

ARTICLE XXIII – REINFORCED CONCRETE

23.1 GENERAL

This Article shall serve as an addendum to the Hawaii Department of Transportation standard specifications 2005 Edition. The work consists of furnishing equipment, materials, labor, appliances and performing all work in connection with forming, installation, finishing, and curing necessary for the job, including waterstops and waterproofing in accordance with this Article of the specifications and the standard specifications, Sections 503, 601, 602, 705.06 and 705.07.

23.2 DESCRIPTION

- (A) Reinforced concrete drainage and sewer structures
- (B) Installation of waterstops as required
- (C) Providing and installing exterior waterproofing on below-grade surfaces where specified

23.3 FORMS

- (A) Forms shall conform to the requirements in Section 503.03(C) of the standard specifications.
- (B) Removal of light pole pedestal forms shall not occur until a minimum of 24 hours after the concrete was finished or the concrete has achieved adequate strength as to not be damaged during form removal, whichever is longer.
- (C) For concrete structures form removal time shall be as indicated in Section 503.03(D) and Table 503.03-1.

23.4 REINFORCING STEEL

- (A) Reinforcing steel materials shall conform to Section 602.01 of the standard specifications, ASTM A615, grade 60.
- (B) Reinforcing steel fabrication, placement and quality control measures shall be in accordance with the applicable items specified in Section 602 of the standard specifications.
- (C) Shop drawings that detail fabrication, bending, and placement shall be submitted for review. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

23.5 CONCRETE

- (A) Materials for concrete, concrete mix requirements and quality control shall be as stated in Section 601 of the standard specifications.
- (B) Concrete for structures and foundations shall have the following minimum 28 day compressive strengths:
 - 1. Drainage000 psiMaximum size aggregate in mix design shall be in accordance with standard specifications, Section 601.03(B).
- (C) Mix design requirements for other strength concrete shall be in accordance with Table 601.03-1 of the standard specifications. The mix design for each strength of concrete shall be submitted to the Engineer for review prior to pouring.
- (D) Contractor shall submit a plan showing location of all construction and expansion joints. Location of construction joints is subject to approval of the Engineer.

23.6 WATERSTOPS

- (A) Waterstop shall be polyvinyl chloride (PVC).

Certificate of Compliance shall be submitted by the Contractor before installation to show that waterstop proposed for use conforms to the contract requirements and test results.
- (B) PVC waterstop shall conform to Corps of Engineers' Specification No. CRD-C572
- (C) Field splice for PVC waterstop shall be made by heat-sealing adjacent surfaces in accordance with manufacturer's recommendations. Thermostatically controlled electric source of heat shall be used to make splices. Apply only enough heat to melt plastic.
- (D) Waterstops shall be installed at the locations shown to form a continuous fluid-tight diaphragm. Adequate provision shall be made to support and completely protect the waterstops during the progress of the work. Exposed waterstops shall be protected during application of form release agents to avoid being coated. Suitable guards shall be provided to protect exposed projecting edges and ends of partially embedded waterstops from damage when concrete placement has been discontinued. Splices shall be made by certified, trained personnel using approved equipment and procedures.

- (E) Follow manufacturer's recommendations for preparation and installation of waterstops.

23.7 WATERPROOFING

- (A) Materials for waterproofing system consisting of asphalt primer, hot asphalt and fabric shall conform to subsection 705.06 of the Standard Specifications.
- (B) Exterior waterproofing shall be installed on vertical and horizontal surfaces of below-grade structures where specified and like-surfaces as those specified.
- (D) Prepare surface and install waterproofing system as specified in subsection 503.03(H) of the Standard Specifications.

23.8 CONCRETE PLACEMENT

- (A) Verify all embedded items are properly located and secured in place prior to beginning concrete placement.
- (B) Concrete shall be placed in accordance with the applicable items specified in Section 503.03(F)(1) of the standard specifications.
- (C) Concrete shall be placed with the aid of closed chute or pipe from no higher than five (5) feet. Aluminum chutes, tremies, troughs and pipes are not permitted to be used to convey concrete.
- (D) Consolidation of concrete shall be as specified in Section 503.03(G)(2)(f) of the standard specifications. Special care to properly consolidate concrete around embedded waterstops shall be taken to avoid voids.
- (E) The concrete shall be protected from injurious action as required in Section 503.03(K) of the standard specifications.

23.9 CURING OF CONCRETE

- (A) The curing of the concrete shall be in accordance with Section 503.03(L) of the standard specifications.
- (B) All drainage structures shall be cured by the water method only.
- (C) The site work concrete shall be cured by the water curing method only.
- (D) Concrete shall be cured for a period of time as specified in Section 503.03(K) of the standard specifications.

23.10 CONCRETE FINISH

- (A) Concrete finish work in general shall conform to Section 503.03(M) of the standard specifications.
- (B) The concrete finish for surface of pedestal shall be a Class 2 rubbed finish as described in Section 503.03(M)(2) of the standard specifications.
- (C) The exposed surface of concrete drainage structures shall have a light broom finish with a Class 6 Float Finish as described in Section 503.03(M)(3)(b) of the standard specifications for sidewalks and median strips. The interior of the structures shall be provide with a Class 2 Rubbed finish [Section 503.03(M)(2)] and the below grade exterior surfaces shall be provided with a Class 1 Ordinary Surface Finish as described in Section 503.03(M)(1) of the standard specifications.

23.11 INSPECTION

- (A) Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports

23.12 MEASUREMENT AND PAYMENT

Reinforced concrete and the related work described in the article will not be measured or paid for separately, but will be compensated as part of the bid items specified in Article X of these specifications of which it is a part.

END OF ARTICLE