FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	H1I-01-14M	2014	13	42

GENERAL

1. Workmanship and materials shall conform to the Hawaii Standard Specifications for Road & Bridge Construction (2005 Edition) & Special Provisions. However, where reference is made to performance conforming to other standards the more stringent shall apply.

2. The Contractor shall compare all the contract documents with each other and report in writing to the 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 Engineer all inconsistencies and omissions.

4. 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.

5. The Contractor shall be responsible for protection of the adjacent properties, structures, streets and utilities during the construction period.

6. Details noted as typical on the Structural drawings shall apply in all conditions unless specifically shown or noted.

7. The General Contractor and his subcontractors must submit in writing any requests for modifications to the plans and specifications.

DESIGN CRITERIA

1. Retaining wall design criteria
   a. Allowable foundation bearing, Dead load + Live load ———— 2,500 psf
   b. Coefficient of friction ———— 0.4
   c. Active earth pressure ———— 40 pcf level backfill, 50 pcf sloping
   d. Passive earth pressure: ———— 300 pcf

FOUNDATION

1. Foundation design is based on Geotechnical Investigation by Hirata & Associates, Inc. and report dated August 24, 2012.

2. Contractor shall provide for de-watering of excavation from surface water, ground water, or seepage.

3. Contractor shall provide for design and installation of all cribbing, sheeting, and shoring necessary to preserve excavations and earth banks.

4. Contractor shall brace or protect all walls below grade from lateral loads until they have attained their full design strength.

5. The project sites should be cleared of all concrete slabs, vegetation, debris, and other deleterious material.

6. Prior to placement of fill, the exposed subgrade should be scarified to a minimum depth of 6 inches, moisture conditioned to about 2 percent above optimum moisture content, and compacted to a minimum 90 percent compaction as determined by ASTM D1557.

7. Soft or loose soils indicated by pumping conditions should be removed and replaced with either approved onsite material or imported granular structural fill.

8. Onsite soils shall be acceptable for reuse in compacted fills and backfills. All rock fragments larger than 3 inches in maximum dimension shall be removed from the onsite soils prior to reuse.

9. Imported structural fill shall be well-graded, non-expansive granular material with a maximum particle size of 3 inches and between 8 and 20 percent of soil by weight shall pass the #200 sieve. The plasticity index (P.I.) of that portion of the soil passing the #40 sieve shall not be grather than 10. Imported structural fill should have a CBR expansion value no greater than 1.0 percent when tested in accordance with ASTM D 1883.

10. Cohesive soils, such as clays and silts, shall be placed in horizontal lifts restricted to eight inches in loose thickness and compacted to between 90 and 95 percent compaction as determined by ASTM D 1557. Granular fill, such as imported structural fill, shall also be placed in horizontal lifts restricted to eight inches in loose thickness, but compacted to at least 95 percent compaction as determined by ASTM D 1557. Fill placed in areas which slope steeper than 5H:1V shall be continually benched as the fill is brought up in lifts.

11. All permanent cut and fill slopes shall be constructed at gradients of 2H:1V or flatter. Fill placed on slopes shall be continually keyed and benched into the existing slope to provide stability for the new fill against sliding. Sliver fills placed on slopes shall be avoided. Fill slopes shall be constructed by overfilling and cutting back to the design slope gradient to obtain a well-compacted slope face.

CONCRETE

1. Concrete construction, workmanship, & materials shall conform to the Hawaii Standard Specifications for Road & Bridge Construction (2005 Edition) & Special Provisions.

2. Concrete shall be regular weight hard rock concrete and shall have the following minimum 28 day compressive strengths:
   a. Footings ———— 3,000 psi
   b. Walls ———— 4,000 psi
   c. All other concrete ———— 3,000 psi

3. 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.

4. All inserts, anchor bolts, plates, and other items to be cast in the concrete shall be hot-dipped galvanized unless otherwise noted.

5. 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. The Contractor shall locate construction joints so as not to impair the strength of the structure and to minimize shrinkage stresses. Submit location of construction joints to the Engineer for approval, unless otherwise noted.

7. The Engineer shall be notified at least 3 working days prior to any concrete pour. No concrete shall be poured prior to observation by the Engineer or his representative.

RON E. IWAMOTO
LICENSED PROFESSIONAL ENGINEER
No. 8871-S
HAWAII, U.S.A.

4/30/14
EXP. DATE

This work was prepared by me or under my supervision.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURAL NOTES

ALA WAI WATERSHED STORM WATER BEST MANAGEMENT PRACTICES ON OAHU
Project No. H1I-01-14M

Scale: None Date: January 2014

SHEET No. N-10 OF 11 SHEETS

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

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
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REINFORCING STEEL

1. Reinforcing Steel shall be deformed bars conforming to ASTM A615, Grade 60.

2. Welded wire fabric shall conform to ASTM A185, Galvanized.

3. Clear concrete cover for reinforcing bars shall be as follows, unless otherwise noted:
   a. Footings, etc. cast against earth ——— 3"
   b. Footings, etc. formed and exposed to earth or weather ——— 2"
   c. Walls
      1. Faces exposed to earth or weather —— 2"

4. Reinforcing Steel shall be spliced where indicated on plans. Provide lap splice length per typical details and schedule, unless otherwise noted.

5. Bar laps shall be made away from points of maximum stress. Unless noted otherwise, splices, laps, dowel extensions and embedments shall be 48 bar diameters, but not less than 24 inches. Splices shall be staggered where possible.

6. Unless otherwise noted, all horizontal reinforcing steel at wall and wall footing corners and intersections shall extend to the far face of the corner and hooked a length of 48 bar diameters, but not less than 24 inches, around the corner.

7. Welded wire fabric shall be lapped 8 inches or one full mesh plus 2 inches, whichever is greater.

8. Bar bends and hooks shall be "Standard Hooks" in accordance with AASHTO LRFD Bridge Design Specifications, Second Edition, Article 5.10.2-Hooks and Bends. See Detail 1 On Sheet EC-02.

9. Only flat sheets of welded wire fabric reinforcement shall be used. No rolled welded wire fabric reinforcement will be allowed.

EPOXIED ANCHOR INSTALLATIONS

1. Epoxy used for anchoring threaded rods and reinforcing steel into existing concrete shall be Hilti HIT HY-RE-500-SD, Simpson SET-XP, Powers PE100+ system or approved equal, and shall be installed per manufacturer's recommendations.

2. Anchors shall be installed with the minimum embedment requirements as indicated on the drawings.

CONCRETE RUBBLE MASONRY (CRM)

1. Concrete rubble masonry construction, workmanship, & materials shall conform to the Hawaii Standard Specifications for Road & Bridge Construction (2005 Edition) & Special Provisions.

2. Mortar shall be Type "M" conforming to ASTM C270 and have a minimum compressive strength of 2,500 PSI at 28 days.

3. Cement rubble masonry shall be constructed by experienced workmen.

4. Selected stones shall be roughly squared and pitched to lines at angles and ends of walls.

SPECIAL INSPECTION

1. The Contractor shall be responsible for ensuring that special inspection of portions of the work as made at the appropriate time. The Contractor shall give timely notice of when and where inspections are to be made and provide access for the Inspector. The Contractor shall correct defective work at no additional cost to the owner.

2. The following Structural work requires Special Inspection:
   a. Concrete
   b. Reinforcing steel
   c. Drilled & Epoxied dowels in concrete

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

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RON E. IWAMOTO
LICENSED PROFESSIONAL ENGINEER
No. 8871-S
HAWAII, U.S.A.

4/30/14
EXP. DATE

This work was prepared by me or under my supervision.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURAL NOTES

ALA WAI WATERSHED STORM WATER BEST MANAGEMENT PRACTICES ON OAHU
Project No. H1I-01-14M

Scale: None Date: January 2014

SHEET No. N-11 OF 11 SHEETS