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	<p>If a seal is present on this sheet, JSP's has been electronically sealed and dated.</p>
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	<p>Addendum No. R001</p>

JOB SPECIAL PROVISIONS (BRIDGE)

A. CONSTRUCTION REQUIREMENTS

1.0 Description. This provision contains general construction requirements for this project.

2.0 Construction Requirements. Plans for the existing structure(s) are included in the contract with the bridge plans for informational purposes only.

2.1 In order to assure the least traffic interference, the work shall be scheduled so that the structure closure is for the absolute minimum amount of time required to complete the work. The structure shall not be closed until material is available for continuous construction and the contractor is prepared to diligently pursue the work until the closed structure is opened to traffic.

2.2 Provisions shall be made to prevent any debris and materials from falling into the stream. Any debris and materials that falls below the bridge outside the limits mentioned previously and if determined necessary by the engineer, the debris shall be removed as approved by the engineer at the contractor's expense.

2.3 Provisions shall be made to prevent damage to any existing utilities. Any damage sustained to the utilities as a result of the contractor's operations shall be the responsibility of the contractor. All costs of repair and disruption of service shall be as determined by the utility owners and as approved by the engineer.

3.0 Method of Measurement. No measurement will be made.

4.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price for other items included in the contract.

B. CLASS 2 PENETRATING CONCRETE SEALER

1.0 Description. This work shall consist of preparing and treating the concrete surfaces of the bridge deck, approach slabs (if present), exposed face of CMU blocks and roadway face and top of sidewalks, curbs, parapets, medians and barrier curbs with a class 2 penetrating concrete sealer meeting this specification. This type of sealer shall be used in lieu of the normal surface sealing for concrete in accordance with Sec 703.

2.0 Materials. The sealer shall meet the requirements of this job special provision. The sealer selected by the contractor shall be submitted to the engineer for approval two weeks before application and shall be listed on MoDOT's Pre-Qualified Product List. If the contractor chooses to submit a new product for MoDOT's Pre-Qualified Product List, the product shall be submitted to the engineer 30 days prior to application. Either submittal shall include certified test data from an independent test laboratory and the concrete mix design and curing procedure on the test specimens in which sealer was tested.

2.1 The sealer shall be a solvent-free 100% solids isobutyltrialkoxysilane, with low oligomer and polymer compound content. The chemical composition shall meet the following requirements:

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Property	Specification
Purity	98% minimum monomer by weight
Solvent	Less than 0.1% by weight
Siloxan or polymer Residue	Less than 0.1% by weight
Chloride Ion Content	Less than 40 PPM
Density	ASTM D2111: 7.2 to 7.4 pounds per gallon
Flash Point	ASTM D93: greater than 145 degrees F
Dry Time	ASTM D7539: less than one hour

2.2 The sealer shall meet the following performance criteria based on a single application at the manufacturer's recommended application rate. All test specimens shall be produced using MoDOT Class B-2 concrete in accordance with Section 501.

Test	Test Method	Duration	Max Absorption / Cl ⁻
Water Immersion	ASTM C 642	48 hours	0.5 percent by weight (mass)
Water Immersion	ASTM C 642	50 days	1.5 percent by weight (mass)
Salt Water Ponding (based on non-abraded specimen)	AASHTO T 259	90 days	0.50 lbs/cu yd (0.30 kg/m ³) Cl ⁻ Depth: (1/2 to 1") (13 to 25 mm)

2.2.1 Absorption. The absorption of the treated concrete under total immersion shall not exceed 0.5 percent after 48 hours or 1.5 percent after 50 days per ASTM C 642 as modified below for non-air entrained concrete.

2.2.1.1 In addition to ASTM C 642 section 4.1, one 4-inch (10 cm) diameter by 4 inch (10 cm) long core shall be retrieved from the surface of a concrete test specimen to which sealer has been applied. No cores shall be taken from the bridge deck. The core shall be oven dried as designated by ASTM C 642 section 5.1. The core shall be sealed with a rapid setting two part epoxy on the sides and bottom. The epoxy shall overlap the top edge of the core 1/8" (3mm). The core shall be weighed to determine the oven dry weight (mass) of the core and coating. The weight (mass) shall be designated as "A".

2.2.1.2 The core, processed in accordance with section 2.2.1.1 of this job special provision, shall be immersed in a suitable receptacle and covered with tap water. The procedure as designated by ASTM C 642 section 5.2 shall be followed to determine the soaked surface dry weight (mass) of the core and coating. This weight (mass) shall be designated as "B".

2.2.1.3 The percent moisture absorption of the core shall be determined by ASTM C 642 section 6.1, equation (1). ASTM C 642 sections 5.3, 5.4, 6.1 and equations (2) through (7) shall not apply.

2.2.2 Salt water ponding. After 90 days ponding of 3 percent NaCl solution per ASSHTO T 259, the chloride ion content of the concrete shall not exceed 0.5 pounds per cubic yard (0.30 kg/m³) at 1/2 to 1 inch (13 to 25 mm) depth.

2.3 The sealer shall not permanently stain, discolor or darken the concrete. Application of the sealer shall not alter the surface texture or form a coating on the concrete surfaces. Treated concrete shall be surface dry within 60 minutes after application.

2.4 The sealer shall be tinted with a fugitive dye to enable the coating to be visible on the treated concrete surface for at least 4 hours after application. The fugitive dye shall not be conspicuous more than 7 days after application when exposed to direct sunlight.

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2.5 The sealer shall be delivered to the project in unopened containers with the manufacturer's label identifying the product and with the seal(s) intact. Each container shall be clearly marked by the manufacturer with the following information:

- Manufacturer's name and address.
- Product name.
- Date of manufacture and expiration date.
- Lot identification.
- Storage requirements.

3.0 Construction Requirements.

3.1 Equipment. Application equipment shall be as recommended by the manufacturer. The spray equipment, tanks, hoses, brooms, rollers, coaters, squeegees, etc. shall be thoroughly clean, dry, free of foreign matter, oil residue and water prior to applying the treatment.

3.2 Cleaning and Surface Preparation. Surfaces which are to be treated shall meet the approved product's requirements for surface condition. Sealing shall not be done until all concrete construction or repair has been completed and cured to the requirements of the manufacturer. At a minimum, the wet cure must be complete and the moisture content of the concrete must be at or below the manufacturer's recommendation as measured by a moisture meter. The contractor shall furnish the engineer with written instructions for the surface preparation requirements and a representative of the manufacturer shall be present to assure that the surface conditions meet the manufacturer's requirements.

3.2.1 Sealing shall be done after the bridge deck has been textured.

3.2.2 At a minimum, the surface shall be thoroughly cleaned to remove dust, dirt, oil, wax, curing components, efflorescence, laitance, coatings and other foreign materials. The manufacturer or manufacturer's representative shall approve the use of chemicals and other cleaning compounds to facilitate the removal of these foreign materials before use. The treatment shall be applied within 48 hours following surface preparation.

3.2.3 Cleaning equipment shall be fitted with suitable traps, filters, drip pans and other devices to prevent oil and other foreign material from being deposited on the surface.

3.3 Test Application. Prior to final application, the contractor shall treat a measured test coverage area on horizontal and vertical surfaces of the different components of the structure to be treated for the purpose of demonstrating the desired physical and visual effect on an application or of obtaining a visual illustration of the absorption necessary to achieve the specified coverage rate. In the latter case, the applicator shall use at least ½ gallon (1.9 liter) of treatment following the manufacturer's recommended method of application for the total of the test surfaces. Horizontal test surfaces shall be located on the deck and on the curb or sidewalk, and vertical test surfaces shall be located on a parapet or safety barrier curb so that the different textures are displayed.

3.4 Application. The sealer shall be applied by thoroughly saturating the concrete surfaces at an application rate of 175 square feet per gallon or the rate designated on the plans.

3.4.1 The concrete surface temperature shall be above 35°F (2°C).

3.4.2 Allow concrete to dry a minimum of 48 hours after any measurable precipitation.

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3.4.3 The treatment shall be spread from puddles to dry areas.

3.4.4 If the applicator is unable to complete the entire application continuously, the location where the application was stopped shall be noted and clearly marked.

3.5 Protection of Adjoining Surfaces and the Public.

3.5.1 When applying the sealer, the contractor shall protect adjoining surfaces of the structure that are not to be sealed by masking off or by other means. Sealer shall not leave residue on glass, painted metal or automobiles. The contractor shall also make provision to protect the public when sealing the fascia of a bridge that spans an area used by the public.

3.5.2 Asphalt and mastic type surfaces shall be protected from spillage and overspray. Any asphalt pavement damaged by the sealer will result in removal and replacement at the contractor's expense. Joint sealants, traffic paints and asphalt overlays may be applied to the treated surfaces 48 hours after the treatment has been applied. Adjoining and nearby surfaces of aluminum or glass shall be covered where there is possibility of the treatment being deposited on the surfaces. Plants and vegetation shall be protected from overspray by covering with drop cloths. Precautions shall be followed as indicated on the manufacturer's product and material safety data sheet.

3.6 Opening to Traffic. Traffic shall be allowed on a deck only after a treated area is visibly dry. Dried coating shall not leave residue on glass, painted metal or automobiles.

4.0 Method of Measurement. No direct measurement will be made.

5.0 Basis of Payment. Payment for the above described work shall be considered completely covered by the contract unit price for other items included in the contract.

C. GEOSYNTHETIC REINFORCED SOIL ABUTMENT

1.0 Description. This special provision describes furnishing materials and equipment for building a permanent earth retention system in accordance to the lines, dimension, elevations and details as shown on the plans and provided in the contract.

1.1 The Geosynthetic Reinforced Soil (GRS) Abutment consists of Reinforced Soil Foundation (RSF), modular blocks, select granular fill, base aggregate and geotextile fabric. Additional information of GRS can be found at a Federal Highway Administration (FHWA) website.

2.0 Materials

2.1 Abutment System Components

2.1.1 Reinforced Soil Foundation (RSF). The RSF as shown on the plans shall be wrapped with a geotextile fabric and support the GRS abutment. The RSF shall be a Type 5 base aggregate in accordance with Sec 1007. Aggregate material shall be virgin crushed stone or crushed gravel.

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2.1.2 Integrated Bridge Approach. An integrated bridge approach as shown on the plans shall be a Type 5 base aggregate in accordance with Sec 1007. Aggregate material shall be virgin crushed stone or crushed gravel.

2.1.3 Abutment Wall Facing. Abutment wall facing units shall consist of precast modular concrete blocks. ~~All units shall incorporate a mechanism or devices that will develop a mechanical connection between vertical block layers.~~ Units that are cracked, chipped, or have other imperfections in accordance to ASTM C1372 or excessive efflorescence shall not be used within the abutment. A single block style shall be used throughout the project. The color and surface texture of the block shall be as given on the plans. Corners shall be constructed as shown on plans and per the block manufacturer's recommendations.

2.1.3.1 Block dimensions may vary no more than $\pm 1/8$ inch from the standard values published by the manufacturer in accordance to ASTM C1372. Blocks must have a minimum nominal width (front face to back face) of 8 inches. Blocks must have a nominal height of 8 inches and a nominal length of 16 inches. The nominal block height shall not exceed the reinforcement spacing shown on the plans. The front face of the blocks shall conform to plan requirements for color, texture, or patterns.

2.1.3.2 Cementitious materials and aggregates for modular blocks shall conform to the requirements of ASTM C1372 Section 4.1 and 4.2. Modular blocks shall meet the following requirements. Additives can be used to reduce efflorescence at face of the blocks.

Test	Method	Requirement
Compressive Strength (psi)	ASTM C140	4000 min.
Water Absorption (%)	ASTM C140	5 max.
Freeze-Thaw Loss (%)	ASTM C1262-	1.0 max. ^[2]
40 cycles, 5 of 5	10 ^[1]	1.5
samples		max. ^[2]
50 cycles, 4 of 5		
samples		

^[1] Test shall be run using a 3% saline solution.

^[2] Test results that meet either of the listed requirements for Freeze-Thaw Loss are acceptable.

2.1.3.3 All blocks shall be certified as to strength, absorption, and freeze-thaw requirements and not be cast more than 18 months prior to delivery. At the time of delivery of the certified blocks, furnish the engineer a certified test report which shall clearly identify the firm conducting the sampling and testing, the type of block, the date sampled, the represented lot, the number of blocks in the lot, and the specific test results for each of the stated requirements of this specification. A lot shall not exceed 5000 blocks. The certified test results shall represent all blocks within the lot. Each pallet of blocks delivered shall bear lot identification information. Block lots that do not meet the requirements of this specification or blocks without supporting certified test reports will be rejected and shall be removed from the project at no expense to MoDOT.

2.1.3.4 MoDOT may conduct testing of certified modular block lots delivered to the project. MoDOT will not do freeze-thaw testing on blocks less than 45 days old. If a random sample of five blocks of any lot tested by MoDOT fails to meet any of the requirements of this specification (non-conforming), the contractor shall remove from the project site all blocks from the failed lot not installed in the finished work, unless the engineer allows otherwise. Any adjustment to the



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contract price for non-conforming blocks installed will not exceed the price of the blocks charged by the supplier.

2.1.3.5 Wet cast blocks shall be produced in accordance with Sec 1052.30. Dry cast blocks shall be produced as previously stated.

2.1.3.6 Submittals. The contractor shall submit to the engineer for approval the following items prior to construction of the GRS abutments:

- a) Block dimensions for the solid and hollow blocks as well as the cap stones
- b) Verification of minimum compressive strength of 4000 psi
- c) Verification of maximum absorption rates
- d) ASTM C1262 Freeze-Thaw test results

2.1.3.7 Method of Measurement. No measurement will be made.

2.1.4 Geotextile Fabric. Geotextile Fabric supplied as reinforcing for the abutment and integrated approach and wrapping of the RSF shall be a biaxial woven polyester, polypropylene, stabilized nylon, polyethylene or polyvinylidene chloride geotextile fabric with a minimum wide width tensile strength (ASTM D4595) of 4,800 lb/ft. The test should be performed at a strain rate of 10 percent per minute. The wide width tensile strength (ASTM D4595) at a strain of 2 percent shall be greater than 1,370 lb/ft.

2.1.4.1 The Geotextile Fabric shall be furnished in a protective wrapping that prevents exposure to ultraviolet radiation and damage from shipping or handling. The Geotextile Fabric shall be kept dry until installed. Each roll shall be clearly marked to identify the material contained.

2.1.5 Connectors. Pins, rods, clips, or other devices ~~used to develop~~, if used for a mechanical interlock between facing unit block layers, shall be galvanized in accordance with Sec 712.

2.1.6 Backfill Materials. All backfill placed within a zone from the top of the RSF to the top of the final layer of abutment facing units and for the full length of the geotextile fabric shall be abutment backfill. This includes all material used to fill openings in the abutment facing units. Select granular fill material for abutment backfill shall be a Type 7 base aggregate in accordance with Sec 1007. Aggregate material shall be virgin crushed stone or crushed gravel.

3.0 Construction

3.1 General. Place the abutment wall facing units in accordance to the manufacturer's instructions and to the lines, elevations, batter, and tolerances as shown on the plans. Blocks are to be staggered, including corners, to ensure there are no vertical joints greater than one block in height.

3.1.1 Place the initial layer of facing units on the RSF; then level them and properly align them. A thin layer of fine aggregate, which shall not exceed 1/4 inch, may be used on top of the RSF to facilitate leveling. If the leveling layer required exceeds 1/4 inch, a mortar or grout shall be used. Fill formed voids or openings in the facing units with abutment backfill. Sweep clean all debris on each layer of facing units before placing the next layer of facing units.

3.1.2 A fine aggregate, similar to the gradation of the select granular fill for the GRS abutment and conforming to the material requirements of Sec 1007.3, shall be used as a leveling course. The fine aggregate level course shall be compacted in accordance with Sec 304.





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3.1.2 Install all pins, rods, clips, or other devices ~~used to develop~~, if used for a mechanical interlock between facing unit layers, in accordance to the manufacturer's directions.

3.1.3 All excavation for the GRS Abutment shall conform to Sec 206. At the end of each working day, provide good temporary drainage such that the backfill shall not become contaminated with run-off soil or water if it should rain. Do not stockpile or store materials or large equipment within 10 feet of the front face of the abutment.

3.1.4 Check wall plumbness a minimum of every 3 layers and correct deviations greater than 1/4". Any misalignment or movement (greater than or equal to 0.5 inches in 10 feet) of the GRS abutment or facing due to construction loads or operations shall be corrected.

3.2 Reinforced Soil Foundation. Subgrade surfaces beneath the GRS Systems shall be level, free from deleterious materials, loose or otherwise unsuitable soils. Prior to placement of geosynthetic reinforcement and granular fill material, the subgrade shall be proof-rolled to provide a uniform and firm surface. Any soft areas, as determined by the engineer, shall be excavated and replaced with suitable compacted materials. Foundation surface shall be inspected and approved by the engineer prior to fill placement. Benching the backcut into competent soil is recommended to improve stability.

3.2.1 Compact RSF aggregate to a dry density of 95.0% of the maximum dry density as determined by AASHTO T-99 and +/- 2% optimum moisture content. Lift thickness for the RSF aggregate shall not exceed 8 inches in depth unless otherwise shown in the plans, or as the engineer directs.

3.2.2 The RSF fill material shall be graded, leveled, and compacted before encapsulating with the geotextile reinforcement. The geotextile shall fully enclose the RSF on the face and the wing wall sides. The reinforcement sheet shall overlap a minimum of 3 feet.

3.3 Abutment Backfill. Place abutment backfill materials in the areas as indicated on the plans and as detailed in this specification. Select granular fill shall be placed, spread, and compacted in such a manner to minimize the development of wrinkles and/or displacement of the geosynthetic reinforcement. Abutment backfill lifts shall be no more than 8-inches or the distance between reinforcement layers (whichever is smaller) in depth unless otherwise shown in the plans. Backfilling shall closely follow erection of each course of abutment facing units.

3.3.1 Compact abutment backfill as specified in Sec 720.4.7. Compact Abutment Backfill to 95.0% of maximum dry density as determined by AASHTO T-99, Method D, and +/- 2% optimum moisture content.

3.3.2 Place and compact the backfill to the level of the next higher layer of reinforcement before placing the reinforcement or connecting it to the abutment facing. The reinforcement shall lay horizontally on top of the most recently placed and compacted layer of backfill.

3.3.3 Conduct backfilling operations in such a manner as to prevent damage or misalignment of the abutment facing units, soil reinforcement, or other abutment components. Correct any such damage or misalignment as directed by the engineer.

3.3.4 Compact abutment backfill with at least three passes of lightweight manually operated compaction equipment acceptable to the engineer. With the approval of the engineer, density testing of the select granular fill material can be omitted if sufficient density is achieved with 3 to

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5 passes of a walk-behind vibratory plate compactor within 3 feet of the fill face and by a ride-on vibratory roller in other areas.

3.3.5 Do not operate tracked or wheeled equipment on the backfill within 3 feet from the back face of modular blocks. The engineer may order the removal of any large or heavy equipment that may cause damage or misalignment of the abutment facing units.

3.3.6 Mortar (or Grout) conforming to the requirements of Sec 1066 shall be used for the following:

- Coping used to cover top of of block wall as shown on the plans
- To fill and secure the top layers of blocks for the entire block wall as shown on plans
- To fill and secure the full height of the corners of the block wall.

3.4 Geotextile Fabric Layers. Place and anchor geotextile fabric material between abutment unit layers as shown on the plans. Each geotextile fabric layer shall be continuous throughout the lengths indicated on the plans.

3.4.1 Do not operate wheeled or tracked equipment directly on the geotextile fabric. A minimum cover of 6 inches is required before such operation is allowed.

3.4.2 Connect adjoining geotextile fabric with straps, rings, hooks or other mechanical devices to prevent movement during backfilling operations. Prior to placing backfill on the geotextile fabric, pull the geotextile fabric taut and hold in position with pins, stakes or other methods approved by the engineer.

3.4.3 Geosynthetic reinforcement shall extend directly beneath each layer of CMU blocks covering greater than 85%, except for a grouted area, of the full width of the block to the front face of the wall.

4.0 Method of Measurement. Measurement of Geosynthetic Reinforced Soil (GRS-IBS) is per each abutment. The estimated quantities shown on the plans are shown for informational purposes. The contractor should develop an independent analysis of materials and work effort required to construct the GRS-IBS abutment as shown on the plans and outlined in the Job Special Provisions.

5.0 Basis of Payment. Payment for all labor, materials, and equipment to construct the GRS-IBS abutment including select granular backfill, geosynthetic reinforcement, CMU blocks, grout and steel reinforcement will be considered completely covered by the lump sum unit price for "GRS-IBS Abutment #", (# is the abutment number).

D. ULTRA HIGH PERFORMANCE CONCRETE (UHPC)

1.0 Description. This specification covers a field casting of closure pour joints for precast concrete modules, including batching, transportation, forming and curing.

2.0 Materials

2.1 High Weight Methyl Methacrylate. The high molecular weight methacrylate (HMWM) resin shall be low viscosity and non-fuming. Acceptance is based on the manufacturer's certification.

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2.1.1 The product container shall include the name of the manufacturer, the brand name of the product and the date of manufacture.

2.2 Sand. The sand shall be commercial quality dry blast sand. 95% of the sand shall pass the #8 sieve, and 95% shall be retained on the #30 sieve.

2.3 Materials Requirements

- a. The material shall be Ultra High Performance Concrete (UHPC), with all components supplied by one manufacturer. The contractor or manufacturer shall be responsible for the UHPC mix design. The UHPC shall be proportioned according to manufacturer's recommendation.
- b. The UHPC shall consist of cementitious materials, fine aggregate, super plasticizer and accelerators admixtures, water and steel fibers, deformed or undeformed specifically made for steel reinforcement.
- c. No change shall be made in the approved UHPC during the progress of the work without the prior written permission of the engineer.
- d. The UHPC mechanical and permeability properties shall conform to the requirement in Table 1. The contractor shall provide independent certified laboratory testing data within the last 5 years and must be submitted with tests as specified in Table 1.

Table 1.

Ultra High Performance Concrete (UHPC)	
Compressive Strength (ASTM C39) minimum 12 ksi at 4 days - minimum 21 ksi at 28 days	
*Flexural Toughness and First-Crack Strength-Fiber Reinforced Concrete (ASTM C1018), 10 inch span	$I_{30} \geq 48$
Long-Term Shrinkage (ASTM C157; initial reading after set)	≤ 800 microstrain
*Chloride Ion Permeability (AASHTO T259) ; $1/2$ inch depth	< 0.07 oz/ft ³
*Chloride Ion Permeability (ASTM C1202)	≤ 250 coulombs
*Scaling Resistance (ASTM C 672)	$y < 3$
Freeze-Thaw Resistance (ASTM C666-B; 600 cycles)	RDM $> 95\%$
*Alkali-Silica Reaction (ASTM C 1567) at 28 days	≤ 0.10

*After thermo treatment

3.0 Mix Design Approval Requirements

- a. The contractor shall submit a pre-test trial of UHPC mix design consisting from a minimum of 4.0 ft³ cubic feet.
- b. The pre-test trial UHPC Mix Design shall be submitted to the engineer 6 weeks prior to any UHPC being placed on the project.
- c. Concrete shall not be placed on the project before the UHPC testing has been reviewed and approved by the engineer.

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- d. Concrete quality control shall be the responsibility of the contractor. A UHPC pre-test trial shall be delivered to the project and shall be sampled and tested by Material and Research Central Laboratory.
 - (1) A minimum of 12-4x8 inch cylinders shall be cast in accordance with ASTM C39. Three cylinders shall be tested and averaged for each reported test. The cylinders shall be tested at 4, 7, 14 and 28 days. The compressive strength shall meet a minimum of 12 ksi at 4 days and a minimum of 21 ksi at 28 days. Only a UHPC mix design that passes these tests may be used to form the joint.
 - (2) The contractor shall submit batching sequence and curing method as specified by the manufacture's recommendation to the engineer.

4.0 CONSTRUCTION

4.1 Pre-Pour Meeting. Prior to the initial placement of the UHPC, the contractor shall arrange for an on-site meeting with the UHPC manufacturer's representative. The contractor's staff, Resident engineer, Inspectors, Materials and Research and Bridge Division shall attend the meeting at the project site. The objective of the meeting will be to clearly outline the procedures for mixing sequence, transporting, finishing and curing of the UHPC mix design.

4.1.1 The contractor shall arrange for a UHPC manufacturer's representative to be on site during the placement of the joints. The representative shall be knowledgeable in the supply, mixing, delivery, placement, and curing of the UHPC.

Material supplier for DUCTAL concrete:

Lafarge North America
#1200, 10655 Southport RD SW
Calgary, Alberta T2W4Y1
Phone (403) 225-5428
FAX (403) 278-7420

4.2 Storage. The contractor shall assure the proper storage of premix, fibers and additives as required by the manufacture's specifications in order to protect materials against loss of physical and mechanical properties.

4.3 UHPC Placement

4.3.1 Slump. The contractor shall measure the slump flow on each batch of UHPC. The slump flow will be conducted using a mini-slump cone. The flow for each batch shall be between 7-10 inches. The slump flow for each batch shall be recorded and reported to the engineer.

4.3.2 Cylinders. MoDOT shall sample and test four sets of 4x8 inch cylinders for compressive strength for each day's placement. All sets shall be cured in an environment similar to the material they represent. The four sets of cylinders shall be delivered to the Material and Research Central Laboratory prior to the fourth day. The cylinders shall be tested at 4, 14 and 28 days. Three cylinders shall be tested and averaged for the final strength. The remaining set will be used as a reserve if the 28-day strength fails to meet design strength.

4.3.3 The bridge maybe opened to traffic when the compressive strength reaches 15 ksi.

4.4 Form Work, Batching and Curing

- a. The design and fabrication of forms shall follow approved installation drawings and shall follow the manufacturer's recommendations. All the forms for UHPC shall be constructed from plywood. The forms shall be coated to prevent absorption of water.
- b. If the ambient temperatures are above 90°F, precautions shall be taken so the forms of the structural modules will be the ambient temperature.
- c. The contractor shall follow the batching sequence as specified by the manufacture and approved by the engineer. The surface of the UHPC field joints shall be filled flush with the precast deck plus 1/8 inch.
- d. Concrete shall be place continuously in each joint, taking care to avoid horizontal planes of weakness.
- e. The contractor shall expose the aggregate along the joint edge of the cast girder module to create a better bond before placing UHPC.
 - (1) The contractor shall use a concrete surface retarder, abrasive blasting, or other method approved by the engineer to expose the aggregate.
 - (2) The epoxy coating of the exposed reinforcing steel shall not be damaged while exposing the aggregate.
- f. The UHPC in the form shall be cured according to manufacturer's recommendations to attain the required strength shown on the contract documents. A minimum curing temperature of 60°F is recommended.
- g. The UHPC quality control shall be responsibility of the contractor. UHPC shall meet required strength specified on the contract documents.
- h. Contacts.

Material Supplier and Cylinder Testing:

Kyle Nachuk
Lafarge-North America
#300, 115 Quarry Park Road, SE
Calgary, Alberta T2C 5G9
403-225-5428
Kyle.nachuk@lafarge.com

Lafarge-North America
8700 West Bryn Mawr. Ave., Suite 300
Chicago, IL 60631
(773) 372-1000

4.4.1 Mockups of each UHPC pour shall be performed prior to actual UHPC construction and conducted per the requirements of this special provision and the recommendation of the Lafarge representative. Mockups of horizontal closure pours shall be four feet in length with all other dimensions to match those required by the plans. Mockups of vertical closure pours shall be two

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feet in length with all other dimensions to match those required by the plans. The mockup process shall be observed by the Lafarge representative.

4.4.2 Two portable batching units will be supplied by Lafarge to the contractor for mixing of the UHPC.

4.6 Diamond Grinding of Joints. Grinding of UHPC and bridge deck surfaces can be performed when UHPC's strength of 10 ksi has been achieved. Use equipment having gang-mounted diamond saw blades on a multi-blade arbor specifically designed for PCC pavement production grinding. Using equipment capable of producing a 3 ft (minimum) grinding pass width that is equipped with a vacuum system capable of removing slurry from the bridge deck surface, contractor shall submit a request to use other equipment 7 days prior to the start of grinding operations.

5.0 Method of Measurement. Measurement of UHPC will be measured by a linear length of joints in feet. Length of in-place UHPC shall be calculated to the nearest foot.

6.0 Basis of Payment. Payment for all labor, equipment, tools, materials, installation and other incidentals necessary to complete the work will be considered completely covered by the contract unit price per linear foot for "Ultra High Performance Concrete (UHPC)".

E. PROTECTION OF COLUMBIA TERMINAL RAILROAD INTERESTS

To Report an Emergency on the Columbia Terminal Railroad call: (573) 875-2555

1.0 Authority of Railroad Operations Manager and State Engineer.

1.1 The authorized representative, herein called "Railroad Operations Manager," of the Columbia Terminal Railroad owned by the City of Columbia, a municipal corporation, herein called "Railroad," shall have final authority in all matters affecting the safe maintenance and operation of railroad traffic including the adequacy of the foundations and structures supporting the railroad tracks.

1.2 The authorized representative of the Missouri Highways and Transportation Commission, herein called "Engineer", shall have authority over all other matters as prescribed herein and in the project specifications.

1.3 The right of way of the Railroad is located within the limits of this project and care shall be taken to insure that no debris or material is dropped on the Railroad's property.

2.0 Notice of Starting Work. The contractor shall not commence any work on the Railroad's right of way until contractor has complied with the following conditions:

- (a) At least 5 working days in advance of the date the contractor proposes to begin work on the Railroad's right of way, the contractor shall give the Railroad Operations Manager written notice to the address below. Also, email a copy of the notice to the email address below.

Mr. David Sprague
Railroad Operations Manager
Columbia Terminal Railroad

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P.O. Box 6015
Columbia, MO 65205
573-441-5562 or
573-823-8390
DAS@goColumbiaMo.com

- (b) Obtain written authorization from the Railroad to begin work on the Railroad's right of way, such authorization will include an outline of specific conditions with which the contractor shall comply.
- (c) Obtain written approval from the Railroad of Railroad Protective coverage as required by paragraph (12) below.
- (d) Determine if any utilities are buried on the Railroad's rights of way and contact the utilities companies to arrange for locates prior to beginning work on Railroad's property.

3.0 Interference with Railroad Operations

3.1 The contractor shall arrange and conduct all work so that there will be no interference with Railroad operations, including train, signal, telephone and telegraphic services; or damage to the property of the Railroad; or to poles, wires, and other facilities of tenants on the rights of way of the Railroad. Whenever work may affect the operations or safety of trains, the method of doing such work shall first be submitted to the Railroad Operations Manager for approval, but such approval shall not relieve the contractor from liability. Any work to be performed by the contractor which requires flagging service or inspection service (watchman) shall be deferred by the contractor until the flagging protection required by the Railroad is available at the job site.

3.2 Whenever work within Railroad rights of way is of such a nature that impediment to Railroad operations is unavoidable such as use of runaround tracks or necessity for reduced speed, the contractor shall schedule and conduct these operations so that such impediment is reduced to the absolute minimum.

3.3 Should conditions arising from or in connection with the work require immediate and unusual provisions be made to protect operations and property of the Railroad, the contractor shall make such provisions. If in the judgment of the Railroad Operations Manager, or the Engineer if Railroad Operations Manager is absent, such provision is insufficient, either may require or provide such provisions as they deem necessary. In any event, such provisions shall be at the contractor's expense and without cost to the Railroad or the Commission.

4.0 Track Clearances

4.1 The minimum track clearances to be maintained by the contractor during construction are shown on the project plans. However, before undertaking any work within Railroad right of way, or before placing any obstruction over any track, the contractor shall:

- (a) Notify the Railroad Operations Manager at least seventy-two (72) hours in advance of the work.
- (b) Receive assurance from the Railroad Operations Manager that arrangements have been made for flagging service as may be necessary.

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- (c) Receive permission from the Railroad Operations Manager to proceed with the work.
- (d) Ascertain that the Engineer has received copies of notice to the Railroad and of the Railroad's response.

5.0 Construction Procedures

5.1 General Construction work on Railroad property shall be:

- (a) Subject to the inspection and review of the Railroad.
- (b) In accord with the Railroad's written outline of specific conditions.
- (c) In accord with these special provisions.

5.2 Excavation The subgrade of an operated track shall be maintained with edge of berm at least twelve feet (12') from centerline of track and not more than twenty-six inches (26") below top of rail. The contractor will not be required to make existing section meet this specification if substandard, in which case existing section will be maintained.

5.3 Excavation for Structures The contractor shall be required to take special precaution and care in connection with excavating and shoring pits, and in driving piles for footings adjacent to tracks to provide adequate lateral support for the tracks and the loads which they carry, without disturbance of track alignment and surface, and to avoid obstructing track clearances with working equipment, tools or other material. The procedure for doing such work, including need of and plans for shoring, will first be approved by the Railroad Operations Manager, but such approval shall not relieve the contractor from liability. Before submission of plans to the Railroad Operations Manager for approval, such plans will first be reviewed by the Engineer in accordance with the Missouri Standard Specifications for Highway Construction (hereinafter, "Standard Specifications").

5.4 Demolition of Existing Structures The contractor shall be required to take special precaution and care in connection with demolition of existing structures. The procedure for doing such work, including need of a plan for temporary falsework, shall first be approved by Railroad Operations Manager, but such approval shall not relieve the contractor from liability. Before submission of plans to the Railroad Operations Manager for approval, such plans shall first be reviewed by the Engineer.

5.5 Falsework The contractor shall be required to take special precaution and care to prevent any material from falling on Railroad's right of way. The procedure for preventing material from falling, including need of and plans for temporary falsework, shall first be approved by Railroad Operations Manager, but such approval shall not relieve the contractor from liability. Before submission of plans to the Railroad Operations Manager for approval, such plans shall first be reviewed by the Engineer.

5.6 Blasting The contractor shall obtain advance approval of the Railroad Operations Manager and the Engineer for use of explosive on or adjacent to Railroad property. If permission for use of explosives is granted, the contractor will be required to comply with the following:

- (a) Blasting shall be done with light charges under the direct supervision of a responsible officer or employee of the contractor.

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- (b) Electric detonating fuses shall not be used because of the possibility of premature explosions resulting from operation of two-way train radios.
- (c) No blasting shall be done without the presence of the Railroad Operations Manager. At least seventy-two (72) hours advance notice to the person designated in the Railroad's notice of authorization to proceed (see paragraph (2)(B)) will be required to arrange for the presence of an authorized Railroad Operations Manager and such flagging as the Railroad may require.
- (d) Have at the job site adequate equipment, labor and materials and allow sufficient time to clean up debris resulting from the blasting without delay to trains, as well as correcting at contractor's expense any track misalignment or other damage to Railroad property resulting from the blasting as directed by the Railroad Operations Manager. If contractor's actions result in delay of trains, the contractor shall bear the entire cost thereof.

5.6.1 The Railroad Operations Manager will:

- (a) Determine the approximate location of trains and advise the contractor the approximate amount of time available for the blasting operation and clean-up.
- (b) Have the authority to order discontinuance of blasting if blasting is too hazardous or is not in accord with these special provisions.

5.7 Maintenance of Railroad Facilities The contractor shall be required to maintain all ditches and drainage structures free of silt or other obstructions which may result from contractor's operations; to promptly repair eroded areas within Railroad rights of way and to repair any other damage to the property of the Railroad or its tenants

5.7.1 All such maintenance and repair of damages due to the contractor's operations shall be done at the contractor's expense.

5.8 Storage of Materials and Equipment Materials and equipment shall not be stored where they will interfere with Railroad operations, nor on the rights of way of the Railroad without first having obtained permission from the Railroad Operations Manager, and such permission will be with the understanding that the Railroad will not be liable for damage to such material and equipment from any cause and that the Railroad Operations Manager may move or require the contractor to move, at the contractor's expense, such material and equipment.

5.8.1 All grading or construction machinery that is left parked near the track unattended by a watchman shall be effectively immobilized so that it cannot be moved by unauthorized persons. The contractor shall protect, defend, indemnify and save Railroad, and any associated, controlled or affiliated corporation, harmless from and against all loss, costs, expenses, claim or liability for loss of or damage to property or the loss of life or personal injury, arising out of or incident to the contractor's failure to immobilize grading or construction machinery.

5.9 Cleanup Upon completion of the work, the contractor shall remove from within the limits of the Railroad right of way, all machinery, equipment, surplus materials, falsework, rubbish or temporary buildings of the contractor, and leave said rights of way in a neat condition satisfactory to the Railroad Operations Manager.

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6.0 Damages The Railroad shall not assume liability for any damages to the contractor, contractor's work, employees, servants, equipment and materials caused by Railroad traffic.

6.1 Any cost incurred by the Railroad for repairing damages to its property or to property of its tenants, caused by or resulting from the operations of the contractor, shall be paid directly to the Railroad by contractor.

7.0 Flagging Services

7.1 When Required The Railroad has sole authority to determine the need for flagging required to protect its operations. In general, the requirements of such services will be whenever the contractor's personnel or equipment are, or are likely to be, working on the Railroad's right of way, or across, over, adjacent to, or under a track, or when such work has disturbed or is likely to disturb a railroad structure or the railroad roadbed or surface and alignment of any track to such extent that the movement of trains must be controlled by flagging, or reasonable probability of accidental hazard to Railroad's operations or personnel. Normally, the Railroad will assign one (1) flagger to a project; but in some cases, more than one may be necessary. However, if the contractor works within distances that violate instructions given by the Railroad Operations Manager or performs work that has not been scheduled with the Railroad Operations Manager, flaggers may be required full time until the project has been completed.

7.2 Scheduling and Notification

7.2.1 Not later than the time that approval is initially requested to begin work on Railroad right of way, contractor shall furnish to the Railroad and the Commission a schedule for all work required to complete the portion of the project within Railroad right of way and arrange for a job site meeting between the contractor, the Engineer, and the Railroad Operations Manager. Flaggers may not be provided until the job site meeting has been conducted and the contractor's work scheduled.

7.2.2 The contractor shall be required to give the Railroad Operations Manager at least ten (10) working days of advance written notice of intent to begin work within Railroad right of way in accordance with this special provision. Once begun, if such work is then suspended at any time, or for any reason, the contractor shall be required to give the Railroad Operations Manager at least three (3) working days of advance notice before resuming work on Railroad right of way. Such notices shall include sufficient details of the proposed work to enable the Railroad Operations Manager to determine if flagging will be required. If such notice is in writing, the contractor shall furnish the Engineer a copy; if notice is given verbally it shall be confirmed in writing with copy to the Engineer. If flagging is required, no work shall be undertaken until the flagger, or flaggers are present at the job site. It may take up to thirty (30) days to obtain flagging initially from the Railroad. When flagging begins, the flagger is usually assigned by the Railroad to work at the project site on a continual basis until no longer needed and cannot be called for on a spot basis. If flagging becomes unnecessary and is suspended, it may take up to thirty (30) days to again obtain from the Railroad. Notification for flagging should be addressed to:

Mr. David Sprague, Railroad Operations Manager
Columbia Terminal Railroad
573-441-5562 or 573-823-8390

7.2.3 If, after the flagger is assigned to the project site, emergencies arise which require the flagger's presence elsewhere, then the contractor shall delay work on Railroad right of way until such time as the flagger is again available. Any additional costs resulting from such delay shall be borne by the contractor and not the Railroad.

7.3 Payment

7.3.1 The Commission will pay the Railroad directly for the cost of flagging services associated with the highway project by deducting this amount from normal contractor payments.

7.3.2 The Railroad shall submit progress invoice to the Engineer during the time flagging services are required. A final invoice shall be submitted to the Engineer within one hundred and eighty (180) days of completion of the project. This is defined as the point in time at which the Commission and the Railroad both accept the project and the contractor is relieved of his/her contractual obligation. Should the invoice not be received within this time period, the Railroad will be responsible for obtaining payment directly from the contractor.

7.3.3 Should a dispute between the Railroad, Commission, and the contractor develop concerning the cost of flagging service, the full amount of the Railroad's invoice will be deducted from the contractor's payment request. However, only ninety-five percent (95%) of the amount requested will be sent to the Railroad by the Commission. The Commission will make a corrected payment once a settlement is reached between the Railroad, the Commission and the contractor.

7.3.4 The contractor shall be responsible for arranging needed flagging services as required by the Railroad to accomplish the highway improvement.

7.3.5 The cost of flagging service is approximately \$200 per day based on an eight (8) hour work day and a forty (40) hour work week. This cost includes the base pay for the flagger and overhead. The charge to the Commission by the Railroad will be the actual cost based on the rate of pay for the Railroad's employees who are available for flagging service at the time the service is required. Work by a flagger in excess of eight (8) hours per day or forty (40) hours per week will result in overtime pay at 1 1/2 times the appropriate rate. If work is performed on a holiday, the flagging rate is 1 1/2 times the normal rate. Railroad expenses incurred preparing and handling invoices will also be charged to the Commission. Charges to the Commission by the Railroad shall be in accordance with applicable provisions of Volume 1, Chapter 4, §3 and Volume 6, Chapter 6, §2, Subsection 1 of the Federal-Aid Highway Program Manual issued by the Federal Highway Administration, including all current amendments. Flagging costs are subject to change. The above estimates of flagging cost are provided for information only and are not binding in any way.

7.3.6 A maximum of one (1) hour travel time each way per day per flagger will be required for travel to and from the project.

7.4 Verification

7.4.1 Any complaints concerning a flagger shall be resolved in a timely manner. If need for a flagger is questioned, please contact Railroad Operations Manager. All verbal complaints must

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be confirmed in writing by the contractor within five (5) working days with copy to the Railroad Operations Manager. All written correspondence should be addressed to:

Mr. David Sprague, Railroad Operations Manager
Columbia Terminal Railroad
573-441-5562 or 573-823-8390

7.4.2 The Railroad flagger assigned to the project will be responsible for notifying the Engineer upon arrival at the job site on the first day (or as soon thereafter as possible) that flagging services begin and on the last day that flagger performs such services for each separate period that services are provided. The Engineer will document such notification in the project records.

8.0 Haul Across Railroads

8.1 Where the plans show or imply that materials of any nature must be hauled across a Railroad, unless the plans clearly show that the Commission has included arrangements for such haul in its agreement with the Railroad, the contractor shall be required to make all necessary arrangements with the Railroad regarding means of transporting such materials across the Railroad. The contractor shall be required to bear all costs incidental to such crossings, including flagging, whether services are performed by contractor's own forces or by Railroad personnel.

8.2 No crossing may be established for use of the contractor for transporting materials or equipment across the tracks of the Railroad unless specific authority for its installation, maintenance, necessary watching and flagging thereof and removal, all at the expense of the contractor, is first obtained from the Railroad Operations Supervisor.

9.0 Work for the Benefit of the Contractor

9.1 All temporary or permanent changes in wire lines or other facilities which are considered necessary to the project are shown on the plans, and is included in the agreement between the Commission and the Railroad or will be covered by appropriate revisions to same which will be initiated and approved by the Commission and/or the Railroad.

9.2 Should the contractor desire any changes in addition to the above, then contractor shall make separate arrangements with the Railroad for same to be accomplished at the contractor's expense.

10.0 Cooperation and Delays

10.1 It shall be the contractor's responsibility to arrange a schedule with the Railroad for accomplishing staged construction involving work by the Railroad or tenants of the Railroad. In arranging a schedule contractor shall ascertain, from the Railroad, the lead time required for assembling crews and materials and shall make due allowance.

10.2 No charge of claims of the contractor against the Railroad will be allowed for hindrance or delay on account of railway traffic; any work done by the Railroad or other delay incident to or necessary for safe maintenance of railway traffic or for any delays due to compliance with these special provisions.

11.0 Trainman's Walkways Along the outer side of each exterior track of multiple operated track, and on each side of single operated track, an unobstructed continuous space suitable for trainman's use in walking along trains, extending to a line not less than twelve feet (12') from

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centerline of track, shall be maintained. Any temporary impediments to walkways and track drainage encroachments or obstructions allowed during work hours while Railway's protective service is provided shall be removed before the close of each work day. If there is any excavation near the walkway, a handrail with a twelve feet (12') minimum clearance from centerline of track, shall be placed.

12.0 Insurance

12.1 In addition to any other forms of insurance or bonds required under the terms of the contract and specifications, the contractor will be required to carry insurance of the following kinds:

12.1.1 Contractor's Public Liability and Property Damage Liability Insurance. Insurance shall include explosion, collapse and underground hazard coverage.

12.1.2 The contractor shall furnish to the Commission for transmittal to the Railroad a certificate of insurance as evidence with respect to the operations contractor performs, contractor carries regular contractor's Public Liability Insurance and regular Contractor's Public Liability Insurance and regular Contractor's Property Damage Liability Insurance both providing for limits of liability as follows:

<u>COVERAGE</u>	<u>MINIMUM COMBINED LIMITS OF LIABILITY</u>
Bodily Injury Liability]	
Property Damage]	\$2,000,000 Per Occurrence
Liability]	\$2,000,000 Aggregate
Physical Damage to]	
Property]	

12.1.3 Contractor's Protective Liability and Property Damage Liability Insurance.

12.1.4 The contractor shall furnish the Commission for transmittal to the Railroad a certificate of insurance as evidence that with respect to the operations performed for the contractor by any subcontractor, contractor carries in his or her own behalf regular Contractor's Public Liability Insurance and regular Contractor's Protective Property Damage Liability Insurance both providing for limits of liability as follows:

<u>COVERAGE</u>	<u>MINIMUM COMBINED LIMITS OF LIABILITY</u>
Bodily Injury Liability]	
Property Damage]	\$2,000,000 Per Occurrence
Liability]	\$2,000,000 Aggregate
Physical Damage to]	
Property	

12.1.5 Automobile Liability Insurance.

12.1.6 The contractor shall furnish to the Commission for transmittal to the Railroad an original copy of Automobile Liability Insurance providing bodily injury and property damage coverage with a combined single limit of at least \$1,000,000 each occurrence or claim. This insurance

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shall cover all motor vehicles including hired and non-owned and mobile equipment excluded from coverage under the general public liability insurance.

12.1.7 Workers' Compensation Insurance.

12.1.8 The contractor shall furnish to the Commission for transmittal to the Railroad an original copy of Workers' Compensation Insurance covering contractor's statutory liability under the State's Workers' Compensation laws affected by this project, the Employers' Liability. If such insurance will not cover the liability of contractor in states that require participation in state workers' compensation fund, contractor shall comply with the laws of such states. If contractor is self-insured, evidence of state approval must be provided.

12.1.9 Railroad Protective Liability Insurance.

12.1.10 The contractor shall furnish to the Commission for transmittal to the Railroad an original copy of Railroad Protective Insurance Policy with limits of liability as follows:

<u>COVERAGE</u>	<u>MINIMUM COMBINED LIMITS OF LIABILITY</u>
Bodily Injury Liability]	
Property Damage]	\$2,000,000 Per Occurrence
Liability]	\$6,000,000 Aggregate
Physical Damage to]	
Property]	

12.1.11 The Standard for this protective insurance shall follow the requirements of Subchapter G, Part 646, Subpart A of the Federal Aid Policy Guide issued December 9, 1991, by the Federal Highway Administration.

12.1.12 Evidence of insurance as required above shall be furnished to the address shown below for review by the Commission and transmittal to the Railroad:

Railroad:	Commission:
Columbia Terminal Railroad	Mr. Dave Ahlvers
P.O. Box 6015	State Construction and Materials Engineer
Columbia, MO 65205	MoDOT
573-441-5562 or	P.O. Box 270
573-823-8390	Jefferson City, MO 65102

12.1.13 Railroad will not accept binders as evidence of insurance; the original policy must be provided. The named insured, description of the work and designation of the job site to be shown on the Policy are as follows:

- (i) Named Insured: City of Columbia
- (ii) Description and Designation: Rte.B bridge replacement adjacent to COLT RR bridge over Business Loop 70.
Route B, Boone County, Job No. J5S2186

12.2 If any part of the work is sublet, similar insurance and evidence thereof in the same amounts as required of the prime contractor, shall be provided by or in behalf of the subcontractor to cover his/her operations. Endorsements to the prime contractor's policies

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specifically naming subcontractors and describing their operations will be acceptable for this purpose.

12.3 All Insurance hereinbefore specified shall be carried until all work required to be performed under the terms of the contract has been satisfactorily completed within the limits of the rights of way of the Railroad as evidenced by the formal acceptance by the Commission. Insuring companies may cancel insurance by permission of the Commission and Railroad or on thirty (30) days written notice to the Commission and Railroad as follows:

NOTICE TO:

Columbia Terminal Railroad
P.O. Box 6015
Columbia, MO 65205
573-441-5562 or
573-823-8390

COPY NOTICE TO:

Mr. Dave Ahlvers
State Construction and Materials Engineer
MoDOT
P.O. Box 270
Jefferson City, MO 65102

13.0 Failure to Comply In the event the contractor violates or fails to comply with any of the requirements of these special provisions:

- (a) The Railroad Operations Manager may require that the contractor vacate Railroad property.
- (b) The Engineer may withhold all monies due the contractor until contractor has remedied the situation to the satisfaction of the Railroad Operations Manager and the Engineer.

13.1 Any such orders shall remain in effect until the contractor has remedied the situation to the satisfaction of the Railroad Operations Manager and the Engineer.

14.0 Payment for Cost of Compliance No separate payment will be made for any extra cost incurred on account of compliance with these special provisions. All such cost shall be included in prices bid for other items of the work as specified in the payment items.

15.0 No Payment by Railroad pursuant to this JSP. Railroad will not be responsible for paying the contractor for any work performed under this special provision.

F. ALTERNATE STRUCTURES

1.0 Description. This work shall consist of constructing one of the proposed two structures:

- 1) 60' Steel Wide Flange Superstructure with GBS-IBS abutments
- 2) 60' Adjacent Box Beam Superstructure with GBS-IBS abutments

The two alternates shall be in accordance with the MoDOT provided bridge plans, standard specifications and the job special provisions.

2.0 Bidding. Separate pay items, descriptions and quantities are included in the itemized proposal for the two alternates. The bidder shall bid only one of the alternates and leave the contract unit price column blank for any pay items listed for the other alternate.

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3.0 Method of Measurement. The quantities for the alternates will be measured in accordance with the plans, specifications and all other contract documents.

4.0 Basis of Payment. The pay item(s) included in the contract for the chosen alternate will be paid for at the contract unit price in accordance with the plans and the specifications.

G. OPTIONAL PRE-ENGINEERED STRUCTURAL STEEL SUPERSTRUCTURES FOR A GRADE SEPARATION

1.0 Description. The contractor shall have the option of constructing a pre-engineered structural steel 'superstructure module' in lieu of the Commission furnished wide flange 'superstructure module'. This work shall consist of, but not limited to, constructing a 'superstructure module' with structural plates, slab deck, concrete end diaphragms, and bearing beams.

2.0 Material. Materials shall be in accordance with the Specifications and specifically as follows.

Item	Section
Class B-1 Concrete	501
Gradation E Coarse Aggregate	1005
Concrete Curing	703
Reinforcing Steel	1036
Structural Steel Fabrication	1080
Coating of Structural Steel	1081

2.1 Concrete and Reinforcing Steel. Concrete shall be Class B-1 with Gradation E coarse aggregate. Reinforcing steel in closure joints, slab deck, concrete end diaphragms, and bearing beams shall be Grade 60 (420) epoxy-coated deformed bars.

2.2 Steel. Bolts used in connections shall be in accordance with Sec 1080 and ASTM A325307. ~~Connection plates and plate washers used in connections shall be in accordance with AASHTO M 270 Grade 36 (250). Nuts used in connections shall be in accordance with AASHTO M 292 Grade 2H.~~

3.0 Design, Load Rating and Submittals. Design, load rating and submittals shall be in accordance with this Job Special Provisions.

3.1 Design Parameters. This provision contains general design parameters for pre-engineered structures.

3.1.1 The 'superstructure module' shall be designed for the design loading and additional parameters shown on the bridge plans in accordance with 2012 *AASHTO LRFD Bridge Design Specifications (6th Ed.)* and 2013 *Interim Revisions*.

3.1.2 Reinforcing steel splicing and spacing requirements shall be in accordance with 2012 *AASHTO LRFD Bridge Design Specifications* and the manufacturer's recommendation.

3.1.3 Minimum Requirements.

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- The pre-engineered ‘superstructure module’ shall be designed for a 75-year design life.
- The overall length and width of the pre-engineered superstructure shall not be less than shown in the Commission furnished wide flange plans.
- Minimum design concrete compressive strength shall be 4000 psi (28 MPa).
- Structure skew = 31 deg. 30’ 00”.
- Final underpass vertical clearance = 14’-8” min.
- Final underpass horizontal clearance = 44’-8” min.
- Hot dip galvanizing for a structural steel is allowed and must be in accordance with ASTM A123 Grade 100.
- Coating inside of structural steel will also be required when a superstructure (i.e., tub shape) is inaccessible for a visual inspection.
- Provide Type B barrier curbs.

3.2 Load Rating. Load rating calculations shall be performed in accordance with the Load and Resistance Factor Method (LRFD) as described in Bridge Special Provision “H. Load Rating for Bridge and Culvert Structures”.

3.3 Submittals.

3.3.1 The contractor shall submit to the engineer for approval the following items signed, sealed and stamped by a registered professional engineer in the state of Missouri in accordance with Authentication of Certain Documents in [Sec 107](#):

(a) Three copies of design and load rating computations. Design computations that are computer-generated shall be accompanied by longhand examples of the design methodology that completely addresses all components of the superstructure.

(b) Five sets of shop drawings. Shop drawings shall be of sufficient detail and clarity to provide a permanent record of the superstructure for future reference. Shop drawings shall include the county and bridge number on each sheet. Shop drawings shall include all notes, details, dimensions and quantities necessary to construct and erect the superstructure.

3.3.2 The contractor shall submit computations on CD in Adobe Acrobat Reader version 7.0 or greater. Each submitted CD shall contain an index file that is labeled accordingly. The index file shall contain links to the computations that are contained within.

3.3.3 The contractor shall submit shop drawings on CD.

3.3.4 Construction or manufacture of any component of the superstructure shall not begin until written approval of computations and shop drawings have been received from the engineer.

3.3.5 During construction, the contractor shall submit to the engineer construction change recommendations to resolve any constructability issues. Construction of any required modification shall not begin until written approval of the construction change recommendations have been received from the engineer.

3.3.6 After construction, the contractor shall submit final shop drawings on CD. Final shop drawings shall include construction changes made to shop drawings during construction.

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3.3.7 Shop drawings shall be in accordance with Specifications of Computer Deliverable Contract Plans in the MoDOT Engineering Policy Guide.

4.0 Manufacture.

4.1 The structural steel shall be manufactured in accordance with [Sec 1023](#).

4.2 Lifting devices or holes will be permitted in precast modules. No more than four holes shall be cast in each module. Drilled holes will not be allowed. Cast holes shall be tapered. Lifting devices used in lifting holes shall have sufficient bearing to avoid damage resulting from concentration of stresses around the lifting holes.

4.3 Precast modules shall be stored in such a manner to prevent cracking or damage. Modules shall not be moved until the concrete compressive strength has reached a minimum of 3000 psi. Modules shall be stored in an upright position at all times.

4.4 Precast modules shall be clearly marked with waterproof paint. The following information shall be shown on each module.

- (a) Date of manufacture.
- (b) Name or trademark of the manufacturer.

5.0 Testing.

5.1 Concrete compressive strength shall be determined from compression tests made on cylinders. When the cylinder test strengths are less than the design concrete strength, then the concrete compressive strength shall be determined from compression tests made on cores. For cylinder testing, a minimum of four cylinders shall be taken during each production run. For core testing, one core shall be cut from each module and production run. A production run shall be considered continuous if not interrupted for more than 2 days.

5.2 Cylinders shall be made and tested in accordance with ASTM C 39. Cores shall be obtained and tested for compressive strength in accordance with ASTM C 42. Requirements for lime curing will be waived.

5.2.1 The compressive strength of the concrete in each module, as defined above, will be acceptable when the core test strength is equal to or greater than the design concrete strength. The manufacturer shall perform a selection and testing of the cores as approved by the engineer.

5.2.2 If the compressive strength of the core tested is less than the design concrete strength, the module from which that core was taken, may be recored. If the compressive strength of the recore is equal to or greater than the design concrete strength, the compressive strength of the concrete in that group of modules will be acceptable.

5.2.3 If the compressive strength of a recore is less than the design concrete strength, the module from which that core was taken will be rejected. Two modules from the remainder of the group shall be selected at random. One core shall be taken from each. If the compressive strengths of both cores are equal to or greater than the design concrete strength, the remainder of the modules in that group will be acceptable. If the compressive strength of either of the two cores tested is less than the design concrete strength, the remainder of the modules in the group will be rejected. However, at the recommendation of the manufacturer, each remaining

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unit in the remainder of the group may be cored and accepted individually. The modules will be rejected which have cores with less than the design concrete strength.

5.3 Core holes shall be plugged and cured by the manufacturer in such a manner that the modules shall meet all the test requirements of these specifications.

5.4 The manufacturer shall furnish all facilities, equipment and personnel necessary to conduct the required testing.

6.0 Rejection.

6.1 Precast modules will also be rejected due to the following conditions:

- (a) Fractures or cracks completely through slab deck.
- (b) Defects that indicates proportioning, mixing or molding which are not in accordance with this specification.
- (c) Honeycombed or open textured concrete.
- (d) Damaged module ends, where such damage prevents making a satisfactory joint.

6.2 Modules may be repaired due to imperfections in manufacture, handling damage or construction. Repair procedures shall be submitted to the engineer for approval. Repairs will be acceptable when determined that repairs are sound, properly finished and cured and repaired units are in accordance with the requirements herein.

6.0 Construction Requirements.

6.1 Structural Module Erection. Erect the modules in accordance with the manufacturer's instructions and design shape shown on the shop drawings.

6.2 Joints Between Precast Modules. Joints between modules shall have the same joint details and Ultra High Performance Concrete (UHPC) as shown on the Commission furnished wide flange superstructure alternate.

6.3 Lift Holes. Lift holes if any shall be filled with UHPC.

7.0 Method of Measurement. No measurement will be made.

8.0 Basis of Payment. Payment for accepted pre-engineered structural steel 'superstructure module' for the above described work, including all material, equipment, labor and any other incidental work necessary to complete this item in place, will be considered completely covered by the total contract price for "Optional Superstructure Module".

H. LOAD RATING FOR BRIDGE AND CULVERT STRUCTURES

Load rating calculations are required for all bridge and culvert structures that are 20 feet or more in length as measured along the centerline of roadway. All load ratings should be done in accordance with the current version of the AASHTO *The Manual for Bridge Evaluation* and the MoDOT *Bridge Inspection Rating Manual*. The load rating calculations shall be performed in accordance with the Load and Resistance Factor Method (LRFD). In addition, AASHTOWare Bridge Rating (an AASHTO software formerly known as Virtis) shall be used for modeling all

JOB SPECIAL PROVISIONS (BRIDGE)

structures, when possible. An exception is that LARS Bridge (a Bentley Systems software) shall be used for truss type structures. The data entry in AASHTOWare Bridge Rating for the bridge components shall be "Schedule Based - Girder System Methodology" unless it is not possible for that particular structure type. An exception is that the data entry in AASHTOWare Bridge Rating for reinforced concrete type structures shall be "Cross Section Based". If a structure type cannot be modeled in AASHTOWare Bridge Rating or LARS Bridge, the contractor is responsible for determining the most applicable software (if needed) to be used for the analysis and rating. A 3" thick future wearing surface shall be included in all load rating calculations.

If a structure can be modeled in AASHTOWare Bridge Rating or LARS Bridge, the contractor shall provide inventory and operating load ratings for the HL93 design loading (not shown), inventory and operating load ratings for the standard AASHTO HS20 design loading (not shown) and load ratings for each load posting vehicle in accordance with the schedule shown below. If a structure cannot be modeled in AASHTOWare Bridge Rating or LARS Bridge, the contractor shall provide load ratings for each AASHTO legal load (not shown), AASHTO specialized hauling vehicle (not shown), routine permit, mobile crane, superload configuration or WASHTO vehicle in accordance with the schedule shown below in addition to the previously mentioned load ratings for HL93 design loading, AASHTO HS20 design loading and load posting vehicles. A tabular results summary for both new and existing members if applicable should be provided and should indicate the rating factor and the bridge capacity (in tons) for the various vehicles and should identify the controlling interior and exterior members. For structures that have been modeled in AASHTOWare Bridge Rating or LARS Bridge, an electronic copy of the structure shall be exported and submitted on a CD for incorporation into MoDOT's AASHTOWare Bridge Rating or LARS Bridge database. If a structure cannot be modeled in AASHTOWare Bridge Rating or LARS Bridge, the contractor shall provide an electronic copy of the calculations or spreadsheets used for the load ratings. The load ratings and supporting calculations shall be signed and sealed by a Professional Engineer that is licensed in the state of Missouri.

Load Posting, AASHTO Legal Load and AASHTO Specialized Hauling Vehicles

1. Provide Posting Ratings and Operating Ratings
 - a. Multiple Lane Rating with Impact
 - b. Centerline of Structure with Impact (Single Lane Rating for Interior Members, Twin Girders and Trusses if applicable)
 - c. Centerline of Structure without Impact (Single Lane Rating for Interior Members, Twin Girders and Trusses if applicable)
 - d. Onelane Rating with Impact (Single Lane Rating for All Members including Exterior Members)
 - e. Onelane Rating without Impact (Single Lane Rating for All Members including Exterior Members)

Note: Posting Rating is taken as 86% of the Operating Rating.

Routine Permit Trucks, Mobile Cranes, and Superload Configurations

2. Provide Operating Ratings
 - a. Multiple Lane Rating with Impact
 - b. Centerline of Structure with Impact (Single Lane Rating for Interior Members, Twin Girders and Trusses if applicable)

JOB SPECIAL PROVISIONS (BRIDGE)

- c. Centerline of Structure without Impact (Single Lane Rating for Interior Members, Twin Girders and Trusses if applicable)
- d. Onelane Rating with Impact (Single Lane Rating for All Members including Exterior Members)
- e. Onelane Rating without Impact (Single Lane Rating for All Members including Exterior Members)

Note: For Centerline and Onelane Ratings, only one vehicle is assumed to be on the structure.

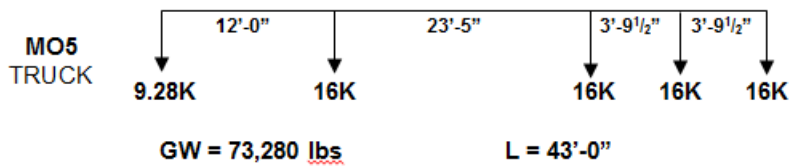
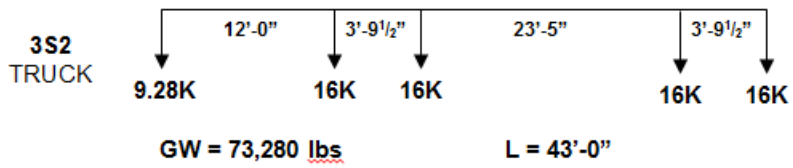
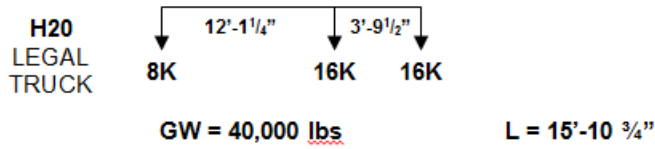
WASHTO Envelope Vehicles

- 3. Provide Operating Ratings
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 - b. Centerline of Structure with Impact (Single Lane Rating for Interior Members, Twin Girders and Trusses if applicable)
 - c. Centerline of Structure without Impact (Single Lane Rating for Interior Members, Twin Girders and Trusses if applicable)
 - d. Onelane Rating with Impact (Single Lane Rating for All Members including Exterior Members)
 - e. Onelane Rating without Impact (Single Lane Rating for All Members including Exterior Members)

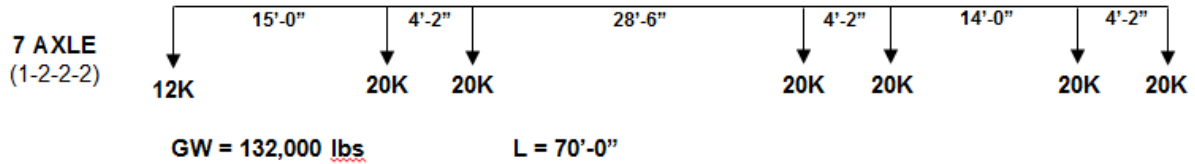
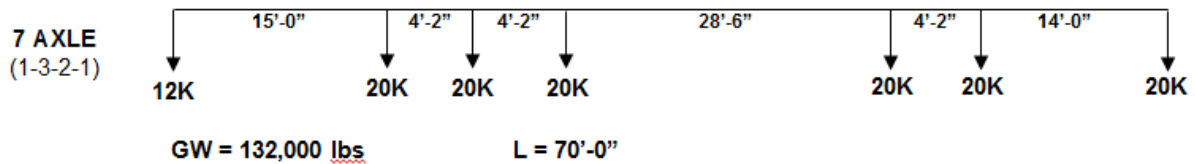
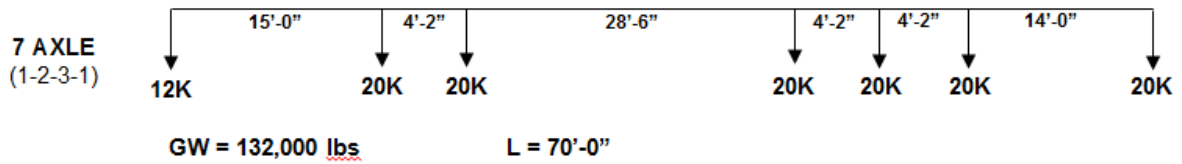
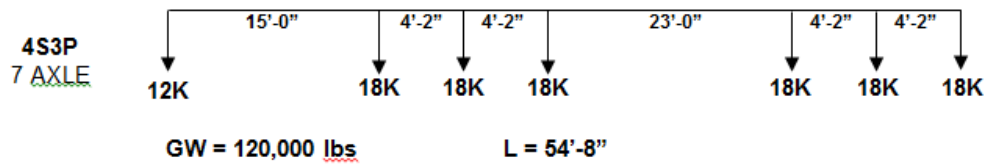
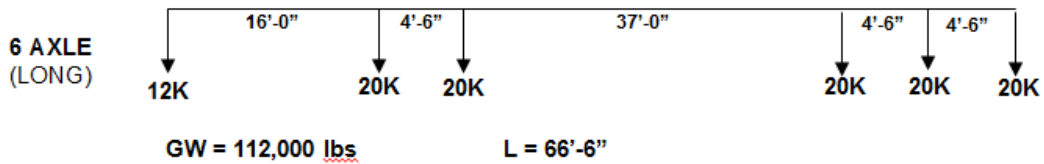
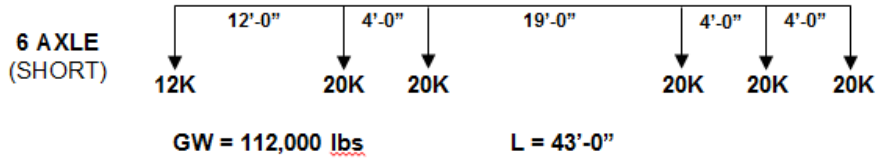
Note: For Centerline and Onelane Ratings, only one vehicle is assumed to be on the structure.

VEHICLES USED TO RATE BRIDGES

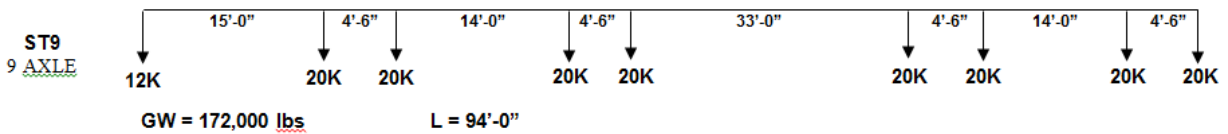
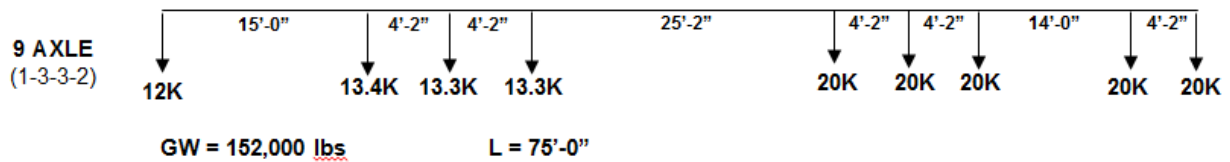
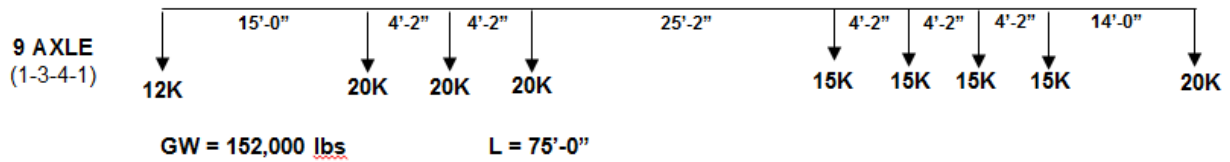
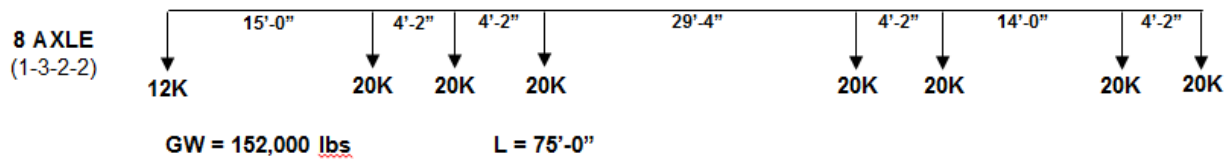
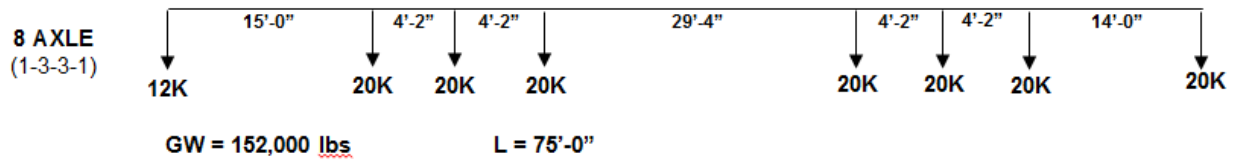
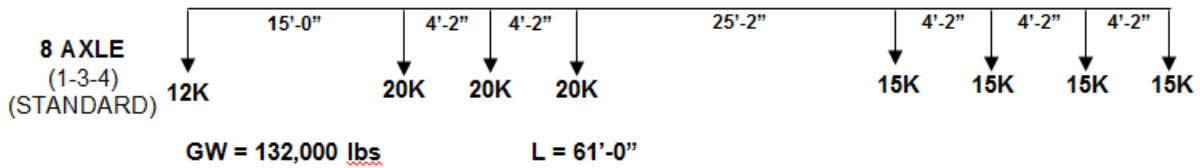
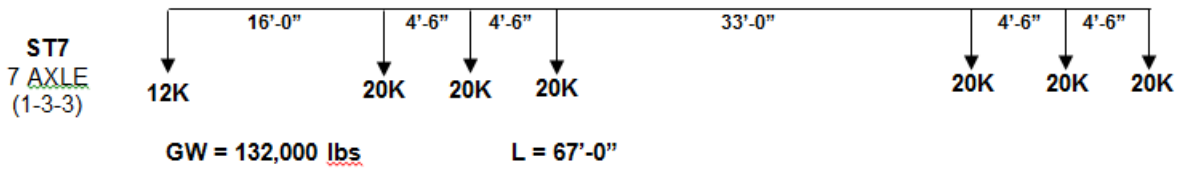
LOAD POSTING VEHICLES



ROUTINE PERMIT TRUCKS

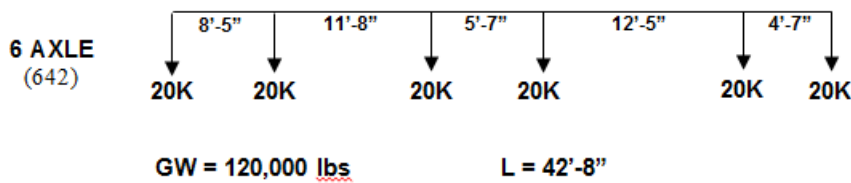
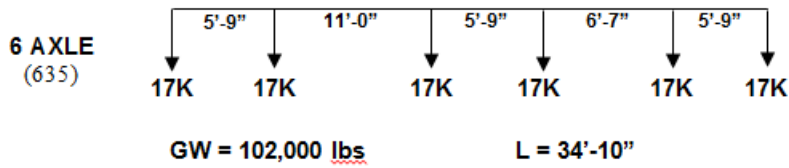
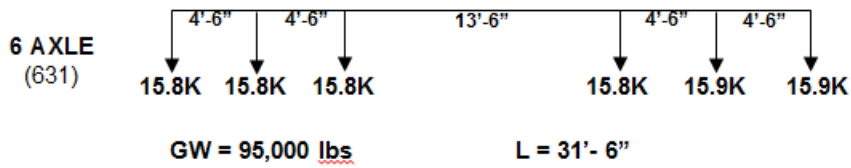
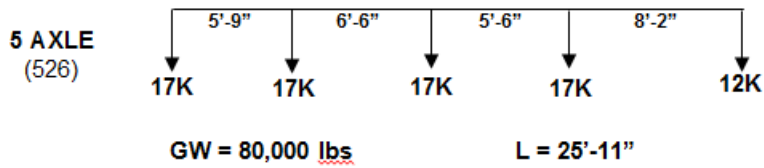


JOB SPECIAL PROVISIONS (BRIDGE)

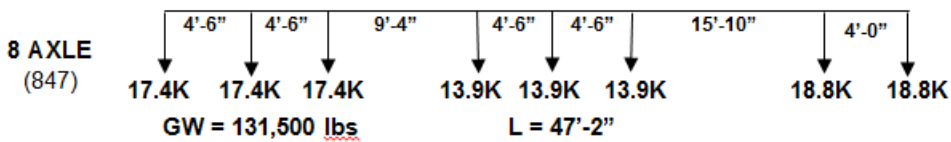
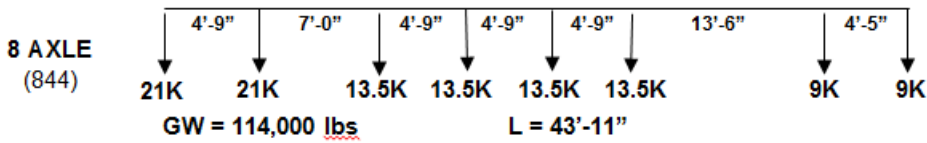
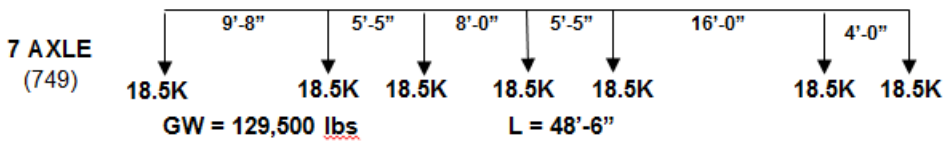
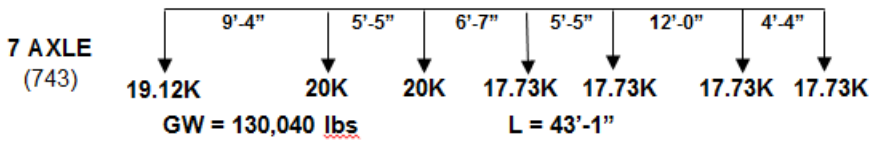
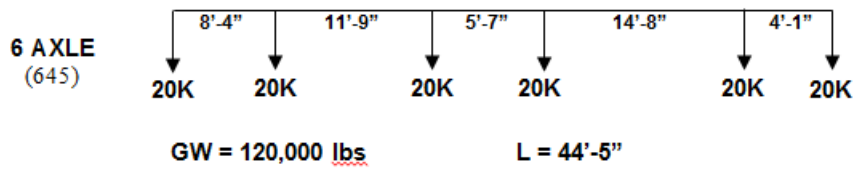


JOB SPECIAL PROVISIONS (BRIDGE)

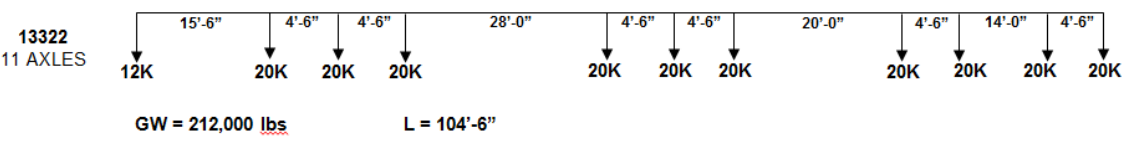
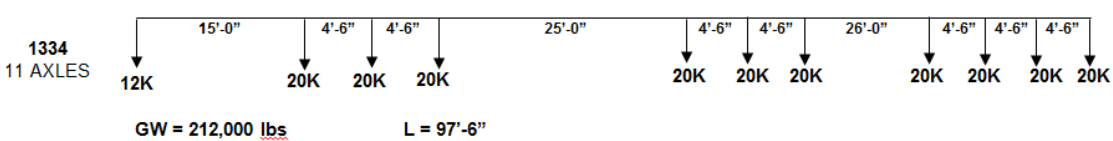
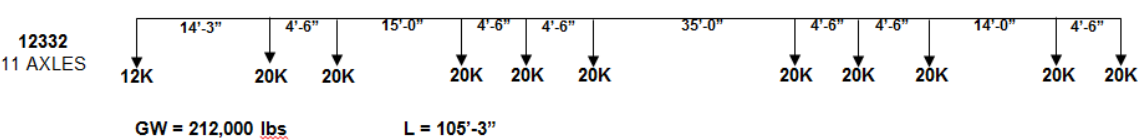
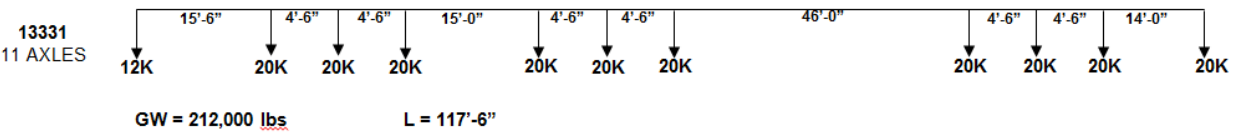
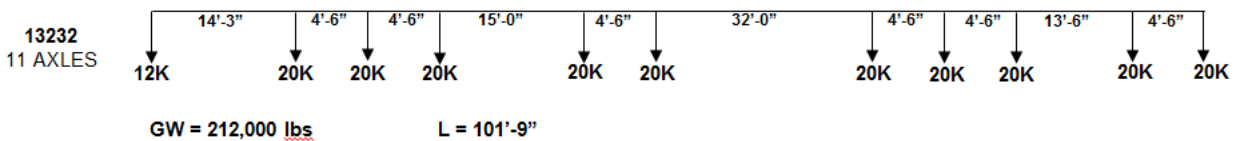
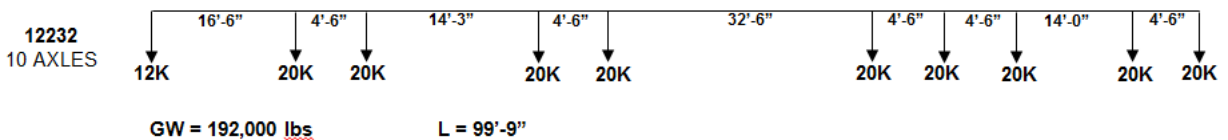
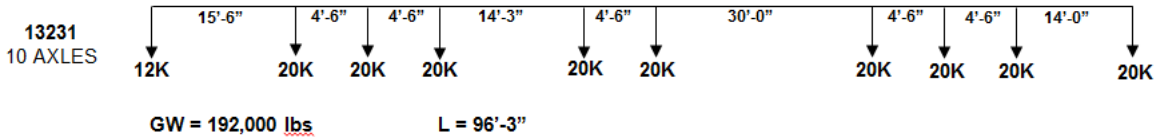
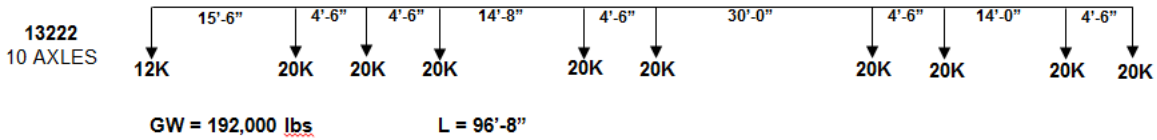
MOBILE CRANES



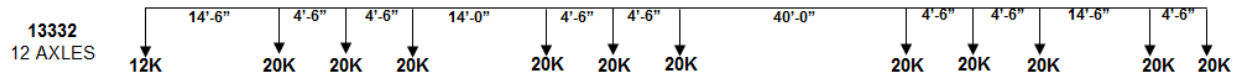
JOB SPECIAL PROVISIONS (BRIDGE)



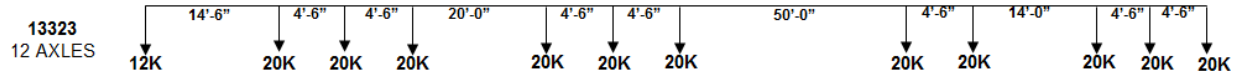
SUPERLOAD CONFIGURATIONS



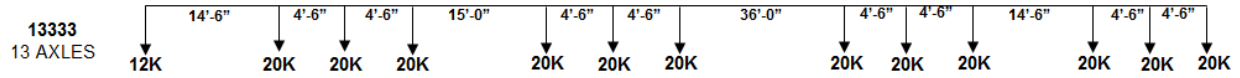
JOB SPECIAL PROVISIONS (BRIDGE)



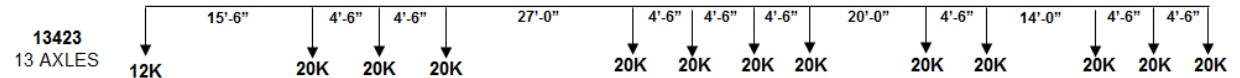
GW = 232,000 lbs L = 114'-6"



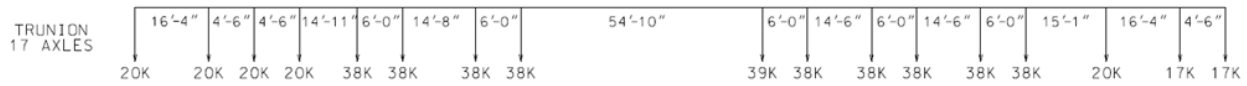
GW = 232,000 lbs L = 130'-0"



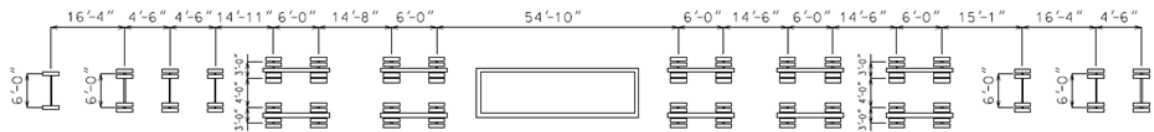
GW = 252,000 lbs L = 116'-0"



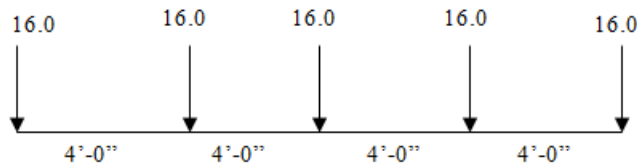
GW = 252,000 lbs L = 112'-6"



GW = 515,000 lbs L = 204'-8"

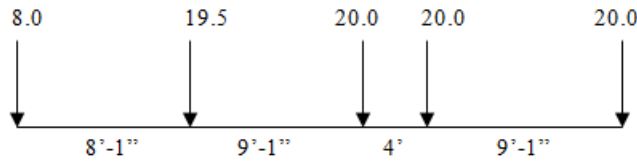


WASHTO Envelope Vehicle Configurations

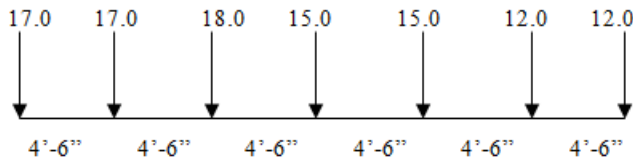


WASHTO—5
(Specialized Equipment--5 Axles)
Length: 16'-0" Weight: 80000 Pounds
[Used for Lengths <27']

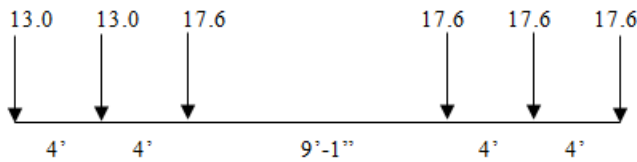
JOB SPECIAL PROVISIONS (BRIDGE)



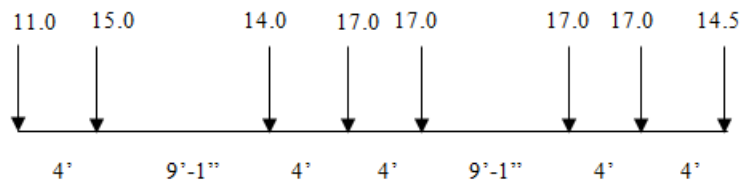
WASHTO—1121A
 (Specialized Equipment--5 Axles)
 Length: 30'-3" Weight: 87500 Pounds
 [Used for Lengths from 27' thru 43']



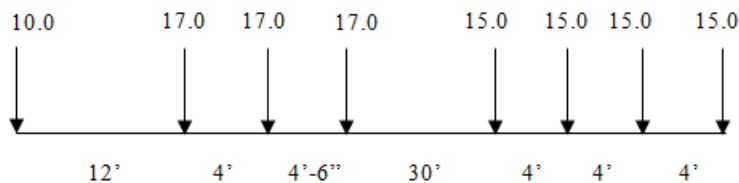
WASHTO—7B
 (Specialized Equipment--7 Axles)
 Length: 27'-0" Weight: 106000 Pounds
 [Used for Lengths <38']



WASHTO—33C
 (Specialized Equipment--6 Axles)
 Length: 25'-1" Weight: 96400 Pounds
 [Used for Lengths <40']



WASHTO—233A
 (Specialized Equipment--8 Axles)
 Length: 38'-2" Weight: 122500 Pounds
 [Used for Lengths <70']



WASHTO—134
 (Specialized Equipment--8 Axles)
 Length: 62'-6" Weight: 121000 Pounds
 [Used for Lengths >70']

JOB SPECIAL PROVISIONS TABLE OF CONTENTS (ROADWAY)

(Job Special Provisions shall prevail over General Special Provisions whenever in conflict therewith.)

- A. General
- B. Contract Liquidated Damages
- C. Early Notice to Proceed
- D. Work Zone Traffic Management Plan
- E. Utilities
- F. Supplemental Revisions
- G. Project Contact for Contractor/Bidder Questions
- H. Emergency Provisions and Incident Management
- I. Quality Management
- J. Safety Plan
- K. Liquidated Damages for Winter Months
- L. Americans with Disabilities Act (ADA) Compliance and Final Acceptance of Constructed Facilities
- M. Bike Lane Arrow Symbol
- N. Shared Lane Symbol
- O. Fertilizing, Seeding and Mulching
- P. Excess Excavation
- Q. Electronic Information for Bidder's Automation
- R. Disposition of Existing Signing
- S. Adjusting Water Valve Meter
- T. X-Tension Crashworthy End Terminal
- U. Liquidated Damages Specified
- V. Safety Requirements

ADDITIONAL INFORMATION

Graphic Representation of Personal Protective Equipment

<p>"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."</p>	<p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 W. CAPITOL AVE. JEFFERSON CITY, MO 65102 Phone 1-888-275-6636</p>
	<p>If a seal is present on this sheet, JSP's have been electronically sealed and dated.</p>
	<p>JOB NUMBER: J5S2186 Boone County, MO DATE PREPARED: 04/17/2014</p>
	<p>ADDENDUM:</p>
<p>Only the following items of the Job Special Provisions (Roadway) are authenticated by this seal: All</p>	

JOB
SPECIAL PROVISIONS

A. GENERAL - FEDERAL JSP-09-02A

1.0 Description. The Federal Government is participating in the cost of construction of this project. All applicable Federal laws, and the regulations made pursuant to such laws, shall be observed by the contractor, and the work will be subject to the inspection of the appropriate Federal Agency in the same manner as provided in Sec 105.10 of the Missouri Standard Specifications for Highway Construction with all revisions applicable to this bid and contract.

1.1 This contract requires payment of the prevailing hourly rate of wages for each craft or type of work required to execute the contract as determined by the Missouri Department of Labor and Industrial Relations, and requires adherence to a schedule of minimum wages as determined by the United States Department of Labor. For work performed anywhere on this project, the contractor and the contractor's subcontractors shall pay the higher of these two applicable wage rates. State Wage Rates, Information on the Required Federal Aid Provisions, and the current Federal Wage Rates are available on the Missouri Department of Transportation web page at www.modot.org under "Bidding". Effective Wage Rates will be posted 10 days prior to the applicable bid opening. These supplemental bidding documents have important legal consequences. It shall be conclusively presumed that they are in the bidder's possession, and they have been reviewed and used by the bidder in the preparation of any bid submitted on this project.

1.2 The following documents are available on the Missouri Department of Transportation web page at www.modot.org under "Business"; "Standards and Specifications". The effective version shall be determined by the letting date of the project.

General Provisions & Supplemental Specifications

Supplemental Plans to October 2009 Missouri Std. Plans
For Highway Construction

These supplemental bidding documents contain all current revisions to the bound printed versions and have important legal consequences. It shall be conclusively presumed that they are in the bidder's possession, and they have been reviewed and used by the bidder in the preparation of any bid submitted on this project.

B. CONTRACT LIQUIDATED DAMAGES

1.0 Description. Liquidated Damages for failure or delay in completing the work on time for this contract shall be in accordance with Sec 108.8. The liquidated damages include separate amounts for road user costs and contract administrative costs incurred by the Commission.

2.0 Period of Performance. Prosecution of work is expected to begin on the date specified below in accordance with Sec 108.2. Regardless of when the work is begun on this contract, all work shall be completed on or before the date specified below. Completion by this date shall be in accordance with the requirements of Sec 108.7.1.

Notice to Proceed: June 16, 2014
Completion Date: October 1, 2014

2.1 Calendar Days. The count of calendar days will begin on the date the contractor starts any construction operations on the project.

Job Number	Calendar Days
J5S2186	60

3.0 Liquidated Damages for Contract Administrative Costs. Should the contractor fail to complete the work on or before the completion date specified in Section 2.0, or within the number of calendar days specified in Section 2.1, whichever occurs first, the contractor will be charged contract administrative liquidated damages in the amount of **\$250** per calendar day for each full calendar day that the work is not fully completed. For projects in combination, these damages will be charged in full for failure to complete one or more projects within the above specified completion date or calendar days.

4.0 Liquidated Damages for Road User Costs. Should the contractor fail to complete the work on or before the completion date specified in Section 2.0, or within the number of calendar days specified in Section 2.1, whichever occurs first, the contractor will be charged road user costs in accordance with Sec 108.8 in the amount specified in Section 4.1. These damages are in addition to the contract administrative damages and any other damages as specified elsewhere in this contract.

4.1 Daily Road User Costs.

Job Number	Daily Road User Cost
J5S2186	\$5,400

C. EARLY NOTICE TO PROCEED

1.0 The contractor will be given a notice to proceed date of **June 16, 2014**. All contracts shall be executed and returned to the Commission prior to this date.

D. WORK ZONE TRAFFIC MANAGEMENT PLAN

1.0 Description. Work zone traffic management shall be in accordance with applicable portions of Division 100 and Division 600 of the Standard Specifications, and specifically as follows.

2.0 Traffic Management Schedule.

2.1 Traffic management schedules shall be submitted to the engineer for review prior to the start of work and prior to any revisions to the traffic management schedule. The traffic management schedule shall include the proposed traffic control measures, hours traffic control will be in place, and work hours.

2.2 The contractor shall notify the engineer 2 weeks prior to lane closures or shifting traffic onto detours.

2.3 The engineer shall be notified as soon as practical of any postponement due to weather, material or other circumstances.

2.4 In order to ensure minimal traffic interference, the contractor shall schedule lane closures for the absolute minimum amount of time required to complete the work. Lanes shall not be closed until material is available for continuous construction and the contractor is prepared to diligently pursue the work until the closed lane is opened to traffic.

2.5 Traffic Congestion. The contractor shall, upon approval of the engineer, take proactive measures to reduce traffic congestion in the work zone.

2.5.1 Traffic Delay. The contractor shall be responsible for maintaining the existing traffic flow through the job site during construction. If disruption of the traffic flow occurs and traffic is backed up in queues of 15 minute delays or longer, then the contractor shall review the construction operations which contributed directly to disruption of the traffic flow and make adjustments to the operations to prevent the queues from occurring again.

2.5.2 Traffic Safety.

2.5.2.1 Where traffic queues routinely extend to within 1000 feet of the ROAD WORK AHEAD, or similar, sign on a divided highway or to within 500 feet of the ROAD WORK AHEAD, or similar, sign on an undivided highway, the contractor shall extend the advance warning area, as approved by the engineer.

2.5.2.2 When a traffic queue extends to within 1000 feet of the ROAD WORK AHEAD, or similar, sign on a divided highway or to within 500 feet of the ROAD WORK AHEAD, or similar, sign on an undivided highway due to non-recurring congestion, the contractor shall deploy a means of providing advance warning of the traffic congestion, as approved by the engineer. The warning location shall be no less than 1000 feet and no more than 0.5 mile in advance of the end of the traffic queue on divided highways and no less than 500 feet and no more than 0.5 mile in advance of the end of the traffic queue on undivided highways.

3.0 Work Hour Restrictions.

3.1 There are three major summer holiday periods: Memorial Day, Independence Day, and Labor Day. All lanes of Business Loop 70 and all lanes of Route B beyond the project limits shall be scheduled to be open to traffic during these holiday periods, from 12:00 noon on the last working day preceding the holiday until 9:00 a.m. on the first working day subsequent to the holiday.

3.2 The contractor shall not perform any construction operation on the active lanes, including the hauling of material within the project limits, during restricted periods, holiday periods or other special events specified in the contract documents.

3.3 Any work requiring a reduction in the number of through lanes of Business Loop 70 shall be completed during nighttime hours. Any work requiring a reduction in the number of lanes of Route B beyond the project limits, shall be completed during nighttime hours. Nighttime hours shall be considered to be 7:00 p.m. to 6:00 a.m. for this project.

3.4 Bridge removal work requiring a closure of Business Loop 70 shall be done between the hours of 10:00 pm Friday and 5:00 am Monday. A complete closure of Business Loop 70 for additional work may be done with the prior approval of the engineer. The engineer shall approve the days and hours that Business Loop 70 may be closed and traffic detoured.

3.5 Work is scheduled within the limits of this project to resurface Business Loop 70 under the Route B bridge during the summer of 2014. It is anticipated that the resurfacing work will take place between September 1, 2014 and November 1, 2014. Any work included in this contract on or adjacent to the Business Loop 70 pavement shall be completed by September 1, 2014.

4.0 Detours and Lane Closures.

4.1 The contractor shall provide changeable message signs notifying motorists of future traffic disruption and possible traffic delays one week before traffic is shifted to a detour or prior to lane closures. The changeable message sign shall be installed at a location as approved or directed by the engineer.

5.0 Basis of Payment. No direct payment will be made to the contractor to recover the cost of equipment, labor, materials or time required to fulfill the above provisions, unless specified elsewhere in the contract document.

E. UTILITIES

1.0 For informational purposes only, the following is a list of names, addresses, and telephone numbers of the known utility companies in the area of the construction work for this improvement:

<u>Utility Name</u>	<u>Known Required Adjustment</u>
City of Columbia, Water & Light Dept. 105 E. Ash Street Columbia, MO 65205 Contact: Greg Baehr – Electric (573) 817-5026	Yes
Contact: Joe Strodman – Water (573) 874-7794	No

CenturyLink 625 Cherry Street Columbia, MO 65201 Contact: Tim Dishman (573) 886-3505	Yes
Charter Communications Contact Person: Ted Spradlin 573-219-0652	No
Ameren MO – Gas 2001 Maguire Blvd Columbia, MO 65201 Contact: Bruce Darr (573) 876-3030	No
Mediacom 901 N. College Ave. Columbia, MO 65201 Contact: Bob Boner (573) 443-1536	Yes
AT&T Transmission Contact: Kevin Wingard (580) 931-7688	No

1.1 The existence and approximate location of utility facilities known to exist, as shown on the plans, are based upon the best information available to the Commission at this time. This information is provided by the Commission "as-is" and the Commission expressly disclaims any representation or warranty as to the completeness, accuracy, or suitability of the information for any use. Reliance upon this information is done at the risk and peril of the user, and the Commission shall not be liable for any damages that may arise from any error in the information. It is, therefore, the responsibility of the contractor to verify the above listing information indicating existence, location and status of any facility. Such verification includes direct contact with the listed utilities.

1.2 The contractor agrees that any effects of the presence of the utilities, their relocation, contractor's coordination of work with the utilities and any delay in utility relocation shall not be compensable as a suspension of work, extra work, a change in the work, as a differing site condition or otherwise including but, without limitation, delay, impact, incidental or consequential damages. The contractor's sole remedy for the effects of the presence of utilities, delay in their relocation or any other effects shall be an excusable delay as provided in Section 105.7.3. The contractor waives, for itself, its subcontractors and suppliers the compensability of the presence of utilities, delay in their relocation and any cost to the contractor, it's subcontractors and suppliers in any claim or action arising out of or in relation to the work under the contract.

1.3 The contractor shall be solely responsible and liable for incidental and consequential damage to any utility facilities or interruption of the service caused by it or its subcontractors operation. The contractor shall hold and save harmless the Commission from damages to any utility facilities interruption of service by it or it's subcontractor's operation.

2.0 It shall be noted by the contractor that MoDOT is a member of Missouri One Call (800 Dig Rite). Some work on this project may be in the vicinity of MoDOT utility facilities, which includes but is not limited to traffic signal cables, highway lighting circuits, ITS cables, cathodic protection cables, etc. Prior to beginning work, the contractor shall request locates from Missouri One Call. The contractor shall also complete the Notice of Intent to Perform Work form located at the Missouri Department of Transportation website:

<http://www.modot.mo.gov/asp/intentToWork.shtml>

The contractor shall submit the form over the web (preferred method) or by fax to the numbers on the printed form. The notice must be submitted a minimum of 2 and a maximum of 10 working days prior to excavation just as Missouri One Call requires.

F. SUPPLEMENTAL REVISIONS JSP-09-01M

Insert Sec 109.15, Sec 109.16 and Sec 109.17, subsequent section renumbered accordingly:

109.15 Seal Coat Price Index. Adjustments will be made to the payments due the contractor for Seal Coat placed in accordance with Section 409 of the Standard Specifications when the quantity exceeds 50,000 square yards for an individual project or any number of projects in the contract combination. Adjustments will be calculated in accordance with Asphalt Cement Price Index of the General Provisions, except as defined herein.

109.15.1 Basis of Payment. To determine the adjustment for any material specified in this provision the following formula will be used.

$$A = B \times (2.01/2000) \times (D - E)$$

Where: A = adjustment for Seal Coat placed during the index period
B = square yards of seal coat placed during the index period
D = average index price at the beginning of the period
E = average index price at the time of bid

109.15.2 Optional. This provision is optional. If the bidder wishes to be bound by this provision, the bidder shall execute the acceptance form in the Bid for the Asphalt Cement Price Index. Acceptance of this provision will apply to both the Asphalt Cement Price Index and Seal Coat Price Index. Failure by the bidder to execute the acceptance form will be interpreted to mean election to not participate in the Asphalt Cement Price Index or Seal Coat Price Index.

109.16 Asphalt Underseal Price Index. Adjustments will be made to the payments due the contractor for Asphalt underseal placed in accordance with Section 625 of the Standard Specifications when the quantity exceeds 10,000 gallons for an individual project or any number of projects in the contract combination. Adjustments will be calculated in accordance with Asphalt Cement Price Index of the General Provisions, except as defined herein.

109.16.1 Basis of Payment. To determine the adjustment for any material specified in this provision the following formula will be used.

$$A = B \times (8.66/2000) \times (D - E)$$

Where: A = adjustment for asphalt underseal placed during the index period
B = gallons of asphalt underseal placed during the index period
D = average index price at the beginning of the period
E = average index price at the time of bid
(use average specific gravity of 1.04 for underseal)

109.16.2 Optional. This provision is optional. If the bidder wishes to be bound by this provision, the bidder shall execute the acceptance form in the Bid for the Seal Coat Price Index. Failure by the bidder to execute the acceptance form will be interpreted to mean election to not participate in the Seal Coat Price Index.

109.17 Polymer Modified Emulsion Membrane Price Index. Adjustments will be made to the payments due the contractor for Polymer Modified Emulsion Membrane placed in accordance with Sec 413.30 when the quantity exceeds 5,000 square yards. Adjustment will be calculated in accordance with the Supplemental Asphalt Price Adjustment except as defined herein.

109.17.1 Basis of Payment. To determine the adjustment for any material specified in this provision the following formula will be used.

$$A=B \times (1.20/2000) \times (D - E)$$

Where: A = adjustment for membrane placed during the index period
B = square yards of membrane placed during the index period
D = average index price at the beginning of the period
E = average index price at time of bid

109.17.2 Optional. This provision is optional. If the bidder wishes to be bound by the provision, the bidder shall execute the acceptance form in the Bid for Polymer Modified Emulsion Membrane Price Index. Failure by the bidder to execute the acceptance form will be interpreted to mean election not to participate in the Polymer Modified Emulsion Membrane Price Index.

Delete Sec 407 in its entirety and substitute the following:

407.1 Description. This work shall consist of preparing and treating an existing bituminous or concrete surface with bituminous material, in accordance with these specifications.

407.2 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Section
Emulsified Asphalt or PG Liquid Asphalt	1015

407.3 Equipment. The contractor shall provide a system for heating and applying the bituminous material. The system shall be designed, equipped, maintained and operated such that emulsified asphalt or liquid asphalt, at even heat, may be applied uniformly on variable widths of surface up to 15 feet with uniform pressure and an allowable variation from any specified rate of ± 0.01 gallon per square yard. The system shall include a calibrated tank and a thermometer for measuring temperature of tank contents. The system shall be equipped with instrumentation that continuously verifies application rates. The calibration of the system shall be approved by the engineer prior to use, and the contractor shall furnish all equipment, material and assistance if calibration is required.

407.4 Construction Requirements.

407.4.1 Preparation of Surface. The existing surface shall be free of all dust, loose material, grease or other foreign material at the time the tack is applied. Any excess bituminous surface mixture or bituminous joint material will be removed by MoDOT without cost to the contractor before the tack is applied.

407.4.2 Application. Asphalt emulsion or PG liquid asphalt shall be applied uniformly with a pressure distributor at the minimum rates indicated in the following table. No dilution of the emulsified asphalt material shall be allowed. The tack coat material shall be heated at the time of application to a temperature in accordance with Sec 1015. The tack coat shall be properly cured and the tacked surface shall be clean of all dirt before the next course is placed.

Tack Coat Application Rates	
Surface Type	Minimum Application Rate (gal/sq yd)
New Asphalt Pavement	0.05
Existing Asphalt or Concrete Pavement	0.08

407.4.3 Tack. The tack coat shall be applied in such a manner as to cause the least inconvenience to traffic and to permit one-way traffic without tracking of asphalt emulsion. All exposed tack coat shall be covered with bituminous mixture prior to opening to traffic.

407.5 Method of Measurement. Measurement of asphalt emulsion to the nearest 10 gallons will be made in accordance with Sec 1015.

407.6 Basis of Payment. The accepted quantity of tack coat will be paid for at the contract unit price.

Delete Sec 1015.20.5.1 and substitute the following:

1015.20.5.1 Polymer Modified Asphalt Emulsion – Seal Coat. Bituminous material for polymer modified asphalt shall be in accordance with the following:

Polymer Modified Asphalt Emulsion				
Test ^a	CRS-2P		EA-90P	
	Min	Max	Min	Max
Viscosity, SSF @ 50 C	100	400	100	400
Storage Stability Test ^b , 24 hour, percent	----	1	----	1
Classification Test	Pass	----	----	----
Particle Charge Test	Positive	----	----	----
Sieve Test, percent	----	0.3	----	0.3
Demulsibility, 0.02 N CaCl ₂ , percent	----	----	30	----
Distillation:				
Oil distillate by volume of emulsion, percent	----	3	----	3
Residue from distillation ^c , percent	65	----	65	----
Tests on Residue from Distillation:				
Penetration, 25 C, 100 g, 5 sec	100	200	100	200
Ductility, 4 C, 5 cm/minute, cm	30	----	25	----
Ash ^d , percent	----	1	----	1
Float Test at 60 C, sec	----	----	1200	----
Elastic Recovery ^e , percent	58	----	58	----

^aAll tests shall be performed in accordance with AASHTO T 59 except as noted.

^bIn addition to AASHTO T 59, upon examination of the test cylinder, and after standing undisturbed for 24 hours, the surface shall show no appreciable white, milky colored substance and shall be a homogeneous brown color throughout.

^cAASHTO T 59 shall be modified to maintain a 399 F ± 10 F maximum temperature for 15 minutes.

^dPercent ash shall be determined in accordance with AASHTO T 111, *Ash in Bituminous Material*.

^eElastic recovery shall be determined as follows. Condition the ductilometer and samples to be treated at 50 F. Prepare the brass plate, mold and briquet specimen in accordance with AASHTO T 51. Keep the specimen at the specified test temperature of 50 F for 85 to 95 minutes. Immediately after conditioning, place the specimen in the ductilometer and proceed to elongate the sample to 20 cm at a rate of pull of 5 cm/min. After the 20 cm elongation has been reached, stop the ductilometer and hold the sample in the elongated position for 5 minutes. After 5 minutes, clip the sample approximately in half by means of scissors or other suitable cutting devices. Let the sample remain in the ductilometer in an undisturbed condition for one hour. At the end of this time period, retract the half sample specimen until the two broken ends touch. At this point note the elongation (x) in cm. Calculate the percent recovery by the following formula:

$$\% \text{ Recovery} = \frac{20 - X}{20} \times 100$$

Polymer Modified Asphalt Emulsion		
Test ^a	CHFRS-2P	
	Min.	Max.
Viscosity, SFS @ 50 C	100	400
Storage Stability Test, 24 hour, percent	---	1.0

Demulsibility, 35 ml 0.8% dioctyl sodium sulfosuccinate, percent	60	---
Sieve Test, percent	---	0.1 0
Particle Charge Test	Positive	
Distillation ^b		
Oil Distillate, by volume of emulsion, percent	---	0.5
Residue from distillation, percent	65	---
Tests on Residue from Distillation:		
Polymer content, weight, percent (solids based)	3.0	---
Softening Point, C	54	---
Float test at 60 C, s	1800	---
Penetration, 25 C, 100 g, 5 s	80	130
Viscosity @ 60 C, Poise	1300	---
Solubility in Trichloroethylene, percent	95	---
Elastic Recovery ^c @ 10 C, percent	65	---

^aAll tests shall be performed in accordance with AASHTO T-59 except as noted.

^bAASHTO T59 shall be modified to maintain a 177 ± 5 C maximum temperature to be held for 20 minutes. Complete the total distillation in 60 ± 5 minutes from the first application of heat.

^cElastic recovery shall be determined as follows. Condition the ductilometer and samples to be treated at 10 C. Prepare the brass plate, mold, and briquet specimen in accordance with AASHTO T 51. Keep the specimen at the specified test temperature of 10 C for 85 to 95 minutes. Immediately after conditioning, place the specimen in the ductilometer and proceed to elongate the sample to 20 cm at a rate of pull of 5 cm/min. After the 20 cm elongation has been reached, stop the ductilometer and hold the sample in the elongated position for 5 minutes. After the 5 minutes, clip the sample approximately in half by means of scissors or other suitable cutting devices. Let the sample remain in the ductilometer in an undisturbed condition for one hour. At the end of this time period, retract the half sample specimen until the two broken ends touch. At this point note the elongation recovery (X) in cm. Calculate the percent recovery by the following formula:

$$\% \text{ Recovery} = \frac{20 - X}{20} \times 100$$

Amend Sec 1015.20.5.1.1 to include the following:

1015.20.5.1.1 Polymer Modified Asphalt Emulsion – Tack Coat. Bituminous material for polymer modified asphalt shall be in accordance with the following:

Slow Setting Polymer Modified Asphalt Emulsion ^a					
		SS-1HP		CSS-1HP	
Test on Emulsion	Method	Min	Max	Min	Max
Viscosity, Saybolt Furol @ 25°C (77°F), s	AASHTO T 59	20	100	20	100

Particle Charge Test		Negative		Positive	
Storage Stability Test ^b , 24 hr, percent	AASHTO T 59	--	1	--	1
Sieve Test, percent	AASHTO T 59	--	0.50	--	0.50
Residue by Distillation ^c , percent	AASHTO T 59	57		57	
Oil Distillate by Distillation, percent	AASHTO T 59	--	--	--	--
Test on Residue from Distillation					
Penetration 25°C, 100 g, 5 s	AASHTO T 49	40	90	40	90
Elastic Recovery ^d , 20 cm, 5 cm/min, 60 min, %	AASHTO T 301	30	--	30	--
Solubility in Trichloroethylene ^e , %	AASHTO T 44	97.5	--	97.5	--

^a The emulsified asphalt shall be in accordance with Section 1015.20.5 of the 2011 Missouri Standard Specifications for Highway Construction, except as indicated above, and shall be modified with a styrene-butadiene diblock or triblock copolymer or a styrene butadiene rubber.

^b In addition to AASHTO T 59, upon examination of the test cylinder, and after standing undisturbed for 24 hours, the surface shall show no appreciable white, milky colored substance and shall be homogeneous brown color throughout. The storage stability test may be waved provided the asphalt emulsion storage tank at the project site has adequate provisions for circulating the entire contents of the tank, provided satisfactory field results are obtained.

^c AASHTO T 59 shall be modified to use a lower distillation temperature of 177° C (350° F).

^d AASHTO T 301 shall be modified to allow the residue to be obtained from distillation as long as the distillation temperature is modified as stated above. The test on residue shall be conducted at a temperature of 10° C (50° F).

^e In lieu of performing AASHTO T 44, AASHTO T 111, Ash in Bituminous Material, may be performed with a maximum allowable percent ash of 1.0 percent.

G. PROJECT CONTACT FOR CONTRACTOR/BIDDER QUESTIONS

All questions concerning this project during the bidding process shall be forwarded to the project contact listed below.

Mike Dusenberg, Project Manager
MoDOT – Central District
1511 Missouri Blvd., P.O. Box 718
Jefferson City, MO 65102

Telephone Number 573-751-7699
e-mail michael.dusenberg@modot.mo.gov
fax: 573-751-8267

All questions concerning the bid document preparation can be directed to the Central Office – Design at (573) 751-2876.

H. EMERGENCY PROVISIONS AND INCIDENT MANAGEMENT

1.0 The contractor shall have communication equipment on the construction site or immediate access to other communication systems to request assistance from the police or other emergency agencies for incident management. In case of traffic accidents or the need for police to direct or restore traffic flow through the job site, the contractor shall notify police or other emergency agencies immediately as needed. The area engineer's office shall also be notified when the contractor requests emergency assistance.

2.0 In addition to the 911 emergency telephone number for ambulance, fire or police services, the following agencies may also be notified for accident or emergency situation within the project limits.

Missouri Highway Patrol: 573-751-1000
City of Columbia Police: 573-874-7652

City of Columbia – Public Safety Joint Communications: 573-874-7400

2.1 This list is not all inclusive. Notification of the need for wrecker or tow truck services will remain the responsibility of the appropriate police agency.

2.2 The contractor shall notify enforcement and emergency agencies before the start of construction to request their cooperation and to provide coordination of services when emergencies arise during the construction at the project site. When the contractor completes this notification with enforcement and emergency agencies, a report shall be furnished to the engineer on the status of incident management.

3.0 No direct pay will be made to the contractor to recover the cost of the communication equipment, labor, materials or time required to fulfill the above provisions.

I. QUALITY MANAGEMENT (VERSION - 10/2013)

1.0 Quality Management. The contractor shall provide Quality Management as specified herein to ensure the project work and materials meets or exceeds all contract requirements.

1.1 The contractor shall provide all Quality Control (QC) of the work and material. Contractor QC staff shall hold the primary responsibility for ensuring all work and material is in compliance with contract requirements. QC staff shall perform and document all inspection and testing. The QC inspectors and testers may be employed by the contractor, sub-contractor, or a qualified professional service hired by the contractor.

1.2 The engineer will provide Quality Assurance (QA) inspection. The role of QA is to verify the performance of QC and provide confidence that the product will satisfy given requirements for quality.

1.3 The contractor shall designate a person to serve as the project Quality Manager (QM). The QM shall be knowledgeable of standard testing and inspection procedures for highway and bridge construction, including a thorough understanding of the standard specifications. The QM shall be responsible for the implementation and execution of the Quality Management Plan and shall oversee all QC responsibilities, including all sub-contract work. The QM shall be the primary point of contact for all quality related issues and responsibilities, and shall ensure qualified QC technicians and inspectors are assigned to all work activities. The QM should be separate from the manager of the work activities.

1.4 Any QC personnel determined in sole discretion of the engineer to be incompetent, derelict in their duties, or dishonest, shall at a minimum be removed from the project. Further investigation will follow with a stop work notification to be issued until the contractor submits a corrective action report that meets the approval of the engineer.

2.0 Quality Management Plan. The contractor shall develop, implement and maintain a Quality Management Plan (QMP) that will ensure the project quality meets or exceeds all contract requirements, and provides a record for acceptance of the work and material.

2.1 The QMP shall address all QC inspection and testing requirements of the work as described herein. A draft QMP shall be submitted to the Resident Engineer for review at least two weeks prior to the pre-construction conference.

2.2 Physical work on the project shall not begin prior to approval of the QMP by the engineer. The approved QMP shall be considered a contract document and any revisions to the QMP will require approval from the engineer.

2.3 The following items shall be included in the Quality Management Plan:

- a) General organizational structure of the contractor's production and QC staff.
- b) Name, qualifications and job duties of the Quality Manager.
- c) A list of all certified QC testers who will perform QC duties on the project, including sub-contract work, and the areas of testing in which they are certified.
- d) A list of all QC inspectors who will perform inspection duties on the project, including sub-contract work, and the areas of inspection that they will be assigned.
- e) A Document Control Procedure for verifying documentation is accurate and complete as described in Section 3.
- f) A procedure describing QC Inspections as outlined in Section 4.
- g) A procedure describing QC Testing, as outlined in Section 5, including a job specific Inspection and Test Plan (ITP).
- h) A procedure describing Material Receiving as outlined in Section 6.

- i) A list of Hold Points as outlined in Section 8.
- j) A procedure for documenting and resolving Non-Conforming work as described in Section 9.
- k) A procedure for tracking revisions to the QMP.
- l) A list of any approved changes to the Standard Specifications or ITP, including a reference to the corresponding change order.
- m) Format for the Weekly Schedule and Work Plans as described in Section 10, including a list of activities that will require pre-activity meetings.

3.0 Project Documentation. The contractor shall establish a Document Control Procedure for producing and uploading the required Quality Management documents to a web-based electronic storage site provided by MoDOT (Microsoft SharePoint), or to an alternate storage site provided by the contractor and approved by the engineer. This process will allow efficient sharing of documents among authorized users. Any proposed alternate site must provide equal or better efficiency in document sharing as the MoDOT provided site. If an alternate site is utilized, upon completion of the project the contractor shall provide all files to the engineer on an approved electronic media.

3.1 The contractor shall utilize a file naming system that allows efficient location of documents. The file naming system for each folder should be shown in the QMP.

3.2 Documents (standard forms, reports, and checklists) referenced throughout this provision are considered the minimum documentation required. They shall be obtained from MoDOT at the following web address: <http://www.modot.org/quality> . The documents provided by MoDOT are required to be used in the original format, unless otherwise approved by the engineer. Contractor-altered versions may be allowed in some cases; however, many of these forms must remain in the original format in order to simplify data entry into SiteManager (MoDOT's internal project management system).

3.3 Timely submittal of the required documents to the MoDOT document storage location is essential to ensure payment can be processed for the completed work. Submittal of the documents is required within 12 hours of the work shift that the work was performed, or on a document-specific schedule approved by the engineer and included in the QMP.

3.4 The contractor shall establish a verification procedure that ensures all required documents are submitted to the engineer within the specified time, and prior to the end of each pay period for the work that was completed during that period. Payment will not be made for work that does not include all required documents. Minimum documents that might be required prior to payment include: Test Reports, Inspection Checklists, Materials Receiving Reports, and Daily Inspection Reports.

3.5 The contractor shall perform an audit at project closeout to ensure the final collection of documents is accurate and complete.

4.0 Quality Control Inspections. The QMP shall identify a procedure for performing QC inspections. QC inspections shall be performed for all project activities to ensure the work is in compliance with the contract, plans and specifications.

4.1 The QM shall identify the QC inspectors assigned to each work activity. The QC inspectors shall inspect the work to ensure the work is completed in accordance with the plans and specifications, and shall document the inspection by completing the required inspection checklists, forms, and reports provided by MoDOT. Depending on the type of work, the checklists may be necessary daily, or they may follow a progressive work process. The frequency of each checklist shall be stated in the QMP. The contractor may propose alternate versions of checklists that are more specific to the work.

4.2 A Daily Inspection Report is required to document pertinent activity on the project each day. This report shall include a detailed diary that describes the work performed as well as observations made by the inspection staff regarding quality control. The report shall include other items such as weather conditions, location of work, installed quantities, tests performed, and a list of all subcontractors that performed work on that date. The report shall include the full name of the responsible person who filled out the report and shall be digitally signed by an authorized contractor representative.

4.3 External fabrication of materials does not require further QC inspection if the product is currently under MoDOT inspection or an approved QC/QA program. QC inspection and testing required in the production of concrete for the project shall be the responsibility of the contractor.

4.4 The contractor shall measure and document the quantity for all items of work that require measurement. Any calculations necessary to support the measurement shall be included with the documentation. The engineer will verify the measurements prior to final payment.

5.0 Quality Control Testing. The QMP shall identify a procedure for QC testing. The contractor shall perform testing of the work at the frequency specified in the Inspection and Test Plan (ITP).

5.1 MoDOT will provide a standard ITP and the contractor shall modify it to include only the items of work in the contract, including adding any Job Special Provision items. The standard ITP is available on the MoDOT website at <http://www.modot.org/quality>. The contractor shall not change the specifications, testing procedures, or the testing frequencies, from the standard ITP without approval by the engineer and issuance of a change order.

5.2 Test results shall be recorded on the standard test reports provided by the engineer, or in a format approved by the engineer. Any test data shall be immediately provided to the engineer upon request at any time, including prior to the submission of the test report.

5.3 The contractor shall ensure that all personnel who perform sampling and/or testing are certified by the MoDOT Technician Certification Program or a certification program that has been approved by MoDOT for the sampling and testing they perform.

5.4 If necessary, an independent third party will be used to resolve any significant discrepancies between QC and QA test results. All dispute resolution testing shall be performed by a laboratory that is accredited in the AASHTO Accreditation Program in the area of the test performed. The contractor shall be responsible for the cost to employ the third party laboratory if the third party test verifies that the QA test was accurate. The Commission shall be responsible for the cost if the third party test verifies that the QC test was accurate.

6.0 Material Receiving. The QMP shall identify a procedure for performing material receiving. Standard material receiving forms will be provided by the engineer.

6.1 The procedure shall address inspections for all material delivered to the site (excluding testable material such as concrete, asphalt, aggregate, etc.) for general condition of the material at the time it is delivered. The material receiving procedure shall record markings and accompanying documentation indicating the material is MoDOT accepted material (MoDOT-OK Stamp, PAL tags, material certifications, etc.).

6.2 All required material documentation must be present at the time of delivery. If the material is not MoDOT accepted, the contractor shall notify the engineer immediately and shall not incorporate the material into the work.

7.0 Quality Assurance. The engineer will perform Quality Assurance inspection and testing (QA) to verify the performance of QC inspection and testing. The frequency of the QA testing will be as shown in the ITP, but may be more frequent at the discretion of the engineer. The engineer will record the results of the QA testing and inspection and will inform the contractor of any known discrepancies.

7.1 QA is responsible for verifying the accuracy of the final quantity of all pay items in the contract. This includes taking measurements on items that require measurement and other items that are found to have appreciable errors.

7.2 QA inspection and test results may not be used as a substitute for QC inspection and testing.

7.3 QA will be available for Hold Point inspections at the times planned in the Weekly Schedule. The inspections may be re-scheduled as needed, but a minimum 24-hour advance notification from the contractor is required unless otherwise approved by the engineer.

8.0 Hold Points. Hold Points are events that require approval by the engineer prior to continuation of work. Hold Points occur at definable stages of work when the succeeding work depends on a QA review of the preceding work.

8.1 a list of minimum hold points will be provided by the engineer and shall be included in the qmp. The engineer may make changes to the hold point list at any time.

8.2 prior to all hold point inspections, qc shall provide the engineer with the daily inspection reports, inspection checklists, test reports, and material receiving reports for the work performed leading up to the hold point. If the engineer identifies any corrective actions needed during a hold point inspection, the corrections shall be completed prior to continuing work. The engineer may require a new hold point to be scheduled if the corrections require a follow-up inspection.

9.0 Non-Conforming Work. Non-conforming work is defined as work that does not meet the contract requirements. The contractor shall establish a procedure for identifying and resolving non-conforming work as well as tracking the status of the reports.

9.1 Contractor QC staff or production staff should identify non-conforming work and document the details on the Non-Conformance Report form provided by MoDOT. QA staff may also initiate a non-conformance report.

9.2 In-progress work that does not meet the contract requirements may not require a non-conformance report if production staff is aware of the issue and corrects the problem during production. QC or QA may issue a non-conformance report for in-progress work when documentation of the deficiency is considered beneficial to the project record.

9.3 The contractor shall propose a resolution to the non-conforming work. Acceptance of a resolution by the engineer is required before closure of the non-conformance report.

9.4 For recurring non-conformance work of the same or similar nature, a written Corrective Action Request will be issued by QC or QA. The contractor shall then establish a procedure for tracking the corrective action from issuance of the request to implementation of the solution. Approval from the engineer is required prior to implementation of the proposed corrective action. The contractor shall notify the engineer after the approved corrective action has been implemented.

10.0 Work Planning and Scheduling. The contractor shall include Quality Management in all aspects of the work planning and scheduling. This shall include providing a Weekly Schedule, a Work Plan for each work activity, and holding pre-activity meetings for each new activity.

10.1 A Weekly Schedule shall be provided to the engineer each week that outlines the planned project activities for the following two-week period. This schedule shall include all planned work, identification of all new activities, traffic control events, and requested hold point inspections for the period. Planned quantity of materials, along with delivery dates should also be included in the schedule.

10.2 A Work Plan shall be submitted to the engineer at least one week prior to the pre-activity meeting. The Work Plan shall include the following: a safety plan, list of materials to be used, work sequence, defined responsibilities for QC testing and inspection personnel, and stages of work that will require hold point inspections.

10.3 A pre-activity meeting is required prior to the start of each new activity. The purpose of this meeting is to discuss details of the Work Plan and schedule, including all safety precautions. Those present at the meeting shall include: the production supervisor for the activity, the Quality Manager, QC inspection and testing staff, and QA. The Quality Manager will review the defined responsibilities for QC testing and inspection personnel and will address any quality issues with the production staff. Attendees may join the meeting in person or by phone or video conference.

11.0 Basis of Payment. Payment for all costs associated with developing, implementing and maintaining the Quality Management Plan, providing Quality Control inspection and testing, and all other costs associated with this provision, will be considered included in the unit price of each contract item. No direct pay will be made for this provision.

J. SAFETY PLAN

1.0 Description. This contractor shall submit to the engineer a project Safety Plan (SP) for all work performed by the contractor and all subcontractors. The purpose of the SP is to encourage and enable all work to be performed in the safest possible manner and that all parties involved are aware of their individual responsibility for safety on the jobsite.

1.1 The SP shall be completed by the contractor and provided to the engineer prior to the beginning of any construction activity or phase on the project.

1.2 The contractor shall designate a person to serve as Project Safety Manager (PSM). The PSM shall be responsible for implementing and overseeing the SP. The PSM is not required to be present on the project at all times, but must be available to address safety issues and needs.

1.3 The PSM shall make revisions to the SP as necessary. Any new project activities or phases shall be included in the SP prior to work beginning on that activity or phase.

1.4 An example Safety Plan is available at: www.modot.org/safetyplan

2.0 Emergency Preparedness. The SP shall outline and detail for all workers, the specific procedures and actions necessary to respond to a jobsite emergency and the measures taken to communicate these requirements to all workers.

2.1 The SP shall include a list of local emergency contacts including phone numbers. A copy of the emergency contact list shall be accessible to workers.

2.2 In the case where there is no cellular or land line phone service at the jobsite, the SP shall identify how to reach the nearest available phone service.

3.0 Project Safety Analysis. The SP should contain a basic Project Safety Analysis (PSA) that outlines the actions necessary to complete each activity or phase of the project. The SP shall include a general description of the primary activities or steps required to safely complete the project.

3.1 Each activity should also include a general description of the work involved along with the known risks associated with the activity. In addition the PSA should outline the controls for those risks, including any Personal Protection Equipment (PPE) requirements for that activity or phase, and whether or not the activity or phase requires a specific safety meeting prior to beginning the activity or phase.

3.2 Submittal of the PSA for all activities or phases is not required with the initial submittal of the SP; however, the PSA for each activity or phase shall be completed prior to the beginning of that activity or phase.

4.0 Safety Meetings. The SP shall include the types of safety meetings that will be required of and conducted by the contractor.

5.0 Safety Training. The SP shall identify the required safety training provided to the contractor's personnel. The contractor shall require that the appropriate safety training for the contractor's personnel is completed prior to the beginning of work on each activity or phase.

5.1 The SP shall identify the recommended safety training needs and PPE for MoDOT employees who will be exposed to the work activities. MoDOT will provide safety training and PPE to MoDOT employees based on MoDOT safety policies.

6.0 Payment. There will be no direct payment for compliance with this Safety Plan provision.

K. LIQUIDATED DAMAGES FOR WINTER MONTHS JSP-04-17

1.0 Description. Revise Sec 108.8.1.2 (a) and (b) and substitute the following for the project:

- (a) Liquidated damages will be assessed from December 15 to March 15
- (b) Liquidated damages will be assessed for Saturdays, Sundays and Holidays.

L. AMERICANS WITH DISABILITIES ACT (ADA) COMPLIANCE AND FINAL ACCEPTANCE OF CONSTRUCTED FACILITIES JSP-10-01A

1.0 Description. The contractor shall comply with all laws pertaining to the Americans with Disabilities Act (ADA) during construction of pedestrian facilities on public rights of way for this project. An ADA Checklist is provided herein to be utilized by the contractor for verifying compliance with the ADA law. The contractor is expected to familiarize himself with the plans involving pedestrian facilities and the ADA Post Construction Checklist prior to performing the work.

2.0 ADA Checklist. The contractor can locate the ADA Checklist form on the Missouri Department of Transportation website:

http://www.modot.mo.gov/business/contractor_resources/forms.htm

2.1 The ADA Checklist is intended to be a helpful tool for the contractor to use during the construction of the pedestrian facilities and a basis for the commission's acceptance of work. Prior to work being performed, the contractor shall bring to the engineer's attention any planned work that is in conflict with the design or with the requirement shown in the checklist. Situations may arise where the checklist may not fully address all requirements needed to construct a facility to the full requirements of current ADA law. In those situations, the contractor shall propose a solution to the engineer that is compliant with current ADA law using the following hierarchy of resources: 2010 ADA Standards for Accessible Design, Draft Public Rights of Way Accessibility Guidelines (PROWAG) dated November 23, 2005, MoDOT's Engineering Policy Guidelines (EPG), or a solution approved by the U.S. Access Board.

2.2 It is encouraged that the contractor monitor the completed sections of the newly constructed pedestrian facilities in attempts to minimize negative impacts that his equipment, subcontractors or general public may have on the work. Completed facilities must comply with the requirements of ADA and the ADA Checklist or have documented reasons for the non-complaint items to remain.

3.0 Coordination of Construction.

3.1 Prior to construction and/or closure on an existing pedestrian path of travel, the contractor shall submit a schedule of work to be constructed, which includes location of work performed, the duration of time the contractor expects to impact the facility and an accessible signed pedestrian detour complaint with MUTCD Section 6D that will be used during each stage of construction. This plan shall be submitted to the engineer for review and approval at or prior to the pre-construction conference. Accessible signed detours shall be in place prior to any work being performed that has the effect of closing an existing pedestrian travel way.

3.2 When consultant survey is included in the contract, the contractor shall use their survey crews to verify that the intended design can be constructed to the full requirements as established in the 2010 ADA Standards. When 2010 ADA Standards do not give sufficient information to construct the contract work, the contractor shall refer to the PROWAG.

3.3 When consultant survey is not included in the contract, the contractor shall coordinate with the engineer, prior to construction, to determine if additional survey will be required to confirm the designs constructability.

4.0 Final Acceptance of Work. The contractor shall provide the completed ADA Checklist to the engineer at the semi-final inspection. ADA improvements require final inspection and compliance with the ADA requirements and the ADA Checklist. Each item listed in the checklist must receive either a "YES" or an "N/A" score. Any item receiving a "NO" will be deemed non-compliant and shall be corrected at the contractor's expense unless deemed otherwise by the engineer. Documentation must be provided about the location of any non-complaint items that are allowed to remain at the end of the construction project. Specific details of the non-complaint items, the ADA requirement that the work was not able to comply with, and the specific reasons that justify the exception are to be included with the completed ADA Checklist provided to the engineer.

4.1 Slope and grade measurements shall be made using a properly calibrated, 2 foot long, electronic digital level approved by the engineer.

5.0 Basis of Payment. The contractor will receive full pay of the contract unit cost for all sidewalk, ramp, curb ramp, median, island, approach work, cross walk striping, APS buttons, pedestrian heads, detectible warning systems and temporary traffic control measures that are completed during the current estimate period as approved by the engineer. Based upon completion of the ADA Checklist, the contractor shall complete any necessary adjustments to items deemed non-compliant as directed by the engineer.

5.1 No direct payment will be made to the contractor to recover the cost of equipment, labor, materials, or time required to fulfill the above provisions, unless specified elsewhere in the contract documents.

M. BIKE LANE ARROW SYMBOL

1.0 Description. This work shall consist of placing an arrow symbol in the bike lanes of Route B as shown in the plans or as directed by the engineer.

2.0 Construction Requirements. The bike lane arrow symbol shall be constructed with acrylic waterborne paint to the dimensions and specifications set forth in the Manual on Uniform Traffic Control Devices and as shown in the plans.

3.0 Basis of Payment. All cost incurred for equipment, labor, materials or time required to fulfill the above provision shall be considered as included in and completely covered by the unit price for Item No. 620-99.02 “Acrylic Waterborne Pavement Marking Paint, Bike Lane Arrow” per each.

N. SHARED LANE SYMBOL

1.0 Description. This work shall consist of placing a shared lane symbol in the shared use lanes of Route B as shown in the plans or as directed by the engineer.

2.0 Construction Requirements. The shared lane symbol shall be constructed with acrylic waterborne paint to the dimensions and specifications set forth in the Manual on Uniform Traffic Control Devices and as shown in the plans.

3.0 Basis of Payment. All cost incurred for equipment, labor, materials or time required to fulfill the above provision shall be considered as included in and completely covered by the unit price for Item No. 620-99.02 “Shared Use Lane Symbol” per each.

O. FERTILIZING, SEEDING AND MULCHING

1.0 Fertilizing shall conform to Sec. 801 and more specifically as follows:

<u>Route</u>	<u>County</u>	<u>Project</u>	<u>Pounds per Acre</u>			<u>Effective Neutralizing Material</u>
			<u>Nitrogen (N)</u>	<u>Phos. (P₂O₅)</u>	<u>Potash (K₂O)</u>	
B	Boone	J5S2186	80	120	40	400

2.0 Seeding shall conform to Section 805 and the rate of application shall be as follows:

– All settings – within the first 30 feet (mow area)

Tall fescue	100 lbs.
Annual ryegrass	10 lbs.
Perennial ryegrass	5 lbs.
White clover	5 lbs.
Oats	10 lbs.
TOTAL	120 lbs. / acre

3.0 Mulching shall conform to Section 802 and more specifically the contractor shall use vegetative mulch with mulch overspray.

4.0 Basis of Pavement.

4.1 No direct payment will be made for fertilizing or mulching seeded areas.

4.2 All cost incurred by the contractor for labor, equipment and materials in compliance with the above requirements including furnishing and placing fertilizer and mulch shall be considered as completely covered by the unit price bid for Item No. 805-10.00A, "Seeding – Cool Season Mixtures", per acre.

P. EXCESS EXCAVATION

1.0 Description. The contractor is hereby advised that construction of the project may result in the excavation of excess materials that cannot be incorporated in the work, or must otherwise be disposed of by the contractor. These excavated materials may require disposal as excess materials.

2.0 Requirements. All materials excavated from the project area that are not otherwise incorporated into the work shall be disposed of by the contractor per the requirements of Section 203.

3.0 Basis of Payment. No additional payment will be made to the contractor for complying with the requirements of this special provision. Payment for completing the work as outlined herein shall be considered as included in the unit price for 203-10.00, Class A Excavation.

Q. ELECTRONIC INFORMATION FOR BIDDER'S AUTOMATION

1.0 Electronic Information. Electronic information, consisting of survey and design information including but not limited to 3-dimensional design models, cross-section models, alignment data, and plan view geometry, does not constitute part of the bid or contract documents. This electronic information will be distributed with the cross-sections or upon the contractor's request. This information, used for project design and quantity estimation purposes, is provided for the bidder's use in automation of bid estimating, contractor furnishing staking, automated machine guidance and other construction methods if provided in the contract. This information shall not be considered a representation of actual conditions to be encountered during construction. Furnishing this information does not relieve a bidder or contractor from the responsibility of making an investigation of conditions to be encountered including, but not limited to site visits, and basing the bid on information obtained from these investigations, and the professional interpretations and judgment of the bidder or contractor. The bidder or contractor shall assume the risk of error if the information is used for any purposes for which the information was not intended. The Commission makes no representation as to the accuracy or reliability of the information, since the information may not be representative of the sealed contract documents. Any assumptions the bidder or contractor may make from this electronic information is at the bidder or contractor's risk; none are intended by the Missouri Highways and Transportation Commission. The bidder or contractor assumes the sole risk of liability or loss if the bidder or contractor does rely on this electronic information to its detriment, delay or loss.

R. DISPOSITION OF EXISTING SIGNING

1.0 Description. All signing indicated for removal in the plans, shall be covered by the contractor and transported to the MoDOT Maintenance building located at 4201 Paris Rd., Columbia, MO.

2.0 Basis of Payment. Payment for removal and transportation of these signs, as shown in the plans, shall be considered as and completely covered by the contract unit price for Item No. 2022010 "Removal of Improvements" per lump sum.

S. ADJUSTING WATER VALVE METER

1.0 Description. There is one water valve and/or meter within the existing pavement that will be in the pavement when the project is completed. The contractor shall adjust this water valve and/or meter to be level with the new pavement surface as approved by the engineer.

2.0 Basis of Payment.

2.1 All cost incurred by the contractor for labor, equipment and materials in compliance with the above requirements shall be considered as completely covered by the unit price bid for Adjusting Water Valve Meter Item No. 603-99.02 per each.

T. X-TENSION CRASHWORTHY END TERMINAL

1.0 The contractor shall install the X-Tension guardrail end terminal at the location shown on the plans. The X-Tension end terminal is manufactured by Barriers Systems of Lindsay Transportation Solutions.

1.1 The X-Tension end terminal shall be installed according to manufacturer's recommendations and as approved by the engineer.

2.0 Basis of Payment. All cost incurred for equipment, labor, materials or time required to fulfill the above provision shall be considered as included in and completely covered by the contract unit price bid for Item No. 6069902 "X-Tension Crashworthy End Terminal", per each.

U. LIQUIDATED DAMAGES SPECIFIED

1.0 Description. If the Route B bridge replacement over Business Loop 70 is not complete and all lanes open to traffic prior to **September 15, 2014**, the Commission, the traveling public, and state and local police and governmental authorities will be damaged in various ways, including but not limited to, increased construction administration cost, potential liability, traffic and traffic flow regulation cost, traffic congestion and motorist delay, with its resulting cost to the traveling public. These damages are not reasonably capable of being computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount of **\$10,000 per day** for each full day that Route B bridge replacement over Business Loop 70 is not complete and open to traffic in excess of the limitation as specified elsewhere in this special provision. It shall be the responsibility of the engineer to determine the quantity of excess closure time.

1.1 The said liquidated damages specified will be assessed regardless if whether it would otherwise be charged as liquidated damages under the Missouri Standard Specification for Highway Construction, as amended elsewhere in this contract.

V. SAFETY REQUIREMENTS

Delete Sec 616.3.1 and substitute the following:

616.3.1 All workers within highway right of way shall wear approved ANSI/ISEA 107 Performance Class 2 or 3 safety apparel and more specifically as follows:

616.3.1.1 Daytime Flagger. During daytime activities, flaggers shall wear a high visibility hard hat, safety glasses, a Performance Class 3 top OR a Performance Class 2 top, and safety footwear. Hard hats other than high visibility orange or green shall be covered with a high visibility covering.

616.3.1.2 Daytime Worker. During daytime activities, workers shall wear a hard hat, safety glasses, a Performance Class 3 top OR a Performance Class 2 top, and safety footwear.

616.3.1.3 Nighttime Flagger. During nighttime activities, flaggers shall wear a high visibility/reflective hard hat, safety glasses, a Performance Class 3 top AND Class E bottoms, OR Performance Class 2 top AND Class E bottoms, and safety footwear. Hard hats shall be reflective or covered with a high visibility covering.

616.3.1.4 Nighttime Worker. During nighttime activities, workers shall wear a hard hat, safety glasses, a Performance Class 3 top OR Performance Class 2 top AND Class E bottoms, and safety footwear.

Note: A graphic representation of the various PPE as described above can be found in the "Additional Information" portion of these provisions. A color representation can be found on the MoDOT website at: <http://tinyurl.com/Safe-Apparel>.

GRAPHIC REPRESENTATION OF PERSONAL PROTECTIVE EQUIPMENT

616.3.1.1

Choose One
-hard hats must be high visibility



OR

Choose One *-prescription*



Choose One

Class 3 Vest 	Class 3 Shirt 	Class 3 Jacket 
Class 2 Vest 	Class 2 Shirt 	Class 2 Jacket 

Choose One
Safety Toe



Daytime Flagger PPE


- PPE = Personal Protective Equipment
- PPE is not required in fully enclosed equipment/cab
- PPE examples reflect minimum requirements

MT13.113

March 24, 2014


616.3.1.2

Choose One
-hard hats may be any color or design









OR


Choose One *-prescription*



Choose One

Class 3 Vest 	Class 3 Shirt 	Class 3 Jacket 
Class 2 Vest 	Class 2 Shirt 	Class 2 Jacket 

Choose One
Safety Toe



Daytime Worker PPE

- PPE = Personal Protective Equipment
- PPE is not required in fully enclosed equipment/cab
- PPE examples reflect minimum requirements

MT13.113

March 24, 2014

616.3.1.3

Choose One
 - hard hats must be high visibility and reflective

OR

Choose One -prescription

For nighttime activities, flaggers shall wear a high visibility/reflective hard hat; safety glasses; an ANSI/ISEA 107 Performance Class 3 top and a Class E bottom OR a Performance Class 2 top and a Class E bottom; and safety footwear.

Choose One

Class 3 Vest	Class 3 Shirt	Class 3 Jacket
OR		
Class 2 Vest	Class 2 Shirt	Class 2 Jacket

Choose One

Class E Pants	Class E Shorts or Gaiter	Class E Coverall
---------------	--------------------------	------------------

Choose One
Safety Toe

Nighttime Flagger PPE

- PPE = Personal Protective Equipment
 - PPE is not required in fully enclosed equipment/cab
 - PPE examples reflect minimum requirements

MTT3.113

March 24, 2014

616.3.1.4

Choose One
 -hard hats may be any color or design

OR

Choose One -prescription

For nighttime activities, workers shall wear a hard hat; safety glasses; an ANSI/ISEA 107 Performance Class 3 top OR Performance Class 2 top and Class E bottoms; and safety footwear.

Choose One

Class 3 Vest	Class 3 Shirt	Class 3 Jacket
OR		
Class 2 Vest	Class 2 Shirt	Class 2 Jacket

Choose One

Class E Pants	Class E Shorts or Gaiter	Class E Coverall
---------------	--------------------------	------------------

Choose One
Safety Toe

Nighttime Worker PPE

- PPE = Personal Protective Equipment
 - PPE is not required in fully enclosed equipment/cab
 - PPE examples reflect minimum requirements

MTT3.113

March 24, 2014

General Notes:

Design Specifications (Superstructure):

2012 AASHTO LRFD Bridge Design Specifications (6th Ed.) and
2013 Interim Revisions

Design Specifications (GRS Abutments):

Geosynthetic Reinforced Soil Integrated Bridge System Interim
Implementation Guide, FHWA-HRT-11-026, January 2011.

Design factor of safety against sliding is ≥ 1.5 ; Factor of safety
against bearing failure is ≥ 2.5 .

A global stability analysis shall be performed for each site. Factor
of safety against global failure is ≥ 1.5 .

Design Loading (Superstructure):

HL-93
35#/Sq. Ft. Future Wearing Surface
Earth 120 #/Cu. Ft., Equivalent Fluid Pressure 45#/Cu. Ft.
Superstructure: Simply-supported, non-composite for dead load.
Composite for live load.

Design Loading (GRS Abutments):

Combined load: Bearing beam pressure = 3.33 ksf (service load,
allowable stress design). Roadway live load surcharge: 250 psf uniform vertical

Road Base unit weight = 140 pcf, thickness = 48 inches

Soil Conditions:

Retained backfill: Unit weight = 120 pcf, friction angle = 28°,
cohesion = 0 psf, max diameter = 0.5 inches
Foundation soil: Unit weight = 120 pcf, friction angle = 28°, cohesion = 400 psf
Reinforced fill: Unit weight = 140 pcf, friction angle = 40°, cohesion = 0 psf
RSF backfill: Unit weight = 140 pcf, friction angle = 40°, cohesion = 0 psf

Design Unit Stresses:

Class B-1 Concrete (Safety Barrier Curb) $f'c = 4,000$ psi
Class B-2 Concrete (Superstructure, except
Prestressed Box Beams and Safety Barrier Curb) $f'c = 4,000$ psi
Concrete Modular Unit (CMU) Block $f'c = 4,000$ psi
Reinforcing Steel (Grade 60) $fy = 60,000$ psi
For Prestressed Box Beam Stresses, see Sheet No. 8.
For Prestressed Box Beam Shear Key Grout Stresses, see Sheet No. 7.

Reinforcing Steel:

Minimum clearance to reinforcing steel shall be 1 1/2",
unless otherwise shown.

Traffic Handling:

Structure to be closed during construction. See roadway plans for traffic control plan.

A minimum vertical clearance of 14'-0" from crown of existing lanes and a minimum
lateral clearance of 24'-0" centered on existing lanes shall be maintained during
construction.

Concrete Protective Coatings:

Sacrificial graffiti protective coating shall be applied on all exposed faces
of CMU blocks in accordance with Sec 711.

Removal of Existing Bridge:

Remove A0087 per Standard Specifications, except that Bents 2 & 3 footings shall be
removed to bottom of footing. Existing steel piles may remain in place after removal
of existing footing up to an elevation of 760.50. Additionally, footings remaining
from previous bridge within limits of wall shall be removed.

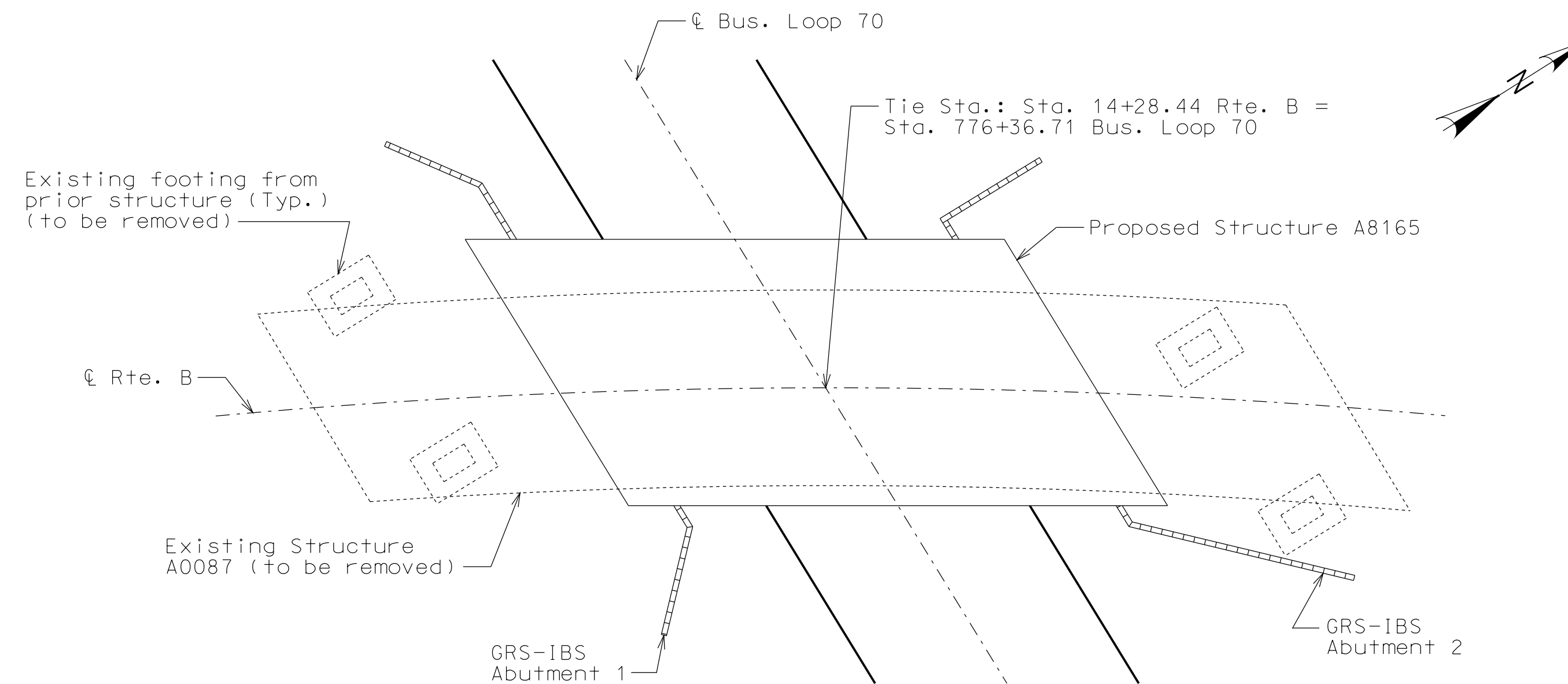
Temporary Shoring:

If temporary shoring is required, cost of temporary shoring will be considered
completely covered by the contract lump sum price for GRS-IBS Abutment No.1
or GRS-IBS Abutment No. 2.

Estimated Quantities for Reinforced Concrete Slab Overlay		
Item		Total
Class B-2 Concrete	cu. yard	44.4
Reinforcing Steel (Epoxy Coated)	pound	4,420

The table of Estimated Quantities for Reinforced Concrete Slab Overlay represents the quantities used by
the State in preparing the cost estimate for concrete slabs. The area of the concrete slab will be
measured to the nearest square yard with the horizontal dimensions as shown on the plan of slab.
Payment for conventional forms, all concrete and coated and reinforcing steel will be considered
completely covered by the contract unit price for the slab. Variations may be encountered in the
estimated quantities but the variations cannot be used for an adjustment in the contract unit price.

Method of forming the slab shall be as shown on the plans and in accordance with Sec 703. All hardware
for forming the slab to be left in place as a permanent part of the structure shall be coated in accordance
with ASTM A123 or ASTM B633 with a thickness class SC 4 and a finish type I, II or III.



LOCATION SKETCH

Estimated Quantities				
Item		Substr.	Superstr.	Total
*** Class 1 Excavation	cu. yard	520		520
Removal of Bridges (A0087)	lump sum			1
* Safety Barrier Curb	linear foot		129	129
Reinforced Concrete Slab Overlay	sq. yard		230	230
21 in., Prestressed Concrete Adjacent Box Beam	linear foot		496	496
Conduit System on Structure	lump sum			1
Sacrificial Graffiti Protection System	lump sum			1
Bicycle Railing	linear foot		65	65
** GRS-IBS Abutment 1	lump sum			1
** GRS-IBS Abutment 2	lump sum			1

* Safety barrier curb shall be cast-in-place option for left safety barrier curb only and shall be
cast-in-place option or slip-form option for right safety barrier curb.

All reinforcement and concrete in the backwalls is included in the Estimated Quantities for Reinforced
Concrete Slab Overlay.

** Payment for all materials and labor to construct the GRS-IBS Abutments (does not included excavation)
including Select Granular Fills, Geosynthetic Reinforcement, CMU Facing Blocks, grout and reinforcing steel
will be considered completely covered by the Contract lump sum price for GRS-IBS Abutment 1 or GRS-IBS
Abutment 2.

*** Includes all excavation required to build each GRS-IBS Abutment.

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NOT BE CONSIDERED
A CERTIFIED
DOCUMENT."

DATE PREPARED
4/18/2014

ROUTE STATE
B MO
DISTRICT SHEET NO.
BR 2

COUNTY
BOONE
JOB NO.
J5S2186
CONTRACT ID.

PROJECT NO.
BRIDGE NO.
A8165

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION


105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

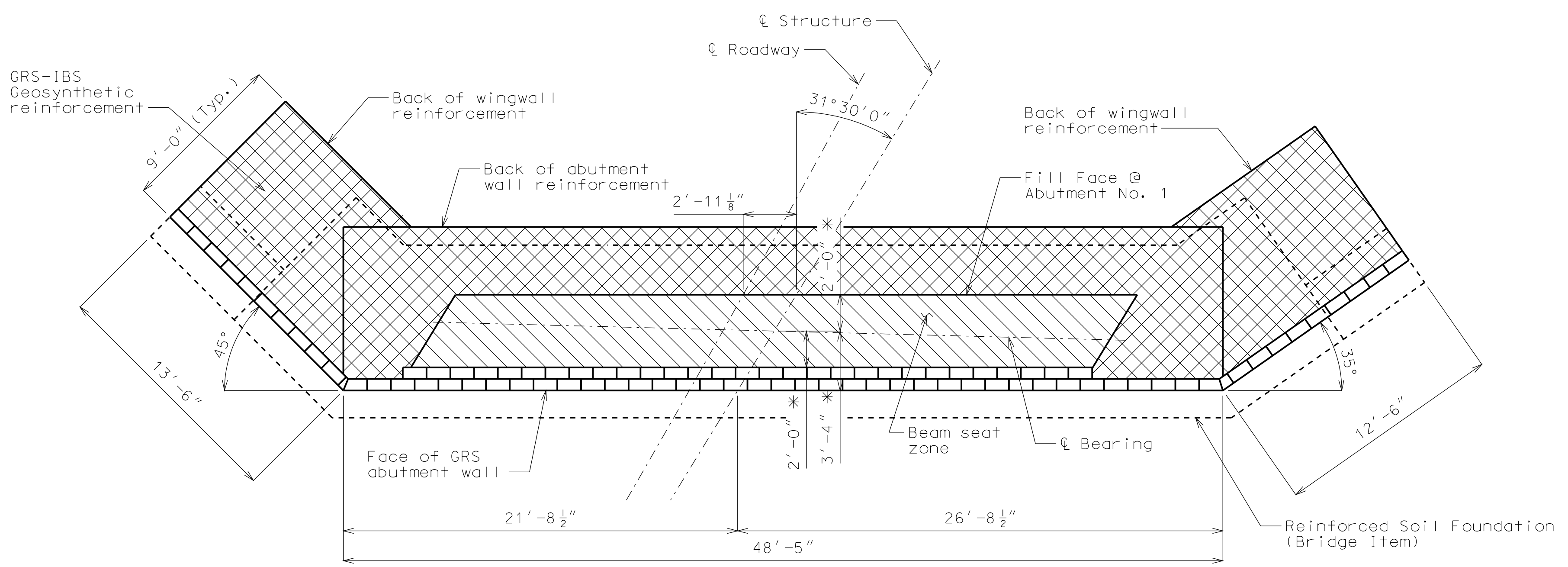
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"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."

DATE PREPARED
4/15/2014
ROUTE B STATE MO
DISTRICT BR SHEET NO. 3
COUNTY BOONE
JOB NO. J5S2186
CONTRACT ID.
PROJECT NO.
BRIDGE NO. A8165

DESCRIPTION	DATE

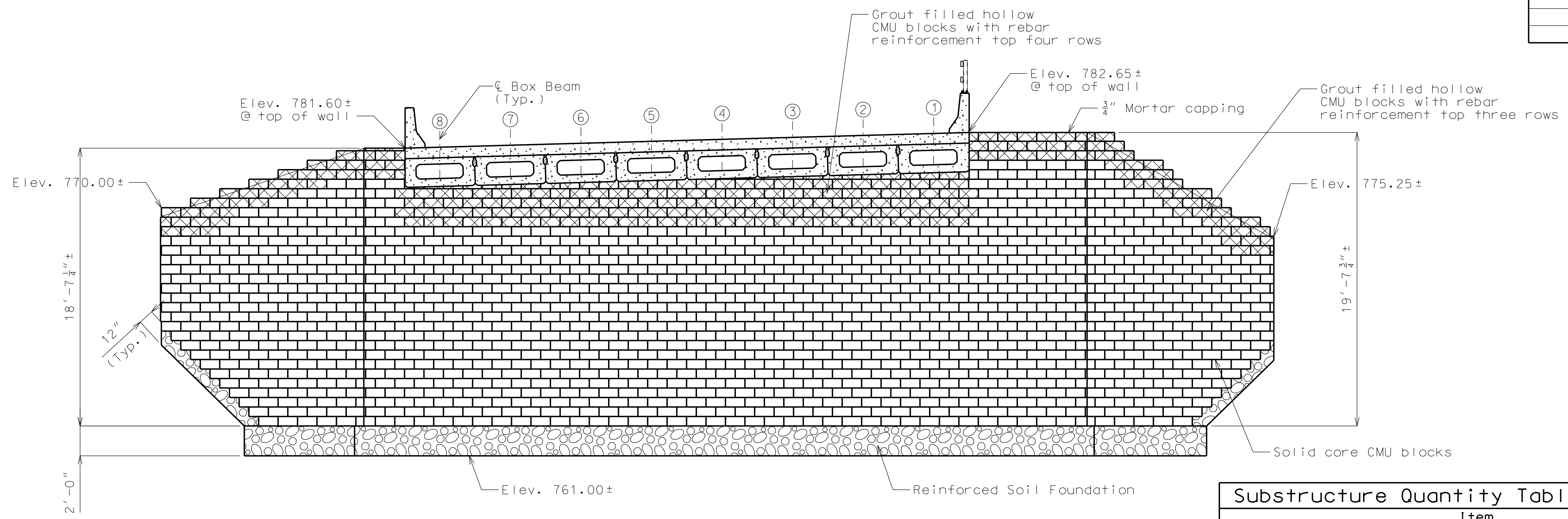
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

 105 WEST CAPITOL
 JEFFERSON CITY, MO 65102
 1-888-ASK-MODOT (1-888-275-6636)



PLAN VIEW
* Measured at \varnothing of Structure.

Notes:
 Insert epoxy coated #4 rebars 27" long into the top 3 rows of CMU's and all corner CMU's and fill with grout.
 CMU blocks are staggered, including corners, so there are no vertical joints greater than 1 CMU block height.
 For CMU Block configuration underneath bridge, see Section Thru GRS-IBS.
 All CMU blocks shall be grey with a split face pattern.
 All CMU blocks shall be solid, except as shown.
 Apply Class 2 Penetrating Concrete Sealer to all exposed faces of CMU blocks prior to graffiti protection. See Job Special Provisions.

Box Beam No.	Elevation (ft)
1	780.27
2	780.14
3	780.00
4	779.87
5	779.74
6	779.60
7	779.46
8	779.34



DEVELOPED ELEVATION VIEW

Item	Quantity
Class 1 Excavation	cu. yard 275
GRS-IBS Abutment No. 1	lump sum 1

Note: These quantities are included in the estimated quantities table on Sheet No. 2.

DETAILS OF GRS-IBS ABUTMENT NO. 1

Detailed Mar. 2014
Checked Apr. 2014

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 3 of 20

ADJACENT BOX BEAM ALTERNATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."

DATE PREPARED
5/13/2014

ROUTE B STATE MO

DISTRICT BR SHEET NO. 3

COUNTY BOONE

JOB NO. J5S2186

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A8165

DESCRIPTION

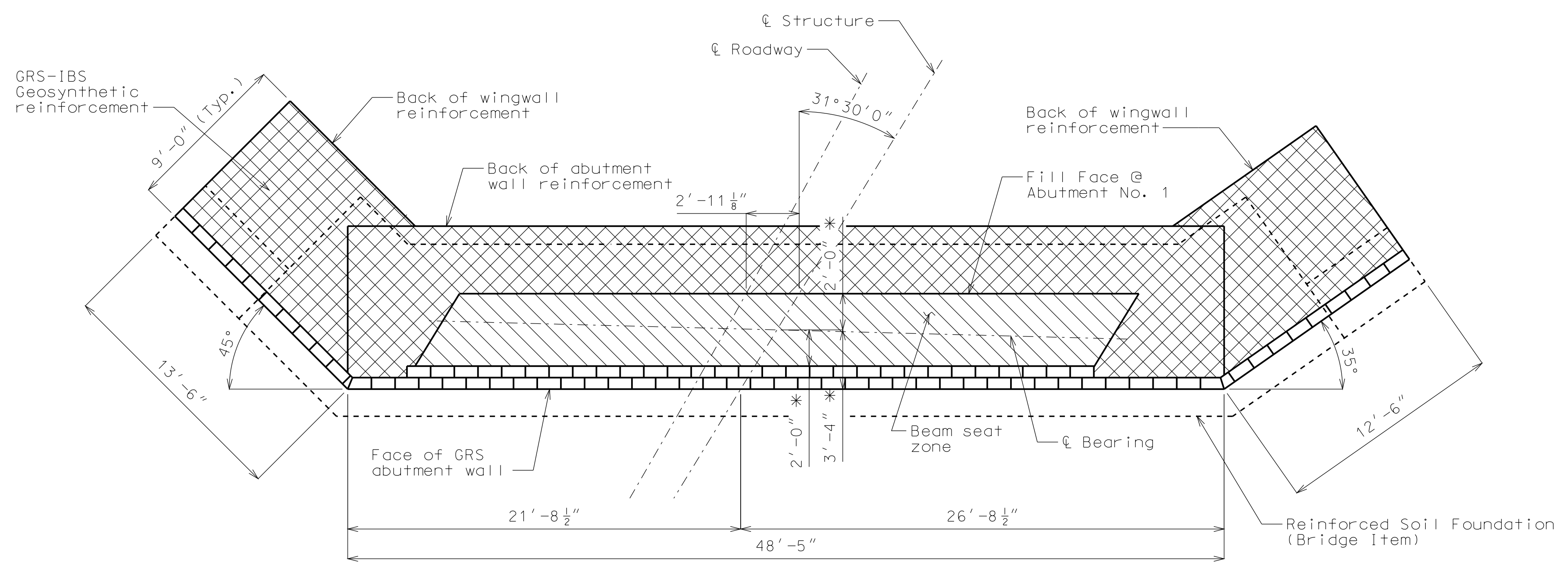
DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102

1-888-ASK-MODOT (1-888-275-6636)

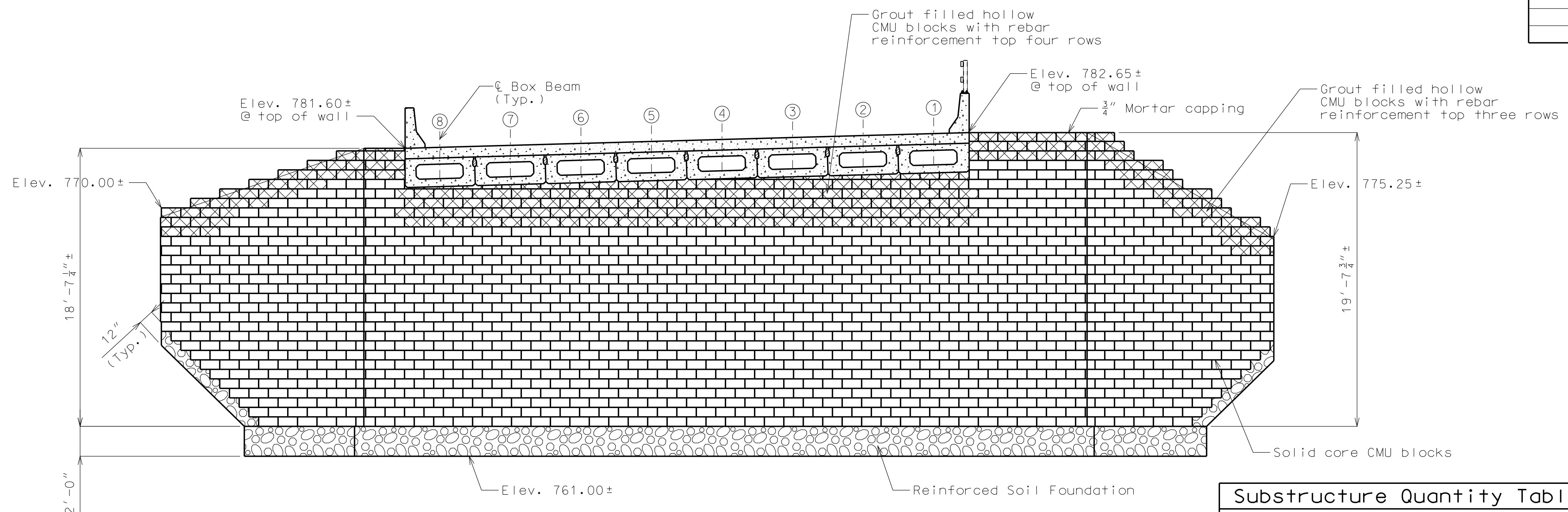
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



PLAN VIEW
* Measured at ϕ of Structure.

Notes:
Insert epoxy coated #4 rebars 27" long into the top 3 rows of CMU's and all corner CMU's and fill with grout.
CMU blocks are staggered, including corners, so there are no vertical joints greater than 1 CMU block height.
For CMU Block configuration underneath bridge, see Section Thru GRS-IBS.
All CMU blocks shall be grey with a split face pattern.
All CMU blocks shall be solid, except as shown.
Apply Class 2 Penetrating Concrete Sealer to all exposed faces of CMU blocks prior to graffiti protection. See Job Special Provisions.

Bottom of Box Beam Elevations @ ϕ Box Beam & ϕ Bearing	
Box Beam No.	Elevation (ft)
1	780.27
2	780.14
3	780.00
4	779.87
5	779.74
6	779.60
7	779.46
8	779.34



DEVELOPED ELEVATION VIEW

Substructure Quantity Table for GRS-IBS Abutment No. 1		
Item		Quantity
Class 1 Excavation	cu. yard	275
GRS-IBS Abutment No. 1	lump sum	1

Note: These quantities are included in the estimated quantities table on Sheet No. 2.

DETAILS OF GRS-IBS ABUTMENT NO. 1

Detailed Mar. 2014
Checked Apr. 2014

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 3 of 20

Added 5/13/14

ADJACENT BOX BEAM ALTERNATE

"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."

DATE PREPARED
4/15/2014

ROUTE B STATE MO
DISTRICT BR SHEET NO. 4

COUNTY
BOONE

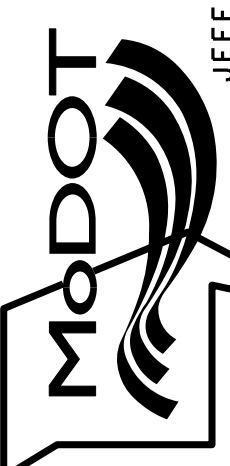
JOB NO.
J5S2186

CONTRACT ID.
PROJECT NO.

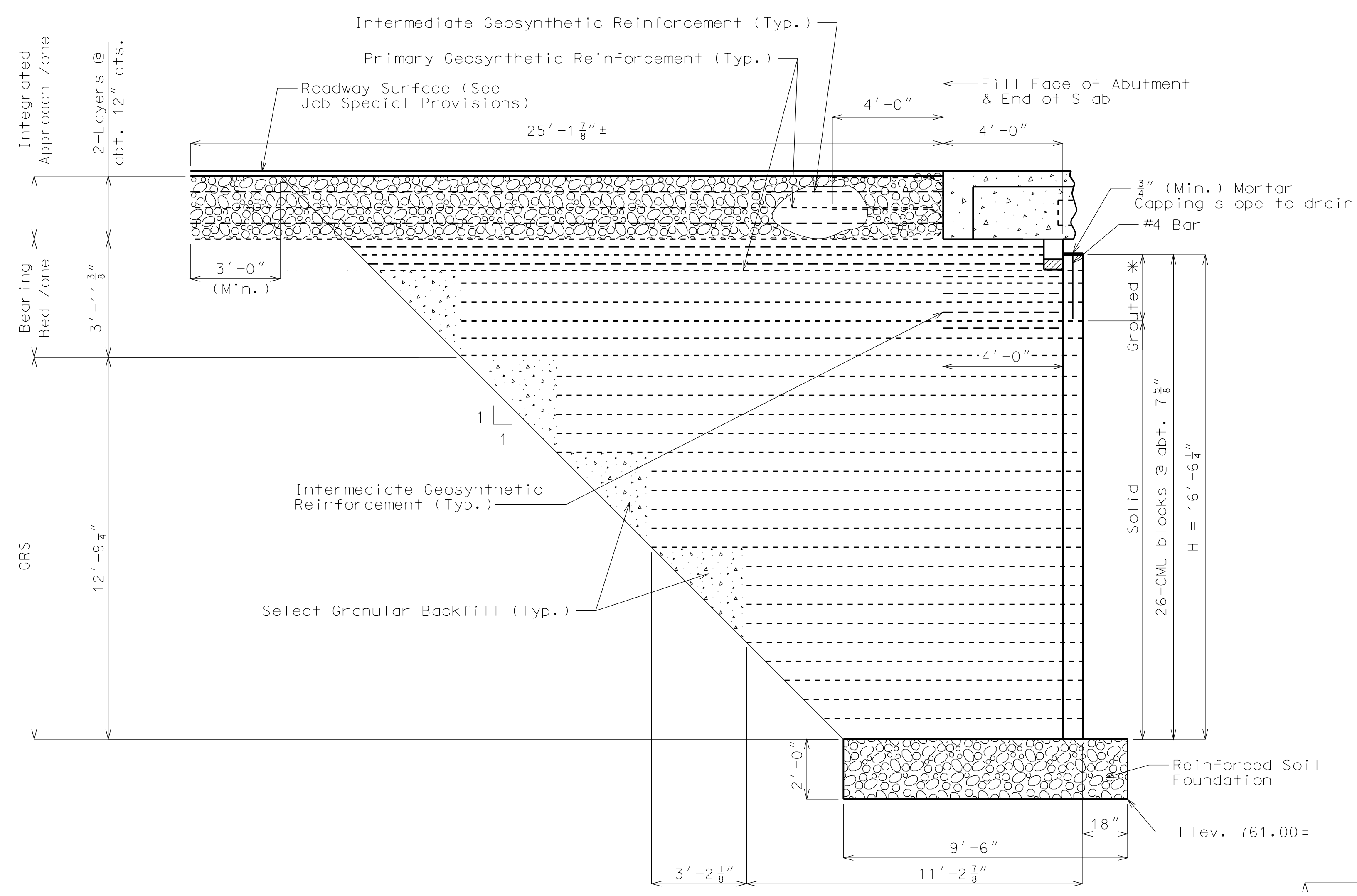
BRIDGE NO.
A8165

DATE	DESCRIPTION

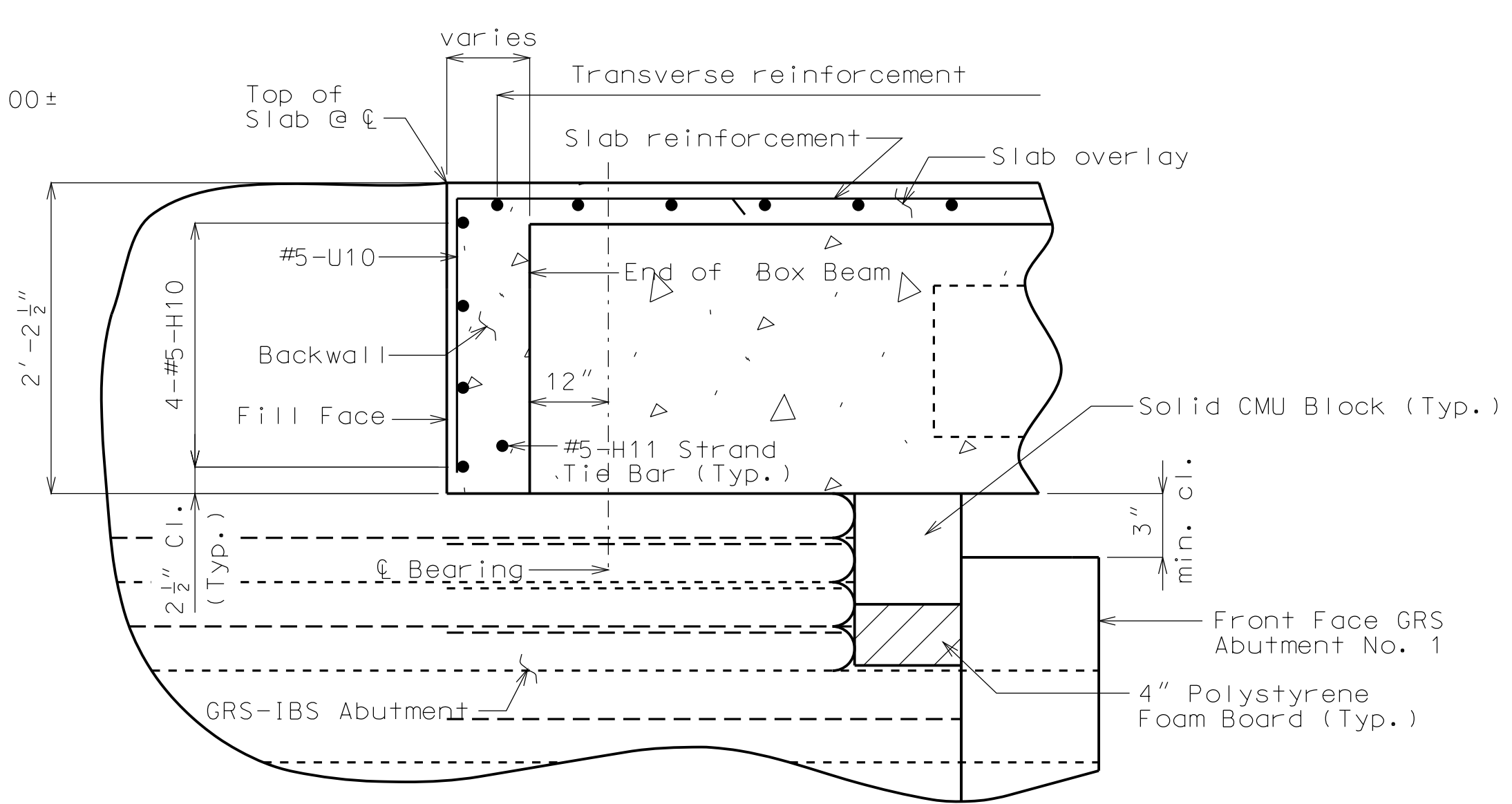
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SECTION THRU GRS-IBS



PART ELEVATION OF BACKWALL AT ABUTMENT

DETAILS OF GRS-IBS ABUTMENT NO. 1

Notes:

Insert epoxy coated #4 rebars 27" long into the top 3 rows (top 4 rows under bridge) of CMU's and all corner CMU's above solid blocks and fill with grout. Trim geosynthetic reinforcement to facilitate filling of hollow CMU's with grout.

On the top row of CMU's create a mortar capping approx. 3/4 inch thick.

Vertical wall face batter = 0°.

Provide a minimum of 5 layers of bearing bed reinforcement. Additional top layers should be sloped to accommodate for superstructure.

Primary wrap reinforcement vertical spacing for the integrated approach is a maximum of 12 inches.

Extend integrated approach zone layers past cut slope at least 3'-0".

Integrated approach zone primary reinforcement shall have a minimum of 4 foot tail.

A bituminous paint coating shall be applied to the extents of the fill face of superstructure backwall. The cost of coating superstructure backwall will be considered completely covered by the contract unit price for other items.

* Fill with grout along the whole width of bridge.

Provide polystyrene foam board conforming to AASHTO M230, Type VI.

Note: This drawing is not to scale. Follow dimensions.

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

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DATE PREPARED
5/13/2014
ROUTE B STATE MO
DISTRICT BR SHEET NO. 4

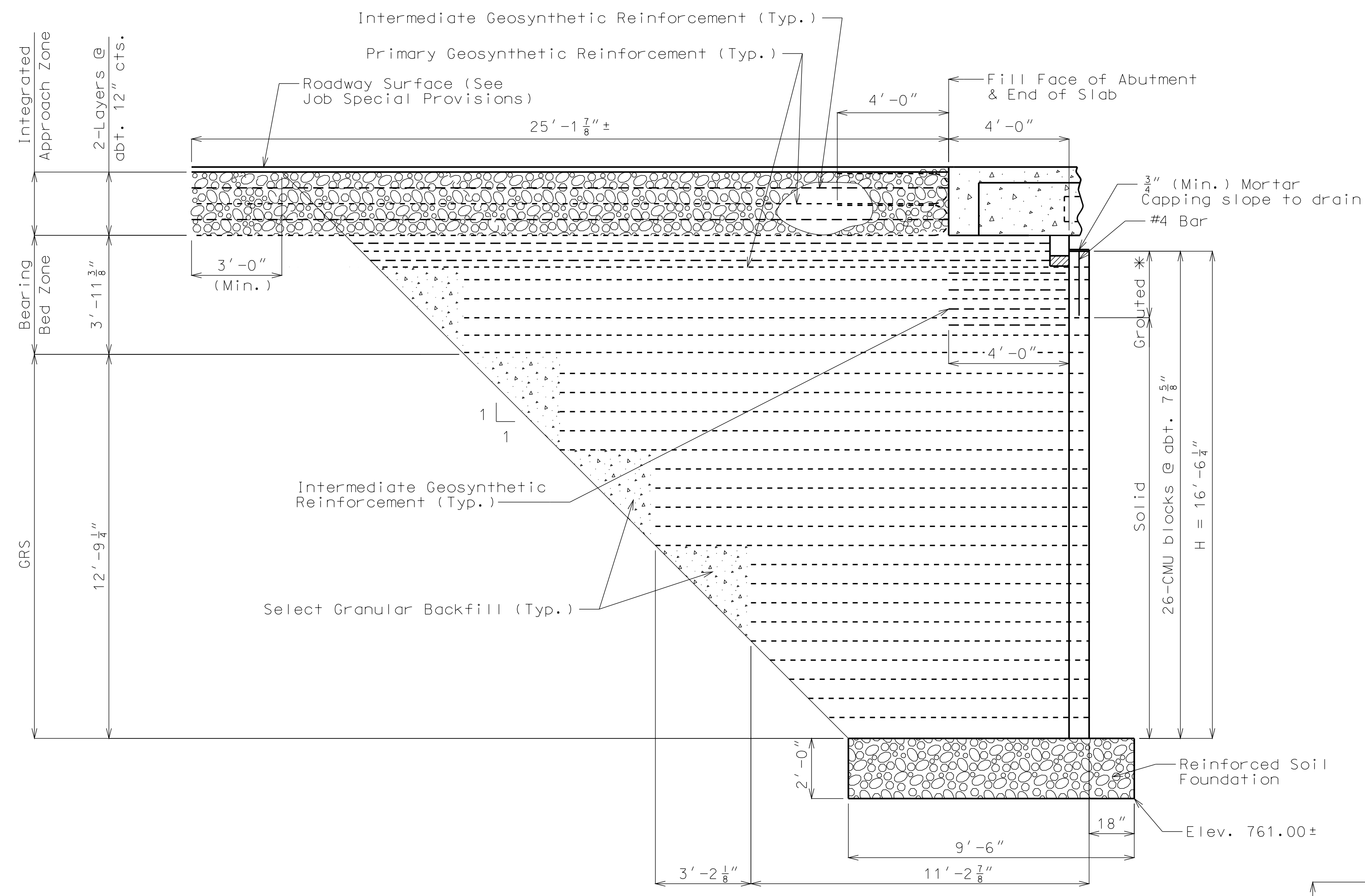
COUNTY
BOONE
JOB NO.
J5S2186
CONTRACT ID.

PROJECT NO.
BRIDGE NO.
A8165

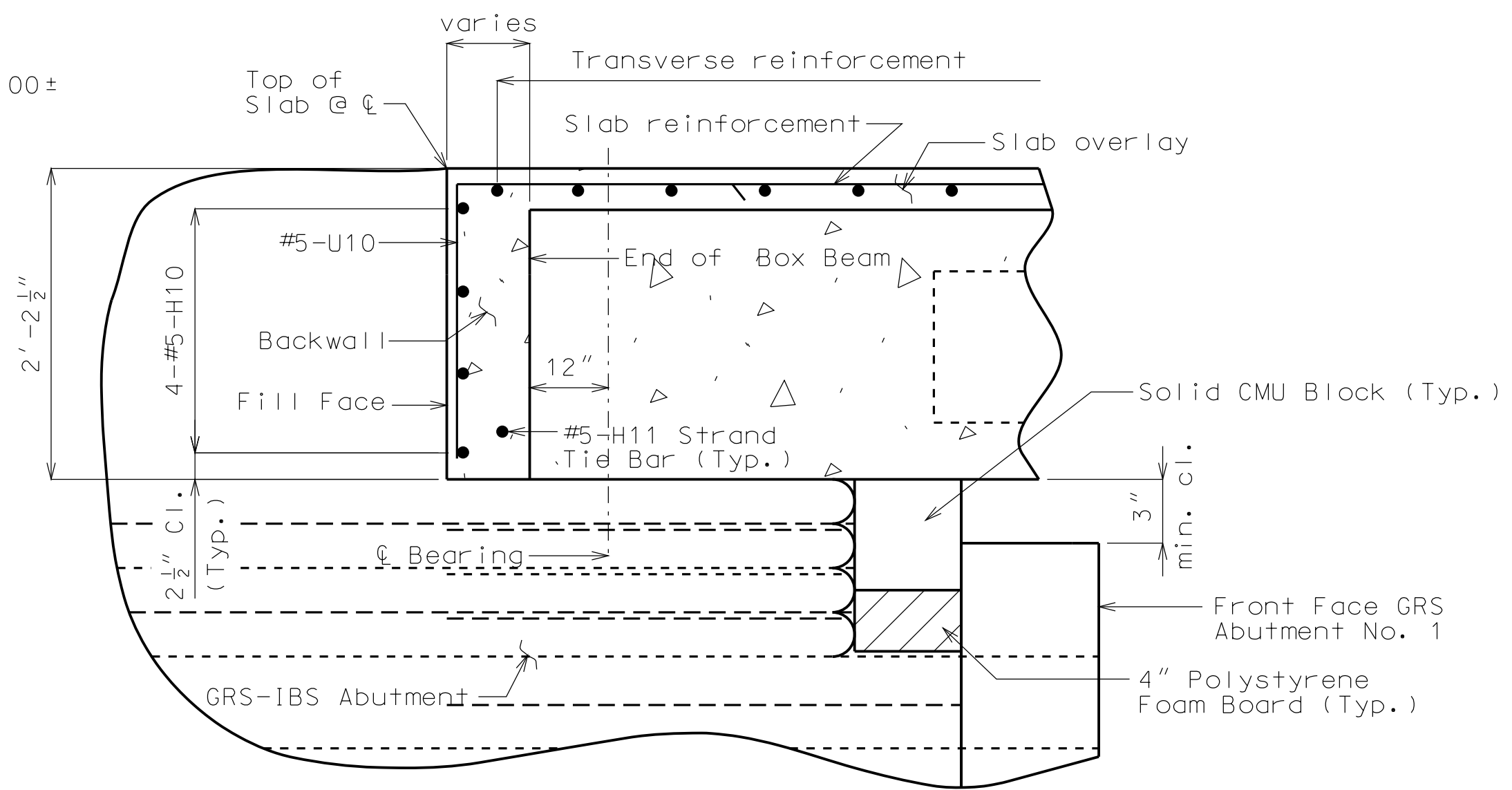
DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

 105 WEST CAPITOL
 JEFFERSON CITY, MO 65102
 1-888-ASK-MODOT (1-888-275-6636)



SECTION THRU GRS-IBS



PART ELEVATION OF BACKWALL AT ABUTMENT

DETAILS OF GRS-IBS ABUTMENT NO. 1

Notes:

Insert epoxy coated #4 rebar's 27" long into the top 3 rows (top 4 rows under bridge) of CMU's and all corner CMU's above solid blocks and fill with grout. Trim geosynthetic reinforcement to facilitate filling of hollow CMU's with grout.

On the top row of CMU's create a mortar capping approx. 3/4 inch thick.

Vertical wall face batter = 0°.

Provide a minimum of 5 layers of bearing bed reinforcement. Additional top layers should be sloped to accommodate for superstructure.

Primary wrap reinforcement vertical spacing for the integrated approach is a maximum of 12 inches.

Extend integrated approach zone layers past cut slope at least 3'-0".

Integrated approach zone primary reinforcement shall have a minimum of 4 foot tail.

A bituminous paint coating shall be applied to the extents of the fill face of superstructure backwall. The cost of coating superstructure backwall will be considered completely covered by the contract unit price for other items.

* Fill with grout along the whole width of bridge.

Provide polystyrene foam board conforming to AASHTO M230, Type VI.

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

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DATE PREPARED
4/15/2014

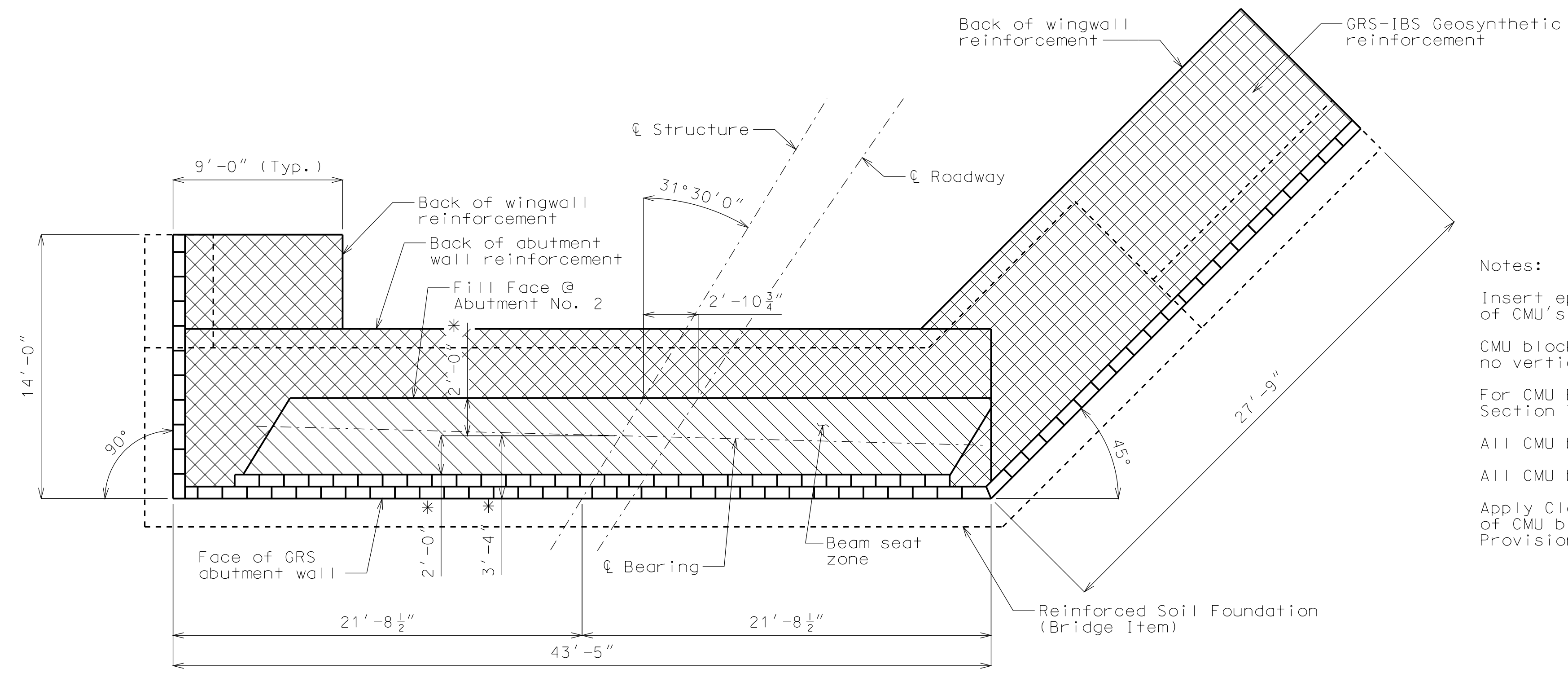
ROUTE B STATE MO
DISTRICT BR SHEET NO. 5

COUNTY
BOONE

JOB NO.
J5S2186

CONTRACT ID.

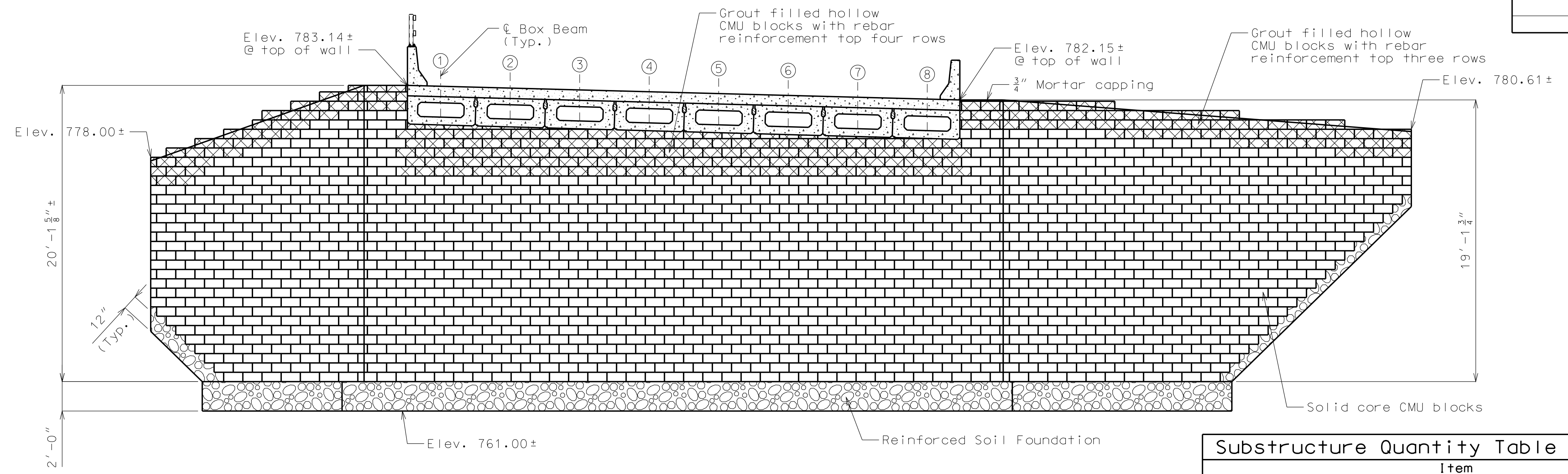
PROJECT NO.
BRIDGE NO. A8165



Notes:
Insert epoxy coated #4 rebars 27" long into the top 3 rows of CMU's and all corner CMU's and fill with grout.
CMU blocks are staggered, including corners, so there are no vertical joints greater than 1 CMU block height.
For CMU Block configuration underneath bridge, see Section Thru GRS-IBS.
All CMU blocks shall be grey with a split face pattern.
All CMU blocks shall be solid, except as shown.
Apply Class 2 Penetrating Concrete Sealer to all exposed faces of CMU blocks prior to graffiti protection. See Job Special Provisions.

Box Beam No.	Elevation (ft)
1	780.83
2	780.71
3	780.58
4	780.46
5	780.33
6	780.21
7	780.09
8	779.96

PLAN VIEW
* Measured at ℓ of structure



DEVELOPED ELEVATION VIEW

Item	Quantity
Class 1 Excavation	cu. yard 245
GRS-IBS Abutment No. 2	lump sum 1

Note: These quantities are included in the estimated quantities table on Sheet No. 2.

DETAILS OF GRS-IBS ABUTMENT NO. 2

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 5 of 20

ADJACENT BOX BEAM ALTERNATE

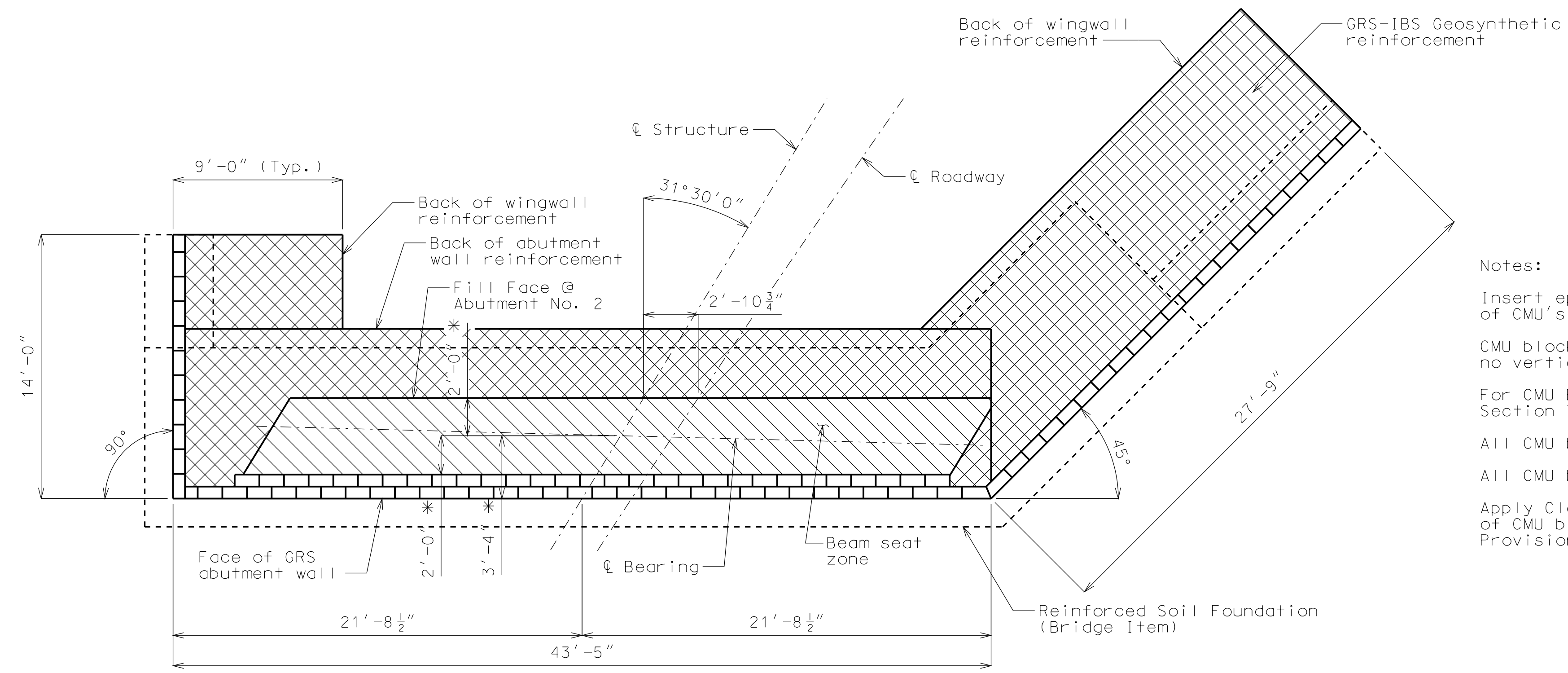
Detailed Mar. 2014
Checked Apr. 2014

DESCRIPTION DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

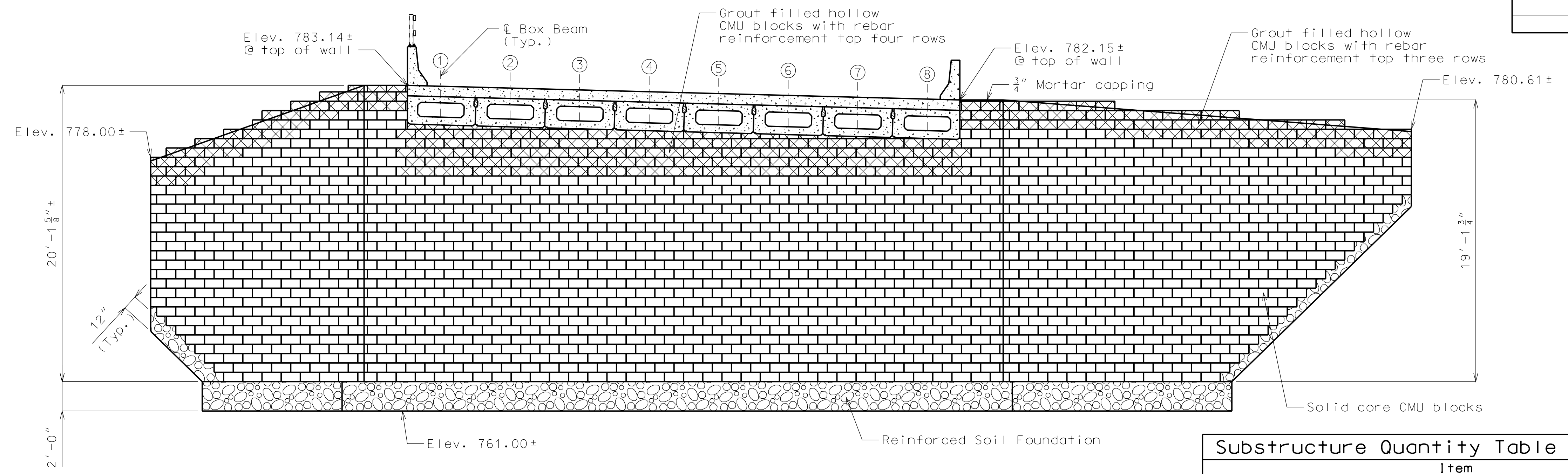
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



Notes:
 Insert epoxy coated #4 rebars 27" long into the top 3 rows of CMU's and all corner CMU's and fill with grout.
 CMU blocks are staggered, including corners, so there are no vertical joints greater than 1 CMU block height.
 For CMU Block configuration underneath bridge, see Section Thru GRS-IBS.
 All CMU blocks shall be grey with a split face pattern.
 All CMU blocks shall be solid, except as shown.
 Apply Class 2 Penetrating Concrete Sealer to all exposed faces of CMU blocks prior to graffiti protection. See Job Special Provisions.

PLAN VIEW
 * Measured at ℓ of structure

Bottom of Box Beam Elevations @ ℓ Box Beam & ℓ Bearing	
Box Beam No.	Elevation (ft)
1	780.83
2	780.71
3	780.58
4	780.46
5	780.33
6	780.21
7	780.09
8	779.96



DEVELOPED ELEVATION VIEW

Substructure Quantity Table for GRS-IBS Abutment No. 2		
Item		Quantity
Class 1 Excavation	cu. yard	245
GRS-IBS Abutment No. 2	lump sum	1

Note: These quantities are included in the estimated quantities table on Sheet No. 2.

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DATE PREPARED
 5/13/2014
 ROUTE B STATE MO
 DISTRICT BR SHEET NO. 5
 COUNTY BOONE
 JOB NO. J5S2186
 CONTRACT ID.
 PROJECT NO.
 BRIDGE NO. A8165

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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 1-888-ASK-MODOT (1-888-275-6636)

Detailed Mar. 2014
 Checked Apr. 2014

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 5 of 20

Added 5/13/14

ADJACENT BOX BEAM ALTERNATE

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ROUTE B STATE MO

DISTRICT BR SHEET NO. 6

COUNTY BOONE

JOB NO. J5S2186

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A8165

DESCRIPTION

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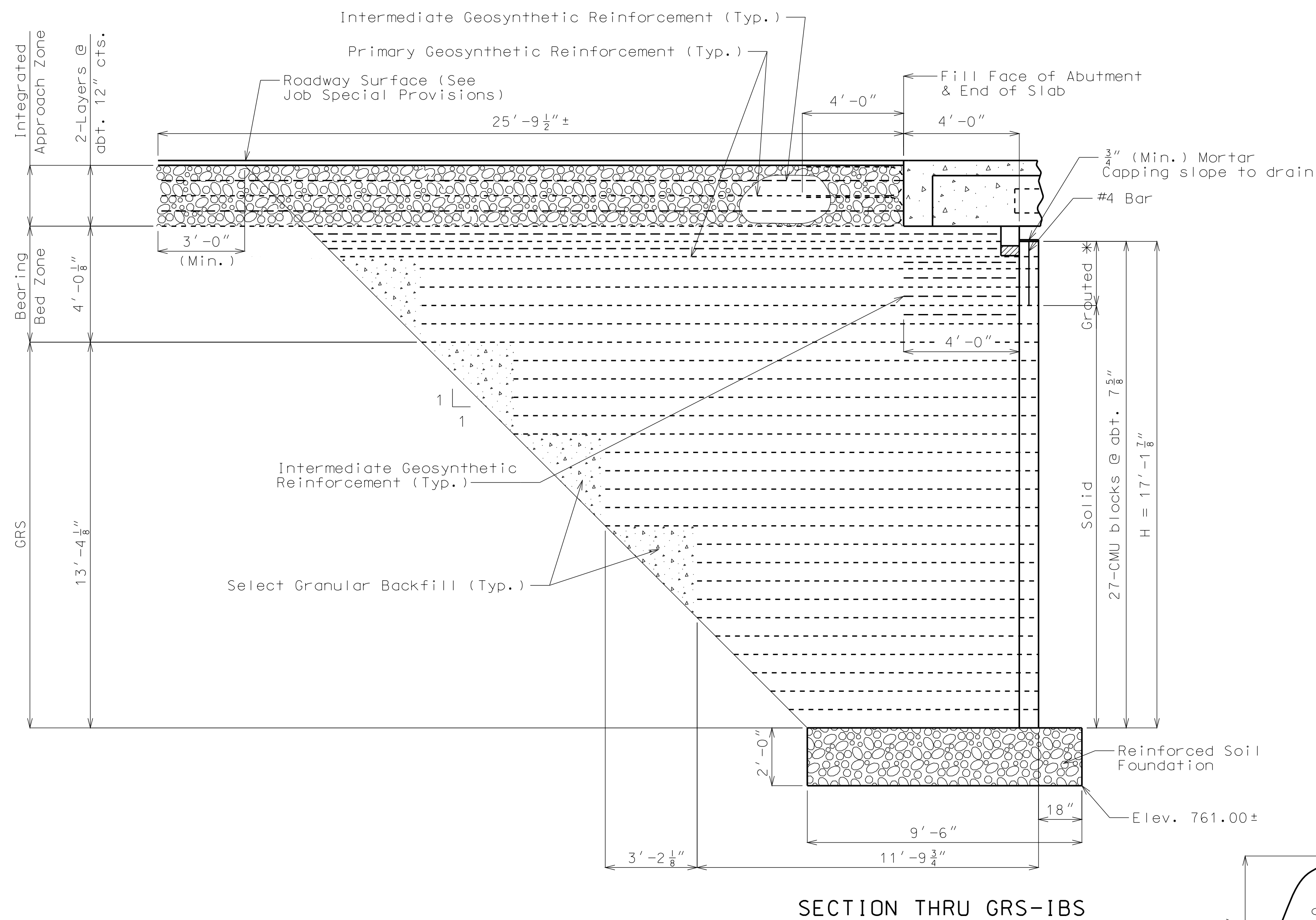
DATE

DESCRIPTION

DATE

DESCRIPTION

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



Notes:

Insert epoxy coated #4 rebars 27" long into the top 3 rows (top 4 rows under bridge) of CMU's and all corner CMU's above solid blocks and fill with grout. Trim geosynthetic reinforcement to facilitate filling of hollow CMU's with grout.

On the top row of CMU's create a mortar capping approx. 3/4 inch thick.

Vertical wall face batter = 0°.

Provide a minimum of 5 layers of bearing bed reinforcement. Additional top layers should be sloped to accommodate for superstructure.

Primary wrap reinforcement vertical spacing for the integrated approach is a maximum of 12 inches.

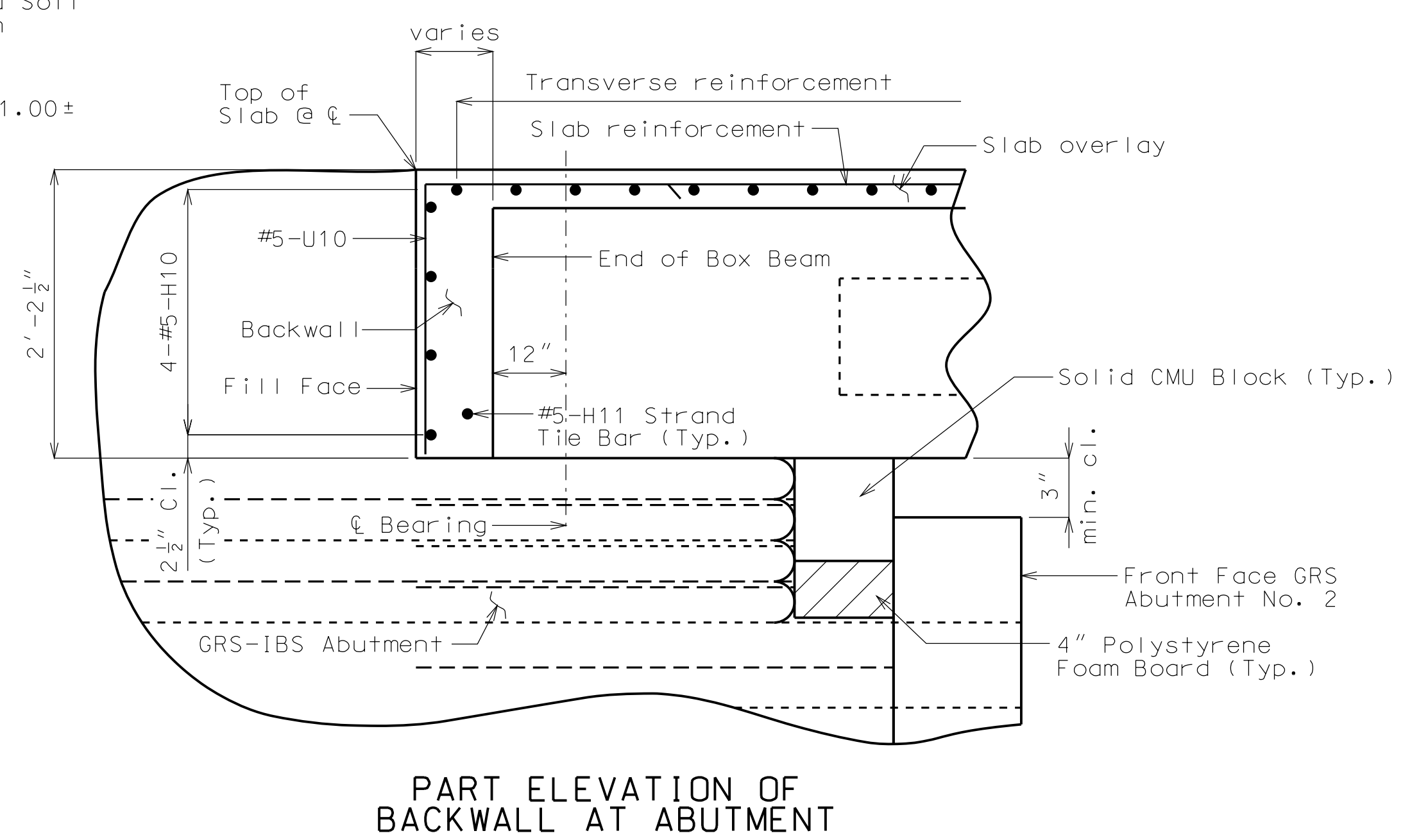
Extend integrated approach zone layers past cut slope at least 3'-0".

Integrated approach zone primary reinforcement shall have a minimum of 4 foot tail.

A bituminous paint coating shall be applied to the extents of the fill face of superstructure backwall. The cost of coating superstructure backwall will be considered completely covered by the contract unit price for other items.

* Fill with grout along the whole width of bridge.

Provide polystyrene foam board conforming to AASHTO M230, Type VI.



DETAILS OF GRS-IBS ABUTMENT NO. 2

ADJACENT BOX BEAM ALTERNATE

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DATE PREPARED
5/13/2014

ROUTE B STATE MO

DISTRICT BR SHEET NO. 6

COUNTY BOONE

JOB NO. J5S2186

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A8165

DESCRIPTION

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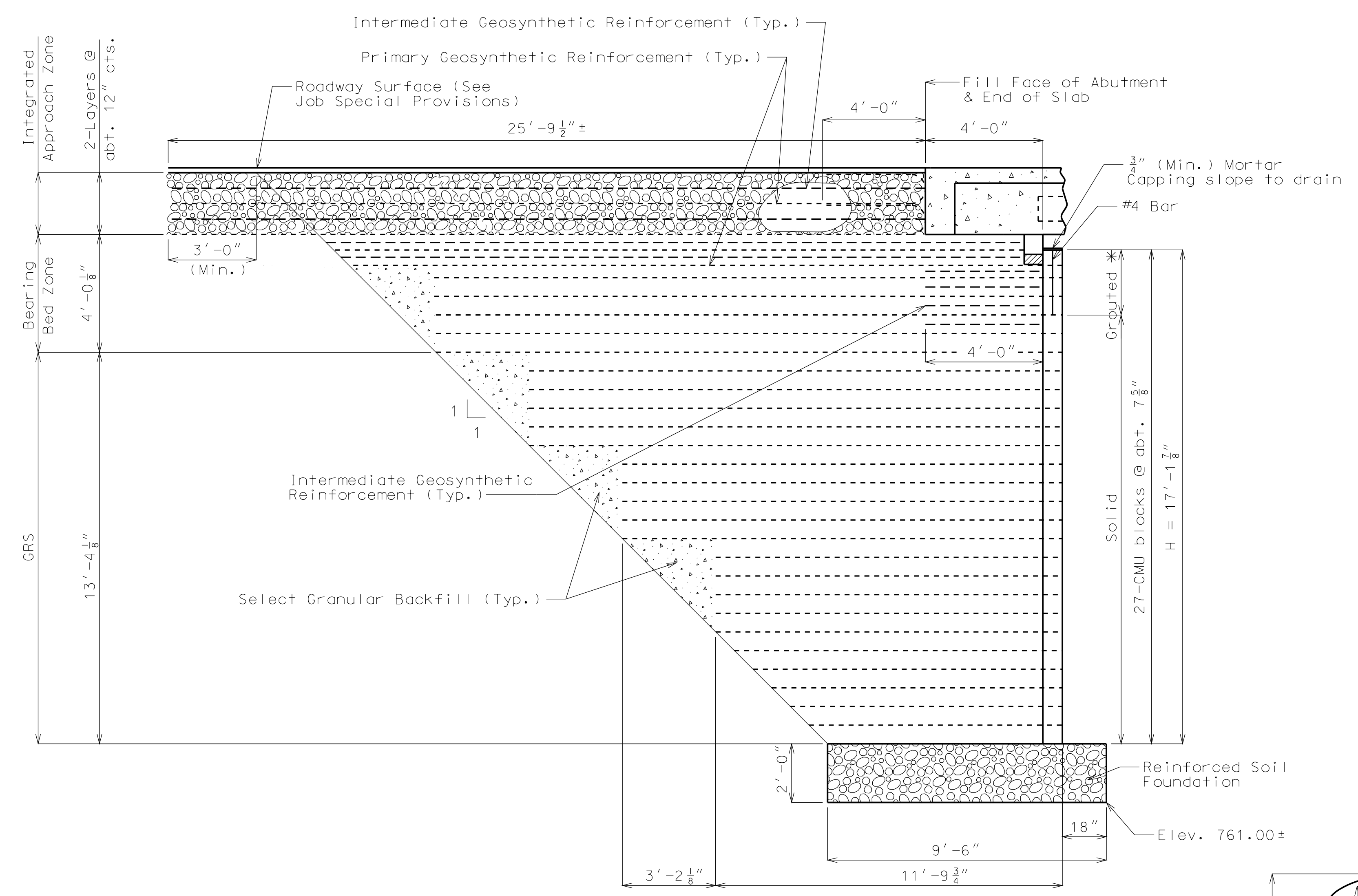
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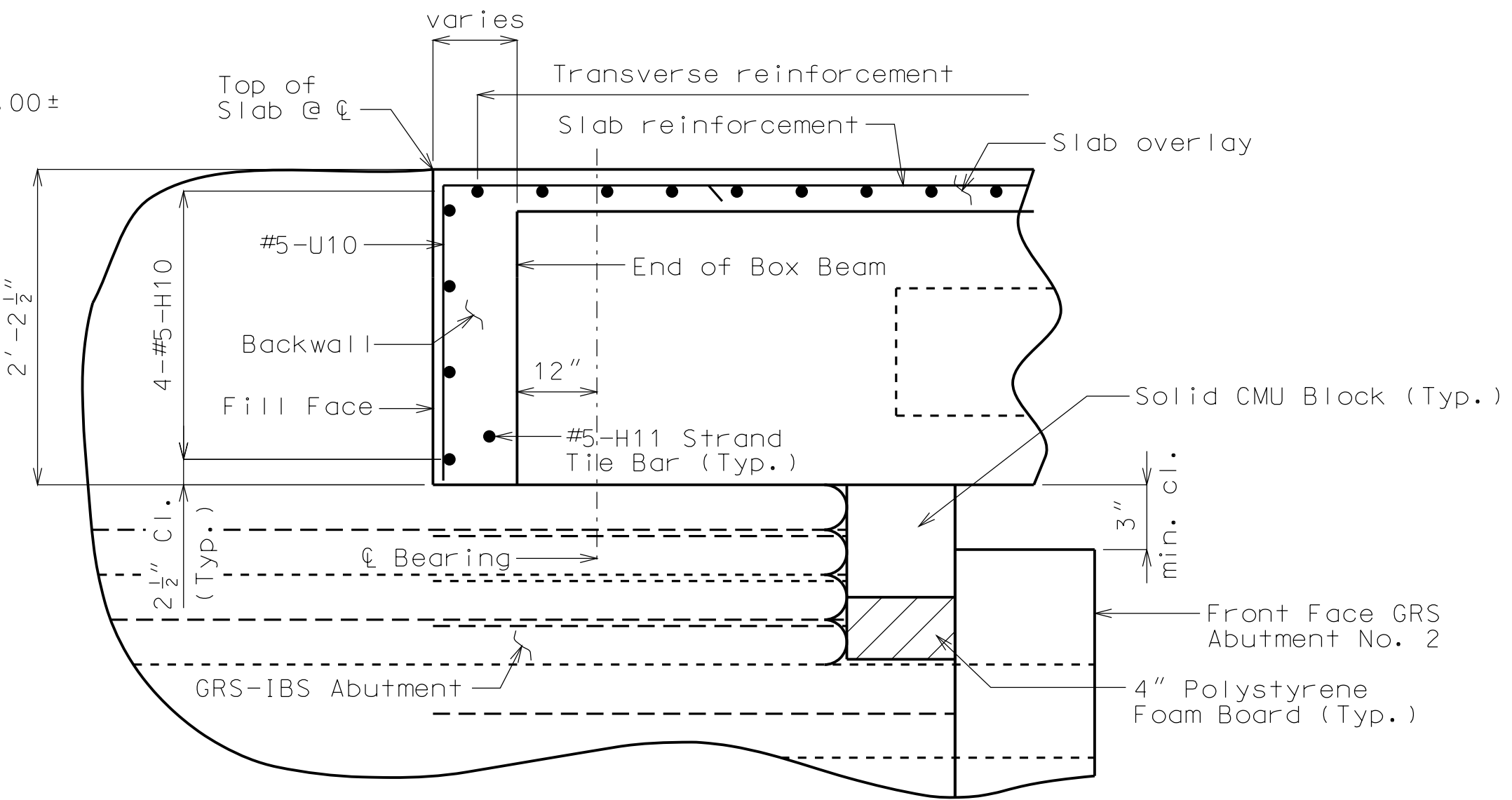
DATE

DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



SECTION THRU GRS-IBS



PART ELEVATION OF BACKWALL AT ABUTMENT

Notes:

Insert epoxy coated #4 rebars 27" long into the top 3 rows (top 4 rows under bridge) of CMU's and all corner CMU's above solid blocks and fill with grout. Trim geosynthetic reinforcement to facilitate filling of hollow CMU's with grout.

On the top row of CMU's create a mortar capping approx. 3/4 inch thick.

Vertical wall face batter = 0°.

Provide a minimum of 5 layers of bearing bed reinforcement. Additional top layers should be sloped to accommodate for superstructure.

Primary wrap reinforcement vertical spacing for the integrated approach is a maximum of 12 inches.

Extend integrated approach zone layers past cut slope at least 3'-0".

Integrated approach zone primary reinforcement shall have a minimum of 4 foot tail.

A bituminous paint coating shall be applied to the extents of the fill face of superstructure backwall. The cost of coating superstructure backwall will be considered completely covered by the contract unit price for other items.

* Fill with grout along the whole width of bridge.

Provide polystyrene foam board conforming to AASHTO M230, Type VI.

DETAILS OF GRS-IBS ABUTMENT NO. 2

Detailed Mar. 2014
Checked Apr. 2014

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 6 of 20

Added 5/13/14

ADJACENT BOX BEAM ALTERNATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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4/15/2014

ROUTE STATE
B MO

DISTRICT SHEET NO.
BR 7

COUNTY
BOONE

JOB NO.
J5S2186

CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A8165

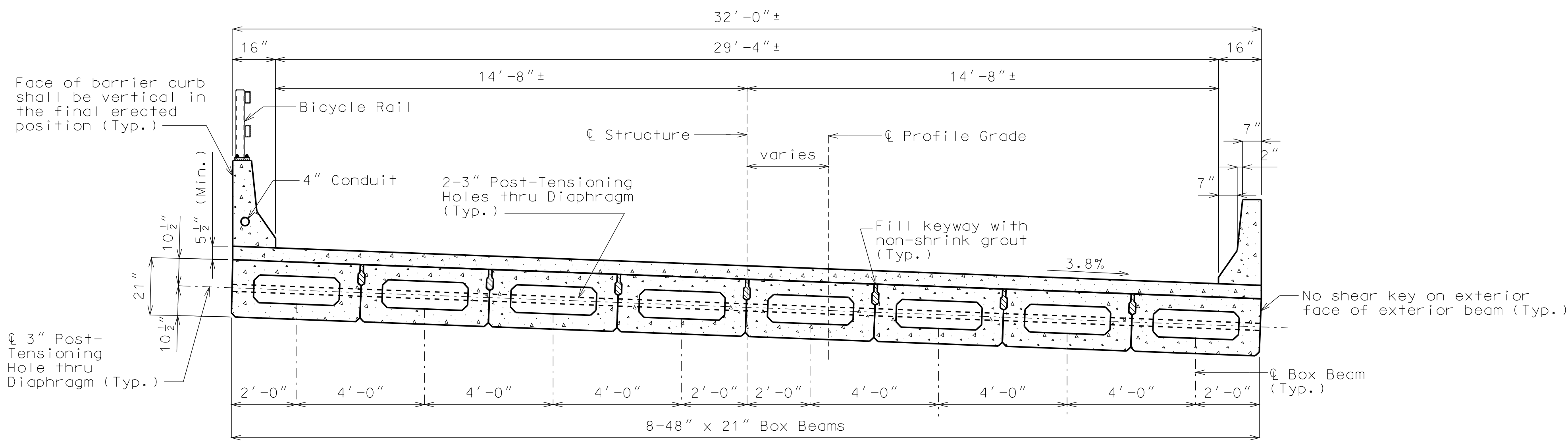
DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

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105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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SECTION THRU SUPERSTRUCTURE NEAR MID SPAN

Notes:

- Box beams shall be kept upright at all times. Support shall be within 12 inches of ends only.
- Keyways shall be sandblasted prior to shipping beams. Keyways shall be water or air blasted prior to erection. Post-tension ducts shall have Styrofoam blocks installed around post-tension ducts before erection.
- Beams that are in tolerance for camber may not be in tolerance for differential camber. In order to consider salvaging a beam which fails in differential camber, the centers of the adjacent post-tensioning ducts in those beams shall align to within one inch and overall camber shall also be within fabrication tolerance. Do not remove lifting loops until post tensioning and grouting has been completed and accepted.
- If a beam (or group of beams) is out of spec for overall fabrication tolerance for camber, salvaging this beam will require a noncompliance report and the engineer's approval.
- In all cases, the transverse post-tensioning tendon shall be fished through the duct without binding. Do not cut strand tails until girders are grouted and leave a 2 inch tail (or recommended length to reattach) on the ends of the post tensioning strand. This allows the strand to be de-tensioned at some future date if needed.
- Partial and full post-tension sequencing shall start with center (mid-span) diaphragms and proceed symmetrically to the ends of the beams. Post-tensioning of box beams shall be tensioned to 10% of capacity to pull beams tight.

- Prior to grouting, prepare joints per grout manufacturer's recommendations. Seal the bottom of the joint with backer rod to prevent grout from pouring through the joint. Make sure the Styrofoam blocks are installed around the post-tension ducts. No grout shall be allowed in the post-tension ducts and shall be verified while grouting.
- Once all beams are in full contact with beams partially tensioned, keyways shall be grouted with a qualified non-metallic expansive grout with a minimum compressive strength of 5 ksi shall be placed flush with top of beams. Shear key grout shall be pencil vibrated and then wet cured to the minimum compressive strength.
- If placing grout at a joint of one inch or more in differential camber, recess shall not be left but rather finish the grout flush with the higher girder and place a 3:1 wedge over the joint and lower girder. If an individual beam is flatter than the beams on either side and differential camber is one inch or more, place grout across the entire beam utilizing an approved bonding agent and then the top surface shall be scored transversely to a depth of approximately 1/4 inch with a wire brush, stiff broom or other approved method.
- Beams shall be fully post-tensioned after grout has reached design strength and before slab is poured.
- Grout post-tension duct recesses on exterior girders and paint newly grouted area with protective coating - concrete bents & piers (epoxy).
- Payment for all materials and labor required for transverse post-tensioning, grouting and epoxy coating of the shear keys complete in place will be considered completely covered by the contract unit price for 21 in., Prestressed Concrete Adjacent Box Beam per linear foot.

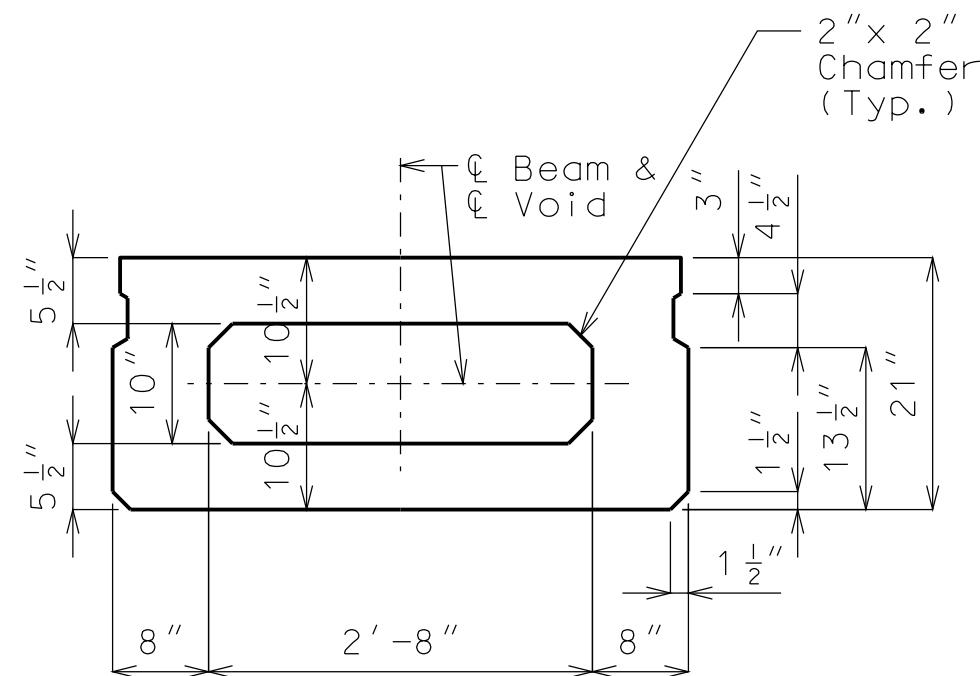
Work this sheet with Sheets No. 8, 9 & 10.

DETAILS OF BOX BEAMS

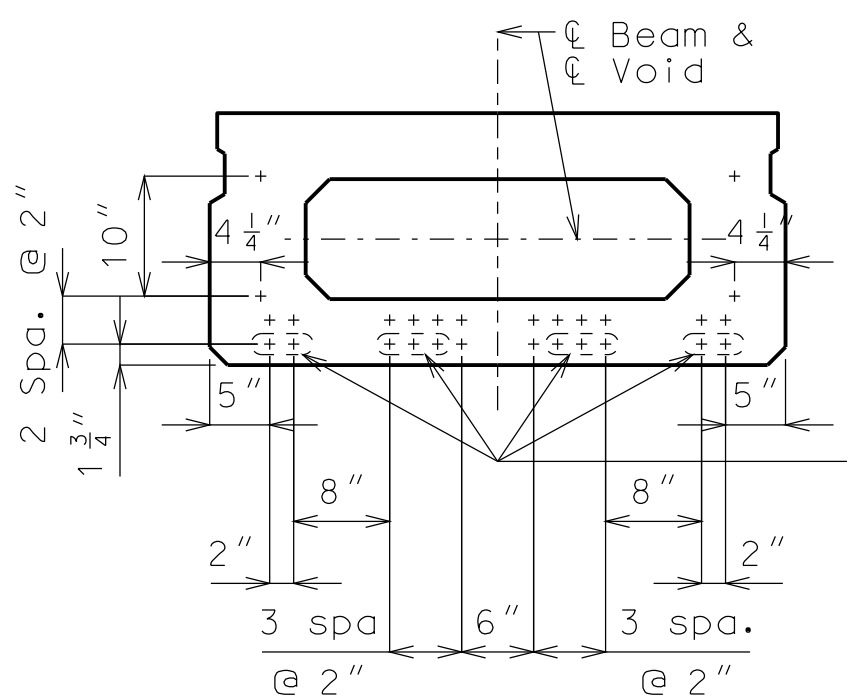
Detailed Mar. 2014
Checked Mar. 2014

Note: This drawing is not to scale. Follow dimensions. Sheet No. 7 of 20

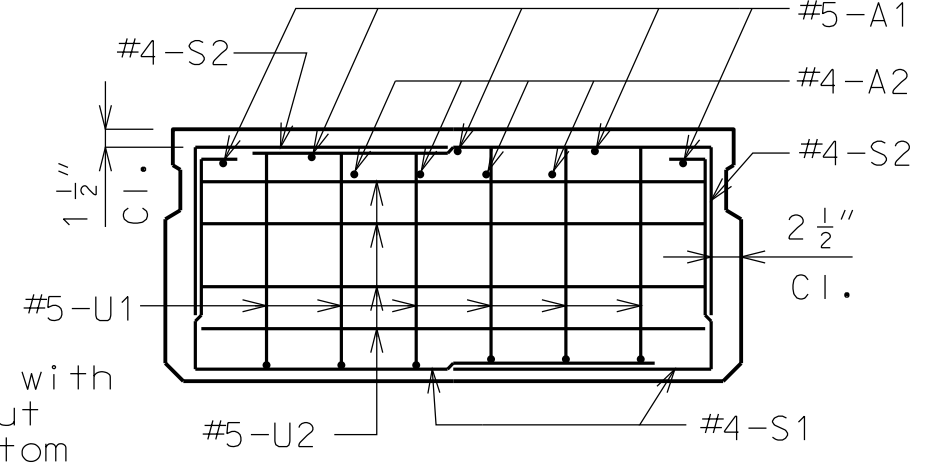
ADJACENT BOX BEAM ALTERNATE



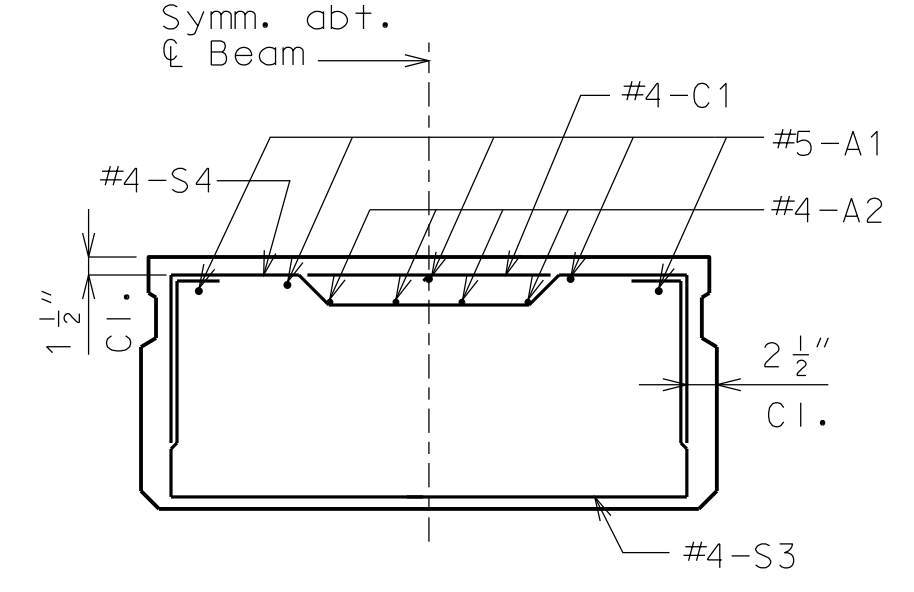
INTERIOR BOX BEAM DIMENSIONS



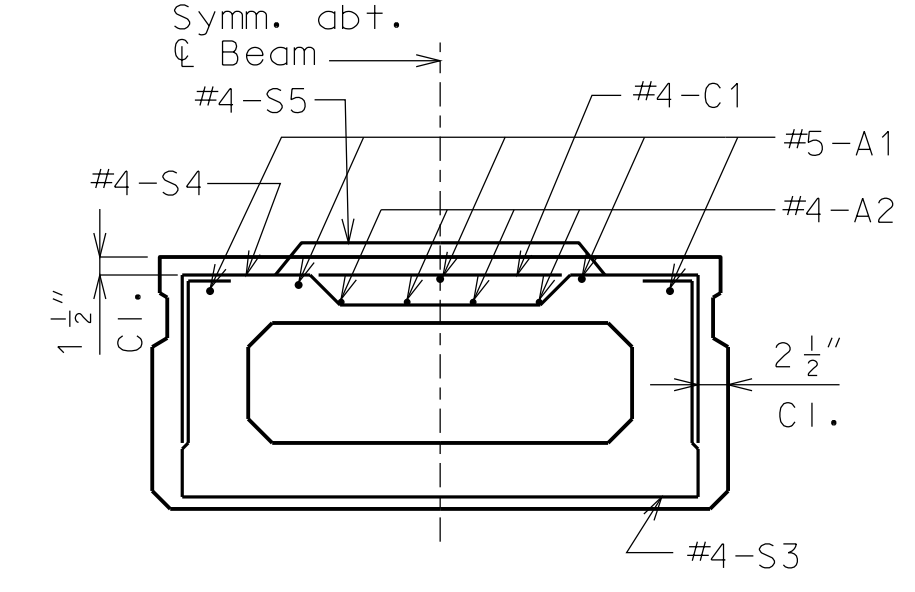
TYPICAL STRAND ARRANGEMENT
(Interior Beam shown, Exterior Beam similar)



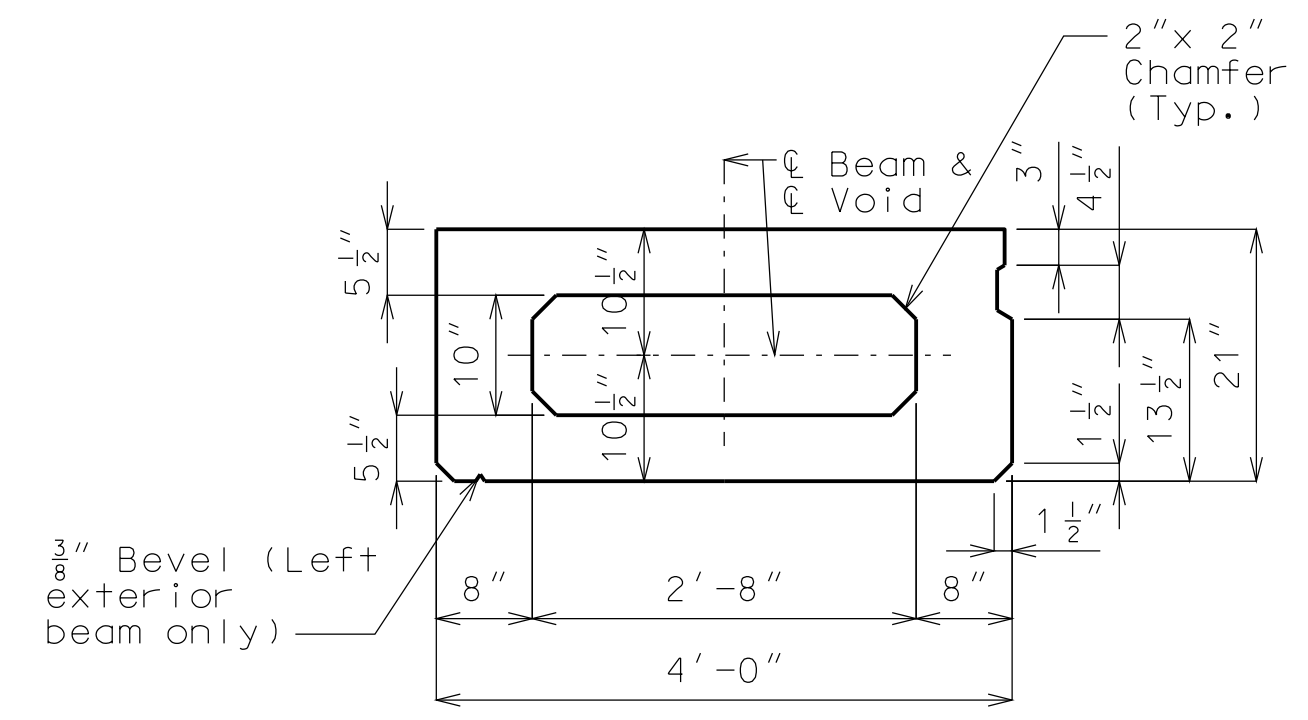
TYPICAL END ELEVATION
(Interior Beam shown, Exterior Beam similar)
(Strands not shown for clarity)



TYPICAL SECTION NEAR END
(Interior Beam shown, Exterior Beam similar)
(Strands not shown for clarity)

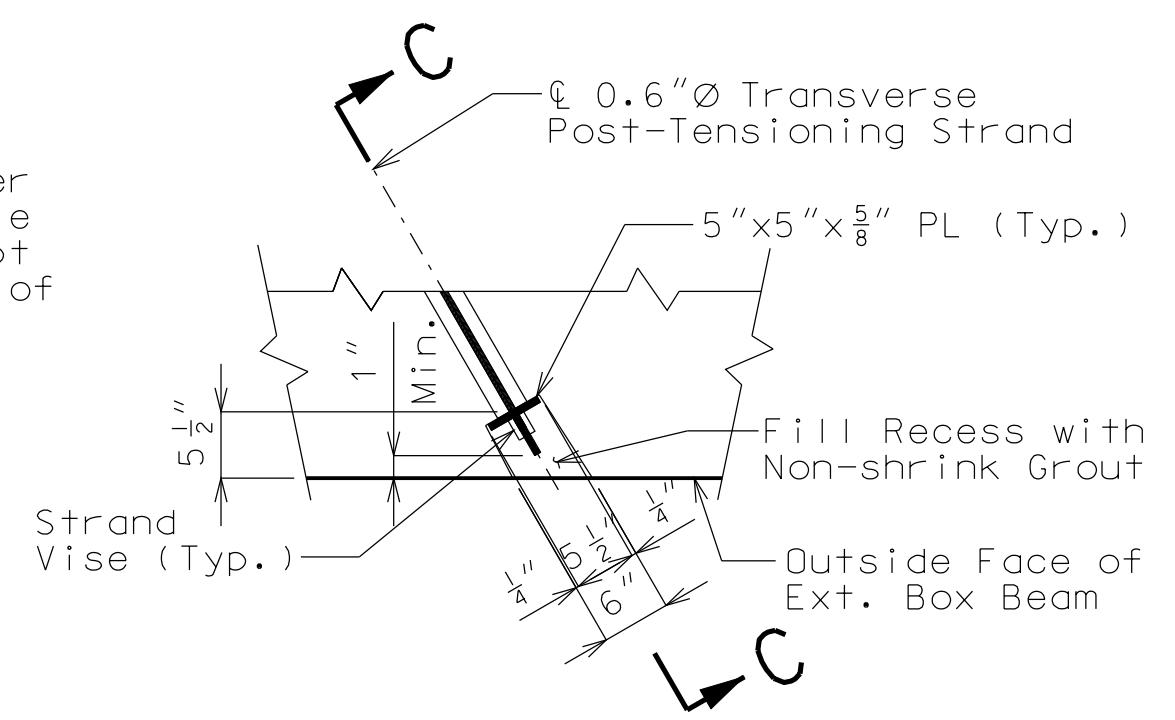


TYPICAL SECTION THRU VOID
(Interior Beam shown, Exterior Beam similar)
(Strands not shown for clarity)

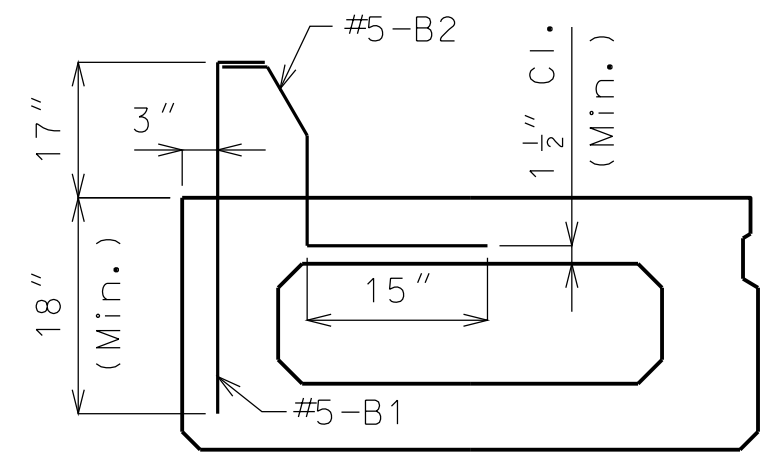


EXTERIOR BOX BEAM DIMENSIONS

* At the contractor's option the location for bent-up strands may be varied from that shown. The total number of bent-up strands shall not be changed. One strand tie bar is required for each layer of bent-up strands except at abutments which require one bar on the bottom layer of strands only.



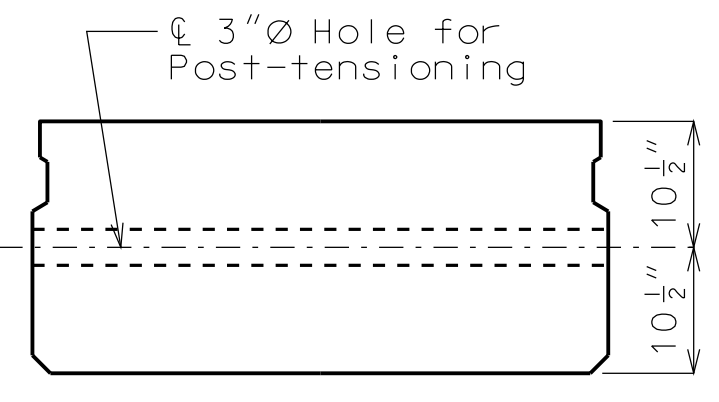
SECTION B-B
For location of Section B-B, see Sheet No. 10



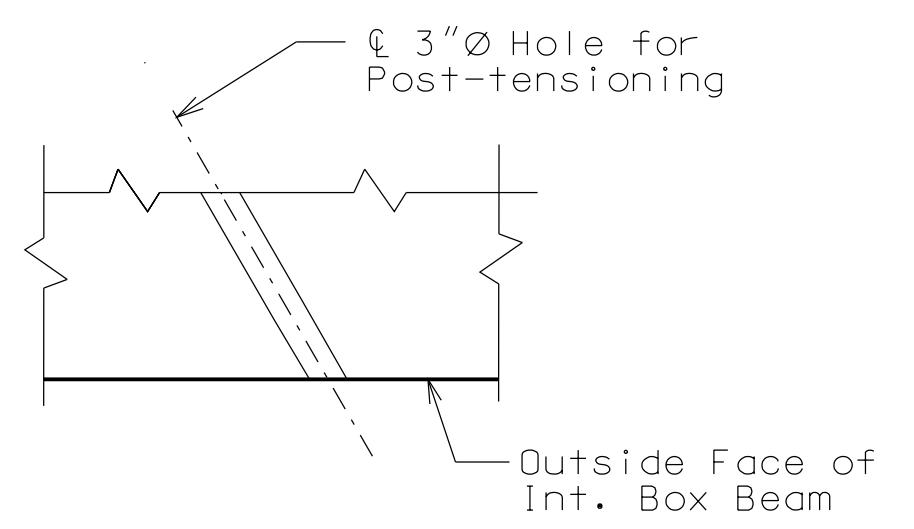
EXTERIOR BEAM DETAILS SHOWING B-BARS
(Reinforcement extends thru overlay and into Barrier)

Grade 270 L.R. Strands	
	0.6" Dia.
Area (Square Inches)	0.217
Ultimate Strength (Lbs. per Strand)	58,590
Applied Final Post-Tension (Lbs. per Strand)	43,943

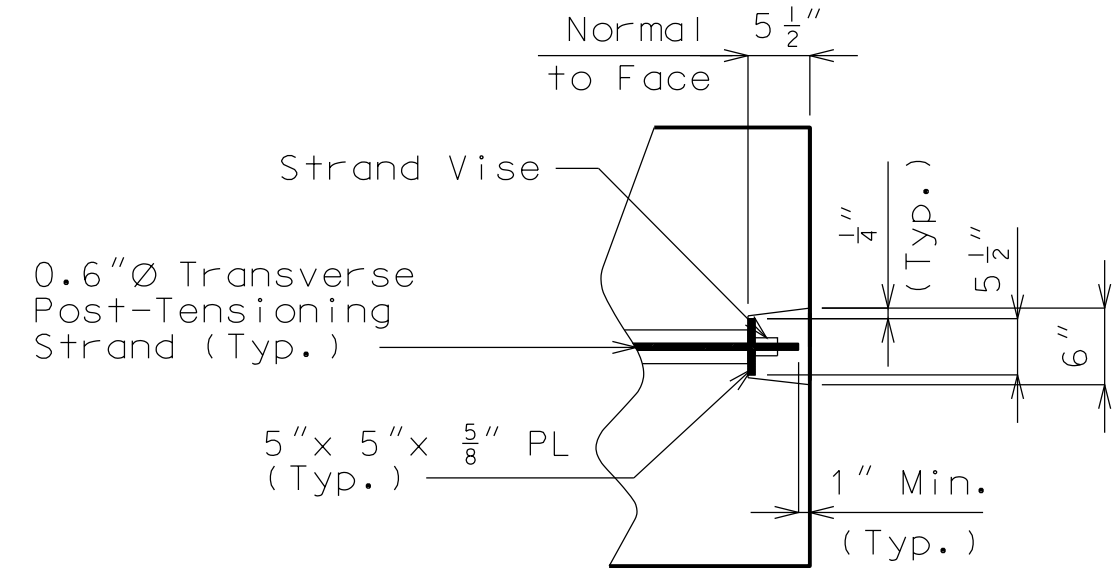
BOX BEAM TRANSVERSE POST-TENSIONING DETAILS



POST-TENSIONING HOLE LOCATION

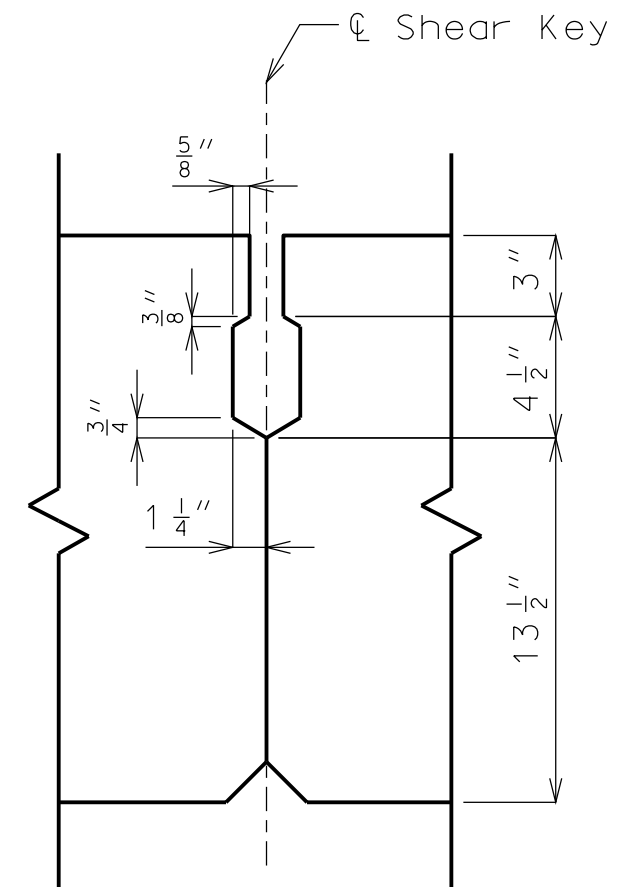


SECTION A-A
For location of Section A-A, see Sheet No. 9

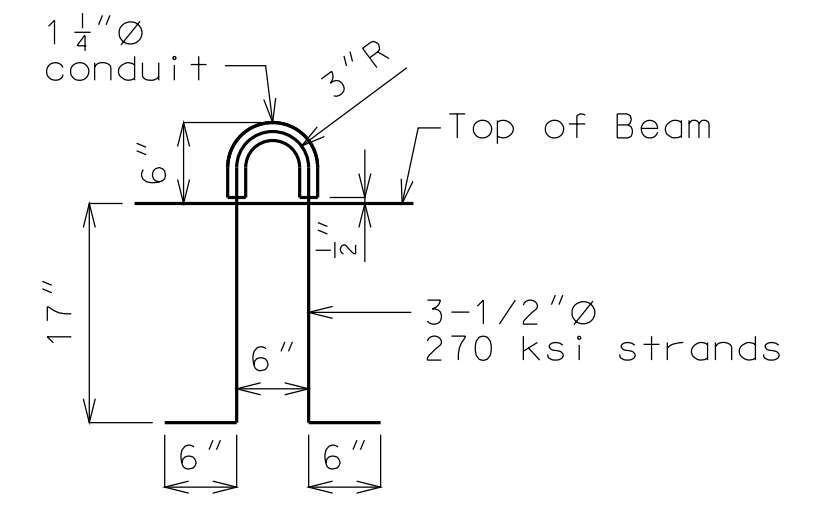


SECTION C-C

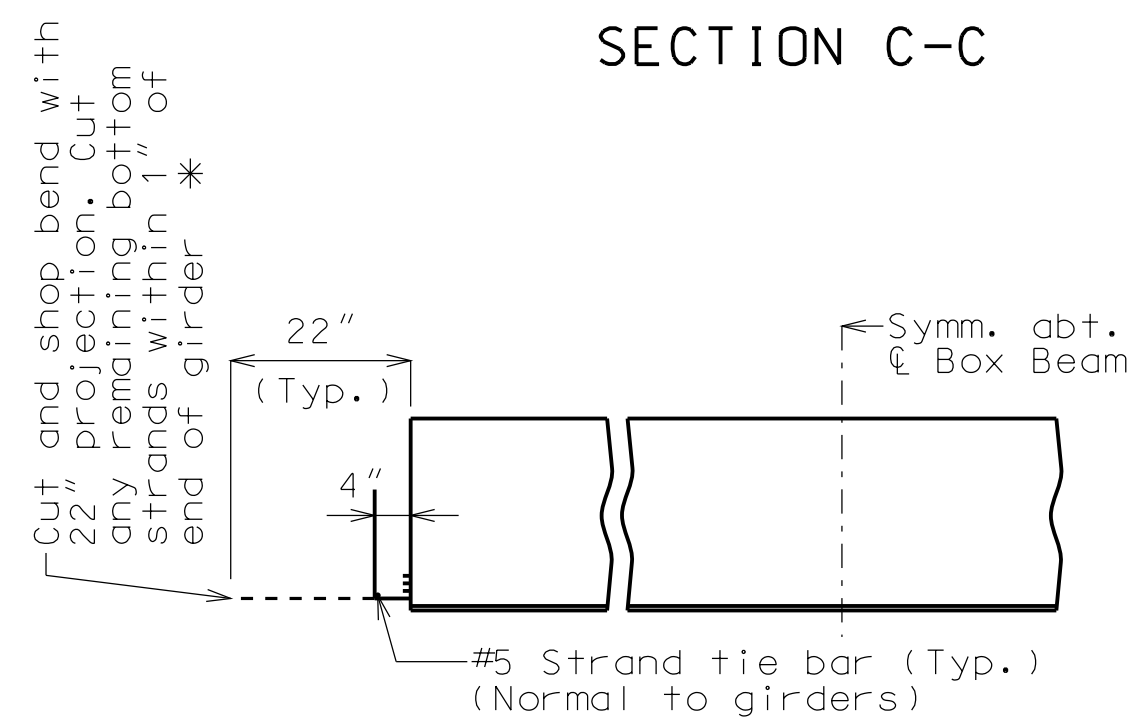
Notes:
Concrete for prestressed box beams shall be Class A-1 with $f'_c = 6,000$ psi and $f'_{ci} = 5,000$ psi.
(+) Indicates prestressing strand.
Use 28 strands with an initial prestress force of 868 kips.
Minimum clearance to reinforcing shall be 1", except as noted.
Prestressing tendons for prestressed box beams shall be uncoated, seven-wire, low-relaxation strands, 0.5 inch diameter conforming to AASHTO M203, Grade 270. Pretensioned members shall be in accordance with Sec 1029.
Transverse Post-Tensioning strands shall be uncoated, seven-wire, low-relaxation strands, 0.6 inch diameter conforming to AASHTO M203, Grade 270. Pretensioned members shall be in accordance with Sec 1029.
Keyways shall be sandblasted prior to shipping box beams.
Structural steel items shall be in accordance with ASTM A572.
Work this sheet with Sheets No. 7, 9 & 10.



SHEAR KEY DETAIL
Symm. abt. \perp Shear Key



LIFTING LOOP DETAIL



STRAND DETAILS AT BOX BEAM ENDS

DETAILS OF BOX BEAMS

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DATE PREPARED 4/15/2014	
ROUTE B	STATE MO
DISTRICT BR	SHEET NO. 8
COUNTY BOONE	
JOB NO. J5S2186	
CONTRACT ID.	
PROJECT NO.	
BRIDGE NO. A8165	

DATE	DESCRIPTION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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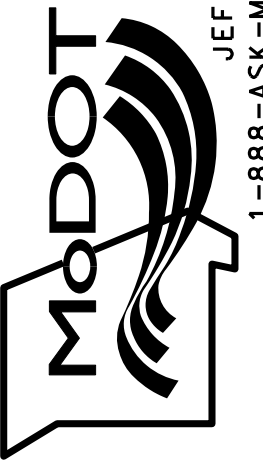
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DATE PREPARED
4/15/2014
ROUTE B STATE MO
DISTRICT BR SHEET NO. 9
COUNTY BOONE
JOB NO. J5S2186
CONTRACT ID.
PROJECT NO.
BRIDGE NO. A8165

DESCRIPTION

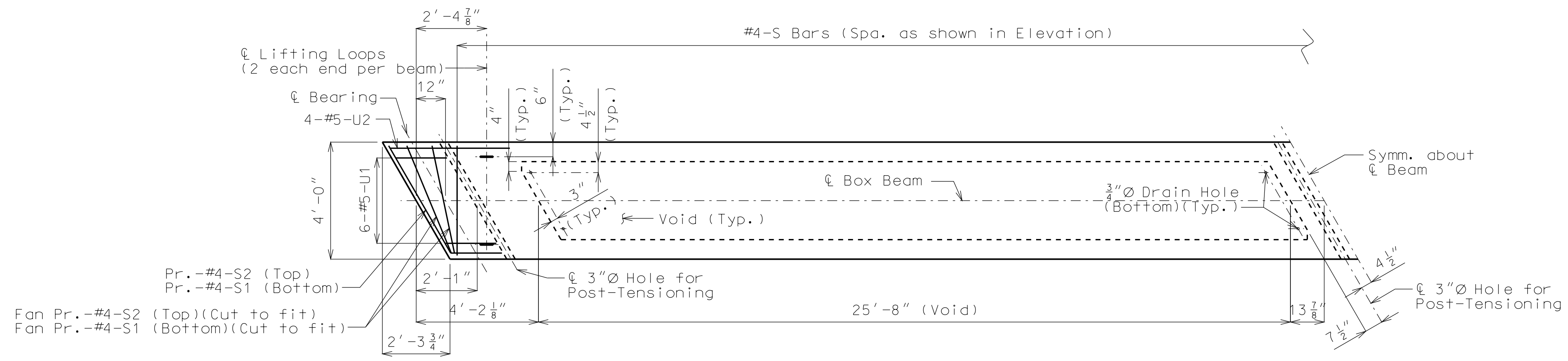
DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

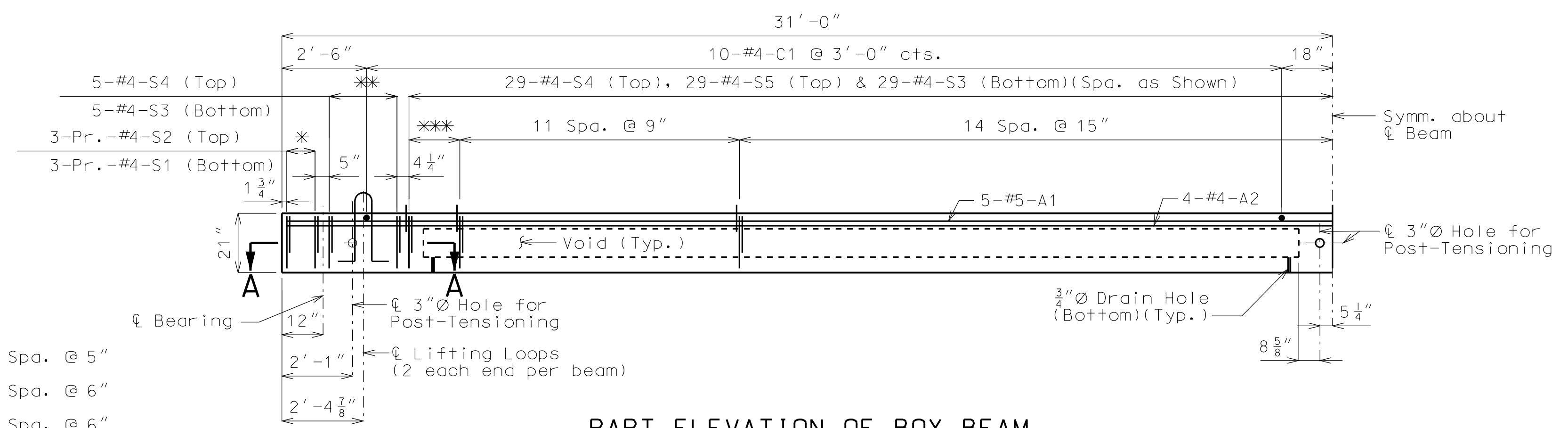


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JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-273-6636)

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PART PLAN OF BOX BEAM



PART ELEVATION OF BOX BEAM
(Dimensions measured along ℓ of Beam)(U-Bars not shown for clarity)

BILL OF REINFORCING STEEL - EACH BEAM				BENDING DIAGRAM	
NO.	SIZE & MARK	ACTUAL LENGTH	SHAPE		
10	5 A1	32'-8"	20	SHAPE 10 (U1)	SHAPE 51 (S5)
8	4 A2	32'-4"	20		
20	4 C1	3'-7"	20	SHAPE 19 (S2)	SHAPE 20
12	4 S1	4'-11"	28		
12	4 S2	4'-3"	19	SHAPE 50 (S4)	SHAPE 21 (U2)
67	4 S3	7'-1"	52		
67	4 S4	5'-9"	50	SHAPE 52 (S3)	SHAPE 28 (S1)
57	4 S5	4'-5"	51		
12	5 U1	4'-9"	10	SHAPE 21 (U2)	SHAPE 28 (S1)
8	5 U2	9'-8"	21		

Notes:
 All dimensions in bending diagram are out to out.
 Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

Actual lengths are measured along centerline of bar to the nearest inch.

Minimum clearance to reinforcing shall be 1", except as noted.

All reinforcement shall be Grade 60.

All reinforcement shall be epoxy coated.

3/4" ϕ drain holes shall be provided at each end of each void, and shall be kept open at all times.

Reinforcement shall be in accordance with Sec 1036.

The box beams shall be finished in accordance with Sec 1029.6.14, except as noted.

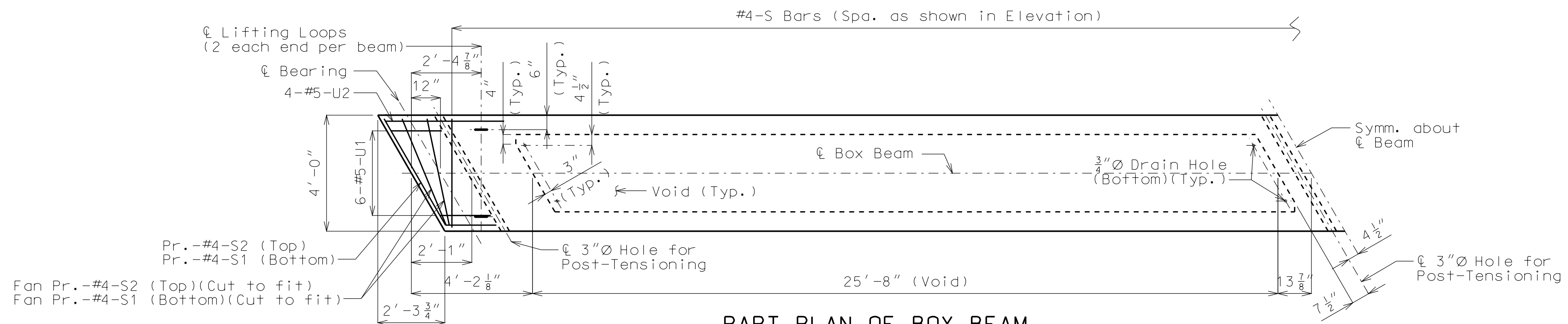
VOIDS shall be non-absorptive cellular polystyrene, according to ASTM C 578, designed to withstand the forces imposed upon them during fabrication without substantial deformation such as bulging, sagging, or collapsing. Cardboard voids will not be allowed. The outside dimensions of voids shall be as shown on the plans. When two or more sections of void are used to make up a required length, they shall be effectively taped or spliced together.

Work this sheet with Sheets No. 7 & 8.

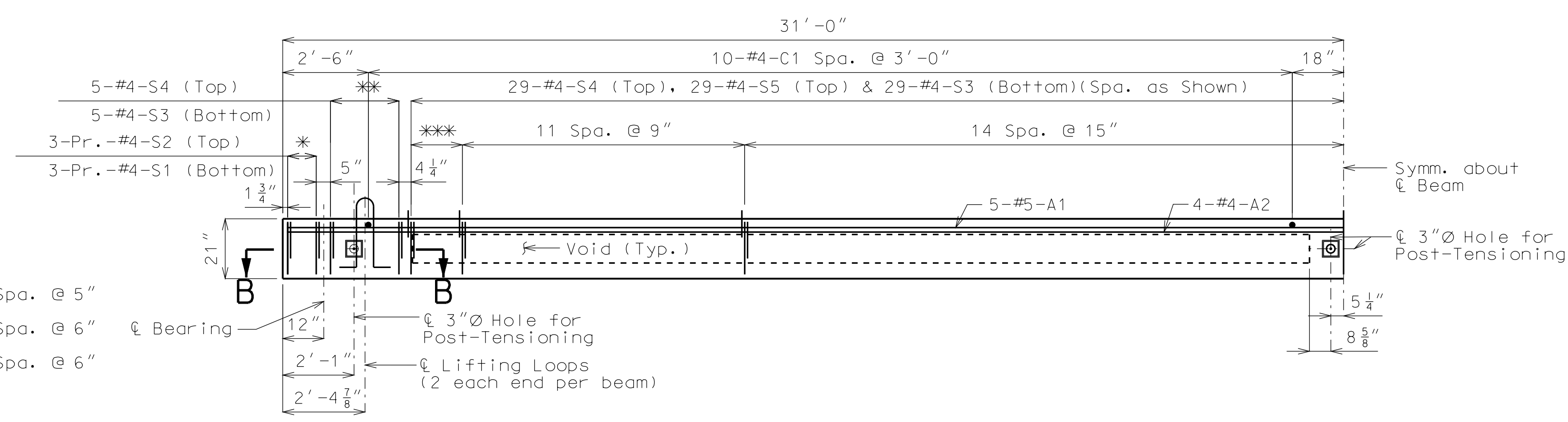
For Section A-A, see Sheet No. 8.

DETAILS OF INTERIOR BOX BEAMS

ADJACENT BOX BEAM ALTERNATE

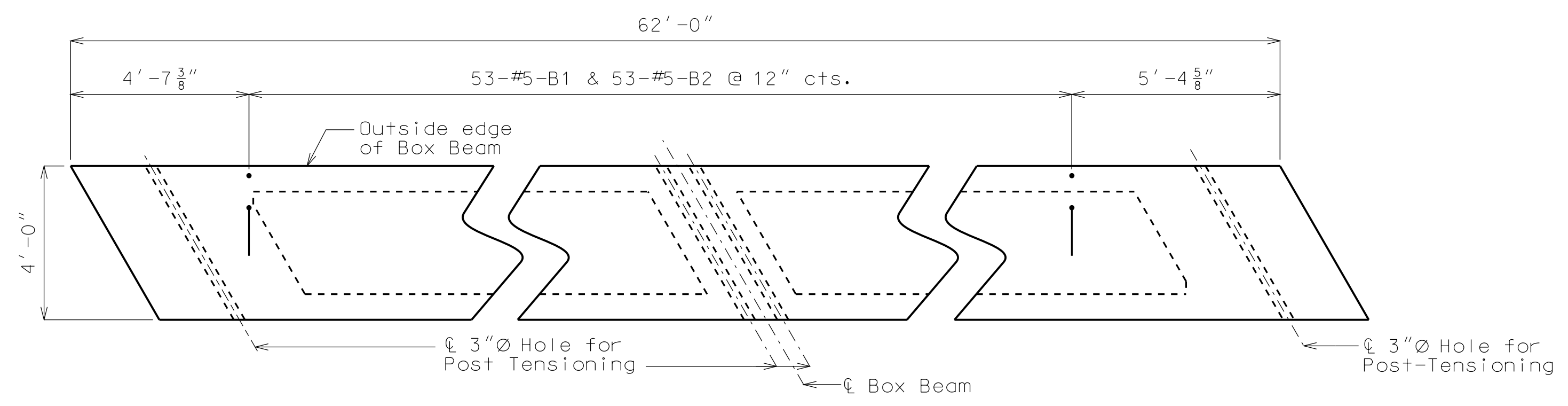


PART PLAN OF BOX BEAM
(B-Bars not shown for clarity)

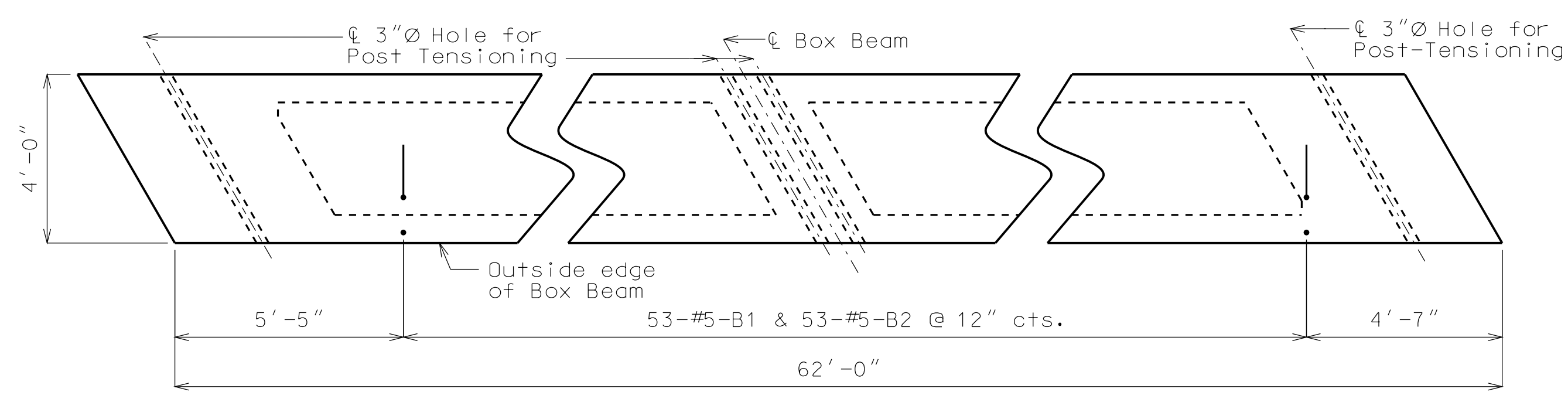


PART ELEVATION OF BOX BEAM
(Dimensions measured along centerline of beam)(U-Bars and B-Bars not shown for clarity)

- * 2 Spa. @ 5"
- ** 4 Spa. @ 6"
- *** 3 Spa. @ 6"



PLAN OF LEFT EXTERIOR BOX BEAM SHOWING B-BARS
(A-Bars, C-Bars, S-Bars, U-Bars, Lifting loops & Vent holes not shown for clarity)



PLAN OF RIGHT EXTERIOR BOX BEAM SHOWING B-BARS
(A-Bars, C-Bars, S-Bars, U-Bars, Lifting loops & Vent holes not shown for clarity)

DETAILS OF EXTERIOR BOX BEAMS

BILL OF REINFORCING STEEL - EACH BEAM				BENDING DIAGRAM	
NO.	SIZE & MARK	ACTUAL LENGTH	SHAPE		
10	5 A1	32'-8"	20	SHAPE 10 (U1)	
8	4 A2	32'-4"	20	SHAPE 51 (S5)	
53	5 B1	3'-2"	19	SHAPE 20	
53	5 B2	3'-6"	27	SHAPE 50 (S4)	
20	4 C1	3'-7"	20	SHAPE 19 (S2)	
12	4 S1	4'-11"	28	SHAPE 52 (S3)	
12	4 S2	4'-3"	19	SHAPE 19 (B1)	
67	4 S3	7'-1"	52	SHAPE 27 (B2)	
67	4 S4	5'-9"	50	SHAPE 21 (U2)	
57	4 S5	4'-5"	51	SHAPE 28 (S1)	
12	5 U1	4'-9"	10		
8	5 U2	9'-8"	21		

Notes:

All dimensions in bending diagram are out to out.

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

Actual lengths are measured along centerline of bar to the nearest inch.

Minimum clearance to reinforcing shall be 1", except as noted.

All reinforcement shall be Grade 60.

All reinforcement shall be epoxy coated.

3/4" drain holes shall be provided at each end of each void, and shall be kept open at all times.

Reinforcement shall be in accordance with Sec 1036.

The box beams shall be finished in accordance with Sec 1029.6.14, except as noted.

VOIDS shall be non-absorptive cellular polystyrene, according to ASTM C 578, designed to withstand the forces imposed upon them during fabrication without substantial deformation such as bulging, sagging, or collapsing. Cardboard voids will not be allowed. The outside dimensions of voids shall be as shown on the plans. When two or more sections of void are used to make up a required length, they shall be effectively taped or spliced together.

Work this sheet with Sheets No. 7 & 8.

For Section B-B, see Sheet No. 8.

Detailed Mar. 2014
Checked Mar. 2014

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 10 of 20

ADJACENT BOX BEAM ALTERNATE

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DATE PREPARED
4/15/2014

ROUTE B	STATE MO
DISTRICT BR	SHEET NO. 10

COUNTY
BOONE

JOB NO.
J5S2186

CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A8165

DATE	DESCRIPTION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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DATE PREPARED
4/15/2014

ROUTE B STATE MO

DISTRICT BR SHEET NO. 11

COUNTY BOONE

JOB NO. J5S2186

CONTRACT ID.

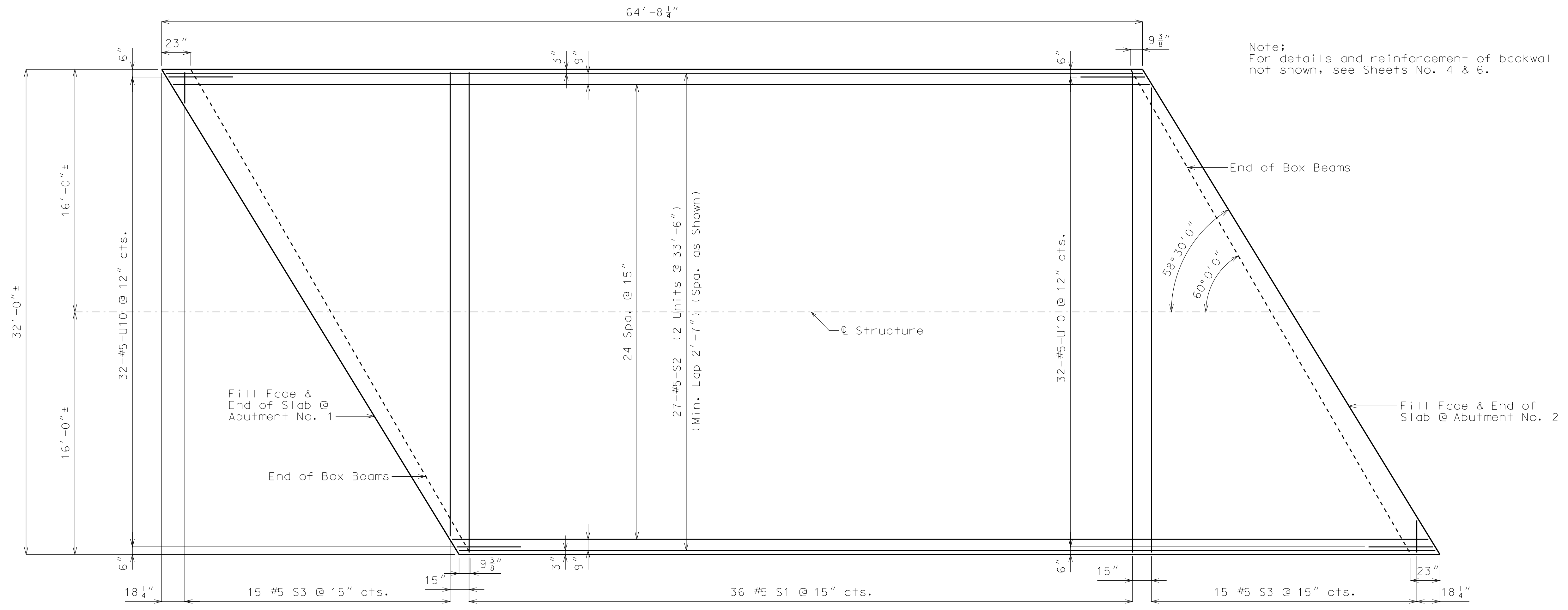
PROJECT NO.

BRIDGE NO. A8165

DESCRIPTION	DATE

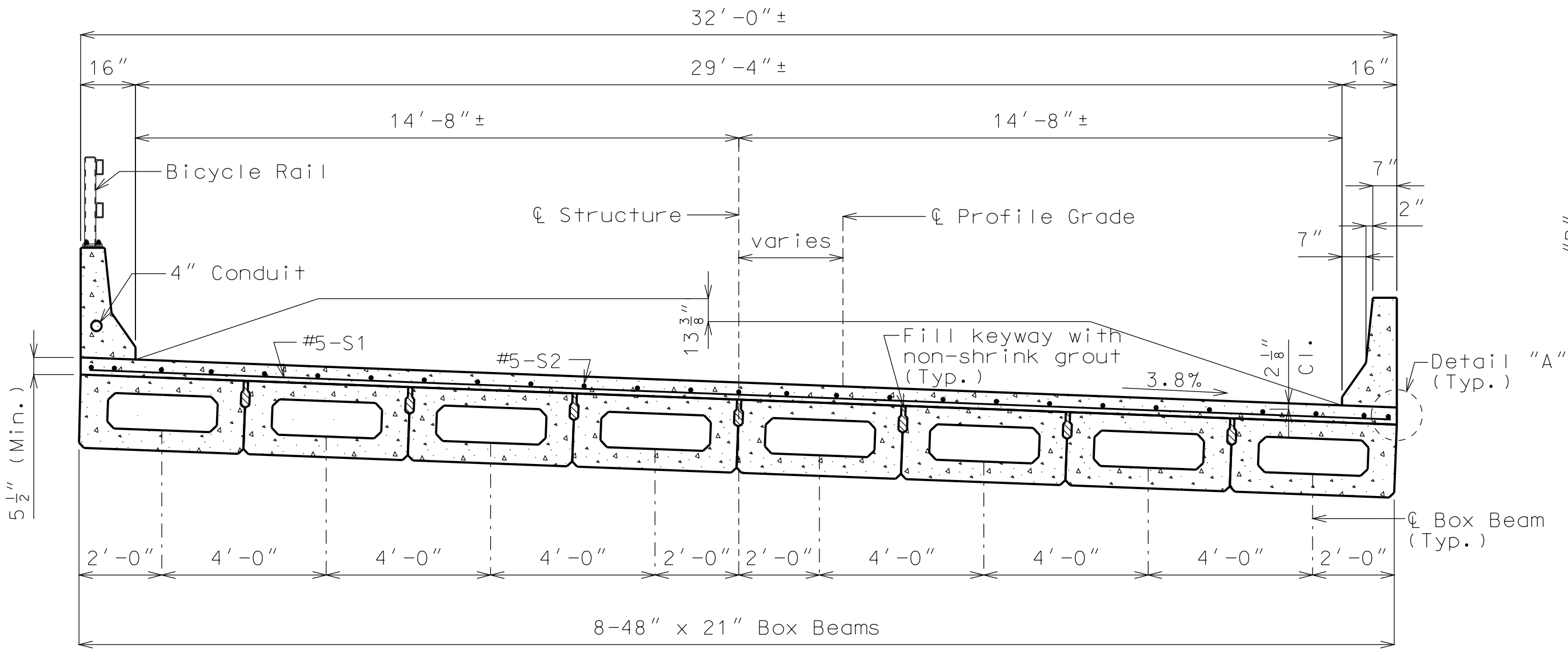
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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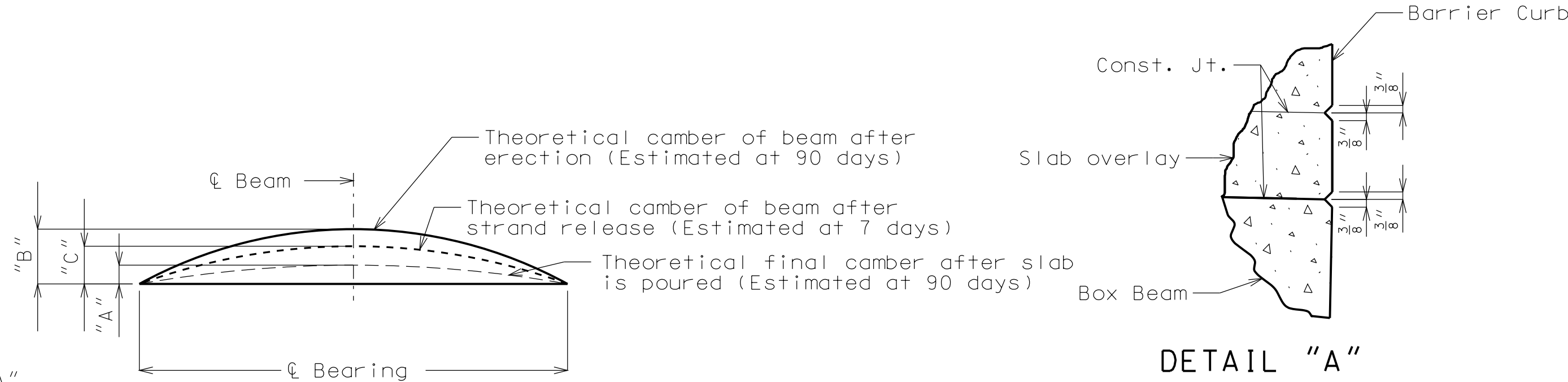


PLAN OF SLAB SHOWING REINFORCEMENT

Note: Longitudinal dimensions are horizontal



SECTION THRU SLAB NEAR MID SPAN



	Span (1-2)		
	A	B	C
48" x 21" Beams No. 1 thru 8	$\frac{7}{8}$ "	1 1/2"	1"

BOX BEAM CAMBER DIAGRAM

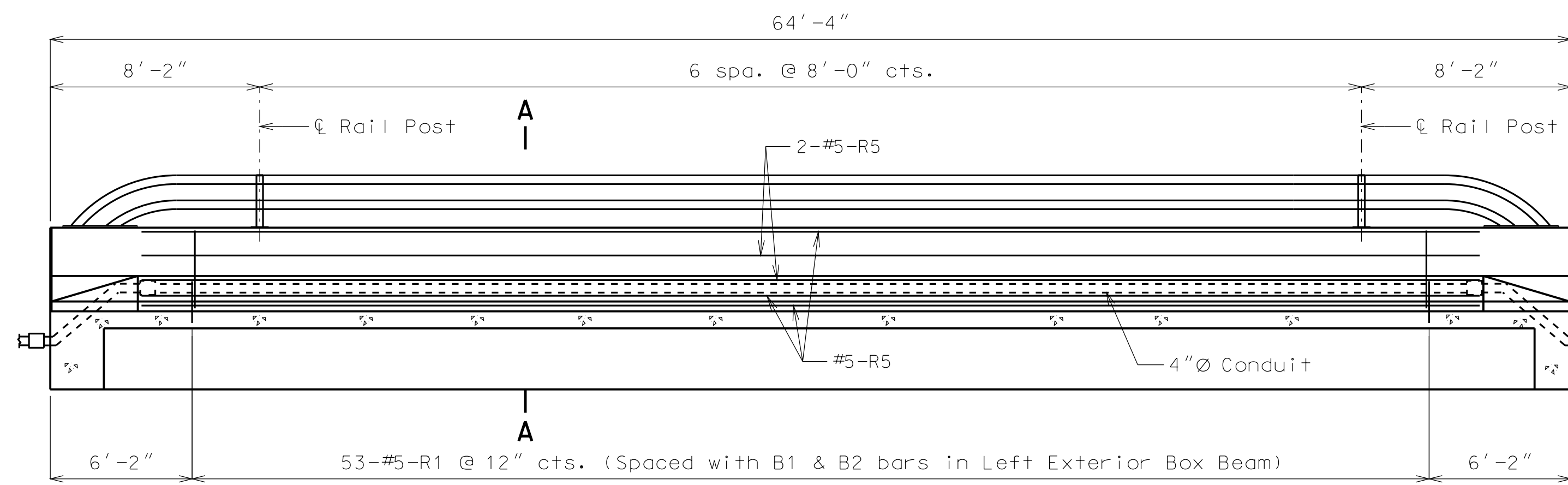
Conversion factors for box beam camber:
0.25 pt. = 0.7125 x 0.5 pt.

Differential camber between adjacent box beams shall not be greater than 1/2" prior to grouting shear keys.

If box beam camber is different from that shown in the camber diagram, in order to maintain minimum slab thickness adjustment of the slab haunches, an increase in slab thickness or a raise in grade uniformly throughout the structure shall be necessary. No payment will be made for additional labor or materials required for variation in haunching, slab thickness or grade adjustment.

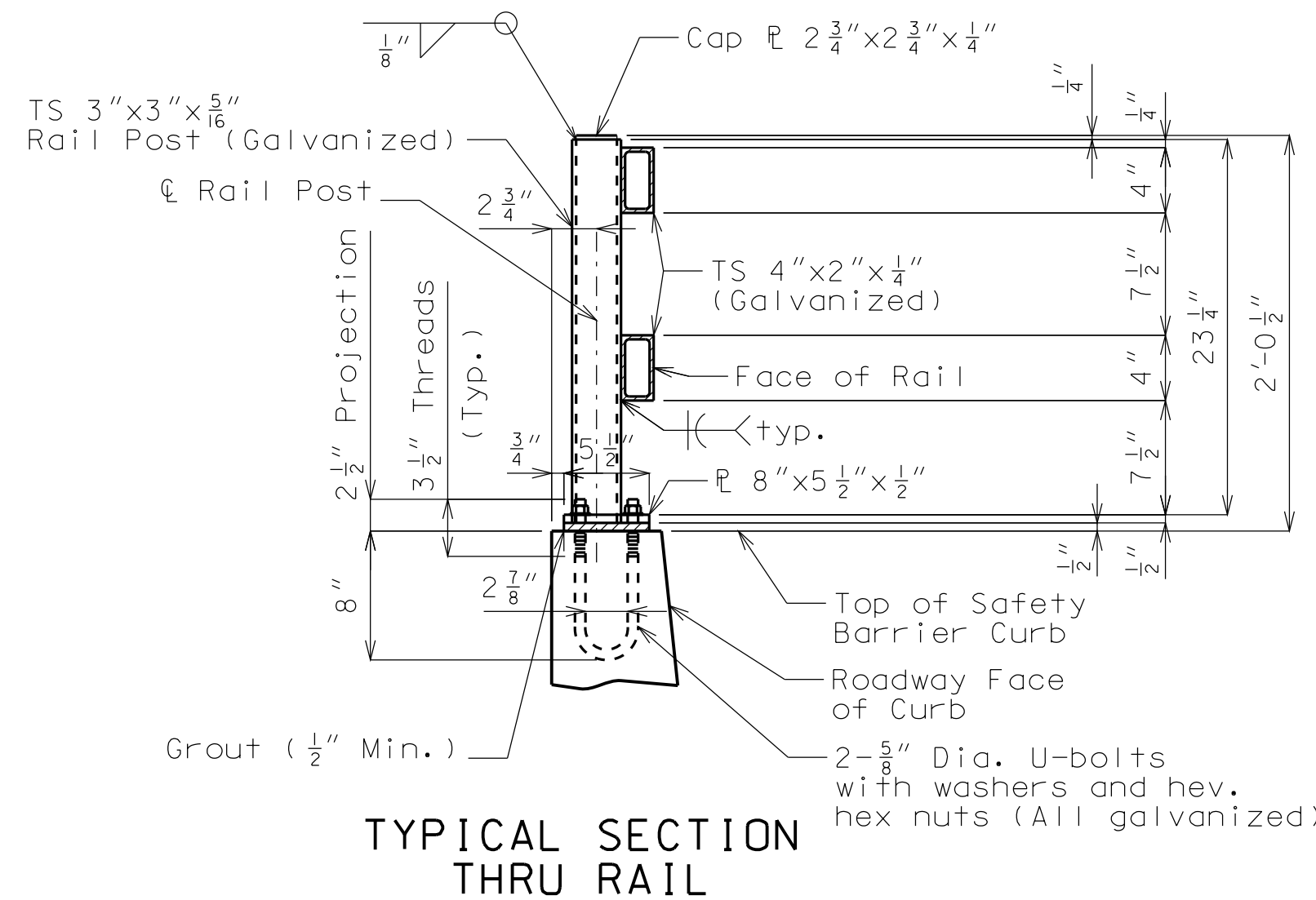
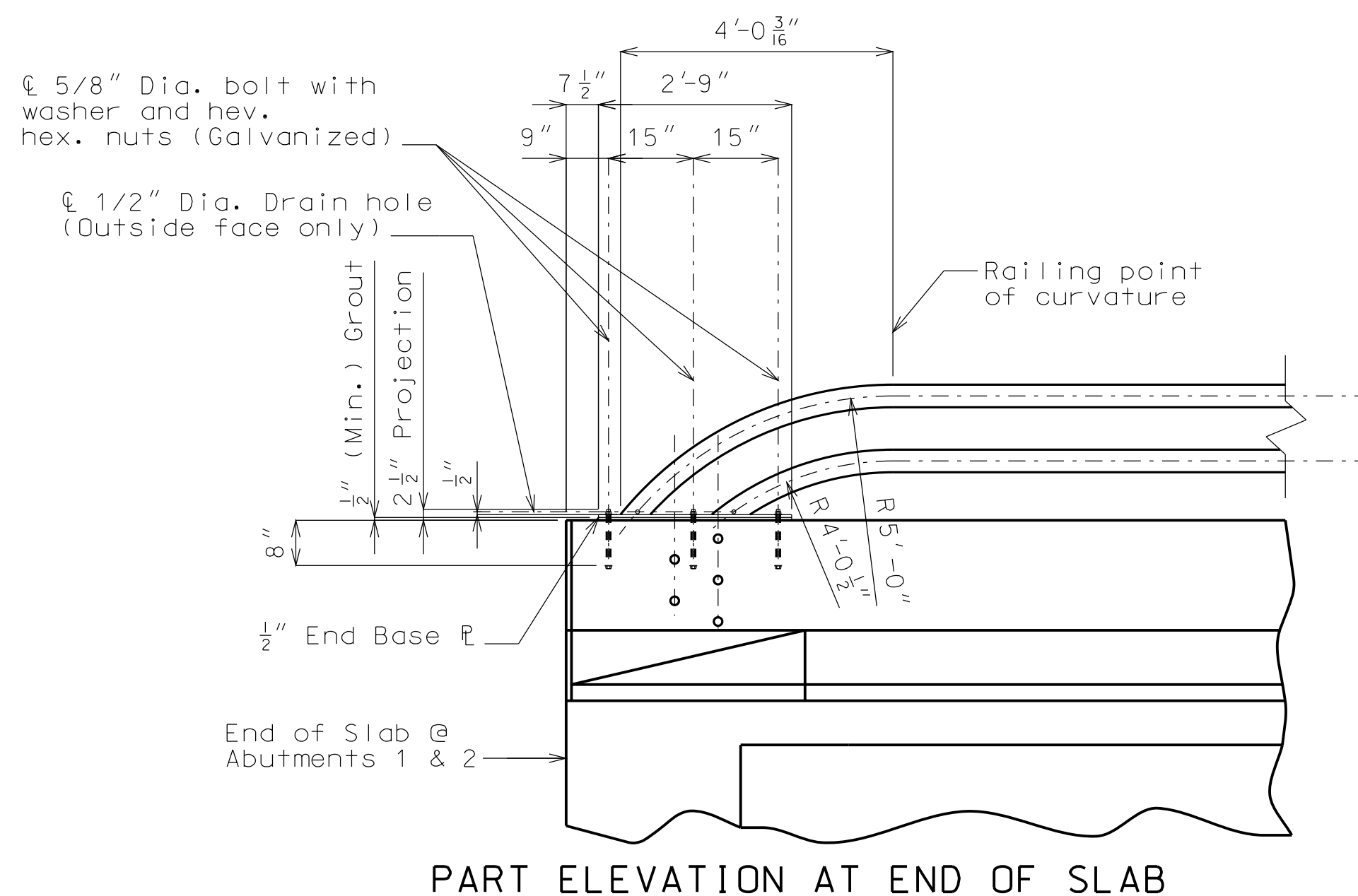
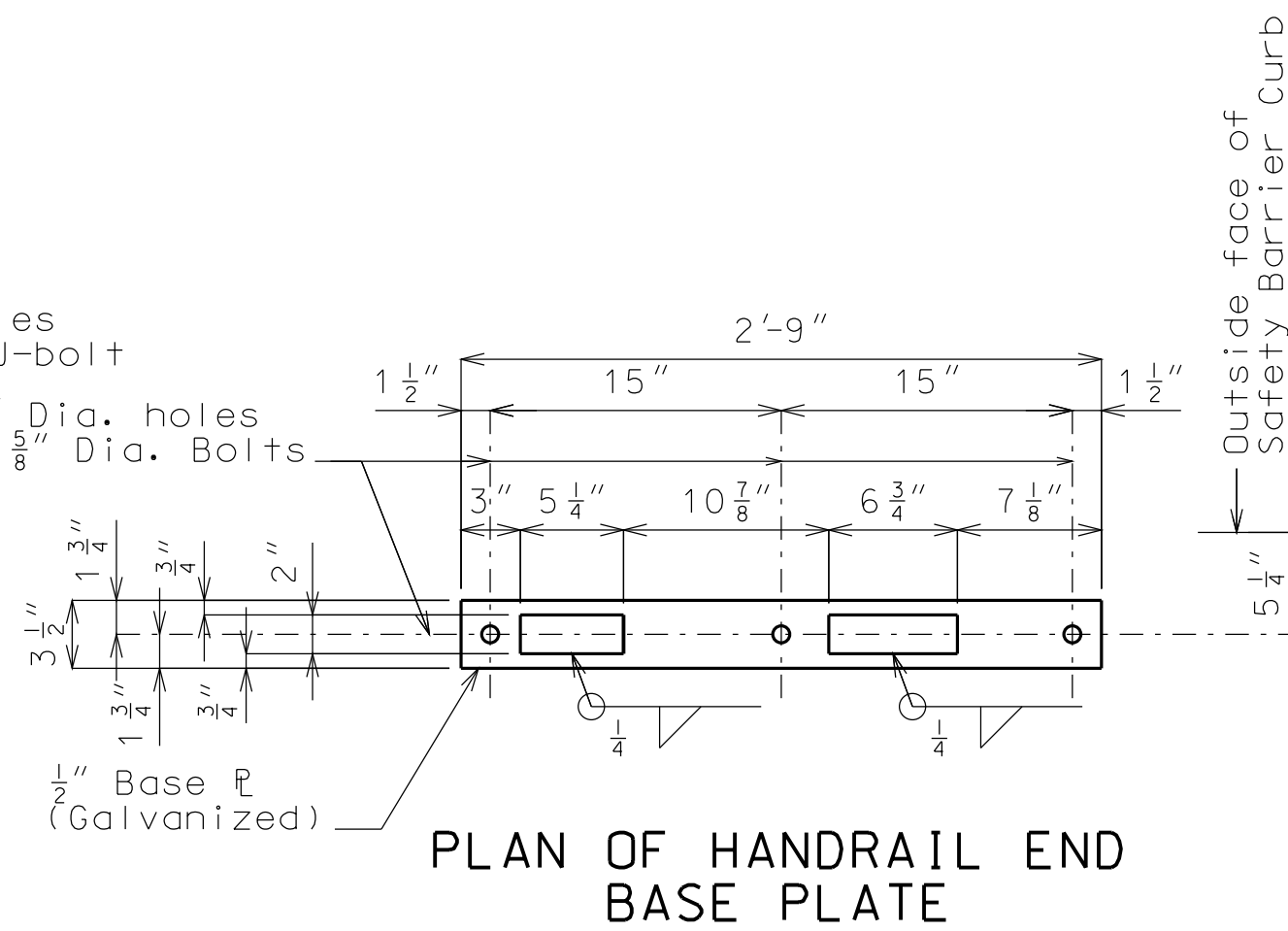
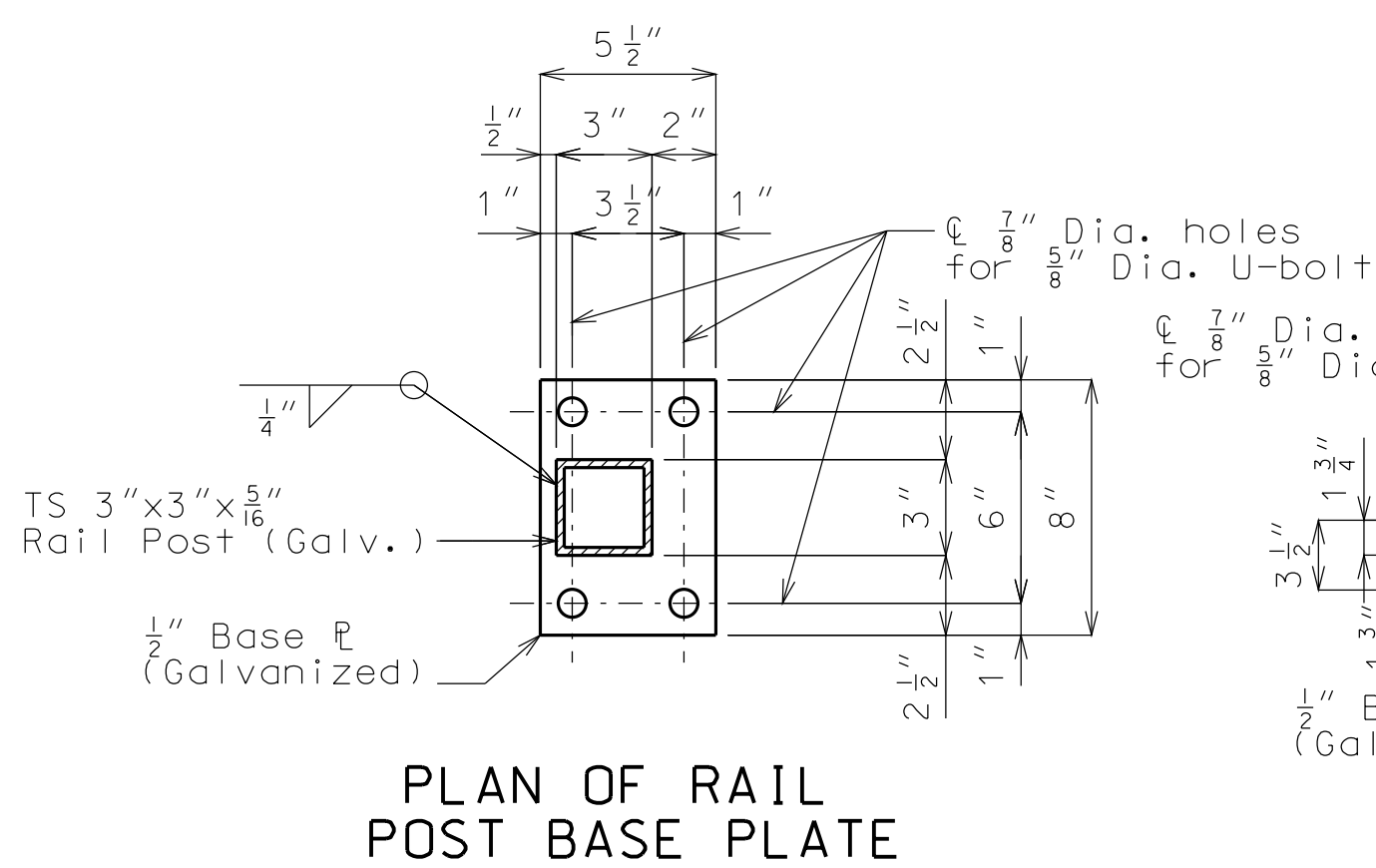
Notes:
For details and reinforcement of barrier curb not shown, see Sheets No. 12, 13, 14 & 15.
Slab shall be poured to exterior face of exterior box beam.

The contractor shall pour and satisfactorily finish the slab overlay at a rate of not less than 25 cubic yards per hour with an approved retarder to retard the set of concrete to 2.5 hours.
The slab is to be built parallel to grade and to a minimum thickness of 5 1/2".



SECTION NEAR LEFT SAFETY BARRIER CURB

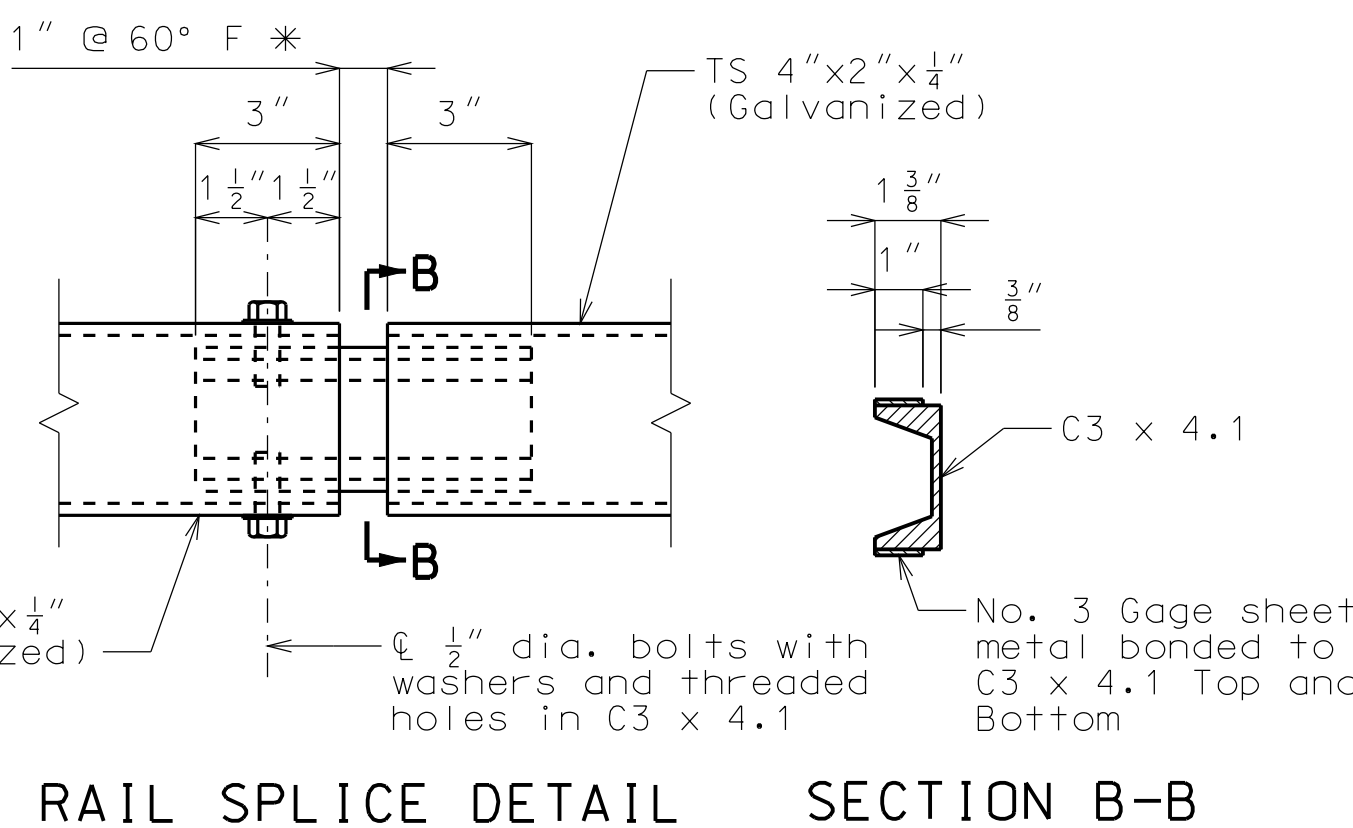
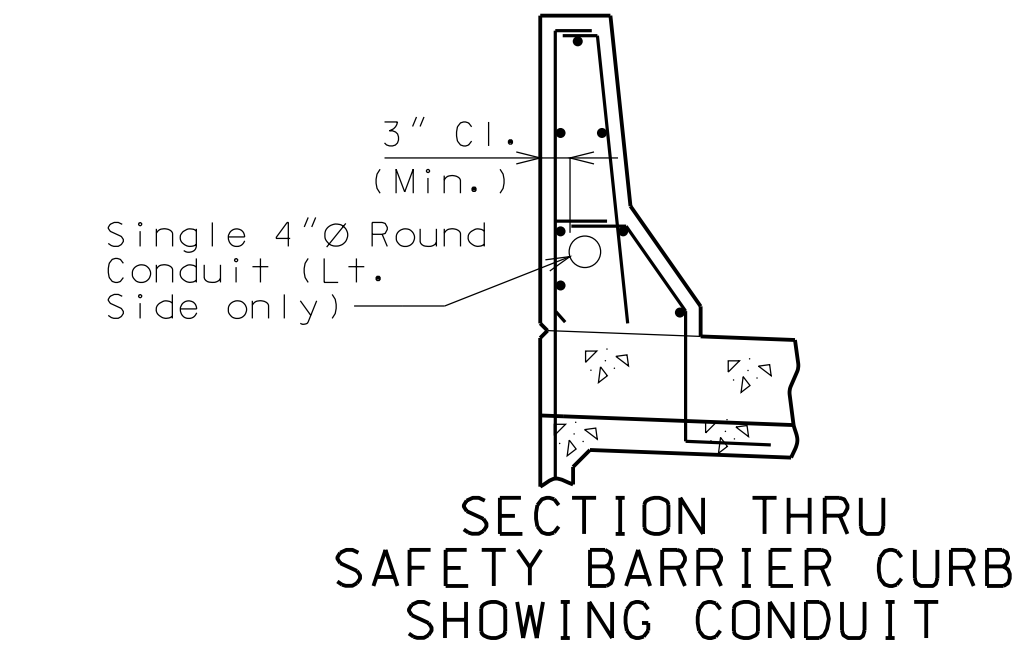
Note: Longitudinal dimensions are horizontal.



DETAILS OF LEFT SAFETY BARRIER CURB

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 12 of 20



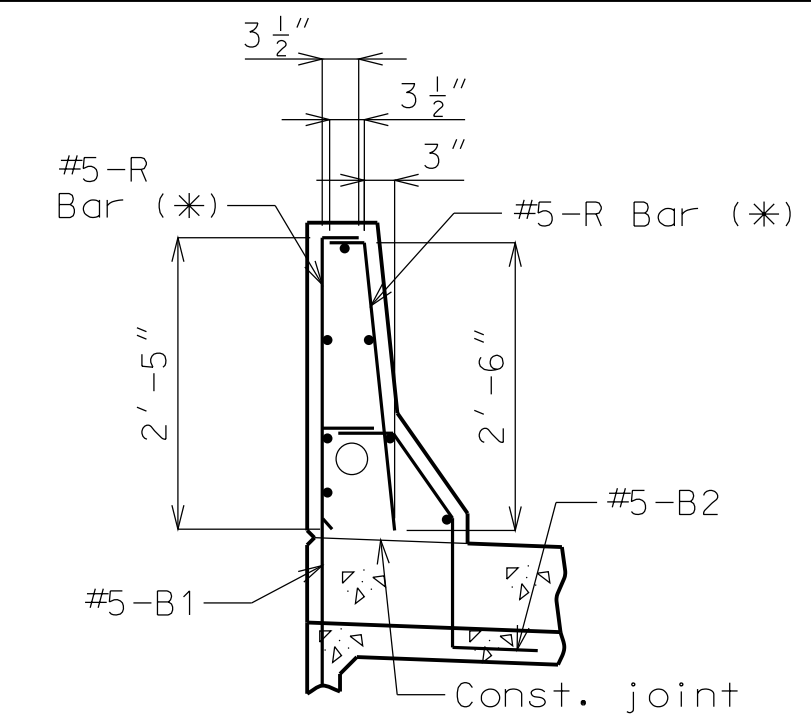
RAIL SPLICE DETAIL SECTION B-B

PART SECTION A-A

Notes:

Use a minimum lap of 2'-11" for #5 horizontal safety barrier curb bars.

The cross-sectional area above the slab = 2.22 sq. ft.



R-BAR PERMISSIBLE ALTERNATE SHAPE

(*) The R1 bar may be separated into two bars as shown, at the contractor's option, only when slip forming is not used. (All dimensions are out to out.)

Notes:

Top of safety barrier curb shall be built parallel to grade with barrier curb joints normal to grade.

All exposed edges of safety barrier curb shall have either a 1/2" radius or a 3/8" bevel, unless otherwise noted.

Payment for all concrete and reinforcement, complete in place, will be considered completely covered by the contract unit price for safety barrier curb per linear foot.

Concrete in the safety barrier curb shall be Class B-1.

Measurement of safety barrier curb is to the nearest linear foot for each structure, measured along the outside top of slab from end of slab to end of slab.

Concrete traffic barrier delineators shall be placed on top of the safety barrier curb as shown on Missouri Standard Plans 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for "Safety Barrier Curb".

U-bolts with heavy hex nuts and standard plate washers shall conform to ASTM A307, galvanized.

All railing, posts, bolts, nuts, washers and base plates shall be galvanized after fabrication in accordance with ASTM A123, ASTM A153 and Section 712.14 of the Missouri Standard Specifications. Vent holes shall be provided at all internally closed joints for galvanizing.

Payment for furnishing, galvanizing and installation of Bicycle Railing shall be made at the contract unit price for Bicycle Railing, per linear foot. Such payment will be full compensation for furnishing the railing, for galvanizing, installation, including the anchorage system; and for labor, materials, equipment, and incidentals to complete the work as specified and as approved by the Engineer.

Dimensions of bicycle rail are measured longitudinally.

Hollow structural steel tubing and expansion sleeves shall conform to the requirements of ASTM designation A500 Grade A.

Channels and base plates shall be fabricated from ASTM A709 grade 36 steel.

Maximum distance between rail splices shall be 32'-0".

Welding and Fabrication of structural steel shall be in accordance with Section 712 of the Missouri Standard Specifications.

* Gap at Rail Splice shall be increased 1/8" for each 10° fall in temperature and decreased 1/8" for each 10° rise in temperature at installation.

All rail posts shall be installed normal to grade. Grout at 1/2" minimum thickness shall be placed under base plates to provide for vertical alignment of rail posts.

For Details of Conduit System on Structure see Sheet No. 16.

ADJACENT BOX BEAM ALTERNATE

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DATE PREPARED

4/15/2014

ROUTE B MO

DISTRICT BR SHEET NO. 12

COUNTY BOONE

JOB NO. J5S2186

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A8165

DESCRIPTION

DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102

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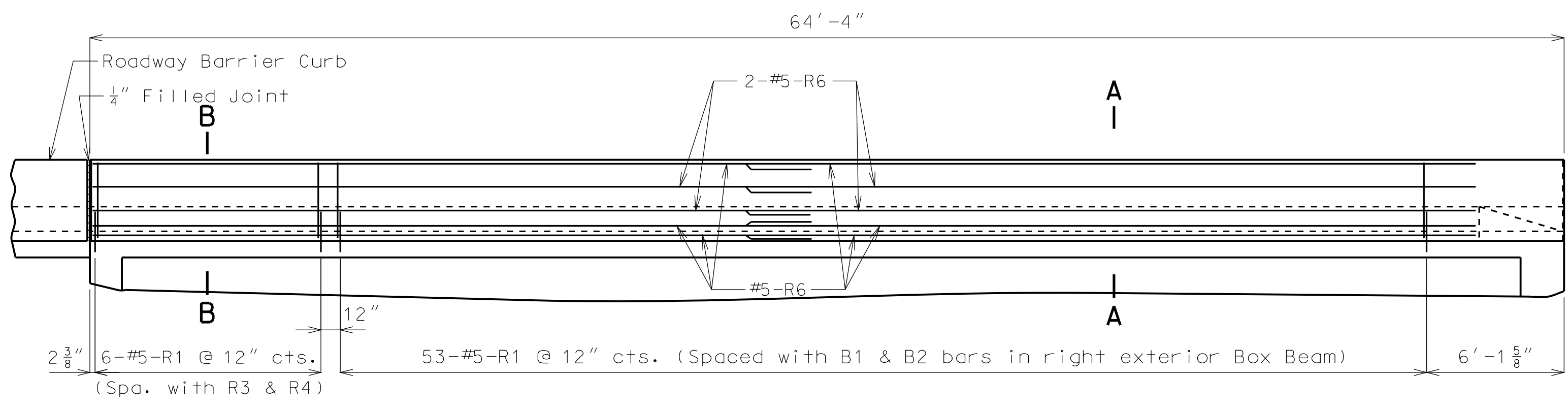
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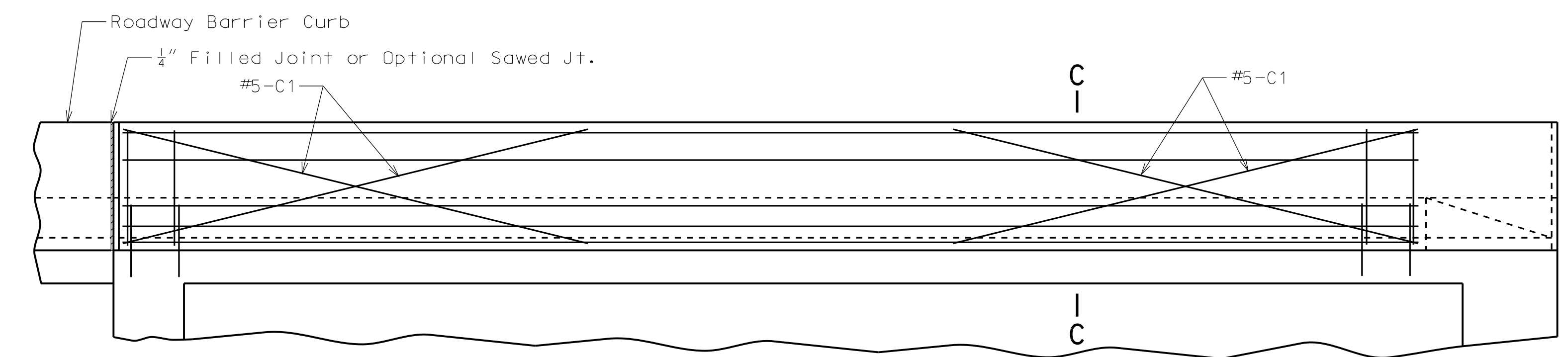
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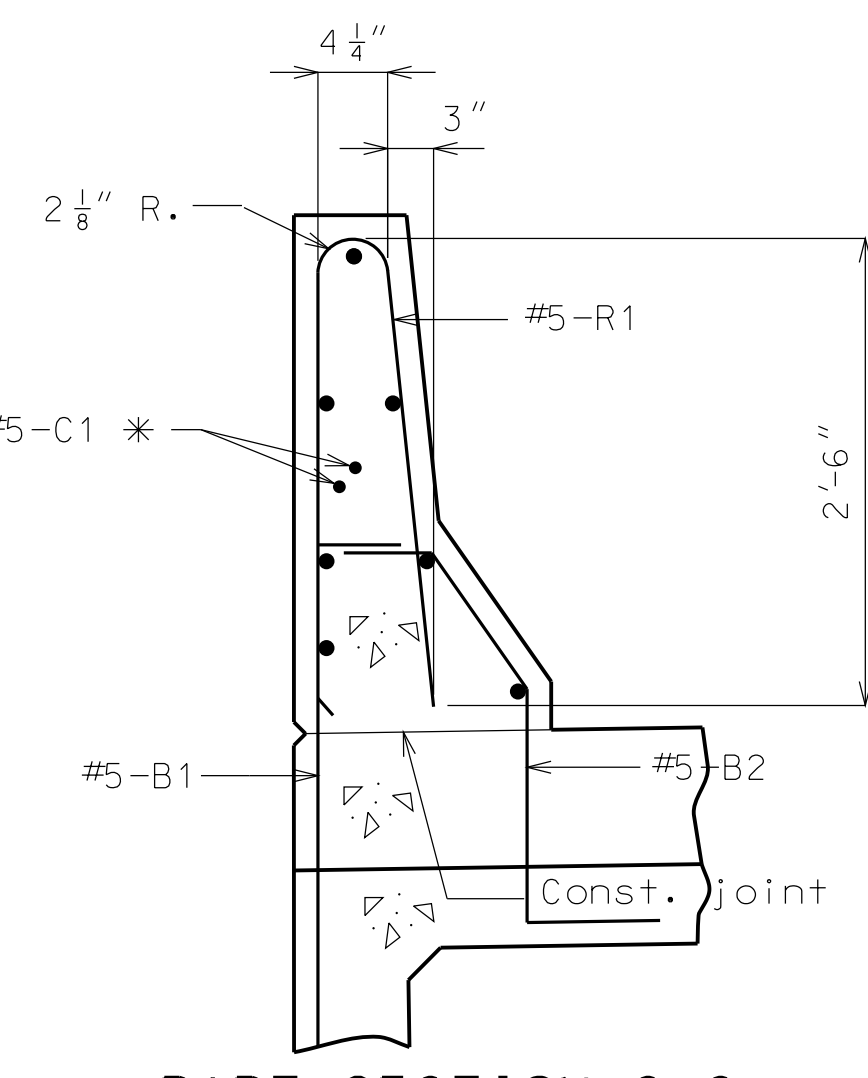
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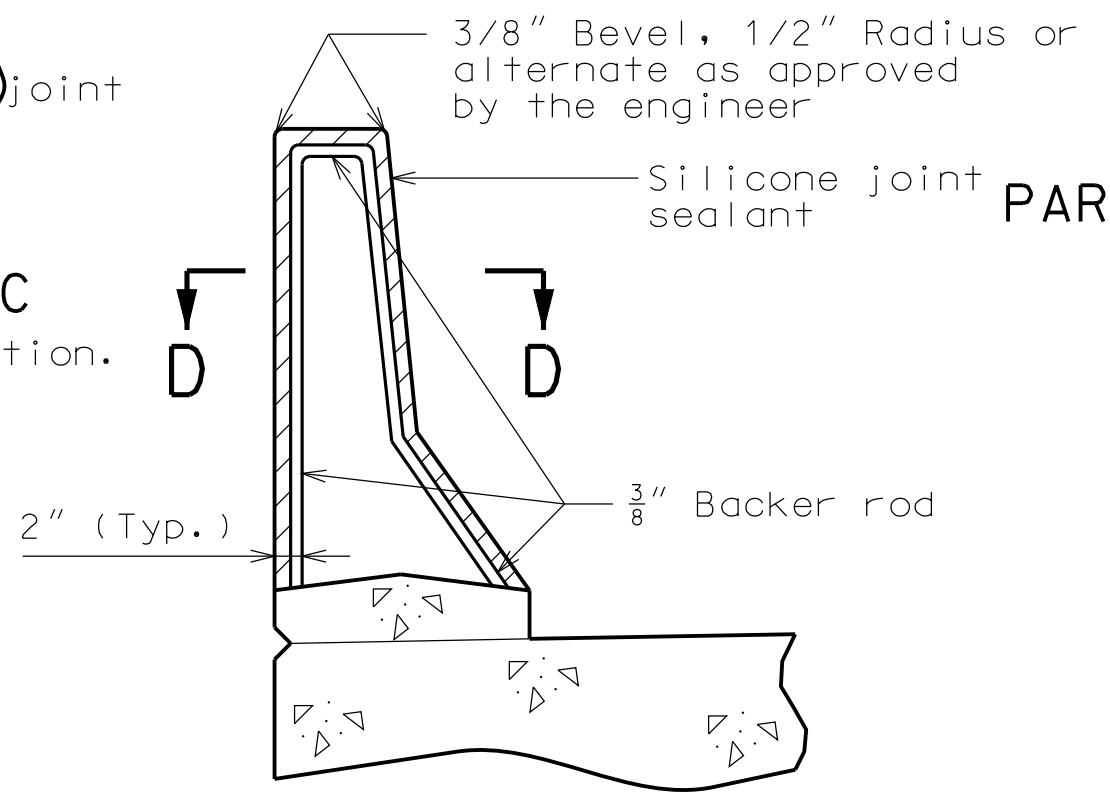
ELEVATION NEAR RIGHT SAFETY BARRIER CURB
 Note: Longitudinal dimensions are horizontal.



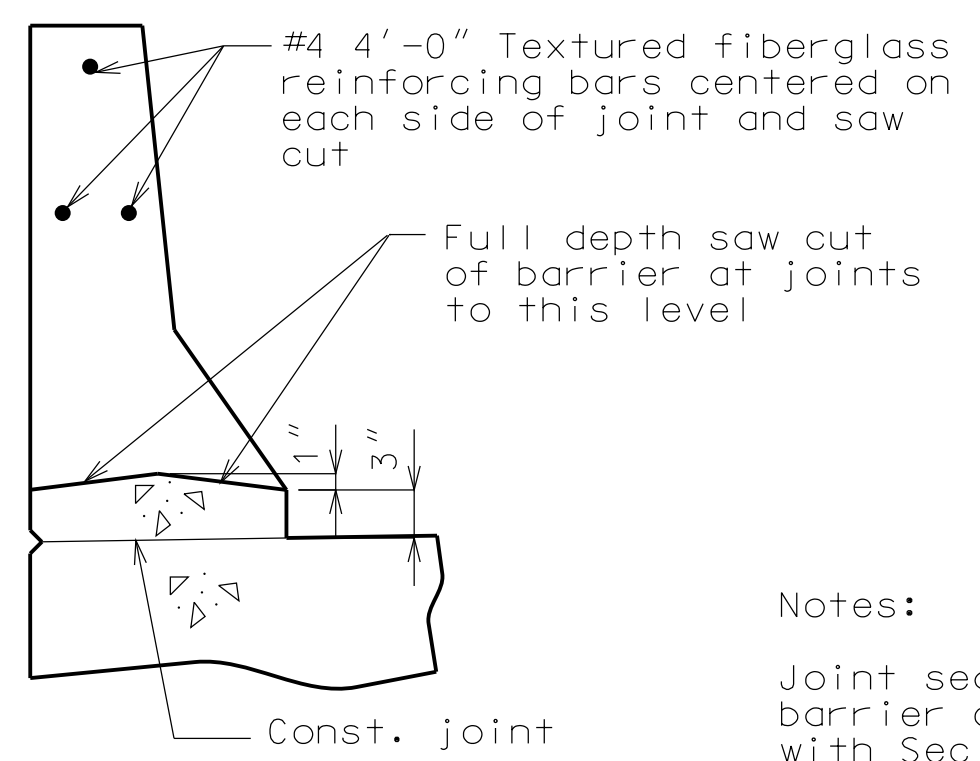
TYPICAL ELEVATION NEAR RIGHT SAFETY BARRIER CURB AT SUPPORT LOCATIONS (OPTIONAL SLIP-FORM BRIDGE SAFETY BARRIER CURB)



PART SECTION C-C
 * Near each support location.



SECTION THRU JOINT



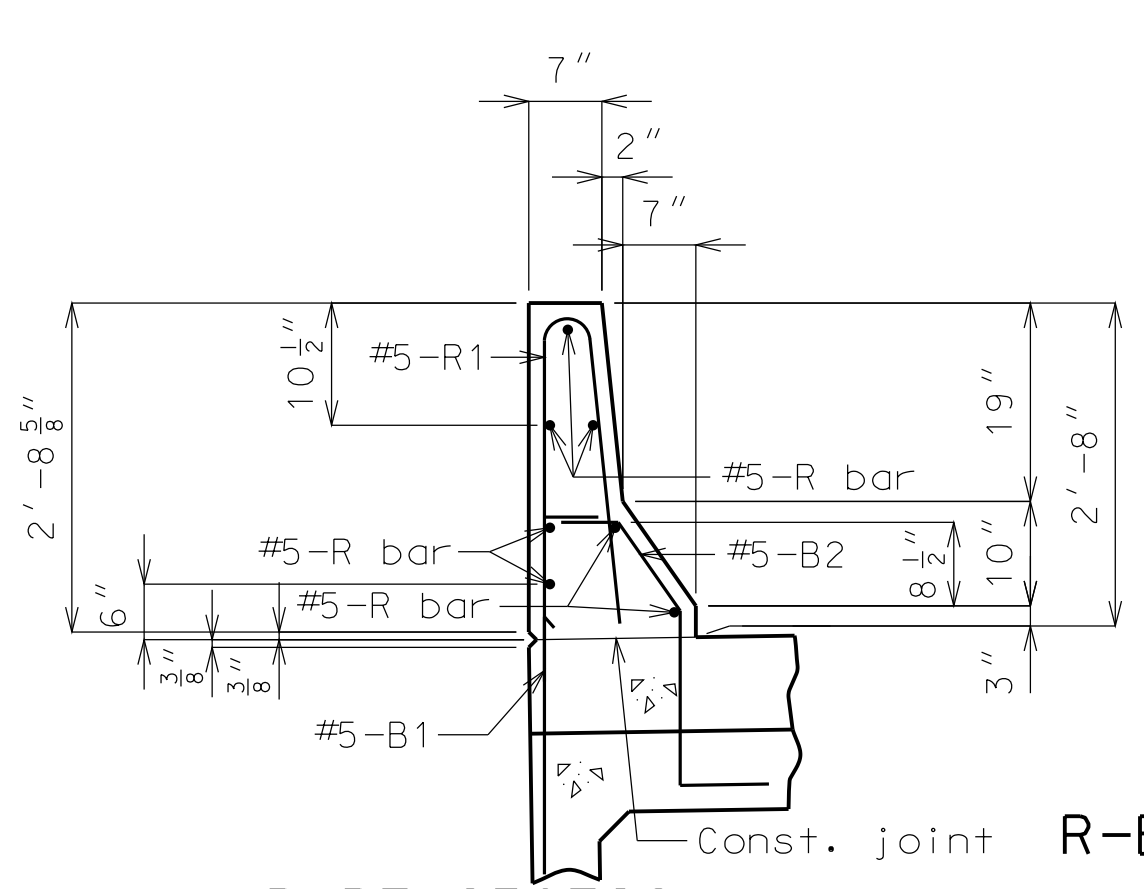
PART SECTION THRU JOINT

Notes:

Joint sealant and backer rods shall be used on all slip-form barrier curbs instead of joint filler and shall be in accordance with Sec 717 for silicone joint sealant for saw cut and formed joints.

C Bars (Slip-form option only) shall be used in addition to cast-in-place conventional forming reinforcement for bridge safety barrier curb.

For Slip-Form option, all sides of the safety barrier curb shall have a vertically broomed finish and the curb top shall have a transversely broomed finish.

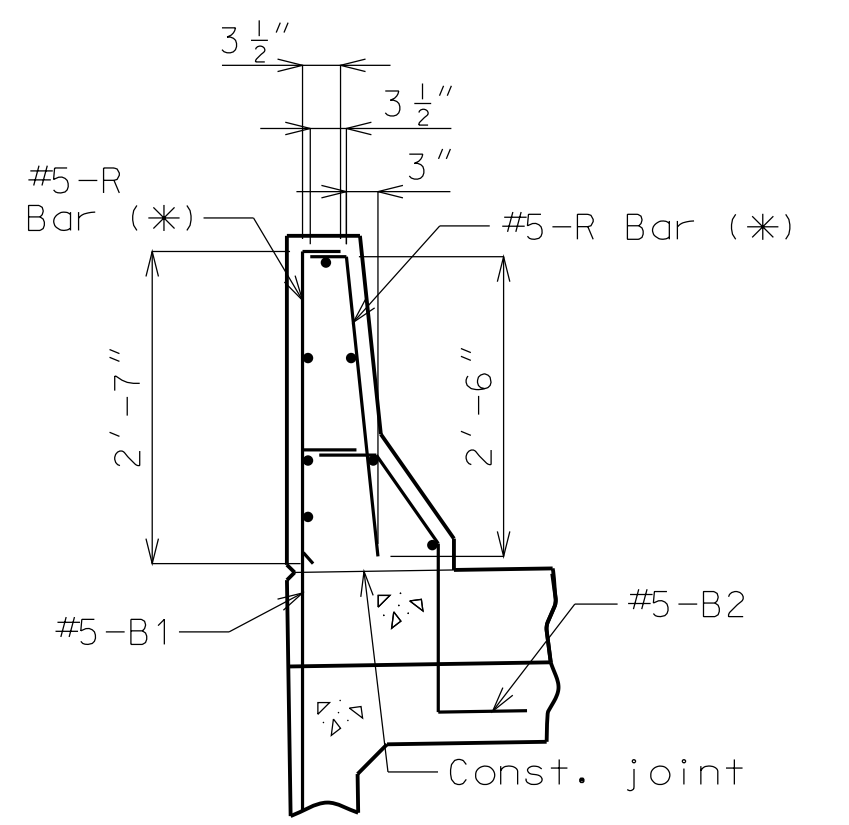


PART SECTION A-A

Notes:

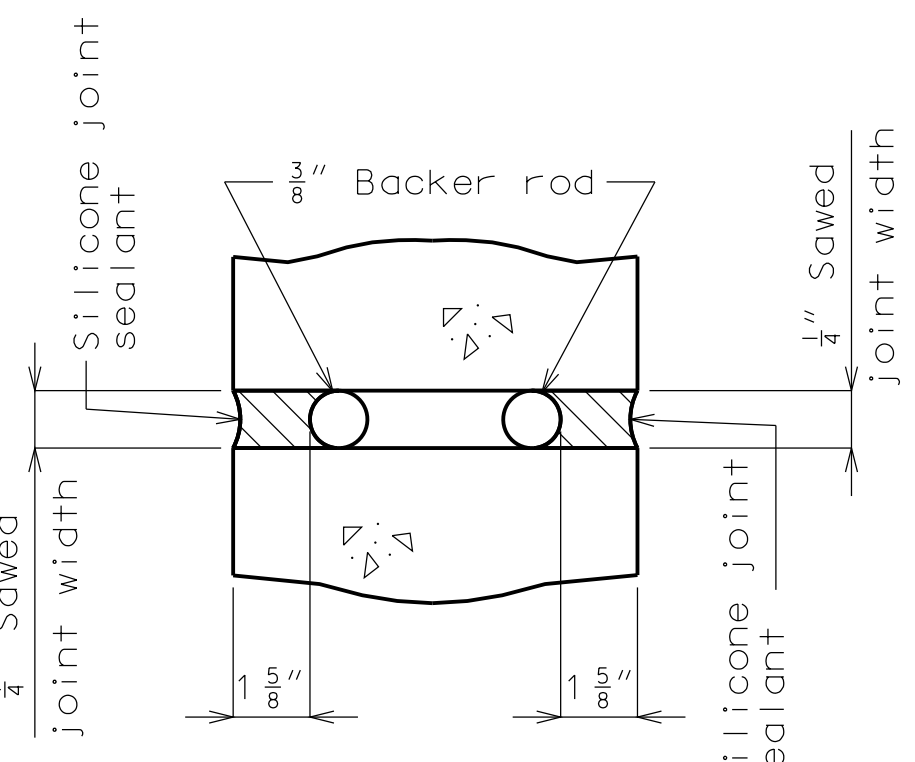
Use a minimum lap of 2'-11" for #5 horizontal safety barrier curb bars.

The cross-sectional area above the slab = 2.29 sq. ft.



R-BAR PERMISSIBLE ALTERNATE SHAPE

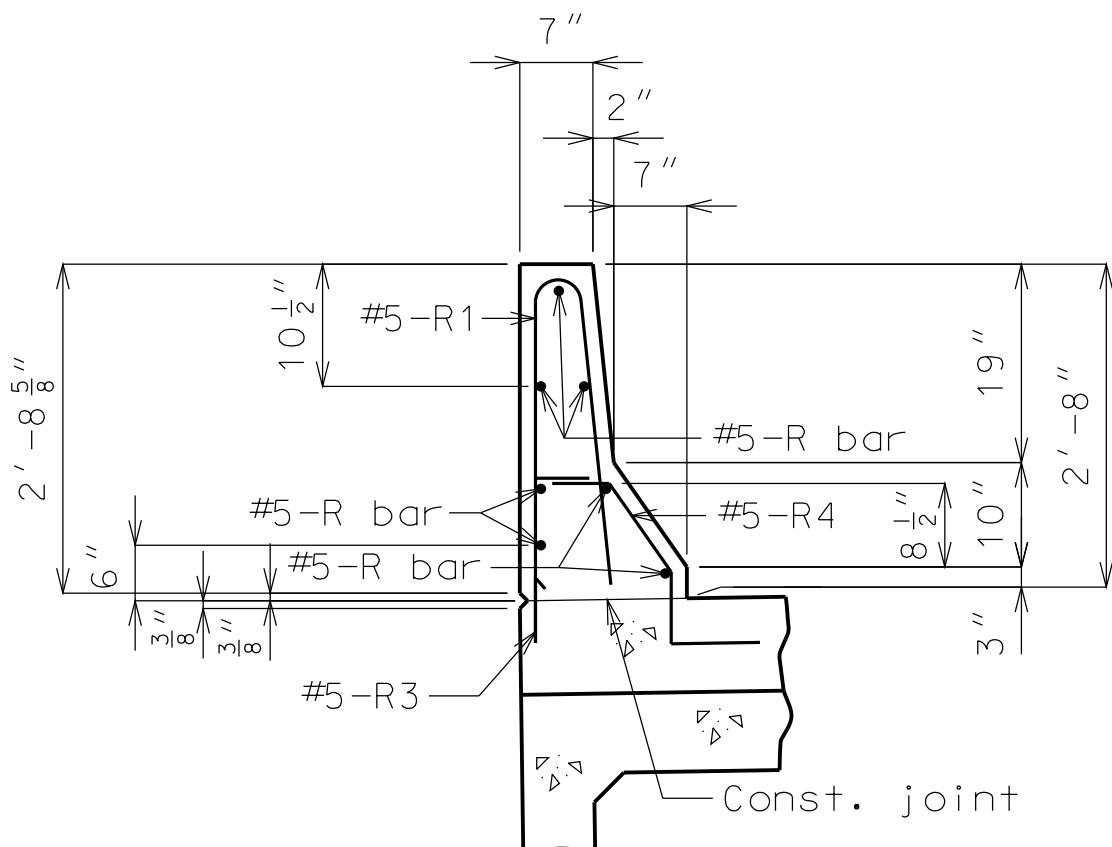
(* The R1 bar may be separated into two bars as shown, at the contractor's option, only when slip forming is not used. (All dimensions are out to out.)



SECTION D-D

Note:

Cost of silicone joint sealant and backer rod, complete in place, will be considered completely covered by the contract unit price for Safety Barrier Curb.



PART SECTION B-B

Notes:

Use a minimum lap of 2'-11" for #5 horizontal safety barrier curb bars.

The cross-sectional area above the slab = 2.29 sq. ft.

Notes:

Top of safety barrier curb shall be built parallel to grade with barrier curb joints normal to grade.

All exposed edges of safety barrier curb shall have either a 1/2" radius or a 3/8" bevel, unless otherwise noted.

Payment for all concrete and reinforcement, complete in place, will be considered completely covered by the contract unit price for safety barrier curb per linear foot.

Concrete in the safety barrier curb shall be Class B-1.

Measurement of safety barrier curb is to the nearest linear foot for each structure, measured along the outside top of slab from Fill Face @ Abutment No. 1 to Fill Face @ Abutment No. 2.

Concrete traffic barrier delineators shall be placed on top of the safety barrier curb as shown on Missouri Standard Plans 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for Safety Barrier Curb.

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DATE PREPARED 4/15/2014	
ROUTE B	STATE MO
DISTRICT BR	SHEET NO. 13
COUNTY BOONE	
JOB NO. J5S2186	
CONTRACT ID.	

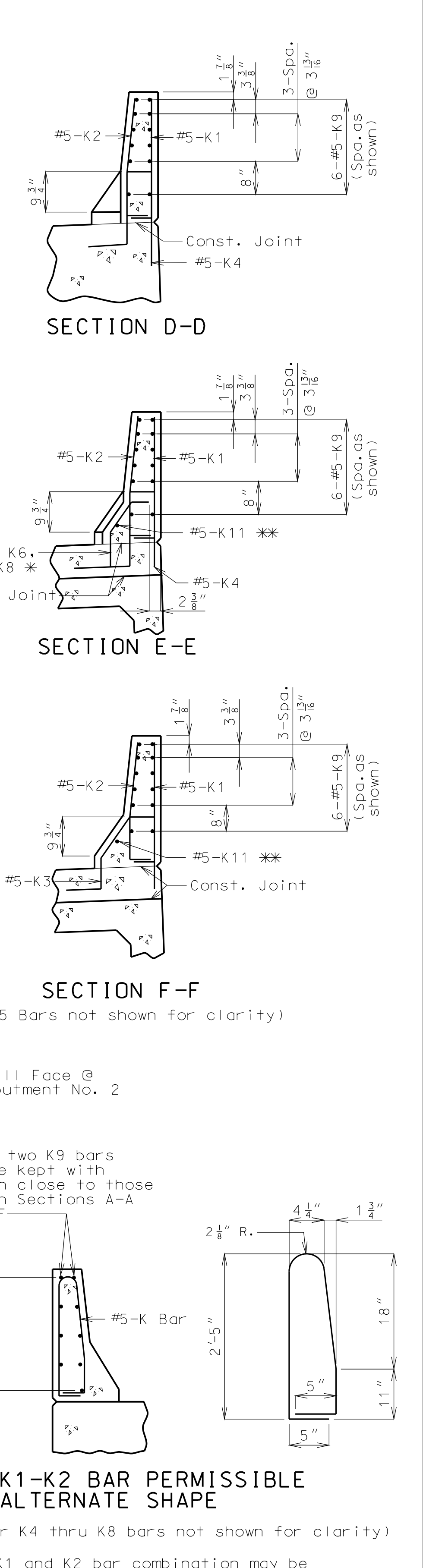
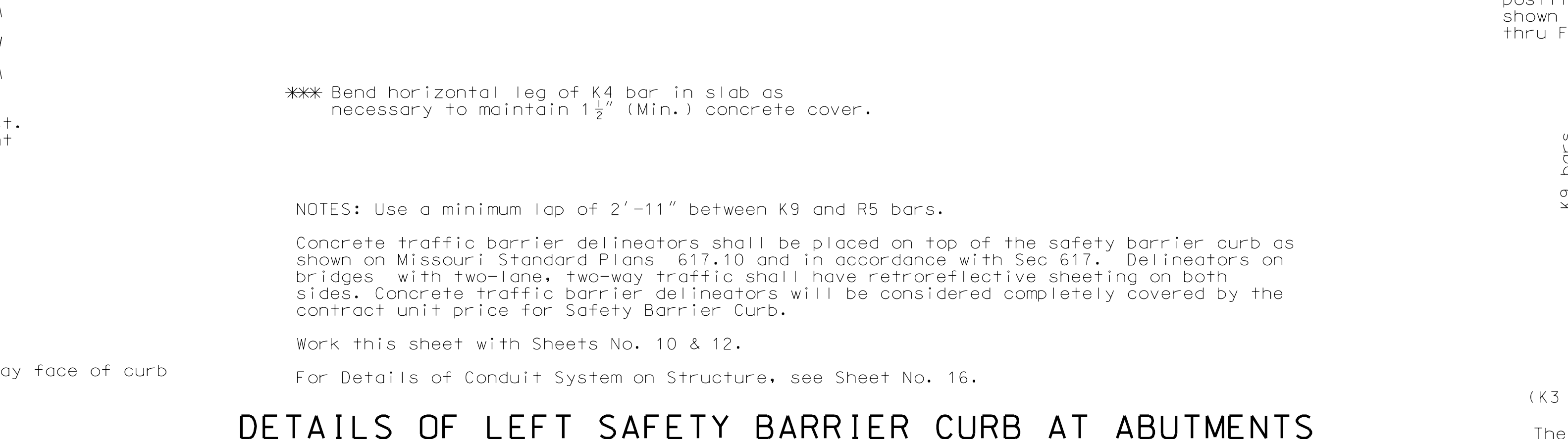
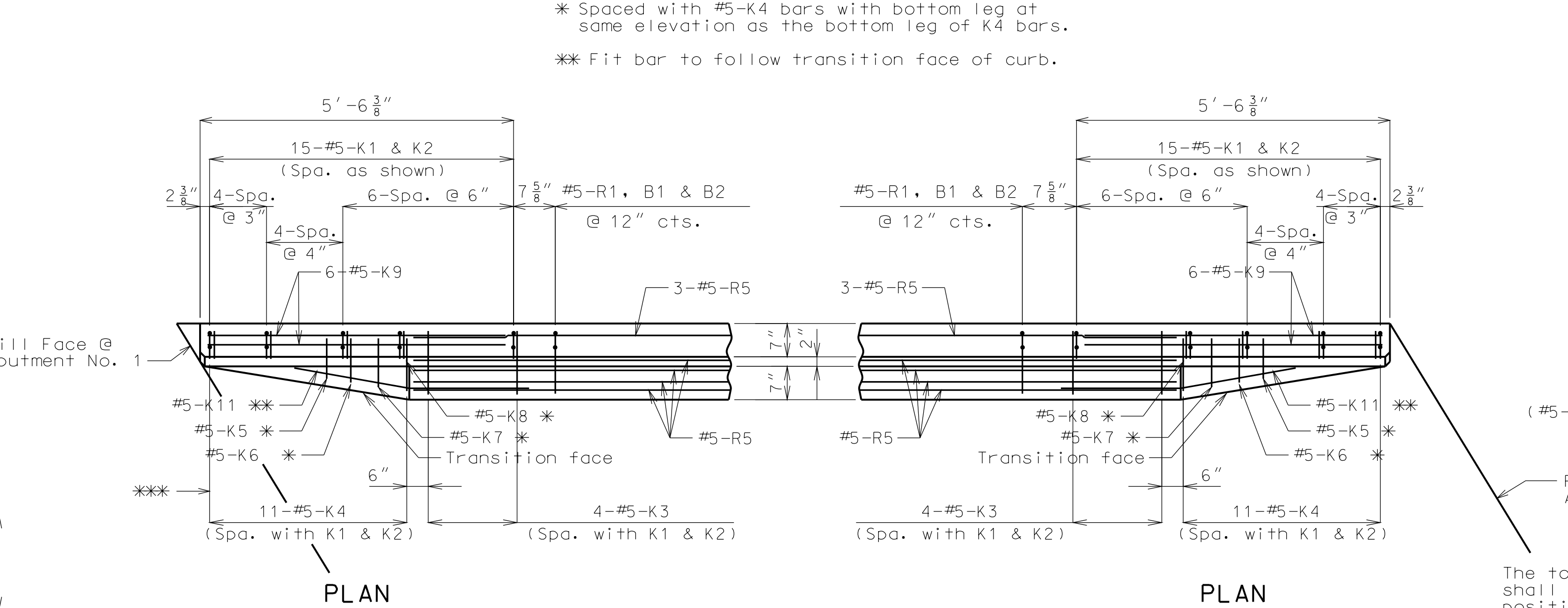
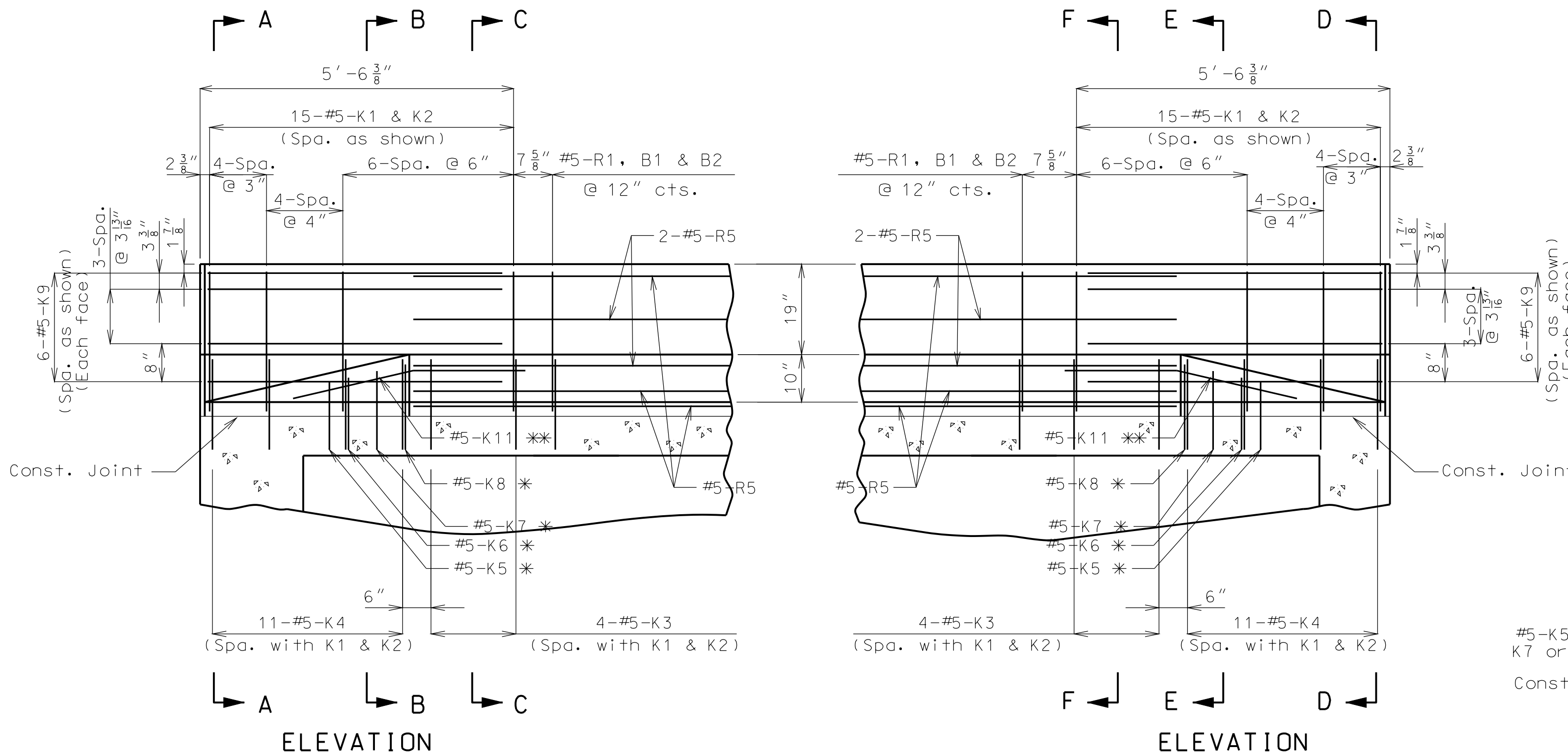
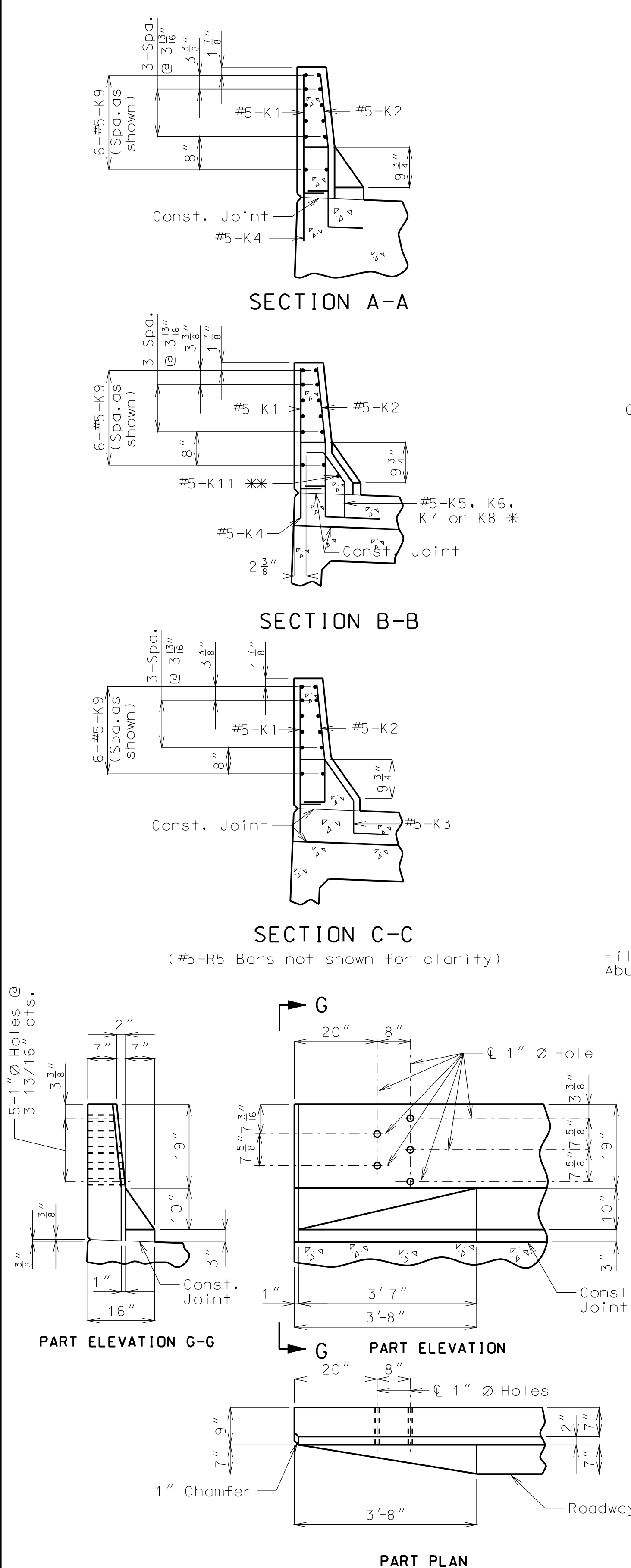
PROJECT NO.	
BRIDGE NO. A8165	

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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Detailed Mar. 2014
Checked Mar. 2014

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 14 of 20

DETAILS OF LEFT SAFETY BARRIER CURB AT ABUTMENTS

(Bicycle Rail not shown for clarity)

*** Bend horizontal leg of K4 bar in slab as necessary to maintain 1 1/2" (Min.) concrete cover.

NOTES: Use a minimum lap of 2'-11" between K9 and R5 bars.

Concrete traffic barrier delineators shall be placed on top of the safety barrier curb as shown on Missouri Standard Plans 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for Safety Barrier Curb.

Work this sheet with Sheets No. 10 & 12.

For Details of Conduit System on Structure, see Sheet No. 16.

The top two K9 bars shall be kept with position close to those shown in Sections A-A thru F-F

K1-K2 BAR PERMISSIBLE ALTERNATE SHAPE

(K3 or K4 thru K8 bars not shown for clarity)

The K1 and K2 bar combination may be furnished as one bar as shown, at the contractor's option.

ADJACENT BOX BEAM ALTERNATE

"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."

DATE PREPARED 4/15/2014	
ROUTE B	STATE MO
DISTRICT BR	SHEET NO. 14

COUNTY BOONE	
JOB NO. J5S2186	
CONTRACT ID.	

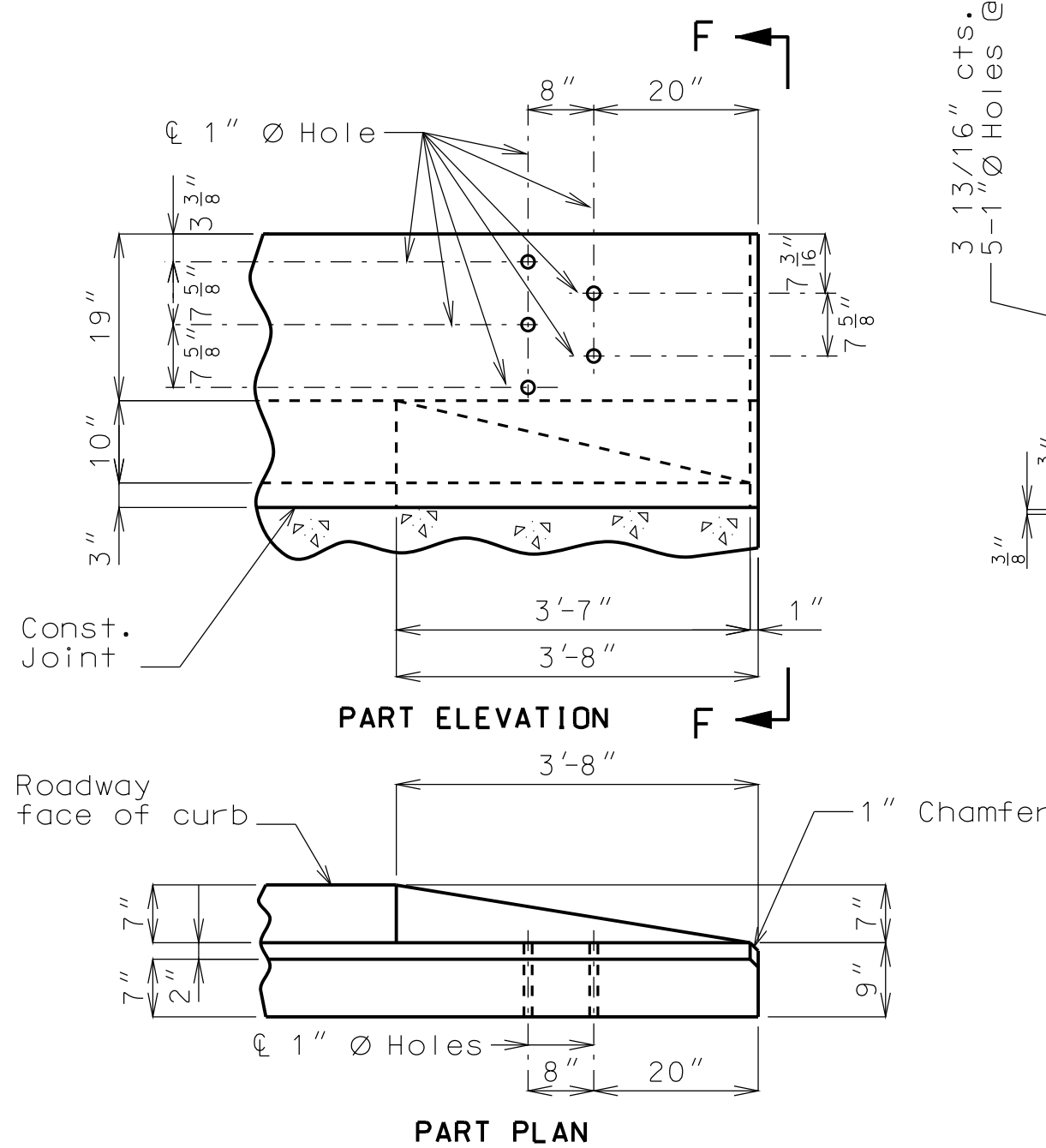
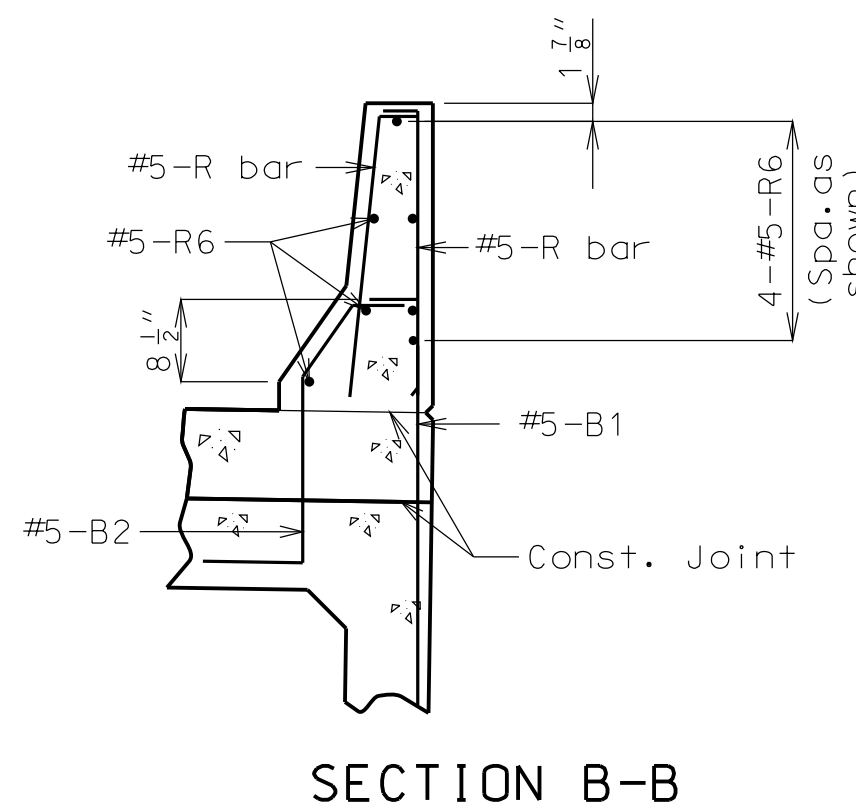
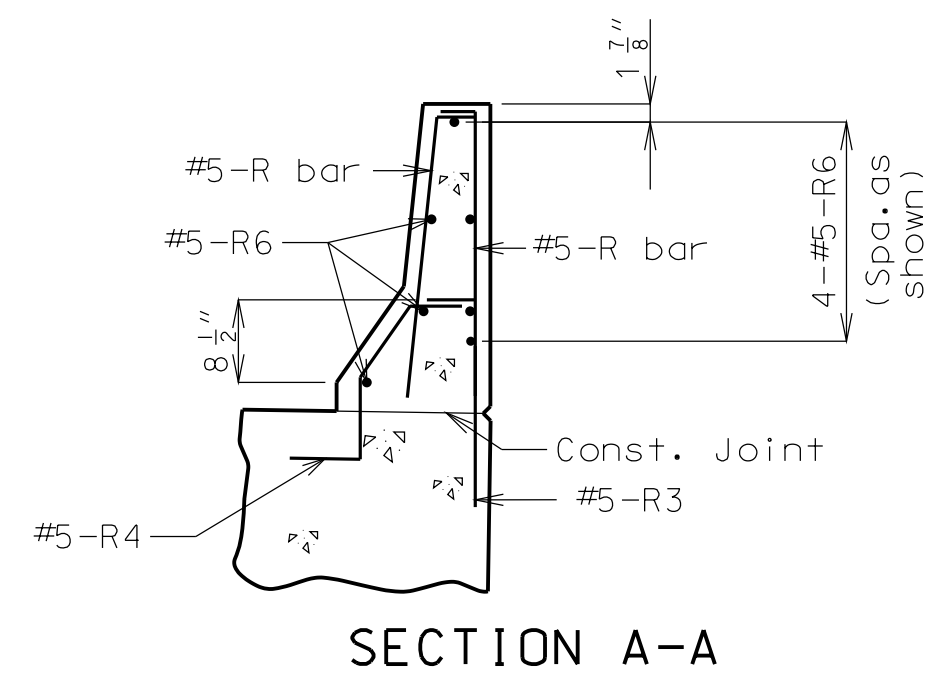
PROJECT NO.	
BRIDGE NO. A8165	

DESCRIPTION	DATE

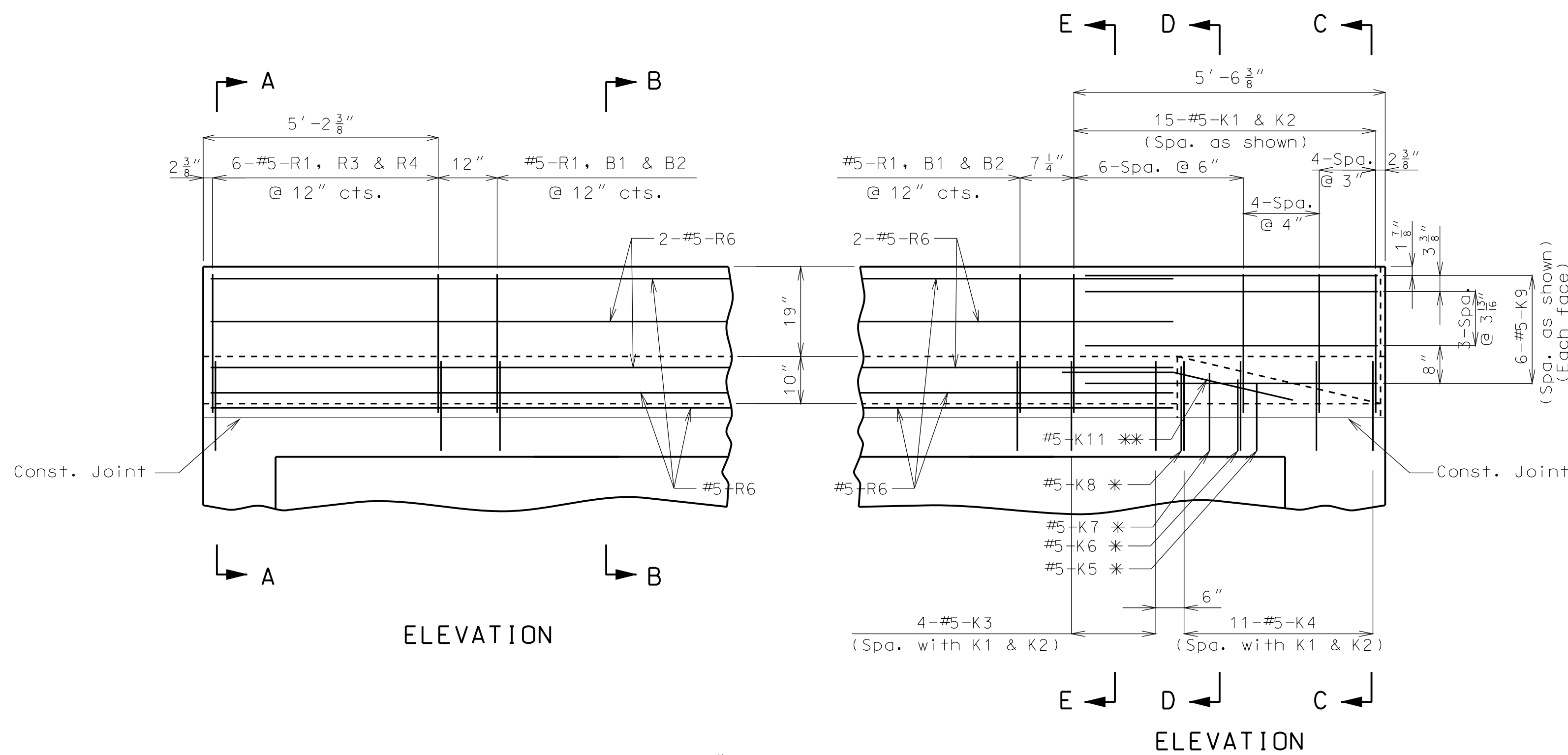
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-273-6636)

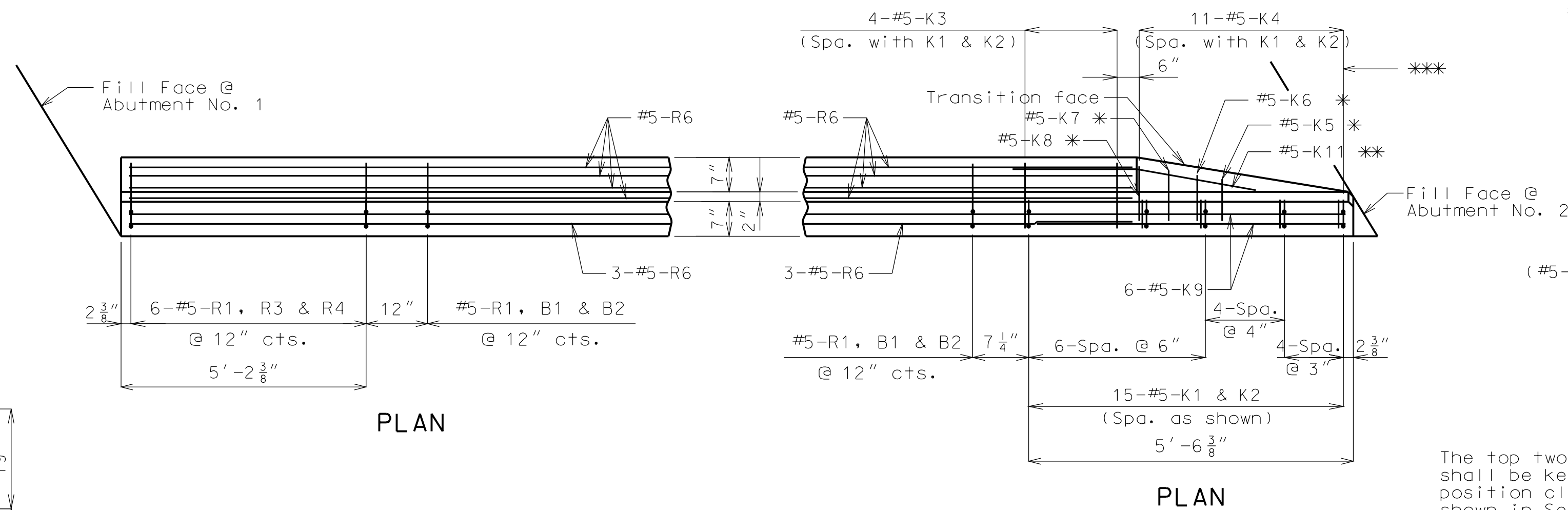
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



DETAILS OF GUARD RAIL ATTACHMENT



* Spaced with #5-K4 bars with bottom leg at same elevation as the bottom leg of K4 bars.
 ** Fit bar to follow transition face of curb.



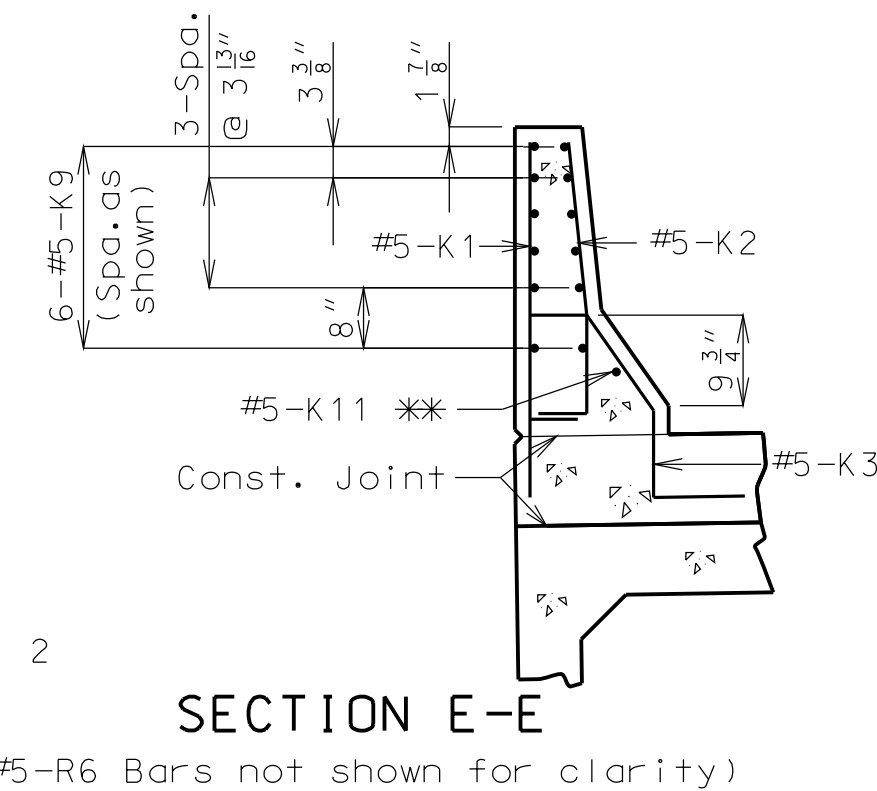
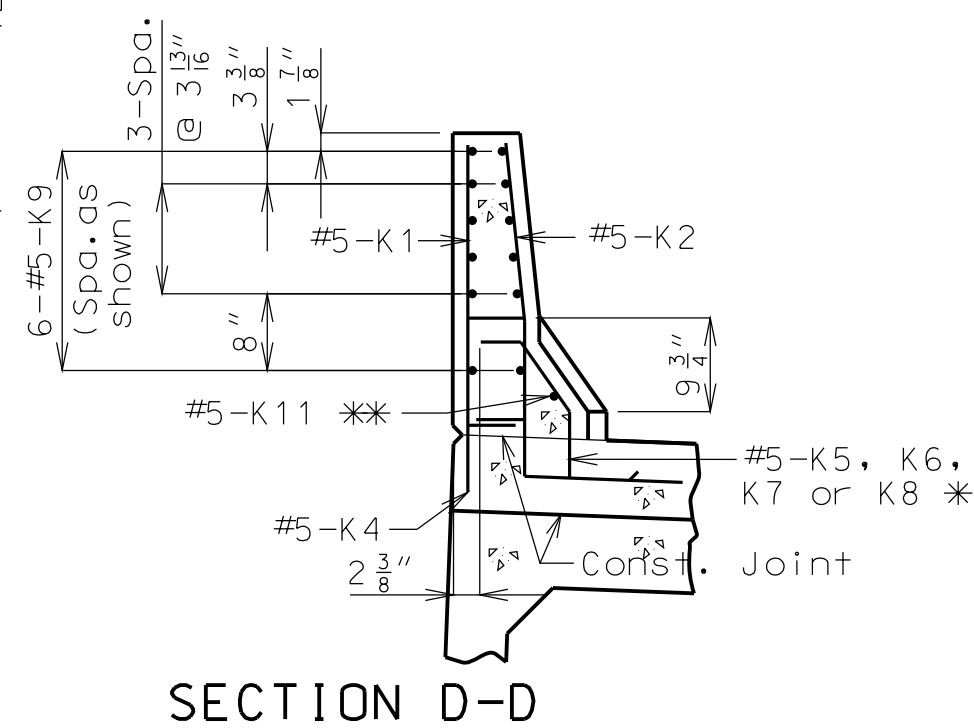
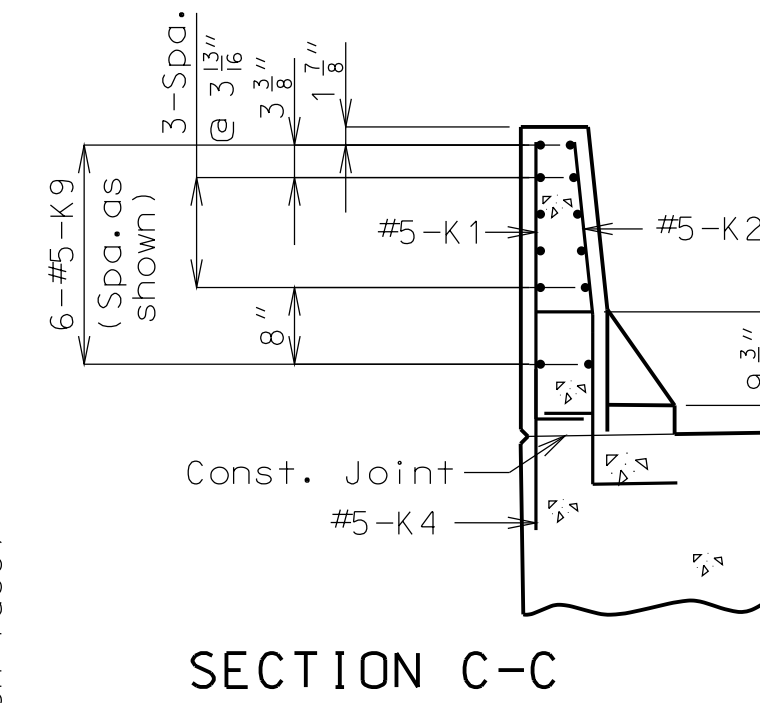
*** Bend horizontal leg of K4 bar in slab as necessary to maintain 1 1/2\"/>

NOTES: Use a minimum lap of 2'-11\"/>

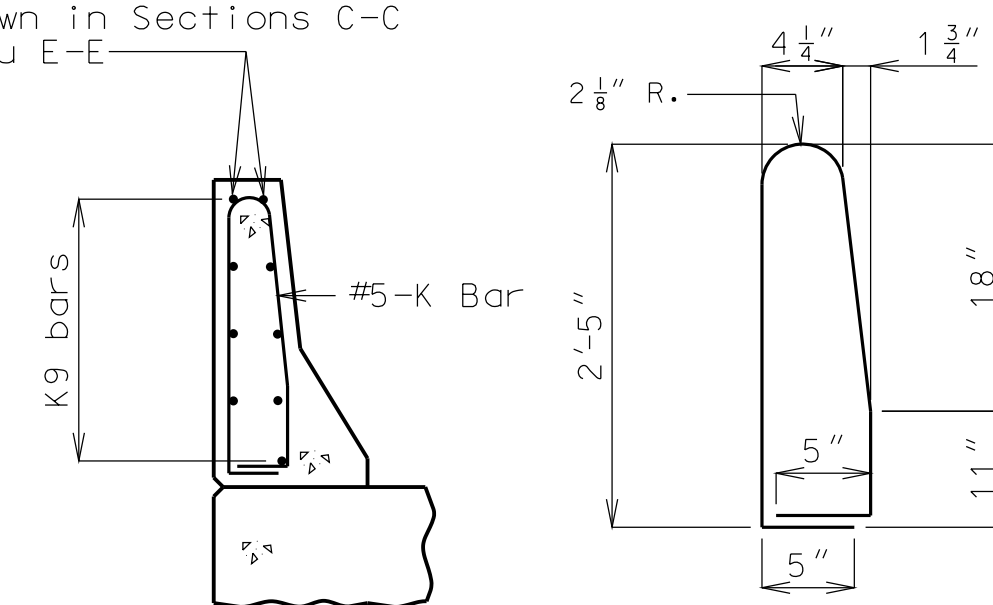
Concrete traffic barrier delineators shall be placed on top of the safety barrier curb as shown on Missouri Standard Plans 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for Safety Barrier Curb.

Work this sheet with Sheets No. 10 & 13.

DETAILS OF RIGHT SAFETY BARRIER CURB AT ABUTMENTS



The top two K9 bars shall be kept with position close to those shown in Sections C-C thru E-E



K1-K2 BAR PERMISSIBLE ALTERNATE SHAPE
 (K3 or K4 thru K8 bars not shown for clarity)

The K1 and K2 bar combination may be furnished as one bar as shown, at the contractor's option.

ADJACENT BOX BEAM ALTERNATE

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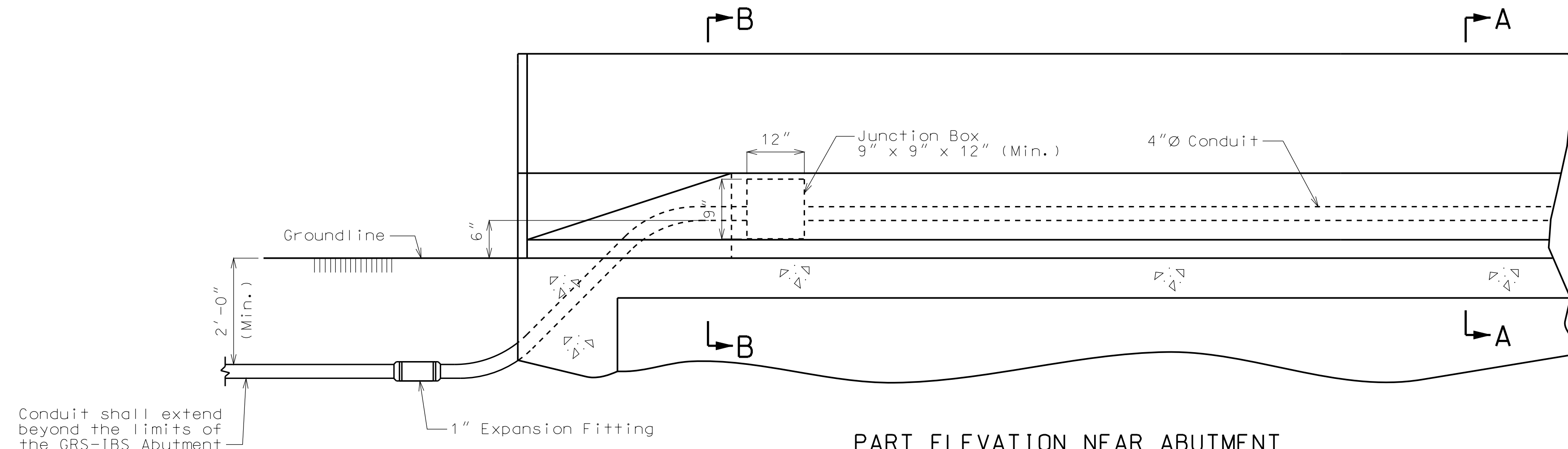
DATE PREPARED 4/15/2014	
ROUTE B	STATE MO
DISTRICT BR	SHEET NO. 15
COUNTY BOONE	
JOB NO. J5S2186	
CONTRACT ID.	
PROJECT NO.	
BRIDGE NO. A8165	

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

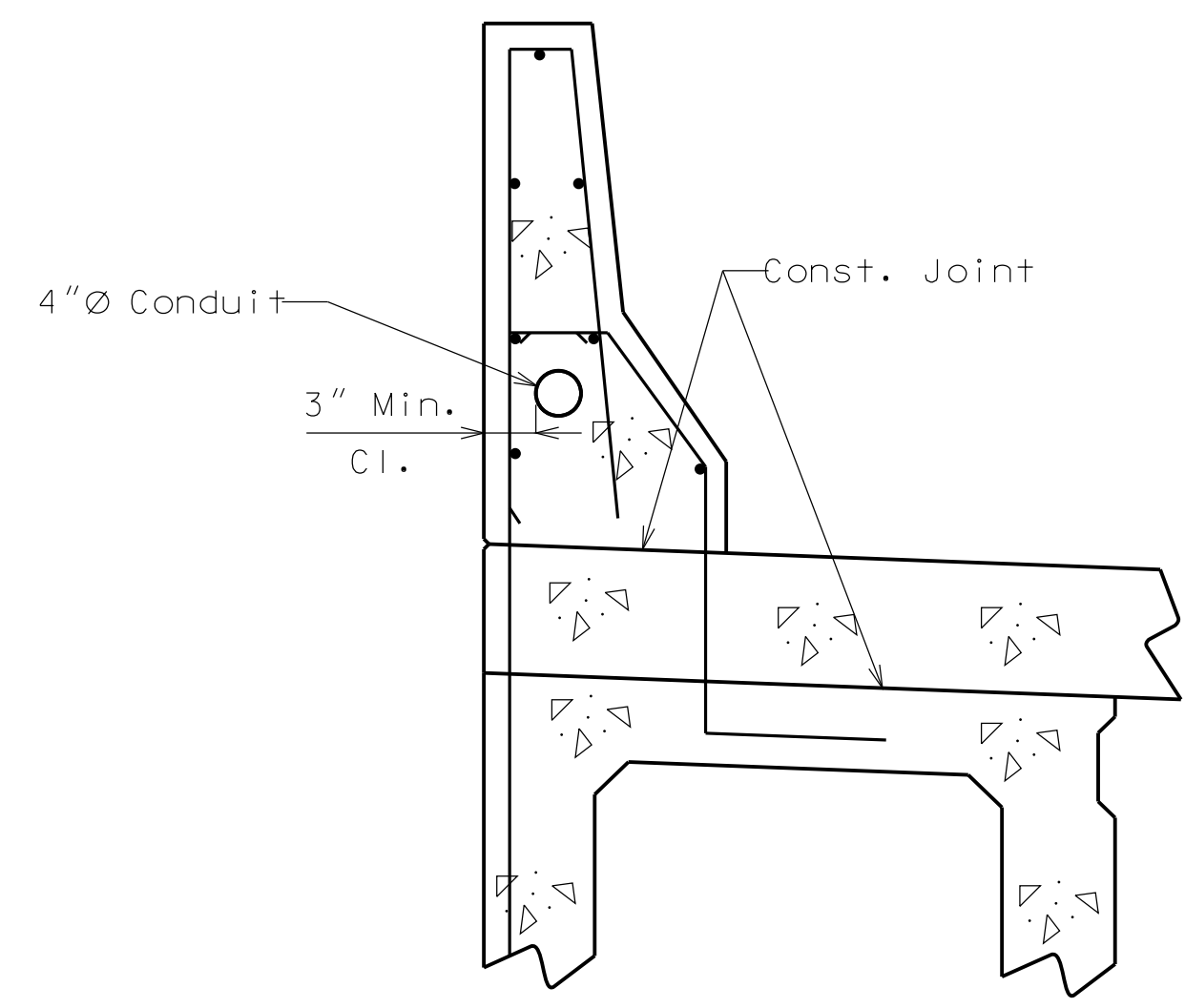
105 WEST CAPITOL
 JEFFERSON CITY, MO 65102
 1-888-ASK-MODOT (1-888-273-6636)

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

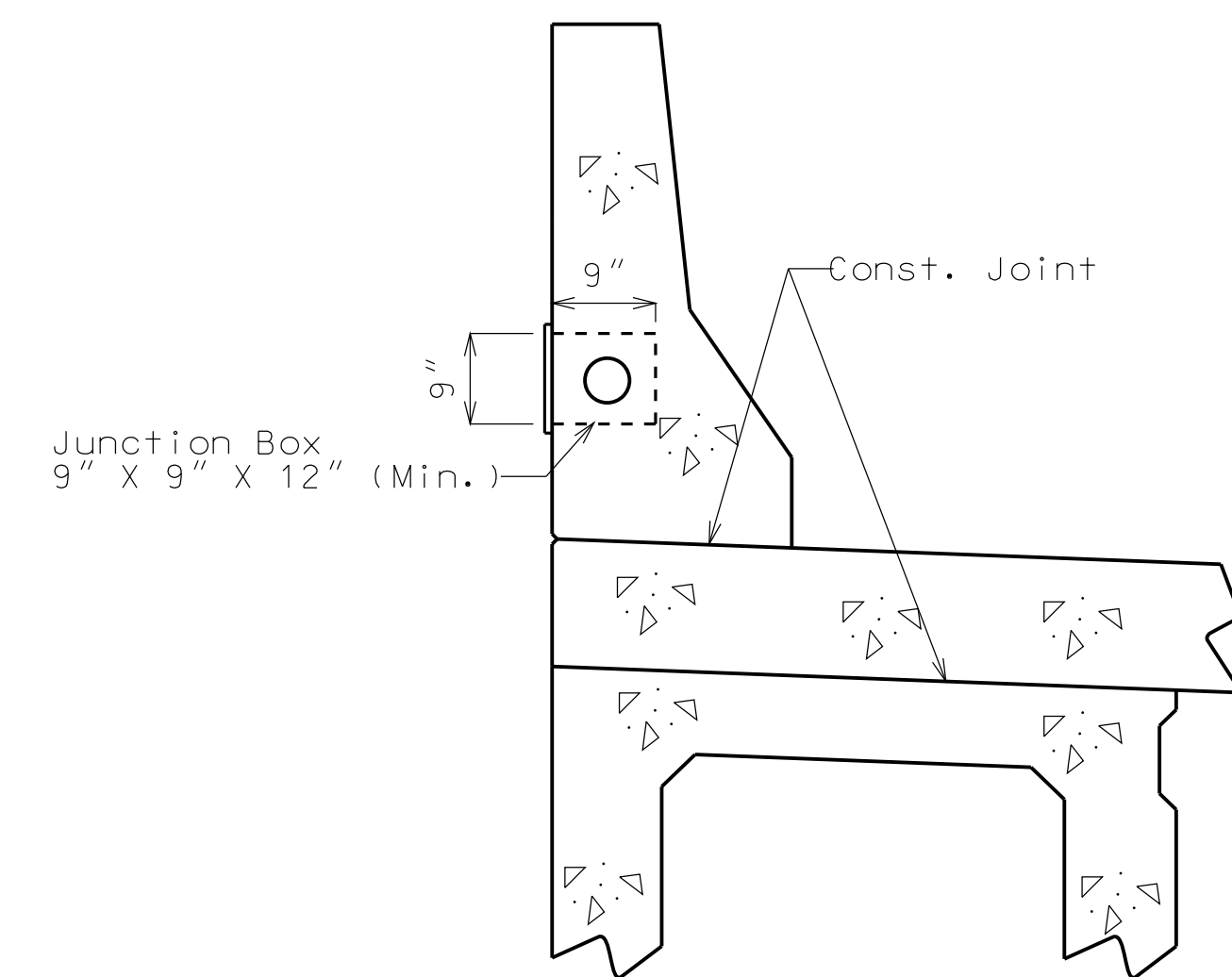


PART ELEVATION NEAR ABUTMENT
 (Abutment No. 1 shown, Abutment No. 2 similar)
 (Bicycle Rail not shown for clarity)

Conduit shall extend beyond the limits of the GRS-IBS Abutment



PART SECTION A-A



PART SECTION B-B

Notes:

All conduit shall be rigid non-metallic schedule 40 heavy wall PVC (polyvinyl chloride plastic) with 3" minimum cover in concrete. Each section of conduit shall bear the Underwriters Laboratories, (UL) label.

All safety barrier curb junction boxes shall be PVC molded in accordance with Sec 1062 and designed for flush mounting. The conduit terminations shall be permanent or separable. The terminations and covers shall be of watertight construction and shall meet requirements for NEMA 4 enclosure.

Drainage shall be provided at low points or other critical locations of all conduits and all junction boxes in accordance with Sec 707. All conduits shall be sloped to drain where possible.

Expansion fittings shall be placed as shown and set in accordance with the manufacturer's requirements and based on the air temperature at the time of setting given an estimated total expansion movement of 1" at open joints and 1" at filled joints using a maximum temperature range of 120° F and a maximum temperature of 110° F.

Shift reinforcing steel in field where necessary to clear conduit and junction boxes.

Conduit should be placed within the GRS-IBS Abutments as to not interfere with installation of guard rail posts.

Payment for furnishing and installing Conduit System, complete-in-place, measured from the outer limits of GRS Abutment No. 1 to outer limits of GRS Abutment No. 2, will be considered completely covered by the contract lump sum price for Conduit System on Structure.

DETAILS OF CONDUIT SYSTEM (LEFT SIDE OF STRUCTURE)

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DATE PREPARED 4/15/2014	
ROUTE B	STATE MO
DISTRICT BR	SHEET NO. 16
COUNTY BOONE	
JOB NO. J5S2186	
CONTRACT ID.	
PROJECT NO.	
BRIDGE NO. A8165	

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
 JEFFERSON CITY, MO 65102
 1-888-ASK-MODOT (1-888-275-6636)

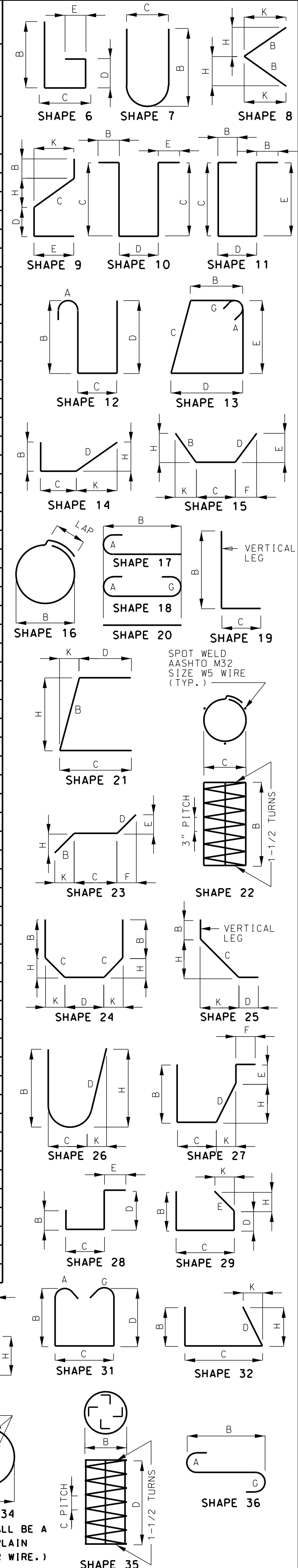
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO.	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS								NOMINAL LENGTH	ACTUAL LENGTH	WEIGHT
									B	C	D	E	F	H	K				
									FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.				
		ABUTS 1&2																	
8	5 H10	BACKWALL	E	20													310		
16	5 H11	STRAND TIE	E	20													64		
64	5 U10	BACKWALL	E	19													384		
		SLAB																	
38	5 S1	SLAB	E	20													1258		
54	5 S2	SLAB	E	20													1887		
30	5 S3	SLAB	E	20	V	2													
		INCREMENT = 24.500 INCH																512	
		BARRIER CURB																	
45	5 K1	BARRIER CURB	E	19	S												129		
45	5 K2	BARRIER CURB	E	14	S												129		
12	5 K3	BARRIER CURB	E	27	S												51		
33	5 K4	BARRIER CURB	E	28	S												135		
3	5 K5	BARRIER CURB	E	27	S												8		
3	5 K6	BARRIER CURB	E	27	S												8		
3	5 K7	BARRIER CURB	E	27	S												8		
3	5 K8	BARRIER CURB	E	27	S												9		
36	5 K9	BARRIER CURB	E	20													247		
3	5 K11	BARRIER CURB	E	8													14		
112	5 R1	BARRIER CURB	E	26													604		
6	5 R3	BARRIER CURB	E	19	S												11		
6	5 R4	BARRIER CURB	E	27	S												17		
7	5 R5	BARRIER CURB	E	20													414		
14	5 R6	BARRIER CURB	E	20													466		
		SLIP FORM																	
4	5 C1	SLIP FORM	E	20													42		
		TOTALS																	
5		TOTAL	E														6707		
		TOTAL	E														0		
		TOTAL	E														6707		
		Slab on Girder																	
5		TOTAL	E														4415		
		TOTAL	E														4415		
		Safety Barrier Curb																	

BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO.	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS								NOMINAL LENGTH	ACTUAL LENGTH	WEIGHT
									B	C	D	E	F	H	K				
									FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.				
5		TOTAL	E														2250		
		Slip Form Option																	
5		TOTAL	E														42		



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DATE PREPARED: 4/15/2014

ROUTE: B STATE: MO

DISTRICT: BR SHEET NO.: 17

COUNTY: BOONE

JOB NO.: J5S2186

CONTRACT ID.

PROJECT NO.

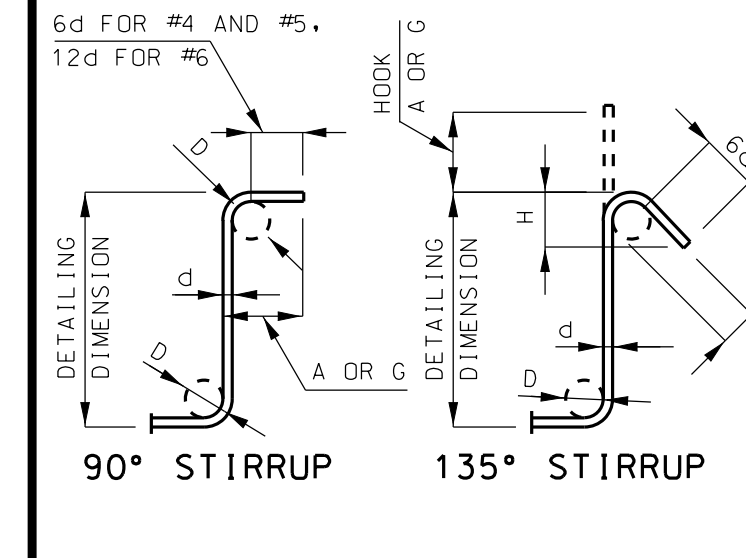
BRIDGE NO.: A8165

DESCRIPTION

DATE

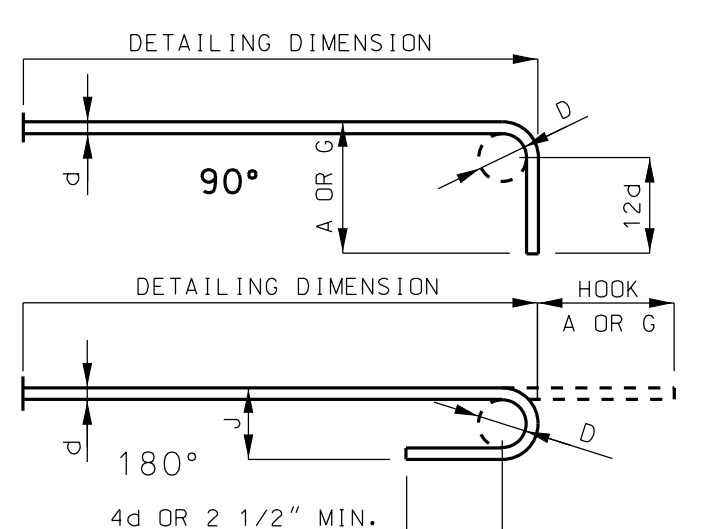
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-273-6636)



BAR SIZE	D (IN.)	90° HOOK		135° HOOK		APPROX. H
		HOK A OR G	HOK A OR G	HOK A OR G	HOK A OR G	
#4	2"	4 1/2"	4 1/2"	3"		
#5	2 1/2"	6"	5 1/2"	3 3/4"		
#6	4 1/2"	12"	8"	4 1/2"		

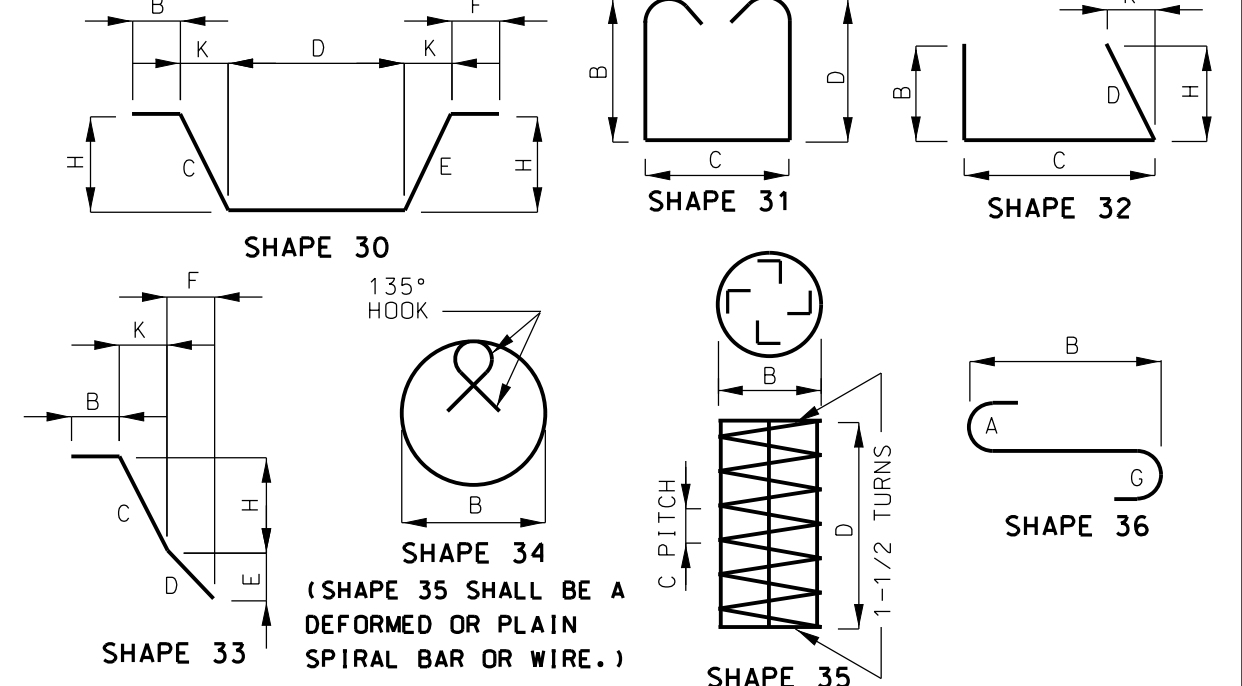
NOTE: UNLESS OTHERWISE NOTED, DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



BAR SIZE	D (IN.)	180° HOOKS		90° HOOKS	
		A OR G	J	A OR G	G
#3	2 1/4"	5"	3"	6"	
#4	3"	6"	4"	8"	
#5	3 3/4"	7"	5"	10"	
#6	4 1/2"	8"	6"	12"	
#7	5 1/4"	10"	7"	14"	
#8	6"	11"	8"	16"	
#9	9 1/2"	15"	11 3/4"	19"	
#10	10 3/4"	17"	13 1/4"	22"	
#11	12"	19"	14 3/4"	2'-0"	
#14	18 1/4"	2'-3"	21 3/4"	2'-7"	

TWO ADDITIONAL #5-S1 ARE INCLUDED IN THE BAR BILL FOR TESTING.

NOTE: ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS. HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET. E = EPOXY COATED REINFORCEMENT. S = STIRRUP. X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES. Y = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE. NO. EA. = NUMBER OF BARS OF EACH LENGTH. NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH) ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH. PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS. FOUR ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF SPIRALS DO NOT INCLUDE SPLICES OR SPACERS. REINFORCING STEEL (GRADE 60) F_y = 60,000 PSI.



IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

Missouri Department of Transportation
Construction and Materials

BORING NO. O-13-48

PAGE 1 OF 2

Job No.: J5S2186	County: Boone	Route: B	Logged By: Thomas Fennessey
Design: _____	Skew: 32° RA	Coordinate Units: U.S. Survey Feet	Operator: Ray Murray
Bent: 1	Location: Columbia, MO	Coordinate Proj. Factor: 1.0000958	Date of Work: 05/29/13-05/29/13
Station: 13+93.5	Northing: 1139964.1	Coordinate System: Modified U.S. State Plane 1983	Depth to Water: 0
Offset: 21.3L	Easting: 1694109.8	Coordinate Datum: NAD 83 (CONUS)	Time Change: 19 hours
Elevation: 768.5	Drilling Method: Hollow Stem Auger	Coordinate Zone: Missouri Central	Depth Hole Open: 15.2
Drill No.: G-9462	Hammer Efficiency: 69%	Equipment: Acker Soil XLS, Split-Spoon Sampler, Shelby Tube, NX	

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N_{60})	Pocket Pen (tsf)	Tonvane (tsf)	Saturated Unit Weight (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	USCS	Shear Data	Consolidation Parameters										
															P_1 (ksf)	P_e (ksf)	P_u (ksf)	e_1	e_c	e_2	C_c	C_v (ft ² /d)			
0-1'		Brown, LEAN CLAY, medium stiff to stiff, wet to moist																							
1-24.6'		Yellowish brown to tannish gray, LEAN CLAY, very stiff, moist																							
1-4.5'		occasional silty fine sand seams																							
6.8'		Shelby tube refusal	760	X 73	5-9-12 (24)	3.50		137.1	15																
10.5'		Recompression Index = 0.020																							
11.6'		Shelby tube refusal																							
12.2-12.9'		rock fragments																							
12.4'		SPT refusal																							
16.5'		Shelby tube refusal	750	X 100	8-44/0.2	4.50+		136.4	15																
21'		Recompression Index = 0.014																							
21.9'		Shelby tube refusal																							
24.6-25.3'		Gray and tan, LEAN CLAY with sand, hard, wet																							
25.3-25.7'		Gray, CLAYEY SAND, dense, wet																							
25.7-28.9'		Gray and tan, LEAN CLAY with sand, hard, wet	740	X 40	10-6-6 (14)	4.50		137.1	15																
26.1'		Shelby tube refusal																							
28.9-30.3'		Limestone, moderately weathered																							
30.3-31.9'		Limestone, grayish brown, thin to medium bedded, medium hard, moderately weathered to slightly weathered																							
30.3-35.3'		RQD 75% on limestone portion only																							

(1) = Assumed, (2) = Actual (Continued Next Page)

Missouri Department of Transportation
Construction and Materials

BORING NO. O-13-48

PAGE 2 OF 2

Job No.: J5S2186	County: Boone	Route: B	Logged By: Thomas Fennessey
Design: _____	Skew: 32° RA	Coordinate Units: U.S. Survey Feet	Operator: Ray Murray
Bent: 1	Location: Columbia, MO	Coordinate Proj. Factor: 1.0000958	Date of Work: 05/29/13-05/29/13
Station: 13+93.5	Northing: 1139964.1	Coordinate System: Modified U.S. State Plane 1983	Depth to Water: 0
Offset: 21.3L	Easting: 1694109.8	Coordinate Datum: NAD 83 (CONUS)	Time Change: 19 hours
Elevation: 768.5	Drilling Method: Hollow Stem Auger	Coordinate Zone: Missouri Central	Depth Hole Open: 15.2
Drill No.: G-9462	Hammer Efficiency: 69%	Equipment: Acker Soil XLS, Split-Spoon Sampler, Shelby Tube, NX	

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N_{60})	Pocket Pen (tsf)	Tonvane (tsf)	Saturated Unit Weight (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	USCS	Shear Data	Consolidation Parameters										
															P_1 (ksf)	P_e (ksf)	P_u (ksf)	e_1	e_c	e_2	C_c	C_v (ft ² /d)			
31.9-32.9'		Shale, greenish gray, extremely soft																							
32.9-34.8'		Bituminous Coal, black																							
33.7-33.9'		limestone																							
34.8-38.7'		Shale, gray, extremely soft to very soft (continued)	730																						
39.7-42.5'		Limestone, gray, thin to medium bedded, medium hard, slightly weathered																							
39.8-44.8'		RQD 71% on limestone portion only																							
42.5-55'		Shale, gray, extremely soft to very soft	720																						
54.8-59.8'		RQD 100% on dolomite portion only																							
55-57.8'		Shale, greenish gray, very soft																							
57.8-59.3'		Dolomite, tan, moderately hard	710																						
59.3-59.8'		Shale, gray, extremely soft to very soft																							
		Bottom of borehole at 59.8 feet.																							

(1) = Assumed, (2) = Actual

BORING DATA

Note: For locations of borings, see Sheet No. 1.

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 18 of 20

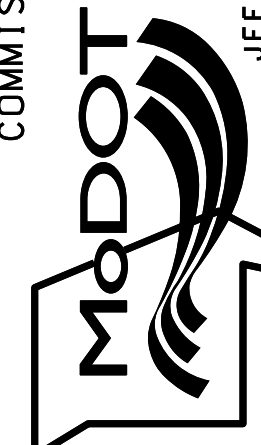
Detailed Mar. 2014
Checked Mar. 2014

ADJACENT BOX BEAM ALTERNATE

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DATE PREPARED	
4/15/2014	
ROUTE	STATE
B	MO
DISTRICT	SHEET NO.
BR	18
COUNTY	
BOONE	
JOB NO.	
J5S2186	
CONTRACT ID.	
PROJECT NO.	
BRIDGE NO.	
A8165	
DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION



105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MD0T (1-888-273-6636)

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Missouri Department of Transportation
Construction and Materials

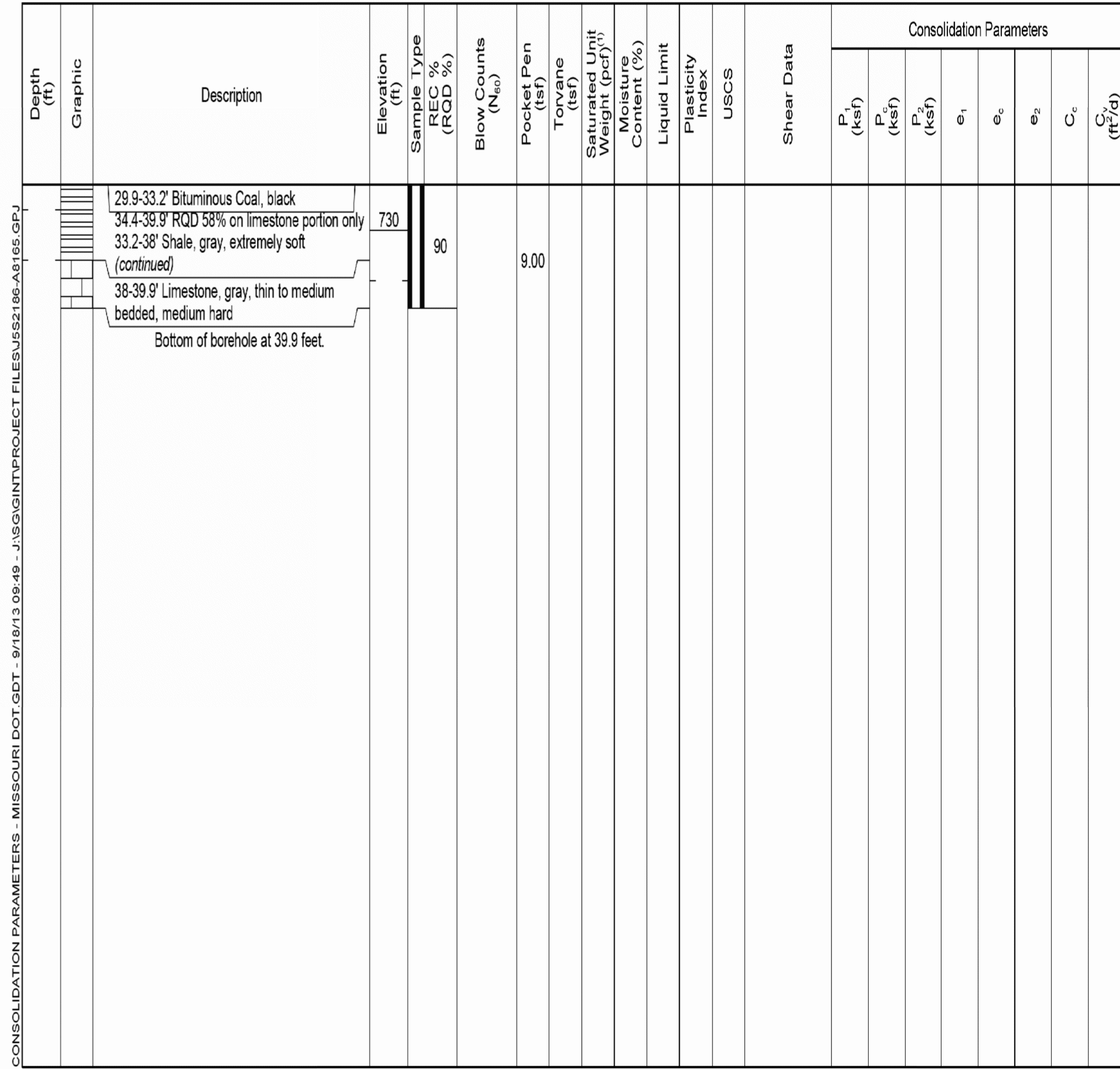
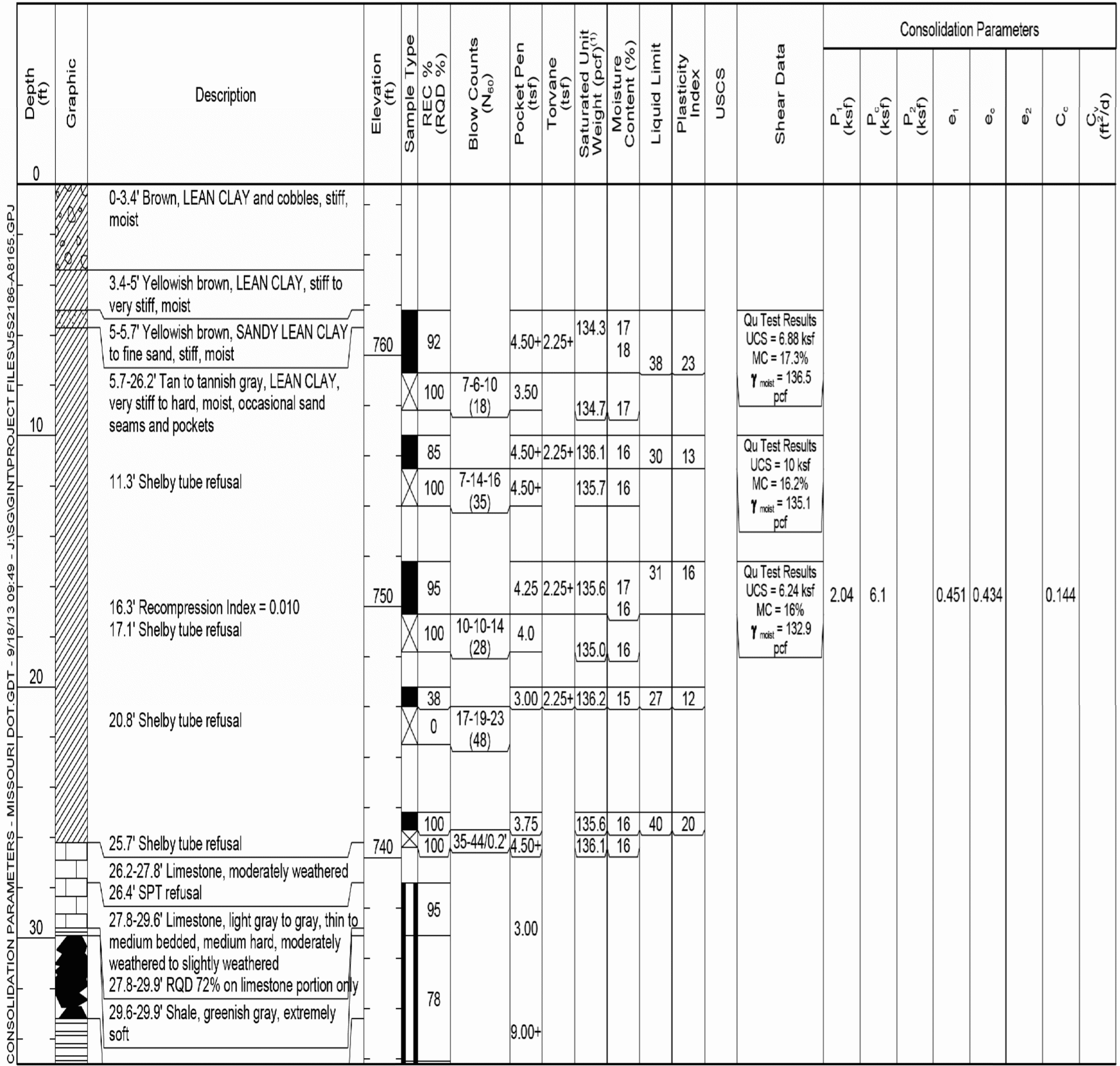
BORING NO. O-13-49
PAGE 1 OF 2

Job No.: J5S2186 County: Boone Route: B Logged By: Thomas Fennessey
 Design: Skew: 32° RA Coordinate Units: U.S. Survey Feet Operator: Ray Murray
 Bent: 2 Location: Columbia, MO Coordinate Proj. Factor: 1.0000958 Date of Work: 05/30/13-05/30/13
 Station: 14+57.5 Northing: 1140012.3 Coordinate System: Modified U.S. State Plane 1983 Depth to Water:
 Offset: 27.0R Easting: 1694192.9 Coordinate Datum: NAD 83 (CONUS) Time Change: 0 hours
 Elevation: 766.8 Drilling Method: Hollow Stem Auger Coordinate Zone: Missouri Central Depth Hole Open:
 Drill No.: G-9462 Hammer Efficiency: 69% Equipment: Acker Soil XLS, Split-Spoon Sampler, Shelby Tube, NX

Missouri Department of Transportation
Construction and Materials

BORING NO. O-13-49
PAGE 2 OF 2

Job No.: J5S2186 County: Boone Route: B Logged By: Thomas Fennessey
 Design: Skew: 32° RA Coordinate Units: U.S. Survey Feet Operator: Ray Murray
 Bent: 2 Location: Columbia, MO Coordinate Proj. Factor: 1.0000958 Date of Work: 05/30/13-05/30/13
 Station: 14+57.5 Northing: 1140012.3 Coordinate System: Modified U.S. State Plane 1983 Depth to Water:
 Offset: 27.0R Easting: 1694192.9 Coordinate Datum: NAD 83 (CONUS) Time Change: 0 hours
 Elevation: 766.8 Drilling Method: Hollow Stem Auger Coordinate Zone: Missouri Central Depth Hole Open:
 Drill No.: G-9462 Hammer Efficiency: 69% Equipment: Acker Soil XLS, Split-Spoon Sampler, Shelby Tube, NX



THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT.

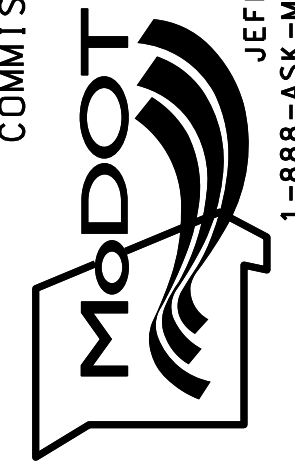
DATE PREPARED 4/15/2014	
ROUTE B	STATE MO
DISTRICT BR	SHEET NO. 19

COUNTY
BOONE
JOB NO.
J5S2186
CONTRACT ID.

BRIDGE NO.
A8165

DESCRIPTION	DATE

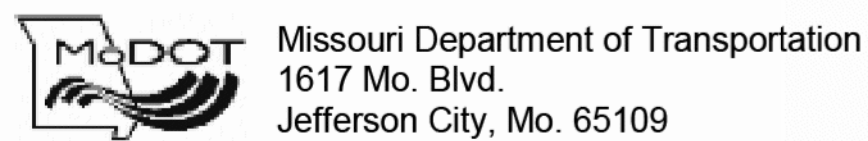
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION



105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

BORING DATA



Missouri Department of Transportation
1617 Mo. Blvd.
Jefferson City, Mo. 65109

KEY TO SYMBOLS

CLIENT MoDOT Bridge Division PROJECT NAME Route B (Paris Road) over Business Loop 70
PROJECT NUMBER J5S2186 PROJECT LOCATION Columbia, MO

LITHOLOGIC SYMBOLS (Unified Soil Classification System)

- CL: USCS Low Plasticity Clay
- CLG: USCS Low Plasticity Gravelly Clay
- CLS: USCS Low Plasticity Sandy Clay
- COAL: Coal
- DOLOMITE: Dolomite
- LIMESTONE: Limestone
- SC: USCS Clayey Sand
- SHALE: Shale

SAMPLER SYMBOLS

- Rock Core
- Split-Spoon Sampler
- Shelby Tube

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

- LL - LIQUID LIMIT (%)
- PI - PLASTIC INDEX (%)
- W - MOISTURE CONTENT (%)
- DD - DRY DENSITY (PCF)
- NP - NON PLASTIC
- 200 - PERCENT PASSING NO. 200 SIEVE
- PP - POCKET PENETROMETER (TSF)
- TV - TORVANE
- PID - PHOTOIONIZATION DETECTOR
- UC - UNCONFINED COMPRESSION
- ppm - PARTS PER MILLION
- Water Level at Time of Drilling
- Water Level at End of Drilling
- Water Level after Drilling

KEY TO SYMBOLS - MISSOURI DOT.GDT - 9/18/13 09:49 - J:\SG\GIT\PROJECT FILES\J5S2186-A8165.GPJ

BORING DATA

Note: For locations of borings, see Sheet No. 1.

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 20 of 20

"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."

DATE PREPARED
4/15/2014

ROUTE B	STATE MO
DISTRICT BR	SHEET NO. 20

COUNTY
BOONE
JOB NO.
J5S2186
CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A8165

DATE	DESCRIPTION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



Missouri Department of Transportation

Vendor Ranking

Call Order: D06 **Contract ID:** 140523-D06 **Counties:** BOONE

Letting Date: May 23, 2014 11:00 a.m. **District(s):** Central

Contract Time: 10/01/14 COMPLETION DATE **Min:** **Max:**

Contract Description: J5S2186 - ROUTE B - BOONE COUNTY

Project(s): FAS-S400(36)

Rank	Vendor ID/Name	Total Bid	Percent Of Low Bid	Bid Status
1	0011146 APAC-Missouri, Inc.	\$881,239.00	100.00%	
2	0010191 J. C. Industries, Inc.	\$1,129,551.30	128.18%	



CONTRACT ID: 140523-D06
 LETTING DATE: 05/23/14

TABULATION OF BIDS

Call No:			
D06	APAC-Missouri, Inc.	Jeff City Industry, Inc.	
	Low Bid	2nd Low	

Project J5S2186: Bridge replacement

Section 0001: ROADWAY ITEMS - J5S2186

Item ID	Description	Unit	Quantity	Unit Price	Total Price
0010	202-20.10 REMOVAL OF IMPROVEMENTS	LUMP SUM			
Lump Sum	\$13,000.00	\$51,000.00			
0020	203-10.00 CLASS A EXCAVATION	517 CUYD			
Bid Price	38.00	19.00			
Bid Amount	\$19,646.00	\$9,823.00			
0030	214-20.00 FURNISHING ROCK FILL	86 CUYD			
Bid Price	43.00	25.00			
Bid Amount	\$3,698.00	\$2,150.00			
0040	214-30.00 PLACING ROCK FILL	86 CUYD			
Bid Price	44.00	22.00			
Bid Amount	\$3,784.00	\$1,892.00			
0050	304-01.43 TYPE 1 AGGREGATE FOR BASE (4 IN. THICK)	190 SQYD			
Bid Price	13.00	7.15			
Bid Amount	\$2,470.00	\$1,358.50			
0060	304-01.63 TYPE 1 AGGREGATE FOR BASE (6 IN. THICK)	1,128 SQYD			
Bid Price	10.00	7.15			
Bid Amount	\$11,280.00	\$8,065.20			
0070	401-01.04 11 INCHES, BITUMINOUS PAVEMENT	1,448.50 SQYD			
Bid Price	57.60	62.80			
Bid Amount	\$83,433.60	\$90,965.80			
0080	401-01.50 TYPE A2 SHOULDER	20.30 SQYD			
Bid Price	165.00	71.00			
Bid Amount	\$3,349.50	\$1,441.30			
0090	502-11.06 CONCRETE PAVEMENT (6 IN. NON-REINF)	118.80 SQYD			
Bid Price	60.00	66.00			
Bid Amount	\$7,128.00	\$7,840.80			
0100	502-99.05 MISC. CONCRETE PAVEMENT 7 1/2" NON REINFORCED	71 SQYD			
Bid Price	77.00	76.00			
Bid Amount	\$5,467.00	\$5,396.00			
0110	603-99.02 WATER ADJUST WATER VALVE METER	1 EA			
Bid Price	1000.00	1000.00			
Bid Amount	\$1,000.00	\$1,000.00			
0120	604-20.10 ADJUSTING MANHOLE	1 EA			
Bid Price	700.00	1000.00			
Bid Amount	\$700.00	\$1,000.00			
0130	606-10.11A GUARDRAIL TYPE A, 7 FT. POST, 3 FT. - 1.5 IN SPACING	13 LF			
Bid Price	35.00	35.00			
Bid Amount	\$455.00	\$455.00			



CONTRACT ID: 140523-D06
 LETTING DATE: 05/23/14

TABULATION OF BIDS

Call No:

D06

	APAC-Missouri, Inc.	Jeff City Industry, Inc.
	Low Bid	2nd Low

0140	606-22.02A	BRIDGE ANCHOR SECTION, 7.5 FT. POSTS (SAFETY BARRIER CURB) (ROADWAY AND REHABILITATION WORK ONLY)	3 EA
Bid Price	1720.00	2250.00	
Bid Amount	\$5,160.00	\$6,750.00	
0150	606-23.01A	TRANSITION SECTION, 7.5 FT. POSTS	3 EA
Bid Price	430.00	700.00	
Bid Amount	\$1,290.00	\$2,100.00	
0160	606-30.15	TYPE A CRASHWORTHY END TERMINAL	1 EA
Bid Price	2125.00	2665.00	
Bid Amount	\$2,125.00	\$2,665.00	
0170	606-66.10	END ANCHOR	1 EA
Bid Price	800.00	1180.00	
Bid Amount	\$800.00	\$1,180.00	
0180	606-99.02	MISC. X-TENSION CRASHWORTHY END TERMINAL	1 EA
Bid Price	3345.00	3550.00	
Bid Amount	\$3,345.00	\$3,550.00	
0190	608-60.04	CONCRETE SIDEWALK, 4 IN.	32.40 SQYD
Bid Price	65.00	62.00	
Bid Amount	\$2,106.00	\$2,008.80	
0200	609-10.10	CONCRETE CURB (6 IN. HEIGHT AND UNDER) TYPE S	221 LF
Bid Price	50.00	29.50	
Bid Amount	\$11,050.00	\$6,519.50	
0210	609-10.51	CURB AND GUTTER TYPE A	20 LF
Bid Price	70.00	57.00	
Bid Amount	\$1,400.00	\$1,140.00	
0220	609-10.52	CURB AND GUTTER TYPE B	65 LF
Bid Price	34.00	41.00	
Bid Amount	\$2,210.00	\$2,665.00	
0230	609-10.55	CONCRETE CURB AND GUTTER (4 INCH)	46 LF
Bid Price	103.00	44.00	
Bid Amount	\$4,738.00	\$2,024.00	
0240	611-30.10	FURNISHING TYPE 1 ROCK BLANKET	74 CUYD
Bid Price	42.00	25.00	
Bid Amount	\$3,108.00	\$1,850.00	
0250	611-30.30	PLACING TYPE 1 ROCK BLANKET	74 CUYD
Bid Price	42.00	22.00	
Bid Amount	\$3,108.00	\$1,628.00	
0260	612-30.00A	TRUCK OR TRAILER MOUNTED ATTENUATOR (TMA)	2 EA
Bid Price	2000.00	9570.00	
Bid Amount	\$4,000.00	\$19,140.00	
0270	616-10.05	CONSTRUCTION SIGNS	1,565 SQFT
Bid Price	8.00	9.00	
Bid Amount	\$12,520.00	\$14,085.00	



CONTRACT ID: 140523-D06
 LETTING DATE: 05/23/14

TABULATION OF BIDS

Call No: **D06**
 APAC-Missouri, Inc. **Low Bid**
 Jeff City Industry, Inc. **2nd Low**

0280	616-10.08	ADVANCED WARNING RAIL SYSTEM				2 EA
Bid Price	50.00	54.50				
Bid Amount	\$100.00	\$109.00				
0290	616-10.09	FLAG ASSEMBLY				23 EA
Bid Price	20.00	22.00				
Bid Amount	\$460.00	\$506.00				
0300	616-10.25	CHANNELIZER (TRIM LINE)				138 EA
Bid Price	30.00	33.00				
Bid Amount	\$4,140.00	\$4,554.00				
0310	616-10.31	TYPE III MOVEABLE BARRICADE WITH LIGHT				23 EA
Bid Price	200.00	220.00				
Bid Amount	\$4,600.00	\$5,060.00				
0320	616-10.34	DIRECTIONAL INDICATOR BARRICADE WITH LIGHT				14 EA
Bid Price	60.00	70.00				
Bid Amount	\$840.00	\$980.00				
0330	616-10.40	FLASHING ARROW PANEL				2 EA
Bid Price	1000.00	1100.00				
Bid Amount	\$2,000.00	\$2,200.00				
0340	616-10.47	TYPE III OBJECT MARKER				4 EA
Bid Price	100.00	110.00				
Bid Amount	\$400.00	\$440.00				
0350	616-10.52	WARNING LIGHT, TYPE B				22 EA
Bid Price	50.00	54.50				
Bid Amount	\$1,100.00	\$1,199.00				
0360	616-10.98	CHANGEABLE MESSAGE SIGN, CONTRACTOR FURNISHED, CONTRACTOR RE TAINED				4 EA
Bid Price	3000.00	3300.00				
Bid Amount	\$12,000.00	\$13,200.00				
0370	617-20.00	CONCRETE TRAFFIC BARRIER, TYPE B				41 LF
Bid Price	125.00	120.00				
Bid Amount	\$5,125.00	\$4,920.00				
0380	617-31.00	CONCRETE TRAFFIC BARRIER, TYPE D				121 LF
Bid Price	151.00	175.00				
Bid Amount	\$18,271.00	\$21,175.00				
0390	618-10.00	MOBILIZATION				LUMP SUM
Lump Sum	\$63,700.00	\$212,350.00				
0400	620-60.00B	4 IN. WHITE ACRYLIC WATERBORNE PAVEMENT MARKING PAINT				965 LF
Bid Price	2.00	2.20				
Bid Amount	\$1,930.00	\$2,123.00				
0410	620-60.01B	4 IN. YELLOW ACRYLIC WATERBORNE PAVEMENT MARKING PAINT				792 LF
Bid Price	2.00	2.20				
Bid Amount	\$1,584.00	\$1,742.40				



CONTRACT ID: 140523-D06
 LETTING DATE: 05/23/14

TABULATION OF BIDS

Call No:		Jeff City Industry, Inc.			
D06	APAC-Missouri, Inc.	Inc.			
	Low Bid	2nd Low			
0420	620-61.15	ACRYLIC WATERBORNE PAVEMENT MARKING PAINT, BIKE SYMBOL			2 EA
Bid Price	100.00	110.00			
Bid Amount	\$200.00	\$220.00			
0430	620-61.24	ACRYLIC WATERBORNE PAVEMENT MARKING PAINT, 24 IN., WHITE			84 LF
Bid Price	5.00	5.50			
Bid Amount	\$420.00	\$462.00			
0440	620-70.01	PAVEMENT MARKING REMOVAL			1,089 LF
Bid Price	0.60	0.75			
Bid Amount	\$653.40	\$816.75			
0450	620-99.02	MISC. "ACRYLIC WATERBORNE PAVEMENT MARKING PAINT, BIKE LANE ARROW"			1 EA
Bid Price	100.00	110.00			
Bid Amount	\$100.00	\$110.00			
0460	620-99.02	MISC. "ACRYLIC WATERBORNE PAVEMENT MARKING PAINT, SHARED LANE SYMBOL"			1 EA
Bid Price	100.00	110.00			
Bid Amount	\$100.00	\$110.00			
0470	627-40.00	CONTRACTOR FURNISHED SURVEYING AND STAKING			LUMP SUM
Lump Sum	\$7,000.00	\$22,000.00			
0480	805-10.00A	SEEDING - COOL SEASON MIXTURES			1 ACRE
Bid Price	3650.00	4000.00			
Bid Amount	\$3,650.00	\$4,000.00			
0490	806-10.16	SEDIMENT REMOVAL			30 CU YD
Bid Price	30.00	30.00			
Bid Amount	\$900.00	\$900.00			
0500	806-10.19	SILT FENCE			405 LF
Bid Price	2.90	3.25			
Bid Amount	\$1,174.50	\$1,316.25			
0510	806-10.21	TYPE I DITCH CHECK			8 EA
Bid Price	135.00	150.00			
Bid Amount	\$1,080.00	\$1,200.00			
0520	806-10.22	TYPE II DITCH CHECK			18 EA
Bid Price	165.00	180.00			
Bid Amount	\$2,970.00	\$3,240.00			
SECTION TOTALS	\$346,869.00	\$554,626.30			

Section 0002: SIGNAL ITEMS - J5S2186

0530	902-94.00	TEMPORARY TRAFFIC SIGNALS			LUMP SUM
Lump Sum	\$20,000.00	\$7,100.00			



CONTRACT ID: 140523-D06
 LETTING DATE: 05/23/14

TABULATION OF BIDS

Call No:		Jeff City Industry, Inc.
D06	APAC-Missouri, Inc.	Inc.
	Low Bid	2nd Low

Section 0003: Br. No. A8165 - Steel Wide Flange

0540	206-10.00	CLASS 1 EXCAVATION	520 CUYD
Bid Price			
Bid Amount			
0550	216-05.00	REMOVAL OF BRIDGES	LUMP SUM
Lump Sum			
0560	703-10.04	DIAMOND GRINDING	224 SQYD
Bid Price			
Bid Amount			
0570	703-42.15	SAFETY BARRIER CURB	125 LF
Bid Price			
Bid Amount			
0580	703-99.03	MISC. ULTRA HIGH PERFORMANCE CONCRETE (UHPC)	252 LF
Bid Price			
Bid Amount			
0590	706-99.03	MISC. OPTIONAL SUPERSTRUCTURE MODULE	315 LF
Bid Price			
Bid Amount			
0600	707-10.00	CONDUIT SYSTEM ON STRUCTURE	LUMP SUM
Lump Sum			
0605	711-04.00	SACRIFICIAL GRAFFITI PROTECTION SYSTEM	LUMP SUM
Lump Sum			
0610	712-53.65A	INTERMEDIATE FIELD COAT (SYSTEM G)	3,400 SQFT
Bid Price			
Bid Amount			
0620	712-53.70A	FINISH FIELD COAT (SYSTEM G)	400 SQFT
Bid Price			
Bid Amount			
0630	712-99.03	MISC. bicycle railing	61 LF
Bid Price			
Bid Amount			
0640	720-99.01	MISC. GRS-IBS Abutment No. 1	LUMP SUM
Lump Sum			
0650	720-99.01	MISC. GRS-IBS ABUTMENT NO. 2	LUMP SUM
Lump Sum			
SECTION TOTALS	\$0.00	\$0.00	

Section 0004: Br. No. A8165 - Adjacent Box Beam

0660	206-10.00	CLASS 1 EXCAVATION	520 CUYD
Bid Price	37.00	33.00	
Bid Amount	\$19,240.00	\$17,160.00	



CONTRACT ID: 140523-D06
 LETTING DATE: 05/23/14

TABULATION OF BIDS

Call No: **D06**
 APAC-Missouri, Inc. **Low Bid**
 Jeff City Industry, Inc. **2nd Low**

0670	216-05.00	REMOVAL OF BRIDGES				LUMP SUM
Lump Sum	\$71,000.00	\$53,000.00				
0680	703-42.15	SAFETY BARRIER CURB				129 LF
Bid Price	107.00	120.00				
Bid Amount	\$13,803.00	\$15,480.00				
0690	703-42.26	REINFORCED CONCRETE SLAB OVERLAY				230 SQYD
Bid Price	180.00	270.00				
Bid Amount	\$41,400.00	\$62,100.00				
0700	705-99.03	MISC. 21 in., Prestressed Concrete Adjacent Bo x Beam				496 LF
Bid Price	237.00	260.00				
Bid Amount	\$117,552.00	\$128,960.00				
0710	707-10.00	CONDUIT SYSTEM ON STRUCTURE				LUMP SUM
Lump Sum	\$6,000.00	\$6,500.00				
0715	711-04.00	SACRIFICIAL GRAFFITI PROTECTION SYSTEM				LUMP SUM
Lump Sum	\$5,300.00	\$5,800.00				
0720	712-99.03	MISC. Bicycle Railing				65 LF
Bid Price	155.00	325.00				
Bid Amount	\$10,075.00	\$21,125.00				
0730	720-99.01	MISC. GRS-IBS ABUTMENT NO. 1				LUMP SUM
Lump Sum	\$115,000.00	\$116,900.00				
0740	720-99.01	MISC. GRS-IBS ABUTMENT NO. 2				LUMP SUM
Lump Sum	\$115,000.00	\$140,800.00				
SECTION TOTALS	\$514,370.00	\$567,825.00				

Contract Totals - 140523-D06

	\$881,239.00	\$1,129,551.30				
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CONTRACT ID: 140523-D06
 LETTING DATE: 05/23/14

TABULATION OF BIDS

Call No:			
D06	APAC-Missouri, Inc.	Jeff City Industry, Inc.	
	Low Bid	2nd Low	

Project J5S2186: Bridge replacement

Section 0001: ROADWAY ITEMS - J5S2186

Item	Description	Unit	Quantity	Unit Price	Total Price
0010	202-20.10 REMOVAL OF IMPROVEMENTS	LUMP SUM			
Lump Sum	\$13,000.00	\$51,000.00			
0020	203-10.00 CLASS A EXCAVATION	517 CU YD			
Bid Price	38.00	19.00			
Bid Amount	\$19,646.00	\$9,823.00			
0030	214-20.00 FURNISHING ROCK FILL	86 CU YD			
Bid Price	43.00	25.00			
Bid Amount	\$3,698.00	\$2,150.00			
0040	214-30.00 PLACING ROCK FILL	86 CU YD			
Bid Price	44.00	22.00			
Bid Amount	\$3,784.00	\$1,892.00			
0050	304-01.43 TYPE 1 AGGREGATE FOR BASE (4 IN. THICK)	190 SQ YD			
Bid Price	13.00	7.15			
Bid Amount	\$2,470.00	\$1,358.50			
0060	304-01.63 TYPE 1 AGGREGATE FOR BASE (6 IN. THICK)	1,128 SQ YD			
Bid Price	10.00	7.15			
Bid Amount	\$11,280.00	\$8,065.20			
0070	401-01.04 11 INCHES, BITUMINOUS PAVEMENT	1,448.50 SQ YD			
Bid Price	57.60	62.80			
Bid Amount	\$83,433.60	\$90,965.80			
0080	401-01.50 TYPE A2 SHOULDER	20.30 SQ YD			
Bid Price	165.00	71.00			
Bid Amount	\$3,349.50	\$1,441.30			
0090	502-11.06 CONCRETE PAVEMENT (6 IN. NON-REINF)	118.80 SQ YD			
Bid Price	60.00	66.00			
Bid Amount	\$7,128.00	\$7,840.80			
0100	502-99.05 MISC. CONCRETE PAVEMENT 7 1/2" NON REINFORCED	71 SQ YD			
Bid Price	77.00	76.00			
Bid Amount	\$5,467.00	\$5,396.00			
0110	603-99.02 WATER ADJUST WATER VALVE METER	1 EA			
Bid Price	1000.00	1000.00			
Bid Amount	\$1,000.00	\$1,000.00			
0120	604-20.10 ADJUSTING MANHOLE	1 EA			
Bid Price	700.00	1000.00			
Bid Amount	\$700.00	\$1,000.00			
0130	606-10.11A GUARDRAIL TYPE A, 7 FT. POST, 3 FT. - 1.5 IN SPACING	13 LF			
Bid Price	35.00	35.00			
Bid Amount	\$455.00	\$455.00			



CONTRACT ID: 140523-D06
 LETTING DATE: 05/23/14

TABULATION OF BIDS

Call No:

D06

	APAC-Missouri, Inc.	Jeff City Industry, Inc.
	Low Bid	2nd Low

0140	606-22.02A	BRIDGE ANCHOR SECTION, 7.5 FT. POSTS (SAFETY BARRIER CURB) (ROADWAY AND REHABILITATION WORK ONLY)	3 EA
Bid Price	1720.00	2250.00	
Bid Amount	\$5,160.00	\$6,750.00	
0150	606-23.01A	TRANSITION SECTION, 7.5 FT. POSTS	3 EA
Bid Price	430.00	700.00	
Bid Amount	\$1,290.00	\$2,100.00	
0160	606-30.15	TYPE A CRASHWORTHY END TERMINAL	1 EA
Bid Price	2125.00	2665.00	
Bid Amount	\$2,125.00	\$2,665.00	
0170	606-66.10	END ANCHOR	1 EA
Bid Price	800.00	1180.00	
Bid Amount	\$800.00	\$1,180.00	
0180	606-99.02	MISC. X-TENSION CRASHWORTHY END TERMINAL	1 EA
Bid Price	3345.00	3550.00	
Bid Amount	\$3,345.00	\$3,550.00	
0190	608-60.04	CONCRETE SIDEWALK, 4 IN.	32.40 SQYD
Bid Price	65.00	62.00	
Bid Amount	\$2,106.00	\$2,008.80	
0200	609-10.10	CONCRETE CURB (6 IN. HEIGHT AND UNDER) TYPE S	221 LF
Bid Price	50.00	29.50	
Bid Amount	\$11,050.00	\$6,519.50	
0210	609-10.51	CURB AND GUTTER TYPE A	20 LF
Bid Price	70.00	57.00	
Bid Amount	\$1,400.00	\$1,140.00	
0220	609-10.52	CURB AND GUTTER TYPE B	65 LF
Bid Price	34.00	41.00	
Bid Amount	\$2,210.00	\$2,665.00	
0230	609-10.55	CONCRETE CURB AND GUTTER (4 INCH)	46 LF
Bid Price	103.00	44.00	
Bid Amount	\$4,738.00	\$2,024.00	
0240	611-30.10	FURNISHING TYPE 1 ROCK BLANKET	74 CUYD
Bid Price	42.00	25.00	
Bid Amount	\$3,108.00	\$1,850.00	
0250	611-30.30	PLACING TYPE 1 ROCK BLANKET	74 CUYD
Bid Price	42.00	22.00	
Bid Amount	\$3,108.00	\$1,628.00	
0260	612-30.00A	TRUCK OR TRAILER MOUNTED ATTENUATOR (TMA)	2 EA
Bid Price	2000.00	9570.00	
Bid Amount	\$4,000.00	\$19,140.00	
0270	616-10.05	CONSTRUCTION SIGNS	1,565 SQFT
Bid Price	8.00	9.00	
Bid Amount	\$12,520.00	\$14,085.00	



CONTRACT ID: 140523-D06
 LETTING DATE: 05/23/14

TABULATION OF BIDS

Call No:

D06

APAC-Missouri, Inc.	Jeff City Industry, Inc.
Low Bid	2nd Low

0280	616-10.08	ADVANCED WARNING RAIL SYSTEM				2 EA
Bid Price	50.00	54.50				
Bid Amount	\$100.00	\$109.00				
0290	616-10.09	FLAG ASSEMBLY				23 EA
Bid Price	20.00	22.00				
Bid Amount	\$460.00	\$506.00				
0300	616-10.25	CHANNELIZER (TRIM LINE)				138 EA
Bid Price	30.00	33.00				
Bid Amount	\$4,140.00	\$4,554.00				
0310	616-10.31	TYPE III MOVEABLE BARRICADE WITH LIGHT				23 EA
Bid Price	200.00	220.00				
Bid Amount	\$4,600.00	\$5,060.00				
0320	616-10.34	DIRECTIONAL INDICATOR BARRICADE WITH LIGHT				14 EA
Bid Price	60.00	70.00				
Bid Amount	\$840.00	\$980.00				
0330	616-10.40	FLASHING ARROW PANEL				2 EA
Bid Price	1000.00	1100.00				
Bid Amount	\$2,000.00	\$2,200.00				
0340	616-10.47	TYPE III OBJECT MARKER				4 EA
Bid Price	100.00	110.00				
Bid Amount	\$400.00	\$440.00				
0350	616-10.52	WARNING LIGHT, TYPE B				22 EA
Bid Price	50.00	54.50				
Bid Amount	\$1,100.00	\$1,199.00				
0360	616-10.98	CHANGEABLE MESSAGE SIGN, CONTRACTOR FURNISHED, CONTRACTOR RE TAINED				4 EA
Bid Price	3000.00	3300.00				
Bid Amount	\$12,000.00	\$13,200.00				
0370	617-20.00	CONCRETE TRAFFIC BARRIER, TYPE B				41 LF
Bid Price	125.00	120.00				
Bid Amount	\$5,125.00	\$4,920.00				
0380	617-31.00	CONCRETE TRAFFIC BARRIER, TYPE D				121 LF
Bid Price	151.00	175.00				
Bid Amount	\$18,271.00	\$21,175.00				
0390	618-10.00	MOBILIZATION				LUMP SUM
Lump Sum	\$63,700.00	\$212,350.00				
0400	620-60.00B	4 IN. WHITE ACRYLIC WATERBORNE PAVEMENT MARKING PAINT				965 LF
Bid Price	2.00	2.20				
Bid Amount	\$1,930.00	\$2,123.00				
0410	620-60.01B	4 IN. YELLOW ACRYLIC WATERBORNE PAVEMENT MARKING PAINT				792 LF
Bid Price	2.00	2.20				
Bid Amount	\$1,584.00	\$1,742.40				



CONTRACT ID: 140523-D06
 LETTING DATE: 05/23/14

TABULATION OF BIDS

Call No:		Jeff City Industry, Inc.			
D06	APAC-Missouri, Inc.	Inc.			
	Low Bid	2nd Low			
0420	620-61.15	ACRYLIC WATERBORNE PAVEMENT MARKING PAINT, BIKE SYMBOL			2 EA
Bid Price	100.00	110.00			
Bid Amount	\$200.00	\$220.00			
0430	620-61.24	ACRYLIC WATERBORNE PAVEMENT MARKING PAINT, 24 IN., WHITE			84 LF
Bid Price	5.00	5.50			
Bid Amount	\$420.00	\$462.00			
0440	620-70.01	PAVEMENT MARKING REMOVAL			1,089 LF
Bid Price	0.60	0.75			
Bid Amount	\$653.40	\$816.75			
0450	620-99.02	MISC. "ACRYLIC WATERBORNE PAVEMENT MARKING PAINT, BIKE LANE ARROW"			1 EA
Bid Price	100.00	110.00			
Bid Amount	\$100.00	\$110.00			
0460	620-99.02	MISC. "ACRYLIC WATERBORNE PAVEMENT MARKING PAINT, SHARED LANE SYMBOL"			1 EA
Bid Price	100.00	110.00			
Bid Amount	\$100.00	\$110.00			
0470	627-40.00	CONTRACTOR FURNISHED SURVEYING AND STAKING			LUMP SUM
Lump Sum	\$7,000.00	\$22,000.00			
0480	805-10.00A	SEEDING - COOL SEASON MIXTURES			1 ACRE
Bid Price	3650.00	4000.00			
Bid Amount	\$3,650.00	\$4,000.00			
0490	806-10.16	SEDIMENT REMOVAL			30 CU YD
Bid Price	30.00	30.00			
Bid Amount	\$900.00	\$900.00			
0500	806-10.19	SILT FENCE			405 LF
Bid Price	2.90	3.25			
Bid Amount	\$1,174.50	\$1,316.25			
0510	806-10.21	TYPE I DITCH CHECK			8 EA
Bid Price	135.00	150.00			
Bid Amount	\$1,080.00	\$1,200.00			
0520	806-10.22	TYPE II DITCH CHECK			18 EA
Bid Price	165.00	180.00			
Bid Amount	\$2,970.00	\$3,240.00			
SECTION TOTALS	\$346,869.00	\$554,626.30			

Section 0002: SIGNAL ITEMS - J5S2186

0530	902-94.00	TEMPORARY TRAFFIC SIGNALS			LUMP SUM
Lump Sum	\$20,000.00	\$7,100.00			



CONTRACT ID: 140523-D06
 LETTING DATE: 05/23/14

TABULATION OF BIDS

Call No:		Jeff City Industry, Inc.
D06	APAC-Missouri, Inc.	Inc.
	Low Bid	2nd Low

Section 0003: Br. No. A8165 - Steel Wide Flange

0540	206-10.00	CLASS 1 EXCAVATION	520 CUYD
Bid Price			
Bid Amount			
0550	216-05.00	REMOVAL OF BRIDGES	LUMP SUM
Lump Sum			
0560	703-10.04	DIAMOND GRINDING	224 SQYD
Bid Price			
Bid Amount			
0570	703-42.15	SAFETY BARRIER CURB	125 LF
Bid Price			
Bid Amount			
0580	703-99.03	MISC. ULTRA HIGH PERFORMANCE CONCRETE (UHPC)	252 LF
Bid Price			
Bid Amount			
0590	706-99.03	MISC. OPTIONAL SUPERSTRUCTURE MODULE	315 LF
Bid Price			
Bid Amount			
0600	707-10.00	CONDUIT SYSTEM ON STRUCTURE	LUMP SUM
Lump Sum			
0605	711-04.00	SACRIFICIAL GRAFFITI PROTECTION SYSTEM	LUMP SUM
Lump Sum			
0610	712-53.65A	INTERMEDIATE FIELD COAT (SYSTEM G)	3,400 SQFT
Bid Price			
Bid Amount			
0620	712-53.70A	FINISH FIELD COAT (SYSTEM G)	400 SQFT
Bid Price			
Bid Amount			
0630	712-99.03	MISC. bicycle railing	61 LF
Bid Price			
Bid Amount			
0640	720-99.01	MISC. GRS-IBS Abutment No. 1	LUMP SUM
Lump Sum			
0650	720-99.01	MISC. GRS-IBS ABUTMENT NO. 2	LUMP SUM
Lump Sum			
SECTION TOTALS	\$0.00	\$0.00	

Section 0004: Br. No. A8165 - Adjacent Box Beam

0660	206-10.00	CLASS 1 EXCAVATION	520 CUYD
Bid Price	37.00	33.00	
Bid Amount	\$19,240.00	\$17,160.00	



CONTRACT ID: 140523-D06
 LETTING DATE: 05/23/14

TABULATION OF BIDS

Call No: **D06**
 APAC-Missouri, Inc. **Low Bid**
 Jeff City Industry, Inc. **2nd Low**

0670	216-05.00	REMOVAL OF BRIDGES				LUMP SUM
Lump Sum	\$71,000.00	\$53,000.00				
0680	703-42.15	SAFETY BARRIER CURB				129 LF
Bid Price	107.00	120.00				
Bid Amount	\$13,803.00	\$15,480.00				
0690	703-42.26	REINFORCED CONCRETE SLAB OVERLAY				230 SQYD
Bid Price	180.00	270.00				
Bid Amount	\$41,400.00	\$62,100.00				
0700	705-99.03	MISC. 21 in., Prestressed Concrete Adjacent Bo x Beam				496 LF
Bid Price	237.00	260.00				
Bid Amount	\$117,552.00	\$128,960.00				
0710	707-10.00	CONDUIT SYSTEM ON STRUCTURE				LUMP SUM
Lump Sum	\$6,000.00	\$6,500.00				
0715	711-04.00	SACRIFICIAL GRAFFITI PROTECTION SYSTEM				LUMP SUM
Lump Sum	\$5,300.00	\$5,800.00				
0720	712-99.03	MISC. Bicycle Railing				65 LF
Bid Price	155.00	325.00				
Bid Amount	\$10,075.00	\$21,125.00				
0730	720-99.01	MISC. GRS-IBS ABUTMENT NO. 1				LUMP SUM
Lump Sum	\$115,000.00	\$116,900.00				
0740	720-99.01	MISC. GRS-IBS ABUTMENT NO. 2				LUMP SUM
Lump Sum	\$115,000.00	\$140,800.00				
SECTION TOTALS	\$514,370.00	\$567,825.00				

Contract Totals - 140523-D06

	\$881,239.00	\$1,129,551.30				
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General Notes:

Design Specifications (Superstructure):

2012 AASHTO LRFD Bridge Design Specifications (6th Ed.) and
2013 Interim Revisions

Design Specifications (GRS Abutments):

Geosynthetic Reinforced Soil Integrated Bridge System Interim
Implementation Guide, FHWA-HRT-11-026, January 2011.

Design factor of safety against sliding is ≥ 1.5 ; Factor of safety
against bearing failure is ≥ 2.5 .

A global stability analysis shall be performed for each site. Factor
of safety against global failure is ≥ 1.5 .

Design Loading (Superstructure):

HL-93
35#/Sq. Ft. Future Wearing Surface
Earth 120 #/Cu. Ft., Equivalent Fluid Pressure 45#/Cu. Ft.
Superstructure: Simply-supported, non-composite for dead load.
Composite for live load.

Design Loading (GRS Abutments):

Combined load: Bearing beam pressure = 3.33 ksf (service load,
allowable stress design). Roadway live load surcharge: 250 psf uniform vertical

Road Base unit weight = 140 pcf, thickness = 48 inches

Soil Conditions:

Retained backfill: Unit weight = 120 pcf, friction angle = 28° ,
cohesion = 0 psf, max diameter = 0.5 inches
Foundation soil: Unit weight = 120 pcf, friction angle = 28° , cohesion = 400 psf
Reinforced fill: Unit weight = 140 pcf, friction angle = 40° , cohesion = 0 psf
RSF backfill: Unit weight = 140 pcf, friction angle = 40° , cohesion = 0 psf

Design Unit Stresses:

Class B-1 Concrete (Safety Barrier Curb) $f'c = 4,000$ psi
Class B-2 Concrete (Superstructure, except
Prestressed Box Beams and Safety Barrier Curb) $f'c = 4,000$ psi
Concrete Modular Unit (CMU) Block $f'c = 4,000$ psi
Reinforcing Steel (Grade 60) $fy = 60,000$ psi
For Prestressed Box Beam Stresses, see Sheet No. 8.
For Prestressed Box Beam Shear Key Grout Stresses, see Sheet No. 7.

Reinforcing Steel:

Minimum clearance to reinforcing steel shall be 1 1/2",
unless otherwise shown.

Traffic Handling:

Structure to be closed during construction. See roadway plans for traffic control plan.

A minimum vertical clearance of 14'-0" from crown of existing lanes and a minimum
lateral clearance of 24'-0" centered on existing lanes shall be maintained during
construction.

Concrete Protective Coatings:

Sacrificial graffiti protective coating shall be applied on all exposed faces
of CMU blocks in accordance with Sec 711.

Removal of Existing Bridge:

Remove A0087 per Standard Specifications, except that Bents 2 & 3 footings shall be
removed to bottom of footing. Existing steel piles may remain in place after removal
of existing footing up to an elevation of 760.50. Additionally, a partial removal of
retaining wall and footings remaining from previous bridge within limits of wall
shall be removed.

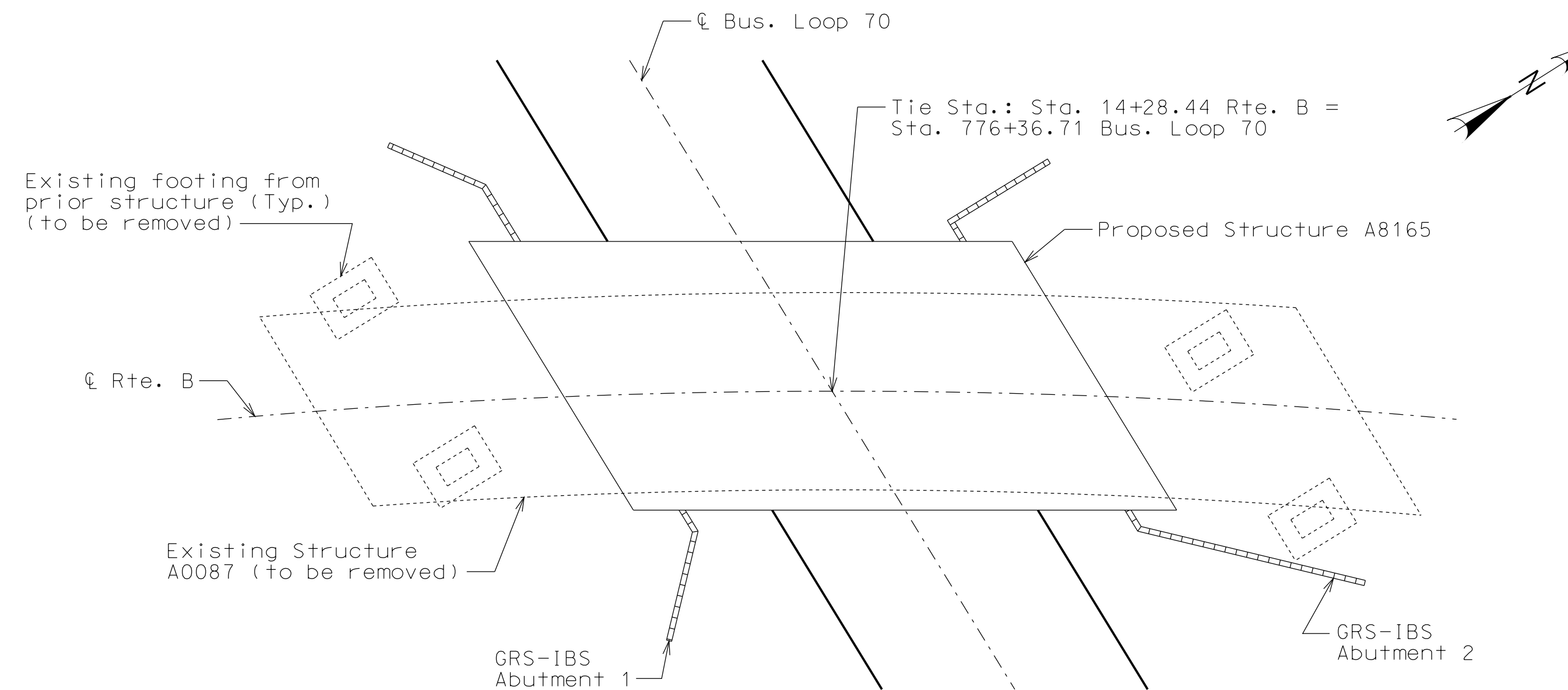
Temporary Shoring:

If temporary shoring is required, cost of temporary shoring will be considered
completely covered by the contract lump sum price for GRS-IBS Abutment No. 1
or GRS-IBS Abutment No. 2.

Estimated Quantities for Reinforced Concrete Slab Overlay		
Item		Total
Class B-2 Concrete	cu. yard	44.4
Reinforcing Steel (Epoxy Coated)	pound	4,420

The table of Estimated Quantities for Reinforced Concrete Slab Overlay represents the quantities used by
the State in preparing the cost estimate for concrete slabs. The area of the concrete slab will be
measured to the nearest square yard with the horizontal dimensions as shown on the plan of slab.
Payment for conventional forms, all concrete and coated and reinforcing steel will be considered
completely covered by the contract unit price for the slab. Variations may be encountered in the
estimated quantities but the variations cannot be used for an adjustment in the contract unit price.

Method of forming the slab shall be as shown on the plans and in accordance with Sec 703. All hardware
for forming the slab to be left in place as a permanent part of the structure shall be coated in accordance
with ASTM A123 or ASTM B633 with a thickness class SC 4 and a finish type 1, 11 or 111.



LOCATION SKETCH

Estimated Quantities				
Item		Substr.	Superstr.	Total
*** Class 1 Excavation	cu. yard	520		520
Removal of Bridges (A0087)	lump sum			1
* Safety Barrier Curb	linear foot		129	129
Reinforced Concrete Slab Overlay	sq. yard		230	230
21 in. Prestressed Concrete Adjacent Box Beam	linear foot		496	496
Conduit System on Structure	lump sum			1
Sacrificial Graffiti Protection System	lump sum			1
Bicycle Railing	linear foot		65	65
** GRS-IBS Abutment 1	lump sum			1
** GRS-IBS Abutment 2	lump sum			1

* Safety barrier curb shall be cast-in-place option for left safety barrier curb only and shall be
cast-in-place option or slip-form option for right safety barrier curb.

All reinforcement and concrete in the backwalls is included in the Estimated Quantities for Reinforced
Concrete Slab Overlay.

** Payment for all materials and labor to construct the GRS-IBS Abutments (does not included excavation)
including Select Granular Fills, Geosynthetic Reinforcement, CMU Facing Blocks, grout and reinforcing steel
will be considered completely covered by the Contract lump sum price for GRS-IBS Abutment 1 or GRS-IBS
Abutment 2.

*** Includes all excavation required to build each GRS-IBS Abutment.

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NOT BE CONSIDERED
A CERTIFIED
DOCUMENT."

DATE PREPARED 5/13/2014	
ROUTE B	STATE MO
DISTRICT BR	SHEET NO. 2
COUNTY BOONE	
JOB NO. J5S2186	
CONTRACT ID.	
PROJECT NO.	
BRIDGE NO. A8165	

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

General Notes:

Design Specifications (Superstructure):

2012 AASHTO LRFD Bridge Design Specifications (6th Ed.) and
2013 Interim Revisions

Design Specifications (GRS Abutments):

Geosynthetic Reinforced Soil Integrated Bridge System Interim
Implementation Guide, FHWA-HRT-11-026, January 2011.

Design factor of safety against sliding is ≥ 1.5 ; Factor of safety
against bearing failure is ≥ 2.5 .

A global stability analysis shall be performed for each site. Factor
of safety against global failure is ≥ 1.5 .

Design Loading (Superstructure):

HL-93
35#/Sq. Ft. Future Wearing Surface
Earth 120 #/Cu. Ft., Equivalent Fluid Pressure 45#/Cu. Ft.
Superstructure: Simply-supported, non-composite for dead load.
Composite for live load.

Design Loading (GRS Abutments):

Combined load: Bearing beam pressure = 3.33 ksf (service load,
allowable stress design). Roadway live load surcharge: 250 psf uniform vertical

Road Base unit weight = 140 pcf, thickness = 48 inches

Soil Conditions:

Retained backfill: Unit weight = 120 pcf, friction angle = 28°,
cohesion = 0 psf, max diameter = 0.5 inches
Foundation soil: Unit weight = 120 pcf, friction angle = 28°, cohesion = 400 psf
Reinforced fill: Unit weight = 140 pcf, friction angle = 40°, cohesion = 0 psf
RSF backfill: Unit weight = 140 pcf, friction angle = 40°, cohesion = 0 psf

Design Unit Stresses:

Class B-1 Concrete (Safety Barrier Curb) $f'c = 4,000$ psi
Class B-2 Concrete (Superstructure, except
Prestressed Box Beams and Safety Barrier Curb) $f'c = 4,000$ psi
Concrete Modular Unit (CMU) Block $f'c = 4,000$ psi
Reinforcing Steel (Grade 60) $fy = 60,000$ psi
For Prestressed Box Beam Stresses, see Sheet No. 8.
For Prestressed Box Beam Shear Key Grout Stresses, see Sheet No. 7.

Reinforcing Steel:

Minimum clearance to reinforcing steel shall be 1 1/2",
unless otherwise shown.

Traffic Handling:

Structure to be closed during construction. See roadway plans for traffic control plan.

A minimum vertical clearance of 14'-0" from crown of existing lanes and a minimum
lateral clearance of 24'-0" centered on existing lanes shall be maintained during
construction.

Concrete Protective Coatings:

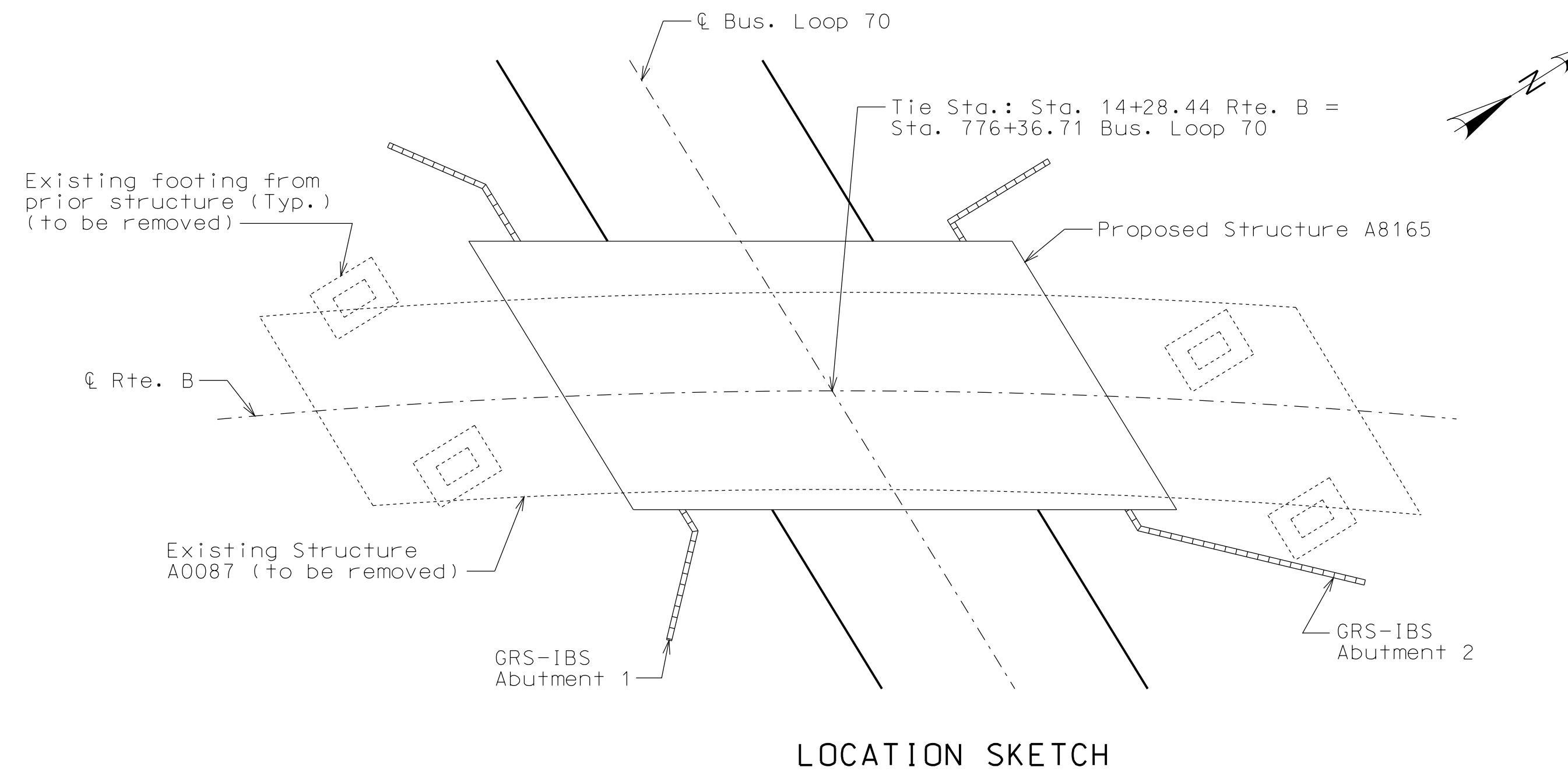
Sacrificial graffiti protective coating shall be applied on all exposed faces
of CMU blocks in accordance with Sec 711.

Removal of Existing Bridge:

Remove A0087 per Standard Specifications, except that Bents 2 & 3 footings shall be
removed to bottom of footing. Existing steel piles may remain in place after removal
of existing footing up to an elevation of 760.50. Additionally, footings remaining
from previous bridge within limits of wall shall be removed.

Temporary Shoring:

If temporary shoring is required, cost of temporary shoring will be considered
completely covered by the contract lump sum price for GRS-IBS Abutment No.1
or GRS-IBS Abutment No. 2.



Item	cu. yard	Total
Class B-2 Concrete	44.4	
Reinforcing Steel (Epoxy Coated)		4,420

The table of Estimated Quantities for Reinforced Concrete Slab Overlay represents the quantities used by the State in preparing the cost estimate for concrete slabs. The area of the concrete slab will be measured to the nearest square yard with the horizontal dimensions as shown on the plan of slab. Payment for conventional forms, all concrete and coated and reinforcing steel will be considered completely covered by the contract unit price for the slab. Variations may be encountered in the estimated quantities but the variations cannot be used for an adjustment in the contract unit price.

Method of forming the slab shall be as shown on the plans and in accordance with Sec 703. All hardware for forming the slab to be left in place as a permanent part of the structure shall be coated in accordance with ASTM A123 or ASTM B633 with a thickness class SC 4 and a finish type I, II or III.

Item	Substr.	Superstr.	Total
*** Class 1 Excavation	520		520
Removal of Bridges (A0087)			1
* Safety Barrier Curb		129	129
Reinforced Concrete Slab Overlay		230	230
21 in., Prestressed Concrete Adjacent Box Beam		496	496
Conduit System on Structure			1
Sacrificial Graffiti Protection System			1
Bicycle Railing		65	65
** GRS-IBS Abutment 1			1
** GRS-IBS Abutment 2			1

* Safety barrier curb shall be cast-in-place option for left safety barrier curb only and shall be cast-in-place option or slip-form option for right safety barrier curb.

All reinforcement and concrete in the backwalls is included in the Estimated Quantities for Reinforced Concrete Slab Overlay.

** Payment for all materials and labor to construct the GRS-IBS Abutments (does not included excavation) including Select Granular Fills, Geosynthetic Reinforcement, CMU Facing Blocks, grout and reinforcing steel will be considered completely covered by the Contract lump sum price for GRS-IBS Abutment 1 or GRS-IBS Abutment 2.

*** Includes all excavation required to build each GRS-IBS Abutment.

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DATE PREPARED
4/18/2014

ROUTE
B MO

DISTRICT
BR SHEET NO.
2

COUNTY
BOONE

J5S2186
CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A8165

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."

DATE PREPARED
4/15/2014

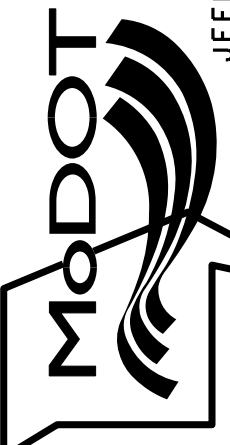
ROUTE B STATE MO
DISTRICT BR SHEET NO. 3

COUNTY BOONE
JOB NO. J5S2186
CONTRACT ID.

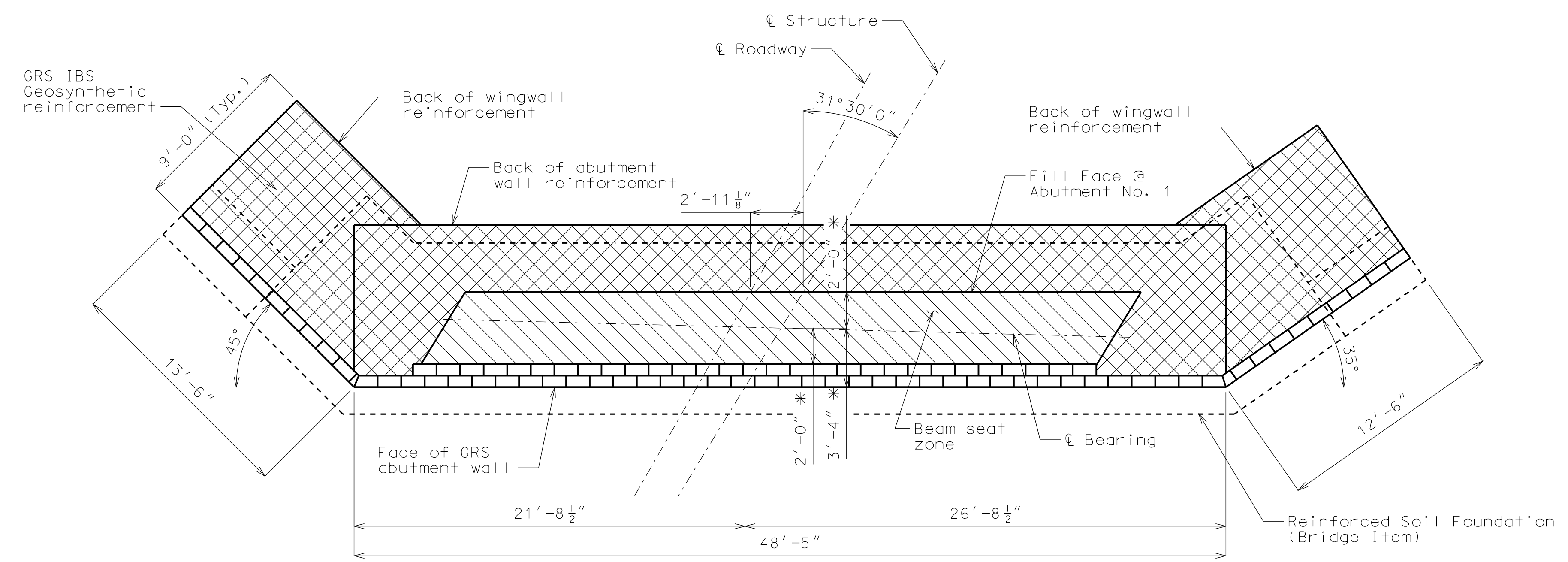
PROJECT NO.

BRIDGE NO. A8165

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

 105 WEST CAPITOL
 JEFFERSON CITY, MO 65102
 1-888-ASK-MODOT (1-888-275-6636)

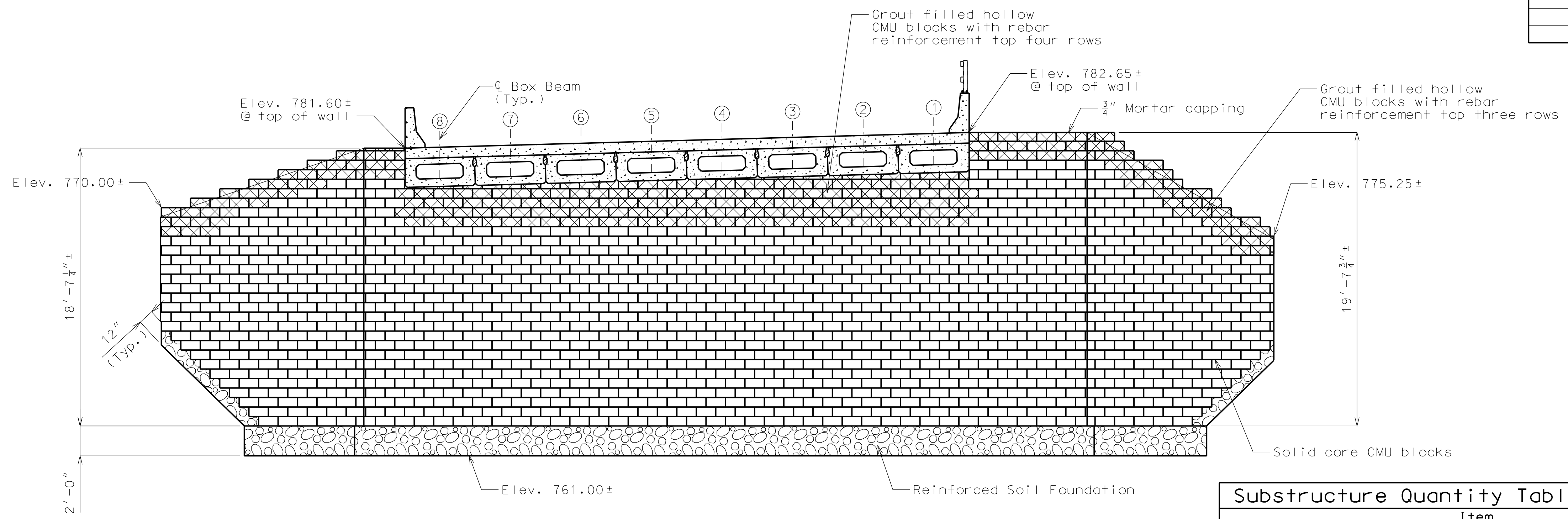
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



PLAN VIEW
* Measured at ϕ of Structure.

Notes:
 Insert epoxy coated #4 rebars 27" long into the top 3 rows of CMU's and all corner CMU's and fill with grout.
 CMU blocks are staggered, including corners, so there are no vertical joints greater than 1 CMU block height.
 For CMU Block configuration underneath bridge, see Section Thru GRS-IBS.
 All CMU blocks shall be grey with a split face pattern.
 All CMU blocks shall be solid, except as shown.
 Apply Class 2 Penetrating Concrete Sealer to all exposed faces of CMU blocks prior to graffiti protection. See Job Special Provisions.

Box Beam No.	Elevation (ft)
1	780.27
2	780.14
3	780.00
4	779.87
5	779.74
6	779.60
7	779.46
8	779.34



DEVELOPED ELEVATION VIEW

Item	Quantity
Class 1 Excavation	cu. yard 275
GRS-IBS Abutment No. 1	lump sum 1

Note: These quantities are included in the estimated quantities table on Sheet No. 2.

DETAILS OF GRS-IBS ABUTMENT NO. 1

Detailed Mar. 2014
Checked Apr. 2014

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 3 of 20

ADJACENT BOX BEAM ALTERNATE

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DATE PREPARED
5/13/2014

ROUTE B STATE MO

DISTRICT BR SHEET NO. 3

COUNTY BOONE

JOB NO. J5S2186

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A8165

DESCRIPTION

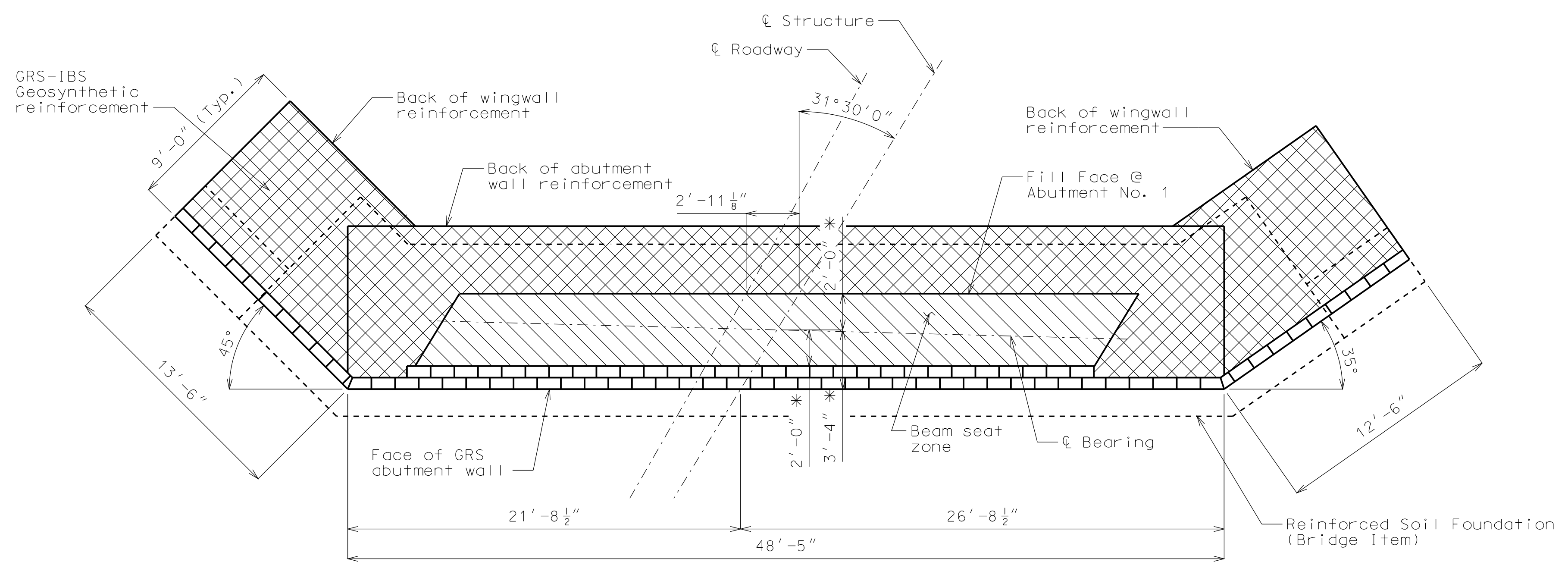
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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102

1-888-ASK-MODOT (1-888-275-6636)

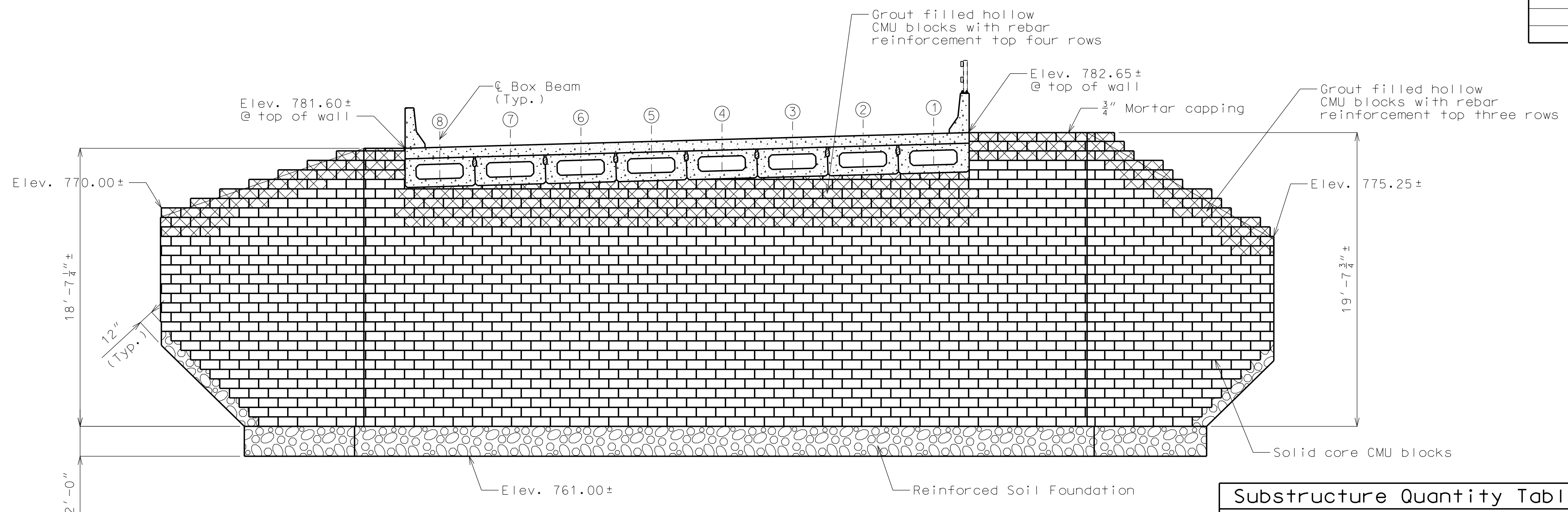
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



PLAN VIEW
* Measured at ϕ of Structure.

Notes:
Insert epoxy coated #4 rebars 27" long into the top 3 rows of CMU's and all corner CMU's and fill with grout.
CMU blocks are staggered, including corners, so there are no vertical joints greater than 1 CMU block height.
For CMU Block configuration underneath bridge, see Section Thru GRS-IBS.
All CMU blocks shall be grey with a split face pattern.
All CMU blocks shall be solid, except as shown.
Apply Class 2 Penetrating Concrete Sealer to all exposed faces of CMU blocks prior to graffiti protection. See Job Special Provisions.

Box Beam No.	Elevation (ft)
1	780.27
2	780.14
3	780.00
4	779.87
5	779.74
6	779.60
7	779.46
8	779.34



DEVELOPED ELEVATION VIEW

Item	Quantity
Class 1 Excavation	cu. yard 275
GRS-IBS Abutment No. 1	lump sum 1

Note: These quantities are included in the estimated quantities table on Sheet No. 2.

DETAILS OF GRS-IBS ABUTMENT NO. 1

Detailed Mar. 2014
Checked Apr. 2014

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 3 of 20

Added 5/13/14

ADJACENT BOX BEAM ALTERNATE

"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."

DATE PREPARED
5/13/2014

ROUTE B STATE MO
DISTRICT BR SHEET NO. 4

COUNTY
BOONE
JOB NO.
J5S2186
CONTRACT ID.

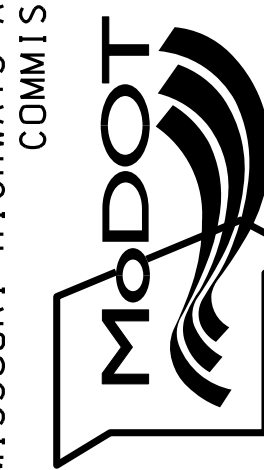
PROJECT NO.

BRIDGE NO.
A8165

DESCRIPTION

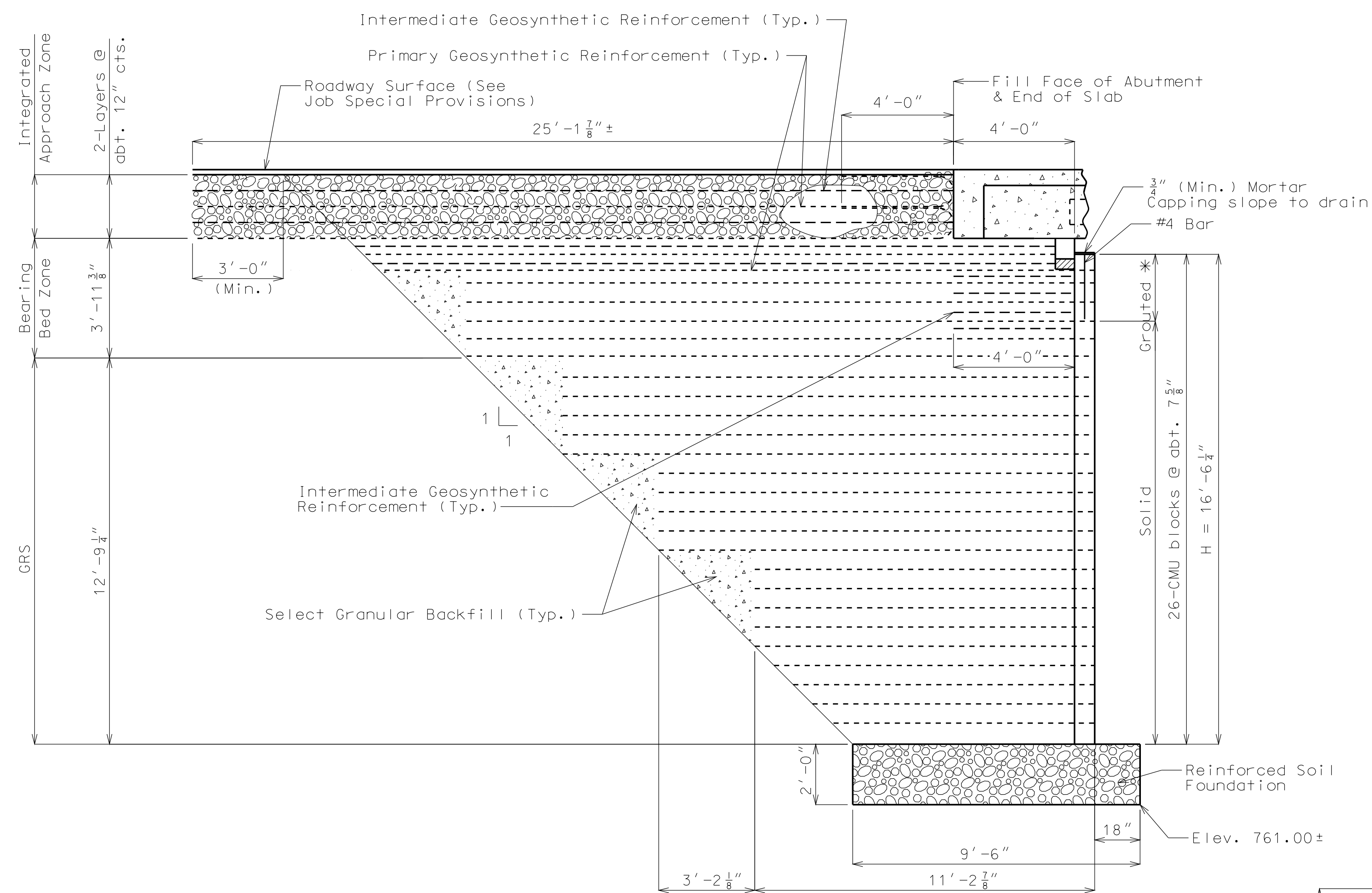
DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION



105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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SECTION THRU GRS-IBS

Notes:

Insert epoxy coated #4 rebars 27" long into the top 3 rows (top 4 rows under bridge) of CMU's and all corner CMU's above solid blocks and fill with grout. Trim geosynthetic reinforcement to facilitate filling of hollow CMU's with grout.

On the top row of CMU's create a mortar capping approx. 3/4 inch thick.

Vertical wall face batter = 0°.

Provide a minimum of 5 layers of bearing bed reinforcement. Additional top layers should be sloped to accommodate for superstructure.

Primary wrap reinforcement vertical spacing for the integrated approach is a maximum of 12 inches.

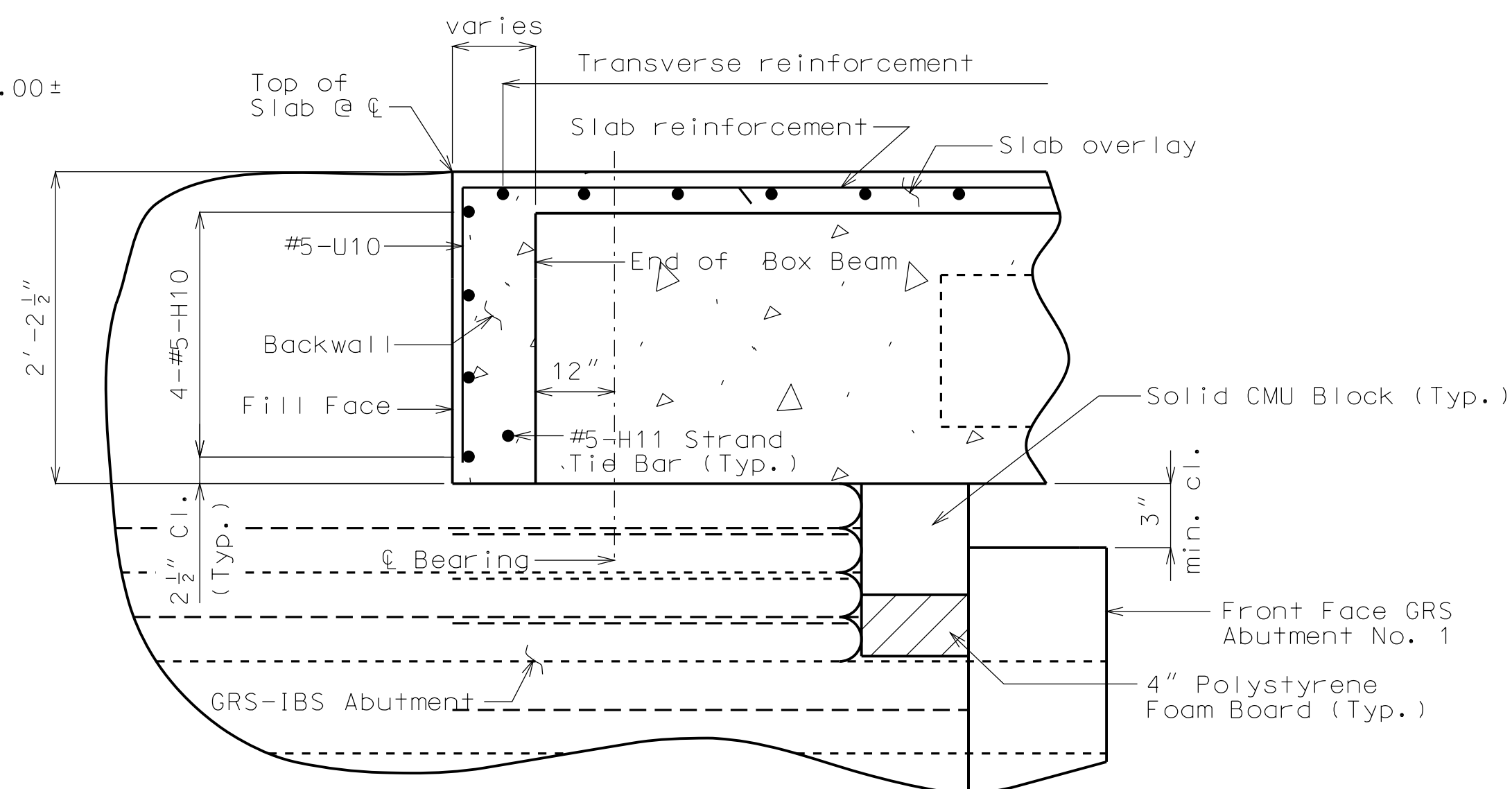
Extend integrated approach zone layers past cut slope at least 3'-0".

Integrated approach zone primary reinforcement shall have a minimum of 4 foot tail.

A bituminous paint coating shall be applied to the extents of the fill face of superstructure backwall. The cost of coating superstructure backwall will be considered completely covered by the contract unit price for other items.

* Fill with grout along the whole width of bridge.

Provide polystyrene foam board conforming to AASHTO M230, Type VI.



PART ELEVATION OF BACKWALL AT ABUTMENT

DETAILS OF GRS-IBS ABUTMENT NO. 1

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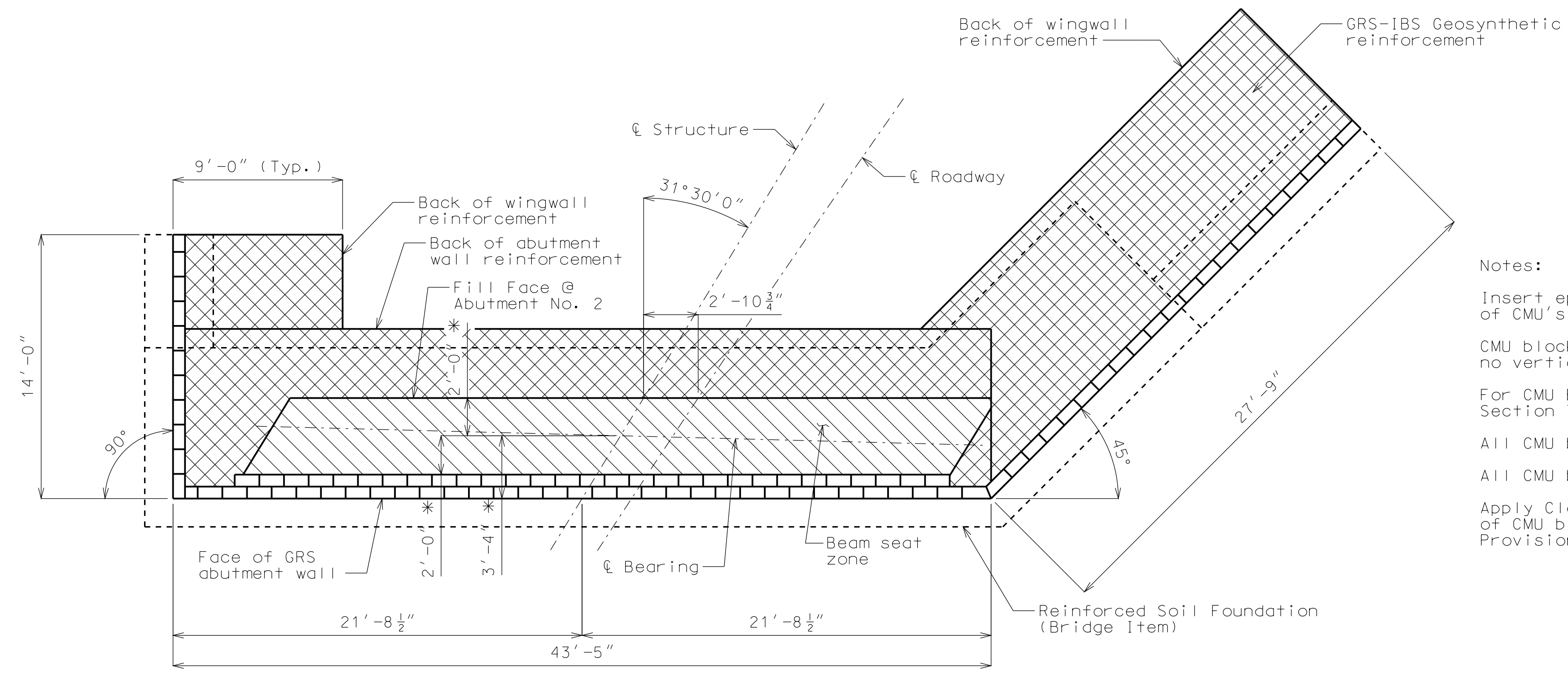
DATE PREPARED
4/15/2014

ROUTE B STATE MO
DISTRICT BR SHEET NO. 5

COUNTY BOONE
JOB NO. J5S2186
CONTRACT ID.

PROJECT NO.

BRIDGE NO. A8165



Notes:

Insert epoxy coated #4 rebars 27" long into the top 3 rows of CMU's and all corner CMU's and fill with grout.

CMU blocks are staggered, including corners, so there are no vertical joints greater than 1 CMU block height.

For CMU Block configuration underneath bridge, see Section Thru GRS-IBS.

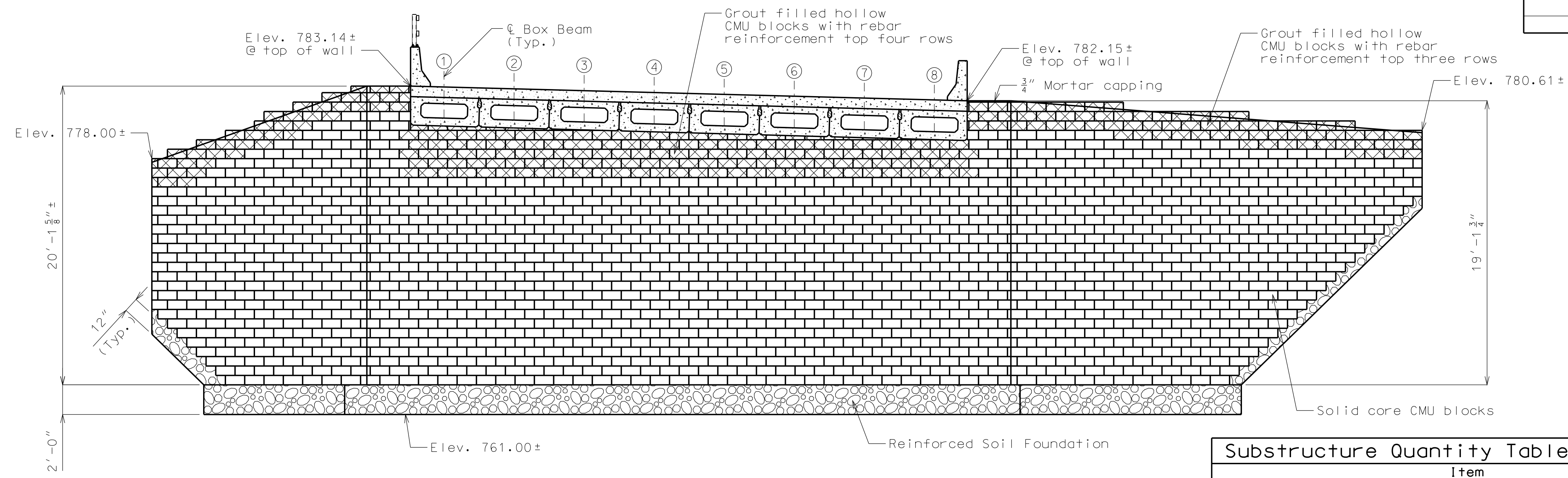
All CMU blocks shall be grey with a split face pattern.

All CMU blocks shall be solid, except as shown.

Apply Class 2 Penetrating Concrete Sealer to all exposed faces of CMU blocks prior to graffiti protection. See Job Special Provisions.

Bottom of Box Beam Elevations @ ℓ Box Beam & ℓ Bearing	
Box Beam No.	Elevation (ft)
1	780.83
2	780.71
3	780.58
4	780.46
5	780.33
6	780.21
7	780.09
8	779.96

PLAN VIEW
* Measured at ℓ of structure



DEVELOPED ELEVATION VIEW

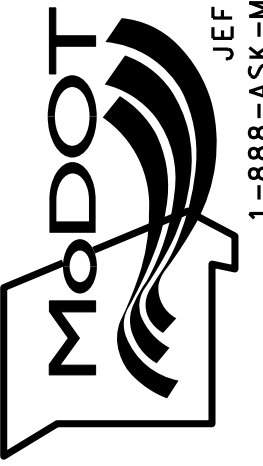
Substructure Quantity Table for GRS-IBS Abutment No. 2		
Item	Quantity	
Class 1 Excavation	cu. yard	245
GRS-IBS Abutment No. 2	lump sum	1

Note: These quantities are included in the estimated quantities table on Sheet No. 2.

DETAILS OF GRS-IBS ABUTMENT NO. 2

ADJACENT BOX BEAM ALTERNATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION



105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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DATE PREPARED
5/13/2014

ROUTE STATE
B MO

DISTRICT SHEET NO.
BR 5

COUNTY
BOONE

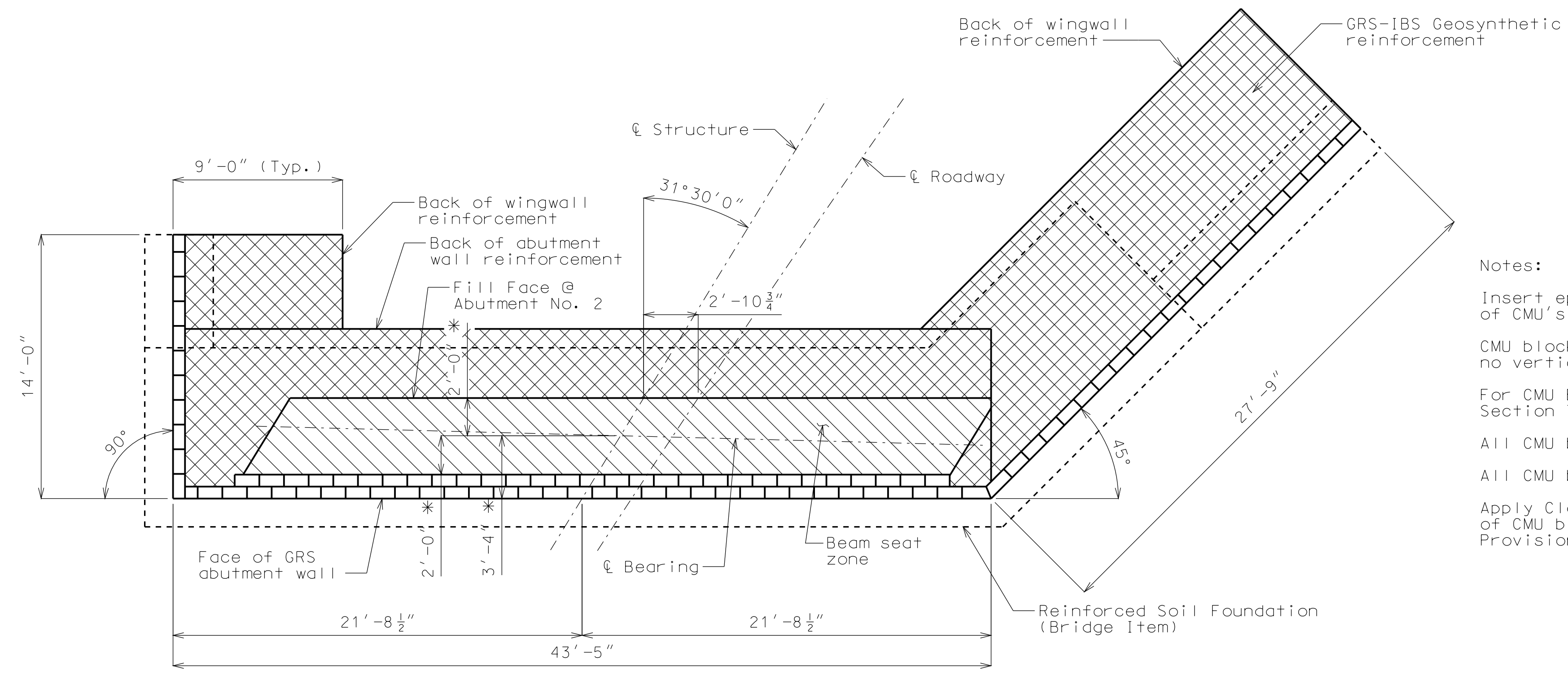
JOB NO.
J5S2186

CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A8165

DESCRIPTION	DATE



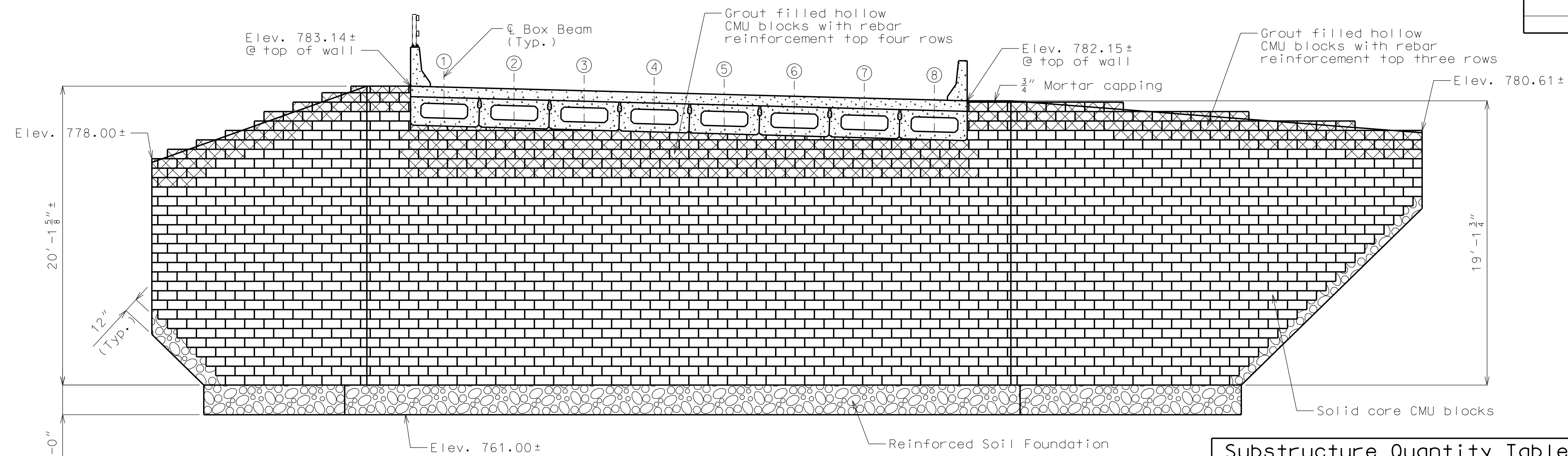
Notes:

- Insert epoxy coated #4 rebars 27" long into the top 3 rows of CMU's and all corner CMU's and fill with grout.
- CMU blocks are staggered, including corners, so there are no vertical joints greater than 1 CMU block height.
- For CMU Block configuration underneath bridge, see Section Thru GRS-IBS.
- All CMU blocks shall be grey with a split face pattern.
- All CMU blocks shall be solid, except as shown.
- Apply Class 2 Penetrating Concrete Sealer to all exposed faces of CMU blocks prior to graffiti protection. See Job Special Provisions.

Bottom of Box Beam Elevations @ Center of Box Beam & Center of Bearing

Box Beam No.	Elevation (ft)
1	780.83
2	780.71
3	780.58
4	780.46
5	780.33
6	780.21
7	780.09
8	779.96

PLAN VIEW
* Measured at center of structure



DEVELOPED ELEVATION VIEW

Substructure Quantity Table for GRS-IBS Abutment No. 2

Item	Quantity
Class 1 Excavation	cu. yard 245
GRS-IBS Abutment No. 2	lump sum 1

Note: These quantities are included in the estimated quantities table on Sheet No. 2.

DETAILS OF GRS-IBS ABUTMENT NO. 2

Detailed Mar. 2014
Checked Apr. 2014

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 5 of 20

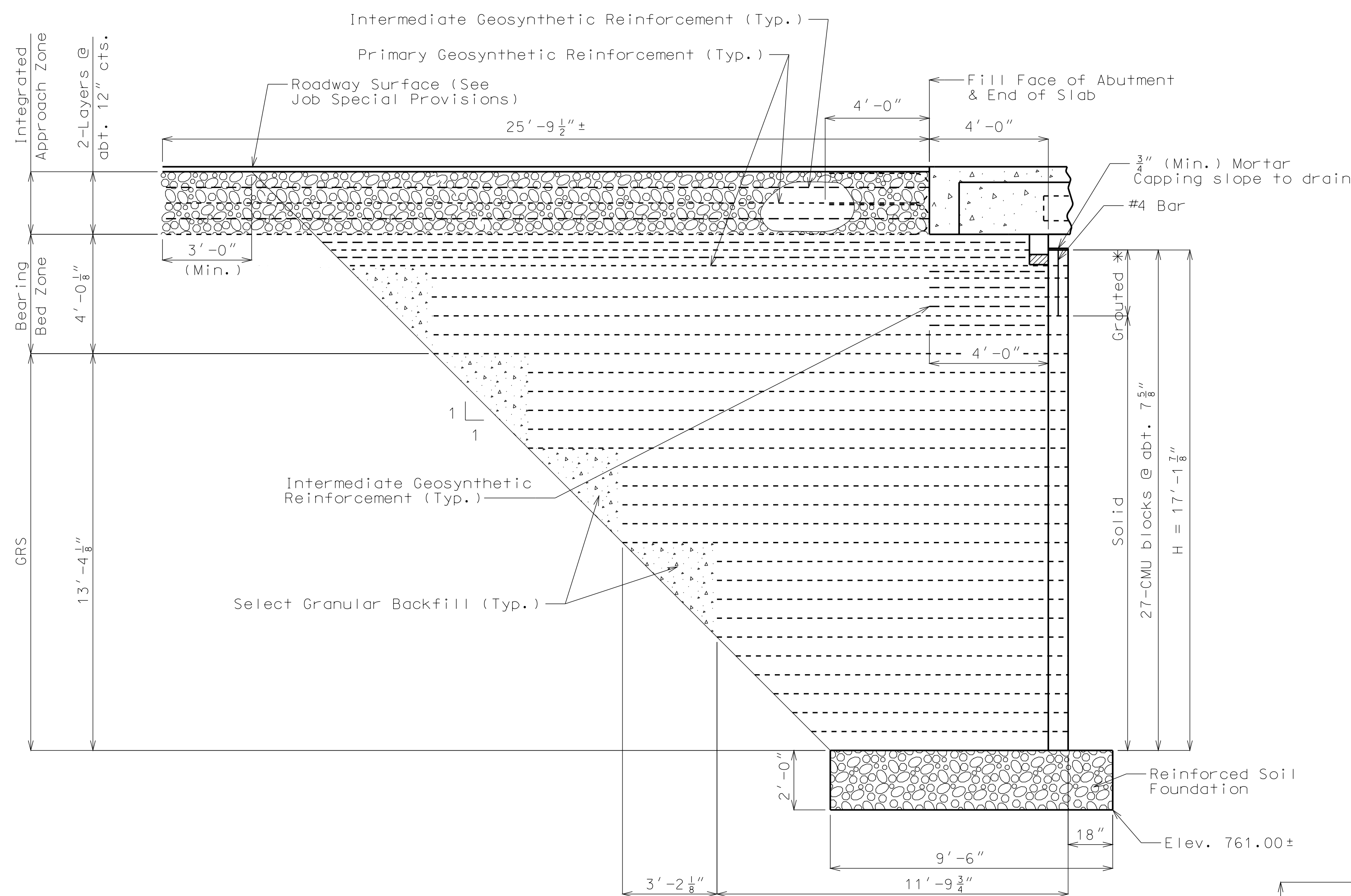
Added 5/13/14

ADJACENT BOX BEAM ALTERNATE

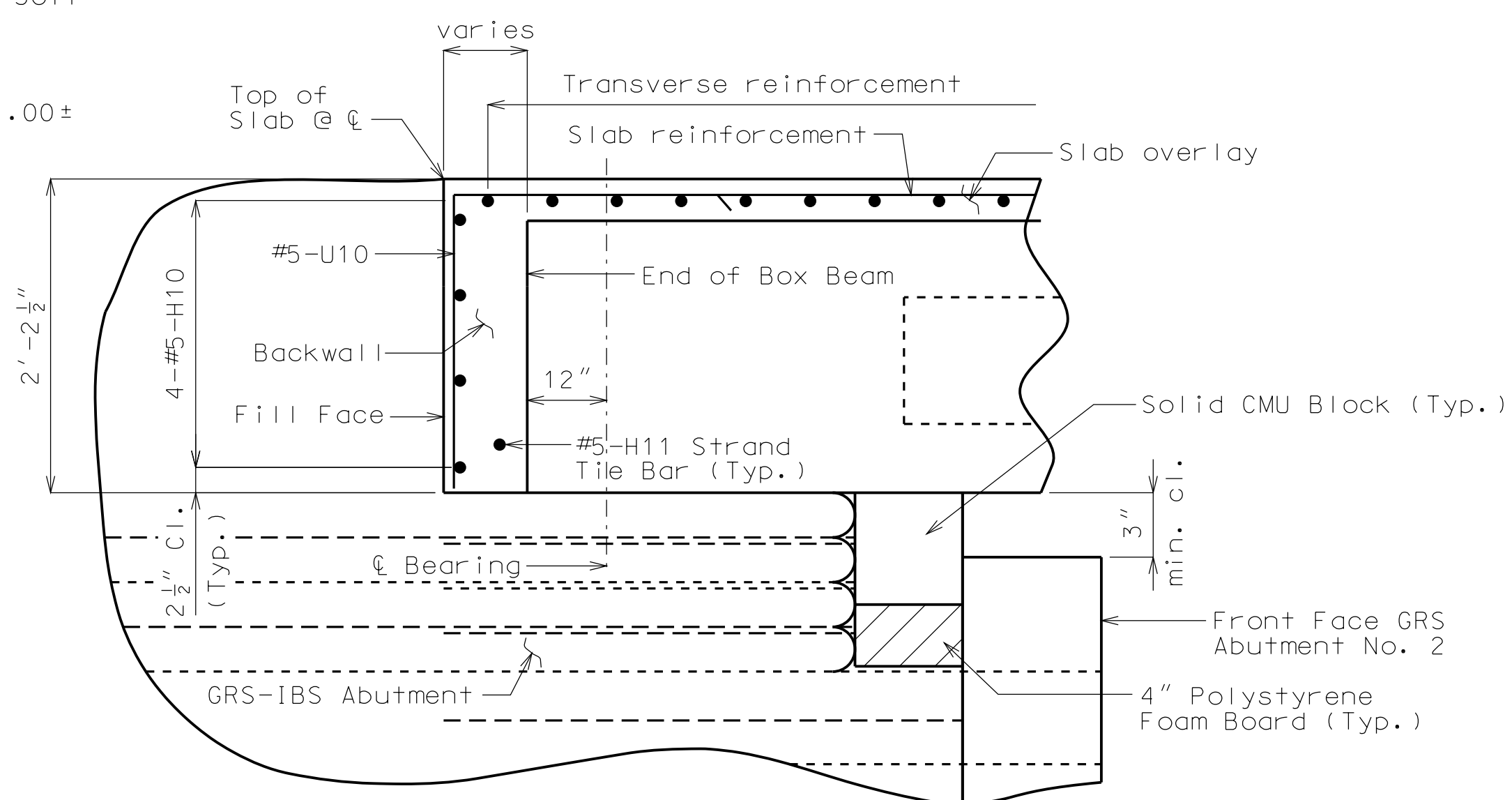
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

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SECTION THRU GRS-IBS



PART ELEVATION OF BACKWALL AT ABUTMENT

Notes:

Insert epoxy coated #4 rebar 27" long into the top 3 rows (top 4 rows under bridge) of CMU's and all corner CMU's above solid blocks and fill with grout. Trim geosynthetic reinforcement to facilitate filling of hollow CMU's with grout.

On the top row of CMU's create a mortar capping approx. 3/4 inch thick.

Vertical wall face batter = 0°.

Provide a minimum of 5 layers of bearing bed reinforcement. Additional top layers should be sloped to accommodate for superstructure.

Primary wrap reinforcement vertical spacing for the integrated approach is a maximum of 12 inches.

Extend integrated approach zone layers past cut slope at least 3'-0".

Integrated approach zone primary reinforcement shall have a minimum of 4 foot tail.

A bituminous paint coating shall be applied to the extents of the fill face of superstructure backwall. The cost of coating superstructure backwall will be considered completely covered by the contract unit price for other items.

* Fill with grout along the whole width of bridge.

Provide polystyrene foam board conforming to AASHTO M230, Type VI.

DETAILS OF GRS-IBS ABUTMENT NO. 2

"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."

DATE PREPARED
4/15/2014

ROUTE B STATE MO
DISTRICT BR SHEET NO. 6

COUNTY BOONE
JOB NO. J5S2186
CONTRACT ID.

PROJECT NO.

BRIDGE NO. A8165

DESCRIPTION

DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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DATE PREPARED
5/13/2014

ROUTE B STATE MO

DISTRICT BR SHEET NO. 6

COUNTY BOONE

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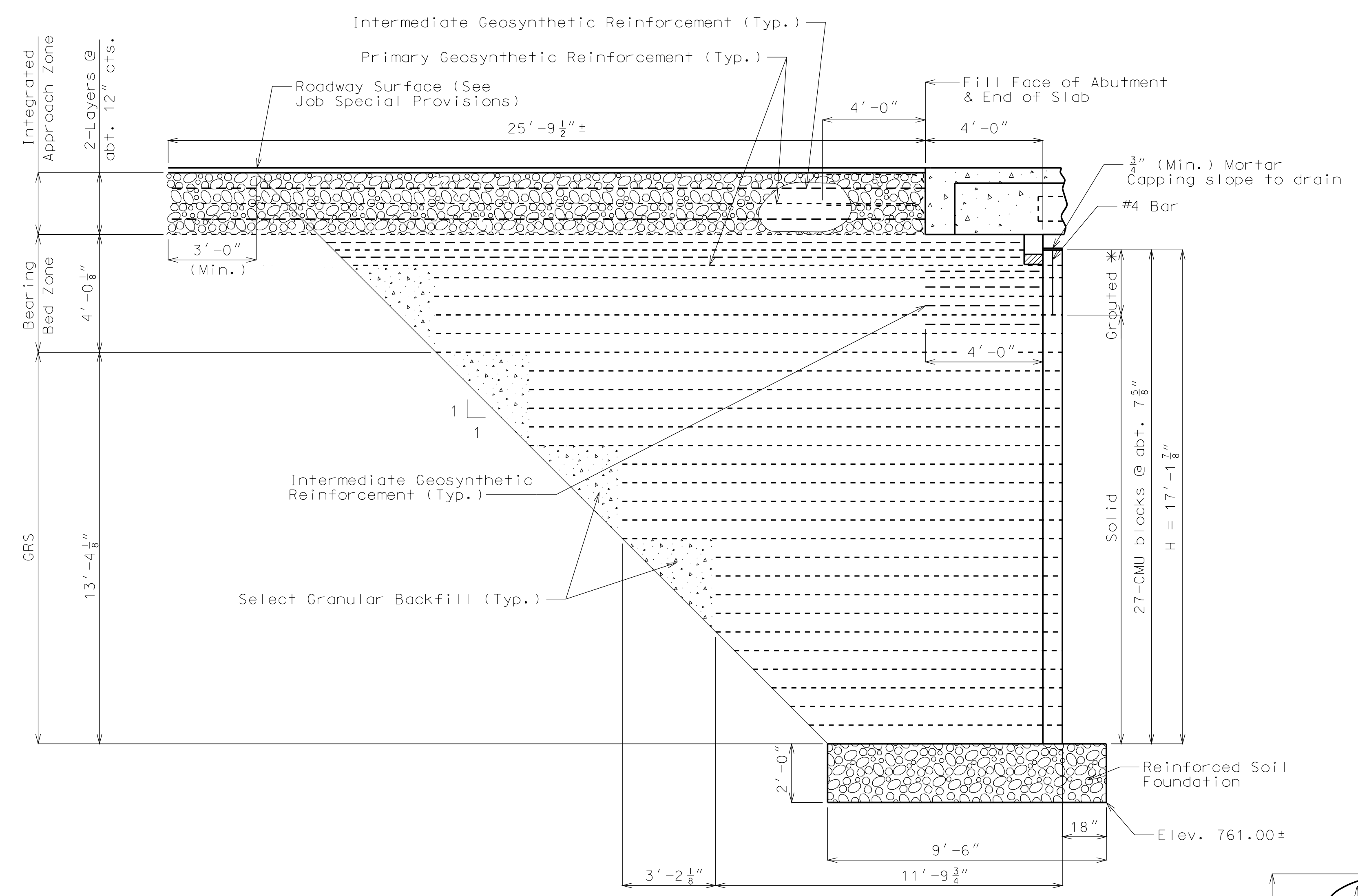
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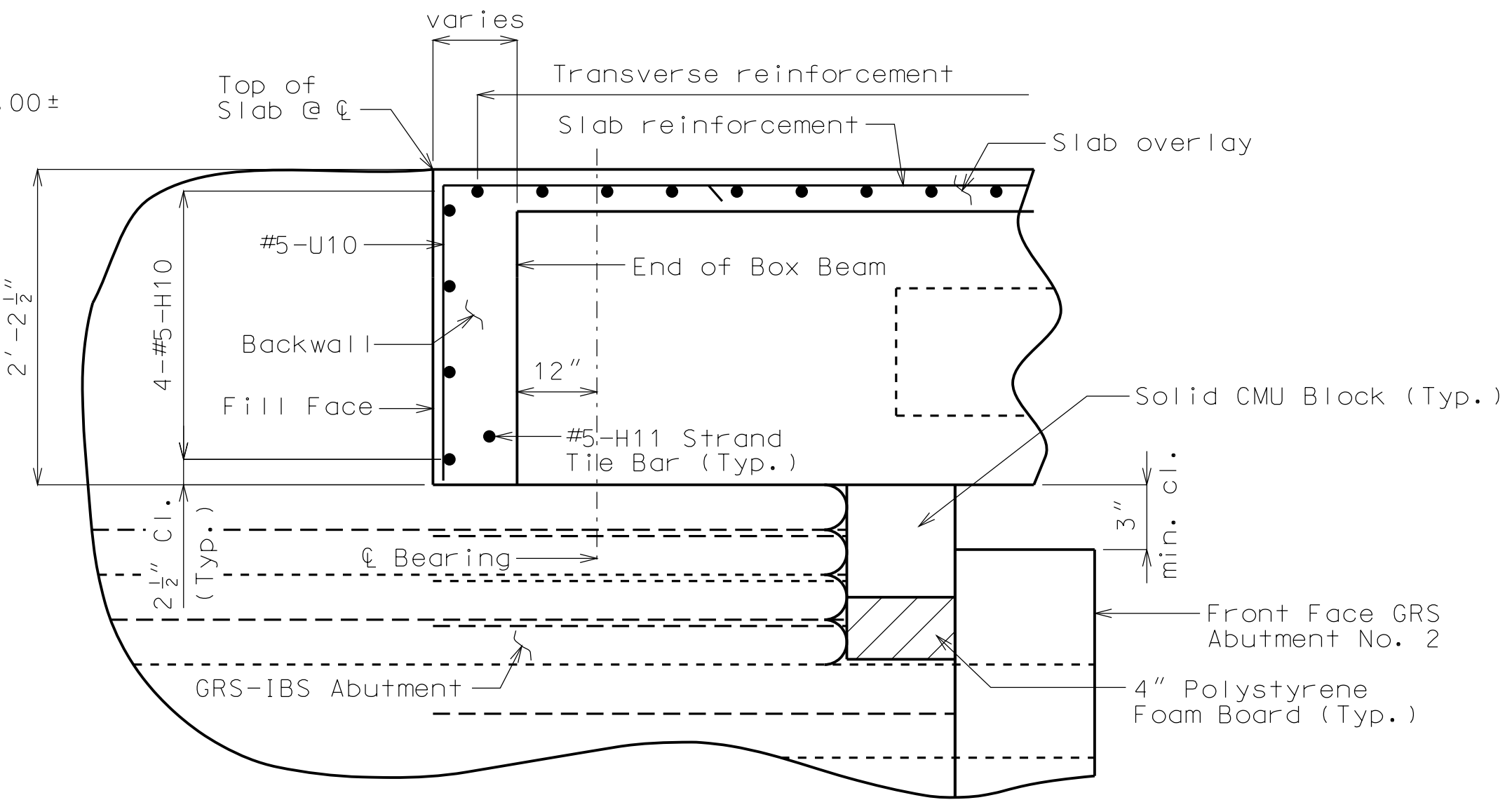
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DATE

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



SECTION THRU GRS-IBS



PART ELEVATION OF BACKWALL AT ABUTMENT

Notes:

Insert epoxy coated #4 rebars 27" long into the top 3 rows (top 4 rows under bridge) of CMU's and all corner CMU's above solid blocks and fill with grout. Trim geosynthetic reinforcement to facilitate filling of hollow CMU's with grout.

On the top row of CMU's create a mortar capping approx. 3/4 inch thick.

Vertical wall face batter = 0°.

Provide a minimum of 5 layers of bearing bed reinforcement. Additional top layers should be sloped to accommodate for superstructure.

Primary wrap reinforcement vertical spacing for the integrated approach is a maximum of 12 inches.

Extend integrated approach zone layers past cut slope at least 3'-0".

Integrated approach zone primary reinforcement shall have a minimum of 4 foot tail.

A bituminous paint coating shall be applied to the extents of the fill face of superstructure backwall. The cost of coating superstructure backwall will be considered completely covered by the contract unit price for other items.

* Fill with grout along the whole width of bridge.

Provide polystyrene foam board conforming to AASHTO M230, Type VI.

DETAILS OF GRS-IBS ABUTMENT NO. 2

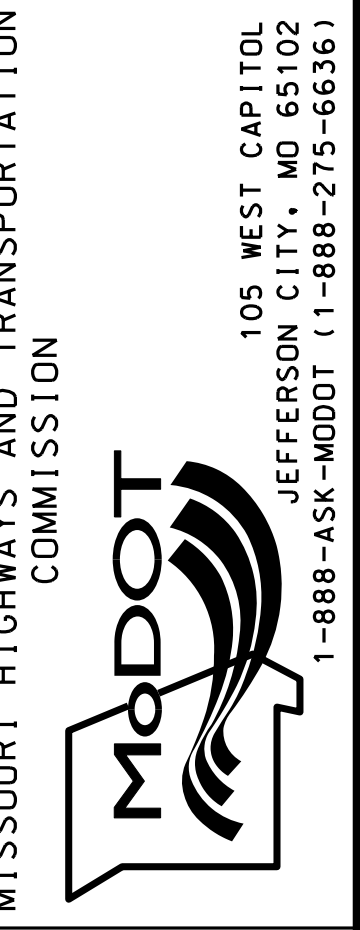
Detailed Mar. 2014
Checked Apr. 2014

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 6 of 20

Added 5/13/14

ADJACENT BOX BEAM ALTERNATE



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DATE PREPARED
4/15/2014

ROUTE B STATE MO

DISTRICT BR SHEET NO. 7

COUNTY
BOONE

JOB NO.
J5S2186

CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A8165

DESCRIPTION

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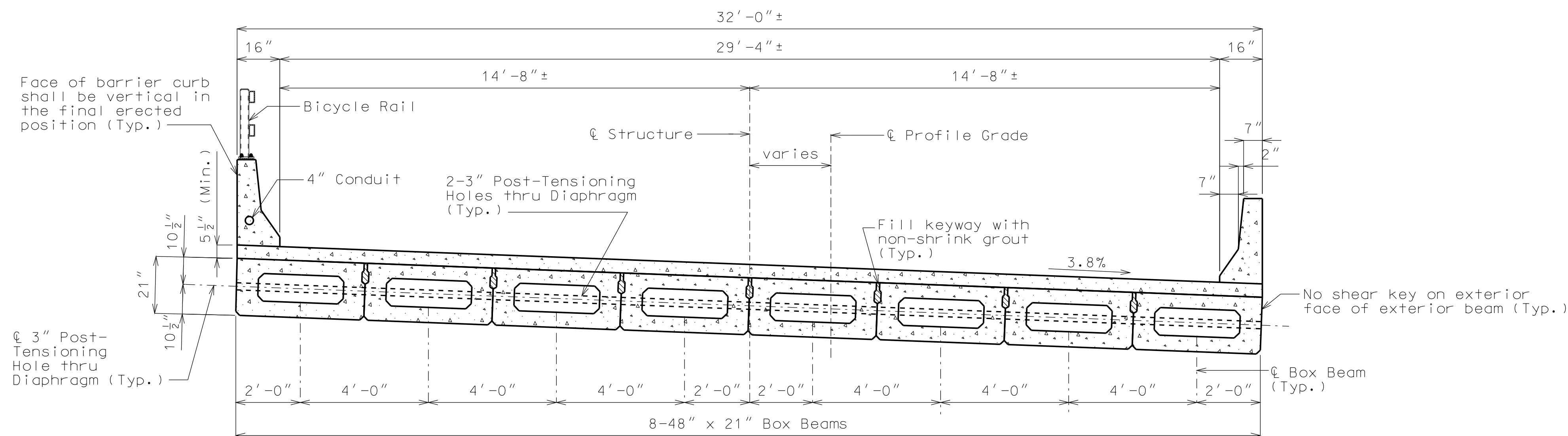
DATE

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SECTION THRU SUPERSTRUCTURE NEAR MID SPAN

Notes:

Box beams shall be kept upright at all times. Support shall be within 12 inches of ends only.

Keyways shall be sandblasted prior to shipping beams. Keyways shall be water or air blasted prior to erection. Post-tension ducts shall have Styrofoam blocks installed around post-tension ducts before erection.

Beams that are in tolerance for camber may not be in tolerance for differential camber. In order to consider salvaging a beam which fails in differential camber, the centers of the adjacent post-tensioning ducts in those beams shall align to within one inch and overall camber shall also be within fabrication tolerance. Do not remove lifting loops until post tensioning and grouting has been completed and accepted.

If a beam (or group of beams) is out of spec for overall fabrication tolerance for camber, salvaging this beam will require a noncompliance report and the engineer's approval.

In all cases, the transverse post-tensioning tendon shall be fished through the duct without binding. Do not cut strand tails until girders are grouted and leave a 2 inch tail (or recommended length to reattach) on the ends of the post tensioning strand. This allows the strand to be de-tensioned at some future date if needed.

Partial and full post-tension sequencing shall start with center (mid-span) diaphragms and proceed symmetrically to the ends of the beams. Post-tensioning of box beams shall be tensioned to 10% of capacity to pull beams tight.

Prior to grouting, prepare joints per grout manufacturer's recommendations. Seal the bottom of the joint with backer rod to prevent grout from pouring through the joint. Make sure the Styrofoam blocks are installed around the post-tension ducts. No grout shall be allowed in the post-tension ducts and shall be verified while grouting.

Once all beams are in full contact with beams partially tensioned, keyways shall be grouted with a qualified non-metallic expansive grout with a minimum compressive strength of 5 ksi shall be placed flush with top of beams. Shear key grout shall be pencil vibrated and then wet cured to the minimum compressive strength.

If placing grout at a joint of one inch or more in differential camber, recess shall not be left but rather finish the grout flush with the higher girder and place a 3:1 wedge over the joint and lower girder. If an individual beam is flatter than the beams on either side and differential camber is one inch or more, place grout across the entire beam utilizing an approved bonding agent and then the top surface shall be scored transversely to a depth of approximately 1/4 inch with a wire brush, stiff broom or other approved method.

Beams shall be fully post-tensioned after grout has reached design strength and before slab is poured.

Grout post-tension duct recesses on exterior girders and paint newly grouted area with protective coating - concrete bents & piers (epoxy).

Payment for all materials and labor required for transverse post-tensioning, grouting and epoxy coating of the shear keys complete in place will be considered completely covered by the contract unit price for 21 in., Prestressed Concrete Adjacent Box Beam per linear foot.

Work this sheet with Sheets No. 8, 9 & 10.

DETAILS OF BOX BEAMS

Note: This drawing is not to scale. Follow dimensions.

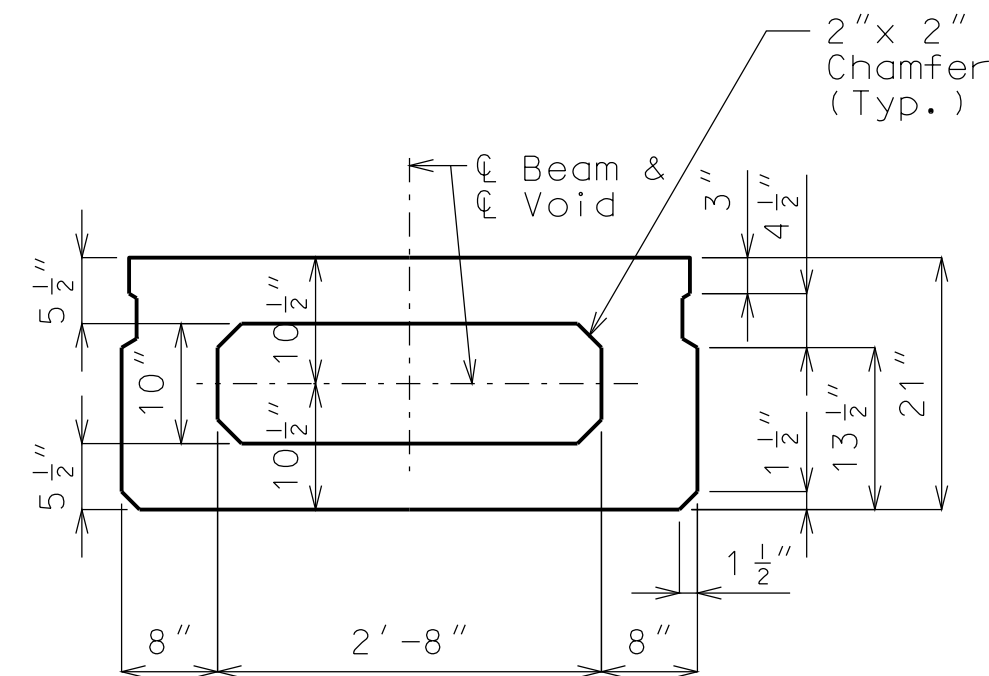
Sheet No. 7 of 20

Detailed Mar. 2014
Checked Mar. 2014

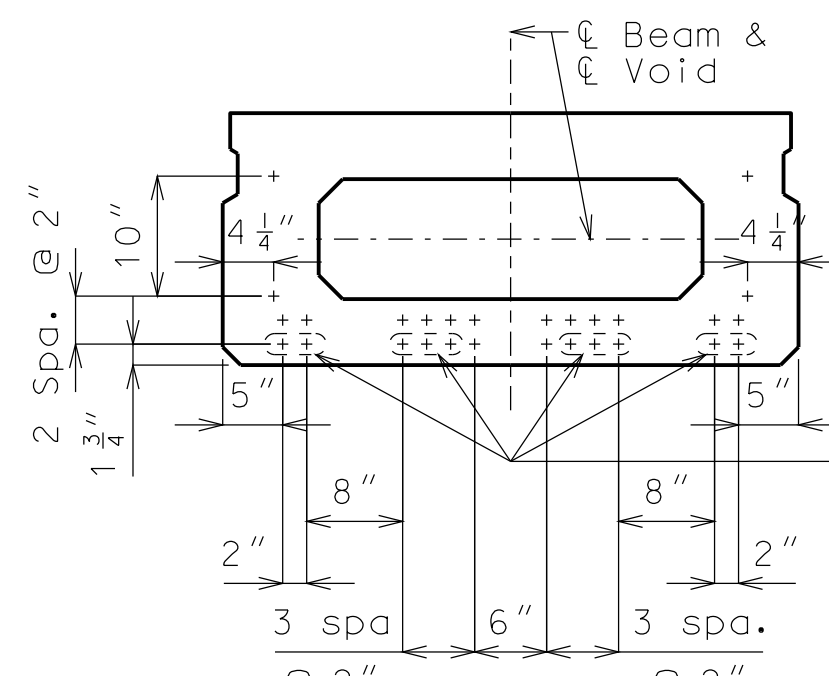
ADJACENT BOX BEAM ALTERNATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

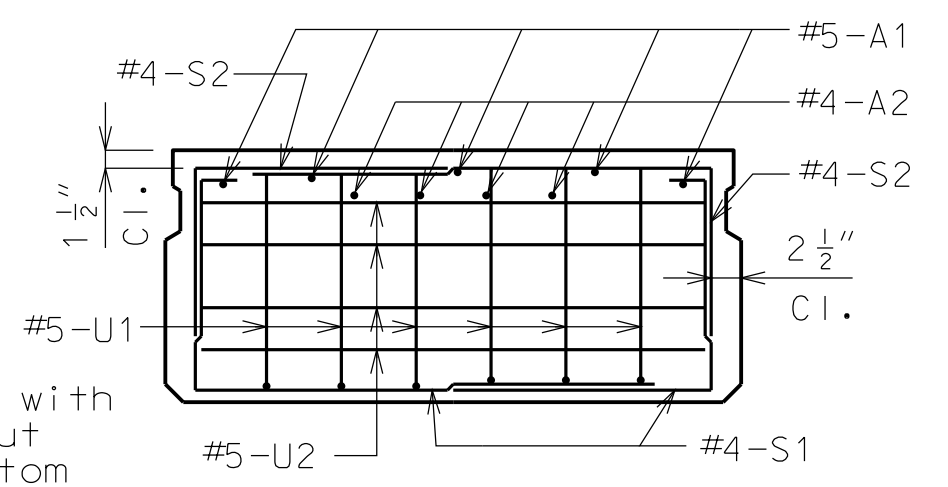
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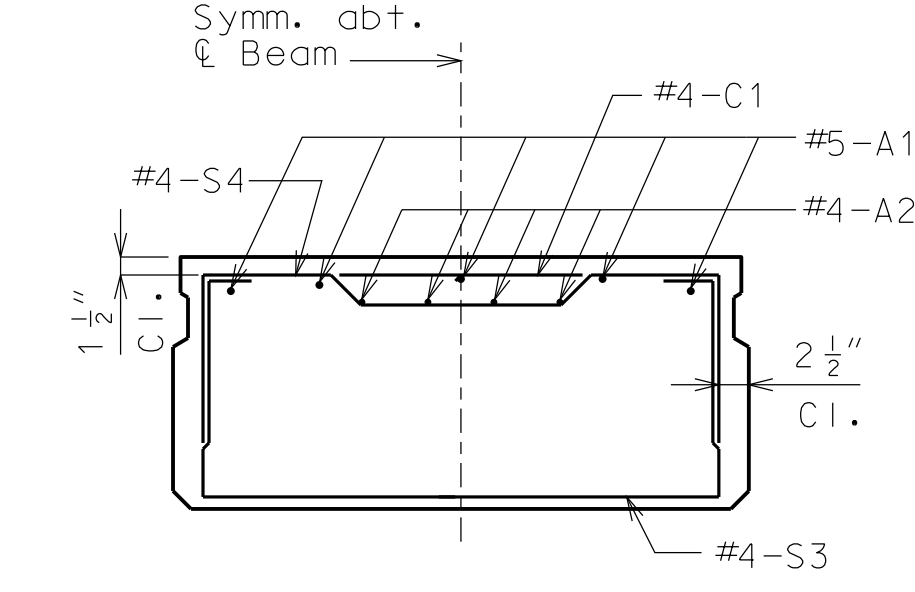
INTERIOR BOX BEAM DIMENSIONS



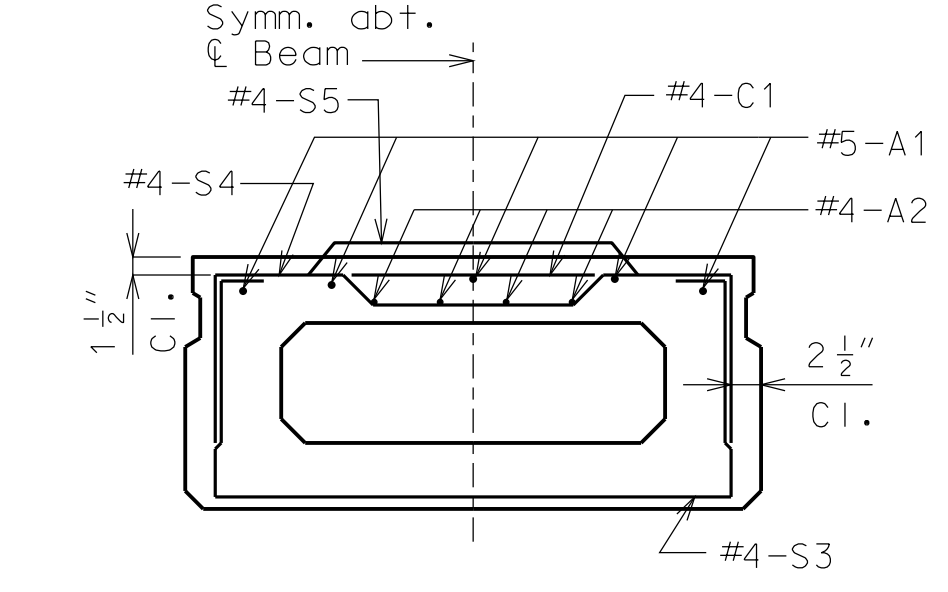
TYPICAL STRAND ARRANGEMENT



TYPICAL END ELEVATION



TYPICAL SECTION NEAR END



TYPICAL SECTION THRU VOID

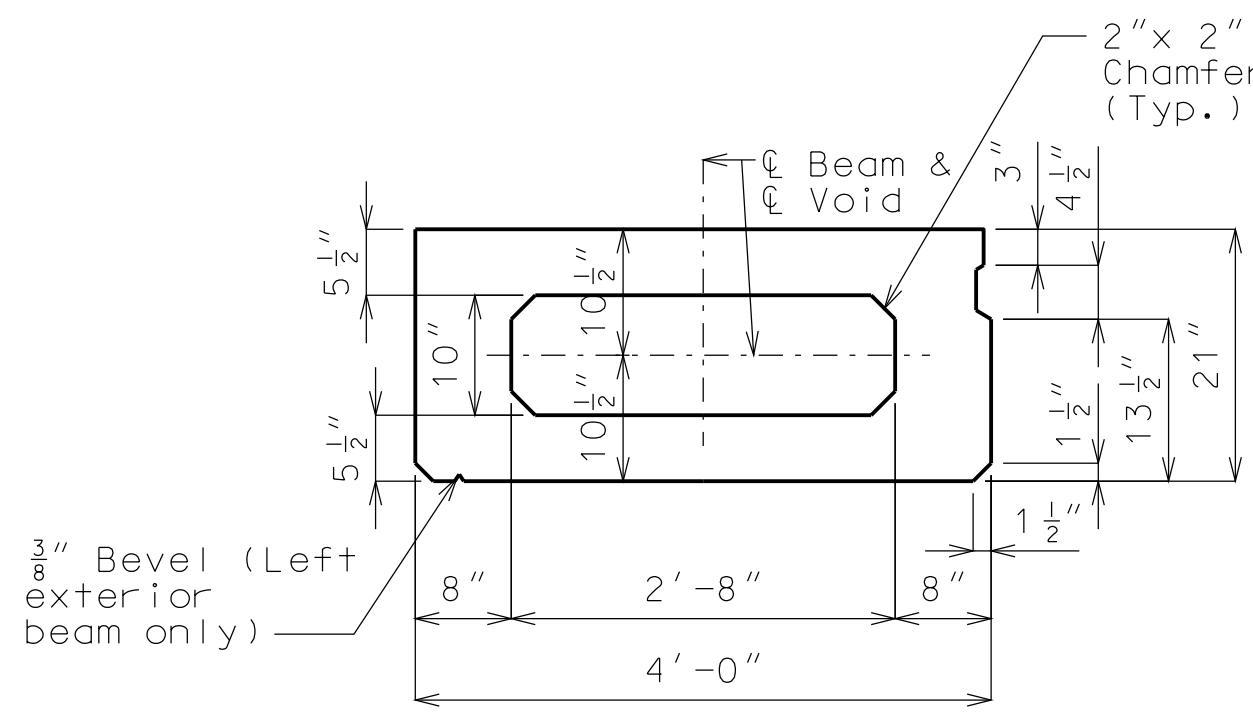
Cut and shop bend with 22" projection. Cut any remaining bottom strands within 1" of end of girder *

(Interior Beam shown, Exterior Beam similar) (Strands not shown for clarity)

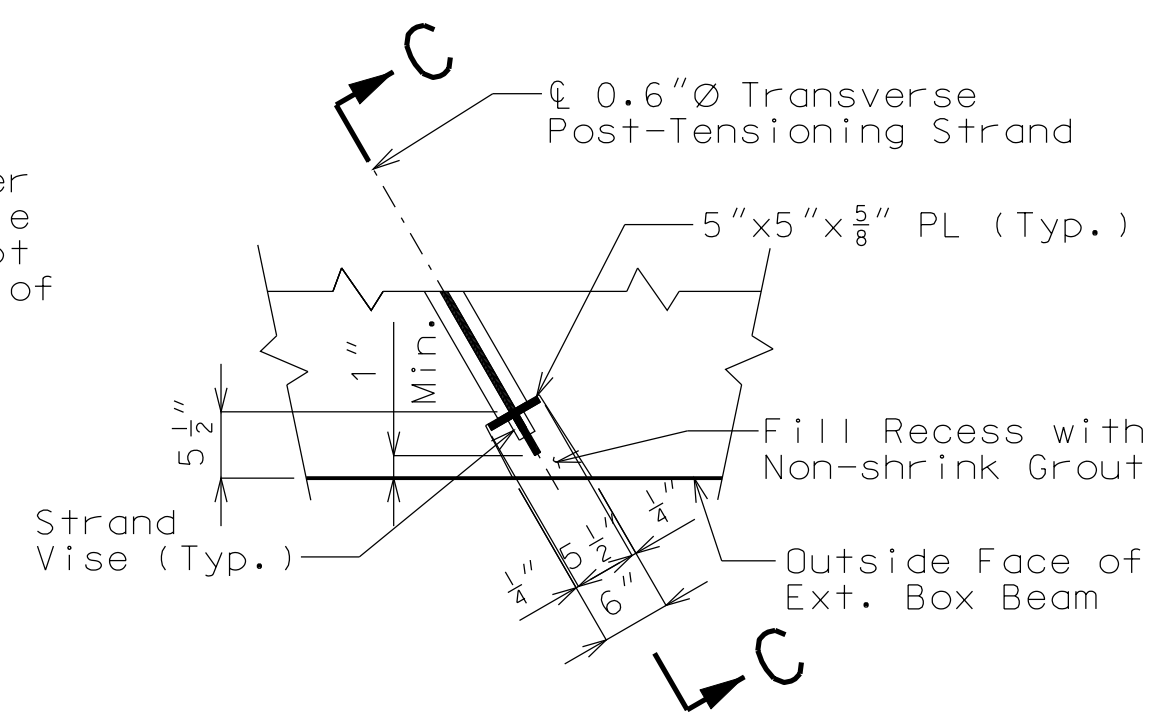
(Interior Beam shown, Exterior Beam similar) (Strands not shown for clarity)

(Interior Beam shown, Exterior Beam similar) (Strands not shown for clarity)

* At the contractor's option the location for bent-up strands may be varied from that shown. The total number of bent-up strands shall not be changed. One strand tie bar is required for each layer of bent-up strands except at abutments which require one bar on the bottom layer of strands only.

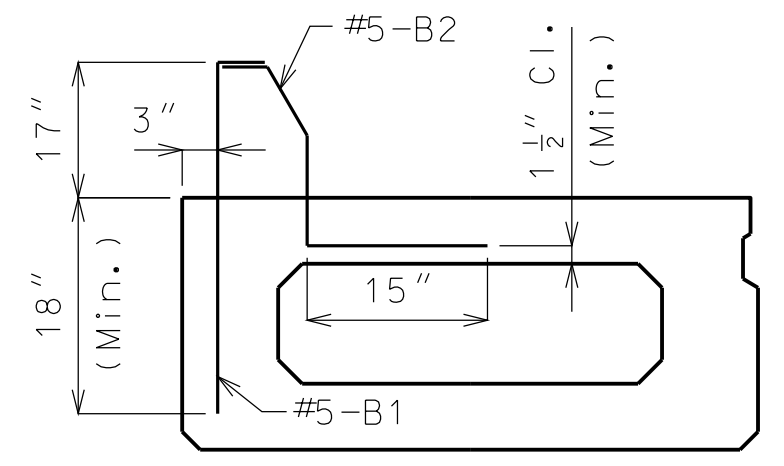


EXTERIOR BOX BEAM DIMENSIONS



SECTION B-B

For location of Section B-B, see Sheet No. 10

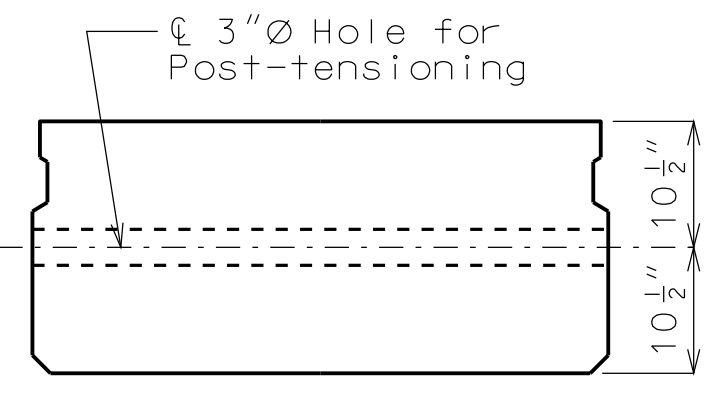


EXTERIOR BEAM DETAILS SHOWING B-BARS

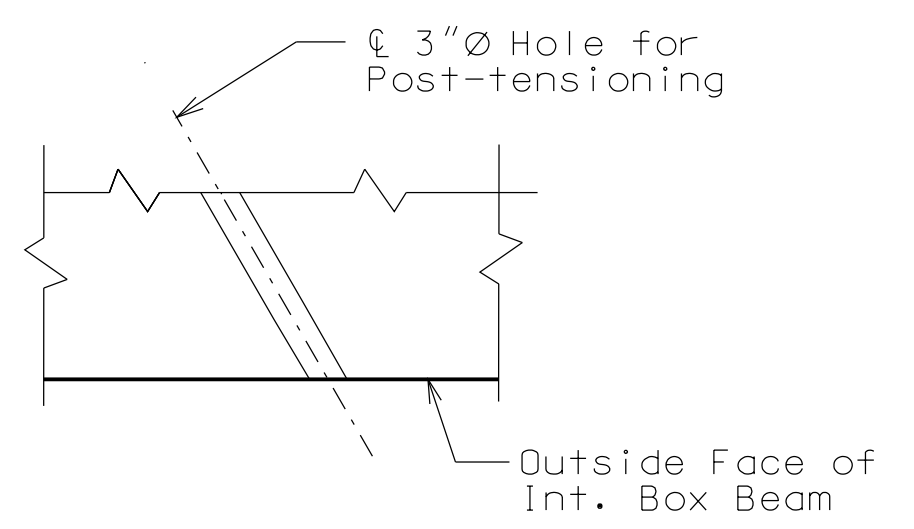
(Reinforcement extends thru overlay and into Barrier)

Grade 270 L.R. Strands	
	0.6" Dia.
Area (Square Inches)	0.217
Ultimate Strength (Lbs. per Strand)	58,590
Applied Final Post-Tension (Lbs. per Strand)	43,943

BOX BEAM TRANSVERSE POST-TENSIONING DETAILS

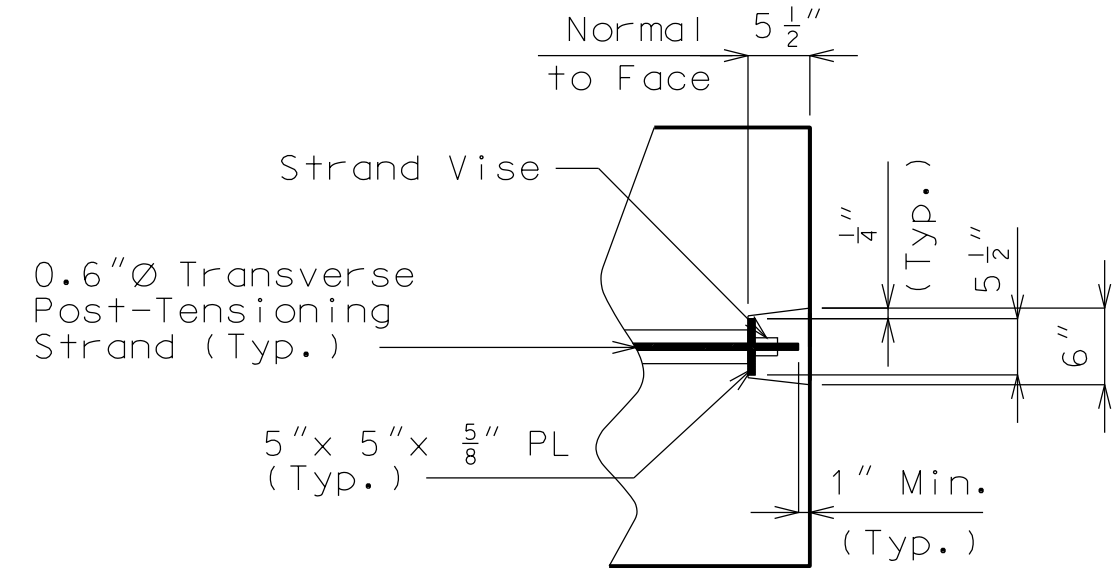


POST-TENSIONING HOLE LOCATION



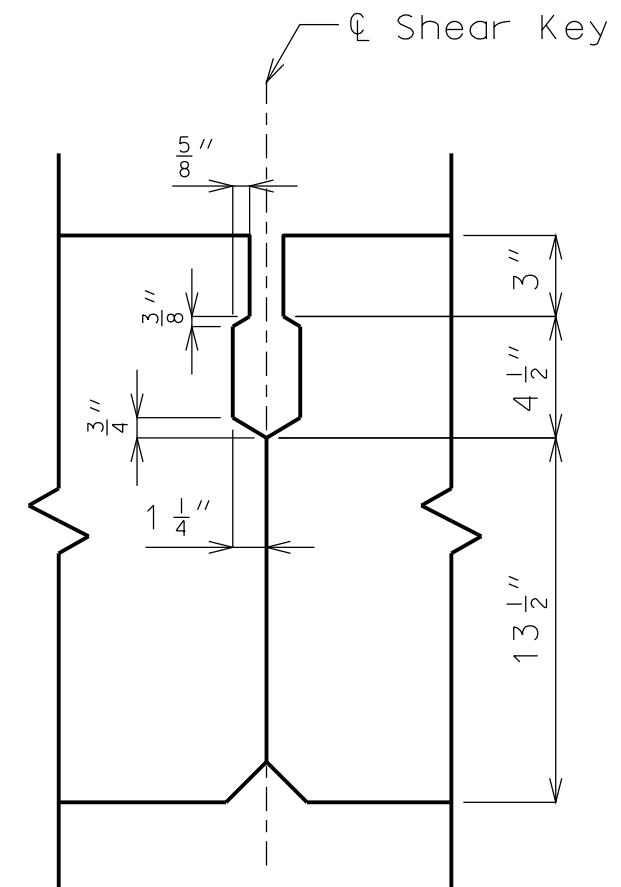
SECTION A-A

For location of Section A-A, see Sheet No. 9



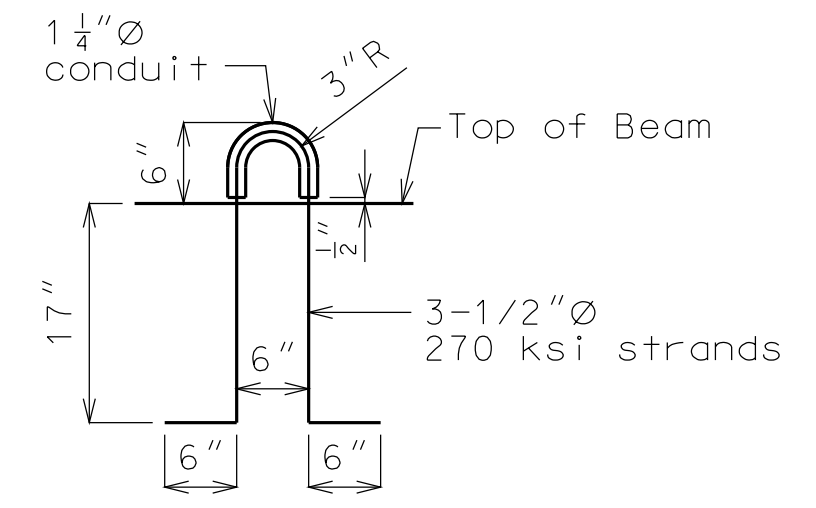
SECTION C-C

- Notes:
- Concrete for prestressed box beams shall be Class A-1 with $f'c = 6,000$ psi and $f'ci = 5,000$ psi.
 - (+) Indicates prestressing strand.
 - Use 28 strands with an initial prestress force of 868 kips.
 - Minimum clearance to reinforcing shall be 1", except as noted.
 - Prestressing tendons for prestressed box beams shall be uncoated, seven-wire, low-relaxation strands, 0.5 inch diameter conforming to AASHTO M203, Grade 270. Pretensioned members shall be in accordance with Sec 1029.
 - Transverse Post-Tensioning strands shall be uncoated, seven-wire, low-relaxation strands, 0.6 inch diameter conforming to AASHTO M203, Grade 270. Pretensioned members shall be in accordance with Sec 1029.
 - Keyways shall be sandblasted prior to shipping box beams.
 - Structural steel items shall be in accordance with ASTM A572.
 - Work this sheet with Sheets No. 7, 9 & 10.

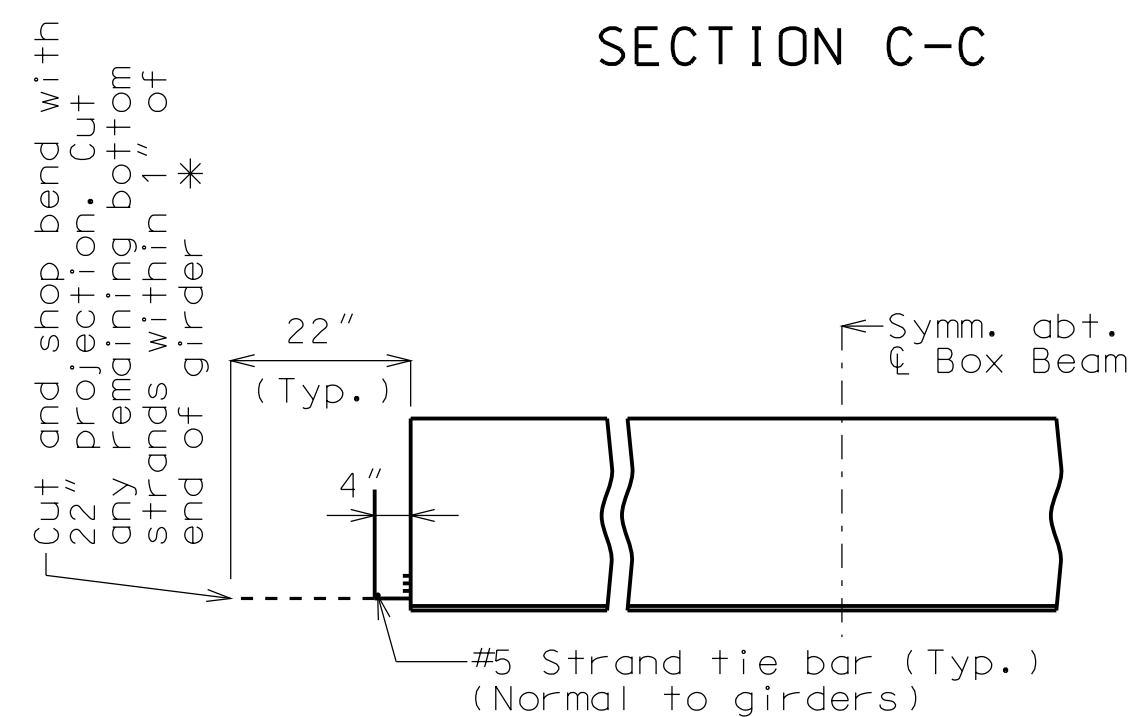


SHEAR KEY DETAIL

Symm. abt. ϕ Shear Key



LIFTING LOOP DETAIL



STRAND DETAILS AT BOX BEAM ENDS

DETAILS OF BOX BEAMS

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DATE PREPARED 4/15/2014	
ROUTE B	STATE MO
DISTRICT BR	SHEET NO. 8
COUNTY BOONE	
JOB NO. J5S2186	
CONTRACT ID.	
PROJECT NO.	
BRIDGE NO. A8165	

DATE	DESCRIPTION

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ROUTE B STATE MO

DISTRICT BR SHEET NO. 9

COUNTY BOONE

J5S2186

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A8165

DESCRIPTION

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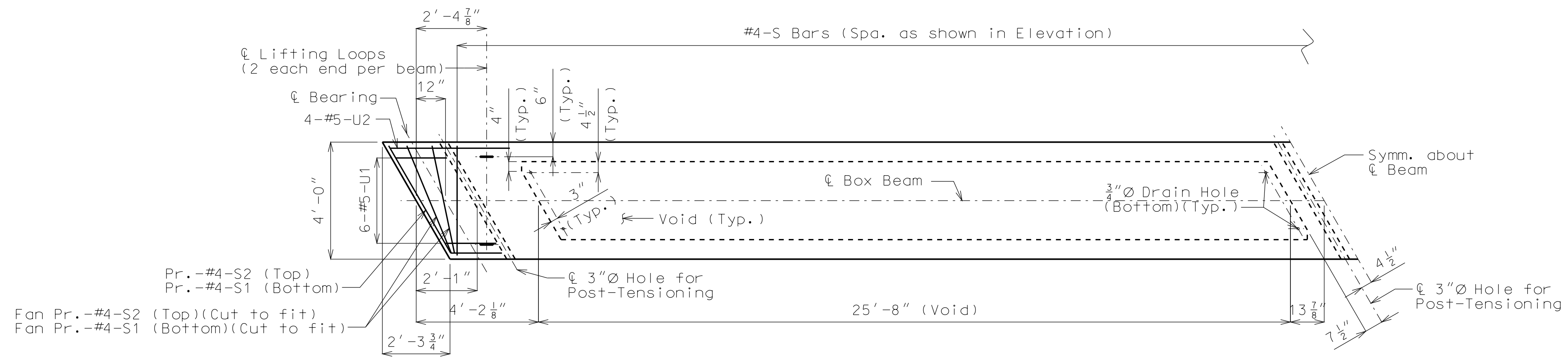
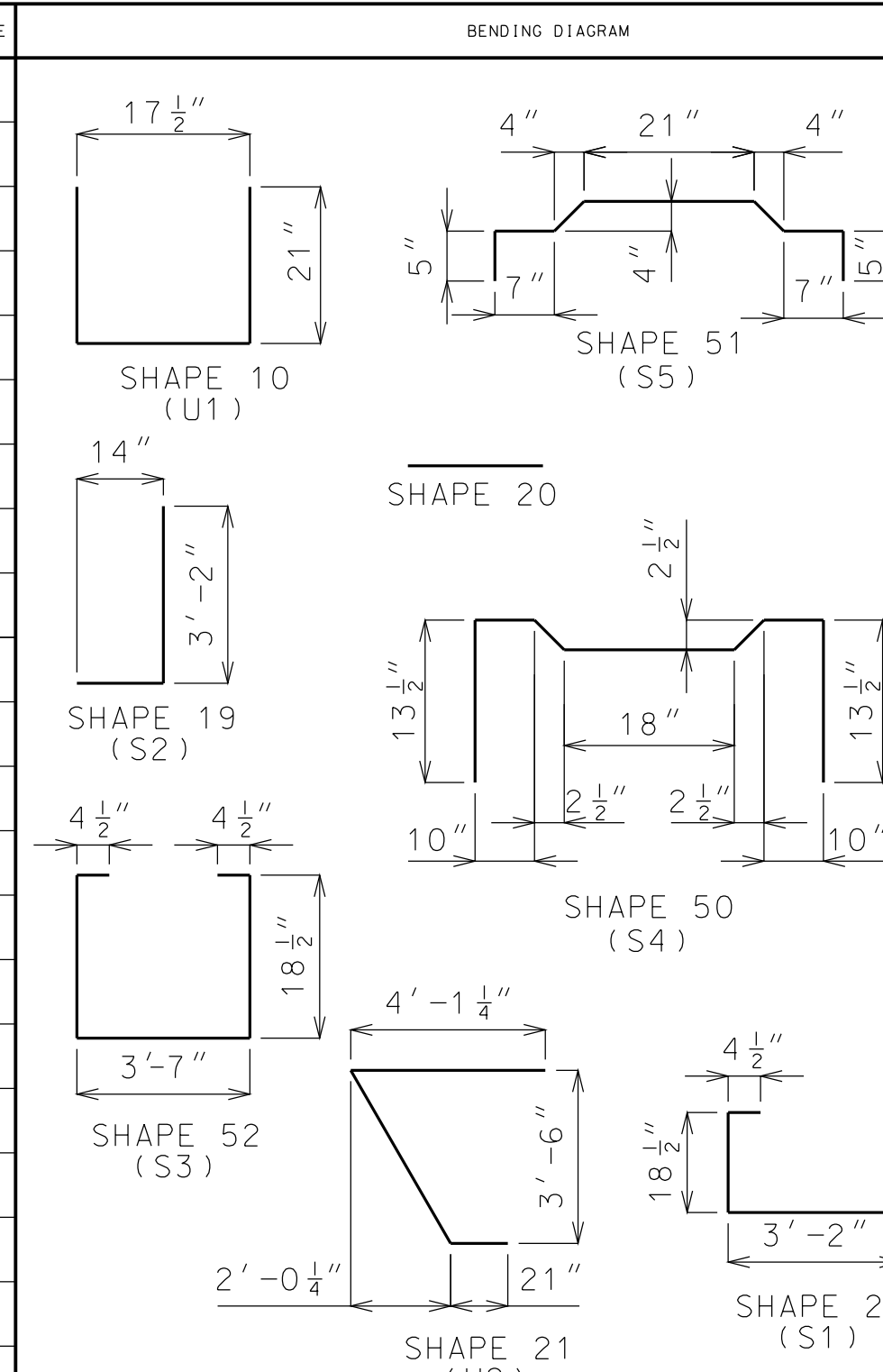
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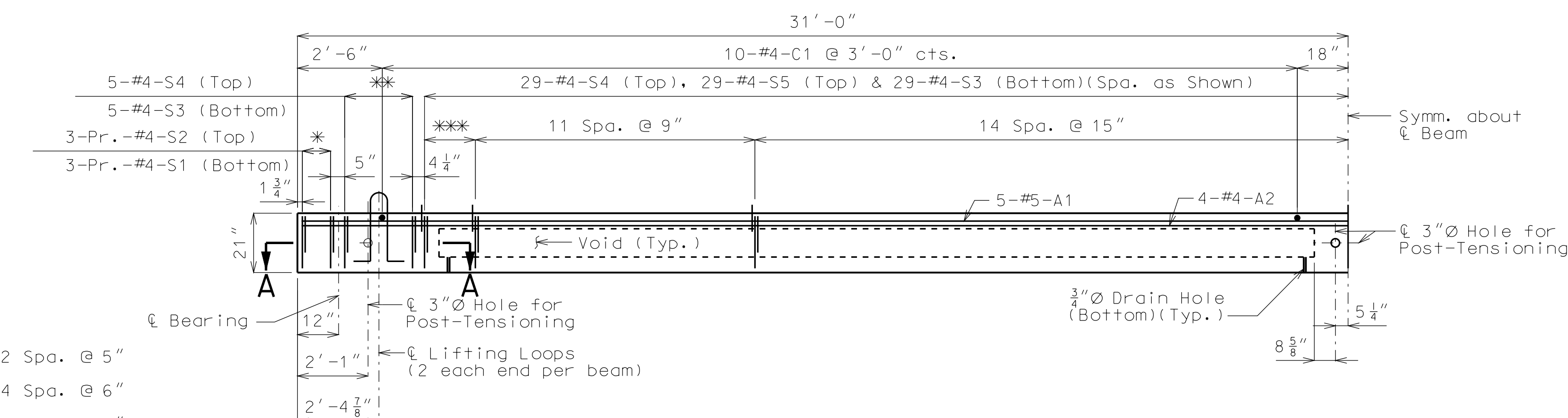
DATE

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BILL OF REINFORCING STEEL - EACH BEAM			
NO.	SIZE & MARK	ACTUAL LENGTH	SHAPE
10	5 A1	32'-8"	20
8	4 A2	32'-4"	20
20	4 C1	3'-7"	20
12	4 S1	4'-11"	28
12	4 S2	4'-3"	19
67	4 S3	7'-1"	52
67	4 S4	5'-9"	50
57	4 S5	4'-5"	51
12	5 U1	4'-9"	10
8	5 U2	9'-8"	21



PART PLAN OF BOX BEAM



PART ELEVATION OF BOX BEAM
(Dimensions measured along \bar{C} of Beam)(U-Bars not shown for clarity)

Notes:

All dimensions in bending diagram are out to out.

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

Actual lengths are measured along centerline of bar to the nearest inch.

Minimum clearance to reinforcing shall be 1", except as noted.

All reinforcement shall be Grade 60.

All reinforcement shall be epoxy coated.

$\frac{3}{4}$ " \bar{C} drain holes shall be provided at each end of each void, and shall be kept open at all times.

Reinforcement shall be in accordance with Sec 1036.

The box beams shall be finished in accordance with Sec 1029.6.14, except as noted.

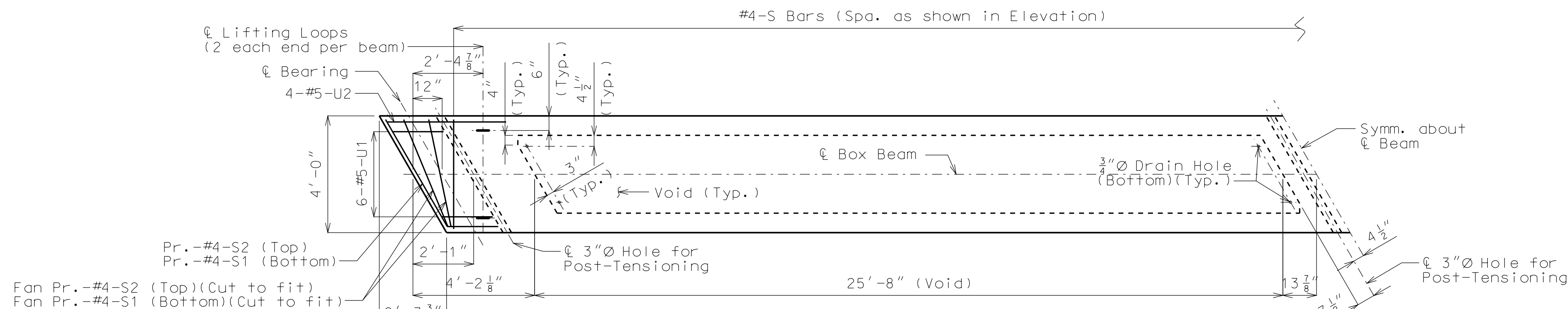
VOIDS shall be non-absorptive cellular polystyrene, according to ASTM C 578, designed to withstand the forces imposed upon them during fabrication without substantial deformation such as bulging, sagging, or collapsing. Cardboard voids will not be allowed. The outside dimensions of voids shall be as shown on the plans. When two or more sections of void are used to make up a required length, they shall be effectively taped or spliced together.

Work this sheet with Sheets No. 7 & 8.

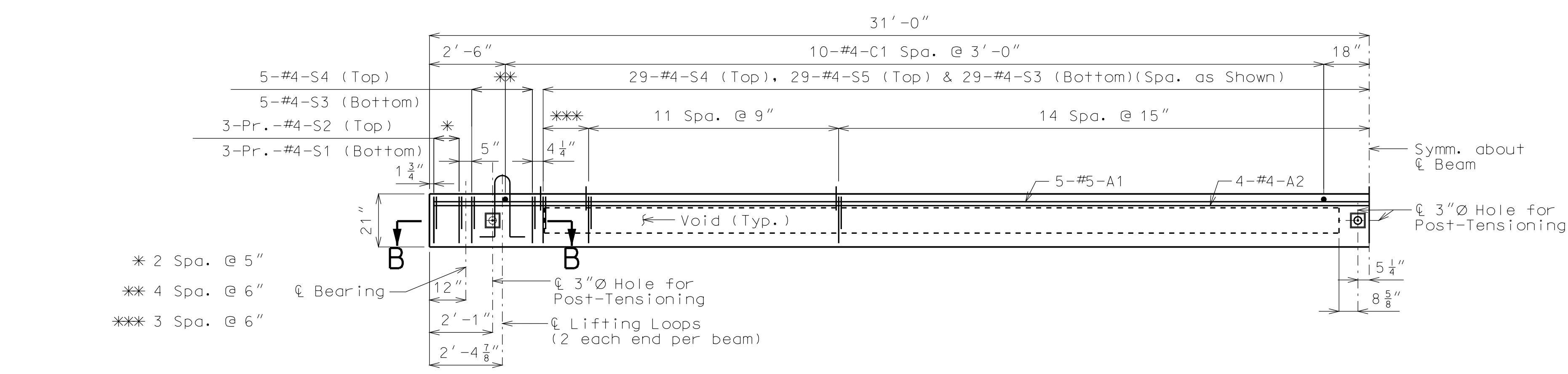
For Section A-A, see Sheet No. 8.

DETAILS OF INTERIOR BOX BEAMS

ADJACENT BOX BEAM ALTERNATE

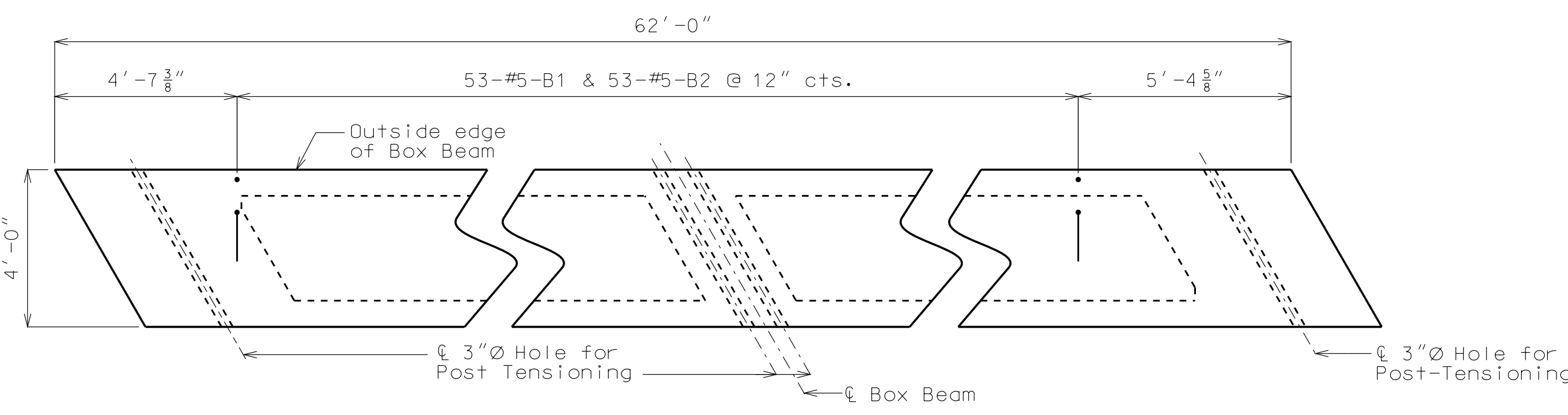


PART PLAN OF BOX BEAM
(B-Bars not shown for clarity)

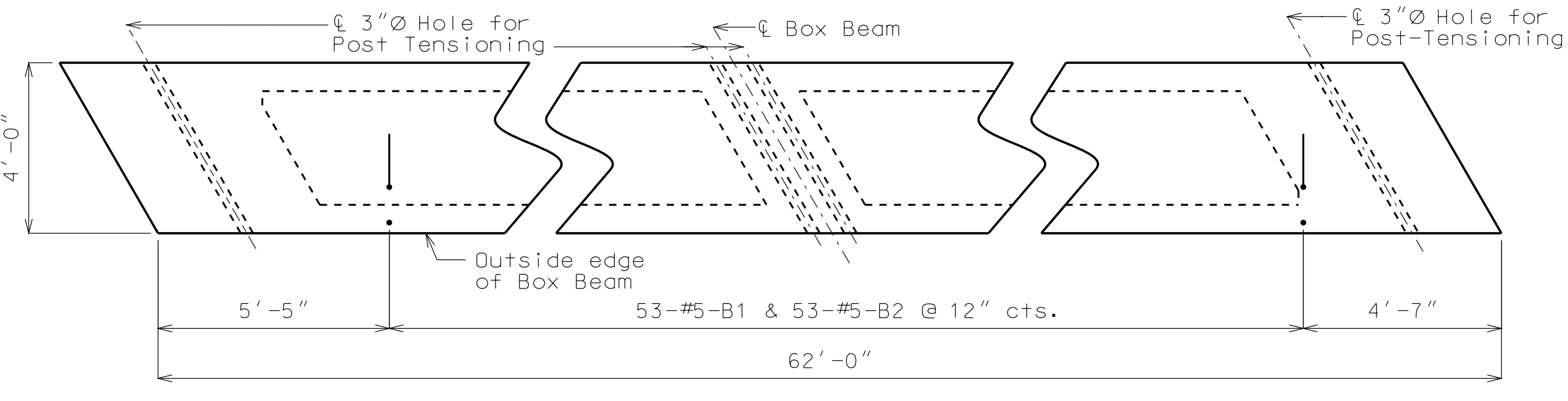


PART ELEVATION OF BOX BEAM
(Dimensions measured along centerline of beam)

- * 2 Spa. @ 5"
- ** 4 Spa. @ 6"
- *** 3 Spa. @ 6"



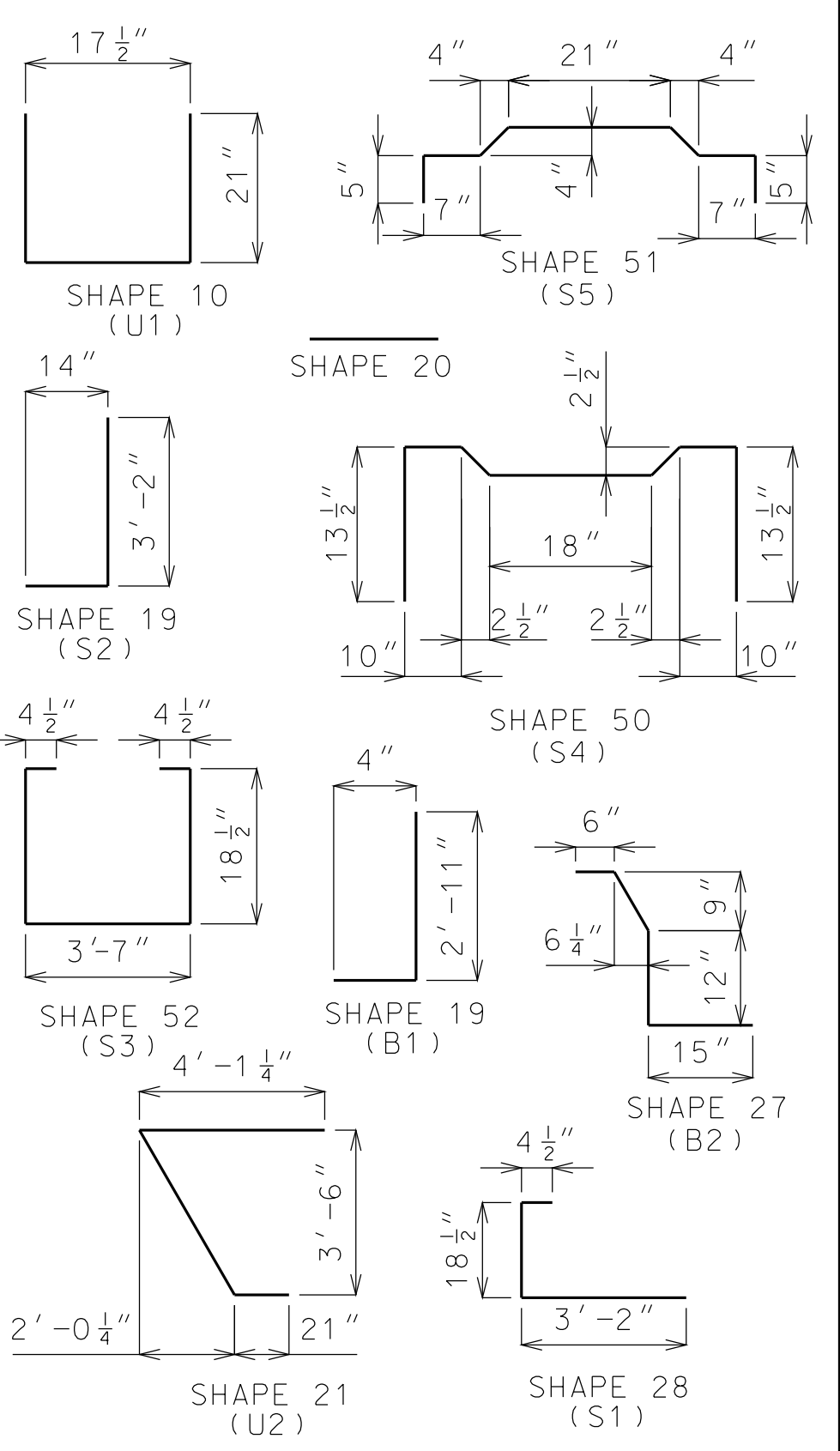
PLAN OF LEFT EXTERIOR BOX BEAM SHOWING B-BARS
(A-Bars, C-Bars, S-Bars, U-Bars, Lifting loops & Vent holes not shown for clarity)



PLAN OF RIGHT EXTERIOR BOX BEAM SHOWING B-BARS
(A-Bars, C-Bars, S-Bars, U-Bars, Lifting loops & Vent holes not shown for clarity)

DETAILS OF EXTERIOR BOX BEAMS

BILL OF REINFORCING STEEL - EACH BEAM			
NO.	SIZE & MARK	ACTUAL LENGTH	SHAPE
10	5 A1	32'-8"	20
8	4 A2	32'-4"	20
53	5 B1	3'-2"	19
53	5 B2	3'-6"	27
20	4 C1	3'-7"	20
12	4 S1	4'-11"	28
12	4 S2	4'-3"	19
67	4 S3	7'-1"	52
67	4 S4	5'-9"	50
57	4 S5	4'-5"	51
12	5 U1	4'-9"	10
8	5 U2	9'-8"	21



Notes:

All dimensions in bending diagram are out to out.

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

Actual lengths are measured along centerline of bar to the nearest inch.

Minimum clearance to reinforcing shall be 1", except as noted.

All reinforcement shall be Grade 60.

All reinforcement shall be epoxy coated.

3/4" drain holes shall be provided at each end of each void, and shall be kept open at all times.

Reinforcement shall be in accordance with Sec 1036.

The box beams shall be finished in accordance with Sec 1029.6.14, except as noted.

VOIDS shall be non-absorptive cellular polystyrene, according to ASTM C 578, designed to withstand the forces imposed upon them during fabrication without substantial deformation such as bulging, sagging, or collapsing. Cardboard voids will not be allowed. The outside dimensions of voids shall be as shown on the plans. When two or more sections of void are used to make up a required length, they shall be effectively taped or spliced together.

Work this sheet with Sheets No. 7 & 8.

For Section B-B, see Sheet No. 8.

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DATE PREPARED: 4/15/2014

ROUTE: B STATE: MO DISTRICT: BR SHEET NO.: 10

COUNTY: BOONE JOB NO.: J5S2186 CONTRACT ID.: PROJECT NO.: BRIDGE NO.: A8165

DATE	DESCRIPTION

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JEFFERSON CITY, MO 65102
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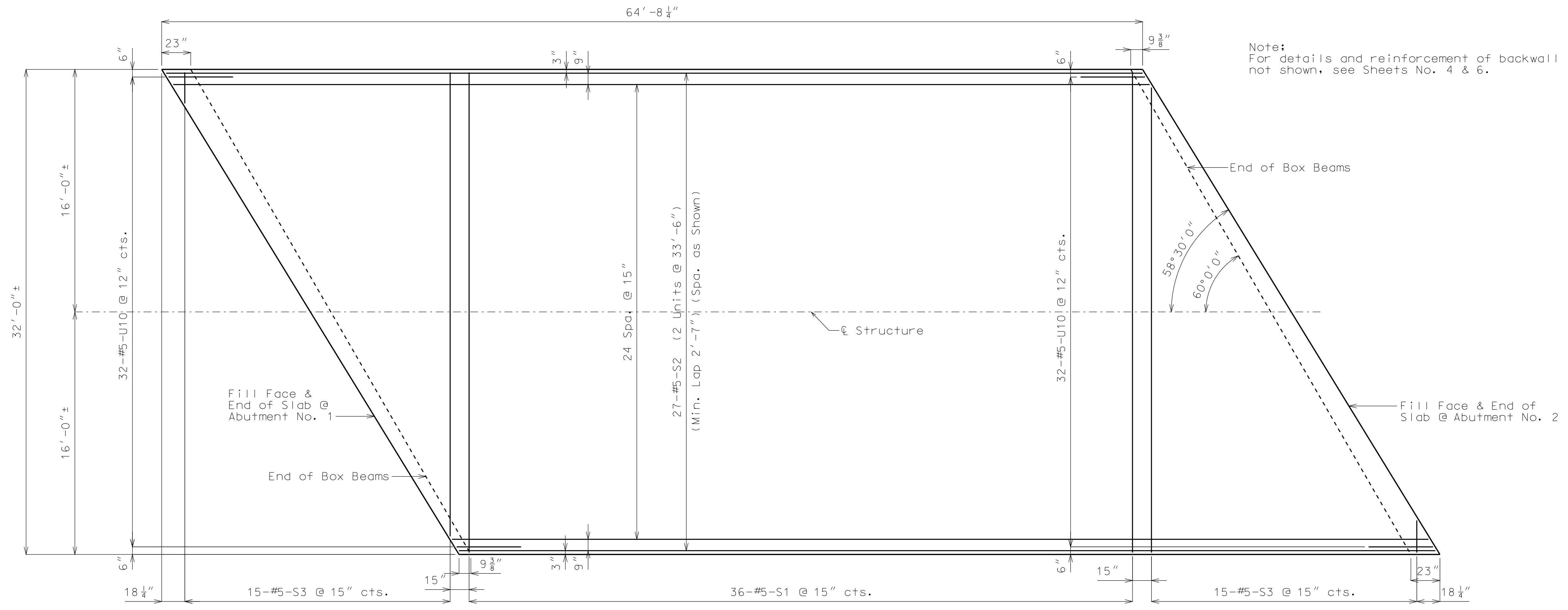
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

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DISTRICT BR SHEET NO. 11
COUNTY BOONE
JOB NO. J5S2186
CONTRACT ID.

PROJECT NO.
BRIDGE NO. A8165

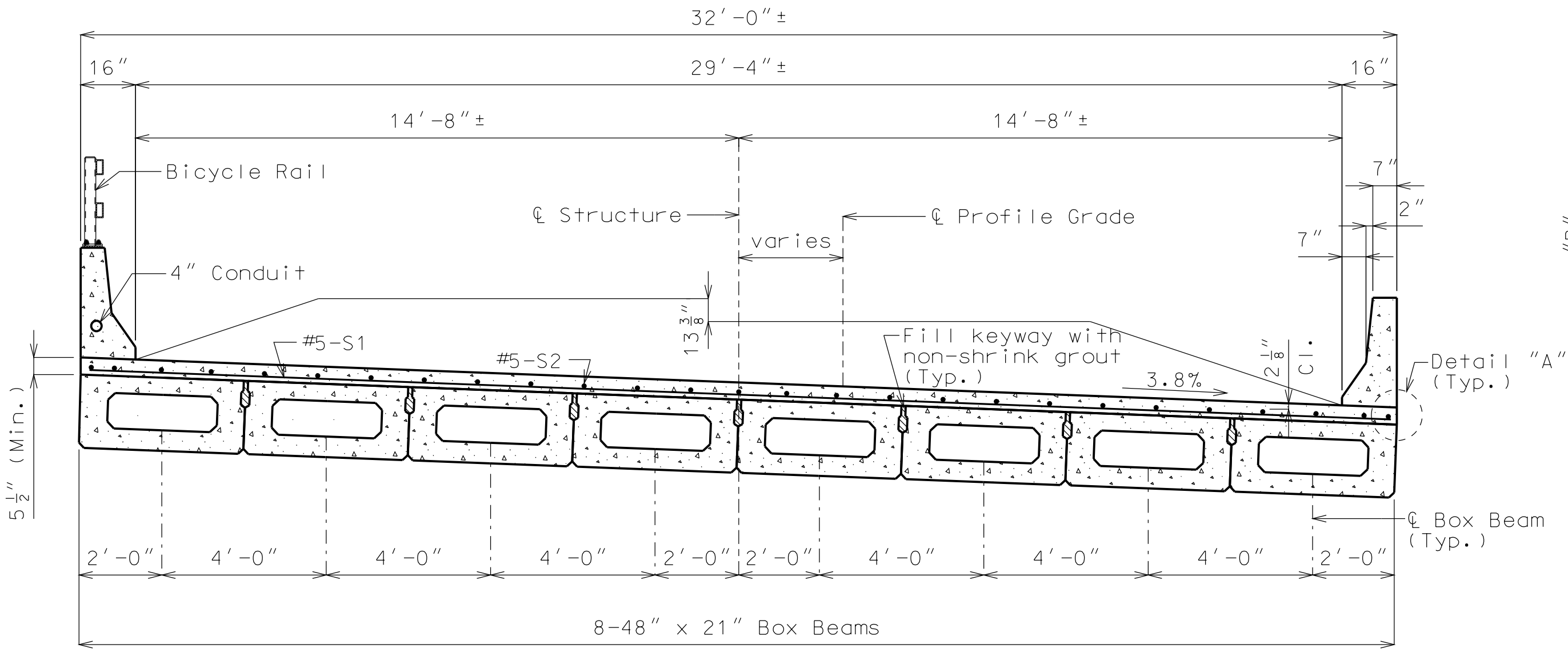
DATE	DESCRIPTION



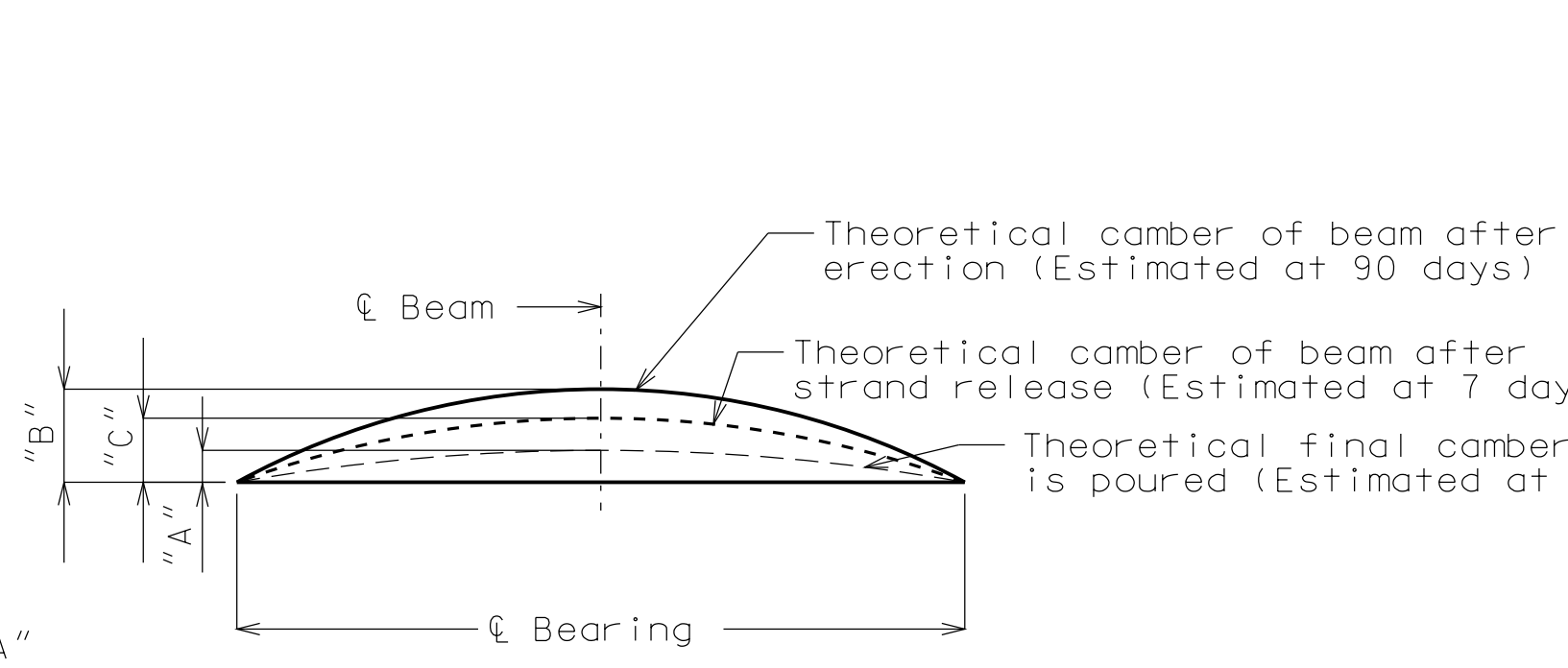
Note:
For details and reinforcement of backwall not shown, see Sheets No. 4 & 6.

PLAN OF SLAB SHOWING REINFORCEMENT

Note: Longitudinal dimensions are horizontal



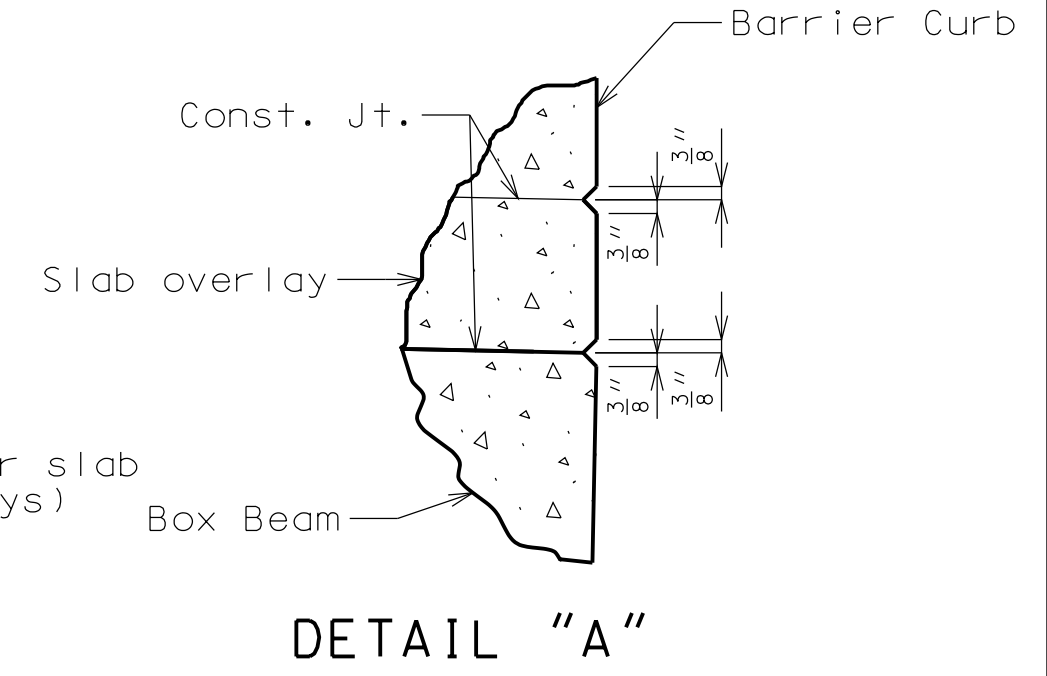
SECTION THRU SLAB NEAR MID SPAN



48" x 21" Beams No. 1 thru 8	Span (1-2)		
	A	B	C
	$\frac{7}{8}$ "	1 $\frac{1}{2}$ "	1"

BOX BEAM CAMBER DIAGRAM

Conversion factors for box beam camber:
0.25 pt. = 0.7125 x 0.5 pt.



DETAIL "A"

Differential camber between adjacent box beams shall not be greater than $\frac{1}{2}$ " prior to grouting shear keys.

If box beam camber is different from that shown in the camber diagram, in order to maintain minimum slab thickness adjustment of the slab haunches, an increase in slab thickness or a raise in grade uniformly throughout the structure shall be necessary. No payment will be made for additional labor or materials required for variation in haunching, slab thickness or grade adjustment.

Notes:
For details and reinforcement of barrier curb not shown, see Sheets No. 12, 13, 14 & 15.
The contractor shall pour and satisfactorily finish the slab overlay at a rate of not less than 25 cubic yards per hour with an approved retarder to retard the set of concrete to 2.5 hours.
Slab shall be poured to exterior face of exterior box beam. The slab is to be built parallel to grade and to a minimum thickness of 5 $\frac{1}{2}$ ".

Detailed Mar. 2014
Checked Mar. 2014

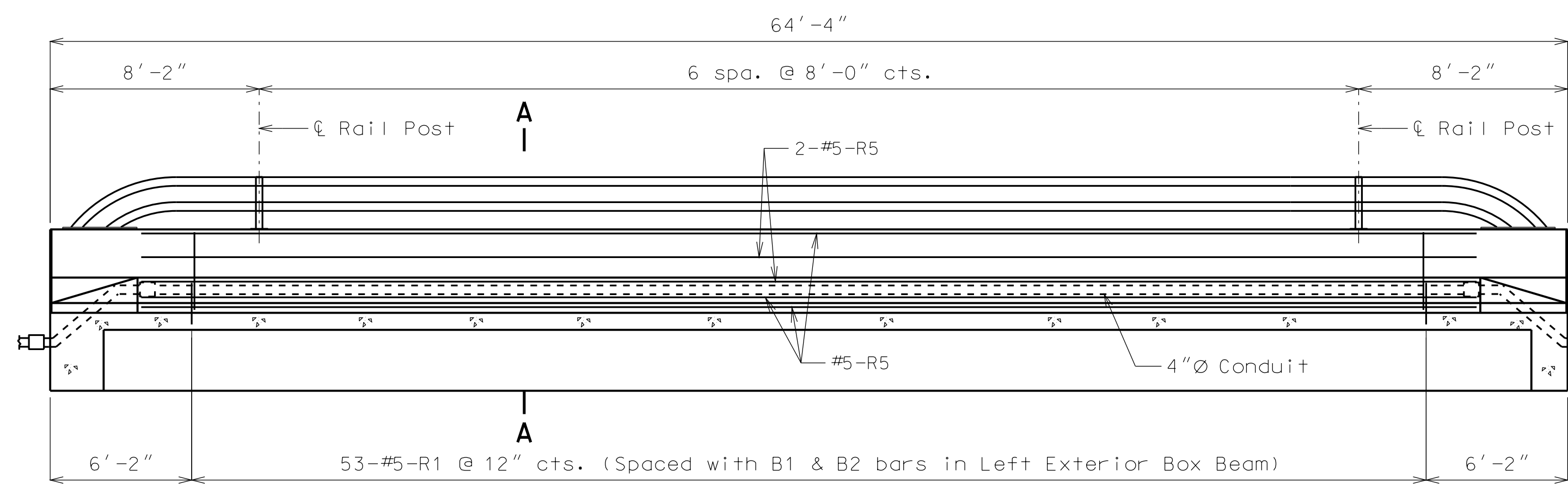
Note: This drawing is not to scale. Follow dimensions.

Sheet No. 11 of 20

ADJACENT BOX BEAM ALTERNATE

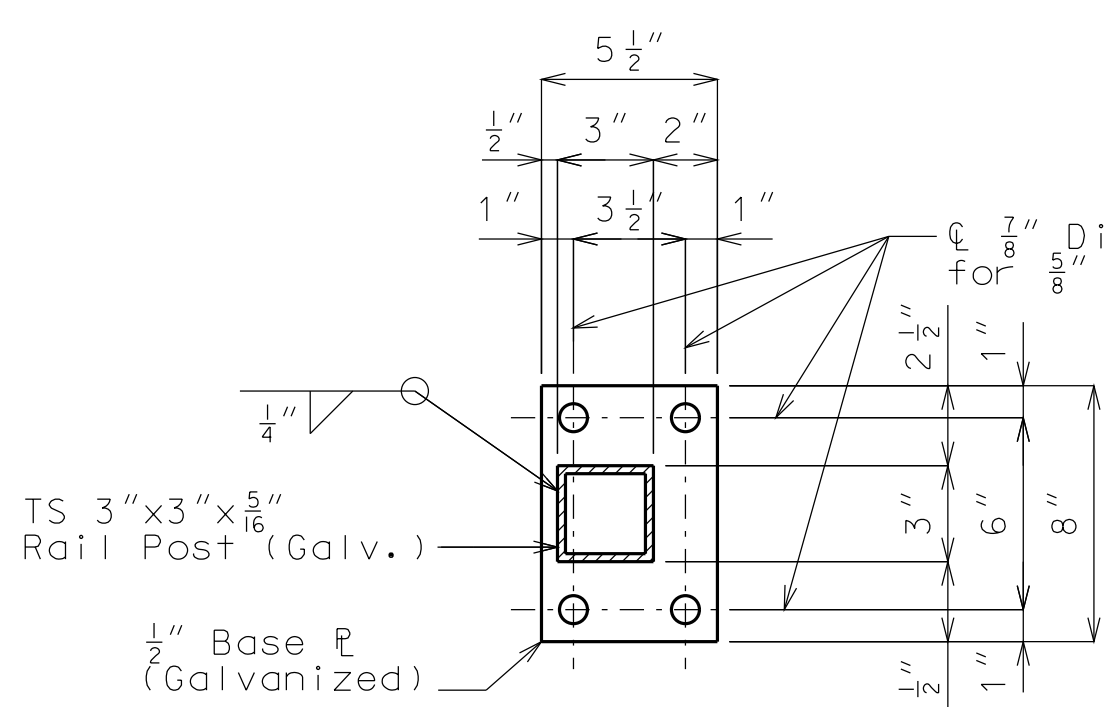
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
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 1-888-ASK-MODOT (1-888-275-6636)

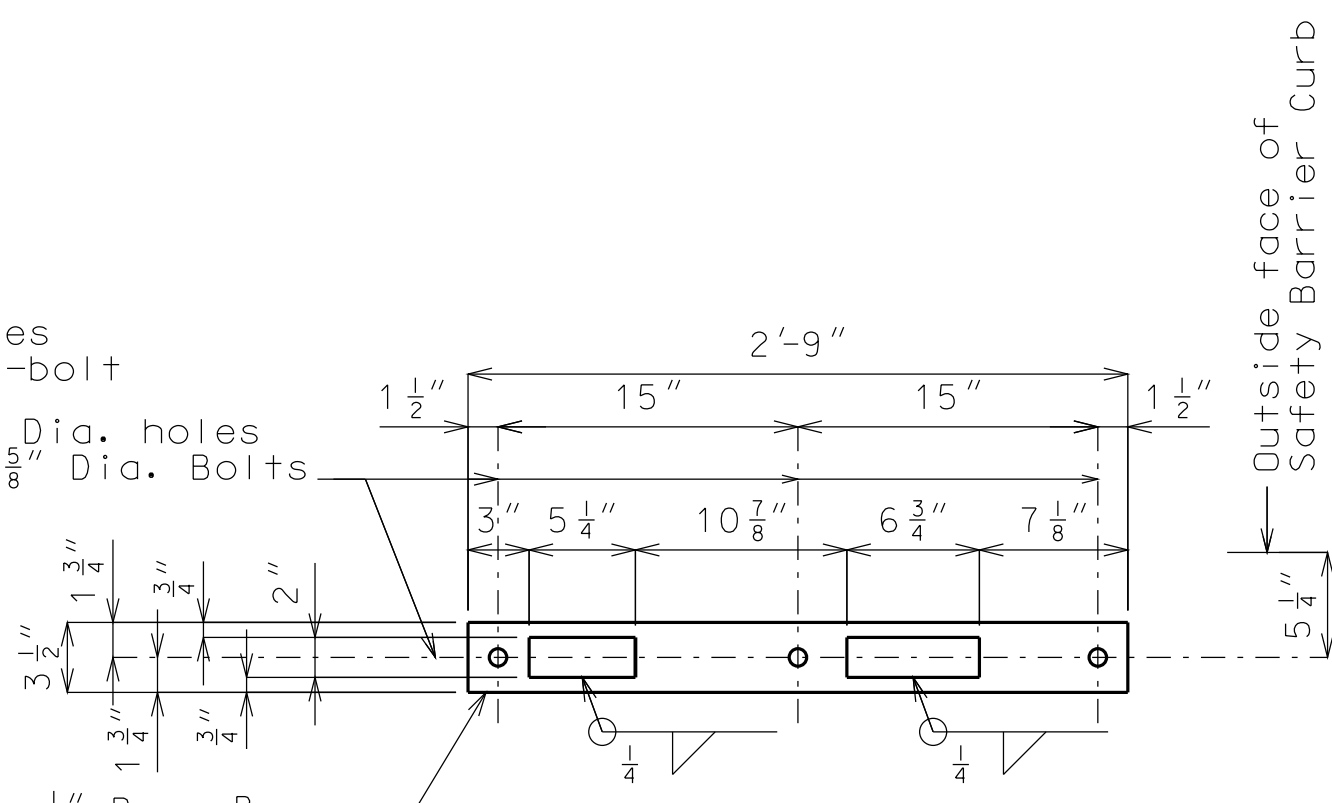


SECTION NEAR LEFT SAFETY BARRIER CURB

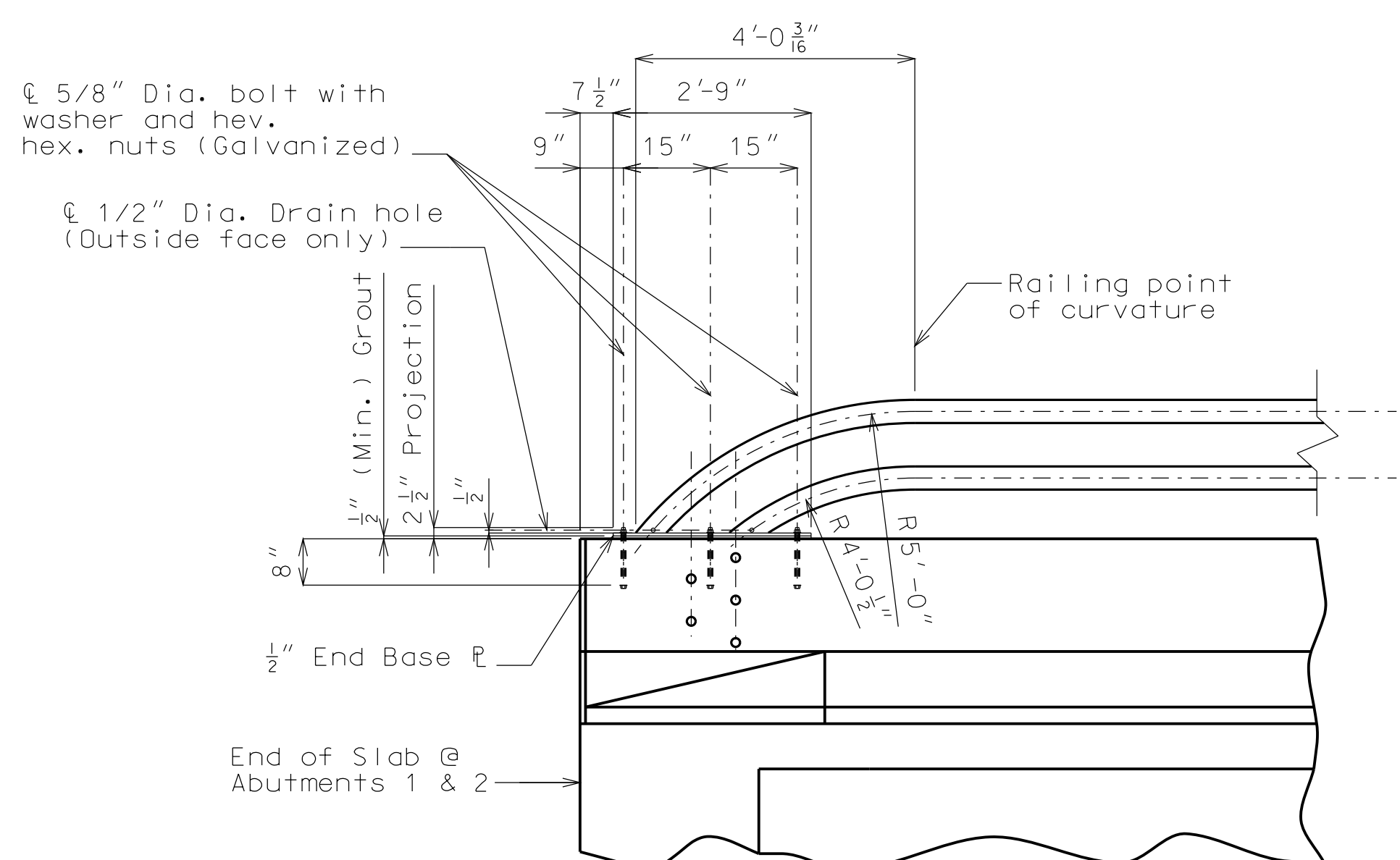
Note: Longitudinal dimensions are horizontal.



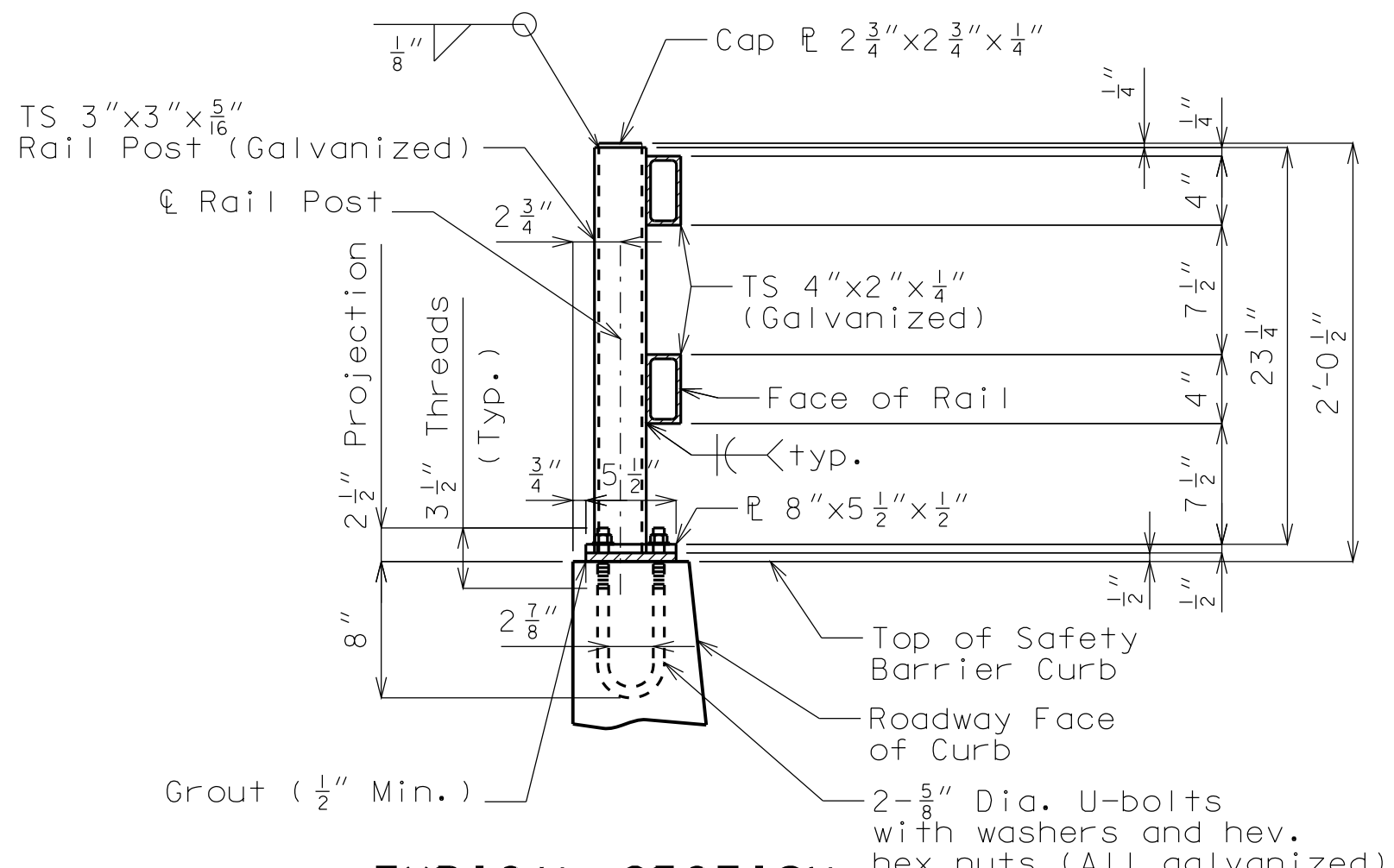
PLAN OF RAIL POST BASE PLATE



PLAN OF HANDRAIL END BASE PLATE



PART ELEVATION AT END OF SLAB

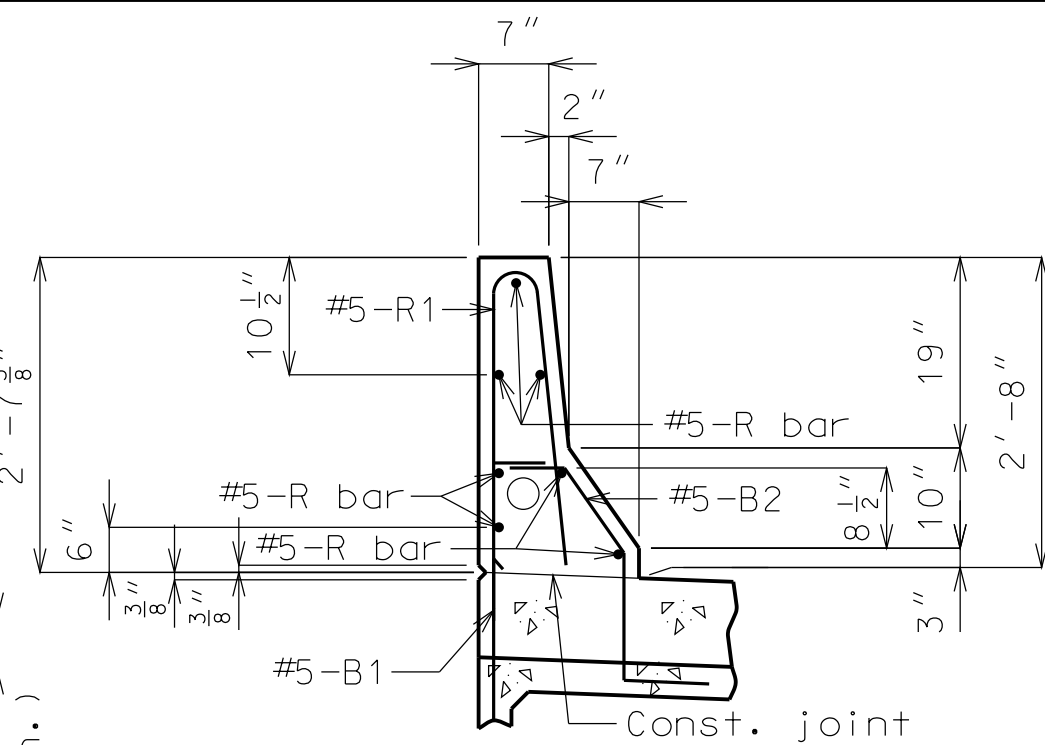


TYPICAL SECTION THRU RAIL

DETAILS OF LEFT SAFETY BARRIER CURB

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 12 of 20

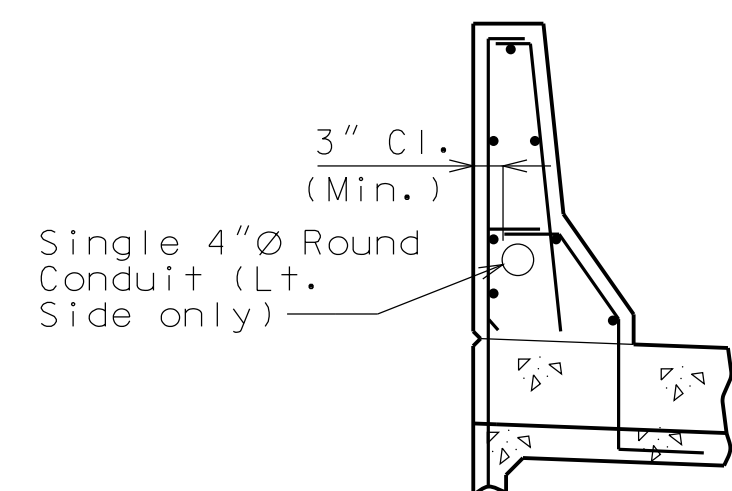


PART SECTION A-A

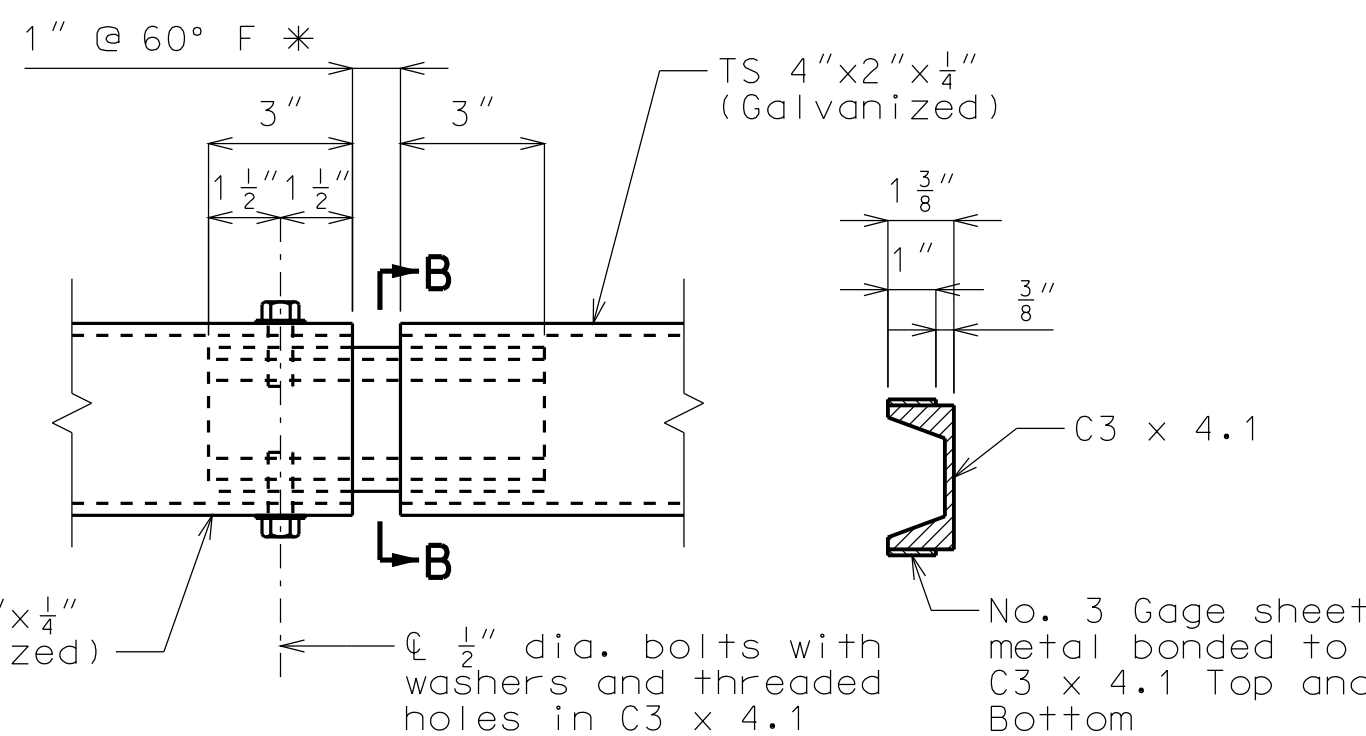
Notes:

Use a minimum lap of 2'-11" for #5 horizontal safety barrier curb bars.

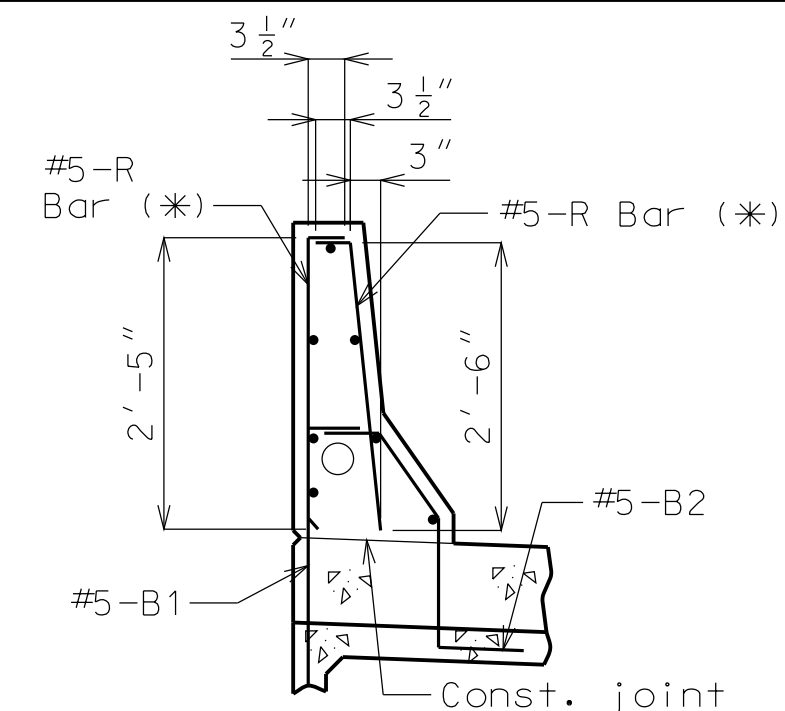
The cross-sectional area above the slab = 2.22 sq. ft.



SECTION THRU SAFETY BARRIER CURB SHOWING CONDUIT



RAIL SPLICE DETAIL SECTION B-B



R-BAR PERMISSIBLE ALTERNATE SHAPE

(*) The R1 bar may be separated into two bars as shown, at the contractor's option, only when slip forming is not used. (All dimensions are out to out.)

Notes:

Top of safety barrier curb shall be built parallel to grade with barrier curb joints normal to grade.

All exposed edges of safety barrier curb shall have either a 1/2" radius or a 3/8" bevel, unless otherwise noted.

Payment for all concrete and reinforcement, complete in place, will be considered completely covered by the contract unit price for safety barrier curb per linear foot.

Concrete in the safety barrier curb shall be Class B-1.

Measurement of safety barrier curb is to the nearest linear foot for each structure, measured along the outside top of slab from end of slab to end of slab.

Concrete traffic barrier delineators shall be placed on top of the safety barrier curb as shown on Missouri Standard Plans 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for "Safety Barrier Curb".

U-bolts with heavy hex nuts and standard plate washers shall conform to ASTM A307, galvanized.

All railing, posts, bolts, nuts, washers and base plates shall be galvanized after fabrication in accordance with ASTM A123, ASTM A153 and Section 712.14 of the Missouri Standard Specifications. Vent holes shall be provided at all internally closed joints for galvanizing.

Payment for furnishing, galvanizing and installation of Bicycle Railing shall be made at the contract unit price for Bicycle Railing, per linear foot. Such payment will be full compensation for furnishing the railing, for galvanizing, installation, including the anchorage system; and for labor, materials, equipment, and incidentals to complete the work as specified and as approved by the Engineer.

Dimensions of bicycle rail are measured longitudinally.

Hollow structural steel tubing and expansion sleeves shall conform to the requirements of ASTM designation A500 Grade A.

Channels and base plates shall be fabricated from ASTM A709 grade 36 steel.

Maximum distance between rail splices shall be 32'-0".

Welding and Fabrication of structural steel shall be in accordance with Section 712 of the Missouri Standard Specifications.

* Gap at Rail Splice shall be increased 1/8" for each 10° fall in temperature and decreased 1/8" for each 10° rise in temperature at installation.

All rail posts shall be installed normal to grade. Grout at 1/2" minimum thickness shall be placed under base plates to provide for vertical alignment of rail posts.

For Details of Conduit System on Structure see Sheet No. 16.

ADJACENT BOX BEAM ALTERNATE

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DATE PREPARED 4/15/2014	
ROUTE B	STATE MO
DISTRICT BR	SHEET NO. 12
COUNTY BOONE	
JOB NO. J5S2186	
CONTRACT ID.	

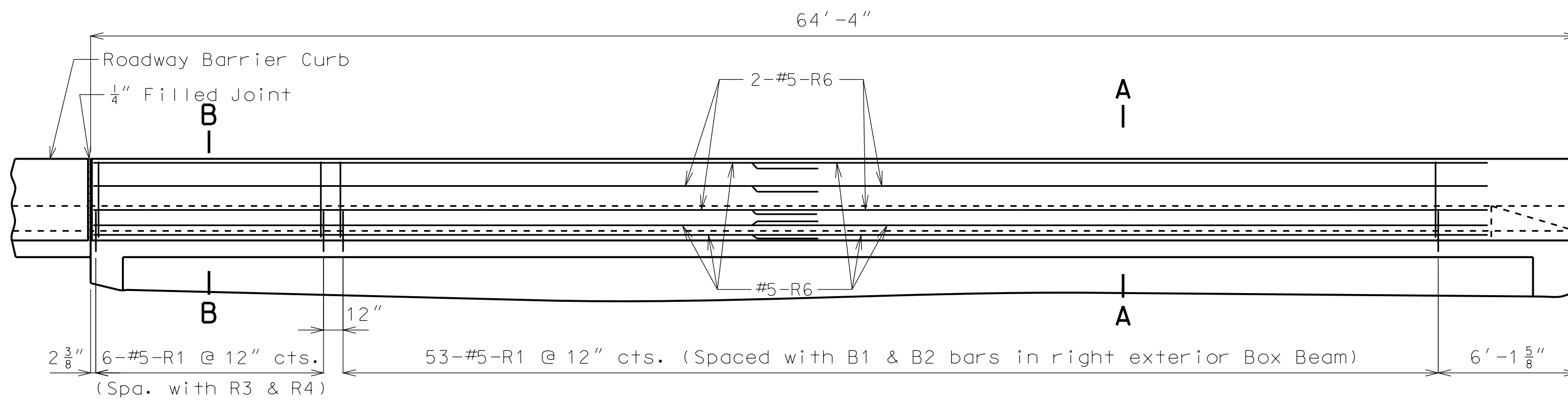
PROJECT NO.
BRIDGE NO. A8165

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

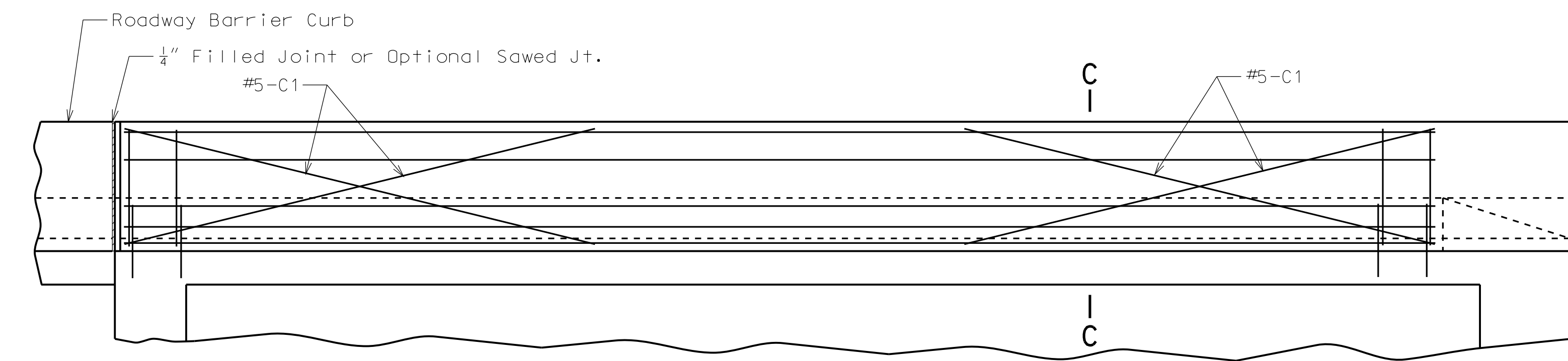
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

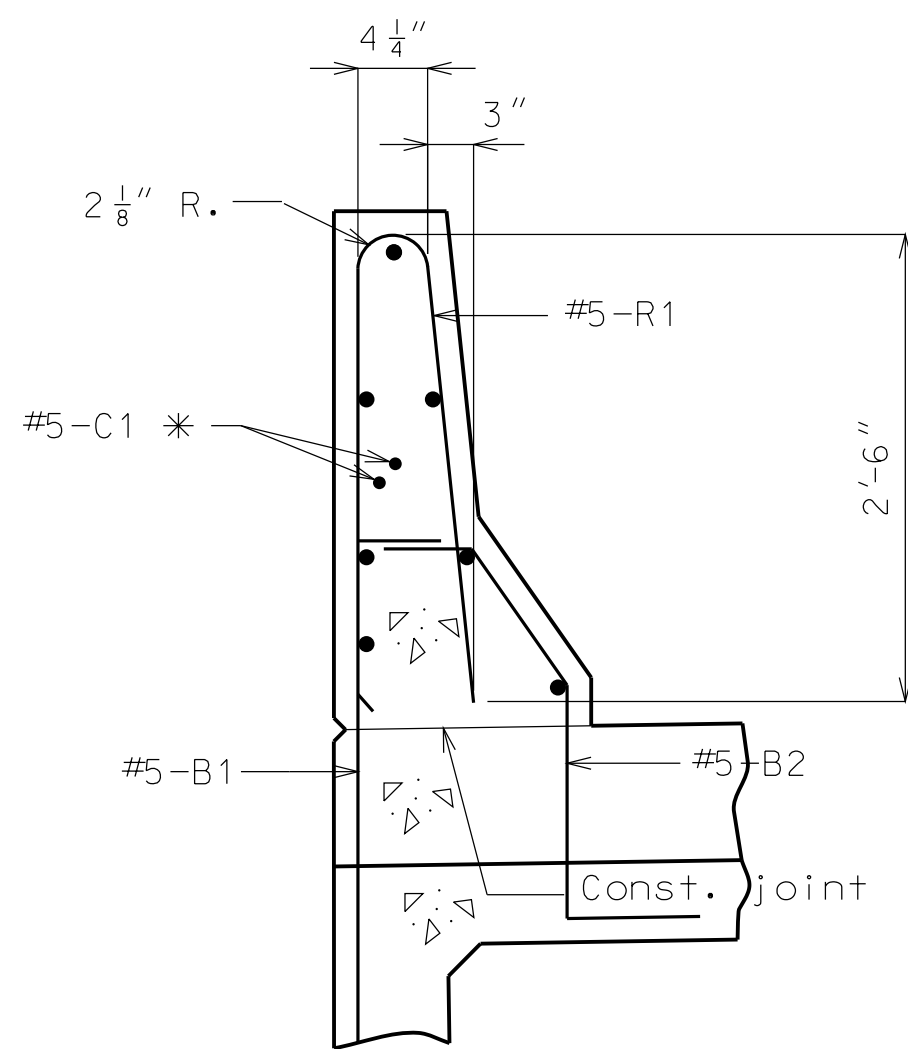


ELEVATION NEAR RIGHT SAFETY BARRIER CURB

Note: Longitudinal dimensions are horizontal.

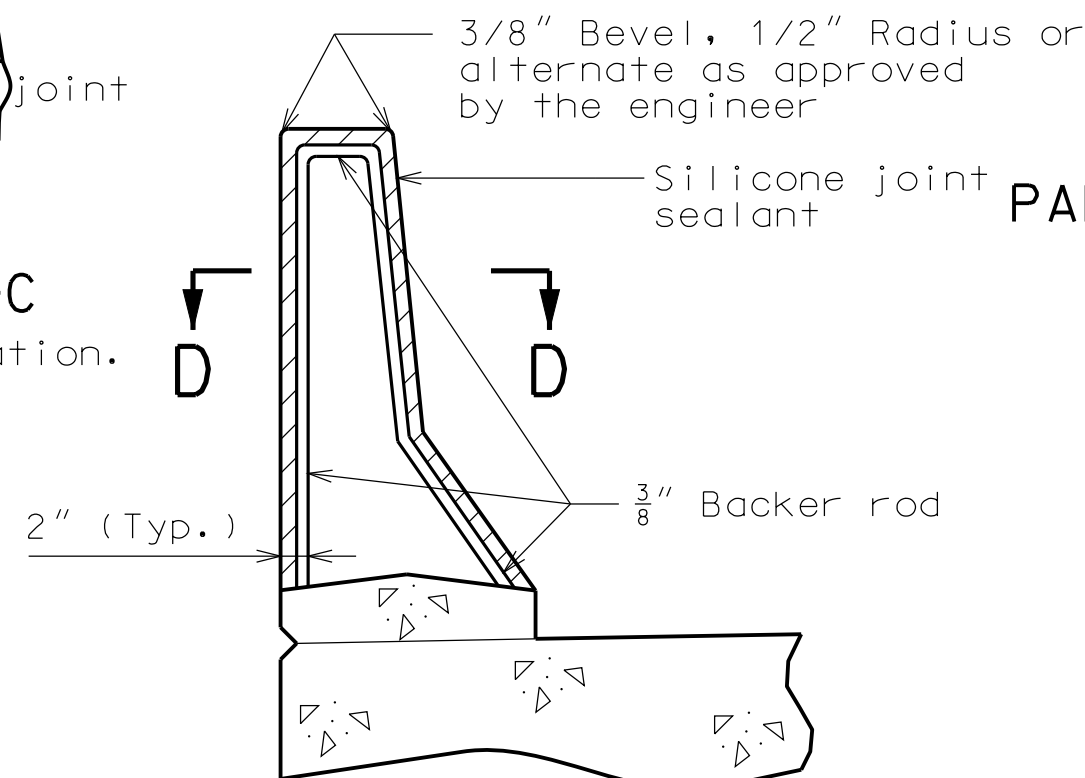


TYPICAL ELEVATION NEAR RIGHT SAFETY BARRIER CURB AT SUPPORT LOCATIONS (OPTIONAL SLIP-FORM BRIDGE SAFETY BARRIER CURB)

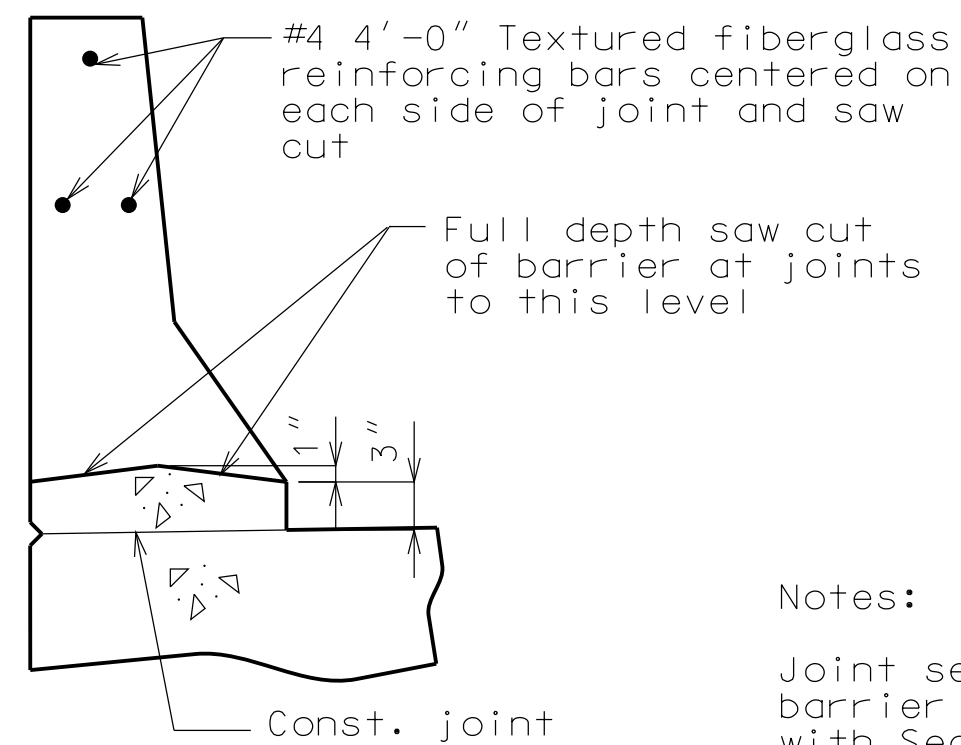


PART SECTION C-C

* Near each support location.



SECTION THRU JOINT



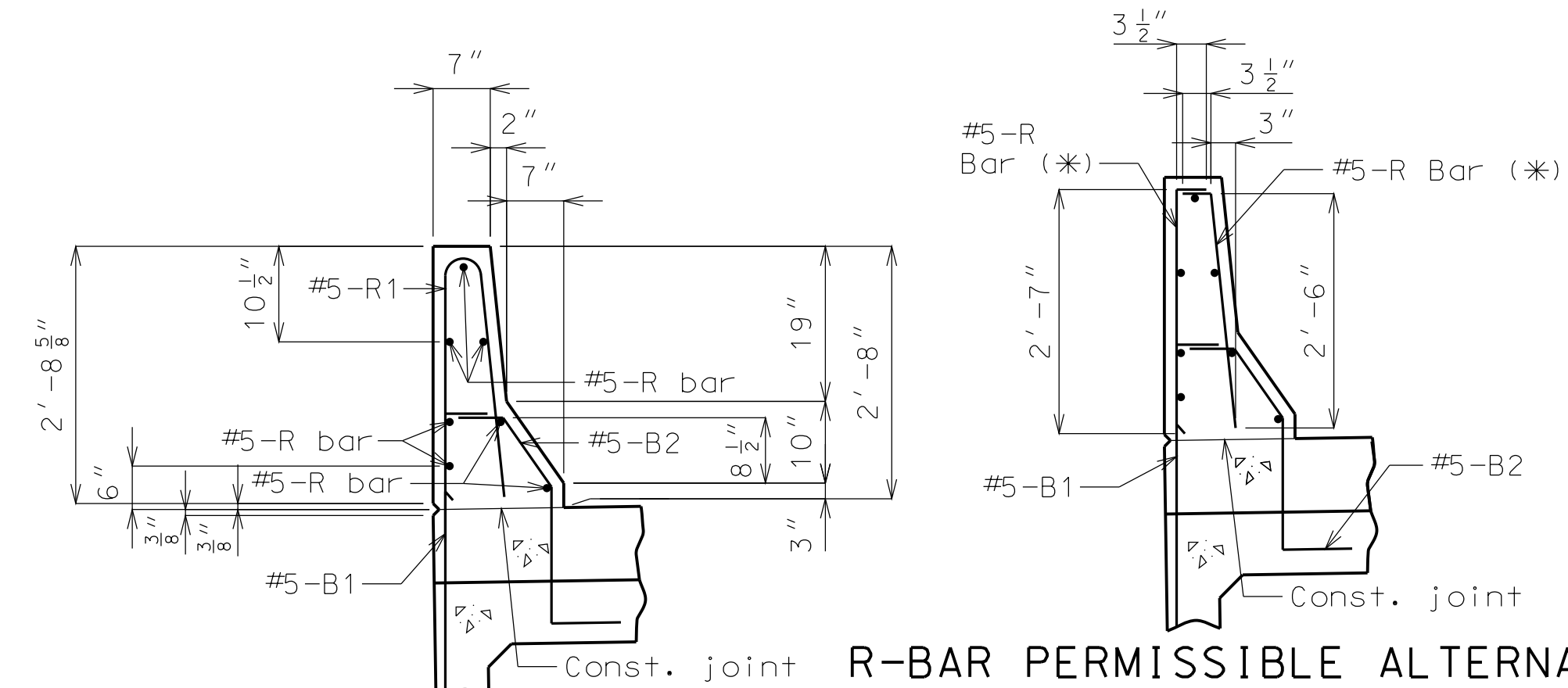
PART SECTION THRU JOINT

Notes:

Joint sealant and backer rods shall be used on all slip-form barrier curbs instead of joint filler and shall be in accordance with Sec 717 for silicone joint sealant for saw cut and formed joints.

C Bars (Slip-form option only) shall be used in addition to cast-in-place conventional forming reinforcement for bridge safety barrier curb.

For Slip-Form option, all sides of the safety barrier curb shall have a vertically broomed finish and the curb top shall have a transversely broomed finish.



PART SECTION A-A

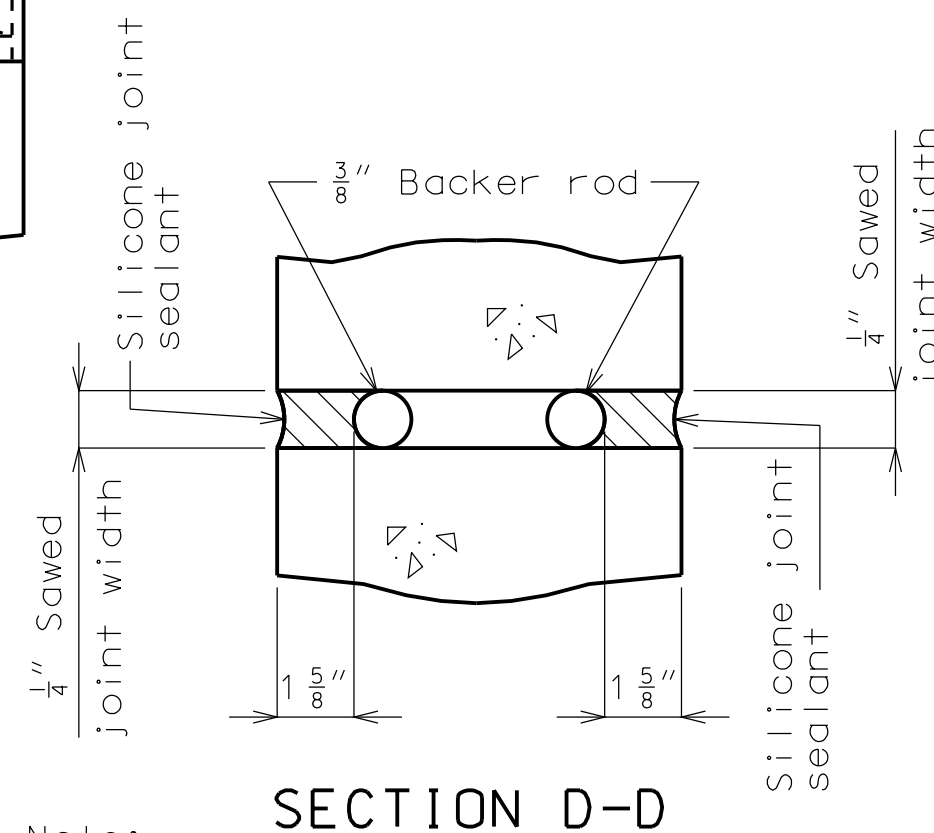
Notes:

Use a minimum lap of 2'-11" for #5 horizontal safety barrier curb bars.

The cross-sectional area above the slab = 2.29 sq. ft.

(* The R1 bar may be separated into two bars as shown, at the contractor's option, only when slip forming is not used. (All dimensions are out to out.)

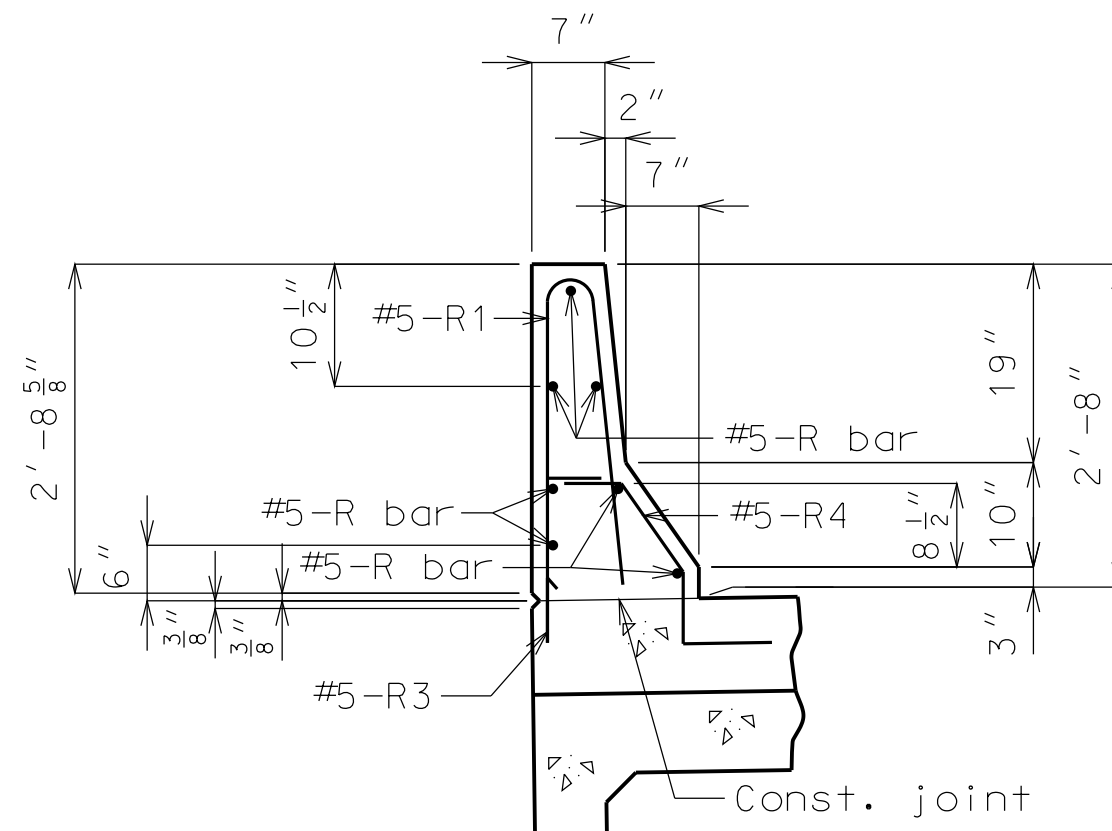
R-BAR PERMISSIBLE ALTERNATE SHAPE



SECTION D-D

Note:

Cost of silicone joint sealant and backer rod, complete in place, will be considered completely covered by the contract unit price for Safety Barrier Curb.



PART SECTION B-B

Notes:

Use a minimum lap of 2'-11" for #5 horizontal safety barrier curb bars.

The cross-sectional area above the slab = 2.29 sq. ft.

Notes:

Top of safety barrier curb shall be built parallel to grade with barrier curb joints normal to grade.

All exposed edges of safety barrier curb shall have either a 1/2" radius or a 3/8" bevel, unless otherwise noted.

Payment for all concrete and reinforcement, complete in place, will be considered completely covered by the contract unit price for safety barrier curb per linear foot.

Concrete in the safety barrier curb shall be Class B-1.

Measurement of safety barrier curb is to the nearest linear foot for each structure, measured along the outside top of slab from Fill Face @ Abutment No. 1 to Fill Face @ Abutment No. 2.

Concrete traffic barrier delineators shall be placed on top of the safety barrier curb as shown on Missouri Standard Plans 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for Safety Barrier Curb.

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DATE PREPARED

4/15/2014

ROUTE B STATE MO

DISTRICT BR SHEET NO. 13

COUNTY BOONE

JOB NO. J5S2186

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A8165

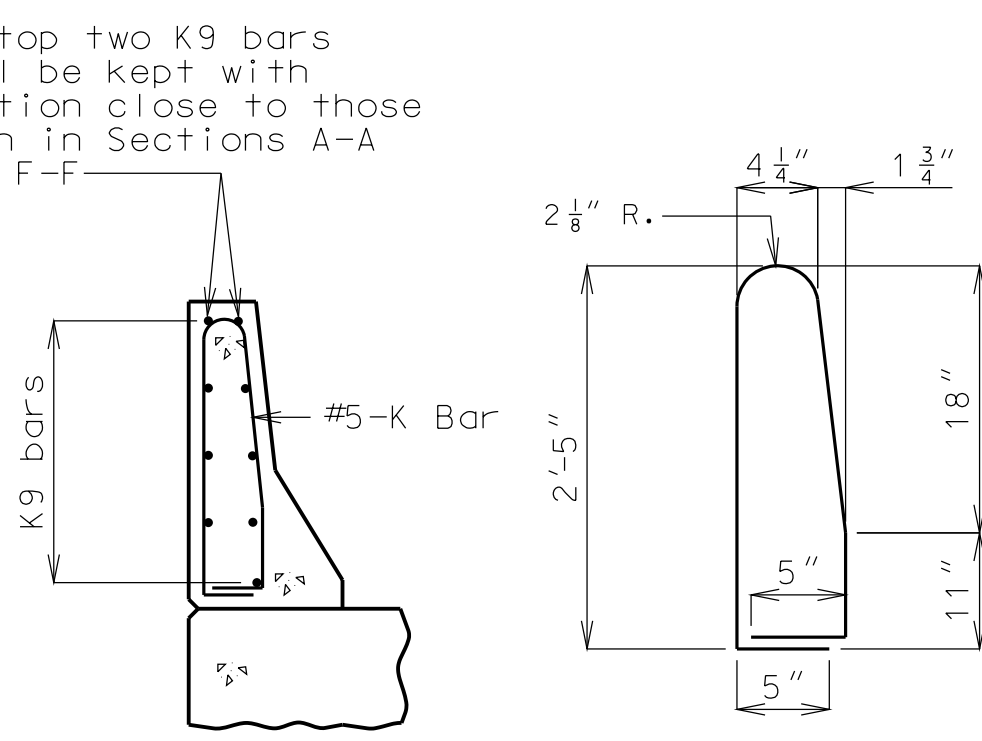
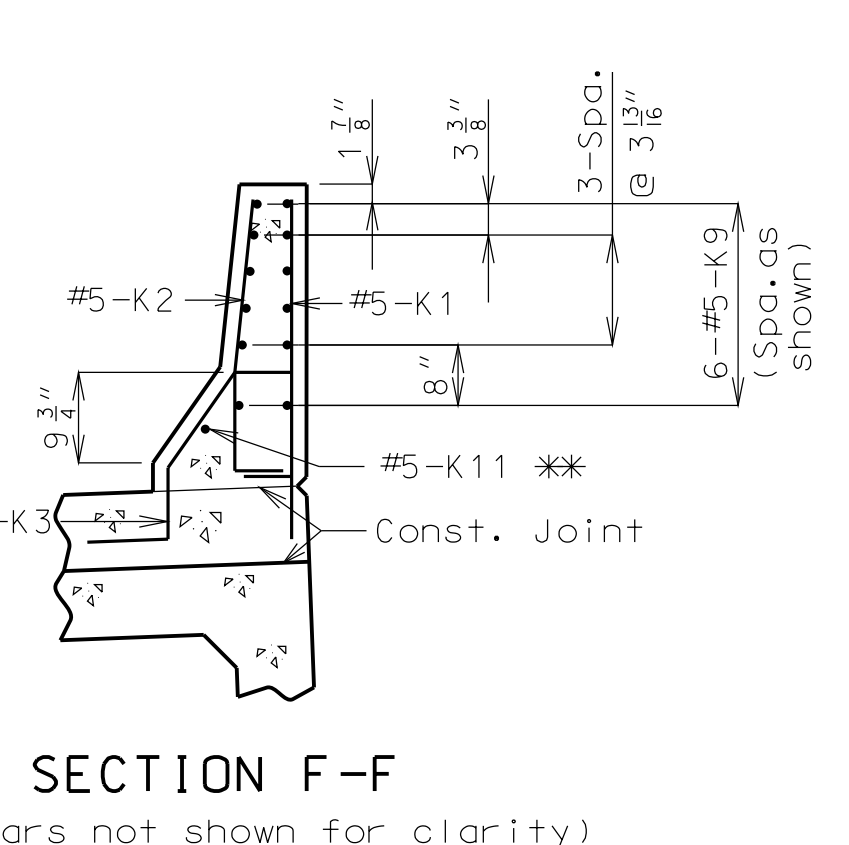
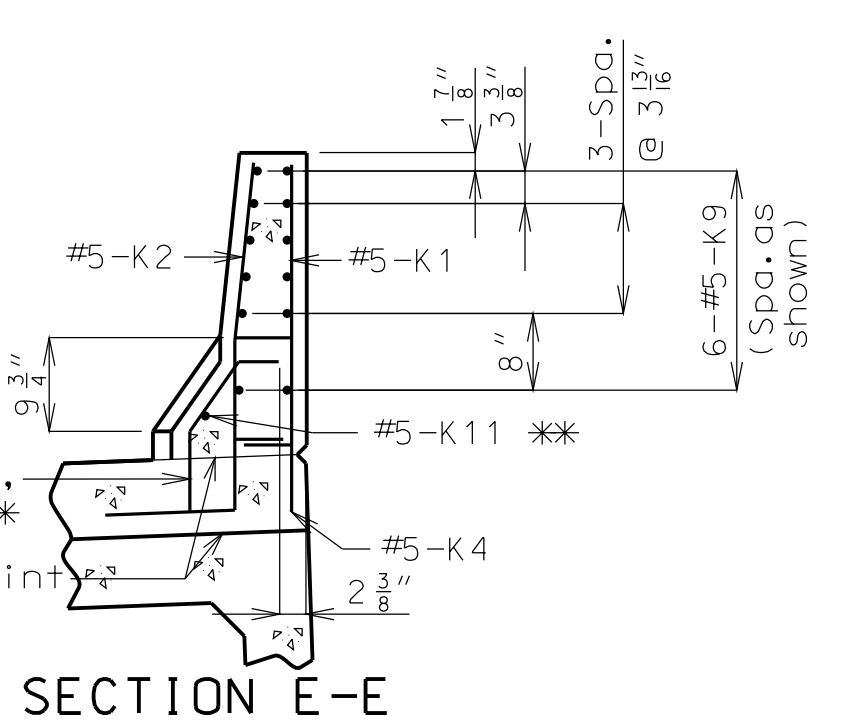
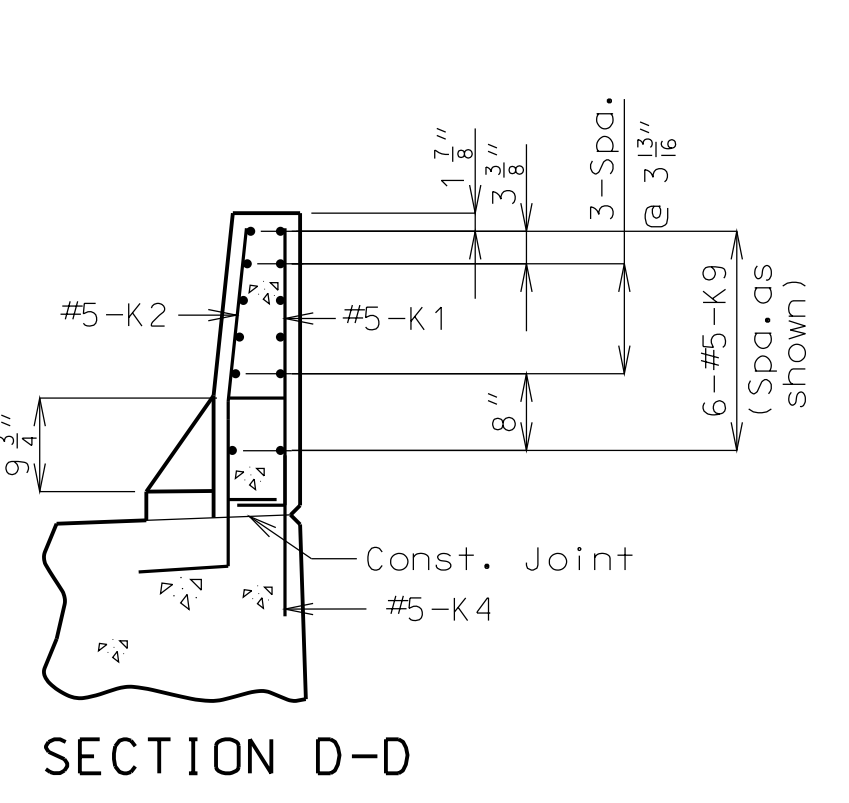
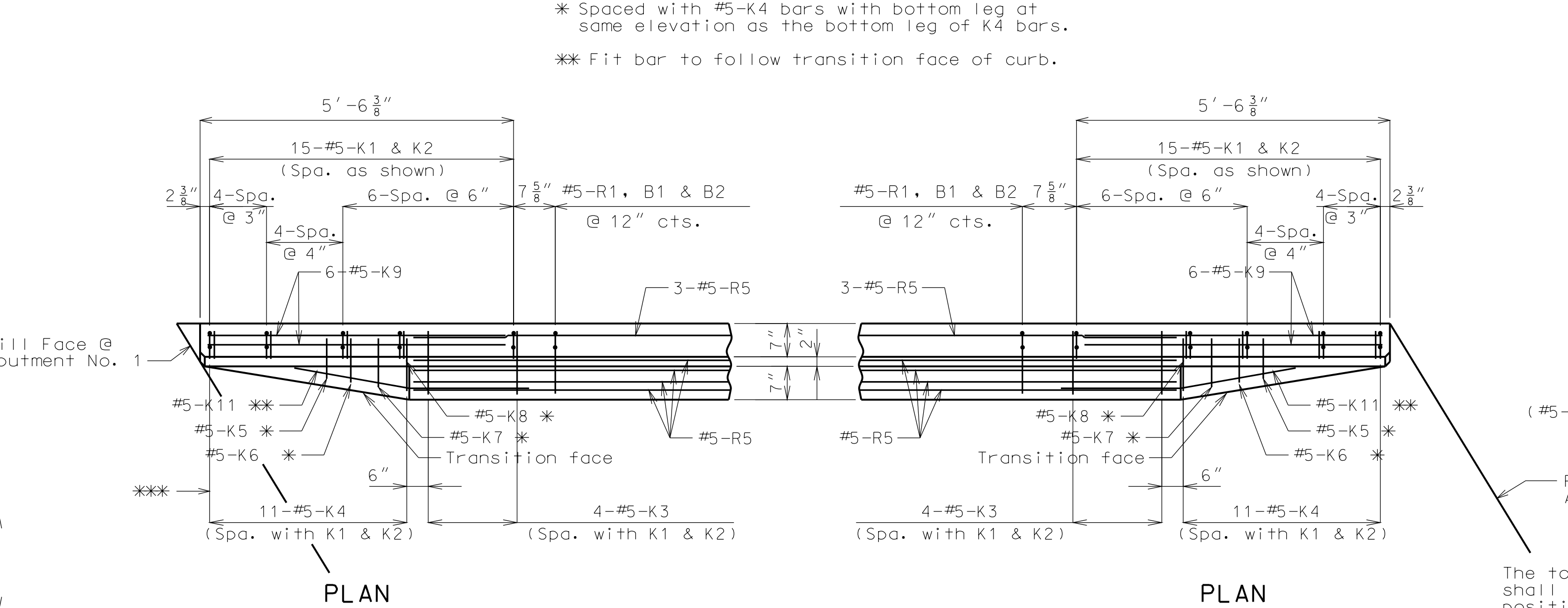
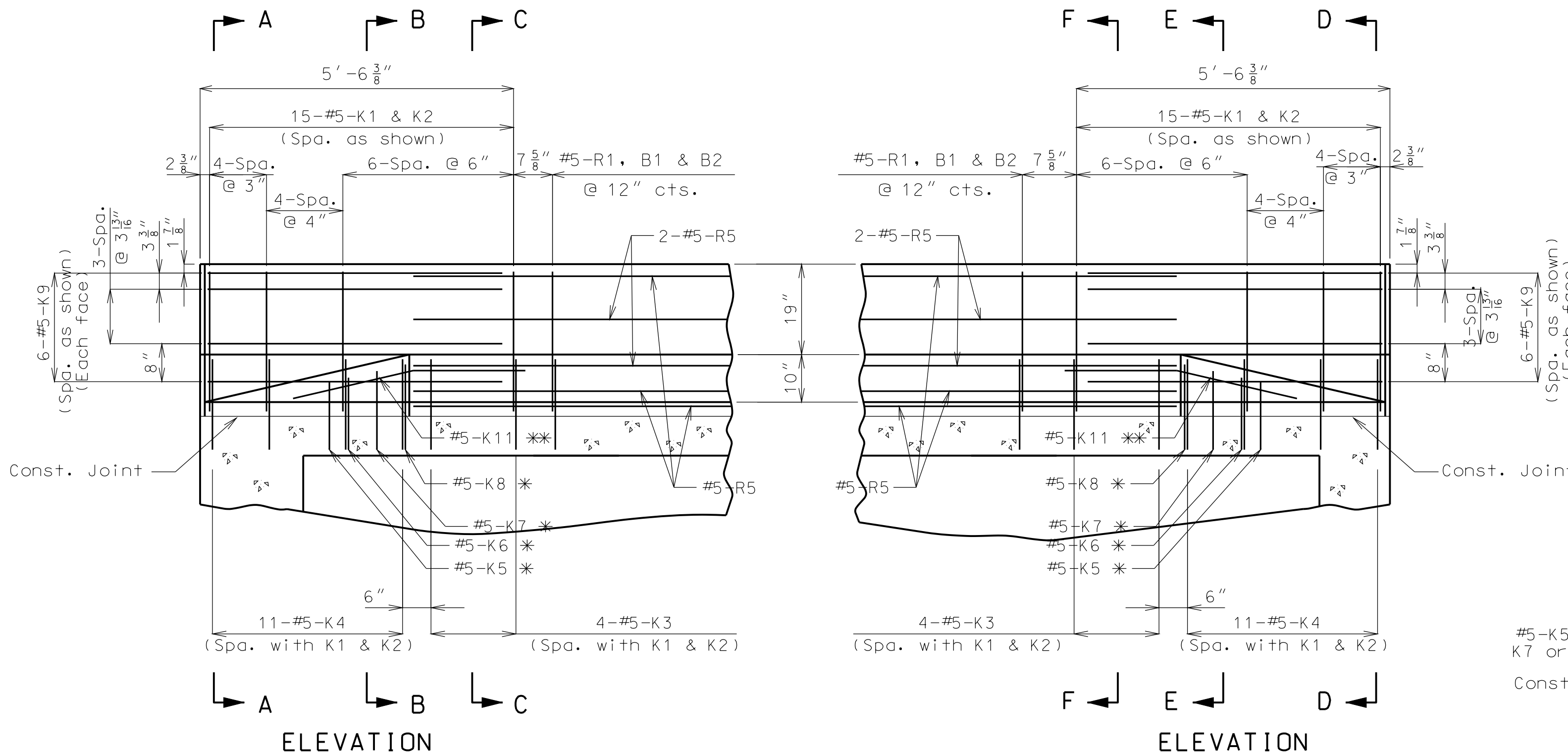
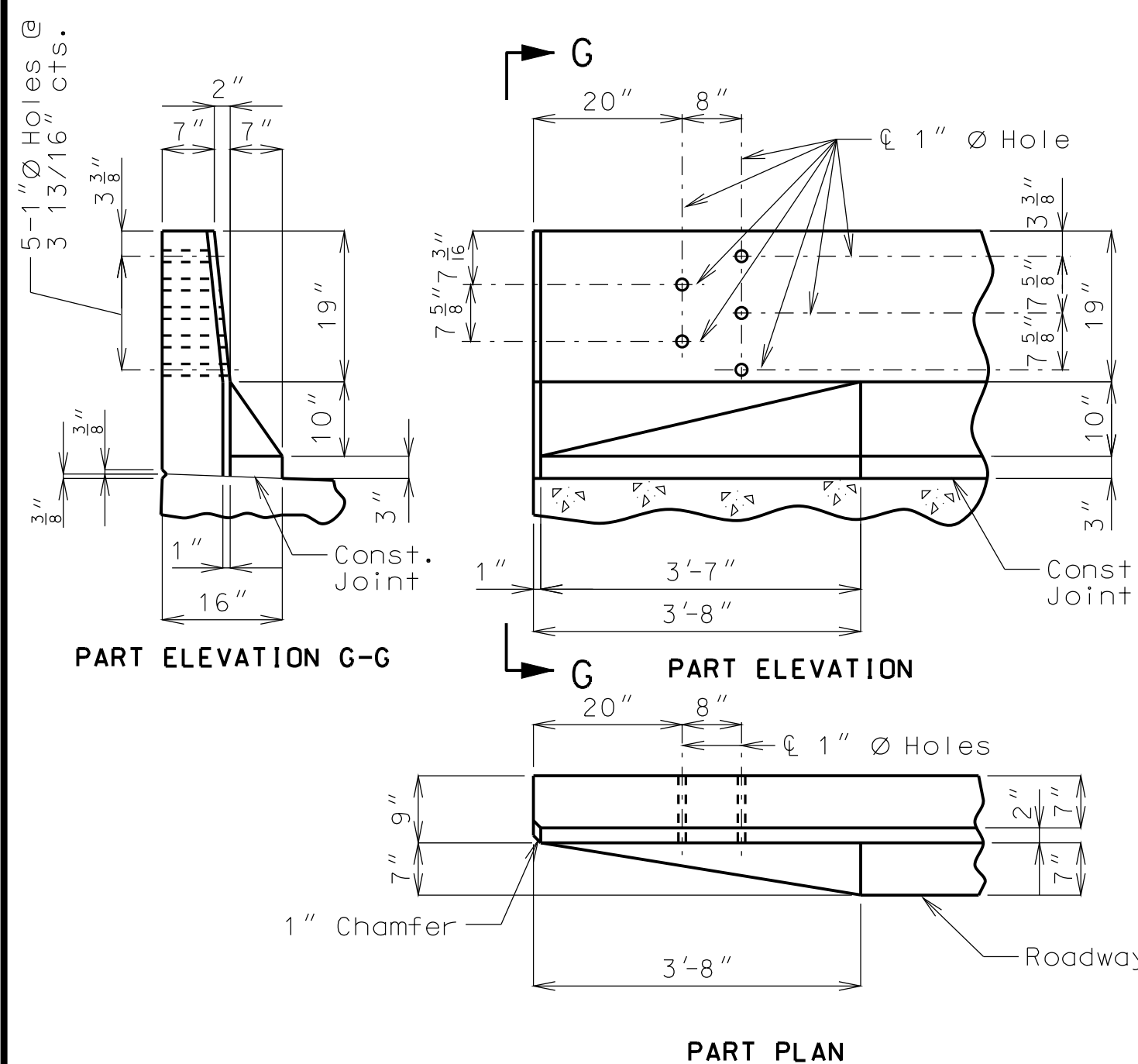
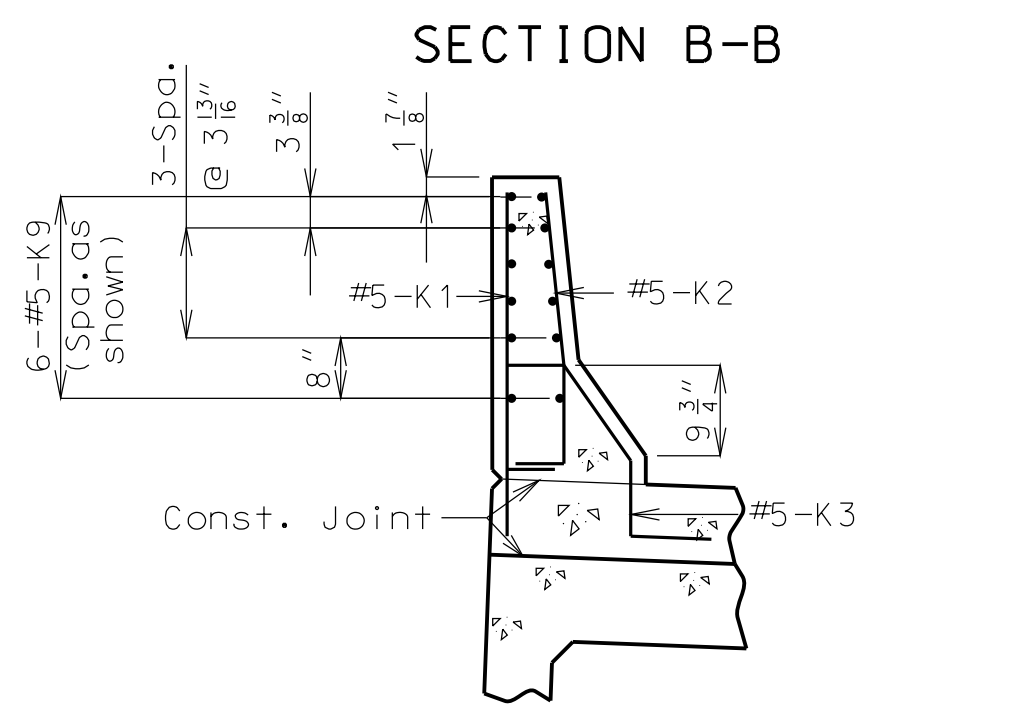
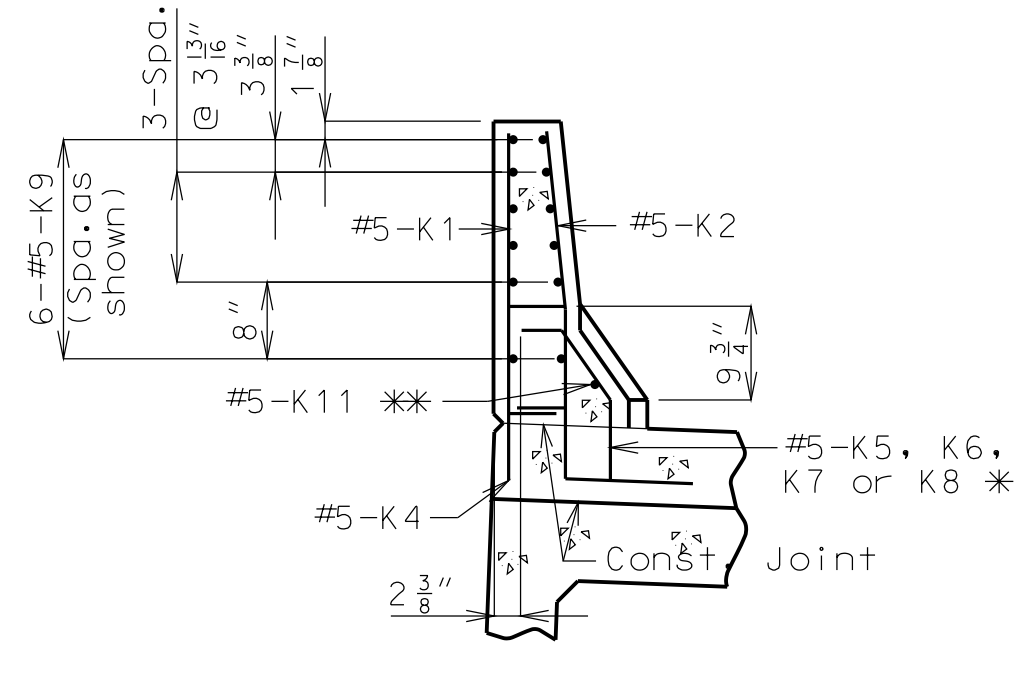
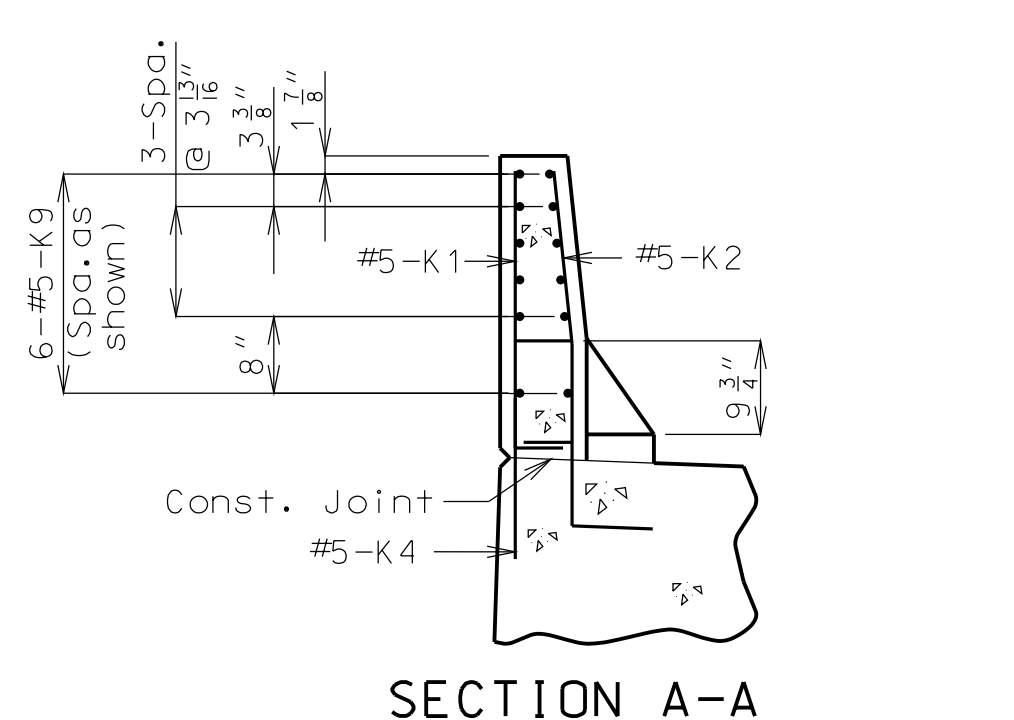
DESCRIPTION

DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102

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(K3 or K4 thru K8 bars not shown for clarity)

The K1 and K2 bar combination may be furnished as one bar as shown, at the contractor's option.

* Spaced with #5-K4 bars with bottom leg at same elevation as the bottom leg of K4 bars.
 ** Fit bar to follow transition face of curb.

*** Bend horizontal leg of K4 bar in slab as necessary to maintain 1 1/2" (Min.) concrete cover.

NOTES: Use a minimum lap of 2'-11" between K9 and R5 bars.

Concrete traffic barrier delineators shall be placed on top of the safety barrier curb as shown on Missouri Standard Plans 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for Safety Barrier Curb.

Work this sheet with Sheets No. 10 & 12.
 For Details of Conduit System on Structure, see Sheet No. 16.

DETAILS OF LEFT SAFETY BARRIER CURB AT ABUTMENTS
 (Bicycle Rail not shown for clarity)

"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."

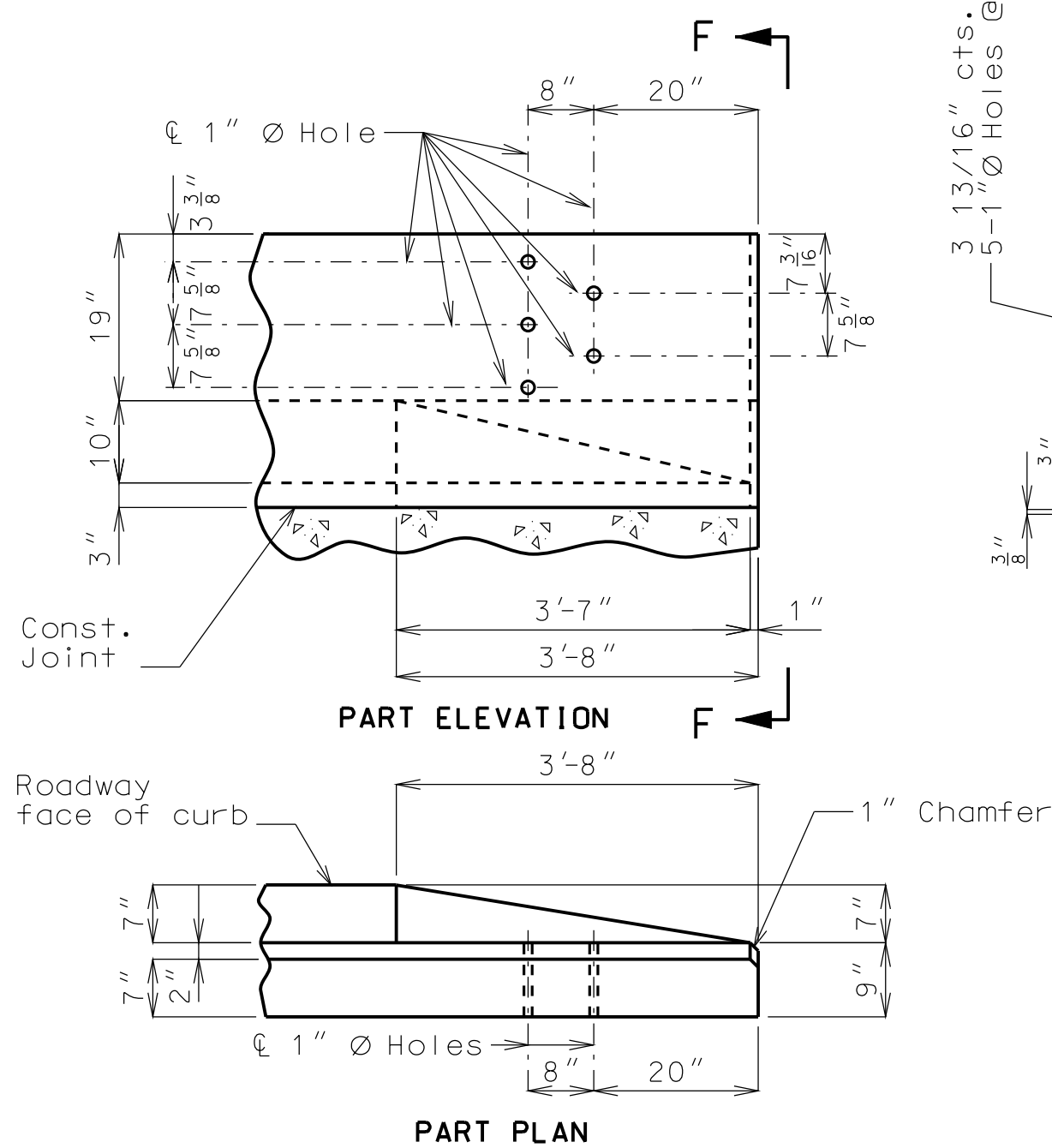
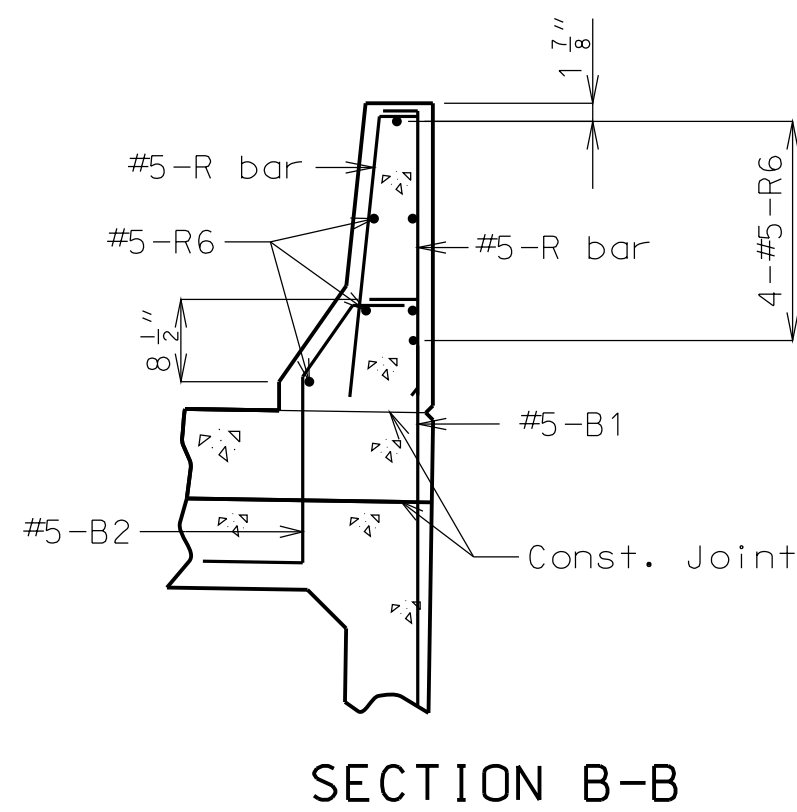
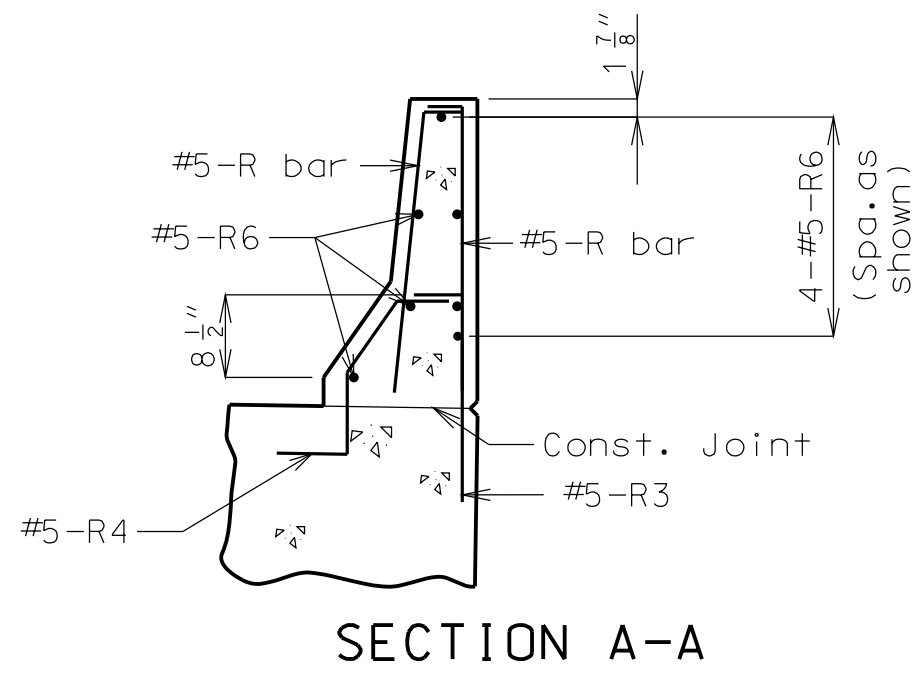
DATE PREPARED 4/15/2014	
ROUTE B	STATE MO
DISTRICT BR	SHEET NO. 14
COUNTY BOONE	
JOB NO. J5S2186	
CONTRACT ID.	
PROJECT NO.	
BRIDGE NO. A8165	

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

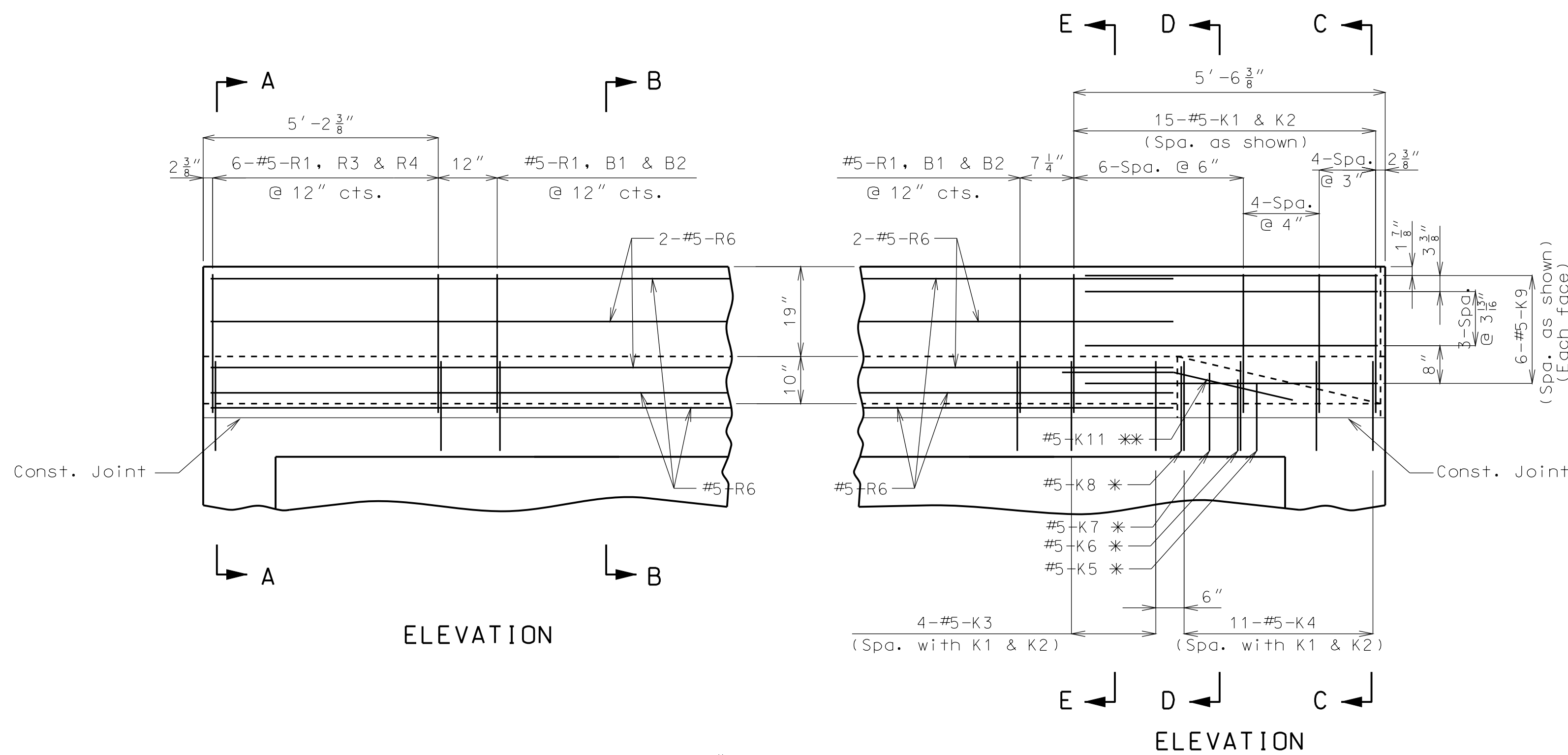
105 WEST CAPITOL
 JEFFERSON CITY, MO 65102
 1-888-ASK-MODOT (1-888-273-6636)

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

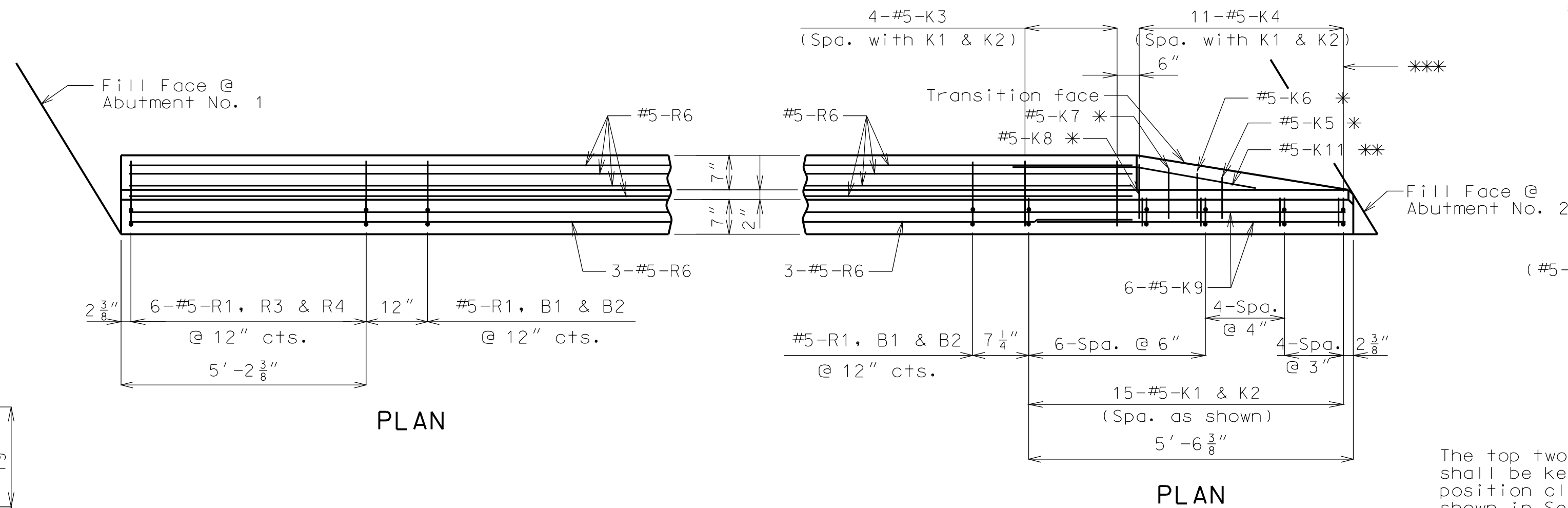


DETAILS OF GUARD RAIL ATTACHMENT

Detailed Mar. 2014
Checked Mar. 2014



* Spaced with #5-K4 bars with bottom leg at same elevation as the bottom leg of K4 bars.
** Fit bar to follow transition face of curb.



*** Bend horizontal leg of K4 bar in slab as necessary to maintain 1 1/2" (Min.) concrete cover.

NOTES: Use a minimum lap of 2'-11" between K9 and R6 bars.

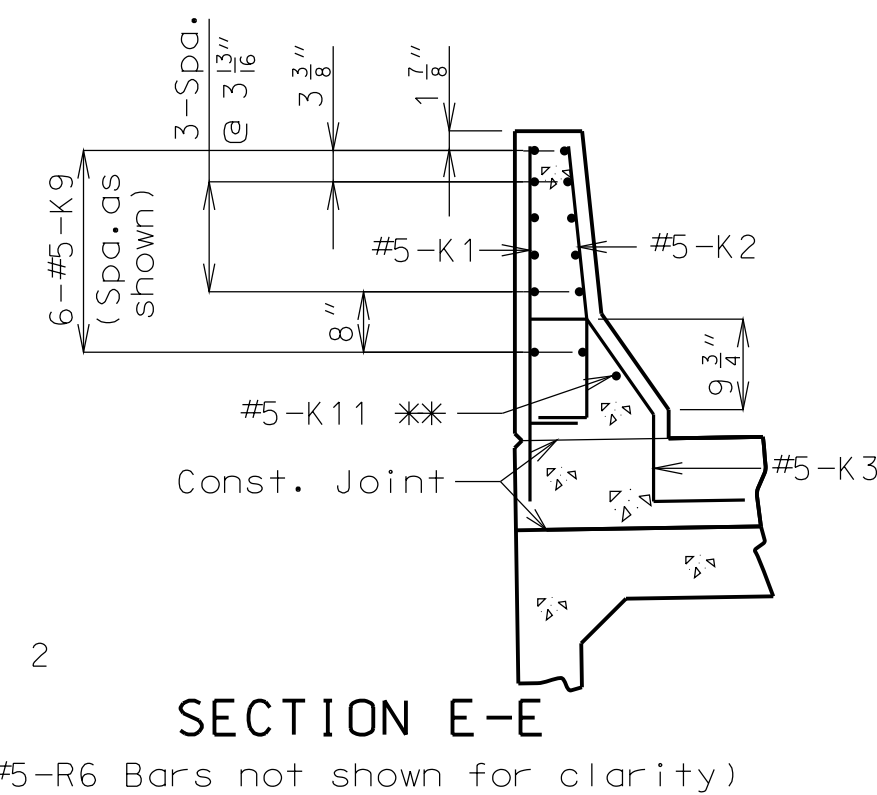
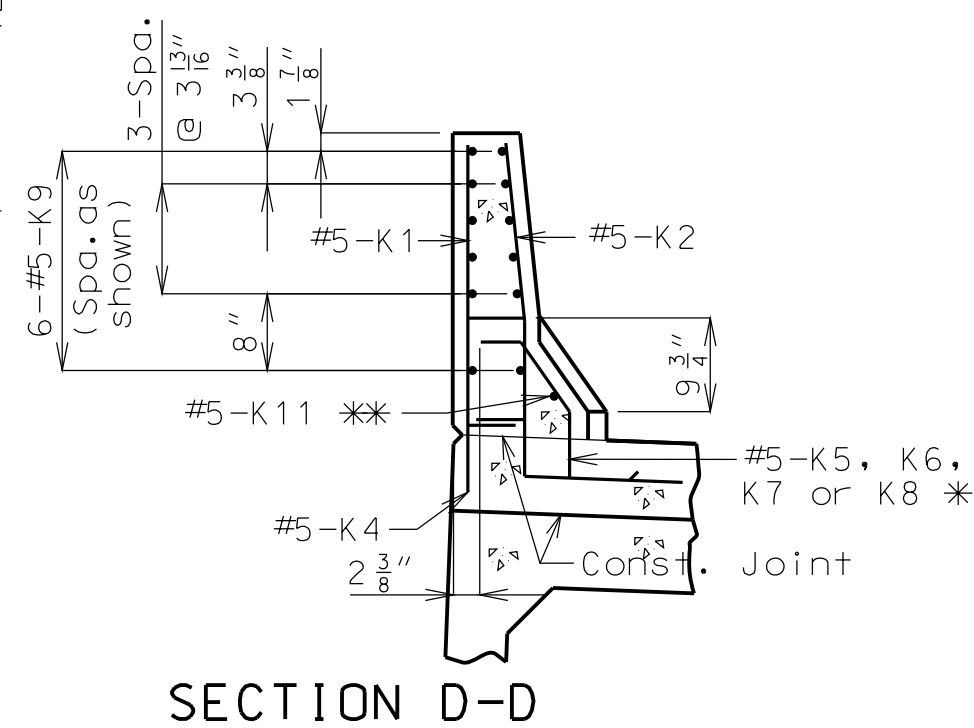
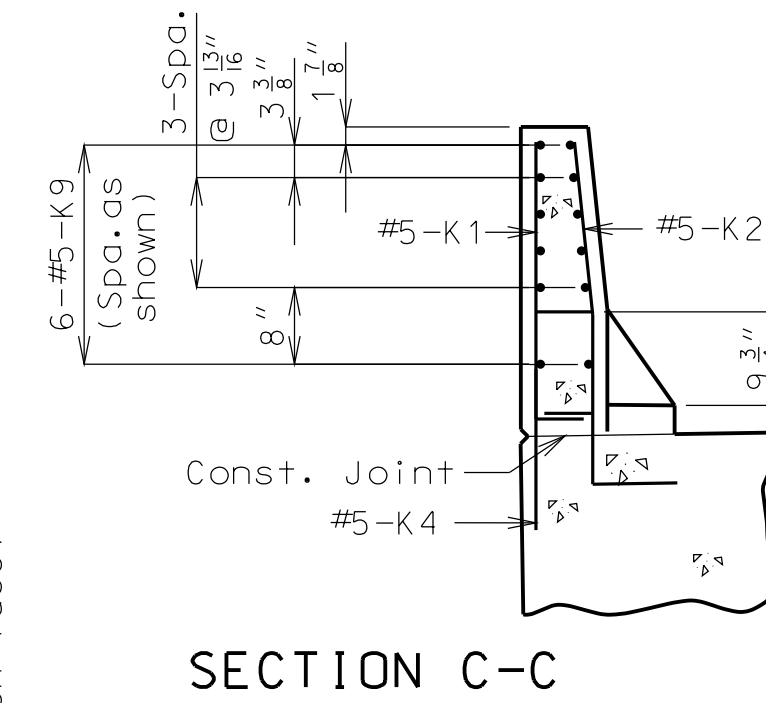
Concrete traffic barrier delineators shall be placed on top of the safety barrier curb as shown on Missouri Standard Plans 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for Safety Barrier Curb.

Work this sheet with Sheets No. 10 & 13.

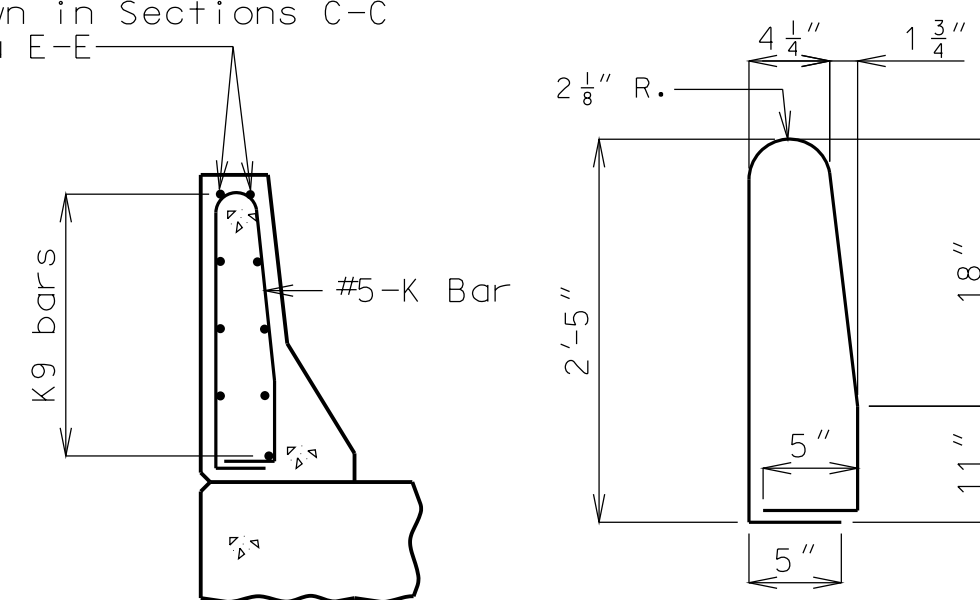
DETAILS OF RIGHT SAFETY BARRIER CURB AT ABUTMENTS

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 15 of 20



The top two K9 bars shall be kept with position close to those shown in Sections C-C thru E-E



(K3 or K4 thru K8 bars not shown for clarity)

The K1 and K2 bar combination may be furnished as one bar as shown, at the contractor's option.

ADJACENT BOX BEAM ALTERNATE

"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."

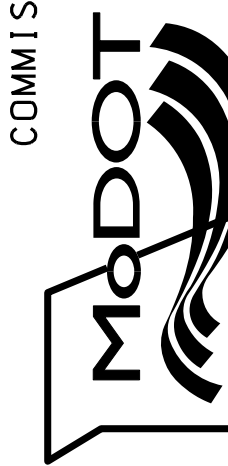
DATE PREPARED
4/15/2014
ROUTE B STATE MO
DISTRICT BR SHEET NO. 15
COUNTY BOONE
JOB NO. J5S2186
CONTRACT ID.

PROJECT NO.
BRIDGE NO. A8165

DESCRIPTION

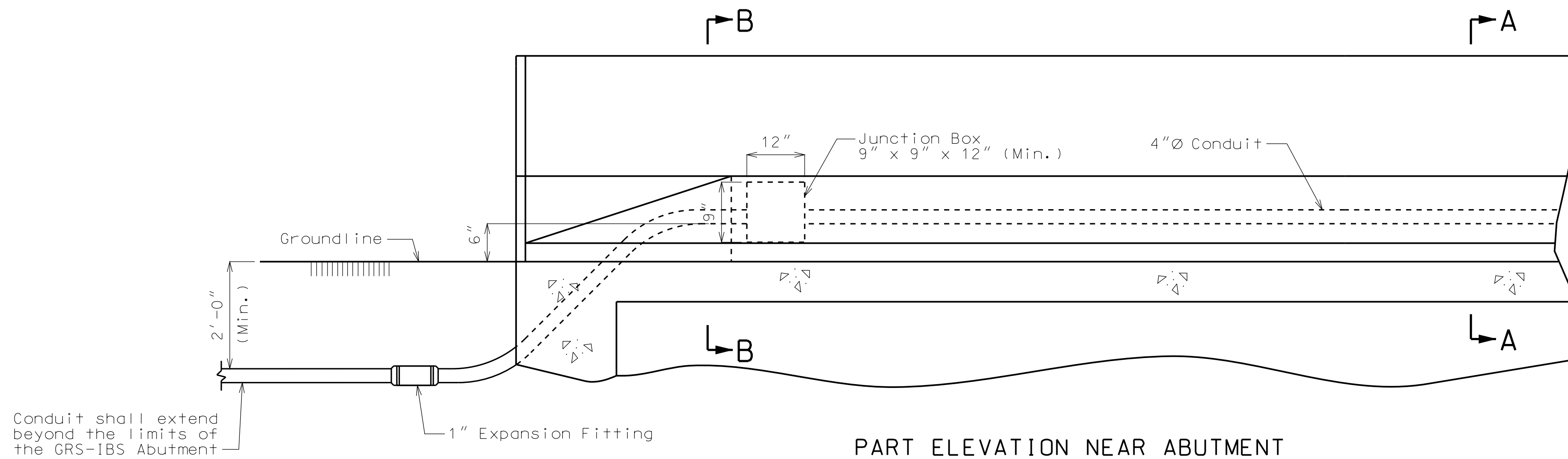
DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION



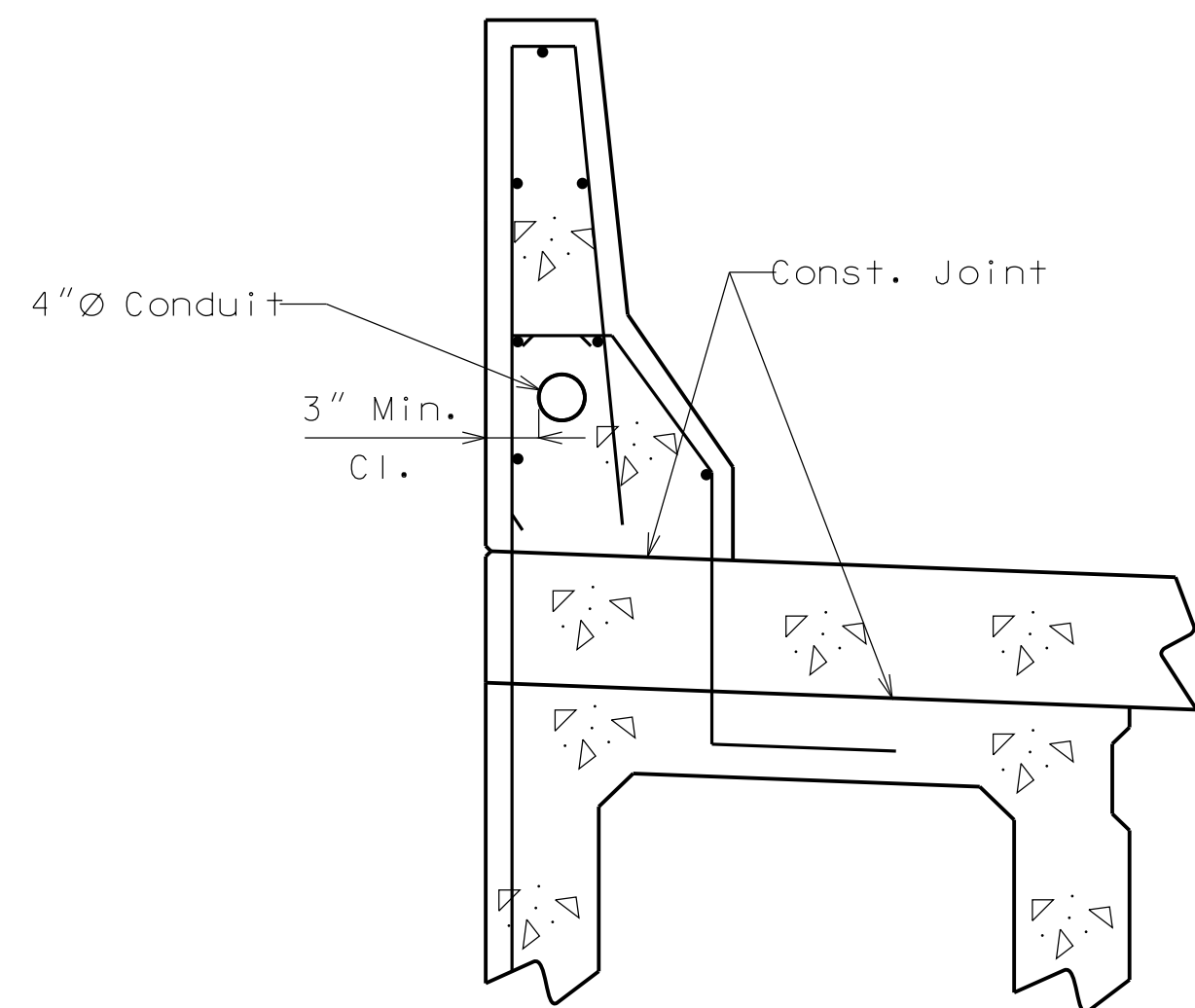
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-273-6636)

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

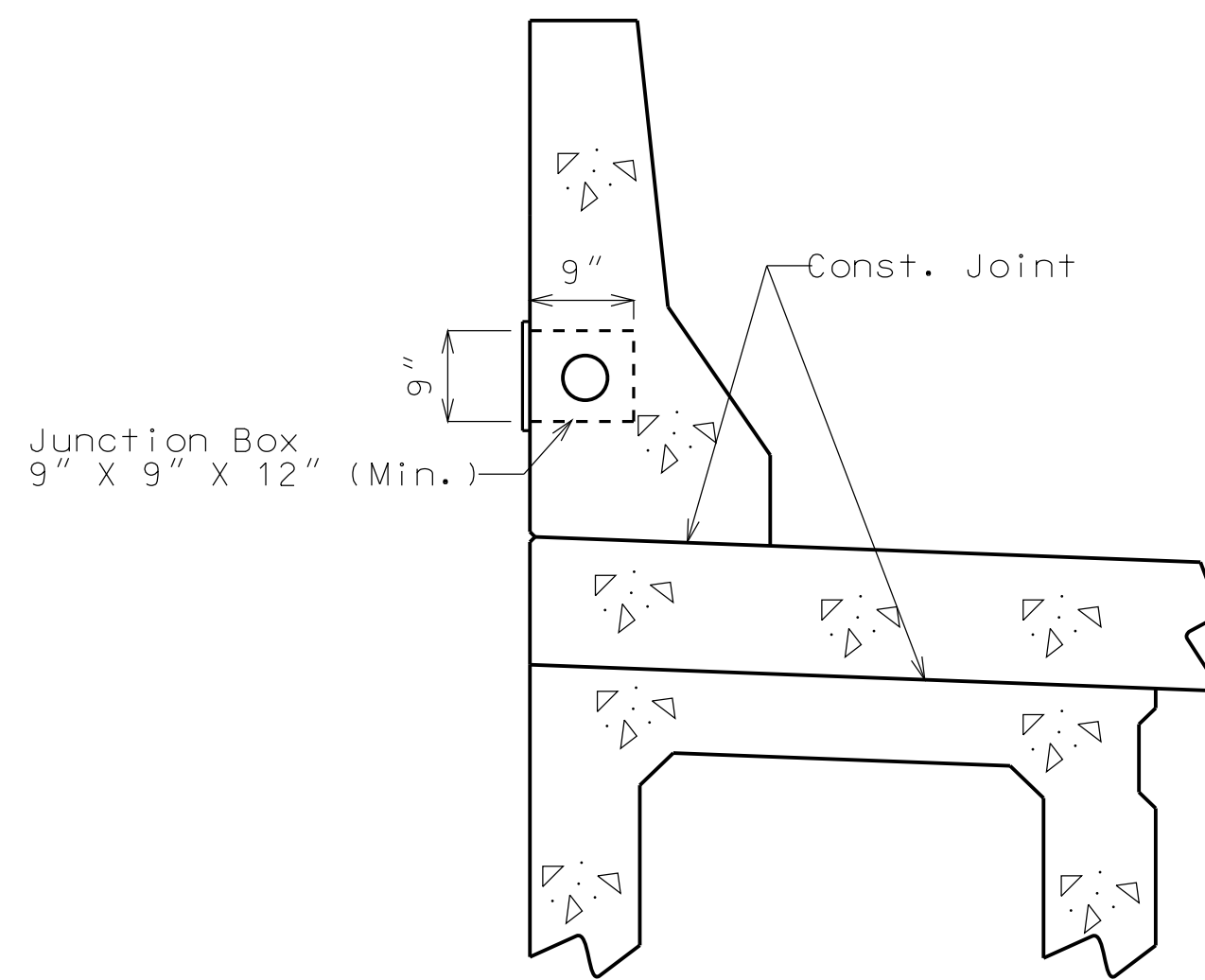


PART ELEVATION NEAR ABUTMENT
 (Abutment No. 1 shown, Abutment No. 2 similar)
 (Bicycle Rail not shown for clarity)

Conduit shall extend beyond the limits of the GRS-IBS Abutment



PART SECTION A-A



PART SECTION B-B

Notes:

All conduit shall be rigid non-metallic schedule 40 heavy wall PVC (polyvinyl chloride plastic) with 3" minimum cover in concrete. Each section of conduit shall bear the Underwriters Laboratories, (UL) label.

All safety barrier curb junction boxes shall be PVC molded in accordance with Sec 1062 and designed for flush mounting. The conduit terminations shall be permanent or separable. The terminations and covers shall be of watertight construction and shall meet requirements for NEMA 4 enclosure.

Drainage shall be provided at low points or other critical locations of all conduits and all junction boxes in accordance with Sec 707. All conduits shall be sloped to drain where possible.

Expansion fittings shall be placed as shown and set in accordance with the manufacturer's requirements and based on the air temperature at the time of setting given an estimated total expansion movement of 1" at open joints and 1" at filled joints using a maximum temperature range of 120° F and a maximum temperature of 110° F.

Shift reinforcing steel in field where necessary to clear conduit and junction boxes.

Conduit should be placed within the GRS-IBS Abutments as to not interfere with installation of guard rail posts.

Payment for furnishing and installing Conduit System, complete-in-place, measured from the outer limits of GRS Abutment No. 1 to outer limits of GRS Abutment No. 2, will be considered completely covered by the contract lump sum price for Conduit System on Structure.


DETAILS OF CONDUIT SYSTEM (LEFT SIDE OF STRUCTURE)

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DATE PREPARED 4/15/2014	
ROUTE B	STATE MO
DISTRICT BR	SHEET NO. 16
COUNTY BOONE	
JOB NO. J5S2186	
CONTRACT ID.	
PROJECT NO.	
BRIDGE NO. A8165	

DESCRIPTION	DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION



105 WEST CAPITOL
 JEFFERSON CITY, MO 65102
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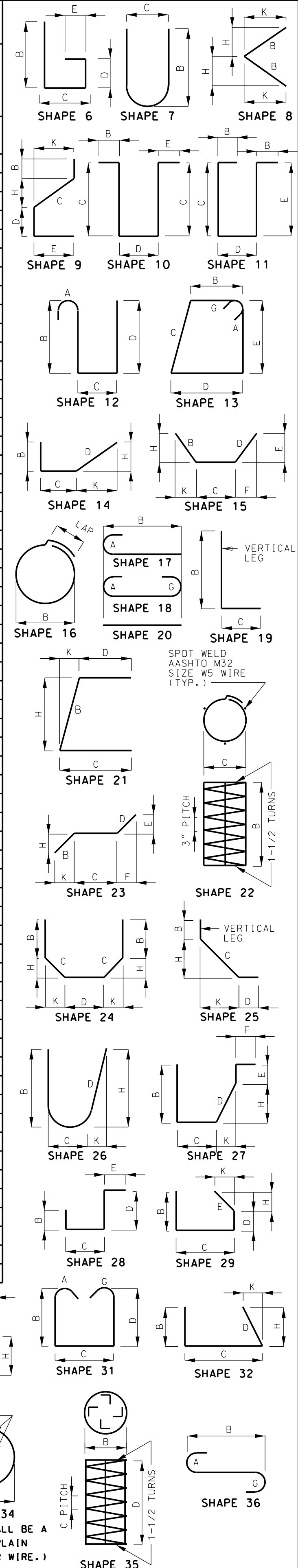
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO.	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS								NOMINAL LENGTH	ACTUAL LENGTH	WEIGHT
									B	C	D	E	F	H	K				
									FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.				
		ABUTS 1&2																	
8	5 H10	BACKWALL	E	20													310		
16	5 H11	STRAND TIE	E	20													64		
64	5 U10	BACKWALL	E	19													384		
		SLAB																	
38	5 S1	SLAB	E	20													1258		
54	5 S2	SLAB	E	20													1887		
30	5 S3	SLAB	E	20	V	2													
		INCREMENT = 24.500 INCH																512	
		BARRIER CURB																	
45	5 K1	BARRIER CURB	E	19	S												129		
45	5 K2	BARRIER CURB	E	14	S												129		
12	5 K3	BARRIER CURB	E	27	S												51		
33	5 K4	BARRIER CURB	E	28	S												135		
3	5 K5	BARRIER CURB	E	27	S												8		
3	5 K6	BARRIER CURB	E	27	S												8		
3	5 K7	BARRIER CURB	E	27	S												8		
3	5 K8	BARRIER CURB	E	27	S												9		
36	5 K9	BARRIER CURB	E	20													247		
3	5 K11	BARRIER CURB	E	8													14		
112	5 R1	BARRIER CURB	E	26													604		
6	5 R3	BARRIER CURB	E	19	S												11		
6	5 R4	BARRIER CURB	E	27	S												17		
7	5 R5	BARRIER CURB	E	20													414		
14	5 R6	BARRIER CURB	E	20													466		
		SLIP FORM																	
4	5 C1	SLIP FORM	E	20													42		
		TOTALS																	
5		TOTAL	E														6707		
		TOTAL	E														0		
		TOTAL	E														6707		
		Slab on Girder																	
5		TOTAL	E														4415		
		TOTAL	E														4415		
		Safety Barrier Curb																	

BILL OF REINFORCING STEEL

NO. REQ'D.	MARK NO.	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS								NOMINAL LENGTH	ACTUAL LENGTH	WEIGHT
									B	C	D	E	F	H	K				
									FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.	FT. IN.				
5		TOTAL	E														2250		
		Slip Form Option																	
5		TOTAL	E														42		



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DATE PREPARED: 4/15/2014

ROUTE: B STATE: MO

DISTRICT: BR SHEET NO.: 17

COUNTY: BOONE

JOB NO.: J5S2186

CONTRACT ID.:

PROJECT NO.:

BRIDGE NO.: A8165

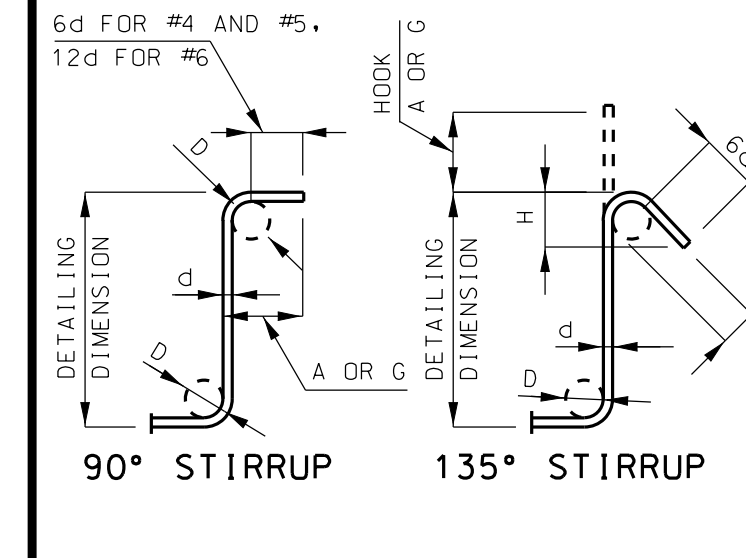
DESCRIPTION:

DATE:

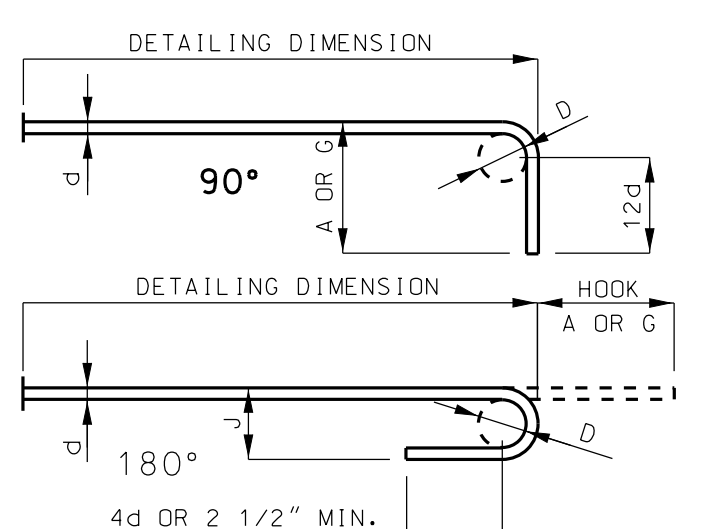
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102

1-888-ASK-MODOT (1-888-273-6636)



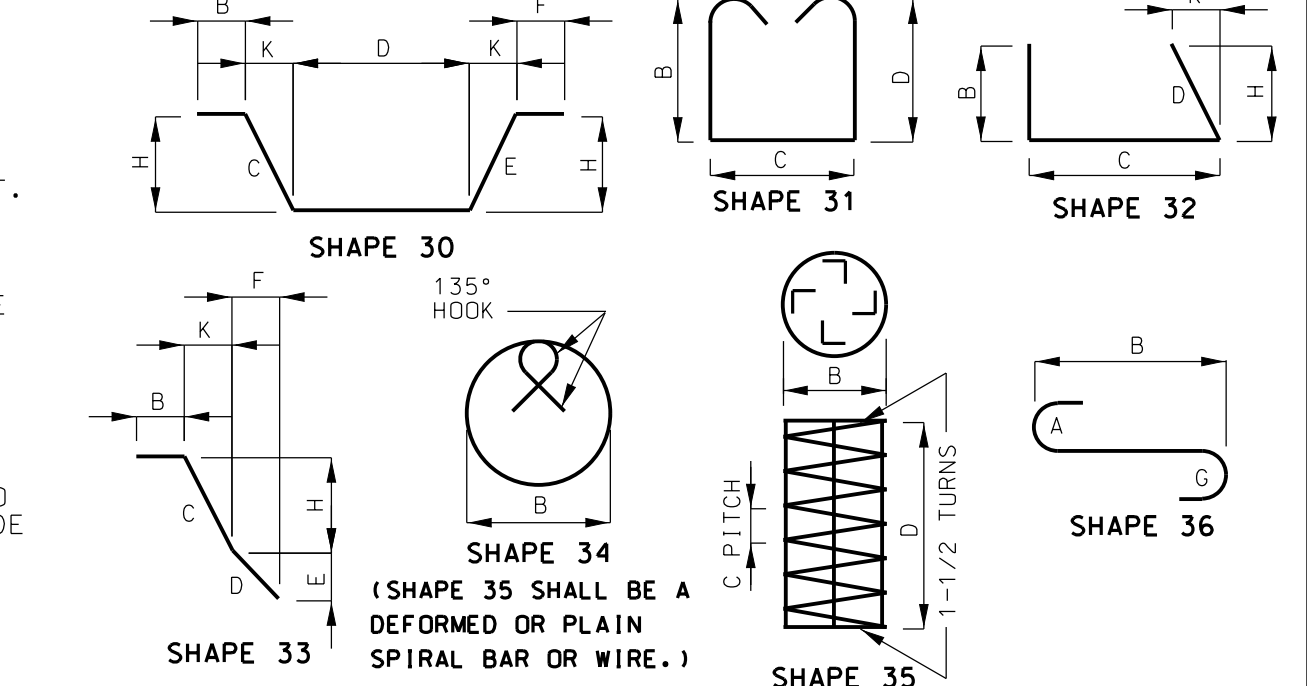
STIRRUP HOOK DIMENSIONS				
GRADES 40 - 50 - 60 KSI				
BAR SIZE	D (IN.)	90° HOOK		135° HOOK
		HOK A OR G	HOK A OR G	APPROX. H
#4	2"	4 1/2"	4 1/2"	3"
#5	2 1/2"	6"	5 1/2"	3 3/4"
#6	4 1/2"	12"	8"	4 1/2"



BAR SIZE	D (IN.)	ALL GRADES			
		180° HOOKS		90° HOOKS	
		A OR C	J	A OR C	G
#3	2 1/4"	5"	3"	6"	6"
#4	3"	6"	4"	8"	8"
#5	3 3/4"	7"	5"	10"	10"
#6	4 1/2"	8"	6"	12"	12"
#7	5 1/4"	10"	7"	14"	14"
#8	6"	11"	8"	16"	16"
#9	9 1/2"	15"	11 3/4"	19"	19"
#10	10 3/4"	17"	13 1/4"	22"	22"
#11	12"	19"	14 3/4"	2'-0"	2'-0"
#14	18 1/4"	2'-3"	21 3/4"	2'-7"	2'-7"

TWO ADDITIONAL #5-S1 ARE INCLUDED IN THE BAR BILL FOR TESTING.

NOTE: ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS. HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET. E = EPOXY COATED REINFORCEMENT. S = STIRRUP. X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES. Y = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE. NO. EA. = NUMBER OF BARS OF EACH LENGTH. NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH) ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH. PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS. FOUR ANGLE OR CHANNEL SPACERS ARE REQUIRED FOR EACH COLUMN SPIRAL. SPACERS ARE TO BE PLACED ON INSIDE OF SPIRALS. LENGTH AND WEIGHT OF SPIRALS DO NOT INCLUDE SPLICES OR SPACERS. REINFORCING STEEL (GRADE 60) F_y = 60,000 PSI.



IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

