# STRUCTURAL GENERAL NOTES:

#### 1. General:

- A. Workmanship and materials shall conform to the AASHTO LRFD Bridge Design Specification, 4th Edition and the Hawaii Standard Specifications for Bridge and Road Construction, as modified by the State of Hawaii Department of Transportation.
- B. The Contractor shall compare the Civil and Structural drawings with each other and report in writing to the Engineer, inconsistencies or omissions.
- C. 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.
- D. 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.
- E. Details noted as typical on structural drawings shall apply in all conditions unless specifically shown or noted otherwise.
- F. The Contractor shall be responsible for coordinating the work of all trades.
- G. 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 same or better condition at no cost to the State.

#### 2. Design Criteria (Assumed):

#### A Lateral Farth Pressures

A. Luterai Eurtii Pressures	
Earth Pressure	40 pcf
Earth Pressure (Restrained Condition) ————	60 pcf
Passive Earth Pressure ————————————————————————————————————	270 pcf
B. Soil Bearing Capacity ————————————————————————————————————	3000 psf
C. Friction Factor	0.3
D. Live Load —	H20

#### 3. Foundation:

- A. Contractor shall provide for de-watering of excavation from either surface water, ground water or seepage. NPDES permit required for discharging into State waters.
- C. Contractor shall provide for design and installation of all cribbing, sheeting, and shoring necessary for personnel safety and to preserve excavations and earth banks, and adjacent structures and property for damage.
- D. Excavation boundaries and grade elevations for footing shall be approved by the Engineer prior to placing the concrete and reinforcing.
- E. Fill and backfill shall consist of non-expansive granular material such as crushed coral or basalt. The select granular fill shall be well graded from coarse to fine with no particles larger than 3 inches in largest dimension. The material also shall contain less than 15 percent particles passing the No. 200 sieve. The material shall have a laboratory CBR value of 25 or more and shall have a maximum swell value of 1 percent or less.
- F. Fill and backfill shall be placed in uniform lifts of no more than 8 inches in loose thickness, moisture-conditioned to within 3 percent of the optimum moisture content, and uniformly compacted to at least 90 percent, but should not exceed 95 percent relative compaction to minimize the lateral earth pressure against the wall.

#### 4. Reinforcing Steel:

- A. 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:
- a. Footing, Wall, ETC. Cast against earth b. Footing, Wall, ETC.
- Formed and exposed to earthc. Wall faces exposed to each

# or weather —

#### C. Splices:

- a. Reinforcing steel shall be spliced only where indicated on plans. Provide lap splice length per typical details and schedule, unless otherwise noted.
- D. Bar bends and hook shall be "standard hooks" in accordance with AASHTO 5.11.2.

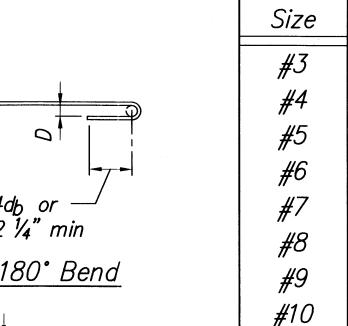
#### 5. Concrete:

- A. Concrete shall be regular weight hard rock concrete and shall have a minimum 28-day compressive strength of 4000 psi.
- B. All inserts, anchor bolts, plates, etc. embedded in concrete shall be hot-dip galvanized unless otherwise noted.
- C. Conduits, pipes, and sleeves passing through a wall not conforming to typical details shall be located and submitted to the Engineer for approval.
- D. Construction joints may be located by the Contractor and submitted to the Engineer for approval. Construction joints shall be made and located as not to impair the strength of the structure and to minimize shrinkage stresses. All construction joints shall be cleaned, laitance removed and wetted. See typical details for specific requirements.
- E. Non-shrink grout shall be a premixed compound consisting of non-staining, non-metallic aggregate, cement, water reducing and plasticizing agents capable of developing minimum compressive strength of 4,000 psi in 3 days and 7,000 psi in 28 days.
- F. Unless otherwise noted, chamfer all concrete edges 3/4".
- G. 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.
- H. Reinforcing bars, anchor bolts, inserts and other items to be cast in the concrete shall be secured in position prior to placement of concrete.

#### 6. Structural Steel:

- A. Fabrication and erection of structural steel shall conform to the AASHTO LRFD Bridge Construction Specifications, Fourth Edition. and to the American Institute of Steel Construction, Ninth Edition.
- B. Structural steel shall conform to ASTM A36, unless otherwise noted.
- C. Welds and welding procedures shall conform to the structural welding code AWS D1.1 of the American Welding Society.
- D. Welding shall be performed by welders prequalified for welding procedures to be used.
- E. Welding electrodes shall be E70XX.
- F. Steel shall be hot-dip galvanized after fabrication According to ASTM 123.

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJECT NO.	FISCAL YEAR		
HAWAII	HAWAII	STP-019-2(60)	2010	29	<i>36</i>

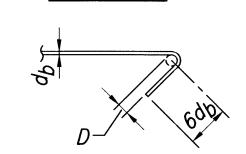


# 4db or — 2 1/4" min 180° Bend

#### Concrete Strength = 4,000 PSI Lap Splice Development Straight with Other Other Standard Тор Top Bars Bars Bars Bars Hook 26" 20" 54" 22" #10 *68*" 28"

Minimum Splice and Development Lengths

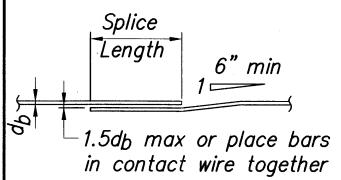
## 90° Bend



1. Lengths are for concrete with rebar space 6 bar diameters minimum. Increase 25% for bars spaced less than 6 bar diameters.

2. "Top Bars" are horizontal bars with 12" or more of concrete cast below.

### 135° Bend



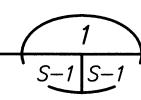
 $D = 6d_b$  for #8 and Smaller  $D = 8d_b$  for #9 to #11

Bar Lap

TYPICAL REBAR SPLICE AND EMBEDMENT LENGTH SCHEDULE

Notes:

Not to Scale



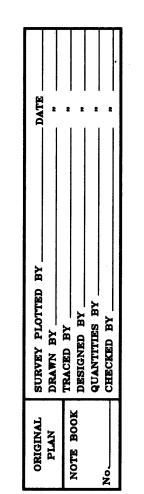


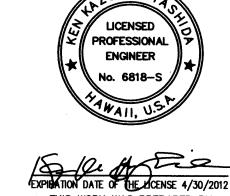
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

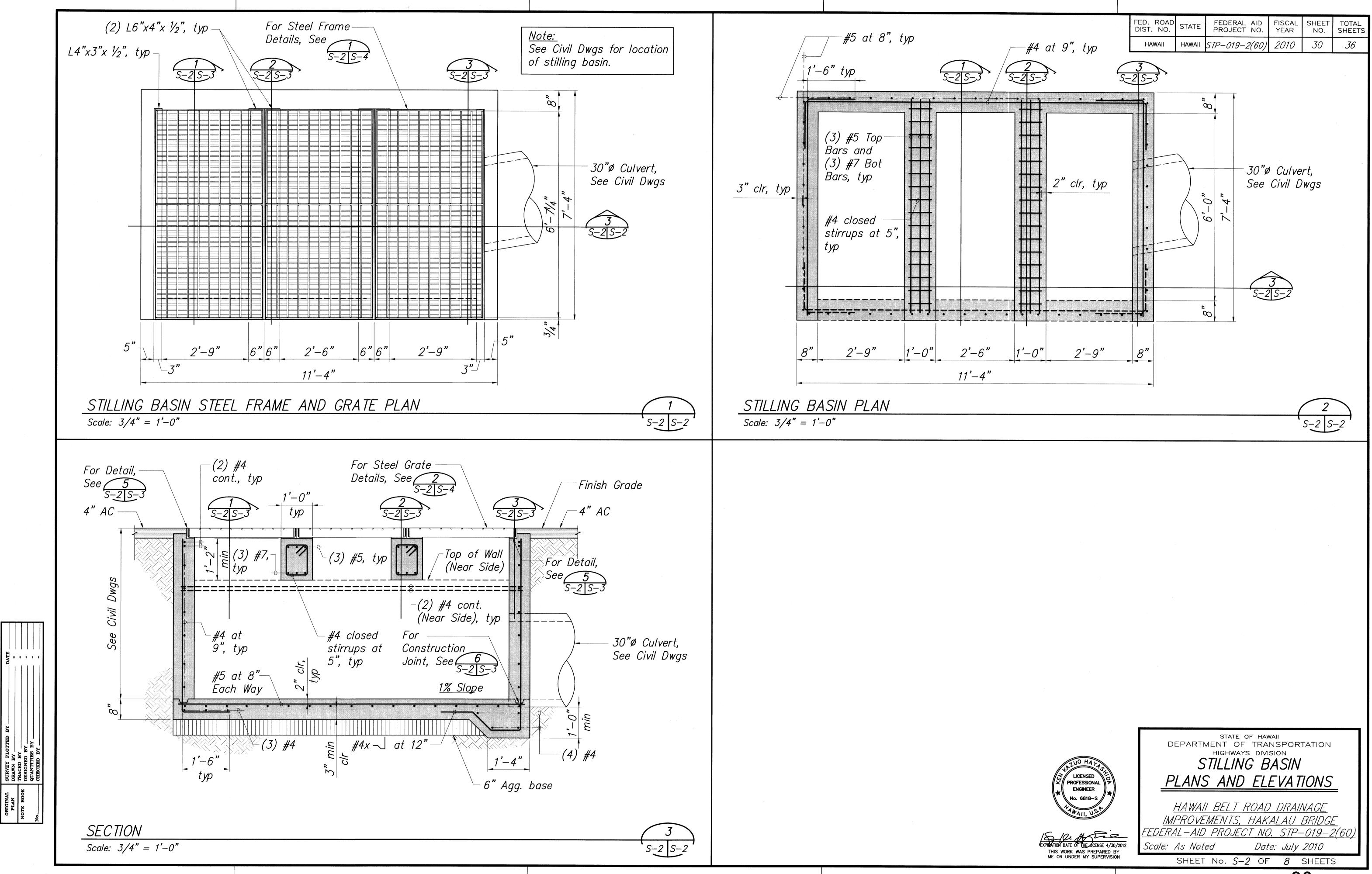
# GENERAL NOTES

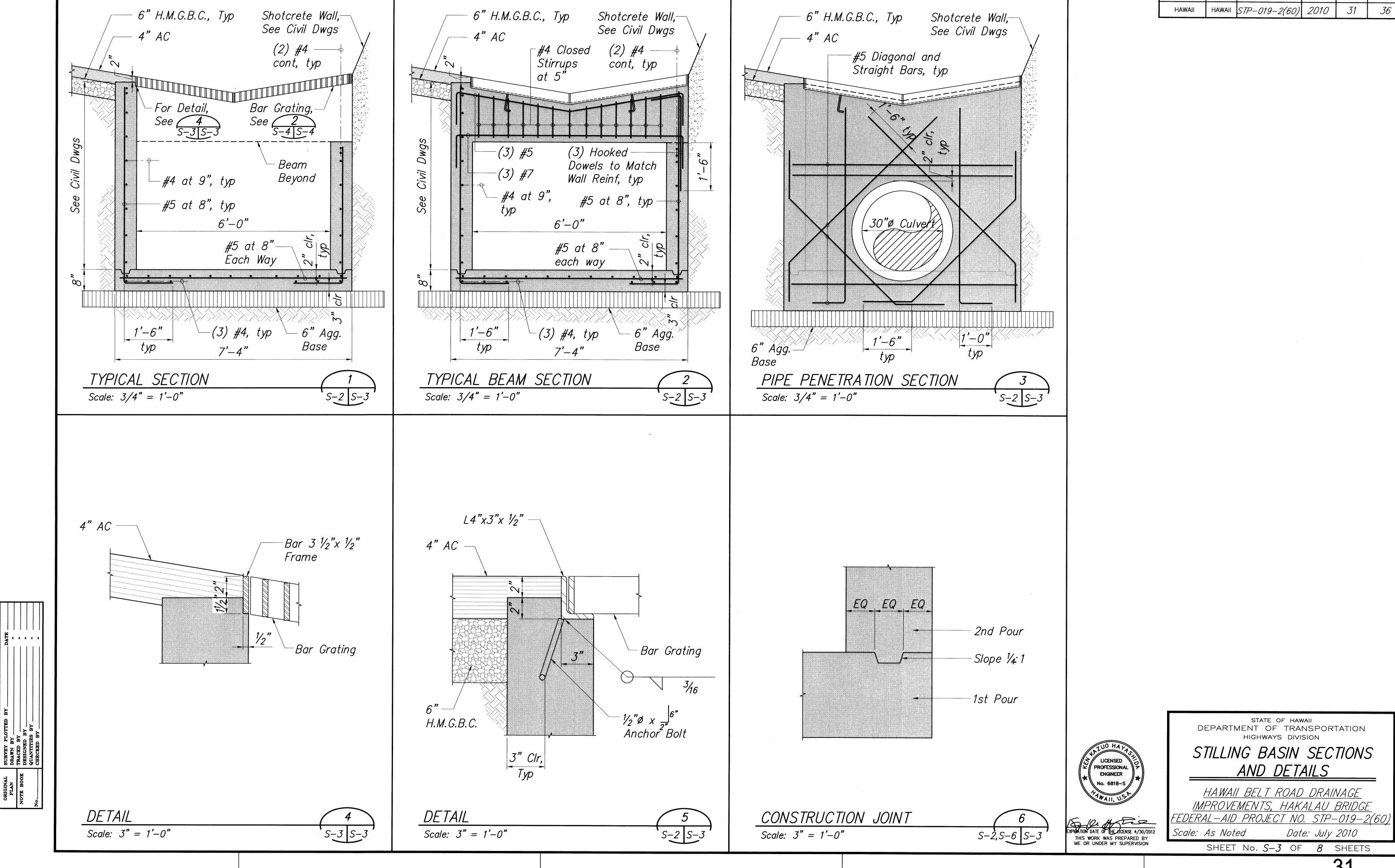
HAWAII BELT ROAD DRAINAGE IMPROVEMENTS, HAKALAU BRIDGE FEDERAL - AID PROJECT NO. STP-019-2(60) Date: July 2010 Scale: As Noted

SHEET No. S-1 OF 8 SHEETS

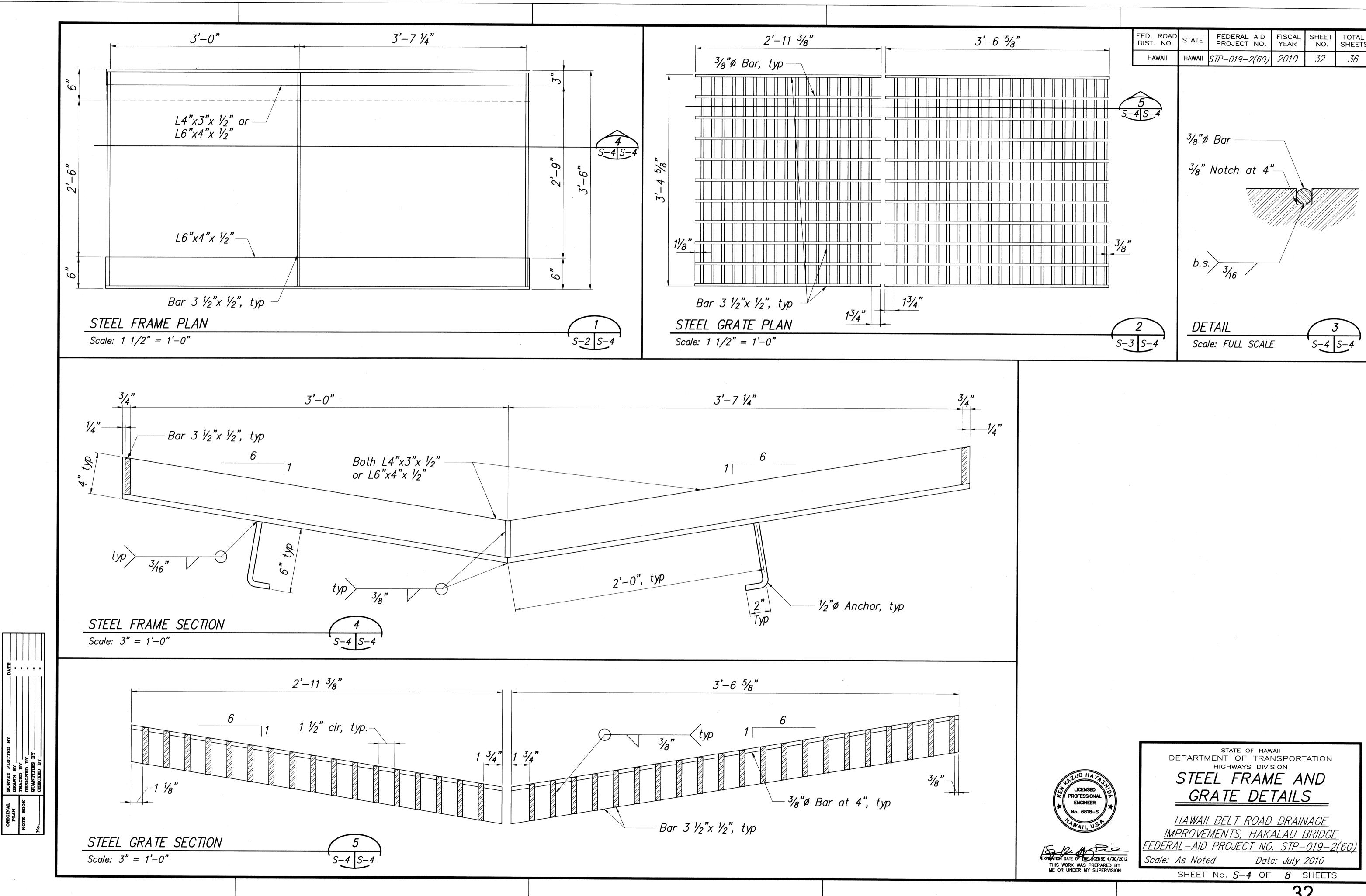


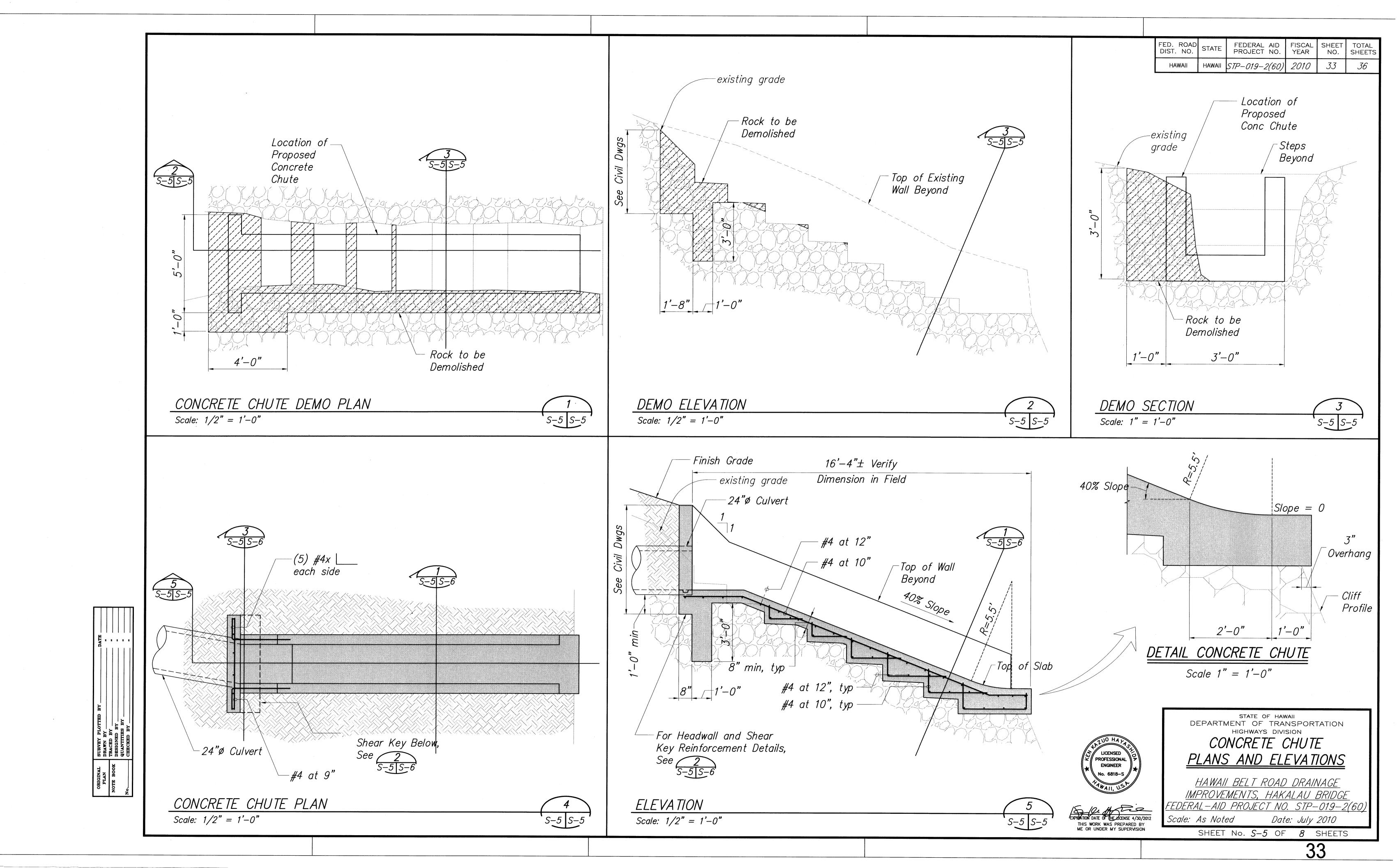


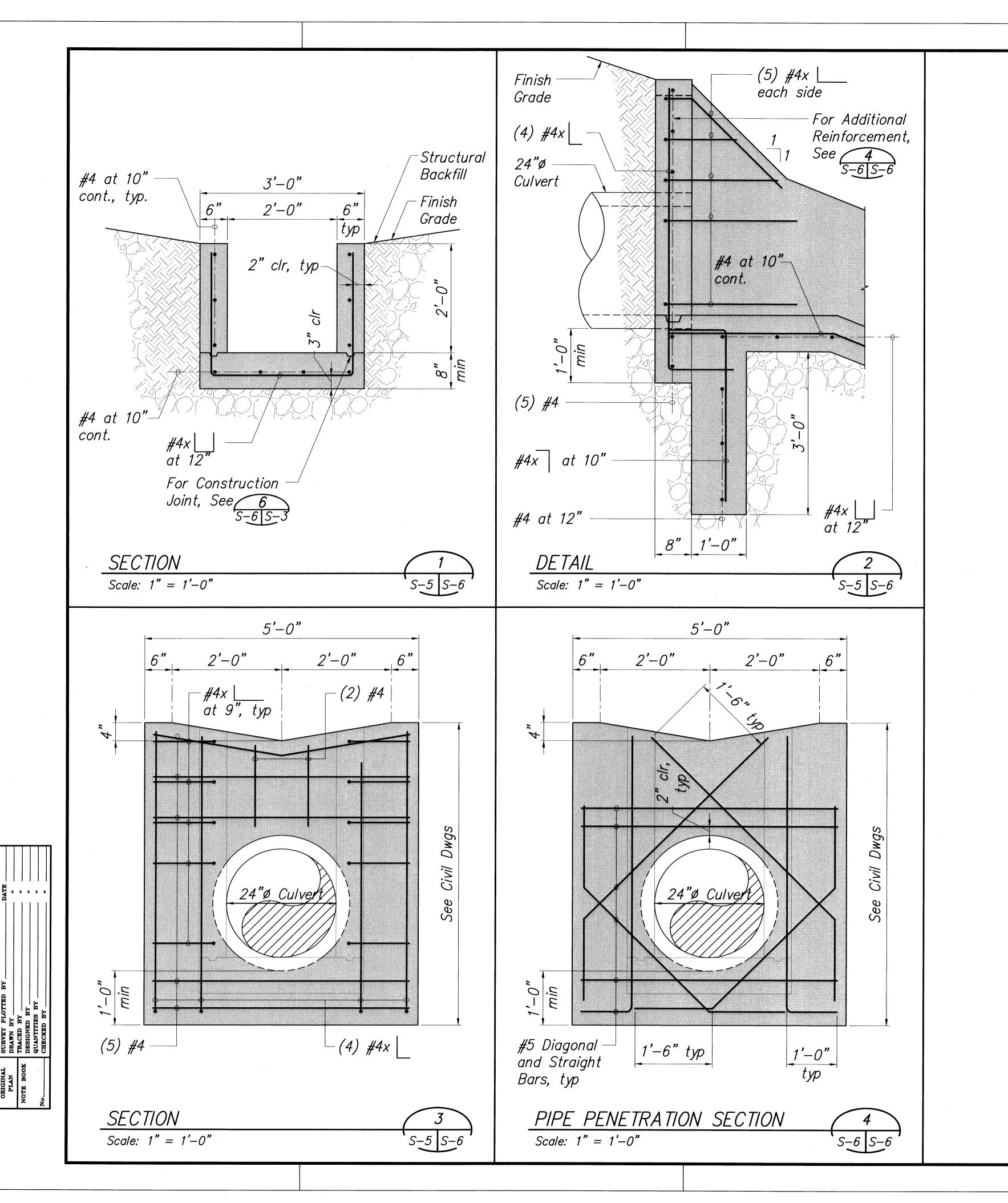




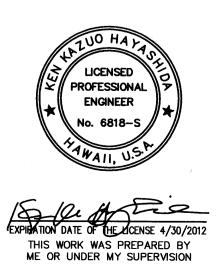
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FED. ROAD DIST. NO. FEDERAL AID PROJECT NO. FISCAL YEAR SHEET NO. STATE HAWAII *STP-019-2(60)* 2010 34



state of hawaii DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION CONCRETE CHUTE

# SECTIONS AND DETAILS

HAWAII BELT ROAD DRAINAGE IMPROVEMENTS, HAKALAU BRIDGE FEDERAL-AID PROJECT NO. STP-019-2(60)

Scale: As Noted Date: July 2010 SHEET No. S-6 OF 8 SHEETS

