Quality Control Manual for Bridge Plan Detailing

ALDOT Bridge Bureau

March 2024

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Contents

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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.

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1.2 Approval

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

3/13/2024

William T. Colquett, PE Date
State Bridge Engineer

4/4/24

Edward N. Austin, PE Date
Chief Engineer

04/15/2024

Mark 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 refering 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:

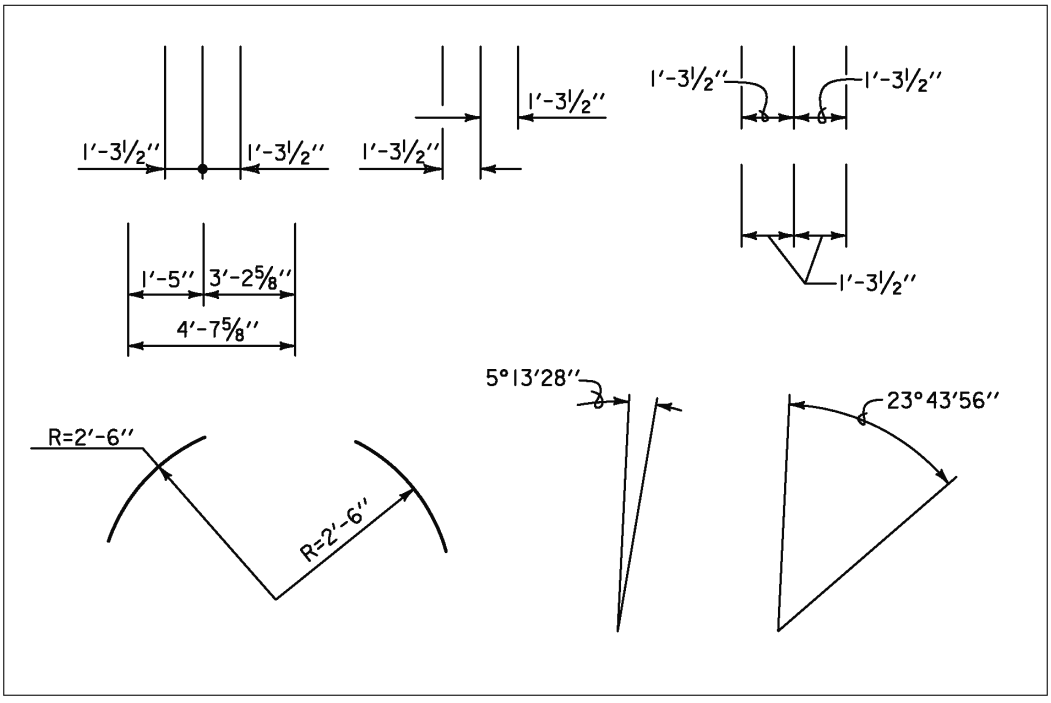
a) Spacing between dimension lines is left to the discretion of the detailer, being mindful to leave adequate space for text not to waste space nor be too narrow. Line spacing for a single line of text should be 3.5 x text height. Line spacing for a double line of text should be 5 x text height. Extension line should extend approximately 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 3/4 inch from the object and parallel dimension lines should be spaced about 3/8 inch.

b) 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.

c) 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.

d) 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.

e) 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 ½"). 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 ½", 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., 32ˆ02'47").

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

BAR CALLOUT	LOCATION	POSITION
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

BAR CALLOUT	LOCATION	POSITION
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

BAR CALLOUT	LOCATION	POSITION
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.

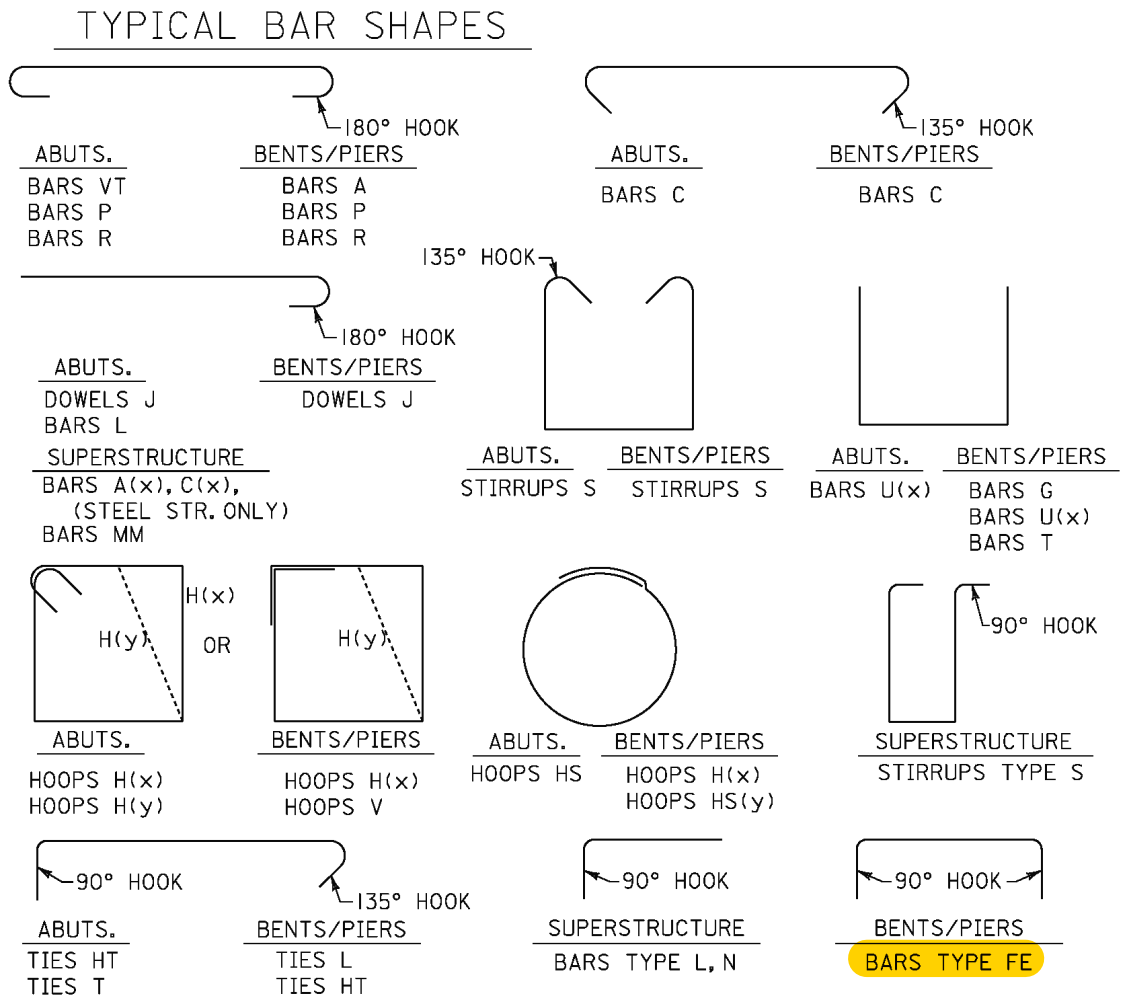
3.3.2.2 Bar Lengths

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

Bar Size	Maximum Length (feet)
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

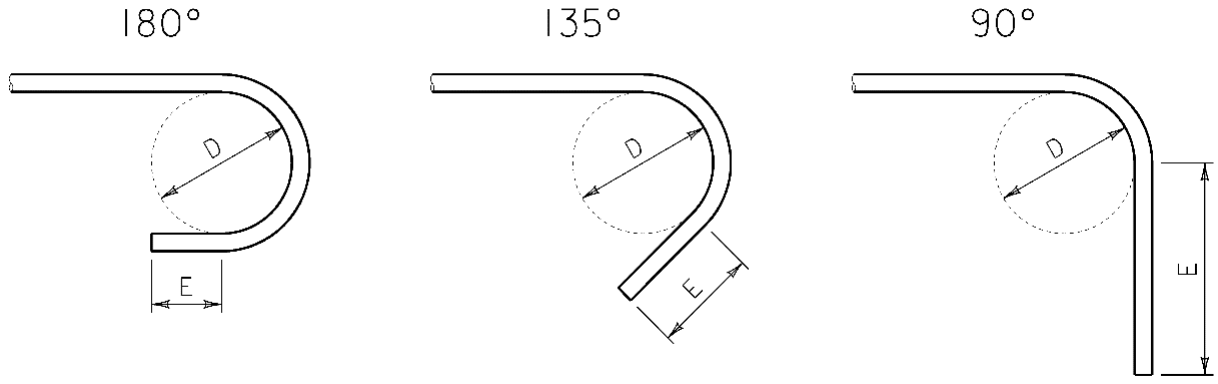
See below for guidance on detailing of standard hooks

DETAILING OF STANDARD HOOKS
(Not for Fabrication)

Main Bars			
Bar Size	D	E	
		180	90
3	2 ¼”	2½"	4½"
4	3”	2½"	6"
5	3 ¾”	2½"	7½"
6	4 ½”	3"	9"
7	5 ¼”	3½"	10½"
8	6”	4"	1’-0"
*9	9 ½”	4½"	1’-1½"
*10	10 ¾”	5¼"	1’-3¼"
*11	12”	5¾"	1’ - 5"

Stirrups & Ties			
Bar Size	D	E	
		135	90
3	1½”	2½"	2¼"
4	2”	3"	3"
5	2½”	3¾"	3¾""
6	4½”	4 ½”	9"
7	5¼”	5 ¼"	10½"
8	6”	6"	1’-0"

* Values shown are rounded to nearest ¼"



3.3.2.5 Reinforcing Properties

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

				Non-Tension Lap Splices			Additional Length per Hook			
Bar	Dia.	Area	Weight	Splice Length			Main Bars		Stirrups & Ties	
Size	in.	$in.^2$	#/ft.	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 splice and add a note stating: "SPLICE BARS (TYPE) D, & W(x) (include as appropriate) 30 DIA. (MIN.)"
Include the appropriate number of splices per line of bars in the quantities.
On spans greater than 60'-0", continuous decks and continuous spans (usually steel) where typically a pouring schedule is included showing the layout of the longitudinal reinforcement, include a note stating:
"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

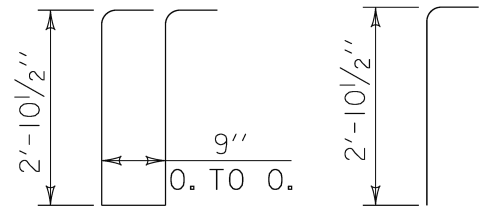
A bill of reinforcement shall be included for each component of the structure. Include the bar mark, number required, size, length, location, shape (straight or bent). All bars shall be listed in the table, bent or straight.

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 REINFORCMENT					
MARK	SIZE	NUMBER	LENGTH	LOCATION	BENDING
BL	4	16	*	RAIL	STRAIGHT
B1	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
L1	5	12	3′-4 1/2″	EDGE BEAM	SEE DIAG.
S1	5	70	7′-6″	EDGE BEAM	SEE DIAG.
R1	5	8	4′-7″	EDGE BEAM	STRAIGHT
W1	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. S1 #5 BAR L1 #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

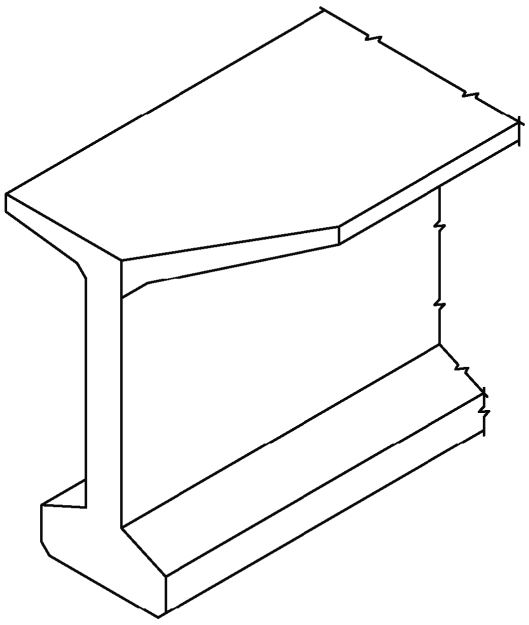
1) This section generally applies to pretensioned pre-stressed concrete girders only.

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 skews).

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

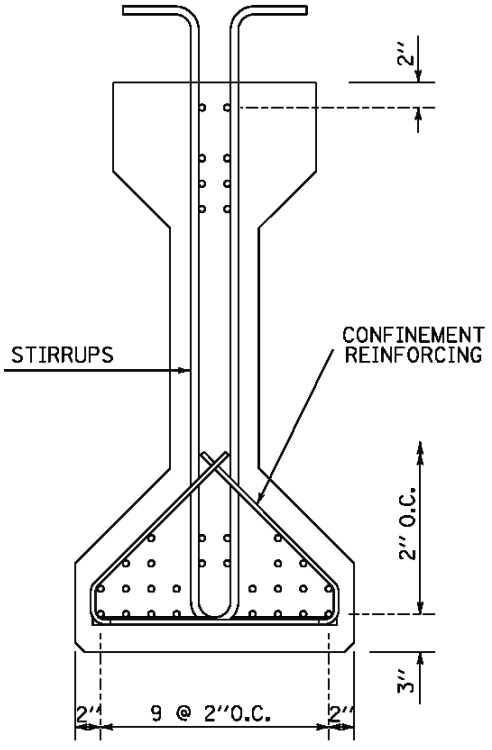
1) Detail reinforcing steel and pre-stressed strand in elevation and sections as appropriate to adequately describe the specific locations of individual bars and strands. All reinforcing steel and strands should be shown in cut sections.

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

BAR CALLOUT	LOCATION	POSITION
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 4.8.16 thru 4.8.33 for typical details. See Section 5.2 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.

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

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

Pre-Cast Bridges:

Quantity	Unit	Item Number	Description
☐	Each	507A000	Wire Rope Abutment Anchor Assembly
☐	Each	512AXXX	Precast Concrete Abutment Caps, _____
☐	Each	512BXXX	Precast Concrete Intermediate Bent Caps, _____
☐	Each	512CXXX	Precast Concrete Type 1 Span Section, _____
☐	Each	512DXXX	Precast Concrete Barrier Rail, _____
☐	Each	512EXXX	Precast Concrete Abutment Panels, _____
☐	Each	512FXXX	Precast Concrete Wing Panels, _____
☐	Each	512GXXX	Precast Concrete Abutment Wing Panels,_____

Pay Item Comments:

1. 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.

2. 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.)

3. Refer to foundation report for recommended Class of drilled shaft concrete, DS1, DS2, or DS3, as applicable.

4. Refer to foundation report to verify if test pile/static loading test are required.

5. Refer to foundation report for dynamic loading tests requirements, if any.
6. Use Figure 4.8.35 for weights and measures of commonly used items when calculating quantities.
7. 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:

- ☐ 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 reference.
- ☐ Standard Bridge Notes, Bridge Special Project Dwg. SBN- 1.
- ☐ Standard Deck Reinforcement Details, Bridge Special Project Dwg. SDR- 1.
- ☐ Standard Bridge Details, Bridge Special Project Dwg. SBD-1.
- ☐ Pre-cast Bridge Standard Drawings (as applicable)
- ☐ Bridge Barrier Rail, Bridge Special Project Dwg. BBR- 1, BBR-2 ,or BBR-M(54) as appropriate.
- ☐ Bridge Barrier Rail Extension, Bridge Special Project Dwg. BES-EXT as appropriate.
- ☐ Standard Prestressed Girder Details, Bridge Special Project Dwg. SPGD- 1.
- ☐ Edge Beam/End Wall Details, Bridge Special Project Dwg. EBEW(type) as required.
- ☐ Bridge End Slab, Bridge Special Project Dwg. BES-450(x)xx (x = IJ or OJ as appropriate, xx = BP or CP as appropriate) as required.
- ☐ Other Bridge Special Project Drawings as required. (i.e., prestressed concrete pile details PSCP-1, industrial fence details IFS-____, traffic protection details TP-1, steel bearings, I-100, etc.).
- ☐ Plans of existing bridge to be removed (if applicable) Bridge Sheet E1 to E(n) as available. 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 4.8.39 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

- ☐ Include the following: NOTE: THE SUPERSTRUCTURE AND SUBSTRUCTURE DESIGNS ON THIS BRIDGE HAVE BEEN PREPARED USING LRFD METHODS. THE GEOTECHNICAL DESIGN ON THIS BRIDGE HAS BEEN PREPARED USING ASD/LRFD 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: NOTE: ALL CONCRETE 28 DAY STRENGTH 4000PSI UNLESS NOTED OTHERWISE. ALL STEEL REINFORCEMENT GRADE 60 UNLESS NOTED OTHERWISE.
- ☐ For pay items 508A and 508B, add note indicating grade of steel if different than the Standard Specifications (i.e., “GRADE 50”).
- ☐ 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)

REGISRATION NO. _____

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

REGISRATION 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 Reqd. 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 4.8.39. 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.
- ☐ 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 4.8.34.

☐ 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 if applicable.

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 (Sq. Feet) (corrected for skew if applicable).
- ☐ 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(s) that address removal and replacement (if required) of such material and method of payment (similar to preceding note).

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.
- ☐ Verify that this information has been shown correctly on the bridge drawings and that grade data used in calculating bridge geometrics agrees with roadway grade data.

- ☐ 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 (as applicable)

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.

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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.
- ☐ 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.

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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-450(x)x
- ☐ 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-1as 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.

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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 BES-450(XX)XX.

☐ 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). Omit if this information has been provided in general plan or other supplemental plan view(s) such as with transition diagram.

☐ 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 transverse reinforcement (Bars A & C or Bars C). For the usual 7" deck, this dimension will be 2 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. 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 4.8.33.
- ☐ Show reinforcing details and include bill of reinforcement.

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. 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 and provide a note to reference Bridge Special Project Dwg. SPGD-1 for embedded sole plate details.
- ☐ 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 4.8.2 thru 4.8.6):

- ☐ Show Typical Girder Section with dimensions.
- ☐ Show section at end of girder with strand pattern and sheathing if any.
- ☐ Show section at end of girder with reinforcement and holes/inserts.
- ☐ Do NOT show clearances to reinforcement.
- ☐ Show section at midpoint of girder with strand pattern.
- ☐ Show section at midpoint of girder with 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.

Note: Strand pattern and reinforcement sections may be combined into a single drawing if desired. It should be noted that more sections may be required dependent on the number of different stirrups used in the girder.

3. MISCELLANEOUS:

☐ Include detail of haunch over top of girder based on designer provided data. See Figure 4.8.1.

☐ 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.*

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 transverse reinforcement (Bars A & C or Bars C). For the usual 7” deck, this dimension will be 2 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 4.8.33):

- ☐ 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 table of finish grade elevations if not previously provided on General Plan Sheet.
- ☐ 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 4.8.37 & 4.8.38.

4.2.2.2 Framing Plan Details

1. FRAMING PLAN (See Figures 4.8.25 thru 4.8.27):

- ☐ 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 = ___’) for each girder if curved.

2. GIRDER ELEVATION (see Figure 4.8.28):

- ☐ 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.
- ☐ GIRDER WEBS SHALL BE PLUMB IN THE FINAL POSITION.
- ☐ 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.

☐ STRUCTURAL STEEL UNIT IS DESIGNED FOR _____ FIT. (Designer to provide fit condition).

☐ 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 ¼ 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 4.8.16 thru 4.8.20):

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 4.8.21 thru 4.8.24):

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).

☐ Show 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 4.8.21 and 4.8.22.*

6. FIELD SPLICE DETAILS (See Figure 4.8.29):

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 4.8.30):

☐ 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 4.8.31):

☐ 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 4.8.32):

☐ 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 4.8.23):

☐ 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

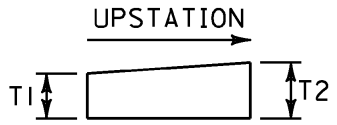
4.2.3.1 Elastomeric Bearings (Steel or Conc. Gdrs.)

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.

- ☐ Check slope of girder to verify type bearing specified. If slope is 1.00 percent or less, Type 2 bearings may be used. If slope is greater than 1.00 percent, a bearing type with beveled bearing plates should be specified. For example, Type 4 or 5 elastomeric bearings for prestressed concrete girders.
- ☐ When beveled bearing plates are required, calculate required thicknesses and tabulate. 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



Typical Bearing Plate Thickness Table

When special bearing design is required:

- ☐ 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.
- ☐ Indicate that bearing plate and sole plate in prestressed girder have been shown to be galvanized per specifications (Type 4 or Type 5).
- ☐ Check that holes in bearing plates or connection angles will work with required anchor bolt holes and slots.

When Bridge Special Project Drawing SPGD-1 is not required include the following notes as appropriate:

- ☐ 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.)
- ☐ 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.
- ☐ THE CONTRACTOR SHALL REMOVE ANY RUST THAT APPEARS IN THE FIELD WELD AREAS OF THE BEARING PLATE AND SOLE PLATE BY WIRE BRUSHING JUST PRIOR TO FIELD WELDING THESE PLATES. ALL DECK POURS SHALL BE COMPLETED PRIOR TO WELDING BEARING PLATE TO SOLE PLATE. SEE SECTIONS 511 AND 837 OF THE STANDARD SPECIFICATIONS FOR BEARING PLATE PREPARATION REQUIREMENTS.

NOTE: When possible, bearing details may be combined with details on the span detail 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 4.8.23).
- ☐ 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 an approved elastomeric sealant.
- ☐ 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 ¼" 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 ¼" continuous angles attached to vertical surface of tooth joint to mount neoprene trough and locate these angles 1 ¼ " minimum relative to the bottom face of the tooth plate.
- ☐ Show connection of trough to tooth joint using ½" 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 ½” 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 ½” 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 ½” on center and cut with a 1” radius. The tooth joint is cut from a single plate using a ¼” 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.

- ☐ 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).

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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 4.8.7 or 4.8.8):

- ☐ 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 4.8.11.
- ☐ 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.
- ☐ See Figure 4.8.13 for pedestal layout guidance. See Figure 4.8.14 for pedestal reinforcing guidance. See Figure 4.8.15 for skidblock layout guidance.

2. ELEVATION – PILES AND DRILLED SHAFTS (See Figure 4.8.9):

- ☐ 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 2.9.3.
- ☐ 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 4.8.14.
- ☐ 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 4.8.10.

- ☐ 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 4.8.13).
- ☐ 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.
- ☐ When the backwall extends up to finished grade include the following note: “TOP OF BACKWALL SHALL MATCH BRIDGE GRADE AND CROSS SLOPE.”

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).
- ☐ 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 4.8.12):

- ☐ 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. SHEET NOTES:

- ☐ FOR PILE CAP PLATE, PILE CAP CHANNEL AND PILE SPLICE DETAILS, SEE BRIDGE SPECIAL PROJECT DWG. SBD-1.
- ☐ MAINTAIN 2” CONCRETE COVER AT TOP OF BARS B.
- ☐ Provide note/location for splicing bars if needed. Refer to Section 3.3.2.6 of this document for splicing requirements.
- ☐ 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 ½" 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 4.???

☐ 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 4.8.10.

☐ 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:

- ☐ FOR PILE CAP PLATE, PILE CAP CHANNEL AND PILE SPLICE DETAILS, SEE BRIDGE SPECIAL PROJECT DWG. SBD-1.
- ☐ Provide note/location for splicing bars if needed. Refer to Section 3.3.2.4 of this document for splicing requirements.
- ☐ ADJUST BARS C AND TYPE V TO ENSURE CORRECT LOCATION OF SWEDGED DOWELS.

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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 4.8.13 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 abutment 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 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 4.8.34 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 4.8.14.
- ☐ 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 4.8.13).
- ☐ 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 4.8.40.
- ☐ 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 4.8.15.
- ☐ 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 4.8.33.

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. NOTES:

- ☐ Provide note/location for splicing bars. See Section 3.3.2.6.2.
- ☐ 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.
- ☐ When piles are required add a note referencing Bridge Special Project Dwg. SBD-1 for pile splice details.

9. 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.

10. SPLICING REQUIREMENTS FOR REINFORCEMENT:

- ☐ For all reinforcement in cap, column and drilled shaft, verify that correct splicing has been provided (see Section 3.3.2.6 of this document for maximum length of bar that should be specified without splicing being considered).

11. 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.

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.

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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.
- ☐ 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 always 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): Should always be included with bridge plans utilizing prestressed concrete girders typically used by ALDOT.
- ☐ EBEW(x) (Uniform Details for Edge Beams and End Walls) Applicable only for prestressed concrete girder bridges typically used by ALDOT.
- ☐ BES-450(x)xx (Reinforced Concrete Bridge End Slab with Barrier Rail Transition)
- ☐ 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(54) (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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4.7 Miscellaneous Comments

- ☐ Verify that foundation details (bottom of footing, bottom of shaft, pile tip elevations, etc.) agree with recommendations provided in the designer sketches.
- ☐ A pay item for Crosshole Sonic Logging should be provided for each diameter drilled shaft on the project. Quantities should be provided for the total number of shafts of each diameter.
- ☐ Verify that quantity for test pile(s) has been removed from estimated pile quantity in the Estimated Bridge Quantities total.
- ☐ Verify that pile size and design load shown on plans agree with designer sketches and/or standard drawings.
- ☐ Verify that drilled shaft excavation quantities (soil and rock excavation) have been calculated using hub elevations and rock line elevations (if applicable) based on the boring logs provided on the test boring record. The exception to this would be when bridge piers are to be constructed in roadway cut section and hub elevations represent ground elevation prior to roadway cut.
- ☐ Verify that area of unclassified excavation falling within the limits of the proposed bridge has been clearly indicated and noted for payment as a roadway item. (An example would be removal of old roadbed material adjacent to the proposed abutment, roadway cut, etc.).
- ☐ When mechanically stabilized earth wall abutments are required, verify the requirement for a pile/soil slip layer treatment so that pile down drag will be minimized and add a note reading ‘’PAYMENT FOR SOIL SLIP LAYER IS INCLUDED IN PAY ITEM ____”.

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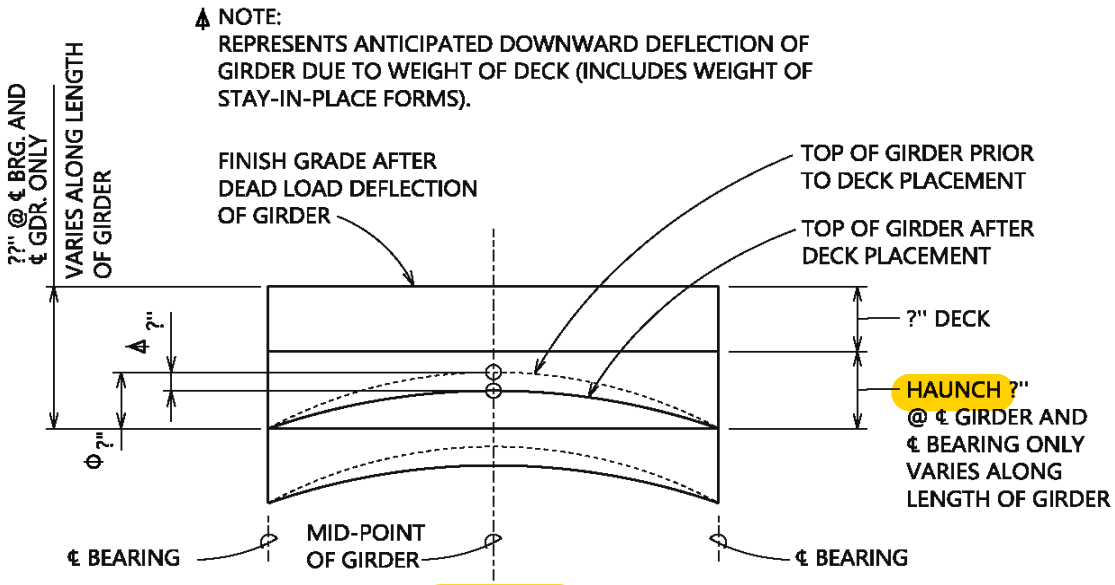
4.8 Figures

4.8.1 Detail of Haunch Over Top of Prestressed Girder

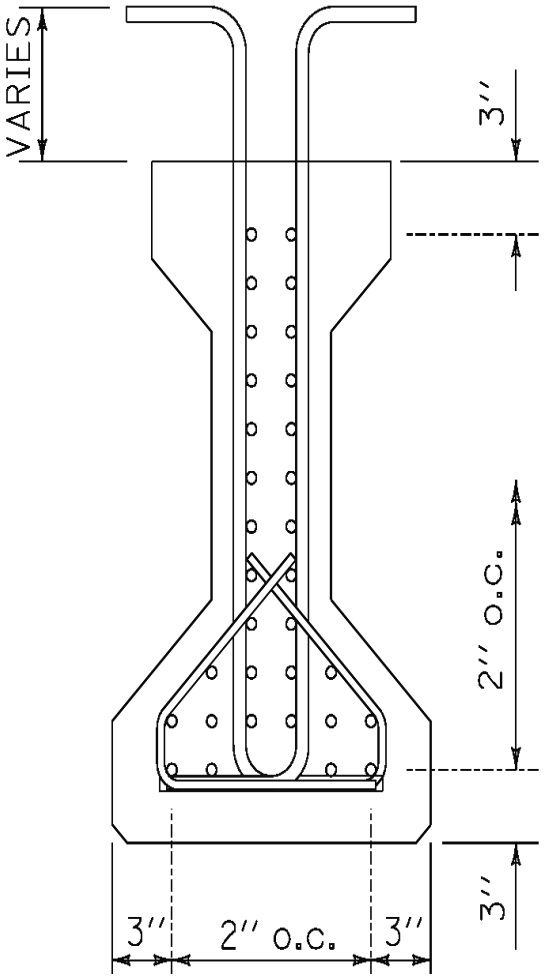


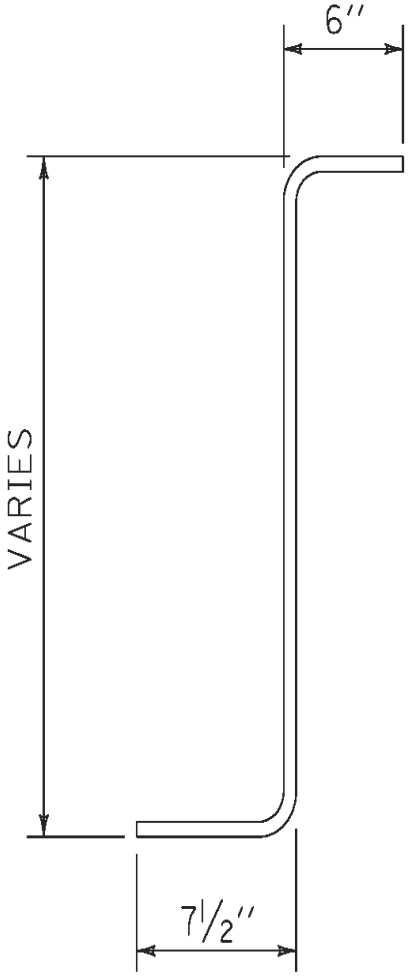
DETAIL OF HAUNCH BETWEEN BOTTOM OF DECK AND TOP OF GIRDER (ALONG ℄ GIRDER)

NOT TO SCALE

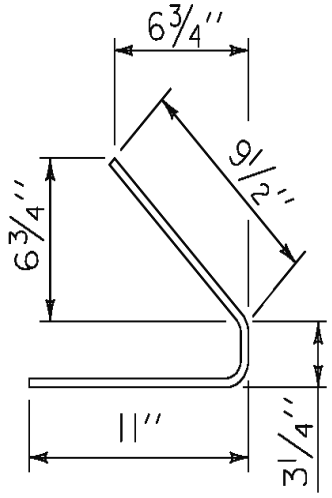
NOTE:
REPRESENTS THE EXPECTED CAMBER (UPWARD DEFLECTION DUE TO PRESTRESS) USED FOR STATE DESIGN PURPOSES AND IS SHOWN HERE FOR INFORMATION ONLY. AFTER ERECTING GIRDERS AND PRIOR TO ORDERING MATERIAL AND SETTING FORMS, THE CONTRACTOR SHALL PROFILE GIRDERS TO DETERMINE THE IN-PLACE CAMBER. THE MEASURED CAMBER ORDINATES OBTAINED FROM PROFILING THE GIRDERS SHALL BE USED IN CALCULATIONS TO PROPERLY SET FORMS.

4.8.2 AASHTO Girder Type I Strand Pattern and Typical Reinforcement



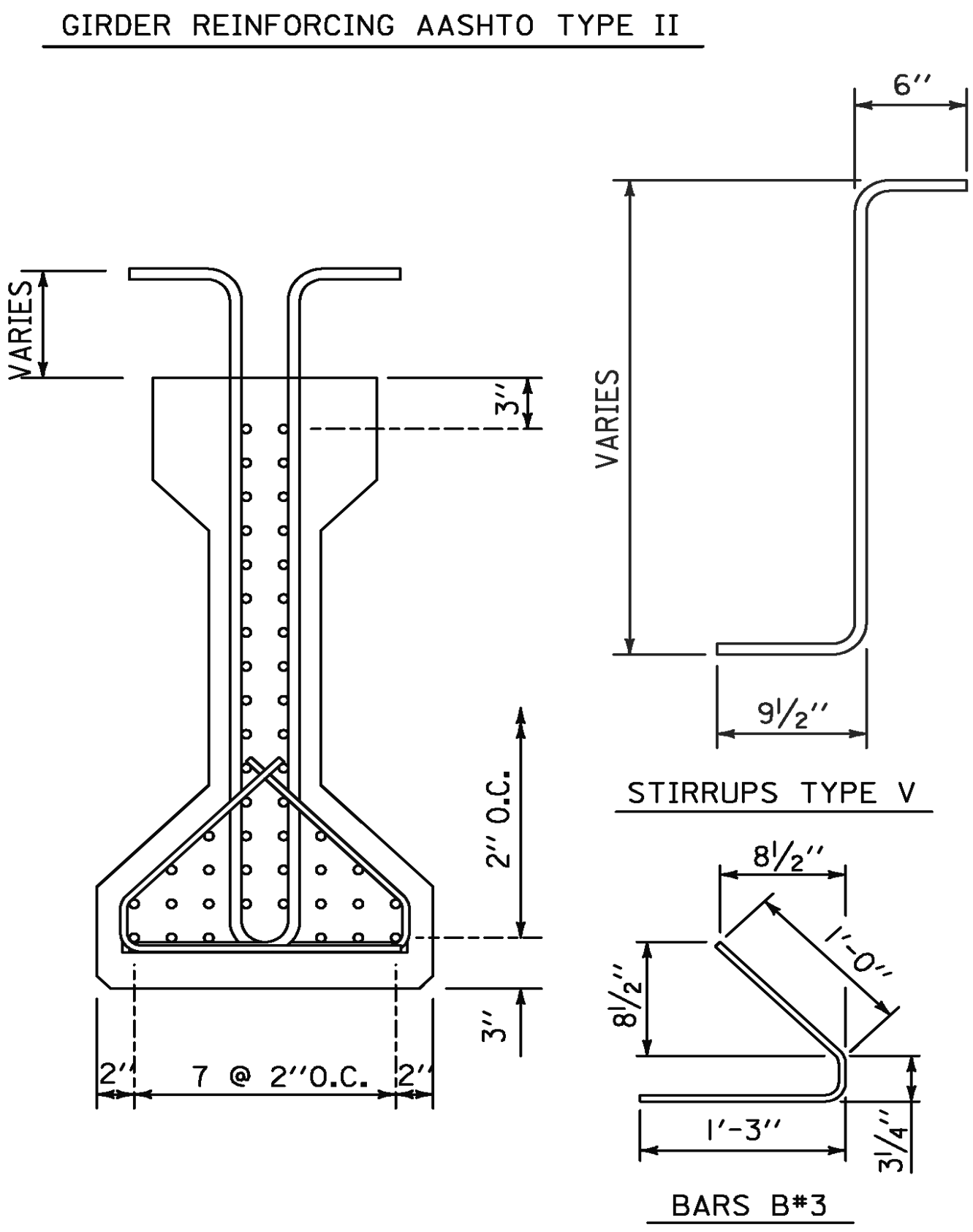


STIRRUPS TYPE V

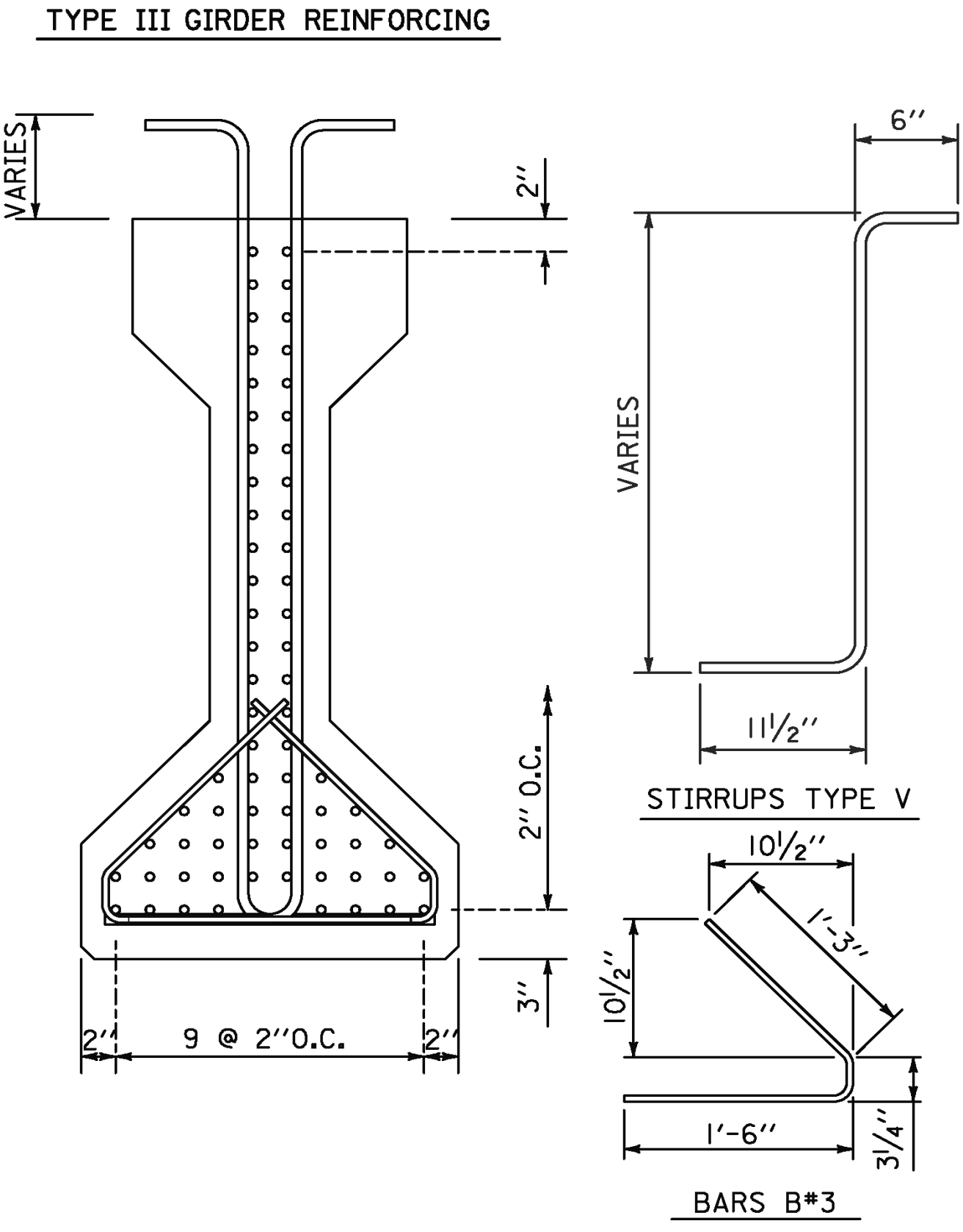


BARS B#3

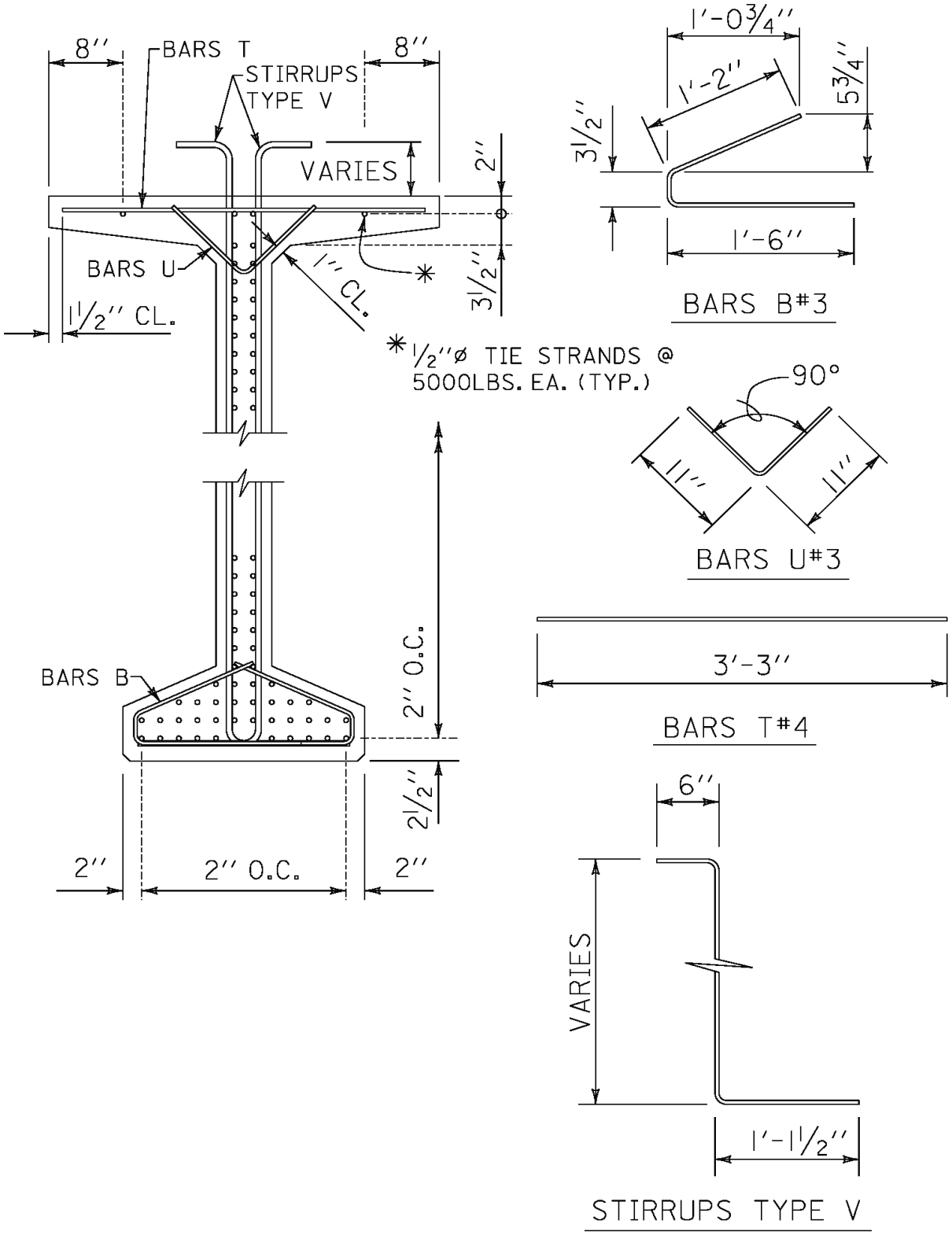
4.8.3 AASHTO Girder Type II Strand Pattern and Typical Reinforcement



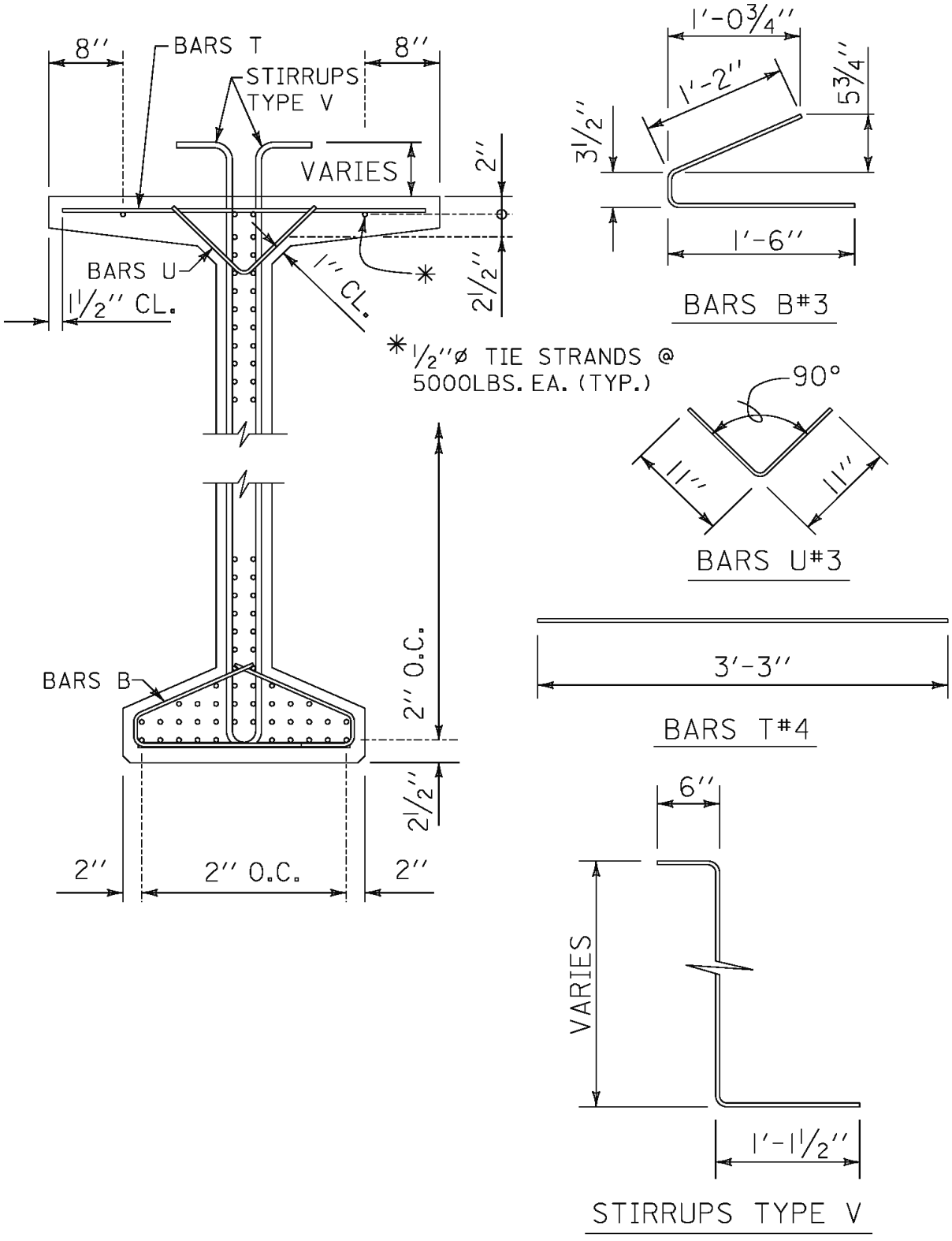
4.8.4 AASHTO Girder Type III Strand Pattern and Typical Reinforcement



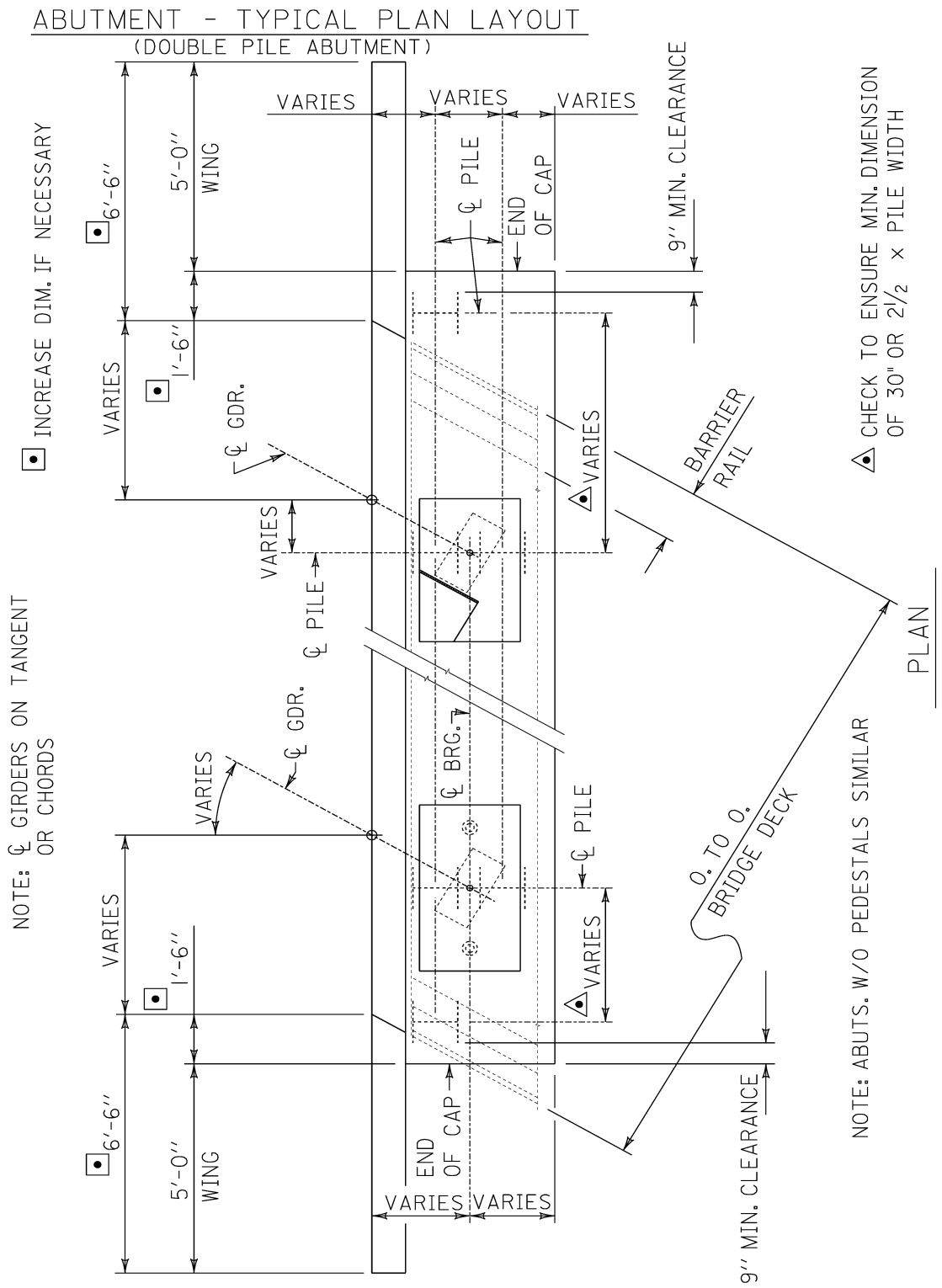
4.8.5 Girder Type BT54 or BT72 Strand Pattern and Typical Reinforcment



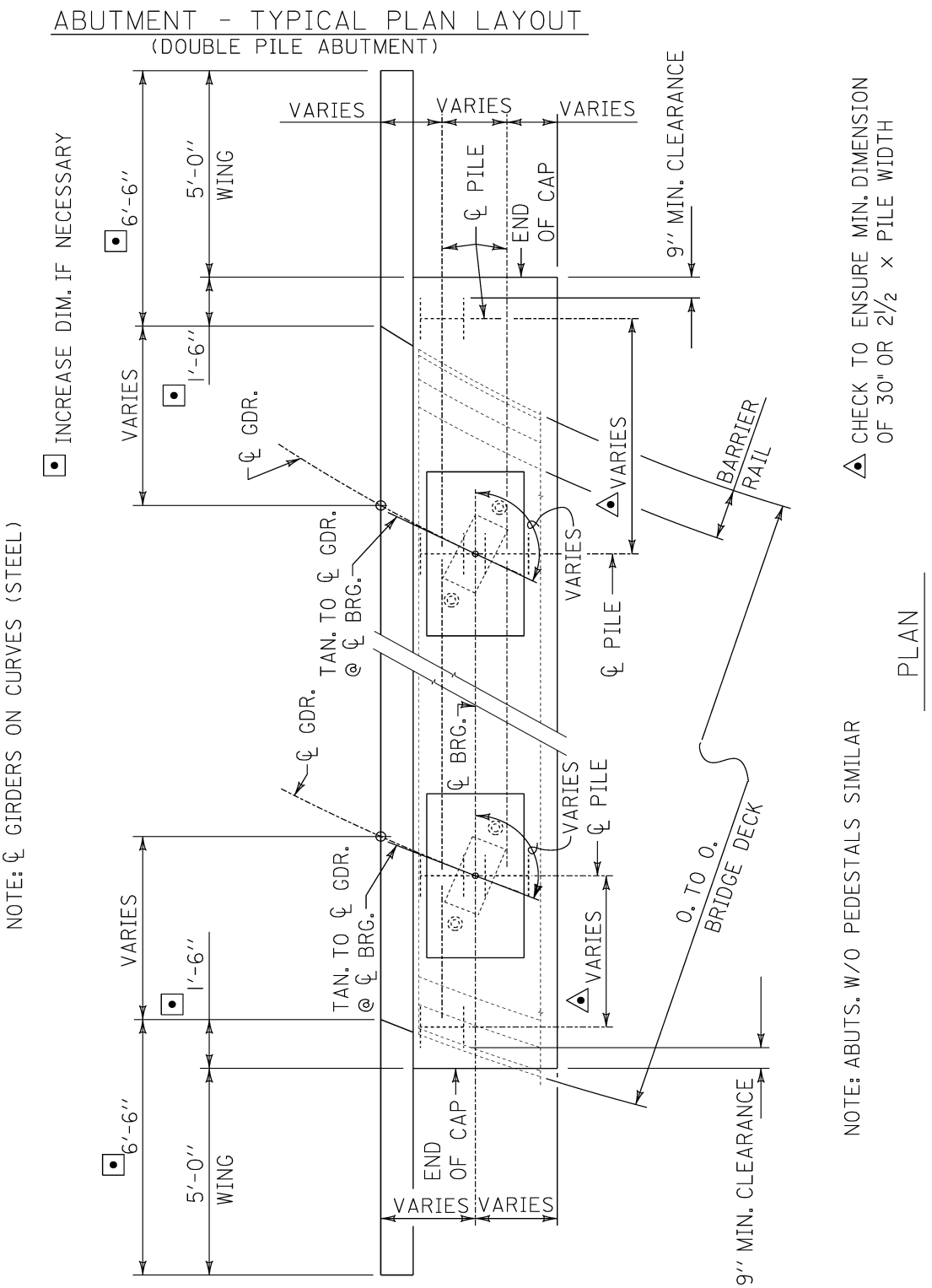
4.8.6 Girder Type BT63 Strand Pattern and Typical Reinforcement



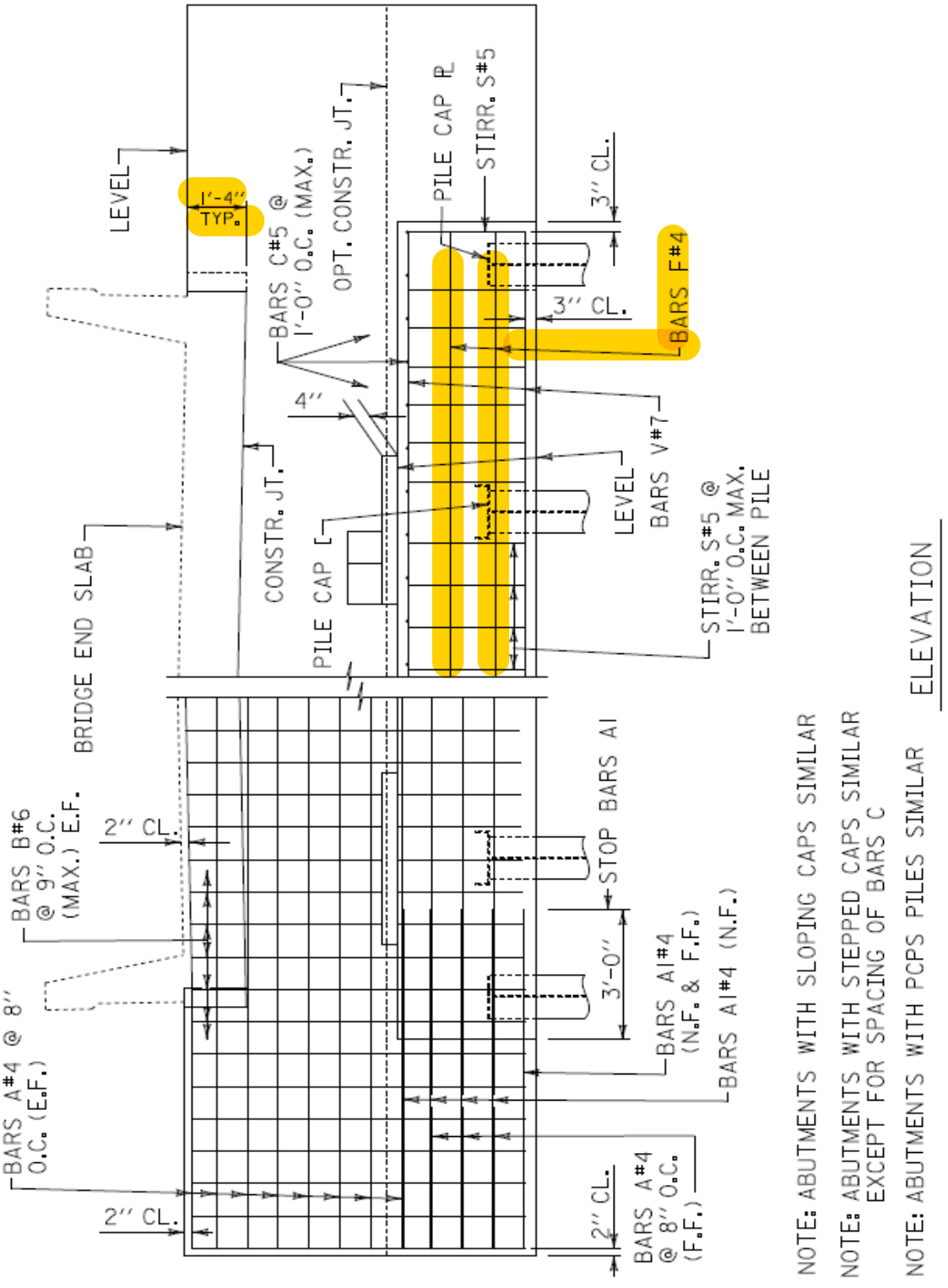
4.8.7 Abutment Plan Typical Layout - Girders Tangent or on Chords



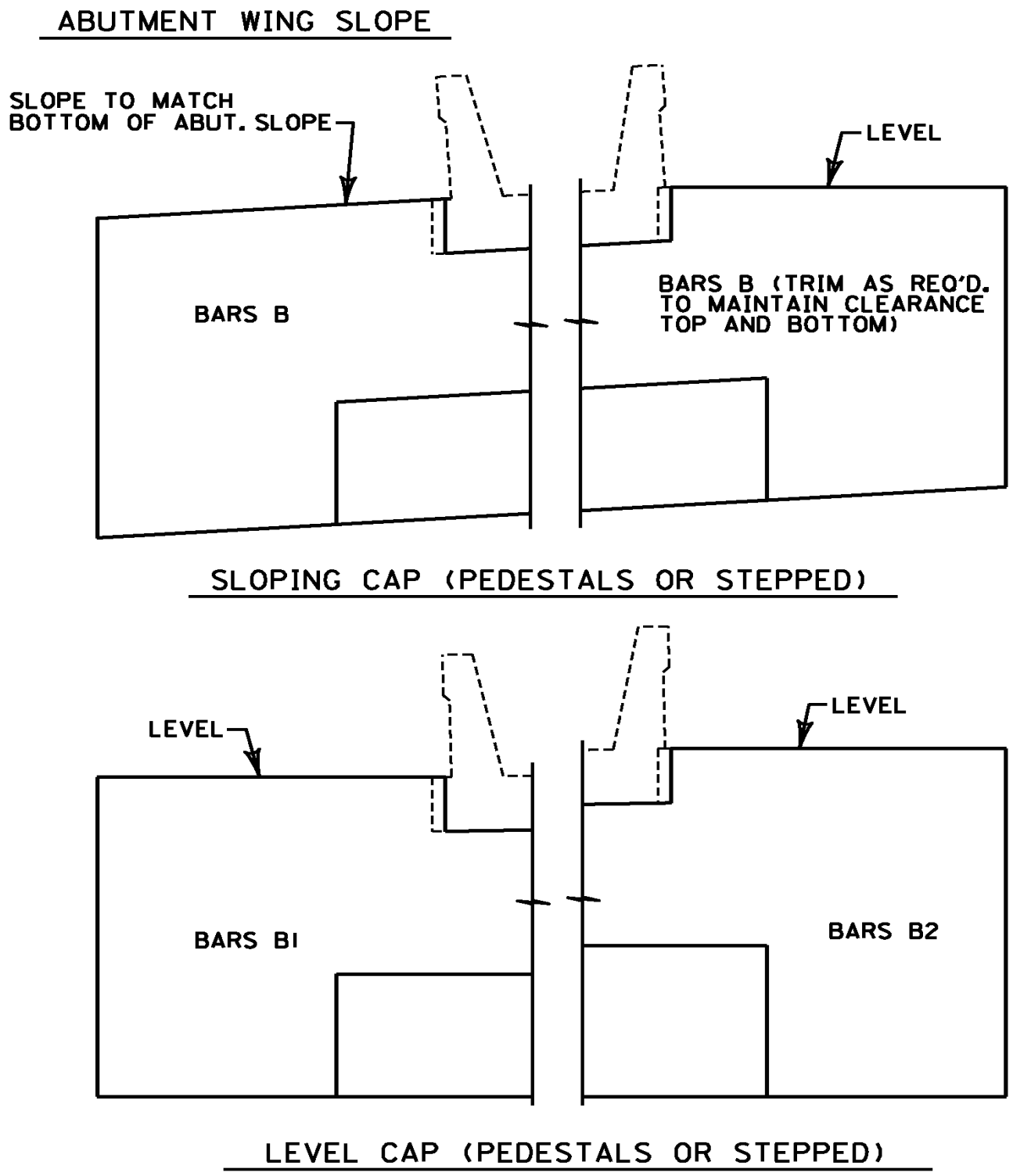
4.8.8 Abutment Plan Typical Layout - Curved Girders (Steel)



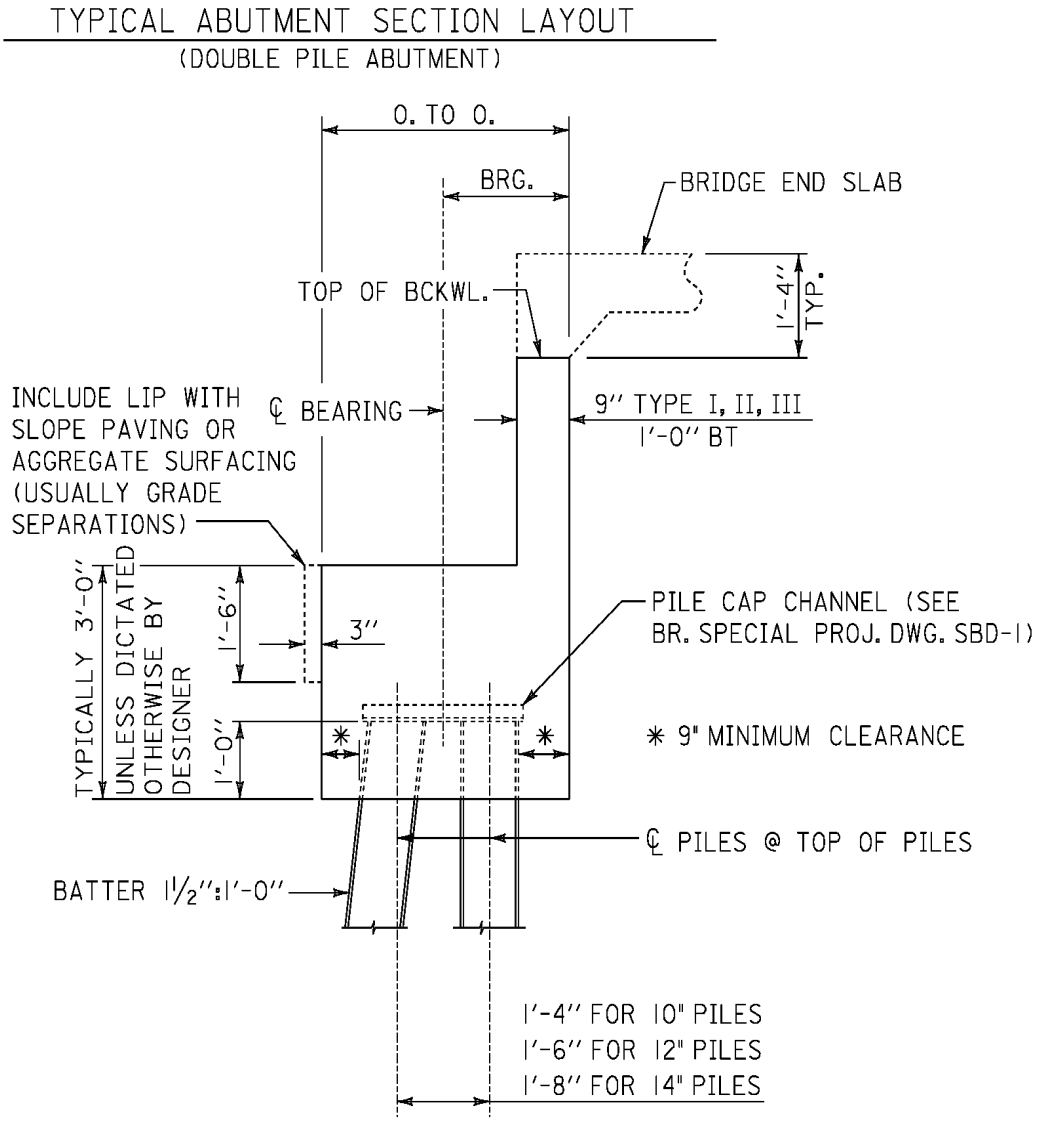
4.8.9 Abutment Elevation Typical Layout



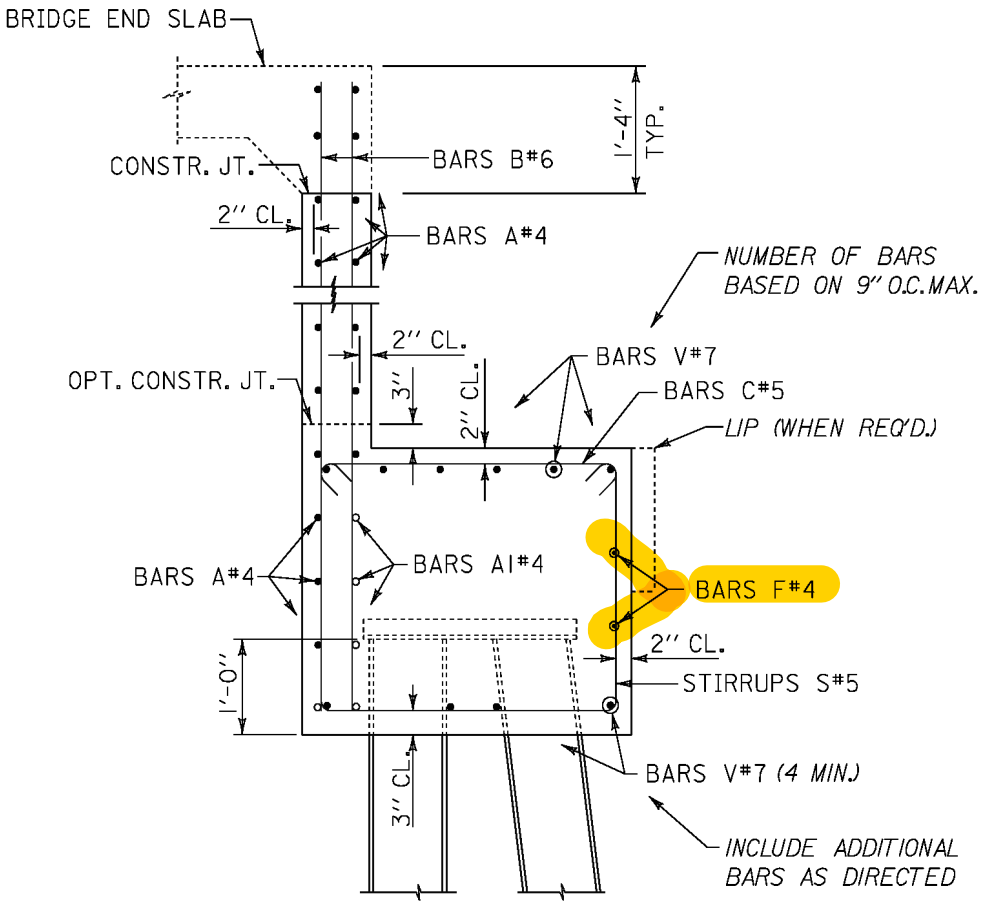
4.8.10 Abutment Typical Wing Slope



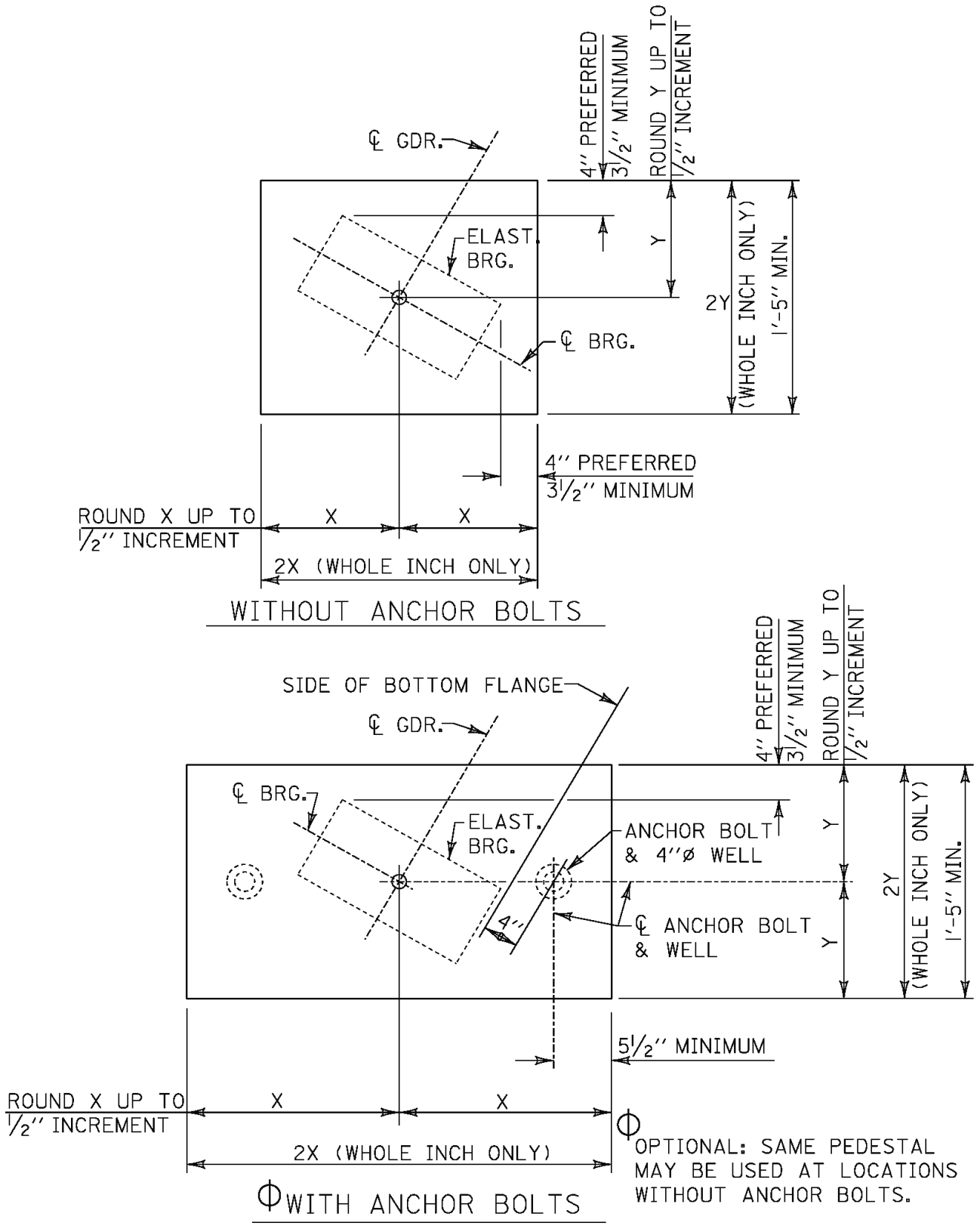
4.8.11 Abutment Section Typical Layout



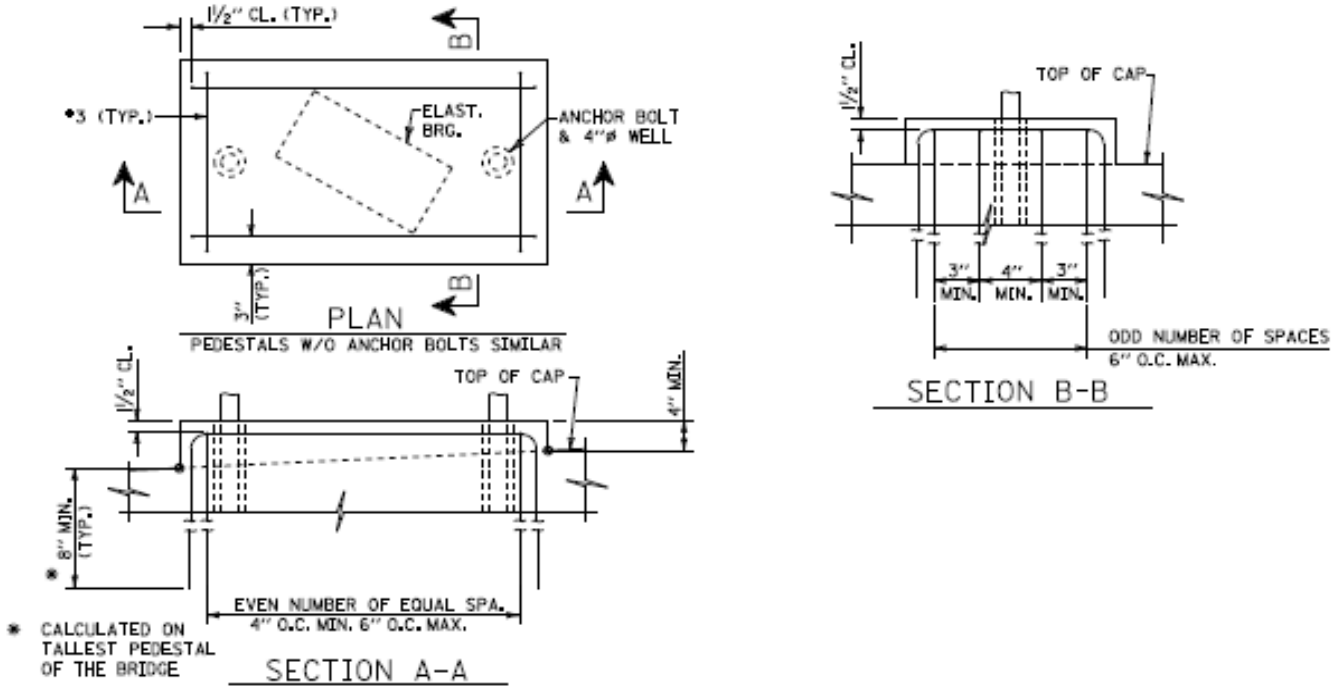
4.8.12 Abutment Section Typical Reinforcement Layout



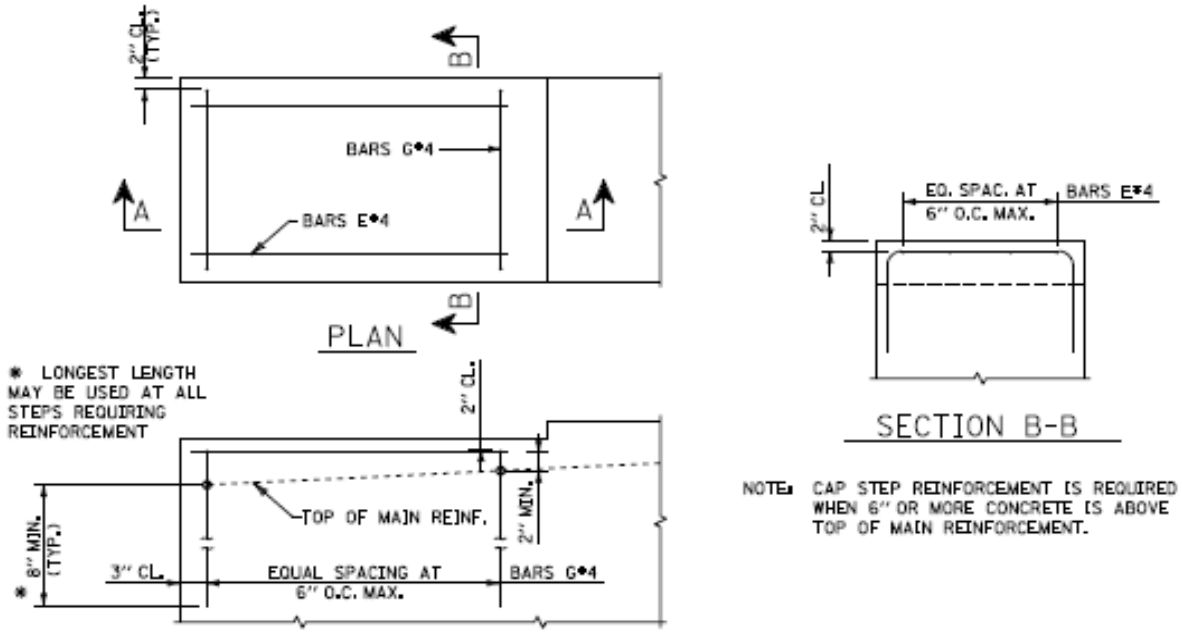
4.8.13 Pedestal Typical Layout



4.8.14 Pedestal and Cap Step Reinforcement Typical Layout

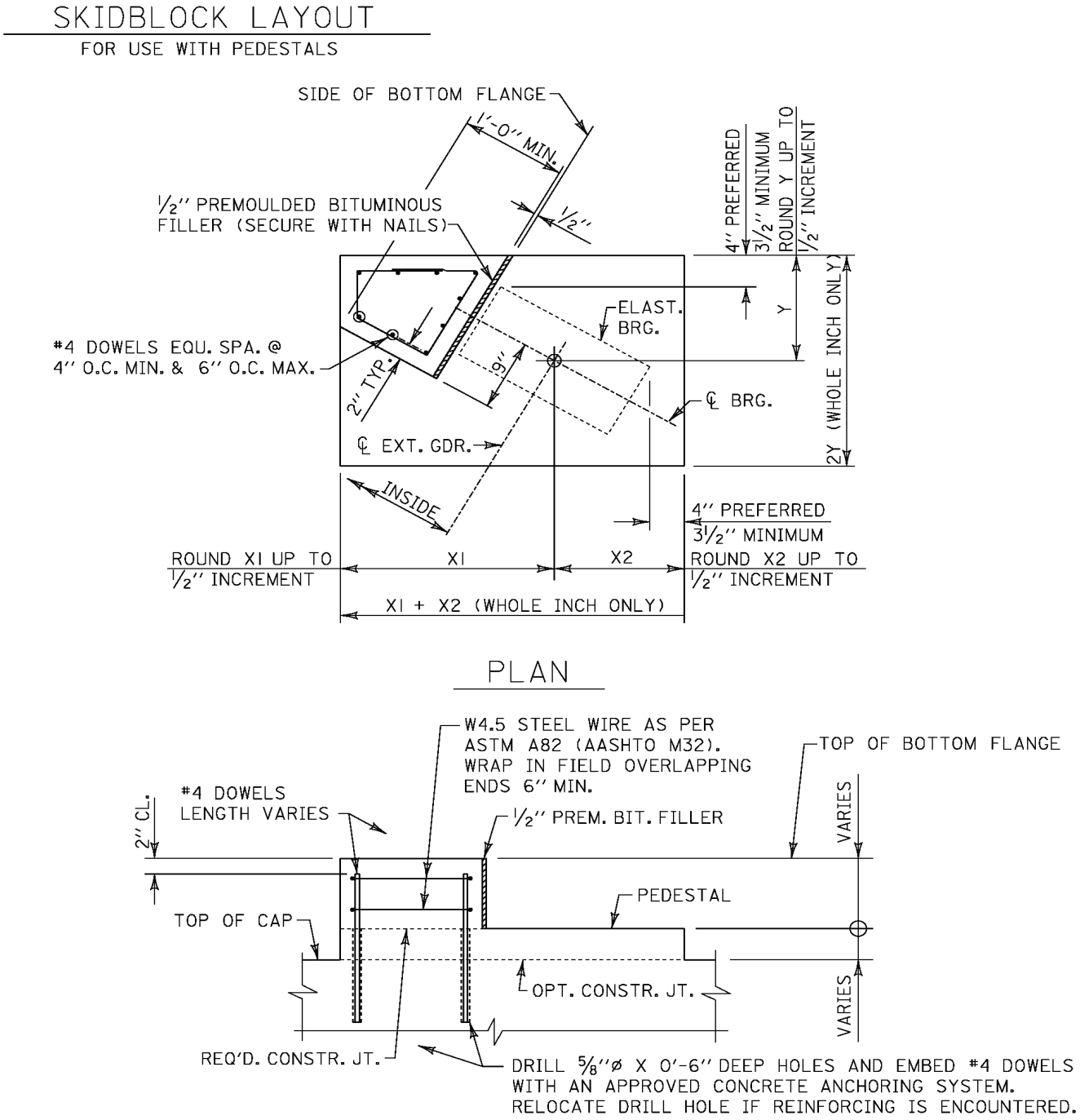


PEDESTAL REINFORCING



CAP STEP REINFORCING

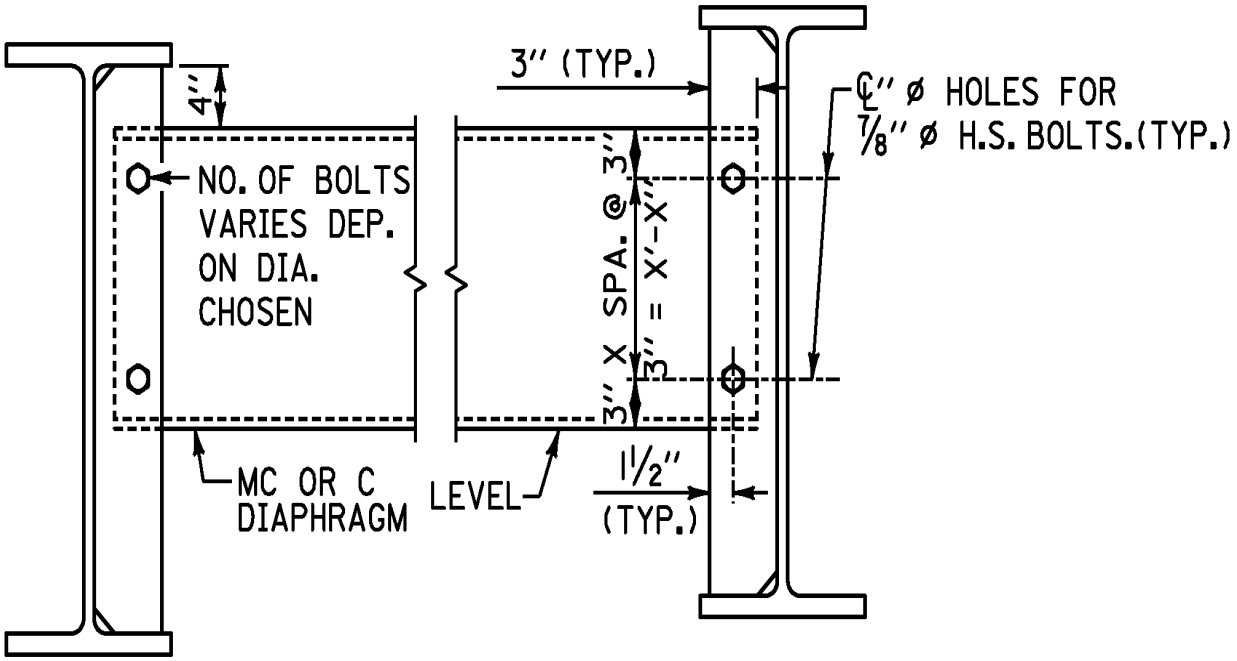
4.8.15 Skidblock Typical Layout (For Use with Pedestals



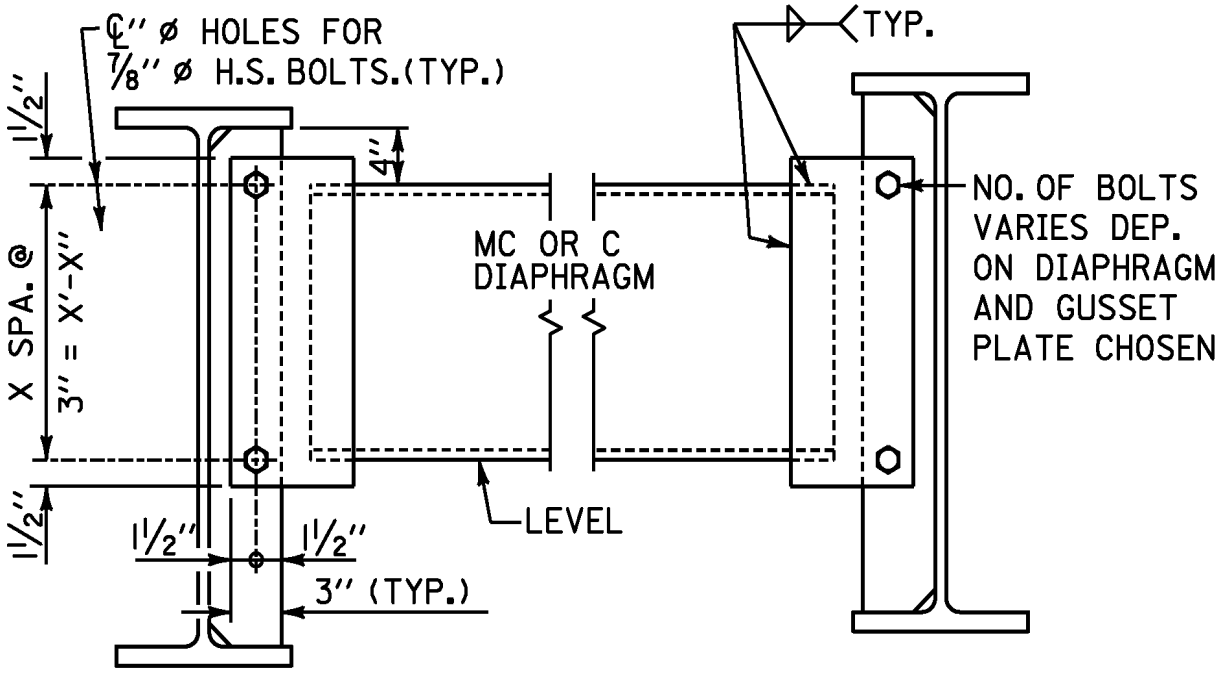
WHEN TYPE 4 BEARINGS ARE USED, INCLUDE THE FOLLOWING NOTE:

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

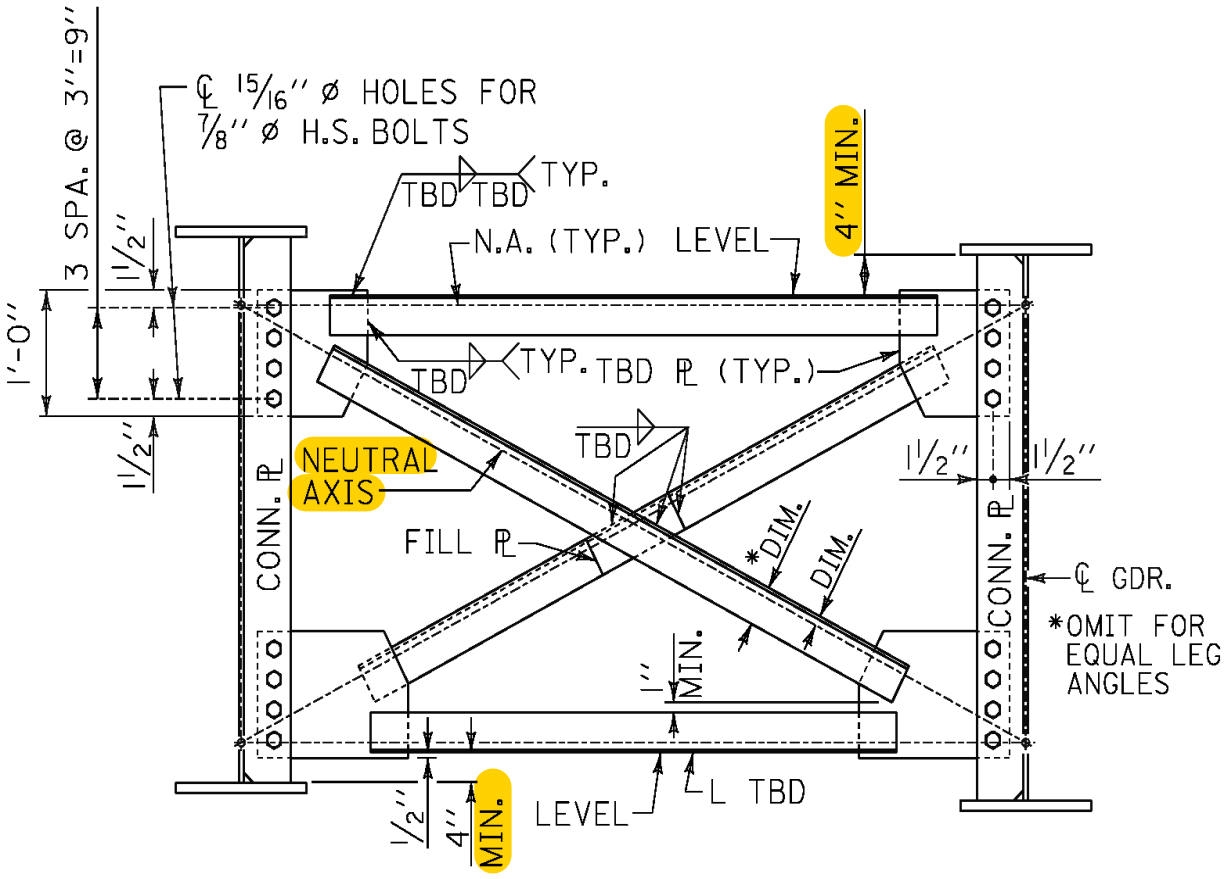
4.8.16 Typical Diaphragm (Steel Girders) (Preferred)



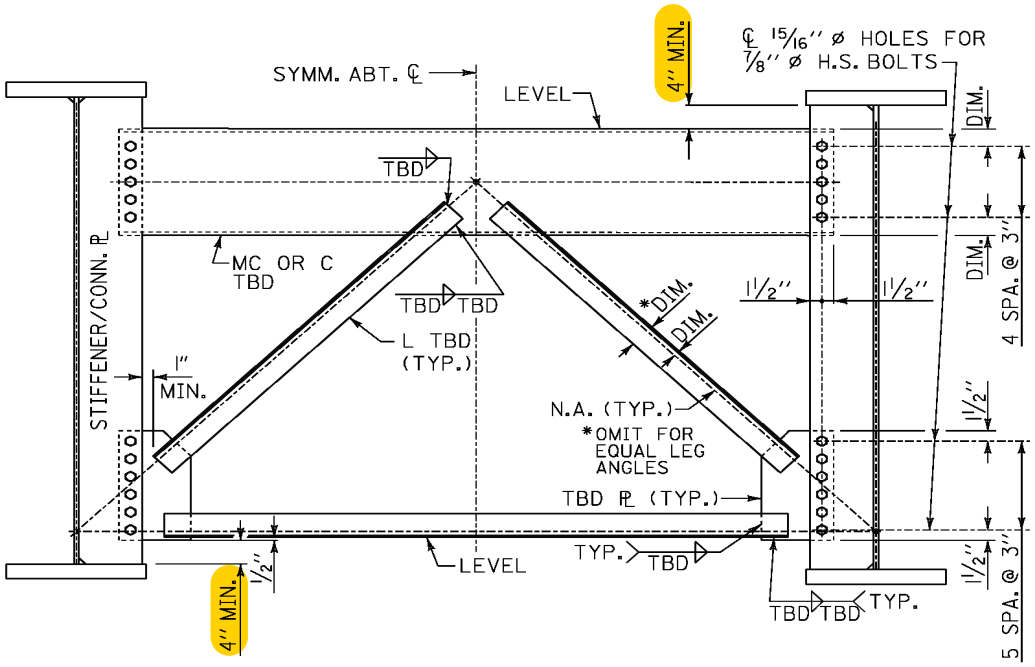
4.8.17 Typical Diaphragm (Steel Girders)



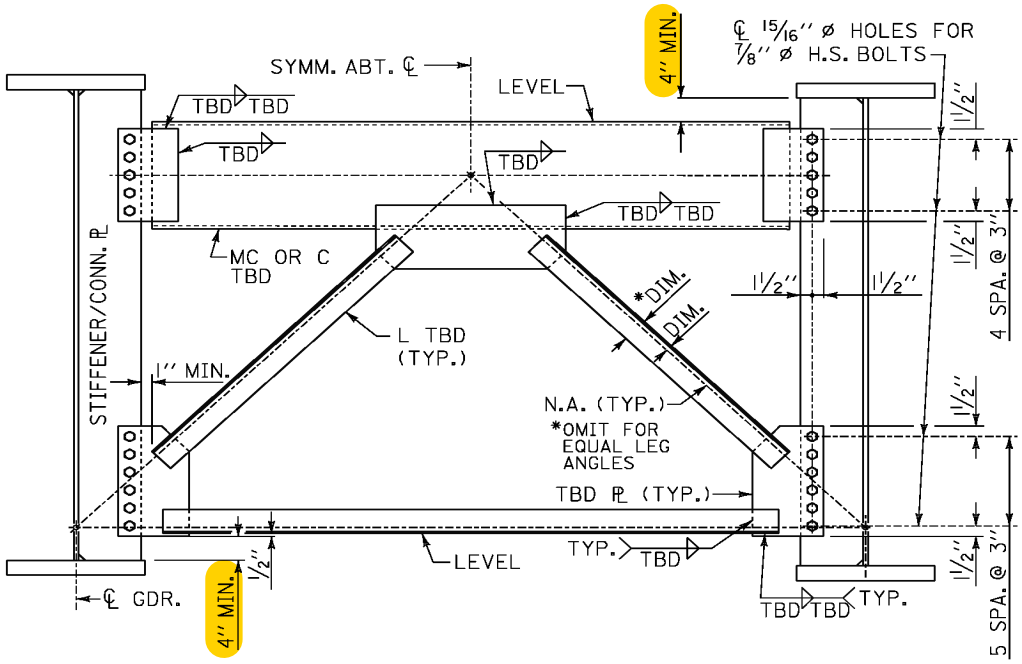
4.8.18 Typical "X" Crossframe (Steel Girders)



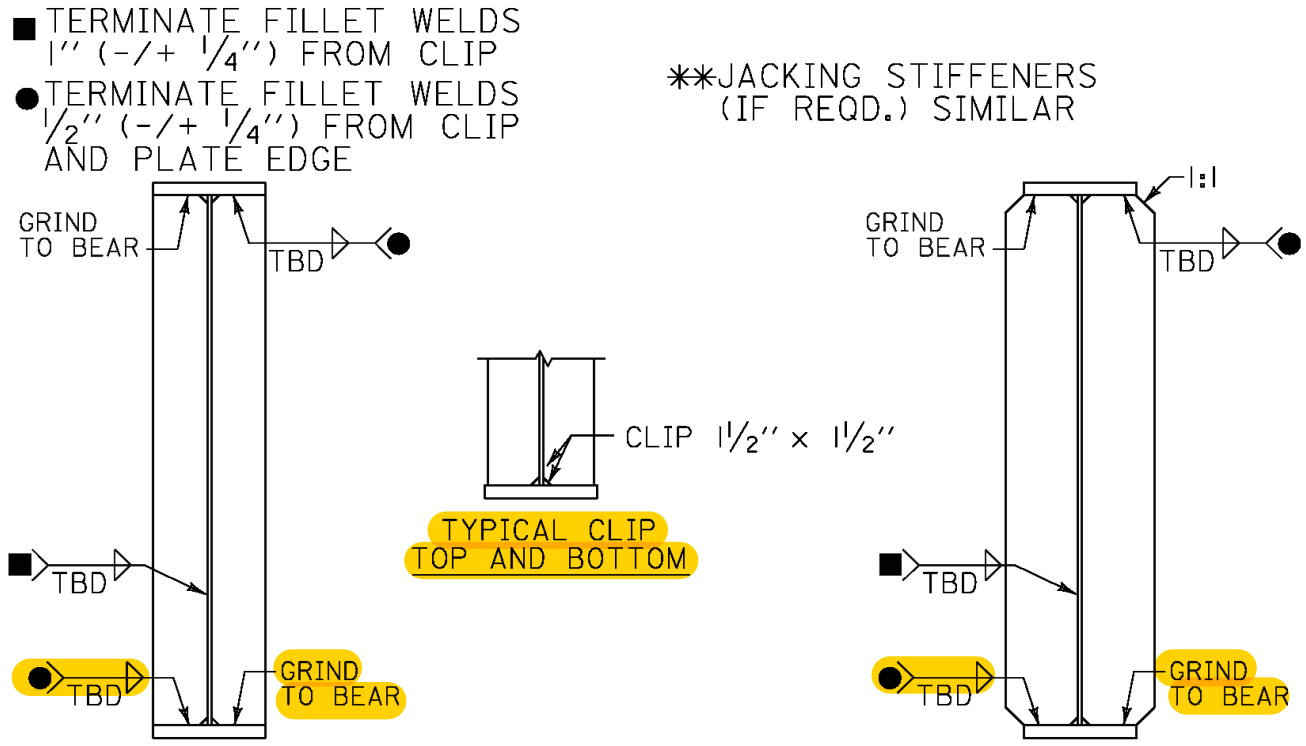
4.8.19 Typical End "K" Crossframe at Armor Plate Joint, Diaphragm Type (Steel Girders) (Preferred)

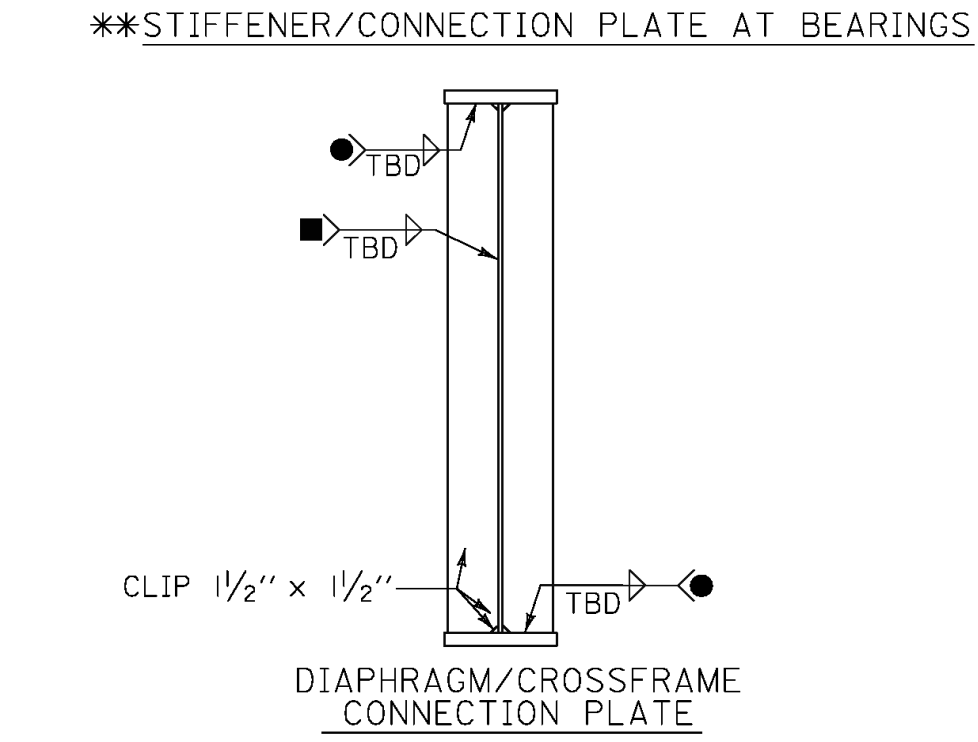


4.8.20 Typical End "K" Crossframe at Armor Plate Joint, Diaphragm Type (Steel Girders)

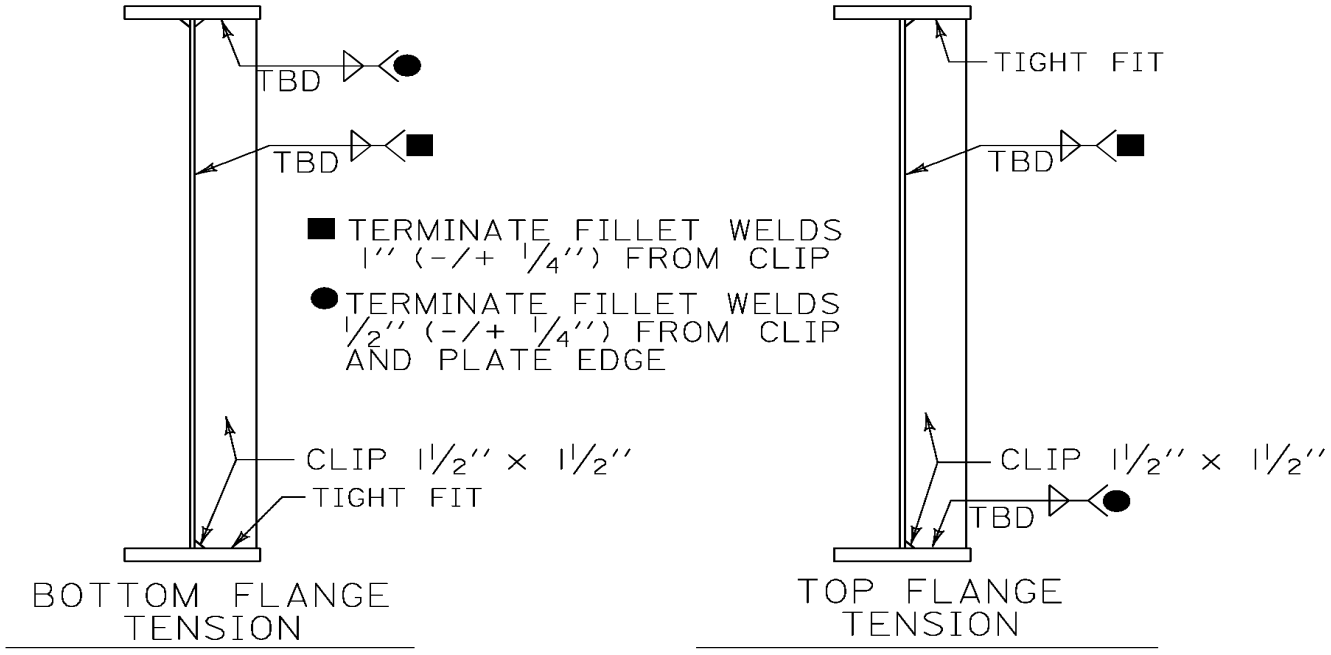


4.8.21 Typical Details for Bearing Stiffeners and Connection Plates

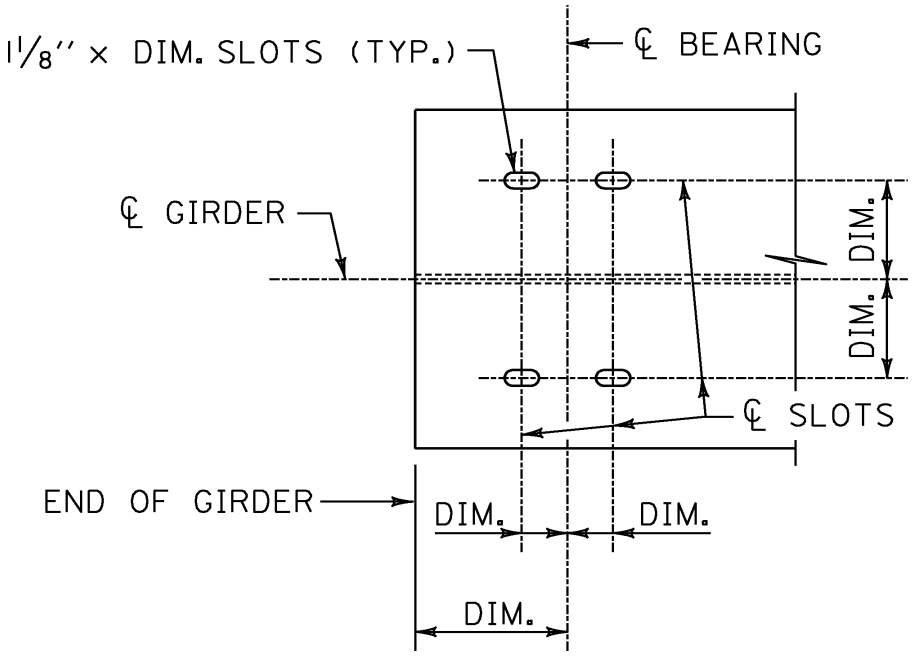




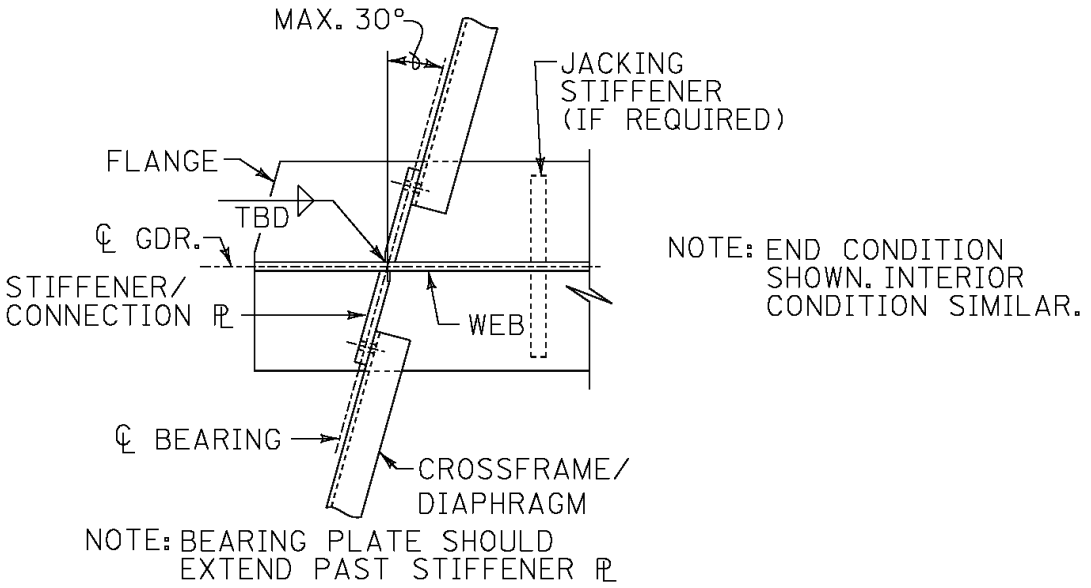
4.8.22 Details for Intermediate Transverse Stiffeners



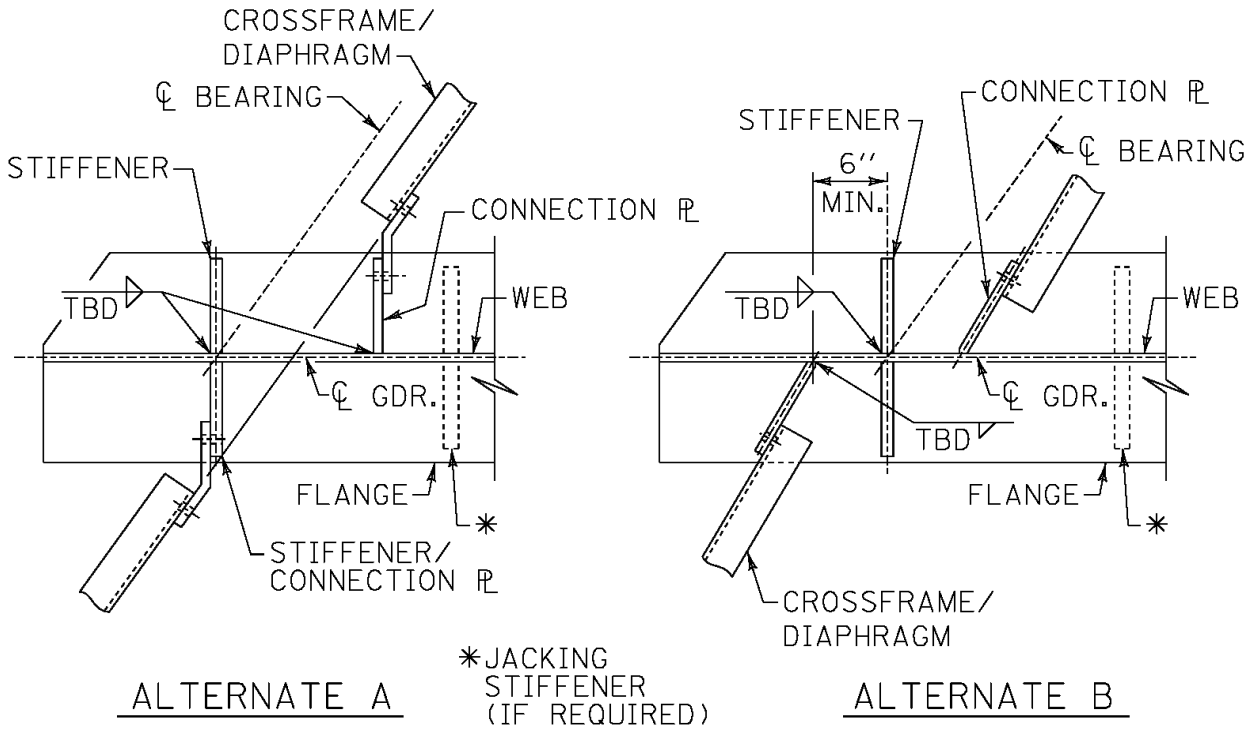
4.8.23 Girder Top Flange End Detail for Tooth Joint Connection



4.8.24 Details for Diaphragm/Stiffener Connection to Web



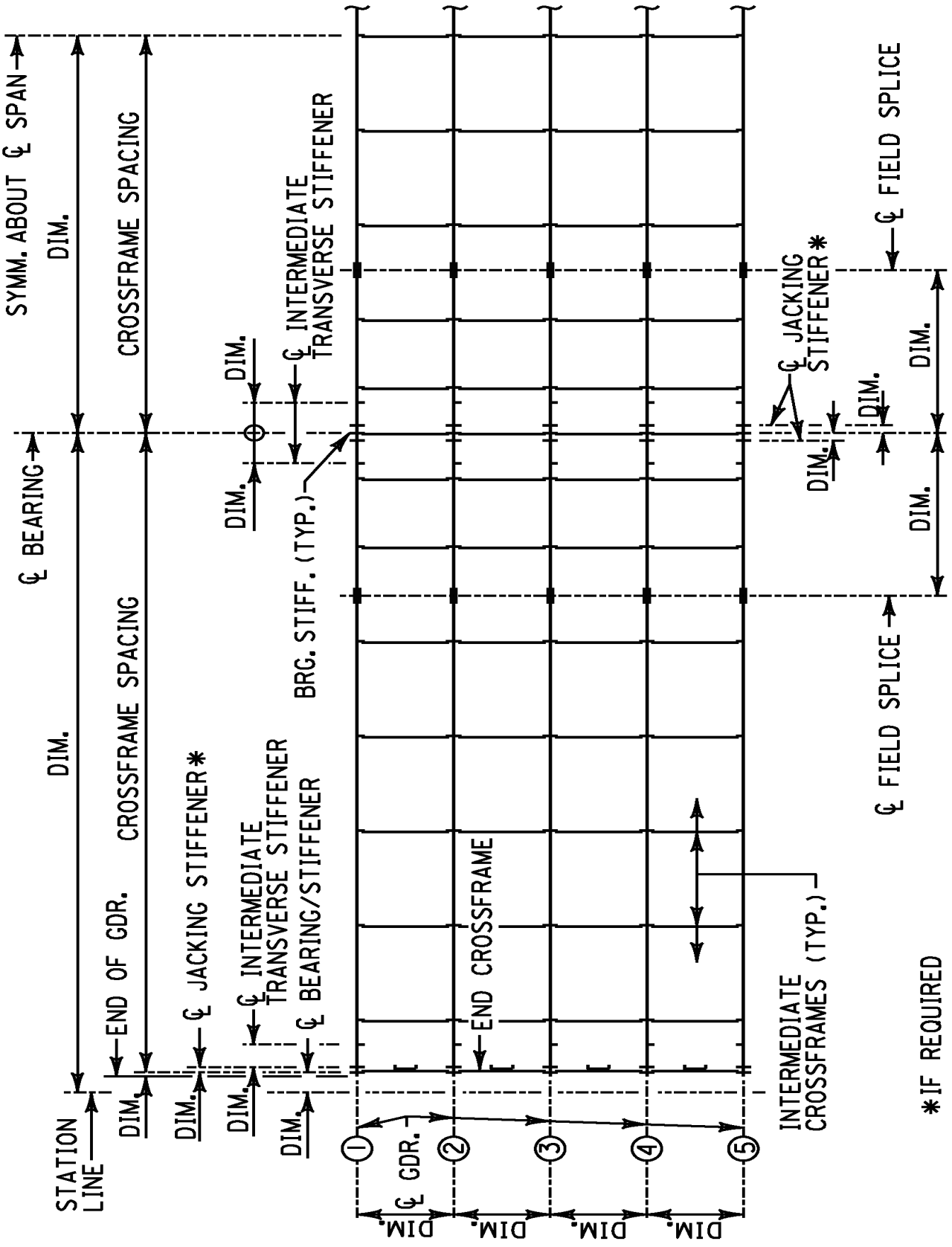
FOR SKEWS 30 DEGREES AND LESS



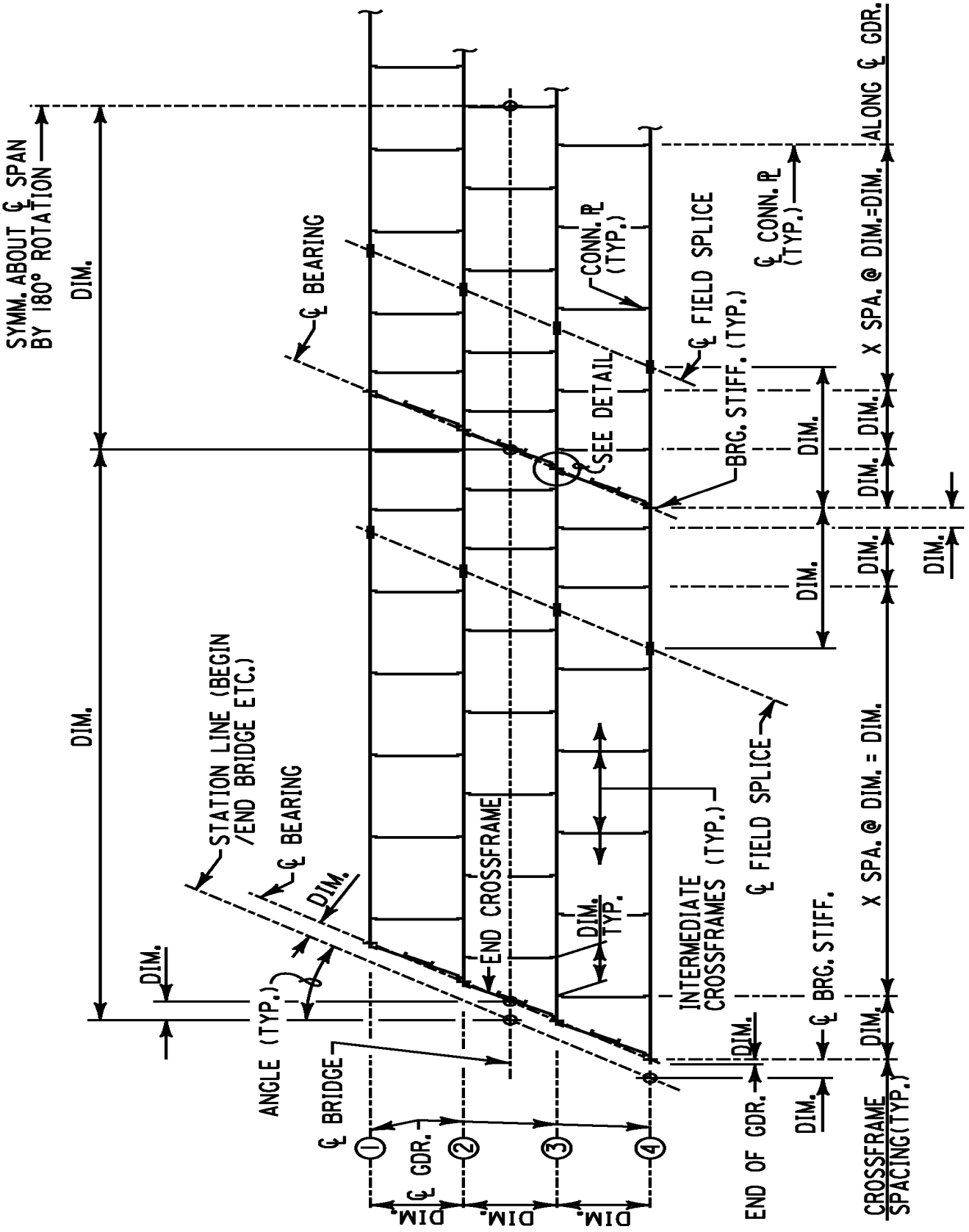
NOTE: END CONDITION SHOWN. INTERIOR CONDITION SIMILAR.

FOR SKEWS GREATER THAN 30 DEGREES

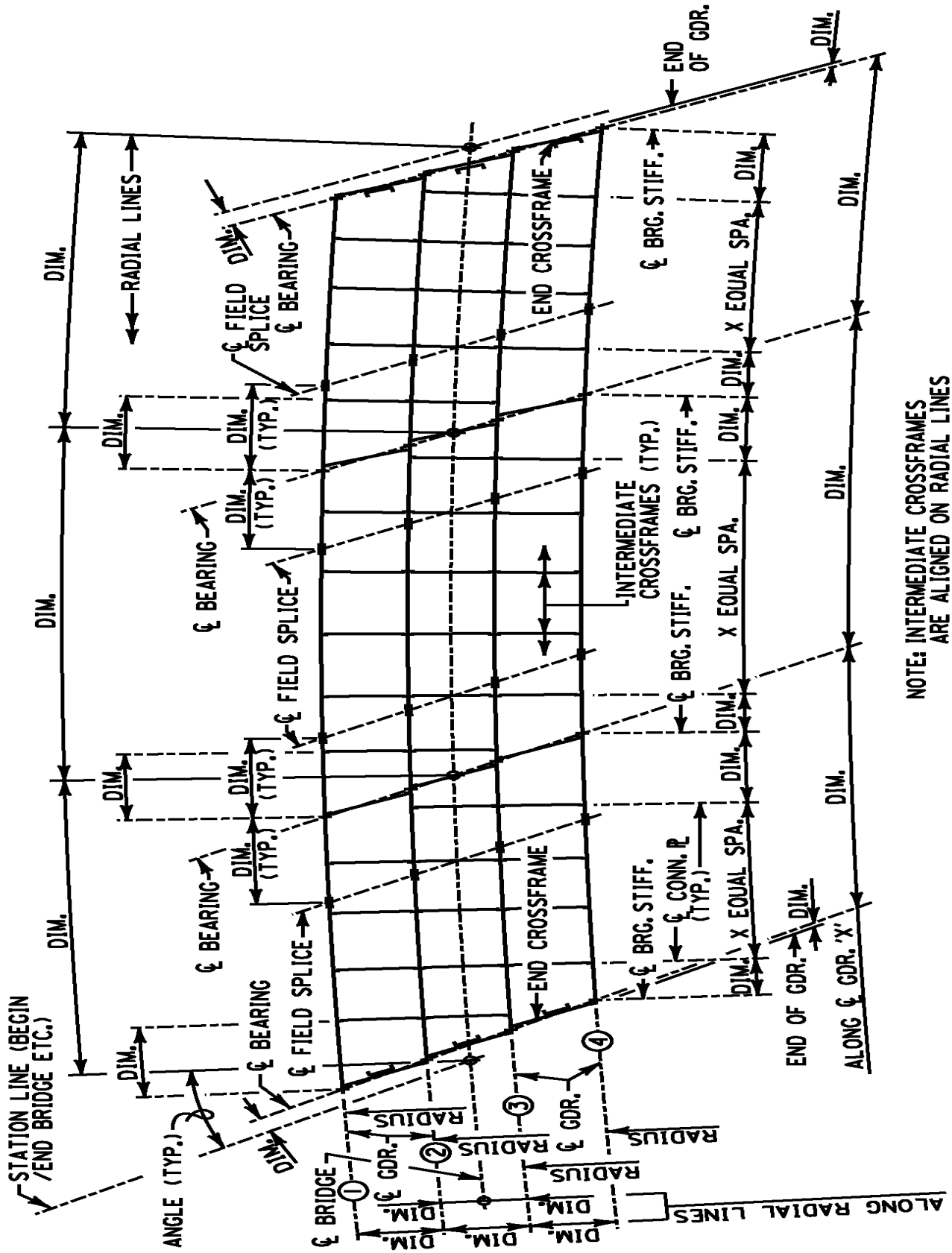
4.8.25 Typical Framing Plan (Tangent, No Skew)



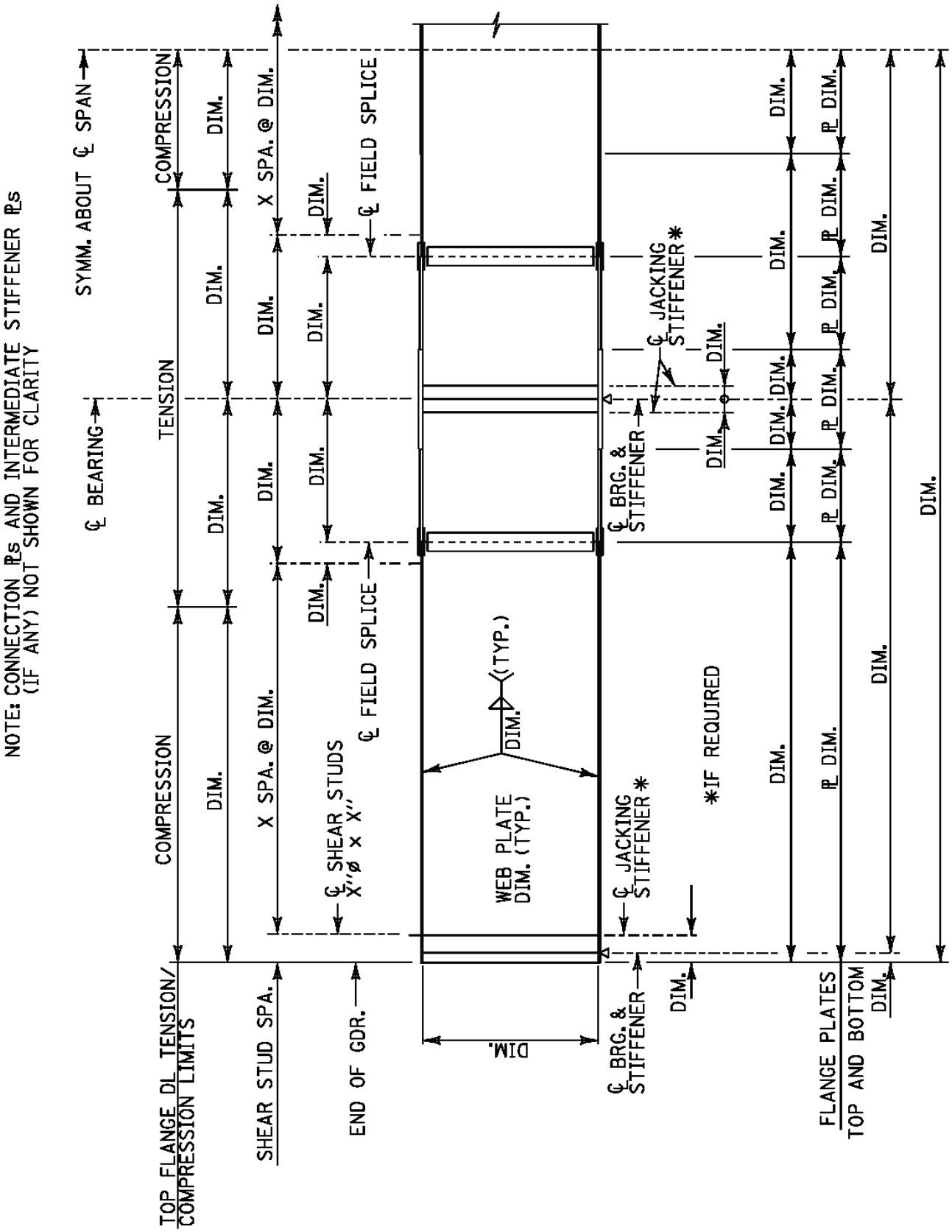
4.8.26 Typical Framing Plan (Tangent, Skew > 20 Degrees)



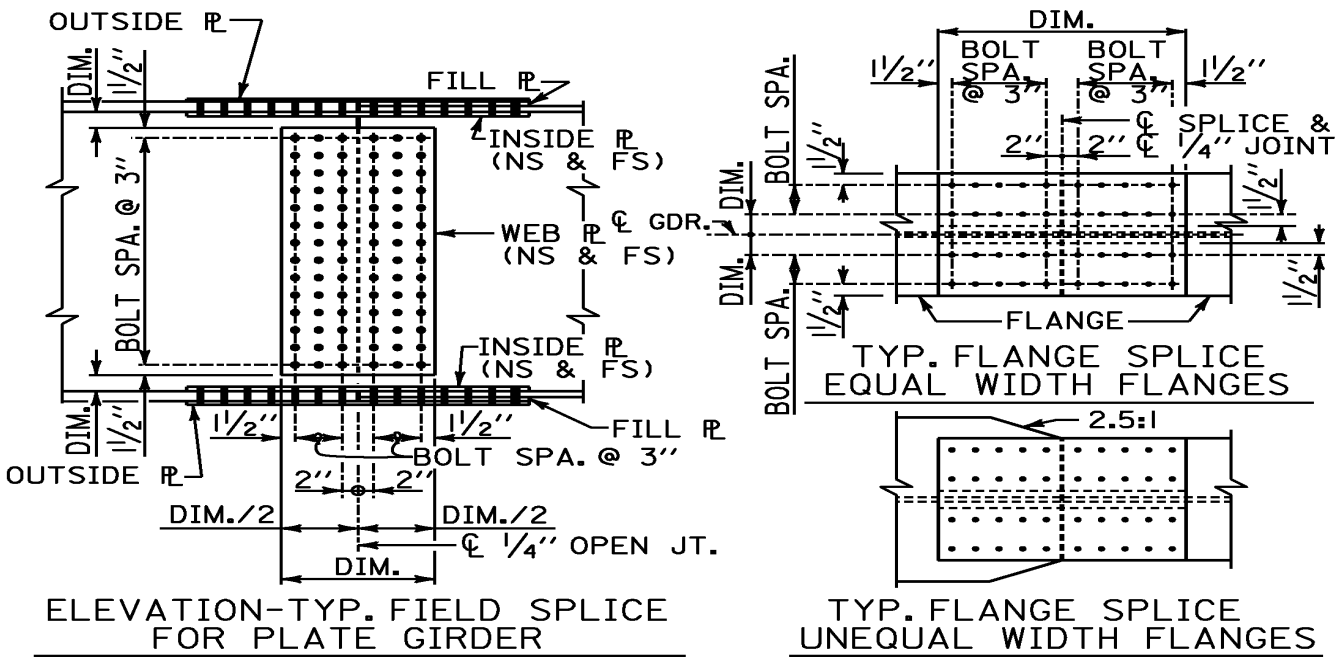
4.8.27 Typical Framing Plan (Curved, Skewed)



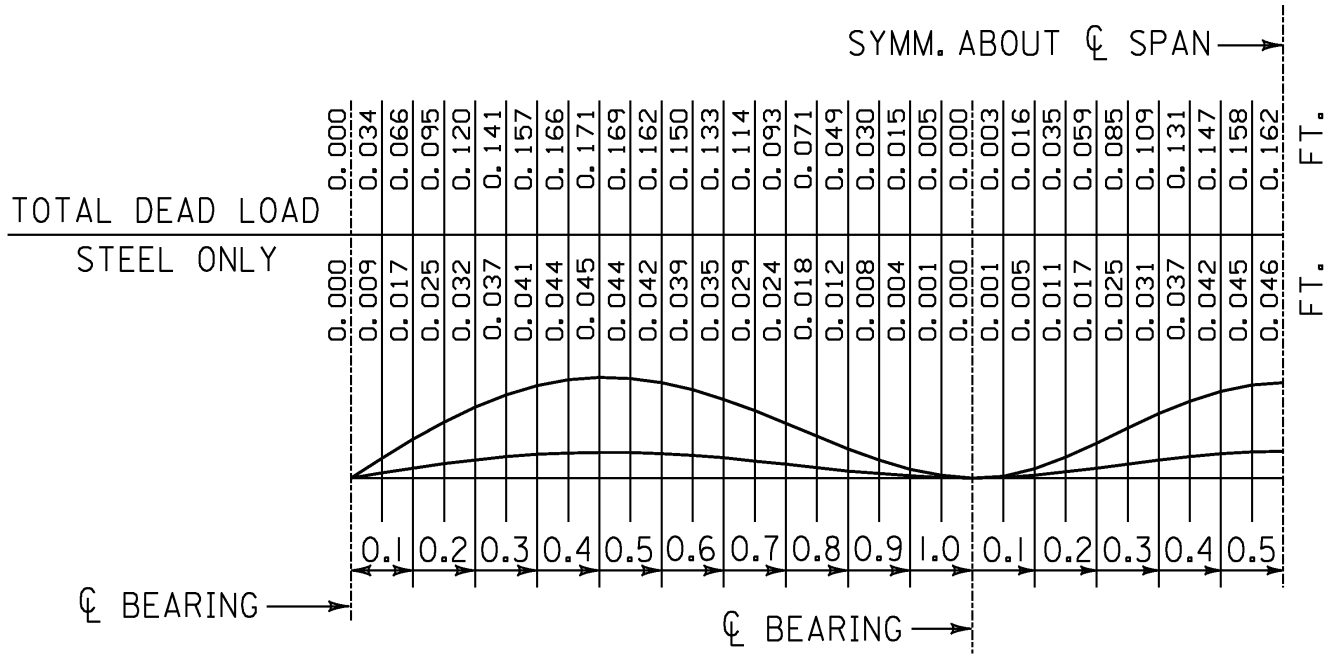
4.8.28 Typical Girder Elevation



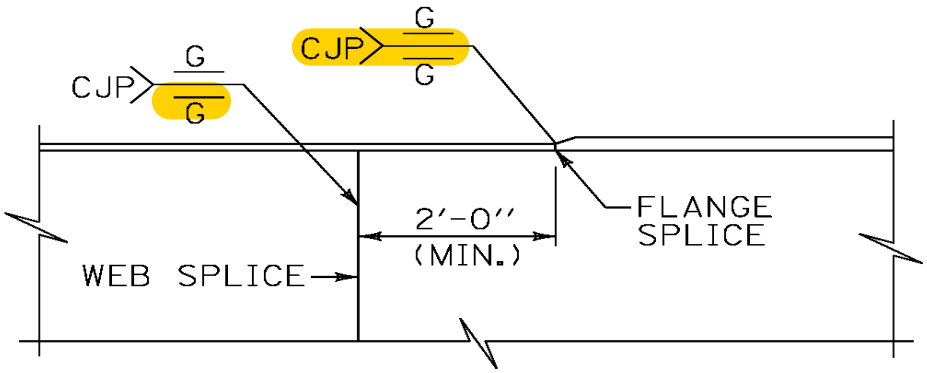
4.8.29 Bolted Field Splice Details



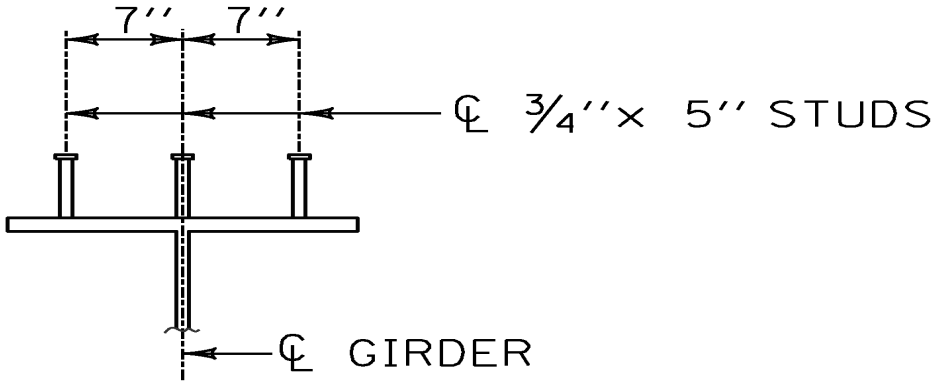
4.8.30 Typical Camber Diagram (Steel Girders)



4.8.31 Shop Splice Detail

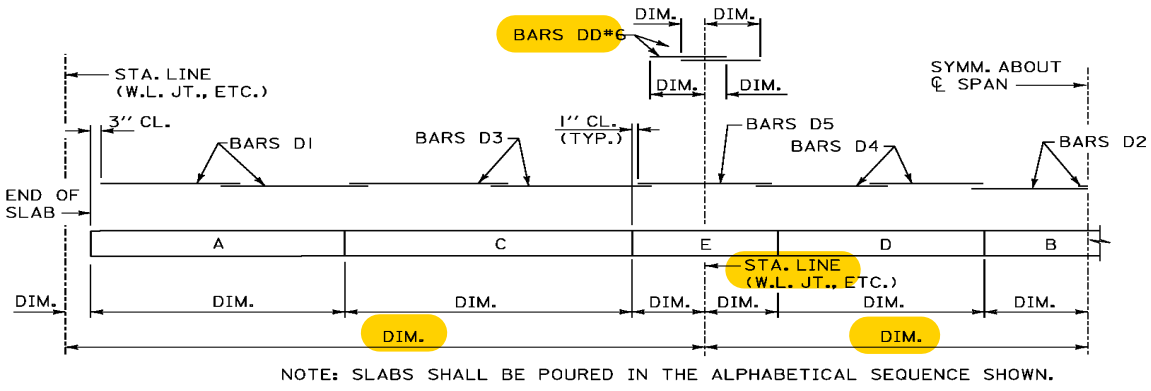


4.8.32 Typical Shear Stud Detail



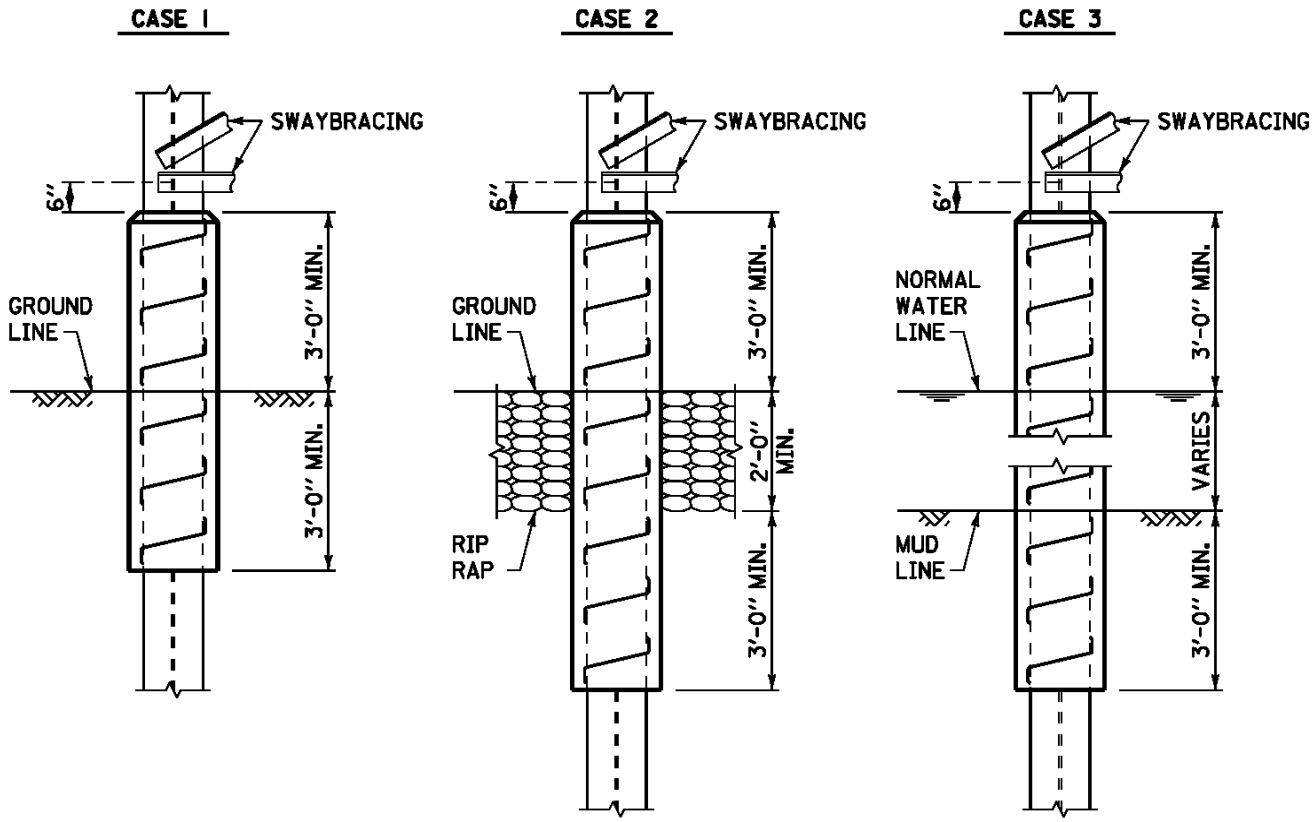
NOTE: Stud size and spacing shown for illustration purposes only

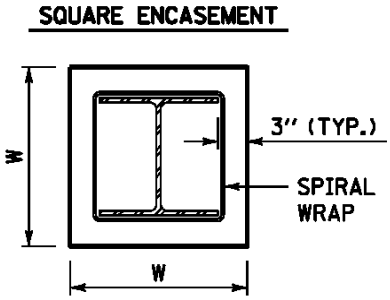
4.8.33 Typical Pouring Schedule

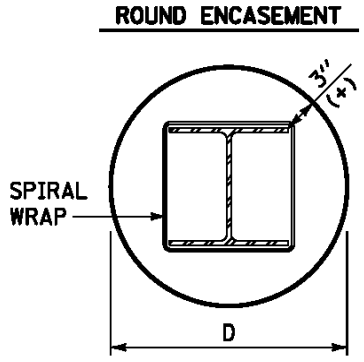


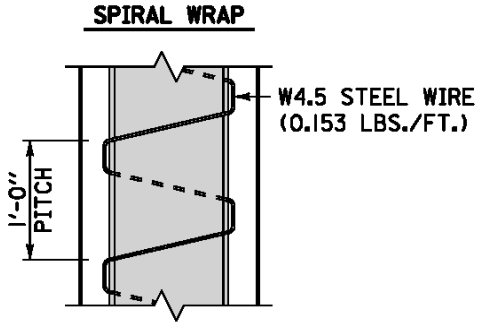
NOTE: Bar size and numbering for illustration purposes only.

4.8.34 Standard Pile Encasements









	SQUARE		ROUND		REINF.
PILE SIZE	W	C.Y./FT.	* D	C.Y./FT.	LBS./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 COMMERCIALLY AVAILABLE FORMS

4.8.35 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 6⁹⁄₁₆" 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

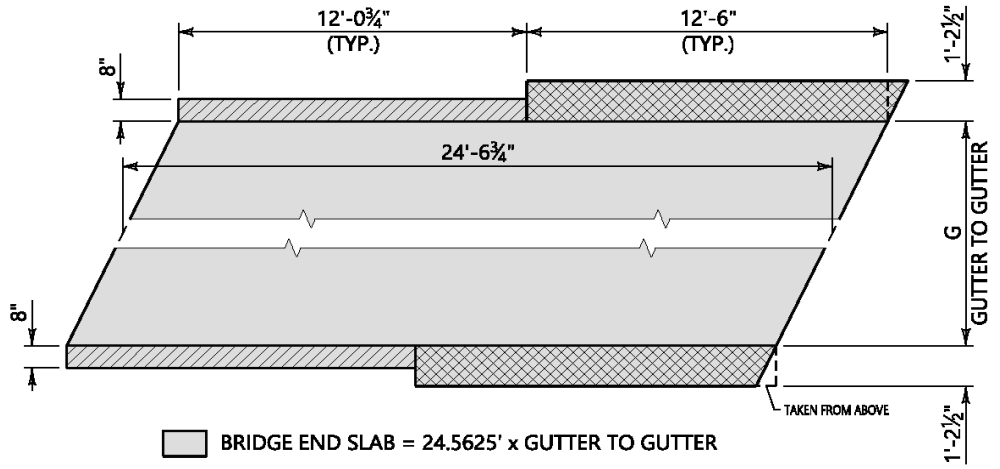
STEEL PLATE: 489.6 LBS/CU.FT.
SHAPES: CURRENT AISC MANUAL
A325/A490 H.S. BOLTS: SEE FOLLOWING CHARTS

510E GROOVING CONCRETE BRIDGE DECKS

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

NOTE: LIKE QUANTITIES ARE TO BE ADDED
TOGETHER THEN ROUNDED FOR SHEET TOTALS

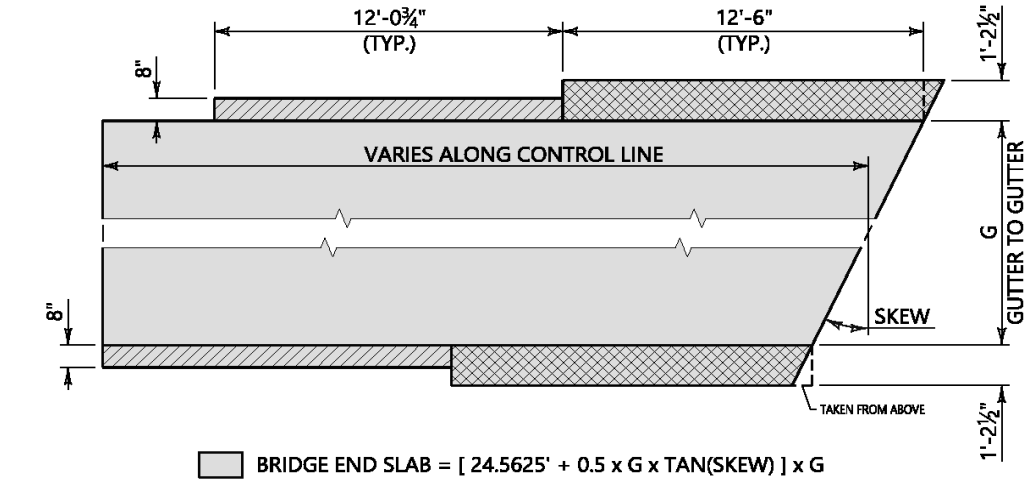
450B REINFORCED CEMENT CONCRETE BRIDGE END SLAB (BP)



TOTAL SQ. YDS.

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

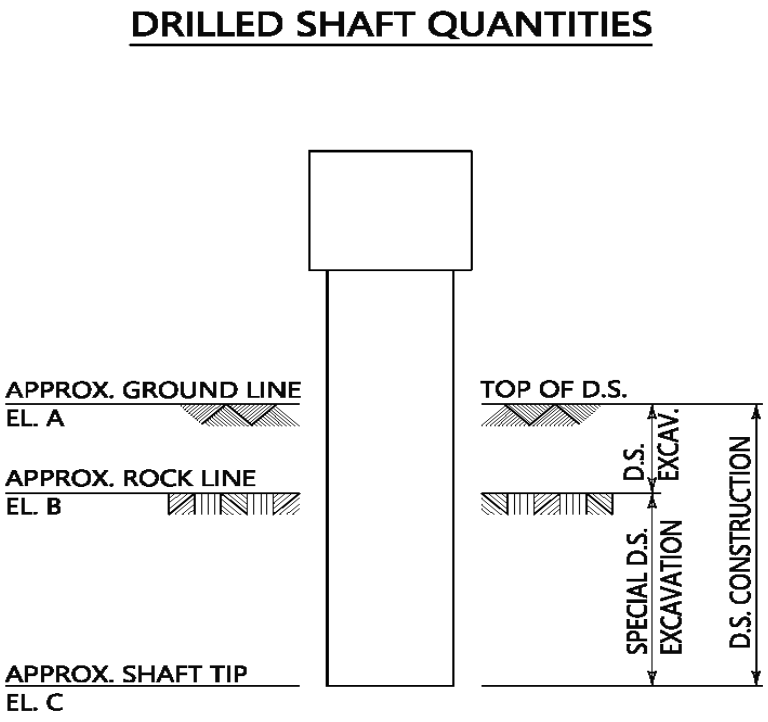
450B REINFORCED CEMENT CONCRETE BRIDGE END SLAB (CP)

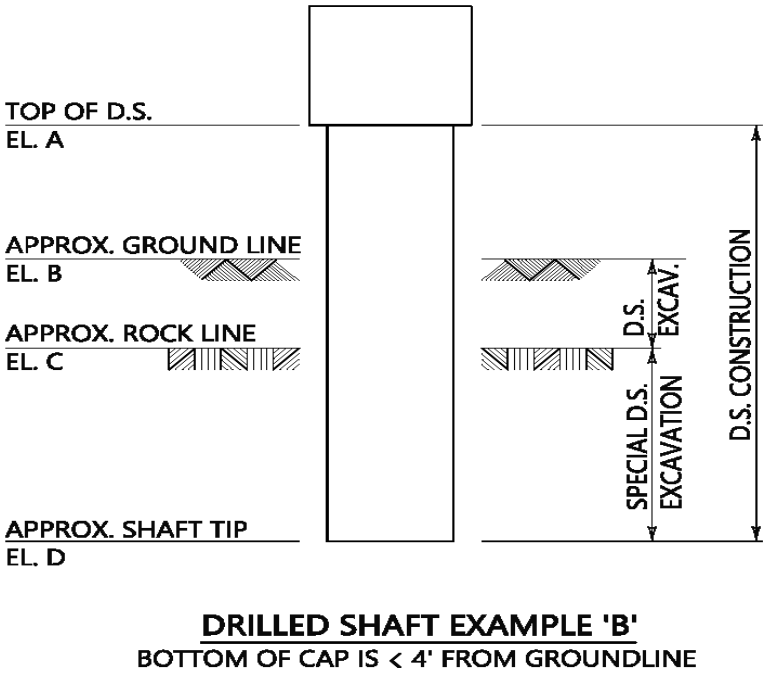


TOTAL SQ. YDS.

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

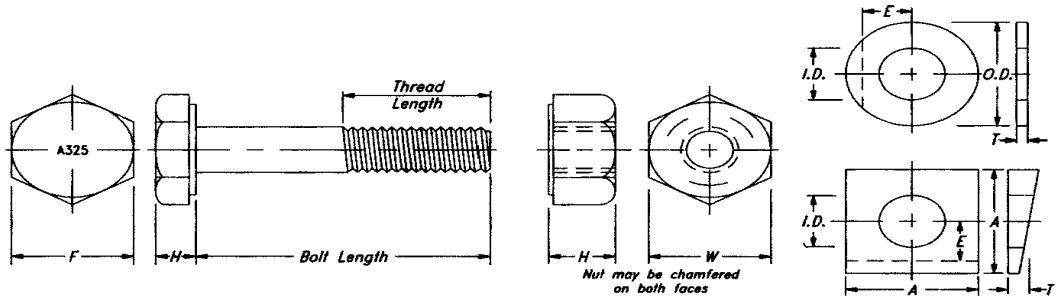
4.8.36 Drilled Shaft Quantities





4.8.37 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, *F*		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, *H*		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 + →		11/16	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, *W*		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, *H*		31/64	39/64	47/64	55/64	63/64	1 7/64	1 7/32	1 11/32	1 15/32
F436 Circular Washers[b]	Nom. Outside Diameter, *OD*		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, *ID*		17/32	11/16	13/16	15/16	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8
	Thckns., *T*	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, *E*[c]		7/16	9/16	21/32	25/32	7/8	1	1 3/32	1 7/32	1 5/16
F436 Square or Rect. Washers[b,d]	Min. Side Dimension, *A*		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, *T*		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, *E*[c]		7/16	9/16	21/32	25/32	7/8	1	1 3/32	1 7/32	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)

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

4.8.38 Bolt Weights

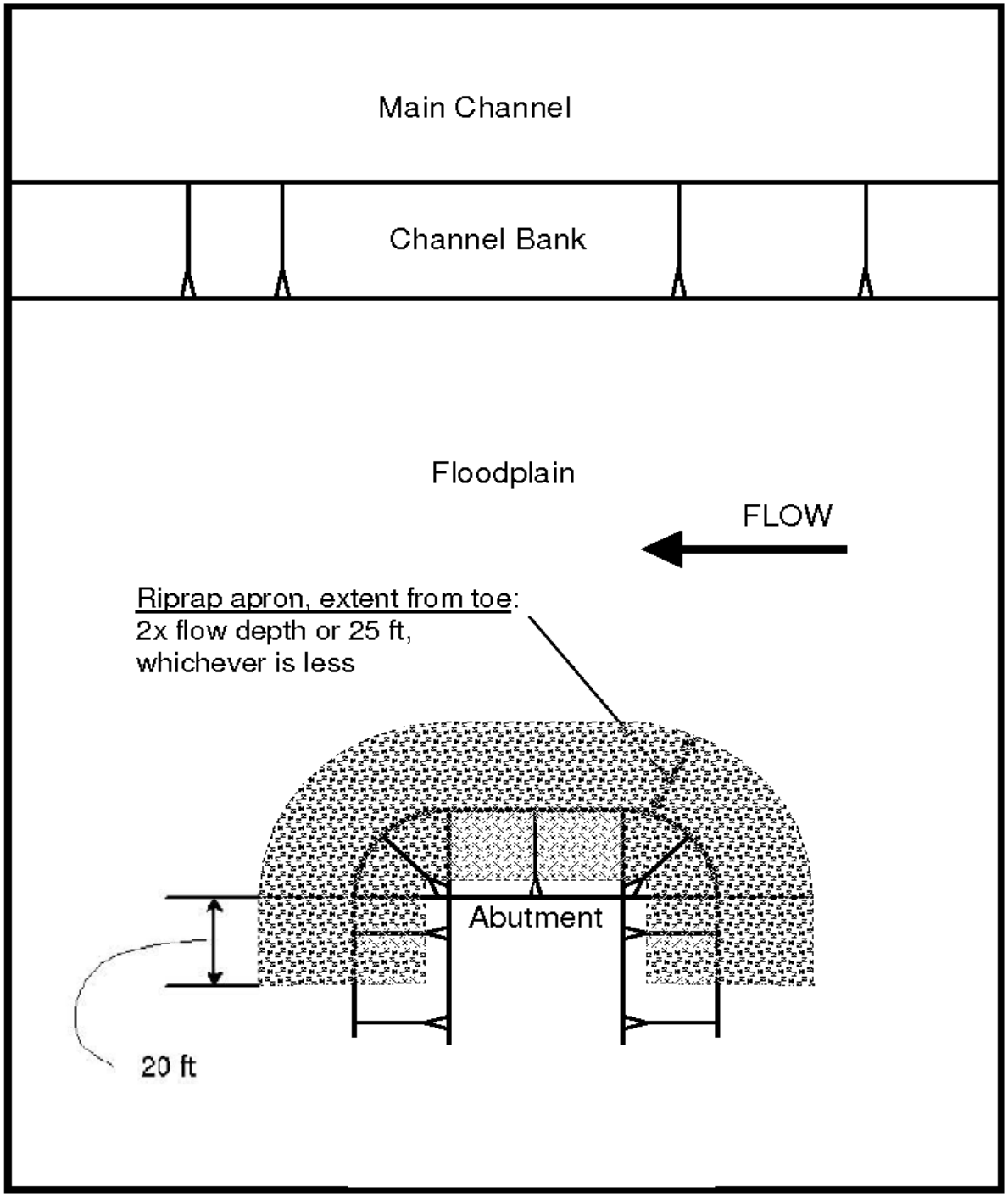
Table 7-18
Weights of High-Strength Fasteners, pounds per 100 count

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.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION

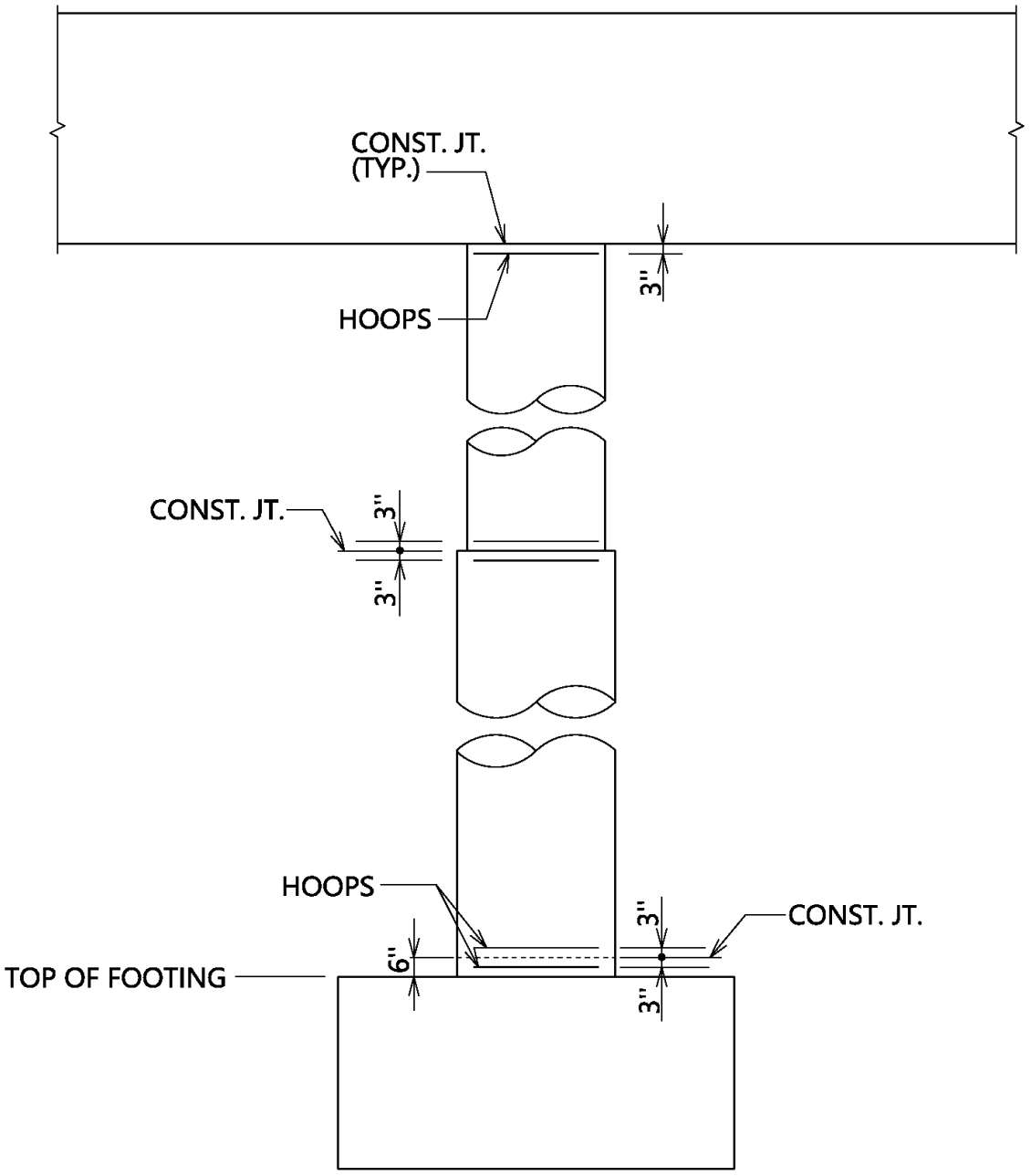
4.8.39 Typical Riprap Apron Length Calculation (For Use with SBN 12)



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.)

4.8.40 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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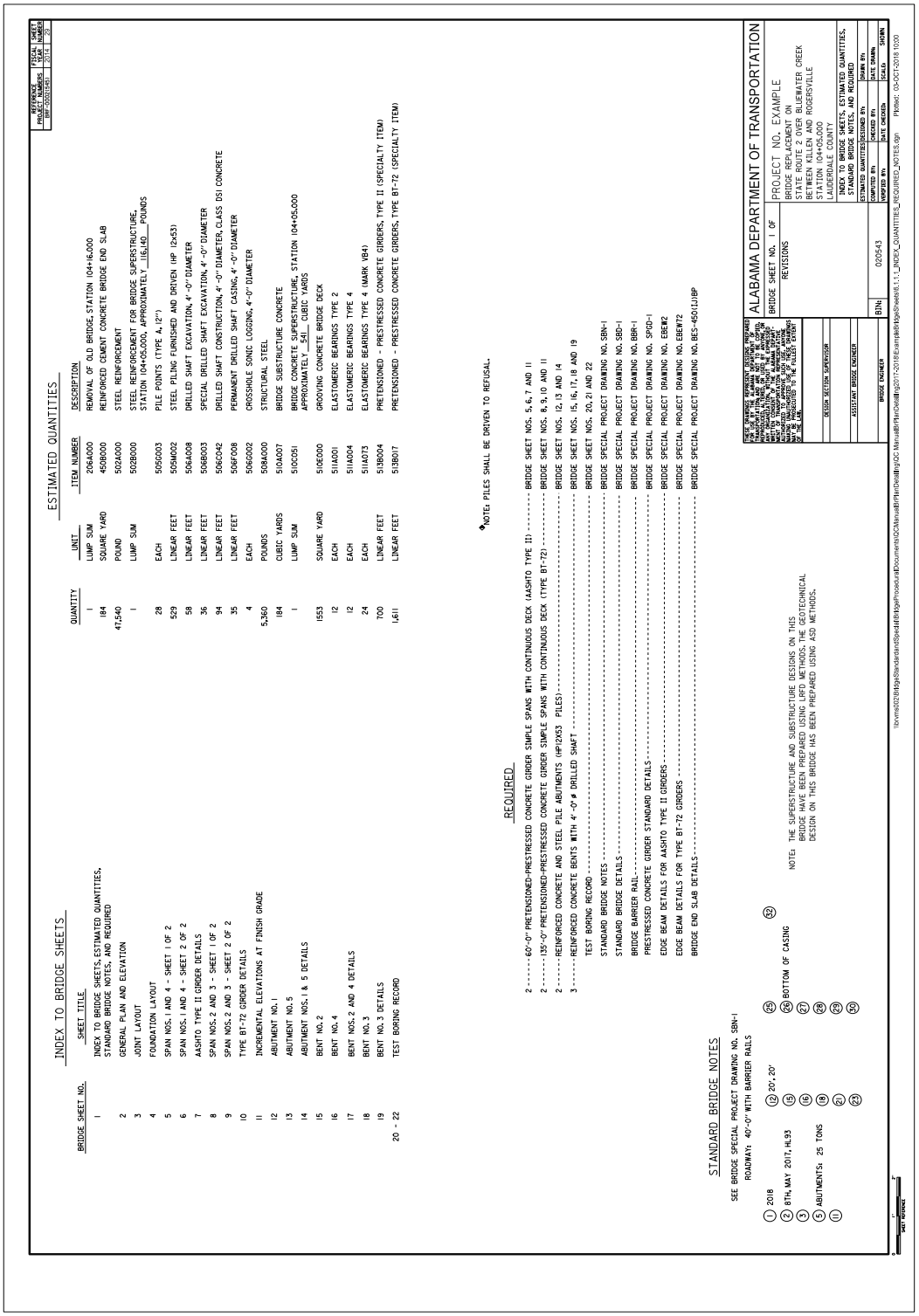
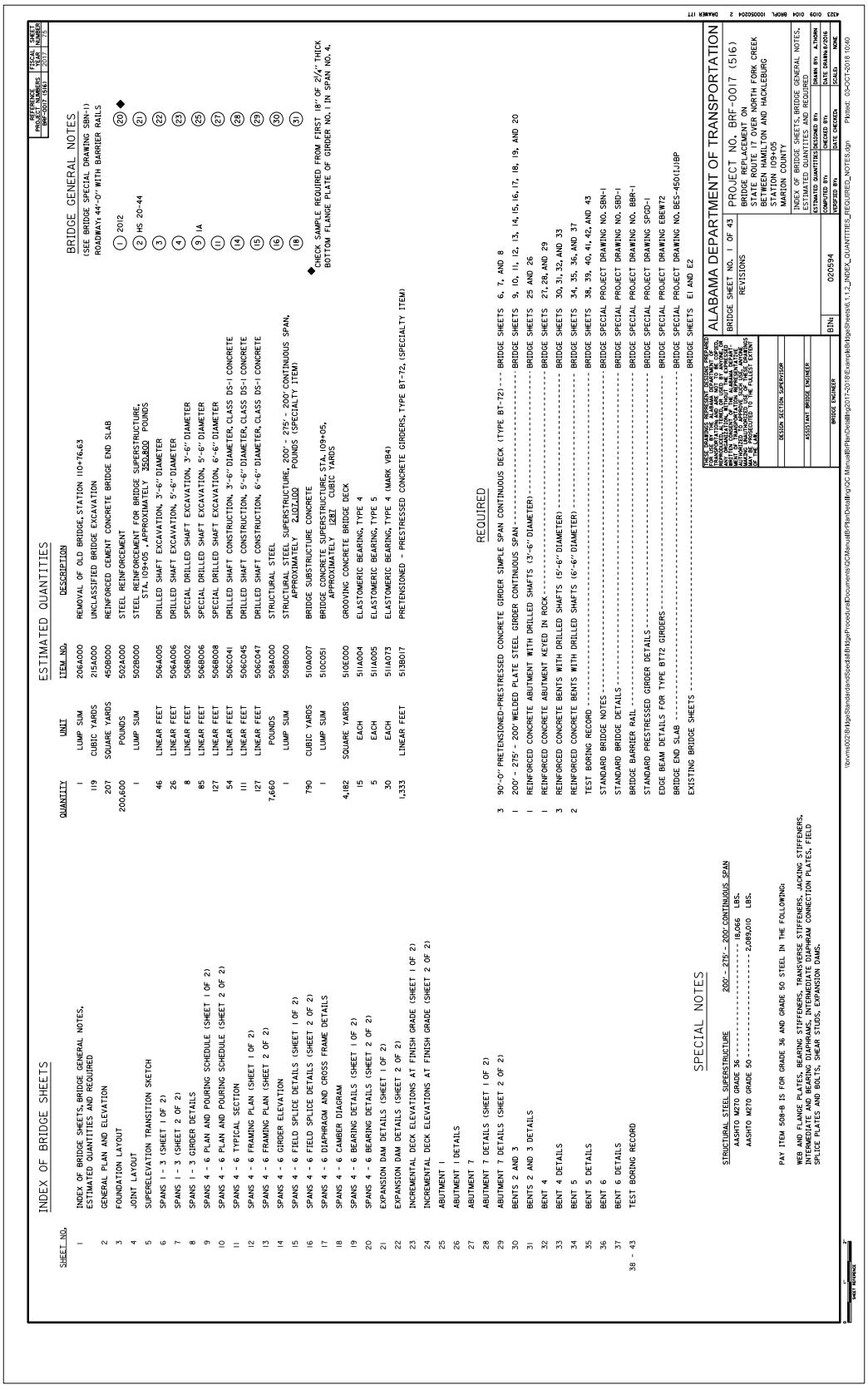
A General Information Sheets

1.1 Index Sheets

1.1.1 Index/Quantities/Required/Notes



1.1.2 Index/Quantities/Required/Notes



INDEX OF BRIDGE SHEETS

SHEET NO.		QUANTITY
1	INDEX OF BRIDGE SHEETS, BRIDGE GENERAL NOTES, ESTIMATED QUANTITIES AND REQUIRED	
2	GENERAL PLAN AND ELEVATION	
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 SPLICE DETAILS (SHEET 1 OF 2)	
16	SPANS 4 - 6 FIELD SPLICE 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	

ESTIMATED QUANTITIES

QUANTITY	UNIT	ITEM NO.	DESCRIPTION
1	LUMP SUM	206A000	REMOVAL OF OLD BRIDGE, STATION 110+76.63
119	CUBIC YARDS	215A000	UNCLASSIFIED BRIDGE EXCAVATION
207	SQUARE YARDS	460B000	REINFORCED CEMENT CONCRETE BRIDGE END SLAB
200,600	POUNDS	502A000	STEEL REINFORCEMENT
1	LUMP SUM	502B000	STEEL REINFORCEMENT FOR BRIDGE SUPERSTRUCTURE, STA. 109+05, APPROXIMATELY 350,800 POUNDS
46	LINEAR FEET	506A005	DRILLED SHAFT EXCAVATION, 3'-6" DIAMETER
26	LINEAR FEET	506A006	DRILLED SHAFT EXCAVATION, 5'-6" DIAMETER
8	LINEAR FEET	506B002	SPECIAL DRILLED SHAFT EXCAVATION, 3'-6" DIAMETER
85	LINEAR FEET	506B006	SPECIAL DRILLED SHAFT EXCAVATION, 5'-6" DIAMETER
127	LINEAR FEET	506B008	SPECIAL DRILLED SHAFT EXCAVATION, 6'-6" DIAMETER
54	LINEAR FEET	506C041	DRILLED SHAFT CONSTRUCTION, 3'-6" DIAMETER, CLASS DS-1 CONCRETE
111	LINEAR FEET	506C045	DRILLED SHAFT CONSTRUCTION, 5'-6" DIAMETER, CLASS DS-1 CONCRETE
127	LINEAR FEET	506C047	DRILLED SHAFT CONSTRUCTION, 6'-6" DIAMETER, CLASS DS-1 CONCRETE
7,660	POUNDS	508A000	STRUCTURAL STEEL
1	LUMP SUM	508B000	STRUCTURAL STEEL SUPERSTRUCTURE, 200' - 275' - 200' CONTINUOUS SPAN, APPROXIMATELY 2,407,400 POUNDS (SPECIALTY ITEM)
790	CUBIC YARDS	510A007	BRIDGE SUBSTRUCTURE CONCRETE
1	LUMP SUM	510C051	BRIDGE CONCRETE SUPERSTRUCTURE, STA.109+05, APPROXIMATELY 281 CUBIC YARDS
4,182	SQUARE YARDS	510E000	GROOVING CONCRETE BRIDGE DECK
15	EACH	511A004	ELASTOMERIC BEARING, TYPE 4
5	EACH	511A005	ELASTOMERIC BEARING, TYPE 5
30	EACH	511A073	ELASTOMERIC BEARING, TYPE 4 (MARK V84)
1,333	LINEAR FEET	513B017	PRETENSIONED - PRESTRESSED CONCRETE GIRDERS, TYPE BT-72, (SPECIALTY ITEM)

BRIDGE GENERAL NOTES

(SEE BRIDGE SPECIAL DRAWING SBN-1)

ROADWAYS 44'-0" WITH BARRIER RAILS

1. 2012
2. HS 20-44
3.
4.
5. 1A
6.
7.
8.
9.
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11.
12.
13.
14.
15.
16.
17.
18.

◆CHECK SAMPLE REQUIRED FROM FIRST 18" OF 2¼" THICK BOTTOM FLANGE PLATE OF GIRDER NO. 1 IN SPAN NO. 4.

REQUIRED

3	90'-0" PRETENSIONED-PRESTRESSED CONCRETE GIRDER SIMPLE SPAN CONTINUOUS DECK (TYPE BT-72)	BRIDGE SHEETS 6, 7, AND 8
1	200' - 275' - 200' WELDED PLATE STEEL GIRDER CONTINUOUS SPAN	BRIDGE SHEETS 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, AND 20
1	REINFORCED CONCRETE ABUTMENT WITH DRILLED SHAFTS (3'-6" DIAMETER)	BRIDGE SHEETS 25 AND 26
1	REINFORCED CONCRETE ABUTMENT KEYED IN ROCK	BRIDGE SHEETS 27, 28, AND 29
3	REINFORCED CONCRETE BENTS WITH DRILLED SHAFTS (5'-6" DIAMETER)	BRIDGE SHEETS 30, 31, 32, AND 33
2	REINFORCED CONCRETE BENTS WITH DRILLED SHAFTS (6'-6" DIAMETER)	BRIDGE SHEETS 34, 35, 36, AND 37
	TEST BORING RECORD	BRIDGE SHEETS 38, 39, 40, 41, 42, AND 43
	STANDARD BRIDGE NOTES	BRIDGE SPECIAL PROJECT DRAWING NO. SBN-1
	STANDARD BRIDGE DETAILS	BRIDGE SPECIAL PROJECT DRAWING NO. SBD-1
	BRIDGE BARRIER RAIL	BRIDGE SPECIAL PROJECT DRAWING NO. BBR-1
	STANDARD PRESTRESSED GIRDER DETAILS	BRIDGE SPECIAL PROJECT DRAWING SPGD-1
	EDGE BEAM DETAILS FOR TYPE BT72 GIRDERS	BRIDGE SPECIAL PROJECT DRAWING EBEW72
	BRIDGE END SLAB	BRIDGE SPECIAL PROJECT DRAWING NO. BES-450(1)BP
	EXISTING BRIDGE SHEETS	BRIDGE SHEETS E1 AND E2

SPECIAL NOTES

STRUCTURAL STEEL SUPERSTRUCTURE 200' - 275' - 200' CONTINUOUS SPAN

AASHTO M270 GRADE 36 ---------- 18,066 LBS.

AASHTO M270 GRADE 50 ---------- 2,089,010 LBS.

PAY ITEM 508-B IS FOR GRADE 36 AND GRADE 50 STEEL IN THE FOLLOWING:

WEB AND FLANGE PLATES, BEARING STIFFENERS, TRANSVERSE STIFFENERS, JACKING STIFFENERS, INTERMEDIATE AND BEARING DIAPHRAMS, INTERMEDIATE DIAPHRAM CONNECTION PLATES, FIELD SPLICE PLATES AND BOLTS, SHEAR STUDS, EXPANSION DAMS.

FOR BIDDING PURPOSES ONLY. DESIGN PROCESS NOT COMPLETED. PLANS NOT APPROVED FOR CONSTRUCTION. THESE PLANS ARE PREPARED FOR THE USE BY THE ALABAMA DEPARTMENT OF TRANSPORTATION AND ITS AUTHORIZED AGENTS. ANY UNAUTHORIZED USE OF THESE DRAWINGS SHALL BE LIMITED TO THE ILLUSTRATION OF THE JOB.

DESIGN SECTION SUPERVISOR

ASSISTANT BRIDGE ENGINEER

BRIDGE ENGINEER

ALABAMA DEPARTMENT OF TRANSPORTATION

BRIDGE SHEET NO. 1 OF 43

REVISIONS

PROJECT NO. BRF-0017 (516)

BRIDGE REPLACEMENT ON STATE ROUTE 17 OVER NORTH FORK CREEK 6 MILES NORTH-NORTHEAST AND HACKLEBURG

STATION 109+05

MARION COUNTY

INDEX OF BRIDGE SHEETS, BRIDGE GENERAL NOTES, ESTIMATED QUANTITIES AND REQUIRED

ESTIMATED QUANTITIES	DESIGNED BY:	DRAWN BY: A.THOMPSON
COMPUTED BY:	CHECKED BY:	DATE DRAWN: 5/2016
CHECKED BY:	DATE CHECKED:	SCALE: NONE

BIN: 020594

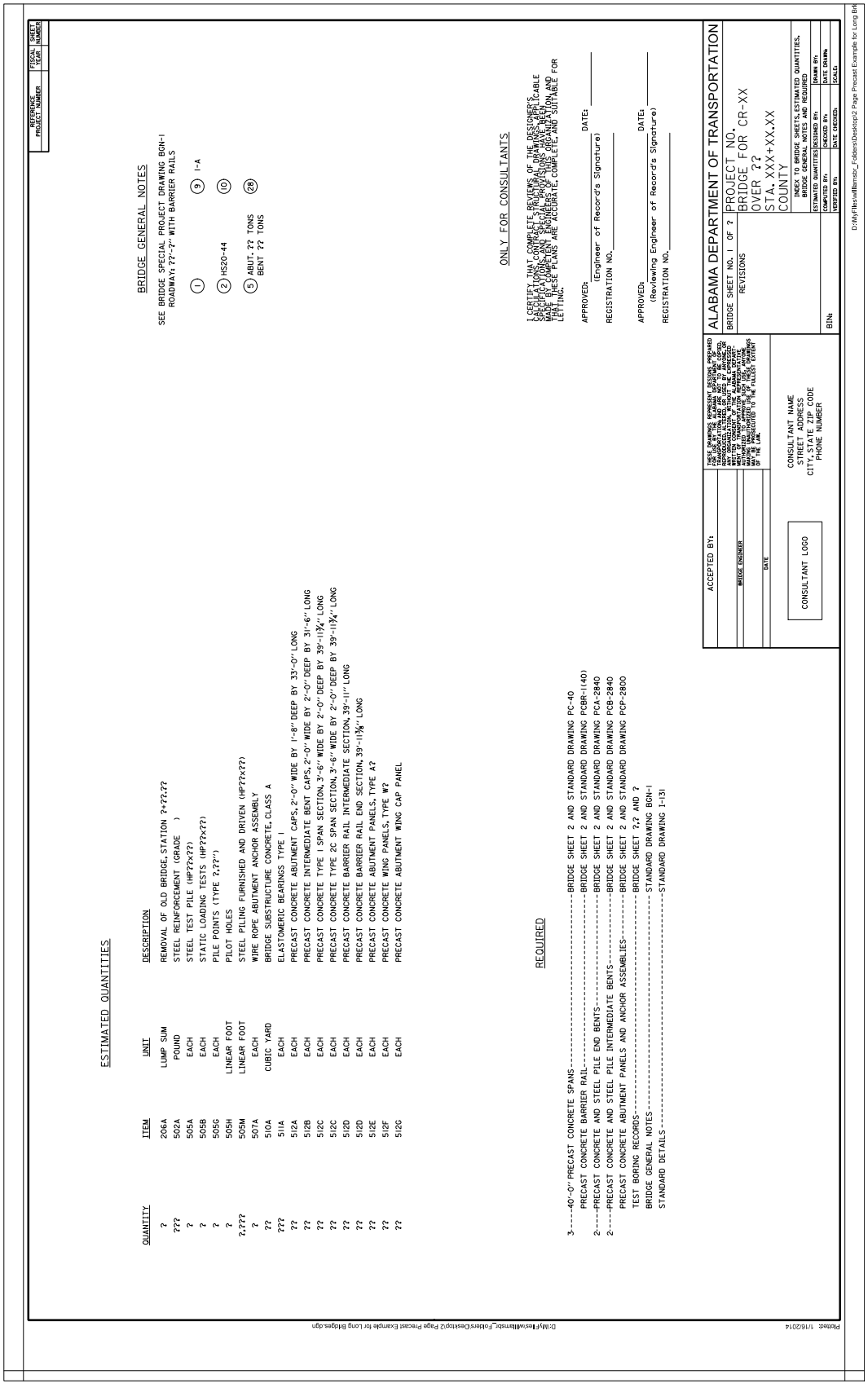
REFERENCE PROJECT NUMBERS: BRF-0017 (516)

FISCAL YEAR	SHEET NUMBER
2017	1

4423 0109 0104 BROPL 100050204 2 DRAWN ITT

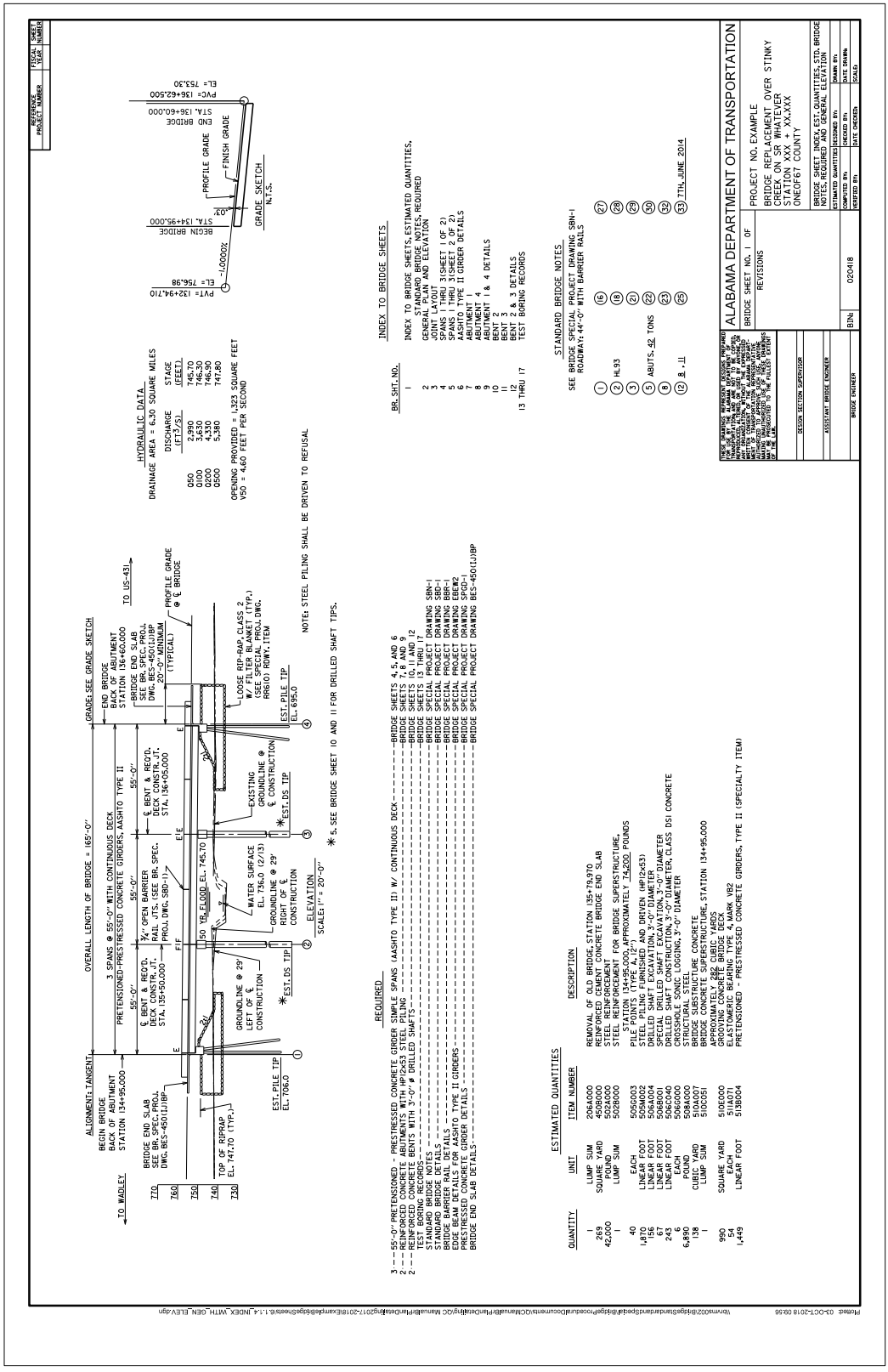
\\brvms\02\Bridge\Standards\pedal\Bridge\Procedural\Documents\QC Manual\BrPlanDetailing\QC Manual\BrPlanDetailing\2017-2018\Example\Bridge\Sheets\1.1.2_INDEX_QUANTITIES_REQUIRED_NOTES.dgn Plotted: 03-OCT-2018 10:40

1.1.3 Index/Quantities/Required/Notes (Precast)

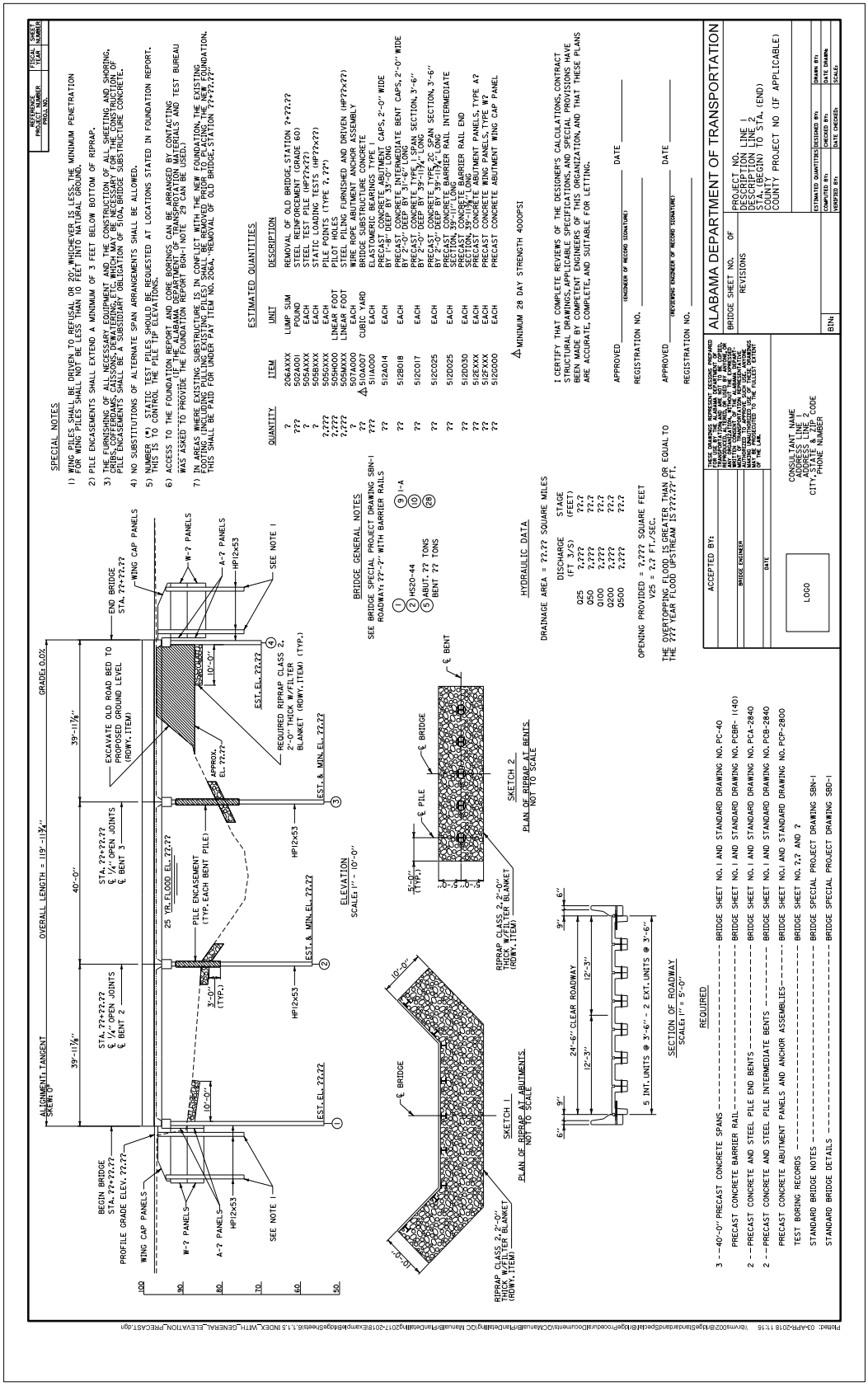


1.1.4 Combined w/General Elevation (optional)

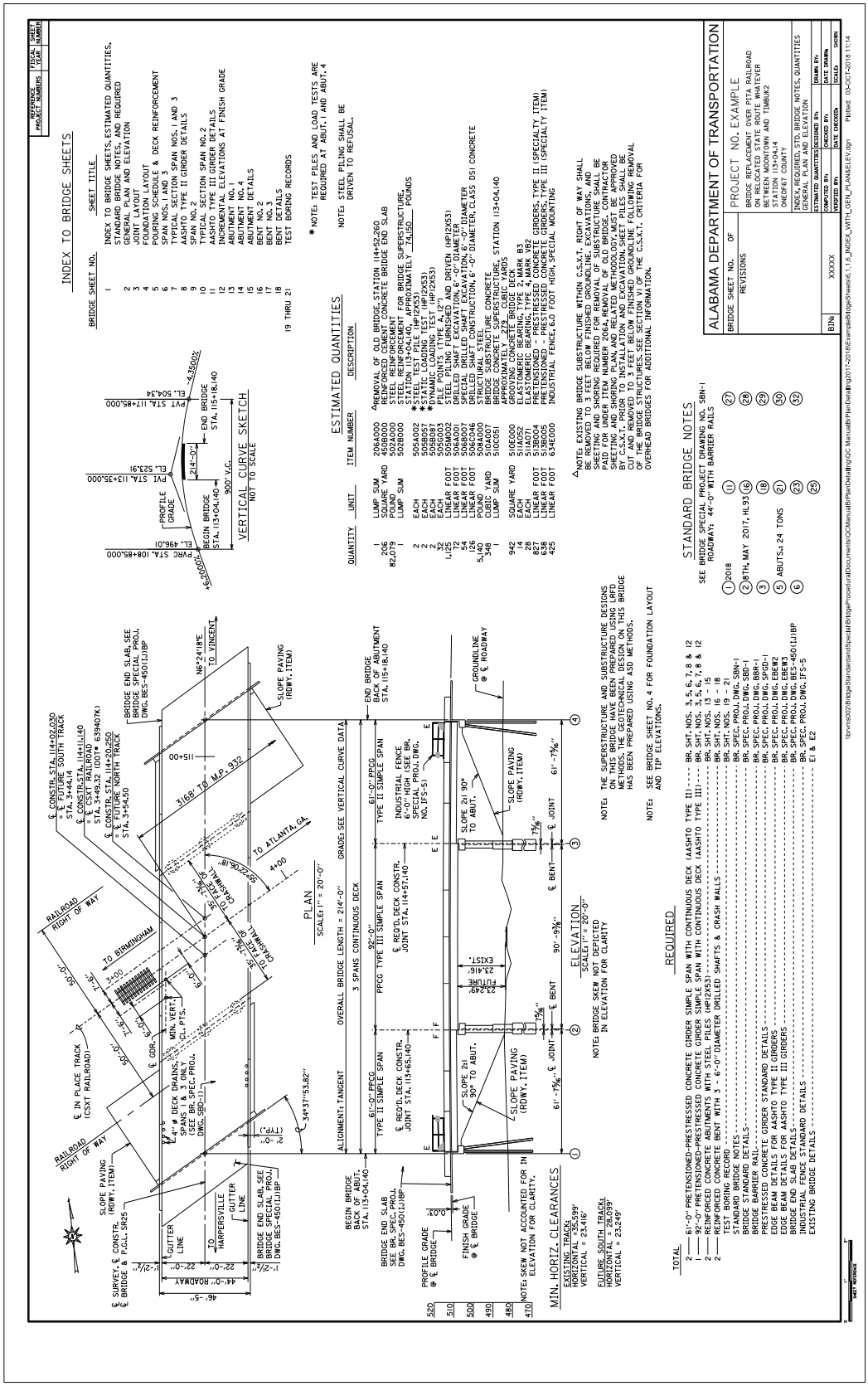
When the bridge is simple, the General Elevation may be combined with the Index Sheet. The General Plan may be omitted when there are no topographic features that necessitate inclusion of a plan view.



1.1.5 Combined w/Gen. Elev. (opt.) (Precast)

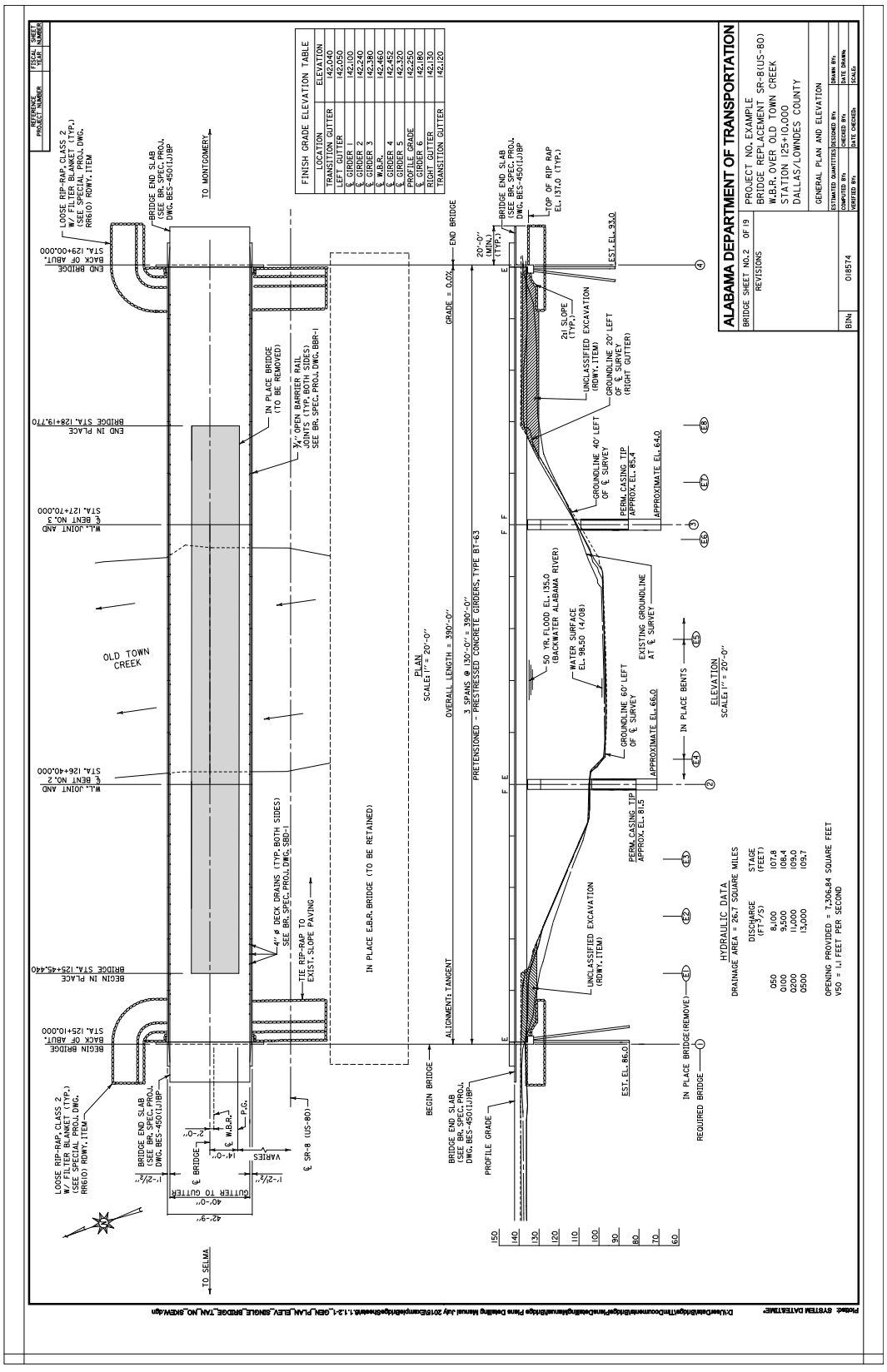


1.1.6 Combined w/General Plan & Elev. (optional)

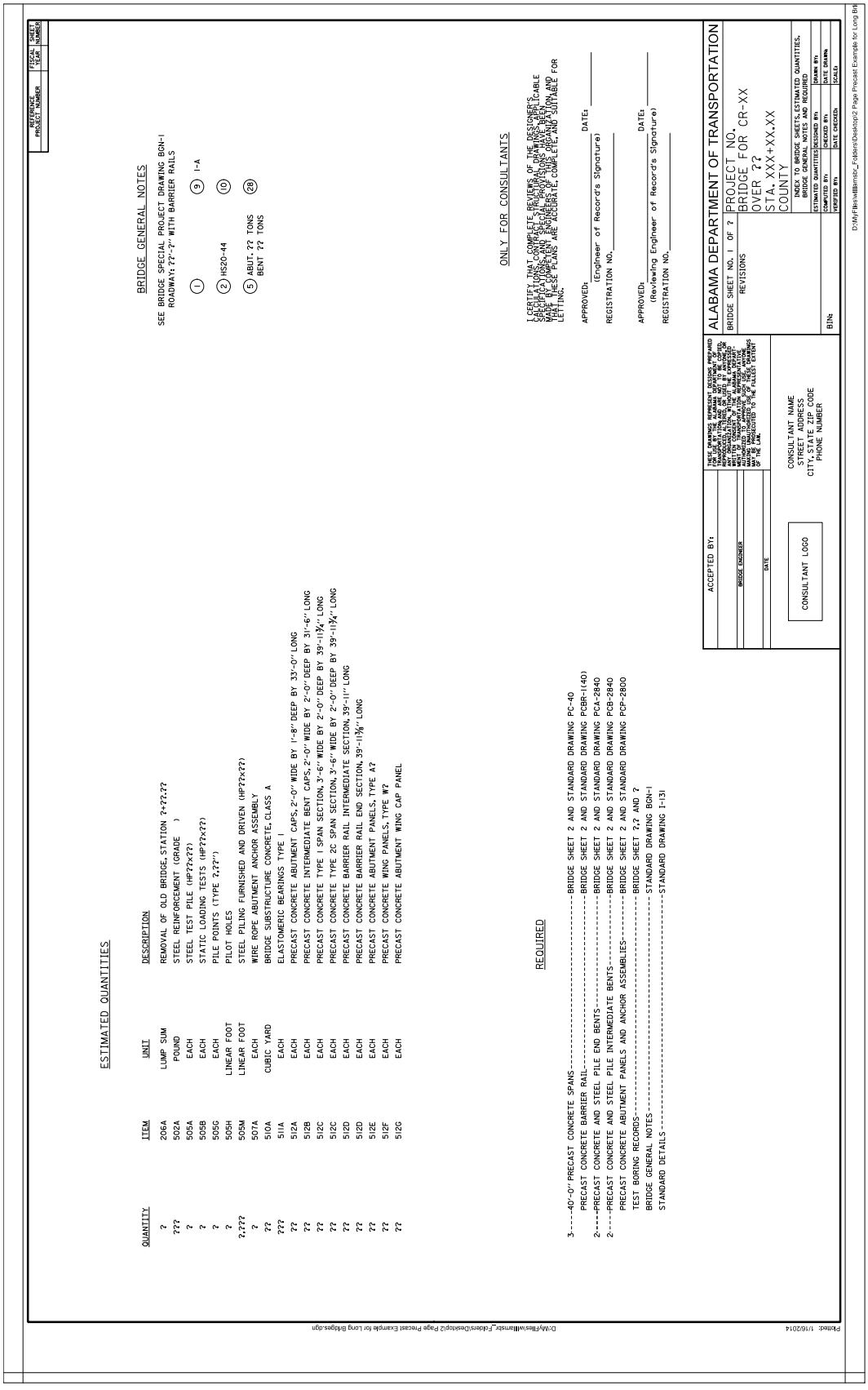


1.2 General Plan & Elevation Sheets

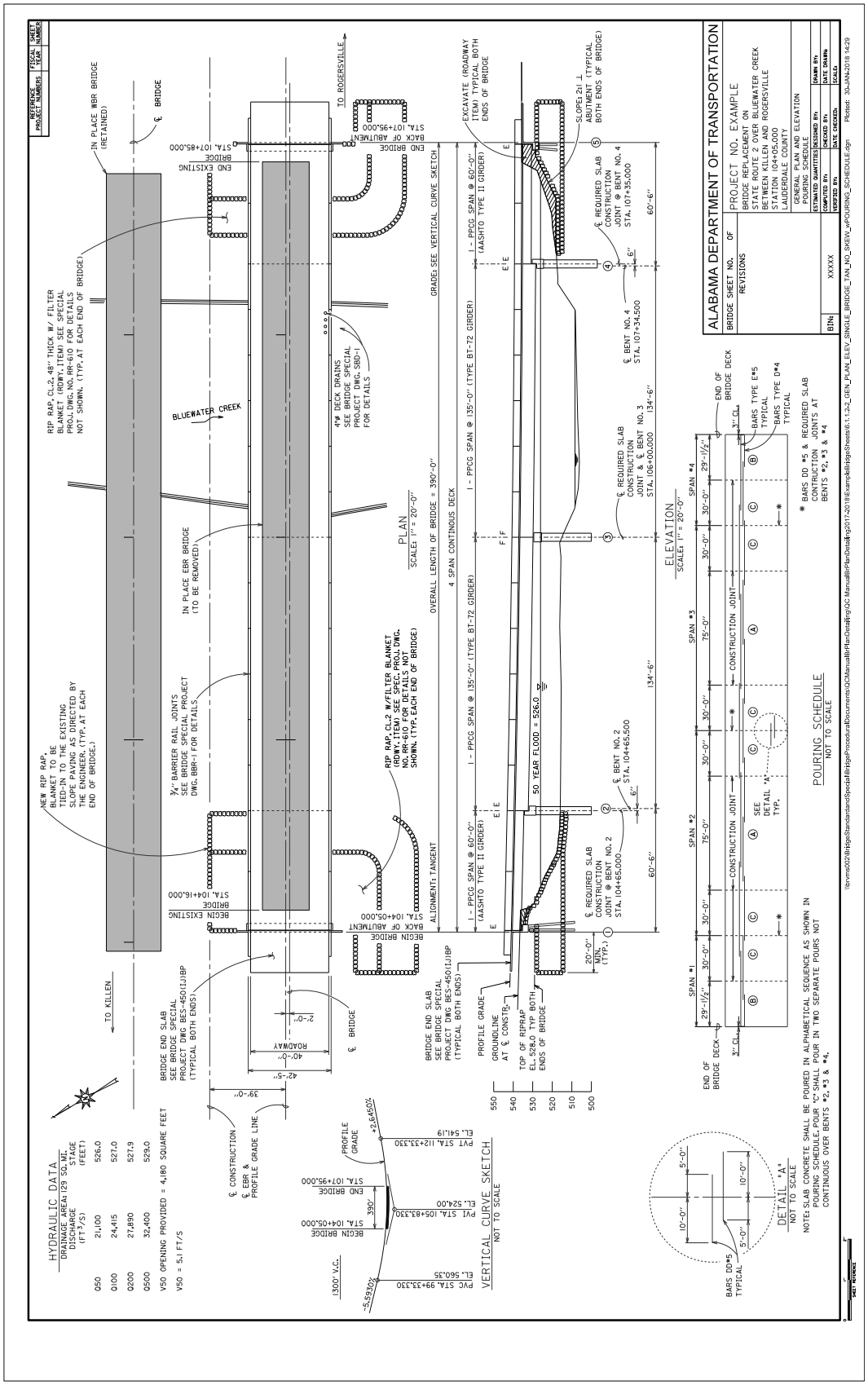
1.2.1 General Plan & Elevation, Single Bridge, Tangent, No Skew



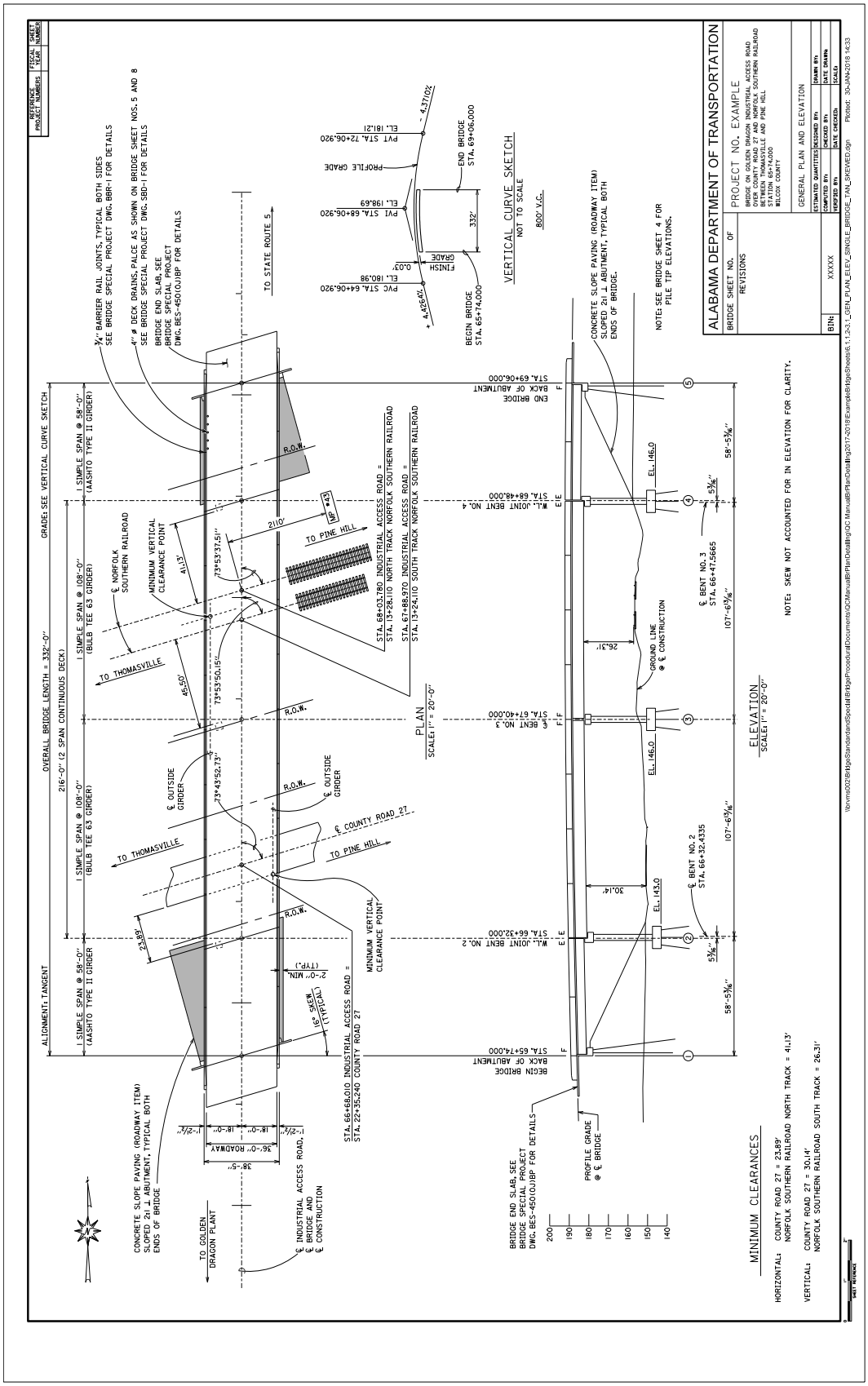
1.2.2 General Elevation, Single Bridge, Tangent, No Skew (Precast)



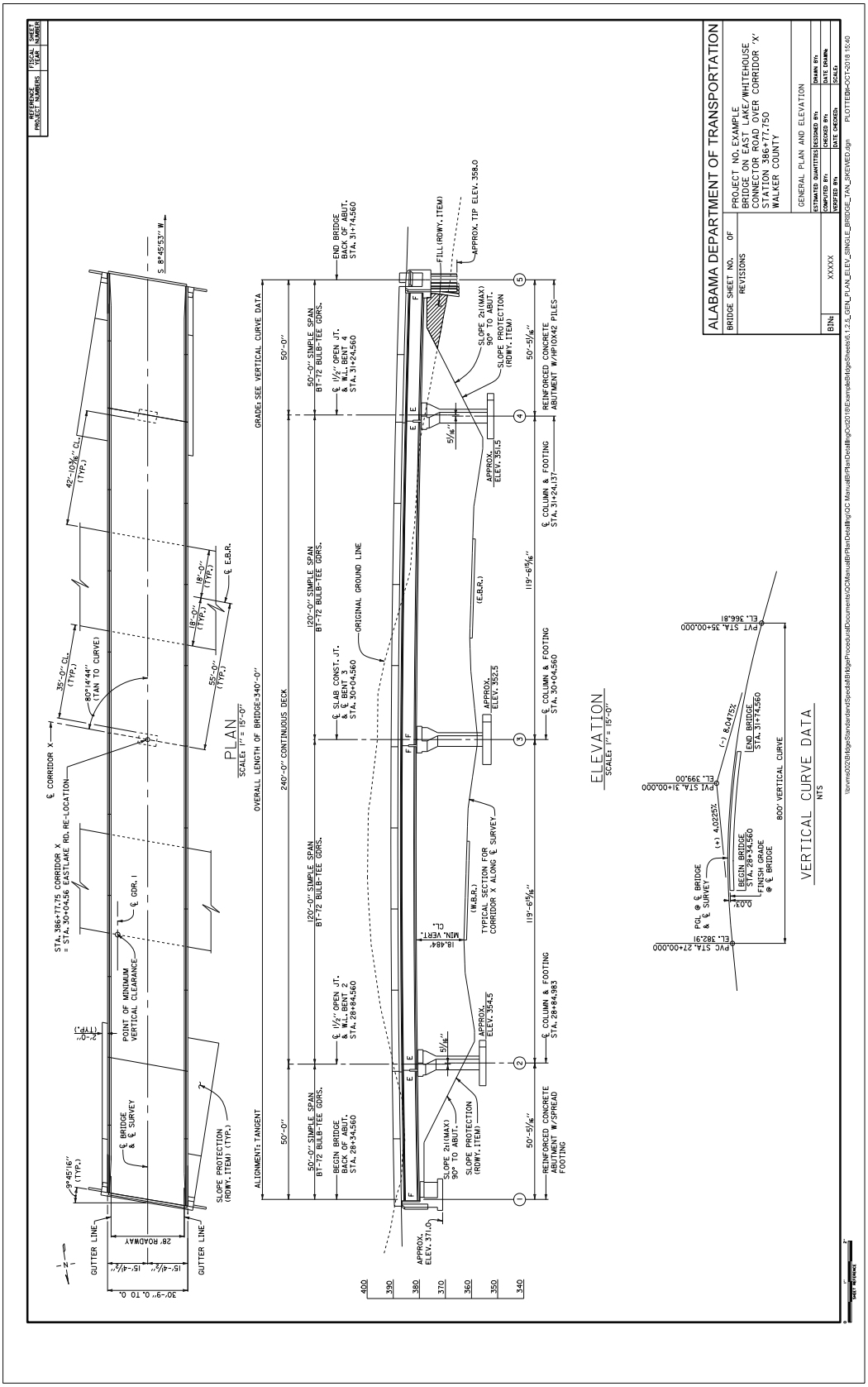
1.2.3 General Plan & Elevation, Single Bridge, Tangent, No Skew, w/ Pouring Schedule (Opt.)



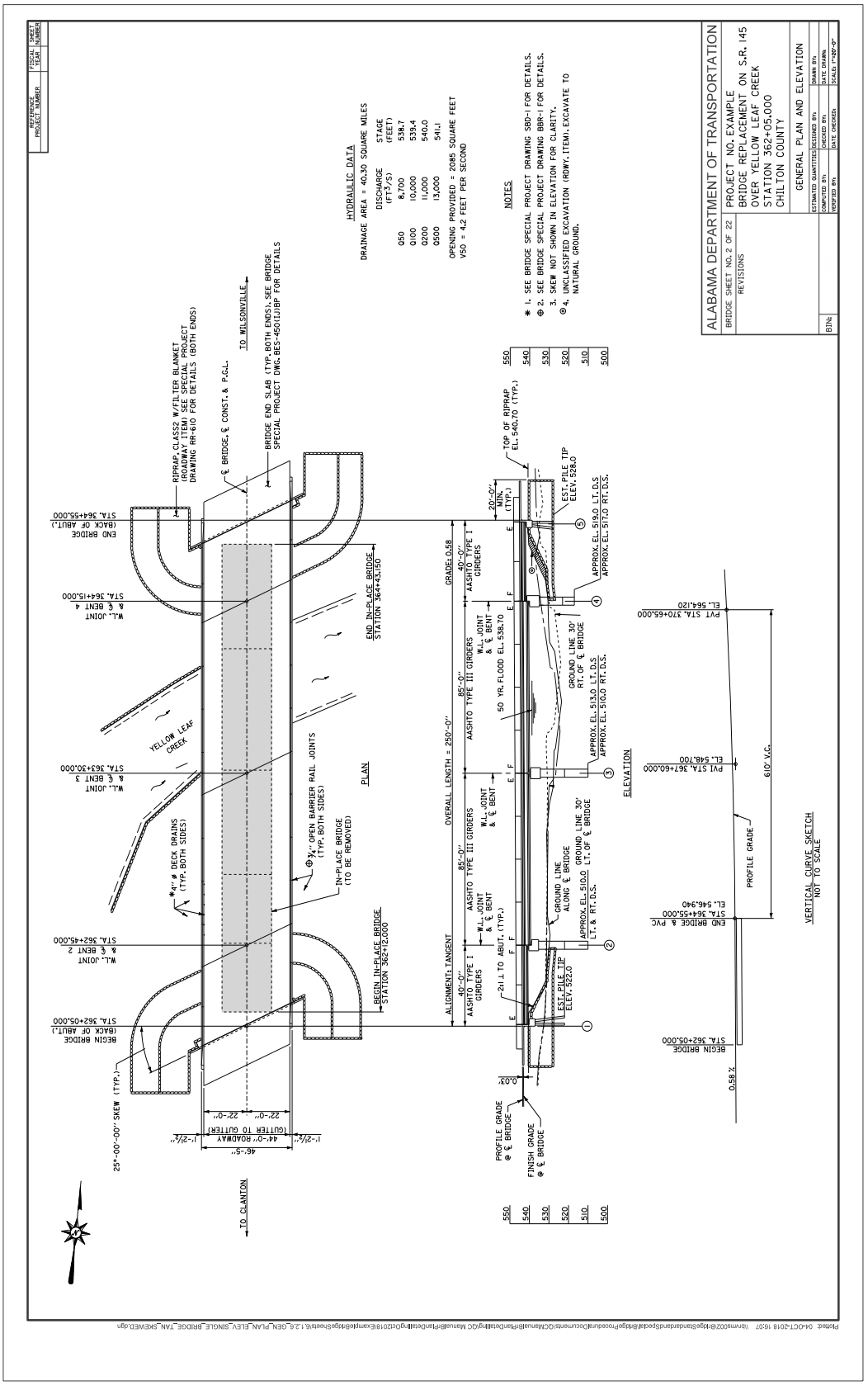
1.2.4 General Plan & Elevation, Single Bridge, Tangent, Skewed



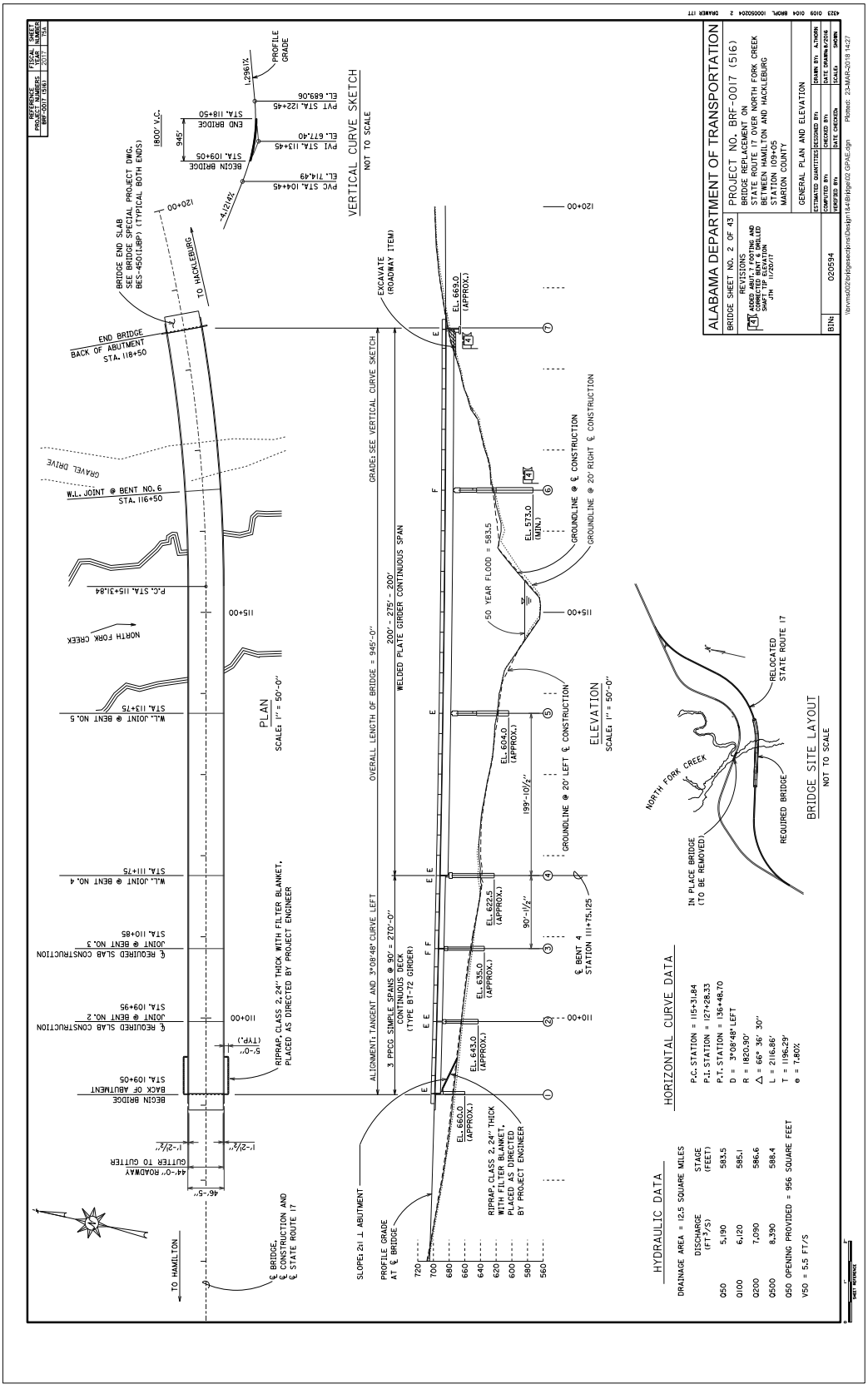
1.2.5 General Plan & Elevation, Single Bridge, Tangent, Skewed



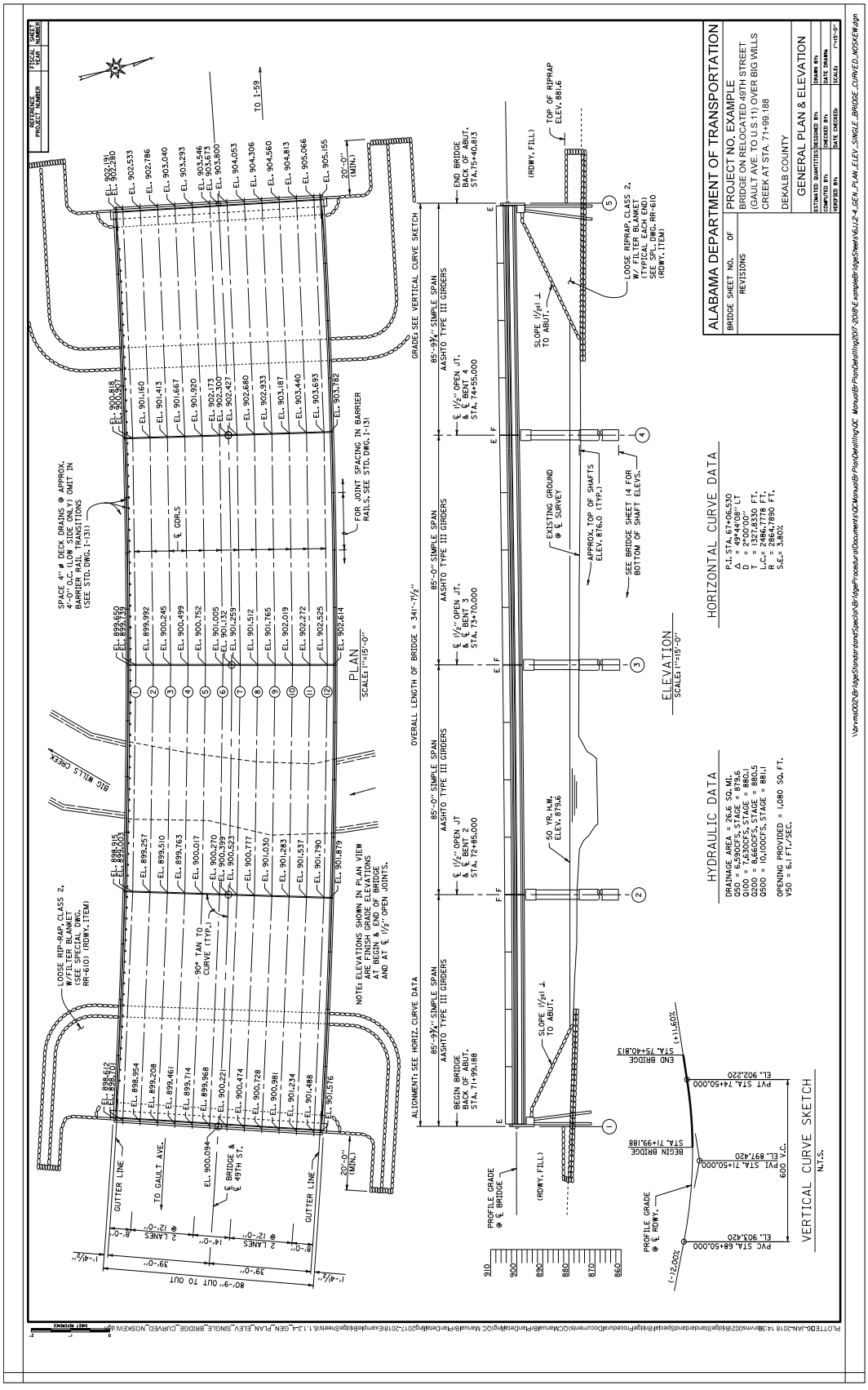
1.2.6 General Plan& Elevation, Single Bridge, Tangent, Skewed



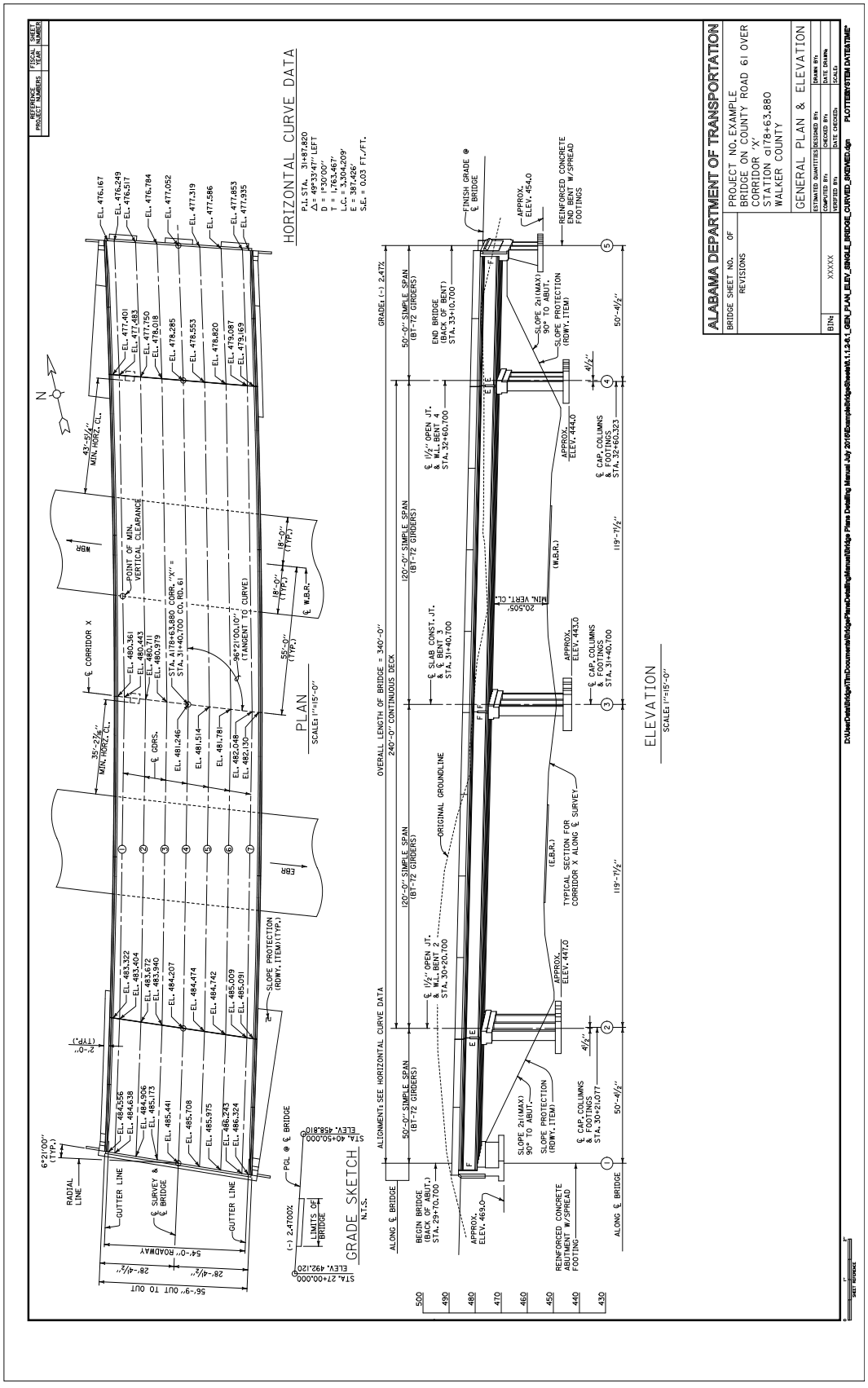
1.2.7 General Plan & Elevation, Single Bridge, Tangent & Curved, 0 Degree Skew (Steel and Conc.)



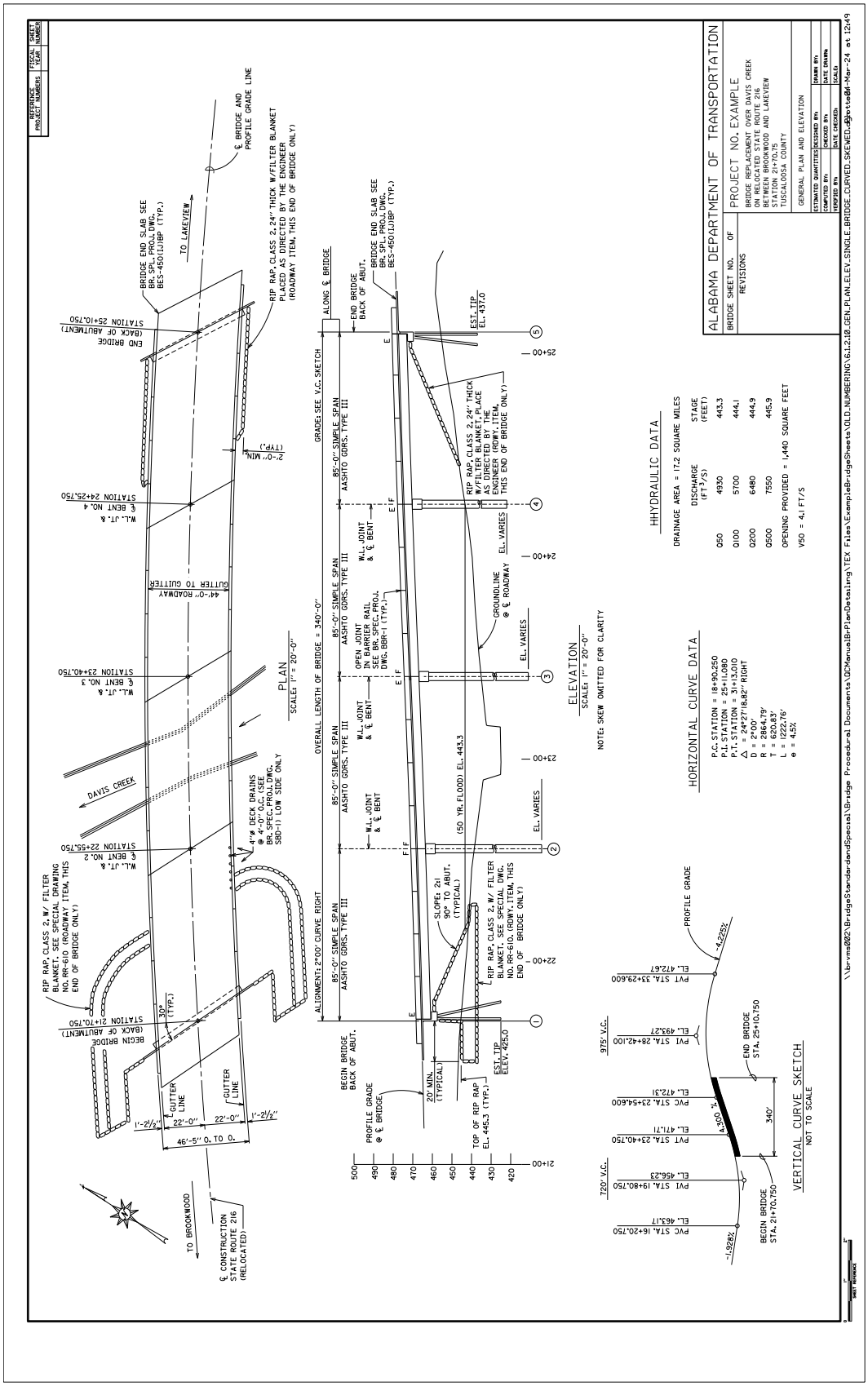
1.2.8 General Plan & Elevation, Single Bridge, Curved, Skewed



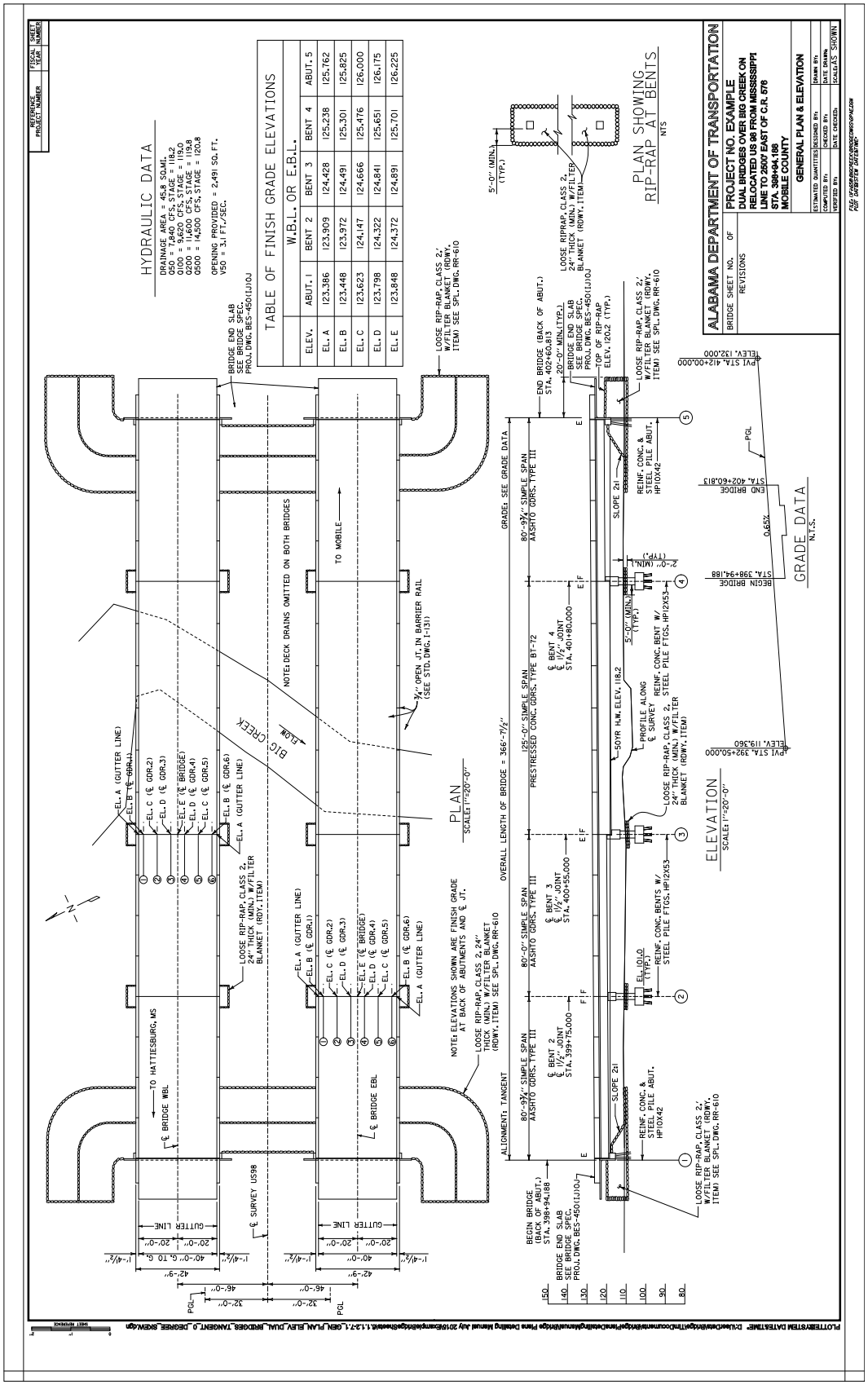
1.2.9 General Plan& Elevation, Single Bridge, Curved, Skewed



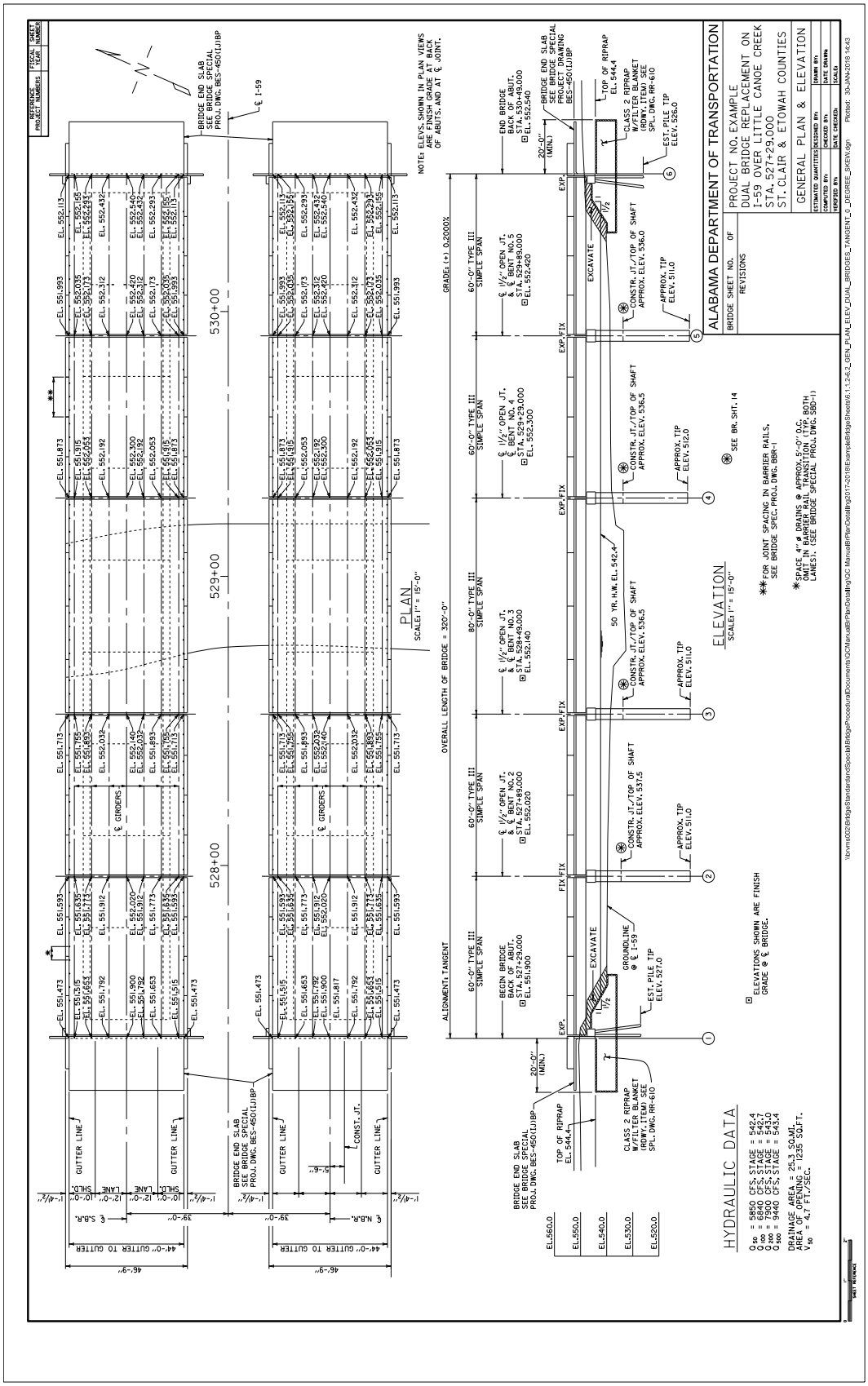
1.2.10 General Plan & Elevation, Dual Bridges, Tangent, 0 Degree Skew



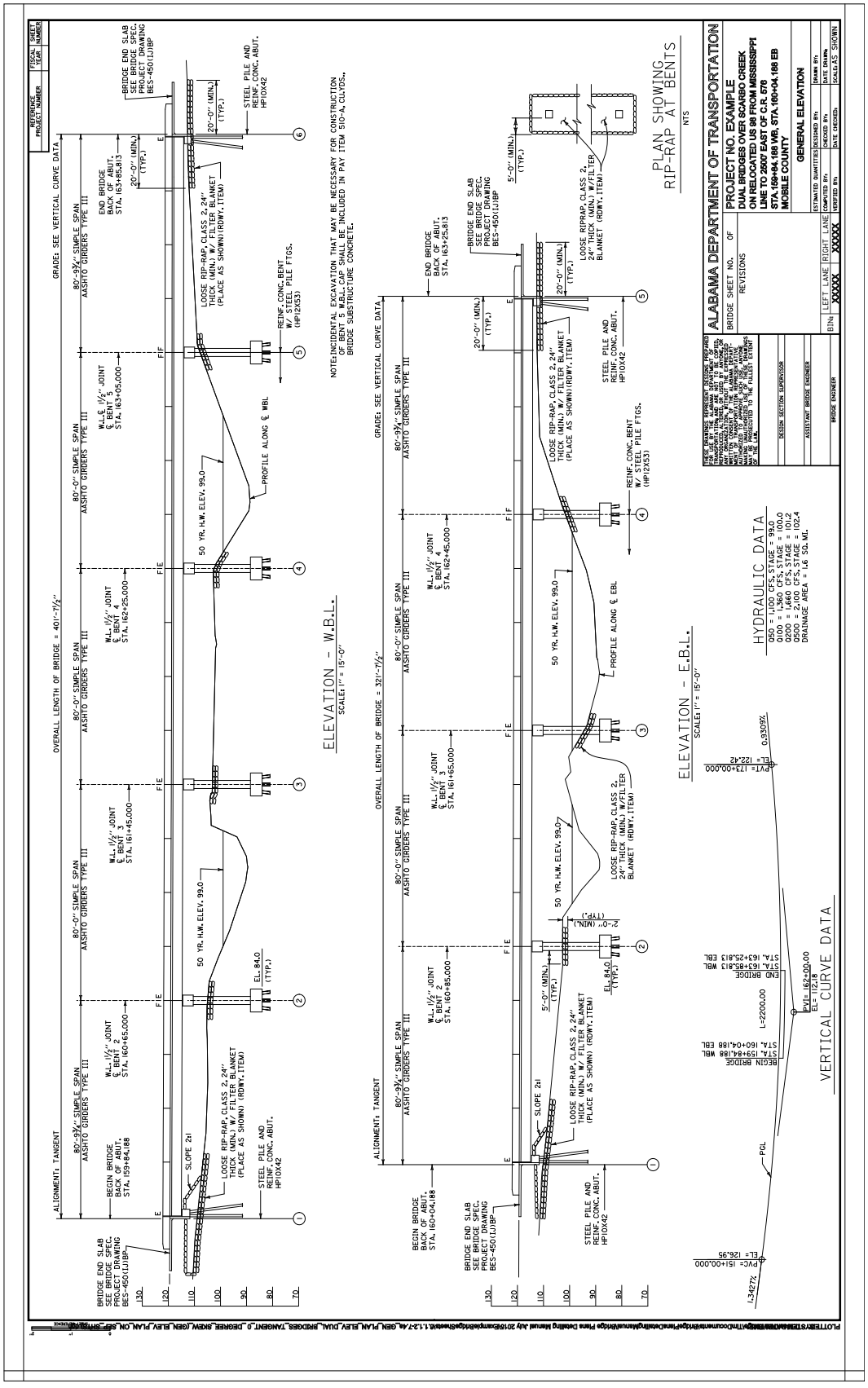
1.2.11 General Plan & Elevation, Dual Bridges, Tangent, 0 Degree Skew

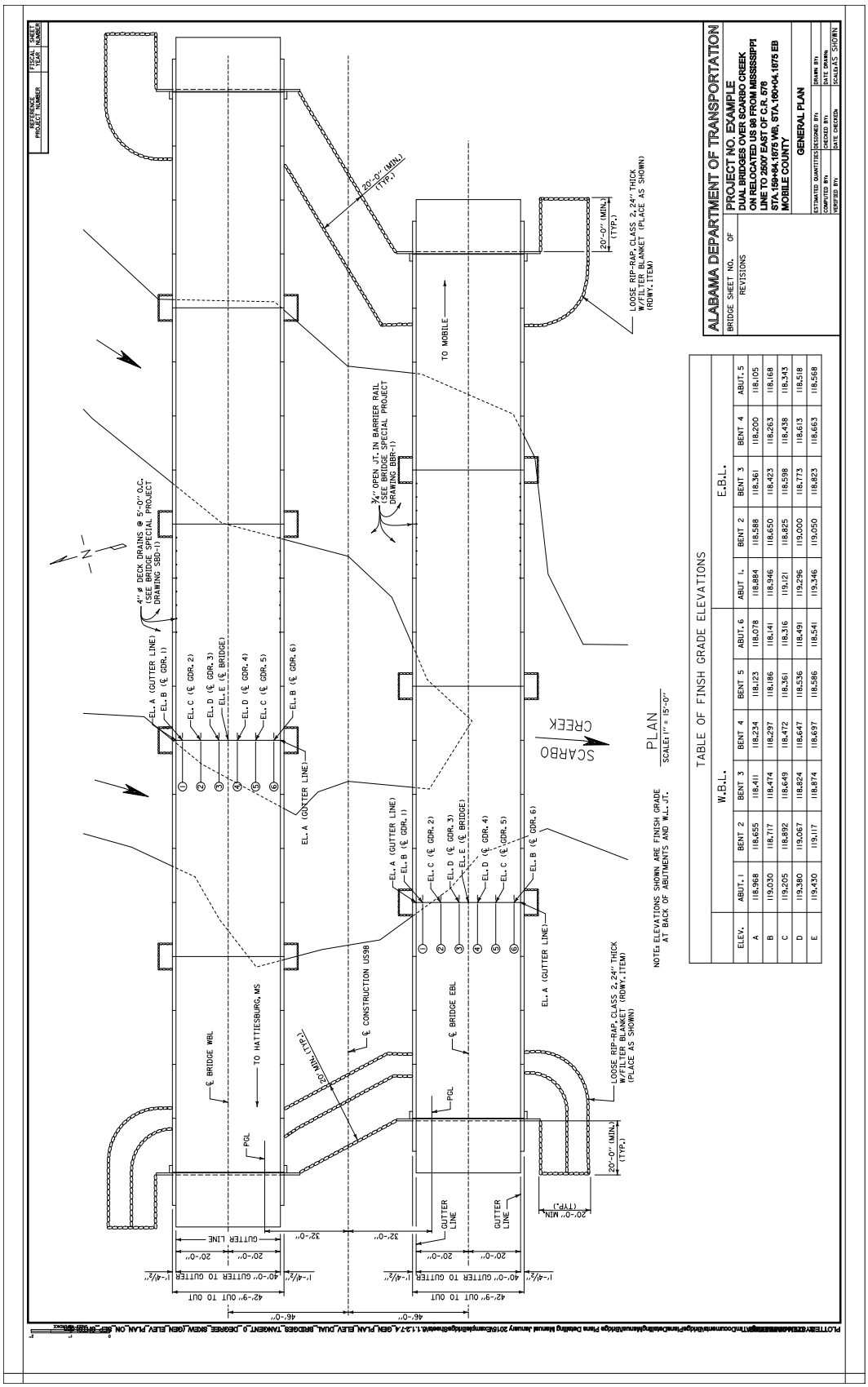


1.2.12 General Plan & Elevation, Dual Bridges, Tangent, 0 Degree Skew

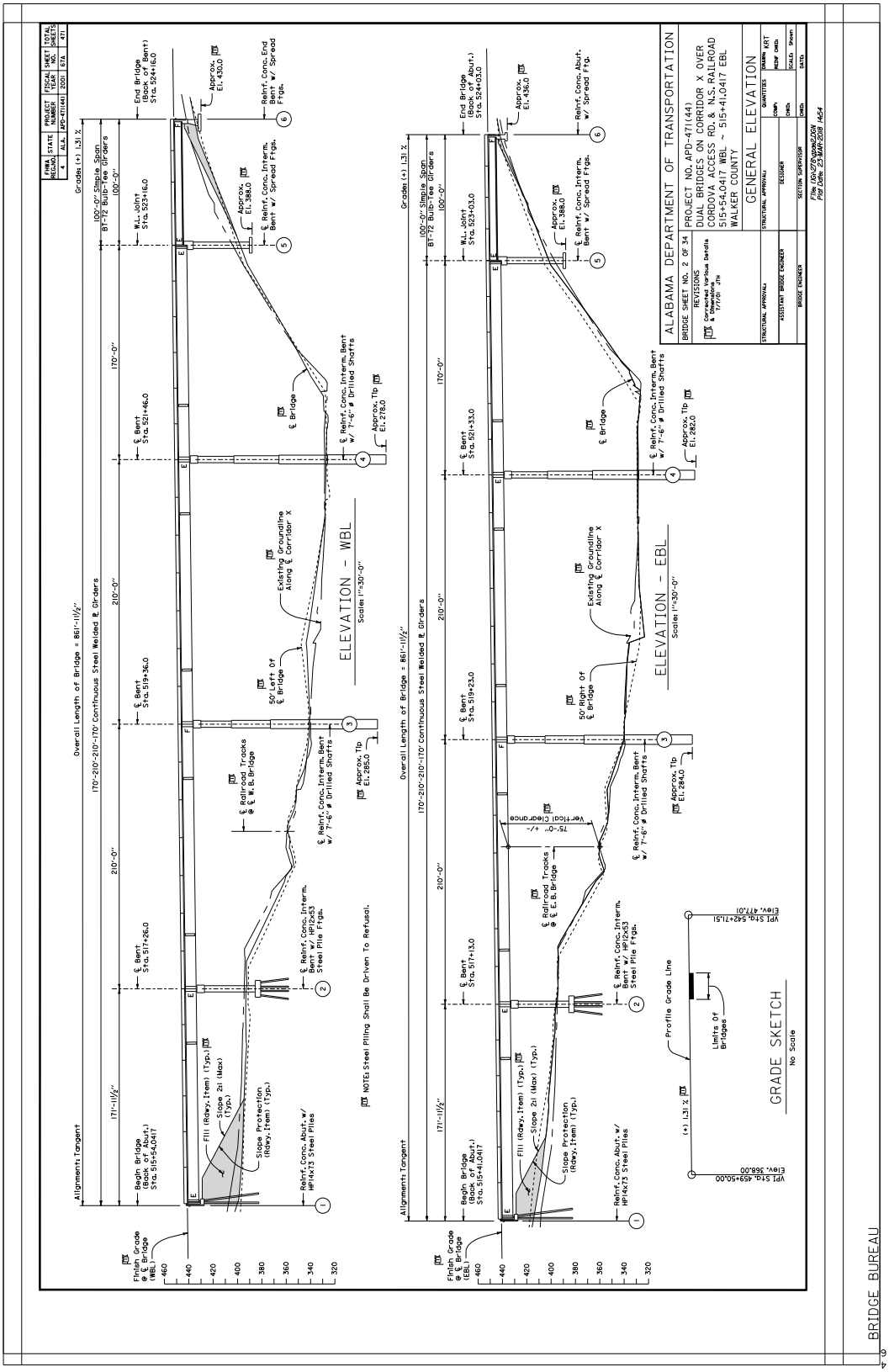


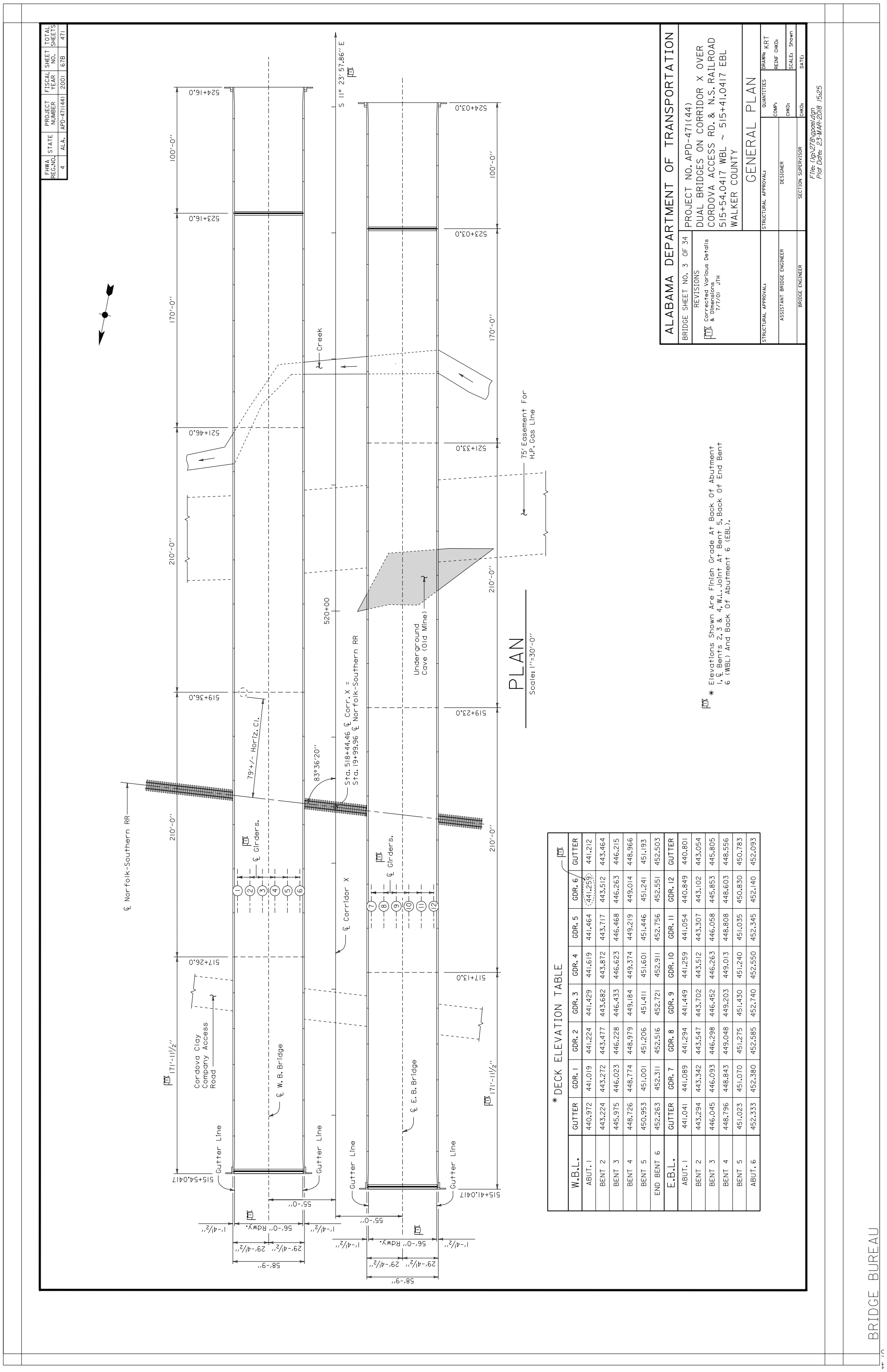
1.2.13 General Plan & Elevation, Dual Bridges, Tangent, 0 Degree Skew, Elevation, Plan on Sep. Shts.




ALABAMA DEPARTMENT OF TRANSPORTATION
PROJECT NO. EXAMPLE
DUAL BRIDGES OVER SCARBO CREEK
ON RELOCATED US 98 FROM MISSISSIPPI
LINE TO 2500' EAST OF C.R. 576
STA. 159+84.1875 WB, STA. 160+04.1875 EB
MOBILE COUNTY
GENERAL PLAN
BRIDGE SHEET NO. OF
REVISIONS
TABLE OF FINSH GRADE ELEVATIONS
W.B.L.
E.B.L.
ELEV. ABUT. 1 BENT 2 BENT 3 BENT 4 BENT 5 ABUT. 6 ABUT. 1 BENT 2 BENT 3 BENT 4 ABUT. 5
A 118.968 118.655 118.411 118.234 118.123 118.078 118.884 118.588 118.361 118.200 118.105
B 119.030 118.717 118.474 118.297 118.186 118.141 118.946 118.650 118.423 118.263 118.168
C 119.205 118.892 118.649 118.472 118.361 118.316 119.121 118.825 118.598 118.438 118.343
D 119.380 119.067 118.824 118.647 118.536 118.491 119.296 119.000 118.773 118.613 118.518
E 119.430 119.117 118.874 118.697 118.586 118.541 119.346 119.050 118.823 118.663 118.568
PLAN
SCALE: 1" = 15'-0"
SCARBO CREEK
TO MOBILE
TO HATTIESBURG, MS
℄ BRIDGE WBL
℄ BRIDGE EBL
℄ CONSTRUCTION US98
PGL
EL. A (GUTTER LINE)
EL. B (℄ GDR. 1)
EL. C (℄ GDR. 2)
EL. D (℄ GDR. 3)
EL. E (℄ BRIDGE)
EL. D (℄ GDR. 4)
EL. C (℄ GDR. 5)
EL. B (℄ GDR. 6)
4" ø DECK DRAINS @ 5'-0" O.C. (SEE BRIDGE SPECIAL PROJECT DRAWING SBD-1)
¾" OPEN JT. IN BARRIER RAIL (SEE BRIDGE SPECIAL PROJECT DRAWING SBR-1)
20'-0" (MIN.) (TYP.)
LOOSE RIP-RAP, CLASS 2, 24" THICK W/FILTER BLANKET (PLACE AS SHOWN) (RDWY. ITEM)
NOTE: ELEVATIONS SHOWN ARE FINISH GRADE AT BACK OF ABUTMENTS AND W.L.J.T.
GUTTER LINE
20'-0"
32'-0"
40'-0" GUTTER TO GUTTER
42'-9" OUT TO OUT
46'-0"
1'-4½"

1.2.14 General Plan & Elevation, Dual Bridges, Tangent, Skewed, Elevatioin, Plan on Separate Shts.

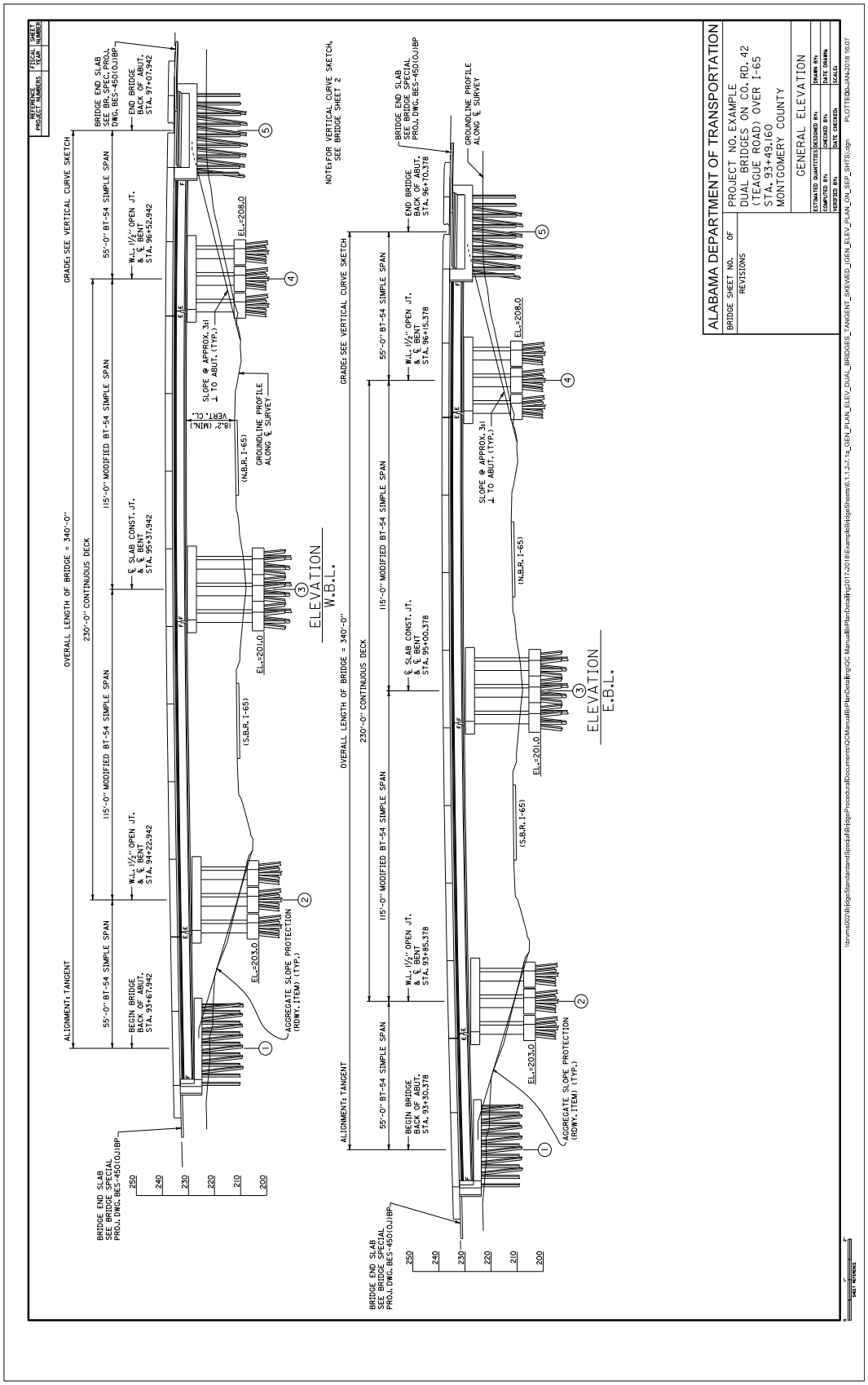


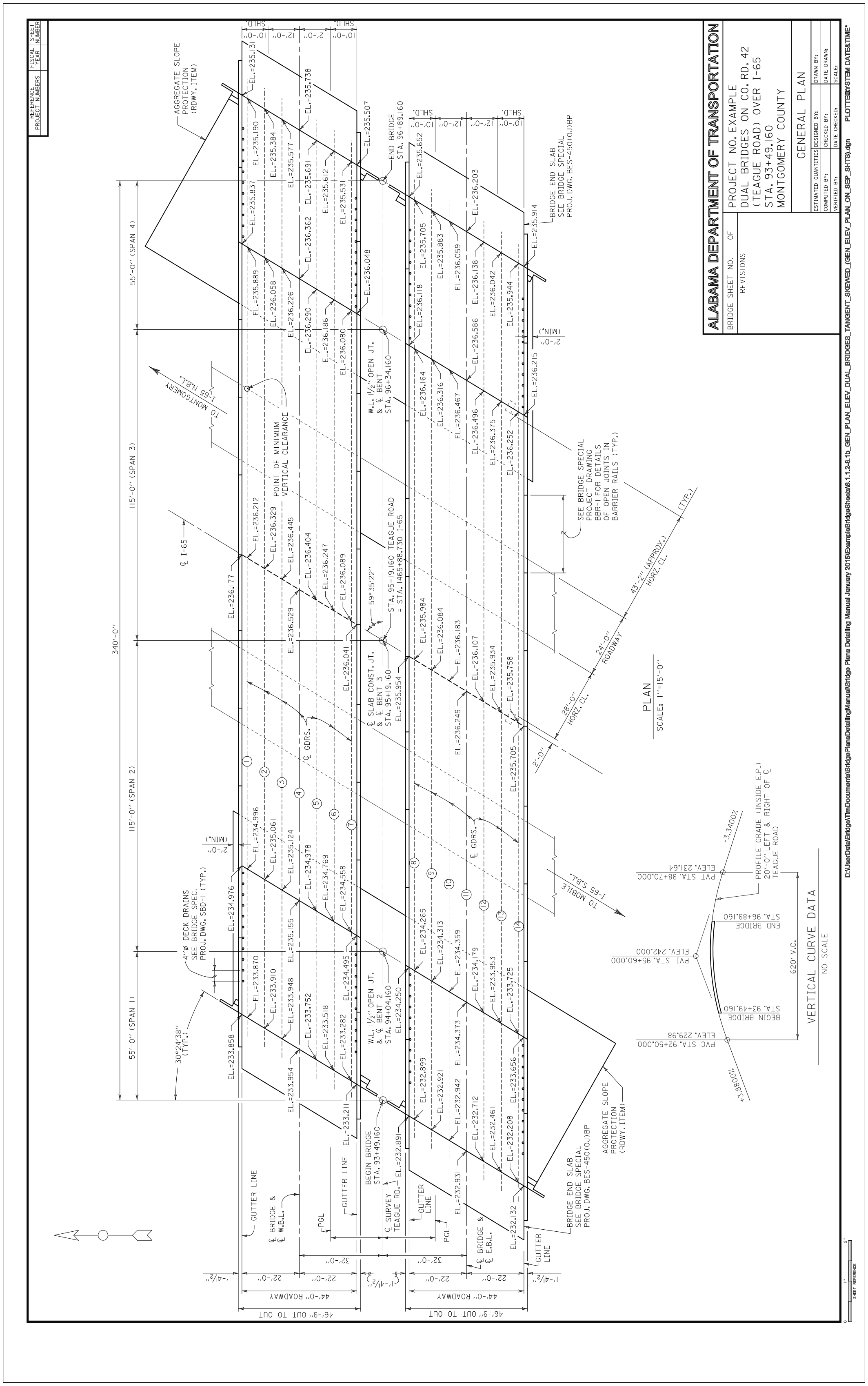


*DECK ELEVATION TABLE

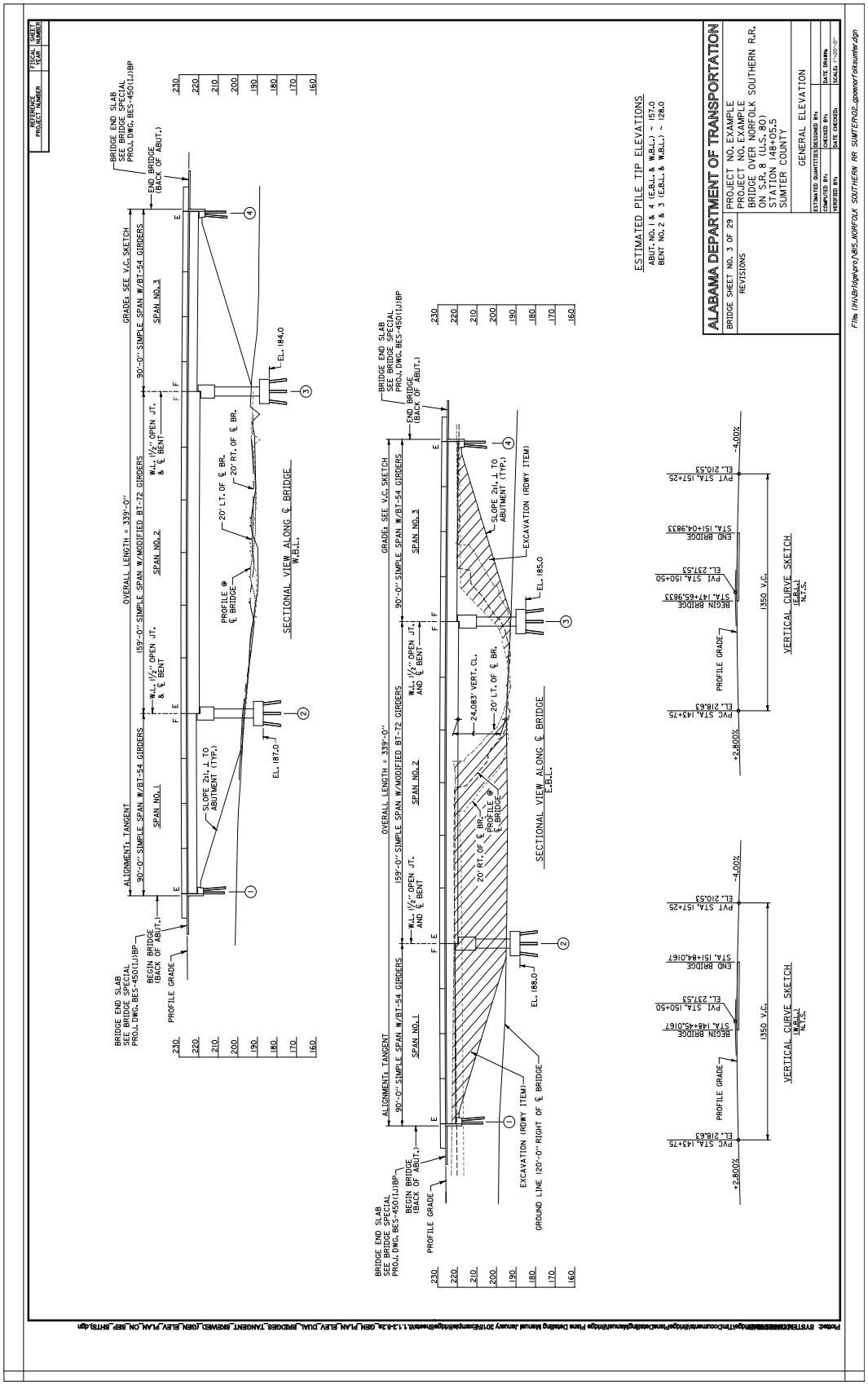
W.B.L.	GUTTER	GDR. 1	GDR. 2	GDR. 3	GDR. 4	GDR. 5	GDR. 6	GUTTER
ABUT. 1	440.972	441.019	441.224	441.429	441.619	441.464	441.259	441.212
BENT 2	443.224	443.272	443.477	443.682	443.872	443.717	443.512	443.464
BENT 3	445.975	446.023	446.228	446.433	446.623	446.468	446.263	446.215
BENT 4	448.726	448.774	448.979	449.184	449.374	449.219	449.014	448.966
BENT 5	450.953	451.001	451.206	451.411	451.601	451.446	451.241	451.193
END BENT 6	452.263	452.311	452.516	452.721	452.911	452.756	452.551	452.503
E.B.L.	GUTTER	GDR. 7	GDR. 8	GDR. 9	GDR. 10	GDR. 11	GDR. 12	GUTTER
ABUT. 1	441.041	441.089	441.294	441.449	441.259	441.054	440.849	440.801
BENT 2	443.294	443.342	443.547	443.702	443.512	443.307	443.102	443.054
BENT 3	446.045	446.093	446.298	446.452	446.263	446.058	445.853	445.805
BENT 4	448.796	448.843	449.048	449.203	449.013	448.808	448.603	448.556
BENT 5	451.023	451.070	451.275	451.430	451.240	451.035	450.830	450.783
ABUT. 6	452.333	452.380	452.585	452.740	452.550	452.345	452.140	452.093

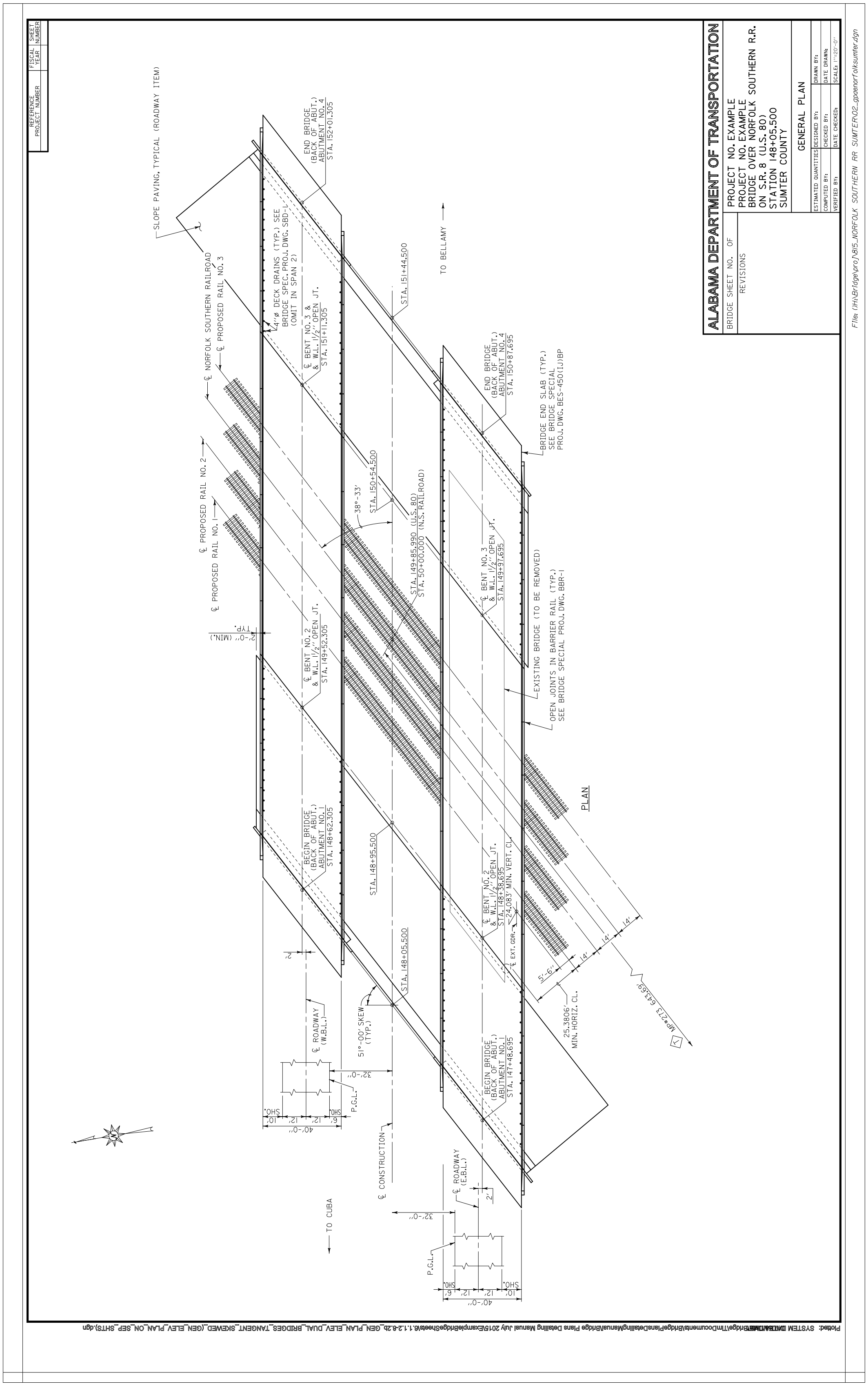
1.2.15 General Plan & Elevation, Dual Bridges, Tangent, Skewed, Elevation, Plan on Separate Shts.



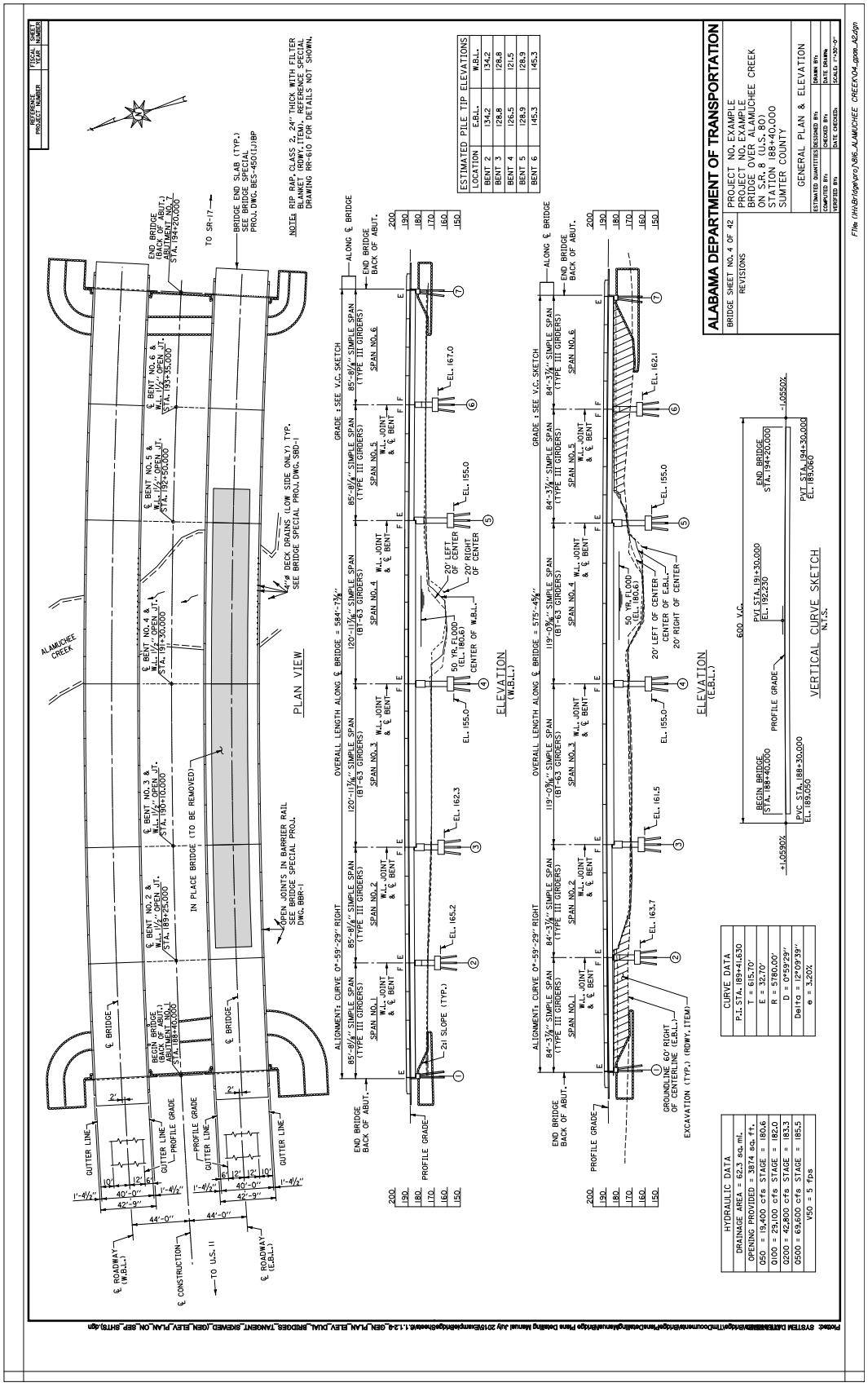

ALABAMA DEPARTMENT OF TRANSPORTATION
PROJECT NO. EXAMPLE
DUAL BRIDGES ON CO. RD. 42
(TEAGUE ROAD) OVER I-65
STA. 93+49.160
MONTGOMERY COUNTY
GENERAL PLAN
PLAN
SCALE: 1"=15'-0"
VERTICAL CURVE DATA
NO SCALE

1.2.16 General Plan & Elevation, Dual Bridges, Tangent, Skewed, Elevation, Plan on Separate Shts.

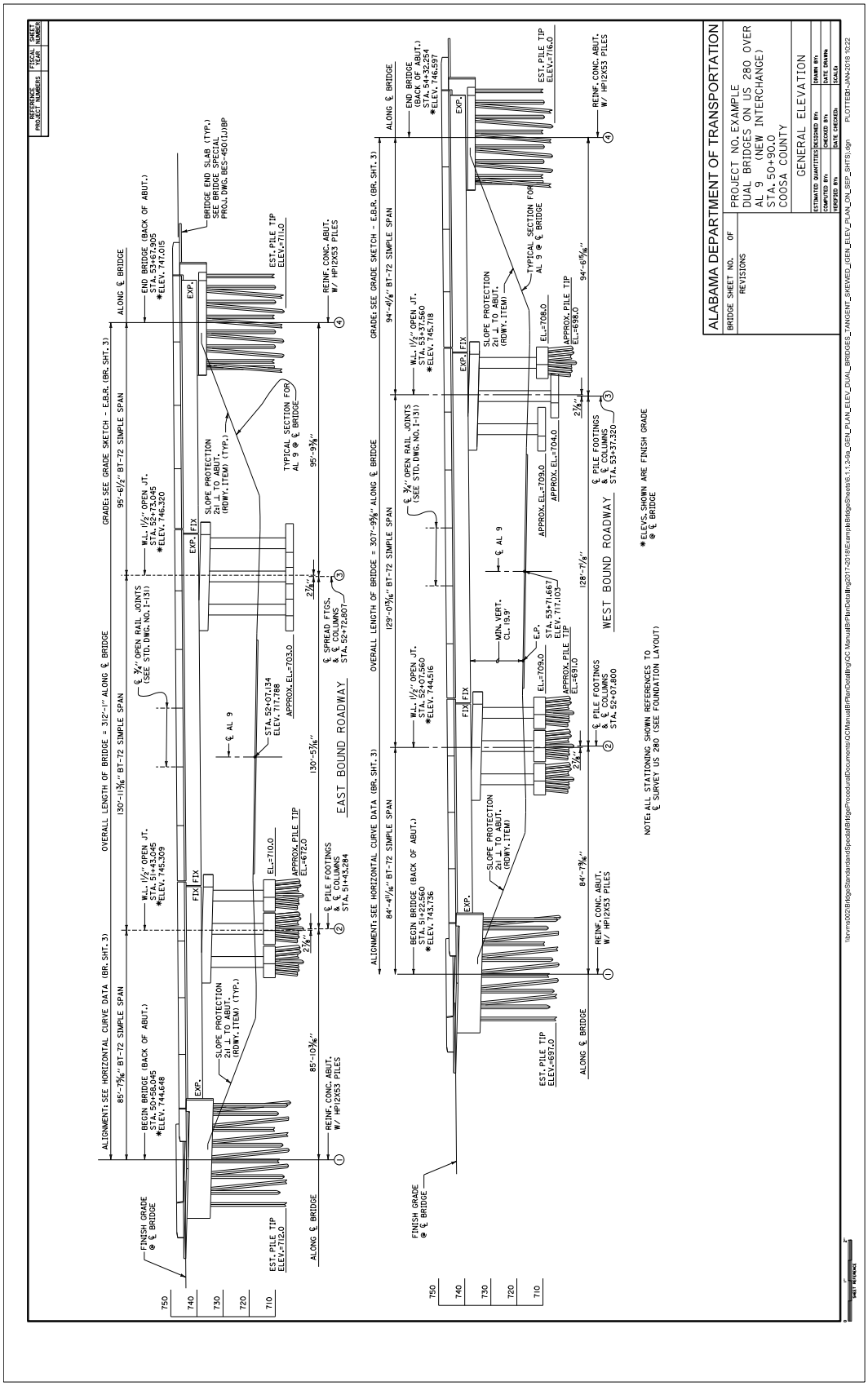


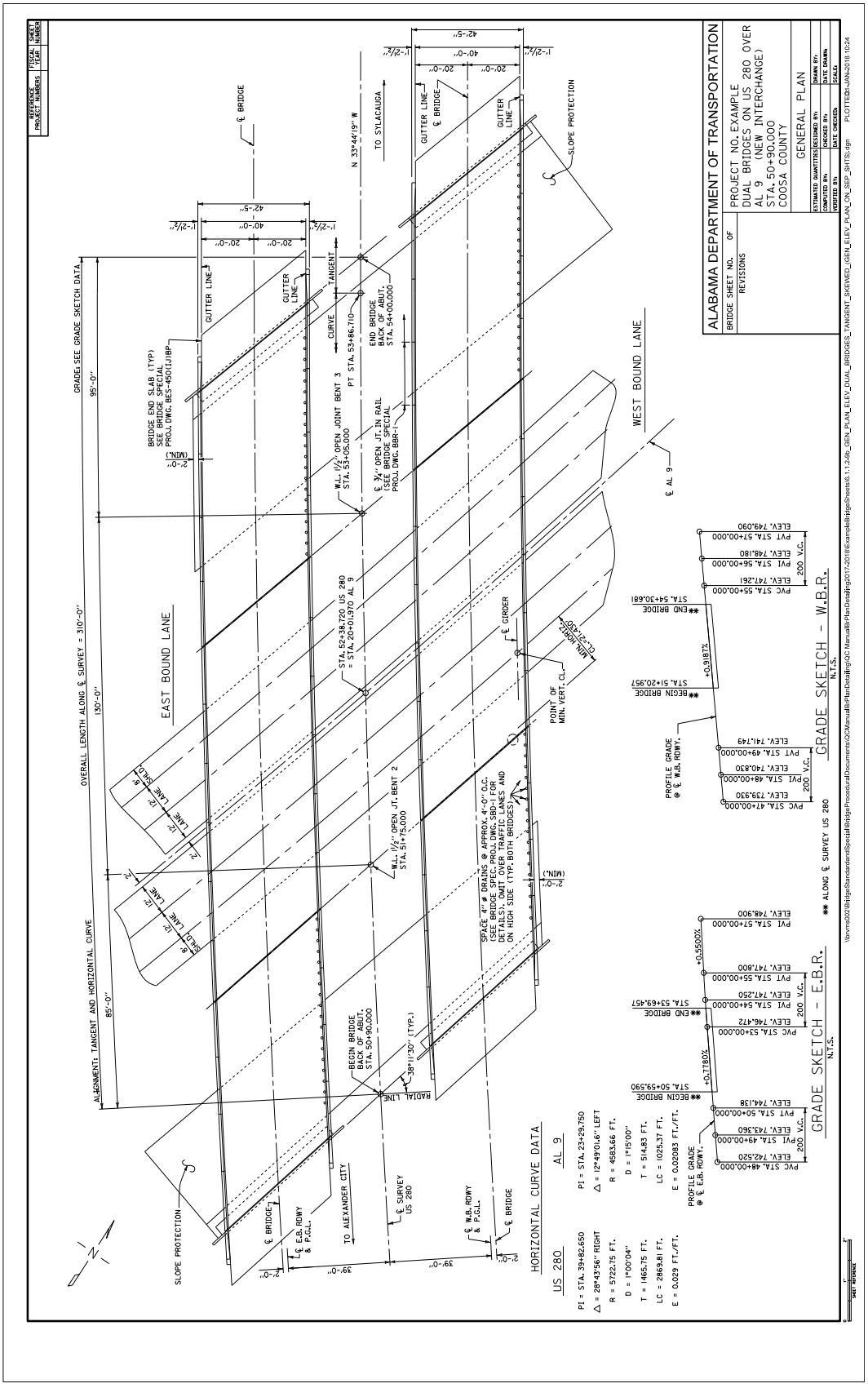

ALABAMA DEPARTMENT OF TRANSPORTATION
BRIDGE SHEET NO. OF
REVISIONS
PROJECT NO. EXAMPLE
PROJECT NO. EXAMPLE
BRIDGE OVER NORFOLK SOUTHERN R.R.
ON S.R. 8 (U.S. 80)
STATION 148+05.500
SUMTER COUNTY
GENERAL PLAN
PLAN
TO BELLAMY
TO CUBA
SLOPE PAVING, TYPICAL (ROADWAY ITEM)
BRIDGE END SLAB (TYP.) SEE BRIDGE SPECIAL PROJ. DWG. BES-450(1)J18P
EXISTING BRIDGE (TO BE REMOVED)
OPEN JOINTS IN BARRIER RAIL (TYP.) SEE BRIDGE SPECIAL PROJ. DWG. BBR-1
51°-00' SKEW (TYP.)
38°-33'
STA. 149+85.990 (U.S. 80)
STA. 50+00.000 (N.S. RAILROAD)

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



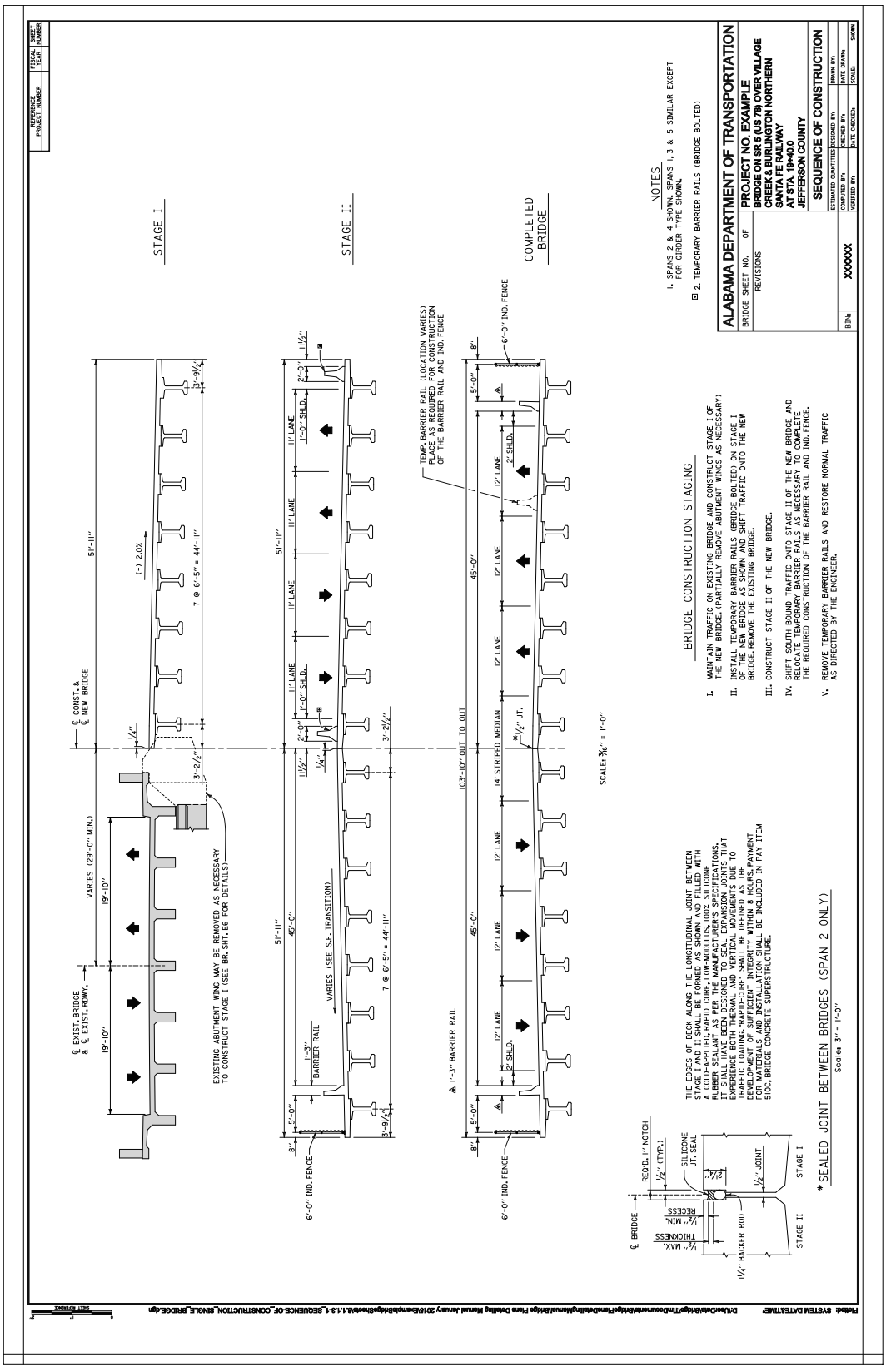
1.2.18 General Plan & Elevation, Dual Bridges, Curved, Skewed, Elevation, Plan on Separate Shts.



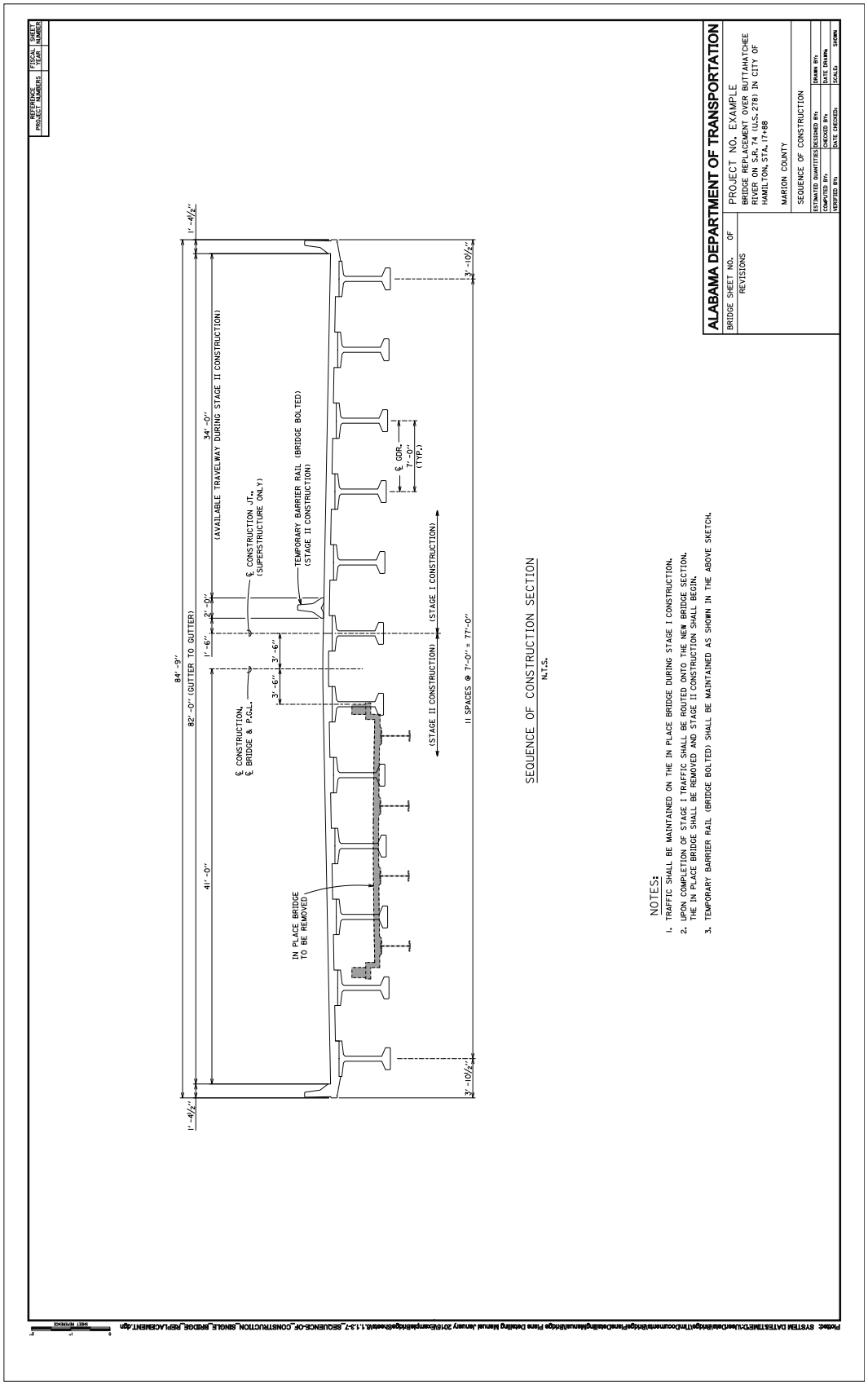

ALABAMA DEPARTMENT OF TRANSPORTATION
PROJECT NO. EXAMPLE
DUAL BRIDGES ON US 280 OVER AL 9 (NEW INTERCHANGE)
STA. 50+90.000
COOSA COUNTY
GENERAL PLAN
GRADE SKETCH - E.B.R.
GRADE SKETCH - W.B.R.
HORIZONTAL CURVE DATA
US 280 AL 9
EAST BOUND LANE
WEST BOUND LANE
OVERALL LENGTH ALONG ℄ SURVEY = 310'-0"
ALIGNMENT: TANGENT AND HORIZONTAL CURVE
GRADE: SEE GRADE SKETCH DATA
SLOPE PROTECTION
TO ALEXANDER CITY
TO SYLACAUGA
BEGIN BRIDGE BACK OF ABUT. STA. 50+90.000
END BRIDGE BACK OF ABUT. STA. 54+00.000
RADIAL LINE
38°11'30" (TYP.)
POINT OF MIN. VERT. CL.
PROFILE GRADE @ ℄ E.B. RDWY.
PROFILE GRADE @ ℄ W.B. RDWY.
** ALONG ℄ SURVEY US 280
N.T.S.

1.3 Sequence of Construction Sheets

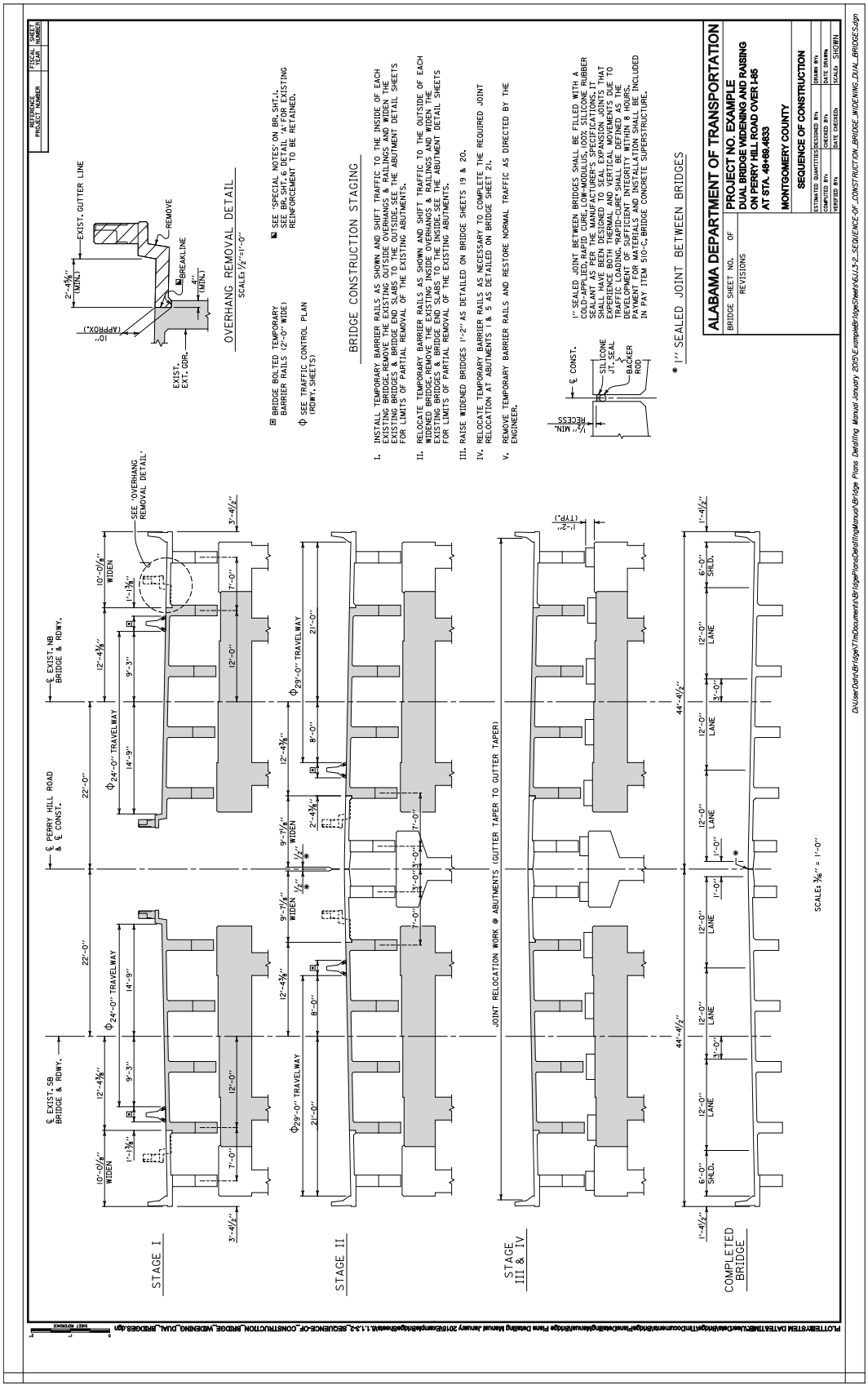
1.3.1 Single Bridge Replacement, Stage Constr.



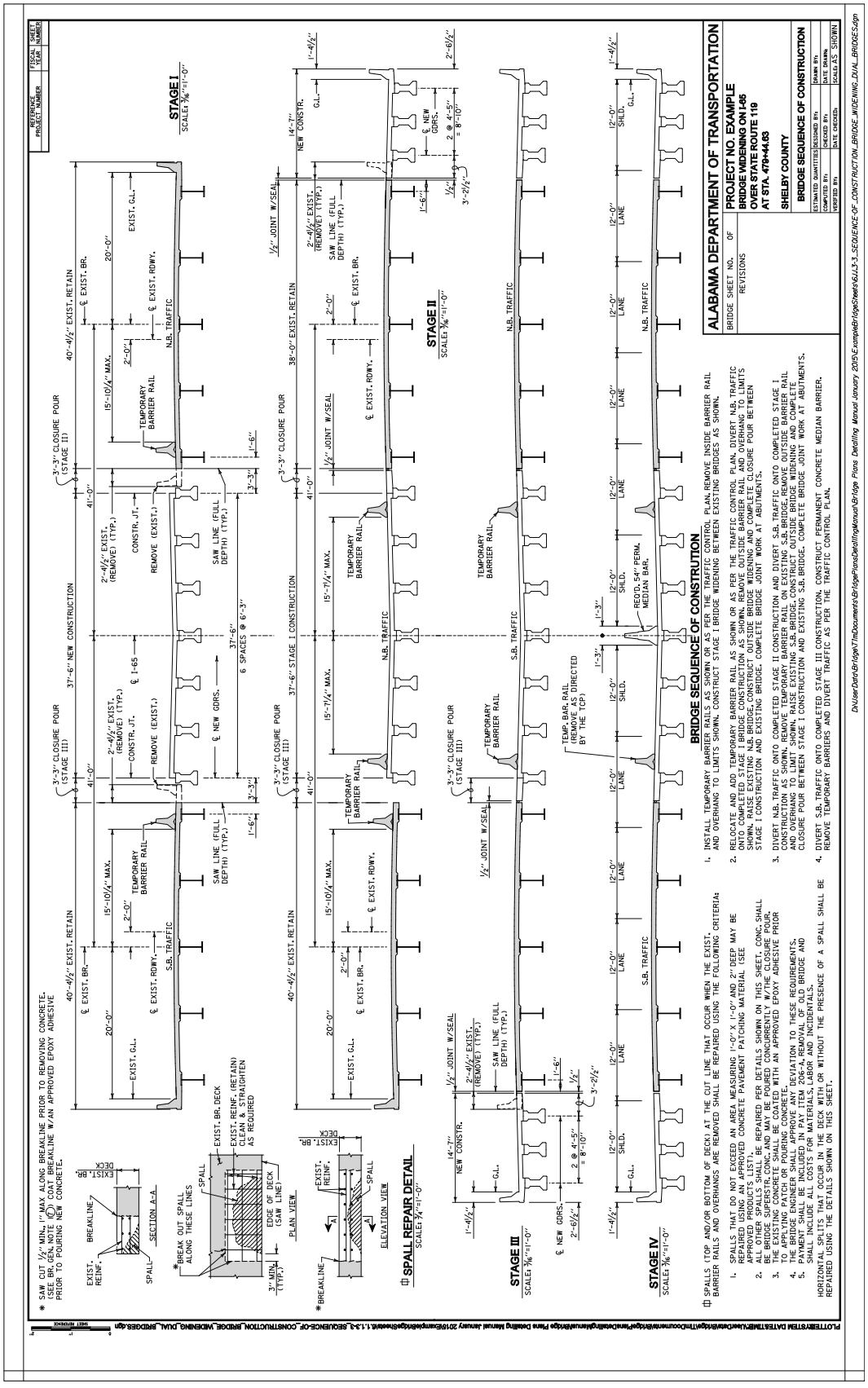
1.3.2 Single Bridge Replacement, Stage Constr.



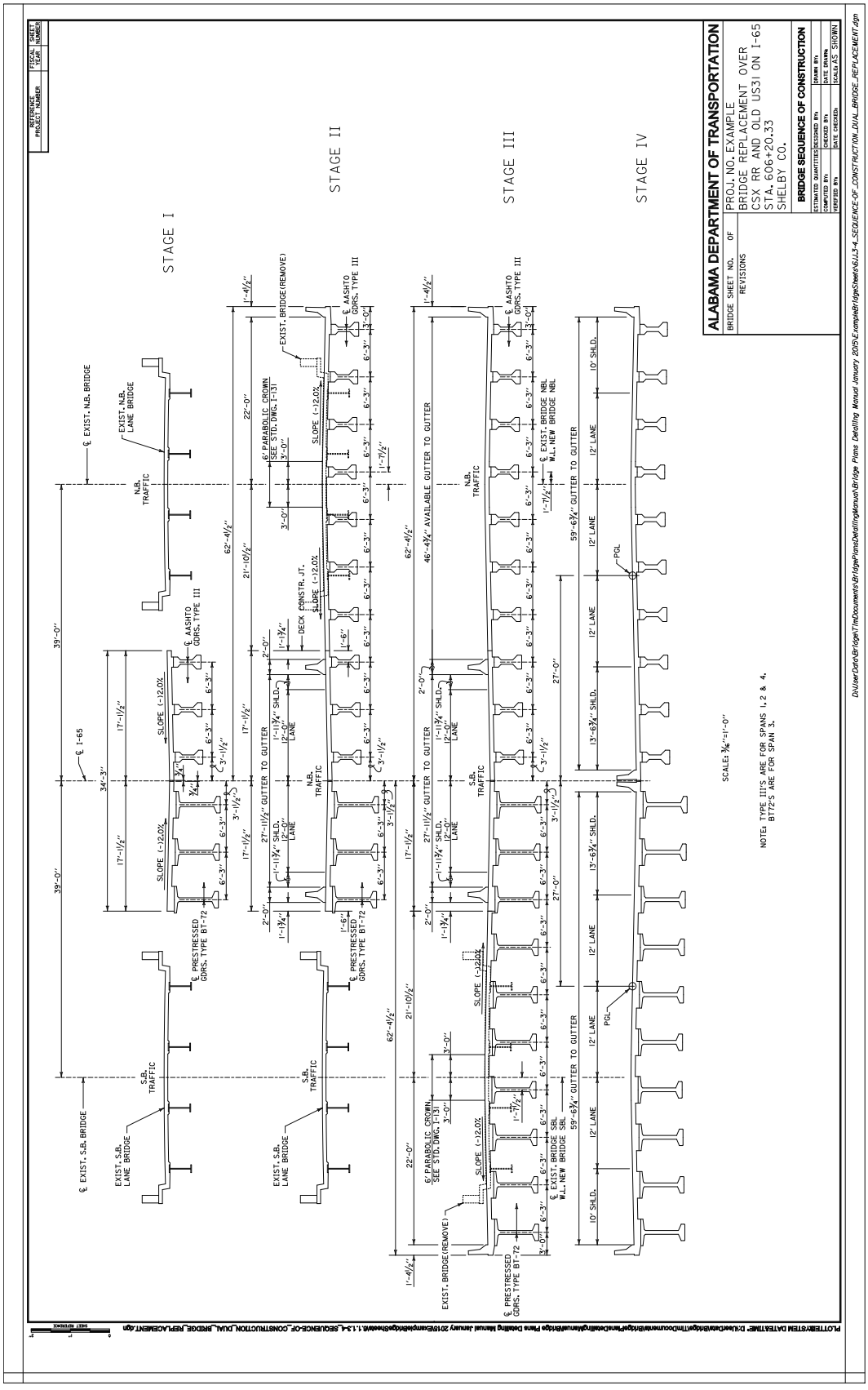
1.3.3 Widening, Dual Bridges, Stage Constr.



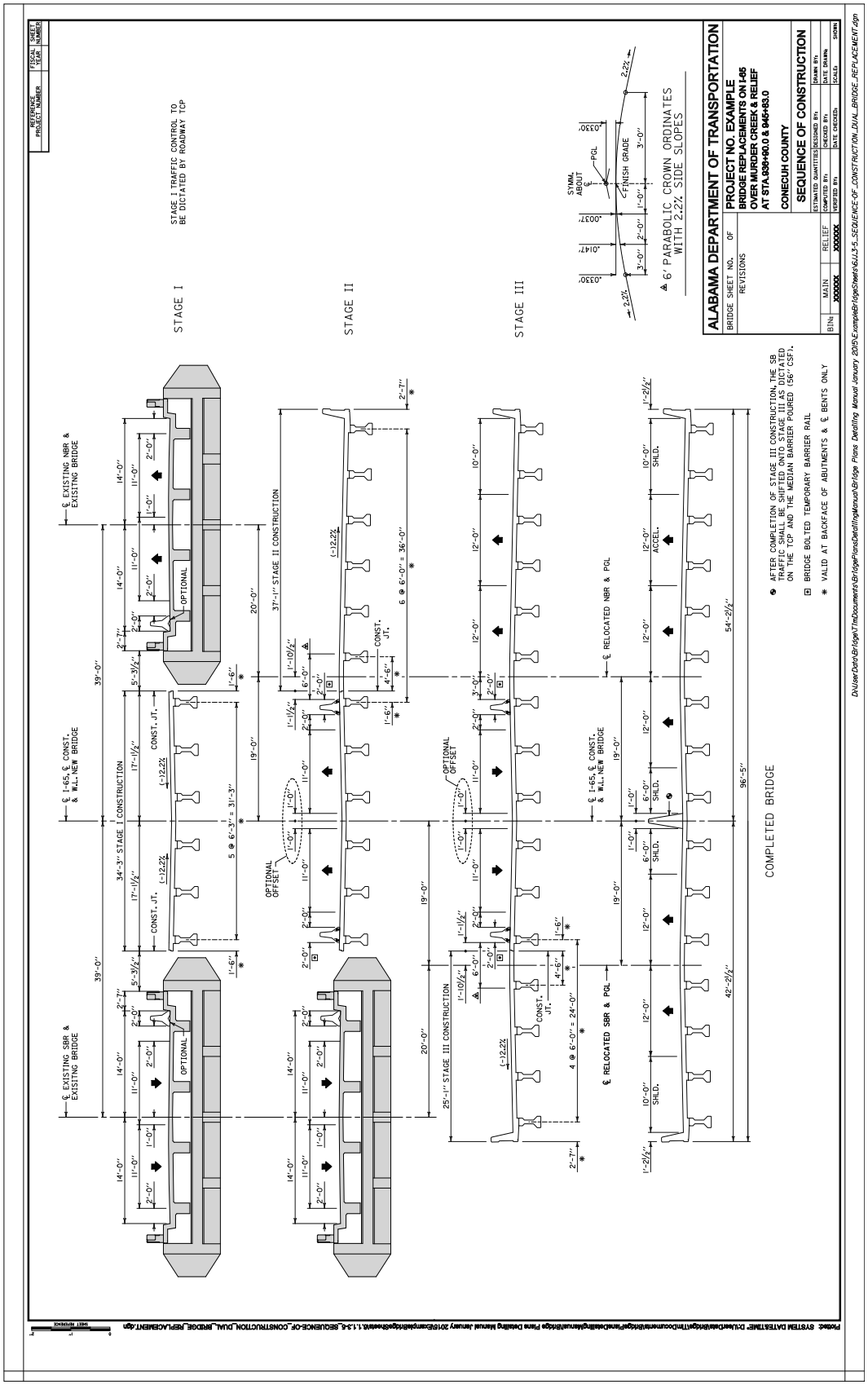
1.3.4 Widening, Dual Bridges, Stage Constr.



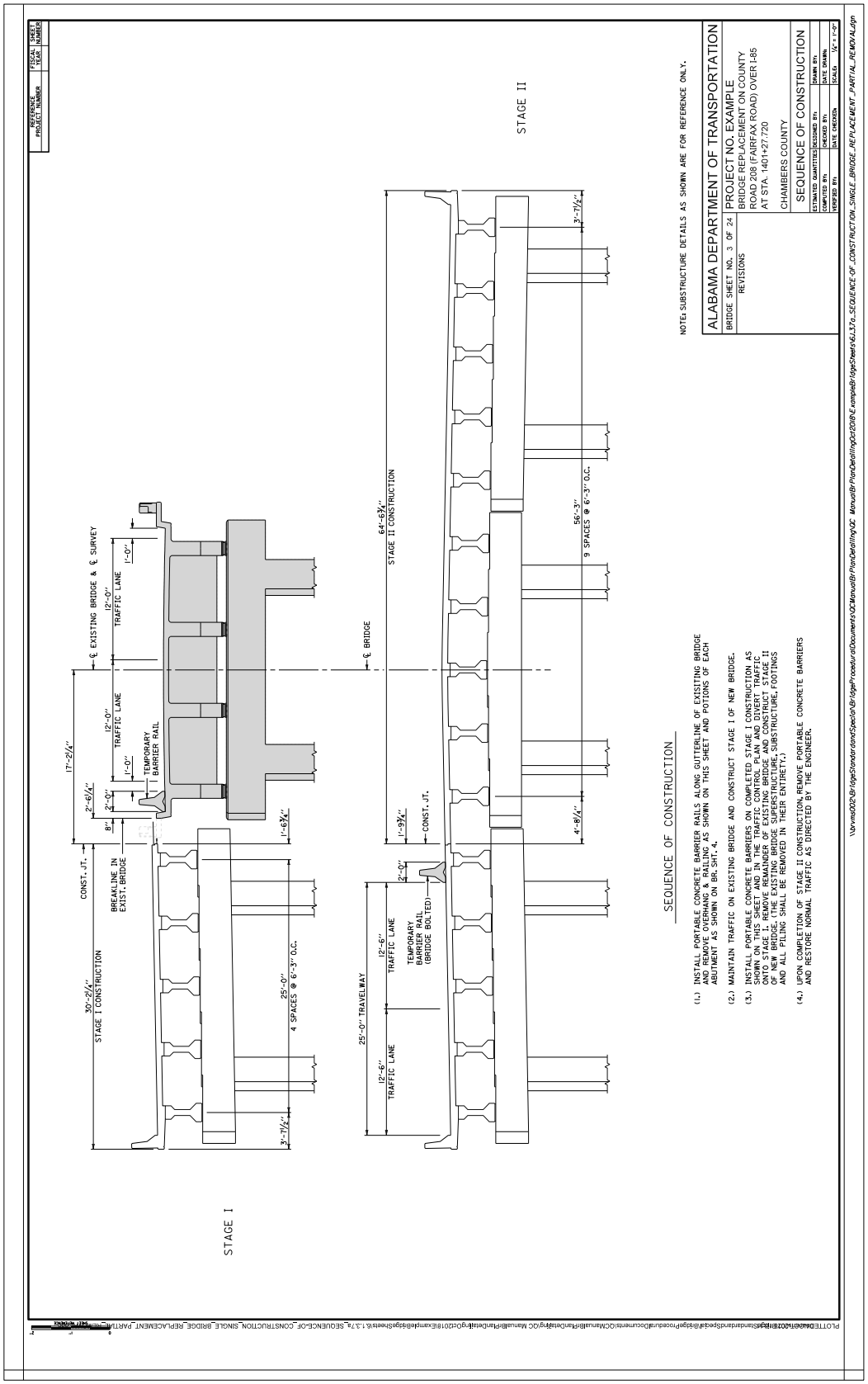
1.3.5 Replacement, Dual Bridges, Stage Constr.

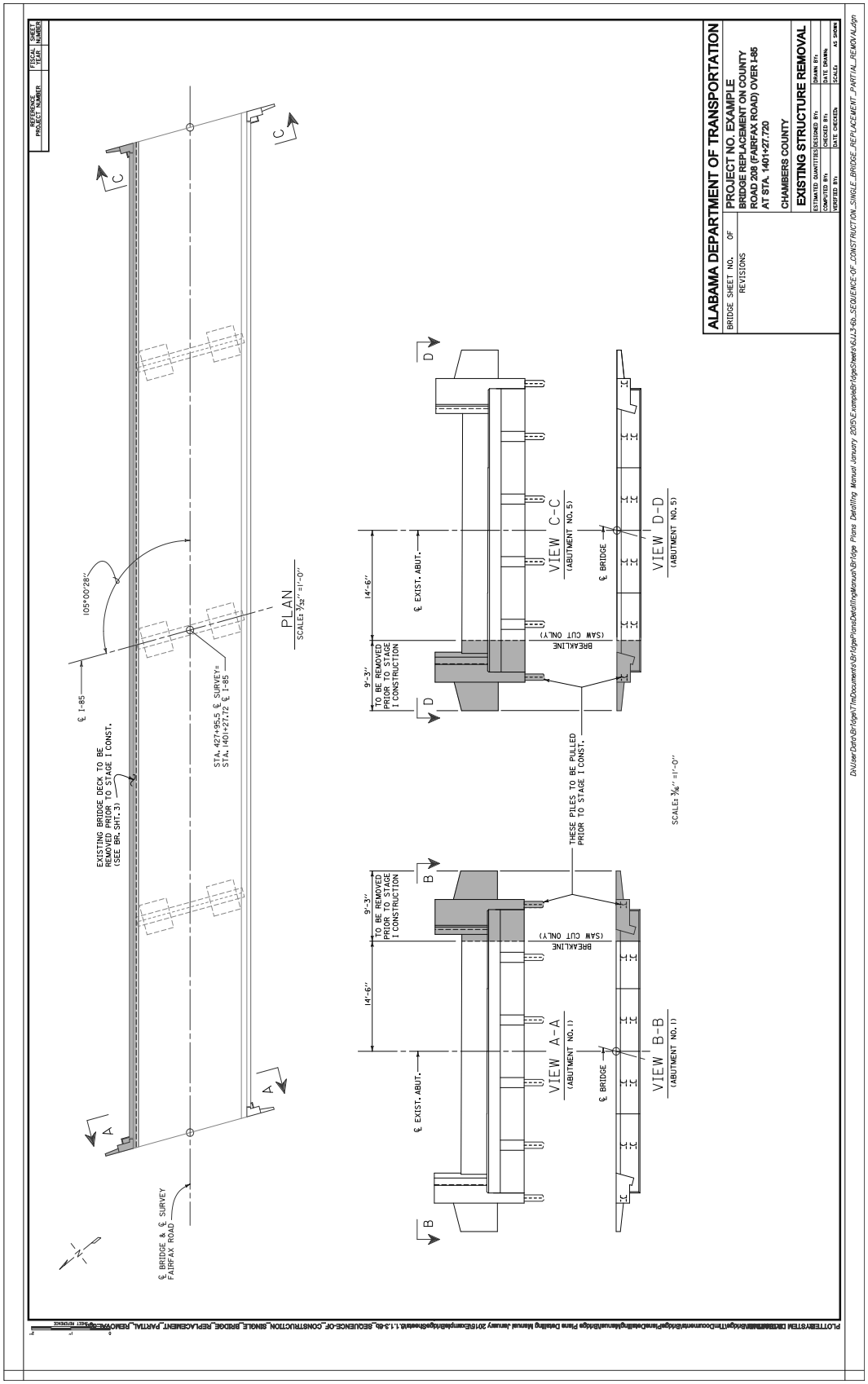


1.3.6 Replacement, Dual Bridges, Stage Constr.



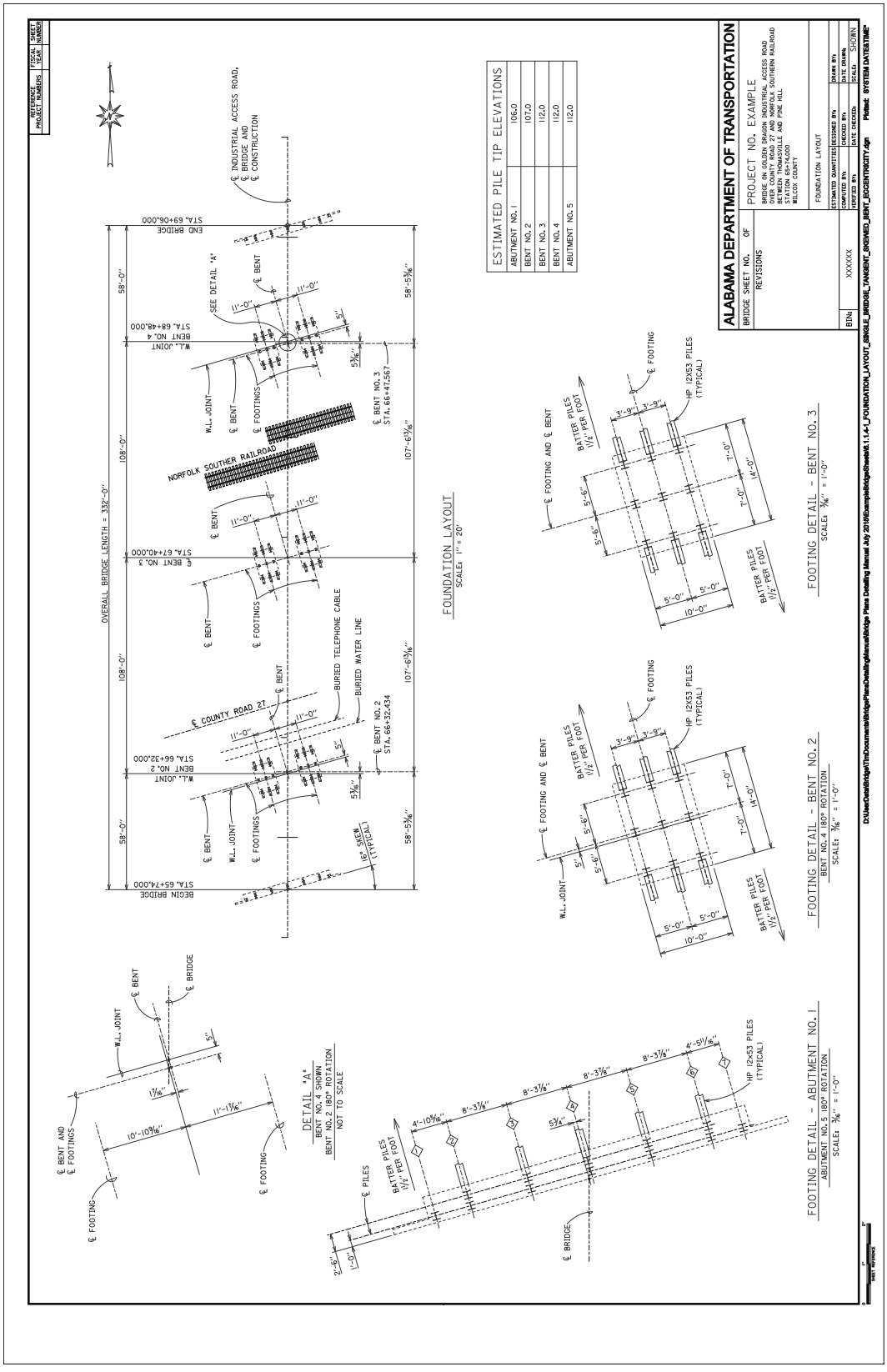
1.3.7 Single Bridge Replacement, Stage Constr. w/Partial Removal of Exist. Structure (2 shts.)



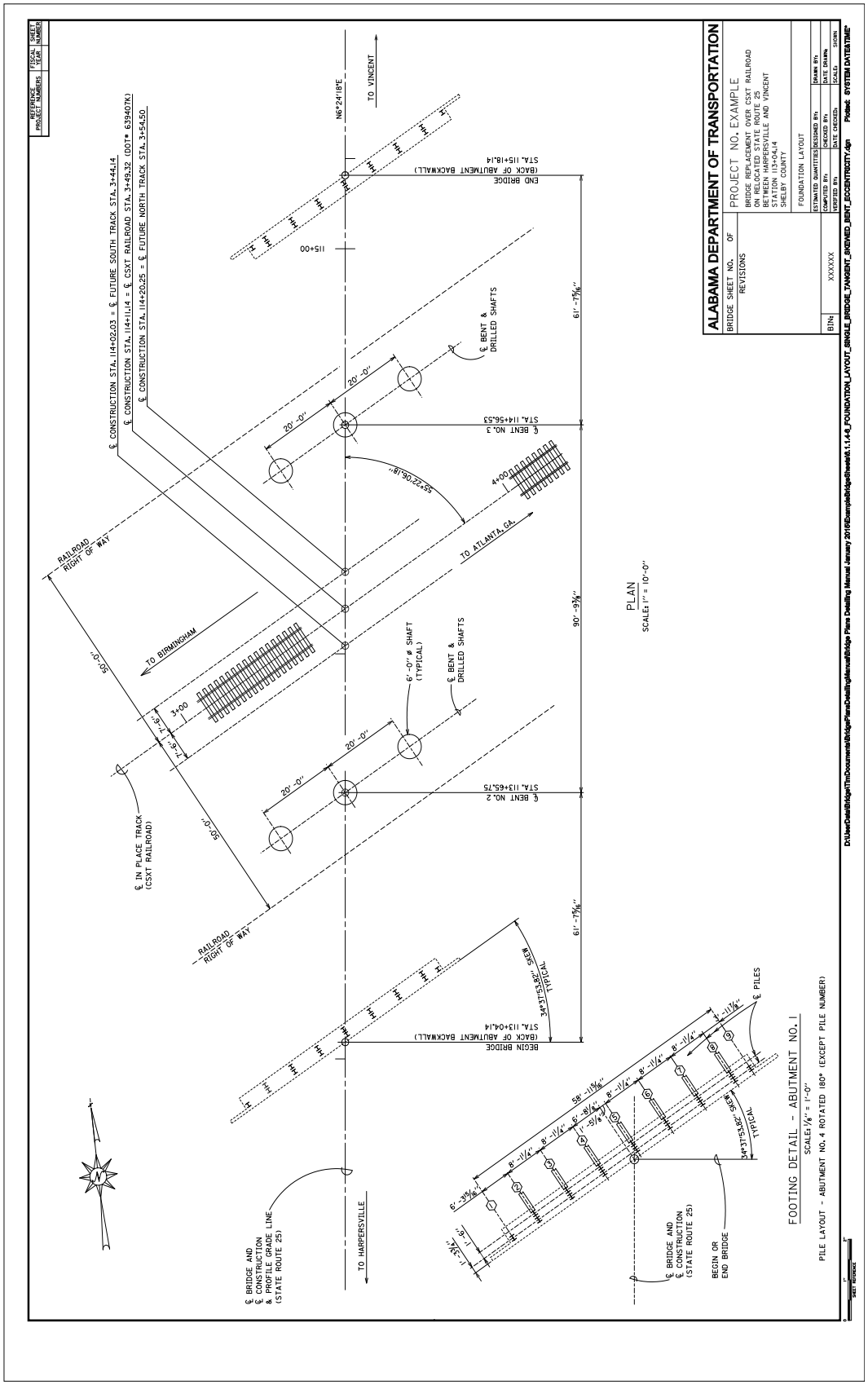

ALABAMA DEPARTMENT OF TRANSPORTATION
PROJECT NO. EXAMPLE
BRIDGE REPLACEMENT ON COUNTY ROAD 208 (FAIRFAX ROAD) OVER I-85
AT STA. 1401+27.720
CHAMBERS COUNTY
EXISTING STRUCTURE REMOVAL
REFERENCE PROJECT NUMBER
FISCAL YEAR
SHEET NUMBER
BRIDGE SHEET NO. OF
REVISIONS
ESTIMATED QUANTITIES
DESIGNED BY:
DRAWN BY:
COMPUTED BY:
CHECKED BY:
DATE DRAWN:
VERIFIED BY:
DATE CHECKED:
SCALE: AS SHOWN
PLAN
SCALE: 3/32" = 1'-0"
105°00'28"
℄ I-85
EXISTING BRIDGE DECK TO BE REMOVED PRIOR TO STAGE I CONST. (SEE BR. SHT. 3)
STA. 427+95.5 ℄ SURVEY = STA. 1401+27.72 ℄ I-85
℄ BRIDGE & ℄ SURVEY FAIRFAX ROAD
N
A
C
D
B
VIEW C-C
(ABUTMENT NO. 5)
VIEW D-D
(ABUTMENT NO. 5)
VIEW A-A
(ABUTMENT NO. 1)
VIEW B-B
(ABUTMENT NO. 1)
℄ EXIST. ABUT.
℄ BRIDGE
14'-6"
9'-3" TO BE REMOVED PRIOR TO STAGE I CONSTRUCTION
BREAKLINE (SAW CUT ONLY)
THESE PILES TO BE PULLED PRIOR TO STAGE I CONST.
SCALE: 3/16" = 1'-0"

1.4 Foundation Layout Sheets

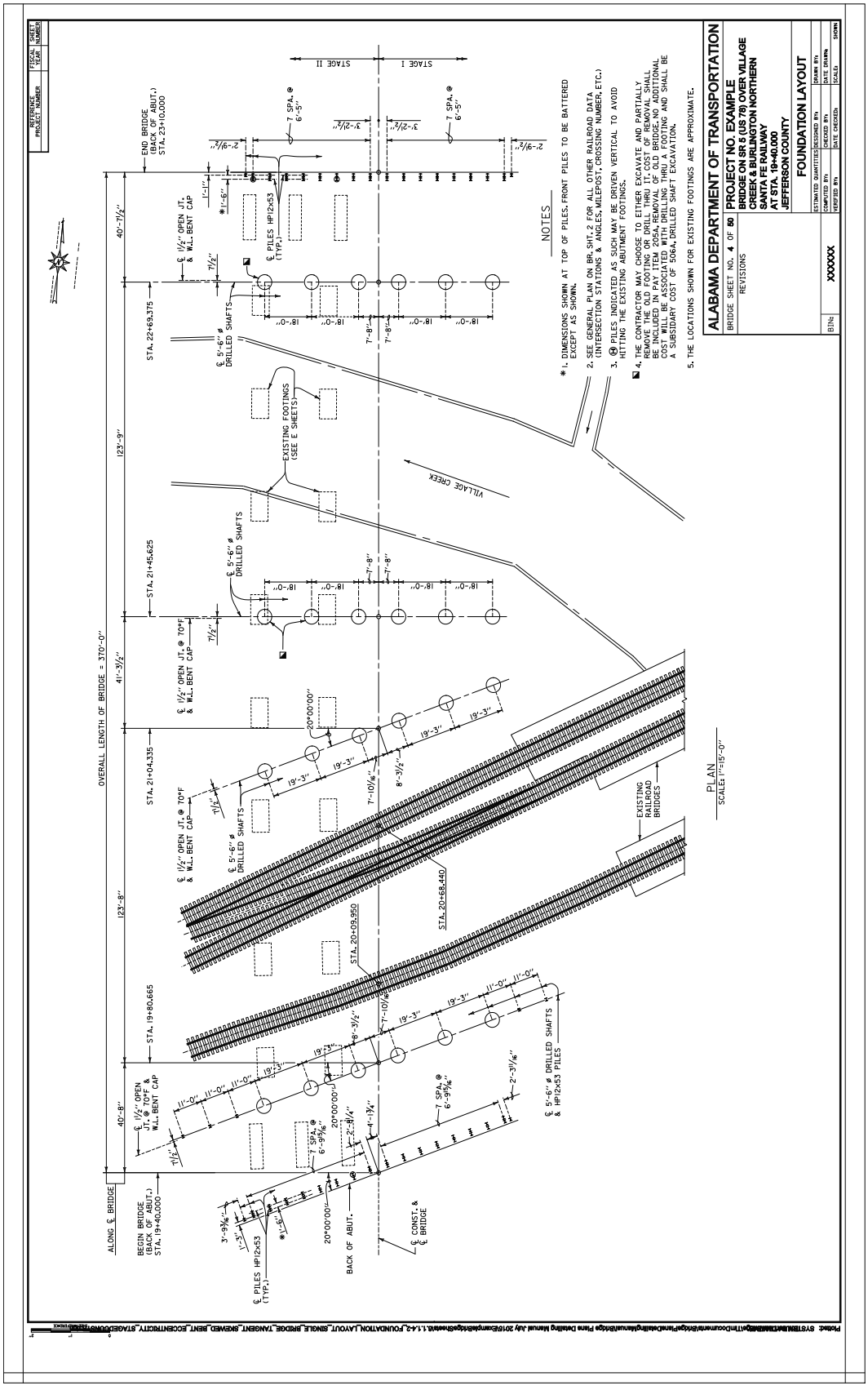
1.4.1 Single Bridge, Tan., Skewed w/Eccentricity



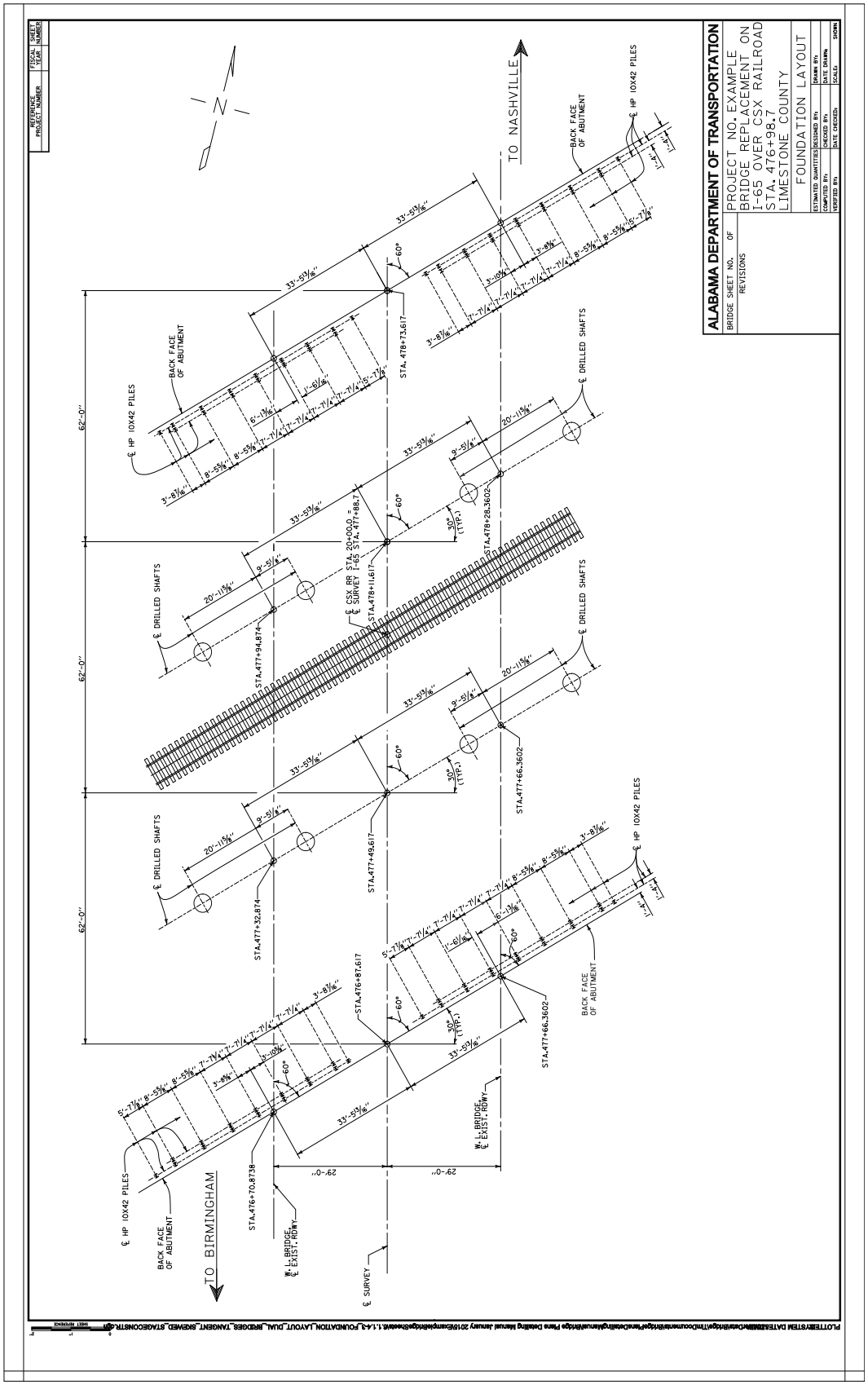
1.4.2 Single Bridge, Tan., Skewed w/Eccentricity



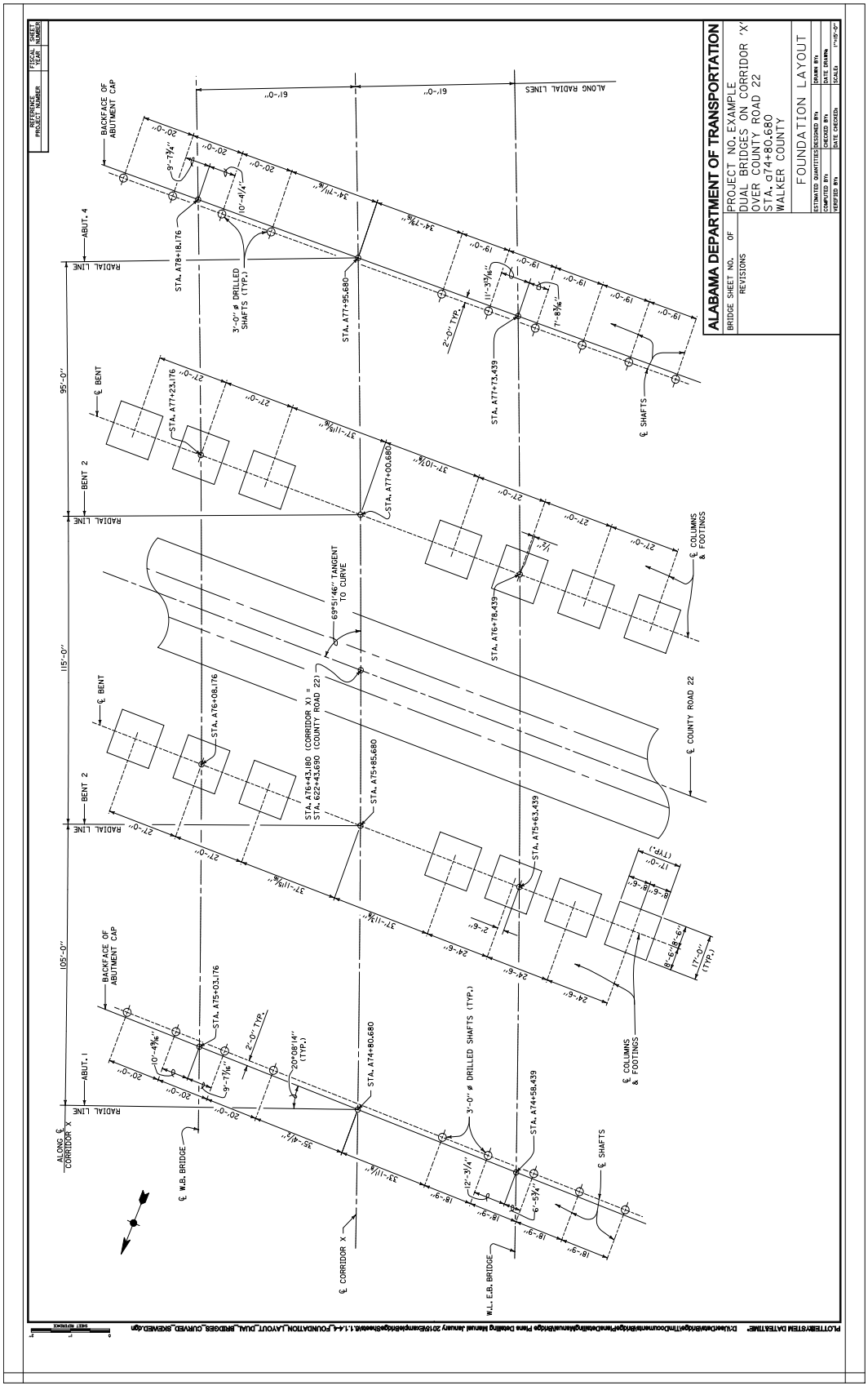
1.4.3 Single Bridge, Tangent, Skewed w/Eccentricity, Stage Construction



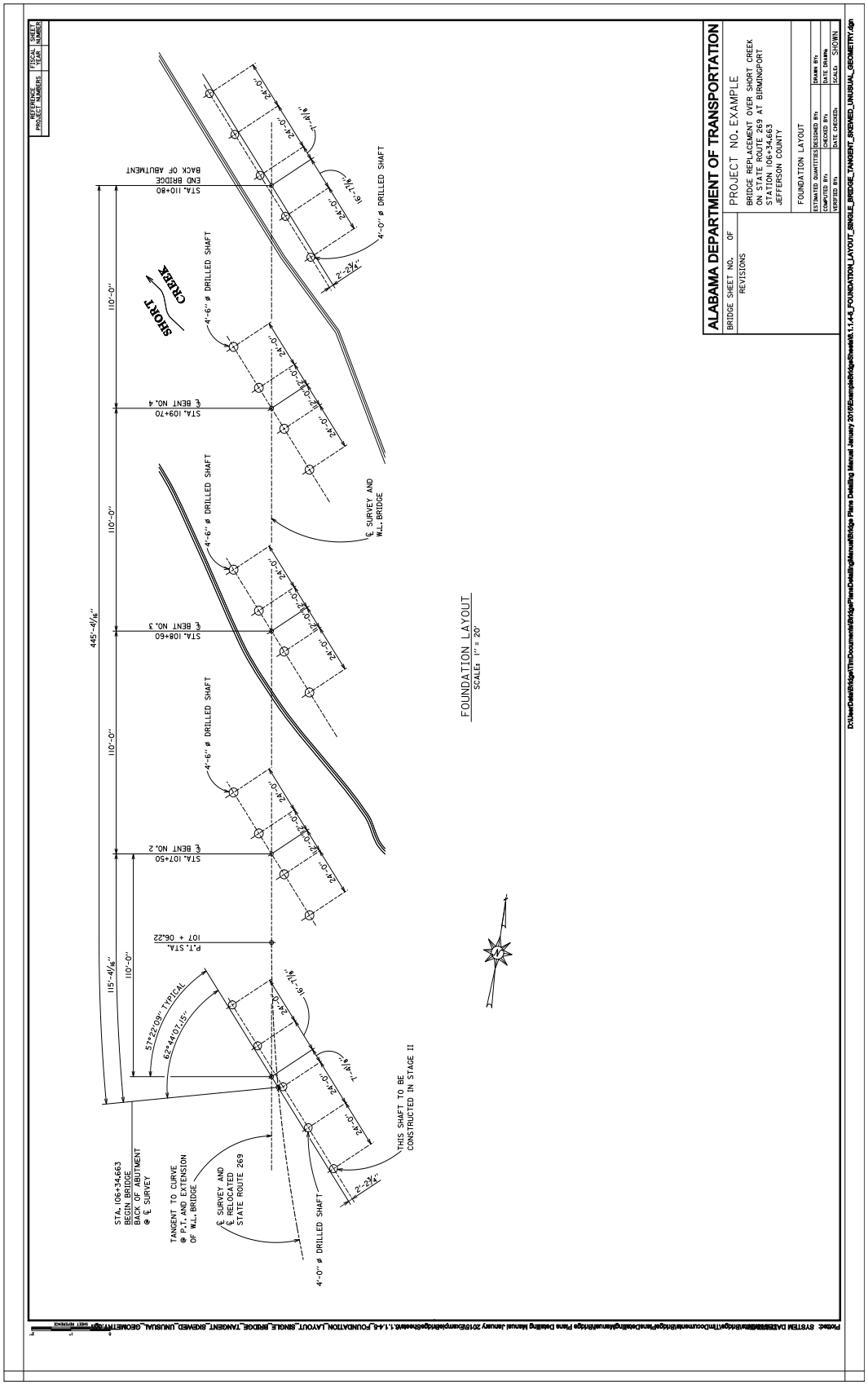
1.4.4 Dual Bridges, Tangent, Skewed, Stage Construction



1.4.5 Dual Bridges, Curved, Skewed

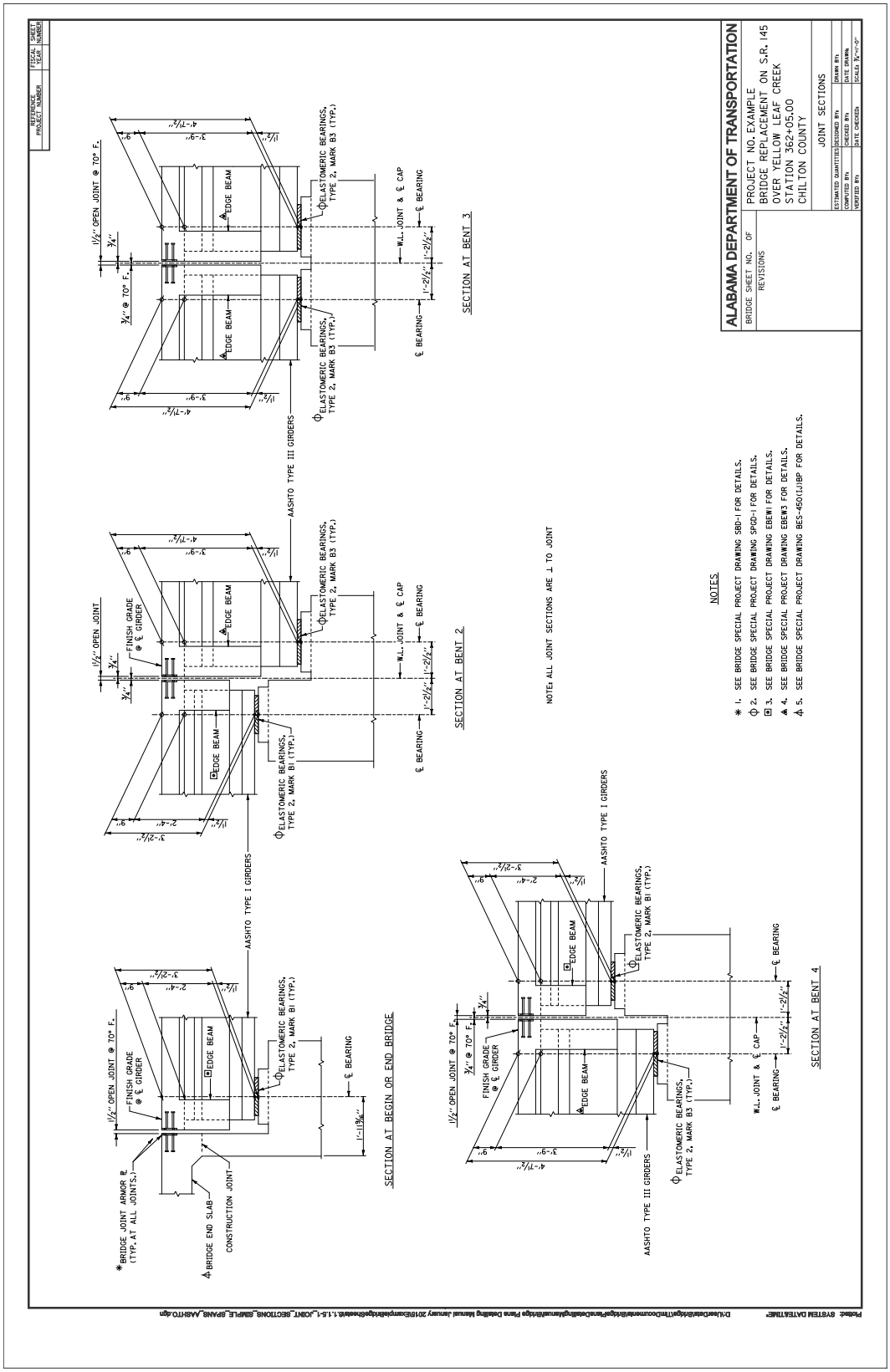


1.4.6 Single Bridge, Tangent, Skewed, Unusual Geometry

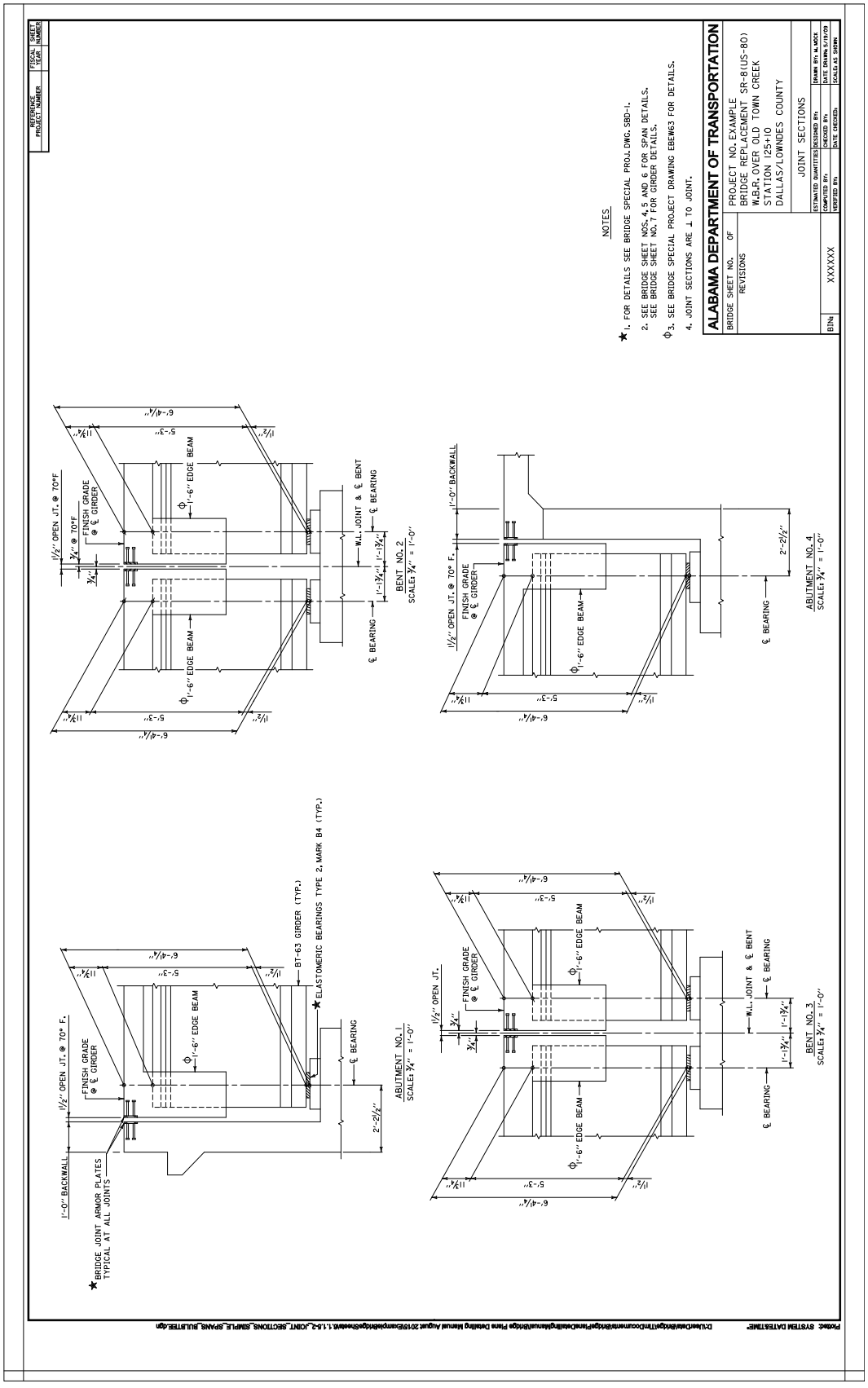


1.5 Joint Sections Sheets

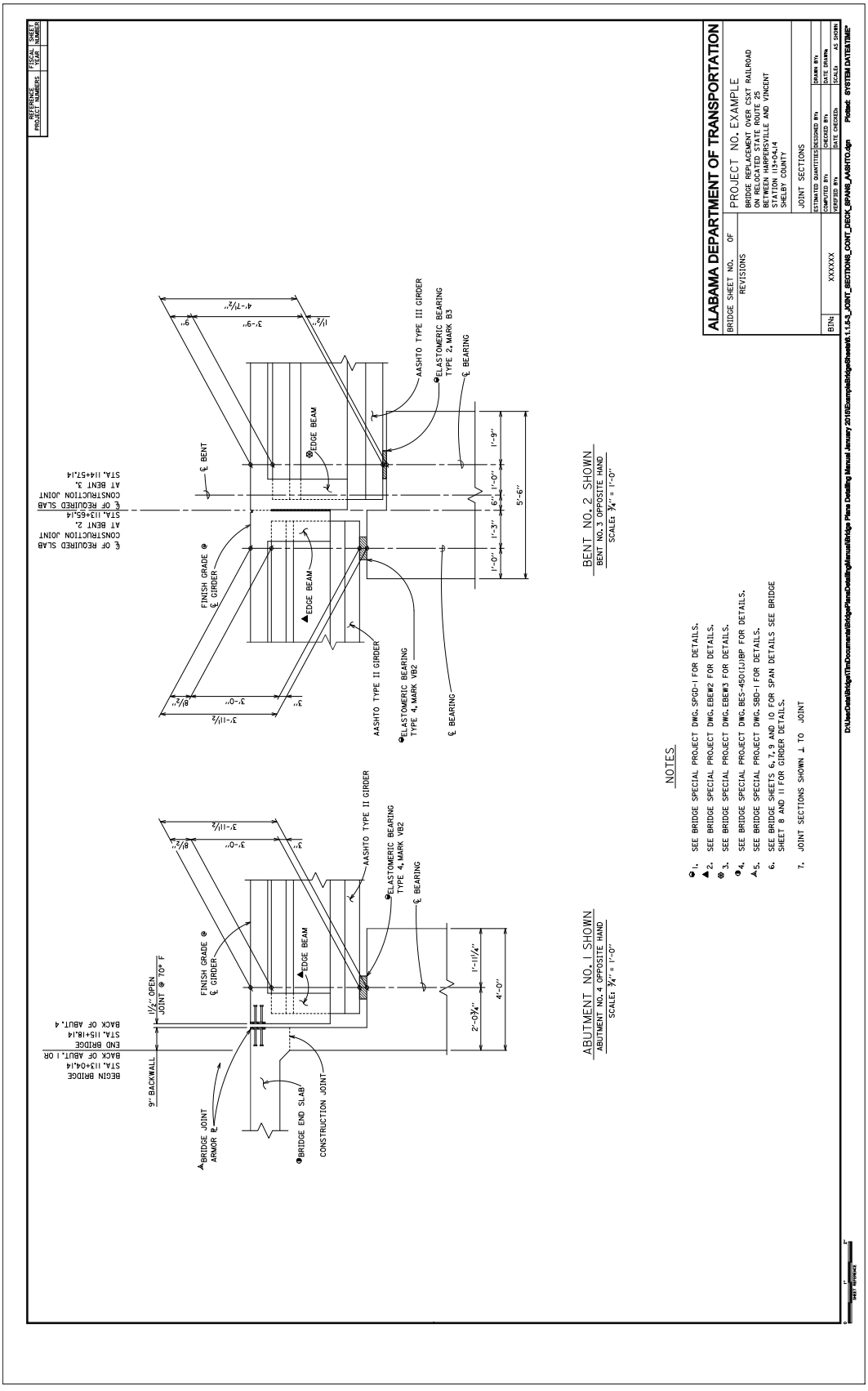
1.5.1 Joint Sections, Simple Spans, Open Joints, AASHTO



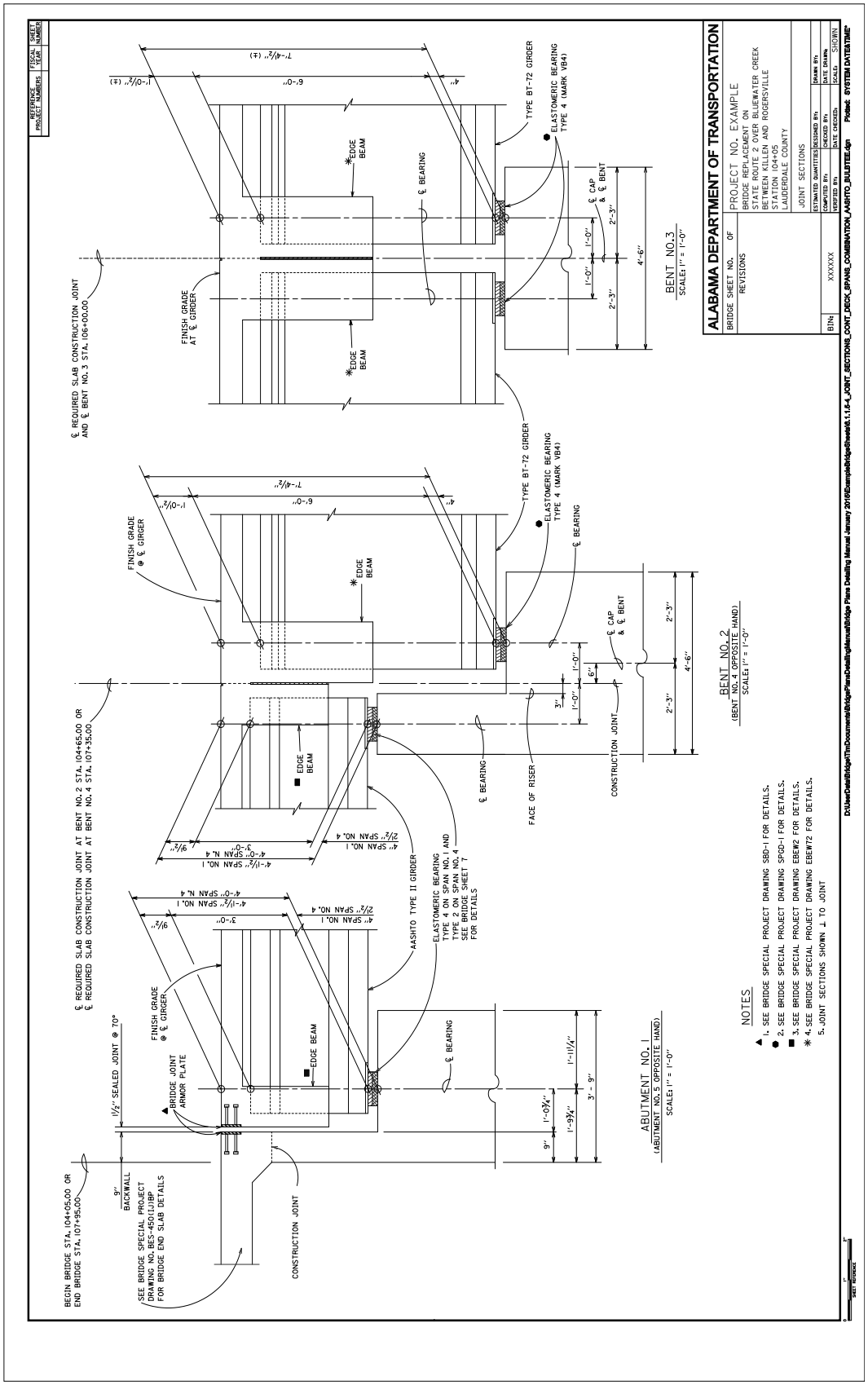
1.5.2 Joint Sections, Simple Spans, Open Joints, Bulb-Tee



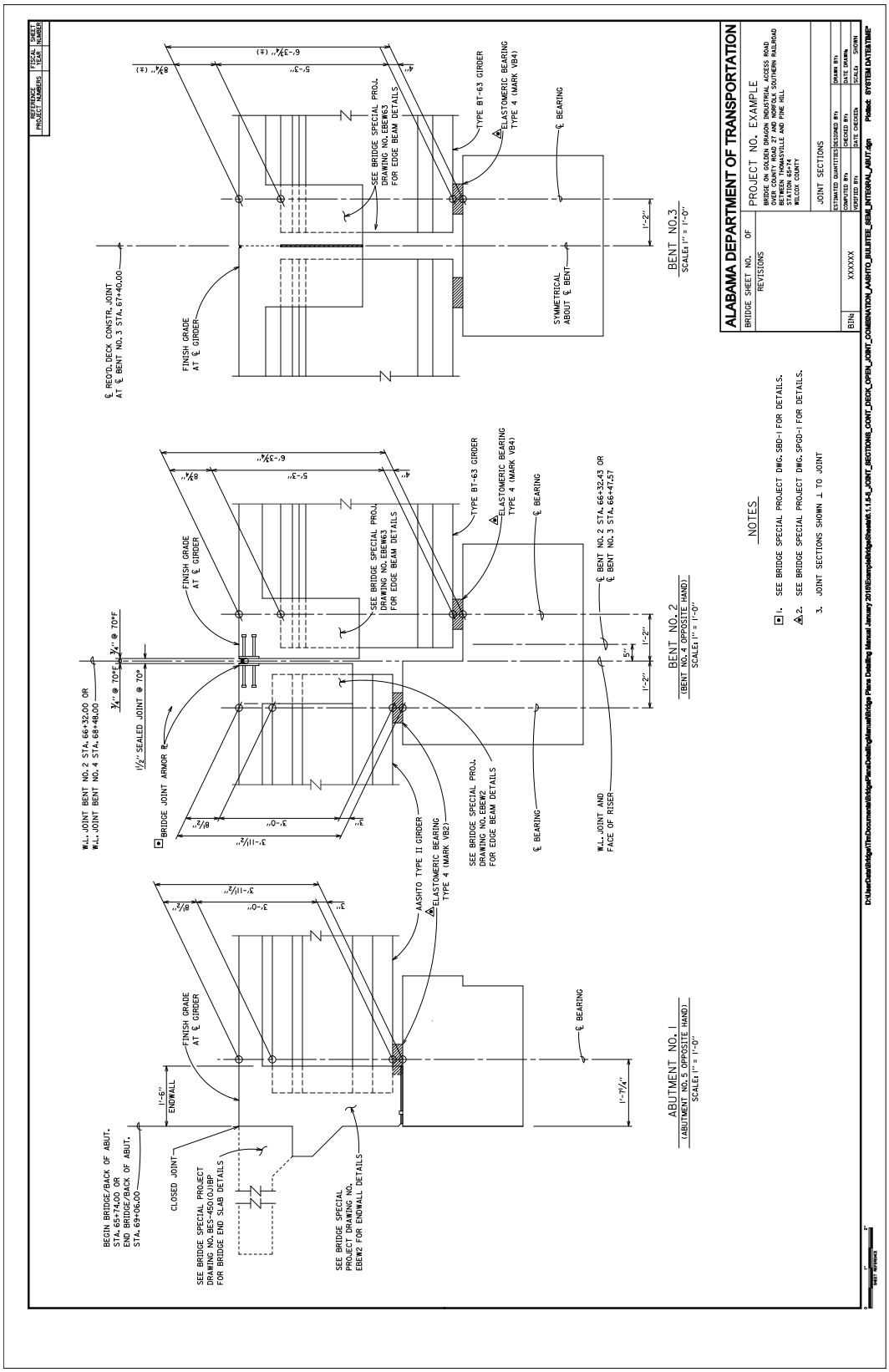
1.5.3 Joint Sections, Simple Spans, Continuous Deck, AASHTO



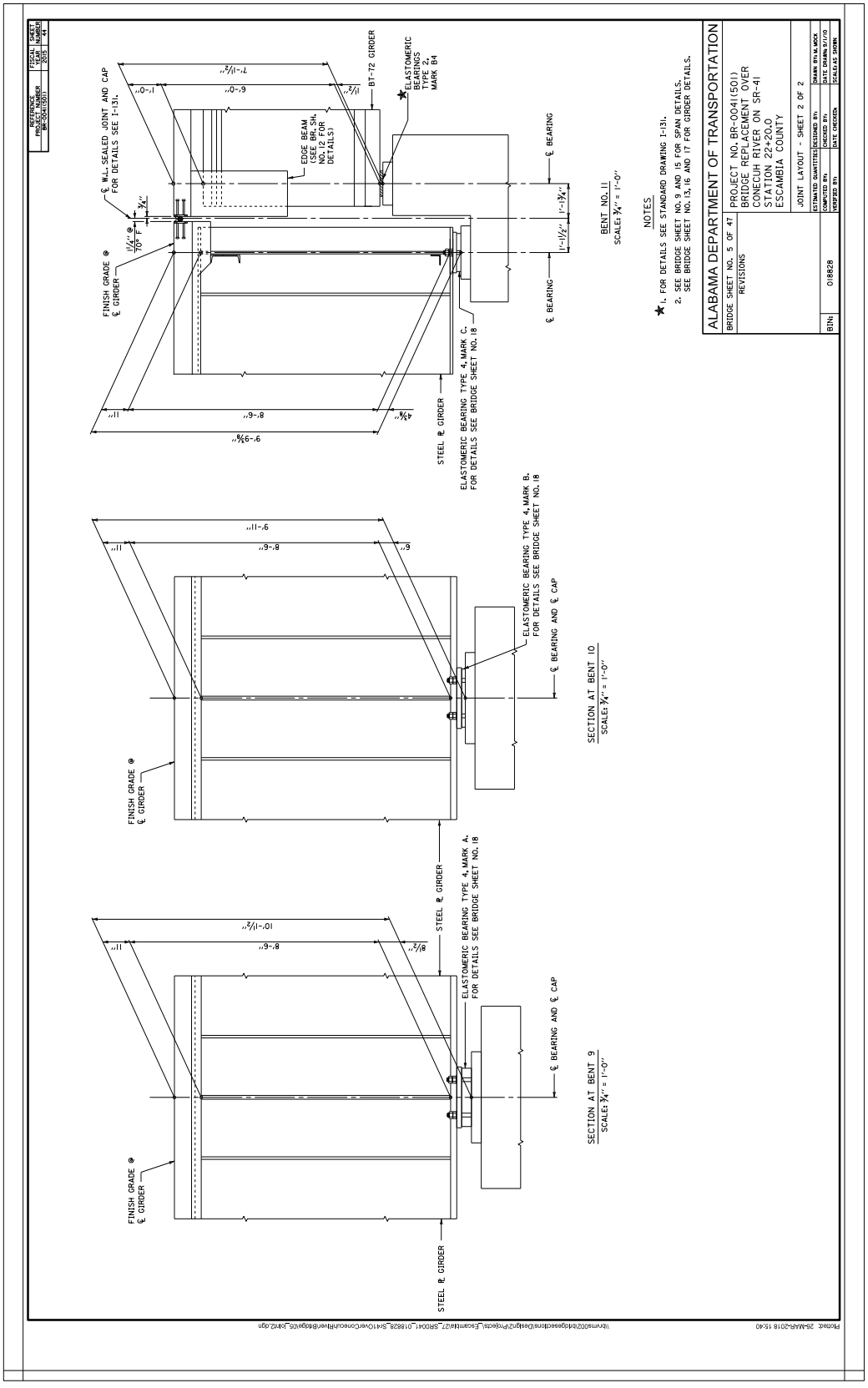
1.5.4 Joint Sections, Simple Spans, Continuous Deck, Combination AASHTO/Bulb Tee



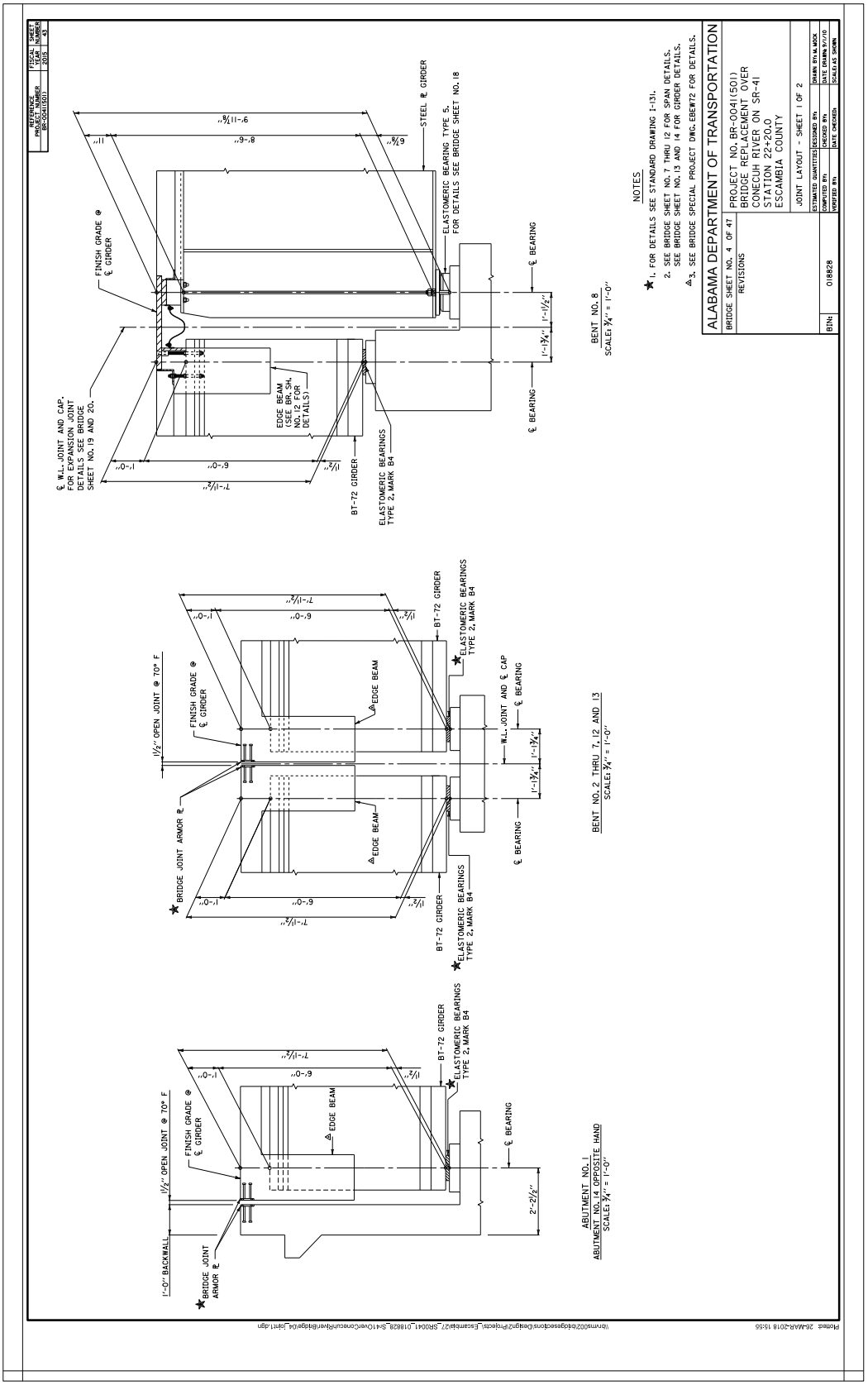
1.5.5 Joint Sections, Simple Spans, Open Joint/Continuous Deck, Combination AASHTO/Bulb Tee, Semi-Integral Abutment



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

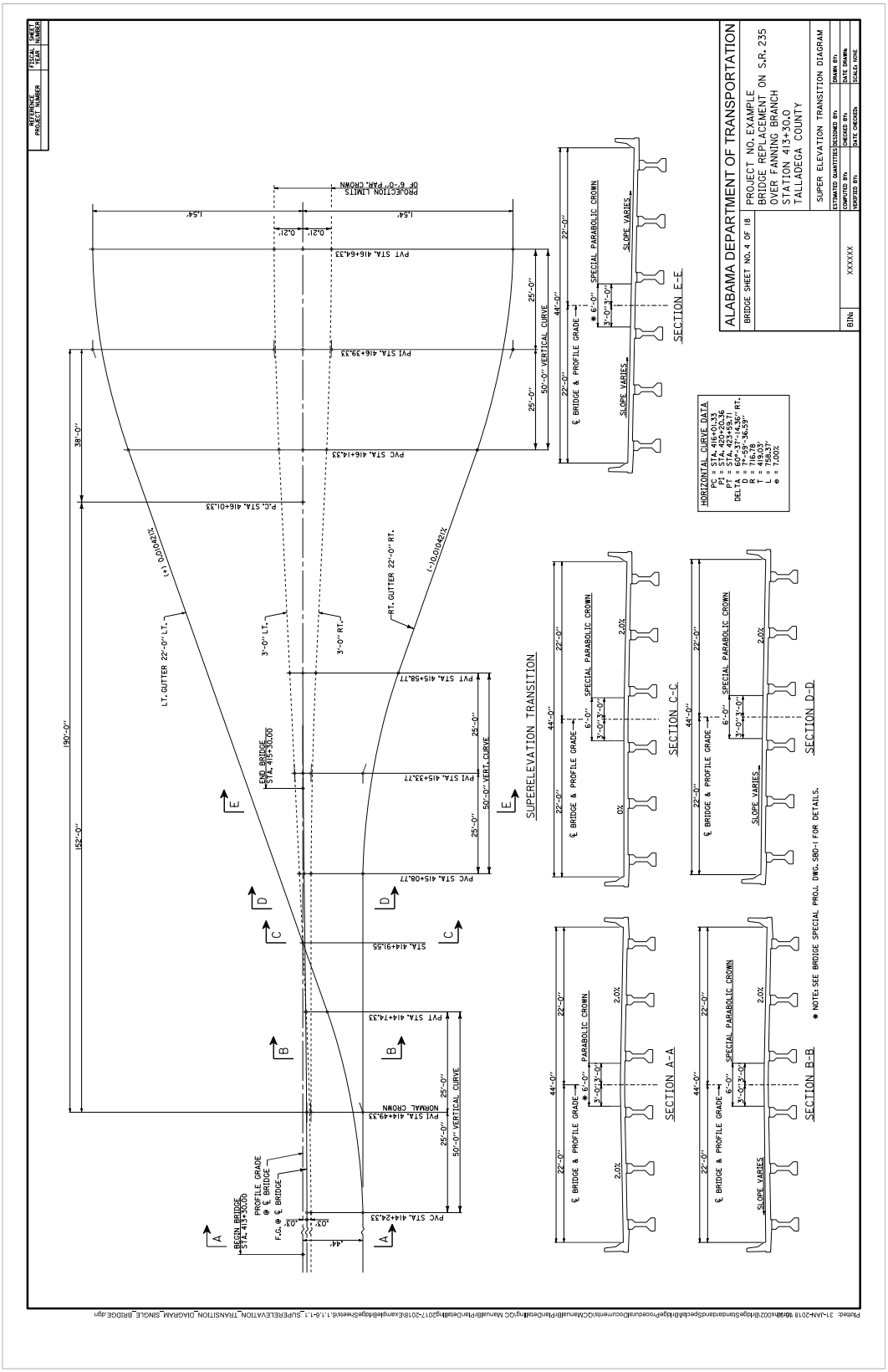


1.5.7 Joint Sections, AAAHTO/Bulb Tee to Continuous Steel, Expansion Dam

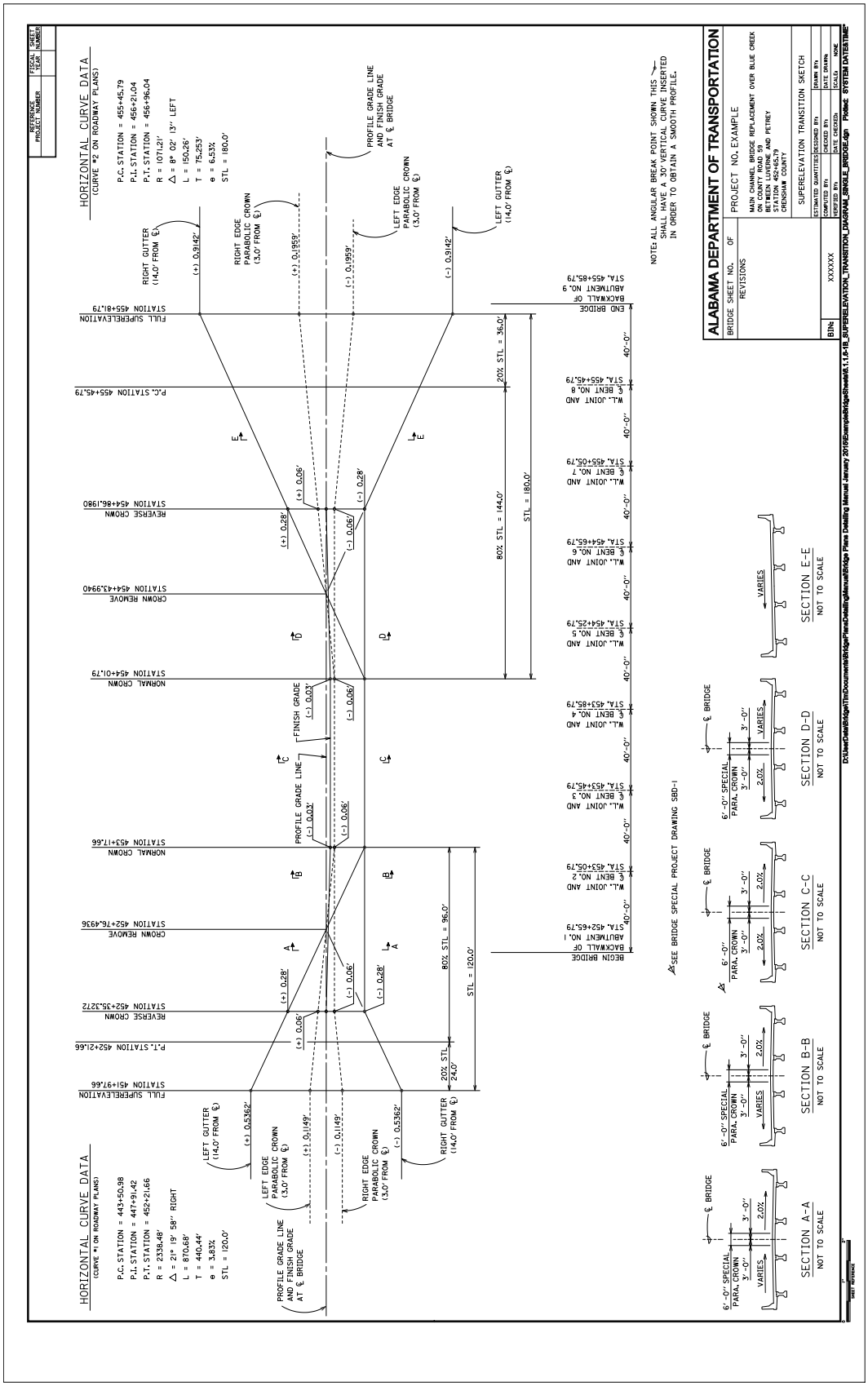


1.6 Superelevation Transition Sheets

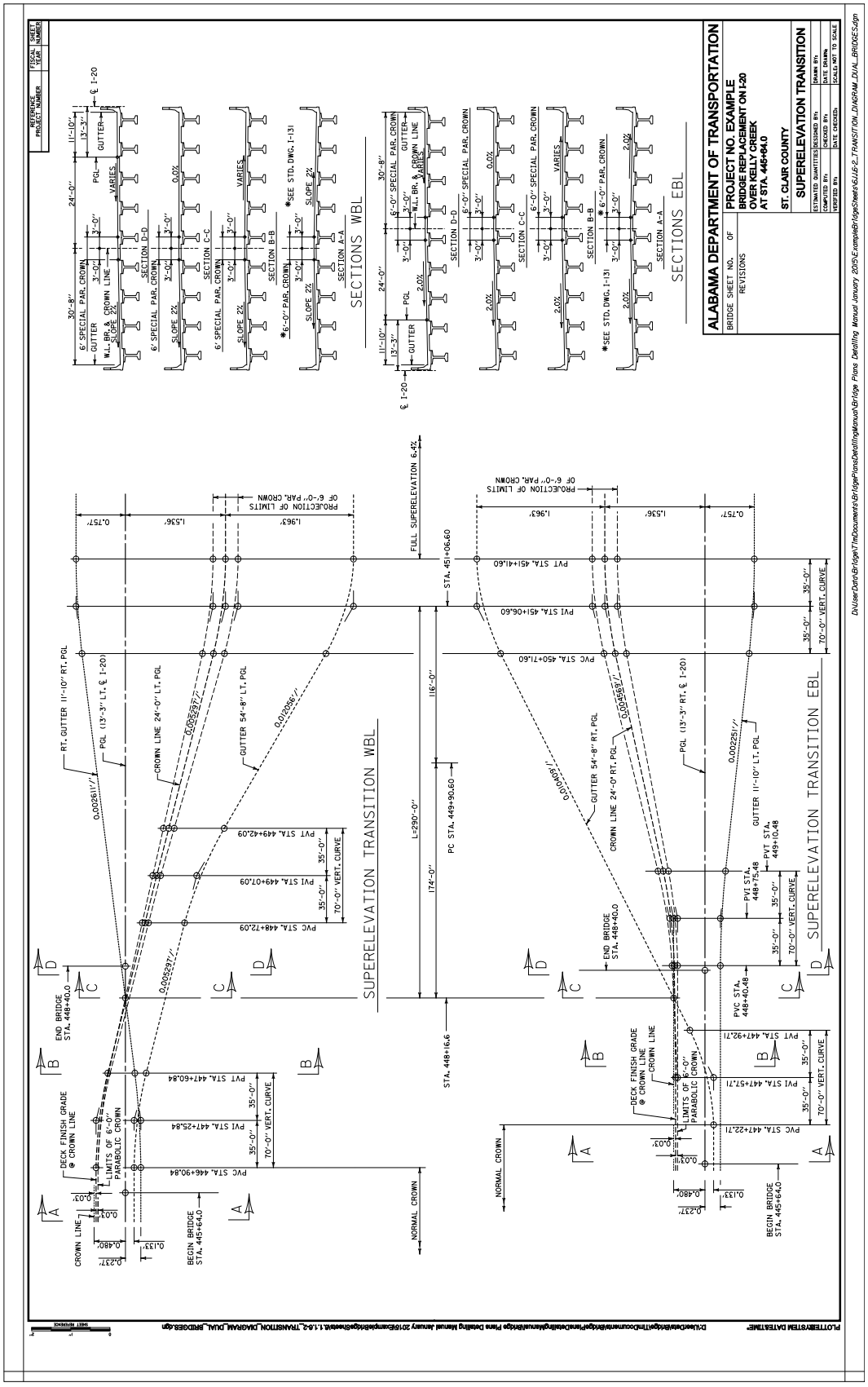
1.6.1 Transition Diagram for Single Bridge



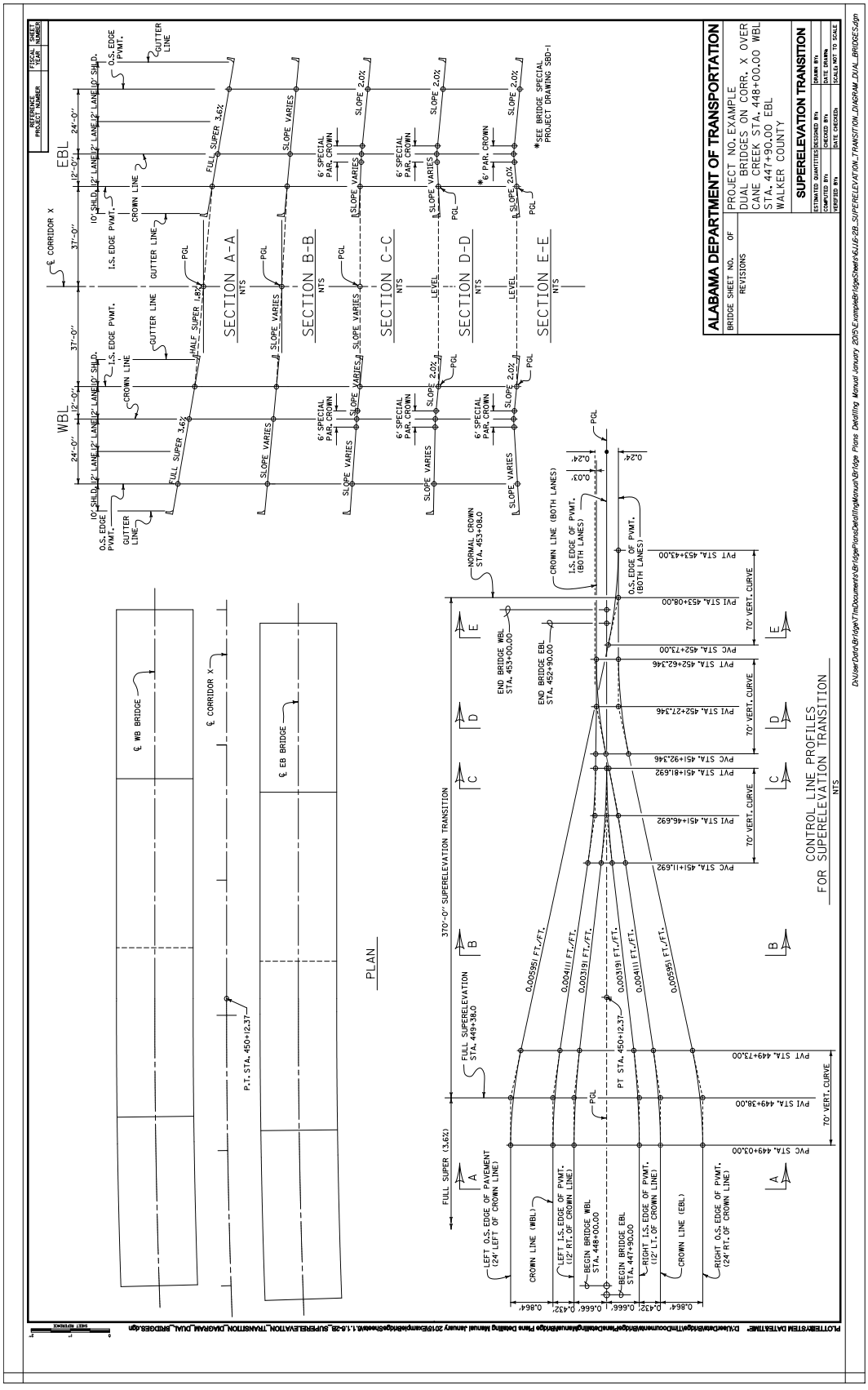
1.6.2 Transition Diagram for Single Bridge



1.6.3 Transition Diagram for Dual Bridges

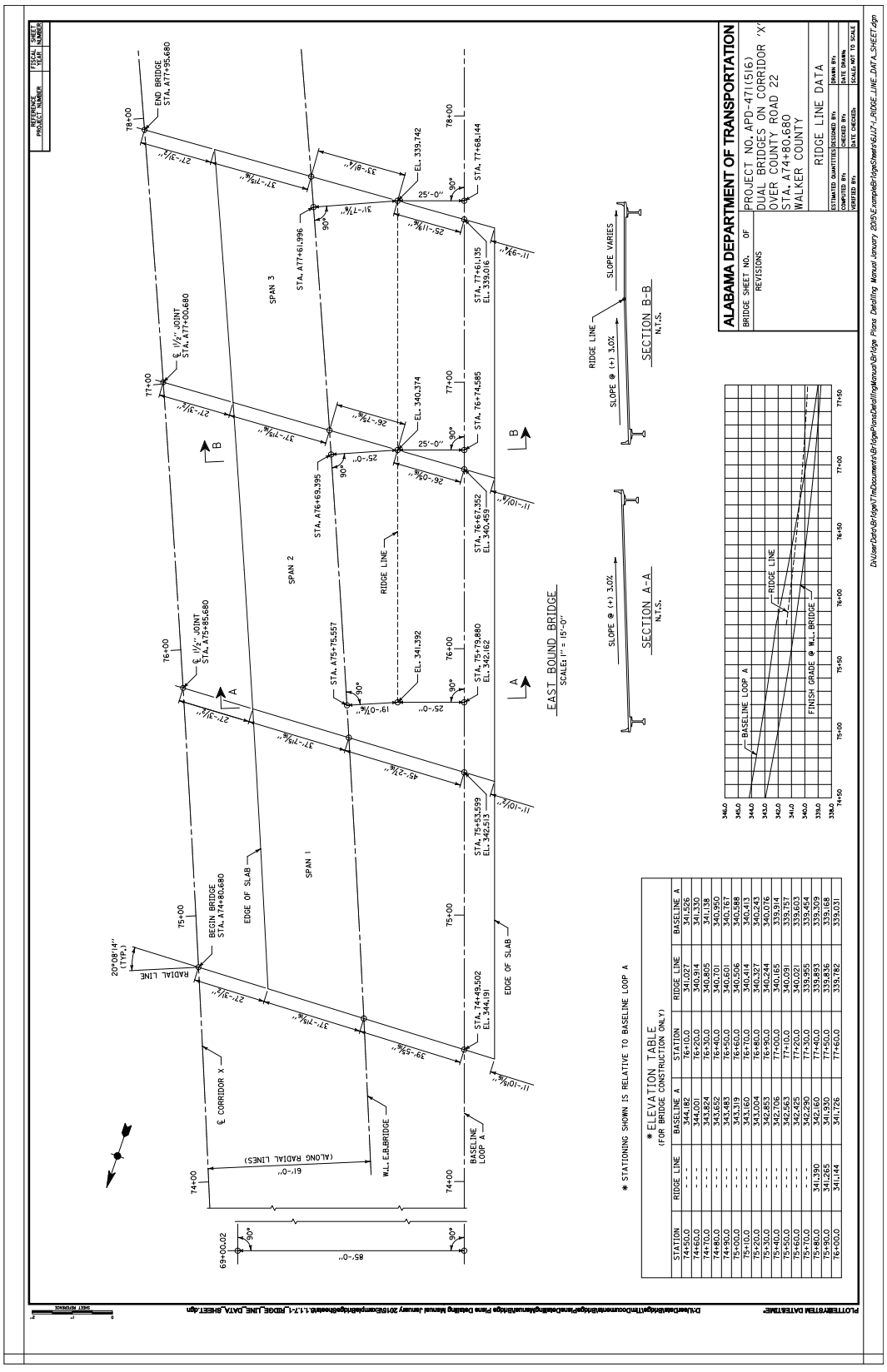


1.6.4 Transition Diagram for Dual Bridges



1.7 Special Information Sheets

1.7.1 Ridge Line Data Sheet



STATION	RIDGE LINE	BASELINE A
74+50.0	- - -	344.182
74+60.0	- - -	344.001
74+70.0	- - -	343.824
74+80.0	- - -	343.652
74+90.0	- - -	343.483
75+00.0	- - -	343.319
75+10.0	- - -	343.160
75+20.0	- - -	343.004
75+30.0	- - -	342.853
75+40.0	- - -	342.706
75+50.0	- - -	342.563
75+60.0	- - -	342.425
75+70.0	342.280	342.280
75+80.0	341.390	341.390
75+90.0	341.265	341.330
76+00.0	341.144	341.726

STATION	RIDGE LINE	BASELINE A
76+10.0	341.027	341.526
76+20.0	340.914	341.330
76+30.0	340.805	341.138
76+40.0	340.701	340.950
76+50.0	340.601	340.767
76+60.0	340.506	340.588
76+70.0	340.414	340.414
76+80.0	340.327	340.243
76+90.0	340.244	340.076
77+00.0	340.165	339.914
77+10.0	340.091	339.757
77+20.0	340.021	339.603
77+30.0	339.955	339.454
77+40.0	339.893	339.308
77+50.0	339.836	339.168
77+60.0	339.782	339.031

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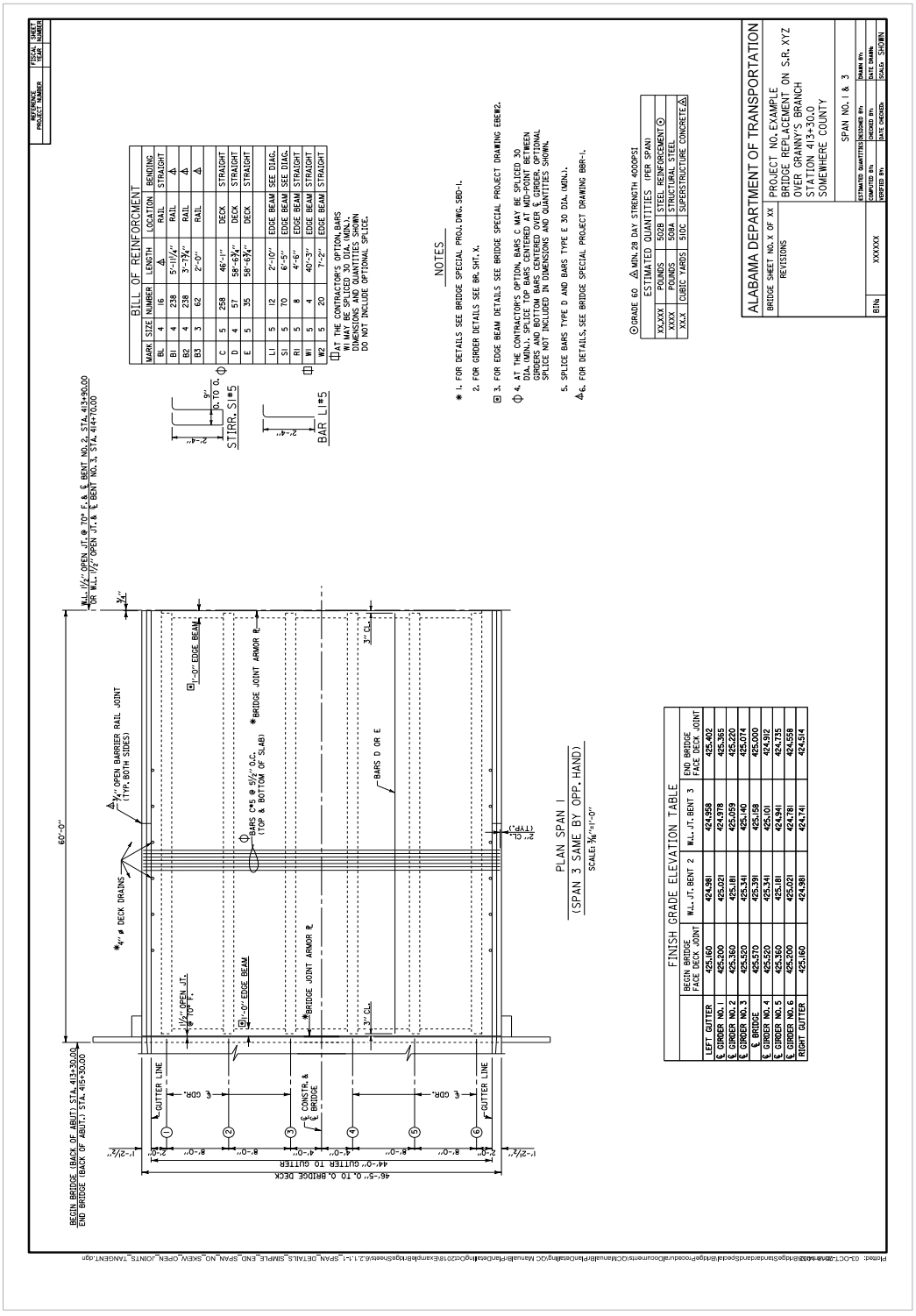
B Superstructure Sheets

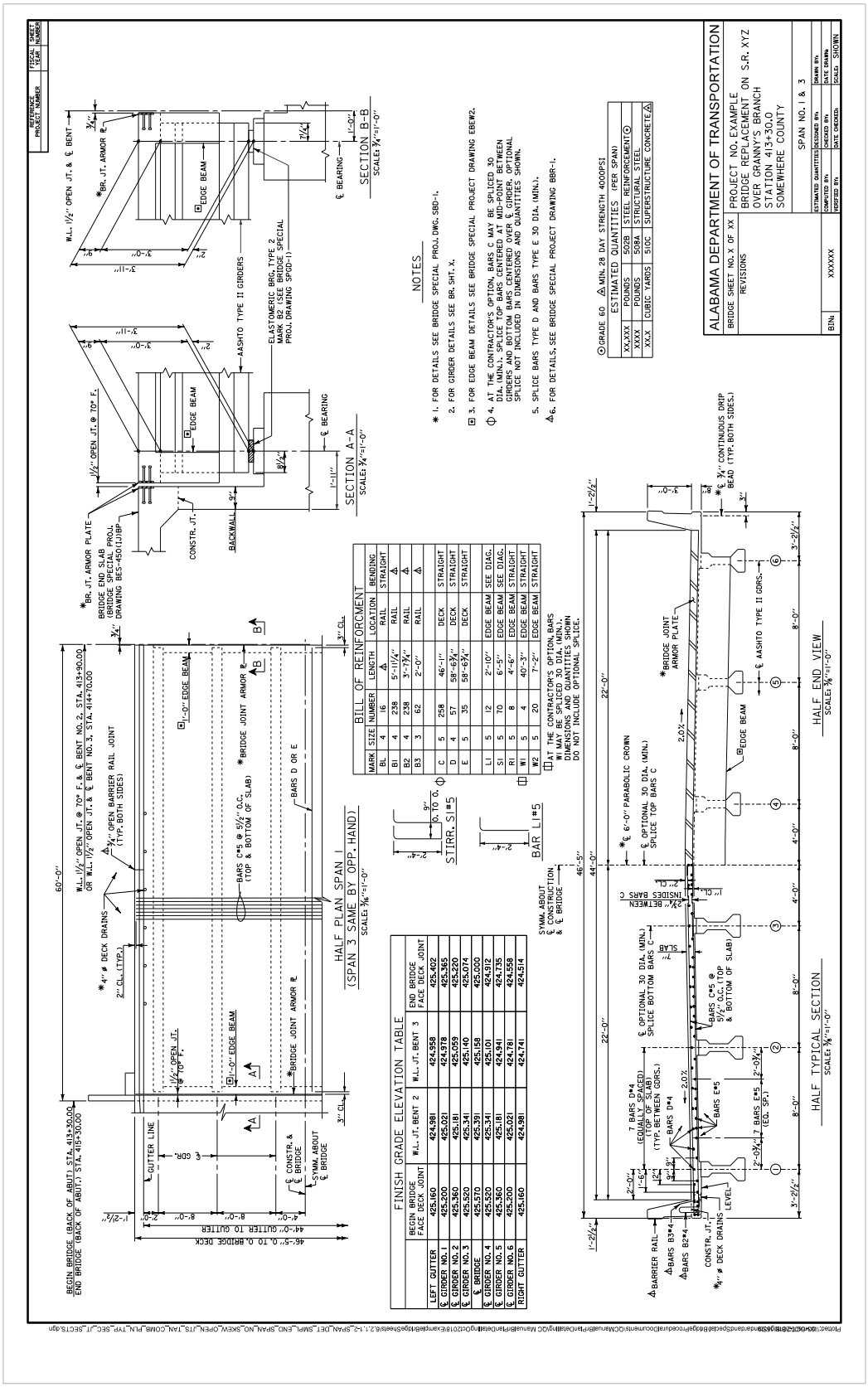
2.1 Prestressed Concrete Girders

2.1.1 Span Details

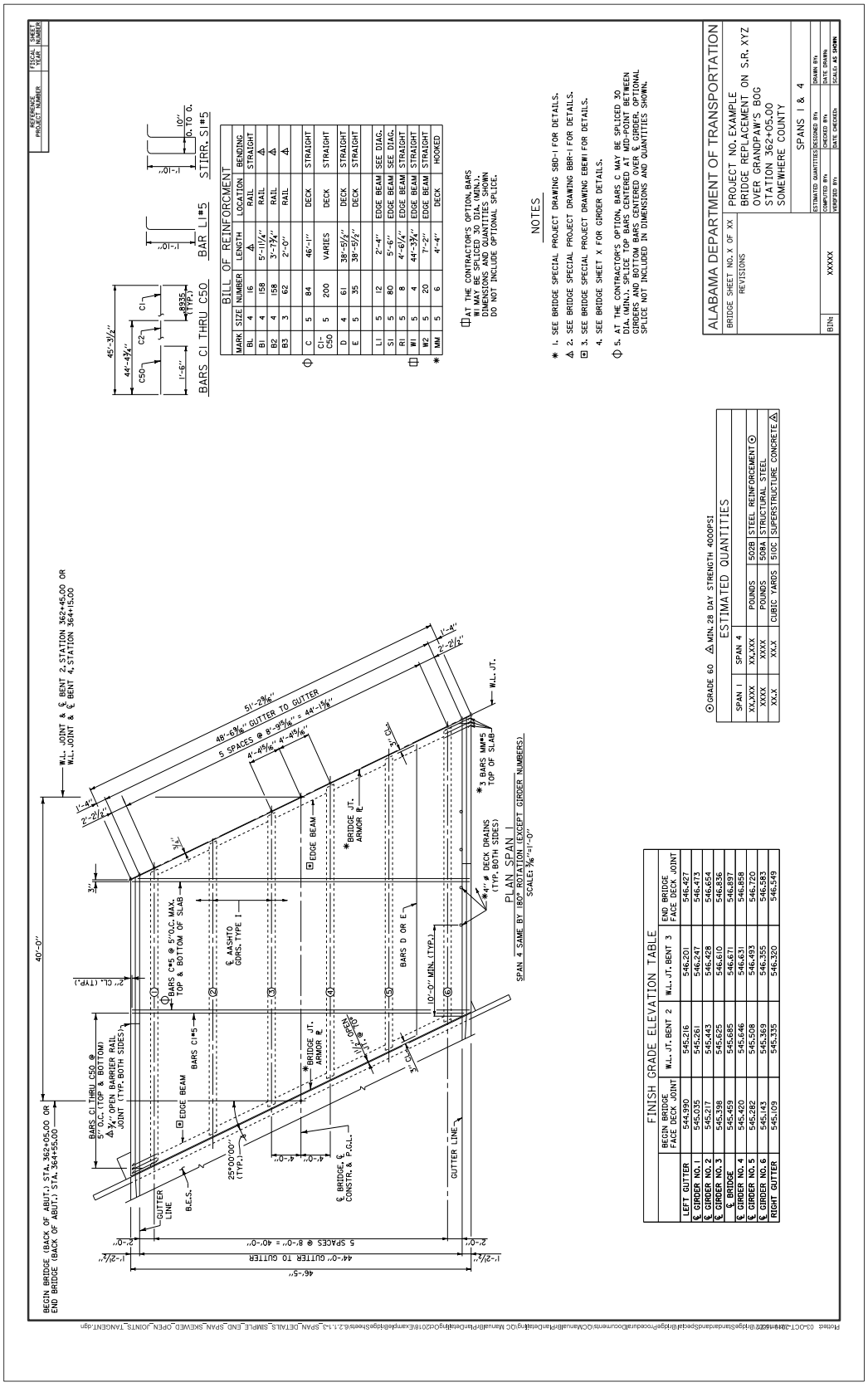
2.1.1.1 Simple End Span, No Skew, Open Joints, Tangent, Plan View



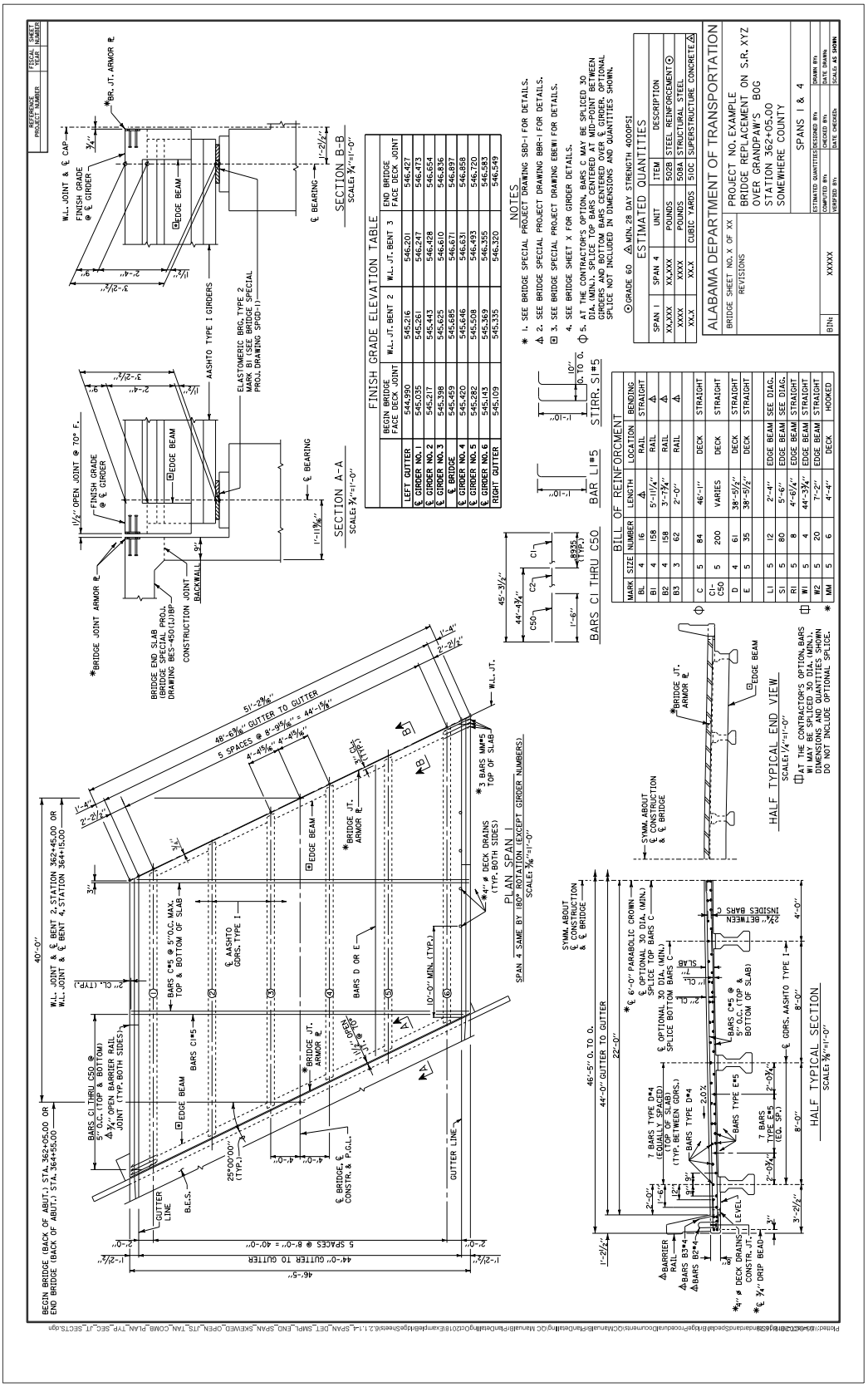
2.1.1.2 Simple End Span, No Skew, Open Joints, Tangent, Comb. Plan, Typ. Sect., Jt. Sects.



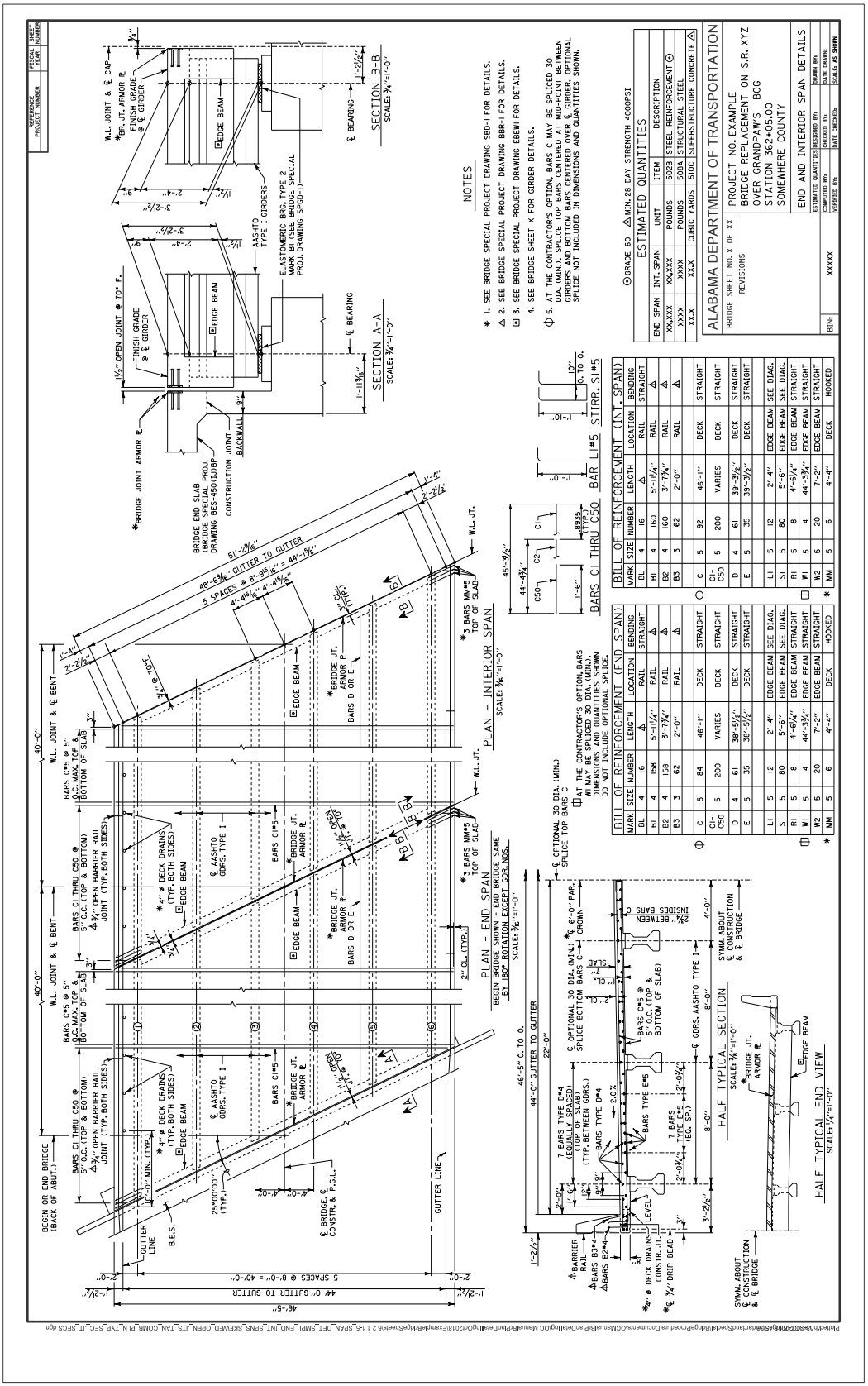
2.1.1.3 Simple End Span, Skewed, Open Joints, Tangent, Plan View



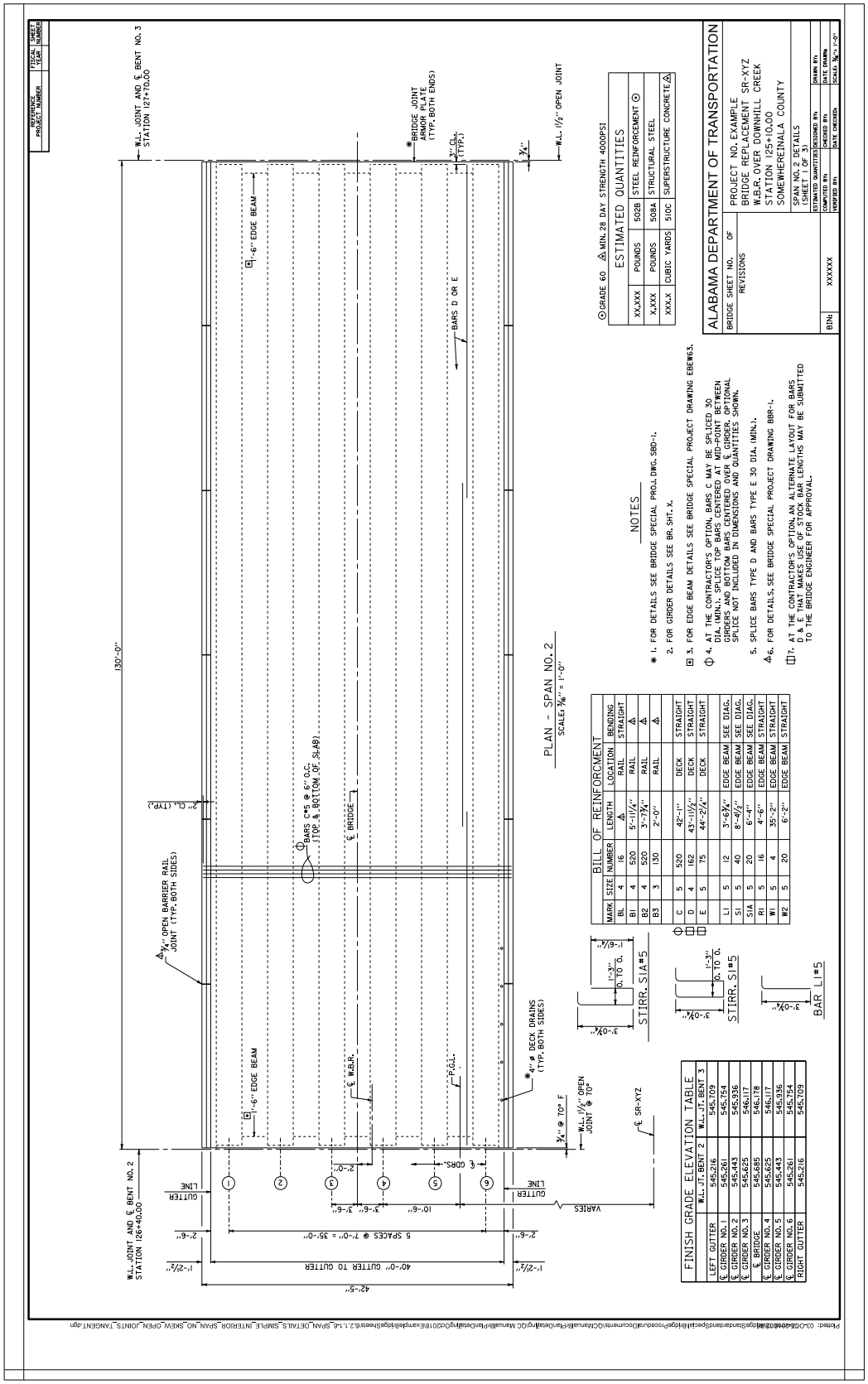
2.1.1.4 Simple End Span, Skewed, Open Joints, Tangent, Combined Plan, Typical Sect., Joint Sects.



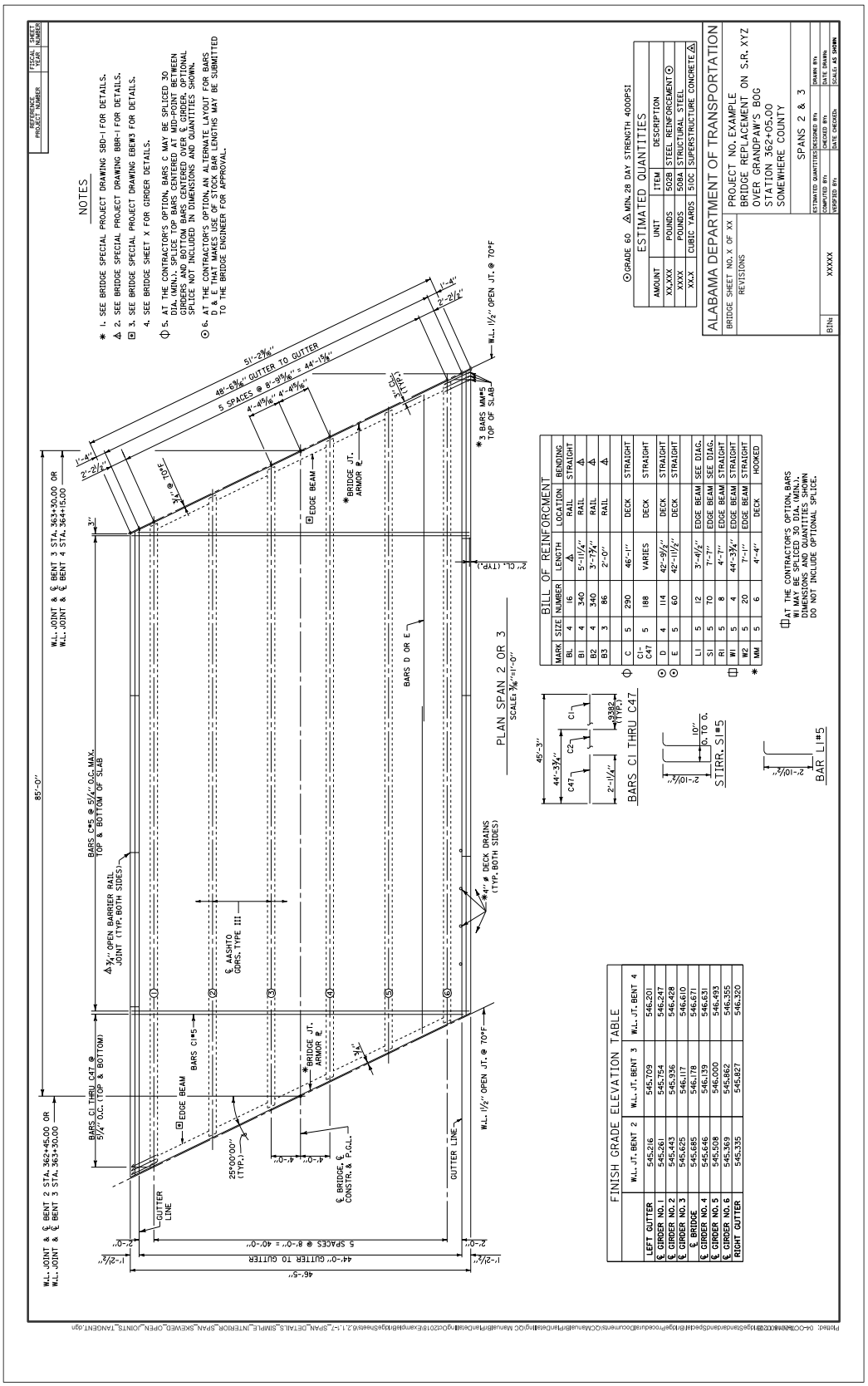
2.1.1.5 Simple End & Int. Spans, Skewed, Open Jts., Tangent, Comb. Plan, Typ. Sect., Jt. Sects.



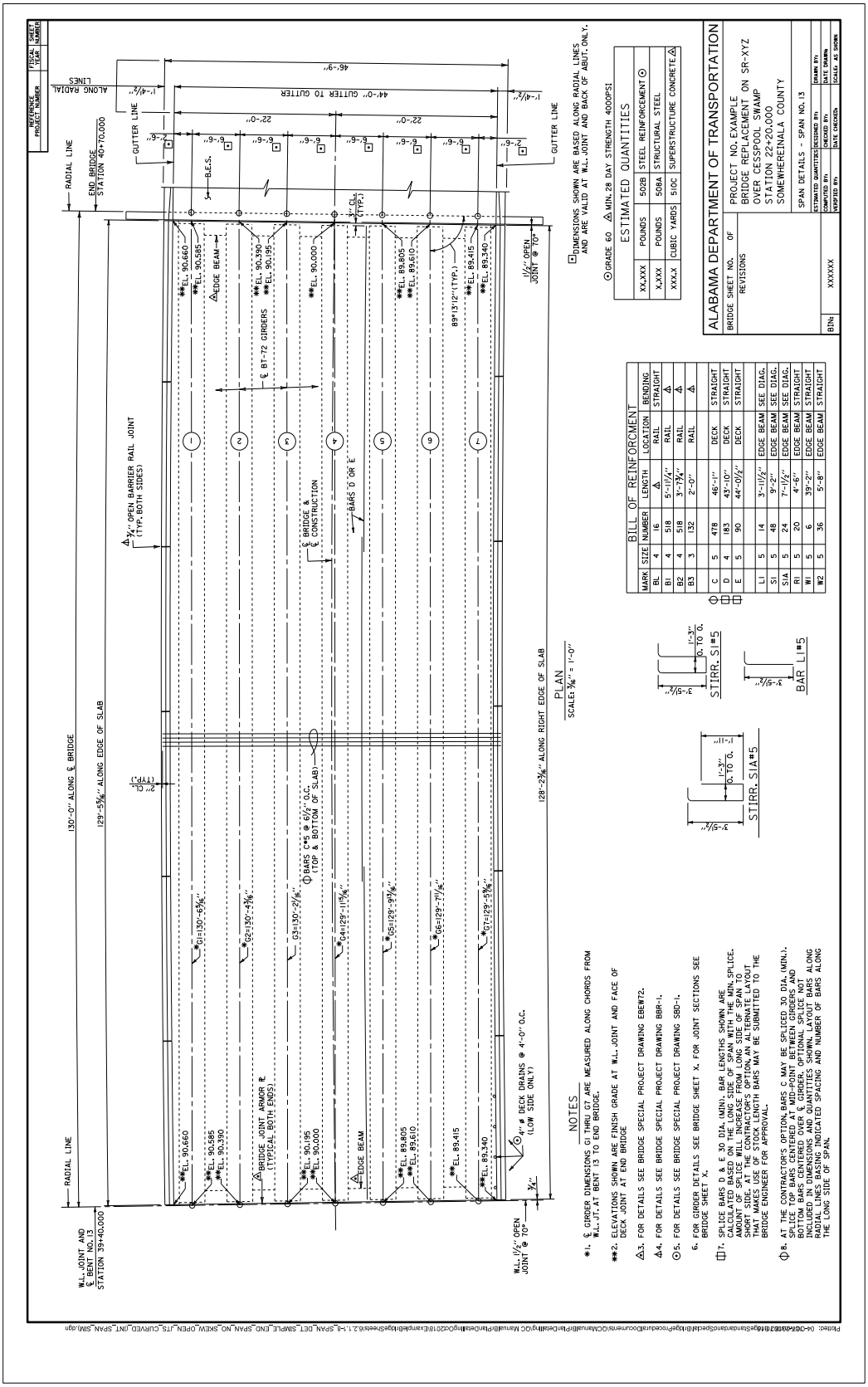
2.1.1.6 Simple Interior Span, No Skew, Open Joints, Tangent, Plan View



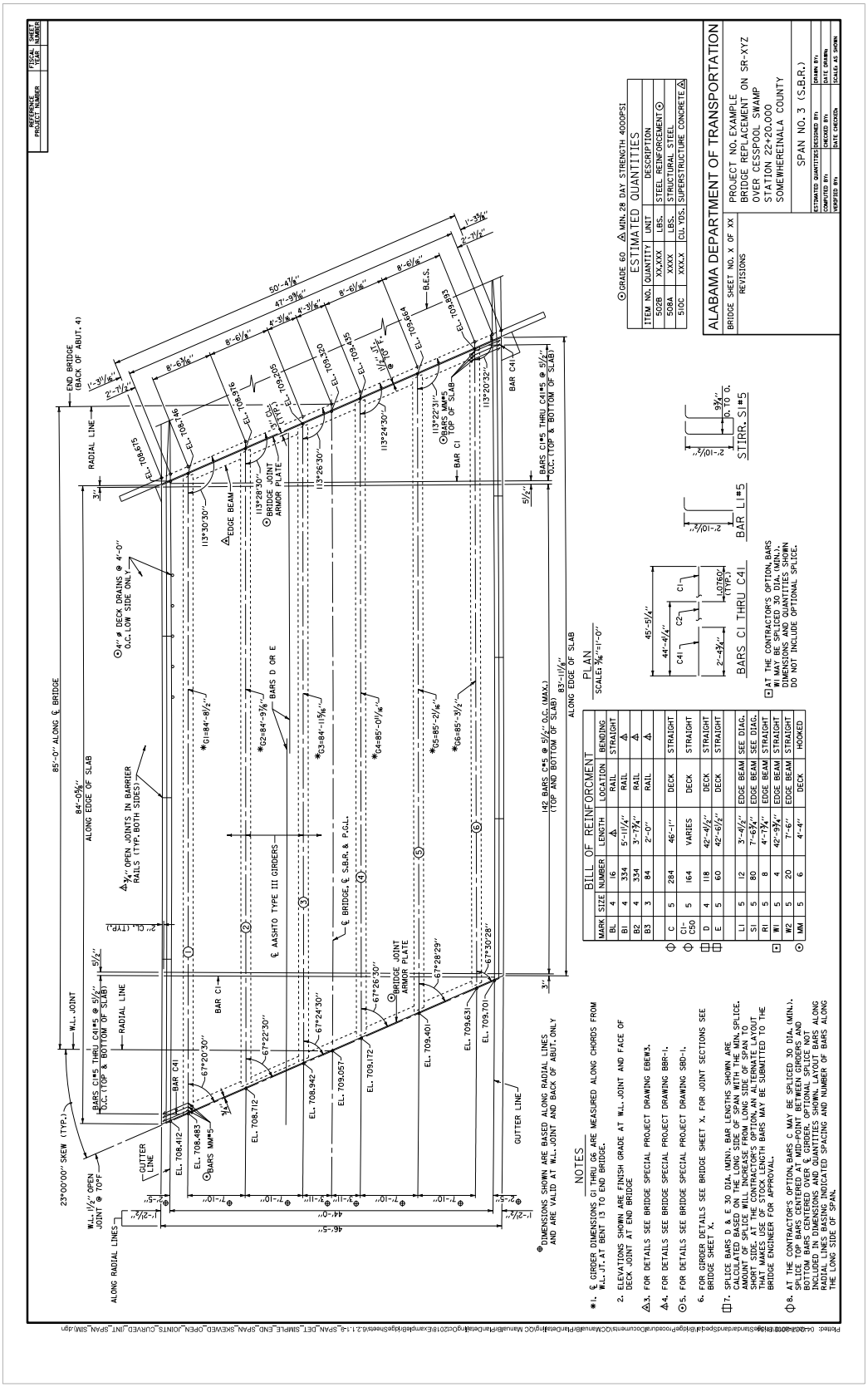
2.1.1.7 Simple Interior Span, Skewed, Open Joints, Tangent, Plan View



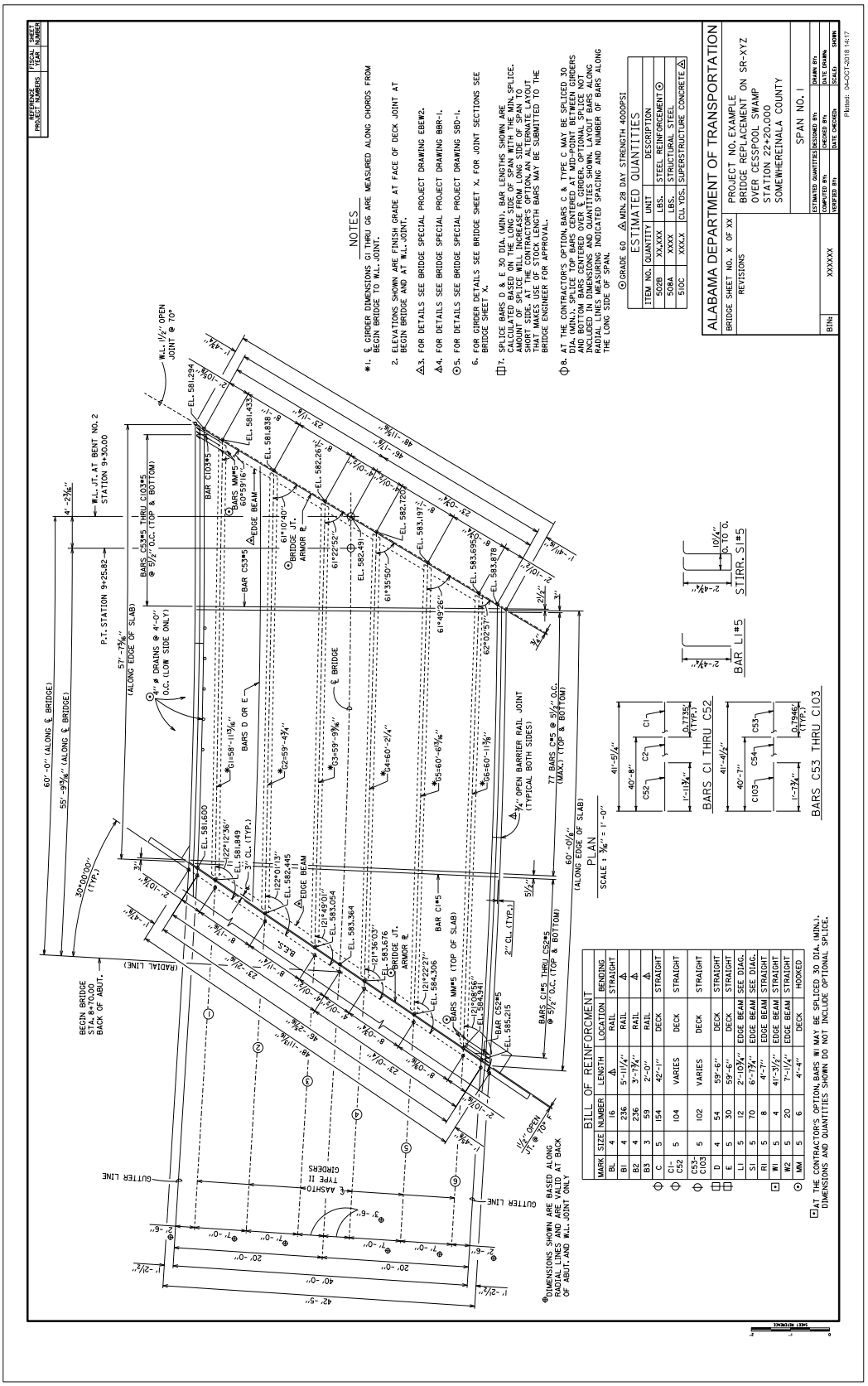
2.1.1.8 Simple End Span, No Skew, Open Joints, Curved, Plan View (Interior Span Similar)



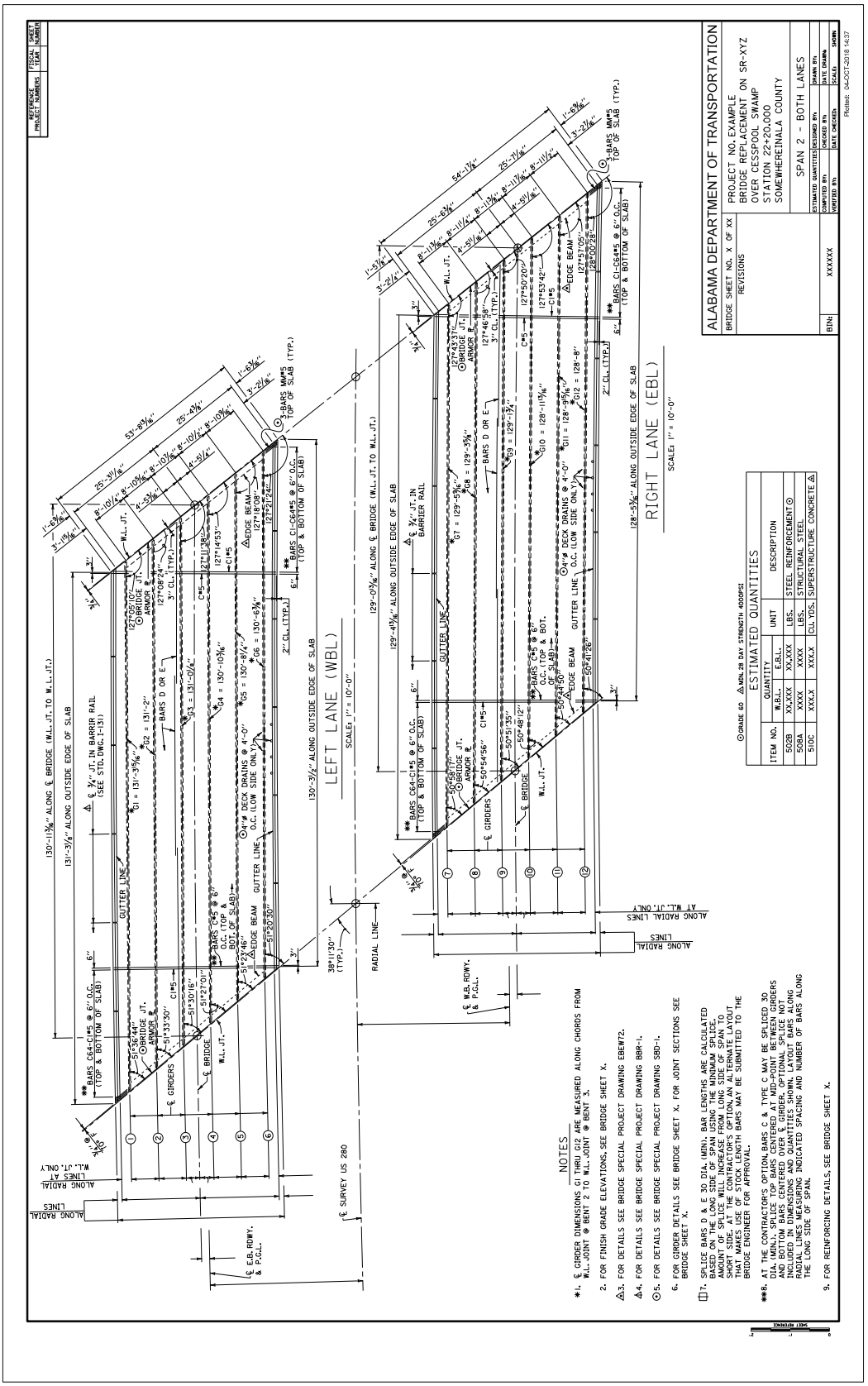
2.1.1.9 Simple End Span, Skewed, Open Joints, Curved, Plan View (Interior Span Similar)



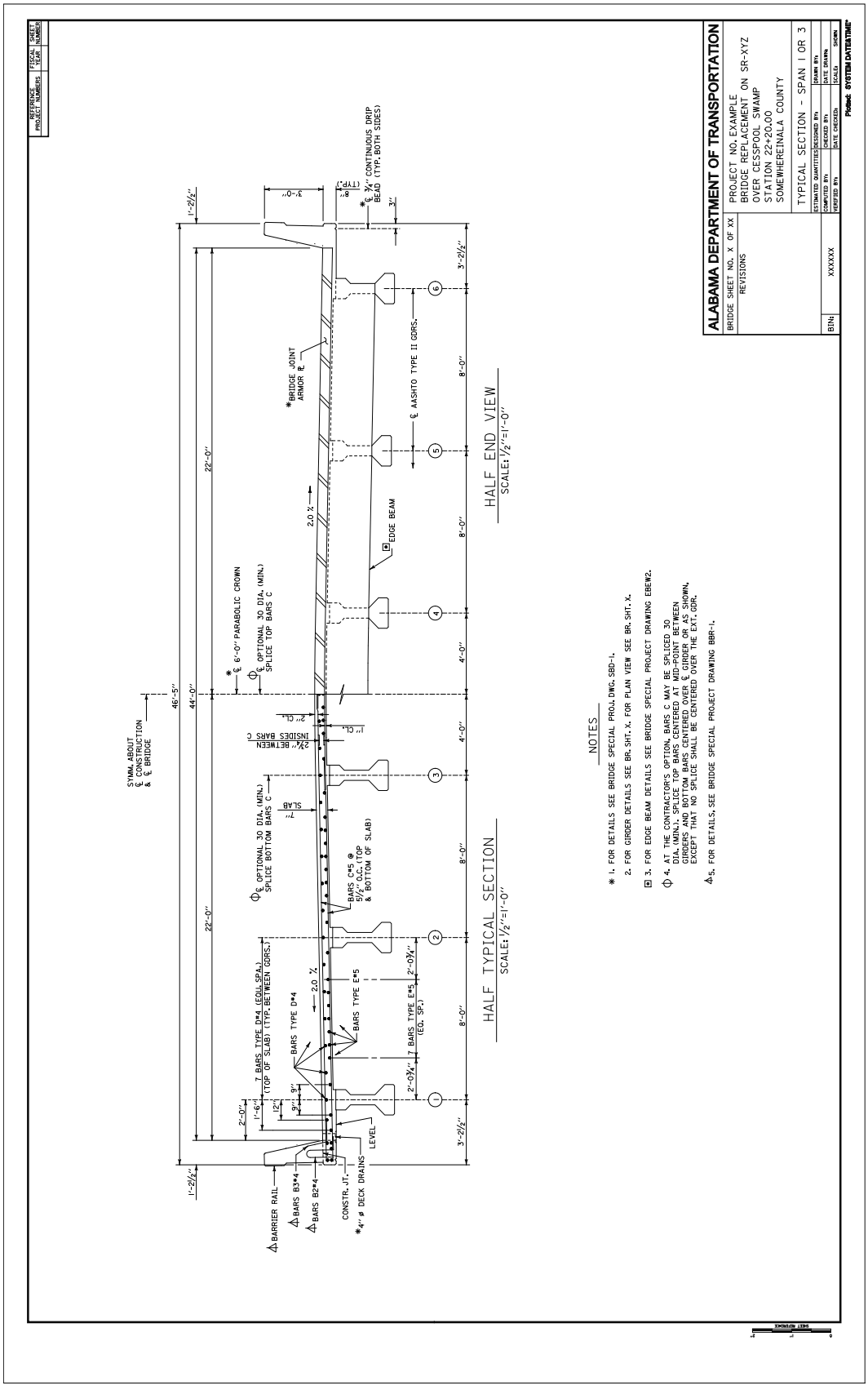
2.1.1.10 Simple End Span, Skewed, Open Joints, Part Tan., Part Curved, Plan View (Int. Span Sim.)



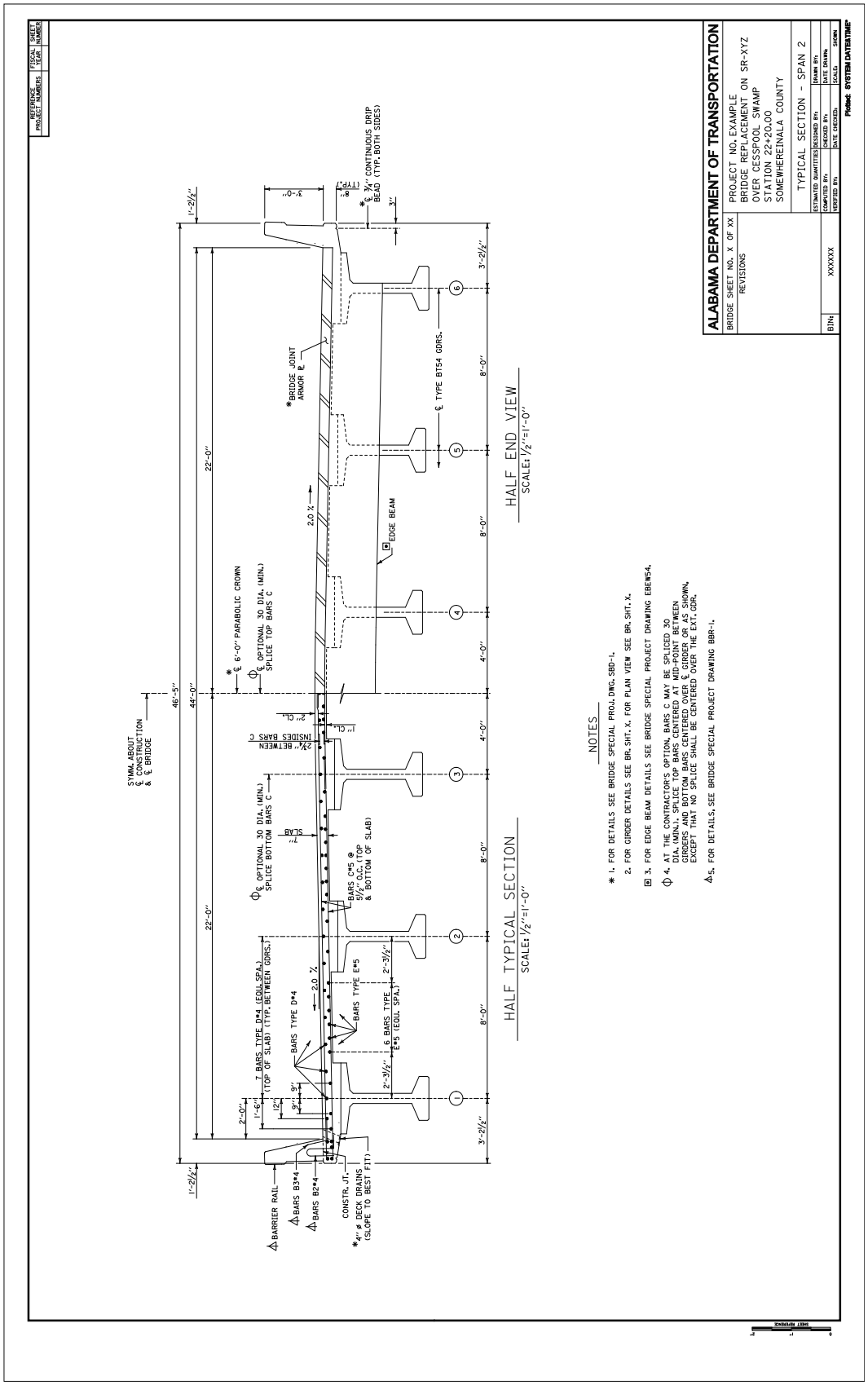
2.1.1.11 Simple Int. Spans, Dual Bridges, Skewed, Open Joints, Curved, Plan View



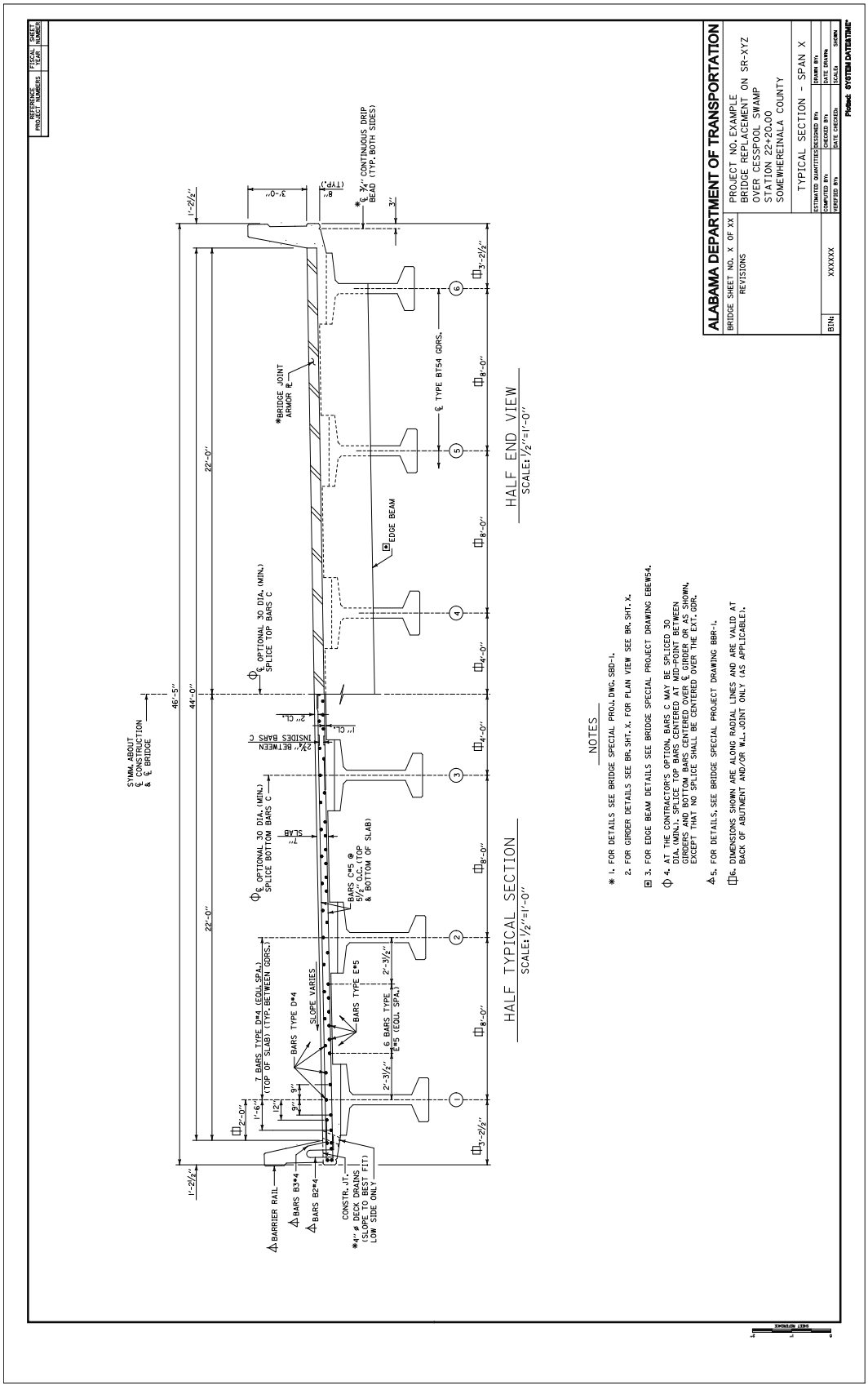
2.1.1.12 Typical Section, AASHTO, Normal Crown, Tangent



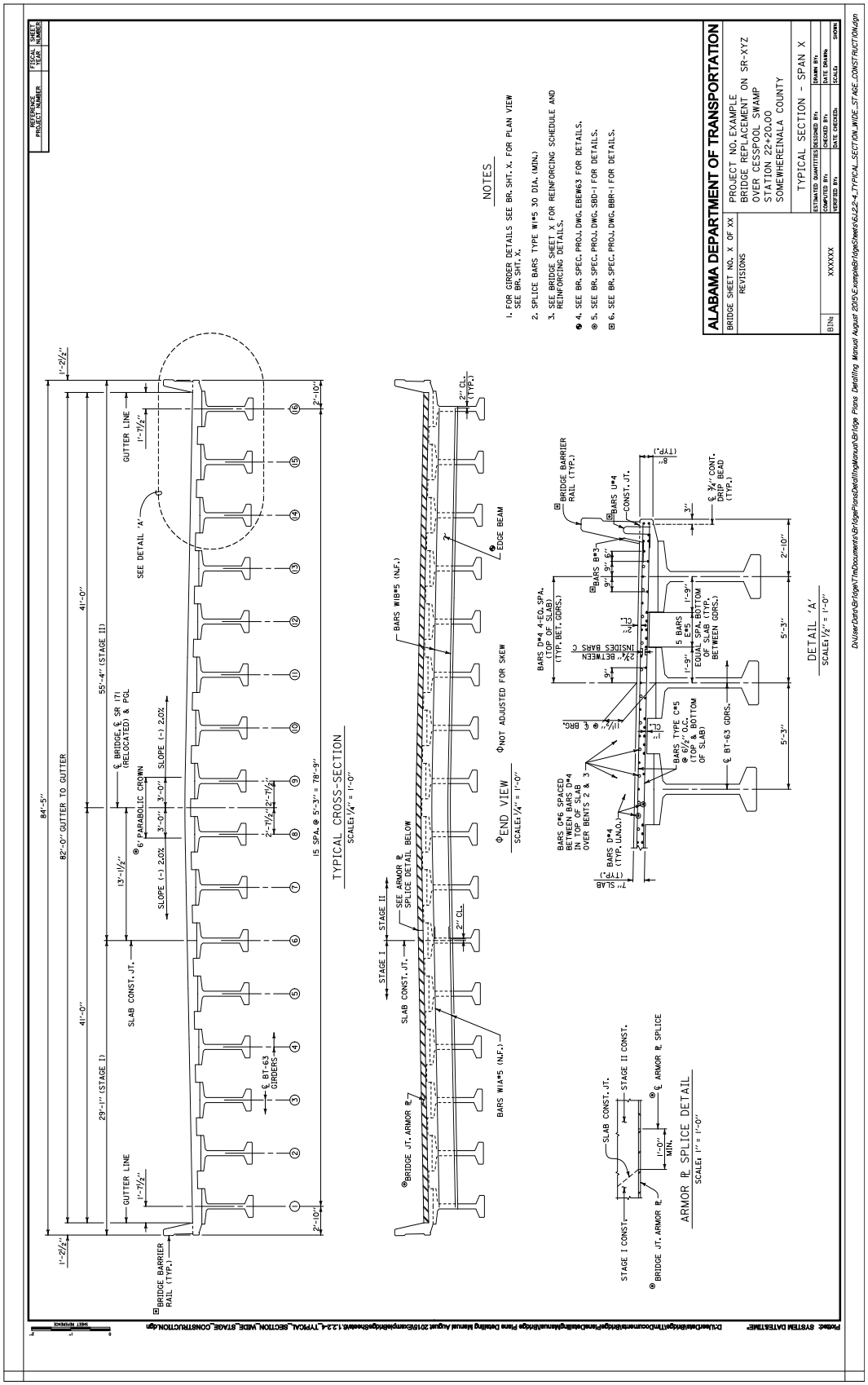
2.1.1.13 Typical Section, Bulb Tee, Normal Crown, Tangent



2.1.1.14 Typical Section, Bulb Tee, Sloped, Curved

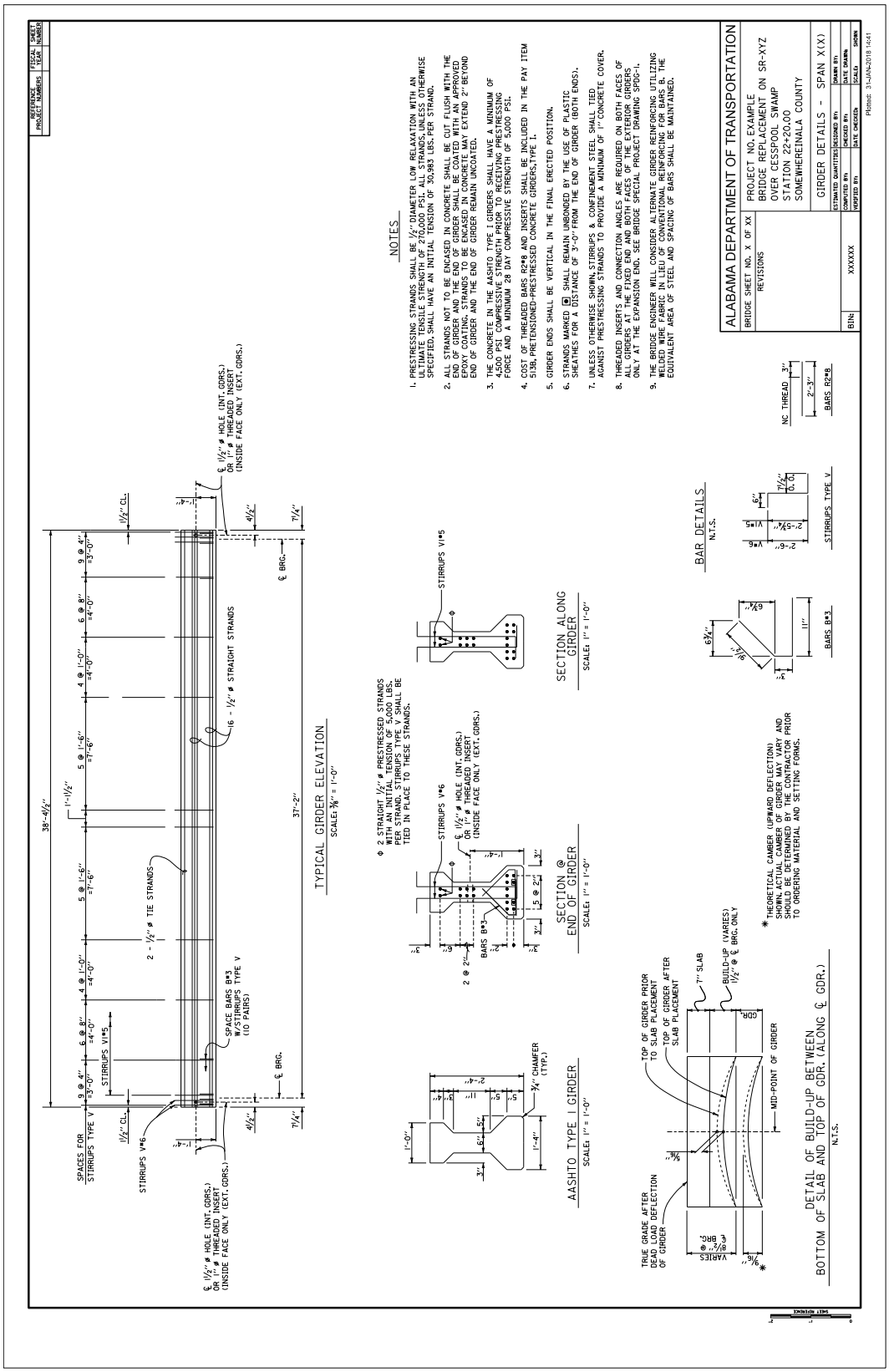


2.1.1.15 Typical Section, Bulb Tee, Wide Deck, Stage Construction, Tangent

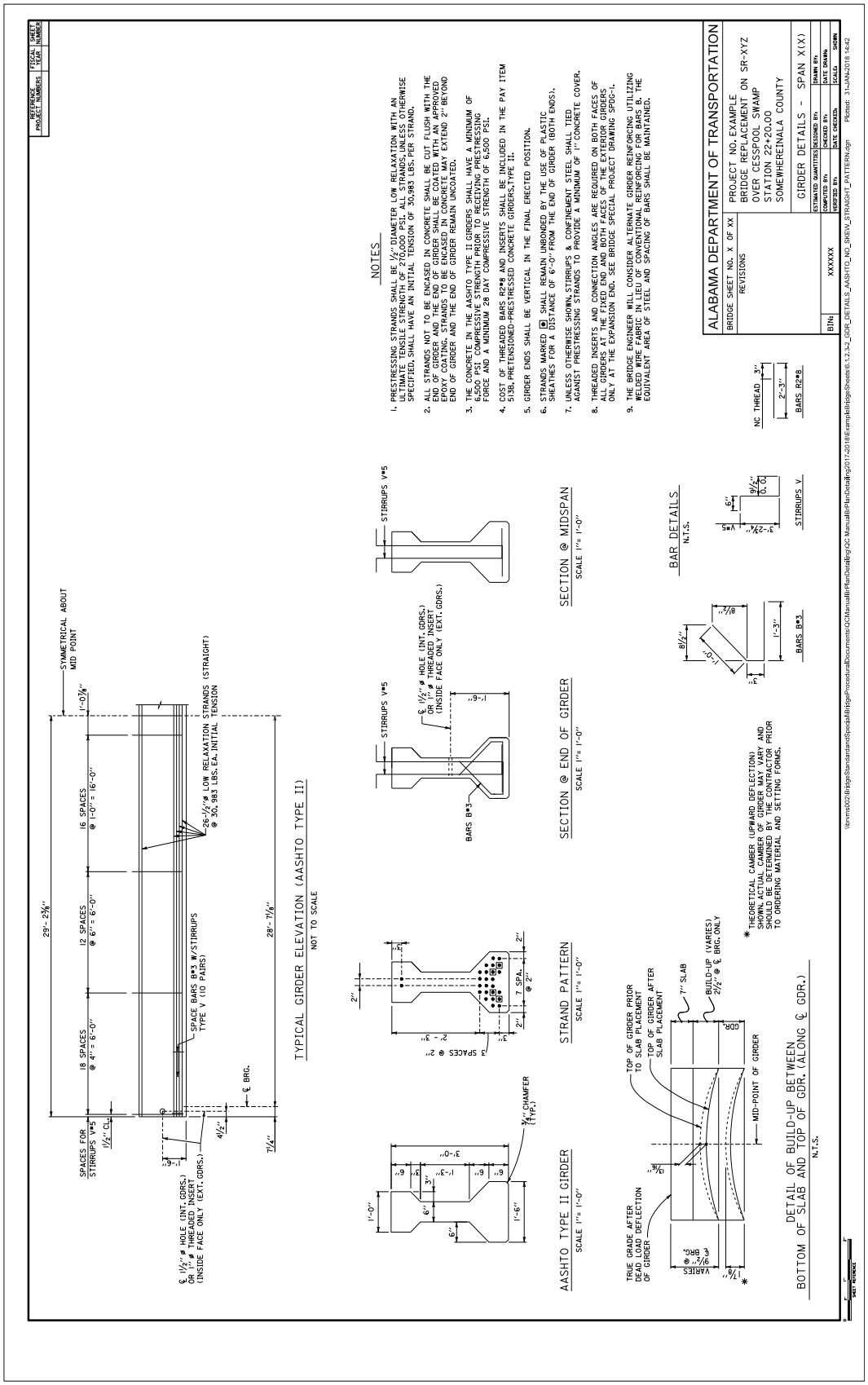


2.1.2 Girder Details

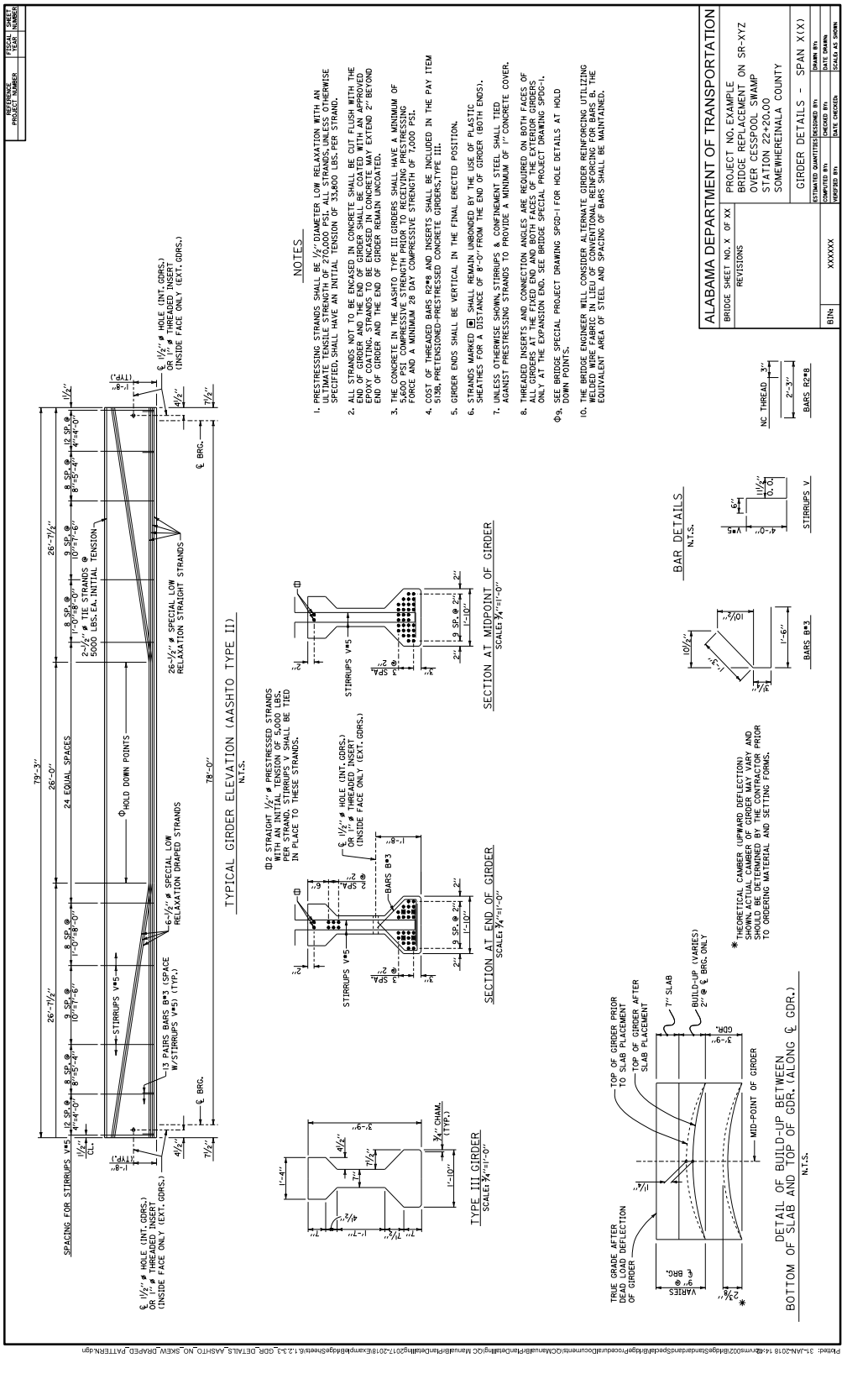
2.1.2.1 AASHTO, No Skew, Straight Pattern



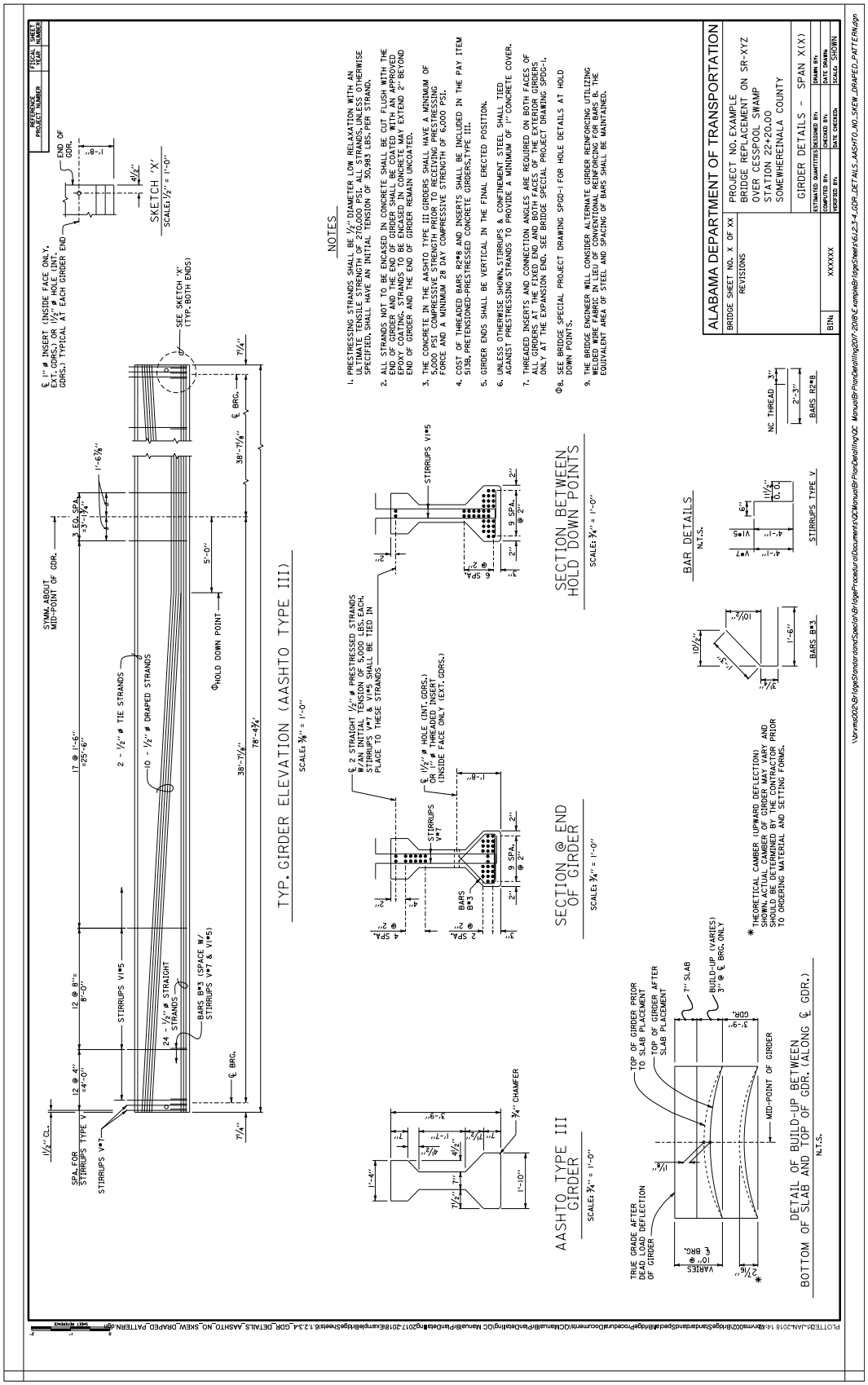
2.1.2.2 AASHTO, No Skew, Straight Pattern



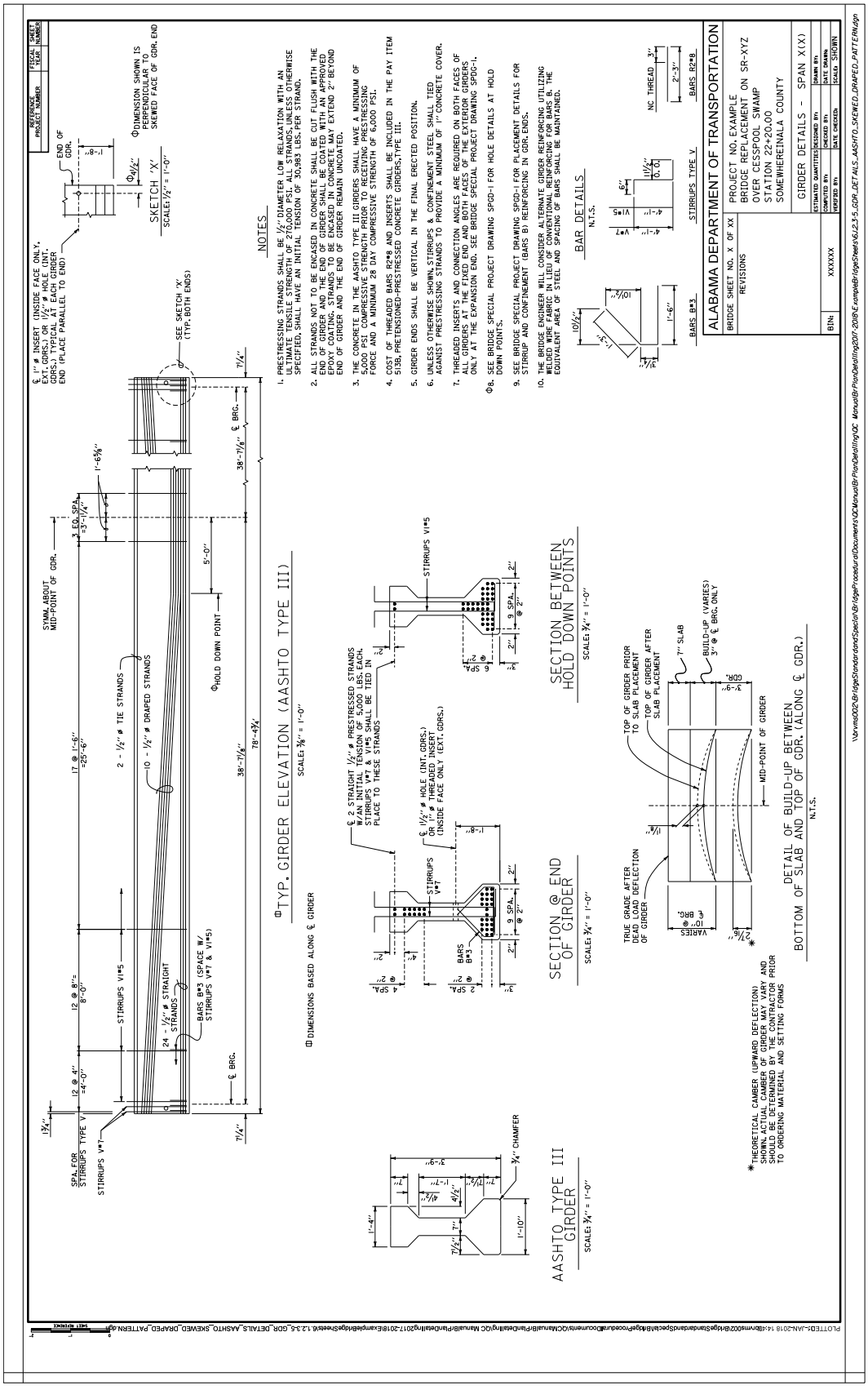
2.1.2.3 AASHTO, No Skew, Draped Pattern



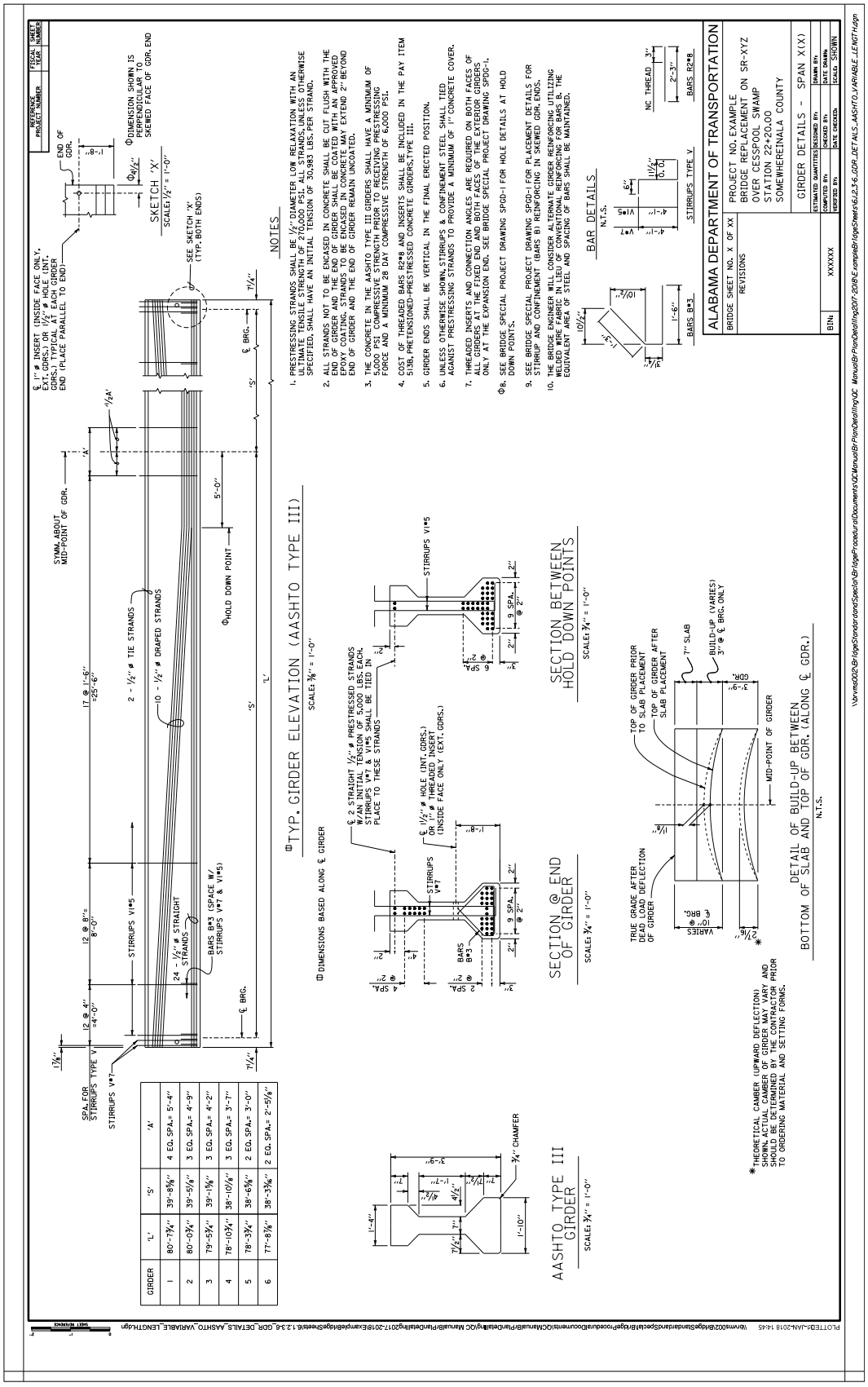
2.1.2.4 AASHTO, No Skew, Draped Pattern



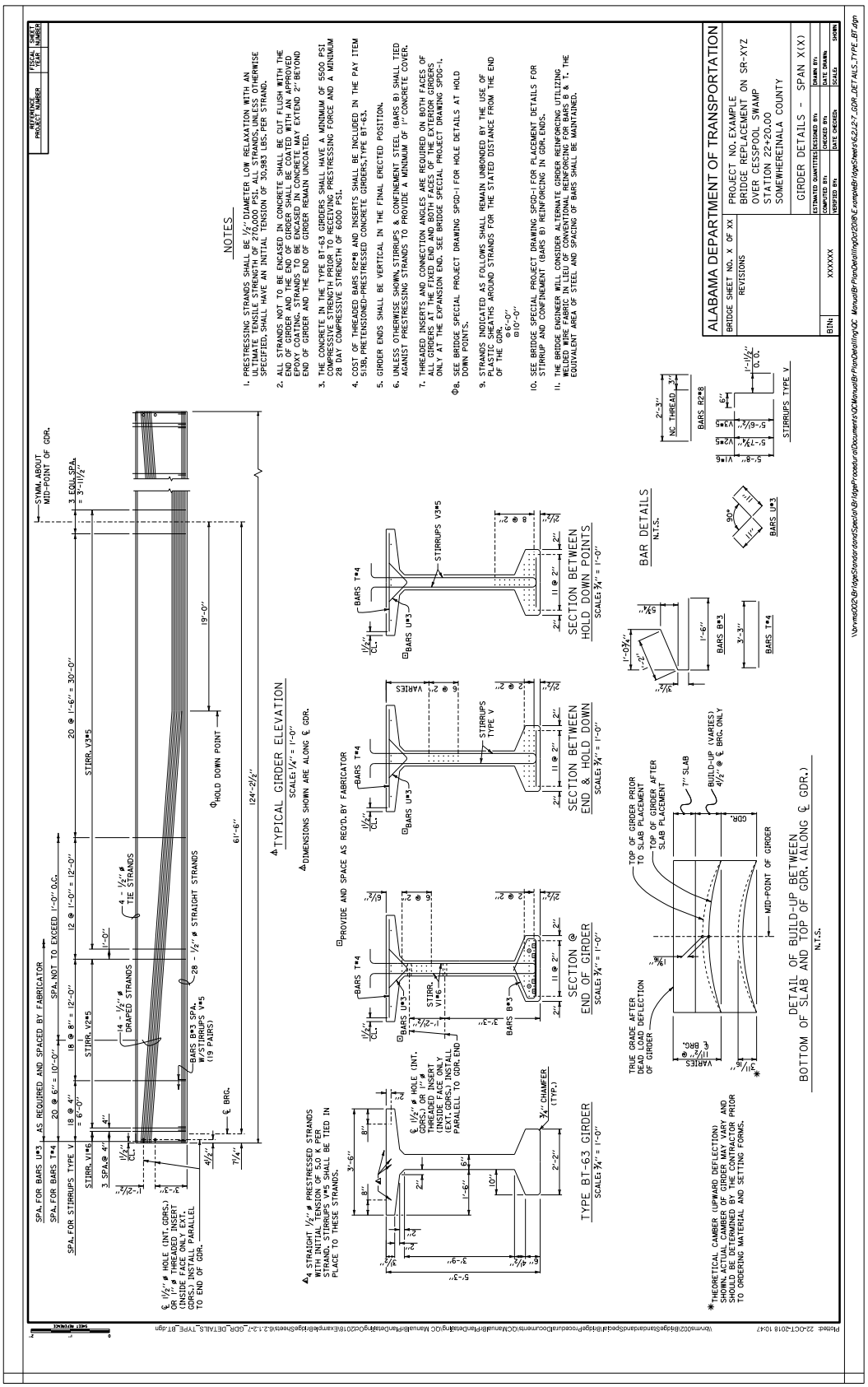
2.1.2.5 AASHTO, Skewed, Draped Pattern



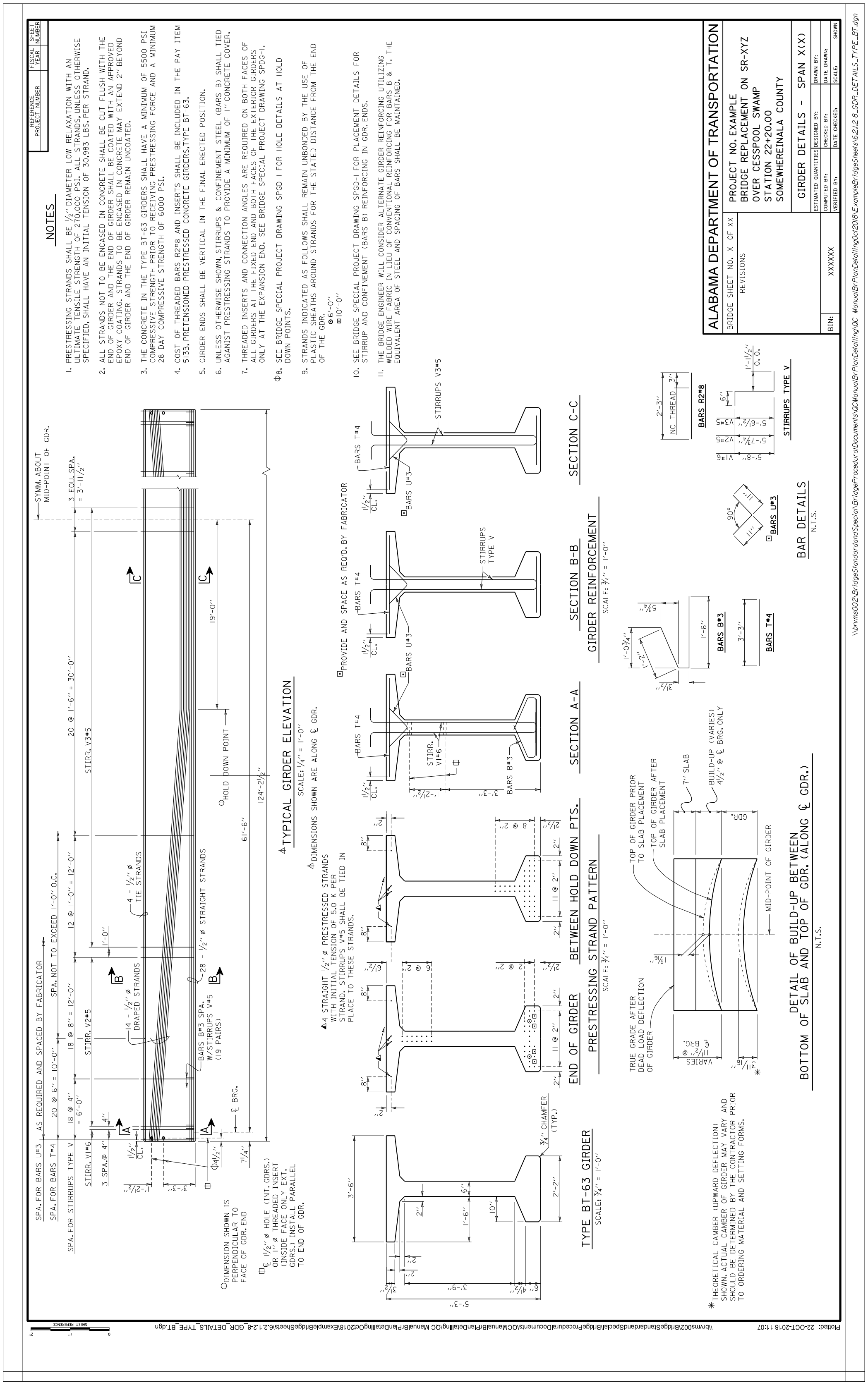
2.1.2.6 AASHTO, Skewed, Length Varies, Draped



2.1.2.7 Bulb Tee, Draped Pattern



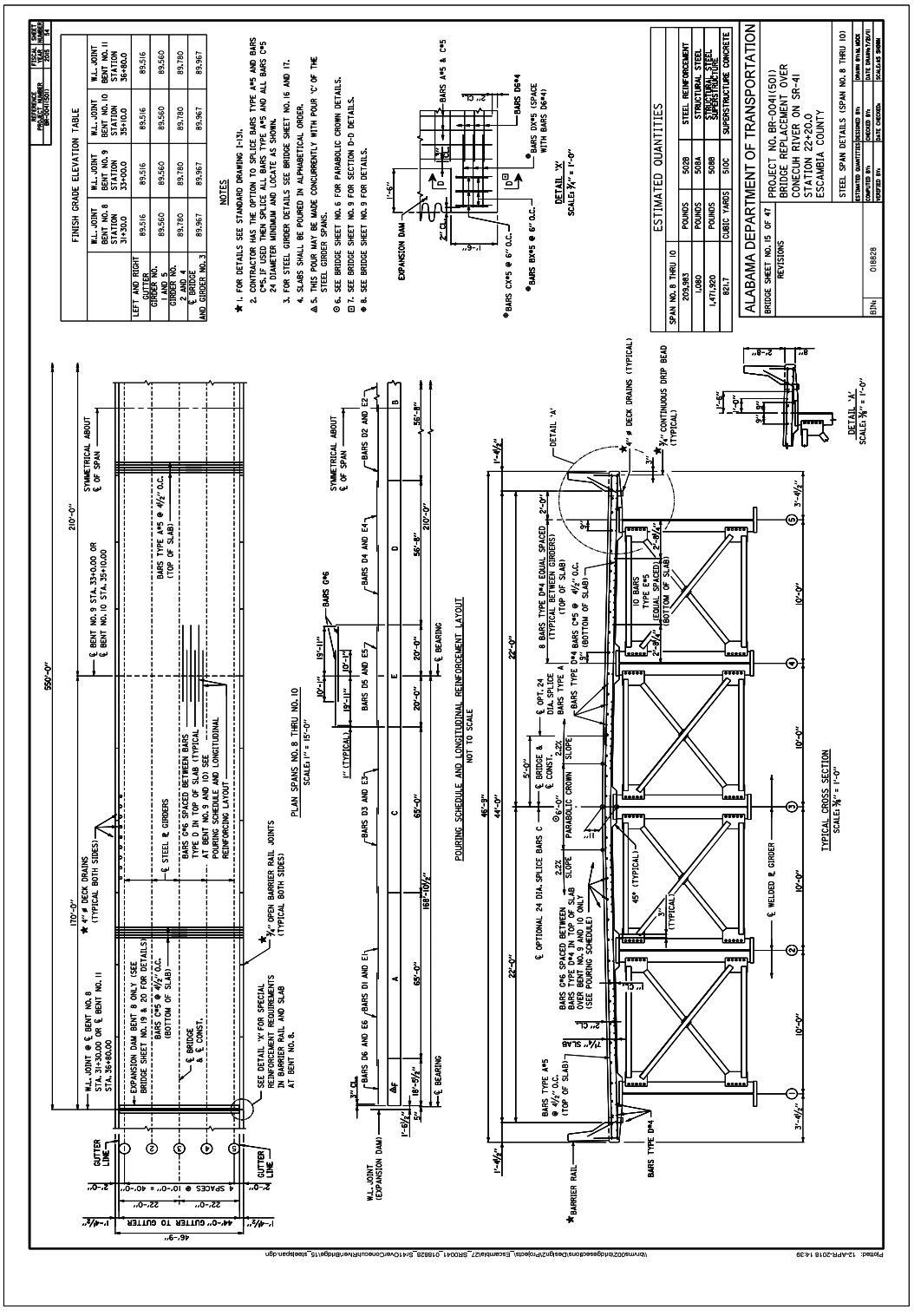
2.1.2.8 Bulb Tee, Draped Pattern



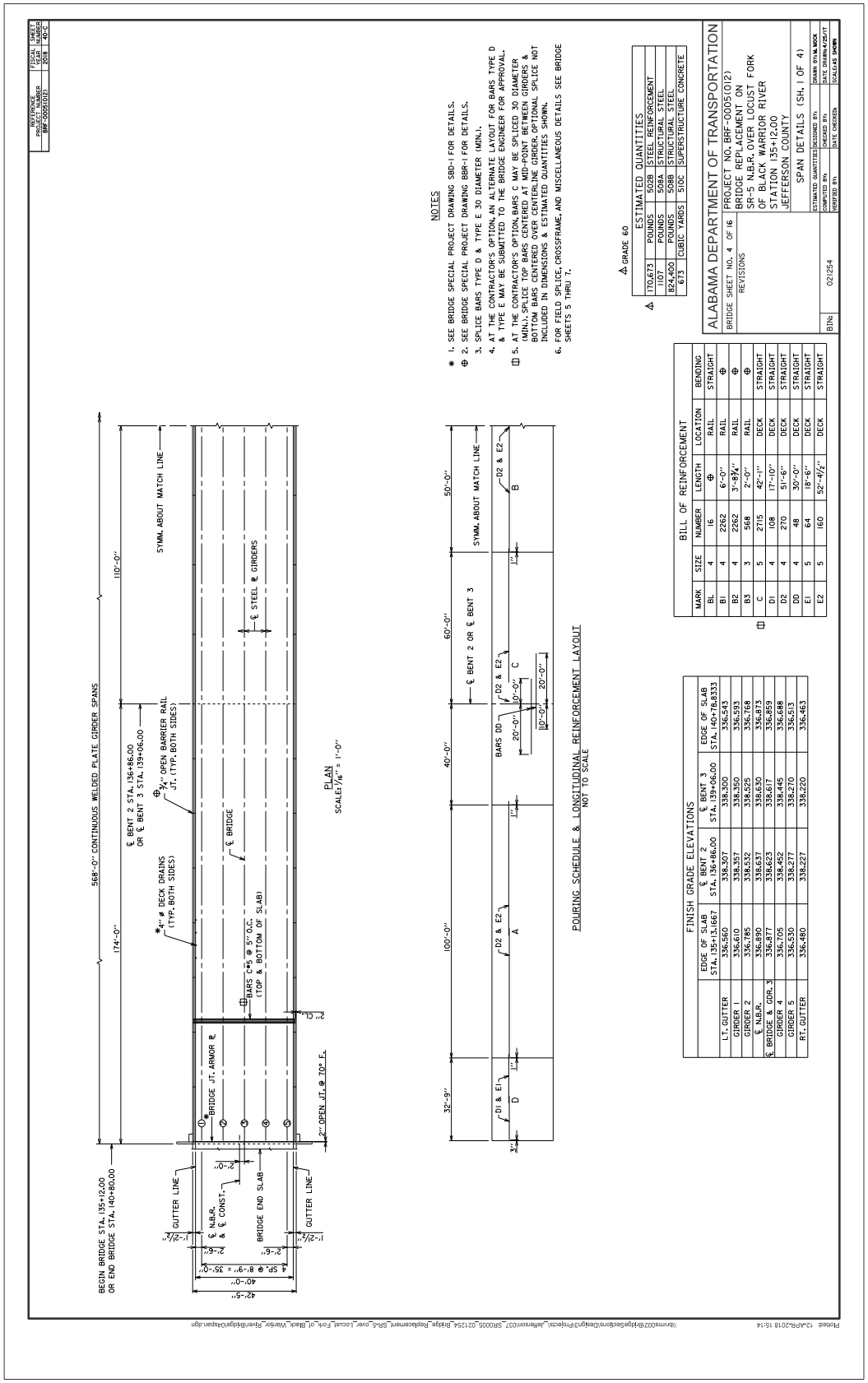
2.2 Steel Girders

2.2.1 Deck Details

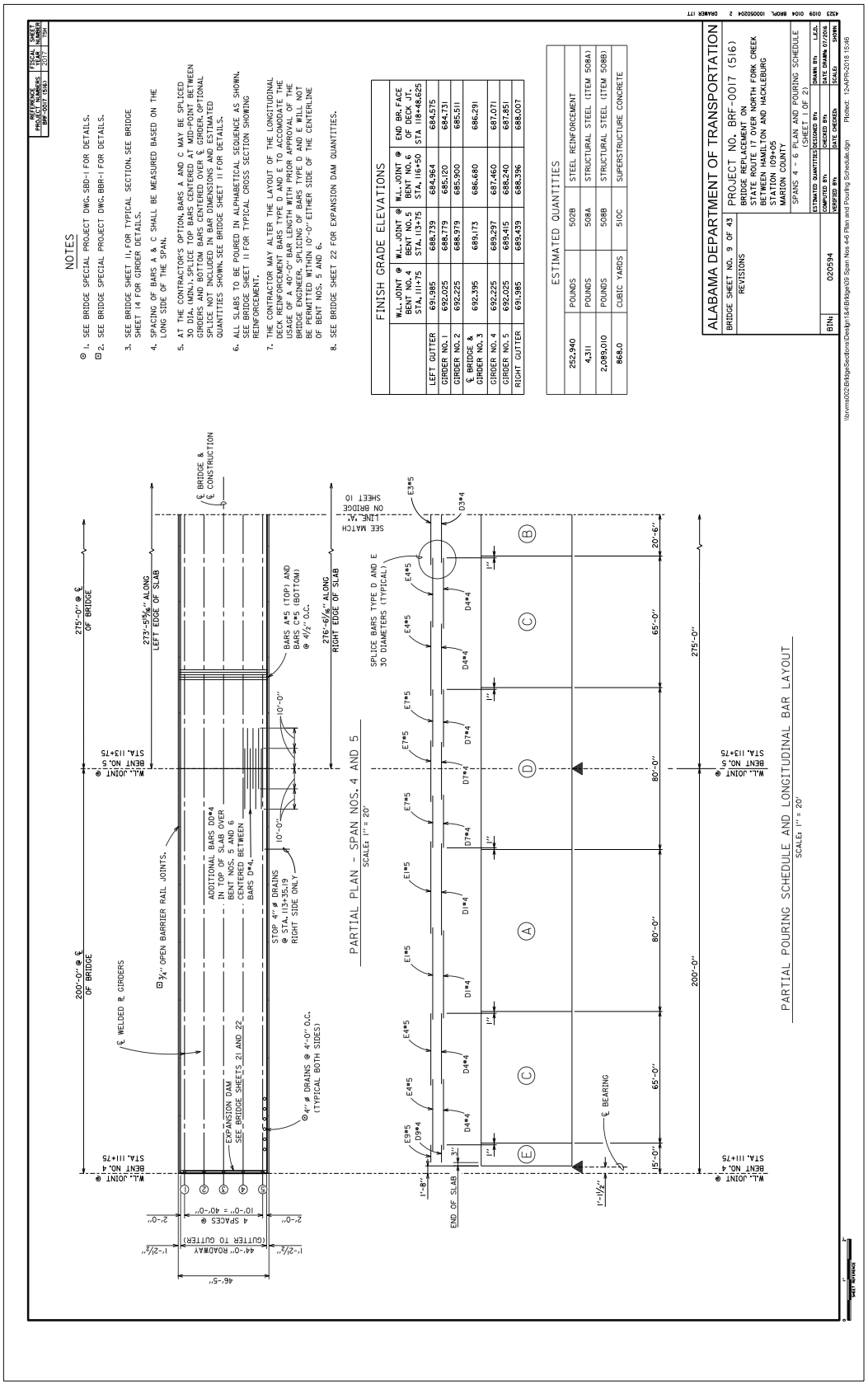
2.2.1.1 Plan View, Pouring Schedule, Typ. Section, Miscellaneous Details (Tangent)

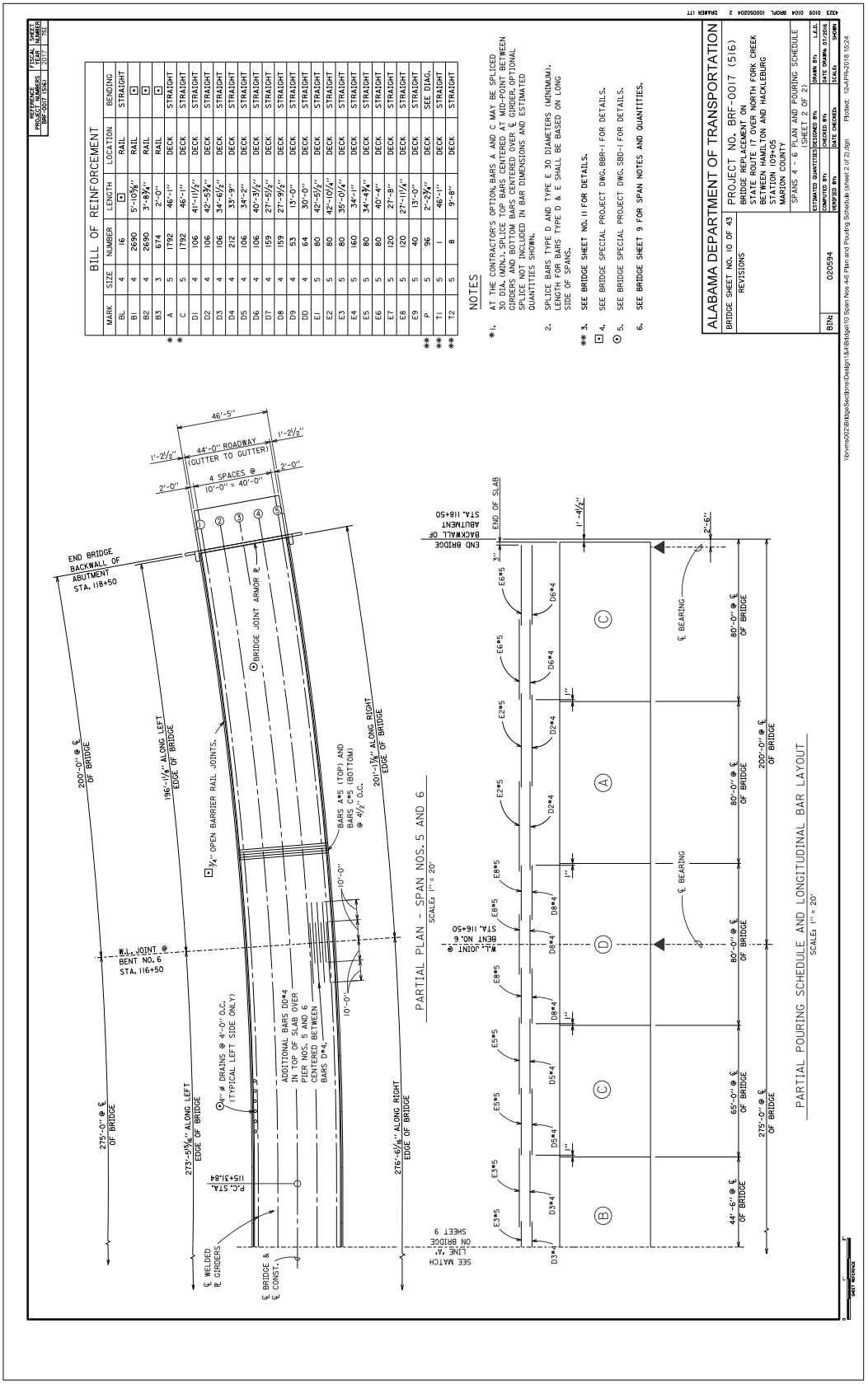


2.2.1.2 Plan View, Pouring Schedule, Notes, Bill of Reinf., Finish Grade Elevs. (Tangent)

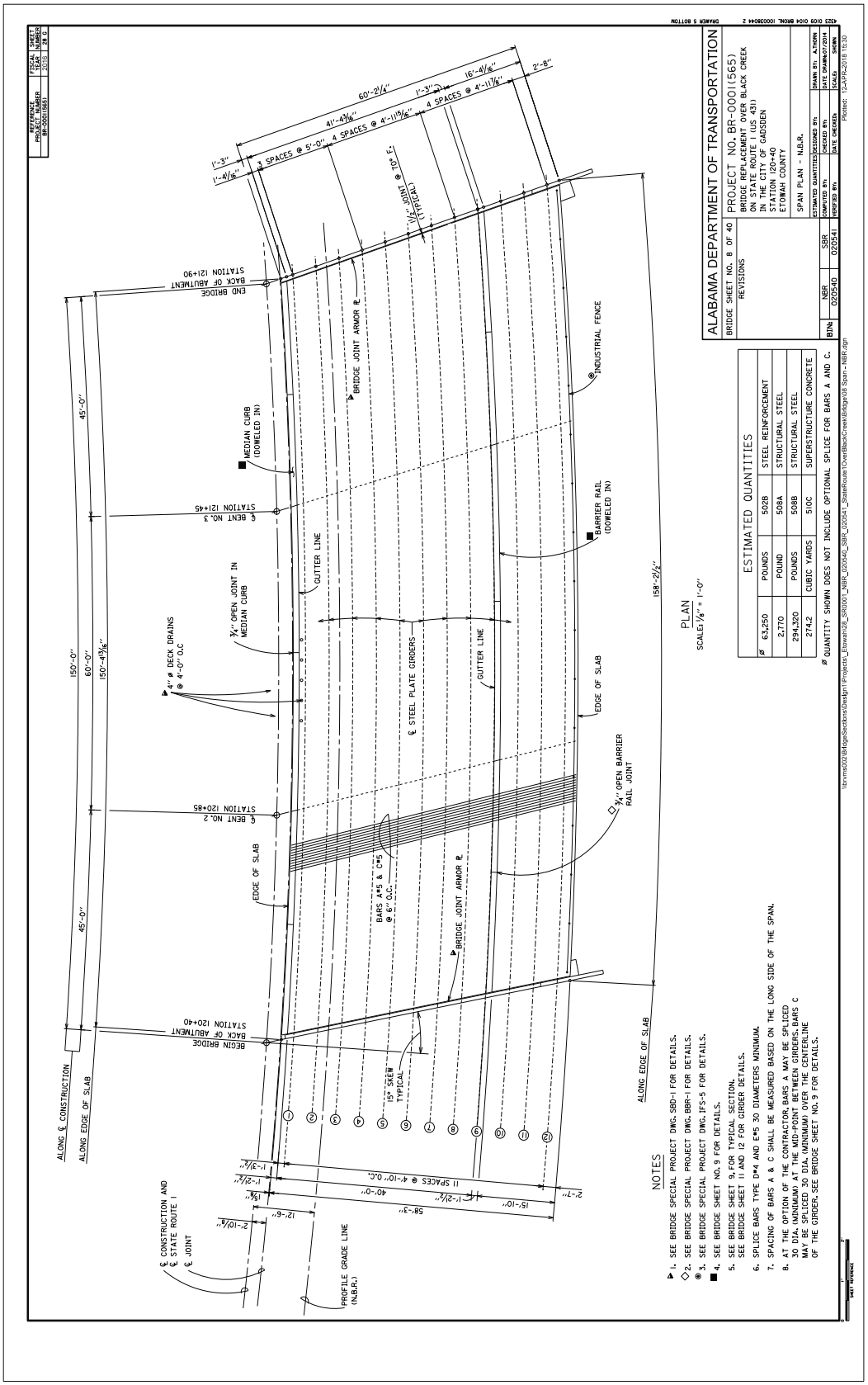


2.2.1.3 Plan View, Pouring Schedule, Notes, Bill of Reinf., Finish Grade Elevs. (Tan. & Curved) (2 Shts)

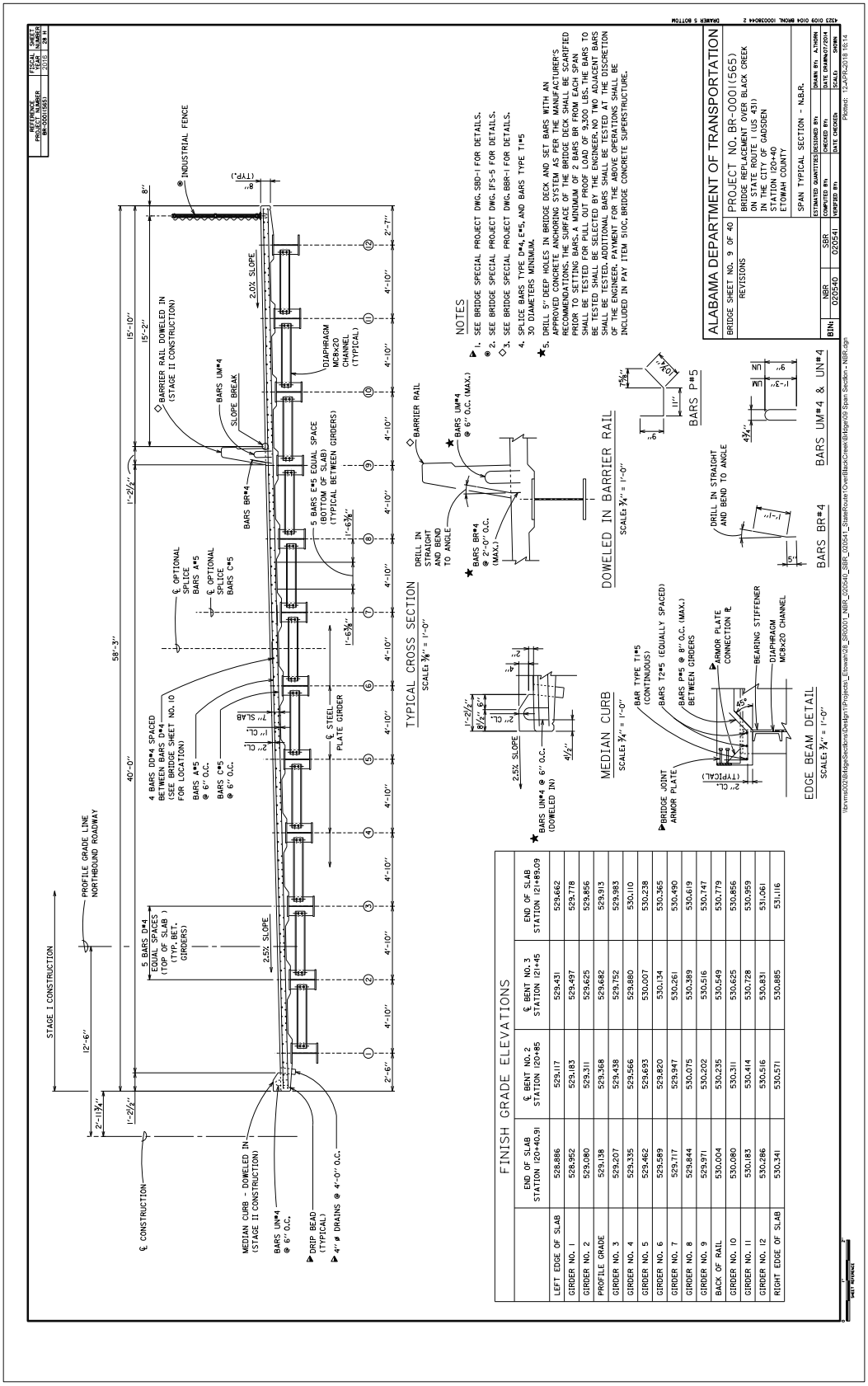



BILL OF REINFORCEMENT
NOTES
PARTIAL PLAN - SPAN NOS. 5 AND 6
SCALE: 1" = 20'
PARTIAL POURING SCHEDULE AND LONGITUDINAL BAR LAYOUT
SCALE: 1" = 20'
ALABAMA DEPARTMENT OF TRANSPORTATION
PROJECT NO. BRF-0017 (516)
BRIDGE REPLACEMENT ON
STATE ROUTE 17 OVER NORTH FORK CREEK
BETWEEN HAMILTON AND HACKLEBURG
STATION 109+05
MARION COUNTY
SPANS 4 - 6 PLAN AND POURING SCHEDULE
(SHEET 2 OF 2)
BRIDGE SHEET NO. 10 OF 43
REVISIONS
DESIGNED BY:
DRAWN BY:
CHECKED BY:
DATE DRAWN:
VERIFIED BY:
DATE CHECKED:
SCALE:
SHOWN
020594
Plotted: 13-APR-2018 15:24

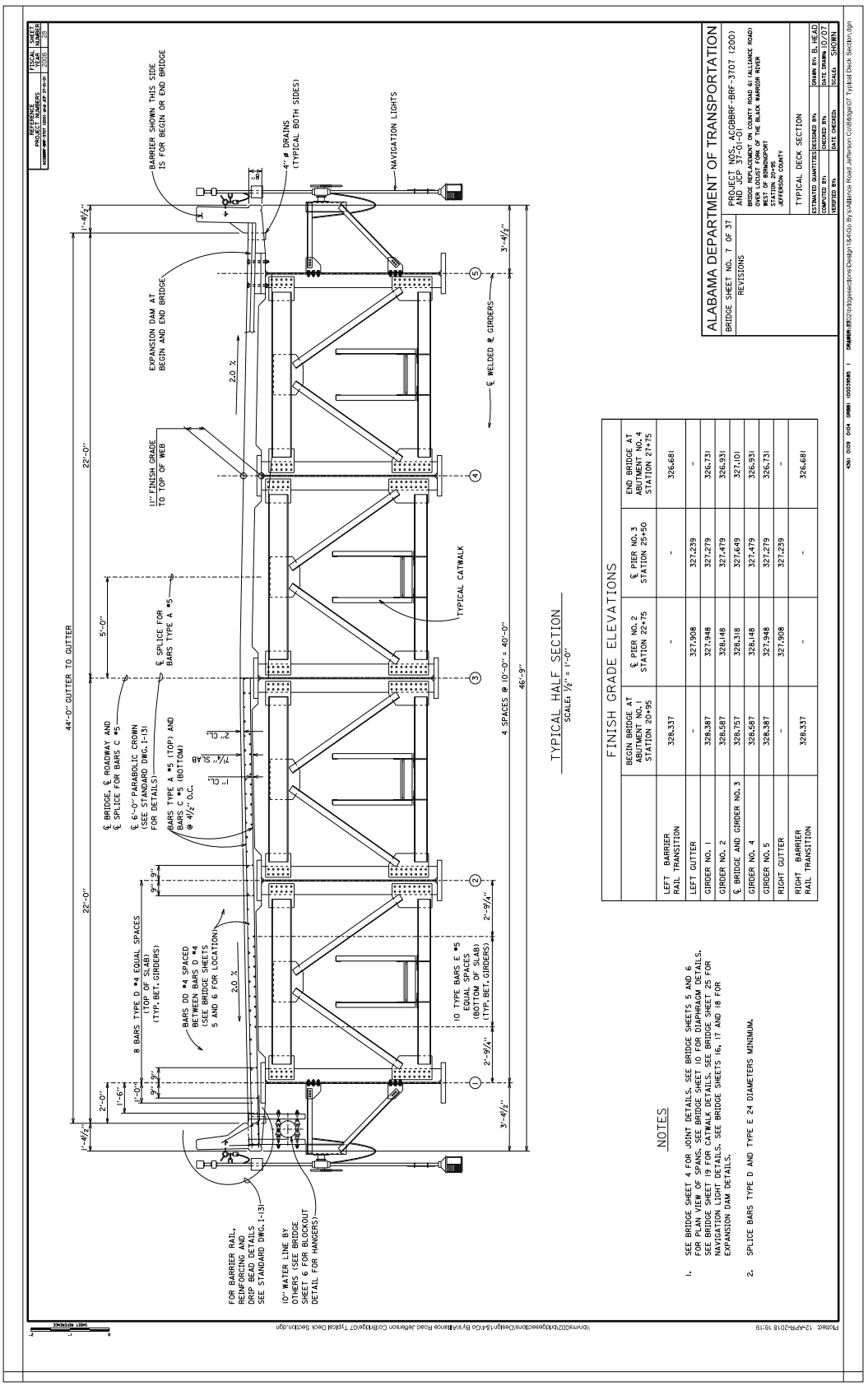
2.2.1.4 Plan View, Notes (Curved)



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

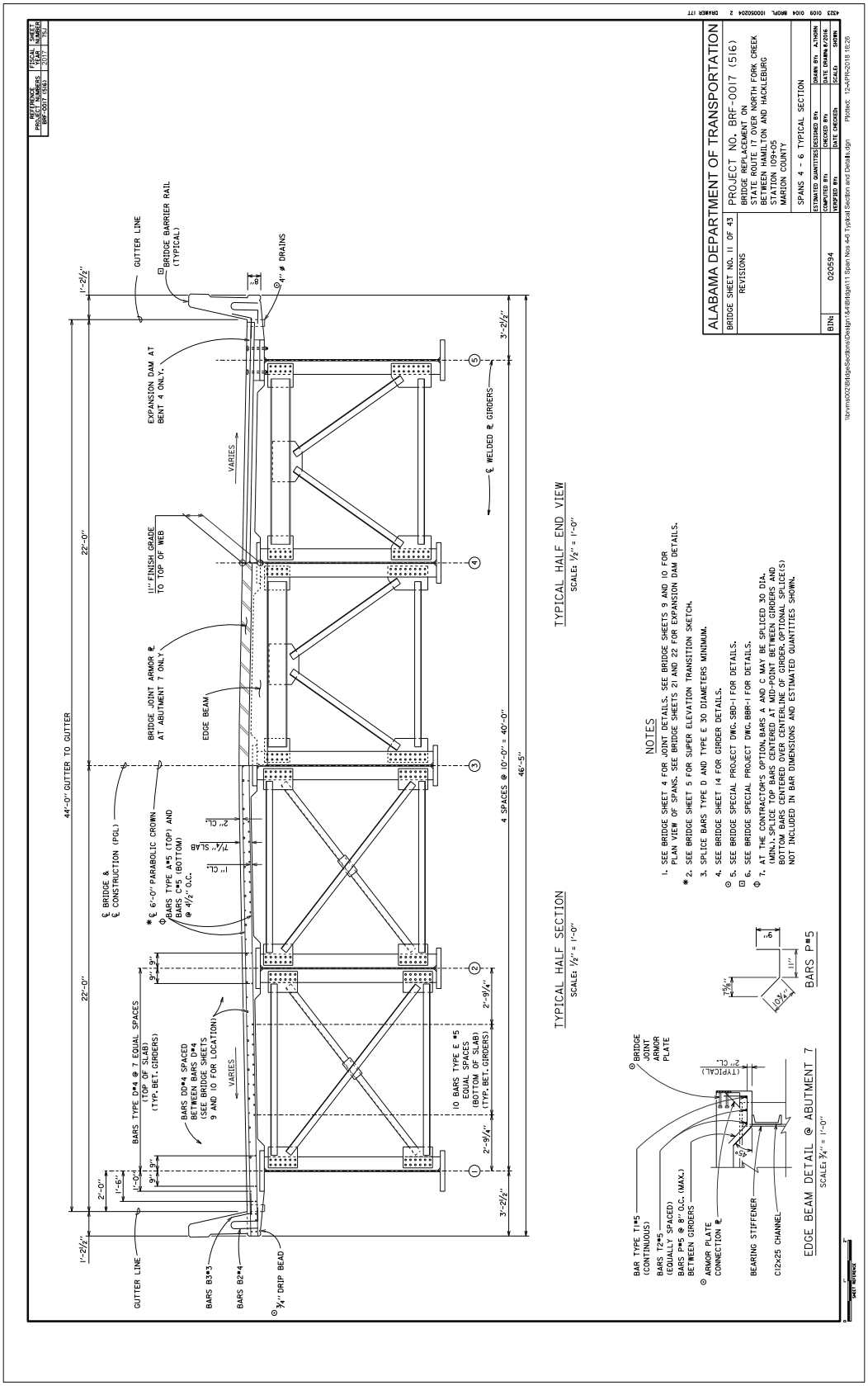


2.2.1.6 Typical Section, Notes, Finish Grade Elevations, (Tangent)

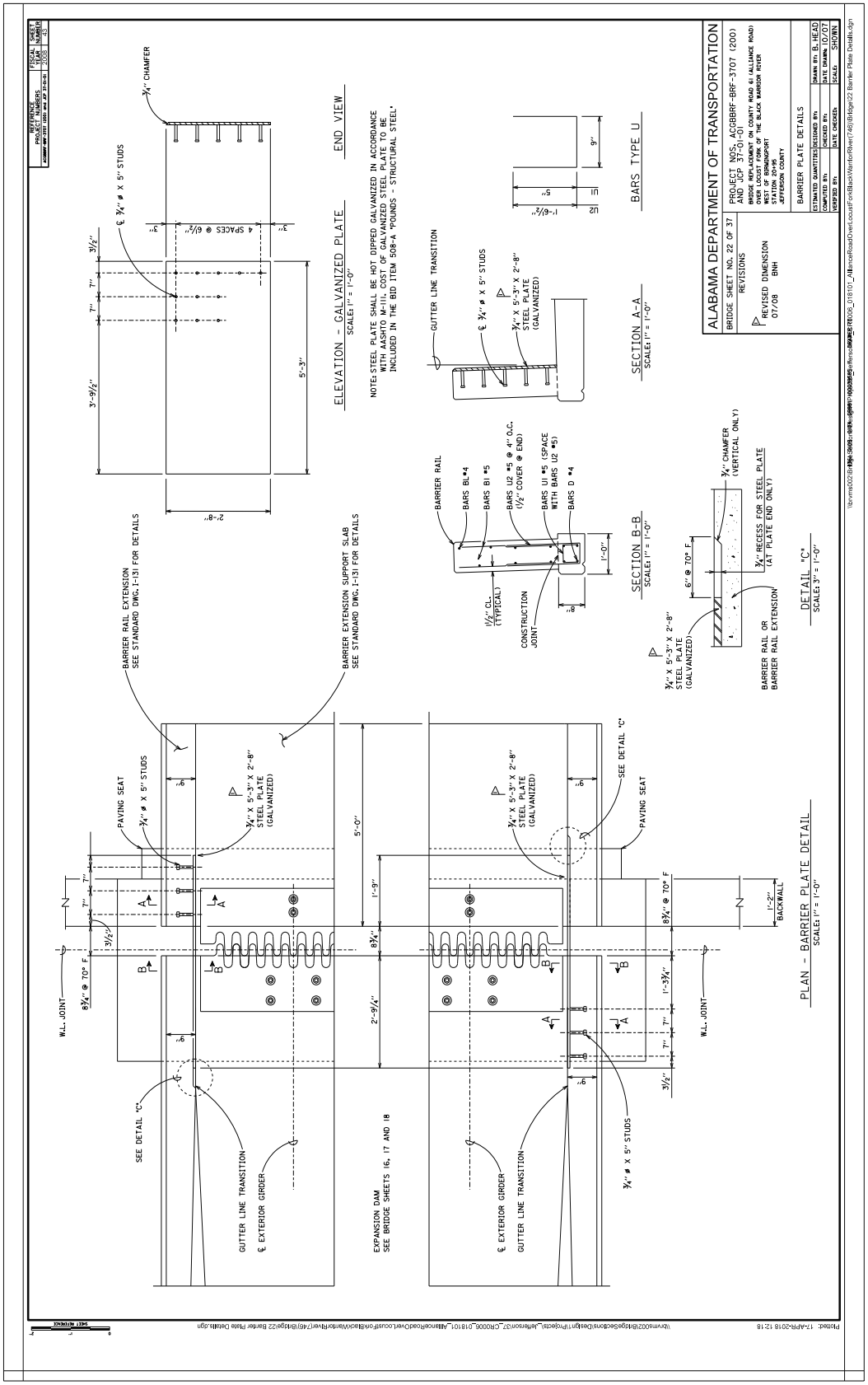


	BEGIN BRIDGE AT ABUTMENT NO. 1 STATION 20+95	℄ PIER NO. 2 STATION 22+75	℄ PIER NO. 3 STATION 25+50	END BRIDGE AT ABUTMENT NO. 4 STATION 27+75
LEFT BARRIER RAIL TRANSITION	328.337	-	-	326.681
LEFT GUTTER	-	327.908	327.239	-
GIRDER NO. 1	328.387	327.948	327.279	326.731
GIRDER NO. 2	328.587	328.148	327.479	326.931
℄ BRIDGE AND GIRDER NO. 3	328.757	328.318	327.649	327.101
GIRDER NO. 4	328.587	328.148	327.479	326.931
GIRDER NO. 5	328.387	327.948	327.279	326.731
RIGHT GUTTER	-	327.908	327.239	-
RIGHT BARRIER RAIL TRANSITION	328.337	-	-	326.681

2.2.1.7 Typ. Half Section, Typ. Half End View, Miscellaneous Details, Notes (Tangent)

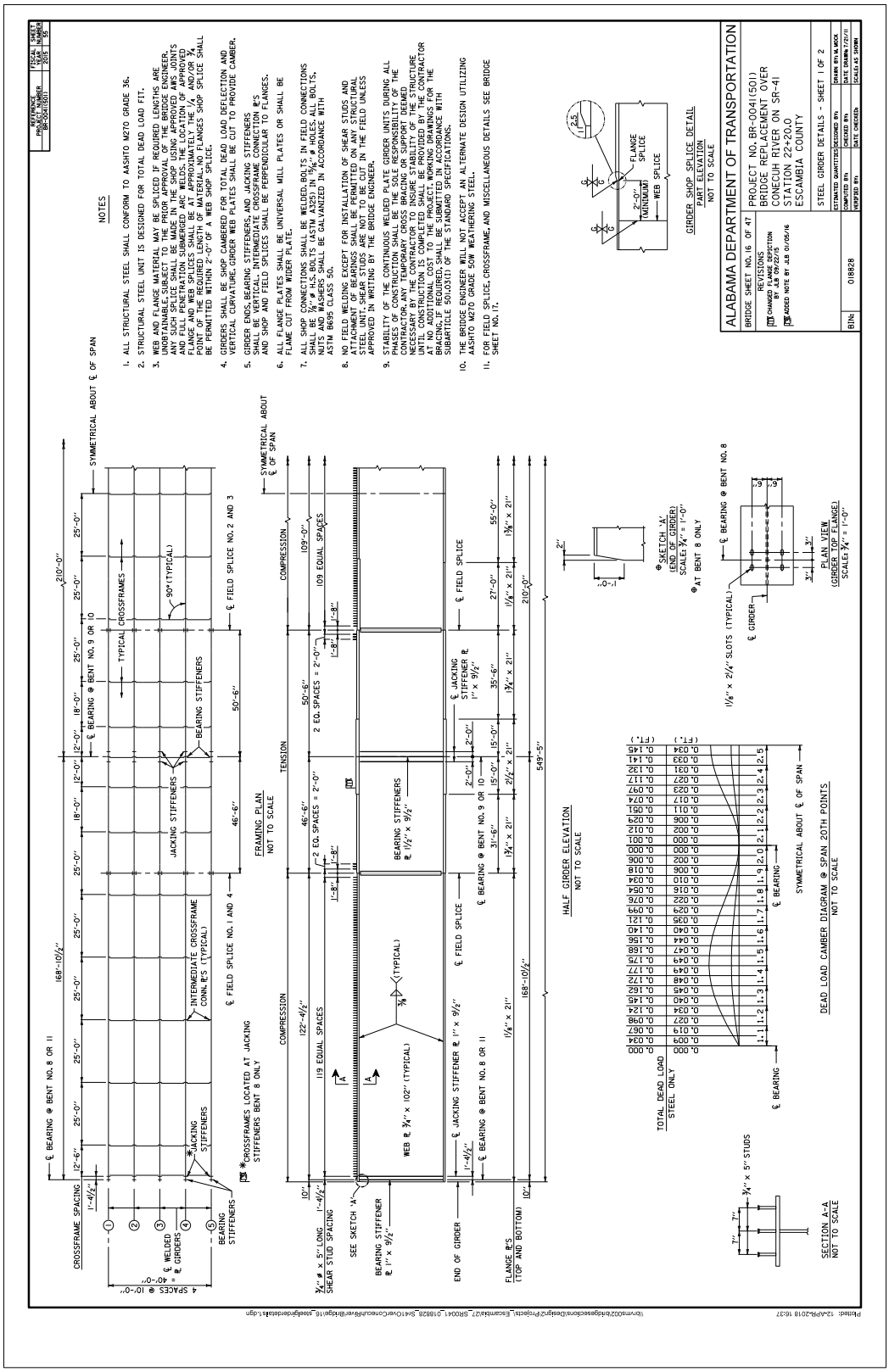


2.2.1.8 Bar. Rail Cover Plate at Tooth Jt. Openings – 6-95

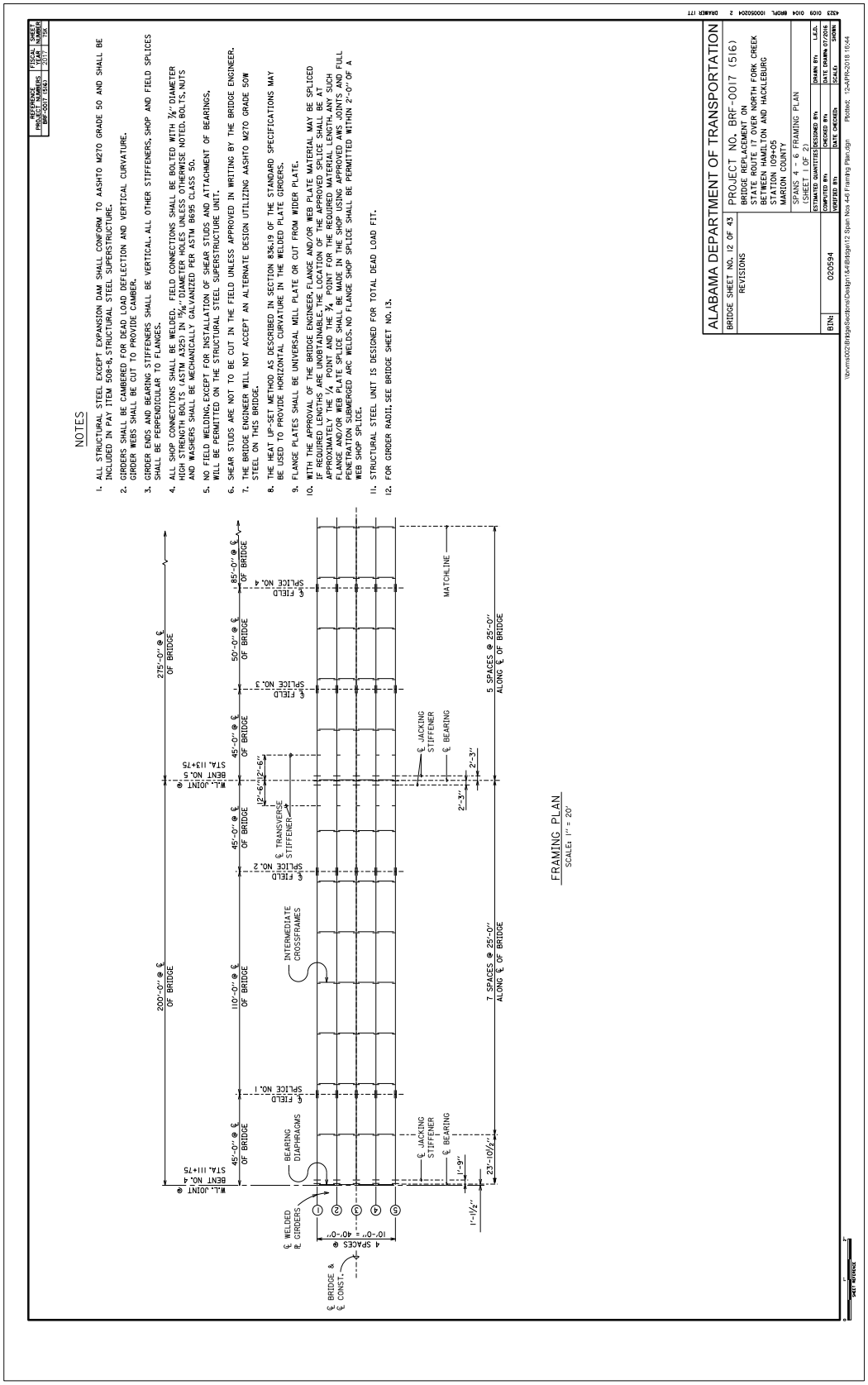


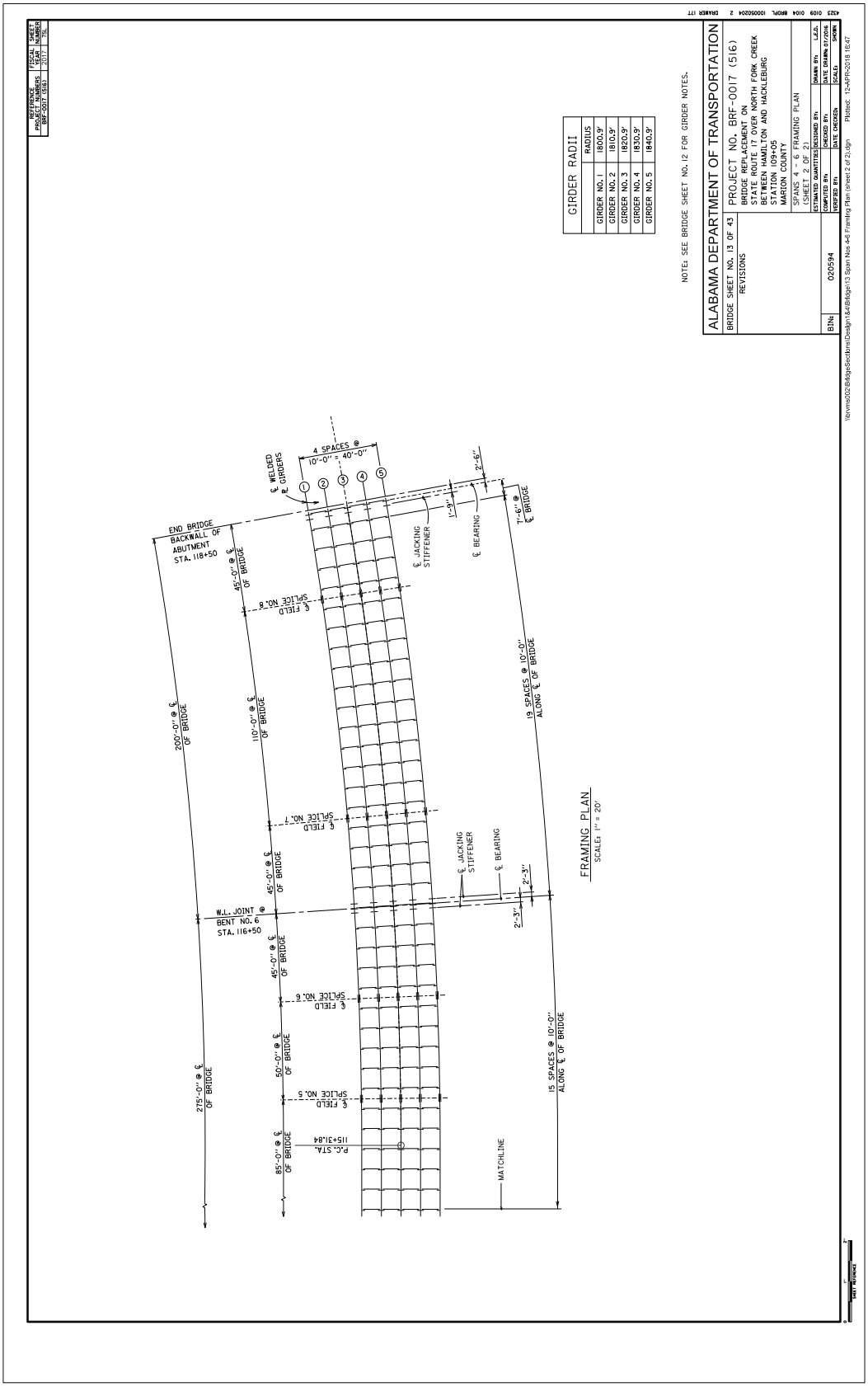
2.2.2 Framing Plan Details

2.2.2.1 Framing Plan, Gdr. Elev., Camber Diag., Notes, Misc. Details (Tangent)

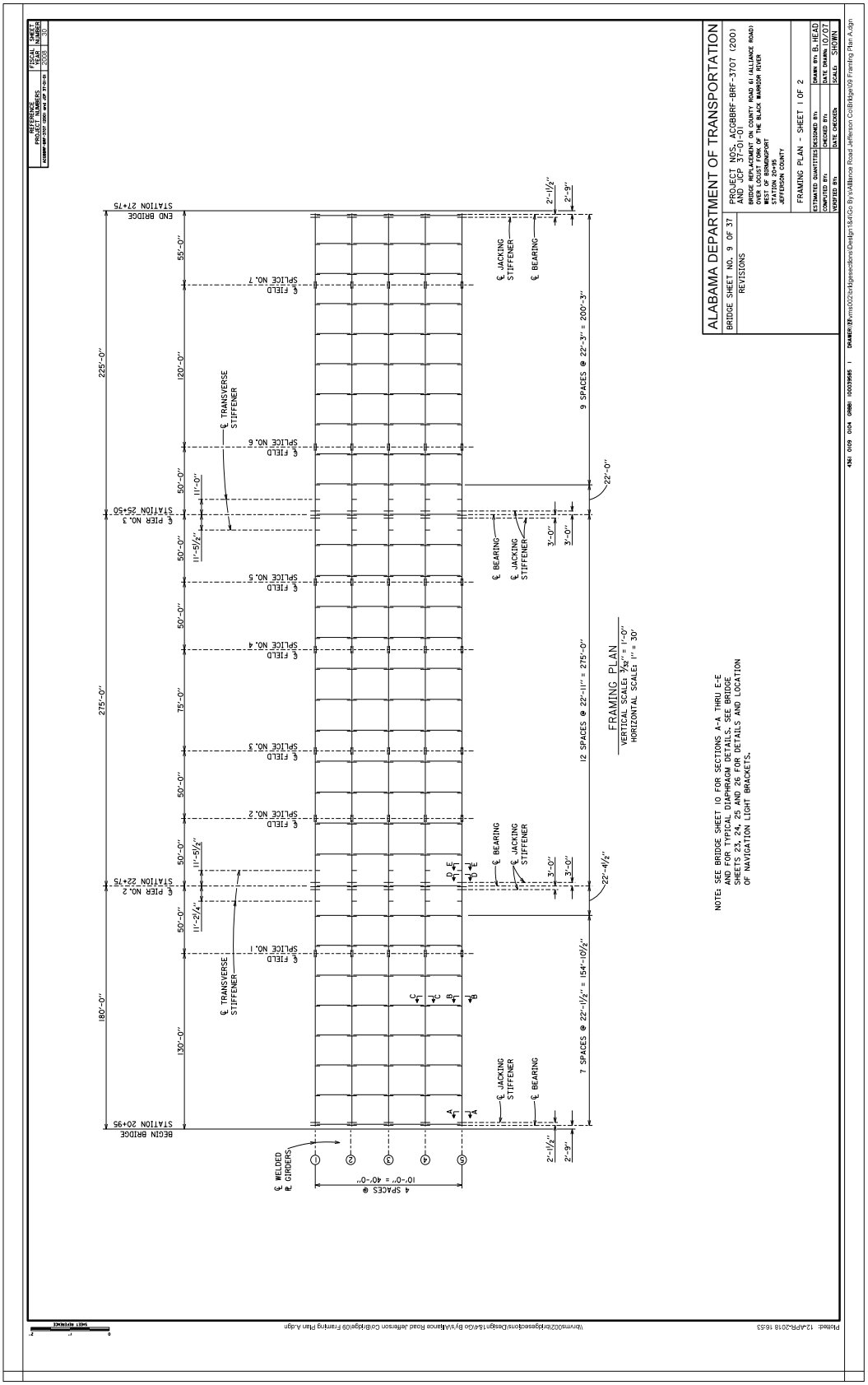


2.2.2.2 Framing Plan, Notes (Tan., Crvd.) (2 Shts.) – 6-98

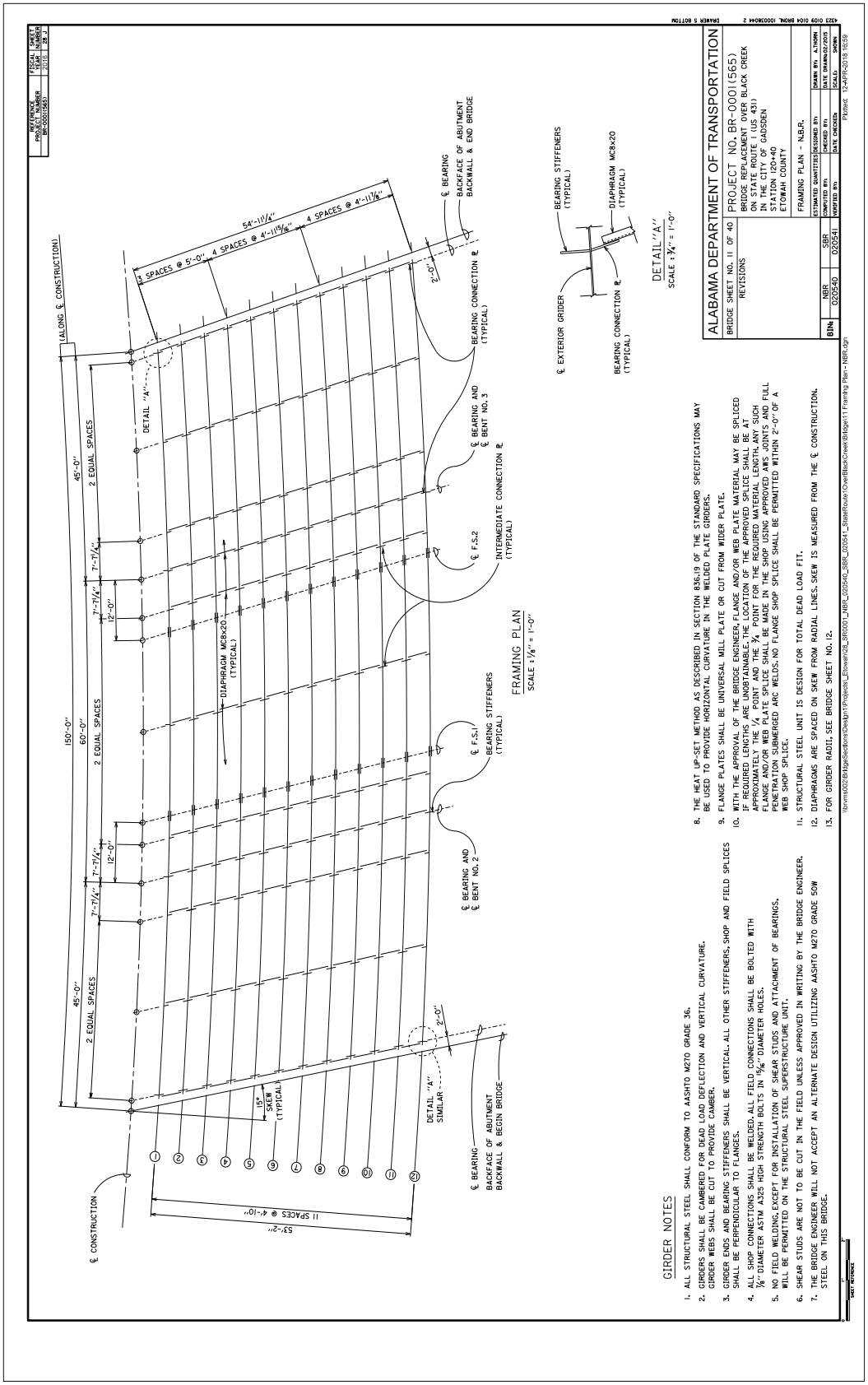



GIRDER RADII
RADIUS
GIRDER NO.1 1800.9'
GIRDER NO.2 1810.9'
GIRDER NO.3 1820.9'
GIRDER NO.4 1830.9'
GIRDER NO.5 1840.9'
NOTE: SEE BRIDGE SHEET NO.12 FOR GIRDER NOTES.
ALABAMA DEPARTMENT OF TRANSPORTATION
PROJECT NO. BRF-0017 (516)
BRIDGE REPLACEMENT ON STATE ROUTE 17 OVER NORTH FORK CREEK BETWEEN HAMILTON AND HACKLEBURG STATION 109+05 MARION COUNTY
SPANS 4 - 6 FRAMING PLAN
(SHEET 2 OF 2)
BRIDGE SHEET NO. 13 OF 43
REVISIONS
BIN: 020594
DESIGNED BY:
DRAWN BY: LAD
CHECKED BY:
QUANTITIES BY:
CHECKED BY:
VERIFIED BY:
DATE CHECKED:
DATE DRAWN: 11/2018
SCALE: SHOWN
SHEET NUMBER
PROJECT NUMBERS
BRF-0017 (516)
YEAR
2017
SHEET NO.
76
4 SPACES @ 10'-0" = 40'-0"
6 WELDED I GIRDERS
END BRIDGE BACKWALL OF ABUTMENT STA. 118+50
45'-0" @ ℄ OF BRIDGE
℄ FIELD SPLICE NO. 8
℄ JACKING STIFFENER
℄ BEARING
1'-3"
2'-6"
7'-6" @ ℄ BRIDGE
200'-0" @ ℄ OF BRIDGE
110'-0" @ ℄ OF BRIDGE
19 SPACES @ 10'-0" ALONG ℄ OF BRIDGE
℄ FIELD SPLICE NO. 7
45'-0" @ ℄ OF BRIDGE
℄ JACKING STIFFENER
℄ BEARING
2'-3"
W.L. JOINT @ BENT NO. 6 STA. 116+50
45'-0" @ ℄ OF BRIDGE
℄ FIELD SPLICE NO. 6
50'-0" @ ℄ OF BRIDGE
℄ FIELD SPLICE NO. 5
275'-0" @ ℄ OF BRIDGE
15 SPACES @ 10'-0" ALONG ℄ OF BRIDGE
85'-0" @ ℄ OF BRIDGE
P.C. STA. 115+31.84
MATCHLINE
FRAMING PLAN
SCALE: 1" = 20'

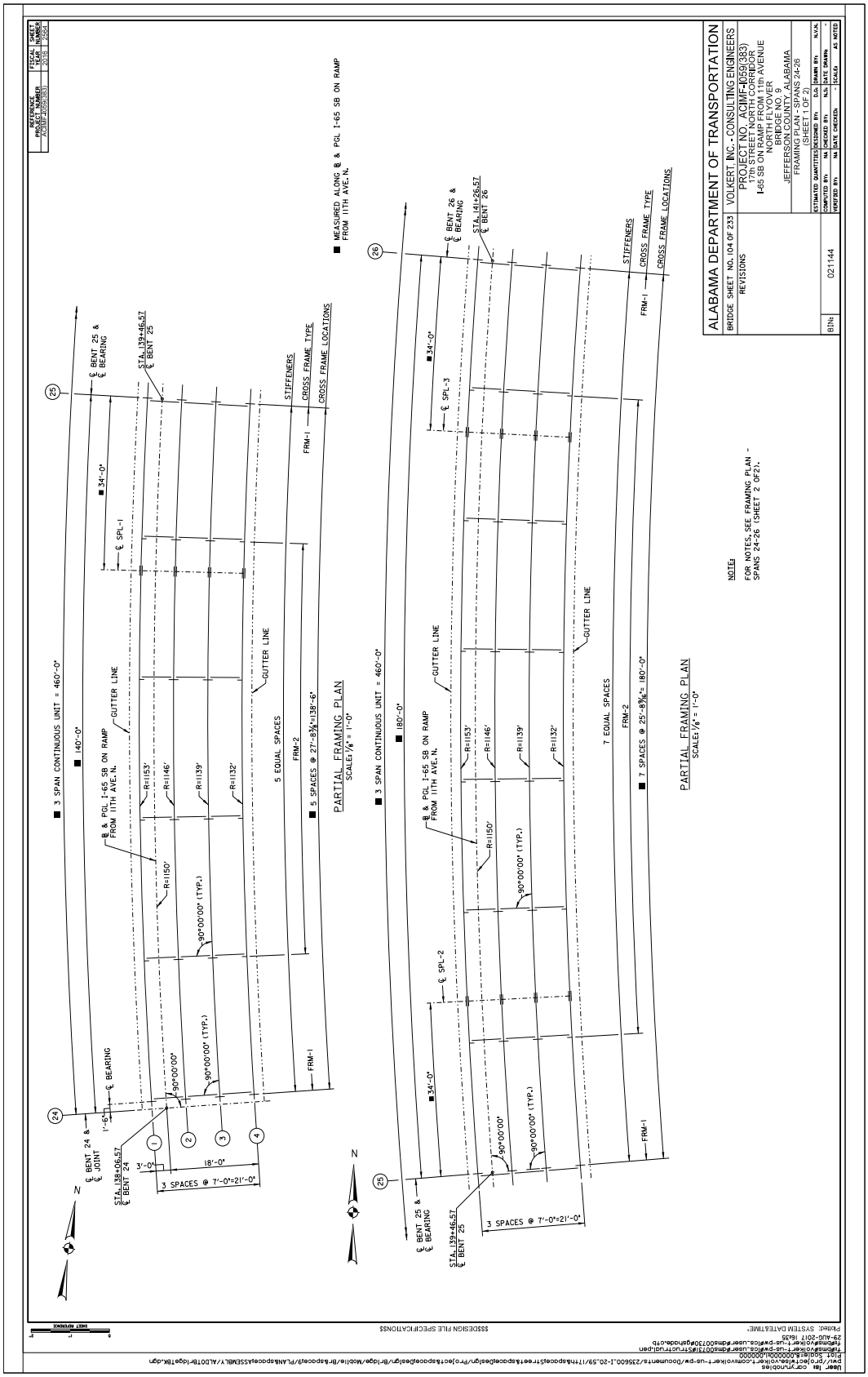
2.2.2.3 Framing Plan (Tangent)

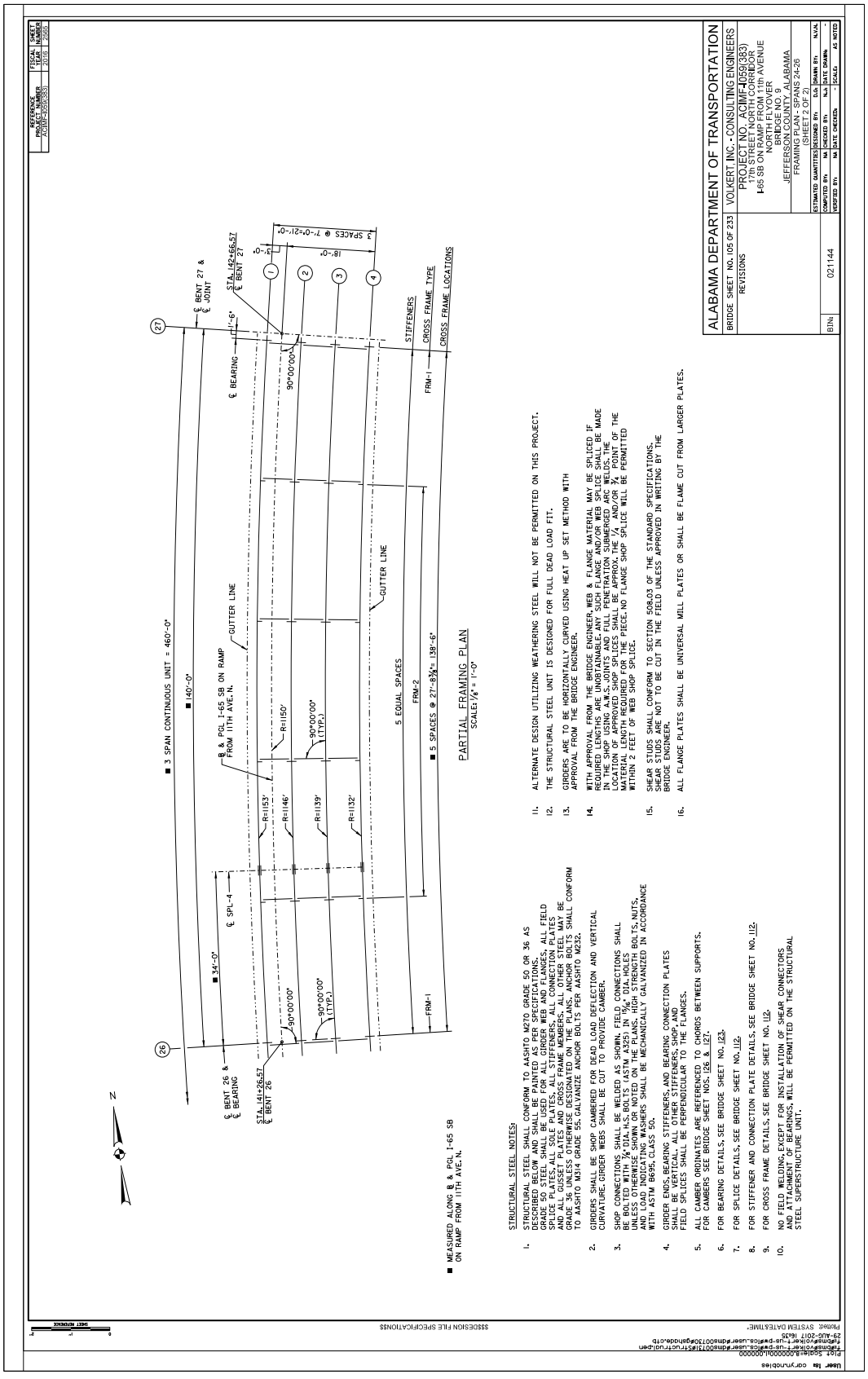


2.2.2.4 Framing Plan, Notes (Curved, Skewed)

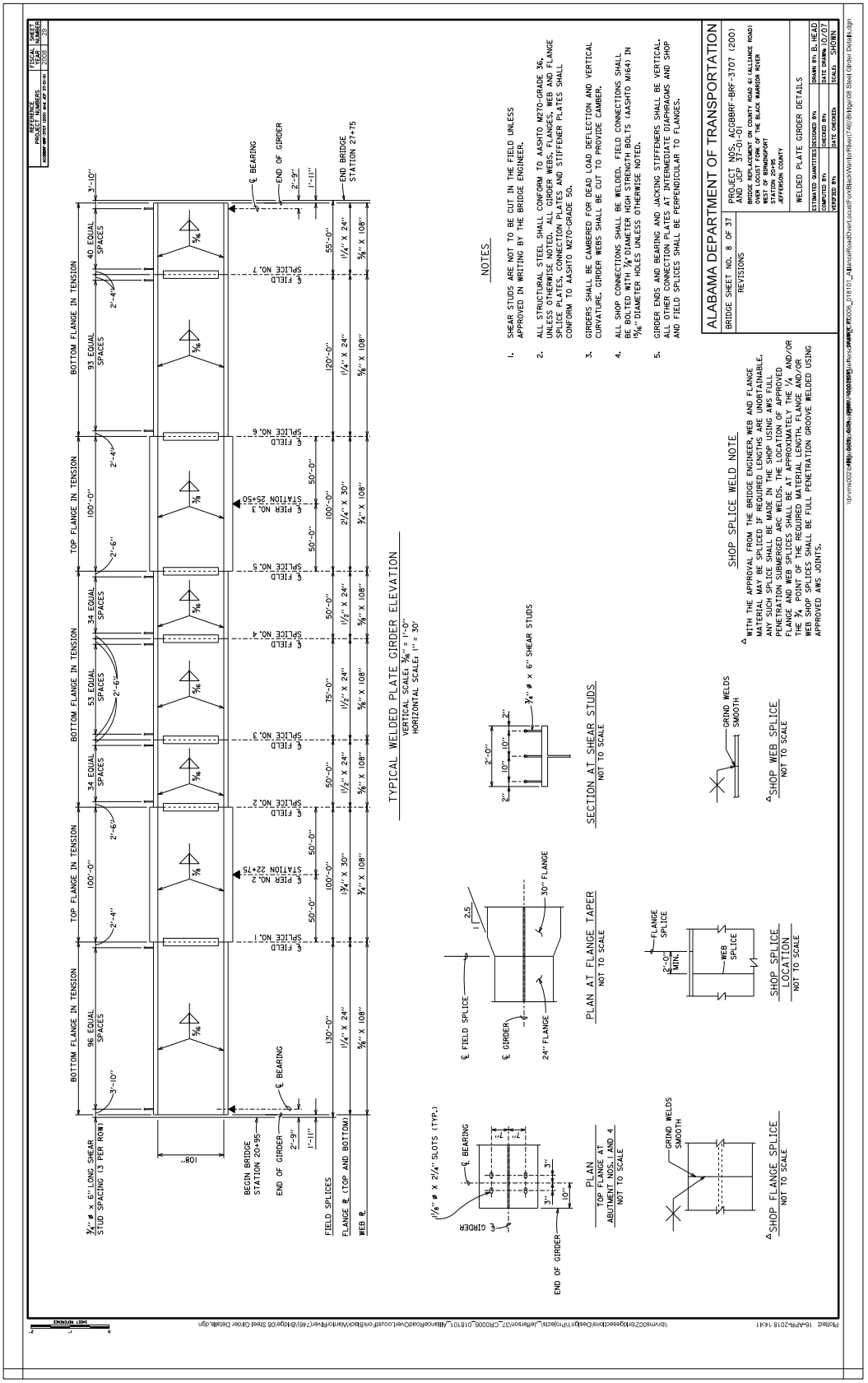


2.2.2.5 Framing Plan, Notes (Curved) (2 Shts.)

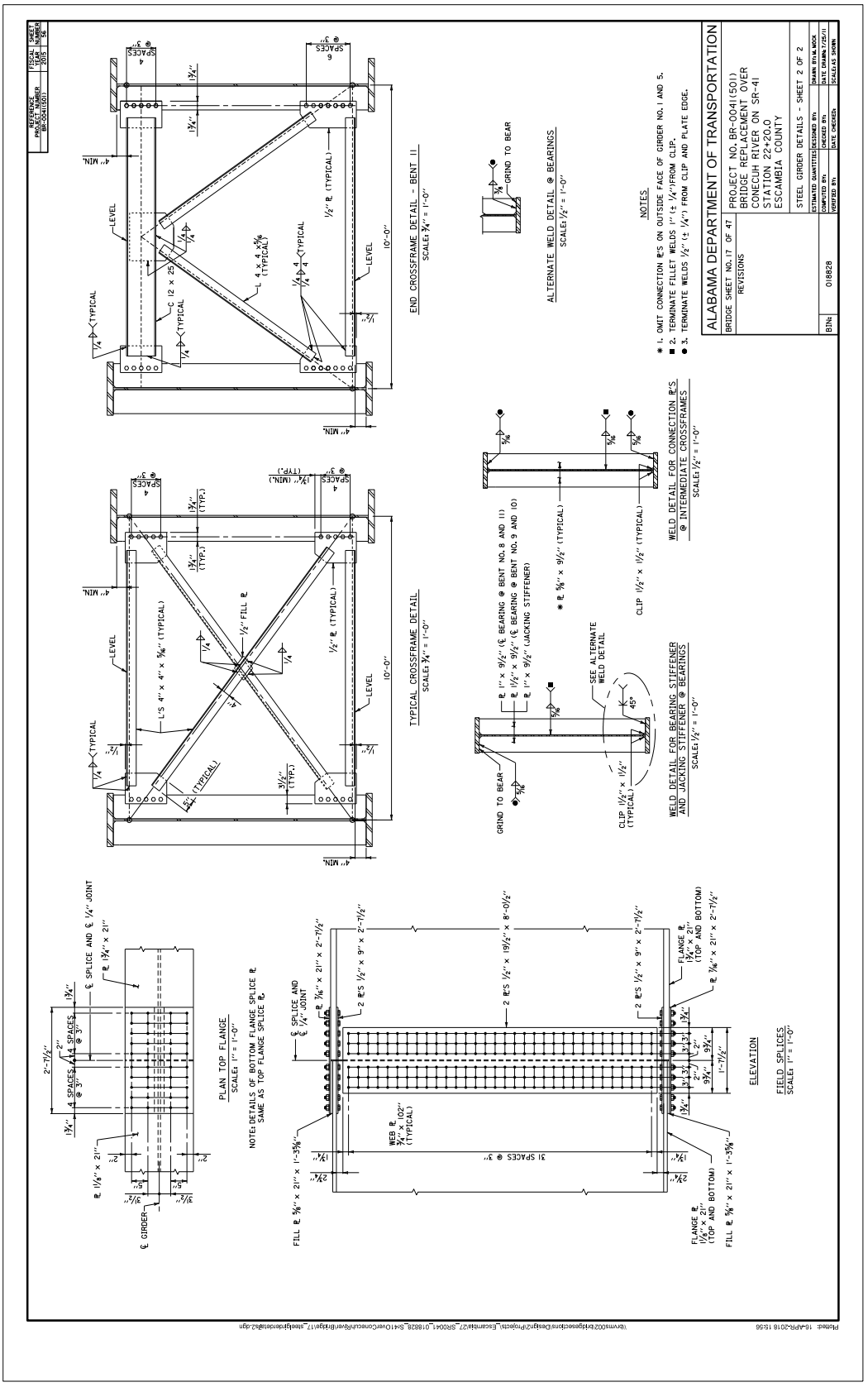




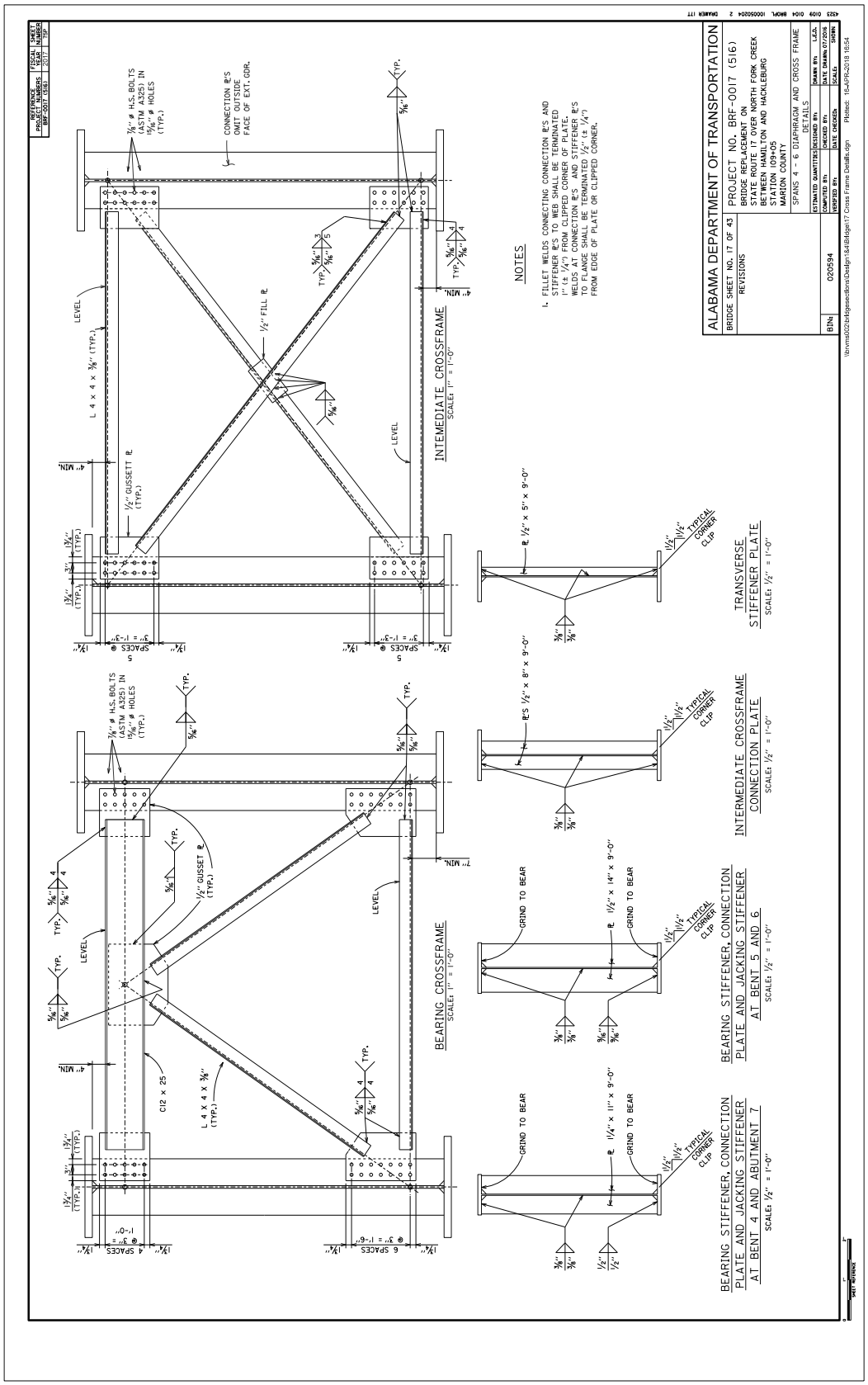
2.2.2.6 Girder Elevation, Notes, Misc. Details



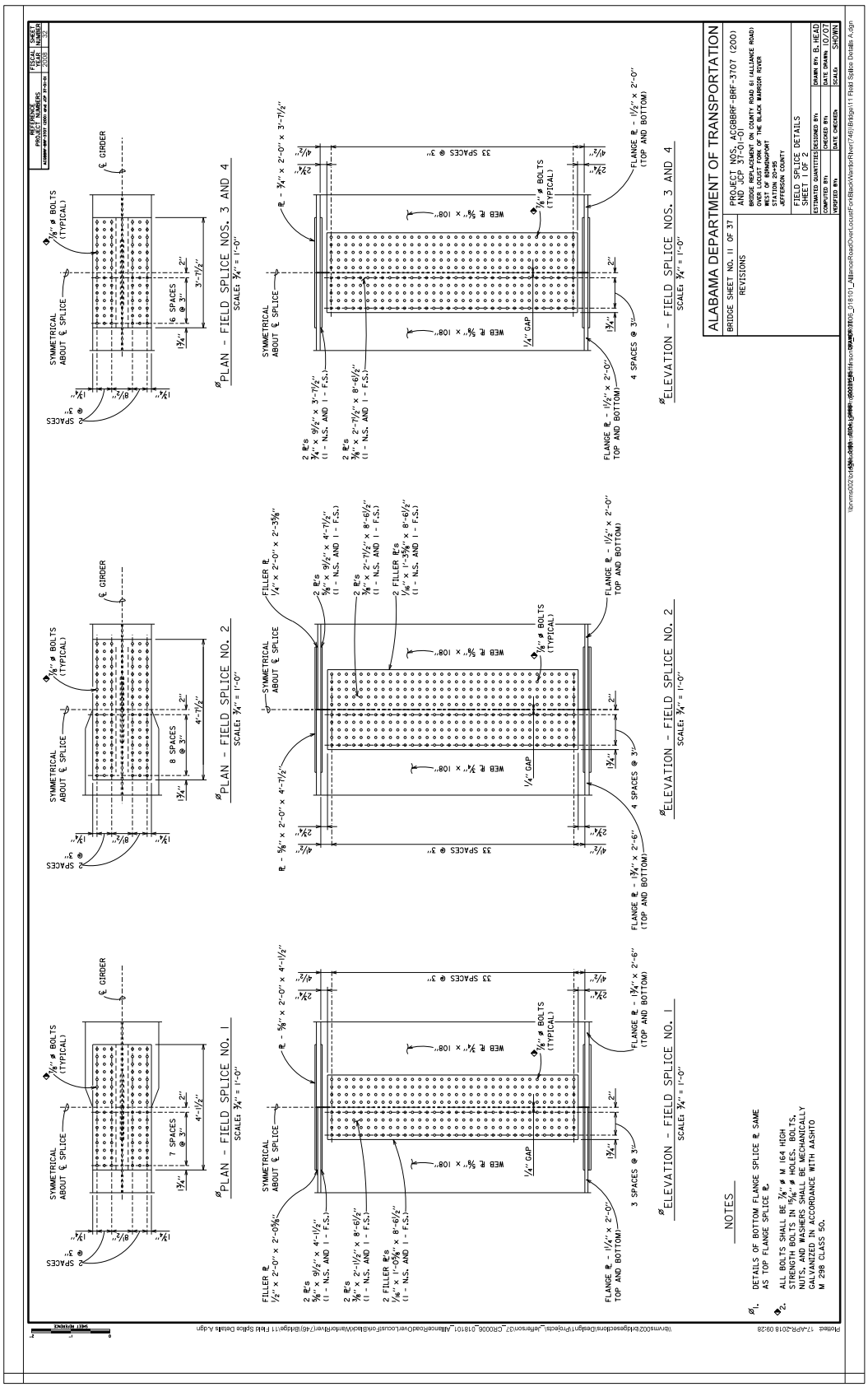
2.2.2.7 Field Splice, Crossframe, Connection/Stiffener Plate Details



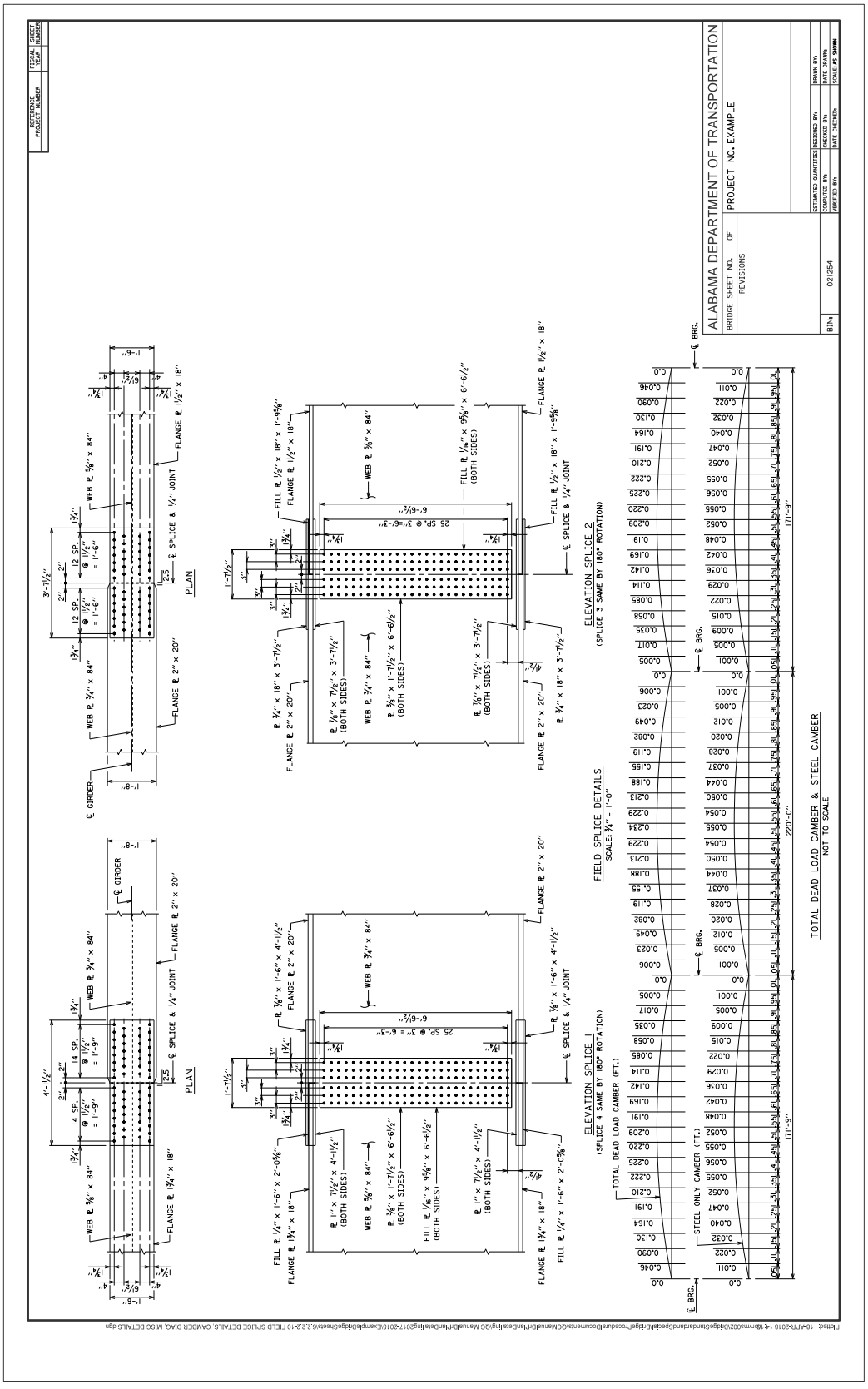
2.2.2.8 Crossframe, Connection/Stiffener Plate Det.



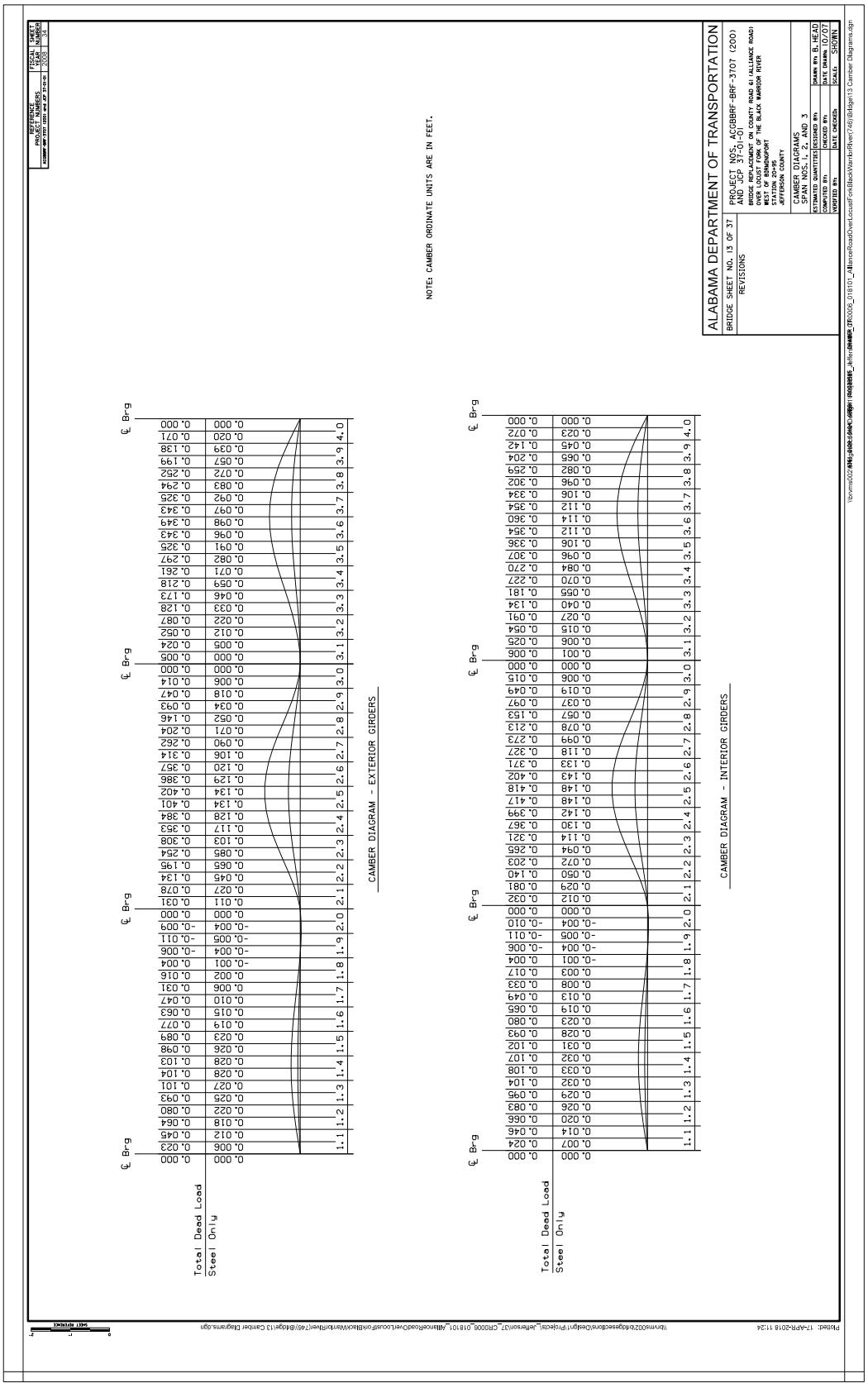
2.2.2.9 Field Splice Details



2.2.2.10 Field Splice, Camber Diagram



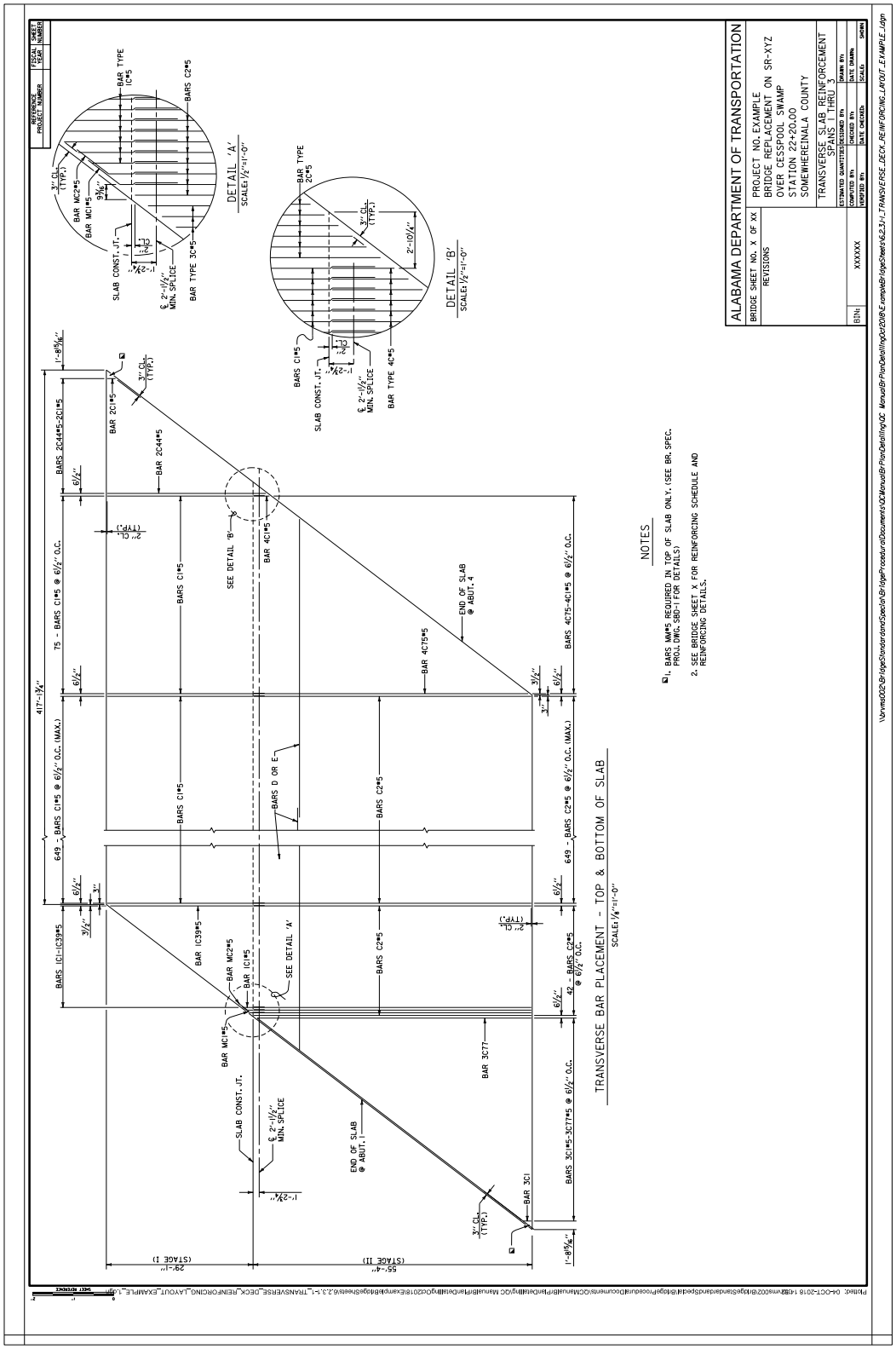
2.2.2.11 Camber Diagram



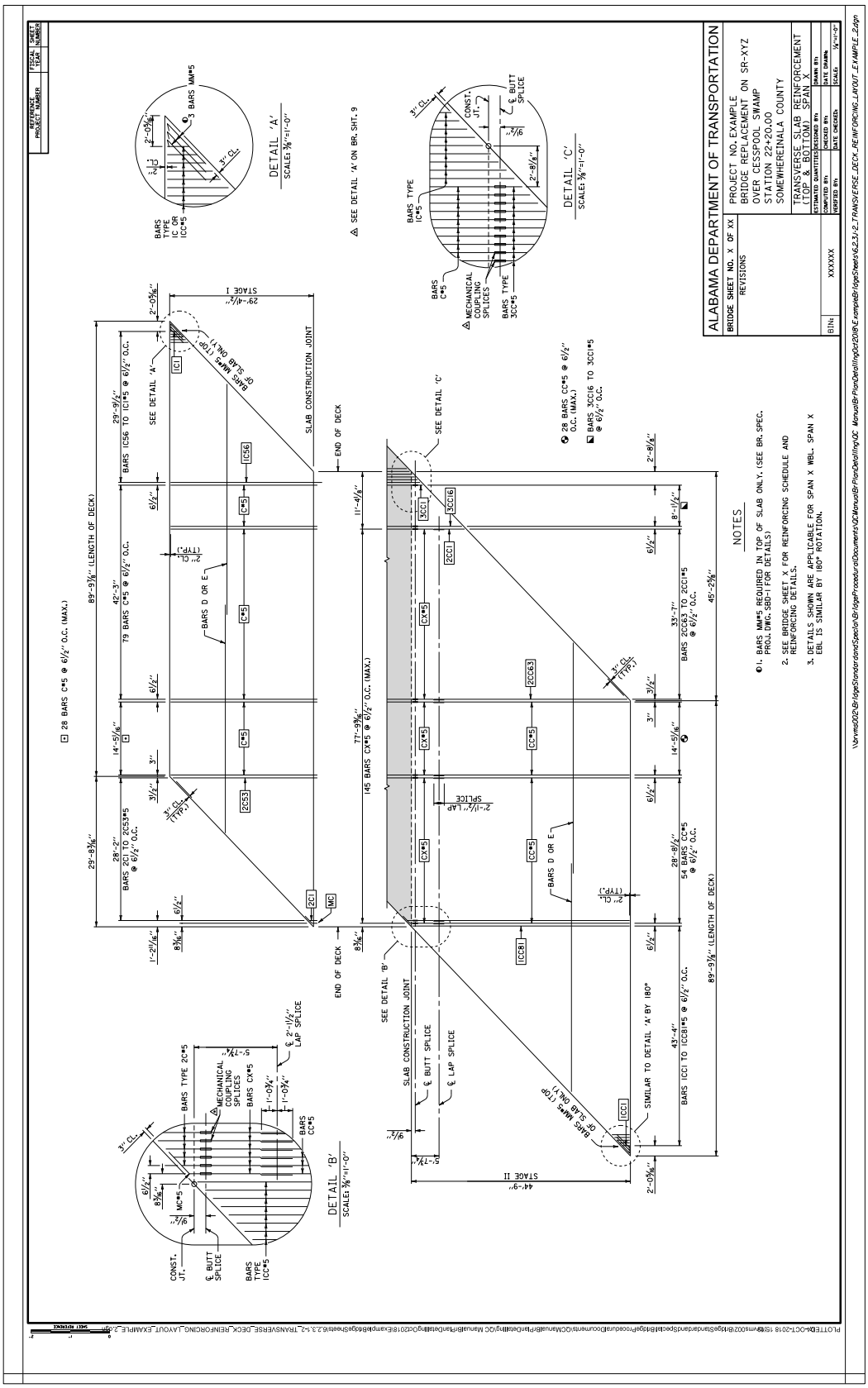
2.3 Special Superstructure Details

2.3.1 Transverse Deck Reinforcing

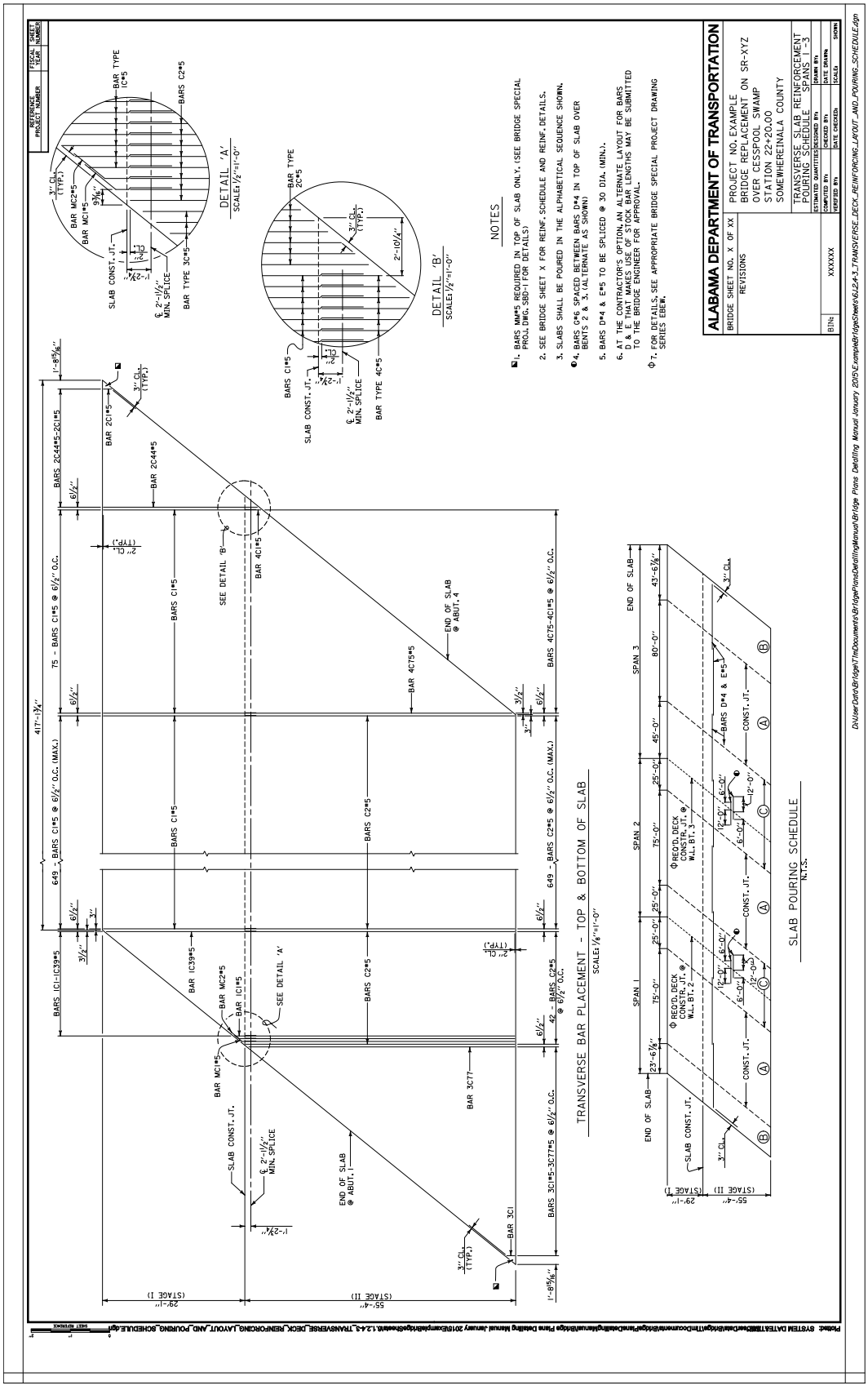
2.3.1.1 Example 1



2.3.1.2 Example 2

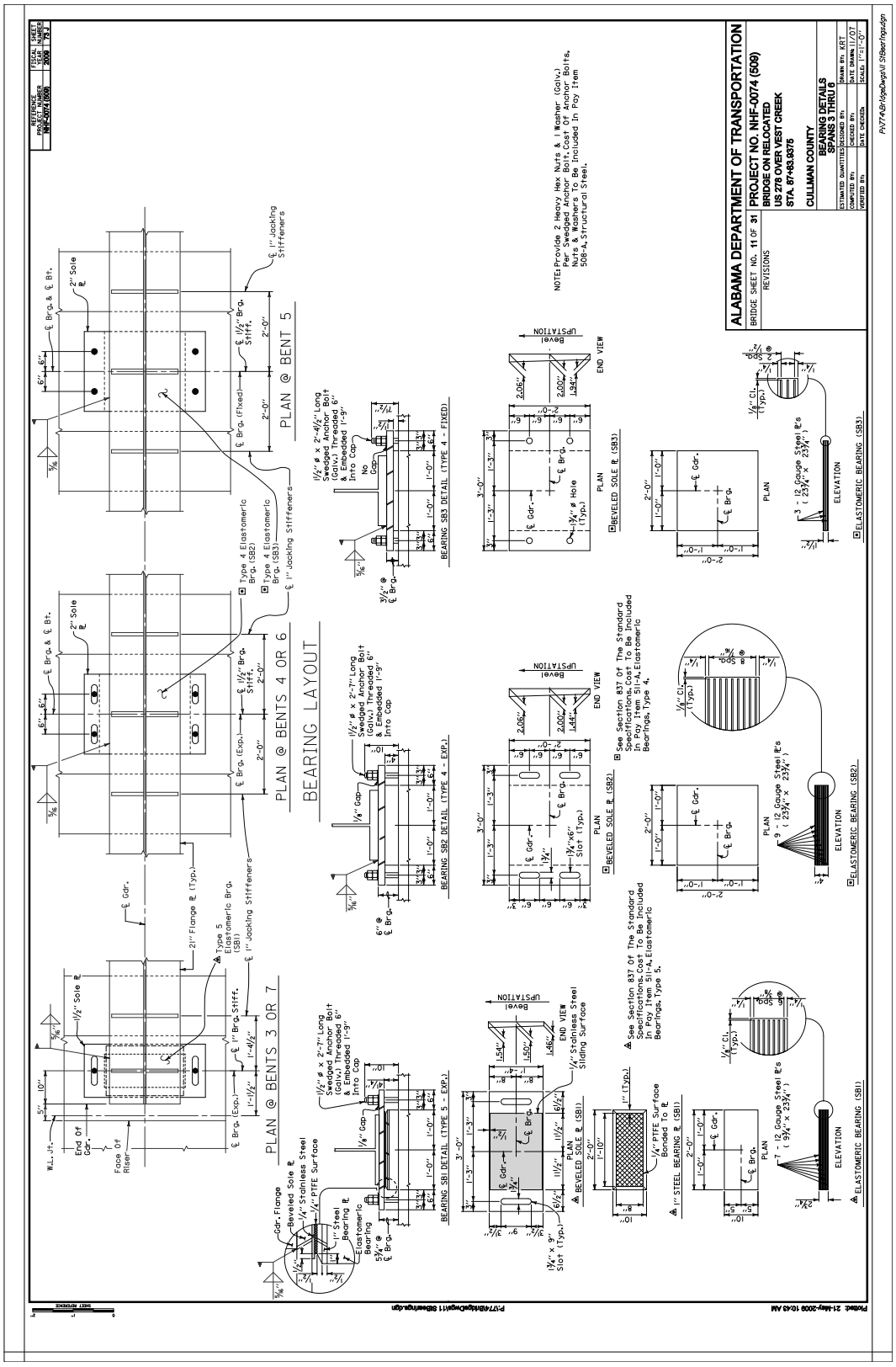


2.3.1.3 Example 3 with Pouring Schedule

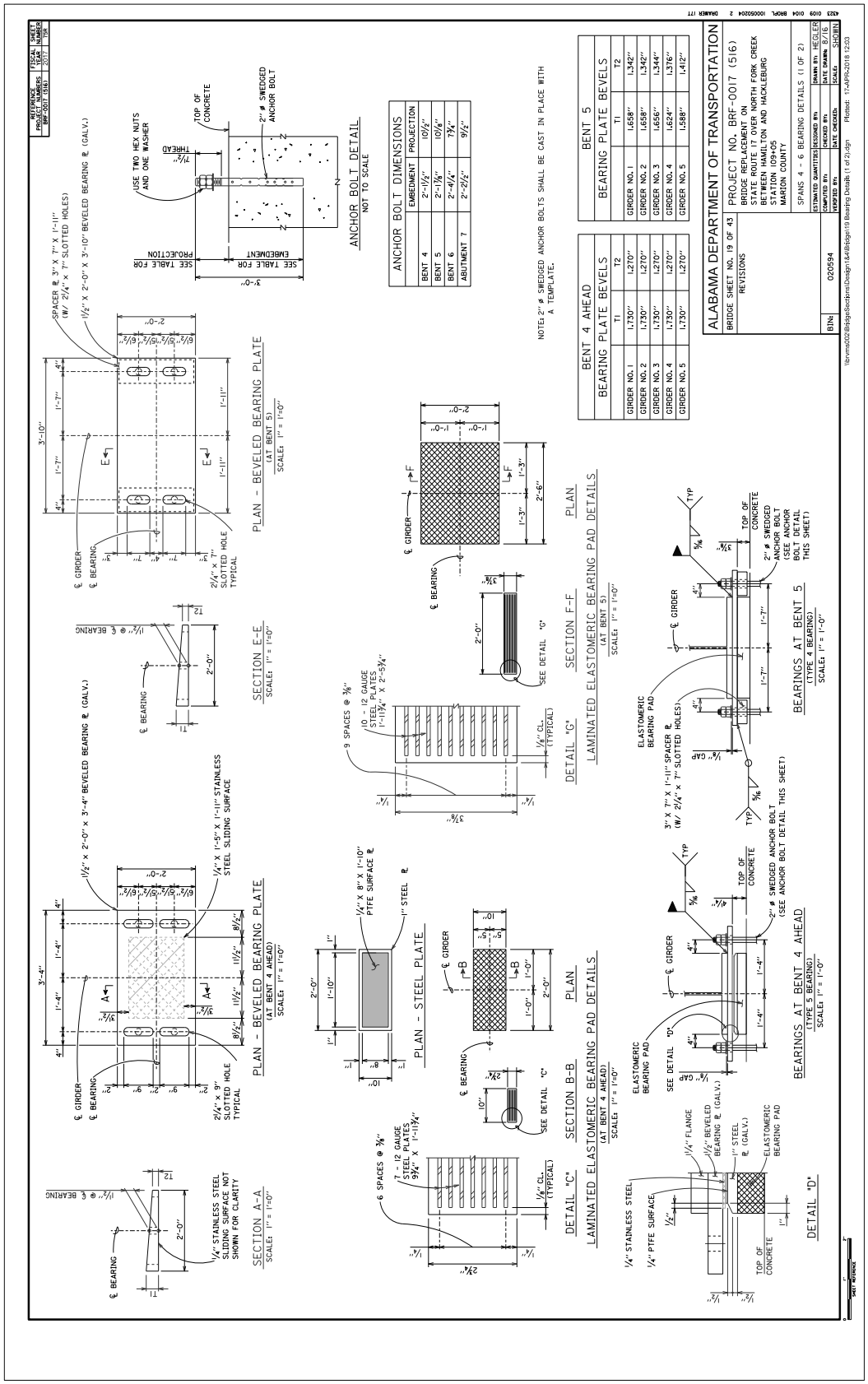


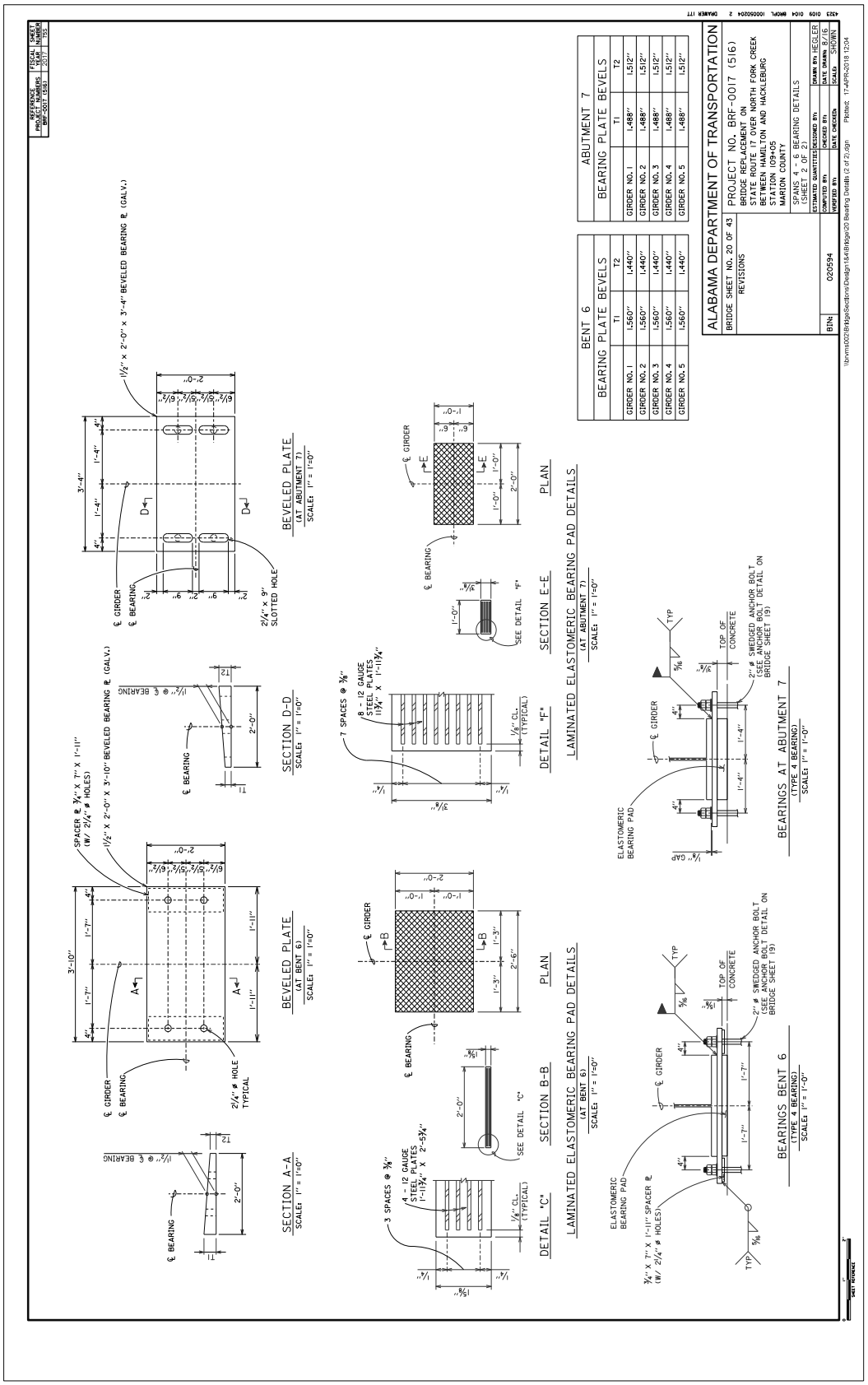
2.3.2 Bearing Details

2.3.2.1 Example 1 w/Bearing Layout



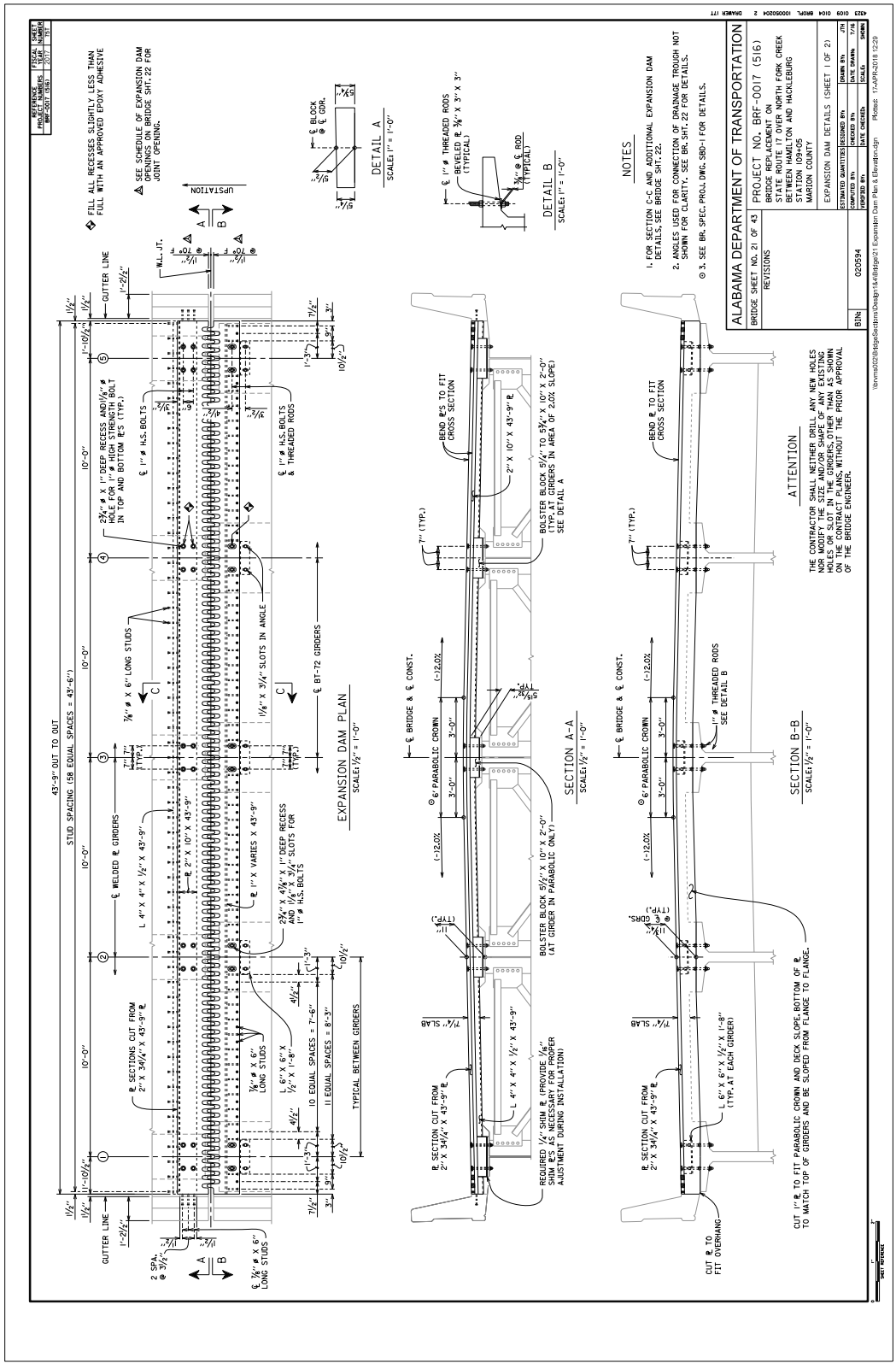
2.3.2.2 Example 2 (2 Sheets)

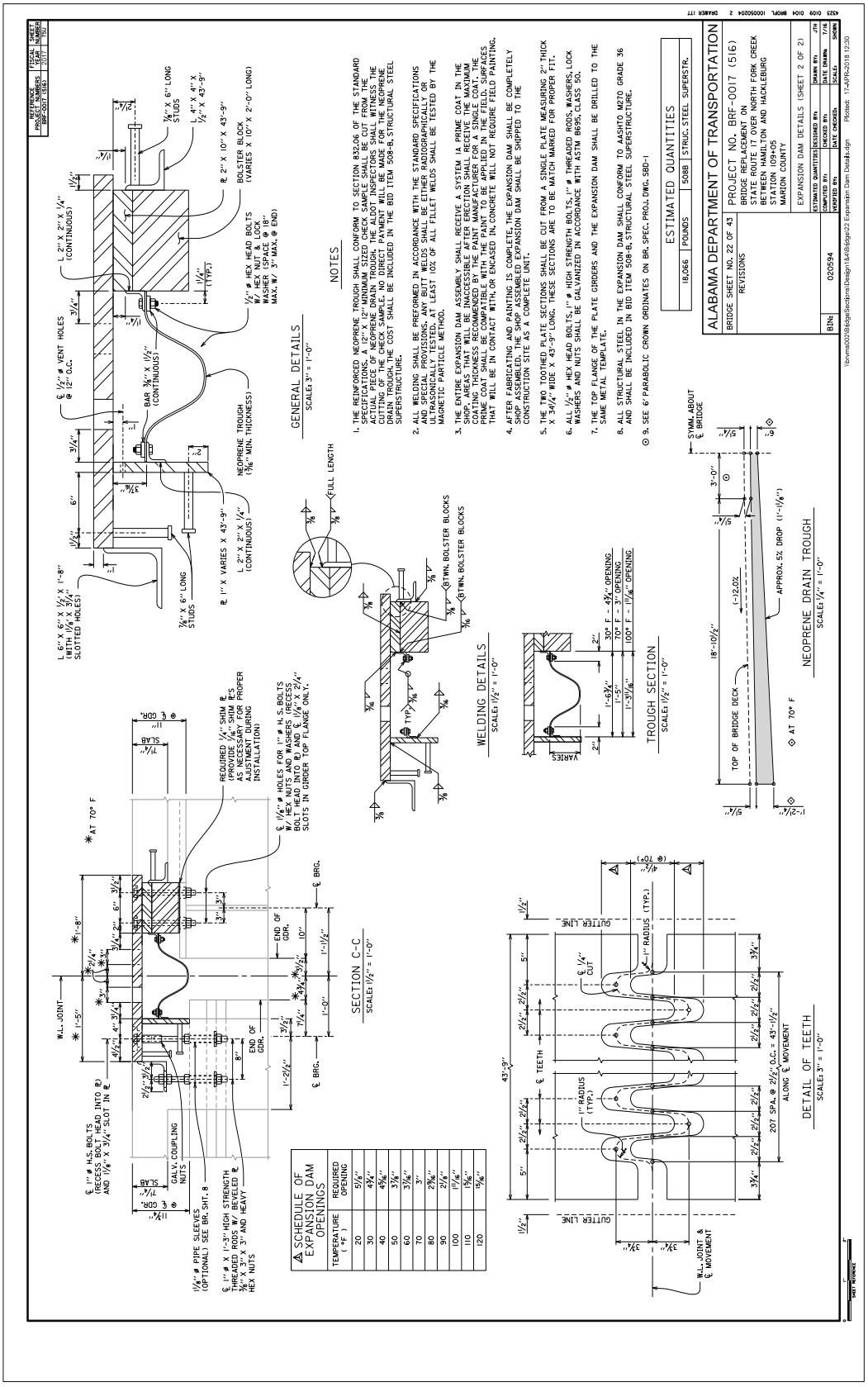



ALABAMA DEPARTMENT OF TRANSPORTATION
PROJECT NO. BRF-0017 (516)
BRIDGE REPLACEMENT ON
STATE ROUTE 17 OVER NORTH FORK CREEK
BETWEEN HAMILTON AND HACKLEBURG
STATION 109+05
MARION COUNTY
SPANS 4 - 6 BEARING DETAILS
(SHEET 2 OF 2)
BRIDGE SHEET NO. 20 OF 43
REVISIONS
BIN: 020594
ABUTMENT 7
BEARING PLATE BEVELS
T1 T2
GIRDER NO. 1 1.488" 1.512"
GIRDER NO. 2 1.488" 1.512"
GIRDER NO. 3 1.488" 1.512"
GIRDER NO. 4 1.488" 1.512"
GIRDER NO. 5 1.488" 1.512"
BENT 6
BEARING PLATE BEVELS
T1 T2
GIRDER NO. 1 1.560" 1.440"
GIRDER NO. 2 1.560" 1.440"
GIRDER NO. 3 1.560" 1.440"
GIRDER NO. 4 1.560" 1.440"
GIRDER NO. 5 1.560" 1.440"
BEVELED PLATE (AT BENT 6)
BEVELED PLATE (AT ABUTMENT 7)
SECTION A-A
SECTION D-D
SECTION B-B
SECTION E-E
DETAIL "C"
DETAIL "F"
LAMINATED ELASTOMERIC BEARING PAD DETAILS (AT BENT 6)
LAMINATED ELASTOMERIC BEARING PAD DETAILS (AT ABUTMENT 7)
BEARINGS BENT 6 (TYPE 4 BEARING)
BEARINGS AT ABUTMENT 7 (TYPE 4 BEARING)

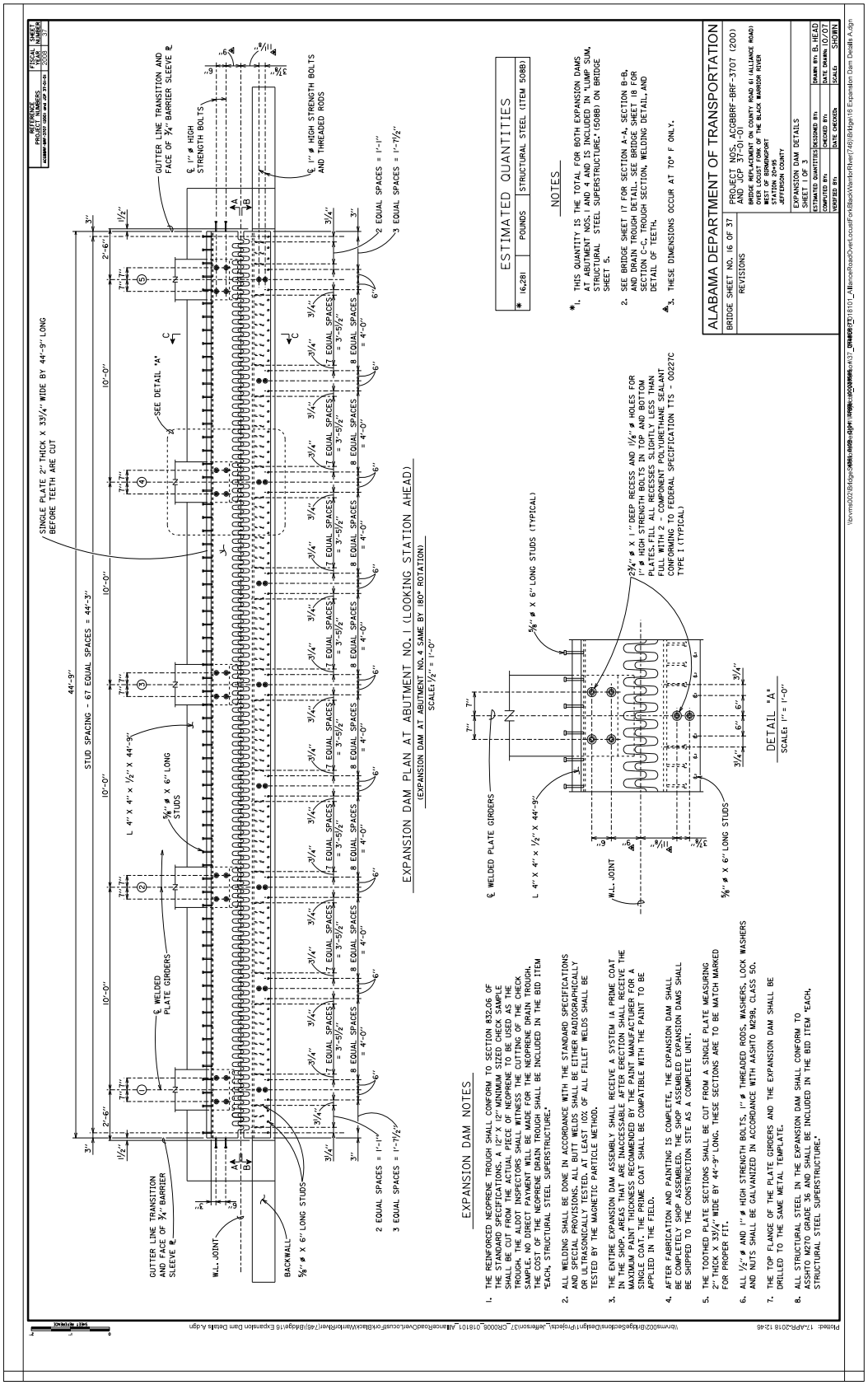
2.3.3 Expansion Dam Details

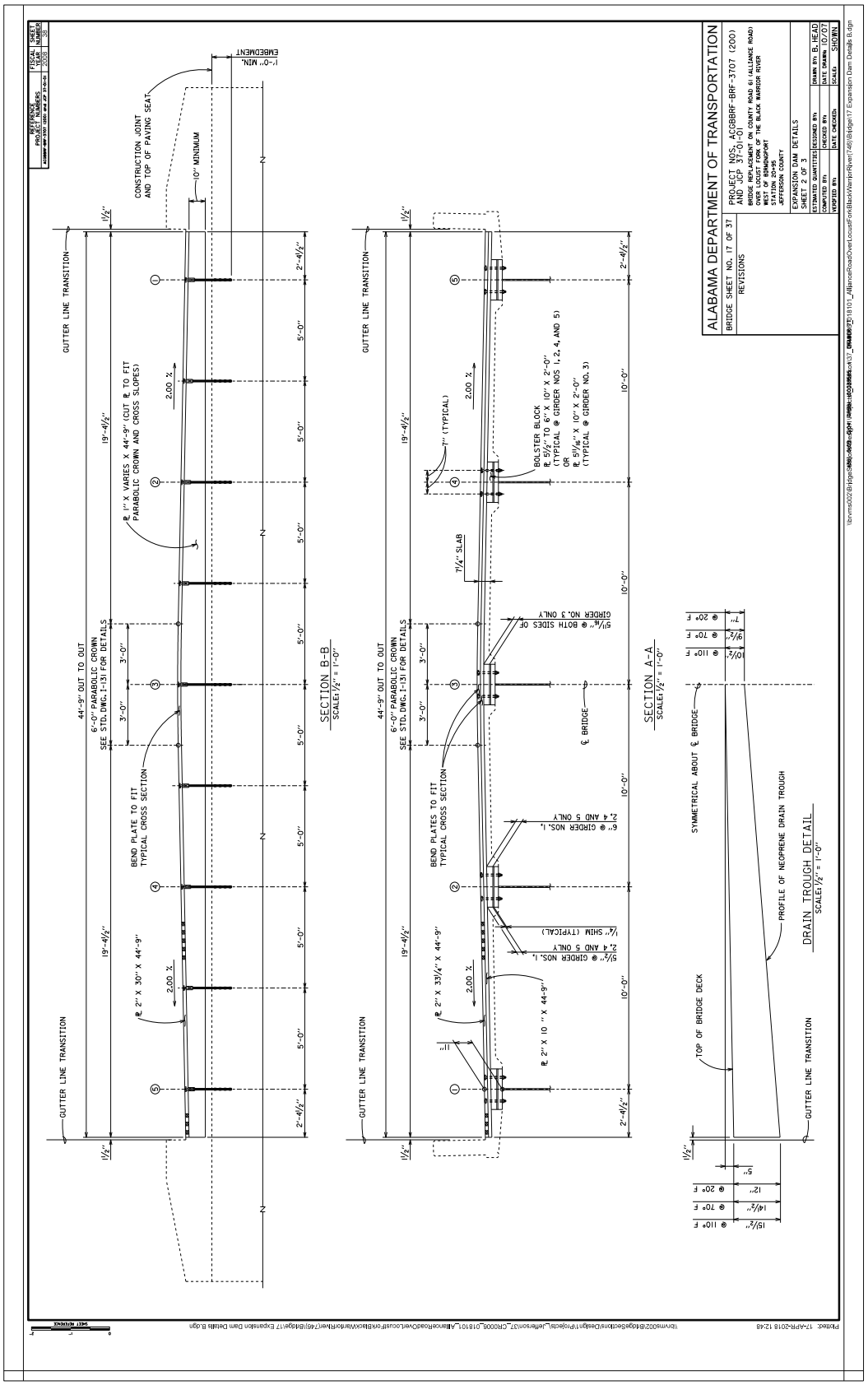
2.3.3.1 Tooth Joint Example 1 (2 Sheets) (Bulb Tee to Steel Girders)

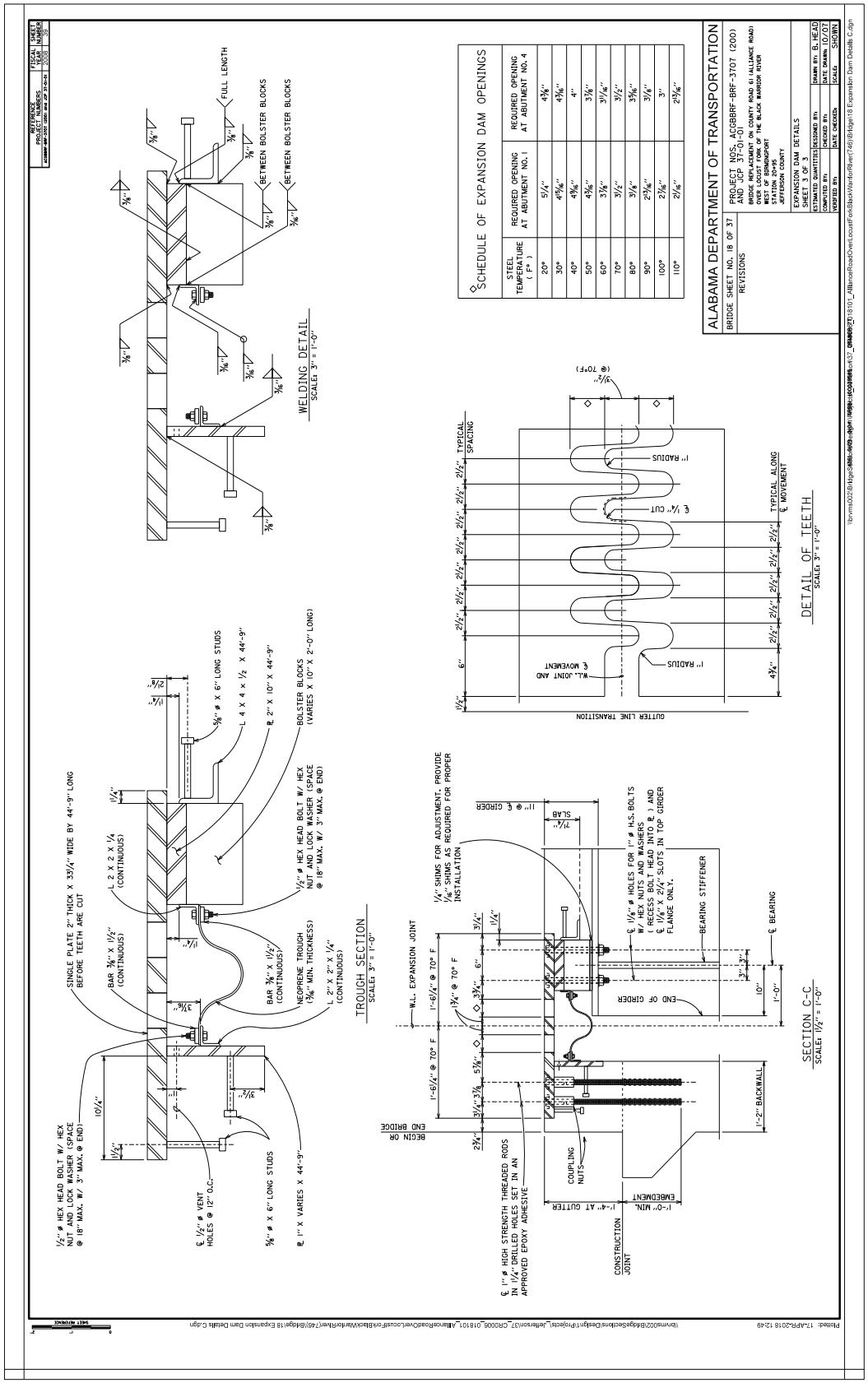



ALABAMA DEPARTMENT OF TRANSPORTATION
PROJECT NO. BRF-0017 (516)
BRIDGE REPLACEMENT ON STATE ROUTE 17 OVER NORTH FORK CREEK BETWEEN HAMILTON AND HACKLEBURG
STATION 109+05
MARION COUNTY
EXPANSION DAM DETAILS (SHEET 2 OF 2)
ESTIMATED QUANTITIES
18,066 | POUNDS | 508B | STRUC. STEEL SUPERSTR.
BRIDGE SHEET NO. 22 OF 43
REVISIONS
GENERAL DETAILS
NOTES
1. THE REINFORCED NEOPRENE TROUGH SHALL CONFORM TO SECTION 832.06 OF THE STANDARD SPECIFICATIONS. A 2" MINIMUM SIZED CHECK SAMPLE SHALL BE CUT FROM THE ACTUAL PIECE OF NEOPRENE DRAIN TROUGH. THE ALDOT INSPECTORS SHALL WITNESS THE CUTTING OF THE CHECK SAMPLE. NO DIRECT PAYMENT WILL BE MADE FOR THE NEOPRENE DRAIN TROUGH. THE COST SHALL BE INCLUDED IN THE BID ITEM 508-B, STRUCTURAL STEEL SUPERSTRUCTURE.
2. ALL WELDING SHALL BE PREFORMED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS. ANY BUTT WELDS SHALL BE EITHER RADIOGRAPHICALLY OR ULTRASONICALLY TESTED. AT LEAST 10% OF ALL FILLET WELDS SHALL BE TESTED BY THE MAGNETIC PARTICLE METHOD.
3. THE ENTIRE EXPANSION DAM ASSEMBLY SHALL RECEIVE A SYSTEM 1A 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 THAT WILL BE IN CONTACT WITH, OR ENCASED IN CONCRETE WILL NOT REQUIRE FIELD PAINTING.
4. AFTER FABRICATING AND PAINTING IS COMPLETE, THE EXPANSION DAM SHALL BE COMPLETELY SHOP ASSEMBLED. THE SHOP ASSEMBLED EXPANSION DAM SHALL BE SHIPPED TO THE CONSTRUCTION SITE AS A COMPLETE UNIT.
5. THE TWO TOOTHED PLATE SECTIONS SHALL BE CUT FROM A SINGLE PLATE MEASURING 2" THICK X 34¼" WIDE X 43'-9" LONG. THESE SECTIONS ARE TO BE MATCH MARKED FOR PROPER FIT.
6. ALL ½" ø HEX HEAD BOLTS, 1" ø HIGH STRENGTH BOLTS, 1" ø THREADED RODS, WASHERS, LOCK WASHERS AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM B695, CLASS 50.
7. THE TOP FLANGE OF THE PLATE GIRDERS AND THE EXPANSION DAM SHALL BE DRILLED TO THE SAME METAL TEMPLATE.
8. ALL STRUCTURAL STEEL IN THE EXPANSION DAM SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE INCLUDED IN BID ITEM 508-B, STRUCTURAL STEEL SUPERSTRUCTURE.
9. SEE 6° PARABOLIC CROWN ORDINATES ON BR. SPEC. PROJ. DWG. SBD-1
WELDING DETAILS
TROUGH SECTION
NEOPRENE DRAIN TROUGH
DETAIL OF TEETH
SECTION C-C
SCHEDULE OF EXPANSION DAM OPENINGS
TEMPERATURE (°F) | REQUIRED OPENING
20 | 5¼"
30 | 4¾"
40 | 4⅜"
50 | 3⅞"
60 | 3⅜"
70 | 3"
80 | 2⅝"
90 | 2¼"
100 | 1⅞"
110 | 1⅝"
120 | 1⅜"
APPROX. 5% DROP (1'-1⅛")
AT 70° F
TOP OF BRIDGE DECK
SYMM. ABOUT ℄ BRIDGE
207 SPA. @ 2½" O.C. = 43'-½"
ALONG ℄ MOVEMENT
W.L. JOINT & ℄ MOVEMENT
GUTTER LINE
1" RADIUS (TYP.)
℄ TEETH
43'-9"
ESTIMATED QUANTITIES
COMPUTED BY:
CHECKED BY:
VERIFIED BY:
DRAWN BY:
DATE CHECKED:
SCALES:
DATE DRAWN:
SHOWN
7/16
JTH
020594
BIN:
Plotted: 17-APR-2018 12:30

2.3.3.2 Tooth Joint Example 2 (3 Sheets) (Abutment to Steel Girders)




ALABAMA DEPARTMENT OF TRANSPORTATION
PROJECT NOS. ACGBBRF-BRF-3707 (200) AND JCP 37-01-01
BRIDGE SHEET NO. 17 OF 37
REVISIONS
BRIDGE REPLACEMENT ON COUNTY ROAD 61 (ALLIANCE ROAD) WEST OF INTERSECTION OF THE BLACK WARRIOR RIVER
STATION 20+99
JEFFERSON COUNTY
EXPANSION DAM DETAILS
SHEET 2 OF 3
SECTION B-B
SCALE: 1/2" = 1'-0"
SECTION A-A
SCALE: 1/2" = 1'-0"
DRAIN TROUGH DETAIL
SCALE: 1/2" = 1'-0"
GUTTER LINE TRANSITION
CONSTRUCTION JOINT AND TOP OF PAVING SEAT
EMBEDMENT
10" MINIMUM
44'-9" OUT TO OUT
6'-0" PARABOLIC CROWN
SEE STD. DWG. 1-151 FOR DETAILS
BEND PLATE TO FIT TYPICAL CROSS SECTION
2.00 %
PROFILE OF NEOPRENE DRAIN TROUGH
TOP OF BRIDGE DECK
SYMMETRICAL ABOUT ℄ BRIDGE
BOLSTER BLOCK
7¼" SLAB
SHIM (TYPICAL)


ALABAMA DEPARTMENT OF TRANSPORTATION
PROJECT NOS. ACGBBRF-BRF-3707 (200) AND DPI 37-01-01
BRIDGE NO.P-ABUTMENT ON COUNTY ROAD 61 (ALLIANCE ROAD) OVER LITTLE EBENEZER CREEK ON THE BLACK WARRIOR RIVER WEST OF BERMUDPORT STATION 20+00
JEFFERSON COUNTY
EXPANSION DAM DETAILS
SHEET 1 OF 1
BRIDGE SHEET NO. 18 OF 37
REVISIONS
ESTIMATED QUANTITIES
COMPUTED BY:
VERIFIED BY:
DESIGNED BY:
CHECKED BY:
DATE CHECKED:
DRAWN BY: B. HEAD
DATE DRAWN: 10/07
SCALES: SHOWN
SCHEDULE OF EXPANSION DAM OPENINGS
STEEL TEMPERATURE (°F.)
REQUIRED OPENING AT ABUTMENT NO. 1
REQUIRED OPENING AT ABUTMENT NO. 4
20° 5¼" 4⅜"
30° 4⅝" 4⅜"
40° 4⅜" 4"
50° 4⅛" 3⅞"
60° 3⅞" 3⅛"
70° 3½" 3½"
80° 3¼" 3⅜"
90° 2⅞" 3⅛"
100° 2⅝" 3"
110° 2⅛" 2⅝"
DETAIL OF TEETH
SCALE: 3" = 1'-0"
TROUGH SECTION
SCALE: 3" = 1'-0"
WELDING DETAIL
SCALE: 3" = 1'-0"
SECTION C-C
SCALE: 1½" = 1'-0"
FULL LENGTH
BETWEEN BOLSTER BLOCKS
BEGIN OR END BRIDGE
W.L. EXPANSION JOINT
SINGLE PLATE 2" THICK X 33¼" WIDE BY 44'-9" LONG BEFORE TEETH ARE CUT
BAR ¾" X 1½" (CONTINUOUS)
L 2 X 2 X ¼ (CONTINUOUS)
¾" ø X 6" LONG STUDS
L 4 X 4 X ½ X 44'-9"
PL 2" X 10" X 44'-9"
BOLSTER BLOCKS (VARIES X 10" X 2'-0" LONG)
½" ø HEX HEAD BOLT W/ HEX NUT AND LOCK WASHER (SPACE @ 18" MAX. W/ 3" MAX. @ END)
NEOPRENE TROUGH (⅜" MIN. THICKNESS)
BAR ¾" X 1½" (CONTINUOUS)
L 2" X 2" X ¼" (CONTINUOUS)
℄ ½" ø VENT HOLES @ 12" O.C.
¾" ø X 6" LONG STUDS
PL 1" X VARIES X 44'-9"
1" ø HIGH STRENGTH THREADED RODS IN 1¼" DRILLED HOLES SET IN AN APPROVED EPOXY ADHESIVE
1'-6¼" @ 70° F
1'-6⅛" @ 70° F
¼" SHIMS FOR ADJUSTMENT. PROVIDE ⅛" SHIMS AS REQUIRED FOR PROPER INSTALLATION
11" @ ℄ GIRDER
SLAB
℄ 1¼" ø HOLES FOR 1" ø H.S. BOLTS W/ HEX NUTS AND WASHERS (RECESS BOLT HEAD INTO PL) AND ℄ ⅛" X 2¼" SLOTS IN TOP GIRDER FLANGE ONLY.
BEARING STIFFENER
END OF GIRDER
℄ BEARING
1'-2" BACKWALL
1'-0" MIN. EMBEDMENT
1'-4" AT GUTTER
COUPLING NUTS
CONSTRUCTION JOINT
GUTTER LINE TRANSITION
ML. JOINT AND ℄ MOVEMENT
1" RADIUS
℄ ¼" CUT
TYPICAL SPACING
TYPICAL ALONG ℄ MOVEMENT
(@ 70°F)

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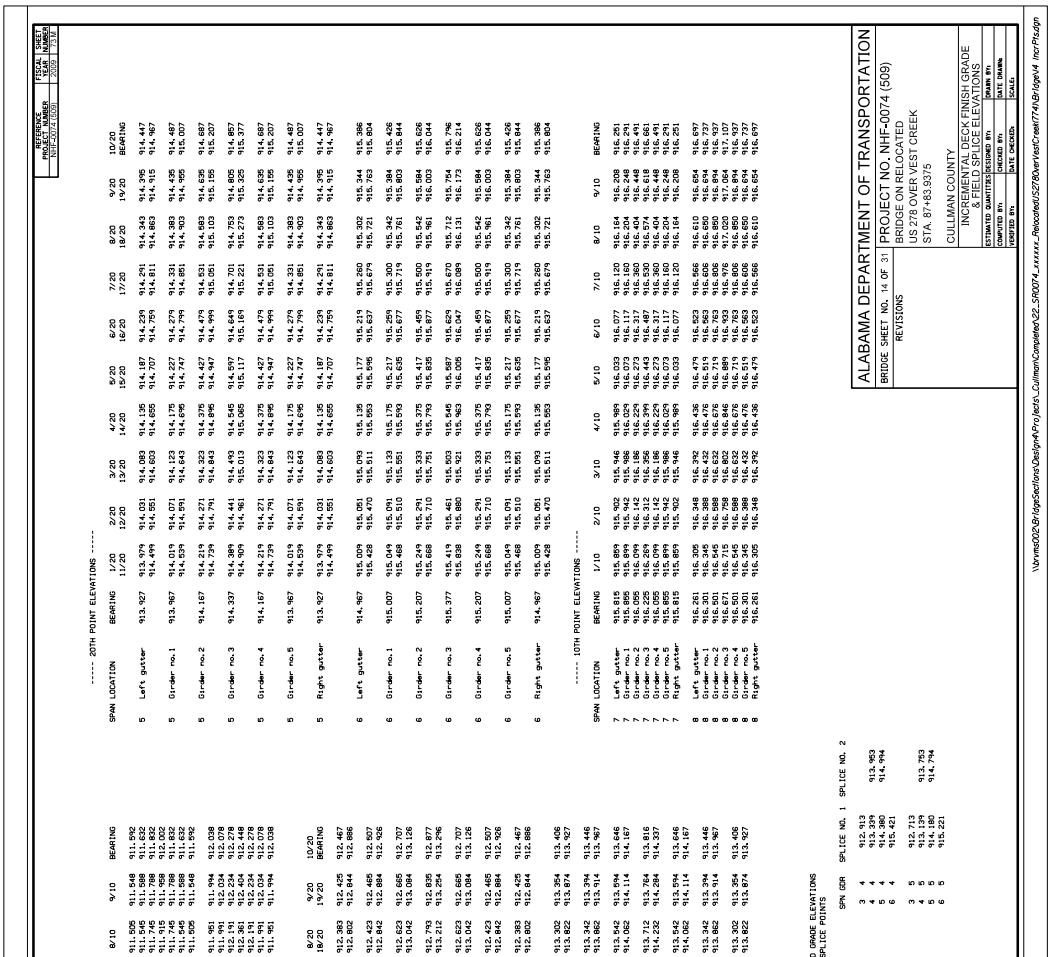
2.3.4 Finish Grade Elevs. at Incremental Span Points

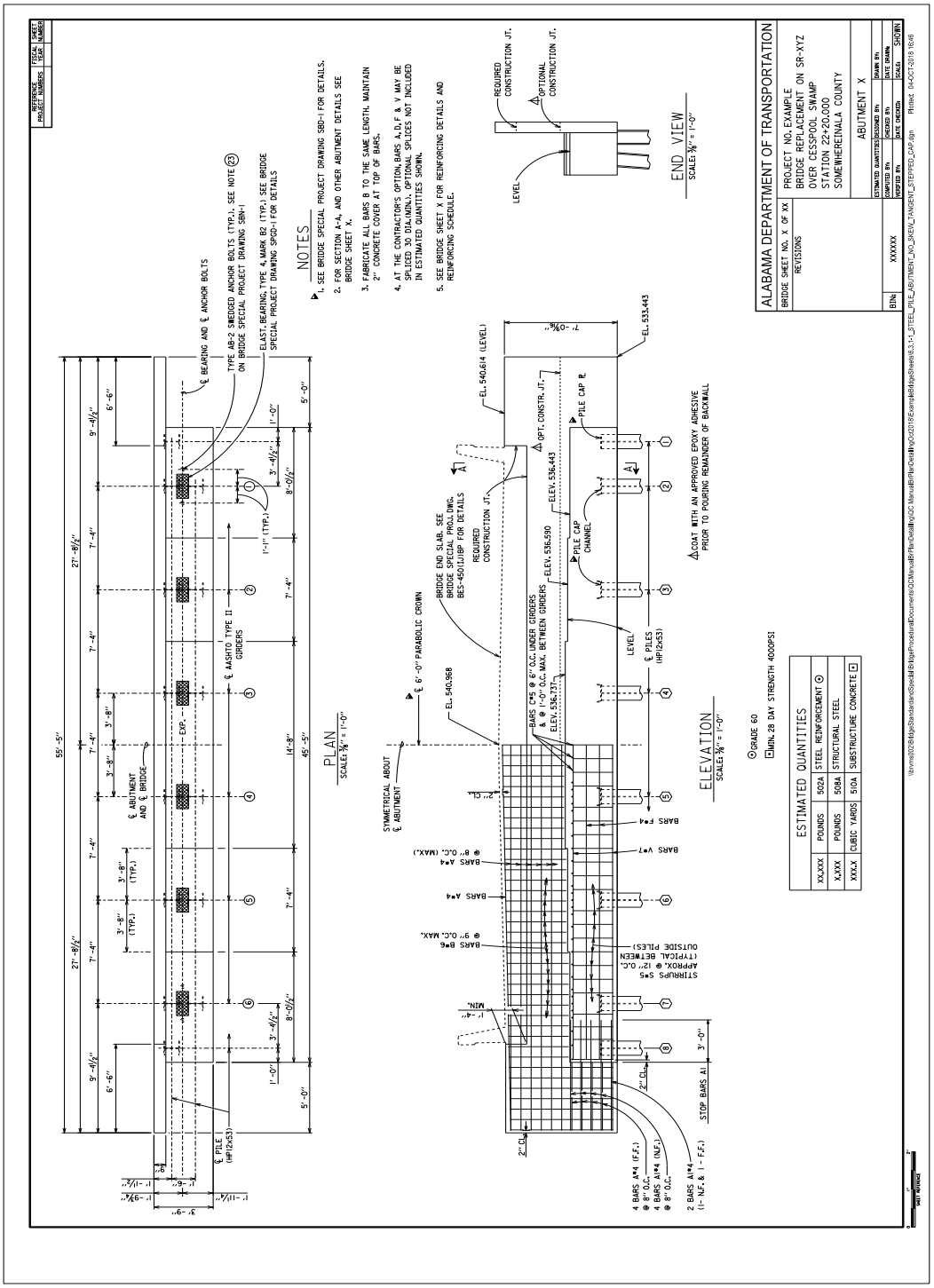
2.3.4.1 Example 1 (Comb. Prestr. and Stl. Spans)



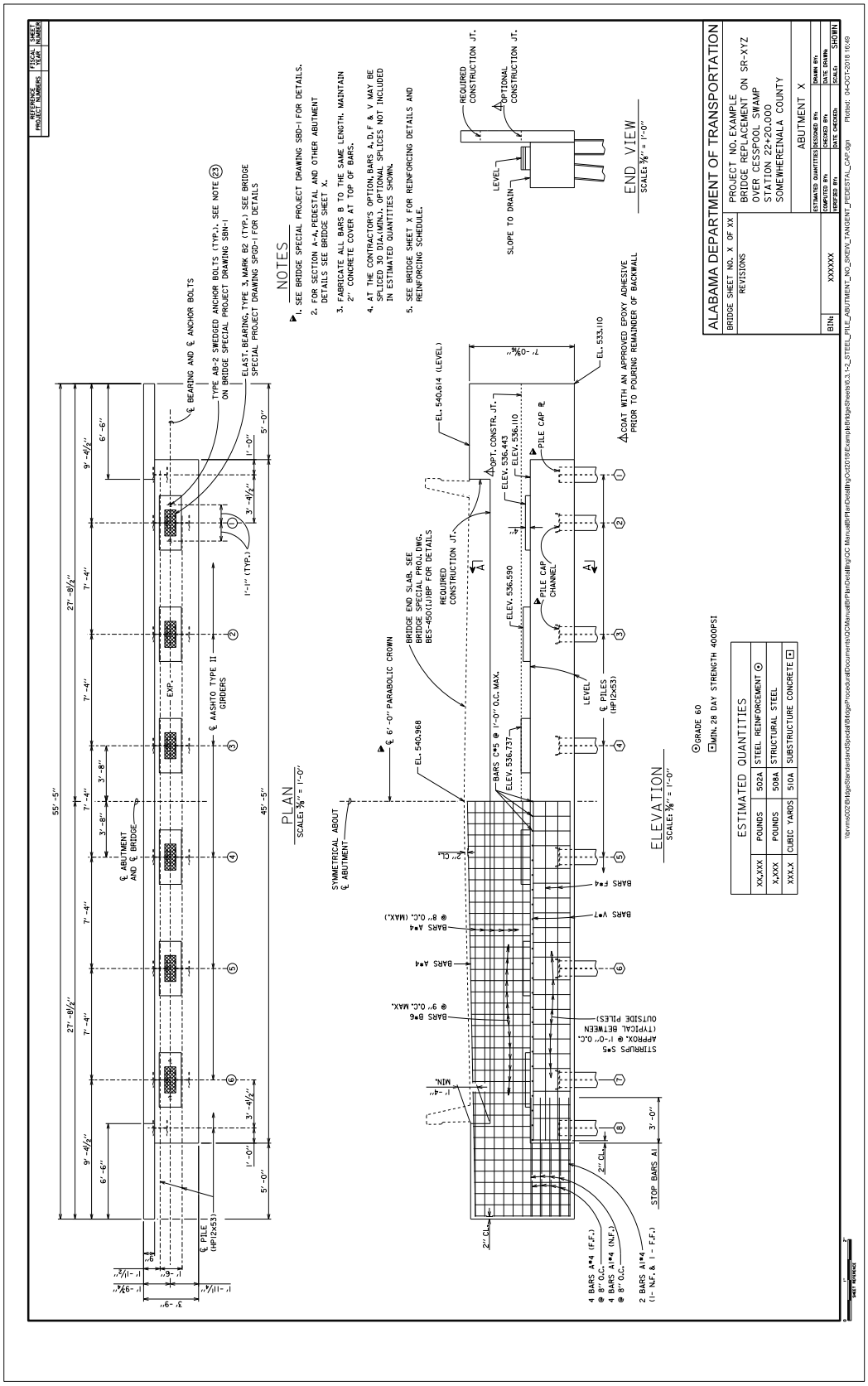
C Substructure Sheets

3.1 Abutment Details

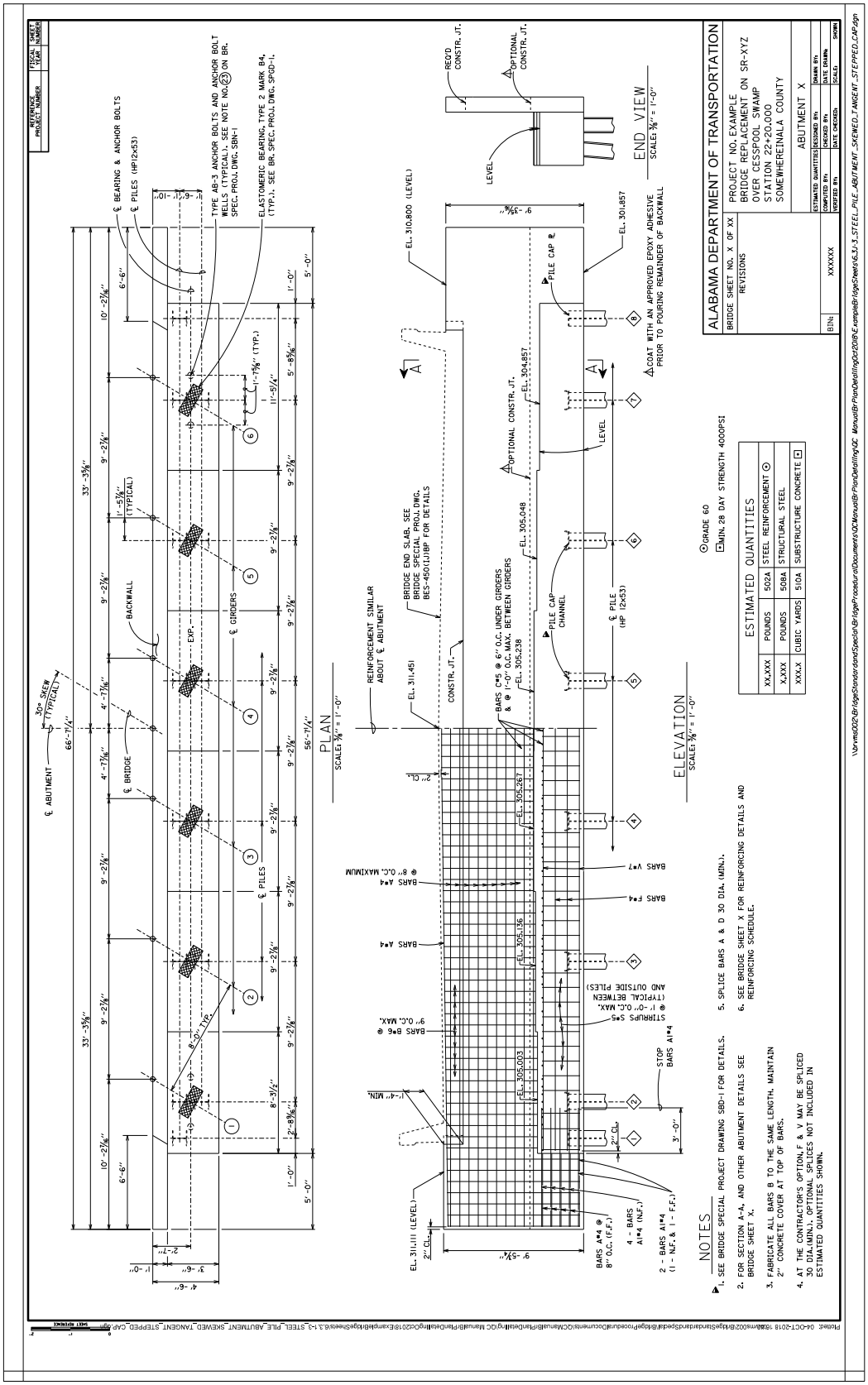
3.1.1 Steel Piles, No Skew, Tangent, Stepped Cap



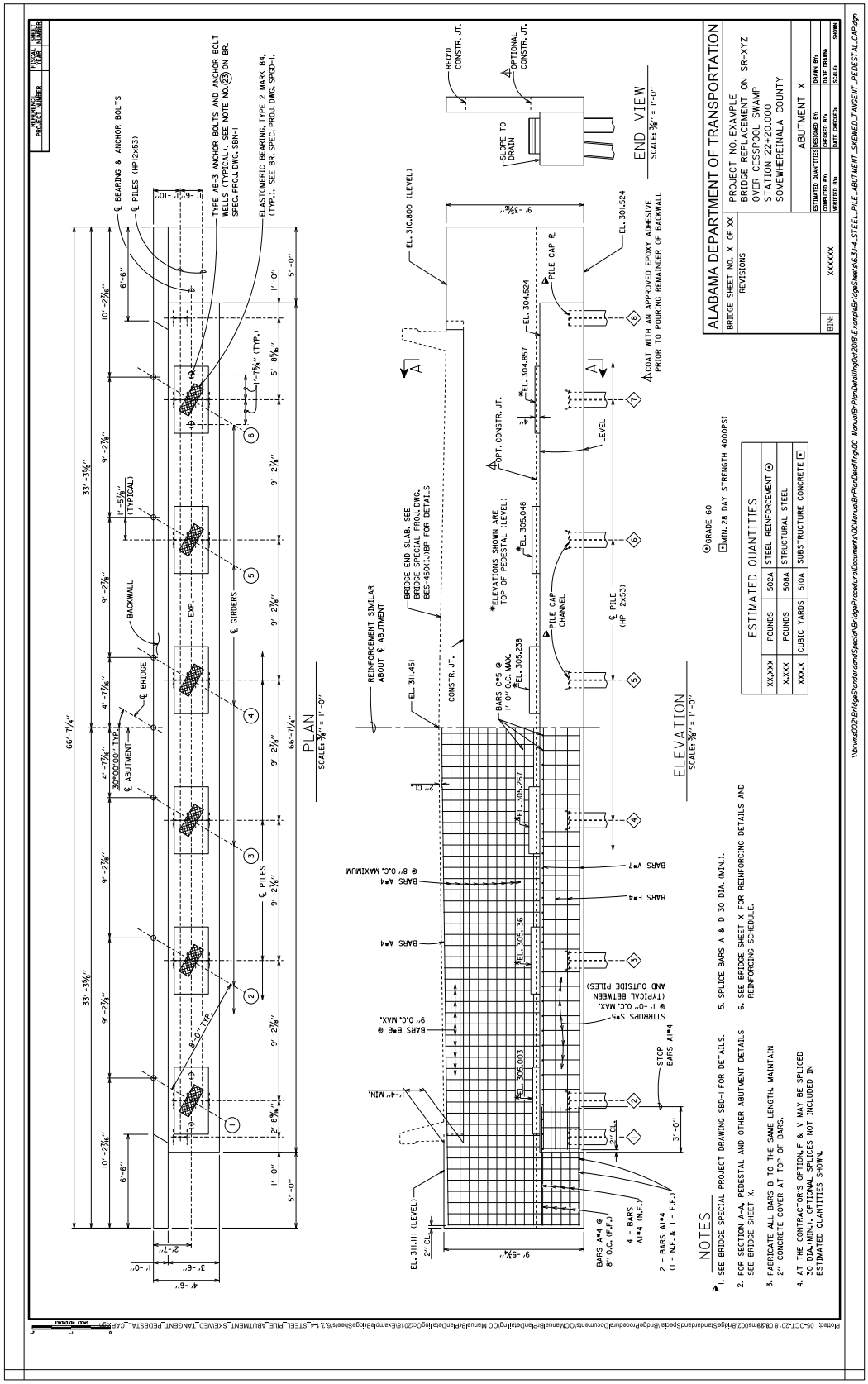
3.1.2 Steel Piles, No Skew, Tangent, Pedestal Cap



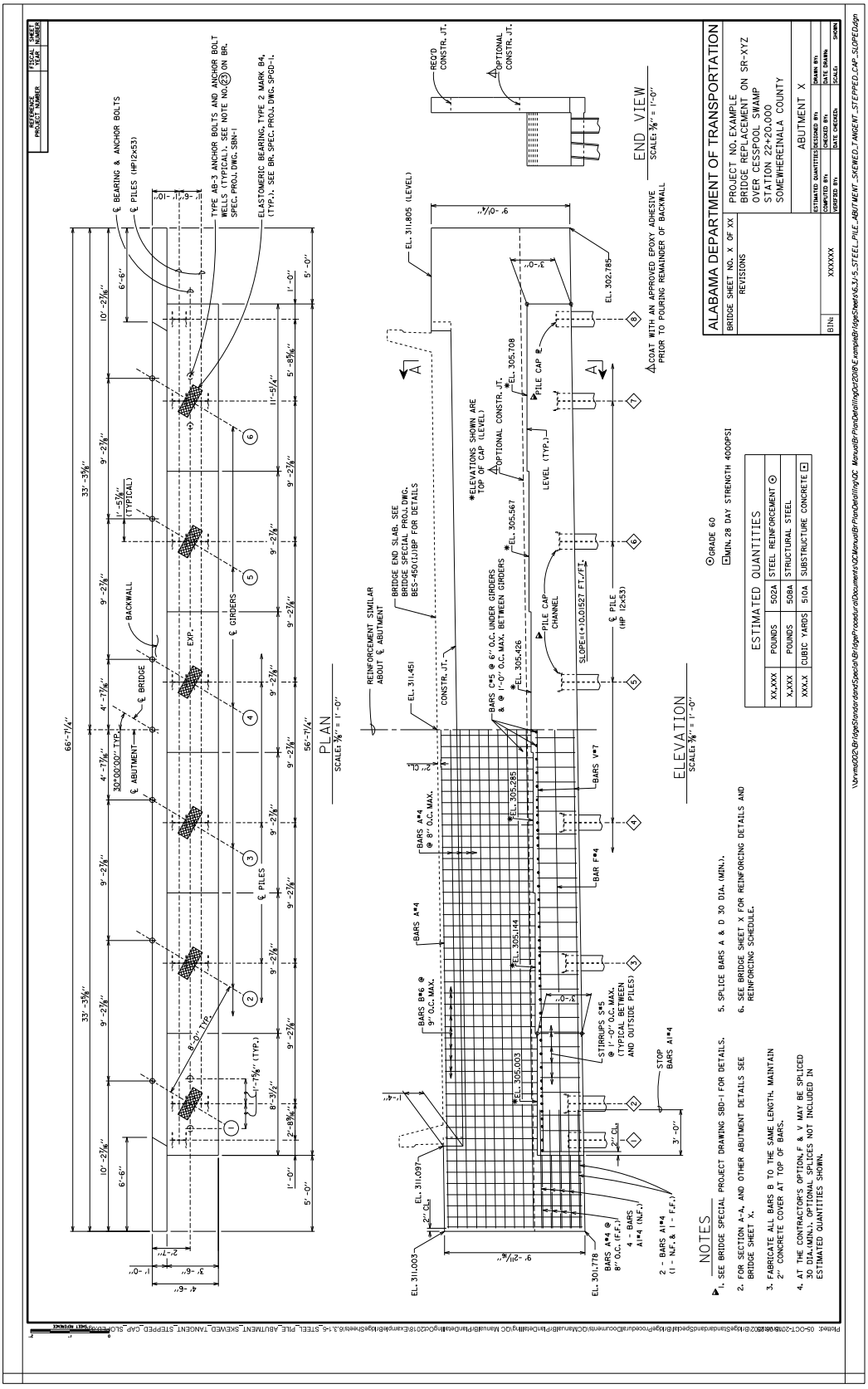
3.1.3 Steel Piles, Skewed, Tangent, Stepped Cap



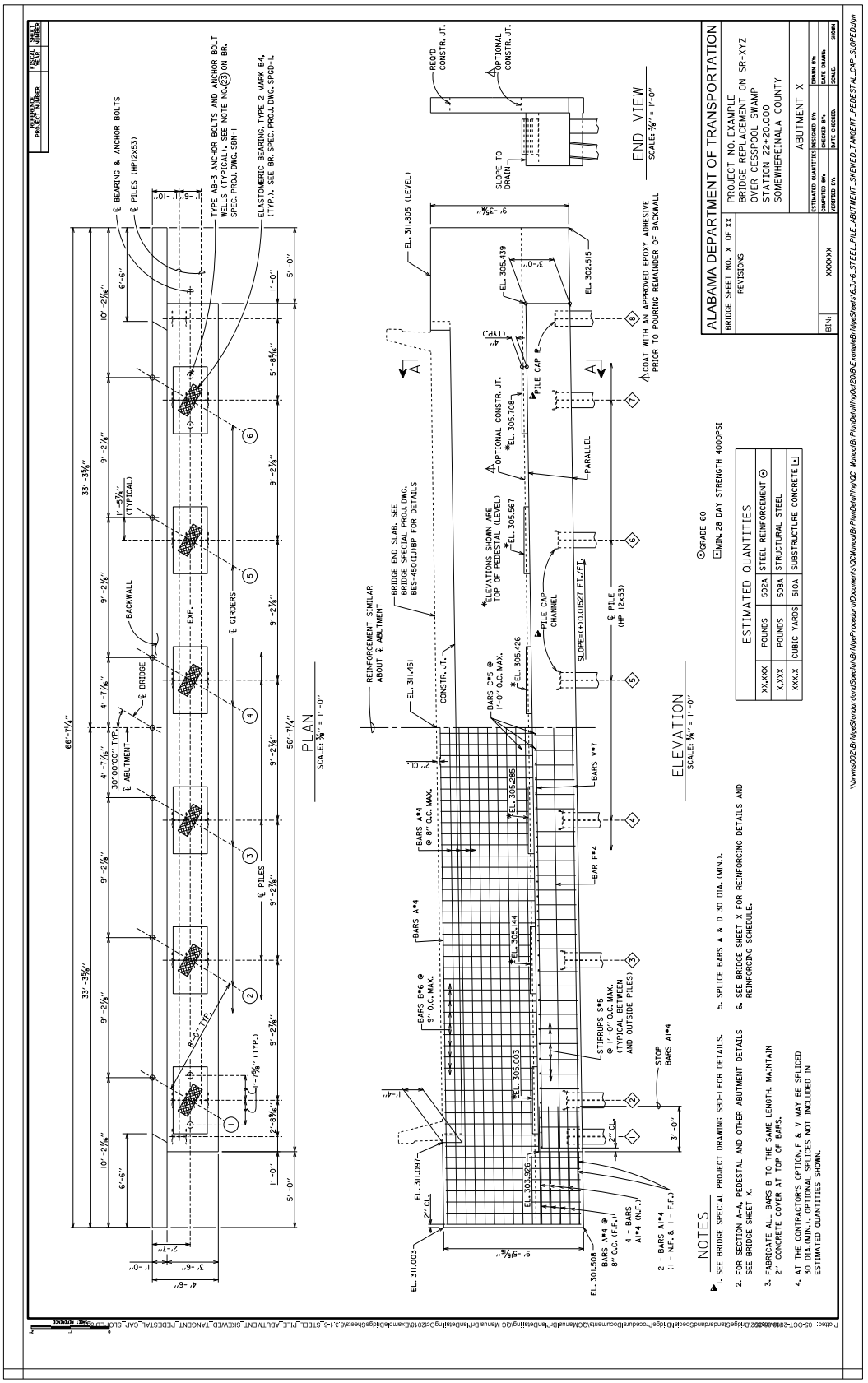
3.1.4 Steel Piles, Skewed, Tangent, Pedestal Cap



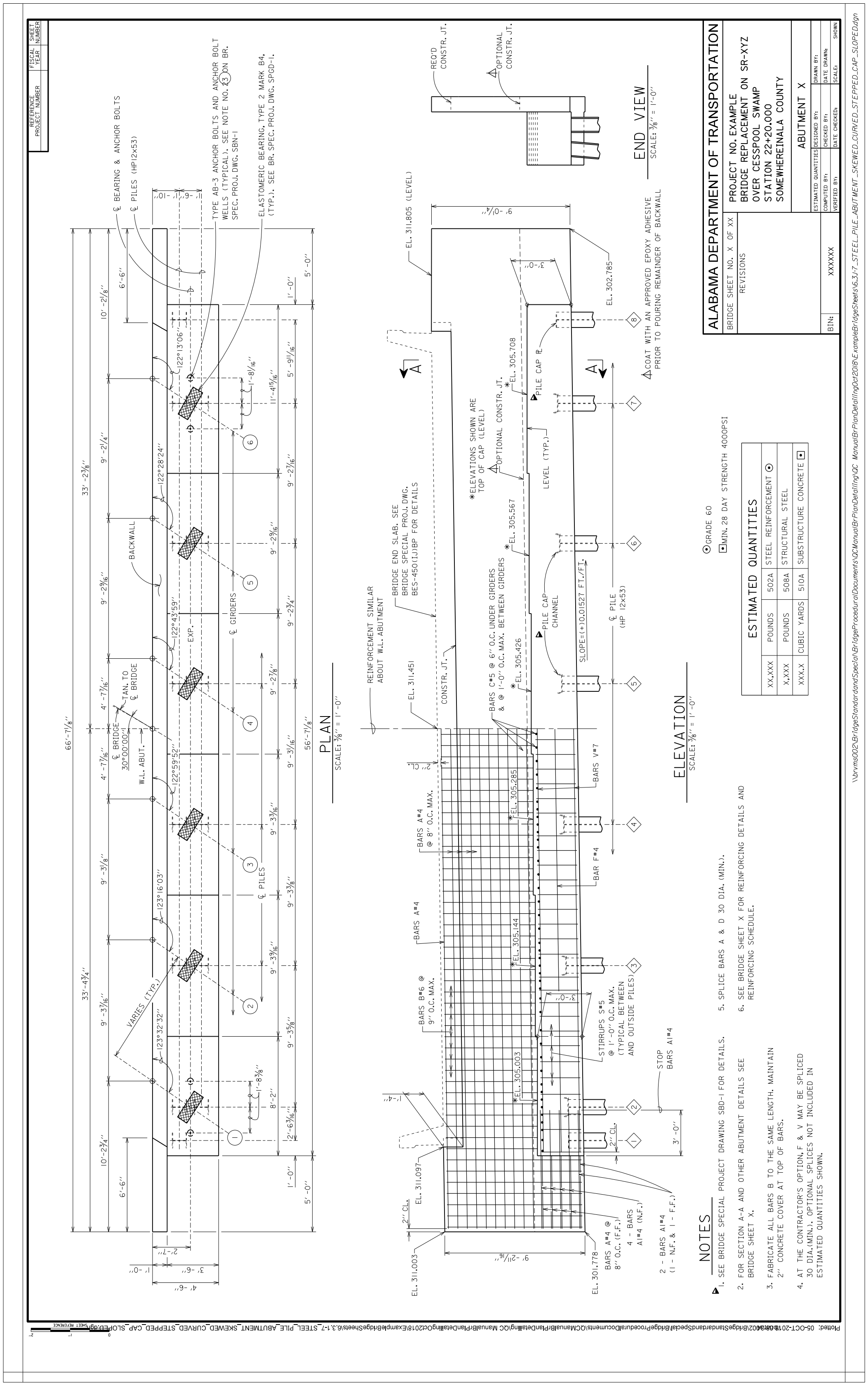
3.1.5 Steel Piles, Skewed, Tangent, Stepped Cap, Sloped



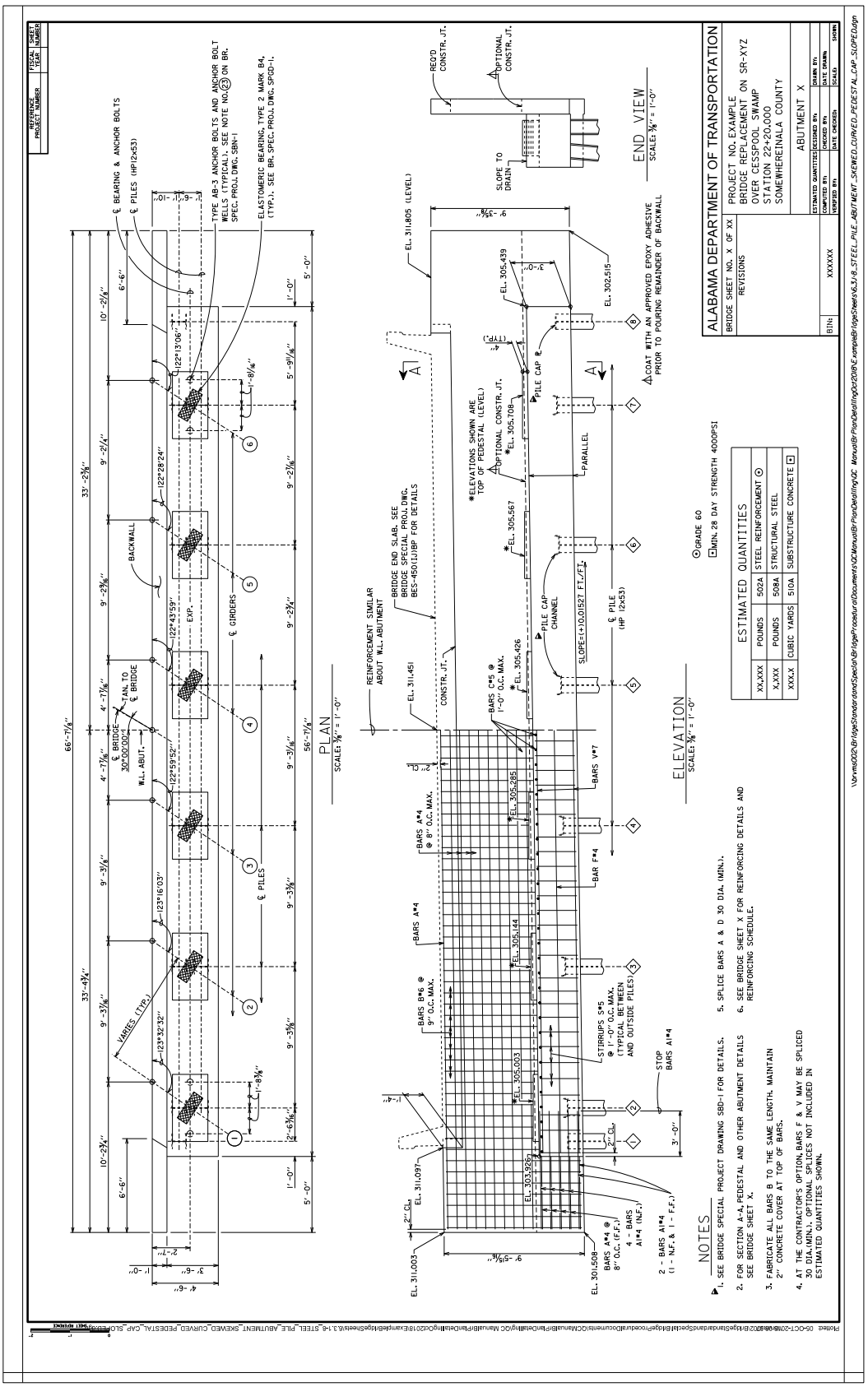
3.1.6 Steel Piles, Skewed, Tangent, Pedestal Cap, Sloped



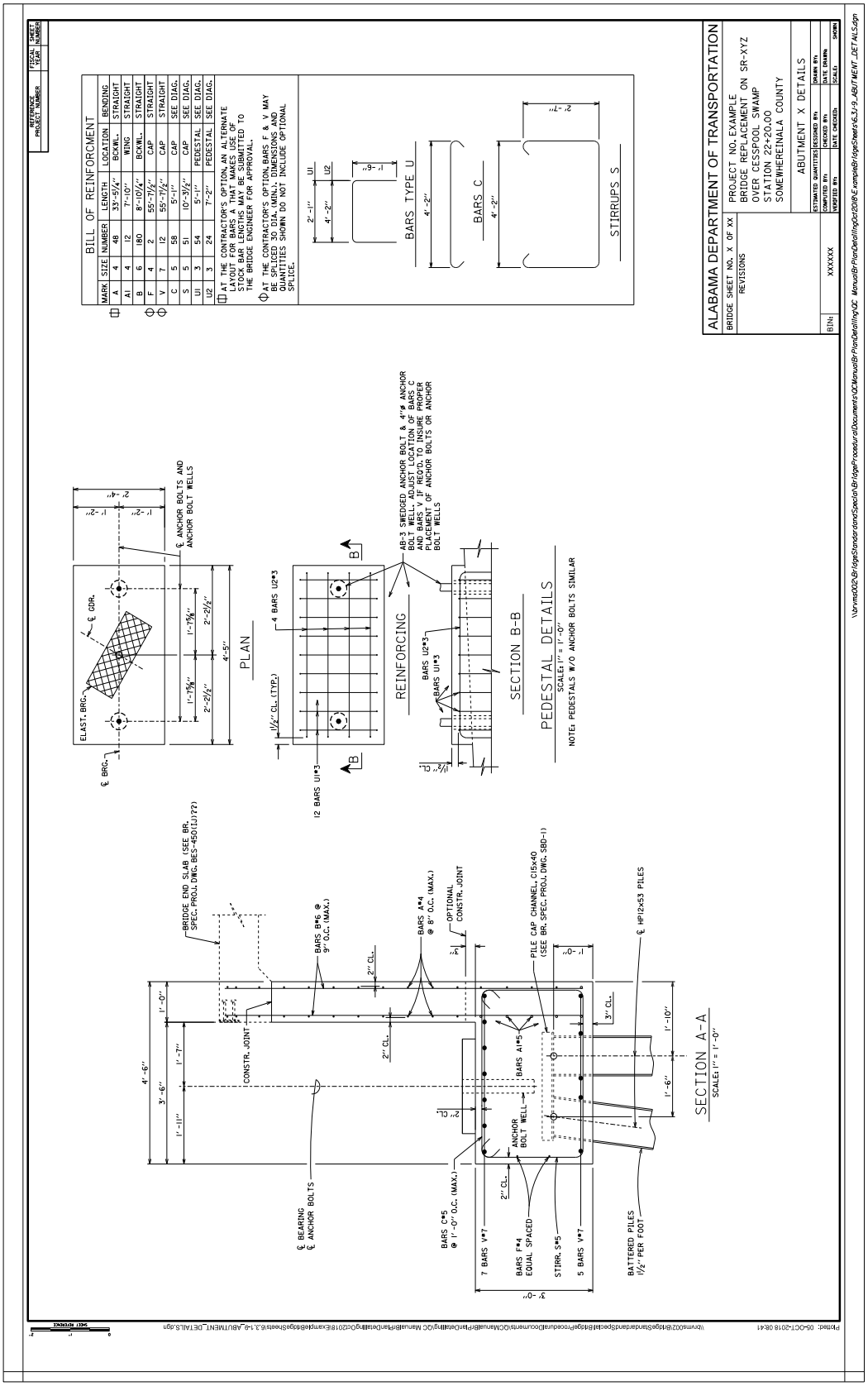
3.1.7 Steel Piles, Skewed, Curved, Stepped Cap, Sloped



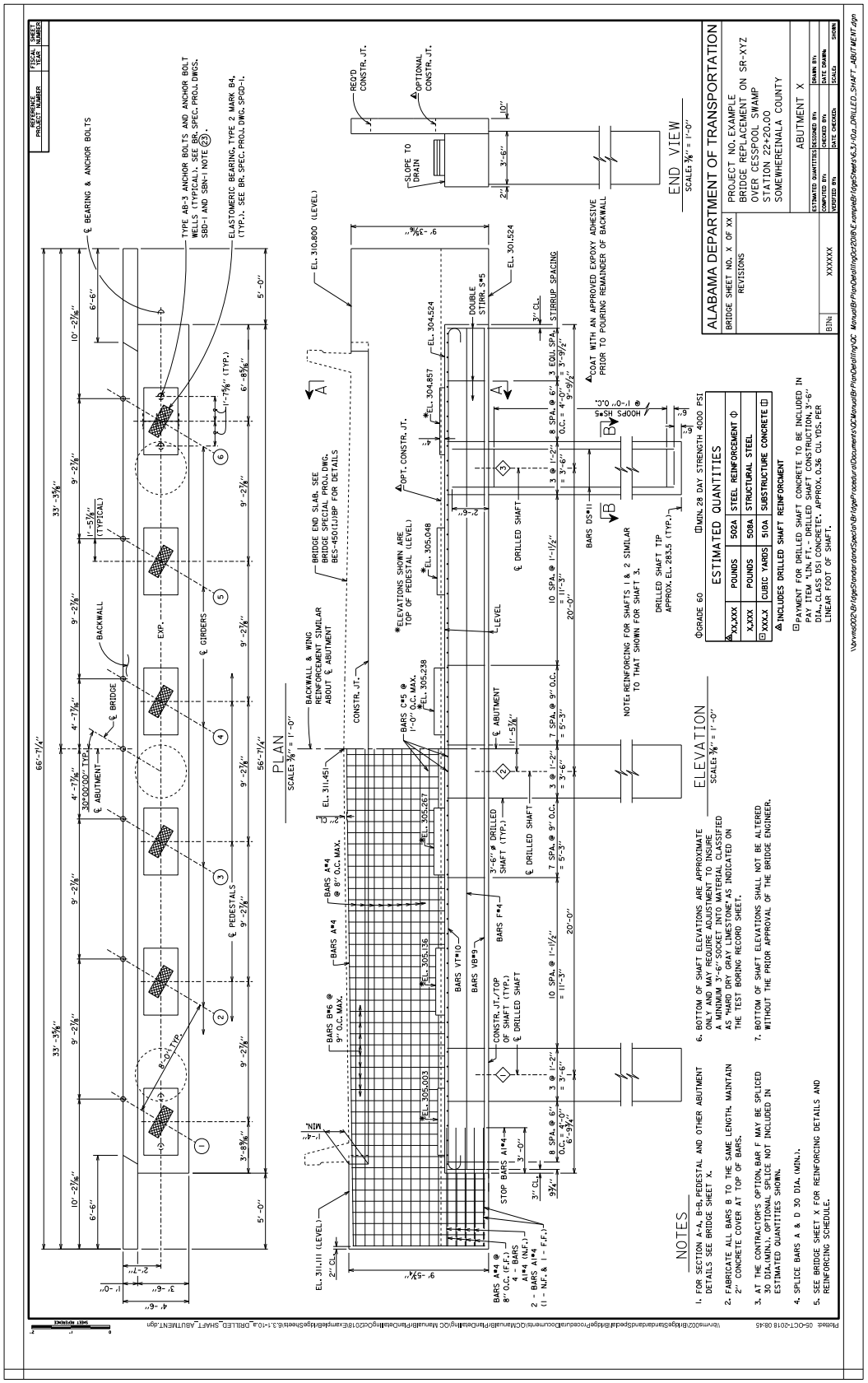
3.1.8 Steel Piles, Skewed, Curved, Pedestal Cap, Sloped

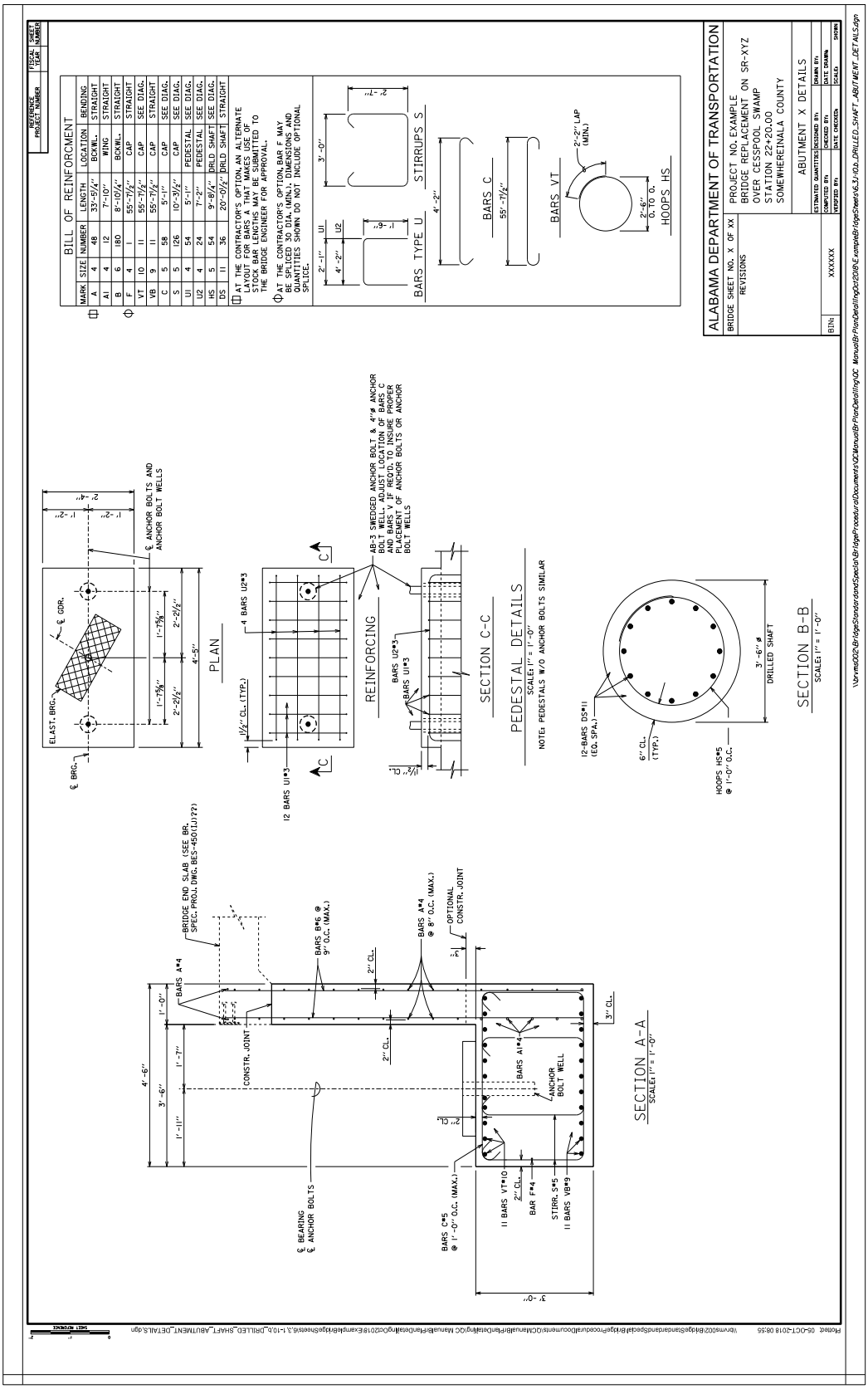


3.1.9 Abutment Details (Sections, Reinf., Etc.)



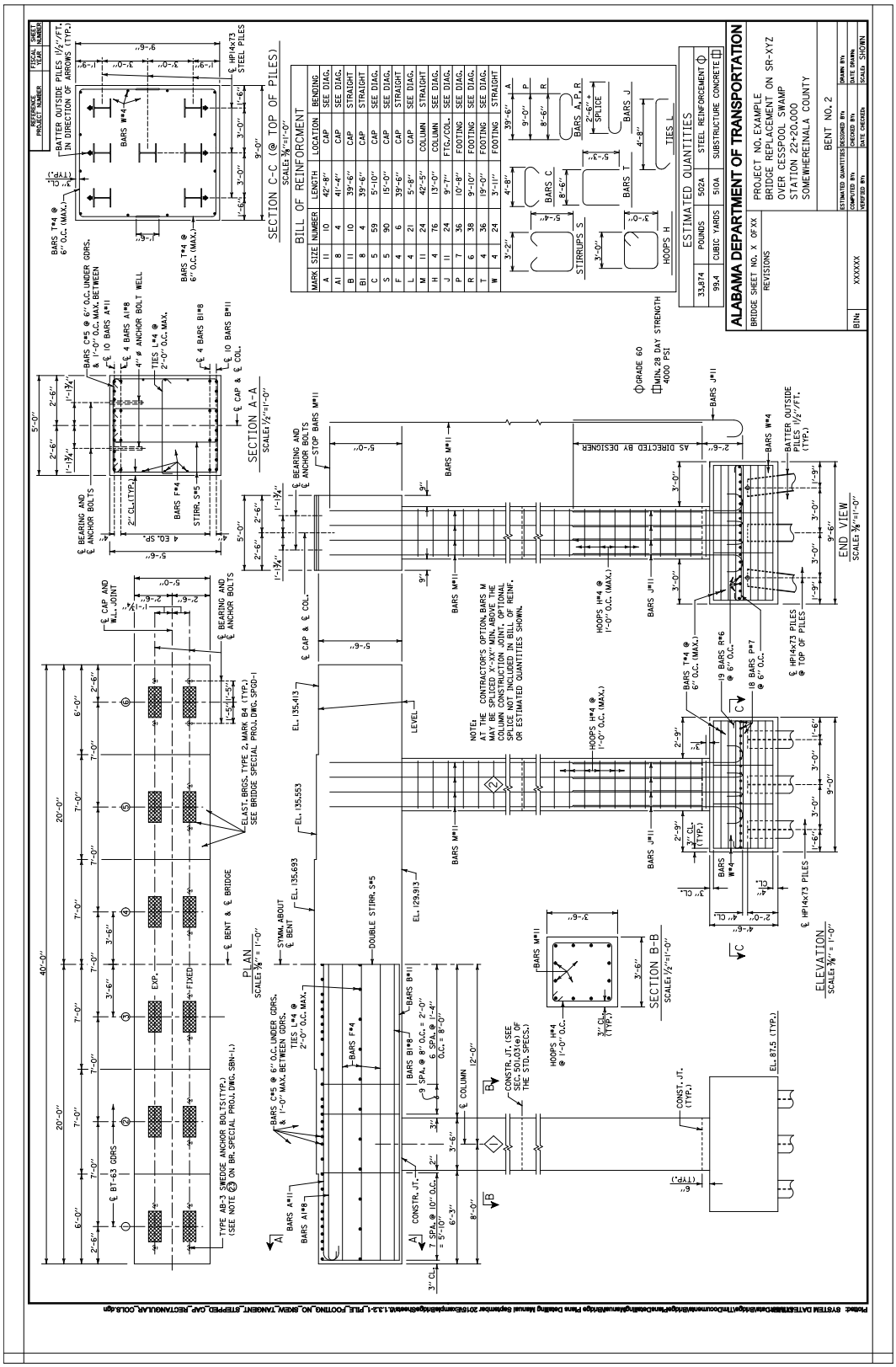
3.1.10 Drilled Shaft Abutment (2 Sheets)



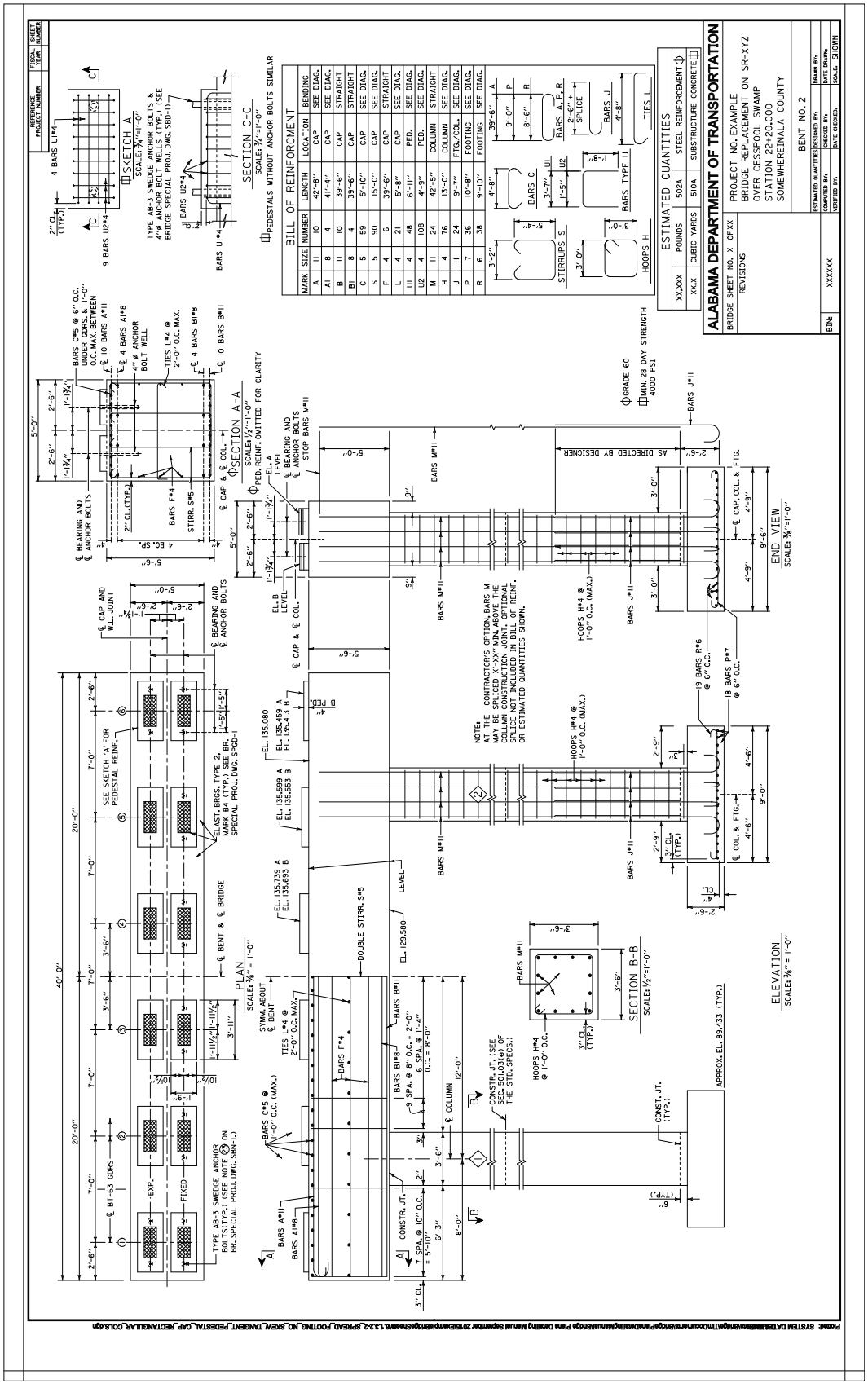

BILL OF REINFORCMENT
MARK SIZE NUMBER LENGTH LOCATION BENDING
A 4 48 33'-5¼" BCKWL. STRAIGHT
A1 4 12 7'-10" WING STRAIGHT
B 6 180 8'-10¼" BCKWL. STRAIGHT
F 4 1 55'-7½" CAP STRAIGHT
VT 10 11 55'-7½" CAP SEE DIAG.
VB 9 11 55'-7½" CAP STRAIGHT
C 5 58 5'-1" CAP SEE DIAG.
S 5 126 10'-3½" CAP SEE DIAG.
U1 4 54 5'-1" PEDESTAL SEE DIAG.
U2 4 24 7'-2" PEDESTAL SEE DIAG.
HS 5 54 9'-8¼" DRLD SHAFT SEE DIAG.
DS 11 36 20'-0½" DRLD SHAFT STRAIGHT
AT THE CONTRACTOR'S OPTION, AN ALTERNATE LAYOUT FOR BARS A MAY BE USED. A MARKED STOCK BAR LENGTHS MAY BE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL.
AT THE CONTRACTOR'S OPTION, BAR F MAY BE SPLICED 30 DIA. (MIN.); DIMENSIONS AND QUANTITIES SHOWN DO NOT INCLUDE OPTIONAL SPLICE.
BARS TYPE U
STIRRUPS S
BARS C
BARS VT
HOOPS HS
2'-2" LAP (MIN.)
ALABAMA DEPARTMENT OF TRANSPORTATION
PROJECT NO. EXAMPLE
BRIDGE REPLACEMENT ON SR-XYZ
OVER CESSPOOL SWAMP
STATION 22+20.00
SOMEWHEREINALA COUNTY
ABUTMENT X DETAILS
BRIDGE SHEET NO. X OF XX
REVISIONS
BIN: XXXXXX
ESTIMATED QUANTITIES
DESIGNED BY:
DRAWN BY:
COMPUTED BY:
CHECKED BY:
DATE DRAWN:
VERIFIED BY:
DATE CHECKED:
SCALE:
SHOWN
PLAN
REINFORCING
SECTION C-C
PEDESTAL DETAILS
SCALE: 1" = 1'-0"
NOTE: PEDESTALS W/O ANCHOR BOLTS SIMILAR
SECTION B-B
SCALE: 1" = 1'-0"
SECTION A-A
SCALE: 1" = 1'-0"
ELAST. BRG.
℄ BRG.
℄ GDR.
℄ ANCHOR BOLTS AND ANCHOR BOLT WELLS
4 BARS U2*3
12 BARS U1*3
AB=3 SWEDGED ANCHOR BOLT & 4"ø ANCHOR BOLT WELL, ADJUST LOCATION OF BARS C AND BARS U*3 IF REQ'D. TO INSURE PROPER ALIGNMENT OF ANCHOR BOLTS OR ANCHOR BOLT WELLS
BARS U2*3
BARS U1*3
12-BARS DS*11 (EQ. SPA.)
6" CL. (TYP.)
3'-6" ø DRILLED SHAFT
HOOPS HS*5 @ 1'-0" O.C.
BRIDGE END SLAB (SEE BR. SPEC. PROJ. DWG. BES-450(1J)Y2Y)
BARS A*4
BARS B*6 @ 9" O.C. (MAX.)
BARS A*4 @ 8" O.C. (MAX.)
OPTIONAL CONSTR. JOINT
CONSTR. JOINT
BARS A1*4
ANCHOR BOLT WELL
℄ BEARING ℄ ANCHOR BOLTS
BARS C*5 @ 1'-0" O.C. (MAX.)
11 BARS VT*10
BAR F*4
STIRR. S*5
11 BARS VB*9

3.2 Bent Sheets

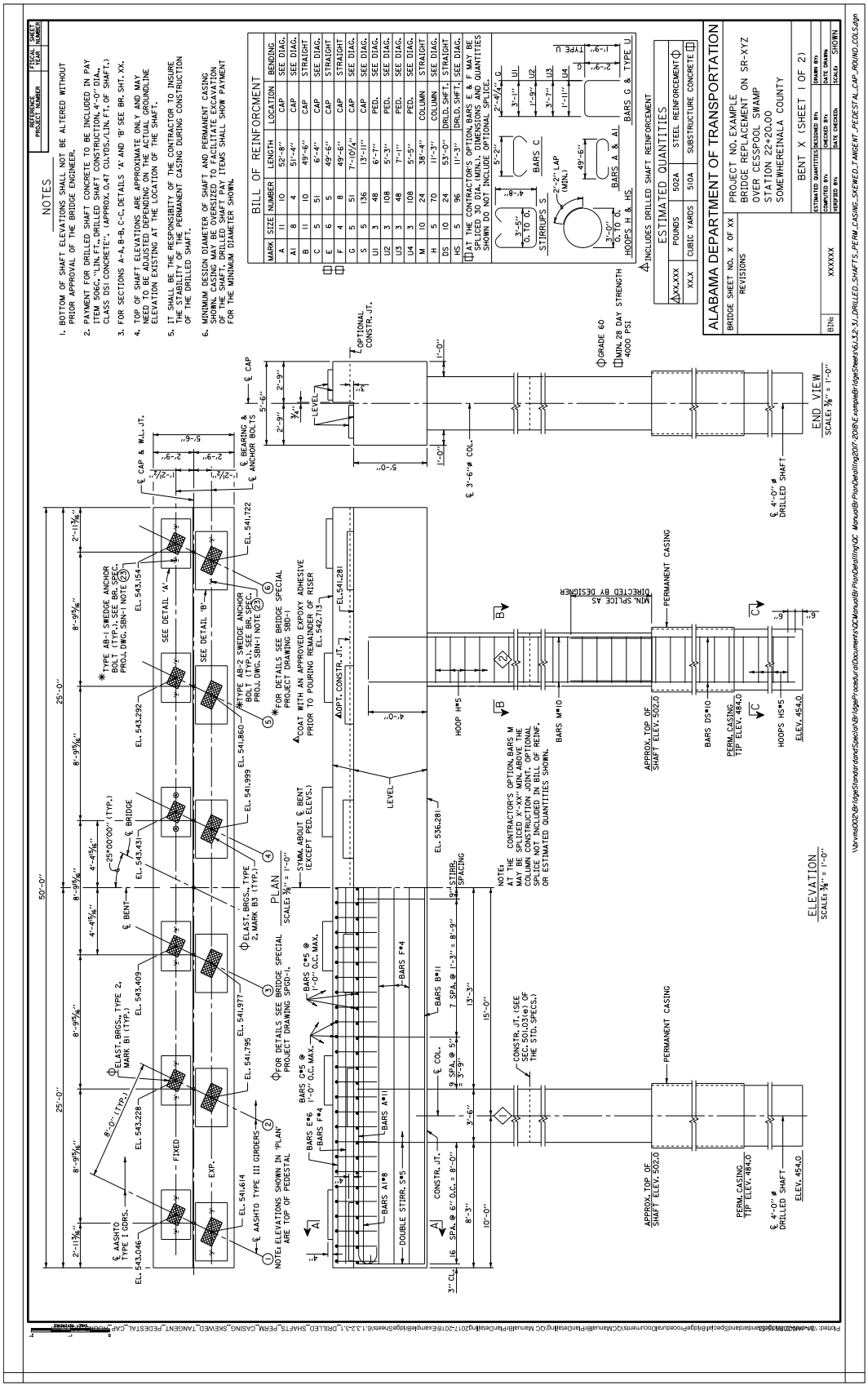
3.2.1 Steel Pile Footings, No Skew, Tangent, Stepped Cap, Rectangular Columns

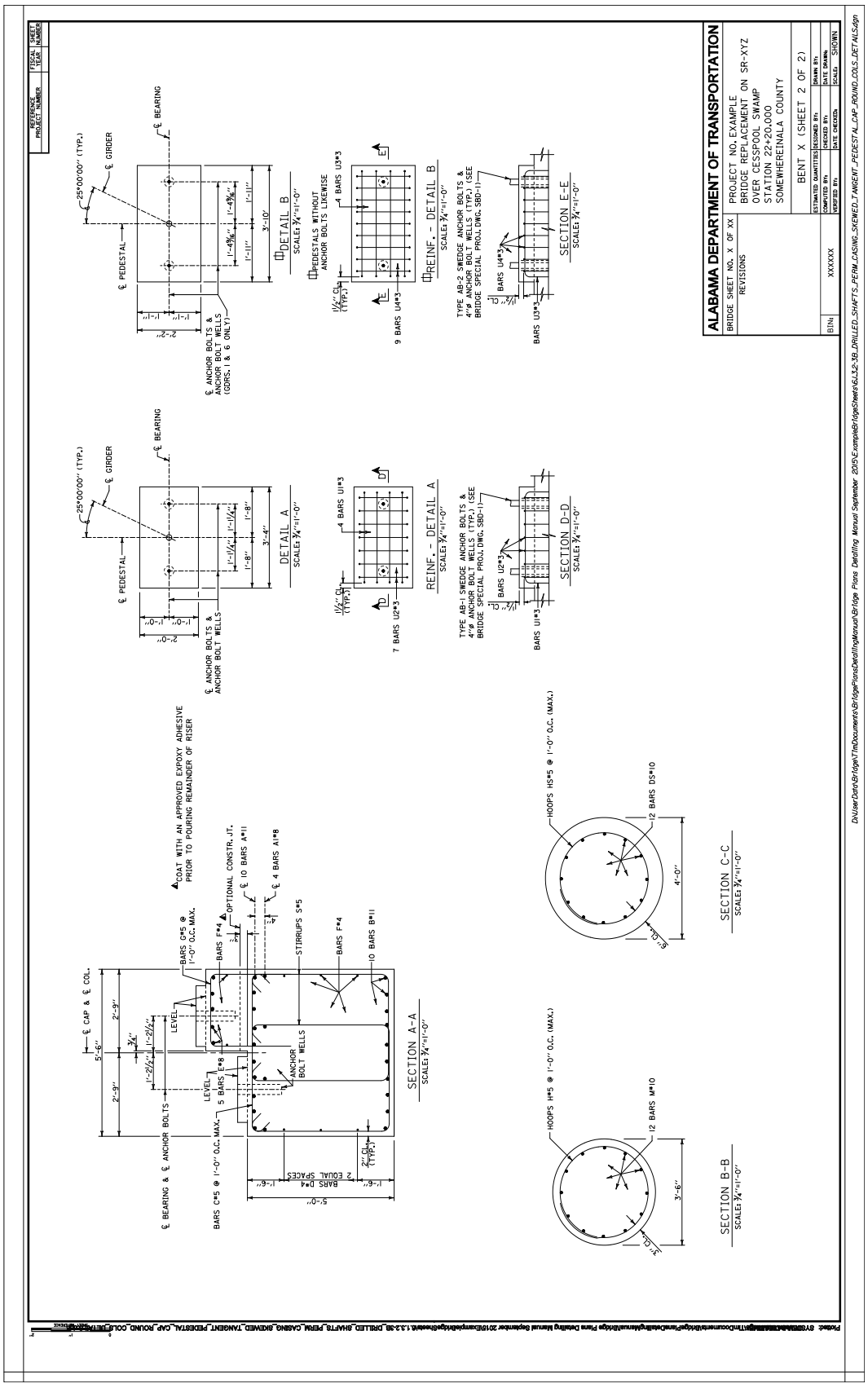


3.2.2 Spread Footings, No Skew, Tangent, Pedestal Cap, Rectangular Columns

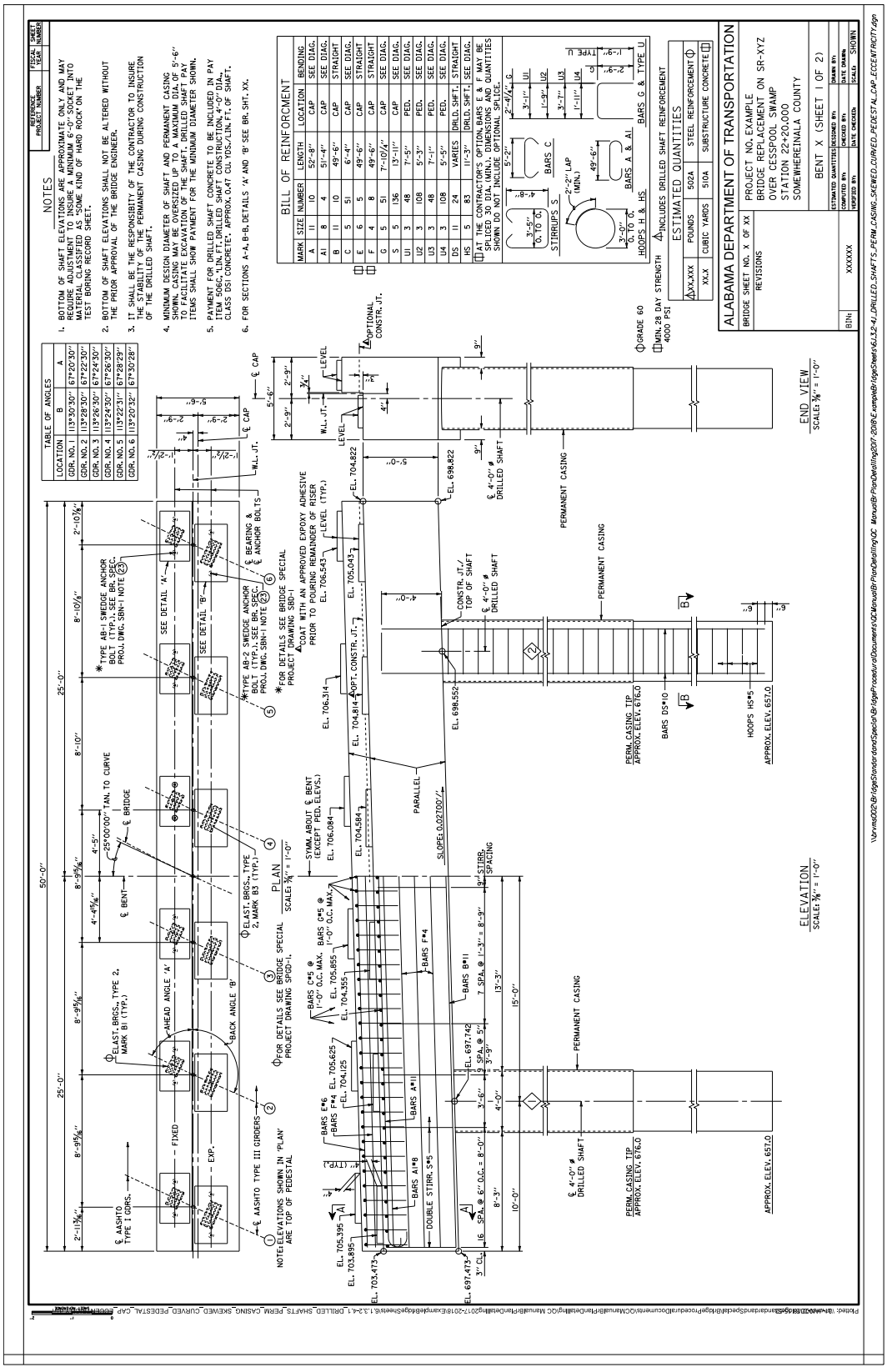


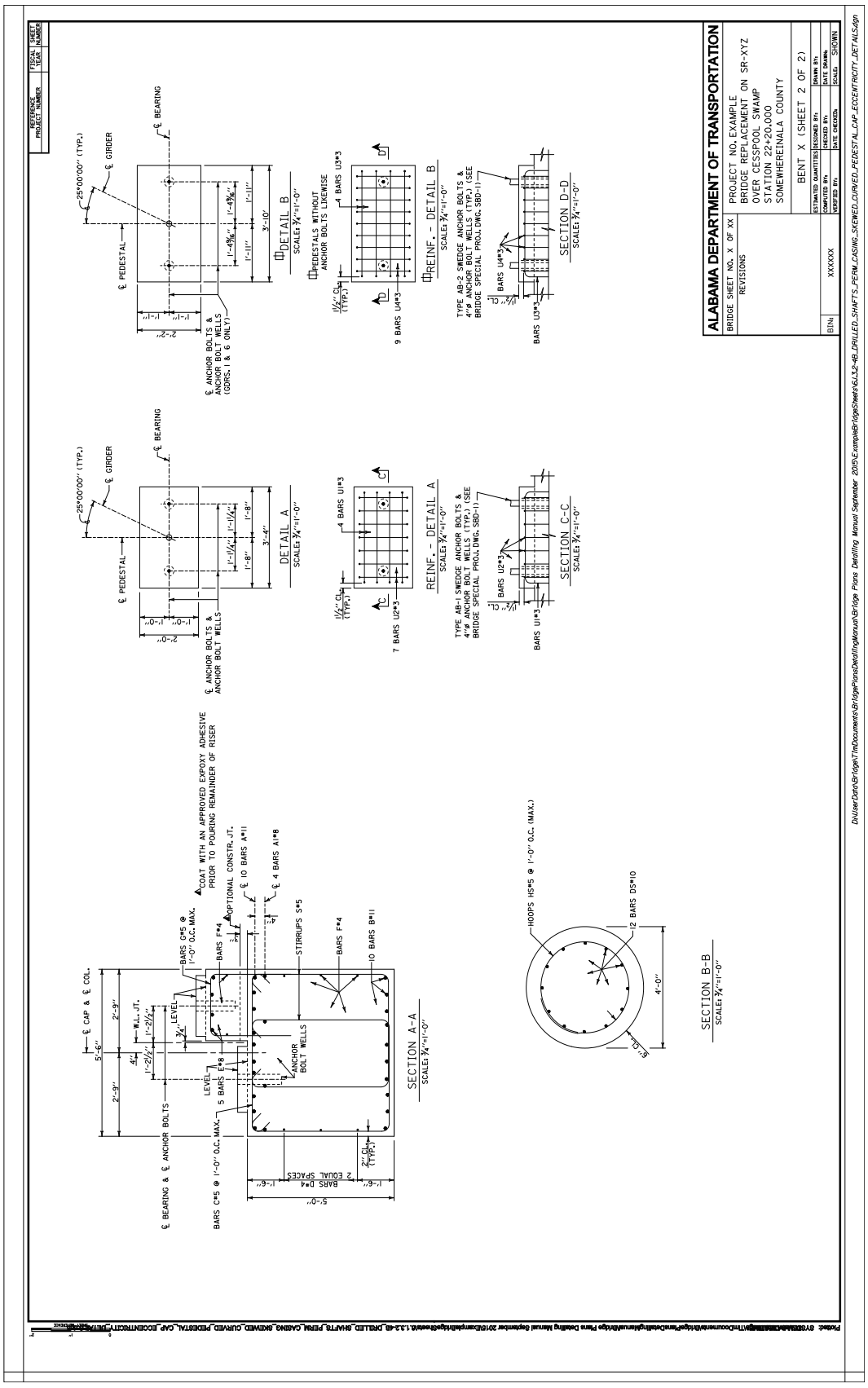
3.2.3 Drilled Shafts, Permanent Casing, Skewed, Tangent, Pedestal Cap, Cap Riser, (2 Sheets)



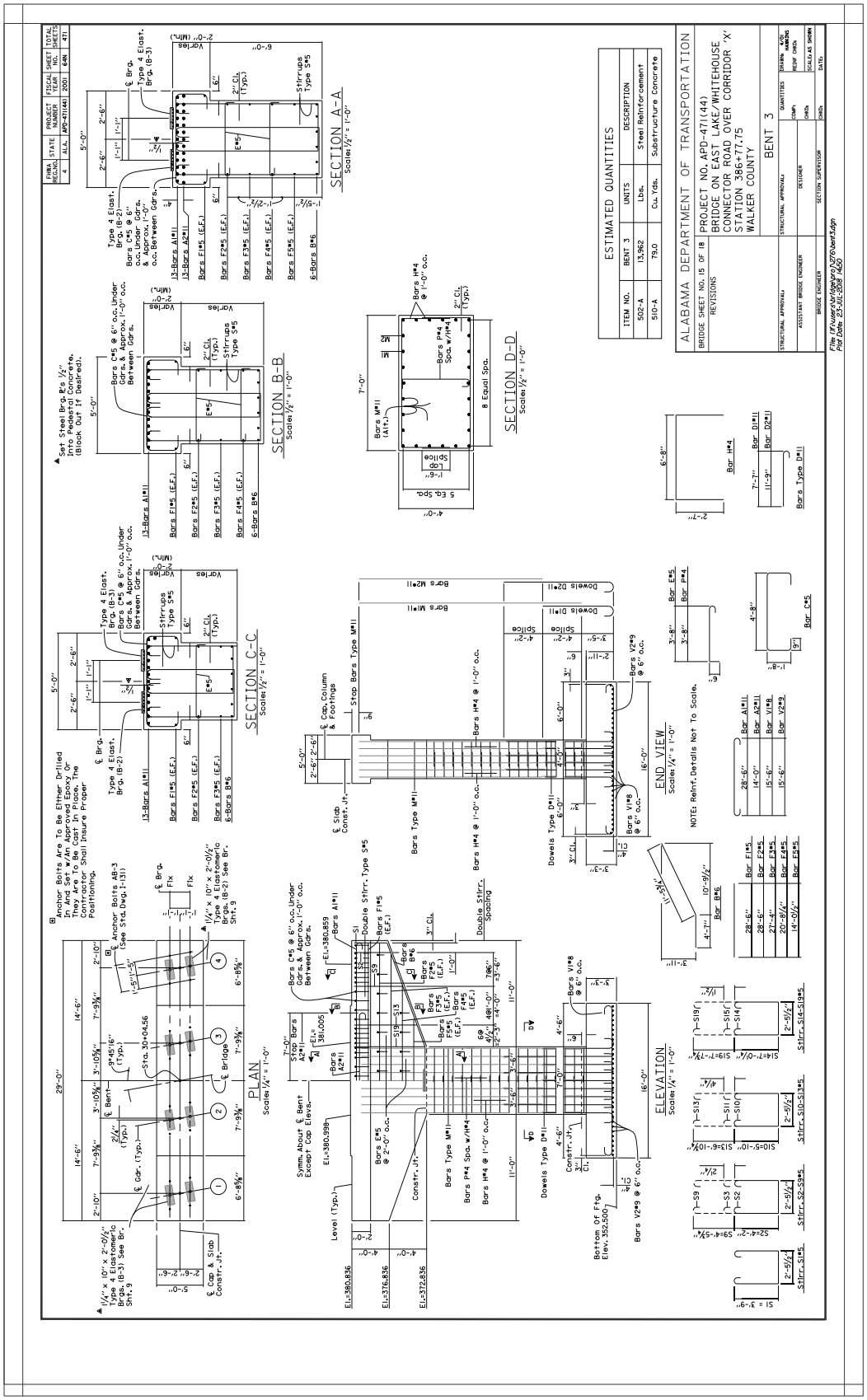

ALABAMA DEPARTMENT OF TRANSPORTATION
BRIDGE SHEET NO. X OF XX
REVISIONS
PROJECT NO. EXAMPLE
BRIDGE REPLACEMENT ON SR-XYZ
OVER CESSPOOL SWAMP
STATION 22+20.000
SOMEWHEREINALA COUNTY
BENT X (SHEET 2 OF 2)
ESTIMATED QUANTITIES
DESIGNED BY:
DRAWN BY:
CHECKED BY:
DATE DRAWN:
COMPUTED BY:
VERIFIED BY:
DATE CHECKED
SCALE: SHOWN
BIN: XXXXXX
REFERENCE PROJECT NUMBER
FISCAL YEAR
SHEET NUMBER
DETAIL B
DETAIL A
REINF. - DETAIL B
REINF. - DETAIL A
SECTION E-E
SECTION D-D
SECTION A-A
SECTION B-B
SECTION C-C
PEDESTALS WITHOUT ANCHOR BOLTS LIKEWISE
TYPE AB-2 SWEDGE ANCHOR BOLTS & 4"ø ANCHOR BOLT WELLS (TYP.) (SEE BRIDGE SPECIAL PROJ. DWG. SBD-1)
TYPE AB-1 SWEDGE ANCHOR BOLTS & 4"ø ANCHOR BOLT WELLS (TYP.) (SEE BRIDGE SPECIAL PROJ. DWG. SBD-1)
COAT WITH AN APPROVED EXPOXY ADHESIVE PRIOR TO POURING REMAINDER OF RISER
OPTIONAL CONSTR. JT.
STIRRUPS S#5
ANCHOR BOLT WELLS
2 EQUAL SPACES
12 BARS M#10
12 BARS D5#10
HOOPS H#5 @ 1'-0" O.C. (MAX.)
BARS C#5 @ 1'-0" O.C. MAX.
BARS D#4
BARS F#4
10 BARS B#11
4 BARS A#8
10 BARS A#11
5 BARS E#8
℄ BEARING & ℄ ANCHOR BOLTS
℄ CAP & ℄ COL.
℄ PEDESTAL
℄ GIRDER
℄ BEARING
℄ ANCHOR BOLTS & ANCHOR BOLT WELLS (GDRS. 1 & 6 ONLY)
25°00'00" (TYP.)
9 BARS U4#3
7 BARS U2#3
4 BARS U1#3
BARS U3#3
BARS U4#3
BARS U2#3
BARS U1#3

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

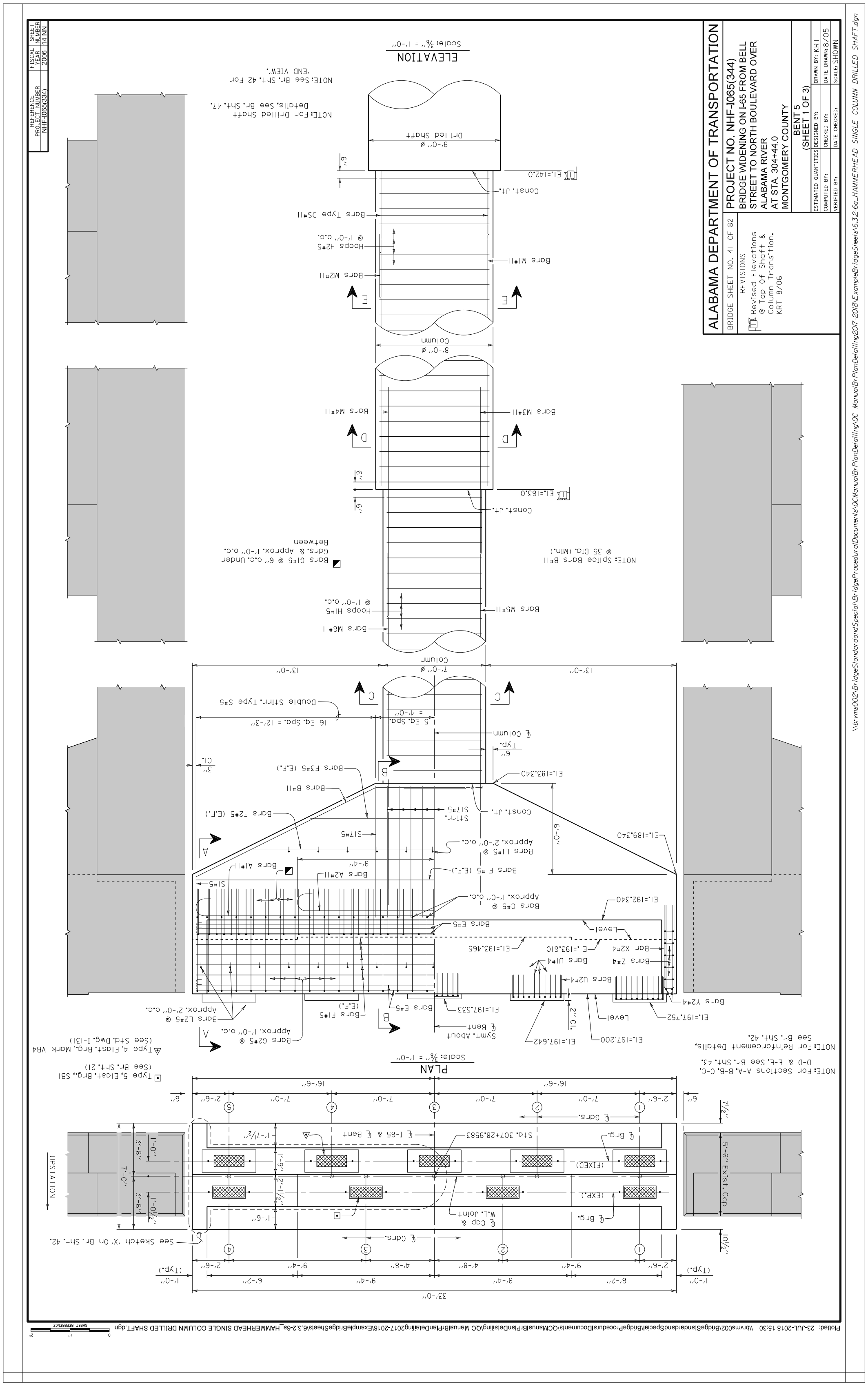


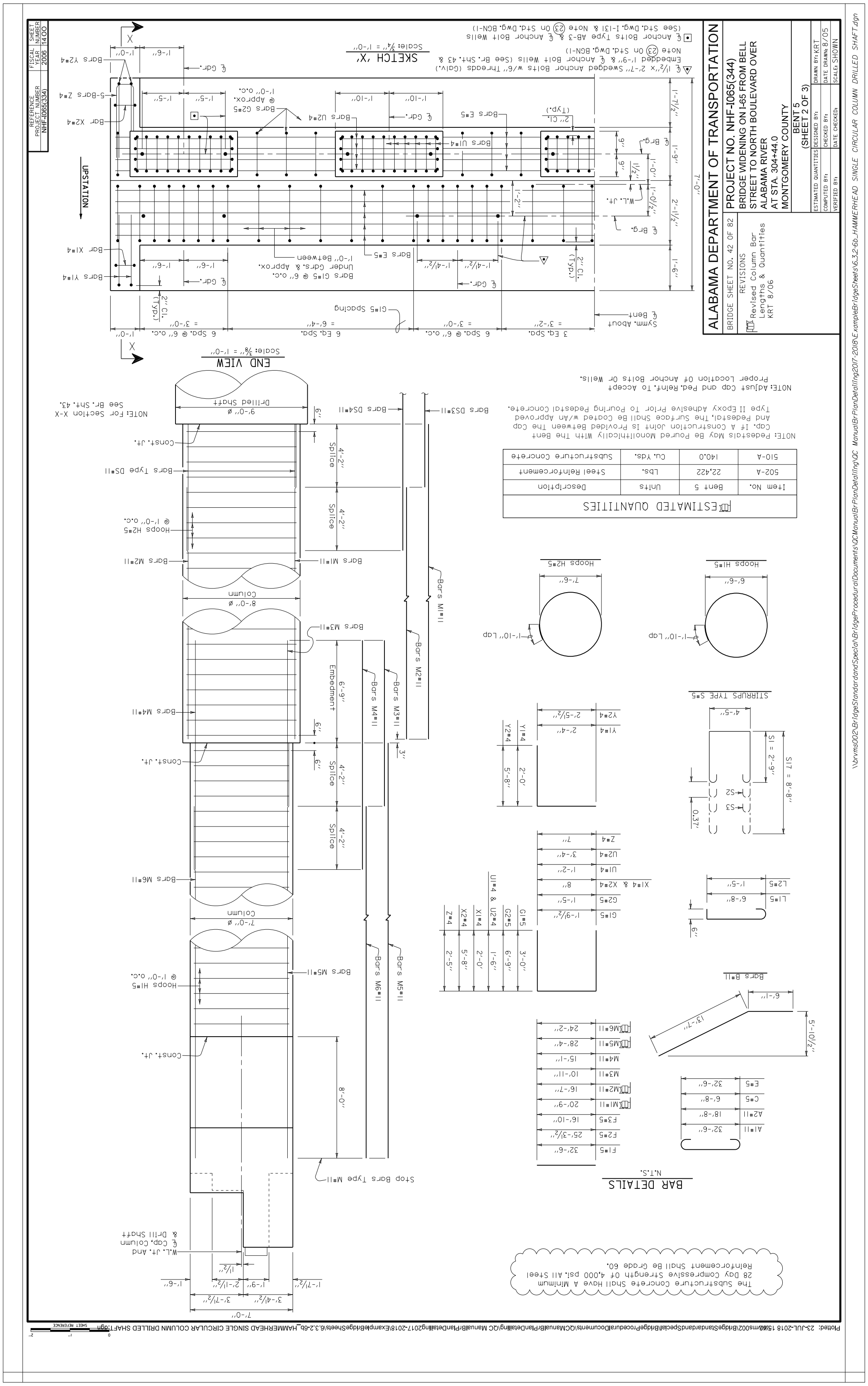

ALABAMA DEPARTMENT OF TRANSPORTATION
PROJECT NO. EXAMPLE
BRIDGE REPLACEMENT ON SR-XYZ
OVER CESSPOOL SWAMP
STATION 22+20.000
SOMEWHEREINALA COUNTY
BENT X (SHEET 2 OF 2)
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
DETAIL A
DETAIL B
REINF. - DETAIL A
REINF. - DETAIL B

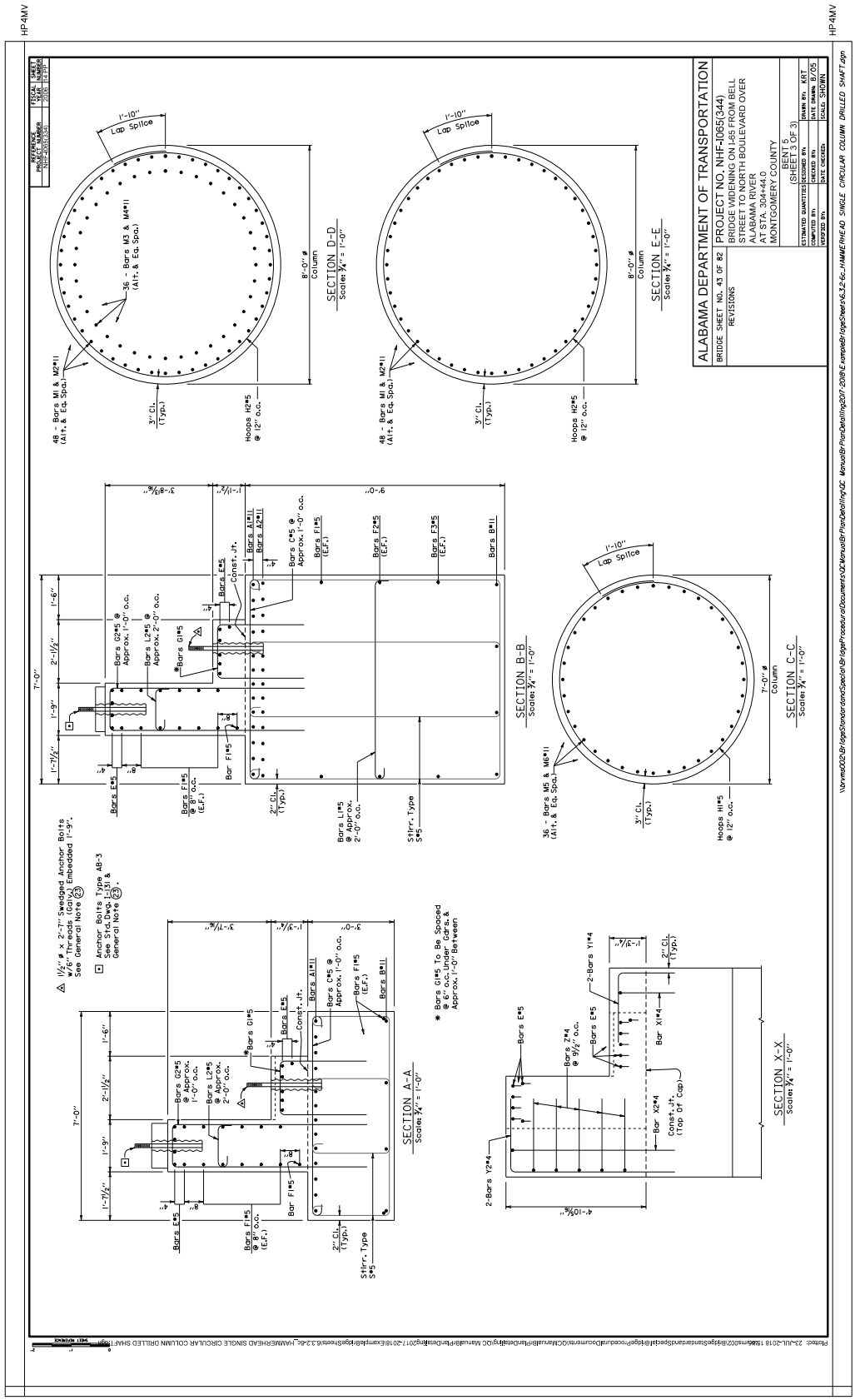
3.2.5 Hammerhead w/Single Rectangular Column w/Spread Footings



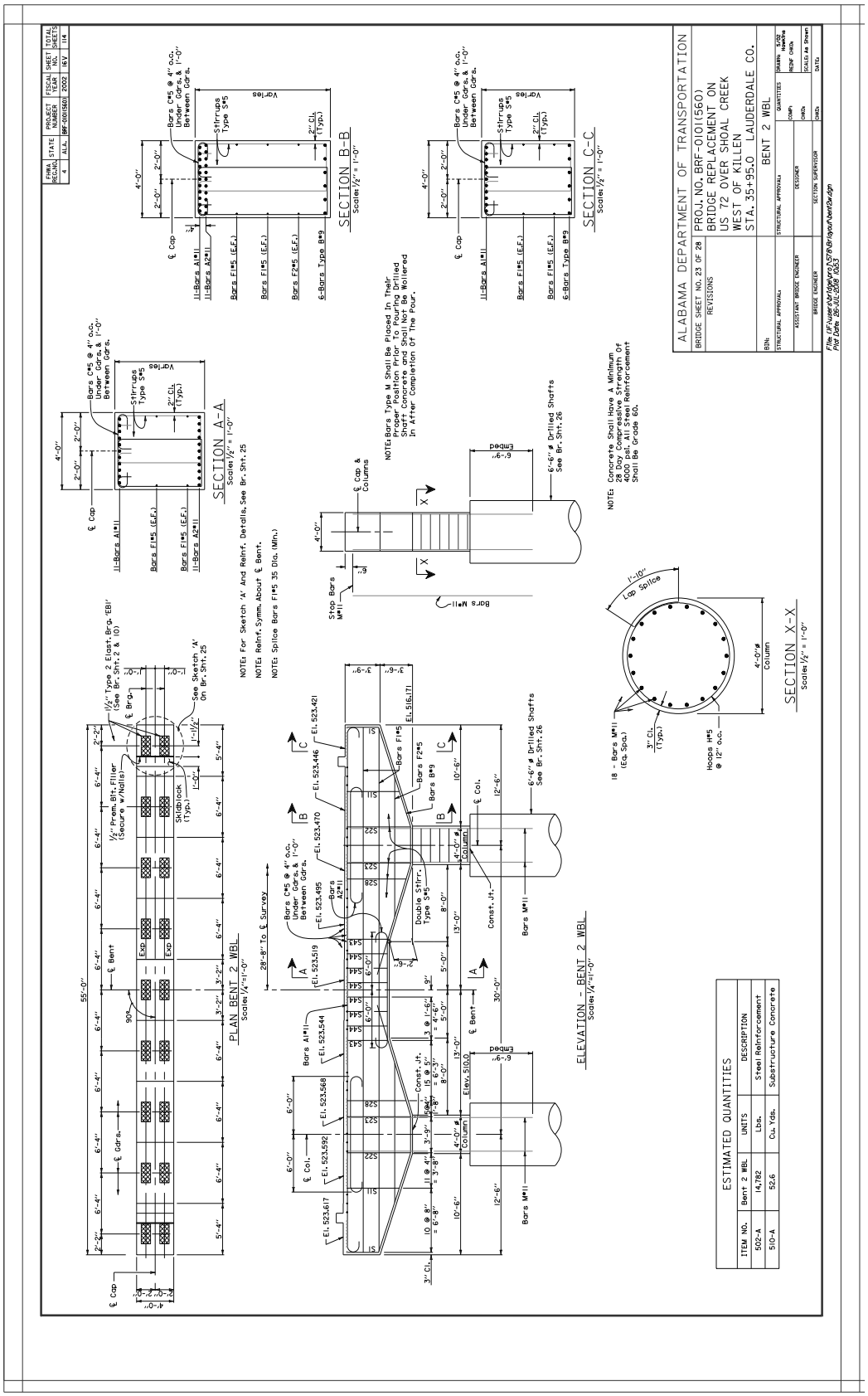
3.2.6 Hammerhead w/Single Round Column-Drilled Shaft (3 Sheets)

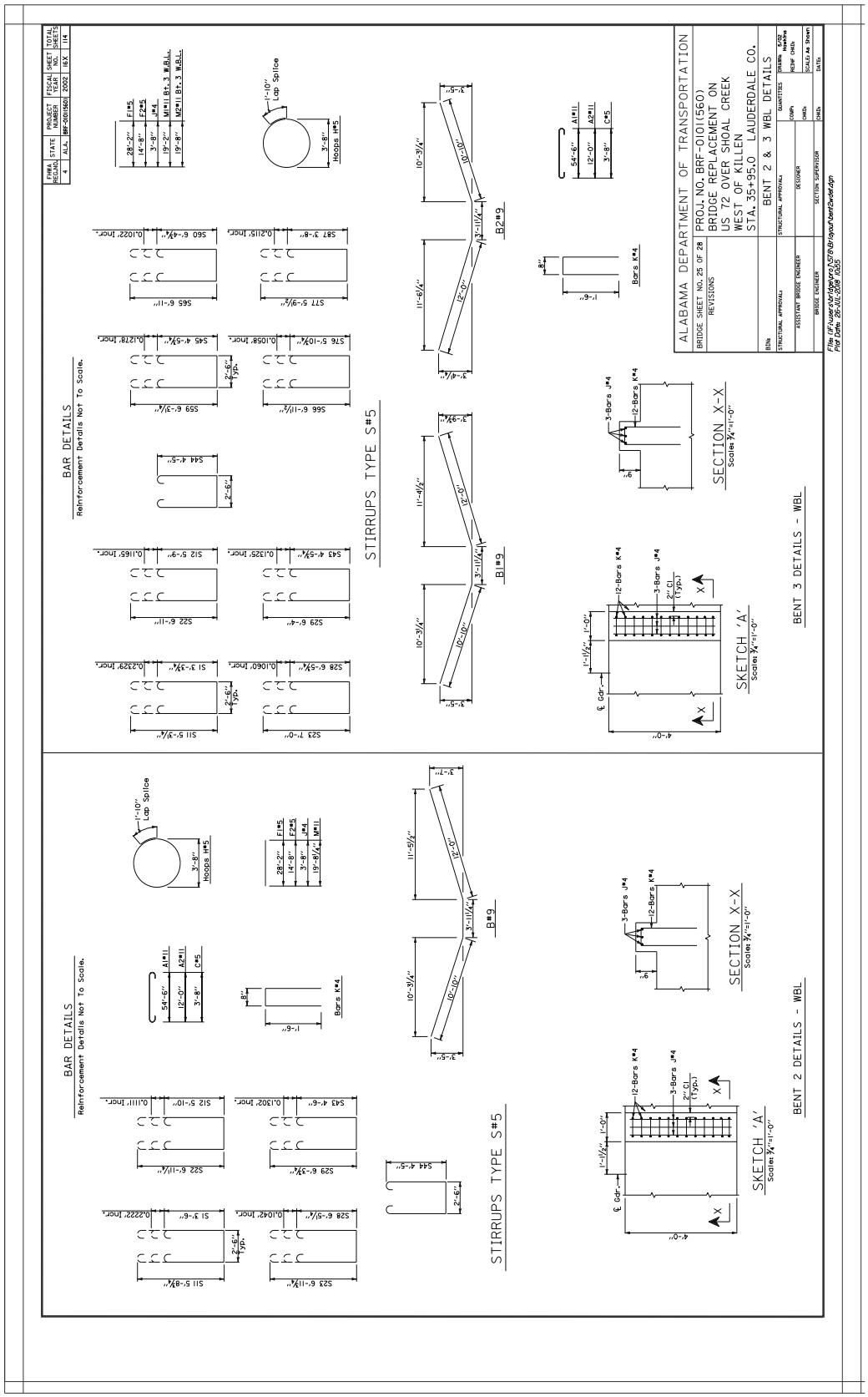



ALABAMA DEPARTMENT OF TRANSPORTATION
PROJECT NO. NHF-I065(344)
BRIDGE WIDENING ON I-65 FROM BELL STREET TO NORTH BOULEVARD OVER ALABAMA RIVER
AT STA. 304+44.0
MONTGOMERY COUNTY
BENT 5
(SHEET 2 OF 3)
BRIDGE SHEET NO. 42 OF 82
ESTIMATED QUANTITIES
BAR DETAILS
END VIEW
SKETCH 'X'

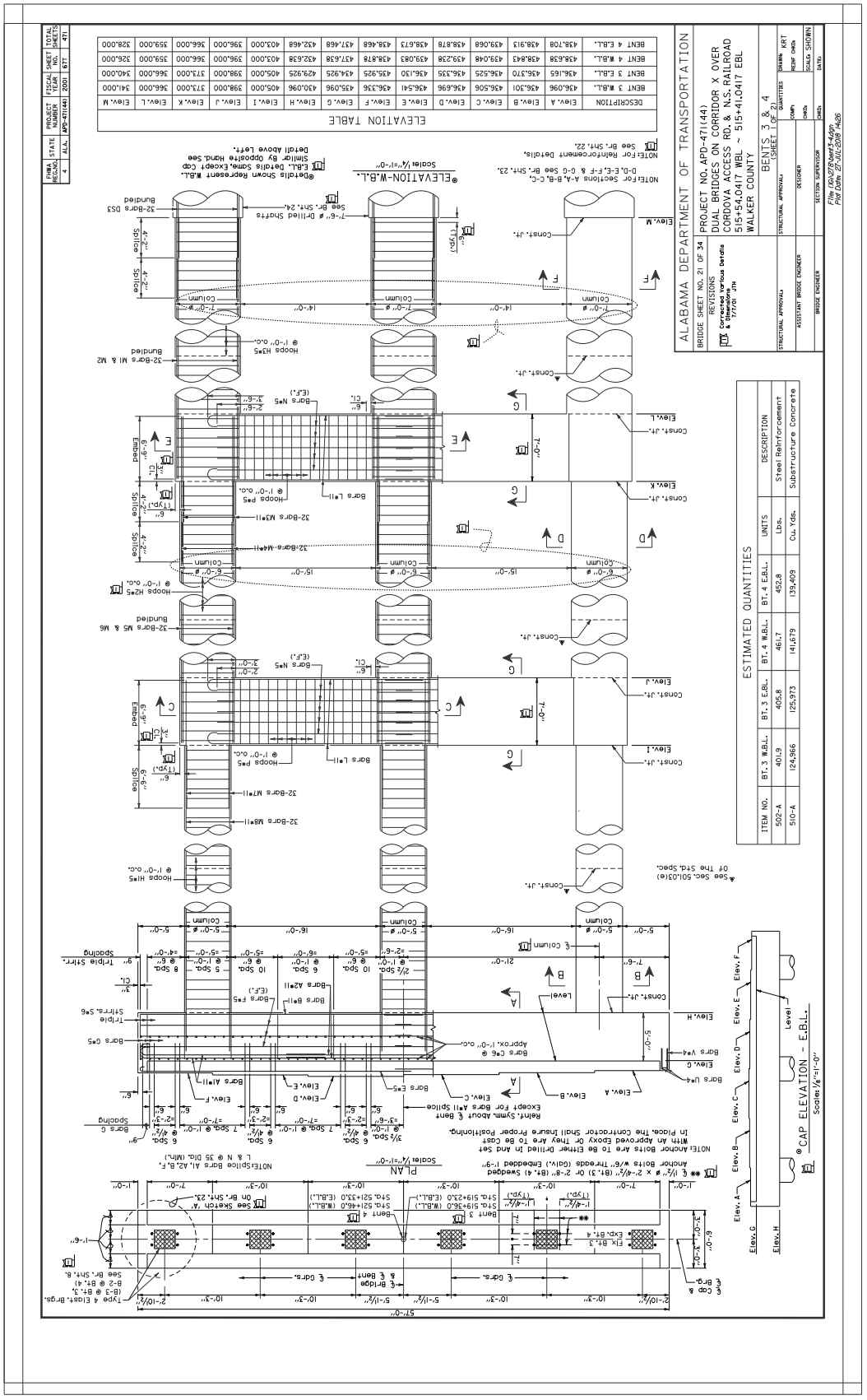

ALABAMA DEPARTMENT OF TRANSPORTATION
PROJECT NO. NHF-1065(344)
BRIDGE WIDENING ON I-65 FROM BELL STREET TO NORTH BOULEVARD OVER ALABAMA RIVER
AT STA. 304+44.0
MONTGOMERY COUNTY
BENT 5
(SHEET 3 OF 3)
BRIDGE SHEET NO. 43 OF 82
REVISIONS
SECTION D-D
SECTION E-E
SECTION B-B
SECTION C-C
SECTION A-A
SECTION X-X
Lap Splice
Hoops H#5 @ 12" o.c.
3" Cl. (Typ.)
Stirr. Type S#5
Const. Jt.
Bars E#5
Bars F#5 @ 8" o.c. (E,F,)
Bars L#5 @ Approx. 2'-0" o.c.
Bar F1#5
Bars G#5
Bars G2#5 @ Approx. 1'-0" o.c.
Bars L2#5 @ Approx. 2'-0" o.c.
Bars C#5 @ Approx. 1'-0" o.c.
Bars A1#11
Bars A2#11
Bars F1#5 (E,F,)
Bars F2#5 (E,F,)
Bars F3#5 (E,F,)
Bars B#11
Bars Z#4 @ 9½" o.c.
Bar X1#4
Bar X2#4
Const. Jt. (Top Of Cap)
2-Bars Y1#4
2-Bars Y2#4
* Bars G1#5 To Be Spaced @ 6" o.c. Under Gdrs. & Approx. 1'-0" Between
Anchor Bolts Type AB-3 See Std. Dwg. [illegible] & General Note (23).
1½" ø x 2'-7" Swedged Anchor Bolts w/6" Threads (Qty. 4) Embedded 1'-9". See General Note (23).

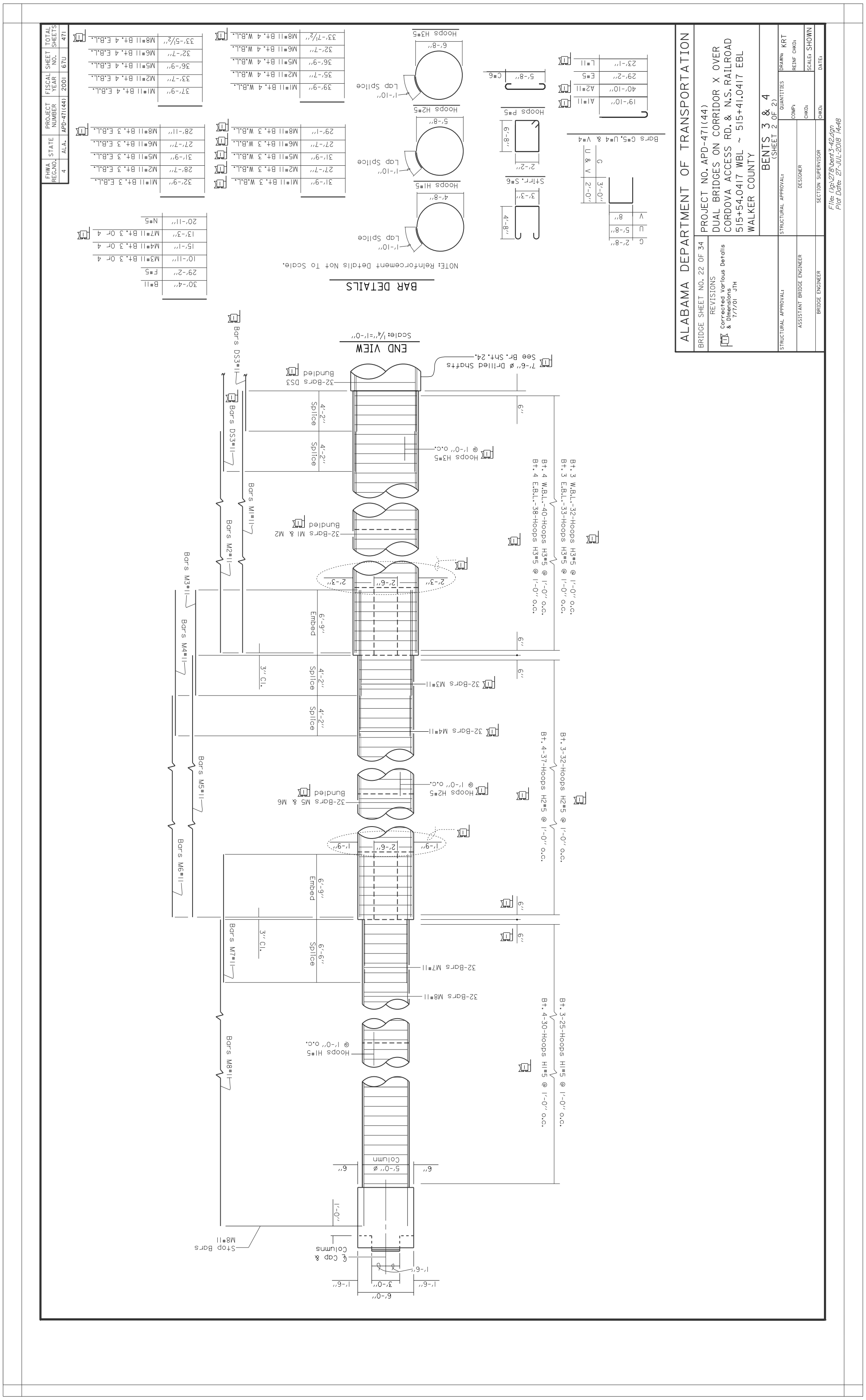
3.2.7 Hammerhead w/Two Circular Column-Drilled Shafts (2 Sheets)

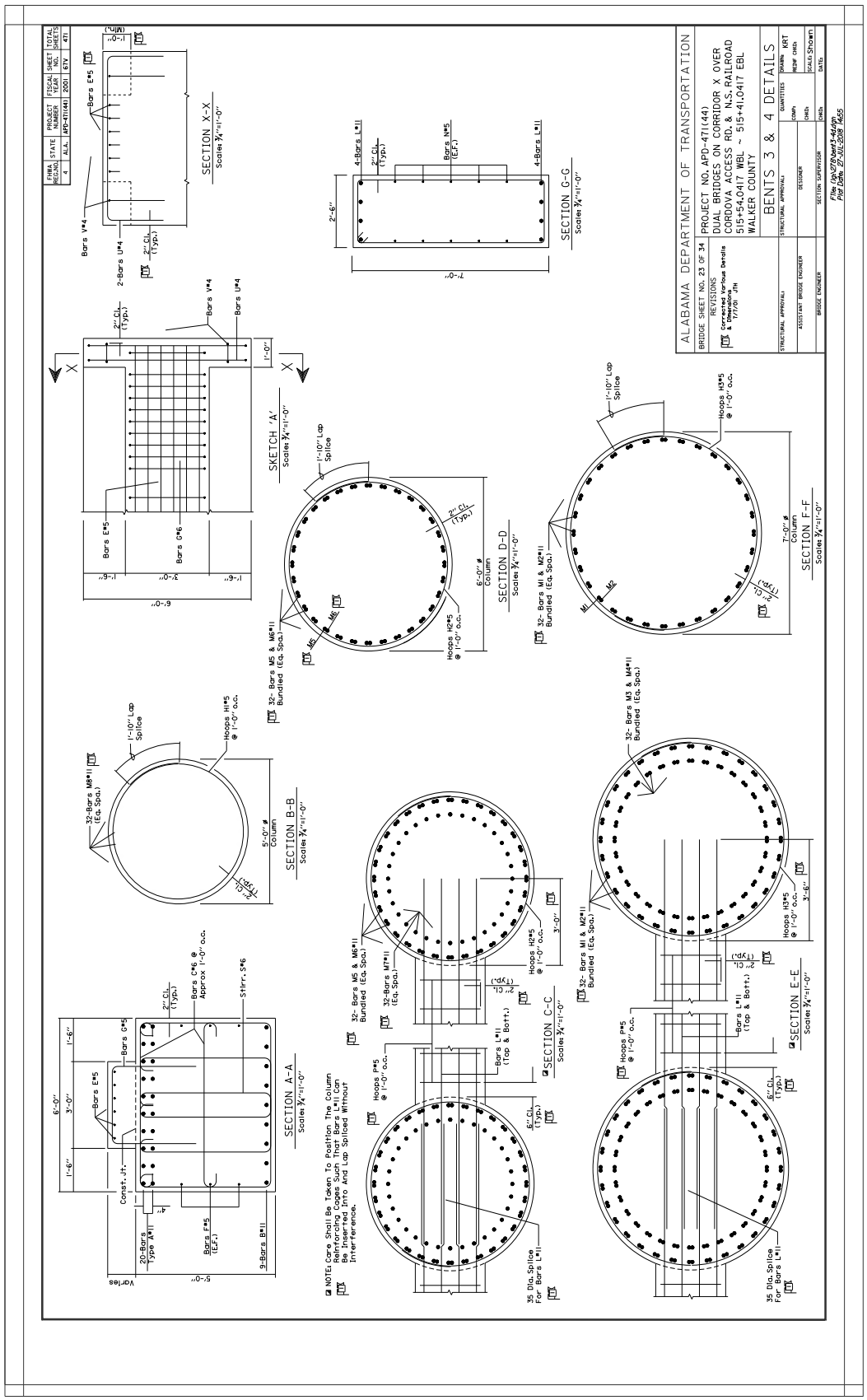



ALABAMA DEPARTMENT OF TRANSPORTATION
PROJ. NO. BRF-0101(560)
BRIDGE REPLACEMENT ON
US 72 OVER SHOAL CREEK
WEST OF KILLEN
STA. 35+95.0 LAUDERDALE CO.
BRIDGE SHEET NO. 25 OF 28
REVISIONS
BENT 2 & 3 WBL DETAILS
BAR DETAILS
Reinforcement Details Not To Scale.
STIRRUPS TYPE S#5
B1#9
B2#9
SECTION X-X
SKETCH 'A'
BENT 3 DETAILS - WBL
BENT 2 DETAILS - WBL
Bars K#4
Hoops H#5
2'-CI (Typ.)
12-Bars K#4
3-Bars J#4

3.2.8 Drilled Shafts, Multi Column, Multi Story, Circular Columns (3 Sheets)




ALABAMA DEPARTMENT OF TRANSPORTATION
PROJECT NO. APD-471(44)
DUAL BRIDGES ON CORRIDOR X OVER
CORDOVA ACCESS RD. & N.S. RAILROAD
515+54.0417 WBL ~ 515+41.0417 EBL
WALKER COUNTY
BENTS 3 & 4
(SHEET 2 OF 2)
BAR DETAILS
NOTE: Reinforcement Details Not To Scale.
END VIEW


ALABAMA DEPARTMENT OF TRANSPORTATION
PROJECT NO. APD-47(144)
DUAL BRIDGES ON CORRIDOR X OVER
CORDOVA ACCESS RD. & N.S. RAILROAD
515+54.0417 WBL ~ 515+41.0417 EBL
WALKER COUNTY
BENTS 3 & 4 DETAILS
BRIDGE SHEET NO. 23 OF 34
REVISIONS
Corrected Various Details & Dimensions 1/1/20 - JH
FINAL PLANS 4
STATE ALA.
PROJECT NUMBER APD-47(144)
FISCAL YEAR 2001
SHEET NO. 67V
TOTAL SHEETS 471
SECTION X-X
SECTION G-G
SKETCH 'A'
SECTION D-D
SECTION F-F
SECTION B-B
SECTION A-A
SECTION C-C
SECTION E-E
Bars V#4
2-Bars U#4
Bars E#5
Bars G#6
Bars M#5 (E.F.)
4-Bars L#11
Bars G#5
Bars C#6 @ Approx 1'-0" o.c.
Stirr. S#6
Const. Jt.
20-Bars Type A#11
Bars F#5 (E.F.)
9-Bars B#11
Varies
32-Bars M8#11 (Eq. Spa.)
32- Bars M5 & M6#11 Bundled (Eq. Spa.)
32- Bars M1 & M2#11 Bundled (Eq. Spa.)
32- Bars M3 & M4#11 Bundled (Eq. Spa.)
32-Bars M7#11 (Eq. Spa.)
Hoops H#5 @ 1'-0" o.c.
Hoops H2#5 @ 1'-0" o.c.
Hoops H3#5 @ 1'-0" o.c.
Hoops P#5 @ 1'-0" o.c.
1'-10" Lap Splice
2" Cl. (Typ.)
6" Cl. (Typ.)
5'-0" ø Column
6'-0" ø Column
7'-0" ø Column
35 Dia. Splice For Bars L#11
Bars L#11 (Top & Bott.)
NOTE: Care Shall Be Taken To Position The Column Reinforcing Cages Such That Bars L#11 Can Be Placed Into And Lap Spliced Without Interference.