DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
MAUI	HAW.	BR-030-1(37)	2024	27	42

STRUCTURAL GENERAL NOTES:

1. General:
   A. Workmanship and materials shall conform to the AASHTO LRFD Bridge Design Specification, 9th Edition, 2020 including its subsequent interim specifications, State of Hawaii Department of Transportation Design Criteria for Bridges and Structures, August 8, 2014 and the Hawaii Standard Specifications for Road and Bridge Construction, 2005 as modified by the State of Hawaii Department of Transportation.
   B. The Contractor shall compare the Civil, Electrical 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 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 is 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:
   A. Dead Load - Weight of all components of the structures, appurtenances attached thereto, and earth covers.
      Future wearing surface (curb to curb) ———— 25 psf
      Future utilities on each side of the bridge ———— 150 plf
   B. Live Load - AASHTO HL-93 Loading
   C. Seismic
      0.2-second spectral response acceleration coefficient, Ss = 0.543
      1.0-second spectral response acceleration coefficient, S_1 = 0.155
      Horizontal peak ground acceleration coefficient, PGA = 0.237
      Site class ———— = D
      Seismic Zone ———— = 3
   D. Basic Wind Speed ———— = 130 MPH
   E. Bridge Railing ———— in accordance with AASHTO TL-2 design factors
   F. Design Soil Parameters:

	Extreme	Strength	Service
a. Bearing Pressure	7500 psf	3750 psf	2500 psf
b. Passive Earth Pressure	425 pcf	210 pcf	
c. Coefficient of friction	0.58	0.50	

      d. Active Earth Pressure
         Active condition ———— = 40 pcf
         At-Rest condition ———— = 55 pcf
         Saturated Active condition ———— = 115 pcf
   G. 100-Yr Flood Stream Velocity, V = 15 fps

3. Foundation:
   A. Foundation design is based upon geotechnical investigations by Hirata & Associates, Inc. and dated September 13, 2023. See note 3A on S9.1 for temporary bridge foundation design geotechinal investigation reference.
   B. The soils/existing bridge abutment backfills beneath the new footings shall be overexcavated down to the bottom of the existing CRM abutment footing elevation and replaced with Controlled Low-Strength Material (CLSM).
   C. The overexcavations should extend laterally 2'-0" minimum beyond the edge of the new footing or up to the existing CRM wingwalls. The CLSM should have a minimum commpressive strength of 1000 psi. Prior to placement of the CLSM, the exposed subgrade at the bottom of the overexcavations should be thoroughly tamped and cleaned of all loose material. Soft or loose soils, indicated by pumping conditions, should be removed and replaced with CLSM
   D. Contractor shall provide for de-watering of excavation from either surface water, ground water or seepage. NPDES permit required for discharging into State waters.
   E. 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, roadways, and property from damage.
   F. Excavation boundaries, shoring design, and grade elevations for footing shall be approved by the Engineer prior to excavation work.
   G. Backfill behind the retaining structures shall consist of type A Structure Backfill conforming to Section 703.20 of the State of Hawaii Standard Specifications for Road and Bridge Construction (2005). Backfill shall be placed in uniform lifts of no more than 8 inches in loose thickness and uniformly compacted to between 90 and 95 percent relative compaction per ASTM D1557.

4. Concrete:
   A. Concrete shall be regular weight hard rock concrete and shall have the following minimum 28-day compressive strengths:
      a. Prestressed tee beams ———— 8000 psi
      b. Slab topping, beams, abutment walls, and wing walls —— 4000 psi
      c. Abutment footings ———— 4000 psi
      d. All other concrete ———— Class "A"
      All concrete shall have maximum w/c ratio of 0.45 except for Class "A" which shall be as specified in the standard specifications.
   B. Tetraguard AS20 shrinkage reducing admixture, Eclipse Plus shrinkage reducing admixture, or an approved equal, shall be included in the concrete mix for the concrete topping and bridge railing. The required dosage shall be 128 ounces per cubic yard of concrete or as recommended by the manufacturer. Addition of shrinkage reducing admixture shall be as recommended by the manufacturer.
   C. All inserts, anchor bolts, plates, etc. embedded in concrete shall be hot-dip galvanized unless otherwise noted.
   D. Conduits, pipes, and sleeves passing through a wall not conforming to typical details shall be located and submitted to the Engineer for approval.
   E. Construction joints may be relocated by the Contractor and submitted to the Engineer for approval. Construction joints shall be made and relocated 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.
   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.
   I. Non-shrink Grout Shall Conform to Section 712.04 of the Standard Specification.

5. Reinforcing Steel:
   A. Reinforcing steel shall be deformed bars conforming to ASTM A615, Grade 60 Unless Otherwise Noted.
   B. Pre-stress strands shall be uncoated seven wire low-relaxation strand conforming to ASTM A416 Grade 270, or AASHTO M203 Grade 270.
   C. Clear concrete cover for rebar shall be as follows, unless otherwise noted:
      a. Footing, Grade Beams, etc. cast against earth ———— 3"
      b. Footing, Grade Beams, etc. formed and exposed to earth ———— 2"
      c. Wall faces exposed to earth or weather ———— 2"
      d. Deck slabs
         i. Top bars ———— 2 1/2"
         ii. Bottom bars ———— 1 1/2"
   D. Splices:
      a. Reinforcing steel shall be spliced only where indicated on plans. Provide lap splice length per typical details and schedule, Sht S0.2, unless otherwise noted.
   E. Bar bends and hook shall be in accordance with typical Details Sht S0.2.

6. Structural Steel:
   A. Fabrication and erection of structural steel shall conform to the AASHTO LRFD Bridge Construction Specifications, 4th Edition 2017, including its subsequent interim specifications.
   B. Structural steel shall conform to ASTM A709 Grade 50, unless otherwise noted.
      a. Steel pipes shall conform to ASTM A53, Grade B.
      b. Steel tubes shall conform to ASTM A500, Grade B.
      c. Anchor Bolts shall conform to ASTM F1554, Grade 105, unless otherwise noted.
      d. Welds and welding procedures shall conform to the Bridge welding code AWS D1.5 of the American Welding Society.
      e. Welding shall be performed by welders that are prequalified for applicable welding procedures.
      f. The Contractor shall hire an independent special inspector to conduct ultrasonic NDT testing of all field welds. The cost for all testing shall be paid for by the contractor under various contract pay items. The inspection test results shall be provided to the DOT.
      g. Welding electrodes shall be E70XX.
      h. All steel shall be hot-dip galvanized after fabrication.

7. Metal Pedestrian Railing:
   A. The metal pedestrian railings shall be hot dip galvanized after fabrication and shop painted according to Paint Schedule, Sht. S0.2.

8. Structural Steel Painting Notes:
   A. Contractor shall shop coat all members. Field coating shall consist of touch up only.
   B. The touch up paint shall consist of the following:
      a. Prepare surface per SSPC-SP1, solvent cleaning.
      b. Apply first and second coat according to paint schedule
   C. Color for top coat shall be according to paint schedule, as proposed by the contractor and approved by the Engineer. Intermediate coat shall have contrasting light color. Finish for top coat shall not be gloss or high gloss.
   D. Multiple coats may be required to obtain minimum dry film thickness (DFT).
   E. All hot-dip galvanized coating that is damaged shall be repaired. The repairs shall consist of the following:
      a. Prepare surface per SSPC-SP1, solvent cleaning.
      b. Apply (2) coats of cold galvanizing compound containing 95% metallic zinc content by weight in dry film and 52% solids content by volume.
      c. Application rate shall be 1.5 mils dry film thickness per coat.
      d. Rust scale shall be cleaned per SSPC-SP3.
      e. The coating shall be applied at sufficient wet film thickness to achieve a minimum dry film.
      f. The coating shall be well stirred before use so that it is completely homogeneous during application.
      g. Minimum dry film build is 3 mils, using manufacturer's recoat directions.
      h. Apply paint system according to paint schedule.
   F. Painting of galvanized steel shall be in accordance with ASTM D6386, "Standard Practice for Preparation of Zinc (Hot-Dipped Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting."
   G. Cost of painting is incidental to metal railings.

9. Controlled Low-Strength Material (CLSM):
   A. CLSM shall include mixture of portland cement, aggregate, and provide flowable CLSM with aggregate in suspension. Proportion CLSM to produce the following:
      a. Self-compacting backfill material that is able to be pumped.
      b. Uniform, flowable mixture that is self-leveling when placed.
      c. 28-day compressive strength be 1000 psi minimum.
      d. Setting strength of CLSM shall be not less than 200 psi compressive strength in 12-hour after pour.
   B. CLSM shall be placed in uniform lifts of no more than 2 feet high and cured for a minimum 8 hours before the next lift is poured.
   C. Submit manufacture's certification of CLSM including unconfined 12-hour, 3-day, 7-day and 28-day compressive strength test data for each mixture used for engineer's review and approval. Test data shall be current, having been obtained within one year of use.
   D. Place 30# felt or plastic sheet to prevent CLSM from leaking out of CRM wall

DATE
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
ORIGINAL PLAN
NOTE BOOK
No.

KEN KAZUO HAYASHIDA
LICENSED PROFESSIONAL ENGINEER
No. 6818-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

APRIL 30, 2026
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

Structural General Notes

Honoapi'ilani Highway
Rehabilitation of Honolua Bridge
F.A.P No. BR-030-1(37)

Scale: As Shown Date: August 2024

SHEET No. S0.1 OF 42 SHEETS