

Appendix A – Test Girder Drawings

Total prestress is based on 72.6% f_s , $f_s = 270$ ksi and $A_s = 0.217$ in²

All prestressing strands shall conform to ASTM A416 Grade 270 Low Relaxation Strands

All beams are to be increased in length to compensate for elastic shortening, creep, and shrinkage

All concrete strengths shall not be greater than 1,000 psi greater than the specified concrete strength

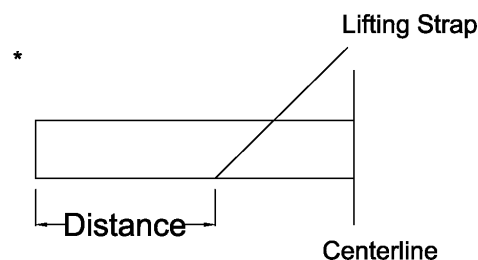
Rebar dimensions are taken from edge to edge, not centerline to centerline

Cracking will be detrimental to the girders, therefore girders shall be lifted at the points described in the Lifting points as measured from end of girder table

12 modulus of rupture cylinders shall be cast per girder and cured with the girder

Precaster provides girders, girder reinforcement (including hooks), and test cylinders (deck and deck reinforcement are not to be provided by the precaster)

Lifting points as measured from end of girder	
Girder	Distance* (ft)
A34	13
BTC 60	20
BTE 70	25



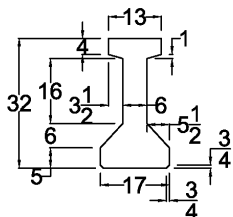
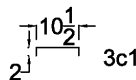
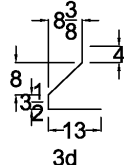
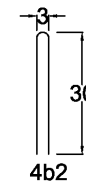
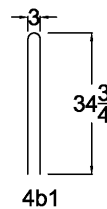
NCHRP 12-94	Cover Page		Dr. Sri Sritharan <small>Principal Investigator</small>	<small>BRIDGE NO.</small> —	05-05-2015						
				<small>POST MILES</small> —	Test Units						
				<small>DISREGARD PRINTS BEARING EARLIER REVISION DATES</small>	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;"><small>REVISION DATES (PRELIMINARY STAGE ONLY)</small></td> <td style="text-align: center;"><small>SHEET</small></td> <td style="text-align: center;"><small>OF</small></td> </tr> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> </table>	<small>REVISION DATES (PRELIMINARY STAGE ONLY)</small>	<small>SHEET</small>	<small>OF</small>	X	1	1
<small>REVISION DATES (PRELIMINARY STAGE ONLY)</small>	<small>SHEET</small>	<small>OF</small>									
X	1	1									

Figure A.1 – RC and Pretensioned Girder Drawing Cover Page

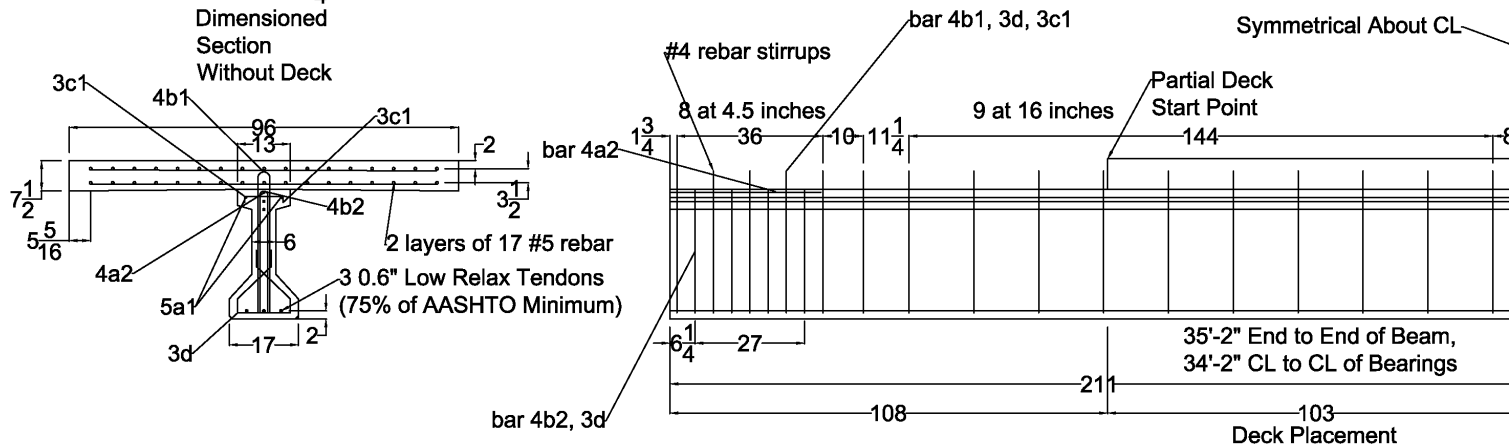
A 34 Specimen (75% AASHTO)
 Use a minimum 28 day concrete
 compressive strength of 6,000 psi
 All units are in inches

Reinforcing Bar List		
Bar	Shape	Number
5a1		2
4a2		2
4b1		32
4b2		8
3c1		32
3d		80

5a1 length: 34'-11"
 4a2 length: 3'-3"



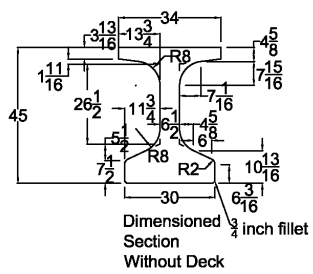
Dimensioned Section Without Deck



NCHRP 12-94	A34 Test Unit	Dr. Sri Sritharan Principal Investigator	DESIGN NO.	05-05-2015
			POST TITLE	Test Units
			DATE REVISIONS	
DESIGNED BY			REVIEW DATE (PRELIMINARY/ETAC ONLY)	SHEET OF
EARLIER REVISION DATES			X	1

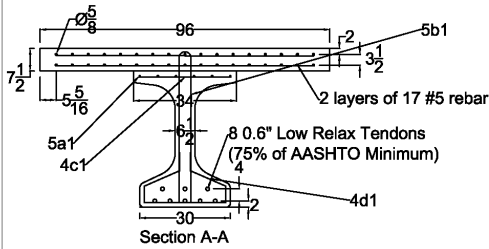
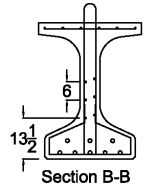
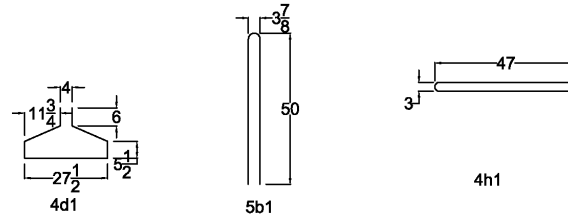
Figure A.2 – A34 Test Unit Details

BTC 60 Specimen (75% AASHTO)
 Use a minimum 28 day concrete
 compressive strength of 6,000 psi
 All units are in inches

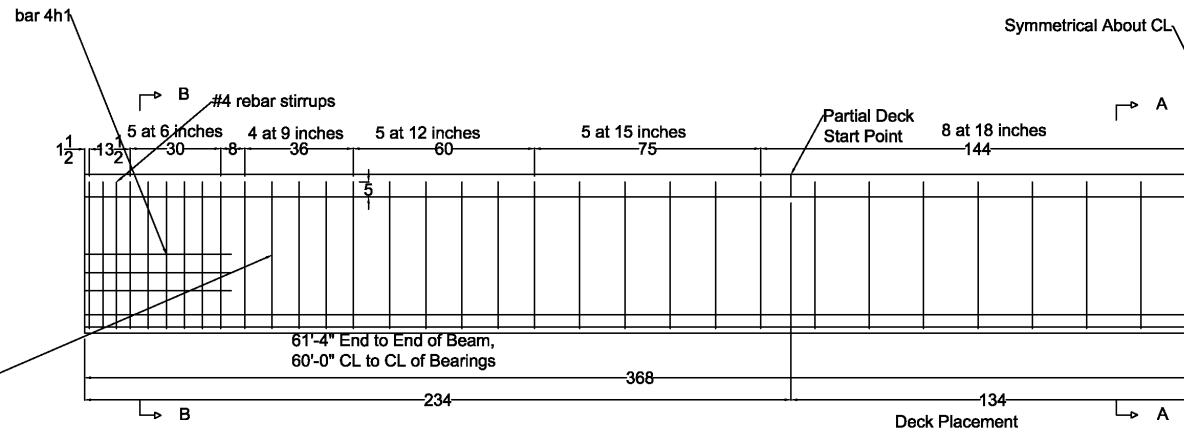


Reinforcing Bar List		
Bar	Shape	Number
5a1		12
5b1		62
4c1		77
4d1		63
4h1		6

5a1 has a length of 31'-8"
 4c1 has a length of 2'-7"



bar 4d1, 4c1, 5b1



NCHRP 12-94	BTC 60 Test Unit		Dr. Sri Sritharan <small>Principal Investigator</small>	BRIDGE NO.	05-05-2015
				PORT MILES	Test Units
				DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY)
				X	2

Figure A.3 – BTC 60 Test Unit Details

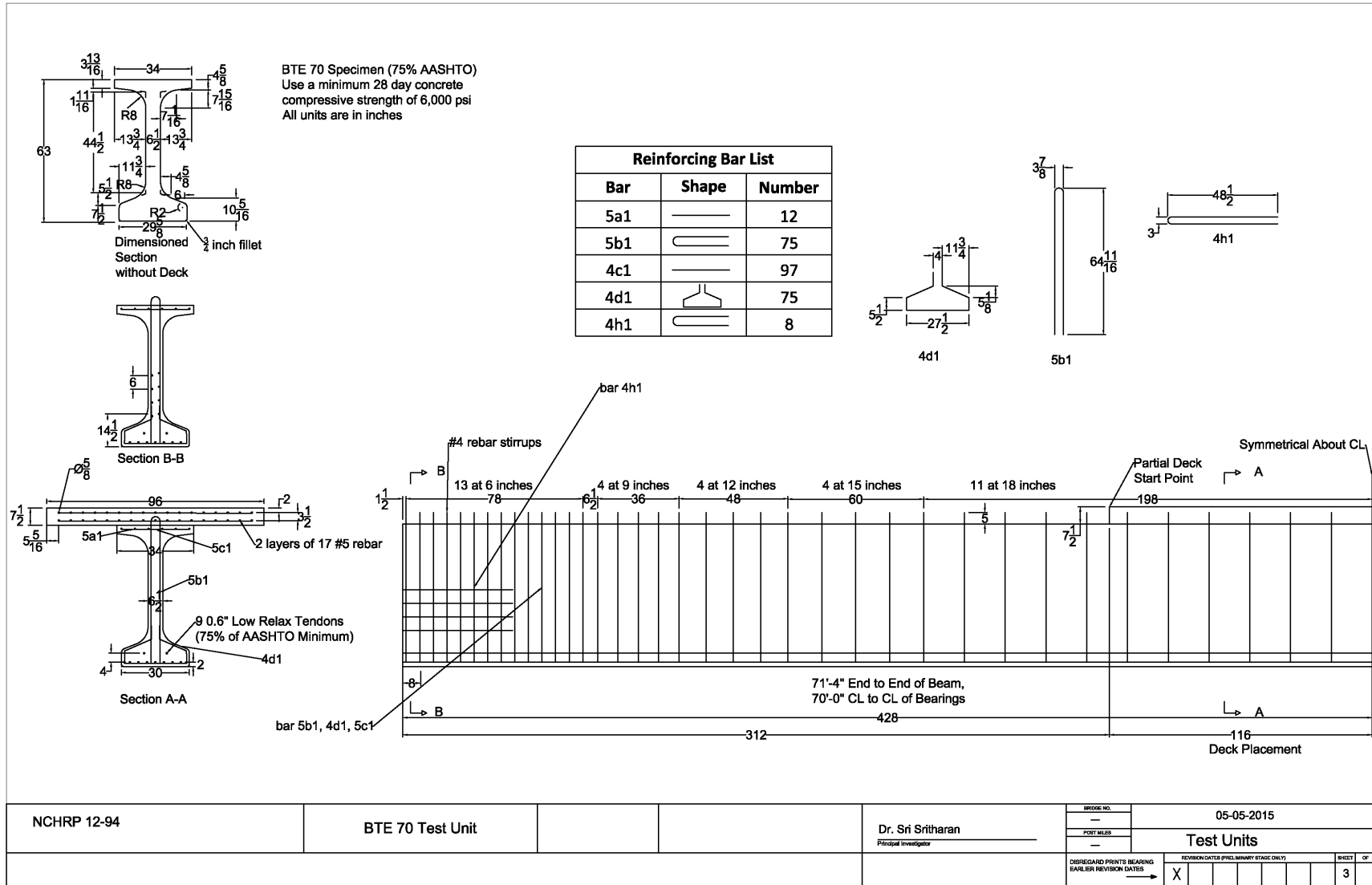


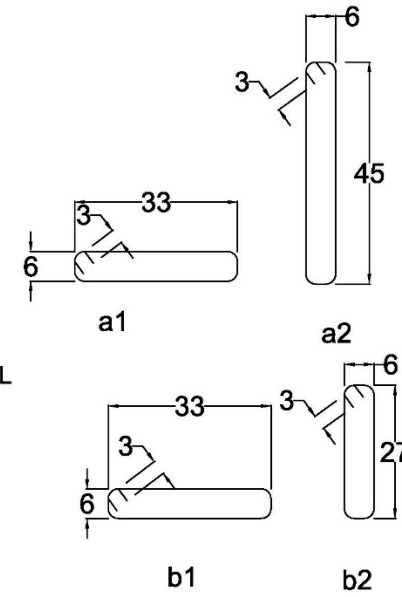
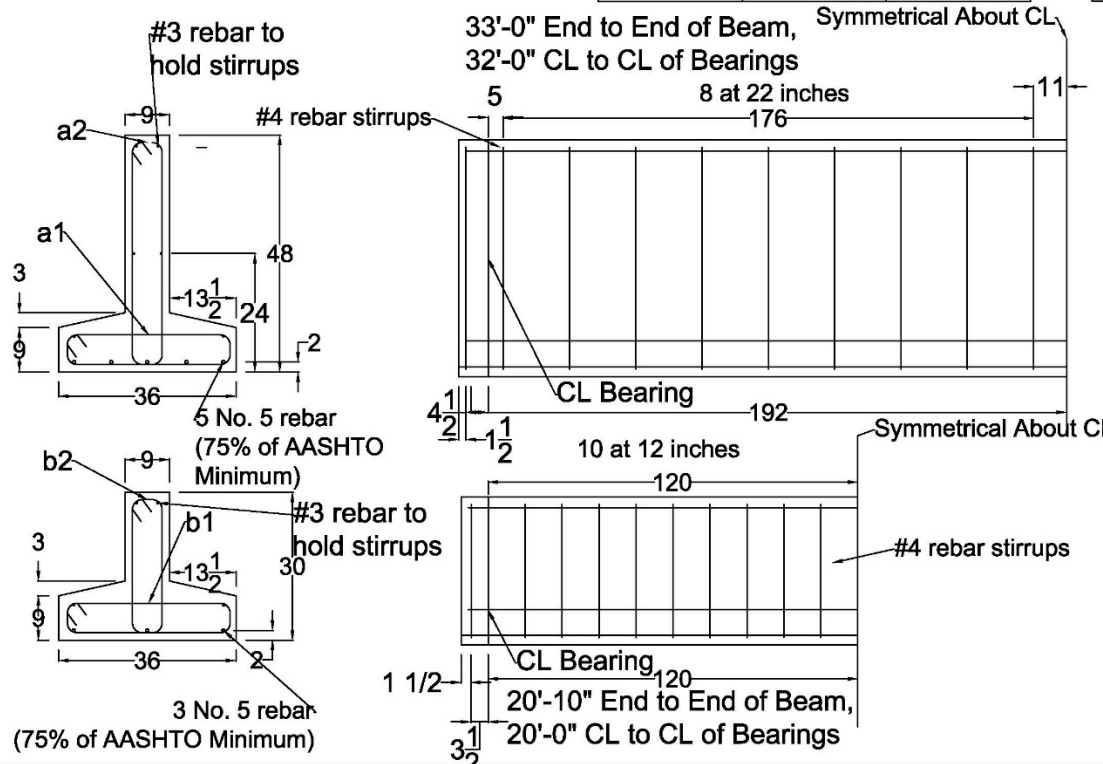
Figure A.4 – BTE 70 Test Unit Details

BRIDGE NO.	05-05-2015
POST RELEASE	Test Units
REVISION DATES (PANEL NUMBER, STAGE ONLY)	
DISREGARD PRINTS BEARING EARLIER REVISION DATES	X
SHEET OF	3

Inverted Tee Specimens (75% AASHTO)
 Use a minimum 28 day concrete compressive strength of 5,000 psi
 All units are in inches

Large Inverted Tee		
Reinforcing Bar List		
Bar	Shape	Number
a1		20
a2		20

Small Inverted Tee		
Reinforcing Bar List		
Bar	Shape	Number
b1		23
b2		23



NCHRP 12-94	RC Inverted Tee Test Units	Dr. Sri Sritharan Principal Investigator	05-05-2015
			Test Units
			DISREGARD PRINTS BEARING CAPABLES REVISED DATES
			REVISION DATES (PRELIMINARY STAGE ONLY)
			SHEET 5 OF 5

Figure A.5 – Large and Small Inverted Tee Test Unit Details

Sheet List	
Sheet Number	Sheet Name
01	GENERAL NOTES
02	REBAR DETAILS
03	SEGMENTAL BEAMS
04	UNB1 TYPICAL SEGMENT
05	UNB1 END BLOCK
06	UNB1 DEVIATOR
07	UNB2 TYPICAL SEGMENT
08	UNB2 END BLOCK
09	UNB2 DEVIATOR
10	UNB3 TYPICAL SEGMENT
11	UNB3 END BLOCK
12	UNB3 DEVIATOR
13	BON2 TYPICAL SEGMENT
14	BON2 END BLOCK
15	DEVIATOR DETAILS
16	DEVIATOR SEGMENT ISOMETRIC
17	SHEAR & ALIGNMENT KEY DETAILS
18	SHEAR & ALIGNMENT KEY DETAILS 2

General Notes

All reinforcement bars are #4 unless noted otherwise.

The clear cover is 1 inch unless noted otherwise.

For UNB1 and UNB2 the maximum aggregate size is 1/2 inch. For UNB3 and BON2 the maximum aggregate size is 3/4 inch.

No concrete will enter the ducts during the pouring of the segments.

The 28 day compressive strength of the concrete will be at least 6 ksi and not more than 7 ksi.

The mild reinforcement used in the segments is A615 Grade 60 steel.

All transverse sections are symmetrical about their centerlines.

Short reinforcement bars may be placed to secure the tendon ducts.

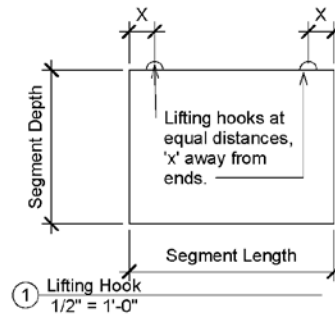
Concrete will have a compressive strength of at least 2.5 ksi before the forms are stripped (AASHTO 5.14.2.4.2).

In addition to the needs of the precaster, provide 18 - 4x8 inch cylinders and 4 - 6 inch x 6 inch x 36 inch modulus of rupture beams for each pour.

All anchorage systems are Multiplane Anchorage from DSI. UNB1: use two 5-0.6". UNB2: Use two 7-0.6". UNB3: Use two 9-0.5". BON2: Use 12-0.5".

The segments will be match cast to ensure proper geometric placement during testing.

Provide lifting hooks at equal distance longitudinally from the center of the segments. (See detail below)



IOWA STATE UNIVERSITY

GENERAL NOTES

NCHRP
12-94

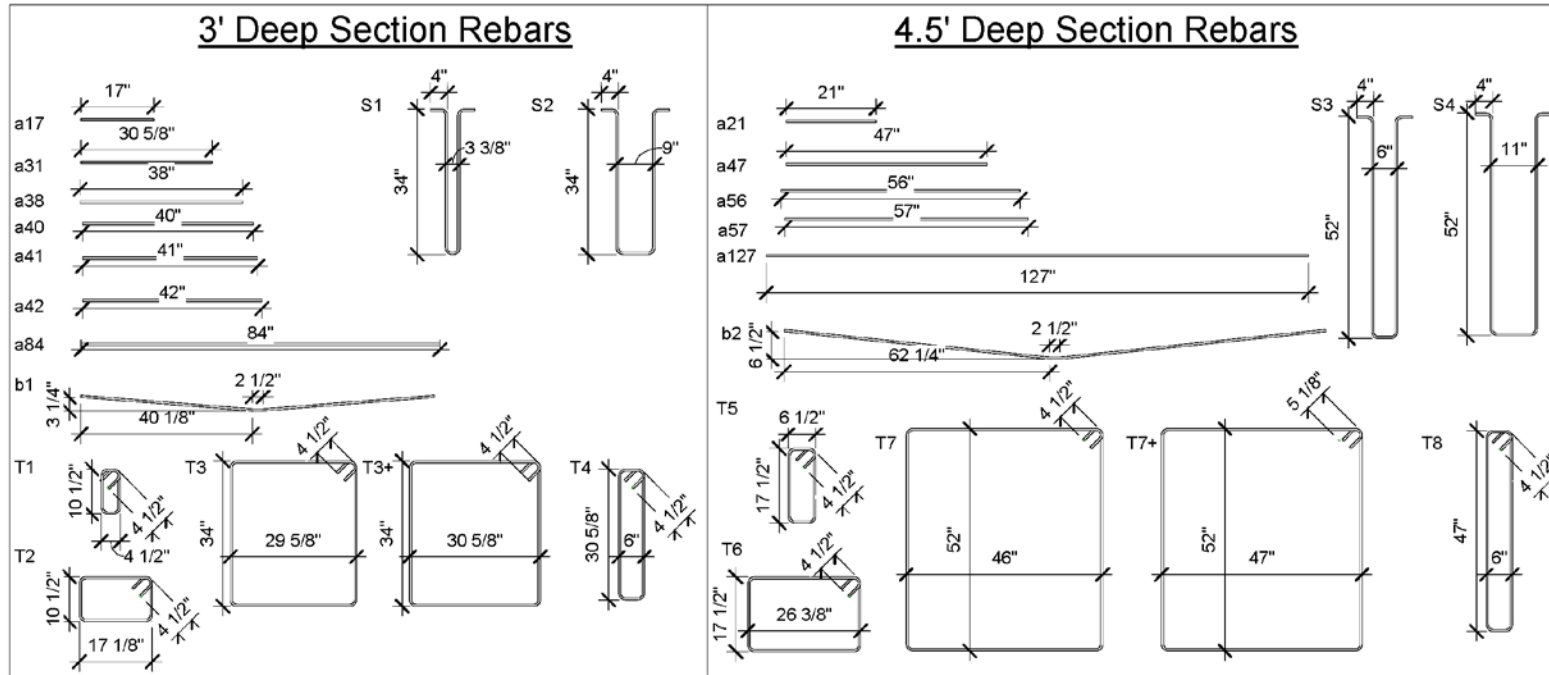
Dr. Sri Sritharan
Principal Investigator

Drawn by Michael Rosenthal
mjr@iastate.edu
319-210-7435

BRIDGE NO.	05-20-15	
POST MILES	Test Units	
DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY)	SHEET OF
→	X X	01

Figure A.6 – Segmental Cover Sheet and Sheet List

Notes:
 -All 90 degree bends have an inside radius of 1 inch.



① REBAR SCHEDULE
 1/2" = 1'-0"

IOWA STATE UNIVERSITY

REBAR DETAILS

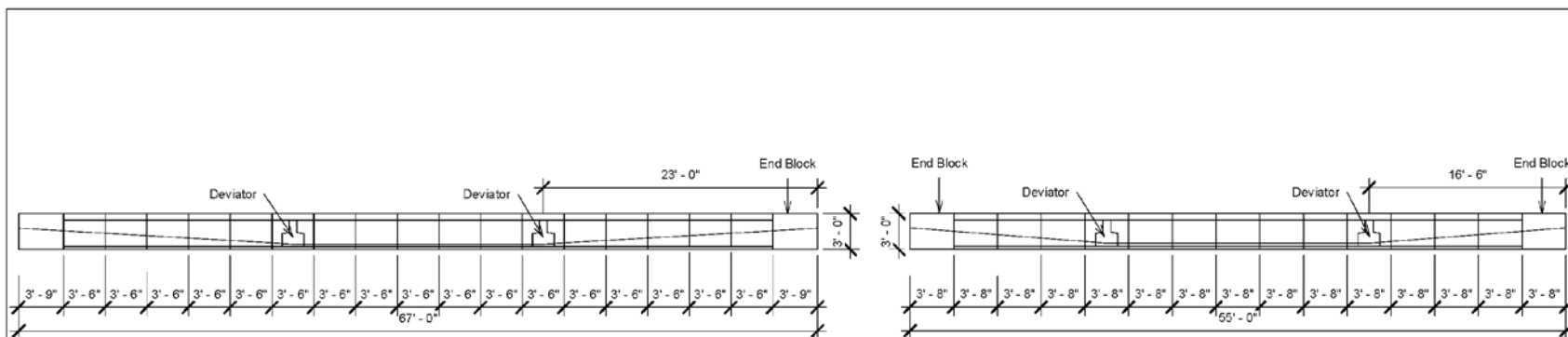
NCHRP
 12-94

Dr. Sri Sritharan
 Principal Investigator

Drawn by
 Michael Rosenthal
 mjr@iastate.edu
 319-210-7435

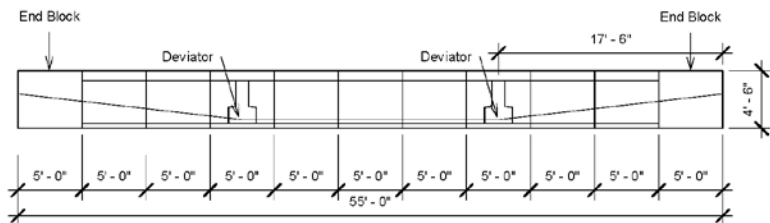
BRIDGE NO.	05-20-15			
POST MILES	Test Units			
DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY)	SHEET	OF	
→	X X	02		

Figure A.7 – Mild Reinforcement Details

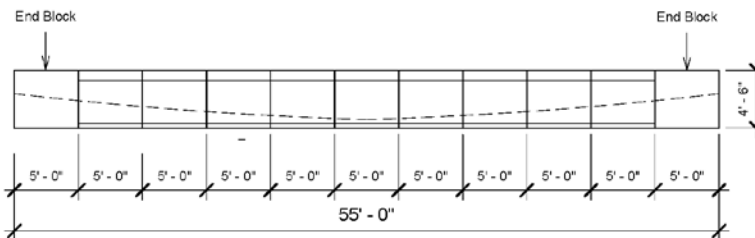


① UNB1 - SHEETS 3-5
1/8" = 1'-0"

② UNB2 - SHEETS 6-8
1/8" = 1'-0"



③ UNB3 - SHEETS 9-11
1/8" = 1'-0"



⑤ BON2 - SHEETS 17-18
1/8" = 1'-0"

IOWA STATE UNIVERSITY

SEGMENTAL BEAMS

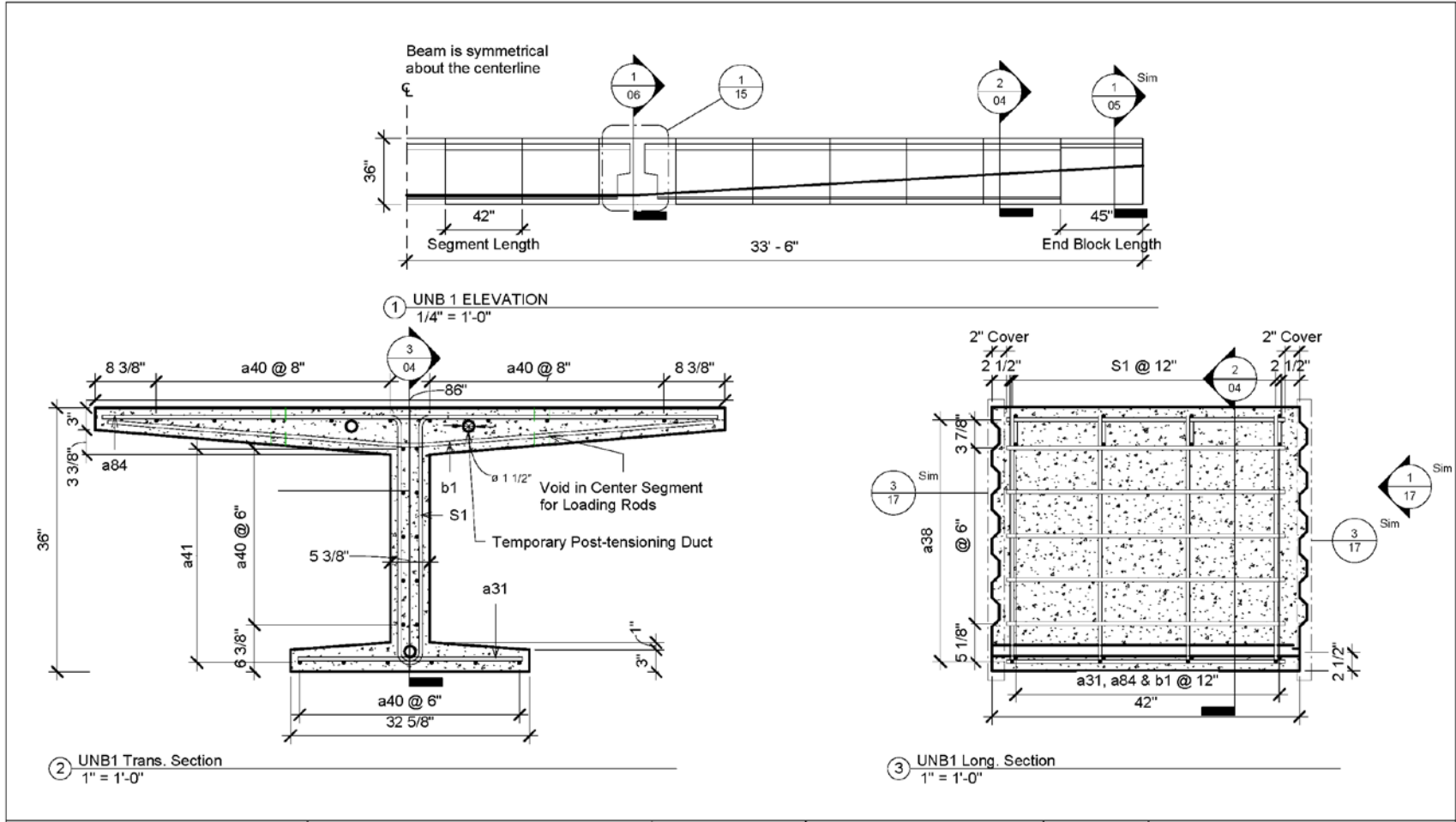
NCHRP
12-94

Dr. Sri Sritharan
Principal Investigator

Drawn by
Michael Rosenthal
mjr@iastate.edu
319-210-7435

BRIDGE NO.	05-20-15	
POST MILES	Test Units	
DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY)	SHEET OF
→	X X	03

Figure A.8 – Segmental Elevations



IOWA STATE UNIVERSITY	UNB1 TYPICAL SEGMENT	NCHRP 12-94	Dr. Sri Sritharan Principal Investigator	BRIDGE NO. POST MILES	05-20-15 Test Units	SHEET OF
			Drawn by Michael Rosenthal mjr@iastate.edu 319-210-7435	DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY)	04

Figure A.9 – UNB1 Typical Longitudinal and Transverse Section

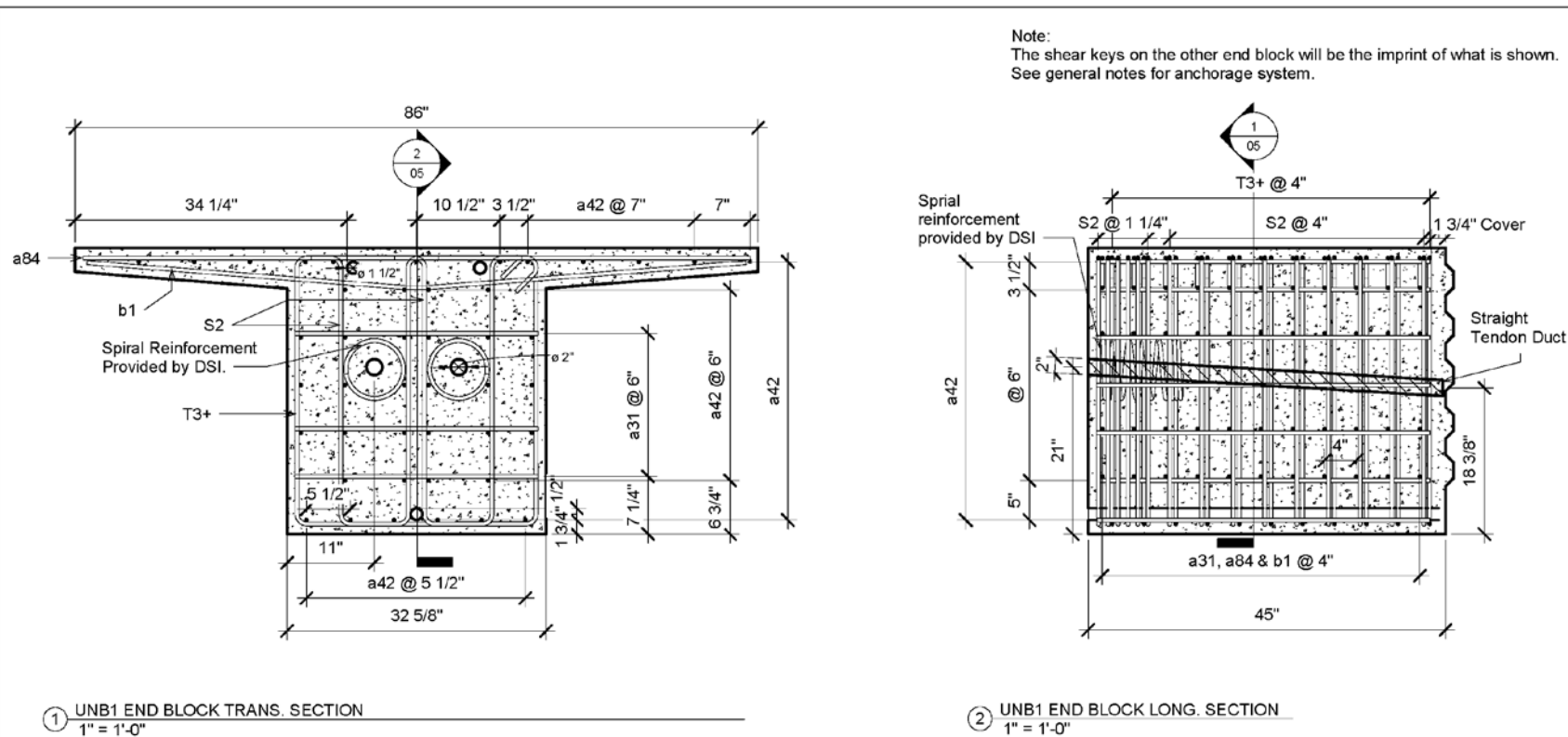


Figure A.10 – UNB1 End Block Longitudinal and Transverse Section

IOWA STATE UNIVERSITY

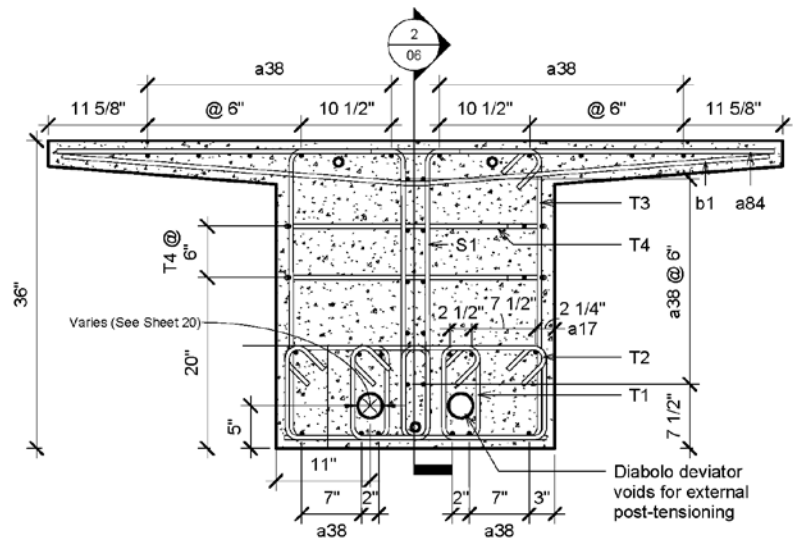
UNB1 END BLOCK

NCHRP
12-94

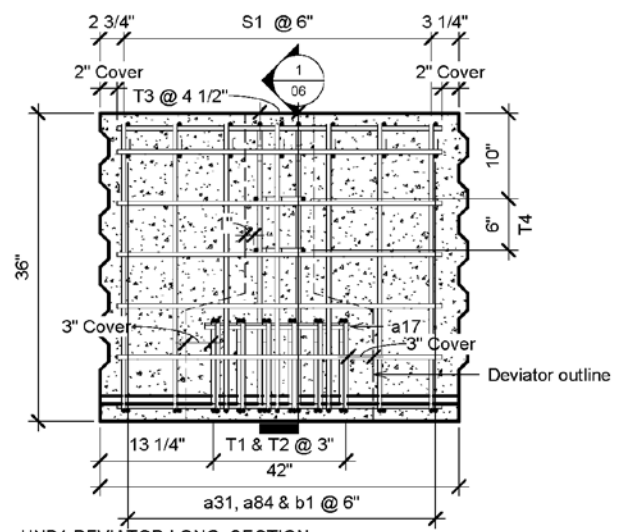
Dr. Sri Sritharan
Principal Investigator

Drawn by
Michael Rosenthal
mjr@iastate.edu
319-210-7435

BRIDGE NO.	05-20-15			
POST MILES	Test Units			
DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY)	SHEET	OF	
→	X X	05		



① UNB1 DEVIATOR TRANS. SECTION
1" = 1'-0"



② UNB1 DEVIATOR LONG. SECTION
1" = 1'-0"

IOWA STATE UNIVERSITY

UNB1 DEVIATOR

NCHRP
12-94

Dr. Sri Sritharan
Principal Investigator

Drawn by
Michael Rosenthal
mjr@iastate.edu
319-210-7435

BRIDGE NO.	05-20-15
POST MILES	Test Units
DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY)
→ XX	
SHEET	06
OF	

Figure A.11 – UNB1 Deviator Segment Longitudinal and Transverse Section

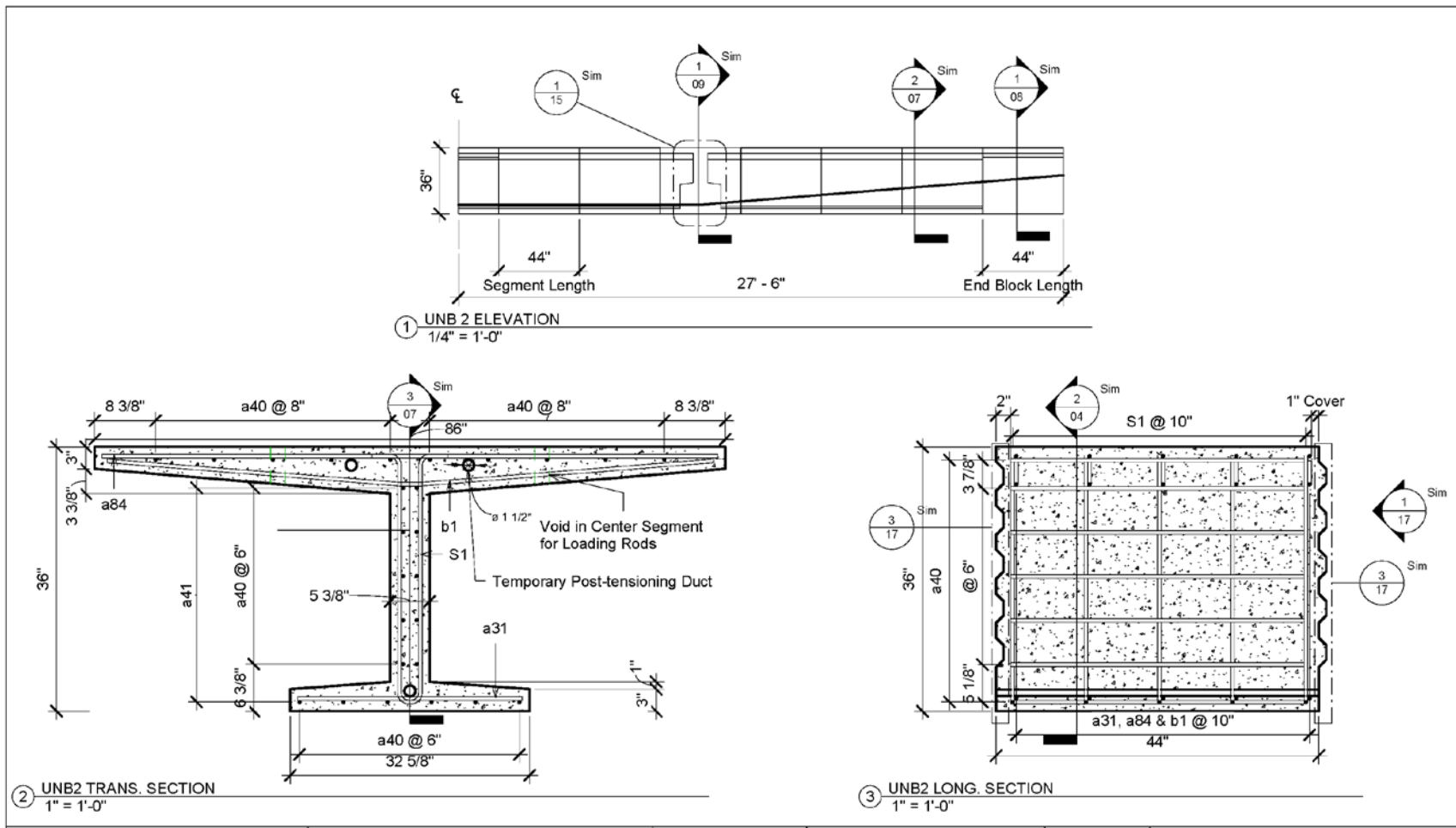
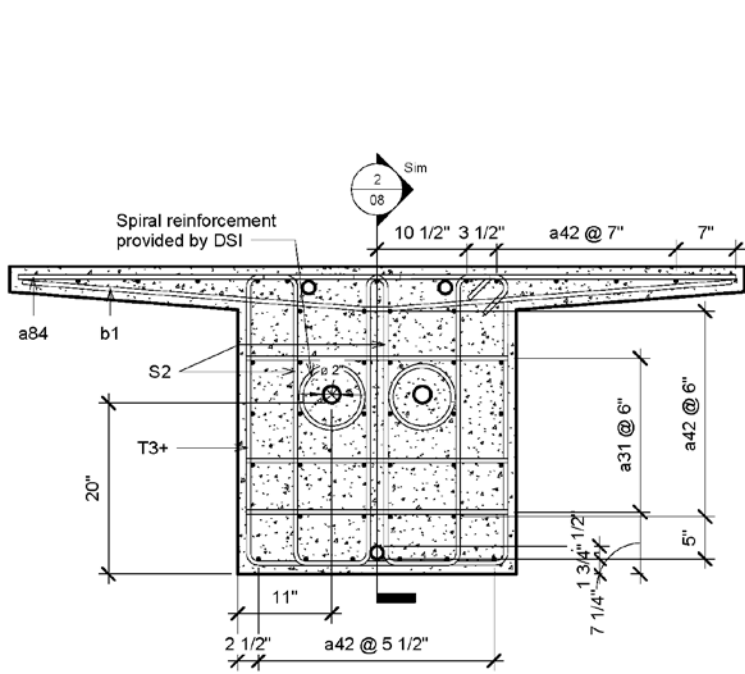


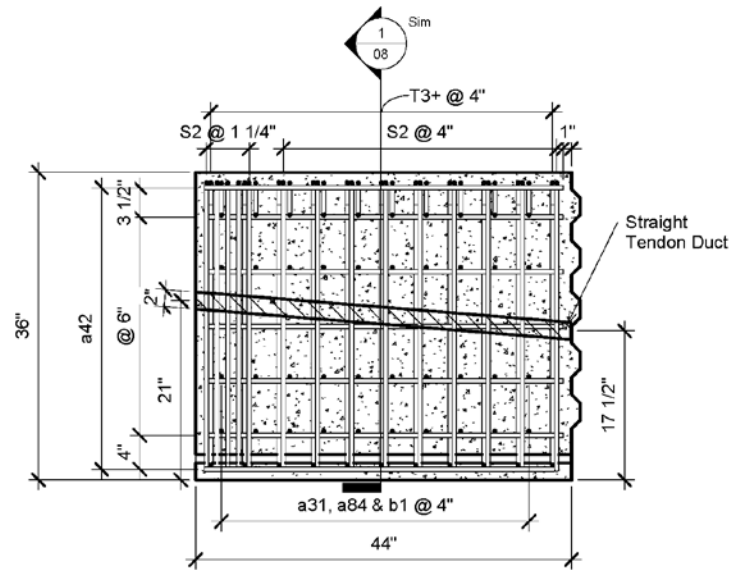
Figure A.12 – UNB2 Typical Longitudinal and Transverse Section

IOWA STATE UNIVERSITY	UNB2 TYPICAL SEGMENT	NCHRP 12-94	Dr. Sri Sritharan Principal Investigator	BRIDGE NO. POST MILES	05-20-15 Test Units	SHEET OF
			Drawn by Michael Rosenthal mjr@iastate.edu 319-210-7435	DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY) → XX	07



① UNB2 END BLOCK TRANS. SECTION
1" = 1'-0"

Note:
The shear keys on the other end block will be the imprint of what is shown.
See general notes for anchorage system.



② UNB2 END BLOCK LONG. SECTION
1" = 1'-0"

IOWA STATE UNIVERSITY

UNB2 END BLOCK

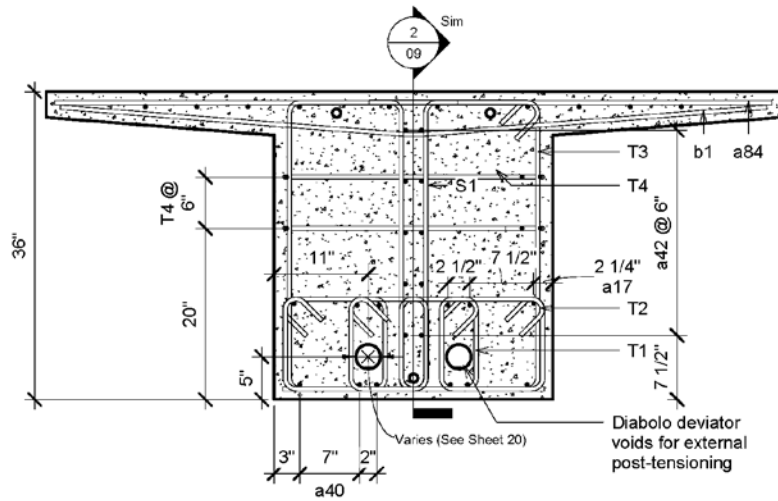
NCHRP
12-94

Dr. Sri Sritharan
Principal Investigator

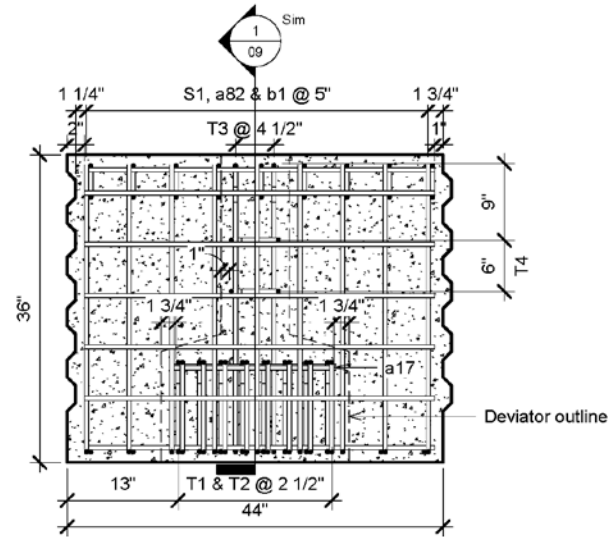
Drawn by
Michael Rosenthal
mjr@iastate.edu
319-210-7435

BRIDGE NO.	05-20-15	
POST MILES	Test Units	
DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY)	SHEET OF
	X X	08

Figure A.13 – UNB2 End Block Longitudinal and Transverse Section



① UNB2 DEVIATOR TRANS. SECTION
1" = 1'-0"



② UNB2 DEVIATOR LONG. SECTION
1" = 1'-0"

IOWA STATE UNIVERSITY

UNB2 DEVIATOR

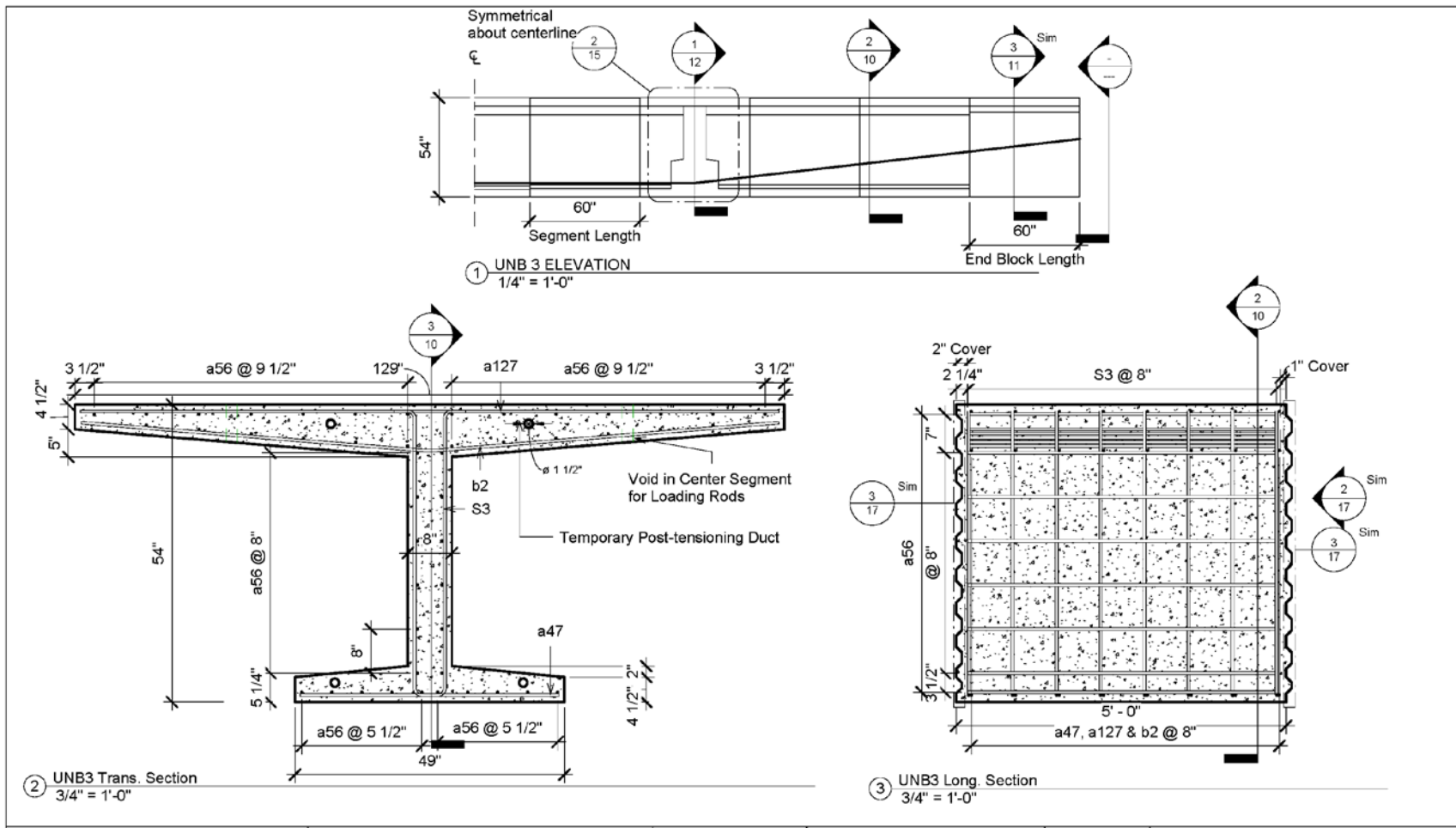
NCHRP
12-94

Dr. Sri Sritharan
Principal Investigator

Drawn by
Michael Rosenthal
mjr@iastate.edu
319-210-7435

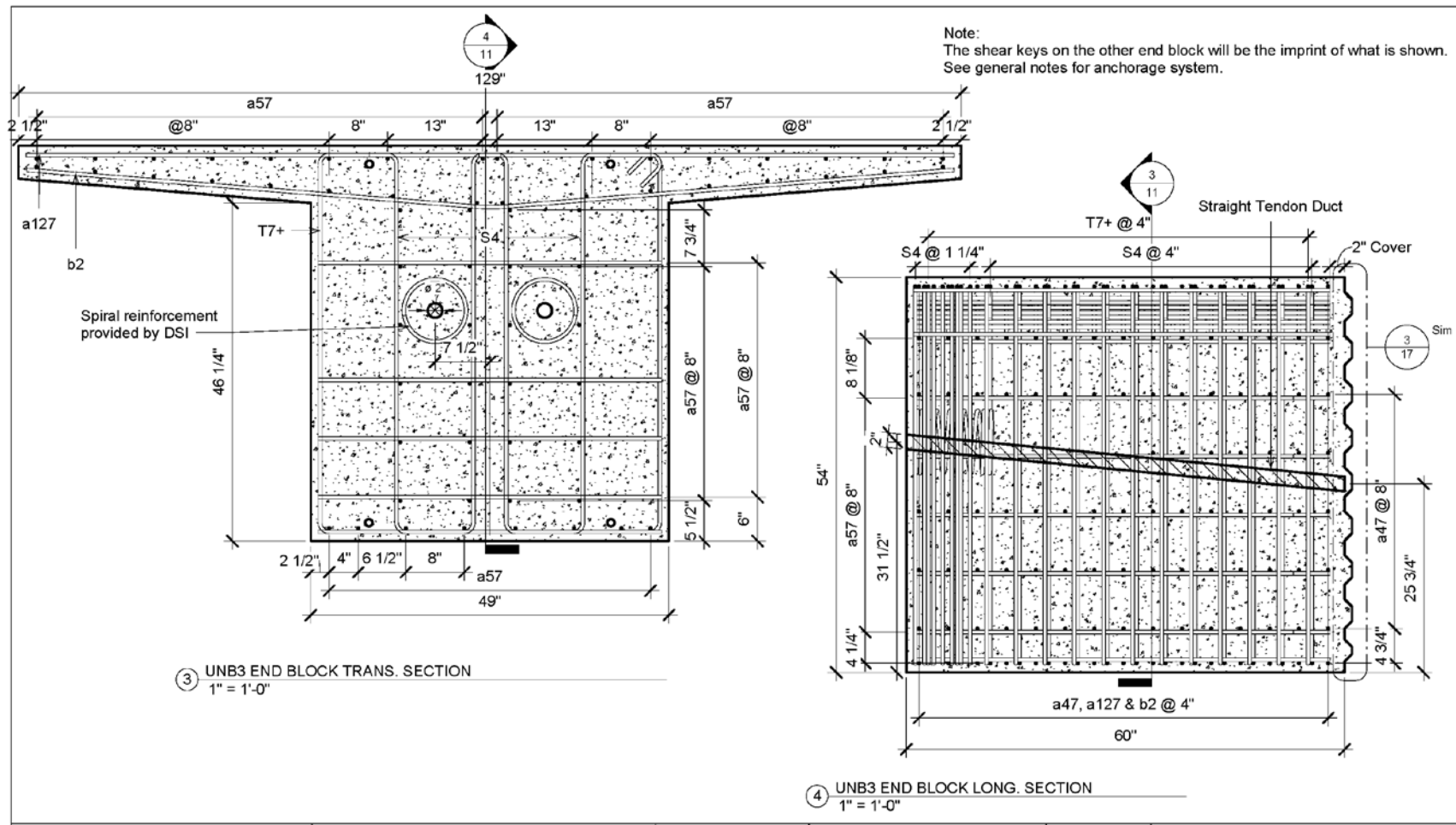
BRIDGE NO.	05-20-15	
POST MILES	Test Units	
DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY)	SHEET OF
→	X X	09

Figure A.14 – UNB2 Deviator Segment Longitudinal and Transverse Section



IOWA STATE UNIVERSITY	UNB3 TYPICAL SEGMENT	NCHRP 12-94	Dr. Sri Sritharan Principal Investigator	BRIDGE NO. POST MILES	05-20-15 Test Units	REVISION DATES (PRELIMINARY STAGE ONLY)	SHEET OF
			Drawn by Michael Rosenthal mjr@iastate.edu 319-210-7435	DISREGARD PRINTS BEARING EARLIER REVISION DATES	→ X X	10	OF

Figure A.15 – UNB3 Typical Longitudinal and Transverse Section



IOWA STATE UNIVERSITY	UNB3 END BLOCK	NCHRP 12-94	BRIDGE NO.	05-20-15	SHEET OF
			POST MILES	Test Units	
Drawn by Michael Rosenthal mjr@iastate.edu 319-210-7435			DISREGARD PRINTS BEARING EARLIER REVISION DATES →	REVISION DATES (PRELIMINARY STAGE ONLY)	11

Figure A.16 – UNB3 End Block Longitudinal and Transverse Section

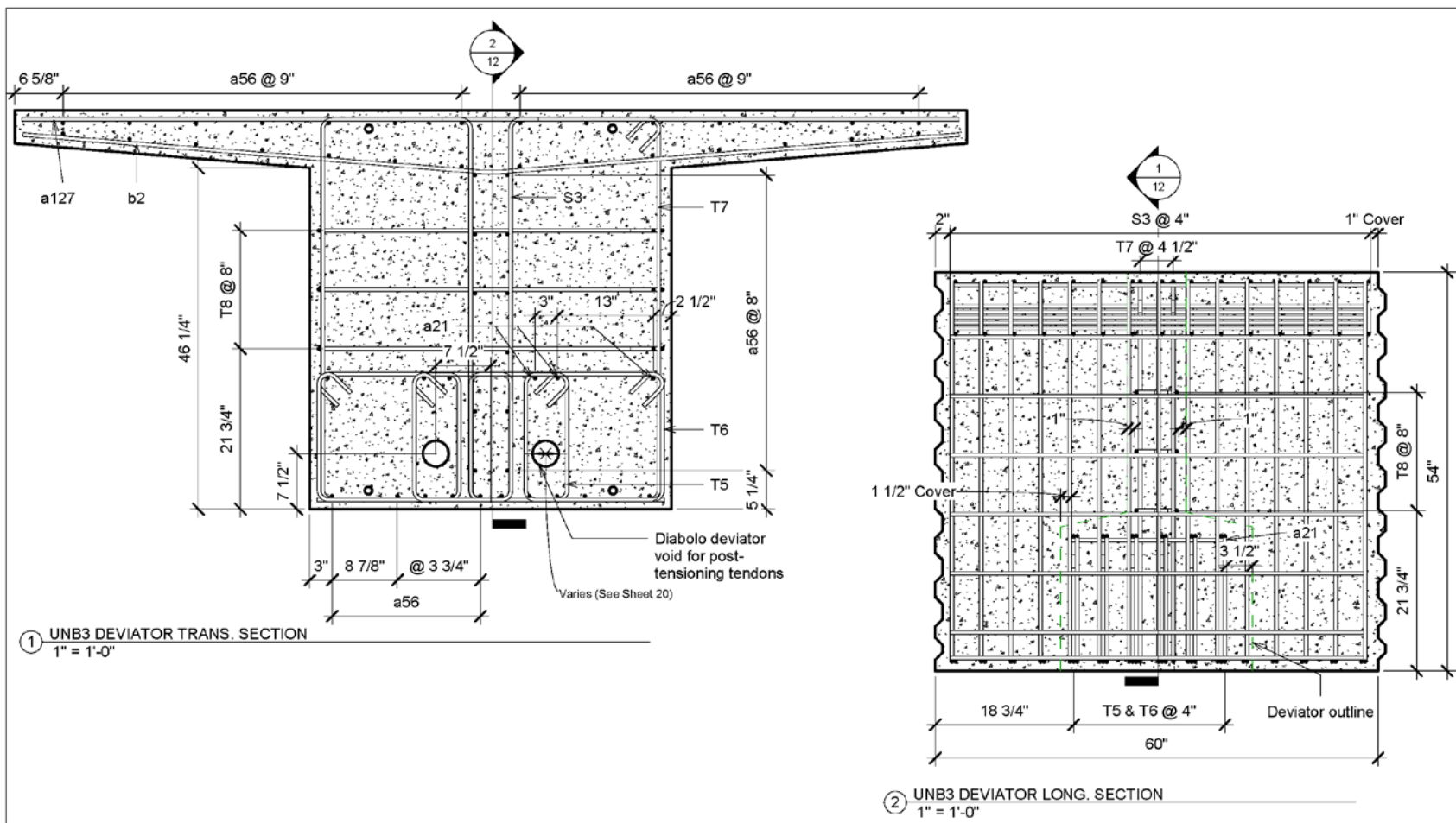


Figure A.17 – UNB3 Deviator Segment Longitudinal and Transverse Section

IOWA STATE UNIVERSITY

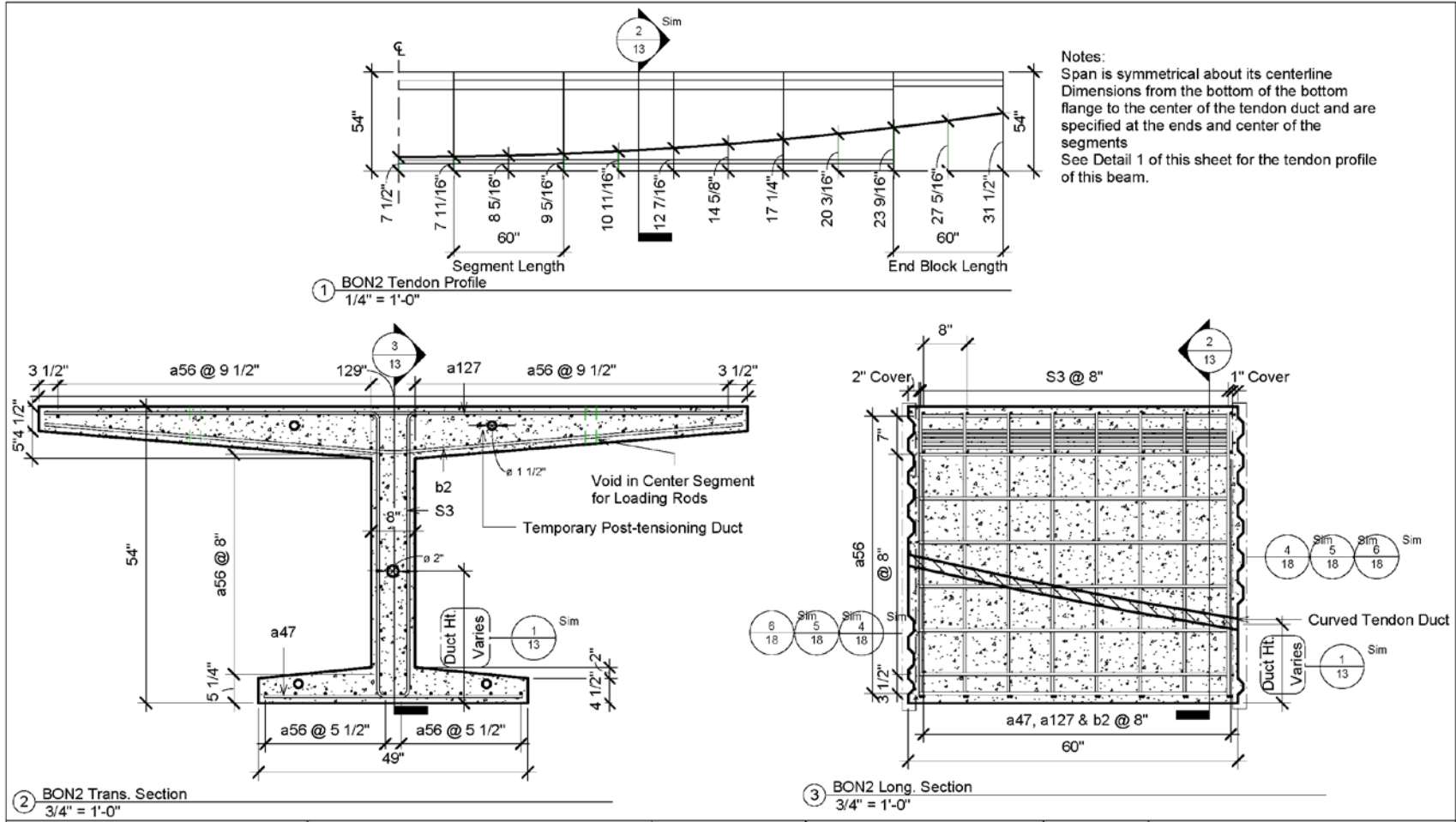
UNB3 DEVIATOR

NCHRP
12-94

Dr. Sri Sritharan
Principal Investigator

Drawn by
Michael Rosenthal
mjr@iastate.edu
319-210-7435

BRIDGE NO.	05-20-15
POST MILES	Test Units
DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY)
→ X X	
SHEET	OF
12	



BON2 TYPICAL SEGMENT

NCHRP
12-94

Dr. Sri Sritharan
Principal Investigator

Drawn by Michael Rosenthal
mjr@iastate.edu
319-210-7435

BRIDGE NO.	05-20-15
POST MILES	Test Units
DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY)
→ XX	
SHEET	13
OF	

Figure A.18 – BON2 Typical Longitudinal and Transverse Section

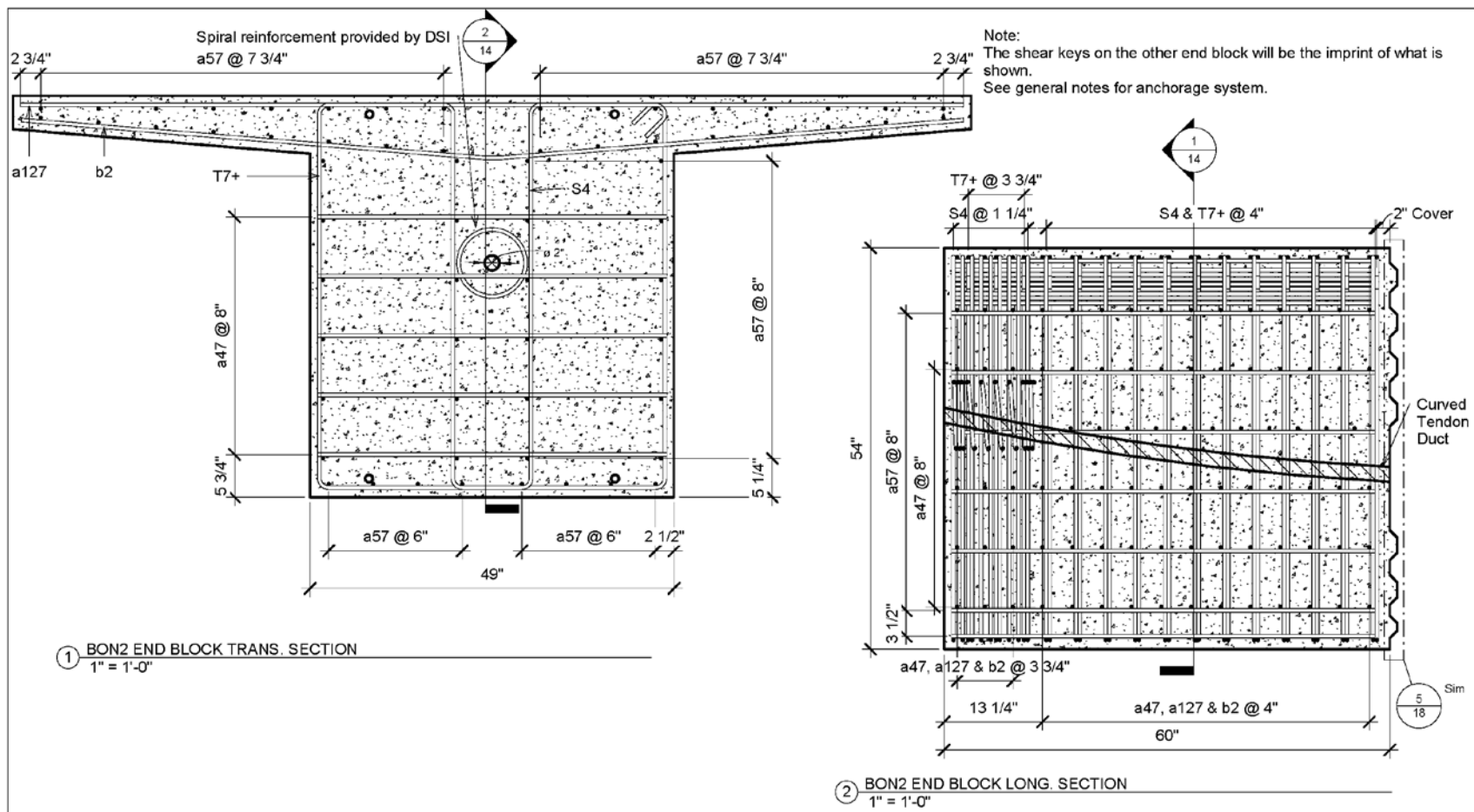
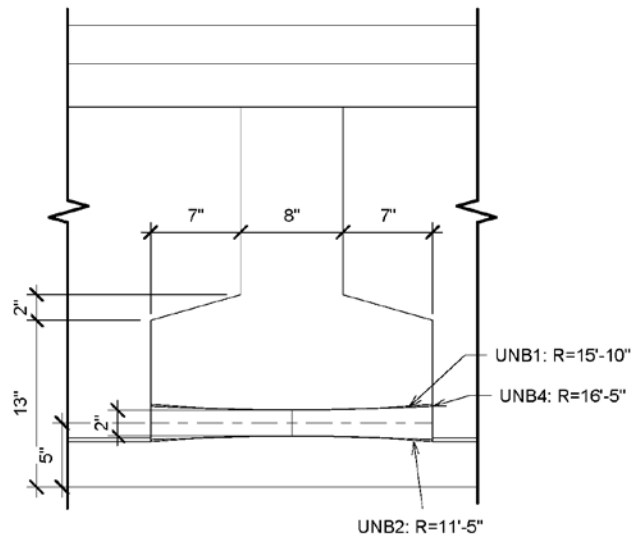
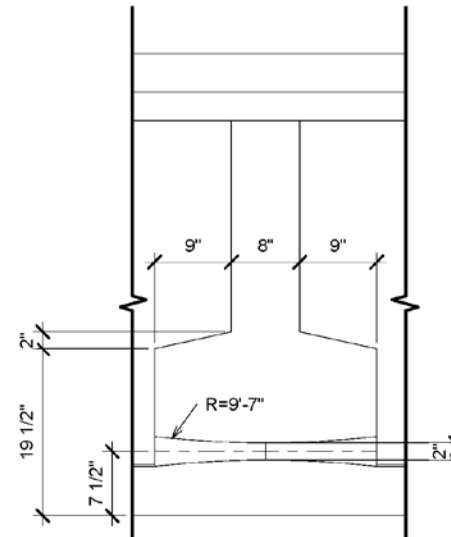


Figure A.19 – BON2 End Block Longitudinal and Transverse Section

- Notes:
- The unbonded spans utilize a diablo void with the specified radius.
 - All Deviators are located at the center of the segment.
 - Deviator locations from the ends are symmetric.
 - Provide duct extension to diabolos that will generate a groove of the outside radius (See sheet 21 for example).



① UNB1, 2 & 4 DIABOLO DEVIATOR DTLS
1 1/2" = 1'-0"



② UNB3 DIABOLO DEVIATOR DETAILS
1" = 1'-0"

IOWA STATE UNIVERSITY

DEVIATOR DETAILS

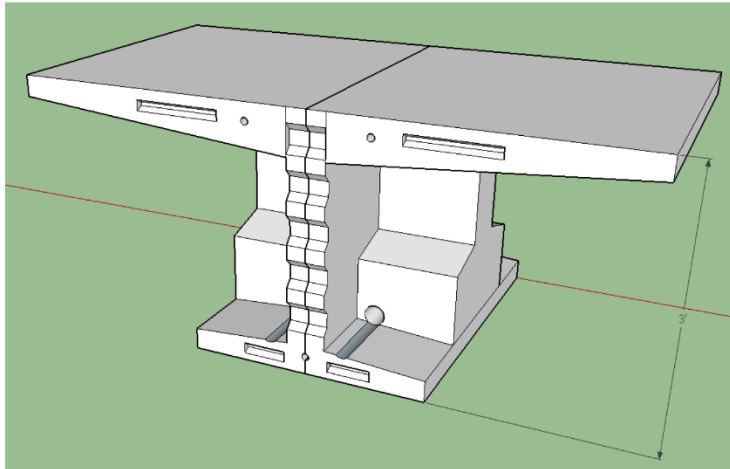
NCHRP
12-94

Dr. Sri Sritharan
Principal Investigator

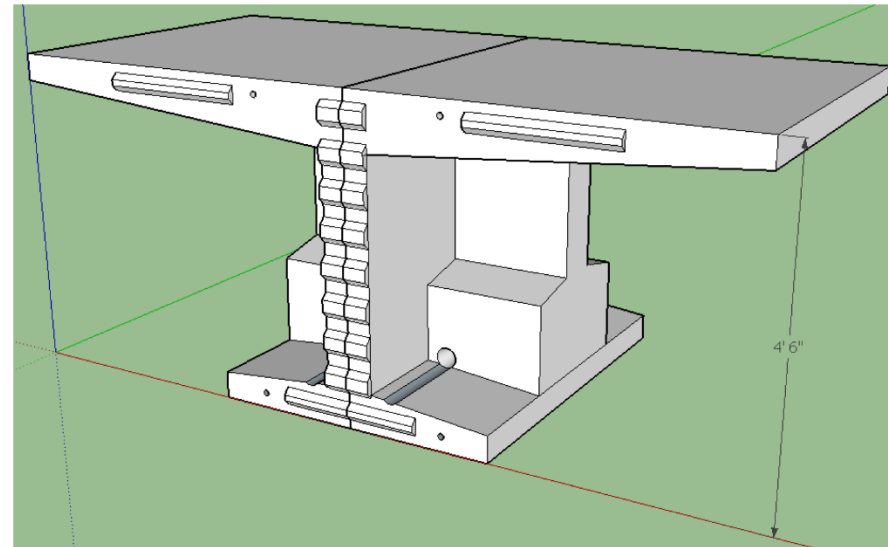
Drawn by Michael Rosenthal
mjr@iastate.edu
319-210-7435

BRIDGE NO.	05-20-15			
POST MILES	Test Units			
DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY)	SHEET	OF	
→	X X	15		

Figure A.20 – Deviator Details



① UNB2 DEVIATOR SEGMENT ISOMETRIC
1/8" = 1'-0"



② UNB3 DEVIATOR SEGMENT ISOMETRIC
1/8" = 1'-0"

IOWA STATE UNIVERSITY

DEVIATOR SEGMENT ISOMETRIC

NCHRP 12-94

Dr. Sri Sritharan
Principal Investigator

Drawn by Michael Rosenthal
mjr@iastate.edu
319-210-7435

BRIDGE NO.
POST MILES

05-20-15

Test Units

DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY)	SHEET	OF
→ XX		16	

Figure A.21 – Isometric View of Deviator Section

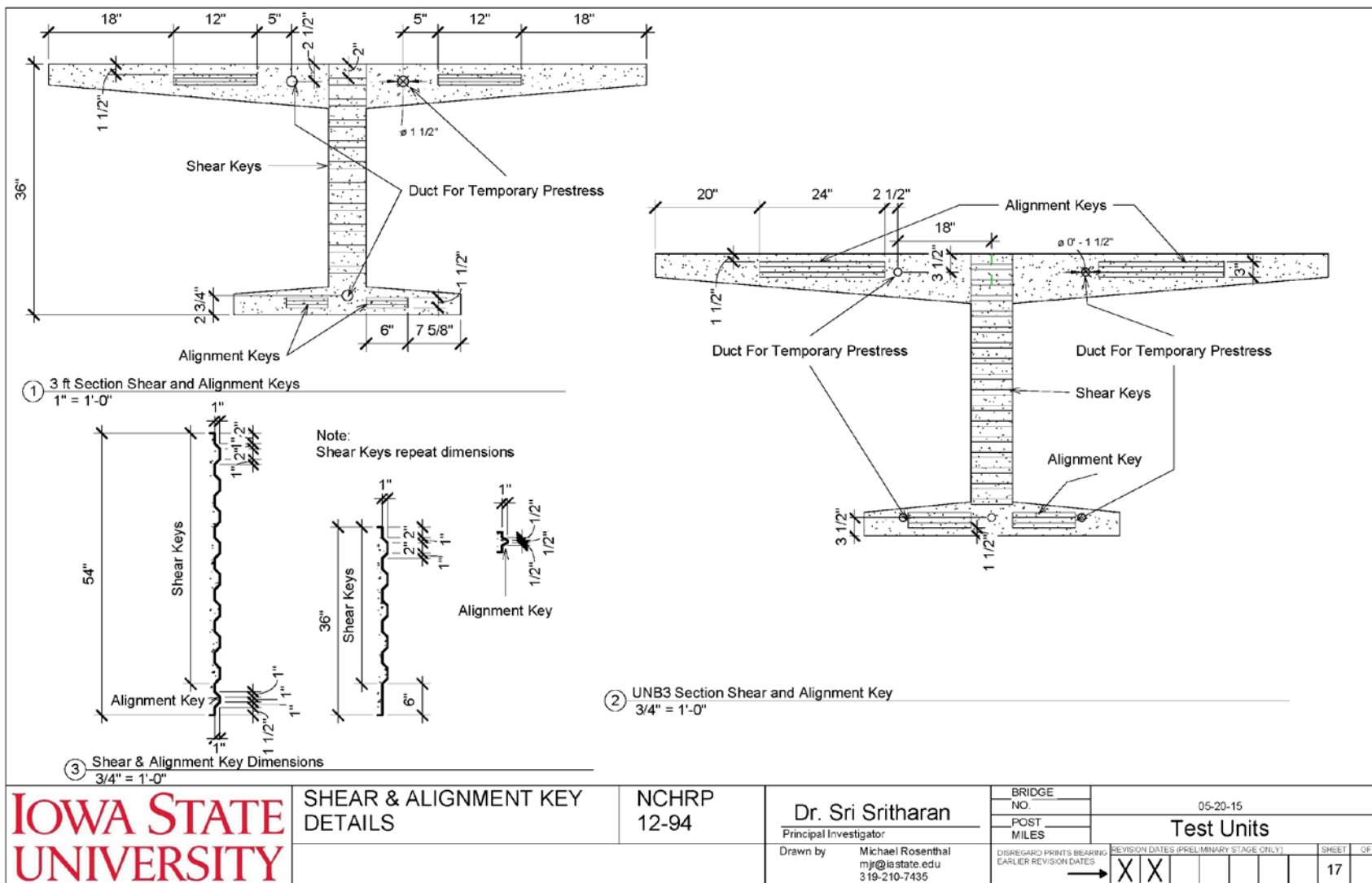


Figure A.22 – Shear and Alignment Key Details

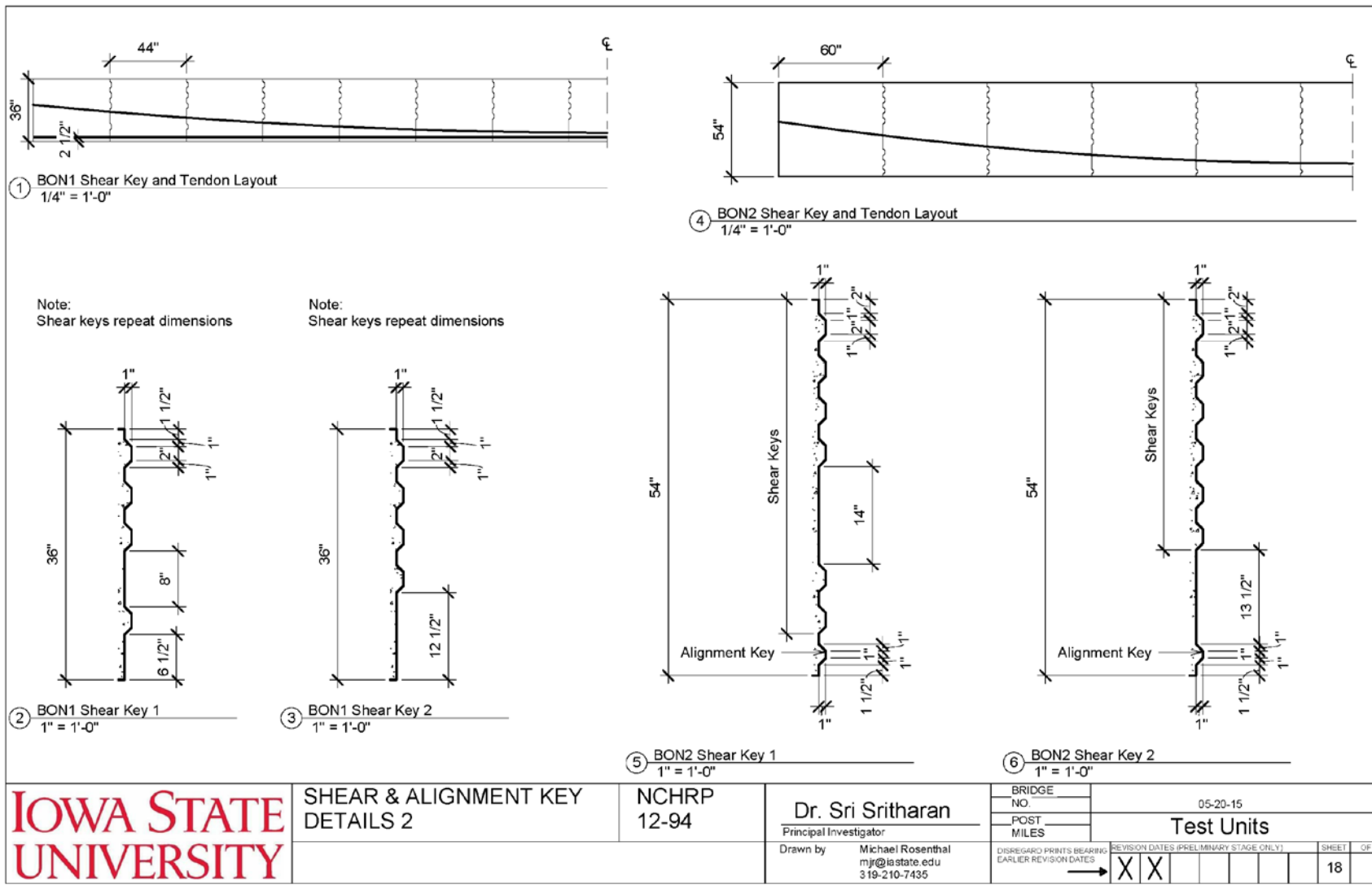


Figure A.23 – Shear and Alignment Key Details for Bonded Segments