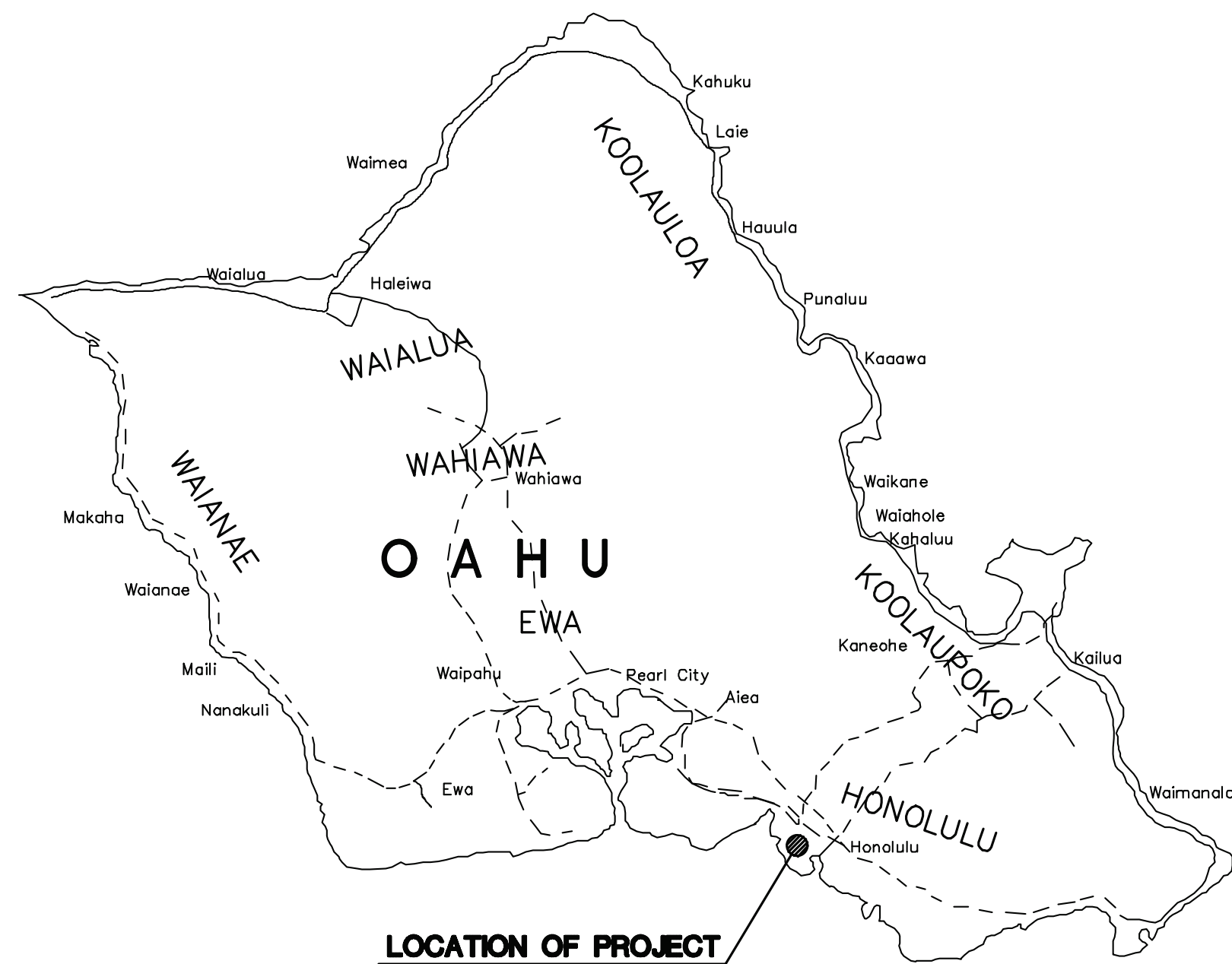


# HONOLULU HARBOR, PIERS 52-53, REPAIR TRENCH DRAINS, OAHU, HAWAII

FOR THE  
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HARBORS  
S10948

**CONSULTANTS:**

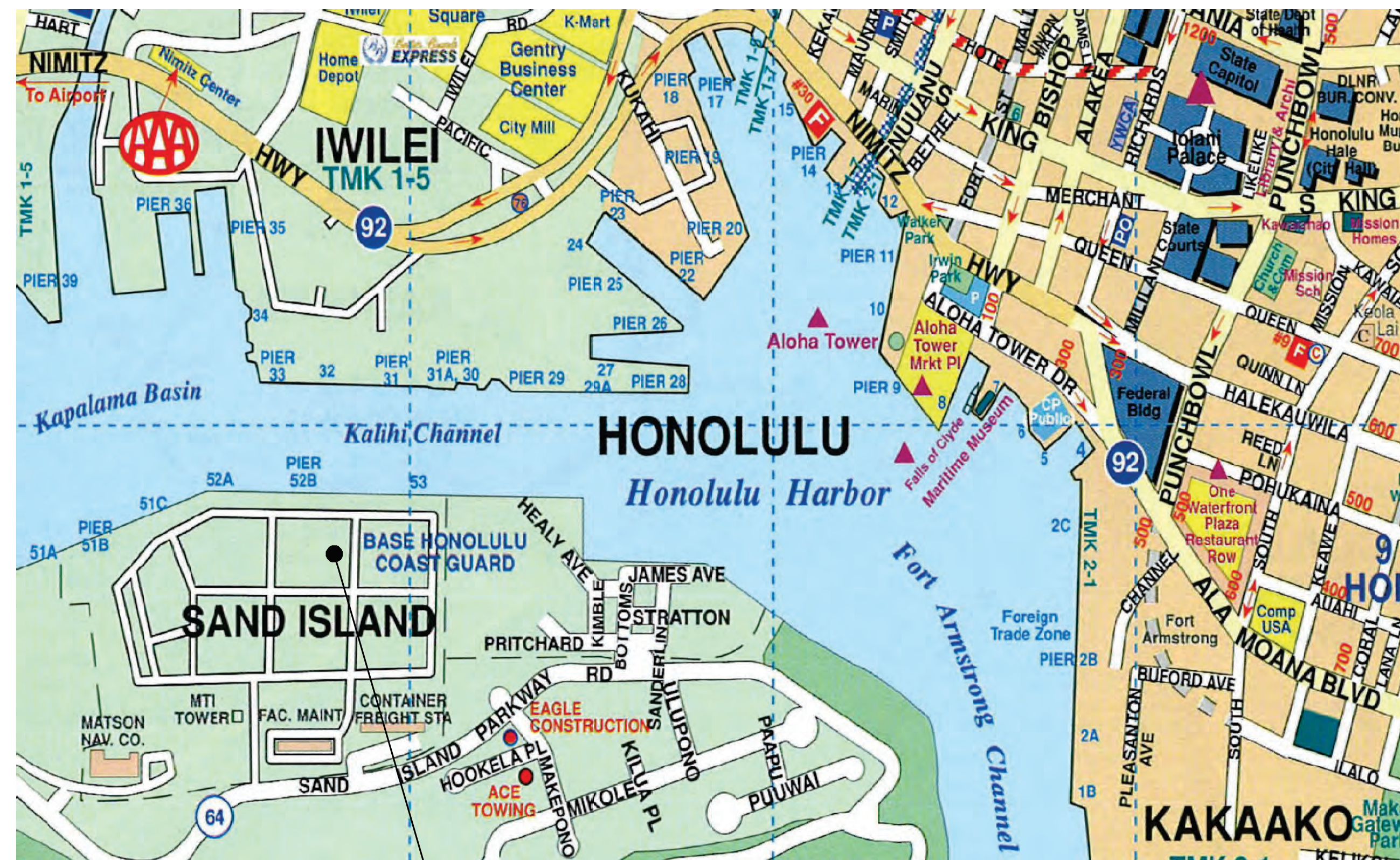
**MKE ASSOCIATES LLC**  
STRUCTURAL ENGINEER



**ISLAND OF OAHU**

**LOCATION MAP**

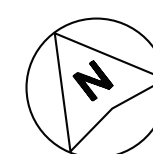
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**PROJECT SITE**

**VICINITY MAP**

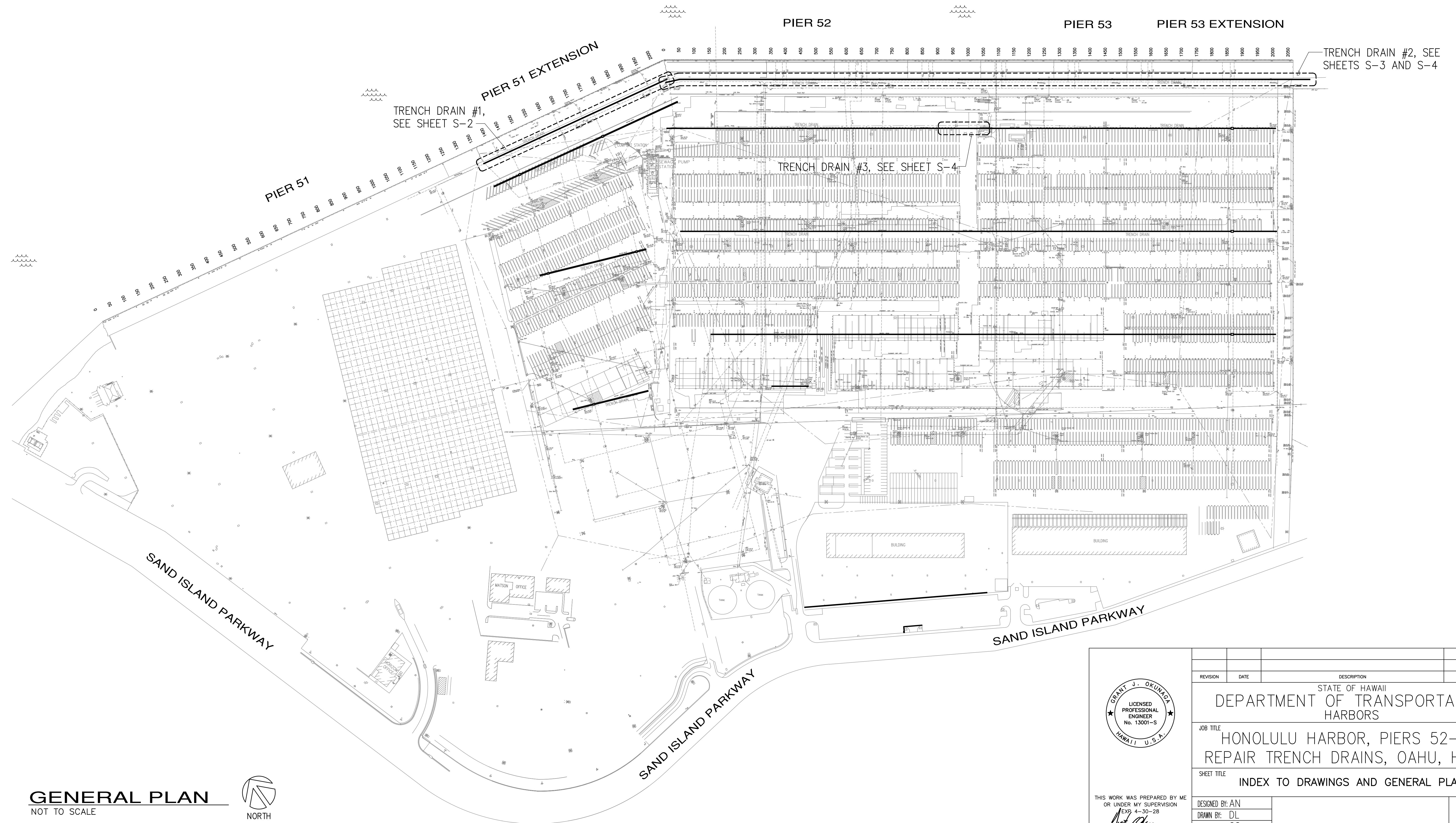
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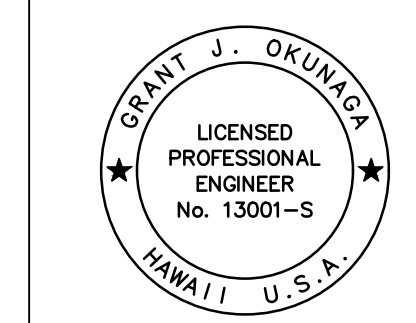
<b>DEPARTMENT OF TRANSPORTATION STATE OF HAWAII</b>		SHEET <b>T-1</b>
APPROVED BY:		04/14/2026
FOR DIRECTOR OF TRANSPORTATION		DATE
		1 of 9 SHEETS

# INDEX TO DRAWINGS

SHEET NO.	TITLE
T-1	TITLE SHEET, LOCATION AND VICINITY MAPS
T-2	INDEX TO DRAWINGS AND GENERAL PLAN
S-1	STRUCTURAL NOTES
S-2	TRENCH DRAIN #1 PLAN
S-3	TRENCH DRAIN #2 PLAN
S-4	TRENCH DRAINS #2 AND #3 PLAN
S-5	REPAIR DETAILS
S-6	REPAIR DETAILS
S-7	REPAIR DETAILS



**GENERAL PLAN**  
NOT TO SCALE



THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION  
EXP. 4-30-28  
*Grant J. Okunaga*  
MKE ASSOCIATES LLC

REVISION	DATE	DESCRIPTION	BY	APPROVED
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS				
JOB TITLE HONOLULU HARBOR, PIERS 52-53, REPAIR TRENCH DRAINS, OAHU, HAWAII				
SHEET TITLE INDEX TO DRAWINGS AND GENERAL PLAN				
DESIGNED BY: AN	JOB NUMBER		SHEET	
DRAWN BY: DL	S10948		T-2	
CHECKED BY: GO				
DATE: 04/2026	2 OF 9 SHEETS			
SCALE: AS SHOWN				

**STRUCTURAL NOTES:**

**GENERAL:**

1. WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE HAWAII STATE BUILDING CODE (2018 EDITION) AND THE HAWAII STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION, 2005, FOR THE STATE OF HAWAII, UNLESS OTHERWISE INDICATED. HOWEVER, SHOULD THERE BE CONFLICTS, OR WHERE REFERENCE IS MADE TO PERFORMANCE CONFORMING TO OTHER STANDARDS THE MORE STRINGENT SHALL APPLY.
2. THE CONTRACTOR SHALL COMPARE PLANS, SPECIFICATIONS AND ALL OTHER CONTRACT DOCUMENTS WITH EACH OTHER AND REPORT IN WRITING TO THE HARBORS CONSTRUCTION ENGINEER ALL INCONSISTENCIES AND OMISSIONS.
3. THE CONTRACTOR SHALL TAKE FIELD MEASUREMENTS AND VERIFY FIELD CONDITIONS AND SHALL COMPARE SUCH FIELD MEASUREMENTS AND CONDITIONS WITH THE DRAWINGS BEFORE COMMENCING WORK. REPORT IN WRITING TO THE HARBORS CONSTRUCTION ENGINEER ALL INCONSISTENCIES AND OMISSIONS.
4. CONTRACTOR SHALL RESOLVE ANY DISCREPANCIES AND QUESTIONS PRIOR TO THE START OF WORK. NO EXTRA PAYMENT SHALL BE ALLOWED ON ACCOUNT OF WORK MADE NECESSARY BY CONTRACTORS FAILURE TO VISIT THE SITE AND/OR FAILURE TO RESOLVE DISCREPANCIES AND QUESTIONS.
5. THE CONTRACTOR SHALL PROTECT ALL UTILITIES AND STRUCTURES IN AND ADJACENT TO THE PROJECT SITE. ANY DAMAGE SHALL BE REPAIRED TO THE SATISFACTION OF THE HARBORS CONSTRUCTION ENGINEER AND PAID FOR BY THE CONTRACTOR.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK OF ALL TRADES.
7. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER CONTRACTORS WITHIN THE PROJECT AREA. THE CONTRACTOR SHALL ALSO COORDINATE WITH THE HARBORS OAHU DISTRICT MANAGER AND CONSTRUCTION ENGINEER FOR AN APPROVED STAGING AND STORAGE AREA AND FOR RESTRICTIONS OF HARBORS OPERATIONS OVER REPAIR AREAS.
8. THE CONTRACTOR SHALL REMOVE ALL DEBRIS RESULTING FROM HIS WORK AS REQUIRED FOR PUBLIC HEALTH AND SAFETY AND TO THE SATISFACTION OF THE HARBORS CONSTRUCTION ENGINEER. SHOULD THE STATE PERFORM ANY OF THE ABOVE WORK DUE TO NON-PERFORMANCE BY THE CONTRACTOR, THE CONTRACTOR AGREES TO REIMBURSE THE STATE FOR ALL COSTS INCURRED.
9. HARBOR OPERATIONS TAKE PRECEDENCE OVER CONSTRUCTION ACTIVITY. THE CONTRACTOR MUST WORK AROUND HARBOR OPERATIONS SO THAT THE PIERS WILL REMAIN OPERATIONAL. WEEKEND WORK MAY BE REQUIRED AND SHALL BE COORDINATED WITH THE HARBORS CONSTRUCTION ENGINEER AND TENANTS IN ADVANCE.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR METHODS OF CONSTRUCTION, WORKMANSHIP AND JOB SAFETY. THE CONTRACTOR SHALL PROVIDE TEMPORARY SHORING AND BRACING AS REQUIRED FOR STABILITY OF STRUCTURAL MEMBERS AND SYSTEMS.
11. ALL WORK SPECIFIED IN THE CONTRACT BUT NOT LISTED SEPARATELY SHALL BE CONSIDERED INCIDENTAL AND WILL NOT BE PAID FOR SEPARATELY.
12. THE CONTRACTOR SHALL COMPLY WITH THE CLEAN WATER ACT AND THE STATE HARBORS STORMWATER MANAGEMENT PROGRAM. NO POLLUTANTS ARE ALLOWED TO BE DISCHARGED DIRECTLY OR INDIRECTLY INTO ADJACENT HARBOR WATER, THROUGH THE HARBORS SMALL MS4 OR OTHER POTENTIAL PATHWAYS.
13. THE CONTRACTOR WILL BE RESPONSIBLE FOR REGULATORY FINES OR PENALTIES THAT MAY BE IMPOSED BY ENVIRONMENTAL REGULATORY AGENCIES (USEPA AND/OR STATE DOH) IN THE EVENT OF VIOLATIONS.
14. HARBOR OPERATIONS TAKE PRECEDENCE OVER CONSTRUCTION ACTIVITY. THE CONTRACTOR MUST WORK AROUND THESE OPERATIONS SO THAT THE PIERS WILL REMAIN OPERATIONAL. WEEKEND WORK MAY BE REQUIRED.
15. THE CONTRACTOR SHALL SUBMIT A SITE-SPECIFIC BEST MANAGEMENT PRACTICES (BMP) PLAN TO THE HARBORS ENGINEERING BRANCH FOR REVIEW AND ACCEPTANCE PRIOR TO THE START OF ANY CONSTRUCTION WORK. THIS BMP PLAN SHALL COMPLY WITH THE TEMPORARY WATER POLLUTION, DUST, AND EROSION CONTROL ARTICLE IN THE SPECIFICATIONS AND PROPOSAL.
16. IN CASE OF SPILL, LEAK OR OTHER RELEASE CONTAINING A HAZARDOUS SUBSTANCE OR OIL, THE CONTRACTOR SHALL NOTIFY APPROPRIATE FACILITY PERSONNEL, EMERGENCY RESPONSE AGENCIES, AND REGULATORY AGENCIES FOLLOWING NOTIFICATION PROCEDURES, AND SHALL NOTIFY THE HARBORS CONSTRUCTION ENGINEER AND ENVIRONMENTAL HOTLINE (808-587-1962) IMMEDIATELY (I.E., WITHIN 24 HOURS). SUCH CONTACT INFORMATION MUST BE IN LOCATIONS THAT ARE READILY ACCESSIBLE AND AVAILABLE.
17. THIS PROJECT IS SUBJECT TO THE REQUIREMENTS OF THE STATE HARBORS CONSTRUCTION SITE RUNOFF CONTROL PROGRAM, INCLUDING PROJECT REVIEW AND BEST MANAGEMENT PRACTICE (BMP) INSPECTIONS. OBTAIN PRIOR CONSENT FROM STATE HARBORS AND KEEP HARBORS ENGINEERING BRANCH ENVIRONMENTAL SECTION INFORMED WHEN THE CONSTRUCTION SITE IS READY FOR THE INITIAL BMP INSPECTION AT LEAST THREE (3) WORKING DAYS IN ADVANCE TO ENSURE THAT ALL NECESSARY AND PROPER STORMWATER POLLUTION PREVENTION MEASURES BE IN PLACE, WHICH WILL BE FOLLOWED BY RECURRING BMP INSPECTIONS (ONCE EVERY TWO MONTHS FROM APRIL TO SEPTEMBER AND ONCE EVERY TWO WEEKS FROM OCTOBER TO MARCH) AND FINAL BMP INSPECTION (UPON COMPLETION OF THIS PROJECT).

**CONCRETE:**

1. CONCRETE CONSTRUCTION SHALL CONFORM TO AMERICAN CONCRETE INSTITUTE ACI 318R-14 AND ACI 546R-14.
2. FORMED CONCRETE SHALL HAVE A 28-DAY COMPRESSIVE STRENGTH OF  $f'_c=5,000$  PSI WITH SILICA FUME AND CORTEC MCI 2005 NS MIGRATING CORROSION INHIBITING ADMIXTURE, OR APPROVED EQUAL.
3. MAXIMUM AGGREGATE SIZE SHALL BE  $\frac{3}{8}$  INCHES AND SHALL BE COORDINATED WITH CONCRETE PREPARATION PROCEDURES FOR SPALL REPAIRS.
4. 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.
5. MAXIMUM WATER TO CEMENTITIOUS MATERIALS RATIO SHALL BE 0.40.
6. REINFORCING BARS, ANCHOR BOLTS, INSERTS, AND OTHER ITEMS TO BE CAST IN THE CONCRETE SHALL BE SECURED IN POSITION PRIOR TO PLACEMENT OF CONCRETE.
7. POLYMER MODIFIED REPAIR MORTAR FOR SEAT ANGLE REPAIRS SHALL BE SIKATOP 122 PLUS, OR APPROVED EQUAL. MAX  $\frac{3}{8}$  IN. HARD ROCK AGGREGATE THAT IS CLEANED, WASHED, AND PREDAMPENED SHALL BE ADDED AT THE MANUFACTURER'S RECOMMENDED RATE TO EXTEND THE REPAIR MORTAR FOR DEEPER REPAIRS.
8. PATCHING COMPOUND FOR REPAIRING VERTICAL IN LIFTS SHALL BE SIKAQUICK VOH WITH LATEX R BY SIKA, OR APPROVED EQUAL.
9. THE CONCRETE REPAIR EDGES SHALL BE SQUARED BY SAW-CUTTING AND CHIPPING THE CONCRETE AT THE PERIMETER BEYOND THE REMOVAL AREA AS NECESSARY TO ATTAIN A MINIMUM DEPTH OF  $\frac{3}{4}$  IN. AND TO PREVENT FEATHER EDGE CONDITIONS. EXERCISE GREAT CARE TO AVOID CUTTING OR DAMAGING ANY EXISTING EMBEDDED REINFORCING STEEL. ANGLES BETWEEN ADJACENT SAW-CUTS AROUND THE PERIMETER SHALL NOT BE LESS THAN 90 DEGREES AND THE SHAPE OF EACH PATCH SHALL NOT BE IRREGULAR.
10. EXISTING CONCRETE SURFACES WITHIN THE REPAIR AREAS SHALL BE ROUGHENED TO MIN  $\frac{1}{4}$  IN. AMPLITUDE TO ENSURE PROPER ADHESION WITH REPAIR MORTAR.
11. THE PATCH AREA SHALL BE CLEANED OF ALL DUST AND DEBRIS JUST PRIOR TO PATCHING WITH HIGH PRESSURE, OIL-FREE COMPRESSED AIR.
12. PRIOR TO PLACEMENT OF REPAIR MORTAR, ALL SUBSTRATE SURFACES SHALL BE WASHED WITH CLEAN WATER AND THE EXPOSED CONCRETE SURFACE SHALL BE SATURATED WITH NO WATER ACCUMULATION ON THE SURFACE.
13. A SLURRY COAT OF THE REPAIR MORTAR SHALL BE USED TO PRIME THE SUBSTRATE. FOR VERTICAL REPAIRS THE REPAIR MORTAR SHALL BE APPLIED IN LIFTS PER MANUFACTURER'S RECOMMENDATIONS.
14. REPAIR MORTAR SHALL BE VIBRATED, RODDED OR TAMPED DURING PLACEMENT TO CONSOLIDATE THE POUR AND FILL ALL CORNERS OF THE PATCH OR FORM AND AROUND THE REINFORCING.
15. THERE SHALL BE NO COLD JOINTS IN THE FIELD OF THE REPAIR.
16. ALL CONCRETE REPAIRS SHALL BE BUILT UP TO THE ORIGINAL SURFACE.
17. THE SURFACE FINISH SHALL MATCH THE ORIGINAL SURFACE FINISH.
18. CONCRETE REPAIRS SHALL BE CURED BY COVERING THE SURFACE WITH A CURING COMPOUND APPROVED BY THE CONSTRUCTION ENGINEER.
19. CONCRETE REPAIRS SHALL NOT BE SUBJECTED TO LIVE LOADS UNTIL THE REPAIR HAS BEEN ALLOWED TO CURE FOR 3 DAYS.

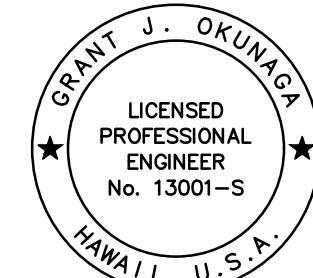
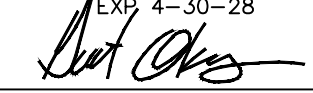
**SEAT ANGLE VOID REPAIRS:**

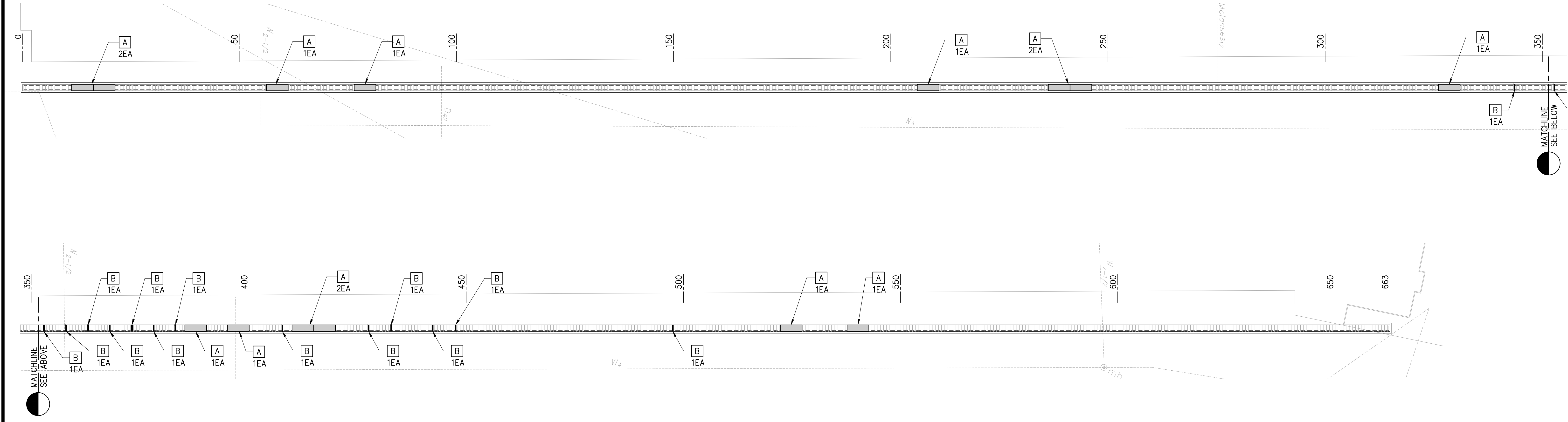
1. EPOXY REPAIR GROUT FOR SEAT ANGLE VOID REPAIRS SHALL BE SIKADUR 22 LO-MOD BY SIKA CORP., OR APPROVED EQUAL MIXED WITH 1.5 PARTS OF 20 MESH SILICA SAND. EPOXY REPAIR GROUT SHALL BE SEMI-SELF-LEVELING AND FLOWABLE.

**STRUCTURAL STEEL:**

1. FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION MANUAL OF STEEL CONSTRUCTION, FIFTEENTH EDITION.
2. STRUCTURAL STEEL BARS FOR TRENCH DRAIN GRATING SHALL CONFORM TO ASTM A36 UNLESS NOTED OTHERWISE.
3. WELDS AND WELDING PROCEDURES SHALL CONFORM TO THE STRUCTURAL WELDING CODES AWS D1.1 OF THE AMERICAN WELDING SOCIETY.
4. WELDING SHALL BE PERFORMED BY WELDERS PREQUALIFIED FOR WELDING PROCEDURES TO BE USED.
5. WELDING ELECTRODES SHALL HAVE AN ULTIMATE TENSILE STRENGTH OF 70 KSI.
6. TRENCH DRAIN GRATING AND HATCH COVERS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION.

Printed: April 28, 2026, 10:24am

 <p>THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION                  EXP. 4-30-28                    MKE ASSOCIATES LLC</p>	REVISION	DATE	DESCRIPTION	BY	APPROVED
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS				
	JOB TITLE HONOLULU HARBOR, PIERS 52-53, REPAIR TRENCH DRAINS, OAHU, HAWAII				
	SHEET TITLE STRUCTURAL NOTES				
	DESIGNED BY: AN				SHEET <b>S-1</b>
DRAWN BY: DL				JOB NUMBER <span style="font-size: 24pt;">S10948</span>	
CHECKED BY: GO					
DATE: 04/2026					
SCALE: AS SHOWN				3 of 9 SHTS.	

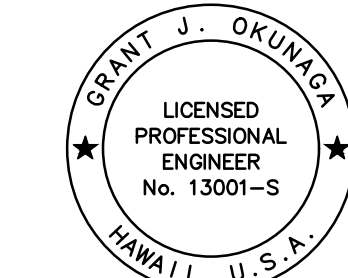


LEGEND:

- INDICATES FOOT MARKER ALONG TRENCH DRAIN
- INDICATES CALLOUT OF REPAIR TYPE
- REPLACE GRATING (TYPE A), SEE 1/S-6
- GRATING BAR REPAIR DETAILS (TYPE B), SEE DETAIL 2/S-6
- EA EACH

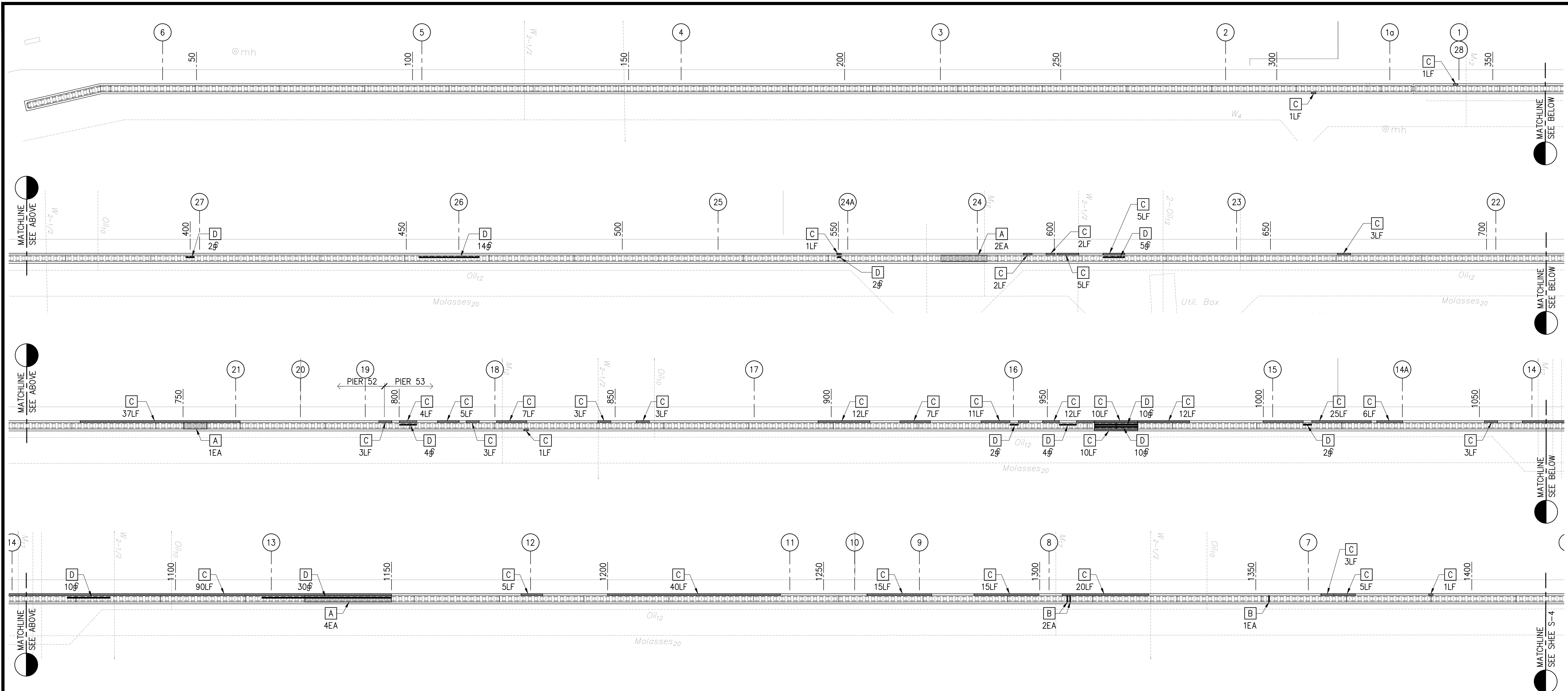
TRENCH DRAIN #1 PLAN

SCALE: 3/32" = 1'-0"



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OR UNDER MY SUPERVISION  
EXP. 4-30-28  
*Grant J. Okuniga*  
MKE ASSOCIATES LLC

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SHEET TITLE TRENCH DRAIN #1 PLAN				
DESIGNED BY: AN	JOB NUMBER			SHEET
DRAWN BY: DL	S10948			S-2
CHECKED BY: GO				
DATE: 04/2026	4			9
SCALE: AS SHOWN				SHTS.



- LEGEND:**
- INDICATES BENT NUMBERING LOCATION ON ADJACENT PIER
  - INDICATES DOCK MARKER LOCATION ON ADJACENT PIER
  - INDICATES CALLOUT OF REPAIR TYPE
  - REPLACE GRATING (TYPE A), SEE DETAIL 1/S-6
  - GRATING BAR REPAIR (TYPE B), SEE DETAIL 2/S-6
  - SEAT ANGLE REPAIR (TYPE C), SEE DETAIL 3/S-6
  - VERTICAL SPALL REPAIR (TYPE D), SEE DETAIL 1/S-7

- ⊠ SQUARE FEET
  - LF LINEAR FEET
  - EA EACH
- NOTE:**
- APPROXIMATE QUANTITY FOR EACH REPAIR ARE LISTED BELOW THE REPAIR CALLOUT.

**TRENCH DRAIN #2 PLAN**  
 SCALE: 3/32" = 1'-0"



GRANT J. OKUNAGA  
 LICENSED PROFESSIONAL ENGINEER  
 No. 13001-S  
 HAWAII, U.S.A.

REVISION	DATE	DESCRIPTION	BY	APPROVED

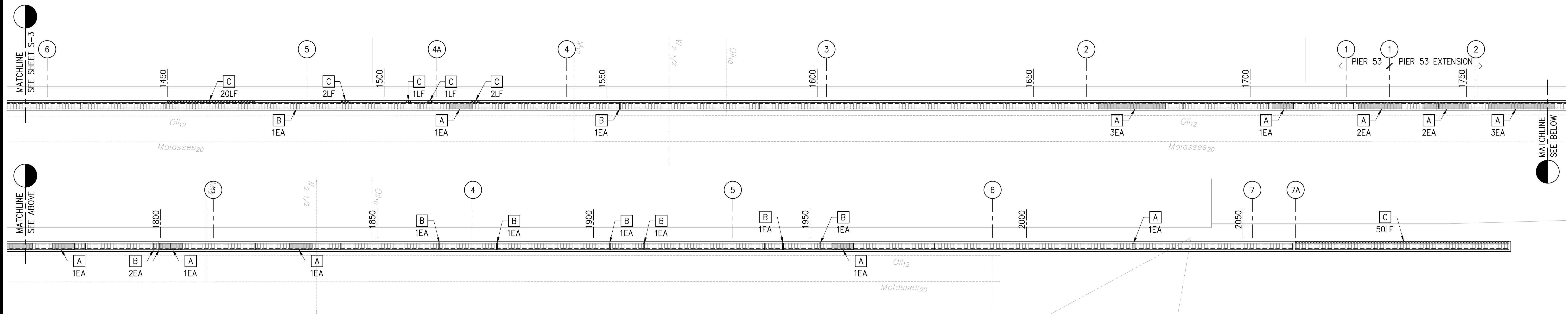
STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HARBORS

JOB TITLE  
 HONOLULU HARBOR, PIERS 52-53,  
 REPAIR TRENCH DRAINS, OAHU, HAWAII

SHEET TITLE  
 TRENCH DRAIN #2 PLAN

DESIGNED BY: AN	SHEET
DRAWN BY: DL	<b>S-3</b>
CHECKED BY: GO	JOB NUMBER <b>S10948</b>
DATE: 04/2026	
SCALE: AS SHOWN	5 of 9 SHEETS

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LEGEND:

- INDICATES BENT NUMBERING LOCATION ON ADJACENT PIER
- INDICATES DOCK MARKER LOCATION ON ADJACENT PIER
- INDICATES CALLOUT OF REPAIR TYPE
- REPLACE GRATING (TYPE A), SEE DETAIL 1/S-6
- GRATING BAR REPAIR (TYPE B), SEE DETAIL 2/S-6
- SEAT ANGLE REPAIR (TYPE C), SEE DETAIL 3/S-6

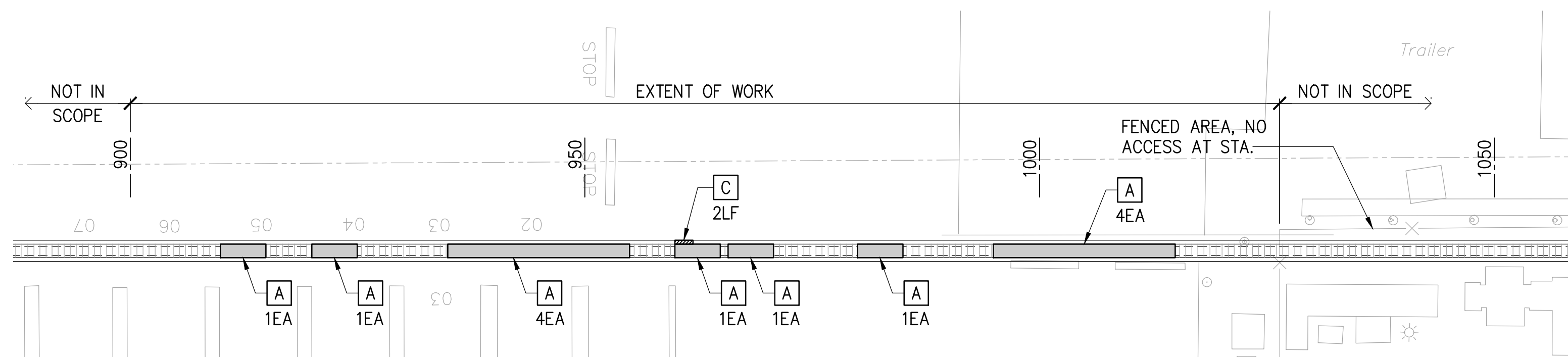
- ⊠ SQUARE FEET
- LF LINEAR FEET
- EA EACH

NOTE:

1. APPROXIMATE QUANTITY FOR EACH REPAIR ARE LISTED BELOW THE REPAIR CALLOUT.

TRENCH DRAIN #2 PLAN

SCALE: 3/32" = 1'-0"



LEGEND:

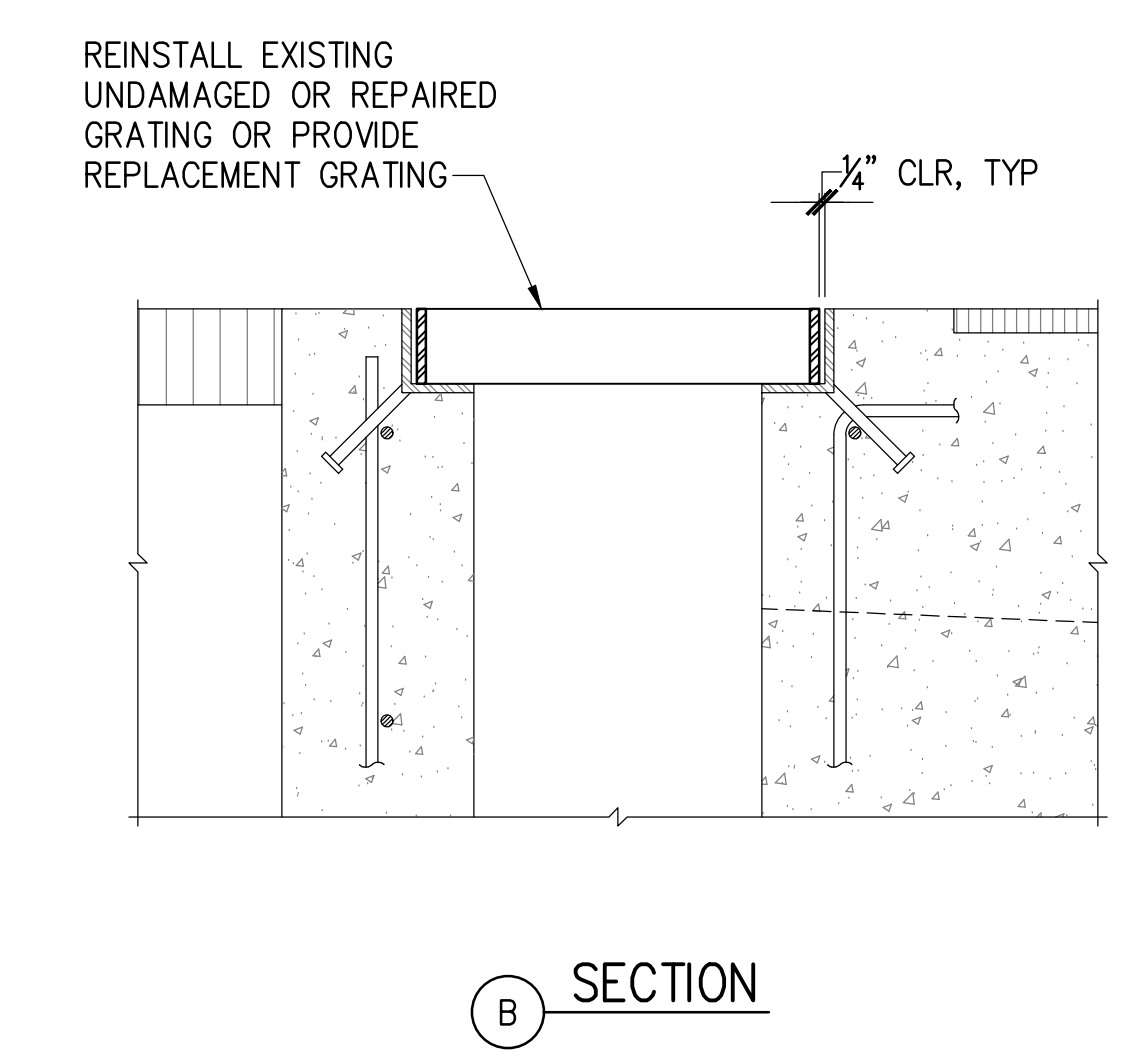
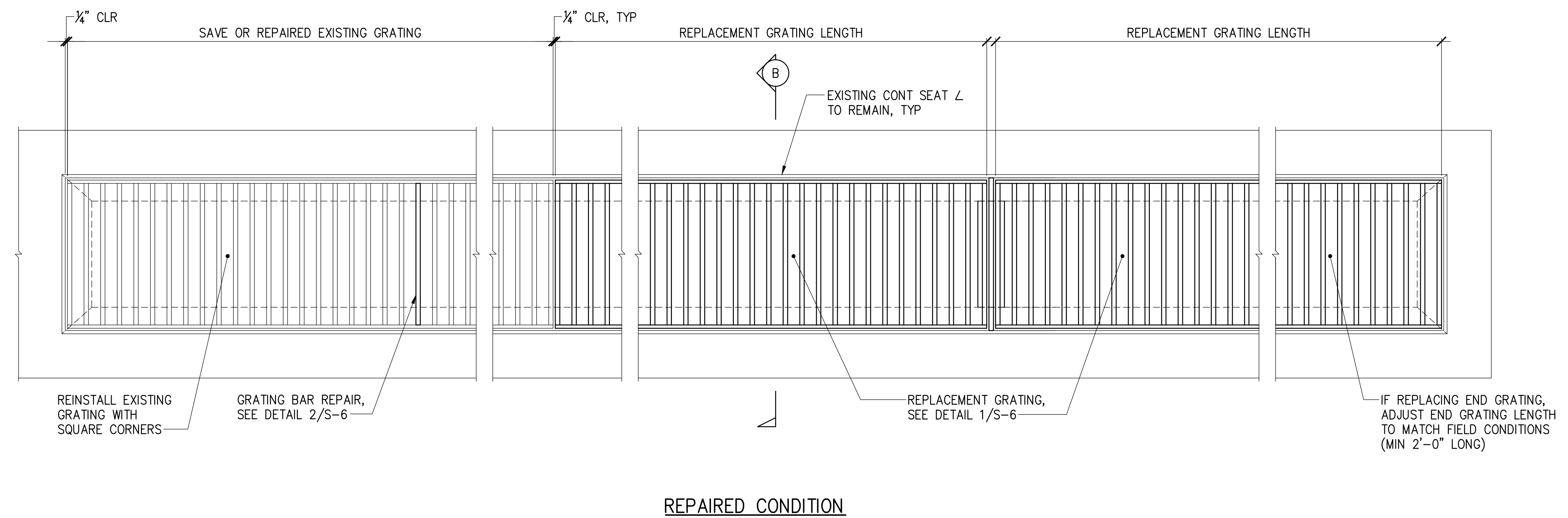
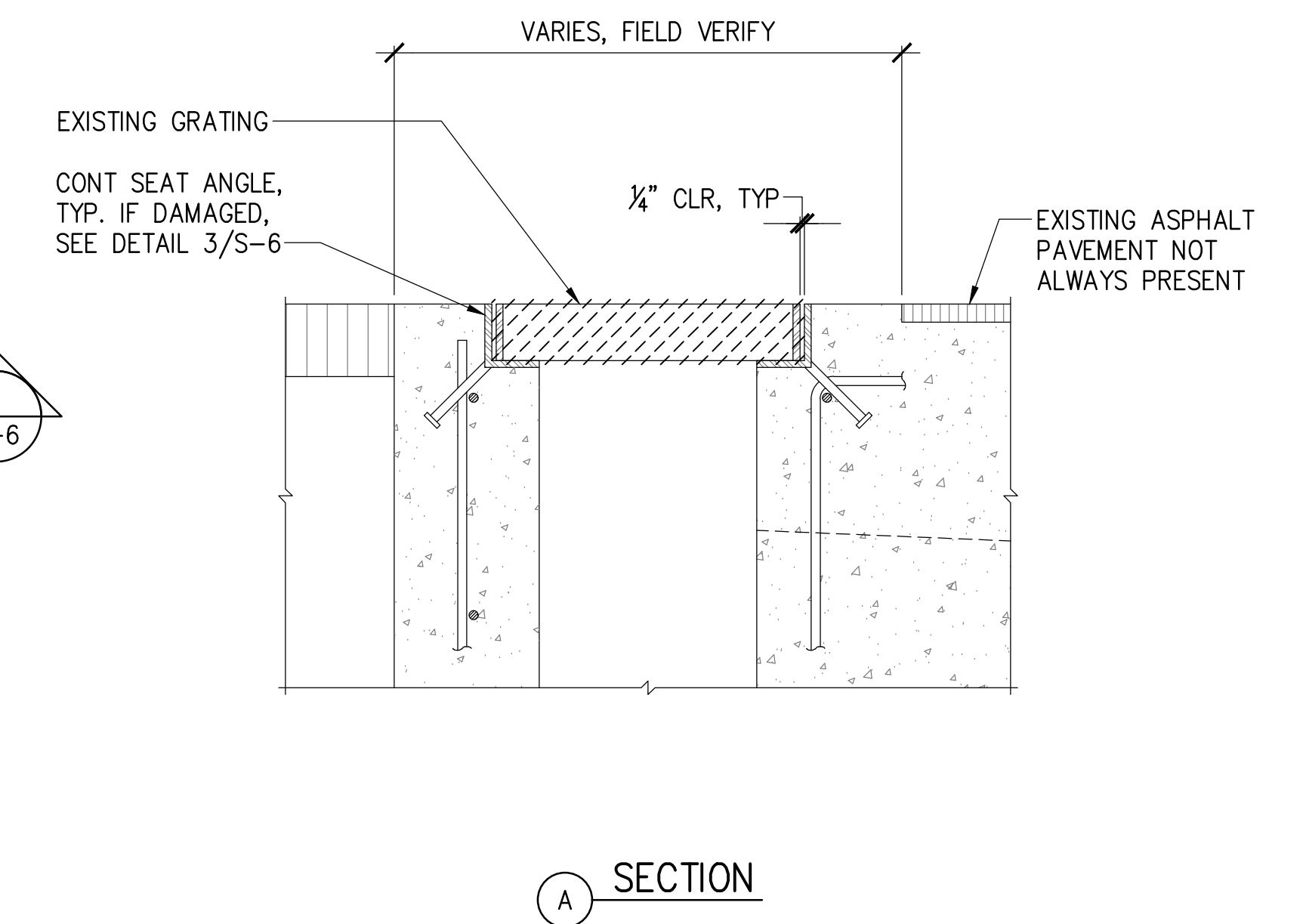
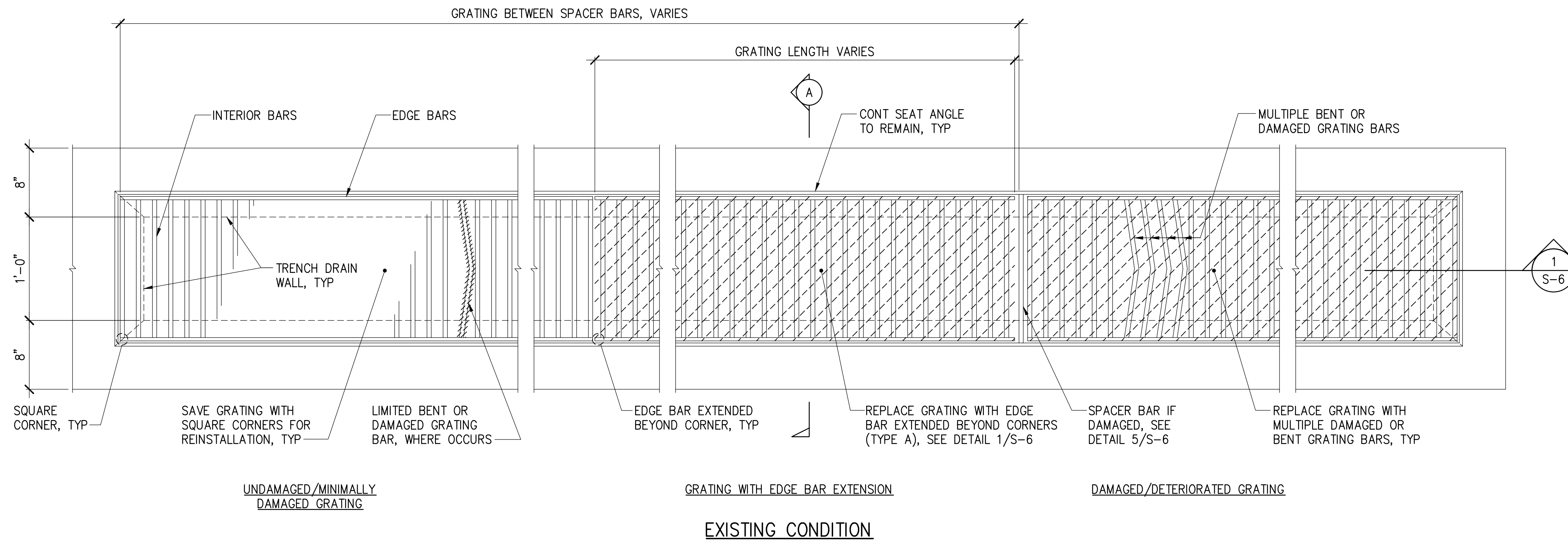
- INDICATES FOOT MARKER ALONG TRENCH DRAIN
- INDICATES CALLOUT OF REPAIR TYPE
- REPLACE GRATING (TYPE A), SEE 1/S-6
- EA EACH

TRENCH DRAIN #3 PLAN

SCALE: 3/32" = 1'-0"



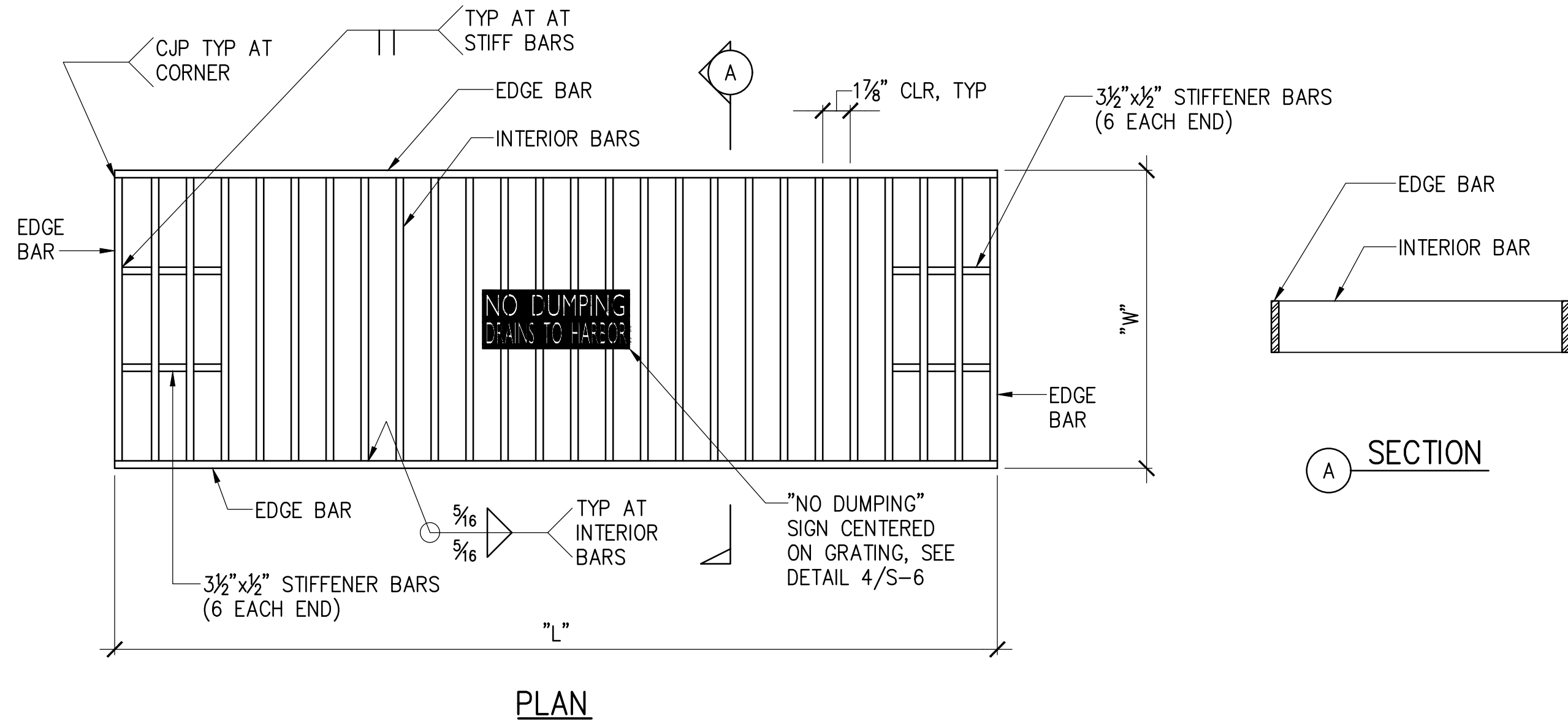
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	JOB TITLE HONOLULU HARBOR, PIERS 52-53, REPAIR TRENCH DRAINS, OAHU, HAWAII				
	SHEET TITLE TRENCH DRAINS #2 AND #3 PLAN				
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CHECKED BY: GO		DATE: 04/2026		SCALE: AS SHOWN	
DATE: 04/2026		SCALE: AS SHOWN		6 OF 9 SHEETS	



**GRATING REPAIR NOTES:**

1. CONTRACTOR SHALL PERFORM THE TRENCH DRAIN WORK IN PHASES TO MINIMIZE SHUTDOWN OF THE ADJACENT AREA AND PIERS.
2. CONTRACTOR SHALL SURVEY THE GRATINGS AND CONSULT WITH THE HARBORS CONSTRUCTION ENGINEER ON THE QUANTITY OF REPLACEMENT GRATING PRIOR TO ORDERING.
3. EXISTING DAMAGED GRATING SHALL BE BROUGHT TO THE ATTENTION OF THE HARBORS CONSTRUCTION ENGINEER. BASED ON THE CONTRACTOR'S UNIT COST BID FOR GRATING BAR REPAIRS, THE CONSTRUCTION ENGINEER SHALL DECIDE WHETHER DAMAGED GRATING IS TO BE REPAIRED AND REINSTALLED OR REPLACED WITH A REPLACEMENT GRATING.
4. CAREFULLY REMOVE AND SAVE EXISTING UNDAMAGED OR MINIMALLY DAMAGED GRATING FOR REINSTALLATION.
5. GRATING NOT REINSTALLED SHALL BE INSPECTED BY THE HARBORS CONSTRUCTION ENGINEER AND HE/SHE SHALL DETERMINE IF GRATING NOT TO BE REINSTALLED WILL BE SALVAGED. SALVAGED GRATING SHALL BE DELIVERED BY THE CONTRACTOR TO THE DOT HARBORS OAHU BASEYARD AT 48 SAND ISLAND ACCESS ROAD AT THE CONCLUSION OF THE PROJECT. ALL OTHER GRATING SHALL BE CONSIDERED PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF AWAY FROM THE PROJECT SITE.
6. CONTRACTOR SHALL TAKE FIELD MEASUREMENTS AND ADJUST GRATING LENGTHS AT ENDS OF THE TRENCHES TO FIT.

<p>THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION EXP. 4-30-28 <i>Grant Okuniga</i> MKE ASSOCIATES LLC</p>	REVISION	DATE	DESCRIPTION	BY	APPROVED
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	SHEET TITLE REPAIR DETAILS				
DESIGNED BY: AN	JOB NUMBER			SHEET	
DRAWN BY: DL	S10948			S-5	
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DATE: 04/2026					
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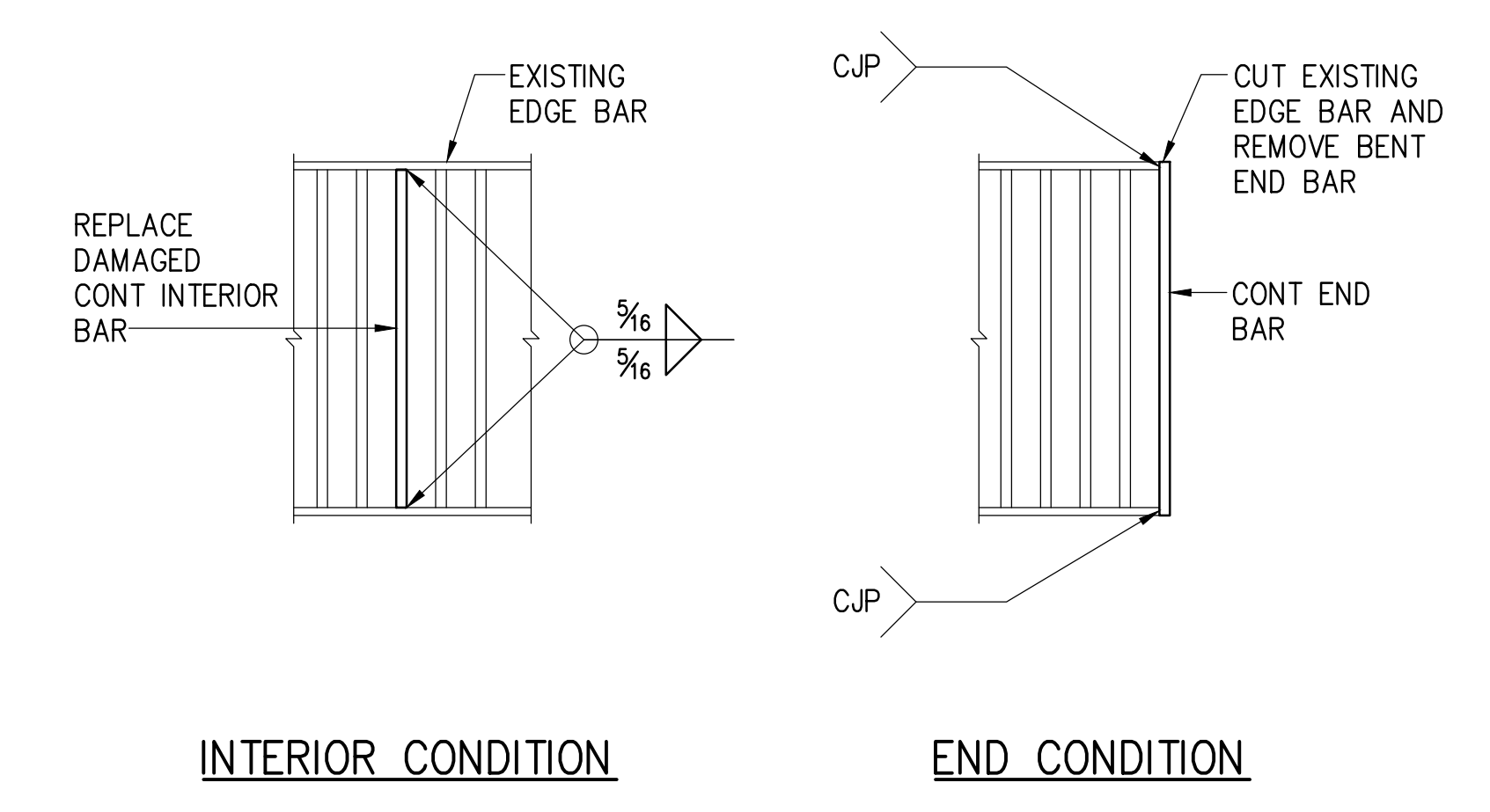


TRENCH DRAIN GRATING REPAIR SCHEDULE			
DRAIN NO.	TYP GRATING LENGTH "L" (FT)	GRATING WIDTH "W" (FT)	INTERIOR AND EDGE BAR (WIDTH x HEIGHT)
1	5'-0"	1'-8 1/4"	1/2" x 3 1/2"
2	5'-0"	1'-4 3/4"	1/2" x 3 3/8"
3	5'-0" OR 10'-0"	1'-10 1/2"	1/2" x 4 1/2"

NOTE:  
1. PAYMENT FOR REPLACEMENT GRATING SHALL BE PER UNIT LENGTH OF REPLACEMENT GRATING.

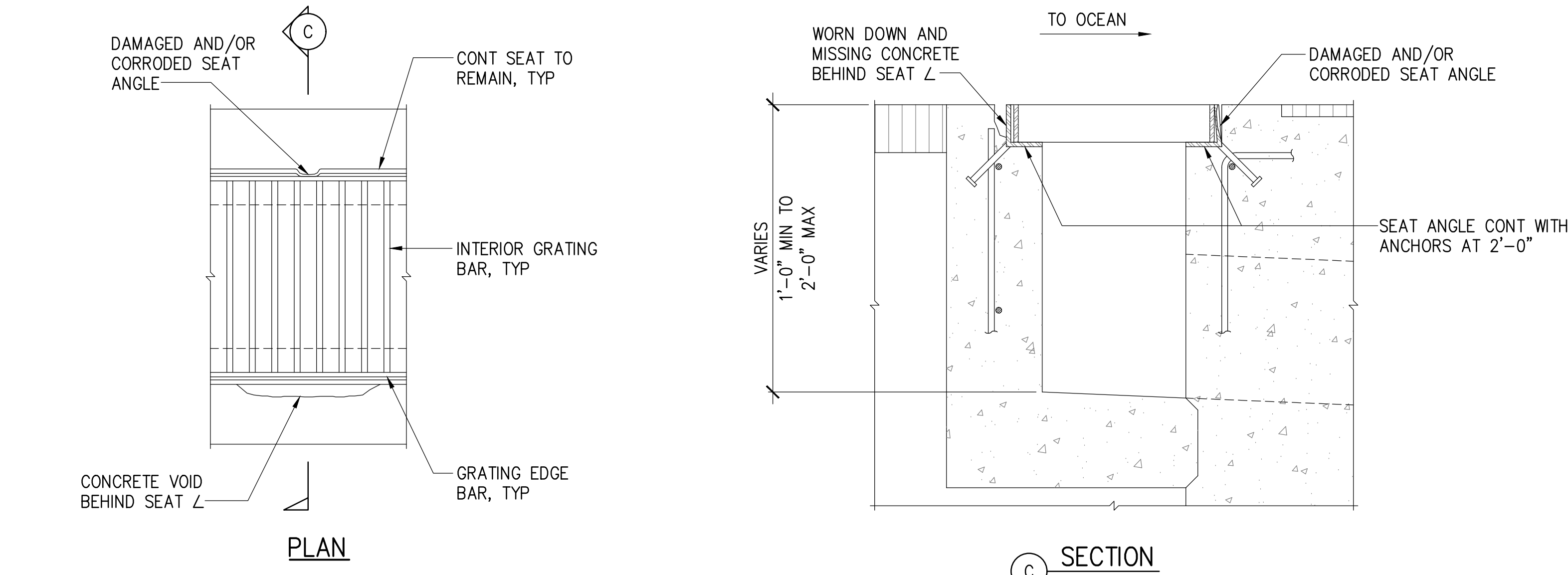
1 REPLACEMENT GRATING DETAIL (TYPE A)  
S-6 SCALE: 1-1/2" = 1'-0"

NOTE:  
1. SEE SCHEDULE FOR GRATE DIMENSIONS.

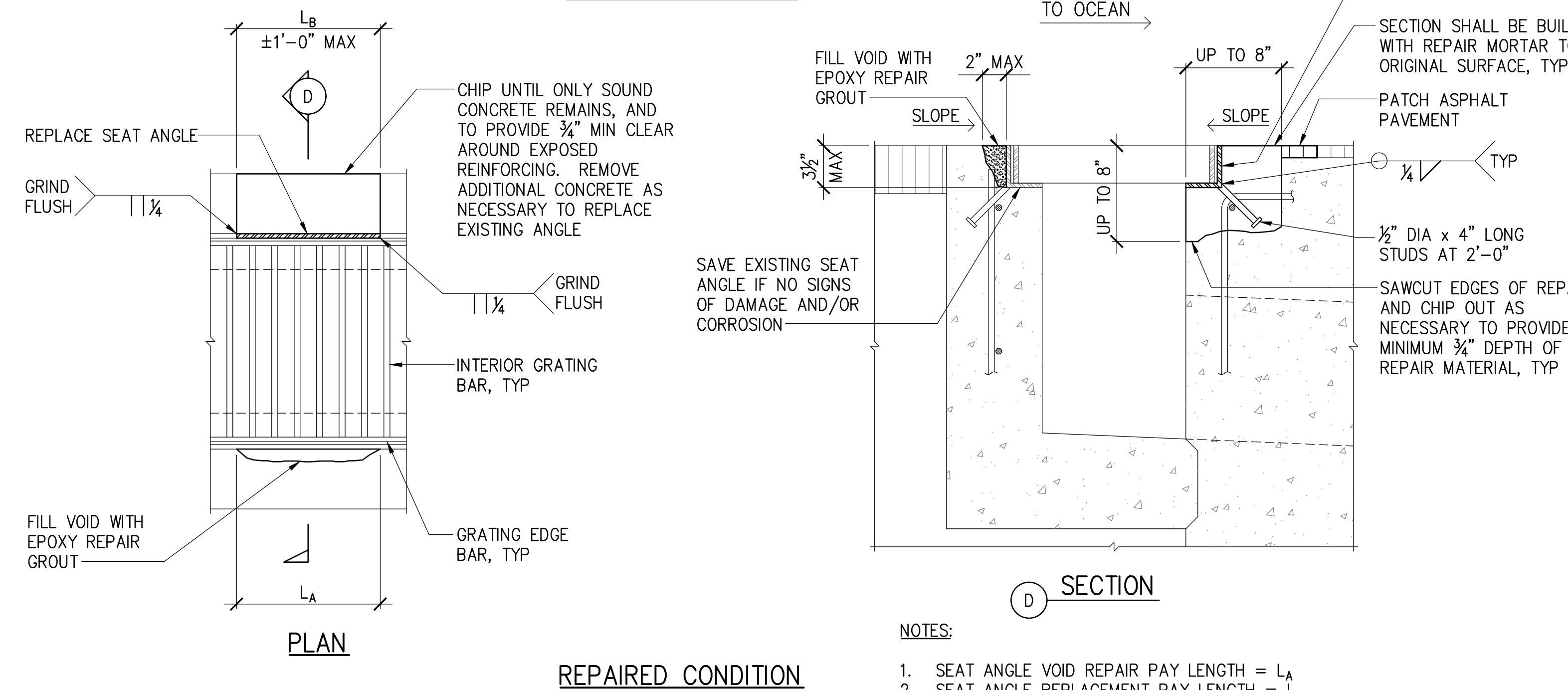


NOTE:  
1. FOR END CONDITION REPAIRS, REPAIRED GRATING SHALL MAINTAIN 4'-10 1/2" LENGTH

2 GRATING BAR REPAIR DETAILS (TYPE B)  
S-6 SCALE: 1-1/2" = 1'-0"



EXISTING CONDITION

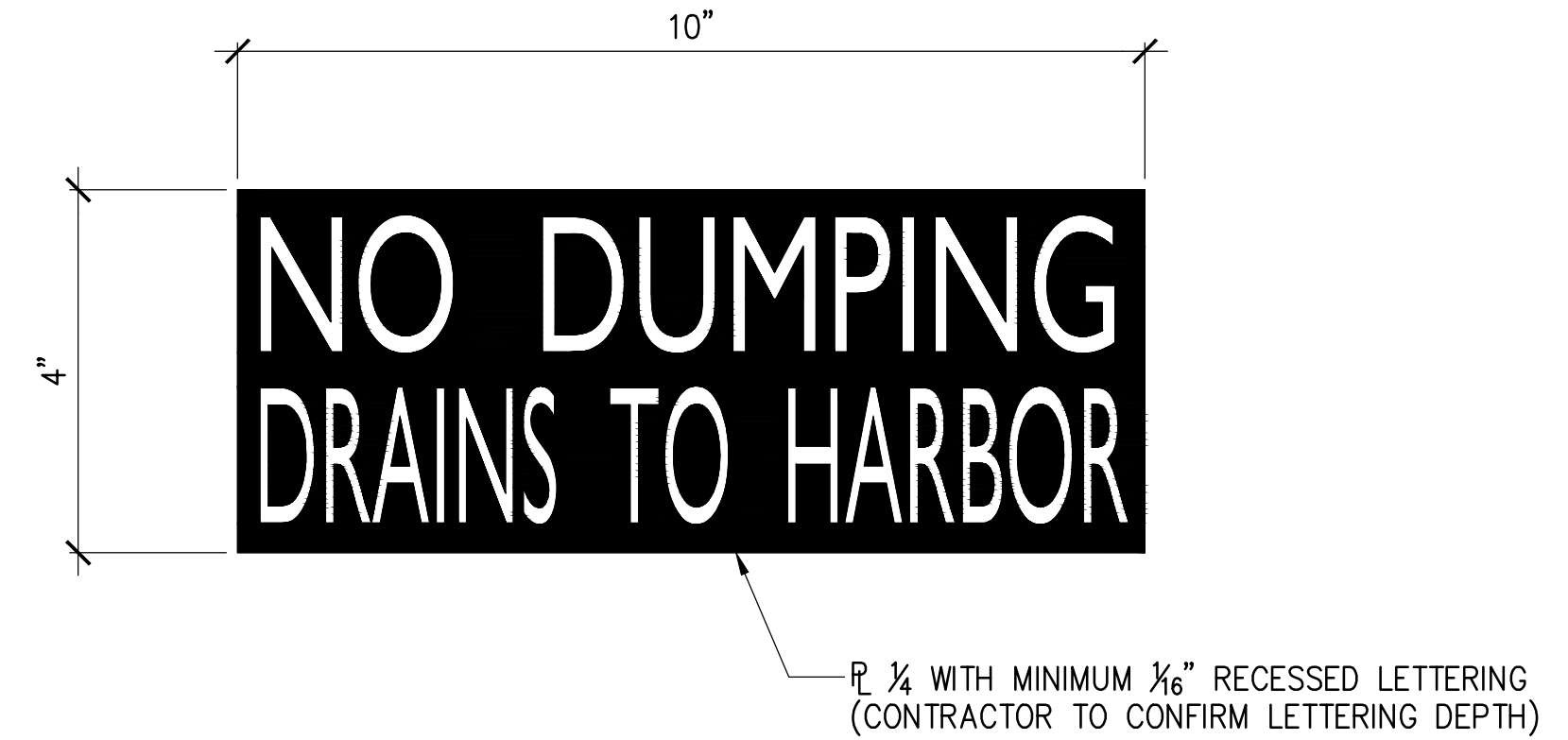


REPAIRED CONDITION

NOTES:  
1. SEAT ANGLE VOID REPAIR PAY LENGTH = L<sub>A</sub>  
2. SEAT ANGLE REPLACEMENT PAY LENGTH = L<sub>B</sub>

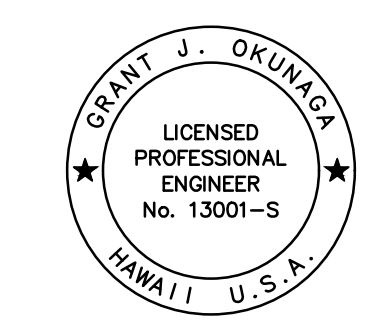
3 SEAT ANGLE REPLACEMENT AND SEAT ANGLE VOID REPAIR DETAILS (TYPE C)  
S-6 SCALE: 1-1/2" = 1'-0"

SEAT ANGLE REPAIR SCHEDULE	
DRAIN NO.	WIDTH x HEIGHT x THICKNESS
1	4" x 4" x 1/2"
2	3 1/2" x 3" x 3/8"
3	5" x 2" x 1/2"



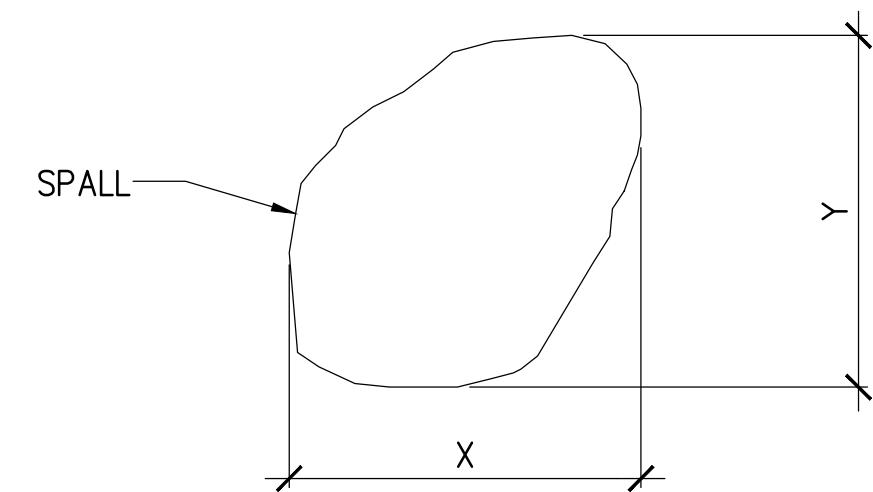
NOTE:  
CONTRACTOR TO PAINT RECESSED LETTERS SAFETY YELLOW AFTER HOT-DIP GALVANIZING.

4 "NO DUMPING" SIGN  
S-6 SCALE: 6" = 1'-0"



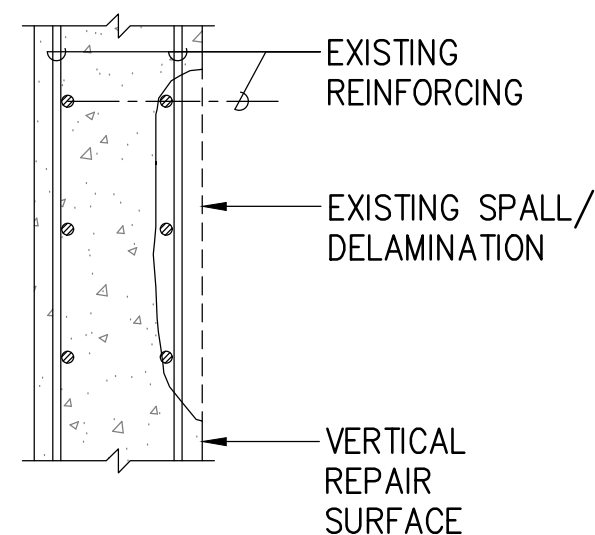
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION  
EXP. 4-30-28  
MKE ASSOCIATES LLC

REVISION	DATE	DESCRIPTION	BY	APPROVED
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS				
JOB TITLE HONOLULU HARBOR, PIERS 52-53, REPAIR TRENCH DRAINS, OAHU, HAWAII				
SHEET TITLE REPAIR DETAILS				
DESIGNED BY: AN	JOB NUMBER		SHEET	
DRAWN BY: DL	S10948		S-6	
CHECKED BY: GO	DATE: 04/2026		8 of 9 SHTS.	
SCALE: AS SHOWN				



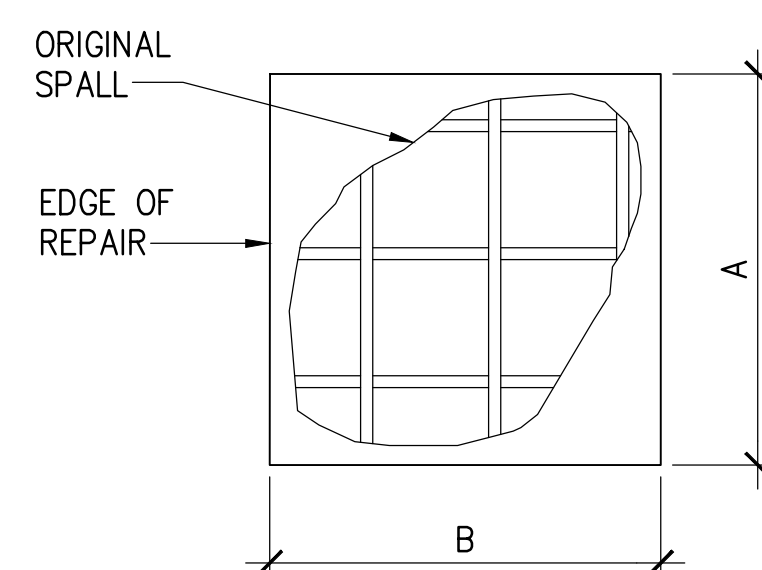
ELEVATION

EXISTING SPALL AREA = X x Y



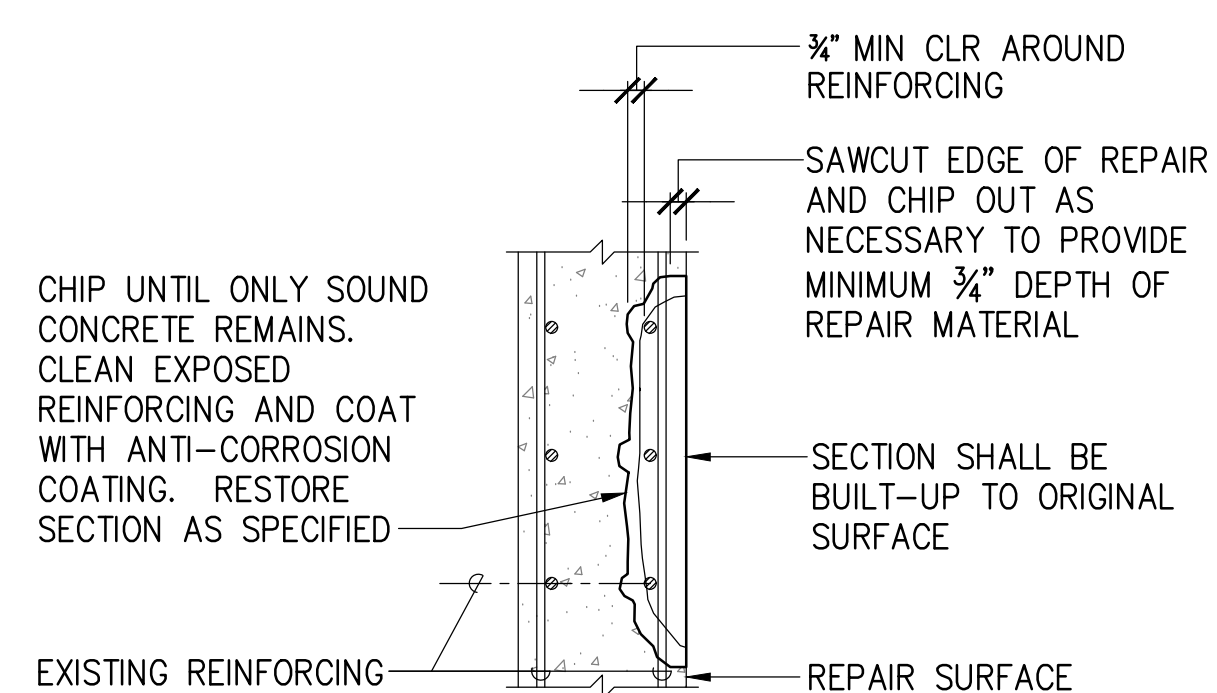
SECTION

EXISTING CONDITION



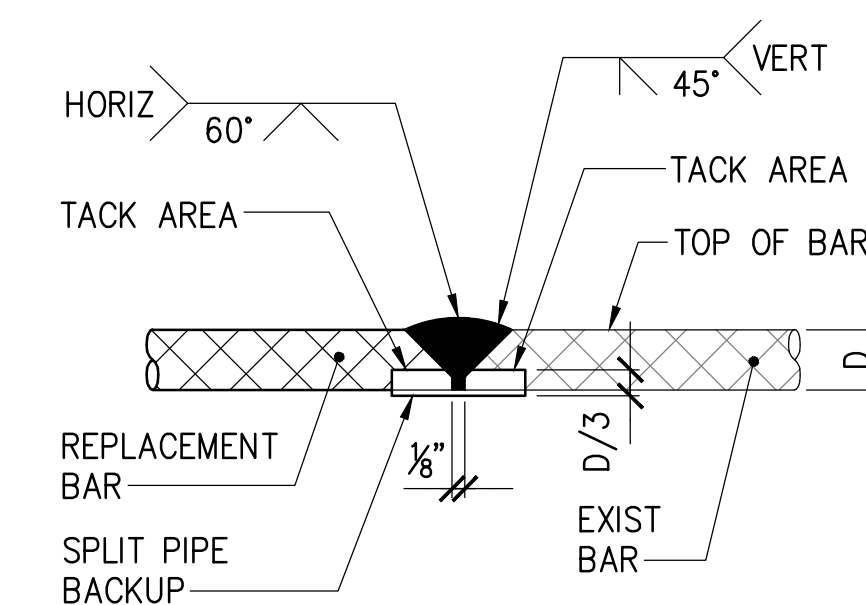
ELEVATION

PAY AREA = A x B



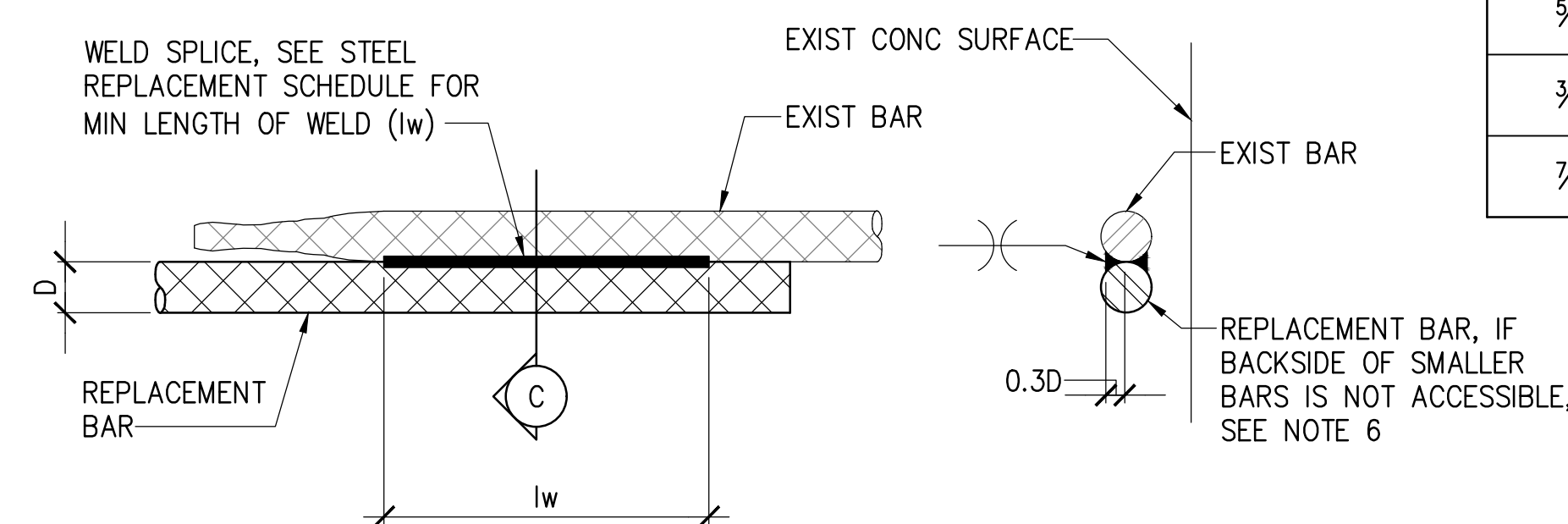
SECTION

REPAIRED CONDITION



(A) BUTT SPLICE

USE DETAIL A FOR #7 BARS AND LARGER



NOTE:  
lw = LENGTH OF WELD EACH SIDE  
(SEE STEEL REPLACEMENT SCHEDULE)

(B) LAP SPLICE

(C) SECTION

USE DETAIL B FOR #6 BARS AND SMALLER

REINFORCING STEEL WELDING NOTES:

1. CHIP, GRIND, OR GOUGE TO SOUND METAL BEFORE WELDING.
2. CLEAN EXIST REBAR AND PREPARE ACCORDING TO SPECIFICATIONS. APPLY COATING AFTER WELDING.
3. SEE STEEL REPLACEMENT SCHEDULE BELOW FOR REPLACEMENT BAR SIZE.
4. USE E70 ELECTRODES.
5. SEE AWS D1.4 FOR WELDING PROCESS AND OTHER DETAILS.
6. FOR WELDING OF #3, #4, AND #5 REPLACEMENT REINFORCING, WELDING MAY BE PERFORMED ON ONE SIDE ONLY, IF lw IS INCREASED TO lw1 AS FOLLOWS

STEEL REPLACEMENT SCHEDULE

SIZE OF EXISTING REINFORCING		SIZE OF REPLACEMENT REINFORCING	MINIMUM LENGTH OF WELD EACH SIDE (lw)	MINIMUM LENGTH OF WELD ONE SIDE lw1
SQUARE	ROUND			
3/8"	#3, #4	#4	2"	4"
1/2"	#5	#5	2 1/2"	5"
5/8"	#6	#6	3 1/2"	-
3/4"	#7	#7	-	-
7/8"	#8	#8	-	-

1 VERTICAL SPALL REPAIR (TYPE D)  
S-7 NOT TO SCALE

2 REINFORCING STEEL SPLICE DETAIL  
S-7 NOT TO SCALE

GRANT J. OKUNIGA  
LICENSED PROFESSIONAL ENGINEER  
No. 13001-S  
HAWAII, U.S.A.

REVISION	DATE	DESCRIPTION	BY	APPROVED
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS				
JOB TITLE HONOLULU HARBOR, PIERS 52-53, REPAIR TRENCH DRAINS, OAHU, HAWAII				
SHEET TITLE REPAIR DETAILS				
DESIGNED BY: AN				SHEET
DRAWN BY: DL				S-7
CHECKED BY: GO				
DATE: 04/2026	JOB NUMBER			
SCALE: AS SHOWN	S10948			

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION  
EXP. 4-30-28  
*[Signature]*  
MKE ASSOCIATES LLC

9 OF 9 SHEETS