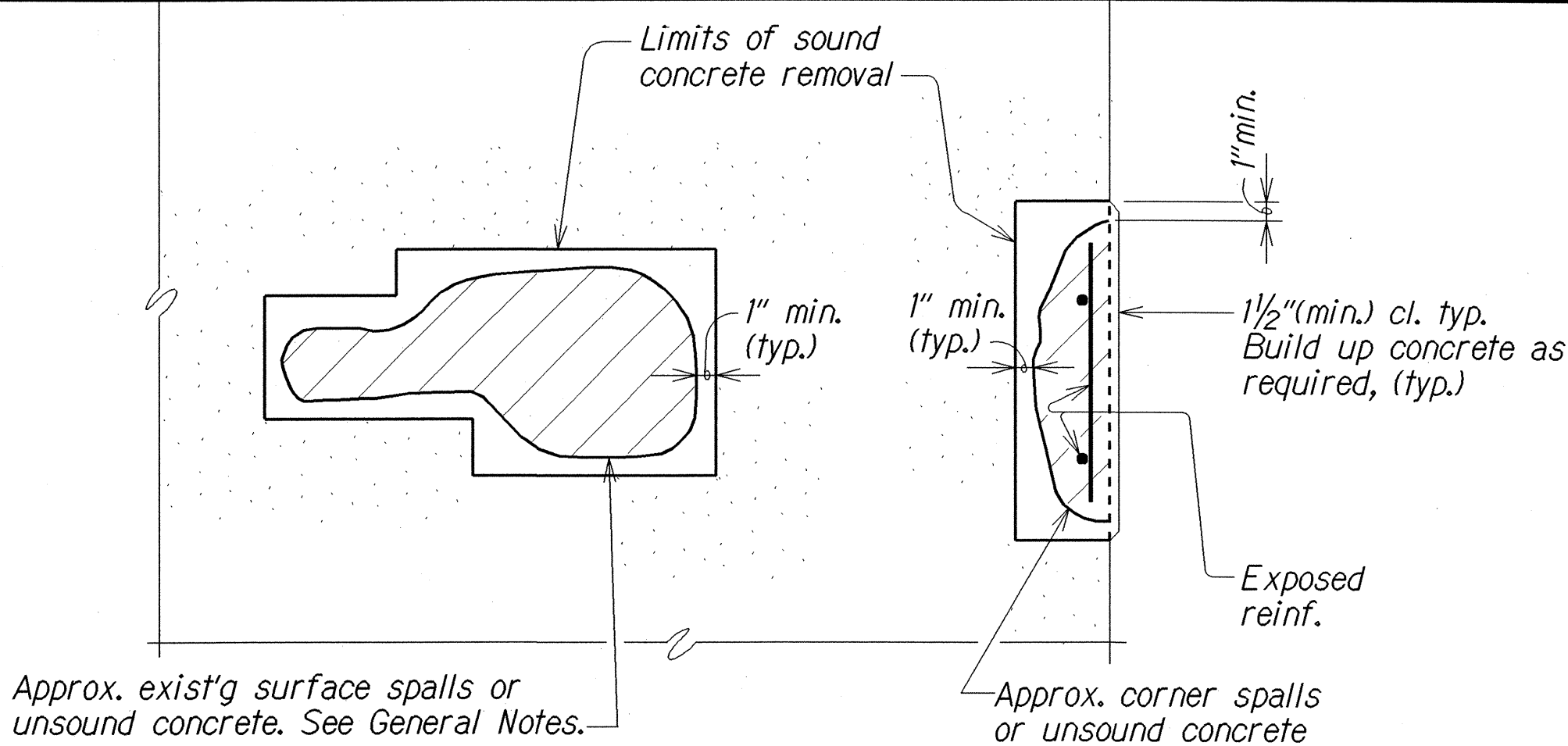
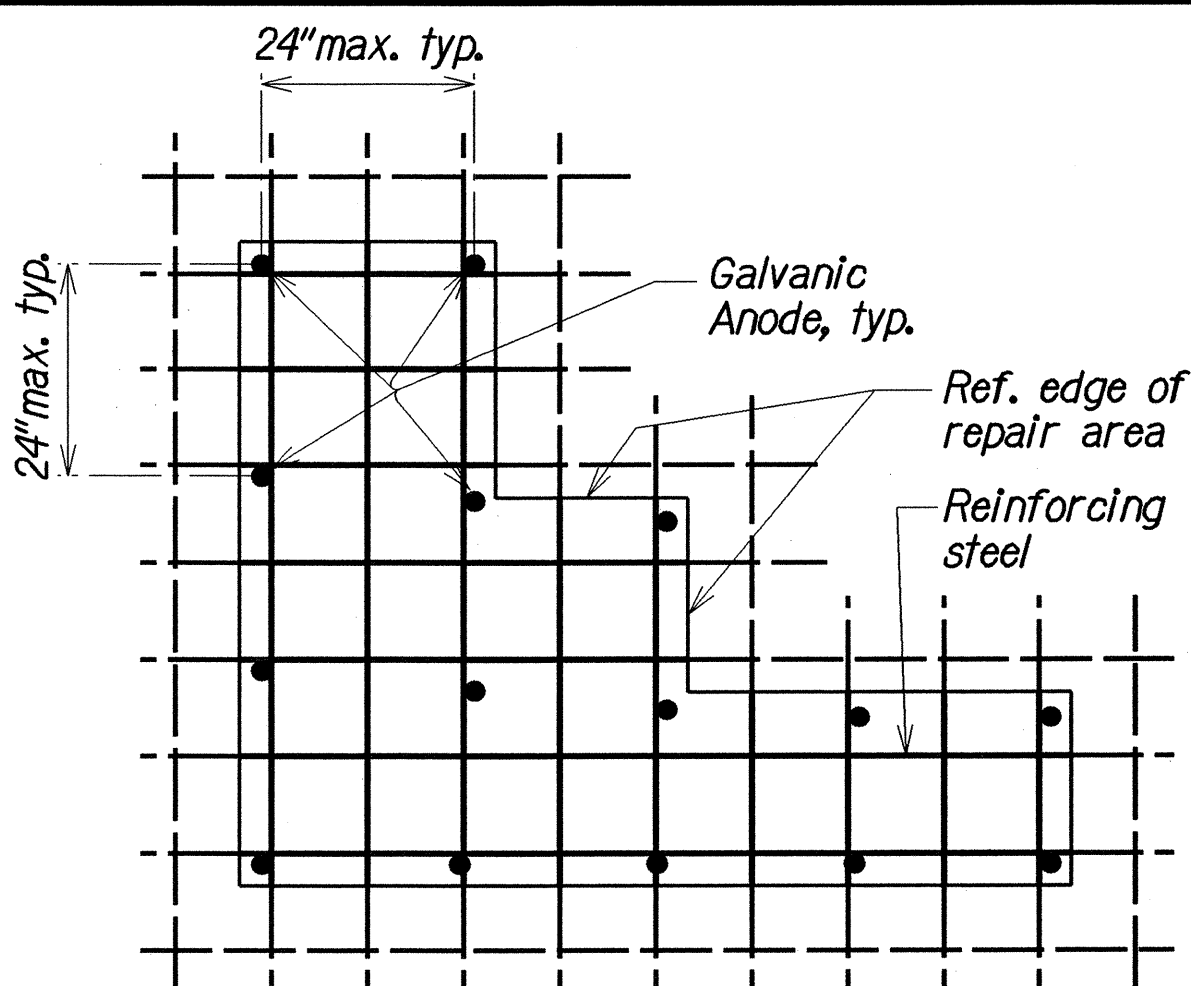


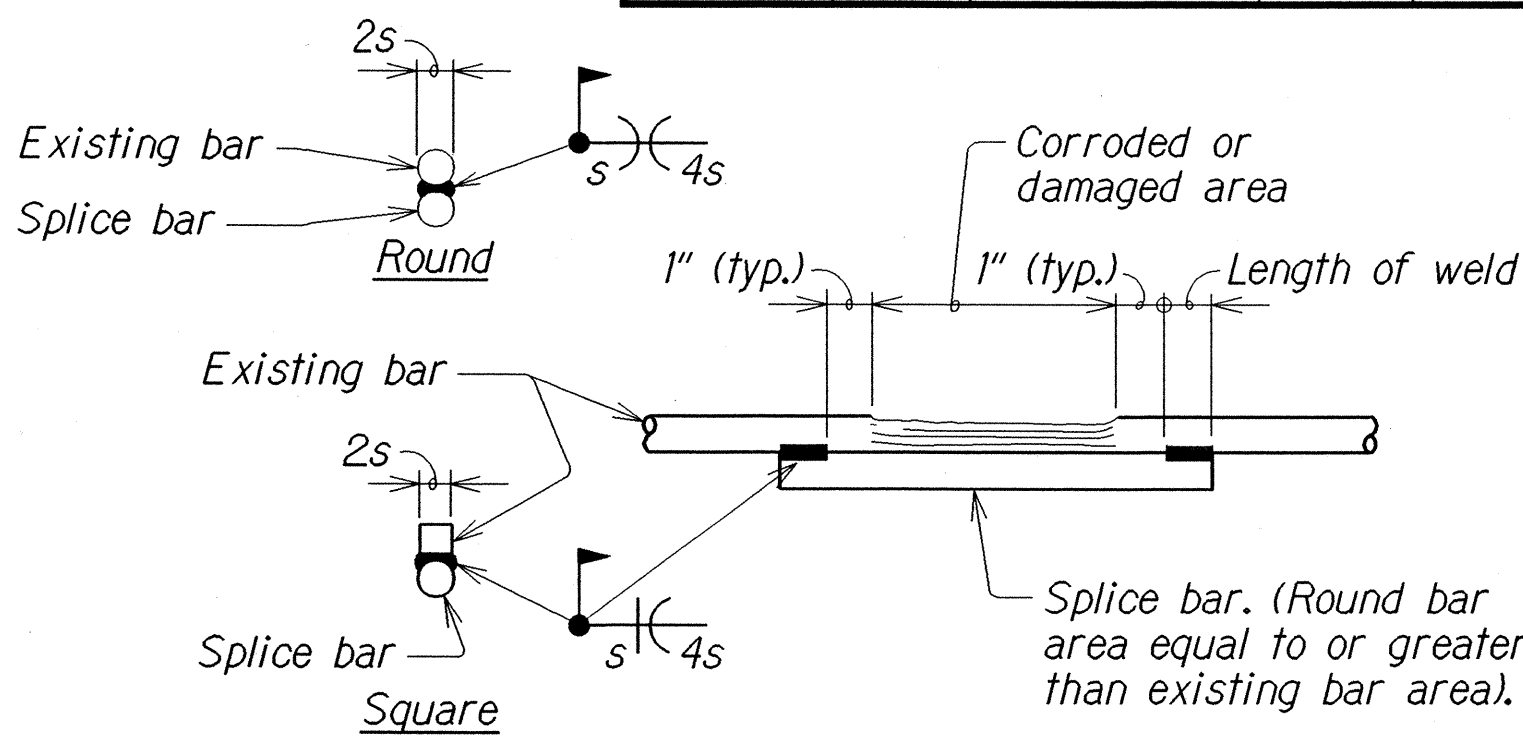
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-04-03M	2003	7	15



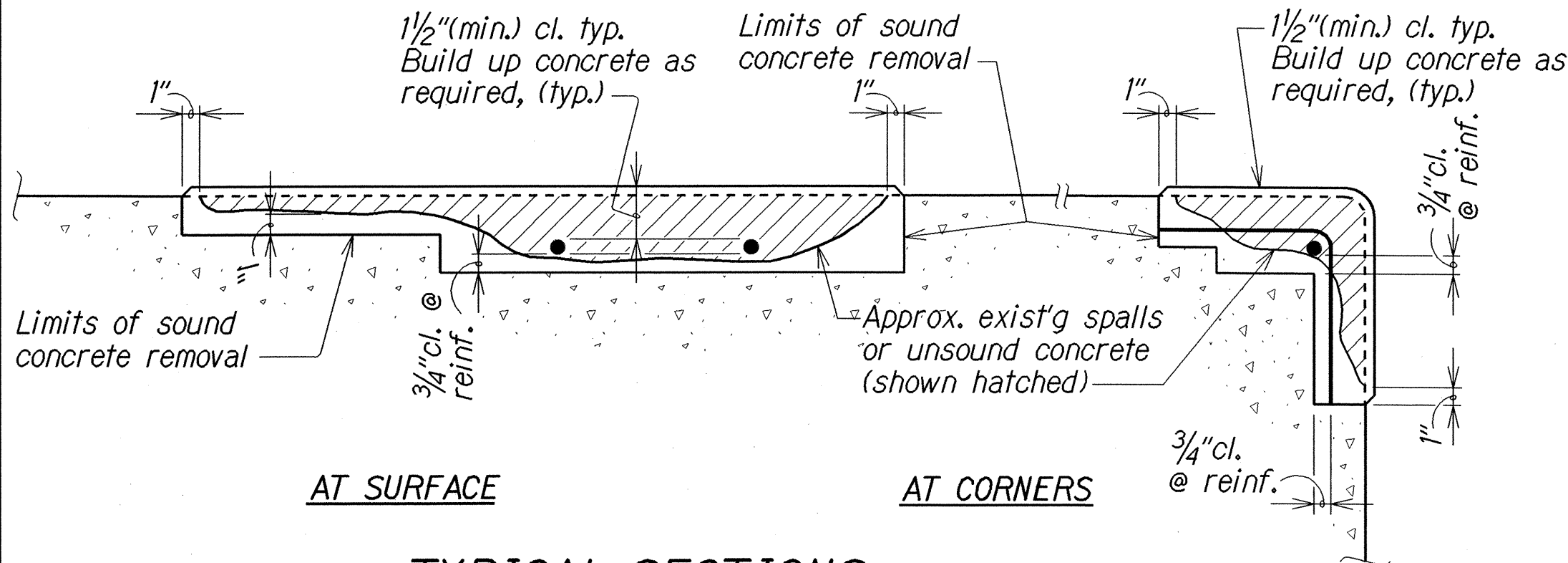
PLAN OR ELEVATION



TYPICAL LAYOUT FOR DECK OR WALL

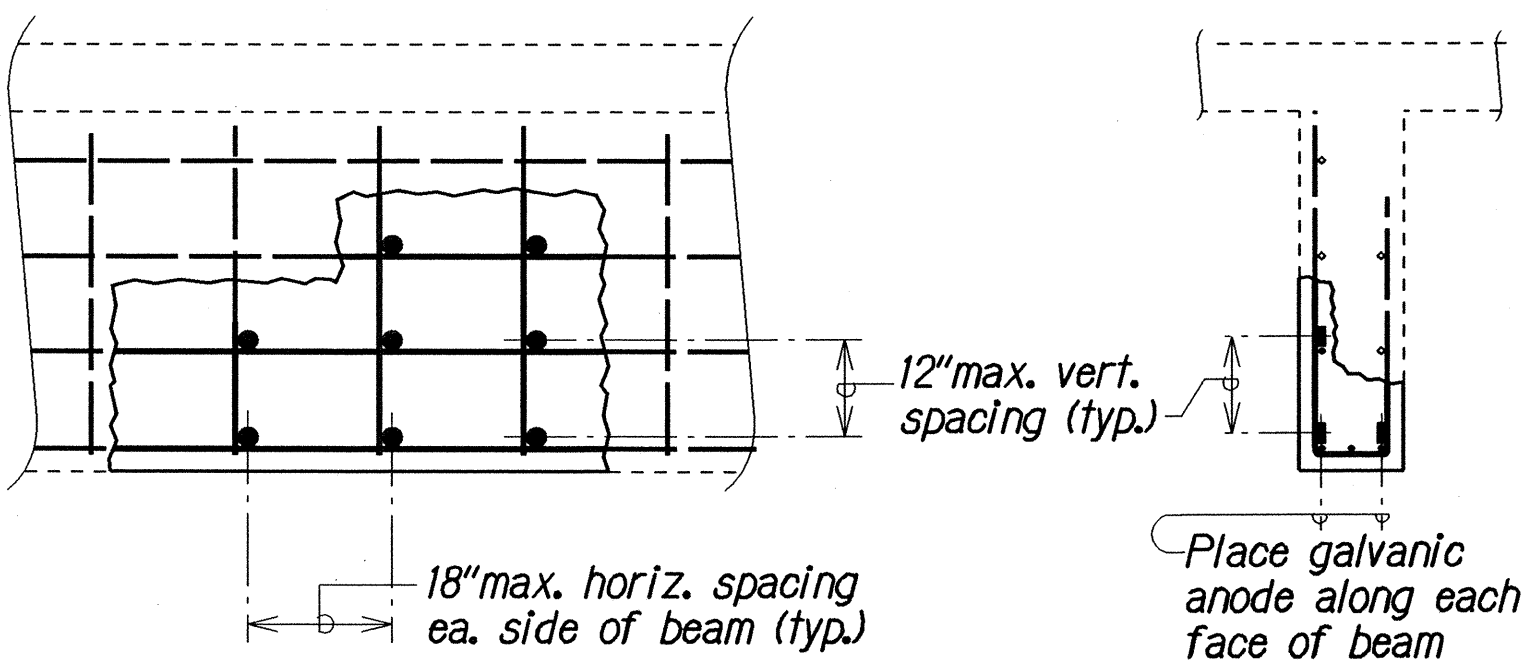


REINFORCING BAR
REPAIR SPLICE DETAIL



TYPICAL SECTIONS

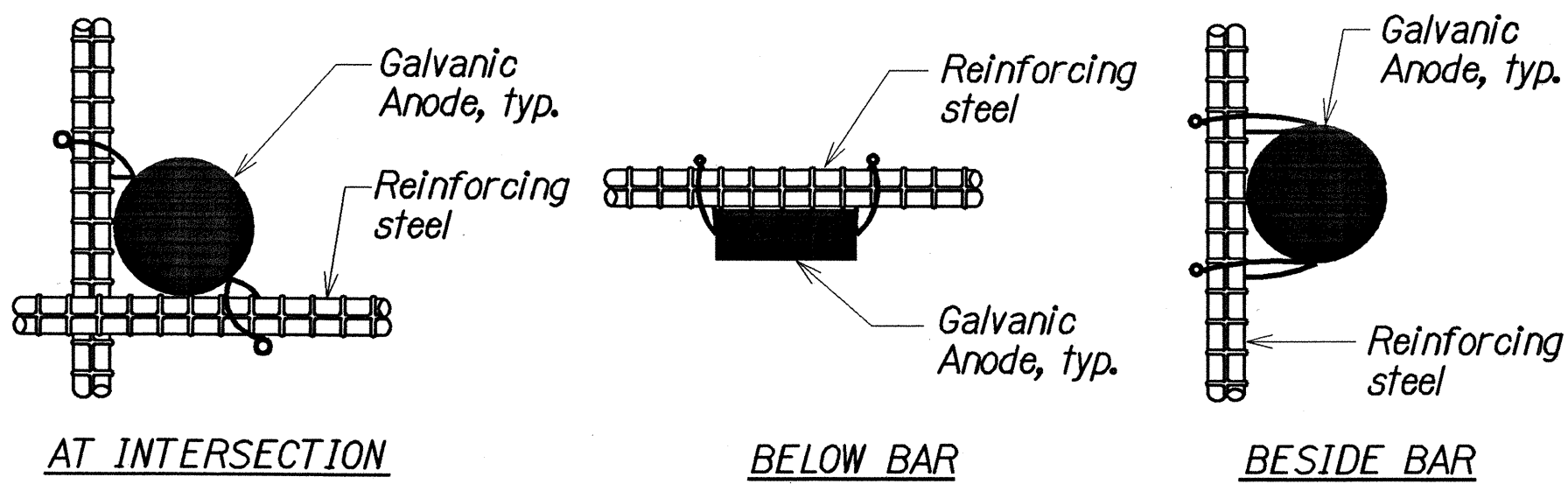
TYPICAL CONCRETE REPAIRS



ELEVATION

TYPICAL BEAM

TYPICAL SECTION



TYPICAL INSTALLATION DETAILS
GALVANIC ANODE INSTALLATION

GENERAL NOTES

GENERAL:

1. New reinforcing steel to be ASTM A 615. All welded reinforcing steel to be ASTM A 706.
2. All welding shall be done in accordance with the current edition of the Reinforcing Steel Welding Code AWS D1.4.
3. Repair material to be compatible with Galvanic Anode System. See Special Provisions.
4. Larger spall repairs may be filled with concrete with the approval of the Engineer. Repair concrete shall be 5,000 p.s.i. strength with maximum water/cement ratio of (0.4). Use 3/8" maximum size aggregate. Concrete mix design to be submitted to the Engineer for approval.
5. Shotcrete shall not be used to make repairs.
6. Repair material shall not consist of any concrete bonding agents.
7. All work not listed in the Proposal Schedule shall be considered incidental and will not be paid for separately.
8. Concrete for railing curb, endpost repair and stopper blocks shall be 5,000 p.s.i. strength with maximum water/cement ratio of (0.4). Concrete mix design to be submitted to the Engineer for approval.

REPAIR NOTES:

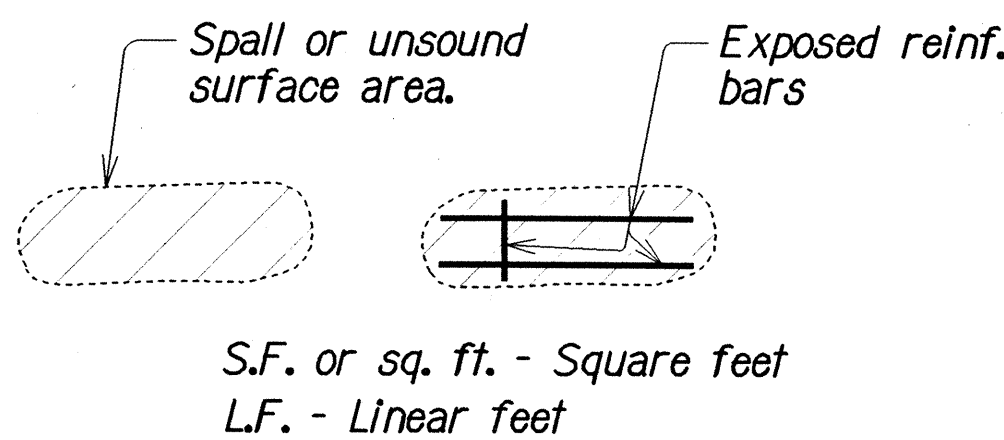
1. All deteriorated, damaged, cracked, spalled, honeycombed concrete or concrete over rusted reinforcing bars shall be removed as shown and repaired with an appropriate concrete patch material.
2. Clean reinforcing steel by oil-free abrasive blasting down to sound metal.
3. Provide minimum 1 1/2" concrete cover over reinforcement.

4. Reinforcing bars that have rusted more than 25% of their original cross sectional area shall be strengthened as shown on "Reinforcing Bar Repair Splice Detail", this sheet.
5. Install galvanic anodes at spacing noted on details. Follow all instructions in the Special Provisions and manufacturer's recommendations.
6. Wet repair surface with water. Use compressed air to remove all surface moisture in the repair location just prior to application of repair material.
7. Apply patch material per manufacturer's recommendations and instructions.
8. The Contractor shall sound and mark all locations to be repaired. The Contractor shall sound with a hammer or other suitable device and mark the location with paint the exact perimeter of the repairs. The Engineer will verify and measure the locations prior to the Contractor starting the work.
9. The Contractor shall prevent the contamination of the repair with salt water. Some repairs may require the work to be performed at low tide. If the repair area will be affected by tide or wave action during curing, the repair shall be covered with plywood until the patch material has cured.
10. If the repair is underwater the Contractor shall devise a method to maintain a dry work area to prevent contamination with salt water during the repair and curing processes.

INCIDENTAL ITEMS: The following items shall be considered incidental to the various pay items for repairs and will not be paid for separately:

1. Cleaning of all exposed, corroded reinforcing steel to sound metal.
2. Repair of reinforcing bars.
3. Furnishing and installation of galvanic anodes.
4. Any work platforms required for access.
5. Any formwork required to place patch materials.
6. The Contractor is responsible for any shoring of members. The Contractor shall provide calculations performed by a Hawaii licensed structural engineer for all shoring requirements.
7. Grout

SYMBOLS AND ABBREVIATIONS:



ESTIMATED QUANTITIES

LISTED BY BRIDGE

ITEM NO.	ITEM	UNIT	QTY
202.0300	Maillili Bridge, Removal of Pedestrian Rail and Curb	L.S.	L.S.
503.6000	Maillili Bridge, Concrete for Pedestrian Rail Curb	L.S.	L.S.
503.7000	Maillili Bridge, Concrete for New Foundation and Curb	L.S.	L.S.
507.0000	Maillili Bridge, Metal Pedestrian Railing	L.F.	382
507.0000	Maillili Bridge, Spall Repair	L.F.	1,600
202.0400	Waimea Bridge, Removal of Bridge Endpost	L.S.	L.S.
503.8000	Waimea Bridge, Concrete for Stopper Blocks	L.S.	L.S.
503.9000	Waimea Bridge, Concrete for Endpost	L.S.	L.S.
676.2000	Waimea Bridge, Spall Repair	S.F.	150
677.1000	Waimea Bridge, Roller Bearing Repair	L.S.	L.S.
676.3000	Hauula Bridge, Spall Repair	S.F.	375
676.4000	Waipuhi Bridge, Spall Repair	S.F.	375

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

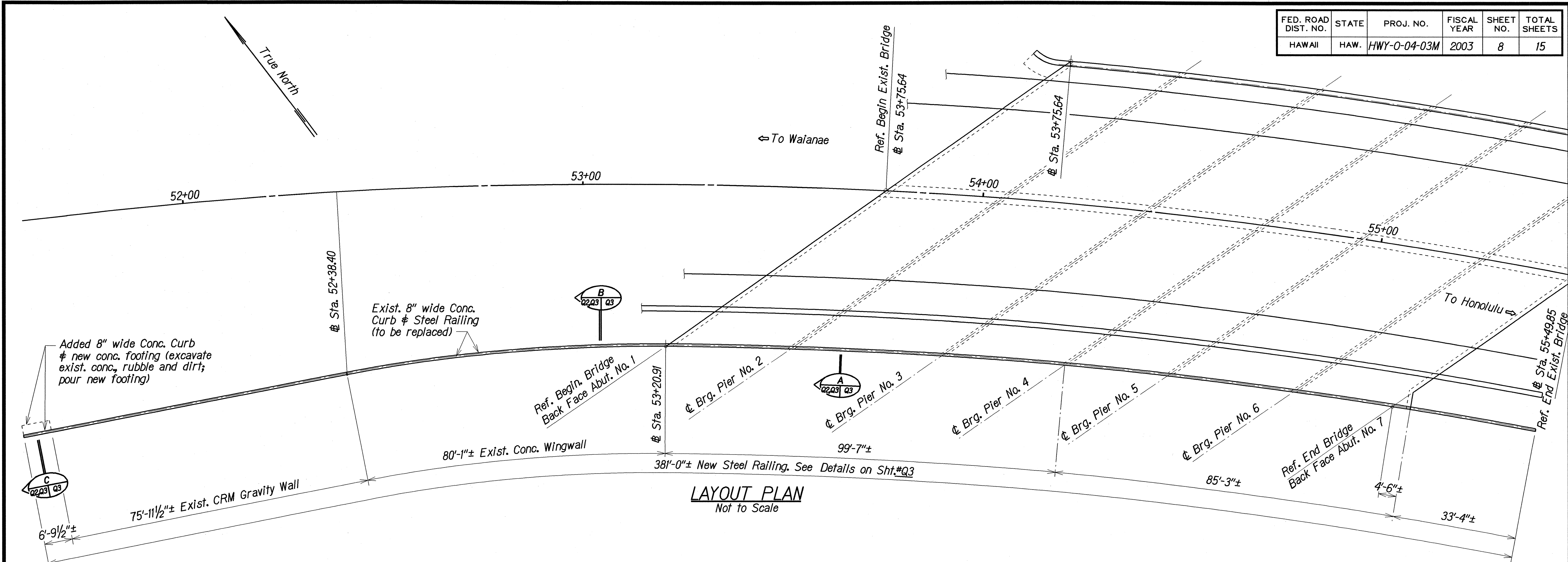
SPALL and CRACK REPAIR DETAILS
BRIDGE REPAIRS AT VARIOUS LOCATIONS
Kamehameha Highway/Farrington Highway
Project No. HWY-0-04-03M

Scale: As Noted

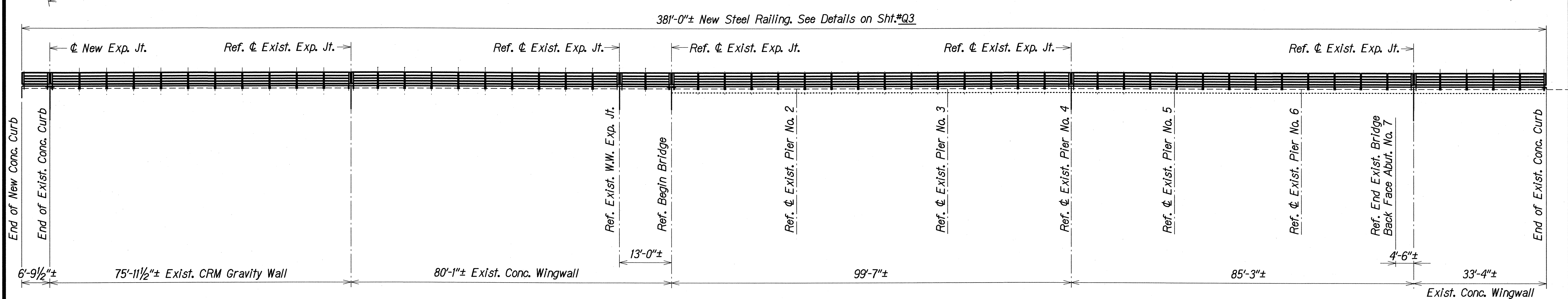
Date: May, 2003

SHEET No. 01 OF 9 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-04-03M	2003	8	15



LAYOUT PLAN
Not to Scale



ELEVATION
Not to Scale

REPLACE EXISTING STEEL RAILING and CONCRETE CURB
MAILILII STREAM BRIDGE

SURVEY PLOTTED BY	DATE
DESIGNED BY	MAY 2003
CHECKED BY	MAY 2003
NOTED BY	MAY 2003
QUANTITIES BY	MAY 2003
PLT	MAY 2003

DS = 150

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

REPLACE EXISTING STEEL RAILING
and CONCRETE CURB
MAILILII STREAM BRIDGE
BRIDGE REPAIRS AT VARIOUS LOCATIONS
Kamehameha Highway/Farrington Highway
Project No. HWY-0-04-03M
Scale: As Noted Date: May, 2003

WINGWALL, ABUTMENT and PIER ELEVATIONS
MAILILII STREAM BRIDGE
 Not to Scale

NOTE:
 Spall locations are for illustration purpose only. Actual locations to be determined by the Contractor and Engineer in the field.

SYMBOLS:

- Approximate spall or crack location (not repaired)
- Approximate location of repaired spall/crack

LEGEND FOR AS-BUILT POSTINGS

- Squiggly line for as-built deletion
- Double line for as-built deletion
- Text for as-built posting

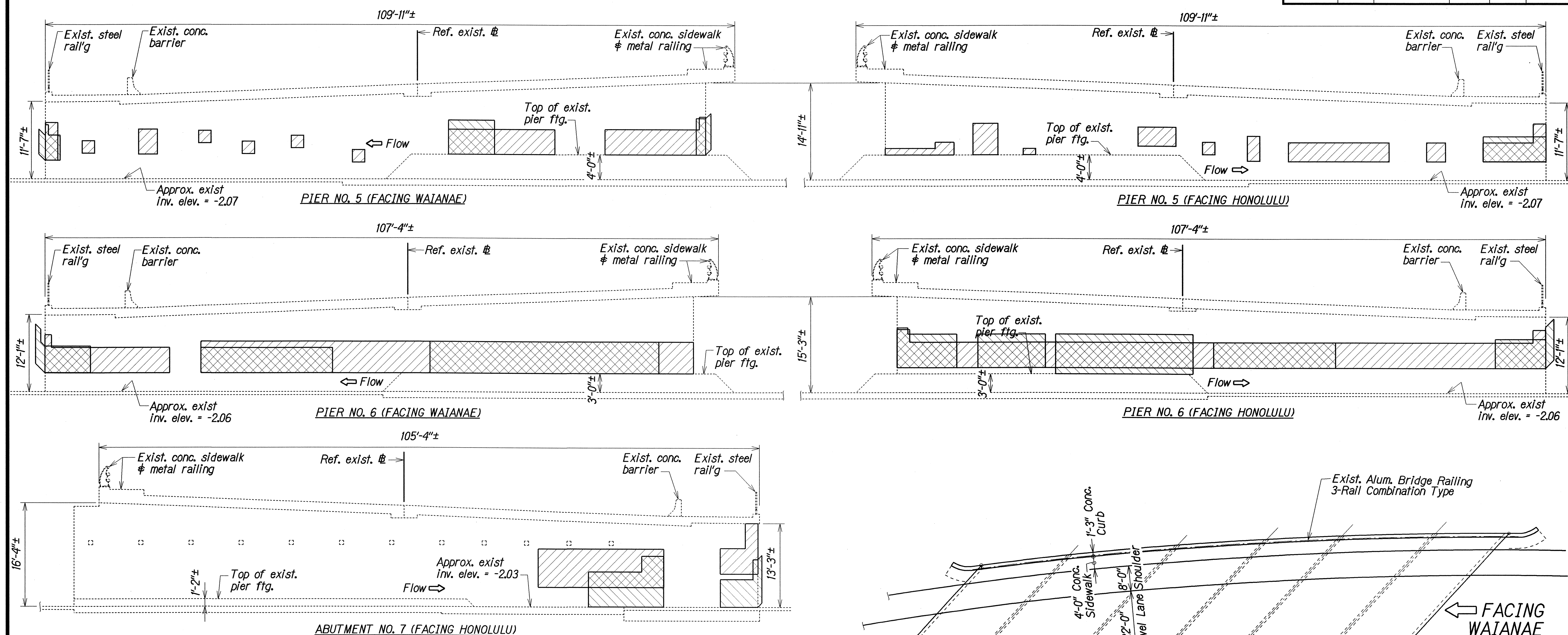
WINGWALL, ABUTMENT and PIER ELEVATIONS
MAILILII STREAM BRIDGE
 Bridge Repairs at Various Locations
 Kamehameha Highway/Farrington Highway
 Project No. HWY-0-04-03M

Scale: As Noted Date: May, 2003

Sheet No. 04 of 9 Sheets

10

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-04-03M	2003	11	15



NOTE:

Spall locations are for illustration purpose only. Actual locations to be determined by the Contractor and Engineer in the field.

SYMBOLS:

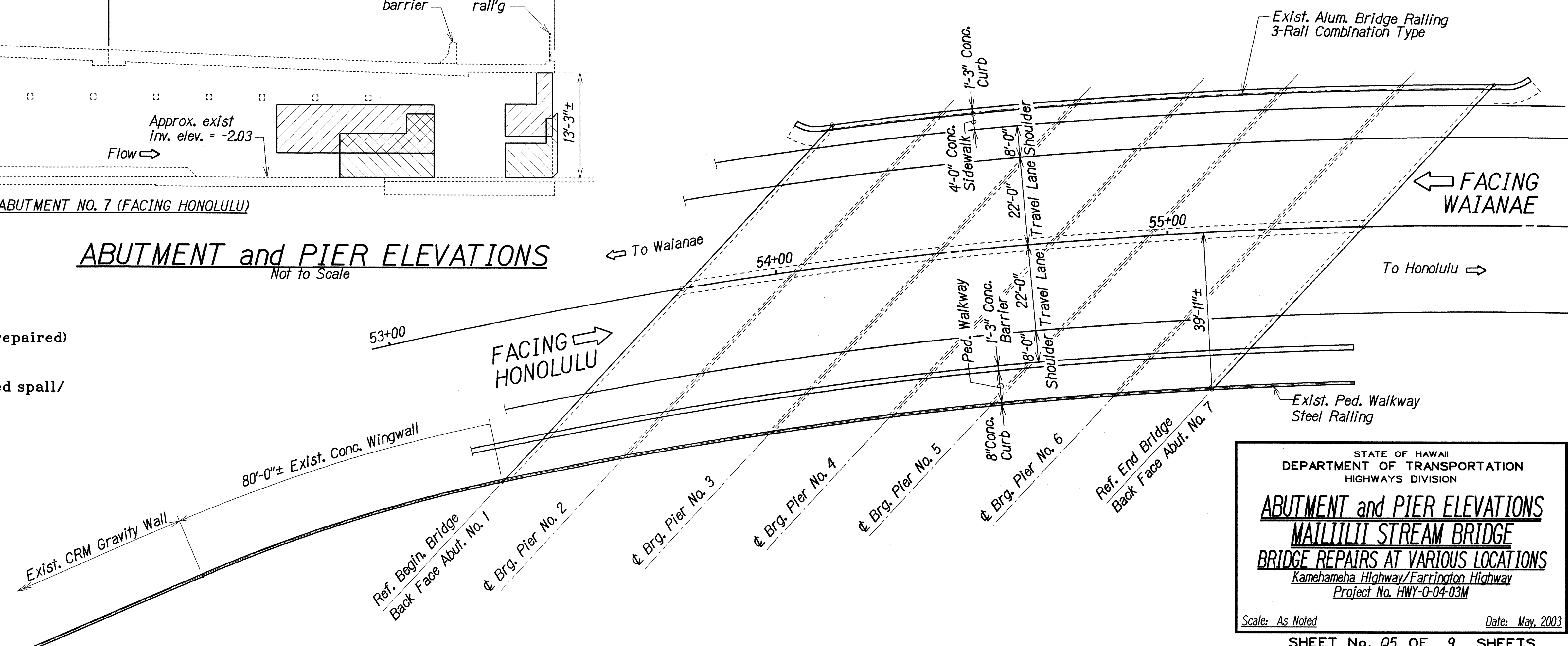
- Approximate spall or crack location (not repaired)
- Approximate location of repaired spall/crack

LEGEND FOR AS-BUILT POSTINGS

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- Double line for as-built deletion
- Roadway Text for as-built posting

ABUTMENT and PIER ELEVATIONS

Not to Scale



"AS-BUILT"

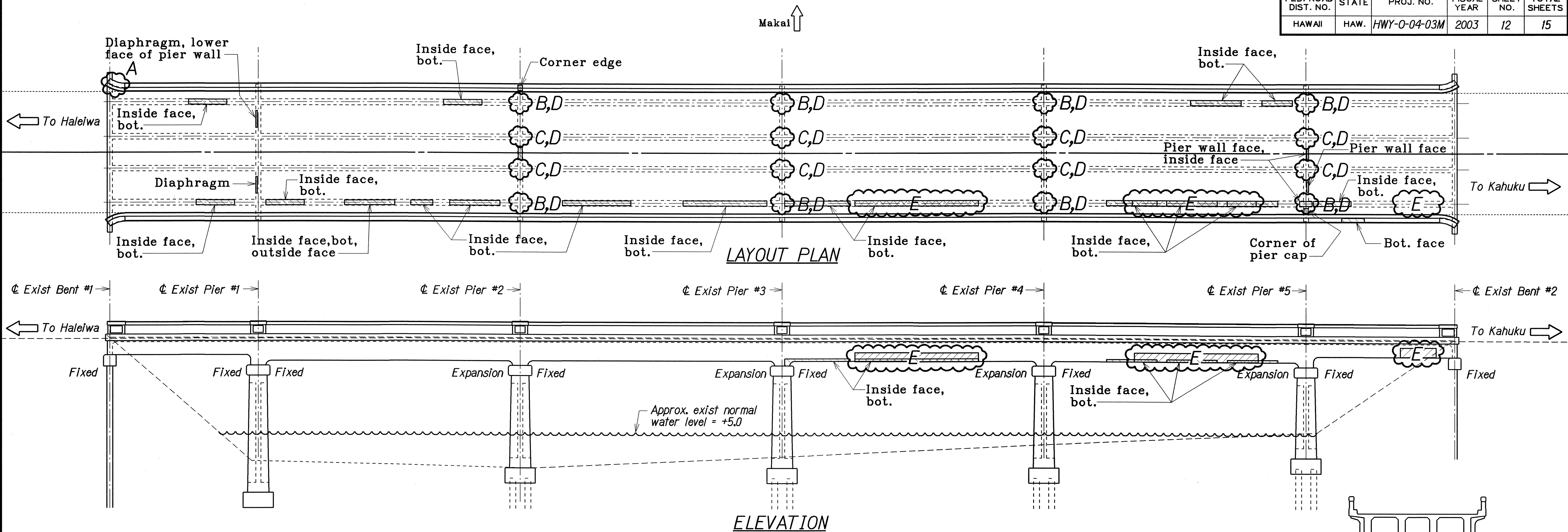
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ABUTMENT and PIER ELEVATIONS
MAILILI STREAM BRIDGE
BRIDGE REPAIRS AT VARIOUS LOCATIONS
Kamehameha Highway/Farrington Highway
Project No. HWY-0-04-03M

Scale: As Noted Date: May, 2003

SHEET No. Q5 OF 9 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-04-03M	2003	12	15



APPROXIMATE REPAIR LOCATIONS--WAIMEA STREAM BRIDGE

Not to Scale

KEY TO WORK

See Sht.#Q1 for spall repair details
See Sht.#Q7 for concrete stopper and roller bearing repair details

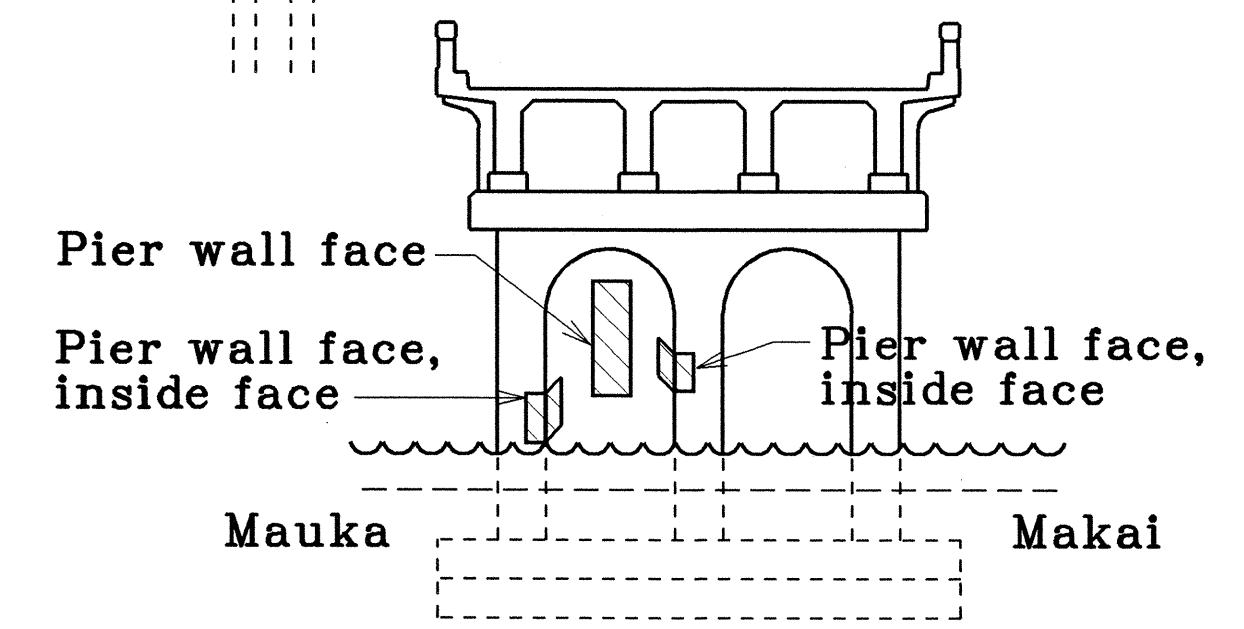
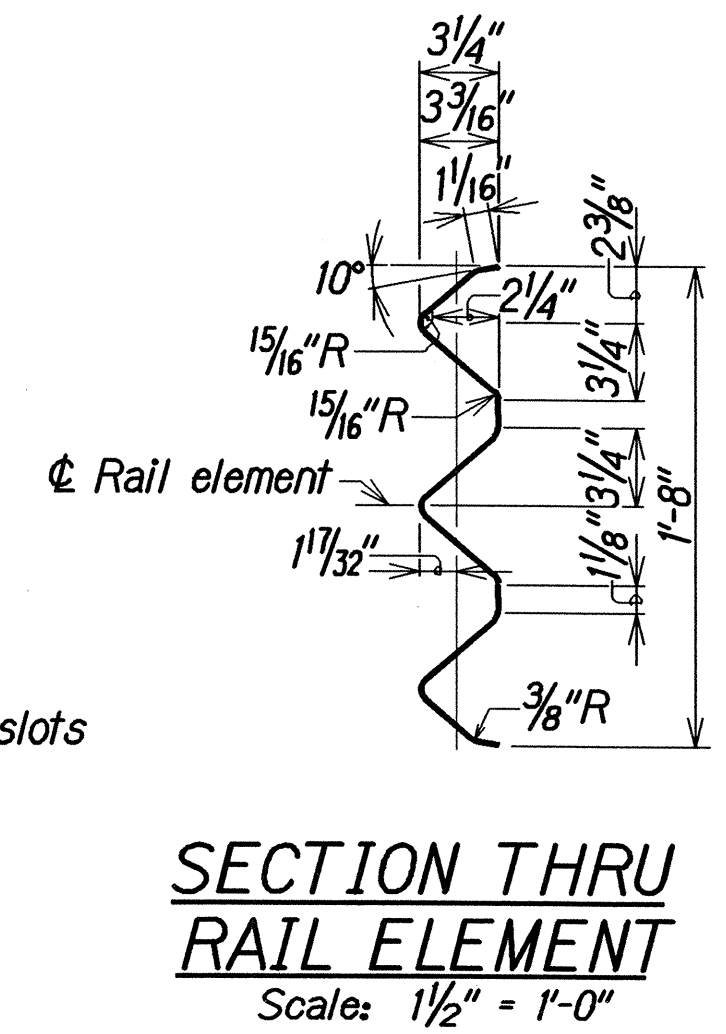
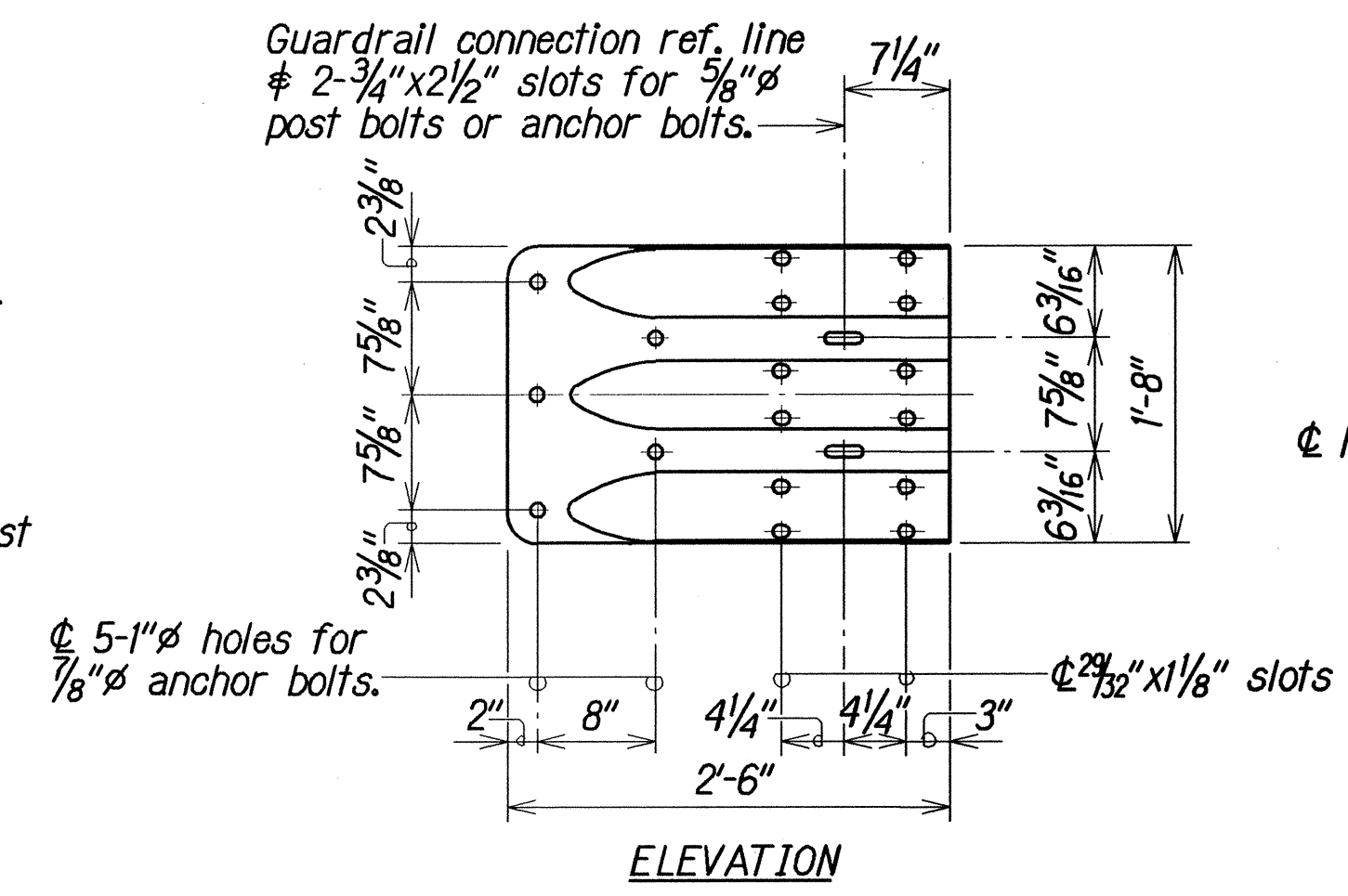
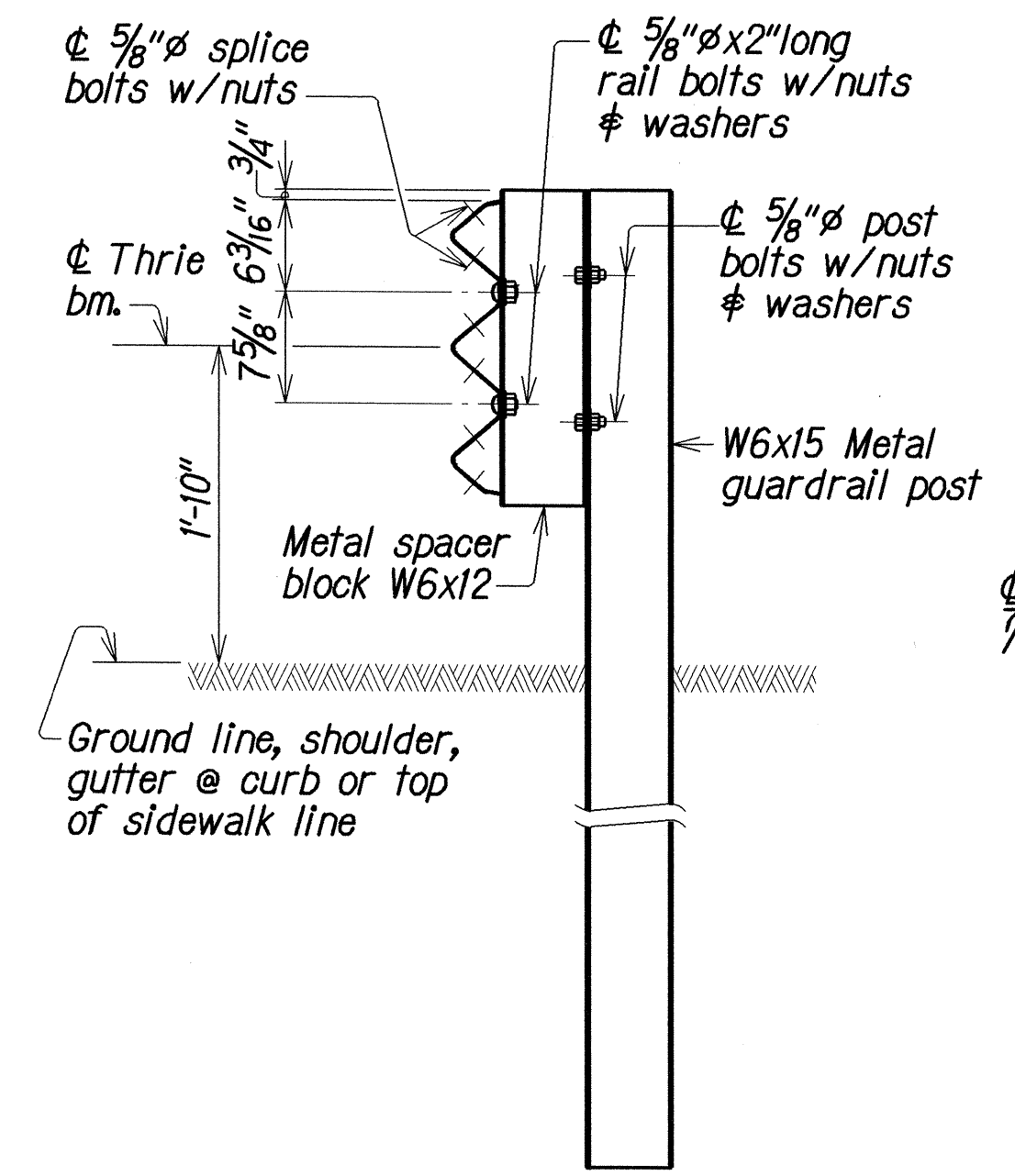
- A** Rebuild damaged endpost. Demolish damaged portion of the endpost. Repair any damaged reinforcement to original condition. Concrete to be rebuilt to original dimensions and finish. ~~Replace thrie beam and terminal connector (see adjacent details). Guardrail work shall be incidental to concrete.~~
- B** Install new concrete stopper block at backwall only
- C** Install new concrete stopper block at girder and backwall
- D** Replace missing and damaged roller bearings. Replace all heavily corroded roller bearings. Clean and paint all other roller bearings and bearing plates.

E Repair spalled or cracked concrete (not repaired)

Note: Spall locations are for illustration purpose only. Actual locations to be determined by the Contractor and Engineer in the field.

Approximate location of repaired spall/crack.

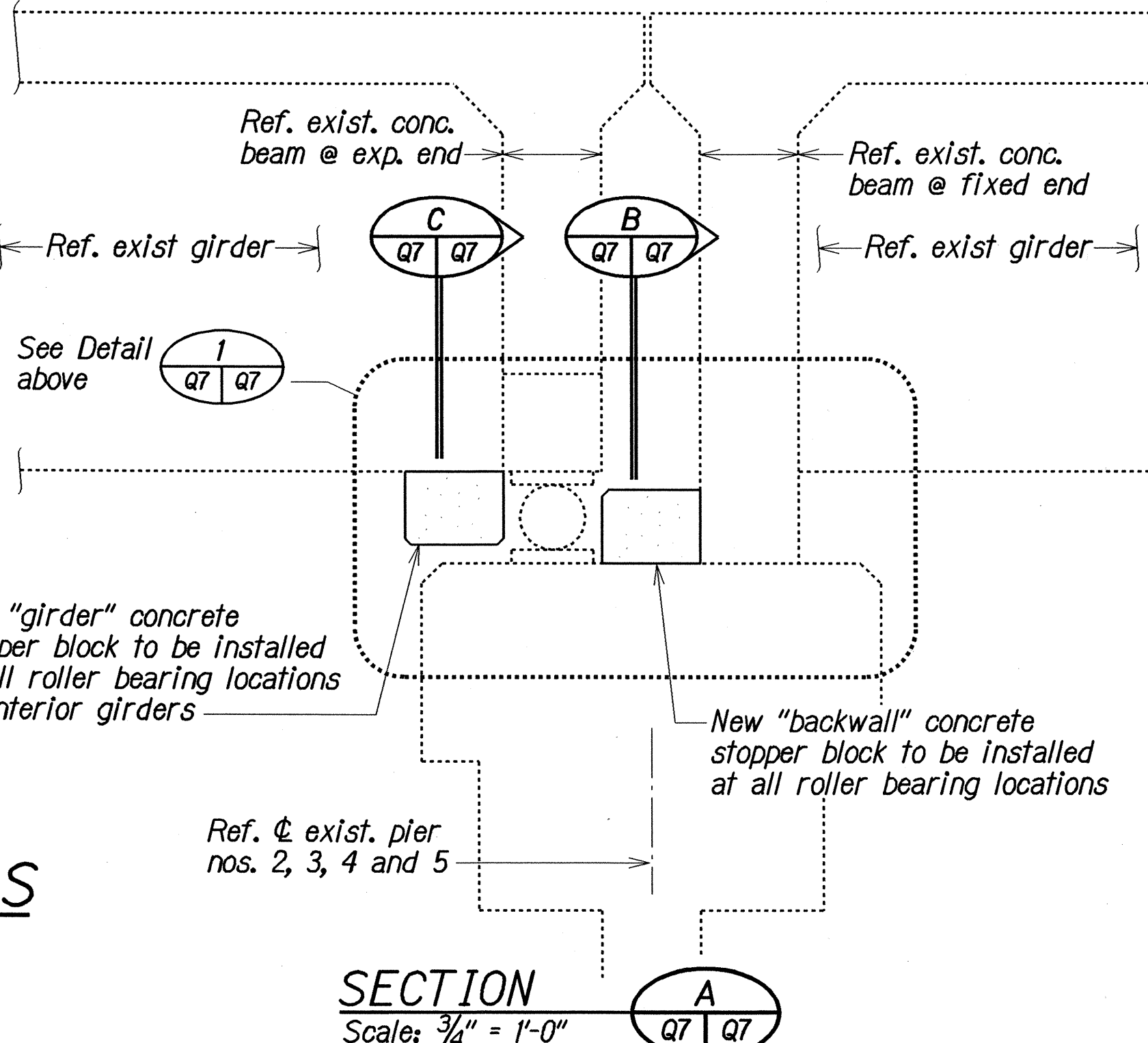
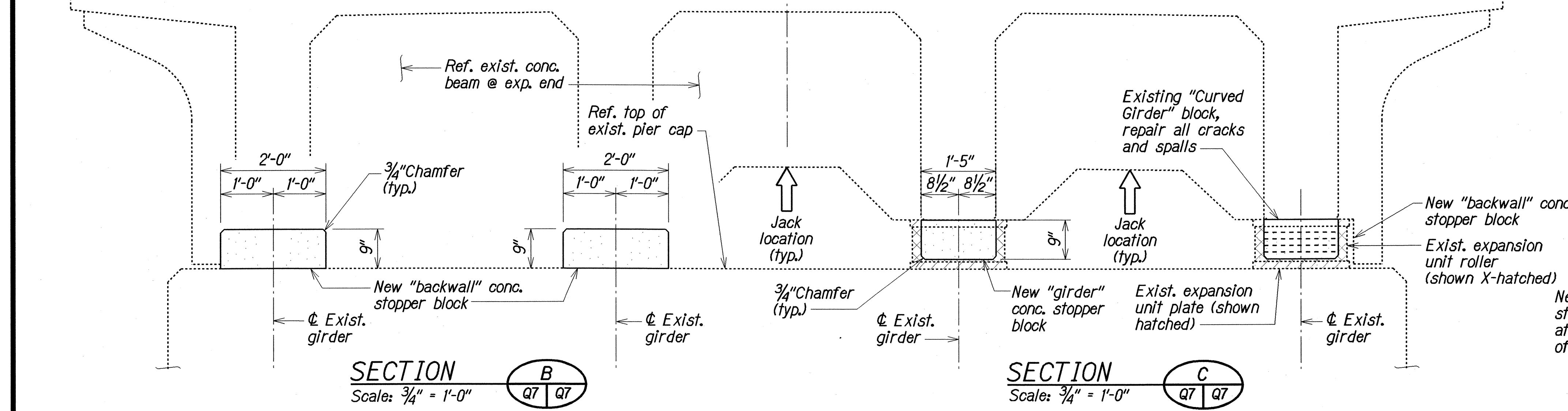
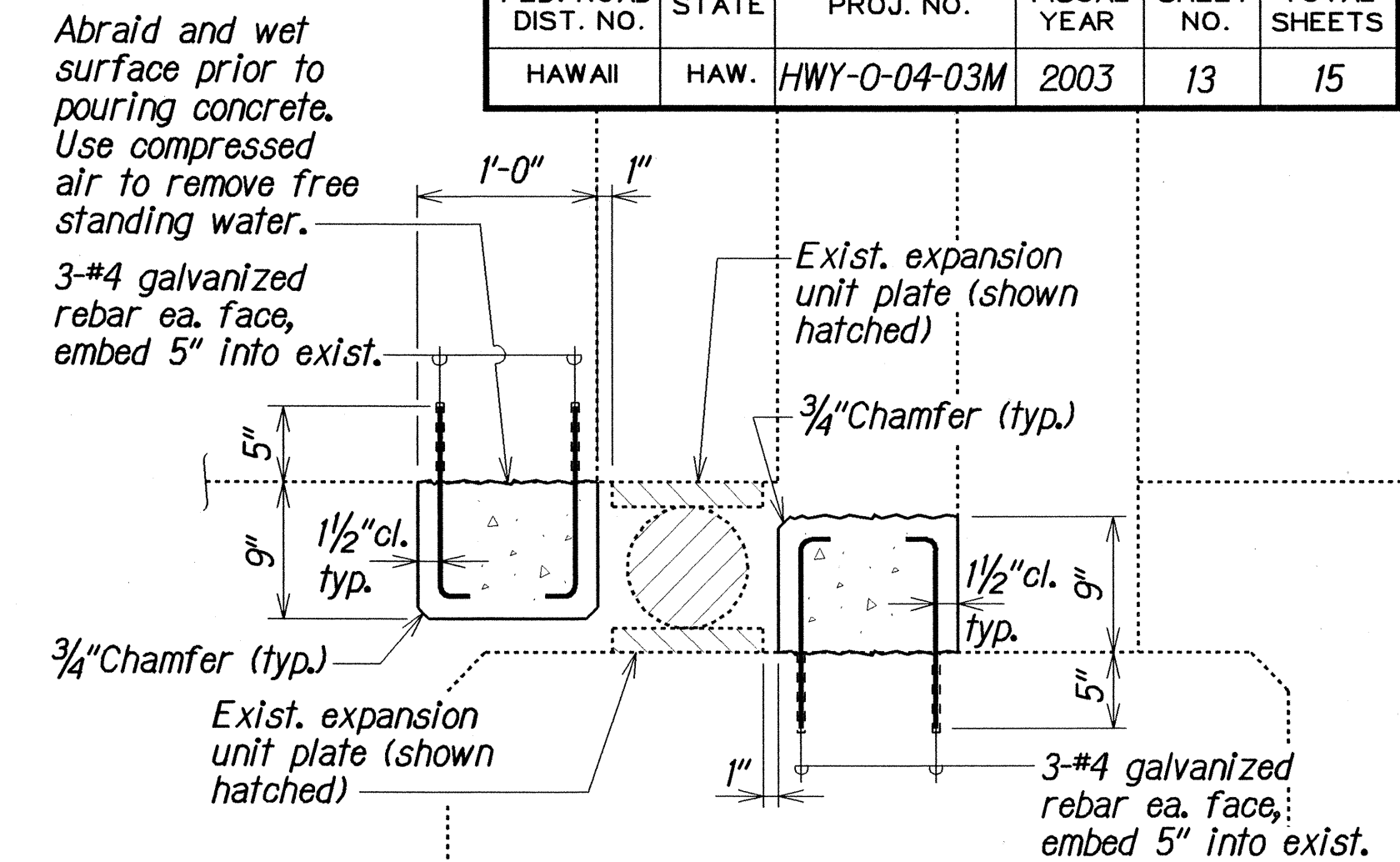
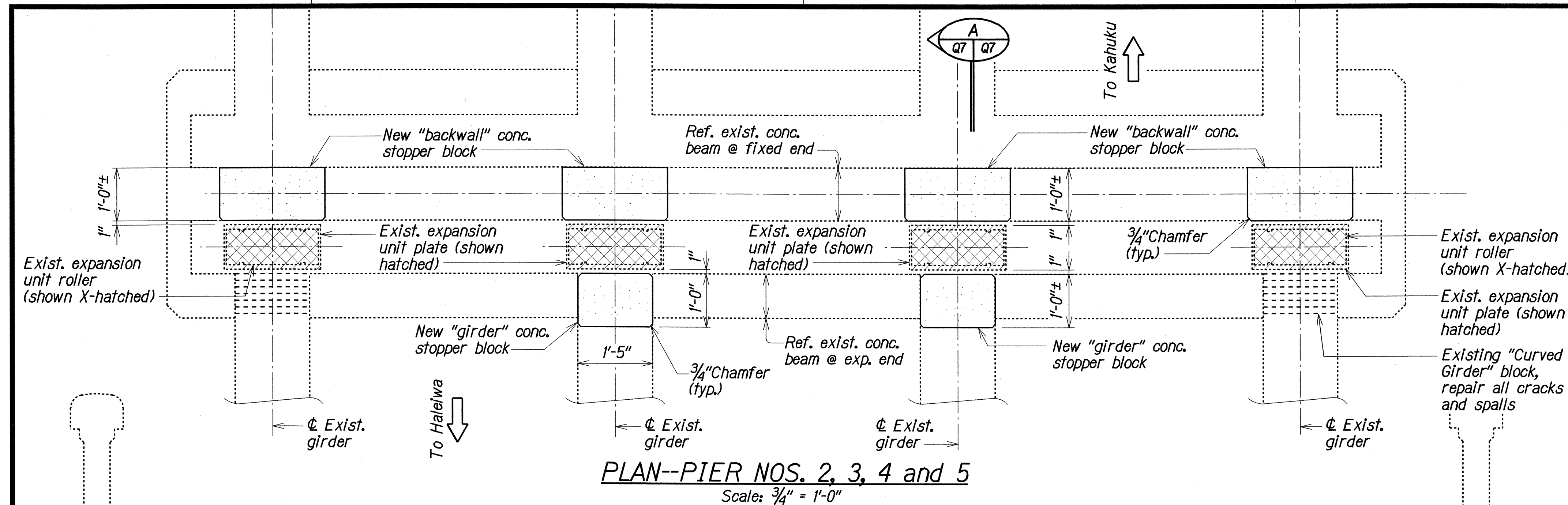
LEGEND FOR AS-BUILT POSTINGS	
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	Double line for as-built deletion
Roadway	Text for as-built posting



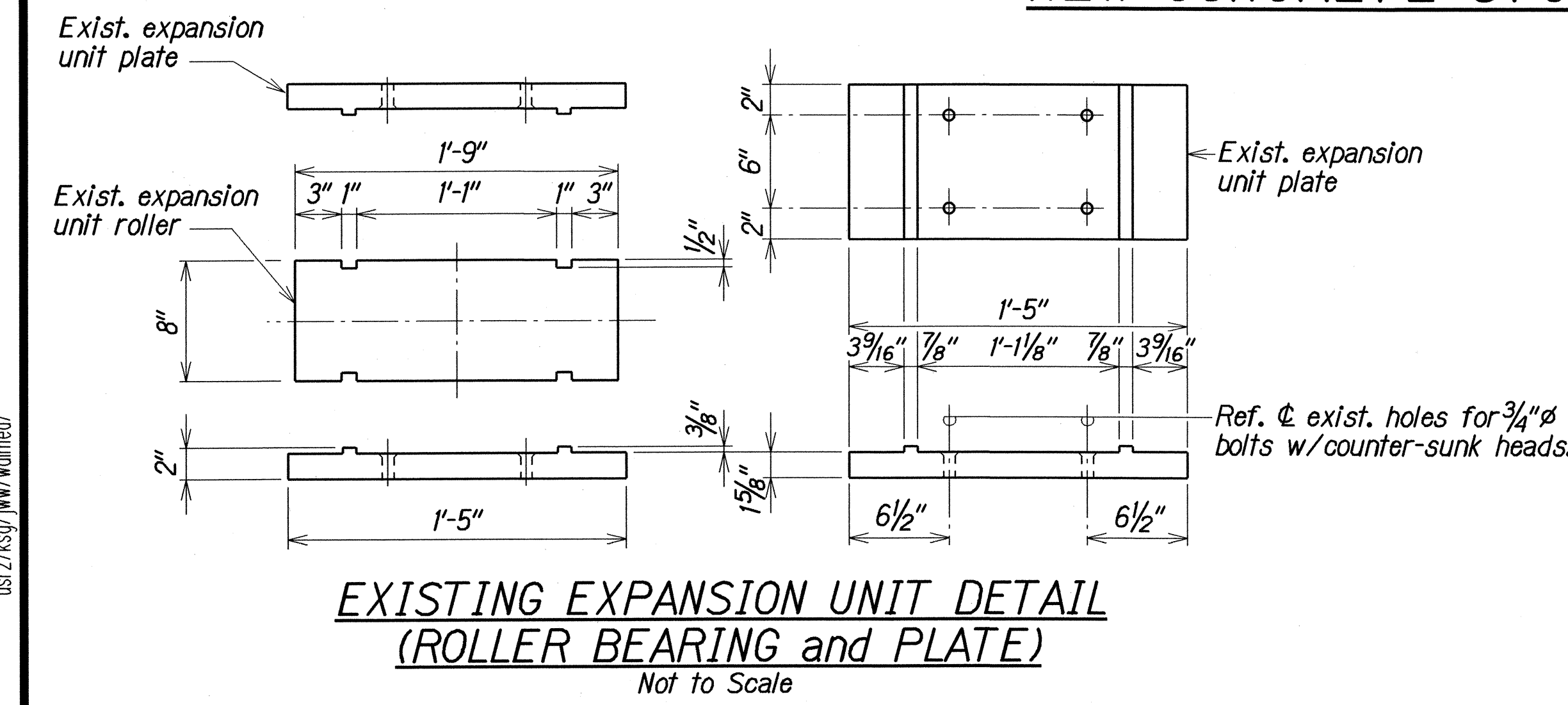
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LAYOUT PLAN and ELEVATION
APPROXIMATE REPAIR LOCATIONS
WAIMEA STREAM BRIDGE
Kamehameha Highway/Farrington Highway
Project No. HWY-0-04-03M Date: May, 2003
Scale: As Noted

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-04-03M	2003	13	15



NEW CONCRETE STOPPER and ROLLER BEARING REPAIR DETAILS WAIMEA STREAM BRIDGE



ROLLER BEARING NOTES:

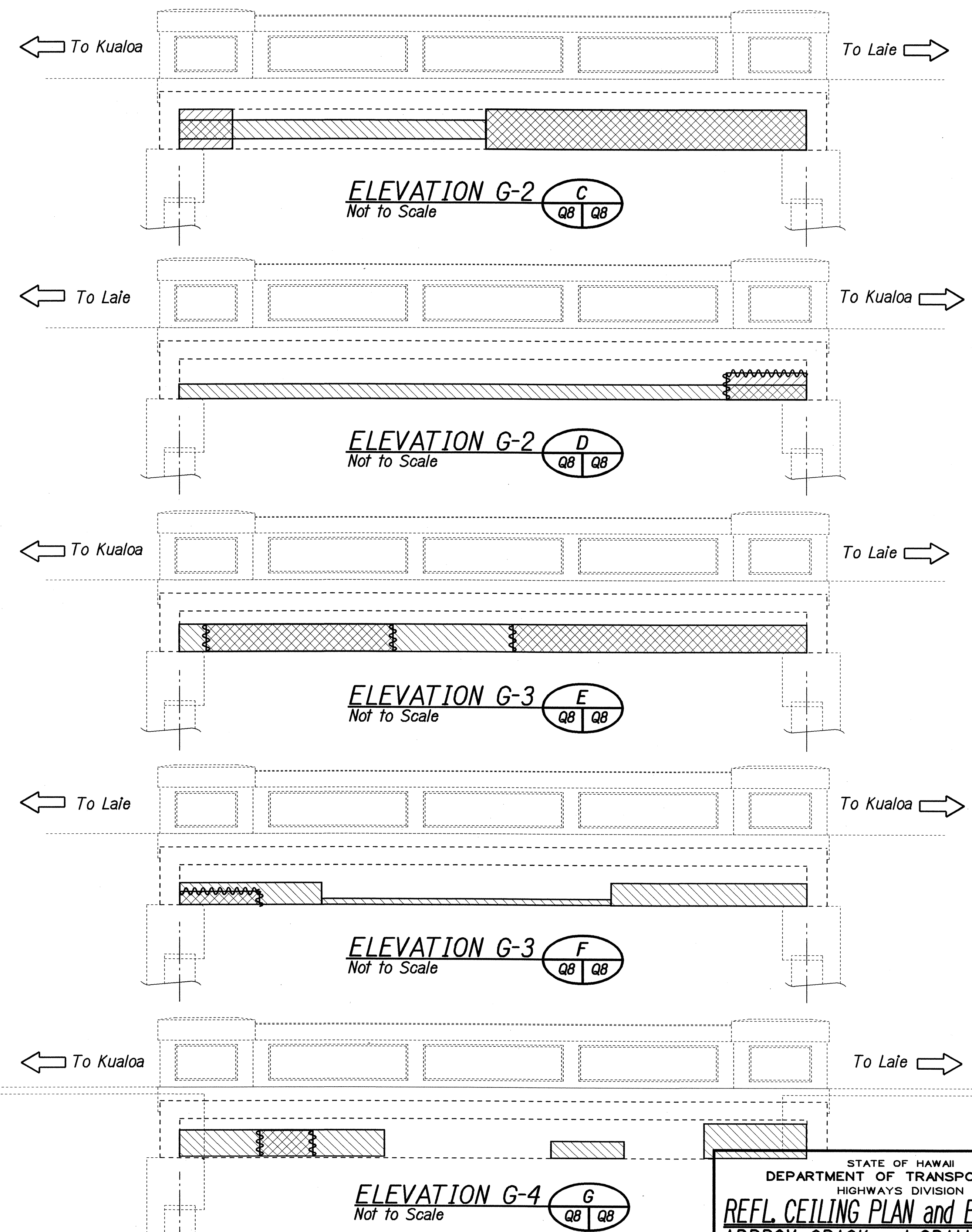
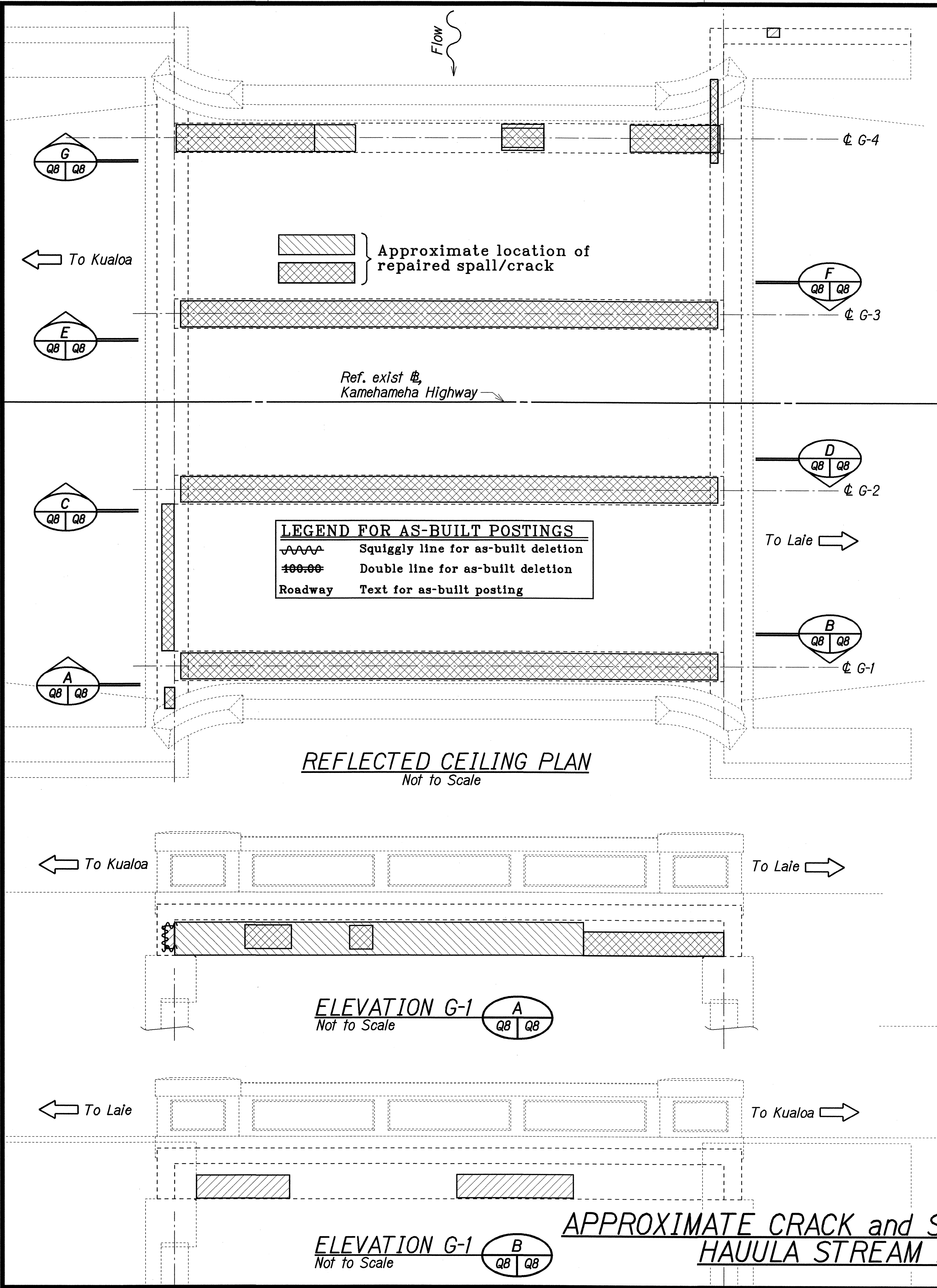
- Reset existing roller bearings or replace missing or heavily corroded roller bearings. Verify roller bearing dimensions prior to fabrication.
- Blast clean existing roller bearings and plates to SSPC-SP10 near-white blast cleaning. Paint shall be applied within six (6) hours of blast cleaning.
- Replace all deteriorated, rusted, pitted or damaged roller bearings. Replace all roller bearings that are no longer circular in cross section.
- Paint bearings and plates with the following "U.S. Coatings" products, applied per manufacturer's specifications:
Primer: RustGrip 2300, 1-mil DFT
Intermediate Coat: MasticGrip 2500, 5-mil DFT
Finish Coat: MasticGrip 2500, 5-mil DFT
- Install concrete stopper blocks.
- New roller bearings shall be ASTM, A668, Class F.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**NEW CONCRETE STOPPER and
ROLLER BEARING REPAIR DETAILS
WAIMEA STREAM BRIDGE**

BRIDGE REPAIRS AT VARIOUS LOCATIONS
Kamehameha Highway/Farrington Highway
Project No. HWY-0-04-03M
Scale: As Noted Date: May, 2003

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-04-03M	2003	14	15



See Sht. #Q1 for Spall and Crack Repair Details

NOTE:
Spall locations are for illustration purpose only. Actual locations to be determined by the Contractor and Engineer in the field.

SYMBOLS:
Approximate spall or crack location (not repaired)

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**REFL. CEILING PLAN and ELEVATIONS,
APPROX. CRACK and SPALL LOCATIONS**

HAULA STREAM BRIDGE

BRIDGE REPAIRS AT VARIOUS LOCATIONS

Kamehameha Highway/Farrington Highway
Project No. HWY-0-04-03M Date: May, 2003

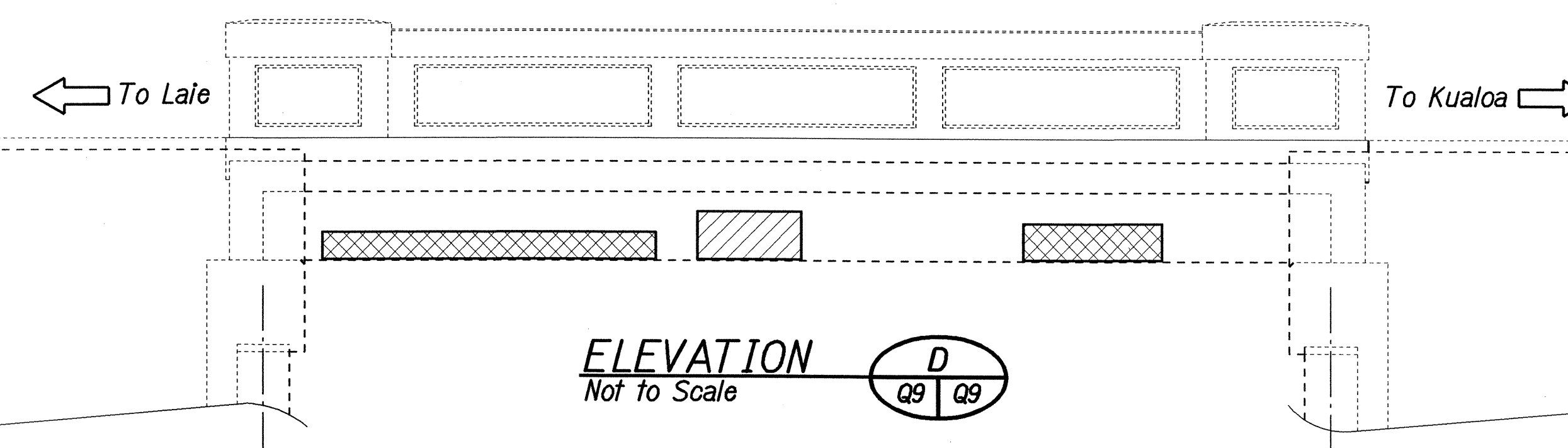
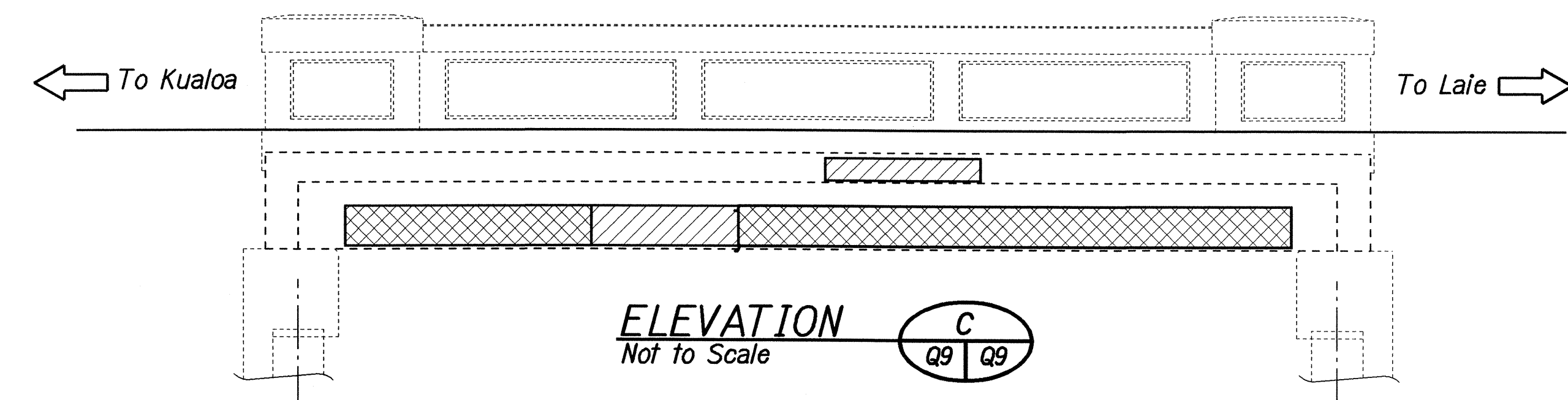
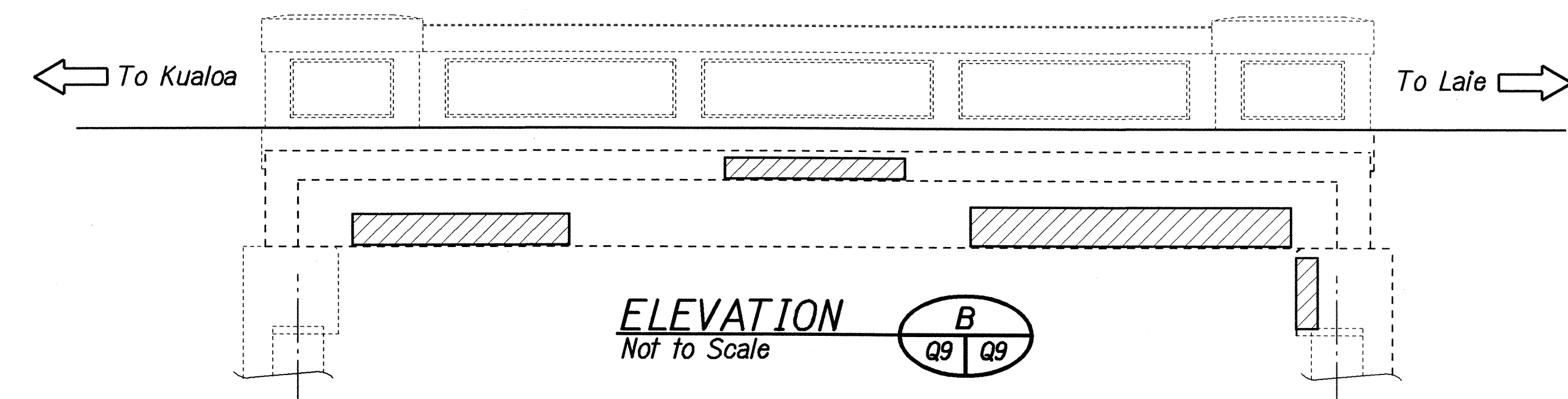
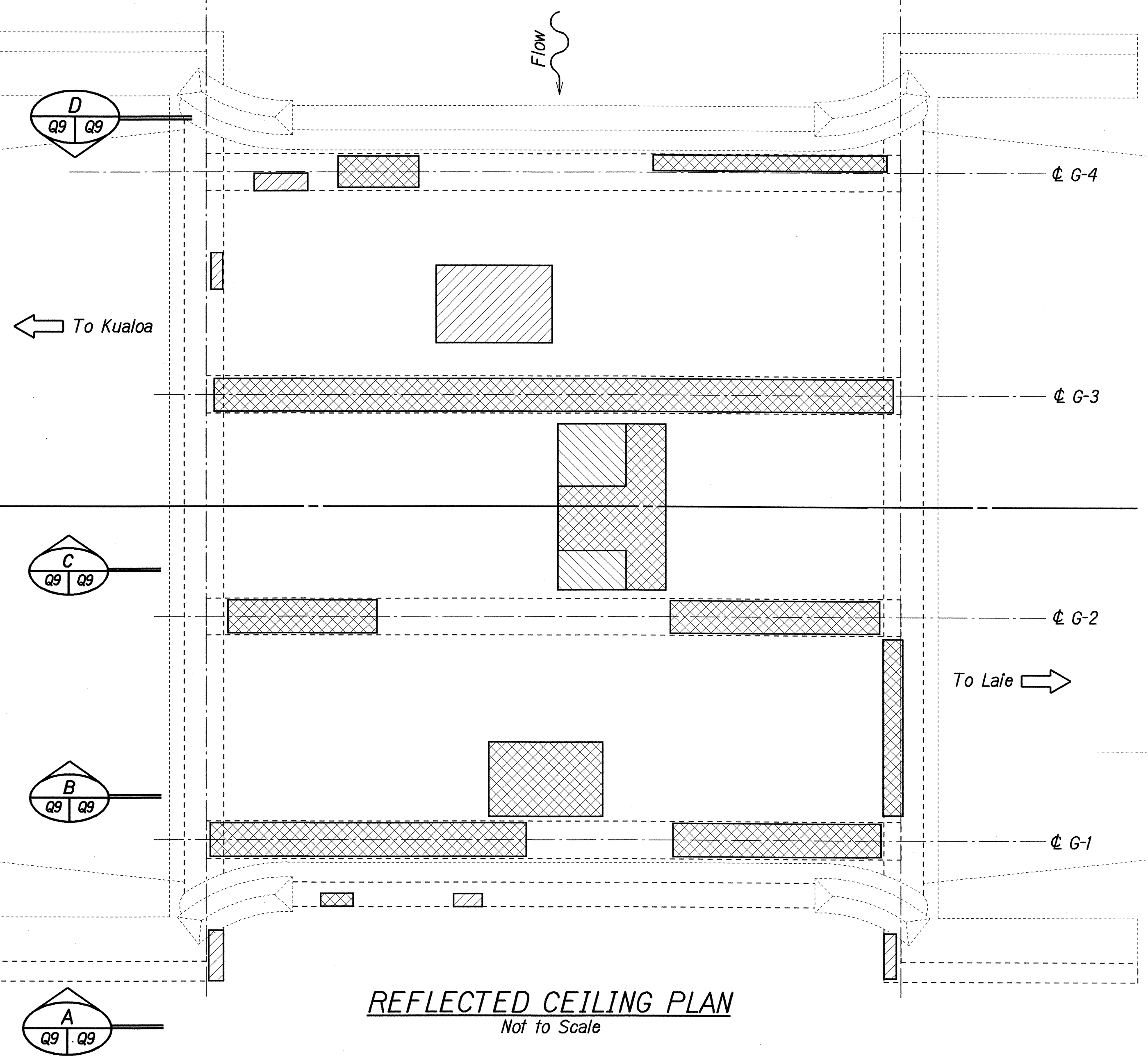
Scale: As Noted

SHEET No. Q8 OF 9 SHEETS

ORIGINAL PLAN	DATE	DESIGNED BY	DATE
NOTED BY	DATE	DESIGNED BY	DATE
QUANTITIES BY	DATE	DESIGNED BY	DATE
CHECKED BY	DATE	DESIGNED BY	DATE

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-04-03M	2003	15	15



LEGEND FOR AS-BUILT POSTINGS	
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	Double line for as-built deletion
Roadway	Text for as-built posting

See Sht.#Q1 for Spall and Crack Repair Details

NOTE:

Spall locations are for illustration purpose only. Actual locations to be determined by the Contractor and Engineer in the field.

SYMBOLS:

- Approximate spall or crack location (not repaired)
- Approximate location of repaired spall/crack

**APPROXIMATE CRACK and SPALL LOCATIONS
WAIPUHI STREAM BRIDGE**

ORIGINAL PLAN	DATE
SURVEY PLOTTED BY	MAY 2003
DRAWN BY	ASG
NOTED BY	MMW
DESIGNED BY	MMW
CHECKED BY	PTS
APPROVED BY	MMW

1st 2/18/03/ MMW/Noima

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**REFL. CEILING PLAN and ELEVATIONS,
APPROX. CRACK and SPALL LOCATIONS
WAIPUHI STREAM BRIDGE
BRIDGE REPAIRS AT VARIOUS LOCATIONS**

Kamehameha Highway/Farrington Highway
Project No. HWY-0-04-03M Date: May, 2003

Scale: As Noted

SHEET No. Q9 OF 9 SHEETS

"AS-BUILT"