

TENNESSEE STRUCTURES MEMORANDUM - 011

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CHECK LIST OF STANDARD NOTES

RMD:vh

Distribution: Office, Consultants

The enclosed lists of notes are those more frequently used on structural design drawings. They are intended to be a checklist or guide for the designer in order to produce consistency between projects and should be used with forethought and discretion.

The heading at the top of each sheet and notations in the left margin are to index the notes and provide instructions for application.

The underlined portion of the notes is optional or variable information to be provided by the designer for each application.

Portions of some notes are noted as "reminders to the designer and/or detailer" and should not appear on the design drawings.

Any recommended changes to these notes should be reported to Houston Walker, **Tim Huff**, or Rick Crawford.

Designating Costs of Items

Items can be paid for either directly or indirectly. Their payment must be designated in a note on the plans. The standard notes cover the items most commonly used. When special notes are needed, clarity of payment is important.

When paid for directly, the key phrase in the note should read: ". . . will be measured and paid for under Item _____." When paid for indirectly, the key phrase should read: "Cost (of _____) to be included in the unit price bid for Item _____ " (or for other items").

<p>All Note A-1</p>	<p>Specifications: Standard Road and Bridge Specifications of the Tennessee Department of Transportation (January 1, 2015 Edition). [and (<i>in case of RR Bridge</i>) current AREMA Specifications except as modified on these drawings.]</p>
<p>All Note A-2</p>	<p>Loading: HL-93 live loading; Seismic Category ___ with $A_S=$____, $S_{DS}=$ ____, $S_{D1}=$____, (1000 year return period). Dead Load includes 35 lb/sq. ft. for future wearing surface.</p>
<p>All except RR Note A-3</p>	<p>Design Specifications: AASHTO LRFD Seventh Edition, 2014, and the 2011 AASHTO Guide Specifications for LRFD Seismic Bridge Design, Edition 2 (with Interims.)</p>
<p>Reinforced Concrete & Steel Girder Note A-4</p>	<p>Concrete: To be Class "A" $f'c =$ _____psi except as noted otherwise.</p>
<p>Prestressed Concrete Note A-5</p>	<p>Concrete: To be Class "A" (cast in place) $f'c =$ _____ psi except as noted otherwise.</p>
<p>Post-Tensioned Concrete Note A-6</p>	<p>Concrete: To be Class "A", $f'c =$ _____ psi for superstructure concrete and _____ psi for substructures and parapets.</p>
<p>Bridge Deck (All deck slabs) Note A-6a</p>	<p>Class "D" Concrete for bridge decks shall be in accordance with Section 604 of the Standard Specifications.</p>
<p>Bridge Deck (All deck slabs) Note A-6b</p>	<p>Bridge Deck Surface Finish: To be in accordance with Method [1 or 3] in Article 604.22 of the Standard Specifications.</p> <p><i>Note to detailer: Use "1" when approach roadway design speed is less than 40 mph. Use "3" for all other structures. When "3" is used, add the Item Number for Bridge Deck Grooving (Mechanical) to the Estimated Quantities. The limits of the grooving shall be to within one foot of the toe of the parapet or face of the rail for the full length of the bridge plus the approach pavements.</i></p>

<p>All Note A-7</p> <p>[Add reference to STD-14-1 for bridges with Bulb-Tee beams, STD-14-2 for I-beams, and STD-14-3 for box beams]</p>	<p>Bridge Deck Forms: Bridge Deck Forms for concrete decks shall be constructed using either removable forms or permanent forms. Permanent forms may be either remain-in-place steel or precast, prestressed concrete panels. In either case, forms shall be attached by means other than welding to main structural members or reinforcing steel. Temporary erection diaphragms must be used at the ends of precast concrete girders where end diaphragms, support diaphragms, or abutment backwalls are to be poured concurrently with the deck and shall be provided elsewhere in accordance with the Specifications to prevent girder rotation. See Standard Drawings STD-4-1 thru 4 [STD-14-1, 2, or 3] and Article 604.05 of the Standard Specifications.</p> <p><i>Note to Designer and Detailer: Prestressed concrete deck panels are not allowed on horizontally curved girders.</i></p>
<p>Bridges with Bulb-Tee Beams Note A-7a</p>	<p>Slab Overhangs Supported by Bulb-Tee Beams: It is recommended that spacing of overhang brackets for Bulb-Tee beams not exceed 2'-0" center to center.</p>
<p>Bearing Devices Note A-8 (See SMO44)</p>	<p>Bearing Devices shall be in accordance with the details and dimensions shown on Drawing _____.</p> <p><i>Note to Designer: For each bearing device, show the required dead and live load reactions, total movement and angular rotation. For sliding bearings, show a temperature setting chart. For bearings which have structural steel, show the appropriate structural steel and paint notes.</i></p>
<p>All Note A-9</p>	<p>Reinforcing Steel: Shall be ASTM A615 Grade 60 unless noted otherwise. See Section 604 and 907 of the Standard Specifications.</p> <p><i>Note to Designer and Detailer on placement of epoxy bars: See SMO15-03 for specific instruction regarding the use and location of epoxy coated reinforcing steel.</i></p>
<p>All in Seismic Category D (or any category when pushover analysis is used to verify displacement capacity) Note A-9a</p>	<p>Reinforcing Steel in Columns: All longitudinal reinforcing steel in columns shall be ASTM A706 Grade 60, or A615 Grade 60 if mill test reports certifying that the maximum yield strength is 78 ksi or less are forwarded to the Division of Structures for approval prior to installation.</p> <p><i>Note to Designer: Using A706 steel (or A615 steel with $F_{y_{max}} = 78$ ksi) will reduce the plastic shear compared to using normal A615 steel. Also, use hoops instead of spirals, with 135 degree seismic hooks in lieu of welded or mechanical coupler closing connections. Use 15 bar diameter extensions instead of 6 bar diameter extensions for hooks.</i></p>

<p>Bridges over RR Note A-10</p>	<p>Special Note for Railroad Crossing: The contractor shall conduct his work so as to protect the railroad tracks and properties from any damage. The work shall be done in accordance with regulations stipulated by the (name of R.R.) so as to maintain clearance and not interrupt traffic.</p>
<p>Bent Footings on Rock Note A-11</p>	<p>Special Note – Footing for Bents: After excavation to rock for footing has been completed, holes 6’ deep shall be drilled at points designated by the Engineer. From the results obtained, the Engineer shall determine the final footing elevations. No reinforcing steel for bent columns shall be ordered until final footing elevations have been determined.</p>
<p>Steel Piles @ Bents (Point Bearing) Note A-12</p>	<p>Special Note: Foundations for bents shall be excavated to the bottom of footing elevations shown; rod soundings shall then be made as directed by the Engineer. From the results obtained the Engineer will decide if piles will be used or the footings carried to rock. Cost of rod sounding to be included in the unit price bid for other items. No reinforcing steel for bent columns or footings shall be ordered until final elevations have been determined.</p>
<p>When needed for point bearing piles Note A-13</p>	<p>Piles: To be _____ driven to refusal on rock or a minimum bearing of _____ tons for the bents and _____ tons for the abutments.</p> <p><i>Note to Designer: The loads shown above shall be service load values designed in accordance with SM031.</i></p>

<p>Friction Piles</p> <p>Note A-14</p>	<p>Friction Piles: To be _____. After excavation to the proposed footing elevations, a test pile shall be driven at each substructure at the location designated on drawing number _____. A load test will then be applied to the test pile in (<u>bent or abut. no.</u>). From the results of the load test, the Engineer of Structures will determine the required length of the production piles and minimum required bearing. For pile design loads and cut-off elevations, see table on drawing number _____.</p> <p>The contractor shall install piling such that all the following requirements are met. The tip elevation for all test piles and production piles shall be equal to or below the minimum pile tip elevation shown on the plans. In addition, test piles to be load tested shall be installed to at least the specified bearing shown on the plans or full length; all other test piles shall be installed to at least 1.5 times the specified bearing shown on the plans or full length. All production piles shall be installed full length unless excessively hard driving which might damage the piles is encountered. If the production piles do not achieve the minimum required bearing, the Engineer of Structures will determine if additional piles are required.</p> <p>In the event that driving the test pile to at least the minimum tip elevation or driving the production pile full length might damage the pile because of excessively hard driving, the contractor shall use other methods approved by the Engineer for installing the piles such as jetting or pre-drilling holes. However, all piles must be driven by hammer for the last few feet of penetration. No measurement for payment will be made for pre-drilling holes or for jetting piling to obtain the required pile penetration.</p> <p>The pile load test shall be conducted in accordance with the Specifications. The pile load test apparatus for applying loads and measuring movement shall meet the requirements of ASTM D1143, Standard Method of Testing Piles Under Static Axial Compressive Load. When insufficient clearance is available within an excavation, the clearance requirements in Article 4.1.1 may be reduced, but only with prior approval of the Engineer.</p> <p><i>Note to Designer: The value for required pile bearing shown shall be <u>twice the service load value</u>, designed in accordance with SM031. Show minimum tip elevations <u>when required</u> due to scour at piers or when piling must be driven through abutment fills because excessive settlement of the underlying soil is expected, or to penetrate liquefiable layers in seismic zones.</i></p>
<p>All with Friction Piles</p> <p>Note A-15</p>	<p>Alternate Piles: The contractor may use piling of a different material or configuration from that shown on the plans provided the substitution meets minimum design standards and specifications, and is approved by the Engineer.</p>

<p>Pile Tip Reinforcement</p> <p>Note A-15A</p> <p>Optional as Required</p>	<p>Note: Piles shall be equipped with cast steel points. Also, see standard drawing STD-5-1 for additional notes.</p> <p><i>Note to Designer: Pile tip reinforcement is not required for Steel H Piles when driving through overburden that is relatively free of boulders and the rock surface is generally flat.</i></p> <p><i>Pile reinforcement is required when driving through overburden of small scattered boulders, overburden of dense boulders, inclined rock surface, or the rock surface is fragmented or weathered.</i></p> <p>.</p>
<p>Steel Pipe Piles</p> <p>A-15B</p>	<p>Pipe Piles: Shall be PP ___x___, Grade ____, in accordance with ASTM A252. Weathering Steel will not be allowed for pipe piles. Any pipe pile having bends, kinks or other deformations during the process of driving that would impair the strength (10% reduction as determined by the engineer) efficiency of the completed pile shall be either removed and replaced or repaired by the contractor in a manner satisfactory to the engineer. The contractor will not be reimbursed for any such pipe pile ordered removed or replaced by the engineer.</p> <p>Pile Splices: Full length piles shall be used where practicable. Piles may be spliced with the prior approval of the engineer. Splices shall use full penetration welds designed to develop the full strength of the pile cross section in tension and compression. Only one splice per 40 linear feet of pile will be allowed. Drive on splices shall not be used and only commercially manufactured splices will be allowed. Splicing details must be submitted to the Engineer for approval. Cost to be included in the cost of piles Item No. _____ .</p> <p><i>Note to Designer: Add the following to the note above if galvanizing is required:</i></p> <p>Galvanizing: All steel pipe piles shall be galvanized after fabrication to the requirements of ASTM A123 and repaired according to ASTM A780.</p>

<p>Bents located in the Toe of Abutment Fill</p> <p>Note A-16</p>	<p>Note: All fill shall be in place prior to excavating for bent footings. After constructing the bent, extreme care shall be taken when backfilling so as not to damage or misalign the bent.</p>
<p>Piers located in water when seal footings are not mandatory</p> <p>Note A-17</p>	<p>Foundation Preparation: See Section 204 of the Standard Specifications. If cofferdams are required, they shall be in accordance with Section 204.09 of the Standard Specifications.</p> <p><i>Note to Designer: The design notes should indicate when this note is to be used. The first foundation preparation on project is Item No. XXX-XX.01, etc.</i></p>
<p>Piers located in water when seal footings are mandatory</p> <p>Note A-17A</p>	<p>Foundation Preparation: See Special Provision 604F regarding Foundation Preparation.</p> <p><i>Note to Designer: When seal footings are mandatory, Special Provision 604F must be prepared for the project. See SM032 for an example.</i></p>
<p>All</p> <p>Note A-18</p>	<p>Bridge Rail System: Build bridge railings according to Standard Drawing (STD-1-1SS, STD-1-1, STD-7-1, or STD-11-1). The railing shall be formed and cast plumb, not perpendicular to the slab. The dimensions at the traffic face shall be kept constant, with variation due to cross slope accommodated at the rear face.</p>
<p>All</p> <p>Note A-18b</p>	<p>Note: The contractor shall provide 100% conventional fall protection for workers installing decking above 15 feet.</p>

<p>All with reinforcing Steel grouted in drilled holes</p> <p>Note A-19</p>	<p>Grouted Bars in Drilled Holes: Horizontally drilled holes shall be drilled ½” in diameter larger than the bar, cleaned, packed with non-shrink grout, and the bar rotated (not driven) to its seat. Vertically drilled holes shall be drilled ¼” in diameter larger than the bar, cleaned, packed with epoxy grout and the bar shall be driven to its seat. All grouting material shall be approved by T.D.O.T. Materials and Tests.</p> <p><i>Do not use drilled inserts or masonry anchors in a tension situation. Use a dowel set in grout or drill all the way through with a back up plate. For utilities on new construction use cast-in-place anchors. Must show size, location, and spacing of anchors.</i></p> <p><i>Note to Designer: If drilled hole is in a horizontal position, use a non-shrink grout. If hole is in vertical position, use epoxy.</i></p>
<p>When Needed</p> <p>A-20</p>	<p>Special Note for Utilities: It is intended that the cost of materials and labor necessary for the complete installation of utilities shall be borne by others and shall not be paid for as a part of this contract. The Contractor shall cooperate with others in the installation of utilities with no additional compensation allowed the Contractor as a result.</p>
<p>All Bridges</p> <p>Note A-21</p>	<p>Shop Drawings: See Section 105.02 of the Standard Specifications.</p>
<p>When Needed</p> <p>Note A-22</p>	<p>Bridge Deck Sealant: Use System A or B modified.</p> <p><i>Note to Detailer: See Structural Memorandum No. 051 for this note. Use only when directed by the Engineer of Structures.</i></p>

<p>All with Steel Pile Bents</p> <p>Note A-23</p>	<p>Pile Protection Systems: At the bent locations specified on the Plans, and after the steel piles have been driven to their final elevation, a concrete collar as detailed on drawing _____ shall be constructed one (1) foot above and three (3) feet below the finished ground elevation indicated on the contract plans.</p> <p>Steel piles that extend above the ground or water surface shall be painted as specified in Subsection 606.19 of the Standard specifications. The top coat color shall be mountain gray, color No. 36440, Federal Standard 595C. Instead of field painting, steel piles may be shop painted provided the Contractor repairs to the satisfaction of the Engineer any areas damaged due to handling or installation.</p>
<p>All with Reinforced Concrete Median Barrier Rail</p> <p>Note A -24</p>	<p>Note: The reinforced concrete median barrier rail shall be constructed in accordance with the details shown on drawing [STD-1-3 or STD-1-3SS] and shall be given an applied texture finish. The color of the finish shall be white, color No. 37886, Federal Standard 595C. The cost of the finish shall be included in the linear foot price bid for the median rail. Precast bridge deck panels are not permitted in the bay supporting the median barrier rail.</p> <p><i>Note to Detailer & Designer: For all bridges, the traffic face and the top of the bridge rails shall be painted white.</i></p>

<p>Fiber Joint</p> <p>Note A-25</p>	<p>Joint Sealer: Use Type II, Class “A” or “B”.</p>
<p>When Needed</p> <p>Note A-26</p>	<p>Waterproofing: (Class I Type “A” or “B”; Class II) See Tennessee Standard Specifications Section 605.</p> <p>Note to Designer: Specify Class I Type “A” or Class I Type “B” or Class II <i>Class I Type “A” is an asphalt seal.</i> <i>Class I Type “B” is a tar seal</i> <i>Class II is an asphalt seal with an asphalt plank cover</i></p>
<p>All with Roadway Expansion Device</p> <p>Note A-27</p>	<p>Concrete Sealer: Concrete sealer shall be applied to substructures coinciding with expansion joint locations before placement of bearing devices and applying texture coating. [Concrete sealer shall be applied to the front vertical face of the abutment backwall, the front and top of the abutment beam (plus curtain walls, sump walls or any other faces that are deemed necessary by the Engineer).] [Concrete sealer shall be applied to the top and vertical surfaces of the bent or pier cap.]</p> <p>Concrete shall be clean and dry before applying the concrete seal, and the thickness of the seal shall be as recommended by the sealant manufacturer. Acceptable concrete sealers are included in the Qualified Products List for Non-Penetrating Concrete Seals maintained by the Division of Materials and Tests. The sealer shall be clear or similar to the color of existing concrete surfaces to be sealed. The cost of the sealer, complete and in place, shall be included in the unit price of the expansion device at each substructure.</p> <p><i>Note to Designer and Detailer: Use the applicable sentences in brackets [] depending on the location of the expansion joint.</i></p>
<p>Conc. Bridges w/Steel Brngs. or Steel Exp. Devices</p> <p>Note A-28</p>	<p>Structural Steel: See notes on Drawing No. _____ and (in case of R.R. bridge) Railroad Special Provisions.</p>
<p>Steel Bridges</p> <p>Note A-29</p>	<p>Welding: See Section 602 of the Standard Specifications and notes on Drawing No. _____.</p>

Steel Bridges or Bridges W/Structural Steel (Including Bearing Devices)

<p>When Painted Steel Note A-30</p>	<p>Paint: Inorganic zinc with urethane finish – (Color) top coat conforming to Federal Standard 595C, (Spec. No.).</p>
<p>When Painted Steel Note A-31</p>	<p>Painting Structural Steel: All surfaces of structural steel girders must be painted. However, the faying surfaces of field splices, the top of the top flange, surfaces embedded in concrete, and bearing areas shall receive only a coat of primer. Bolted faying surfaces for this project are designed for a Class B surface. (See AASHTO Table 6.13.2.8-3). The Contractor shall insure the faying surfaces are prepared to provide a slip coefficient at least equal to that required for this Class for the thickness of primer applied in the shop. The faying surfaces are to be painted, as noted above, and the Contractor shall supply a Paint Manufacturer's certification that the paint to be used will provide the required resistance at the applied thickness when tested in accordance with AASHTO Art. 6.13.2.8.</p>
<p>Welded Plate Box Girders Note A-31A</p>	<p>Special Paint Note: Interior surfaces of welded plate box girders shall receive the same paint system as the exterior surfaces, except the color shall be White.</p>
<p>Steel Bridges Note A-32</p>	<p>Radiographic, Ultrasonic, and Magnetic Inspection: See Section 602 of The Standard Specifications and Notes on Drawing No. _____.</p>
<p>Steel Bridges Note A-33</p>	<p>Steel Structures: See Tennessee Standard Specifications Section 602 and notes on Drawing No. _____, and (in case of R.R. Bridge) Railroad Special Provisions.</p>
<p>Steel Bridges with HPS70W Steel Note A-33b</p>	<p>Fabrication of Steel Structures: The fabrication of structures utilizing HPS70W steel shall be in accordance with AASHTO's <i>Guide Specifications for Highway Bridge Fabrication with HPS70W Steel</i>, current edition, and AASHTO/AWS D1.5, current edition.</p>

<p>All with Unpainted Weathering Steel</p> <p>Note A-34</p>	<p>Protection Of Substructures: Since this bridge utilizes weathering steel, the contractor must take special precautions to prevent staining of piers and abutments. Prior to the erection of any steel, the tops and sides of the completed substructures shall be protected from staining by wrapping with translucent, reinforced, high density, two-ply, cross laminated polyethylene. In lieu of this protection, the Contractor may elect to thoroughly clean the concrete of rust staining by sandblasting or other approved methods, prior to applying a textured coated finish. No sealant type materials shall be applied which are incompatible with the textured coat finish unless they can be thoroughly removed prior to applying the finish. Texture coating of the substructure should be delayed until after the deck is completed. After a substructure has received its final finish, the top and sides shall be protected from staining by wrapping with reinforced polyethylene, which, if being reused, shall be in good condition and free from holes and tears. It shall be the contractor's responsibility to protect the substructures from staining for the duration of the contract. Any corrective textured coating shall be at his expense. Cost to be included in the unit price bid for other items.</p>
<p>Note A-34a</p>	<p>Blast Cleaning: The fascia girders and all faying surfaces of field splices of all girders shall be blast cleaned in accordance with the Steel Structures Painting Council Surface Preparation specifications "No. 6 Commercial Blast Cleaning" SSPC-SP 6. Prior to bolting, any loose rust on the faying surfaces shall be removed.</p> <p><i>Note to Designer and Detailer: For grade separations, require all girders to be blast cleaned.</i></p>
<p>Note A-34b</p>	<p>Final Appearance: Prior to final acceptance, all Structural Steel shall be free of grease, oil, chalk marks, paint, concrete spatter and similar soilage. Depending on the location, with respect to view, and severity of the fore-going soilage, the Structural Steel shall be cleaned under the provisions of one of the following Steel Structures Painting Council Surface Preparation Specifications; "No. 1 Solvent Cleaning" SSPC-SP 1, "No. 2 Hand Cleaning" SSPC-SP 2, "No. 3 Power Tool Cleaning" SSPC-SP 3 or "No. 7 Brush-off Blast Cleaning" SSPC-SP 7.</p>

Note A-34c	Weathering Bolts: All Bolts shall be ASTM A-325, Type 3. All bolts, nuts, and washers shall have the same weathering characteristics as the Structural Steel used. In lieu of using direct tension indicators (DTI's), all bolts shall be installed by either turn-of-nut tightening or calibrated wrench tightening in accordance with the AASHTO LRFD Bridge Construction Specifications, current edition.
Note A-34d	Weathering Steel: All weathering steel shall have atmospheric corrosion resistance equal to or better than two times that of carbon structural steel with copper.
Note A-34e	<p><i>Note to Designer and Detailer: When weathering steel girders are encased in integral abutments and/or pier caps use Note A-30 and the following note:</i></p> <p>Painting Girders Encased in Concrete: Where weathering steel girders are encased in concrete at integral abutments (and integral pier caps), the girders shall be painted over the entire embedment length plus at least one foot outside the encasement. The color of the top coat shall be Brown, Federal Standard Color 595C, Color No. 30059.</p>
Note A-34f	<p><i>Note to Designer and Detailer: When bridges with weathering steel girders have expansion joints, use Note A-30 and the following note:</i></p> <p>Painting Girders below Expansion Joints: Weathering steel girders below expansion joints shall be painted for a minimum distance of 1 ½ times the depth (1.5D) of the girder on either side of the joint. The color of the top coat shall be Brown, Federal Standard Color 595C, Color No. 30059.</p>

<p>When needed</p> <p>Note A-35</p> <p>See Note A-19 for Grouted Bars in Drilled Holes</p>	<p>Drilled-In Anchors (Mechanical or Epoxy):</p> <p>Certification: The contractor shall furnish certified anchor pull out data from an independent testing laboratory using Class “A” concrete as prescribed by Tennessee Highway Specifications. The required ultimate load for 7/8” ∅ anchors is 19,000 lbs., 18,000 lbs. for 3/4” ∅ anchors, 12,000 lbs. for 5/8” ∅ and 9,000 lbs. for 1/2” ∅.</p> <p>In Place Requirements: The units shall be subset 3/32” to 1/4” and torqued, with base plate in place, to an equivalent direct pull out load of 60 percent of required ultimate load. The Department will perform testing of anchors on site to insure the specified in place requirements. Installations not meeting these requirements must be corrected at the contractor’s expense. For mechanical anchors, slippage shall not exceed 1/4”.</p> <p><i>Note to Designers: The design notes should indicate which anchors should receive a pull out test. Do not use mechanical anchors in a direct tension loading. If mechanical anchors are not allowed, delete the last sentence in the above note and show “Epoxy only” in the title.</i></p>
<p>Note A-36</p>	<p>(Deleted)</p>

<p>All</p> <p>Note A-37</p>	<table border="0"> <thead> <tr> <th style="text-align: left;">List of Drawings</th> <th style="text-align: left;">Drawing No.</th> <th style="text-align: left;">Revision</th> </tr> </thead> <tbody> <tr> <td>(1) Drawing numbers as required per Individual bridge</td> <td></td> <td></td> </tr> <tr> <td>(2) Standard Drawings</td> <td></td> <td></td> </tr> <tr> <td> Bridge Railing-Concrete Parapet</td> <td>STD-1-1SS</td> <td>*</td> </tr> <tr> <td> Parapet Drains</td> <td>STD-1-2</td> <td>*</td> </tr> <tr> <td> Concrete Median Barrier</td> <td>STD-1-3SS thru STD-1-4SS</td> <td>*</td> </tr> <tr> <td> Reinf. Concrete Pavement* at Bridge Ends</td> <td>STD-1-5</td> <td></td> </tr> <tr> <td> Bridge End drain details</td> <td>STD-1-6 thru 13</td> <td>*</td> </tr> <tr> <td> Precast Prestressed Bridge Deck Panels</td> <td>STD-4-1 thru 4</td> <td>*</td> </tr> <tr> <td> Std. Pile Details</td> <td>STD-5-1 and 2</td> <td>*</td> </tr> <tr> <td> Standard Seismic Details</td> <td>STD-6-1 and 2</td> <td>*</td> </tr> <tr> <td> Std. Reinf. Bar Support</td> <td>STD-9-1</td> <td>*</td> </tr> <tr> <td> Misc. Abutment & Drainage Details</td> <td>STD-10-1</td> <td>*</td> </tr> <tr> <td> Standard Details for Bulb-Tee Beams</td> <td>STD-14-1</td> <td>*</td> </tr> <tr> <td> Standard Details for I-Beams</td> <td>STD-14-2</td> <td>*</td> </tr> <tr> <td> Standard Details for Box Beams</td> <td>STD-14-3</td> <td>*</td> </tr> <tr> <td colspan="3">*See Gray Standards Notebook and for other Standards and latest revision dates as required per individual bridge.</td> </tr> <tr> <td>(3) Reference Drawings – List the existing bridge drawings for large or complicated bridge replacement or widening projects. <u>All reference drawings must be turned in with the final plans.</u> When there are no drawings of the existing structure, add the following note to the layout and roadway sheet 2: Note: Drawings of the existing structure are not available.</td> <td></td> <td></td> </tr> <tr> <td>(4) List of Special Provisions – List all pertinent Special Provisions for the structure involved, giving the number, title, and date of latest revision (see sheet 37/37 for a listing of the General Special Provisions dealing with bridge structures).</td> <td></td> <td></td> </tr> </tbody> </table>	List of Drawings	Drawing No.	Revision	(1) Drawing numbers as required per Individual bridge			(2) Standard Drawings			Bridge Railing-Concrete Parapet	STD-1-1SS	*	Parapet Drains	STD-1-2	*	Concrete Median Barrier	STD-1-3SS thru STD-1-4SS	*	Reinf. Concrete Pavement* at Bridge Ends	STD-1-5		Bridge End drain details	STD-1-6 thru 13	*	Precast Prestressed Bridge Deck Panels	STD-4-1 thru 4	*	Std. Pile Details	STD-5-1 and 2	*	Standard Seismic Details	STD-6-1 and 2	*	Std. Reinf. Bar Support	STD-9-1	*	Misc. Abutment & Drainage Details	STD-10-1	*	Standard Details for Bulb-Tee Beams	STD-14-1	*	Standard Details for I-Beams	STD-14-2	*	Standard Details for Box Beams	STD-14-3	*	*See Gray Standards Notebook and for other Standards and latest revision dates as required per individual bridge.			(3) Reference Drawings – List the existing bridge drawings for large or complicated bridge replacement or widening projects. <u>All reference drawings must be turned in with the final plans.</u> When there are no drawings of the existing structure, add the following note to the layout and roadway sheet 2: Note: Drawings of the existing structure are not available.			(4) List of Special Provisions – List all pertinent Special Provisions for the structure involved, giving the number, title, and date of latest revision (see sheet 37/37 for a listing of the General Special Provisions dealing with bridge structures).		
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<p>Machined Rip-Rap for Bridge Waterways and Open Channels</p> <p>Note A-38</p>	<p>Rip-Rap: Machined rip-rap shall be Class ___ in accordance with Section 709 of the Standard Specifications and shall be measured and paid for under Roadway Item _____.</p> <p><i>Note to Detailer: * Hydraulics will give Class No.</i></p>																																																									

<p>Rubble Stone Rip-Rap for Bridge Waterways and Open Channels</p> <p>Note A-38a</p>	<p>Rip-Rap: Rubble stone rip-rap shall be hand-placed in accordance with Subsection 709.06 of the Standard Specifications and shall be measured and paid for under Item 709-07.</p>
<p>Reinforced Concrete Slope Pavement</p> <p>Note A-39</p>	<p><i>See SM028 for instructions and Plans notes.</i></p>
<p>Rip-Rap for Grade Crossings (& Some Stream Crossings)</p> <p>Note A-40</p>	<p>Machined Rip-Rap: Machined Rip-Rap for slope protection shall be 2" to 6" in size uniformly graded and meet the requirements of section 709 of the Standard Specifications for Road and Bridge Construction and shall be measured and paid for under Roadway Item _____ – Ton.</p> <p><i>Note to Detailer: Add RD01-SA-1 to standard drawing list and base quantities on 8" thickness.</i></p>
<p>All</p> <p>Note A-41</p> <p>(Do not use on Grant Bridges)</p>	<p>Value Engineering Alternate Bridge Design Criteria: Alternate bridge design proposals may not diminish the functional or structural equivalency of the bridge and must meet or exceed both the service level and ultimate capacities of the Contract Plans structure. Additionally, the waterway opening and flood clearances may not be reduced; for grade separations, the horizontal clearances may not be reduced, nor may the vertical clearances be less than the minimum acceptable for the type facility crossed.</p>
<p>Falsework Over Traffic</p> <p>No. A-42</p>	<p>Falsework over Traffic: See Section 604.06 of the Standard Specifications.</p>
<p>Note A-43</p> <p>When maintenance of Traffic is required on existing substandard bridge</p>	<p>Note: The Contractor shall erect posting signs at each approach to the existing bridge stating the load limit to be _____ tons. Additionally, the contractor shall maintain the existing structure in accordance with the specifications. The cost of required labor and materials shall be included in the unit price bid for other items.</p> <p><i>Note to Designer: The load posting shall be equal to the present posting, but not less than 3 tons.</i></p>

<p>Note A-44</p> <p>For Stage Construction Projects</p> <p>(Use only the notes applicable to the particular project.)</p>	<p>Requirements and Restrictions for Phase Construction</p> <ol style="list-style-type: none"> 1- The stage construction sequence may prohibit the extraction of some cofferdam sheet piling. All costs associated with sheet piling shall be included in the lump sum bid price for foundation preparation. 2- The location of longitudinal construction joints shall not be changed to accommodate remain-in-place deck forms. 3- No sheet piles or bearing piles may be driven from the existing or proposed structure. 4- <u>(Number and Width)</u> foot traffic lanes shall be maintained at all times.
<p>Note A-45</p> <p>When existing structural steel to be reconditioned and repainted, or removed and scrapped, contains lead or chromate based paints</p>	<p><i>Note to Designer: In order to determine which condition applies, consult the original contract plans <u>and</u> the bridge repair section to determine what paint system was originally applied to the structural steel and whether it was removed or overcoated subsequent to construction. If information is not available regarding this, contact WJS for instructions on how to proceed. <u>This fact-finding should begin during development of the preliminary layout.</u></i></p> <p><i>Present the information using one of the three notes A-45A, A-45B, or A-45C below. If structural steel with lead and/or chromate paint is to be removed, use note A-45D also.</i></p>
<p>Note A-45A</p>	<p>Note: Our maintenance records indicate the bridge was originally painted with materials containing lead and/or chromates and the contractor is required to proceed accordingly to take all mandatory safeguards prescribed by State and Federal Law for both worker protection and hazardous materials disposal.</p>
<p>Note A-45B</p>	<p>Note: Our maintenance records indicate the bridge was originally painted with materials containing lead and/or chromates and subsequently overcoated with _____ and _____. The contractor is required to proceed accordingly to take all mandatory safeguards prescribed by State and Federal Law for both worker protection and hazardous materials disposal.</p>
<p>Note A-45C</p>	<p>Note: Our maintenance records indicate this bridge has been stripped of lead and/or chromate based paints and repainted with inorganic zinc primer and _____(vinyl or polyurethane) top coat. Small residual amounts of lead and/or chromates may remain and if found the contractor is required to proceed accordingly to take all mandatory safeguards prescribed by State and Federal Law for both worker protection and hazardous materials disposal.</p>
<p>Note A-45D</p>	<p>Note: When structural steel coated with lead and/or chromate paints are to be severed using thermal cutting methods, the areas to be cut shall first be cleaned to bare metal by abrasion.</p>

<p>Note A-45E</p> <p>When needed for Asbestos</p>	<p><i>Note to Designer: See C.E. Manager 1 to determine if bridge contains ACM (asbestos containing material). Add note C-2A.</i></p> <p>Note: Our existing bridge drawings, inspection reports or ACM (asbestos containing material) survey indicate this bridge contains elements with ACM. To minimize the amount of hazardous material waste, the elements containing asbestos shall be removed prior to demolition of the entire structure. The contractor is required to take all mandatory safeguards prescribed by state and federal law for both worker protection and hazardous materials disposal.</p> <p><i>Use Item No. 202-01.02 Removal of Asbestos, L.S., 1.</i></p>
<p>For Bridge Widening with Slab Removal</p> <p>Note A-46</p>	<p>Note: The Contractor shall saw cut 1 inch deep into the slab before removing concrete. All transverse reinforcing steel shall remain in place and be spliced with the new reinforcing. The contractor shall not use a hydraulic ram mounted on a backhoe (commonly called a hoe ram) or other similar heavy equipment for concrete removal. The maximum allowable hammer size is the 60 pound class.</p>

Other Notes

<p>Applied Texture Finish (Optional)</p> <p>Note B-1</p>	<p>Finishing Concrete Surfaces: Concrete finishing shall be in accordance with Section 604.21 of the Tennessee Standard Specifications with the Contractor having the option of using either Class II finish or a Class I finish followed by an Applied Texture Finish. No texture finish shall be applied prior to completion of paving and hauling operations at the bridge site. The cost of finishing concrete shall be included in the unit price bid for Item No. _____.</p>
<p>Applied Texture Finish (Required)</p> <p>As required to modify Specifications</p> <p>Note B-2</p>	<p>Finishing Concrete Surfaces: Concrete finishing shall be in accordance with Section 604.21 of the Tennessee Standard Specification. A Class I finish followed by an Applied Texture Finish shall be used in lieu of a class II finish. No texture finish shall be applied prior to completion of paving and hauling operations at the bridge site. The applied texture finish shall be measured and paid for under Item No. _____.</p> <p><i>Note to Designer: Any surface that is to receive a texture finish, but is not included in the specifications must be shown on the plans and added to the above note. For example, tops of abutment beams, tops of cap beams with expansion joints, bottoms of reinforced concrete hollow box bridges. The bottom of slab between spread girders shall not receive a texture finish.</i></p> <p><i>Note to Detailer: When the STD-7-1 or STD-11-1 Rail is used, designate on the surface finish sketch that the entire rail will be painted white.</i></p>
<p>Abutment with overturning problems during construction</p> <p>Note B-3</p>	<p>Note: The Contractor shall support the abutments until the superstructure is in place, falsework has been removed and backfilling has been completed.</p>
<p>Note for all Widening</p> <p>Note B-4</p>	<p>Note: The Contractor shall check the location of all existing substructures and verify span lengths before fabricating girders.</p>

Other Notes

<p>General Information as needed on all bridges</p> <p>Note B-5</p>	<p><i>Note to Detailer: In addition to the Standard Notes there will be several specific notes as directed by the Designer. The Layout Sheet should also show the following specific information.</i></p> <ol style="list-style-type: none"><i>1. End fill slopes and berm width.</i><i>2. Hydraulic data, high water elevation, normal pool, datum, and scour elevations when applicable.</i><i>3. Existing ground line and rock line.</i><i>4. Limits of rip-rap.</i><i>5. Substructures as fixed, expansion, or integral.</i><i>6. Substructure types, pile or rock.</i><i>7. Horizontal and vertical curve geometry, skew angle.</i><i>8. Finished grade location in plan view, finished grade elevations and stations in elevation view.</i><i>9. Survey and stream flow directions and north arrow.</i><i>10. Identify non-pay items. Also, see payment notes on SM013-01.</i><i>11. Twenty year projected ADT, Design Speed and Bridge I.D. Number.</i><i>12. Bridge deck drains and bridge end drains (location and No. required).</i><i>13. Notes regarding traffic maintenance and/or phase construction.</i><i>14. Put bridge deck sealant, portable median barrier rail and rip-rap quantities in border of layout sheet.</i>
<p>Abutment on fill</p> <p>Note B-6</p>	<p>Note: The fills at the ends of the bridge shall be in place and thoroughly compacted before any abutment piles are driven.</p>

Estimated Quantities

<p>All Bridges with Pavement at Bridge Ends</p> <p>Note C-1</p>	<p><i>Note to Detailer: Pavement at Bridge End Quantities are to be included as an item in the quantity box. The quantity is now a separate item and bid by the square yard. The correct item number and name is: 604-03.04 – Pavement at Bridge Ends – S.Y. The s.y. quantity may be included in the bridge total. A separate line for Pavement at Bridge End is not necessary.</i></p> <p><i>Note to Designers: Approach slabs must be provided on structures with a roadway width of greater than 30 feet, except that ramp bridges of any width must have approach slabs.</i></p> <p>Note: Prior to construction of the pavement at bridge ends, the Contractor shall submit a proposed Bill of Steel to the Engineer for approval.</p>
<p>When needed for Removal of Structures</p> <p>Note C-2</p>	<p>Note: Lump Sum: (Description of Structure)</p> <p><i>Note to Designer: Give a complete description of the bridge. Spec. Art. 202.04 specifies the limits of removal including the removal of all conflicting elements of the existing structure. Spec. Art. 202.03 specifies the salvageable value to be the property of the contractor. Any deviation from the specifications must be noted on the bridge quantity sheet and on sheet 2. The bridge designer must obtain information about salvageable material from the construction PS & E report.</i></p> <p><i>Note to Designer: For large or unusual existing bridges, the existing bridge plans should be printed with the plans as reference drawings. If in doubt, consult with Construction</i></p>
<p>When needed for Asbestos removal</p> <p>Note C-2A</p>	<p>Note: The following asbestos containing material elements were determined to be located on the existing bridges: <i>[list material(s), location, and quantity]</i>. See Special Provision No. 202ACM.</p>
<p>“All”</p> <p>Note C-3</p>	<p>Note: Excavation based (<u>on existing ground</u>), (<u>on lower road profile</u>) or (<u>final profile</u>). [<i>Specify one.</i>]</p>
<p>All with expansion device</p> <p>Note C-4</p>	<p>Note: The price bid for roadway expansion devices to include the cost of _____ s.y. of concrete seal required. See general notes for description of concrete seal.</p>
<p>All with cofferdams</p> <p>Note C-5</p>	<p>Note: See Foundation Preparation note this sheet.</p>

Estimated Quantities

<p>Steel Bridges</p> <p>Note C-6</p>	<p>Note: Lump Sum: Total estimated weight of _____ lbs. of structural steel includes (<i>roadway expansion device, lead plates, self-lubricated bronze plates, shear connectors, bolts, rivets, etc.</i>) Also see Tennessee Standard Specifications Section 602.49 and 602.50.</p> <p><i>Note to Detailer: Break down the total estimated weight into the separate ASTM Grades. Show only parts included in bridge which are not covered by a specific item no. such as bearing devices and expansion joints.</i></p>
<p>All with finger or sliding plate roadway expansion joints.</p> <p>Note C-7</p>	<p>Note: The cost of the 50 Durometer, ¼” fabric reinforced, elastomeric gutter is to be included in the unit price bid for Item No. _____.</p>
<p>When needed (except prest. beams)</p> <p>Note C-8</p>	<p>Note: Cost of Rubber Bonding Cement and Elastomeric Bearing Pads to be included in unit price bid for Class “A” Concrete. (This applies to steel or concrete bridges where pads are not bid under a bearing bid item).</p>
<p>0.0% Grade or bottom of V.C. or as directed by Hydraulics</p> <p>Note C-9</p>	<p>Note: Cost of _____ bridge deck drains to be included in the unit price bid for the parapet.</p> <p><i>Omit bridge deck drains over traveled roadways, railroads, and bents.</i></p>
<p>When needed</p> <p>Note C-10</p>	<p>Note: The cost of <u>water stops, bituminous-fiberboard, epoxy joints, etc.</u>, and all miscellaneous joint material to be included in the unit price bid for other items. (Specify only those items used on your bridge).</p>
<p>C-11</p>	<p>(Left Blank Intentionally)</p>

**(C) LAYOUT SHEET – NOTES UNDER
ESTIMATED QUANTITIES**

<p>Railroad Note C-12</p>	<p>Note: End Fill Drainage System: Lump sum – drainage system includes all drainage pipe and porous backfill material.</p>
<p>Prestressed Note C-13</p>	<p>Note: Cost of elastomeric pads and rubber bonding cement to be included in the unit price bid for the prestressed beam. <i>Note to Detailer: Other type bearing devices should be included in a bid item for bearings.</i></p>
<p>Bridges with Bulb-Tee Beams Note C-14</p>	<p>Note: Intermediate Diaphragms shall be paid for in accordance with Standard Drawing STD-14-1.</p>
<p>All Note C-15</p>	<p>Note: Cost of polyethylene sheeting and all miscellaneous items necessary for installation to be included in the unit price bid for Perforated Pipe.</p>
<p>Note C-16</p>	<p>(LEFT BLANK INTENTIONALLY)</p>
<p>All Widening C-17</p>	<p>Note: The cost of removing the exterior portion of the existing slab, portions of the existing abutment, and the bridgerail shall be included in the unit price bid for Removal of Structures, Item No. _____.</p>
<p>All with Anchor Bolt Assemblies per Std. Dwg. STD-6-1 C-17A</p>	<p>Note: The cost of all materials and labor necessary for the installation of ____*____ anchor bolt assemblies shall be included in the unit price bid for Class "A" Concrete (Bridges), Item No. _____. <i>*Note to Detailer: Show the total number of assemblies required for the bridge.</i></p>

**(C) LAYOUT SHEET – NOTES UNDER
ESTIMATED QUANTITIES**

<p>All with Structure Lighting</p> <p>Note C-18</p>	<p>Note: Lump sum for structure lighting, Item No. (Item No.) includes (length) ft. 2"∅ conduit with pull wires, conduit with pull wires, (No.) junction boxes, (No.) pull boxes, (No.) anchor bolts and all necessary materials for installation of structure lighting.</p>
<p>All with Navigation Lighting</p> <p>Note C-19</p>	<p>Lump Sum: Includes all items and labor necessary to install the navigation lighting complete as shown on the plans, including connection to power source. Power source to be furnished by others (See Roadway Plans). The Contractor shall furnish navigation lighting in accordance with the Coast Guard Permit. Shop drawings for navigation lighting support brackets shall be submitted for approval.</p>
<p>Strip Seal Expansion Joints</p> <p>Note C-20 (See SMO45)</p>	<p>Note: The Expansion Joint at (<u>Location</u>) shall be in accordance with Section 623.03 of the Standard Specifications. The total required movement is 4 inches. Shop drawings shall be submitted to the Engineer of Structures for approval.</p> <p><i>Note to Detailer: Set joint opening at 2" at 60° F. If slider plates are required, cost of plates are to be included in the unit price bid for the expansion device.</i></p>
<p>Modular Expansion Joints</p> <p>Note C-21 (See SMO45)</p>	<p>Note: The Expansion Joint at (<u>Location</u>) shall be in accordance with Section 623.02 of the Standard Specifications. The total required movement is ___ inches. Shop drawings shall be submitted to the Engineer of Structures for approval. Joint members and support boxes shall be galvanized after fabrication in accordance with ASTM A123.</p>
<p>Scarifying Bridge Deck</p> <p>Note C-22</p>	<p>Note: The cost of removing any existing asphalt overlay shall be included in the unit price bid for scarifying.</p> <p><i>Note to Designer: See SMO51-16.</i></p>
<p>Removal of Bridge Deck by Hydro</p> <p>Note C-23 (Cont. on next page)</p>	<p>Note: The surface of the bridge deck shall be removed to the depth necessary to expose sound concrete utilizing hydrodemolition equipment with a minimum nozzle pressure of 17,000 psi. The equipment and work operation at each site will be subject to approval of the Engineer. If the depth and/or soundness of concrete being removed is unacceptable to the Engineer, the nozzle pressure shall be adjusted as necessary to provide satisfactory performance.</p> <p>After the hydro demolition operation is completed, the Engineer will determine if the exposed reinforcing steel and concrete is sufficiently cleaned or if additional sand blasting is required. All loose material shall be removed from the deck prior to pouring concrete.</p>

**(C) LAYOUT SHEET – NOTES UNDER
ESTIMATED QUANTITIES**

<p>Removal of Bridge Deck by Hydro</p> <p>Note C-23 (cont'd)</p>	<p>Areas of the deck, not accessible or otherwise adaptable to hydrodemolition, shall be removed by conventional power chipping or hand tools. Pneumatic hammers heavier than the 30 pound class shall not be used.</p> <p>The cost of all work required to remove unsound concrete from the deck and to clean and prepare the deck to the satisfaction of the Engineer shall be included in the unit price bid for Item No. _____, Bridge Deck Removal (Hydro), S.Y.</p> <p><i>Note to Detailer: Item No. _____, Bridge Deck Removal (Hydro) L.S. is also available, but may be used only with the approval of the Engineer of Structures.</i></p>
<p>Mechanical Bar Splices</p> <p>Note C-24</p>	<p>Note: Mechanical bar splicers must be on the Qualified Products List 27 maintained by the Division of Materials and Tests. The bar splicer shall meet AASHTO Standard Specifications for mechanical connection. When epoxy coating is required, the exposed threads shall be repaired after splicing according to Section 907 of the Standard Specifications. The cost of furnishing the bar splicers, (and epoxy coating when required) including all labor and materials necessary for complete installation, shall be included in the unit price bid for Item No. _____ and Item No. _____.</p> <p><i>Note to detailers: Give item numbers for Reinforcing steel and Epoxy coated reinforcing steel.</i></p>
<p>All Bridges with Concrete Piling Except in Seismic Category A</p> <p>Note C-25</p>	<p>Note: Cost of preparation of the top of pile for seismic requirements shall be included in the unit price bid for Item 606-12.01. See Standard Drawing STD-6-1 for details. The pile and test pile lengths shown on the plans do not include the 2 feet required for seismic attachment.</p> <p><i>Note to Designer: See Standard Drawing STD-6-1 for seismic requirements for piling.</i></p>
<p>All</p> <p>Note C-26</p>	<p>Note: Granular backfill shall be Class "A" Grading "D" material. See Standard Drawing STD-10-1.</p> <p><i>Note to Detailer: For granular material, use a conversion factor of 1.75 when converting cubic yards to tons.</i></p>
<p>All with Pile Tip Reinforcement</p> <p>Note C-27</p>	<p>Note: The unit price bid for the cast steel points shall include furnishing and installation to the piles.</p>

**(D) Superstructure Sheet
General Notes**

<p>All Note D-1</p>	<p><i>Note to Designer and Detailer: For pouring sequence and construction details see Structures Memorandum No. 050.</i></p>
<p>All Steel Bridges Note D-1a</p>	<p><i>Note to Designer and Detailer: Refer to SMO40-06/06 for details and notes regarding fabrication and erection, cross frames, and phasing and widening of steel bridges.</i></p> <p><i>Refer to SMO40-05/06 for standard and alternate cross frame to flange connection details.</i></p>
<p>Continuous Steel & Precast Concrete Note D-2</p>	<p>Note: No portion of the (<u>curb, parapet or median barrier rail</u>) shall be poured until the entire deck slab is in place.</p>
<p>Cast-In-Place Note D-2a</p>	<p>Note: No portion of the (<u>curb, parapet or median barrier rail</u>) shall be poured until the entire deck slab has been poured and all superstructure falsework has been removed.</p>
<p>Bridge on Curve Note D-3</p>	<p>Note: Outside edge of slab and bridge rail to conform to horizontal curve.</p>
<p>Steel Note D-4</p>	<p>Note: The concrete deck shall not be poured until all structural steel is erected and all welding and/or bolting complete.</p> <p><i>Note to Designers and Detailers: Other coordinating notes may be required for projects involving staged construction.</i></p>
<p>Prestressed Note D-5</p>	<p>Special Note for Anchor Bolts at Bents: Anchor bolt assemblies at bents shall be in accordance with Standard Drawing STD-6-1.</p>
<p>Reinforced Concrete Note D-6</p>	<p>Special Note for Anchor Bolts at Bents: Anchor bolt assemblies at bents shall be in accordance with Standard Drawing STD-6-1.</p> <p><i>Note to Detailer: This note applies only when full bearing is on a compressible material.</i></p>
<p>Reinforced Concrete Note D-7</p>	<p>Dead Load Correction Curve: Note: This curve is for dead load camber only and should be increased by the amount of anticipated take up in the falsework.</p>

**(D) Superstructure Sheet
General Notes**

<p>Steel Box Girder or Concrete Hollow Box</p> <p>Note D-8</p>	<p>Note: 2" \varnothing weep holes with screen wire cover required at low point of each cell.</p>
<p>Steel</p> <p>Note D-9</p>	<p>Dead Load Correction Curve: Girders shall be cambered to compensate for dead load deflection and vertical curve.</p> <p><i>Note to Detailer: Show total camber and girder camber when total camber is $\pm 1-1/4"$. Otherwise show only total camber. Omit the vertical curve part of this note when a vertical curve is not involved.</i></p> <p><i>Note to Designer: D.L. girder camber should include the weight of cross-frames, stringers, etc. Also see SMO40-06 for information and notes regarding erection, cross-frames, phasing, etc.</i></p>
<p>Prestressed</p> <p>Note D-10</p>	<p>Dead Load Correction Curve: This curve is for dead load slab and all dead loads that are applied after slab is in place and should be corrected to compensate for the effects due to vertical curve.</p> <p><i>Note to Detailer: Omit the vertical curve correction part of this note when a vertical curve is not involved.</i></p>
<p>All Except Cast-in-Place</p> <p>Note D-10B</p> <p>Add to Dead Load Correction Note</p>	<p>Note: If prestressed deck panels are used and the beams are profiled after panels are in place, reduce the dead load correction values shown by 25%.</p> <p><i>Note to Designer: If necessary, correct the percent reduction shown above due to actual design requirements.</i></p>
<p>All with Bridge Rail</p> <p>Note D-11</p> <p>When Superstructure is on Falsework</p>	<p>Note: When pouring (curb or slab), provisions shall be made for setting (Reinforcing Steel or Anchor Bolts) for (Bridge Rail or Parapet). *The parapet shall not be poured until the slab is poured and cured. [When pouring parapet, provisions shall be made for setting anchor bolts for parapet rails.] Also see drawing No. _____ & _____</p> <p>[Required when the parapet has a rail.]</p> <p>*No sidewalks or parapets are to be poured until falsework has been removed.</p>

(D) Superstructure Sheet - General Notes

<p>When Needed Note D-12</p>	<p>Bridge Deck Sealant: <i>[See Structures Memorandum No. 051 for detail and note information.]</i></p>
<p>When Strands are Cut in Top of Prestressed Beams Note D-13</p>	<p>Note: All the strands in the block out that are to be cut in the field shall be heated in a sufficient amount (usually near white surface) to relieve the stresses in the strands before the strands are cut. Any damage that occurs to the beams due to a deviation from the cutting procedure as stated shall be the responsibility of the Contractor and repaired at his own expense to the complete satisfaction of the Engineer.</p>
<p>All Prestressed Beams Note D-14</p>	<p>Note: The Contractor is solely responsible for supporting the beams to prevent damage due to twisting or overturning during all phases of construction. It is strongly recommended that the temporary erection diaphragms be installed and the permanent intermediate diaphragms be poured and cured prior to placing any loads on the girders. However, temporary erection diaphragms and permanent intermediate diaphragms must be in place in the span at the time the slab is poured in said span.</p> <p><i>Note to Detailer: Delete reference to permanent intermediate diaphragms when not applicable. See SMO48.</i></p>
<p>All Cast-in-Place Hollow Boxes Note D-15</p>	<p>Note: If internal formwork for the deck is used, the contractor shall provide access to all cells of the structure in order to completely remove all internal forms.</p>
<p>Steel Bridges Note D-16</p>	<p>Approval of Materials: No fabrication shall be started until the materials involved have been approved by the Tennessee Department of Transportation, Division of Materials and Tests or (in case of a railroad structure, name of railroad) with a copy of the test reports also going to the Tennessee Department of Transportation, Division of Materials and Tests.</p>
<p>All Prestressed Beams Note D-17</p>	<p>Note: The support diaphragms at the bents shall be formed and the bottom 15 inches poured as soon as possible after the beams have been set. The remainder of the diaphragm shall be poured concurrently with the deck slab. The beams shall attain an age of at least 90 days prior to pouring the remainder of the support diaphragms and deck slab. All diaphragm concrete shall be included in the quantity for item No. _____.</p> <p><i>Note to detailer: Use item number for Class "D" Concrete, Bridge Deck.</i></p>

(D) Superstructure Sheet – General Notes

<p>Steel Bridges Note D-18</p>	<p>Identity of Main Materials: See Section 602 of the Standard Specifications.</p>
<p>Steel Bridges Note D-19</p> <p><i>Note to Designer:</i></p> <p><i>Use 2nd Paragraph of Note Only for Non-Redundant (Fracture Critical) Members</i></p> <p>When HPS 70W steel ≤ 2" in thickness is used</p> <p>Note D-19b</p>	<p>Structural Steel: Shall conform to ASTM A709 Grade _____ unless otherwise noted. All structural steel for girder flanges in tension and all webs shall meet the supplemental requirements for longitudinal charpy V-Notch tests specified in the ASTM Specifications. Zone 2 of (Non-Fracture Critical Criteria or Fracture Critical Criteria) shall apply.</p> <p>Structural steel designated on the plans as fracture critical shall meet the requirements of the AASHTO Guide Specifications for Fracture Critical Non-Redundant Steel Bridge Members as required for Zone 2. Fabrication of fracture critical bridge members shall be accomplished by fabricators certified under the AISC Quality Certification Program, Category III, Major Steel Bridges. No other certification program will be acceptable.</p> <p><i>Note to Designers: Unpainted ASTM A709 Grade 50W is the preferred steel for most bridges. When the bridge is to be painted, use ASTM A709 Grade 50. The use of ASTM Grade HPS 70W is encouraged for all fracture critical members, and for non-fracture critical members to avoid plates thicker than 3 inches. When ASTM Grade HPS 70W plates 2 inches or less in thickness are used, the following note shall be added:</i></p> <p>Note: The use of Thermo-Mechanically Controlled Processed (TMCP) Grade 70W plate up to 2 inches in thickness is allowed.</p>
<p>Steel Bridges Note D-20</p>	<p>Welding: ANSI/AASHTO/AWS D1.5-[Current Edition] Bridge Welding Code and Section 602 of the Standard Specifications.</p>
<p>Steel Bridges Note D-21</p>	<p>Field Connections: Shall be _____∅ High Tensile strength bolts ASTM-A325 [or ASTM A490] unless otherwise shown. See AASHTO LRFD Bridge Construction Specifications Art. 11.3.2 and Section 602 of the Standard Specifications.</p>

(D) Superstructure Sheet - General Notes

Steel Bridges where Applicable Note D-22	Heat Curving Steel Girders: Heat curving will be permitted for girders with radius of curvature in excess of the minimum requirements specified in AASHTO LRFD Bridge Design Specifications Art. 6.7.7.2, provided the procedure is in accordance with AASHTO LRFD Bridge Construction Specifications Art. 11.4.12, and the vertical camber is adjusted in accordance with AASHTO LRFD Bridge Design Specifications Art. 6.7.7.3.
Welded Girders Note D-23	Additional Shop Splice Note: Shop splices necessary due to lengths or size of material involved may be added by the Fabricator subject to approval by the Engineer and shall be at no additional cost to the project.
Steel Girders Note D-24	Additional Field Splice Note: Field splices necessary due to lengths involved may be added by the Fabricator subject to approval by the Engineer and shall be at no additional cost to the project. Field Splice Note: Field splices shown on the plans may be deleted by the Contractor. Adjustment to the lump sum price for steel structures shall be in accordance with the specifications.
When Applicable Show Detail Note D-25	Inspection Handrail: A 2" diameter standard pipe (A36) shall be welded to stiffeners in each bay for the full length of the structure. The cost shall be included in the lump sum bid for Item 602-03. <i>Note to Designer: Not usually required. Check with Inspection section on need.</i>
When needed for Bearing Pins Note D-26	Note: Material for bearing pins to be ASTM _____ Grade _____ Class _____. <i>Note to Designer: See AASHTO LRFD Table 6.4.2-1 for allowable stresses of different pin sizes and classes of material.</i>
Steel Bridges Note D-27	Shop Assembly: Progressive Shop Assembly will be allowed. See AASHTO LRFD Bridge Construction Specifications Art. 11.5.3.1.
Straight Steel Bridges Note D-28	Steel Beam Design Data (Per Beam): Live Load Distribution Factor: _____ Lanes for Moment _____ Lanes for Shear _____ Lanes for Fatigue Composite Dead Load: DC = _____ LB/FT DW = _____ LB/FT Composite Slab Design Strength: $f'_c = 3000$ psi
Steel Bridges Note D-29	<i>Note to Designers: The need for supplemental cantilever bracing should be checked for all steel girder bridges. An in-house computer program called CBR is available to perform this check. If supplemental bracing is required, the program will generate required notes for the plans. Consultants may obtain the program by contacting the Division of Structures.</i>

**(E) Superstructure Sheet - General Notes
Post Tensioned Structures**

<p>All Note E-1</p>	<p>Post Tensioning: See Standard Specification Section 616 Regarding Post-Tensioned Prestressed Concrete and notes this sheet.</p>
<p>All Note E-2</p>	<p>Concrete: To be Class "A". $f'_c =$ _____ psi. Stressing operations shall not begin until the concrete has reached a compressive strength of _____ psi as indicated by test specimens. See Section 615-09 of the Tennessee Standard Specifications.</p>
<p>All Note E-3</p>	<p>Friction Coefficients: $U =$ _____ and $K =$ _____</p>
<p>All Note E-4</p>	<p>Stressing Sequence: At no time during stressing operations shall more than 1/6th of the total prestressing force be eccentric about the centerline of the bridge.</p>
<p>All Note E-5</p>	<p>Tendon Path: The tendon path shall be parabolic between control points.</p>
<p>All Note E-6</p>	<p>Clearances for Post-Tensioning Ducts: Horizontal clearance between ducts = 2-1/2" minimum. Ducts may be bundled vertically in groups of 3 maximum. Vertical between bundled ducts = 3" minimum.</p>
<p>All Note E-7</p>	<p>Note: Bar reinforcement interfering with duct alignment shall be adjusted by the Engineer. No reinforcing bars are to be field cut to provide duct clearance. Ducts will not be permitted in the bottom slab.</p>
<p>All Note E-8</p>	<p>Anchorage Details: Anchorage details are to be determined by the fabricator. Details shall be shown on the shop drawings and submitted to the Engineer. Shop drawings for the anchorage shall show the placement of all reinforcing in the end diaphragms including both plans reinforcing and any reinforcing required due to the post-tensioned system. The fabricator must include bursting stress calculations with the shop drawings submittal.</p>

Post-Tensioned Structures

<p>For One Span Bridges</p> <p>Note E-9</p>	<p>Working Force: The combination of total force per bridge and eccentricity at the centerline of the span remaining after losses have occurred shall be within the following range:</p> <p style="text-align: center;"> "x" in inches working force in kips </p> <p style="text-align: center;"> _____ _____ _____ _____ _____ _____ </p>
<p>For One Span Bridges</p> <p>Note E-10</p>	<p>Loss Calculations: Losses due to anchor set, friction, elastic shortening, creep, shrinkage, and relaxation of steel shall be calculated by AASHTO Specifications using the following properties.</p> <p>A. Section Properties:</p> <p>1. $A = \text{Area} = \text{_____} \text{ (ft.}^2\text{)}$</p> <p>2. $I = \text{Moment of inertia} = \text{_____} \text{ (ft.}^4\text{)}$</p> <p>3. $Z_t = \text{Section modulus @ top} = \text{_____} \text{ (ft.}^3\text{)}$</p> <p>4. $Z_b = \text{Section modulus @ bottom} = \text{_____} \text{ (ft.}^3\text{)}$</p> <p>B. RH = ambient relative humidity = 70%</p> <p>C. Moment due to superstructure deadload = _____ (ft.³) (for the calculation of f_{cir})</p> <p>D. Moment due to dead loads applied after post-tension = _____ (k-ft.) (for the calculation of f_{cds})</p>
<p>For Two Span Bridges</p> <p>Note E-11</p>	<p>Tensioning Force: The maximum required tensioning force at the jack is _____ kips per web which is _____ percent of the specified minimum ultimate tensile strength of the prestressing steel. Tendons shall be jacked to the above value and anchored at an equivalent anchor set of 5/8".</p>
<p>For All Bridges</p> <p>Note E-12</p>	<p>Duct Vents: All ducts shall be vented at both ends of tendons, and when ducts exceed 400 feet in length, they shall be vented within 6 feet of the high points of the cable path.</p>

(F) Prestressed Beam Sheet - General Notes

<p>All with Prestressed Bulb-Tee Beams</p> <p>Note F-1</p>	<p>Note: See STD-14-1 for Bulb-Tee Beam Standard Details and Notes.</p>
<p>All with Prestressed I-Beams</p> <p>Note F-2</p>	<p>Note: See STD-14-2 for I-Beam Standard Details, Notes, and Reinforcing.</p>
<p>All with Prestressed Box Beams</p> <p>Note F-3</p>	<p>Note: See STD-14-3 for Box Beam Standard Details, Notes and Reinforcing.</p>
<p>When Needed</p> <p>Note F-4</p>	<p>Note: Anchorage at the Expansion End of Beams accomplished by dowels 1" dia. x 1'-3". Fixed end dowels to be 1" dia. x 1'-9".</p> <p><i>Note To Designer & Detailer: Use fixed end dowel 1" dia. x 1'-6" when using Type I I-Beams.</i></p>
<p>All</p> <p>Note F-5</p> <p>Note to designers and detailers</p>	<p><i>Note to Designer and Detailer: The initial force shown on the beam Standard Drawings STD-14-1, 2, and 3 is for 1/2" dia. 270 k low relaxation strands. If other size or type of strands are used, the size, type and stressing force shall be shown on the plans. Redesigns by the contractor will be allowed. Strands larger than 0.6" diameter will not be allowed.</i></p> <p><i>When bond breaks are required, a maximum of 50% of the total number of strands may be debonded in I-beams and box beams. For Bulb-Tee Beams, a maximum of 25% of the total number of strands may be debonded. Bond breaks not to exceed 50% and raised strands may be used, however shear in the bond break range shall be designed for in accordance with AASHTO Section 8 (reinforced concrete). The vertical component of raised strands will be allowed as specified in prestressed shear design.</i></p> <p><i>Do not break bond on adjacent strands or the exterior strands in the bottom row, regardless of bond break strength. Partially pulled strands are not allowed except for strands placed in the top of a beam to support the reinforcing cage. These strands shall be limited to 5,000 lb. maximum initial force.</i></p>

(F) Prestressed Beam Sheets - General Notes

<p>All with Prestressed I-Beams</p> <p>Note F-6</p>	<p>Note: All beams are AASHTO - PCI Standard Type (I, II, III, or IV).</p>
<p>All with Prestressed Bulb-Tee Beams</p> <p>Note F-7</p>	<p>Note: All beams are (BT-54, BT-63, or BT-72).</p>
<p>When the End of Beam is Left Exposed at an Expansion Joint</p> <p>Note F-8</p>	<p>Note: The prestressing strands shall be cut flush at the end of beam adjacent to the expansion joint and a protective coating placed on the end of the beam.</p>
<p>All</p> <p>Note F-9</p>	<p>Note: The concrete for this construction shall be of such properties as to attain a compressive strength of not less than <u>(5,000 psi)</u> at the age of 28 days and stress transfer shall not be made to the bridge member until the test specimens indicate that the concrete has reached a compressive strength of at least <u>(4,000 psi)</u>. See General Notes for Concrete finishing note.</p> <p><i>Note to Detailer: Show exact strength values as shown in designer notes. Round to nearest 100 psi.</i></p>
<p>All</p> <p>Note F-10</p>	<p>Prestressed Beam Design Data (Per Beam):</p> <p>Live Load Distribution Factor: Moment = _____ Lanes Shear = _____ Lanes Composite Dead Load: DC = _____ LB/FT Composite Dead Load: DW = _____ LB/FT Composite Slab Design Strength: $f'c = 3000$ psi</p> <p>Note: Downward deflection under total DL is <u>not</u> allowed.</p>
<p>All</p> <p>Note F-11</p>	<p>Note: The prestressed beams shall attain an age of at least 90 days prior to pouring the support diaphragms (excluding bottom 15 inches) and deck slab.</p>

(G)Bent Sheet

<p>All with Anchor Bolt Assemblies per Std. Dwg. STD-6-1</p> <p>Note G-1</p>	<p>Note: When pouring cap beam, provisions shall be made for setting anchor bolts. See Standard Drawing STD-6-1. Bolt projection 11".</p> <p><i>Note to Detailer: Do not locate anchors outside the centerline of the exterior girders for I-beams.</i></p>
<p>All with Riser Blocks</p> <p>Note G-2</p>	<p>Note: Riser block(s) to be poured monolithically with cap beam.</p> <p><i>Note to Detailer: Riser blocks of 6 inches in height or higher shall be reinforced. Riser blocks should be a minimum of 2 inches at centerline and 1 inch at the edge.</i></p>
<p>All bridges with Elastomeric Pads</p> <p>Note G-3</p>	<p>Note: Elastomeric pads shall be in place a minimum of one day before being disturbed by <u>setting beams</u> on concrete. Place rubber bonding cement in such a way that visible concrete surfaces will not be stained.</p> <p><i>Note to Detailer: For cast in place beams replace underlined with "placing superstructure forms". Also, this note is not needed when the elastomeric pad is mechanically fixed to or recessed into the concrete cap.</i></p>
<p>All Bridges with Elastomeric Pads or Sliding Bearing Devices</p> <p>Note G-4</p>	<p>Note: Riser block bearing surface to conform to bottom of beam grade.</p> <p><i>Note to Detailer: Use this note when bottom of beam slope is numerically equal to or greater than 0.0052 ft. per ft. (1/16" per ft.). Show actual riser block slope dimensions on the detail. The riser block bearing surface can be poured level when a hinged joint bearing device is used.</i></p>
<p>All with Cap Beam</p> <p>Note G-5</p>	<p>Note: Column steel to extend _____ feet into cap beam.</p>
<p>All Bridges with Piling Except in Seismic Category A</p> <p>Note G-6</p>	<p>Note: See Standard Drawing STD-6-1 for pile details and notes.</p>
<p>All Bridges with Spiral Reinforcement</p> <p>Note G-7</p>	<p>Note: See Standard Drawing STD-6-2 for spiral reinforcement details and notes.</p>

(H) Abutment Sheet

<p>When Needed</p> <p>Note H-1</p>	<p>Note: When pouring abutment beam, provisions shall be made for setting (anchor bolts or dowel bars). If the Contractor elects to drill the holes for the (anchor bolts or dowel bars), the reinforcing steel shall be placed so as not to interfere with the drilling. (Bolt or dowel bar) projection _____.</p> <p><i>Note to Detailer: Dowel bar projection to be 3-3/4" for prestress.</i></p> <p><i>Note to Detailer: In some cases the Contractor will not be allowed to drill holes. If holes are drilled, the base plate holes should be at least 1-1/2" dia. so that 1-3/8" dia. bit can be inserted through base plate holes. Also, Note A-35 must be shown on the General Notes when drilled anchors are allowed.</i></p>
<p>All with Riser Blocks</p> <p>Note H-2</p>	<p>Note: Riser block(s) shall be poured monolithically with the abutment beam.</p> <p><i>Note to Detailer: Riser blocks of 6 inches in height or higher shall be reinforced. Riser blocks should be a minimum of 2 inches at centerline and 1 inch at the edge.</i></p>
<p>All</p> <p>Note H-3</p>	<p>Note: When pouring wingwalls, provisions shall be made for setting reinforcing steel for wingposts and parapets. For details of wingposts and parapet, see Std. Dwg. No. _____.</p>
<p>Multi-Span Prestressed Bridges with Integral Abutments</p> <p>Note H-4A</p>	<p>Note: Not less than half of the slab in the end span shall be poured prior to, or concurrently with, placement of any part of the abutment backwall. At least the top 12 inches of the backwall shall be poured concurrently with the end of slab.</p>
<p>Single Span Prestressed Bridges with Integral Abutments</p> <p>Note H-4B</p>	<p>Note: Not less than half of the slab shall be poured prior to, or concurrently with, placement of any part of the abutment backwalls. At least the top 12 inches of the backwall shall be poured concurrently with the end of slab. One abutment backwall must be poured full height concurrently with the end of slab.</p>
<p>All Steel Bridges with Integral Abutments</p> <p>Note H-4C</p>	<p>Note: The entire abutment backwall shall be poured concurrently with Pour No. _____. See Dwg. No. _____ for details.</p>

(H) Abutment Sheet

<p>All with Expansion Joints</p> <p>Note H-4D</p>	<p>Note: The girders shall be in place prior to pouring the abutment backwall. At least the top 12 inches of the backwall shall be poured concurrently with the expansion joint closure pour.</p>
<p>All Bridges with Elastomeric Pads</p> <p>Note H-5</p>	<p>Note: Riser block bearing pad surfaces to conform to bottom of beam grade.</p> <p><i>Note to Detailer: Use this note when bottom of beam slope is numerically equal to or greater than 0.0052 ft. per ft. (1/16" per ft.). Show actual riser block slope dimensions on the detail drawings.</i></p>
<p>All</p> <p>Note H-6</p>	<p>Note: Cost of bridge rail and post is to be included in the unit price bid for the bridge rail system.</p>
<p>All Bridges with Elastomeric Pads</p> <p>Note H-7</p>	<p>Note: Elastomeric pads shall be in place a minimum of one day before being disturbed by <u>setting beams</u>. Place rubber bonding cement in such a way that visible concrete surfaces will not be stained.</p> <p><i>Note to Detailer: For cast-in-place beams, replace underlined with "placing superstructure forms on concrete". Also, this note is not needed when the elastomeric pad is mechanically fixed to or recessed into the concrete cap.</i></p>
<p>When Needed</p> <p>Note H-8</p>	<p>Note: Top of apron wall to conform to bottom of roadway slab.</p> <p><i>Note to Detailer: The bottom of the slab should <u>not</u> be cast against the apron wall. Use at least 1/2" bituminous fiberboard as a separator.</i></p>
<p>Abutment with Overturning Problems During Construction</p> <p>Note H-9</p>	<p>Note: The Contractor shall support the abutment until the superstructure is in place, falsework has been removed and backfilling has been completed.</p>

(H) Abutment Sheet

<p>All Bridges with Piling except in Seismic Category A</p> <p>Note H-10</p>	<p>Note: See Standard Drawing STD-6-1 for pile details and notes.</p>
<p>Abutments with Wingbeam Piles</p> <p>Note H-11</p>	<p>Note: Wingbeam piles shall be driven to the plans tip elevation or refusal. Seismic attachment is not required for wingbeam piles.</p>

Note to designers and detailers: The Special Provisions required for a particular structure must be listed either on the Layout or General Notes and Estimated Quantities Drawings. The format is that shown below:

Special Provision Number	Date Latest Revision	<u>List of Special Provisions</u>
602	*	Regarding Steel Structures
202ACM	*	Regarding Asbestos Containing Materials

* Show Latest Revision Date on Plans.