

Quality Control Manual for Bridge Plan Detailing



ALDOT Bridge Bureau

February 2025

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1 INTRODUCTION

1.1 General

This Manual is intended to provide criteria and guidance for drafting and detailing methods to promote consistency in developing bridge contract drawings. Detailers are expected to follow the guidelines set forth in this manual. Exceptions to the guidelines that may occasionally be necessary due to unusual designs or other circumstances or as may be directed by the Designer and/or Section Supervisor shall have the prior concurrence of the Assistant State Bridge Engineer for Design or State Bridge Engineer. The manual is targeted for internal Bridge Bureau use; however, Consultants preparing bridge plans to be let through ALDOT are expected to follow the guidelines contained herein.

Structural plans must clearly communicate the design concept and construction requirements for each project. It is the detailer's responsibility to prepare complete plans in accordance with these guidelines. Competent personnel other than those performing the initial detailing shall make an independent check of the bridge plans for completeness and accuracy.

For details not specifically addressed in this document (such as navigational lighting and gauge details, structural seal footing details, structural cage details for footings and columns, access ladder and inspection platform details, catwalk details, rocker bearing details, etc.), detailers should reference sample drawings of the most current details used by the Bridge Bureau.

Included as an appendix are example drawings which represent some of the many situations that may be encountered when detailing bridge plans. The drawings, although a few are somewhat dated, are intended to illustrate typical detailing and organizational concepts. Detailers should be mindful to verify against current practice noted in the applicable sections of Section 4, Bridge Plans Checklist.

Significant revisions to this document since the previous edition have been highlighted throughout. The "Miscellaneous Comments" section of this document has been deleted. Items in this section were either moved or combined in other sections of the document.

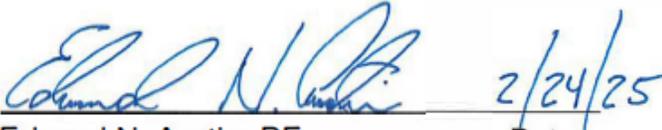
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1.2 Approval

This document is approved for implementation and is effective as of the date shown.



William T. Colquett, PE Date
State Bridge Engineer



Edward N. Austin, PE Date
Chief Engineer



Mark D. Bartlett, PE Date
Division Administrator
FHWA Alabama Division

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2 PROCEDURES AND DRAFTING RULES

2.1 Directory Folders

Directory names will be generated by the Project Folder Creator application that is available either as a desktop icon or as an icon in the All Projects Data Base.

Example: 66_SR0000_020642_IndustrialAccessRoadToGoldenDragonPlant

The Project Folder Creator creates the following subfolders:

- Bridge
- Design
- Documents
- Existing
- Geometry
- Layout
- Pictures
- Roadway

File names for bridge sheets will have the following format:

Example: 01 Payitem.dgn or 01_Payitem.dgn

Where 01 is the bridge sheet number and PayItem is the general sheet description. Keep sheet description as **brief** as possible, use whole words and avoid abbreviations or truncations if possible.

Note: **xx GPAE** for the General Plan and Elevation is acceptable

2.2 Sheet Border and Title Box

A border file will be setup in the bridge drawings directory and referenced to the bridge sheets. Verify title block information. The Bridge Inventory Number (BIN) shall be shown on all sheets.

2.3 Drafting and Plotting

All drafting shall be based on full size bridge sheets, 22"x34". Special cases such as Bridge Rail Retrofits and Bridge Guardrail Retrofits are exceptions and have been specially prepared for 8 ½"x11" and are used by request. Other exceptions may exist and should be approved prior to implementation.

2.4 Documentation

Prior to submission to Office Engineer, each sheet of the contract bridge plans shall be embossed to denote that the sheet is the original. All signatures and initials shall be in blue ink. For "In-House" projects, the Section Supervisor, Assistant State Bridge Engineer QA and State Bridge Engineer shall sign the plans. For all consultant prepared plans, only the State Bridge Engineer will sign the plans.

2.5 Text

All bridge sheets shall use "Segoe UI Symbol" font by Microsoft. Typical text on all sheets shall measure approximately 1/8" in height on a full-size bridge sheet. Text shall be all capital letters except when referencing Standard Specifications (ex. 501.03(c)3) and the letter "x" in the context describing member sizes (i.e. HP12x53). Line spacing in paragraphs shall be 0.75 times the text height.

Headings (detail titles, section labels, etc.) shall be Bold with a line weight 3 underline and shall be 1.5 times the height of typical sheet text. Subheadings shall be Bold with a line weight 2 underline and shall be 1.25 times the height of typical sheet text. Underlines should be spaced 0.38 times the text height below the text.

Example:

ESTIMATED QUANTITIES

Item No.

Description

206A000

REMOVAL OF OLD BRIDGE, STATION 115+18.13

Standard text heights used by the Bridge Bureau are listed below. They have been calibrated to provide an approximate 1/8" height on full size sheets.

| Architectural | | Engineering | |
|----------------------|-----------------|--------------------|----------------|
| Sheet Scale | Text Ht. | Sheet Scale | Text Ht |
| 1/8" = 1'-0" | 1.080' | 1" = 10'-0" | 1.350' |
| 3/16" = 1'-0" | 0.720' | 1" = 15'-0" | 2.025' |
| 1/4" = 1'-0" | 0.540' | 1" = 20'-0" | 2.700' |
| 3/8" = 1'-0" | 0.360' | 1" = 30'-0" | 4.050' |
| 1/2" = 1'-0" | 0.270' | 1" = 40'-0" | 5.400' |
| 3/4" = 1'-0" | 0.180' | 1" = 50'-0" | 6.750' |
| 1" = 1'-0" | 0.135' | 1" = 60'-0" | 8.100' |
| 1 1/2" = 1'-0" | 0.090' | 1" = 100'-0" | 13.500' |
| 3" = 1'-0" | 0.045' | | |

Text heights for a sheet should match the text height of "REVISIONS" in the title box of the standard Bridge Bureau border file

2.6 Symbols

All symbols shall be from the font library and follow the requirements of text as outlined in Section 2.5. This will ensure that symbols are the same size as the text. Symbols should be used to provide a compact, efficient representation of information.

Examples of when symbols are necessary are as follows:

- Many call-outs on the sheet refer to the same note.
- A detail is too crowded for the call-out.

Examples of when symbols can be omitted are as follows:

- Note can be reworded to better describe what it is referring to.
- Symbol only references one item on the sheet.

2.7 Line Weights

The following line weights shall be used unless extenuating circumstances dictate otherwise:

Object Lines - 3

Dimension Lines - 1

Hidden Lines - 1

Construction Lines - 2

Extension Lines - 1

Terminator - 1

Phantom Lines - 2

Reinforcement - 2

Ground Lines - 2

Ensure that relative line weights provide uncompromised legibility when reproduced by normal printing procedures.

2.8 Line Styles

Select the appropriate line style for a particular usage. Generally:

- a) For centerline girder, centerline bearing, centerline bridge, etc., select the centerline line style. For long lines such as c.l. bridge, use the longer interval line; for short lines, use the shorter interval line.
- b) For hidden lines, use dashed lines. Long or short dashes should be used at the discretion of the detailer as appropriately fits the drawing.
- c) For lines designated as construction joints, dashed lines should be used. For long line runs such as construction joints between bridge stages, use a longer dash. For shorter line runs such as a vertical construction joint between deck pours, use a shorter dash.
- d) For structure(s) or portions to be removed, use a dashed line.
- e) All other lines should be solid.

2.9 Color Selection

Although production CADD drawings are printed in black, internal color selection in CADD files affects the intensity of the printed material. Although color selection for the various drawn elements in the CADD file is at the discretion of the detailer, intensity of the printed material is lost with higher color numbers (grayscale). Detailers should be mindful to choose color numbers 0 – 40 when drawing in the CADD file. Higher color numbers should only be chosen when grayscale is desired intentionally or for shading. The following colors are suggested for the various drawing elements of a CADD file but are not mandatory:

Structure drawings, yellow

Dimensions, text, white

Reinforcing, light blue, purple

Water, blue

Ground lines, light green

Shading, gray (appropriate 200 level number)

End fills, brown

Rip Rap, Slope Paving, gray

Roadway, RRs, brown

Profile Grade Line, red

Background, black

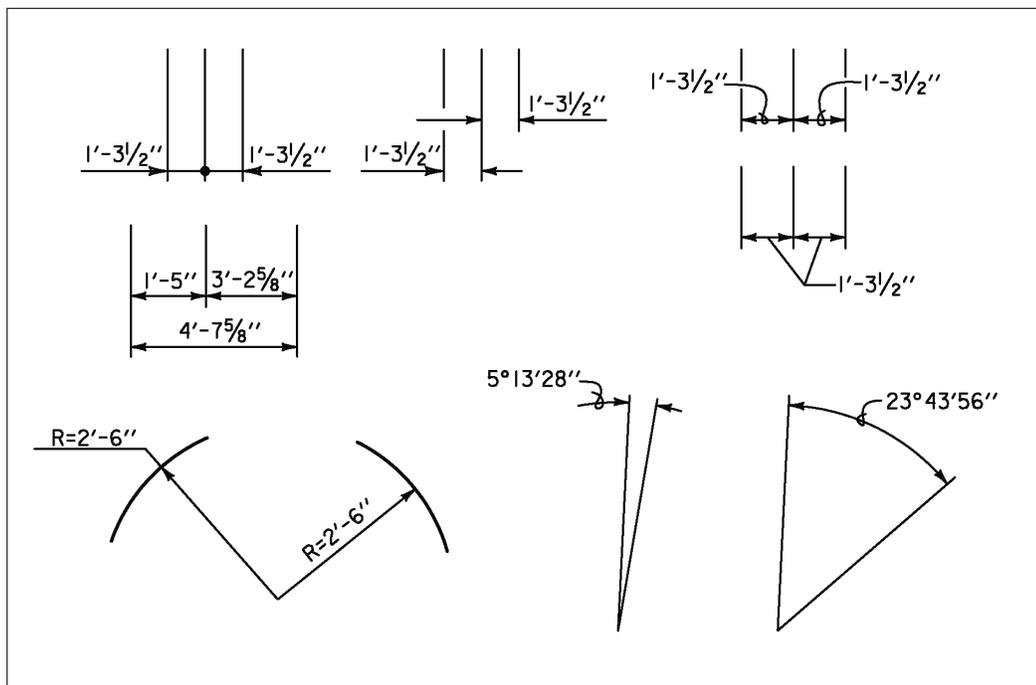
Whatever color scheme chosen, try to make it consistent, i.e., all text same color, all structure drawings, same color, etc.

2.10 Dimensioning

2.10.1 Dimension Lines

Lines used for dimensioning should generally adhere to the following guidelines:

- Spacing between dimension lines is left to the discretion of the detailer, being mindful to leave adequate space for text not to waste space nor be too narrow. Line spacing for a single line of text should be 3.5 x text height. Line spacing for a double line of text should be 5 x text height. Extension line should extend approximately $\frac{2}{3}$ x text height past the final dimension line. Break lines as appropriate when lines cross each other. When plotted full size, dimension lines should be spaced about $\frac{3}{4}$ inch from the object and parallel dimension lines should be spaced about $\frac{3}{8}$ inch.
- Terminate dimension lines with arrowheads. Arrowheads should be of a uniform size and match text size. In lieu of arrowheads where space is limited, small filled circles may be used to indicate the terminal point of a dimension line.
- When numerals or text occupy more space than provided by the dimension line, show on extensions of the dimension line or remotely by leader line to the dimension line.
- Lines indicating the radius of a curve or a circle should always be 90 degrees to the element being dimensioned. Indicate angles with a part circle with the endpoints at 90 degrees to the intersecting lines comprising the angle.
- Leader lines may be curved or straight.



2.10.2 Numeration

Numerical values used in dimensioning indicate the size and/or position of a bridge's components. Generally, the following rules should be observed:

- a) Linear dimensions (including diameters) should be shown in feet and inches (e.g., 5'-6 1/2"). Dimensions of 12" or more should be shown in feet and inches, include the zero placeholder if inch dimension is less than 1 (e.g., 1'-0", 5'-0 1/2", etc.). Exceptions to this rule are component or member designations (e.g. Existing 36" Steel Girder, 16" Square Pile, etc.).
- b) Elevations and radii are shown in feet and decimals of a foot.
- c) Angles are shown to the whole angle, minutes and seconds with no hyphens used between numbers.
- d) Show grades and bridge deck cross slope to whole and decimal percentages.
- e) Show slopes in feet per foot.
- f) Show stationing in hundreds of feet plus tens and decimals of feet.

2.10.3 Accuracy

Accuracy of dimensions should be as follows:

- a) String dimensions should be shown to the nearest 1/16 inch. Ensure the sum of string dimensions equals the total overall dimension. Overall dimensions of a component should be shown to the precisions indicated in Section 3.3.4.
- b) Elevations and radii should be expressed to the 3rd decimal place. Omit unit notation on elevations as this is understood. Exceptions to this rule are generally elevations shown to describe the bottom of footing elevation, etc. which should be shown no closer than the 1st decimal place.
- c) Express angle values using 1 and 2 digits for the degrees and 2 digits each for the minutes and seconds, rounding any decimal value in seconds to the nearest second (e.g., 32°02'47").
- d) Express grades to 4 decimal places (e.g., 3.3269%) except deck cross slope to the 1st decimal place and 2 decimal places for some superelevation rate instances.
- e) Show slopes to 4 significant figures beyond the decimal and include the zero whole digit in feet per foot (e.g., slope for the bottom of a cap, 0.001234'/', etc). Maximum 6 decimal places.
- f) Show stationing to 3 decimal places (e.g., 412+56.167, 56+09.375) except that even stations may be shown to 1 decimal place (e.g. 13+89.0, etc.).
- g) When dimensioning a series of equal spaces, show incremental dimensions, e.g., 12 spa. @ 1'-3". If possible, avoid the use of "Equal Spaces".

2.11 Scales

Draw all plan details full size (1:1) in order to ensure that the plans accurately convey the intended design. Care should be exercised to maintain the accuracy of dimensions shown relative to the plans and details as they are drawn to avoid potential design errors and construction conflicts. Scale the border to obtain an appropriate scale for the primary view on that sheet (i.e., plan and elevation on a bent sheet). Factor secondary details (sections, views) to result in an appropriate final standard scale for the detail being depicted. Select scales large enough to legibly show required details when printed on 11" x 17" size paper. Appropriate scales are those shown on standard Architect's and Engineer's scales. Details shown excessively large or small are inappropriate.

- a) General Plan and Elevation, Foundation Layouts, use Engineer's scales. 1"=15'-0" is acceptable.
- b) Use Architect's scale for all other details.
Note: Do not use 1/16"=1'-0".

It may be necessary to exaggerate some plan details to adequately show certain features, such as joint openings, etc. The detailer should use judgment when choosing a multiplier for these conditions.

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3 BRIDGE PLANS DETAILING REQUIREMENTS

3.1 General

Before starting a drawing, study the bridge or component to be detailed and determine the views, sections and other pertinent drawings and data that will be required to describe it fully and to the best advantage. Plan the layout, choose scale(s) and detail appropriately, allowing sufficient room for dimensions and notes.

- 1) For structures detailed on more than one sheet, place the plan, elevation, end views, reinforcing schedule, notes and quantities on the first sheet. Place sections, end view (opt.), pedestal details (if applicable), reinforcing schedule (opt.) and other details on the second sheet. For example, a wide bent. Note, the end view and reinforcing schedule are required information but can be placed on the 1st or 2nd sheet as space on the sheet allows.
- 2) Longitudinal dimensions are computed on a horizontal basis without accounting for any slope or vertical curvature. Transverse dimensions are computed similarly without accounting for slope of cross section.
- 3) All details throughout the plan set should be oriented consistently. Bridge stationing should be shown increasing from left to right. Abutment 1 should be detailed looking back station, all other substructures should be detailed looking up station. Superstructure sections should be detailed looking up station
- 4) Use a planned system for arranging individual details on the sheet. Do not randomly place views and sections/details on the drawing. Generally, the sheet should be laid out with the plan view in the upper left, the elevation view aligned with the plan view in the lower left, end view and sections on the right side.
- 5) When an enlarged detail of a certain area in a view is needed, use a circle or ellipse to capture the area needed in the enlarged detail. Annotate/label the circle/ellipse and provide the enlarged detail on the same sheet if possible and title accordingly. If the enlarged detail must be placed on a subsequent sheet, provide cross reference for the detail on both sheets.
- 6) Care should be taken when using the letters "I", "O", & "Q" to avoid confusion with visually similar numerals. Specifically, these letters should not be used for Bar Designation. Use of these letters is acceptable for numbering plan sheets.
- 7) Place quantities, elevation tables, and any other additional information either to the right side of the sheet or at the bottom of the sheet.
- 8) Generally, place planned note groups on the right side of the sheet or at the bottom of the sheet. Do not scatter notes around the sheet. Other short notes as needed for reference or clarification of items should be placed in logical proximity to the item.
- 9) Quantity boxes, when required, will show pay items listed according to pay item numerical order.

- 10) Cut sections are imaginary lines extending at right angles to the component being cut and are for purposes of showing detail such as reinforcement, clearances, spacing, etc. Use section arrows to indicate the direction of the cut. Place the identification letter of the section on the interior side of the cut line. Normally, section cuts, such as in a bent cap, should be oriented such that when viewed the direction of up station will be from left to right.
- 11) All text should read left to right with respect to its orientation on the sheet; horizontal text should read from the bottom of the sheet left to right, vertical text should read from the right side of the sheet bottom to top, inclined text should be placed such that the sheet is rotated through the least angle to read bottom to top or left to right with respect to vertical or horizontal orientation.
- 12) Circles with a number should be used to designate girder centerlines and abutments and bents on the General Plan and Elevation. Diamonds with numbers should be used to designate pile, column, and footing centerlines.

3.2 Composition of Plans, Order of Sheets

A typical set of bridge plans is a compilation of the following sheets usually presented in the following order. The bridge plans should furnish all information necessary to facilitate the complete construction of the structure. Some sheet sequences can be combined on bridge plans with less complicated details (i.e. Quantities, and Required Sheet and General Plan and Elevation Sheet, span plan and span typical section sheets, etc.). For multiple bridges in a project, the applicable Bridge Special Project Drawings can be included one time at the end; Existing Bridge Sheets may be included separately for each bridge or all together after the BSPDs. When assigning plan sheet numbers utilize the scheme used in the Roadway Index.

3.2.1 General Information Sheets

- Estimated Quantities, Standard Bridge Notes, Required, Other Data/Notes
- General Plan and Elevation
- Sequence of Construction (as applicable)
- Foundation Layout (as required)
- Joint Layout (optional)
- Superelevation Transition (as required)

3.2.2 Superstructure Sheets

The following bullet lists represent typical content needed to detail bridge superstructure sheets. These lists are not intended to be all inclusive, additional details or sheets (or less depending on complexity of the structure) may be required to adequately convey necessary information needed to construct the structure. Multiple superstructure types may be present in a bridge structure, such instances will require combination and coordination of items noted below.

3.2.2.1 Prestressed Concrete Girder Bridge

- Span 1 Plan View (Include Typ. Sections and Joint Sections (optional as space permits))
- Span 1 Deck Reinforcing Layout (as needed) & Pouring Schedule (when required)
- Span 1 Typical Sections (include w/Plan View (optional as space permits))
- Span 1 Girder Details
Repeat the above items for additional spans of different lengths or combinations as appropriate.
- Incremental Deck Elevations At Finish Grade
For prestressed concrete girder bridges with continuous decks, detail each continuous deck unit in plan view.
- Spans X thru XX Plan View (Include Typ. Sections and Joint Sections (optional as space permits))
- Spans X thru XX Deck Reinforcing Layout (as needed) & Pouring Schedule (when required)
- Span X or Spans X thru XX Typical Sections (include w/Plan View (optional as space permits))
- Span X or Spans X thru XX Girder Details
Repeat the above items as appropriate.
- Incremental Deck Elevations At Finish Grade

3.2.2.2 Steel Girder Bridge

- Span X or Spans X thru XX Plan View (Pouring schedule (required for continuous spans))
- Span X or Spans X thru XX Deck Reinforcing (as needed) Layout & Pouring Schedule (required for continuous spans)
- Span X or Spans X thru XX Typical Sections (include w/Plan View (optional as space permits))
- Span X or Spans X thru XX Framing Plan, Girder Elevation, Camber Diagram, Shear Stud Detail, Special Details, Notes
- Span X or Spans X thru XX Diaphragm Details or Intermediate and Bearing Crossframe Details, Field Splice Details, Connection Plate, Bearing Stiffener, Intermediate Stiffener (if required), Jacking Stiffener (if required) Details, Weld Details
- Span X or Spans X thru XX Bearing Details
Repeat the above items for additional spans of different lengths or continuous spans as appropriate.

- Expansion Dam (Tooth Joint, etc.) Details as required.
- Details of Cat Walks, Inspection Platforms and Ladders, Navigation Light Brackets (if required)
- Incremental Deck Elevations At Finish Grade

3.2.3 Substructure Sheets

- Abutment 1 Details (1 or more sheets when required)
- Abutment “n” Details (1 or more sheets when required)
- Miscellaneous Abutment Details (for both abutments when required)
- Bent 2 Details (one or more sheets when required)
- Remaining Bent “n” Details (one or more sheets when required)
- Miscellaneous Bent Details (for all bents when required)

For staged construction repeat the above items (superstructure and substructure) for additional stages.

3.2.4 Foundation Investigation Test Boring Logs

- Boring Location Plan
- Test Boring Record Sheets

3.2.5 Bridge Special Project Drawings

- Applicable Bridge Special Project Drawings

3.2.6 Original Plans for Existing Bridge(s)

- Copies of Original Bridge Drawings of Existing Bridge(s)

3.2.7 Plan Revisions

- Coordinate with project lead to determine flag number.
- A numbered flag will be placed next to each revision on each affected sheet.
- In the Revision Box, or as close to this area of the sheet if box is full, a description of the revision, the date of revision, and the initials of the person making the revision will be included.
- Follow GFO 3-5 for distribution of revised sheets and provide two half-size copies of revised sheets with a copy of the cover letter to the QA Administrator.

3.3 Reinforced Concrete (Cast in Place)

3.3.1 General

- 1) When detailing reinforced concrete components, generally show plan, elevation and end views as appropriate and any necessary cut sections, enlarged details, reinforcing schedules and notes.
- 2) Show the vertical and horizontal locations, spacing and clearances of all necessary reinforcing steel. It is acceptable to show a few bars, such as in decks, to represent the entire run of reinforcement. Include the bar mark(s), number, limits, spacing and clearances as pertinent.
- 3) Include pictorial representation and labeling of other embedded and attached items and accessories such as armor plates, anchor bolt wells, junction boxes for electrical installations, connection angles, elastomeric bearings, etc.

3.3.2 Steel Reinforcement

- 1) Detail reinforcing bars in plan, elevation and sections as appropriate to clearly indicate the size, location and spacing of individual bars. Generally, all bars in a cut section should be shown except in special circumstances.
- 2) Do not use bar marks with the letters "I", "O" or "Q".
- 3) Detail location of bar splices when required by the designer. Other bars may be shown as a continuous run without showing splices. See Section 3.3.2.6, Splicing.

3.3.2.1 Bar Designations

The compilation below lists commonly used bar designations. More complex designs such as spread footing abutments, end bents etc. may require designations and bar shapes not shown here. Detailers should adhere to this convention unless extenuating circumstances exist and with prior approval.

(a) SUBSTRUCTURE**ABUTMENTS**

| <u>BAR CALLOUT</u> | <u>LOCATION</u> | <u>POSITION</u> |
|---------------------------|---------------------------|-------------------------------------|
| Bars A | Backwall | (horizontal, straight) |
| Bars A1 | Backwall | (horizontal, straight) |
| Bars B | Backwall | (vertical, straight) |
| Bars V | Cap/w Pile(s) Under Gdrs. | (horiz./top and bottom, straight) |
| Bars VT | Cap/w Drilled Shaft/Cols. | (top/horizontal, hooked) |
| Bars VB | Cap/w Drilled Shaft/Cols. | (bottom/horizontal, straight) |
| Stirrups S | Cap | (vertical/hooked/stirrup) |
| Bars C | Cap | (top/horizontal, hooked) |
| Bars F | Cap | (cap face/horizontal, straight) |
| Bars U(x) | Cap/w Pedestals | (vertical/horizontal) |
| Bars K | Cap/w Skidblock | (vertical, straight) |
| Ties T | Cap | (transverse, hooked) |
| Bars DS | Drilled Shaft | (vertical/main, straight) |
| Hoops HS | Drilled Shaft | (horizontal, circular hoop) |
| Bars M(x) | Column, End Bent | (vertical/main, straight) |
| Hoops H(x) | Column, End Bent | (horizontal, rectangular hoop) |
| Bars P | Footing, End Bent | (longitudinal/horizontal, hooked) |
| Bars R | Footing, End Bent | (transverse/horizontal, hooked) |
| Bars J | Footing and Cap | (vertical, hooked) |
| Bars N | Strip Footing/Barrel | (transverse, hooked) |
| Bars L | Strip Footing | (transverse, hooked) |
| Bars G | Strip Footing | (longitudinal/horizontal, straight) |
| Hoops H(y) | Jawpost | (horizontal, rectangular hoop) |

BENT/PIERS

| <u>BAR CALLOUT</u> | <u>LOCATION</u> | <u>POSITION</u> |
|---------------------------|------------------------|---------------------------------------|
| Bars A | Cap | (top/horizontal, hooked) |
| Bars B | Cap | (bottom/horizontal, straight) |
| Bars C | Cap | (top/horizontal, hooked) |
| Stirrups S | Cap | (vertical/hooked, stirrup) |
| Bars F | Cap | (cap/riser face/horizontal, straight) |
| Bars FE | Cap End | (cap end/horizontal, hooked) |
| Bars E | Cap Step/Riser | (top/horizontal, straight) |
| Bars G | Cap Step/Riser | (vertical) |
| Bars U(x) | Pedestals | (vertical/horizontal) |
| Bars K | Skidblock | (vertical, straight) |
| Ties L | Cap | (horiz./transverse, tie) |
| Bars M(x) | Column | (vertical/main, straight) |
| Hoops H(x) | Column | (horizontal, hoop) |
| Ties HT | Column | (horiz./transverse, tie) |
| Bars DS | Drilled Shaft | (vertical/main, straight) |
| Hoops HS(y) | Drilled Shaft | (horizontal, hoop) |
| Dowels N | Drilled Shaft | (dowel splice, straight) |
| Bars P | Footing | (horizontal/longitudinal, hooked) |
| Bars R | Footing | (horizontal/transverse, hooked) |
| Bars T | Footing | (horizontal) |
| Bars W | Footing | (vertical/perimeter, straight) |
| Bars J | Footing | (vertical, hooked) |
| Bars X | Strut | (horizontal/main, straight) |
| Bars Y | Strut | (horizontal/face, straight) |
| Hoops V | Strut | (vertical, hoop) |

(b) SUPERSTRUCTURE

| <u>BAR CALLOUT</u> | <u>LOCATION</u> | <u>POSITION</u> |
|---------------------------|------------------------|-------------------------------------------------------------------------------------------------|
| Bars A | Deck | (top/transverse, straight) |
| Bars C | Deck | (top/bottom/transverse, straight) |
| Bar A1/C1 | Deck | (1st top/bot. mat cutoff bar for Spans skewed greater 20 degrees, hooked steel structures only) |
| Bar A(x)/C(x) | Deck | (last top/bottom mat cutoff bar) (min. o. to o. length = 1'-6", hooked steel structures only) |
| Bars CC | Deck | (supplemental, transverse/top, overhang) |
| Bars D | Deck | (longitudinal/top and bottom, straight) |
| Bars DD | Deck | (supplemental, longitudinal/top over bents on continuous spans, straight) |
| Bars MM | Deck | (top corner bars for skewed span, see Bridge Special Project Dwg. SBD-1) |

Note: When splicing is not a requirement for transverse deck reinforcement, it is recommended to designate both top and bottom bars as Bars C. See section 3.3.2.6.1 for guidance when splicing is required for transverse deck reinforcement.

| | | |
|----------------------|--------------------|-----------------------------------|
| Bars L(x) | Edge Beam/End Wall | (vertical/over gdr. end) |
| Bars R1 | Edge Beam/End Wall | (transverse, horizontal) |
| Stirrups S(x) | Edge Beam/End Wall | (vertical/between gdrs., stirrup) |
| Bars W(x) | Edge Beam | (transverse, horizontal) |
| Bars B(x) | Barrier Rail | (vertical, horizontal) |

For the preceding, **(x)** **(y)** represents a unique bar number. For example, bars Type A indicated in a bridge deck have different lengths. One length bar would be designated **A1** and the remaining bars in sequential order **A(x)**, such as **A2**, **A3**, etc.

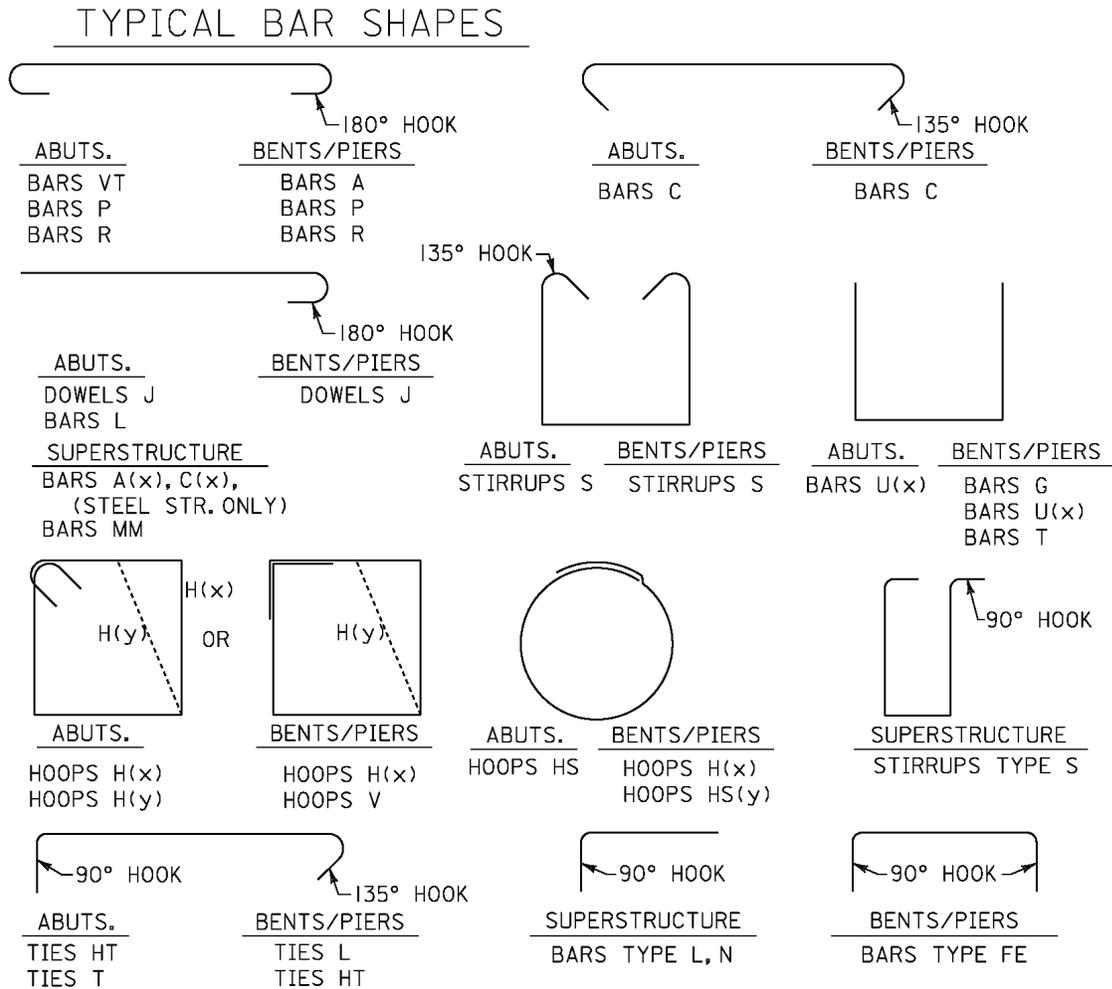
3.3.2.2 Bar Lengths

The following lengths are recommended as maximum lengths (end to end) for reinforcing bars without providing a splice:

| <u>Bar Size</u> | <u>Maximum Length (feet)</u> |
|-----------------|------------------------------|
| 3 | 40 |
| 4 | 60 |
| 5 | 60 |
| 6 | 60 |
| 7 | 60 |
| 8 | 60 |
| 9 | 60 |
| 10 | 60 |
| 11 | 60 |
| 14 | 60 |
| 18 | 60 |

3.3.2.3 Bar Configurations

Steel reinforcement shapes shall be detailed as per CRSI Manual of Standard Practice unless extenuating circumstances dictate otherwise and with the approval of the Bridge Engineer. See below for shapes of typically used reinforcing.



3.3.2.4 Detailing of Standard Hooks

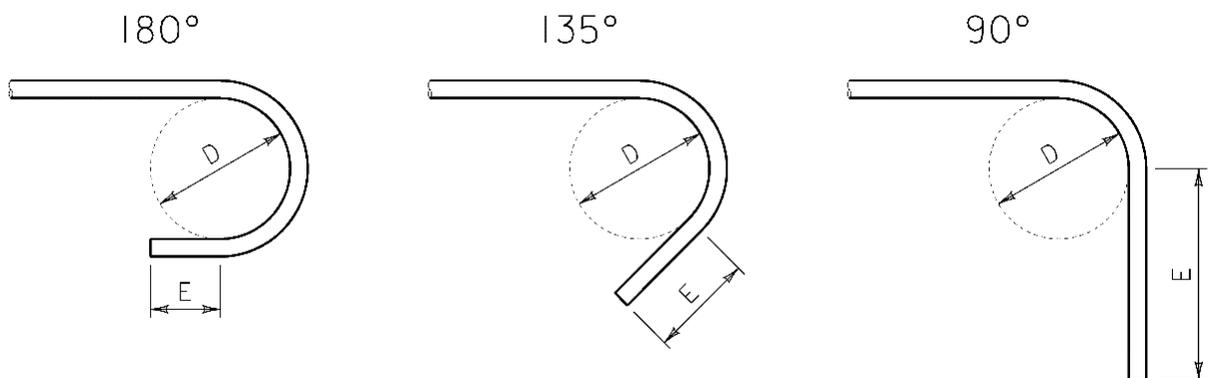
See below for guidance on detailing of standard hooks

DETAILING OF STANDARD HOOKS (Not for Fabrication)

| Main Bars | | | |
|-----------|---------|--------|-----------|
| Bar Size | D | E | |
| | | 180 | 90 |
| 3 | 2 1/4" | 2 1/2" | 4 1/2" |
| 4 | 3" | 2 1/2" | 6" |
| 5 | 3 3/4" | 2 1/2" | 7 1/2" |
| 6 | 4 1/2" | 3" | 9" |
| 7 | 5 1/4" | 3 1/2" | 10 1/2" |
| 8 | 6" | 4" | 1'-0" |
| *9 | 9 1/2" | 4 1/2" | 1'-1 1/2" |
| *10 | 10 3/4" | 5 1/4" | 1'-3 1/4" |
| *11 | 12" | 5 3/4" | 1' - 5" |

| Stirrups & Ties | | | |
|-----------------|--------|--------|---------|
| Bar Size | D | E | |
| | | 135 | 90 |
| 3 | 1 1/2" | 2 1/2" | 2 1/4" |
| 4 | 2" | 3" | 3" |
| 5 | 2 1/2" | 3 3/4" | 3 3/4" |
| 6 | 4 1/2" | 4 1/2" | 9" |
| 7 | 5 1/4" | 5 1/4" | 10 1/2" |
| 8 | 6" | 6" | 1'-0" |

* Values shown are rounded to nearest 1/4"



3.3.2.5 Reinforcing Properties

See Table below for reinforcing properties to be used when calculating quantities.

| Bar Size | Dia. in. | Area in. ² | Weight #/ft. | Non-Tension Lap Splices | | | Additional Length per Hook | | | |
|-------------|-------------|--------------------------|-----------------|----------------------------|--------|--------|----------------------------|--------|--------------------|-------|
| | | | | Splice Length | | | Main Bars | | Stirrups & Ties | |
| | | | | 24d | 30d | 35d | 180° | 90° | 135° | 90° |
| 3 | 0.375 | 0.11 | 0.376 | 1'-0" | 1'-0" | 1'-2" | 5" | 6" | 4" | 4" |
| 4 | 0.500 | 0.20 | 0.668 | 1'-0" | 1'-3" | 1'-6" | 6" | 8" | 4½" | 4½" |
| 5 | 0.625 | 0.31 | 1.043 | 1'-3" | 1'-7" | 1'-10" | 7" | 10" | 5½" | 6" |
| 6 | 0.750 | 0.44 | 1.502 | 1'-6" | 1'-11" | 2'-3" | 8" | 1'-0" | 8" | 1'-0" |
| 7 | 0.875 | 0.60 | 2.044 | 1'-9" | 2'-3" | 2'-7" | 10" | 1'-2" | 9" | 1'-2" |
| 8 | 1.000 | 0.79 | 2.670 | 2'-0" | 2'-6" | 2'-11" | 11" | 1'-4" | 10½" | 1'-4" |
| 9 | 1.128 | 1.00 | 3.400 | 2'-3" | 2'-10" | 3'-4" | 1'-3" | 1'-7" | — | — |
| 10 | 1.270 | 1.27 | 4.303 | 2'-7" | 3'-3" | 3'-9" | 1'-5" | 1'-10" | — | — |
| 11 | 1.410 | 1.56 | 5.313 | 2'-10" | 3'-7" | 4'-2" | 1'-7" | 2'-0" | — | — |

3.3.2.6 Splicing

Splicing requirements should be determined by the designer and will appear in the design sketches. The following guidelines may be followed for splicing reinforcement, but should be verified by the EOR.

Transverse deck reinforcement:

When bar length exceeds 40'-0" but is less than 60'-0", include a note stating:

"AT THE CONTRACTOR'S OPTION, BARS C (or Bars A and C if they're called out that way) MAY BE SPLICED 30 DIA. (MIN.). SPLICE TOP BARS CENTERED AT MID-POINT BETWEEN GIRDERS AND BOTTOM BARS CENTERED OVER CENTERLINE OF INTERIOR GIRDER ONLY. OPTIONAL SPLICE(S) NOT INCLUDED IN BAR DIMENSIONS AND ESTIMATED QUANTITIES SHOWN."

Bar lengths exceeding 60'-0" will require splicing at designated locations and lengths as determined by the designer and shall be included in the quantities.

Longitudinal deck reinforcement (Bars D) (Steel and Concrete Girder Spans);

Horizontal reinforcement for Edge Beams and End Walls (Bars W(x)) (Concrete Girder Spans):

When bar length exceeds 40'-0" but does not exceed 60'-0", include a note stating:

"AT THE CONTRACTOR'S OPTION, BARS D AND W(x) (include as appropriate) MAY BE SPLICED 30 DIA. (MIN.). LOCATION OF SPLICES FOR BARS D AND W(x) (include as appropriate) THAT MAKES USE OF STOCK BAR LENGTHS MAY BE SUBMITTED TO THE

BRIDGE ENGINEER FOR APPROVAL. SPLICED BAR LENGTHS SHALL BE 10'-0" (MIN.). OPTIONAL SPLICE NOT INCLUDED IN BAR DIMENSIONS AND ESTIMATED QUANTITIES SHOWN."

When bar length exceeds 60'-0", compute the lengths including splices and add the following notes:

"SPLICE BARS (TYPE) D, & W(x) (include as appropriate) 30 DIA. (MIN.)"

"AT THE CONTRACTOR'S OPTION, ALTERNATE LOCATIONS OF SPLICES FOR BARS (TYPE) D THAT MAKES USE OF STOCK BAR LENGTHS MAY BE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL. SPLICED BAR LENGTHS SHALL BE 10'-0" (MIN.).

For continuous decks add the following text to the splice note(s) shown above:

"SPLICING OF BARS D WILL NOT BE PERMITTED WITHIN 10'-0" OF REQUIRED SLAB CONSTRUCTION JOINT AT BENT(PIER) LOCATIONS."

Where Bars D are unequal lengths (such as a curved span), include splice(s) and compute lengths of Bars (Type) D based on the long side of the span(s). Add the following text to the splice note(s) shown above:

"LENGTHS SHOWN FOR BARS (TYPE) D ARE BASED ON THE LONG SIDE OF SPAN AND INCLUDE ADDITIONAL LENGTH REQUIRED FOR SPLICE(S). AMOUNT OF SPLICE WILL INCREMENTALLY INCREASE FROM LONG SIDE OF SPAN TO SHORT SIDE."

Abutments:

Longitudinal backwall (Bars A), paving seat (Bars PS1) (if applicable), cap temperature (Bars F) when length exceeds 40'-0" but is less than 60'-0" include a note stating:

"AT THE CONTRACTOR'S OPTION, BARS A AND F (PS1 if applicable) MAY BE SPLICED 30 DIA. (MIN.). LOCATION OF SPLICES FOR BARS A AND F (PS1 if applicable) THAT MAKES USE OF STOCK BAR LENGTHS MAY BE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL. SPLICED BAR LENGTHS SHALL BE 10'-0" (MIN.). OPTIONAL SPLICES NOT INCLUDED IN BAR DIMENSIONS AND ESTIMATED QUANTITIES SHOWN."

When the aforementioned bars exceed 60'-0" in length, include a note stating:

"SPLICE BARS A AND F (PS1 if applicable) 30 DIA. (MIN.). AT THE CONTRACTOR'S OPTION, ALTERNATE LOCATIONS OF SPLICES FOR BARS A AND F (PS1 if applicable) THAT MAKES USE OF STOCK BAR LENGTHS MAY BE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL. SPLICED BAR LENGTHS SHALL BE 10'-0" (MIN.)."

Include the appropriate number of splices in the quantities. When the abutment cap is supported by piles under each girder and length of main cap reinforcement (Bars V) exceeds 60'-0", include in the previous note to splice 30 Dia. (Min.). When the abutment cap is supported by columns or drilled shafts and the length of the main cap reinforcement (Bars VT & VB) exceeds 60'-0" end to end of bar, they shall be spliced at designated locations and lengths as determined by the designer and the additional splice length included in the quantities.

Bent and Pier Caps:

Longitudinal main cap reinforcement (Bars A, B) when length exceeds 60'-0" end to end of bar shall be spliced at designated locations and lap lengths as determined by the designer and the additional splice length included in the quantities. Other longitudinal reinforcement (Bars F, E) shall be spliced and noted in a manner similar to abutments.

Columns:

When column height exceeds 20'-0" (see Sec. 501.03(e)1 of the Standard Specifications), include a note stating:

"AT THE CONTRACTOR'S OPTION, BARS (TYPE) M MAY BE SPLICED X' - XX" MIN. ABOVE THE COLUMN CONSTRUCTION JOINT ONLY. OPTIONAL SPLICE NOT INCLUDED IN BAR DIMENSIONS OR ESTIMATED QUANTITIES SHOWN."

This will be in addition to the foundation to column splice (Bars Type J or DS to Type M). Use splice pattern (staggered or 100%) and length as directed by the designer. Include a detail of the splice pattern when staggered.

Drilled Shafts:

When vertical drilled shaft reinforcement exceeds 60'-0" in length, provide splices to be located in the lower part of the shaft with pattern and length as directed by the designer.

3.3.2.7 Presentation

- 1) All dimensions on reinforcement details shall be rounded to a quarter inch. Where there is no splice, round down; with a splice, round up.
- 2) Details shall be included for all bent bars.
- 3) In no case, shall the same designation be used for reinforcement bars of different size, length and shape when employed in elements of the same substructure unit, and the same shall be applicable to bars used in the superstructure design.
- 4) If it becomes necessary to provide varying length reinforcement bars to accommodate a tapering or flared condition on any part of a structure, do not detail the bars in a table of small increment changes in length; detail the bars in groups of the same length to accommodate the flare by variance of lap. All bars in the same group shall carry the same bar designation.
- 5) Cut-off bars at the end of a skewed deck shall be fabricated to the required out-to-out length and marked. Provide detail and indicate maximum and minimum lengths and the incremental cutoff per bar. On steel girder spans hooks are required. Concrete girder spans hooks are not required.
- 6) When bars are sloped and the effect of slope would increase the overall length of any individual bar by 1" or more, the length of the bar shall be calculated to compensate for the slope (Ex., sloped bent caps, superelevated decks, steep grades, etc.).

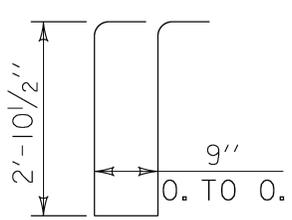
3.3.2.8 Bill of Reinforcement

A bill of reinforcement shall be included for each component of the structure. Include the bar mark, number required, size, length, location, shape (straight or bent). All bars shall be listed in the table, bent or straight.

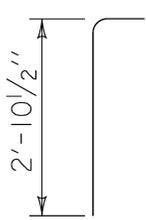
EXAMPLE BILL OF REINFORCEMENT
 EXAMPLE SHOWN IS A TYPICAL BAR CALLOUT FOR A PRE-STRESSED CONCRETE GIRDER SPAN w/ SKEW LESS THAN 25°

| BILL OF REINFORCEMENT | | | | | |
|-----------------------|------|--------|--------------------------------------|-----------|-----------|
| MARK | SIZE | NUMBER | LENGTH | LOCATION | BENDING |
| BL | 4 | 16 | * | RAIL | STRAIGHT |
| BI | 4 | 304 | 5'-11 ¹ / ₄ " | RAIL | * |
| B2 | 4 | 304 | 3'-7 ³ / ₄ " | RAIL | * |
| B3 | 3 | 76 | 2'-0" | RAIL | * |
| | | | | | |
| A | 5 | 152 | 46'-1" | DECK | STRAIGHT |
| C | 5 | 152 | 46'-1" | DECK | STRAIGHT |
| D | 4 | 94 | 37'-9" | DECK | STRAIGHT |
| E | 5 | 60 | 37'-10 ¹ / ₂ " | DECK | STRAIGHT |
| | | | | | |
| LI | 5 | 12 | 3'-4 ¹ / ₂ " | EDGE BEAM | SEE DIAG. |
| SI | 5 | 70 | 7'-6" | EDGE BEAM | SEE DIAG. |
| RI | 5 | 8 | 4'-7" | EDGE BEAM | STRAIGHT |
| WI | 5 | 4 | 39'-8" | EDGE BEAM | STRAIGHT |
| W2 | 5 | 20 | 7'-1" | EDGE BEAM | STRAIGHT |

* SEE BRIDGE SPECIAL PROJECT DRAWING NO. BBR-1, BBR-2, OR BBR-M(54)



STIRR. SI#5



BAR LI#5

3.3.3 Concrete Cover

The following typical minimum concrete cover should be provided for reinforcing bars. Clearance stated is to first steel encountered.

- 1) Deck: 2" clear top, 1" clear bottom, 2" clear sides, 3" clear ends.
- 2) Edge Beams and End Walls: 3" clear top of slab to stirrup; 1½" clear side to stirrup; 2" clear bottom to stirrup. 2" clear girder to reinforcing. 1½" clear paving seat (end walls) (typical).
- 3) Abutments, Bents and Piers:
 - a) Cap, 3" clear end, 3" clear bottom, 2" clear top and sides.
 - b) Backwall and wings, 2" clear ends, top (B.E.S.), sides.
 - c) Pedestals (as applicable), 1½" typical.
 - d) Jawposts (as applicable), 1½" clear front and sides, 2" clear back.
 - e) Footings, 4" clear bottom, 3" clear sides and top, 4" clear top of pile to bottom mat of reinforcing.
 - f) Drilled shafts, in soil, 6" clear sides, 6" clear bottom to main reinforcing, 1'-0" to first hoop. Drilled shafts, in rock, 4" clear min. sides, 6" clear bottom to main reinforcing, 1'-0" to first hoop.
 - g) Columns: End bent, 3" clear; Water crossings, 3" clear; grade separations, 2" clear.
 - h) Struts (as applicable), 2" clear typical transverse, 3" minimum end (clearance may be greater dependent on the embedment of the main reinforcing as stipulated by the designer).

3.3.4 Precision

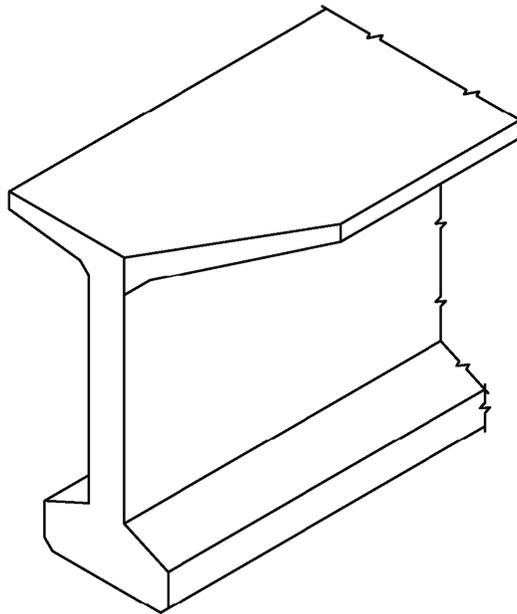
- 1) Overall dimension of concrete components should be rounded to the nearest 1/8".
- 2) Foundation layouts should be dimensioned to the nearest 1/8".
- 3) Out to out length of steel reinforcement should be to the ¼". Splice bars should be rounded to the greater ¼", full length bars such as may be used in a bent cap should be rounded to the lesser ¼".
- 4) Spacing of steel reinforcement should be shown to the nearest ¼".
- 5) Show manufactured items to industry standards.

3.4 Prestressed Concrete

3.4.1 General

- 1) This section generally applies to pretensioned pre-stressed concrete girders only.
- 2) Detail elevation view of girder along center line of girder, full length or half elevation if symmetrical, typical girder section and any necessary cut sections, enlarged details, reinforcing schedules, diagrams and notes. Show the vertical and horizontal locations and spacing of all mild reinforcing steel, pre-stressing strands and hold down points as applicable. It is acceptable to show a few bars to represent sections of different spacing and/or changes in bar type, such as stirrups.
- 3) Include pictorial representation of embedded items such as threaded inserts and sole plates, etc.
- 4) To visually demonstrate special girder details, include orthographic views as necessary (ex., clipped flanges on sharp skewes).

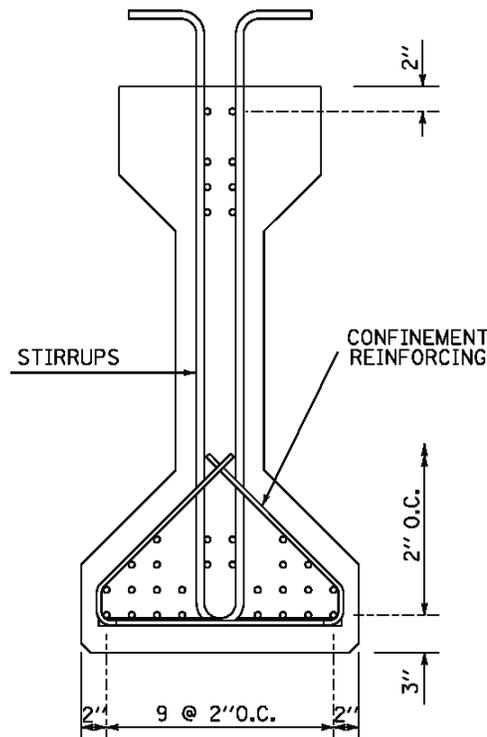
EXAMPLE OF ORTHOGRAPHIC VIEW OF GDR. END



- 5) Include applicable notes such as strand type and initial tension, concrete strengths, etc.

3.4.2 Mild and Prestressed Reinforcement

- 1) Detail reinforcing steel and pre-stressed strand in elevation and sections as appropriate to adequately describe the specific locations of individual bars and strands. All reinforcing steel and strands should be shown in cut sections.
- 2) It is permissible to combine strand pattern and reinforcing steel details in the same cut section. Separate cut sections for strand pattern(s) and mild reinforcement may be used if desired.
- 3) Include details of mild reinforcement and threaded bars.
- 4) For bottom flanges, when the design does not require all available positions in a row of strands to be occupied, place strands in the outer most positions. Confinement reinforcement (Bars B) is tied to these strands and automatically establishes the clearance. In addition, strands should also occupy interior positions for tying of stirrups. This automatically establishes web clearance.
- 5) Do not show clearances to reinforcing in cut sections. Include note stating that unless otherwise shown, all stirrups and confinement steel shall be securely tied to strands to provide a minimum 1" cover.



Example Girder Cut Section

3.4.2.1 Mild Reinforcement Designations

| <u>BAR CALLOUT</u> | <u>LOCATION</u> | <u>POSITION</u> |
|--------------------------|----------------------------|---------------------------|
| Stirrups E | End of Girder | (vertical, S shape) |
| Stirrups V(x) | Length of Girder | (vertical, S shape) |
| Bars T (Bulb Tee) | Top Flange, Length of Gdr. | (horizontal, transverse) |
| Bars U (Bulb Tee) | Web to Top Flange | (per fabricator, v shape) |
| Bars B | End of Girder, Bottom Flg. | (confinement) |
| Threaded Bars R2 | Loose, shipped w/gdr. | (edge beam, end wall) |

For the preceding, **(x)** represents a unique stirrup number. Stirrups Type V indicated in a pre-stressed girder have different lengths. One length stirrup would be designated **V1** and the other **V(x)**, such as **V2**, etc. Stirrups E are used if larger bar size is needed for bursting.

3.4.3 Minimum Concrete Cover

The following typical minimum concrete cover should be provided for reinforcing bars. Clearance stated is to first steel encountered.

- 1) End of girder to stirrups, confinement, etc. should be shown 1½" clear perpendicular to end.
- 2) Side and bottom clearance to stirrups, confinement steel is governed by position tied to the strand pattern but in no case less than 1". See related note Section 4.2.1.2 part 3.
- 3) Bars T (Bulb Tee), 1½" clear from edge of flange, clearance from top governed by strand position.
- 4) Bars U (Bulb Tee), 1" clear from web/flange chamfer.

3.4.4 Precision

- 1) The overall length of girder measured along centerline girder should be rounded to the nearest 1/8".
- 2) Stirrup spacing runs should be to the whole inch. Avoid use of equal spaces except at the very middle of the beam.
- 3) Stirrup legs should be calculated to the nearest ¼".

3.5 Structural Steel

3.5.1 General

- 1) Structural steel details are for purposes of presenting the principle controlling dimensions of the structure. The Contractor and Fabricator use this information to compute the exact dimensions necessary to produce the members to assemble the structure.
- 2) Longitudinal dimensions are computed on a horizontal basis without accounting for any slope or vertical curvature. Transverse dimensions are computed similarly without accounting for slope of cross section.
- 3) For a horizontally curved superstructure, the layout of the girders should be based on concentric circles unless otherwise directed by the designer or your supervisor. The endpoints of chorded girders should intersect the circles at the station (control) line.
- 4) Diaphragms and/or cross frames (except for diagonal members) are detailed and shown in the level position unless instructed otherwise.
- 5) Unless instructed otherwise, use diaphragms (MC or C channels as directed by the designer) for girders 36" deep or less. Use crossframes for girders greater than 36" (use "X" frames at intermediate points and "K" frames at joints excluding expansion dams). Member types and sizes as per the designer.
- 6) Geometrical control of crossframes (X or K type) shall be established using the neutral axis of the member. Refer to AISC Manual of Steel Construction for member properties.
- 7) Use open joints with armor plates for maximum joint opening 4". For joint openings greater than 4" use expansion dam (tooth joint).
- 8) Bolts shall be 7/8" diameter ASTM F3125 Grade A325 galvanized unless instructed otherwise by the designer.
- 9) Minimum edge distance for 7/8" diameter bolts is 1½" from the center of the bolt.
- 10) See Section 4.2.2 for structural steel detailing checklist. See Figures 5.16 thru 5.33 for typical details. See Appendices for example structural steel sheets.

Note: Examples of catwalks, bearing inspection platforms, rocker bearings, jacking frames and navigation lighting brackets are not included because of their infrequent use. When needed, refer to examples from previous projects for guidance along with any instructions from the designer or your supervisor.

3.5.2 Precision

- 1) The overall length of girders measured along centerline girder should be rounded to the nearest 1/16".
- 2) Expansion dams (tooth joints) should be detailed to the nearest 1/16". Control joint opening is based on 70 degrees Fahrenheit.
- 3) For curved girders, the radius shall be measured to the centerline of girder and expressed in feet and decimals of a foot.

3.6 Precast Concrete (non-prestressed)

The context of Pre-Cast Concrete Items used here refers to bridges consisting of pre-cast concrete bridge components and are normally used for bridges located on off-system roadways. These include pre-cast superstructure “channel” beams, pre-cast barrier rail, pre-cast abutment caps, pre-cast intermediate bent caps, abutment and wing panels.

3.6.1 General

- 1) Typical plan sets for pre-cast concrete bridge structures consist of the bridge General Elevation only and Estimated Quantities, Standard Bridge Notes, Required sheet (combined together on one sheet or on separate sheets as appropriate), boring logs and a compilation of the appropriate pre-cast standard drawings and other required Bridge Special Project Drawings.
- 2) Standard drawings for pre-cast bridge members are inventoried and maintained by the ALDOT Bridge Bureau.
- 3) Pre-cast bridges shall only be used with tangent alignments, 0

3.7 Culverts (future)

Future

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4 BRIDGE PLANS CHECKLIST

This checklist is provided to list items commonly necessary to produce typical bridge detail sheets but is not all inclusive or exclusive. This checklist should be followed unless extenuating circumstances dictate otherwise with the approval of your supervisor. The detailer is responsible to include all details/information and ask questions as necessary to produce contract drawings that will adequately present information and details to construct the structure. Copies of the pertinent sections should be made and a check mark should be placed in the box to the left of the item to indicate accomplishment or N.A. to indicate not applicable.

4.1 General Information Sheets

4.1.1 Estimated Quantities, Standard Bridge Notes, Required

The following items should appear on this sheet. Other applicable notes should be included as required. The General Plan and Elevation may be combined with this sheet when space permits. This is preferable in the case of small projects when minimal information is needed such as pre-cast bridges.

1. ESTIMATED QUANTITIES

Include as appropriate. Quantity, unit, item number and description of each pay item. (Be certain each item of work or material required has method of payment) Quantity numbers should be right justified and unit descriptions should be left justified. The following is a partial list of commonly used pay items. XXX represents unique number associated with pay item.

| <u>Quantity</u> | <u>Unit</u> | <u>Item Number</u> | <u>Description</u> |
|--------------------------|-------------|--------------------|------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | Lump Sum | 206AXXX | Removal of Old Bridge, Station _____ |
| <input type="checkbox"/> | Cubic Yard | 215A000 | Unclassified Bridge Excavation |
| <input type="checkbox"/> | Lump Sum | 215BXXX | Cofferdams or Sheeting and Shoring, Station_____ |
| <input type="checkbox"/> | Square Yard | 450B000 | Reinforced Cement Concrete Bridge End Slab |
| <input type="checkbox"/> | Pound | 502A000 | Steel Reinforcement |
| <input type="checkbox"/> | Lump Sum | 502BXXX | Steel Reinforcement For Bridge Superstructure, Station _____ , Approximately_____ Pounds |
| <input type="checkbox"/> | Each | 505AXXX | Steel Test Piles (HP_____ x _____) |
| <input type="checkbox"/> | Each | 505AXXX | Concrete Test Piles (_____" Square) |
| <input type="checkbox"/> | Each | 505BXXX | Static Loading Tests (Pile Type/Size) |
| <input type="checkbox"/> | Each | 505BXXX | Dynamic Loading Tests (PileType/Size) (Driving/Restrike) |
| <input type="checkbox"/> | Linear Foot | 505MXXX | Steel Piling Furnished and Driven (HP _____ x_____) |
| <input type="checkbox"/> | Linear Foot | 505NXXX | Concrete Piling Furnished (_____" Square) |
| <input type="checkbox"/> | Linear Foot | 505OXXX | Concrete Piling Driven (_____" Square) |
| <input type="checkbox"/> | Linear Foot | 506AXXX | Drilled Shaft Excavation, _____ ' -_____ " Diameter |
| <input type="checkbox"/> | Linear Foot | 506BXXX | Special Drilled Shaft Excavation, _____ ' -_____ " Diameter |
| <input type="checkbox"/> | Linear Foot | 506CXXX | Drilled Shaft Construction, _____ ' -_____ " Diameter, Class DS _____ Concrete |

| <u>Quantity</u> | <u>Unit</u> | <u>Item Number</u> | <u>Description</u> |
|--------------------------|-------------|--------------------|----------------------------------------------------------------------------------------|
| <input type="checkbox"/> | Each | 506GXXX | Crosshole Sonic Logging, _____ ' - _____ " Diameter |
| <input type="checkbox"/> | Pound | 508A000 | Structural Steel |
| <input type="checkbox"/> | Each | 508BXXX | Structural Steel Superstructure, (Description), Approx. _____ lbs. (Specialty Item) |
| <input type="checkbox"/> | Cubic Yard | 510A007 | Bridge Substructure Concrete |
| <input type="checkbox"/> | Lump Sum | 510CXXX | Bridge Concrete Superstructure, Sta. _____, Approx. _____ Cu. Yds. |
| <input type="checkbox"/> | Square Yard | 510E000 | Grooving Concrete Bridge Decks |
| <input type="checkbox"/> | Linear Foot | 510JXXX | Bridge Barrier Rail, Type_____ |
| <input type="checkbox"/> | Each | 511AXXX | Elastomeric Bearing Type_____ (Mark_____) |
| <input type="checkbox"/> | Linear Foot | 513BXXX | Pretensioned-Prestressed Concrete Girders, Type_____, (Specialty Item) |

Pre-Cast Bridges:

| <u>Quantity</u> | <u>Unit</u> | <u>Item Number</u> | <u>Description</u> |
|--------------------------|-------------|--------------------|------------------------------------------------|
| <input type="checkbox"/> | Each | 507A000 | Wire Rope Abutment Anchor Assembly |
| <input type="checkbox"/> | Each | 512AXXX | Precast Concrete Abutment Caps, _____ |
| <input type="checkbox"/> | Each | 512BXXX | Precast Concrete Intermediate Bent Caps, _____ |
| <input type="checkbox"/> | Each | 512CXXX | Precast Concrete Type 1 Span Section, _____ |
| <input type="checkbox"/> | Each | 512DXXX | Precast Concrete Barrier Rail, _____ |
| <input type="checkbox"/> | Each | 512EXXX | Precast Concrete Abutment Panels, _____ |
| <input type="checkbox"/> | Each | 512FXXX | Precast Concrete Wing Panels, _____ |
| <input type="checkbox"/> | Each | 512GXXX | Precast Concrete Abutment Wing Panels, _____ |

Pay Item Comments:

- Avoid contingency pay items whenever possible. Contingency pay items are those that, in the opinion of the designer, merit inclusion in the estimated quantities because of unknowns relative to the project. Examples include:
 - a. Seal concrete: if the designer has question as to whether or not a seal will be required to de-water a cofferdam.
 - b. Pilot holes: if the designer has question as to whether or not pre-drilling will be necessary to obtain specified minimum tip elevations.

Whenever a contingency pay item is deemed necessary, ensure that contingency item is flagged and referenced with appropriate notes.

- For projects with dual bridges (2 BINs), separate quantities by lane and include total (3 columns). If the both lanes share the same BIN (common substructure), do not separate. (Do not further separate by Stage if Staged construction.)
- Refer to foundation report for recommended Class of drilled shaft concrete, DS1, DS2, or DS3, as applicable.

- A pay item for Crosshole Sonic Logging, if recommended in the foundation report, should be provided for each diameter drilled shaft on the project. Quantities should be provided for the total number of shafts.
- Refer to foundation report to verify if test pile and static/dynamic loading tests are required.
- Verify the linear foot quantity of test piles has been removed from the estimated quantity for driven and furnished piles.
- When mechanically stabilized earth wall abutments are required, verify the requirement for a pile/soil slip layer treatment and add a note reading, "PAYMENT FOR SOIL SLIP LAYER IS INCLUDED IN PAY ITEM ____."
- Use Figure 5.35 for weights and measures of commonly used items when calculating quantities.
- Use the following rounding guidelines when summarizing quantities:
 - Steel reinforcement pay items, round up to the nearest 100 pounds.
 - Structural steel pay items, round up to the nearest 10 pounds.
 - Concrete pay items, round up to the nearest cubic yard.
 - Pay items using square yard, round up to the nearest square yard.
 - Pay items using linear feet, round up to the nearest linear foot.

Do not apply percentages when summarizing quantities.

2. REQUIRED:

- Bridge sheets are listed according to checklist sections. Example:

REQUIRED

| | |
|----------------------------------------------------------------------------------------------------------|---------------------------------------|
| GENERAL INFORMATION | BRIDGE SHEET NOS. 1 & 2 |
| SUPERSTRUCTURE | BRIDGE SHEET NOS. 3 & 4 |
| 3 80'-0" PRETENSIONED-PRESTRESSED CONCRETE GIRDER (AASHTO TYPE III) SIMPLE SPANS WITH CONTINUOUS DECK | |
| SUBSTRUCTURE | BRIDGE SHEET NOS. 5 - 7 |
| 2 REINFORCED CONCRETE ABUTMENTS WITH HP12x53 STEEL PILES | |
| 2 REINFORCED CONCRETE BENTS WITH PILE FOOTINGS (HP12x53 STEEL PILES) | |
| TEST BORING RECORD | BRIDGE SHEET NOS. 8 - 15 |
| BRIDGE SPECIAL PROJECT DRAWINGS | |
| STANDARD BRIDGE NOTES | BRIDGE SPECIAL PROJECT DRAWING SBN-1 |
| STANDARD DECK REINFORCEMENT DETAILS | BRIDGE SPECIAL PROJECT DRAWING SDR-1 |
| STANDARD BRIDGE DETAILS | BRIDGE SPECIAL PROJECT DRAWING SBD-1 |
| BRIDGE BARRIER RAIL DETAILS | BRIDGE SPECIAL PROJECT DRAWING BBR-1 |
| STANDARD PRESTRESSED CONCRETE GIRDERS DETAILS | BRIDGE SPECIAL PROJECT DRAWING SPGD-1 |
| EDGE BEAM DETAILS | BRIDGE SPECIAL PROJECT DRAWING EBEW3 |
| BRIDGE END SLAB DETAILS | BRIDGE SPECIAL PROJECT DRAWING BES-BP |
| EXISTING BRIDGE INFORMATION | BRIDGE SHEETS E1 AND E2 |

- Description of required superstructure separated into span lengths.
- Description of required abutments with foundation descriptions.
- Description of required bents with foundation descriptions.
- Test Boring Record Sheets.
- Bridge Special Project Drawings (as applicable). See Section 4.5.
- Pre-cast Bridge Standard Drawings (as applicable)
- Existing Bridge Information (if applicable) See Section 4.6.

3. STANDARD BRIDGE NOTES

- Reference required notes to Bridge Special Project Dwg. SBN-1.
- Under title STANDARD BRIDGE NOTES, provide roadway width (gutter to gutter) and rail type (include sidewalk if applicable).
- List appropriate SBN-1 notes from current special project drawing.
- On abutment slopes where SBN-1 Note 12 is applicable and an apron is required, the minimum width shall be 8 feet and the maximum shall be 25 feet. See Figure 5.39 and check Hydraulic Report and Scour Report for riprap requirements.
- Include SBN-1 Note 15 Joint Seal only when directed by your supervisor.
- Include SBN-1 Note 26 only when permanent casing will be visible. In such a case, permanent casing shall be coated down to an elevation 3 feet minimum below ground/water line.
- Relating to SBN-1 Note 29, if the foundation report has been provided by an entity other than the Bureau of Materials and Tests (i.e., a consultant working for a county/city), include the following note: "ACCESS TO THE FOUNDATION REPORT AND CORE BORING LOGS FOR THIS PROJECT CAN BE ARRANGED BY CONTACTING THE _____ COUNTY/ CITY ENGINEER".

4. MISCELLANEOUS

- If bridge is NOT designed using LRFD include the following: NOTE: THE SUPERSTRUCTURE AND SUBSTRUCTURE DESIGNS ON THIS BRIDGE HAVE BEEN PREPARED USING _____ METHODS. THE GEOTECHNICAL DESIGN ON THIS BRIDGE HAS BEEN PREPARED USING _____ METHODS. Verify with your designer.
- Include the following as applicable (verify with your designer): NOTE: STEEL PILING SHALL BE DRIVEN TO REFUSAL.

- If cutting or biting teeth are required (see Foundation Report) on pile tips due to inclined rock, then provide the following note:
"THE CONTRACTOR SHALL FURNISH PILE POINT PROTECTORS WITH INTEGRALLY CAST CUTTING TEETH INTENDED FOR USE ON STEEPLY SLOPED ROCK."
- Include the following if applicable: NOTE: SEE ROADWAY PLAN NOTES FOR ENVIRONMENTAL COMMITMENTS THAT IMPACT BRIDGE CONSTRUCTION.
- For pay items 502A and 502B, add note indicating grade of steel if different than the Standard Specifications (i.e., "75 ksi").
- For pay items 508A and 508B, add note indicating grade of steel if different than the Standard Specifications (i.e., "GRADE 50").
- For pay items 510A and 510C, add note indicating strength of concrete if different than the Standard Specifications (i.e., "5,000 psi").
- For structural steel spans utilizing AASHTO M270 Grade 50 steel include the following:
NOTE: THE BRIDGE ENGINEER WILL NOT ACCEPT AN ALTERNATE DESIGN UTILIZING AASHTO M 270 GRADE 50W STEEL ON THIS BRIDGE UNLESS IT IS PAINTED IN ACCORDANCE WITH SECTION 508 AND 521 OF THE STANDARD SPECIFICATIONS.
- Relating to pre-cast bridges, include the following: NOTE: WING PILES SHALL BE DRIVEN TO REFUSAL OR 20 FT. WHICHEVER IS LESS. THE MINIMUM PENETRATION FOR THE WING PILES SHALL NOT BE LESS THAN 10'-0" INTO NATURAL GROUND. ALL ABUTMENT PILES, BENT PILES AND ABUTMENT ANCHOR PILES SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 505 OF THE STANDARD SPECIFICATIONS.
- Provide the following warning note for unauthorized use of plans (Locate this note above or beside title block):
THESE DRAWINGS REPRESENT DESIGNS PREPARED FOR USE BY THE ALABAMA DEPARTMENT OF TRANSPORTATION AND ARE NOT TO BE COPIED, REPRODUCED, ALTERED, OR USED BY ANYONE, OR ANY ORGANIZATION, WITHOUT THE EXPRESSED WRITTEN CONSENT OF THE ALABAMA DEPARTMENT OF TRANSPORTATION REPRESENTATIVE AUTHORIZED TO APPROVE SUCH USE. ANYONE MAKING UNAUTHORIZED USE OF THESE DRAWINGS MAY BE PROSECUTED TO THE FULLEST EXTENT OF THE LAW.
- When pile bents are being specified and concrete encasements are required, include the following note: "FURNISHING OF ALL NECESSARY EQUIPMENT AND CONSTRUCTION OF ALL SHEETING AND SHORING, CRIBS, COFFERDAMS, CAISSONS, DE-WATERING, ETC. WHICH MAY BE NECESSARY FOR THE CONSTRUCTION OF THE PILE ENCASEMENTS SHALL BE A SUBSIDIARY OBLIGATION OF PAY ITEM 510A, BRIDGE SUBSTRUCTURE CONCRETE".

5. PLANS PREPARED BY SERVICES OF A CONSULTANT:

- The first sheet of the bridge plans should be stamped by the engineer(s) of record and the following note should be included adjacent to the registered engineer(s) stamp. The Engineer of Record and Reviewing Engineer shall be Alabama registered.

I CERTIFY THAT COMPLETE REVIEWS OF THE DESIGNER'S CALCULATIONS, CONTRACT STRUCTURAL DRAWINGS, APPLICABLE SPECIFICATIONS, AND SPECIAL PROVISIONS HAVE BEEN MADE BY COMPETENT ENGINEERS OF THIS ORGANIZATION, AND THAT THESE PLANS ARE ACCURATE, COMPLETE, AND SUITABLE FOR LETTING.

APPROVED: _____ DATE: _____
(*Engineer of Record's Signature*)

REGISTRATION NO. _____

APPROVED: _____ DATE: _____
(*Reviewing Engineer's Signature*)

REGISTRATION NO. _____

4.1.2 General Plan and Elevation

Usually, the general plan and elevation of a bridge are shown together on the same sheet. Occasionally, a bridge may be wide enough or in the instance of dual bridges, the general plan and general elevation may need to be shown on separate sheets. Pertinent information, such as curve data, should be shown on the appropriate sheet. The following applies to all superstructure types.

1. PLAN:

- Identify stationing line (centerline survey/constr. or other alignment control line(s) (such as baseline(s)). Locate bridge reference line (C.L. bridge, W.L. bridge, etc.) with respect to stationing line if not one in same. Locate Profile Grade Line.
- Name of road, tracks, creek, etc. that bridge crosses over.
- For grade separations, intersection angle, skew, intersecting stations of alignments.
- Station number at Abuts. and Bents. At abuts., attach label "Begin or End Bridge/Back Of Abut.". At bents/piers, attach label "Working Line Joint" or "Centerline Req'd. Slab Constr. Jt." (as appropriate) and "Centerline of Bent/Pier" if one in same (omit if eccentricity exists).
- Point of minimum vertical clearance over roadway or railroad.
- Horizontal clearance provided (with respect to face of column or crashwall) if applicable.
- Bridge width gutter to gutter and overall deck width and tied to bridge reference line.
- Limits of riprap protection (if stream crossing) at abutments. Detail abutment riprap and note in accordance with RR-610 unless site justifies otherwise. Dimensioning of riprap apron (8' min. / 25' max.) will be addressed through SBN-1 Note 12. See Figure 5.39. When abutments are not affected by Design Stage Flood show riprap on front slope only and dimension 2' outside limits of bridge deck. Skew should be considered when providing this detail. No apron or side slope riprap protection will be required.
- Limits of riprap protection (if stream crossing) at bents. Show riprap whenever scour protection is required around piers. Refer to Hydraulic and Scour Report. Specify 2 feet thick minimum with filter blanket and set limits a minimum of 5 feet outside substructure construction limits. (i.e., footing width/length plus 10 feet, or for pile bent, 5 feet from face of piles both sides of bent and 5 feet from outside edge of end piles).
- North arrow.
- Show bridge end slab with reference to appropriate Bridge Special Project Drawing.
- Bridge orientation at both ends. (i.e., —> To Jasper).
- Nearest RR Mile Post, RR DOT # and ROW limits (if proposed bridge is to be constructed over a railroad).
- Show existing bridge to be removed with begin and end bridge stations.

- Show utilities that coexist with the bridge. If a foundation layout is included in the plans, this information may be omitted and shown there.
- Show points of horizontal curvature (PC) and tangency (PT) on stationing line.
- On grade separations, show slope paving (Special Dwg. B-614) or aggregate slope protection (Special Dwg. ASP-609) as appropriate. Reference ALDOT Special and Standard Highway Drawings (Rdwy. Items).
- Optional, finish grade elevations at end of deck at abutments and at working line joint locations may be shown in the plan view as space permits in lieu of showing on span detail sheet(s). May also be accomplished by referencing to a table showing same.

2. SECTIONAL ELEVATION:

When skewed, show true projected view unless extenuating circumstances exist such as wide bridges where projected elements would conflict and create confusion would be a consideration. In such events, include a note that skew is omitted for clarity.

- Span lengths and type of spans, simple or simple with continuous deck, continuous spans, AASHTO (type), Bulb Tee (type), rolled steel beam, welded plate steel girder, etc.
- Overall length of bridge. The overall length of bridge is defined from the back of the abutment backwall at begin bridge and back of abutment backwall at end bridge.
- Indicate alignment. Indicate if tangent, or if curved, degree of curve and indicate if curve is to the left or to the right ahead looking ahead.
- Label finish grade/profile grade
- Grade (in percentage) and give reference to grade sketch, or if bridge will be in vertical curve, give reference to Vertical Curve Data(see Vertical Curve Data).
- When in 0.0000% grade, omit sketch and show line in bridge elevation representing profile grade and indicate such with elevation and also show dimension from PG to finish grade of bridge if not one and the same.
- Number abutments and bents.
- Show vertical elevation scale to the left of the elevation view.
- For grade separation structures, show aggregate protection or slope paving (Roadway Item). Specify slope of 3:1 (3 horizontal to 1 vertical) Interstate; 2:1 State and Rural routes unless otherwise noted on the roadway drawings or foundation report. Bridges spanning railroads typically require 2:1 slopes.
- For stream crossings, provide loose riprap, Class 2 (Roadway Item) to protect abutment fills. Use 2:1 slope unless noted otherwise on the roadway drawings or in the foundation report. If applicable, show riprap apron from toe of fill to limits indicated by SBN-1 note 12.

- Show elevation for top of riprap on abutment roadway fill side slopes at 2 feet above design flood stage.
- Provide riprap protection at bents (Roadway Item) when required (see Hydraulic and Scour Reports). Typically riprap protection should be provided at all bent locations of a stream crossing when pile type foundations (pile bents or pile footings) are being used. Specify 2 feet thick minimum with filter blanket and set limits a minimum of 5 feet outside substructure construction limits. (i.e., footing width/length plus 10 feet, or for pile bent, 5 feet from face of piles both sides of bent and 5 feet from outside edge of end piles). Ensure that top of riprap is detailed flush with top of natural ground.
- If pile encasements are to be used where riprap protection is required, then verify that encasements extend a minimum of 3' below bottom of riprap. See Figure 5.34.
- Designate expansion and fixed end of span so that expansion is uphill.
- Show groundline profile at centerline of bridge. Preferably use a solid line. Show groundline profiles at offsets left and right of centerline if required by varying site conditions. (This information should agree with the 3-line profile information used to prepare the bridge layout.) For grade separations, additional profiles are not usually necessary. If additional profiles are needed, the bridge layout will indicate such.
- Bottom of footing elevation(s). Show as "approximate" for rock or spread type footing. Show actual elevation for pile footing.
- Bottom of drilled shaft elevations. Show as "approximate" as applicable.
- Show design flood stage elevation (i.e., 25 year flood for county projects unless otherwise directed. 50 year flood for state and federal projects. DO NOT show normal pool elevation. Show water surface elevation at time of foundation investigation as needed.)
- For navigable waterways, show bridge reference elevation for navigational clearance, (BRENC) or other elevation used in establishing the navigational vertical clearance. Show horizontal and vertical clearance provided for navigation.
- If excavation of natural ground or existing roadway fill(s) is required at abutments (such as excavation needed to obtain end fill slopes at abutments) or if channel improvement is required, indicate the excavation limits and note as a roadway item.
- Show vertical clearance on grade separation structures.
- Show Bridge End Slabs.

Pre-Cast Bridges:

The following special requirements apply to pre-cast bridges in addition to the applicable requirements previously noted.

- Show overall length of bridge. The overall length of bridge is defined from the end of the pre-cast span unit at begin bridge to the end of the pre-cast span unit at end bridge.

- Show alignment, "TANGENT".
- Show grade, "0.00"
- Show loose riprap, Class 2 with filter blanket (Roadway Item) as directed by the hydraulic report and/or foundation report.
- Show stationing. Begin bridge (end of pre-cast span unit), centerline of joints, end bridge (end of pre-cast span unit).

3. HYDRAULIC DATA (refer to Hydraulic Report):

- Show floodplain drainage area (Sq. Miles), bridge opening provided which is area under design flood elevation (usually Q50) corrected for skew. (round up to nearest Sq. Ft.)
- Show design year flows (Q10, Q25, Q50, etc.) (Cu. Ft./Sec.) with stage elevations as per hydraulic report.
- Show design year velocity (Ft./Sec.) (Usually Q50 for State roads).
- If more than one bridge exists in a flood plain, include distributed design year data for each structure:
 - Show Total Flood Plain design year flows (Q10, Q25, Q50 etc.) and drainage area (Sq. Mi.)
 - Show distributed design year flow for main bridge and relief structure(s) as applicable.
 - Compute and show area of opening for each structure and compute and show design year velocity.

4. SPECIAL NOTES

- Where materials such as rip-rap, slope paving, etc. exist that interfere with construction of new foundations, provide note that addresses removal and replacement (if required) of such material and method of payment (similar to SBN note 32).

5. VERTICAL CURVE AND GRADE SKETCH:

- Provide a grade sketch if in straight grade greater than 0% or vertical curve sketch if in VC to show profile grade data.
- Show grades, PVI stations and elevations, and vertical curve length as shown on the roadway drawings.
- Show low point of sag vertical curve if on bridge.

- Show bridge limits in sketch(es) and indicate difference from profile grade to finish grade of bridge if not same.

6. HORIZONTAL CURVE DATA:

- If bridge is to be constructed in horizontal curve, provide verified curve data (see roadway plans).

7. MISCELLANEOUS

If space permits, other information/special details can be included on this sheet in lieu of separate sheets. Such details may include:

- Pouring schedule.
- Superelevation transition details.
- Special rip-rap details.
- Location sketch(es).
- Special geometry information (ridge line data, etc.).

4.1.3 Sequence of Construction

Include this sheet(s) when a bridge is being replaced or widening and the construction is taking place in stages. Usually this should be at the direction of your supervisor and the details of same should be furnished to you.

- Show bridge cross sections detailing the limits of the various stages of construction, and include placement of temporary barrier rails over the life of the bridge construction.
- Note temporary barrier rails as bridge bolted if applicable.
- Show sections of existing bridge(s) to be partially or completely removed and any early stage partial removals of specific parts of the existing bridge necessary to facilitate construction.
- Include a narrative description of the stages including verbiage on timing and placement of temporary barrier rails, removal or partial removal of existing bridge(s), traffic shifting, etc.
- This sheet should be coordinated with the Traffic Control Plan (TCP). Do not use the same terminology ("Phase" or "Stage") as the TCP.

4.1.4 Foundation Layout (as required)

A foundation layout sheet shall be provided if any of the following applies: bridges with a combination of tangent and curved alignments, multiple alignments such as ramps, varying skews, combination curved and skewed, bents with eccentricity, complex foundation designs, unusual substructure configurations, conflicts with existing substructure or utilities, staged construction, etc. When a foundation layout sheet is required, scaled details of the following information should be provided:

- Numbering and stationing for each abutment and bent location.
- Dimensions from beginning of bridge to centerline of foundation unit (footings, shafts) and between units then to end of bridge.
- Offset dimensions from control line (centerline/w.l. of bridge) to centerline of each footing/shaft/pile etc. **Verify dimensions account for eccentricity if skewed.**
- Indicate footing dimensions, drilled shaft diameter, pile size/type, as applicable.
- Indicate where pile encasements are to be used if applicable.
- Show skew of substructure unit relative to control line.
- Show North arrow.
- Include other alignments, stream banks, railroads, etc. from bridge general plan and include stationing, angles, etc.
- When existing foundation elements of the bridge to be removed conflict with the new foundations, details of these conditions should be included on the foundation layout.
- Where utilities will coexist with the new bridge, details of these conditions should also be included on the foundation layout.

4.1.5 Joint Sections (optional)

When the bridge is short and/or the number of joint elevations is few or the details are repetitive, joint elevation(s) or sections should be shown with details on individual span sheets to convey this information (at the discretion of the detailer with supervisor approval).

1. ELEVATION VIEW (ABUTMENT):

- Show cut section perpendicular to joint for superstructure at abutment(s) and indicate girder type, bearing type (reference Bridge Special Project Drawing SPGD-1 as applicable), overall superstructure depth (slab + haunch + girder + bearing) at centerline of bearing.
- Show abutment backwall thickness.
- Show dimension from back face of abutment backwall to centerline of bearing.
- Show required joint opening at 70 degrees F if expansion condition.
- Indicate whether the joint is open or sealed.
- Show and label armor plates (reference Bridge Special Project Drawing SBD-1) or other joint type as applicable.
- Reference applicable bridge special project drawing sheet for edge beams and end walls (for pre-stressed concrete girder spans).
- Show bridge end slab and reference appropriate Bridge Special Project Drawing BES-xx
- Show paving seat if required.

2. ELEVATION VIEW (BENTS):

- Show cut section perpendicular to joint for superstructure at bent(s) and indicate girder type, bearing type (reference Bridge Special Project Drawing SPGD-1 as applicable), control dimensions for superstructure depth (slab + haunch + girder + bearing) at centerline of bearing, c.l. slab constr. jt. or w.l. joint as applicable.
- Show dimension from working line/center line of open or req'd. constr. joint to centerline of bearing.
- Show required joint opening at 70 degrees F for open joint (with or without seal). No dimension required for closed joint (continuous deck) or continuous spans.
- Indicate whether the joint is open or sealed.
- Show and label armor plates (reference Bridge Special Project Drawing SBD-1) or other joint type as applicable.
- Reference applicable bridge special project drawing sheet for edge beams and end walls.

4.1.6 Superelevation Transition (as required)

A superelevation transition sketch should be provided whenever all or a portion of the bridge will be in transition. When a bridge will be in full superelevation for the entire length of the structure, this drawing is not required. When required, this sheet should provide the following information:

- Identify control line(s) used in developing transition sketch (i.e., centerline/w.l. of bridge, baseline WBR, etc.).
- Show transition lines at edges of 6' parabolic and at gutterlines (sometimes lane lines) (from a condition of full superelevation to a point of normal crown and/or vice versa).
- Show transition line from bridge finish grade to profile grade if centerline parabolic crown and profile grade line is one in same.
- Label left and right gutter or lane lines, left and right side of 6' parabolic crown.
- Show transition control stations, i.e. normal crown, crown remove, reverse crown, full superelevation. Label normal crown and full superelevation stations. Other control stations may be labeled if desired.
- Show critical bridge deck sections with cross slopes and barrier rails. It is not necessary to draw girders in the bridge sections especially when there is a mix of girder types.
- Show correction (in feet) to transition lines (parabolic crown lines and gutterlines or lane lines).
- Insert symmetrical vertical curves at PVI stations in transition lines. The length of vertical curves should be no less than 50'. If vertical curves of adjacent PVIs overlap using 50' length, shorten the V.C. to where the P.V.C. and P.V.T. or vice versa points do not overlap to the lesser whole foot. In lieu of showing vertical curves, a note may be added that angular break points shall have a 50' symmetrical vertical curve inserted to obtain a smooth profile.
- Show bridge limits affected by SE transitioning.
- Show Superelevation Transition length and locate P.C. or P.T. as applicable.
- Use critical stations (normal crown and full superelevation) and superelevation rates as identified in the roadway plans for use in calculating transition data.

NOTE: The sketch should be drawn to actual dimensions and then scaled with a multiplier in the vertical direction for clarity.

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4.2 Superstructure Sheets

4.2.1 Details for Prestress Concrete Girder Spans

4.2.1.1 Span Details

The checklist shown below covers most simple span pre-stressed concrete girder spans and 1 or 2 sheets should be sufficient. More complex structures such as curved and skewed, continuous deck, stage construction etc. may require additional sheets to sufficiently cover details necessary for construction. Details such as pouring schedules, reinforcing layouts, etc. may be required. The detailer should be aware of these possibilities and plan his sheets accordingly. Many details can be shown on the same sheet with the plan view, such as joint sections, typical deck cross section(s), end view(s), bill of reinforcement, quantities, notes, etc. as room and sheet planning permits. See examples.

Standard Deck Reinforcement Details shall be used for all applicable bridges. See Bridge Special Project Drawing SDR-1. Exceptions to this shall have prior approval of the State Bridge Engineer.

1. PLAN VIEW:

- Overall span length w.l. joint to w.l. joint (if end span, show dimension from Beginning/End of bridge to the working line of joint of the next span). Continuous decks from required deck construction joint to same or w.l. joint.
- If skewed, show skew angle.
- Show transverse dimensioning on left end of span and if skewed show skewed dimensioning on right end of span.
- If curved, show chord girder lengths "LG" in a table or show a dimension on each girder (begin or end bridge to working line joint or reqd. slab constr. jt.; working line joint or reqd. slab constr. jt. to working line joint or reqd. slab constr. jt.) for each girder. Include a note stating "GIRDER LENGTHS SHOWN ARE C.L. GIRDER ALONG CHORDS FROM BACK OF ABUTMENT(BEGIN OR END BRIDGE) TO WORKING LINE/REQD. SLAB CONSTR. JOINT" (as appropriate) "AND FROM WORKING LINE/REQD. SLAB CONSTR. JOINT TO WORKING LINE/REQD. SLAB CONSTR. JOINT" (as appropriate). Show angle from centerline girder to station (skew) line, back and ahead.
- On curved bridges, show dimensions along both edges of slab and along centerline of bridge.
- Show joint reference (i.e. Begin, End of Bridge, working line of joint, centerline of bent no. X) and station.
- Show required joint opening @ 70 degrees F for normal armor plate joints sealed or unsealed.

- Note barrier rail joints and refer to Bridge Special Project Dwg. BBR-1, BBR-2, or BBR-M(54) for details. Intermediate joints should be shown perpendicular to the rail. Joints at c.l. of bent/pier at location of a continuous deck required slab construction joint (closed joint) and at w.l. of open joints should be shown parallel to the skew angle.
- Show all deck drains, if applicable, and reference Bridge Special Project Dwg. SBD-1 for details. Note the deck drain spacing, if different than 5'-0" as shown on Bridge Special Project Dwg. SBD-1.

Verify that the following is addressed:

- 1) Reduce spacing to 4'- 0" o.c. for bridge widths greater than 44 feet gutter to gutter.
 - 2) Reduce spacing to 4'- 0" o.c. if bridge is in full superelevation and gutter to gutter dimension is greater than 28 feet.
 - 3) Omit deck drains on high side of span if bridge is in full superelevation.
 - 4) Omit drains in portions of spans over roadway lanes or railroad R.O.W.
 - 5) Omit drains within 10'-0" of bridge ends and 5'-0" of interior bents.
 - 6) When the bridge is in a sag vertical curve and the low point falls on the bridge, verify spacing of drains with the designer or section supervisor. If necessary, consult with the Bridge Hydraulic Engineer for assistance in determining deck drain spacing.
 - 7) Blockouts should be spaced as above, but omit blockouts within 3'-0" of barrier rail joint.
- Show girders and illustrate using the width of the top flange.
 - Show edge beams, label and reference appropriate EBEW as applicable.
 - Identify Bridge Joint Armor Plates on both ends and reference Bridge Special Project Dwg. SBD-1. Identify other joint types as applicable and reference to the appropriate detail drawing.
 - Locate c.l. girders, gutterline and outside edge of slab with respect to centerline/w.l. of bridge. Show overall width of bridge and barrier rail width.
 - Show numbering of girders left to right looking station ahead.
 - Reference applicable Bridge Special Project Dwg. EBEW(x) for edge beam details.
 - For end spans show portion of B.E.S. and reference applicable bridge special project drawing.
 - Show finished deck elevations at edge of slab (face of joint) at beginning and end of bridge, working line of joint locations, slab construction joints at bents(continuous decks) at gutter lines, girder lines, centerline of bridge, profile grade, construction stage joint as applicable. Show all elevations at required locations or in tabular form (include station as necessary). (This information may be provided elsewhere, i.e. general plan, transition diagram, etc.)

- Show point of horizontal curvature (PC) or tangency (PT).

If SDR-1 is NOT used:

- Show representative transverse deck reinforcement (Bars A & C) all the way across the bridge (no window). Show clearance to edge of slab.
- For skews 25 degrees and less, detail transverse deck reinforcement to be placed along skew.
- For skews greater than 25 degrees, use incrementally cutoff bars in skewed portion of deck and show bars perpendicular to centerline of bridge. Determine number of required cutoff bars by computing length of the first cutoff bar per detail shown on Bridge Special Project Drawing SBD-1. Calculate the incremental cutoff and then compute number of bars so that the length of the last cutoff bar is no less than 1'-6". Do not include hooks. Include Bars MM and detail Bars MM with hook on one end placing hook adjacent to the joint. Space per detail on Bridge Special Project Drawing SBD-1.
- When span is curved and skewed greater than 25 degrees, include a note stating Bars A & C (or Bars C only) shall be placed along radial lines and the spacing shall be measured based on the long side of the span. Include cutoff bars similarly to above. When skewed less than 25 degrees, include a note stating spacing of Bars A & C (or Bars C) shall be measured based on the long side of the span.
- Show representative longitudinal deck reinforcement (Bars D) full length of span and Bars DD as appropriate. Show clearance to end of slab. This may be shown on the pouring schedule if required.
- Provide splice and bar layout note(s) as appropriate for longitudinal deck reinforcing Bars D and transverse deck reinforcing Bars A and C (or Bars C only) (See Section 3.3.2.6.1).

2. DECK CROSS-SECTIONAL VIEWS:

- Identify the section being represented by the view. (e.g., TYPICAL CROSS SECTION, TYPICAL HALF CROSS SECTION, etc.)
- Number girders left to right, show girder spacing and dimension overhang.
- When the span is in a horizontal curve the girders are on chords, add a note stating that spacing shown for the girders is along radial lines at the beginning and end of bridge and working line/centerline/reqd. deck constr. joint (as appropriate) locations only.
- Show typical deck thickness (between girders) and reference SDR-1 if applicable.
- Show typical deck thickness at outside edge of slab.
- Show deck drains if applicable and reference Bridge Special Project Drawing SBD-1.
- Show drip bead and reference Bridge Special Project Drawing SBD-1.
- Reference Bridge Special Project Drawings for applicable details in this section.

- Show gutterline to gutterline, gutterline to edge of slab, and out to out slab dimensions.
- Locate centerline/w.l. of bridge, profile grade or other control lines and show dimensioning to centerline of girders from this line. Show location of profile grade line w/respect to c.l./w.l. bridge or other control line(s).
- Indicate girder type (i.e., AASHTO Type II, BT-72, etc.).
- Show deck slope and refer to Bridge Special Project Dwg. SBD-1 for 6' parabolic crown details if applicable.
- Verify that the slopes shown on the Deck Cross-Sectional View agree with the slopes shown on the roadway typical section.
- Show and label construction joint at base of barrier rail. Label rail and refer to Bridge Special Project Drawing BBR-1, BBR-2, or BBR-M(54) as appropriate.

If SDR-1 is NOT used:

- Show dimension between longitudinal reinforcement (Bars D). For the usual 7" deck, this dimension will be 1 3/4".
- Show complete deck reinforcement details in the TYPICAL CROSS SECTION. Identify, show appropriate number, spacing, cover and dimensioning for all longitudinal and transverse reinforcing (transverse Bars A, C, any supplemental bars (i.e. C1) if required; longitudinal Bars D, supplemental bars (i.e. DD) if required; barrier rail reinforcing that extends into the deck only).
- Show location, dimension, and note optional splices for top and bottom transverse deck reinforcing bars if bars lengths exceed 40 feet but are less than 60 feet.

3. END VIEW:

If section is symmetrical, then may be combined with TYPICAL HALF CROSS SECTION. For ordinary bridges using EBEW details end view cross sections may be omitted.

- Identify the view being represented (i.e., TYPICAL END VIEW AT OPEN JOINT, TYPICAL HALF END VIEW @ OPEN JOINT, etc.).
- Indicate and reference appropriate Bridge Special Project Dwg. EBEW(x) for edge beam or end wall details represented.
- Show drip bead.
- Show bridge joint armor plate. On continuous deck bridges, show view(s) at open joint with armor plate and indicate by note that end view(s) at required slab construction joint(s) are the same except omit armor plate. Reference Bridge Special Project Drawing SBD-1 for armor plate details.
- For special considerations such as Stage Construction, show location, details and dimensions of construction joints, custom reinforcement, armor plate splice points, etc. not covered by EBEW standards. Use capture circle(s), block(s), etc. and show enlargements as needed to clearly convey details.

- Reference Bridge Special Project Drawings for applicable details in this section.
- Show other required information not included with the typical deck cross section(s).

4. ESTIMATED QUANTITIES:

- Provide quantities and grade/strength for 502B POUNDS STEEL REINFORCEMENT (round up to nearest 10 pounds), 508A POUND STRUCTURAL STEEL (round up to nearest pound), and 510C CU. YDS. BRIDGE CONCRETE SUPERSTRUCTURE (round up to nearest 0.1 cu. yd.) in that order.
- If details address more than one span, separate quantities for each span or add note to indicate that quantities shown are for one span only.
- On continuous deck spans, show the total quantity for all spans made continuous.
- If deck is built in stages, separate quantities for each stage.

5. MISCELLANEOUS

- Sections at joints. Include with span details if joint layout sheet is not included. See Section 4.1.5 for requirements.
- Transverse deck reinforcing layout. This is usually required for bridges skewed greater than 25 degrees and constructed in stages. See Section 6.2 for example.
- Deck pouring schedule. When the deck is continuous and the span lengths are greater than 80', a pouring schedule is required. Pour lengths, sequence and longitudinal reinforcing layout should be furnished by the designer. See Figure 5.33.
- Show reinforcing details and include bill of reinforcement.
- Denote cut off bar detail as "BEGIN SPAN" and "END SPAN", if different, and label location as such in Bill of Reinforcement.

6. NOTES:

- SEE BRIDGE SPECIAL PROJECT DRAWING SBD-1 FOR DETAILS.
- SEE BRIDGE SPECIAL PROJECT DRAWING SDR-1 FOR DETAILS.
- SEE BRIDGE SPECIAL PROJECT DRAWING BBR-1 FOR DETAILS.
- SEE BRIDGE SPECIAL PROJECT DRAWING EBEW_{xx} FOR DETAILS.
- SEE BRIDGE SPECIAL PROJECT DRAWING BES-_{xx} FOR DETAILS.
- AT THE CONTRACTOR'S OPTION, BARS C (or Bars A and C if they're called out that way) MAY BE SPLICED 30 DIA. (MIN.). SPLICE TOP BARS CENTERED AT MID-POINT BETWEEN GIRDERS AND BOTTOM BARS CENTERED OVER CENTERLINE OF INTERIOR GIRDER ONLY. OPTIONAL SPLICE(S) NOT INCLUDED IN BAR DIMENSIONS AND ESTIMATED QUANTITIES SHOWN.

- AT THE CONTRACTOR'S OPTION, BARS D AND W(x) (include as appropriate) MAY BE SPLICED 30 DIA. (MIN.). LOCATION OF SPLICES FOR BARS D AND W(x) (include as appropriate) THAT MAKES USE OF STOCK BAR LENGTHS MAY BE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL. SPLICED BAR LENGTHS SHALL BE 10'-0" (MIN.). OPTIONAL SPLICE NOT INCLUDED IN BAR DIMENSIONS AND ESTIMATED QUANTITIES SHOWN.
- SPLICE BARS (TYPE) D, & W(x) (include as appropriate) 30 DIA. (MIN.)
- AT THE CONTRACTOR'S OPTION, ALTERNATE LOCATIONS OF SPLICES FOR BARS (TYPE) D THAT MAKES USE OF STOCK BAR LENGTHS MAY BE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL. SPLICED BAR LENGTHS SHALL BE 10'-0" (MIN.).
- For continuous decks add the following text to the note shown above: "SPLICING OF BARS D WILL NOT BE PERMITTED WITHIN 10'-0" OF REQUIRED SLAB CONSTRUCTION JOINT AT BENT(PIER) LOCATIONS."
- For curved spans: "LENGTHS SHOWN FOR BARS (TYPE) D ARE BASED ON THE LONG SIDE OF SPAN AND INCLUDE ADDITIONAL LENGTH REQUIRED FOR SPLICE(S). AMOUNT OF SPLICE WILL INCREMENTALLY INCREASE FROM LONG SIDE OF SPAN TO SHORT SIDE."

4.2.1.2 Girder Details

1. GIRDER ELEVATION:

- Show overall girder length (along centerline of girder) and dimensioning from centerline of bearing to centerline of bearing and from centerline of bearing to end of girder. Half girder elevation is acceptable as long as the girder is symmetrical about the midpoint. When design requires draped strands, show and dimension mid-point of girder and dimension location of hold downs. **DO NOT** Reference Bridge Special Project Dwg. SPGD-1 for holddown point details.
- Show stirrup spacing and verify that spacing + clearance = overall girder length.
- Show strands and verify that location of strands agrees with cut sections.
- Indicate strand size, number of strands, and whether strands are draped, straight or tie.
- Show threaded inserts and/or holes for edge beam or end wall connections. Reference SPGD-1.
- Show confinement reinforcing Bars B at ends of girder and indicate spacing.
- Label elevation detail, (i.e. GIRDER ELEVATION (TYPE BT-72), etc. and note that dimensioning is along centerline of girder if girder ends are skewed.
- For girders that will require Type 4 Bearings, show sole plate. Reference SPGD-1.
- On Bulb Tee girders, show Bars U and in the vicinity include a note stating "SPACE AS REQUIRED BY THE FABRICATOR".
- On Bulb Tee girders, show Bars T and space at 20 spaces @ 6" o.c.=10'-0" at the ends and at 1'-0" o.c. maximum for the remainder.

2. GIRDER CUT SECTIONS (See Figures 5.2 thru 5.6):

- Show Typical Girder Section with dimensions.
- Show section at end of girder with strand pattern, reinforcement, holes/inserts, and sheathing if any.
- Do NOT show clearances to reinforcement.
- Show section at midpoint of girder with strand pattern and reinforcement.
- Show sheathed strands at end of girder if applicable and flag sheathing designation to a note indicating length of sheathing required.
- Show tie strands in cut sections if applicable and call out strand size and pull force.
- Show "stick-up" dimension for Stirrups. Stick-up may be double dimension in section at midpoint of girder for multiple stirrup types.

Note: Strand pattern and reinforcement sections may be separated as necessary for clarity.

3. MISCELLANEOUS:

- Include detail of haunch over top of girder based on designer provided data. See Figure 5.1.
- Show Reinforcing Bar Details and verify dimensions shown.
- Ensure enough overhang for bearings on skewed girder ends.

4. NOTES:

The following notes should be provided on every girder detail sheet.

- PRESTRESSING STRANDS SHALL BE _____ DIAMETER 270,000 PSI _____ WITH AN INITIAL TENSION OF _____ LBS./STRAND UNLESS OTHERWISE NOTED. (*Designer to furnish _____ information in design sketches.*)
- THE GIRDER CONCRETE SHALL HAVE A MINIMUM OF _____ PSI COMPRESSIVE STRENGTH PRIOR TO RECEIVING PRESTRESSING FORCE AND A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF _____ PSI. (*See designer sketches for compressive strength requirements.*)
- STRANDS SHOWN THUS (O) SHALL REMAIN UNBONDED BY USING PLASTIC SHEATHS AROUND CABLES FOR A DISTANCE OF _____ FROM THE ENDS OF THE GIRDER. (*Designer to furnish this information and may require multiple statements.*)
- ALL STRANDS NOT TO BE ENCASED IN CONCRETE SHALL BE CUT FLUSH AT EACH END OF THE GIRDER. COAT GIRDER ENDS WHERE STRANDS ARE CUT WITH AN APPROVED EPOXY COATING. STRANDS TO BE ENCASED IN CONCRETE MAY EXTEND 2" FROM THE END OF THE GIRDER.
- THREADED BARS R2 AND THREADED INSERTS SHALL BE INCLUDED IN THE BID ITEM "513B, PRETENSIONED-PRESTRESSED CONCRETE GIRDERS, TYPE _____".
- GIRDER ENDS SHALL BE VERTICAL IN FINAL ERECTED POSITION.
- CONNECTION ANGLES ARE REQUIRED ON BOTH FACES OF ALL GIRDERS AT THE FIXED END AND BOTH FACES OF THE EXTERIOR GIRDERS ONLY AT THE EXPANSION END. SEE BRIDGE SPECIAL PROJECT DWG. SPGD-1 FOR DETAILS. NOTE: *If skidblocks are used at the expansion end, this note will require modification or possible omission.*
- UNLESS OTHERWISE SHOWN, STIRRUPS AND CONFINEMENT STEEL SHALL BE SECURELY TIED TO THE PRESTRESSING STRANDS TO PROVIDE A MINIMUM OF 1" CONCRETE COVER.
- THE BRIDGE ENGINEER WILL CONSIDER ALTERNATE GIRDER REINFORCEMENT UTILIZING WELDED WIRE FABRIC IN LIEU OF TIED REINFORCING FOR BARS B AND BARS T. THE EQUIVALENT AREA OF STEEL AND SPACING OF BARS SHALL BE MAINTAINED. NOTE: *Omit "BARS T" when girder is an AASHTO shape.*
- SEE BRIDGE SPECIAL PROJECT DRAWING SPGD-1 FOR DETAILS.

4.2.2 Details for Structural Steel Girder Spans

All structural steel details have not been addressed in this manual. When detailing ladders and platforms, navigational light brackets, cat walks, rocker bearings, etc. refer to details from a previous project and/or as directed by your supervisor and adapt to the bridge you are working on.

4.2.2.1 Span Details

1. PLAN VIEW:

- Overall span length joint to joint (For end span, show dimension from Beginning/End of Bridge to the working line of joint of the next span or on continuous spans, from working line of joint/centerline bent to working line of joint/centerline bent as appropriate).
- If skewed, show skew angle.
- On skewed bridges, show transverse dimensioning on left end of span and show skewed dimensioning on right end of span.
- On curved bridges, show dimensions along both sides of slab and along centerline of bridge.
- Show joint reference (i.e. Begin, End of Bridge, working line (W.L.) of joint, centerline of Bent No. X, etc.) and begin and end span stations.
- Show required joint opening @ 70 degrees F for expansion/fixed condition, omit temperature and show joint opening only for fixed/fixed condition.
- If applicable, identify Bridge Joint Armor Plate(s) and reference Bridge Special Project Dwg. SBD-1.
- If applicable, identify Expansion Dam(s) and reference table for required opening in increments of 10 degrees from 20 degrees F to 120 degrees F.
- Note barrier rail joints and refer to Bridge Special Project Dwg. BBR-1, BBR-2, or BBR-M(54) for details. Intermediate joints should be shown perpendicular to the rail. Joints at c.l. of bent/pier should be shown parallel to the skew angle.
- Show all deck drains, if applicable, and reference Bridge Special Project Dwg. SBD-1 for details. Note the deck drain spacing, if different than 5'-0" as shown on Bridge Special Project Dwg. SBD-1.

Verify that the following is addressed:

- 1) Reduce spacing to 4'- 0" o.c. for bridge widths greater than 44 feet gutter to gutter.
- 2) Reduce spacing to 4'- 0" o.c. if bridge is in full superelevation and gutter to gutter dimension is greater than 28 feet.
- 3) Omit deck drains on high side of span if bridge is in full superelevation.

- 4) Omit drains in portions of spans over roadway lanes or railroad R.O.W.
- 5) Omit drains within 10'-0" of bridge ends and 5'-0" of interior bents.
- 6) When the bridge is in a sag vertical curve and the low point falls on the bridge, verify spacing of drains with the designer or section supervisor. If necessary, consult with the Bridge Hydraulic Engineer for assistance in determining deck drain spacing.
- 7) Blockouts should be spaced as above, but omit blockouts within 3'-0" of barrier rail joint.

- Show girders and illustrate using the width of the top flange.
- Identify centerline (C.L.) or working line (W.L.) of bridge and reference it to centerline of roadway, construction, survey, profile grade, or baseline as applicable. Dimension centerline to profile grade line if separate.
- Locate and identify girders, gutterline and outside edge of slab with respect to centerline or working line of bridge. Show overall width of bridge and barrier rail width.
- Show numbering of girders left to right, stations ahead.
- Show finished grade elevations at beginning and end bridge and working line of joint/centerline Bent locations at gutter lines, girder lines, centerline of bridge, profile grade, as applicable. Show all elevations at required locations or in tabular form.

If SDR-1 is NOT used:

- Show representative transverse deck reinforcement (Bars A & C) all the way across the bridge (no window). Show clearance to edge of slab.
- For skews 25 degrees and less, detail transverse deck reinforcement to be placed along skew.
- For skews greater than 25 degrees, use incrementally cutoff bars in skewed portion of deck and show bars perpendicular to centerline of bridge. Determine number of required cutoff bars by computing length of the first cutoff bar per detail shown on Bridge Special Project Drawing SBD-1. Calculate the incremental cutoff and then compute number of bars so that the length of the last cutoff bar is no less than 1'-6". Include a hook on the ends of these bars placing hook adjacent to the joint. Include Bars MM and detail Bars MM with hook on one end placing hook adjacent to the joint. Space per detail on Bridge Special Project Drawing SBD-1.
- When span is curved and skewed greater than 25 degrees, include a note stating Bars A & C (or Bars C only) shall be placed along radial lines and the spacing shall be measured based on the long side of the span. Include cutoff bars similarly to above. When skewed less than 25 degrees, include a note stating spacing of Bars A & C (or Bars C) shall be measured based on the long side of the span.
- Provide splice and bar layout note(s) as appropriate for longitudinal deck reinforcing Bars D and transverse deck reinforcing Bars A and C (or Bars C only) (See Section 3.3.2.6.1).

2. DECK CROSS-SECTIONAL VIEWS:

- Identify the section being represented by the view (i.e., TYPICAL CROSS SECTION or TYPICAL HALF CROSS SECTION, etc.).
- Number girders left to right, show girder spacing and dimension overhang.
- Show gutterline to gutterline, gutterline to edge of slab, and out to out dimensions.
- Locate C.L. or W.L. of bridge and show dimensioning to centerline of girders from this control line.
- If span is in horizontal curve add a note stating that dimensions are along radial lines. If the girders are on chords (simple spans only), add a note stating that spacing shown for the girders is along radial lines at the beginning and end of bridge and working line joint (as appropriate) locations only.
- Show typical deck thickness (between girders) and reference SDR-1 if applicable.
- Show typical deck thickness at outside edge of slab.
- Show deck drains if applicable.
- Show drip bead and reference Bridge Special Project Drawing SBD-1.
- Reference Bridge Special Project Drawings for applicable details in this section.
- Show and indicate construction joint at base of barrier rail. Label rail and refer to Bridge Special Project Drawing BBR-1, BBR-2, or BBR-M(54) as appropriate.
- Indicate girder type (i.e., wide flange W ___x ___ or steel plate girder).
- Show and label bridge joint armor plate if applicable. Reference Bridge Special Project Drawing SBD-1.
- Show and label expansion dam if applicable and reference appropriate sheet for details.
- Show cross frames.
- Show deck slope and refer to Special Project Dwg. SBD-1 for 6' parabolic crown details if applicable.
- Verify that the slopes shown on the Deck Cross-Sectional View agree with the slopes shown on the roadway typical section.
- If stiffeners are present, show stiffener plate on outside face of exterior girder and note that outside stiffener plates are required at bearing locations only.

If SDR-1 is NOT used:

- Show dimension between longitudinal reinforcement (Bars D). For the usual 7" deck, this dimension will be 1 ¾".

- Show complete deck reinforcement details in the TYPICAL CROSS SECTION. Identify, show appropriate number, spacing, cover and dimensioning for all longitudinal and transverse reinforcing (transverse Bars A, C, any supplemental bars (i.e. C1) if required; longitudinal Bars D, supplemental bars (i.e. DD) if required; barrier rail reinforcing that extends into the deck only).
- Show location, dimension, and note optional splices for top and bottom transverse deck reinforcing bars if bars lengths exceed 40 feet but are less than 60 feet.

3. END VIEW:

If section is symmetrical, then may be combined with TYPICAL HALF CROSS SECTION.

- Identify the view being represented (i.e., TYPICAL END VIEW AT OPEN JOINT, TYPICAL HALF END VIEW AT OPEN JOINT, etc.).
- Show drip bead.
- As applicable, show bridge joint armor plate. Reference Bridge Special Project Drawing SBD-1 for armor plate details.
- As applicable, show expansion dam. Reference appropriate bridge sheet for details.
- For special considerations such as Stage Construction, show location, details and dimensions of construction joints, custom reinforcement, armor plate and/or expansion dam splice points, etc. not covered by plan details. Use capture circle(s), block(s), etc. and show enlargements as needed to clearly convey details.
- Show, label and reference to the appropriate Bridge Special Project Drawing misc. items such as fences that are attached to the top of barrier rail, etc.
- Include navigation lighting brackets and fixtures, utilities such as water lines if required.
- Show other required information not included with the typical deck cross section(s).

4. POURING SCHEDULE (See Figure 5.33):

- If continuous steel spans, provide pouring schedule. Pour positive moment locations 1st, end of span 2nd pour, negative moment locations (over bent or pier) pour last. Follow instructions as given by the designer or your supervisor.
- If expansion dam(s) are required at the end(s) of continuous welded plate girder spans, then utilize short pours (10 to 15 feet at the ends of the continuous unit) as final deck pours. Add a note stating "IN ORDER TO INSURE PROPER ALIGNMENT OF BOLT HOLES IN THE EXPANSION DAM AND GIRDERS, PRIOR TO POURING ANY DECK CONCRETE AND FINAL TORQUING OF CROSSFRAME BOLTS AT THE JOINT, A FULL SIZE METAL TEMPLATE MATCHING THE EXPANSION DAM SHALL BE INSTALLED AT THE JOINT LOCATION TO ALLOW FOR ANY NECESSARY ADJUSTMENT OF THE GIRDERS. COST OF TEMPLATE SHALL BE INCLUDED IN PAY ITEM 508B."

- Show dimensions, pour lengths, sequence and longitudinal reinforcing layout as furnished by the designer.

5. SPECIAL DETAILS:

- If expansion dams are utilized, provide details for special requirements for concrete and reinforcement adjacent to the joint. See example sheets.
- If required, provide details for barrier rail cover plate over joint in rail adjacent to expansion dam. See example sheet.

6. MISCELLANEOUS:

- Provide reinforcement details and reinforcement schedule.
- Provide joint section details when a separate joint section sheet is not provided.

7. ESTIMATED QUANTITIES:

- Provide quantities and grade/strength for 502B POUNDS STEEL REINFORCEMENT (round up to nearest 10 pounds), 508A POUND STRUCTURAL STEEL (round up to nearest pound), 508B POUND STRUCTURAL STEEL SUPERSTRUCTURE (round up to nearest pound), and 510C CU. YDS. BRIDGE CONCRETE SUPERSTRUCTURE (round up to nearest 0.1 cu. yd.) in that order.
- When two grades of steel are used for superstructure elements, show the quantity of steel for each grade (i.e., Grade 36, Grade 50).
- If details address more than one span or continuous unit that are identical to each other, separate quantities for each span/continuous unit or add note to indicate that quantities shown are for one span/continuous unit only.
- If stage construction, separate stages. If more than one lane, separate lanes (i.e., "WESTBOUND, EASTBOUND", etc.).
- When calculating bolt quantities include the full length of bolt. There should be no deduction in plate quantities for bolt holes. See figures 5.37 & 5.38.

8. NOTES:

- SEE BRIDGE SPECIAL PROJECT DRAWING SBD-1 FOR DETAILS.
- SEE BRIDGE SPECIAL PROJECT DRAWING SDR-1 FOR DETAILS.
- SEE BRIDGE SPECIAL PROJECT DRAWING BBR-1 FOR DETAILS.
- SEE BRIDGE SPECIAL PROJECT DRAWING BES-xx FOR DETAILS.
- AT THE CONTRACTOR'S OPTION, BARS C (or Bars A and C if they're called out that way) MAY BE SPLICED 30 DIA. (MIN.). SPLICE TOP BARS CENTERED AT MID-POINT BETWEEN GIRDERS AND BOTTOM BARS CENTERED OVER CENTERLINE OF INTERIOR GIRDER ONLY. OPTIONAL SPLICE(S) NOT INCLUDED IN BAR DIMENSIONS AND ESTIMATED QUANTITIES SHOWN.

- AT THE CONTRACTOR'S OPTION, BARS D AND W(x) (include as appropriate) MAY BE SPLICED 30 DIA. (MIN.). LOCATION OF SPLICES FOR BARS D AND W(x) (include as appropriate) THAT MAKES USE OF STOCK BAR LENGTHS MAY BE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL. SPLICED BAR LENGTHS SHALL BE 10'-0" (MIN.). OPTIONAL SPLICE NOT INCLUDED IN BAR DIMENSIONS AND ESTIMATED QUANTITIES SHOWN.
- SPLICE BARS (TYPE) D, & W(x) (include as appropriate) 30 DIA. (MIN.)
- AT THE CONTRACTOR'S OPTION, ALTERNATE LOCATIONS OF SPLICES FOR BARS (TYPE) D THAT MAKES USE OF STOCK BAR LENGTHS MAY BE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL. SPLICED BAR LENGTHS SHALL BE 10'-0" (MIN.).
- For continuous decks add the following text to the note shown above: "SPLICING OF BARS D WILL NOT BE PERMITTED WITHIN 10'-0" OF REQUIRED SLAB CONSTRUCTION JOINT AT BENT(PIER) LOCATIONS."
- For curved spans: "LENGTHS SHOWN FOR BARS (TYPE) D ARE BASED ON THE LONG SIDE OF SPAN AND INCLUDE ADDITIONAL LENGTH REQUIRED FOR SPLICE(S). AMOUNT OF SPLICE WILL INCREMENTALLY INCREASE FROM LONG SIDE OF SPAN TO SHORT SIDE."

4.2.2.2 Framing Plan Details

1. FRAMING PLAN (See Figures 5.25 thru 5.27):

- Provide a framing plan in the form of a line diagram showing the layout of the superstructure with controlling dimensions, lines, all framed members (girders, crossframes, connection plates, stiffeners, etc.) and descriptive verbiage.
- For curved structures using simple spans where girders are on chords, show centerline girder chord lengths "LG" in a table or show a dimension on each girder (Begin or End Bridge to working line joint; working line joint to working line joint) and include a note stating "GIRDER LENGTHS SHOWN ARE C.L. GIRDER ALONG CHORD LINES FROM BACK OF ABUTMENT (BEGIN OR END BRIDGE) TO WORKING LINE JOINT AND FROM WORKING LINE JOINT TO WORKING LINE JOINT". Show angle from centerline girder to station (skew) line, back and ahead.
- Provide overall span lengths.
- Locate centerline of girders w/respect to C.L. or W.L. bridge and provide spacing.
- If skewed, show skew angle.
- On skewed bridges show transverse spacing of girders on left end of span and skewed dimensions on right end of span based along station line. For curved/skewed bridges show spacing along skew relative to radial lines.
- Number girders left to right looking stations ahead.
- If applicable, locate field splices and coordinate labeling with field splice details (i.e. F.S. 1, F.S. 2 etc. or F.S. A, F.S. B, etc.).
- Locate centerline of bearings and centerline of bents and tie to controlling dimensions.
- Identify diaphragms/crossframes and show spacing. Provide indication of orientation of diaphragms. For curved bridges provide note to indicate that all diaphragms/crossframes are spaced along radial lines.
- Locate intermediate transverse stiffeners if applicable.
- Locate jacking stiffener plates if applicable.
- If design requires bearing stiffeners, include stiffener on outside face of exterior girders.
- Show girder radii (i.e. $R = \text{---}'$) for each girder if curved.

2. GIRDER ELEVATION (see Figure 5.28):

- Locate centerline of bearings and/or centerline bents.
- If applicable, locate field splices and coordinate labeling with field splice details (i.e. F.S. 1, F.S. 2 etc. or F.S. A, F.S. B, etc.).
- Show dimensioning from end of girder to centerline of bearing.

- Locate jacking stiffener plates if applicable.
- Dimension length of girder. Dimension lengths of top and bottom flange plates and web plates and specify plate sizes.
- Specify weld size for web to flange weld.
- Indicate shear stud size. Provide stud spacing and number of studs across width of flange.
- Show and dimension flange tension and/or compression zones.
- Provide STRUCTURAL STEEL NOTES if not shown on Framing Plan.
- If skewed, provide girder end detail showing clip of top flange in plan view.

3. STRUCTURAL STEEL NOTES:

Confirm with the designer or your supervisor the applicable notes and blank fill in's for your project.

- ALL STRUCTURAL STEEL SHALL CONFORM TO AASHTO M270 GRADE ____.
- FLANGE PLATES, WEB PLATES, FLANGE AND WEB SPLICE PLATES, FILL PLATES, BEARING STIFFENERS, INTERMEDIATE STIFFENERS, CONNECTION PLATES, _____, _____, SHALL CONFORM TO AASHTO M270 GRADE _____. ALL OTHER STRUCTURAL STEEL MEMBERS SHALL CONFORM TO SECTION 836 OF THE STANDARD SPECIFICATIONS.
- GIRDERS SHALL BE CAMBERED FOR TOTAL DEAD LOAD DEFLECTION AND (*as applicable*) VERTICAL CURVATURE. GIRDER WEBS SHALL BE CUT TO PROVIDE CAMBER (*for plate girders only*).
- TOTAL DEAD LOAD CAMBER SHALL BE INCREASED BY 10% TO COMPENSATE FOR ADDITIONAL DEFLECTION DUE TO CONCRETE SHRINKAGE (*for simple span units only*).
- GIRDER ENDS, BEARING STIFFENERS/CONNECTION PLATES AND JACKING STIFFENERS (*if present*) SHALL BE VERTICAL. ALL OTHER STIFFENERS, CONNECTION PLATES, SHOP AND FIELD SPLICES SHALL BE PERPENDICULAR TO FLANGES.
- STRUCTURAL STEEL UNIT IS DESIGNED FOR _____ FIT. GIRDER WEBS SHALL BE PLUMB IN THE FIT POSITION SPECIFIED. (Designer to provide fit condition).
- FLANGE PLATES SHALL BE UNIVERSAL MILL PLATE OR FLAME CUT FROM WIDER PLATE.

- ALL SHOP CONNECTIONS SHALL BE WELDED. ALL FIELD CONNECTIONS SHALL BE BOLTED WITH ___" DIAMETER ASTM F3125 GRADE A325 HIGH STRENGTH BOLTS IN ___" DIAMETER HOLES UNLESS OTHERWISE NOTED. ALL BOLTS, NUTS AND WASHERS SHALL BE MECHANICALLY GALVANIZED IN ACCORDANCE WITH ASTM B695 CLASS 50.
- NO FIELD WELDING, EXCEPT FOR INSTALLATION OF SHEAR STUDS AND ATTACHMENT OF BEARINGS, WILL BE PERMITTED ON THE STRUCTURAL STEEL SUPERSTRUCTURE UNIT.
- SHEAR STUDS SHALL NOT BE CUT IN THE FIELD UNLESS APPROVED IN WRITING BY THE BRIDGE ENGINEER.
- SEE SECTION 508.03(d)8 FOR WELDED SHEAR STUD INSTALLATION, INSPECTION AND TESTING REQUIREMENTS.
- STABILITY OF THE STEEL GIRDER UNITS DURING ALL PHASES OF CONSTRUCTION SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. ANY TEMPORARY CROSS BRACING OR SUPPORT DEEMED NECESSARY BY THE CONTRACTOR TO INSURE STABILITY OF THE STRUCTURE UNTIL CONSTRUCTION IS COMPLETED SHALL BE PROVIDED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE PROJECT. WORKING DRAWINGS FOR SUCH BRACING, IF REQUIRED, SHALL BE SUBMITTED IN ACCORDANCE WITH ARTICLE 105.02(C) OF THE STANDARD SPECIFICATIONS. *(This note is required for simple and continuous span units).*
- If rolled beams are detailed in the plans then provide the following note:

THE CONTRACTOR MAY SUBSTITUTE, ON AN EQUAL BASIS, WELDED PLATE GIRDERS FOR THE WIDE FLANGE BEAMS. THE PLATE GIRDERS ARE TO BE OF EQUIVALENT CROSS-SECTIONAL DIMENSIONS AS THE WIDE FLANGE BEAMS. CONNECTION PLATES ARE TO REMAIN AS SHOWN FOR THE WIDE FLANGE BEAMS. A ___" FILLET WELD WILL BE REQUIRED FOR THE FLANGE-TO-WEB WELD.

- For Horizontally Curved *Welded* Plate Girders the designer should determine if heat curving is permissible. If permissible, provide the following note:

THE HEAT UP-SET METHOD AS DESCRIBED IN SECTION 836.19 OF THE STANDARD SPECIFICATIONS MAY BE USED TO PROVIDE HORIZONTAL CURVATURE IN THE WELDED PLATE GIRDERS.

If not permissible, provide the following note:

HORIZONTAL CURVATURE OF THE WELDED PLATE GIRDER SHALL BE ACCOMPLISHED BY CUTTING FLANGE PLATES TO THE RADII SHOWN ON THE PLANS FROM WIDER PLATE. HEAT CURVING OF MATERIAL SHALL NOT BE ALLOWED.

- For Horizontally Curved *Rolled* Beams the following note should be provided: THE HEAT UP-SET METHOD AS DESCRIBED IN SECTION 836.19 OF THE STANDARD SPECIFICATIONS SHALL BE USED TO PROVIDE HORIZONTAL CURVATURE IN THE ROLLED BEAMS.
- WITH THE APPROVAL OF THE BRIDGE ENGINEER, FLANGE AND/OR WEB PLATE MATERIAL MAY BE SPLICED IF REQUIRED LENGTHS ARE UNOBTAINABLE. THE LOCATION OF THE APPROVED SPLICE SHALL BE AT APPROXIMATELY THE $\frac{1}{4}$ POINT FOR THE REQUIRED MATERIAL LENGTH. ANY SUCH FLANGE AND/OR WEB PLATE SPLICE SHALL BE MADE IN THE SHOP USING APPROVED AWS JOINTS AND FULL PENETRATION SUBMERGED ARC WELDS. NO FLANGE SHOP SPLICE SHALL BE PERMITTED WITHIN 2'-0" OF A WEB SHOP SPLICE.

4. TRANSVERSE BRACING DETAILS (See Figures 5.16 thru 5.20):

Refer to designer sketches and/or supervisor instructions for bracing types, locations, design details.

- Indicate member sizes for cross-frames or diaphragms.
- Cross-frame members (except for diagonals) or diaphragms should be shown level and located a minimum distance of 4" down from inside edge of top flange. Indicate minimum distance to bottom cross-frame member from inside edge of bottom flange.
- At bearing locations, verify that diaphragm or bottom member of cross-frame has adequate clearance for installation of anchor bolts.
- Where diaphragms are indicated at bearing and intermediate points (usually with rolled beam or shallow depth plate girders), bolt diaphragms directly to connection plates unless gusset plates are utilized.
- Where X style cross-frames are indicated, frame members (normally structural angles) together using gusset plates shop welded to the members and bolted to bearing and connection plates.
- Where K style cross-frames are indicated (usually at bearings at armor plate joints), frame members (normally a combination of structural diaphragms and angles) together using a combination of direct connection of members and gusset plates or only gusset plates shop welded to the members and bolted to bearing stiffeners or connection plates.
- Provide weld sizes for cross-frame members to gusset plates. Provide length of weld for cross-frame members to gusset plates.
- Indicate size of gusset plates.
- Show minimum edge distance to bolt holes and bolt hole spacing for connection and gusset plates or diaphragms as applicable.
- Provide fill plate between diagonals if applicable. Show plate thickness and weld requirements.
- On detail for bearing cross-frames, show stiffener plate on outside face of girder and note same.

5. STIFFENER AND CONNECTION PLATE DETAILS (see Figures 5.21 thru 5.24):A. STIFFENER PLATES AT BEARINGS; JACKING STIFFENERS:

- Show fillet weld to top and bottom flange (specify weld size as required by design) and note joints as “GRIND TO BEAR”.
- When bearing plate extends past flange, clip excess overhang on 1 to 1 slope cut from edge of flange.
- Fillet weld to web (specify weld size as required by design).
- Provide bearing connection or bearing stiffener plate size.
- Clip inside corners of plate adjacent to web 1 ½ to 1 ½.

B. INTERMEDIATE CONNECTION PLATES.

- Show fillet weld to top and bottom flange (specify weld size as required by design).
- Show fillet weld to web (specify weld size as required by design).
- Provide intermediate connection plate size.
- Clip inside corner of plate adjacent to web 1 ½ to 1 ½.

C. INTERMEDIATE TRANSVERSE STIFFENER PLATES

(not used as connection plates, straight girders only):

- Show fillet weld to compression flange (specify weld size as required by design).
 - Indicate “GRIND TO BEAR” (no weld size required) on tension flange.
 - Show fillet weld to web (specify weld size as required by design).
 - Provide intermediate transverse stiffener plate size.
 - Clip inside corner of plate adjacent to web 1 ½ to 1 ½.
- Note for A, B and C: *Include weld termination notes as shown in Figures 5.21 and 5.22.*

6. FIELD SPLICE DETAILS (See Figure 5.29):A. PLAN VIEW:

- Locate and identify centerline of girder.
- Locate and identify centerline of splice and ¼” open joint between girder ends.
- Dimension bolt spacing across width and length of flange splice.
- Indicate edge distance from outside row of bolts to edge of flange splice plate.

- Show by dashed lines hidden splice plate on inside of flange; show edge distance from inside row of bolts to splice plate.
- Dimension overall width and length of flange splice plate.
- Show taper requirements of 2.5:1 when varying width flanges are to be spliced.

B. ELEVATION VIEW:

- Locate and identify centerline of splice and ¼" open joint between girder ends.
- Dimension horizontal and vertical bolt spacing for web splice.
- Indicate edge distance from outside row of bolts to edge of web splice plate.
- Dimension overall width and length of web splice plate.
- Specify web plate and top and bottom flange plate sizes.
- Specify top and bottom and inside and outside flange splice plate size.
- Specify web splice plate size.
- Specify flange (and web if required) fill plate sizes.
- Insure that a minimum of 3" is being provided between the inside edge of the inside flange splice plates and the first horizontal row of web splice bolts.

NOTE: Provide plan and elevation view for each field splice condition and coordinate labeling of field splice detail with labeling provided on the "Framing Plan and Girder Elevation" detail sheet.

7. MISCELLANEOUS DETAILS:

A. CAMBER DIAGRAM (See Figure 5.30):

- Provide camber diagram that includes camber ordinates in decimal foot due to steel only and total dead load. For spans 100 feet and less, ordinates should be shown at tenth point locations between bearings. For spans greater than 100 feet up to 200 feet, ordinates should be shown at twentieth point locations between bearings. For spans greater than 200 feet, coordinate with designers for ordinates based on program limitations. Ordinate locations must correspond with finish grade elevation locations.

B. SHOP SPLICE DETAILS (See Figure 5.31):

- The shop splice detail(s) should clearly indicate any special requirements for the splice (i.e., tapering of flanges, 2 foot offset between web shop splice and flange shop splice, flush grinding of weld, etc.). Multiple details should be provided to clearly indicate all transition of flange and/or web thicknesses.

C. SHEAR STUD DETAIL (See Figure 5.32):

- Provide cut section of girder and locate studs across width of girder flange relative to centerline of girder.
- Locate outside studs a minimum of 2 inches from edge of flange.
- Indicate size of shear studs.

D. TOP FLANGE TO STEEL TOOTH JOINT CONNECTION DETAIL (See Figure 5.23):

- Provide plan view detail of the top flange. Identify centerline of girder and centerline of bearing.
- Locate slots for bolts relative to centerline of girder and centerline of bearing.
- Identify slot size.

4.2.3 Bearing Details

4.2.3.1 Elastomeric Bearings (Steel or Conc. Gdrs.)

For prestressed concrete girder spans, typically utilize bearing details as provided on Bridge Special Project Drawing SPGD-1 as directed by the designer. Structural steel girder spans require special design and details.

- Calculate bearing plate thicknesses, T1 and T2. If bevel of bearing plate ($T2 - T1$) is greater than 0.125", beveled bearing plates should be specified. For example, Type 4 or 5 elastomeric bearings for prestressed concrete girders. Otherwise, Type 2 bearings should be used.
- When beveled bearing plates are required, tabulate required thicknesses. Dimension in decimal inches to the 2nd place. Group bearings together that have thickness dimensions that are equal when rounded to the second decimal place.

| BEARING PLATE THICKNESSES (INCHES) | | | |
|------------------------------------|---------|------|------|
| SPAN | GDR(S). | T1 | T2 |
| 1 | 1 - 3 | 1.45 | 1.55 |
| | 4 - 7 | 1.44 | 1.56 |
| | 8 - 11 | 1.43 | 1.57 |
| | 12 - 15 | 1.42 | 1.58 |
| 2 | 1 - 3 | 1.57 | 1.43 |
| | 4 - 7 | 1.56 | 1.44 |
| | 8 - 11 | 1.55 | 1.45 |
| | 12 - 15 | 1.54 | 1.46 |

The diagram shows a rectangular bearing plate with a slight upward slope from left to right. The left end has a thickness labeled T1, and the right end has a thickness labeled T2. An arrow above the plate points to the right, labeled 'UPSTATION'.

Typical Bearing Plate Thickness Table

When special bearing design is required for concrete or steel girders:

- Detail elastomeric bearing and bearing plate (beveled if required).
- For Type 2, 4, and 5 bearings, specify 12 gage steel plates.
- Indicate field weld size for attachment of Type 4 and 5 bearings to sole plate or girder flange.
- Check that holes in bearing plates or connection angles will work with required anchor bolt holes and slots.

Notes when special bearing design is required for concrete or steel girders:

- A BEARING LAYOUT (ERECTION PLAN) SHALL BE INCLUDED IN THE BEARING PAD FABRICATION DRAWINGS SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL AND SHALL INCLUDE ALL BEARINGS FOR EACH STRUCTURE. THE LAYOUT SHALL LOCATE EACH BEARING WITH RESPECT TO UNIQUE IDENTIFICATION NUMBERS AND SHALL INDICATE CORRECT PLACEMENT OF THE BEARINGS WITH RESPECT TO BEVELING. *(whenever beveled bearing plates are specified in the bridge drawings.)*
- THE CONTRACTOR SHALL REMOVE ANY RUST THAT APPEARS IN THE FIELD WELD AREAS. ALL DECK POURS SHALL BE COMPLETED PRIOR TO WELDING BEARING PLATE TO SOLE PLATE *(concrete girders)*/GIRDER *(steel girders)*. SEE SECTIONS 511 AND 837 OF THE STANDARD SPECIFICATIONS FOR BEARING PLATE PREPARATION REQUIREMENTS.
- SOLE PLATES SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH AASHTO M 111. BEVELED EDGES OF THE SOLE PLATE TO RECEIVE FIELD WELDING SHALL BE GROUND TO BARE METAL BEFORE BEING CAST IN GIRDER. *(This note required for concrete girders only.)*

NOTE: When possible, bearing details may be combined with details on another superstructure sheet.

4.2.4 Expansion Dam Details

4.2.4.1 Tooth Joint

Tooth Joints may occur at joint openings between concrete girder spans to steel girder spans, steel girder spans to steel girder spans, and at abutments adjacent to steel girder spans. This section of the Manual will NOT address each case that might be applicable for use of this type joint. See example drawings.

1. PLAN VIEW:

- Provide thickness, width and overall length of plates.
- Show ends of plates 1 ½” from each gutter line.
- Locate and identify centerline of girders either side of the joint.
- Dimension centerline bolt locations relative to centerline of girder for attaching expansion dam to top flange of girder. Locate centerline of bolts down length of girder (see Figure 5.23).
- Show bolt size for attaching joint to the structure. Show size of holes/slots in plates and size/depth of recesses. Include statement that recesses are to be backfilled with a cold applied silicone from the Qualified Materials LIST III-4.
- Show anchor stud dimensions (i.e., diameter and length) and spacing.
- Identify other plate, angle, etc. that will be part of the expansion dam unit.
- Indicate the working line of the open joint and “flag” the working line to a schedule of openings for various steel temperatures ranging from 20 to 120 degrees F.

2. TRANSVERSE SECTION:

- Show typical deck cross section either side of the joint. Show same for both sides of joint if superstructure types are different or if at an abutment.
- Locate centerline of girders and anchoring system (bolts and/or threaded rods) relative to girder centerlines.
- Show required deck slope. Locate parabolic crown if applicable.
- Show gutterline to gutterline dimension for expansion dam.
- Show dimension from top of deck to top of girder for concrete girders at centerline of girder locations.
- Show dimension from top of deck to top of web for steel girders at centerline of girder locations.
- Indicate slab thickness.

- Indicate top and bottom plate sizes and note that plates are to be bent to fit typical cross section.
- Indicate bolster block size (steel girders) and show required thickness on each side of bolster block.
- Include required 1/4" thick shim plate under bolster block. Include note to require 1/8" shims as necessary to adjustment.
- Concrete girders only; show 1" plate and note that plate shall be cut to fit parabolic crown and deck slope and to fit top of girders and slope between edges of girder flanges.
- Concrete girders only; include detail of threaded rod passing through flange including beveled plate.

3. PERPENDICULAR SECTION:

- Show working line of joint.
- Provide dimensions across width of tooth joint and note opening between teeth at 70 degrees F.
- Dimension slab depth and overall depth top of slab to top of web or girder flange (see transverse section for overall dimension location for concrete or steel girders).
- Locate and identify centerline bearing with respect to working line of joint.
- Show dimension from end of girder to centerline bearing and to working line joint.
- Locate and identify 1" diameter bolts for connecting expansion dam to steel girder flange. Show dimension from centerline bearing to centerline bolts.
- Provide hole size through tooth joint and slot size in top flange of steel girder.
- Locate and identify 1" diameter threaded rods, coupling nuts and bolts for connecting expansion dam to concrete girder flange. Show dimension from end of girder to centerline threaded rods.
- Show 1" plate for concrete girder connection.

4. TROUGH SECTION:

- Specify 3/16" minimum thickness for neoprene trough.
- Use 2"x2"x 1/4" continuous angles attached to vertical surface of tooth joint to mount neoprene trough and locate these angles 1 1/4" minimum relative to the bottom face of the tooth plate.
- Show connection of trough to tooth joint using 1/2" mechanically galvanized hex head bolts spaced 1'-6" o.c. max. Show bolts on one side of the trough such that the nut side of the attachment will be downward.

- Provide a 3/8" x 1 1/2" continuous backing bar to secure the trough to the angles.
- If tooth joint is for steel girder joining concrete girder, insure that vertical plate on side of concrete girder is provided with 1/2" diameter vent holes on 1'-0" centers located 1" from the top of the plate.
- Show bottom plate and bolster block and dimension to edge of top plate on slab side.
- Locate and identify all anchor studs.
- Locate and identify any other structural angles that are necessary for the tooth joint unit.
- Identify all other structural plates that are necessary for the tooth joint unit.

5. WELDING DETAIL:

- Indicate required welding (i.e., tooth plate to support plate, anchor angles to support plates, anchor angles to bolster block, trough support angles to vertical plates, etc.)

6. TOOTH CUTTING DETAIL:

- Provide detail for cutting of teeth in tooth joint. Teeth are typically spaced 2 1/2" on center and cut with a 1" radius. The tooth joint is cut from a single plate using a 1/4" cut line.

7. DRAINAGE TROUGH DETAIL:

- Provide detail for neoprene drain trough that attaches below tooth joint plates. Insure that sufficient slope has been provided on trough to allow for drainage. Trough should be dimensioned to accommodate the full range of movement.

8. TABLE OF JOINT OPENINGS:

- Provide table of required joint openings from 20° to 120° F steel in 10° increments. Note that the temperature is the temperature of the steel (not ambient air temp.).

9. BARRIER RAIL COVER PLATE:

- Provide details for barrier rail cover plate. See Example 6.2.2.1-8.

10. QUANTITIES:

- Provide estimated quantity for complete tooth joint unit. Include note stating quantity shown is included in superstructure quantities on the related bridge sheet.
- If quantity includes more than one tooth joint unit, provide note indicating the other locations that are included in the stated quantity.
- Round quantity up to the nearest 10 pounds.

11. NOTES:

- ALL STRUCTURAL STEEL IN THE TOOTH JOINT SHALL CONFORM TO AASHTO M270 GRADE 36 (MINIMUM) AND SHALL BE INCLUDED IN PAY ITEM 508B "EACH, STRUCTURAL STEEL SUPERSTRUCTURE".
- THE REINFORCED NEOPRENE TROUGH SHALL CONFORM TO SECTION 832.06 OF THE STANDARD SPECIFICATIONS. A 12"x12" CHECK SAMPLE SHALL BE CUT FROM THE ACTUAL PIECE OF NEOPRENE MATERIAL TO BE USED AS THE TROUGH. THE ALDOT INSPECTOR SHALL WITNESS CUTTING OF THE CHECK SAMPLE. THE NEOPRENE TROUGH SHALL BE CONSIDERED A SUBSIDIARY OBLIGATION OF PAY ITEM 508B "EACH STRUCTURAL STEEL SUPERSTRUCTURE".
- ALL WELDING SHALL BE PERFORMED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS. ALL FULL PENETRATION WELDS ARE REQUIRED TO HAVE RADIOGRAPHIC OR ULTRASONIC TESTING. A MINIMUM OF 10% OF ALL FILLET WELDS SHALL BE TESTED BY THE MAGNETIC PARTICLE METHOD.
- THE ENTIRE TOOTH JOINT ASSEMBLY SHALL RECEIVE A SYSTEM 1-A PRIME COAT IN THE SHOP. AREAS THAT WILL BE INACCESSIBLE AFTER ERECTION SHALL RECEIVE THE MAXIMUM COATING THICKNESS RECOMMENDED BY THE PAINT MANUFACTURER FOR A SINGLE COAT. THE PRIME COAT SHALL BE COMPATIBLE WITH THE PAINT TO BE APPLIED IN THE FIELD. SURFACES TO BE IN CONTACT WITH OR ENCASED IN CONCRETE WILL NOT REQUIRE FIELD PAINTING.
- AFTER FABRICATION AND SHOP PAINTING IS COMPLETED, THE TOOTH JOINT SHALL BE COMPLETELY SHOP ASSEMBLED. THE SHOP ASSEMBLED TOOTH JOINT SHALL BE SHIPPED TO THE CONSTRUCTION SITE AS A COMPLETE UNIT.
- THE TOOTHED PLATE SECTIONS SHALL BE CUT FROM A SINGLE PLATE MEASURING ___" THICK x ___" WIDE x ___' - ___" LONG. THESE SECTIONS SHALL BE MATCH MARKED FOR PROPER FIT. (Ensure extra 1/4" is added to width for loss due to burning of tooth joint.)
- ALL H.S BOLTS, (H.S. THREADED RODS, IF APPLICABLE), LOCK WASHERS AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM B695, CLASS 50 TYPE I.
- THE TOP FLANGE OF THE PLATE GIRDERS AND THE TOOTH JOINT SHALL BE DRILLED TO THE SAME METAL TEMPLATE.
- THE CONTRACTOR SHALL NEITHER DRILL NEW HOLES NOR MODIFY THE SIZE AND/OR SHAPE OF ANY EXISTING HOLES OR SLOTS IN THE GIRDERS, OTHER THAN AS SHOWN ON THE CONTRACT PLANS, WITHOUT THE PRIOR APPROVAL OF THE BRIDGE ENGINEER.

4.2.5 Incremental Deck Elevations at Finish Grade

Incremental point bridge sheet is required except for bridges on 0.00% grades. Chorded girders in a curve may necessitate providing incremental data as determined by the EOR.

- Set up incremental point elevation sheet on a 1:1 scale and use a minimum text size of 0.125.
- Provide data along gutters and centerline of girders from centerline of bearing to centerline of bearing.
- Also provide data at field splice locations for steel spans.
- Tenth point elevations should be provided for span lengths 100 feet and less.
- Twentieth point elevations should be provided for span lengths greater than 100 feet up to 200 feet.
- Coordinate with designers for incremental points for span lengths greater than 200 feet. Locations must correspond with camber ordinate locations (steel girders).

NOTE: When possible, incremental data may be combined with details on another superstructure sheet.

4.3 Substructure Sheets

4.3.1 Abutment Details

4.3.1.1 Backwall Type Abutment

This checklist is compiled for abutments with standard backwalls.

1. PLAN (See Figures 5.7 or 5.8):

- Show overall abutment dimensions.
- Number and label centerline of girders for Abutment 1 from right to left looking back station.
- Number and label centerline of girders for End of Bridge Abutment from left to right looking ahead station.
- Label centerline of piles.
- Dimension girder spacing along back of abutment backwall.
- Dimension pile spacing at centerline bearing.
- Show and label centerline of bearing.
- Locate centerline of piles. Verify that pile centroid is approx. under the centerline of bearing and the centerline of girders. See Figure 5.11.
- Locate centerline of drilled shafts.
- Verify that pile type and size specified on the bridge drawing agree with recommendations of the Foundation Report.
- When anchor bolts are required show anchor bolt and anchor bolt wells. Dimension from centerline of girder unless shown in pedestal details. Indicate anchor bolt type and reference Bridge Special Project Drawing SBD-1.
- For non-standard anchor bolts reference details for anchor bolt and anchor bolt well and provide details on abutment detail sheet.
- Show and label backwall thickness. In general, use 1'-0" backwalls on BT54, BT-63, and BT-72. Use 9" backwalls on AASHTO Type I, II, and III girders. Refer to designer's sketches for special situations.
- Show and label elastomeric bearing pads. Specify Mark No. if bearings from Bridge Special Project Dwg. SPGD-1 are being used. Specify size and type if standard bearings are not being used. Reference applicable sheet or Bridge Special Project Dwg. SPGD-1 for details.
- Label fixed or expansion and verify with GPAE.

- When bridge is curved and girders are on chords show angle between back of abutment and chord of girder in a table or at each girder.
- When bridge is curved and girders are curved (steel), show angle between tangent to c.l. girder at c.l. bearing and c.l. bearing in a table or at each girder.
- Show skew if applicable shown by perpendicular lines from back of abutment to control (stationing) line. End points of angle should land at 90 degrees to lines.
- For normal abutments, locate control line of abutment (c.l./w.l. etc.) with respect to control line of bridge (c.l./ w.l.).
- Show skidblocks at the exterior girders or other designated girders when so directed by the designer and/or your supervisor, otherwise show anchor bolts at the exterior girders.
- Verify minimum 1.5 inch clear between pedestal and backwall. See Figure 5.13 for pedestal layout guidance. See Figure 5.14 for pedestal reinforcing guidance. See Figure 5.15 for skidblock layout guidance.

2. ELEVATION – PILES AND DRILLED SHAFTS (See Figure 5.9):

- For normal abutments, detail beginning of bridge abutment looking back station and detail end of bridge abutment looking ahead station.
- Detail and label reinforcement in backwall on left side and cap and drilled shaft (if applicable) reinforcement on the right side (if symmetrical).
- Show anchor bolts when required.
- When the slope between bearing elevations of exterior girders is greater than 0.02 feet per foot, sloping of the cap is required. Show slope in feet per foot as per guidance in section 2.10.3.
- For pedestal caps, when the height of any pedestal is greater than 1'-0" then sloping of the cap is required.
- For stepped caps, when the difference between the low step and the high step is greater than 8" then sloping of the cap is required.
- For stepped caps, reinforcement is required when 6" or more concrete is above top of main reinforcement. See Figure 5.14.
- Show bearing elevations either in tabular form or shown directly on pedestals or steps (may instead be shown in plan view, but not both).
- Dimension wing heights based on elevations. Show elevations on top and bottom of wings and cap.
- When the abutment cap is sloped, show top of wing level on high side starting at outside edge of bridge deck outward and slope the low wing with the slope of the abutment. When the abutment is cap is level, show top of wings level on both sides. See Figure 5.10.

- Show top of bridge end slab and barrier rail dashed and refer to appropriate B.E.S. Bridge Special Proj. Drawing. Dimension depth of B.E.S and show depth as constant following finish grade.
- Show finish grade elevation at centerline bridge and/or centerline parabolic crown.
- Dimension the limits of bridge joint armor plate only when different from B.E.S. Bridge Special Proj. Drawing.
- Show top of pedestals level. Pedestal minimum thickness 4". When cap is level, dimension controlling pedestal thickness 4 inches. When cap is sloped, dimension controlling pedestal(s) thickness 4 inches at edge (see Figure 5.13).
- Label top and bottom of cap as level, if applicable.
- Number piles/shafts for Abutment No. 1 from right to left. Number piles/shafts for end of bridge abutment from left to right.
- Locate and dimension Drilled Shafts, show tip elevations actual or approximate as appropriate.
- Specify pile size.
- Use Bars A #4 at 8" o.c. for horizontal reinforcement in backwall. Bars may follow slope of top of backwall.
- Use Bars B # 6 at 9" o.c. (max.) for vertical reinforcement in backwall unless design specifies otherwise. Compute all Bars B to the same length maintaining 2" clear at top of bar to top of bridge end slab. If a significant difference in the heights of the wings (+3") exists, provide separate runs of Bars B (B1, B2).
- In the case of a pile abutment, space Stirrups S #5 @ 1'-0" o.c.(max.) between and outside exterior piling. Otherwise, space Stirrups according to designer's notes.
- Space Bars C #5 @ 1'-0" o.c.(max.) when pedestals are used. If cap is stepped (no pedestals), space @ 6" o.c. under girders (provide enough spaces to extend 3" to 6" beyond the edge of bearing on each side) and @ 1'-0" o.c.(max.) between girders.
- Show and label pile cap plates/channels if steel pile abutment and note that pile cap plates/channels required are detailed on Bridge Special Project Dwg. SBD-1 or else provide detail.
- Verify that direction of cap cut section(s) agrees with section details shown.
- Label optional construction joint in backwall 3" above top of cap.
- Label splice location for cap and backwall reinforcing whenever splicing is optional or required. See Section 3.3.2.6.2.
- Label required construction joint between backwall and B.E.S.

3. END VIEW:

- Detail abutment end view with note to slope cap to drain and note top of pedestal as level (N.A. stepped caps). End view shall omit parts of abutment beyond the first pedestal/step for clarity.
- Show and label optional construction joint.
- Dimension cap overhang on drilled shaft abutments.
(Refer to DRILLED SHAFT SECTION of this document for additional information.)
- Label required construction joint between backwall and B.E.S.

4. CUT SECTION(S) (See Figure 5.12):

- Show appropriate cap and backwall dimensions.
- Label pile size and specify batter on piling, i.e., 1 ½ "/ft. Locate centerline of piles. Verify that center or centroid of pile group is approx. under centerline of bearing.
- Show partial B.E.S. (dashed) and refer to appropriate B.E.S. Bridge Special Project Drawing.
- Show pedestal when applicable without reinforcement.
- Label reinforcement and dimension concrete cover over reinforcement. Maintain 3" cover on bottom mat of abutment reinforcement, 2" cover on stirrups and Bars C, and 2" cover on backwall reinforcing.
- When slope paving or aggregate surfacing is being specified to protect end slope at abutment provide 3" wide x ½ cap depth "lip" (extension) on front face of abutment cap to allow slope protection to tie into abutment.
- Dimension and label optional construction joint in backwall 3" above top of cap.
- Show 1'-0" pile embedment dimension.
- Label and identify pile cap channel and plate if present.
- Show anchor bolt wells when applicable.

5. MISCELLANEOUS DETAILS:

- Show plan view of pedestal details with anchor bolt wells and dimensions.
- Dimension anchor bolts/wells from centerline of girder unless shown in abutment plan view.
- Show pedestal reinforcement in a separate detail. Show 1½ " clearance to Bars Type U.
- Show reinforcement details and include bill of reinforcement.

6. ESTIMATED QUANTITIES:

- Show in the following order and provide quantities and grade/strength for 502A POUND STEEL REINFORCEMENT (round up to nearest 10 pounds), 508A POUND STRUCTURAL STEEL (round up to nearest pound), AND 510A CU. YD. SUBSTRUCTURE CONCRETE (round up to nearest 0.1 cu. yd.). Do not include armor plate in 508A.
- If abutment is built in stages, separate quantities for each stage.
- If details address more than one abutment, separate quantities for each abutment or add note to indicate that quantities shown are for one abutment only.

7. NOTES:

- SEE BRIDGE SPECIAL PROJECT DWG. SBD-1 FOR DETAILS.
- SEE BRIDGE SPECIAL PROJECT DWG. SPGD-1 FOR DETAILS.
- SEE BRIDGE SPECIAL PROJECT DWG. BES-xx FOR DETAILS.
- MAINTAIN 2" CONCRETE COVER AT TOP OF BARS B.
- AT THE CONTRACTOR'S OPTION, BARS A AND F (PS1 if applicable) MAY BE SPLICED 30 DIA. (MIN.). LOCATION OF SPLICES FOR BARS A AND F (PS1 if applicable) THAT MAKES USE OF STOCK BAR LENGTHS MAY BE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL. SPLICED BAR LENGTHS SHALL BE 10'-0" (MIN.). OPTIONAL SPLICES NOT INCLUDED IN BAR DIMENSIONS AND ESTIMATED QUANTITIES SHOWN.
- SPLICE BARS A AND F (PS1 if applicable) 30 DIA. (MIN.). AT THE CONTRACTOR'S OPTION, ALTERNATE LOCATIONS OF SPLICES FOR BARS A AND F (PS1 if applicable) THAT MAKES USE OF STOCK BAR LENGTHS MAY BE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL. SPLICED BAR LENGTHS SHALL BE 10'-0" (MIN.)."
- When the backwall extends up to finished grade include the following note: "TOP OF BACKWALL SHALL MATCH BRIDGE GRADE AND CROSS SLOPE."
- When anchor bolts and wells are present include the following note: "HORIZONTALLY ADJUST REINFORCING TO ENSURE CORRECT LOCATION OF ANCHOR BOLT WELLS."
- If skid blocks are specified in conjunction with Type 4 bearings, provide a note stating that "SKID BLOCKS SHALL BE POURED SEPARATELY FROM THE ABUTMENT CAP, REINFORCEMENT SHOULD BE DRILLED IN AND THAT A TYPE II EPOXY ADHESIVE SHALL BE APPLIED TO THE CONSTRUCTION JOINT LOCATION JUST PRIOR TO POURING THE SKID BLOCKS."

4.3.1.2 Semi-Integral Type Abutment (Prestress Concrete Girders ONLY)

This checklist is compiled for semi-integral style abutments which are used in conjunction with Bridge Special Project Drawings series EBEW only.

1. PLAN:

- Show overall abutment dimensions.
- Number and label centerline of girders for Abutment No. 1 from right to left looking back station.
- Number and label centerline of girders for End of Bridge Abutment from left to right looking station ahead.
- Label centerline of piles.
- Dimension girder spacing along back of abutment.
- Dimension pile spacing at centerline bearing.
- Show and label centerline of bearing.
- Locate centerline of piles. Verify that pile centroid is approx. under the centerline of bearing and the centerline of girders.
- Verify that pile type and size specified on the bridge drawing agree with recommendations of the Foundation Report.
- Show swedged dowel and location. Indicate diameter, length and embedment and refer to EBEW Bridge Special Project Drawing.
- Show and label wing thickness. In general, use 1'-0" wings on BT54, BT-63, and BT-72. Use 9" backwalls on AASHTO Type I, II, and III girders. Refer to designer's sketches for special situations.
- Show and label elastomeric bearing pads. Specify Mark No. if bearings from Bridge Special Project Dwg. SPGD-1 are being used. Specify size and type if standard bearings are not being used. Reference applicable sheet or Bridge Special Project Dwg. SPGD-1 for details.
- Show, label and dimension limits of 1/2" premoulded bituminous filler.
- Show and label strip waterstop.
- When bridge is in a curve and girders are on chords show angle between back of abutment and chord of girder in tabular form or at each girder.
- Show skew, if any, and locate from back of abutment with respect to control (stationing) line.
- For normal abutments, locate control line of abutment (c.l./w.l. etc.) with respect to control line of bridge (c.l./ w.l.).

- Show and dimension jawposts.

2. ELEVATION – PILES, DRILLED SHAFTS OR COLUMNS(END BENT):

- For normal situations, detail beginning of bridge abutment looking back station and detail end of bridge abutment looking stations ahead. Detail and label reinforcement in jawpost and wing on left side. Detail and label cap and drilled shaft (if applicable) reinforcement on right side (if symmetrical).
- When the slope of the difference between the outside steps is greater than 0.02'/' or the difference between the low step and the high step is greater than 8" then sloping of the cap is preferred.
- When the cap is sloped, show slope in feet per foot as per guidance section 2.7.3.
- Reinforcement is required when 6" or more concrete is above top of main reinforcement. See Figure 5.14
- Show bearing elevations either in tabular form or show directly on steps (may instead be shown in plan view, but not both).
- Dimension wing heights based on elevations. Show elevations on top and bottom of wings and cap.
- When the abutment cap is sloped, show top of wing and jawpost level on high side starting at outside edge of bridge deck outward and on the low side slope the wing with the slope of the abutment and detail top of jawpost level. When the abutment cap is level, show top of wings and jawpost level on both sides. Similar to Figure 5.10.
- Label bottom and steps of cap as level, as applicable.
- Number piles/shafts/column for Abutment No. 1 from right to left. Number piles/shafts/column for end of bridge abutment from left to right.
- Locate and dimension Drilled Shafts, show tip elevations actual or approximate as appropriate.
- Specify pile size.
- Use #5 bars at 8" o.c. max. for horizontal reinforcement in wing and #5 Bars at 1'-0" o.c. max. for vertical reinforcement in wings unless design specifies otherwise.
- In the case of a pile abutment, space Stirrups S#5 @ 1'-0" o.c.(max.) between and outside exterior piling. Otherwise, space Stirrups according to designer's notes.
- Space Bars C#5 @ 6" o.c. under girders (provide enough spaces to extend 3" to 6" beyond the edge of bearing on each side) and @ 1'-0" o.c.(max.) between girders.
- Show and label pile cap plates/channels if steel pile abutment and note that pile cap plates/channels required are detailed on Bridge Special Project Dwg. SBD-1 or else provide detail.

- Verify that direction of cap cut section(s) agrees with section details shown.
- Label required construction joints in wings level with top of cap.
- Label splice location for cap reinforcing on drilled shaft abutments whenever splicing is required. (Refer to REINFORCEMENT RECOMMENDATIONS section of this document for additional information regarding splicing of reinforcing steel.)

3. END VIEW:

- Detail abutment end view with note to slope cap to drain and note top of cap as level and show and label optional construction joint.
- Dimension cap overhang on drilled shaft abutments.
(Refer to DRILLED SHAFT SECTION of this document for additional information.)

4. CUT SECTION(S):

- Show appropriate cap and wing dimensions.
- Label pile size and specify batter on piling, i.e., 1 ½ "/ft. Locate centerline of piles. Verify that center or centroid of pile group is approx. under centerline of bearing.
- Label reinforcement and dimension concrete cover over reinforcement.
- When slope paving or aggregate surfacing is being specified to protect end slope at abutment provide 3" wide x ½ cap depth "lip" (extension) on front face of abutment cap to allow slope protection to tie into abutment.
- Dimension and label optional construction joint in wing level with top of cap.
- Show 1'-0" pile embedment dimension.
- Label and identify pile cap channel and plate if present.
- Show swedged dowel and well and label. Refer to appropriate EBEW Bridge Special Project Drawing and Bridge Special Project Drawing SBD-1 for details.

5. MISCELLANEOUS DETAILS:

- Show reinforcement details and include bill of reinforcement.

6. ESTIMATED QUANTITIES:

- Show in the following order and provide quantities and grade/strength for 502A POUNDS STEEL REINFORCEMENT (round up to the nearest 10 pounds), 508A POUND STRUCTURAL STEEL (round up to the nearest pound), AND 510A CU. YDS. BRIDGE SUBSTRUCTURE CONCRETE (round up to the nearest 0.1 cu. yd.). Do not include armor plate in 508A.
- If abutment is built in stages, separate quantities for each stage.

- If details address more than one abutment, separate quantities for each abutment or add note to indicate that quantities shown are for one abutment only.

7. NOTES:

- SEE BRIDGE SPECIAL PROJECT DWG. SBD-1 FOR DETAILS.
- SEE BRIDGE SPECIAL PROJECT DWG. SPGD-1 FOR DETAILS.
- SEE BRIDGE SPECIAL PROJECT DWG. BES-xx FOR DETAILS.
- MAINTAIN 2" CONCRETE COVER AT TOP OF BARS B.
- AT THE CONTRACTOR'S OPTION, BARS A AND F (PS1 if applicable) MAY BE SPLICED 30 DIA. (MIN.). LOCATION OF SPLICES FOR BARS A AND F (PS1 if applicable) THAT MAKES USE OF STOCK BAR LENGTHS MAY BE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL. SPLICED BAR LENGTHS SHALL BE 10'-0" (MIN.). OPTIONAL SPLICES NOT INCLUDED IN BAR DIMENSIONS AND ESTIMATED QUANTITIES SHOWN.
- SPLICE BARS A AND F (PS1 if applicable) 30 DIA. (MIN.). AT THE CONTRACTOR'S OPTION, ALTERNATE LOCATIONS OF SPLICES FOR BARS A AND F (PS1 if applicable) THAT MAKES USE OF STOCK BAR LENGTHS MAY BE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL. SPLICED BAR LENGTHS SHALL BE 10'-0" (MIN.)."
- ADJUST BARS C AND TYPE V TO ENSURE CORRECT LOCATION OF SWEDGED DOWELS.

4.3.2 Bent (Pier) Details

1. PLAN:

- Show overall cap dimensions
- Show spacing of girders along working line of joint.
- Number girders left to right.
- Locate and identify centerline of cap with respect to control line (station line) i.e., working line joint/required deck constr. joint (continuous decks).
- Locate and identify centerline of bearings and centerline anchor bolts.
- Verify skew and indicate angle showing between center line bent to working line bridge, center line bridge, tangent line or other control line. End points of angle should land at 90 degrees to lines.
- Locate center line of bent with respect to working line/center line of bridge.
- When applicable, show pedestals and indicate reference to specific detail drawing(s) for pedestal details. The design sketches will indicate if the cap has pedestals. See Figure 5.13 for pedestal layout guidelines.
- When applicable, show cap step locations and dimension accordingly. Usually, the cap will be stepped when the deck is continuous or continuous spans. The design sketches will indicate if the cap is stepped.
- When anchor bolts are required show anchor bolt and anchor bolt wells. Dimension from centerline of girder unless shown in pedestal details. Indicate anchor bolt type and reference Bridge Special Project Drawing SBD-1.
- For non-standard anchor bolts reference details for anchor bolt and anchor bolt well and provide details on bent detail sheet.
- Show and label elastomeric bearing pads. Specify Mark No. if bearings from Bridge Special Project Drawing SPGD-1 are being used. Specify size and type if standard bearings are not being used. Reference appropriate sheet or Bridge Special Project Drawing SPGD-1 for details.
- Show and label fixed/expansion sides and verify with GPAE.
- When girders are on chords show angle between working line/center line (station line) and chord of girder in tabular form or show in plan view.
- Show all elevations at required locations or in tabular form and note on top of pedestal or cap.
- At direction of the designer and/or your supervisor, use skidblocks on the expansion side. Otherwise, show anchor bolts as per above direction on exterior girders only.

2. ELEVATION:

- Show and label column width/diameter or drilled shaft diameter.
- Number columns from left to right, ahead station.
- Show cantilever dimensions and centerline to centerline dimension between columns with respect to centerline of bent.
- Detail cap reinforcement on left and column/shaft/footing reinforcement on right if symmetrical. Cap end bars may be shown on right for clarity.
- Show pedestals when applicable. Verify with the design sketches.
- Show cap steps when applicable. Verify with the design sketches.
- Show cut section arrows for cap and column, i.e. A-A, B-B. etc.
- Show and dimension reinforcement splices in cap and columns when splicing of main reinforcement is required. See Section 3.3.2.6.2.
- In the case of a pile bent, space Stirrups S#5 @ 1'-0" o.c.(max.) between interior piles and outside exterior piles. Otherwise, space stirrups according to designer's notes.
- If pile encasements are required include details. See Figure 5.34 for encasement guidelines.
- Space Bars C#5 @ 1'-0" o.c.(max.) when pedestals are used. If cap is stepped (no pedestals), space @ 6" o.c. under girders (provide enough spaces to extend 3" to 6" beyond the edge of bearing on each side) and @ 1'-0" o.c.(max.) between girders.
- When the slope between bearing elevations of exterior girders is greater than 0.02 feet per foot, sloping of the cap is required. Show slope in feet per foot as per guidance in Section 2.9.3.
- For pedestal caps, when the height of any pedestal is greater than 1'-0" then sloping of the cap is required.
- For stepped caps, when the difference between the low step and the high step is greater than 8" then sloping of the cap is required.
- For stepped caps, reinforcement is required when 6" or more concrete is above top of main reinforcement. See Figure 5.14.
- Label top and bottom of cap as level, if applicable.
- Show top of pedestals level. Pedestal minimum thickness 4". When cap is level, dimension controlling pedestal thickness 4 inches. When cap is sloped, dimension controlling pedestal(s) thickness 4 inches at edge (see Figure 5.13).
- Locate optional construction joint in riser 3" above top of cap if cap has riser and riser height is greater than 9".

- Dimension Hoops 3" above and below column construction joints. See Figure 5.40.
- Indicate construction joint(s) in columns. For pile, spread or rock footings, 6" above top of footing, top of drilled shaft, bottom of cap, intermediate pts. as req'd.
- Provide cap elevations. Show cap depth at end of cap or identify elevation and dimension control points if sloped and/or stepped caps.
- For pile footings, locate and show pile size.
- Show the bottom of footing elevations for spread/rock footings as "approximate". Show the actual bottom of footing elevation for pile footing (without the wording "approximate"). For drilled shafts, show approximate or actual as appropriate (see "DRILLED SHAFT" section).
- If applicable, show skidblocks. See figure 5.15.
- When the difference in bottom of cap elevation and top of drilled shaft elevation is less than 4'-0", extend the top of shaft to the bottom of the cap. Extend any permanent casing in this instance to the bottom of the cap. See figure 5.36.

3. END VIEW:

- Note top of pedestals as level or top of cap if stepped cap.
- Dimension cap overhang with respect to face of column or drilled shafts.
- Show construction joints at top of columns/shafts.
- Show dimension from joint line (station line) to centerline of column/drilled shaft when eccentricity exists.
- Show and label optional construction joint in riser 3" above top of cap if cap has riser and riser height is greater than 9".
- Show dimension from face of column to edge of footing.
- Show overall footing dimensions and detail, dimension and label piles.
- Detail and dimension construction joint 6" above top of footing.
- Detail cap end bars and footing reinforcement as applicable.
- Detail and dimension pile embedment and dimension 4" clearance between reinforcing mat and top of piles.
- When drawing top of cap, detail accordingly showing pedestals, cap steps, skidblocks as applicable.

4. CAP SECTION:

- Show, label and dimension centerline of cap and centerline of bearing. If there is eccentricity, show dimension between joint line (station line) and centerline of column/drilled shaft.
- Label reinforcement and show 2" reinforcement concrete cover. When cap is stepped, indicate 2" clear min.
- Set minimum spacing between all double rows of reinforcement at 4" unless specified differently by designer sketches.
- Show width and depth of cap and indicate depth as minimum if cap is stepped.
- Verify that orientation of cut section agrees with direction of cut arrows. Preferably orient cut section such that up-station is from left to right.
- Locate and dimension optional construction joint in riser 3" above top of cap if cap has riser and riser height is greater than 9".
- When double stirrups are required by design, insure that horizontal out-to-out dimension for stirrup bar has been calculated so that main steel can be placed without conflict with placement of the anchor bolt wells.
- Show anchor bolt wells.
- Verify Bars G embedment into cap with design sketches.

5. COLUMN SECTIONS:

- Show a section for every condition change. Label reinforcement and show reinforcement concrete cover. It is not necessary to cut section(s) at splices.
- Show column dimensions.

6. FOOTING SECTION DETAILS (PILE FOOTING):

- Show overall footing dimensions and label centerlines of piles.
- Label reinforcement and dimension reinforcement concrete cover. Detail, dimension and label piles.
- Verify that orientation of cut section agrees with direction of cut arrows.

7. MISCELLANEOUS DETAILS:

- Show plan view of pedestal details with anchor bolts and/or anchor bolt wells and dimensions and skid block dimensions/section when applicable.
- Dimension anchor bolts from centerline of girder unless shown in cap plan view.
- Show pedestal and skid block reinforcement in a separate detail. Show 1 ½" clearance to Bars U.
- Show reinforcement bar details and Bill of Reinforcement.

8. ESTIMATED QUANTITIES:

- Show in the following order and provide quantities and grade/strength for 502A POUND STEEL REINFORCEMENT (round up to nearest 10 pounds) and 510A CU. YD. BRIDGE SUBSTRUCTURE CONCRETE (round up to nearest 0.1 cu. yd.).
- If bent is constructed in stages, separate quantities by stage.
- If details address more than one bent, separate quantities for each bent or add note to indicate that quantities shown are for one bent only.

9. SPLICING REQUIREMENTS FOR REINFORCEMENT:

- For main reinforcement in cap, column and drilled shaft, verify splicing with designer. See Section 3.3.2.6 for other splicing requirements.

10. COLUMN CONSTRUCTION JOINTS AND STRUTS:

- When column heights exceed 20'-0", a construction joint is referenced per the Standard Specifications and column reinforcing is optionally spliced. See Section 3.3.2.6.2.
- Columns greater than 40 feet in height normally are provided with a strut. This information should be provided by your designer or Section Supervisor.

11. NOTES:

- SEE BRIDGE SPECIAL PROJECT DRAWINGS SBD-1 FOR DETAILS.
- SEE BRIDGE SPECIAL PROJECT DRAWINGS SPGD-1 FOR DETAILS.
- When column height exceeds 20'-0" (see Sec. 501.03(e)1 of the Standard Specifications), include a note stating: "AT THE CONTRACTOR'S OPTION, BARS (TYPE) M MAY BE SPLICED X' - XX" MIN. ABOVE THE COLUMN CONSTRUCTION JOINT ONLY. OPTIONAL SPLICE NOT INCLUDED IN BAR DIMENSIONS OR ESTIMATED QUANTITIES SHOWN."
- AT THE CONTRACTOR'S OPTION, BARS F MAY BE SPLICED 30 DIA. (MIN.). LOCATION OF SPLICES FOR BARS F THAT MAKES USE OF STOCK BAR LENGTHS MAY BE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL. SPLICED BAR LENGTHS SHALL BE 10'-0" (MIN.). OPTIONAL SPLICES NOT INCLUDED IN BAR DIMENSIONS AND ESTIMATED QUANTITIES SHOWN.
- SPLICE BARS F 30 DIA. (MIN.). AT THE CONTRACTOR'S OPTION, ALTERNATE LOCATIONS OF SPLICES FOR BARS F THAT MAKES USE OF STOCK BAR LENGTHS MAY BE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL. SPLICED BAR LENGTHS SHALL BE 10'-0" (MIN.)."
- When anchor bolts are used add a note stating "HORIZONTALLY ADJUST REINFORCEMENT TO ENSURE CORRECT LOCATION OF ANCHOR BOLT WELLS".
- If skid blocks are specified in conjunction with Type 4 bearings, provide a note stating that skid blocks shall be poured separately from the bent cap, reinforcement should be drilled in and that a Type II epoxy adhesive shall be applied to the construction joint location just prior to pouring the skid blocks.

12. SPECIAL NOTES:

- When pile footing foundations are being specified for a stream crossing, provide note stating, "BOTTOM OF FOOTING ELEVATIONS HAVE BEEN SET BASED ON PREDICTED SCOUR AND ARE NOT TO BE ALTERED WITHOUT THE APPROVAL OF THE BRIDGE ENGINEER".
- For large piers that may require structural steel cages for support of designed reinforcement for columns / footings, provide the following notes:
 - a) STRUCTURAL STEEL CAGES MAY BE UTILIZED BY THE CONTRACTOR FOR TYING AND PLACEMENT OF REINFORCEMENT CAGES FOR THE FOOTINGS AND COLUMNS. IF THE CONTRACTOR ELECTS TO USE STRUCTURAL STEEL CAGES TO SUPPORT THE DESIGNED REINFORCEMENT, THEN DETAILS OF THE PROPOSED STRUCTURAL STEEL CAGE(S) SHALL BE SUBMITTED TO THE BRIDGE ENGINEER FOR REVIEW PRIOR TO BEGINNING STEEL TYING OPERATIONS FOR THE COLUMNS AND/OR FOOTINGS.
 - b) ALL STEEL UTILIZED IN THE STRUCTURAL STEEL CAGES SHALL BE NEW.
 - c) THE CAGES SHALL BE ACCURATELY FABRICATED TO INSURE THAT ADEQUATE CONCRETE COVER AS DIMENSIONED ON THE BRIDGE PLANS IS PROVIDED ON THE REINFORCING STEEL.
 - d) FOOTING REINFORCEMENT SHALL NOT BE CONNECTED TO THE STRUCTURAL CAGE FOR THE COLUMNS.
 - e) THERE WILL BE NO DIRECT PAYMENT FOR THE STRUCTURAL STEEL CAGES. COST FOR FURNISHING, FABRICATION, AND INSTALLATION OF THE CAGES SHALL BE CONSIDERED A SUBSIDIARY OBLIGATION TO THE 502A "POUND, STEEL REINFORCEMENT" PAY ITEM.

4.3.3 Drill Shaft Details (Abutments or Bents)

1. DRILLED SHAFT ELEVATION:

- For drilled shaft foundations show top of shaft elevation as approximate unless extended to the bottom of cap (see Section 4.3.2 Topic 2). Confirm approximate top of shaft elevation with core boring hub elevations or ground line profiles.
- When permanent casing is required show top and bottom of casing elevations as approximate elevations except where permanent casing extends to the bottom of cap or strut. For water conditions, plan elevation of top of permanent casings shall be 2' above water line at time of survey unless bottom of cap is less than 2' above water line or drilled shaft is extended to the bottom of cap.
- Label construction joint between drilled shaft concrete and substructure concrete.
- Show drilled shaft dimensions.
- Provide 6" of concrete cover between main reinforcement (Bars DS) and bottom of hole. Provide 1'-0" of concrete cover between hoops and bottom of hole.
- Show bottom of drilled shaft elevation as approximate when required.
- Show approximate rock line elevation as applicable.

2. DRILLED SHAFT SECTIONS:

- Provide 6" of concrete cover on shaft hoop reinforcement. Less side cover (4") may be used for shafts socketed into rock.
- Show a section for every condition change. Label reinforcement and show reinforcement concrete cover. Cut section(s) at reinf. splices are not necessary.
- In the instance of drilled shafts with permanent casing when the reinforcing and diameter of the cased and uncased shaft is the same, it is not necessary to cut sections through both parts. One section will convey the necessary information.
- Show drilled shaft dimensions.
- Show and label permanent drilled shaft casing if applicable.

3. QUANTITIES

- When drilled shafts are detailed on a separate sheet, provide a quantity box and state the total quantity of steel reinforcement required for all shafts with a stated diameter.
- When drilled shafts are detailed combined with a substructure unit, include steel reinforcement quantities with that calculated for the abutment, bent or pier.

Include the following notes relative to drilled shaft quantities:

- PAYMENT FOR DRILLED SHAFT CONCRETE SHALL BE INCLUDED IN PAY ITEM 506C "LIN. FT. DRILLED SHAFT CONSTRUCTION, x'-xx" DIA., CLASS DSx CONCRETE (APPROX. x.xx CU. YDS./LIN. FT. OF SHAFT).
- STEEL REINFORCEMENT FOR DRILLED SHAFTS IS INCLUDED IN PAY ITEM 502A "LBS., STEEL REINFORCEMENT".

4. NOTES:

Top of Shaft Elevation Note:

- Include the note "TOP OF SHAFT ELEVATIONS ARE APPROXIMATE ONLY AND MAY REQUIRE ADJUSTMENT DEPENDING ON THE ACTUAL GROUNDLINE (WATERLINE) ELEVATION AT THE LOCATION OF EACH SHAFT". Do not use in the case of the shaft(s) extending to the bottom of the cap, with or without permanent casing.

Bottom of Shaft Notes:

- ⊙ When the shaft tip elevation is "approximate", include one of the following note groups as directed by the designer or section supervisor:

Note Group A:

- BOTTOM OF SHAFT ELEVATIONS ARE APPROXIMATE ONLY AND MAY REQUIRE ADJUSTMENT TO ENSURE A MINIMUM ____ FOOT SOCKET INTO MATERIAL CLASSIFIED AS " _____ " ON THE TEST BORING RECORD SHEET.

Note Group B:

- BOTTOM OF SHAFT ELEVATIONS ARE APPROXIMATE ONLY AND MAY REQUIRE ADJUSTMENT TO ENSURE A MINIMUM CUMULATIVE SHAFT SOCKET LENGTH OF ____ FEET INTO MATERIAL CLASSIFIED AS " _____ " ON THE TEST BORING RECORD SHEET.
- ROCK LAYERS LESS THAN ____ FEET IN THICKNESS SHALL NOT BE INCLUDED IN THE CUMULATIVE SHAFT SOCKET LENGTH.
- A MINIMUM OF ____ FEET OF COMPETENT ROCK SHALL BE PROVIDED BELOW THE BOTTOM OF THE SHAFT TIP. IN ORDER TO CONFIRM THAT COMPETENT ROCK IS BEING PROVIDED BELOW THE BOTTOM OF THE SHAFT, ROCK CORE SAMPLING, AS REQUIRED UNDER PAY ITEM 506D, SHALL BE PROVIDED AT EACH DRILLED SHAFT LOCATION FOR BENT NO(S) _____. CORE SAMPLING SHALL EXTEND A MINIMUM OF ____ FEET BELOW THE BOTTOM OF THE SHAFT TIP.

Note Group C:

- BOTTOM OF SHAFT ELEVATIONS ARE APPROXIMATE ONLY AND MAY REQUIRE ADJUSTMENT TO ENSURE A MINIMUM _____ FOOT SOCKET INTO MATERIAL CLASSIFIED AS “_____” ON THE TEST BORING RECORD SHEET.
- MATERIAL CLASSIFIED AS “WEATHERED _____” ON THE TEST BORING RECORD SHEET SHALL NOT BE CONSIDERED IN ESTABLISHING THE FINAL SHAFT TIP ELEVATION. (INCLUDE THIS NOTE ONLY WHEN DIRECTED BY THE DESIGNER OR SECTION SUPERVISOR)
- When the shaft tip elevation is actual (not accompanied by the word “approximate”), include the following note:
 - BOTTOM OF SHAFT ELEVATIONS SHALL NOT BE ALTERED WITHOUT PRIOR APPROVAL OF THE BRIDGE ENGINEER.

Permanent Casing Note(s):

- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THE STABILITY OF THE PERMANENT CASING DURING CONSTRUCTION OF THE DRILLED SHAFT
- Where the permanent casing extends to the bottom of the cap, include the following note:
 - MINIMUM DESIGN DIAMETER OF SHAFT AND PERMANENT CASING SHOWN. CASING MAY BE OVERSIZED TO A MAXIMUM DIAMETER OF (x) TO FACILITATE EXCAVATION OF THE SHAFT. PAYMENT FOR OVERSIZE CASING SHALL BE AT THE UNIT PRICE BID FOR THE MINIMUM DIAMETER SHOWN.
(x) = to be determined by the designer
- Where the permanent casing stops below the bottom of the cap, include the following note:
 - MINIMUM DESIGN DIAMETER OF SHAFT AND PERMANENT CASING SHOWN. CASING MAY BE OVERSIZED TO FACILITATE EXCAVATION OF THE SHAFT. PAYMENT FOR OVERSIZE CASING SHALL BE AT THE UNIT PRICE BID FOR THE MINIMUM DIAMETER SHOWN.
- Where permanent casing is required for skin friction shafts add the following note:
 - BOTTOM OF PERMANENT CASING ELEVATIONS SHALL NOT BE ALTERED WITHOUT PRIOR APPROVAL OF THE MATERIALS AND TESTS ENGINEER.

4.4 Foundation Investigation Test Boring Logs

- Include the original(s) of the boring layout sheet as furnished by the Bureau of Materials and Tests.
- Include the original(s) of the boring logs as furnished by the Bureau of Materials and Tests.
- Verify Driven Pile Data Table is included on Boring Location Plan and agrees with designer sketches.
- Verify Pile/Testing Quantities from table.

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4.5 Bridge Special Project Drawings

Bridge Special Project Drawings should be requested from the QA Administrator at least one working day before submittal to Office Engineer. In-house projects have a request form available in the Bridge Special Project Drawings Network folder. Consultants can find a request form on the ALDOT website under Publications, subsection Bridge. A list of current Bridge Special Project Drawings can be found there as well.

Include the appropriate Bridge Special Project Drawings as required for the project as follows:

4.5.1 Standard Information Drawings

Generally, the following drawings are included with all bridge plans.

- SBN-1 (Standard Bridge Notes)
- SDR-1 (Standard Deck Reinforcement)
- SBD-1 (Standard Bridge Details)
- BBR-1 or BBR-2 (Bridge Barrier Rail)

4.5.2 Project Specific Drawings

Usually, one or more of the following drawings will be included with the bridge plans dependent upon the design. Verify with your supervisor the applicable drawing(s) to be included with the plans.

- SPGD-1 (Standard Prestressed Girder Details)
- EBEW(x) (Uniform Details for Edge Beams and End Walls) Applicable only for prestressed concrete girder bridges typically used by ALDOT.
- BES-xx (Bridge End Slab Details for use with Bituminous/Concrete Pavement)
- BES-EXT (Bridge End Slab with Barrier Rail Extension, required with BBR-2 Bridge Barrier Rail when bridge skew is 15 degrees and greater)

4.5.3 Special Use Drawings

Include special use drawings as directed by your supervisor.

- PSCP-1 (Precast Prestressed Concrete Piles)
- TP-1 (Traffic Protection)
- I-100 (Shoe Assemblies with Bronze Bearing Plate)
- IFS-x (Industrial Fence Standard Details)
- BBR-M(xx) (Bridge Median Rail)

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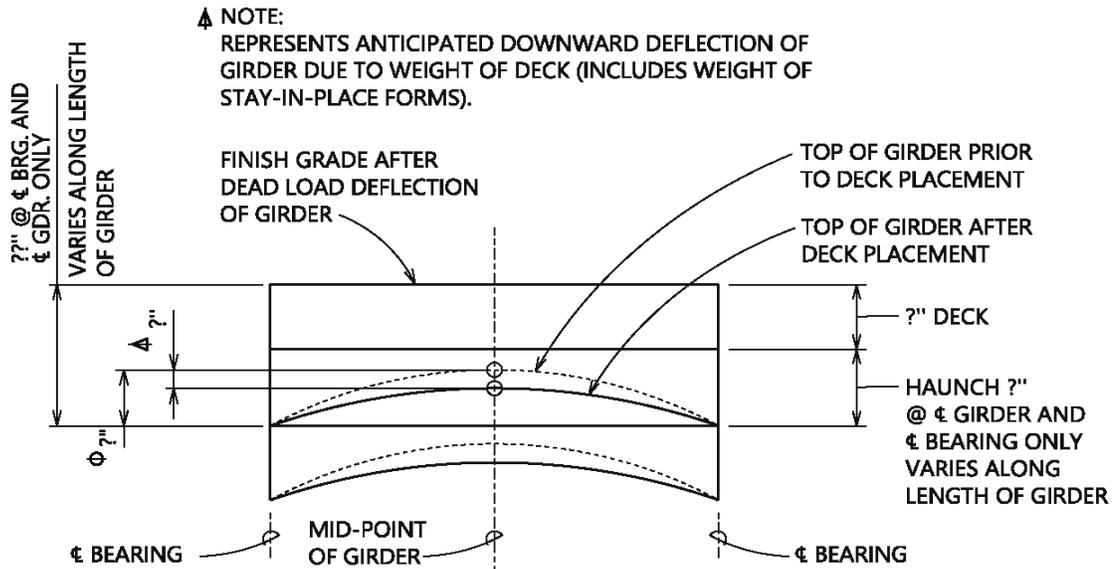
4.6 Original Plans for Existing Bridge(s) (as required)

- For bridge replacement projects, include copies of the original plans for existing bridges when necessary. Such scenarios include bridge widenings or modifications, bridge replacements where new foundations conflict with existing foundations, unusual or complex structures such as trusses, etc.
- Include old boring logs if available and as appropriate.
- Include the verbiage on each sheet “THIS SHEET INCLUDED FOR INFORMATION ONLY”.
- Sequentially number each sheet identifying the sheet as “BRIDGE SHEET E1” with subsequent sheets as “E(n)”.
- Electronic copy of E-sheets should be referenced to a .dgn file with the appropriate project border.

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5 Figures

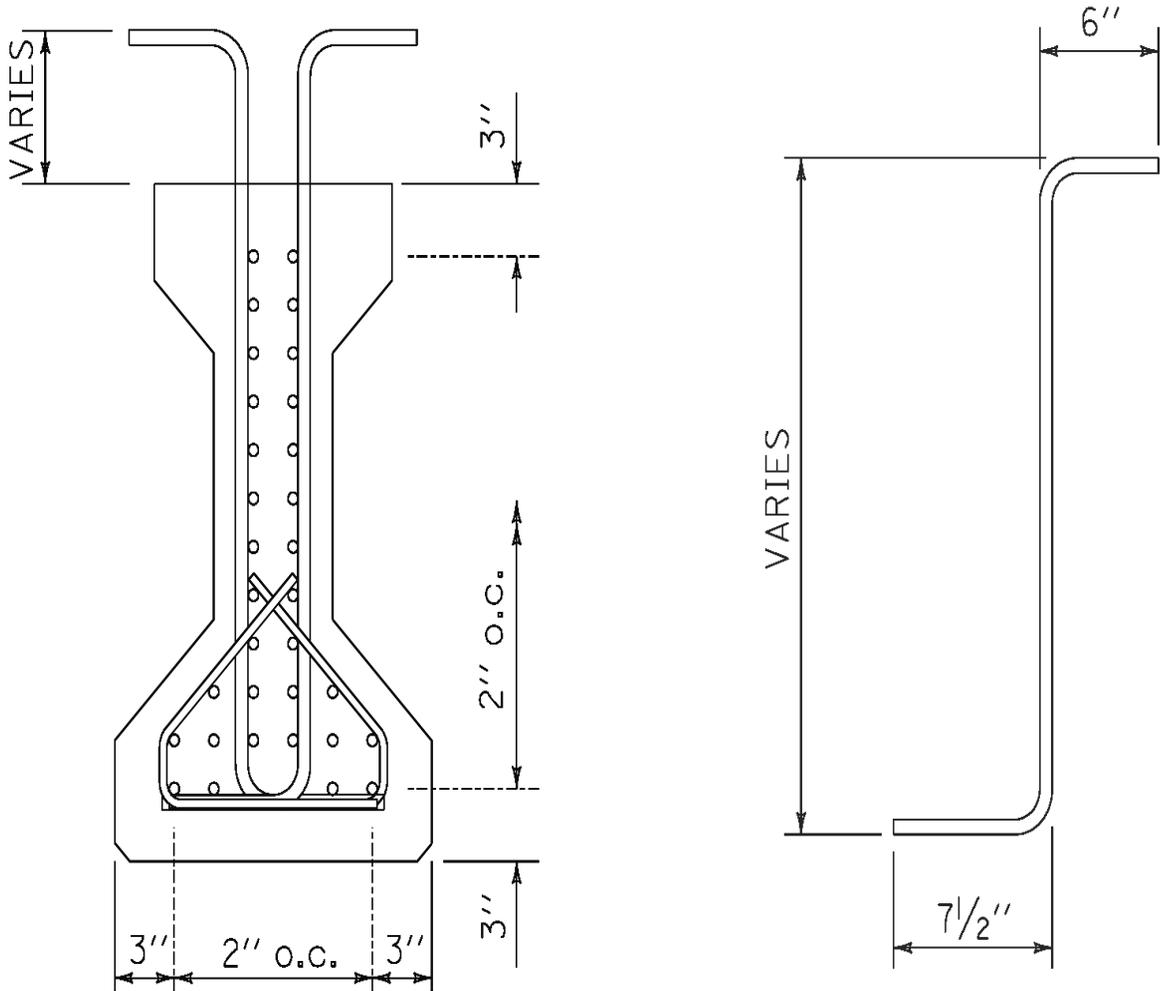
5.1 Detail of Haunch Over Top of Prestressed Girder



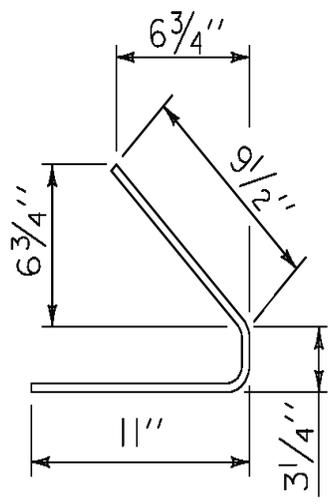
**DETAIL OF HAUNCH BETWEEN
BOTTOM OF DECK AND TOP OF GIRDER
(ALONG ϵ GIRDER)**

⊕ NOTE:
NOT TO SCALE
REPRESENTS THE EXPECTED CAMBER (UPWARD DEFLECTION DUE TO PRESTRESS) USED FOR STATE DESIGN PURPOSES AND IS SHOWN HERE FOR INFORMATION ONLY. AFTER ERECTING GIRDERS AND PRIOR TO ORDERING MATERIAL AND SETTING FORMS, THE CONTRACTOR SHALL PROFILE GIRDERS TO DETERMINE THE IN-PLACE CAMBER. THE MEASURED CAMBER ORDINATES OBTAINED FROM PROFILING THE GIRDERS SHALL BE USED IN CALCULATIONS TO PROPERLY SET FORMS.

5.2 AASHTO Girder Type I Strand Pattern and Typical Reinforcement



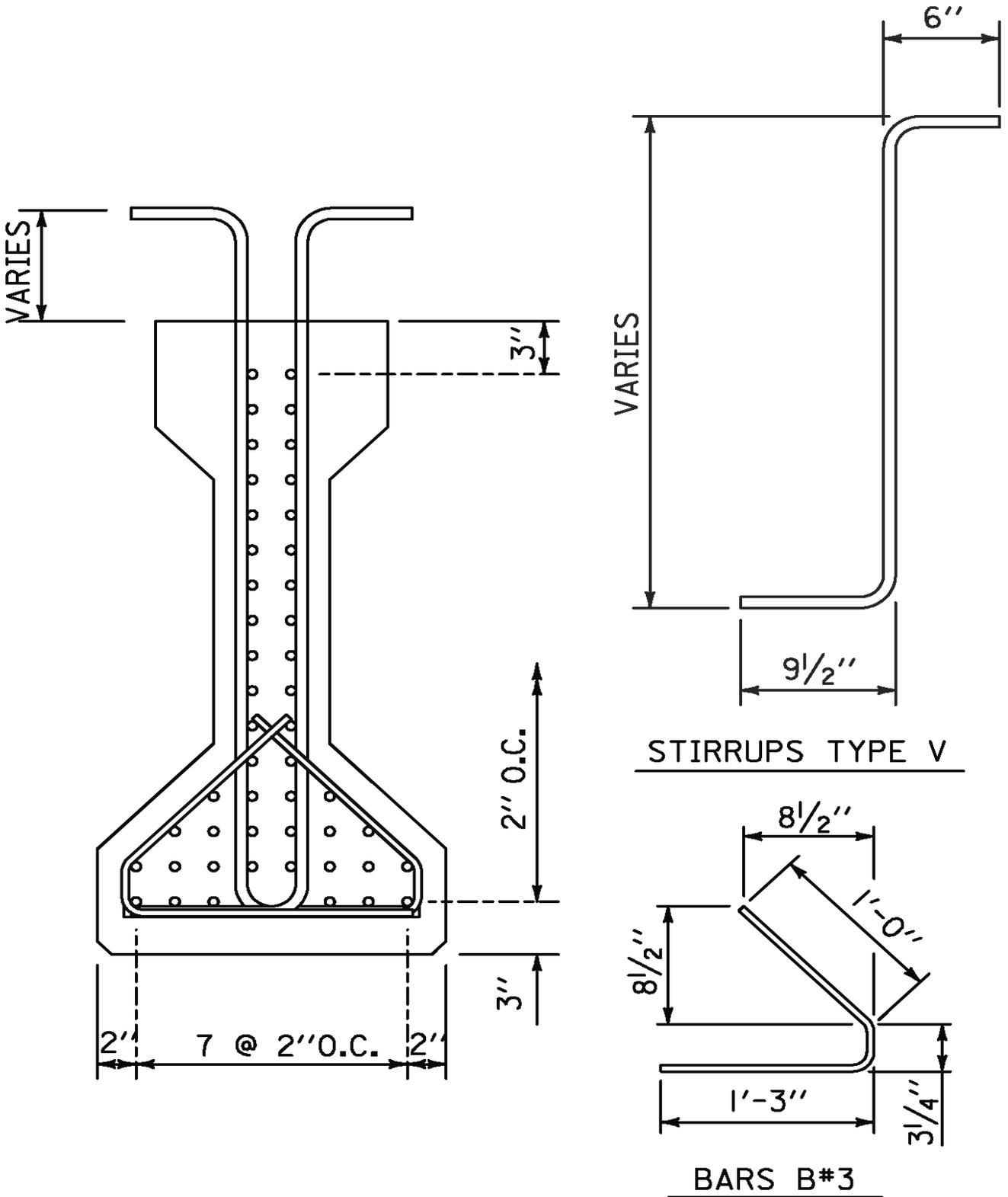
STIRRUPS TYPE V



BARS B#3

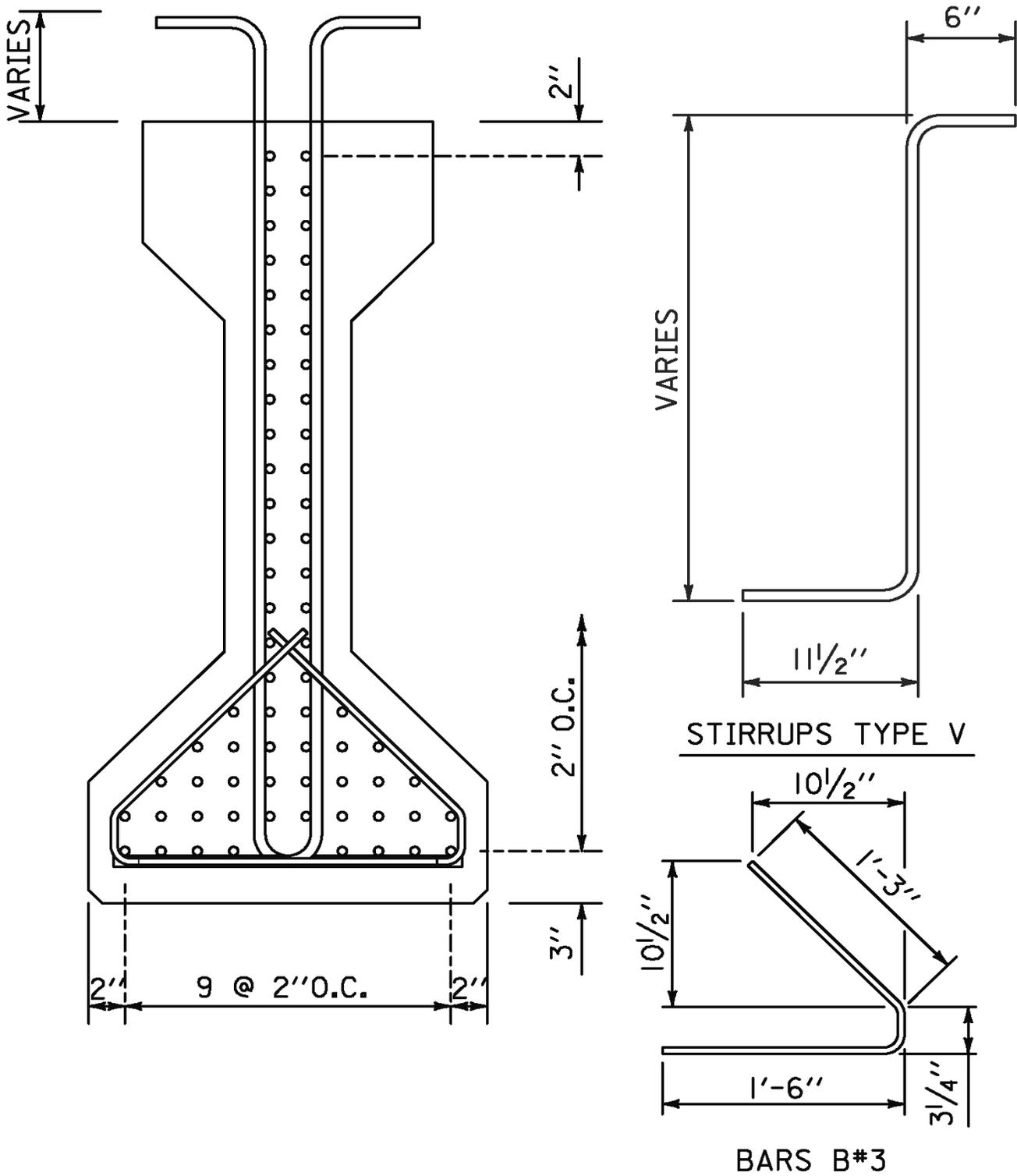
5.3 AASHTO Girder Type II Strand Pattern and Typical Reinforcement

GIRDER REINFORCING AASHTO TYPE II

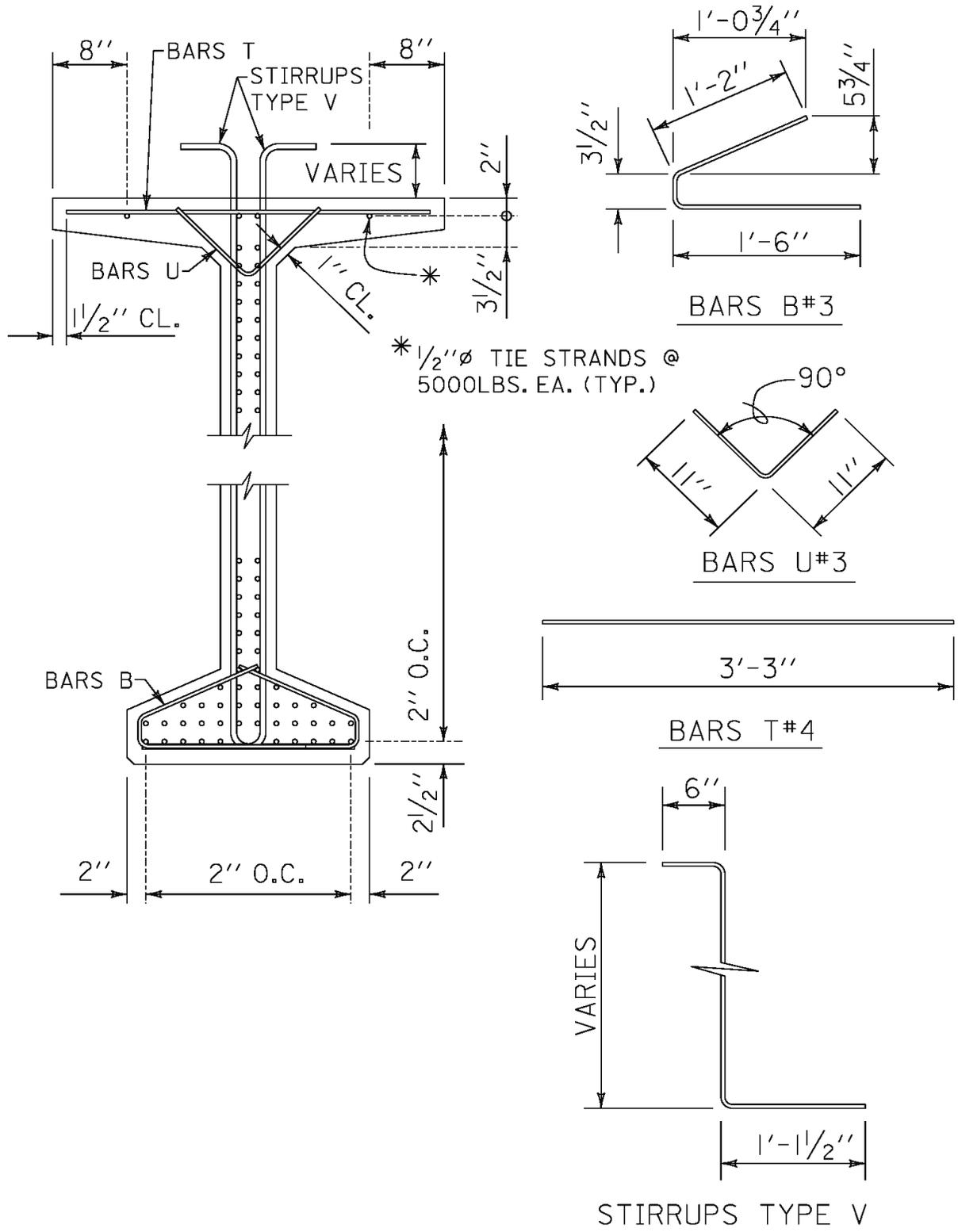


5.4 AASHTO Girder Type III Strand Pattern and Typical Reinforcement

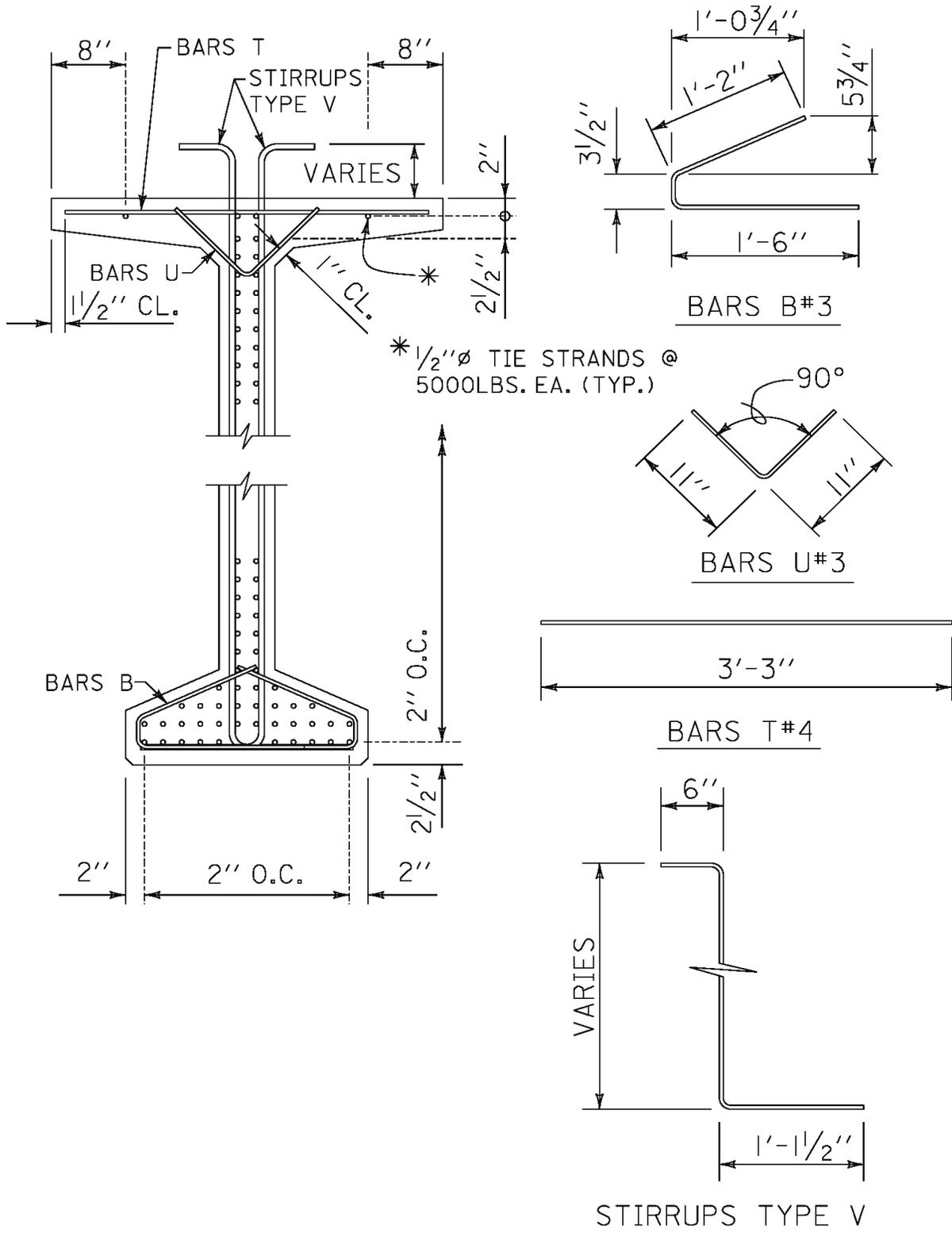
TYPE III GIRDER REINFORCING



5.5 Girder Type BT54 or BT72 Strand Pattern and Typical Reinforcement

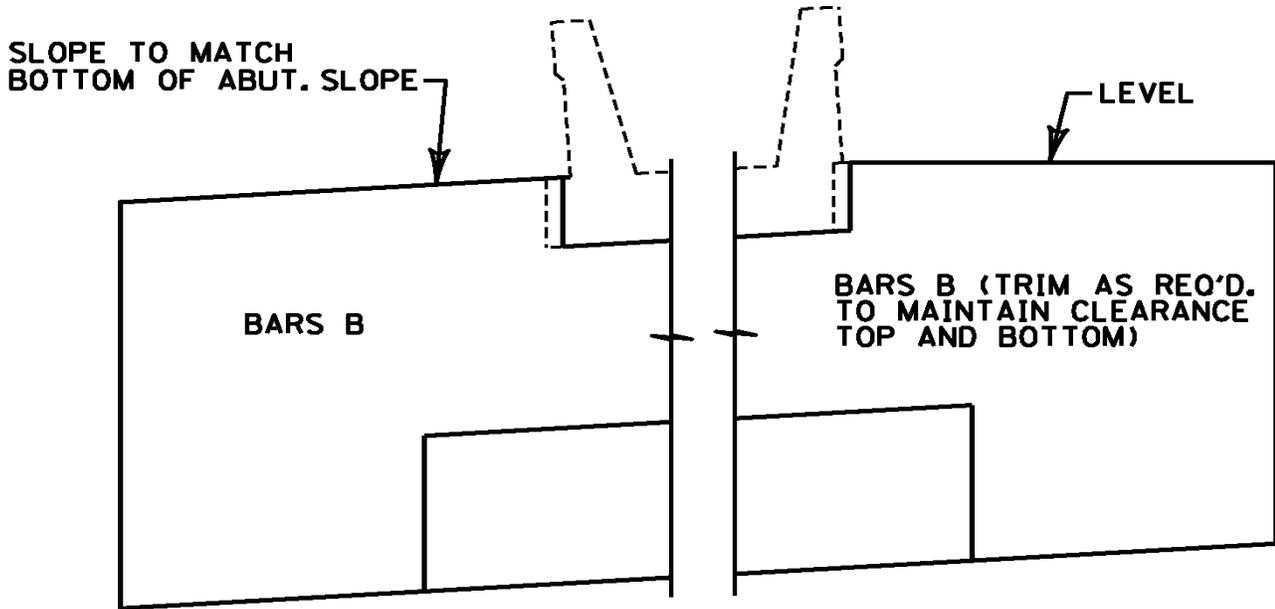


5.6 Girder Type BT63 Strand Pattern and Typical Reinforcement

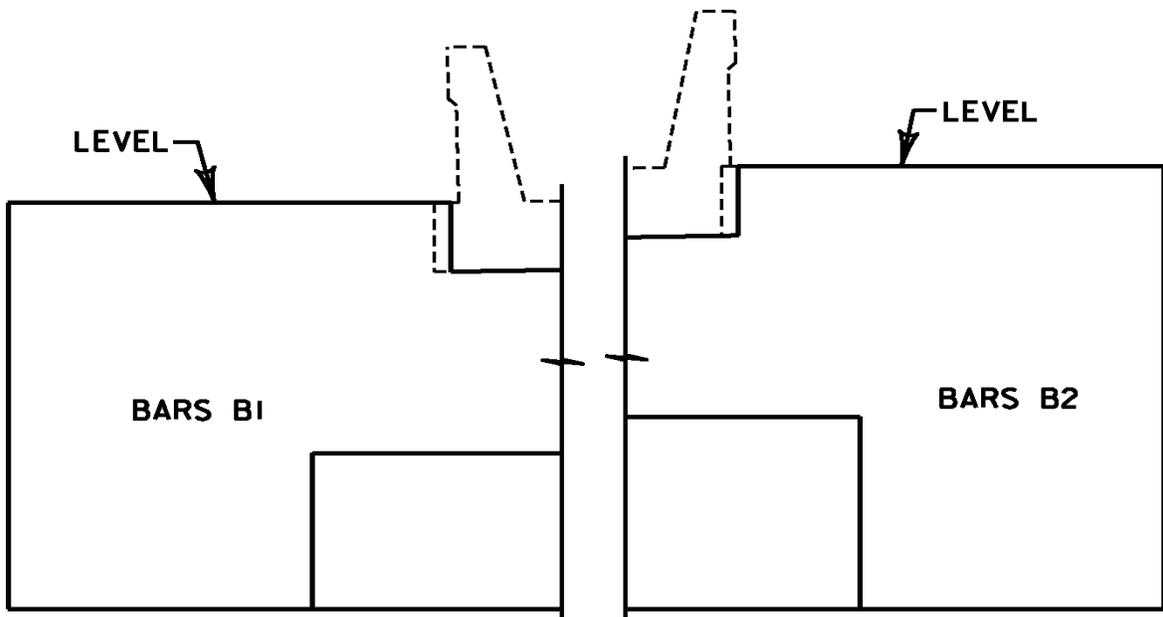


5.10 Abutment Typical Wing Slope

ABUTMENT WING SLOPE

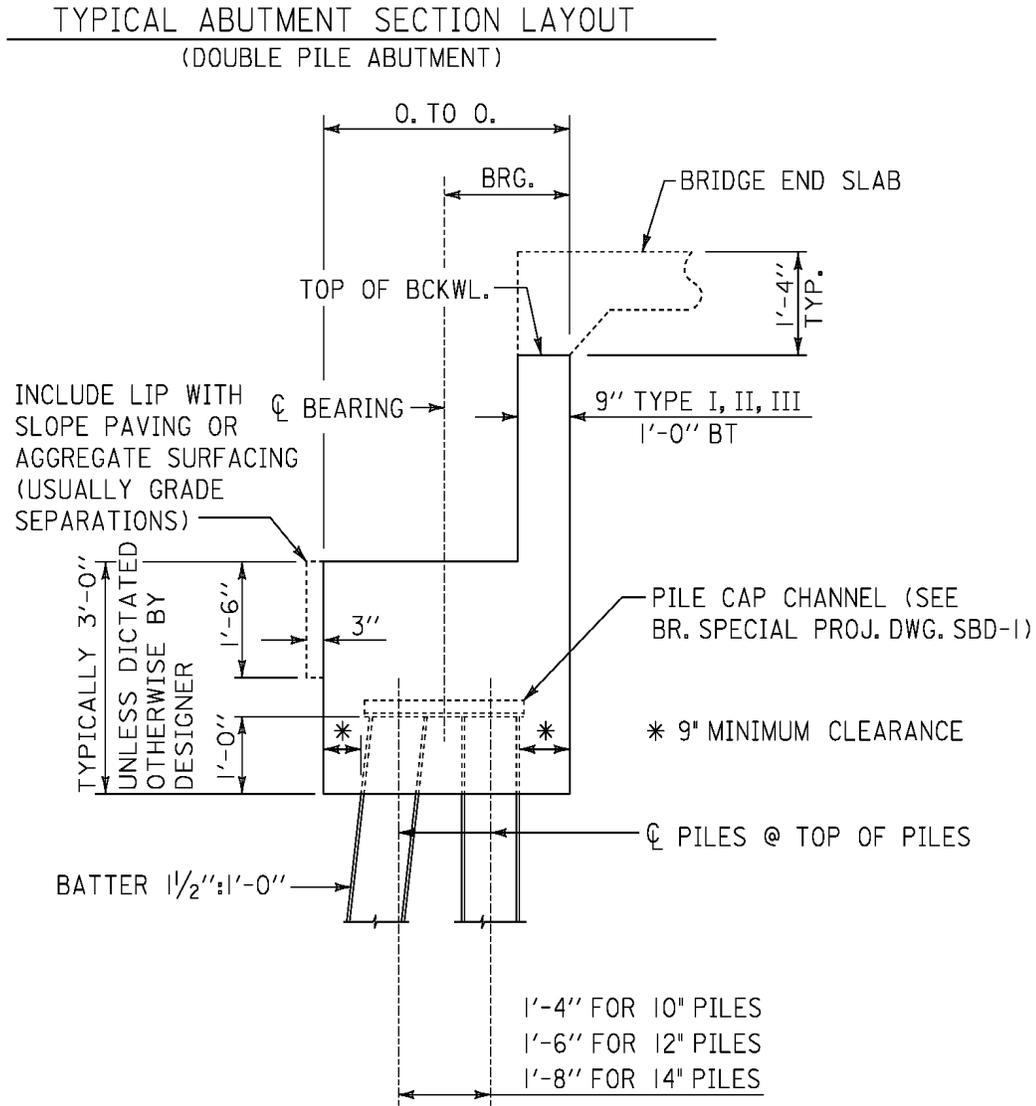


SLOPING CAP (PEDESTALS OR STEPPED)

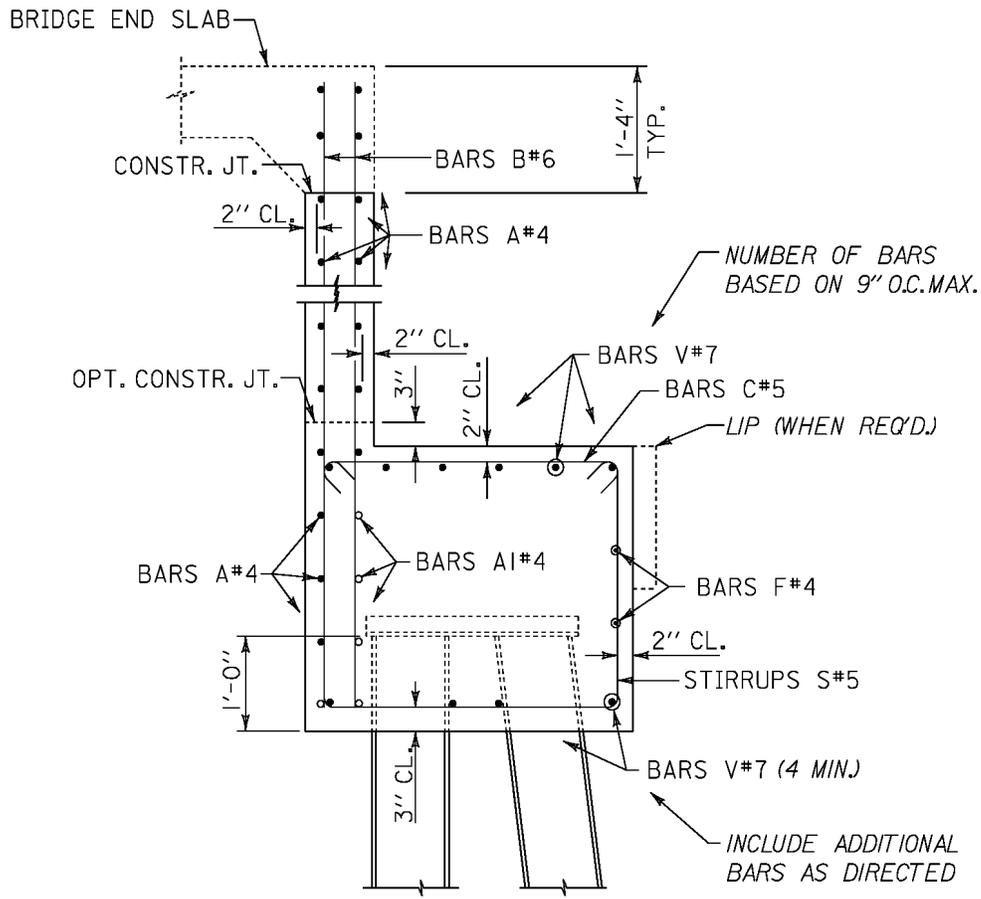


LEVEL CAP (PEDESTALS OR STEPPED)

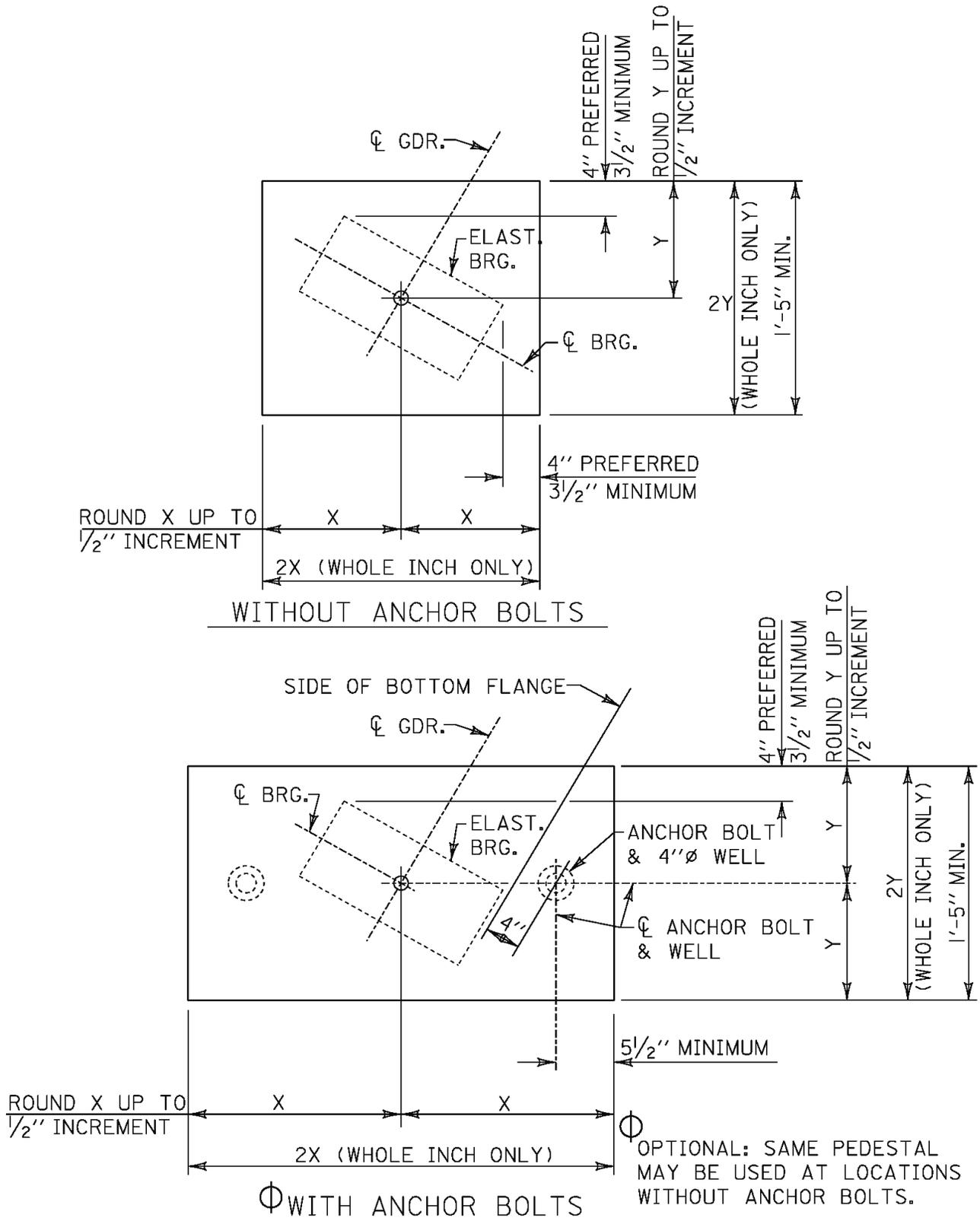
5.11 Abutment Section Typical Layout



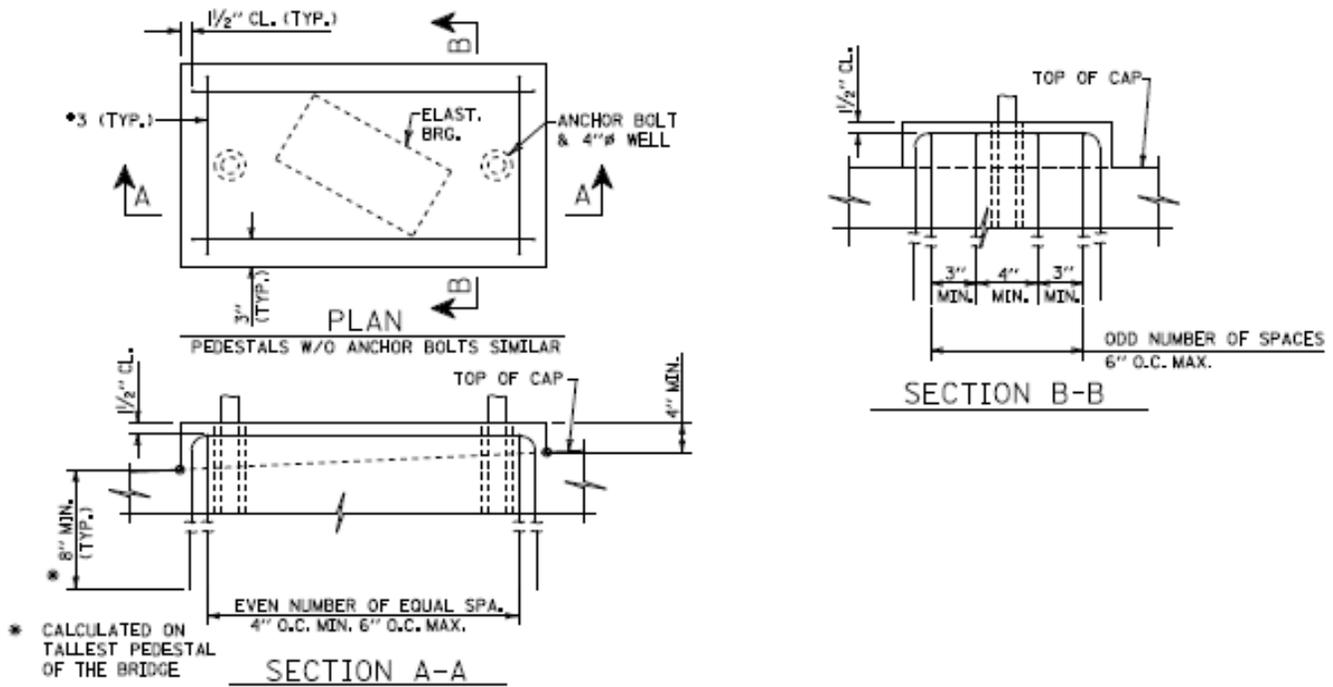
5.12 Abutment Section Typical Reinforcement Layout



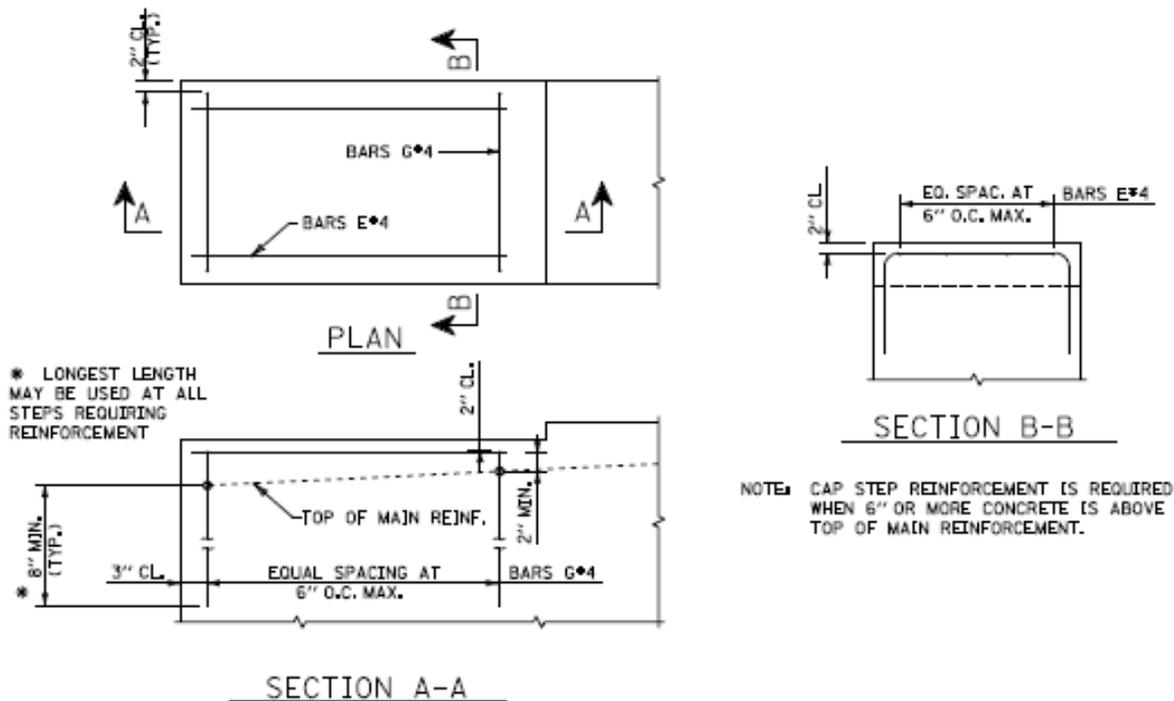
5.13 Pedestal Typical Layout



5.14 Pedestal and Cap Step Reinforcement Typical Layout



PEDESTAL REINFORCING

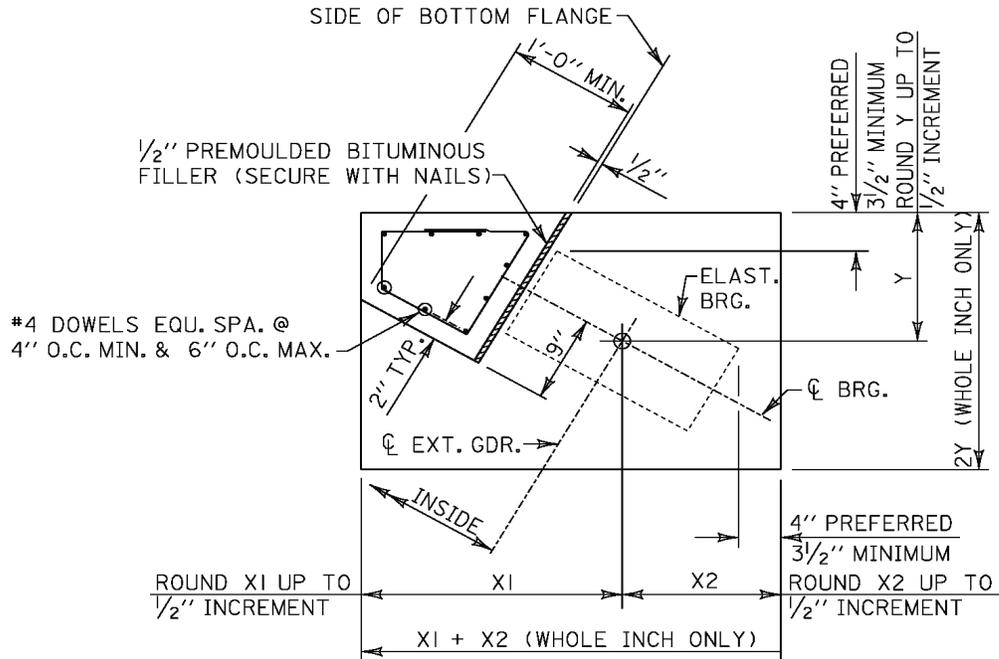


CAP STEP REINFORCING

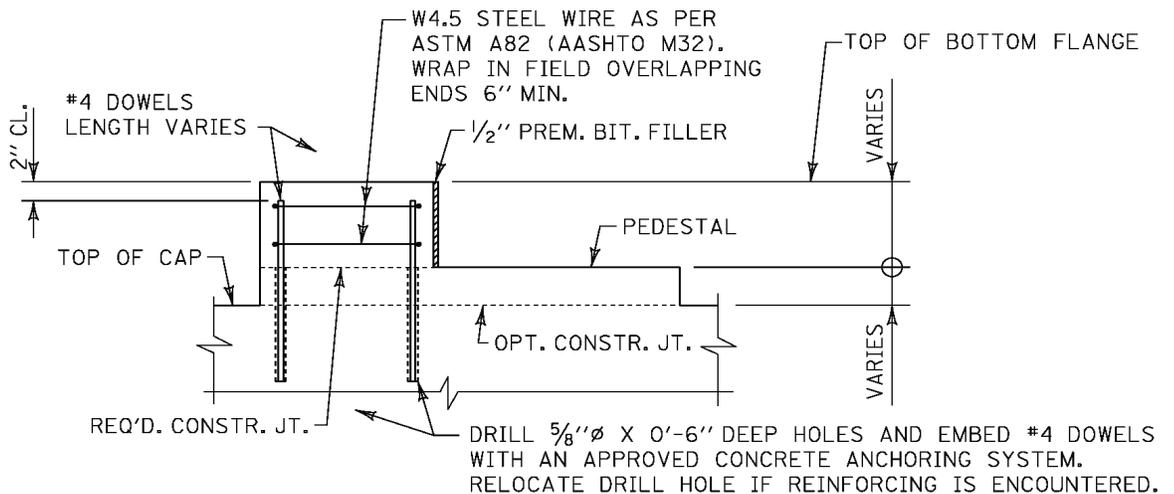
5.15 Skidblock Typical Layout (For Use with Pedestals)

SKIDBLOCK LAYOUT

FOR USE WITH PEDESTALS



PLAN

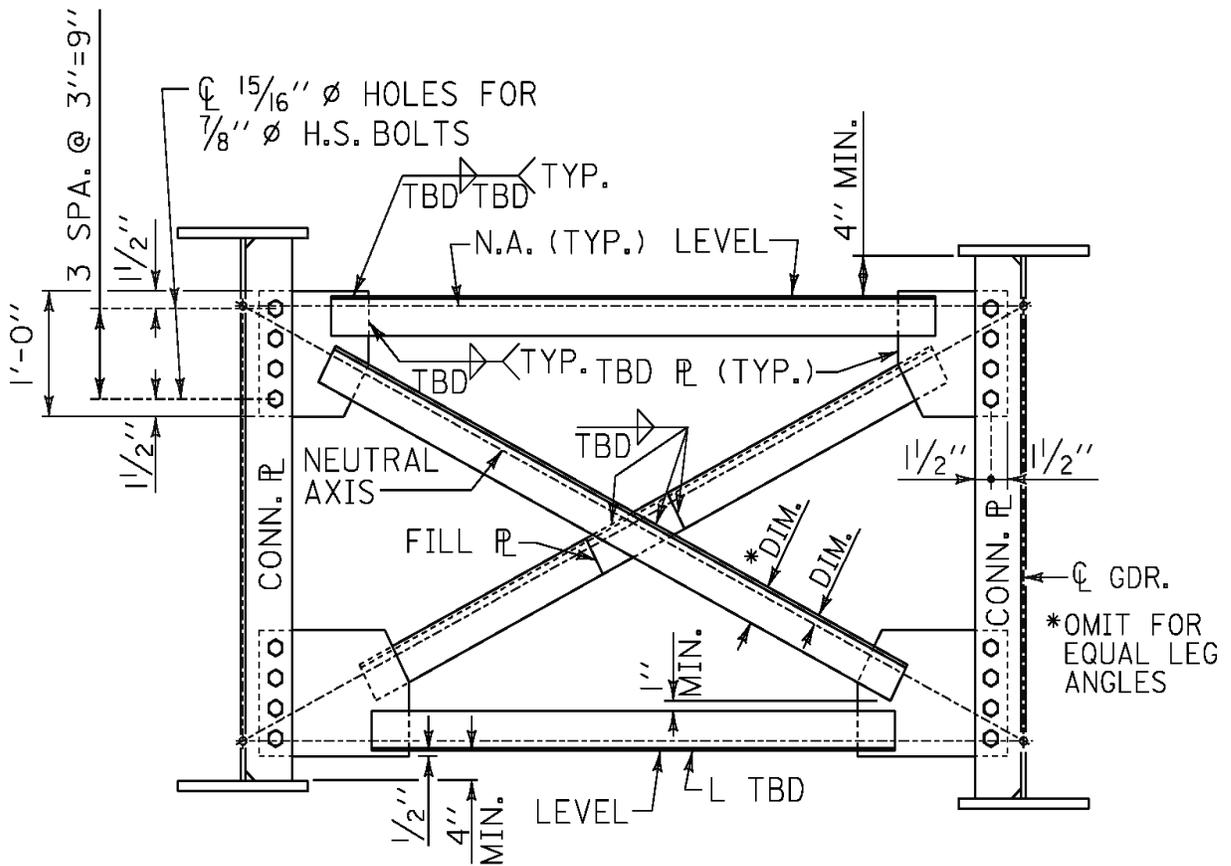


SECTION

WHEN TYPE 4 BEARINGS ARE USED, INCLUDE THE FOLLOWING NOTE:

#4 DOWELS TO BE PLACED AND THE SKIDBLOCK POURED AFTER WELDING AND GALVANIZATION REPAIR OF THE BEARING AND GIRDER SOLE \bar{r} HAVE BEEN COMPLETED. PRIOR TO POURING THE SKIDBLOCK, THE SURFACE SHALL BE COATED WITH AN APPROVED TYPE II EPOXY ADHESIVE.

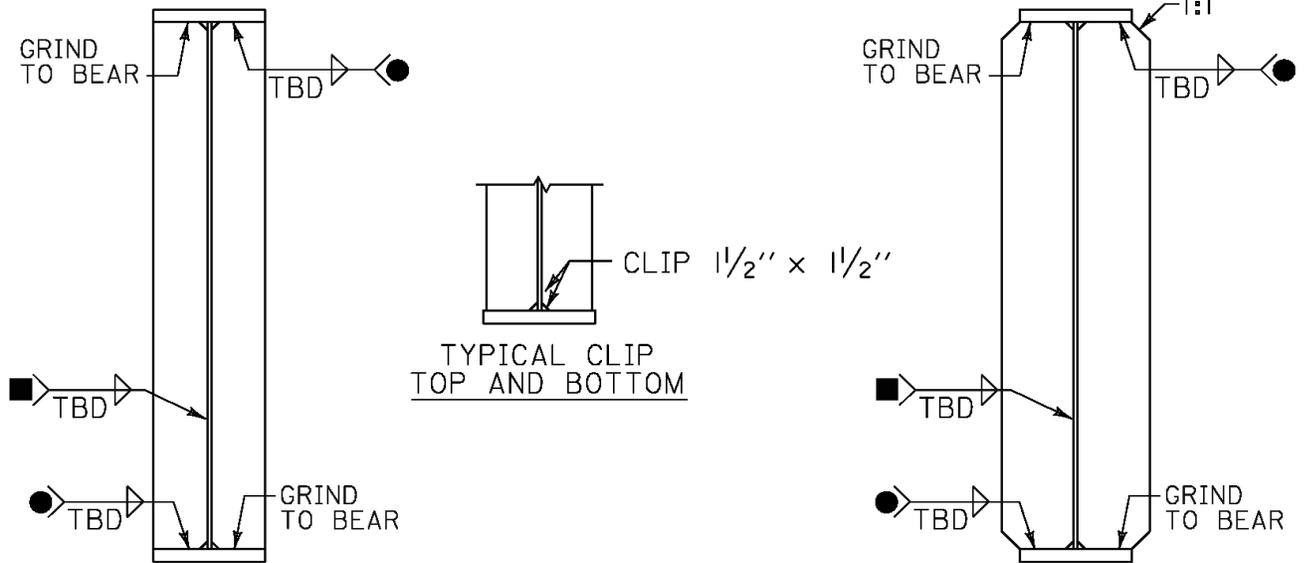
5.18 Typical "X" Crossframe (Steel Girders)



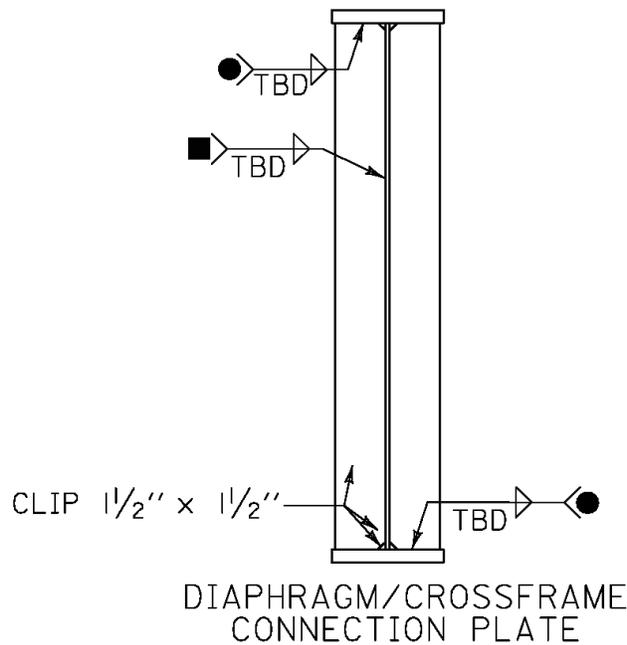
5.21 Typical Details for Bearing Stiffeners and Connection Plates

- TERMINATE FILLET WELDS 1" (-/+ 1/4") FROM CLIP
- TERMINATE FILLET WELDS 1/2" (-/+ 1/4") FROM CLIP AND PLATE EDGE

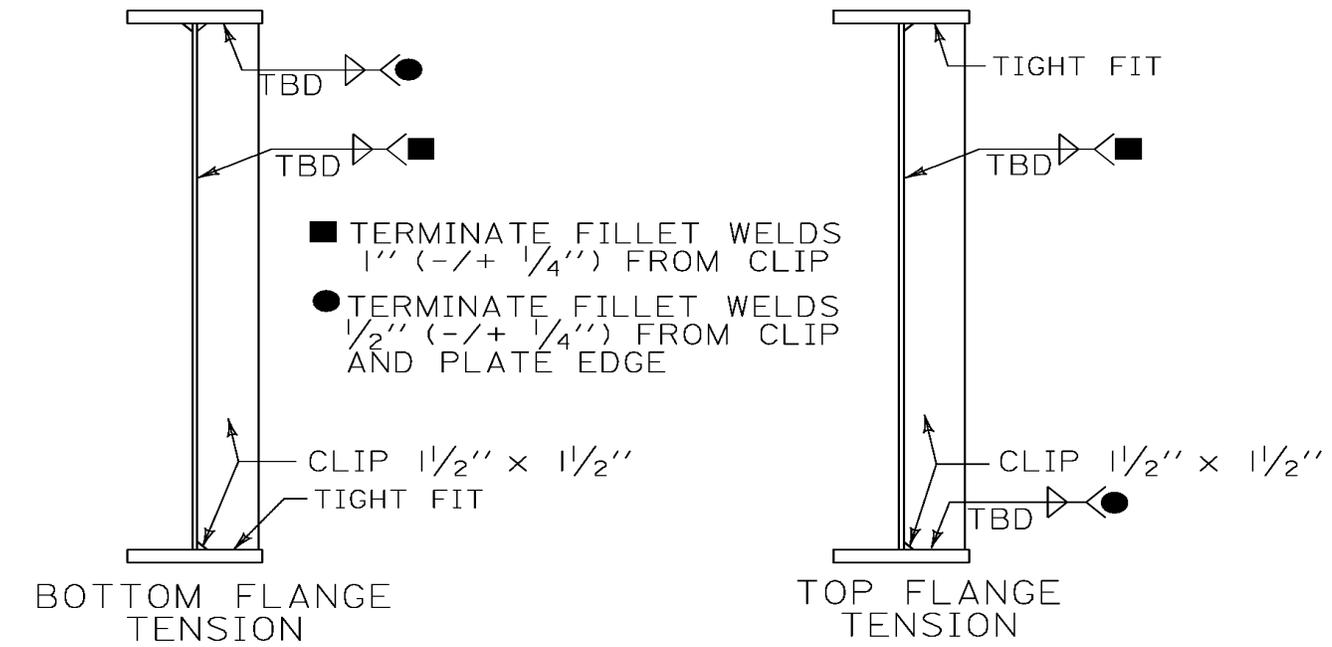
**JACKING STIFFENERS (IF REQD.) SIMILAR



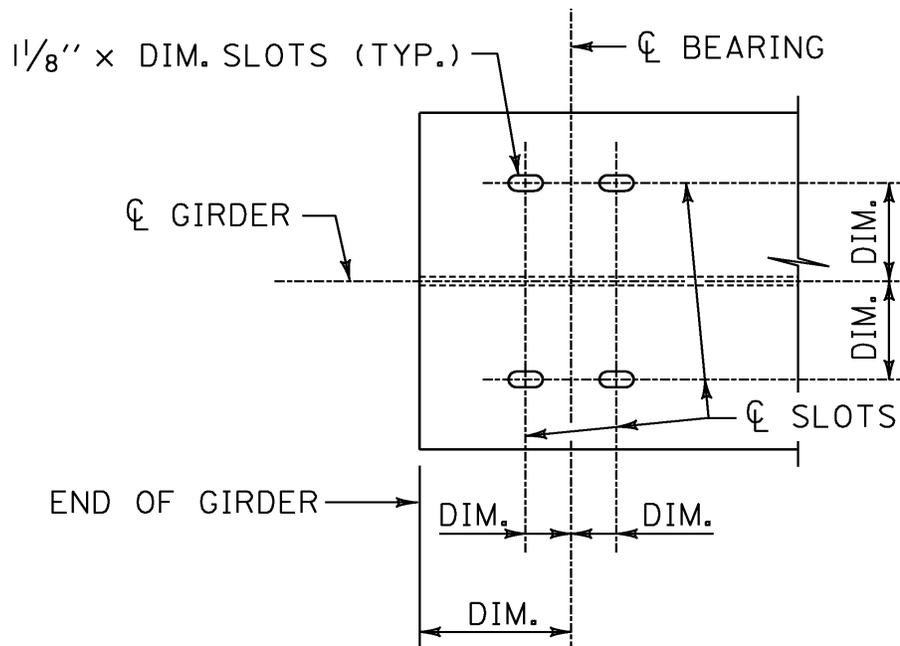
**STIFFENER/CONNECTION PLATE AT BEARINGS



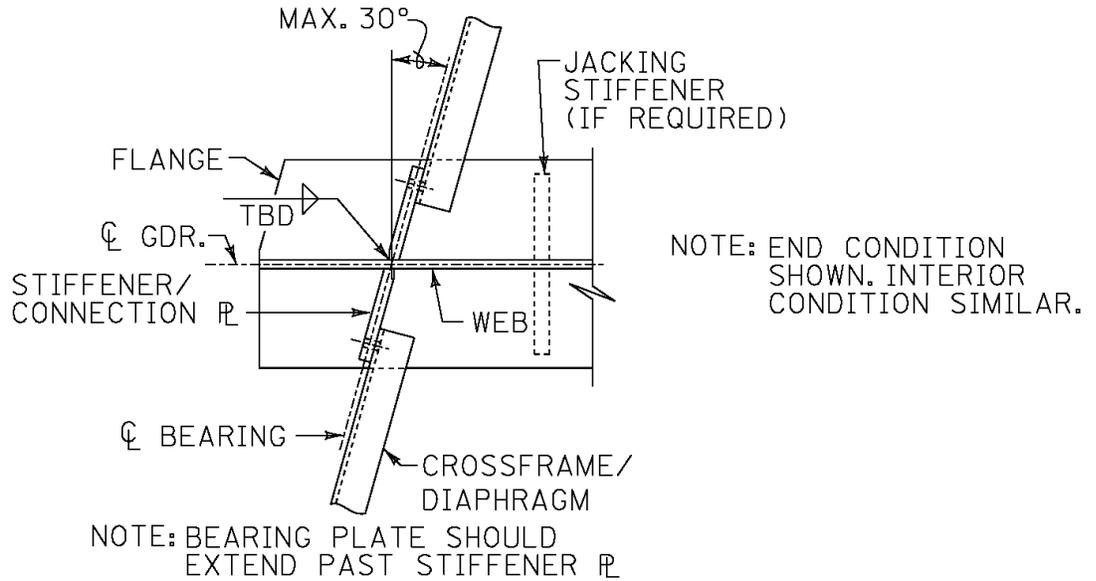
5.22 Details for Intermediate Transverse Stiffeners



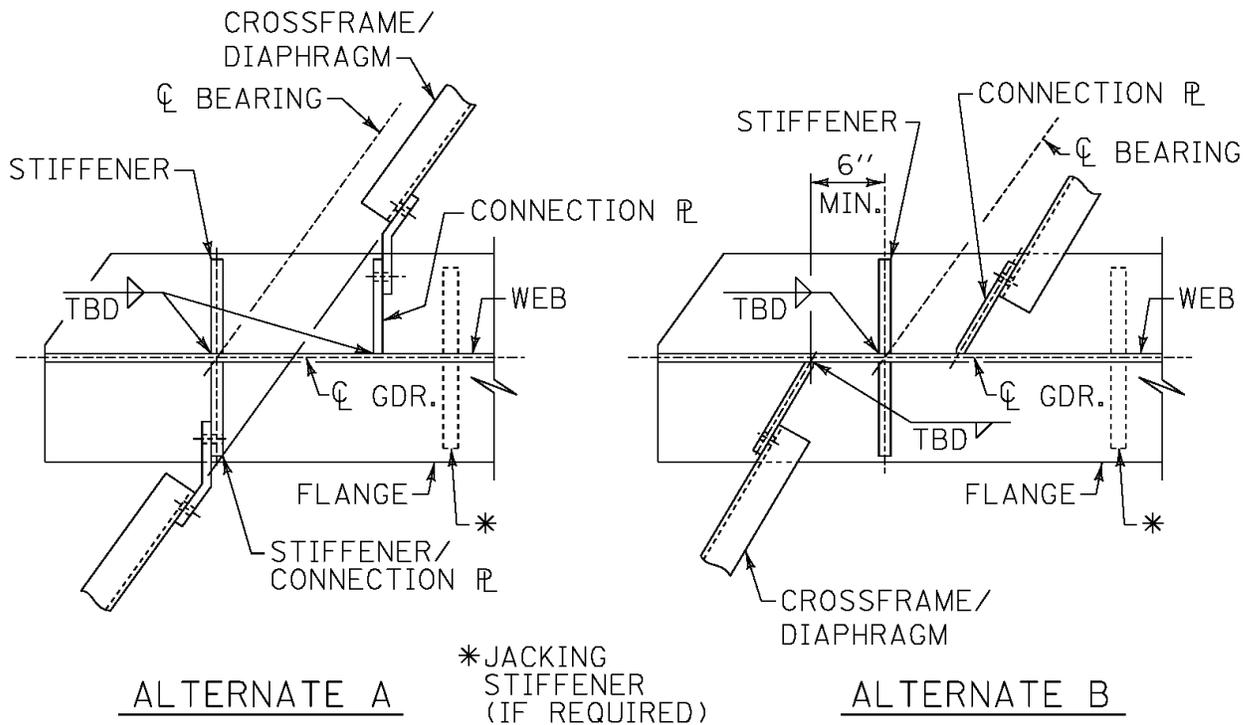
5.23 Girder Top Flange End Detail for Tooth Joint Connection



5.24 Details for Diaphragm/Stiffener Connection to Web



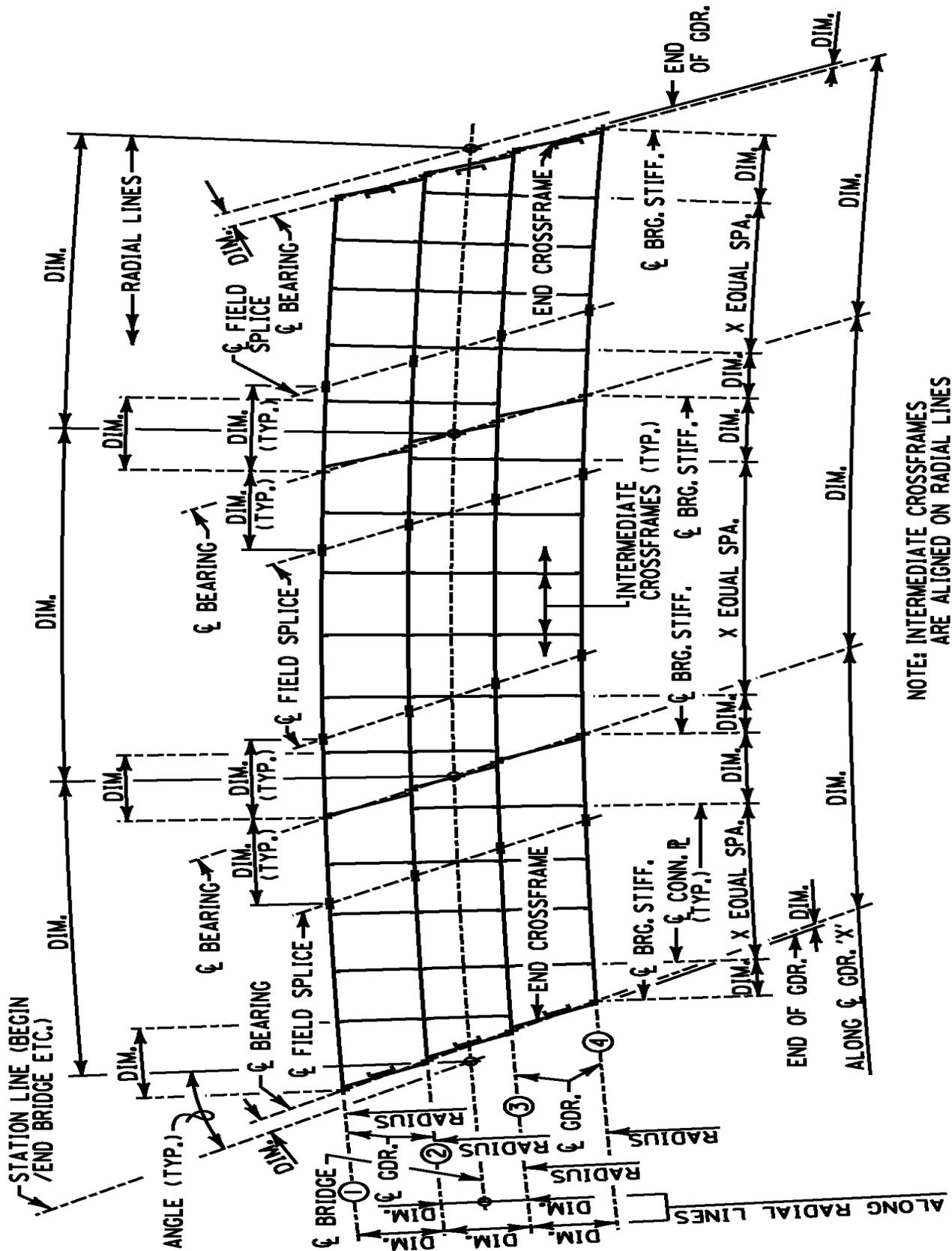
FOR SKEWS 30 DEGREES AND LESS



NOTE: END CONDITION SHOWN. INTERIOR CONDITION SIMILAR.

FOR SKEWS GREATER THAN 30 DEGREES

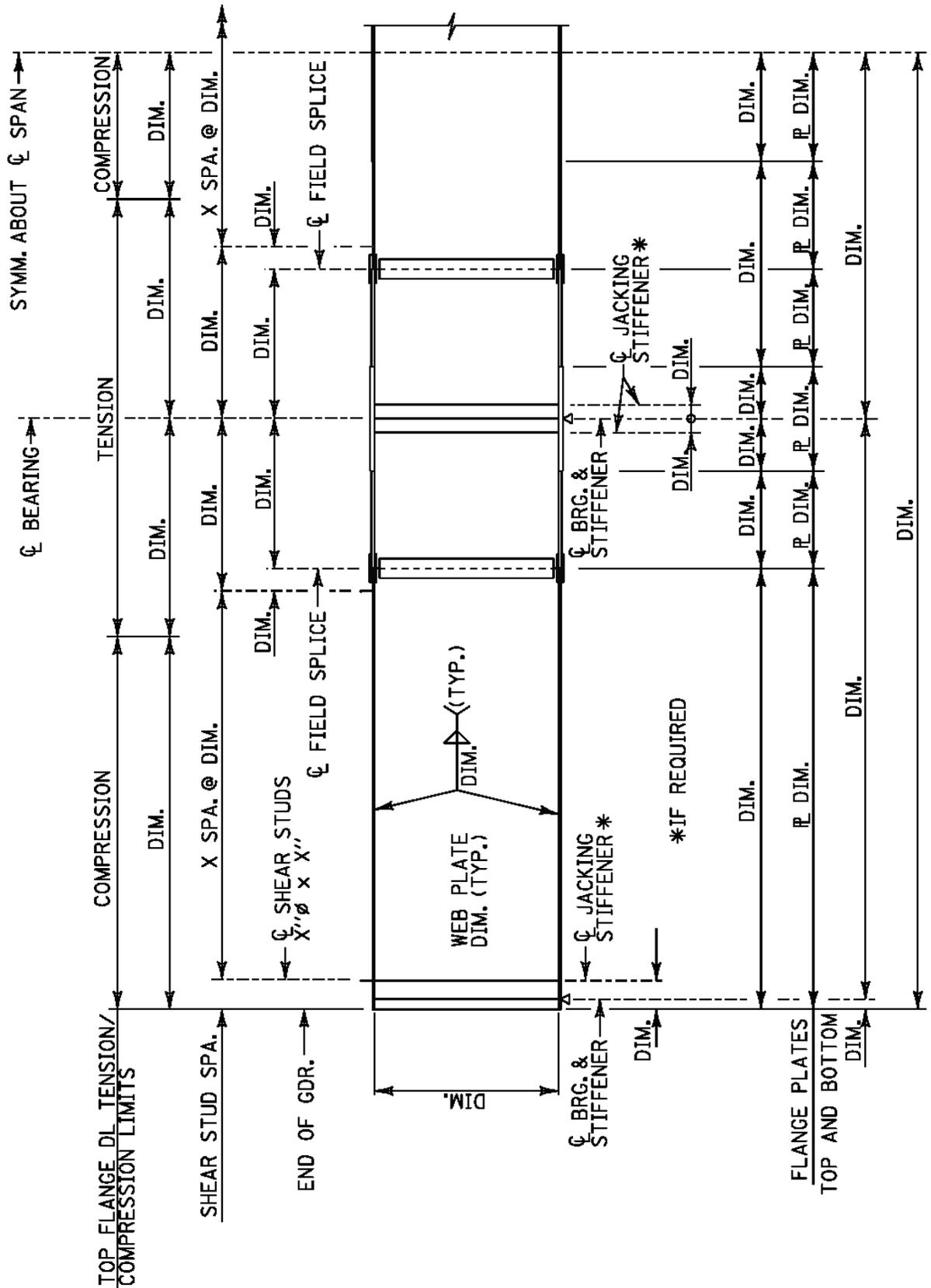
5.27 Typical Framing Plan (Curved, Skewed)



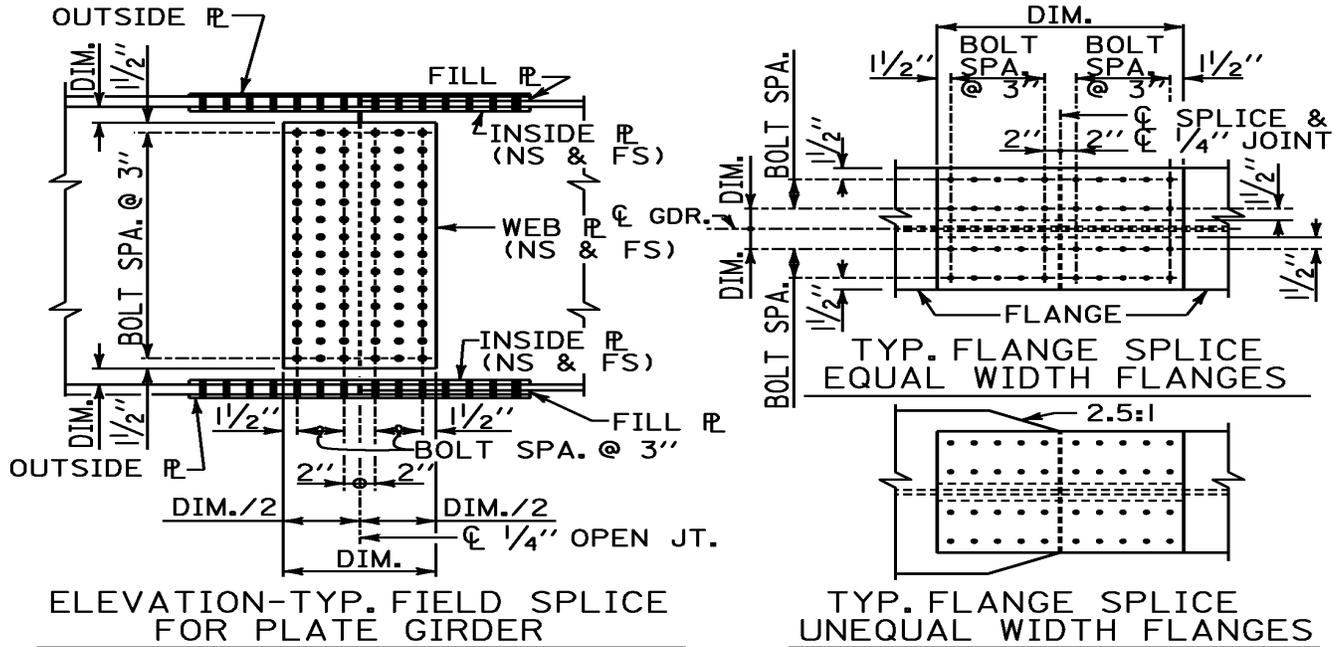
NOTE: INTERMEDIATE CROSSFRAMES ARE ALIGNED ON RADIAL LINES

5.28 Typical Girder Elevation

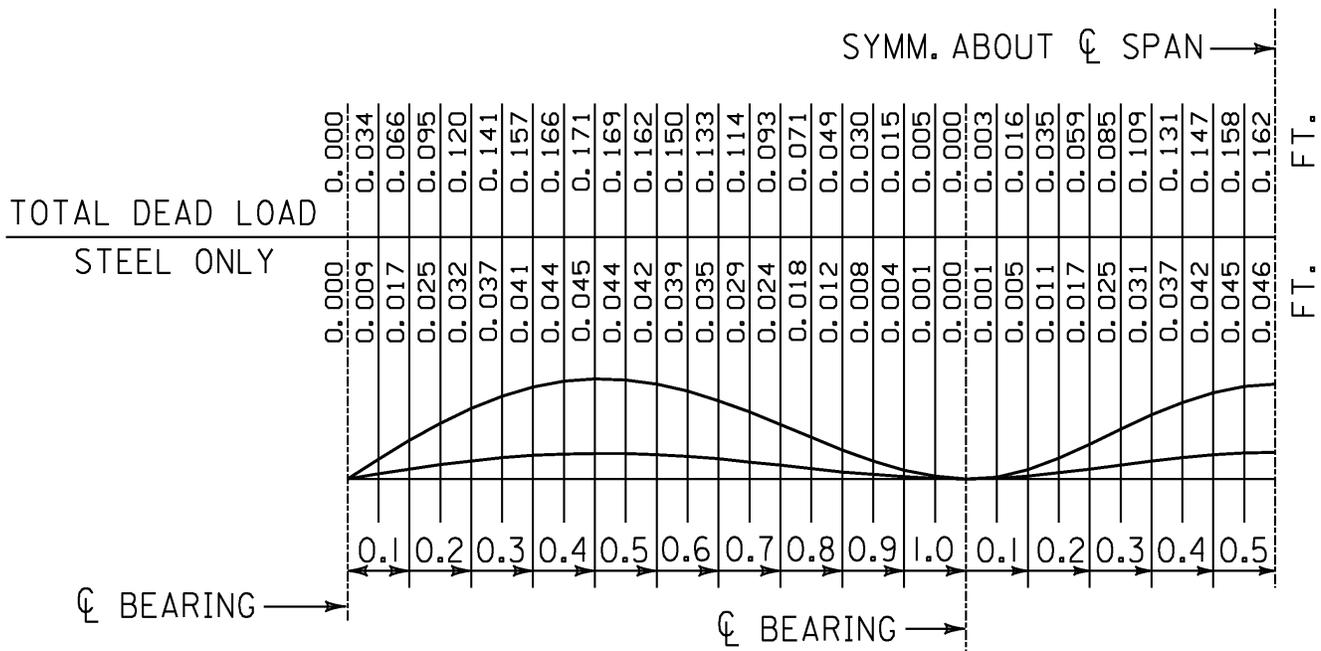
NOTE: CONNECTION R_s AND INTERMEDIATE STIFFENER R_s
(IF ANY) NOT SHOWN FOR CLARITY



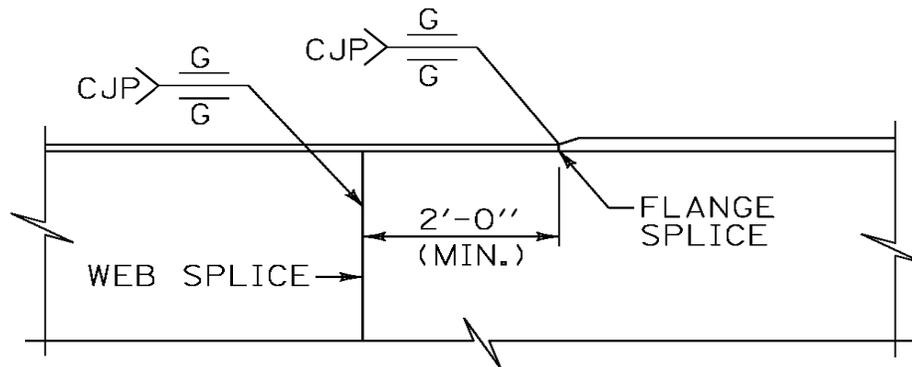
5.29 Bolted Field Splice Details



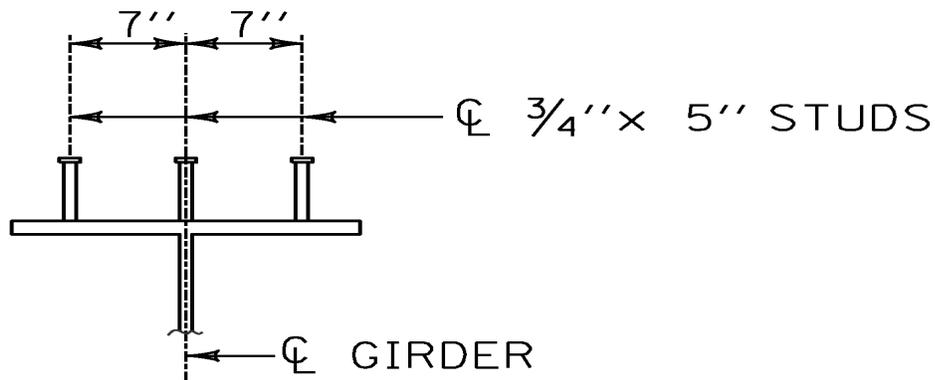
5.30 Typical Camber Diagram (Steel Girders)



5.31 Shop Splice Detail

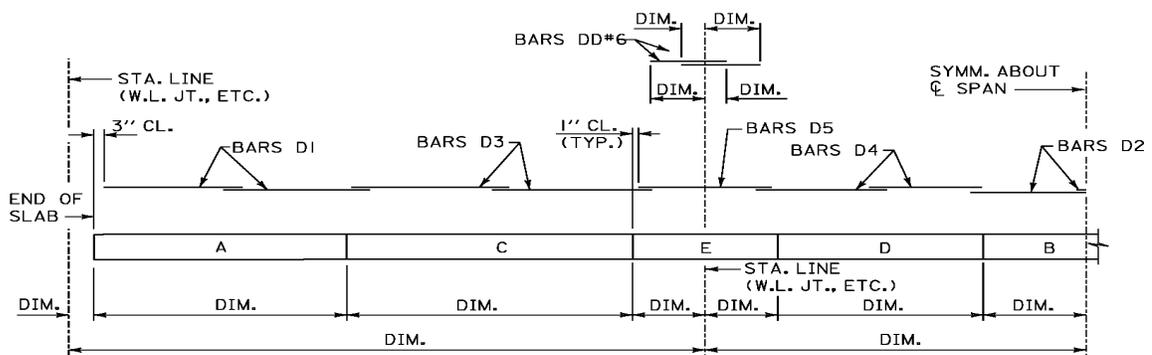


5.32 Typical Shear Stud Detail



NOTE: Stud size and spacing shown for illustration purposes only

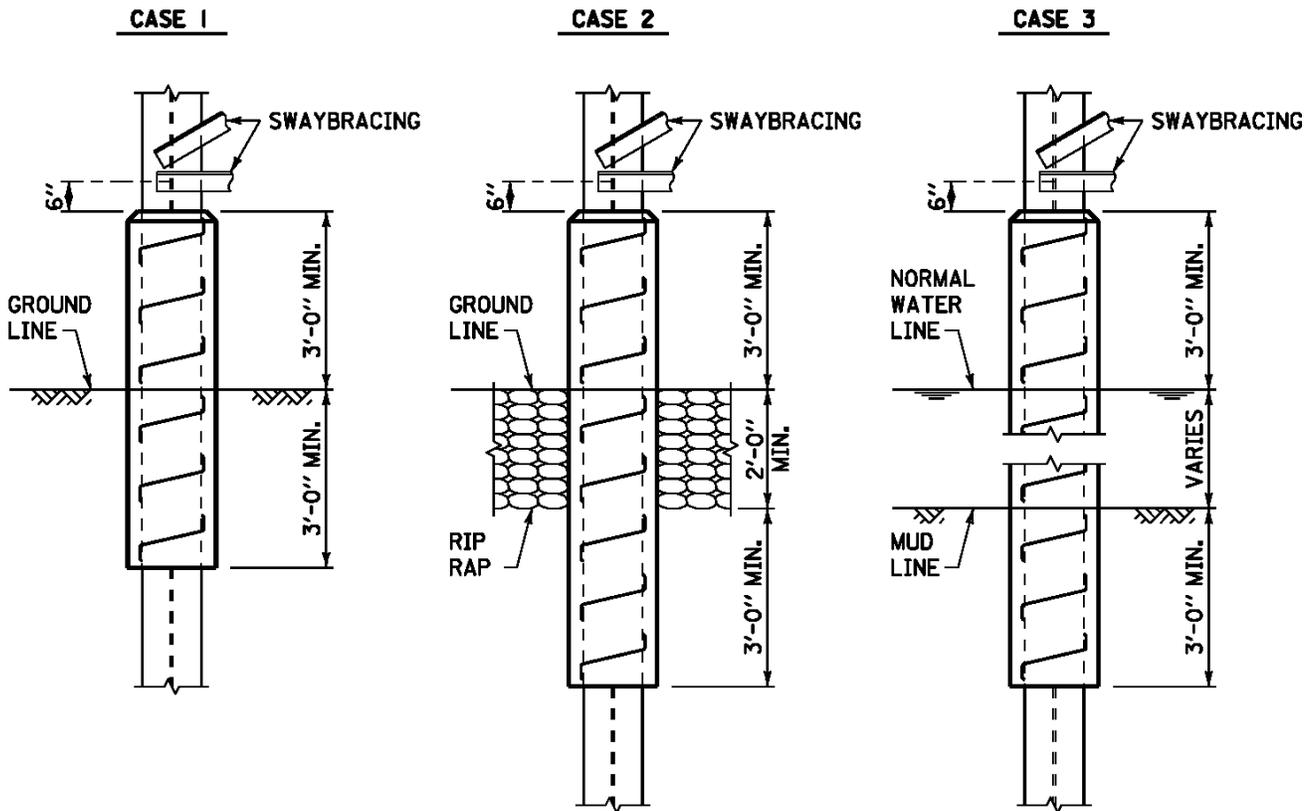
5.33 Typical Pouring Schedule



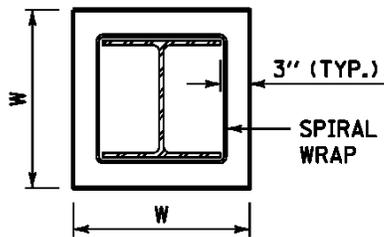
NOTE: SLABS SHALL BE POURED IN THE ALPHABETICAL SEQUENCE SHOWN.

NOTE: Bar size and numbering for illustration purposes only.

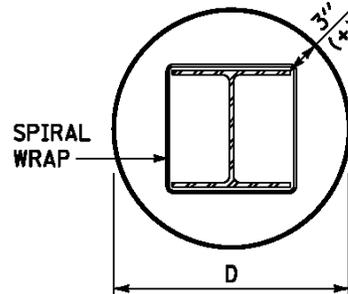
5.34 Standard Pile Encasements



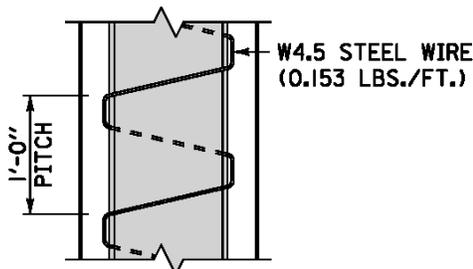
SQUARE ENCASEMENT



ROUND ENCASEMENT



SPIRAL WRAP



| PILE SIZE | SQUARE | | ROUND | | REINF. LBS./FT. |
|-----------|--------|----------|-------|----------|--------------------|
| | W | C.Y./FT. | * D | C.Y./FT. | |
| 10" | 1'-4" | 0.066 | 1'-8" | 0.081 | 0.53 |
| 12" | 1'-6" | 0.083 | 2'-0" | 0.116 | 0.63 |
| 14" | 1'-8" | 0.103 | 2'-2" | 0.137 | 0.73 |

* BASED ON COMMERCIALY AVAILABLE FORMS

5.35 Standard Weights and Measures

508A STRUCTURAL STEEL

1"Ø x 2'-0" A.B. ASSEMBLY: 6.1 LBS. EACH
 1¼"Ø x 2'-3" A.B. ASSEMBLY: 10.8 LBS. EACH
 1½"Ø x 2'-7" A.B. ASSEMBLY: 17.9 LBS. EACH

CONNECTION ANGLE L 6" x 6" x ½": 19.6 LBS. EACH

ARMOR PLATE ⅝" x 6" W/ ⅝"Ø x 6⅞" STUDS: 13.73 LBS./FT

PILE CAP CHANNEL C12 x 30 x 2'-4": 70 LBS. EACH
 PILE CAP CHANNEL C15 x 40 x 2'-8": 106.7 LBS. EACH
 PILE CAP CHANNEL MC18 x 42.7 x 3'-0": 128.1 LBS. EACH

10" PILE CAP PLATE ½" x 10¼" x 0'-10½": 15.3 LBS EACH
 12" PILE CAP PLATE ½" x 12¼" x 1'-1": 22.6 LBS. EACH
 14" PILE CAP PLATE ½" x 15" x 1'-3": 31.9 LBS EACH

508B STRUCTURAL STEEL

STEEL PLATE: 489.6 LBS./CU.FT.
 SHAPES: CURRENT AISC MANUAL
 A325/A490 H.S. BOLTS: SEE FOLLOWING CHARTS

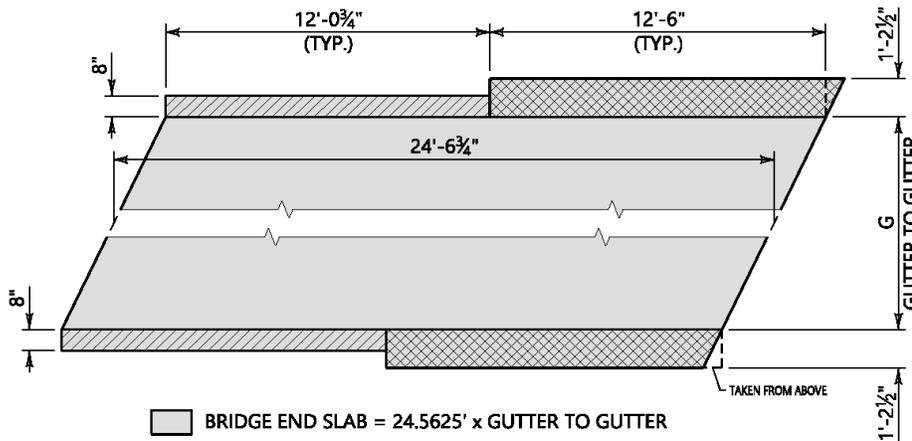
510E GROOVING CONCRETE BRIDGE DECKS

(G TO G - 4.0) x (TOTAL BRIDGE LENGTH - 2.0) / 9

502B STEEL REINF. FOR BRIDGE SUPERSTRUCTURE

36" SINGLE SLOPE - 19.5 LBS./LF
 42" MEDIAN CSF - 22.4 LBS./LF (CAST-IN-PLACE)
 - 19.9 LBS./LF (DRILL-IN)
 54" MEDIAN CSF - 25.9 LBS./LF (CAST-IN-PLACE)
 - 23.4 LBS./LF (DRILL-IN)

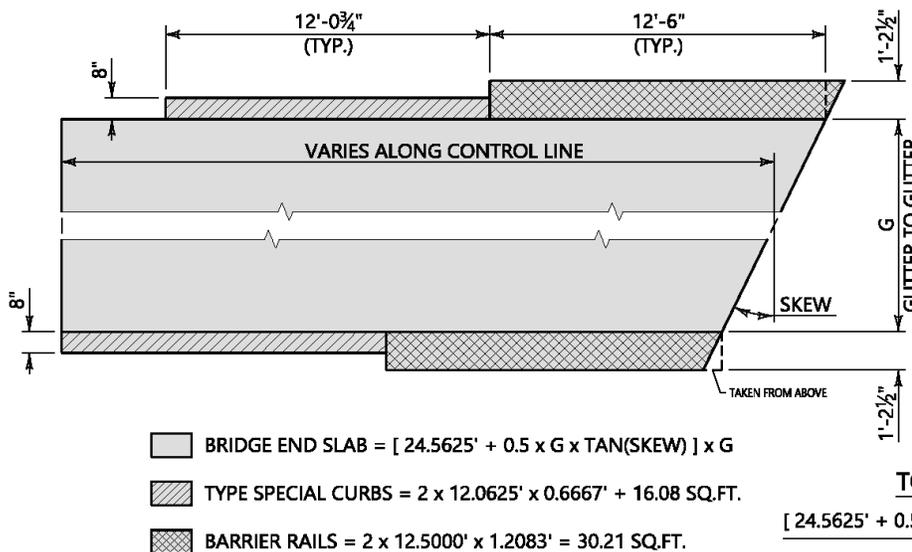
450B REINFORCED CEMENT CONCRETE BRIDGE END SLAB (BP)



TOTAL SQ. YDS.

$$\frac{(24.5625 \times G) + 46.3}{9}$$

450B REINFORCED CEMENT CONCRETE BRIDGE END SLAB (CP)

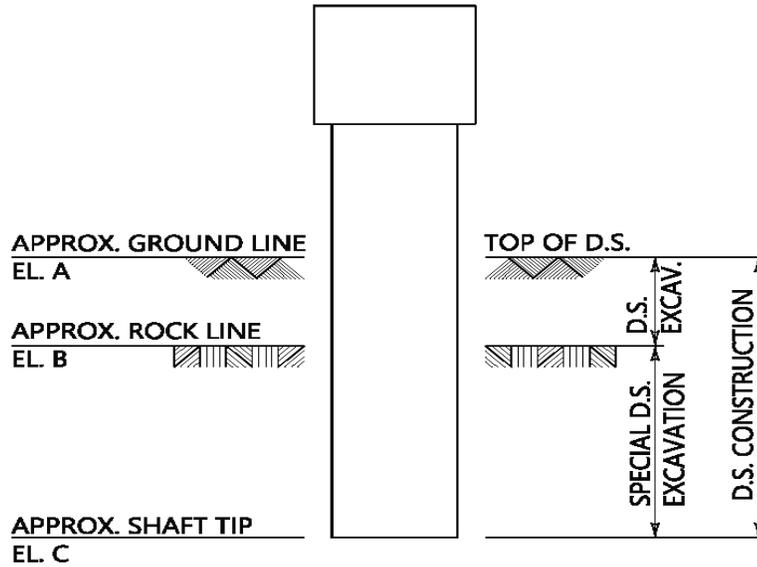


TOTAL SQ. YDS.

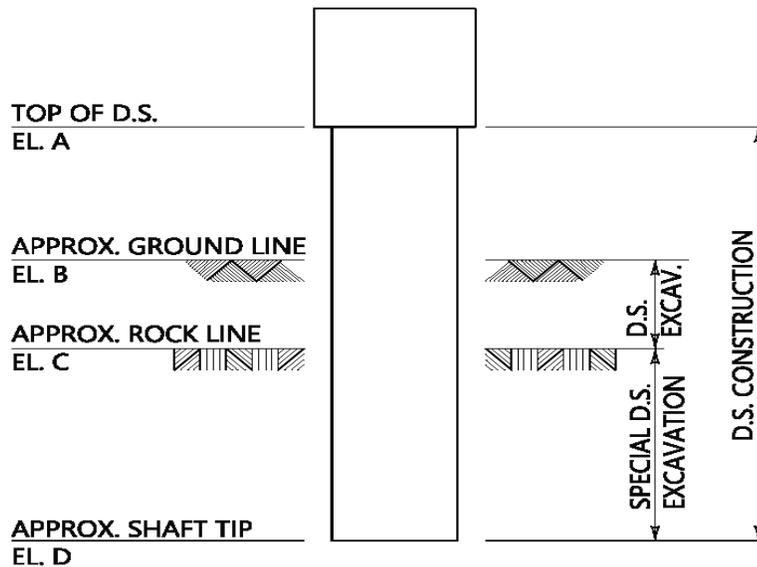
$$\frac{[24.5625' + 0.5 \times G \times \text{TAN}(\text{SKEW})] \times G + 46.3}{9}$$

5.36 Drilled Shaft Quantities

DRILLED SHAFT QUANTITIES



DRILLED SHAFT EXAMPLE 'A'
 BOTTOM OF CAP IS > 4' FROM GROUNDLINE



DRILLED SHAFT EXAMPLE 'B'
 BOTTOM OF CAP IS < 4' FROM GROUNDLINE

5.37 Bolt Lengths

| Table 7-14 Dimensions of High-Strength Fasteners, in. | | | | | | | | | | | |
|------------------------------------------------------------------|-------------------------------------------|---------------------------|--------|---------|--------|-------|---------|--------|---------|---------|-------|
| | | | | | | | | | | | |
| Measurement | | Nominal Bolt Diameter, in | | | | | | | | | |
| | | 1/2 | 5/8 | 3/4 | 7/8 | 1 | 1 1/8 | 1 1/4 | 1 3/8 | 1 1/2 | |
| A325 and A490 Bolts ^a | Width Across Flats, <i>F</i> | 7/8 | 1 1/16 | 1 1/4 | 1 7/16 | 1 5/8 | 1 13/16 | 2 | 2 3/16 | 2 3/8 | |
| | Height, <i>H</i> | 5/16 | 25/64 | 15/32 | 35/64 | 39/64 | 11/16 | 25/32 | 27/32 | 15/16 | |
| | Thread Length | 1 | 1 1/4 | 1 3/8 | 1 1/2 | 1 3/4 | 2 | 2 | 2 1/4 | 2 1/4 | |
| | Bolt Length = Grip + Washer Thickness + → | 1 1/16 | 7/8 | 1 | 1 1/8 | 1 1/4 | 1 1/2 | 1 5/8 | 1 3/4 | 1 7/8 | |
| A563 Nuts ^a | Width Across Flats, <i>W</i> | 7/8 | 1 1/16 | 1 1/4 | 1 7/16 | 1 5/8 | 1 13/16 | 2 | 2 3/16 | 2 3/8 | |
| | Height, <i>H</i> | 31/64 | 39/64 | 47/64 | 55/64 | 63/64 | 17/64 | 17/32 | 1 11/32 | 1 15/32 | |
| F436 Circular Washers ^b | Nom. Outside Diameter, <i>OD</i> | 1 1/16 | 1 5/16 | 1 15/32 | 1 3/4 | 2 | 2 1/4 | 2 1/2 | 2 3/4 | 3 | |
| | Nom. Inside Diameter, <i>ID</i> | 17/32 | 11/16 | 13/16 | 15/16 | 1 1/8 | 1 1/4 | 1 3/8 | 1 1/2 | 1 5/8 | |
| | Thckns., <i>T</i> | Min. | 0.097 | 0.122 | 0.122 | 0.136 | 0.136 | 0.136 | 0.136 | 0.136 | 0.136 |
| | | Max. | 0.177 | 0.177 | 0.177 | 0.177 | 0.177 | 0.177 | 0.177 | 0.177 | 0.177 |
| Min. Edge Distance, <i>E</i> ^c | 7/16 | 9/16 | 21/32 | 25/32 | 7/8 | 1 | 1 3/32 | 17/32 | 1 5/16 | | |
| F436 Square or Rect. Washers ^{b,d} | Min. Side Dimension, <i>A</i> | 1 3/4 | 1 3/4 | 1 3/4 | 1 3/4 | 1 3/4 | 2 1/4 | 2 1/4 | 2 1/4 | 2 1/4 | |
| | Mean Thickness, <i>T</i> | 5/16 | 5/16 | 5/16 | 5/16 | 5/16 | 5/16 | 5/16 | 5/16 | 5/16 | |
| | Taper in Thickness | 2:12 | 2:12 | 2:12 | 2:12 | 2:12 | 2:12 | 2:12 | 2:12 | 2:12 | |
| | Min. Edge Distance, <i>E</i> ^c | 7/16 | 9/16 | 21/32 | 25/32 | 7/8 | 1 | 1 3/32 | 17/32 | 1 5/16 | |

^a Tolerances as specified in ASME B18.2.6
^b ASTM F436 washer tolerances, in.:
 Nominal outside diameter -1/32; +1/32
 Nominal diameter of hole -0; +1/32
 Flatness: max. deviation from straight-edge placed on cut side shall not exceed 0.010
 Concentricity: center of hole to outside diameter (full indicator runout) 0.030
 Burr shall not project above immediately adjacent washer surface more than 0.010
^c For clipped washers only
^d For use with American standard beams (S) and channels (C)

AMERICAN INSTITUTE OF STEEL CONSTRUCTION

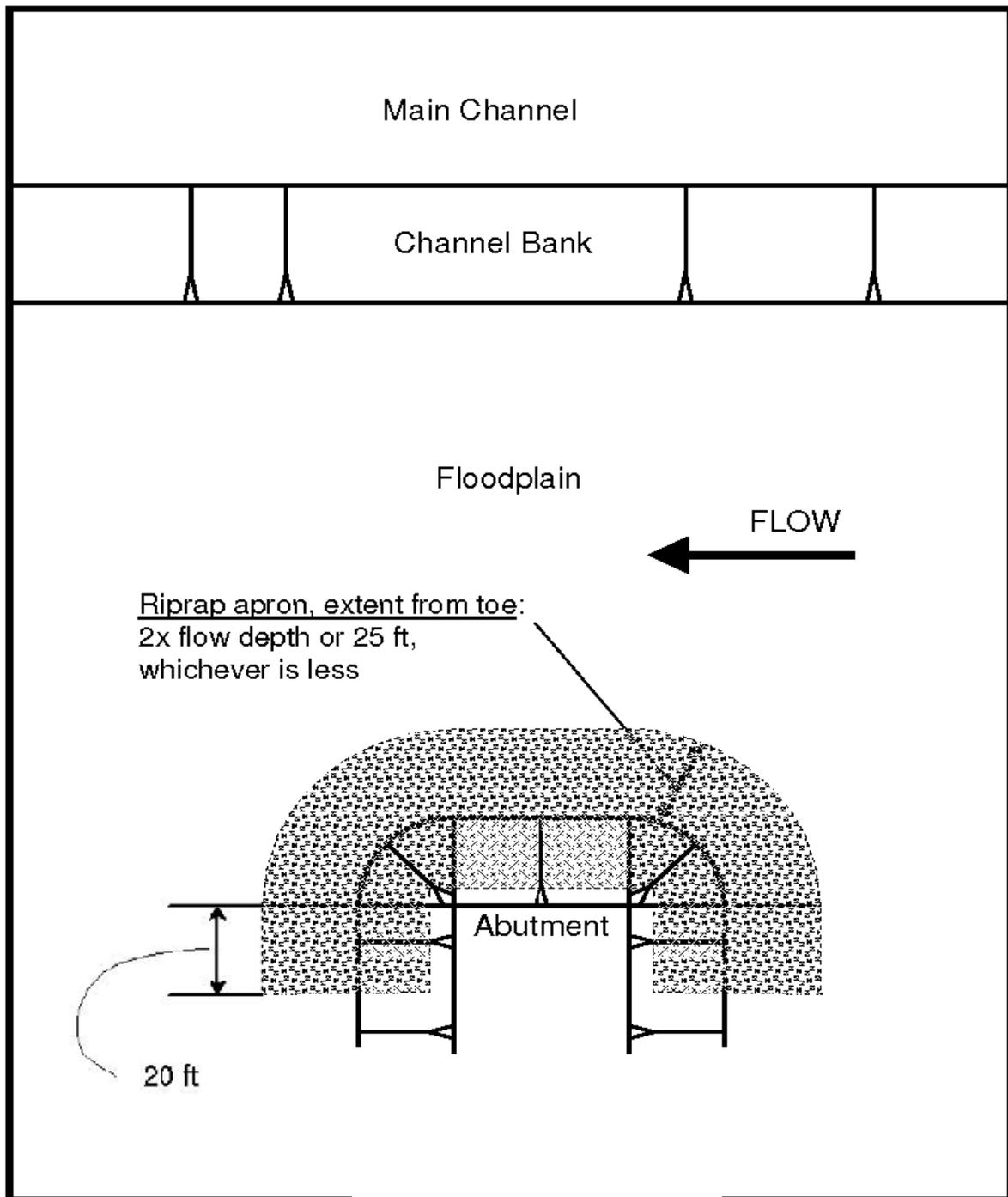
NOTE: Grip equals total material thickness to be bolted together.

5.38 Bolt Weights

| Table 7-18 | | | | | | | | | | |
|---------------------------------------------------------------------|---------------------------------------|-----------------------------------|------------|------------|------------|----------|--------------|--------------|--------------|--------------|
| Weights of High-Strength Fasteners, pounds per 100 count | | | | | | | | | | |
| Bolt Length, in. | | Nominal Bolt Diameter, in. | | | | | | | | |
| | | 1/2 | 5/8 | 3/4 | 7/8 | 1 | 1 1/8 | 1 1/4 | 1 3/8 | 1 1/2 |
| 100, Conventional A325 or A490 Bolts with A563 Nuts | 1 | 16.5 | 29.4 | 47.0 | — | — | — | — | — | — |
| | 1 1/4 | 17.8 | 31.1 | 49.6 | 74.4 | 104 | — | — | — | — |
| | 1 1/2 | 19.2 | 33.1 | 52.2 | 78.0 | 109 | 148 | 197 | — | — |
| | 1 3/4 | 20.5 | 35.3 | 55.3 | 81.9 | 114 | 154 | 205 | 261 | 333 |
| | 2 | 21.9 | 37.4 | 58.4 | 86.1 | 119 | 160 | 212 | 270 | 344 |
| | 2 1/4 | 23.3 | 39.8 | 61.6 | 90.3 | 124 | 167 | 220 | 279 | 355 |
| | 2 1/2 | 24.7 | 41.7 | 64.7 | 94.6 | 130 | 174 | 229 | 290 | 366 |
| | 2 3/4 | 26.1 | 43.9 | 67.8 | 98.8 | 135 | 181 | 237 | 300 | 379 |
| | 3 | 27.4 | 46.1 | 70.9 | 103 | 141 | 188 | 246 | 310 | 391 |
| | 3 1/4 | 28.8 | 48.2 | 74.0 | 107 | 146 | 195 | 255 | 321 | 403 |
| | 3 1/2 | 30.2 | 50.4 | 77.1 | 111 | 151 | 202 | 263 | 332 | 416 |
| | 3 3/4 | 31.6 | 52.5 | 80.2 | 116 | 157 | 209 | 272 | 342 | 428 |
| | 4 | 33.0 | 54.7 | 83.3 | 120 | 162 | 216 | 280 | 353 | 441 |
| | 4 1/4 | 34.3 | 56.9 | 86.4 | 124 | 168 | 223 | 289 | 363 | 453 |
| | 4 1/2 | 35.7 | 59.0 | 89.5 | 128 | 173 | 230 | 298 | 374 | 465 |
| | 4 3/4 | 37.1 | 61.2 | 92.7 | 133 | 179 | 237 | 306 | 384 | 478 |
| | 5 | 38.5 | 63.3 | 95.8 | 137 | 184 | 244 | 315 | 395 | 490 |
| | 5 1/4 | 39.9 | 65.5 | 98.9 | 141 | 190 | 251 | 324 | 405 | 503 |
| | 5 1/2 | 41.2 | 67.7 | 102 | 146 | 196 | 258 | 332 | 416 | 515 |
| | 5 3/4 | 42.6 | 69.8 | 105 | 150 | 201 | 265 | 341 | 426 | 527 |
| | 6 | 44.0 | 71.9 | 108 | 154 | 207 | 272 | 349 | 437 | 540 |
| | 6 1/4 | — | 74.1 | 111 | 158 | 212 | 279 | 358 | 447 | 552 |
| | 6 1/2 | — | 76.3 | 114 | 163 | 218 | 286 | 367 | 458 | 565 |
| | 6 3/4 | — | 78.5 | 118 | 167 | 223 | 293 | 375 | 468 | 577 |
| | 7 | — | 80.6 | 121 | 171 | 229 | 300 | 384 | 479 | 589 |
| | 7 1/4 | — | 82.8 | 124 | 175 | 234 | 307 | 392 | 489 | 602 |
| | 7 1/2 | — | 84.9 | 127 | 179 | 240 | 314 | 401 | 500 | 614 |
| | 7 3/4 | — | 87.1 | 130 | 183 | 246 | 321 | 410 | 510 | 626 |
| | 8 | — | 89.2 | 133 | 187 | 251 | 328 | 418 | 521 | 639 |
| | 8 1/4 | — | — | — | 192 | 257 | 335 | 427 | 531 | 651 |
| | 8 1/2 | — | — | — | 196 | 262 | 342 | 435 | 542 | 664 |
| | 8 3/4 | — | — | — | — | — | — | 444 | 552 | 676 |
| | 9 | — | — | — | — | — | — | 453 | 563 | 689 |
| | Per inch add'tl. Add | 5.50 | 8.60 | 12.4 | 16.9 | 22.1 | 28.0 | 34.4 | 42.5 | 49.7 |
| | 100, F436 Circular Washers | 2.10 | 3.60 | 4.80 | 7.00 | 9.40 | 11.3 | 13.8 | 16.8 | 20.0 |
| | 100, F436 Square Washers | 23.1 | 22.4 | 21.0 | 20.2 | 19.2 | 34.0 | 31.6 | 31.2 | 32.9 |

This table conforms to weight standards adopted by the Industrial Fasteners Institute (IFI), updated for washer weights.

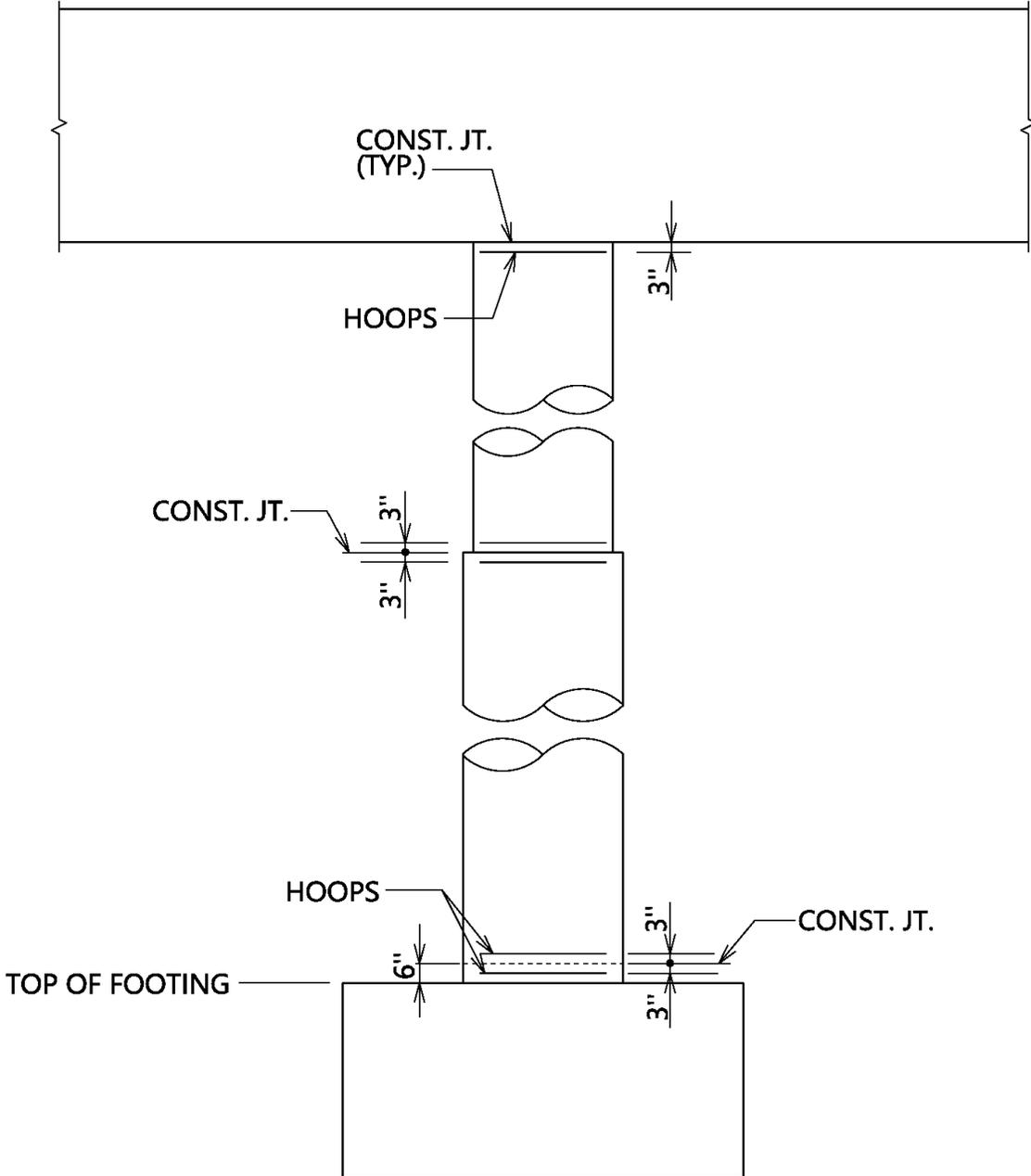
5.39 Typical Riprap Apron Length Calculation (For Use with SBN 12)



Apron length shall be calculated as follows:

2 x (100-yr flood elevation minus natural ground line elevation at toe of fill)
rounded to the nearest foot (8' min. / 25' max.)

5.40 Typical Hoop Spacing at Column Construction Joints



Appendices

The following compilation is provided to illustrate detail sheets used to build typical sets of bridge plans but should not be construed to be all inclusive or exclusive for an individual project. The detailer, working in conjunction with the designer, is responsible for providing all necessary details and sheets properly illustrated for the bridge components being detailed. Detailers should be aware that depending on the type and complexity of the structure, additional detailing/sheets could be required to adequately present information necessary to construct the bridge. Some of the example drawings may be dated but are intended for conceptual purposes. Verify that notes and other information is current. See Section 4 checklists.

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1.1.2 Index/Quantities/Required/Notes

| SHEET NO. | INDEX OF BRIDGE SHEETS | ESTIMATED QUANTITIES | REQUIRED | BRIDGE GENERAL NOTES |
|-----------|---------------------------------------------------------------------------------|----------------------|----------|------------------------------------|
| 1 | INDEX OF BRIDGE SHEETS, BRIDGE GENERAL NOTES, ESTIMATED QUANTITIES AND REQUIRED | | | (SEE BRIDGE SPECIAL DRAWING SBH-1) |
| 2 | GENERAL PLAN AND ELEVATION | | | ROADWAY 44'-0" WITH BARRIER RAILS |
| 3 | FOUNDATION LAYOUT | | | |
| 4 | JOINT LAYOUT | | | |
| 5 | SUPERELEVATION TRANSITION SKETCH | | | |
| 6 | SPANS 1 - 3 (SHEET 1 OF 2) | | | |
| 7 | SPANS 1 - 3 (SHEET 2 OF 2) | | | |
| 8 | SPANS 1 - 3 GIRDER DETAILS | | | |
| 9 | SPANS 4 - 6 PLAN AND POURING SCHEDULE (SHEET 1 OF 2) | | | |
| 10 | SPANS 4 - 6 PLAN AND POURING SCHEDULE (SHEET 2 OF 2) | | | |
| 11 | SPANS 4 - 6 TYPICAL SECTION | | | |
| 12 | SPANS 4 - 6 FRAMING PLAN (SHEET 1 OF 2) | | | |
| 13 | SPANS 4 - 6 FRAMING PLAN (SHEET 2 OF 2) | | | |
| 14 | SPANS 4 - 6 GIRDER ELEVATION | | | |
| 15 | SPANS 4 - 6 FIELD SPICE DETAILS (SHEET 1 OF 2) | | | |
| 16 | SPANS 4 - 6 FIELD SPICE DETAILS (SHEET 2 OF 2) | | | |
| 17 | SPANS 4 - 6 DIAPHRAGM AND CROSS FRAME DETAILS | | | |
| 18 | SPANS 4 - 6 CAMBER DIAGRAM | | | |
| 19 | SPANS 4 - 6 BEARING DETAILS (SHEET 1 OF 2) | | | |
| 20 | SPANS 4 - 6 BEARING DETAILS (SHEET 2 OF 2) | | | |
| 21 | EXPANSION DAM DETAILS (SHEET 1 OF 2) | | | |
| 22 | EXPANSION DAM DETAILS (SHEET 2 OF 2) | | | |
| 23 | INCREMENTAL DECK ELEVATIONS AT FINISH GRADE (SHEET 1 OF 2) | | | |
| 24 | INCREMENTAL DECK ELEVATIONS AT FINISH GRADE (SHEET 2 OF 2) | | | |
| 25 | ABUTMENT 1 | | | |
| 26 | ABUTMENT 1 DETAILS | | | |
| 27 | ABUTMENT 7 | | | |
| 28 | ABUTMENT 7 DETAILS (SHEET 1 OF 2) | | | |
| 29 | ABUTMENT 7 DETAILS (SHEET 2 OF 2) | | | |
| 30 | BENTS 2 AND 3 | | | |
| 31 | BENTS 2 AND 3 DETAILS | | | |
| 32 | BENT 4 | | | |
| 33 | BENT 4 DETAILS | | | |
| 34 | BENT 5 | | | |
| 35 | BENT 5 DETAILS | | | |
| 36 | BENT 6 | | | |
| 37 | BENT 6 DETAILS | | | |
| 38 - 43 | TEST BORING RECORD | | | |

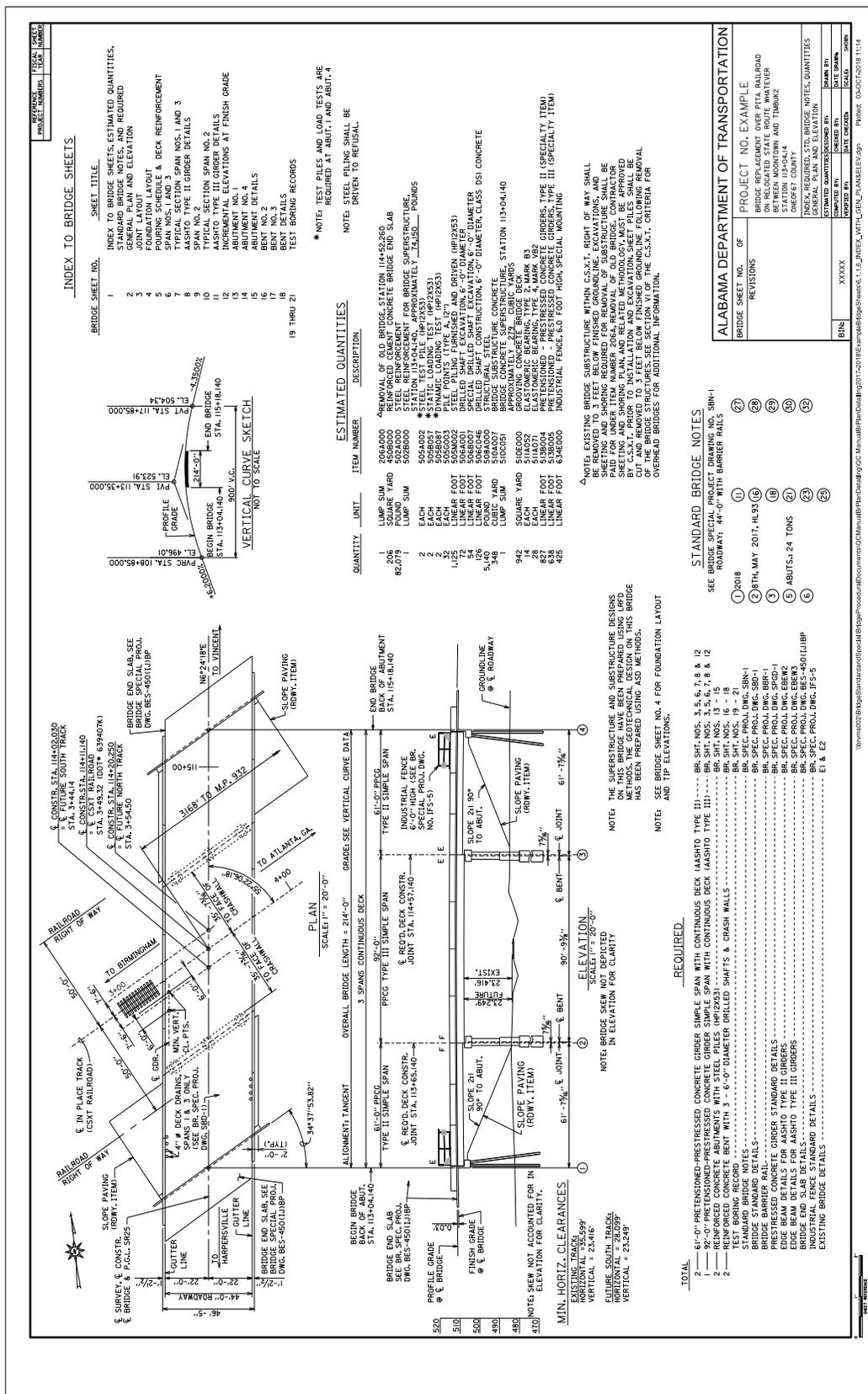
| ITEM NO. | DESCRIPTION | UNIT | QUANTITY |
|----------|----------------------------------------------------------------------------------------------|--------------|----------|
| 208A000 | REMOVAL OF OLD BRIDGE, STATION 110+16.63 | LUMP SUM | 1 |
| 215A000 | UNCLASSIFIED BRIDGE EXCAVATION | CUBIC YARDS | 119 |
| 459B000 | REINFORCED CEMENT CONCRETE BRIDGE END SLAB | SQUARE YARDS | 207 |
| 502A000 | STEEL REINFORCEMENT | POUNDS | 200,600 |
| 509B000 | STEEL REINFORCEMENT FOR BRIDGE SUPERSTRUCTURE, APPROXIMATELY 2.00" DIA | LUMP SUM | 46 |
| 509A005 | DRILLED SHAFT EXCAVATION, 3'-6" DIAMETER | LINEAR FEET | 46 |
| 509A006 | DRILLED SHAFT EXCAVATION, 5'-6" DIAMETER | LINEAR FEET | 26 |
| 508B002 | SPECIAL DRILLED SHAFT EXCAVATION, 3'-6" DIAMETER | LINEAR FEET | 8 |
| 508B006 | SPECIAL DRILLED SHAFT EXCAVATION, 5'-6" DIAMETER | LINEAR FEET | 85 |
| 508B008 | SPECIAL DRILLED SHAFT EXCAVATION, 6'-6" DIAMETER | LINEAR FEET | 127 |
| 506C041 | DRILLED SHAFT CONSTRUCTION, 3'-6" DIAMETER, CLASS DS-1 CONCRETE | LINEAR FEET | 54 |
| 506C045 | DRILLED SHAFT CONSTRUCTION, 5'-6" DIAMETER, CLASS DS-1 CONCRETE | LINEAR FEET | 111 |
| 506C047 | DRILLED SHAFT CONSTRUCTION, 6'-6" DIAMETER, CLASS DS-1 CONCRETE | LINEAR FEET | 127 |
| 508A000 | STRUCTURAL STEEL | POUNDS | 7,660 |
| 508A000 | STRUCTURAL STEEL SUPERSTRUCTURE, 200" - 275" - 200" CONTINUOUS SPAN, APPROXIMATELY 2.00" DIA | LUMP SUM | 1 |
| 508A000 | BRIDGE SUBSTRUCTURE CONCRETE | LUMP SUM | 790 |
| 510A007 | BRIDGE CONCRETE SUPERSTRUCTURE, STA. 109+05, APPROXIMATELY 100' CUBIC YARDS | CUBIC YARDS | 1 |
| 510C051 | APPROXIMATELY 100' CUBIC YARDS | LUMP SUM | 1 |
| 516C000 | GROOVING CONCRETE BRIDGE DECK | SQUARE YARDS | 4,182 |
| 51A004 | ELASTOMERIC BEARING, TYPE 4 | EACH | 15 |
| 51A005 | ELASTOMERIC BEARING, TYPE 5 | EACH | 5 |
| 51A073 | ELASTOMERIC BEARING, TYPE 4 (MARK VB4) | EACH | 30 |
| 519B017 | PRETENSIONED - PRESTRESSED CONCRETE GIRDERS, TYPE BT-72, (SPECIALTY ITEM) | LINEAR FEET | 1,333 |

| REVISIONS | DATE | BY | DESCRIPTION |
|-----------|----------|-----|-------------|
| 1 | 02/08/94 | ETN | 020894 |

ALABAMA DEPARTMENT OF TRANSPORTATION
 PROJECT NO. BR7-0017 (516)
 BRIDGE SHEET NO. 1 OF 43
 STATE ROUTE 17 OVER NORTH FORK CREEK
 BETWEEN HAMILTON AND HACKLEBURG
 STATION 109+05

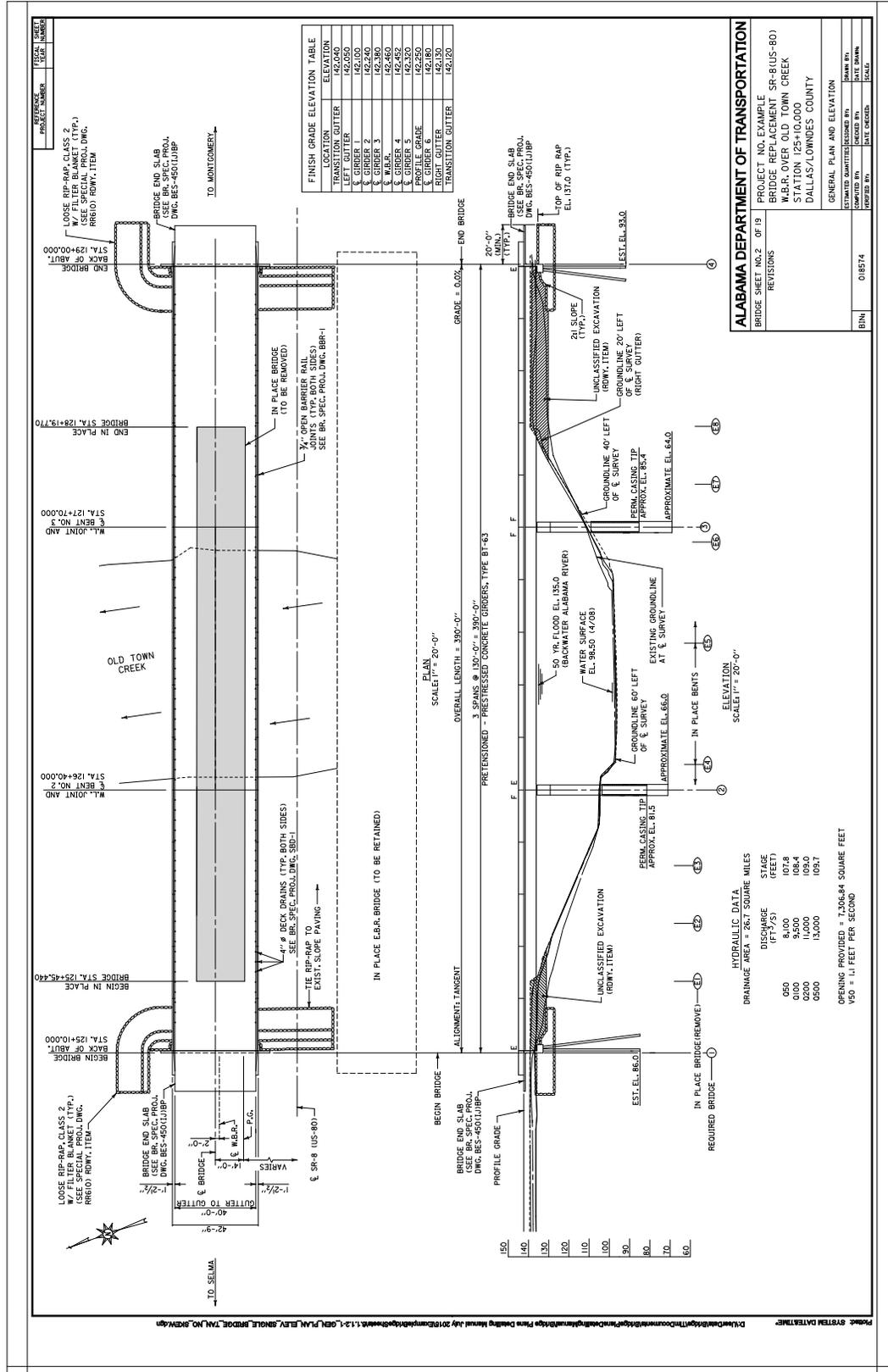
DESIGNER: ETN
 CHECKER: ETN
 ESTIMATED QUANTITIES AND REQUIRED BY: ETN
 ESTIMATED QUANTITIES AND REQUIRED BY: ETN
 DATE CHECKED: 02/08/94
 DRAWN BY: A. THOMAS
 DATE DRAWN: 02/08/94
 PROJECT: BR7-0017 (516)
 SHEET: 1 OF 43

1.1.6 Combined w/General Plan & Elev. (optional)



1.2 General Plan & Elevation Sheets

1.2.1 General Plan & Elevation, Single Bridge, Tangent, No Skew



1.2.2 General Elevation, Single Bridge, Tangent, No Skew (Precast)

| | |
|-----------------------------------|-----------------------------|
| REFERENCE PROJECT NUMBER _____ | FISCAL YEAR NUMBER _____ |
|-----------------------------------|-----------------------------|

| <p style="text-align: center;">ESTIMATED QUANTITIES</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:10%;">ITEM</th> <th style="width:10%;">QUANTITY</th> <th style="width:10%;">UNIT</th> <th style="width:70%;">DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>206A</td> <td>??</td> <td>LUMP SUM</td> <td>REMOVAL OF OLD BRIDGE STATION P+???</td> </tr> <tr> <td>502A</td> <td>??</td> <td>POUND</td> <td>STEEL REINFORCEMENT (GRADE)</td> </tr> <tr> <td>505A</td> <td>?</td> <td>EACH</td> <td>STEEL TEST PILE (HP???)</td> </tr> <tr> <td>505B</td> <td>?</td> <td>EACH</td> <td>STATIC LOADING TESTS (HP???)</td> </tr> <tr> <td>505G</td> <td>?</td> <td>EACH</td> <td>PILE POINTS (TYPE 2,???)</td> </tr> <tr> <td>505H</td> <td>?</td> <td>LINEAR FOOT</td> <td>STEEL PILING FURNISHED AND DRIVEN (HP???)</td> </tr> <tr> <td>505M</td> <td>?</td> <td>LINEAR FOOT</td> <td>WIRE ROPE ABUTMENT ANCHOR ASSEMBLY</td> </tr> <tr> <td>507A</td> <td>?</td> <td>EACH</td> <td>BRIDGE SUBSTRUCTURE CONCRETE CLASS A</td> </tr> <tr> <td>510A</td> <td>??</td> <td>CUBIC YARD</td> <td>ELASTOMERIC BEARINGS TYPE 1</td> </tr> <tr> <td>512A</td> <td>??</td> <td>EACH</td> <td>PRECAST CONCRETE ABUTMENT CAPS, 2'-0" WIDE BY 1'-8" DEEP BY 33'-0" LONG</td> </tr> <tr> <td>512B</td> <td>??</td> <td>EACH</td> <td>PRECAST CONCRETE INTERMEDIATE BENT CAPS, 2'-0" WIDE BY 2'-0" DEEP BY 31'-6" LONG</td> </tr> <tr> <td>512C</td> <td>??</td> <td>EACH</td> <td>PRECAST CONCRETE TYPE 1 SPAN SECTION, 3'-6" WIDE BY 2'-0" DEEP BY 39'-1 1/2" LONG</td> </tr> <tr> <td>512D</td> <td>??</td> <td>EACH</td> <td>PRECAST CONCRETE TYPE 2C SPAN SECTION, 3'-6" WIDE BY 2'-0" DEEP BY 39'-1 1/2" LONG</td> </tr> <tr> <td>512E</td> <td>??</td> <td>EACH</td> <td>PRECAST CONCRETE BARRIER RAIL INTERMEDIATE SECTION, 39'-1 1/2" LONG</td> </tr> <tr> <td>512F</td> <td>??</td> <td>EACH</td> <td>PRECAST CONCRETE ABUTMENT PANELS, TYPE A2</td> </tr> <tr> <td>512F</td> <td>??</td> <td>EACH</td> <td>PRECAST CONCRETE ABUTMENT PANELS, TYPE W2</td> </tr> <tr> <td>512G</td> <td>??</td> <td>EACH</td> <td>PRECAST CONCRETE WING PANEL</td> </tr> </tbody> </table> | ITEM | QUANTITY | UNIT | DESCRIPTION | 206A | ?? | LUMP SUM | REMOVAL OF OLD BRIDGE STATION P+??? | 502A | ?? | POUND | STEEL REINFORCEMENT (GRADE) | 505A | ? | EACH | STEEL TEST PILE (HP???) | 505B | ? | EACH | STATIC LOADING TESTS (HP???) | 505G | ? | EACH | PILE POINTS (TYPE 2,???) | 505H | ? | LINEAR FOOT | STEEL PILING FURNISHED AND DRIVEN (HP???) | 505M | ? | LINEAR FOOT | WIRE ROPE ABUTMENT ANCHOR ASSEMBLY | 507A | ? | EACH | BRIDGE SUBSTRUCTURE CONCRETE CLASS A | 510A | ?? | CUBIC YARD | ELASTOMERIC BEARINGS TYPE 1 | 512A | ?? | EACH | PRECAST CONCRETE ABUTMENT CAPS, 2'-0" WIDE BY 1'-8" DEEP BY 33'-0" LONG | 512B | ?? | EACH | PRECAST CONCRETE INTERMEDIATE BENT CAPS, 2'-0" WIDE BY 2'-0" DEEP BY 31'-6" LONG | 512C | ?? | EACH | PRECAST CONCRETE TYPE 1 SPAN SECTION, 3'-6" WIDE BY 2'-0" DEEP BY 39'-1 1/2" LONG | 512D | ?? | EACH | PRECAST CONCRETE TYPE 2C SPAN SECTION, 3'-6" WIDE BY 2'-0" DEEP BY 39'-1 1/2" LONG | 512E | ?? | EACH | PRECAST CONCRETE BARRIER RAIL INTERMEDIATE SECTION, 39'-1 1/2" LONG | 512F | ?? | EACH | PRECAST CONCRETE ABUTMENT PANELS, TYPE A2 | 512F | ?? | EACH | PRECAST CONCRETE ABUTMENT PANELS, TYPE W2 | 512G | ?? | EACH | PRECAST CONCRETE WING PANEL | <p style="text-align: center;">REQUIRED</p> <p>3-----40'-6" PRECAST CONCRETE SPANS-----BRIDGE SHEET 2 AND STANDARD DRAWING PC-40</p> <p>PRECAST CONCRETE BARRIER RAIL-----BRIDGE SHEET 2 AND STANDARD DRAWING PGB-140</p> <p>2-----PRECAST CONCRETE AND STEEL PILE END BENTS-----BRIDGE SHEET 2 AND STANDARD DRAWING POA-2840</p> <p>2-----PRECAST CONCRETE AND STEEL PILE INTERMEDIATE BENTS-----BRIDGE SHEET 2 AND STANDARD DRAWING PGB-2840</p> <p>PRECAST CONCRETE ABUTMENT PANELS AND ANCHOR ASSEMBLIES-----BRIDGE SHEET 2 AND STANDARD DRAWING POP-2800</p> <p>TEST BORING RECORDS-----BRIDGE SHEET ?? AND ?</p> <p>BRIDGE GENERAL NOTES-----STANDARD DRAWING BOH-1</p> <p>STANDARD DETAILS-----STANDARD DRAWING I-131</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|------------------------------------------------------------------------------------|-------------|------|----|----------|-------------------------------------|------|----|-------|------------------------------|------|---|------|-------------------------|------|---|------|------------------------------|------|---|------|--------------------------|------|---|-------------|-------------------------------------------|------|---|-------------|------------------------------------|------|---|------|--------------------------------------|------|----|------------|-----------------------------|------|----|------|-------------------------------------------------------------------------|------|----|------|----------------------------------------------------------------------------------|------|----|------|-----------------------------------------------------------------------------------|------|----|------|------------------------------------------------------------------------------------|------|----|------|---------------------------------------------------------------------|------|----|------|-------------------------------------------|------|----|------|-------------------------------------------|------|----|------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ITEM | QUANTITY | UNIT | DESCRIPTION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 206A | ?? | LUMP SUM | REMOVAL OF OLD BRIDGE STATION P+??? | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 502A | ?? | POUND | STEEL REINFORCEMENT (GRADE) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 505A | ? | EACH | STEEL TEST PILE (HP???) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 505B | ? | EACH | STATIC LOADING TESTS (HP???) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 505G | ? | EACH | PILE POINTS (TYPE 2,???) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 505H | ? | LINEAR FOOT | STEEL PILING FURNISHED AND DRIVEN (HP???) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 505M | ? | LINEAR FOOT | WIRE ROPE ABUTMENT ANCHOR ASSEMBLY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 507A | ? | EACH | BRIDGE SUBSTRUCTURE CONCRETE CLASS A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 510A | ?? | CUBIC YARD | ELASTOMERIC BEARINGS TYPE 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 512A | ?? | EACH | PRECAST CONCRETE ABUTMENT CAPS, 2'-0" WIDE BY 1'-8" DEEP BY 33'-0" LONG | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 512B | ?? | EACH | PRECAST CONCRETE INTERMEDIATE BENT CAPS, 2'-0" WIDE BY 2'-0" DEEP BY 31'-6" LONG | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 512C | ?? | EACH | PRECAST CONCRETE TYPE 1 SPAN SECTION, 3'-6" WIDE BY 2'-0" DEEP BY 39'-1 1/2" LONG | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 512D | ?? | EACH | PRECAST CONCRETE TYPE 2C SPAN SECTION, 3'-6" WIDE BY 2'-0" DEEP BY 39'-1 1/2" LONG | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 512E | ?? | EACH | PRECAST CONCRETE BARRIER RAIL INTERMEDIATE SECTION, 39'-1 1/2" LONG | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 512F | ?? | EACH | PRECAST CONCRETE ABUTMENT PANELS, TYPE A2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 512F | ?? | EACH | PRECAST CONCRETE ABUTMENT PANELS, TYPE W2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 512G | ?? | EACH | PRECAST CONCRETE WING PANEL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

BRIDGE GENERAL NOTES

SEE BRIDGE SPECIAL PROJECT DRAWING BOH-1 ROADWAY: ??'-??" WITH BARRIER RAILS

① I-A

② HS20-44

⑤ ABUT. ?? TONS

⑥ BENT ?? TONS

ONLY FOR CONSULTANTS

I CERTIFY THAT COMPLETE REVIEWS OF THE DESIGNER'S CALCULATIONS, CONTRACT DOCUMENTS, AND ALL NECESSARY MATERIALS AND METHODS OF CONSTRUCTION HAVE BEEN MADE AND FOUND TO BE COMPLETE, CORRECT, AND SATISFACTORY FOR LETTING.

APPROVED: _____ DATE: _____
 (Engineer of Record's Signature)

REGISTRATION NO. _____

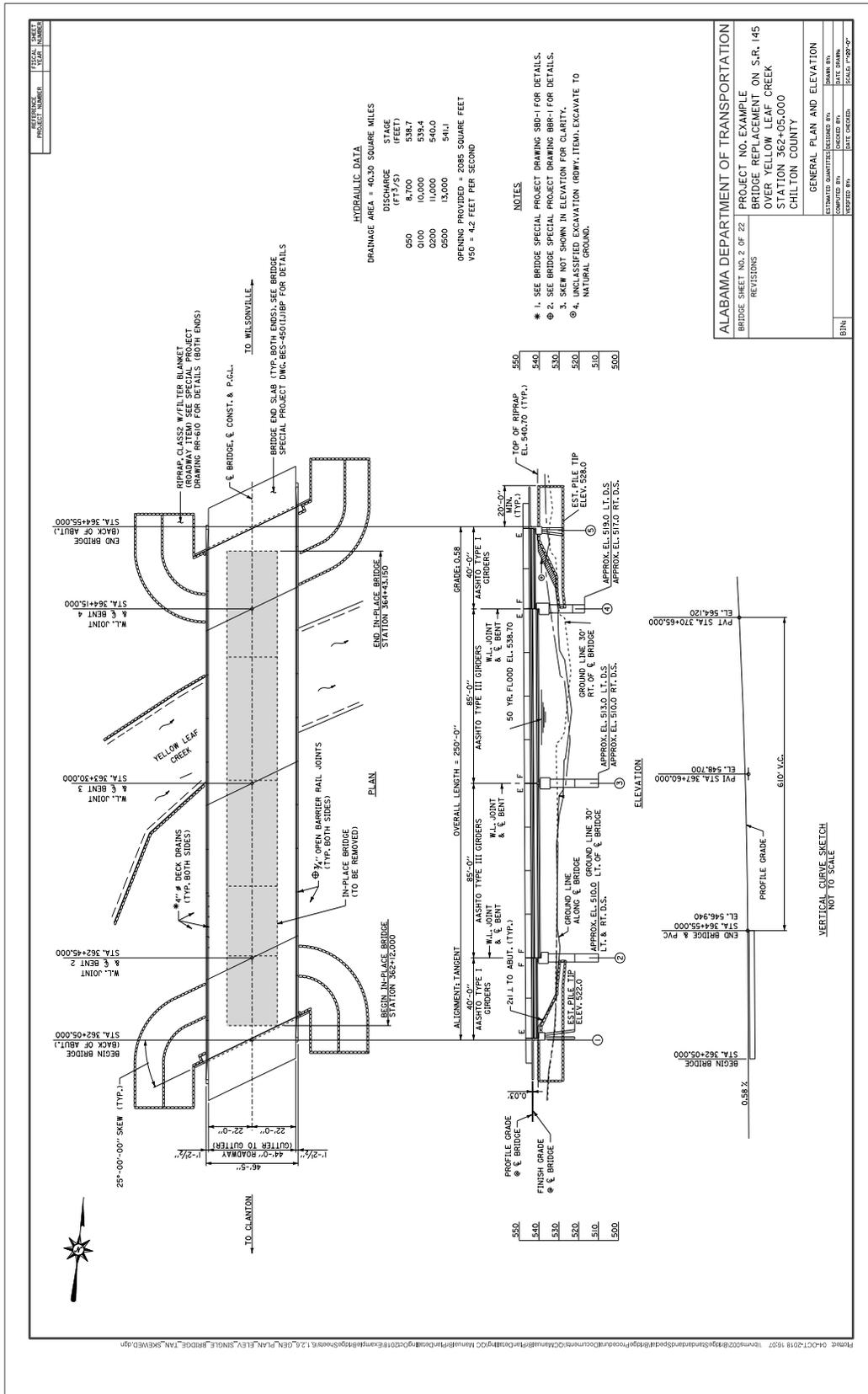
APPROVED: _____ DATE: _____
 (Reviewing Engineer of Record's Signature)

REGISTRATION NO. _____

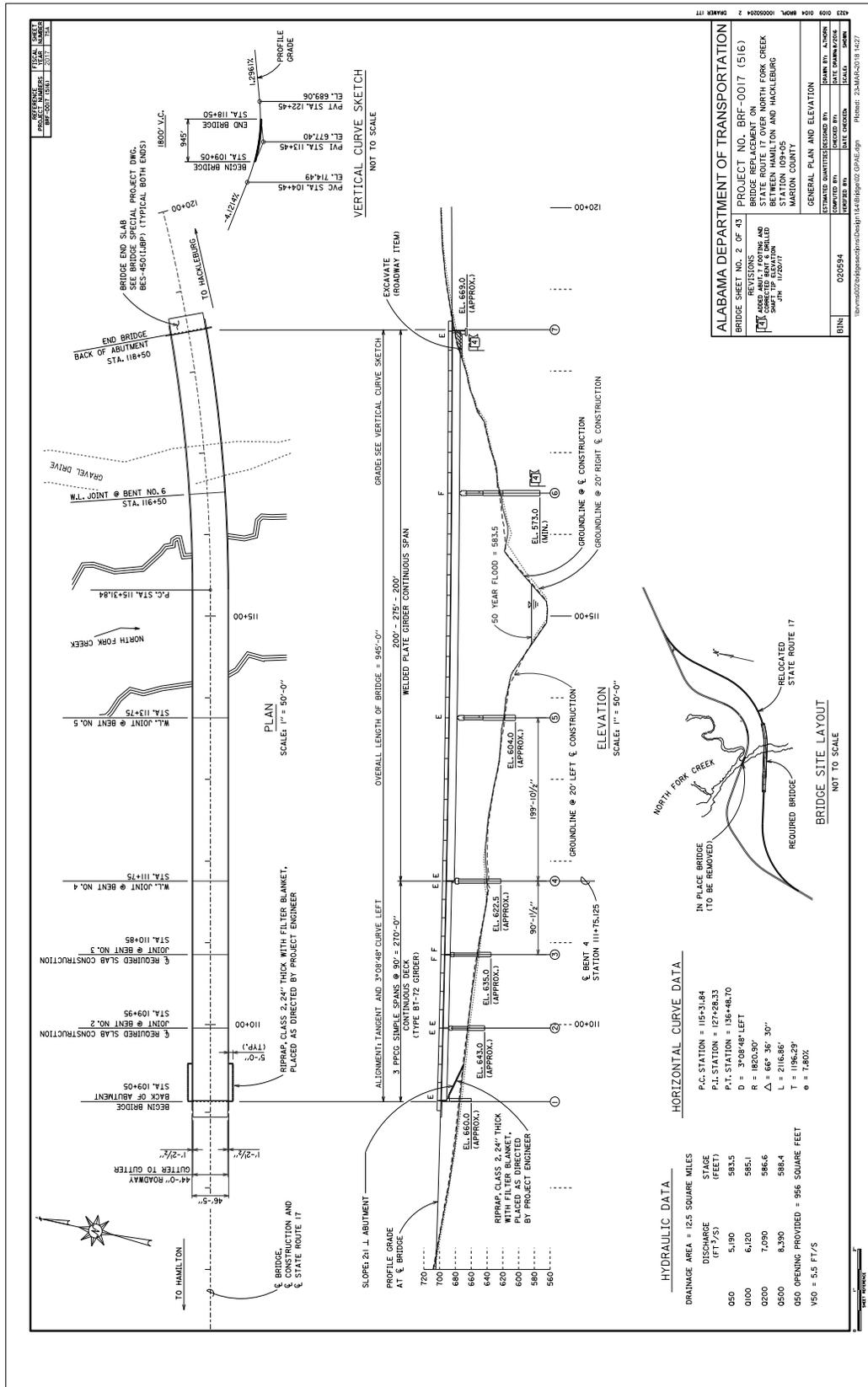
| <p style="text-align: center;">ACCEPTED BY</p> <p>_____ BRIDGE ENGINEER</p> <p>_____ DATE</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center; font-size: small;">CONSULTANT LOGO</p> </div> | <p style="font-size: x-small;">NEEL SHANKAR ENGINEERING, INC. 10000 W. UNIVERSITY BLVD. SUITE 1000, WEST VALLEY CITY, GA 30087. TEL: 770.261.1111 FAX: 770.261.1112. WWW.NEELSHANKAR.COM. ALL RIGHTS RESERVED. THIS DOCUMENT IS THE PROPERTY OF NEEL SHANKAR ENGINEERING, INC. AND IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREIN. ANY REUSE OR REPRODUCTION OF THIS DOCUMENT WITHOUT THE WRITTEN PERMISSION OF NEEL SHANKAR ENGINEERING, INC. IS STRICTLY PROHIBITED. THIS DOCUMENT IS SUBJECT TO THE TERMS AND CONDITIONS OF THE CONSULTANT AGREEMENT.</p> | <p style="text-align: center;">ALABAMA DEPARTMENT OF TRANSPORTATION</p> <p>BRIDGE SHEET NO. 1 OF 2 PROJECT NO. _____ BRIDGE FOR CR-XX OVER ?? STA. XXX+XX.XX COUNTY</p> <p style="font-size: x-small;">INDEX TO BRIDGE SHEETS, ESTIMATED QUANTITIES, REVISIONS, AND RECORDS</p> <table border="1" style="width:100%; border-collapse: collapse; font-size: x-small;"> <tr> <th>ESTIMATED QUANTITIES</th> <th>REVISIONS</th> <th>DATE DRAWN</th> <th>SCALE</th> </tr> <tr> <td>COMPUTED BY: _____</td> <td>REVISIONS: _____</td> <td>DATE CHECKED: _____</td> <td>_____</td> </tr> <tr> <td>CHECKED BY: _____</td> <td>DATE CHECKED: _____</td> <td>_____</td> <td>_____</td> </tr> </table> | ESTIMATED QUANTITIES | REVISIONS | DATE DRAWN | SCALE | COMPUTED BY: _____ | REVISIONS: _____ | DATE CHECKED: _____ | _____ | CHECKED BY: _____ | DATE CHECKED: _____ | _____ | _____ |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------|------------|-------|--------------------|------------------|---------------------|-------|-------------------|---------------------|-------|-------|
| ESTIMATED QUANTITIES | REVISIONS | DATE DRAWN | SCALE | | | | | | | | | | | |
| COMPUTED BY: _____ | REVISIONS: _____ | DATE CHECKED: _____ | _____ | | | | | | | | | | | |
| CHECKED BY: _____ | DATE CHECKED: _____ | _____ | _____ | | | | | | | | | | | |

D:\MyFiles\Williams_E\Files\Drawings\Page Precast Example for Long Br

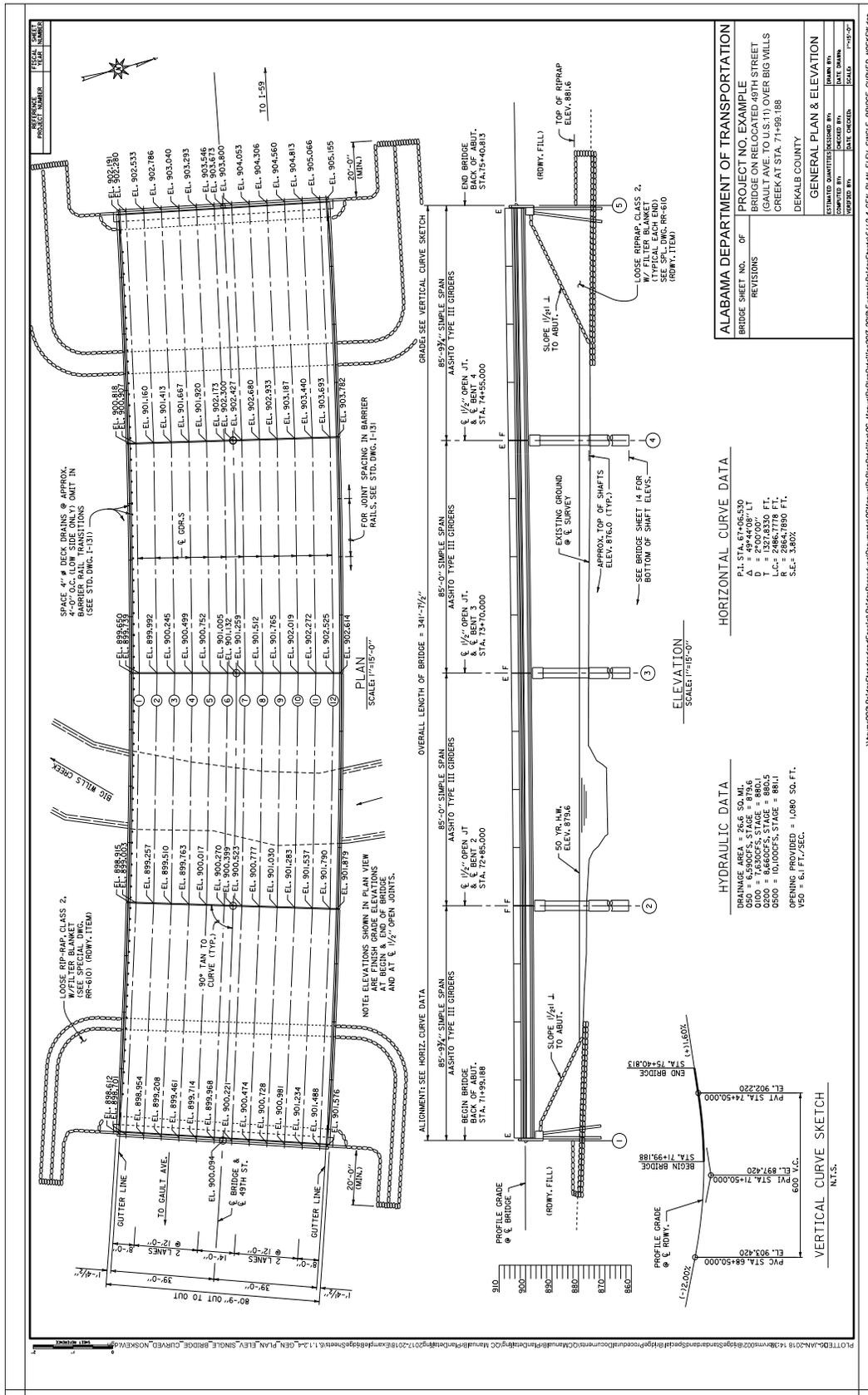
1.2.6 General Plan & Elevation, Single Bridge, Tangent, Skewed



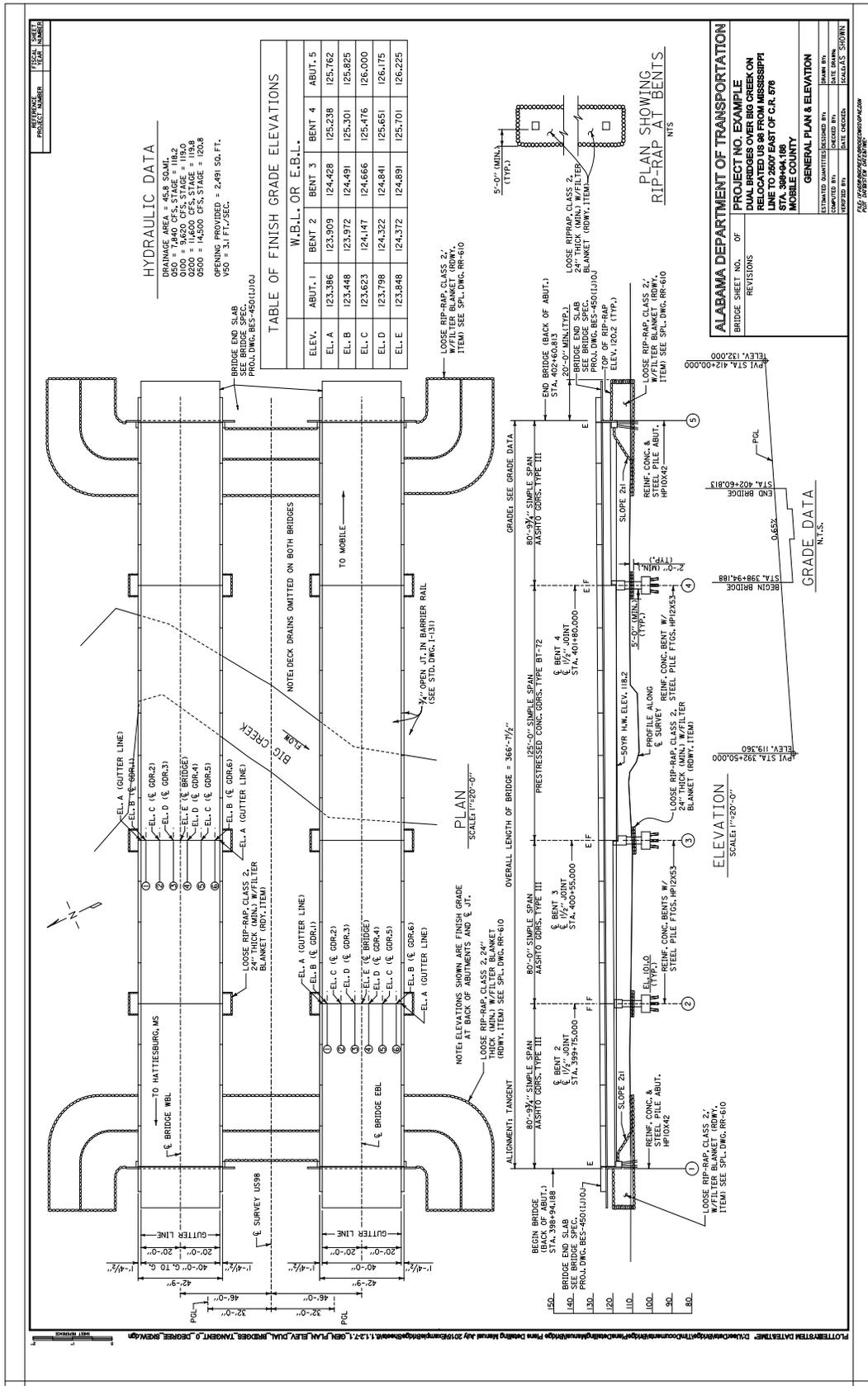
1.2.7 General Plan & Elevation, Single Bridge, Tangent & Curved, 0 Degree Skew (Steel and Conc.)



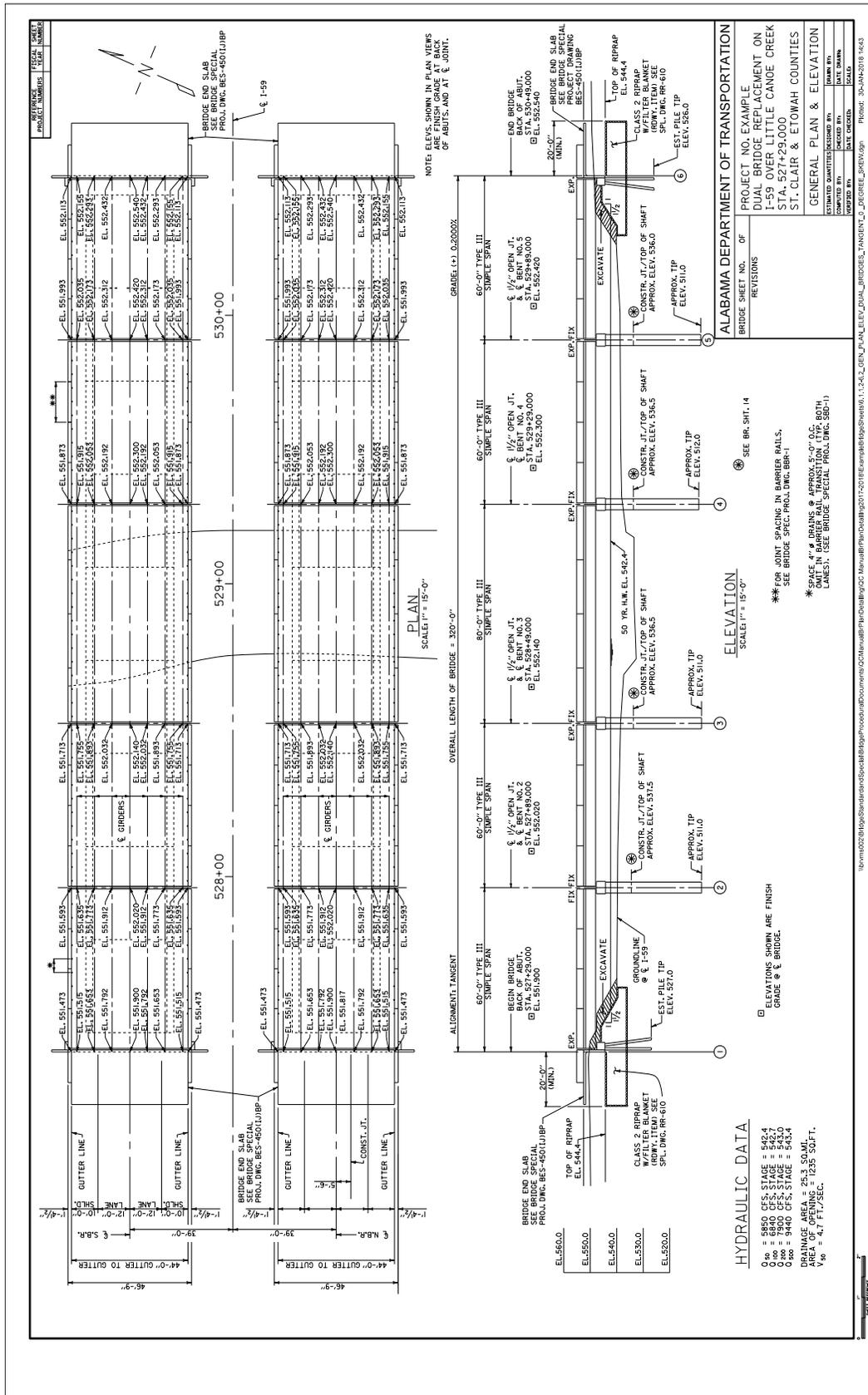
1.2.8 General Plan & Elevation, Single Bridge, Curved, Skewed



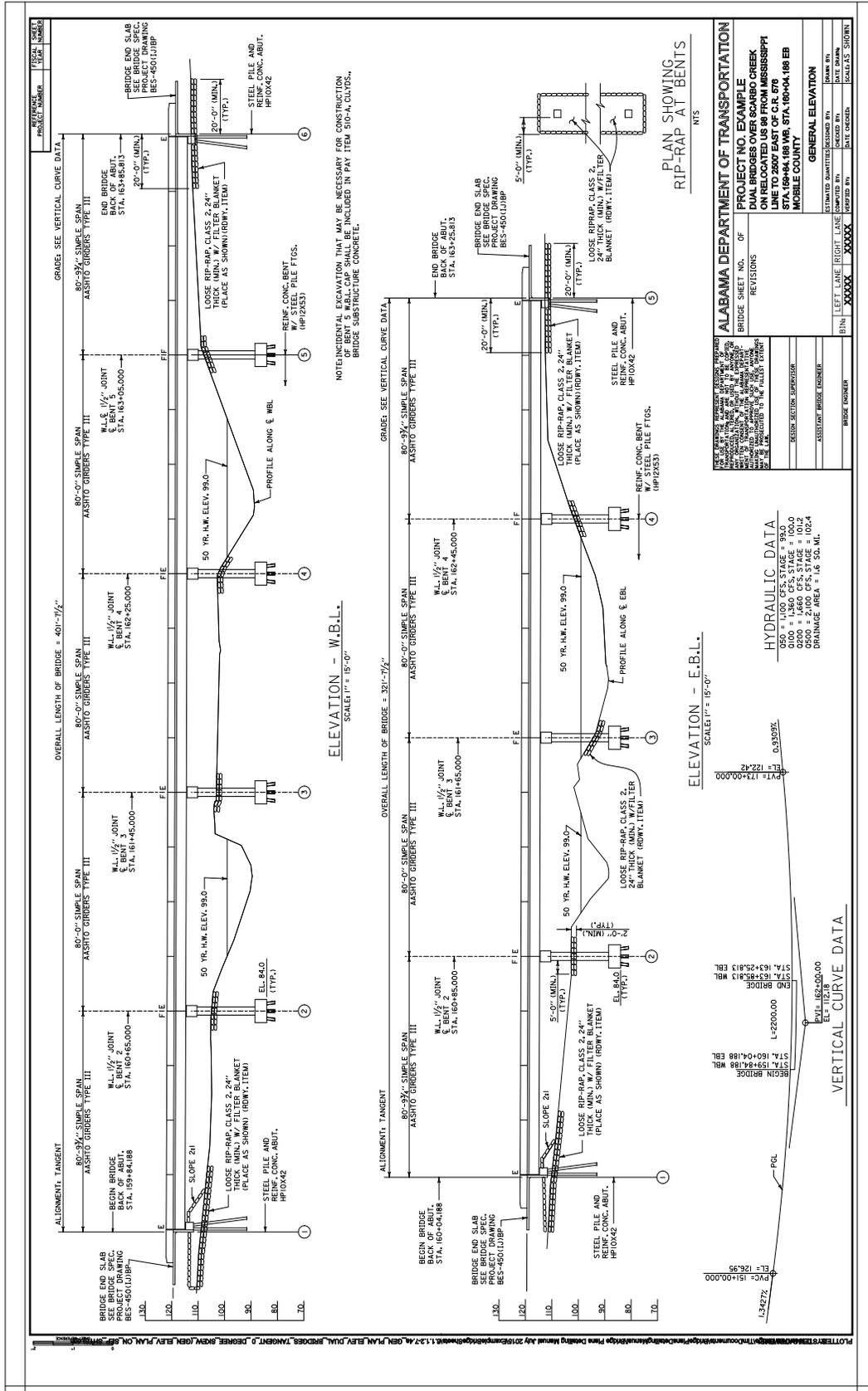
1.2.11 General Plan & Elevation, Dual Bridges, Tangent, 0 Degree Skew



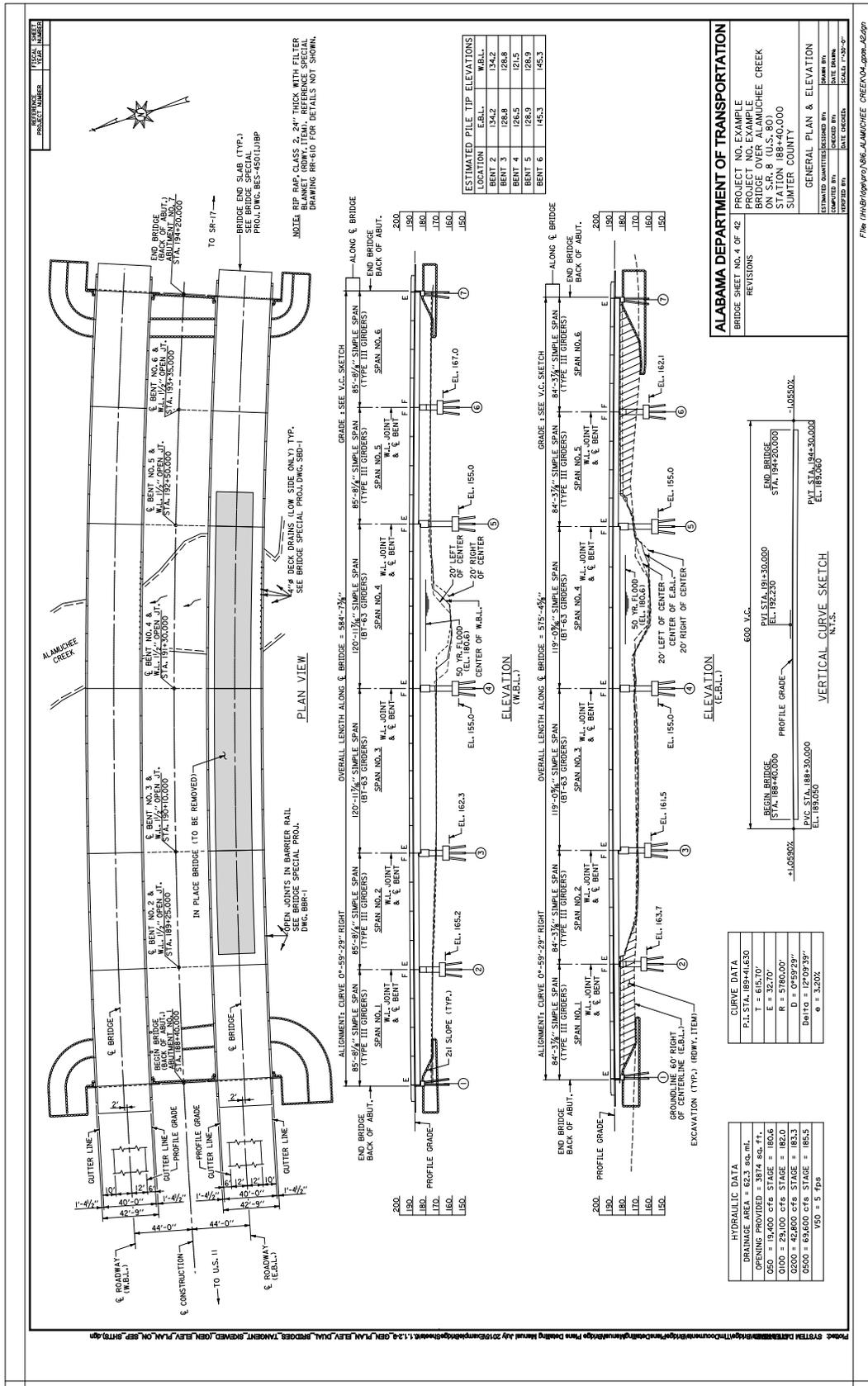
1.2.12 General Plan & Elevation, Dual Bridges, Tangent, 0 Degree Skew

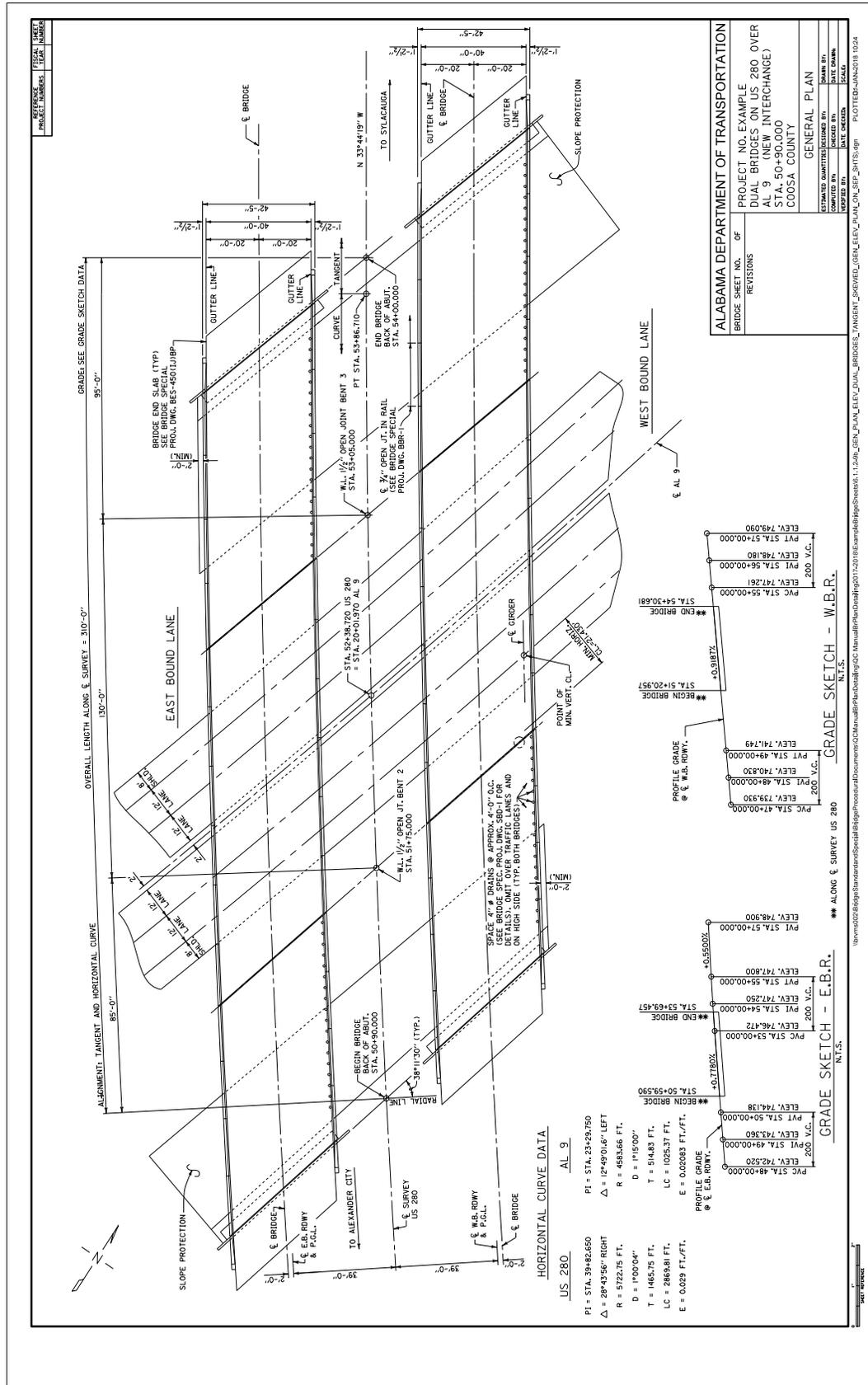


1.2.13 General Plan & Elevation, Dual Bridges, Tangent, 0 Degree Skew, Elevation, Plan on Sep. Shts.

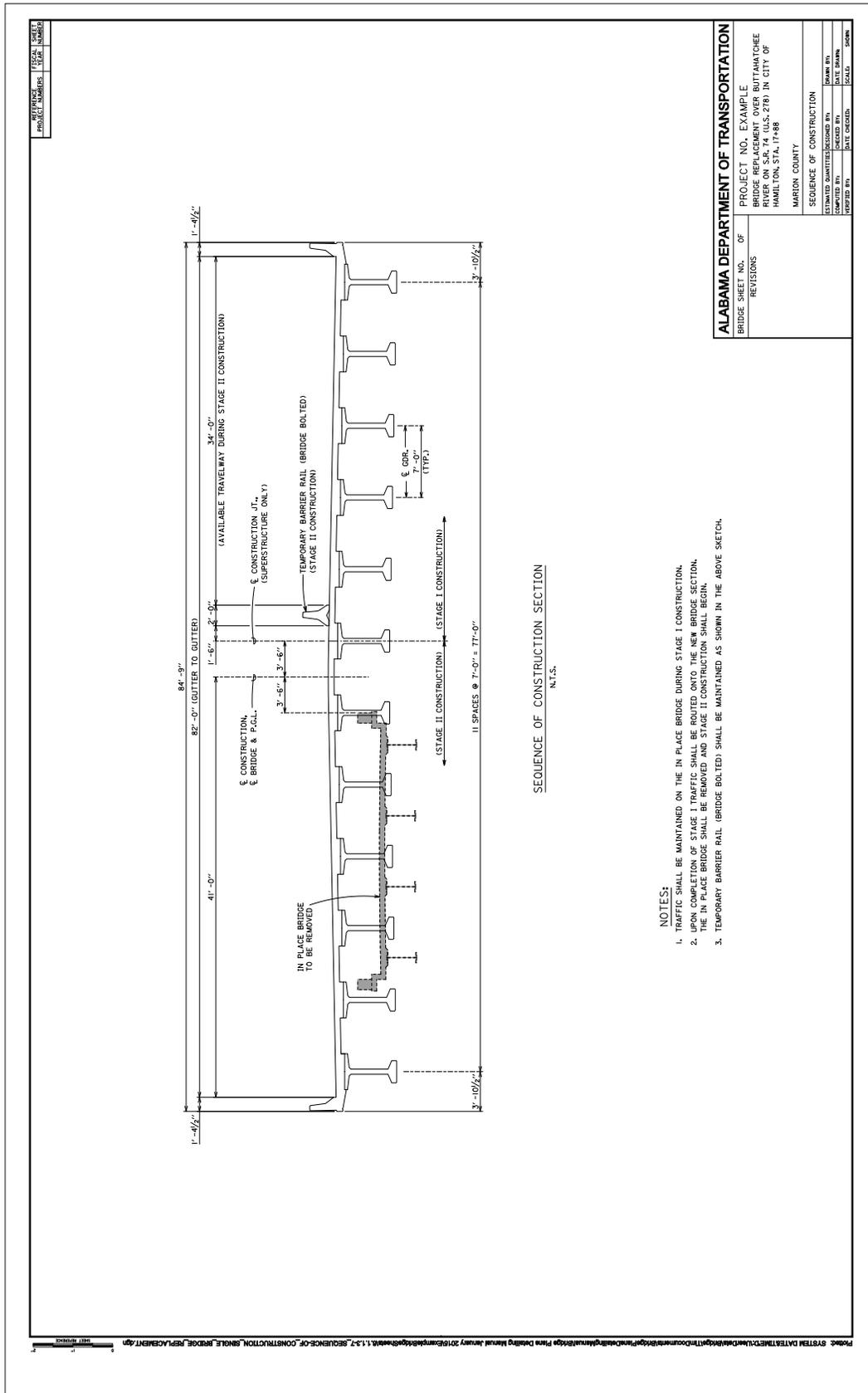


1.2.17 General Plan & Elevation, Dual Bridges, Curved, 0 Degree Skew

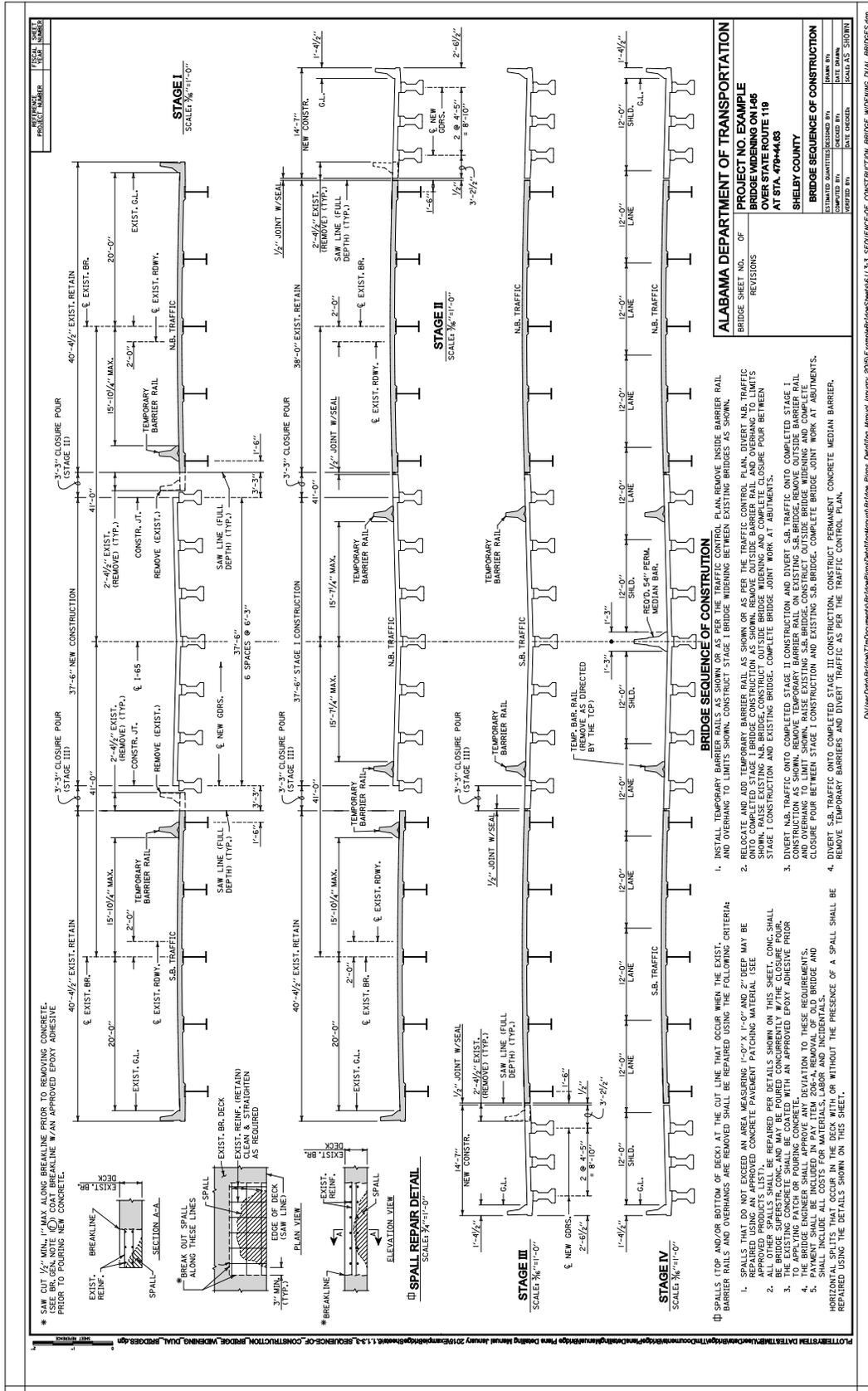




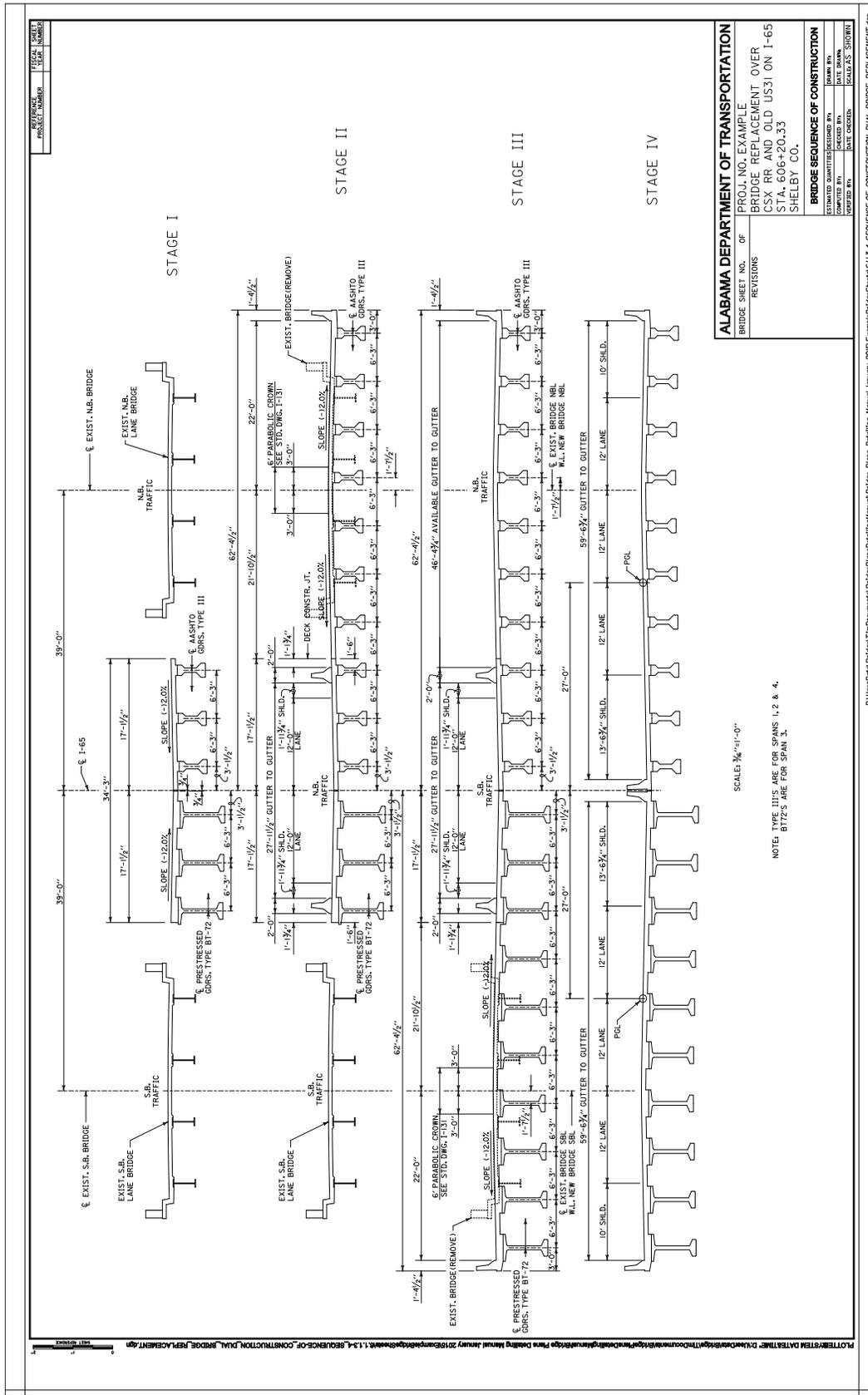
1.3.2 Single Bridge Replacement, Stage Constr.



1.3.4 Widening, Dual Bridges, Stage Constr.



1.3.5 Replacement, Dual Bridges, Stage Constr.



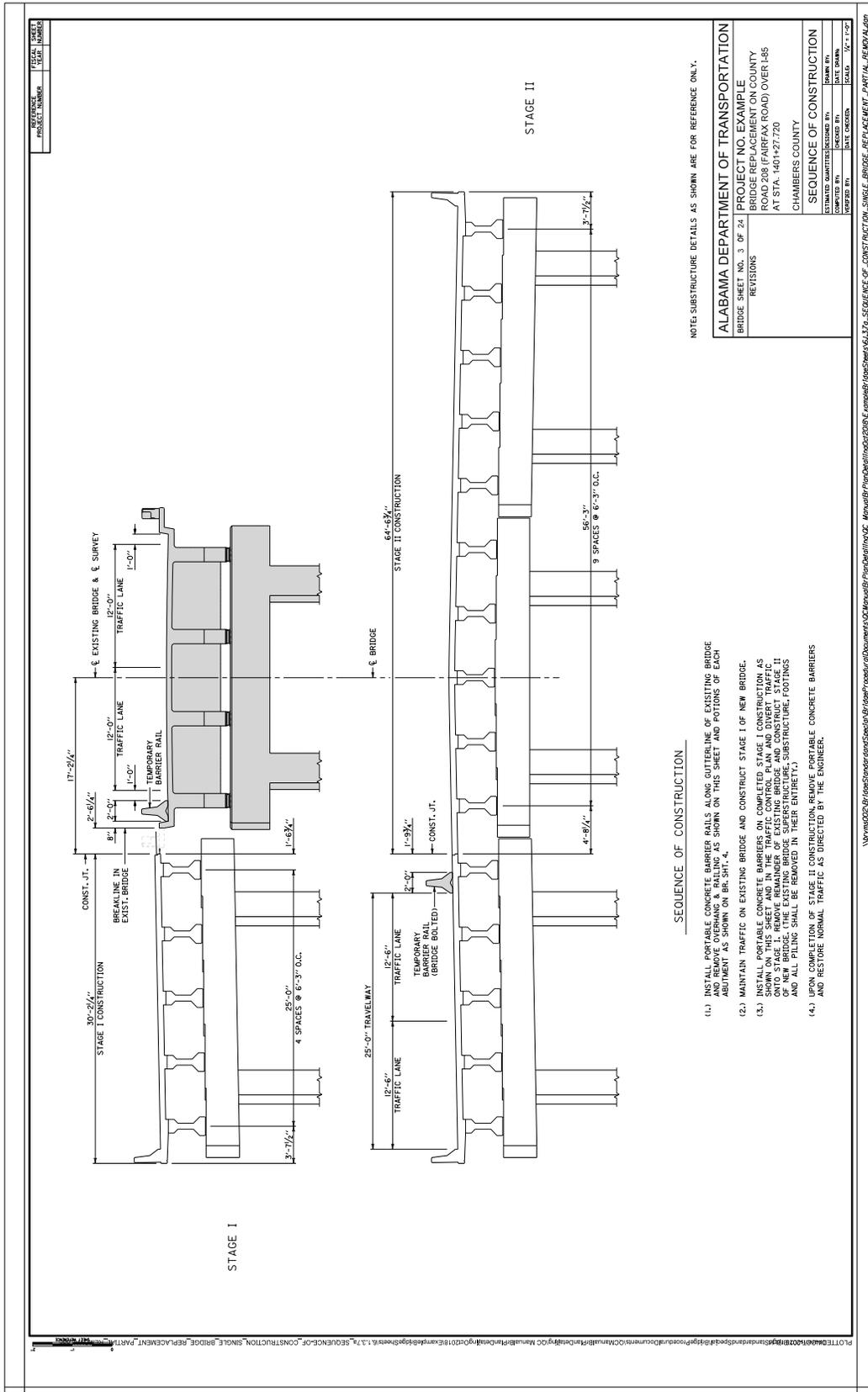
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|-------------------------------------------------------------------------------------------------------------|-----------------|
| ALABAMA DEPARTMENT OF TRANSPORTATION BRIDGE SHEET NO. OF REVISIONS | |
| PROJ. NO. EXAMPLE BRIDGE REPLACEMENT OVER CSX RR AND OLD US31 ON 1-65 STA. 606+20.33 SHELBY CO. | |
| BRIDGE SEQUENCE OF CONSTRUCTION | |
| ESTIMATE QUANTITIES/ISSUED BY: | ISSUED BY: |
| CHECKED BY: | DATE DRAWN: |
| APPROVED BY: | SCALE: AS SHOWN |

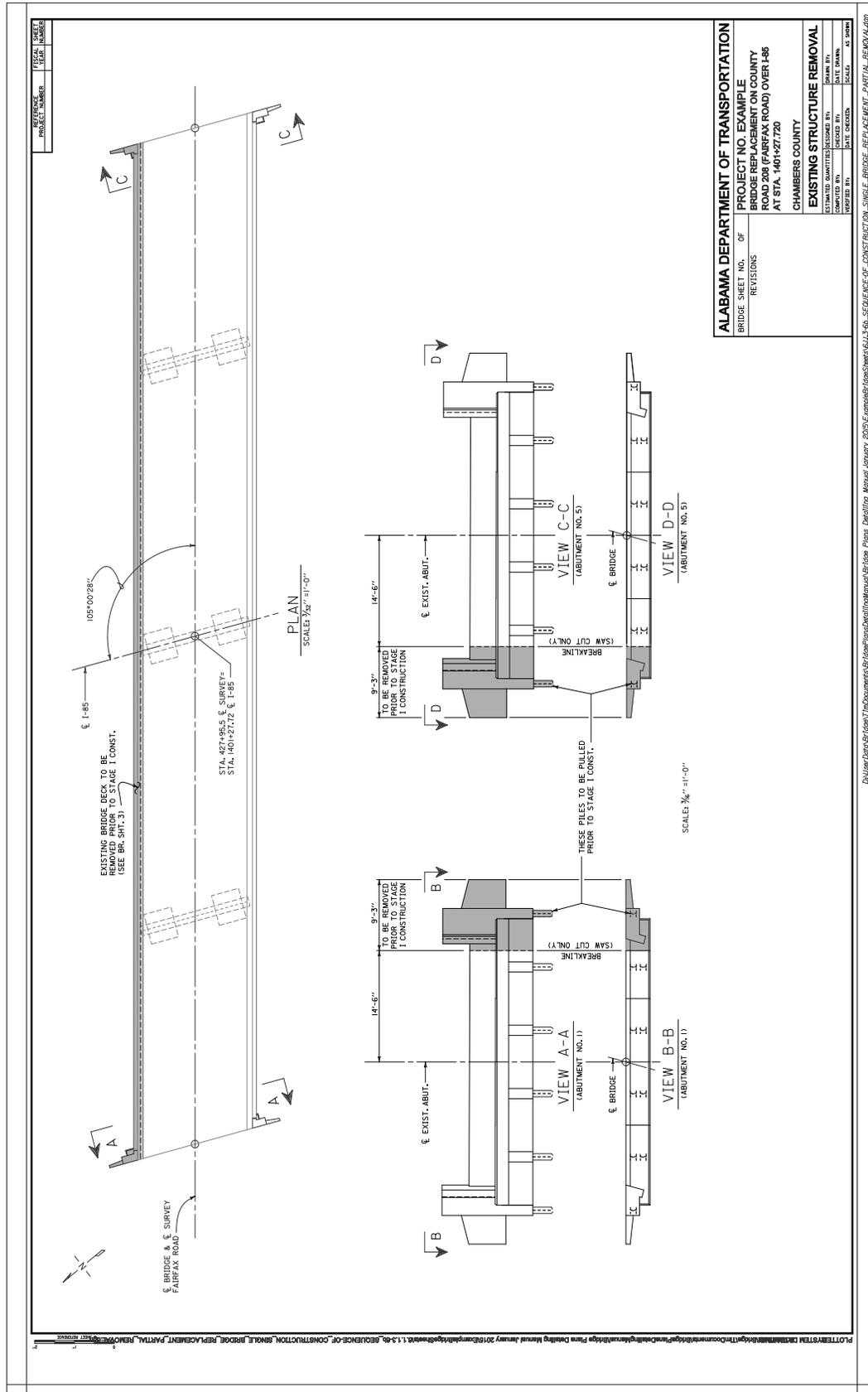
SCALE: 3/8"=1'-0"

NOTE: TYPE IIITS ARE FOR SPANS 1, 2 & 4.
BTZ5 ARE FOR SPAN 3.

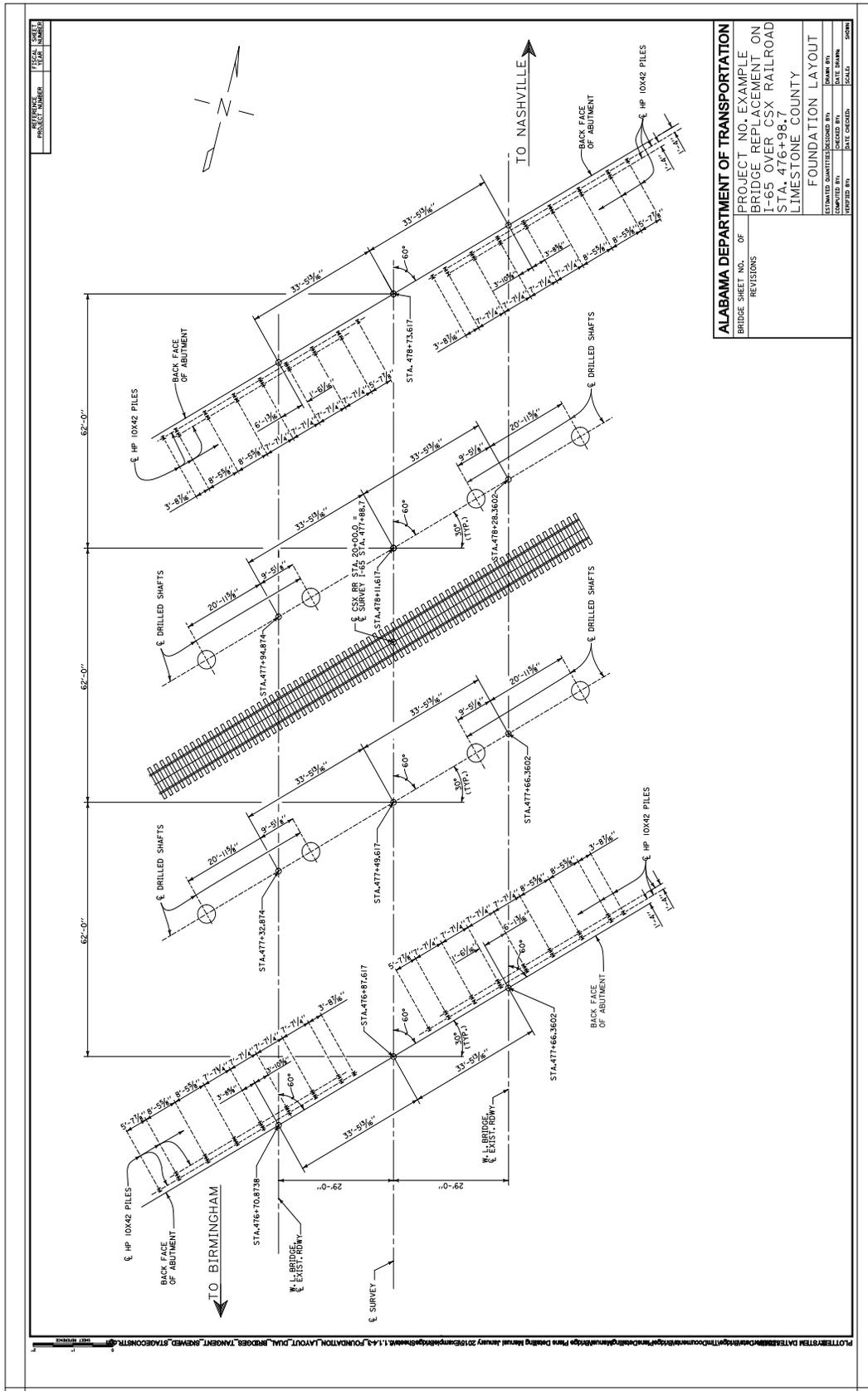
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1.3.7 Single Bridge Replacement, Stage Constr. w/Partial Removal of Exist. Structure (2 shts.)



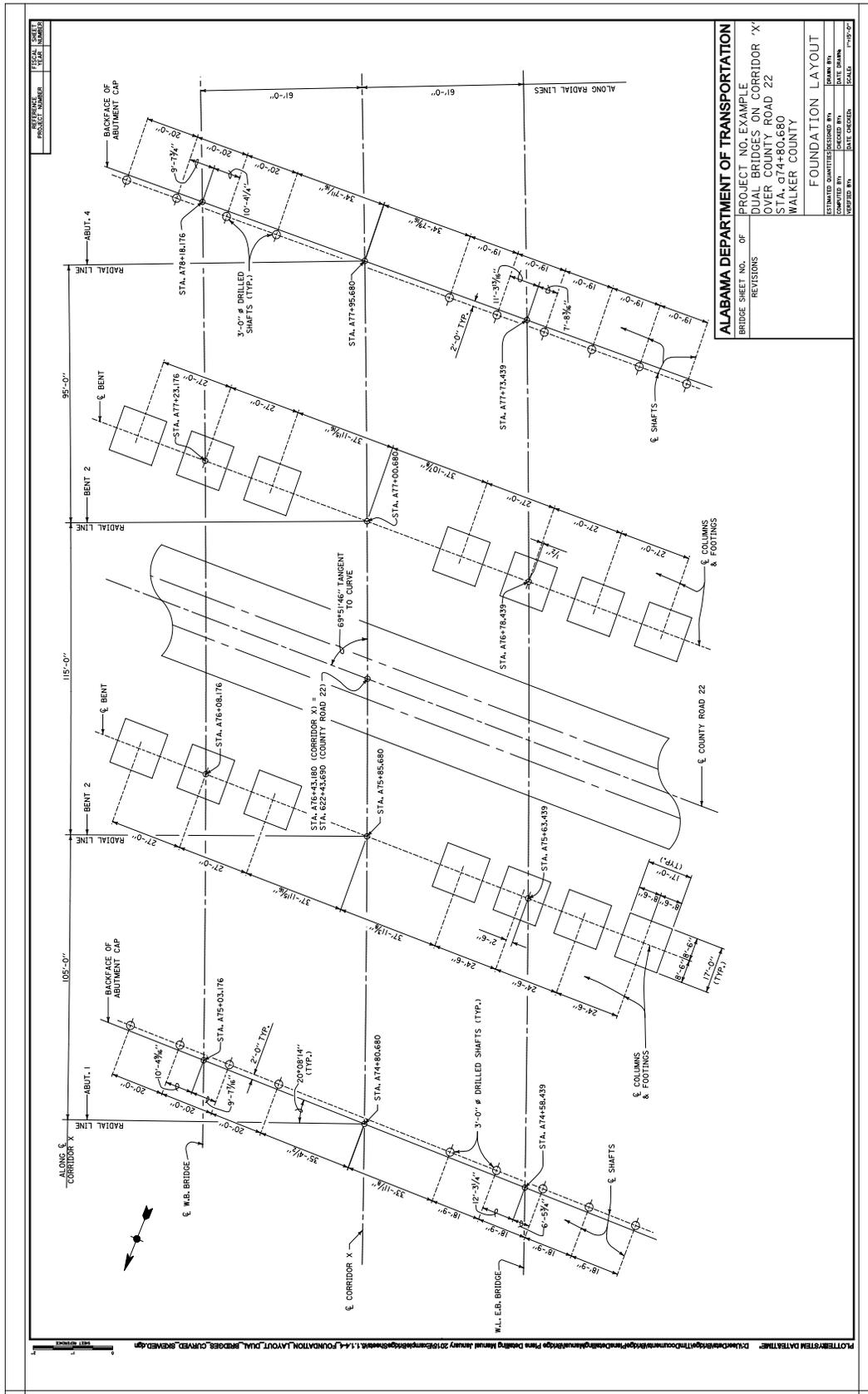


1.4.4 Dual Bridges, Tangent, Skewed, Stage Construction



| |
|-----------------------------------------|
| ALABAMA DEPARTMENT OF TRANSPORTATION |
| PROJECT NO. EXAMPLE |
| BRIDGE REPLACEMENT ON |
| I-65 OVER CSX RAILROAD |
| STA. 476+98.7 |
| LIMESTONE COUNTY |
| FOUNDATION LAYOUT |
| ESTIMATED QUANTITIES DESIGNED BY: _____ |
| COMPUTED BY: _____ |
| DRAWN BY: _____ |
| CHECKED BY: _____ |
| DATE CHECKED: _____ |
| SCALE: _____ |
| SHEET NO. _____ |

1.4.5 Dual Bridges, Curved, Skewed



1.5.2 Joint Sections, Simple Spans, Open Joints, Bulb-Tee

| | |
|---------------------------------------------------------|--|
| REFERENCE SHEET PROJECT NUMBER LOCAL LABEL NUMBER | |
|---------------------------------------------------------|--|

ABUTMENT NO. 1
SCALE: 3/4" = 1'-0"

BENT NO. 2
SCALE: 3/4" = 1'-0"

ABUTMENT NO. 3
SCALE: 3/4" = 1'-0"

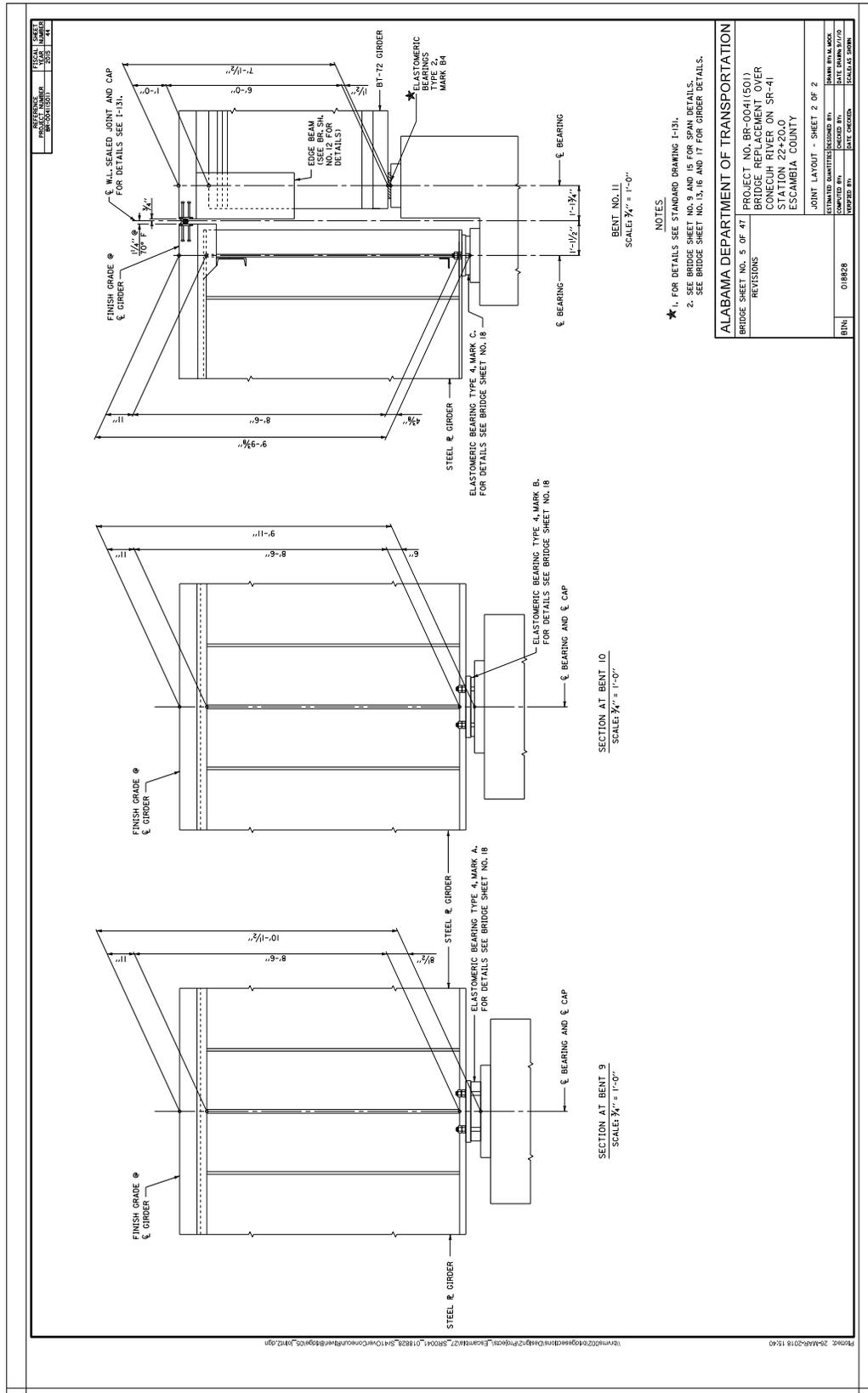
BENT NO. 4
SCALE: 3/4" = 1'-0"

NOTES:

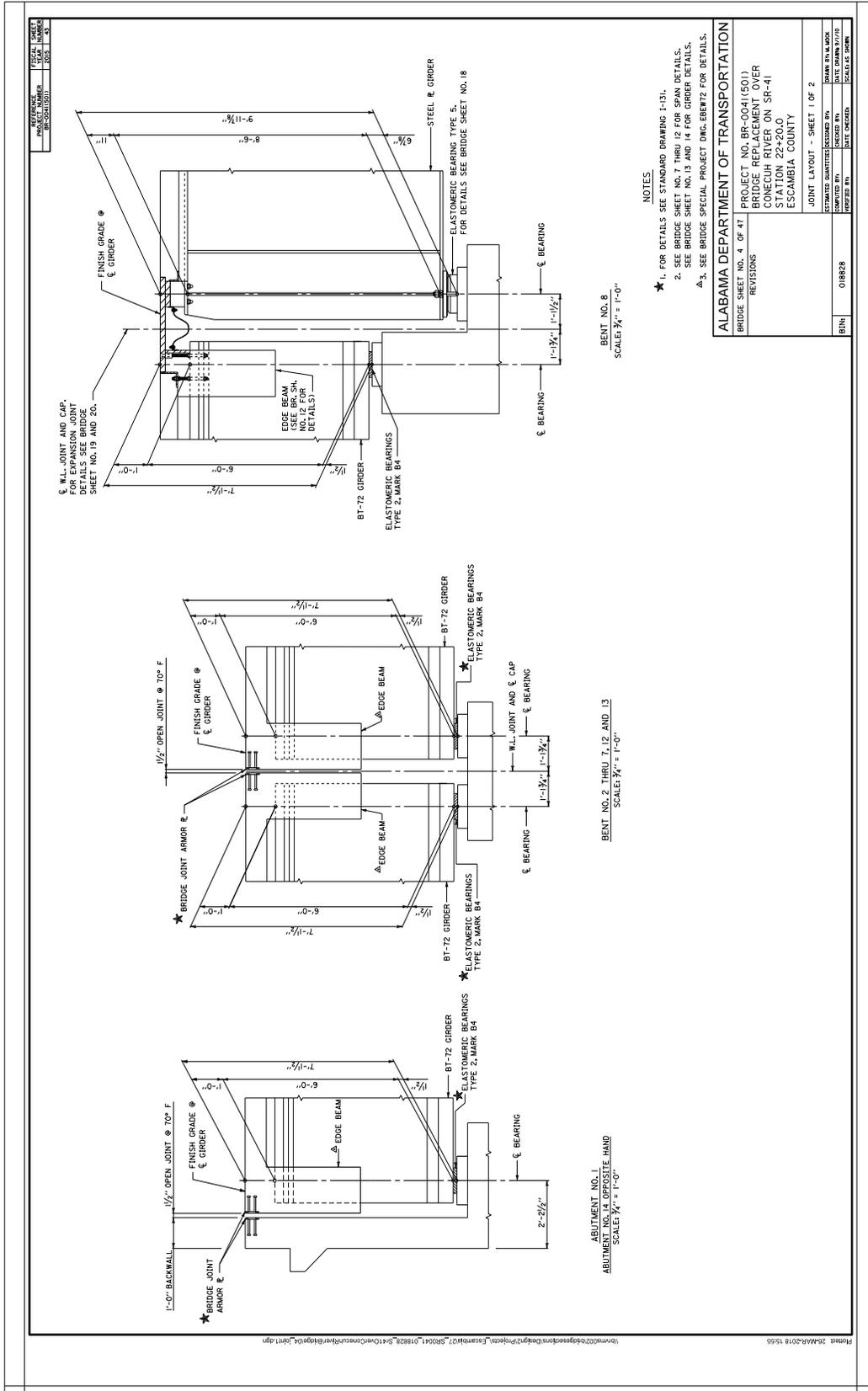
- ★ 1. FOR DETAILS SEE BRIDGE SPECIAL PROJ. Dwg. SBD-1.
- 2. SEE BRIDGE SHEET NOS. 4, 5 AND 6 FOR SPAN DETAILS.
SEE BRIDGE SHEET NO. 7 FOR GIRDER DETAILS.
- Φ 3. SEE BRIDGE SPECIAL PROJECT DRAWING EBEN63 FOR DETAILS.
- 4. JOINT SECTIONS ARE 1 TO JOINT.

| | |
|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| ALABAMA DEPARTMENT OF TRANSPORTATION | |
| PROJECT NO. EXAMPLE BRIDGE REPLACEMENT SR-60(S-80) OVER OLD TOWN CREEK STATION 125+10 DALLAS/LOWMEDES COUNTY | JOINT SECTIONS ESTIMATED QUANTITIES DRAWN BY: M. MOCK CHECKED BY: DATE: 08/24/09 DESIGNED BY: COLAS DORR |
| BRIDGE SHEET NO. OF REGIONS | BIN: XXXXXX DATE: 08/24/09 |

1.5.6 Joint Sections, Continuous Steel to AASHTO/Bulb Tee, Armor Plate Joint

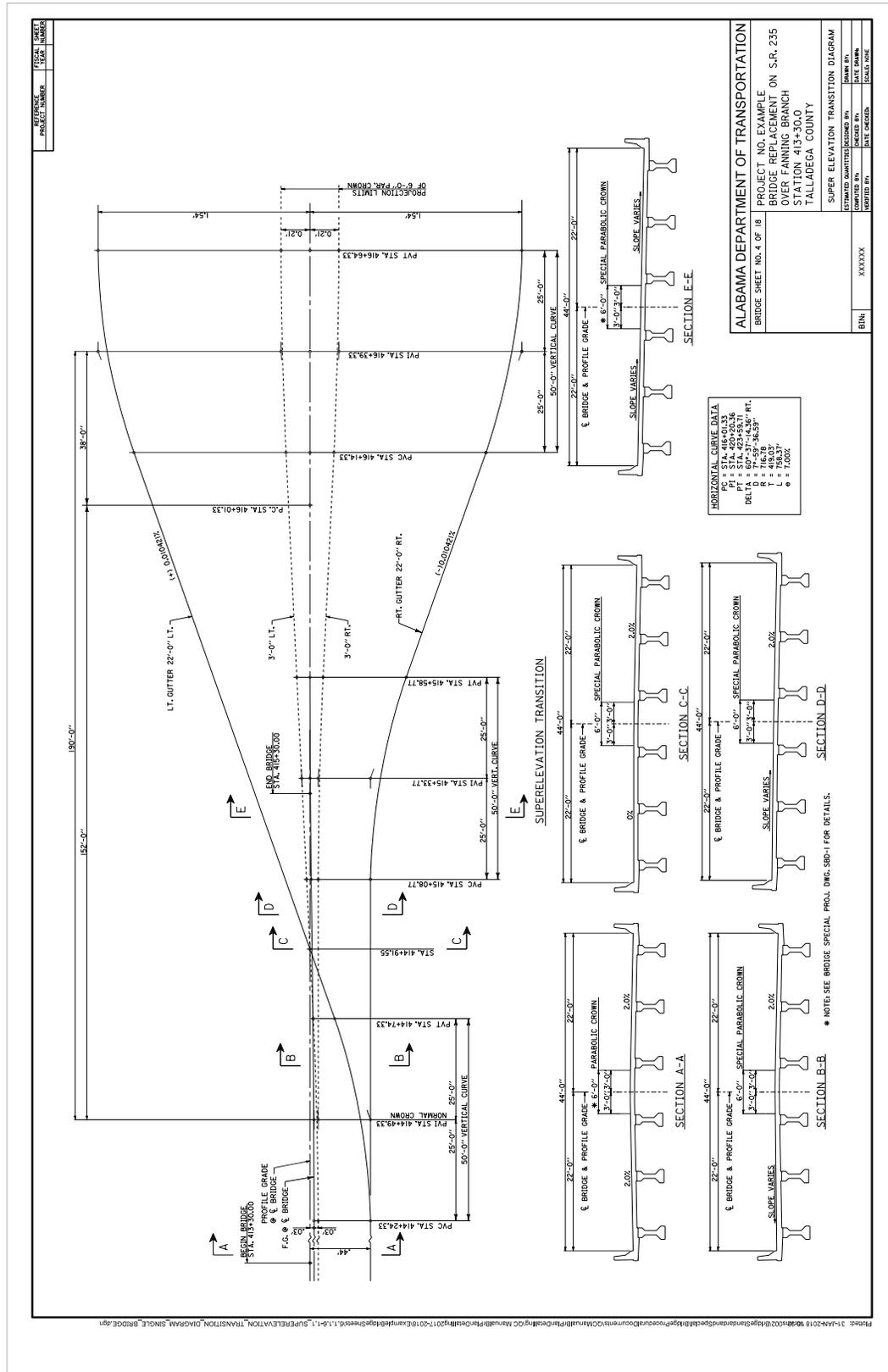


1.5.7 Joint Sections, AAHTO/Bulb Tee to Continuous Steel, Expansion Dam

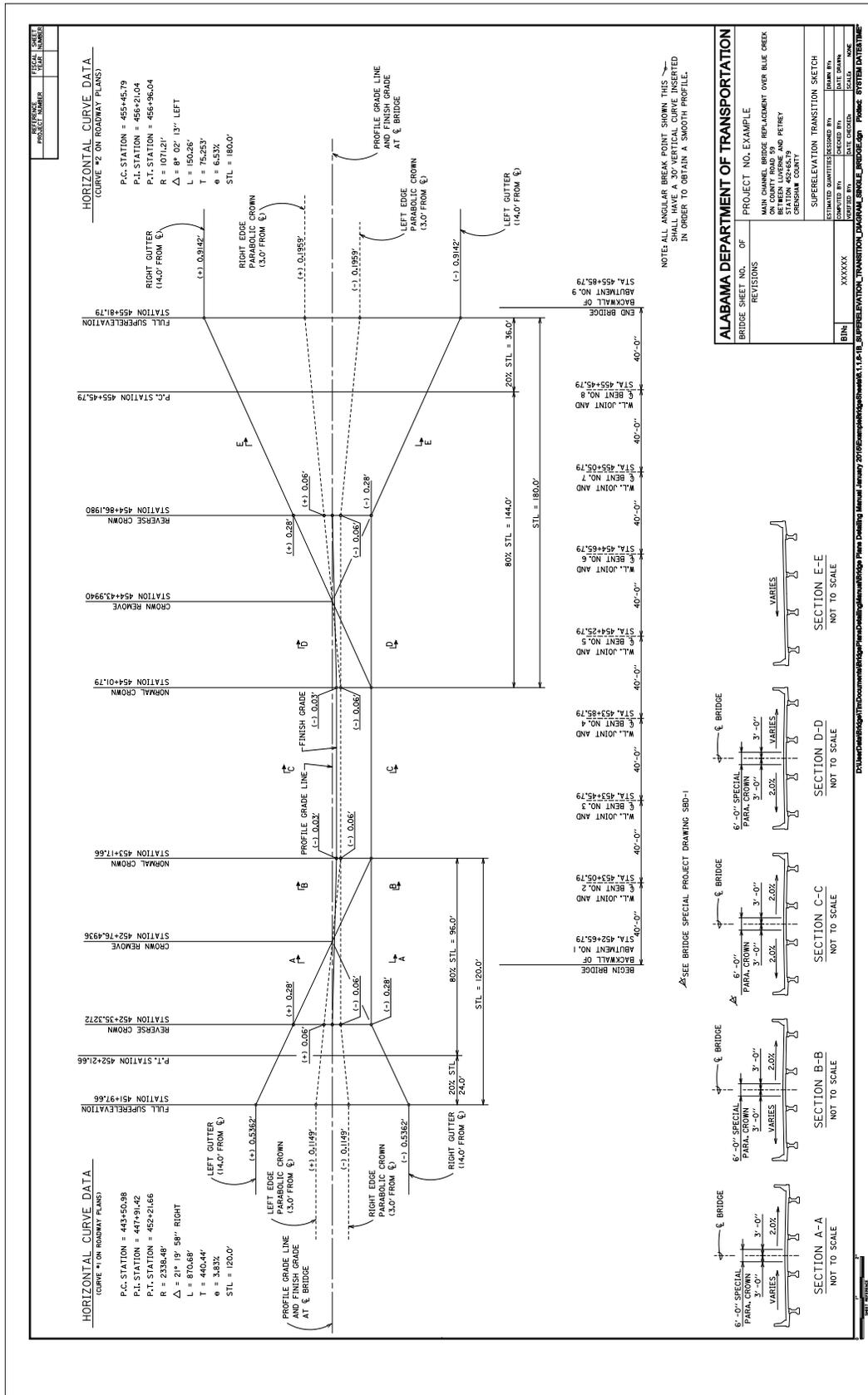


1.6 Superelevation Transition Sheets

1.6.1 Transition Diagram for Single Bridge



1.6.2 Transition Diagram for Single Bridge



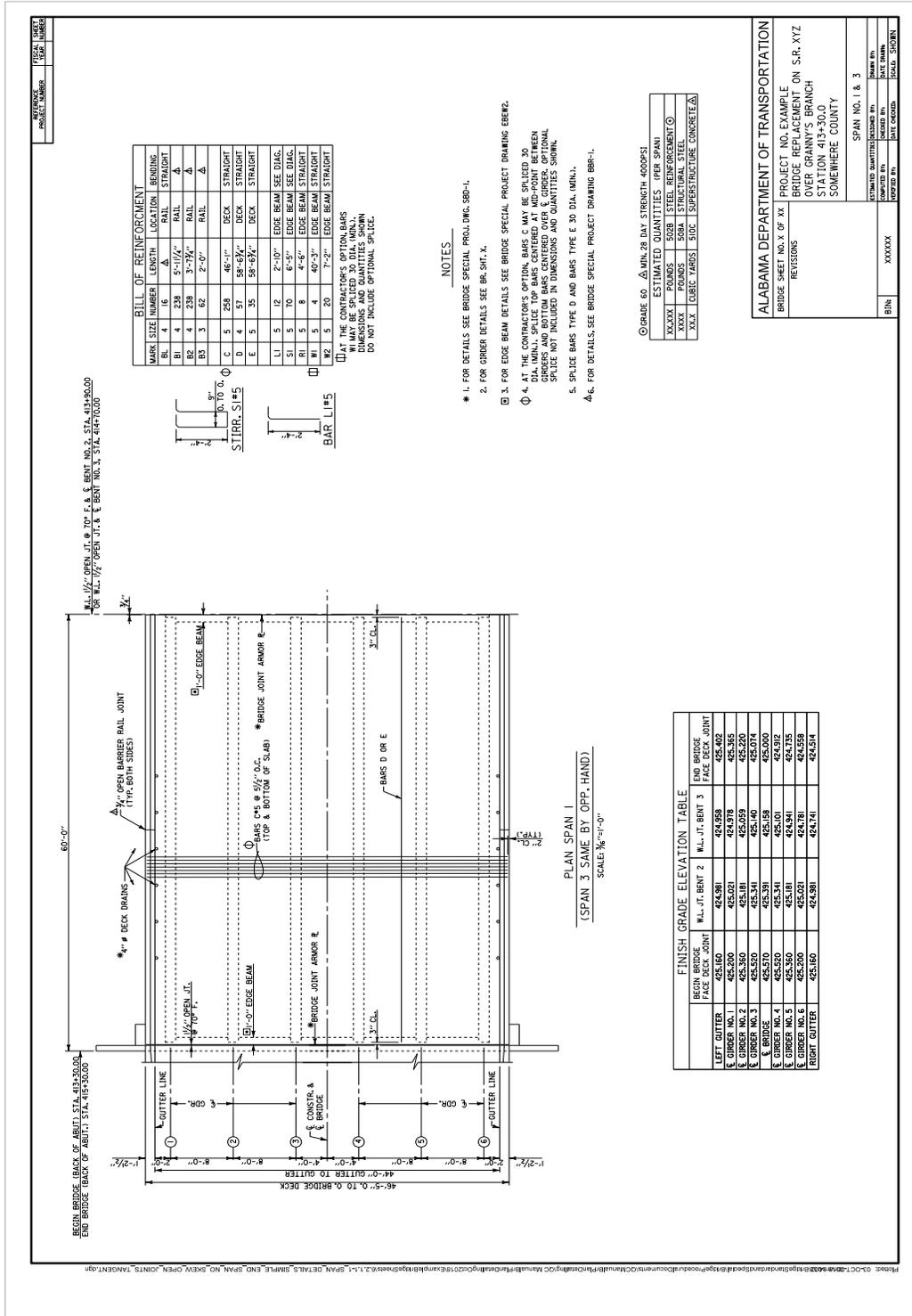
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B Superstructure Sheets

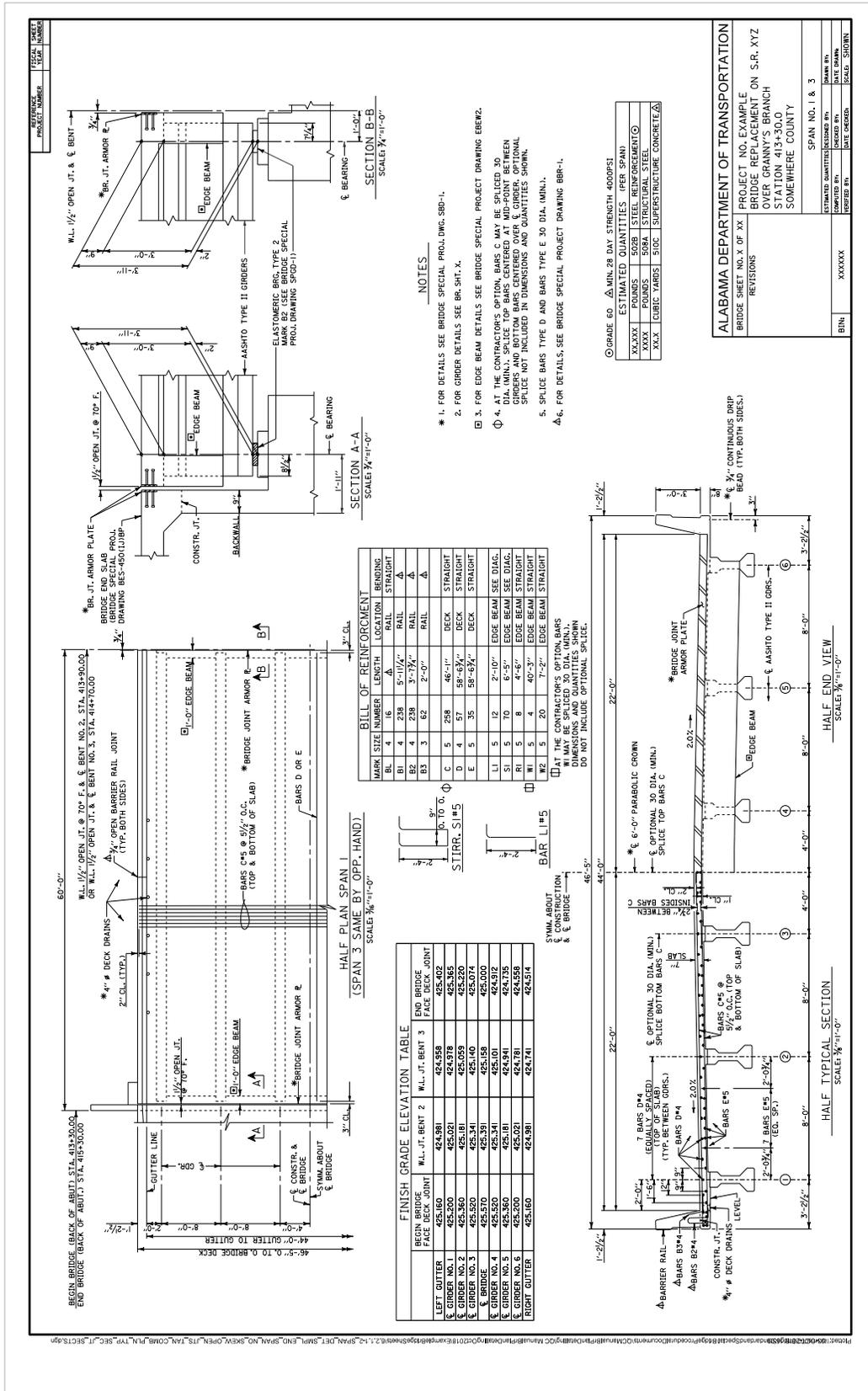
2.1 Prestressed Concrete Girders

2.1.1 Span Details

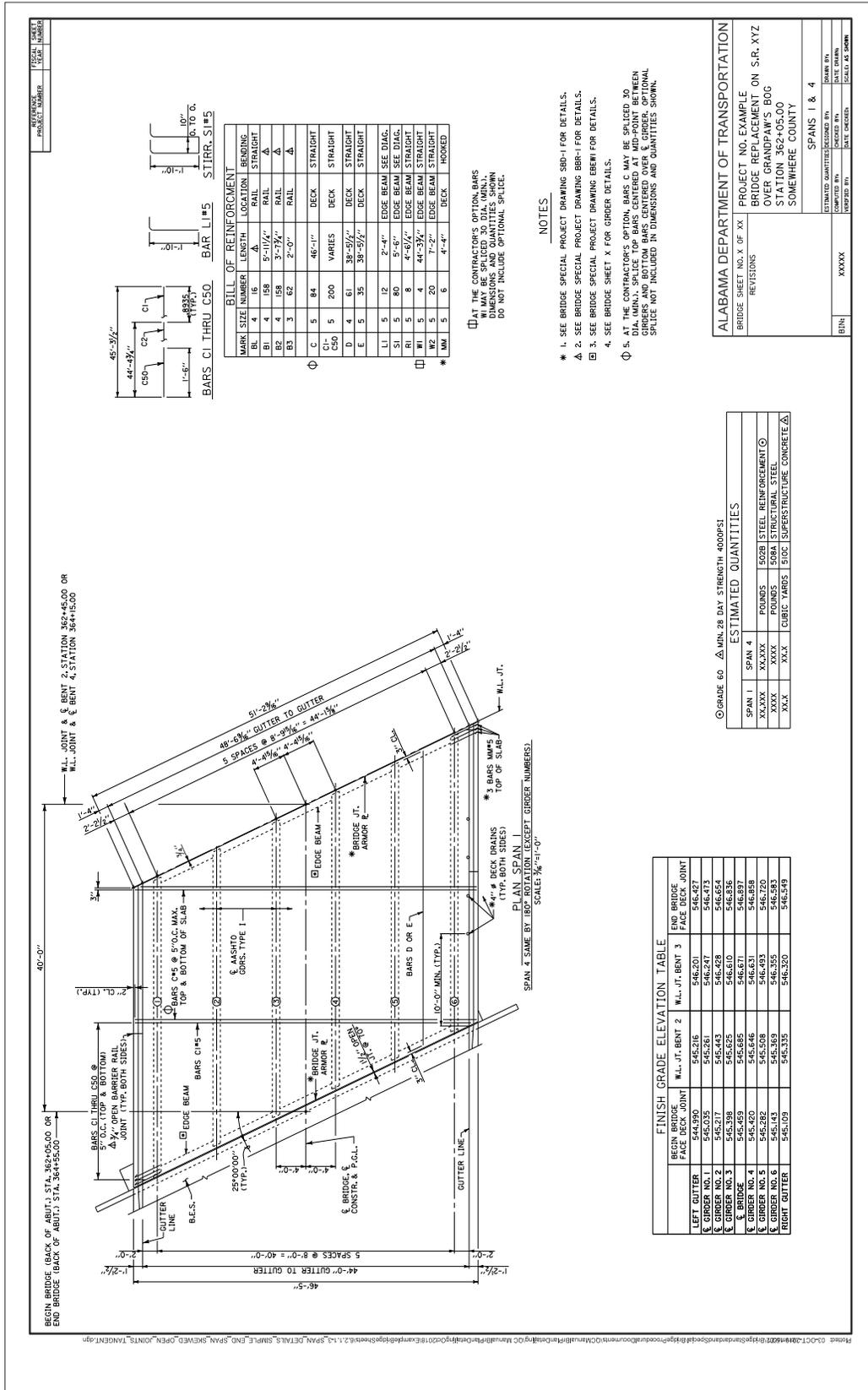
2.1.1.1 Simple End Span, No Skew, Open Joints, Tangent, Plan View



2.1.1.2 Simple End Span, No Skew, Open Joints, Tangent, Comb. Plan, Typ. Sect., Jt. Sects.



2.1.1.3 Simple End Span, Skewed, Open Joints, Tangent, Plan View



BILL OF REINFORCEMENT

| MARK SIZE NUMBER | LENGTH | LOCATION | BENDING |
|------------------|--------|-----------|-----------|
| BL 4 | 16 | RAIL | STRAIGHT |
| BI 4 | 158 | RAIL | △ |
| B2 4 | 158 | RAIL | △ |
| B3 3 | 62 | RAIL | △ |
| C 5 | 84 | DECK | STRAIGHT |
| C50 | 200 | DECK | STRAIGHT |
| D 4 | 61 | DECK | STRAIGHT |
| E 5 | 35 | DECK | STRAIGHT |
| L1 5 | 12 | EDGE BEAM | SEE DIAG. |
| L2 5 | 12 | EDGE BEAM | SEE DIAG. |
| S1 5 | 8 | EDGE BEAM | STRAIGHT |
| S2 5 | 4 | EDGE BEAM | STRAIGHT |
| W1 5 | 4 | EDGE BEAM | STRAIGHT |
| W2 5 | 20 | EDGE BEAM | STRAIGHT |
| *MM 5 | 6 | DECK | HOKED |

□ AT THE CONTRACTOR'S OPTION BARS MAY BE SPLICED 30 DIA. (MIN.) DIMENSIONS AND QUANTITIES SHOWN DO NOT INCLUDE OPTIONAL SPLICES.

NOTES

- * 1. SEE BRIDGE SPECIAL DRAWING SBD-1 FOR DETAILS.
- * 2. SEE BRIDGE SPECIAL PROJECT DRAWING BBR-1 FOR DETAILS.
- * 3. SEE BRIDGE SPECIAL PROJECT DRAWING EBEW FOR DETAILS.
- * 4. SEE BRIDGE SHEET X FOR GIRDER DETAILS.
- 5. AT THE CONTRACTOR'S OPTION BARS MAY BE SPLICED 30 DIA. (MIN.) DIMENSIONS AND QUANTITIES SHOWN DO NOT INCLUDE OPTIONAL SPLICES.

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| ALABAMA DEPARTMENT OF TRANSPORTATION BRIDGE SHEET NO. X OF XX PROJECT NO. EXAMPLE BRIDGE REPLACEMENT ON S.R. XYZ OVER GRANDPAW'S BOG STATION 362+05.00 SOMEWHERE COUNTY | |
| REVISIONS SPAN 1 & 4 | ESTIMATED QUANTITIES COMPUTED BY: XXXXXX CHECKED BY: DATE CHECKED: SCALE AS SHOWN |

GRADE 60 Δ MIN. 28 DAY STRENGTH 4000PSI

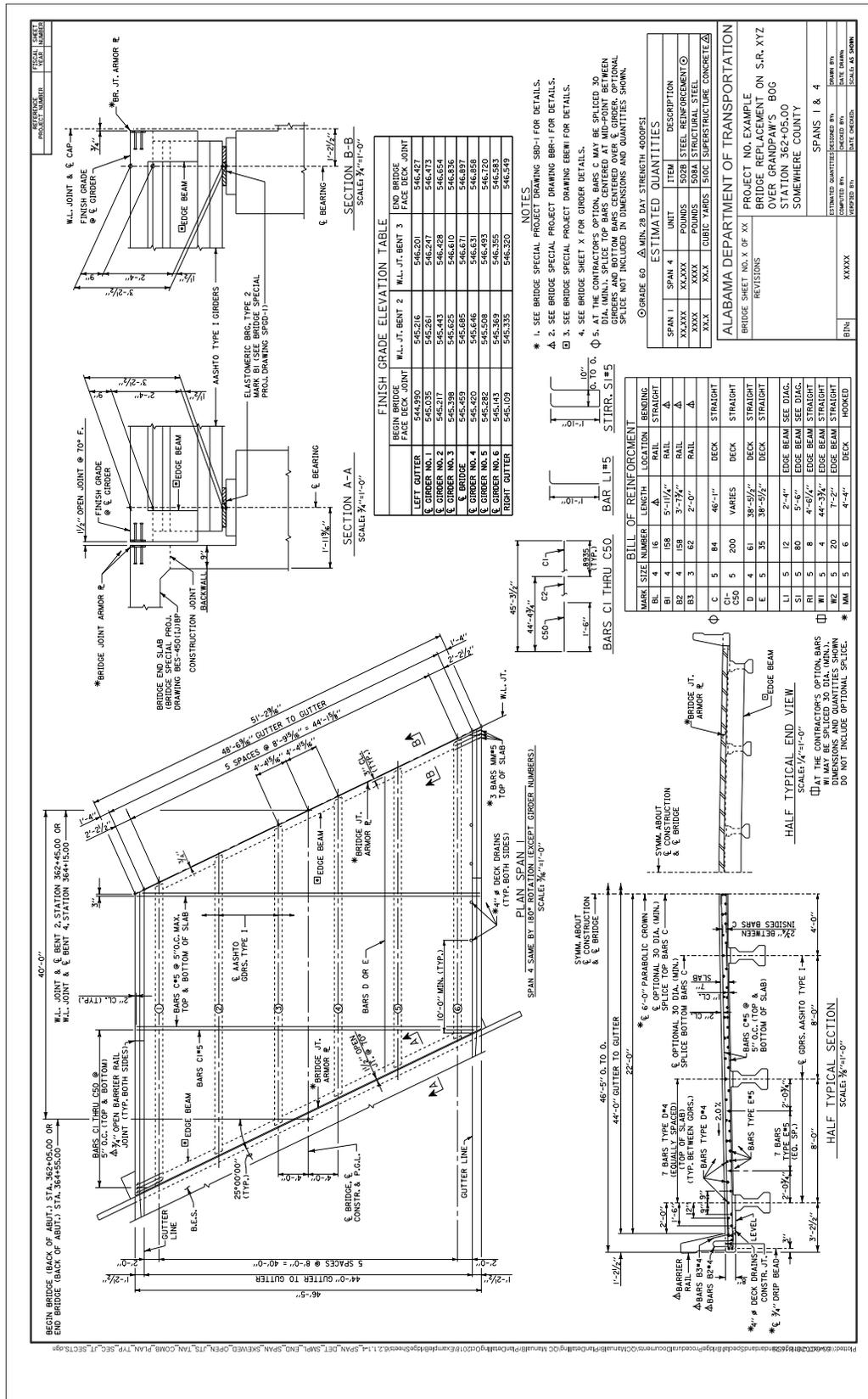
ESTIMATED QUANTITIES

| SPAN | POUNDS | 508B STEEL REINFORCEMENT ○ |
|--------|--------|----------------------------|
| SPAN 1 | XXXX | XXXX |
| SPAN 4 | XXXX | XXXX |
| XXXX | XXXX | XXXX |
| XXXX | XXXX | XXXX |
| XXXX | XXXX | XXXX |

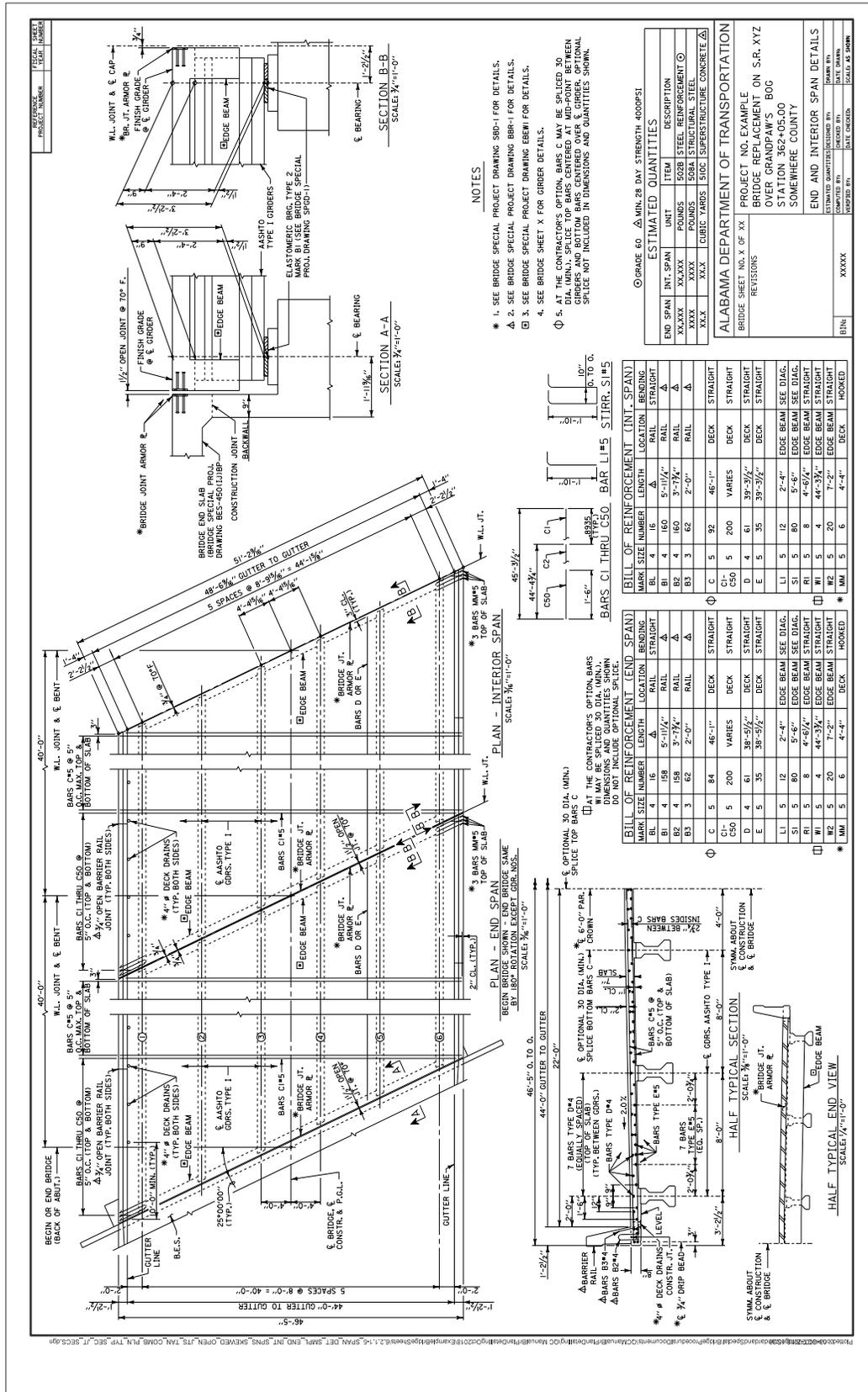
FINISH GRADE ELEVATION TABLE

| FACE | BEGIN BRIDGE | W.L. JT. BENT 2 | W.L. JT. BENT 3 | END BRIDGE |
|-----------------|--------------|-----------------|-----------------|------------|
| LEFT GUTTER | 544.990 | 545.216 | 546.201 | 546.427 |
| FACE DECK JOINT | 545.035 | 545.261 | 546.247 | 546.473 |
| § GIRDER NO. 1 | 545.080 | 545.306 | 546.292 | 546.518 |
| § GIRDER NO. 3 | 545.125 | 545.351 | 546.337 | 546.563 |
| § GIRDER NO. 5 | 545.170 | 545.396 | 546.382 | 546.608 |
| § GIRDER NO. 7 | 545.215 | 545.441 | 546.427 | 546.653 |
| § GIRDER NO. 9 | 545.260 | 545.486 | 546.472 | 546.698 |
| § GIRDER NO. 11 | 545.305 | 545.531 | 546.517 | 546.743 |
| § GIRDER NO. 13 | 545.350 | 545.576 | 546.562 | 546.788 |
| RIGHT GUTTER | 545.395 | 545.621 | 546.607 | 546.833 |

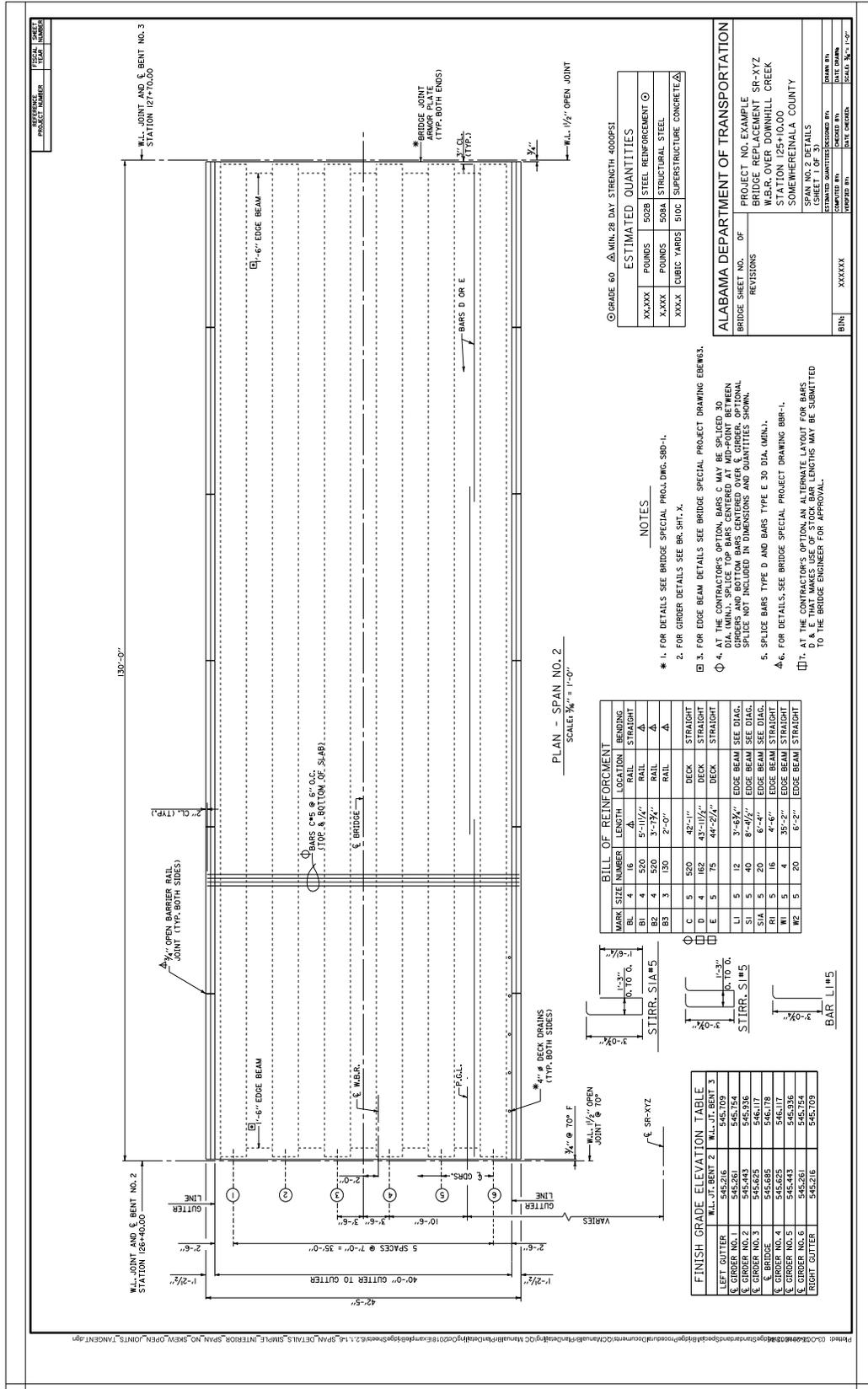
2.1.1.4 Simple End Span, Skewed, Open Joints, Tangent, Combined Plan, Typical Sect., Joint Sects.



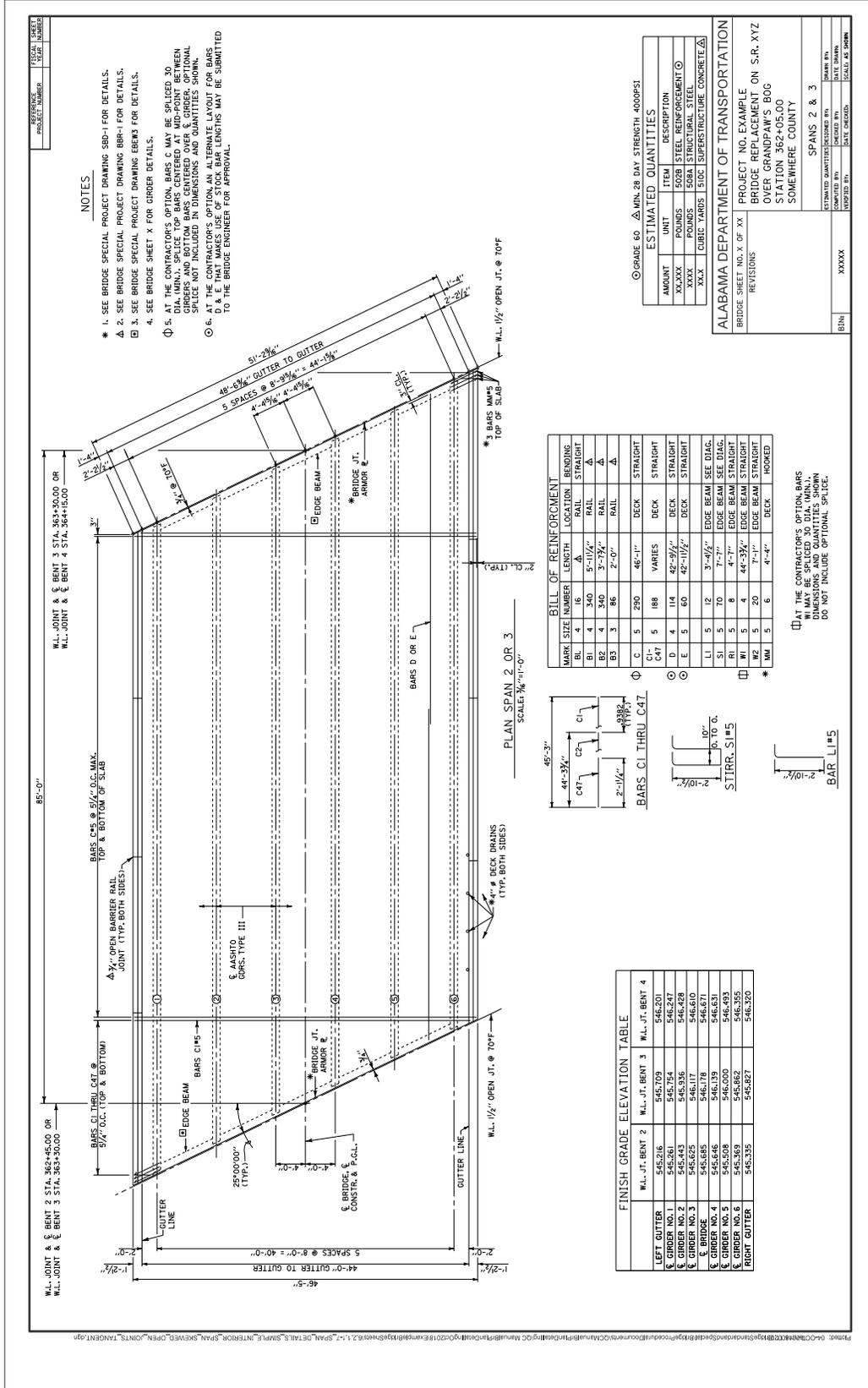
2.1.1.5 Simple End & Int. Spans, Skewed, Open Jts., Tangent, Comb. Plan, Typ. Sect., Jt. Sects.



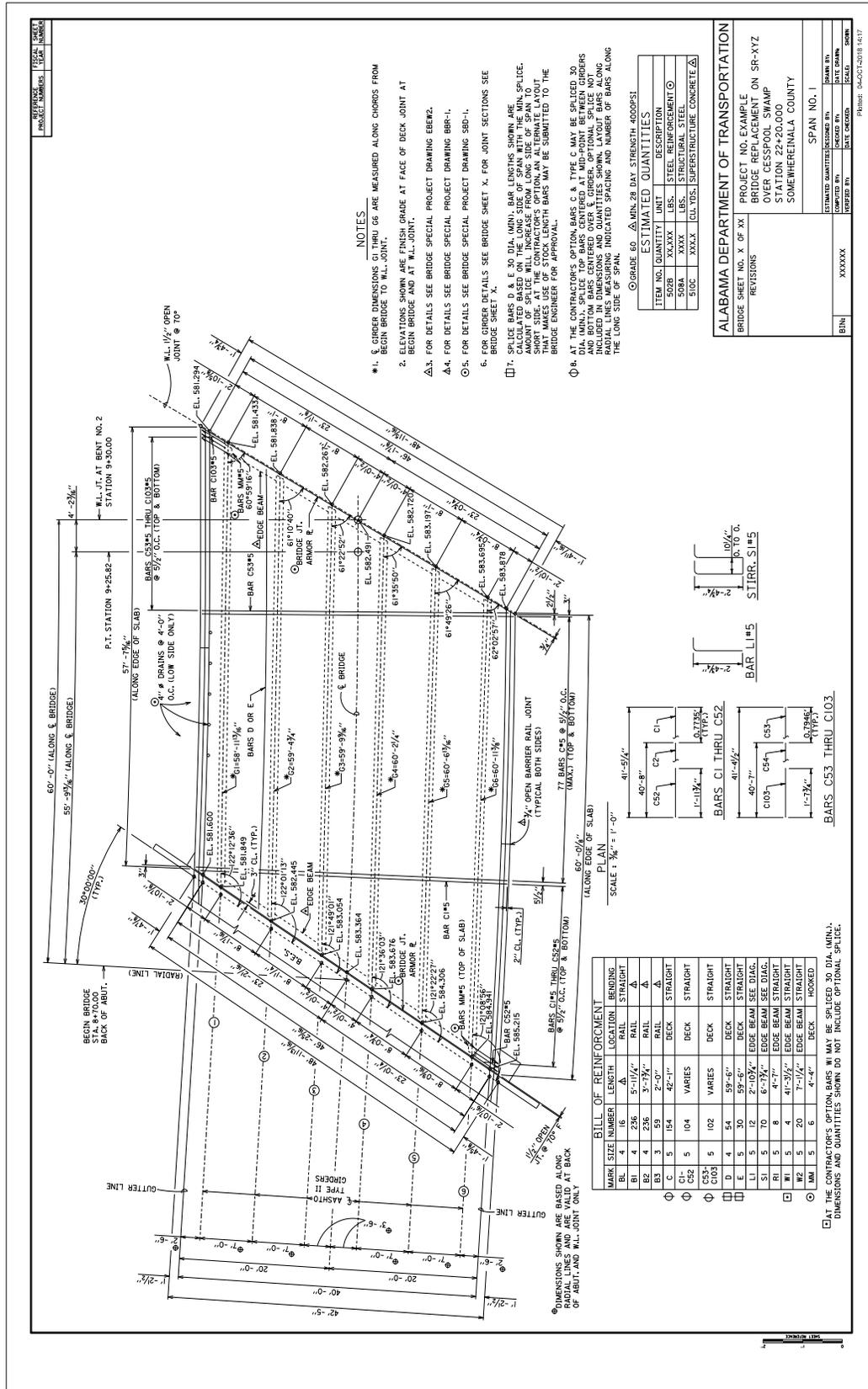
2.1.1.6 Simple Interior Span, No Skew, Open Joints, Tangent, Plan View



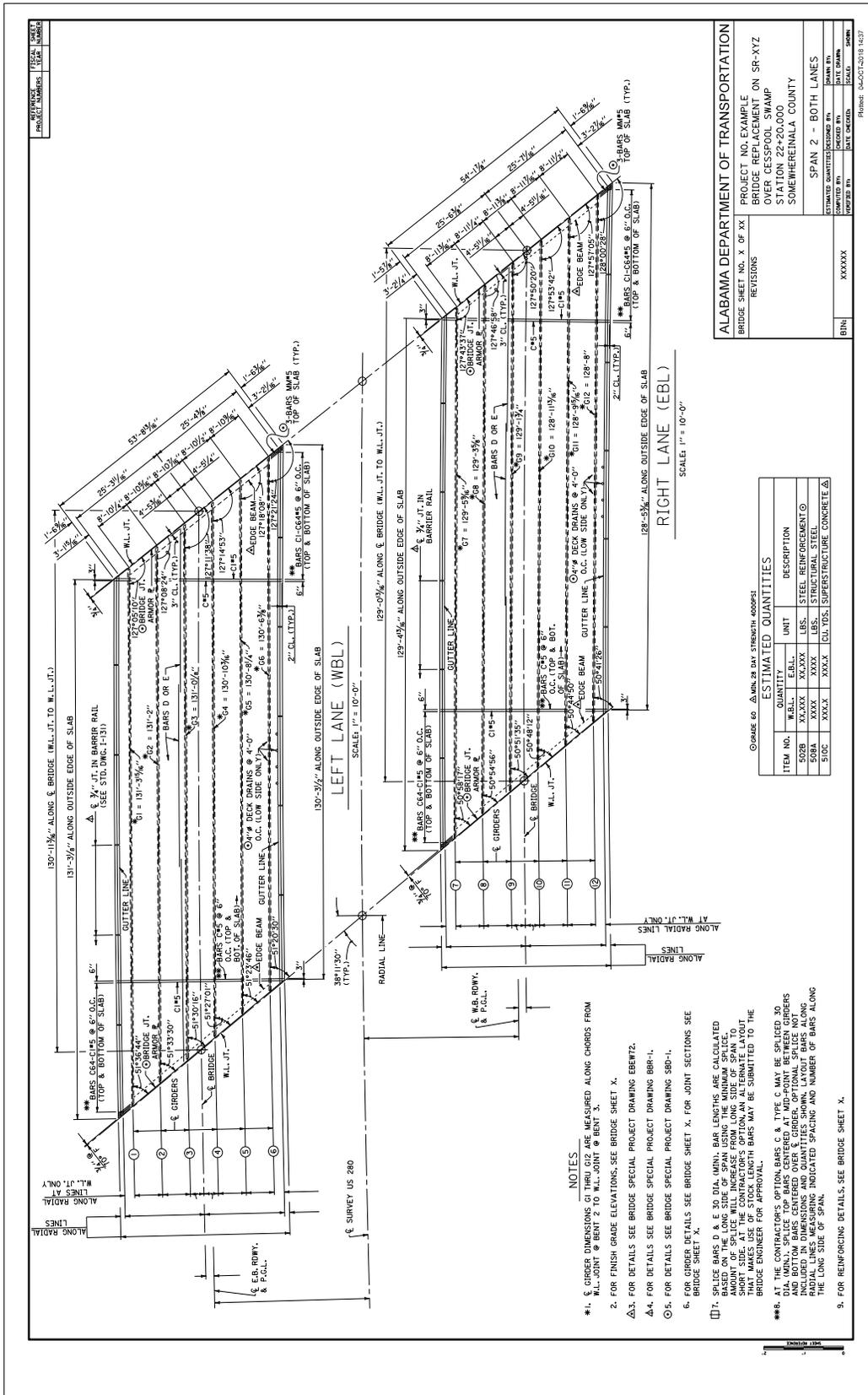
2.1.1.7 Simple Interior Span, Skewed, Open Joints, Tangent, Plan View



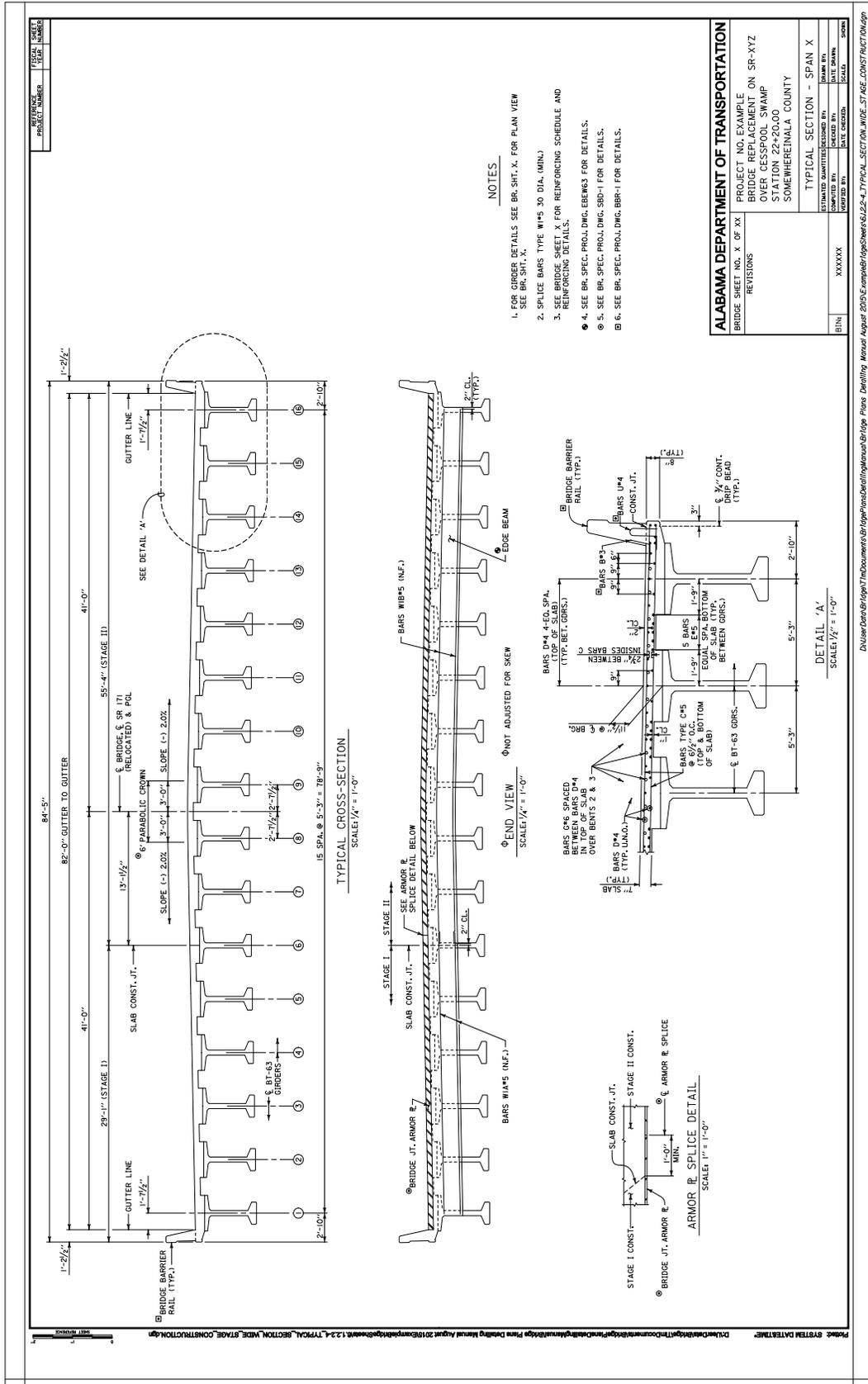
2.1.1.10 Simple End Span, Skewed, Open Joints, Part Tan., Part Curved, Plan View (Int. Span Sim.)



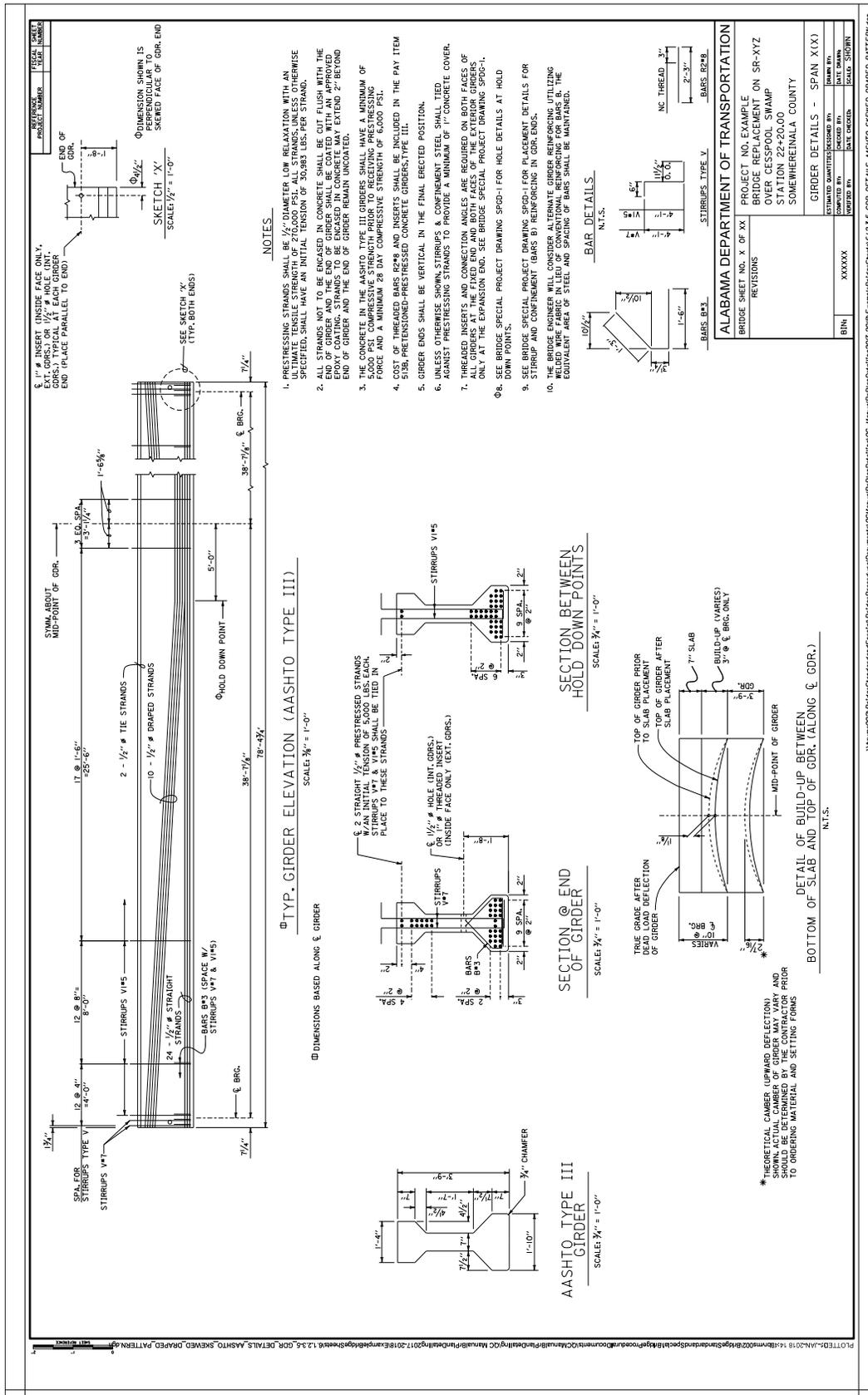
2.1.1.11 Simple Int. Spans, Dual Bridges, Skewed, Open Joints, Curved, Plan View



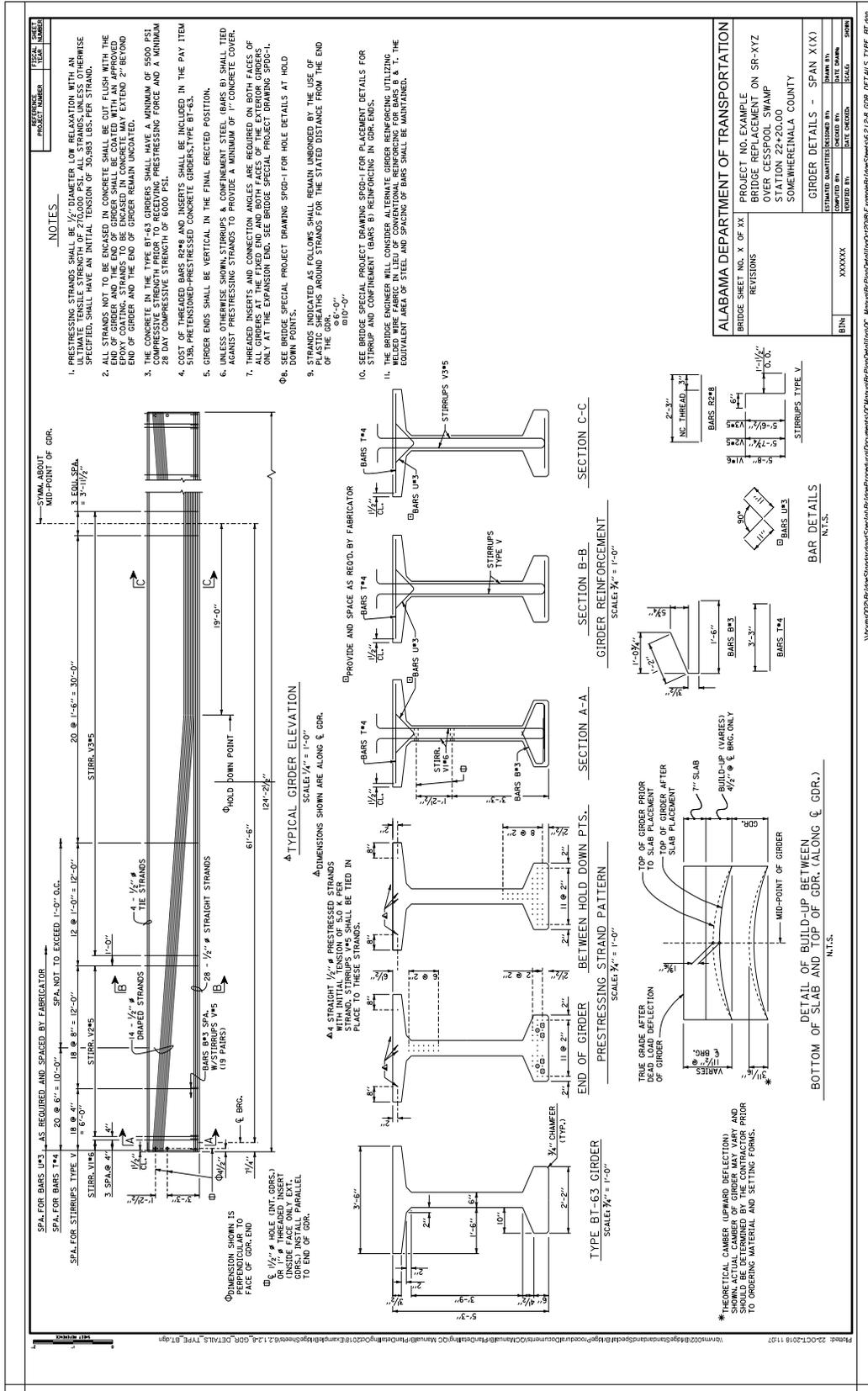
2.1.1.15 Typical Section, Bulb Tee, Wide Deck, Stage Construction, Tangent



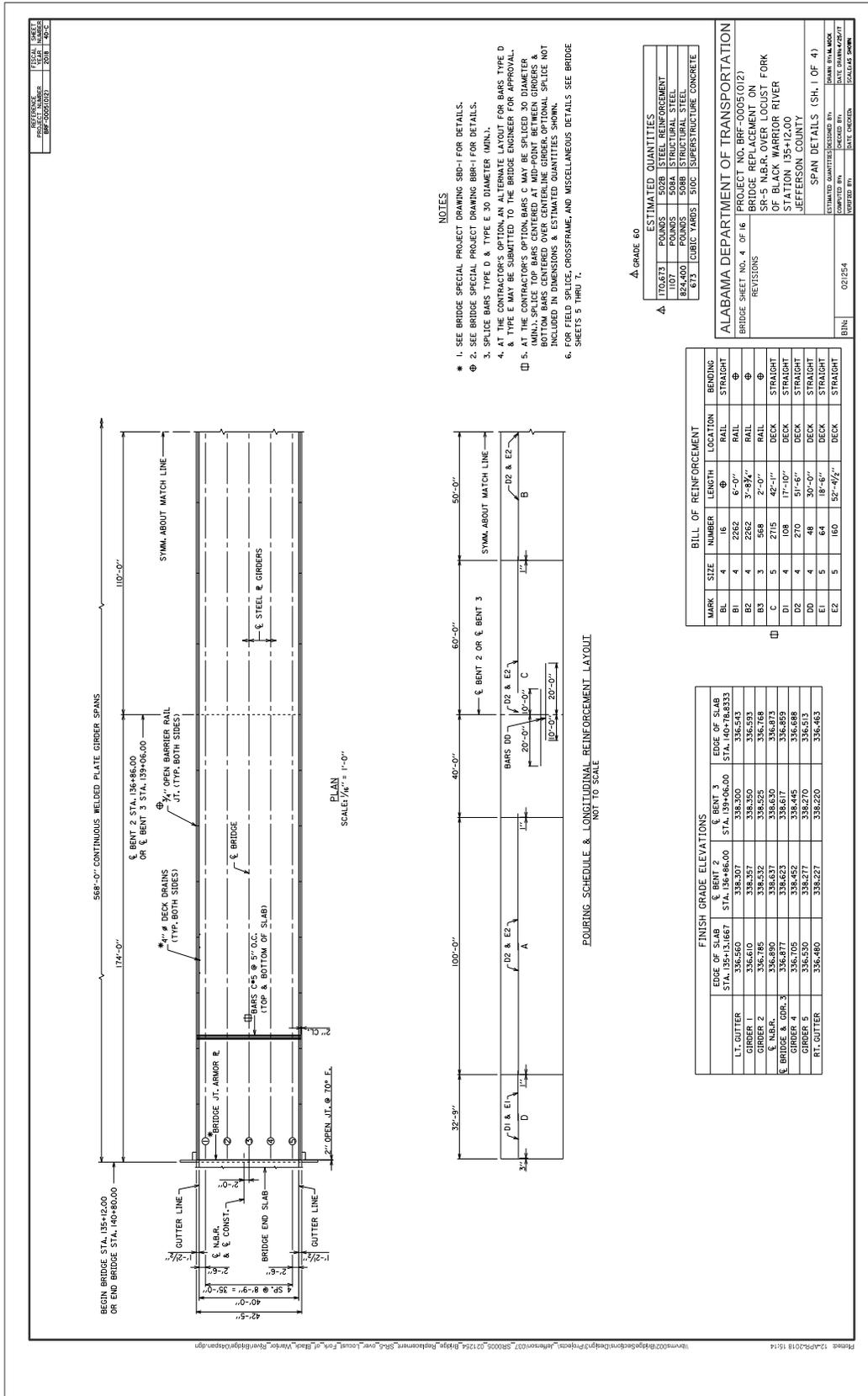
2.1.2.5 AASHTO, Skewed, Draped Pattern



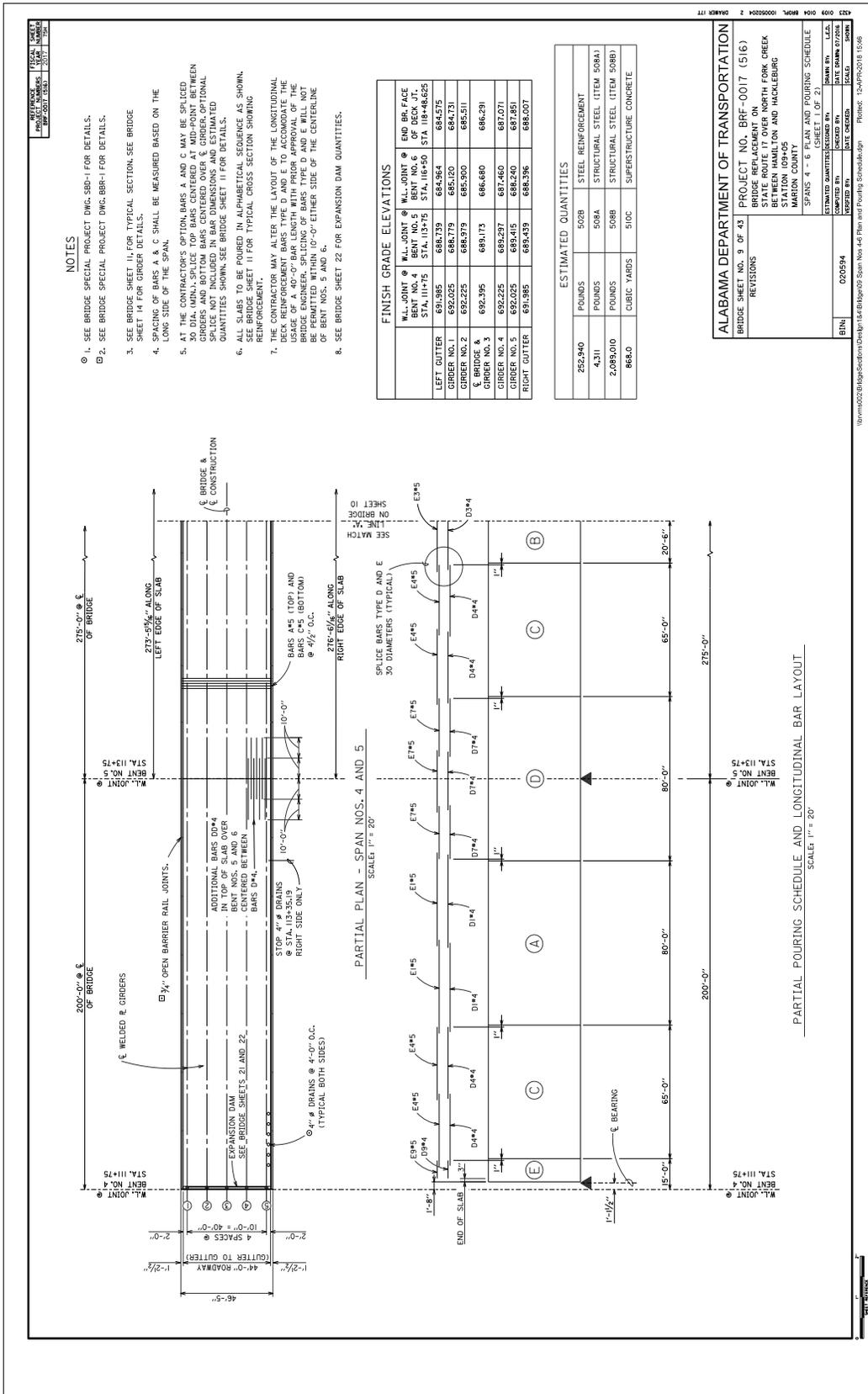
2.1.2.8 Bulb Tee, Draped Pattern

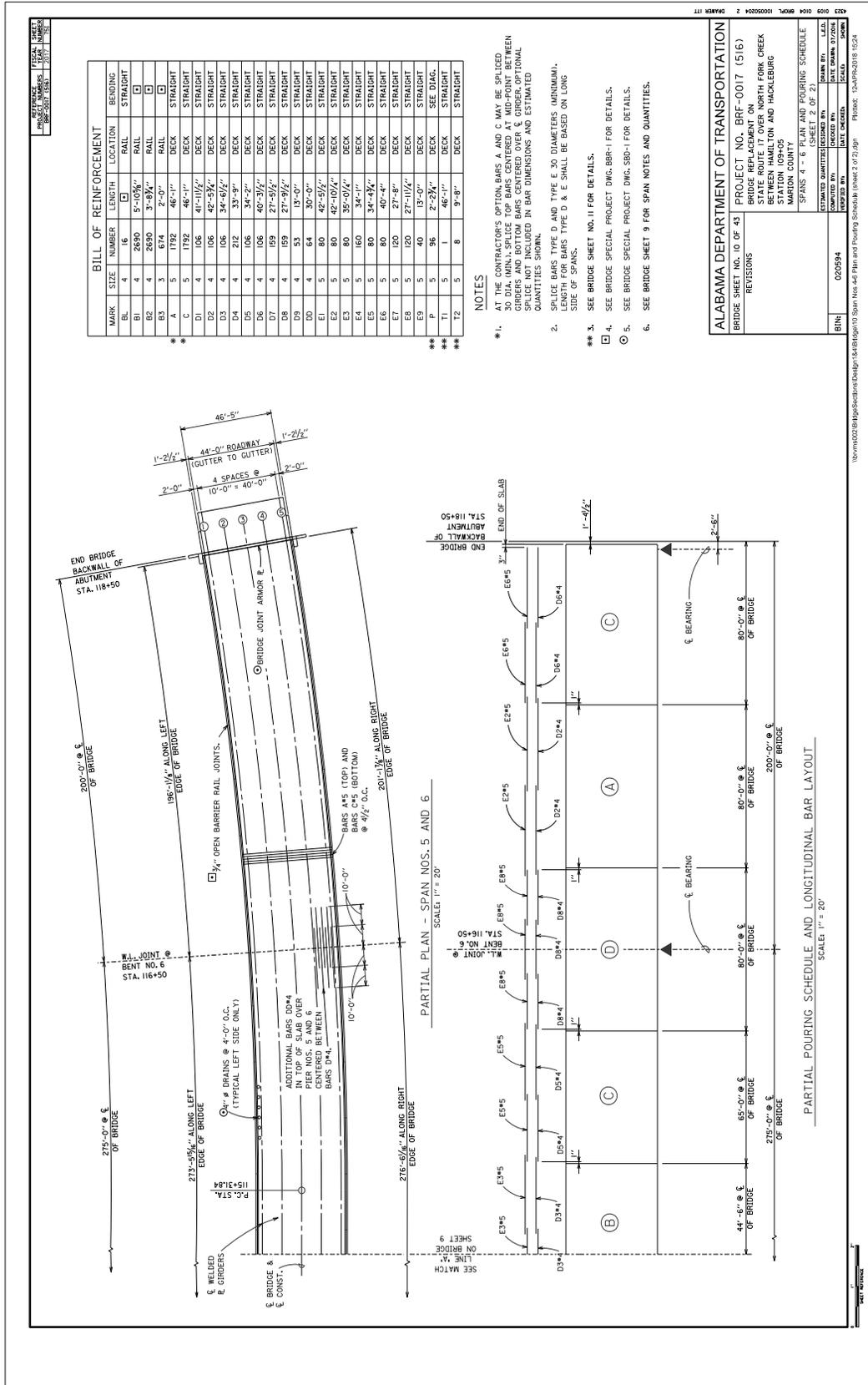


2.2.1.2 Plan View, Pouring Schedule, Notes, Bill of Reinf., Finish Grade Elev. (Tangent)



2.2.1.3 Plan View, Pouring Schedule, Notes, Bill of Reinf., Finish Grade Elevs. (Tan. & Curved) (2 Shts)





BILL OF REINFORCEMENT

| MARK | SIZE | NUMBER | LENGTH | LOCATION | BENDING |
|------|------|--------|-------------|----------|-----------|
| BL | 4 | 16 | | RAIL | STRAIGHT |
| B1 | 4 | 2690 | 5'-10 1/2" | RAIL | □ |
| B2 | 4 | 2690 | 3'-8 3/4" | RAIL | □ |
| B3 | 3 | 674 | 2'-0" | RAIL | □ |
| A | 5 | 1792 | 46'-1" | DECK | STRAIGHT |
| C | 5 | 1792 | 46'-1" | DECK | STRAIGHT |
| D1 | 4 | 106 | 41'-11 1/2" | DECK | STRAIGHT |
| D2 | 4 | 106 | 42'-3 3/4" | DECK | STRAIGHT |
| D3 | 4 | 106 | 34'-9 1/2" | DECK | STRAIGHT |
| D4 | 4 | 106 | 40'-3 1/2" | DECK | STRAIGHT |
| D5 | 4 | 106 | 40'-3 1/2" | DECK | STRAIGHT |
| D6 | 4 | 106 | 34'-9 1/2" | DECK | STRAIGHT |
| D7 | 4 | 159 | 27'-5 1/2" | DECK | STRAIGHT |
| D8 | 4 | 159 | 27'-9 1/2" | DECK | STRAIGHT |
| D9 | 4 | 53 | 13'-0" | DECK | STRAIGHT |
| DD | 4 | 64 | 30'-0" | DECK | STRAIGHT |
| E1 | 5 | 80 | 42'-5 1/2" | DECK | STRAIGHT |
| E2 | 5 | 80 | 42'-10 1/2" | DECK | STRAIGHT |
| E3 | 5 | 80 | 35'-0 1/4" | DECK | STRAIGHT |
| E4 | 5 | 160 | 34'-1" | DECK | STRAIGHT |
| E5 | 5 | 80 | 34'-4 3/4" | DECK | STRAIGHT |
| E6 | 5 | 80 | 40'-4" | DECK | STRAIGHT |
| E7 | 5 | 120 | 27'-8" | DECK | STRAIGHT |
| E8 | 5 | 60 | 13'-4" | DECK | STRAIGHT |
| E9 | 5 | 46 | 13'-0" | DECK | STRAIGHT |
| P | 5 | 36 | 2'-2 3/4" | DECK | SEE DIAG. |
| T1 | 5 | 1 | 46'-1" | DECK | STRAIGHT |
| T2 | 5 | 8 | 9'-8" | DECK | STRAIGHT |

- NOTES**
- AT THE CONTRACTOR'S OPTION BARS A AND C MAY BE SPLICED 30 DIA. MAIN SPLICE TOP BARS CENTERED AT MID-POINT BETWEEN GIRDERS AND BOTTOM BARS CENTERED OVER E GIRDER. OPTIONAL SPLICES IN BAR DIMENSIONS AND ESTIMATED QUANTITIES SHOWN.
 - SPLICE BARS TYPE D AND TYPE E TO DIAMETERS MINIMUM. LENGTH FOR BARS TYPE D & E SHALL BE BASED ON LONG SIDE OF SPANS.
 - SEE BRIDGE SHEET NO. J FOR DETAILS.
 - SEE BRIDGE SPECIAL PROJECT DWG. BRB-1 FOR DETAILS.
 - SEE BRIDGE SPECIAL PROJECT DWG. SBO-1 FOR DETAILS.
 - SEE BRIDGE SHEET 9 FOR SPAN NOTES AND QUANTITIES.

ALABAMA DEPARTMENT OF TRANSPORTATION
 PROJECT NO. BRB-0017 (516)
 BRIDGE REPLACEMENT ON
 STATE ROUTE 17 OVER NORTH FORK CREEK
 BETWEEN HAMILTON AND HACKLERBURG
 SPAN 5 AND 6
 MARION COUNTY

BRIDGE SHEET NO. 10 OF 43
 REVISIONS

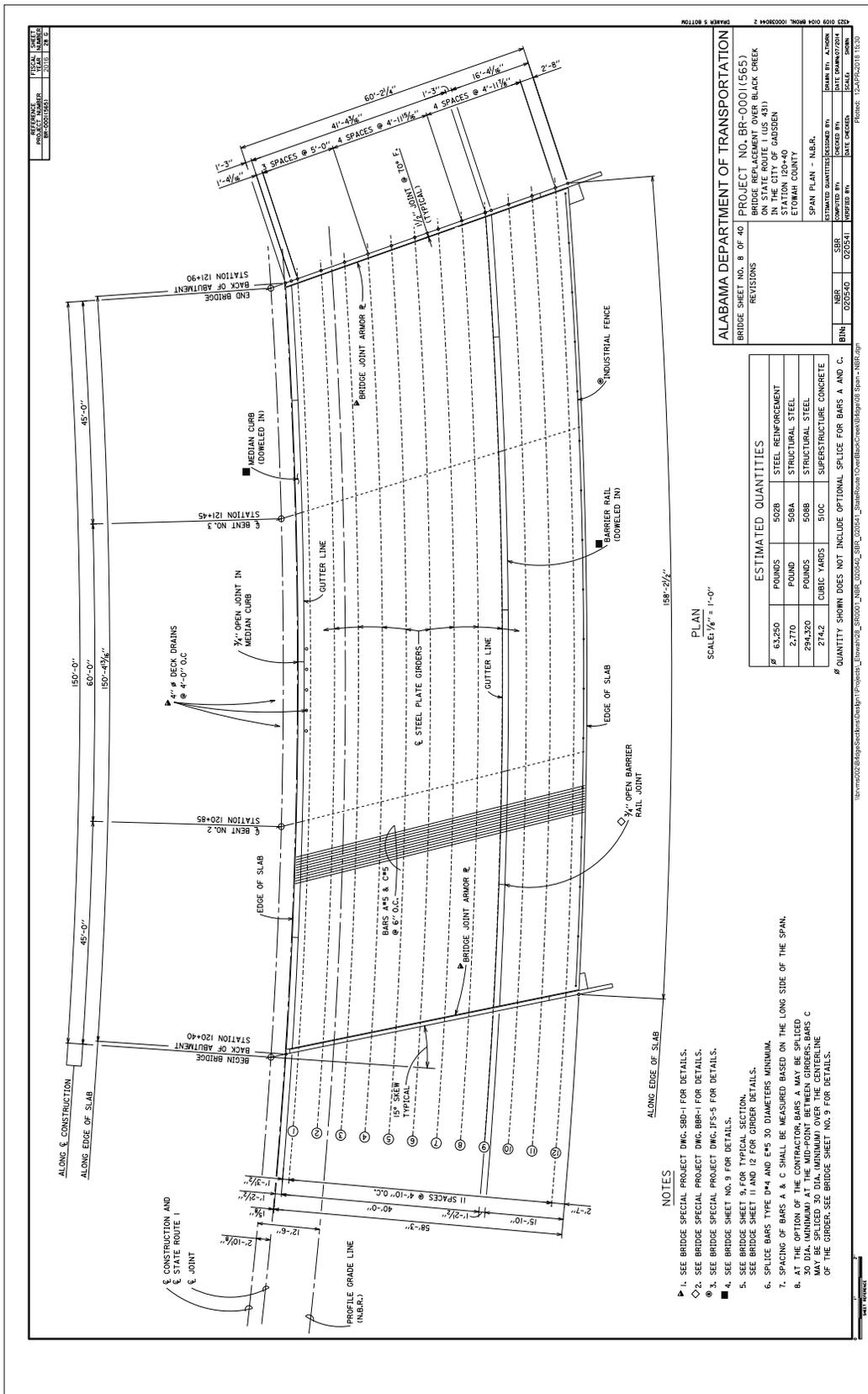
DATE: 02/05/94

ESTIMATED QUANTITIES (CHECKED BY):
 PREPARED BY: [Name]
 CHECKED BY: [Name]
 DATE: 02/05/94

DESIGNED BY: [Name]
 CHECKED BY: [Name]
 DATE: 02/05/94

SCALE: 1" = 20'

2.2.1.4 Plan View, Notes (Curved)



ALABAMA DEPARTMENT OF TRANSPORTATION

BRIDGE SHEET NO. 8 OF 40 PROJECT NO. BR-0001(565)
 BRIDGE OVER BLACK CREEK
 ON STATE ROUTE 1 (US 43)
 STATION 120+40
 ETOWH COUNTY

SPAN PLAN - N.B.R.

ESTIMATED QUANTITIES: REBAR, SBR, CONCRETE, STEEL REINFORCEMENT, STRUCTURAL STEEL, SUPERSTRUCTURE CONCRETE

DATE: 12/24/18

ESTIMATED QUANTITIES

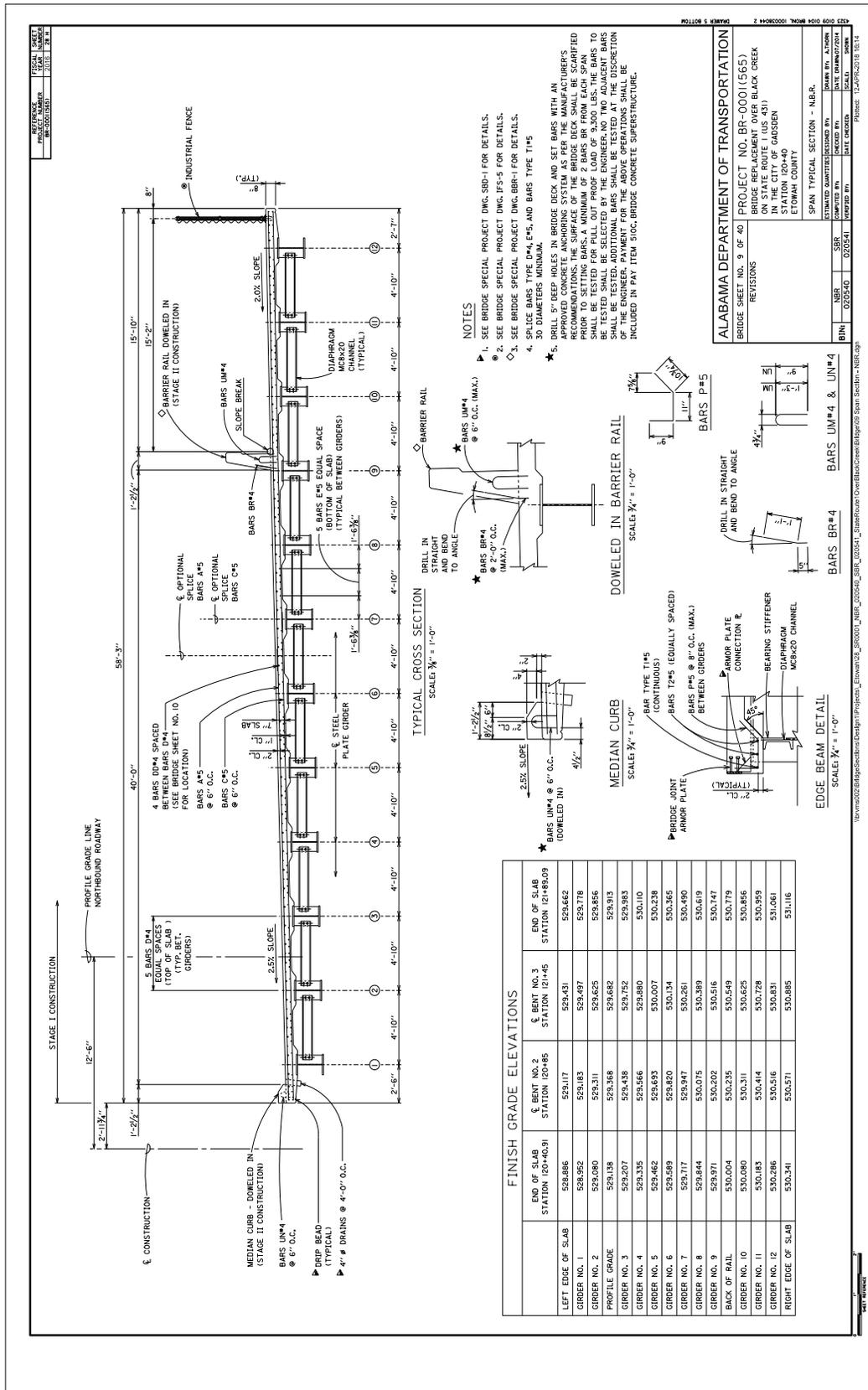
| ITEM | QUANTITY | UNIT | DESCRIPTION |
|------|----------|-------------|------------------------------|
| 1 | 63,250 | POUNDS | 502B STEEL REINFORCEMENT |
| 2 | 2,770 | POUNDS | 508A STRUCTURAL STEEL |
| 3 | 294,320 | POUNDS | 508B STRUCTURAL STEEL |
| 4 | 274.2 | CUBIC YARDS | 510C SUPERSTRUCTURE CONCRETE |

* QUANTITY SHOWN DOES NOT INCLUDE OPTIONAL SPLICE FOR BARS A AND C.

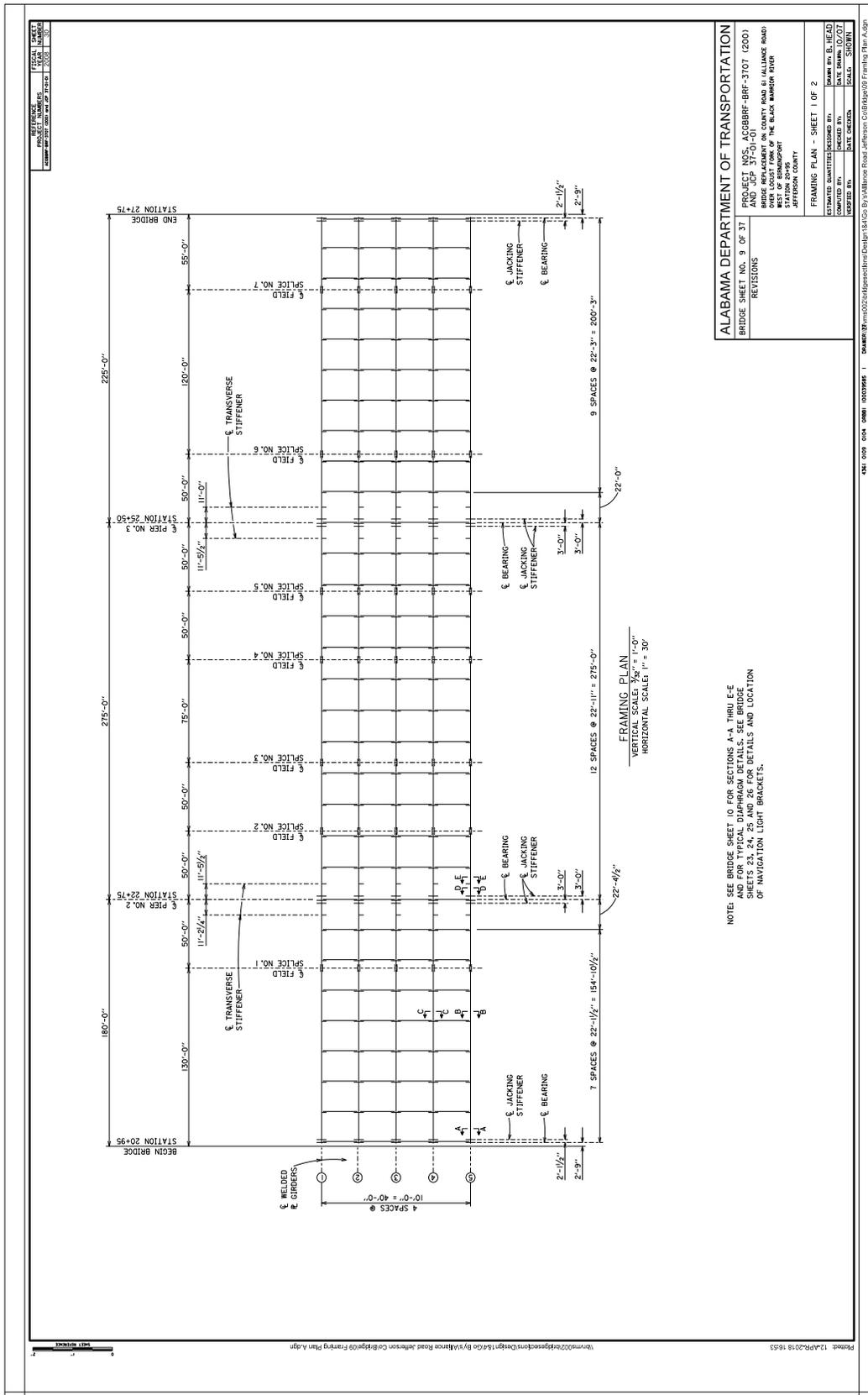
NOTES

- SEE BRIDGE SPECIAL PROJECT DWG. SRD-1 FOR DETAILS.
- SEE BRIDGE SPECIAL PROJECT DWG. BBR-1 FOR DETAILS.
- SEE BRIDGE SPECIAL PROJECT DWG. JES-5 FOR DETAILS.
- SEE BRIDGE SHEET NO. 9 FOR DETAILS.
- SEE BRIDGE SHEET NO. 10 FOR GUTTER DETAILS.
- SPlice BARS TYPE D*4 AND E*4 30 DIAMETERS MINIMUM.
- SPACING OF BARS A & C SHALL BE MEASURED BASED ON THE LONG SIDE OF THE SPAN.
- AT THE OPTION OF THE CONTRACTOR, BARS A MAY BE SPLICED AT THE CENTERLINE OF THE SPAN AND BARS C MAY BE SPLICED 30 DIA. MINIMUM OVER THE CENTERLINE OF THE GIRDER. SEE BRIDGE SHEET NO. 9 FOR DETAILS.

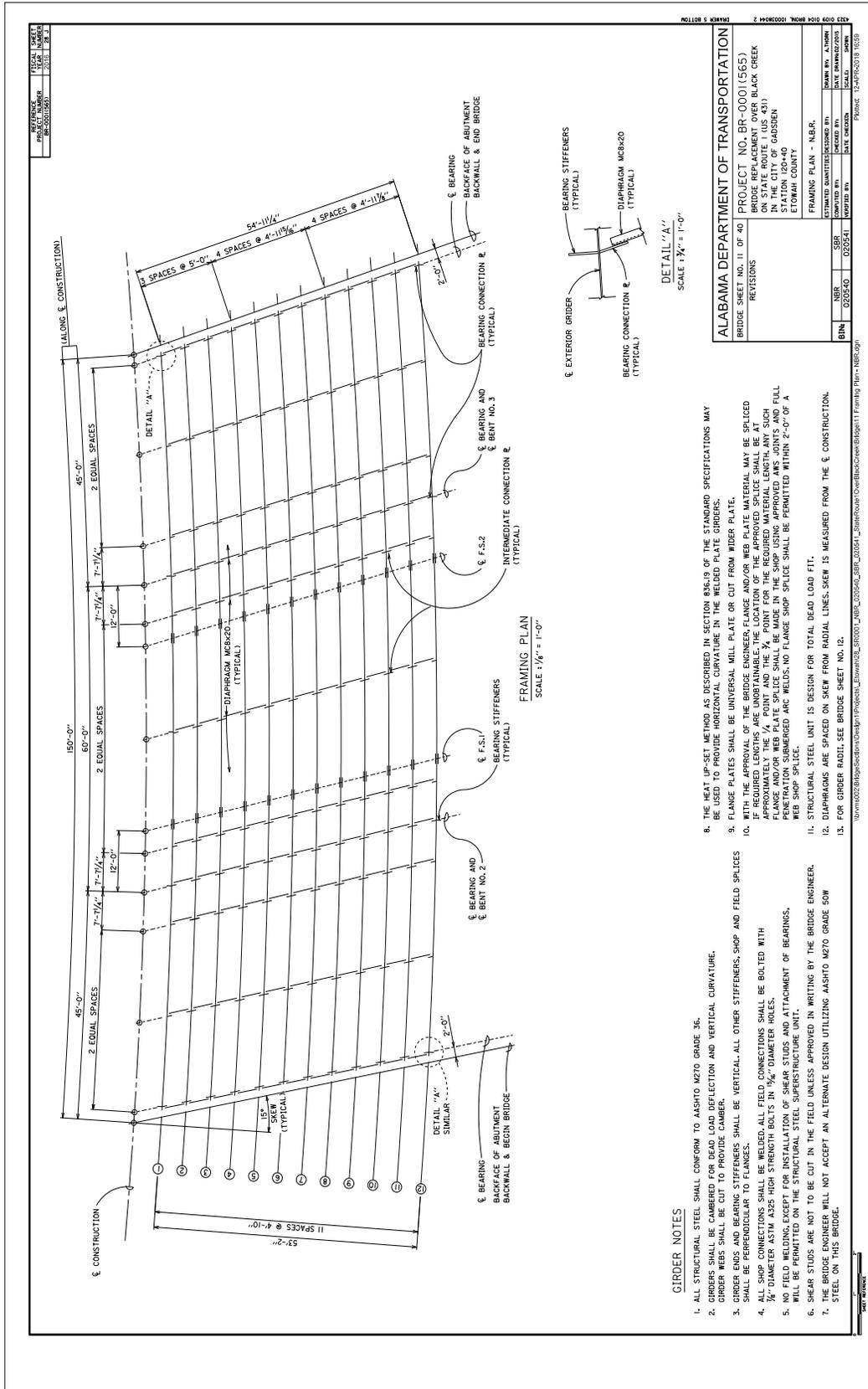
2.2.1.5 Typical Section, Misc. Details, Finish Grade Elevations, Notes (Curved)



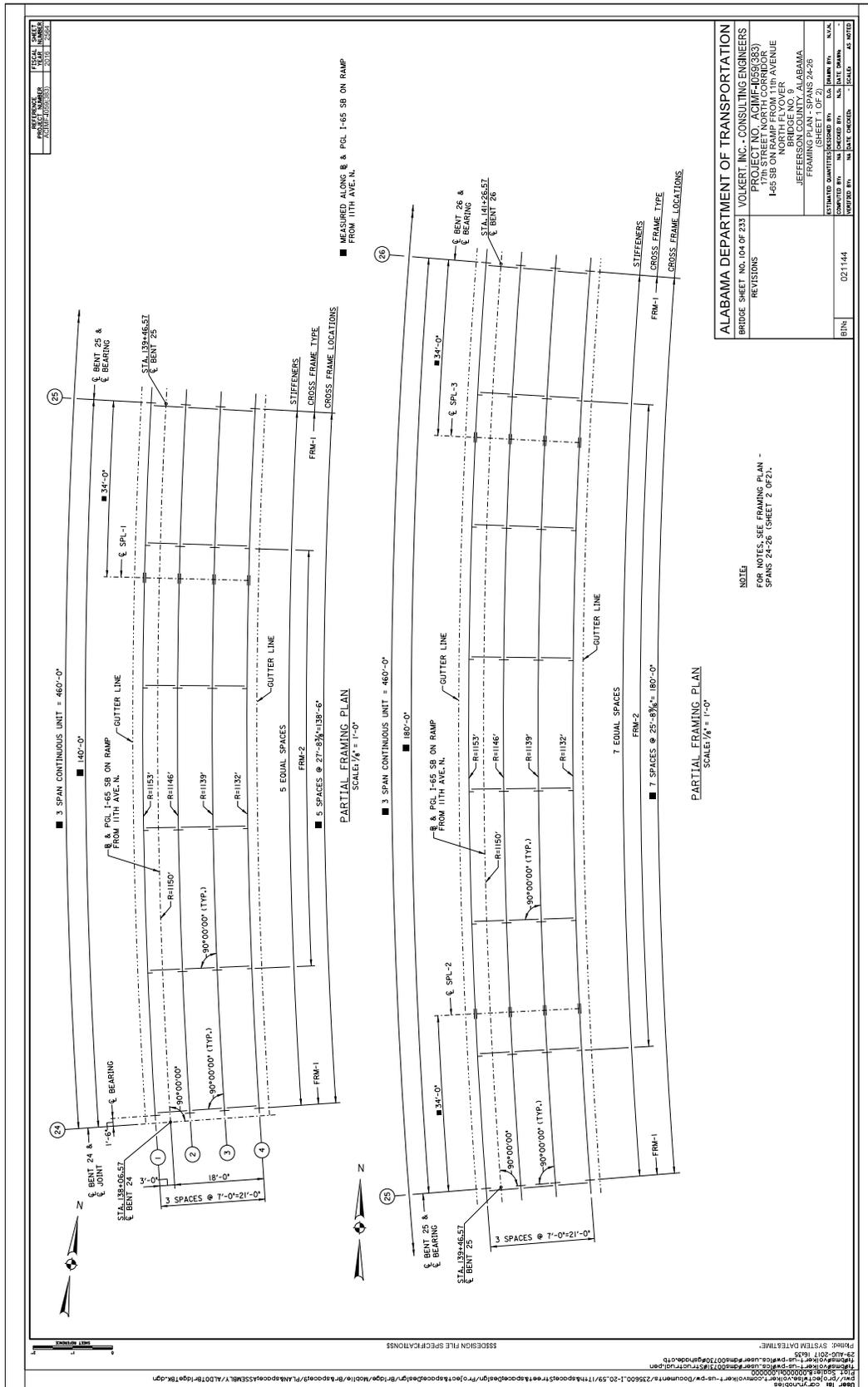
2.2.2.3 Framing Plan (Tangent)

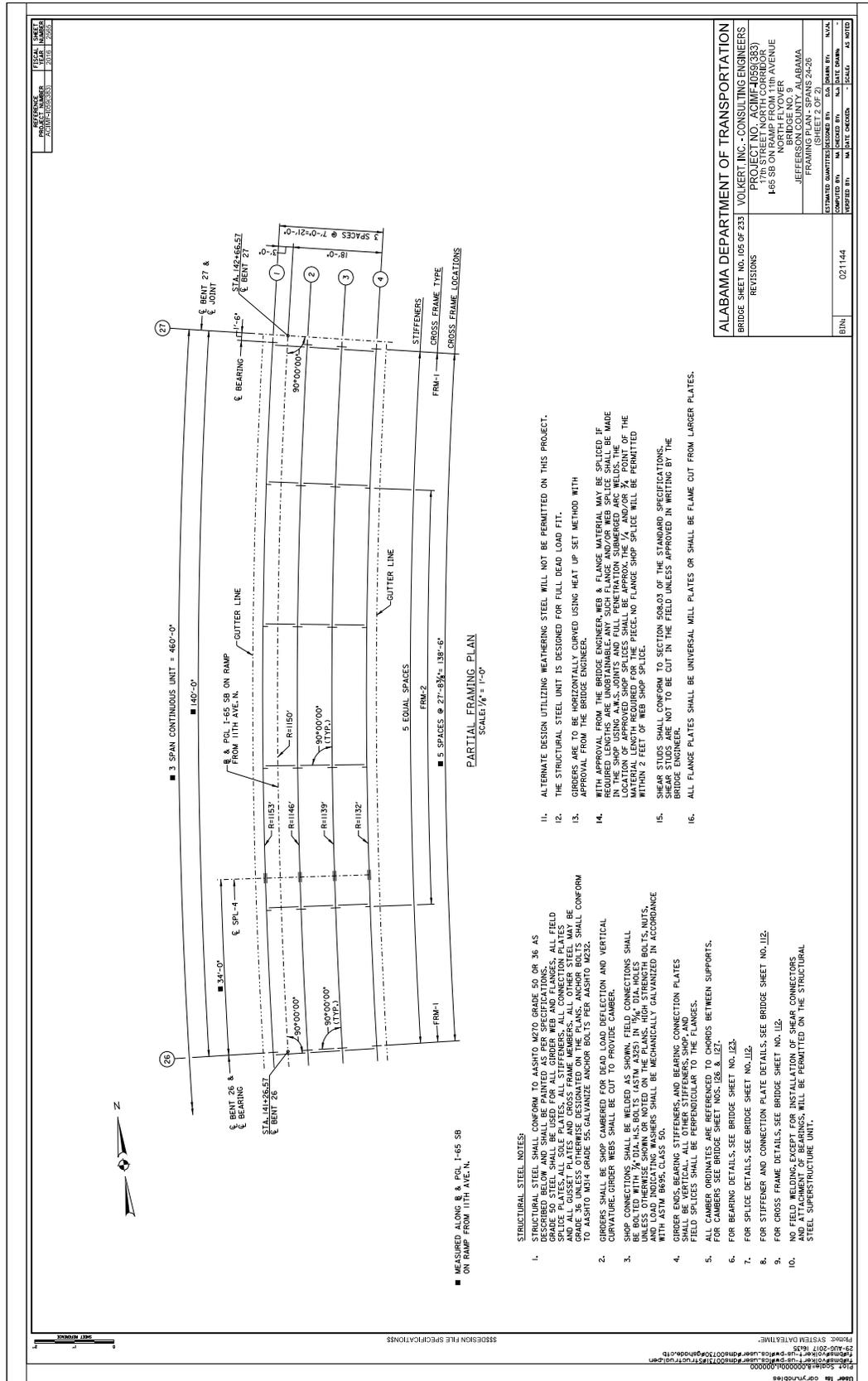


2.2.2.4 Framing Plan, Notes (Curved, Skewed)



2.2.2.5 Framing Plan, Notes (Curved) (2 Shts.)

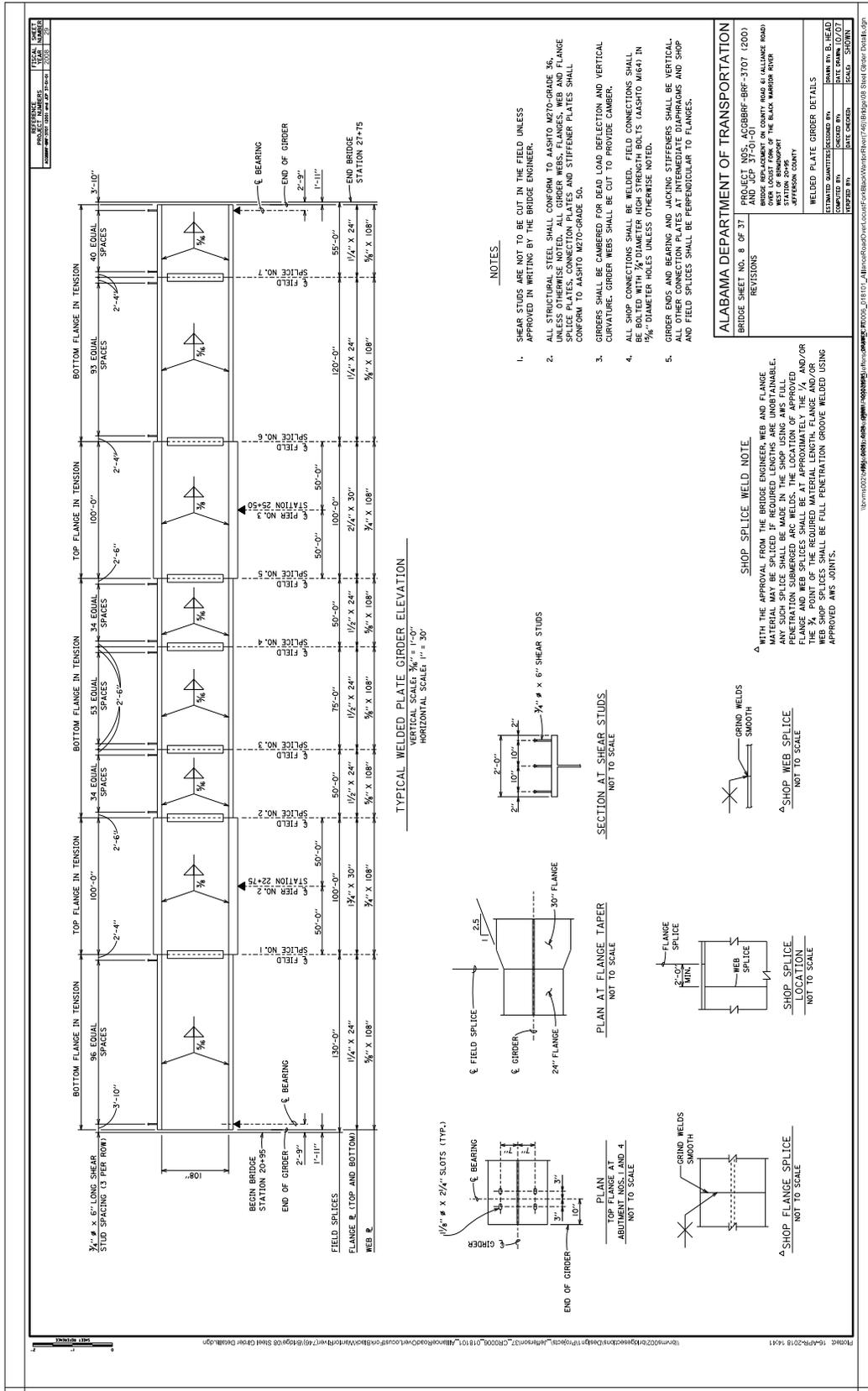




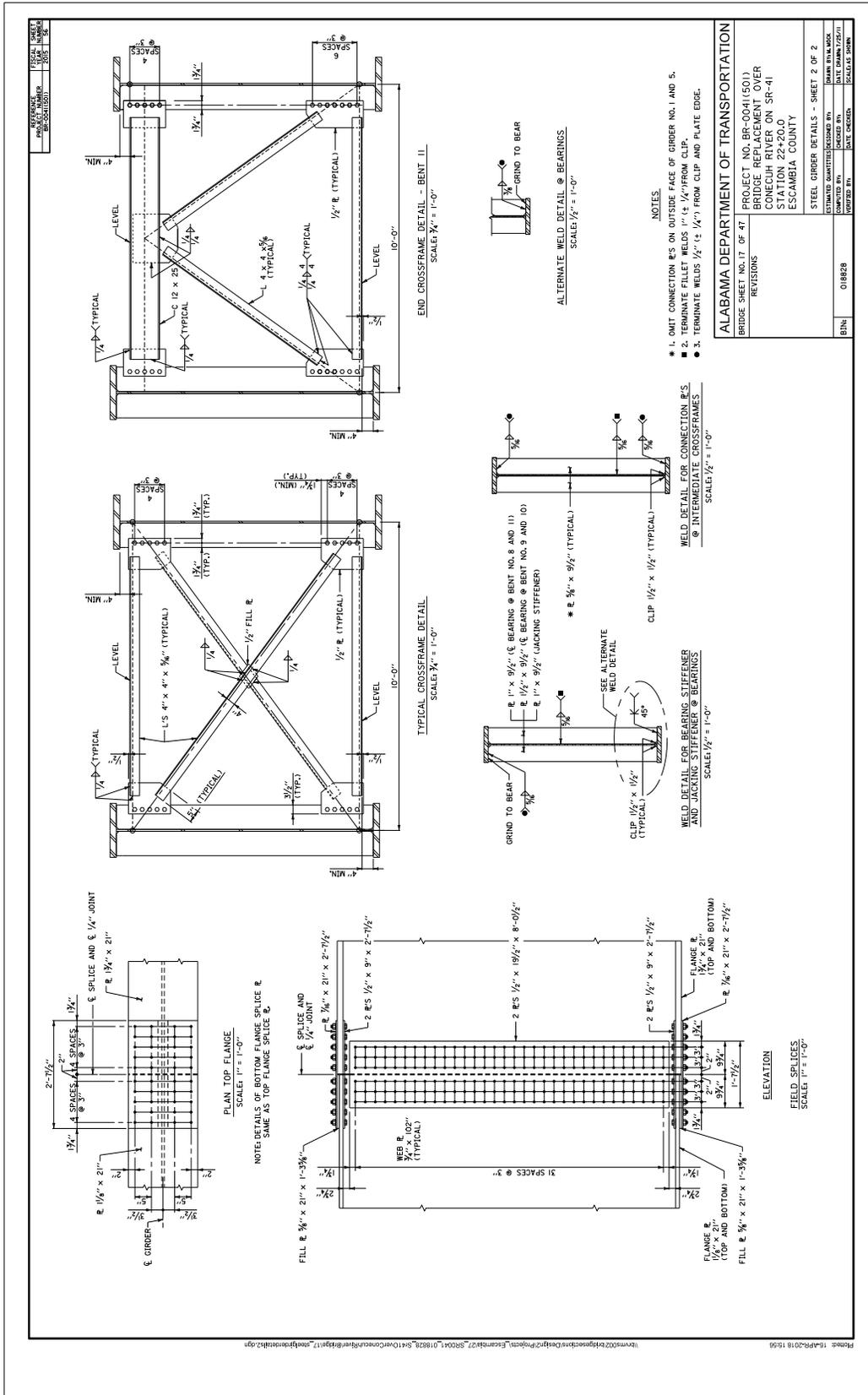
1. STRUCTURAL STEEL SHALL CONFORM TO AASHTO M70 GRADE 50 OR 36 AS SPECIFIED IN THE CONTRACT. ALL CONNECTIONS SHALL BE MADE TO GRADE 50 STEEL UNLESS OTHERWISE NOTED.
2. ALL CONNECTIONS SHALL BE MADE TO GRADE 50 STEEL UNLESS OTHERWISE NOTED.
3. ALL CONNECTIONS SHALL BE MADE TO GRADE 50 STEEL UNLESS OTHERWISE NOTED.
4. ALL CONNECTIONS SHALL BE MADE TO GRADE 50 STEEL UNLESS OTHERWISE NOTED.
5. ALL CONNECTIONS SHALL BE MADE TO GRADE 50 STEEL UNLESS OTHERWISE NOTED.
6. ALL CONNECTIONS SHALL BE MADE TO GRADE 50 STEEL UNLESS OTHERWISE NOTED.
7. ALL CONNECTIONS SHALL BE MADE TO GRADE 50 STEEL UNLESS OTHERWISE NOTED.
8. ALL CONNECTIONS SHALL BE MADE TO GRADE 50 STEEL UNLESS OTHERWISE NOTED.
9. ALL CONNECTIONS SHALL BE MADE TO GRADE 50 STEEL UNLESS OTHERWISE NOTED.
10. ALL CONNECTIONS SHALL BE MADE TO GRADE 50 STEEL UNLESS OTHERWISE NOTED.
11. ALTERNATE DESIGN UTILIZING WEATHERING STEEL WILL NOT BE PERMITTED ON THIS PROJECT.
12. THE STRUCTURAL STEEL UNIT IS DESIGNED FOR FULL DEAD LOAD FIT.
13. GIRDERS ARE TO BE HORIZONTALLY CURVED USING HEAT UP SET METHOD WITH APPROVAL FROM THE BRIDGE ENGINEER.
14. WITH APPROVAL FROM THE BRIDGE ENGINEER, WEB & FLANGE MATERIAL MAY BE SPliced IN THE SHOP USING A.M.S. JOINTS AND FULL PENETRATION SUBMERGED ARC WELDS. THE LOCATION OF ANY SPlices SHALL BE APPROX. THE CENTER AND/OR 1/4 POINT OF THE SPlice UNLESS OTHERWISE NOTED. THE SPlicing OF FLANGE SHOP SPlice WILL BE PERMITTED WITHIN 2 FEET OF WEB SHOP SPlice.
15. SHEAR STUDS SHALL CONFORM TO SECTION 504.03 OF THE STANDARD SPECIFICATIONS.
16. ALL FLANGE PLATES SHALL BE UNIVERSAL MILL PLATES OR SHALL BE FLAME CUT FROM LARGER PLATES.

| ALABAMA DEPARTMENT OF TRANSPORTATION | |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BRIDGE SHEET NO. 105 OF 233 | VOLKERT INC. CONSULTING ENGINEERS |
| REVISIONS | 1701 NORTH AVENUE (NORTH CORRIDOR) 1701 STREET NORTH CORRIDOR 165 SB ON RAMP FROM 11TH AVENUE JEFFERSON COUNTY, ALABAMA BRIDGE NO. 9 FRAMING AND CONNECTIONS 24-28 (SHEET 2 OF 2) |
| ESTIMATED QUANTITY | NO. DATE CHECKED BY: N.A. DATE DRAWN BY: N.A. |
| COMPUTED BY: N.A. | NO. DATE CHECKED BY: J. J. DATE DRAWN BY: J. J. |
| BRN: 021144 | |

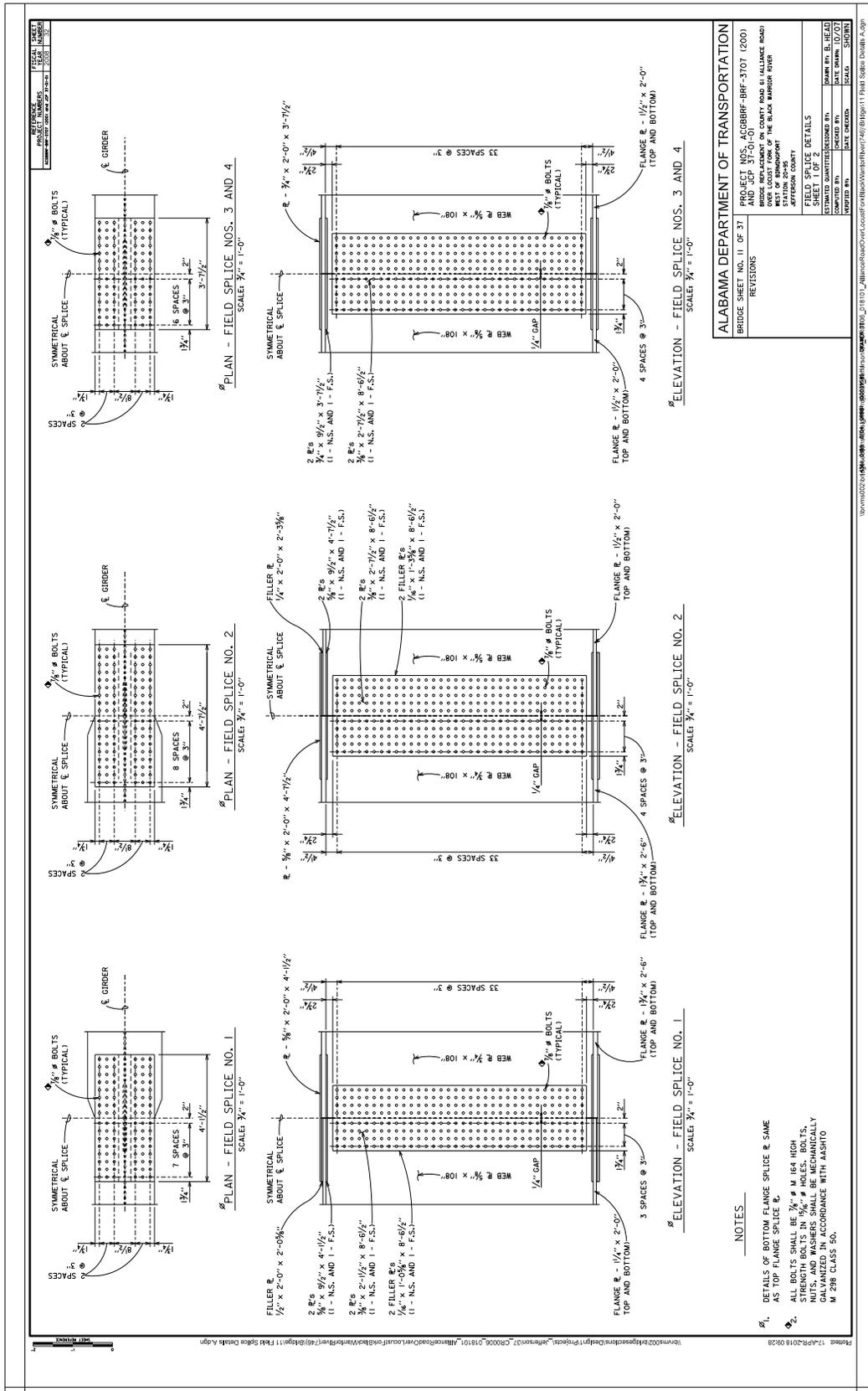
2.2.2.6 Girder Elevation, Notes, Misc. Details



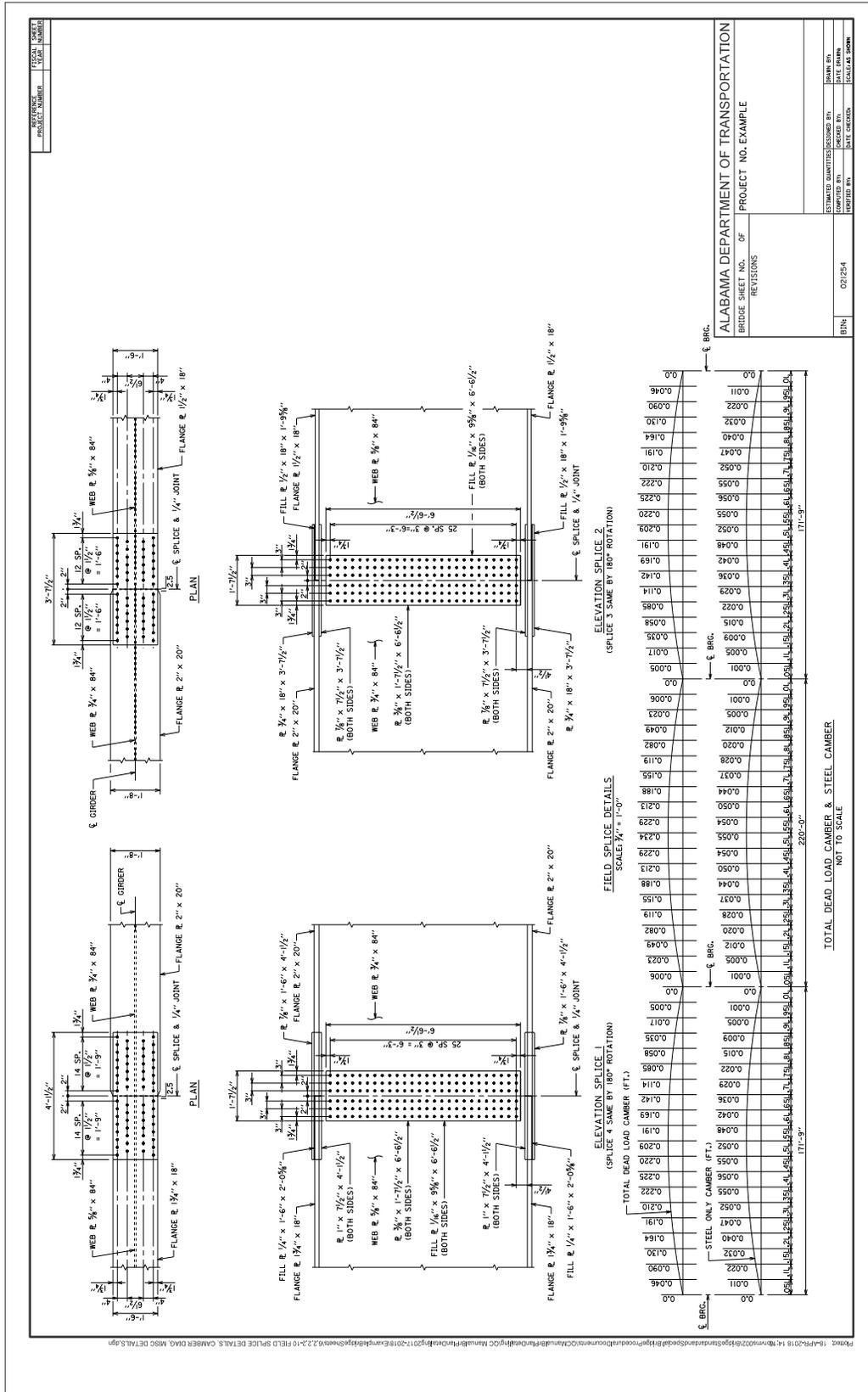
2.2.2.7 Field Splice, Crossframe, Connection/Stiffener Plate Details



2.2.2.9 Field Splice Details



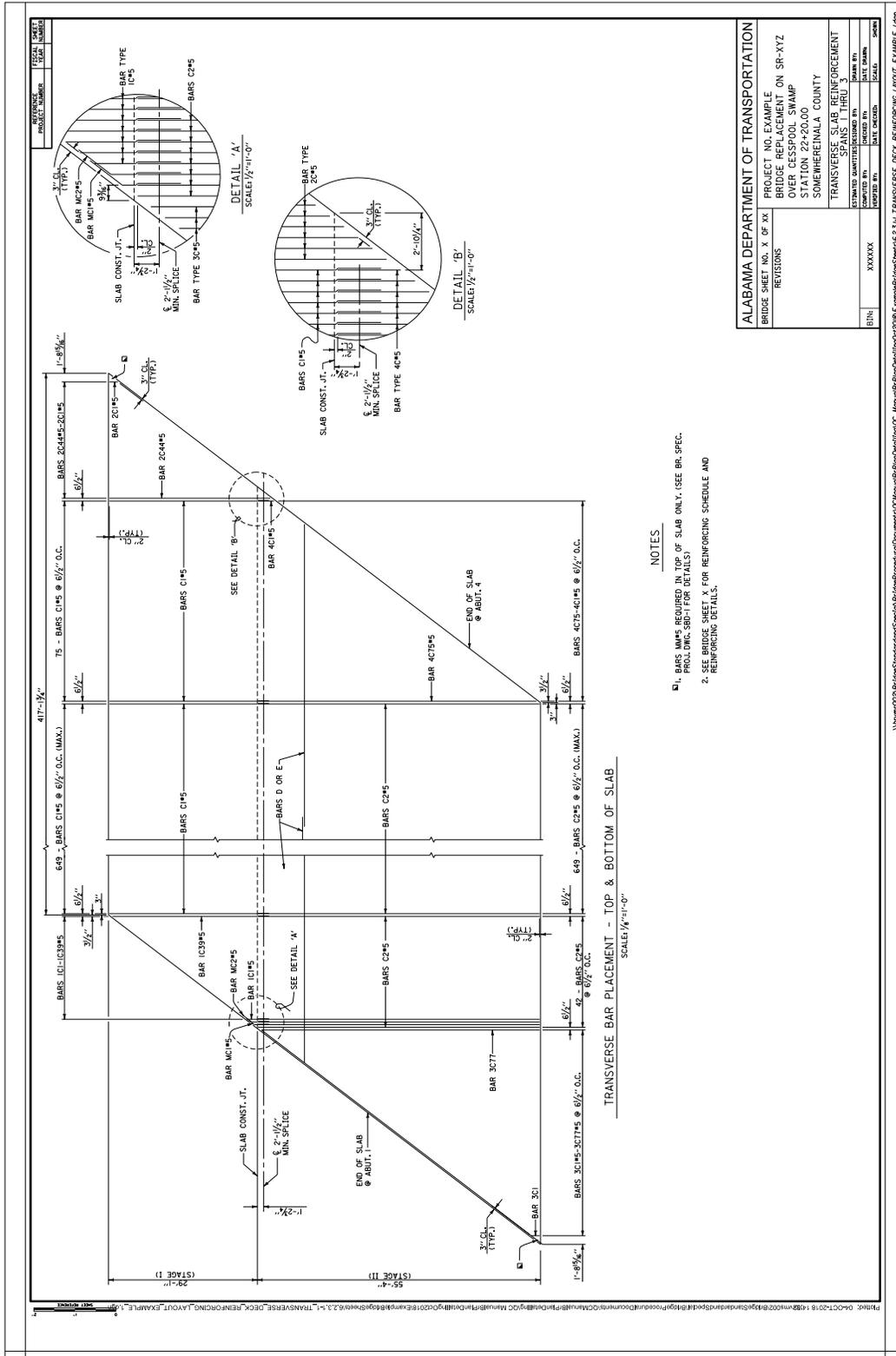
2.2.2.10 Field Splice, Camber Diagram



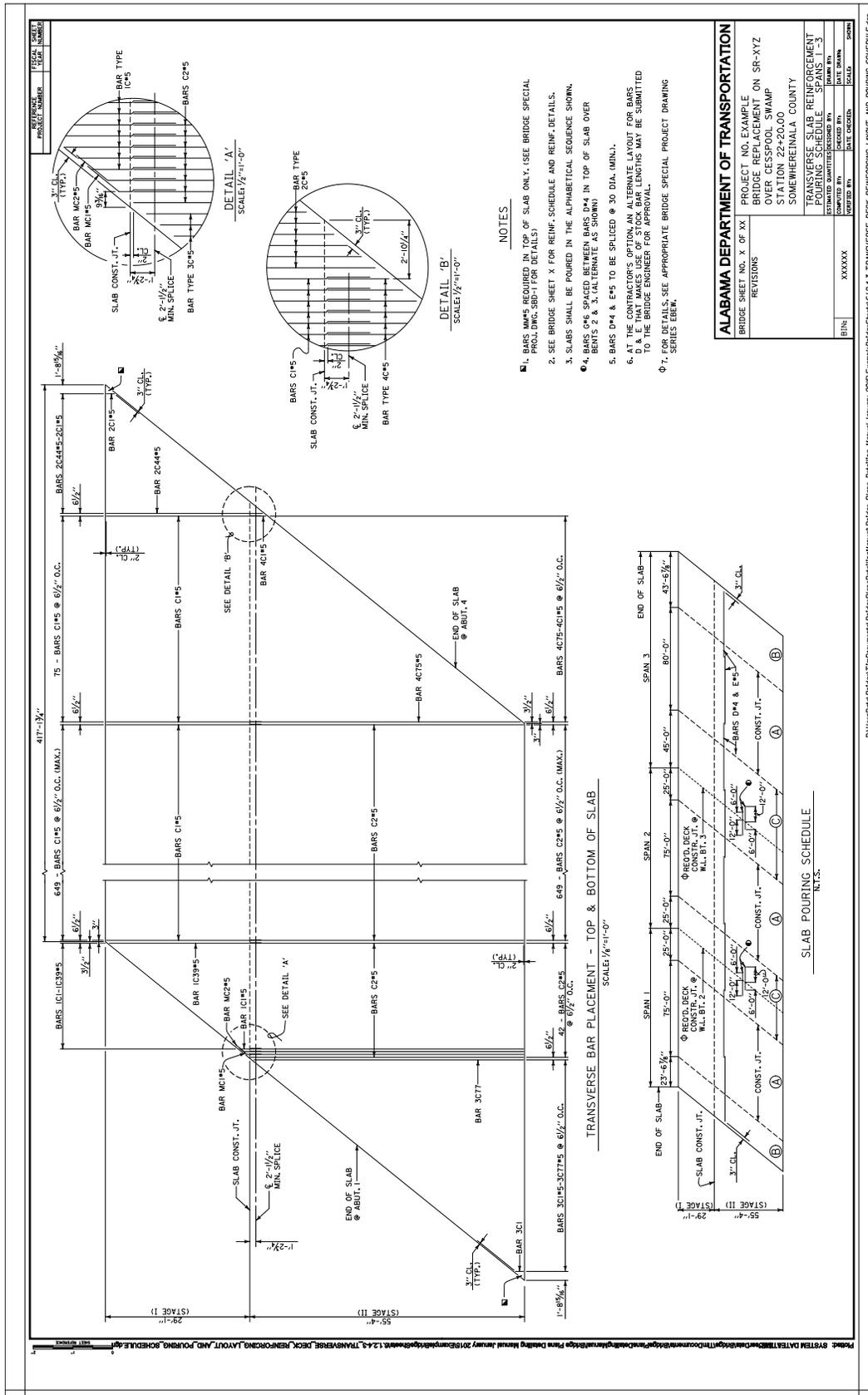
2.3 Special Superstructure Details

2.3.1 Transverse Deck Reinforcing

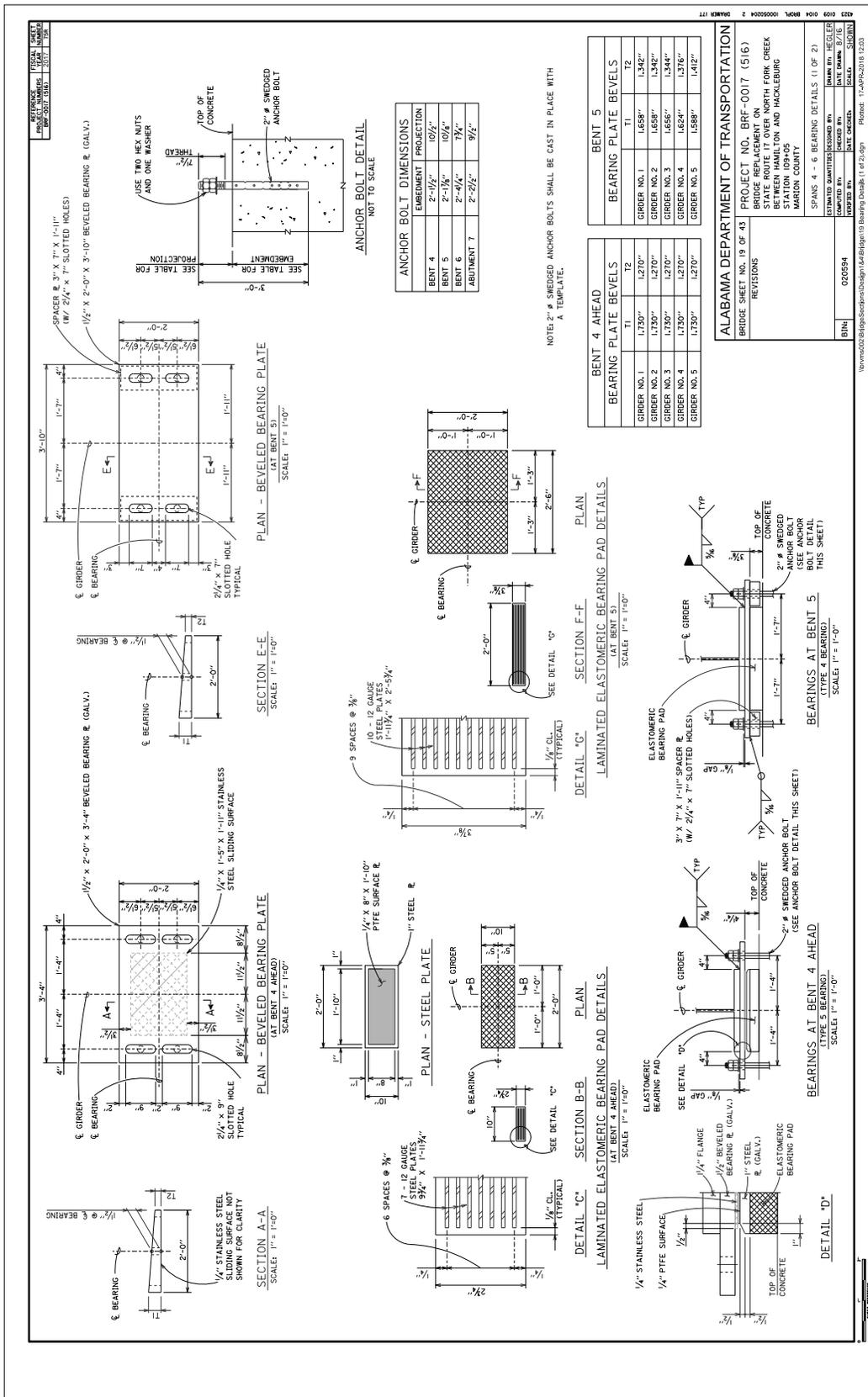
2.3.1.1 Example 1

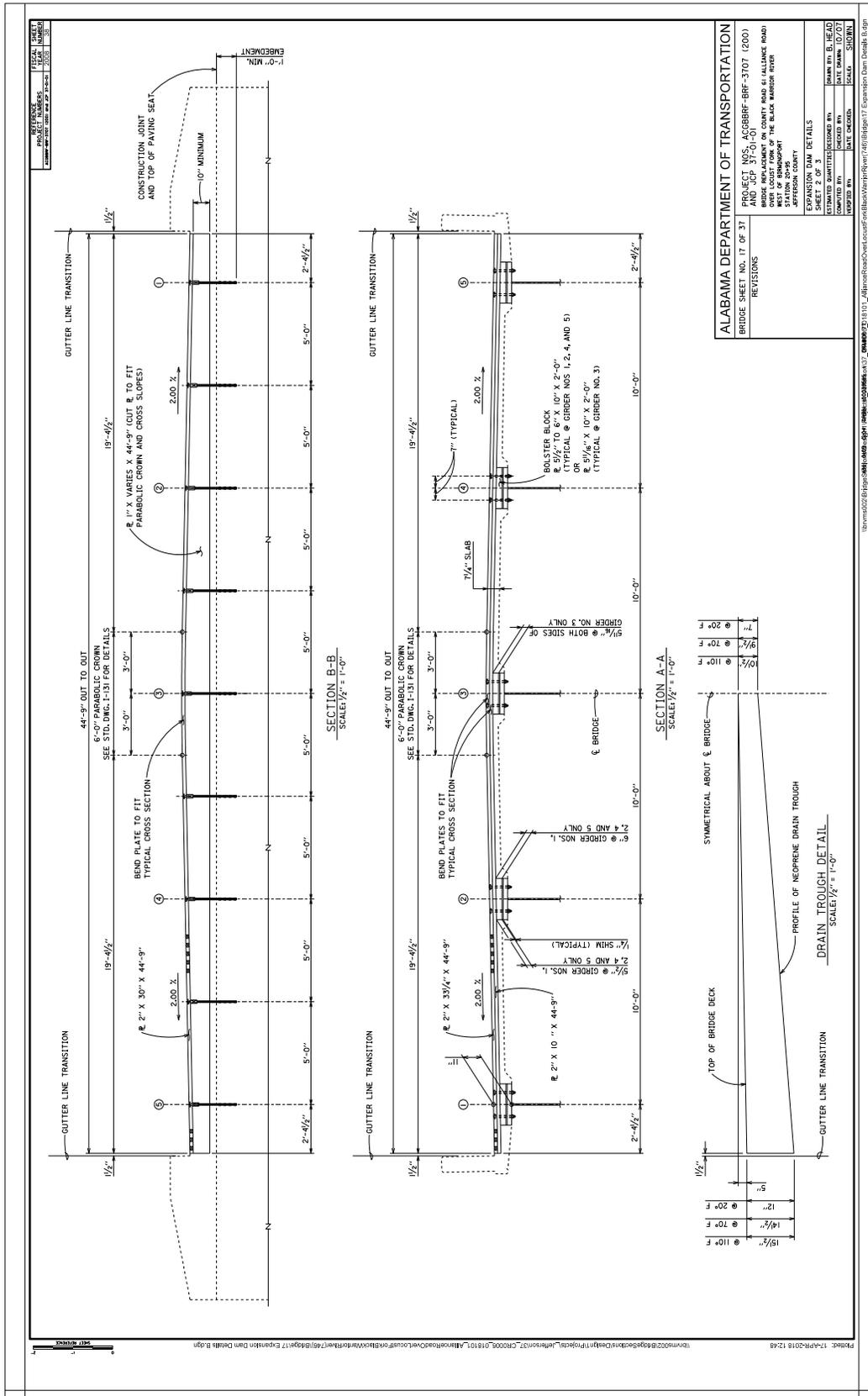


2.3.1.3 Example 3 with Pouring Schedule



2.3.2.2 Example 2 (2 Sheets)





PROJECT NUMBER: 17-APR-2018-1249
LOCAL NUMBER: 17-APR-2018-1249
DATE: 12/01/2018

WELDING DETAIL
SCALE: 3" = 1'-0"

PROJECT: 17-APR-2018-1249
LOCAL NUMBER: 17-APR-2018-1249
DATE: 12/01/2018

TROUGH SECTION
SCALE: 3" = 1'-0"

DETAIL OF TEETH
SCALE: 3" = 1'-0"

SECTION C-C
SCALE: 1/2" = 1'-0"

SCHEDULE OF EXPANSION DAM OPENINGS

| STEEL TEMPERATURE (F) | REQUIRED OPENING AT ABUTMENT NO. 1 | REQUIRED OPENING AT ABUTMENT NO. 4 |
|-----------------------|------------------------------------|------------------------------------|
| 20° | 5 1/4" | 4 3/4" |
| 30° | 4 7/8" | 4 1/8" |
| 40° | 4 1/2" | 3 7/8" |
| 50° | 3 7/8" | 3 1/4" |
| 60° | 3 1/4" | 2 7/8" |
| 70° | 2 7/8" | 2 3/4" |
| 80° | 2 3/4" | 2 3/8" |
| 90° | 2 3/8" | 2 1/4" |
| 100° | 2 1/4" | 2" |
| 110° | 2" | 1 3/4" |

ALABAMA DEPARTMENT OF TRANSPORTATION

BRIDGE SHEET NO. 18 OF 31
 PROJECT: 17-APR-2018-1249
 LOCAL NUMBER: 17-APR-2018-1249
 DATE: 12/01/2018

REVISIONS:

| NO. | DESCRIPTION | DATE | BY | CHKD BY |
|-----|-------------------------|------------|-----|---------|
| 1 | ISSUED FOR CONSTRUCTION | 12/01/2018 | ... | ... |

DESIGNER: ...
CHECKER: ...
DATE: ...

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2.3.4 Finish Grade Elevs. at Incremental Span Points

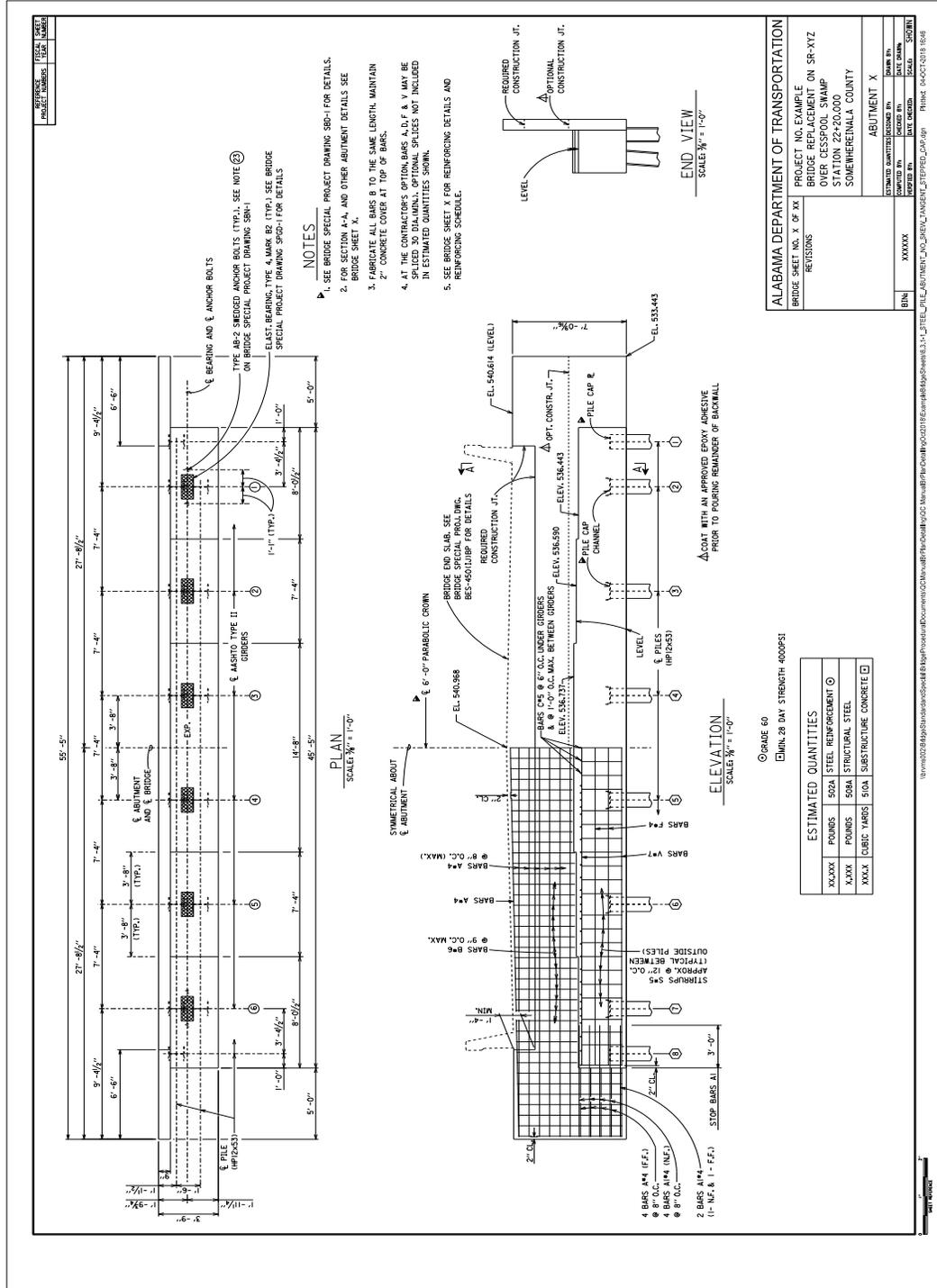
2.3.4.1 Example 1 (Comb. Prestr. and Stl. Spans)

| DATE PLOTTED: 11/11/2014 10:58:11 AM | | PROJECT: US 278 OVER WEST CREEK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| DRAWN BY: J. W. HARRIS | | CHECKED BY: J. W. HARRIS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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<td>911.439</td> <td>911.483</td> <td>911.527</td> <td>911.570</td> <td>911.614</td> <td>911.658</td> <td>911.701</td> <td>911.745</td> <td>911.788</td> <td>911.832</td> </tr> <tr> <td>1 Girder no.4</td> <td>911.842</td> <td>911.886</td> <td>911.930</td> <td>911.974</td> <td>912.018</td> <td>912.061</td> <td>912.105</td> <td>912.149</td> <td>912.192</td> <td>912.236</td> <td>912.279</td> </tr> <tr> <td>1 Right girder</td> <td>911.156</td> <td>911.199</td> <td>911.243</td> <td>911.287</td> <td>911.330</td> <td>911.374</td> <td>911.418</td> <td>911.461</td> <td>911.505</td> <td>911.548</td> <td>911.592</td> </tr> <tr> <td>2 Left girder</td> <td>911.602</td> <td>911.646</td> <td>911.689</td> <td>911.733</td> <td>911.776</td> <td>911.820</td> <td>911.864</td> <td>911.907</td> <td>911.951</td> <td>911.994</td> <td>920.038</td> </tr> <tr> <td>2 Girder no.1</td> <td>911.642</td> <td>911.686</td> <td>911.729</td> <td>911.773</td> <td>911.816</td> <td>911.860</td> <td>911.904</td> <td>911.947</td> <td>911.991</td> <td>920.034</td> <td>920.078</td> </tr> <tr> <td>2 Girder no.2</td> <td>912.012</td> <td>912.056</td> <td>912.100</td> <td>912.143</td> <td>912.187</td> <td>912.230</td> <td>912.274</td> <td>912.317</td> <td>912.361</td> <td>912.404</td> <td>912.448</td> </tr> <tr> <td>2 Girder no.3</td> <td>911.842</td> <td>911.886</td> <td>911.930</td> <td>911.974</td> <td>912.018</td> <td>912.061</td> <td>912.105</td> <td>912.149</td> <td>912.192</td> <td>912.236</td> <td>912.279</td> </tr> <tr> <td>2 Right girder</td> <td>911.602</td> <td>911.646</td> <td>911.689</td> <td>911.733</td> <td>911.776</td> <td>911.820</td> <td>911.864</td> <td>911.907</td> <td>911.951</td> <td>911.994</td> <td>920.038</td> </tr> </tbody> </table> <p>----- 20TH POINT ELEVATIONS -----</p> <table border="1"> <thead> <tr> <th>SPAN LOCATION</th> <th>BEARING</th> <th>17/20</th> <th>27/20</th> <th>37/20</th> <th>47/20</th> <th>57/20</th> <th>67/20</th> <th>77/20</th> <th>87/20</th> 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911.622 | 1 Girder no.2 | 911.586 | 911.629 | 911.673 | 911.717 | 911.760 | 911.804 | 911.848 | 911.891 | 911.935 | 911.978 | 920.022 | 1 Girder no.3 | 911.296 | 911.439 | 911.483 | 911.527 | 911.570 | 911.614 | 911.658 | 911.701 | 911.745 | 911.788 | 911.832 | 1 Girder no.4 | 911.842 | 911.886 | 911.930 | 911.974 | 912.018 | 912.061 | 912.105 | 912.149 | 912.192 | 912.236 | 912.279 | 1 Right girder | 911.156 | 911.199 | 911.243 | 911.287 | 911.330 | 911.374 | 911.418 | 911.461 | 911.505 | 911.548 | 911.592 | 2 Left girder | 911.602 | 911.646 | 911.689 | 911.733 | 911.776 | 911.820 | 911.864 | 911.907 | 911.951 | 911.994 | 920.038 | 2 Girder no.1 | 911.642 | 911.686 | 911.729 | 911.773 | 911.816 | 911.860 | 911.904 | 911.947 | 911.991 | 920.034 | 920.078 | 2 Girder no.2 | 912.012 | 912.056 | 912.100 | 912.143 | 912.187 | 912.230 | 912.274 | 912.317 | 912.361 | 912.404 | 912.448 | 2 Girder no.3 | 911.842 | 911.886 | 911.930 | 911.974 | 912.018 | 912.061 | 912.105 | 912.149 | 912.192 | 912.236 | 912.279 | 2 Right girder | 911.602 | 911.646 | 911.689 | 911.733 | 911.776 | 911.820 | 911.864 | 911.907 | 911.951 | 911.994 | 920.038 | SPAN LOCATION | BEARING | 17/20 | 27/20 | 37/20 | 47/20 | 57/20 | 67/20 | 77/20 | 87/20 | 97/20 | 107/20 | 5 Left girder | 913.927 | 913.979 | 914.031 | 914.083 | 914.135 | 914.187 | 914.239 | 914.291 | 914.343 | 914.395 | 914.447 | 5 Girder no.1 | 913.967 | 914.019 | 914.071 | 914.123 | 914.175 | 914.227 | 914.279 | 914.331 | 914.383 | 914.435 | 914.487 | 5 Girder no.2 | 914.187 | 914.239 | 914.291 | 914.343 | 914.395 | 914.447 | 914.499 | 914.551 | 914.603 | 914.655 | 914.707 | 5 Girder no.3 | 914.337 | 914.389 | 914.441 | 914.493 | 914.545 | 914.597 | 914.649 | 914.701 | 914.753 | 914.805 | 914.857 | 5 Girder no.4 | 914.187 | 914.239 | 914.291 | 914.343 | 914.395 | 914.447 | 914.499 | 914.551 | 914.603 | 914.655 | 914.707 | 5 Right girder | 913.927 | 913.979 | 914.031 | 914.083 | 914.135 | 914.187 | 914.239 | 914.291 | 914.343 | 914.395 | 914.447 | 5 Girder no.5 | 913.967 | 914.019 | 914.071 | 914.123 | 914.175 | 914.227 | 914.279 | 914.331 | 914.383 | 914.435 | 914.487 | 5 Girder no.6 | 914.187 | 914.239 | 914.291 | 914.343 | 914.395 | 914.447 | 914.499 | 914.551 | 914.603 | 914.655 | 914.707 | 5 Girder no.7 | 914.337 | 914.389 | 914.441 | 914.493 | 914.545 | 914.597 | 914.649 | 914.701 | 914.753 | 914.805 | 914.857 | 5 Right girder | 913.927 | 913.979 | 914.031 | 914.083 | 914.135 | 914.187 | 914.239 | 914.291 | 914.343 | 914.395 | 914.447 | 6 Left girder | 914.927 | 914.979 | 915.031 | 915.083 | 915.135 | 915.187 | 915.239 | 915.291 | 915.343 | 915.395 | 915.447 | 6 Girder no.1 | 915.007 | 915.059 | 915.111 | 915.163 | 915.215 | 915.267 | 915.319 | 915.371 | 915.423 | 915.475 | 915.527 | 6 Girder no.2 | 915.207 | 915.259 | 915.311 | 915.363 | 915.415 | 915.467 | 915.519 | 915.571 | 915.623 | 915.675 | 915.727 | 6 Girder no.3 | 915.377 | 915.429 | 915.481 | 915.533 | 915.585 | 915.637 | 915.689 | 915.741 | 915.793 | 915.845 | 915.897 | 6 Girder no.4 | 915.207 | 915.259 | 915.311 | 915.363 | 915.415 | 915.467 | 915.519 | 915.571 | 915.623 | 915.675 | 915.727 | 6 Right girder | 914.927 | 914.979 | 915.031 | 915.083 | 915.135 | 915.187 | 915.239 | 915.291 | 915.343 | 915.395 | 915.447 | 6 Girder no.5 | 915.007 | 915.059 | 915.111 | 915.163 | 915.215 | 915.267 | 915.319 | 915.371 | 915.423 | 915.475 | 915.527 | 6 Right girder | 914.927 | 914.979 | 915.031 | 915.083 | 915.135 | 915.187 | 915.239 | 915.291 | 915.343 | 915.395 | 915.447 | SPAN LOCATION | BEARING | 17/10 | 27/10 | 37/10 | 47/10 | 57/10 | 67/10 | 77/10 | 87/10 | 97/10 | 107/20 | 7 Left girder | 915.855 | 915.899 | 915.943 | 915.987 | 916.031 | 916.075 | 916.119 | 916.163 | 916.207 | 916.251 | 916.295 | 7 Girder no.1 | 916.055 | 916.099 | 916.143 | 916.187 | 916.231 | 916.275 | 916.319 | 916.363 | 916.407 | 916.451 | 916.495 | 7 Girder no.2 | 916.255 | 916.299 | 916.343 | 916.387 | 916.431 | 916.475 | 916.519 | 916.563 | 916.607 | 916.651 | 916.695 | 7 Girder no.3 | 916.055 | 916.099 | 916.143 | 916.187 | 916.231 | 916.275 | 916.319 | 916.363 | 916.407 | 916.451 | 916.495 | 7 Right girder | 915.855 | 915.899 | 915.943 | 915.987 | 916.031 | 916.075 | 916.119 | 916.163 | 916.207 | 916.251 | 916.295 | 8 Left girder | 916.201 | 916.245 | 916.289 | 916.333 | 916.377 | 916.421 | 916.465 | 916.509 | 916.553 | 916.597 | 916.641 | 8 Girder no.1 | 916.201 | 916.245 | 916.289 | 916.333 | 916.377 | 916.421 | 916.465 | 916.509 | 916.553 | 916.597 | 916.641 | 8 Girder no.2 | 916.501 | 916.545 | 916.589 | 916.633 | 916.677 | 916.721 | 916.765 | 916.809 | 916.853 | 916.897 | 916.941 | 8 Girder no.3 | 916.201 | 916.245 | 916.289 | 916.333 | 916.377 | 916.421 | 916.465 | 916.509 | 916.553 | 916.597 | 916.641 | 8 Right girder | 916.201 | 916.245 | 916.289 | 916.333 | 916.377 | 916.421 | 916.465 | 916.509 | 916.553 | 916.597 | 916.641 |
| SPAN LOCATION | BEARING | 17/20 | 27/10 | 37/10 | 47/10 | 57/10 | 67/10 | 77/10 | 87/10 | 97/10 | 107/20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 Left girder | 913.156 | 913.199 | 913.243 | 913.287 | 913.330 | 913.374 | 913.418 | 913.461 | 913.505 | 913.548 | 913.592 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 Girder no.1 | 911.186 | 911.229 | 911.273 | 911.317 | 911.360 | 911.404 | 911.448 | 911.491 | 911.535 | 911.578 | 911.622 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 Girder no.2 | 911.586 | 911.629 | 911.673 | 911.717 | 911.760 | 911.804 | 911.848 | 911.891 | 911.935 | 911.978 | 920.022 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 Girder no.3 | 911.296 | 911.439 | 911.483 | 911.527 | 911.570 | 911.614 | 911.658 | 911.701 | 911.745 | 911.788 | 911.832 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 Girder no.4 | 911.842 | 911.886 | 911.930 | 911.974 | 912.018 | 912.061 | 912.105 | 912.149 | 912.192 | 912.236 | 912.279 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 Right girder | 911.156 | 911.199 | 911.243 | 911.287 | 911.330 | 911.374 | 911.418 | 911.461 | 911.505 | 911.548 | 911.592 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 Left girder | 911.602 | 911.646 | 911.689 | 911.733 | 911.776 | 911.820 | 911.864 | 911.907 | 911.951 | 911.994 | 920.038 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 Girder no.1 | 911.642 | 911.686 | 911.729 | 911.773 | 911.816 | 911.860 | 911.904 | 911.947 | 911.991 | 920.034 | 920.078 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 Girder no.2 | 912.012 | 912.056 | 912.100 | 912.143 | 912.187 | 912.230 | 912.274 | 912.317 | 912.361 | 912.404 | 912.448 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 Girder no.3 | 911.842 | 911.886 | 911.930 | 911.974 | 912.018 | 912.061 | 912.105 | 912.149 | 912.192 | 912.236 | 912.279 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 Right girder | 911.602 | 911.646 | 911.689 | 911.733 | 911.776 | 911.820 | 911.864 | 911.907 | 911.951 | 911.994 | 920.038 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPAN LOCATION | BEARING | 17/20 | 27/20 | 37/20 | 47/20 | 57/20 | 67/20 | 77/20 | 87/20 | 97/20 | 107/20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 Left girder | 913.927 | 913.979 | 914.031 | 914.083 | 914.135 | 914.187 | 914.239 | 914.291 | 914.343 | 914.395 | 914.447 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 Girder no.1 | 913.967 | 914.019 | 914.071 | 914.123 | 914.175 | 914.227 | 914.279 | 914.331 | 914.383 | 914.435 | 914.487 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 Girder no.2 | 914.187 | 914.239 | 914.291 | 914.343 | 914.395 | 914.447 | 914.499 | 914.551 | 914.603 | 914.655 | 914.707 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 Girder no.3 | 914.337 | 914.389 | 914.441 | 914.493 | 914.545 | 914.597 | 914.649 | 914.701 | 914.753 | 914.805 | 914.857 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 Girder no.4 | 914.187 | 914.239 | 914.291 | 914.343 | 914.395 | 914.447 | 914.499 | 914.551 | 914.603 | 914.655 | 914.707 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 Right girder | 913.927 | 913.979 | 914.031 | 914.083 | 914.135 | 914.187 | 914.239 | 914.291 | 914.343 | 914.395 | 914.447 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 Girder no.5 | 913.967 | 914.019 | 914.071 | 914.123 | 914.175 | 914.227 | 914.279 | 914.331 | 914.383 | 914.435 | 914.487 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 Girder no.6 | 914.187 | 914.239 | 914.291 | 914.343 | 914.395 | 914.447 | 914.499 | 914.551 | 914.603 | 914.655 | 914.707 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 Girder no.7 | 914.337 | 914.389 | 914.441 | 914.493 | 914.545 | 914.597 | 914.649 | 914.701 | 914.753 | 914.805 | 914.857 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 Right girder | 913.927 | 913.979 | 914.031 | 914.083 | 914.135 | 914.187 | 914.239 | 914.291 | 914.343 | 914.395 | 914.447 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 Left girder | 914.927 | 914.979 | 915.031 | 915.083 | 915.135 | 915.187 | 915.239 | 915.291 | 915.343 | 915.395 | 915.447 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 Girder no.1 | 915.007 | 915.059 | 915.111 | 915.163 | 915.215 | 915.267 | 915.319 | 915.371 | 915.423 | 915.475 | 915.527 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 Girder no.2 | 915.207 | 915.259 | 915.311 | 915.363 | 915.415 | 915.467 | 915.519 | 915.571 | 915.623 | 915.675 | 915.727 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 Girder no.3 | 915.377 | 915.429 | 915.481 | 915.533 | 915.585 | 915.637 | 915.689 | 915.741 | 915.793 | 915.845 | 915.897 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 Girder no.4 | 915.207 | 915.259 | 915.311 | 915.363 | 915.415 | 915.467 | 915.519 | 915.571 | 915.623 | 915.675 | 915.727 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 Right girder | 914.927 | 914.979 | 915.031 | 915.083 | 915.135 | 915.187 | 915.239 | 915.291 | 915.343 | 915.395 | 915.447 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 Girder no.5 | 915.007 | 915.059 | 915.111 | 915.163 | 915.215 | 915.267 | 915.319 | 915.371 | 915.423 | 915.475 | 915.527 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 Right girder | 914.927 | 914.979 | 915.031 | 915.083 | 915.135 | 915.187 | 915.239 | 915.291 | 915.343 | 915.395 | 915.447 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPAN LOCATION | BEARING | 17/10 | 27/10 | 37/10 | 47/10 | 57/10 | 67/10 | 77/10 | 87/10 | 97/10 | 107/20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 Left girder | 915.855 | 915.899 | 915.943 | 915.987 | 916.031 | 916.075 | 916.119 | 916.163 | 916.207 | 916.251 | 916.295 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 Girder no.1 | 916.055 | 916.099 | 916.143 | 916.187 | 916.231 | 916.275 | 916.319 | 916.363 | 916.407 | 916.451 | 916.495 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 Girder no.2 | 916.255 | 916.299 | 916.343 | 916.387 | 916.431 | 916.475 | 916.519 | 916.563 | 916.607 | 916.651 | 916.695 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 Girder no.3 | 916.055 | 916.099 | 916.143 | 916.187 | 916.231 | 916.275 | 916.319 | 916.363 | 916.407 | 916.451 | 916.495 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 Right girder | 915.855 | 915.899 | 915.943 | 915.987 | 916.031 | 916.075 | 916.119 | 916.163 | 916.207 | 916.251 | 916.295 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 Left girder | 916.201 | 916.245 | 916.289 | 916.333 | 916.377 | 916.421 | 916.465 | 916.509 | 916.553 | 916.597 | 916.641 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 Girder no.1 | 916.201 | 916.245 | 916.289 | 916.333 | 916.377 | 916.421 | 916.465 | 916.509 | 916.553 | 916.597 | 916.641 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 Girder no.2 | 916.501 | 916.545 | 916.589 | 916.633 | 916.677 | 916.721 | 916.765 | 916.809 | 916.853 | 916.897 | 916.941 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 Girder no.3 | 916.201 | 916.245 | 916.289 | 916.333 | 916.377 | 916.421 | 916.465 | 916.509 | 916.553 | 916.597 | 916.641 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 Right girder | 916.201 | 916.245 | 916.289 | 916.333 | 916.377 | 916.421 | 916.465 | 916.509 | 916.553 | 916.597 | 916.641 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>ALABAMA DEPARTMENT OF TRANSPORTATION BRIDGE SHEET NO. 14 OF 31 PROJECT NO. WHE-0074 (509) BRIDGE ON BELLOCATED STA. 97+43.9375 CULLMAN COUNTY INVERT, DECK FINISH GRADE & FIELD SPICE ELEVATIONS ESTIMATED QUANTITIES DRAWN BY: J. W. HARRIS CHECKED BY: J. W. HARRIS DATE: 11/11/2014</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

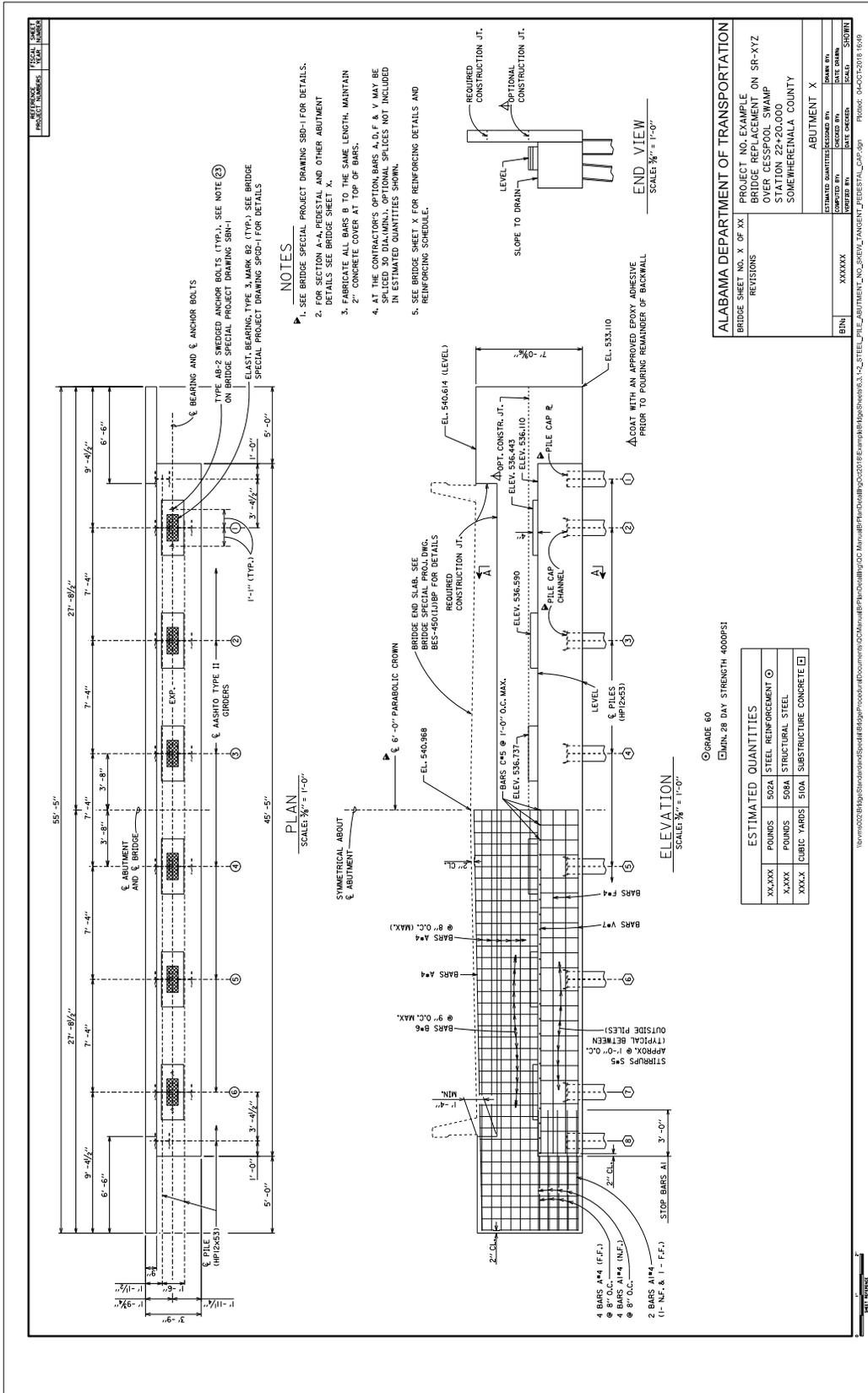
C Substructure Sheets

3.1 Abutment Details

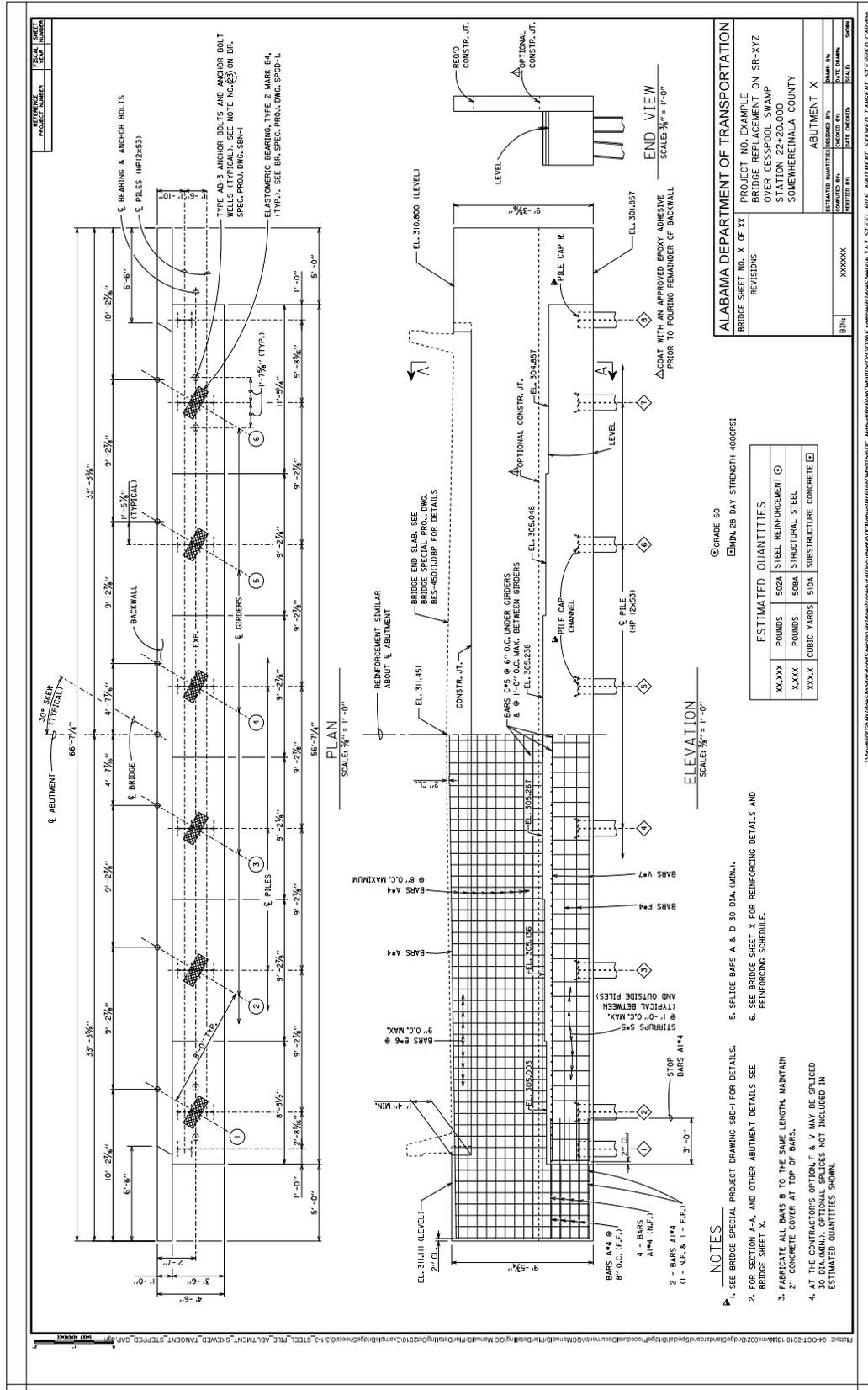
3.1.1 Steel Piles, No Skew, Tangent, Stepped Cap



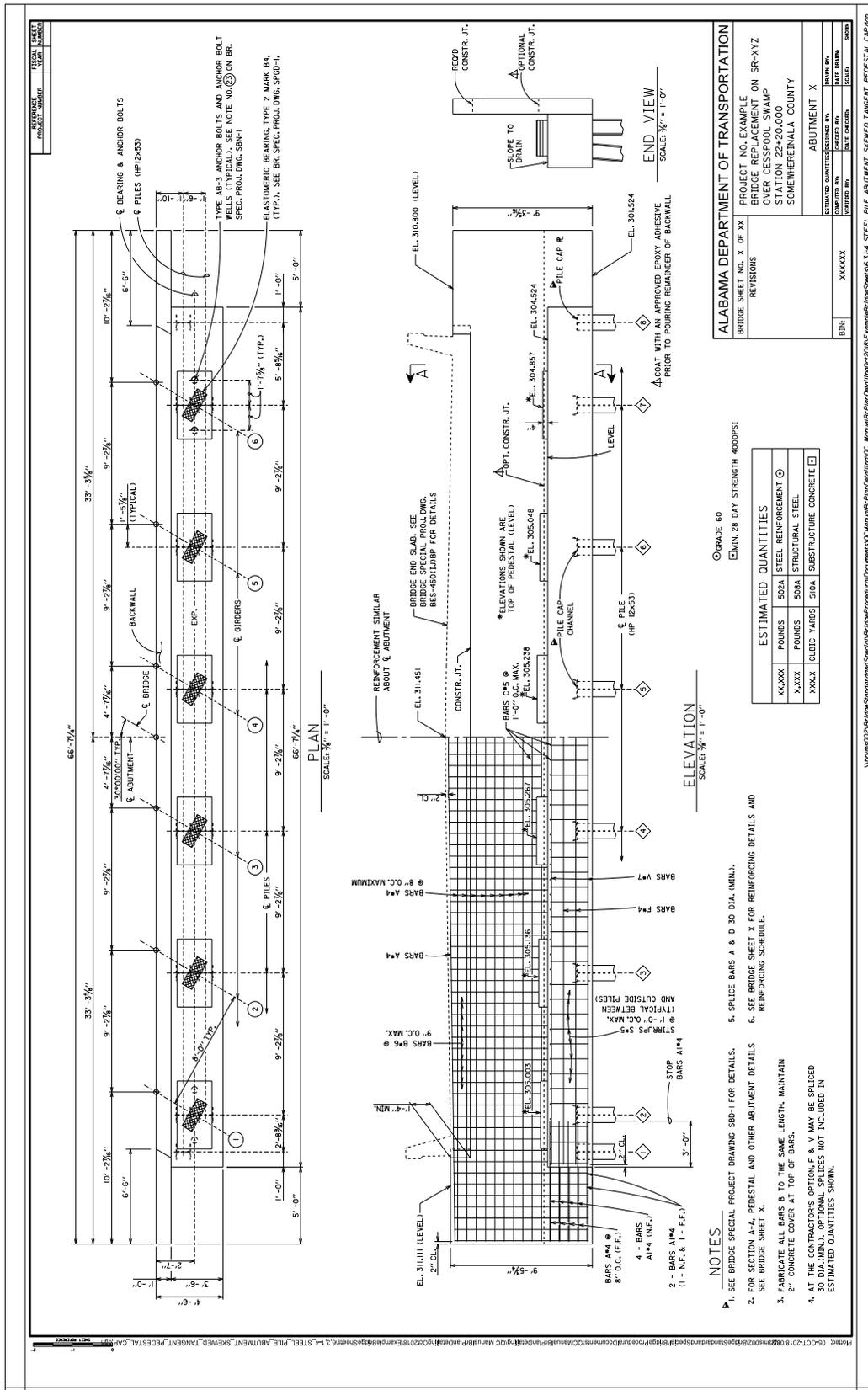
3.1.2 Steel Piles, No Skew, Tangent, Pedestal Cap



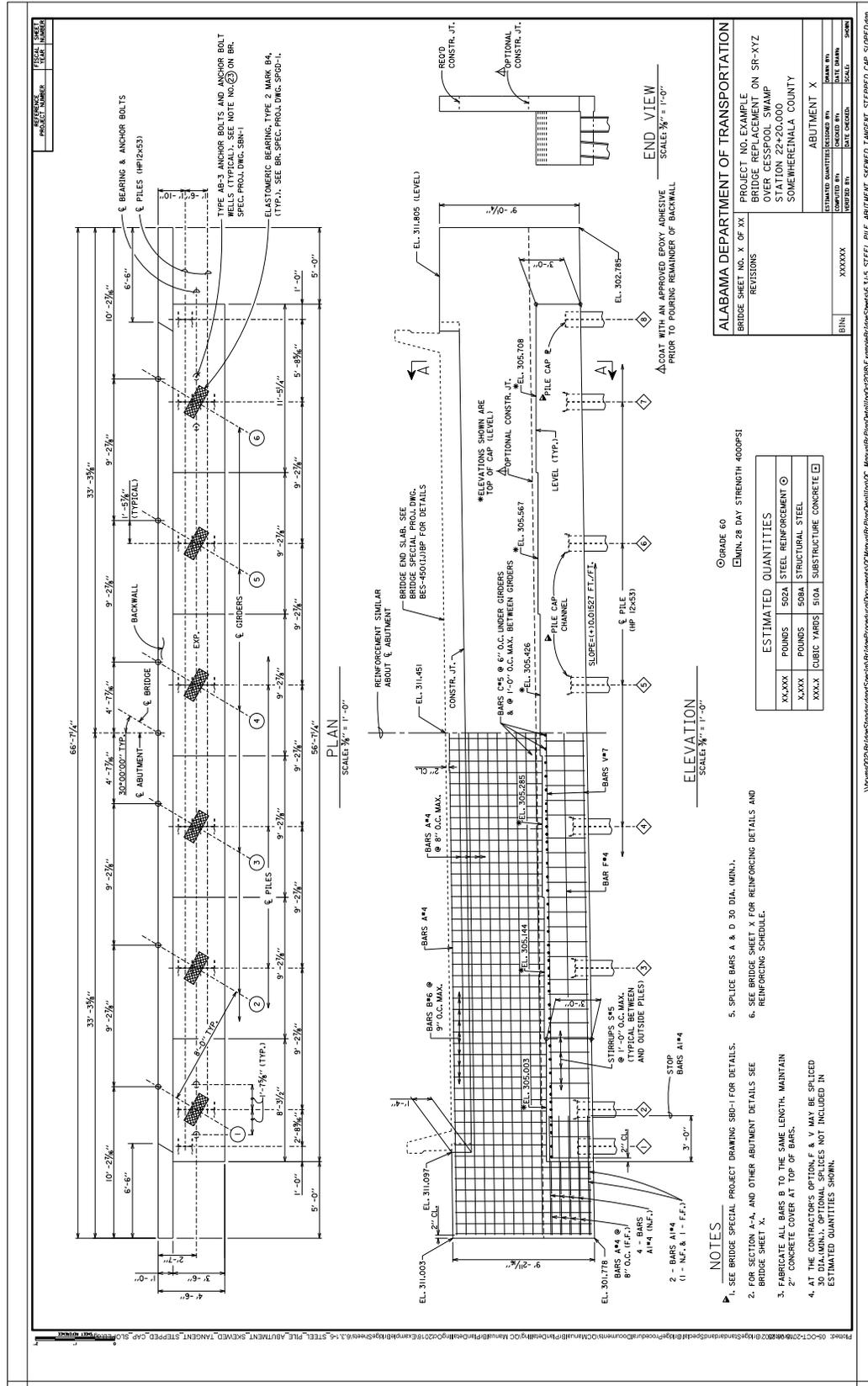
3.1.3 Steel Piles, Skewed, Tangent, Stepped Cap



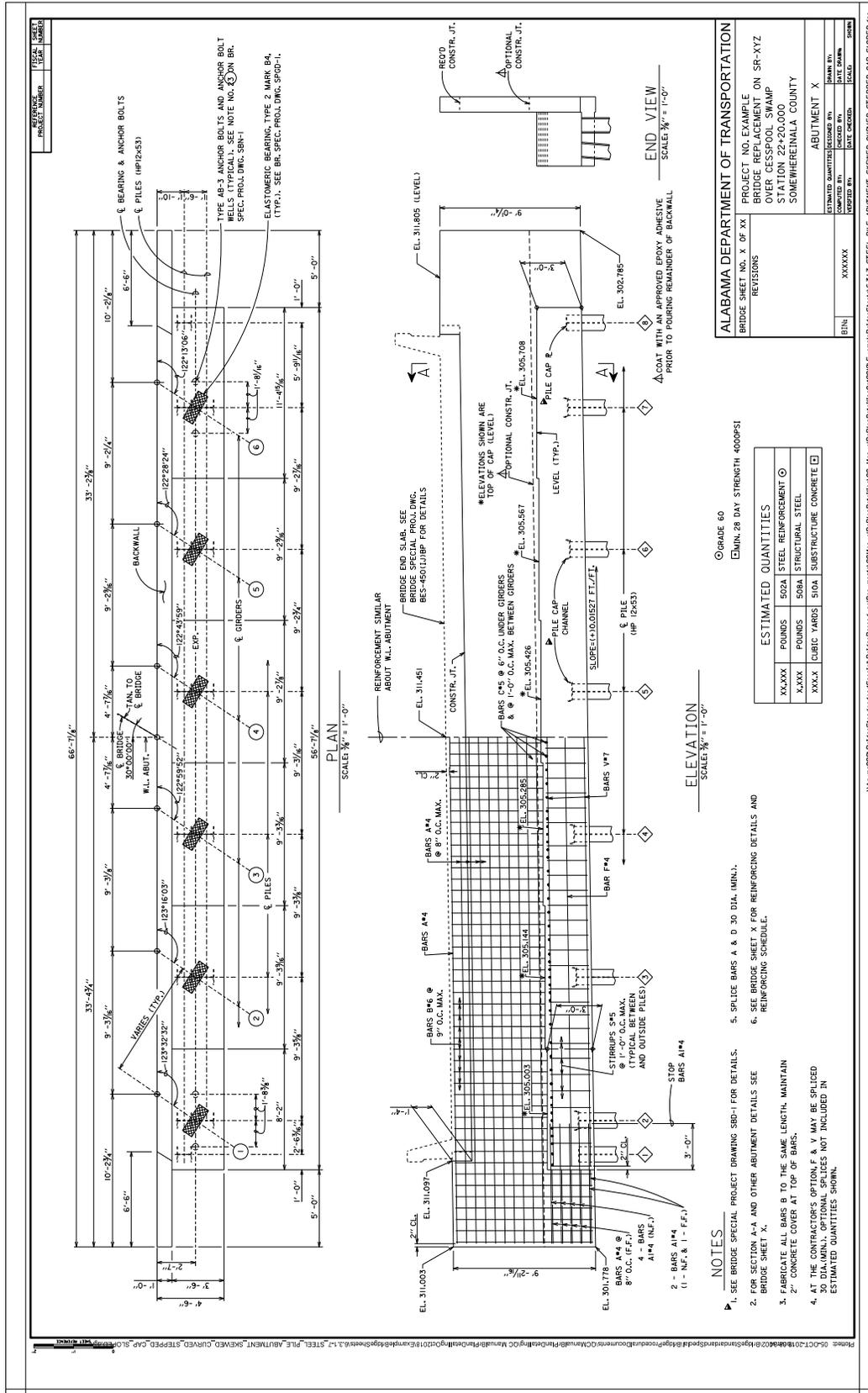
3.1.4 Steel Piles, Skewed, Tangent, Pedestal Cap



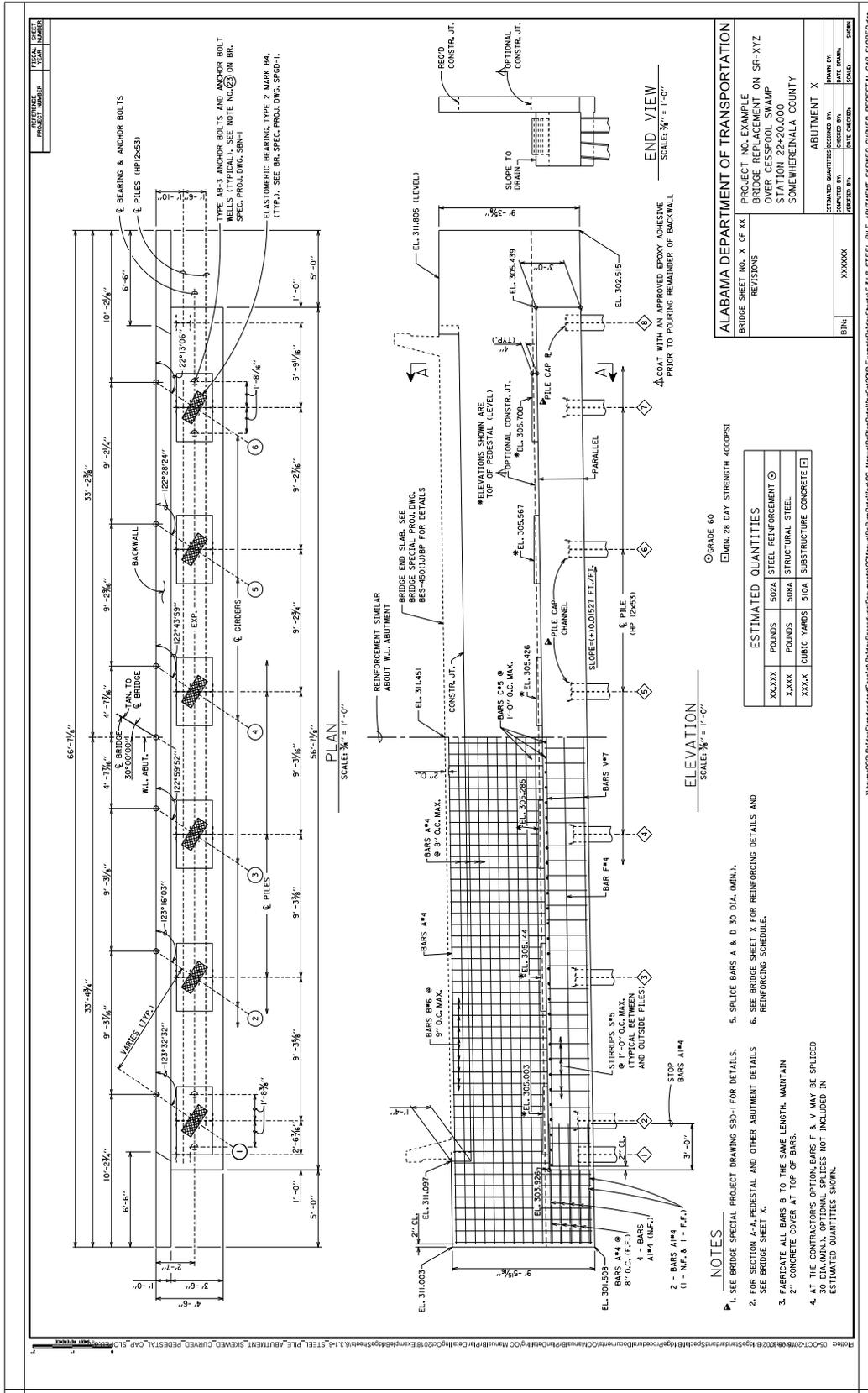
3.1.5 Steel Piles, Skewed, Tangent, Stepped Cap, Sloped



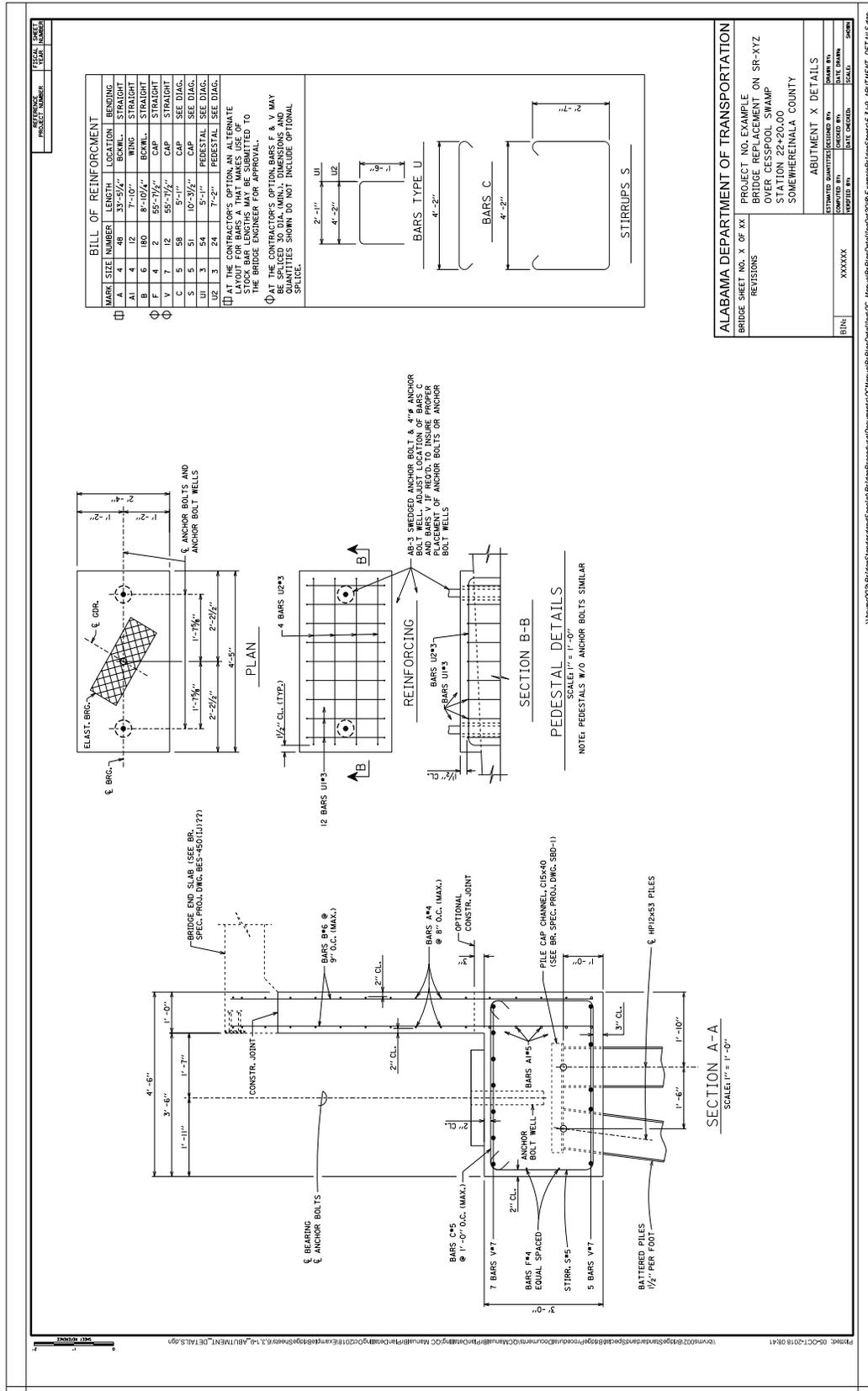
3.1.7 Steel Piles, Skewed, Curved, Stepped Cap, Sloped



3.1.8 Steel Piles, Skewed, Curved, Pedestal Cap, Sloped

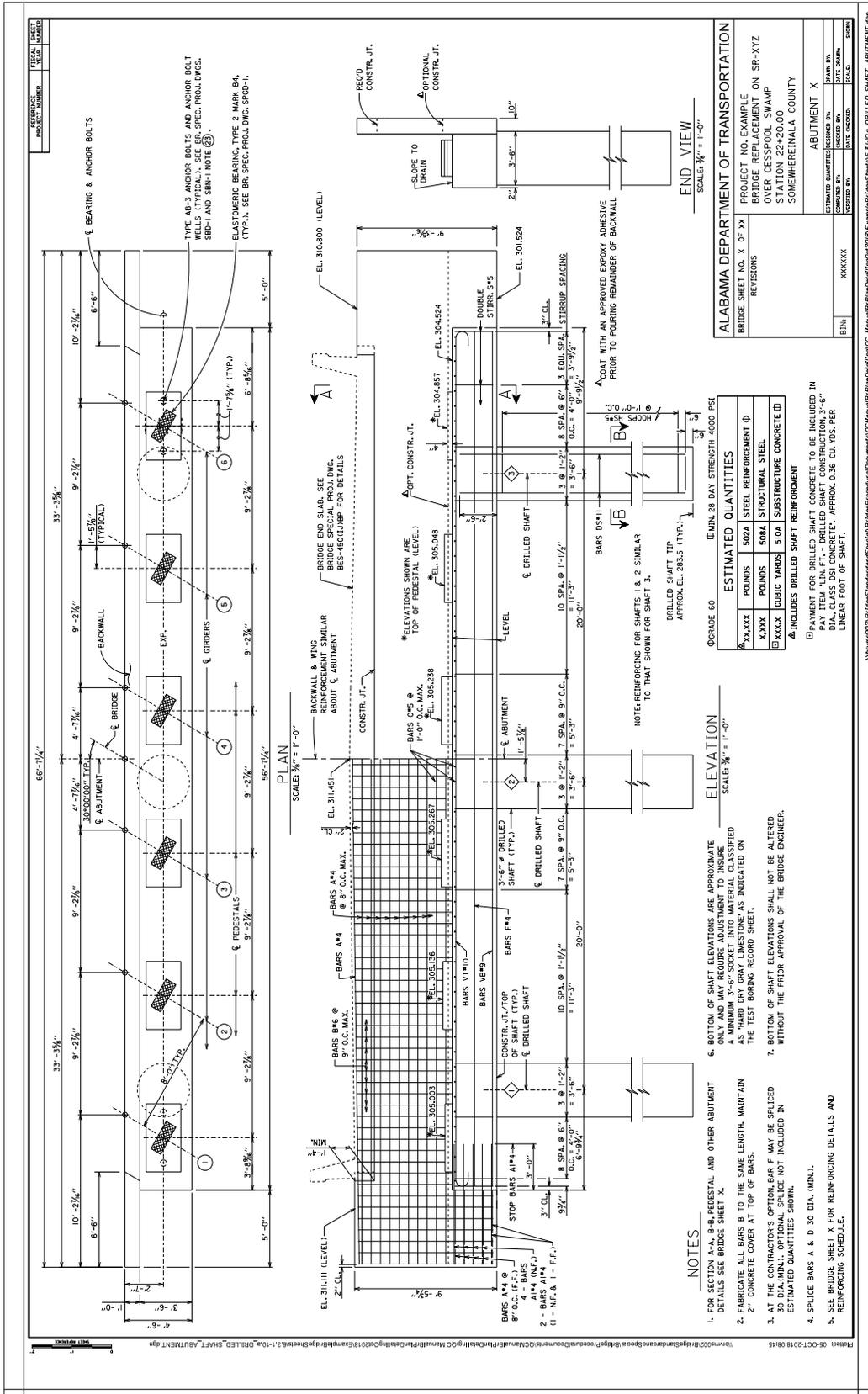


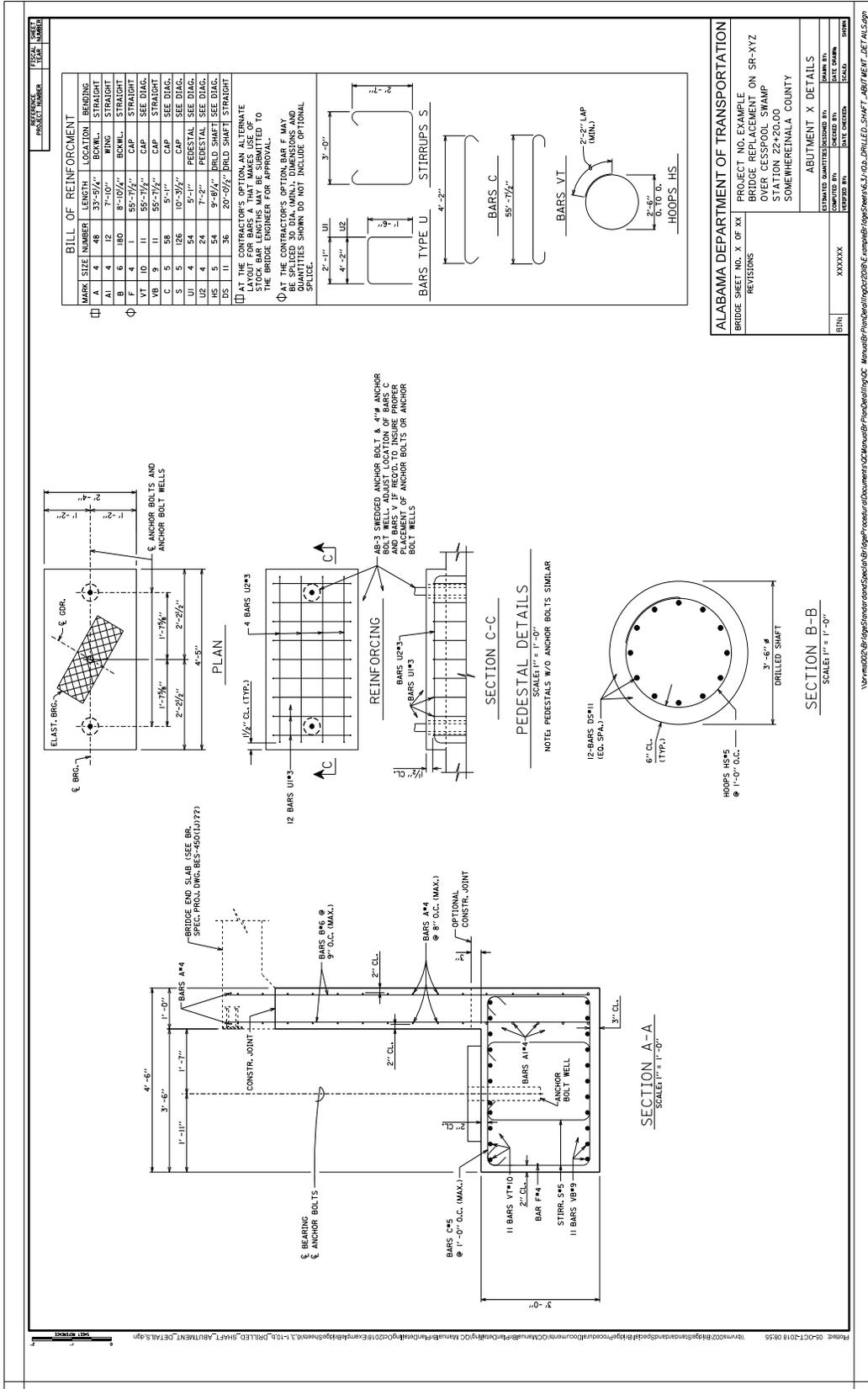
3.1.9 Abutment Details (Sections, Reinf., Etc.)



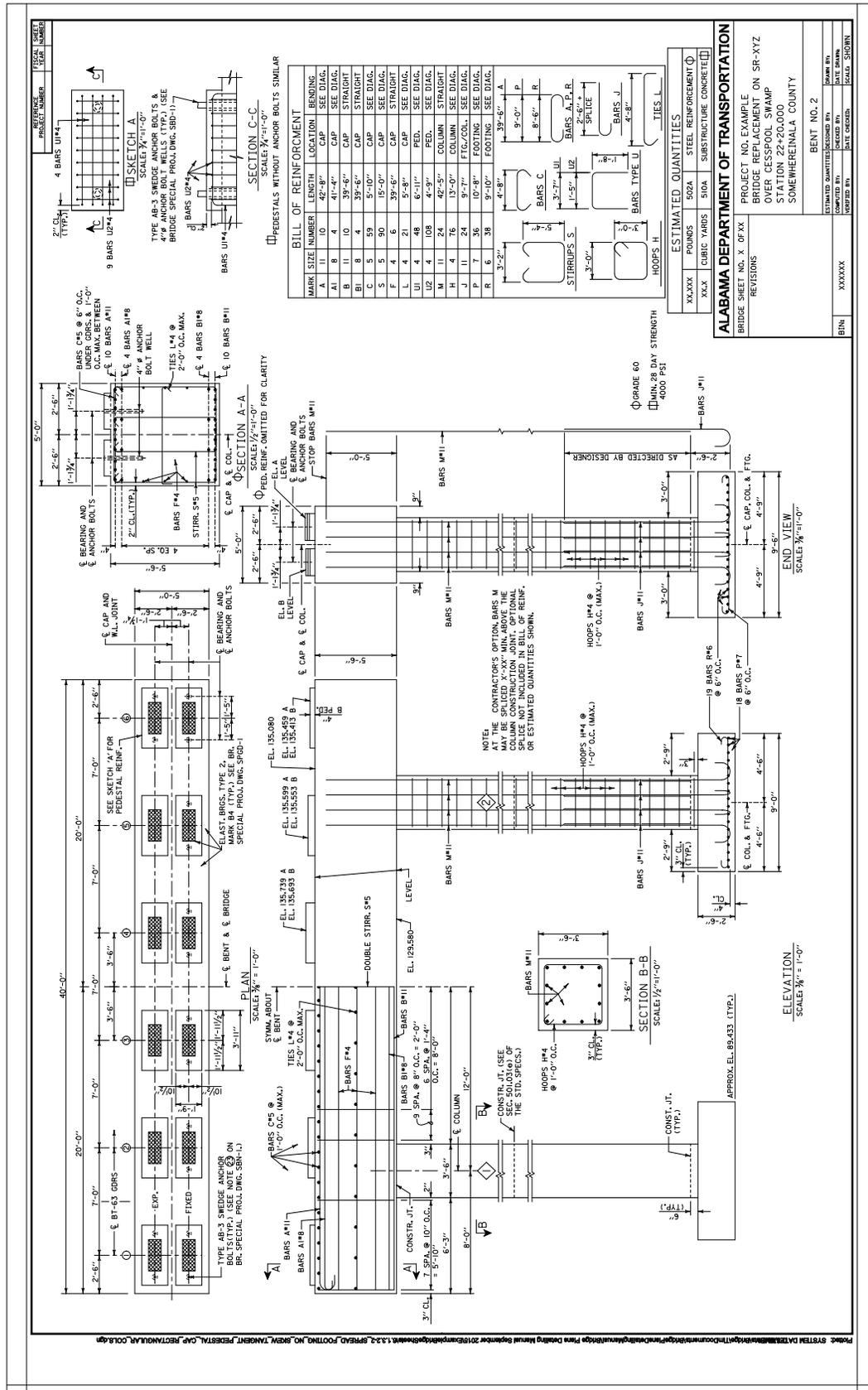
| | |
|--------------------------------------|------------------------------|
| ALABAMA DEPARTMENT OF TRANSPORTATION | |
| BRIDGE SHEET NO. X OF XX | PROJECT NO. EXAMPLE |
| REVISIONS | BRIDGE REPLACEMENT ON SR-XYZ |
| | OVER CRESSPOOL SWAMP |
| | STATION 22+20.00 |
| | SOMEWHERE IN ALA COUNTY |
| ABUTMENT X DETAILS | |
| DESIGNED BY | XXXXXXXX |
| CHECKED BY | XXXXXXXX |
| DATE | XXXXXX |
| SCALE | AS SHOWN |

3.1.10 Drilled Shaft Abutment (2 Sheets)

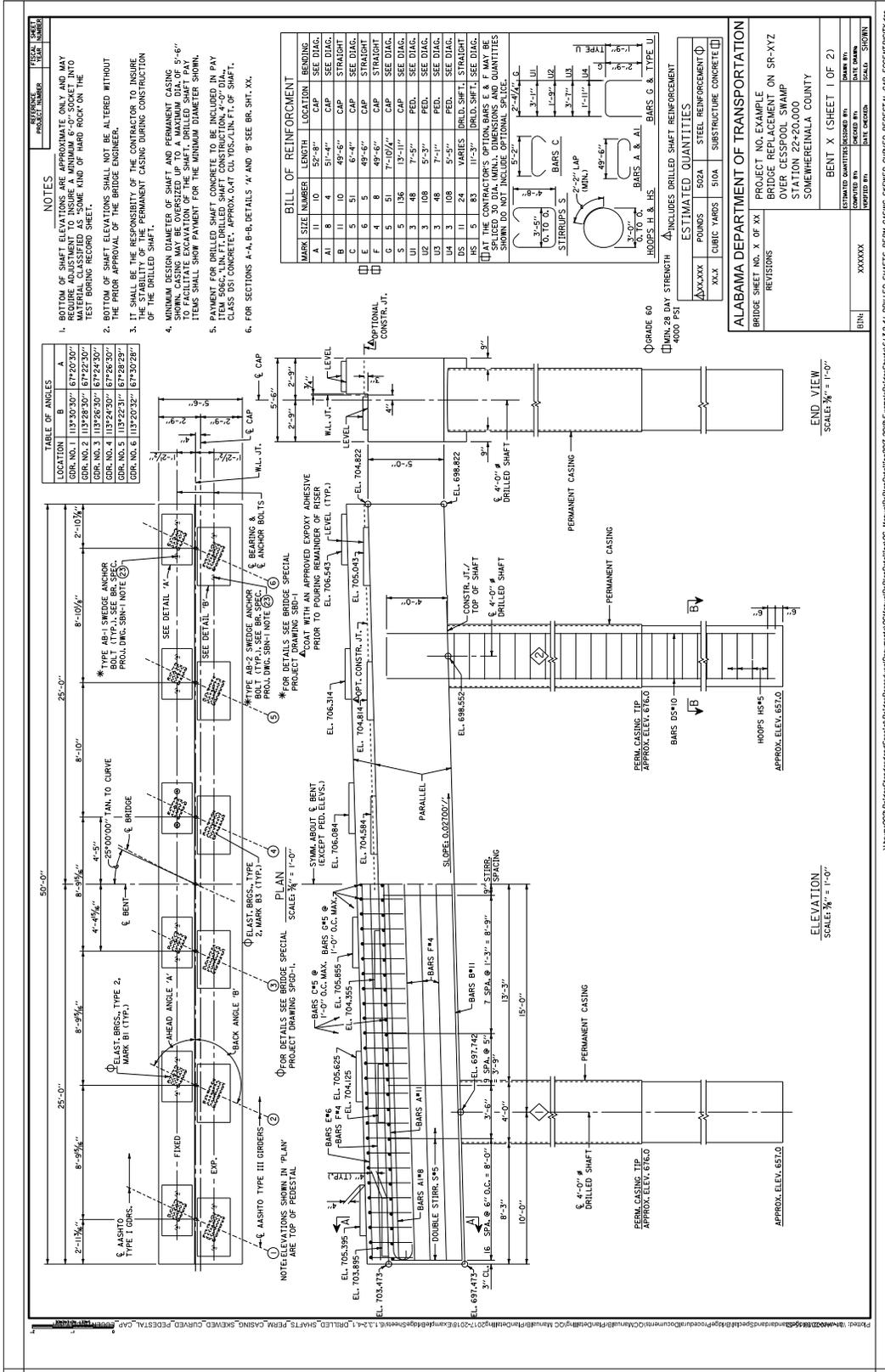




3.2.2 Spread Footings, No Skew, Tangent, Pedestal Cap, Rectangular Columns



3.2.4 Drilled Shafts, Permanent Casing, Skewed, Curved, Pedestal Cap, Sloping Cap, Sloping Cap, Cap Riser, Eccentricity (2 Sheets)



3.2.7 Hammerhead w/Two Circular Column-Drilled Shafts (2 Sheets)

