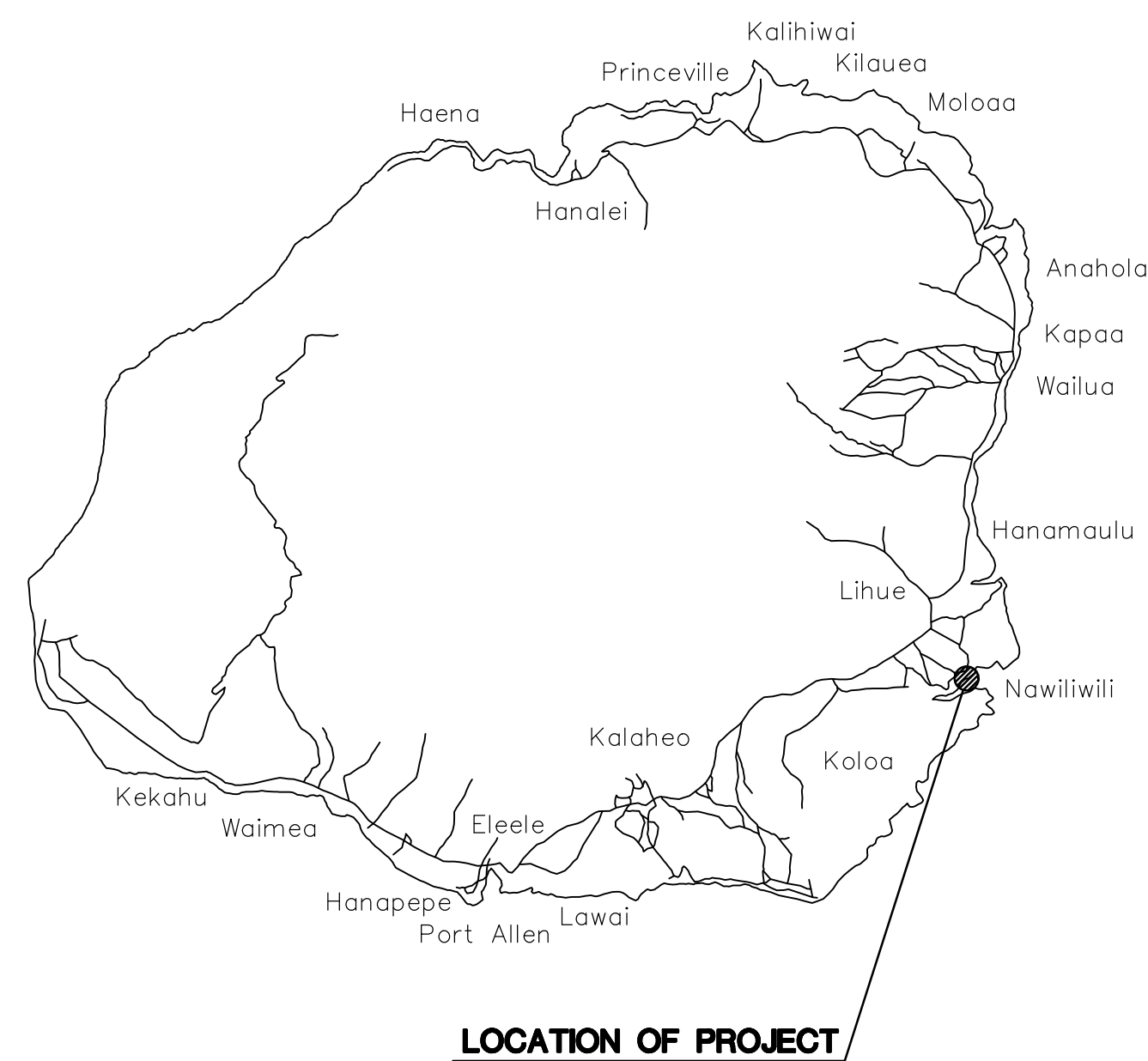


NAWILIWILI HARBOR, BOLLARD REPAIRS, KAUAI, HAWAII

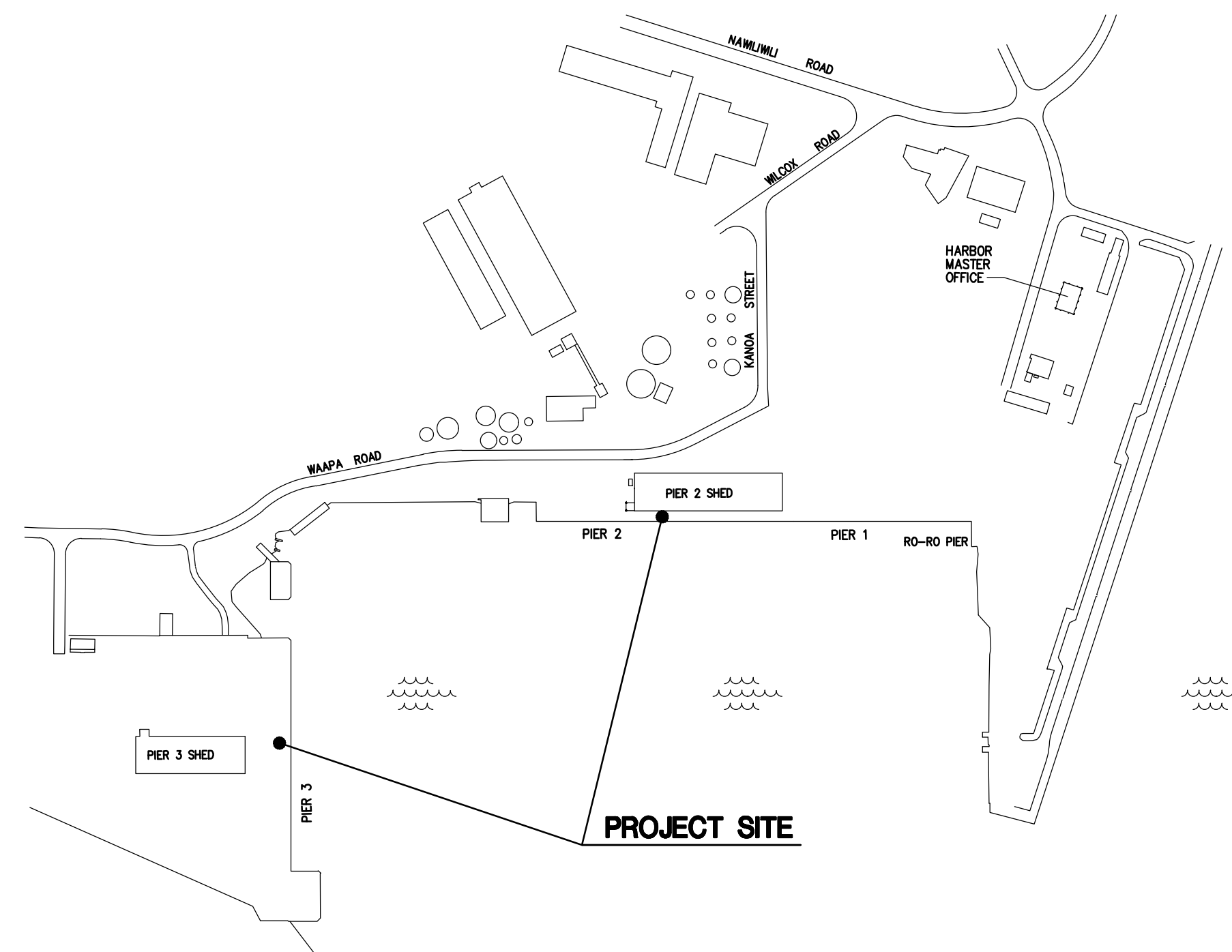
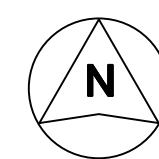
FOR THE
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS
S70171



ISLAND OF KAUAI

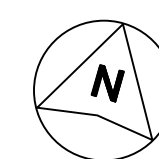
LOCATION MAP

NOT TO SCALE



VICINITY MAP

NOT TO SCALE



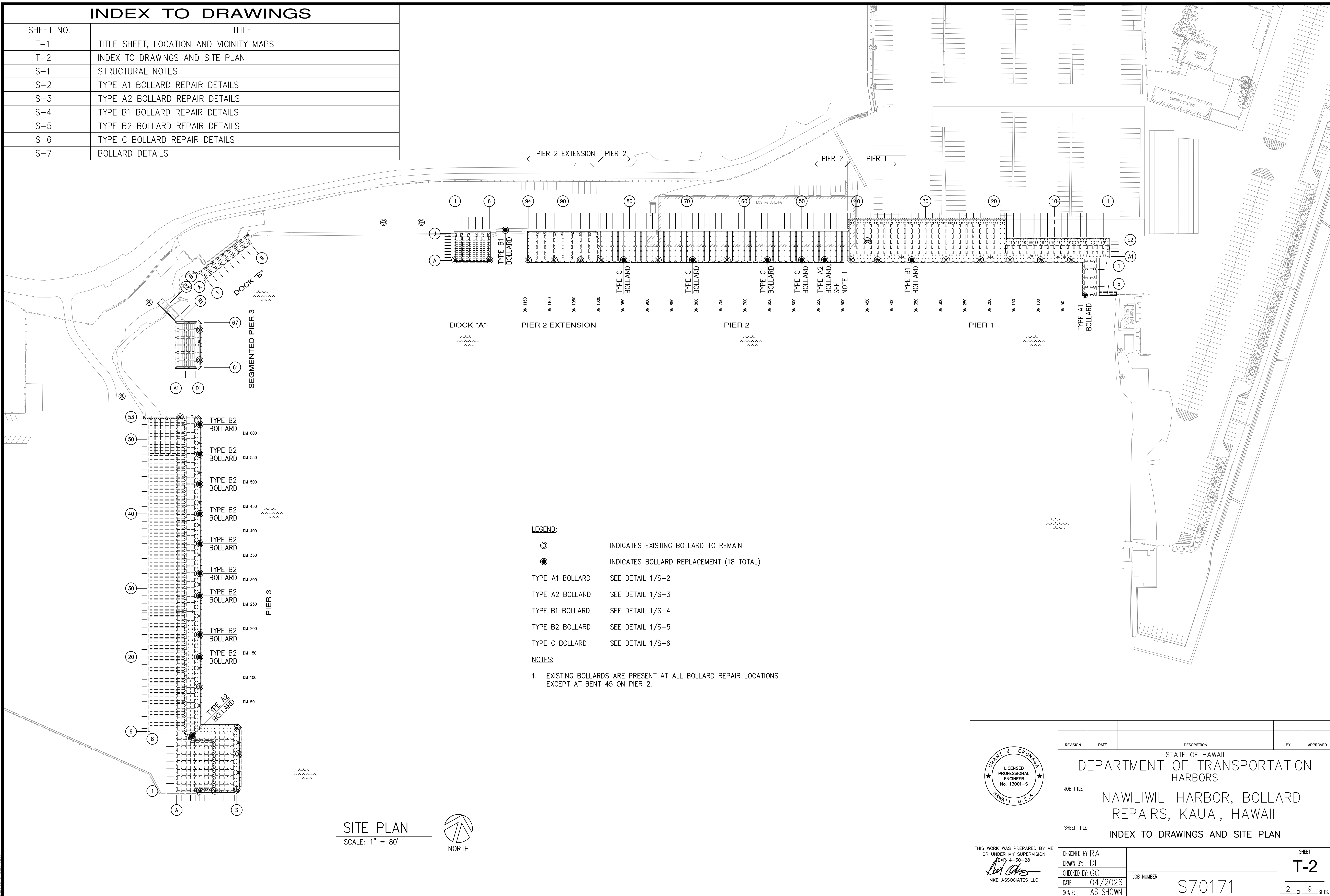
CONSULTANTS:

MKE ASSOCIATES LLC
STRUCTURAL ENGINEER

DEPARTMENT OF TRANSPORTATION STATE OF HAWAII		SHEET T-1
APPROVED BY:		04/30/2026
FOR DIRECTOR OF TRANSPORTATION	DATE	1 of 9 SHEETS

INDEX TO DRAWINGS

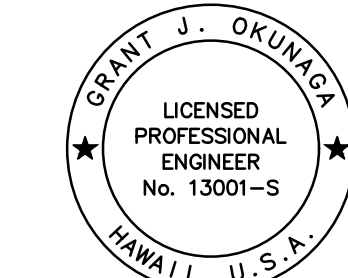
SHEET NO.	TITLE
T-1	TITLE SHEET, LOCATION AND VICINITY MAPS
T-2	INDEX TO DRAWINGS AND SITE PLAN
S-1	STRUCTURAL NOTES
S-2	TYPE A1 BOLLARD REPAIR DETAILS
S-3	TYPE A2 BOLLARD REPAIR DETAILS
S-4	TYPE B1 BOLLARD REPAIR DETAILS
S-5	TYPE B2 BOLLARD REPAIR DETAILS
S-6	TYPE C BOLLARD REPAIR DETAILS
S-7	BOLLARD DETAILS



- LEGEND:**
- ⊙ INDICATES EXISTING BOLLARD TO REMAIN
 - INDICATES BOLLARD REPLACEMENT (18 TOTAL)
 - TYPE A1 BOLLARD SEE DETAIL 1/S-2
 - TYPE A2 BOLLARD SEE DETAIL 1/S-3
 - TYPE B1 BOLLARD SEE DETAIL 1/S-4
 - TYPE B2 BOLLARD SEE DETAIL 1/S-5
 - TYPE C BOLLARD SEE DETAIL 1/S-6

- NOTES:**
- EXISTING BOLLARDS ARE PRESENT AT ALL BOLLARD REPAIR LOCATIONS EXCEPT AT BENT 45 ON PIER 2.

SITE PLAN
SCALE: 1" = 80'



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EXP. 4-30-28
Grant J. Okunaga
MKE ASSOCIATES LLC

REVISION	DATE	DESCRIPTION	BY	APPROVED
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS				
JOB TITLE NAWILIWILI HARBOR, BOLLARD REPAIRS, KAUAI, HAWAII				
SHEET TITLE INDEX TO DRAWINGS AND SITE PLAN				
DESIGNED BY: RA	JOB NUMBER		SHEET	
DRAWN BY: DL	S70171		T-2	
CHECKED BY: GO	DATE: 04/2026		2 OF 9 SHEETS	
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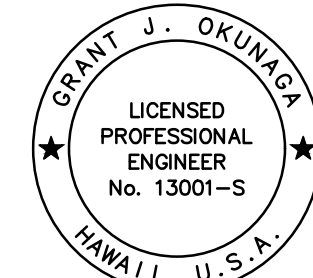
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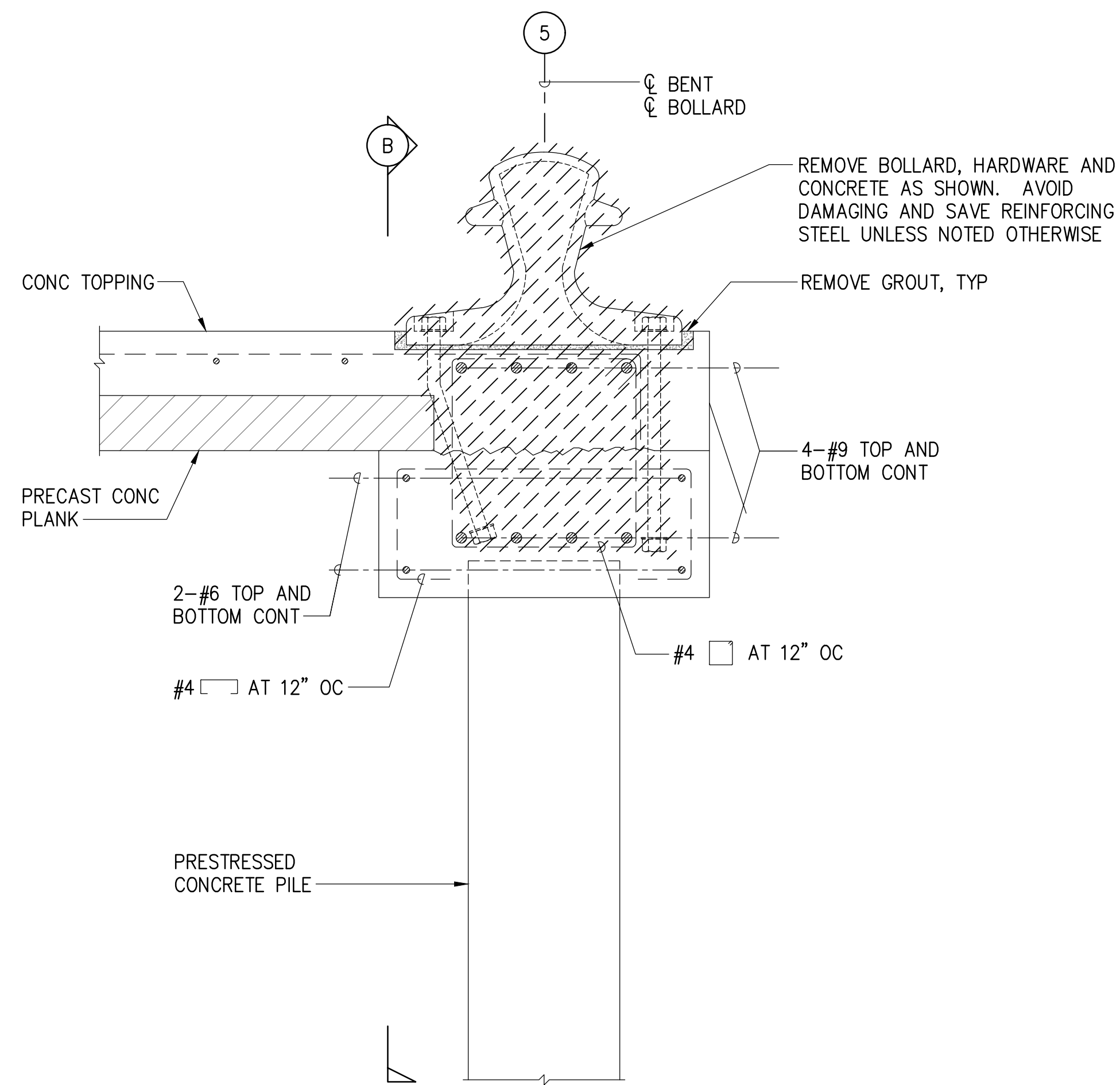
GENERAL:

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 THE 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/HER WORK WITH OTHER CONTRACTORS WITHIN THE PROJECT AREA. THE CONTRACTOR SHALL ALSO COORDINATE WITH THE HARBORS KAUAI 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/HER 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. NOTES AND DETAILS ON THE PLANS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. SHOULD THERE BE CONFLICTS BETWEEN THE REQUIREMENTS OF THE PLANS OR SPECIFICATIONS, THE MORE STRINGENT SHALL APPLY.
13. 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.
14. THE CONTRACTOR SHALL SUBMIT A SITE-SPECIFIC BEST MANAGEMENT PRACTICES (BMP) PLAN TO HARBORS ENGINEER BRANCH PRIOR TO THE START OF ANY CONSTRUCTION WORK. THE SITE SPECIFIC BMP PLAN SHALL COMPLY WITH ENVIRONMENTAL PROTECTION AND TEMPORARY WATER POLLUTION, DUST, AND EROSION CONTROL ARTICLES IN THE SPECIFICATIONS AND PROPOSAL.
15. 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.
16. IN CASE OF RELEASE OF A HAZARDOUS SUBSTANCE, OIL OR ENCOUNTER OF CONTAMINATED SOIL, THE CONTRACTOR SHALL NOTIFY APPROPRIATE FACILITY PERSONNEL, EMERGENCY RESPONSE AGENCIES, AND REGULATORY AGENCIES FOLLOWING NOTIFICATION PROCEDURES, AND SHALL NOTIFY THE HARBORS CONSTRUCTION ENGINEER IMMEDIATELY (I.E., WITHIN 24-HOURS). CONTACT INFORMATION MUST BE IN LOCATIONS THAT ARE READILY ACCESSIBLE AND AVAILABLE. CONTRACTOR SHALL NOTIFY THE HDOT HARBORS ENGINEERING BRANCH ENVIRONMENTAL HOTLINE (808-587-1962) AND HDOT HARBORS CONSTRUCTION ENGINEER OF ANY ILLICIT DISCHARGE AND/OR SPILL/RELEASE THAT OCCURS ONSITE.
17. TIDAL DATA MAY NOT REPRESENT CONDITIONS THAT OCCUR DURING CONSTRUCTION AND ACTUAL WATER LEVELS WILL VARY FROM LEVELS INDICATED. THE CONTRACTOR IS RESPONSIBLE FOR MAKING THEIR OWN ESTIMATES OF WATER LEVELS WHICH MAY OCCUR DURING CONSTRUCTION. VARIATION FROM TIDAL LEVELS INDICATED OR CONTRACTOR'S ESTIMATION OF TIDAL LEVELS WILL NOT BE CONSIDERED AS A CLAIM FOR ADDITIONAL COMPENSATION OR DELAY OF WORK.

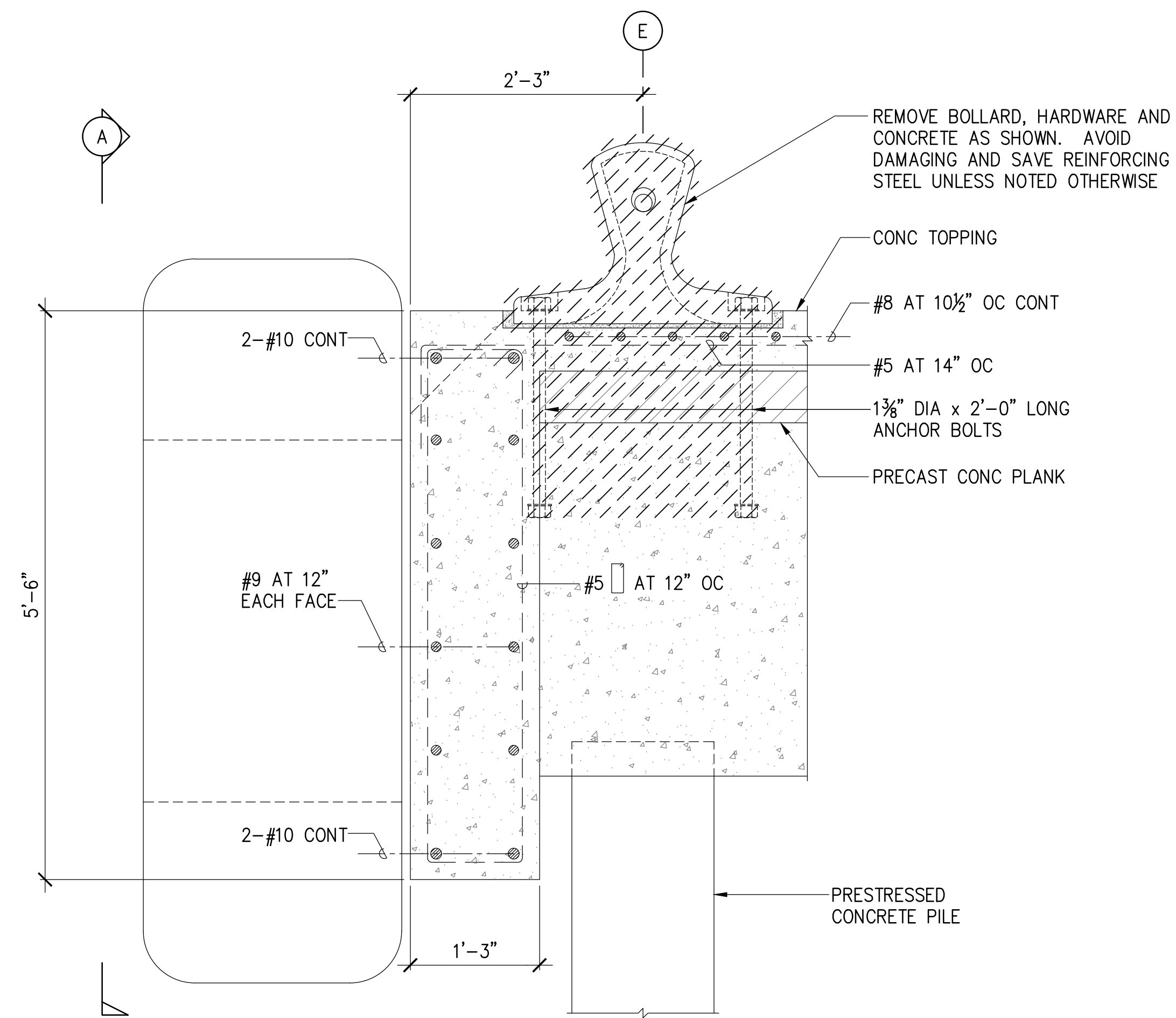
CONCRETE:

1. CONCRETE CONSTRUCTION SHALL CONFORM TO AMERICAN CONCRETE INSTITUTE ACI 318R-14 AND ACI 546R-14.
2. FORMED CONCRETE SHALL BE CLASS $f'_c=5,000$ PSI WITH FLY ASH 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. ANTI-CORROSION COATING WITH A MINIMUM 7 DAY OPEN TIME FOR REINFORCING STEEL AND CONCRETE BONDING AGENT SHALL BE SIKA ARMATEC 110 EPOCEM BY SIKA OR APPROVED EQUAL. FOLLOW MANUFACTURER'S PRINTED INSTRUCTIONS FOR INTENDED USE.
8. TIE WIRE SHALL BE PLASTIC-COATED, STAINLESS STEEL, OR MADE OF DIELECTRIC OR OTHER ACCEPTABLE MATERIAL. ALL LOOSE REINFORCING STEEL SHALL BE SECURED WITH TIES AT ALL INTERSECTIONS WITH ADJACENT REINFORCING STEEL.

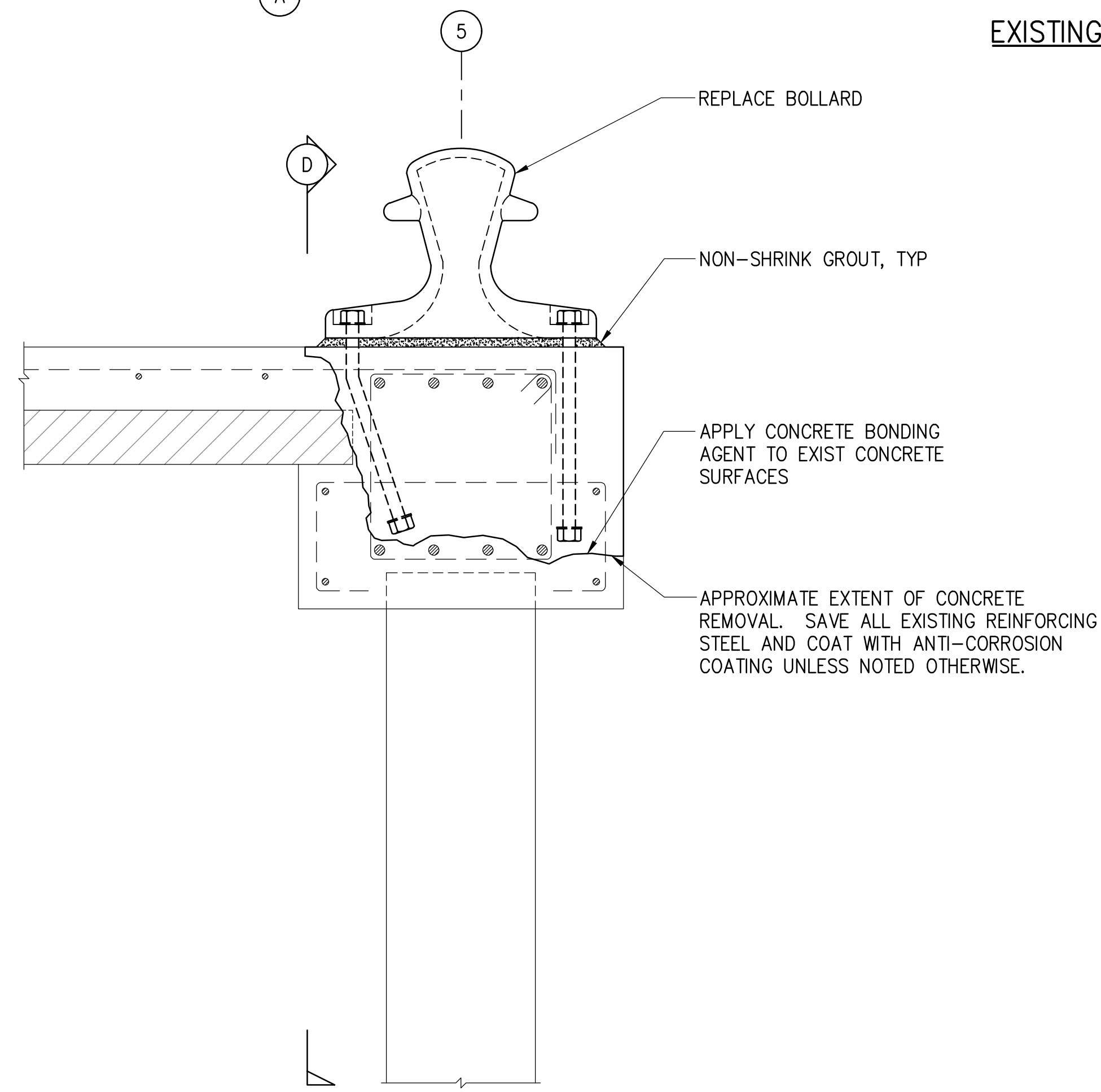
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	REVISION	DATE	DESCRIPTION	BY	APPROVED
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS				
	JOB TITLE NAWILIWILI HARBOR, BOLLARD REPAIRS, KAUAI, HAWAII				
	SHEET TITLE STRUCTURAL NOTES				
DESIGNED BY: RA				SHEET	
DRAWN BY: DL				S-1	
CHECKED BY: GO					
DATE: 04/2026	JOB NUMBER S70171				
SCALE: AS SHOWN				3 of 9 SHEETS	



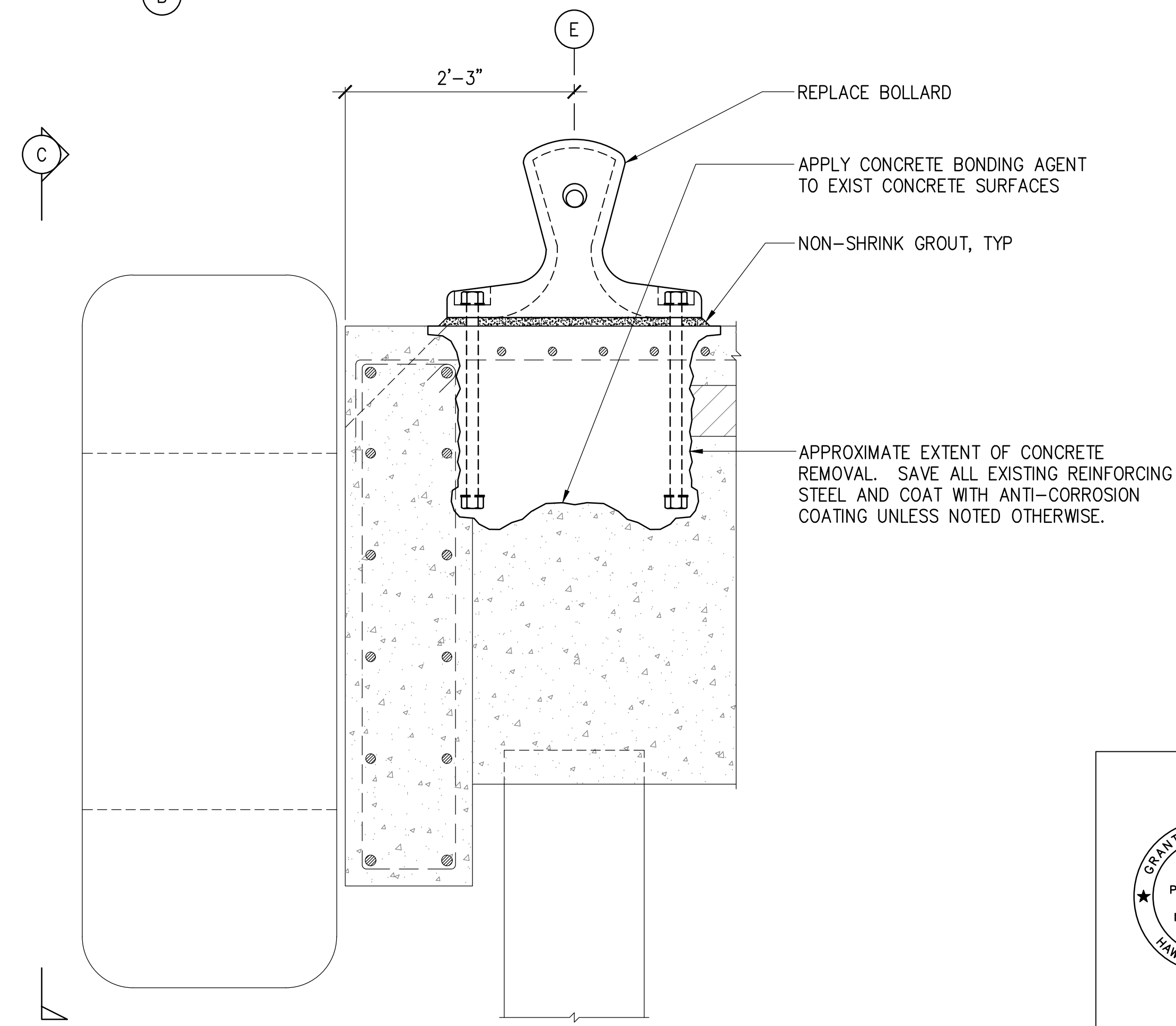
A FASCIA BEAM ELEVATION



B FASCIA BEAM SECTION



C FASCIA BEAM ELEVATION



D FASCIA BEAM SECTION

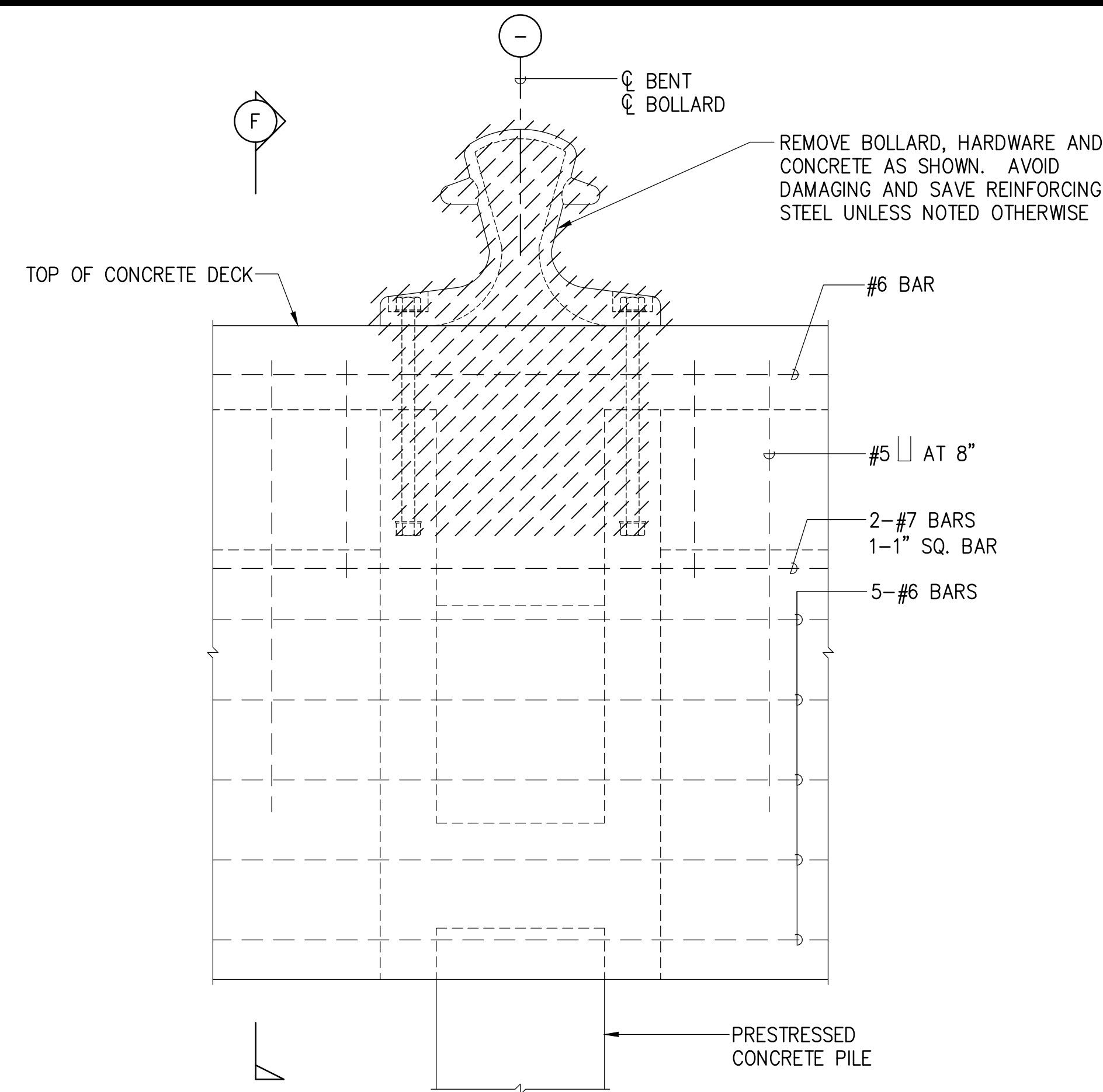
EXISTING CONDITION

REPAIRED CONDITION

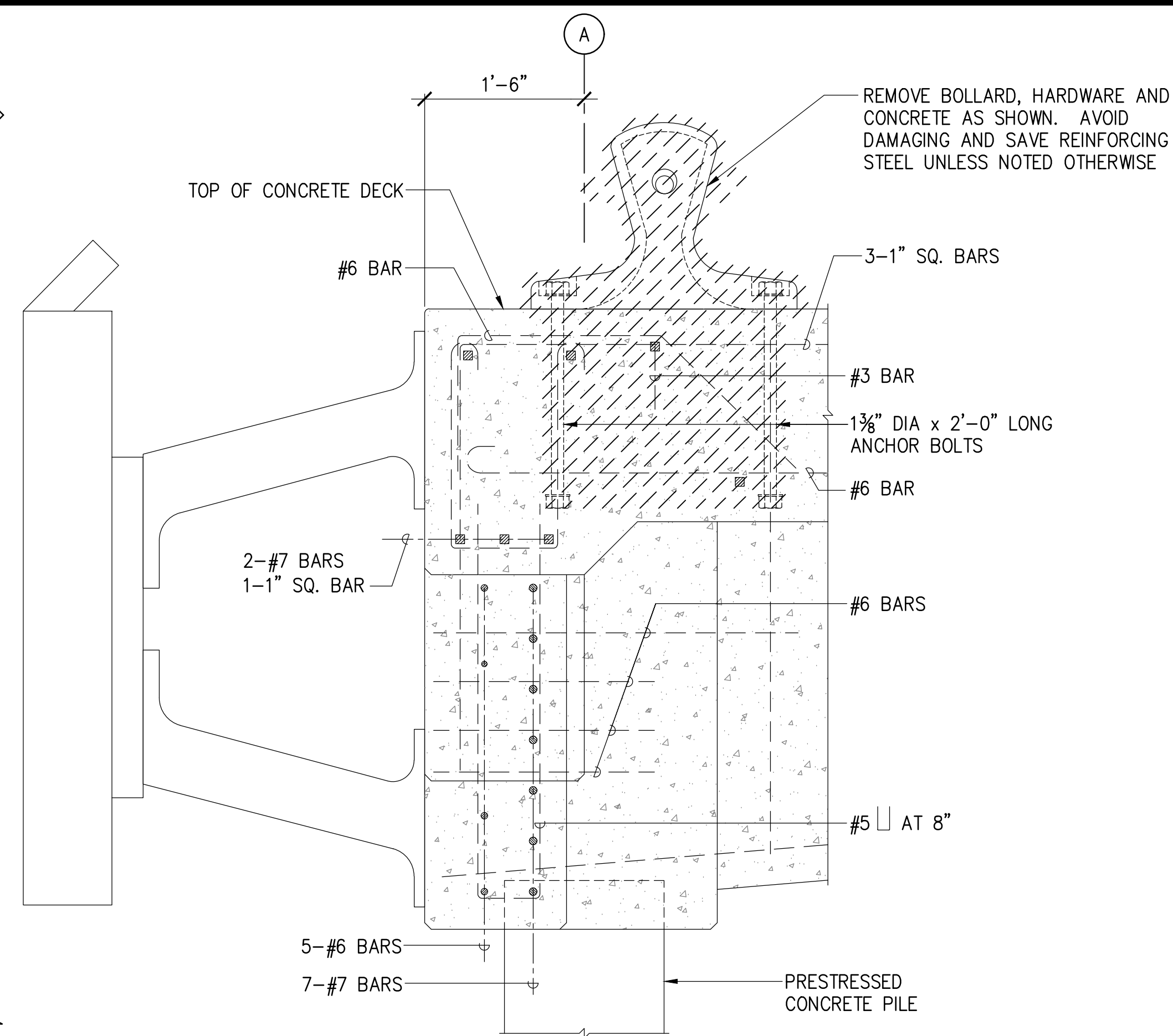
1 TYPE A1 BOLLARD REPAIR DETAILS
S-2 SCALE: 1" = 1'-0"

	REVISION	DATE	DESCRIPTION	BY	APPROVED
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS				
	JOB TITLE NAWILIWILI HARBOR, BOLLARD REPAIRS, KAUAI, HAWAII				
	SHEET TITLE TYPE A1 BOLLARD REPAIR DETAILS				
DESIGNED BY: RA		JOB NUMBER		SHEET	
DRAWN BY: DL		S70171		S-2	
CHECKED BY: GO		DATE: 04/2026		SCALE: AS SHOWN	
DATE: 04/2026		SCALE: AS SHOWN		4 of 9 SHTS.	

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Grant J. Okunaka
MKE ASSOCIATES LLC

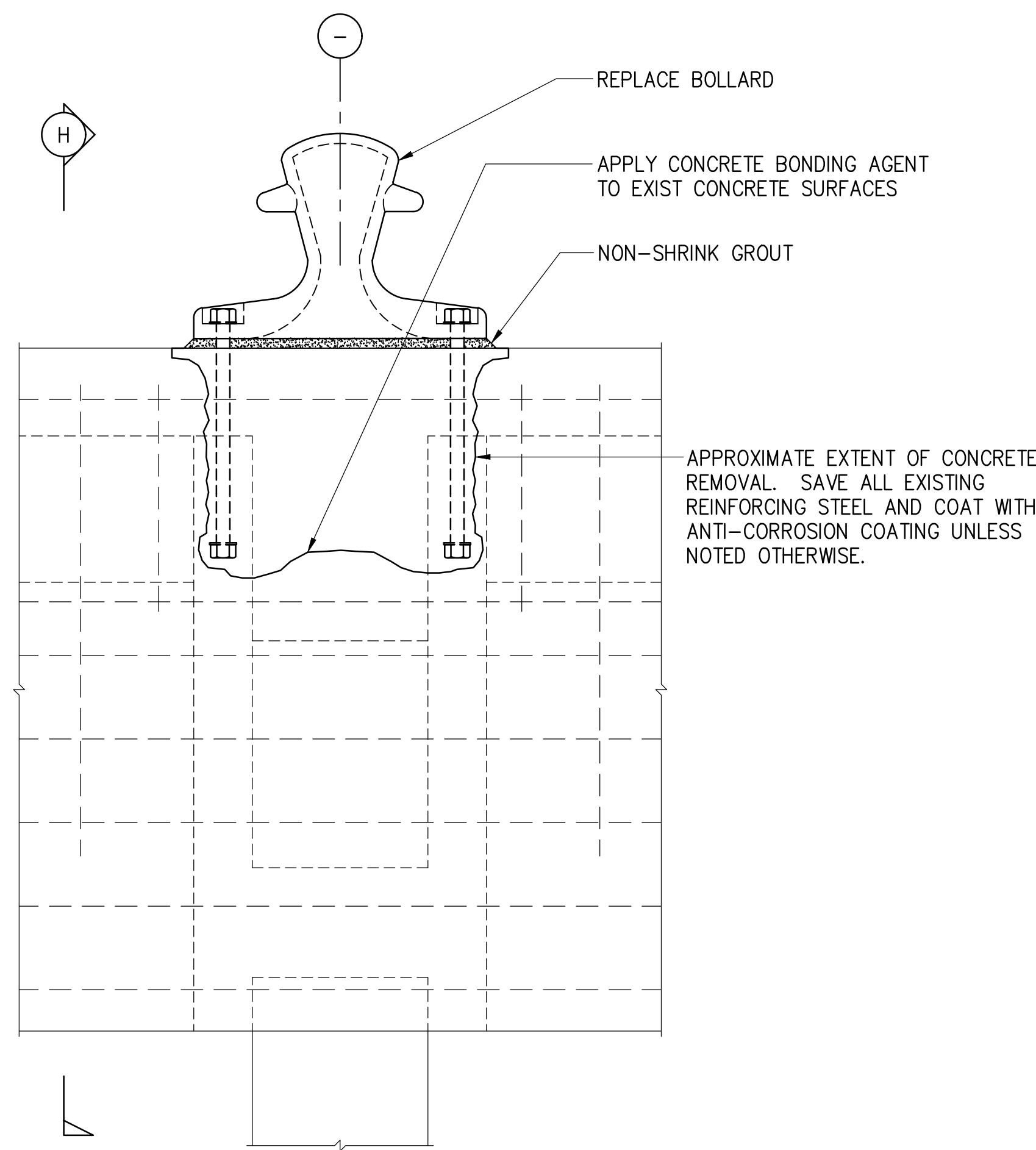


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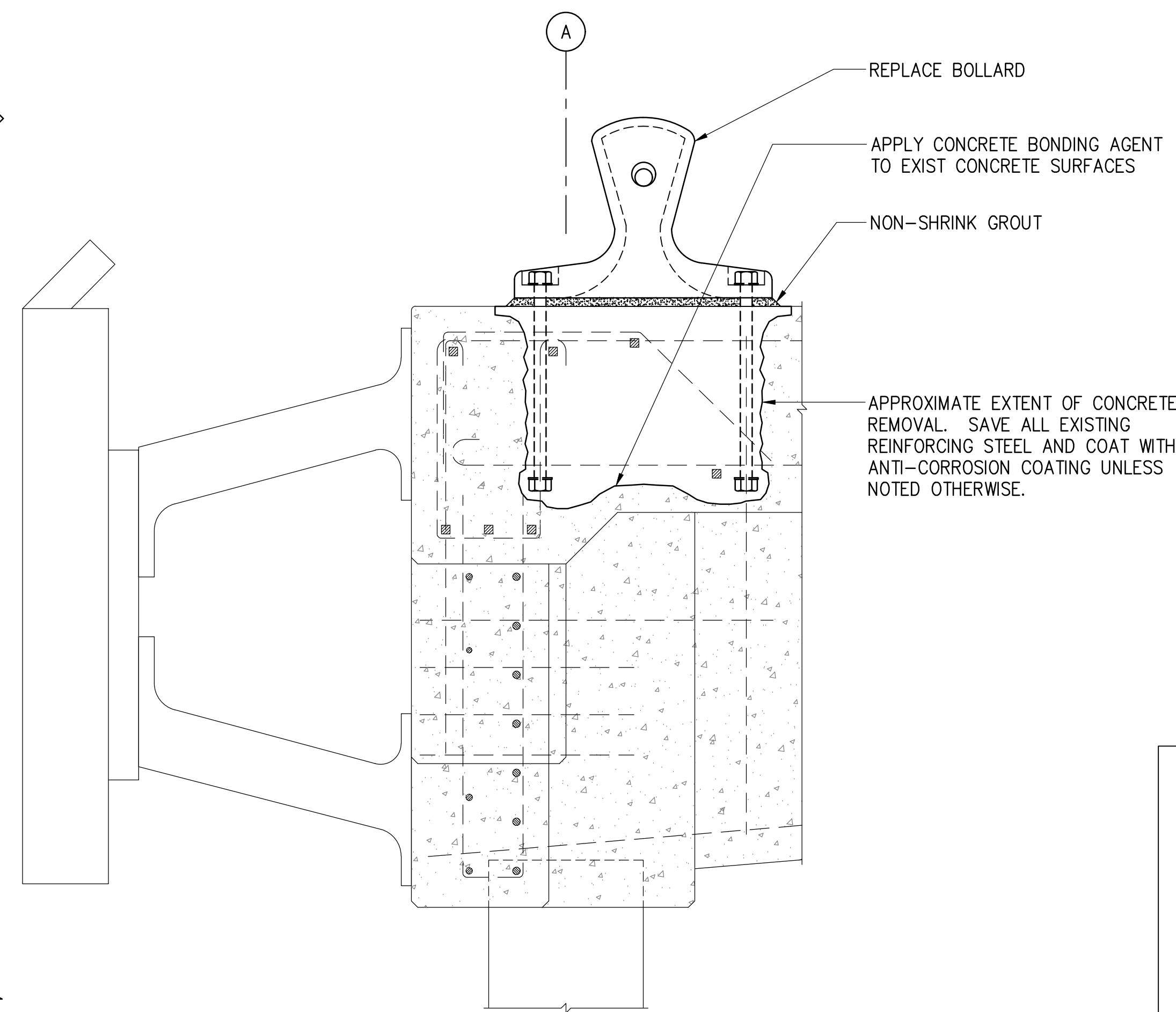


F FASCIA BEAM SECTION

EXISTING CONDITION



G FASCIA BEAM ELEVATION

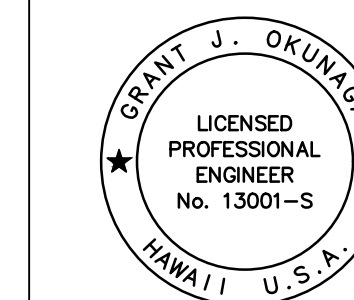


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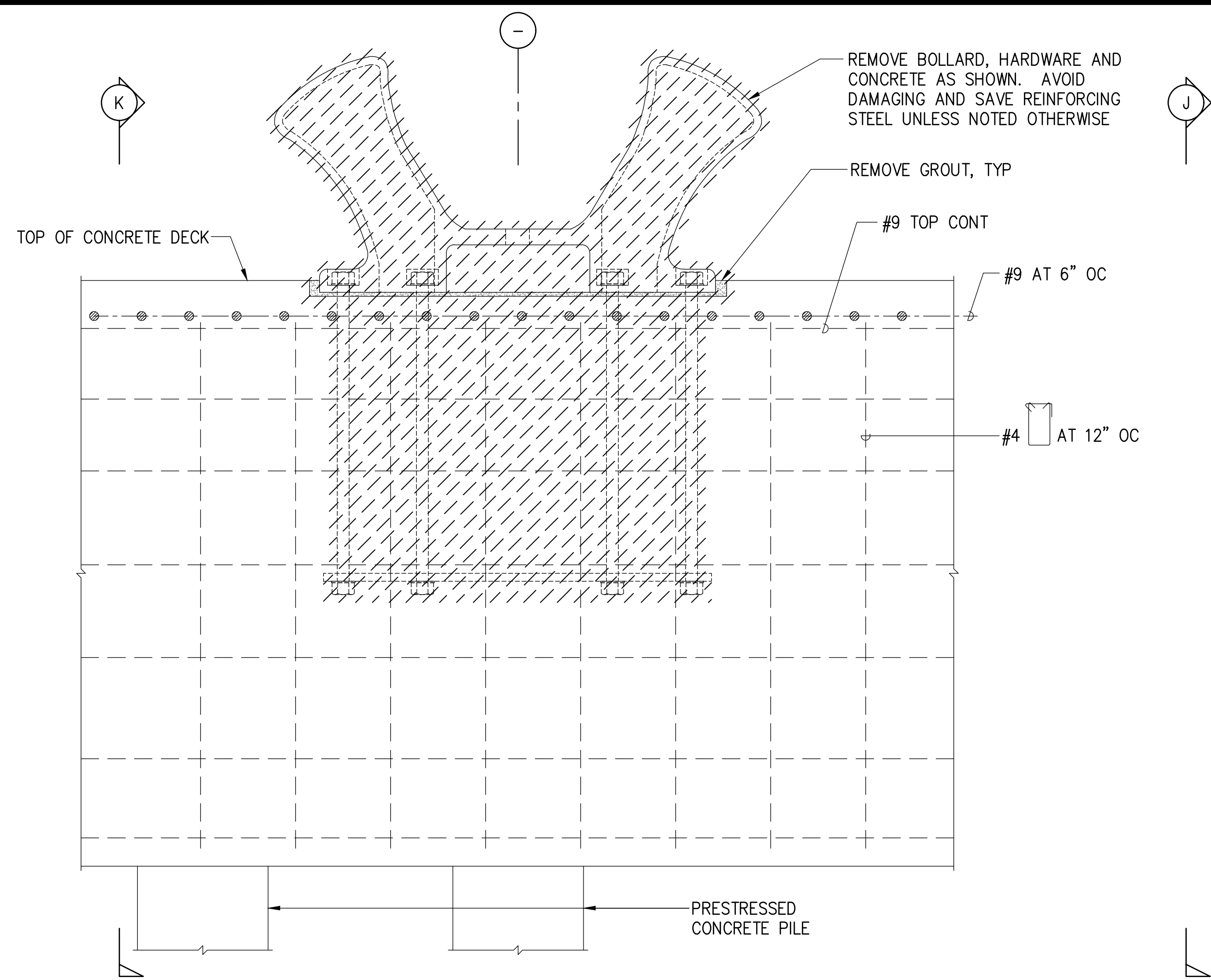
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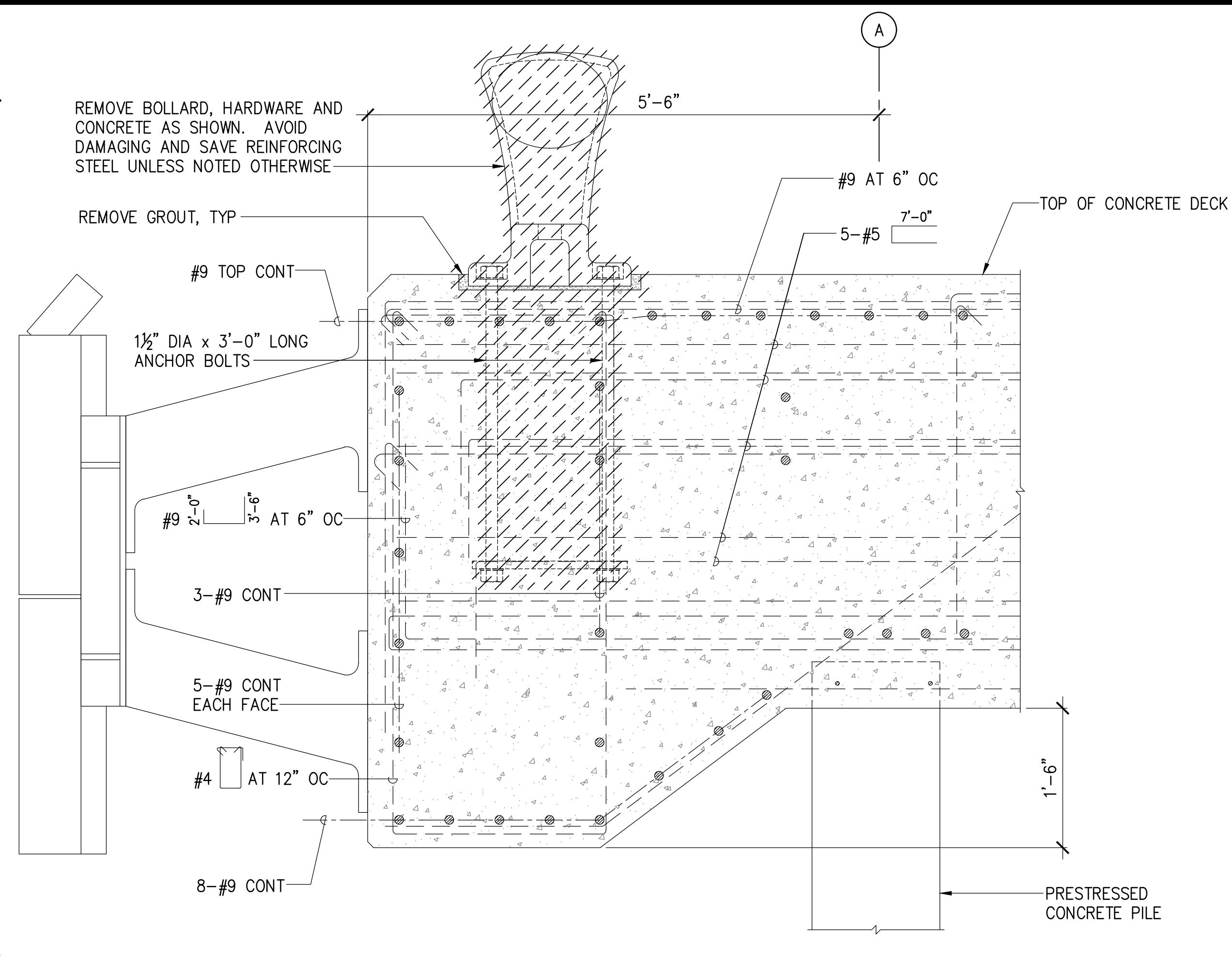


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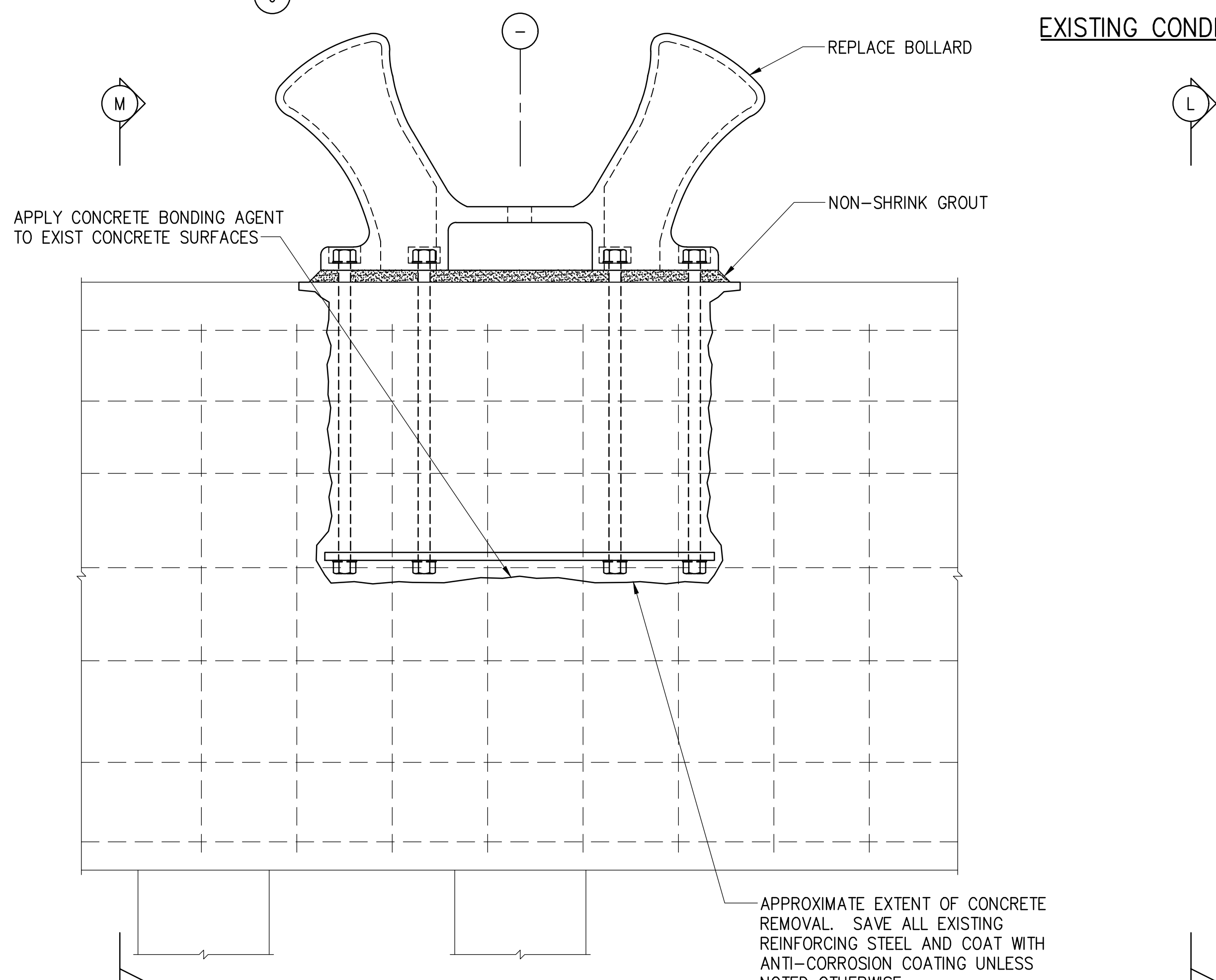
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STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS				
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SHEET TITLE TYPE A2 BOLLARD REPAIR DETAILS				
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CHECKED BY: GO				
DATE: 04/2026				
SCALE: AS SHOWN				5 OF 9 SHTS.



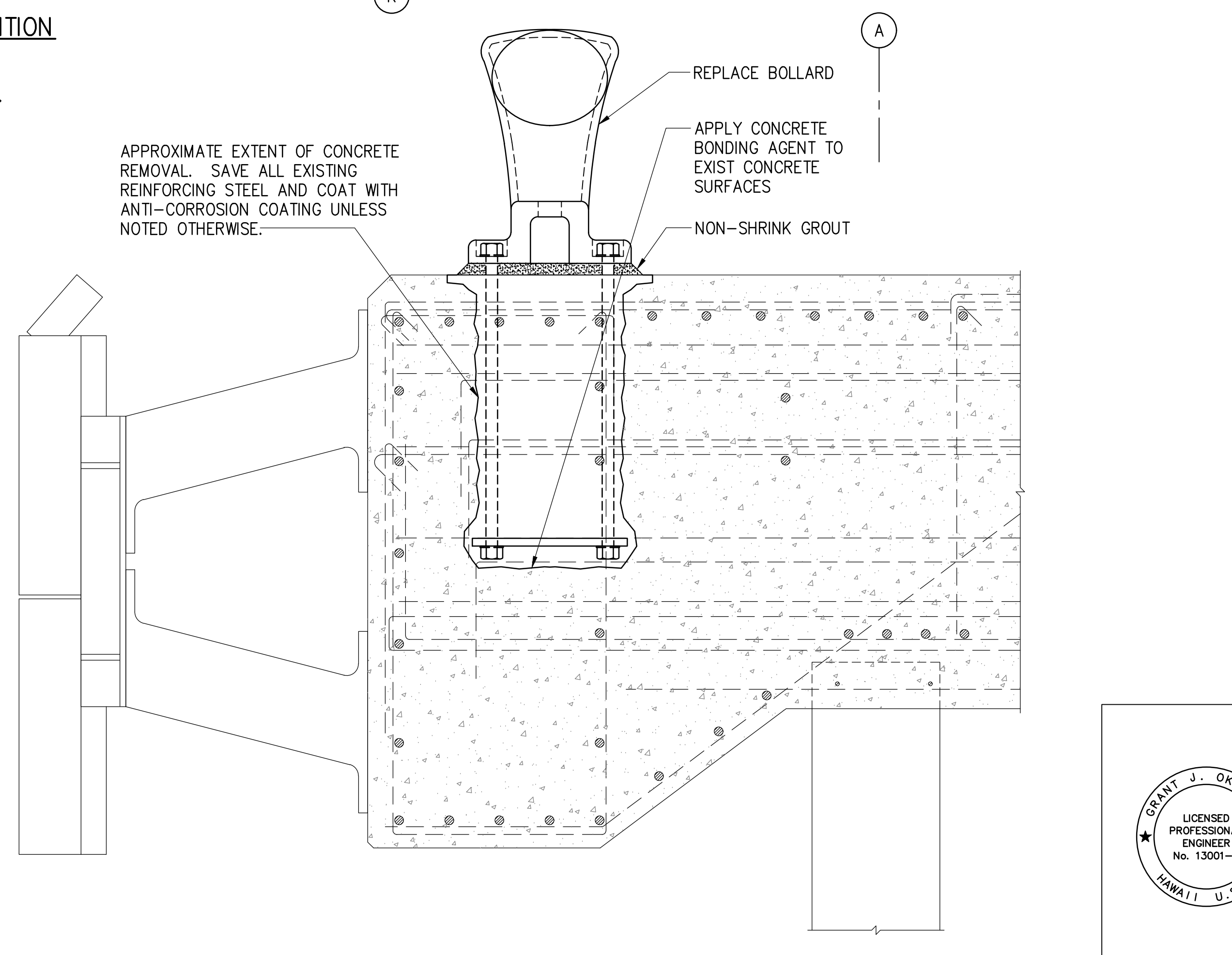
J FASCIA BEAM ELEVATION



K FASCIA BEAM SECTION



L FASCIA BEAM ELEVATION



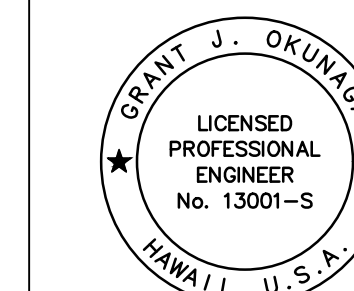
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EXISTING CONDITION

REPAIRED CONDITION

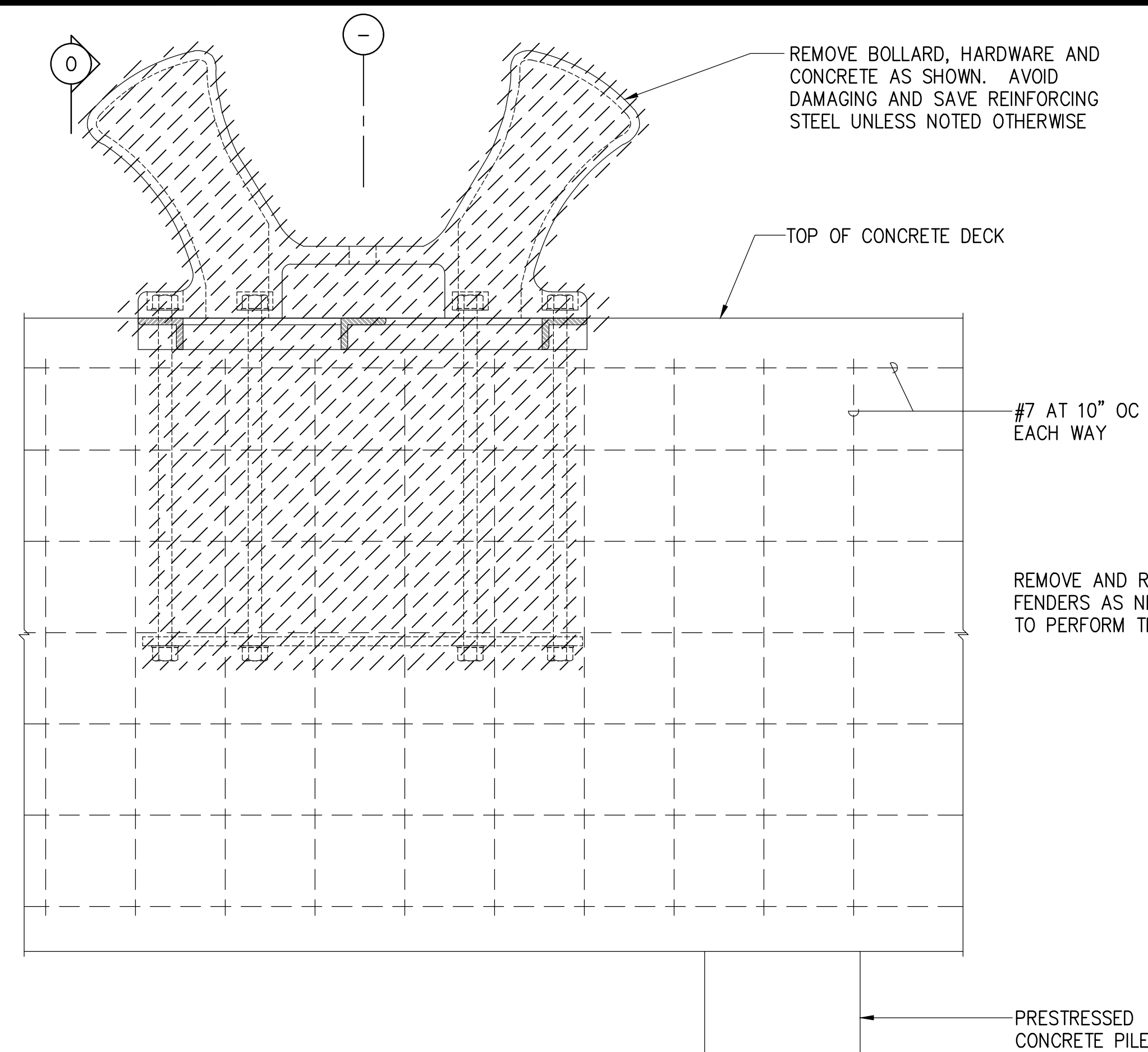
1 TYPE B1 BOLLARD REPAIR DETAILS

S-4 SCALE: 1" = 1'-0"

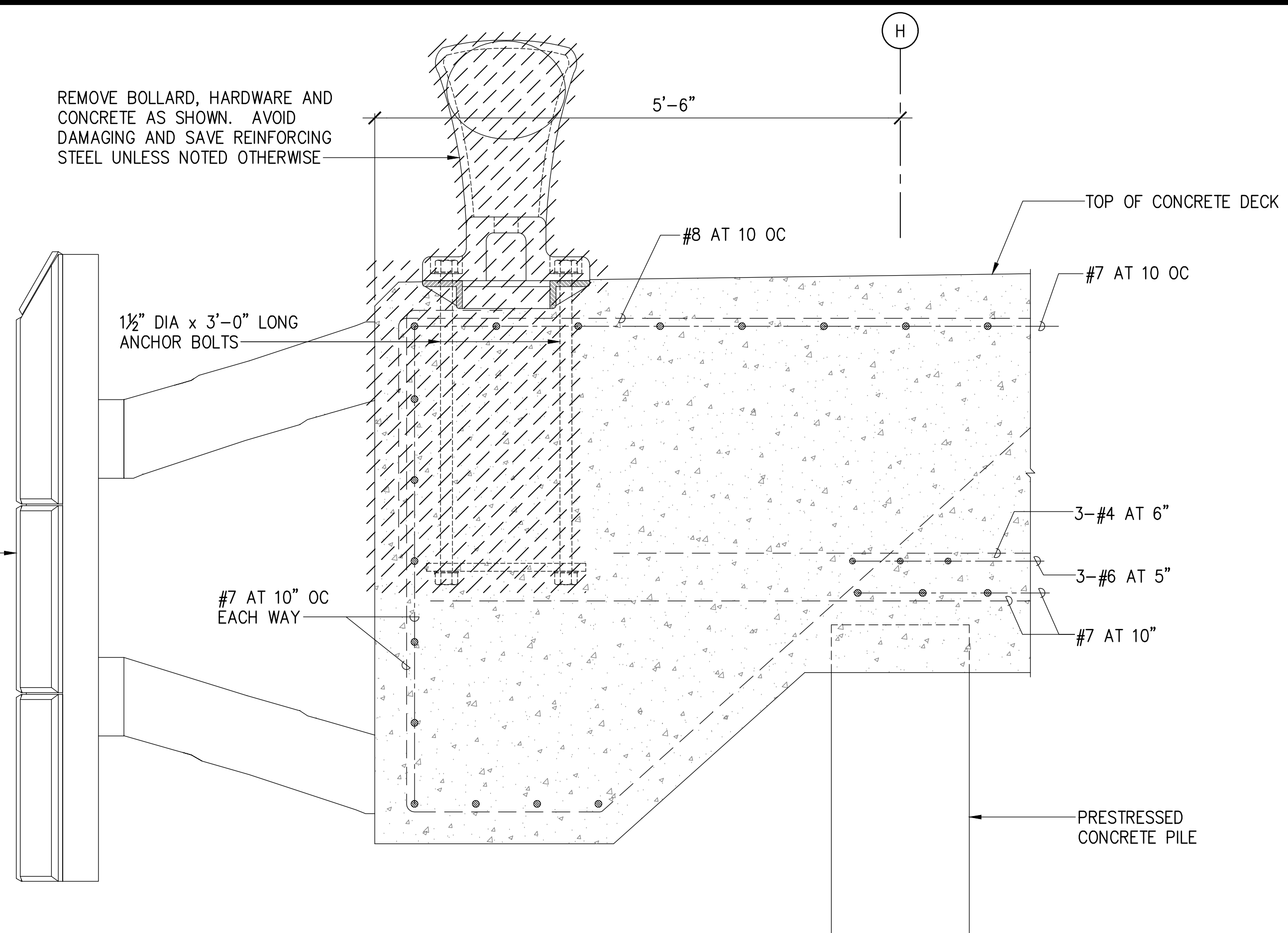


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DL
 MKE ASSOCIATES LLC

REVISION	DATE	DESCRIPTION	BY	APPROVED
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS				
JOB TITLE NAWILIWILI HARBOR, BOLLARD REPAIRS, KAUAI, HAWAII				
SHEET TITLE TYPE B1 BOLLARD REPAIR DETAILS				
DESIGNED BY: RA				SHEET
DRAWN BY: DL				S-4
CHECKED BY: GO				
DATE: 04/2026	JOB NUMBER			
SCALE: AS SHOWN	S70171			
				6 of 9 SHTS.

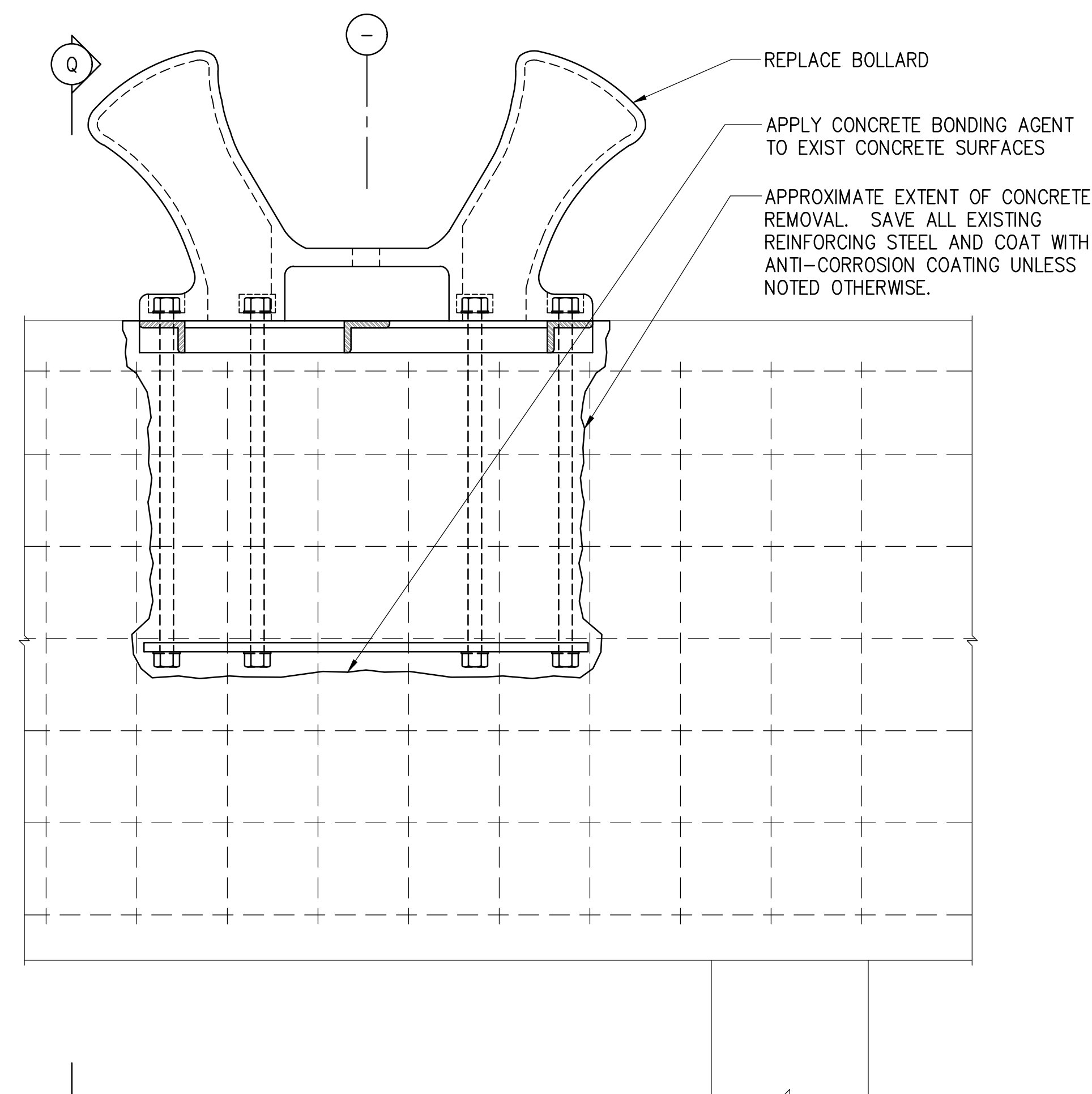


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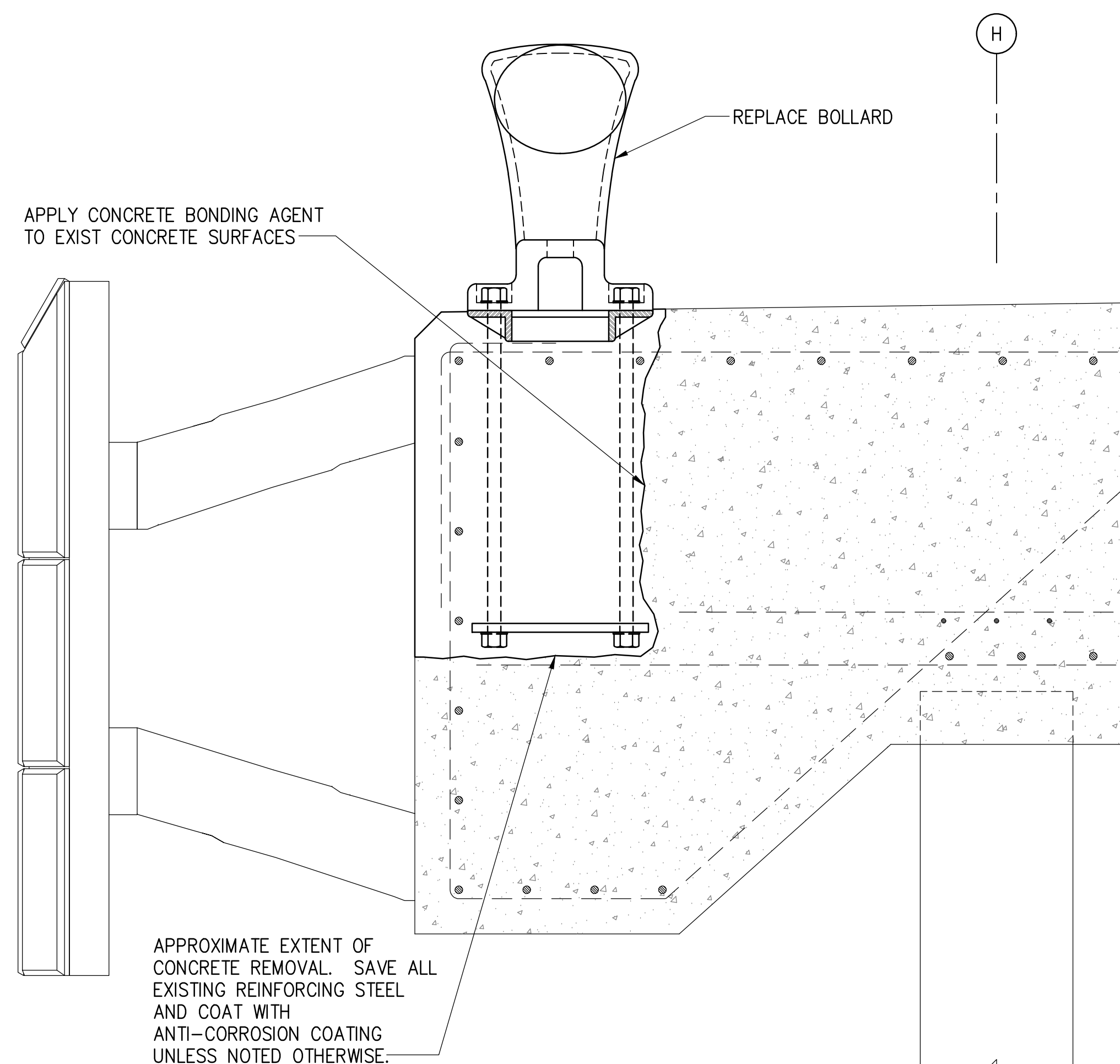


O FASCIA BEAM SECTION

EXISTING CONDITION



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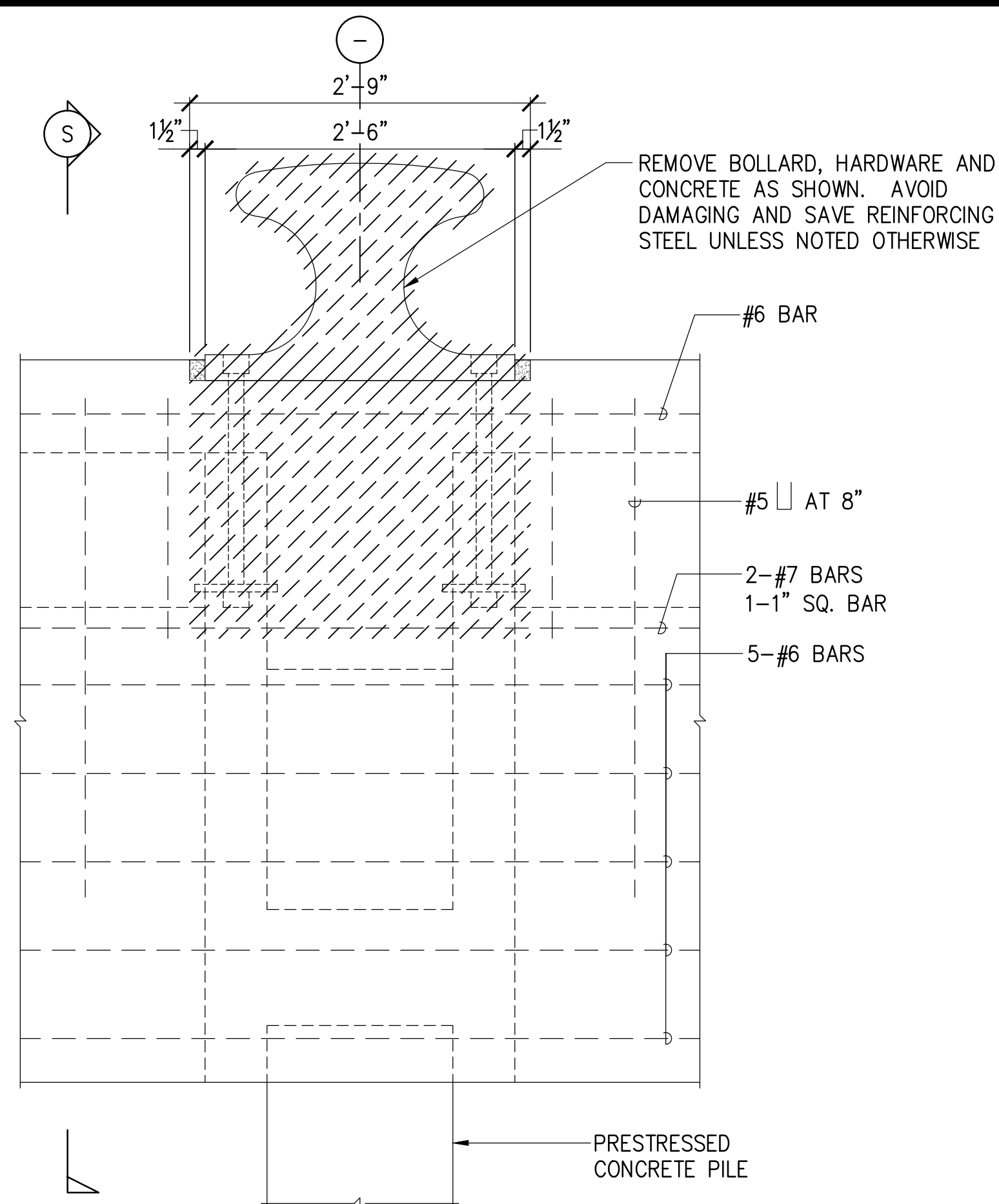


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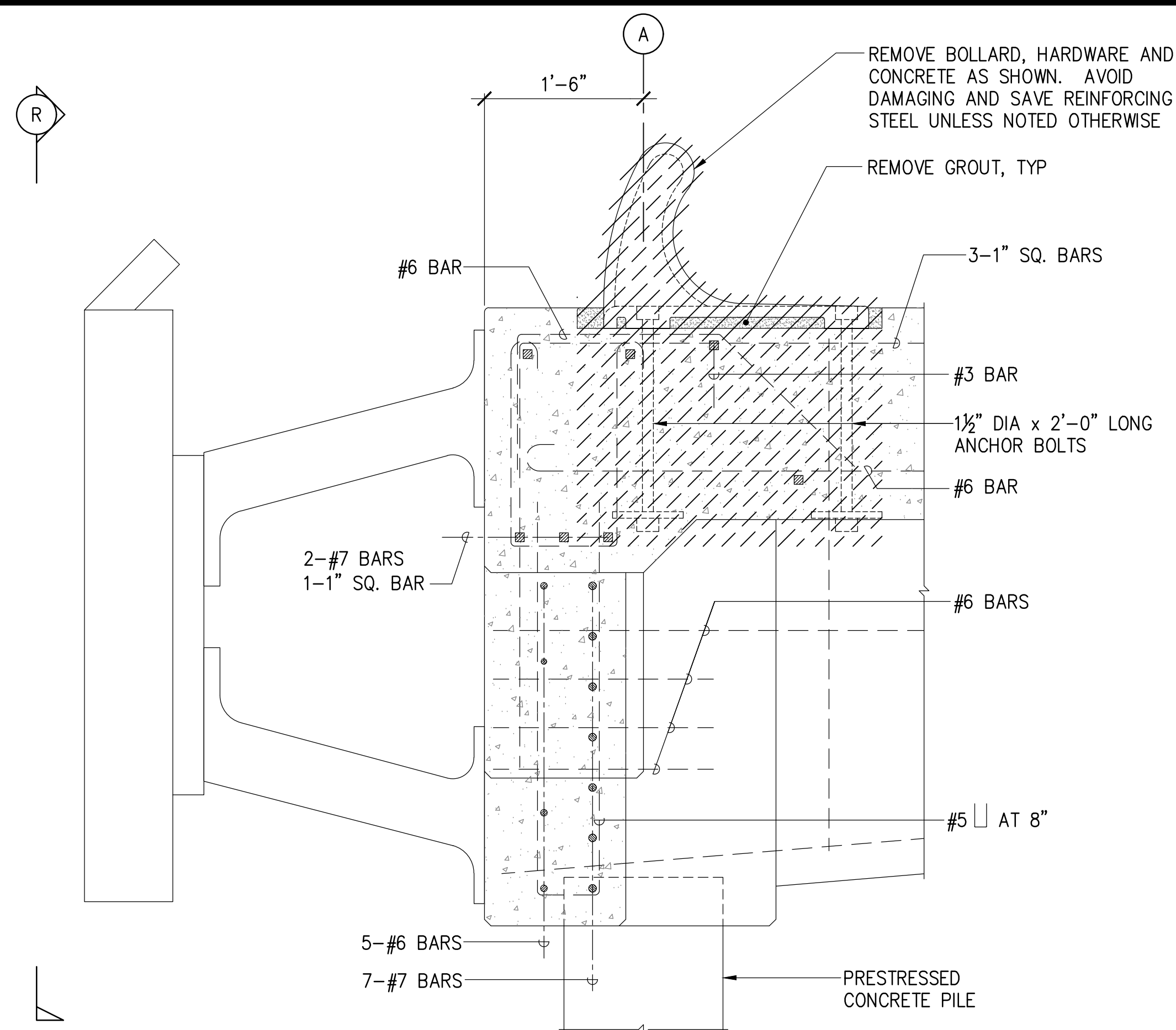
REPAIRED CONDITION

1 TYPE B2 BOLLARD REPAIR DETAILS
S-5 SCALE: 1" = 1'-0"

	DESIGNED BY: RA	DATE: 04/2026	BY:	APPROVED:
	DRAWN BY: DL	CHECKED BY: GO	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS	
	JOB TITLE NAWILIWILI HARBOR, BOLLARD REPAIRS, KAUAI, HAWAII			
	SHEET TITLE TYPE B2 BOLLARD REPAIR DETAILS			
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION MKE ASSOCIATES LLC		JOB NUMBER S70171	SHEET S-5 7 of 9 SHTS.	

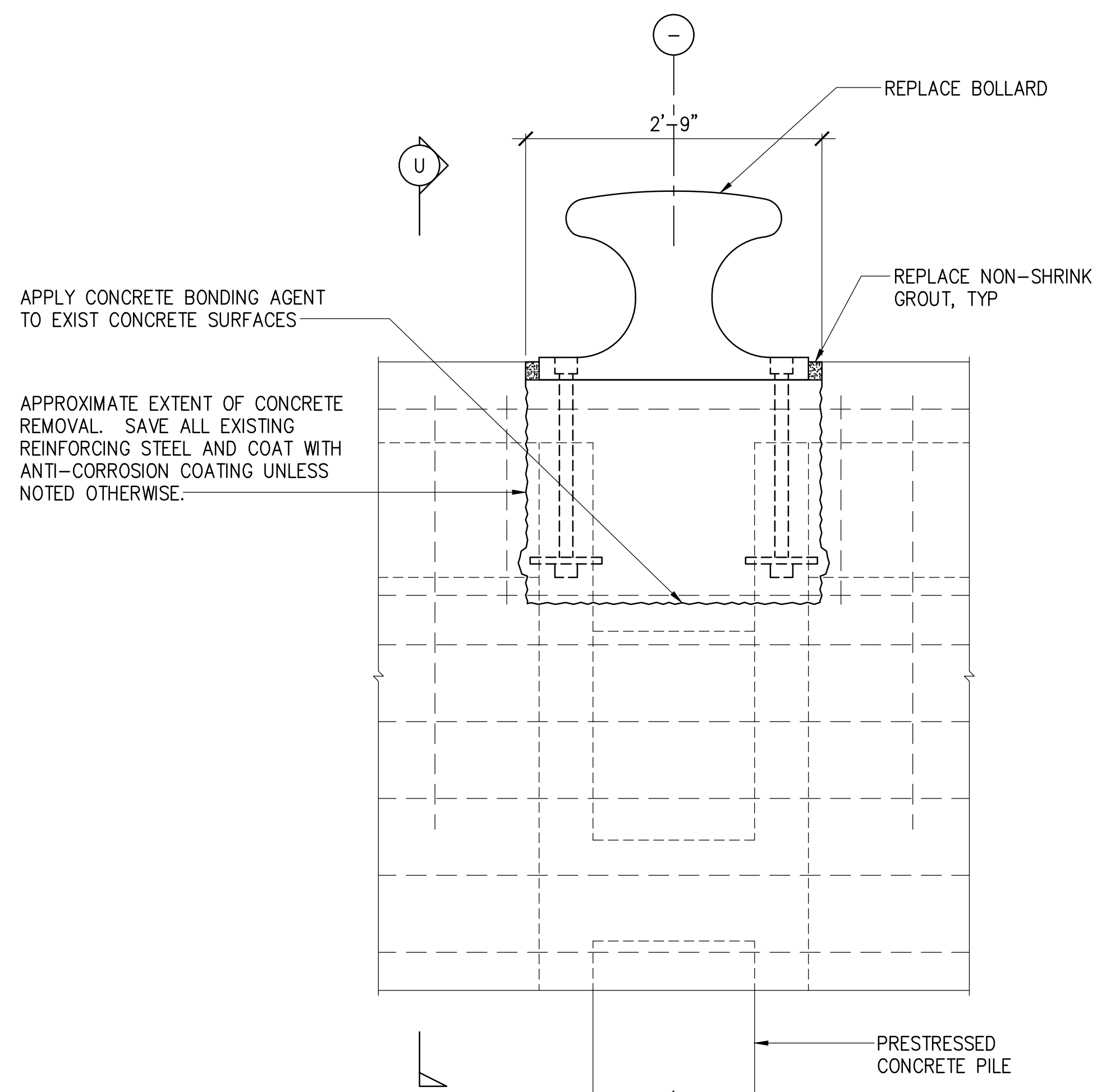


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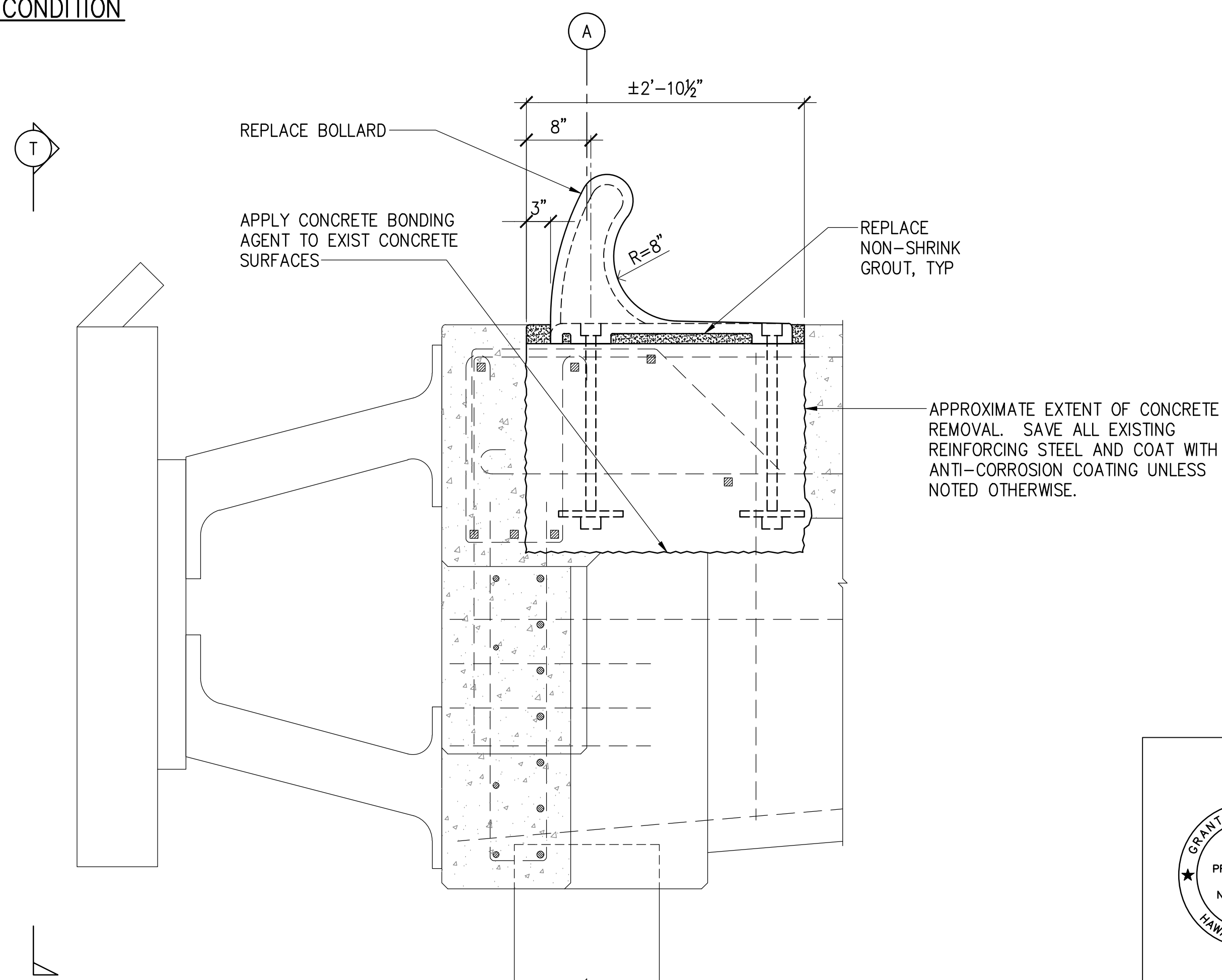


S FASCIA BEAM SECTION

EXISTING CONDITION



T FASCIA BEAM ELEVATION



U FASCIA BEAM SECTION

REPAIRED CONDITION

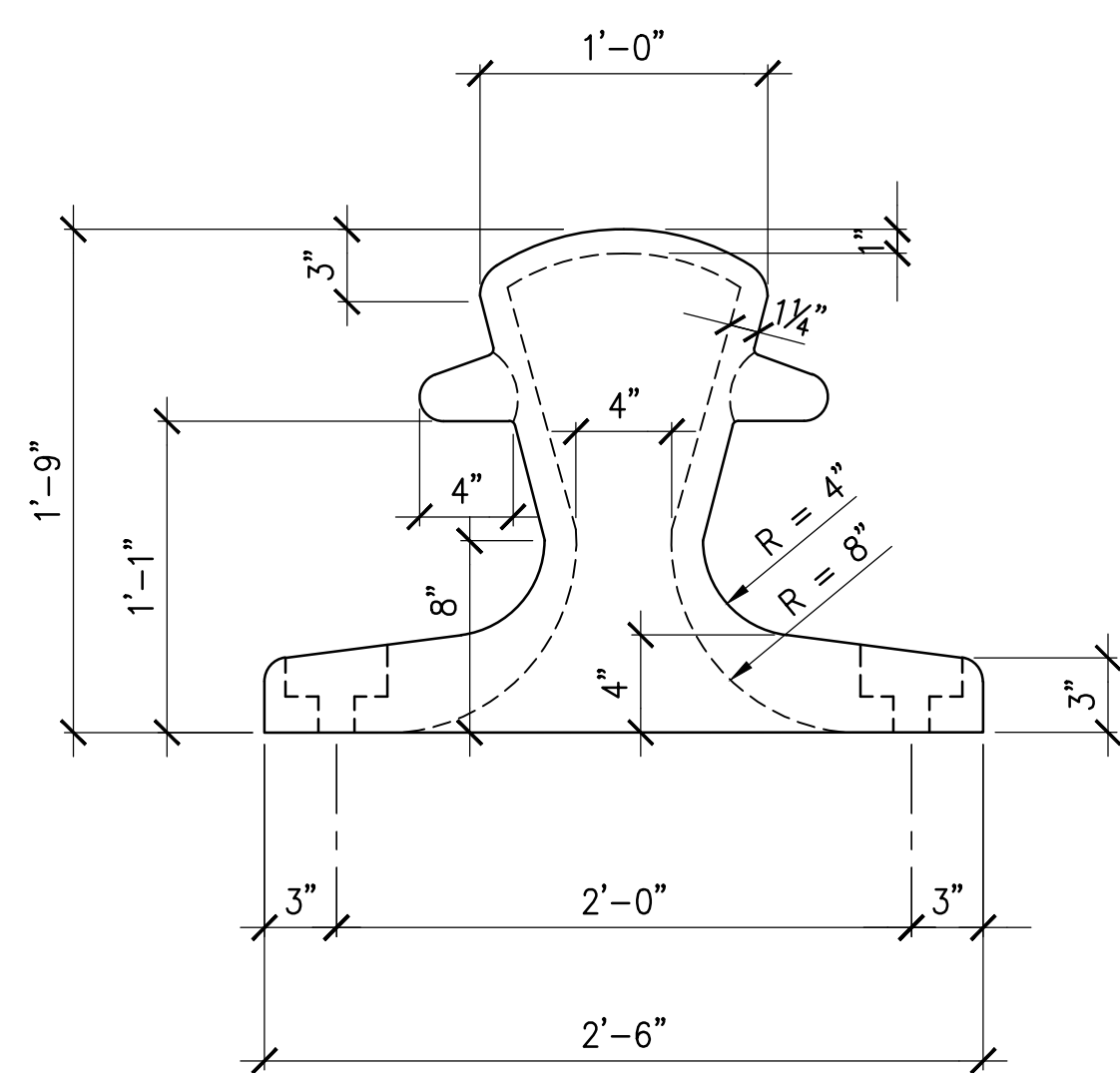
NOTE:

NO RECORD DRAWINGS AVAILABLE FOR TYPE A2 BOLLARD AT PIER 3. REPAIR IS ASSUMED TO BE SIMILAR.

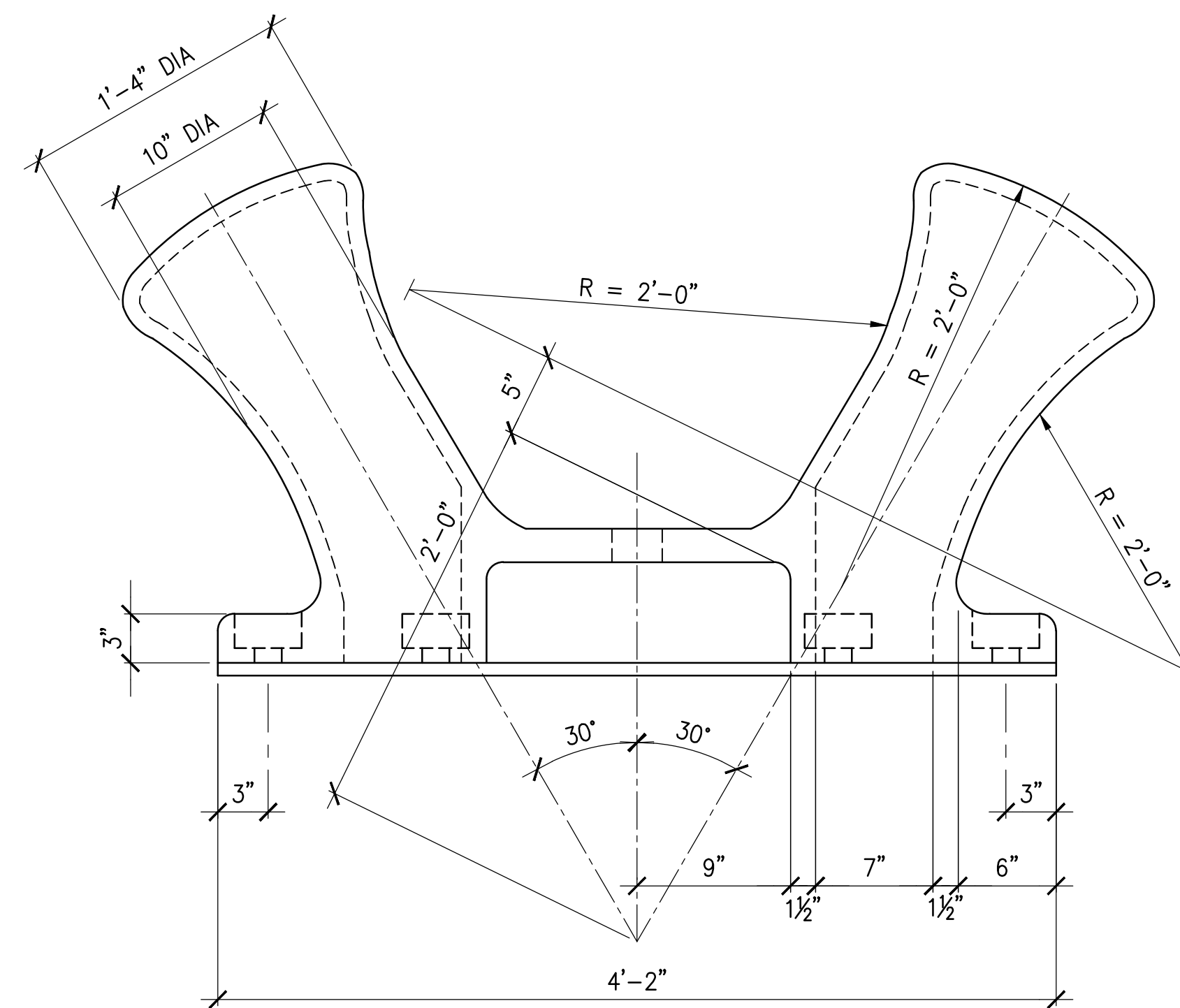
1 TYPE C BOLLARD REPAIR DETAILS
S-6 SCALE: 1" = 1'-0"

	REVISION	DATE	DESCRIPTION	BY	APPROVED
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS				
	JOB TITLE NAWILIWILI HARBOR, BOLLARD REPAIRS, KAUAI, HAWAII				
	SHEET TITLE TYPE C BOLLARD REPAIR DETAILS				
DESIGNED BY: RA	JOB NUMBER				SHEET
DRAWN BY: DL	S70171				S-6
CHECKED BY: GO	DATE: 04/2026				8 of 9 SHTS.
SCALE: AS SHOWN					

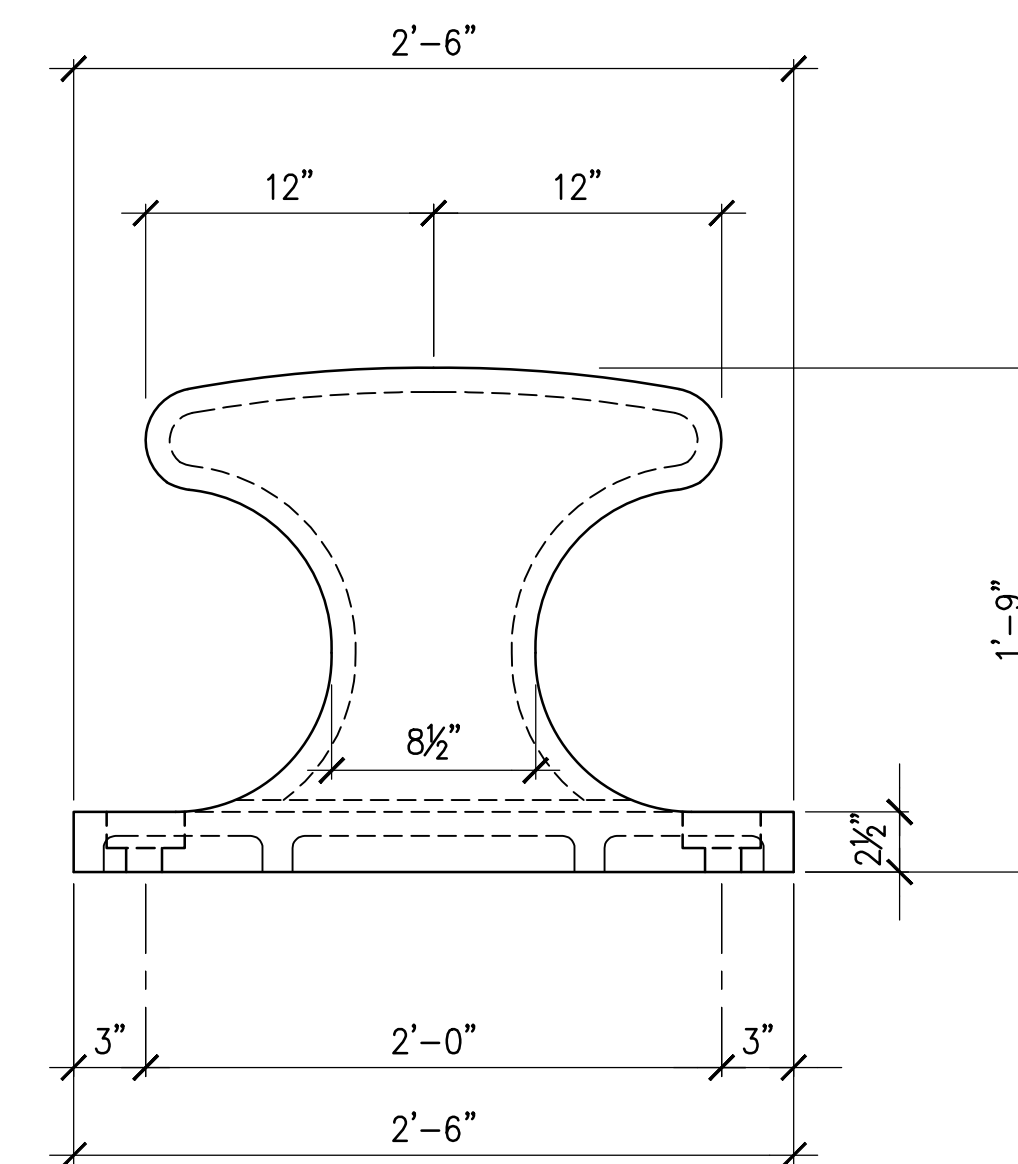
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EXP. 4-30-28
DL
MKE ASSOCIATES LLC



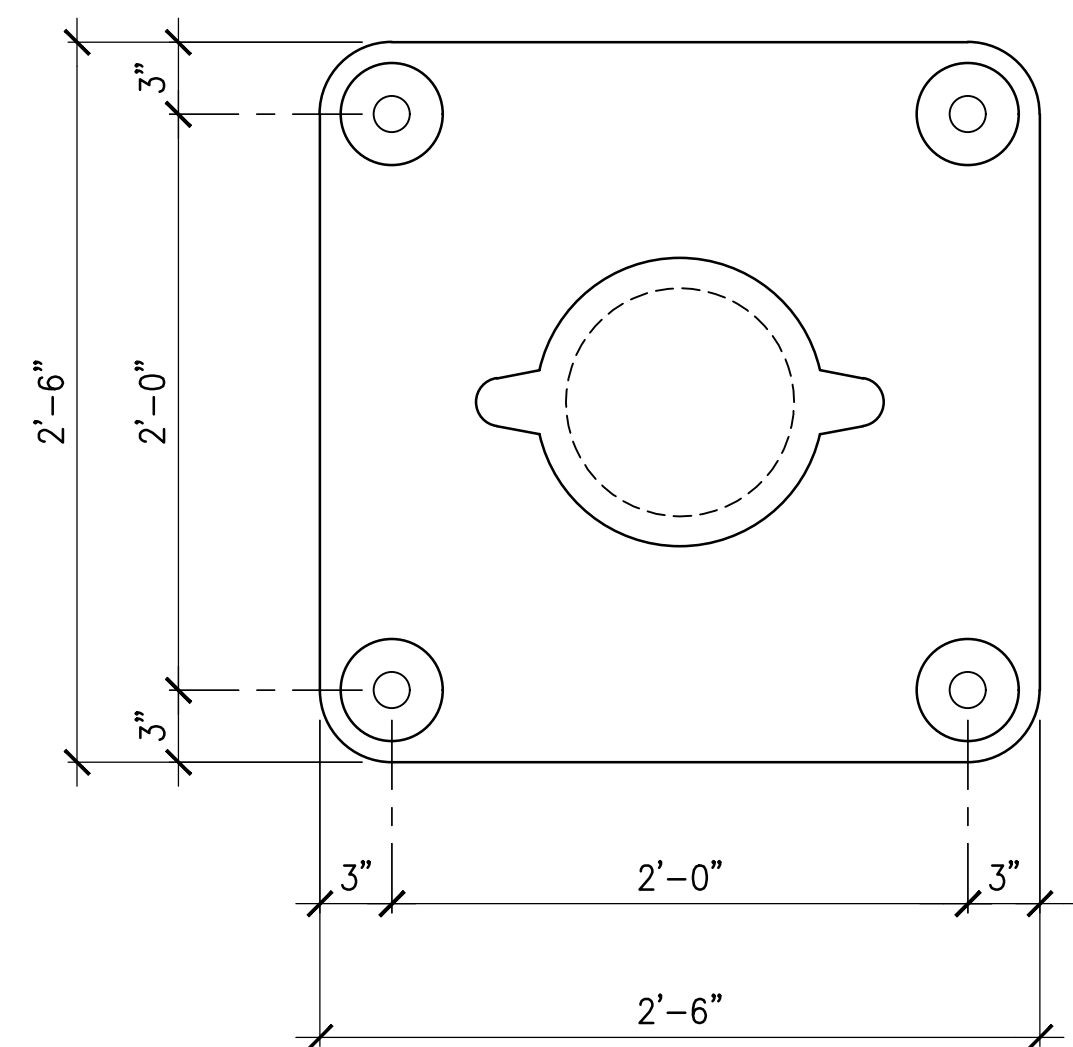
ELEVATION



ELEVATION

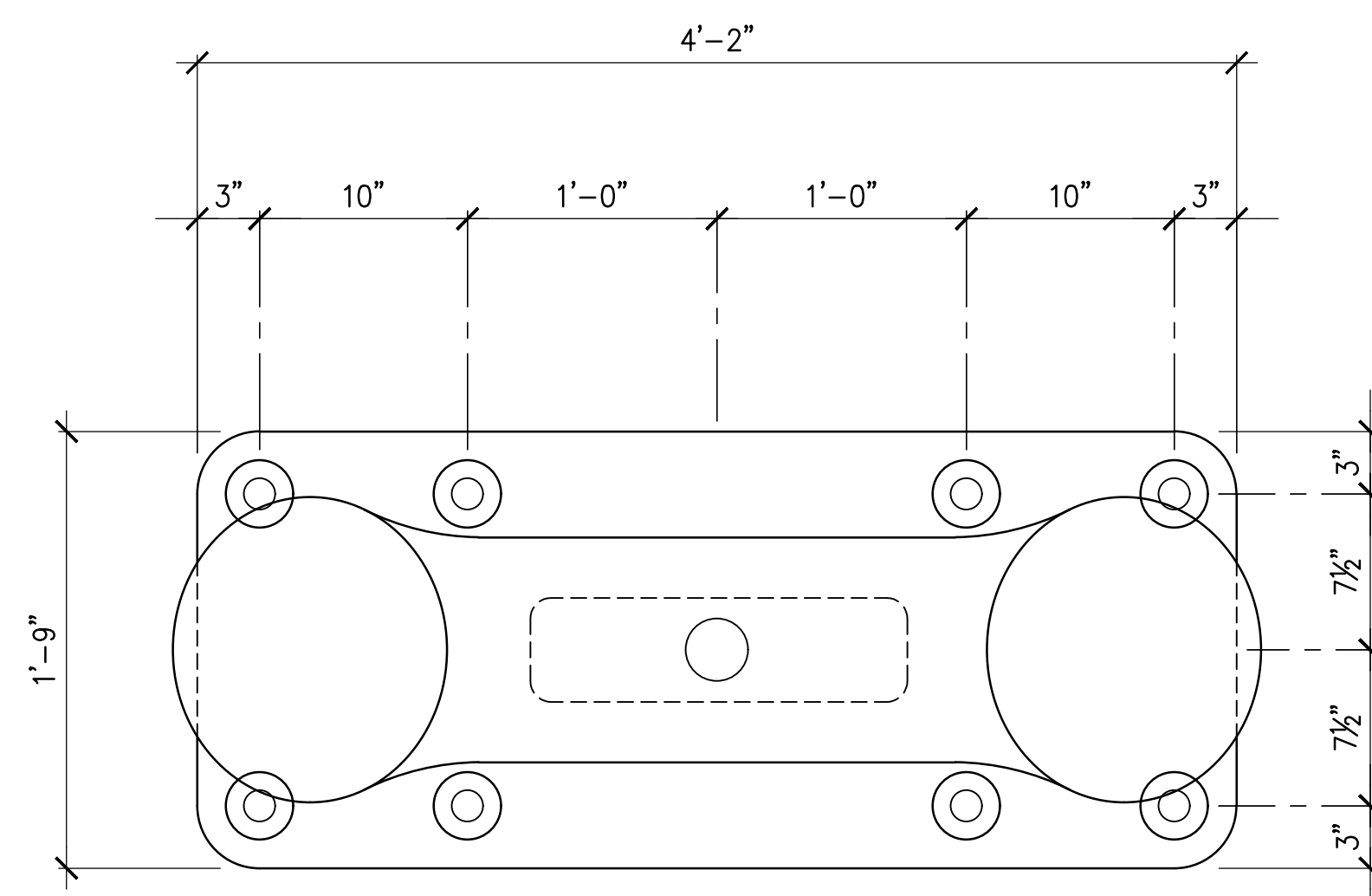


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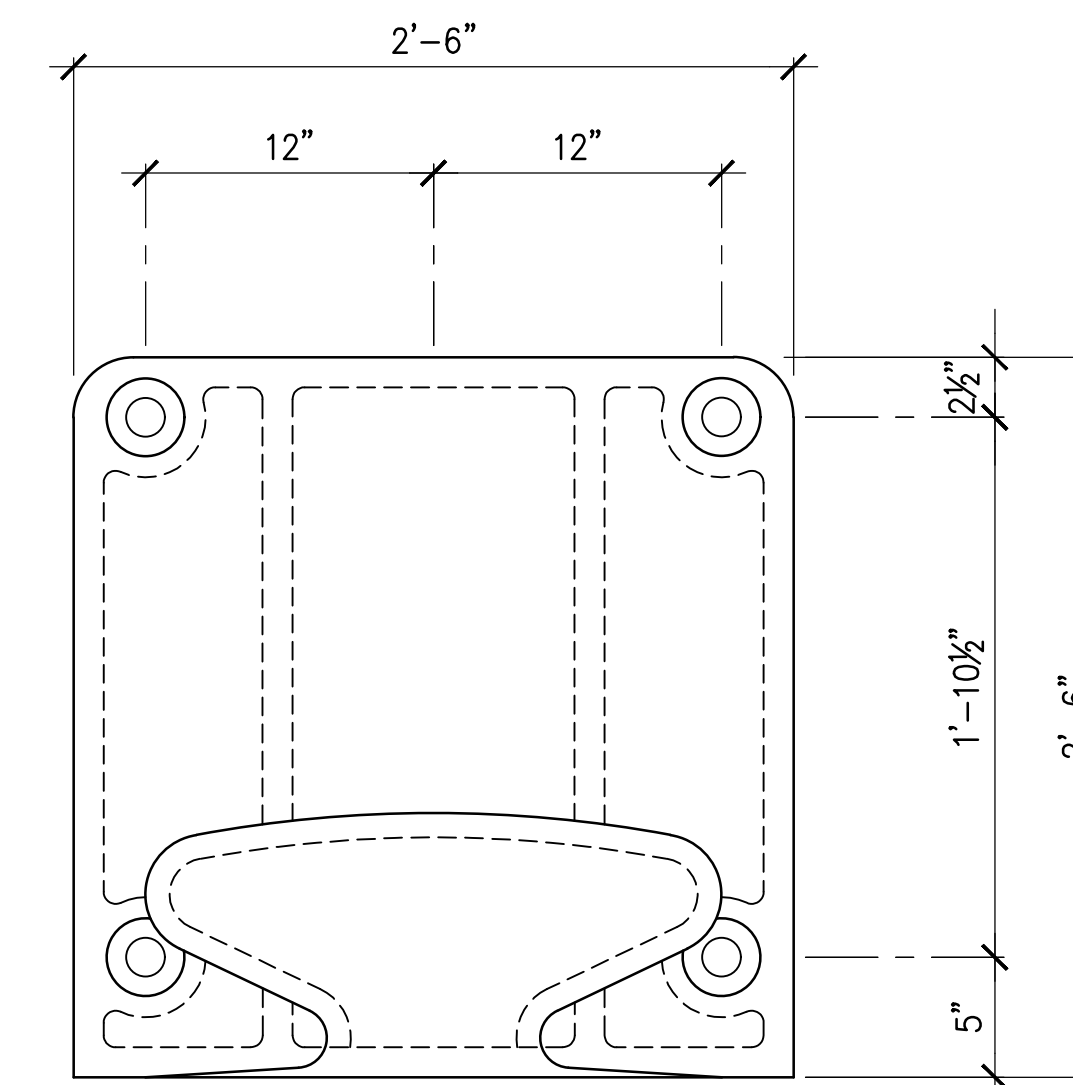
PLAN

TYPE A1/A2 BOLLARD



PLAN

TYPE B1/B2 BOLLARD



PLAN

TYPE C BOLLARD

BOLLARD REPAIR NOTES:

GENERAL:

- NON-SHRINK GROUT UNDER BOLLARD SHALL BE A PREMIXED NON-METALLIC FORMULA, CAPABLE OF DEVELOPING A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI IN 1 DAY AND 5,000 PSI IN 28 DAYS.
- BOLLARD SHALL NOT BE SUBJECTED TO LIVE LOADS UNTIL CONCRETE IN THE BOLLARD HAS BEEN ALLOWED TO CURE FOR 7 DAYS.
- COATING SHALL BE AMERLOCK 400 AND PSX 700 BY PPG PROTECTIVE AND MARINE COATINGS, OR APPROVED EQUAL. COLOR SHALL BE OSHA YELLOW.

BOLLARD REPAIR PROCEDURE:

- DEMOLISH EXISTING BOLLARD, CONCRETE AND HARDWARE. AVOID DAMAGING EXISTING REINFORCING STEEL.
- INSTALL THREADED RODS AND NUTS.
- TOUCH-UP EPOXY COATING ON BOLLARD.
- INSTALL BOLLARD PLUMB ON SETTING PLATE PAD OR LEVELING NUTS.
- INSTALL NON-SHRINK GROUT PAD.
- FILL BOLLARD WITH CONCRETE
- FILL BOLLARD BOLT HOLES WITH POLYURETHANE SEALANT.

	REVISION	DATE	DESCRIPTION	BY	APPROVED
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	SHEET TITLE BOLLARD DETAILS				
DESIGNED BY: RA		JOB NUMBER		SHEET	
DRAWN BY: DL		S70171		S-7	
CHECKED BY: GO					
DATE: 04/2026					
SCALE: AS SHOWN					