SPECIAL SPECIFICATION

7768

RR Concrete Panel Grade Crossing

1. **Description.** These specifications shall govern the furnishing of all labor, materials, equipment, supervision, and incidentals, and the performance of all work necessary to construct and install all railroad grade crossing panels and other appurtenances in accordance with this specification, and with Volume 2, Structures, of the 2004 American Railway Engineering and Maintenance-of-way Association’s (AREMA) Manual for Railway Engineering, and as shown on the Drawings.

Panels shall be constructed in accordance with details shown on the drawings.

2. **Materials:**

   A. **Rail and Other Track Material:** All rail and other track material to be in accordance with Item 7766, “Railroad Construction.”

   B. **Ties:** Ties under Concrete Crossing Panels shall be 7-inch grade, seven inches by nine inches (7” x 9”) in cross section, and ten feet-zero inches (10'-0”) long, in conformance with A.R.E.M.A. Manual, Chapter 3, Part 1, “Timber Cross Ties” and Item 7766, “Railroad Construction.”

   C. **Underdrain System:** Underdrains, if shown, shall be six inch (6”) diameter perforated metal pipe in filter material enveloped in a filter fabric, all in accordance with Item 556, “Pipe Underdrains.”

   D. **Concrete:** Concrete material, mixing, placing and curing to be per current AREMA Manual, Chapter 8, Concrete Structures and Foundations.

      1. Minimum compressive strength of 5000 psi at 28 days.

      2. Minimum of 2000 psi (precast) and 3500 psi (prestressed) before removing from forms.

      3. Minimum cement content = 7 sacks per cubic yard. Maximum water/cement ratio = 0.47 (by weight).

      4. Slump not to exceed 3 inches.

      5. Air entrainment percent of six (6%) +/- one (1%).

      6. Membrane curing shall be used following the recommendations and procedures of AREA Manual, Chapter 8.

   E. **Reinforcing:**
1. **Reinforcing steel** to be per current ASTM A-615 Specifications and meet Grade 60 requirements.

2. **Prestressing strands** shall be one-half inch (1/2”) diameter, seven wire, uncoated, stress relieved, with a minimum F’s 270,000 psi and meet the requirements of ASTM A-416 Specifications. Initial prestress shall be 0.70 F’s = 28,920 lbs per strand.

**F. Structural Steel:** Structural steel shall conform to ASTM A-36 specifications. Each panel shall have a 3” x 3” x ¼” angle surround that shall be coated to protect panels from corrosion.

3. **Construction:**

   **A. Panel Fabrication:** Each panel shall be manufactured to meet HS20-44 loading in accordance with AASHTO Standard Specifications for Highway Bridges, with a thirty percent (30%) impact factor. Design calculations certified by a registered professional engineer shall be supplied for review and no fabrication shall begin prior to approval by the Port Authority.

   Concrete panels shall be manufactured to be compatible with all rail fastening hardware and rail anchors and shall be to the correct height for AREMA 136 # rail as specified in the Item 7766, “Railroad Construction.”

   Production procedures for the manufacture of precast slabs and prestressed slabs shall be in accordance with the Prestressed Concrete Institute’s Manual MNL 116-77 for quality control and in accordance with AREMA Manual, Chapter 8.

   Ends of prestressed tendons shall be burned off and recessed to a depth of one inch (1”). Recesses and minor concrete spalls are to be filled and finished to the plan dimensions using an approved epoxy bonding compound and grout. Copies of the design mix of concrete shall be submitted to the Engineer for approval prior to the start of any casting operations.

   Standard nominal panel lengths are ten (10’), fifteen feet (15’), and twenty feet (20’). Crossties shall be on eighteen-inch (18”) centers for 9’ panels or on twenty-inch (20”) centers for 10’ panels. Other lengths may be fabricated if required provided they comply with this specification and the details in the plans.

   Each gauge and field panel at the end of the grade crossing shall have a tapered steel deflector plate cast into the panel. The deflector plate shall be the full width of the panel and tied back to the angle.

   A rubber flangeway filler, made of SBR compound, shall be provided at each crossing to insure a positive seal between the rail and concrete panels.

   Flangeway filler must meet ASTM D-2000, 2AA708 F-17 G21 and shall be reusable in the event maintenance and surfacing is required. Piece mark and year of fabrication to be stamped into the steel frame angle at locations shown in the plans. Numeral and letter size to be one and one-half inch (1 ½”).
Any welding of structural steel shall be arc process in accordance with current AWS Dl.1.

Recessed lifting devices as shown on the drawings are to be installed by the fabricator. Optional design of lifting devices are permissible and must include a maximum factor of safety of 4 against cracking under lifting and hauling loads. Details and design calculations for optional designs must be submitted to the Engineer for review and approval prior to beginning fabrication.

A 1/8” elastomeric bearing pad shall be placed between the top of the crosstie and the bottom of the concrete panels. Driving surface to have a light broom finish. The addition of water to the surface during finishing is not permitted.

If track is in a curve greater than 3 degrees, the panel shall be custom manufactured to fit radius. Use of filler plates will not be allowed.

B. Remove Existing Pavement and/or Base: All removal of existing pavement and base material required to install grade crossings, shall be in accordance with the Texas Department of Transportation Standard Specifications, Item 105, “Remove Stabilized Base and/or Asphaltic Pavement,” except as modified herein or on the drawings.

C. Install Underdrain System: The underdrain system shall be installed in accordance with Item 556, “Pipe Underdrains,” except as modified herein, to the lines and grades as shown in the drawings.

D. Place Cement Treated Base: Place, compact, and cure cement treated base in accordance with Item 267, “Portland Cement Treated Base (Plant Mixed),” to the lines, grades and thickness as shown on the drawings.

E. Place Soil Stabilization Fabric: The soil stabilization fabric, if shown, shall be placed at all grade crossing construction on finished, compacted base and around drains and filter material as shown on the Drawings for roadway crossings to be constructed under this Contract. The fabric shall be carefully placed without wrinkles, pulled flat and lapped at least two feet (2’) or sewn where two widths of fabric are joined.

F. Place Sub-ballast: Sub-ballast shall conform to and be placed in accordance with Item 247, “Flexible Base,” and in accordance with Item 7766, “Railroad Construction.” Sub-ballast shall be placed to the lines, grades, and thickness as shown on the drawings.

G. Panel Installation: Precast and prestressed panels are to be handled and supported at specified lifting device locations only. Lifting equipment and connection devices are to be properly sized to handle the lengths of panels being installed.

Track grade through the crossing must be uniform. Adze and treat ties as necessary in order to provide an absolutely level surface. Tie spacing must be accurate enough to support the ends of the crossing panels on the centerline of the tie.

Rail and ties shall be supplied, installed, and spiked in accordance with Item 7766, “Railroad Construction,” except as modified herein. All rail shall be welded to produce one continuous section of rail through the crossing.
Panels must butt up to one another, flush and tight with no gaps. Use of filler plate will not be allowed. Manufacturer shall supply shop drawings detailing crosstie spacing and placement prior to installation.

Ballast shall be provided, placed, and tamped in accordance with Item 7766, “Railroad Construction,” except as modified herein. The entire tie shall be tamped within the limits of the crossing panels.

4. **Measurement.** This item will be measured by the linear foot.

5. **Payments.**

   The work performed and materials furnished in accordance with this Item and measured Payment shall be for the plan quantity at the unit price bid for “RR Concrete Crossing Panel (Complete in place).” The price shall be full compensation for fabricating, furnishing, handling, and installing concrete panels as measured above, including all labor, tools, equipment, and incidentals necessary to complete the work.

   The underdrain system shall be measured and paid in accordance with Item 556, “Pipe Underdrains,” except as modified herein.

   Rail, other track materials, open track construction, cement treated base, sub-ballast, ballast, and existing pavement and/or stabilized base removal shall be measured and paid for in accordance with applicable bid items.