

SHEET DESCRIPTION <sup>①</sup>	IF APPLICABLE	BY DESIGNER	GUIDELINES <sup>②</sup>
BRIDGE LAYOUT		X	
FOUNDATION PLAN <sup>③</sup>		X	
ABUTMENT AND WINGWALL DETAILS <sup>④</sup> <sup>(A)</sup>			X
BENT DETAILS <sup>⑤</sup> <sup>(B)</sup>			X
SPAN DETAILS (TRANSVERSE SECTION) <sup>⑥</sup> <sup>(C)</sup>			X
FRAMING PLAN		X	
PRESTRESSED CONCRETE BEAM DESIGN FORM <sup>⑦</sup>			X
ARMOR JOINT			X
APPROACH SLAB			X
COMMON FOUNDATION DETAILS			X
ELASTOMERIC BEARING DETAILS			X
PRESTR CONC SLAB/BOX BEAM DETAILS			X
BRIDGE RAIL DETAILS			X

- ①SHEETS REQUIRED TO COMPLETE BRIDGE SET.
- ②SHEETS SHALL BE MODIFIED TO BE SPECIFIC TO THE PROJECT.
- ③DESIGNER SHALL DETERMINE FOUNDATION LOADS.
- ④ABUTMENT REINFORCING IN GUIDELINE DRAWINGS IS ADEQUATE FOR DRILLED SHAFT OR PILE SPACING, NOT EXCEEDING THIRTEEN FEET. DESIGNER SHALL DETERMINE WINGWALL HEIGHT AND REINFORCING.
- ⑤DESIGNER SHALL VERIFY BENT CAP REINFORCING.
- ⑥DESIGNER SHALL DETERMINE SECTION DEPTH BASED ON CAMBER, DEAD LOAD DEFLECTION AND EFFECT OF VERTICAL CURVE.
- ⑦DESIGNER SHALL DETERMINE BEAM DESIGN USING PGSUPER OR PSTRS14.
- ⑧BOX BEAM GUIDELINES ARE BASED ON A B20 BEAM. SLAB BEAM GUIDELINES ARE BASED ON A SB12 BEAM. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS AND SPAN LENGTH.
- ⑨BOX BEAM ABUTMENT GUIDELINES SHOW BATTERED PILING. IF THE ENGINEER ELECTS TO USE VERTICAL PILING, PILE SPACING SHALL NOT EXCEED 6'-0".

ABUTMENT DESIGN GUIDELINES <sup>(A) ⑧ ⑨</sup>	HALF BOULEVARD	0° SKEW	PILE DRILLED SHAFTS
		30° SKEW	PILE DRILLED SHAFTS
	TWO-WAY ROAD	0° SKEW	PILE DRILLED SHAFTS
		30° SKEW	PILE DRILLED SHAFTS
NOTES	BRIDGES WITH HIGH PEDESTRIAN VOLUME WILL REQUIRE MODIFICATION OF SHEETS.	MAX SKEW IS 30 DEGREES. MODIFY SHEETS FOR SKEWS BETWEEN 0-30 DEGREES. SEE ABUTMENT WINGWALL TABLE FOR WINGWALL LENGTHS.	CONSULT GEOTECHNICAL REPORT FOR FOUNDATION TYPE.DESIGN ENGINEER SHALL DETERMINE FOUNDATION SIZE OR DIAMETER AND LENGTH.

ABUTMENT WINGWALL LENGTH TABLE <sup>(A)</sup>			
SKEW ANGLE BEAM TYPE	0°	0≤15°≤30°	≤30°
SLAB BEAM B12	10'	10'	10'
SLAB BEAM B15	10'	10'	10'
BOX BEAM B20	10'	10'	10'
BOX BEAM B28	10'	11'	12'
BOX BEAM B34	12'	13'	14'
BOX BEAM B40	13'	14'	15'
NOTES	DESIGNER SHALL DETERMINE WINGWALL HEIGHT AND REINFORCING.		

BENT DESIGN GUIDELINES <sup>(B) ⑧</sup>	HALF BOULEVARD	0° SKEW	PILE DRILLED SHAFTS
		30° SKEW	PILE DRILLED SHAFTS
	TWO-WAY ROAD	0° SKEW	PILE DRILLED SHAFTS
		30° SKEW	PILE DRILLED SHAFTS
NOTES	BRIDGES WITH HIGH PEDESTRIAN VOLUME WILL REQUIRE MODIFICATION OF SHEETS.	MAX SKEW IS 30 DEGREES. MODIFY SHEETS FOR SKEWS BETWEEN 0-30 DEGREES.	CONSULT GEOTECHNICAL REPORT FOR FOUNDATION TYPE.DESIGN ENGINEER SHALL DETERMINE FOUNDATION SIZE OR DIAMETER AND LENGTH.

SPAN DESIGN GUIDELINES <sup>(C) ⑧</sup>	HALF BOULEVARD	0° SKEW
		30° SKEW
	TWO-WAY ROAD	0° SKEW
		30° SKEW
NOTES	BRIDGES WITH HIGH PEDESTRIAN VOLUME WILL REQUIRE MODIFICATION OF SHEETS.	MAX SKEW IS 30 DEGREES. MODIFY SHEETS FOR SKEWS BETWEEN 0-30 DEGREES.

RECOMMENDED MAXIMUM SPAN LENGTHS		
BEAM TYPE	BEAM TYPE	MAX SPAN (FT)
BOX BEAMS	B20	60
	B28	75
	B34	95
	B40	110
SLAB BEAMS	SB12	35
	SB15	45
NOTES:	ENGINEER MAY USE SPANS EXCEEDING MAXIMUM RECOMMENDED SPANS IF JUSTIFIED BY CALCULATIONS.	

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

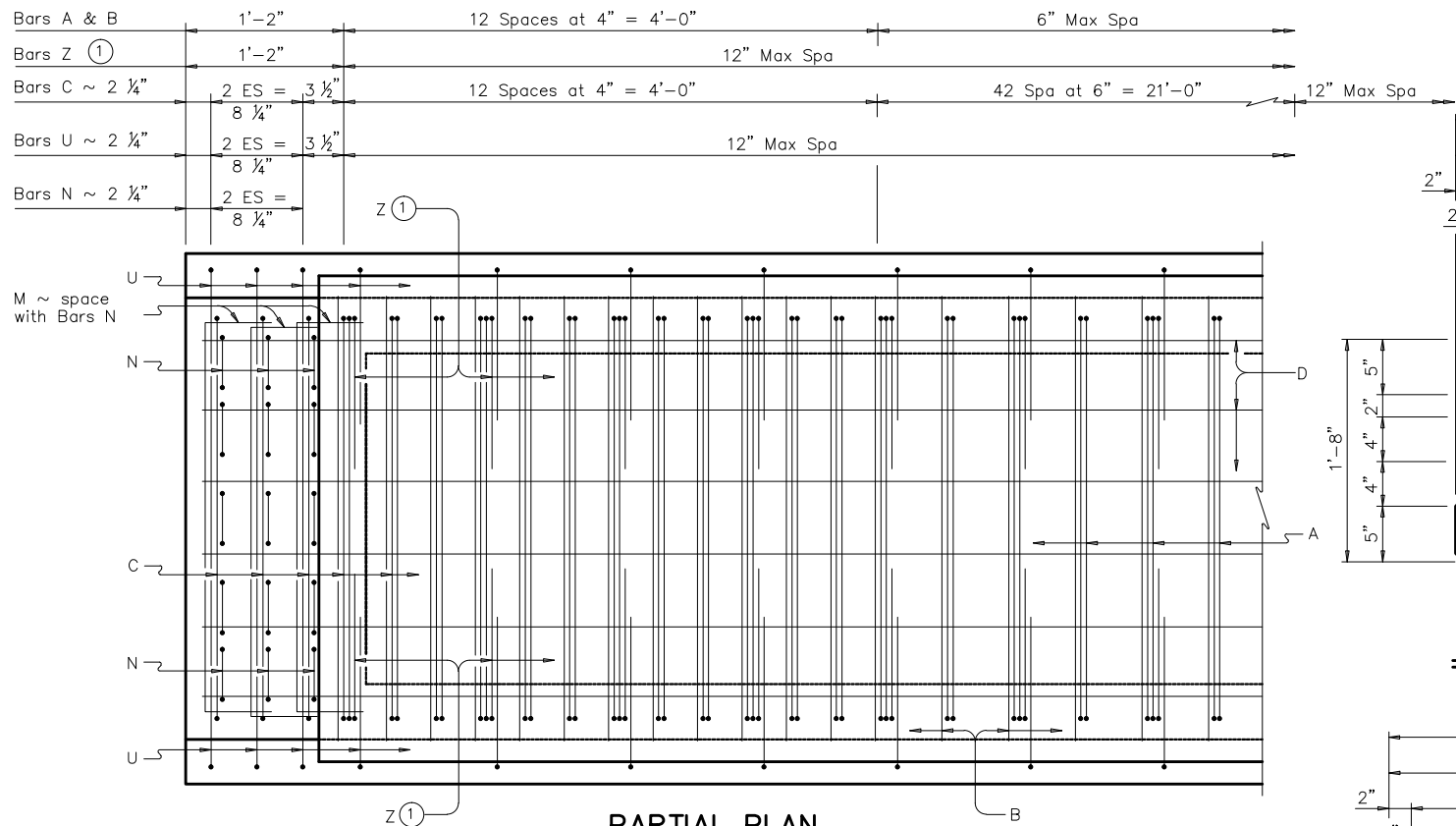
HARRIS COUNTY  
ENGINEERING DEPARTMENT



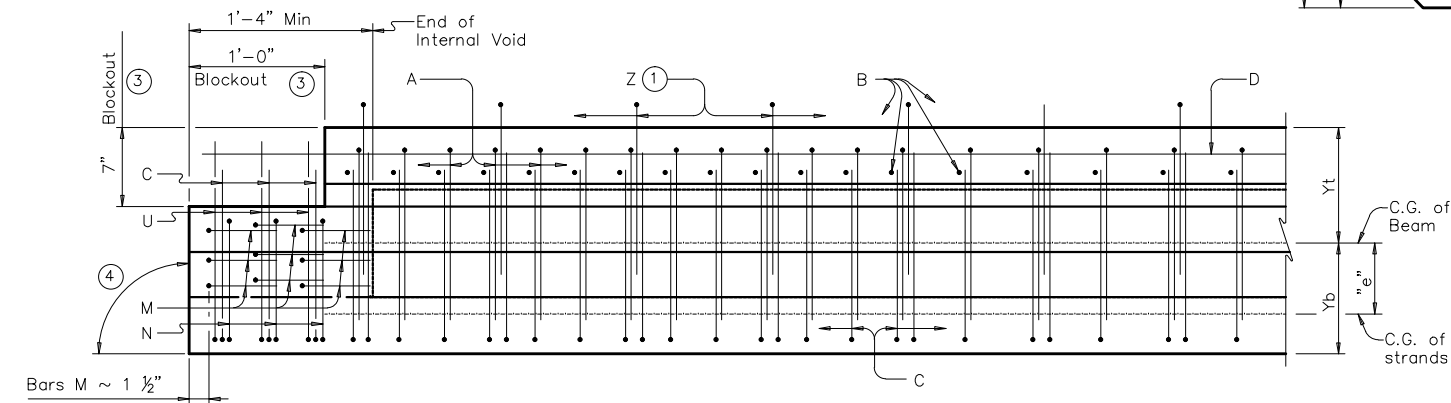
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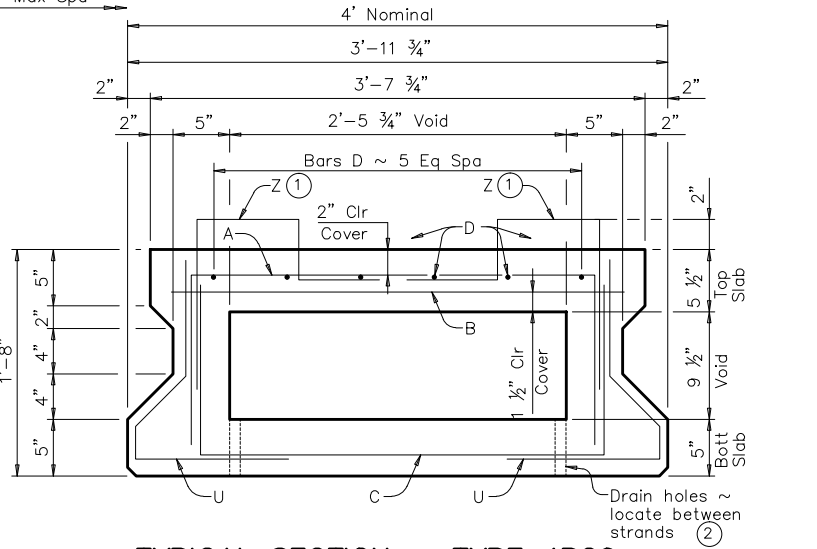
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CHECKED BY:		FILE NAME:
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DATE:	APPROVED BY:	SHT NO:



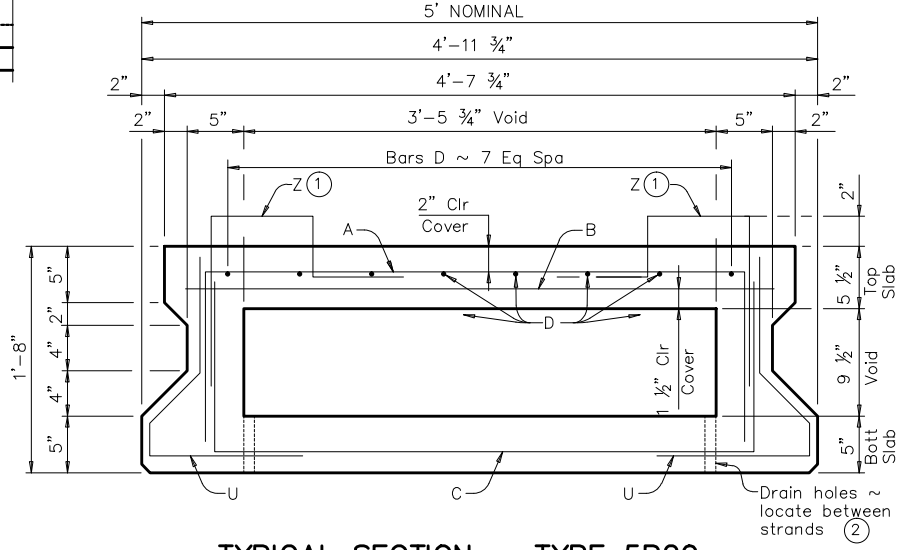
PARTIAL PLAN  
(Showing Type 4B20)



ELEVATION



TYPICAL SECTION ~ TYPE 4B20



TYPICAL SECTION ~ TYPE 5B20

BEAM PROPERTIES			
		Type 4B20	Type 5B20
Area	in <sup>2</sup>	591.8	717.8
Y top	in	10.19	10.12
Y bott	in	9.81	9.88
I	in <sup>4</sup>	28,086	35,234
Weight	lb/ft	616	748

- ① Bars Z are required for beams topped with a cast-in-place concrete slab only.
- ② Place drain holes (1" Dia PVC Sch 40 Pipe) as shown in all beam void corners including each side of interior diaphragms. See "Blockout, Interior Diaphragm, and Drain Details". Drain holes are not required if the void is formed with Expanded Polystyrene (foam).
- ③ Blockouts required at ends of all beams. Extend beam reinforcement into blockouts.
- ④ 90° at conventional Interior Bents. Ends of beams shall be vertical at Abutment backwall.
- ⑤ Based on 150 pcf weight density of concrete. Weight of end blocks and interior diaphragms is not included.

NOTES TO DESIGN ENGINEER:

- A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.
- IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC PROJECT REQUIREMENTS.
- B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT PLANS, AND SHALL ADJUST PAGE NUMBERS ACCORDINGLY.
- C. THE DESIGN ENGINEER SHALL CONSULT THE HARRIS COUNTY DESIGN MANUAL AND SPECIFICATIONS FOR INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
- D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE BRIDGE PLANS.
- E. THESE GUIDELINES ARE BASED ON THE TEXAS DEPARTMENT OF TRANSPORTATION BRIDGE STANDARDS, DATED AUGUST 2009. DESIGN ENGINEER SHALL UPDATE THESE DETAILS FOR ANY REVISIONS TO STANDARDS HEREAFTER.

**GENERAL NOTES:**  
Designed according to AASHTO LRFD Specifications. See Harris County Specification Item 423 for the Casting, Prestressing, and Erection of Precast, Prestressed Beams.  
All reinforcing steel must be Grade 60.  
Two-stage monolithic casting is required. The concrete in the first stage cast (bottom beam flange) must remain plastic until the second stage cast (webs and top beam flange) is placed. Vibrate as required to ensure consolidation between the two casts.  
1 1/4" clear cover to reinforcement is required unless noted otherwise.  
An equal area of welded wire reinforcement (WWR) meeting the requirements of ASTM A 497 may be substituted for Bars A, B, C, and D.  
These details are applicable for skews up to 30 degrees only.  
Chamfer bottom beam corners 3/4" or round to a 3/4" radius.

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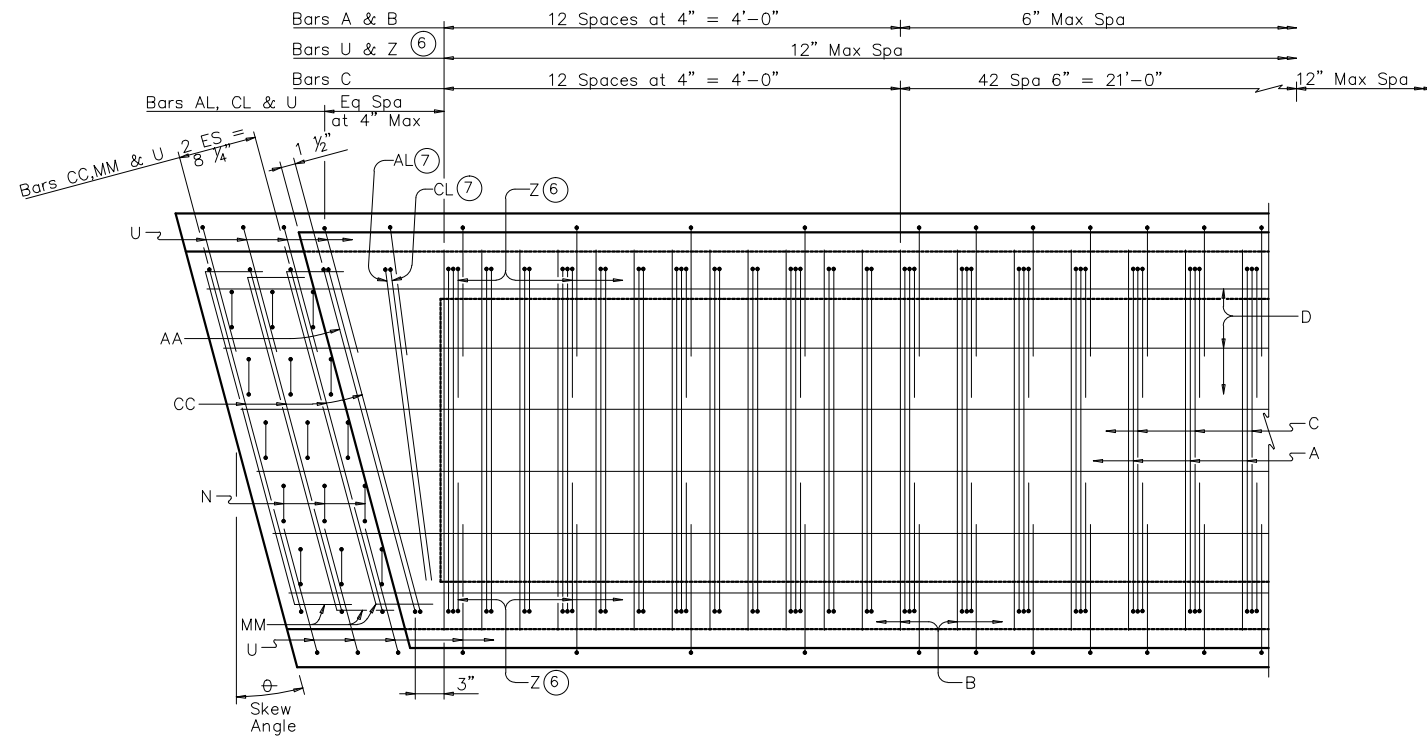
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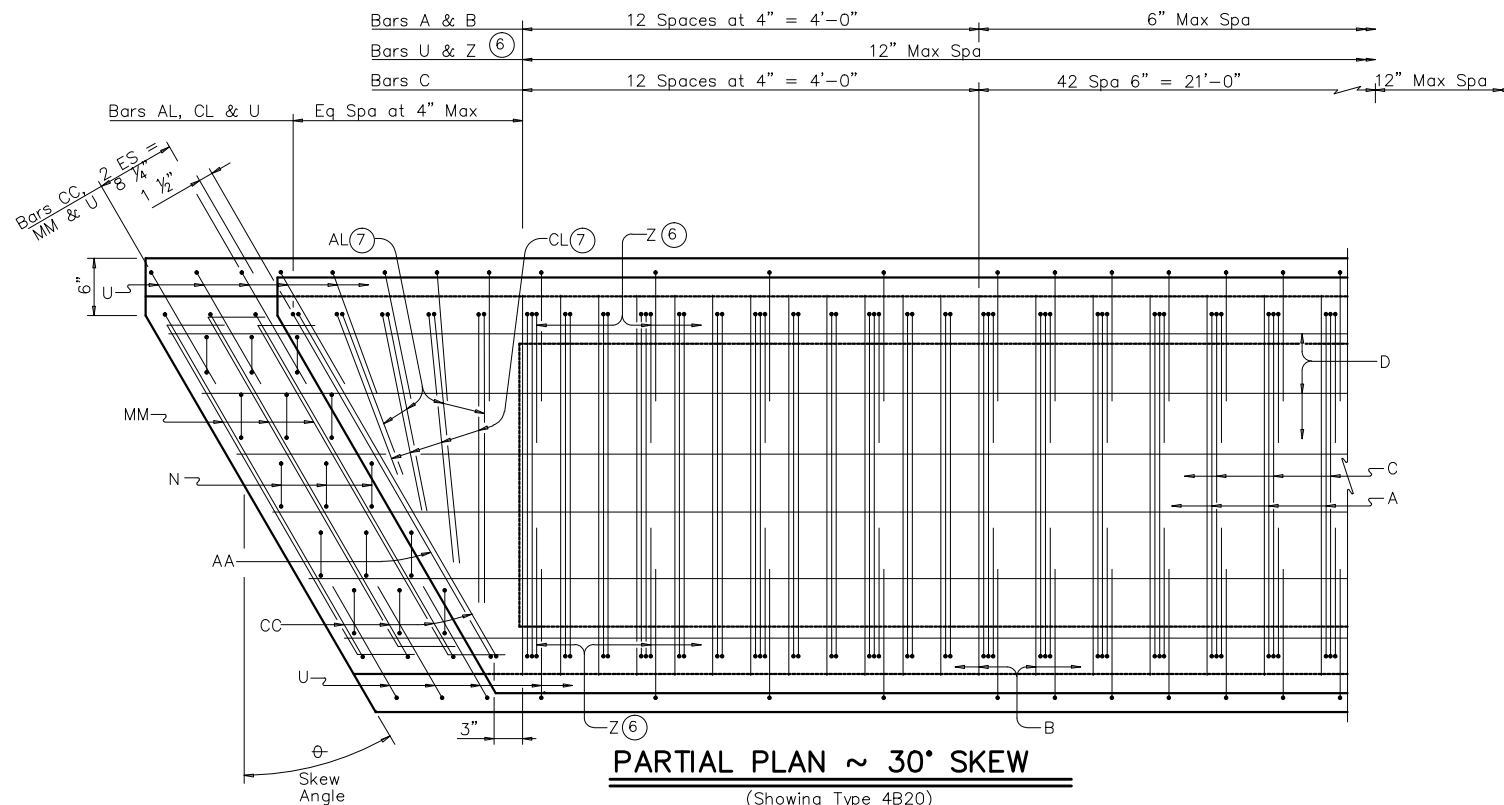
SEAL  
NOTE

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CHK'D BY:		FILE NO:	
SCALE:		FILE NO:	
DATE:	APPROVED BY:	SHT NO:	01



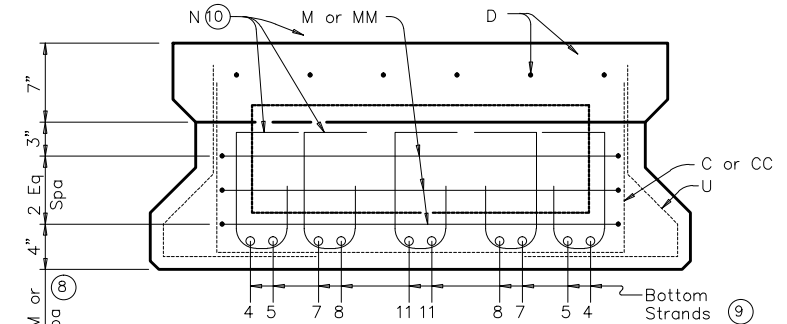
**PARTIAL PLAN ~ 15° SKEW**

(Showing Type 4B20)  
(use for skew angles of 15° or less)



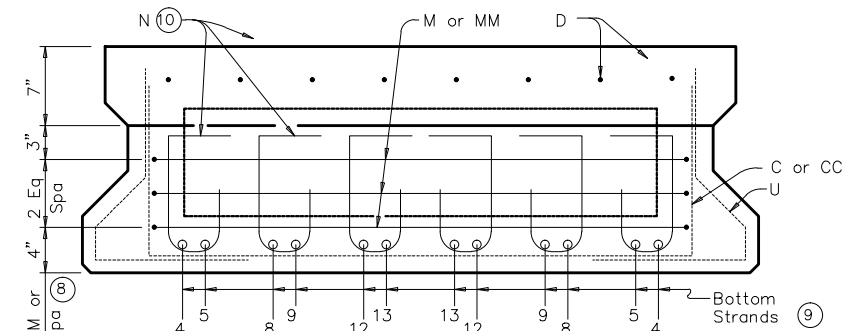
**PARTIAL PLAN ~ 30° SKEW**

(Showing Type 4B20)  
(use for skew angles greater than 15° and less than or equal to 30°)



**SECTION THRU BLOCKOUT ~ TYPE 4B20**

(Showing End Mat Reinforcing)



**SECTION THRU BLOCKOUT ~ TYPE 5B20**

(Showing End Mat Reinforcing)

- ⑥ Bars Z are required for beams topped with a cast-in-place concrete slab only.
- ⑦ Cut as required to maintain one inch clear between bars.
- ⑧ Bars M may be adjusted vertically as required to avoid pretensioning strands in web.
- ⑨ See Box Beam Design Form (BBND) for strand locations.
- ⑩ For Type 4B20 Box Beams: Bars N may be reduced to 4 bars per row when beam design contains fewer than 22 strands. In this case, place Bars N at the 5-6 and 8-9 strand locations.
- For Type 5B20 Box Beams: Bars N may be reduced to 5 bars per row when beam design contains fewer than 28 strands. In this case, place Bars N at the 4-5, 9-10 and 14-14 strand locations.

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**HARRIS COUNTY  
ENGINEERING DEPARTMENT**

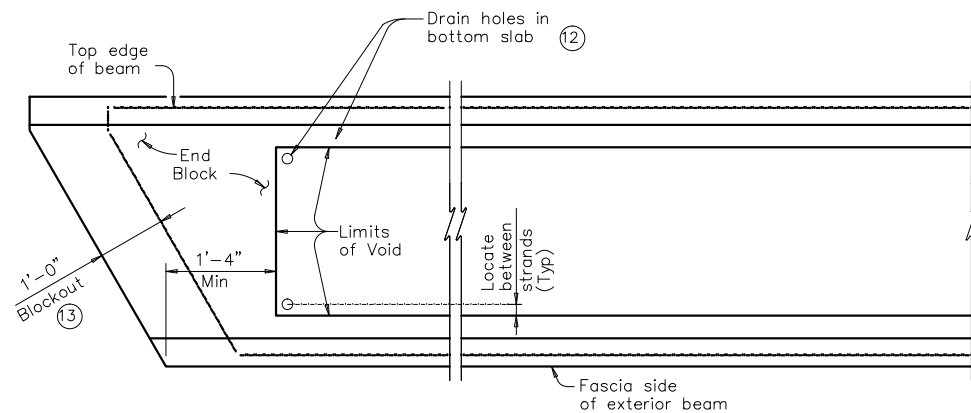


**FIRM INFO**

**SEAL  
NOTE**

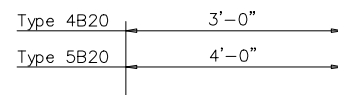
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SCALE:	FILE NO.:	(TYPE B20)(2 OF 3)	
DATE:	APPROVED BY:	SHT NO.:	02

HL93 LOADING

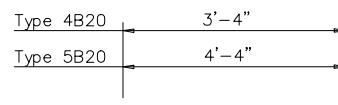


## BLOCKOUT, INTERIOR DIAPHRAGM AND DRAIN DETAILS

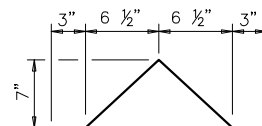
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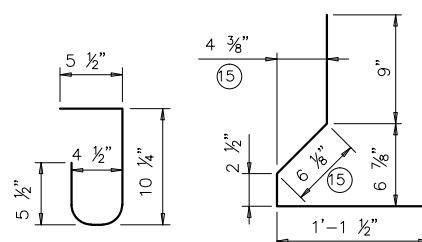
BARS A & C (#4)



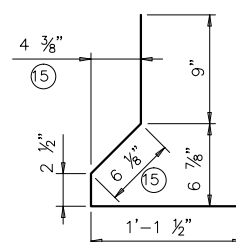
BARS B (#4)



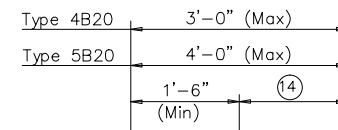
BARS F (#4)



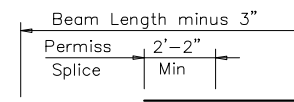
BARS N (#4)



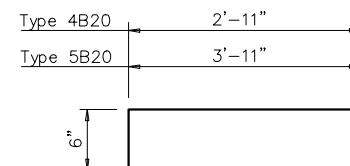
BARS U (#4)



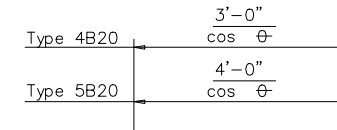
BARS AL & CL (#4)



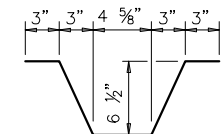
BARS D (#5)  
Permissible splices to  
be placed in middle  
third of span



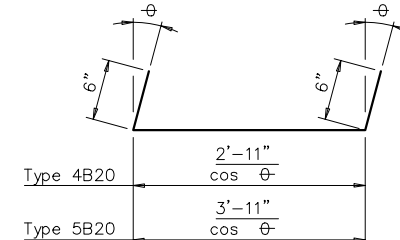
BARS M (#4)



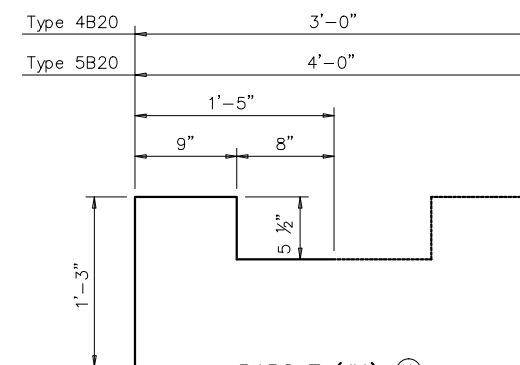
BARS AA & CC (#4)



BARS E (#4)



BARS MM (#4)



BARS Z (#4) (11)

At fabricator's option, Bars Z pairs may be fabricated using one continuous bar. If this option is used, Bars B at Bar Z locations (only) may be omitted.

- (11) Bars Z are required for beams topped with a cast-in-place concrete slab only.
- (12) Place drain holes (1" Dia PVC Sch 40 Pipe) as shown in all beam void corners including each side of interior diaphragms. See "Blockout, Interior Diaphragm, and Drain Details". Drain holes are not required if the void is formed with Expanded Polystyrene (foam).
- (13) Blockouts required at ends of all beams. Extend beam reinforcement into blockouts.
- (14) Cut as required to maintain one inch clear between bars.
- (15) Dimension will vary slightly with skew. Adjust as necessary.

HARRIS COUNTY  
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FIRM INFO

SEAL  
NOTE

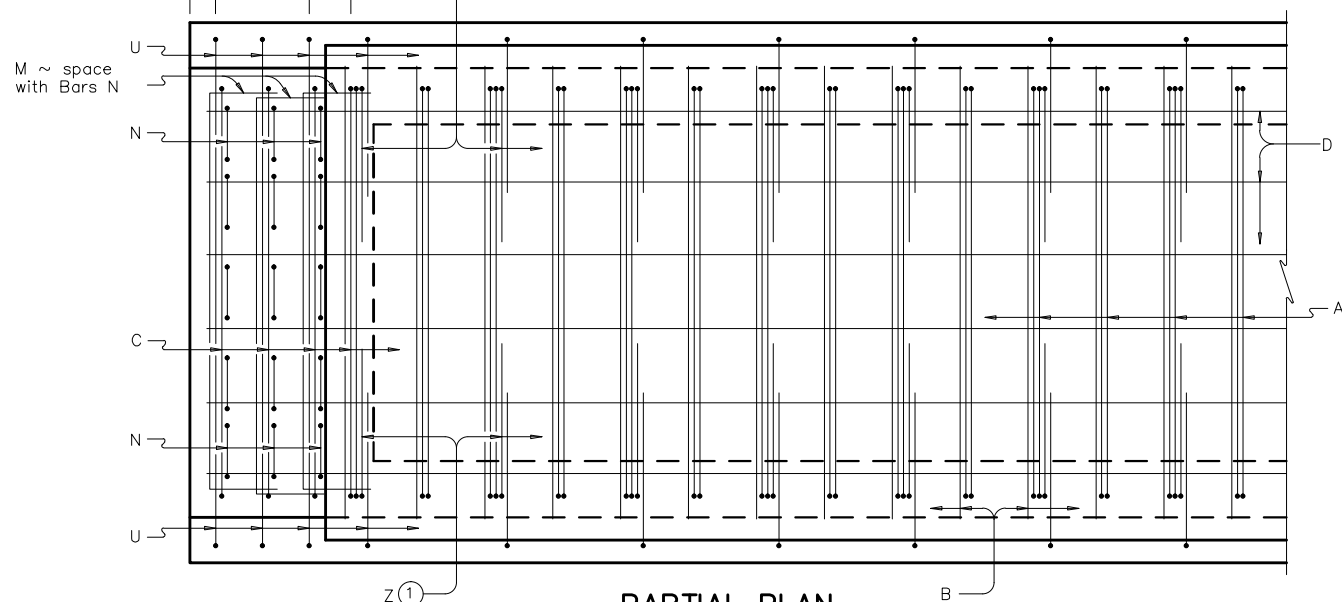
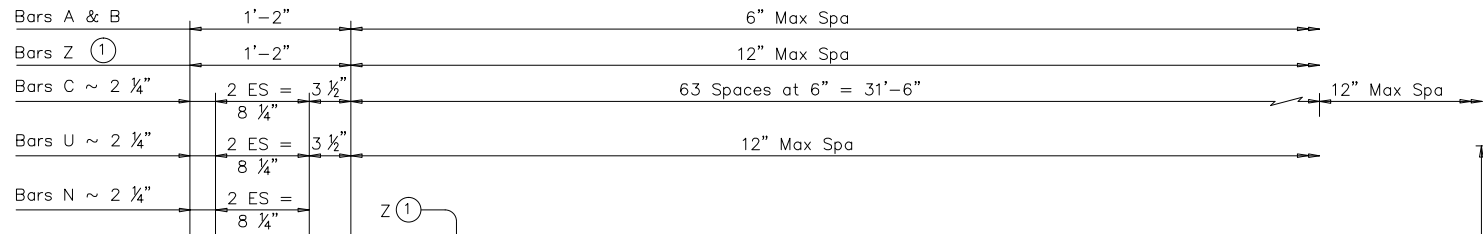
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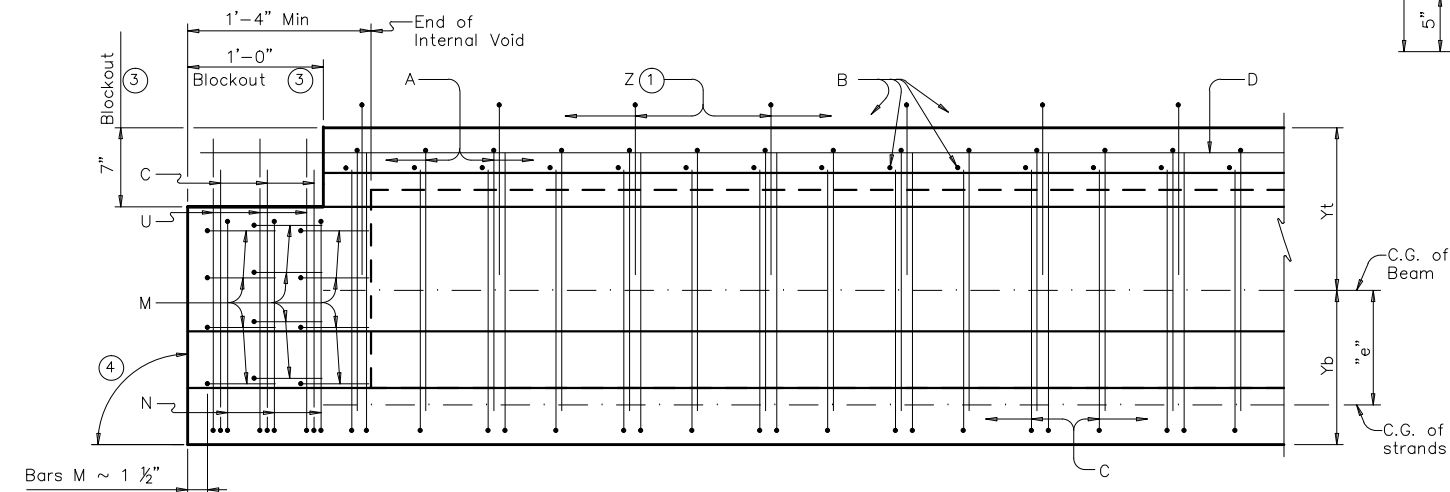
PRESTRESSED CONCRETE  
BOX BEAM DETAILS  
(TYPE B20)(3 OF 3)

03

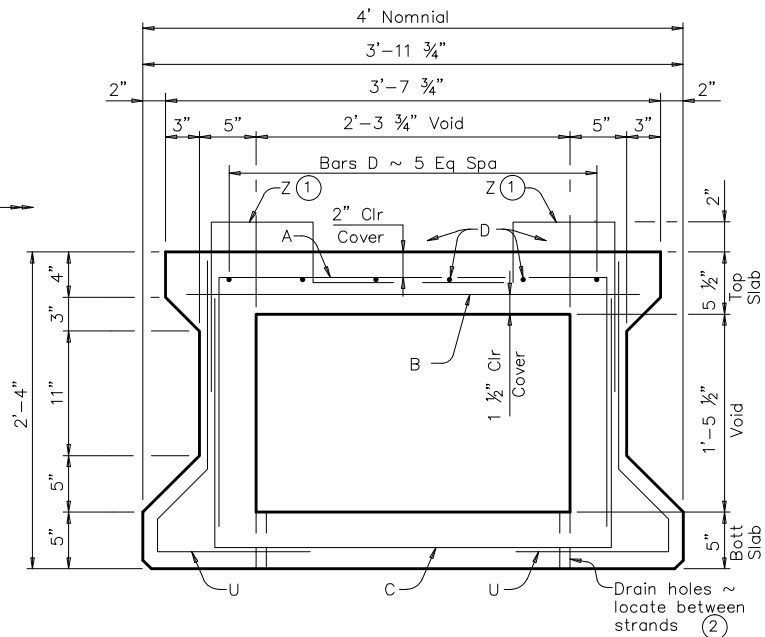




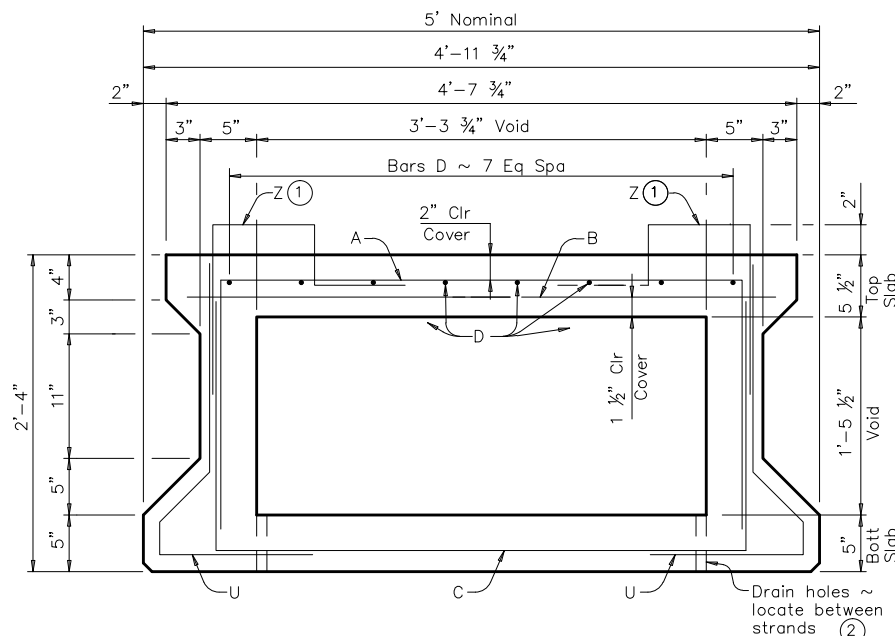
**PARTIAL PLAN**  
(Showing Type 4B28)



**ELEVATION**



**TYPICAL SECTION ~ TYPE 4B28**



**TYPICAL SECTION ~ TYPE 5B28**

BEAM PROPERTIES			
		Type 4B28	Type 5B28
Area	in <sup>2</sup>	678.8	804.8
Y top	in	14.38	14.26
Y bott	in	13.62	13.74
I	in <sup>4</sup>	68,745	85,370
Weight	lb/ft	707	838

- Bars Z are required for beams topped with a cast-in-place concrete slab only.
- Place drain holes (1" Dia PVC Sch 40 Pipe) as shown in all beam void corners including each side of interior diaphragms. See "Blockout, Interior Diaphragm, and Drain Details". Drain holes are not required if the void is formed with Expanded Polystyrene (foam).
- Blockouts required at ends of all beams. Extend beam reinforcement into blockouts.
- 90° at conventional Interior Bents. Ends of beams shall be vertical at Abutment backwall.
- Based on 150 pcf weight density of concrete. Weight of end blocks and interior diaphragms is not included.

**NOTES TO DESIGN ENGINEER:**

A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.

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B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT PLANS, AND SHALL ADJUST PAGE NUMBERS ACCORDINGLY.

C. THE DESIGN ENGINEER SHALL CONSULT THE HARRIS COUNTY DESIGN MANUAL AND SPECIFICATIONS FOR INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE BRIDGE PLANS.

E. THESE GUIDELINES ARE BASED ON THE TEXAS DEPARTMENT OF TRANSPORTATION BRIDGE STANDARDS, DATED AUGUST 2009. DESIGN ENGINEER SHALL UPDATE THESE DETAILS FOR ANY REVISIONS TO STANDARDS HEREAFTER.

**GENERAL NOTES:**

Designed according to AASHTO LRFD Specifications. See Harris County Specification Item 423 for the Casting, Prestressing, and Erection of Precast, Prestressed Beams. All reinforcing steel must be Grade 60.

Two-stage monolithic casting is required. The concrete in the first stage cast (bottom beam flange) must remain plastic until the second stage cast (webs and top beam flange) is placed. Vibrate as required to ensure consolidation between the two casts.

1 1/4" clear cover to reinforcement is required unless noted otherwise.

An equal area of welded wire reinforcement (WWR) meeting the requirements of ASTM A 497 may be substituted for Bars A, B, C, and D.

These details are applicable for skew angles up to 30 degrees only.

Chamfer bottom beam corners 3/4" or round to a 3/4" radius.

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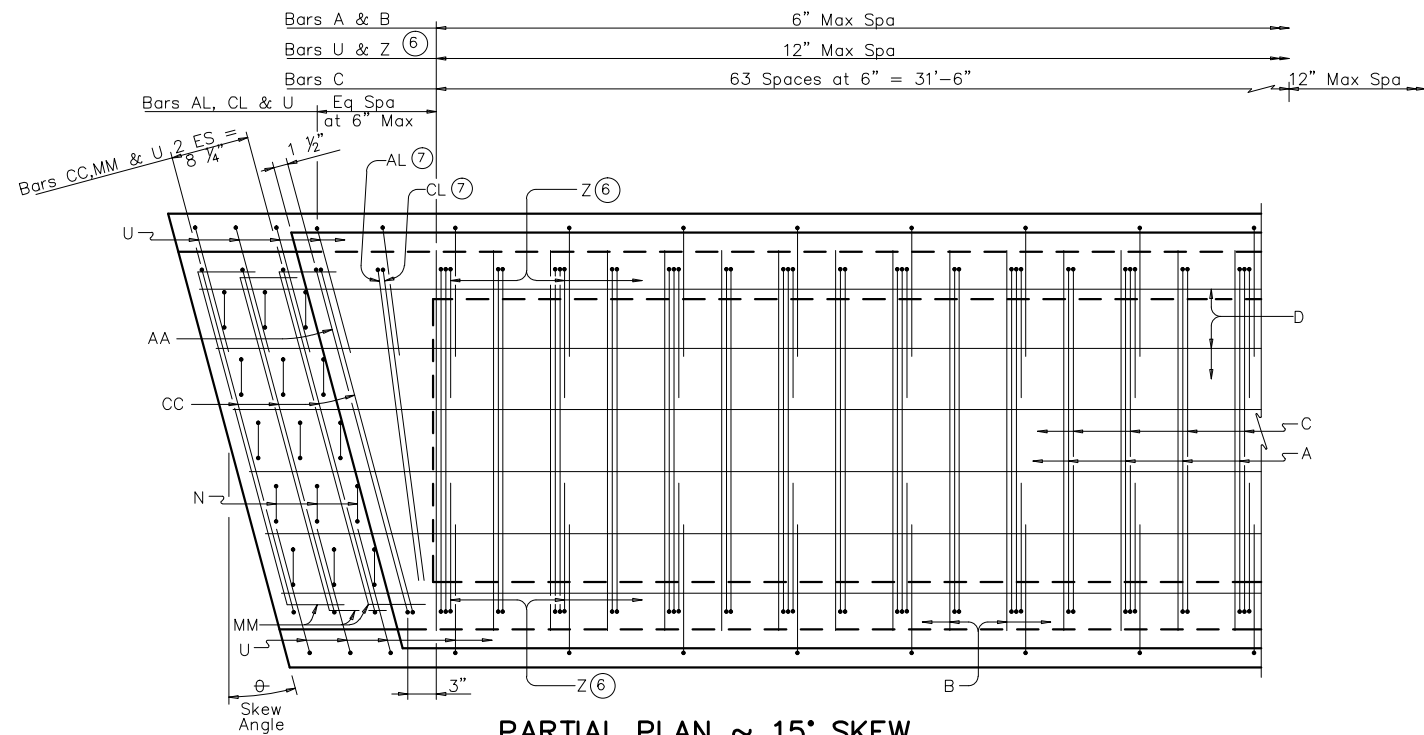
**HARRIS COUNTY  
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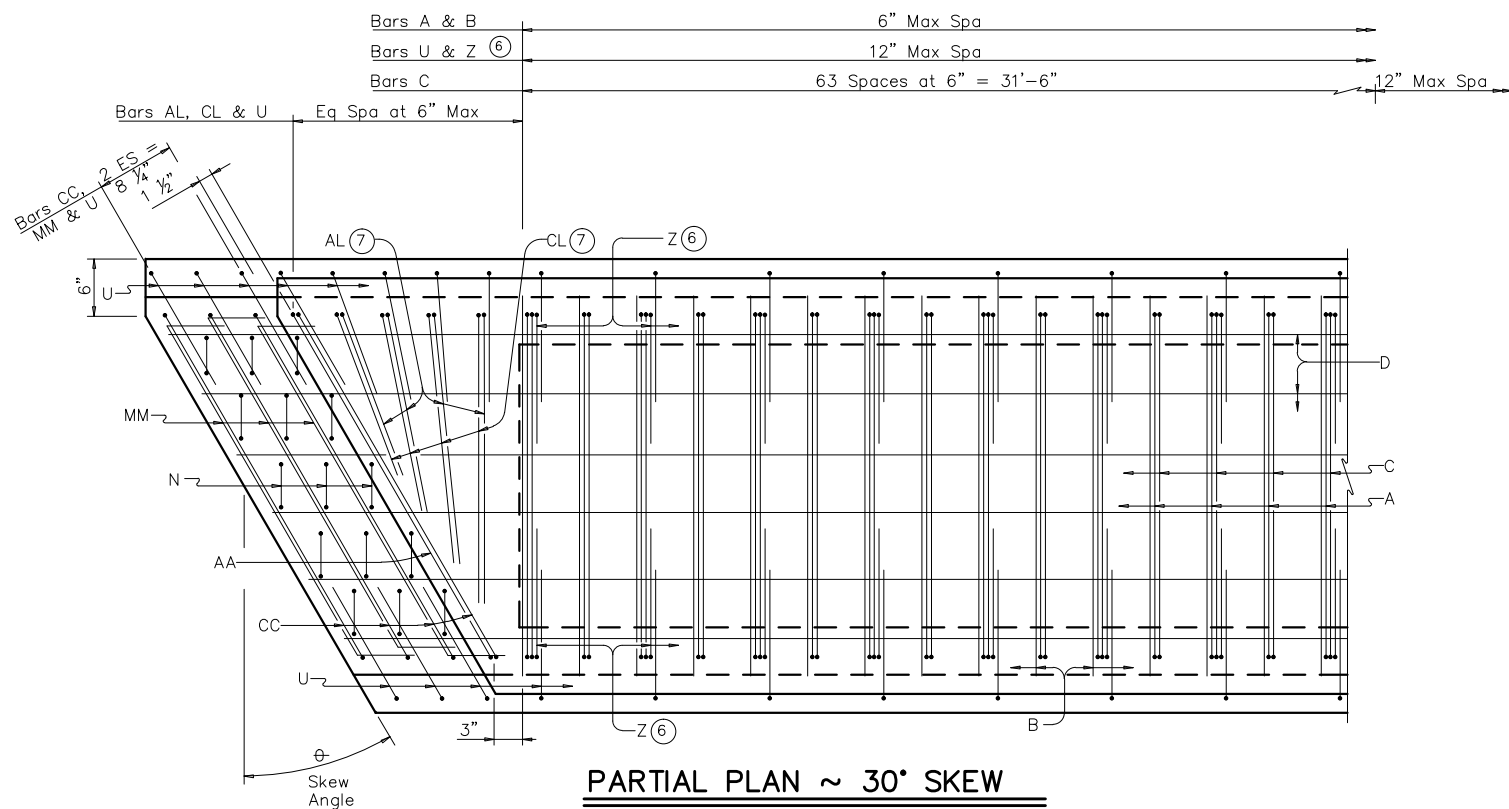
**FIRM INFO**

**SEAL  
NOTE**

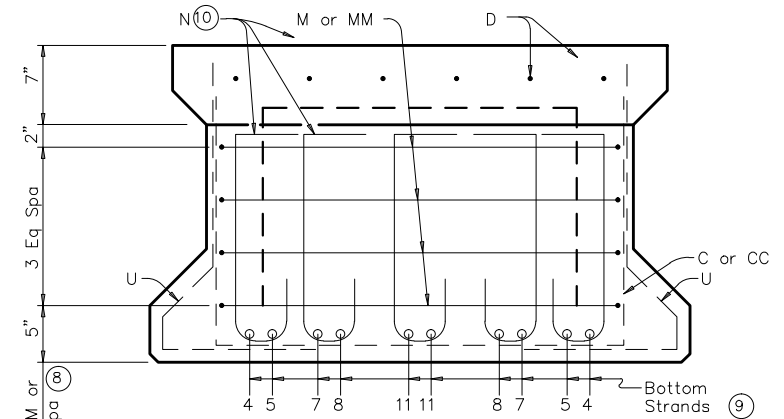
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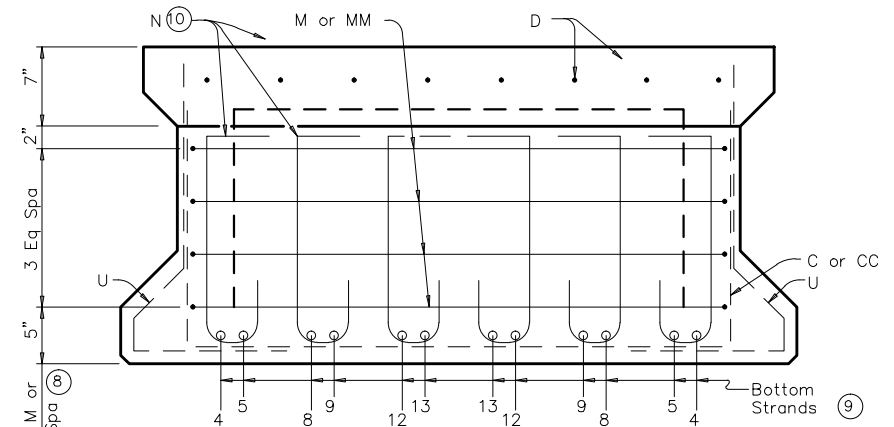
**PARTIAL PLAN ~ 15° SKEW**  
(Showing Type 4B28)  
(use for skew angles of 15° or less)



**PARTIAL PLAN ~ 30° SKEW**  
(Showing Type 4B28)  
(use for skew angles greater than 15° and less than or equal to 30°)



**SECTION THRU BLOCKOUT ~ TYPE 4B28**  
(Showing End Mat Reinforcing)



**SECTION THRU BLOCKOUT ~ TYPE 5B28**  
(Showing End Mat Reinforcing)

- ⑥ Bars Z are required for beams topped with a cast-in-place concrete slab only.
- ⑦ Cut as required to maintain one inch clear between bars.
- ⑧ Bars M may be adjusted vertically as required to avoid pretensioning strands in web.
- ⑨ See Box Beam Design Form (BBND) for strand locations.  
For Type 4B28 Box Beams: Bars N may be reduced to 4 bars per row when beam design contains fewer than 22 strands. In this case, place Bars N at the 5-6 and 8-9 strand locations.
- ⑩ For Type 5B28 Box Beams: Bars N may be reduced to 5 bars per row when beam design contains fewer than 28 strands. In this case, place Bars N at the 4-5, 9-10 and 14-14 strand locations.

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ENGINEERING DEPARTMENT**



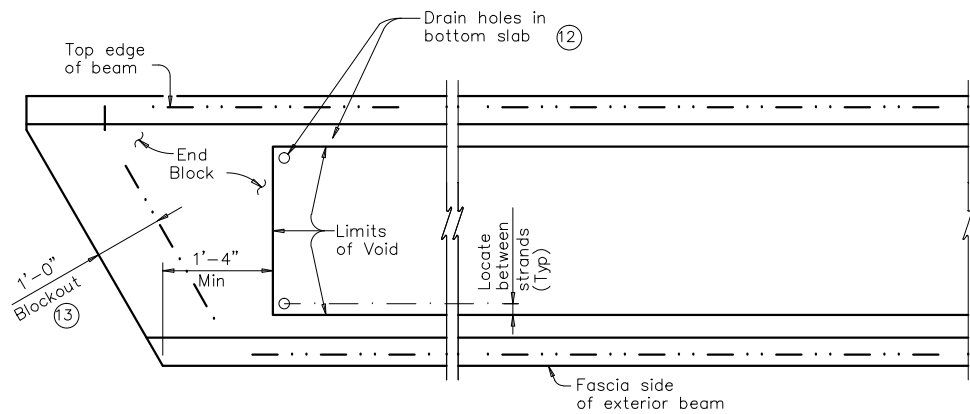
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NOTE**

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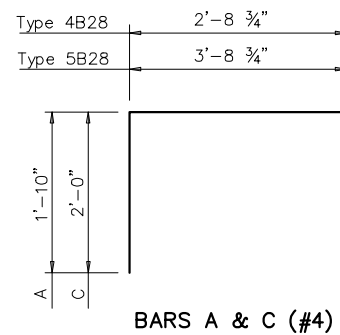
HL93 LOADING

**PRESTRESSED CONCRETE  
BOX BEAM DETAILS  
(TYPE B28) (2 OF 3)**

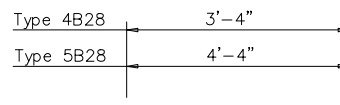


## BLOCKOUT, INTERIOR DIAPHRAGM AND DRAIN DETAILS

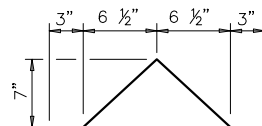
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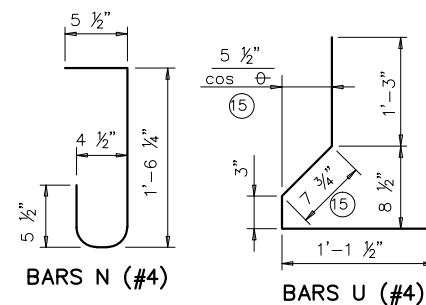
BARS A & C (#4)



BARS B (#4)

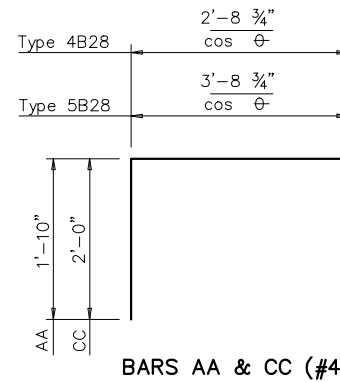


BARS F (#4)

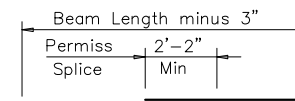


BARS N (#4)

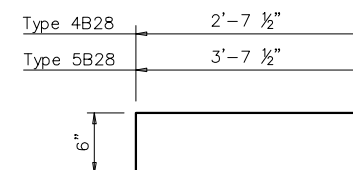
BARS U (#4)



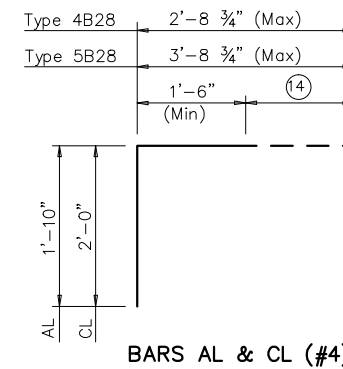
BARS AA & CC (#4)



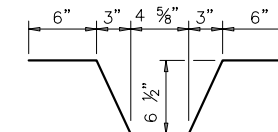
BARS D (#5)  
Permissible splices to be placed in middle third of span



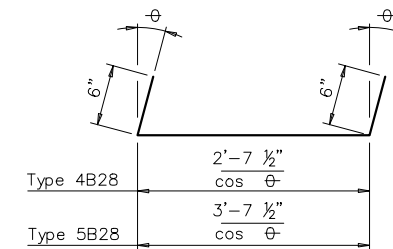
BARS M (#4)



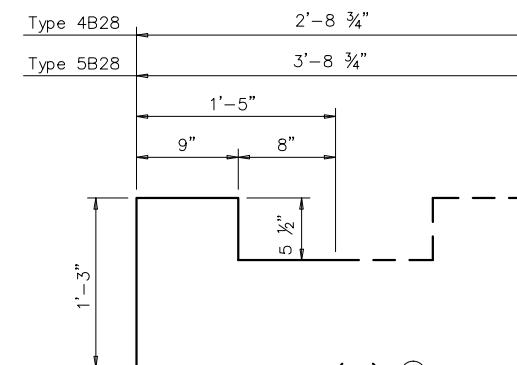
BARS AL & CL (#4)



BARS E (#4)



BARS MM (#4)



BARS Z (#4) (11)

At fabricator's option, Bars Z pairs may be fabricated using one continuous bar. If this option is used, Bars B at Bar Z locations (only) may be omitted.

- (11) Bars Z are required for beams topped with a cast-in-place concrete slab only.
- (12) Place drain holes (1" Dia PVC Sch 40 Pipe) as shown in all beam void corners including each side of interior diaphragms. See "Blockout, Interior Diaphragm, and Drain Details". Drain holes are not required if the void is formed with Expanded Polystyrene (foam).
- (13) Blockouts required at ends of all beams. Extend beam reinforcement into blockouts.
- (14) Cut as required to maintain one inch clear between bars.
- (15) Dimension will vary slightly with skew. Adjust as necessary.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O. AGUIRRE
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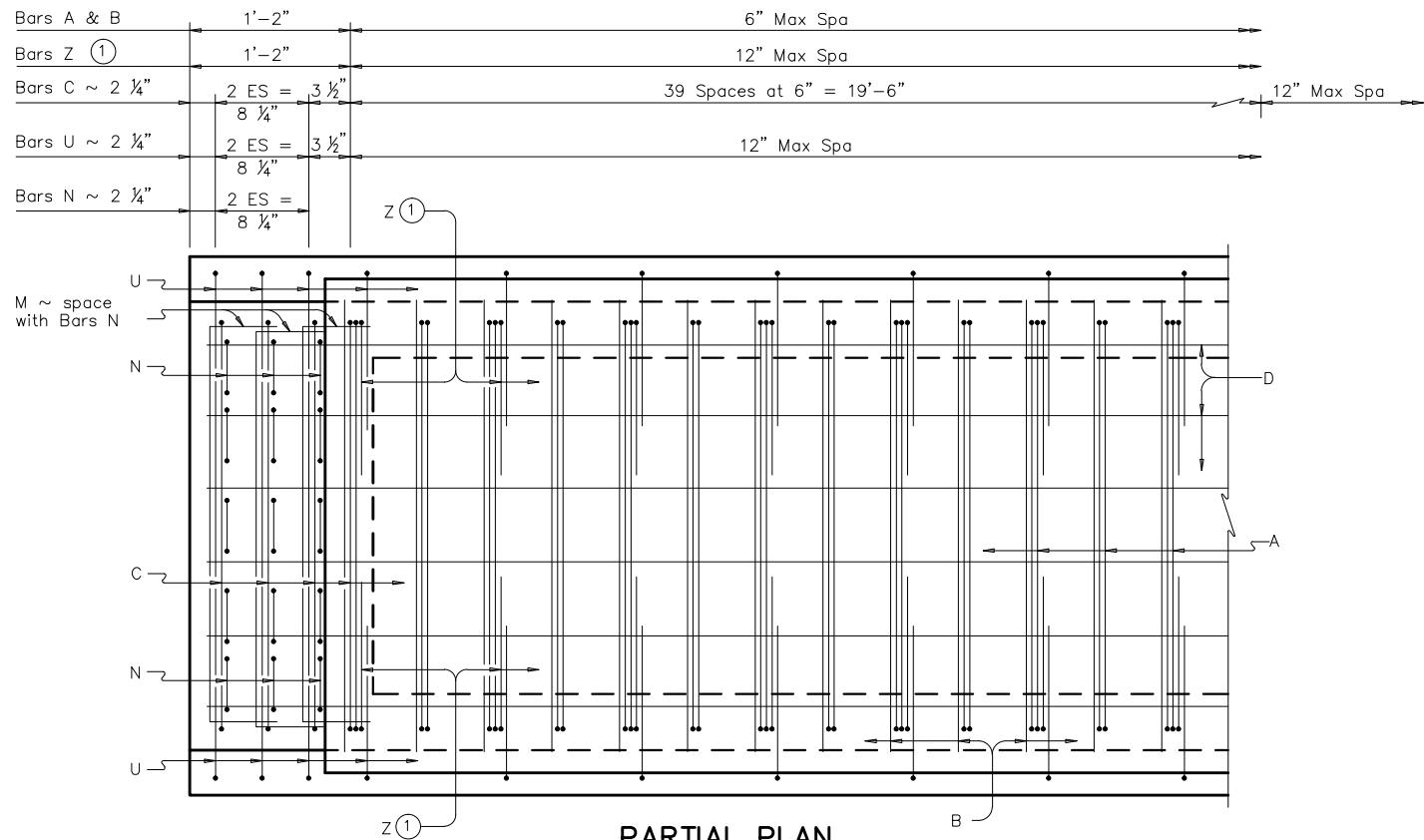
HARRIS COUNTY  
ENGINEERING DEPARTMENT



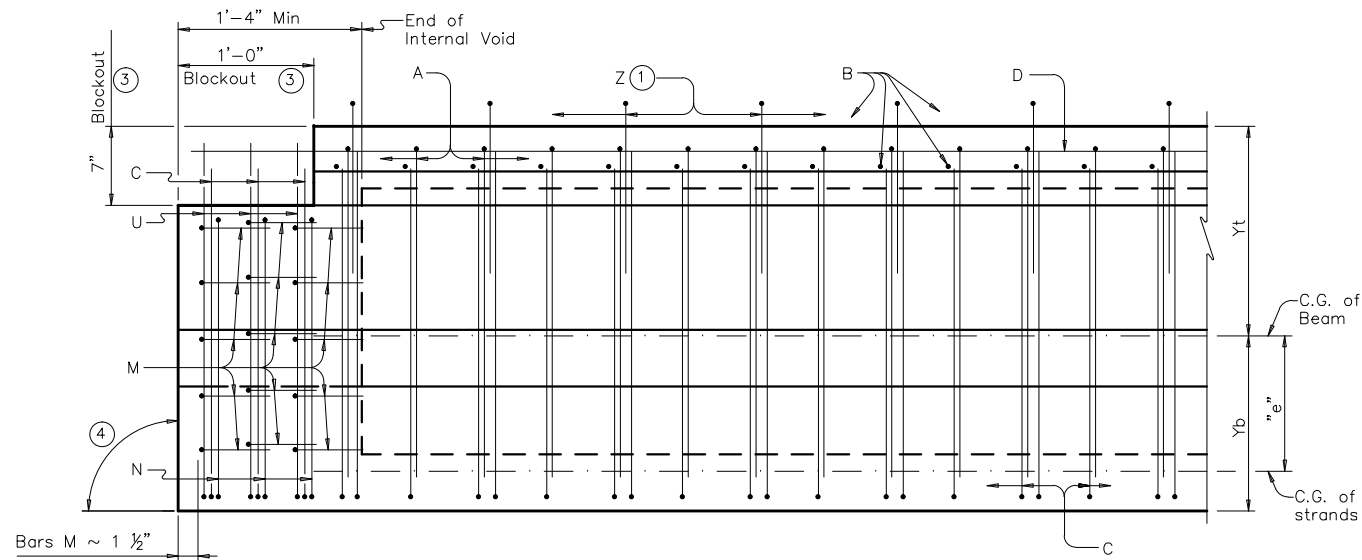
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NOTE

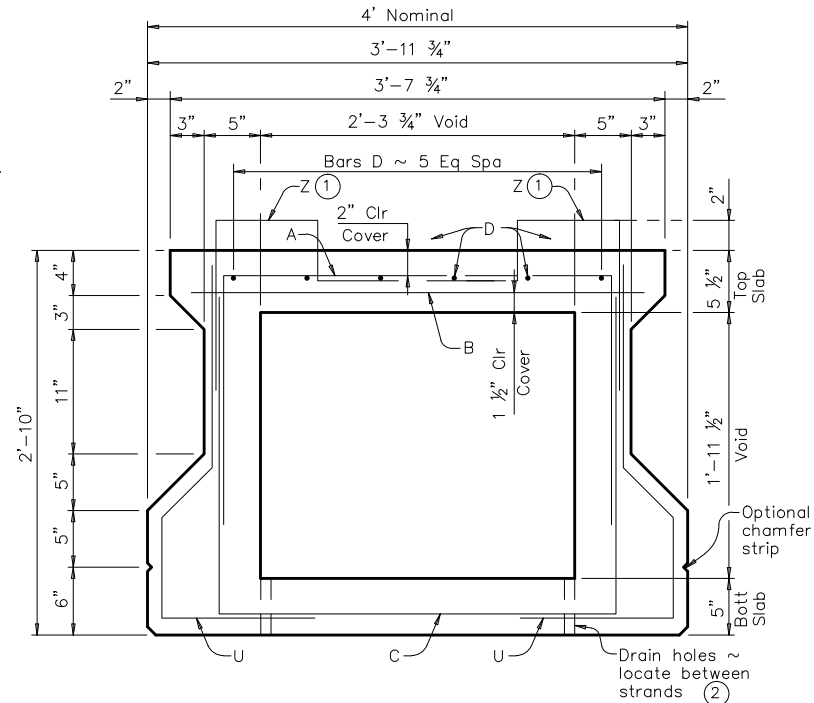
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DRAWN BY:	SHEET NO. 06	PRESTRESSED CONCRETE BOX BEAM DETAILS (TYPE B28) (3 OF 3)	
CHK'D BY:	FILE NO.:	JOB NO.:	
SCALE:	FILE NO.:	SHT NO. 06	
DATE:	APPROVED BY:		



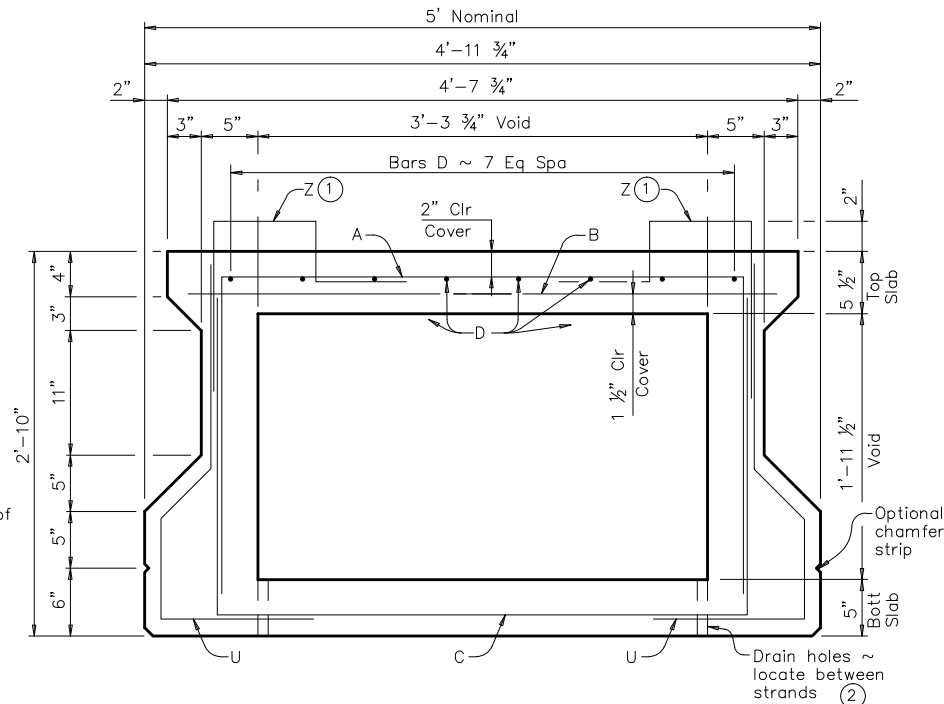
**PARTIAL PLAN**  
(Showing Type 4B34)



**ELEVATION**



**TYPICAL SECTION ~ TYPE 4B34**



**TYPICAL SECTION ~ TYPE 5B34**

- ① Bars Z are required for beams topped with a cast-in-place concrete slab only.
- ② Place drain holes (1" Dia PVC Sch 40 Pipe) as shown in all beam void corners including each side of interior diaphragms. See "Blockout, Interior Diaphragm, and Drain Details". Drain holes are not required if the void is formed with Expanded Polystyrene (foam).
- ③ Blockouts required at ends of all beams. Extend beam reinforcement into blockouts.
- ④ 90° at conventional Interior Bents. Ends of beams shall be vertical at Abutment backwall.
- ⑤ Based on 150 pcf weight density of concrete. Weight of end blocks and interior diaphragms is not included.

**NOTES TO DESIGN ENGINEER:**

- THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS. IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC PROJECT REQUIREMENTS.
- THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT PLANS, AND SHALL ADJUST PAGE NUMBERS ACCORDINGLY.
- THE DESIGN ENGINEER SHALL CONSULT THE HARRIS COUNTY DESIGN MANUAL AND SPECIFICATIONS FOR INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
- THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE BRIDGE PLANS.
- THESE GUIDELINES ARE BASED ON THE TEXAS DEPARTMENT OF TRANSPORTATION BRIDGE STANDARDS, DATED AUGUST 2009. DESIGN ENGINEER SHALL UPDATE THESE DETAILS FOR ANY REVISIONS TO STANDARDS HEREAFTER.

**BEAM PROPERTIES**

	Type 4B34	Type 5B34
Area	in <sup>2</sup>	798.8
Y top	in	17.92
Y bott	in	16.08
I	in <sup>4</sup>	115,655
Weight ⑤	lb/ft	832

**GENERAL NOTES:**

Designed according to AASHTO LRFD Specifications. See Harris County Specification Item 423 for the Casting, Prestressing, and Erection of Precast, Prestressed Beams.

All reinforcing steel must be Grade 60.

Two-stage monolithic casting is required. The concrete in the first stage cast (bottom beam flange) must remain plastic until the second stage cast (webs and top beam flange) is placed. Vibrate as required to ensure consolidation between the two casts.

1 1/2" clear cover to reinforcement is required unless noted otherwise.

An equal area of welded wire reinforcement (WWR) meeting the requirements of ASTM A 497 may be substituted for Bars A, B, C, and D.

These details are applicable for skews up to 30 degrees only.

Chamfer bottom beam corners 3/4" or round to a 3/4" radius.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O. AGUIRRE
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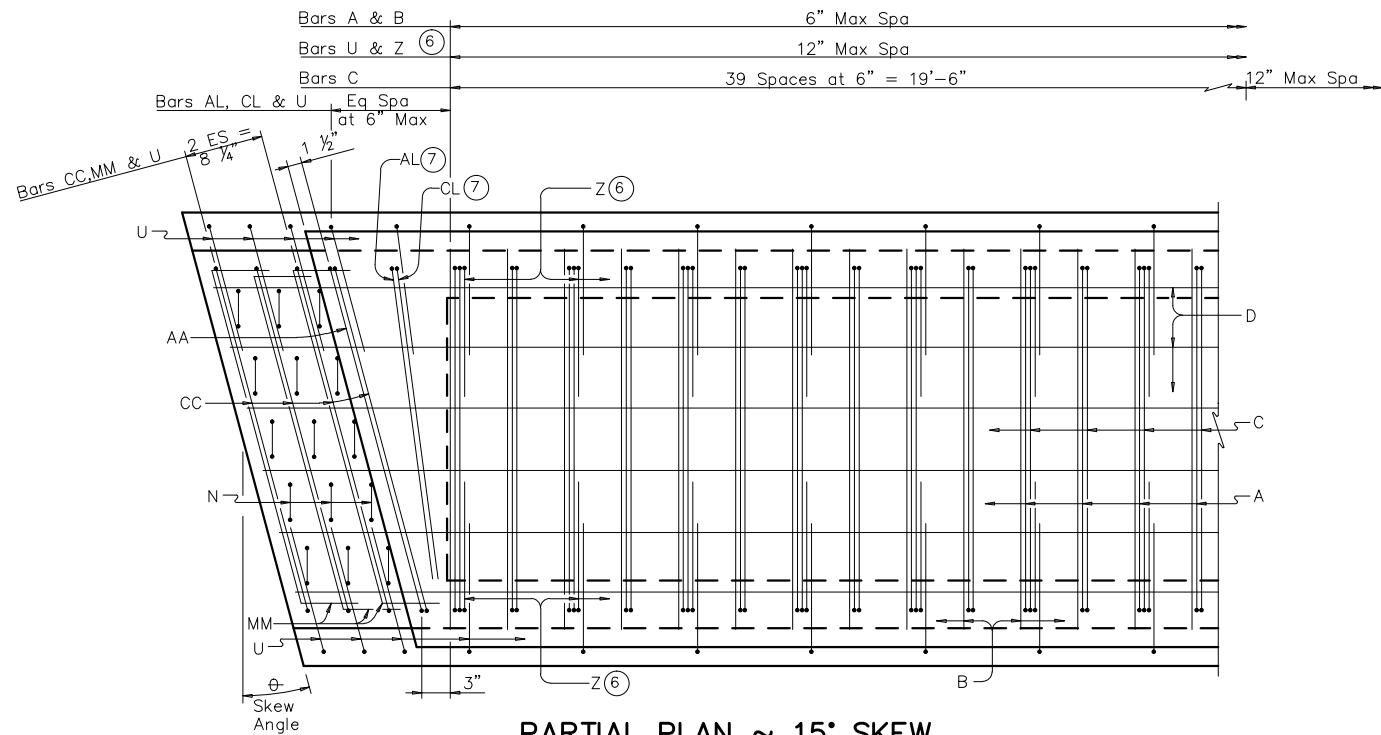
**HARRIS COUNTY  
ENGINEERING DEPARTMENT**



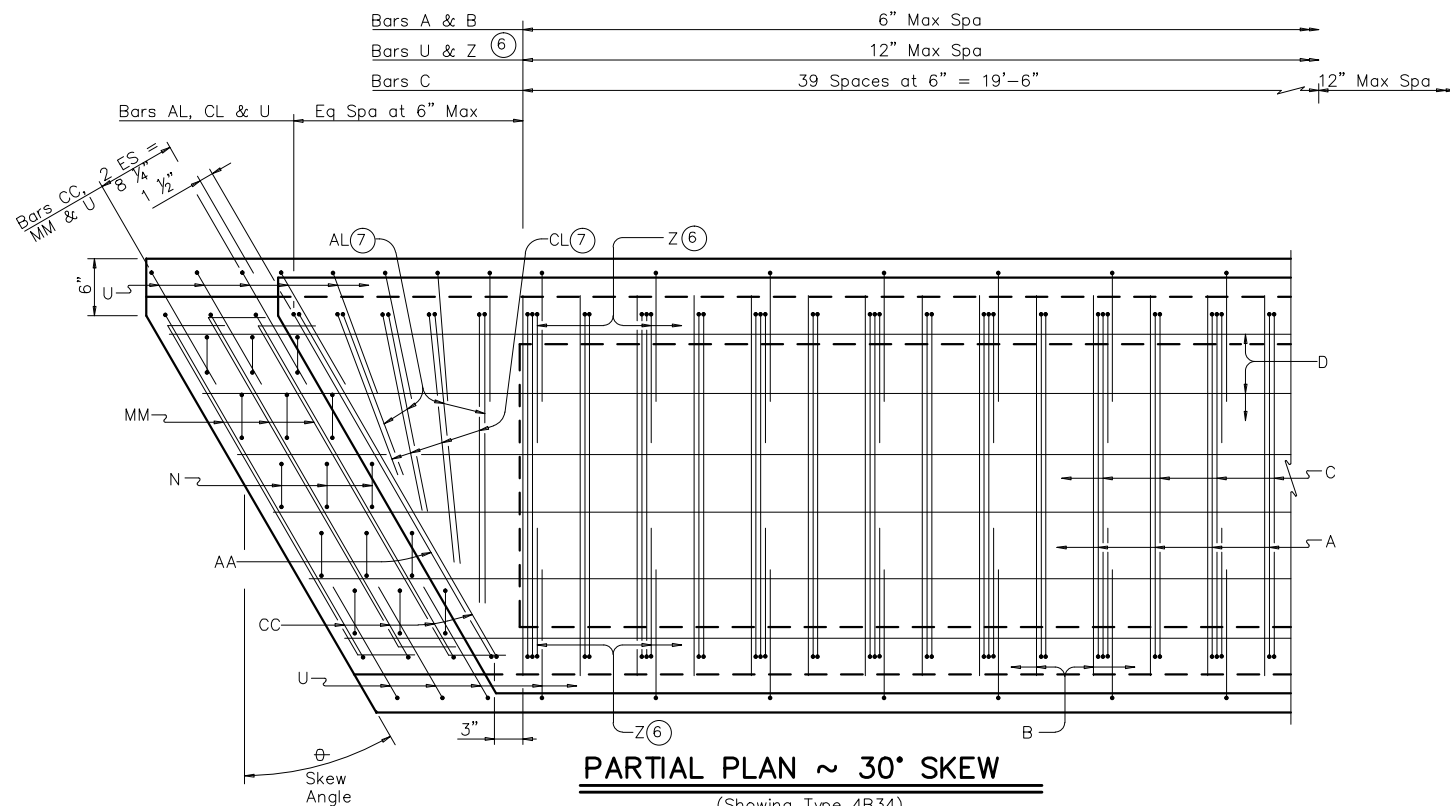
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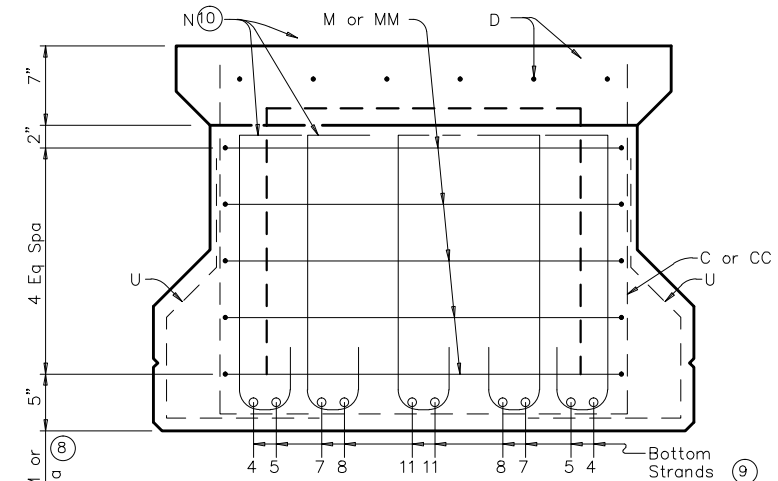
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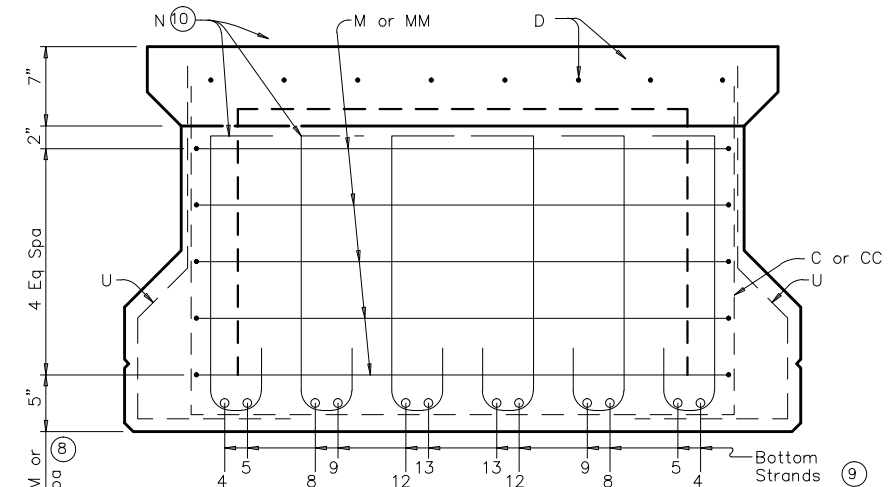
**PARTIAL PLAN ~ 15° SKEW**  
 (Showing Type 4B34)  
 (use for skew angles of 15° or less)



**PARTIAL PLAN ~ 30° SKEW**  
 (Showing Type 4B34)  
 (use for skew angles greater than 15° and less than or equal to 30°)



**SECTION THRU BLOCKOUT ~ TYPE 4B34**  
 (Showing End Mat Reinforcing)



**SECTION THRU BLOCKOUT ~ TYPE 5B34**  
 (Showing End Mat Reinforcing)

- ⑥ Bars Z are required for beams topped with a cast-in-place concrete slab only.
- ⑦ Cut as required to maintain one inch clear between bars.
- ⑧ Bars M may be adjusted vertically as required to avoid pretensioning strands in web.
- ⑨ See Box Beam Design Form (BBND) for strand locations.
- ⑩ For Type 4B34 Box Beams: Bars N may be reduced to 4 bars per row when beam design contains fewer than 22 strands. In this case, place Bars N at the 5-6 and 8-9 strand locations.
- For Type 5B34 Box Beams: Bars N may be reduced to 5 bars per row when beam design contains fewer than 28 strands. In this case, place Bars N at the 4-5, 9-10 and 14-14 strand locations.

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**HARRIS COUNTY  
ENGINEERING DEPARTMENT**

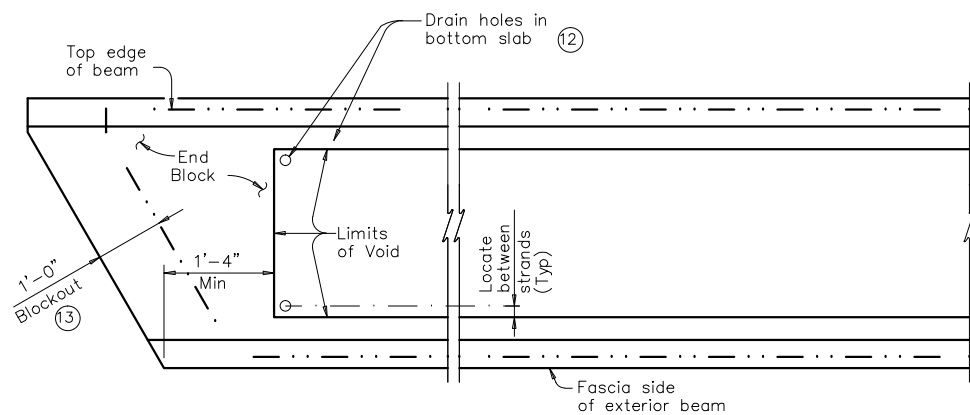


**FIRM INFO**

**SEAL  
NOTE**

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CHK'D BY:	SCALE:	FILE NO.:	
DATE:	APPROVED BY:	SHT NO.:	08

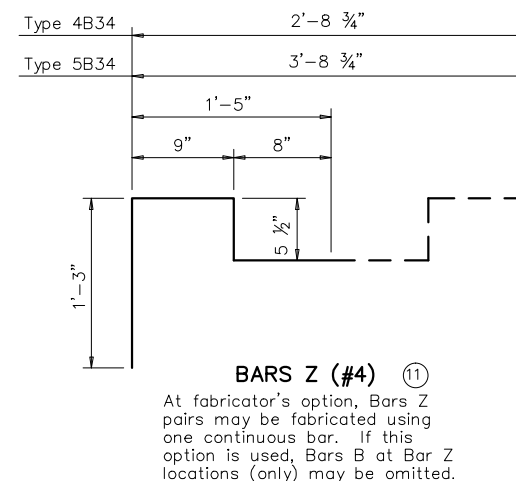
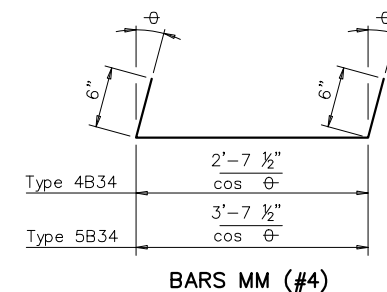
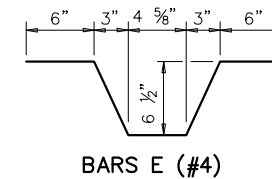
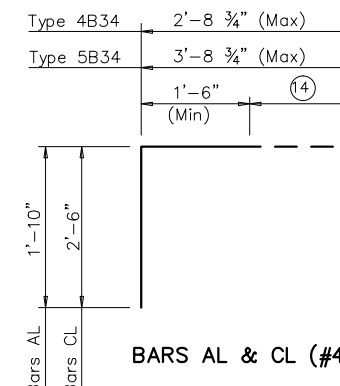
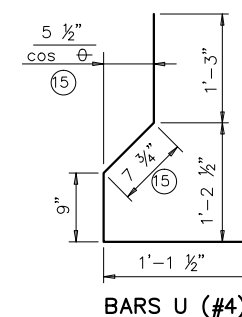
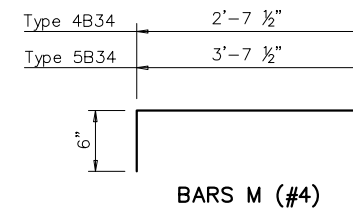
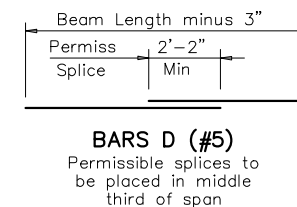
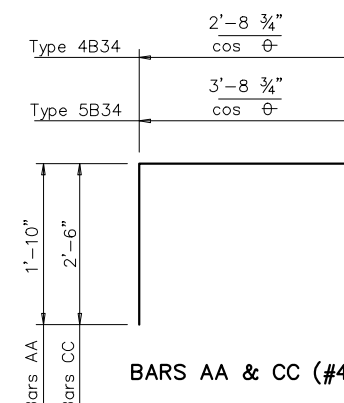
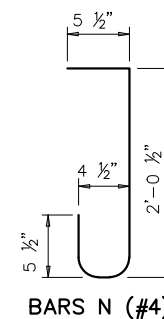
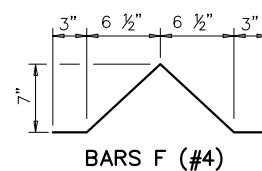
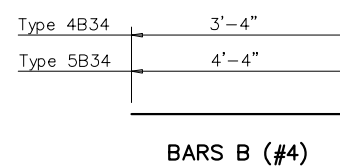
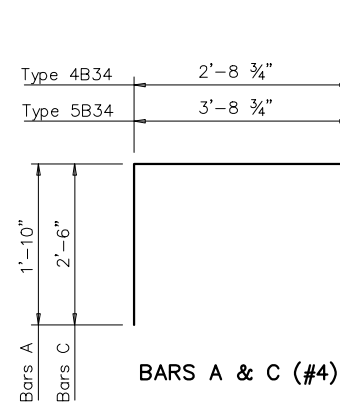
HL93 LOADING



## BLOCKOUT, INTERIOR DIAPHRAGM AND DRAIN DETAILS

(Showing 30° skew)

- (11) Bars Z are required for beams topped with a cast-in-place concrete slab only.
- (12) Place drain holes (1" Dia PVC Sch 40 Pipe) as shown in all beam void corners including each side of interior diaphragms. See "Blockout, Interior Diaphragm, and Drain Details". Drain holes are not required if the void is formed with Expanded Polystyrene (foam).
- (13) Blockouts required at ends of all beams. Extend beam reinforcement into blockouts.
- (14) Cut as required to maintain one inch clear between bars.
- (15) Dimension will vary slightly with skew. Adjust as necessary.



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0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
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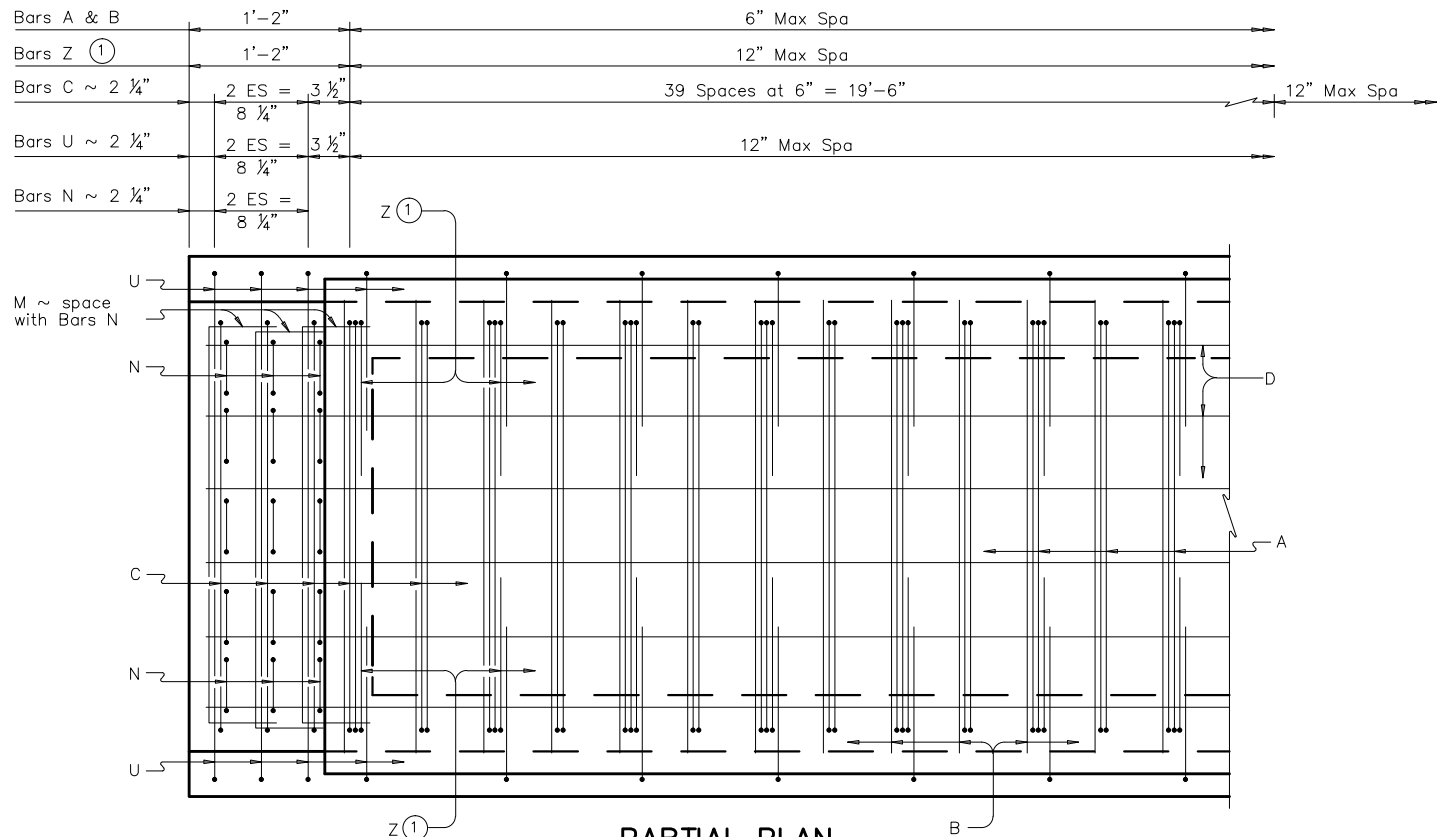
**HARRIS COUNTY  
ENGINEERING DEPARTMENT**



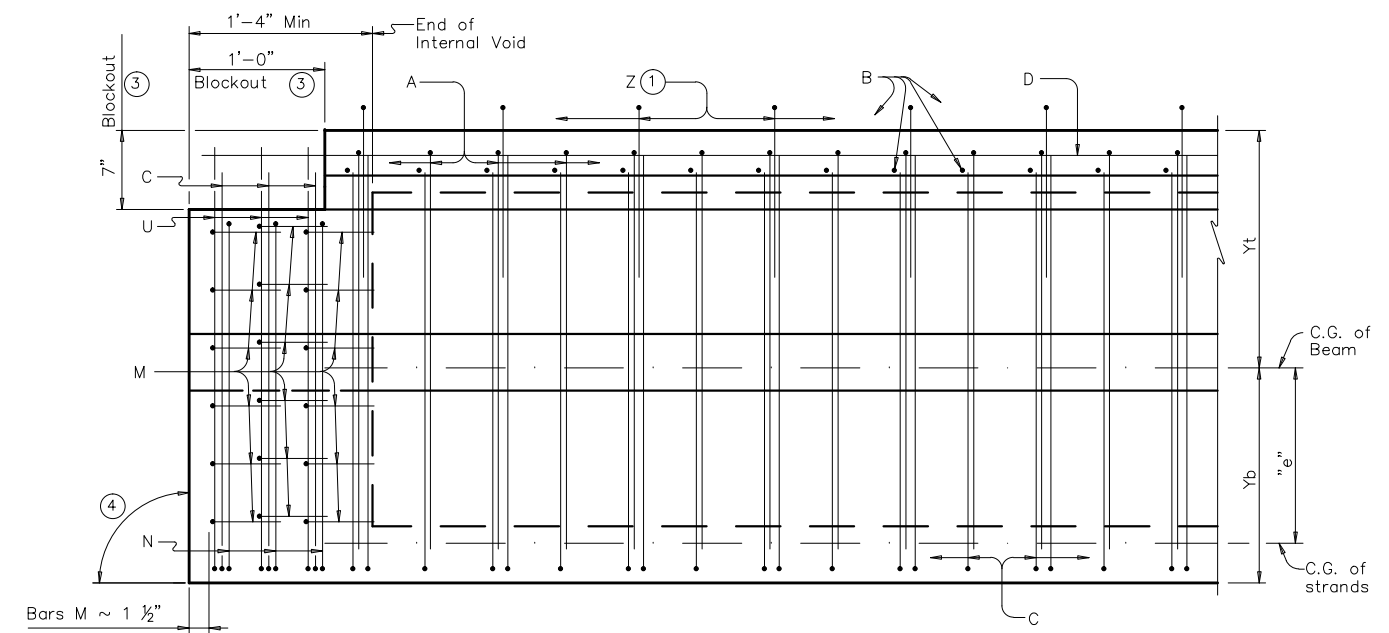
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**SEAL  
NOTE**

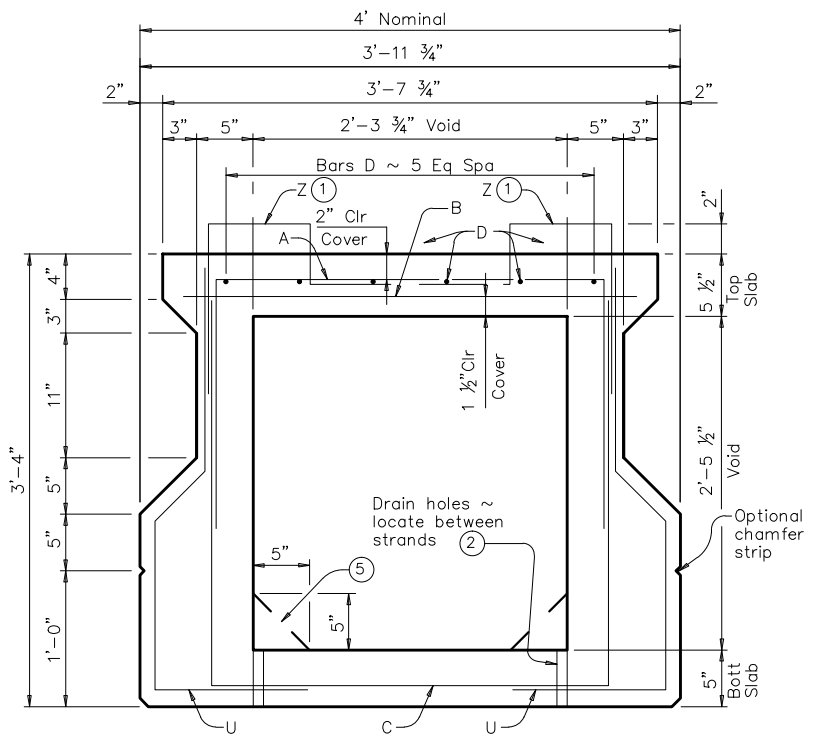
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DRAWN BY:	SHEET NO.:	<b>PRESTRESSED CONCRETE</b>	
CHK'D BY:	FILE NAME:	<b>BOX BEAM DETAILS</b>	
SCALE:	FILE NO.:	<b>(TYPE B34)(3 OF 3)</b>	
DATE:	APPROVED BY:	SHT NO.:	09



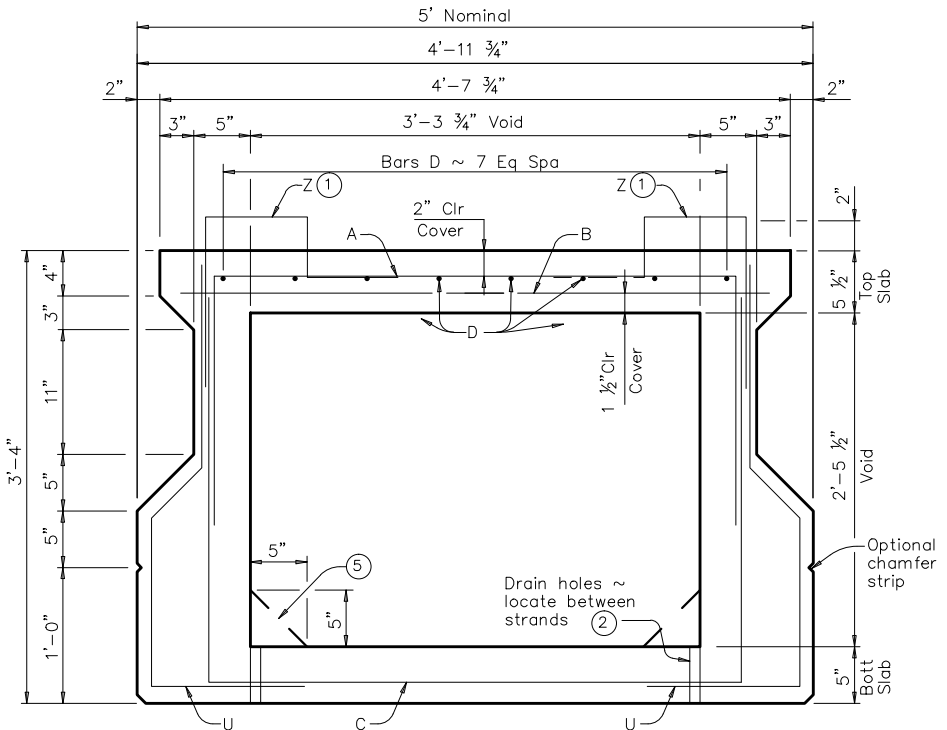
**PARTIAL PLAN**  
(Showing Type 4B40)



**ELEVATION**



**TYPICAL SECTION ~ TYPE 4B40**



**TYPICAL SECTION ~ TYPE 5B40**

- ① Bars Z are required for beams topped with a cast-in-place concrete slab only.
- ② Place drain holes (1" Dia PVC Sch 40 Pipe) as shown in all beam void corners including each side of interior diaphragms. See "Blockout, Interior Diaphragm, and Drain Details". Drain holes are not required if the void is formed with Expanded Polystyrene (foam).
- ③ Blockouts required at ends of all beams. Extend beam reinforcement into blockouts.
- ④ 90° at conventional Interior Bents. Ends of beams shall be vertical at Abutment Backwall.
- ⑤ Add chamfers as shown when beam length is over 100 ft. Locate drain holes at toe of chamfers.

**NOTES TO DESIGN ENGINEER:**

A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.

IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC PROJECT REQUIREMENTS.

B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT PLANS, AND SHALL ADJUST PAGE NUMBERS ACCORDINGLY.

C. THE DESIGN ENGINEER SHALL CONSULT THE HARRIS COUNTY DESIGN MANUAL AND SPECIFICATIONS FOR INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE BRIDGE PLANS.

E. THESE GUIDELINES ARE BASED ON THE TEXAS DEPARTMENT OF TRANSPORTATION BRIDGE STANDARDS, DATED AUGUST 2009. DESIGN ENGINEER SHALL UPDATE THESE DETAILS FOR ANY REVISIONS TO STANDARDS HEREAFTER.

**GENERAL NOTES:**

Designed according to AASHTO LRFD Specifications. See Harris County Specification Item 423 for the Casting, Prestressing, and Erection of Precast, Prestressed Beams.

All reinforcing steel must be Grade 60.

Two-stage monolithic casting is required. The concrete in the first stage cast (bottom beam flange) must remain plastic until the second stage cast (webs and top beam flange) is placed. Vibrate as required to ensure consolidation between the two casts.

1 1/4" clear cover to reinforcement is required unless noted otherwise.

An equal area of welded wire reinforcement (WWR) meeting the requirements of ASTM A 497 may be substituted for Bars A, B, C, and D.

These details are applicable for skews up to 30 degrees only.

Chamfer bottom beam corners 3/4" or round to a 3/4" radius.

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ENGINEERING DEPARTMENT**

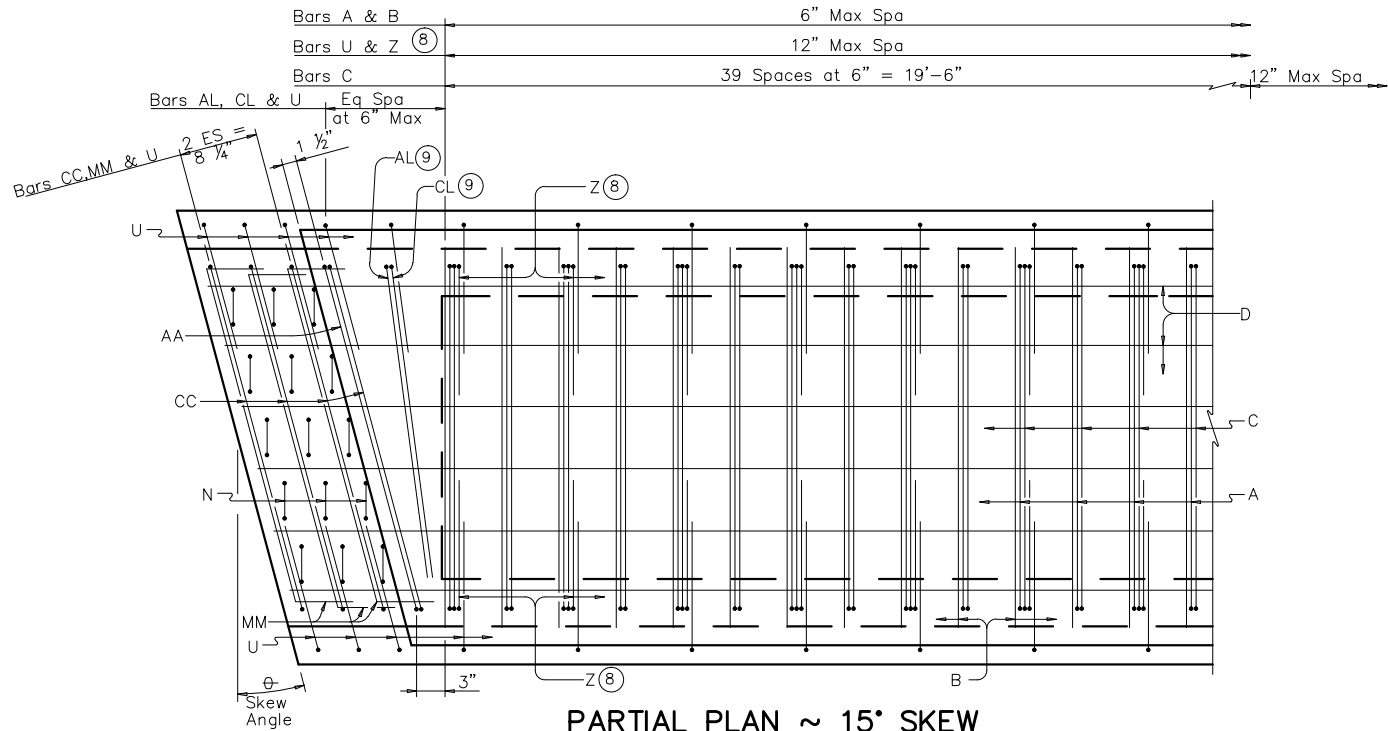


**FIRM INFO**

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NOTE**

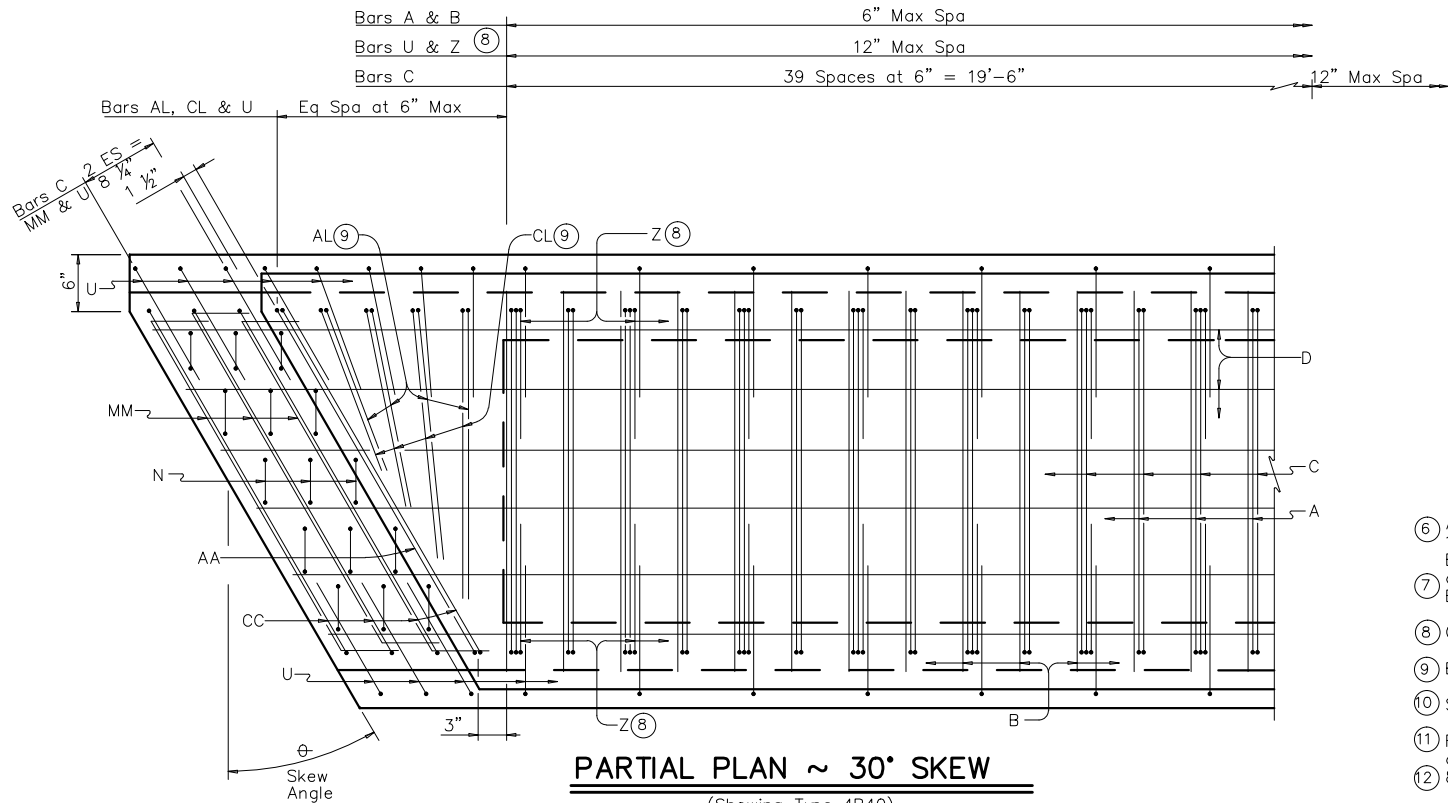
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DRAWN BY:	SHEET NO.:	JOB NO.:	
CK'D BY:	FILE NAME:		FILE NO.:
SCALE:	FILE NO.:		SHT NO.:
DATE:	APPROVED BY:	10	

**PRESTRESSED CONCRETE  
BOX BEAM DETAILS  
(TYPE B40)(1 OF 3)**



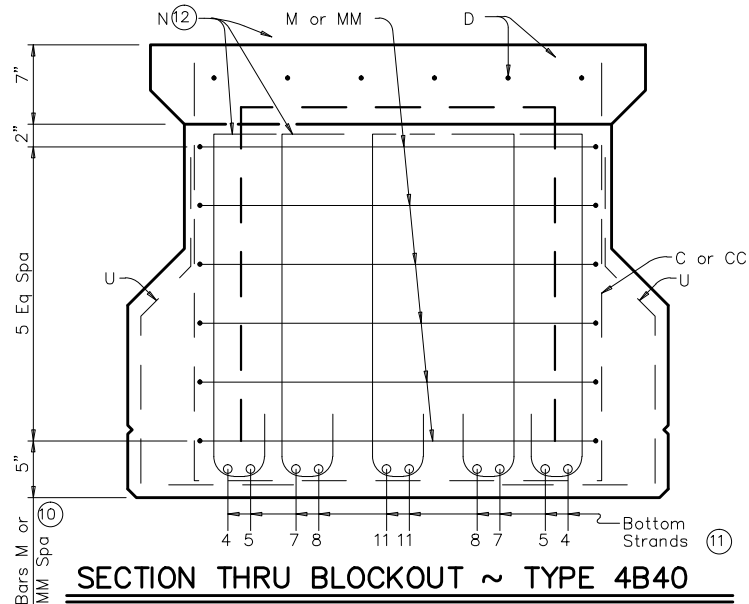
**PARTIAL PLAN ~ 15° SKEW**

(Showing Type 4B40)  
(use for skew angles of 15° or less)

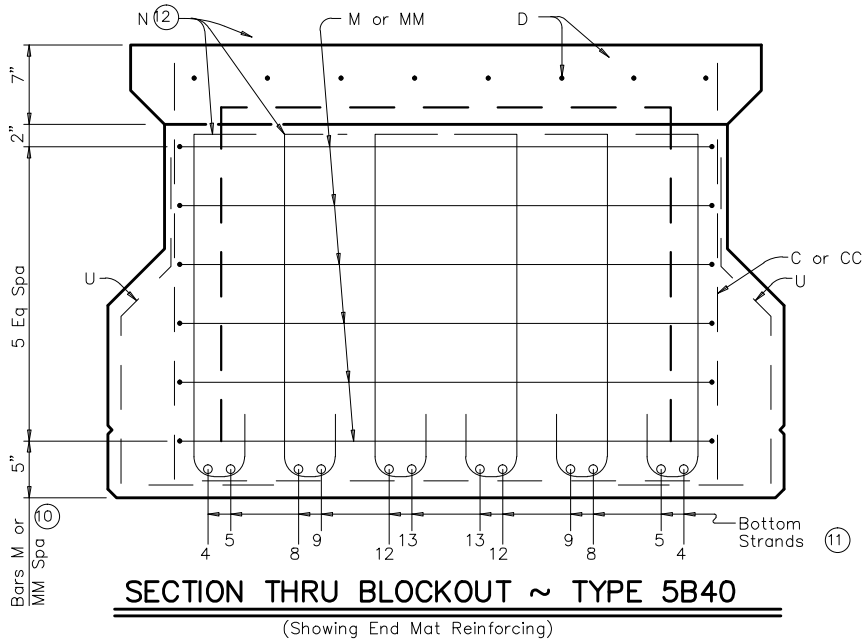


**PARTIAL PLAN ~ 30° SKEW**

(Showing Type 4B40)  
(use for skew angles greater than 15° and less than or equal to 30°)



(Showing End Mat Reinforcing)



(Showing End Mat Reinforcing)

- ⑥ Add chamfers as shown when beam length is over 100 ft. Locate drain holes at toe of chamfers. Based on 150 pcf weight density of concrete. Weight of end blocks and interior diaphragms is not included.
- ⑦ Bars Z are required for beams topped with a cast-in-place concrete slab only.
- ⑧ Cut as required to maintain one inch clear between bars.
- ⑨ Bars M may be adjusted vertically as required to avoid pretensioning strands in web.
- ⑩ See Box Beam Design Form (BBND) for strand locations.
- ⑪ For Type 4B40 Box Beams: Bars N may be reduced to 4 bars per row when beam design contains fewer than 22 strands. In this case, place Bars N at the 5-6 and 8-9 strand locations.
- ⑫ For Type 5B40 Box Beams: Bars N may be reduced to 5 bars per row when beam design contains fewer than 28 strands. In this case, place Bars N at the 4-5, 9-10 and 14-14 strand locations.

## BEAM PROPERTIES

		Type 4B40		Type 5B40	
		100 feet or less	over 100 feet ⑧	100 feet or less	over 100 feet ⑧
Area	in <sup>2</sup>	918.8	943.8	1044.8	1069.8
Y top	in	21.31	21.63	21.07	21.36
Y bott	in	18.69	18.37	18.93	18.64
I	in <sup>4</sup>	176,607	180,159	215,300	219,007
Weight ⑦	lb/ft	957	983	1,088	1,114

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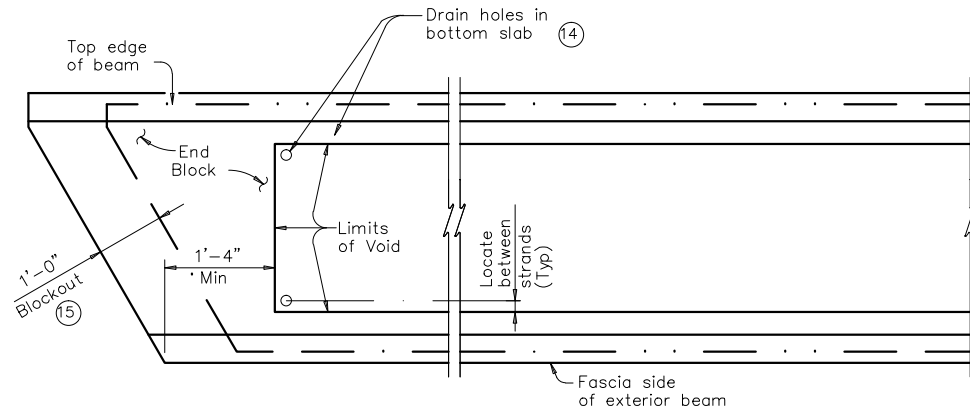
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**SEAL  
NOTE**

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DATE:	APPROVED BY:	FILE NO.:	SHT NO.:
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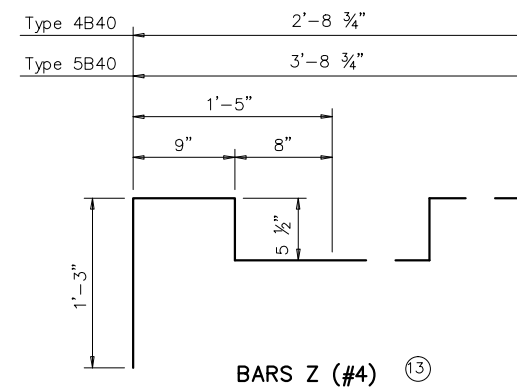
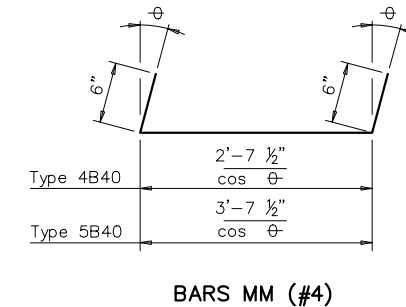
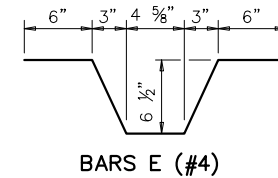
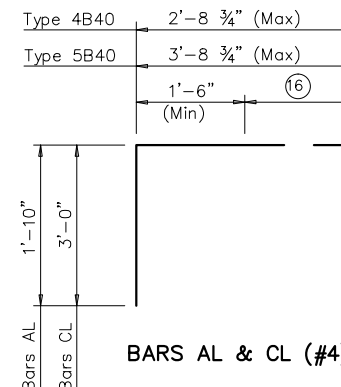
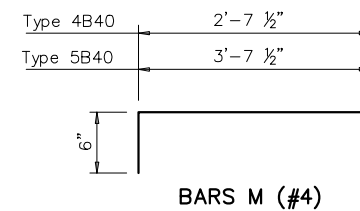
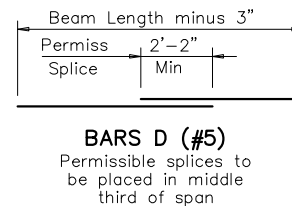
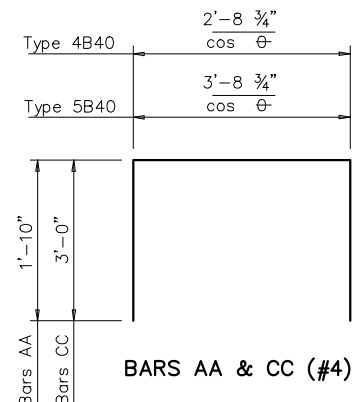
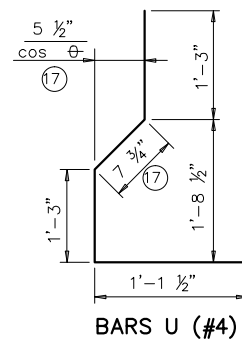
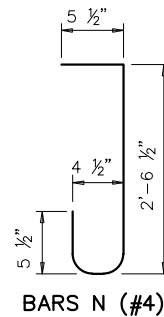
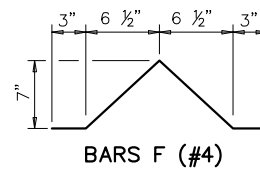
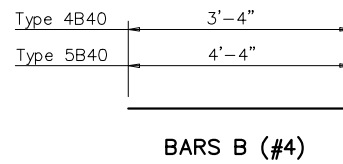
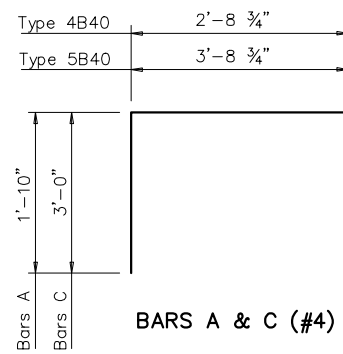
HL93 LOADING





## BLOCKOUT, INTERIOR DIAPHRAGM AND DRAIN DETAILS

(Showing 30° skew)



At fabricator's option, Bars Z pairs may be fabricated using one continuous bar. If this option is used, Bars B at Bar Z locations (only) may be omitted.

- (13) Bars Z are required for beams topped with a cast-in-place concrete slab only.
- (14) Place drain holes (1" Dia PVC Sch 40 Pipe) as shown in all beam void corners including each side of interior diaphragms. See "Blockout, Interior Diaphragm, and Drain Details". Drain holes are not required if the void is formed with Expanded Polystyrene (foam).
- (15) Blockouts required at ends of all beams. Extend beam reinforcement into blockouts.
- (16) Cut as required to maintain one inch clear between bars.
- (17) Dimension will vary slightly with skew. Adjust as necessary.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGURRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

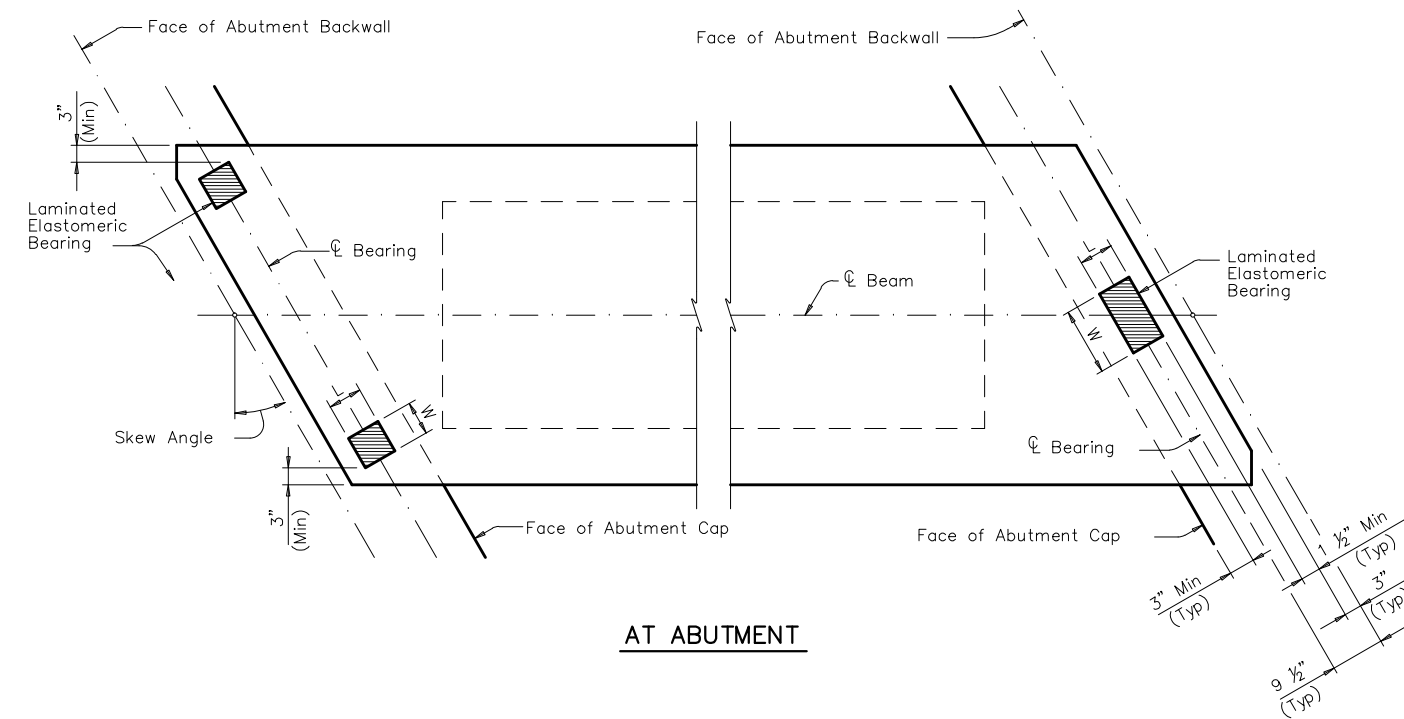
HARRIS COUNTY  
ENGINEERING DEPARTMENT



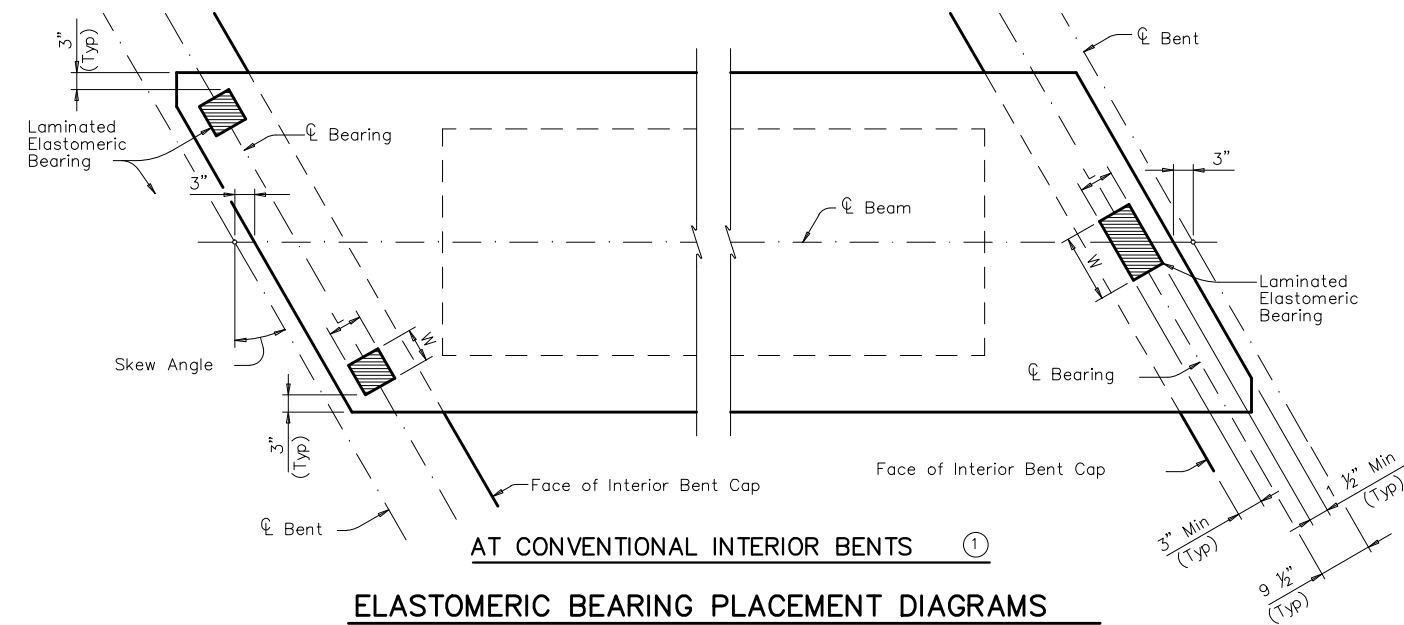
FIRM INFO

SEAL  
NOTE

PROJECT TITLE:	HL93 LOADING
DRAWN BY:	PRESTRESSED CONCRETE
CHK'D BY:	BOX BEAM DETAILS
SCALE:	(TYPE B40) (3 OF 3)
DATE:	APPROVED BY:
	SHT NO: 12



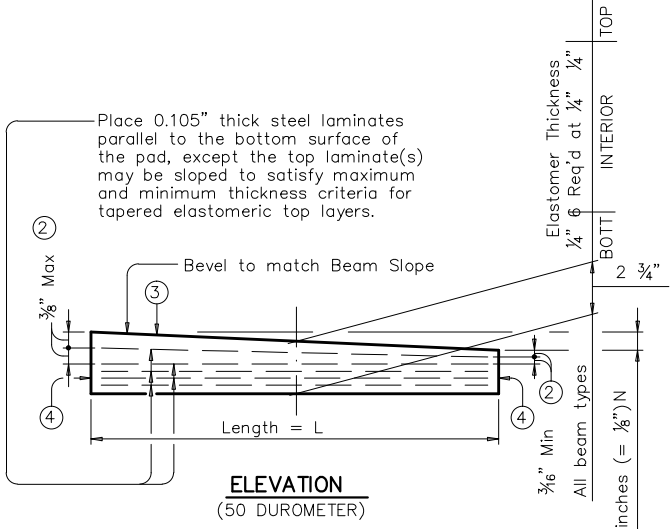
AT ABUTMENT



ELASTOMERIC BEARING PLACEMENT DIAGRAMS

The Forward Station Beam End will have one bearing and the Back Station Beam End will have two bearings.

ELASTOMERIC BEARING DIMENSIONS					
BEARING TYPE	BEAM TYPE	ONE BEARING		TWO BEARINGS	
		L	W	L	W
B20-"N"	4B20	6"	12"	6"	6"
	5B20	6"	12"	6"	6"
B28-"N"	4B28	6"	14"	6"	7"
	5B28	6"	14"	6"	7"
B34-"N"	4B34	6"	16"	6"	8"
	5B34	6"	16"	6"	8"
B40-"N"	4B40	6"	20"	6"	10"
	5B40	6"	20"	6"	10"



ELASTOMERIC BEARING SECTION

(50 DUROMETER)

The use of Polyisoprene (natural rubber), for the manufacture of bearing pads, is not permitted.

- For Transition Bents with backwall, beams and elastomeric bearings will receive the same treatment as shown for Abutment Bents.
- Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.
- Indicate BEARING TYPE on all pads. For tapered pads, BEARING TYPE will be located on the high side. The Fabricator will include the value of "N" (amount of taper in 1/8" increments) in this mark. Examples: N=0, (for 0" taper) N=1, (for 1/8" taper) N=2, (for 1/4" taper) (etc.) Fabricated pad top surface slope must not vary from plan beam slope by more than (0.0625" / Length) IN/IN.
- Locate Permanent Mark here.

NOTES TO DESIGN ENGINEER:

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GENERAL NOTES:

- Set beams on elastomeric bearings of the dimensions shown. Center bearings as near nominal bearing as possible within limits shown.
- Constant thickness bearings may be used for moderate beam slopes up to 0.0113 ft/ft. For skewed supports, Bearings beveled for beam slope may not provide uniform contact. However, predicted contact is considered within allowable tolerances.
- Shop drawings for approval are required. A bearing layout which identifies location and orientation of all bearings will be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer.
- Cost of furnishing and installing elastomeric bearings is to be included in unit price bid for "Prestressed Concrete Box Beams". Details are drawn showing right forward skew. See Bridge Layout for actual direction. These details are applicable for skews up to 30 degrees only.

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0	DATE OF ISSUE	12/12/2011	O.AGURRE
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FIRM INFO

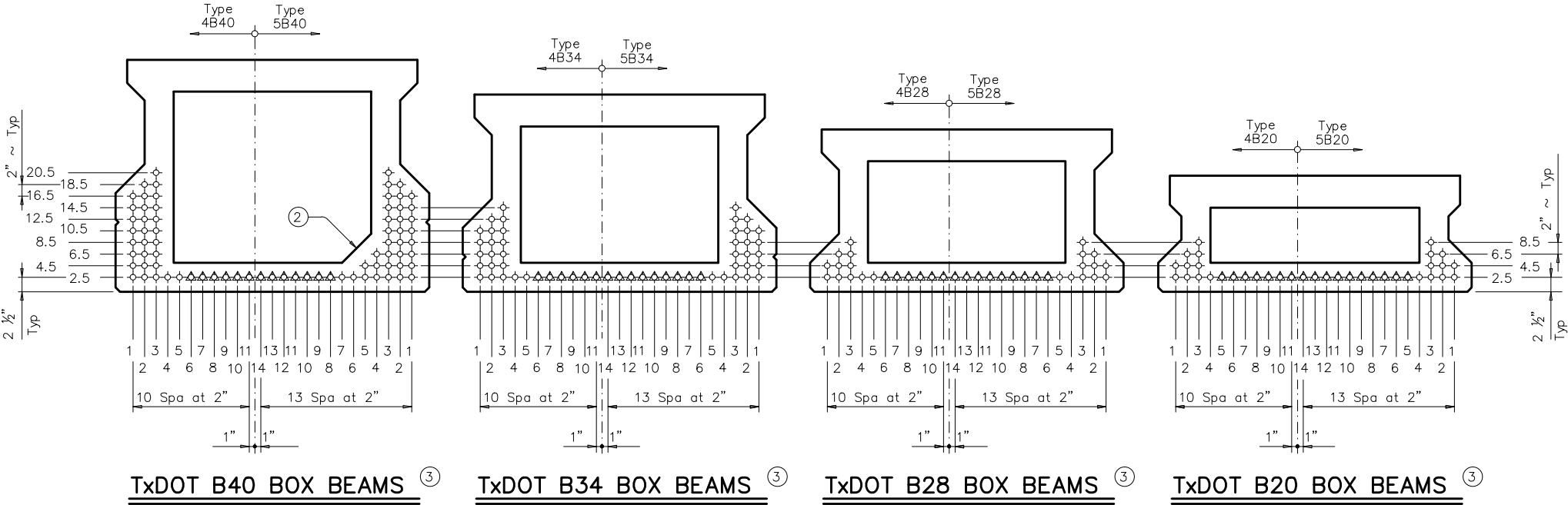
SEAL  
NOTE

PROJECT TITLE:			
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CHK'D BY:	FILE NAME:	PREST CONC BOX BEAMS	FILE NO:
SCALE:	FILE NO:		
DATE:	APPROVED BY:		SHT NO: 13

STRUCTURE	DESIGNED BEAMS (STRAIGHT STRANDS)																					OPTIONAL DESIGN																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
	SPAN NO.	BEAM NO.	BEAM TYPE	PRESTRESSING STRANDS							DEBONDED STRAND PATTERN PER ROW														CONCRETE		DESIGN LOAD COMP STRESS (TOP Q) (SERVICE I)	DESIGN LOAD TENSILE STRESS (BOTT Q) (SERVICE III)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I)	LIVE LOAD DISTRIBUTION FACTOR																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE	STRGTH	"e" C	"e" END	TOT NO. DEB	DIST FROM BOTTOM	NO.OF STRANDS		NUMBER OF STRANDS DEBONDED TO (ft from end)												RELEASE STRGTH				MINIMUM 28 DAY COMP STRGTH																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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**GENERAL NOTES:**  
Designed according to AASHTO LRFD Specifications. See Harris County Specification Item 423 for the Casting, Prestressing, and Erection of Precast, Prestressed Beams. All reinforcing bars shall be Grade 60.  
When shown on this sheet, the Fabricator has the option of furnishing either the designed beam or an approved optional beam design. All optional design submittals and shop drawings must be signed, sealed and dated by a Professional Engineer registered in the State of Texas. Prestress losses for the designed beams have been calculated for a relative humidity of 75 percent. Optional designs must likewise conform.  
Locate strands for the designed beam as low as possible on the 2" grid system unless a Non-Standard Strand Pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc. Place strands within a row as follows:  
1) Locate a strand in each "1" position  
2) Place strand pattern symmetrically about vertical centerline of box  
3) Space strands as equally as possible across the entire width  
Strands in the position "1" may not be debonded. Distribute debonded strands equally about the vertical centerline. Decrease debonded lengths working inward, with debonding staggered in each row.  
Encase debonded strands in plastic sheathing along entire debonded length, and seal ends of sheathing with waterproof tape. Split plastic sheathing may be used provided the seam of the sheathing is sufficiently sealed with waterproof tape to prohibit grout infiltration. Wrapping of strands with tape to provide debonding is not allowed. Use low relaxation strands pretensioned to 75 percent of fpu.

- ① Based on the following allowable stresses (ksi):  
Compression = 0.65 f'ci  
Tension =  $0.24\sqrt{f'ci}$   
Optional designs must likewise conform.
- ② Portion of full HL93.
- ③ Full-length debonded strands are only permitted in strand positions marked Δ. Double encase all full-length debonded strands. Internal vibrator diameter cannot exceed 1 1/8" diameter for bottom flange concrete placement. Full-length debonding, when permitted, must be symmetrical about the vertical centerline of the beam and limited to 10% of the total number of strands or 6 straight strands, whichever is less.



**NOTES TO DESIGN ENGINEER:**

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0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

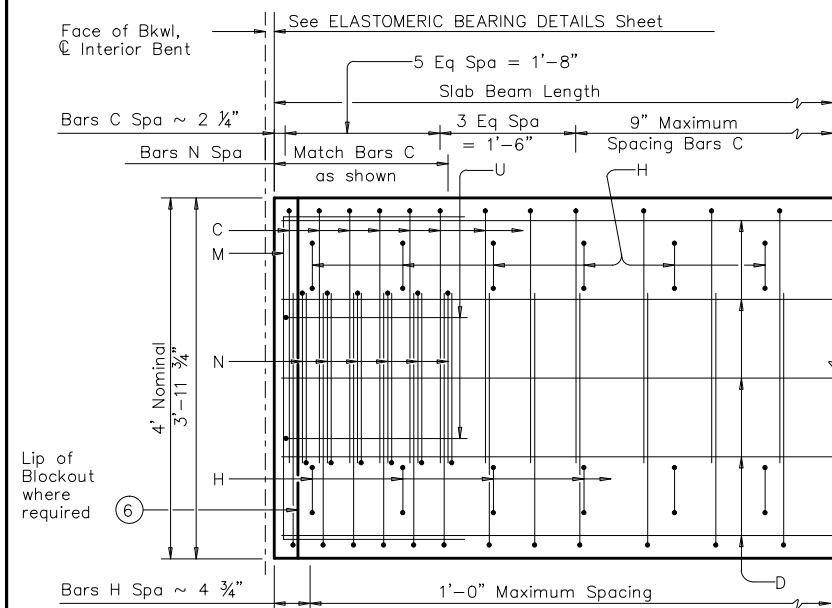
HARRIS COUNTY  
ENGINEERING DEPARTMENT



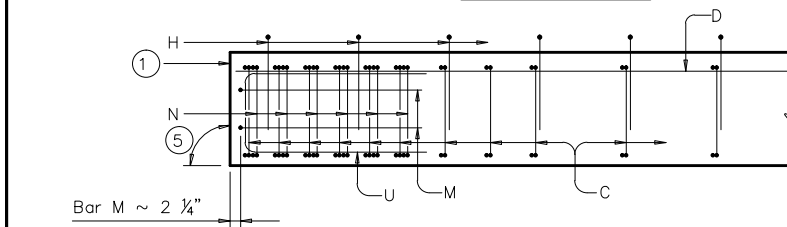
FIRM INFO

SEAL  
NOTE

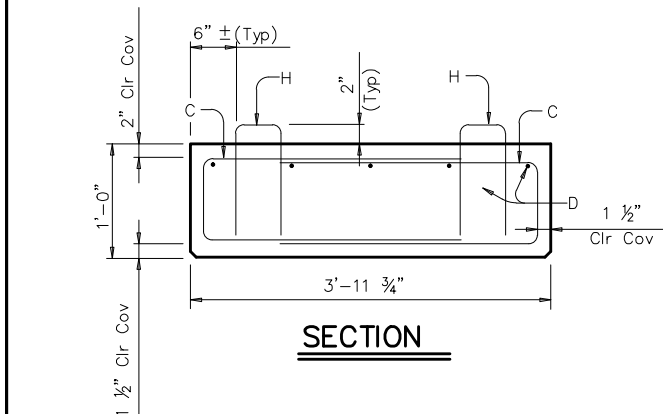
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CHK'D BY:		FILE NO.	
SCALE:		FILE NO.	
DATE:	APPROVED BY:	SHT NO.	14



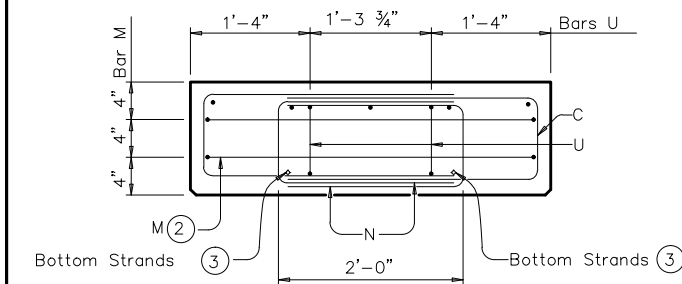
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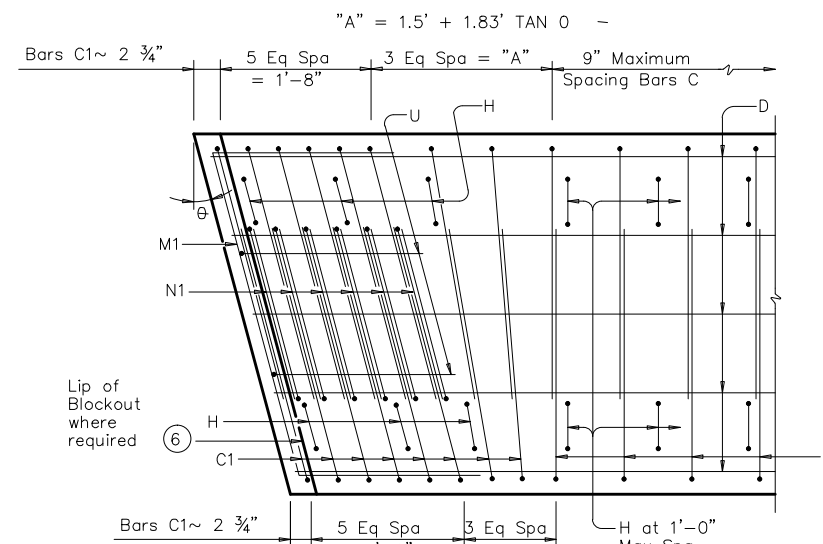


**SECTION**



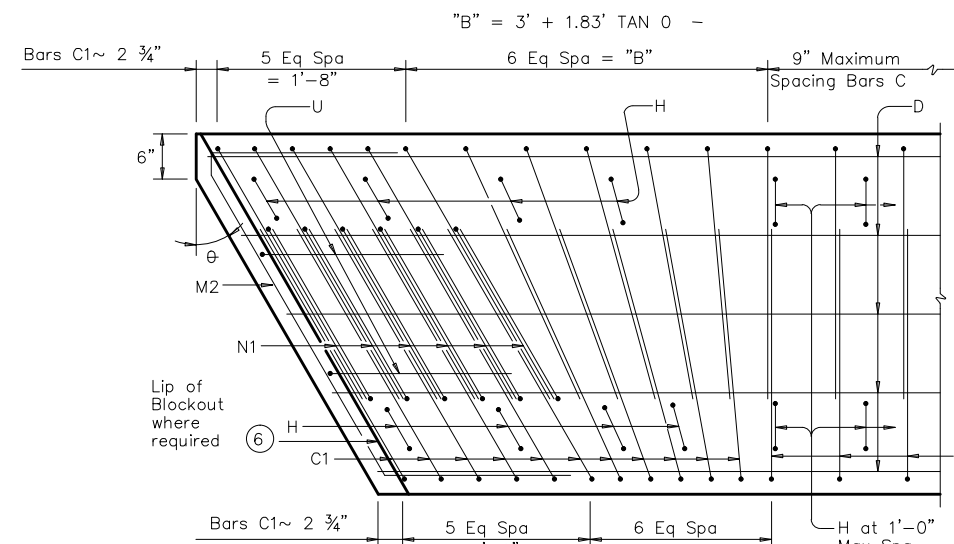
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Bars H not shown for clarity.



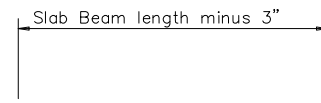
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(Showing 0 over 0° to 15° Skew)

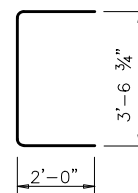


**PART SKEW PLAN**

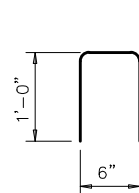
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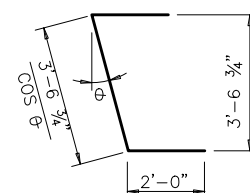
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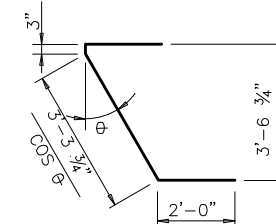
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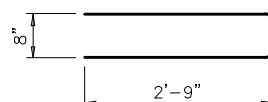
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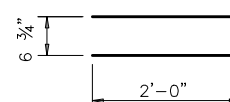
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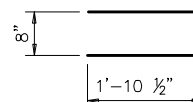
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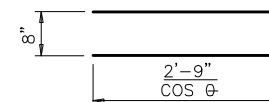
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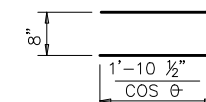
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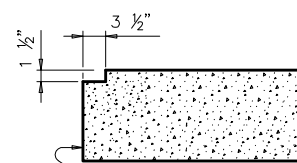
**BARS N(#4)**



**BARS C1(#4)**



**BARS N1(#4)**



**ELEVATION OF BLOCKOUT**

BEAM PROPERTIES		
Area	in <sup>2</sup>	573.0
Y Top	in	6.00
Y Bott	in	6.00
I	in <sup>4</sup>	6,876
Weight	lb/ft	597

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**GENERAL NOTES:**

Designed according to AASHTO LRFD Specifications.  
See Harris County Specification Item 423 for the Casting, Prestressing, and Erection of Precast, Prestressed Beams.  
All reinforcing bars shall be Grade 60.  
See TRAFFIC RAIL DETAILS and RAIL ANCHORAGE DETAILS for additional reinforcing or anchorage hardware to be cast in slab beams.  
An equal area of welded wire fabric may be substituted for bars C and D if approved by the Engineer.  
These details can be used for any skew angle up to a maximum of 30 degrees.  
All exposed corners shall be chamfered 3/4" or rounded to a 3/4" radius.  
Details are drawn showing Right Forward skew. See Bridge Layout for actual direction.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O. AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

**HARRIS COUNTY  
ENGINEERING DEPARTMENT**

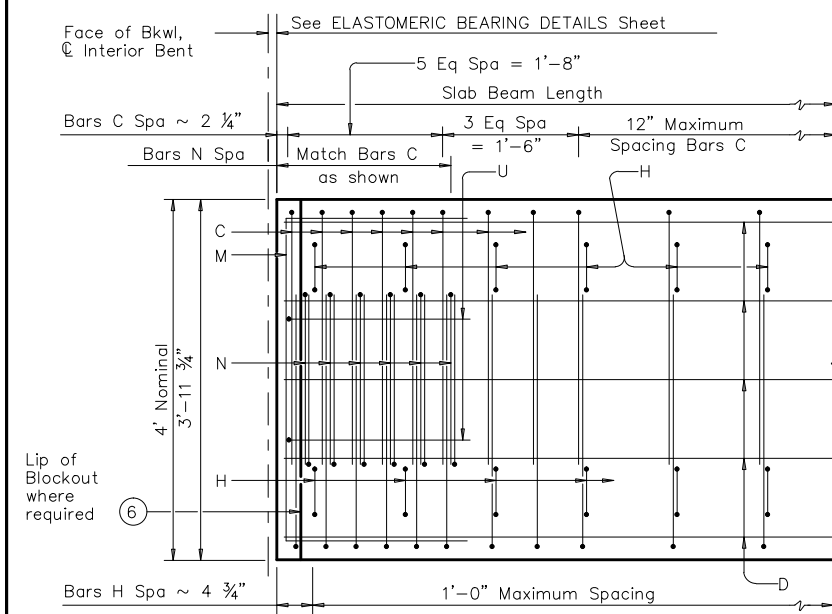


**FIRM INFO**

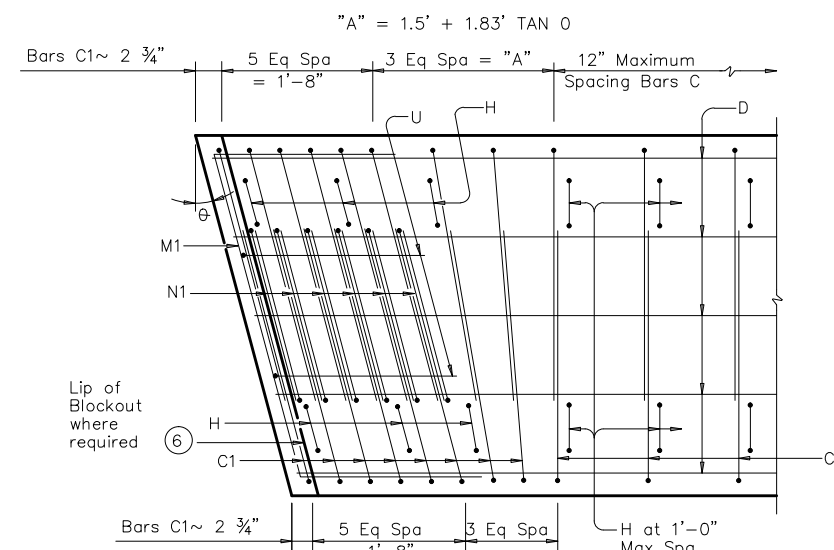
**SEAL  
NOTE**

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DRAWN BY:	SHEET NO.:	JOB NO.:	
CK'D BY:	PRESTRESSED CONCRETE SLAB BEAM DETAILS (TYPE 4SB12)		FILE NAME:
SCALE:	DATE:		FILE NO.:
APPROVED BY:	SHT NO.:		15

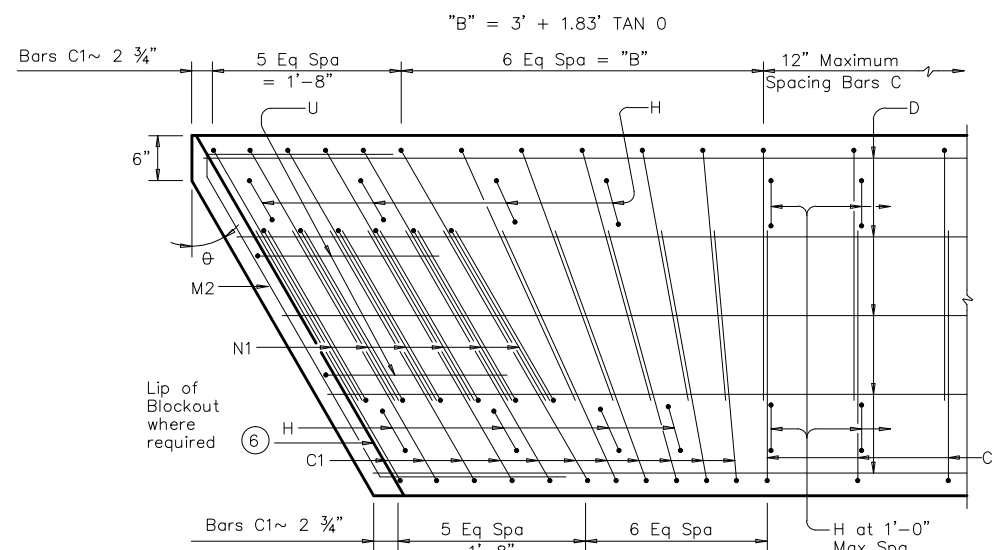
HL93 LOADING



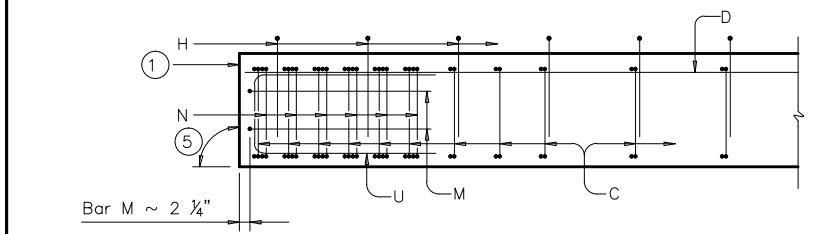
PART PLAN



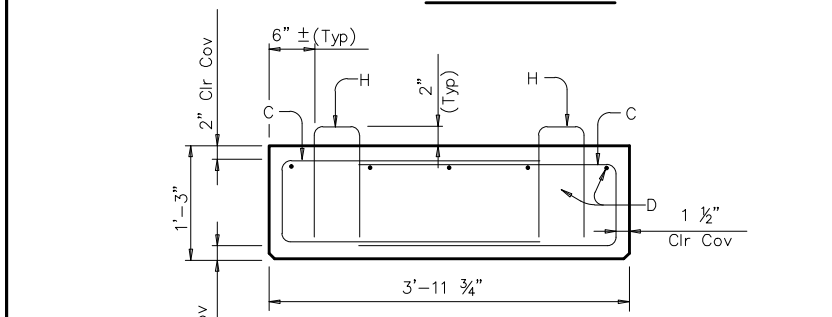
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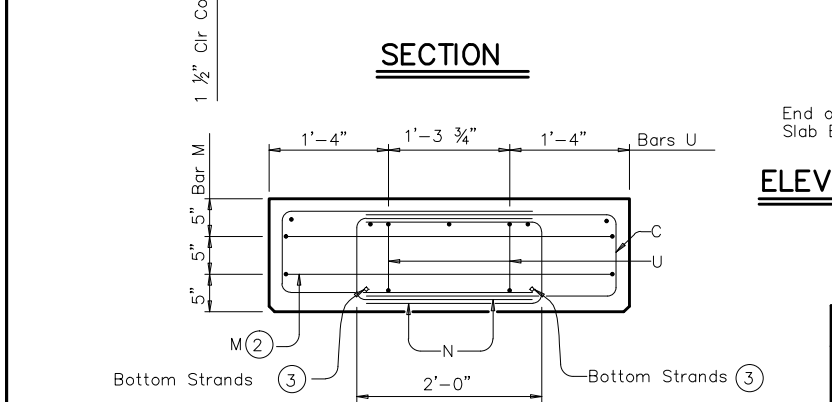
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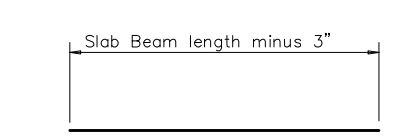
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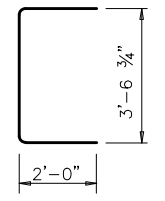
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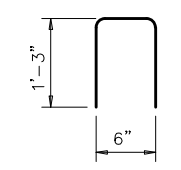
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Bars H not shown for clarity.



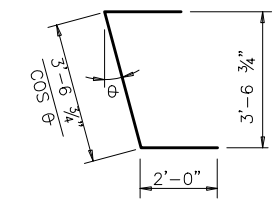
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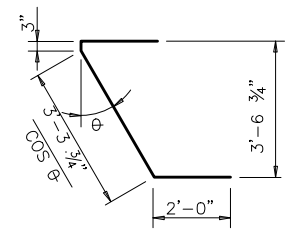
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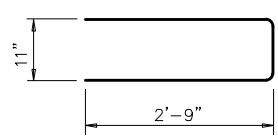
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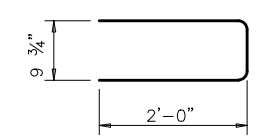
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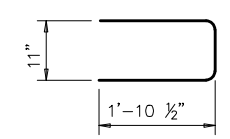
BARS M2(#4)



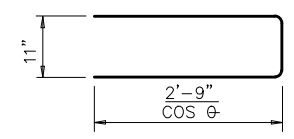
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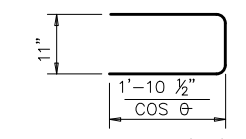
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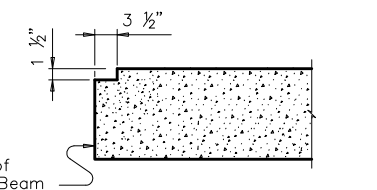
BARS N(#4)



BARS C1(#4)



BARS N1(#4)



ELEVATION OF BLOCKOUT

BEAM PROPERTIES		
Area	in <sup>2</sup>	716.2
Y Top	in	7.50
Y Bott	in	7.50
I	in <sup>4</sup>	13,429
Weight	(4) lb/ft	746

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**GENERAL NOTES:**  
Designed according to AASHTO LRFD Specifications.  
See Harris County Specification Item 423 for the Casting, Prestressing, and Erection of Precast, Prestressed Beams.  
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An equal area of welded wire fabric may be substituted for bars C and D if approved by the Engineer.  
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All exposed corners shall be chamfered 3/4" or rounded to a 3/4" radius.  
Details are drawn showing Right Forward skew. See Bridge Layout for actual direction.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O. AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT

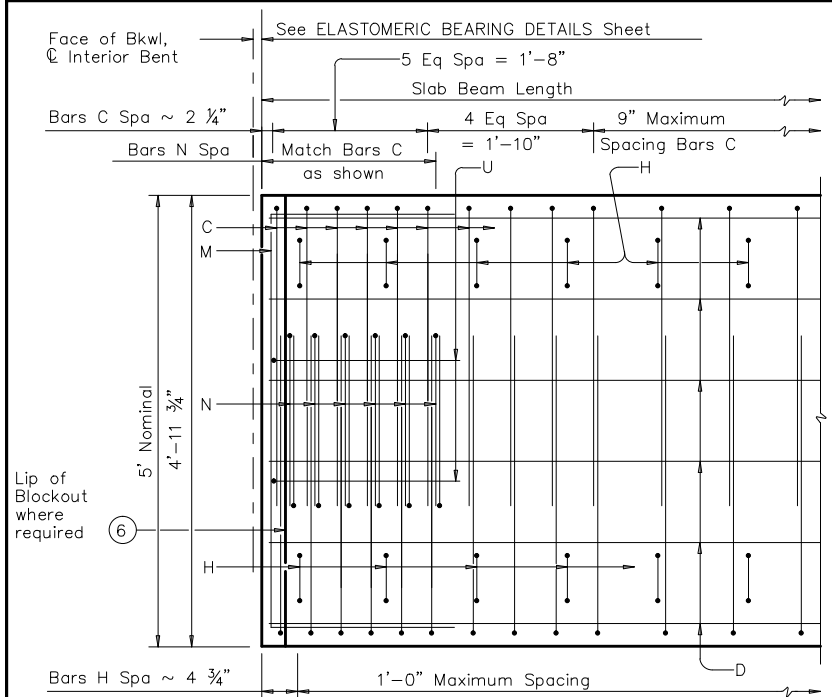


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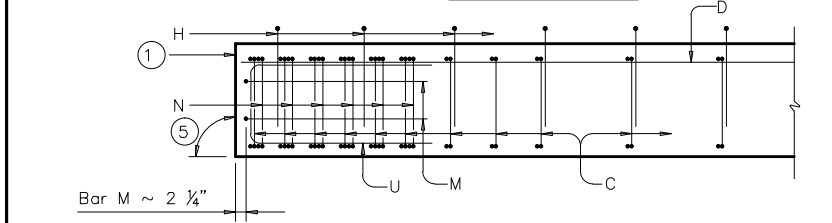
SEAL  
NOTE

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DATE:	APPROVED BY:	FILE NO.:	FILE NO.:

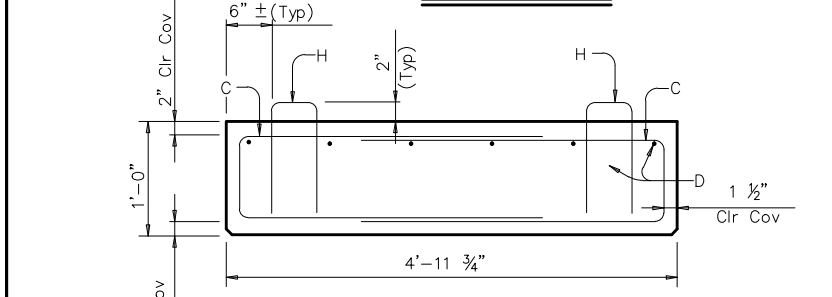
HL93 LOADING



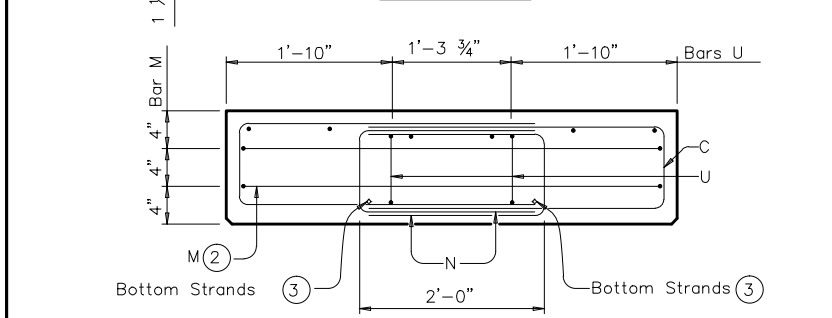
**PART PLAN**



**ELEVATION**

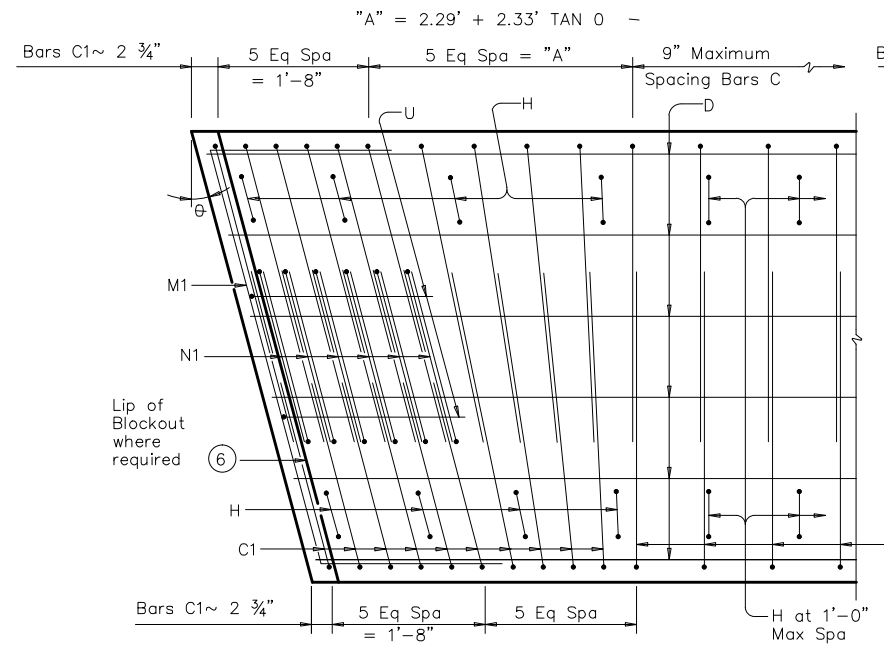


**SECTION**



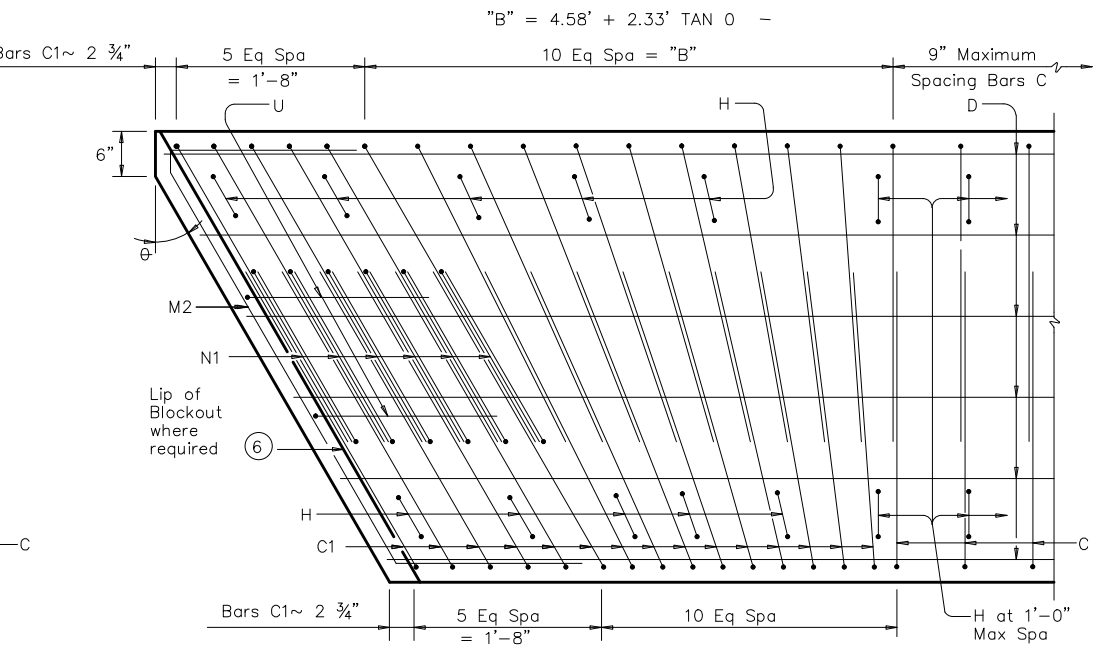
**END MAT REINFORCING**

Bars H not shown for clarity.



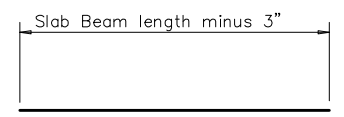
**PART SKEW PLAN**

(Showing 0 over 0° to 15° Skew)

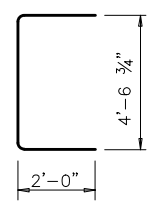


**PART SKEW PLAN**

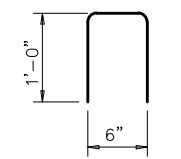
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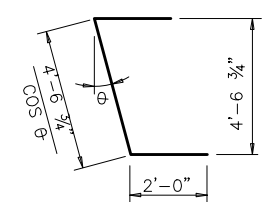
**BARS D(#6)**



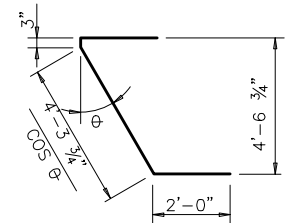
**BARS M(#4)**



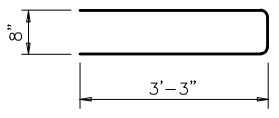
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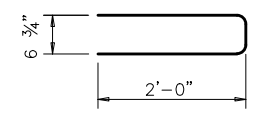
**BARS M1(#4)**



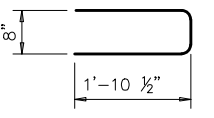
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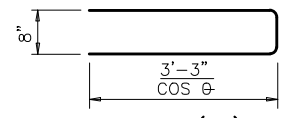
**BARS C(#4)**



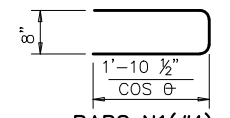
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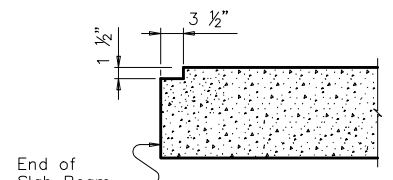
**BARS N(#4)**



**BARS C1(#4)**



**BARS N1(#4)**



**ELEVATION OF BLOCKOUT**

BEAM PROPERTIES		
Area	in <sup>2</sup>	717.0
Y Top	in	6.00
Y Bott	in	6.00
I	in <sup>4</sup>	8,604
Weight	lb/ft	747

- See END MAT REINFORCING detail.
- Bars M may be adjusted vertically to avoid strands.
- See Slab Beam Design Form (PSBND) for strand locations.
- Assumes 150 pcf weight density of concrete.
- 90° at Conventional Interior Bents. End of Beam shall be vertical at Abutment Backwall.
- Blockout required at Armor Jt locations to accommodate joint anchorage.

**GENERAL NOTES:**

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**HARRIS COUNTY  
ENGINEERING DEPARTMENT**



**FIRM INFO**

**SEAL  
NOTE**

PROJECT TITLE			
DRAWN BY:	SHEET NO.:	JOB NO.:	
CHK'D BY:	PRESTRESSED CONCRETE		FILE NAME:
SCALE:	SLAB BEAM DETAILS		FILE NO.:
DATE:	(TYPE 5SB12)		SHT NO.:
APPROVED BY:			17

HL93 LOADING

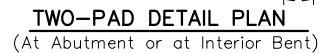


PART SKEW PLAN

PART SKEW PLAN

ELEVATION OF BLOCKOUT (6)

8



NOTE: The use of Polyisoprene (natural rubber), for the manufacture of bearing pads, is not permitted.



Place one bearing at forward station beam end.  
Place two bearings at back station beam end.

- ① Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.
- ② BEARING TYPE shall be indicated on all pads. For tapered pads, BEARING TYPE shall be located on the high side. The Fabricator shall include the value of "N" (amount of taper in  $\frac{1}{8}$ " increments) in this mark.  
 Examples: N=0, (for 0" taper)  
               N=1, (for  $\frac{1}{8}$ " taper)  
               N=2, (for  $\frac{1}{4}$ " taper)  
               (etc.)
- Fabricated pad top surface slope shall not vary from  $\left( \frac{0.0625}{\text{Length}} \right)$  IN./IN. plan beam slope by more than
- ③ Locate Permanent Mark here.



Pad sizes shown are applicable for the following conditions:

- (1) All one, two and three span units where the minimum span length is not less than 25' and the maximum span is not more than 50'.
- (2) Skews less than or equal to 30°.

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GENERAL NOTES:

Shop drawings for approval are required.  
A bearing layout which identifies location and orientation of all bearings shall be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer.

Cost of furnishing and installing elastomeric bearings shall be included in unit price bid for "Prestressed Concrete Slab Beams".

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HARRIS COUNTY  
ENGINEERING DEPARTMENT



## FIRM INFO

SEAL  
NOTE

PROJECT TITLE:		PRESS LOADING	
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:	
	ELASTOMERIC BEARING		
C/D BY:	DETAILS	FILE NAME:	
SCALE:	PRESTR CONC SLAB BEAMS	FILE NO:	
DATE:	APPROVED BY:	SHT NO:	19



STRUCTURE

DESIGNED BEAMS (STRAIGHT STRANDS)

SPAN NO.

BEAM NO.

BEAM TYPE

PRESTRESSING STRANDS

NON-STD STRAND PATTERN

TOTAL NO.

SIZE

STRGTH

"e"  $\varnothing$

"e" END

TOT NO. DEB

DIST FROM BOTTOM

DEBONDED STRAND PATTERN PER ROW

NO.OF STRANDS

NUMBER OF STRANDS DEBONDED TO

(ft from end)

CONCRETE

RELEASE STRGTH

MINIMUM 28 DAY COMP STRGTH

1

f'ci (ksi)

2

f'c (ksi)

DESIGN LOAD COMP STRESS (TOP  $\varnothing$ ) (SERVICE I)

DESIGN LOAD TENSILE STRESS (BOTT  $\varnothing$ ) (SERVICE III)

REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I)

LIVE LOAD DISTRIBUTION FACTOR

Moment

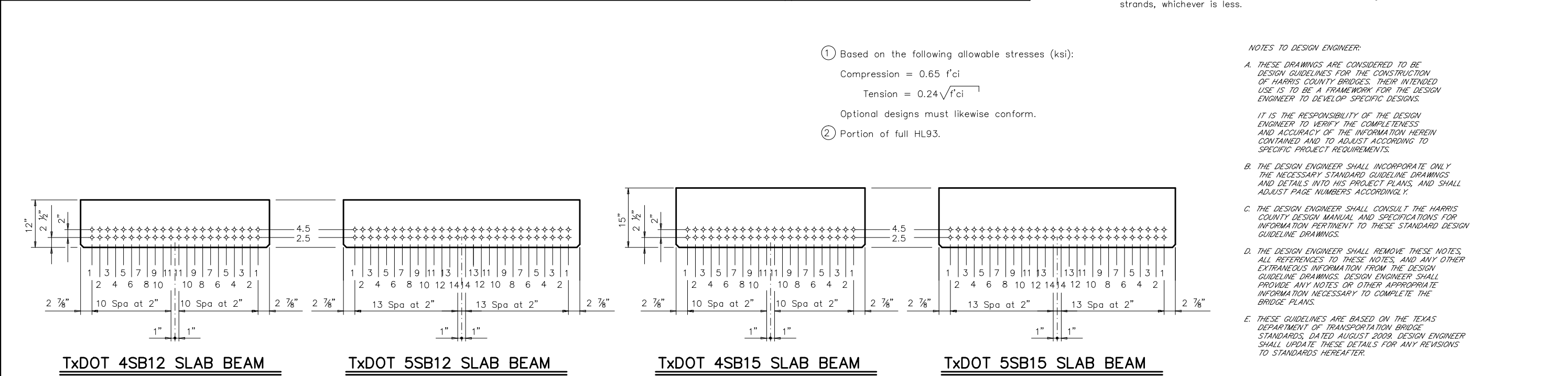
Shear

PATTERN

STRAND ARRANGEMENT AT  $\varnothing$  OF BEAM

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.  
See Harris County Specification Item 423 for the Casting, Prestressing, and Erection of Precast, Prestressed Beams.  
All reinforcing bars shall be Grade 60.  
When shown on this sheet, the Fabricator has the option of furnishing either the designed straight strand beam or an approved optional beam design. All optional design submittals shall be signed, sealed and dated by a registered Professional Engineer.  
Prestress losses for the designed beams have been calculated for a relative humidity of 75 percent. Optional designs shall likewise conform.  
Strands for the designed beam shall be located as low as possible on the 2" grid system unless a Non-Standard Strand Pattern is indicated.  
Fill row "2.5" completely, then row "4.5".  
Strands shall be placed within a row as follows:  
1) Locate a strand in each "1" position.  
2) Place strand pattern symmetrically about vertical centerline of slab beam.  
3) Space strands as equally as possible across the entire width.  
Strands in the position "1" shall not be debonded. Debonded strands shall be distributed equally about the vertical centerline. Debonded lengths shall decrease working inward, with debonding staggered in each row.  
Debonded strands shall be encased in plastic tubing along entire debonded length, and ends of tubing shall be sealed with waterproof tape. Split plastic tubing may be used provided the seam of the tubing is sufficiently sealed with waterproof tape to prohibit grout infiltration. Wrapping of strands with tape to provide debonding will not be permitted.  
Strands for the designed beam shall be low relaxation strands pretensioned to 75 percent of fpu each.  
Full-length debonded strands are not permitted in strand positions 1 and 2. If debonding strands full-length, double wrap strands and internal vibrator diameter cannot exceed 1 1/8" diameter.  
Full-length debonding, when permitted, must be symmetrical about the vertical centerline of the beam and limited to 10% the total number of strands or 6 straight strands, whichever is less.



15"

2 1/2"

2"

1 3/8"

10 Spa at 2"

10 Spa at 2"

2 7/8"

2 7/8"

1

3

5

7

9

11

11

9

7

5

3

1

2

4

6

8

10

10

8

6

4

2

4.5

2.5

1

3

5

7

9

11

13

13

11

9

7

5

3

1

2

4

6

8

10

12

14

14

12

10

8

6

4

2

1"

1"

TxDOT 4SB15 SLAB BEAM

15"

2 1/2"

2"

1 3/8"

13 Spa at 2"

13 Spa at 2"

2 7/8"

2 7/8"

1

3

5

7

9

11

13

13

11

9

7

5

3

1

2

4

6

8

10

12

14

14

12

10

8

6

4

2

4.5

2.5

1

3

5

7

9

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12

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6

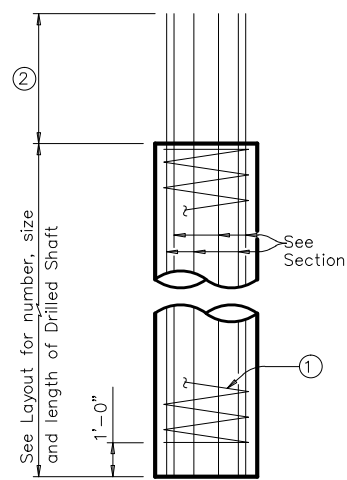
4

2

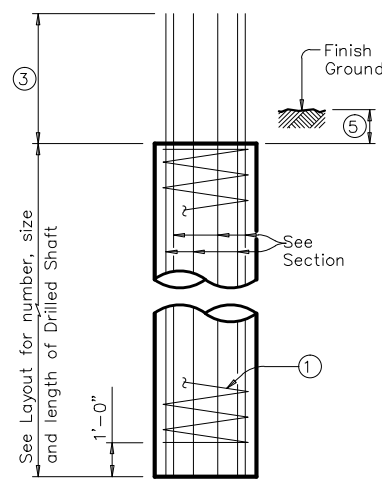
1"

1"

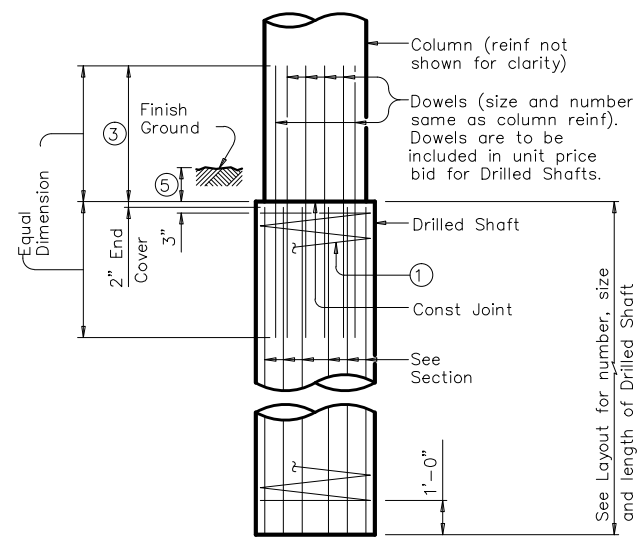
TxDOT 5SB15 SLAB BEAM



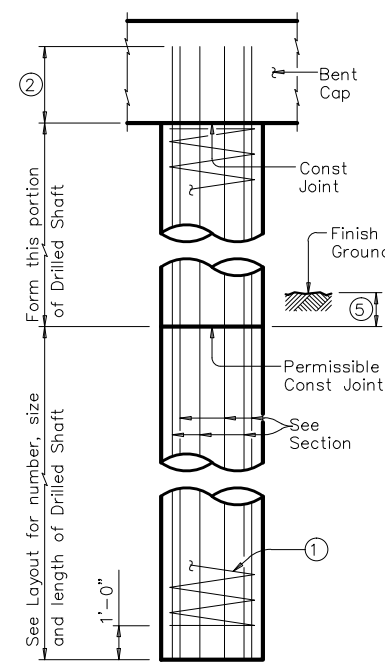
ABUTMENTS, WINGWALLS  
AND MULTI-DRILLED  
SHAFT FOOTINGS



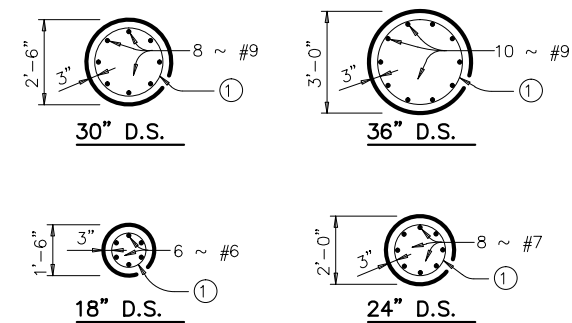
INTERIOR BENTS  
DRILLED SHAFT DIA  
EQUAL TO COLUMN DIA



INTERIOR BENTS  
DRILLED SHAFT DIA  
GREATER THAN COLUMN DIA



OPTIONAL  
INTERIOR BENT  
DRILLED SHAFT DETAIL ④



DRILLED SHAFT SECTIONS

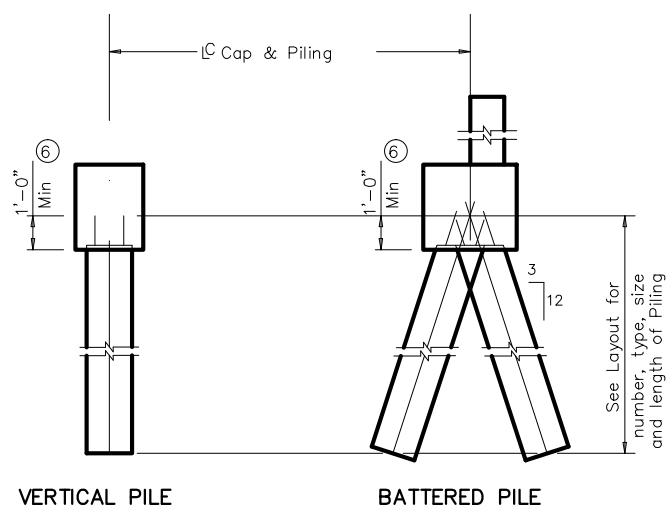
## DRILLED SHAFT DETAILS

### GENERAL NOTES:

See Item 411, "Drilled Shaft Foundations", for concrete requirements.  
All dimensions relating to reinforcing steel are to centers of bars.  
Size, number and length Drilled Shafts shall be as shown on Layout sheets.

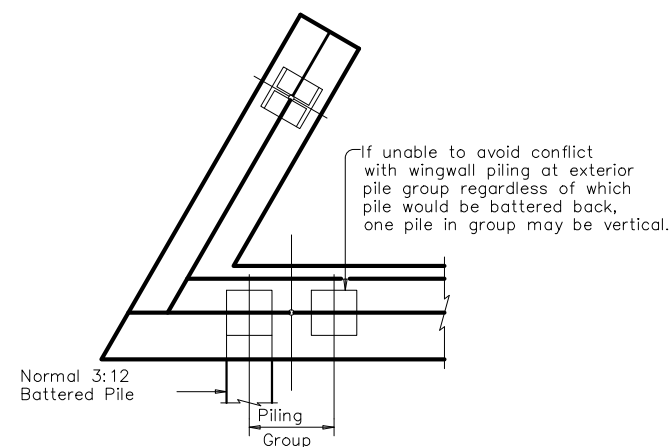
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VERTICAL PILE BATTERED PILE

## PILING DETAILS



## DETAIL "A"

(Showing Plan View of a 30° Skewed Abutment)

- #3 Spiral at 6" pitch (One flat turn top & bottom)
- Min extension into supported element:  
#6 Bars = 1'-0"  
#7 Bars = 1'-5"  
#9 Bars = 2'-3"
- Min lap with Column reinf:  
#7 Bars = 2'-4"  
#9 Bars = 3'-10"
- If approved by the Engineer, Drilled Shafts may extend to bottom of bent caps for "H" heights of 6 ft or less (as shown on Bridge Layout). This option can only be used when Drilled Shaft Dia equals Column Dia. The forming method shall be submitted for approval prior to construction. No adjustments in payment will be made if this option is used.
- 6" Min at Grade Crossing, 1'-0" Min in Channel.
- Or as shown on plans.

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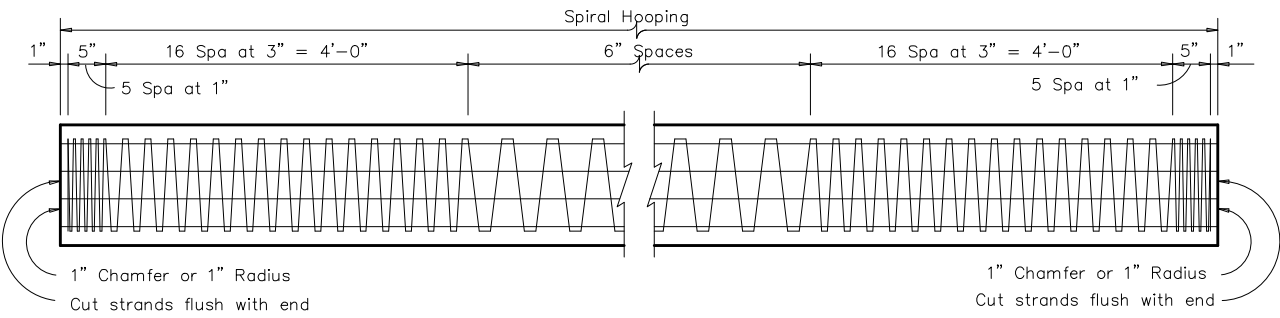
HARRIS COUNTY  
ENGINEERING DEPARTMENT



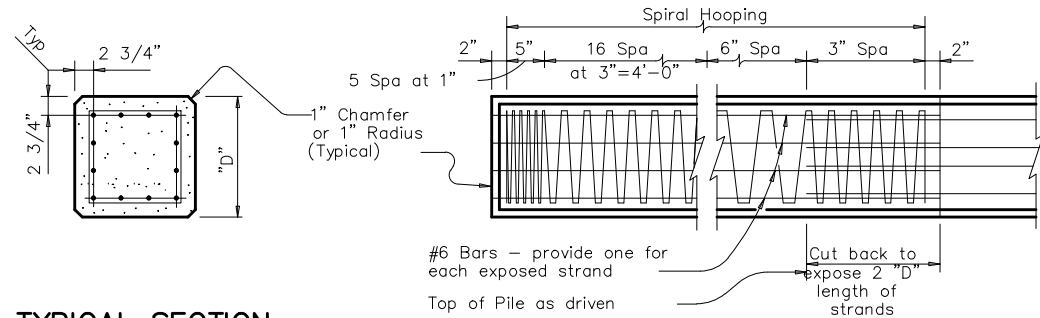
FIRM INFO

SEAL  
NOTE

PROJECT TITLE: HL93 LOADING			
DRAWN BY:	SHEET DESCRIPTION:	COMMON FOUNDATION DETAILS	
CHK'D BY:	FILE NO.:	DETAILS	
SCALE:	FILE NO.:	(SHEET 1 OF 2)	
DATE:	APPROVED BY:	SHT NO.:	21

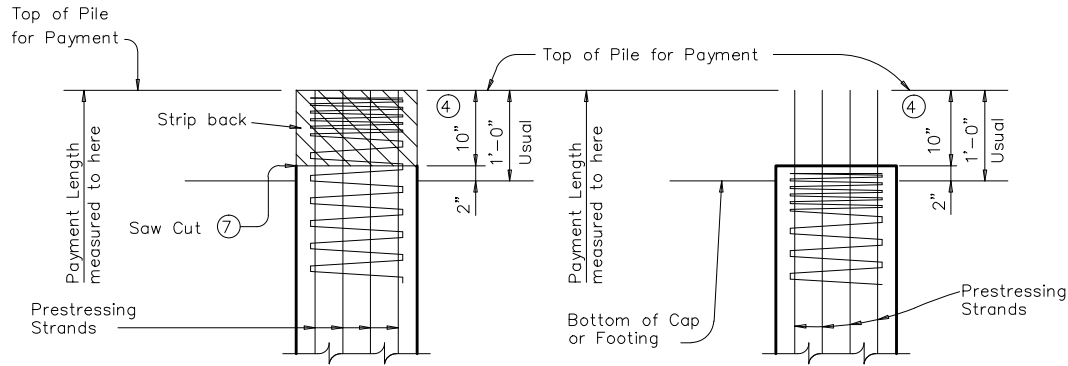


**PILING DETAILS**



**TYPICAL SECTION THRU PILING** ①

**PILE BUILD-UP DETAIL** ②



**PILE STRIPPED BACK AFTER DRIVING**

**PILE CAST WITH PRESTRESSING STRANDS PROTRUDING**

**PILING EMBEDMENT DETAILS** ③

TABLE OF PROPERTIES FOR PRESTRESSED CONCRETE PILING						
Pile Size "D"	Area of Pile Section	I	Weight	Prestressing ⑥		
				No.	Initial Prestress Force	Concrete Final Prestress (15% Loss)
					Kips	psi
15"	223	4,116	232	8	231	881
16"	254	5,340	265	8	231	774
18"	322	8,600	336	10	289	763
20"	398	13,150	415	14	405	864
24"	574	27,380	598	18	520	770

- ① Strand location shall be symmetrical about the axis of the pile with no more than one strand difference between any two adjacent sides.
- ② Concrete for pile build-up shall meet the concrete strength requirements in Item 410.
- ③ Payment for piling shall be made in accordance with the details shown. Piling shall be stripped back 10" with the Prestressing Strands extending into the substructure. Piling may be cast to full payment length and stripped back after driving to expose 10" of Prestressing Strands, or they may be cast 10" short of payment length with Prestressing Strands protruding from top of piling.
- ④ Strip back shall be longer if called for elsewhere in the plans.
- ⑤ When 15" square piling are specified on the plans, Contractor has the option of furnishing either 15" or 16" square piling.
- ⑥ Prestressing strands shall be 1/2" 270 k low relaxation strands tensioned to 28.9 kips each. Optional piling designs shall meet the minimum strength requirements in Item 410 and provide a minimum Concrete Final Prestress of 750 psi.
- ⑦ 1/2" deep saw cut around perimeter of pile at breakback line is required.

**GENERAL NOTES:**

See Item 410, "Prestressed Concrete Piling", for concrete requirements.

All dimensions relating to prestressing steel are to centers of bars or strands.

Size, number and length of piling shall be as shown on Layout sheets.

Spiral Hooping shall have a minimum diameter of 0.207".

- NOTES TO DESIGN ENGINEER:
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- IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC PROJECT REQUIREMENTS.
- B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS ACCORDINGLY.
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**HARRIS COUNTY  
ENGINEERING DEPARTMENT**



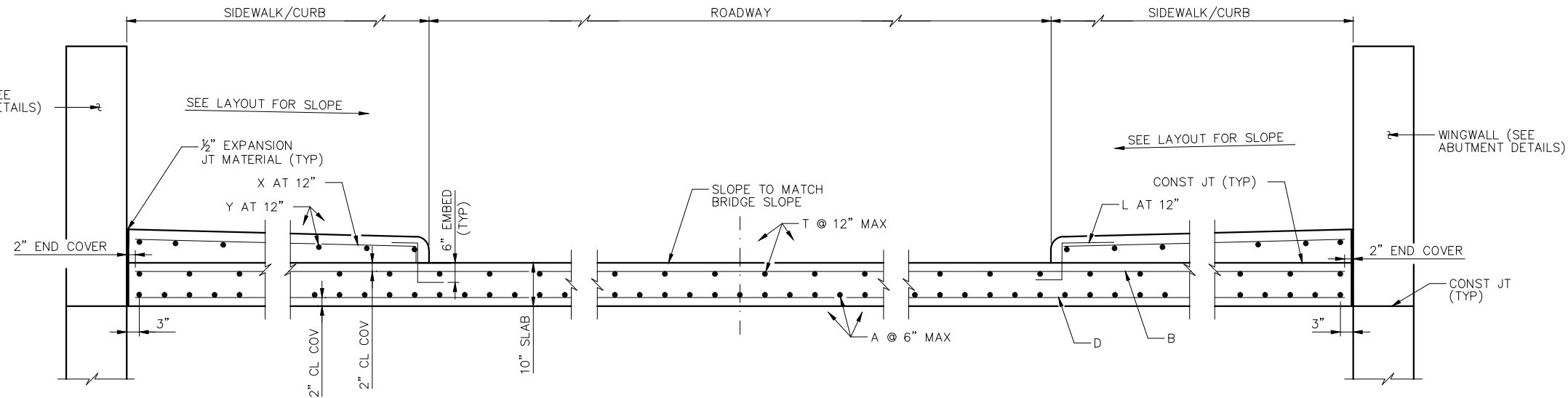
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**SEAL  
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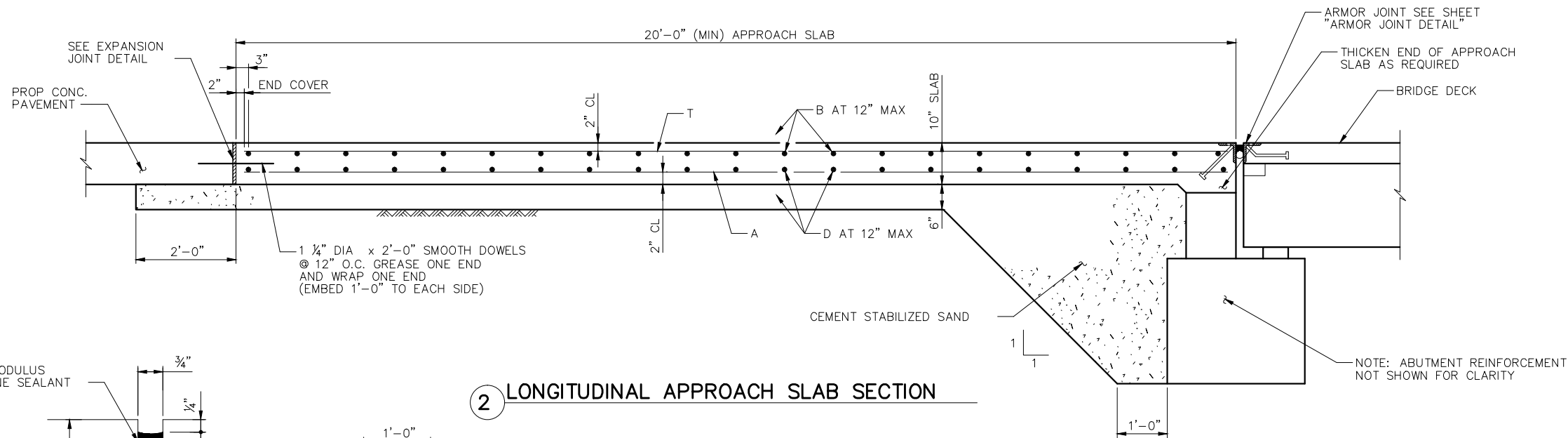
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DATE:	APPROVED BY:	22	

HL93 LOADING

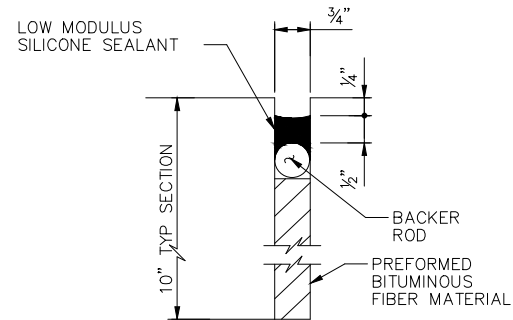
**COMMON FOUNDATION  
DETAILS  
(SHEET 2 OF 2)**



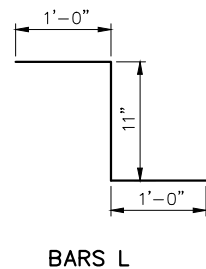
1 TRANSVERSE SECTION



2 LONGITUDINAL APPROACH SLAB SECTION



3 EXPANSION JOINT DETAIL



BARS L

BAR TABLE	
BAR	SIZE
A	#5
B	#5
D	#5
L	#4
T	#5
X	#4
Y	#5

### APPROACH SLAB NOTES

1. ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I. @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
2. ALL EXPOSED CORNERS SHALL BE CHAMFERED  $\frac{3}{4}$ " UNLESS OTHERWISE NOTED.
3. ALL REINFORCING STEEL SHALL BE A.S.T.M. A615, GRADE 60 STEEL.
4. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.

### NOTES TO DESIGN ENGINEER:

- A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.
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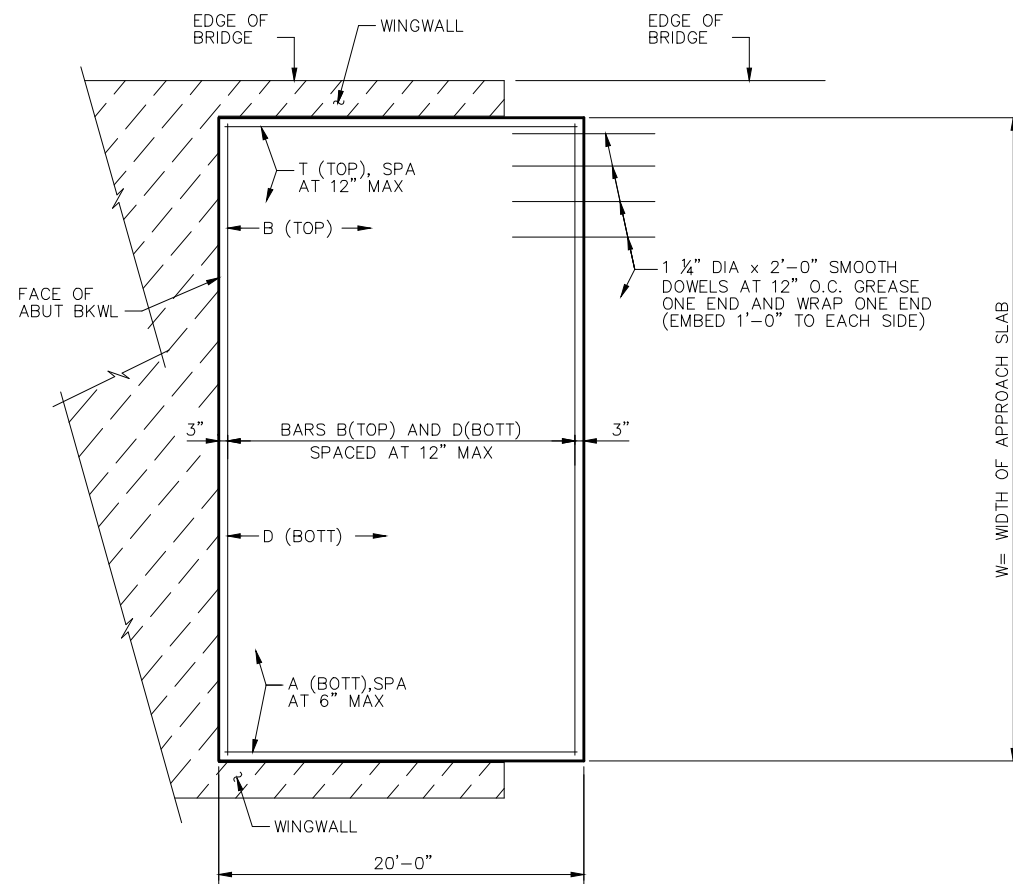


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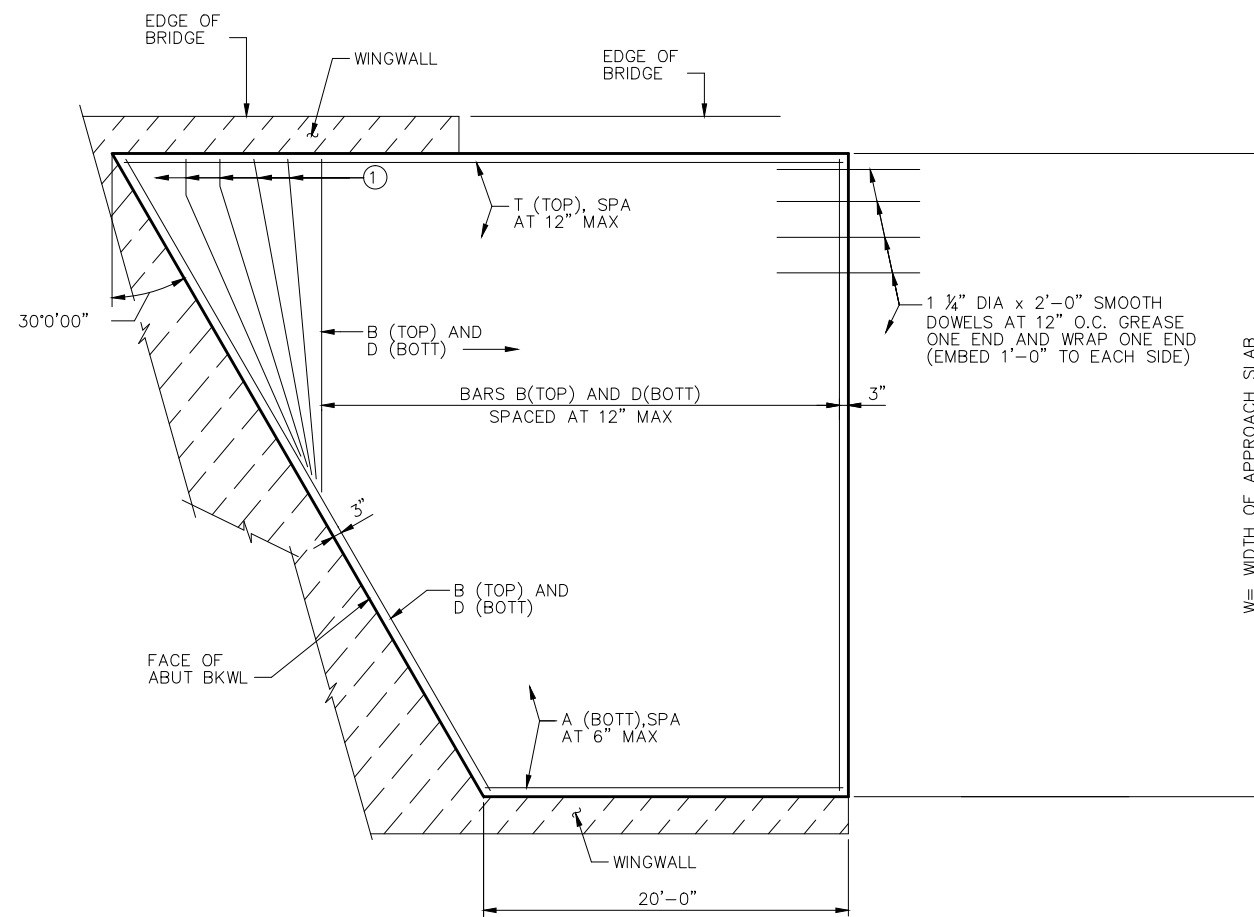
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NOTE

PROJECT TITLE:		
DRAWN BY:	SHEET NO.:	JOB NO.:
CHK'D BY:	BRIDGE APPROACH SLAB DESIGN GUIDELINES (1 OF 2)	
SCALE:	FILE NAME:	FILE NO.:
DATE:	APPROVED BY:	SHT NO.:

HL93 LOADING



**PLAN**  
SHOWING NON-SKEWED PLAN  
(SIDEWALK/CURB REINFORCING  
NOT SHOWN FOR CLARITY)



**PLAN**  
SHOWING 30 DEG SKEW PLAN  
(SIDEWALK/CURB REINFORCING  
NOT SHOWN FOR CLARITY)

### APPROXIMATE QUANTITIES ②

REINF STEEL WEIGHT = 5.2 LBS/SF OF APPROACH SLAB  
AREA OF APPR SLAB =  $20W + 0.5W^2 \tan S$  (SF)  
W = WIDTH OF APPROACH SLAB (FT)  
S = SKEW ANGLE (DEG)

### GENERAL NOTES

- ① FLARE BARS B & D IN THIS REGION (1'-6" MAX SPA, 3" MIN SPA). MIN FLARED BAR LENGTH = 2'-6". BEND BARS AS NECESSARY.
- ② FOR CONTRACTORS INFORMATION ONLY. SIDEWALK QUANTITIES NOT INCLUDED.

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**FIRM INFO**

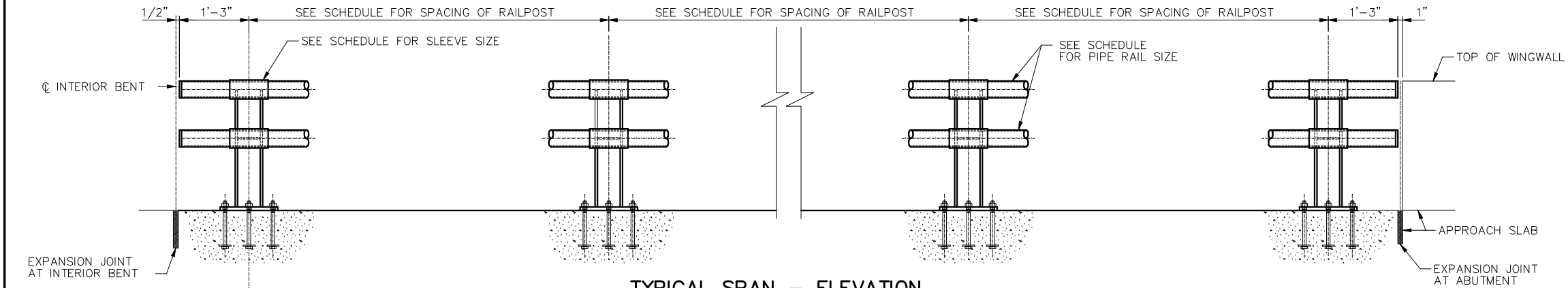
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DATE:	(2 OF 2)		SHT NO.:
APPROVED BY:	24		

HL93 LOADING

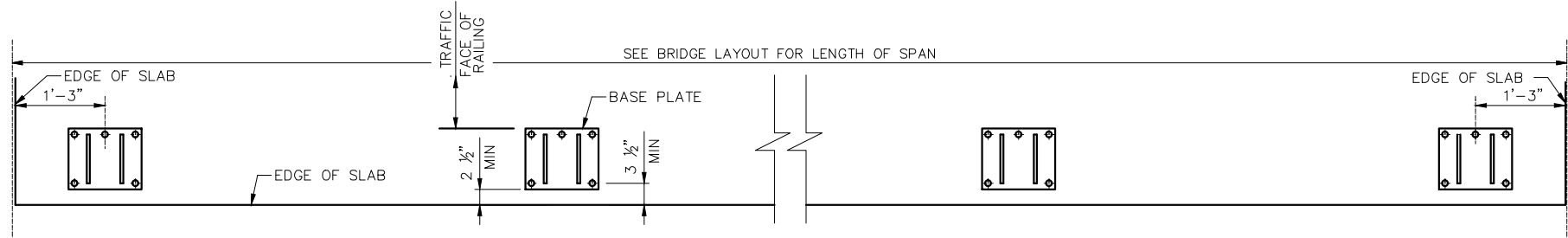


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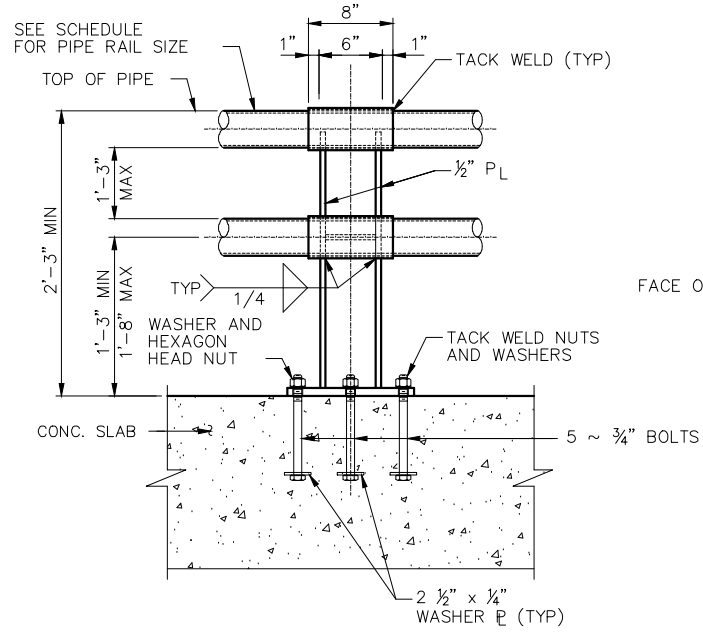


TYPICAL SPAN – ELEVATION  
SCALE: 1' = 1'-0"

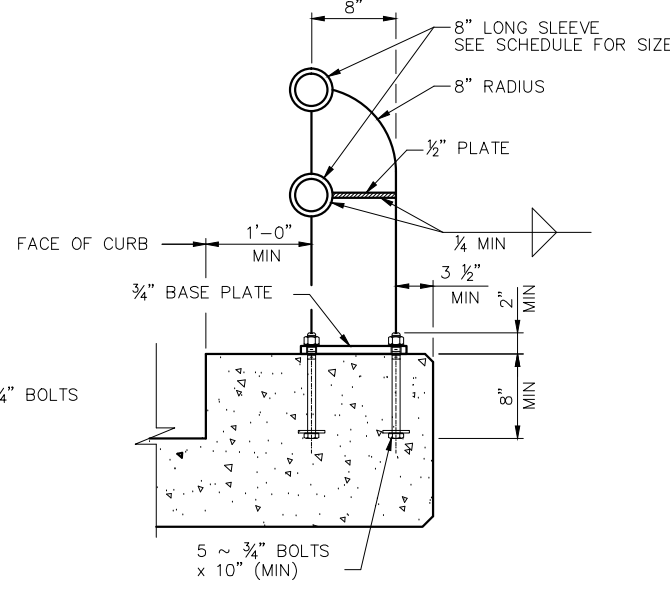
SCHEDULE OF HORIZONTAL TRAFFIC RAIL		
RAILPOST SPACING (MAX)	REQUIRED PIPE SIZE (MIN)	REQUIRED SLEEVE SIZE (MIN)
4'-2"	3" STD. WT O.D.=3.5" I.D.=3.608"	3 1/2" SCH. 10S O.D.=4.00" I.D.=3.75"
5'-8"	3 1/2" STD. WT O.D.=4.0" I.D.=3.548"	4" SCH. 10S O.D.=4.50" I.D.=4.25"
7'-8"	4" STD. WT O.D.=4.5" I.D.=4.026"	5" SCH. 80 O.D.=5.563" I.D.=4.813"



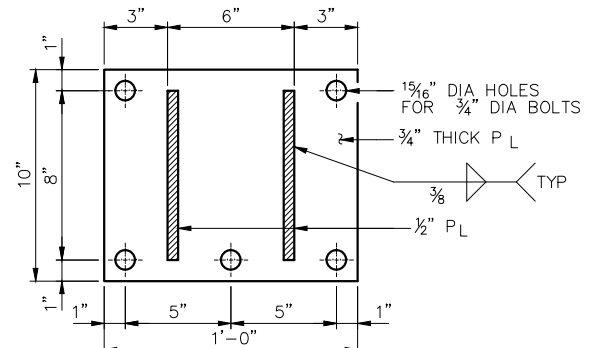
TYPICAL SPAN – ANCHOR BOLT PLAN  
SCALE: 1' = 1'-0"



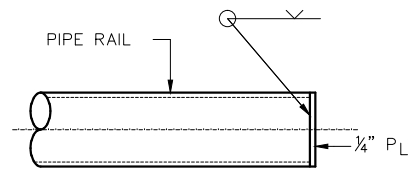
TYPICAL FRONT ELEVATION OF RAILPOST  
SCALE: 1 1/2" = 1'-0"



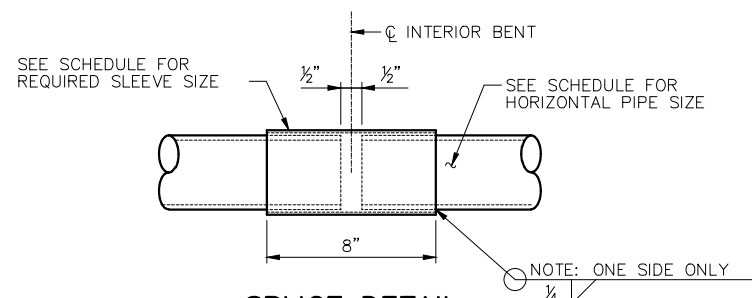
TYPICAL SECTION THRU RAILPOST  
SCALE: 1 1/2" = 1'-0"



BASE PLATE DETAIL  
SCALE: 3" = 1'-0"



PIPE END DETAIL  
SCALE: 3" = 1'-0"



SPLICE DETAIL AT INTERIOR BENT  
SCALE: 3" = 1'-0"

- GENERAL NOTES:
- PIPE SHALL CONFORM TO ASTM A53 GRADE B. STEEL PLATES SHALL CONFORM TO ASTM A36. BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A307.
  - PIPES AND PLATES SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123. BOLTS NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153.
  - DAMAGED GALVANIZED COATING SHALL BE REPAIRED WITH A ZINC-RICH PAINT.
  - THE PIPE SHALL BE FABRICATED TO LENGTHS SUCH THAT THE PIPE ENDS WILL BE LOCATED INSIDE THE PIPE SLEEVES. ALL JOINTS SHALL BE BUTT WELDED. EXPOSED PIPE ENDS BETWEEN THE RAIL POST WILL NOT BE ACCEPTED.
  - AFTER FINAL ADJUSTMENT, BURR THREADS AND TACK WELD NUTS AND WASHERS.
  - DETAILS SHOWN APPLY TO PROJECTS WITH A CURB PROJECTING 9" OR MORE FROM THE TRAFFIC FACE OF RAILING. SEE AASHTO LRFD BRIDGE DESIGN SPECIFICATION FOR REQUIRED MODIFICATIONS FOR OTHER CONDITIONS.

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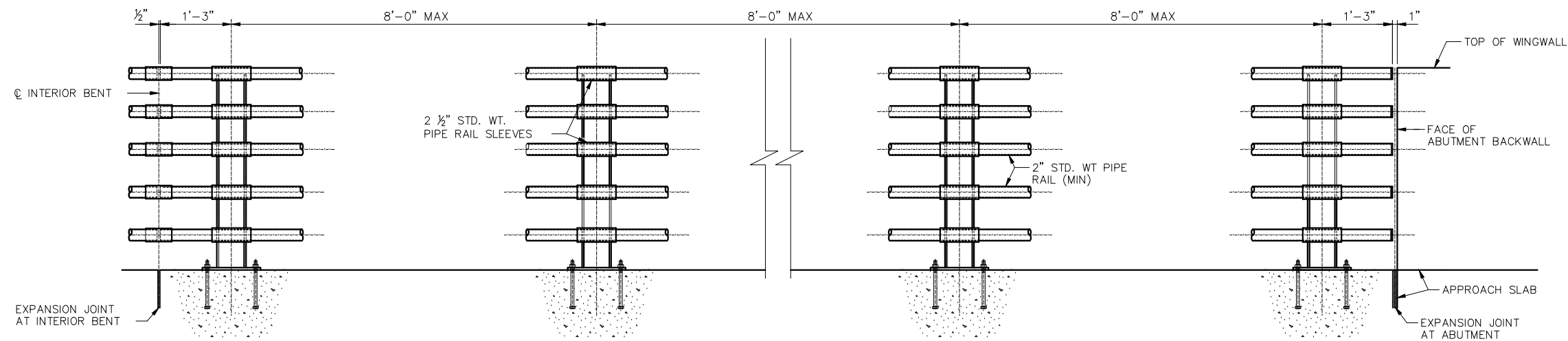
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SEAL  
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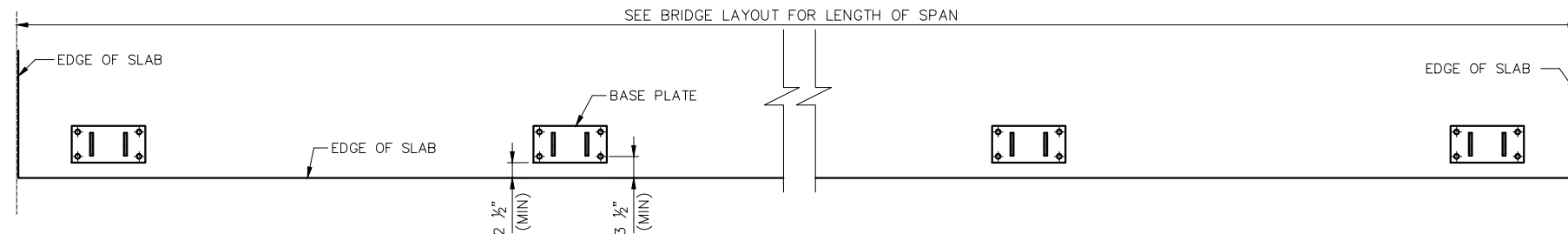
BRIDGE RAILING STANDARDS		
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DRAWN BY:		FILE NAME:
CHECKED BY:		FILE NO.:
SCALE:		
DATE:	APPROVED BY:	SHT NO. 26



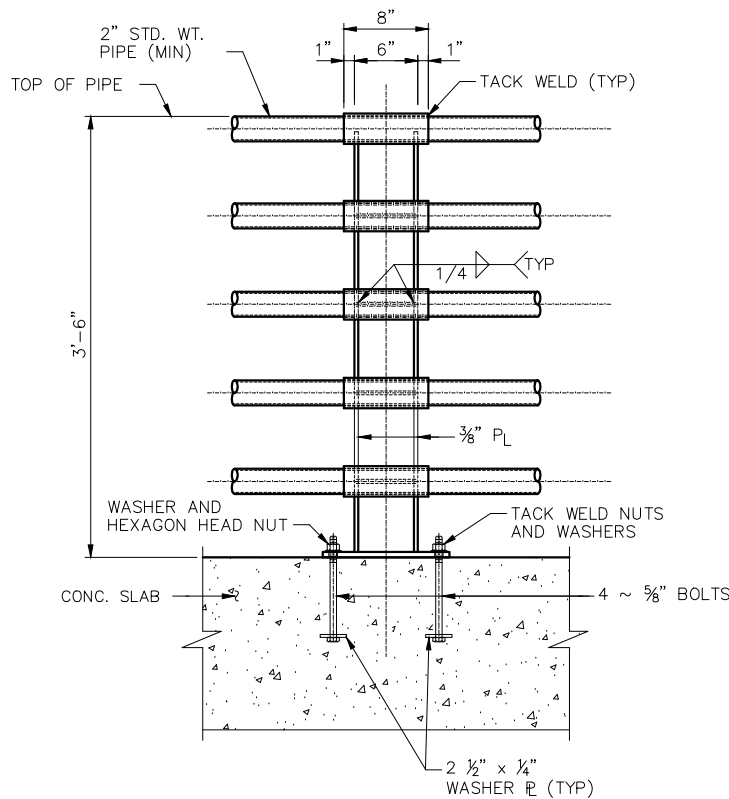




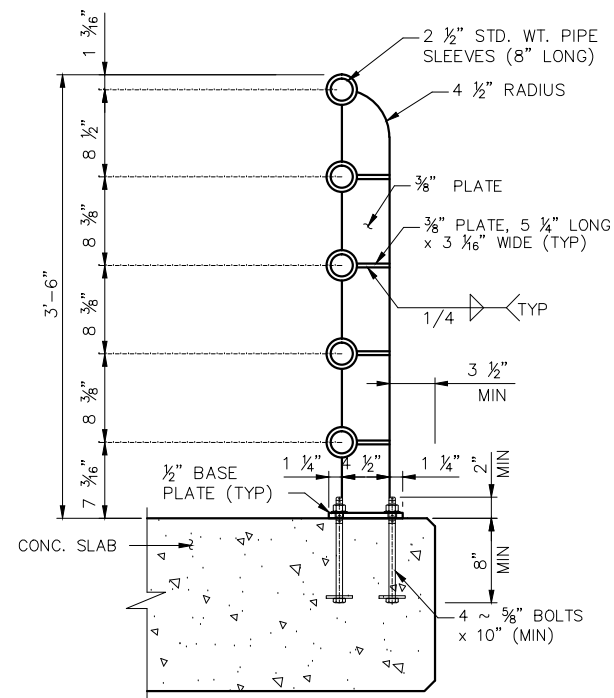
**TYPICAL SPAN - ANCHOR BOLT PLAN**  
SCALE: 1' = 1'-0"



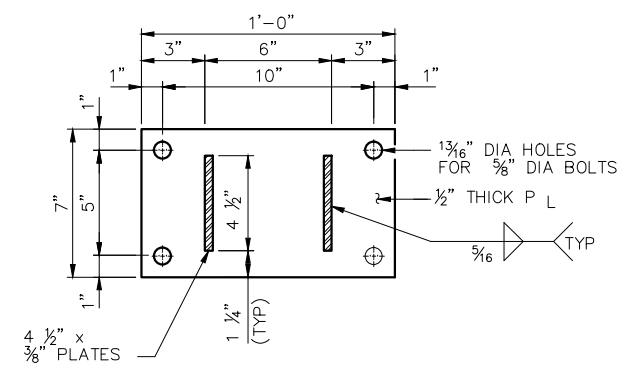
**TYPICAL SPAN - ANCHOR BOLT PLAN**  
SCALE: 1' = 1'-0"



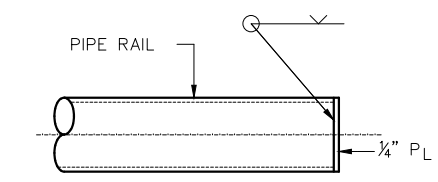
**TYPICAL FRONT ELEVATION OF RAILPOST**  
SCALE: 1 1/2" = 1'-0"



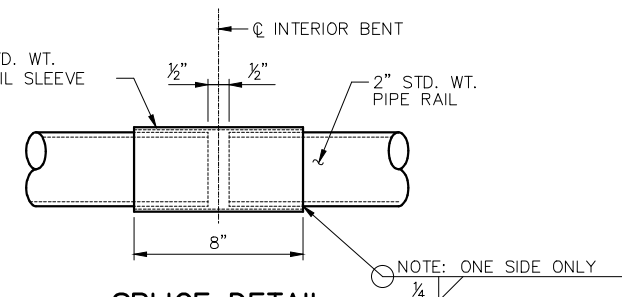
**TYPICAL SECTION THRU RAILPOST**  
SCALE: 1 1/2" = 1'-0"



**BASE PLATE DETAIL**  
SCALE: 3" = 1'-0"



**PIPE END DETAIL**  
SCALE: 3" = 1'-0"



**SPLICE DETAIL AT INTERIOR BENT**  
SCALE: 3" = 1'-0"

**GENERAL NOTES:**

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- AFTER FINAL ADJUSTMENT, BURR THREADS AND TACK WELD NUTS AND WASHERS.
- DETAILS SHOWN APPLY TO PROJECTS WITH A CURB PROJECTING 9" OR MORE FROM THE TRAFFIC FACE OF RAILING. SEE AASHTO LRFD BRIDGE DESIGN SPECIFICATION FOR REQUIRED MODIFICATIONS FOR OTHER CONDITIONS.

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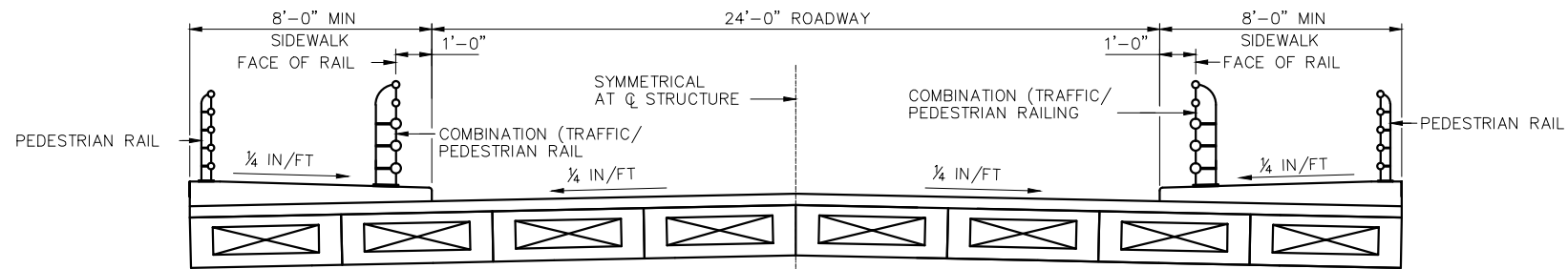
**HARRIS COUNTY  
ENGINEERING DEPARTMENT**



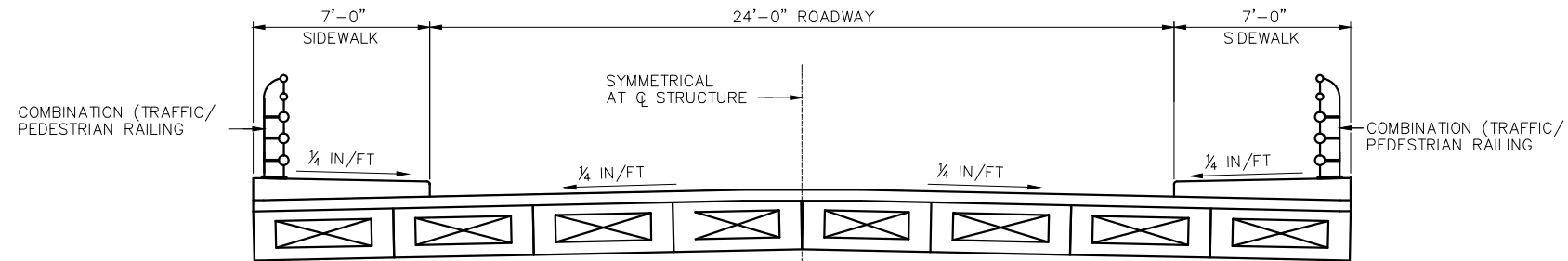
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NOTE**

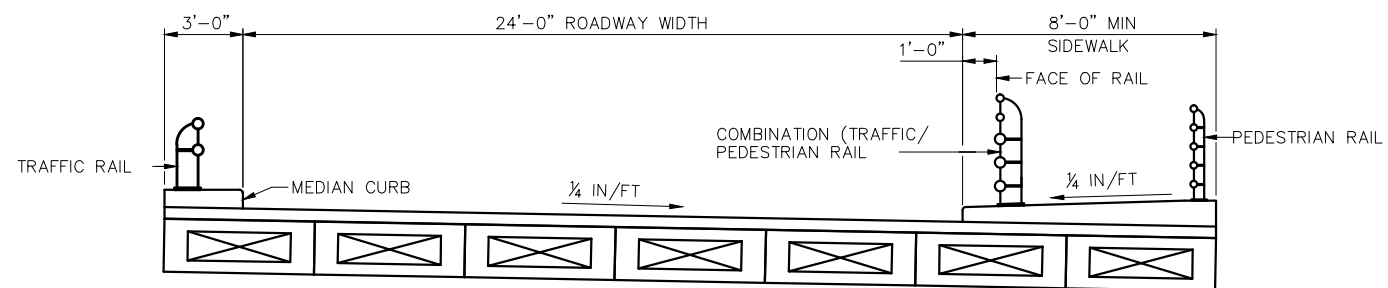
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		28	



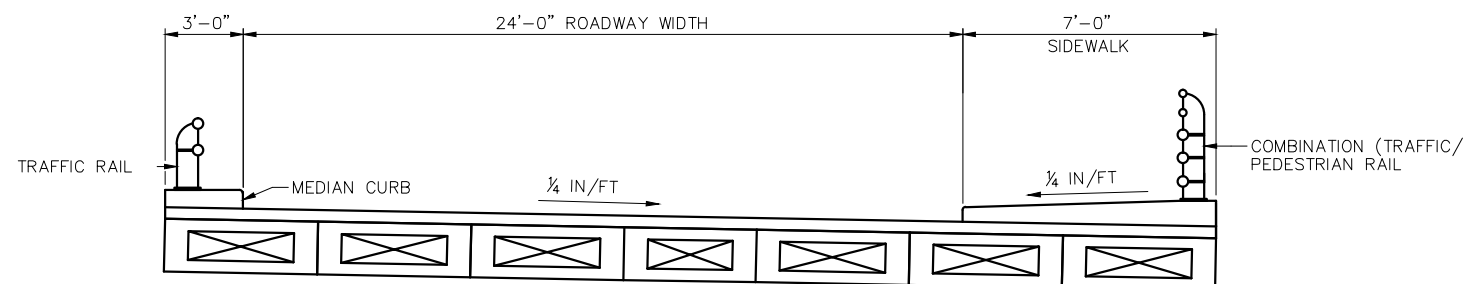
**A** TYPICAL TWO-WAY ROAD  
WITH HIGH PEDESTRIAN VOLUME



**B** TYPICAL TWO-WAY ROAD  
WITH LOW PEDESTRIAN VOLUME



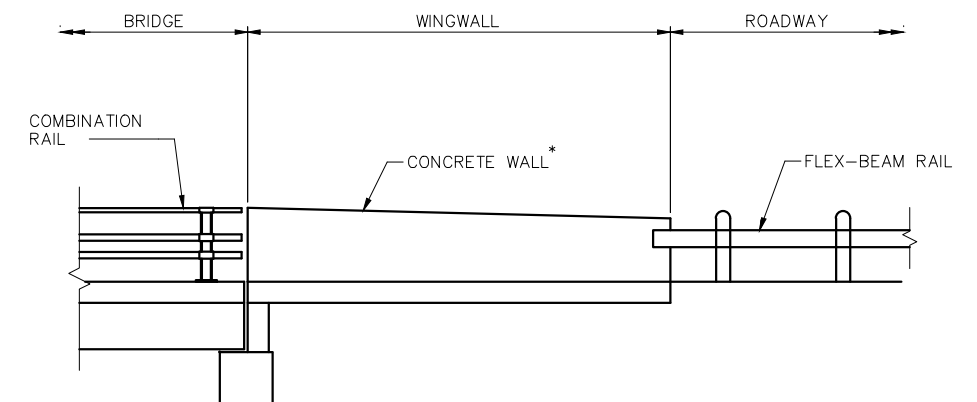
**C** HALF BOULEVARD (ONE WAY)  
WITH HIGH PEDESTRIAN VOLUME



**D** HALF BOULEVARD (ONE WAY)  
WITH LOW PEDESTRIAN VOLUME

**GENERAL NOTES:**

1. IN ABSENCE OF A STUDY THAT SPECIFICALLY ADDRESSES PEDESTRIAN VOLUMES, INDICATORS OF HIGH PEDESTRIAN VOLUMES INCLUDE EXISTING AND/OR PROPOSED SIDEWALKS OR EXISTING FOOT PATHS IN THE IMMEDIATE VICINITY OF THE PROPOSED BRIDGE.
2. IF THE USE OF THE COMBINATION (TRAFFIC/PEDESTRIAN) RAILING AT THE INSIDE FACE OF SIDEWALK (AS SHOWN IN SECTIONS "A" AND "C" WILL CREATE SIGHT DISTANCE PROBLEMS AT A NEARBY INTERSECTION, A TRAFFIC RAIL MAY BE USED IN LIEU OF THE COMBINATION (TRAFFIC/PEDESTRIAN) RAILING.



**SECTION AT BRIDGE APPROACH**

\* TO BE USED FOR TRANSITION BETWEEN  
BRIDGE RAILING AND FLEX-BEAM GUARDRAIL.  
LOCATION OF WALL SHALL COINCIDE WITH  
LOCATION OF RAILING AT INSIDE FACE OF SIDEWALK.

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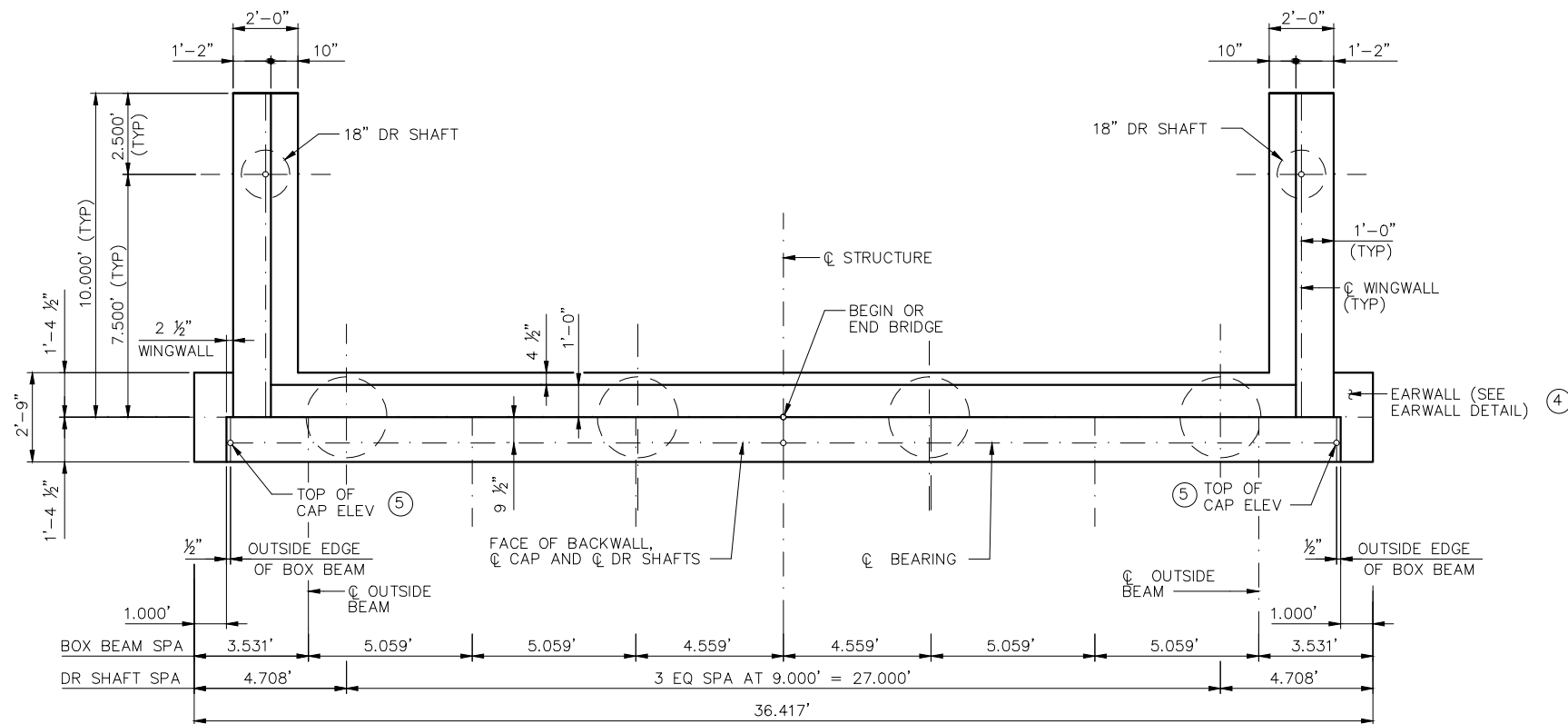


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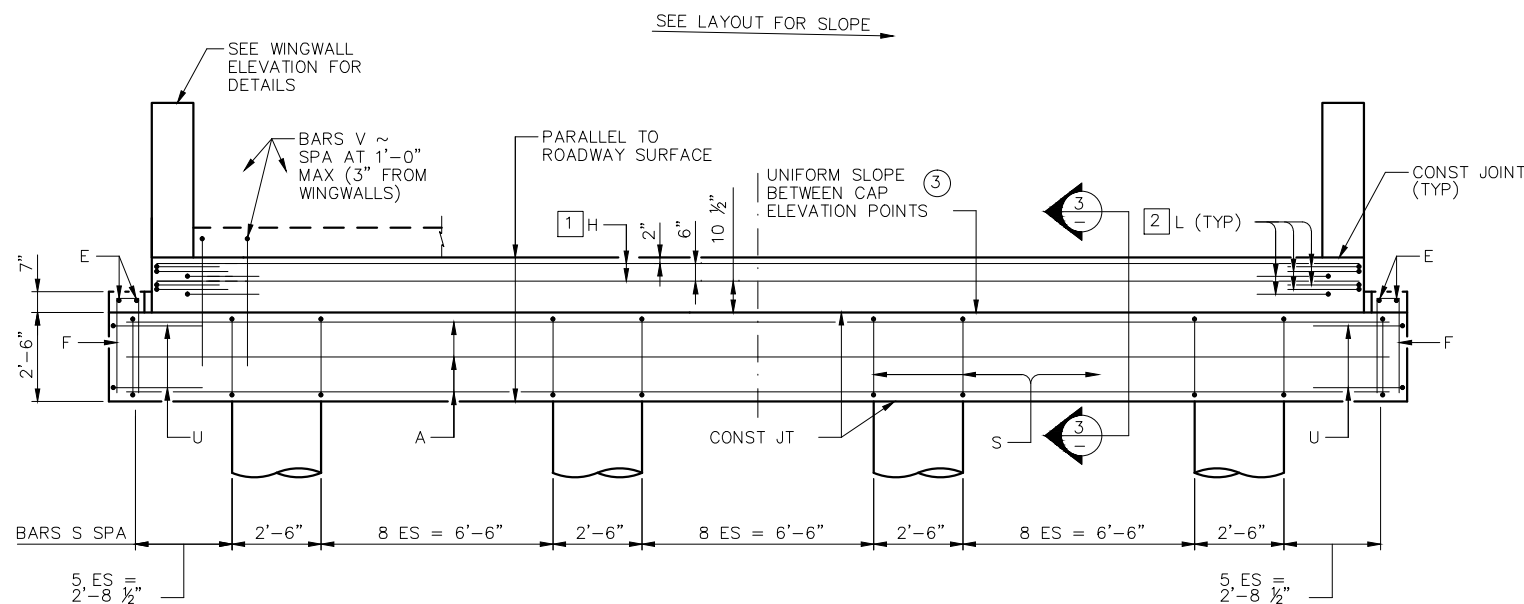
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NOTE**

PROJECT TITLE: <b>BRIDGE RAILING STANDARDS RAILING APPLICATIONS</b>			
DRAWN BY:	SHEET NO.:	FILE NO.:	JOB NO.:
CHK'D BY:			
SCALE:			
DATE:	APPROVED BY:		SHT NO.:
			29

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1 PLAN



2 ELEVATION

NOTES TO DESIGN ENGINEER:

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- D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE BRIDGE PLANS.

- ① INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE.
- ② 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ③ SURFACE FINISH FOR THE TOP OF CAP WILL BE A TEXTURED WOOD FLOAT FINISH. THE SURFACE MUST BE LEVEL IN THE DIRECTION OF THE CENTERLINE OF BEAMS.
- ④ DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- ⑤ TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- ⑥ WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

NOTES TO ENGINEER

- ① ADD AN ADDITIONAL ROW OF H BARS FOR B24, B28 AND B34 BEAMS. ADD TWO ADDITIONAL ROWS OF H BARS FOR B40 BEAMS. ROWS OF H BARS SHALL BE EQUALLY SPACED.
- ② A SET OF L BARS IS REQUIRED FOR EACH ROW OF H BARS.
- ③ GUIDELINE DRAWINGS ARE FOR B20 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.

ABUTMENT NOTES

- 1. DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
- 2. ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
- 3. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
- 4. ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
- 5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
- 6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
- 7. MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER SHAFT.

TOP OF CAP ELEVATIONS ⑥	
WORKING POINT	ELEVATION

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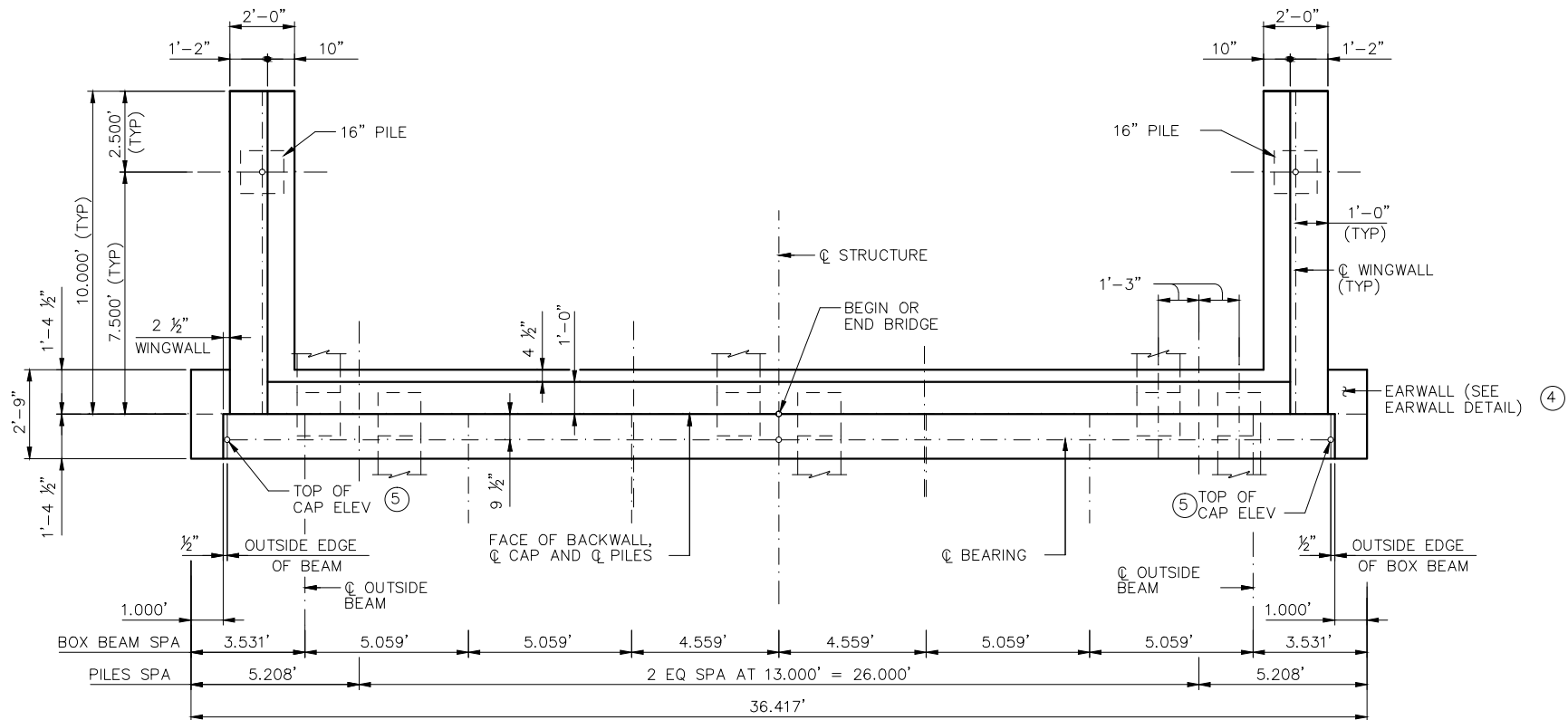
SEAL  
NOTE

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CHK'D BY:		DESIGN GUIDELINES-ABUTMENT	
SCALE:		BOX BEAM-DR SHAFTS	
DATE:		HALF BOULEVARD, 0'SKEW	
APPROVED BY:		(1 OF 2)	
		SHT NO: 30	



NOTES TO DESIGN ENGINEER:

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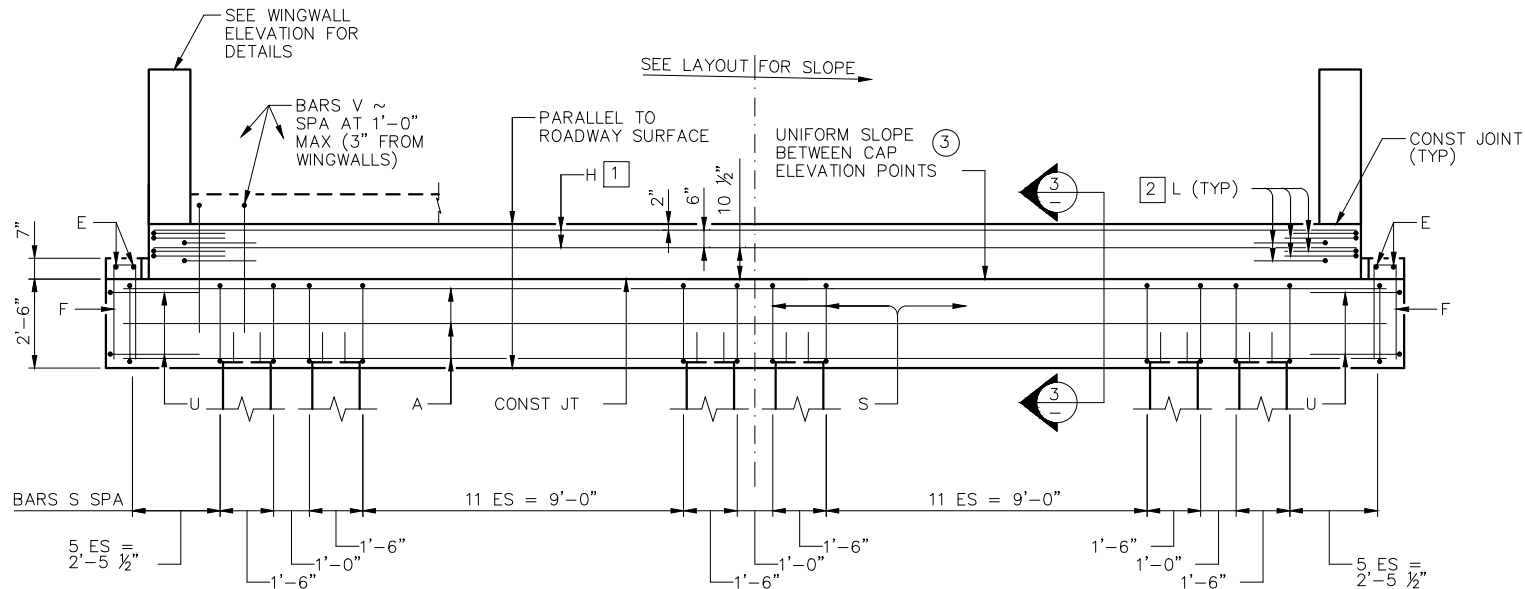
- ① INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE.
- ② 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ③ SURFACE FINISH FOR THE TOP OF CAP WILL BE A TEXTURED WOOD FLOAT FINISH. THE SURFACE MUST BE LEVEL IN THE DIRECTION OF THE CENTERLINE OF BEAMS.
- ④ DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- ⑤ TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- ⑥ WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

NOTES TO ENGINEER

- ① ADD AN ADDITIONAL ROW OF H BARS FOR B24, B28 AND B34 BEAMS. ADD TWO ADDITIONAL ROWS OF H BARS FOR B40 BEAMS. ROWS OF H BARS SHALL BE EQUALLY SPACED.
- ② A SET OF L BARS IS REQUIRED FOR EACH ROW OF H BARS.
- ③ GUIDELINE DRAWINGS ARE FOR B20 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.

ABUTMENT NOTES

1. DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
2. ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
3. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
4. ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
7. MAXIMUM CALCULATED FOUNDATION LOADS:  
X TONS PER PILE.



TOP OF CAP ELEVATIONS ⑥	
WORKING POINT	ELEVATION

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGURRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

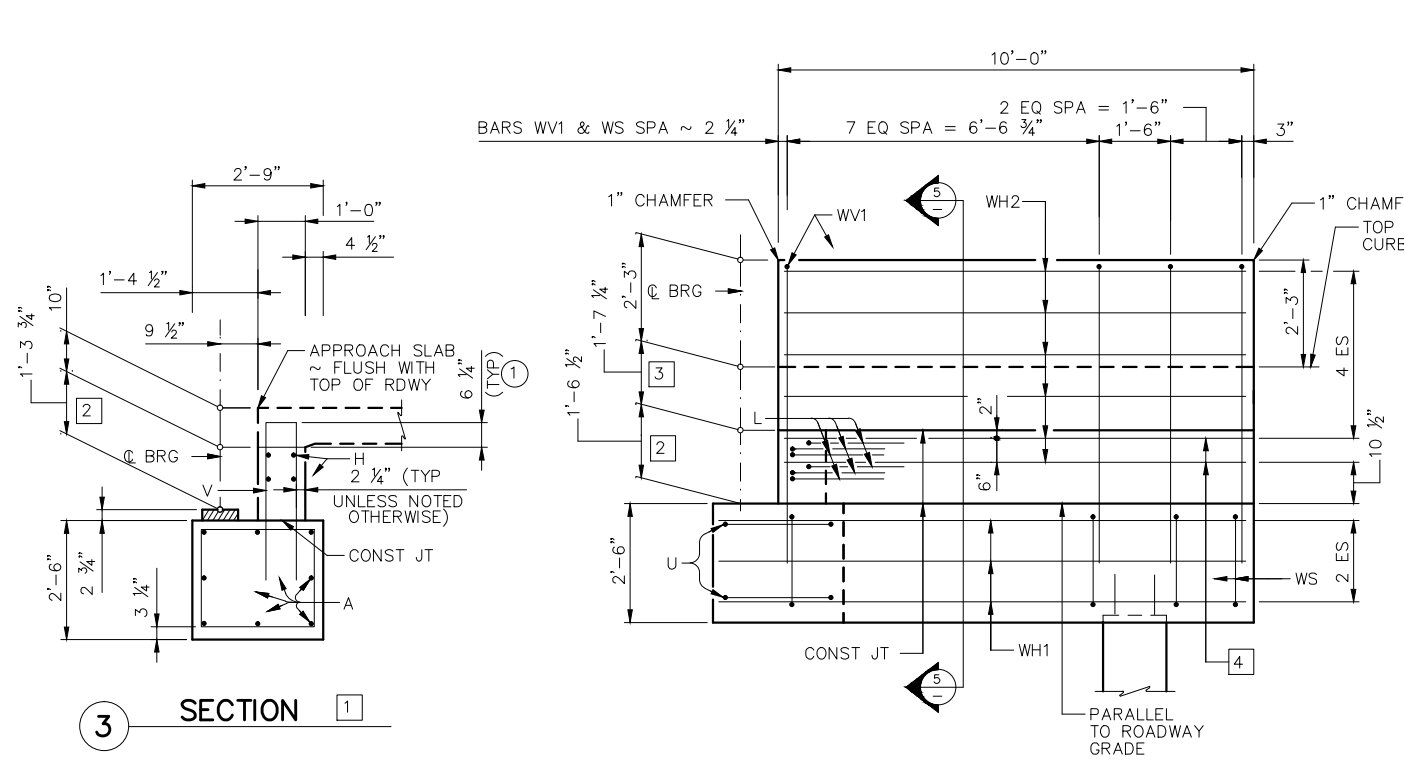
HARRIS COUNTY  
ENGINEERING DEPARTMENT



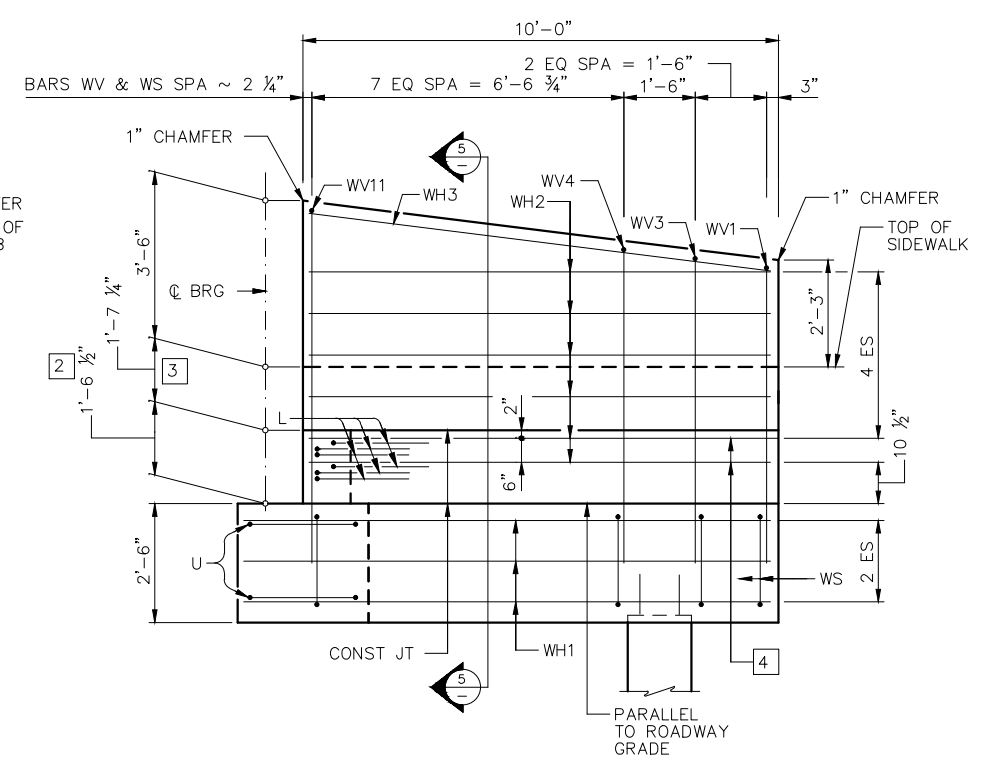
FIRM INFO

SEAL  
NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	FILE NAME:	
	DESIGN GUIDELINES-ABUTMENT		
	BOX BEAM-PILES		
	HALF BOULEVARD, 0'SKEW		
	(1 OF 2)		
DATE:	APPROVED BY:	SHT NO:	32

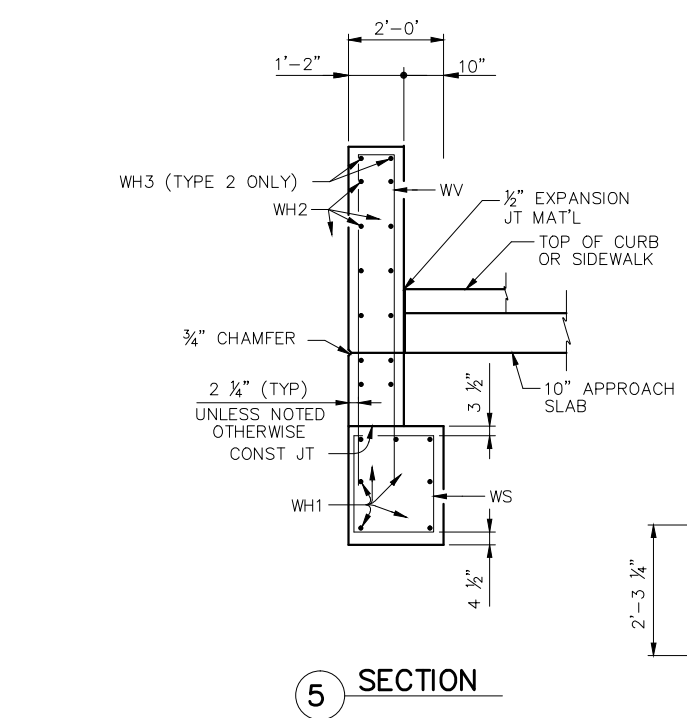


TYPE 1 – TRAFFIC RAIL SIDE

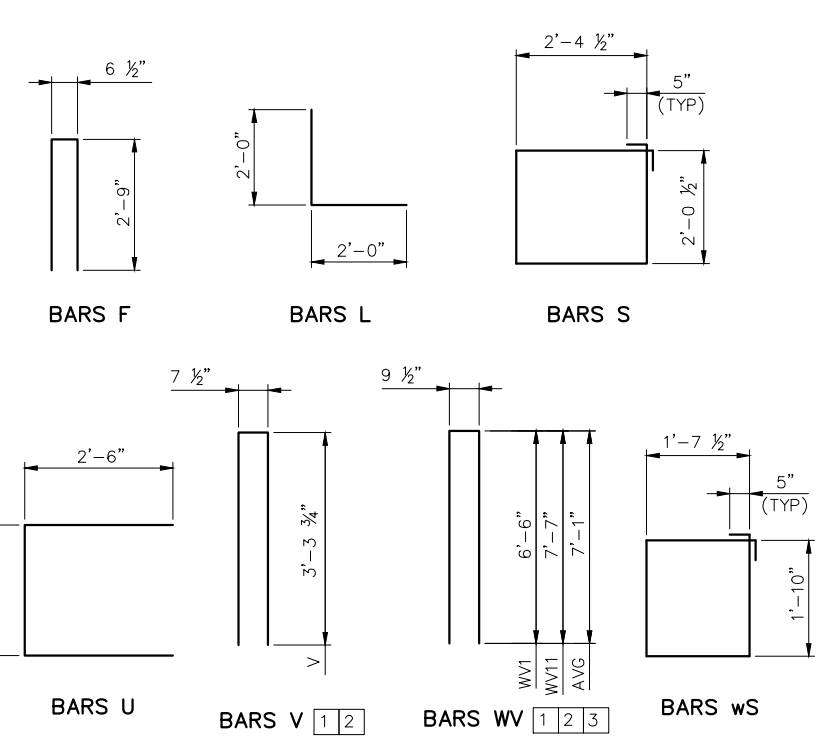


TYPE 2 – COMBINATION RAIL SIDE

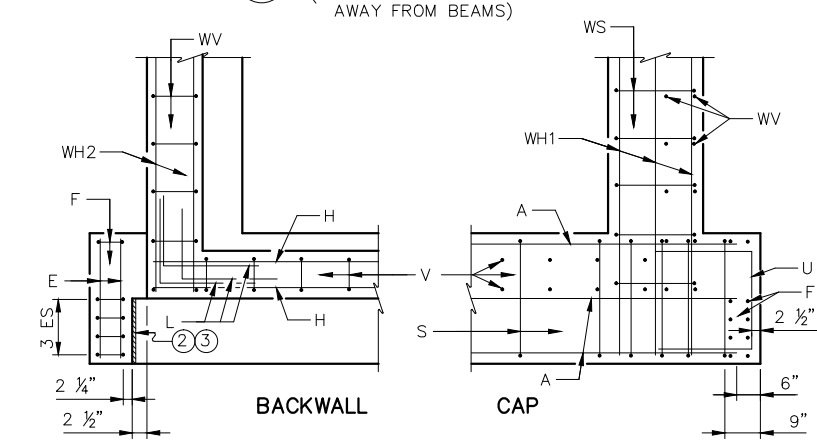
BILL OF REINFORCING STEEL <sup>1</sup>				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	8	#11	35'-5"	1,505
E	4	# 5	2'-5"	10
F	10	# 5	6'-1"	63
H	4	# 6	33'-8"	202
L	12	# 6	4'-0"	72
S	42	# 4	9'-8"	271
U	4	# 6	7'-3"	44
V	33	# 5	7'-3"	250
WH1	14	# 6	11'-1"	232
WH2	24	# 6	9'-8"	348
WH3	2	# 6	9'-9"	29
WS	22	# 4	7'-9"	114
WV1	11	# 5	13'-10"	159
WV (AVG)	11	# 5	15'-0"	172
REINFORCING STEEL			LB	3,471
ESTIMATED QUANTITIES <sup>1</sup>				
REINFORCING STEEL			LB	3,471
CLASS B1 CONCRETE			CY	19.9



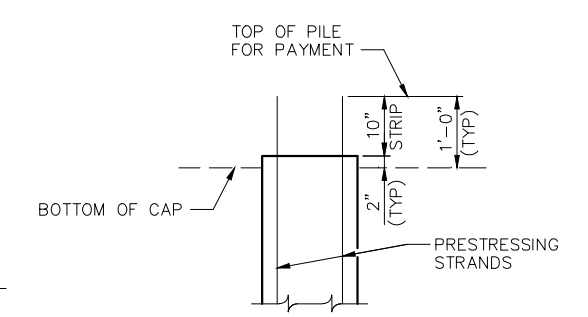
SECTION



EARWALL DETAIL <sup>3</sup>  
(SLOPE TOP OF EARWALL AWAY FROM BEAMS)



CORNER DETAILS



PILING EMBEDMENT DETAIL

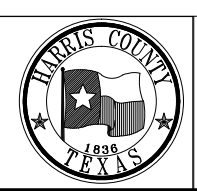
- 1 INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE. 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- 2 DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.

### NOTES TO ENGINEER

- 1 GUIDELINE DRAWINGS ARE FOR B20 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
- 2 THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB, SHEAR KEY AND THE EFFECT OF VERTICAL CURVE.
- 3 THE ENGINEER SHALL DETERMINE WINGWALL HEIGHT BASED ON ROADWAY AND SIDEWALK CROSS SLOPES.
- 4 ADJUST NUMBER OF WH2 BARS TO MATCH NUMBER OF H BARS IN BACKWALL.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGURRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT



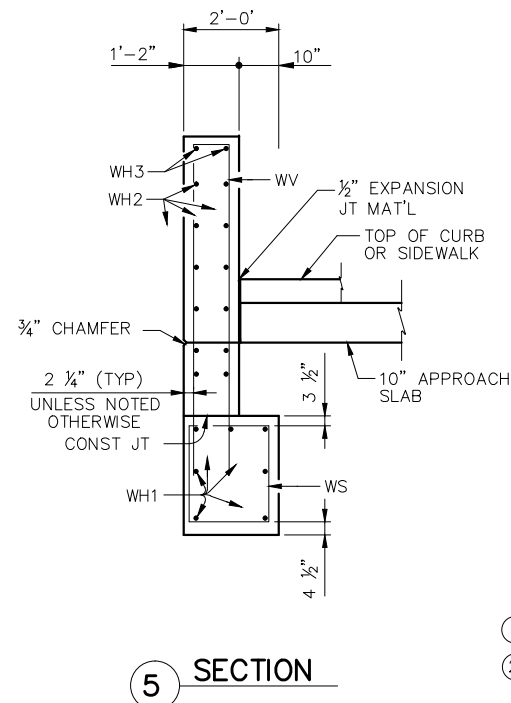
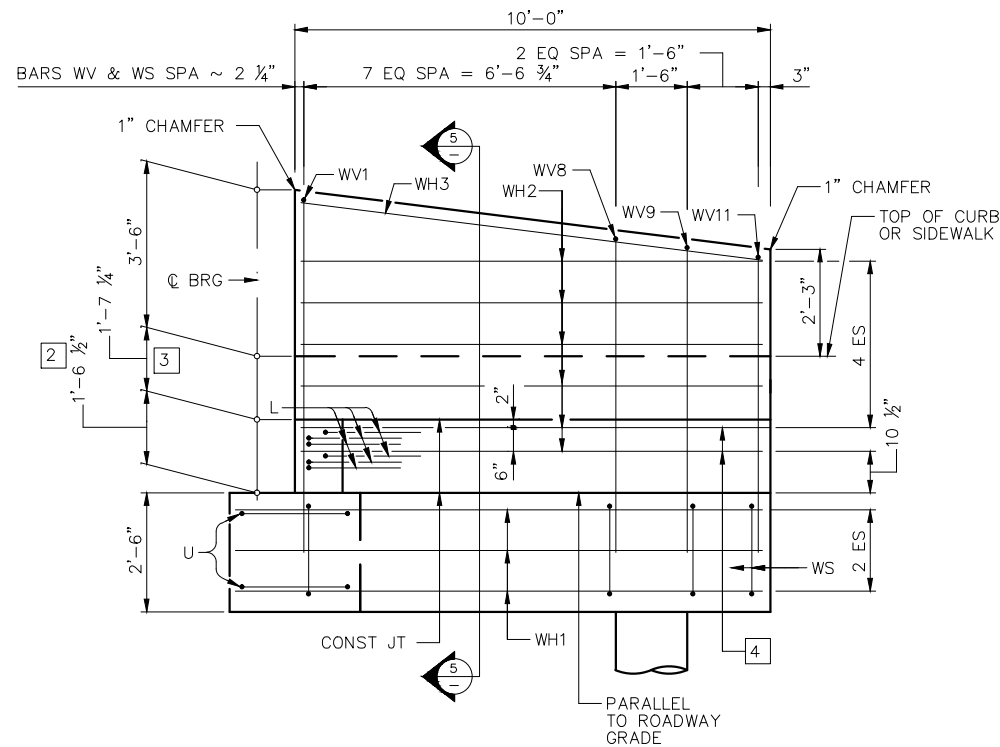
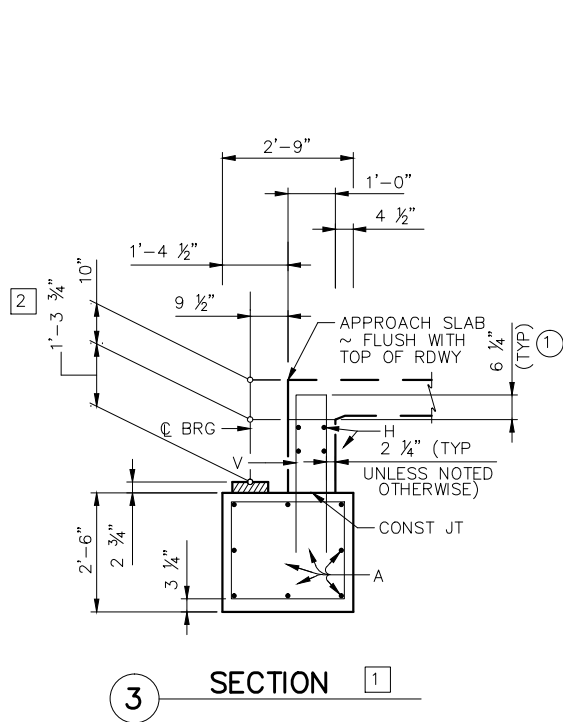
FIRM INFO

SEAL  
NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:	
CK'D BY:	DESIGN GUIDELINES-ABUTMENT	FILE NAME:	
SCALE:	BOX BEAM-PILE	FILE NO:	
DATE:	HALF BOULEVARD, 0'SKEW	SHT NO:	
	(2 OF 2)	33	

HL93 LOADING



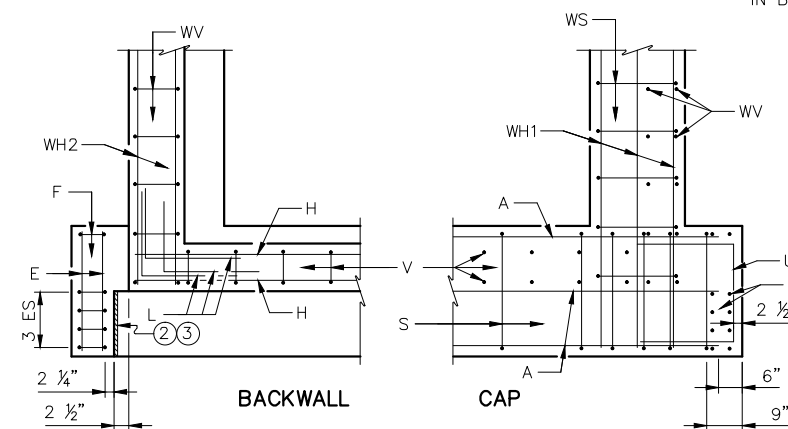
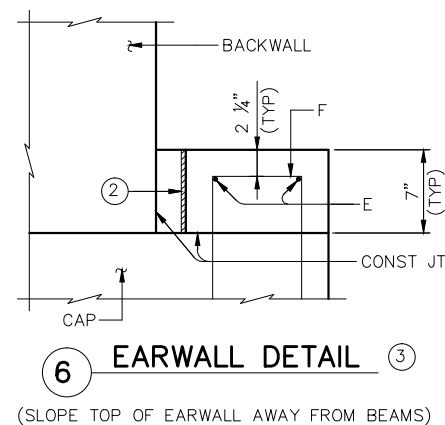
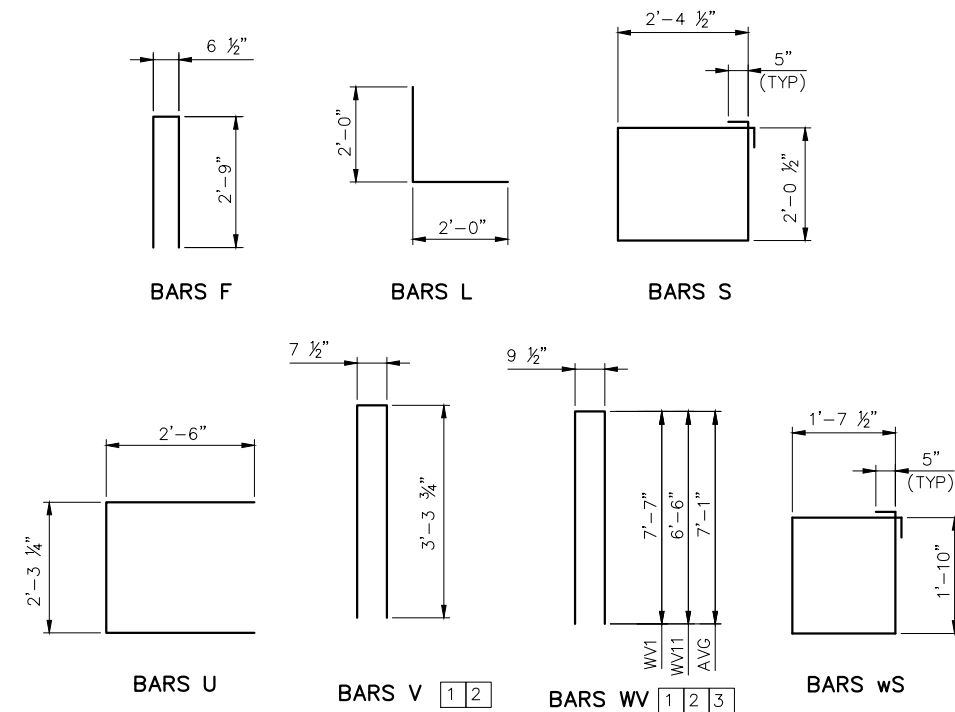


BILL OF REINFORCING STEEL 1				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	8	#11	39'-5"	1,675
E	4	# 5	2'-5"	10
F	10	# 5	6'-1"	63
H	4	# 6	37'-8"	226
L	12	# 6	4'-0"	72
S	46	# 4	9'-8"	297
U	4	# 6	7'-3"	44
V	36	# 5	7'-3"	272
WH1	14	# 6	11'-1"	232
WH2	24	# 6	9'-8"	348
WH3	4	# 6	9'-9"	59
WS	22	# 4	7'-9"	144
WV (AVG)	22	# 5	15'-0"	344
REINFORCING STEEL			LB	3,756
ESTIMATED QUANTITIES 1				
REINFORCING STEEL			LB	3,756
CLASS B1 CONCRETE			CY	21.4

- INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE.
- 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.

#### NOTES TO ENGINEER

- GUIDELINE DRAWINGS ARE FOR B20 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
- THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB, SHEAR KEY AND THE EFFECT OF VERTICAL CURVE.
- THE ENGINEER SHALL DETERMINE WINGWALL HEIGHT BASED ON ROADWAY AND SIDEWALK CROSS SLOPES.
- ADJUST NUMBER OF WH2 BARS TO MATCH NUMBER OF H BARS IN BACKWALL.



NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O. AGUIRRE
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**HARRIS COUNTY  
ENGINEERING DEPARTMENT**



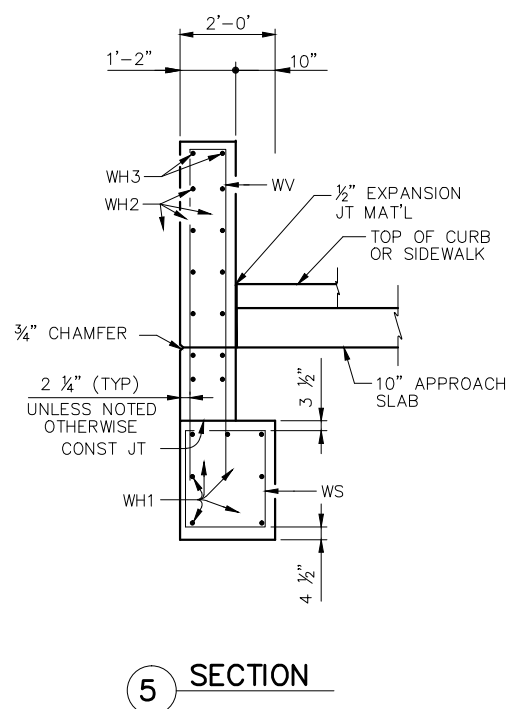
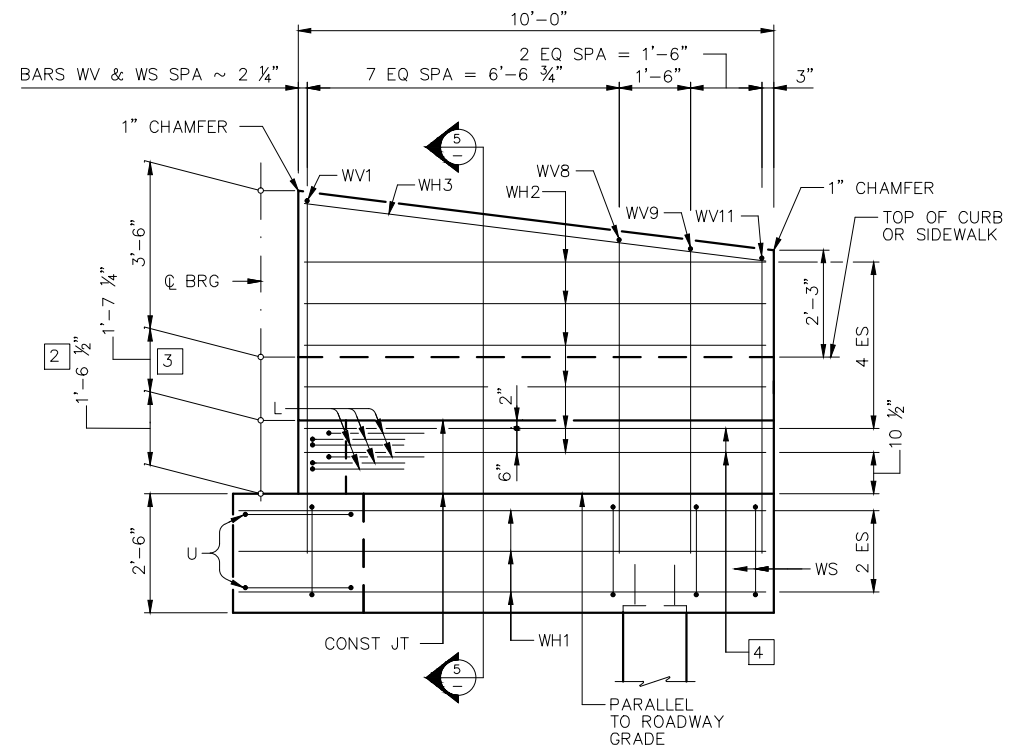
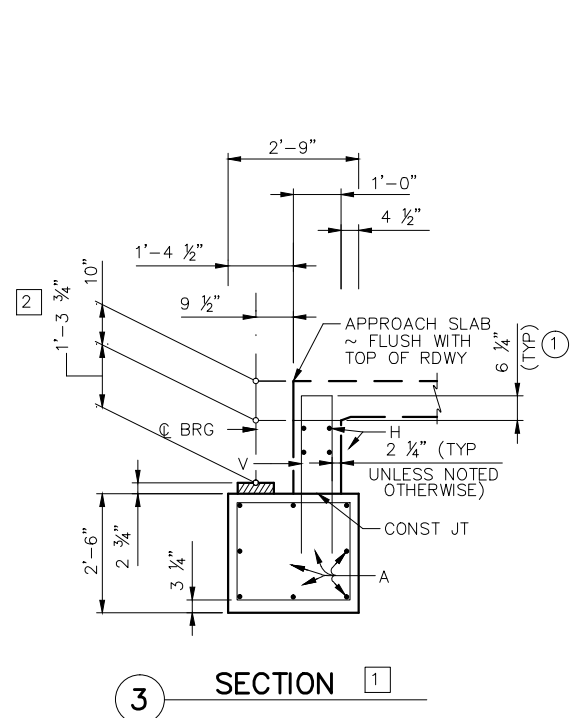
**FIRM INFO**

**SEAL  
NOTE**

PROJECT TITLE: HL93 LOADING			
DRAWN BY:	SHEET DESCRIPTION:	FILE NAME:	JOB NO:
CHK'D BY:	DESIGN GUIDELINES-ABUTMENT	FILE NAME:	
SCALE:	BOX BEAM-DR SHAFTS	FILE NO:	
DATE:	TWO-WAY ROAD, O'SKEW	SHT NO:	35
	(2 OF 2)		







BILL OF REINFORCING STEEL <sup>1</sup>				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	8	#11	39'-5"	1,675
E	4	# 5	2'-5"	10
F	10	# 5	6'-1"	63
H	4	# 6	37'-8"	226
L	12	# 6	4'-0"	72
S	44	# 4	9'-8"	284
U	4	# 6	7'-3"	44
V	36	# 5	7'-3"	272
WH1	14	# 6	11'-1"	232
WH2	24	# 6	9'-8"	348
WH3	4	# 6	9'-9"	59
WS	22	# 4	7'-9"	114
WV	22	# 5	15'-0"	344
REINFORCING STEEL			LB	3,743
ESTIMATED QUANTITIES <sup>1</sup>				
REINFORCING STEEL			LB	3,743
CLASS B1 CONCRETE			CY	21.4

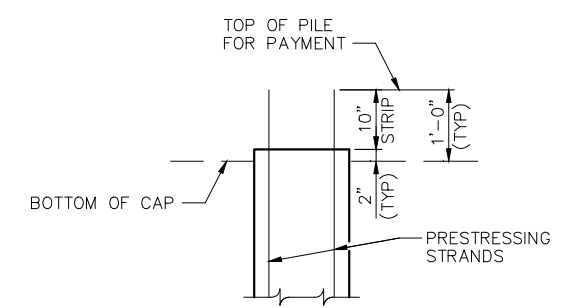
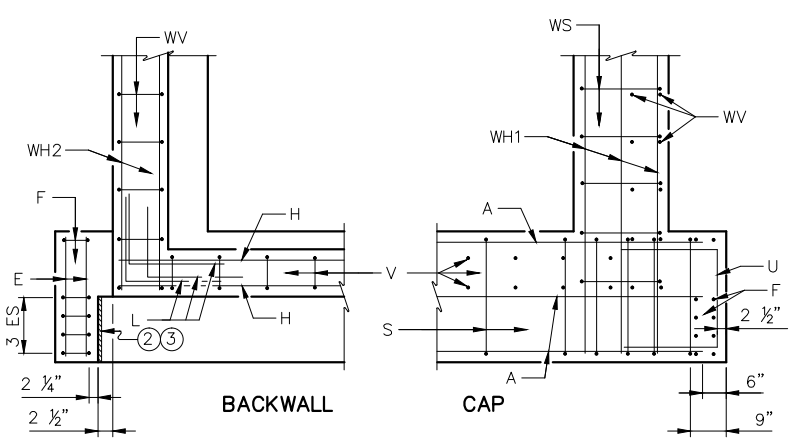
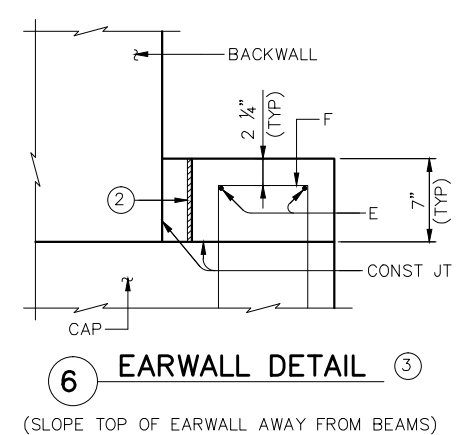
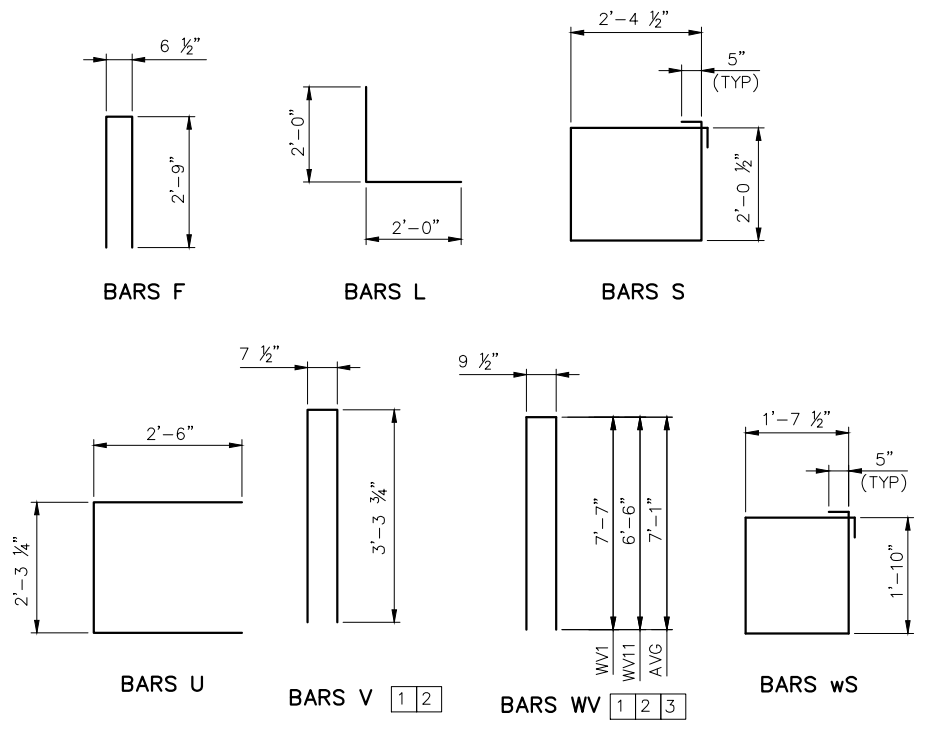
4 WINGWALL ELEVATION <sup>1</sup>  
(EARWALL OMITTED FOR CLARITY)

5 SECTION

- ① INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE. 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ② DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.

NOTES TO ENGINEER

- ① GUIDELINE DRAWINGS ARE FOR B20 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
- ② THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB, SHEAR KEY AND THE EFFECT OF VERTICAL CURVE.
- ③ THE ENGINEER SHALL DETERMINE WINGWALL HEIGHT BASED ON ROADWAY AND SIDEWALK CROSS SLOPES.
- ④ ADJUST NUMBER OF WH2 BARS TO MATCH NUMBER OF H BARS IN BACKWALL.



6 EARWALL DETAIL <sup>3</sup>  
(SLOPE TOP OF EARWALL AWAY FROM BEAMS)

7 CORNER DETAILS

8 PILING EMBEDMENT DETAIL

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O. AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT

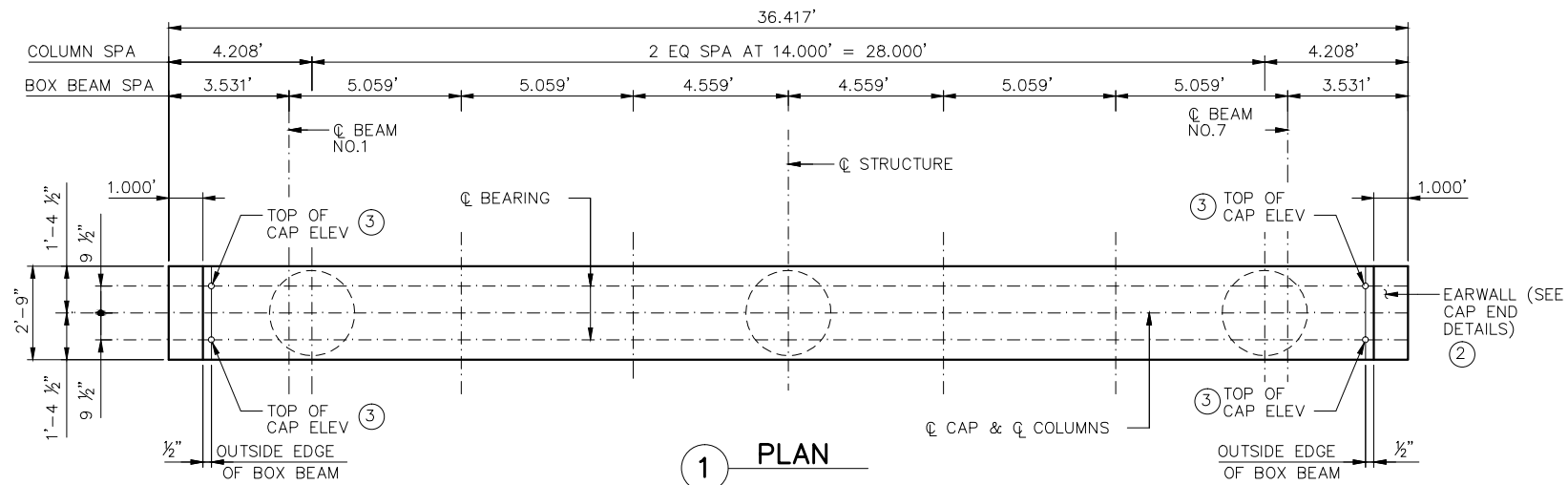


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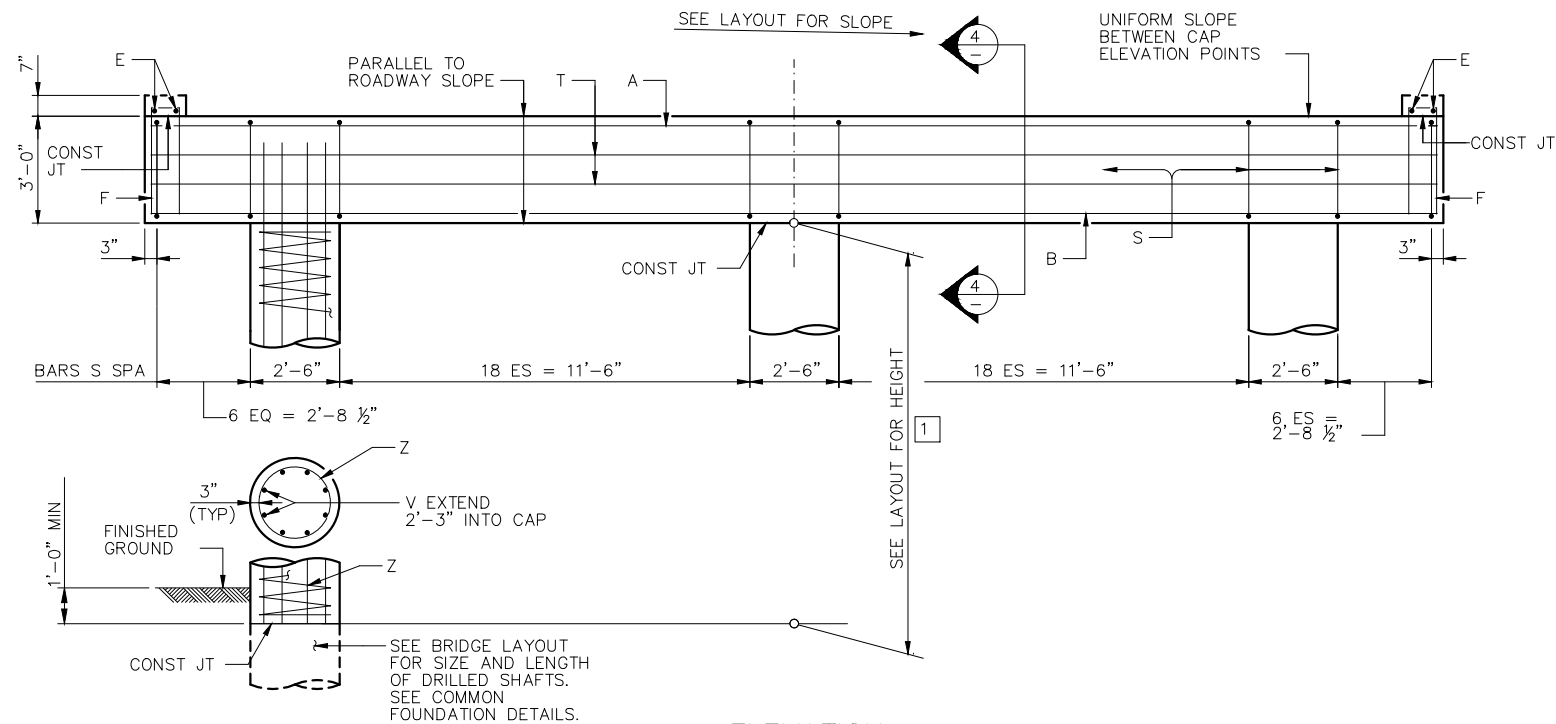
SEAL  
NOTE

PROJECT TITLE		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO.:
CHK'D BY:	DESIGN GUIDELINES-ABUTMENT	FILE NAME:
SCALE:	BOX BEAM-PILES	FILE NO.:
DATE:	TWO-WAY ROAD, 0'SKEW	SHT NO.:
	(2 OF 2)	37

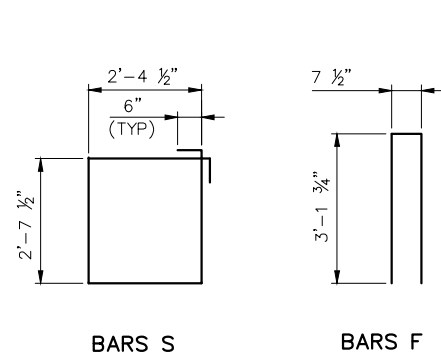
HL93 LOADING



1 PLAN

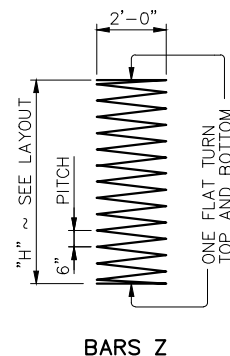


2 ELEVATION

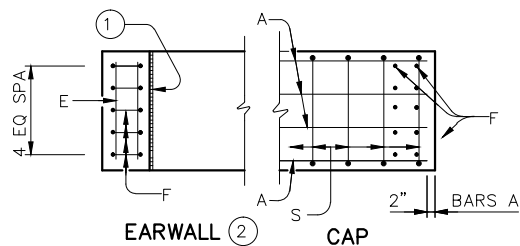


BARS S

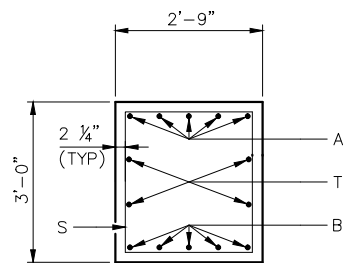
BARS F



BARS Z



3 CAP END DETAILS



4 BENT CAP SECTION

BILL OF REINFORCING STEEL ④				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	5	#11	36'-1"	959
B	5	#11	36'-1"	959
E	4	# 5	2'-5"	10
F	10	# 5	6'-11"	72
S	52	# 5	11'-0"	597
T	4	# 5	36'-1"	151
V	24	# 9	22'-3"	1,816
Z	3	#3	264'-9"	299
REINFORCING STEEL			LB	4,863
ESTIMATED QUANTITIES				
REINFORCING STEEL			LB	4,863
CLASS B1 CONCRETE (CAP)			CY	11.2
CLASS B1 CONCRETE (COL)			CY	10.9

- ① 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EAWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EAWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ② DO NOT CAST EAWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- ③ TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- ④ FOR EACH LINEAR FOOT VARIATION IN "H" VALUE MAKE FOLLOWING ADJUSTMENTS:  
BARS V: 1'-0"  
BARS Z: 12,606'  
REINFORCING STEEL: 96 LB  
CLASS "B1" CONCRETE (COL): 0.545 CY
- ⑤ WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION

TOP OF CAP ELEVATIONS ⑤	
WORKING POINT	ELEVATION

### INTERIOR BENT NOTES

1. DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
2. ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
3. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
4. ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
7. MAXIMUM CALCULATED FOUNDATION LOADS:  
X TONS PER SHAFT.

### NOTES TO ENGINEER

- ① QUANTITIES SHOWN ARE BASED ON AN "H" DIMENSION OF 20'.

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0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
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ENGINEERING DEPARTMENT

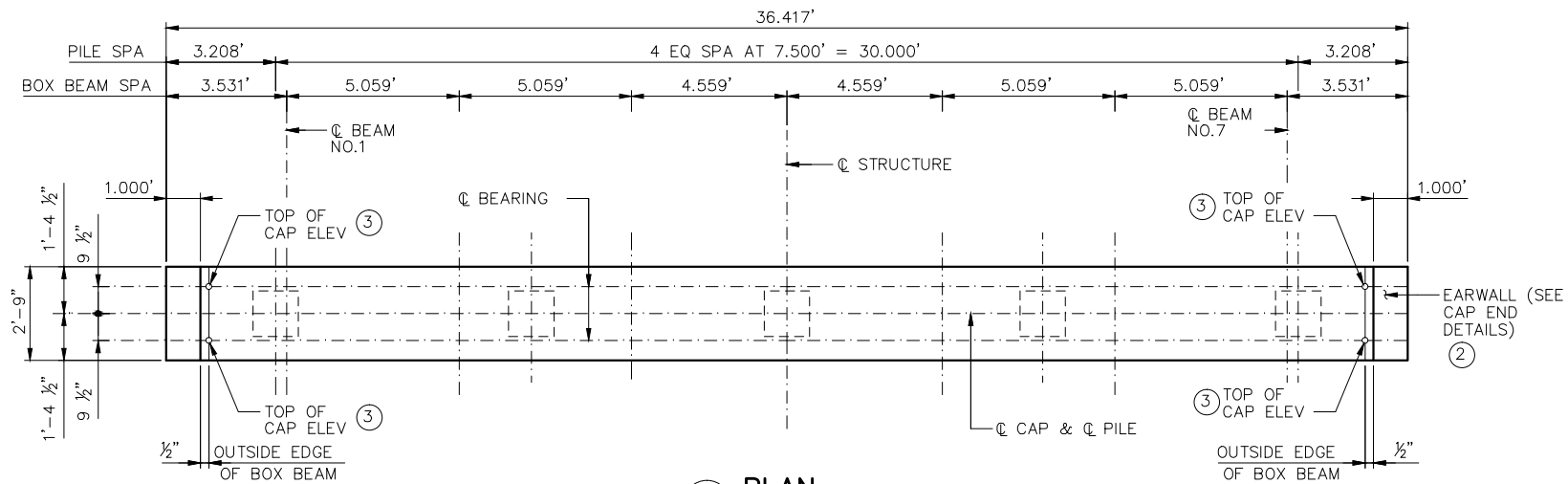


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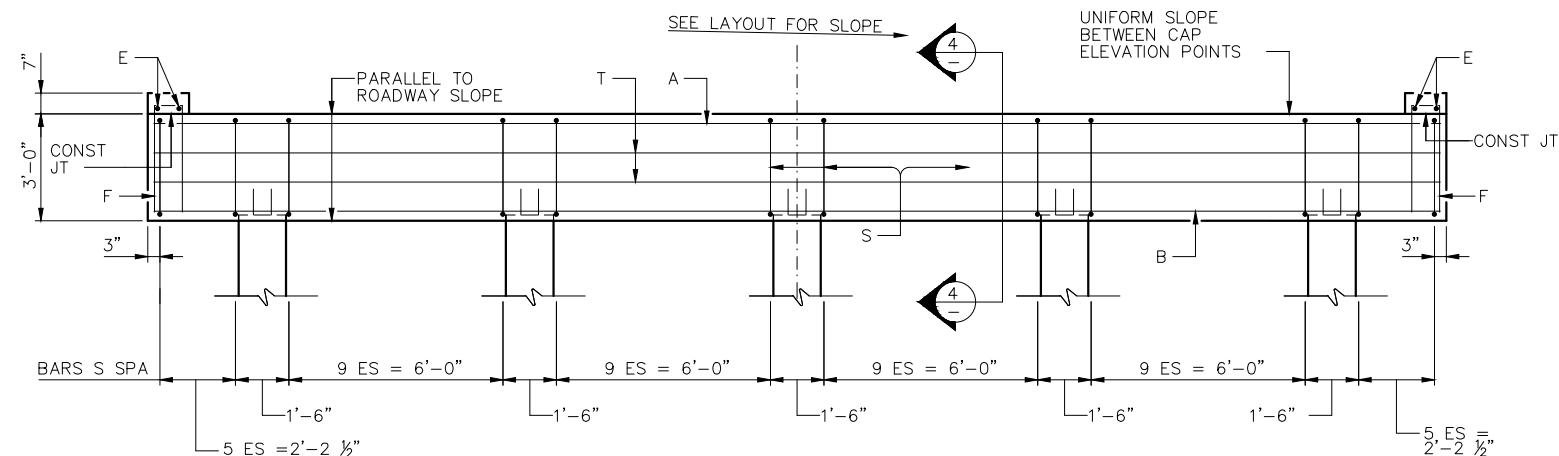
SEAL  
NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	DESIGN GUIDELINES-BENT	JOB NO:
		BOX BEAMS-DR SHAFTS	
CHK'D BY:			FILE NO:
SCALE:			FILE NO:
DATE:	APPROVED BY:		SHT NO:
			38

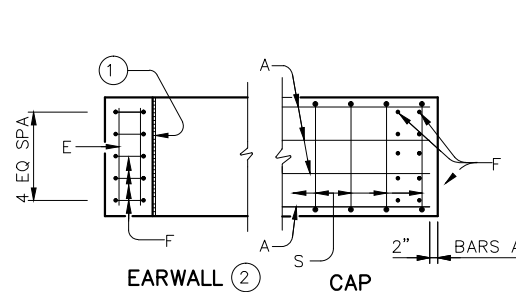
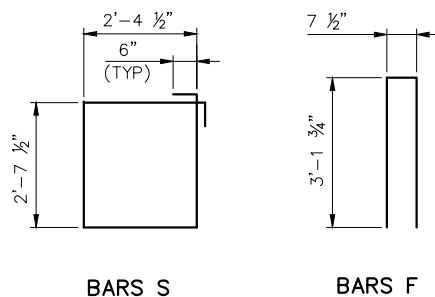
HL93 LOADING



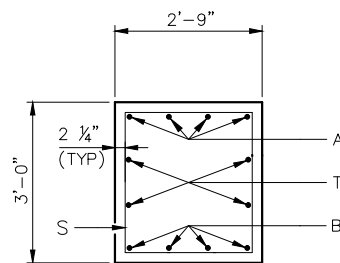
1 PLAN



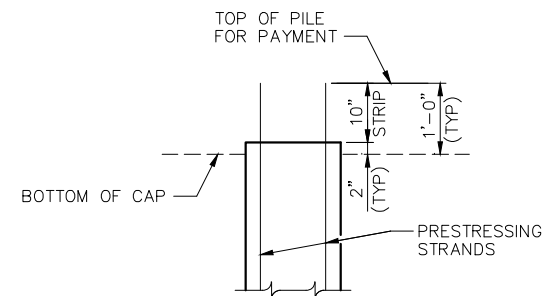
2 ELEVATION 1



3 CAP END DETAILS



4 BENT CAP SECTION



5 PILING EMBEDMENT DETAIL

### BILL OF REINFORCING STEEL

BAR	NO.	SIZE	LENGTH	WEIGHT
A	4	#11	36'-1"	767
B	4	#11	36'-1"	767
E	4	# 5	2'-5"	10
F	10	# 5	6'-11"	72
S	52	# 5	11'-0"	597
T	4	# 5	36'-1"	151

REINFORCING STEEL	LB	2,364
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### ESTIMATED QUANTITIES

REINFORCING STEEL	LB	2,364
CLASS B1 CONCRETE (CAP)	CY	11.2

### TOP OF CAP ELEVATIONS 4

WORKING POINT	ELEVATION

- ① 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ② DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- ③ TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- ④ WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

### INTERIOR BENT NOTES

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3. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
4. ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
7. MAXIMUM CALCULATED FOUNDATION LOADS:  
X TONS PER PILE.

### NOTES TO ENGINEER

- 1 EXPOSED PILE HEIGHT SHALL NOT EXCEED 16' FOR 16" PILING, AND 20' FOR 18" PILING.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
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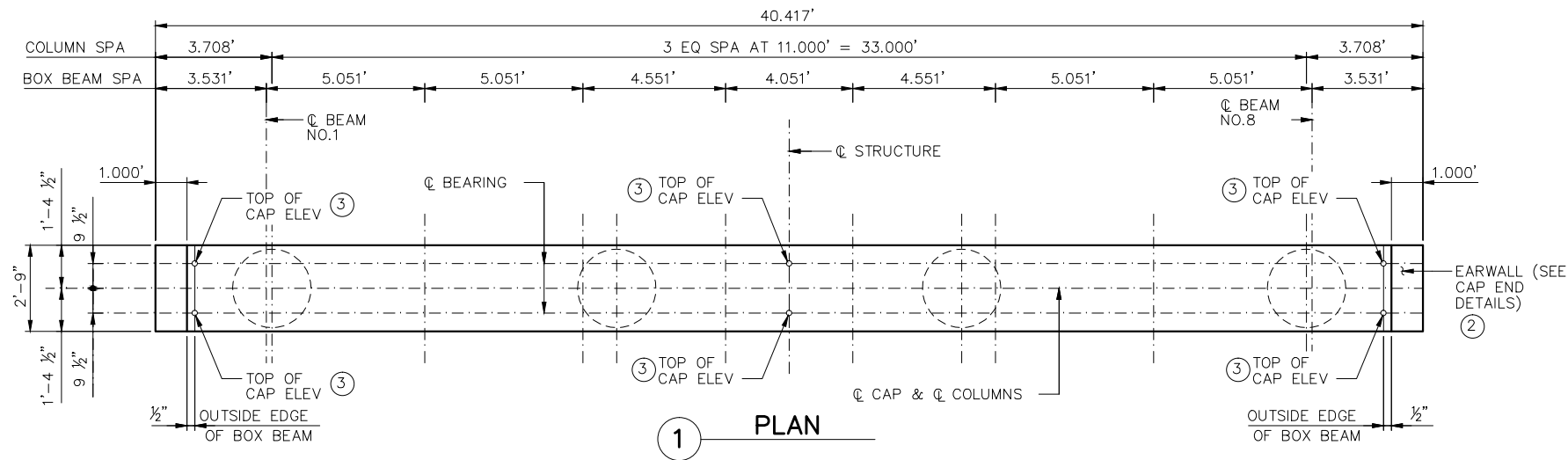
HARRIS COUNTY  
ENGINEERING DEPARTMENT



FIRM INFO

SEAL  
NOTE

PROJECT TITLE: HL93 LOADING			
DRAWN BY:	SHEET DESCRIPTION: DESIGN GUIDELINES-BENT	JOB NO:	
CHK'D BY:	BOX BEAMS-PILE	FILE NAME:	
SCALE:	HALF BOULEVARD, 0° SKEW	FILE NO:	
DATE:	APPROVED BY:	SHT NO: 39	



BILL OF REINFORCING STEEL ④				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	5	# 11	40'-1"	1,065
B	5	# 11	40'-1"	1,065
E	4	# 5	2'-5"	10
F	10	# 5	6'-11"	72
S	54	# 5	11'-0"	620
T	4	# 5	40'-1"	167
V	32	# 9	22'-3"	2,421
Z	4	# 3	264'-9"	398
REINFORCING STEEL			LB	5,818
ESTIMATED QUANTITIES				
REINFORCING STEEL			LB	5,818
CLASS B1 CONCRETE (CAP)			CY	12.5
CLASS B1 CONCRETE (COL)			CY	14.5

- NOTES TO DESIGN ENGINEER:
- A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.
- IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC PROJECT REQUIREMENTS.
- B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT PLANS, AND SHALL ADJUST PAGE NUMBERS ACCORDINGLY.
- C. THE DESIGN ENGINEER SHALL CONSULT THE HARRIS COUNTY DESIGN MANUAL AND SPECIFICATIONS FOR INFORMATION PERTINENT TO THESE DESIGN GUIDELINE DRAWINGS.
- D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE BRIDGE PLANS.

- ① ½" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ② DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- ③ TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- ④ FOR EACH LINEAR FOOT VARIATION IN "H" VALUE MAKE FOLLOWING ADJUSTMENTS:  
 BARS V: 1'-0"  
 BARS Z: 12.606'  
 REINFORCING STEEL: 128 LB  
 CLASS "B1" CONCRETE (COL): 0.727 CY
- ⑤ WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

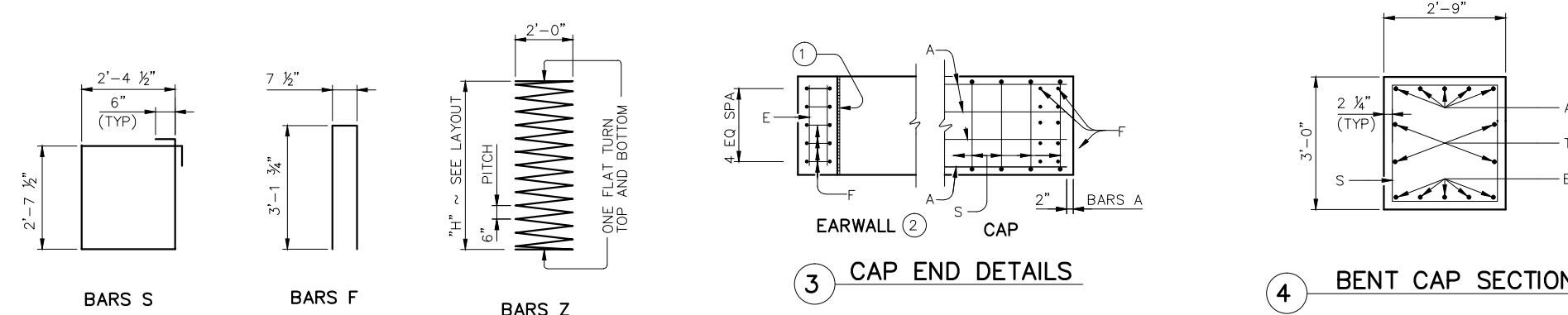
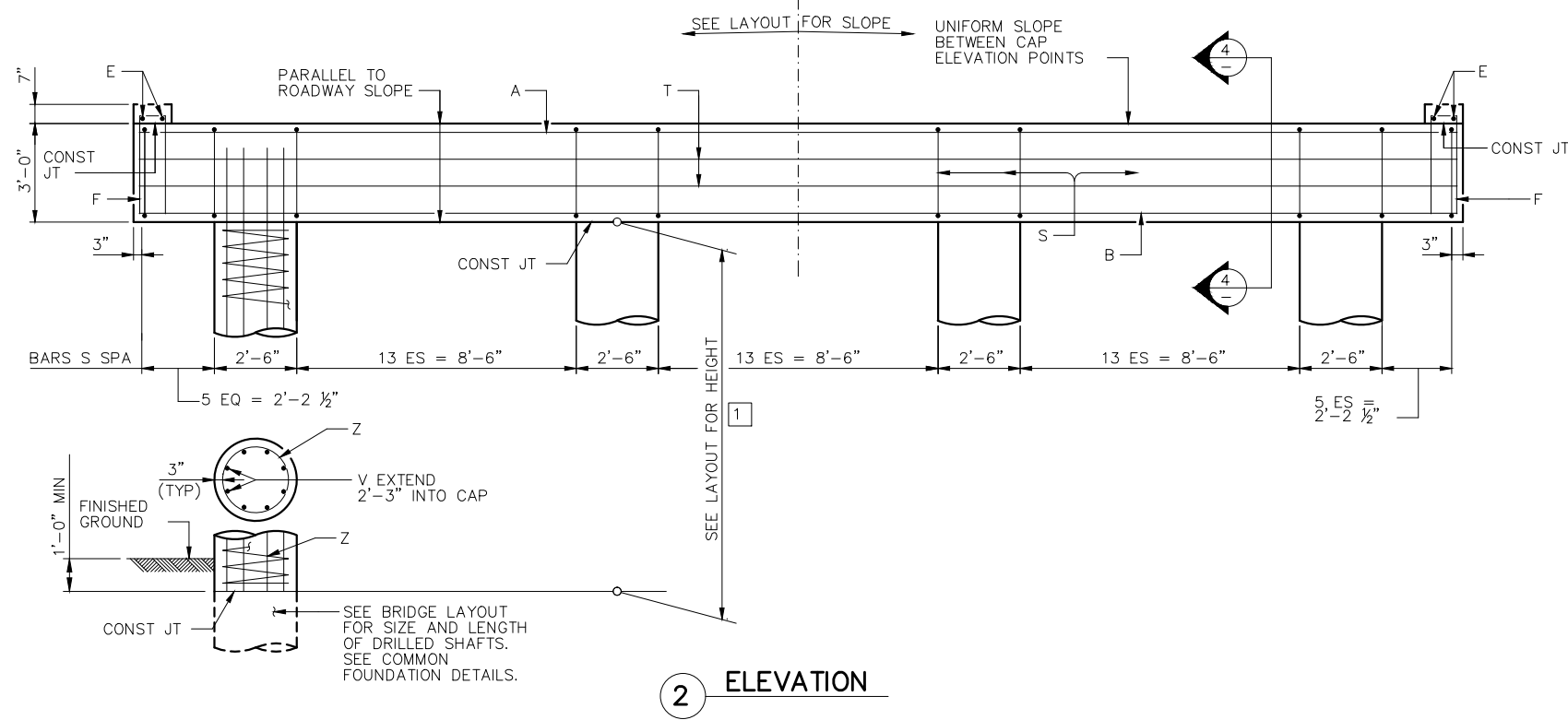
TOP OF CAP ELEVATIONS ⑤	
WORKING POINT	ELEVATION

### INTERIOR BENT NOTES

- DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
- ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
- ALL EXPOSED CORNERS SHALL BE CHAMFERED ¾", UNLESS OTHERWISE NOTED.
- ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
- DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
- SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
- MAXIMUM CALCULATED FOUNDATION LOADS:  
X TONS PER SHAFT.

### NOTES TO ENGINEER

① QUANTITIES SHOWN ARE BASED ON AN "H" DIMENSION OF 20'.



NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

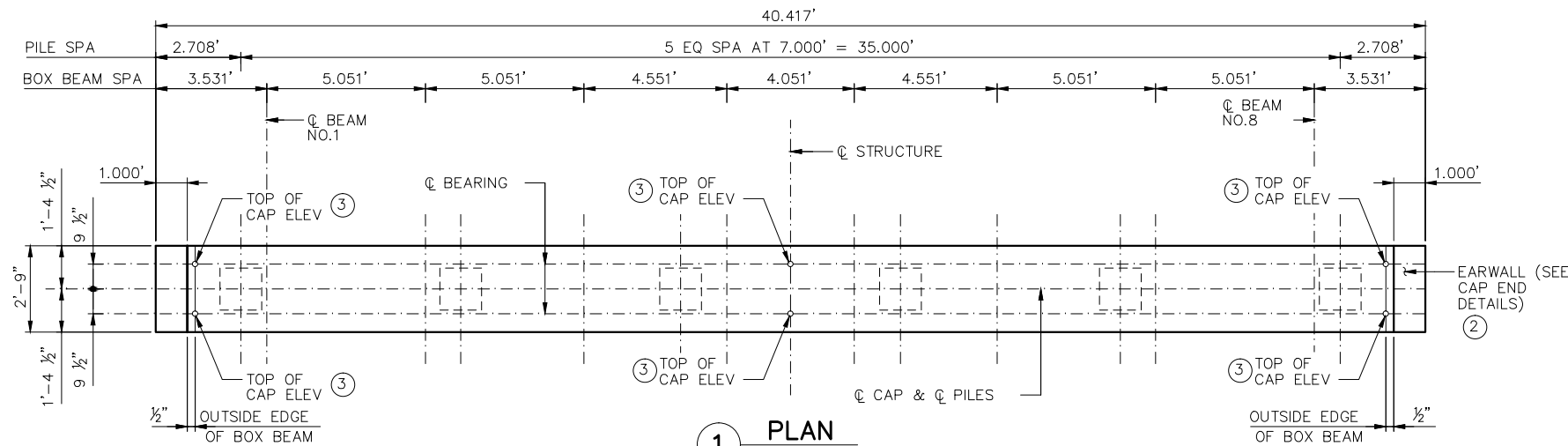
HARRIS COUNTY  
ENGINEERING DEPARTMENT



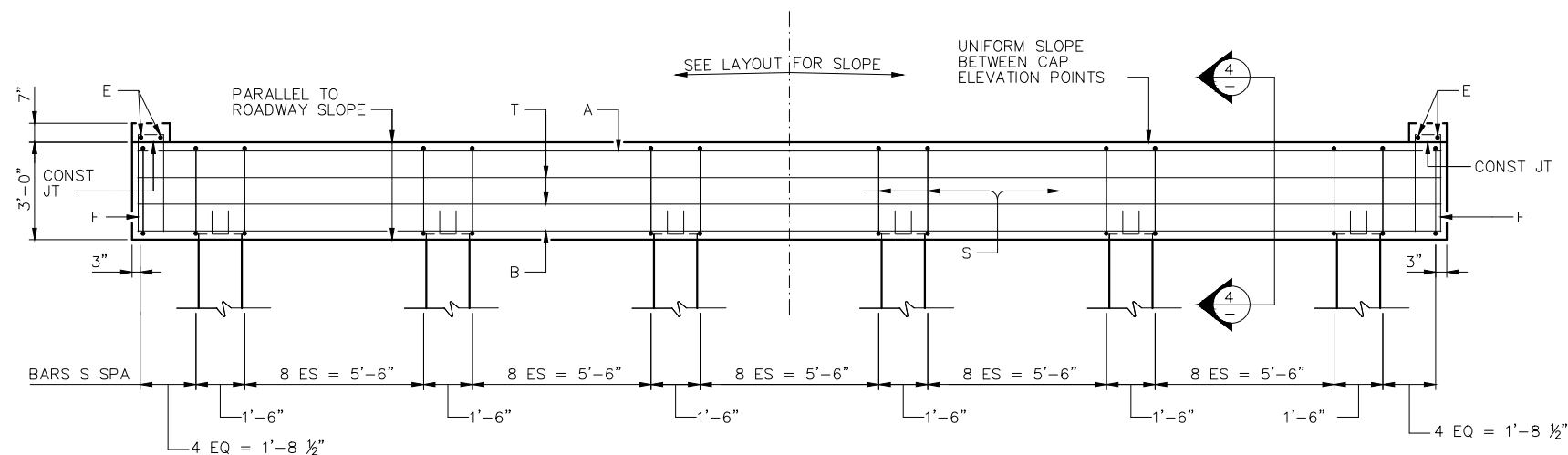
FIRM INFO

SEAL  
NOTE

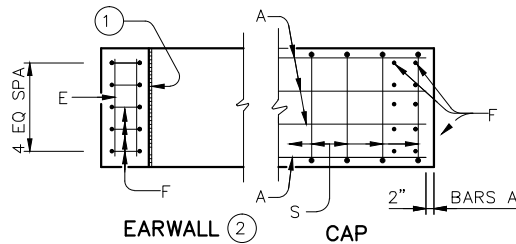
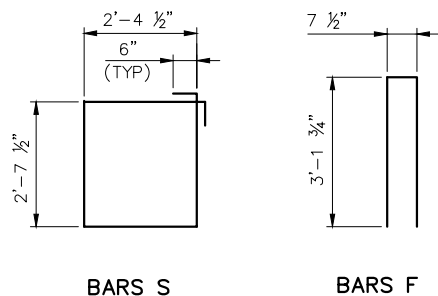
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CHK'D BY:	FILE NAME:	BOX BEAMS-DR SHAFTS	
SCALE:	FILE NO:	TWO-WAY ROAD, 0° SKEW	
DATE:	APPROVED BY:		SHT NO: 40



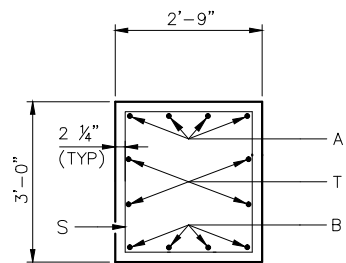
1 PLAN



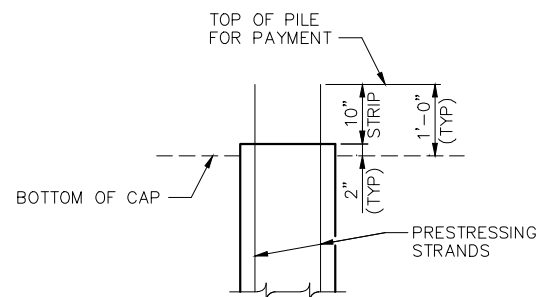
2 ELEVATION 1



3 CAP END DETAILS



4 BENT CAP SECTION



5 PILING EMBEDMENT DETAIL

BILL OF REINFORCING STEEL				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	4	# 11	40'-1"	852
B	4	# 11	40'-1"	852
E	4	# 5	2'-5"	10
F	10	# 5	6'-11"	72
S	55	# 5	11'-0"	631
T	4	# 5	40'-1"	167
REINFORCING STEEL			LB	2,584
ESTIMATED QUANTITIES				
REINFORCING STEEL			LB	2,584
CLASS B1 CONCRETE (CAP)			CY	12.5

TOP OF CAP ELEVATIONS 4	
WORKING POINT	ELEVATION

- 1 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- 2 DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- 3 TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- 4 WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

### INTERIOR BENT NOTES

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- ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
- ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
- ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
- DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
- SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
- MAXIMUM CALCULATED FOUNDATION LOADS:  
X TONS PER PILE.

### NOTES TO ENGINEER

- 1 EXPOSED PILE HEIGHT SHALL NOT EXCEED 16' FOR 16" PILING, AND 20' FOR 18" PILING.

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NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGURRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

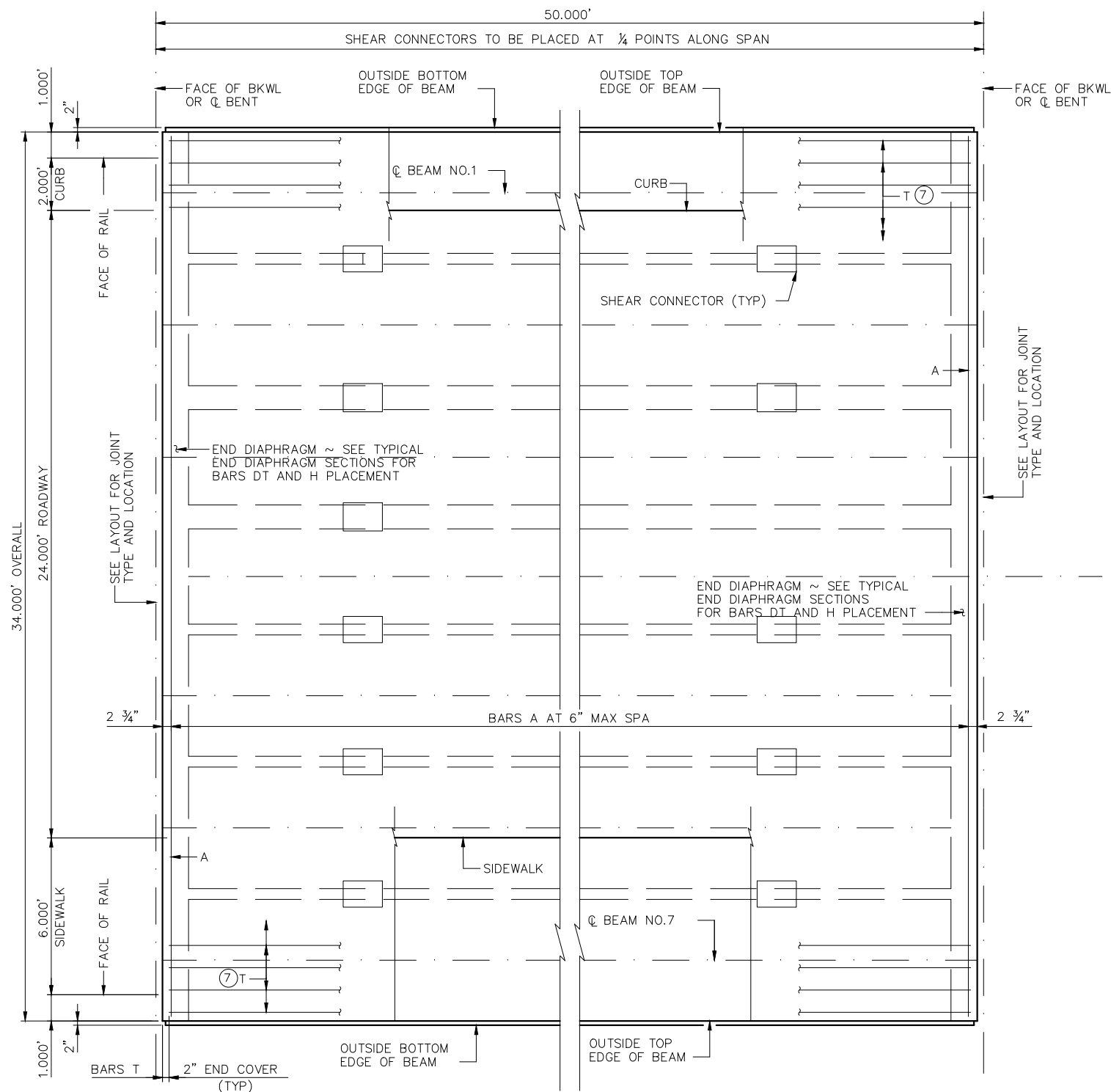
HARRIS COUNTY  
ENGINEERING DEPARTMENT



FIRM INFO

SEAL  
NOTE

PROJECT TITLE			
HL93 LOADING			
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:	
	DESIGN GUIDELINES-BENT		
CHK'D BY:		FILE NAME:	
	BOX BEAMS-PILE		
SCALE:		FILE NO:	
	TWO-WAY ROAD, 0° SKEW		
DATE:	APPROVED BY:	SHT NO:	
		41	



PLAN

BAR TABLE	
BAR	SIZE
A	# 4
DT	# 4
H	# 5
L	# 4
T	# 4
X	# 4
Y	# 5

NOTES TO DESIGN ENGINEER:

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SLAB NOTES

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- ALL REINFORCING STEEL SHALL BE ASTM A615 GRADE 60 STEEL.
- DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS. UNLESS OTHERWISE NOTED.
- THE QUANTITIES GIVEN FOR REINFORCING STEEL AND CONCRETE ARE PRESENTED FOR CONTRACTORS INFORMATION ONLY.
- BAR LAPS, WHERE REQUIRED, SHALL BE AS FOLLOWS:  
~ #4 = 1'-5"  
~ #5 = 1'-9"

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0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
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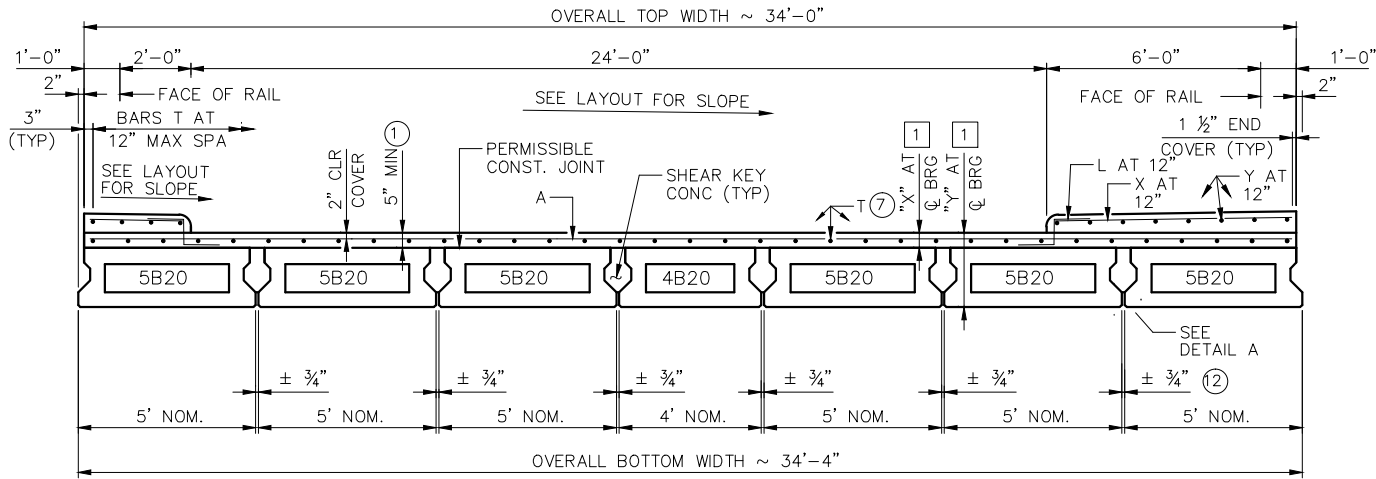
HARRIS COUNTY  
ENGINEERING DEPARTMENT



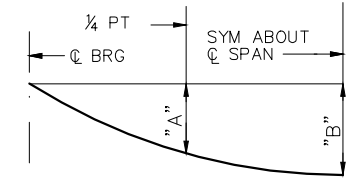
FIRM INFO

SEAL  
NOTE

PROJECT TITLE		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:
OK'D BY:	DESIGN GUIDELINES	FILE NAME:
SCALE:	BOX BEAMS--SPAN DETAILS	FILE NO:
DATE:	HALF BOULEVARD, 0° SKEW	SHT NO:
	(1 OF 2)	42

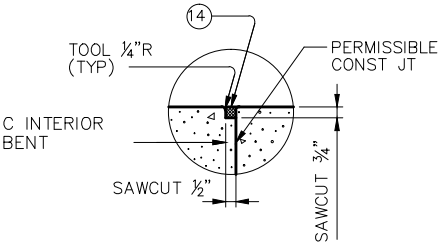


TYPICAL TRANSVERSE SECTION

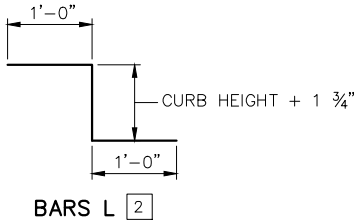


NOTE: DEFLECTIONS SHOWN ARE DUE TO SHEAR KEY AND CONCRETE SLAB ONLY, ( $E_c = 5 \times 10^6$  KSI). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DIMENSION MAY BE LESS. DEFLECTIONS MAY BE ADJUSTED BASED ON FIELD OBSERVATION.

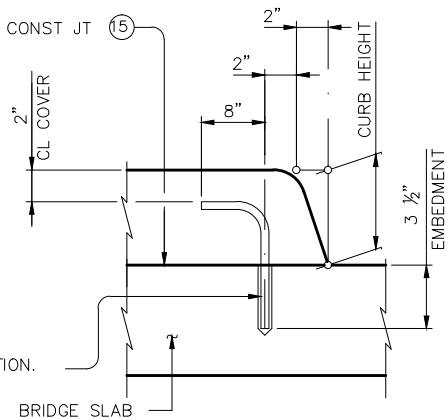
DEAD LOAD DEFLECTION DIAGRAM



SEALED JOINT DETAIL

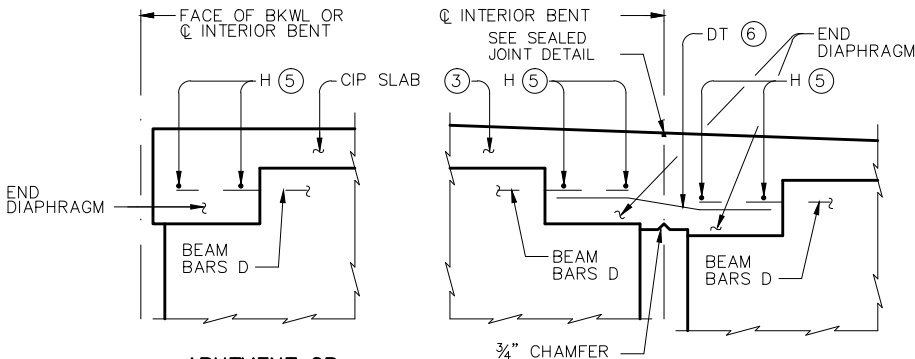


BARS L



OPTIONAL EPOXY ANCHORS

EMBED EA(#4) BAR INTO CONCRETE WITH A TYPE III (CLASS C) EPOXY MEETING THE REQUIREMENTS OF TXDOT DMS-6100, "EPOXIES AND ADHESIVES". FOLLOW MANUFACTURER'S DIRECTIONS FOR INSTALLING THE EPOXIED ANCHOR BARS.



TYPICAL END DIAPHRAGM SECTIONS

(ALONG CENTERLINE OF BOX BEAM)

TABLE OF ESTIMATED QUANTITIES

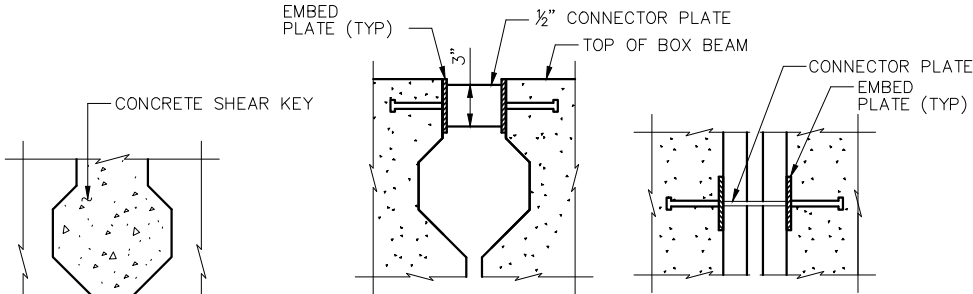
SPAN LENGTH	CLASS "A1" CONCRETE (SHEAR KEY)	CLASS "A1" CONCRETE (SLAB)	CLASS "A1" CONCRETE (SDWK)	CLASS "A1" CONCRETE (CURB)	PRESTR CONCRETE BOX BEAMS (TY 4B20)	PRESTR CONCRETE BOX BEAMS (TY 5B20)	SLAB REINF STEEL	SIDEWALK REINF STEEL	CURB REINF STEEL	TOTAL REINF STEEL
FT	CY	CY	CY	CY	LF	LF	LB	LB	LB	LB
50	7.2	28.9	7.8	2.9	49.5	297.0	3,400	630	270	4,300

- SLAB THICKNESS AT MIDSPAN OF BEAMS MAY NOT EXCEED 7 INCHES.
- OTHER MATERIAL MAY BE USED TO FORM BOTTOM OF SHEAR KEYS IF APPROVED BY ENGINEER.
- SLAB REINFORCING OMITTED FOR CLARITY.
- SEE BRIDGE LAYOUT FOR JOINT TYPE.
- PROVIDE 1 1/2" END COVER TO BARS H. AFTER ALL BEAMS HAVE BEEN PLACED, WELD ONE BAR H TO TWO BARS D AT EACH END OF ALL BEAMS.
- LAP BARS DT 9" MIN WITH EACH BEAM BAR D AT INTERIOR BENTS WITHOUT EXPANSION JOINTS. BARS DT SHOWN BENT FOR CLARITY ONLY.
- IF MULTI-SPAN UNITS (WITH SLAB CONTINUOUS OVER INTERIOR BENTS) ARE INDICATED ON THE BRIDGE LAYOUT, BARS T MUST BE CONTINUOUS THROUGH JOINT. SEE CONTINUOUS SLAB DETAIL.
- REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 2.0 LBS PER SQUARE FOOT OF SLAB.
- REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 1.8 LBS PER SQUARE FOOT OF SIDEWALK.
- REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 1.8 LBS PER SQUARE FOOT OF CURB.
- FABRICATOR SHALL ADJUST BEAM LENGTHS FOR BEAM SLOPES AS REQUIRED.
- GAP WIDTH IS BASED ON NOMINAL BEAM WIDTHS.
- CONNECTOR PLATES ARE INCIDENTAL TO PRESTRESSED BEAM ITEM.
- MATERIAL SHALL BE SELF LEVELING, COLD-APPLIED, RAPID CURE, LOW MODULUS SILICONE RUBBER SEALANT. IN ACCORDANCE WITH ITEM 427 AND SEALANT MANUFACTURER SPECIFICATIONS.
- PROVIDE BROOM FINISH TO TOP OF BRIDGE SLAB WHERE RAISED SIDEWALK OR CURB AREA IS DEFINED.

NOTES TO ENGINEER

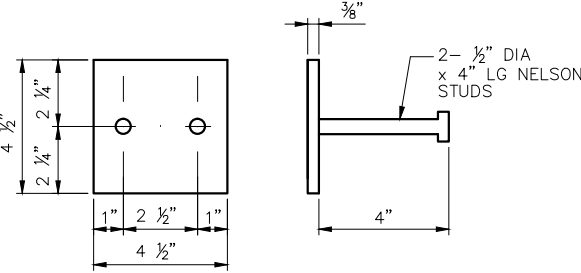
- THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB, SHEAR KEY AND THE EFFECT OF VERTICAL CURVE.
- THE ENGINEER SHALL DETERMINE BRIDGE CURB HEIGHT.

BACKER ROD (25% LARGER THAN JOINT) MAY BE USED AS FORM. SECURE WITH COMPATIBLE ADHESIVE AS REQUIRED



SHEAR CONNECTOR DETAIL

A36 STEEL



EMBED PLATE DETAIL

A36 STEEL

NO.	REVISIONS	DATE	NAME
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1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT

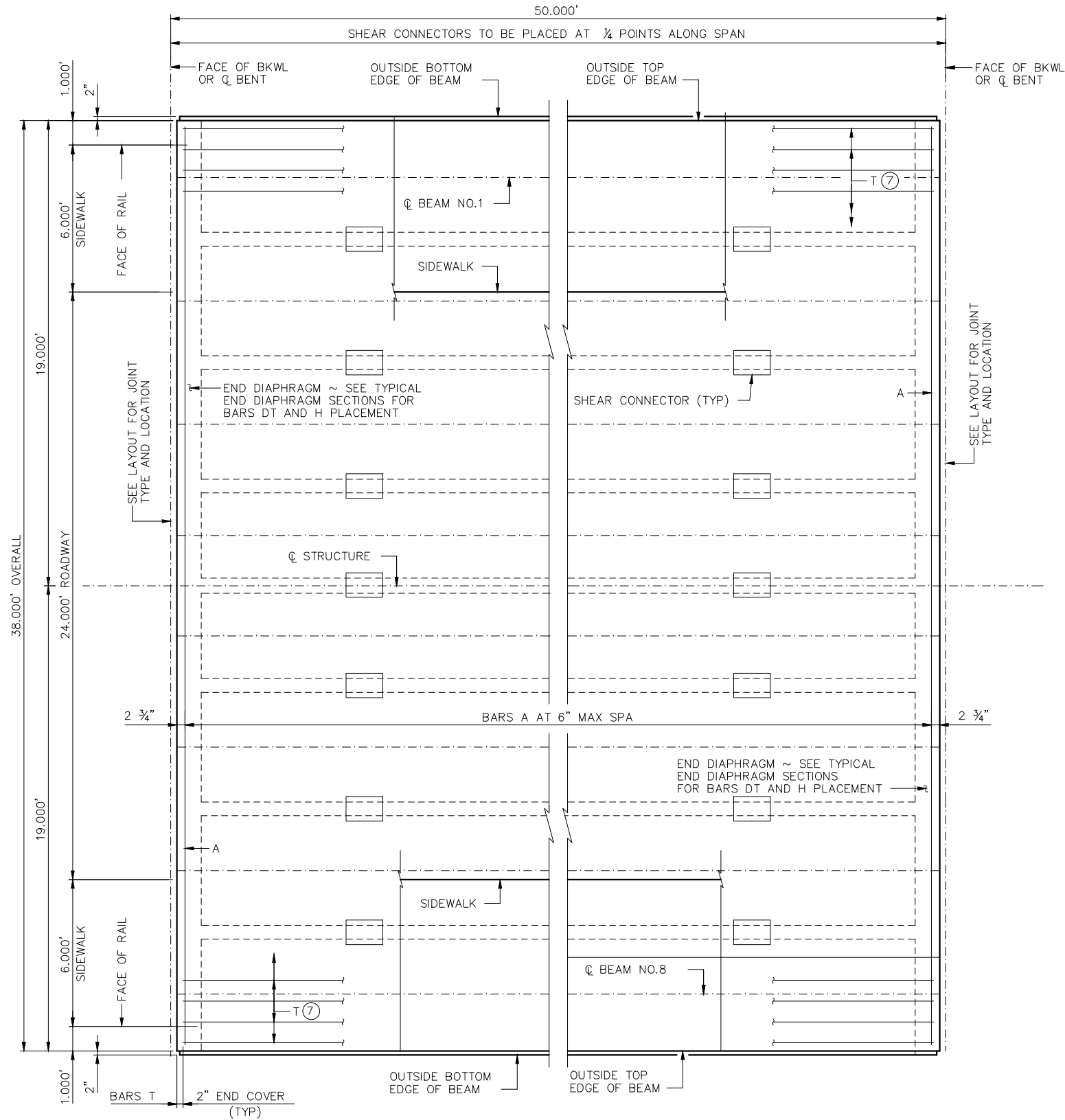


FIRM INFO

SEAL  
NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:	
OK'D BY:	DESIGN GUIDELINES	FILE NAME:	
SCALE:	BOX BEAMS-SPAN DETAILS	FILE NO:	
DATE:	HALF BOULEVARD, 0° SKEW	SHT NO: 43	
	(2 OF 2)		





BAR TABLE	
BAR	SIZE
A	# 4
DT	# 4
H	# 5
L	# 4
T	# 4
X	# 4
Y	# 5

NOTES TO DESIGN ENGINEER:

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SLAB NOTES

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PLAN

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
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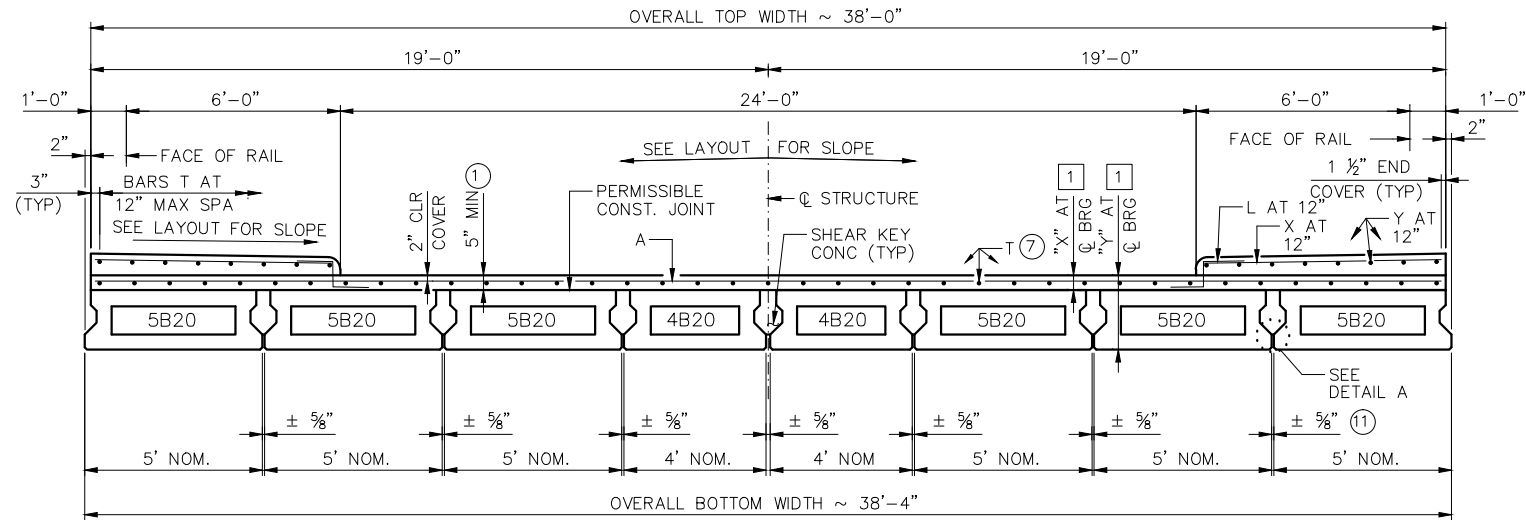
HARRIS COUNTY  
ENGINEERING DEPARTMENT



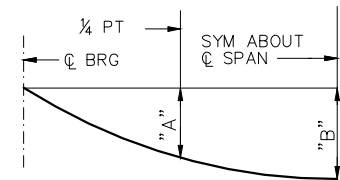
FIRM INFO

SEAL  
NOTE

PROJECT TITLE:		
DRAWN BY:	SHEET DESCRIPTION: DESIGN GUIDELINES	JOB NO:
CHK'D BY:	BOX BEAMS--SPAN DETAILS	FILE NAME:
SCALE:	TWO-WAY ROAD, 0° SKEW	FILE NO:
DATE:	APPROVED BY:	SHT NO: 44
(1 OF 2)		



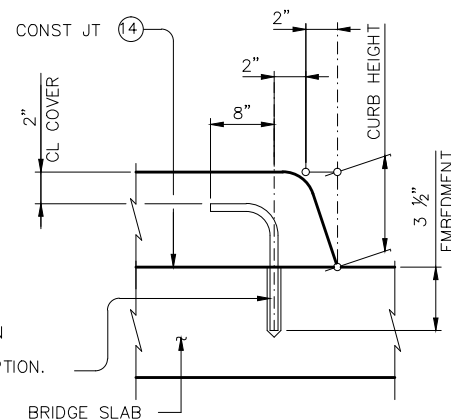
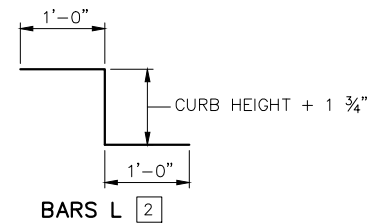
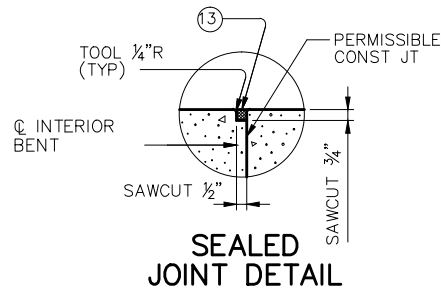
TYPICAL TRANSVERSE SECTION



NOTE: DEFLECTIONS SHOWN ARE DUE TO SHEAR KEY AND CONCRETE SLAB ONLY, ( $E_c = 5 \times 10^3$  KSI). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DIMENSION MAY BE LESS. DEFLECTIONS MAY BE ADJUSTED BASED ON FIELD OBSERVATION.

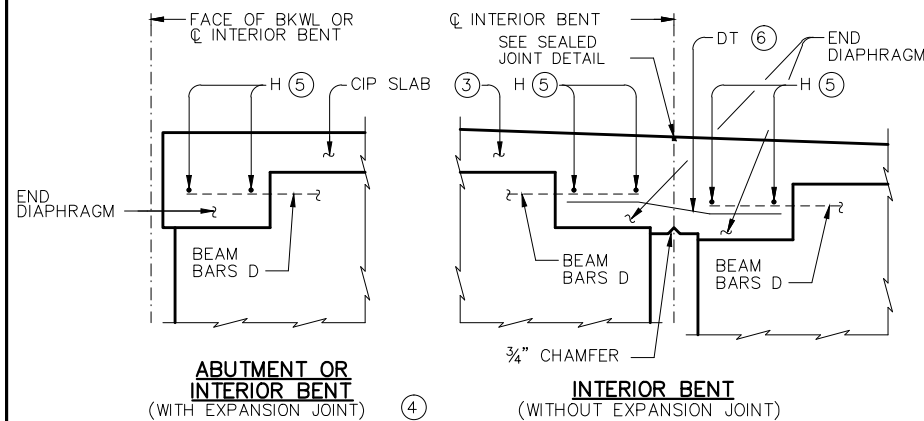
DEAD LOAD DEFLECTION DIAGRAM

TABLE OF DEFLECTIONS AND SECTION DEPTHS							
SPAN LENGTH (FT)	BEAM NO.	POINT	DEAD LOAD DEFLECTIONS(FT)			SECTION DEPTHS	
			SHEAR KEY	SLAB	TOTAL	"X" AT C.BRG 1	"Y" AT C.BRG 1
50	ALL	"A" "B"				5 3/4"	2'-1 3/4"



OPTIONAL EPOXY ANCHORS

EMBED EA(#4) BAR INTO CONCRETE WITH A TYPE III (CLASS C) EPOXY MEETING THE REQUIREMENTS OF TXDOT DMS-6100, "EPOXIES AND ADHESIVES". FOLLOW MANUFACTURER'S DIRECTIONS FOR INSTALLING THE EPOXIED ANCHOR BARS.



TYPICAL END DIAPHRAGM SECTIONS

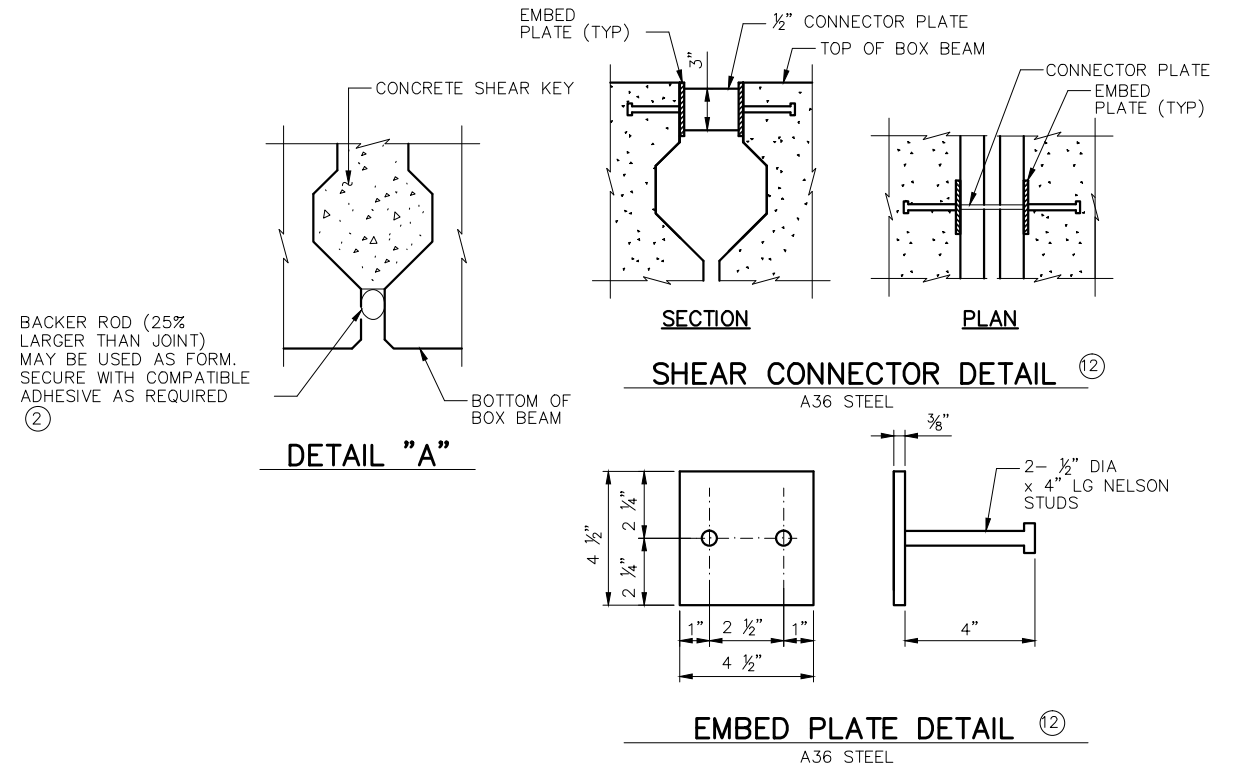
(ALONG CENTERLINE OF BOX BEAM)

TABLE OF ESTIMATED QUANTITIES								
SPAN LENGTH	CLASS "A1" CONCRETE (SHEAR KEY)	CLASS "A1" CONCRETE (SLAB) 1	CLASS "A1" CONCRETE (SDWK)	PRESTR CONCRETE BOX BEAMS (TY 4B20) 10	PRESTR CONCRETE BOX BEAMS (TY 5B20) 10	SLAB REINF STEEL 8	SIDEWALK REINF STEEL 9	TOTAL REINF STEEL
FT	CY	CY	CY	LF	LF	LB	LB	LB
50	8.5	32.3	15.6	99.0	297.0	3,800	1,260	5,060

- SLAB THICKNESS AT MIDSPAN OF BEAMS MAY NOT EXCEED 7 INCHES.
- OTHER MATERIAL MAY BE USED TO FORM BOTTOM OF SHEAR KEYS IF APPROVED BY ENGINEER.
- SLAB REINFORCING OMITTED FOR CLARITY.
- SEE BRIDGE LAYOUT FOR JOINT TYPE.
- PROVIDE 1 1/2" END COVER TO BARS H. AFTER ALL BEAMS HAVE BEEN PLACED, WELD ONE BAR H TO TWO BARS D AT EACH END OF ALL BEAMS.
- LAP BARS DT 9" MIN WITH EACH BEAM BAR D AT INTERIOR BENTS WITHOUT EXPANSION JOINTS. BARS DT SHOWN BENT FOR CLARITY ONLY.
- IF MULTI-SPAN UNITS (WITH SLAB CONTINUOUS OVER INTERIOR BENTS) ARE INDICATED ON THE BRIDGE LAYOUT, BARS T MUST BE CONTINUOUS THROUGH JOINT. SEE CONTINUOUS SLAB DETAIL.
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- CONNECTOR PLATES ARE INCIDENTAL TO PRESTRESSED BEAM ITEM.
- MATERIAL SHALL BE SELF LEVELING, COLD-APPLIED, RAPID CURE, LOW MODULUS SILICONE RUBBER SEALANT. IN ACCORDANCE WITH ITEM 427 AND SEALANT MANUFACTURER SPECIFICATIONS.
- PROVIDE BROOM FINISH TO TOP OF BRIDGE SLAB WHERE RAISED SIDEWALK AREA IS DEFINED.

NOTES TO ENGINEER

- THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB, SHEAR KEY AND THE EFFECT OF VERTICAL CURVE.
- THE ENGINEER SHALL DETERMINE BRIDGE CURB HEIGHT.



SHEAR CONNECTOR DETAIL 12

EMBED PLATE DETAIL 12

A36 STEEL

HL93 LOADING

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGURRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

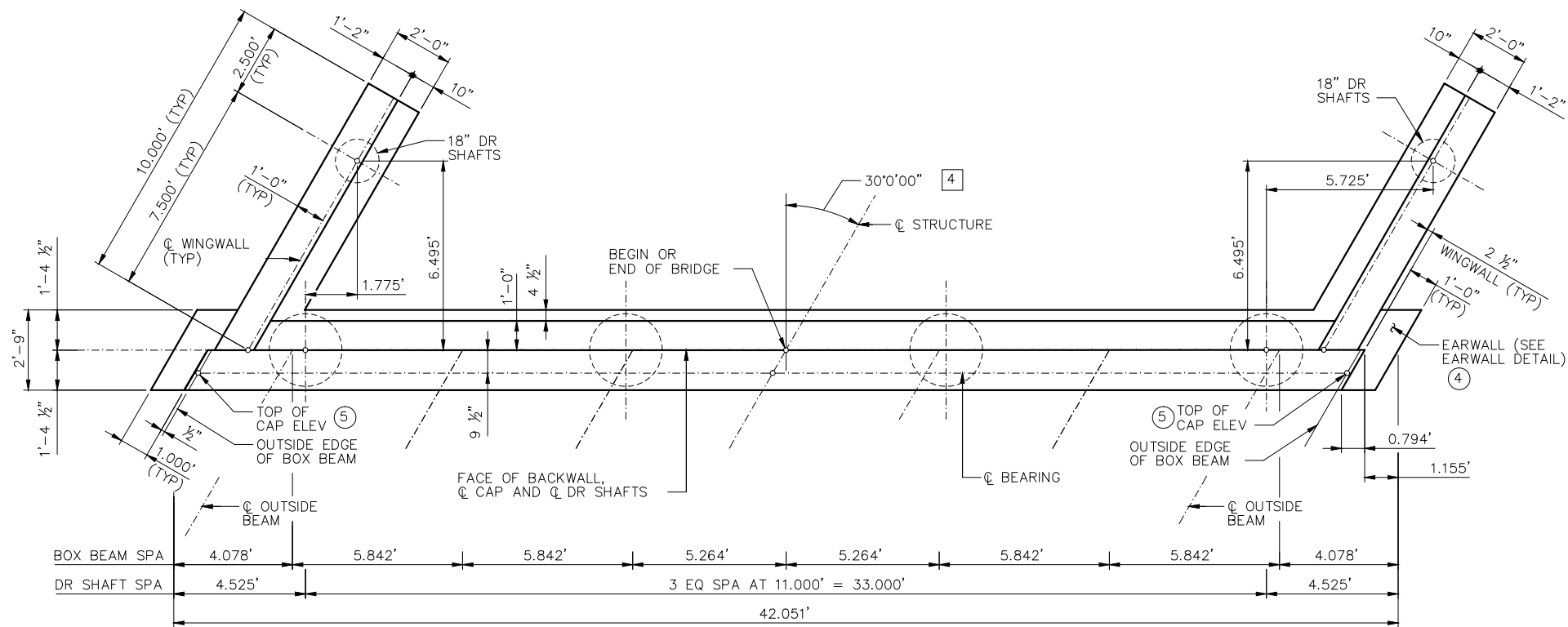
HARRIS COUNTY  
ENGINEERING DEPARTMENT



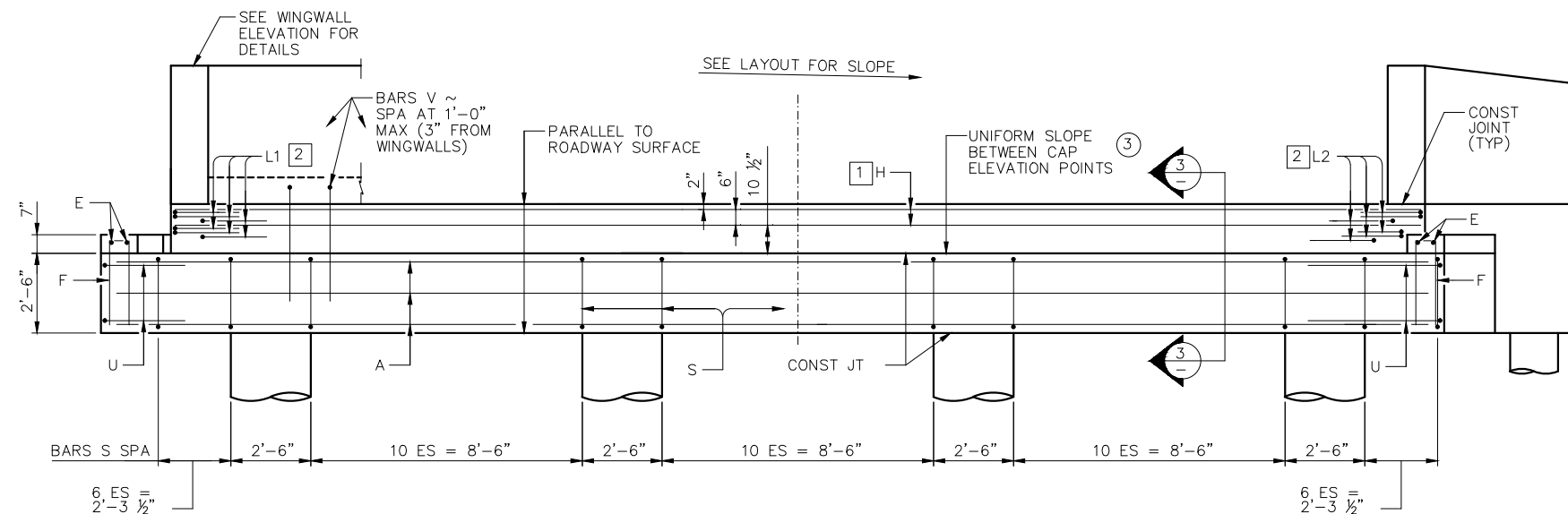
FIRM INFO

SEAL  
NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:	
OK'D BY:	DESIGN GUIDELINES	FILE NAME:	
SCALE:	BOX BEAMS-SPAN DETAILS	FILE NO:	
DATE:	TWO-WAY ROAD, 0° SKEW	SHT NO: 45	
	(2 OF 2)		



1 PLAN



2 ELEVATION

# NOTES TO DESIGN ENGINEER:

A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.

IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC PROJECT REQUIREMENTS.

B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT PLANS, AND SHALL ADJUST PAGE NUMBERS ACCORDINGLY.

C. THE DESIGN ENGINEER SHALL CONSULT THE HARRIS COUNTY DESIGN MANUAL AND SPECIFICATIONS FOR INFORMATION PERTINENT TO THESE DESIGN GUIDELINE DRAWINGS.

D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE BRIDGE PLANS.

- INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE.
- 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- SURFACE FINISH FOR THE TOP OF CAP WILL BE A TEXTURED WOOD FLOAT FINISH. THE SURFACE MUST BE LEVEL IN THE DIRECTION OF THE CENTERLINE OF BEAMS.
- DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION..
- TOP OF CAP ELEVATIONS ARE BASED ON SECTION DEPTH AT CENTERLINE BEARING.
- WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

## ABUTMENT NOTES

- DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
- ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
- ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
- ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
- DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
- SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
- MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER SHAFT.

TOP OF CAP ELEVATIONS ⑥	
WORKING POINT	ELEVATION

## NOTES TO ENGINEER

- ADD AN ADDITIONAL ROW OF H BARS FOR B24, B28 AND B34 BEAMS. ADD TWO ADDITIONAL ROWS OF H BARS FOR B40 BEAMS. ROWS OF H BARS SHALL BE EQUALLY SPACED.
- A SET OF L BARS IS REQUIRED FOR EACH ROW OF H BARS.
- GUIDELINE DRAWINGS ARE FOR B20 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
- SKEWS HIGHER THAN 30° ARE NOT RECOMMENDED.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGURRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT

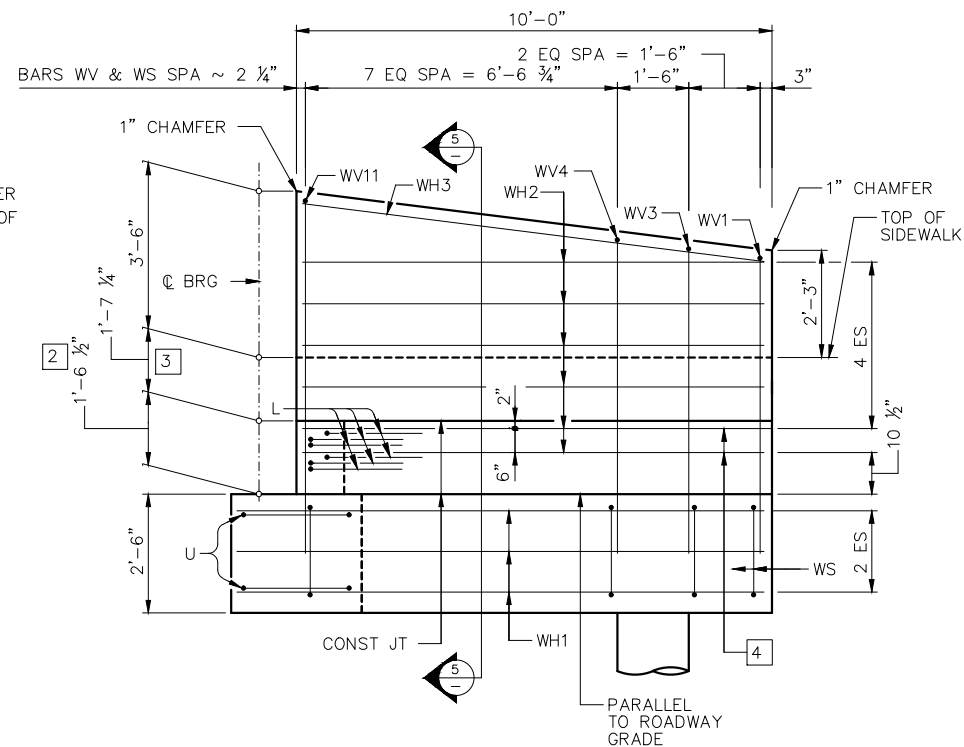
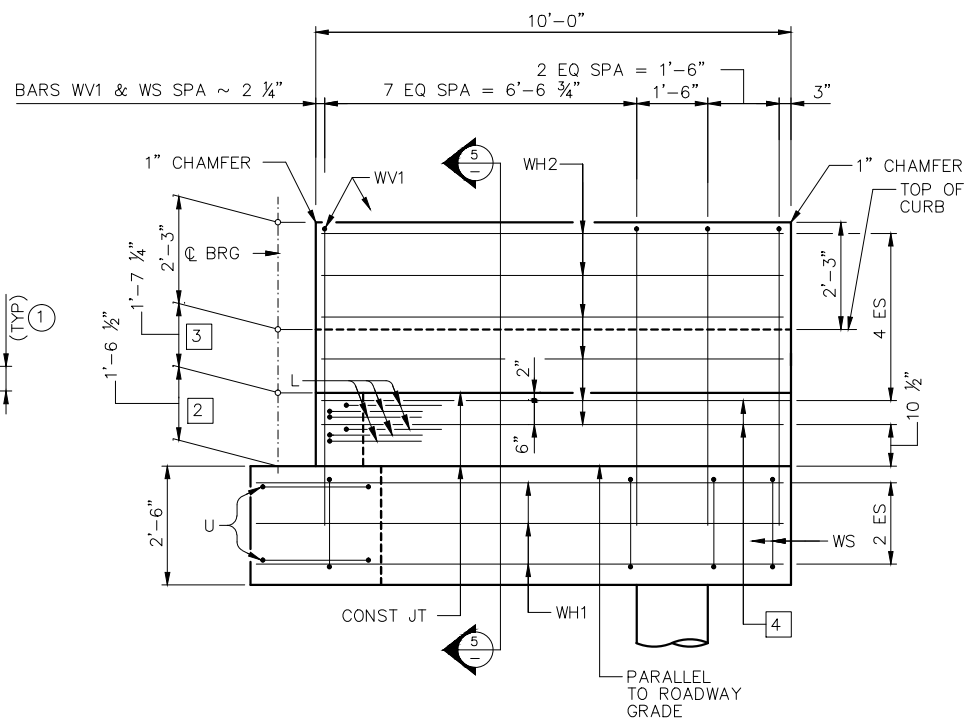
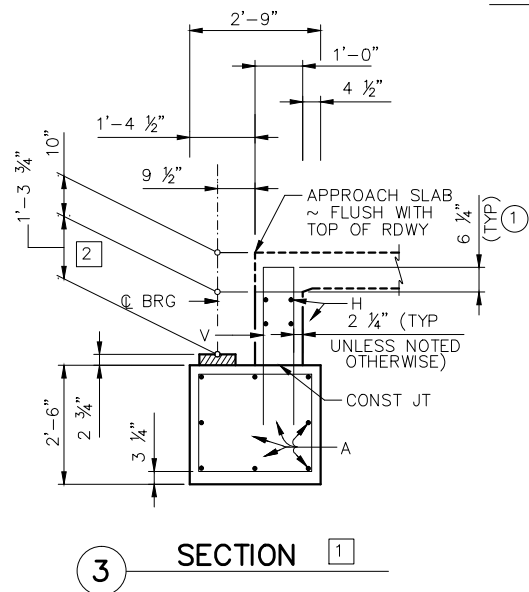


FIRM INFO

SEAL  
NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:	
CK'D BY:	DESIGN GUIDELINES-ABUTMENT	FILE NAME:	
SCALE:	BOX BEAM-DR SHAFTS	FILE NO:	
DATE:	HALF BOULEVARD, 30°SKEW	SHT NO:	
	(1 OF 2)	46	

HL93 LOADING



BILL OF REINFORCING STEEL <sup>1</sup>				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	8	# 11	41'-1"	1,746
E	4	# 5	2'-10"	12
F	10	# 5	6'-2"	64
H	4	# 6	39'-4"	236
L1	6	# 6	4'-0"	36
L2	6	# 6	4'-0"	36
S	47	# 4	9'-8"	303
U	4	# 6	7'-8"	46
V	38	# 5	7'-3"	287
WH1	14	# 6	11'-1"	232
WH2	24	# 6	9'-8"	348
WH3	2	# 6	9'-9"	29
WS	22	# 4	7'-9"	114
WV1	11	# 5	13'-10"	159
WV (AVG)	11	# 5	15'-0"	172
REINFORCING STEEL			LB	3,820
ESTIMATED QUANTITIES <sup>1</sup>				
REINFORCING STEEL			LB	3,820
CLASS B1 CONCRETE			CY	21.6

TYPE 1 - TRAFFIC RAIL SIDE

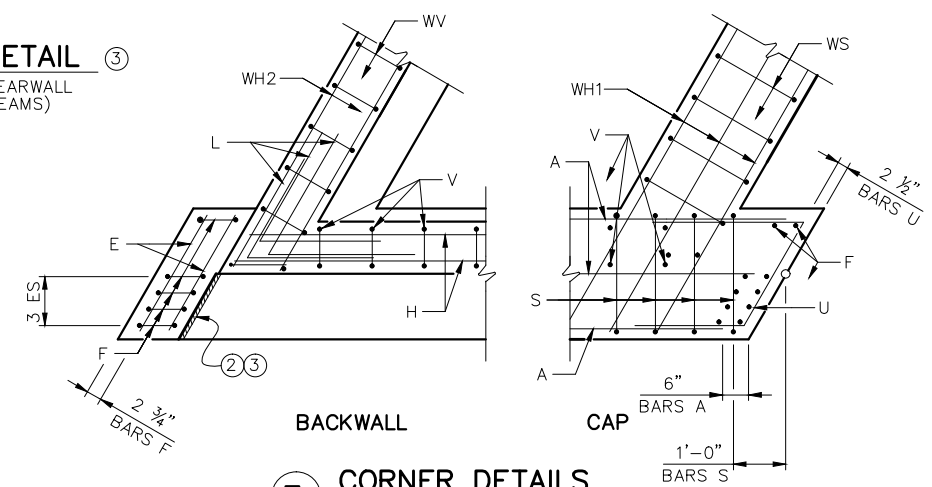
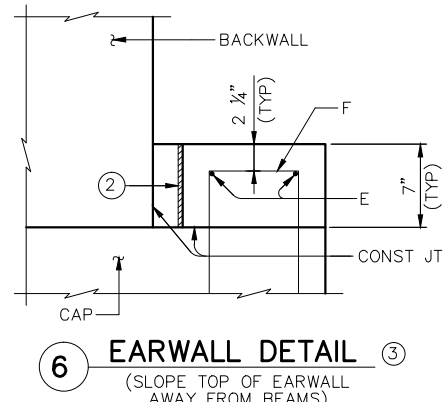
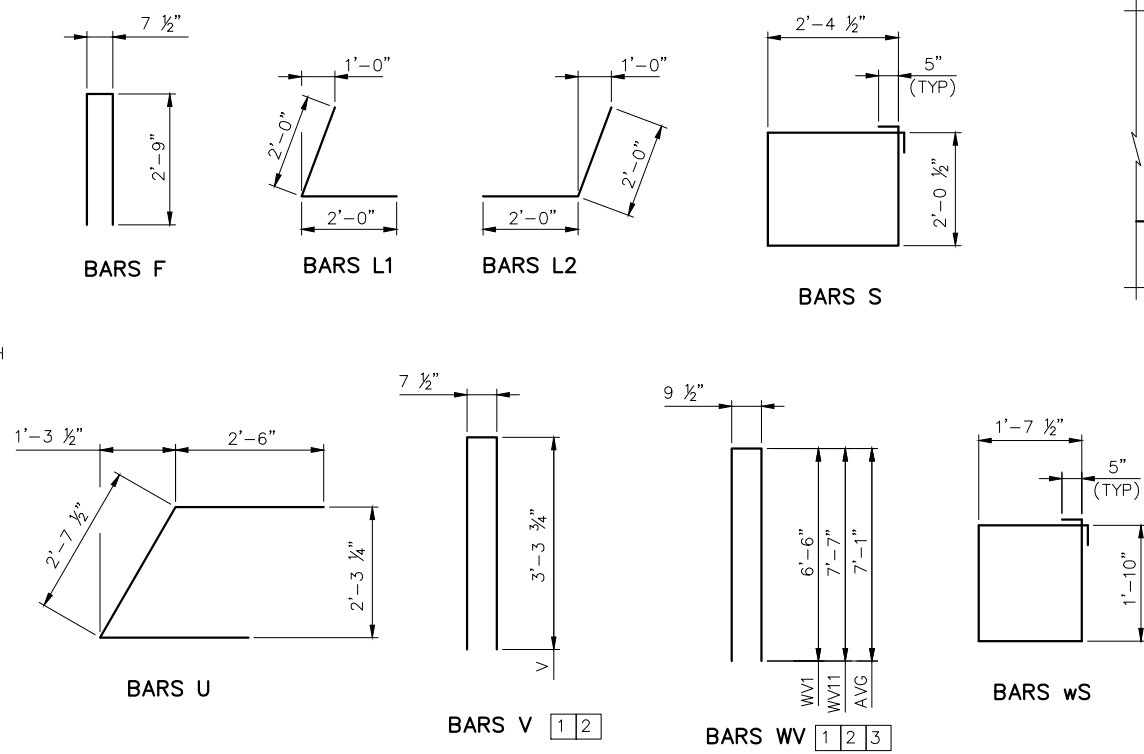
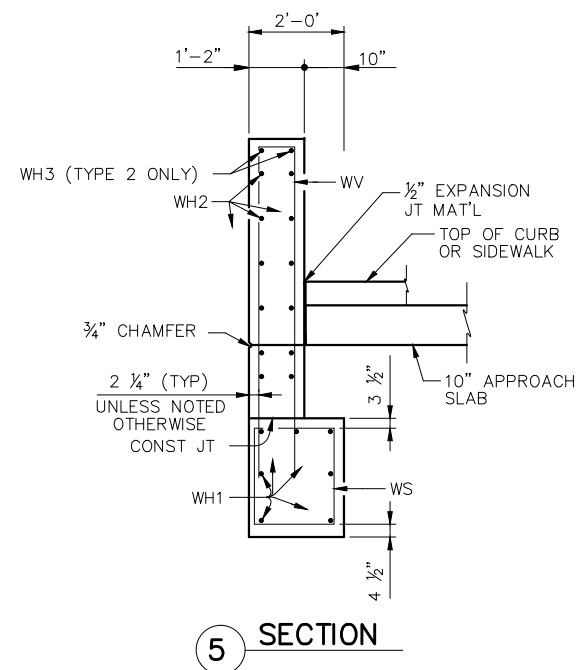
TYPE 2 - COMBINATION RAIL SIDE

4 WINGWALL ELEVATION <sup>1</sup>  
(EARWALL OMITTED FOR CLARITY)

- INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE. 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.

NOTES TO ENGINEER

- GUIDELINE DRAWINGS ARE FOR B20 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
- THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB, SHEAR KEY AND THE EFFECT OF VERTICAL CURVE.
- THE ENGINEER SHALL DETERMINE WINGWALL HEIGHT BASED ON ROADWAY AND SIDEWALK CROSS SLOPES.
- ADJUST NUMBER OF WH2 BARS TO MATCH NUMBER OF H BARS IN BACKWALL.



NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT

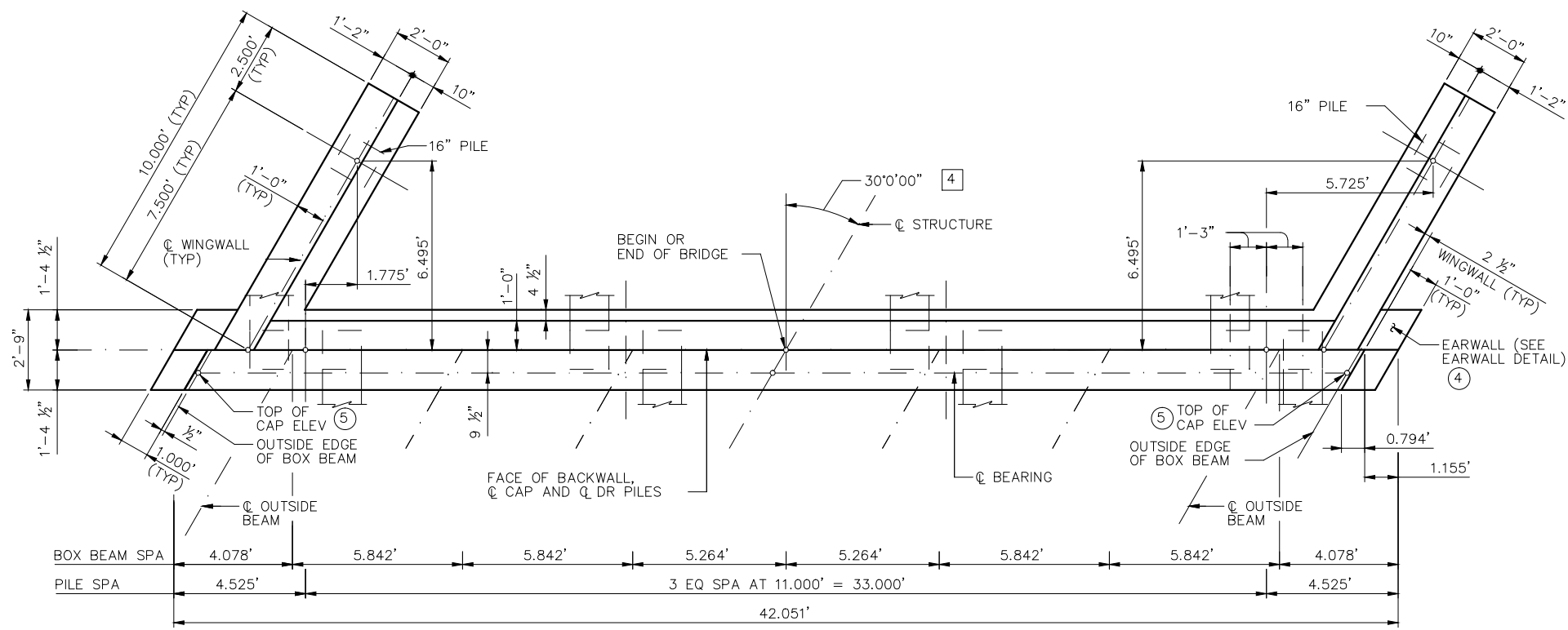


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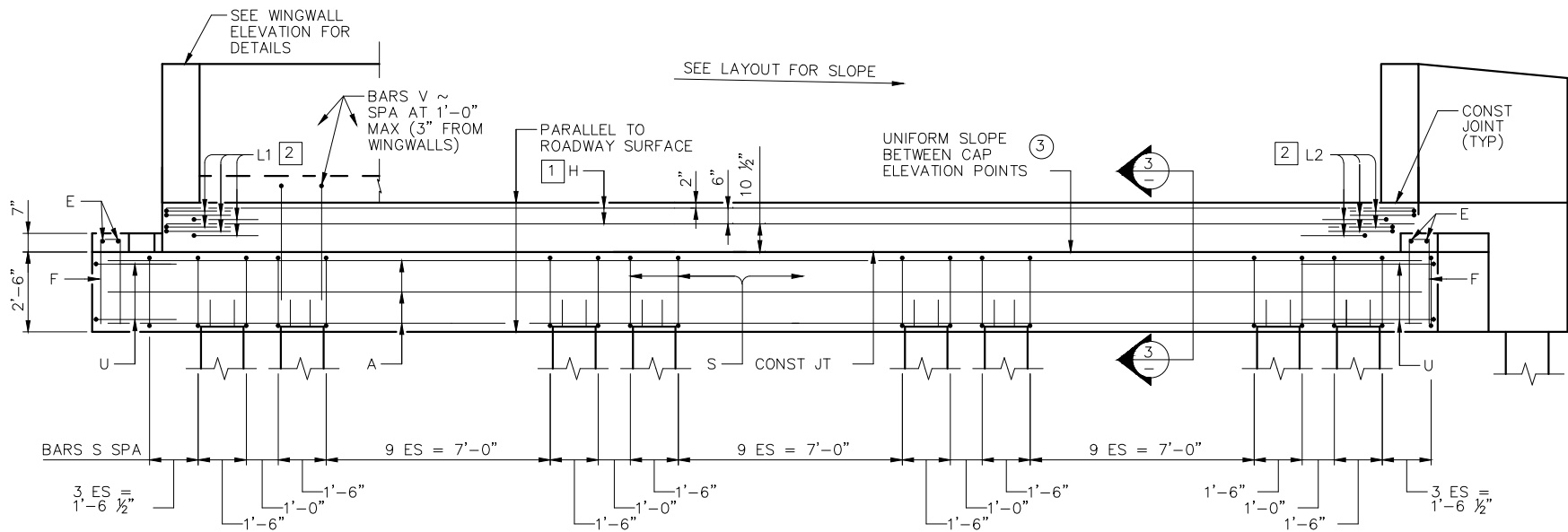
SEAL  
NOTE

PROJECT TITLE: DESIGN GUIDELINES-ABUTMENT BOX BEAM-DR SHAFTS HALF BOULEVARD, 30° SKEW (2 OF 2)			
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:	
CHK'D BY:	FILE NAME:	FILE NO:	
SCALE:	FILE NO:	SHT NO: 47	
DATE:	APPROVED BY:		

HL93 LOADING



1 PLAN



2 ELEVATION

NOTES TO DESIGN ENGINEER:

- A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.
- IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC PROJECT REQUIREMENTS.
- B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT PLANS, AND SHALL ADJUST PAGE NUMBERS ACCORDINGLY.
- C. THE DESIGN ENGINEER SHALL CONSULT THE HARRIS COUNTY DESIGN MANUAL AND SPECIFICATIONS FOR INFORMATION PERTINENT TO THESE DESIGN GUIDELINE DRAWINGS.
- D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE BRIDGE PLANS.

- 1 INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE.
- 2 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- 3 SURFACE FINISH FOR THE TOP OF CAP WILL BE A TEXTURED WOOD FLOAT FINISH. THE SURFACE MUST BE LEVEL IN THE DIRECTION OF THE CENTERLINE OF BEAMS.
- 4 DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION..
- 5 TOP OF CAP ELEVATIONS ARE BASED ON SECTION DEPTH AT CENTERLINE BEARING.
- 6 WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

ABUTMENT NOTES

- 1. DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
- 2. ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
- 3. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
- 4. ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
- 5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
- 6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
- 7. MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER PILE.

TOP OF CAP ELEVATIONS 6	
WORKING POINT	ELEVATION

NOTES TO ENGINEER

- 1 ADD AN ADDITIONAL ROW OF H BARS FOR B24, B28 AND B34 BEAMS. ADD TWO ADDITIONAL ROWS OF H BARS FOR B40 BEAMS. ROWS OF H BARS SHALL BE EQUALLY SPACED.
- 2 A SET OF L BARS IS REQUIRED FOR EACH ROW OF H BARS.
- 3 GUIDELINE DRAWINGS ARE FOR B20 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
- 4 SKEWS HIGHER THAN 30° ARE NOT RECOMMENDED.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGURRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT

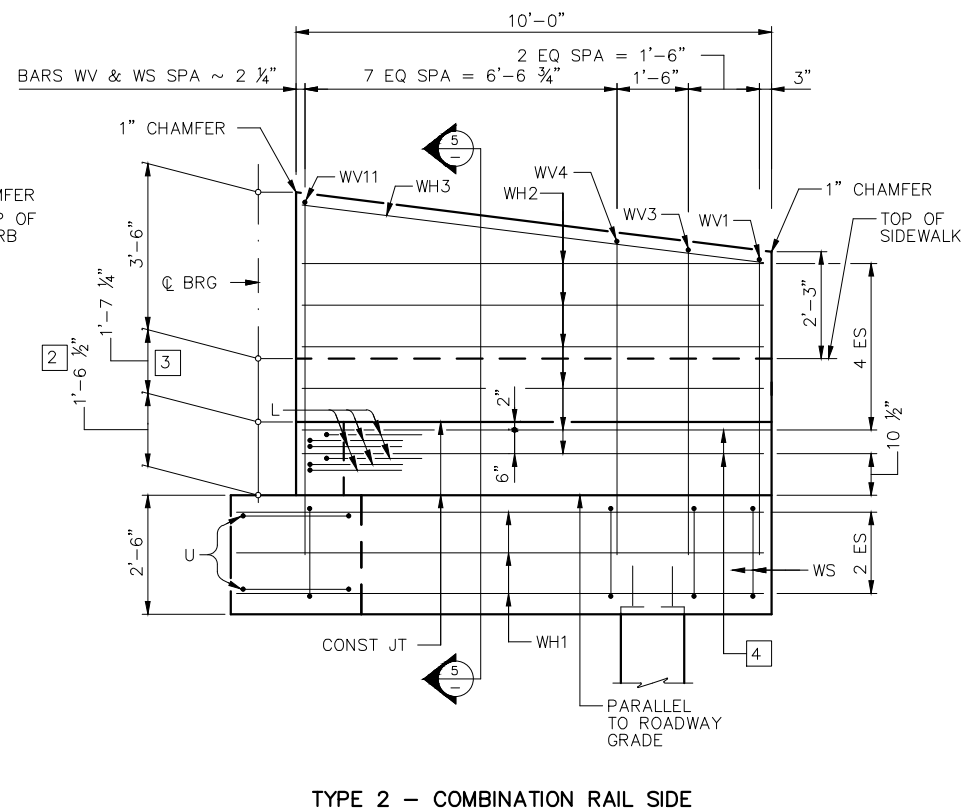
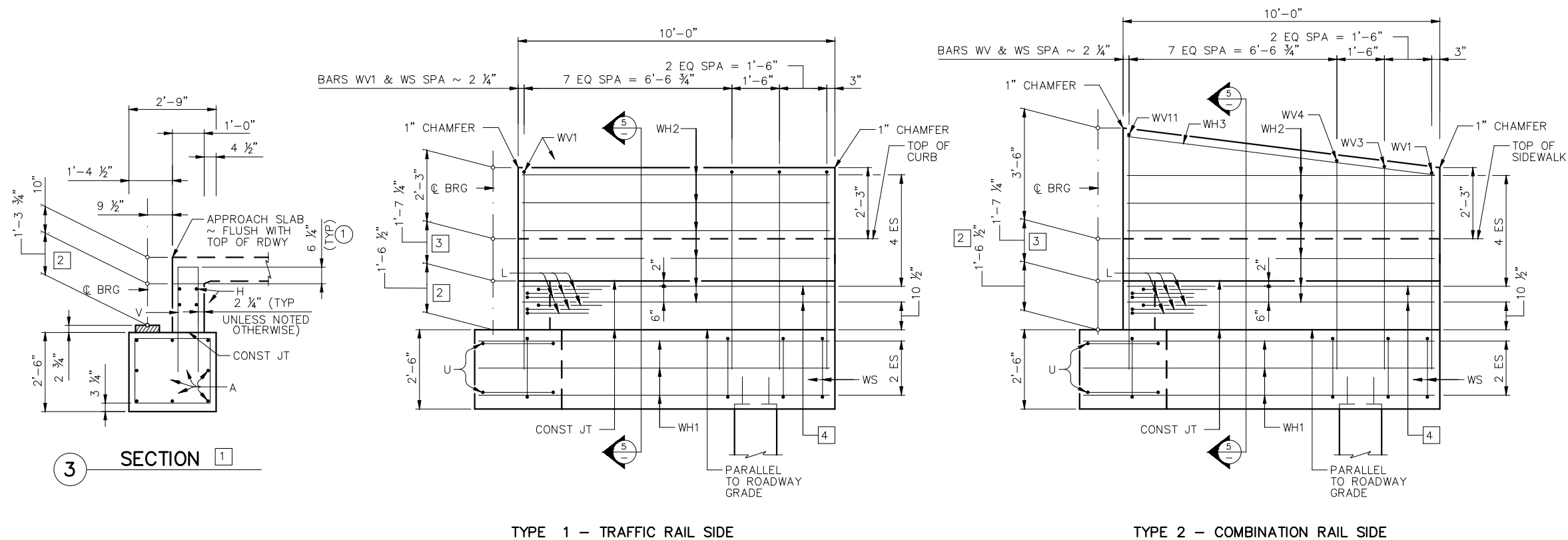


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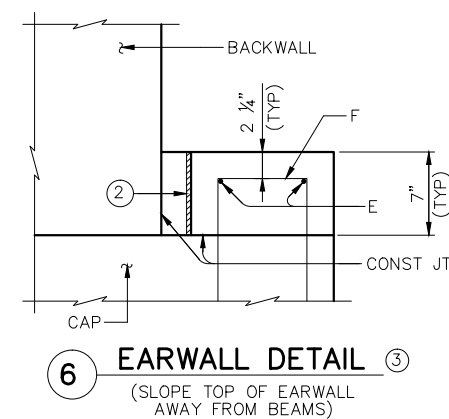
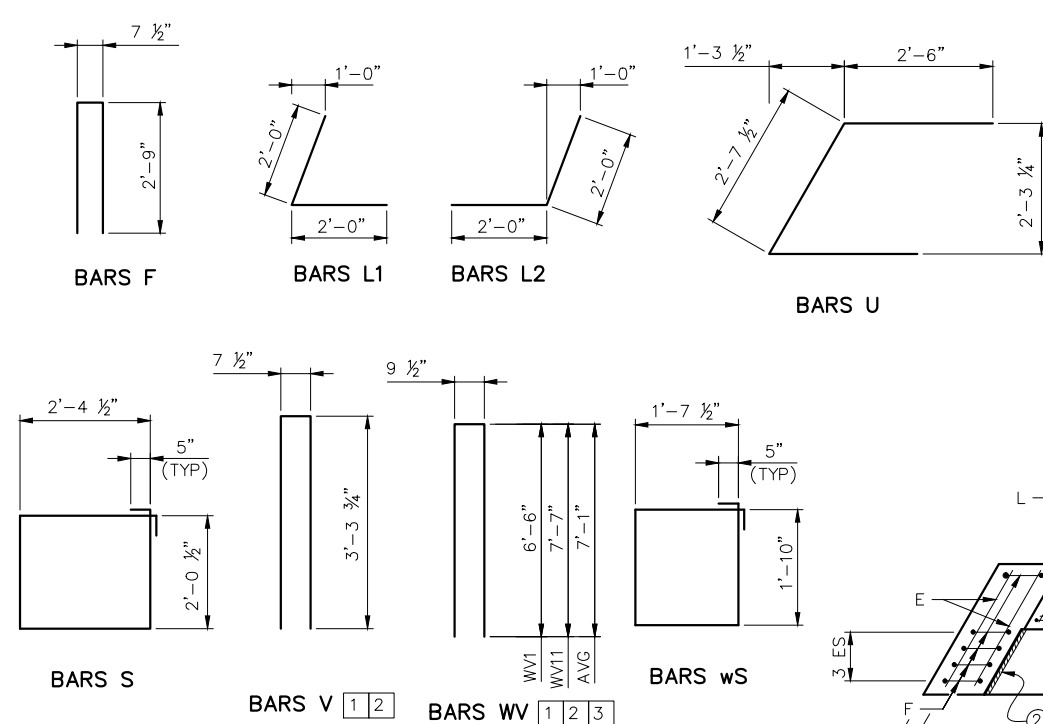
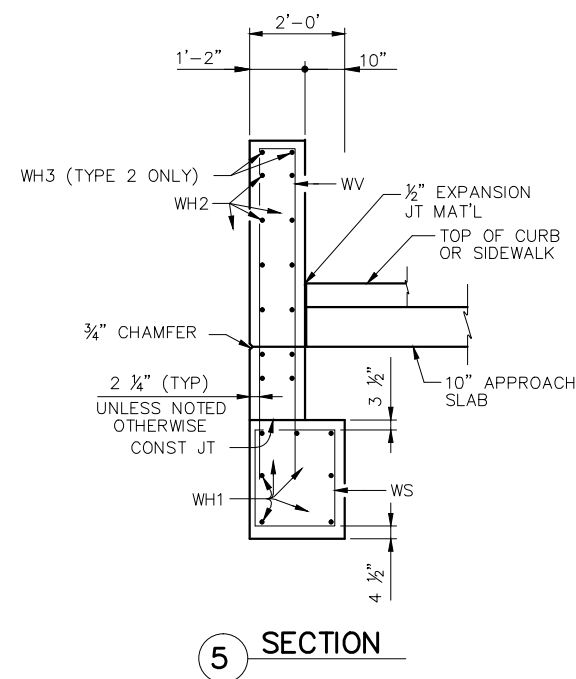
SEAL  
NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:		JOB NO:
	DESIGN GUIDELINES-ABUTMENT		
CHK'D BY:		FILE NAME:	
	BOX BEAM-PILES		
SCALE:		FILE NO:	
	HALF BOULEVARD, 30°SKEW		
DATE:	APPROVED BY:		SHT NO:
			48
(1 OF 2)			

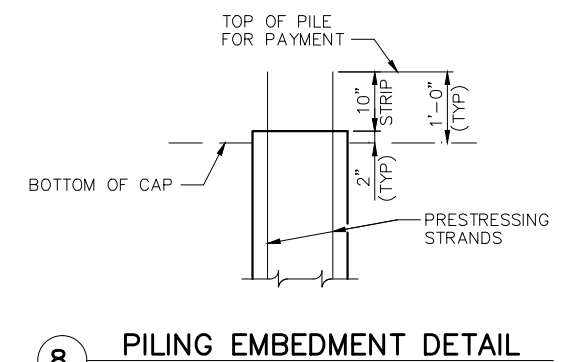
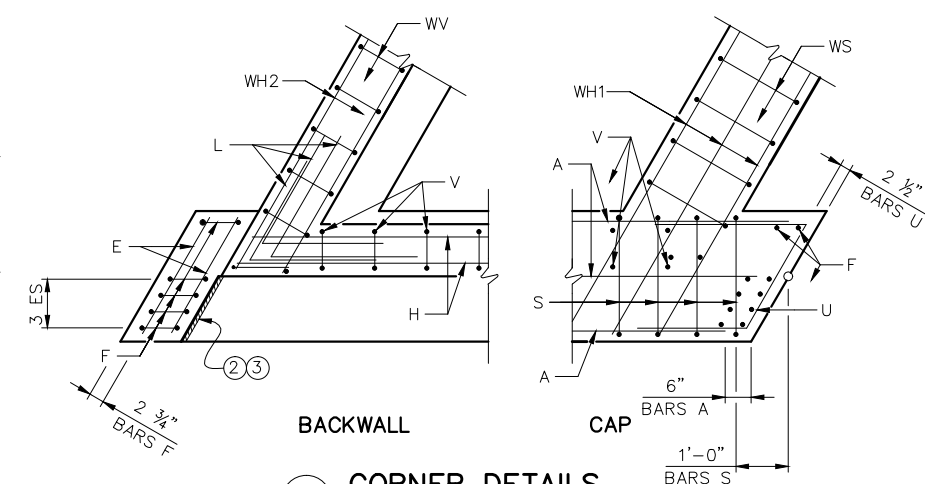
HL93 LOADING



BILL OF REINFORCING STEEL					1
BAR	NO.	SIZE	LENGTH	WEIGHT	
A	8	# 11	41'-1"	1,746	
E	4	# 5	2'-10"	12	
F	10	# 5	6'-2"	64	
H	4	# 6	39'-4"	236	
L1	6	# 6	4'-0"	36	
L2	6	# 6	4'-0"	36	
S	46	# 4	9'-8"	297	
U	4	# 6	7'-8"	46	
V	38	# 5	7'-3"	287	
WH1	14	# 6	11'-1"	232	
WH2	24	# 6	9'-8"	348	
WH3	2	# 6	9'-9"	29	
WS	22	# 4	7'-9"	114	
WV1	11	# 5	13'-10"	159	
WV (AVG)	11	# 5	15'-0"	172	
REINFORCING STEEL			LB	3,814	
ESTIMATED QUANTITIES					1
REINFORCING STEEL			LB	3,814	
CLASS B1 CONCRETE			CY	21.6	



- ① INCREASE AS REQUIRED TO MAINTAIN 3 ¾" FROM FINISHED GRADE.
- ② ½" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EAWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EAWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ③ DO NOT CAST EAWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.

[illegible]

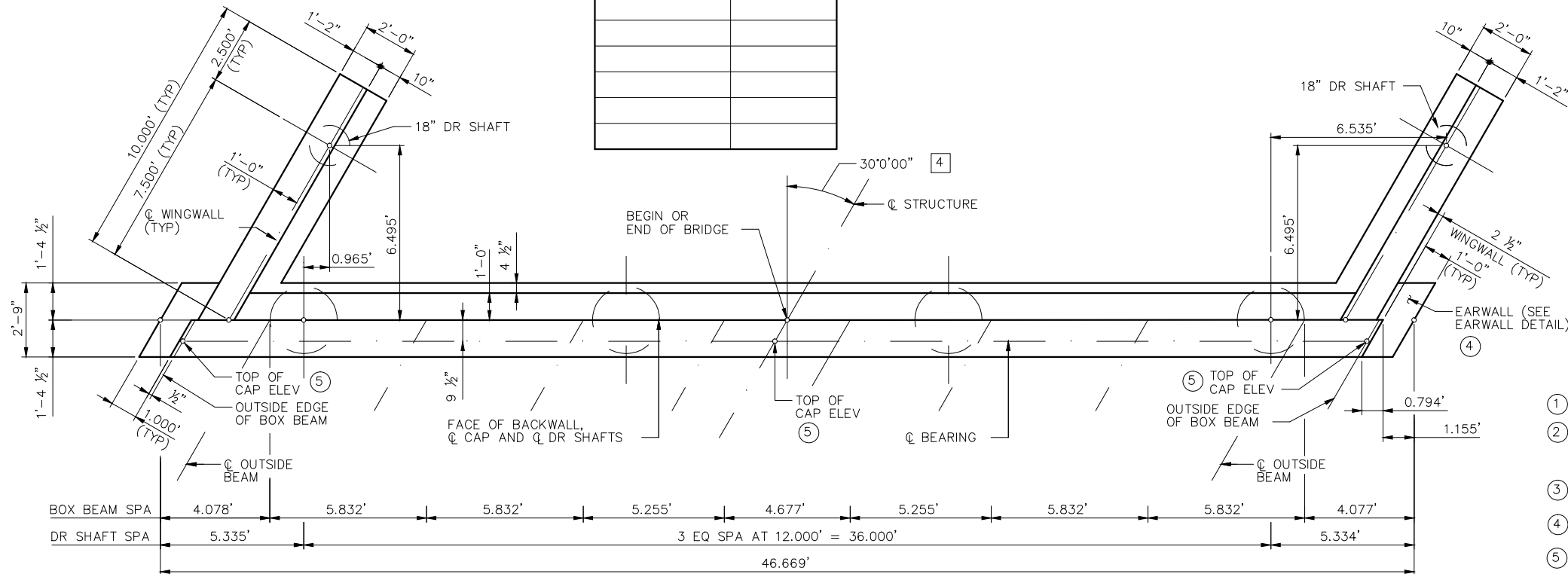
HARRIS COUNTY  
ENGINEERING DEPARTMENT



## FIRM INFO

SEAL  
NOTE

PROJECT TITLE:		PILES - LOADING	
DRAWN BY:	SHEET DESCRIPTION: DESIGN GUIDELINES-ABUTMENT BOX BEAM-PILES		JOB NO:
C'D'D BY:			FILE NAME:
SCALE:	HALF BOULEVARD, 30°SKEW		FILE NO:
DATE:	APPROVED BY:	(2 OF 2)	SHT NO: 49

[illegible]

## 1 PLAN

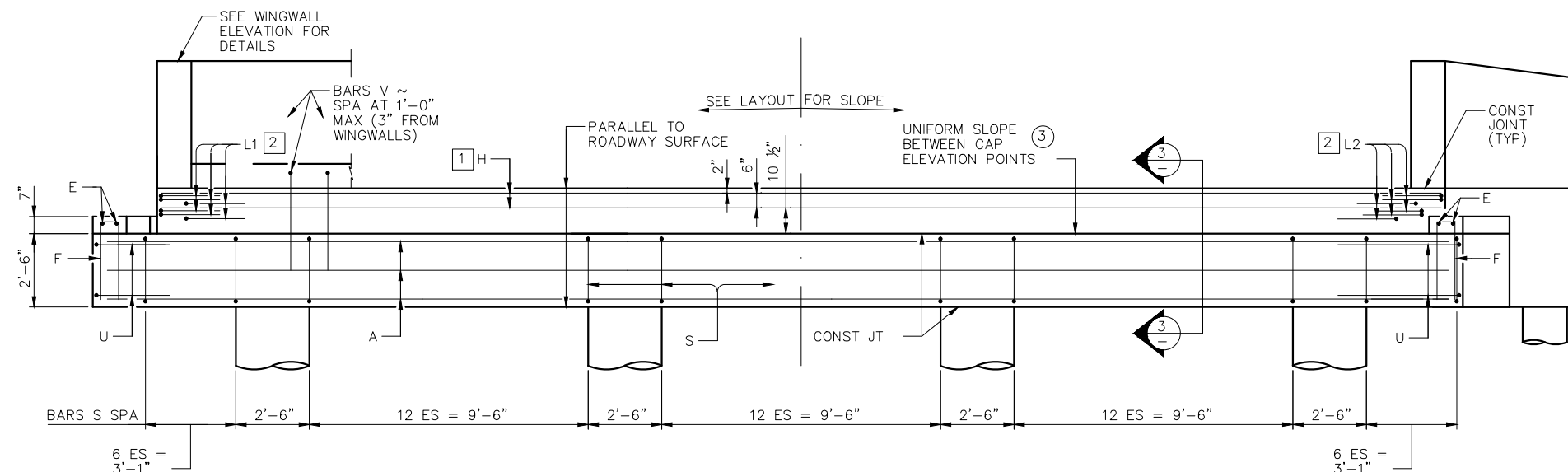
- ① INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE.
- ② 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ③ SURFACE FINISH FOR THE TOP OF CAP WILL BE A TEXTURED WOOD FLOAT FINISH. THE SURFACE MUST BE LEVEL IN THE DIRECTION OF THE CENTERLINE OF BEAMS.
- ④ DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION..
- ⑤ TOP OF CAP ELEVATIONS ARE BASED ON SECTION DEPTH AT CENTERLINE BEARING.
- ⑥ WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

### ABUTMENT NOTES

1. DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
2. ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
3. ALL EXPOSED CORNERS SHALL BE CHAMFERED  $\frac{3}{4}$ ", UNLESS OTHERWISE NOTED.
4. ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
7. MAXIMUM CALCULATED FOUNDATION LOADS:  
X TONS PER SHAFT.

## NOTES TO ENGINEER

- 1 ADD AN ADDITIONAL ROW OF H BARS FOR B24, B28 AND B34 BEAMS. ADD TWO ADDITIONAL ROWS OF H BARS FOR B40 BEAMS. ROWS OF H BARS SHALL BE EQUALLY SPACED.
- 2 A SET OF L BARS IS REQUIRED FOR EACH ROW OF H BARS.
- 3 GUIDELINE DRAWINGS ARE FOR B20 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
- 4 SKEWS HIGHER THAN 30° ARE NOT RECOMMENDED.



## 2 ELEVATION

[illegible]

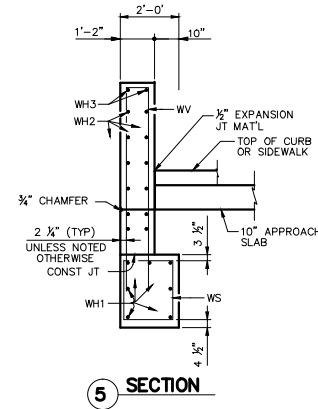
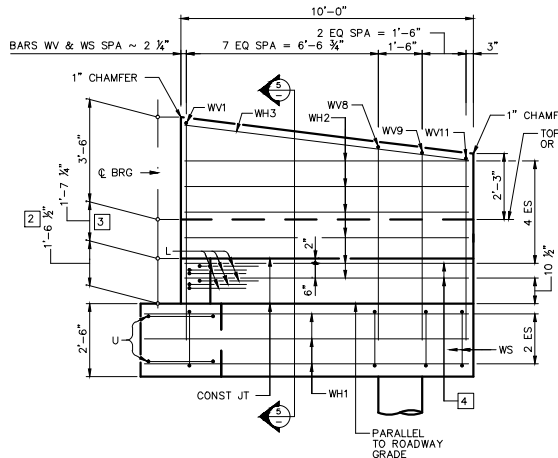
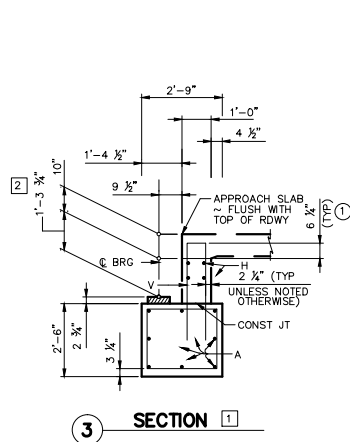
HARRIS COUNTY  
ENGINEERING DEPARTMENT



## FIRM INFO

SEAL  
NOTE

PROJECT TITLE:		HESS LOADING	
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:	
CR'D BY:	DESIGN GUIDELINES—ABUTMENT BOX BEAM—DR SHAFTS	FILE NAME:	
SCALE:	TWO—WAY ROAD, 30°SKEW	FILE NO:	
DATE:	APPROVED BY: (1 OF 2)	SHT NO: 50	



BILL OF REINFORCING STEEL <sup>1</sup>				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	8	# 11	45'-8"	1,941
E	4	# 5	2'-10"	12
F	10	# 5	6'-2"	64
H	4	# 6	43'-6"	261
L1	6	# 6	4'-0"	36
L2	6	# 6	4'-0"	36
S	53	# 4	9'-8"	342
U	4	# 6	7'-8"	46
V	43	# 5	7'-3"	325
WH1	14	# 6	11'-1"	232
WH2	24	# 6	9'-8"	348
WH3	4	# 6	9'-9"	59
WS	22	# 4	7'-9"	114
WV (AVG)	22	# 5	15'-0"	344
REINFORCING STEEL			LB	4,160

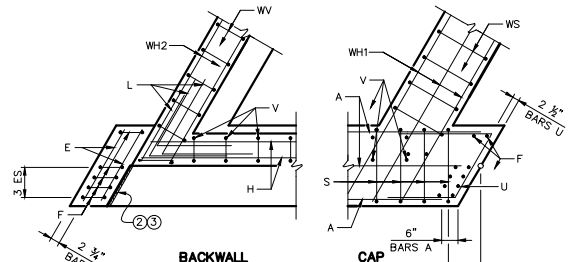
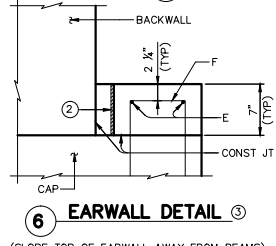
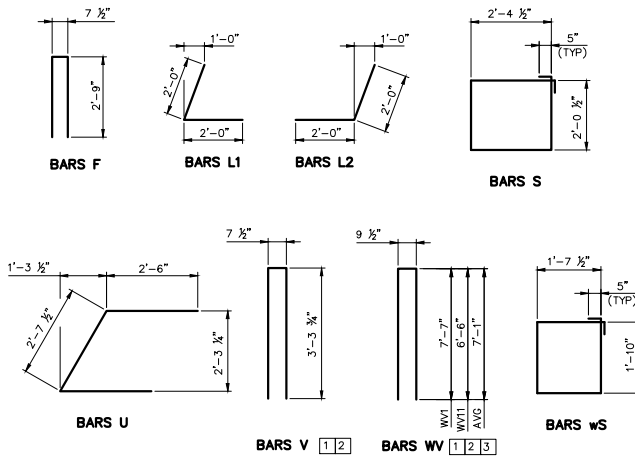
  

ESTIMATED QUANTITIES <sup>1</sup>			
REINFORCING STEEL	LB	4,160	
CLASS B1 CONCRETE	CY	23.3	

- INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE.
- PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EAWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EAWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- DO NOT CAST EAWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.

### NOTES TO ENGINEER

- GUIDELINE DRAWINGS ARE FOR B20 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
- THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB, SHEAR KEY AND THE EFFECT OF VERTICAL CURVE.
- THE ENGINEER SHALL DETERMINE WINGWALL HEIGHT BASED ON ROADWAY AND SIDEWALK CROSS SLOPES.
- ADJUST NUMBER OF WH2 BARS TO MATCH NUMBER OF H BARS IN BACKWALL.



NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	CLABURNE
1	UPDATED DEPARTMENT NAME	5/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT



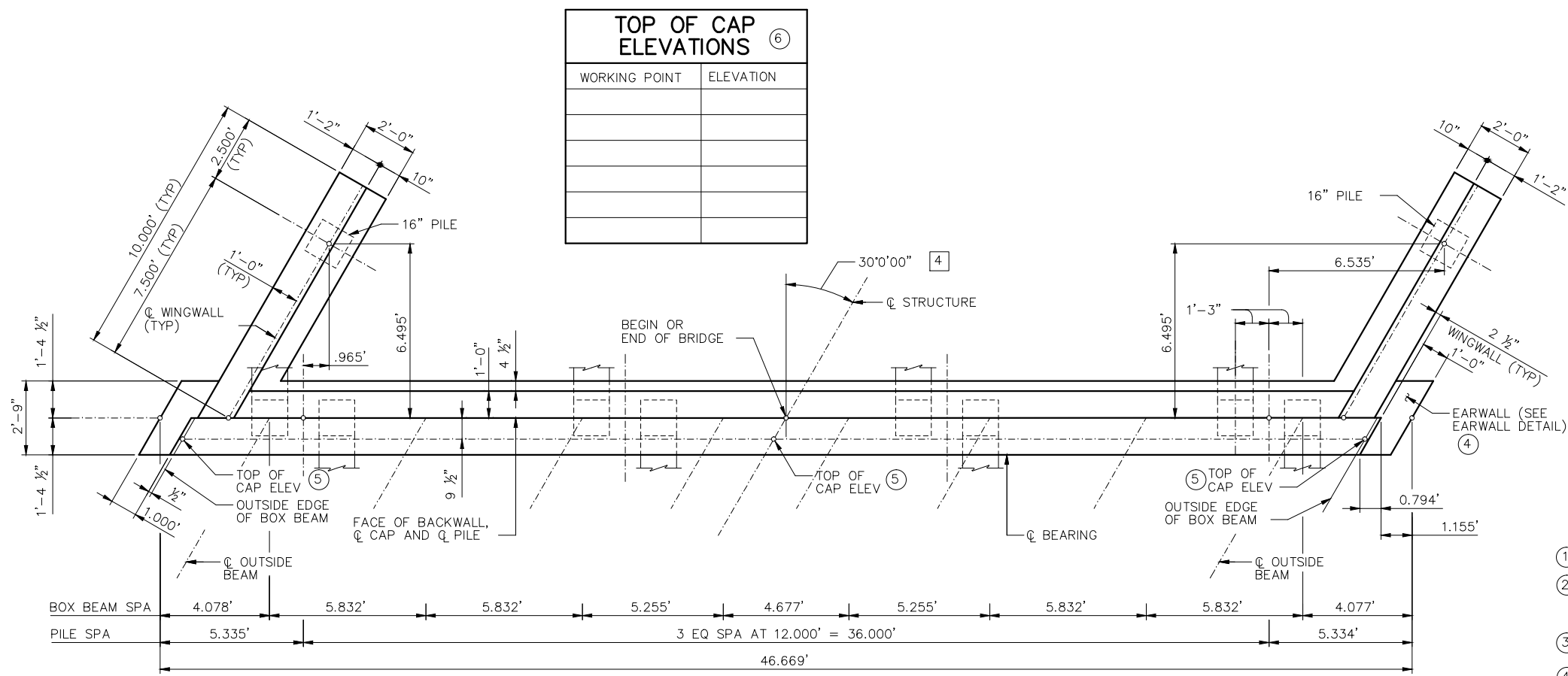
FIRM INFO

SEAL  
NOTE

PROJECT TITLE			
DESIGN BY	DESIGN	GUIDELINES-ABUTMENT	FILE NO.
CHK BY	CHK	BOX BEAM-DR SHAFTS	FILE NO.
DATE	DATE	TWO-WAY ROAD, 30°SKEW	FILE NO.
OFFERED BY	OFFERED BY	(2 OF 2)	51

HL93 LOADING





1 PLAN

NOTES TO DESIGN ENGINEER:

- A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.
- IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC PROJECT REQUIREMENTS.
- B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT PLANS, AND SHALL ADJUST PAGE NUMBERS ACCORDINGLY.
- C. THE DESIGN ENGINEER SHALL CONSULT THE HARRIS COUNTY DESIGN MANUAL AND SPECIFICATIONS FOR INFORMATION PERTINENT TO THESE DESIGN GUIDELINE DRAWINGS.
- D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEIOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE BRIDGE PLANS.

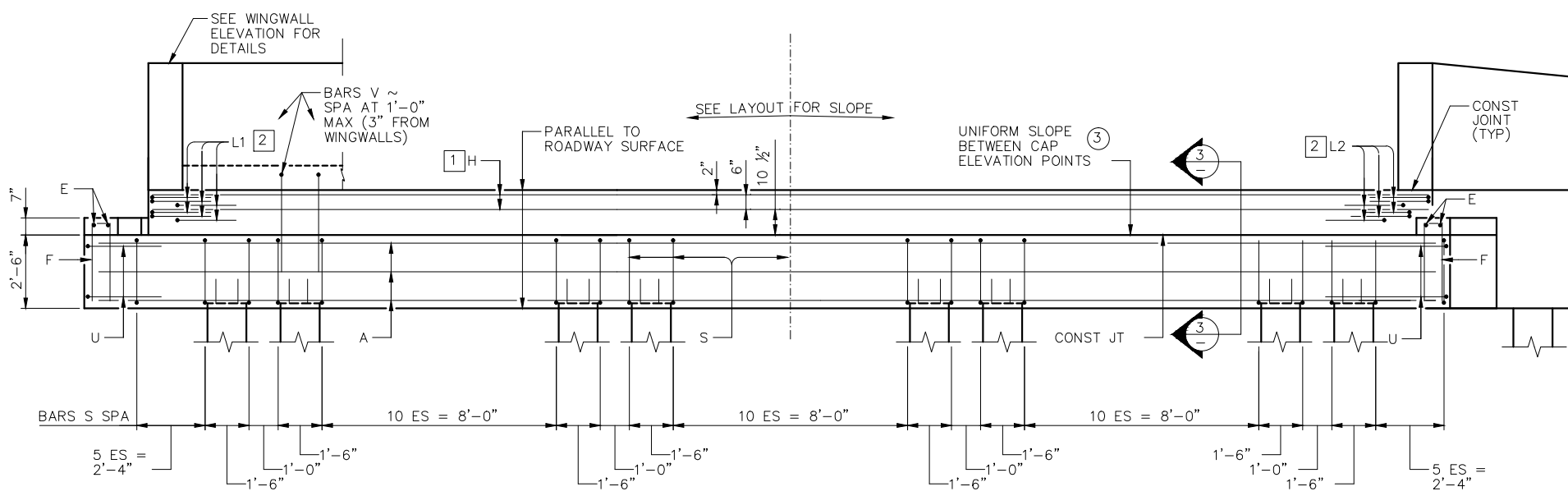
- 1 INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE.
- 2 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- 3 SURFACE FINISH FOR THE TOP OF CAP WILL BE A TEXTURED WOOD FLOAT FINISH. THE SURFACE MUST BE LEVEL IN THE DIRECTION OF THE CENTERLINE OF BEAMS.
- 4 DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION..
- 5 TOP OF CAP ELEVATIONS ARE BASED ON SECTION DEPTH AT CENTERLINE BEARING.
- 6 WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

ABUTMENT NOTES

- 1. DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
- 2. ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
- 3. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
- 4. ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
- 5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
- 6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
- 7. MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER PILE.

NOTES TO ENGINEER

- 1 ADD AN ADDITIONAL ROW OF H BARS FOR B24, B28 AND B34 BEAMS. ADD TWO ADDITIONAL ROWS OF H BARS FOR B40 BEAMS. ROWS OF H BARS SHALL BE EQUALLY SPACED.
- 2 A SET OF L BARS IS REQUIRED FOR EACH ROW OF H BARS.
- 3 GUIDELINE DRAWINGS ARE FOR B20 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
- 4 SKEWS HIGHER THAN 30° ARE NOT RECOMMENDED.



2 ELEVATION

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGURRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT

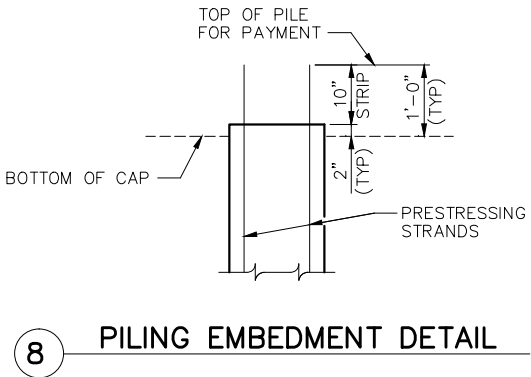
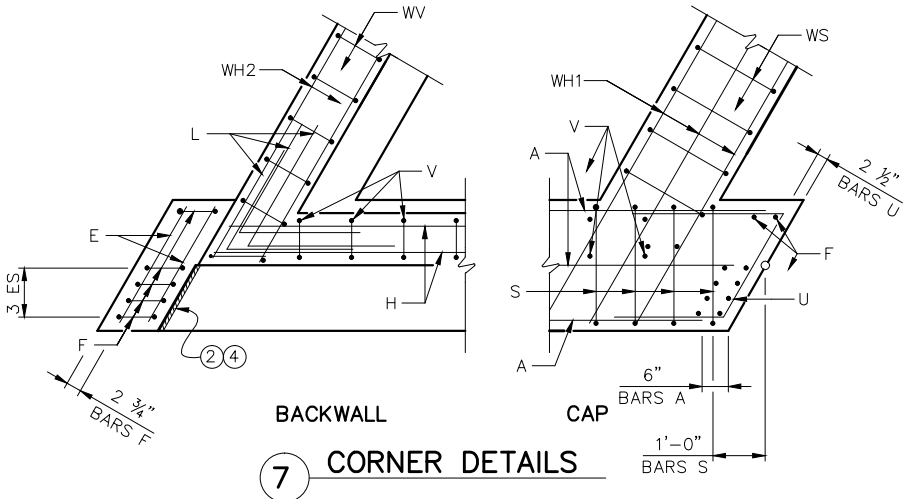
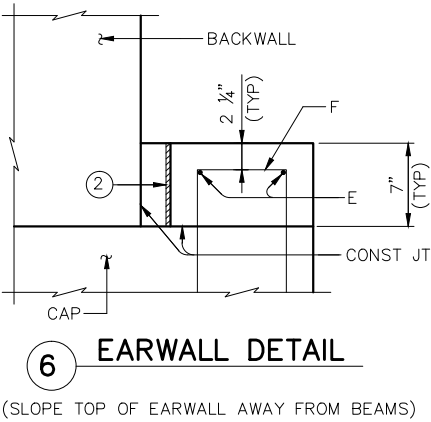
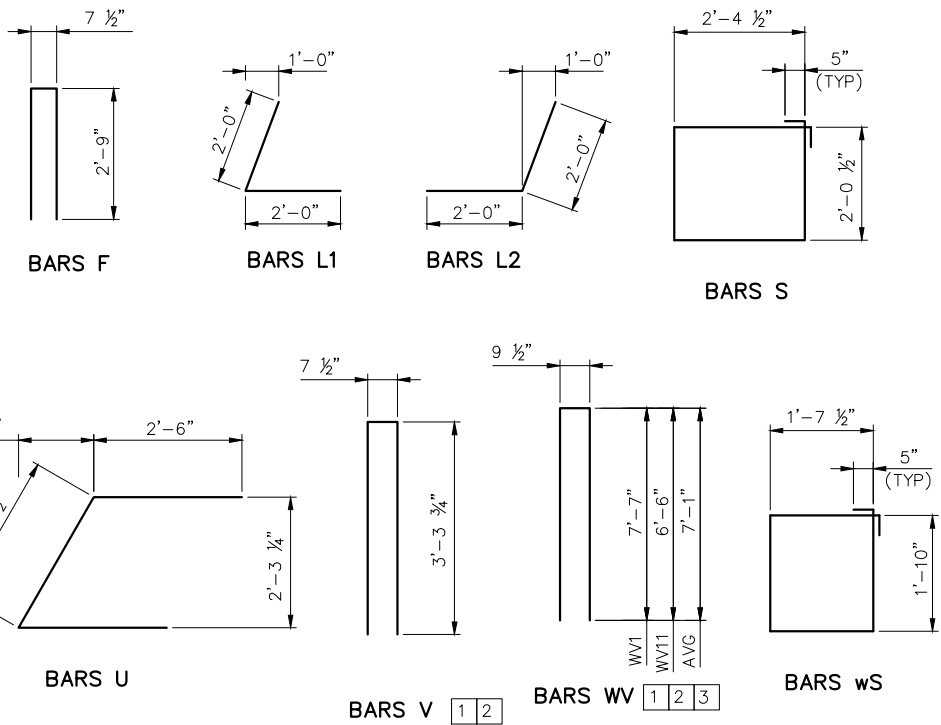
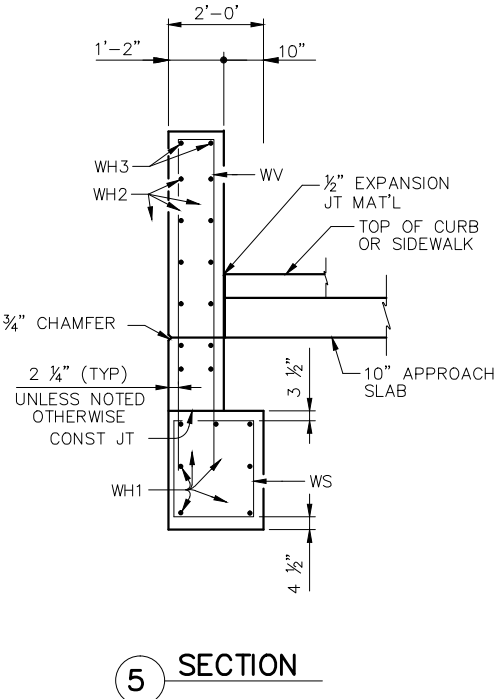
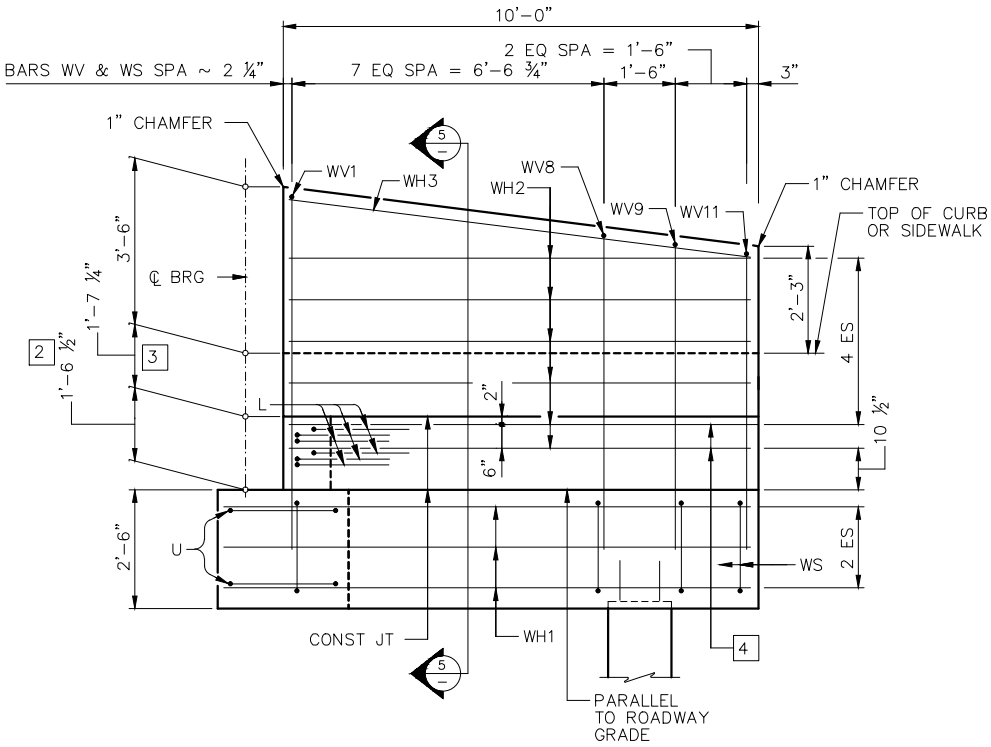
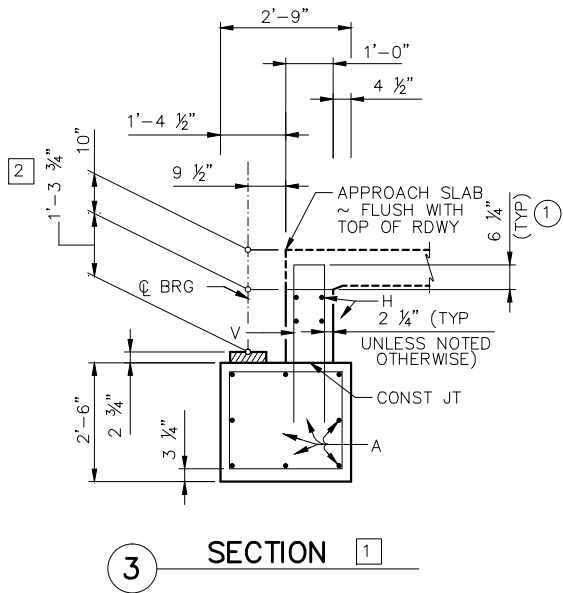


FIRM INFO

SEAL  
NOTE

PROJECT TITLE:			
DRAWN BY:	SHEET DESCRIPTION:		JOB NO:
CHK'D BY:	DESIGN GUIDELINES—ABUTMENT BOX BEAM—PILES		FILE NAME:
SCALE:	TWO—WAY ROAD, 30°SKEW		FILE NO:
DATE:	APPROVED BY:	(1 OF 2)	SHT NO: 52

BILL OF REINFORCING STEEL <span>1</span>				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	8	# 11	45'-8"	1,941
E	4	# 5	2'-10"	12
F	10	# 5	6'-2"	64
H	4	# 6	43'-6"	261
L1	6	# 6	4'-0"	36
L2	6	# 6	4'-0"	36
S	53	# 4	9'-8"	342
U	4	# 6	7'-8"	46
V	43	# 5	7'-3"	325
WH1	14	# 6	11'-1"	232
WH2	24	# 6	9'-8"	348
WH3	4	# 6	9'-9"	59
WS	22	# 4	7'-9"	114
WV (AVG)	22	# 5	15'-0"	344
REINFORCING STEEL			LB	4,160
ESTIMATED QUANTITIES <span>1</span>				
REINFORCING STEEL			LB	4,160
CLASS B1 CONCRETE			CY	23.3



- 1 INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE. 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- 2 DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- NOTES TO ENGINEER
- 1 GUIDELINE DRAWINGS ARE FOR B20 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
- 2 THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB, SHEAR KEY AND THE EFFECT OF VERTICAL CURVE.
- 3 THE ENGINEER SHALL DETERMINE WINGWALL HEIGHT BASED ON ROADWAY AND SIDEWALK CROSS SLOPES.
- 4 ADJUST NUMBER OF WH2 BARS TO MATCH NUMBER OF H BARS IN BACKWALL.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O. AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

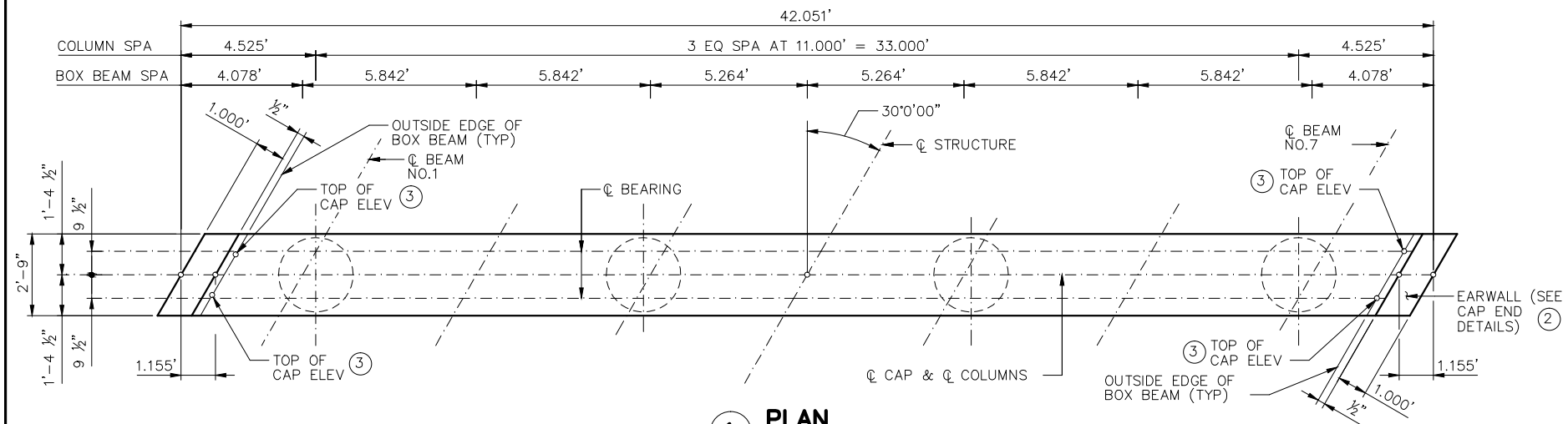
HARRIS COUNTY  
ENGINEERING DEPARTMENT



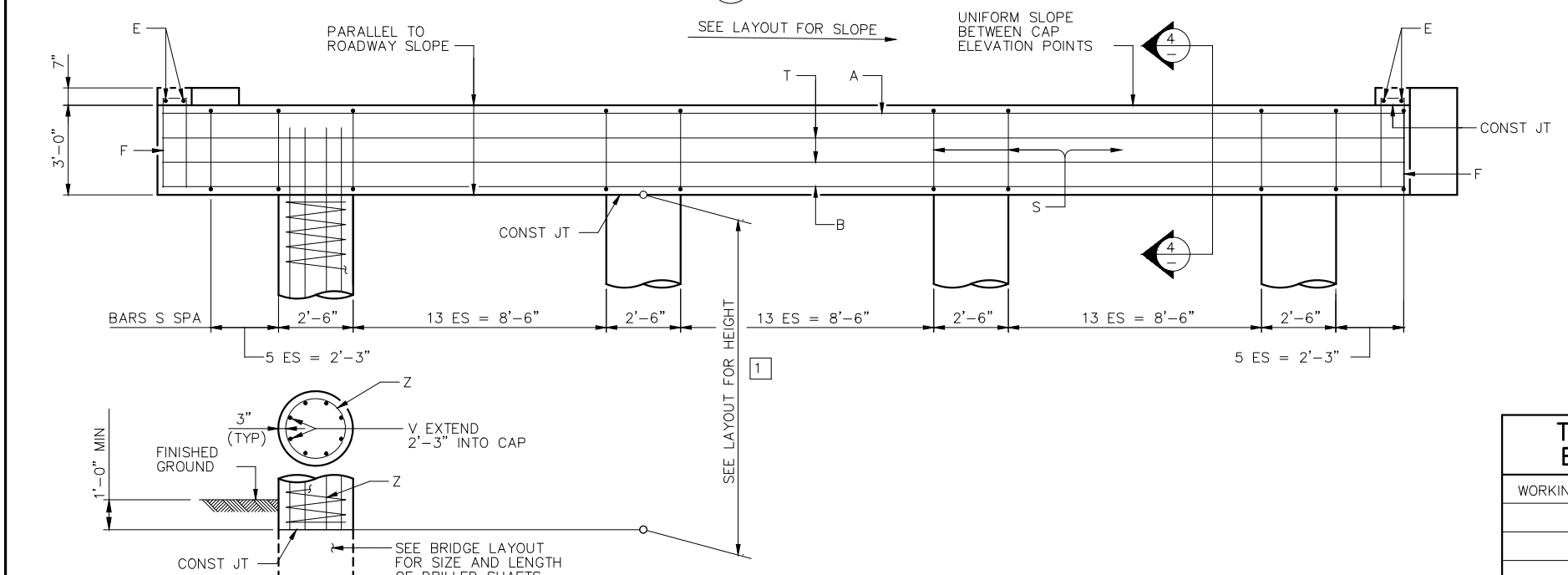
FIRM INFO

SEAL  
NOTE

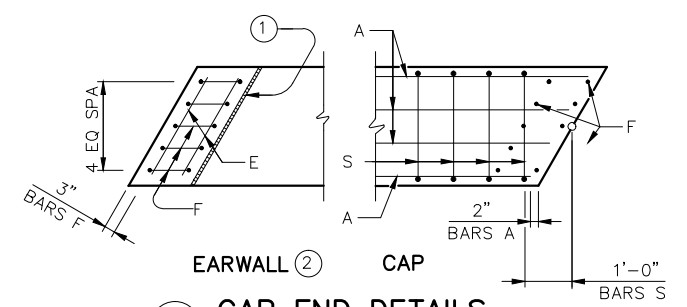
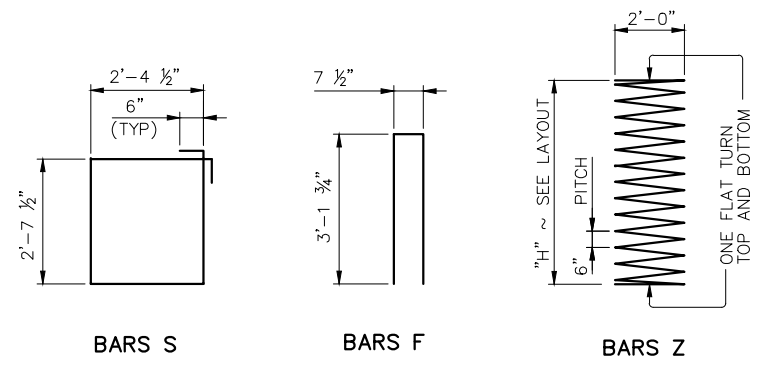
PROJECT TITLE			
DESIGN GUIDELINES-ABUTMENT			
BOX BEAM-PILES			
TWO-WAY ROAD, 30'SKEW			
(2 OF 2)			
DRWN BY:	SHEET DESCRIPTION:	FILE NAME:	JOB NO:
CK'D BY:			
SCALE:			
DATE:	APPROVED BY:		SHT NO: 53



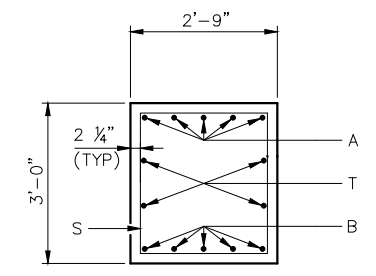
1 PLAN



2 ELEVATION



3 CAP END DETAILS



4 BENT CAP SECTION

BILL OF REINFORCING STEEL ④				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	5	# 11	41'-9"	1,109
B	5	# 11	41'-9"	1,109
E	4	# 5	2'-10"	12
F	10	# 5	6'-11"	72
S	54	# 5	11'-0"	620
T	4	# 5	41'-9"	174
V	32	# 9	22'-3"	2,421
Z	4	# 3	264'-9"	398
REINFORCING STEEL			LB	5,915
ESTIMATED QUANTITIES				
REINFORCING STEEL			LB	5,915
CLASS B1 CONCRETE (CAP)			CY	13.0
CLASS B1 CONCRETE (COL)			CY	14.5

- ① 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ② DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- ③ TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- ④ FOR EACH LINEAR FOOT VARIATION IN "H" VALUE MAKE FOLLOWING ADJUSTMENTS:  
BARS V: 1'-0"  
BARS Z: 12.606'  
REINFORCING STEEL: 128 LB  
CLASS "B1" CONCRETE (COL): 0.727 CY
- ⑤ WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

INTERIOR BENT NOTES

- DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
- ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
- ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
- ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
- DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
- SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
- MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER SHAFT.

NOTES TO ENGINEER

- ① QUANTITIES SHOWN ARE BASED ON AN "H" DIMENSION OF 20'.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

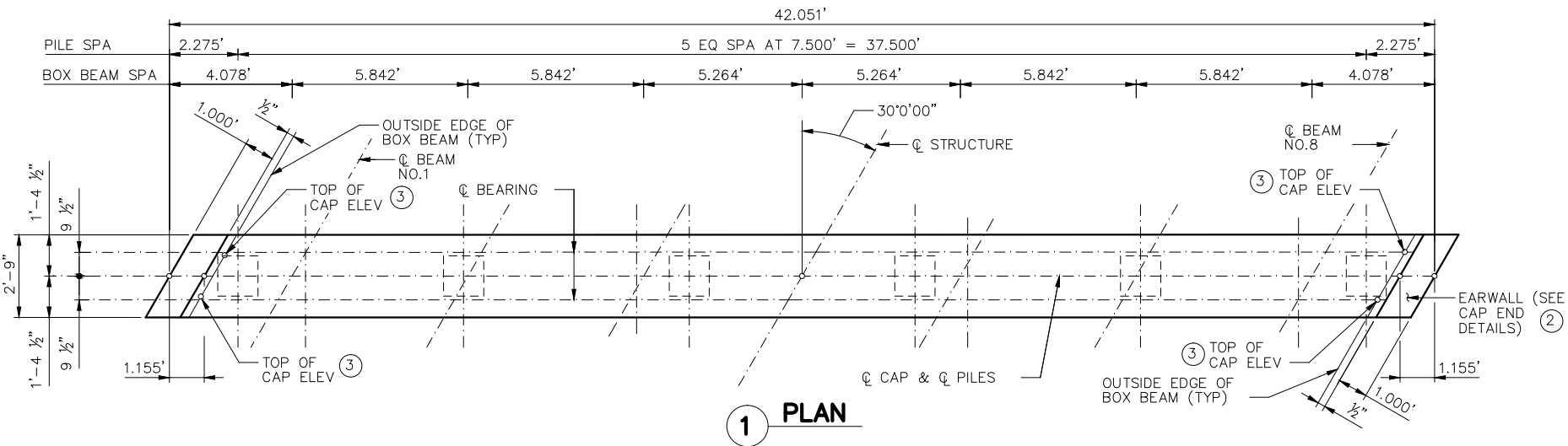
HARRIS COUNTY  
ENGINEERING DEPARTMENT



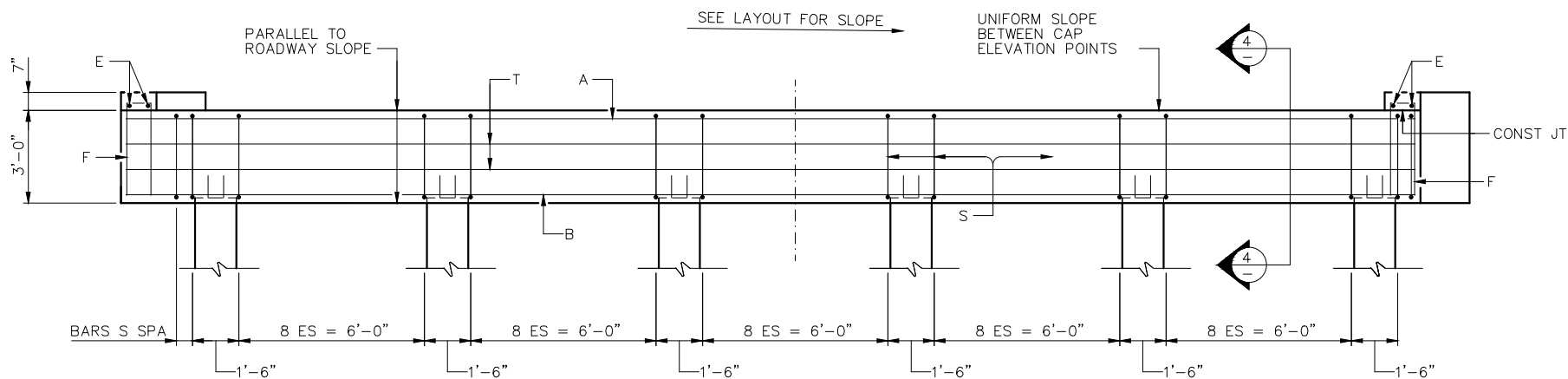
FIRM INFO

SEAL  
NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:	
CK'D BY:	DESIGN GUIDELINES-BENT	FILE NAME:	
SCALE:	BOX BEAMS-DR SHAFTS	FILE NO:	
DATE:	HALF BOULEVARD, 30'SKEW	SHT NO:	
APPROVED BY:		54	

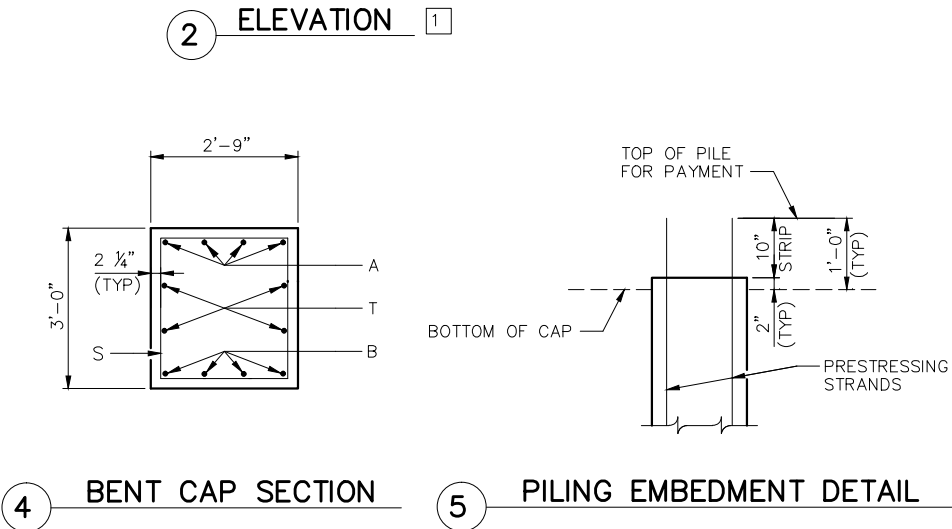
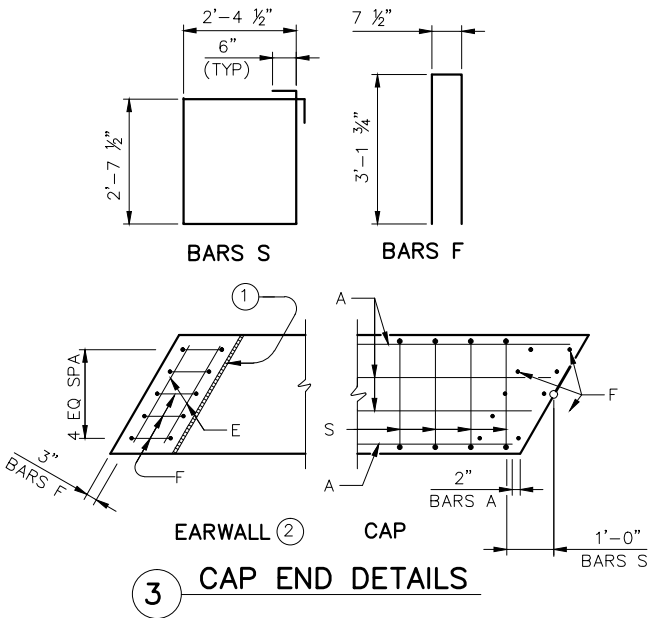


BILL OF REINFORCING STEEL				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	4	# 11	41'-9"	887
B	4	# 11	41'-9"	887
E	4	# 5	2'-10"	12
F	10	# 5	6'-11"	72
S	49	# 5	11'-0"	562
T	4	# 5	41'-9"	174
REINFORCING STEEL			LB	2,594
ESTIMATED QUANTITIES				
REINFORCING STEEL			LB	2,594
CLASS B1 CONCRETE (CAP)			CY	13.0



TOP OF CAP ELEVATIONS ④	
WORKING POINT	ELEVATION

- NOTES TO DESIGN ENGINEER:
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- INTERIOR BENT NOTES
- DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
  - ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I. @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
  - ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
  - ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
  - DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
  - SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
  - MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER PILE.

- 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

NOTES TO ENGINEER

- 1 EXPOSED PILE HEIGHT SHALL NOT EXCEED 16' FOR 16" PILING, AND 20' FOR 18" PILING.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

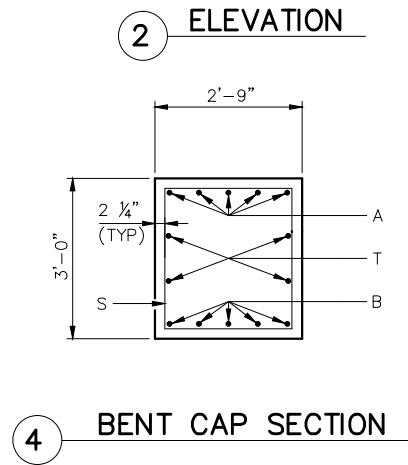
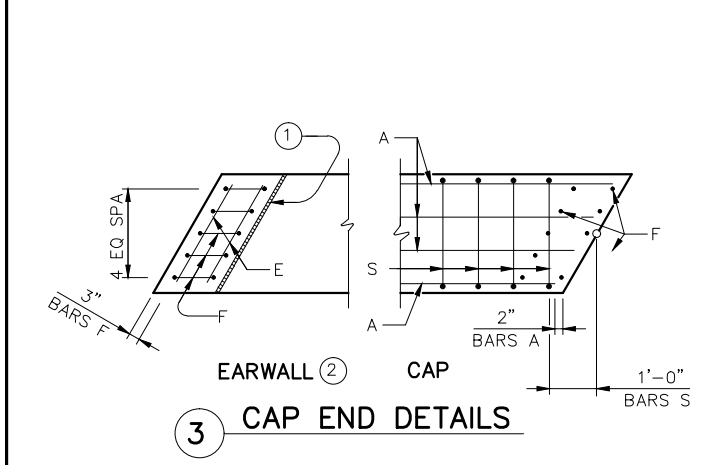
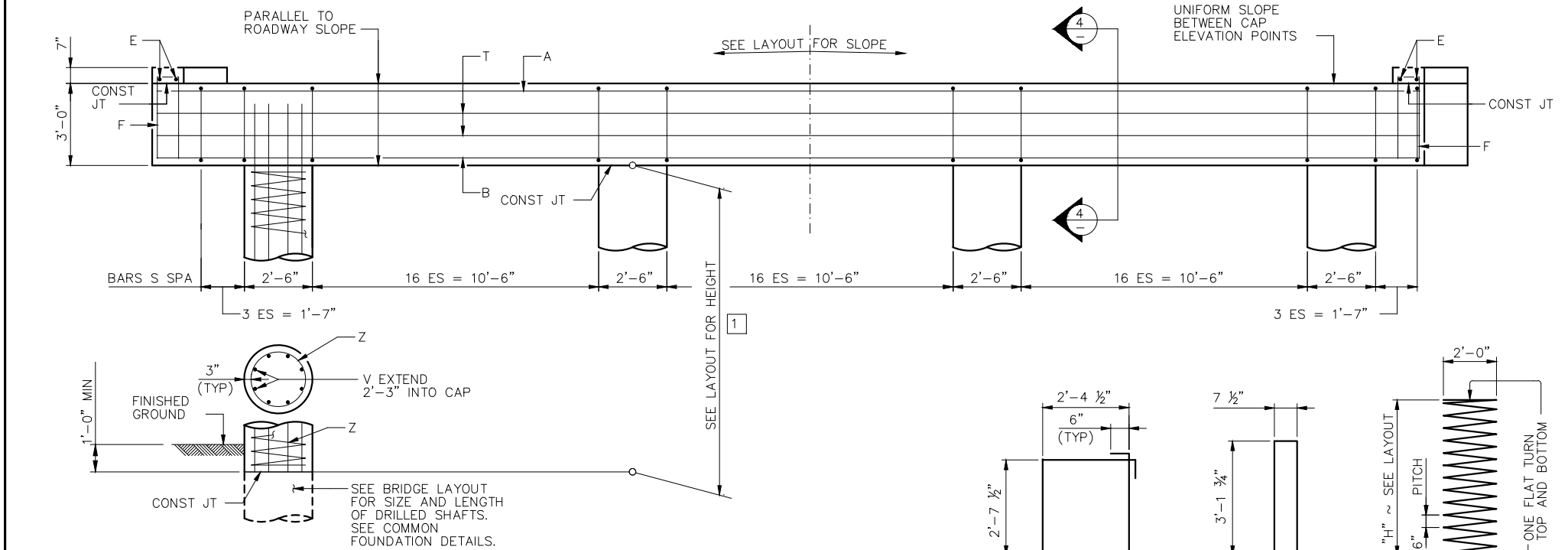
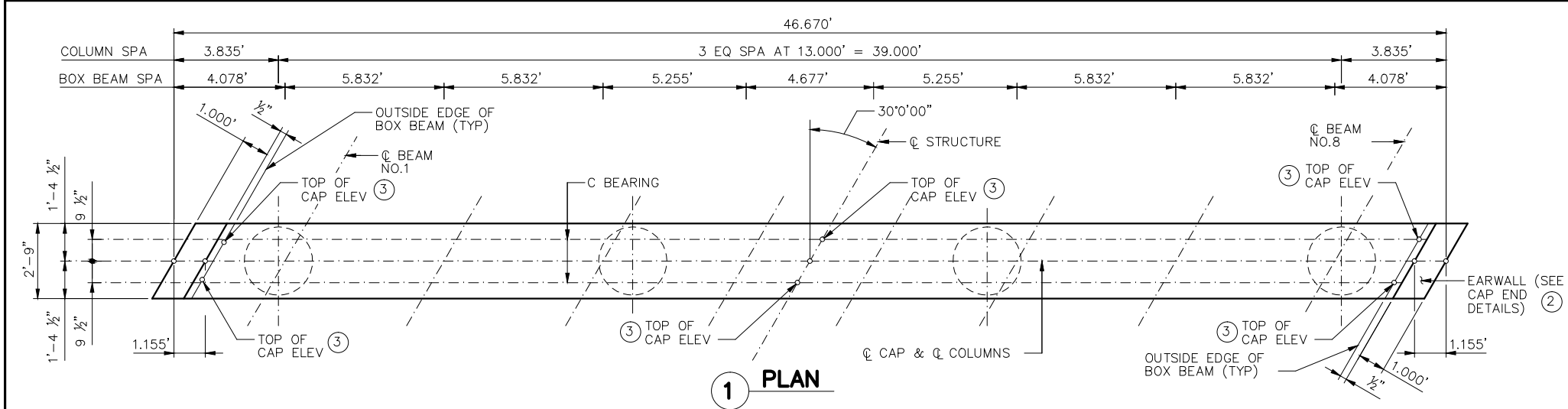
HARRIS COUNTY  
ENGINEERING DEPARTMENT



FIRM INFO

SEAL  
NOTE

PROJECT TITLE: HL93 LOADING			
DRAWN BY:	SHEET DESCRIPTION: DESIGN GUIDELINES-BENT	JOB NO:	
CHK'D BY:	BOX BEAMS-PILE	FILE NAME:	
SCALE:	HALF BOULEVARD, 30'SKEW	FILE NO:	
DATE:	APPROVED BY:	SHT NO: 55	



TOP OF CAP ELEVATIONS ⑤	
WORKING POINT	ELEVATION

- ① 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EAWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EAWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ② DO NOT CAST EAWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- ③ TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- ④ FOR EACH LINEAR FOOT VARIATION IN "H" VALUE MAKE FOLLOWING ADJUSTMENTS:  
BARS V: 1'-0"  
BARS Z: 12.606'  
REINFORCING STEEL: 128 LB  
CLASS "B1" CONCRETE (COL): 0.727 CY
- ⑤ WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

BILL OF REINFORCING STEEL ④				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	5	# 11	46'-4"	1,231
B	5	# 11	46'-4"	1,231
E	4	# 5	2'-10"	12
F	10	# 5	6'-11"	72
S	59	# 5	11'-0"	677
T	4	# 5	46'-4"	193
V	32	# 9	22'-3"	2,421
Z	4	# 3	264'-9"	398
REINFORCING STEEL			LB	6,235

ESTIMATED QUANTITIES		
REINFORCING STEEL	LB	6,235
CLASS B1 CONCRETE (CAP)	CY	14.4
CLASS B1 CONCRETE (COL)	CY	14.5

- NOTES TO DESIGN ENGINEER:
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### INTERIOR BENT NOTES

- DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
- ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
- ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
- ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
- DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
- SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
- MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER SHAFT.

### NOTES TO ENGINEER

① QUANTITIES SHOWN ARE BASED ON AN "H" DIMENSION OF 20'.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGURRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT

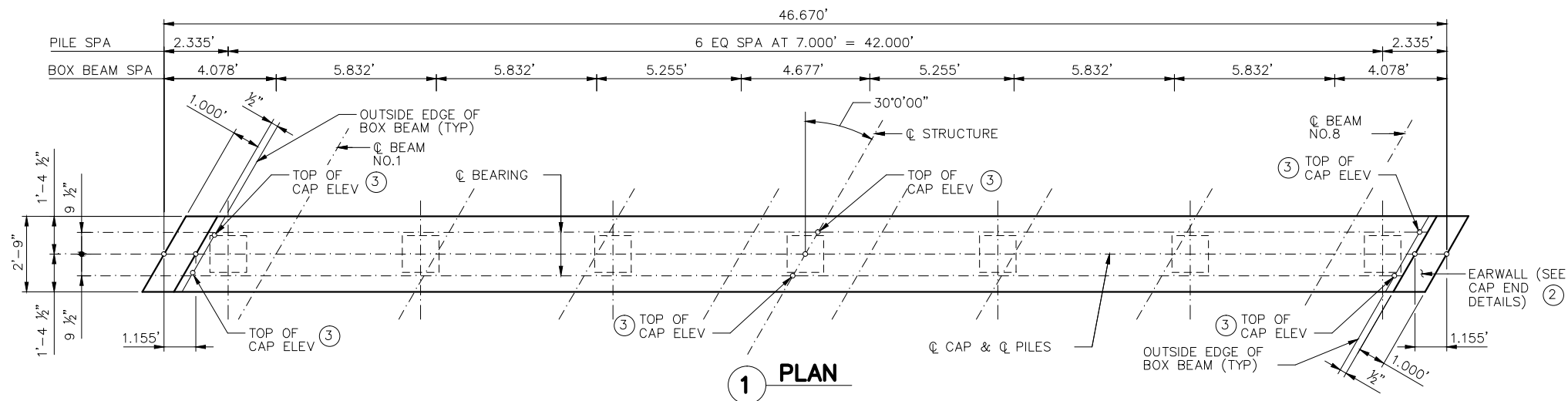


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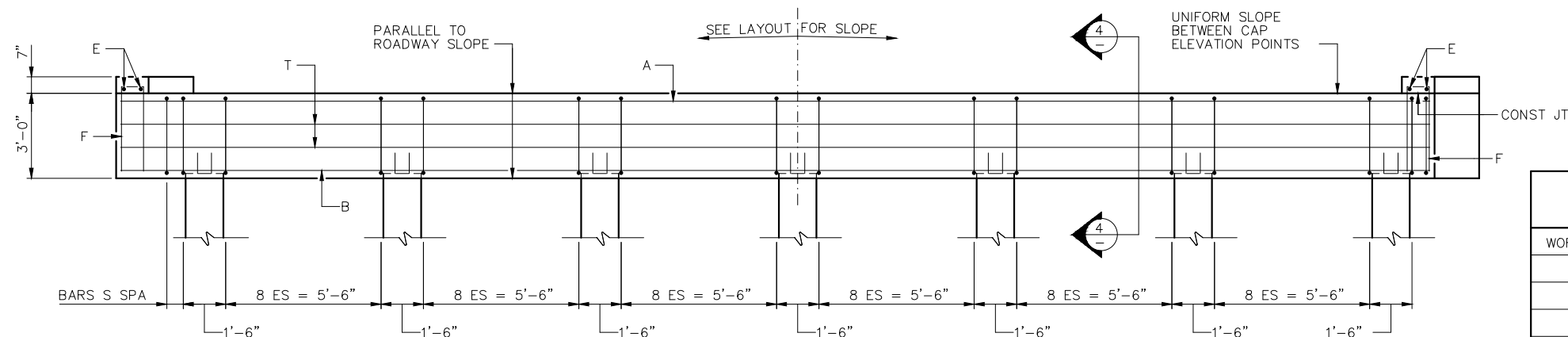
SEAL  
NOTE

PROJECT TITLE		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:
CK'D BY:	DESIGN GUIDELINES-BENT	FILE NAME:
SCALE:	BOX BEAMS-DR SHAFTS	FILE NO:
DATE:	TWO-WAY ROAD, 30'SKEW	SHT NO:

HL93 LOADING



BILL OF REINFORCING STEEL				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	4	# 11	46'-4"	985
B	4	# 11	46'-4"	985
E	4	# 5	2'-10"	12
F	10	# 5	6'-11"	72
S	58	# 5	11'-0"	665
T	4	# 5	46'-4"	193
REINFORCING STEEL			LB	2,912
ESTIMATED QUANTITIES				
REINFORCING STEEL			LB	2,912
CLASS B1 CONCRETE (CAP)			CY	14.4



TOP OF CAP ELEVATIONS	
WORKING POINT	ELEVATION

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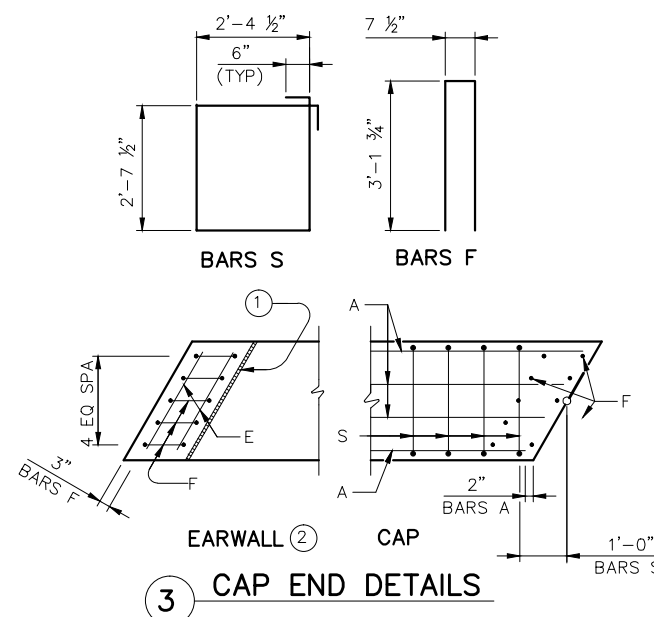
#### INTERIOR BENT NOTES

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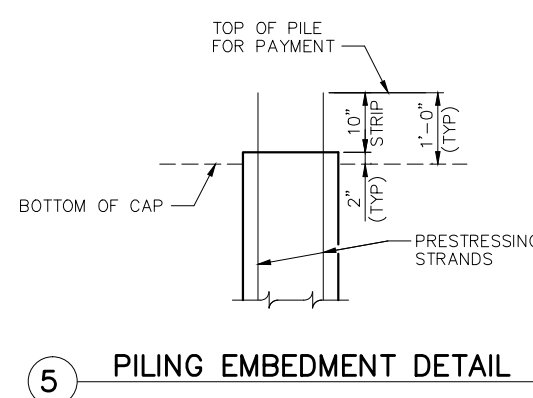
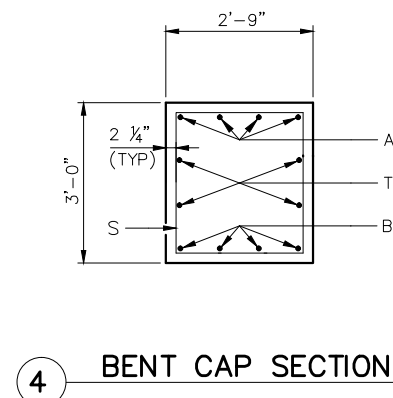
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- DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

#### NOTES TO ENGINEER

- EXPOSED PILE HEIGHT SHALL NOT EXCEED 16' FOR 16" PILING, AND 20' FOR 18" PILING.



#### ELEVATION



#### BENT CAP SECTION

#### PILING EMBEDMENT DETAIL

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT

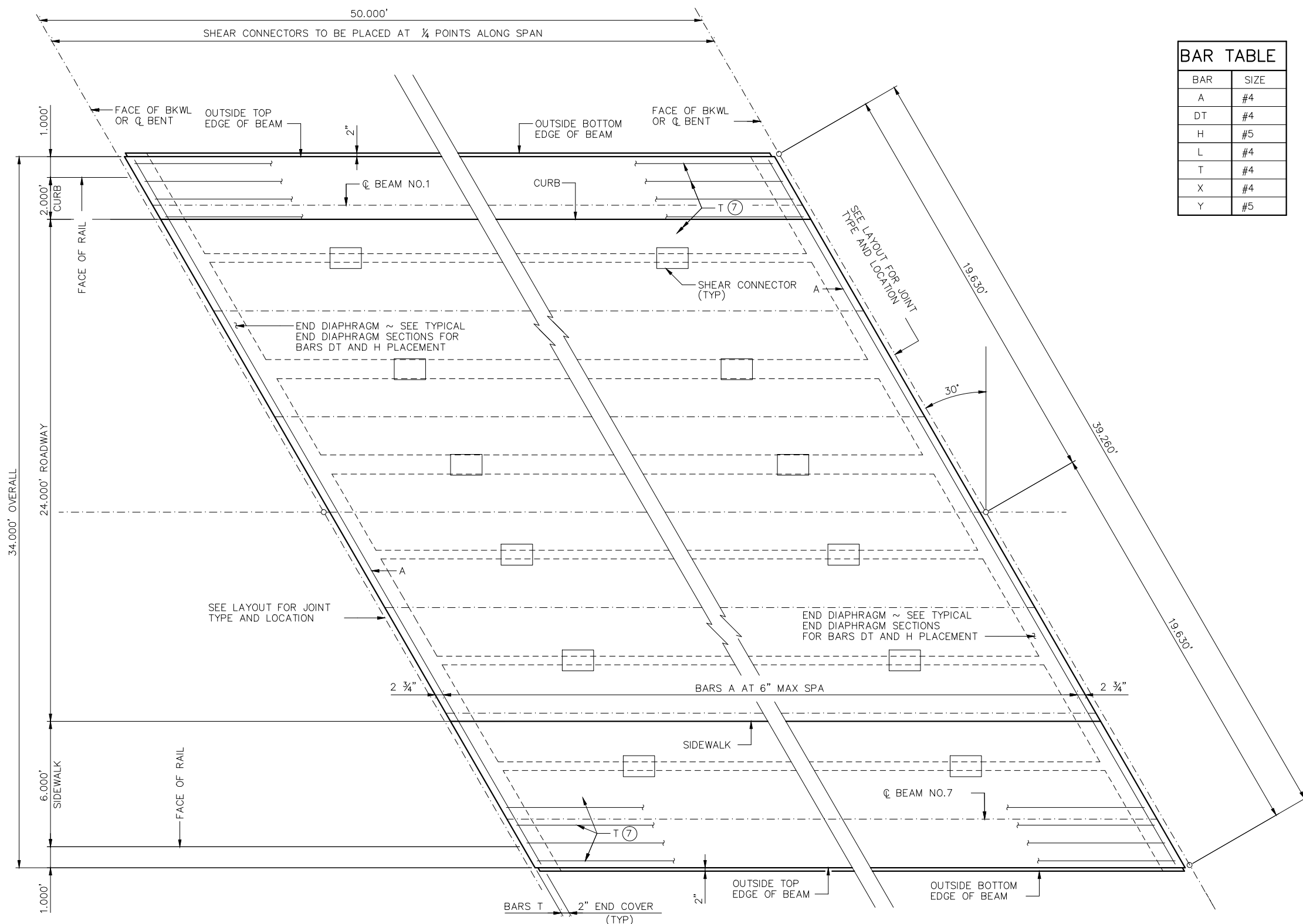


FIRM INFO

SEAL  
NOTE

PROJECT TITLE		
DRAWN BY:	SHEET DESCRIPTION	JOB NO:
CHK'D BY:	DESIGN GUIDELINES-BENT	FILE NAME:
SCALE:	BOX BEAMS-PILE	FILE NO:
DATE:	TWO-WAY ROAD, 30'SKEW	SHT NO:
		57

HL93 LOADING



BAR TABLE

BAR	SIZE
A	#4
DT	#4
H	#5
L	#4
T	#4
X	#4
Y	#5

- NOTES TO DESIGN ENGINEER:
- A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.
- IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC PROJECT REQUIREMENTS.
- B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS ACCORDINGLY.
- C. THE DESIGN ENGINEER SHALL CONSULT THE HARRIS COUNTY DESIGN MANUAL AND SPECIFICATIONS FOR INFORMATION PERTINENT TO THESE DESIGN GUIDELINE DRAWINGS.
- D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE BRIDGE PLANS.

SLAB NOTES

- DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
- ALL CONCRETE SHALL BE CLASS A1 4000 PSI @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4" UNLESS OTHERWISE NOTED.
- ALL REINFORCING STEEL SHALL BE ASTM A615 GRADE 60 STEEL.
- DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS. UNLESS OTHERWISE NOTED.
- THE QUANTITIES GIVEN FOR REINFORCING STEEL AND CONCRETE ARE PRESENTED FOR CONTRACTORS INFORMATION ONLY.
- BAR LAPS, WHERE REQUIRED, SHALL BE AS FOLLOWS:  
~ #4 = 1'-5"  
~ #5 = 1'-9"

PLAN

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

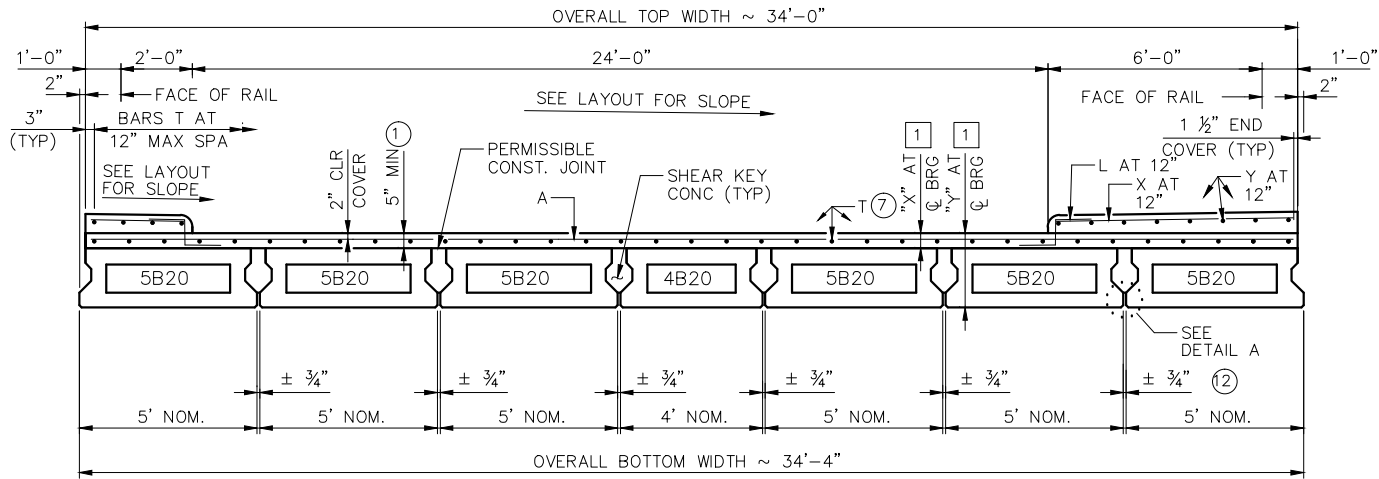
HARRIS COUNTY  
ENGINEERING DEPARTMENT



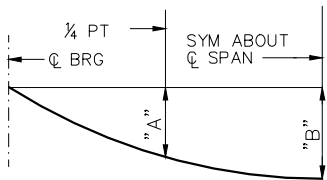
FIRM INFO

SEAL  
NOTE

PROJECT TITLE:		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:
CK'D BY:	DESIGN GUIDELINES	FILE NAME:
SCALE:	BOX BEAMS--SPAN DETAILS	FILE NO:
DATE:	HALF BOULEVARD, 30° SKEW	SHT NO:
	(1 OF 2)	58



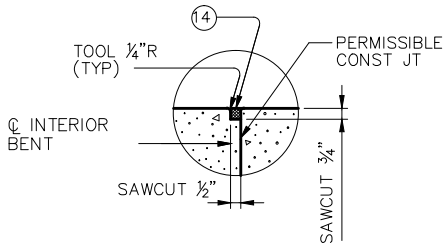
TYPICAL TRANSVERSE SECTION



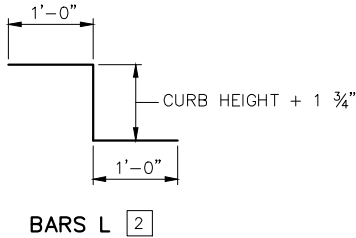
NOTE: DEFLECTIONS SHOWN ARE DUE TO SHEAR KEY AND CONCRETE SLAB ONLY, ( $E_c = 5 \times 10^3$  KSI). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DIMENSION MAY BE LESS. DEFLECTIONS MAY BE ADJUSTED BASED ON FIELD OBSERVATION.

DEAD LOAD DEFLECTION DIAGRAM

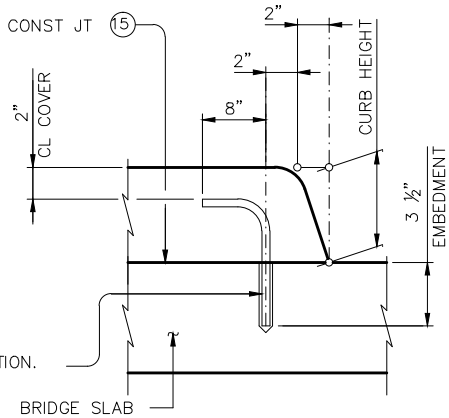
TABLE OF DEFLECTIONS AND SECTION DEPTHS							
SPAN LENGTH (FT)	BEAM NO.	POINT	DEAD LOAD DEFLECTIONS(FT)			SECTION DEPTHS	
			SHEAR KEY	SLAB	TOTAL	"X" AT C BRG 1	"Y" AT C BRG 1
50	ALL	"A" "B"				5 ¾"	2'-1 ¾"



SEALED JOINT DETAIL

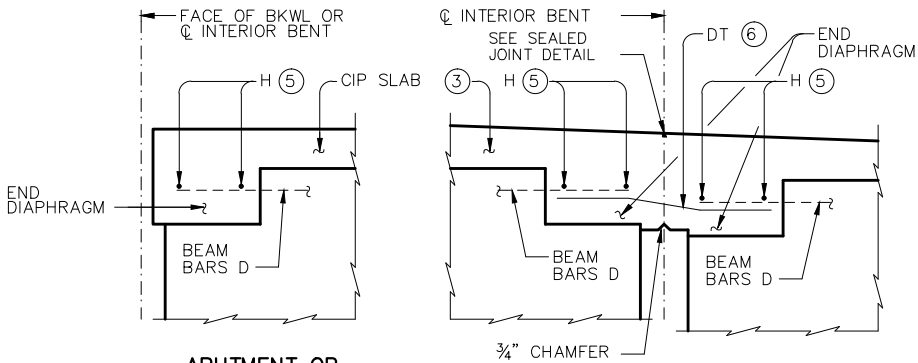


BARS L



OPTIONAL EPOXY ANCHORS

EMBED EA(#4) BAR INTO CONCRETE WITH A TYPE III (CLASS C) EPOXY MEETING THE REQUIREMENTS OF TXDOT DMS-6100, "EPOXIES AND ADHESIVES". FOLLOW MANUFACTURER'S DIRECTIONS FOR INSTALLING THE EPOXYED ANCHOR BARS.



TYPICAL END DIAPHRAGM SECTIONS

(ALONG CENTERLINE OF BOX BEAM)

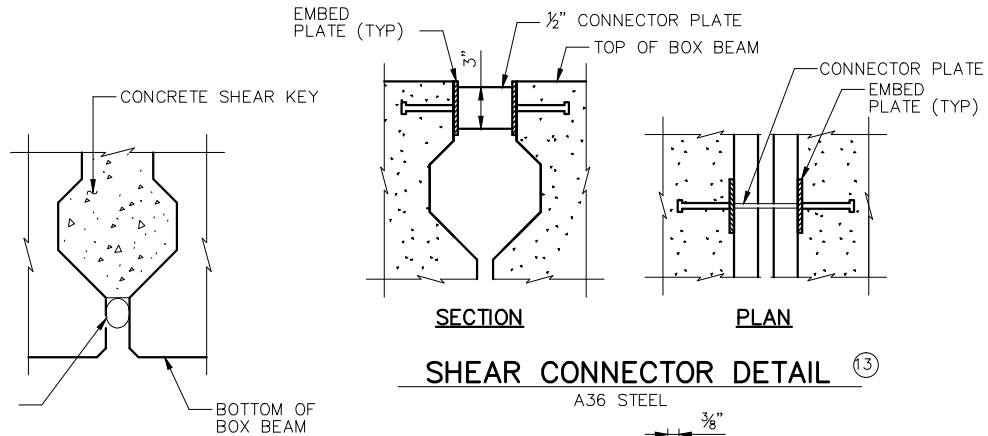
TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	CLASS "A1" CONCRETE (SHEAR KEY)	CLASS "A1" CONCRETE (SLAB)	CLASS "A1" CONCRETE (SDWK)	CLASS "A1" CONCRETE (CURB)	PRESTR CONCRETE BOX BEAMS (TY 4B20)	PRESTR CONCRETE BOX BEAMS (TY 5B20)	SLAB REINF STEEL	SIDEWALK REINF STEEL	CURB REINF STEEL	TOTAL REINF STEEL
FT	CY	CY	CY	CY	LF	LF	LB	LB	LB	LB
50	7.2	28.9	7.2	2.9	49.5	297.0	3,400	630	270	4,300

- SLAB THICKNESS AT MIDSPAN OF BEAMS MAY NOT EXCEED 7 INCHES.
- OTHER MATERIAL MAY BE USED TO FORM BOTTOM OF SHEAR KEYS IF APPROVED BY ENGINEER.
- SLAB REINFORCING OMITTED FOR CLARITY.
- SEE BRIDGE LAYOUT FOR JOINT TYPE.
- PROVIDE 1 1/2" END COVER TO BARS H. AFTER ALL BEAMS HAVE BEEN PLACED, WELD ONE BAR H TO TWO BARS D AT EACH END OF ALL BEAMS.
- LAP BARS DT 9" MIN. WITH EACH BEAM BAR D AT INTERIOR BENTS WITHOUT EXPANSION JOINTS. BARS DT SHOWN BENT FOR CLARITY ONLY.
- IF MULTI-SPAN UNITS (WITH SLAB CONTINUOUS OVER INTERIOR BENTS) ARE INDICATED ON THE BRIDGE LAYOUT, BARS T MUST BE CONTINUOUS THROUGH JOINT. SEE CONTINUOUS SLAB DETAIL.
- REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 2.0 LBS PER SQUARE FOOT OF SLAB.
- REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 1.8 LBS PER SQUARE FOOT OF SIDEWALK.
- REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 1.8 LBS PER SQUARE FOOT OF CURB.
- FABRICATOR SHALL ADJUST BEAM LENGTHS FOR BEAM SLOPES AS REQUIRED.
- GAP WIDTH IS BASED ON NOMINAL BEAM WIDTHS.
- CONNECTOR PLATES ARE INCIDENTAL TO PRESTRESSED BEAM ITEM.
- MATERIAL SHALL BE SELF LEVELING, COLD-APPLIED, RAPID CURE, LOW MODULUS SILICONE RUBBER SEALANT. IN ACCORDANCE WITH ITEM 427 AND SEALANT MANUFACTURER SPECIFICATIONS.
- PROVIDE BROOM FINISH TO TOP OF BRIDGE SLAB WHERE RAISED SIDEWALK OR CURB AREA IS DEFINED.

NOTES TO ENGINEER

- THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB, SHEAR KEY AND THE EFFECT OF VERTICAL CURVE.
- THE ENGINEER SHALL DETERMINE BRIDGE CURB HEIGHT.

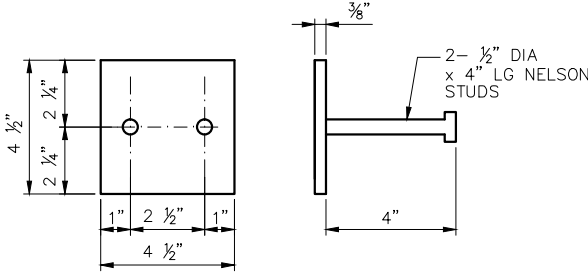


SECTION

PLAN

SHEAR CONNECTOR DETAIL

A36 STEEL



EMBED PLATE DETAIL

A36 STEEL

HL93 LOADING

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGURRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT

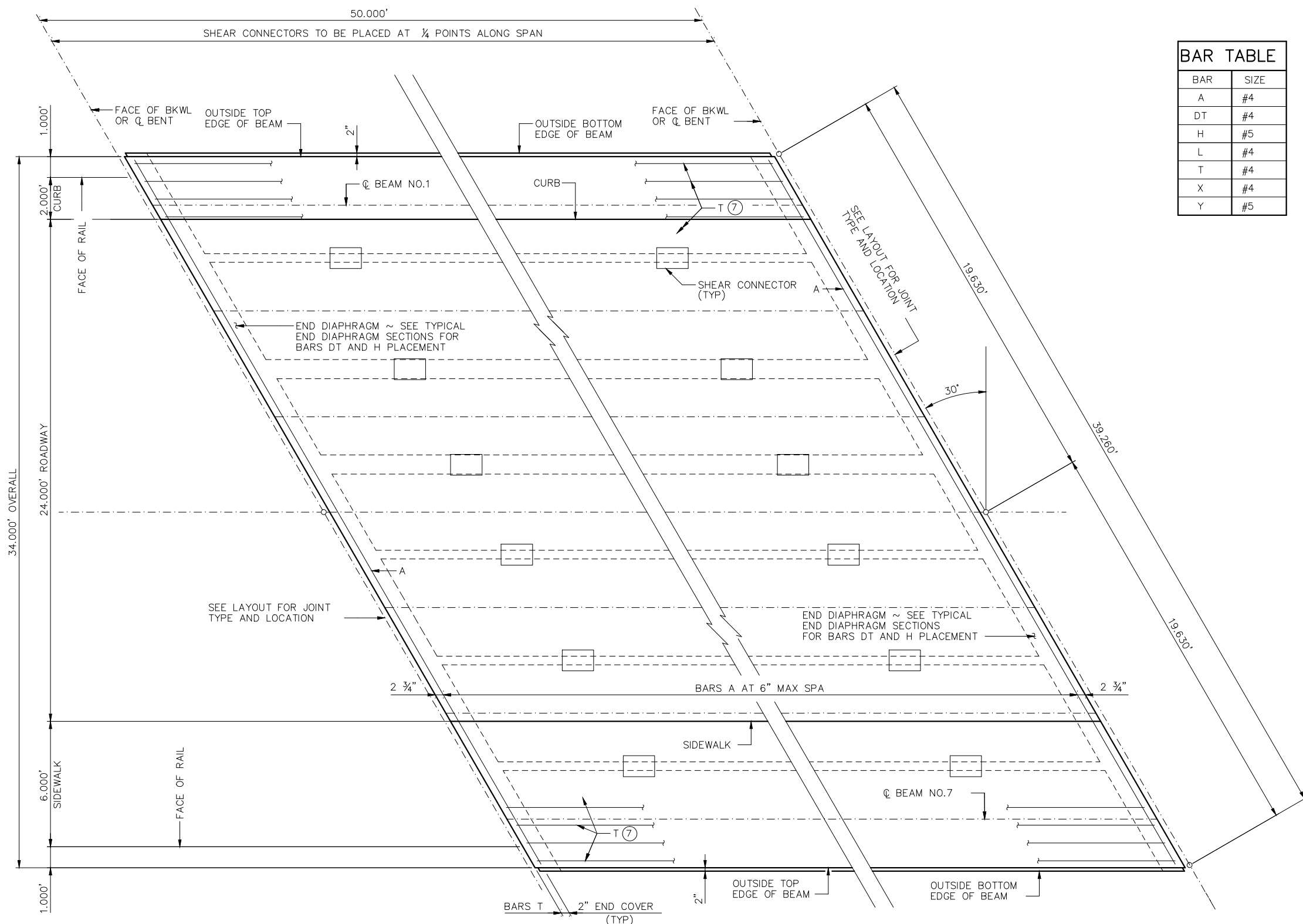


FIRM INFO

SEAL  
NOTE

PROJECT TITLE		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:
OK'D BY:	DESIGN GUIDELINES	FILE NAME:
SCALE:	BOX BEAMS-SPAN DETAILS	FILE NO:
DATE:	HALF BOULEVARD, 30' SKEW	SHT NO:
	(2 OF 2)	59





BAR TABLE

BAR	SIZE
A	#4
DT	#4
H	#5
L	#4
T	#4
X	#4
Y	#5

- NOTES TO DESIGN ENGINEER:
- A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.
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- B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS ACCORDINGLY.
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SLAB NOTES

- DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
- ALL CONCRETE SHALL BE CLASS A1 4000 PSI @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE. ALL EXPOSED CORNERS SHALL BE CHAMFERED  $\frac{3}{4}$ " UNLESS OTHERWISE NOTED.
- ALL REINFORCING STEEL SHALL BE ASTM A615 GRADE 60 STEEL.
- DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS. UNLESS OTHERWISE NOTED.
- THE QUANTITIES GIVEN FOR REINFORCING STEEL AND CONCRETE ARE PRESENTED FOR CONTRACTORS INFORMATION ONLY.
- BAR LAPS, WHERE REQUIRED, SHALL BE AS FOLLOWS:  
~ #4 = 1'-5"  
~ #5 = 1'-9"

PLAN

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

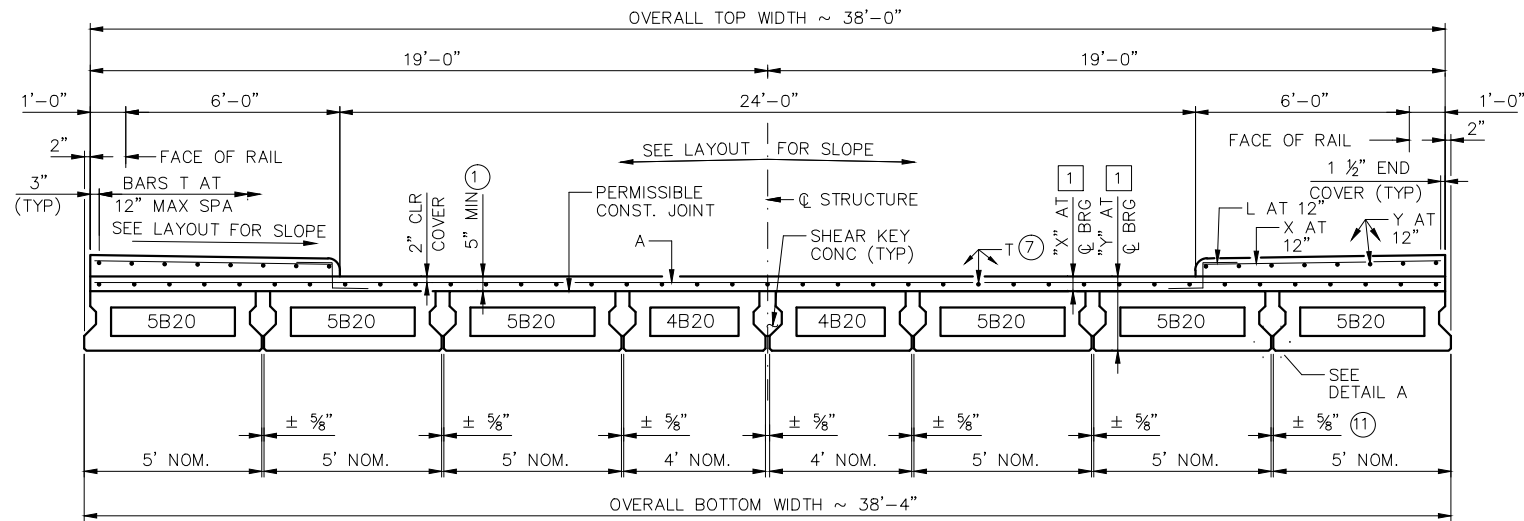
HARRIS COUNTY  
ENGINEERING DEPARTMENT



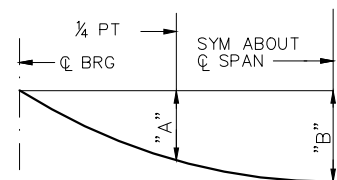
FIRM INFO

SEAL  
NOTE

PROJECT TITLE: HL93 LOADING		
DRAWN BY:	SHEET DESCRIPTION: DESIGN GUIDELINES	JOB NO:
CHK'D BY:	BOX BEAMS--SPAN DETAILS	FILE NAME:
SCALE:	HALF BOULEVARD, 30° SKEW	FILE NO:
DATE:	APPROVED BY:	SHT NO: 58
(1 OF 2)		



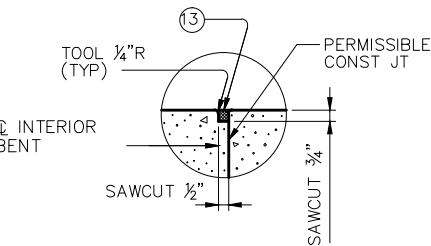
TYPICAL TRANSVERSE SECTION



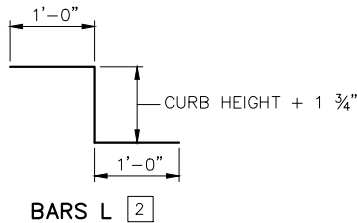
NOTE: DEFLECTIONS SHOWN ARE DUE TO SHEAR KEY AND CONCRETE SLAB ONLY, ( $E_c = 5 \times 10^4$  KSI). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DIMENSION MAY BE LESS. DEFLECTIONS MAY BE ADJUSTED BASED ON FIELD OBSERVATION.

DEAD LOAD DEFLECTION DIAGRAM

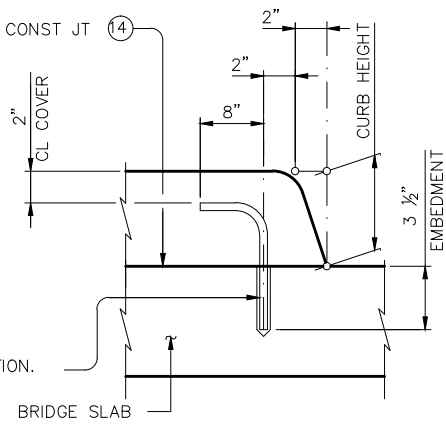
TABLE OF DEFLECTIONS AND SECTION DEPTHS							
SPAN LENGTH (FT)	BEAM NO.	POINT	DEAD LOAD DEFLECTIONS(FT)			SECTION DEPTHS	
			SHEAR KEY	SLAB	TOTAL	"X" AT Q BRG	"Y" AT Q BRG
50	ALL	"A" "B"				5 3/4"	2'-1 3/4"



SEALED JOINT DETAIL

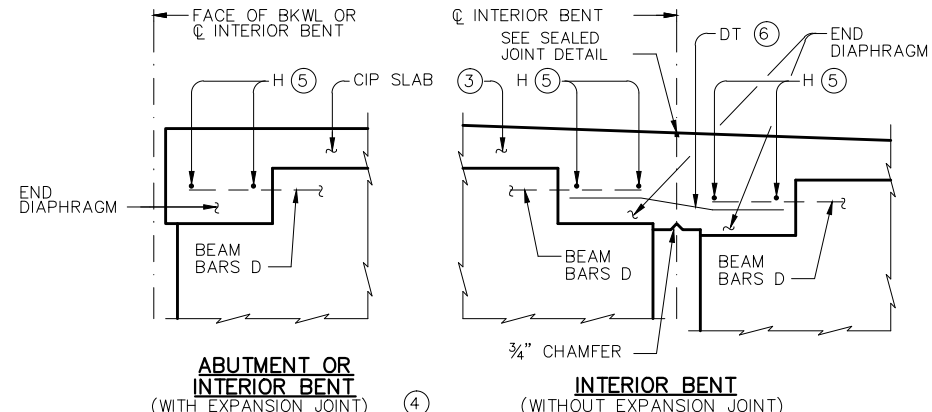


BARS L



OPTIONAL EPOXY ANCHORS

EMBED EA(#4) BAR INTO CONCRETE WITH A TYPE III (CLASS C) EPOXY MEETING THE REQUIREMENTS OF TXDOT DMS-6100, "EPOXIES AND ADHESIVES". FOLLOW MANUFACTURER'S DIRECTIONS FOR INSTALLING THE EPOXIED ANCHOR BARS.



TYPICAL END DIAPHRAGM SECTIONS (ALONG CENTERLINE OF BOX BEAM)

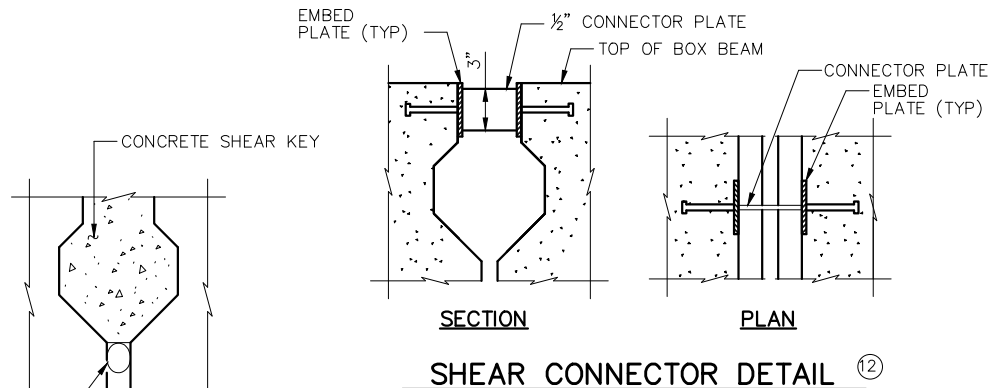
TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	CLASS "A1" CONCRETE (SHEAR KEY)	CLASS "A1" CONCRETE (SLAB)	CLASS "A1" CONCRETE (SDWK)	PRESTR CONCRETE BOX BEAMS (TY 4B20)	PRESTR CONCRETE BOX BEAMS (TY 5B20)	SLAB REINF STEEL	SIDEWALK REINF STEEL	TOTAL REINF STEEL
FT	CY	CY	CY	LF	LF	LB	LB	LB
50	8.5	32.3	15.7	99.0	297.0	3,800	1,260	5,060

- SLAB THICKNESS AT MIDSPAN OF BEAMS MAY NOT EXCEED 7 INCHES.
- OTHER MATERIAL MAY BE USED TO FORM BOTTOM OF SHEAR KEYS IF APPROVED BY ENGINEER.
- SLAB REINFORCING OMITTED FOR CLARITY.
- SEE BRIDGE LAYOUT FOR JOINT TYPE.
- PROVIDE 1 1/2" END COVER TO BARS H. AFTER ALL BEAMS HAVE BEEN PLACED, WELD ONE BAR H TO TWO BARS D AT EACH END OF ALL BEAMS.
- LAP BARS DT 9" MIN WITH EACH BEAM BAR D AT INTERIOR BENTS WITHOUT EXPANSION JOINTS. BARS DT SHOWN BENT FOR CLARITY ONLY.
- IF MULTI-SPAN UNITS (WITH SLAB CONTINUOUS OVER INTERIOR BENTS) ARE INDICATED ON THE BRIDGE LAYOUT, BARS T MUST BE CONTINUOUS THROUGH JOINT. SEE CONTINUOUS SLAB DETAIL.
- REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 2.0 LBS PER SQUARE FOOT OF SLAB.
- REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 1.8 LBS PER SQUARE FOOT OF SIDEWALK.
- FABRICATOR SHALL ADJUST BEAM LENGTHS FOR BEAM SLOPES AS REQUIRED.
- GAP WIDTH IS BASED ON NOMINAL BEAM WIDTHS.
- CONNECTOR PLATES ARE INCIDENTAL TO PRESTRESSED BEAM ITEM.
- MATERIAL SHALL BE SELF LEVELING, COLD-APPLIED, RAPID CURE, LOW MODULUS SILICONE RUBBER SEALANT. IN ACCORDANCE WITH ITEM 427 AND SEALANT MANUFACTURER SPECIFICATIONS.
- PROVIDE BROOM FINISH TO TOP OF BRIDGE SLAB WHERE RAISED SIDEWALK AREA IS DEFINED.

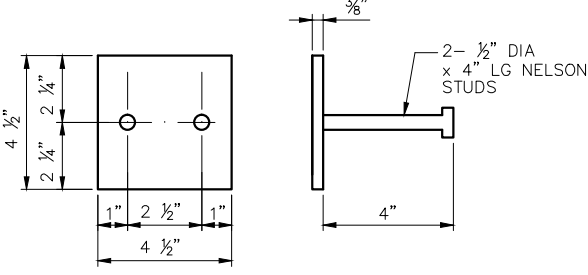
NOTES TO ENGINEER

- THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB, SHEAR KEY AND THE EFFECT OF VERTICAL CURVE.
- THE ENGINEER SHALL DETERMINE BRIDGE CURB HEIGHT.



SHEAR CONNECTOR DETAIL

DETAIL "A"



EMBED PLATE DETAIL

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGURRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT



FIRM INFO

SEAL  
NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:	
CHK'D BY:	DESIGN GUIDELINES	FILE NAME:	
SCALE:	BOX BEAMS-SPAN DETAILS	FILE NO:	
DATE:	TWO-WAY ROAD, 30° SKEW	SHT NO:	
	(2 OF 2)	61	

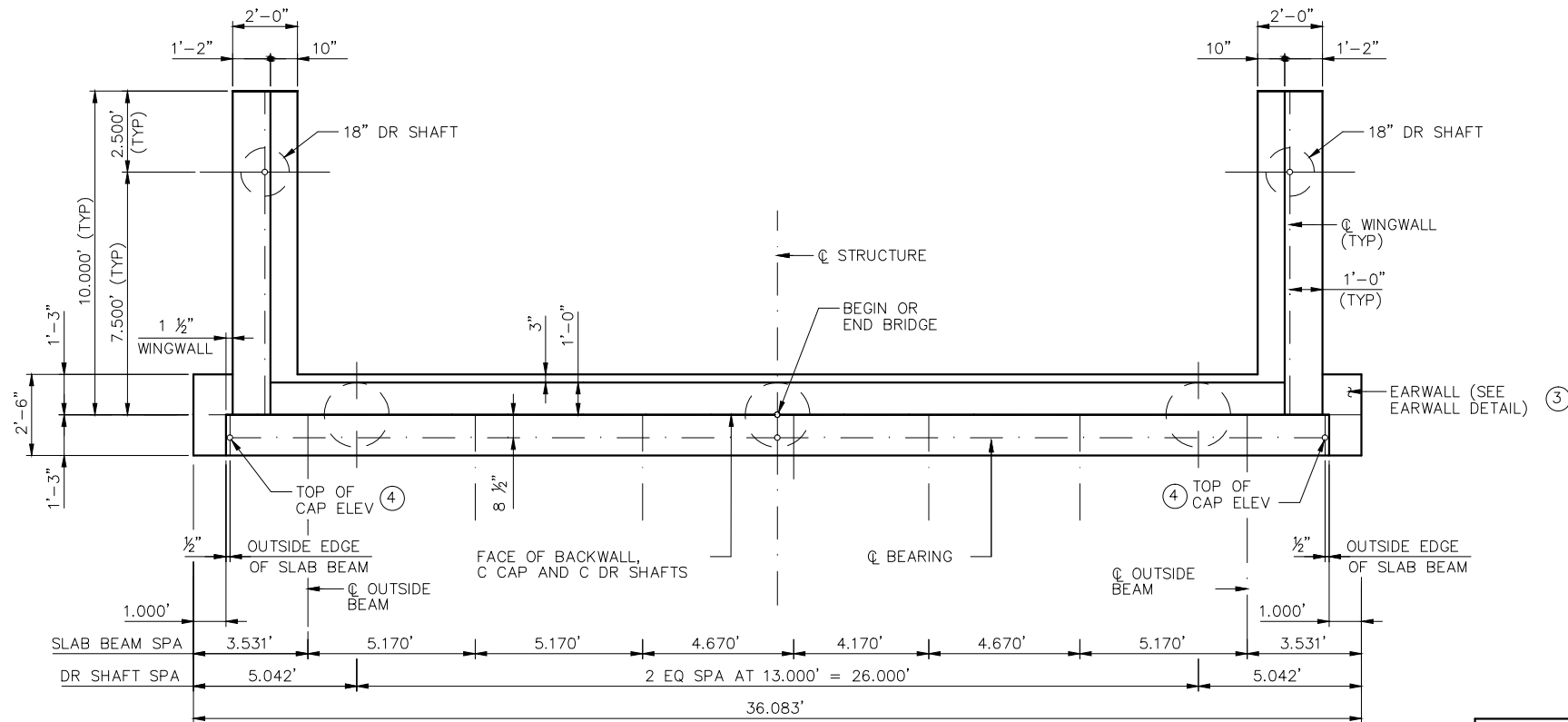
A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.

IT IS THE RESPONSIBILITY OF THE  
DESIGN ENGINEER TO VERIFY THE COMPLETENESS  
AND ACCURACY OF THE INFORMATION HEREIN  
CONTAINED AND TO ADJUST ACCORDING TO  
SPECIFIC PROJECT REQUIREMENTS.

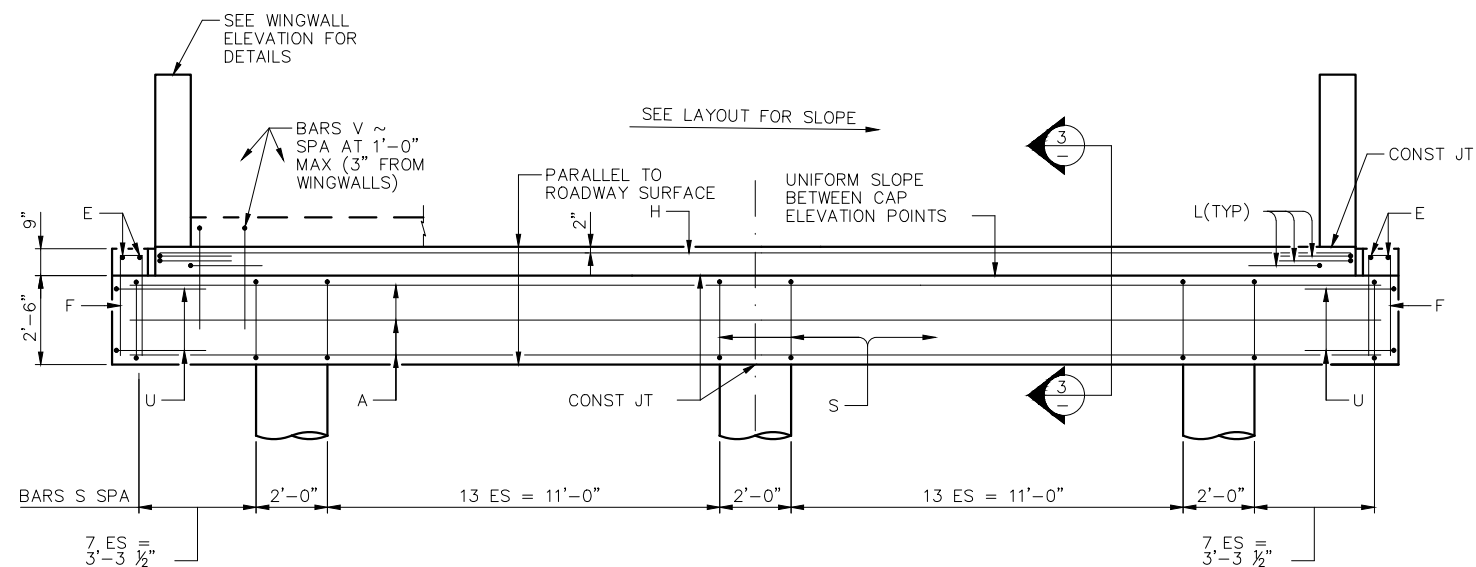
B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT PLANS, AND SHALL ADJUST PAGE NUMBERS ACCORDINGLY.

C. THE DESIGN ENGINEER SHALL CONSULT THE HARRIS COUNTY DESIGN MANUAL AND SPECIFICATIONS FOR INFORMATION PERTINENT TO THESE DESIGN GUIDELINE DRAWINGS.

*D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE BRIDGE PLANS.*



### 1 PLAN



2 ELEVATION

[illegible]

## NOTES TO ENGINEER

- 1 GUIDELINE DRAWINGS ARE FOR B12 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.

### ABUTMENT NOTES

1. DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
2. ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I. @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
3. ALL EXPOSED CORNERS SHALL BE CHAMFERED  $\frac{3}{4}$ ", UNLESS OTHERWISE NOTED.
4. ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
7. MAXIMUM CALCULATED FOUNDATION LOADS:  
X TONS PER SHAFT.

[illegible]

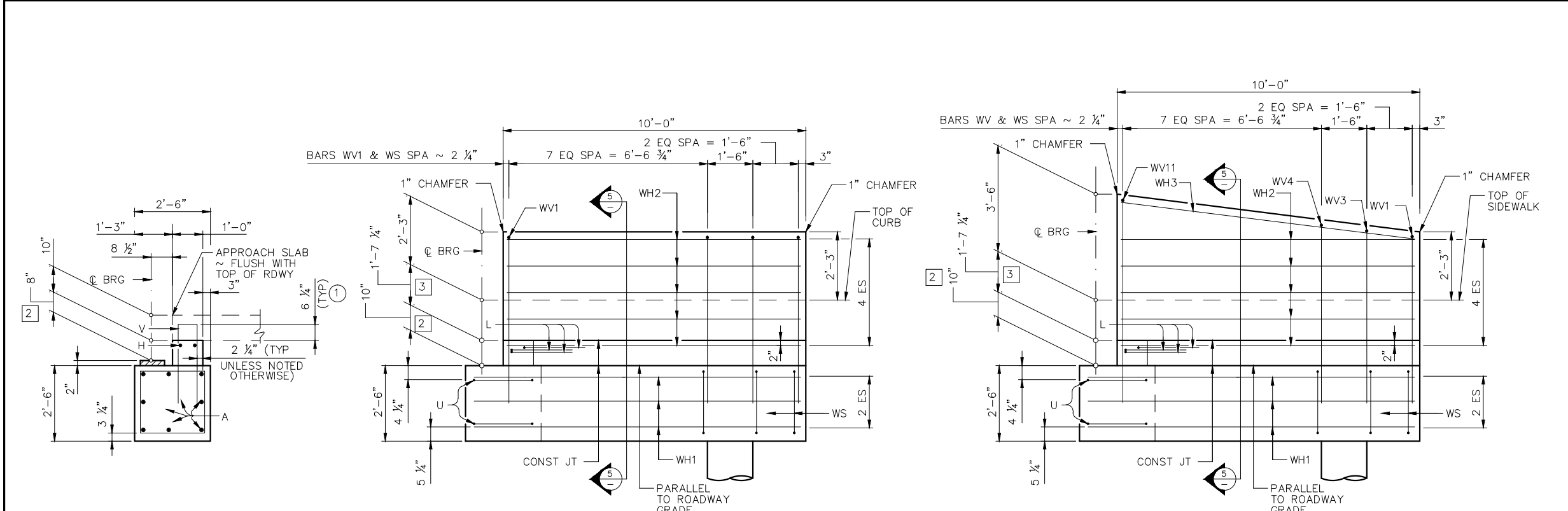
HARRIS COUNTY  
ENGINEERING DEPARTMENT



## FIRM INFO

SEAL  
NOTE

PROJECT TITLE:		PRESS LOADING	
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:	
	DESIGN GUIDELINES-ABUTMENT		
CVD BY:	SLAB BEAM-DR SHAFT	FILE NAME:	
SCALE:	HALF BOULEVARD, 0° SKEW	FILE NO:	
DATE:	APPROVED BY:	SHT NO: 62	
	(1 OF 2)		

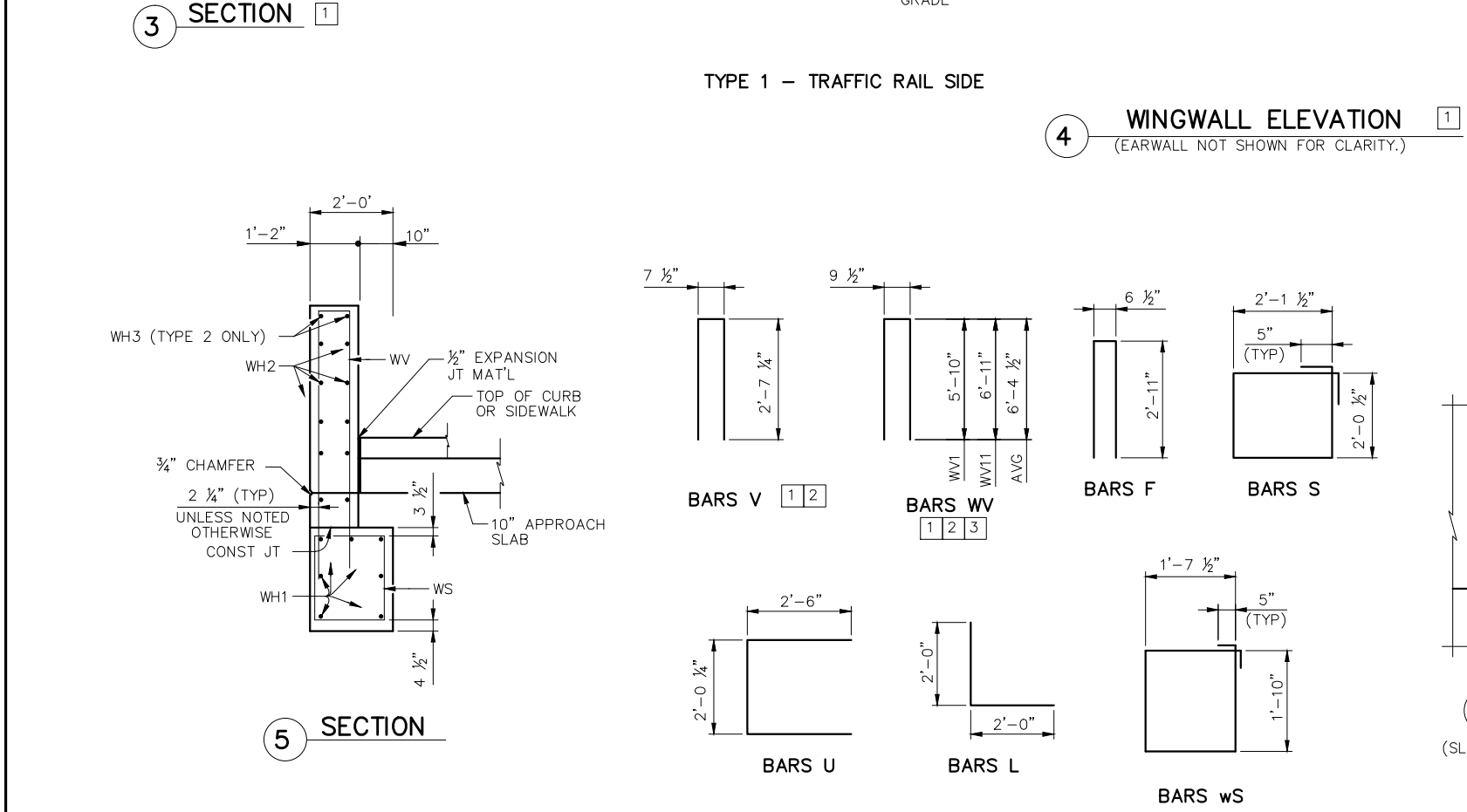


BILL OF REINFORCING STEEL <sup>1</sup>				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	8	#11	35'-1"	1,491
E	4	# 4	2'-2"	6
F	10	# 4	6'-5"	43
H	2	# 6	33'-8"	101
L	6	# 6	4'-0"	36
S	44	# 4	9'-2"	269
U	4	# 6	7'-0"	42
V	33	# 5	5'-10"	201
WH1	14	# 6	11'-0"	231
WH2	20	# 6	9'-8"	290
WH3	2	# 6	9'-9"	29
WS	22	# 4	7'-9"	114
WV1	11	# 5	12'-6"	143
WV (AVG)	11	# 5	13'-7"	156
REINFORCING STEEL			LB	3,152
ESTIMATED QUANTITIES <sup>1</sup>				
REINFORCING STEEL			LB	3,152
CLASS B1 CONCRETE			CY	17.5

- ① INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE.
- ② 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EAWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EAWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ③ DO NOT CAST EAWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.

NOTES TO ENGINEER

- ① GUIDELINE DRAWINGS ARE FOR B12 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
- ② THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB AND THE EFFECT OF VERTICAL CURVE.
- ③ THE ENGINEER SHALL DETERMINE WINGWALL HEIGHT BASED ON ROADWAY AND SIDEWALK CROSS SLOPES.



NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGURRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

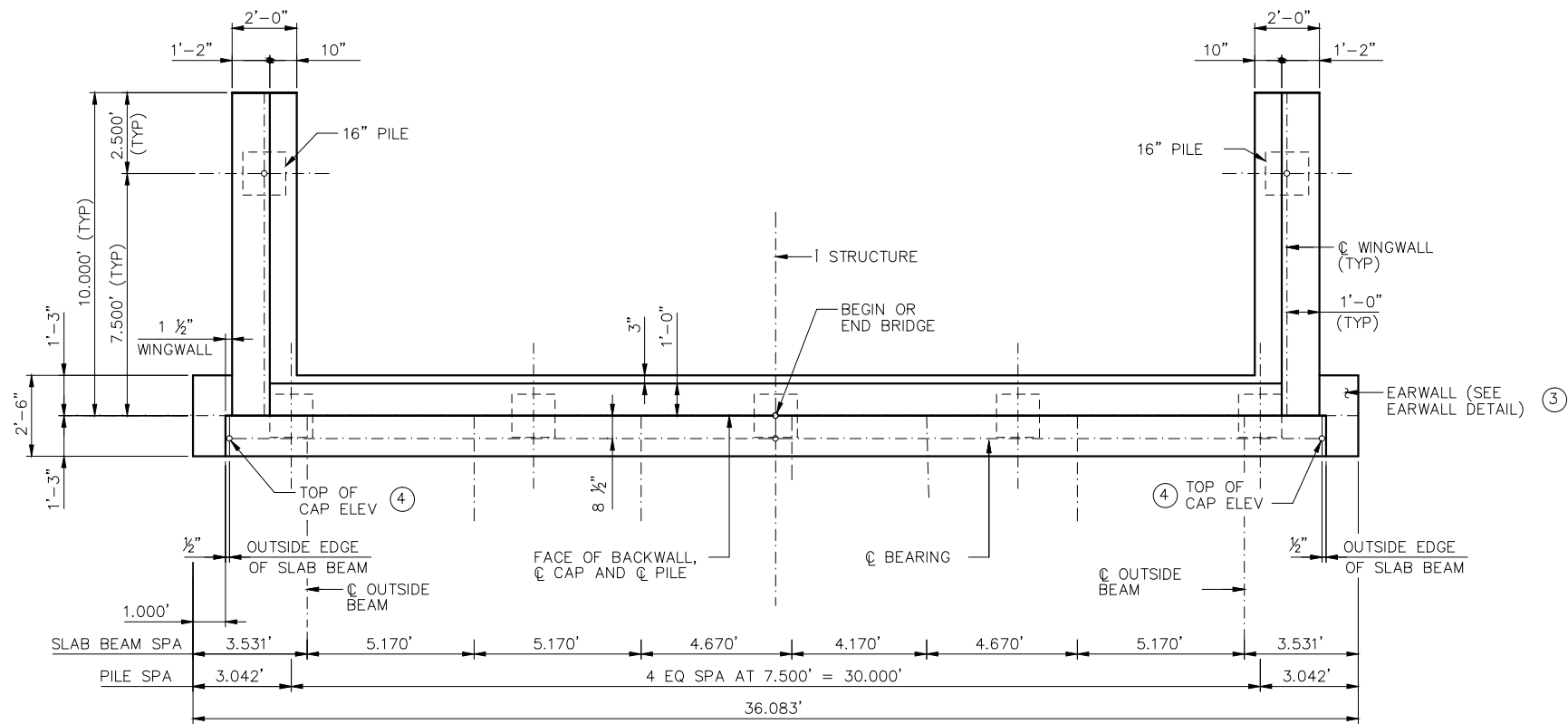
HARRIS COUNTY  
ENGINEERING DEPARTMENT



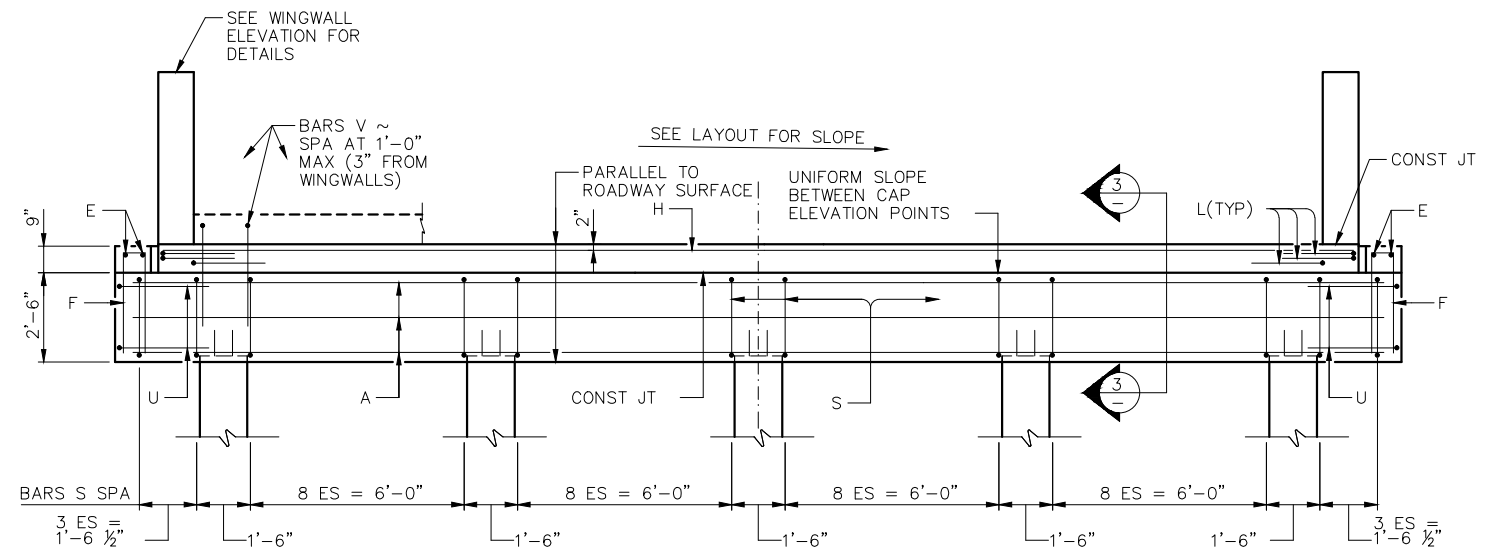
FIRM INFO

SEAL  
NOTE

PROJECT TITLE			HL93 LOADING
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:	
CK'D BY:	DESIGN GUIDELINES-ABUTMENT	FILE NAME:	
SCALE:	SLAB BEAM-DR SHAFT	FILE NO:	
DATE:	HALF BOULEVARD, 0° SKEW	SHT NO:	
	(2 OF 2)	63	



1 PLAN



2 ELEVATION

NOTES TO DESIGN ENGINEER:

- A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.
- IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC PROJECT REQUIREMENTS.
- B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT PLANS, AND SHALL ADJUST PAGE NUMBERS ACCORDINGLY.
- C. THE DESIGN ENGINEER SHALL CONSULT THE HARRIS COUNTY DESIGN MANUAL AND SPECIFICATIONS FOR INFORMATION PERTINENT TO THESE DESIGN GUIDELINE DRAWINGS.
- D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE BRIDGE PLANS.

- ① INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE.
- ② 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ③ DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- ④ TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- ⑤ WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

NOTES TO ENGINEER

- 1 GUIDELINE DRAWINGS ARE FOR B12 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.

ABUTMENT NOTES

1. DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
2. ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
3. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
4. ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
7. MAXIMUM CALCULATED FOUNDATION LOADS:  
X TONS PER PILE.

TOP OF CAP ELEVATIONS ⑤	
WORKING POINT	ELEVATION

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

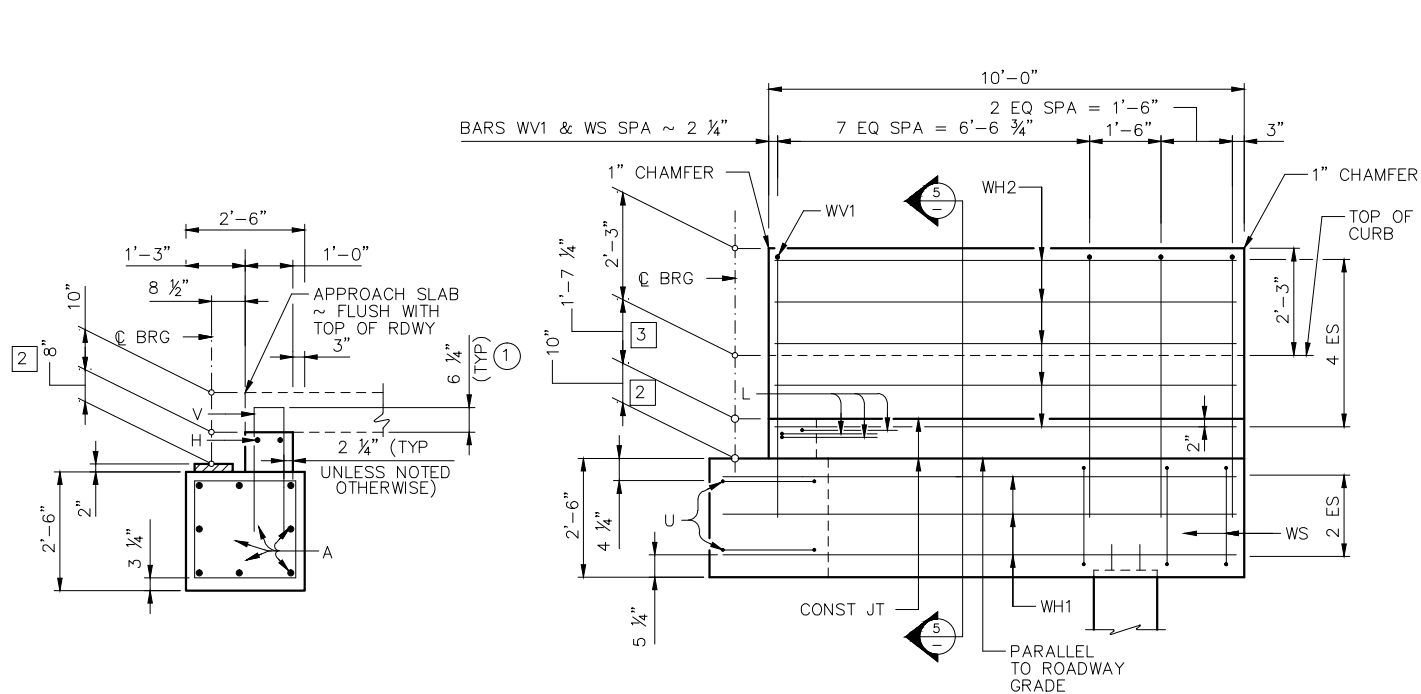
HARRIS COUNTY  
ENGINEERING DEPARTMENT



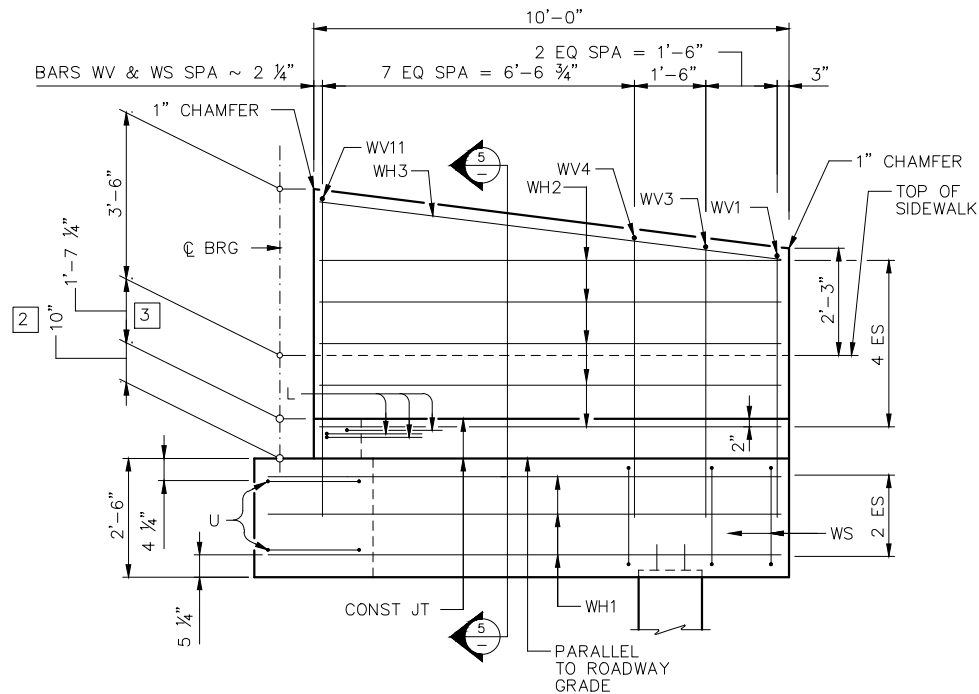
FIRM INFO

SEAL  
NOTE

PROJECT TITLE:			
DRAWN BY:	SHEET DESCRIPTION: DESIGN GUIDELINES-ABUTMENT		JOB NO.:
CKD BY:	SLAB BEAM-PILE		FILE NAME:
SCALE:	HALF BOULEVARD, 0° SKEW		FILE NO.:
DATE:	APPROVED BY:	(1 OF 2)	SHT NO. 64



3 SECTION 1



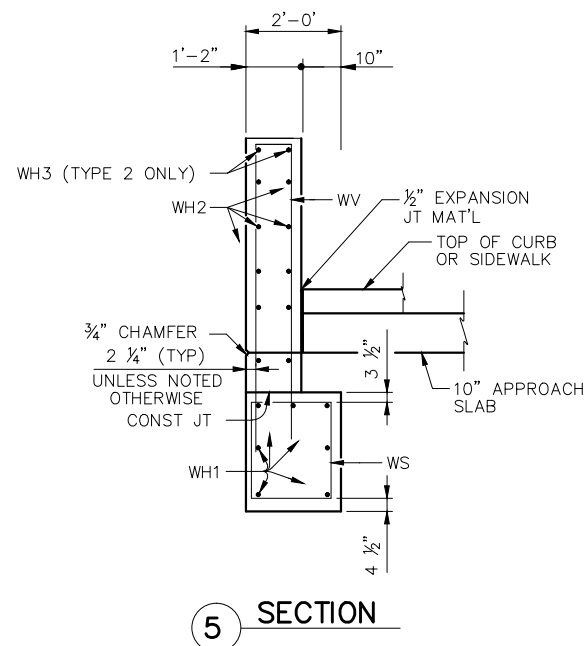
TYPE 2 - COMBINATION RAIL SIDE

4 WINGWALL ELEVATION 1  
(EARWALL NOT SHOWN FOR CLARITY.)

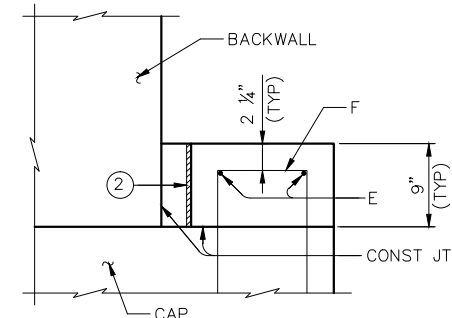
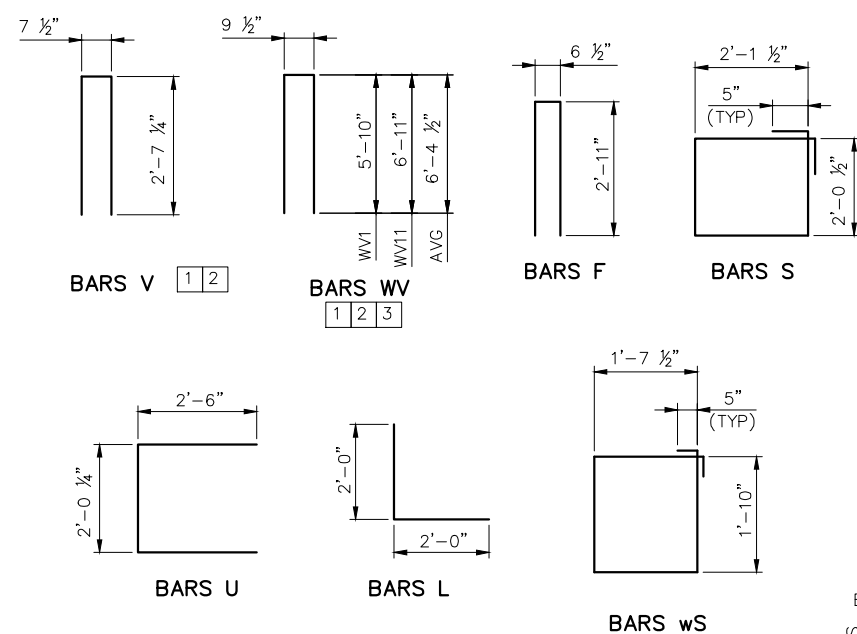
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- 3 DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.

### NOTES TO ENGINEER

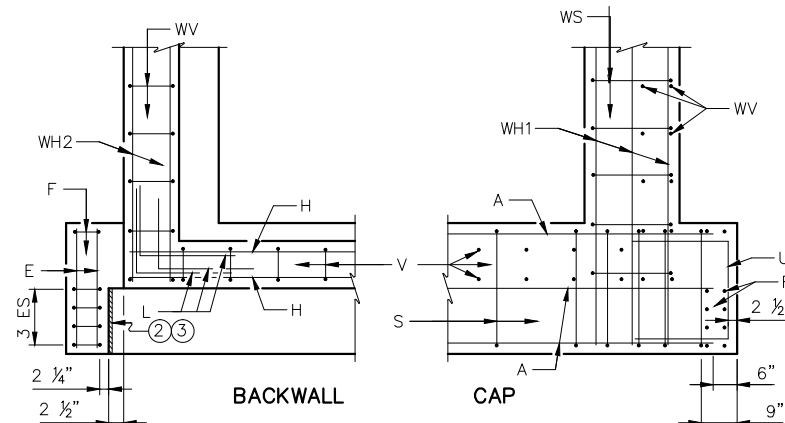
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- 3 THE ENGINEER SHALL DETERMINE WINGWALL HEIGHT BASED ON ROADWAY AND SIDEWALK CROSS SLOPES.



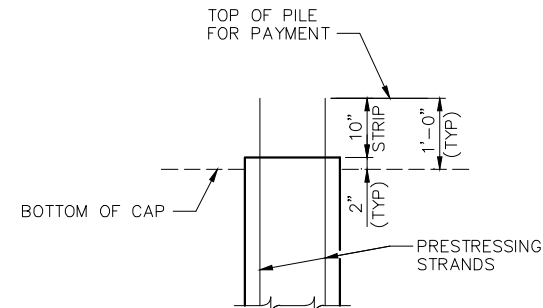
5 SECTION



6 EARWALL DETAIL 3  
(SLOPE TOP OF EARWALL AWAY FROM BEAMS)



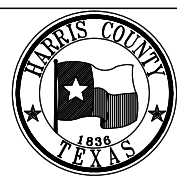
7 CORNER DETAILS



8 PILING EMBEDMENT DETAIL

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O. AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT



FIRM INFO

SEAL  
NOTE

PROJECT TITLE:	HL93 LOADING
DRAWN BY:	DESIGN GUIDELINES-ABUTMENT
CHECKED BY:	SLAB BEAM-PILE
SCALE:	HALF BOULEVARD, 0° SKEW
DATE:	(2 OF 2)
APPROVED BY:	65

NOTES TO DESIGN ENGINEER:

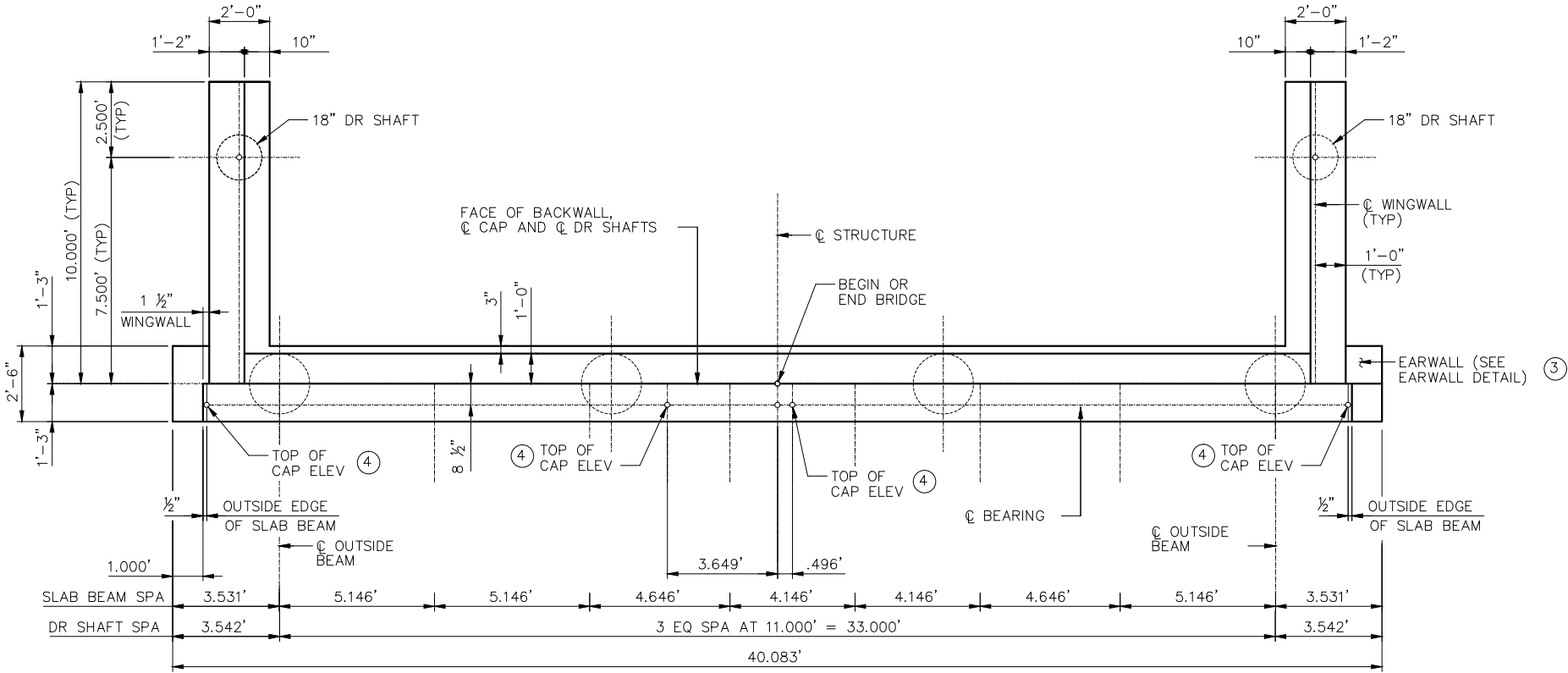
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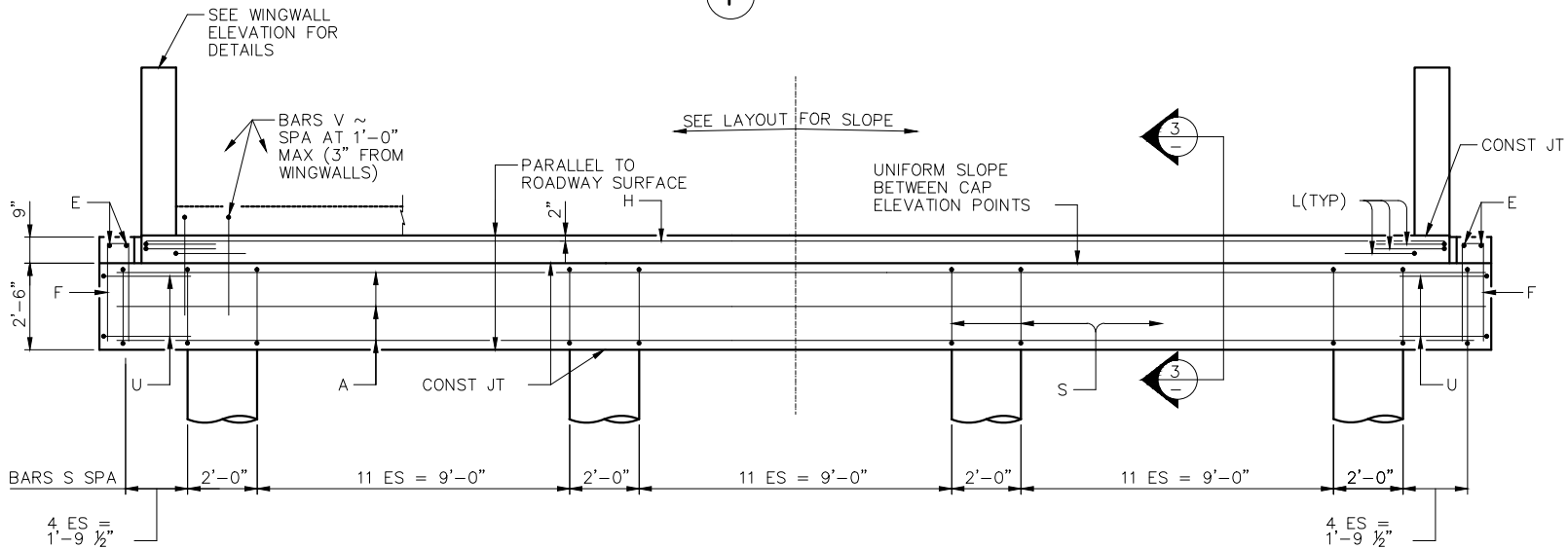


1 PLAN

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2 ELEVATION

TOP OF CAP ELEVATIONS 5	
WORKING POINT	ELEVATION

ABUTMENT NOTES

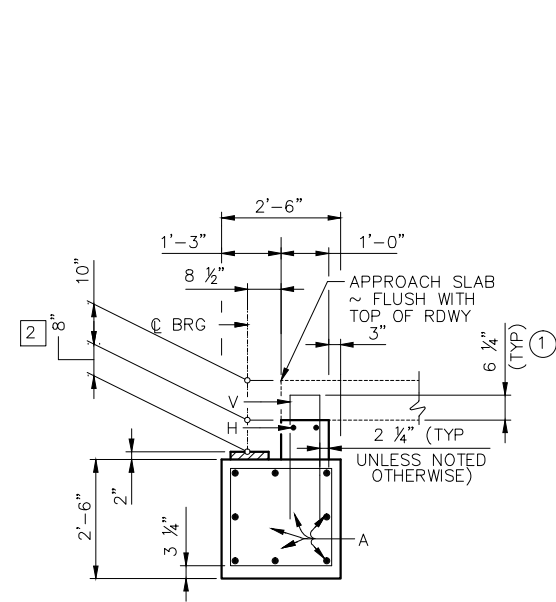
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- 5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
- 6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
- 7. MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER SHAFT.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

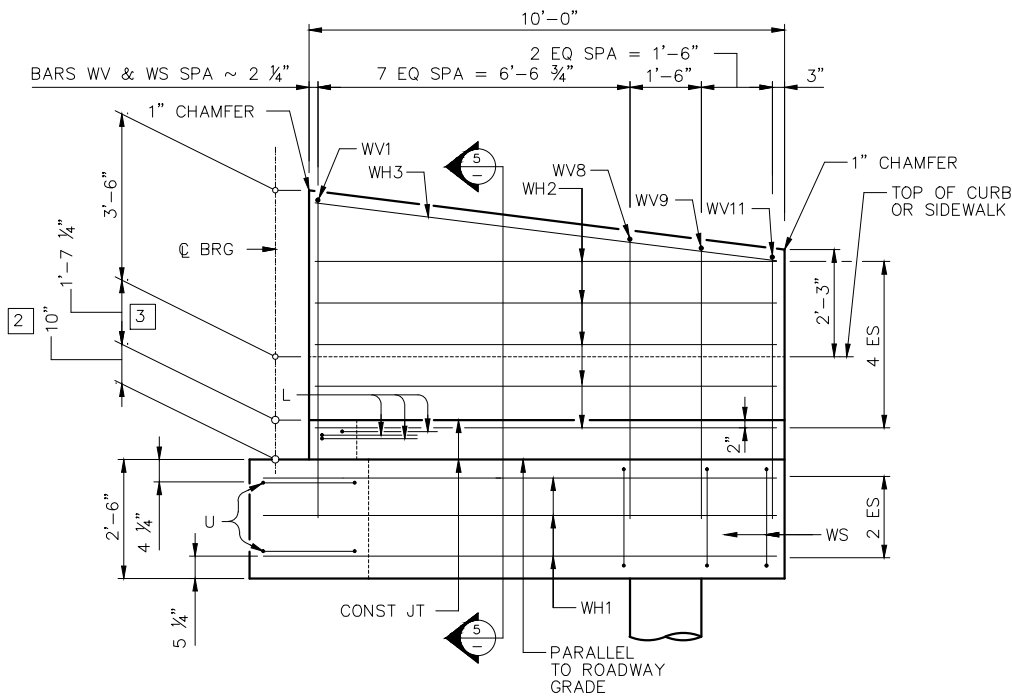
HARRIS COUNTY  
ENGINEERING DEPARTMENT



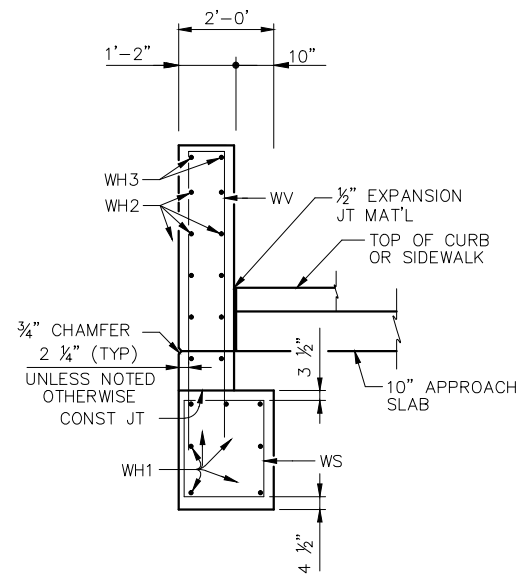
PROJECT TITLE		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:
CK'D BY:	DESIGN GUIDELINES-ABUTMENT	FILE NAME:
SCALE:	SLAB BEAM-DR SHAFTS	FILE NO:
DATE:	TWO-WAY ROAD, 0° SKEW	SHR NO:
	(1 OF 2)	66



3 SECTION 1



4 WINGWALL ELEVATION 1  
(EAWALL NOT SHOWN FOR CLARITY.)



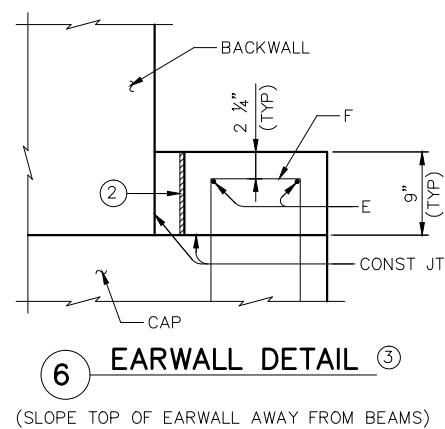
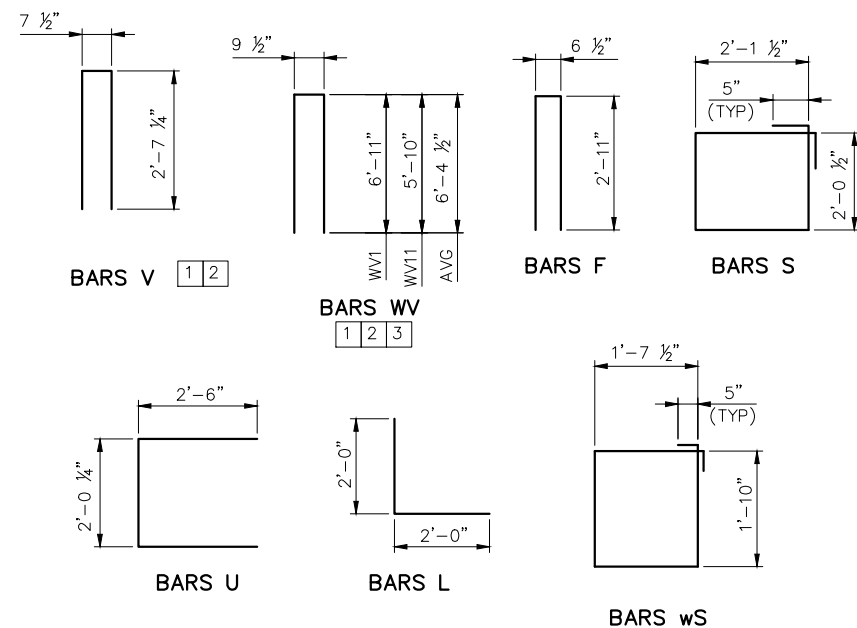
5 SECTION

BILL OF REINFORCING STEEL 1				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	8	# 11	39'-1"	1,661
E	4	# 4	2'-2"	6
F	10	# 4	6'-5"	43
H	2	# 6	37'-8"	113
L	6	# 6	4'-0"	36
S	46	# 4	9'-2"	282
U	4	# 6	7'-0"	42
V	37	# 5	5'-10"	225
WH1	14	# 6	11'-0"	231
WH2	20	# 6	9'-8"	290
WH3	4	# 6	9'-9"	59
WS	22	# 4	7'-9"	114
WV (AVG)	22	# 5	13'-7"	312
REINFORCING STEEL			LB	3,414
ESTIMATED QUANTITIES 1				
REINFORCING STEEL			LB	3,414
CLASS B1 CONCRETE			CY	18.8

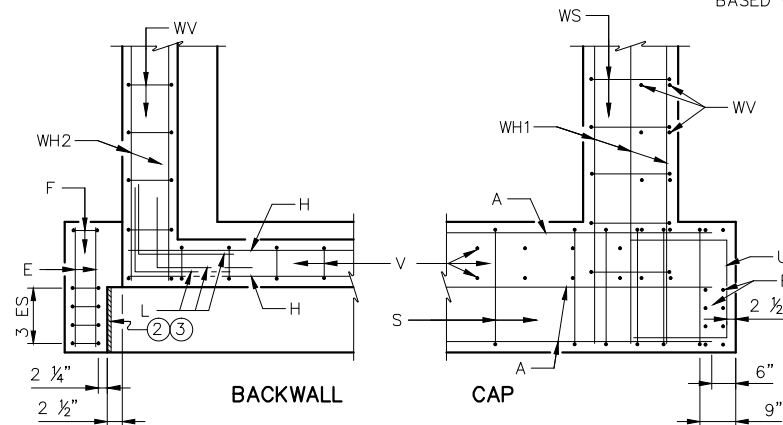
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6 EAWALL DETAIL 3



7 CORNER DETAILS

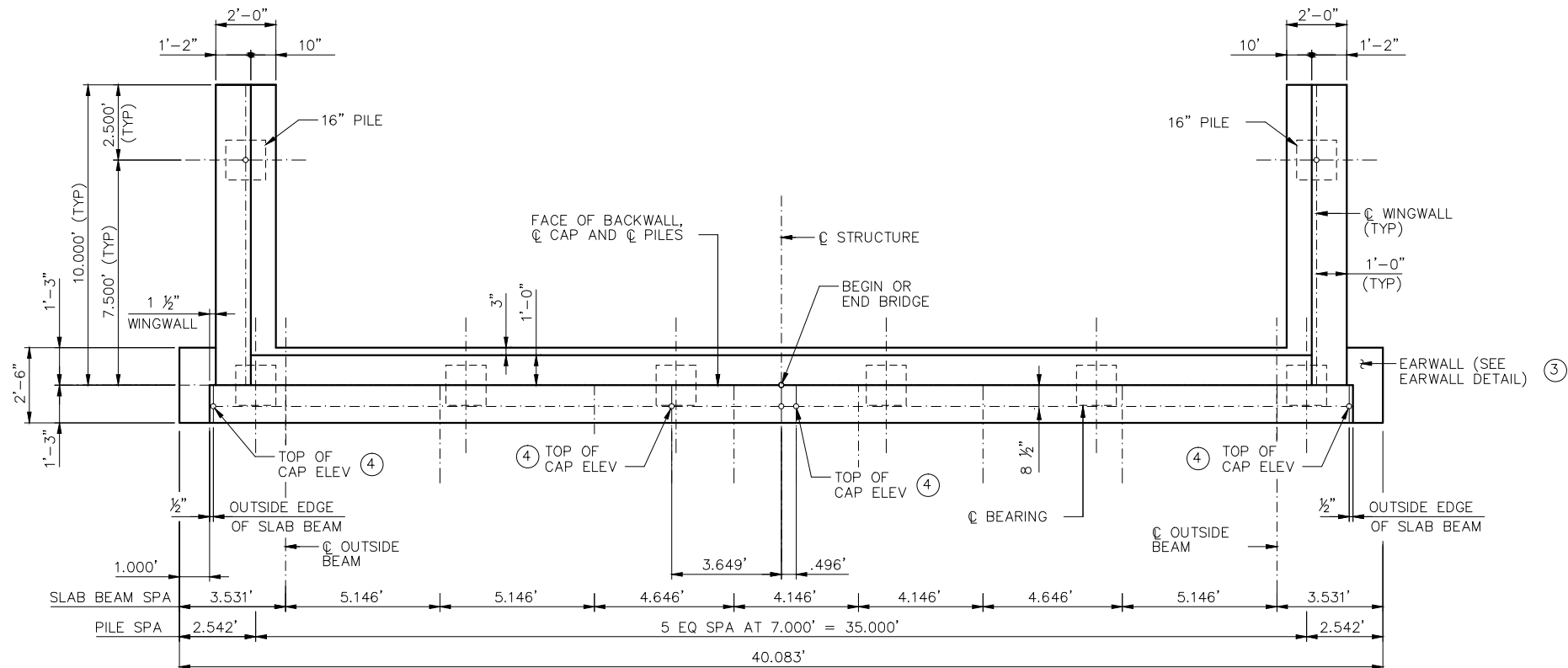
NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT

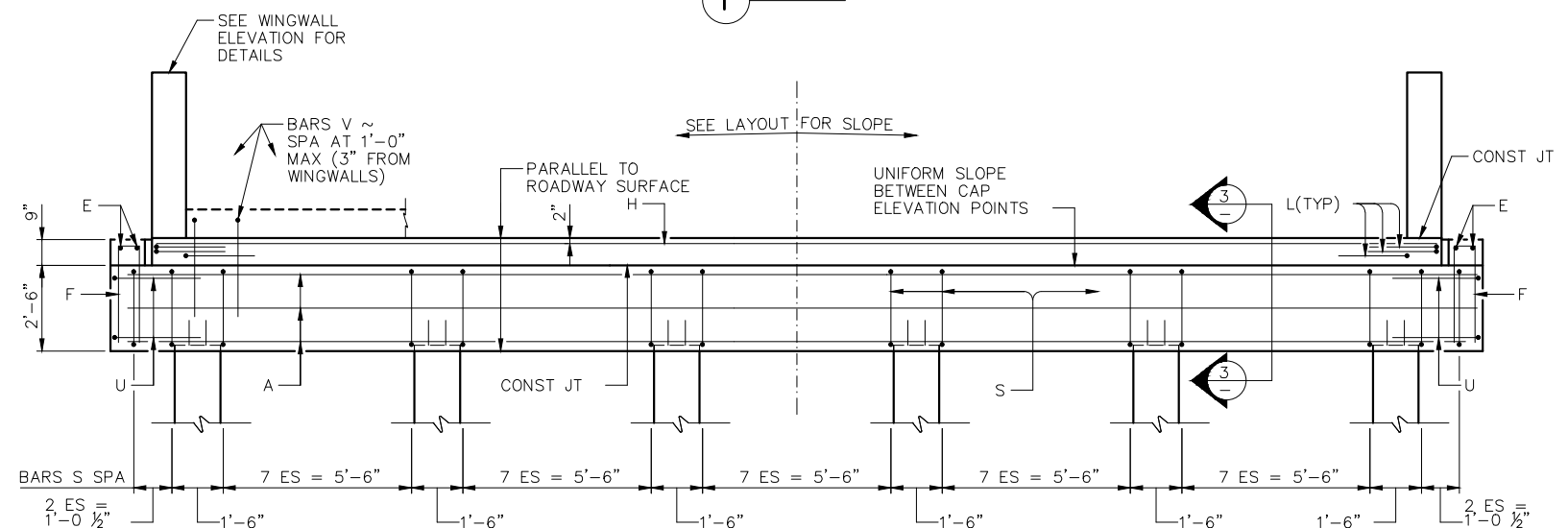


PROJECT TITLE: HL93 LOADING		
DRAWN BY:	SHEET DESCRIPTION: DESIGN GUIDELINES-ABUTMENT SLAB BEAM-DR SHAFTS TWO-WAY ROAD, O'SKEW (2 OF 2)	JOB NO.:
CHK'D BY:	FILE NAME:	
SCALE:	FILE NO.:	
DATE:	APPROVED BY:	SHT NO. 67





1 PLAN



2 ELEVATION

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NOTES TO ENGINEER

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TOP OF CAP ELEVATIONS 5	
WORKING POINT	ELEVATION

ABUTMENT NOTES

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X TONS PER PILE.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O. AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT

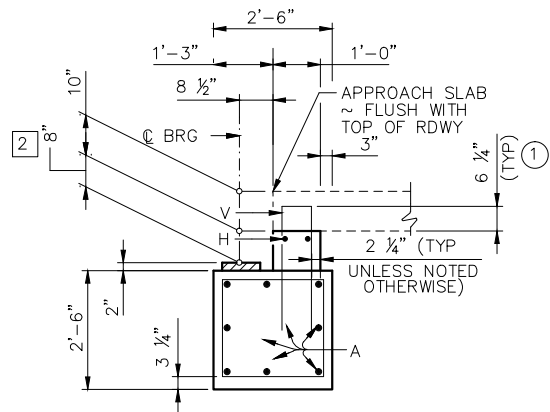


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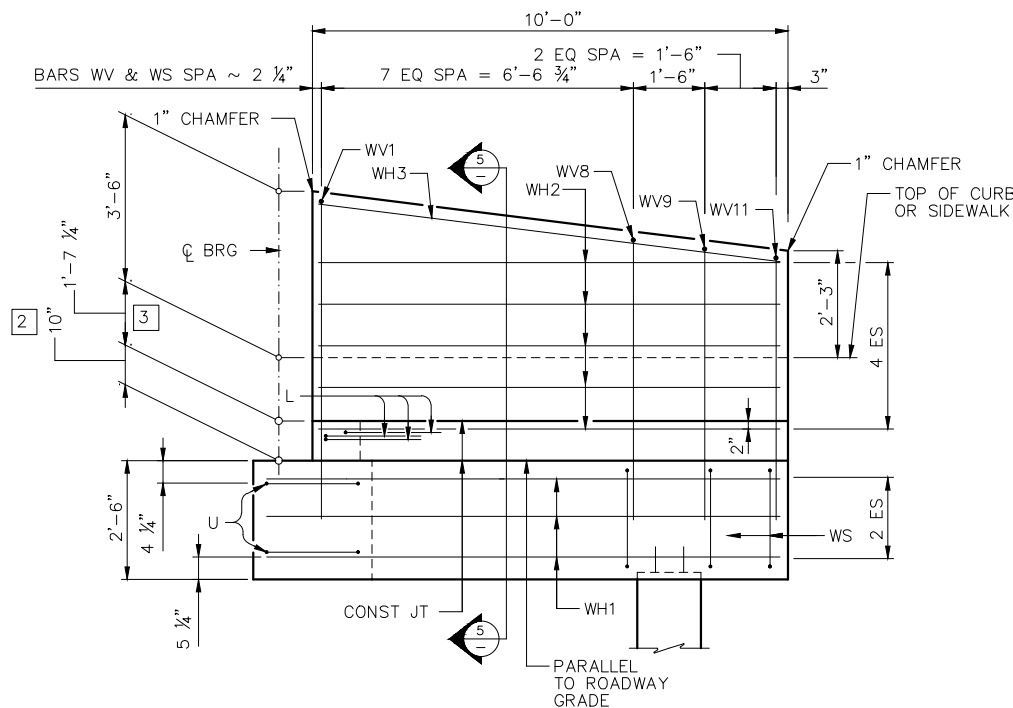
SEAL  
NOTE

PROJECT TITLE			
DRAWN BY:		SHEET DESCRIPTION:	JOB NO:
CK'D BY:		FILE NAME:	
SCALE:		FILE NO:	
DATE:		APPROVED BY:	SHT NO: 68
DESIGN GUIDELINES-ABUTMENT SLAB BEAM-PILE TWO-WAY ROAD, 0° SKEW (1 OF 2)			

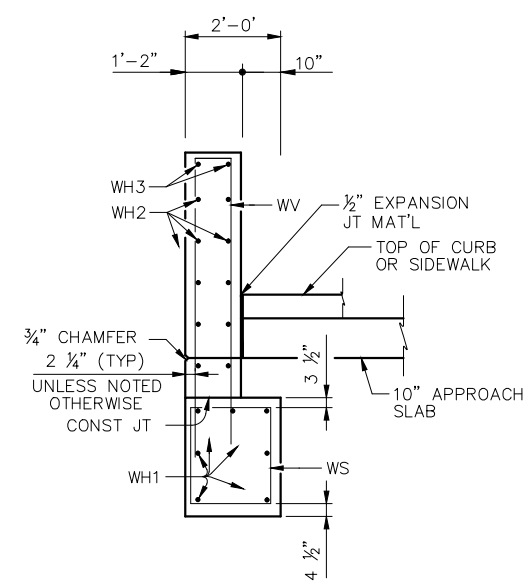
HL93 LOADING



SECTION 3



WINGWALL ELEVATION 4  
(EARWALL NOT SHOWN FOR CLARITY.)



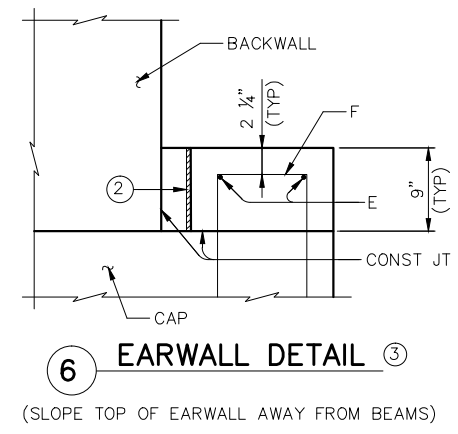
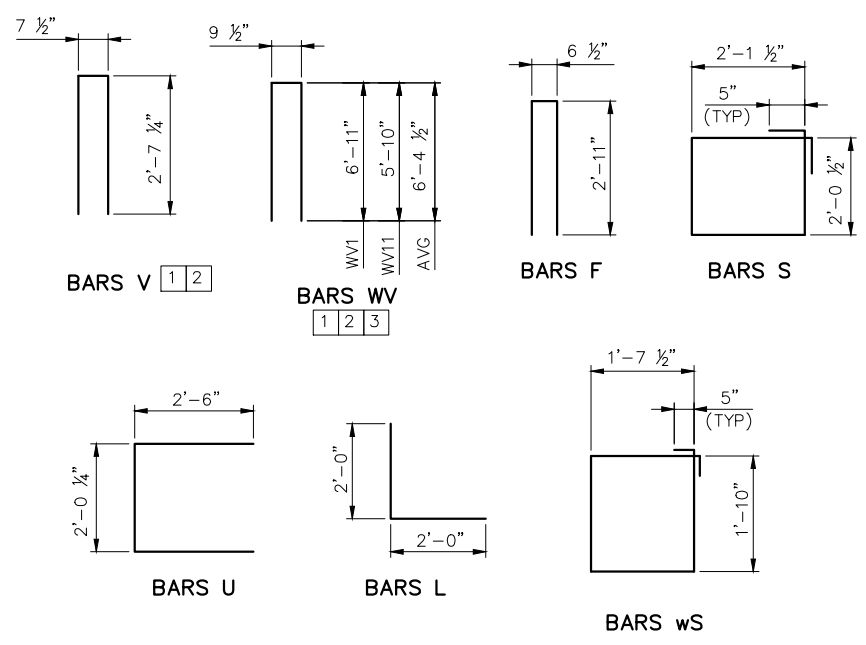
SECTION 5

BILL OF REINFORCING STEEL 1				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	8	# 11	39'-1"	1,661
E	4	# 4	2'-2"	6
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S	46	# 4	9'-2"	282
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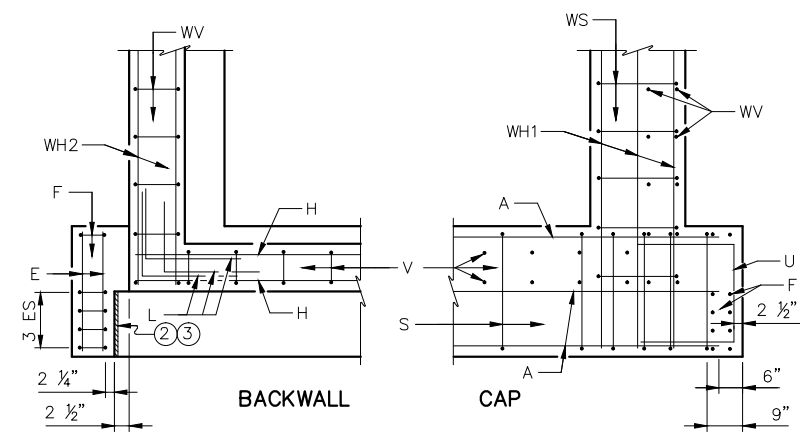
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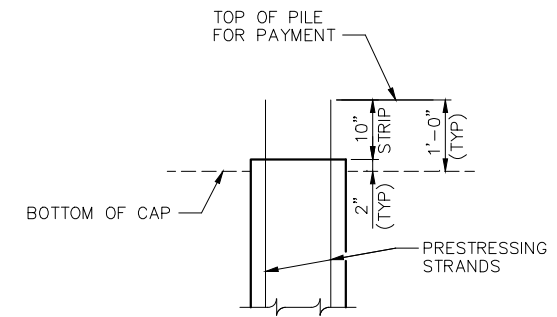
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EARWALL DETAIL 6  
(SLOPE TOP OF EARWALL AWAY FROM BEAMS)



CORNER DETAILS 7



PILING EMBEDMENT DETAIL 8

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O. AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

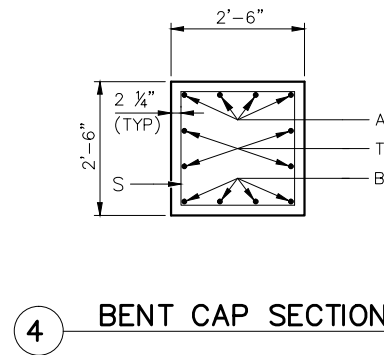
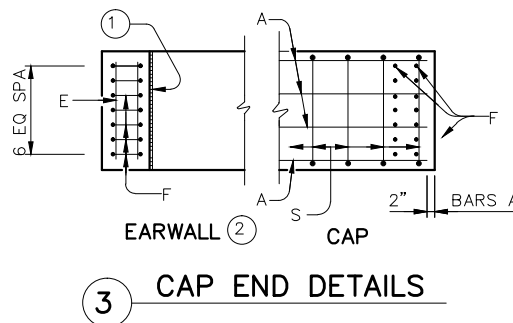
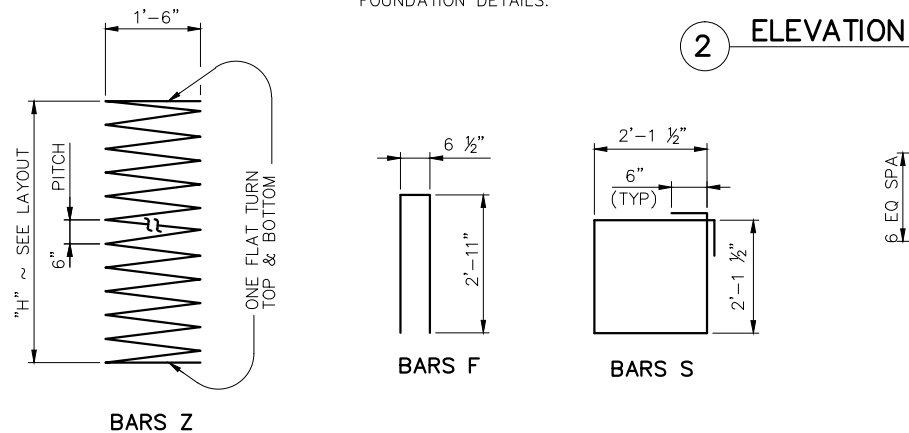
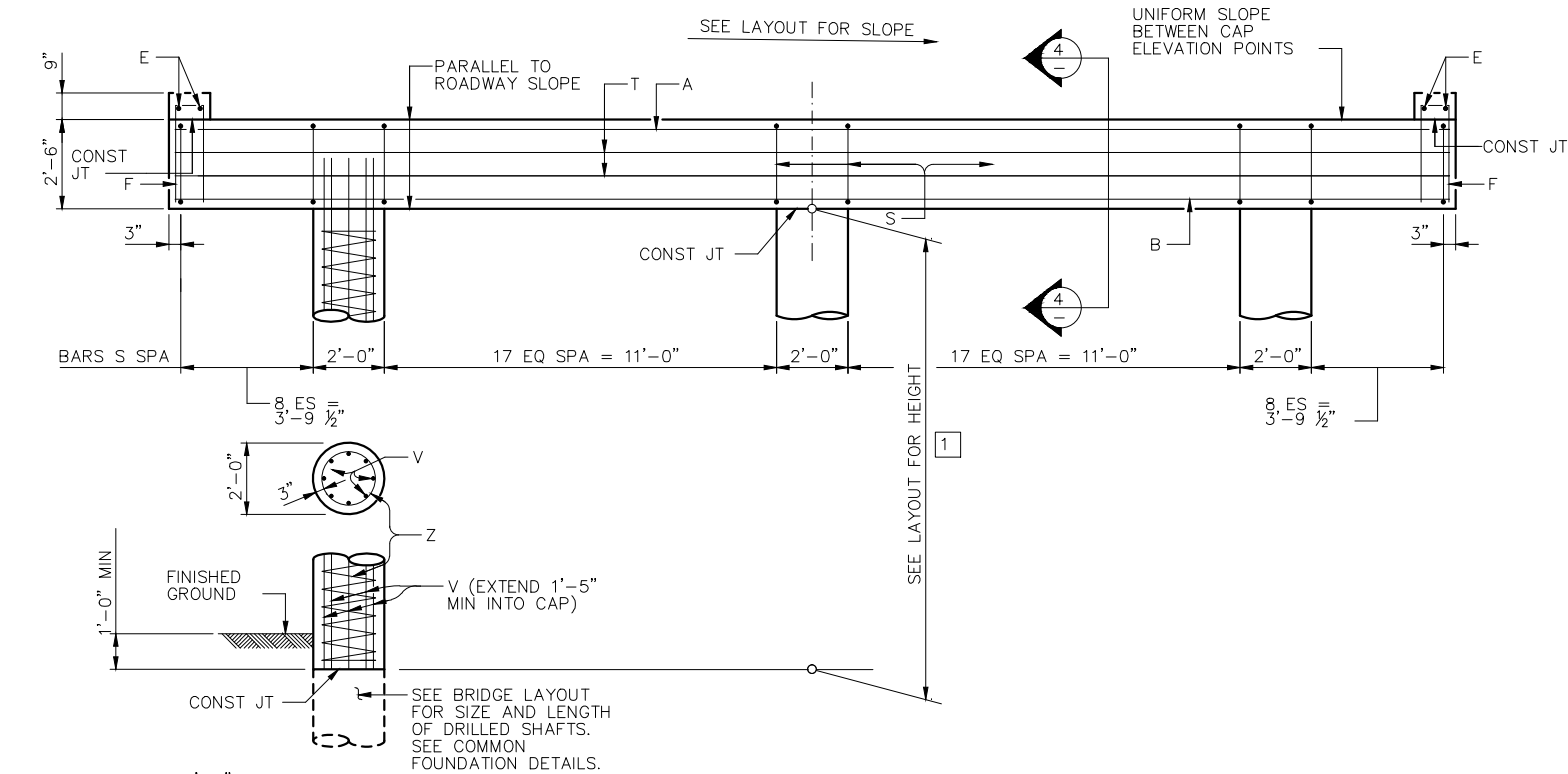
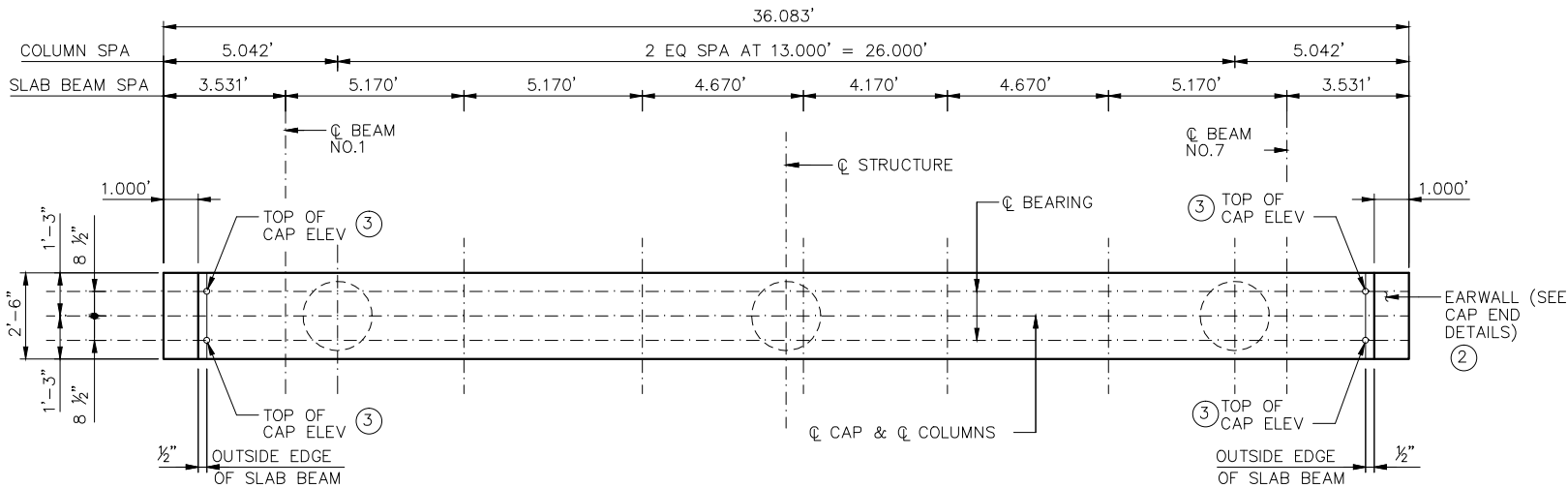
HARRIS COUNTY  
ENGINEERING DEPARTMENT



FIRM INFO

SEAL  
NOTE

PROJECT TITLE			HL93 LOADING
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:	
CHK'D BY:	DESIGN GUIDELINES-ABUTMENT	FILE NAME:	
SCALE:	SLAB BEAM-PILE	FILE NO:	
DATE:	TWO-WAY ROAD, 0° SKEW	SHT NO:	
	(2 OF 2)	69	



BILL OF REINFORCING STEEL ④				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	4	#11	35'-9"	760
B	4	#11	35'-9"	760
E	4	# 4	2'-2"	6
F	14	# 4	6'-5"	60
S	54	# 5	9'-6"	535
T	4	# 5	35'-9"	149
V	24	# 7	21'-5"	1,051
Z	3	# 3	199'-0"	224
REINFORCING STEEL			LB	3,545
ESTIMATED QUANTITIES				
REINFORCING STEEL			LB	3,545
CLASS B1 CONCRETE (CAP)			CY	8.5
CLASS B1 CONCRETE (COL)			CY	7.0

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- ① 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ② DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- ③ TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- ④ FOR EACH LINEAR FOOT VARIATION IN "H" VALUE MAKE FOLLOWING ADJUSTMENTS:  
BARS V: 1'-0"  
BARS Z: 9.478'  
REINFORCING STEEL: 60 LB  
CLASS "B1" CONCRETE (COL): 0.349 CY
- ⑤ WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

TOP OF CAP ELEVATIONS ⑤	
WORKING POINT	ELEVATION

- INTERIOR BENT NOTES
1. DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
  2. ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
  3. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
  4. ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
  5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
  6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
  7. MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER SHAFT.

NOTES TO ENGINEER

① QUANTITIES SHOWN ARE BASED ON AN "H" DIMENSION OF 20'.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT

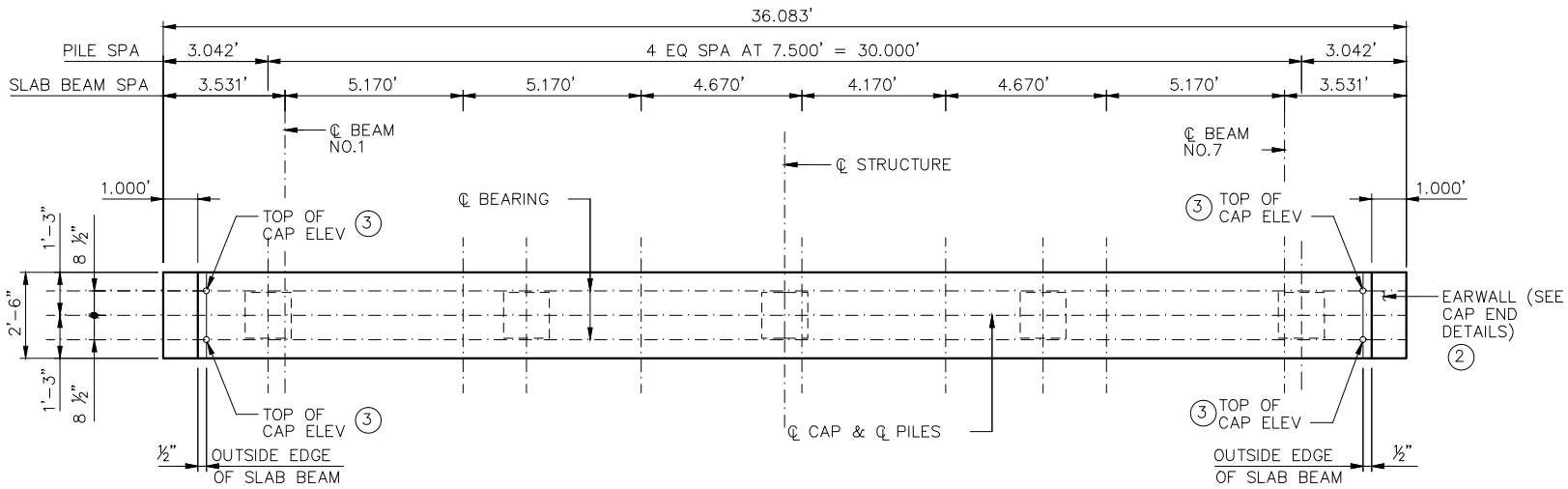


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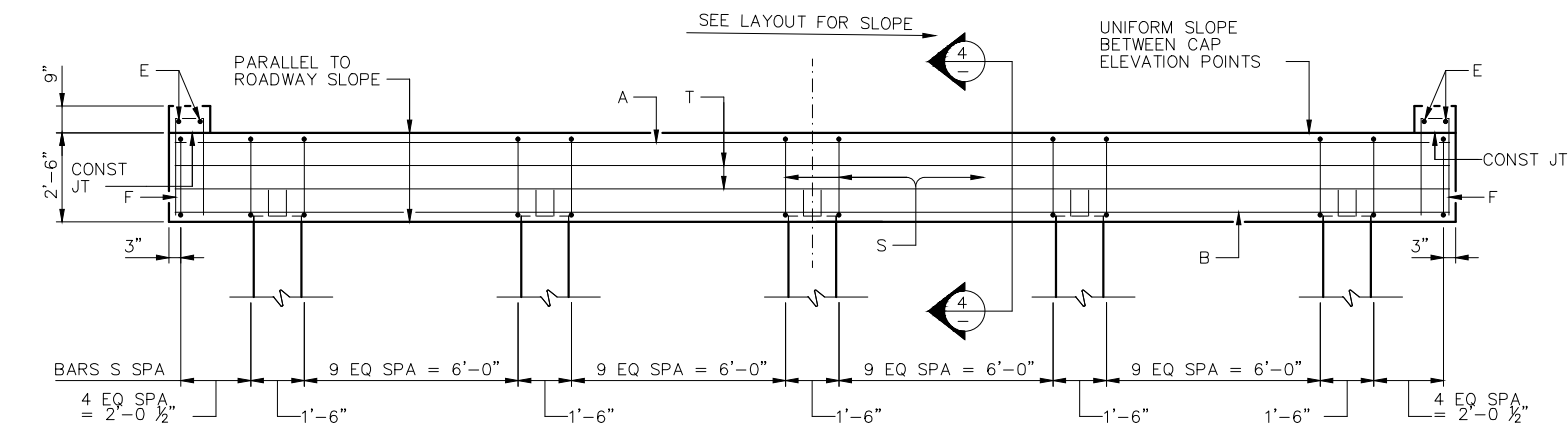
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NOTE

PROJECT TITLE		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:
CHK'D BY:	DESIGN GUIDELINES-BENT	FILE NAME:
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DATE:	HALF BOULEVARD, 0° SKEW	SHT NO: 70
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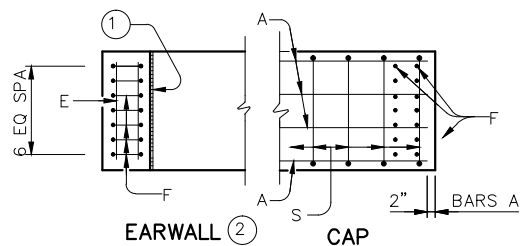
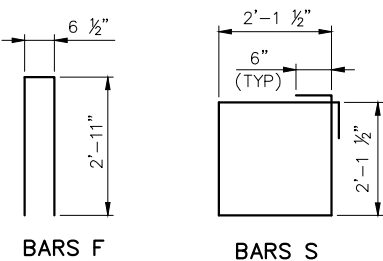
HL93 LOADING



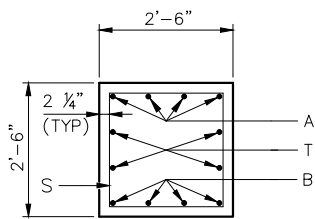
1 PLAN



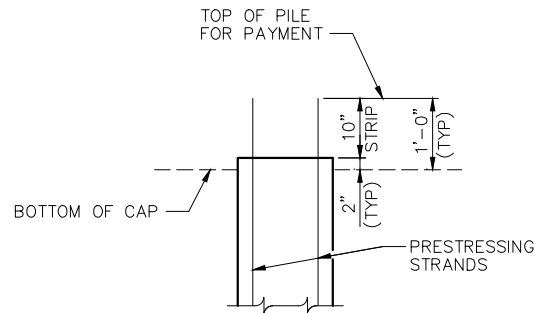
2 ELEVATION 1



3 CAP END DETAILS



4 BENT CAP SECTION



5 PILING EMBEDMENT DETAIL

### BILL OF REINFORCING STEEL

BAR	NO.	SIZE	LENGTH	WEIGHT
A	4	#11	35'-9"	760
B	4	#11	35'-9"	760
E	4	#4	2'-2"	6
F	14	#4	6'-5"	60
S	50	#5	9'-6"	495
T	4	#5	35'-9"	149

REINFORCING STEEL LB 2,230

### ESTIMATED QUANTITIES

REINFORCING STEEL	LB	2,230
CLASS B1 CONCRETE (CAP)	CY	8.5

### TOP OF CAP ELEVATIONS 4

WORKING POINT	ELEVATION

- 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

### INTERIOR BENT NOTES

- DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
- ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
- ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
- ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
- DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
- SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
- MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER PILE.

### NOTES TO ENGINEER

- 1 EXPOSED PILE HEIGHT SHALL NOT EXCEED 16' FOR 16" PILING, AND 20' FOR 18" PILING.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

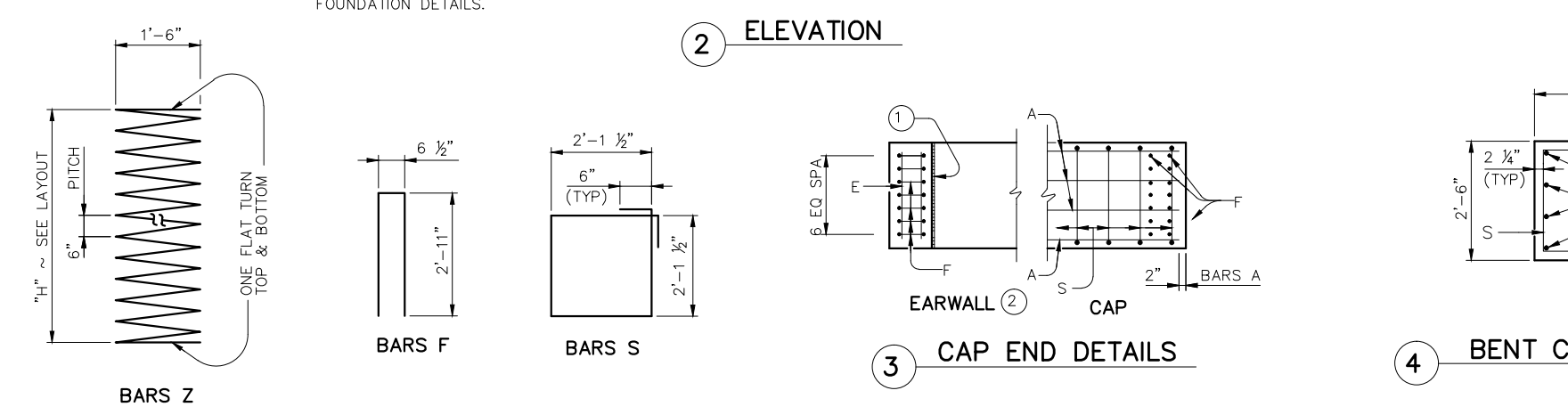
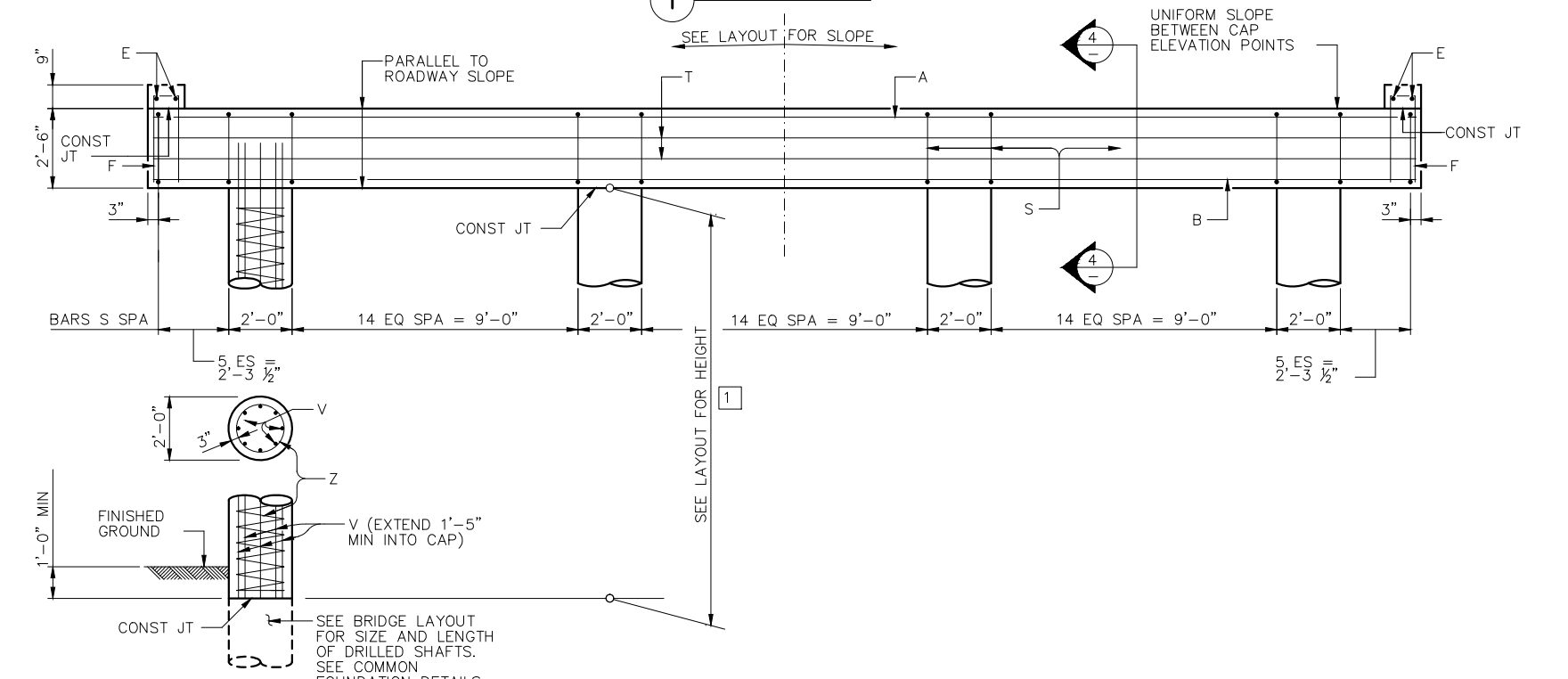
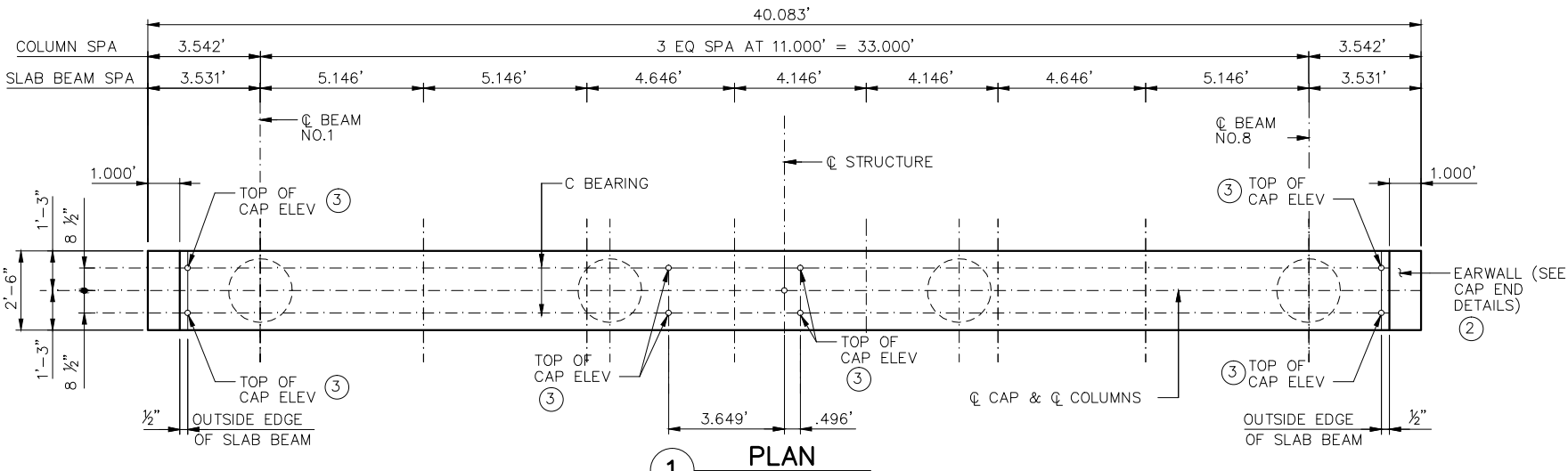
HARRIS COUNTY  
ENGINEERING DEPARTMENT



FIRM INFO

SEAL  
NOTE

PROJECT TITLE:		PILES LOADING	
DRAWN BY:	DESIGN GUIDELINES—BENT		JOB NO:
CHK'D BY:	SLAB BEAMS—PILES		FILE NAME:
SCALE:	HALF BOULEVARD, 0° SKEW		FILE NO:
DATE:	APPROVED BY:	SHT NO: 71	



BILL OF REINFORCING STEEL ④				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	4	# 11	39'-9"	845
B	4	# 11	39'-9"	845
E	4	# 4	2'-2"	6
F	14	# 4	6'-5"	60
S	57	# 5	9'-6"	565
T	4	# 5	39'-9"	166
V	32	# 7	21'-5"	1,401
Z	4	# 3	199'-0"	299
REINFORCING STEEL			LB	4,187
ESTIMATED QUANTITIES				
REINFORCING STEEL			LB	4,187
CLASS B1 CONCRETE (CAP)			CY	9.4
CLASS B1 CONCRETE (COL)			CY	9.3

- ① ½" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ② DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- ③ TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- ④ FOR EACH LINEAR FOOT VARIATION IN "H" VALUE MAKE FOLLOWING ADJUSTMENTS:  
BARS V: 1'-0"  
BARS Z: 9.478'  
REINFORCING STEEL: 80 LB  
CLASS "B1" CONCRETE (COL): 0.465 CY
- ⑤ WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

TOP OF CAP ELEVATIONS ⑤	
WORKING POINT	ELEVATION

- INTERIOR BENT NOTES**
- DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
  - ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I. @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
  - ALL EXPOSED CORNERS SHALL BE CHAMFERED ¾", UNLESS OTHERWISE NOTED.
  - ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
  - DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
  - SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
  - MAXIMUM CALCULATED FOUNDATION LOADS:  
X TONS PER SHAFT.

**NOTES TO ENGINEER**

① QUANTITIES SHOWN ARE BASED ON AN "H" DIMENSION OF 20'.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O. AGUIRRE
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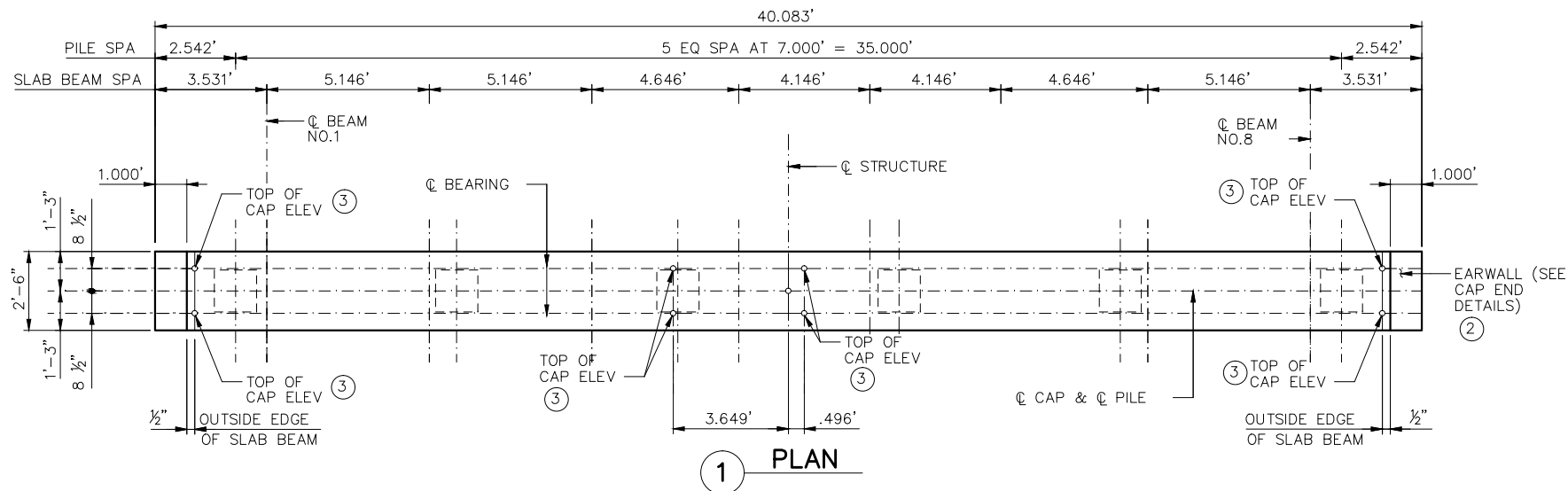
HARRIS COUNTY  
ENGINEERING DEPARTMENT



FIRM INFO

SEAL  
NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:	
CHK'D BY:	DESIGN GUIDELINES-BENT	FILE NAME:	
SCALE:	SLAB BEAMS-DR SHAFTS	FILE NO:	
DATE:	TWO-WAY ROAD, 0° SKEW	SHT NO:	
		72	

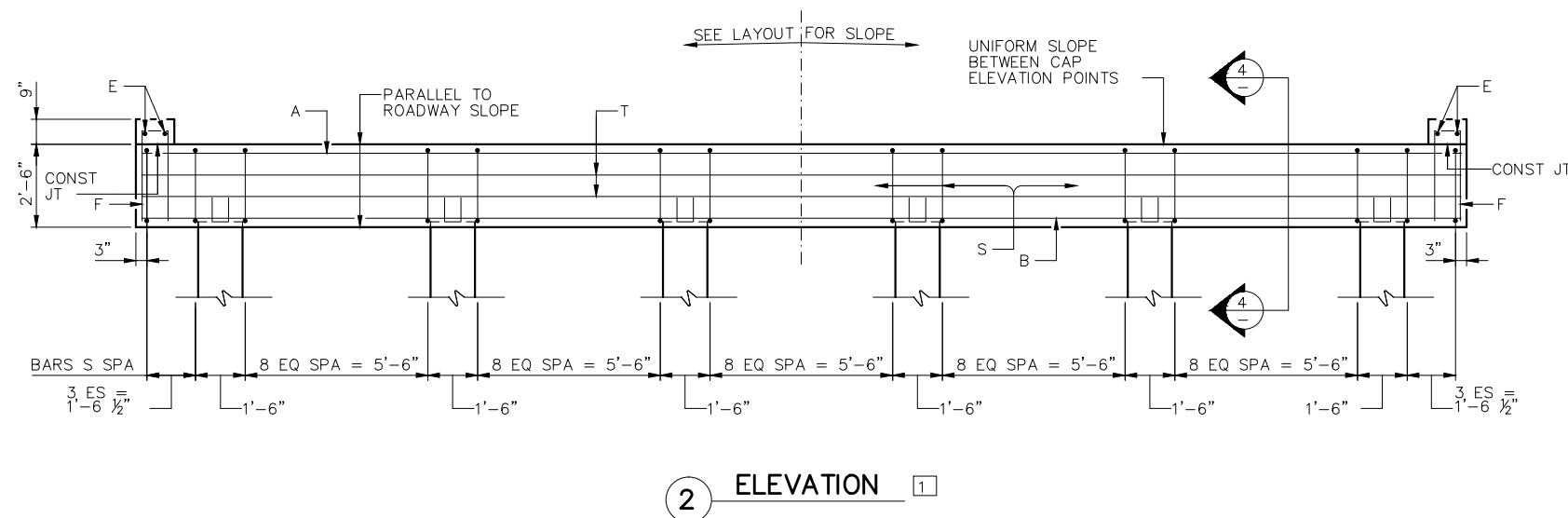


BILL OF REINFORCING STEEL				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	4	# 11	39'-9"	845
B	4	# 11	39'-9"	845
E	4	# 4	2'-2"	6
F	14	# 4	6'-5"	60
S	53	# 5	9'-6"	525
T	4	# 5	39'-9"	166
REINFORCING STEEL			LB	2,447
ESTIMATED QUANTITIES				
REINFORCING STEEL			LB	2,447
CLASS B1 CONCRETE (CAP)			CY	9.4

- NOTES TO DESIGN ENGINEER:
- A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.
- IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC PROJECT REQUIREMENTS.
- B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT PLANS, AND SHALL ADJUST PAGE NUMBERS ACCORDINGLY.
- C. THE DESIGN ENGINEER SHALL CONSULT THE HARRIS COUNTY DESIGN MANUAL AND SPECIFICATIONS FOR INFORMATION PERTINENT TO THESE DESIGN GUIDELINE DRAWINGS.
- D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE BRIDGE PLANS.

TOP OF CAP ELEVATIONS ④	
WORKING POINT	ELEVATION

- ① 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
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- ③ TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
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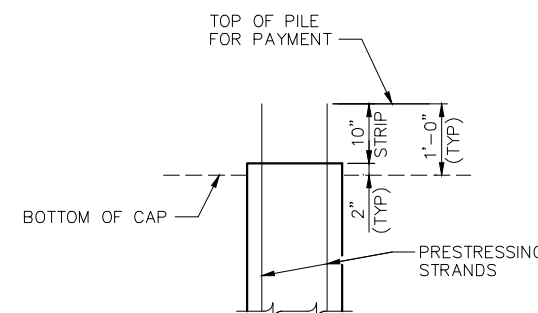
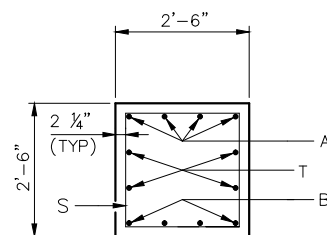
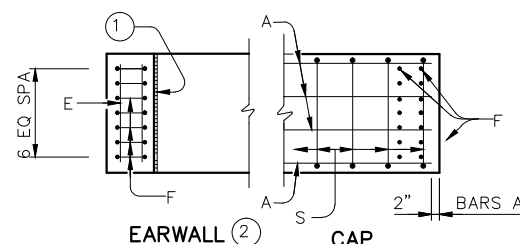
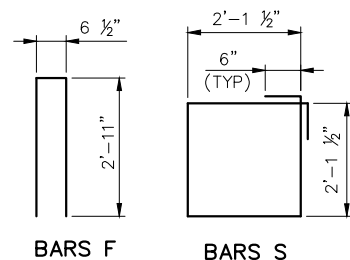


### INTERIOR BENT NOTES

- DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
- ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I. @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
- ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
- ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
- DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
- SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
- MAXIMUM CALCULATED FOUNDATION LOADS:  
X TONS PER PILE.

### NOTES TO ENGINEER

- ① EXPOSED PILE HEIGHT SHALL NOT EXCEED 16' FOR 16" PILING, AND 20' FOR 18" PILING.



NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT

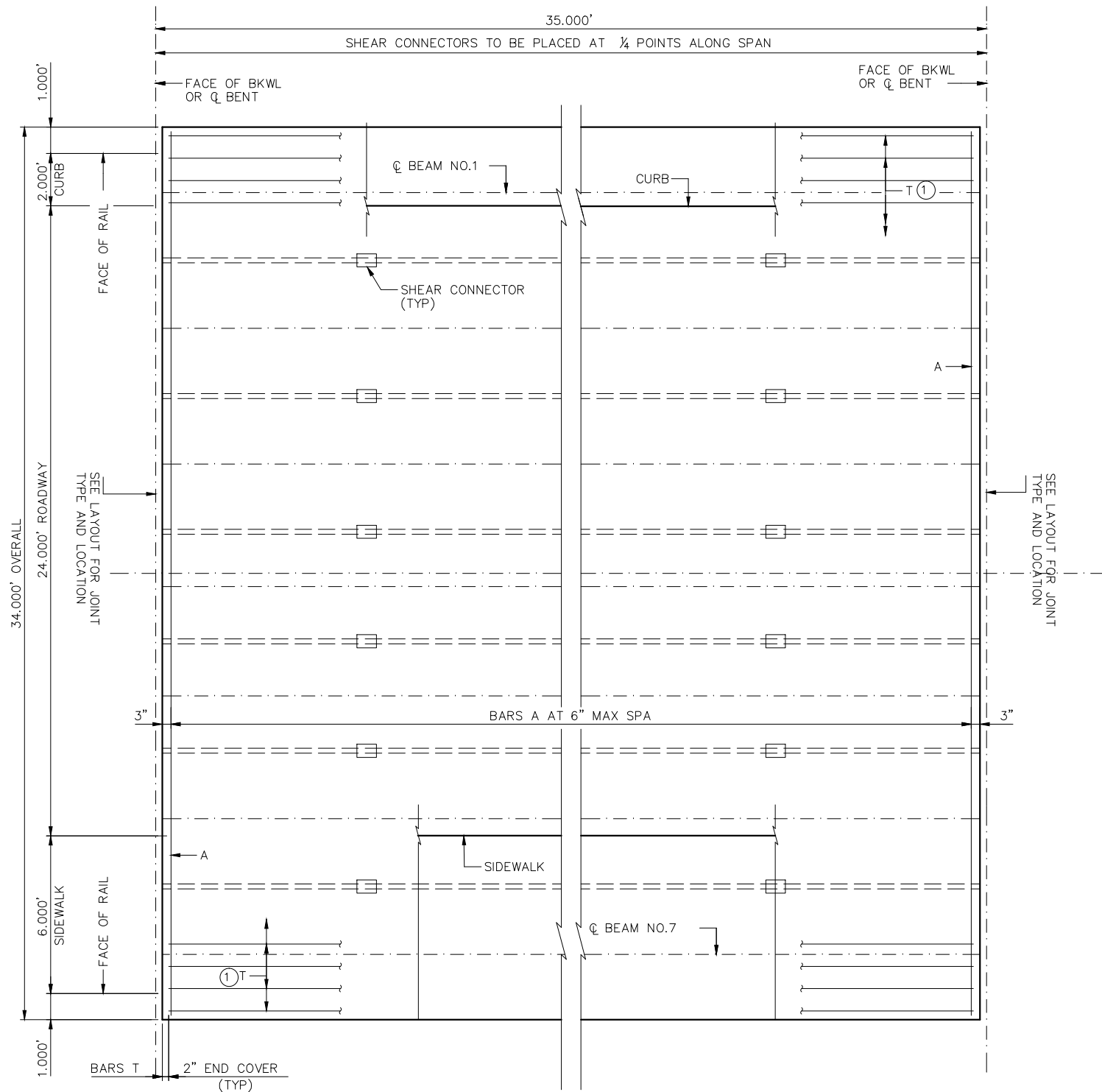


FIRM INFO

SEAL  
NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	DESIGN GUIDELINES-BENT	JOB NO:
CHK'D BY:	FILE NAME:	SLAB BEAMS-PILES	FILE NO:
SCALE:	FILE NO:	TWO-WAY ROAD, 0° SKEW	FILE NO:
DATE:	APPROVED BY:	SHR NO:	73

HL93 LOADING



PLAN

BAR TABLE	
BAR	SIZE
A	# 5
L	# 4
T	# 4
X	# 4
Y	# 5

NOTES TO DESIGN ENGINEER:

- A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.
- IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC PROJECT REQUIREMENTS.
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- C. THE DESIGN ENGINEER SHALL CONSULT THE HARRIS COUNTY DESIGN MANUAL AND SPECIFICATIONS FOR INFORMATION PERTINENT TO THESE DESIGN GUIDELINE DRAWINGS.
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SLAB NOTES

- DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
- ALL CONCRETE SHALL BE CLASS A1 4000 PSI @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE. ALL EXPOSED CORNERS SHALL BE CHAMFERED  $\frac{3}{4}$ " UNLESS OTHERWISE NOTED.
- ALL REINFORCING STEEL SHALL BE ASTM.A615 GRADE 60 STEEL.
- DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS. UNLESS OTHERWISE NOTED.
- THE QUANTITIES GIVEN FOR REINFORCING STEEL AND CONCRETE ARE PRESENTED FOR CONTRACTORS INFORMATION ONLY.
- BAR LAPS, WHERE REQUIRED, SHALL BE AS FOLLOWS:  
~ #4 = 1'-5"  
~ #5 = 1'-9"

NO.	REVISIONS	DATE	NAME
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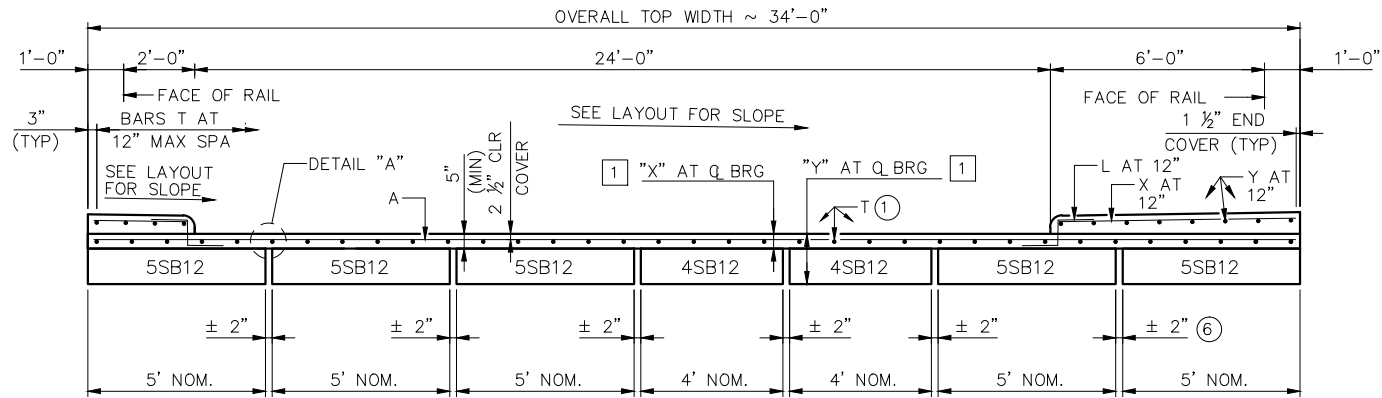
HARRIS COUNTY  
ENGINEERING DEPARTMENT



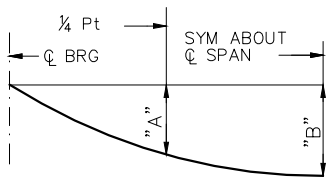
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PROJECT TITLE:		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:
CK'D BY:	DESIGN GUIDELINES	FILE NAME:
SCALE:	SPAN DETAILS-SLAB BEAMS	FILE NO:
DATE:	HALF BOULEVARD,0'SKEW	SHT NO:
	(1 OF 2)	74

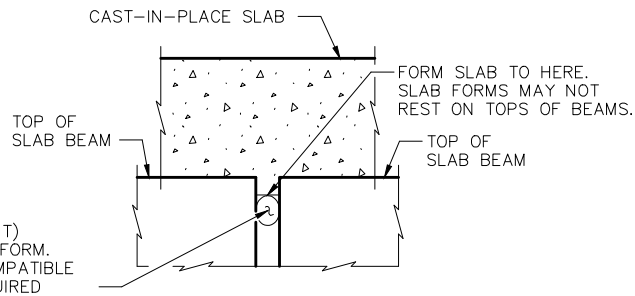


TYPICAL TRANSVERSE SECTION

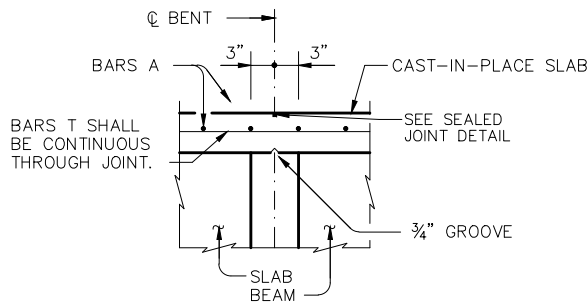


NOTE: DEFLECTIONS SHOWN ARE DUE TO SHEAR KEY AND CONCRETE SLAB ONLY. ( $E_c = 5 \times 10^4$  KSI). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DIMENSION MAY BE LESS. DEFLECTIONS MAY BE ADJUSTED BASED ON FIELD OBSERVATION.

DEAD LOAD DEFLECTION DIAGRAM

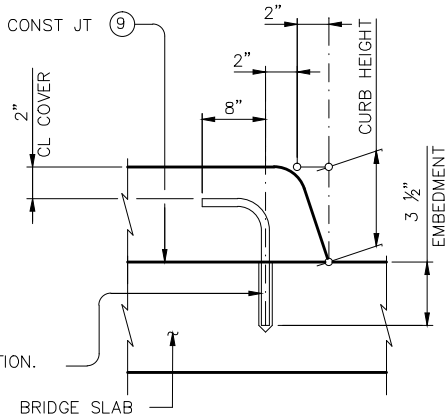
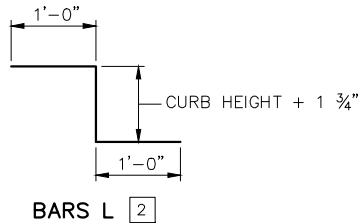


DETAIL "A"



CONTINUOUS SLAB DETAIL

TABLE OF VARIABLE VALUES					
SPAN LENGTH	BEAM TYPE	DEAD LOAD DEFLECTION		SECTION DEPTHS 1	
		"A"	"B"	"X"	"Y"
FT		FT	FT	IN	FT/IN
50	4SB12			6"	1'-6"
50	5SB12			6"	1'-6"



OPTIONAL EPOXIED ANCHORS EA (#4) CAN REPLACE BARS L AT THE CONTRACTOR'S OPTION.

OPTIONAL EPOXY ANCHORS

EMBED EA(#4) BAR INTO CONCRETE WITH A TYPE III (CLASS C) EPOXY MEETING THE REQUIREMENTS OF TXDOT DMS-6100, "EPOXIES AND ADHESIVES". FOLLOW MANUFACTURER'S DIRECTIONS FOR INSTALLING THE EPOXIED ANCHOR BARS.

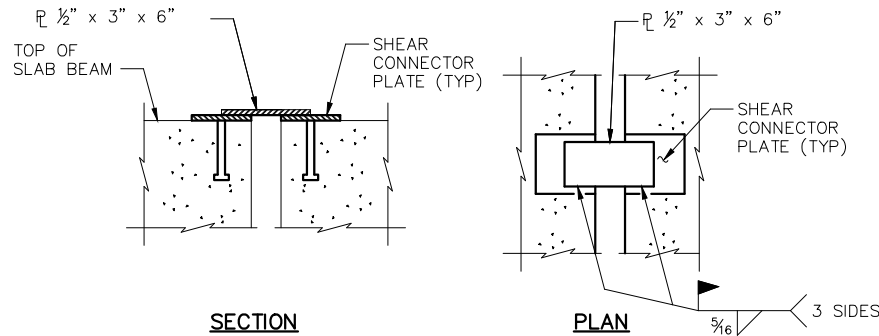
TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	CLASS "A1" CONCRETE (SLAB) 1	CLASS "A1" CONCRETE (SDWK) 1	CLASS "A1" CONCRETE (CURB) 1	PRESTR CONCRETE SLAB BEAMS (TY 4SB12) 5	PRESTR CONCRETE SLAB BEAMS (TY 5SB12) 5	SLAB REINF STEEL 2	SIDEWALK REINF STEEL 3	CURB REINF STEEL 4	TOTAL REINF STEEL
FT	CY	CY	CY	LF	LF	LB	LB	LB	LB
35	20.2	5.8	1.9	69.00	172.50	3,332	441	189	3,962

- WHERE SLAB IS CONTINUOUS OVER INTERIOR BENTS, BARS T SHALL BE CONTINUOUS THROUGH JOINT. SEE "CONTINUOUS SLAB DETAIL". REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 2.8 LBS PER SQUARE FOOT OF SLAB.
- REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 1.8 LBS PER SQUARE FOOT OF SIDEWALK.
- REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 1.8 LBS PER SQUARE FOOT OF CURB.
- FABRICATOR SHALL ADJUST BEAM LENGTHS FOR BEAM SLOPES AS REQUIRED.
- GAP WIDTH IS BASED ON NOMINAL BEAM WIDTHS.
- CONNECTOR PLATES ARE INCIDENTAL TO PRESTRESSED BEAM ITEM.
- MATERIAL SHALL BE SELF LEVELING, COLD-APPLIED, RAPID CURE, LOW MODULUS SILICONE RUBBER SEALANT. IN ACCORDANCE WITH ITEM 427 AND SEALANT MANUFACTURER SPECIFICATIONS.
- PROVIDE BROOM FINISH TO TOP OF BRIDGE SLAB WHERE RAISED SIDEWALK OR CURB AREA IS DEFINED.

NOTES TO ENGINEER

- THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB AND THE EFFECT OF VERTICAL CURVE.
- THE ENGINEER SHALL DETERMINE BRIDGE CURB HEIGHT.

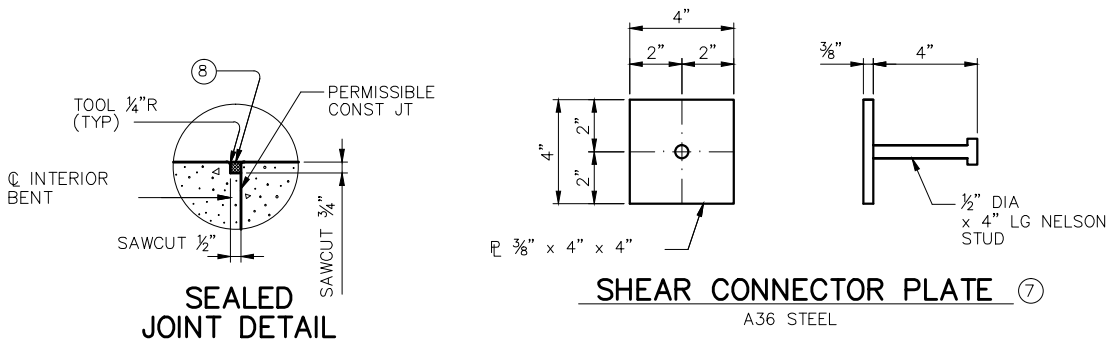


SECTION

PLAN

SHEAR CONNECTION DETAIL

A36 STEEL



SEALED JOINT DETAIL

SHEAR CONNECTOR PLATE 7

A36 STEEL

NO.	REVISIONS	DATE	NAME
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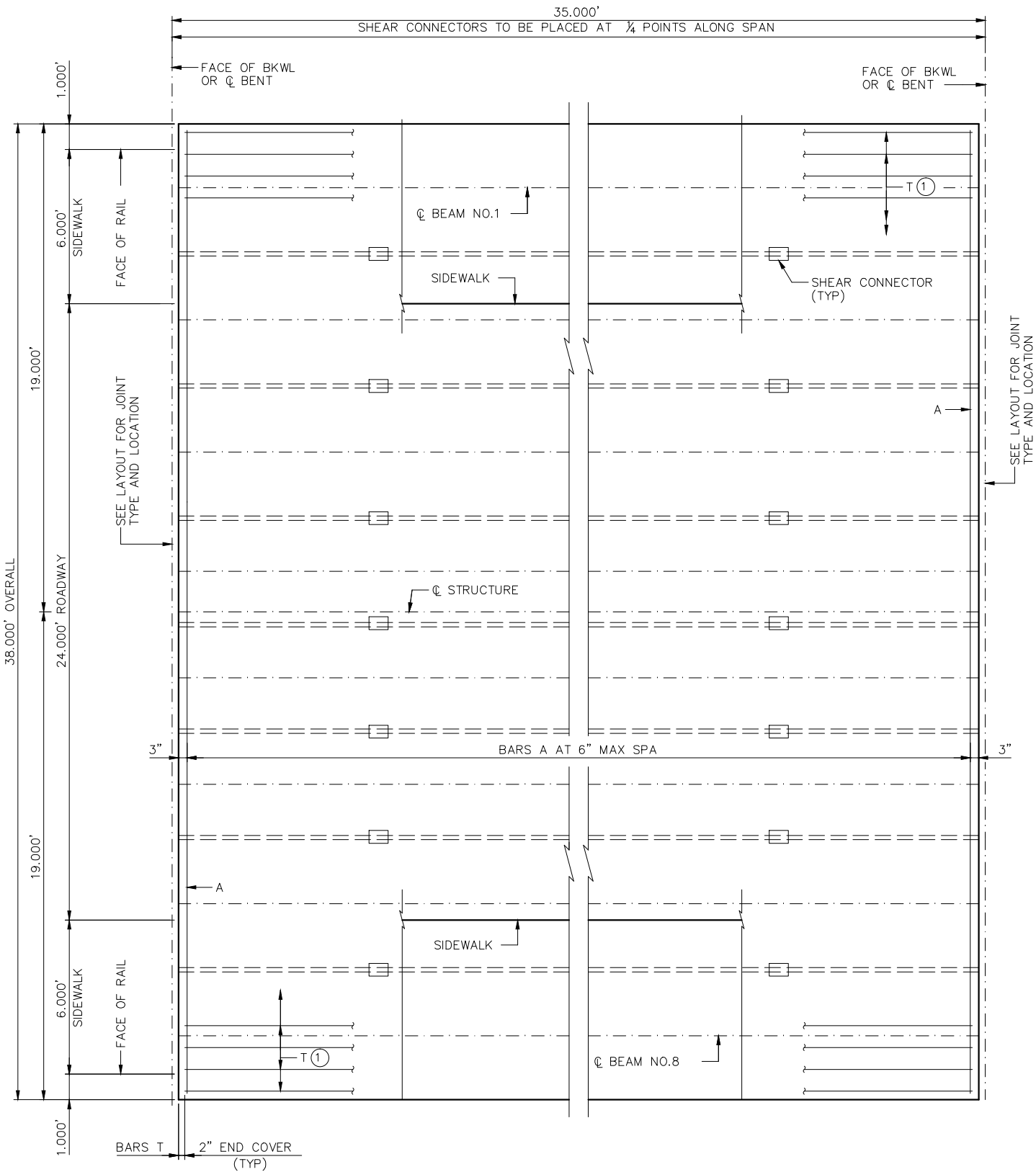
FIRM INFO

SEAL  
NOTE

PROJECT TITLE		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:
CK'D BY:	DESIGN GUIDELINES	FILE NAME:
SCALE:	SPAN DETAILS-SLAB BEAMS	FILE NO:
DATE:	HALF BOULEVARD, 0° SKEW	SHT NO:
	(2 OF 2)	75

HL93 LOADING





PLAN

BAR TABLE

BAR	SIZE
A	# 5
L	# 4
T	# 4
X	# 4
Y	# 5

NOTES TO DESIGN ENGINEER:

A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.

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SLAB NOTES

- DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
- ALL CONCRETE SHALL BE CLASS A1 4000 PSI @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE. ALL EXPOSED CORNERS SHALL BE CHAMFERED  $\frac{3}{4}$ " UNLESS OTHERWISE NOTED.
- ALL REINFORCING STEEL SHALL BE ASTM.A615 GRADE 60 STEEL.
- DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS. UNLESS OTHERWISE NOTED.
- THE QUANTITIES GIVEN FOR REINFORCING STEEL AND CONCRETE ARE PRESENTED FOR CONTRACTORS INFORMATION ONLY.
- BAR LAPS, WHERE REQUIRED, SHALL BE AS FOLLOWS:  
~ #4 = 1'-5"  
~ #5 = 1'-9"

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1	UPDATED DEPARTMENT NAME	2/17/2015	RS

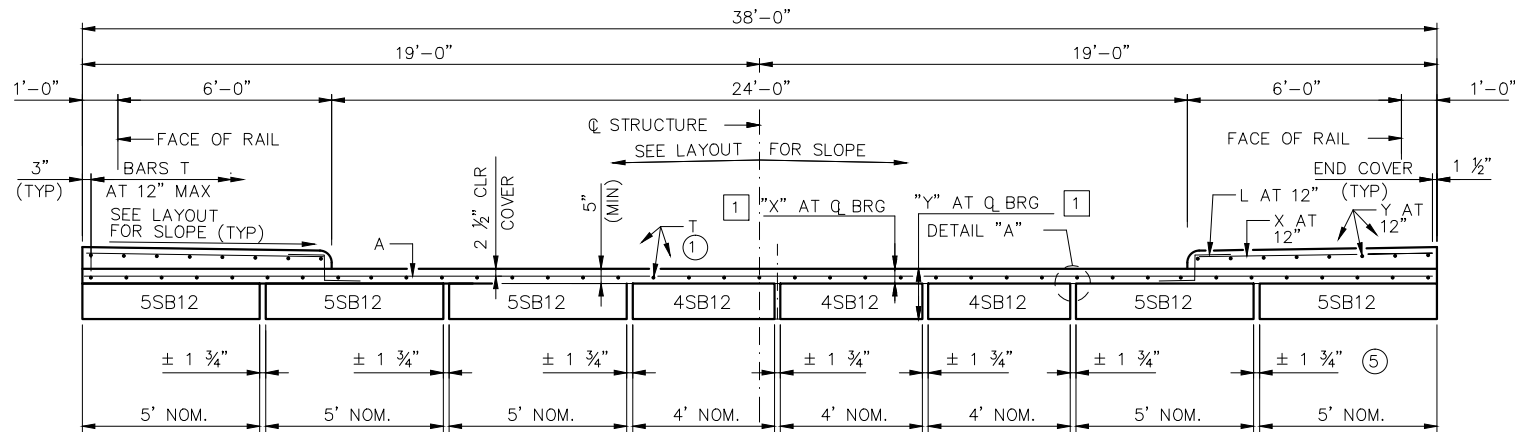
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ENGINEERING DEPARTMENT



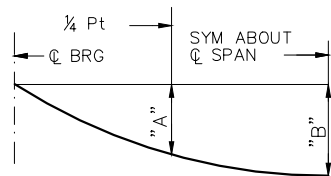
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NOTE

PROJECT TITLE:			
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:	
CK'D BY:	DESIGN GUIDELINES	FILE NAME:	
SCALE:	SPAN DETAILS-SLAB BEAMS	FILE NO:	
DATE:	TWO-WAY ROAD,0'SKEW	SHT NO:	
	(1 OF 2)	76	

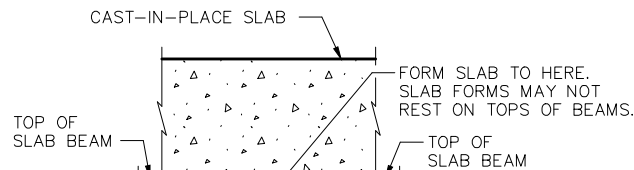


TYPICAL TRANSVERSE SECTION



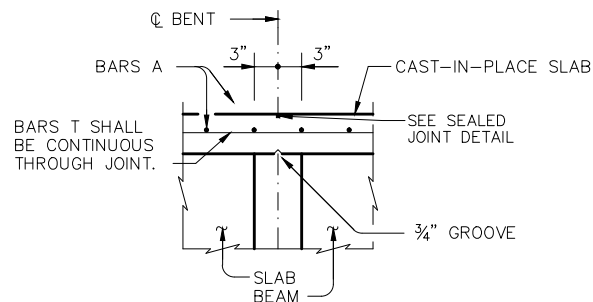
NOTE: DEFLECTIONS SHOWN ARE DUE TO SHEAR KEY AND CONCRETE SLAB ONLY, ( $E_c = 5 \times 10^3$  KSI). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DIMENSION MAY BE LESS. DEFLECTIONS MAY BE ADJUSTED BASED ON FIELD OBSERVATION.

DEAD LOAD DEFLECTION DIAGRAM

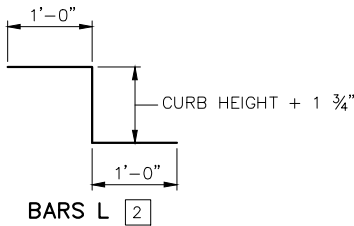


BACKER ROD (25% LARGER THAN JOINT) MAY BE USED AS FORM. SECURE WITH COMPATIBLE ADHESIVE AS REQUIRED

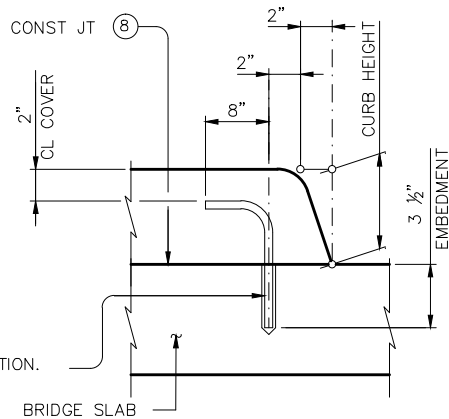
DETAIL "A"



CONTINUOUS SLAB DETAIL



OPTIONAL EPOXIED ANCHORS EA (#4) CAN REPLACE BARS L AT THE CONTRACTOR'S OPTION.



OPTIONAL EPOXY ANCHORS

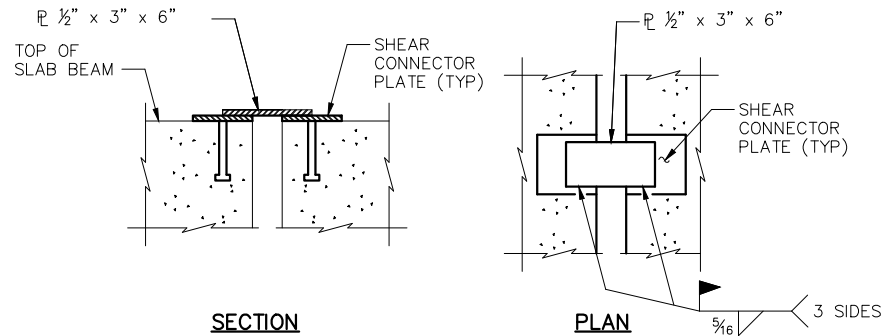
EMBED EA(#4) BAR INTO CONCRETE WITH A TYPE III (CLASS C) EPOXY MEETING THE REQUIREMENTS OF TXDOT DMS-6100, "EPOXIES AND ADHESIVES". FOLLOW MANUFACTURER'S DIRECTIONS FOR INSTALLING THE EPOXIED ANCHOR BARS.

TABLE OF ESTIMATED QUANTITIES							
SPAN LENGTH	CLASS "A1" CONCRETE (SLAB) ①	CLASS "A1" CONCRETE (SDWK)	PRESTR CONCRETE SLAB BEAMS (TY 4SB12) ④	PRESTR CONCRETE SLAB BEAMS (TY 5SB12) ④	SLAB REINF STEEL ②	SIDEWALK REINF STEEL ③	TOTAL REINF STEEL
FT	CY	CY	LF	LF	LB	LB	LB
35	22.6	11.6	103.50	172.50	3,724	882	4,606

- WHERE SLAB IS CONTINUOUS OVER INTERIOR BENTS, BARS T SHALL BE CONTINOUS THROUGH JOINT. SEE "CONTINUOUS SLAB DETAIL." REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 2.8 LBS PER SQUARE FOOT OF SLAB.
- REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 1.8 LBS PER SQUARE FOOT OF SIDEWALK.
- FABRICATOR SHALL ADJUST BEAM LENGTHS FOR BEAM SLOPES AS REQUIRED.
- GAP WIDTH IS BASED ON NOMINAL BEAM WIDTHS. CONNECTOR PLATES ARE INCIDENTAL TO PRESTRESSED BEAM ITEM.
- MATERIAL SHALL BE SELF LEVELING, COLD-APPLIED, RAPID CURE, LOW MODULUS SILICONE RUBBER SEALANT. IN ACCORDANCE WITH ITEM 427 AND SEALANT MANUFACTURER SPECIFICATIONS.
- PROVIDE BROOM FINISH TO TOP OF BRIDGE SLAB WHERE RAISED SIDEWALK AREA IS DEFINED.
- 

NOTES TO ENGINEER

- THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB AND THE EFFECT OF VERTICAL CURVE.
- THE ENGINEER SHALL DETERMINE BRIDGE CURB HEIGHT.

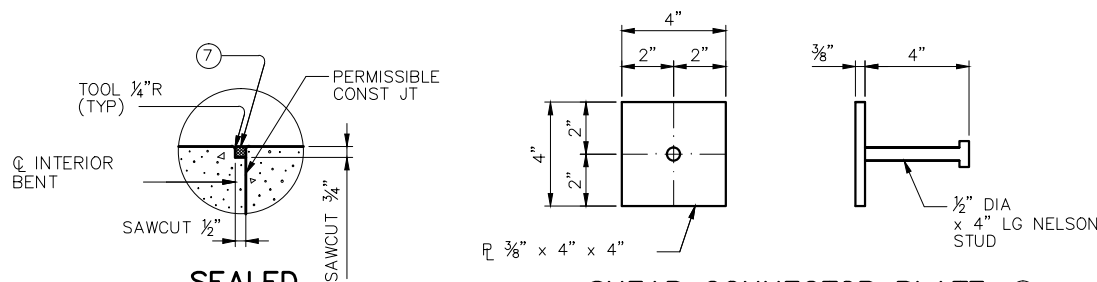


SECTION

PLAN

SHEAR CONNECTION DETAIL

A36 STEEL



SEALED JOINT DETAIL

SHEAR CONNECTOR PLATE ⑥

A36 STEEL

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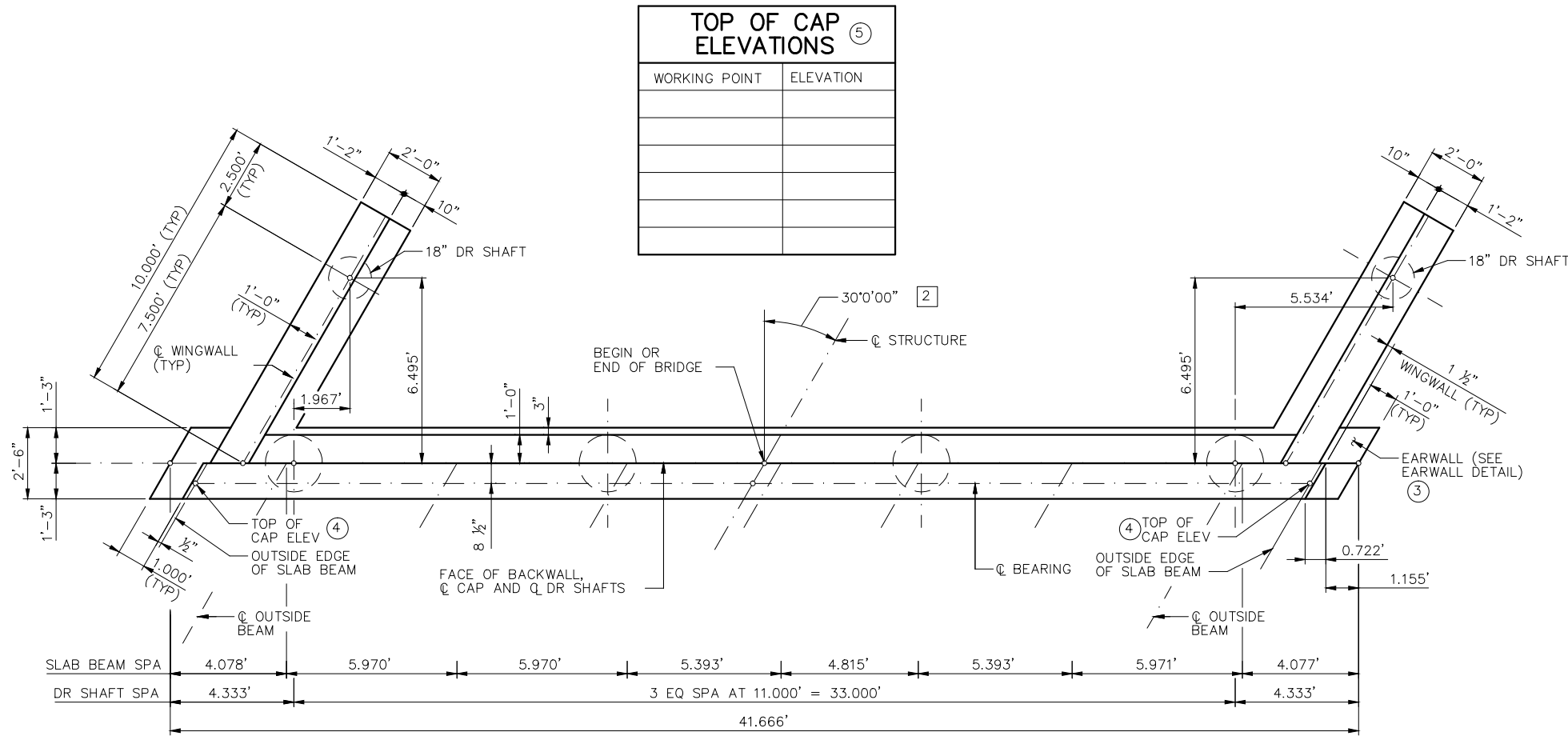


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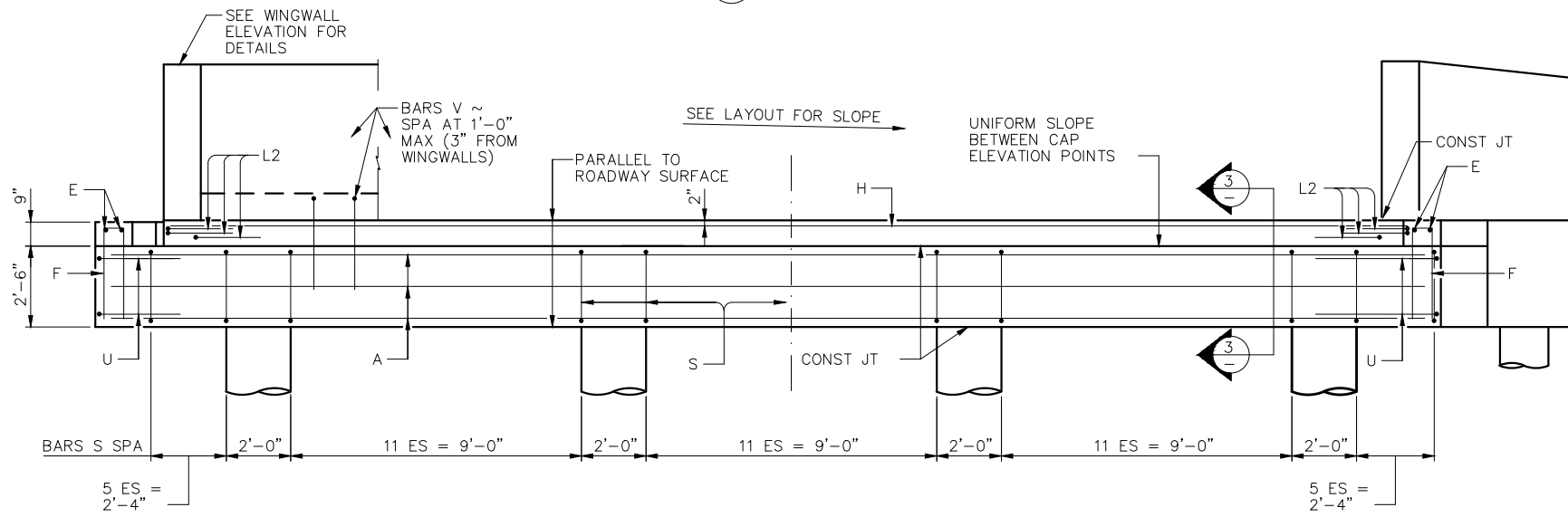
SEAL  
NOTE

PROJECT TITLE			
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SCALE:	SPAN DETAILS-SLAB BEAMS	FILE NO:	
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HL93 LOADING



1 PLAN



2 ELEVATION

TOP OF CAP ELEVATIONS ⑤	
WORKING POINT	ELEVATION

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- ② 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ③ DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
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NOTES TO ENGINEER

- ① GUIDELINE DRAWINGS ARE FOR B12 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
- ② SKEWS HIGHER THAN 30° ARE NOT RECOMMENDED.

ABUTMENT NOTES

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- 5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
- 6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
- 7. MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER SHAFT.

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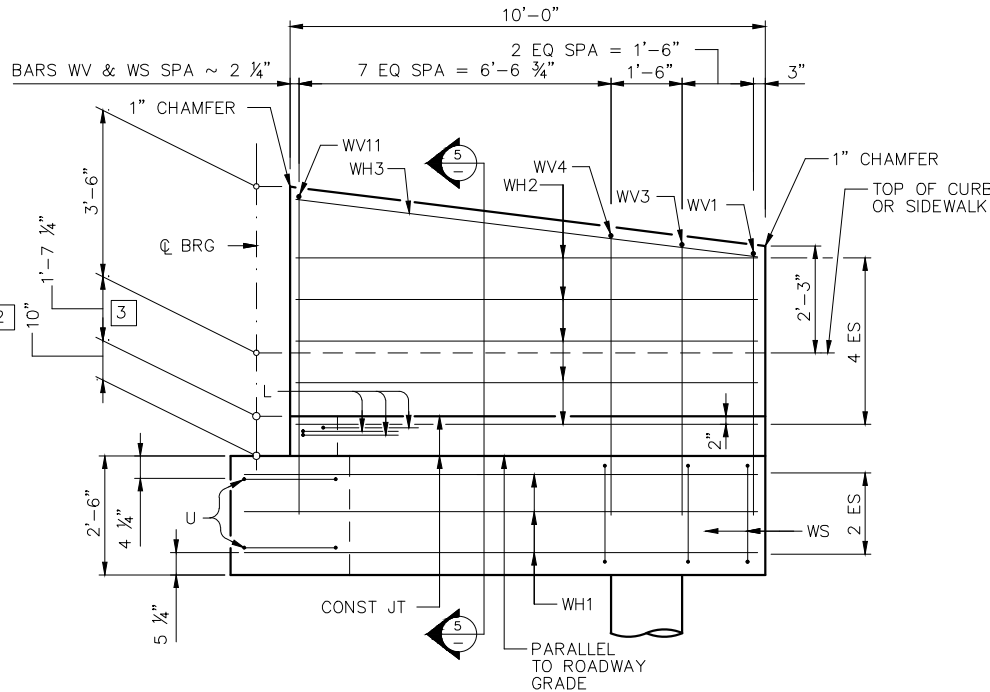
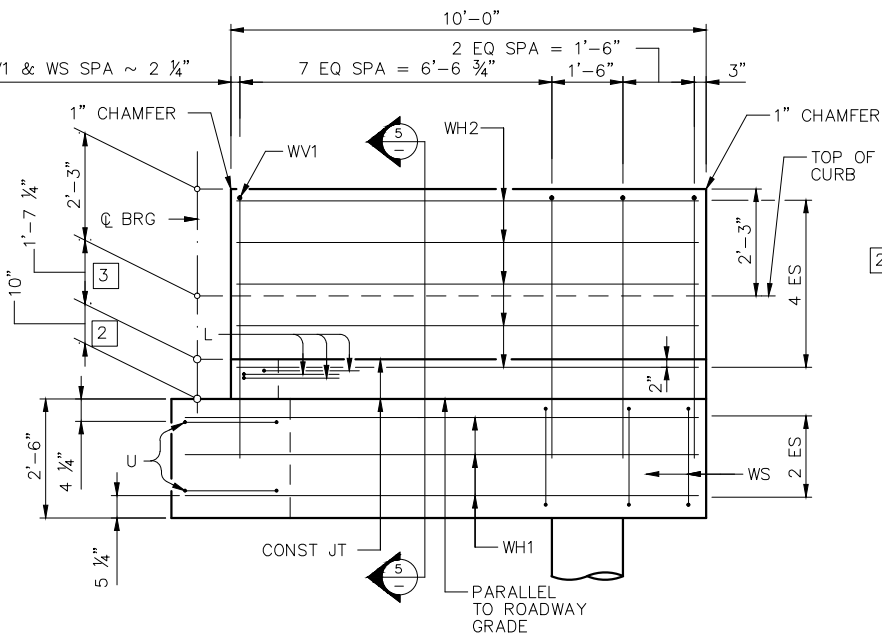
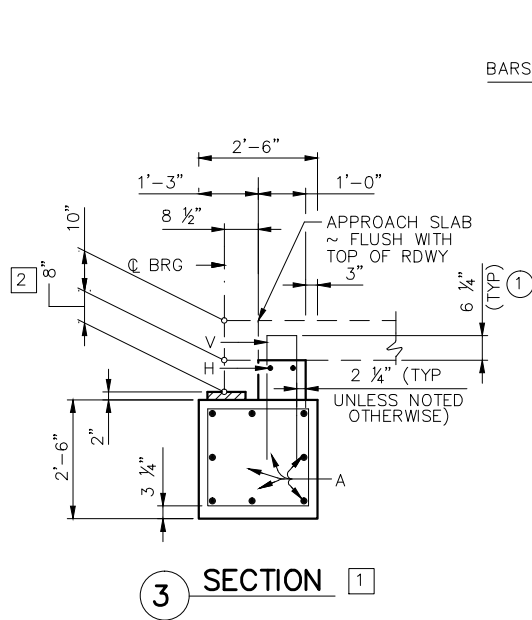
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FIRM INFO

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NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	FILE NAME:	JOB NO:
	DESIGN GUIDELINES-ABUTMENT		
CHK'D BY:	SLAB BEAM-DR SHAFT	FILE NO:	
SCALE:	HALF BOULEVARD, 30° SKEW	FILE NO:	
DATE:	APPROVED BY:	SHT NO:	78



BILL OF REINFORCING STEEL <sup>1</sup>				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	8	#11	40'-8"	1,728
E	4	# 4	2'-6"	7
F	10	# 4	6'-6"	43
H	2	# 6	38'-11"	117
L1	3	# 6	4'-0"	18
L2	3	# 6	4'-0"	18
S	48	# 4	9'-2"	294
U	4	# 6	7'-4"	44
V	38	# 5	5'-10"	231
WH1	14	# 6	11'-0"	231
WH2	20	# 6	9'-8"	290
WH3	2	# 6	9'-9"	29
WS	22	# 4	7'-9"	114
WV1	11	# 5	12'-6"	143
WV(AVG)	11	# 5	13'-7"	156
REINFORCING STEEL			LB	3,463
ESTIMATED QUANTITIES <sup>1</sup>				
REINFORCING STEEL			LB	3,463
CLASS B1 CONCRETE			CY	19.0

TYPE 1 - TRAFFIC RAIL SIDE

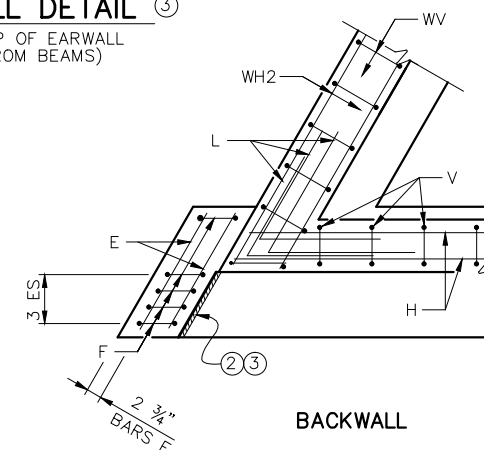
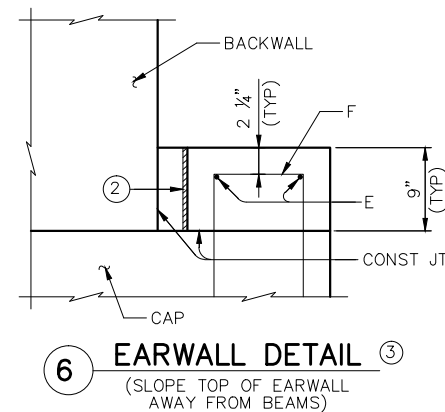
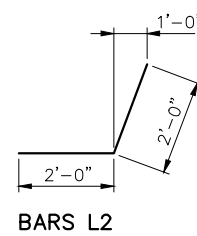
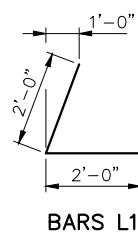
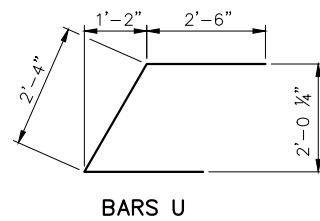
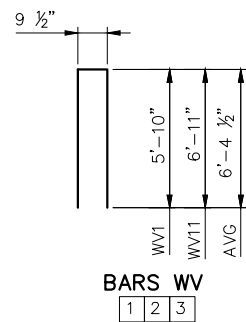
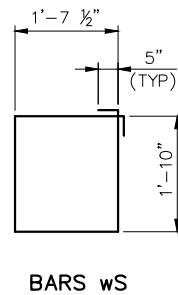
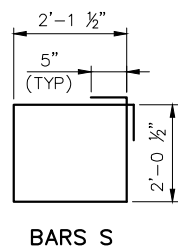
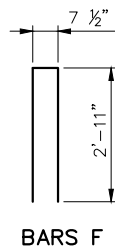
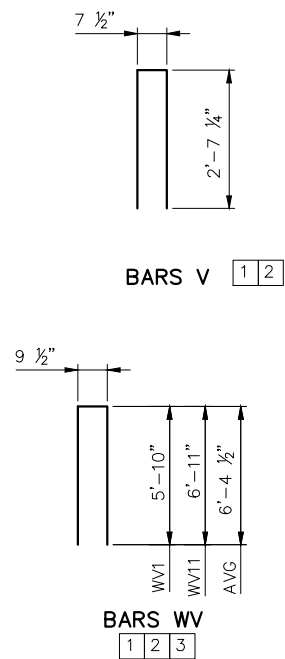
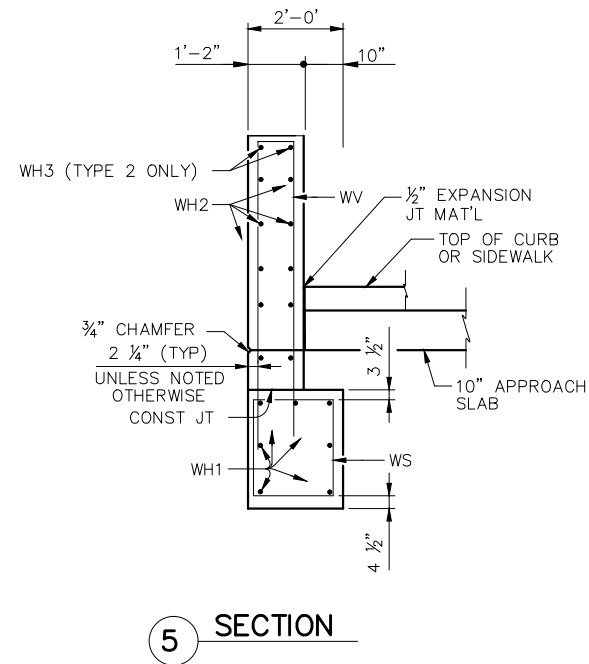
TYPE 2 - COMBINATION RAIL SIDE

4 WINGWALL ELEVATION <sup>1</sup>  
(EARWALL NOT SHOWN FOR CLARITY.)

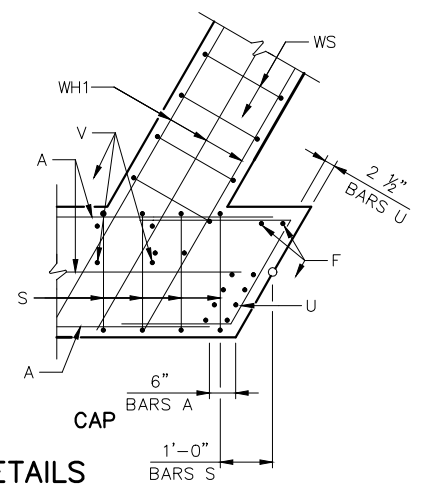
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### NOTES TO ENGINEER

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- THE ENGINEER SHALL DETERMINE WINGWALL HEIGHT BASED ON ROADWAY AND SIDEWALK CROSS SLOPES.



BACKWALL



7 CORNER DETAILS

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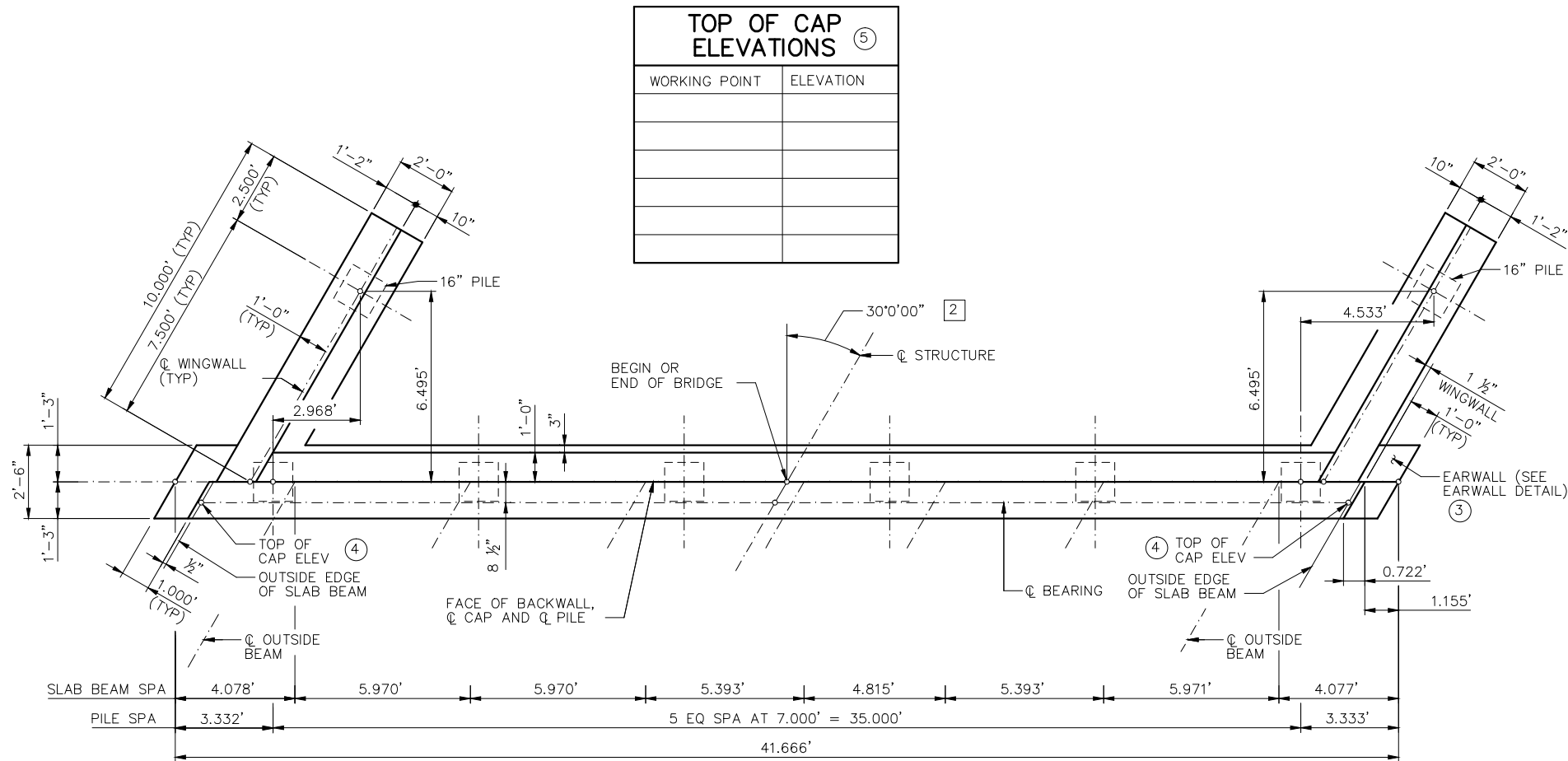


FIRM INFO

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NOTE

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CK'D BY:	DESIGN GUIDELINES-ABUTMENT	FILE NAME:	
SCALE:	SLAB BEAM-DR SHAFT	FILE NO:	
DATE:	HALF BOULEVARD, 30° SKEW	SHT NO:	
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HL93 LOADING



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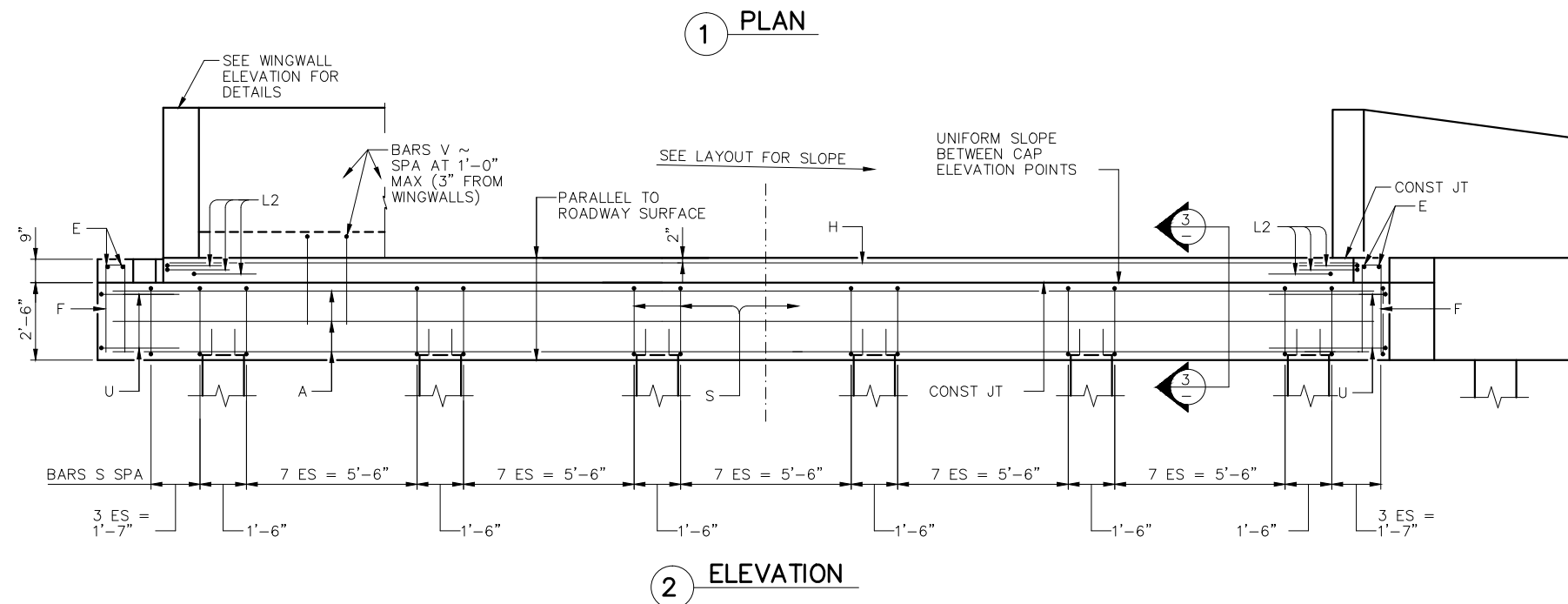
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X TONS PER PILE.



② ELEVATION

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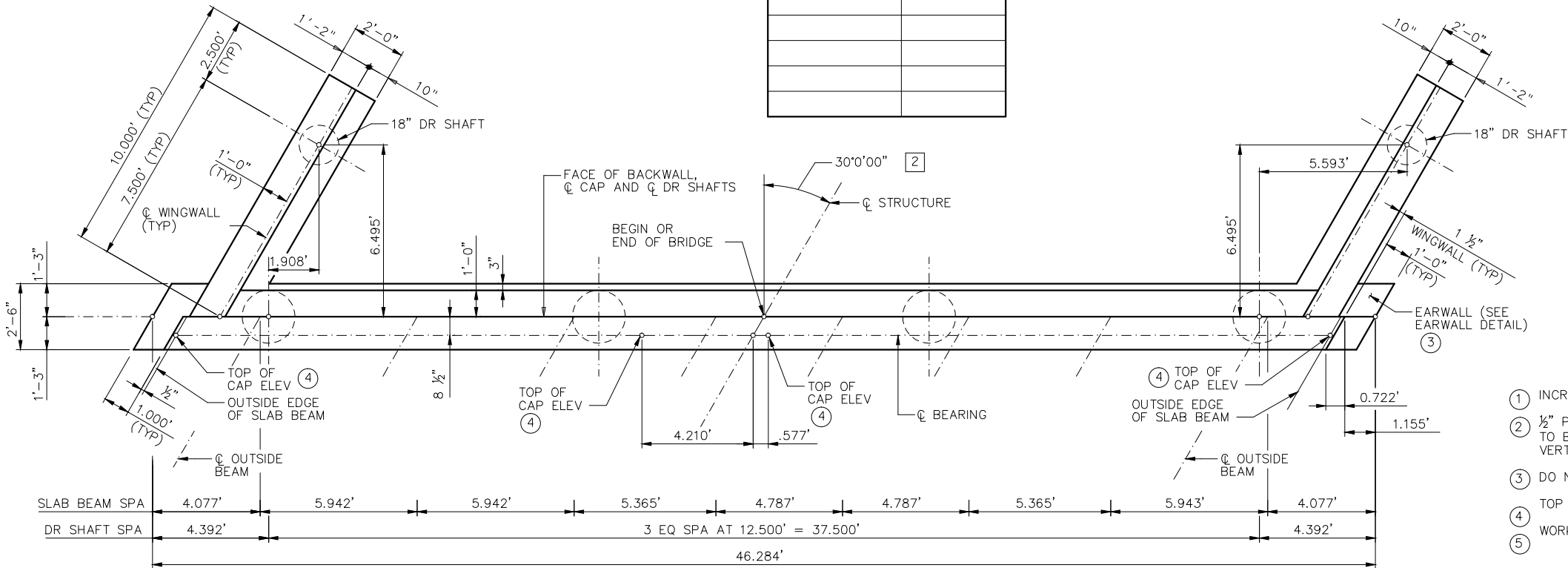
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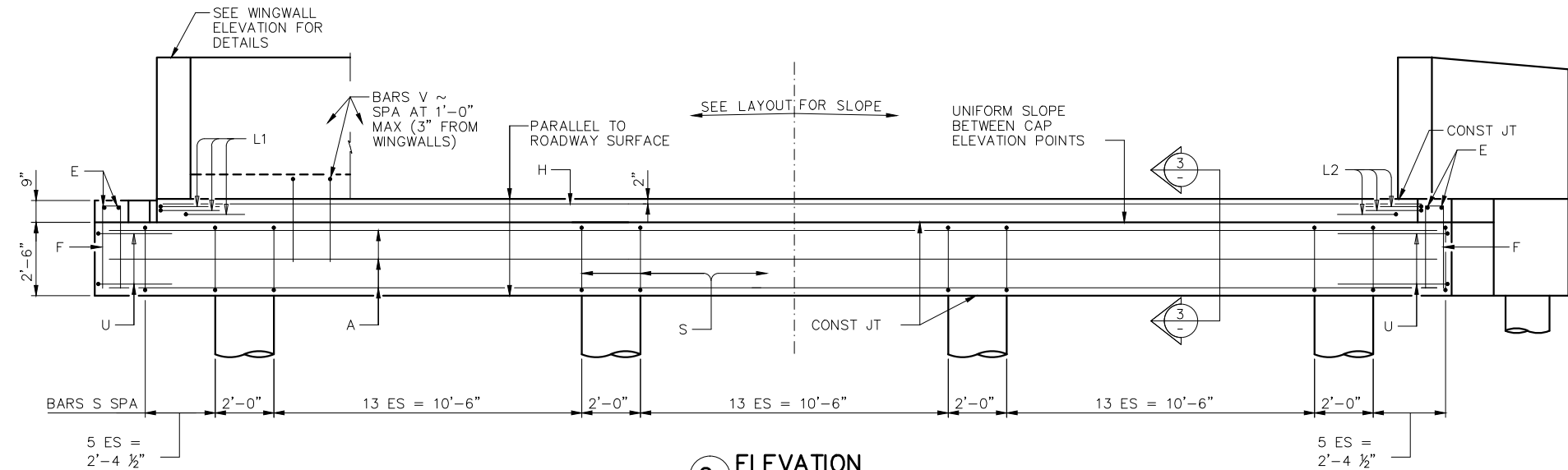
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DRAWN BY:	SHEET DESCRIPTION:	DESIGN GUIDELINES-ABUTMENT	JOB NO:
CK'D BY:		SLAB BEAM-PILES	FILE NAME:
SCALE:		HALF BOULEVARD, 30° SKEW	FILE NO:
DATE:	APPROVED BY:	(SHEET 1 OF 2)	SHT NO: 80



TOP OF CAP ELEVATIONS ⑤	
WORKING POINT	ELEVATION



1 PLAN



2 ELEVATION

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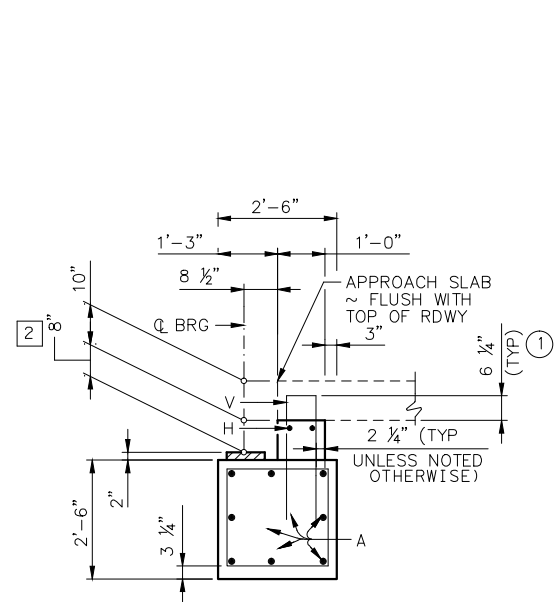


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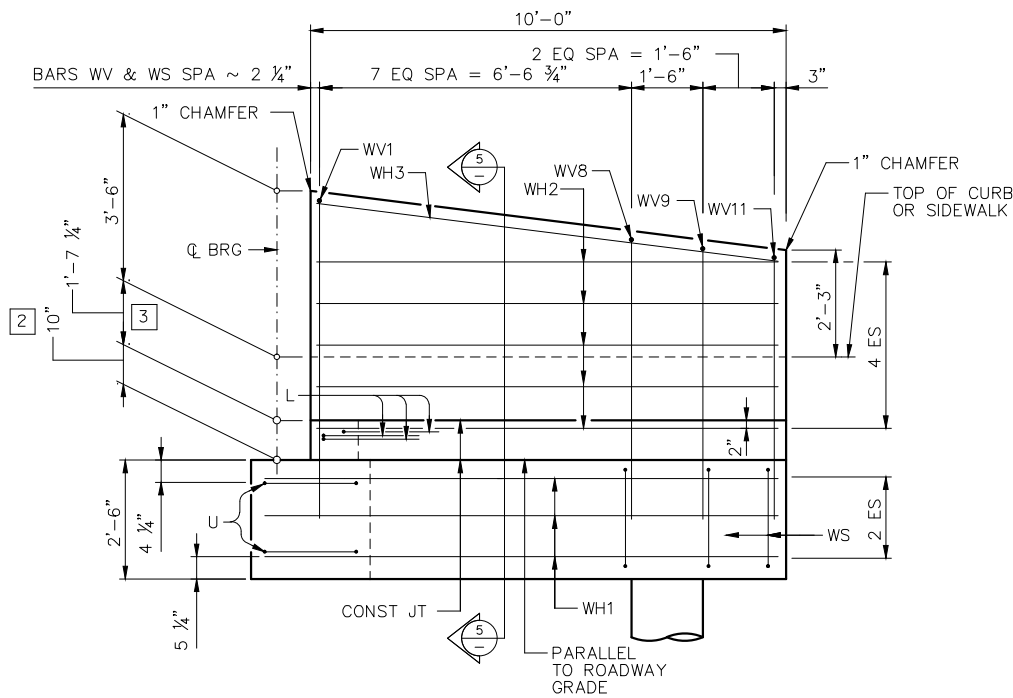
SEAL  
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	(SHEET 1 OF 2)	82

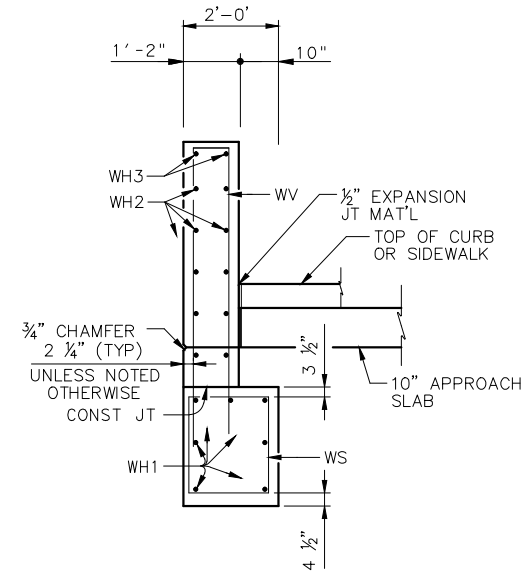
HL93 LOADING



SECTION 1



WINGWALL ELEVATION  
(EARWALL NOT SHOWN FOR CLARITY.)



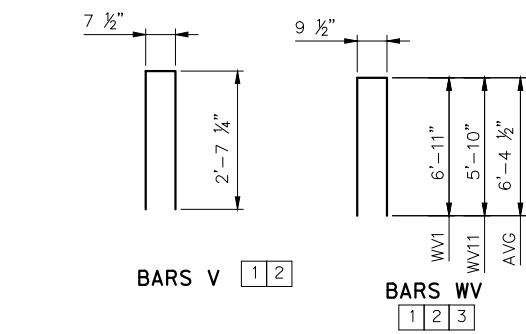
SECTION 5

BILL OF REINFORCING STEEL <sup>1</sup>				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	8	#11	45'-3"	1,923
E	4	#4	2'-6"	7
F	10	#4	6'-6"	43
H	2	#6	43'-6"	131
L1	3	#6	4'-0"	18
L2	3	#6	4'-0"	18
S	54	#4	9'-2"	331
U	4	#6	7'-4"	44
V	42	#5	5'-10"	256
WH1	14	#6	11'-0"	231
WH2	20	#6	9'-8"	290
WH3	4	#6	9'-9"	59
WS	22	#4	7'-9"	114
WV (AVG)	22	#5	13'-7"	312
REINFORCING STEEL			LB	3,777
ESTIMATED QUANTITIES <sup>1</sup>				
REINFORCING STEEL			LB	3,777
CLASS B1 CONCRETE			CY	20.5

- INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE.
- 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.

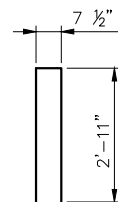
### NOTES TO ENGINEER

- GUIDELINE DRAWINGS ARE FOR B12 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
- THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB AND THE EFFECT OF VERTICAL CURVE.
- THE ENGINEER SHALL DETERMINE WINGWALL HEIGHT BASED ON ROADWAY AND SIDEWALK CROSS SLOPES.

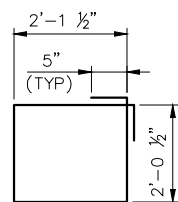


BARS V

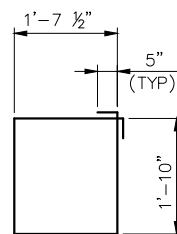
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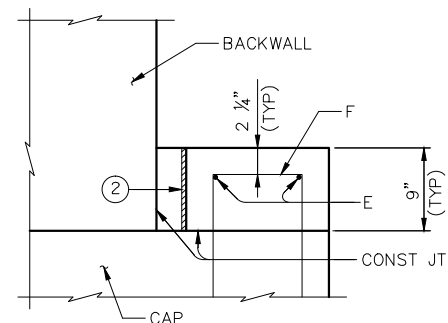
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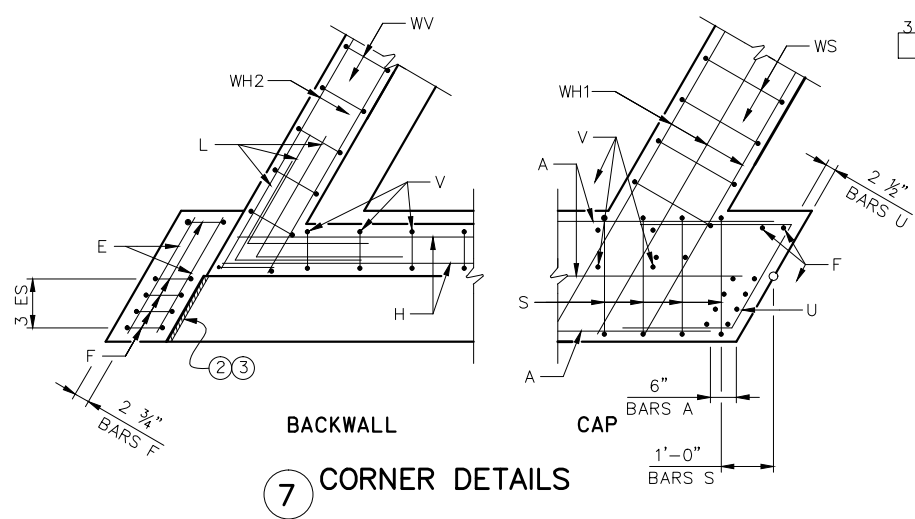
BARS S



BARS WS



EARWALL DETAIL  
(SLOPE TOP OF EARWALL AWAY FROM BEAMS)



CORNER DETAILS

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O. AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT



FIRM INFO

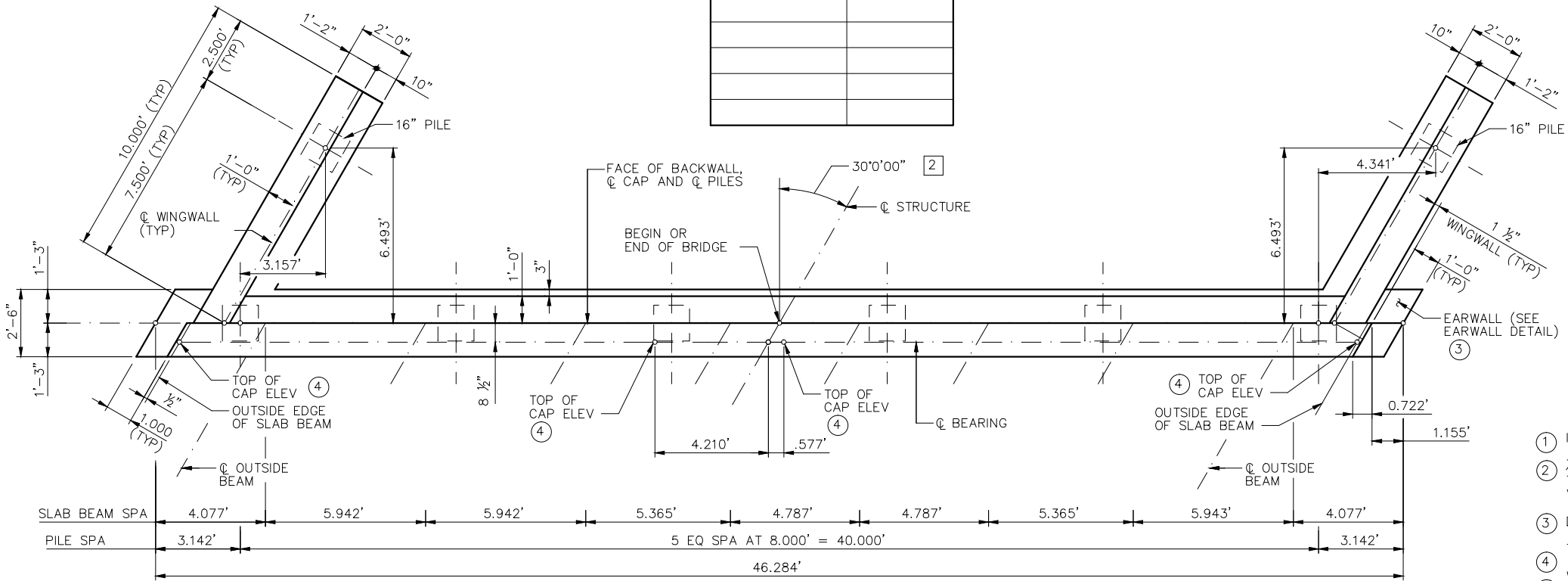
SEAL  
NOTE

PROJECT TITLE		
DRAWN BY:	DESIGN GUIDELINES-ABUTMENT	JOB NO:
CHK'D BY:	SLAB BEAM-DR SHAFT	FILE NAME:
SCALE:	TWO-WAY ROAD, 30° SKEW	FILE NO:
DATE:	(SHEET 2 OF 2)	SHT NO: 83

HL93 LOADING



TOP OF CAP ELEVATIONS ⑤	
WORKING POINT	ELEVATION



NOTES TO DESIGN ENGINEER:

- A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.
- IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC PROJECT REQUIREMENTS.
- B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT PLANS, AND SHALL ADJUST PAGE NUMBERS ACCORDINGLY.
- C. THE DESIGN ENGINEER SHALL CONSULT THE HARRIS COUNTY DESIGN MANUAL AND SPECIFICATIONS FOR INFORMATION PERTINENT TO THESE DESIGN GUIDELINE DRAWINGS.
- D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE BRIDGE PLANS.

- ① INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE.
- ② 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ③ DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- ④ TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- ⑤ WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

1 PLAN

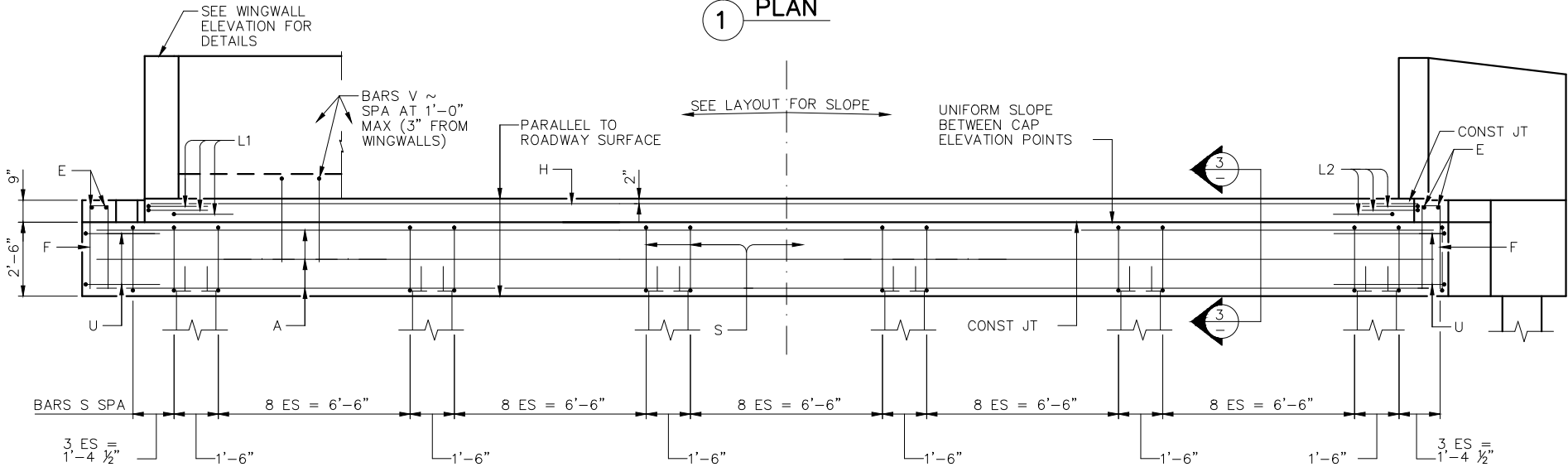
NOTES TO ENGINEER

- ① GUIDELINE DRAWINGS ARE FOR B12 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
- ② SKEWS HIGHER THAN 30° ARE NOT RECOMMENDED.

ABUTMENT NOTES

1. DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
2. ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
3. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
4. ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
7. MAXIMUM CALCULATED FOUNDATION LOADS:  
X TONS PER SHAFT.

2 ELEVATION



NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGURRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT

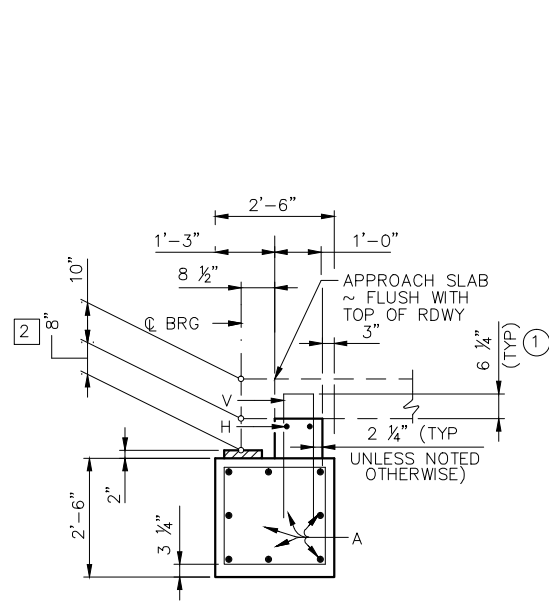


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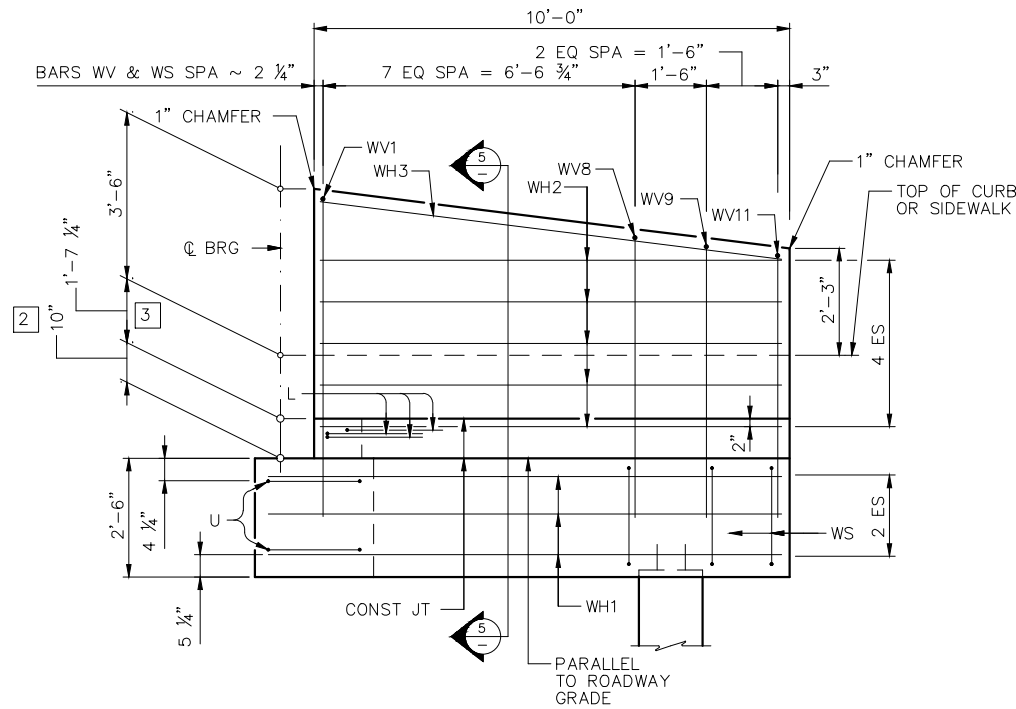
SEAL  
NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	DESIGN GUIDELINES-ABUTMENT	JOB NO:
CK'D BY:		SLAB BEAM-PILES	FILE NAME:
SCALE:		TWO-WAY ROAD, 30° SKEW	FILE NO:
DATE:	APPROVED BY:	(SHEET 1 OF 2)	SHT NO: 84

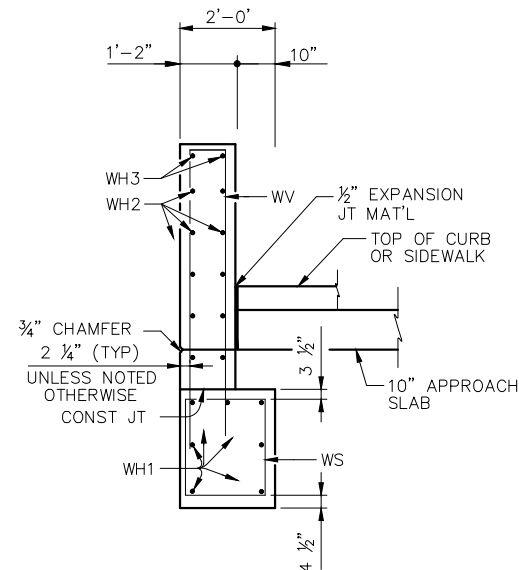
HL93 LOADING



3 SECTION 1



4 WINGWALL ELEVATION 1  
(EARWALL NOT SHOWN FOR CLARITY.)



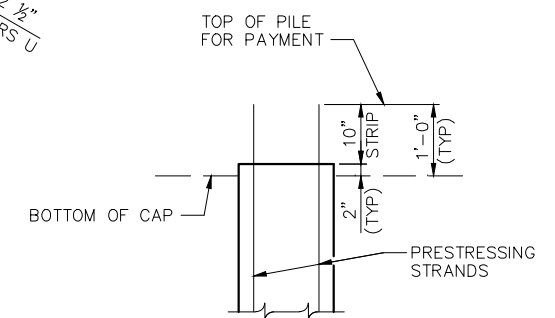
5 SECTION

BILL OF REINFORCING STEEL 1				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	8	#11	45'-3"	1,923
E	4	# 4	2'-6"	7
F	10	# 4	6'-6"	43
H	2	# 6	43'-6"	131
L1	3	# 6	4'-0"	18
L2	3	# 6	4'-0"	18
S	53	# 4	9'-2"	325
U	4	# 6	7'-4"	44
V	42	# 5	5'-10"	256
WH1	14	# 6	11'-0"	231
WH2	20	# 6	9'-8"	290
WH3	4	# 6	9'-9"	59
WS	22	# 4	7'-9"	114
WV (AVG)	22	# 5	13'-7"	312
REINFORCING STEEL			LB	3,771
ESTIMATED QUANTITIES 1				
REINFORCING STEEL			LB	3,771
CLASS B1 CONCRETE			CY	20.5

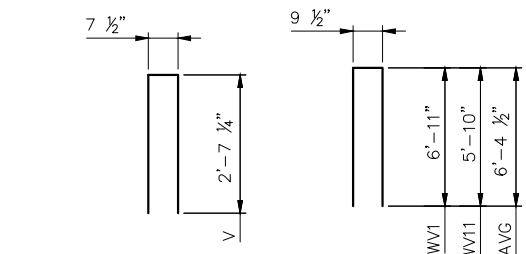
- INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE. 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.

## NOTES TO ENGINEER

- GUIDELINE DRAWINGS ARE FOR B12 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
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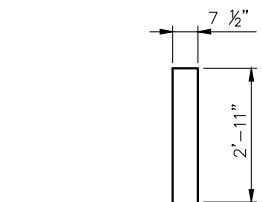


8 PILING EMBEDMENT DETAIL

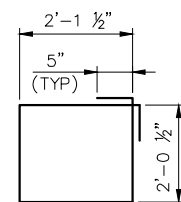


BARS V 1 2

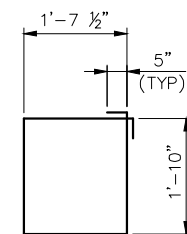
BARS WV 1 2 3



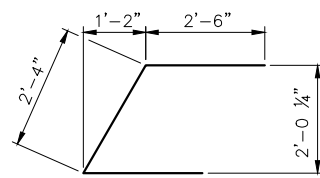
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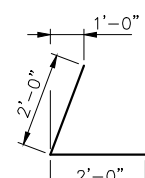
BARS S



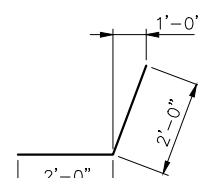
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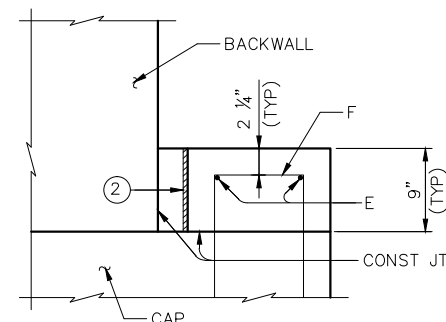
BARS U



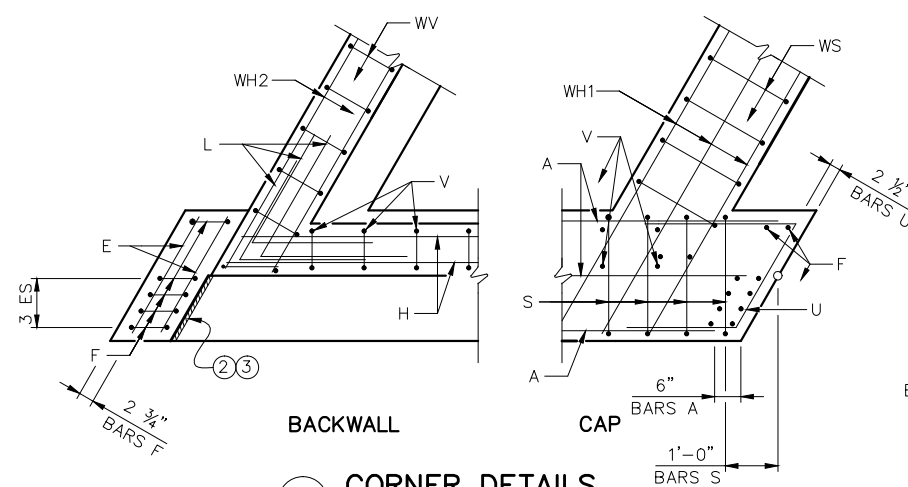
BARS L1



BARS L2



6 EARWALL DETAIL 3  
(SLOPE TOP OF EARWALL AWAY FROM BEAMS)



7 CORNER DETAILS

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O. AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

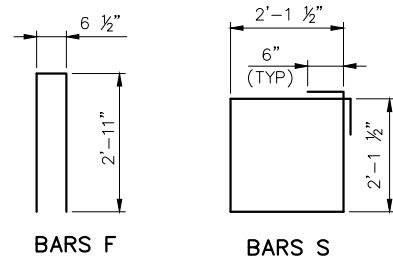
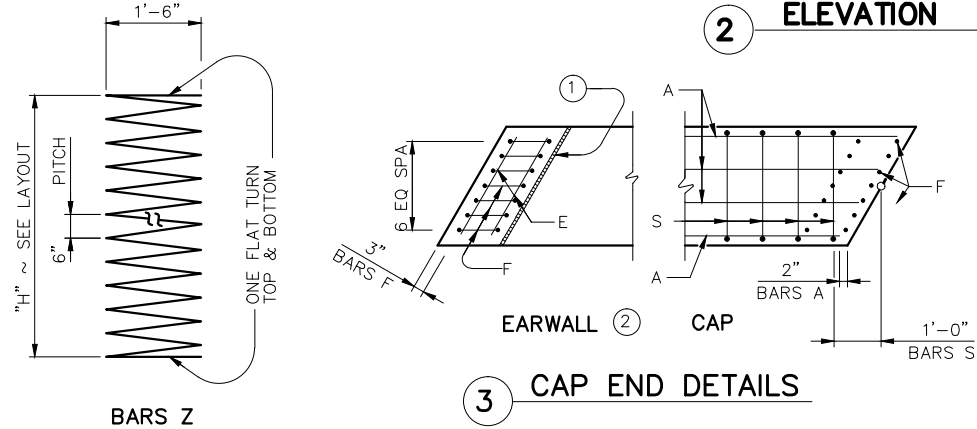
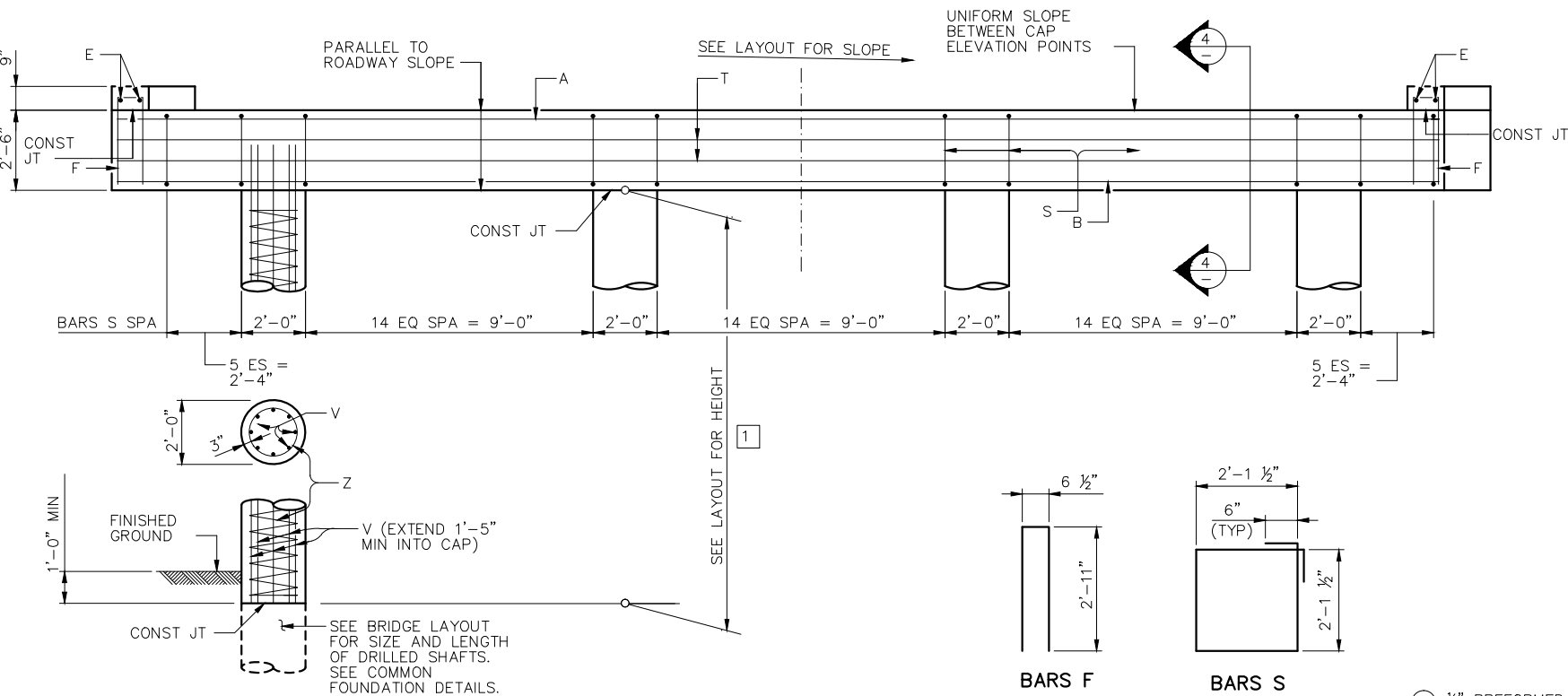
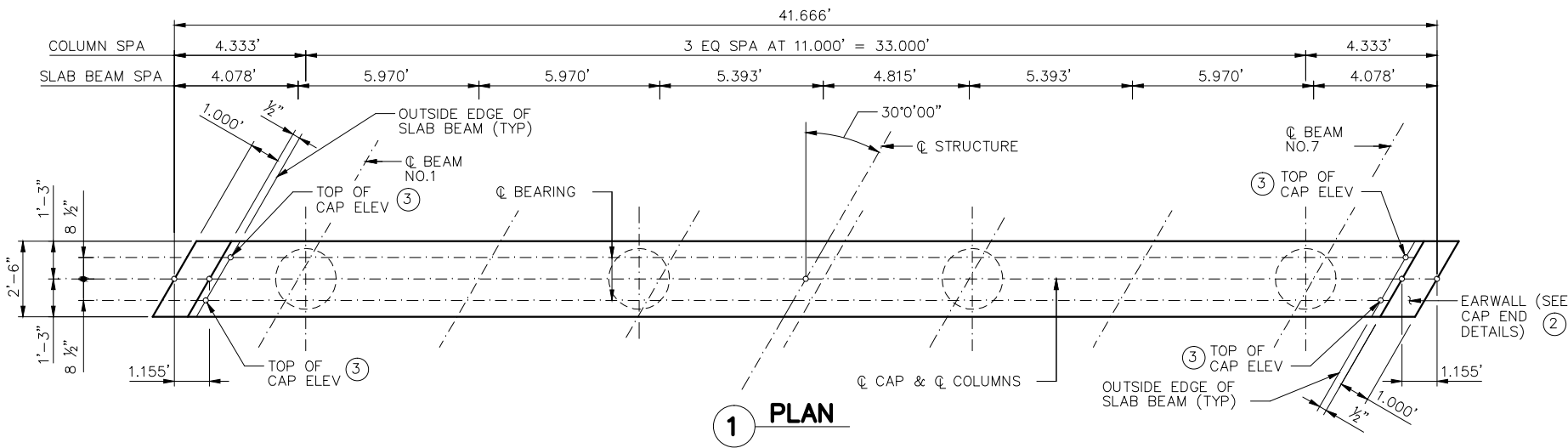
HARRIS COUNTY  
ENGINEERING DEPARTMENT



FIRM INFO

SEAL  
NOTE

PROJECT TITLE:		PSSS LOADING	
DRAWN BY:	SHEET DESCRIPTION: DESIGN GUIDELINES—ABUTMENT		JOB NO:
CHK'D BY:	SLAB BEAM—PILES		FILE NAME:
SCALE:	TWO—WAY ROAD, 30° SKEW		FILE NO:
DATE:	APPROVED BY:	(SHEET 2 OF 2)	SHT NO: 85



- 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- FOR EACH LINEAR FOOT VARIATION IN "H" VALUE MAKE FOLLOWING ADJUSTMENTS:  
BARS V: 1'-0"  
BARS Z: 9.478'  
REINFORCING STEEL: 80 LB  
CLASS "B1" CONCRETE (COL): 0.465 CY
- WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

BILL OF REINFORCING STEEL ④				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	4	#11	41'-4"	878
B	4	#11	41'-4"	878
E	4	# 4	2'-6"	7
F	14	# 4	6'-6"	61
S	57	# 5	9'-6"	565
T	4	# 5	41'-4"	172
V	32	# 7	21'-5"	1,401
Z	4	# 3	199'-0"	299
REINFORCING STEEL			LB	4,261
ESTIMATED QUANTITIES				
REINFORCING STEEL			LB	4,261
CLASS B1 CONCRETE (CAP)			CY	9.8
CLASS B1 CONCRETE (COL)			CY	9.3

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#### INTERIOR BENT NOTES

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- ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
- DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
- SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
- MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER SHAFT.

#### NOTES TO ENGINEER

- QUANTITIES SHOWN ARE BASED ON AN "H" DIMENSION OF 20'.

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGURRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

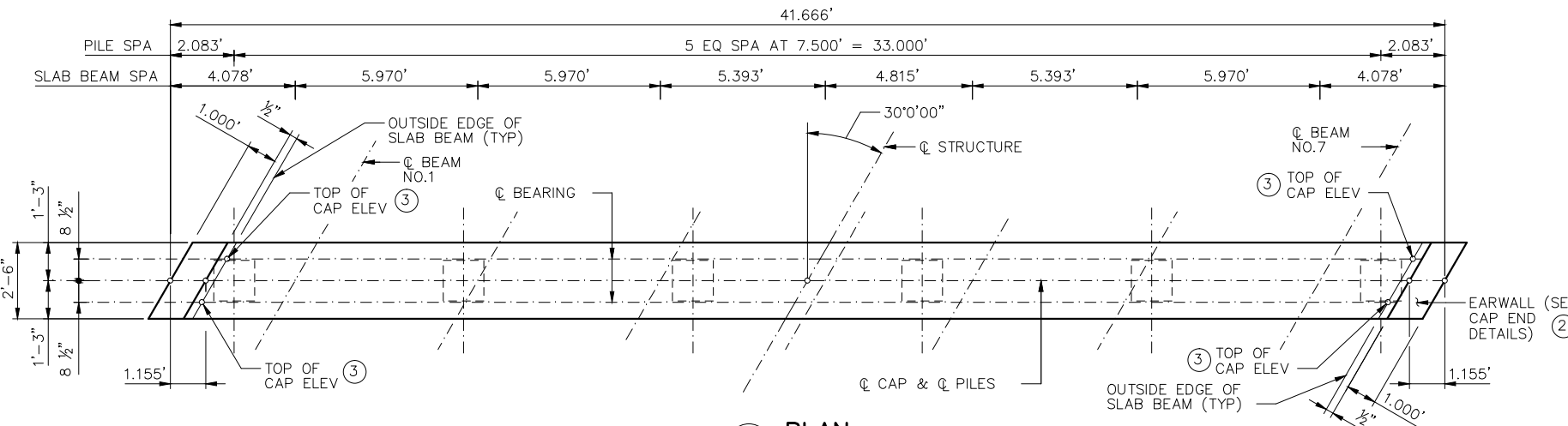
HARRIS COUNTY  
ENGINEERING DEPARTMENT



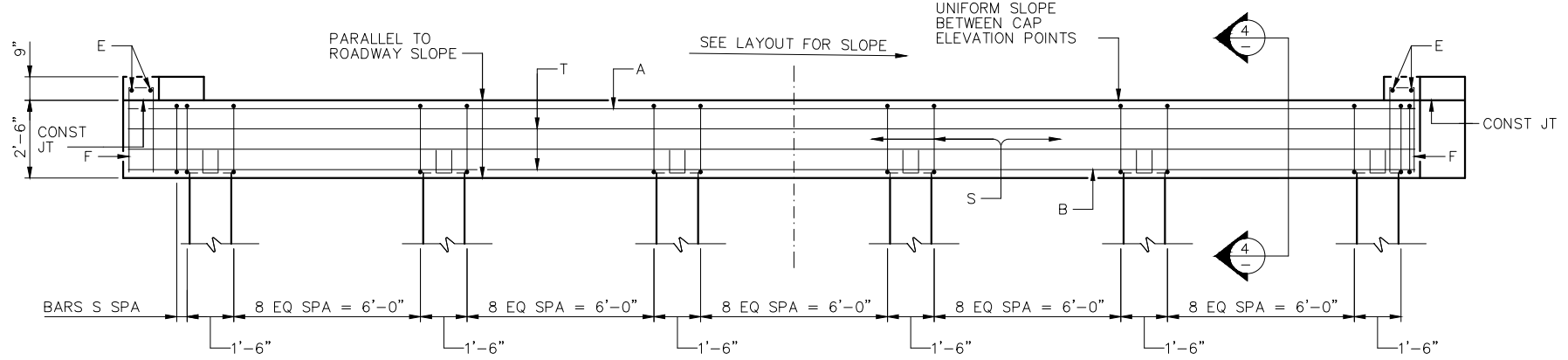
FIRM INFO

SEAL  
NOTE

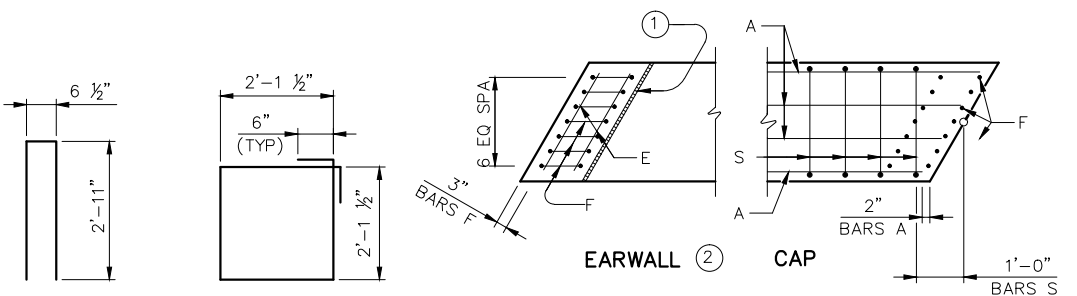
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DRAWN BY:	SHEET DESCRIPTION: DESIGN GUIDELINES-BENT	JOB NO:
CK'D BY:	SLAB BEAMS-DR SHAFT	FILE NAME:
SCALE:	HALF BOULEVARD, 30° SKEW	FILE NO:
DATE:	APPROVED BY:	SHT NO: 86



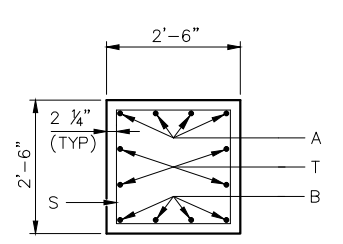
1 PLAN



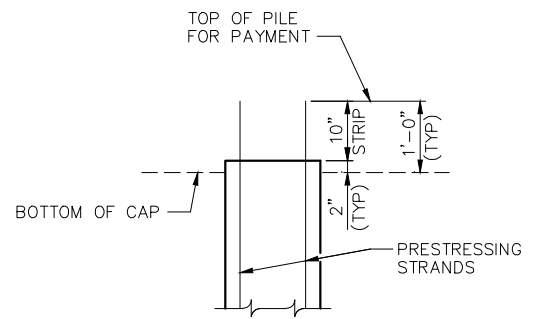
2 ELEVATION 1



3 CAP END DETAILS



4 BENT CAP SECTION



5 PILING EMBEDMENT DETAIL

BILL OF REINFORCING STEEL

BAR	NO.	SIZE	LENGTH	WEIGHT
A	4	#11	41'-4"	878
B	4	#11	41'-4"	878
E	4	# 4	2'-6"	7
F	14	# 4	6'-6"	61
S	49	# 5	9'-6"	486
T	4	# 5	41'-4"	172
REINFORCING STEEL			LB	2,482

ESTIMATED QUANTITIES

REINFORCING STEEL	LB	2,482
CLASS B1 CONCRETE (CAP)	CY	9.8

- ① 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ② DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- ③ TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- ④ WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

NOTES TO DESIGN ENGINEER:

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TOP OF CAP ELEVATIONS ④	
WORKING POINT	ELEVATION

INTERIOR BENT NOTES

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2. ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I. @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
3. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
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5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
7. MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER PILE.

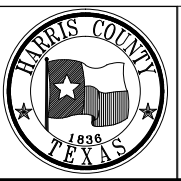
NOTES TO ENGINEER

- 1 EXPOSED PILE HEIGHT SHALL NOT EXCEED 16' FOR 16" PILING, AND 20' FOR 18" PILING.

HL93 LOADING

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGURRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

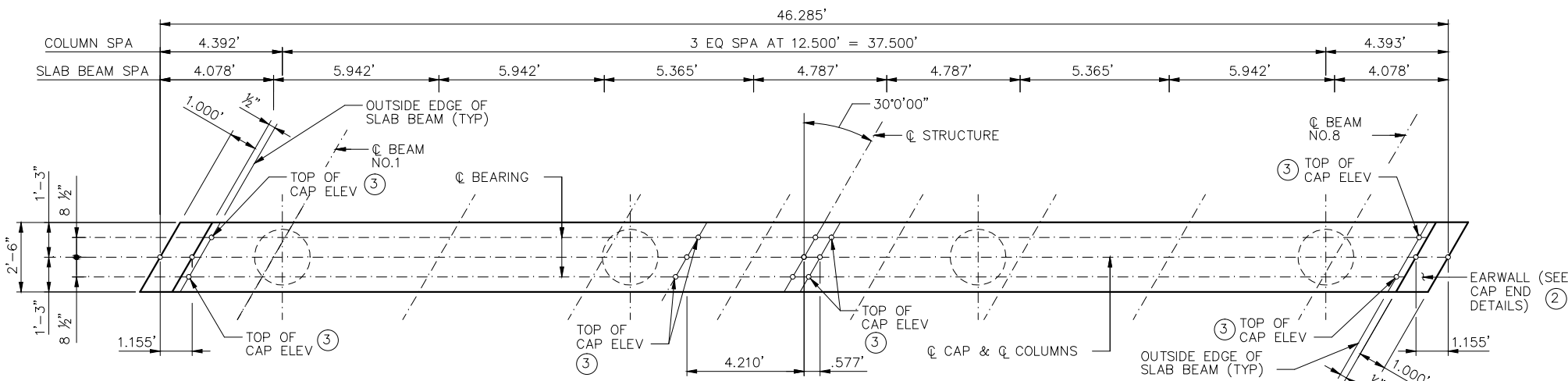
HARRIS COUNTY  
ENGINEERING DEPARTMENT



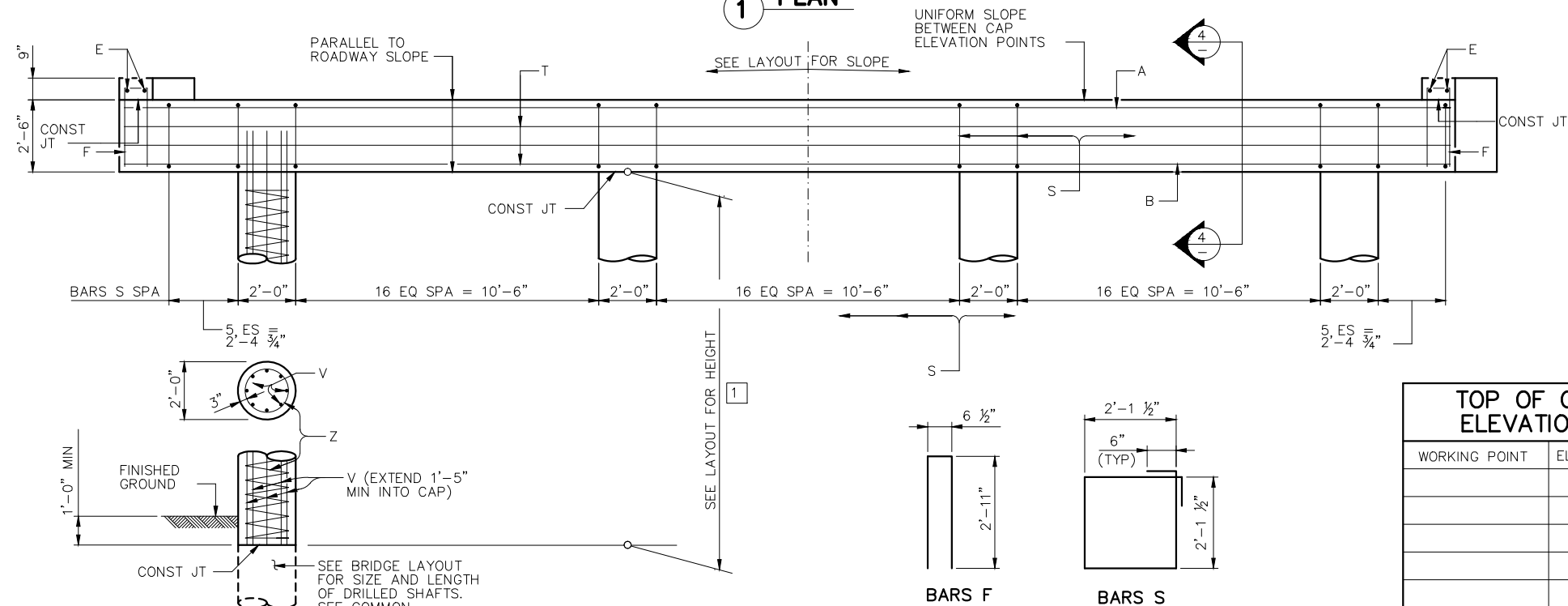
FIRM INFO

SEAL  
NOTE

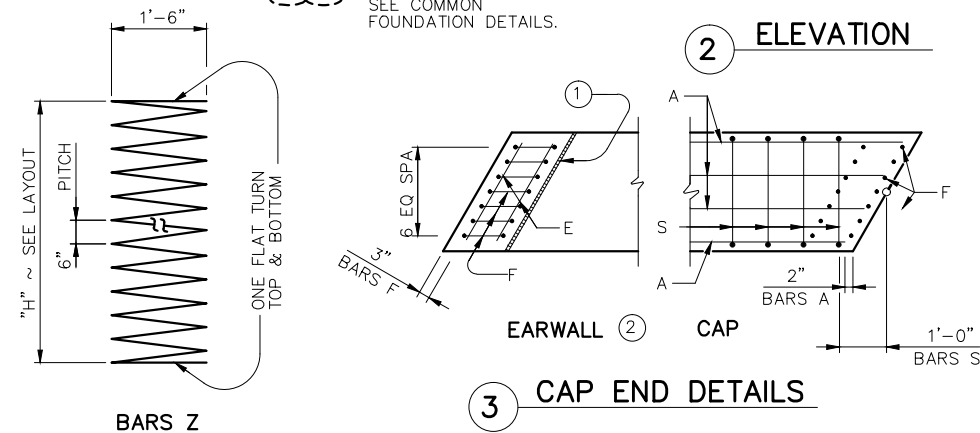
PROJECT TITLE		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:
CHK'D BY:	DESIGN GUIDELINES-BENT	FILE NAME:
SCALE:	SLAB BEAMS-PILES	FILE NO:
DATE:	HALF BOULEVARD,30'SKEW	SHT NO:
		87



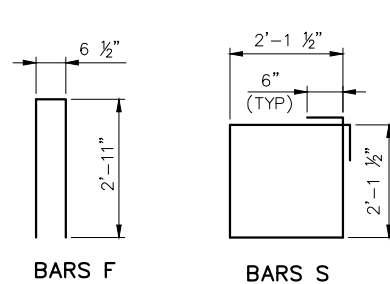
1 PLAN



2 ELEVATION



3 CAP END DETAILS



4 BENT CAP SECTION

- ① 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
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- ④ FOR EACH LINEAR FOOT VARIATION IN "H" VALUE MAKE FOLLOWING ADJUSTMENTS:  
BARS V: 1'-0"  
BARS Z: 9.478'  
REINFORCING STEEL: 80 LB  
CLASS "B1" CONCRETE (COL): 0.465 CY
- ⑤ WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

BILL OF REINFORCING STEEL ④				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	4	# 11	46'-0"	978
B	4	# 11	46'-0"	978
E	4	# 4	2'-6"	7
F	14	# 4	6'-6"	61
S	63	# 5	9'-6"	624
T	4	# 5	46'-0"	192
V	32	# 7	22'-3"	1,455
Z	4	# 3	264'-9"	398
REINFORCING STEEL			LB	4,693
ESTIMATED QUANTITIES				
REINFORCING STEEL			LB	4,693
CLASS B1 CONCRETE (CAP)			CY	10.9
CLASS B1 CONCRETE (COL)			CY	9.3

NOTES TO DESIGN ENGINEER:

- A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.
- IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC PROJECT REQUIREMENTS.
- B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT PLANS, AND SHALL ADJUST PAGE NUMBERS ACCORDINGLY.
- C. THE DESIGN ENGINEER SHALL CONSULT THE HARRIS COUNTY DESIGN MANUAL AND SPECIFICATIONS FOR INFORMATION PERTINENT TO THESE DESIGN GUIDELINE DRAWINGS.
- D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE BRIDGE PLANS.

INTERIOR BENT NOTES

1. DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
2. ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I. @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
3. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
4. ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
7. MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER SHAFT.

NOTES TO ENGINEER

1. QUANTITIES SHOWN ARE BASED ON AN "H" DIMENSION OF 20'.

HL93 LOADING

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGURRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

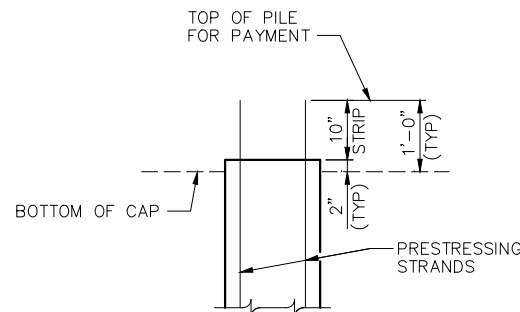
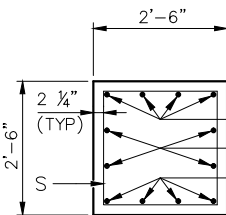
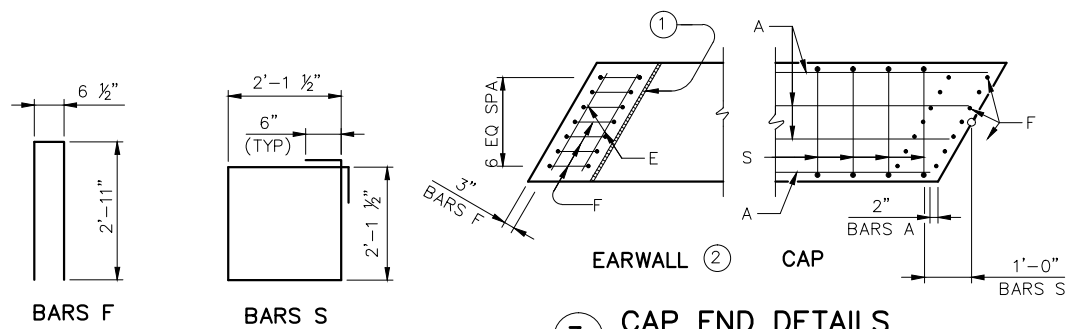
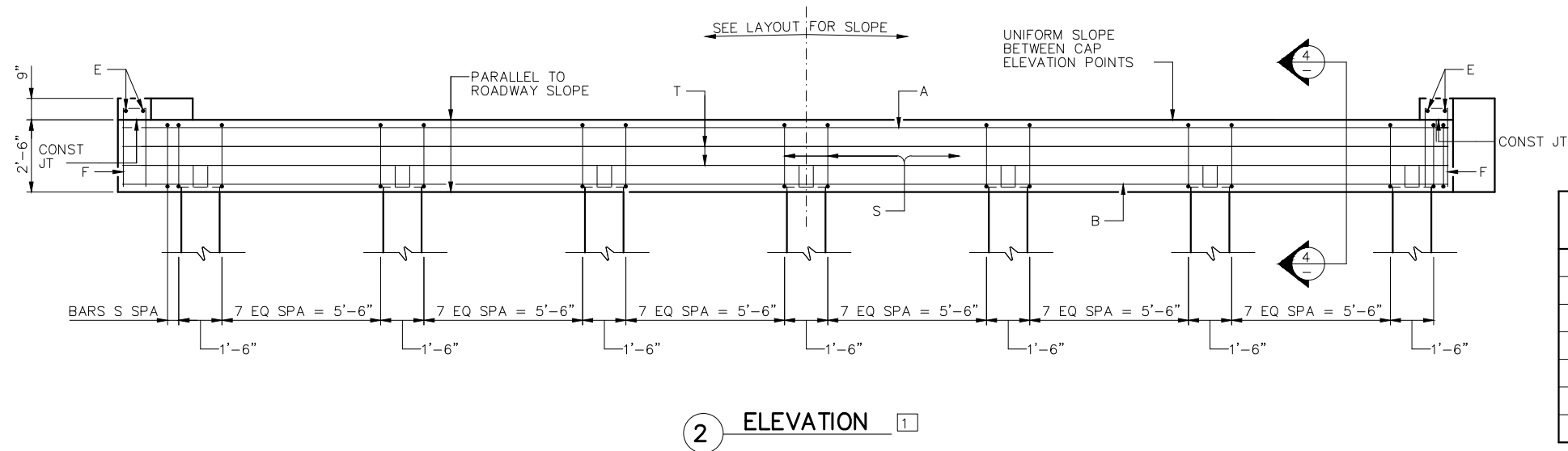
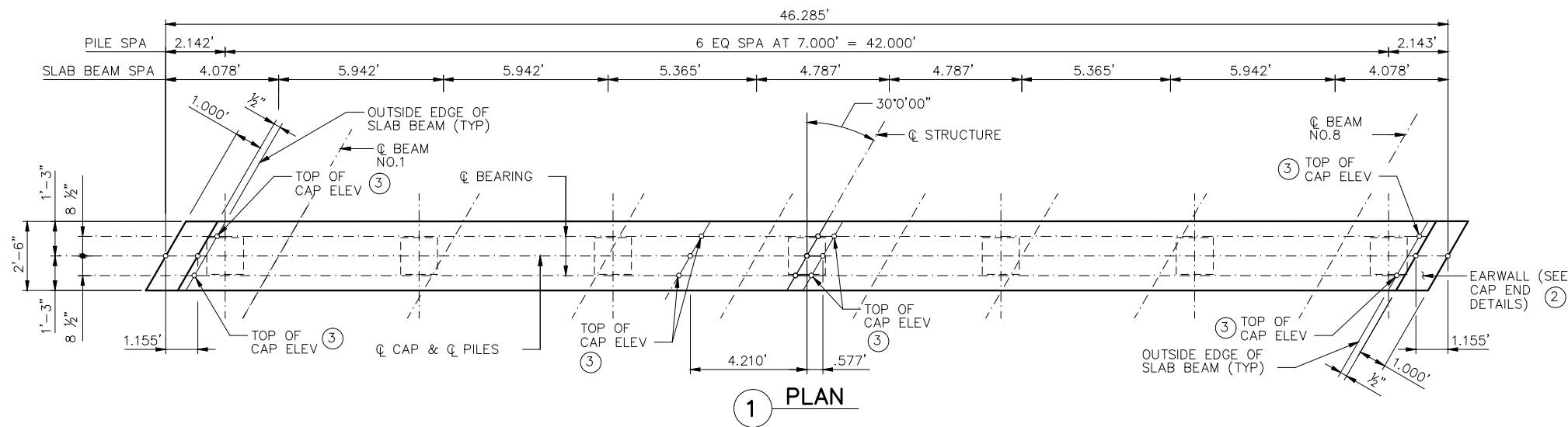
HARRIS COUNTY  
ENGINEERING DEPARTMENT



FIRM INFO

SEAL  
NOTE

PROJECT TITLE		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:
CK'D BY:	DESIGN GUIDELINES-BENT	FILE NAME:
SCALE:	SLAB BEAMS-DR SHAFT	FILE NO:
DATE:	TWO-WAY ROAD, 30' SKEW	SHT NO:
		88



BILL OF REINFORCING STEEL				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	4	# 11	46'-0"	978
B	4	# 11	46'-0"	978
E	4	# 4	2'-6"	7
F	14	# 4	6'-6"	61
S	52	# 5	9'-6"	515
T	4	# 5	46'-0"	192
REINFORCING STEEL			LB	2,731
ESTIMATED QUANTITIES				
REINFORCING STEEL			LB	2,731
CLASS B1 CONCRETE			CY	10.9

- 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

#### NOTES TO DESIGN ENGINEER:

A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.

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TOP OF CAP ELEVATIONS	
WORKING POINT	ELEVATION

#### INTERIOR BENT NOTES

- DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
- ALL CONCRETE SHALL BE CLASS B1, 3500 P.S.I. @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE.
- ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
- ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
- DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
- SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
- MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER PILE.

#### NOTES TO ENGINEER

- EXPOSED PILE HEIGHT SHALL NOT EXCEED 16' FOR 16" PILING, AND 20' FOR 18" PILING.

HL93 LOADING

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGURRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT



FIRM INFO

SEAL  
NOTE

PROJECT TITLE		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:
OK'D BY:	DESIGN GUIDELINES-BENT	FILE NAME:
SCALE:	SLAB BEAMS-PILES	FILE NO:
DATE:	TWO-WAY ROAD, 30'SKEW	SHT NO:
		89

NOTES TO DESIGN ENGINEER:

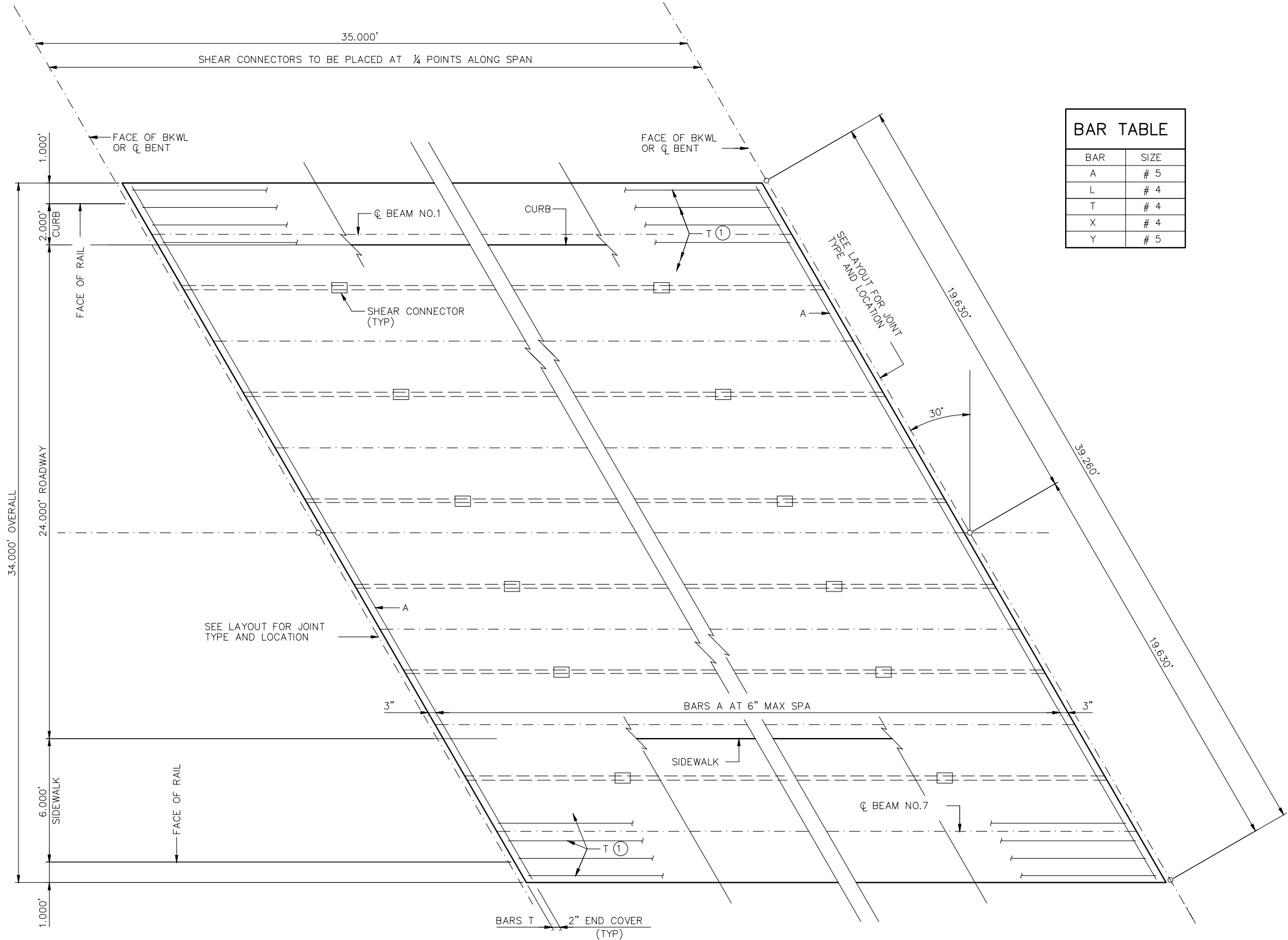
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BAR TABLE

BAR	SIZE
A	# 5
L	# 4
T	# 4
X	# 4
Y	# 5

SLAB NOTES

- DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
- ALL CONCRETE SHALL BE CLASS A1 4000 PSI @ 28 DAYS IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION ITEM 421 FOR STRUCTURAL CONCRETE. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4" UNLESS OTHERWISE NOTED.
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- THE QUANTITIES GIVEN FOR REINFORCING STEEL AND CONCRETE ARE PRESENTED FOR CONTRACTORS INFORMATION ONLY.
- BAR LAPS, WHERE REQUIRED, SHALL BE AS FOLLOWS:  
~ #4 = 1'-5"  
~ #5 = 1'-9"



PLAN

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY  
ENGINEERING DEPARTMENT



FIRM INFO

SEAL  
NOTE

PROJECT TITLE: HL93 LOADING		
DRAWN BY:	SHEET DESCRIPTION: DESIGN GUIDELINES	JOB NO:
CHK'D BY:	SPAN DETAILS-SLAB BEAMS	FILE NAME:
SCALE:	HALF BOULEVARD,30 DEG SKEW	FILE NO:
DATE:	APPROVED BY:	SHT NO: 90

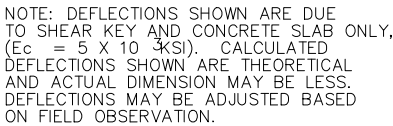
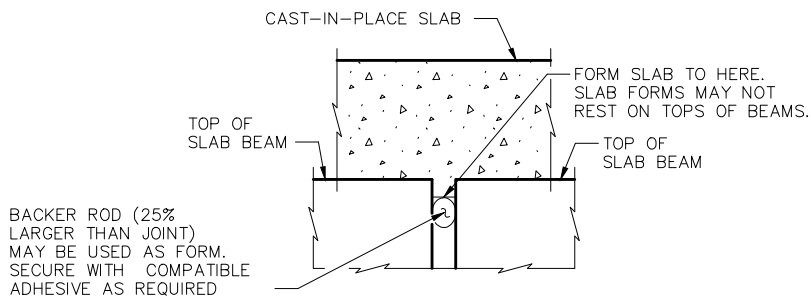
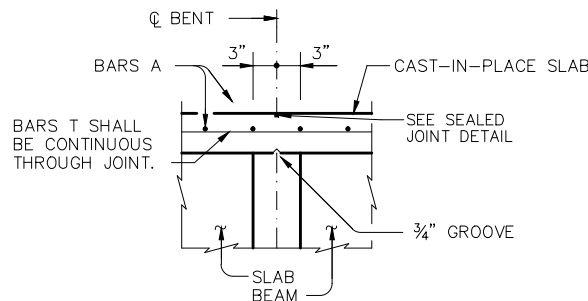


TABLE OF VARIABLE VALUES					
SPAN LENGTH	BEAM TYPE	DEAD LOAD DEFLECTION		SECTION DEPTHS <span style="border: 1px solid black; padding: 0 5px;">1</span>	
		"A"	"B"	"X"	"Y"
FT		FT	FT	IN	FT/IN
50	4SB12			6"	1'-6"
50	5SB12			6"	1'-6"

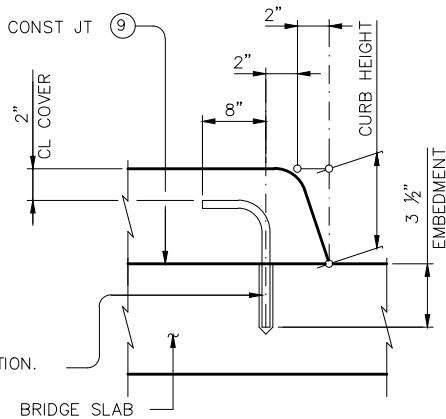
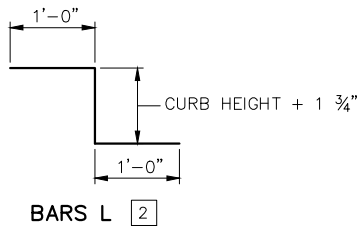
### DEAD LOAD DEFLECTION DIAGRAM



### DETAIL "A"



### CONTINUOUS SLAB DETAIL



## OPTIONAL EPOXY ANCHORS

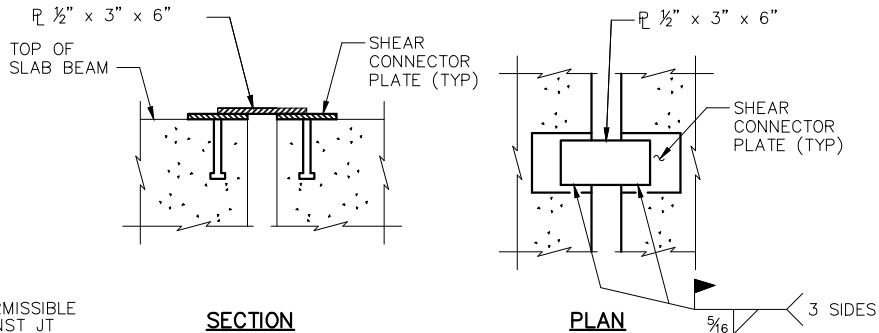
EMBED EA(#4) BAR INTO CONCRETE WITH A TYPE III (CLASS C) EPOXY MEETING THE REQUIREMENTS OF TXDOT DMS-6100, "EPOXIES AND ADHESIVES". FOLLOW MANUFACTURER'S DIRECTIONS FOR INSTALLING THE EPOXIED ANCHOR BARS.

TABLE OF ESTIMATED QUANTITIES									
SPAN LENGTH	CLASS "A1" CONCRETE (SLAB) ①	CLASS "A1" CONCRETE (SDWK)	CLASS "A1" CONCRETE (CURB)	PRESTR CONCRETE SLAB BEAMS (TY 4SB12) ⑤	PRESTR CONCRETE SLAB BEAMS (TY 5SB12) ⑤	SLAB REINF STEEL ②	SIDEWALK REINF STEEL ③	CURB REINF STEEL ④	TOTAL REINF STEEL
FT	CY	CY	CY	LF	LF	LB	LB	LB	LB
35	20.2	5.8	1.9	69.00	172.50	3,332	441	189	3,962

- ① WHERE SLAB IS CONTINUOUS OVER INTERIOR BENTS, BARS T SHALL BE CONTINUOUS THROUGH JOINT.  
SEE "CONTINUOUS SLAB DETAIL."
- ② REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 2.8 LBS PER SQUARE FOOT OF SLAB.
- ③ REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 1.8 LBS PER SQUARE FOOT OF SIDEWALK.
- ④ REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 1.8 LBS PER SQUARE FOOT OF CURB.
- ⑤ FABRICATOR SHALL ADJUST BEAM LENGTHS FOR BEAM SLOPES AS REQUIRED.
- ⑥ GAP WIDTH IS BASED ON NOMINAL BEAM WIDTHS.  
CONNECTOR PLATES ARE INCIDENTAL TO PRESTRESSED BEAM ITEM.
- ⑦ MATERIAL SHALL BE SELF LEVELING, COLD-APPLIED, RAPID CURE, LOW MODULUS SILICONE RUBBER SEALANT.  
IN ACCORDANCE WITH ITEM 427 AND SEALANT MANUFACTURER SPECIFICATIONS.
- ⑧ PROVIDE BROOM FINISH TO TOP OF BRIDGE SLAB WHERE RAISED SIDEWALK OR CURB AREA IS DEFINED.
- ⑨

## NOTES TO ENGINEER

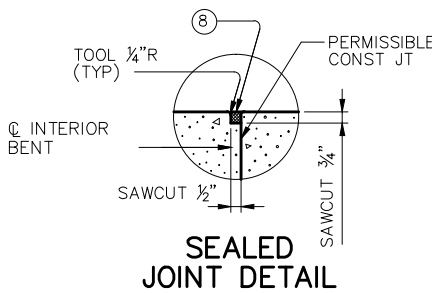
- 1 THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB AND THE EFFECT OF VERTICAL CURVE.
- 2 THE ENGINEER SHALL DETERMINE BRIDGE CURB HEIGHT.



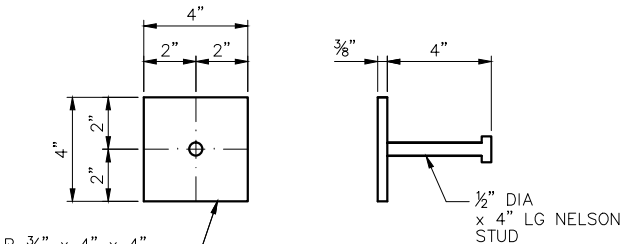
SECTION

## SHEAR CONNECTION DETAIL

A36 STEEL



SEALED  
JOINT DETAIL



SHEAR CONNECTOR PLATE (7)

A36 STEEL

[illegible]

HARRIS COUNTY  
ENGINEERING DEPARTMENT

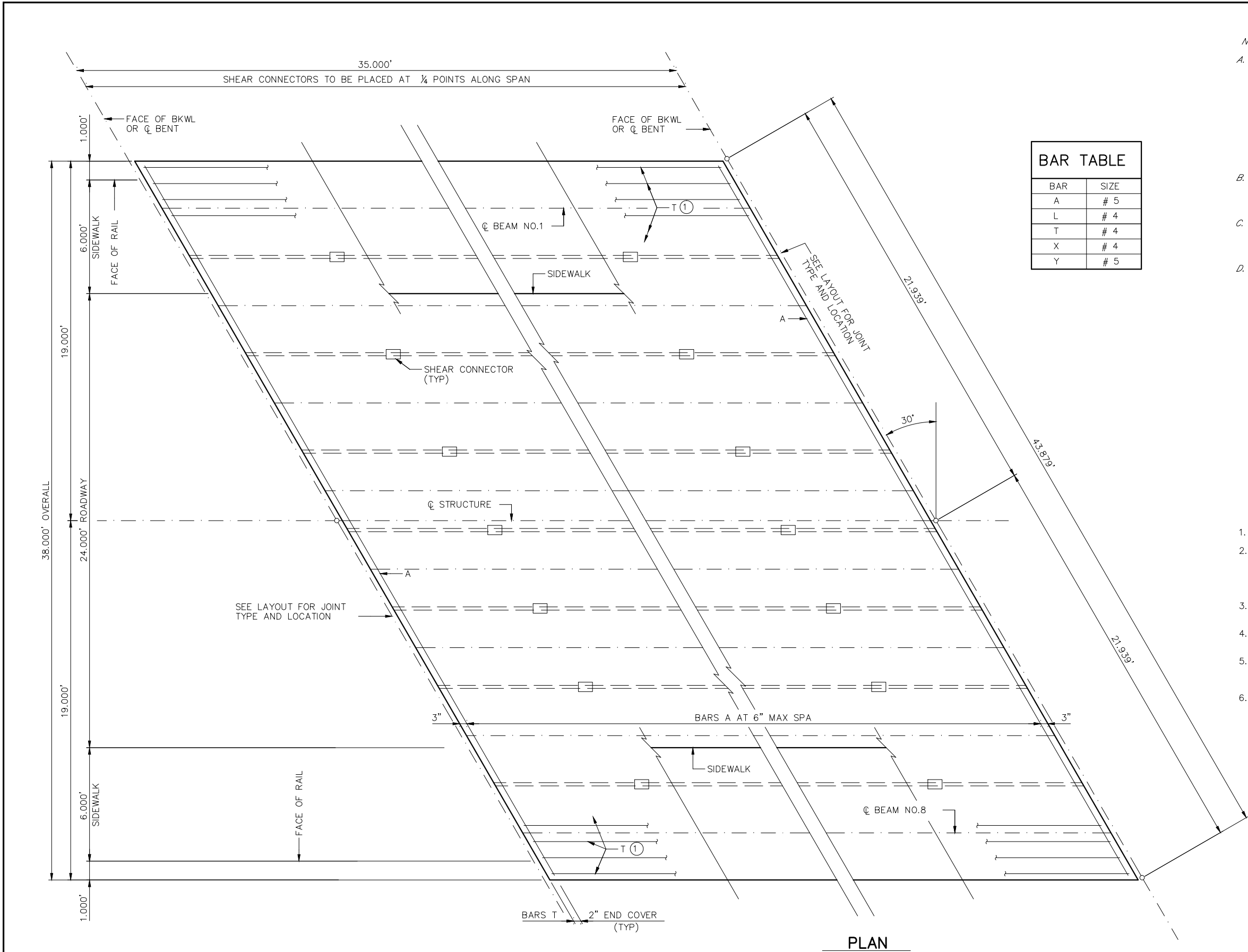


## FIRM INFO

SEAL  
NOTE

PROJECT TITLE:		
DRAWN BY:	SHEET DESCRIPTION: DESIGN GUIDELINES	JOB NO:
CKD BY:	SPAN DETAILS—SLAB BEAMS	FILE NAME:
SCALE:	HALF BOULEVARD, 30 DEG SKEW	FILE NO:
DATE:	APPROVED BY:	SHT NO: 91





BAR TABLE	
BAR	SIZE
A	# 5
L	# 4
T	# 4
X	# 4
Y	# 5

- NOTES TO DESIGN ENGINEER:
- A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.
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SLAB NOTES

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- DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS. UNLESS OTHERWISE NOTED.
- THE QUANTITIES GIVEN FOR REINFORCING STEEL AND CONCRETE ARE PRESENTED FOR CONTRACTORS INFORMATION ONLY.
- BAR LAPS, WHERE REQUIRED, SHALL BE AS FOLLOWS:  
~ #4 = 1'-5"  
~ #5 = 1'-9"

NO.	REVISIONS	DATE	NAME
0	DATE OF ISSUE	12/12/2011	O.AGUIRRE
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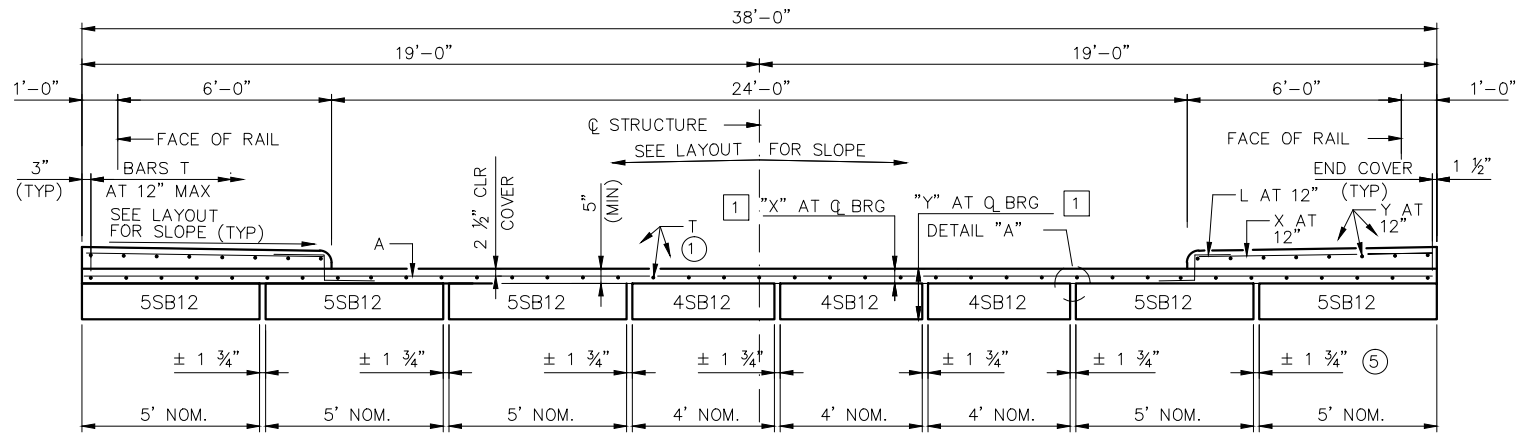
HARRIS COUNTY  
ENGINEERING DEPARTMENT



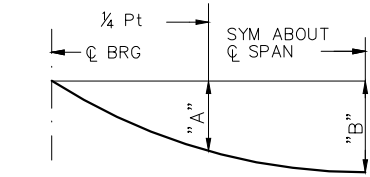
FIRM INFO

SEAL  
NOTE

PROJECT TITLE:		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:
OK'D BY:	DESIGN GUIDELINES	FILE NAME:
SCALE:	SPAN DETAILS-SLAB BEAMS	FILE NO:
DATE:	TWO-WAY ROAD, 30 DEG SKEW	SHT NO:
		92

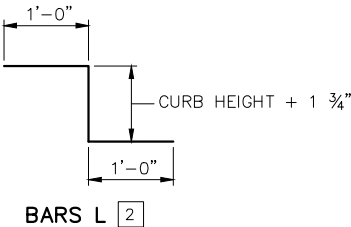


TYPICAL TRANSVERSE SECTION

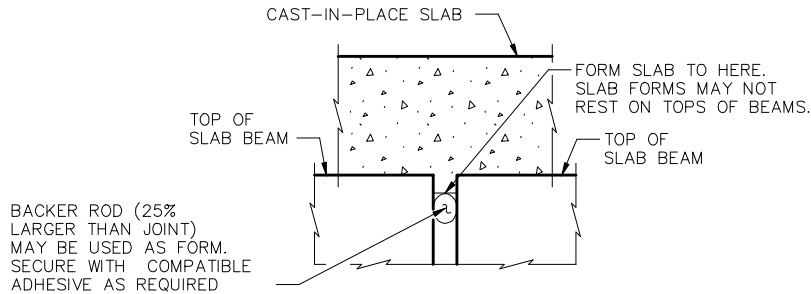


NOTE: DEFLECTIONS SHOWN ARE DUE TO SHEAR KEY AND CONCRETE SLAB ONLY, ( $E_c = 5 \times 10^3$  KSI). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DIMENSION MAY BE LESS. DEFLECTIONS MAY BE ADJUSTED BASED ON FIELD OBSERVATION.

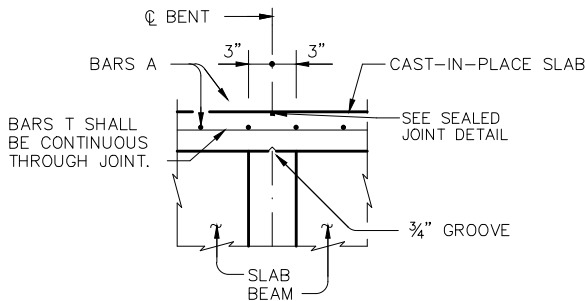
TABLE OF VARIABLE VALUES					
SPAN LENGTH	BEAM TYPE	DEAD LOAD DEFLECTION		SECTION DEPTHS	
		"A"	"B"	"X"	"Y"
FT		FT	FT	IN	FT/IN
50	4SB12			6"	1'-6"
50	5SB12			6"	1'-6"



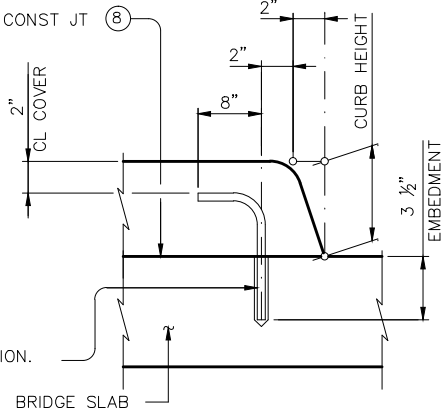
DEAD LOAD DEFLECTION DIAGRAM



DETAIL "A"

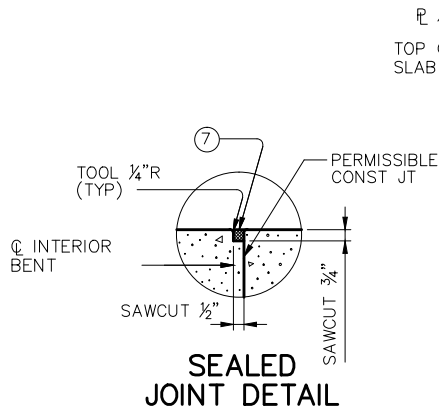


CONTINUOUS SLAB DETAIL

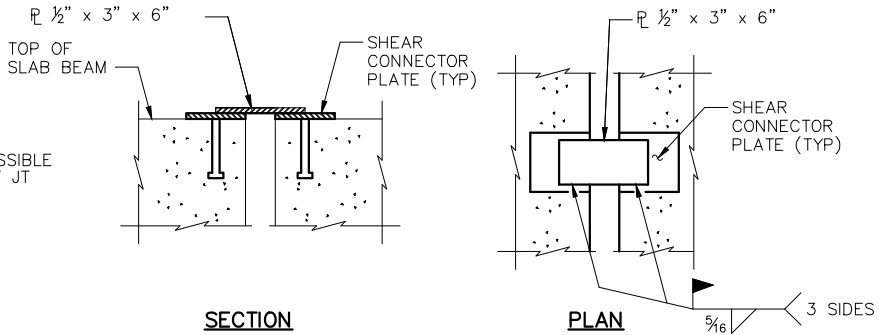


OPTIONAL EPOXY ANCHORS

EMBED EA(#4) BAR INTO CONCRETE WITH A TYPE III (CLASS C) EPOXY MEETING THE REQUIREMENTS OF TXDOT DMS-6100, "EPOXIES AND ADHESIVES". FOLLOW MANUFACTURER'S DIRECTIONS FOR INSTALLING THE EPOXYED ANCHOR BARS.



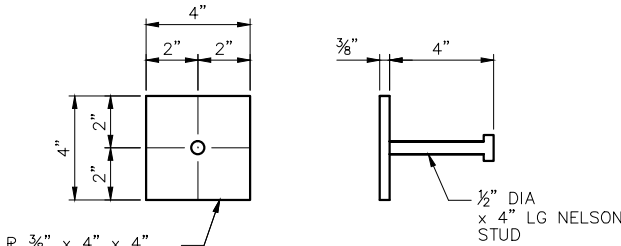
SEALED JOINT DETAIL



SECTION

SHEAR CONNECTION DETAIL

A36 STEEL



SHEAR CONNECTOR PLATE

A36 STEEL

TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	CLASS "A1" CONCRETE (SLAB)	CLASS "A1" CONCRETE (SDWK)	PRESTR CONCRETE SLAB BEAMS (TY 4SB12)	PRESTR CONCRETE SLAB BEAMS (TY 5SB12)	SLAB REINF STEEL	SIDEWALK REINF STEEL	TOTAL REINF STEEL
	1		4	4	2	3	
FT	CY	CY	LF	LF	LB	LB	LB
35	22.6	11.6	103.50	172.50	3,724	882	4,606

- WHERE SLAB IS CONTINUOUS OVER INTERIOR BENTS, BARS T SHALL BE CONTINUOUS THROUGH JOINT. SEE "CONTINUOUS SLAB DETAIL". REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 2.8 LBS PER SQUARE FOOT OF SLAB.
- REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 1.8 LBS PER SQUARE FOOT OF SIDEWALK.
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- GAP WIDTH IS BASED ON NOMINAL BEAM WIDTHS.
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- MATERIAL SHALL BE SELF LEVELING, COLD-APPLIED, RAPID CURE, LOW MODULUS SILICONE RUBBER SEALANT. IN ACCORDANCE WITH ITEM 427 AND SEALANT MANUFACTURER SPECIFICATIONS.
- PROVIDE BROOM FINISH TO TOP OF BRIDGE SLAB WHERE RAISED SIDEWALK AREA IS DEFINED.
- 

NOTES TO ENGINEER

- THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB AND THE EFFECT OF VERTICAL CURVE.
- THE ENGINEER SHALL DETERMINE BRIDGE CURB HEIGHT.

HARRIS COUNTY  
ENGINEERING DEPARTMENT



FIRM INFO

SEAL  
NOTE

PROJECT TITLE		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO:
OK'D BY:	DESIGN GUIDELINES	FILE NAME:
SCALE:	SPAN DETAILS-SLAB BEAMS	FILE NO:
DATE:	TWO-WAY ROAD, 30 DEG SKEW	SHT NO:
		93