

SHEET DESCRIPTION	① IF APPLICABLE	BY DESIGNER	GUIDELINES ②
BRIDGE LAYOUT		X	
FOUNDATION PLAN		X	
ABUTMENT AND WINGWALL DETAILS	③		X
BENT DETAILS	④(A)		X
SPAN DETAILS (TRANSVERSE SECTION)	⑤(B)		X
FRAMING PLAN	⑥(C)		X
PRESTRESSED CONCRETE BEAM DESIGN FORM	⑦	X	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

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

ABUTMENT DESIGN GUIDELINES ⑧⑨	HALF BOULEVARD	0° SKEW	PILE
		30° SKEW	DRILLED SHAFTS
	TWO-WAY ROAD	0° SKEW	PILE
		30° SKEW	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 ①			
SKEW ANGLE	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 ⑧⑨	HALF BOULEVARD	0° SKEW	PILE
		30° SKEW	DRILLED SHAFTS
	TWO-WAY ROAD	0° SKEW	PILE
		30° SKEW	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 ⑧⑨	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

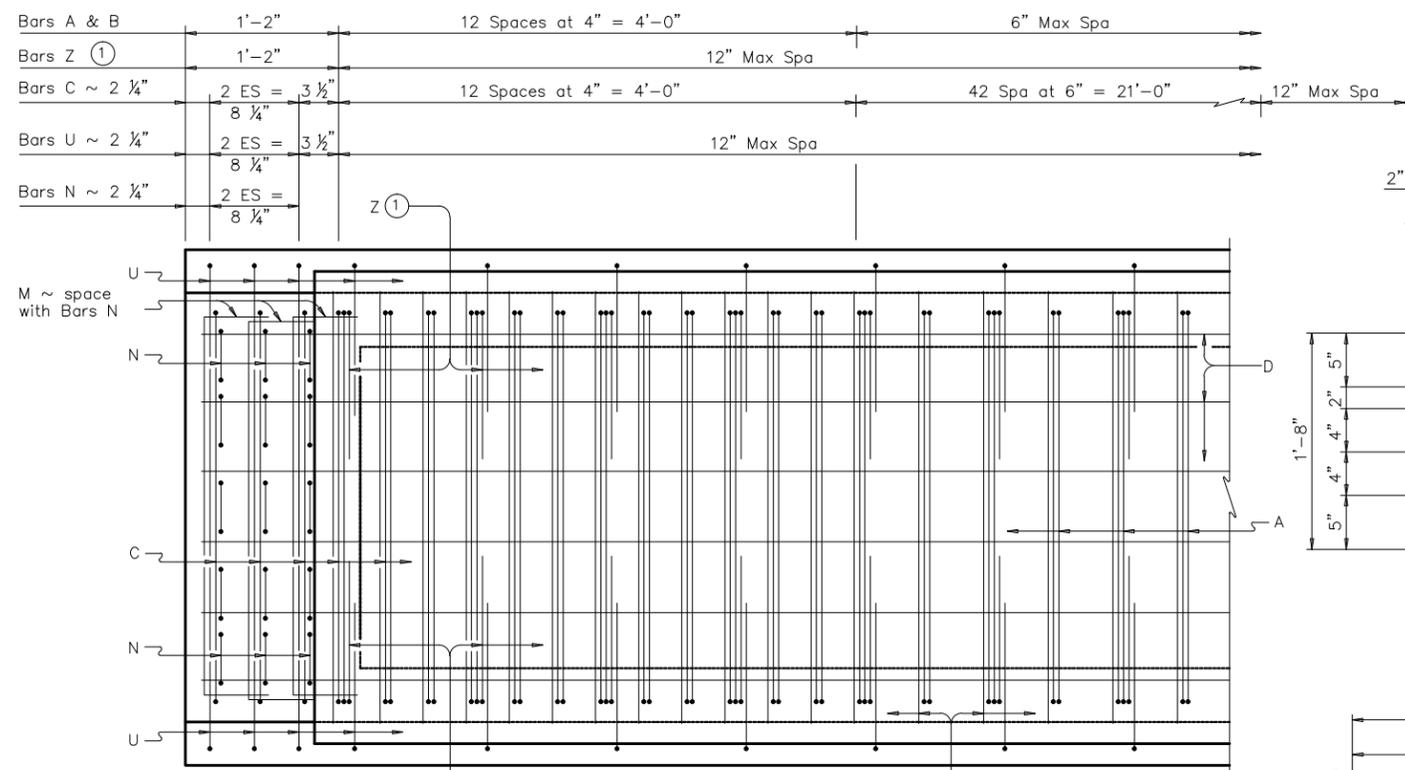
HARRIS COUNTY
ENGINEERING DEPARTMENT



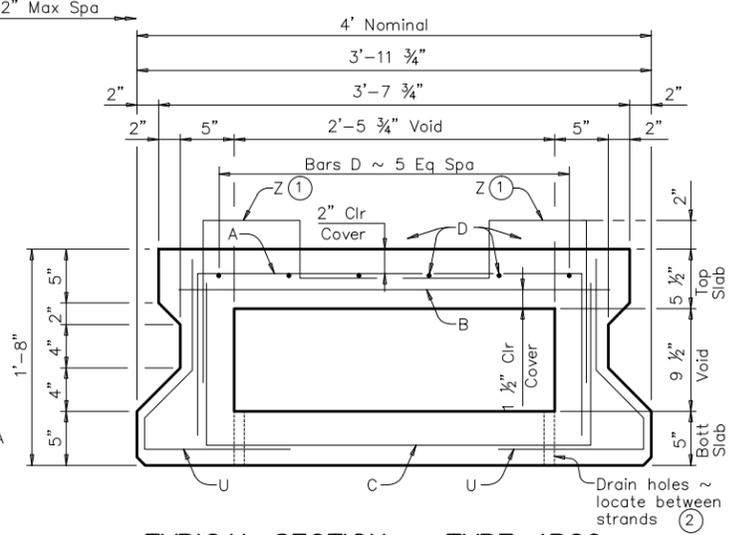
FIRM INFO

SEAL
NOTE

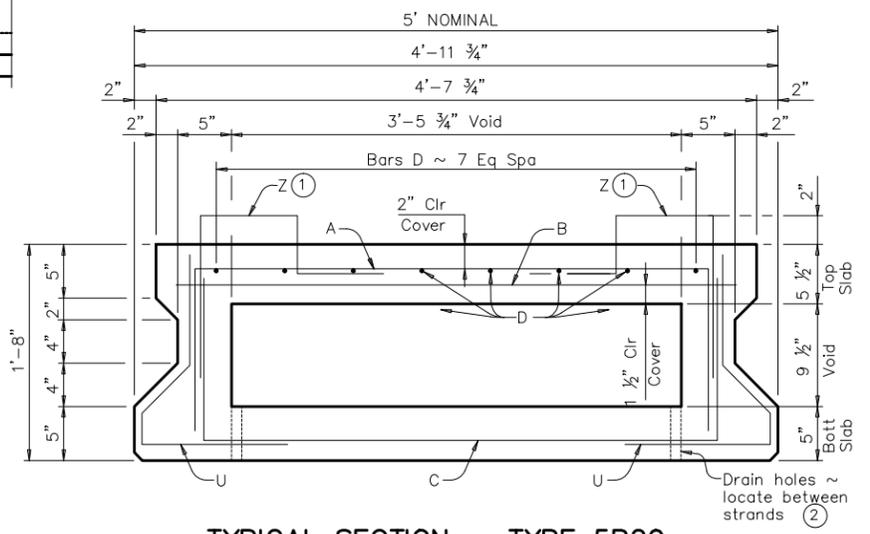
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DRAWN BY:	DESIGN CRITERIA FOR	JOB NO.:
QTD BY:	BRIDGE GUIDELINE	FILE NAME:
SCALE:	DRAWINGS	FILE NO.:
DATE:	APPROVED BY:	SHT NO.:



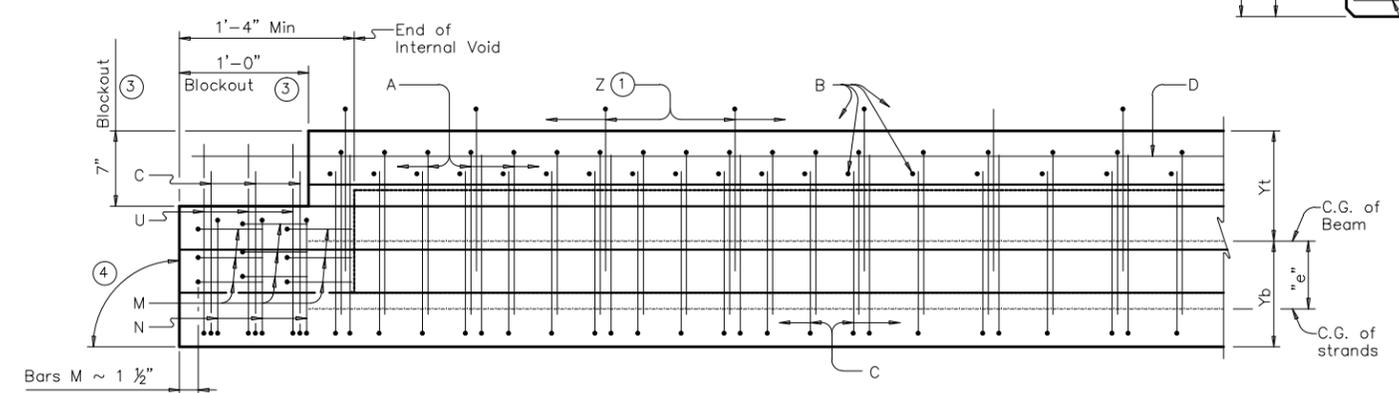
PARTIAL PLAN
(Showing Type 4B20)



TYPICAL SECTION ~ TYPE 4B20



TYPICAL SECTION ~ TYPE 5B20



ELEVATION

BEAM PROPERTIES			
		Type 4B20	Type 5B20
Area	in ²	591.8	717.8
Y top	in	10.19	10.12
Y bott	in	9.81	9.88
I	in ⁴	28,086	35,234
Weight ⑤	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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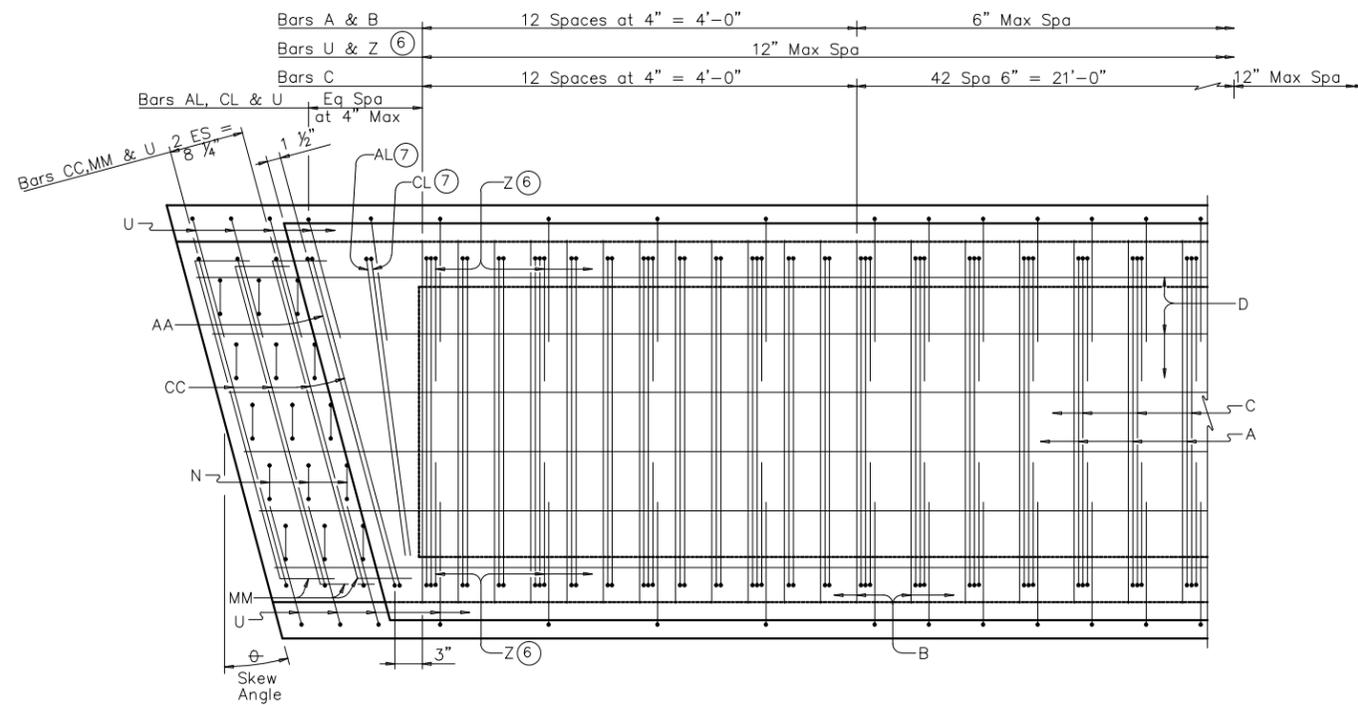


FIRM INFO

**SEAL
NOTE**

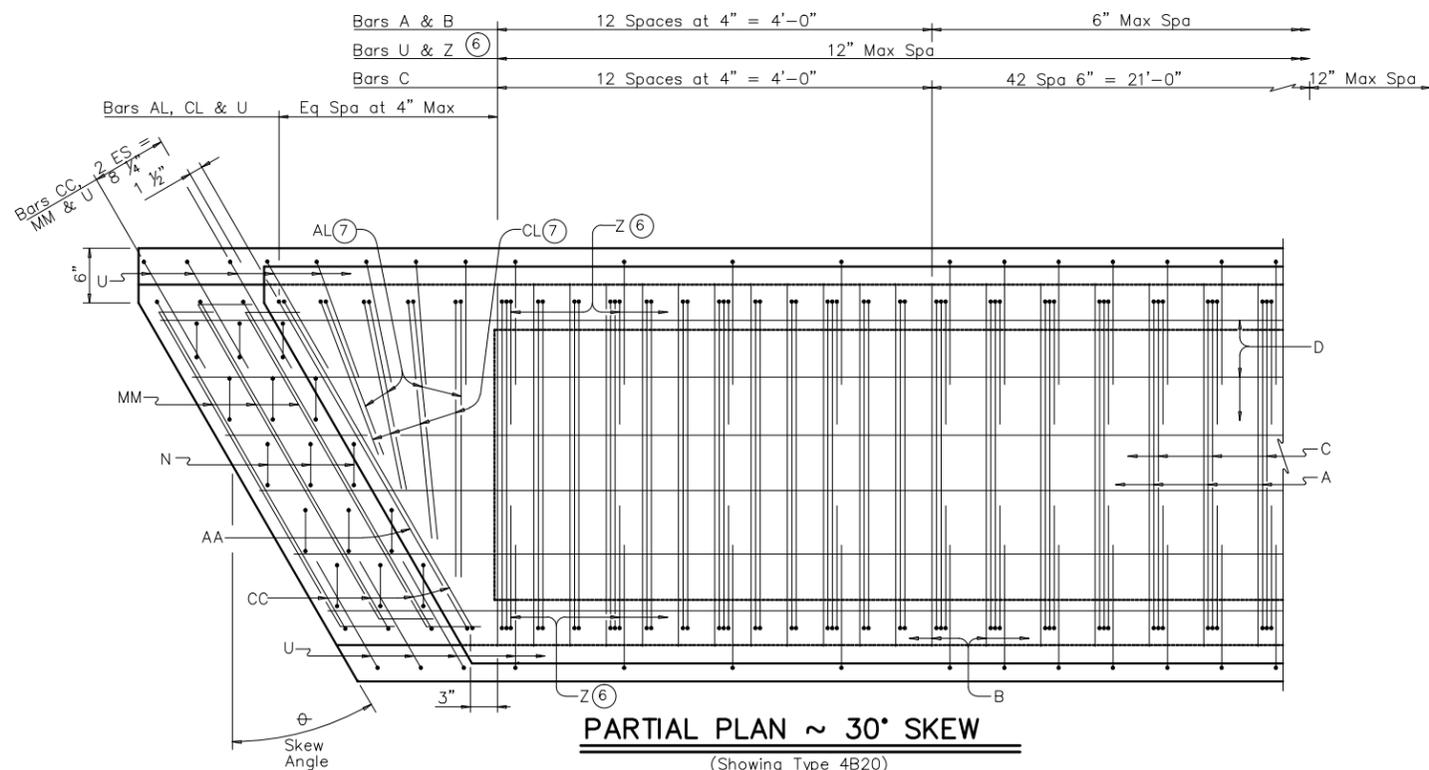
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DRAWN BY:	SHEET NO.:	PRESTRESSED CONCRETE BOX BEAM DETAILS (TYPE B20)(1 OF 3)	
DATE:	APPROVED BY:	FILE NO.:	JOB NO.:
			01

HL93 LOADING



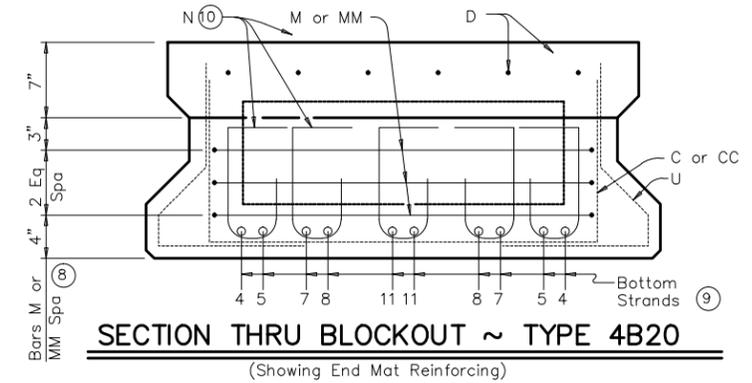
PARTIAL PLAN ~ 15° SKEW

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



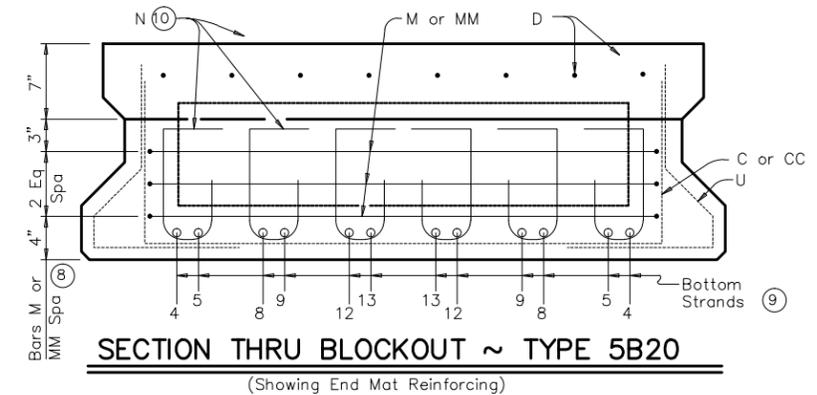
PARTIAL PLAN ~ 30° SKEW

(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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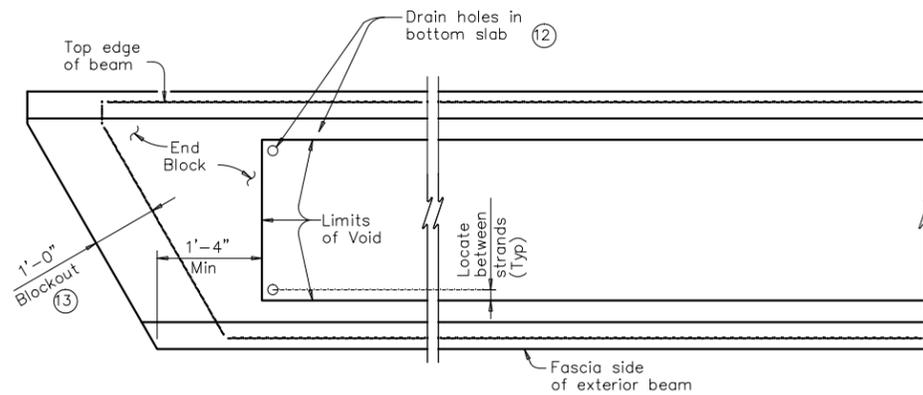


FIRM INFO

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NOTE**

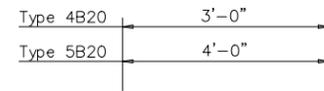
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DRAWN BY:	SHEET NO.	PRESTRESSED CONCRETE BOX BEAM DETAILS (TYPE B20)(2 OF 3)	
CHK'D BY:	FILE NO.		
SCALE:	FILE NO.		
DATE:	APPROVED BY:	SHT NO.	02

HL93 LOADING

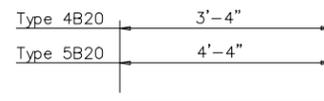


BLOCKOUT, INTERIOR DIAPHRAGM AND DRAIN DETAILS

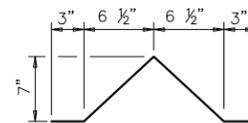
(Showing 30° skew)



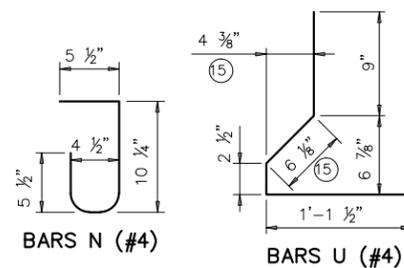
BARS A & C (#4)



BARS B (#4)

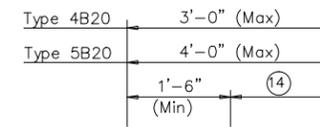


BARS F (#4)

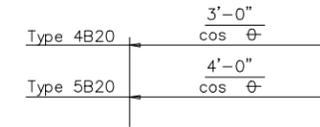


BARS N (#4)

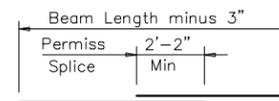
BARS U (#4)



BARS AL & CL (#4)

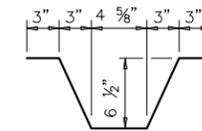


BARS AA & CC (#4)

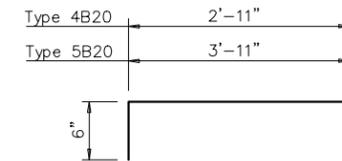


BARS D (#5)

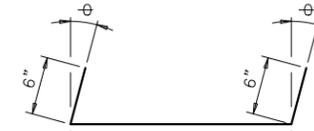
Permissible splices to be placed in middle third of span



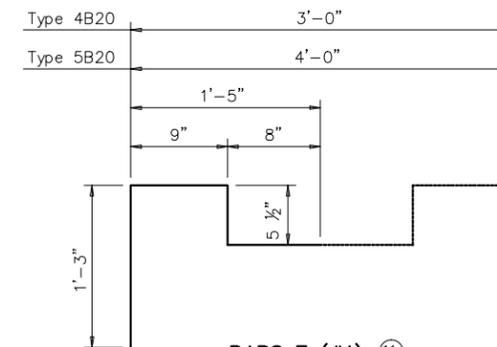
BARS E (#4)



BARS M (#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.

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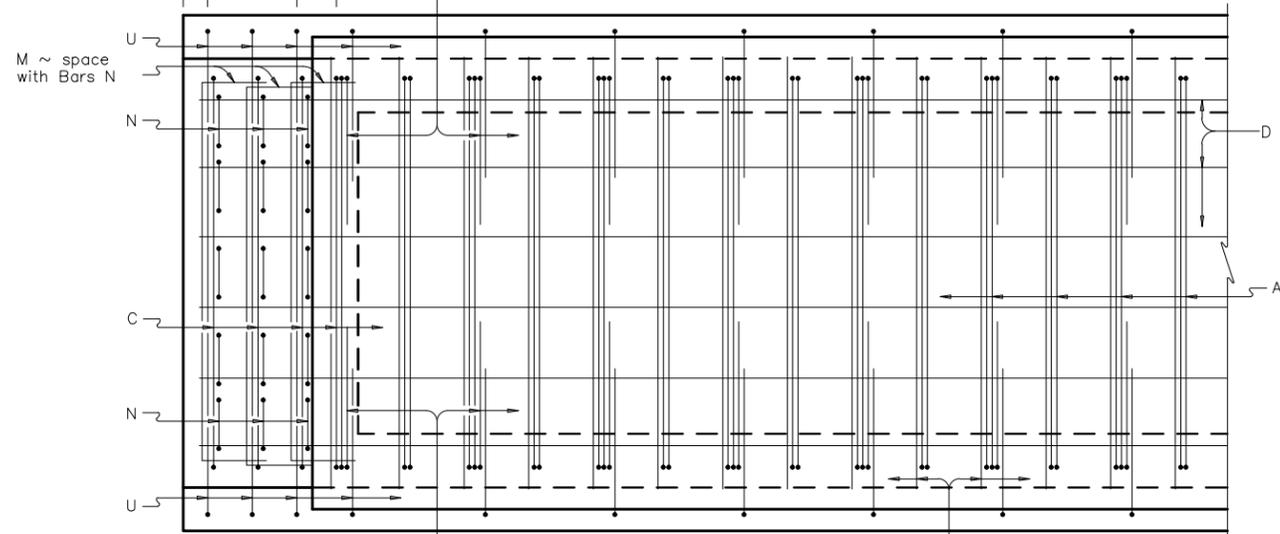
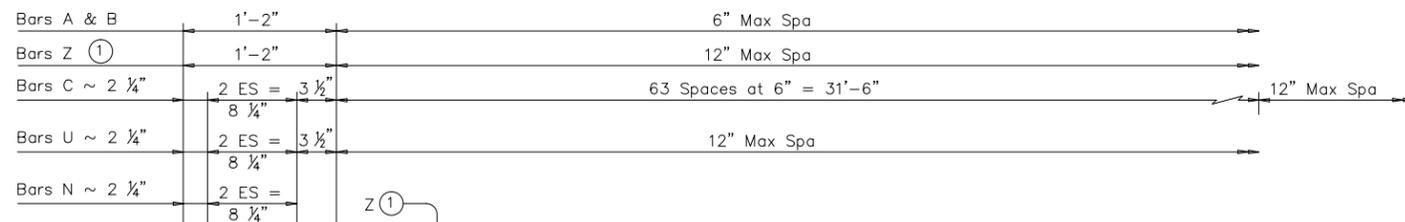
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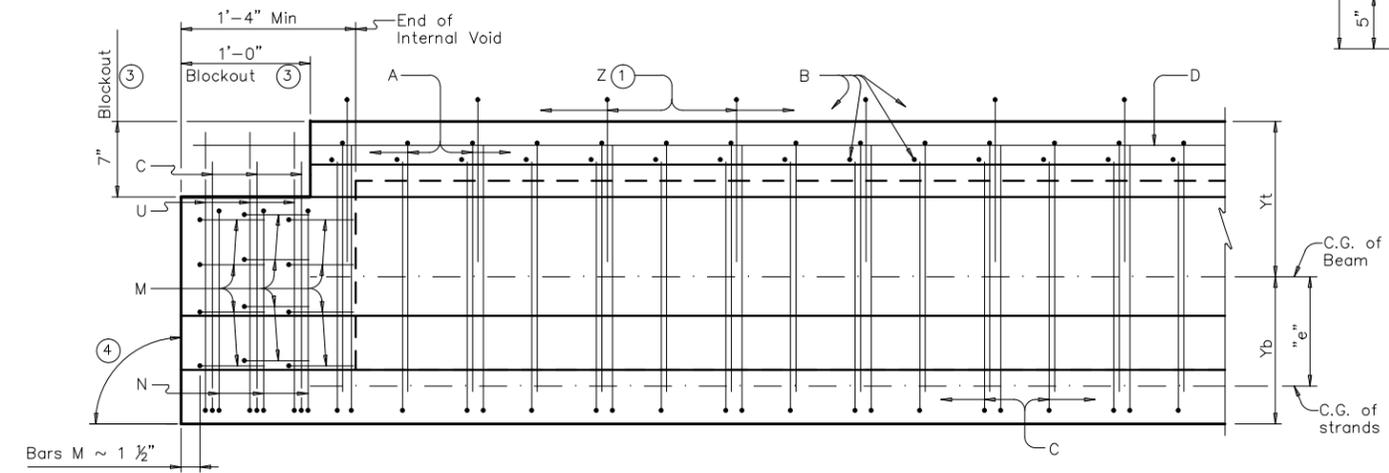
FIRM INFO

**SEAL
NOTE**

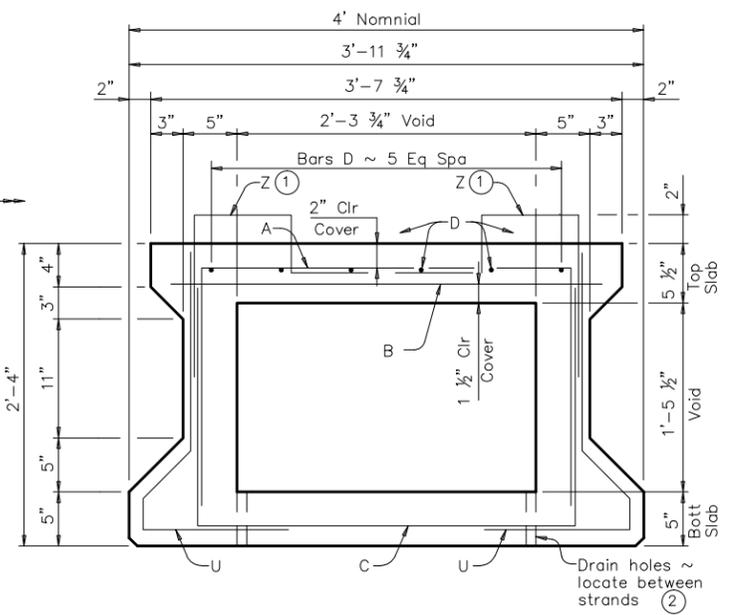
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DRAWN BY:	PRESTRESSED CONCRETE	
CHK'D BY:	BOX BEAM DETAILS	FILE NAME:
SCALE:	(TYPE B20)(3 OF 3)	FILE NO.:
DATE:	APPROVED BY:	SHT NO. 03



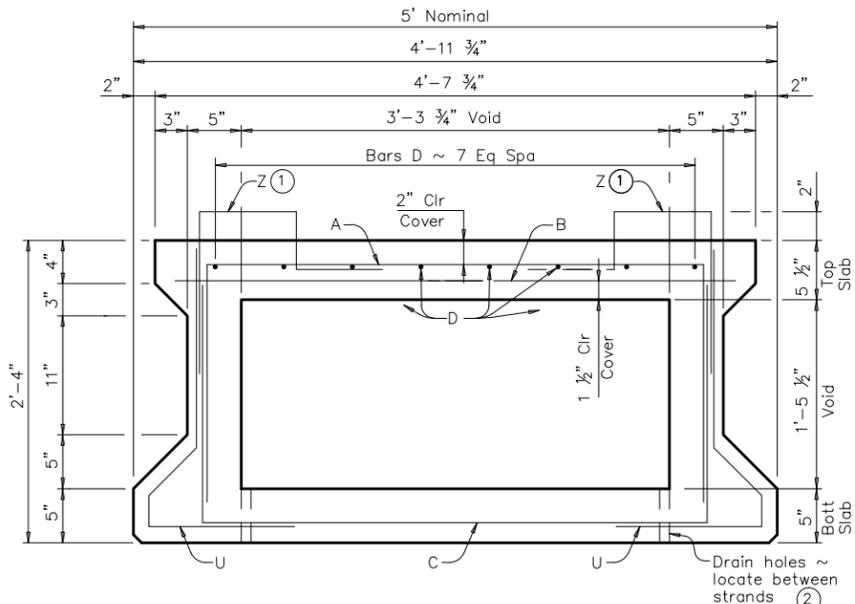
PARTIAL PLAN
(Showing Type 4B28)



ELEVATION



TYPICAL SECTION ~ TYPE 4B28



TYPICAL SECTION ~ TYPE 5B28

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

- 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 skewers up to 30 degrees only.
 Chamfer bottom beam corners 3/4" or round to a 3/4" radius.

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ENGINEERING DEPARTMENT**

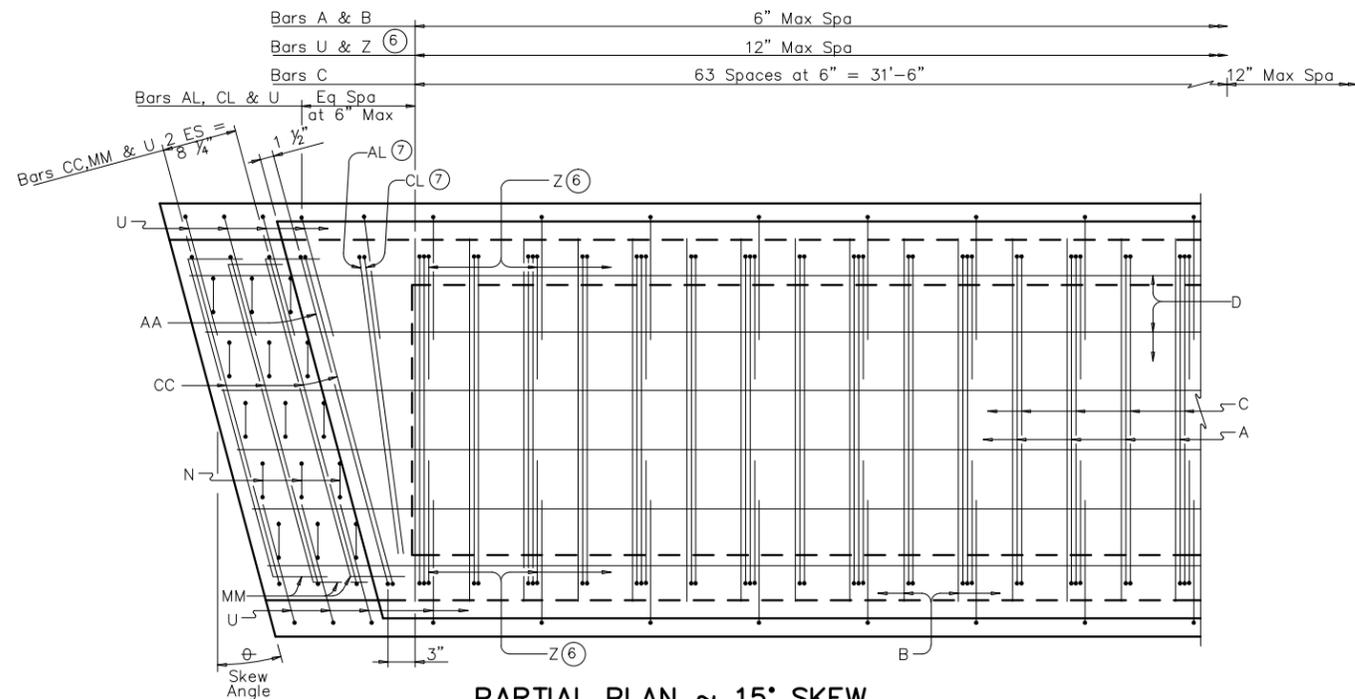


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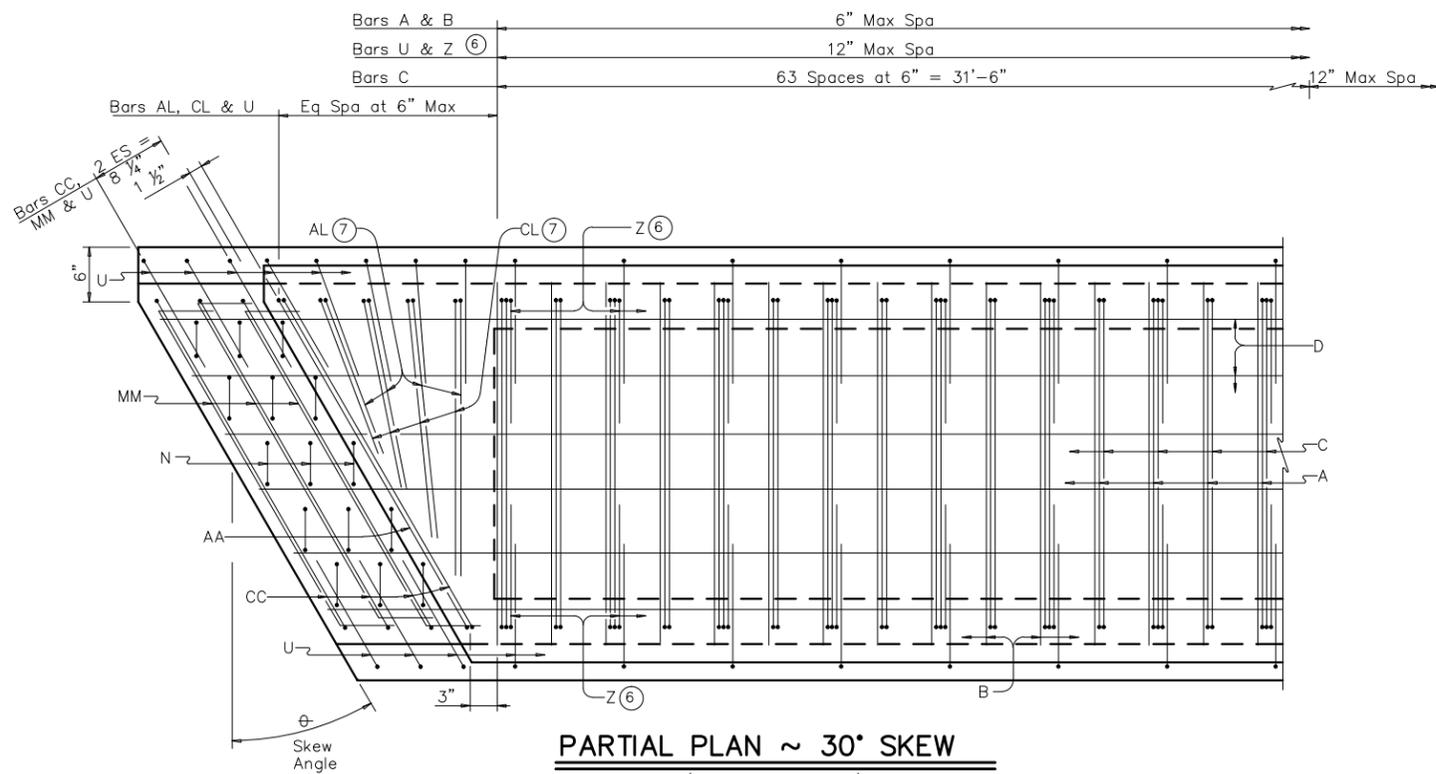
**SEAL
NOTE**

PROJECT TITLE			
DRAWN BY:	SHEET NO.:	PRESTRESSED CONCRETE BOX BEAM DETAILS (TYPE B28) (1 OF 3)	
CHK'D BY:	FILE NAME:		
SCALE:	FILE NO.:		
DATE:	APPROVED BY:	JOB NO.:	
		SHT NO. 04	

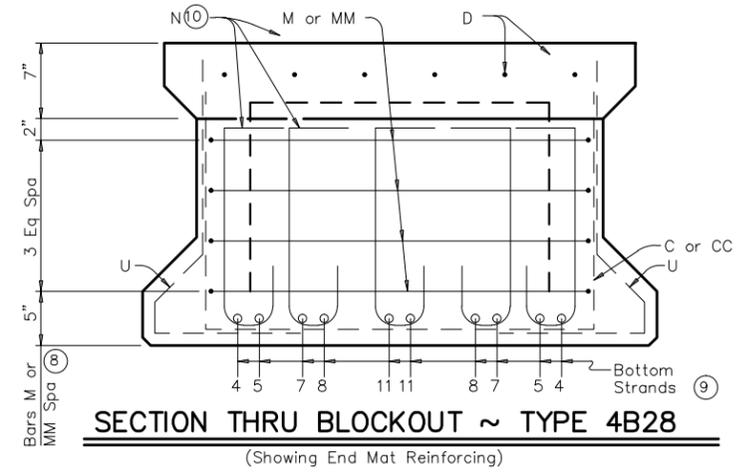
HL93 LOADING



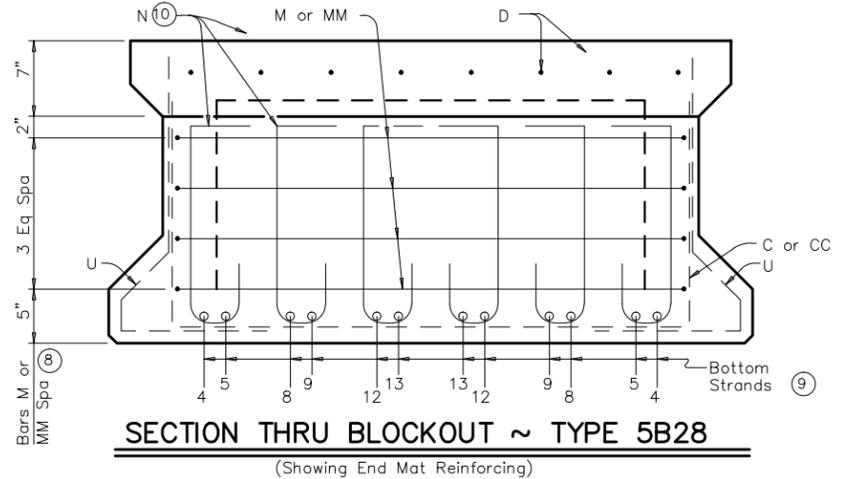
PARTIAL PLAN ~ 15° SKEW
 (Showing Type 4B28)
 (use for skew angles of 15° or less)



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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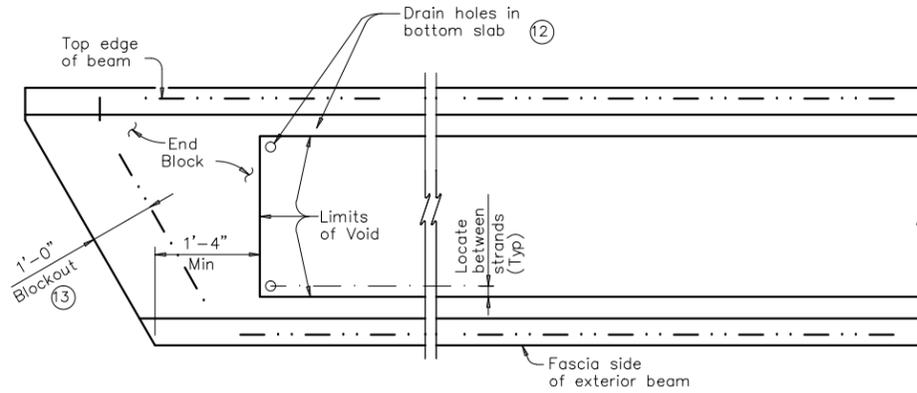
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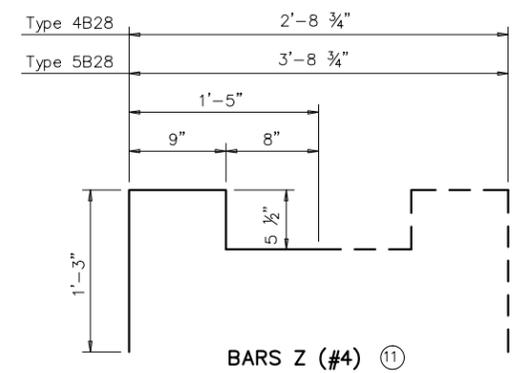
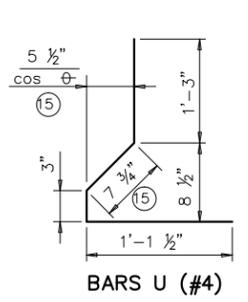
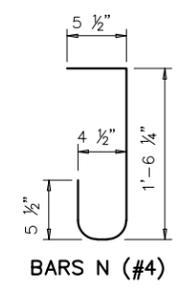
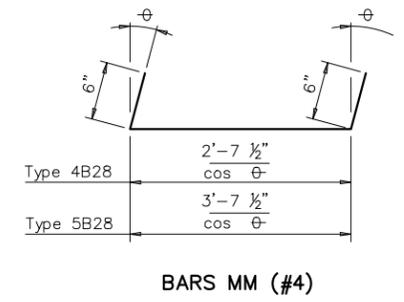
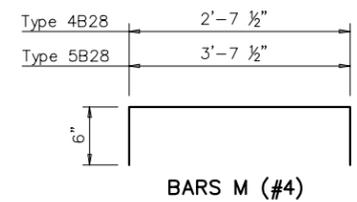
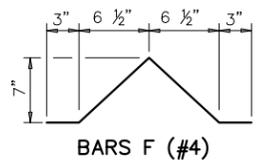
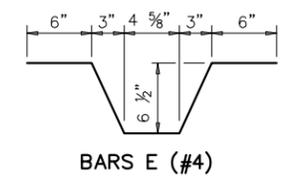
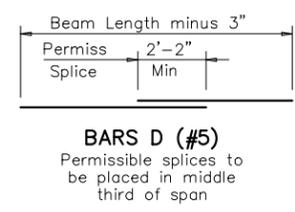
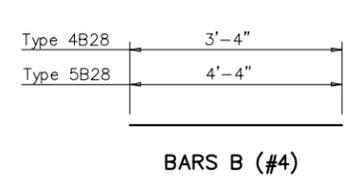
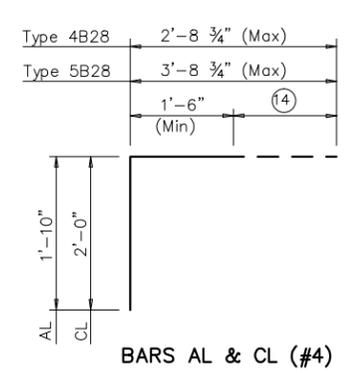
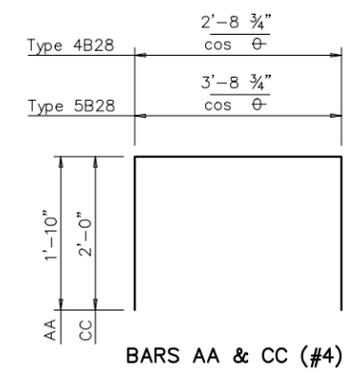
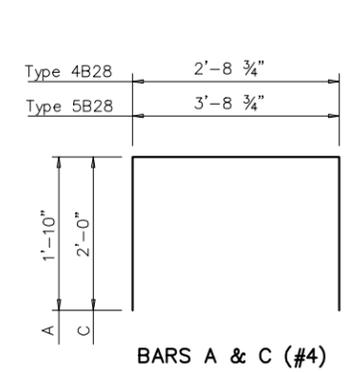
FIRM INFO

SEAL
 NOTE

PROJECT TITLE			
DRAWN BY:	SHEET NO.:	PRESTRESSED CONCRETE	
CHK'D BY:	DATE:	BOX BEAM DETAILS	
SCALE:	APPROVED BY:	(TYPE B28) (2 OF 3)	
DATE:		JOB NO.:	
		FILE NAME:	
		FILE NO.:	
		SHT NO.:	05



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.

- (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
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

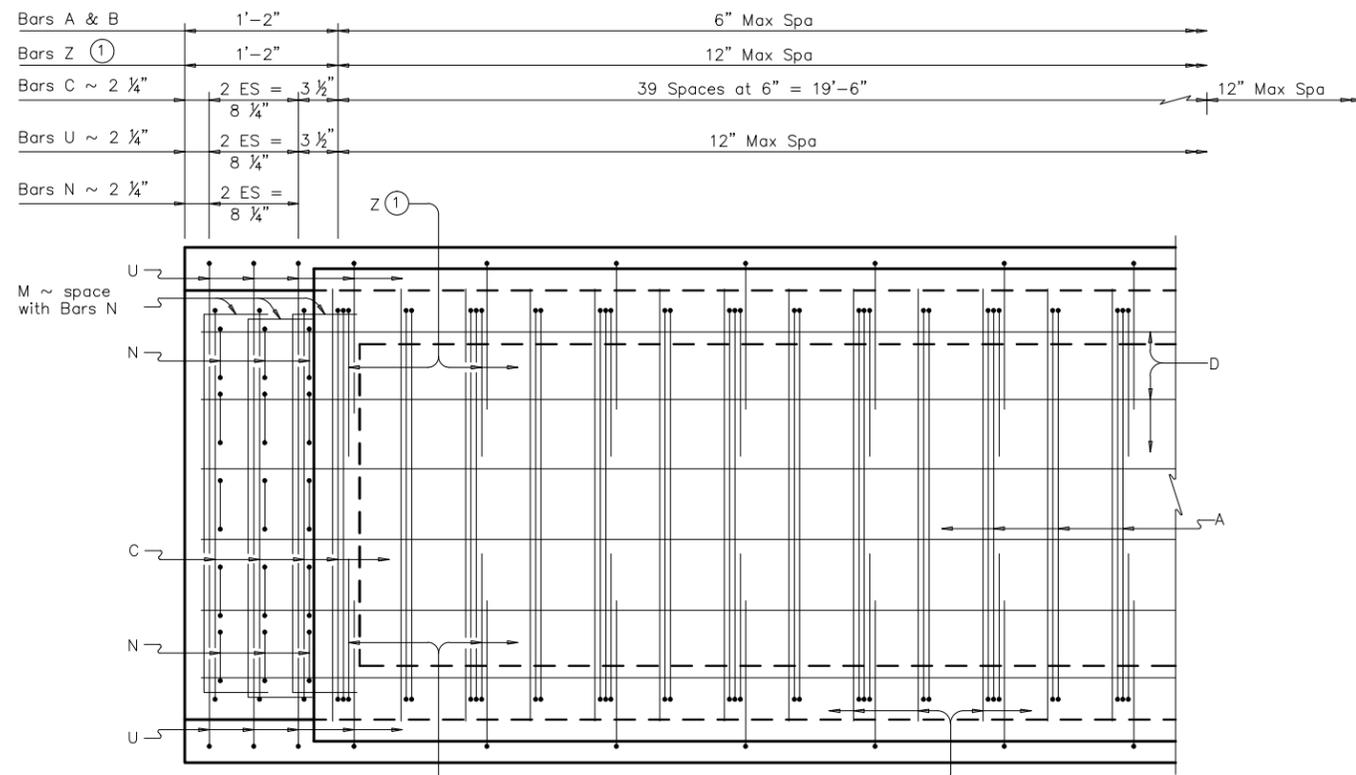
**HARRIS COUNTY
ENGINEERING DEPARTMENT**



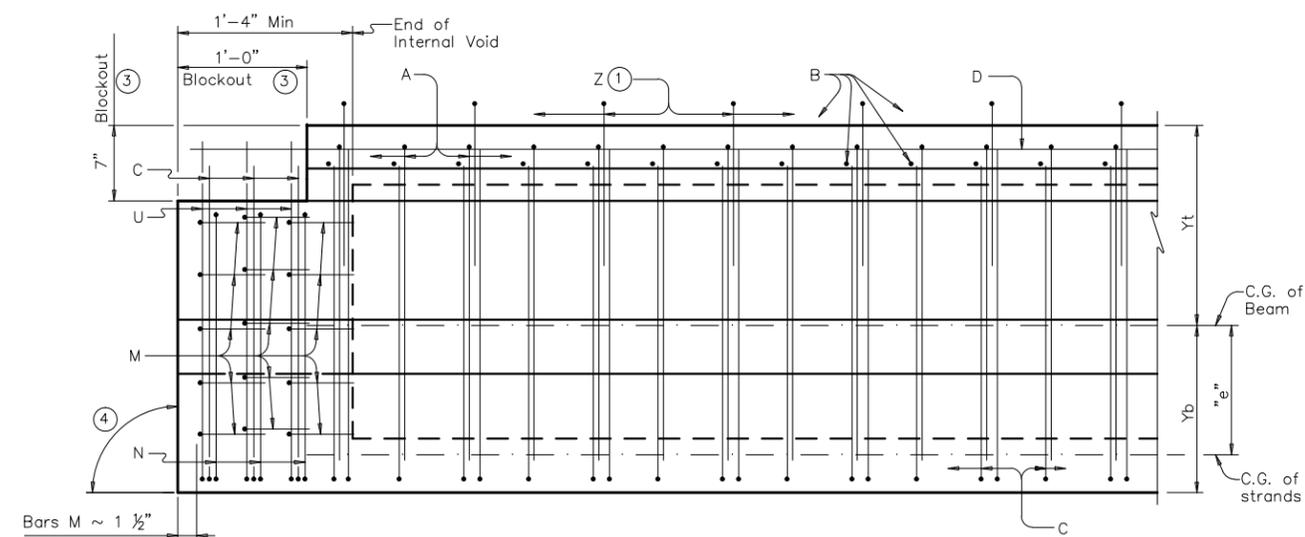
FIRM INFO

**SEAL
NOTE**

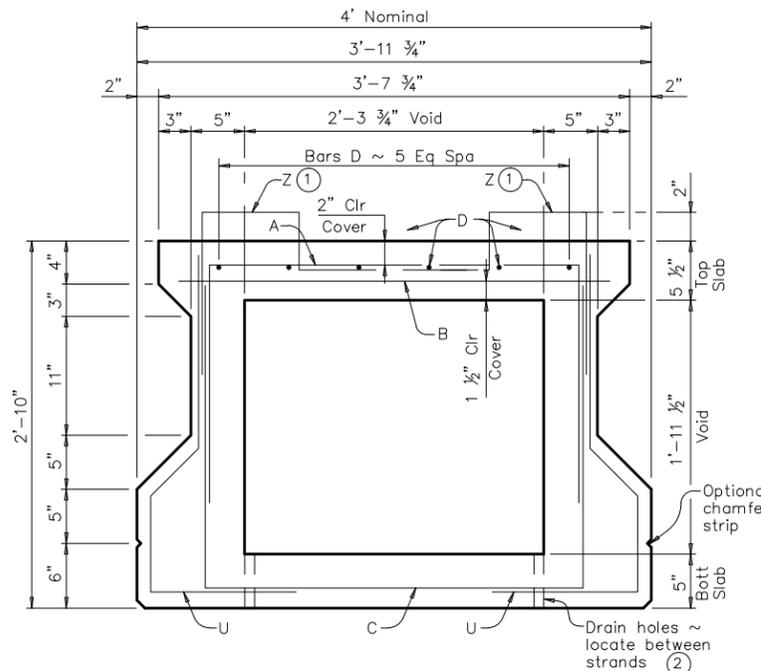
PROJECT TITLE		FILE NO.
DRAWN BY:	SHEET NO. 06	PRESTRESSED CONCRETE BOX BEAM DETAILS (TYPE B28) (3 OF 3)
CHK'D BY:		
SCALE:		
DATE:	APPROVED BY:	
		SHT NO. 06



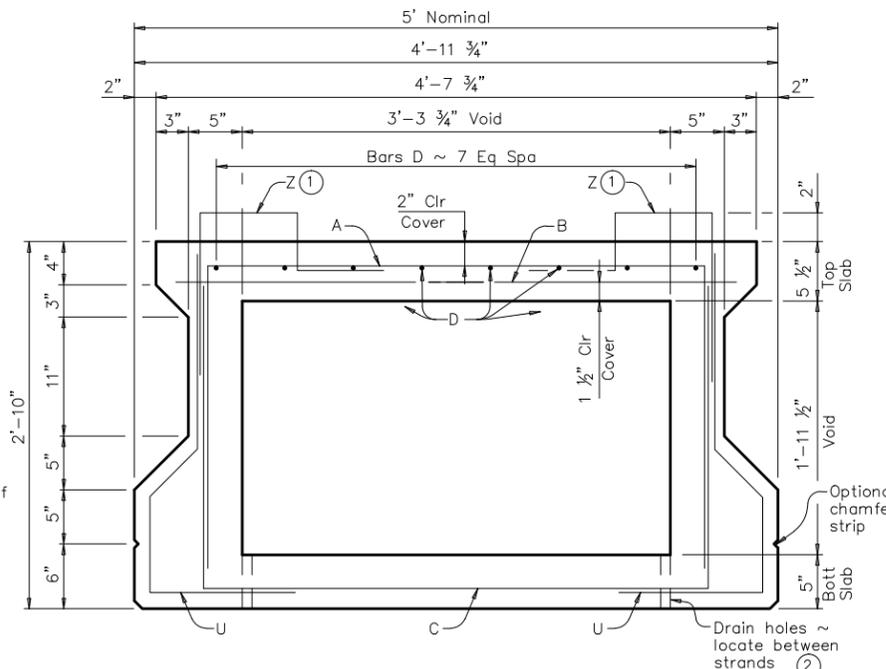
PARTIAL PLAN
(Showing Type 4B34)



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:

- 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.

BEAM PROPERTIES

	Type 4B34	Type 5B34	
Area	in ²	798.8	924.8
Y top	in	17.92	17.72
Y bott	in	16.08	16.28
I	in ⁴	115,655	142,161
Weight	lb/ft	832	963

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
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

**HARRIS COUNTY
ENGINEERING DEPARTMENT**

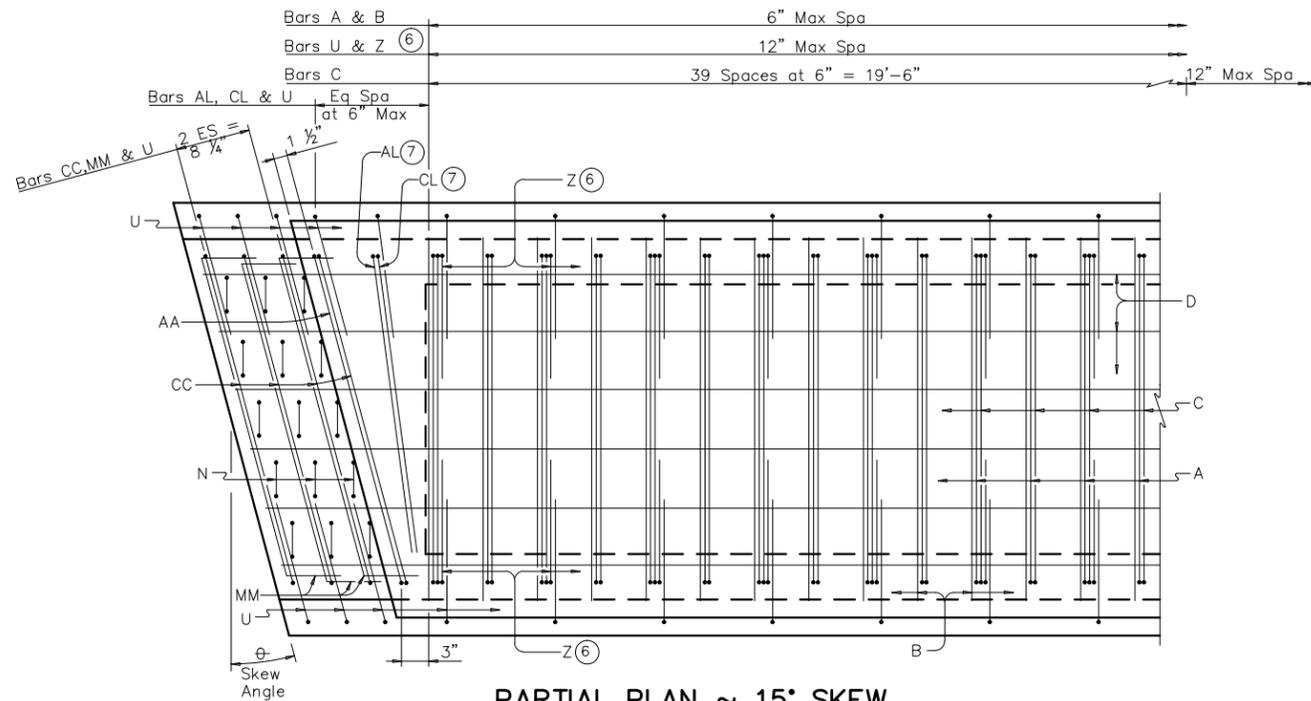


FIRM INFO

**SEAL
NOTE**

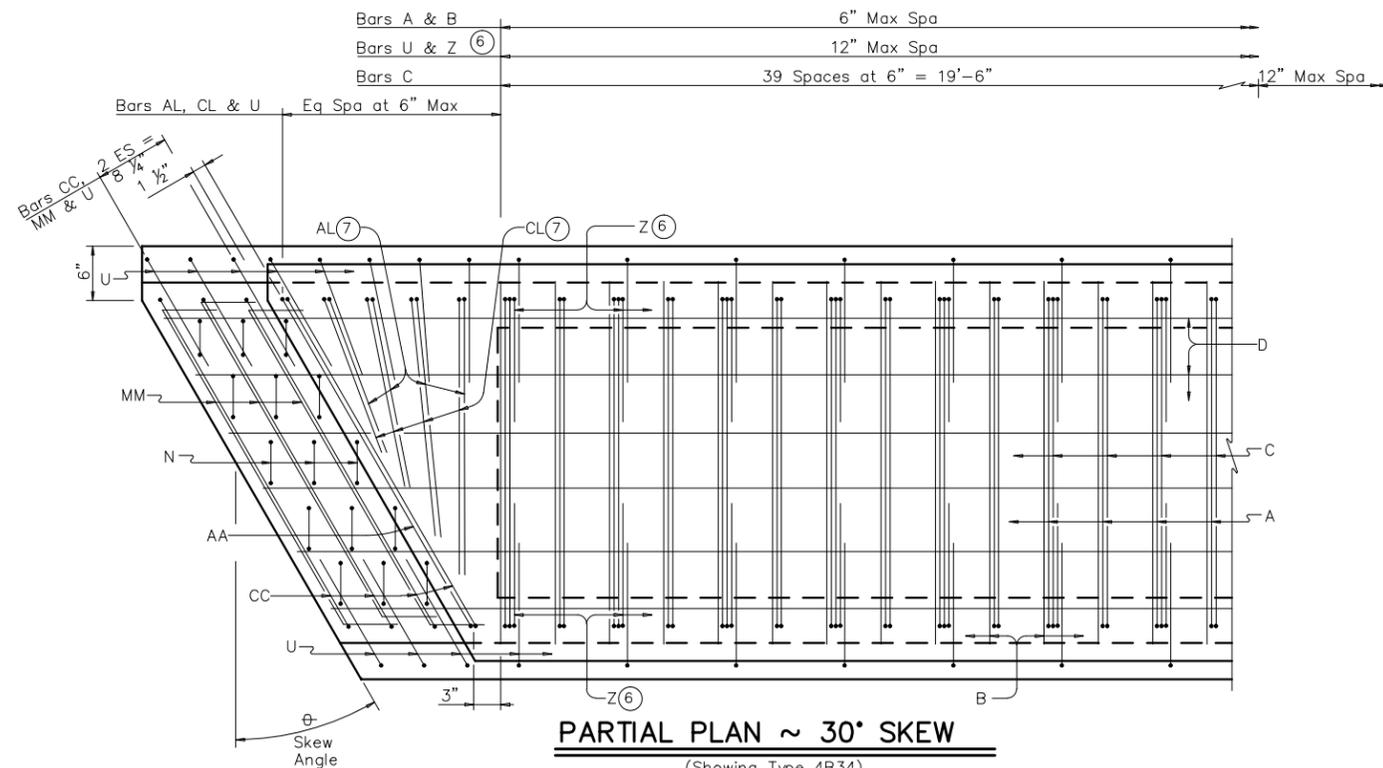
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DRAWN BY:	SHEET NO.:	PRESTRESSED CONCRETE	
CHK'D BY:	FILE NAME:	BOX BEAM DETAILS	
SCALE:	FILE NO.:	(TYPE B34)(1 OF 3)	
DATE:	APPROVED BY:	SHT NO.:	07

HL93 LOADING



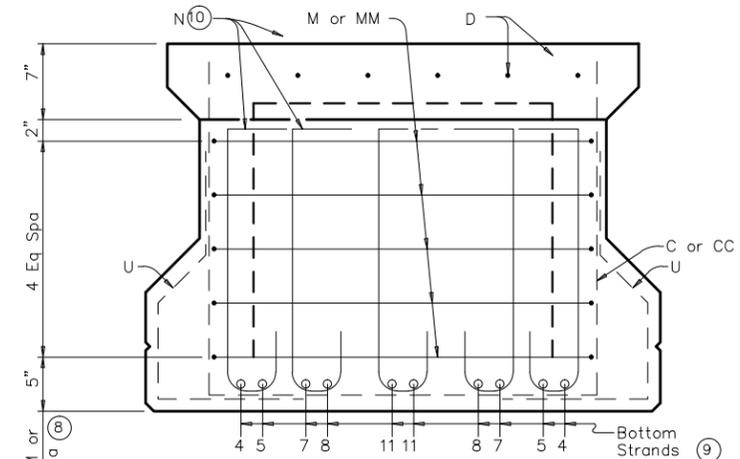
PARTIAL PLAN ~ 15° SKEW

(Showing Type 4B34)
(use for skew angles of 15° or less)



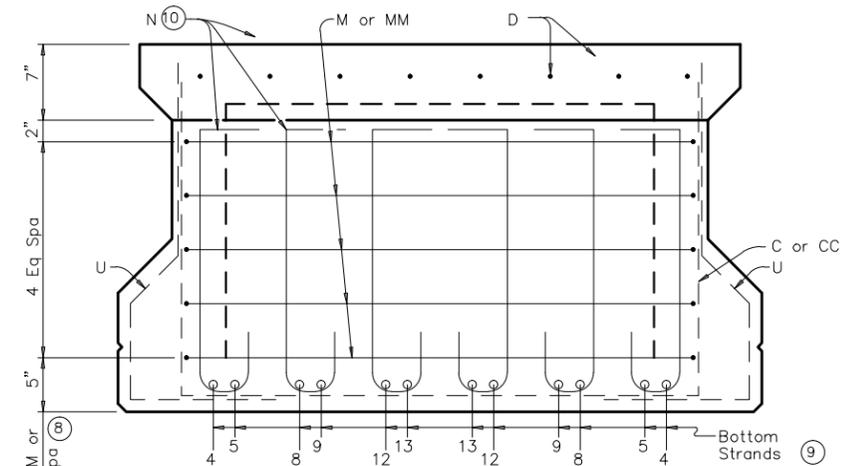
PARTIAL PLAN ~ 30° SKEW

(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.

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**

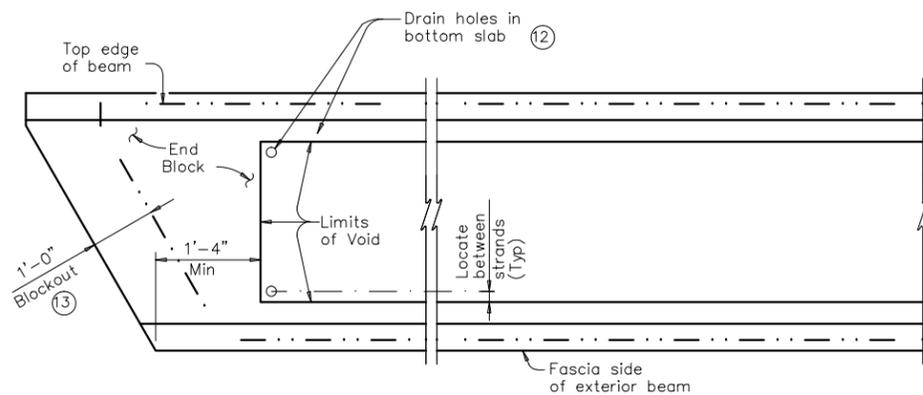


FIRM INFO

SEAL
NOTE

PROJECT TITLE		JOB NO.
DRAWN BY:	SHEET NO.	PRESTRESSED CONCRETE BOX BEAM DETAILS (TYPE B34)(2 OF 3)
CHK'D BY:	FILE NAME:	
SCALE:	FILE NO.:	
DATE:	APPROVED BY:	SHT NO. 08

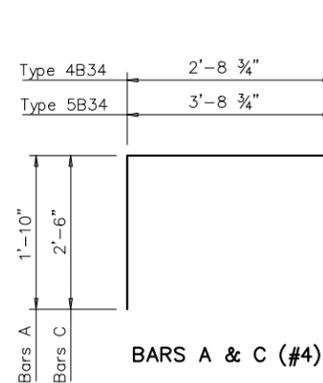
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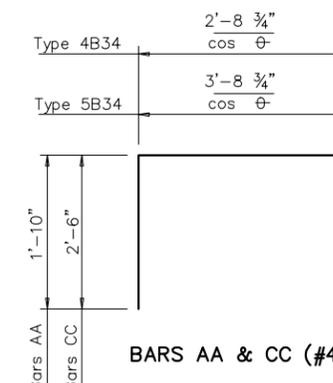
BLOCKOUT, INTERIOR DIAPHRAGM AND DRAIN DETAILS

(Showing 30° skew)

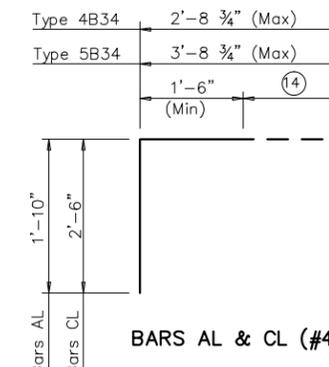
- ① Bars Z are required for beams topped with a cast-in-place concrete slab only.
- ② Place drain holes (1" Dia PVC Sch 40 Pipe) as shown in all beam void corners including each side of interior diaphragms. See "Blockout, Interior Diaphragm, and Drain Details". Drain holes are not required if the void is formed with Expanded Polystyrene (foam).
- ③ Blockouts required at ends of all beams. Extend beam reinforcement into blockouts.
- ④ Cut as required to maintain one inch clear between bars.
- ⑤ Dimension will vary slightly with skew. Adjust as necessary.



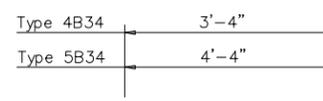
BARS A & C (#4)



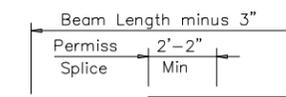
BARS AA & CC (#4)



BARS AL & CL (#4)

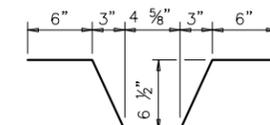


BARS B (#4)

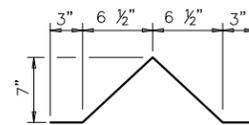


BARS D (#5)

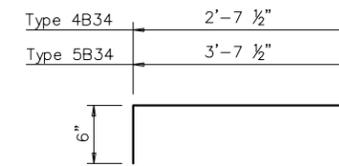
Permissible splices to be placed in middle third of span



BARS E (#4)



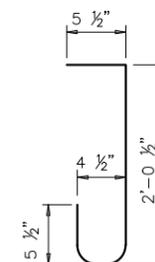
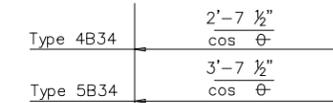
BARS F (#4)



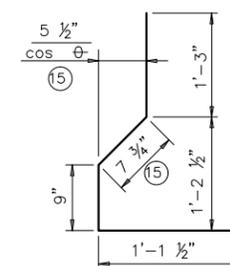
BARS M (#4)



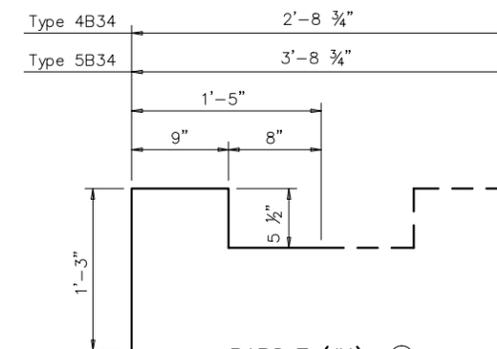
BARS MM (#4)



BARS N (#4)



BARS U (#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.

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

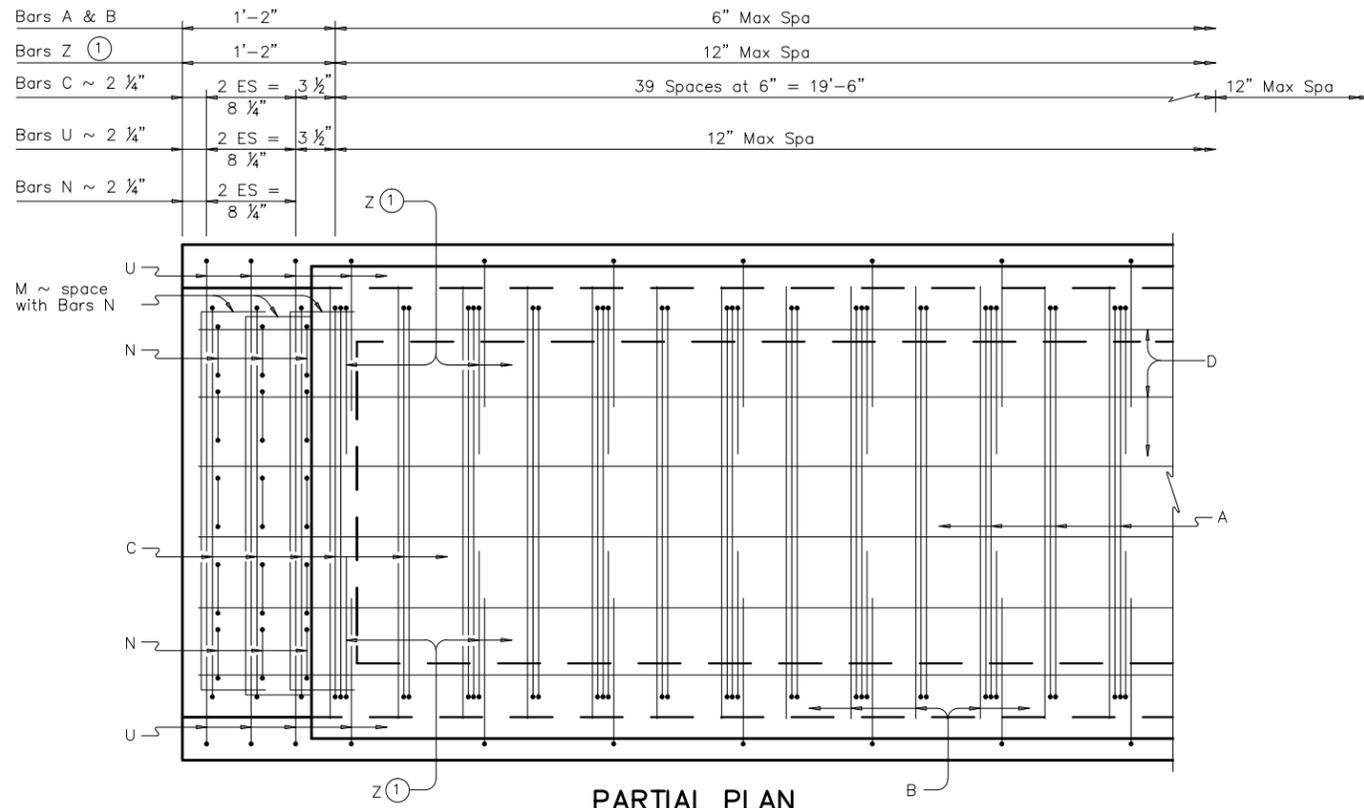
**HARRIS COUNTY
ENGINEERING DEPARTMENT**



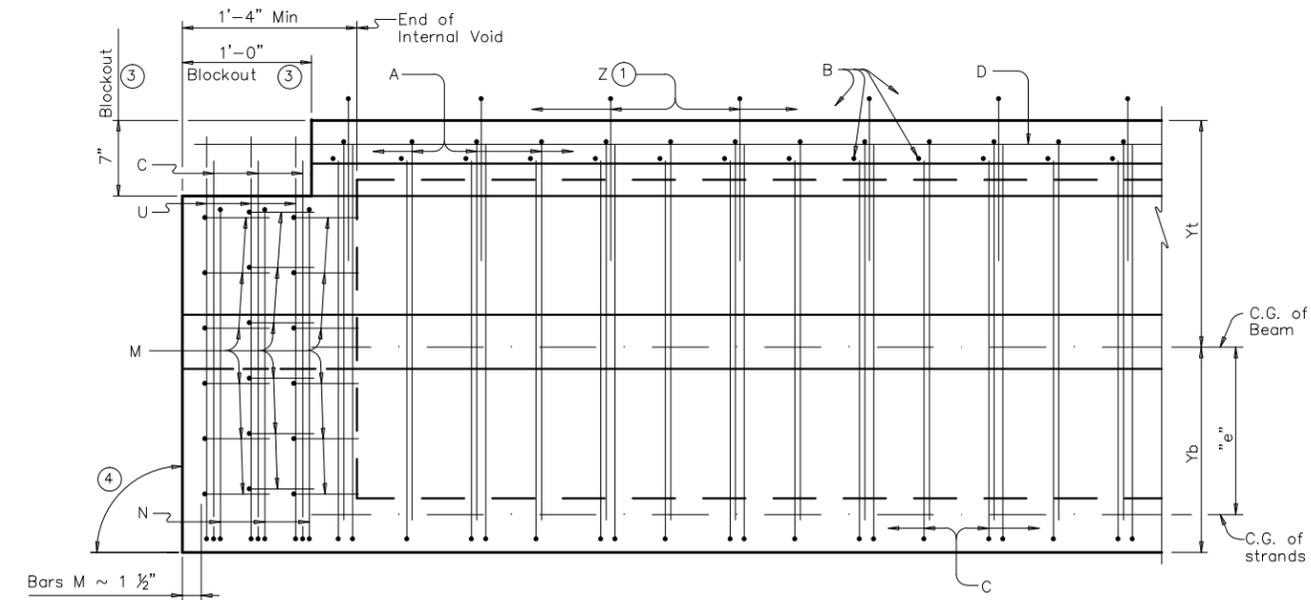
FIRM INFO

**SEAL
NOTE**

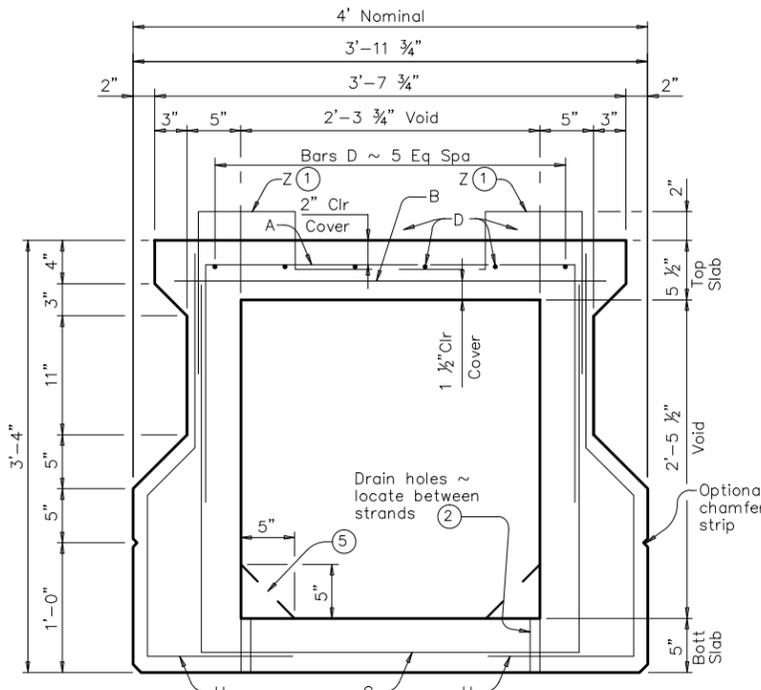
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DRAWN BY:	SHEET NO.	PRESTRESSED CONCRETE
CHK'D BY:	FILE NAME:	BOX BEAM DETAILS
SCALE:	FILE NO.:	(TYPE B34)(3 OF 3)
DATE:	APPROVED BY:	SHT NO. 09



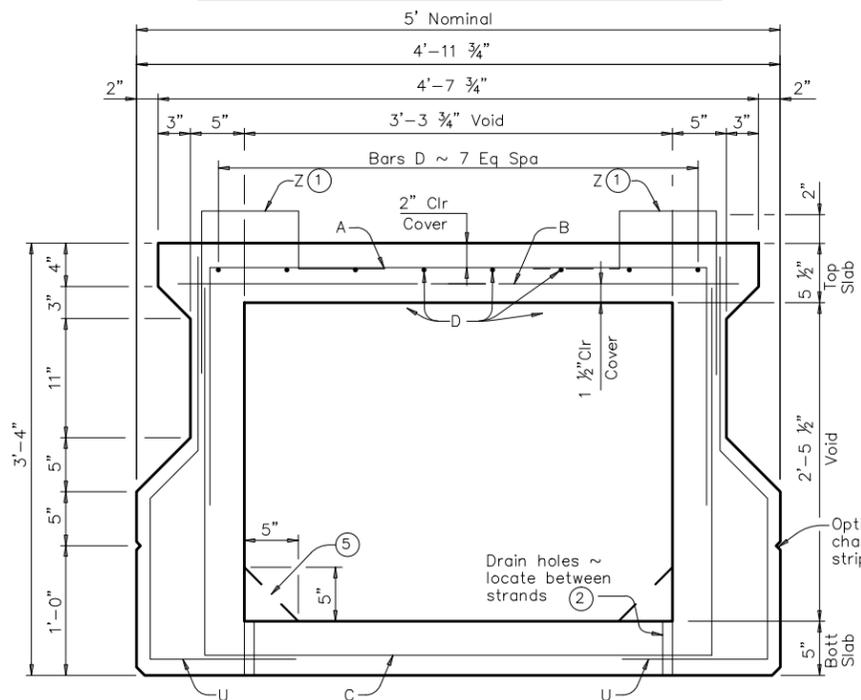
PARTIAL PLAN
(Showing Type 4B40)



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.

1/4" 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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**HARRIS COUNTY
ENGINEERING DEPARTMENT**



FIRM INFO

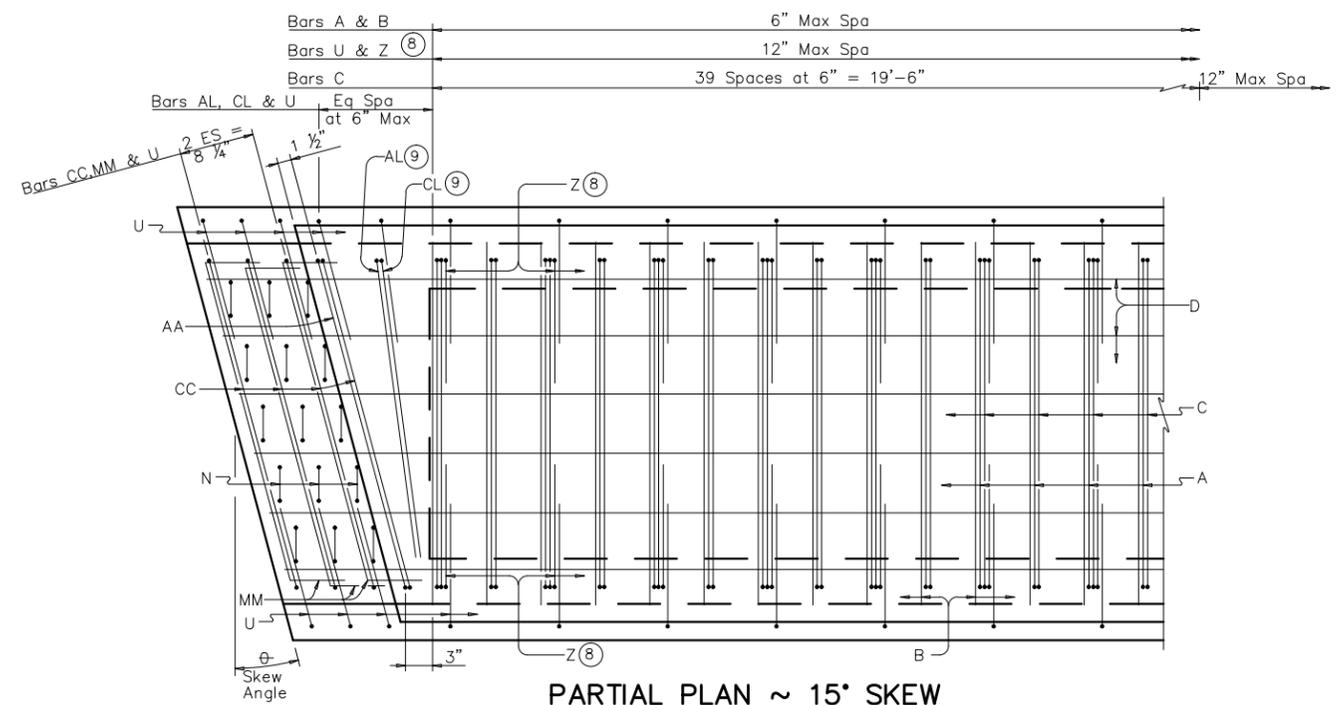
**SEAL
NOTE**

PROJECT TITLE		PROJECT TITLE
DRAWN BY:	SHEET NO.:	PRESTRESSED CONCRETE BOX BEAM DETAILS (TYPE B40)(1 OF 3)
CHK'D BY:	FILE NAME:	
SCALE:	FILE NO.:	
DATE:	APPROVED BY:	SHT NO. 10

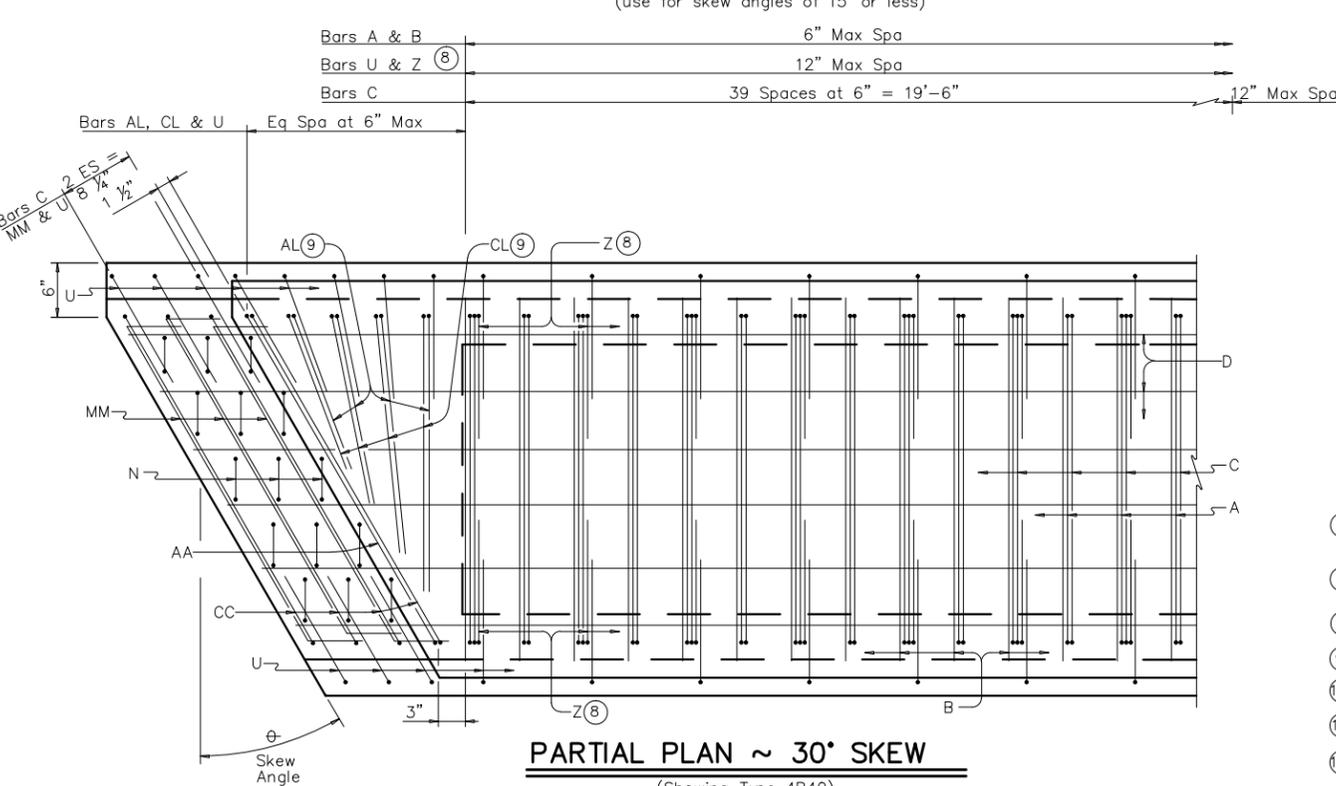
HL93 LOADING

BEAM PROPERTIES

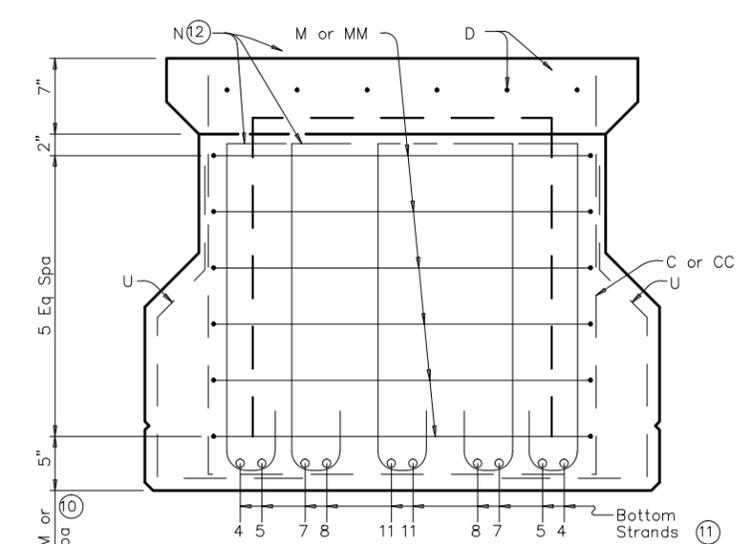
		Type 4B40		Type 5B40	
		100 feet or less	over 100 feet (8)	100 feet or less	over 100 feet (8)
Area	in ²	918.8	943.8	1044.8	1069.8
Y top	in	21.31	21.63	21.07	21.36
Y bott	in	18.69	18.37	18.93	18.64
I	in ⁴	176,607	180,159	215,300	219,007
Weight (7)	lb/ft	957	983	1,088	1,114



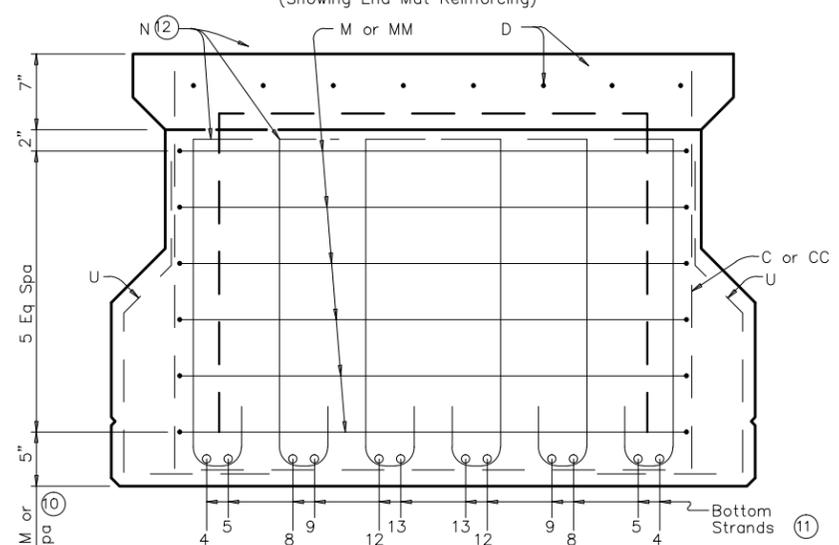
PARTIAL PLAN ~ 15° SKEW
(Showing Type 4B40)
(use for skew angles of 15° or less)



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



SECTION THRU BLOCKOUT ~ TYPE 4B40
(Showing End Mat Reinforcing)



SECTION THRU BLOCKOUT ~ TYPE 5B40
(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.

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**

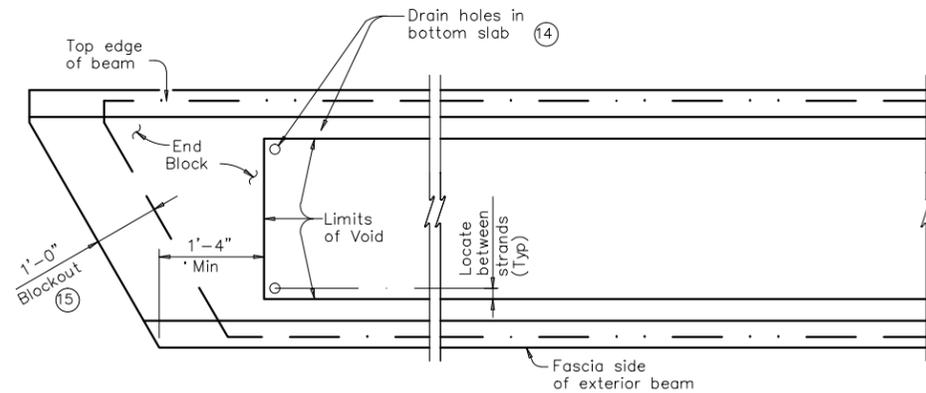


FIRM INFO

**SEAL
NOTE**

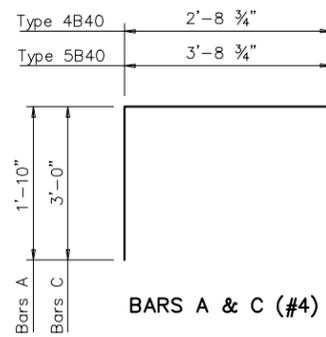
PROJECT TITLE			
DRAWN BY:	SHEET NO.:	PRESTRESSED CONCRETE	
CHK'D BY:	FILE NAME:	BOX BEAM DETAILS	
SCALE:	FILE NO.:	(TYPE B40)(2 OF 3)	
DATE:	APPROVED BY:	SHT NO.:	11

HL93 LOADING

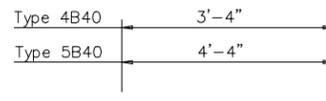


BLOCKOUT, INTERIOR DIAPHRAGM AND DRAIN DETAILS

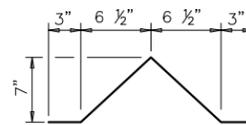
(Showing 30° skew)



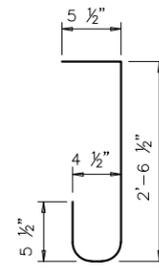
BARS A & C (#4)



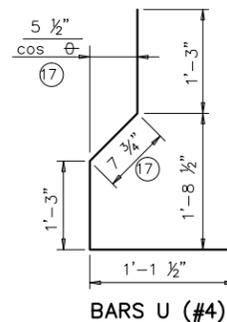
BARS B (#4)



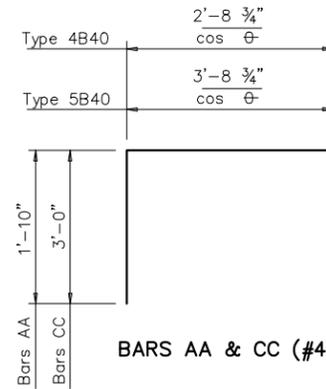
BARS F (#4)



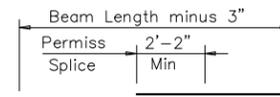
BARS N (#4)



BARS U (#4)

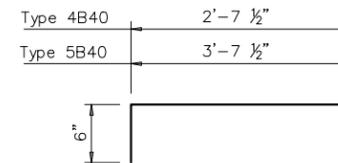


BARS AA & CC (#4)

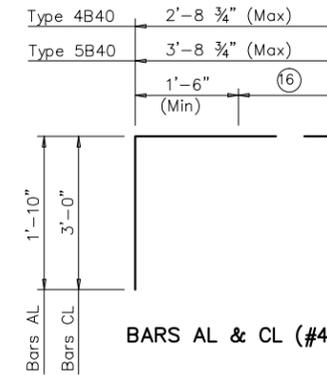


BARS D (#5)

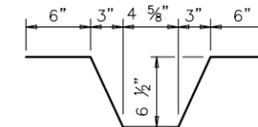
Permissible splices to be placed in middle third of span



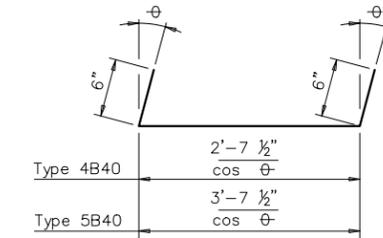
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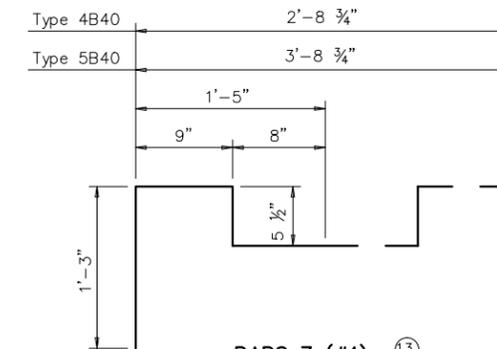
BARS AL & CL (#4)



BARS E (#4)



BARS MM (#4)



BARS Z (#4) (3)

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.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

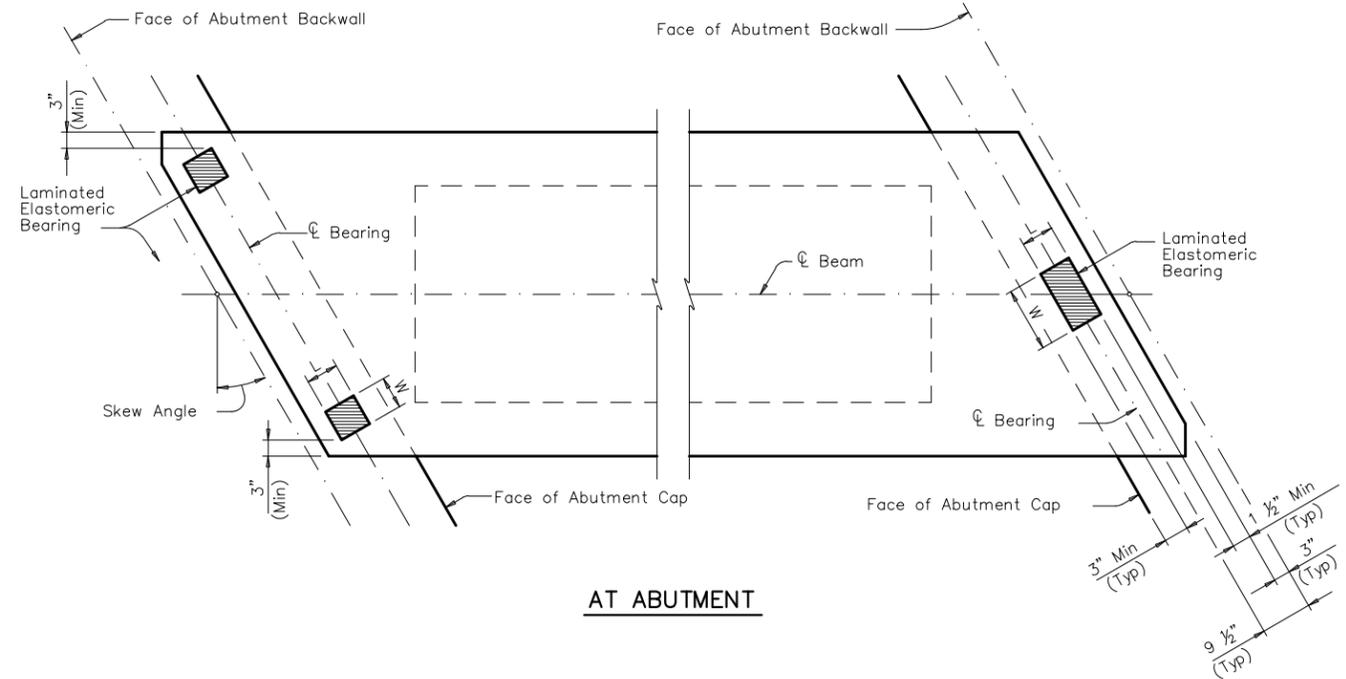
**HARRIS COUNTY
ENGINEERING DEPARTMENT**



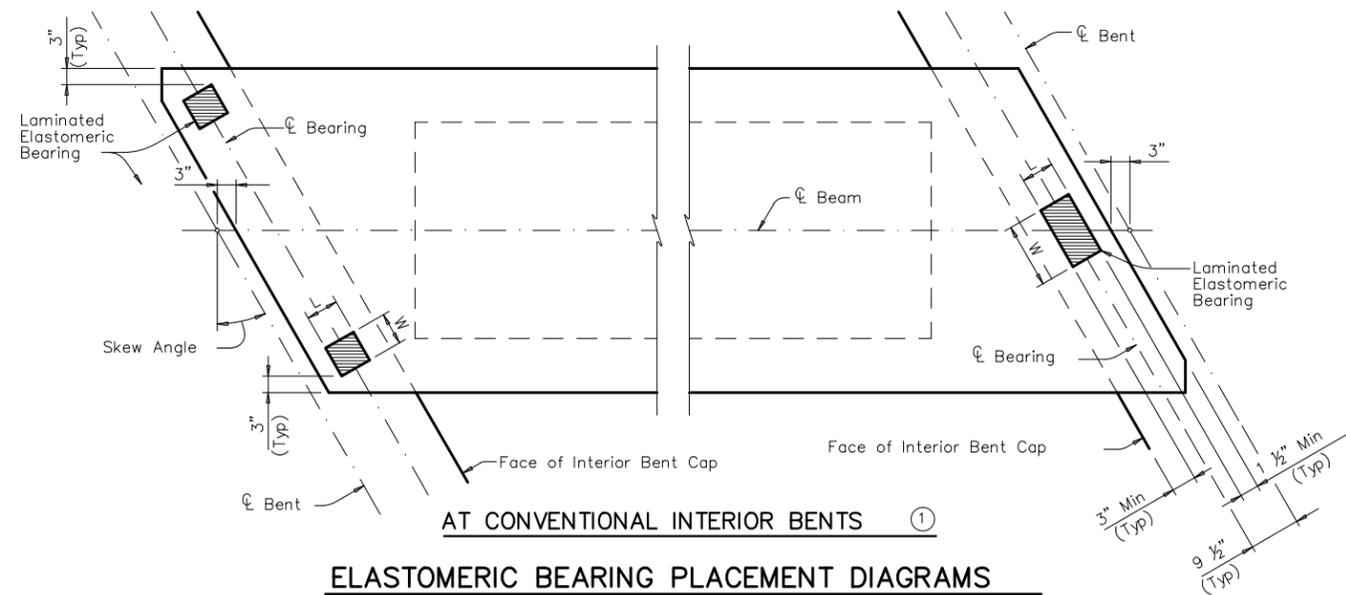
FIRM INFO

**SEAL
NOTE**

PROJECT TITLE		JOB NO.
PRESTRESSED CONCRETE BOX BEAM DETAILS (TYPE B40) (3 OF 3)		
DRAWN BY:	SHEET NO.	FILE NAME:
SCALE:		FILE NO.:
DATE:	APPROVED BY:	SHT NO.:
		12



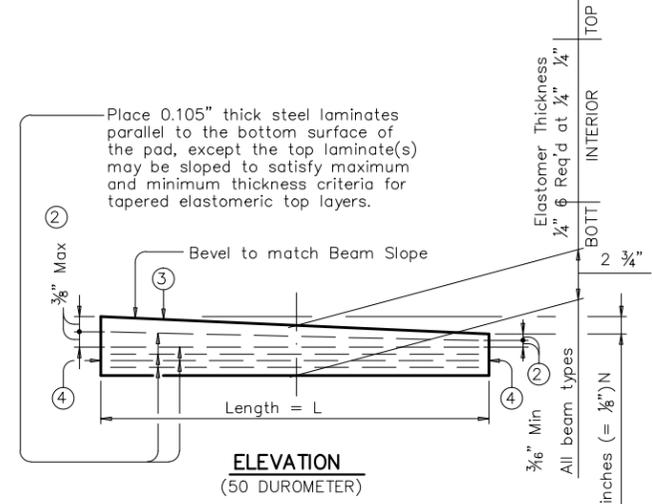
AT ABUTMENT



ELASTOMERIC BEARING PLACEMENT DIAGRAMS

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

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 $(\frac{0.0625}{Length})$ 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.

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

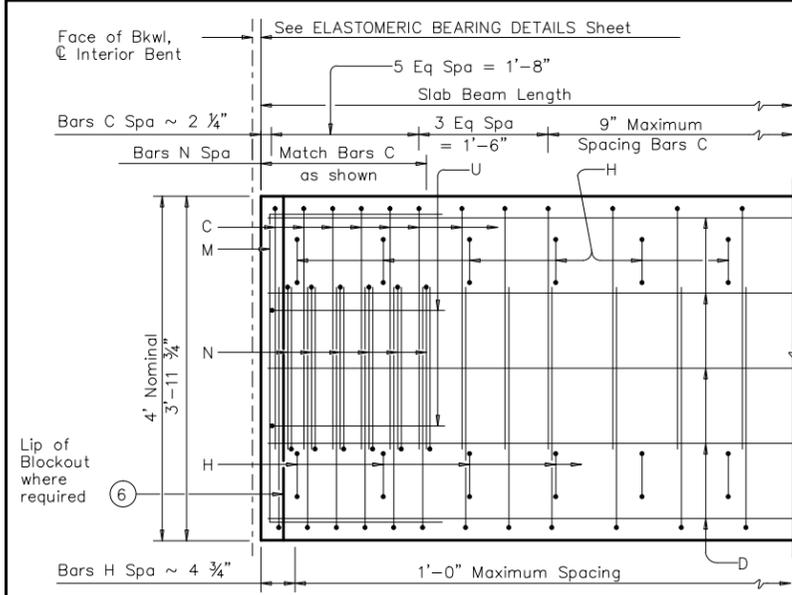
HARRIS COUNTY
ENGINEERING DEPARTMENT



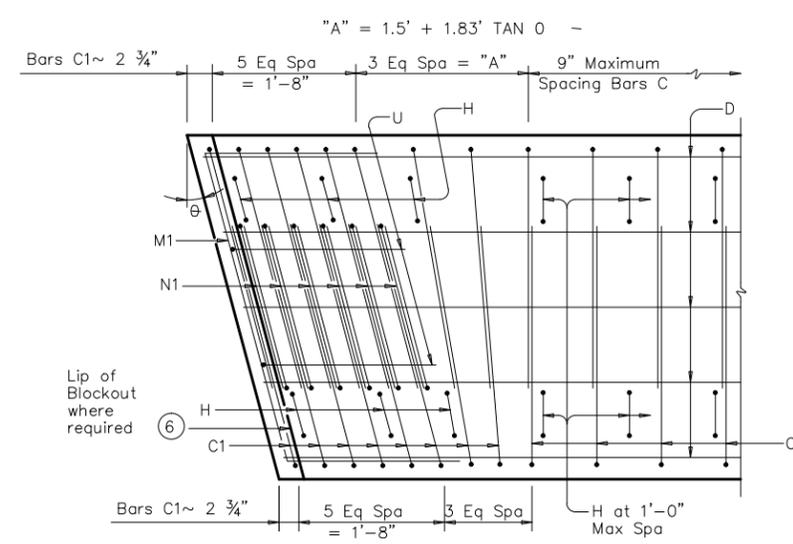
FIRM INFO

SEAL
NOTE

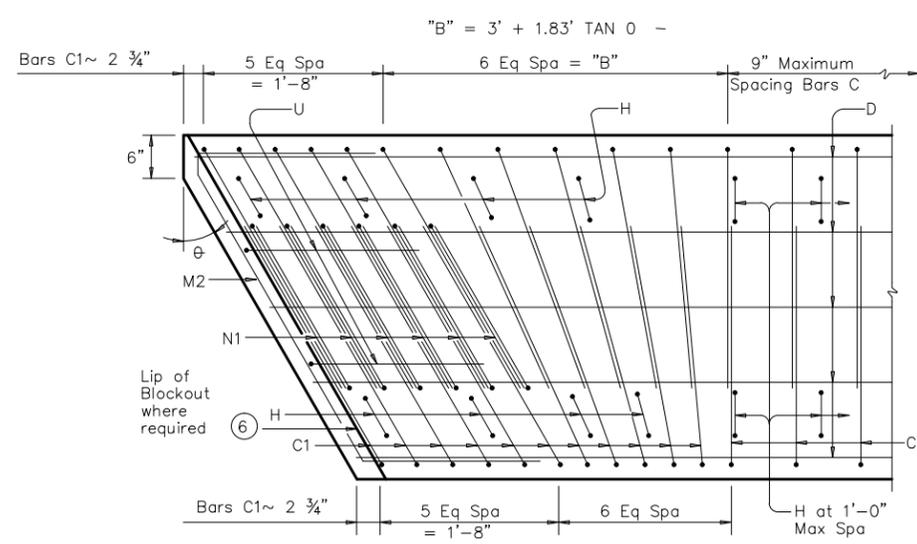
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DRAWN BY:	SHEET DESCRIPTION:	ELASTOMERIC BEARING DETAILS	
DATE:	APPROVED BY:	FILE NAME:	JOB NO.:
		FILE NO.:	
		SHT NO.:	13



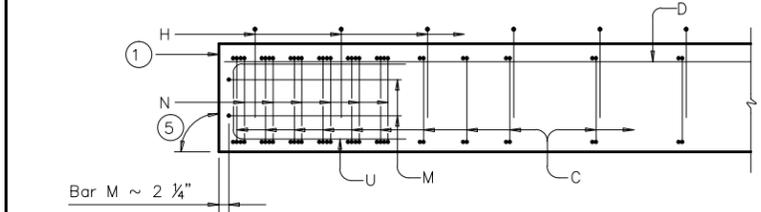
PART PLAN



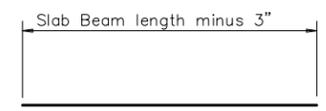
PART SKEW PLAN



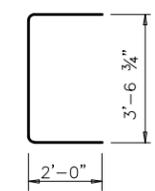
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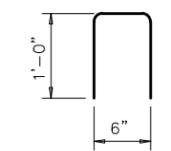
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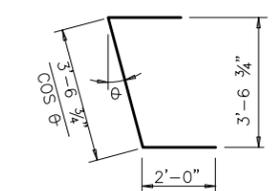
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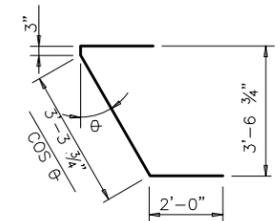
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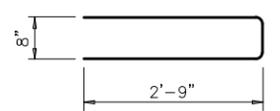
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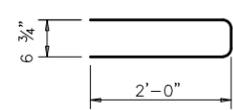
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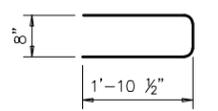
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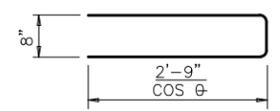
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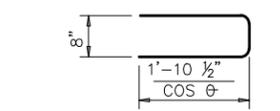
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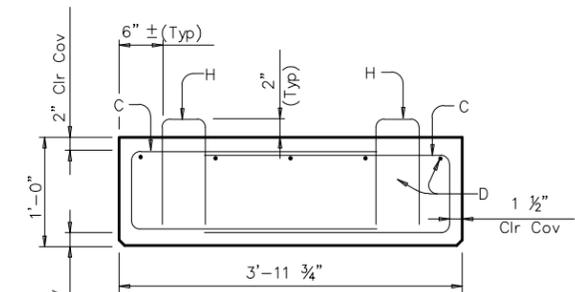
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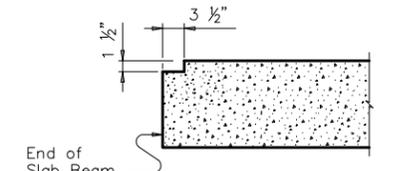
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BARS N1(#4)

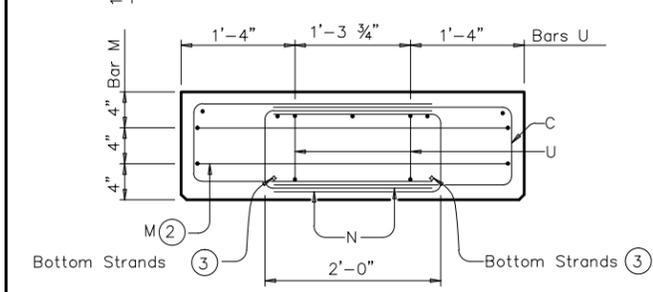


SECTION



ELEVATION OF BLOCKOUT

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



END MAT REINFORCING

Bars H not shown for clarity.

- ① See END MAT REINFORCING detail.
- ② Bars M may be adjusted vertically to avoid strands.
- ③ See Slab Beam Design Form (PSBND) for strand locations.
- ④ Assumes 150 pcf weight density of concrete.
- ⑤ 90° at Conventional Interior Bents. End of Beam shall be vertical at Abutment Backwall.
- ⑥ Blockout required at Armor Jt locations to accommodate joint anchorage.

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.

- 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

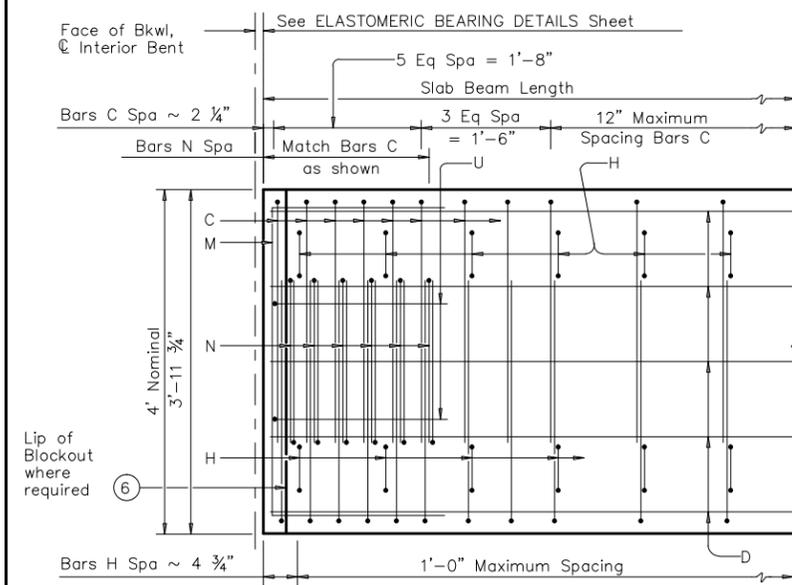


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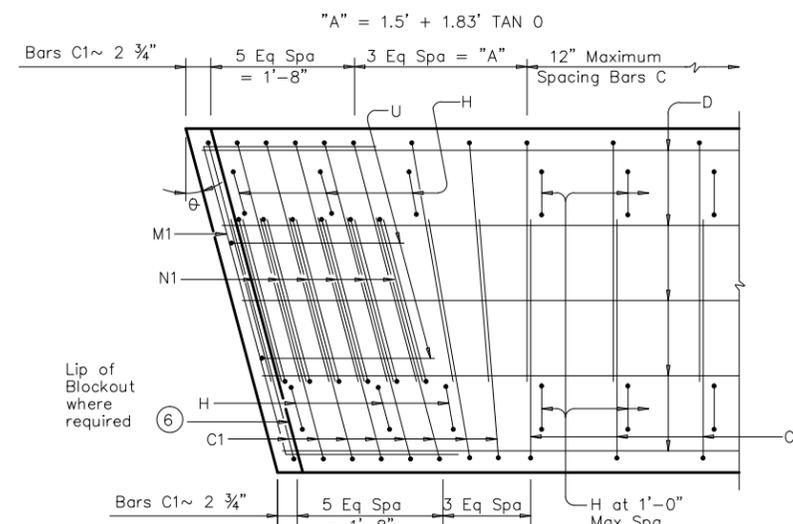
SEAL NOTE

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DRAWN BY:	SHEET NO.:	FILE NAME:
SCALE:	APPROVED BY:	FILE NO.:
DATE:		SHT NO.:

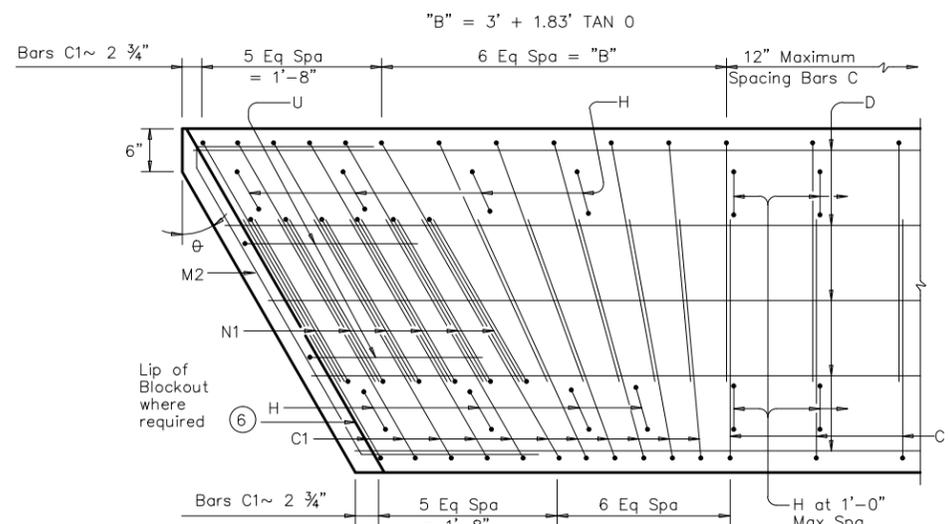
HL93 LOADING



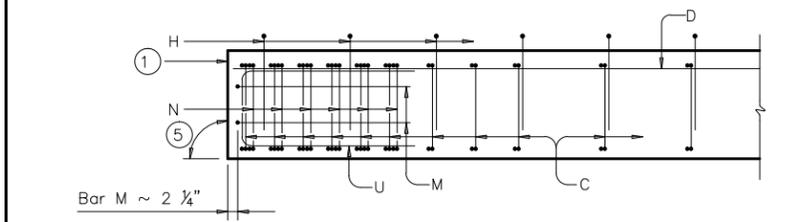
PART PLAN



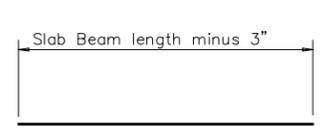
PART SKEW PLAN
(Showing 0 over 0° to 15° Skew)



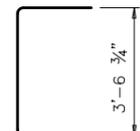
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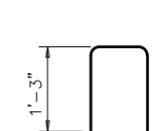
ELEVATION



BARS D(#6)



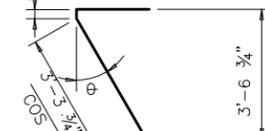
BARS M(#4)



BARS H(#4)

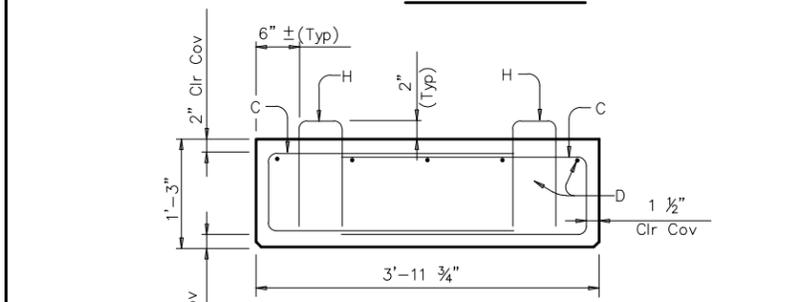


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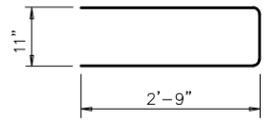


BARS M2(#4)

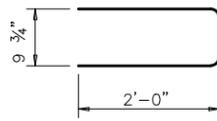
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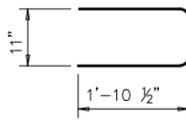
SECTION



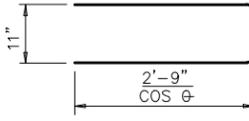
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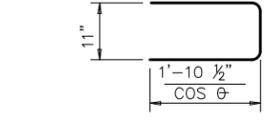
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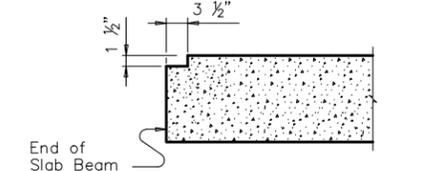
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BARS C1(#4)



BARS N1(#4)

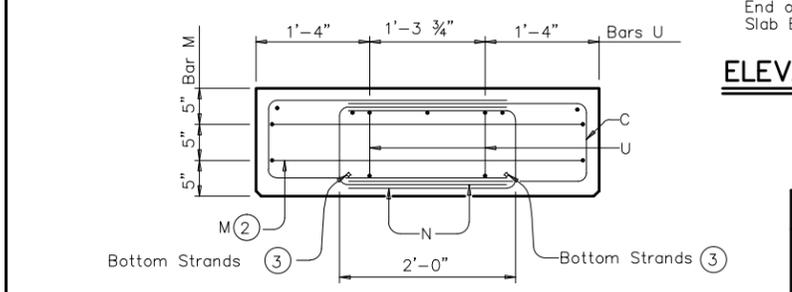


ELEVATION OF BLOCKOUT ⑥

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

- ① See END MAT REINFORCING detail.
- ② Bars M may be adjusted vertically to avoid strands.
- ③ See Slab Beam Design Form (PSBND) for strand locations.
- ④ Assumes 150 pcf weight density of concrete.
- ⑤ 90° at Conventional Interior Bents. End of Beam shall be vertical at Abutment Backwall.
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 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.



END MAT REINFORCING

Bars H not shown for clarity.

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

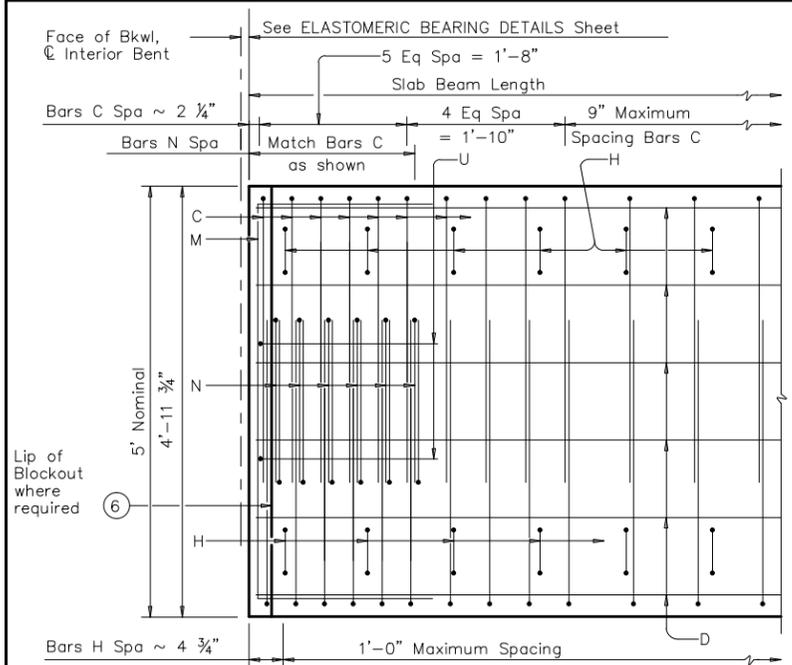


FIRM INFO

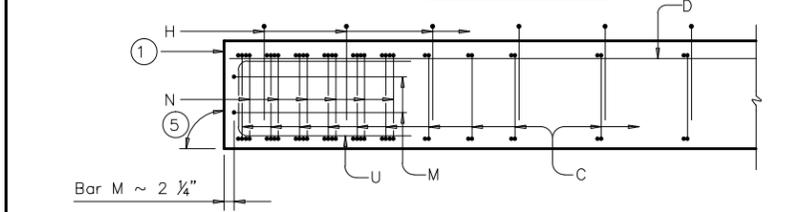
SEAL NOTE

PROJECT TITLE			
DRAWN BY:	SHEET NO.:	PRESTRESSED CONCRETE SLAB BEAM DETAILS (TYPE 4SB15)	
CHK'D BY:	FILE NO.:		
SCALE:	FILE NO.:		
DATE:	APPROVED BY:	SHT NO.:	16

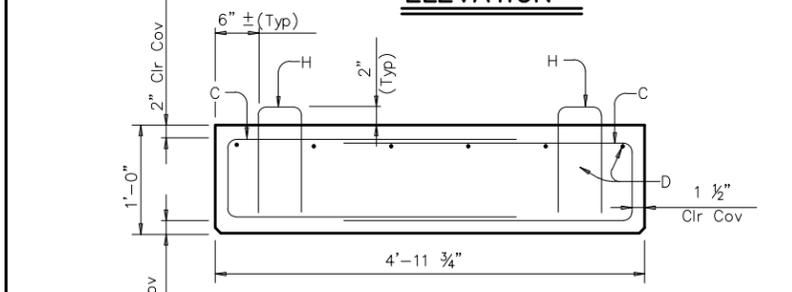
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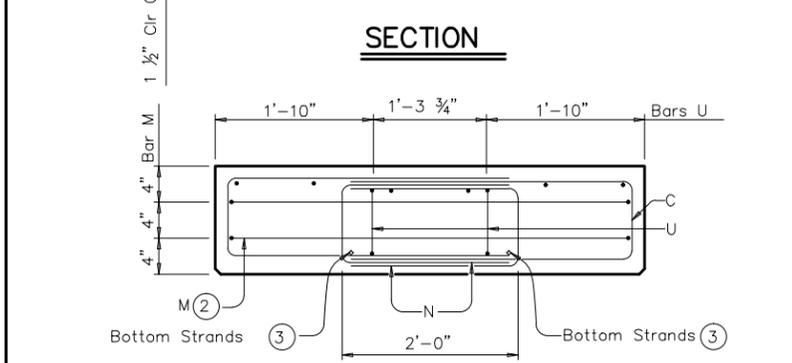
PART PLAN



ELEVATION

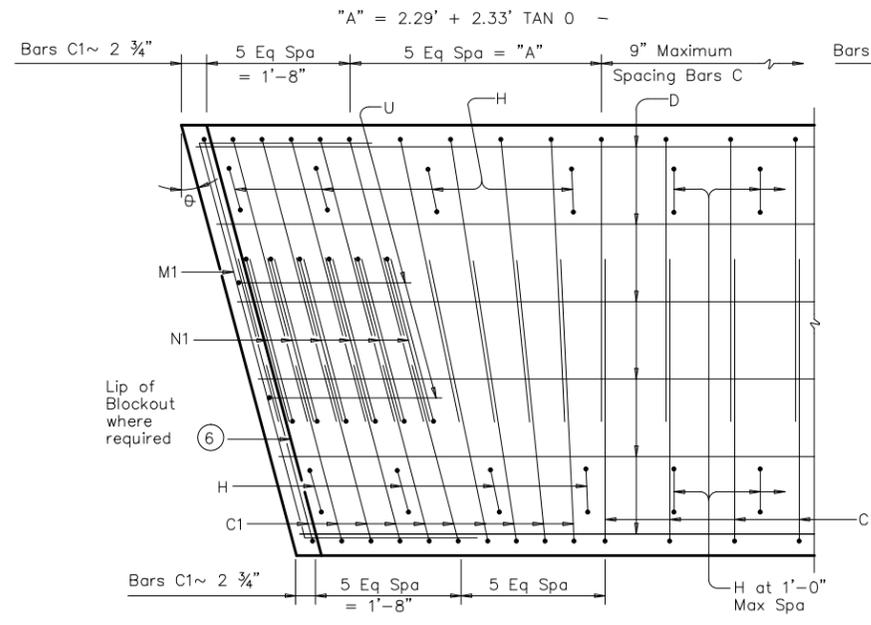


SECTION



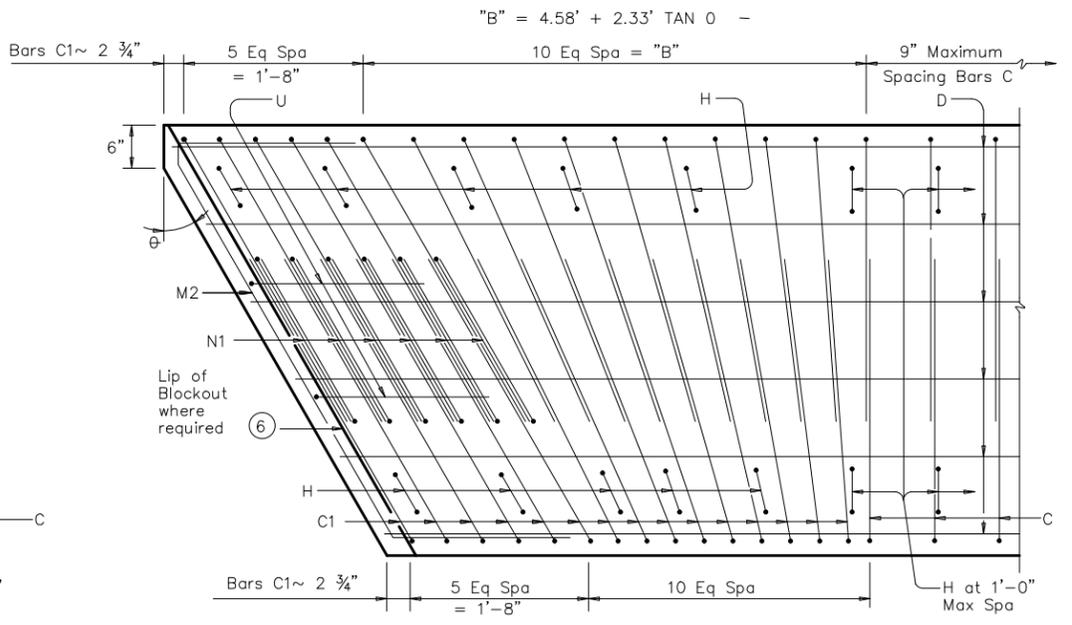
END MAT REINFORCING

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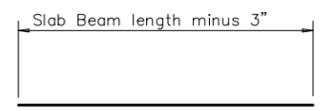
PART SKEW PLAN

(Showing 0 over 0' to 15' Skew)

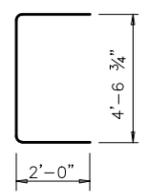


PART SKEW PLAN

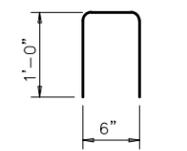
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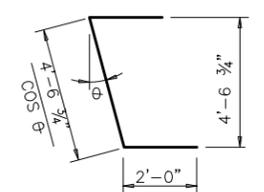
BARS D(#6)



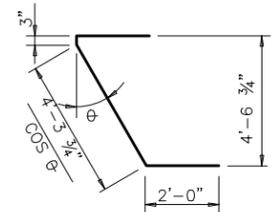
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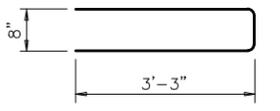
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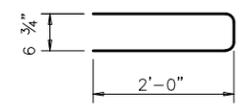
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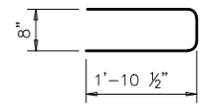
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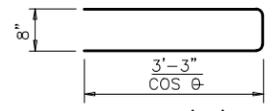
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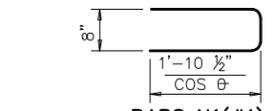
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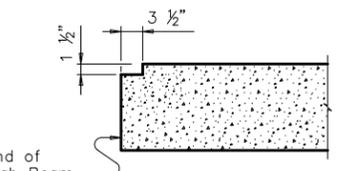
BARS N(#4)



BARS C1(#4)



BARS N1(#4)



ELEVATION OF BLOCKOUT

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

- ① See END MAT REINFORCING detail.
- ② Bars M may be adjusted vertically to avoid strands.
- ③ See Slab Beam Design Form (PSBND) for strand locations.
- ④ Assumes 150 pcf weight density of concrete.
- ⑤ 90° at Conventional Interior Bents. End of Beam shall be vertical at Abutment Backwall.
- ⑥ Blockout required at Armor Jt locations to accommodate joint anchorage.

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.

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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

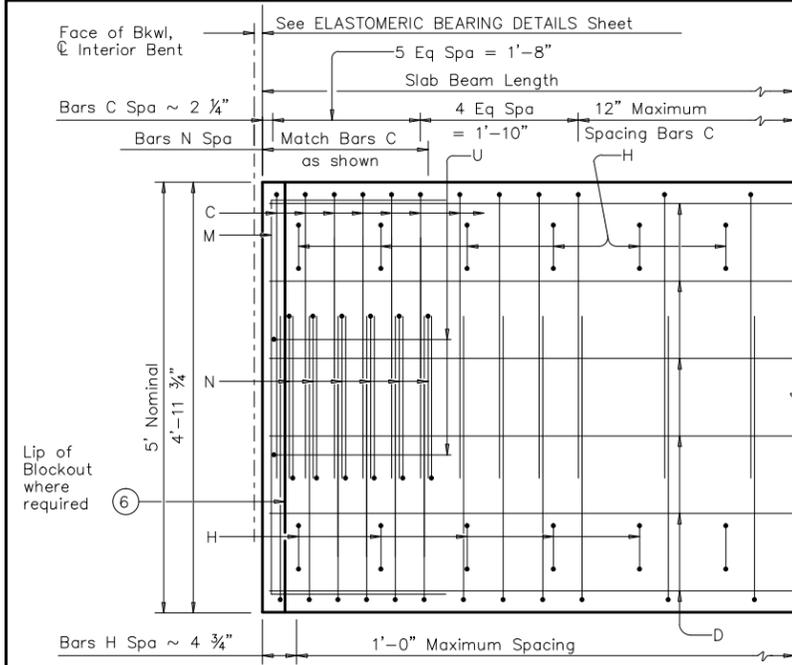


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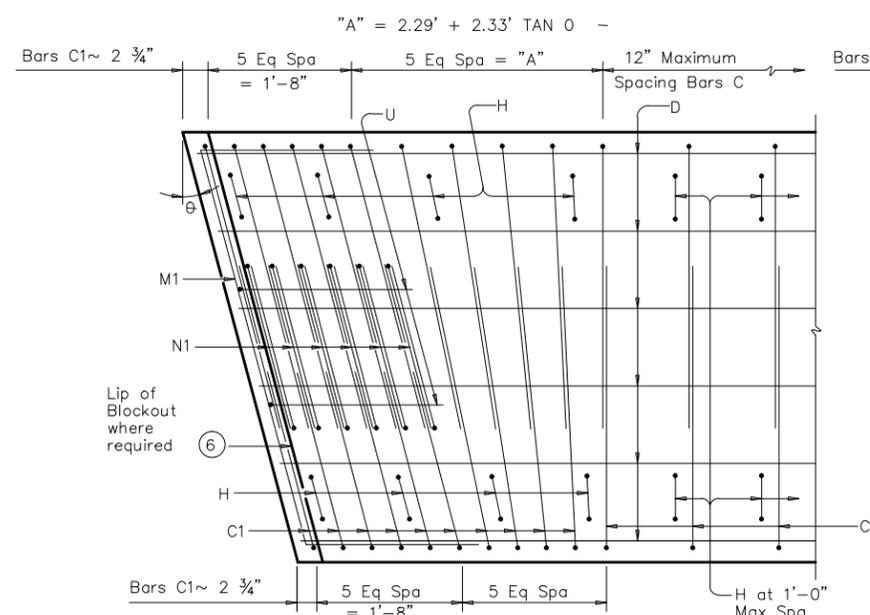
SEAL NOTE

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CHK'D BY:	SLAB BEAM DETAILS	FILE NAME:
SCALE:	(TYPE 5SB12)	FILE NO.:
DATE:	APPROVED BY:	SHT NO.:

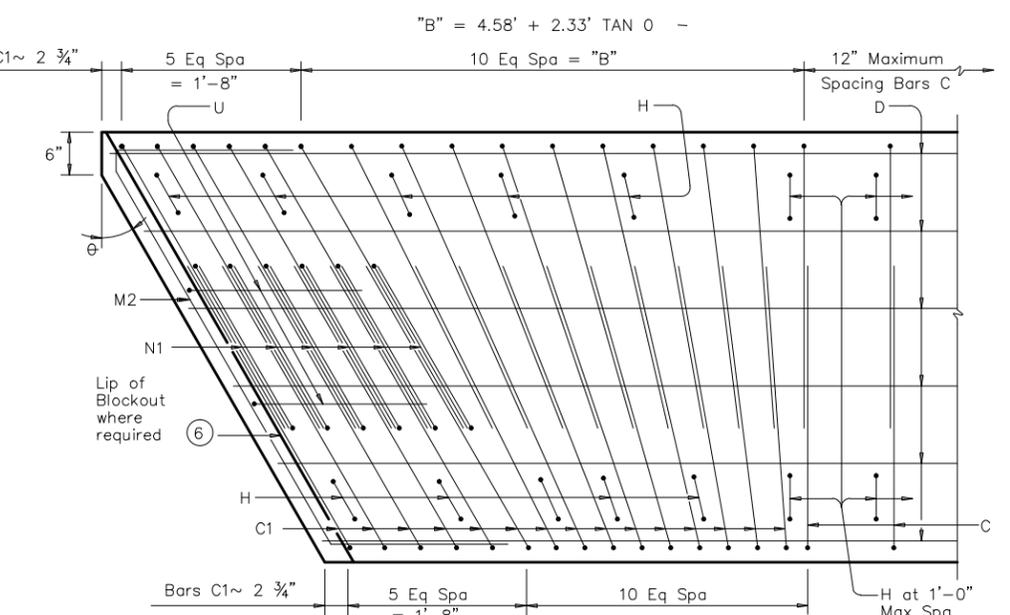
HL93 LOADING



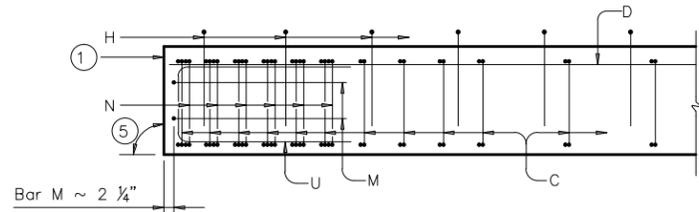
PART PLAN



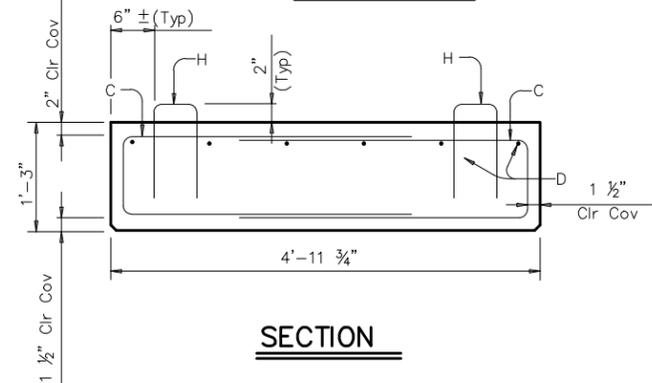
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(Showing 0 over 0° to 15° Skew)



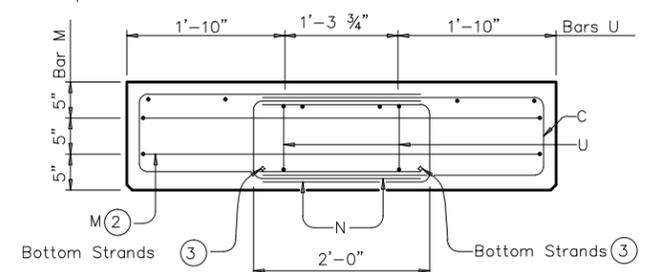
PART SKEW PLAN
(Showing 0 over 15° to 30° Skew)



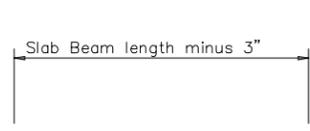
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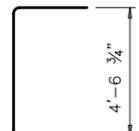
SECTION



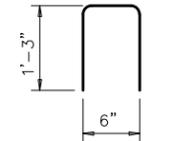
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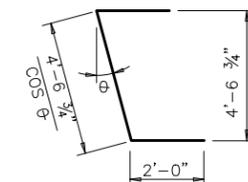
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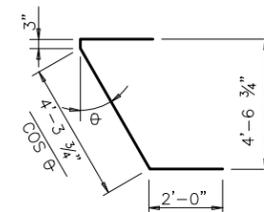
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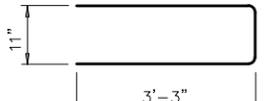
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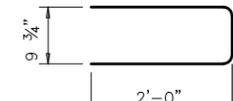
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BARS M2(#4)



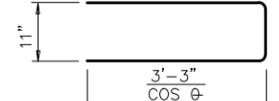
BARS C(#4)



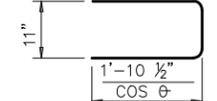
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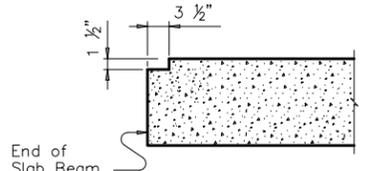
BARS N(#4)



BARS C1(#4)



BARS N1(#4)



ELEVATION OF BLOCKOUT

BEAM PROPERTIES		
Area	in ²	896.2
Y Top	in	7.50
Y Bott	in	7.50
I	in ⁴	16,805
Weight	lb/ft	934

- ① See END MAT REINFORCING detail.
- ② Bars M may be adjusted vertically to avoid strands.
- ③ See Slab Beam Design Form (PSBND) for strand locations.
- ④ Assumes 150 pcf weight density of concrete.
- ⑤ 90° at Conventional Interior Bents. End of Beam shall be vertical at Abutment Backwall.
- ⑥ Blockout required at Armor Jt locations to accommodate joint anchorage.

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.

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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

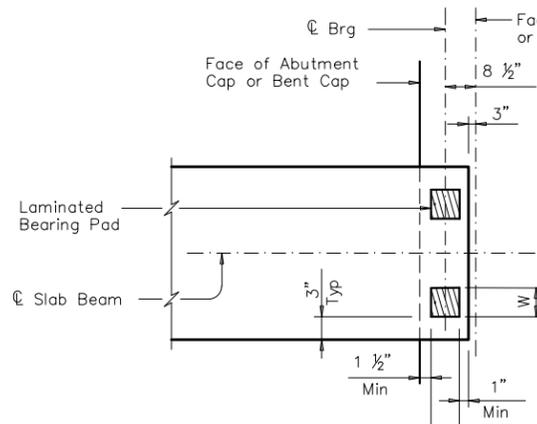


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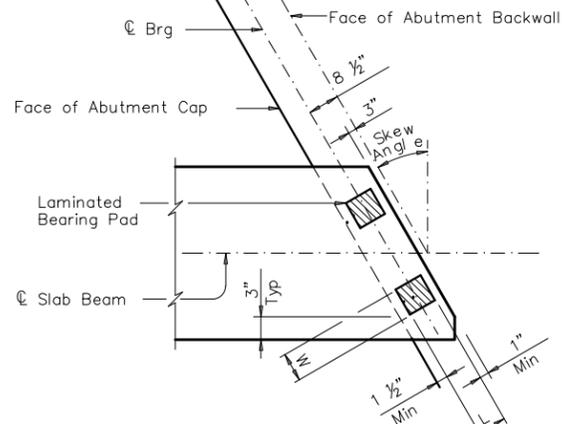
SEAL NOTE

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CHK'D BY:	FILE NAME:		
SCALE:	FILE NO.:		
DATE:	APPROVED BY:	SHT NO. 18	

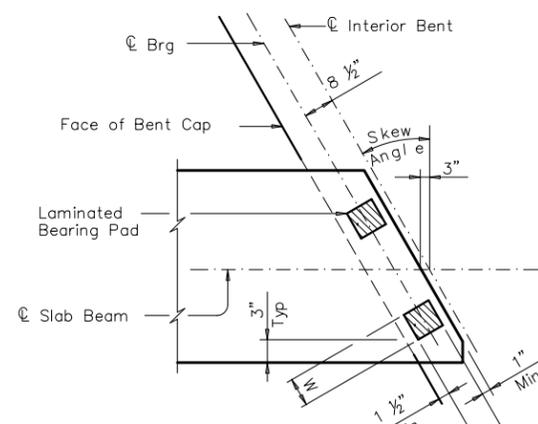
HL93 LOADING



TWO-PAD DETAIL PLAN
(At Abutment or at Interior Bent)



TWO-PAD DETAIL SKEW PLAN
(At Abutment)



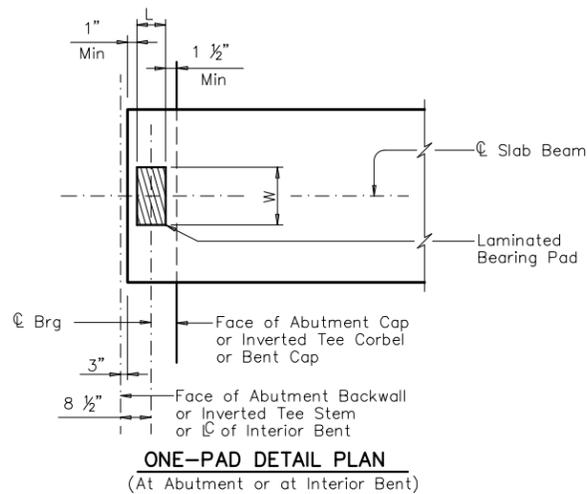
TWO-PAD DETAIL SKEW PLAN
(At Interior Bent)

TABLE OF ELASTOMERIC BEARING PAD DIMENSIONS (ALL PRESTR CONC SLAB BM TYPES)					
One-Pad (Ty SB1-"N")			Two-Pad (Ty SB2-"N")		
W	L	T	W	L	T
14"	7"	2"	7"	7"	2"

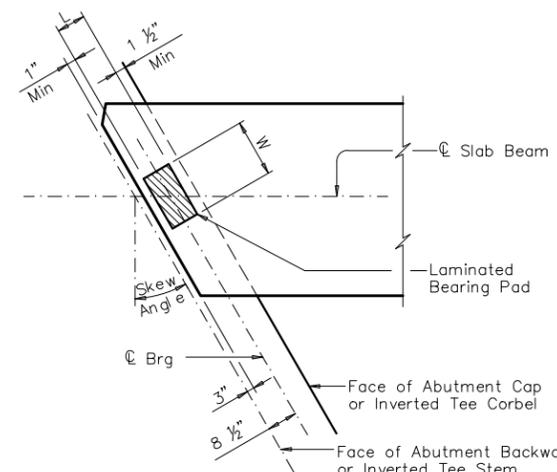
Pad sizes shown are applicable for the following conditions:
 (1) All one, two and three span units where the minimum span length is not less than 25' and the maximum span is not more than 50'.
 (2) Skews less than or equal to 30'.

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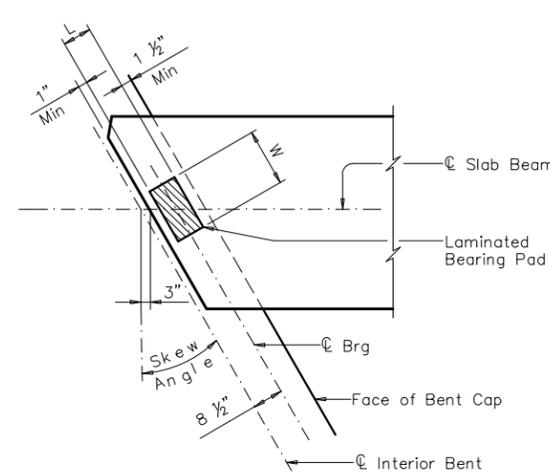
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ONE-PAD DETAIL PLAN
(At Abutment or at Interior Bent)



ONE-PAD DETAIL SKEW PLAN
(At Abutment)

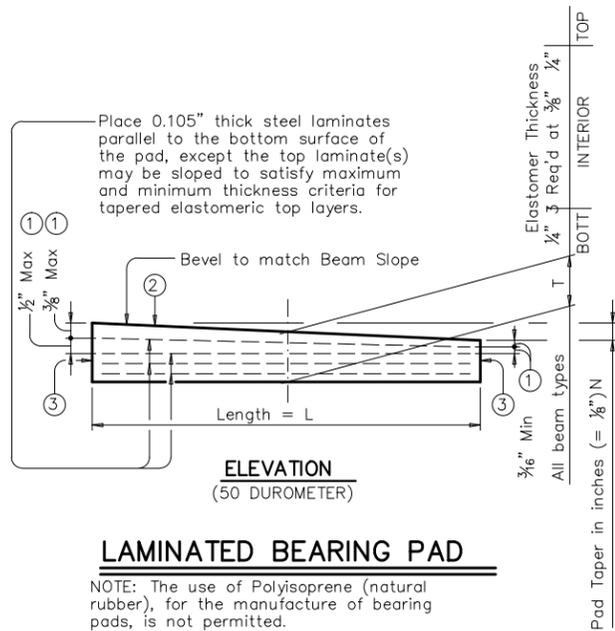


ONE-PAD DETAIL SKEW PLAN
(At Interior Bent)

ELASTOMERIC BEARING PLACEMENT DIAGRAMS

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

- Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.
- 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 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 shall not vary from plan beam slope by more than $(\frac{0.0625}{\text{Length}})$ IN/IN.
- Locate Permanent Mark here.



LAMINATED BEARING PAD

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

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".

HL93 LOADING

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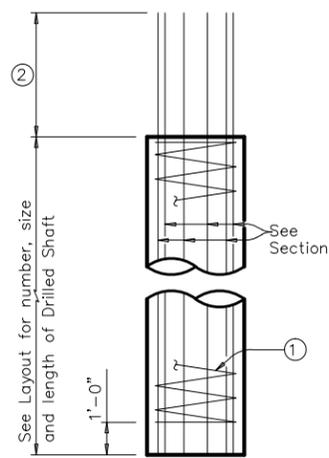
HARRIS COUNTY ENGINEERING DEPARTMENT



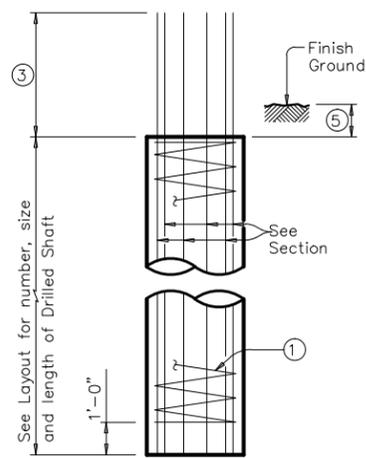
FIRM INFO

SEAL NOTE

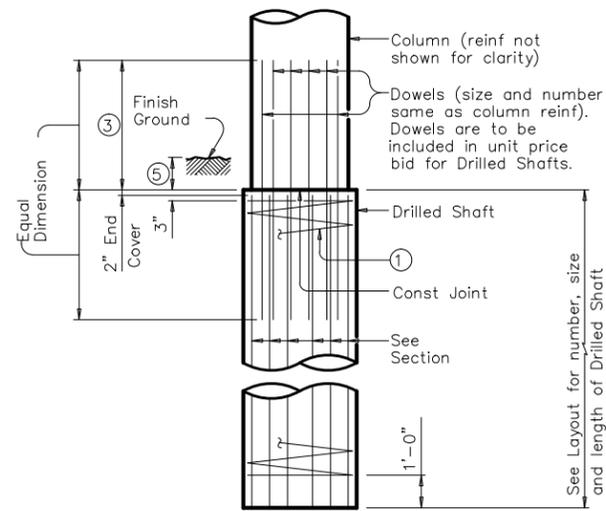
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JOB NO.:	FILE NAME:	PRESTR CONC SLAB BEAMS	
SCALE:	FILE NO.:		
DATE:	APPROVED BY:	SHR NO.:	19



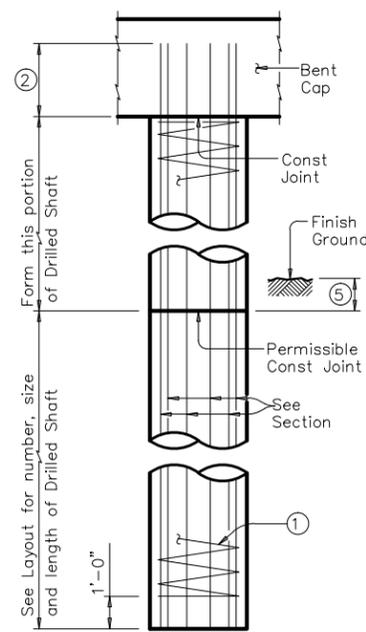
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



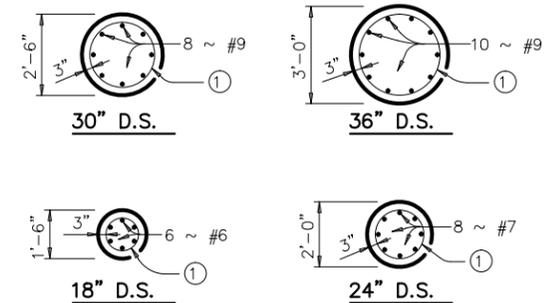
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL ④



DRILLED SHAFT SECTIONS

DRILLED SHAFT DETAILS

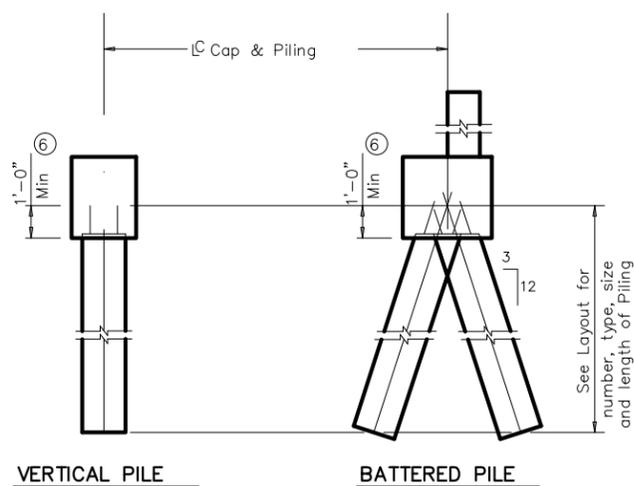
GENERAL NOTES:

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.

NOTES TO DESIGN ENGINEER:

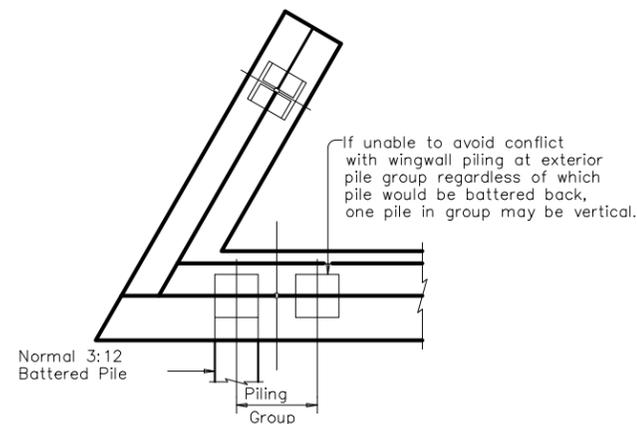
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- ① #3 Spiral at 6" pitch (One flat turn top & bottom)
- ② Min extension into supported element:
#6 Bars = 1'-0"
#7 Bars = 1'-5"
#9 Bars = 2'-3"
- ③ Min lap with Column reinf:
#7 Bars = 2'-4"
#9 Bars = 3'-10"
- ④ If approved by the Engineer, Drilled 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.
- ⑤ 6" Min at Grade Crossing, 1'-0" Min in Channel.
- ⑥ Or as shown on plans.



VERTICAL PILE BATTERED PILE

PILING DETAILS



DETAIL "A"

(Showing Plan View of a 30° Skewed Abutment)

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

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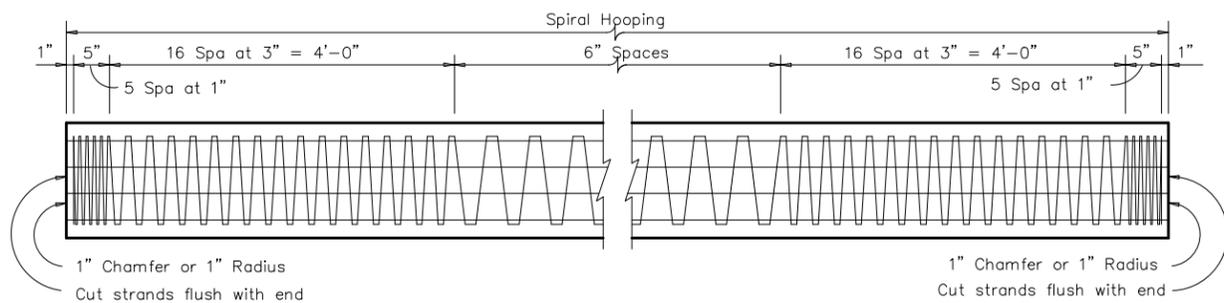


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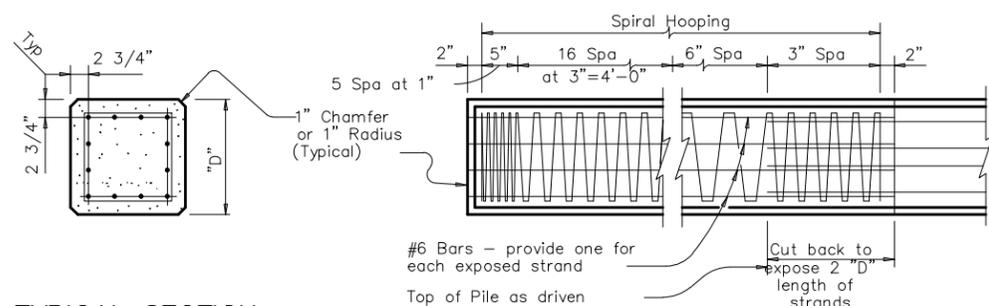
SEAL NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	COMMON FOUNDATION DETAILS (SHEET 1 OF 2)	
DATE:	APPROVED BY:	JOB NO.:	FILE NO.:
			FILE NO.:
			SHT NO. 21

HL93 LOADING

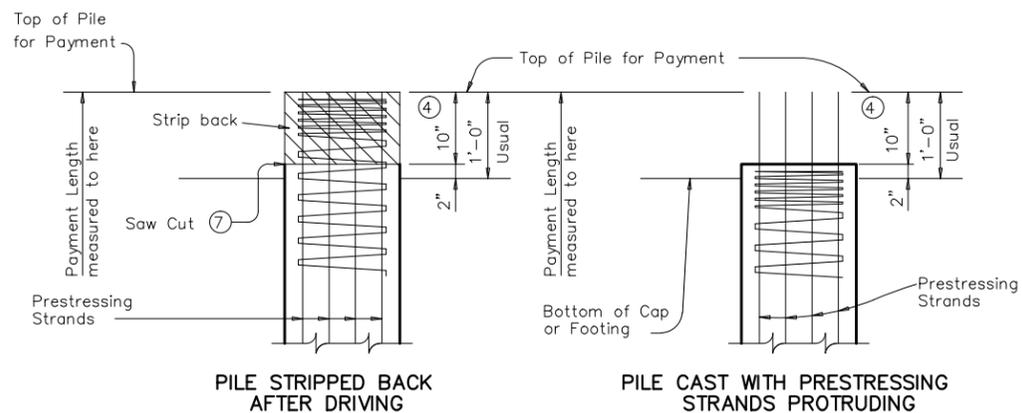


PILING DETAILS



TYPICAL SECTION THRU PILING

PILE BUILD-UP DETAIL



PILE STRIPPED BACK AFTER DRIVING

PILE CAST WITH PRESTRESSING STRANDS PROTRUDING

PILING EMBEDMENT DETAILS

Pile Size "D"	Area of Pile Section	I	Weight	Prestressing		
				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:

- 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 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.

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



FIRM INFO

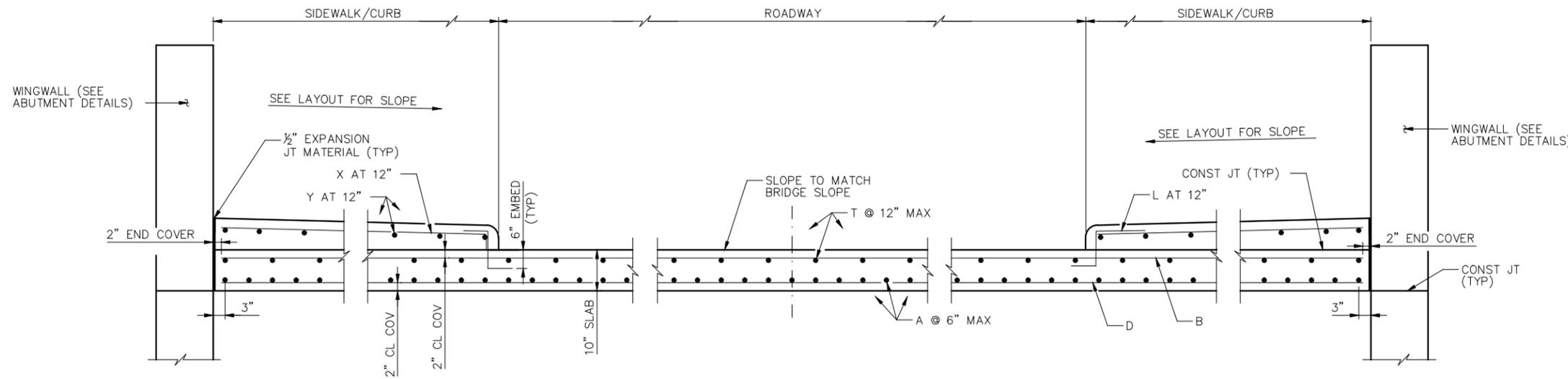
SEAL NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION	FILE NAME:	JOB NO:
DATE:	APPROVED BY:	FILE NO:	SHT NO: 22

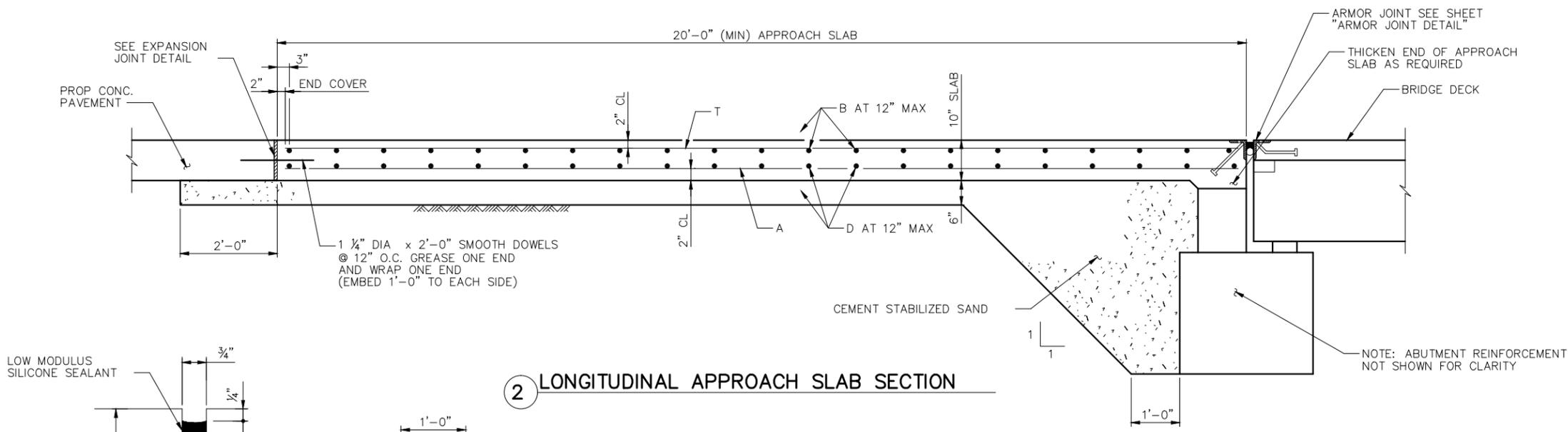
COMMON FOUNDATION DETAILS (SHEET 2 OF 2)

NOTES TO DESIGN ENGINEER:

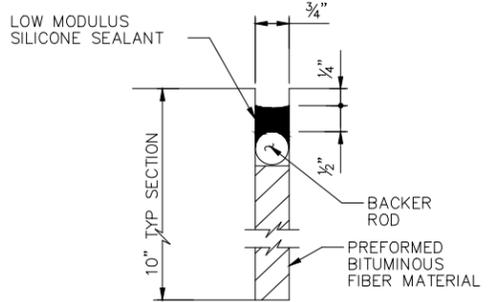
- A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.
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- B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE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



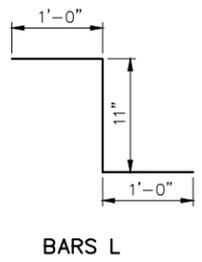
1 TRANSVERSE SECTION



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 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.

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HARRIS COUNTY
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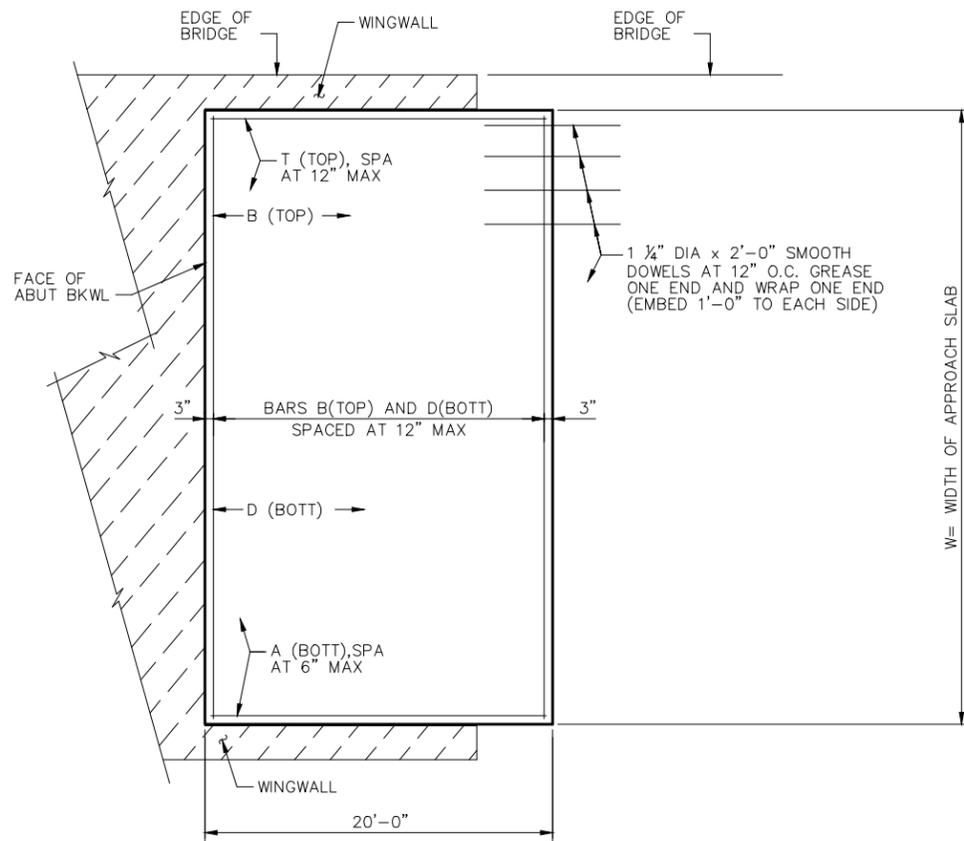


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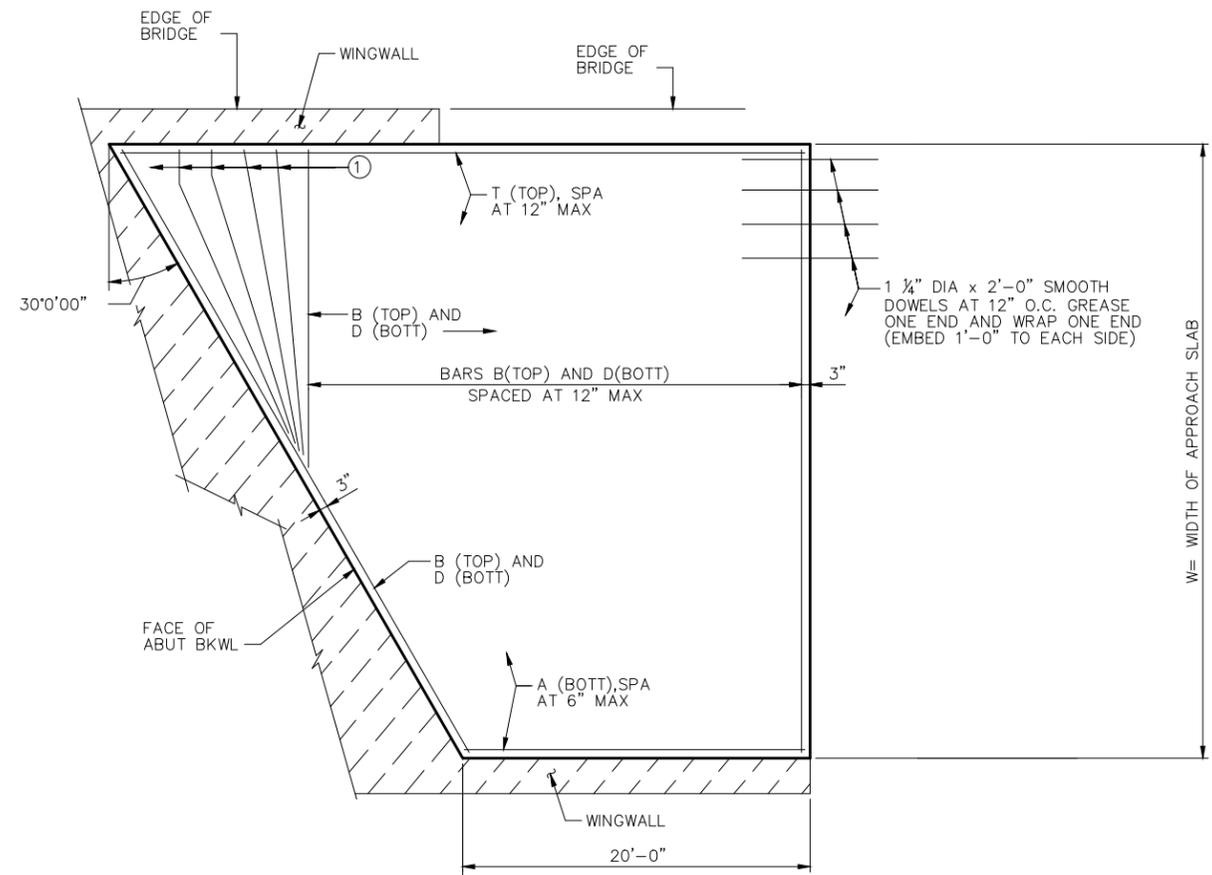
SEAL
NOTE

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

HL93 LOADING

NO.	REVISIONS	DATE	NAME
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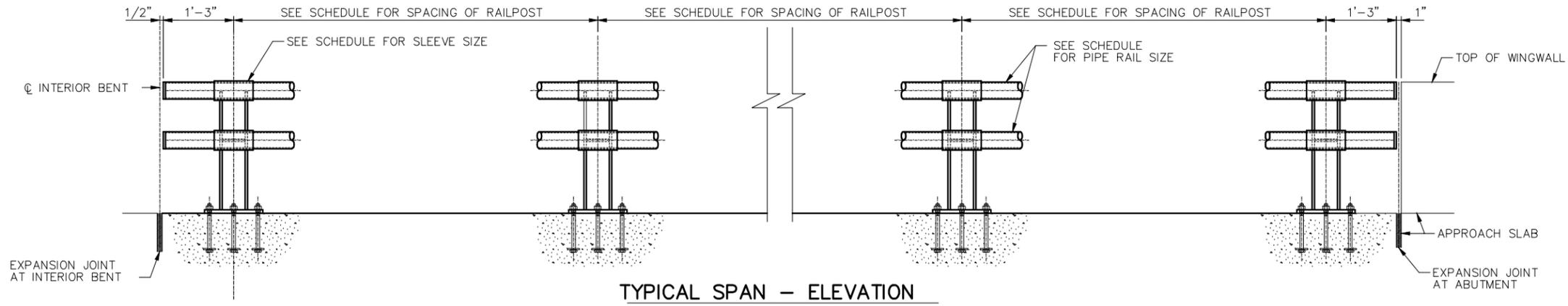
**HARRIS COUNTY
 ENGINEERING DEPARTMENT**



FIRM INFO

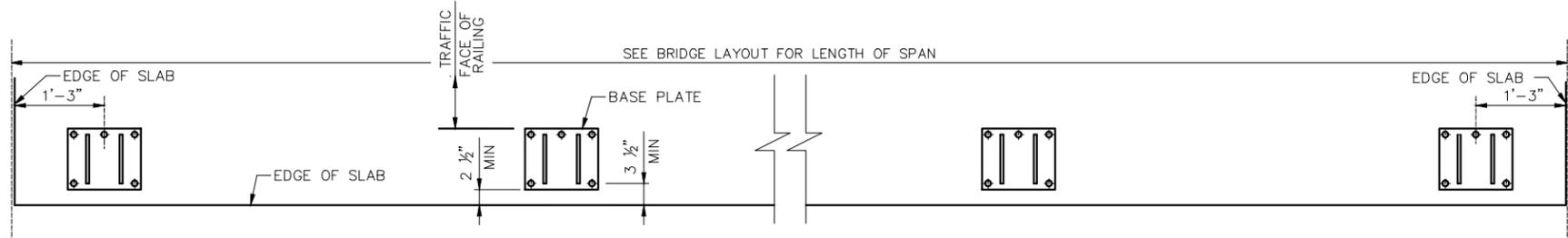
**SEAL
 NOTE**

PROJECT TITLE		JOB NO.
DRAWN BY:	BRIDGE APPROACH SLAB DESIGN GUIDELINES	
CHK'D BY:	(2 OF 2)	FILE NAME:
SCALE:		FILE NO.:
DATE:	APPROVED BY:	SHT NO. 24

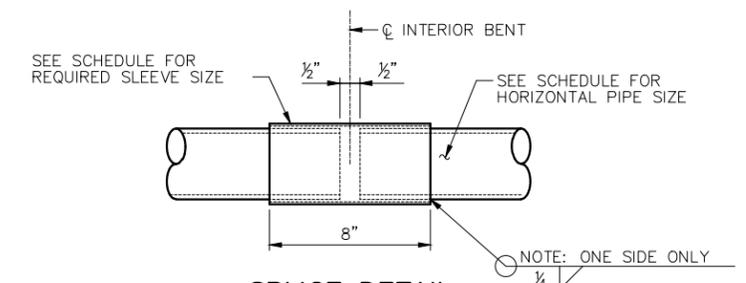


TYPICAL SPAN - ELEVATION
SCALE: 1' = 1'-0"

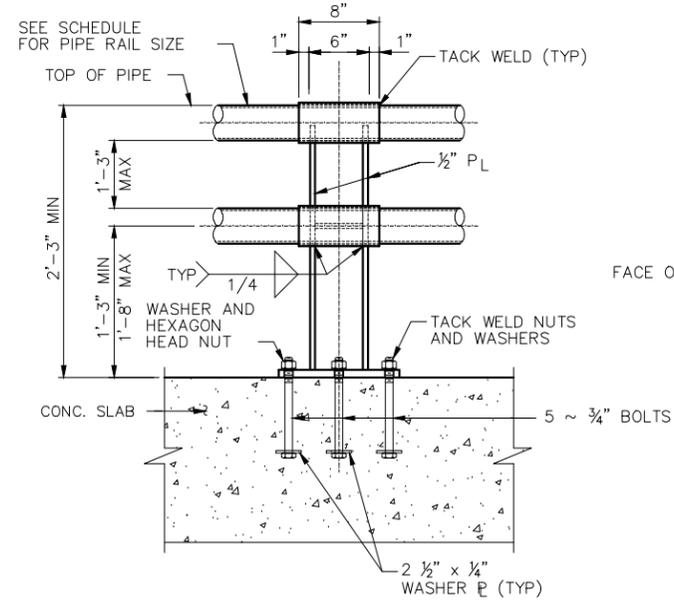
SCHEDULE OF HORIZONTAL TRAFFIC RAIL		
RAILPOST SPACING (MAX)	REQUIRED PIPE SIZE (MIN)	REQUIRED SLEEVE SIZE (MIN)
4'-2"	3" STD. WT O.D.=3.5" I.D.=3.608"	3 1/2" SCH. 10S O.D.=4.00" I.D.=3.75"
5'-8"	3 1/2" STD. WT O.D.=4.0" I.D.=3.548"	4" SCH. 10S O.D.=4.50" I.D.=4.25"
7'-8"	4" STD. WT O.D.=4.5" I.D.=4.026"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



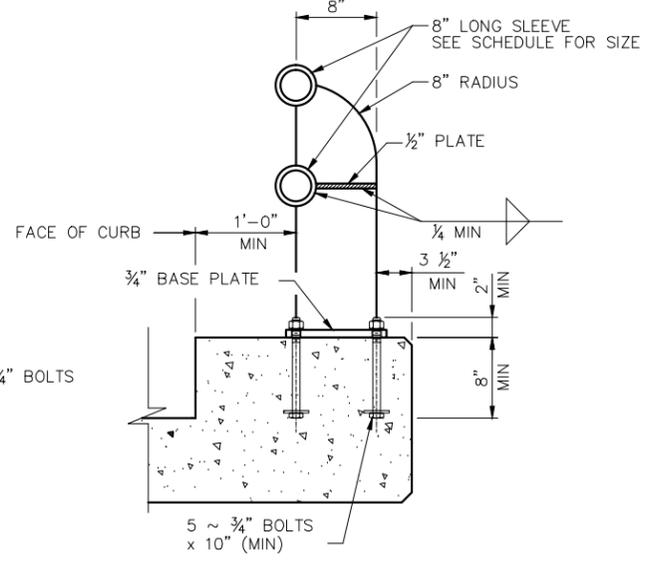
TYPICAL SPAN - ANCHOR BOLT PLAN
SCALE: 1' = 1'-0"



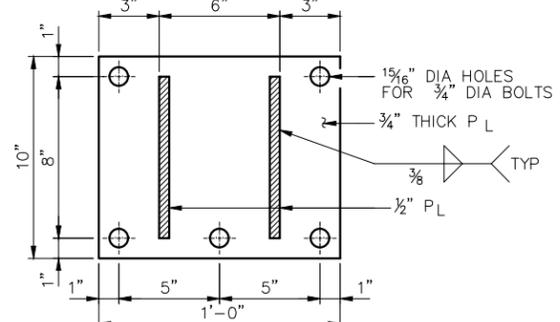
SPLICE DETAIL AT INTERIOR BENT
SCALE: 3" = 1'-0"



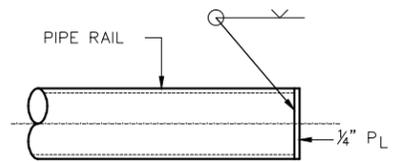
TYPICAL FRONT ELEVATION OF RAILPOST
SCALE: 1 1/2" = 1'-0"



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



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



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

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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**HARRIS COUNTY
ENGINEERING DEPARTMENT**

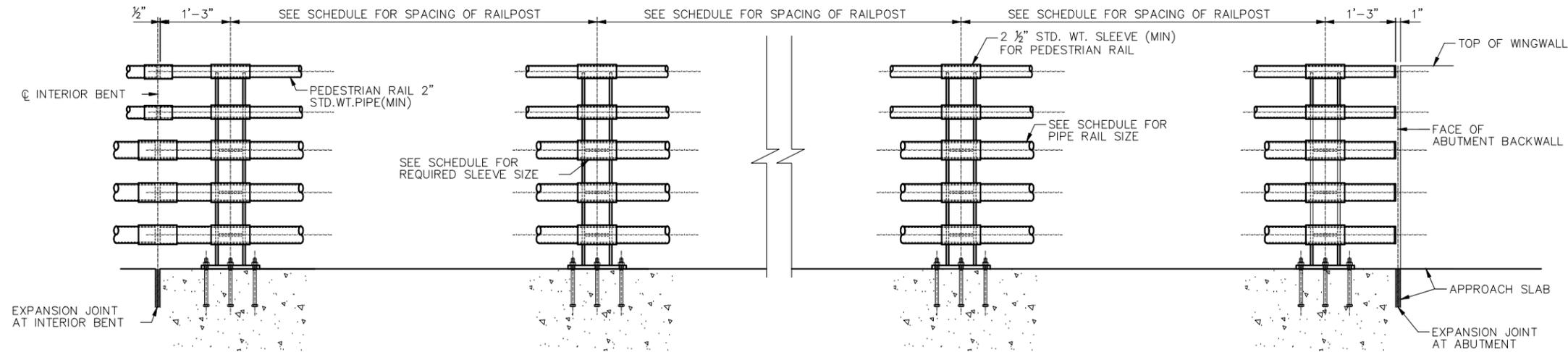


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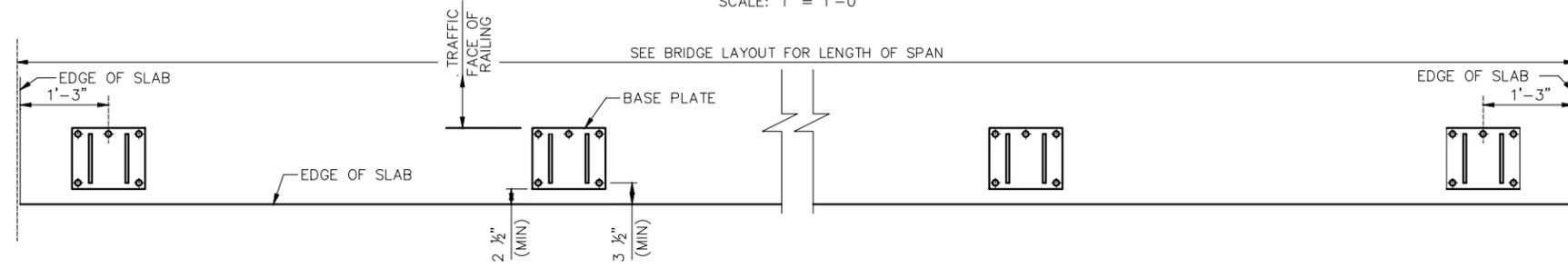
**SEAL
NOTE**

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BRIDGE RAILING STANDARDS		
DRWN BY:	SHEET DESCRIPTION:	FILE NAME:
	TRAFFIC RAILING DETAILS	
SCALE:		FILE NO.:
DATE:	APPROVED BY:	SHT NO.:
		26

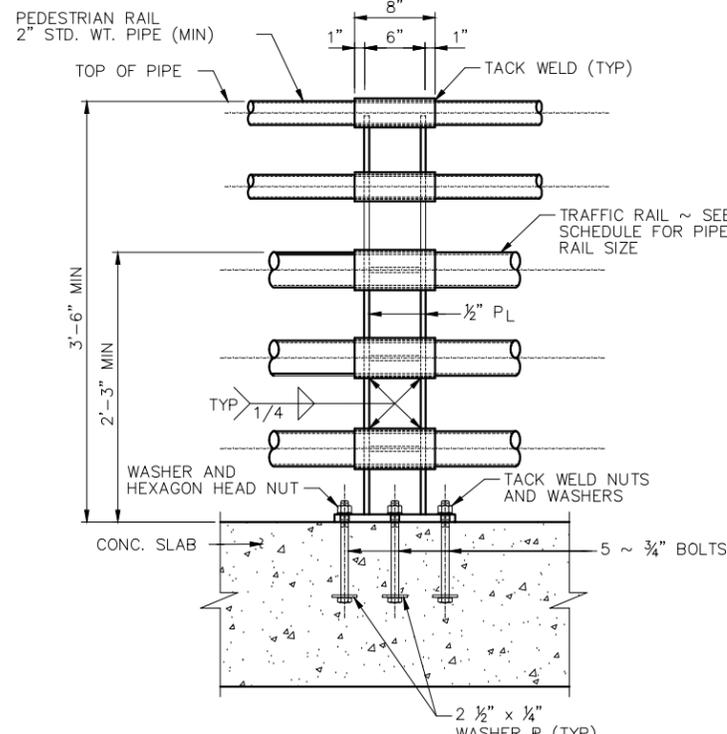
HL93 LOADING



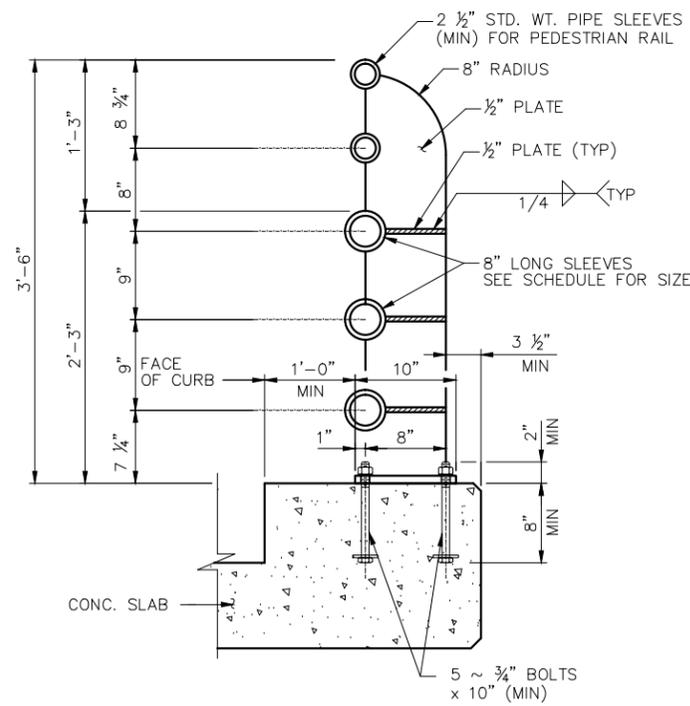
TYPICAL SPAN - ELEVATION
SCALE: 1' = 1'-0"



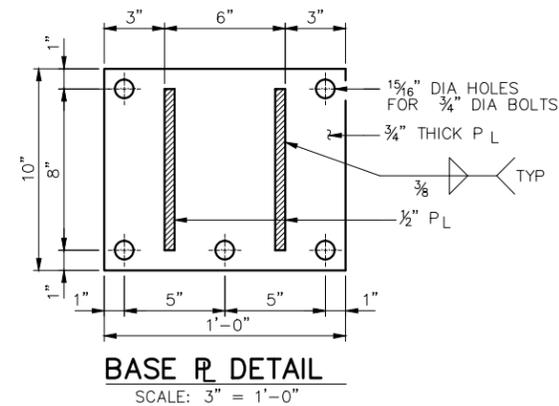
TYPICAL SPAN - ANCHOR BOLT PLAN
SCALE: 1' = 1'-0"



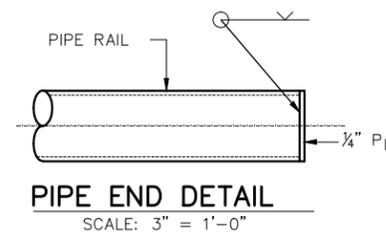
TYPICAL FRONT ELEVATION OF RAILPOST
SCALE: 1 1/2" = 1'-0"



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

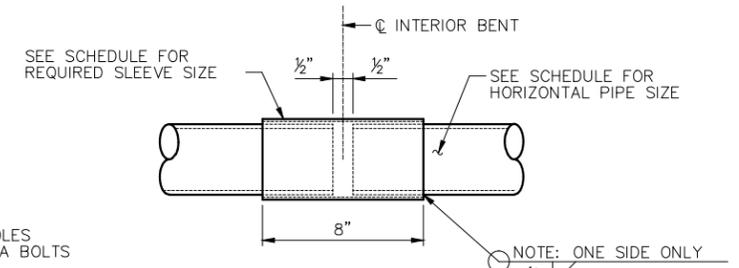


BASE PLATE DETAIL
SCALE: 3" = 1'-0"



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

SCHEDULE OF HORIZONTAL COMBINATION RAIL		
RAILPOST SPACING (MAX)	REQUIRED PIPE SIZE (MIN)	REQUIRED SLEEVE SIZE (MIN)
5'-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"
7'-2"	3 1/2" STD. WT O.D.=4.0" I.D.=3.548"	4" SCH. 10S O.D.=4.50" I.D.=4.25"
9'-8"	4" STD. WT O.D.=4.5" I.D.=4.026"	5" SCH. 80 O.D.=5.563" I.D.=4.813"



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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**HARRIS COUNTY
ENGINEERING DEPARTMENT**

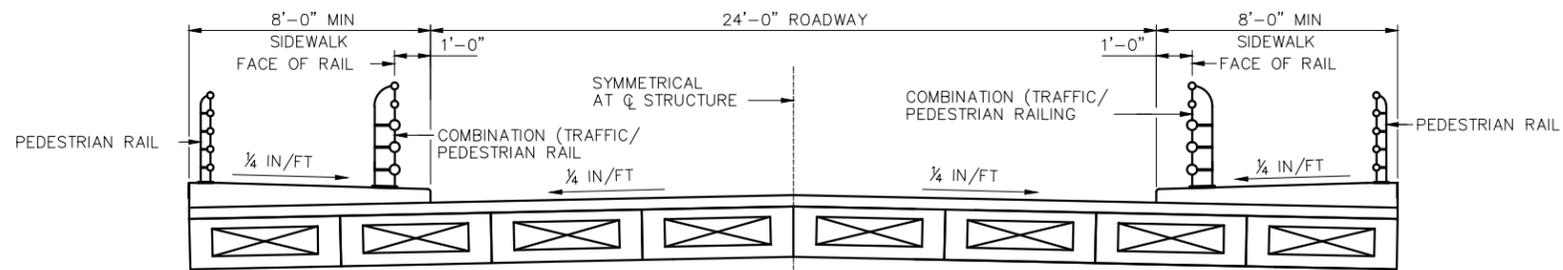


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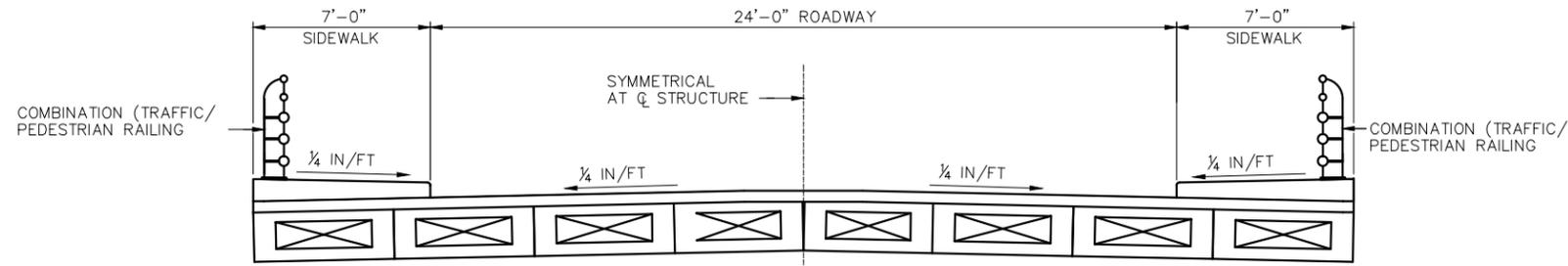
**SEAL
NOTE**

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DRAWN BY:		SHEET DESCRIPTION: COMBINATION RAILING DETAILS	
DATE:		APPROVED BY:	

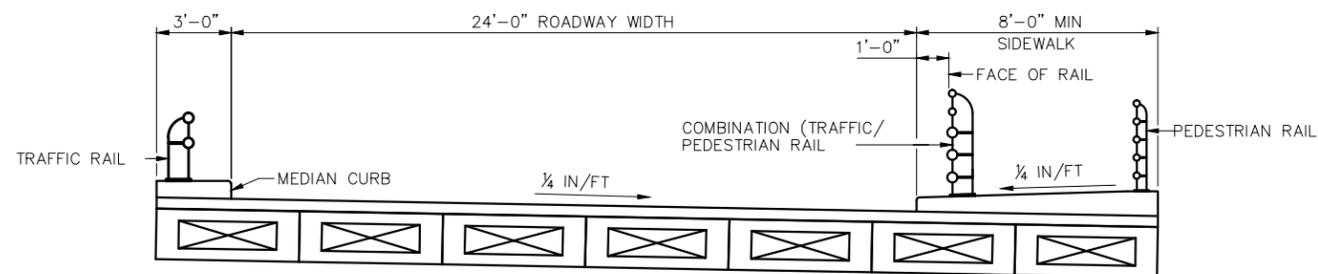
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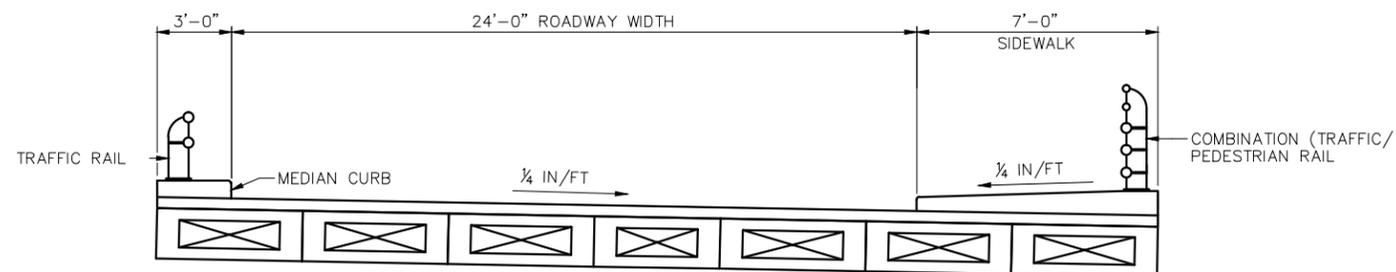
A TYPICAL TWO-WAY ROAD WITH HIGH PEDESTRIAN VOLUME



B TYPICAL TWO-WAY ROAD WITH LOW PEDESTRIAN VOLUME



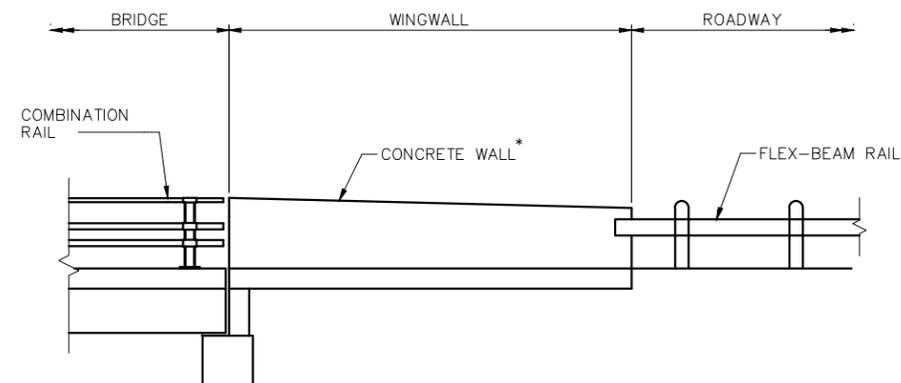
C HALF BOULEVARD (ONE WAY) WITH HIGH PEDESTRIAN VOLUME



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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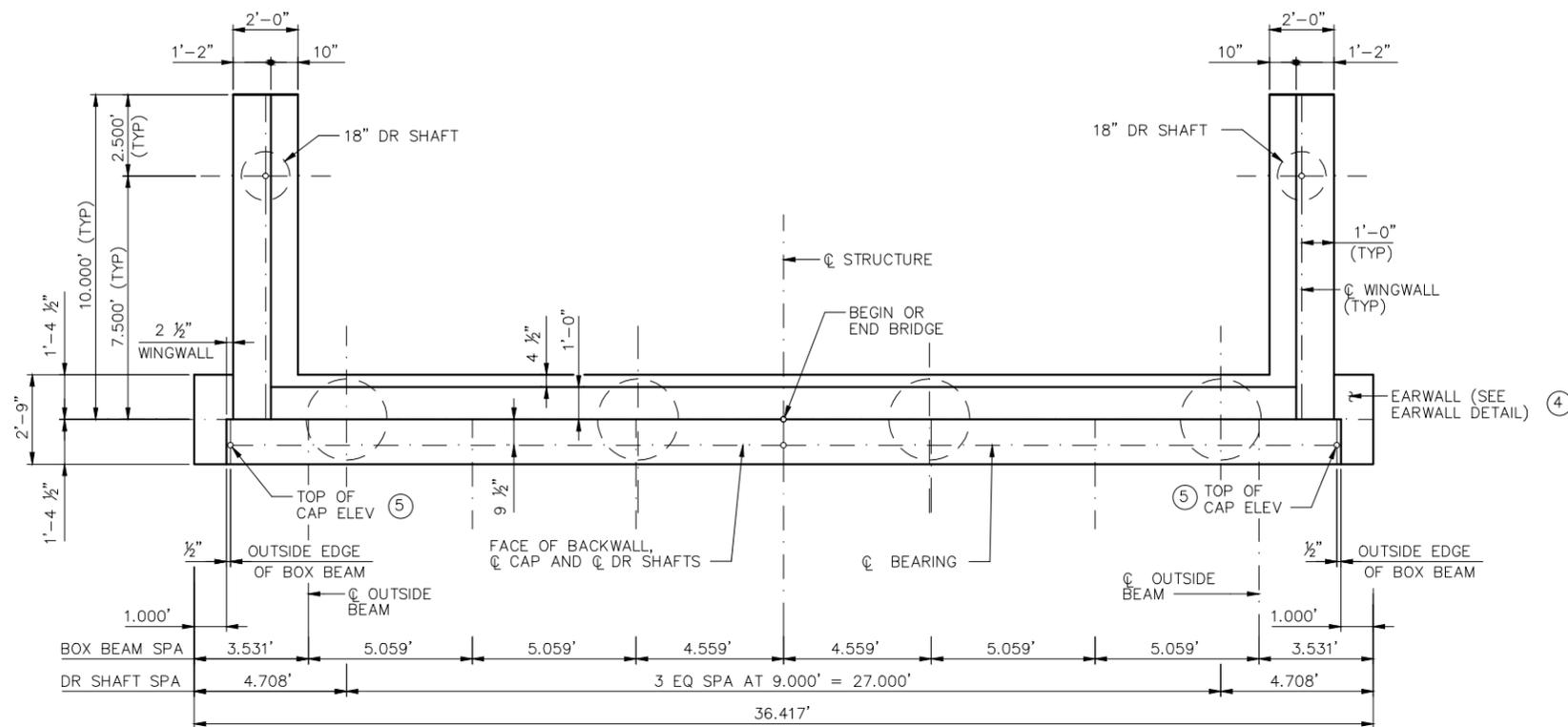
HARRIS COUNTY
ENGINEERING DEPARTMENT



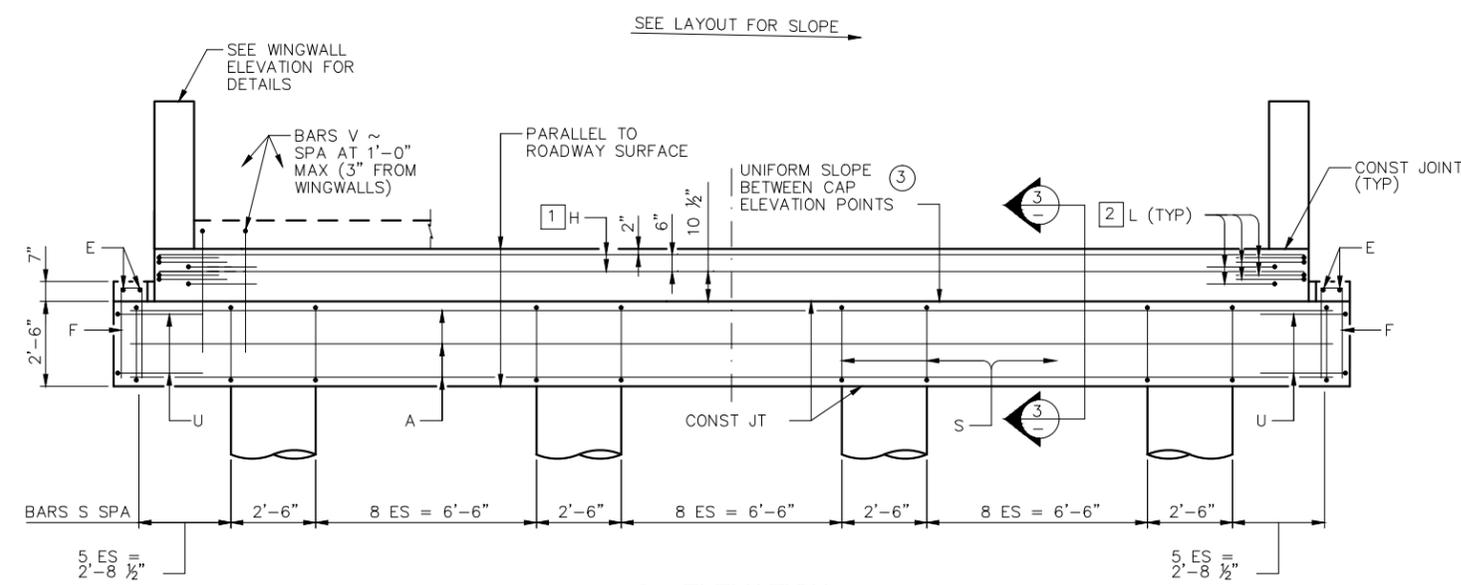
FIRM INFO

SEAL
NOTE

PROJECT TITLE		JOB NO.	
BRIDGE RAILING STANDARDS			
RAILING APPLICATIONS			
DRAWN BY:	SHEET NO.:	FILE NAME:	
SCALE:		FILE NO.:	
DATE:	APPROVED BY:	SHT NO.:	29



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 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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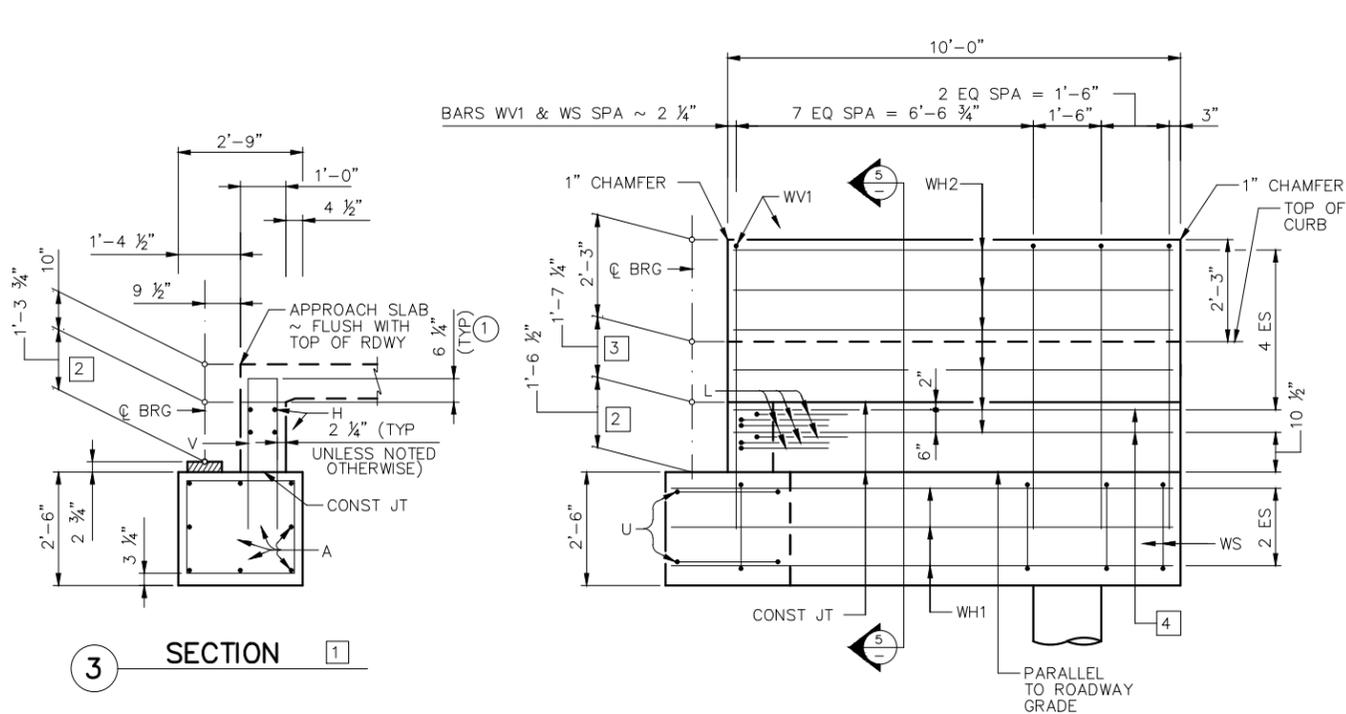
HARRIS COUNTY
ENGINEERING DEPARTMENT



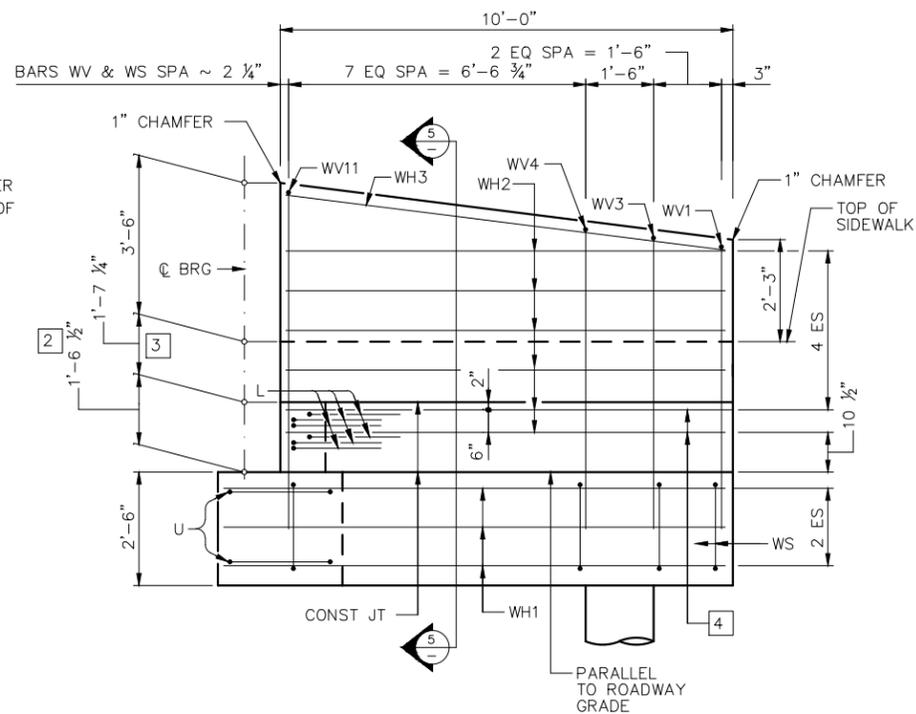
FIRM INFO

SEAL
NOTE

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



TYPE 1 - TRAFFIC RAIL SIDE



TYPE 2 - COMBINATION RAIL SIDE

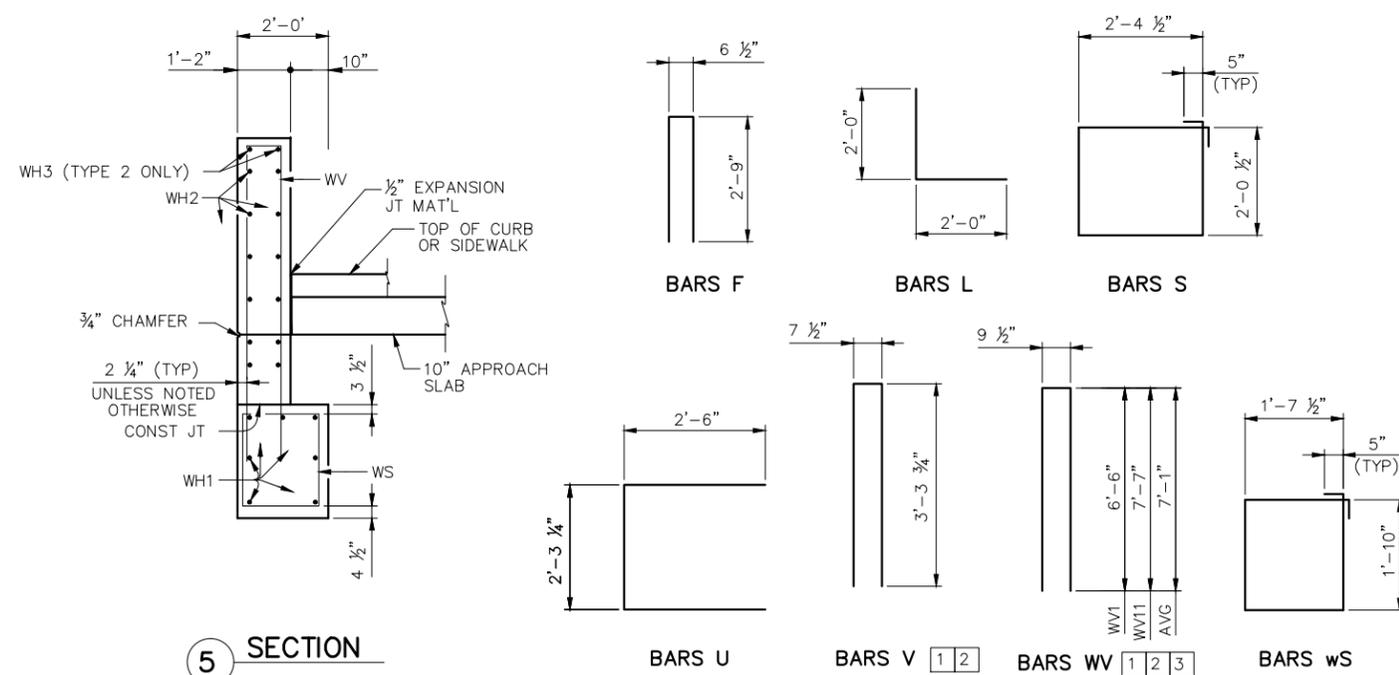
4 WINGWALL ELEVATION (EARWALL OMITTED FOR CLARITY)

BILL OF REINFORCING STEEL				
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	39	# 4	9'-8"	252
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	3,452
ESTIMATED QUANTITIES				
REINFORCING STEEL			LB	3,452
CLASS B1 CONCRETE			CY	19.9

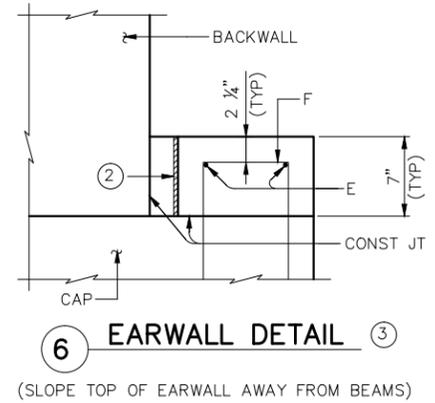
- 1 INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE.
- 2 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- 3 DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL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

NOTES TO ENGINEER

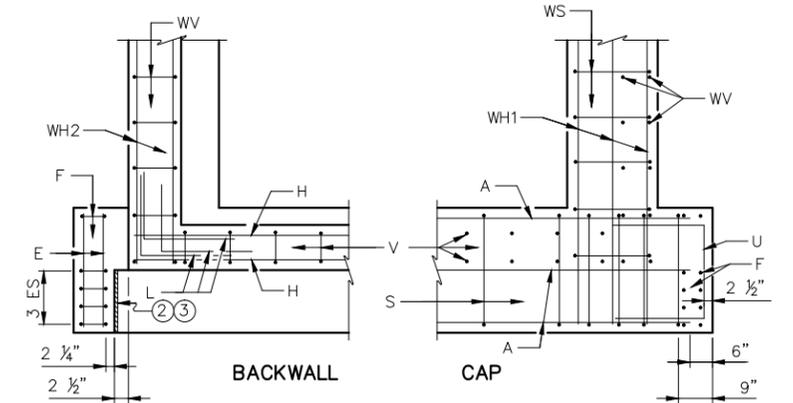
- 1 GUIDELINE DRAWINGS ARE FOR B20 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
- 2 THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB, SHEAR KEY AND THE EFFECT OF VERTICAL CURVE.
- 3 THE ENGINEER SHALL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



SECTION



6 EARWALL DETAIL (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

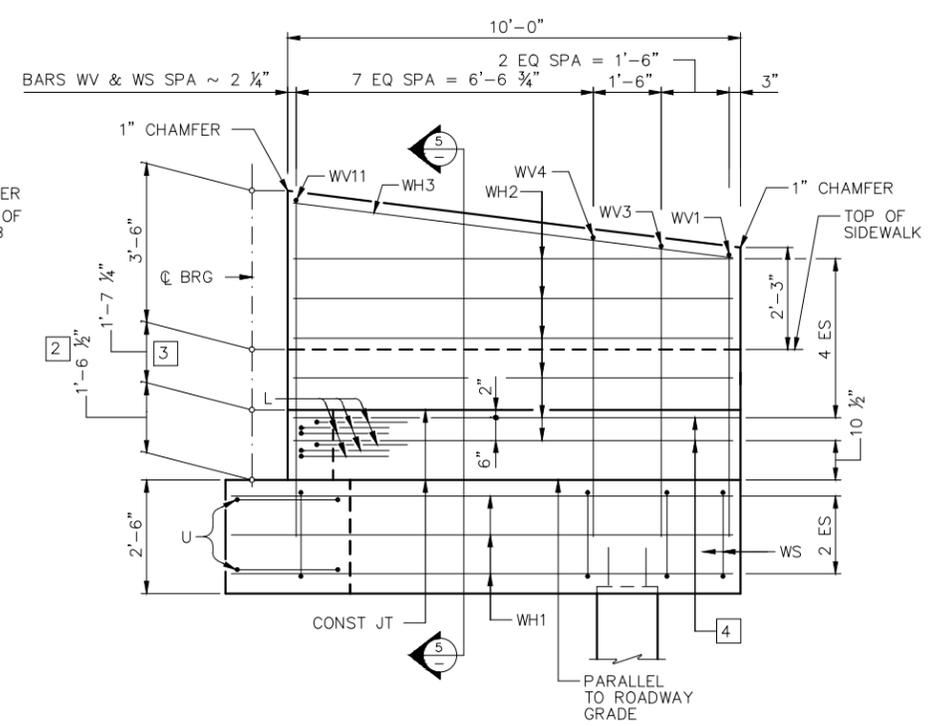
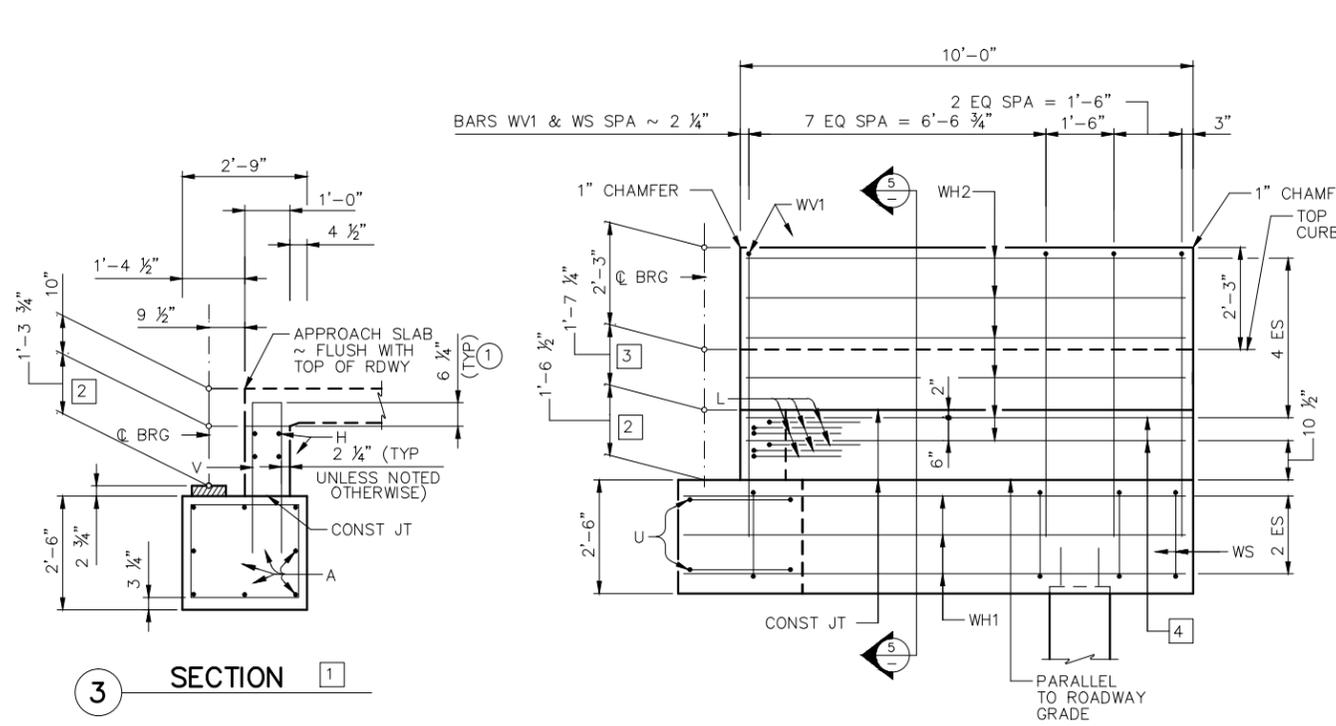


FIRM INFO

SEAL NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	JOB NO.:	
CHK'D BY:	DESIGN GUIDELINES-ABUTMENT	FILE NAME:	
SCALE:	BOX BEAM-DR SHAFTS	FILE NO.:	
DATE:	HALF BOULEVARD, O'SKEW	SHT NO.:	
	(2 OF 2)	31	

HL93 LOADING

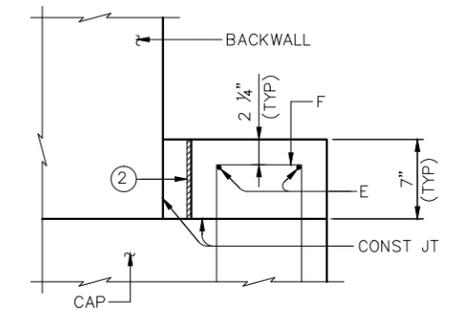


BILL OF REINFORCING STEEL [1]				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	8	#11	35'-5"	1,505
E	4	# 5	2'-5"	10
F	10	# 5	6'-1"	63
H	4	# 6	33'-8"	202
L	12	# 6	4'-0"	72
S	42	# 4	9'-8"	271
U	4	# 6	7'-3"	44
V	33	# 5	7'-3"	250
WH1	14	# 6	11'-1"	232
WH2	24	# 6	9'-8"	348
WH3	2	# 6	9'-9"	29
WS	22	# 4	7'-9"	114
WV1	11	# 5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

TYPE 1 - TRAFFIC RAIL SIDE

TYPE 2 - COMBINATION RAIL SIDE

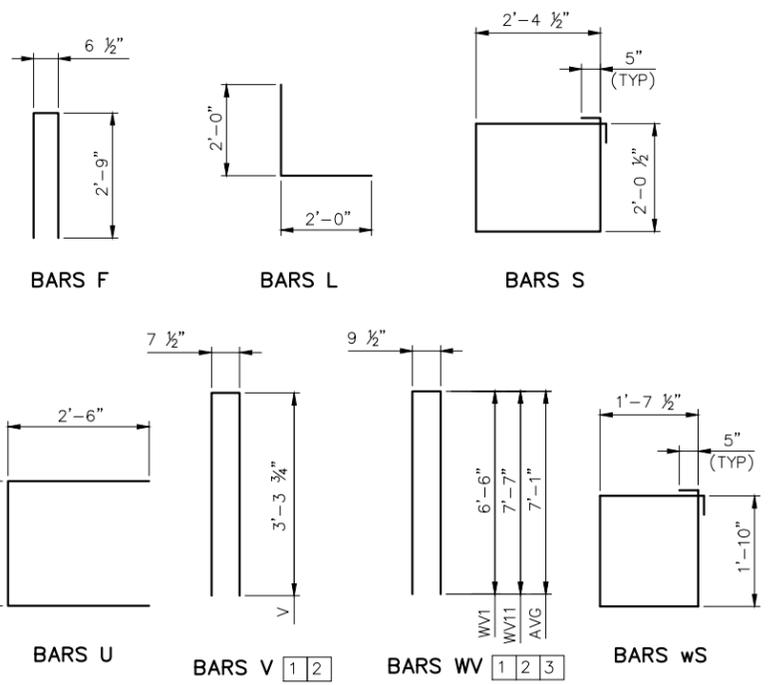
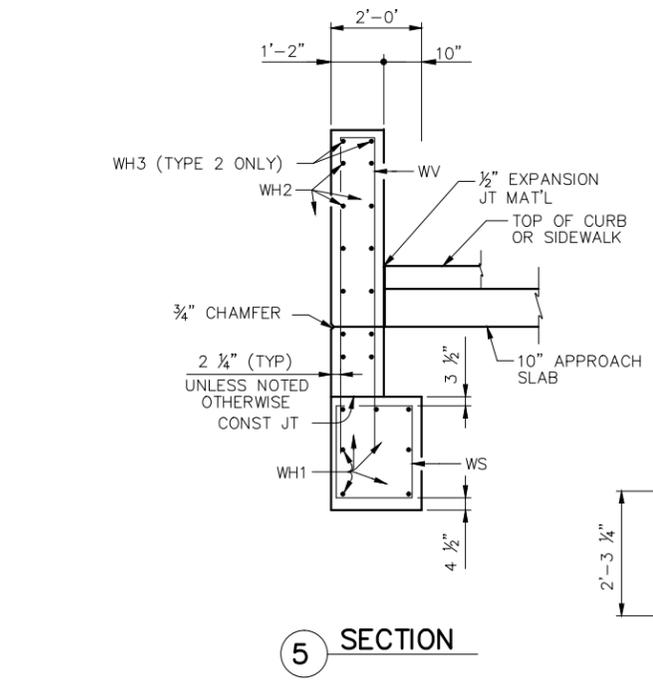
4 WINGWALL ELEVATION [1]
(EARWALL OMITTED FOR CLARITY)



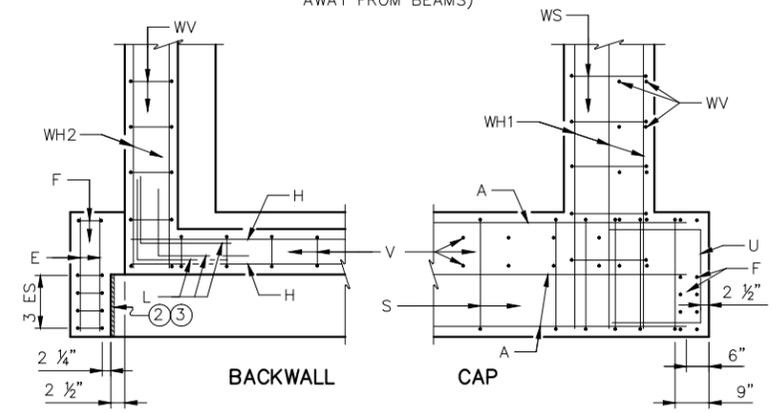
- 1 INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE.
- 2 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- 3 DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL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

NOTES TO ENGINEER

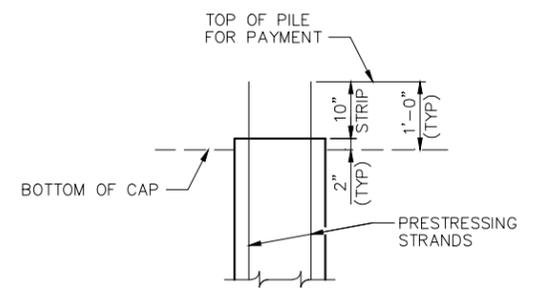
- 1 GUIDELINE DRAWINGS ARE FOR B20 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
- 2 THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB, SHEAR KEY AND THE EFFECT OF VERTICAL CURVE.
- 3 THE ENGINEER SHALL 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 [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			
DRAWN BY:	SHEET DESCRIPTION:	DESIGN GUIDELINES-ABUTMENT	
CHK'D BY:	BOX BEAM-PILE		JOB NO.:
SCALE:	HALF BOULEVARD, O'SKEW		FILE NAME:
DATE:	APPROVED BY:	(2 OF 2)	
			SHT NO. 33

HL93 LOADING

NOTES TO DESIGN ENGINEER:

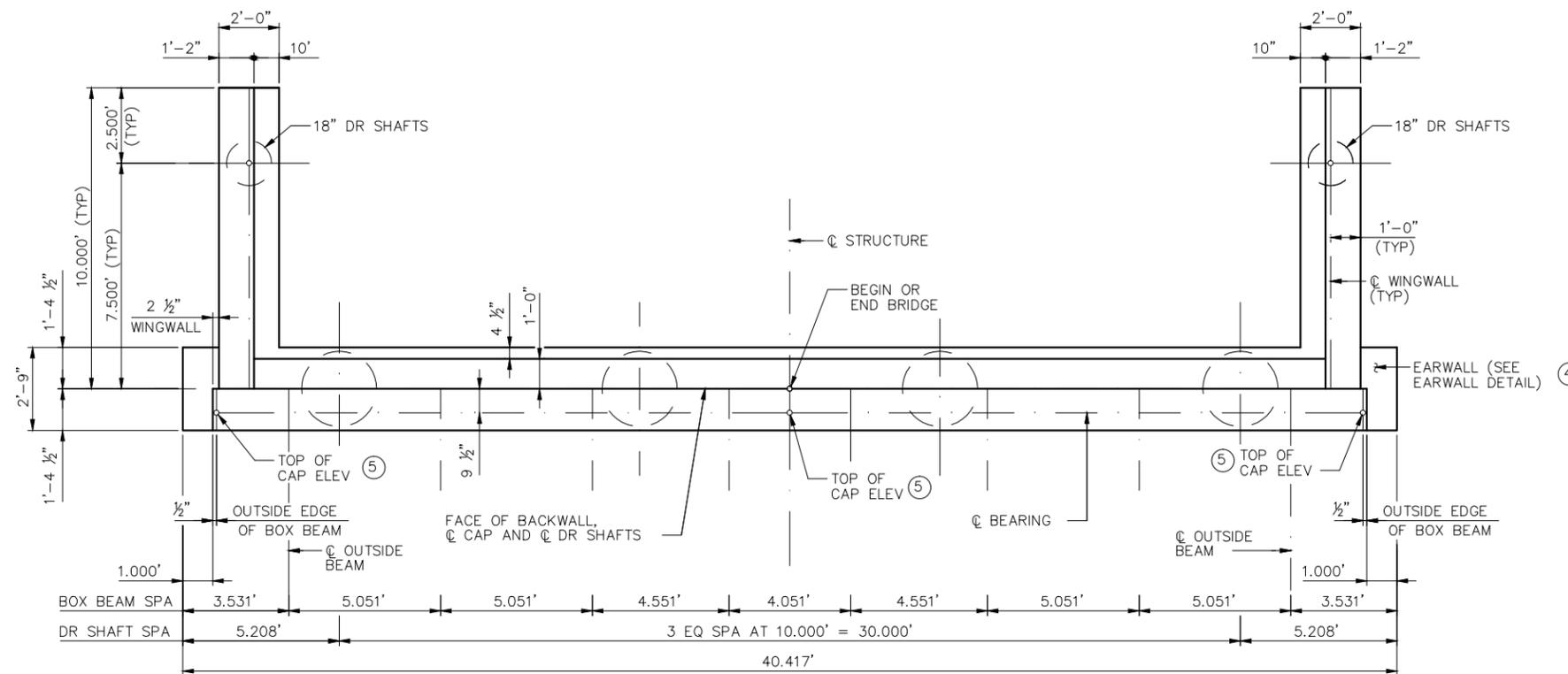
A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.

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 PLAN 3

- 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.

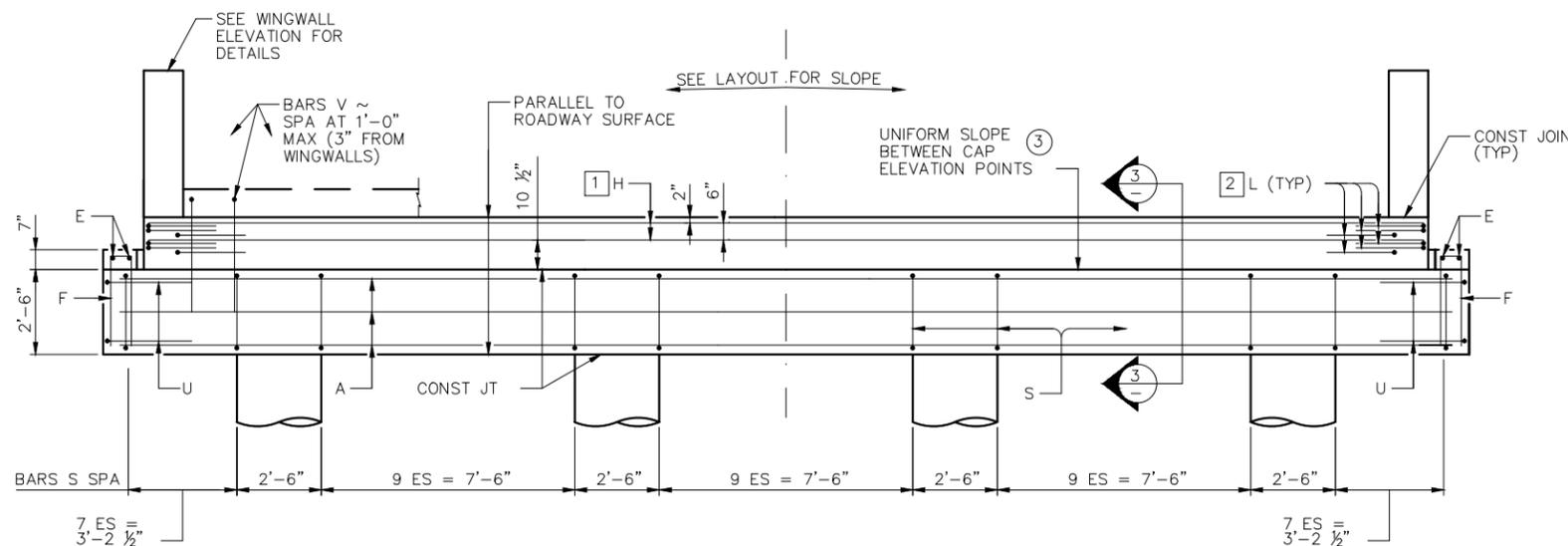
NOTES TO ENGINEER

- 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



2 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

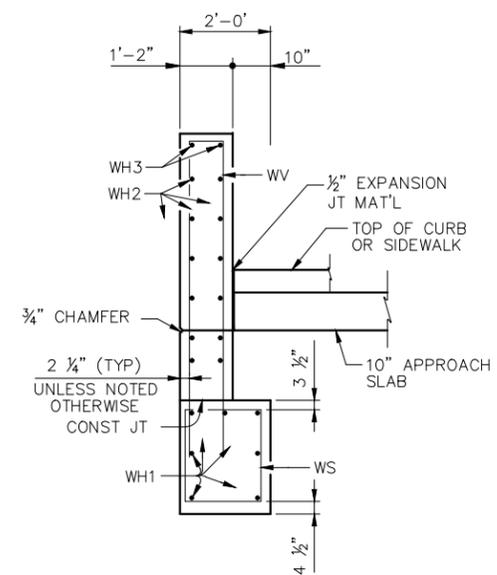
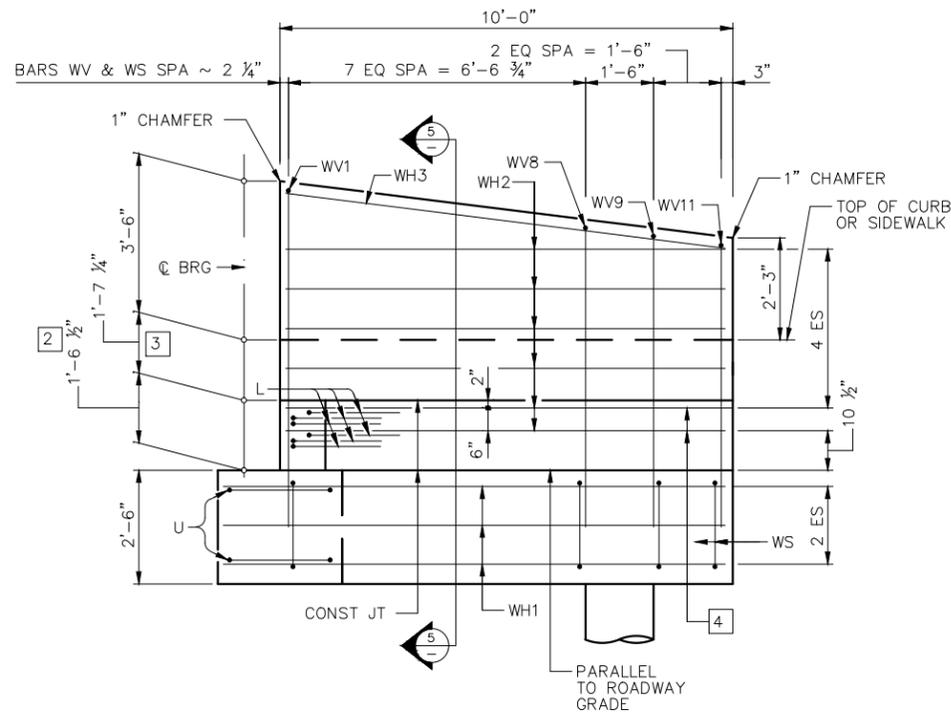
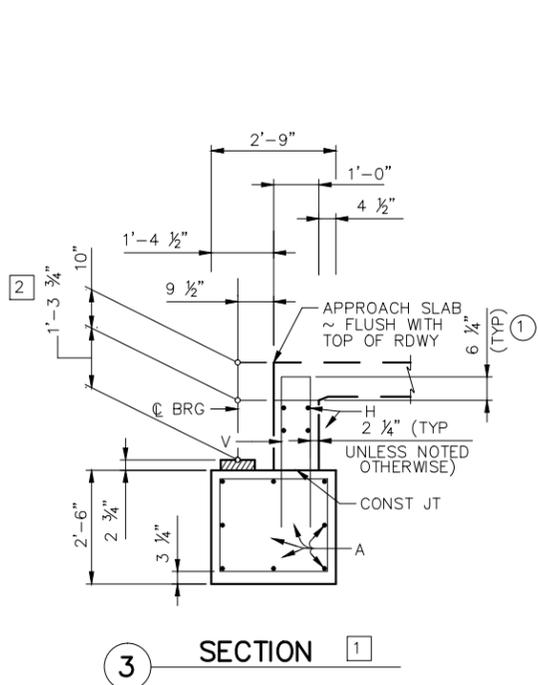


FIRM INFO

SEAL NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	DESIGN GUIDELINES-ABUTMENT	JOB NO.:
CHK'D BY:	FILE NAME:	BOX BEAM-DR SHAFTS	FILE NO.:
SCALE:	FILE NO.:	TWO-WAY ROAD, O'SKEW	FILE NO.:
DATE:	APPROVED BY:	(1 OF 2)	SHT NO. 34

HL93 LOADING

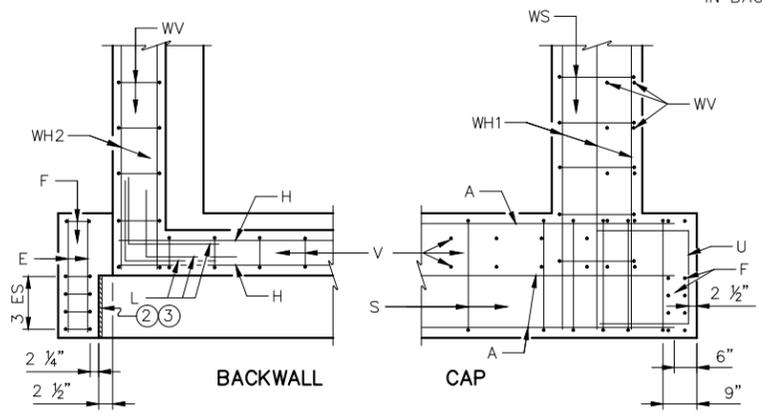
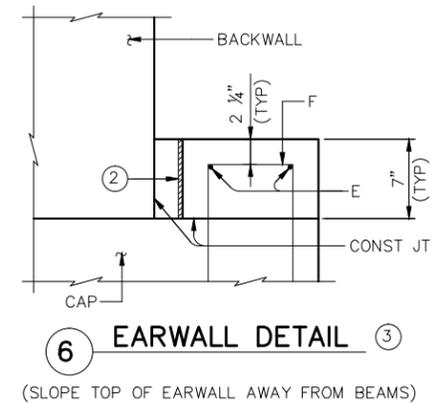
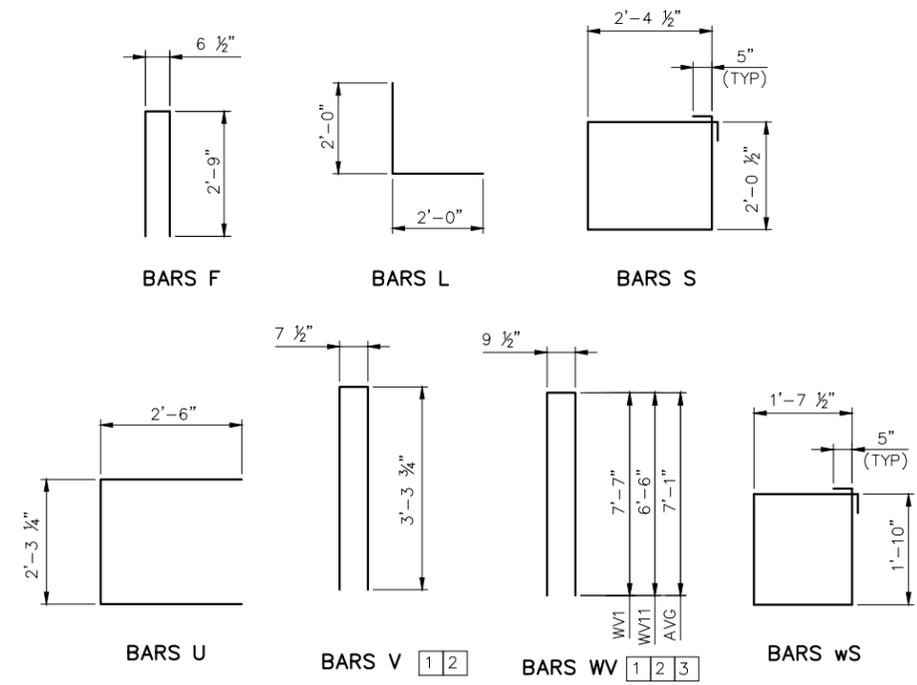


BILL OF REINFORCING STEEL ¹				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	8	#11	39'-5"	1,675
E	4	# 5	2'-5"	10
F	10	# 5	6'-1"	63
H	4	# 6	37'-8"	226
L	12	# 6	4'-0"	72
S	46	# 4	9'-8"	297
U	4	# 6	7'-3"	44
V	36	# 5	7'-3"	272
WH1	14	# 6	11'-1"	232
WH2	24	# 6	9'-8"	348
WH3	4	# 6	9'-9"	59
WS	22	# 4	7'-9"	144
WV (AVG)	22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

- 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.
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- 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

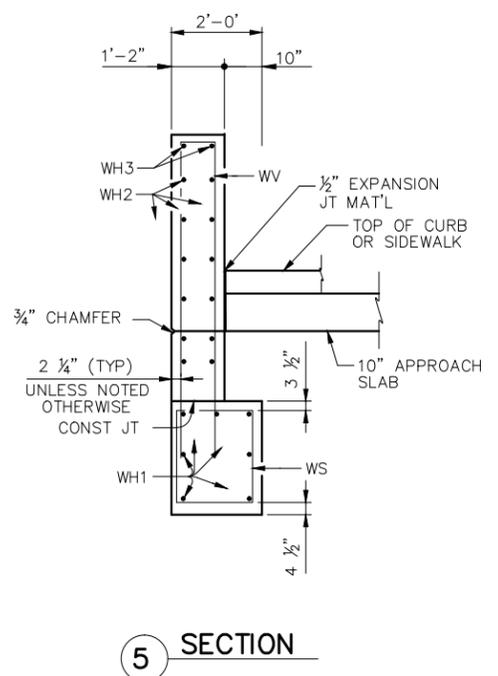
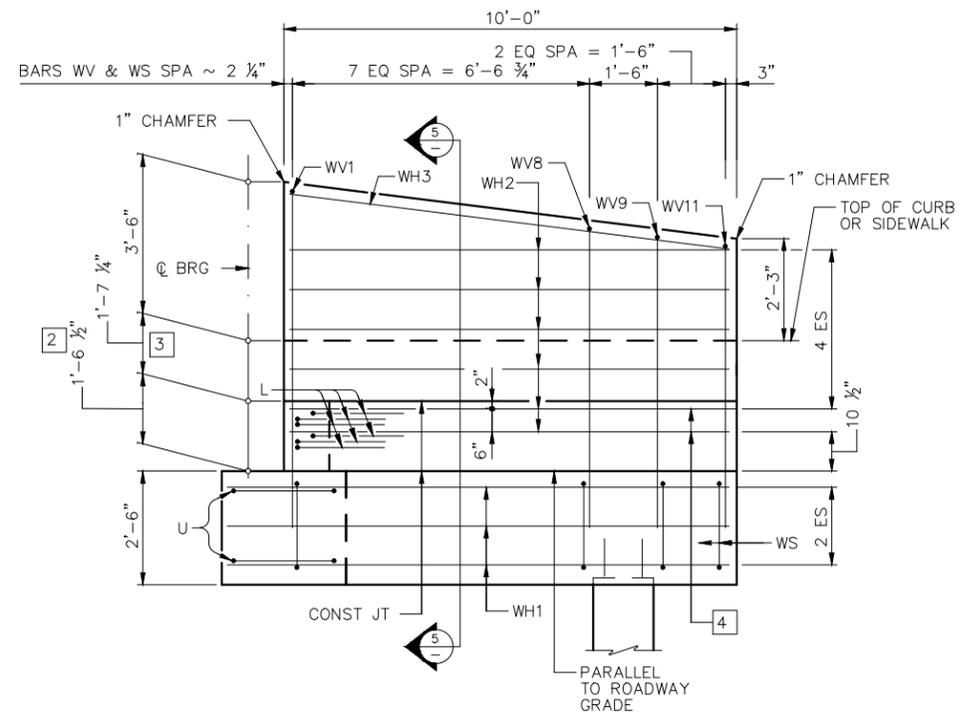
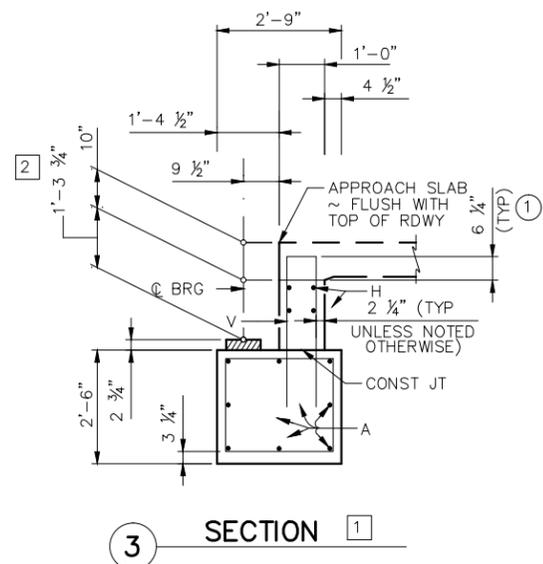
HARRIS COUNTY ENGINEERING DEPARTMENT



FIRM INFO

SEAL NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	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.:	
	(2 OF 2)	35	



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	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 ¹				
REINFORCING STEEL			LB	3,743
CLASS B1 CONCRETE			CY	21.4

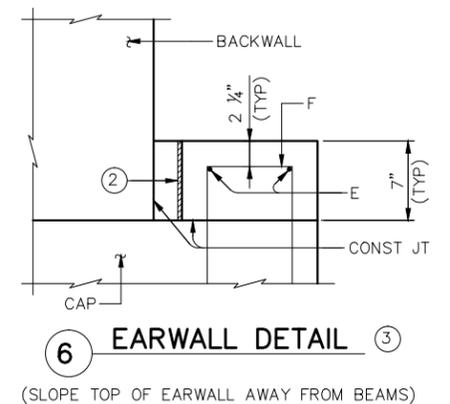
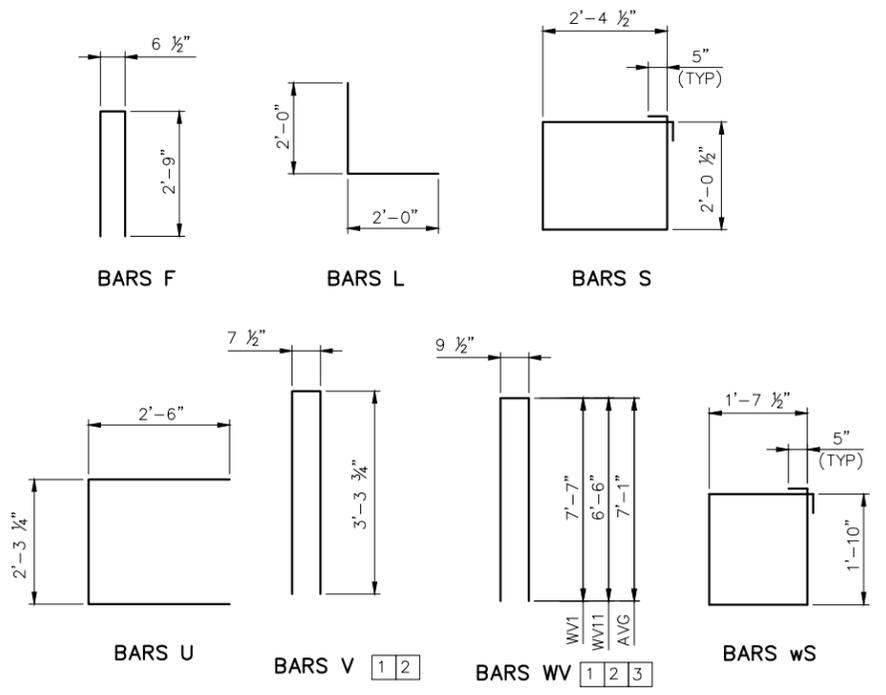
4 WINGWALL ELEVATION ¹
(EARWALL OMITTED FOR CLARITY)

5 SECTION

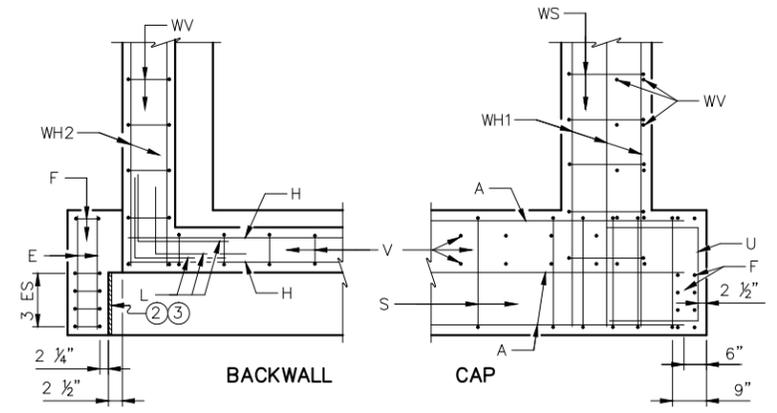
- ① INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE. 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ② DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.

NOTES TO ENGINEER

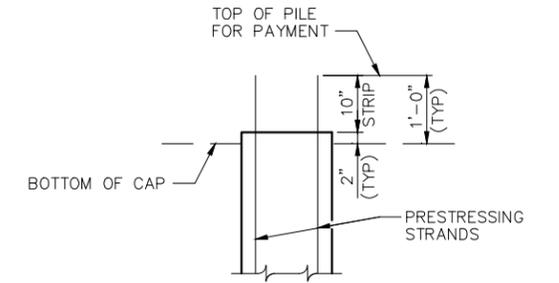
- ① GUIDELINE DRAWINGS ARE FOR B20 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
- ② THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB, SHEAR KEY AND THE EFFECT OF VERTICAL CURVE.
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-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



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

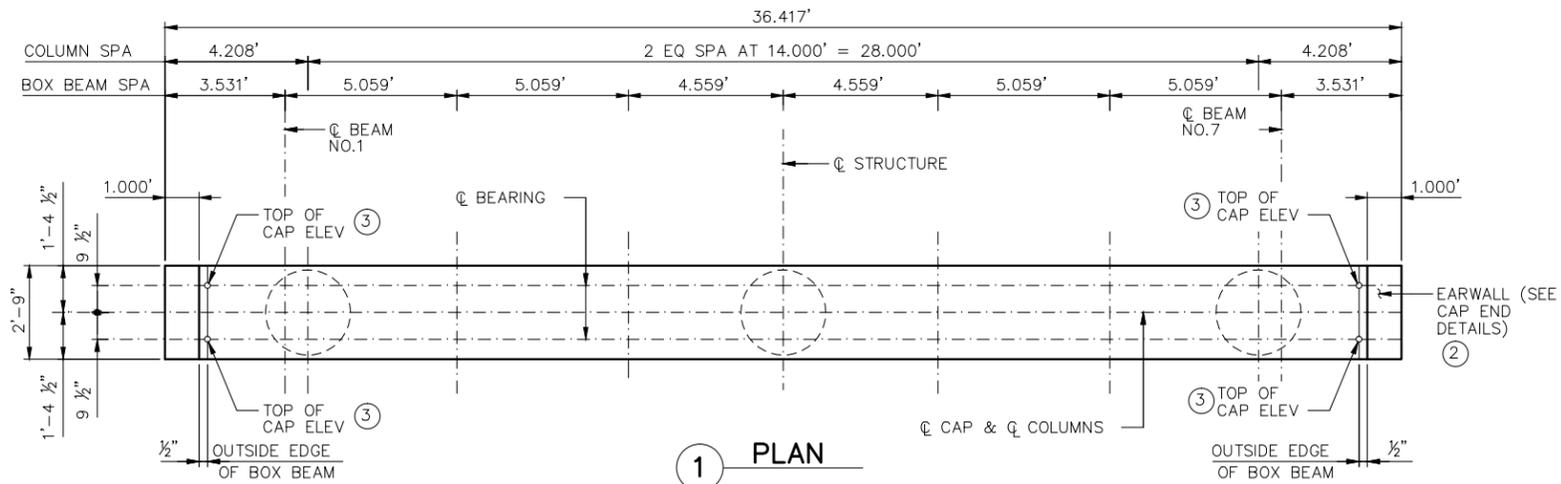
HARRIS COUNTY
ENGINEERING DEPARTMENT



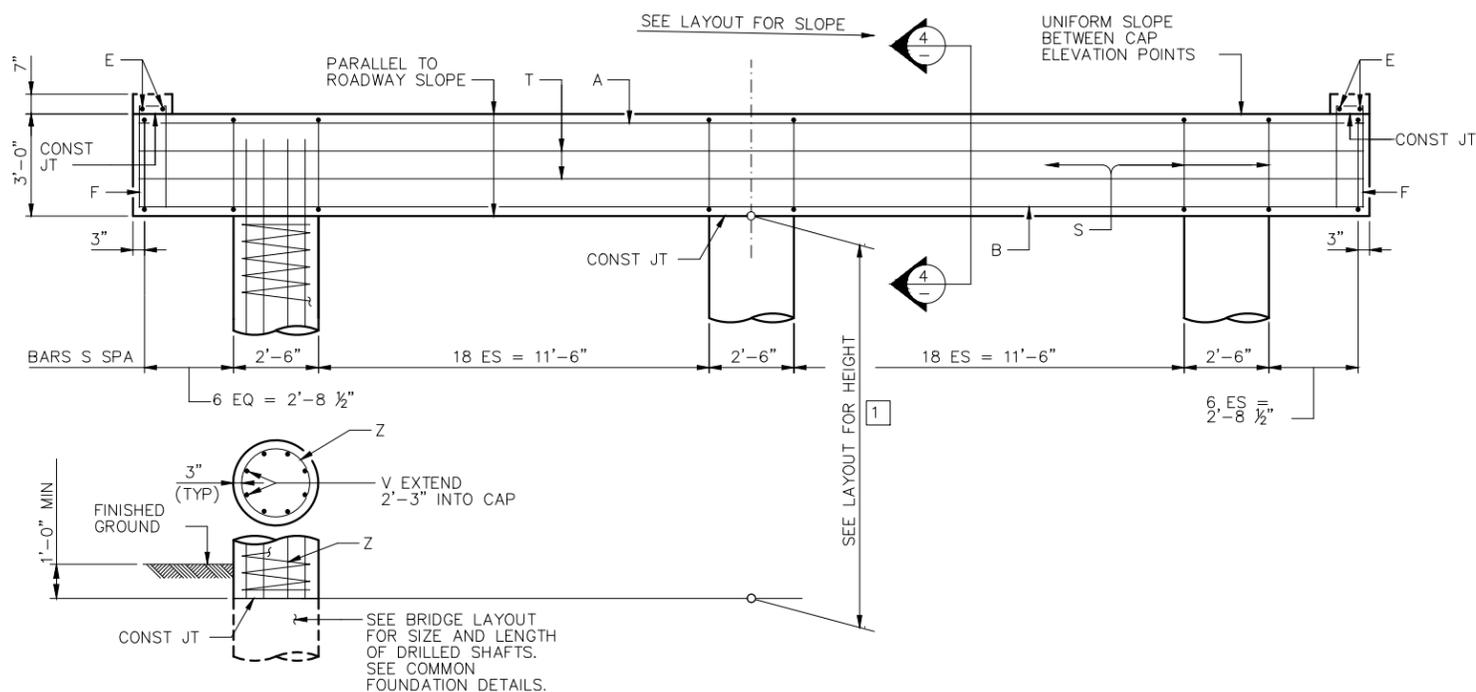
FIRM INFO

SEAL
NOTE

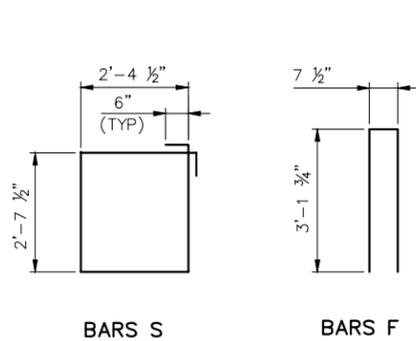
PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	DESIGN GUIDELINES-ABUTMENT	
CHK'D BY:	BOX BEAM-PILES		JOB NO.:
SCALE:	TWO-WAY ROAD, O'SKEW		FILE NAME:
DATE:	APPROVED BY:	(2 OF 2)	FILE NO.:
			SHT NO. 37



1 PLAN

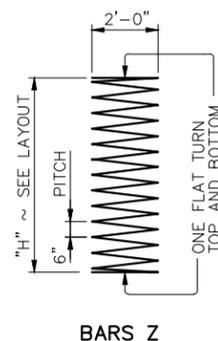


2 ELEVATION

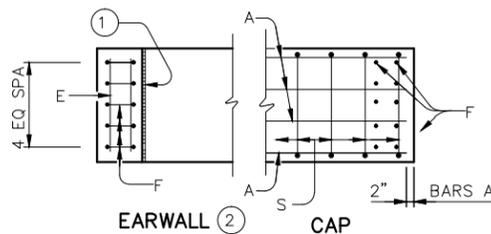


BARS S

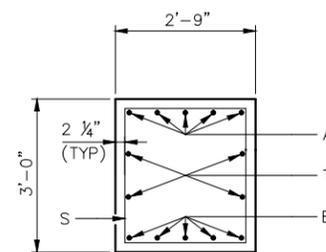
BARS F



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

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 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: 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'.

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

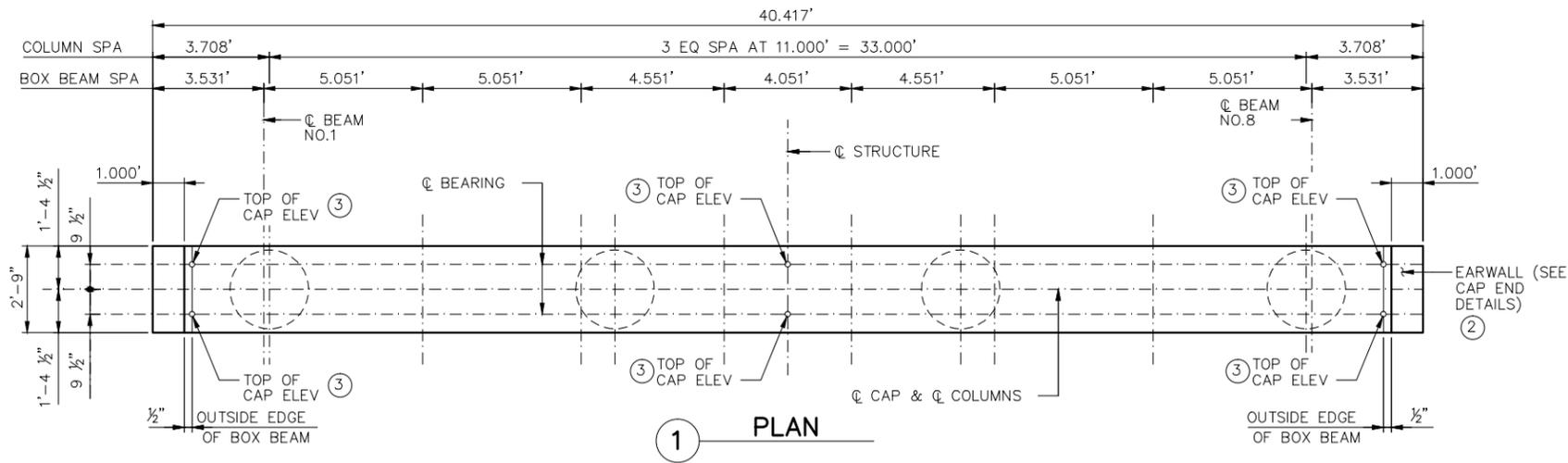


FIRM INFO

SEAL
NOTE

PROJECT TITLE			
DESIGNED BY:	SHEET DESCRIPTION:	DESIGN GUIDELINES-BENT	
DATE:	APPROVED BY:	BOX BEAMS-DR SHAFTS	
		HALF BOULEVARD, 0° SKEW	
		FILE NO.:	
		FILE NO.:	
		SHT NO.:	38

HL93 LOADING



1 PLAN

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:

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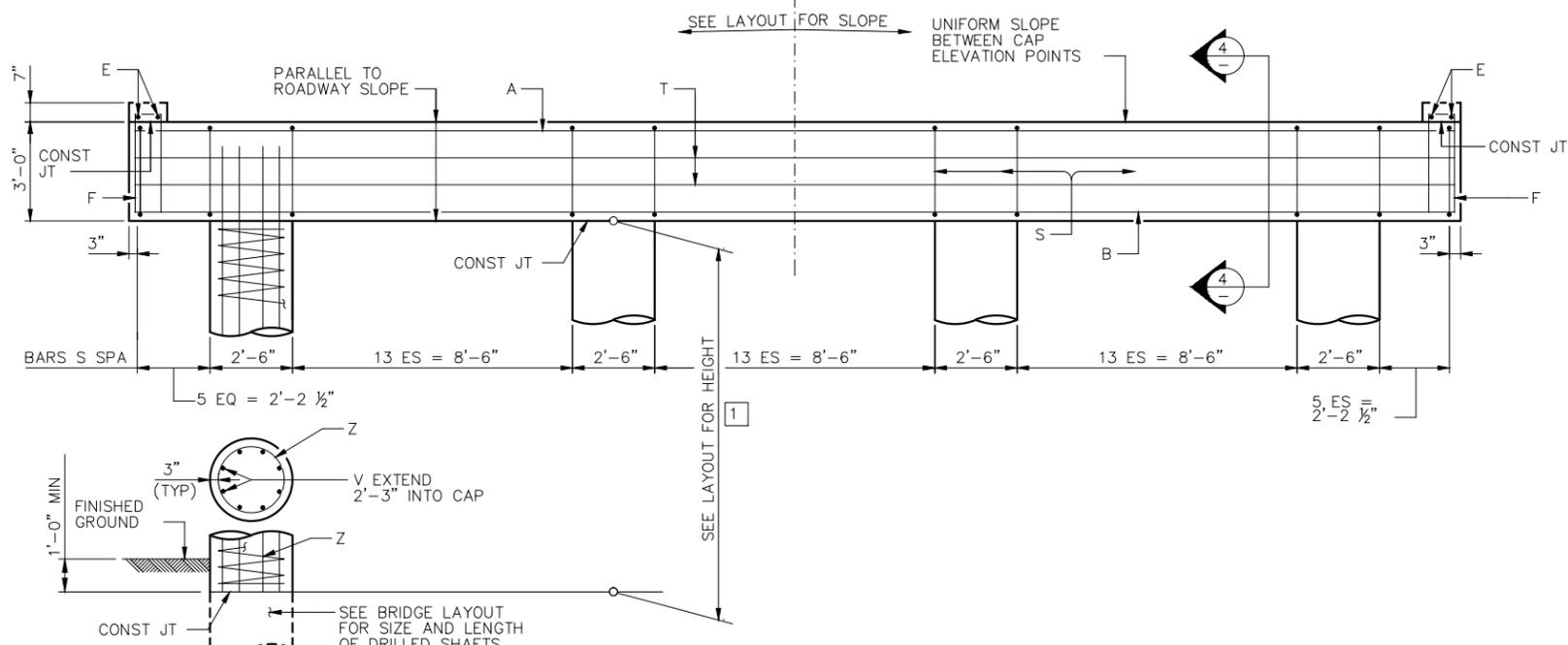
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- ① 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- ② DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
-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

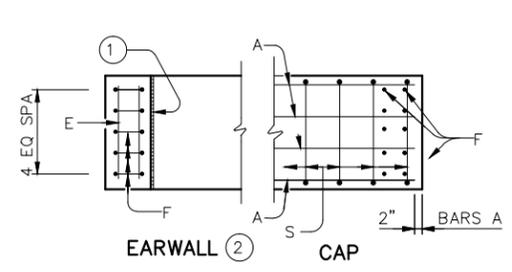
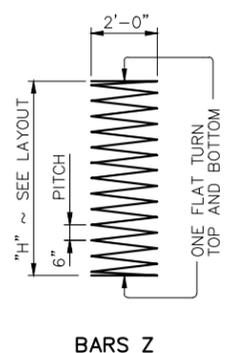
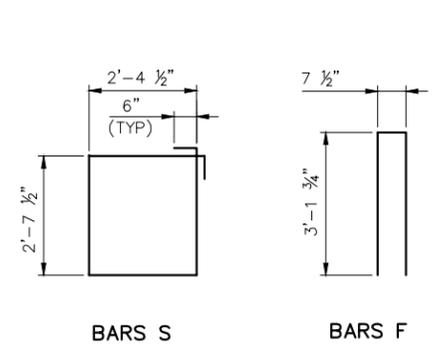
- INTERIOR BENT NOTES**
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 - SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
 - MAXIMUM CALCULATED FOUNDATION LOADS:
X TONS PER SHAFT.



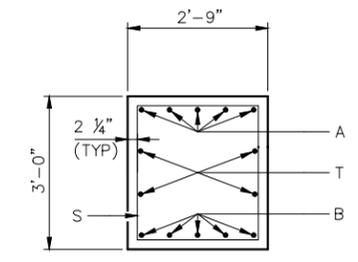
2 ELEVATION

NOTES TO ENGINEER

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



3 CAP END DETAILS



4 BENT CAP SECTION

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

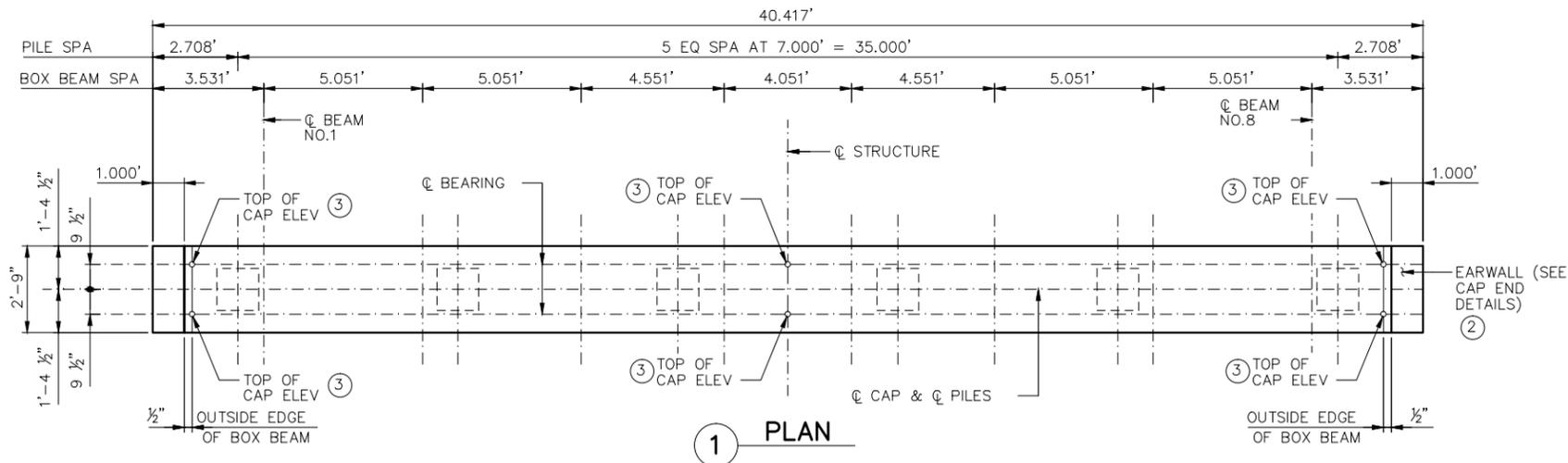
HARRIS COUNTY
ENGINEERING DEPARTMENT



FIRM INFO

SEAL
NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	DESIGN GUIDELINES-BENT	
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

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	

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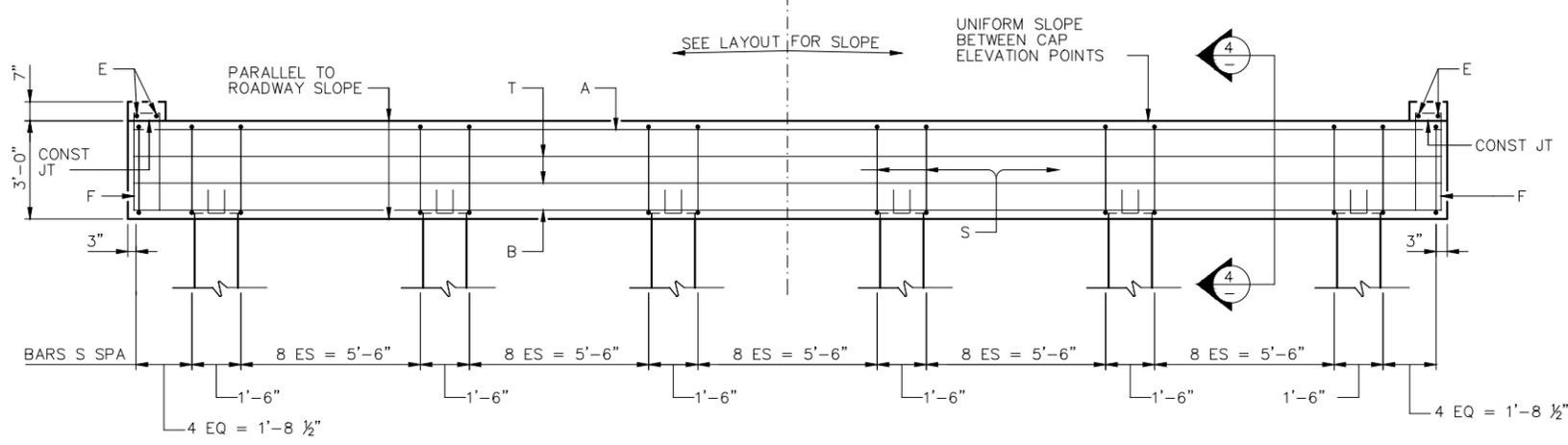
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TOP OF CAP ELEVATIONS 4	
WORKING POINT	ELEVATION

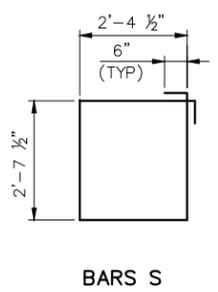
- 1 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
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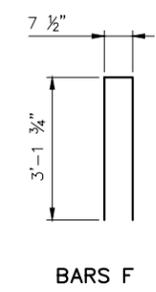
2 ELEVATION 1

INTERIOR BENT NOTES

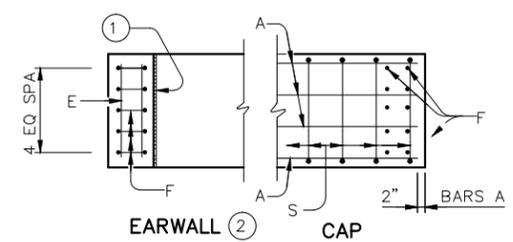
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7. MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER PILE.



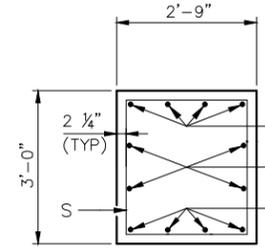
BARS S



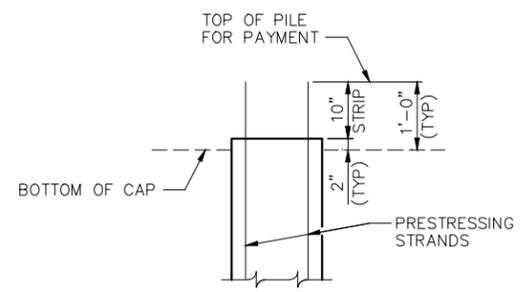
BARS F



3 CAP END DETAILS



4 BENT CAP SECTION



5 PILING EMBEDMENT DETAIL

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

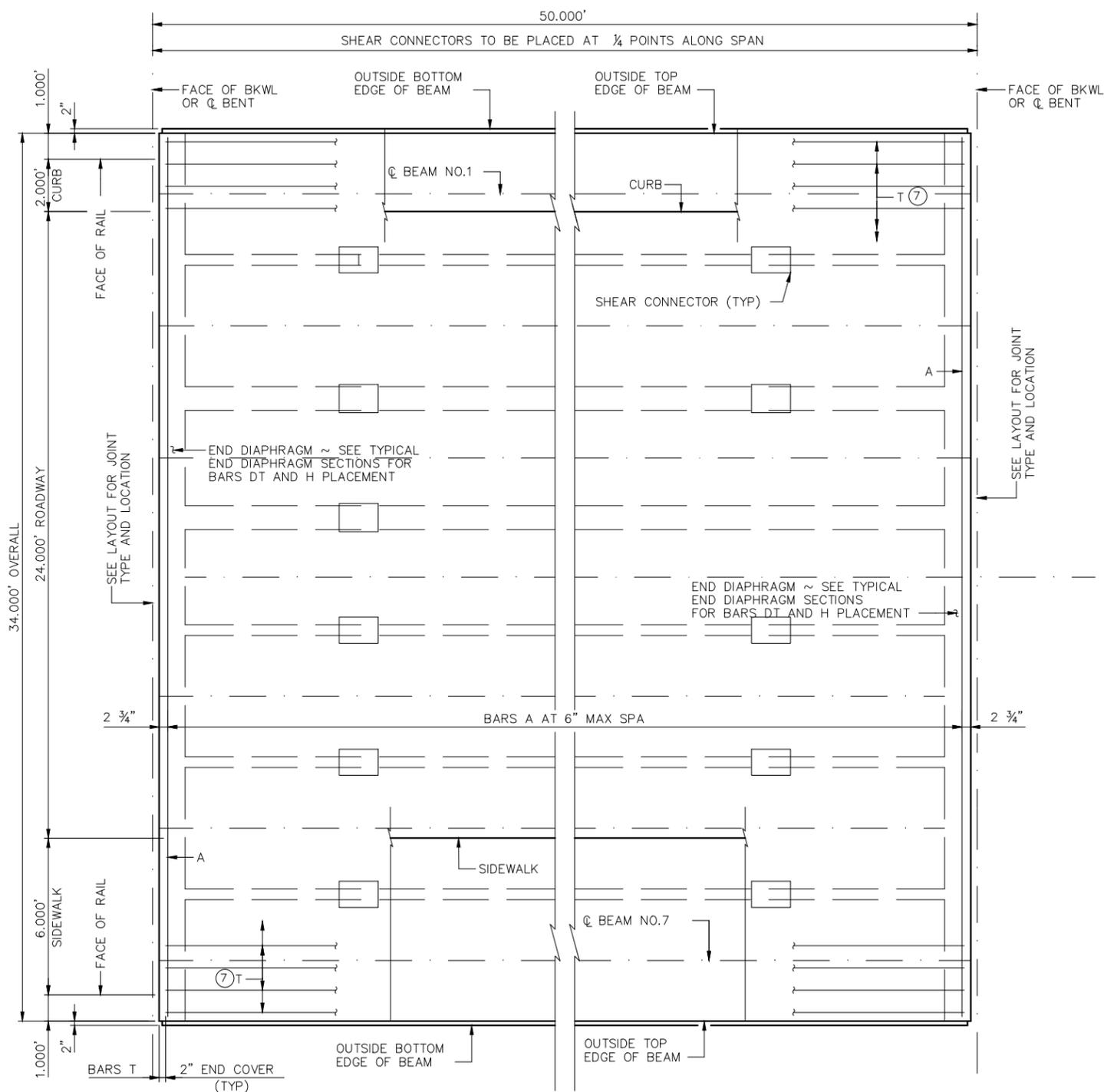


FIRM INFO

SEAL
NOTE

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

HL93 LOADING



PLAN

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

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 ~ #4 = 1'-5"
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HARRIS COUNTY
ENGINEERING DEPARTMENT

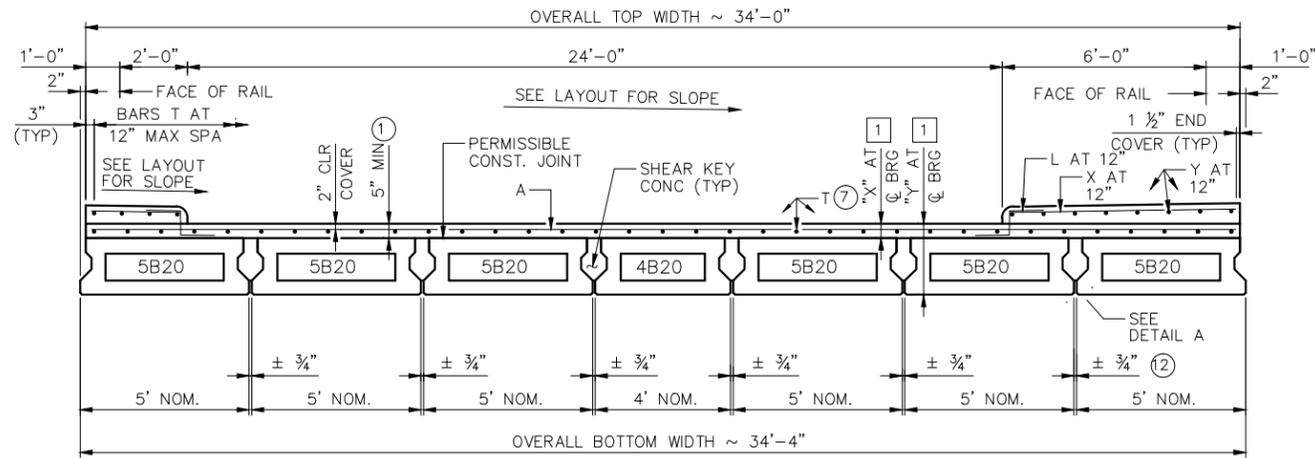


FIRM INFO

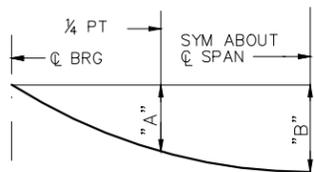
SEAL
NOTE

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

HL93 LOADING



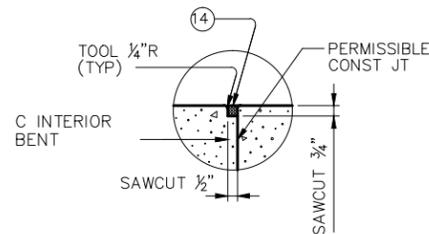
TYPICAL TRANSVERSE SECTION



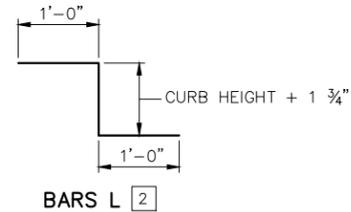
NOTE: DEFLECTIONS SHOWN ARE DUE TO SHEAR KEY AND CONCRETE SLAB ONLY, ($E_c = 5 \times 10^4$ KSI). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DIMENSION MAY BE LESS. DEFLECTIONS MAY BE ADJUSTED BASED ON FIELD OBSERVATION.

DEAD LOAD DEFLECTION DIAGRAM

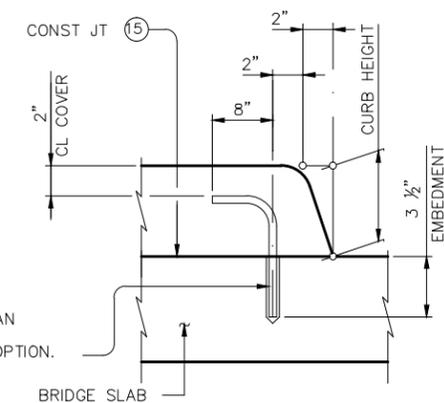
SPAN LENGTH (FT)	BEAM NO.	POINT	DEAD LOAD DEFLECTIONS (FT)			SECTION DEPTHS	
			SHEAR KEY	SLAB	TOTAL	"X" AT ϕ BRG	"Y" AT ϕ BRG
50	ALL	"A" "B"				5 $\frac{3}{4}$ "	2'-1 $\frac{3}{4}$ "



SEALED JOINT DETAIL



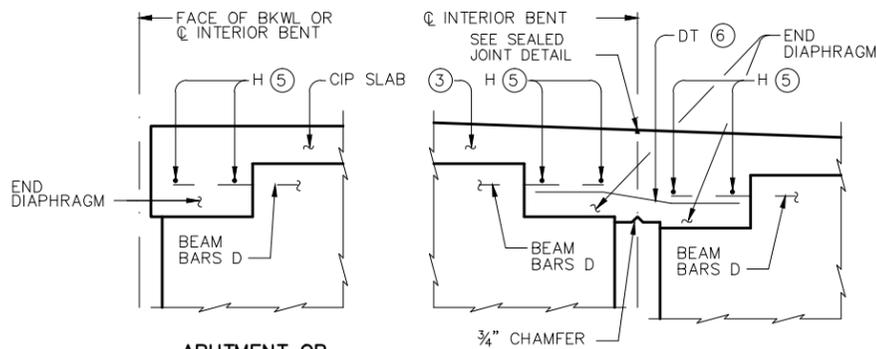
BARS L



OPTIONAL EPOXY ANCHORS

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

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)

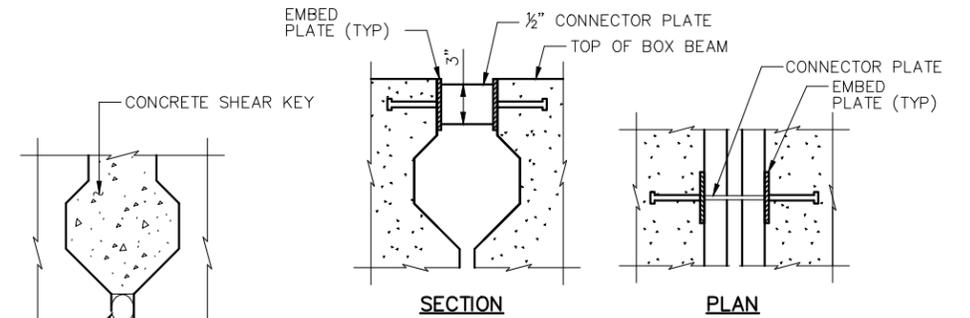
TABLE OF ESTIMATED QUANTITIES

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	7.8	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

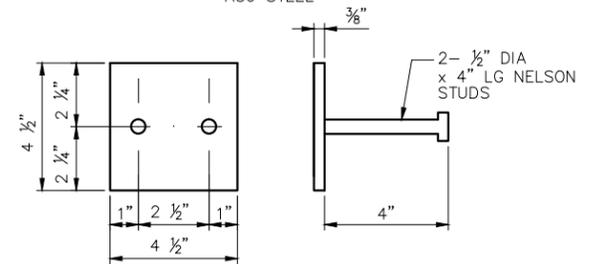
- THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB, SHEAR KEY AND THE EFFECT OF VERTICAL CURVE.
- THE ENGINEER SHALL DETERMINE BRIDGE CURB HEIGHT.



SHEAR CONNECTOR DETAIL

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

DETAIL "A"



EMBED PLATE DETAIL

HL93 LOADING

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

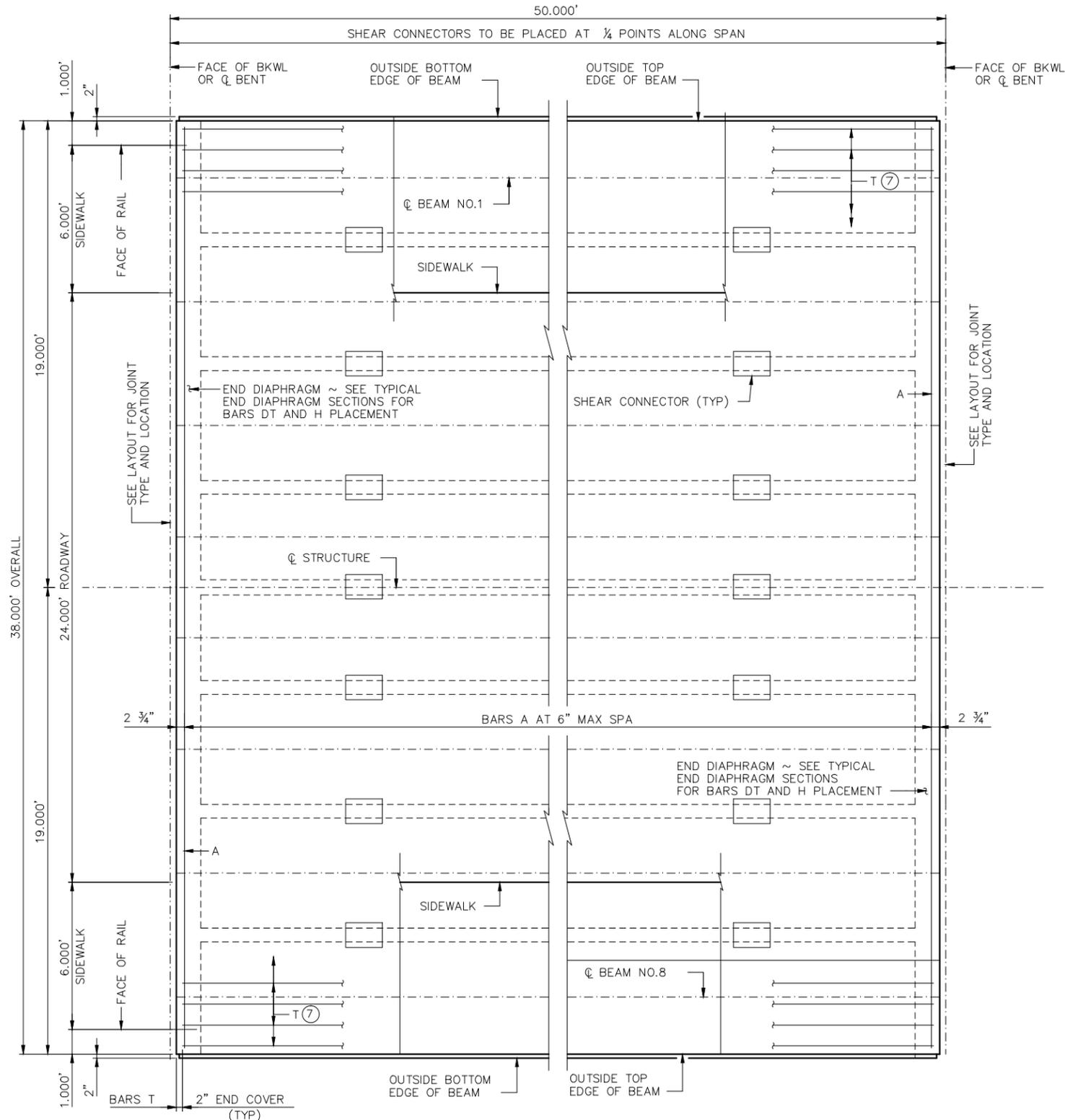
HARRIS COUNTY ENGINEERING DEPARTMENT



FIRM INFO

SEAL NOTE

PROJECT TITLE		JOB NO.
DRAWN BY:	SHEET DESCRIPTION: DESIGN GUIDELINES	FILE NAME:
CHKD BY:	BOX BEAMS-SPAN DETAILS	FILE NO.:
SCALE:	HALF BOULEVARD, 0° SKEW	SHT NO.:
DATE:	APPROVED BY:	43



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

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

**HARRIS COUNTY
ENGINEERING DEPARTMENT**

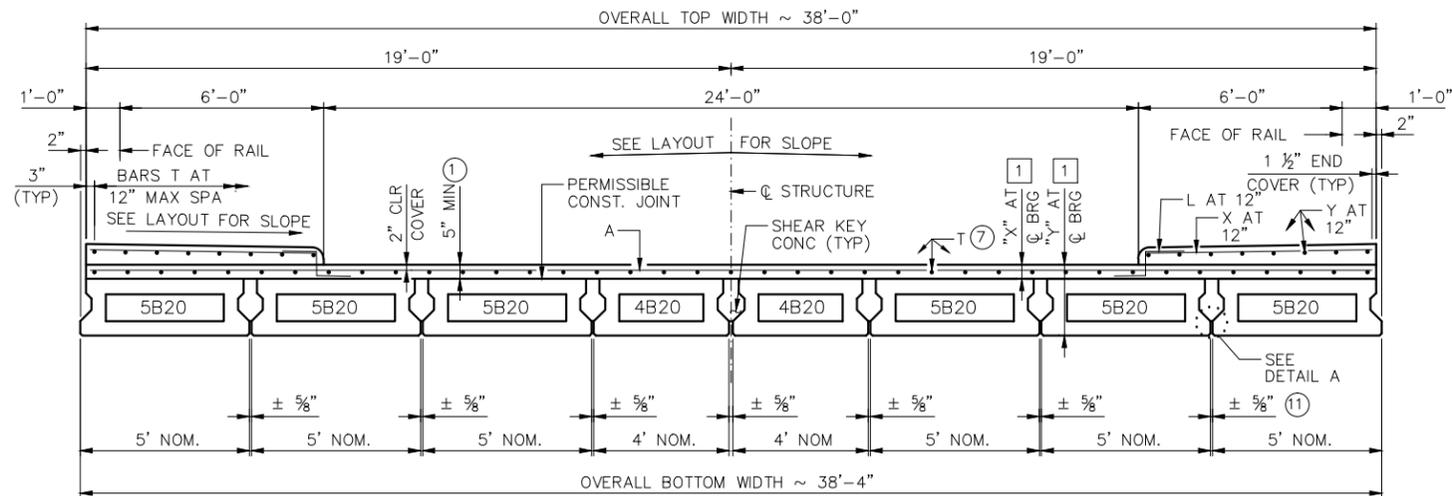


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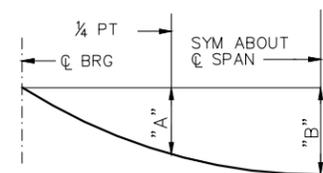
**SEAL
NOTE**

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

HL93 LOADING



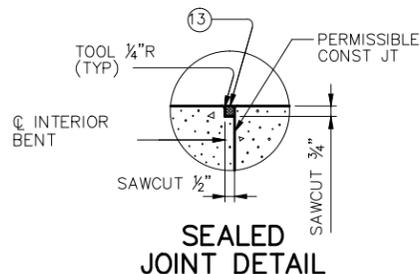
TYPICAL TRANSVERSE SECTION



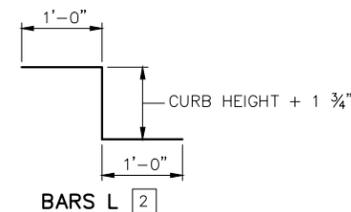
NOTE: DEFLECTIONS SHOWN ARE DUE TO SHEAR KEY AND CONCRETE SLAB ONLY, ($E_c = 5 \times 10^3$ KSI). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DIMENSION MAY BE LESS. DEFLECTIONS MAY BE ADJUSTED BASED ON FIELD OBSERVATION.

DEAD LOAD DEFLECTION DIAGRAM

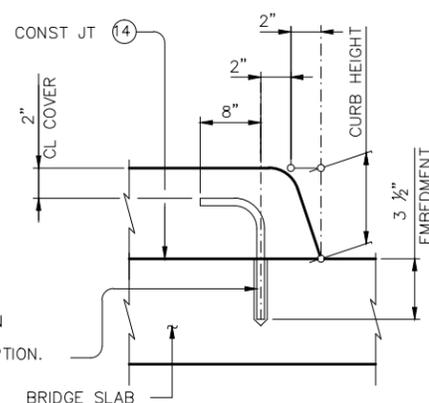
SPAN LENGTH (FT)	BEAM NO.	POINT	DEAD LOAD DEFLECTIONS(FT)			SECTION DEPTHS	
			SHEAR KEY	SLAB	TOTAL	"X" AT C/ BRG	"Y" AT C/ BRG
50	ALL	"A" "B"				5 3/4"	2'-1 3/4"



SEALED JOINT DETAIL

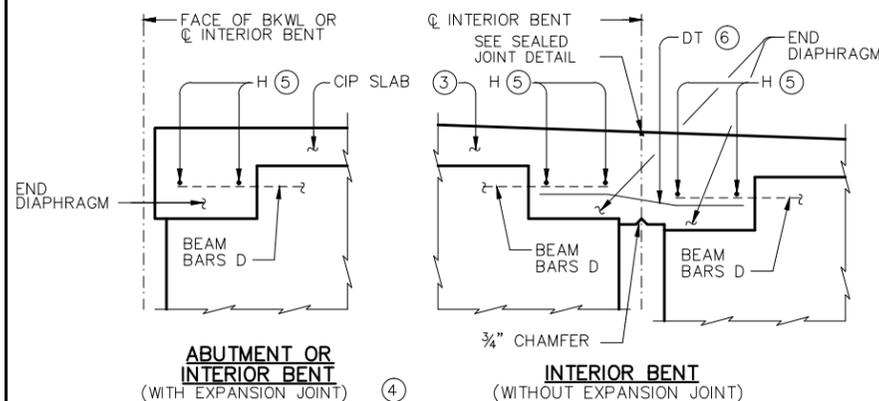


BARS L



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.



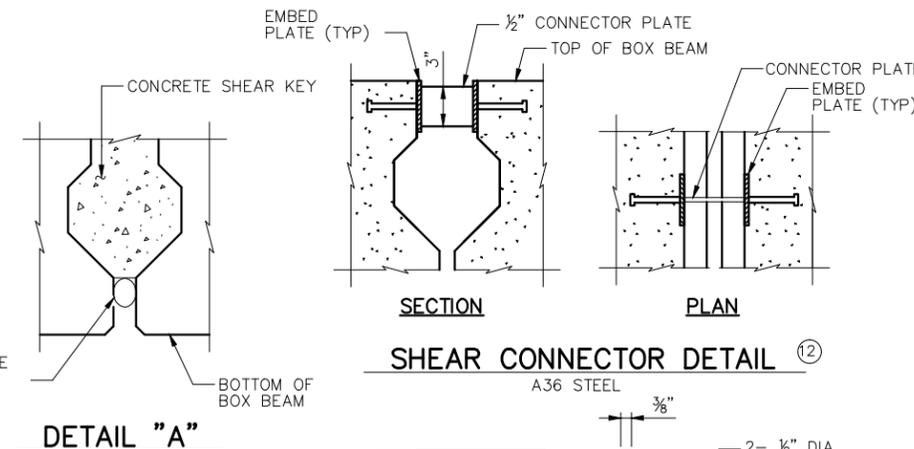
TYPICAL END DIAPHRAGM SECTIONS (ALONG CENTERLINE OF BOX BEAM)

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	15.6	99.0	297.0	3,800	1,260	5,060

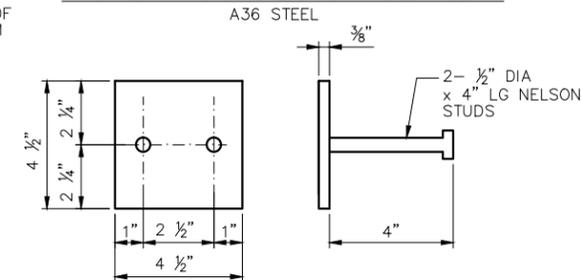
- SLAB THICKNESS AT MIDSPAN OF BEAMS MAY NOT EXCEED 7 INCHES.
- OTHER MATERIAL MAY BE USED TO FORM BOTTOM OF SHEAR KEYS IF APPROVED BY ENGINEER.
- SLAB REINFORCING OMITTED FOR CLARITY.
- SEE BRIDGE LAYOUT FOR JOINT TYPE.
- PROVIDE 1 1/2" END COVER TO BARS H. AFTER ALL BEAMS HAVE BEEN PLACED, WELD ONE 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.
- 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



EMBED PLATE DETAIL

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

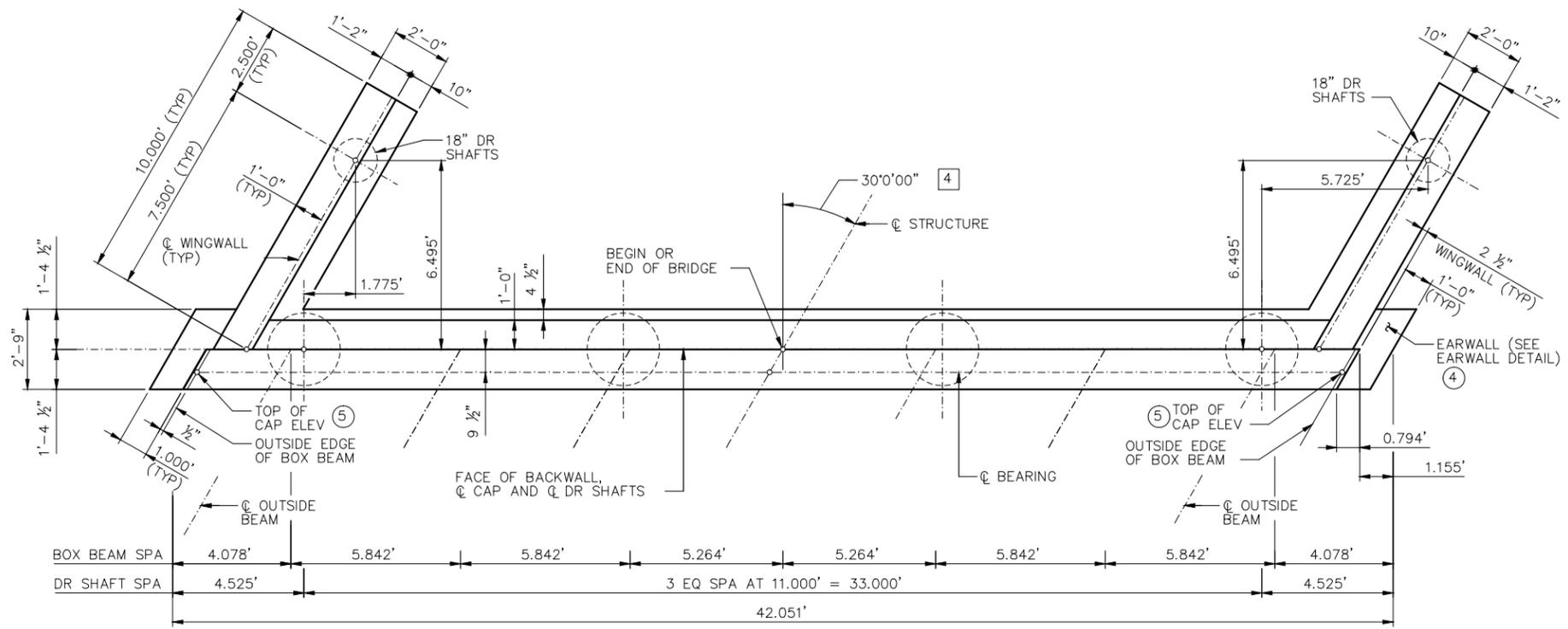
HARRIS COUNTY ENGINEERING DEPARTMENT



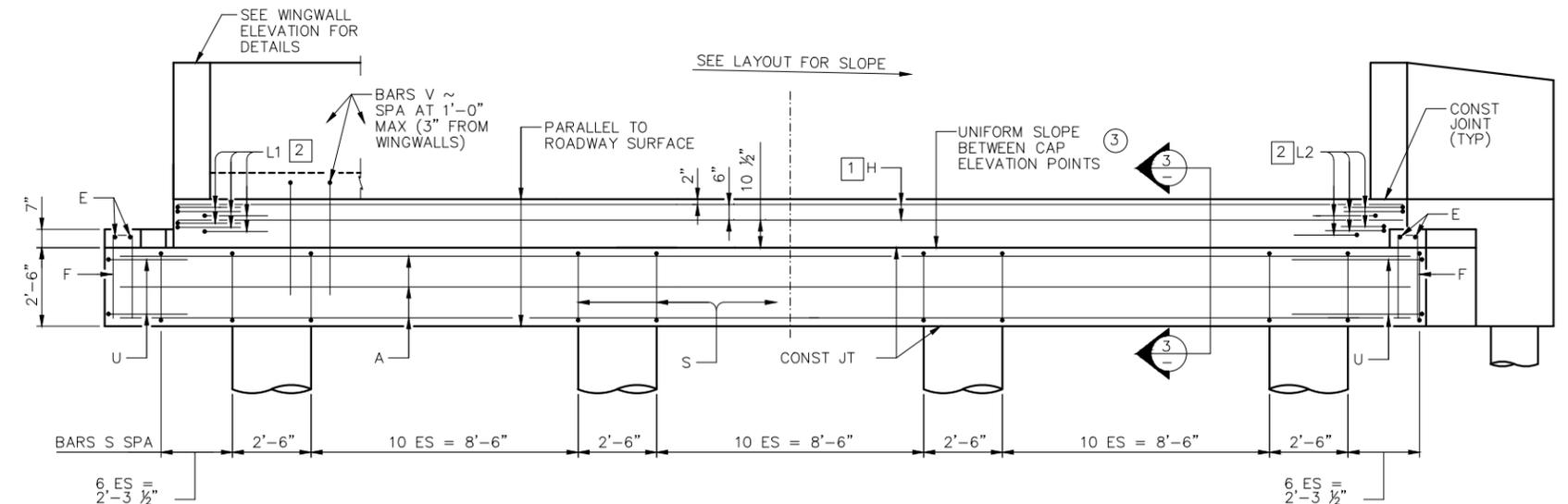
FIRM INFO

SEAL NOTE

PROJECT TITLE		JOB NO.
DRAWN BY:	SHEET DESCRIPTION: DESIGN GUIDELINES	FILE NAME:
CHK'D BY:	BOX BEAMS-SPAN DETAILS	FILE NO.:
SCALE:	TWO-WAY ROAD, 0° SKEW	SHT NO.:
DATE:	APPROVED BY:	45



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.
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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 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 SHAFT.

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.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY
ENGINEERING DEPARTMENT

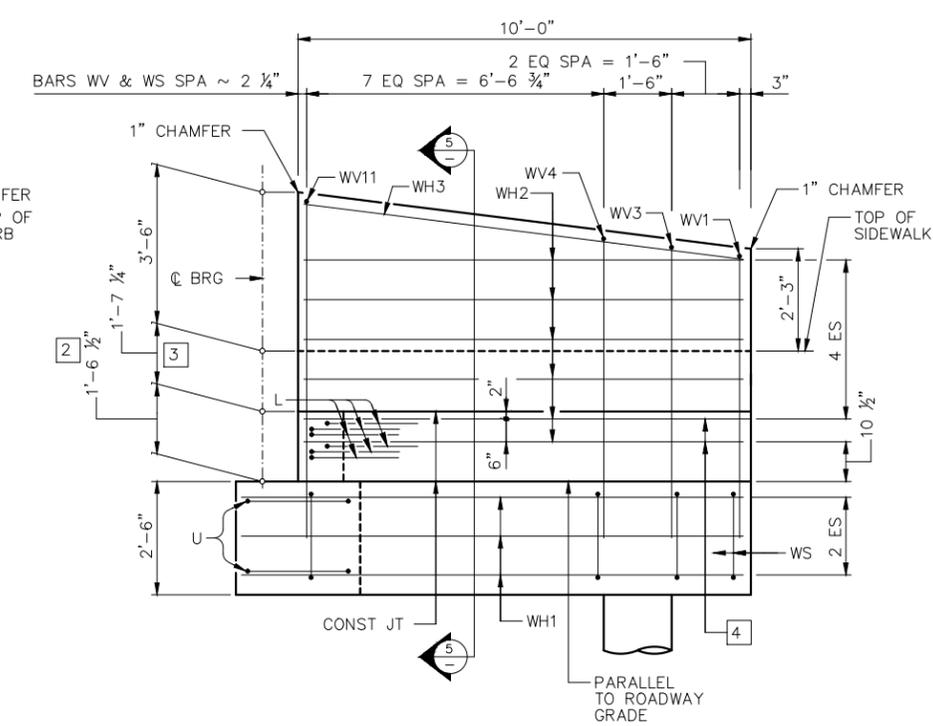
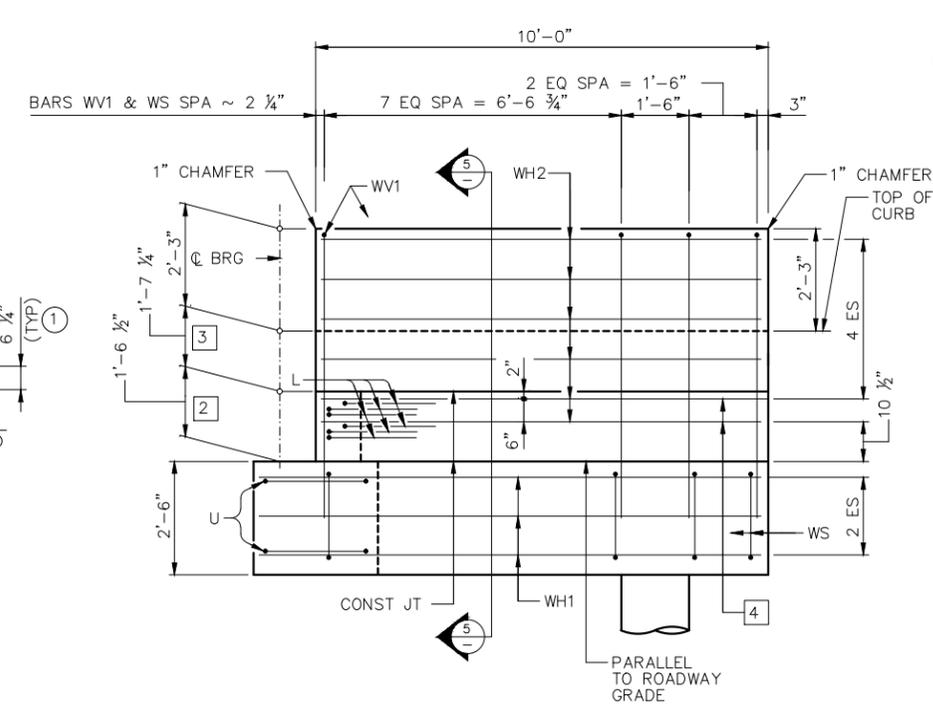
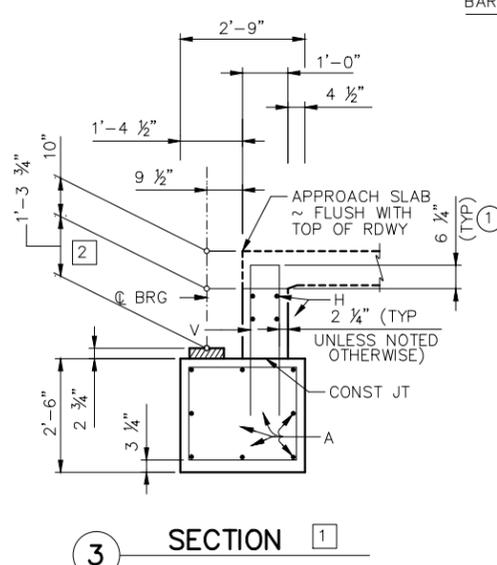


FIRM INFO

SEAL
NOTE

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

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	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 [1]				
REINFORCING STEEL			LB	3,820
CLASS B1 CONCRETE			CY	21.6

TYPE 1 - TRAFFIC RAIL SIDE

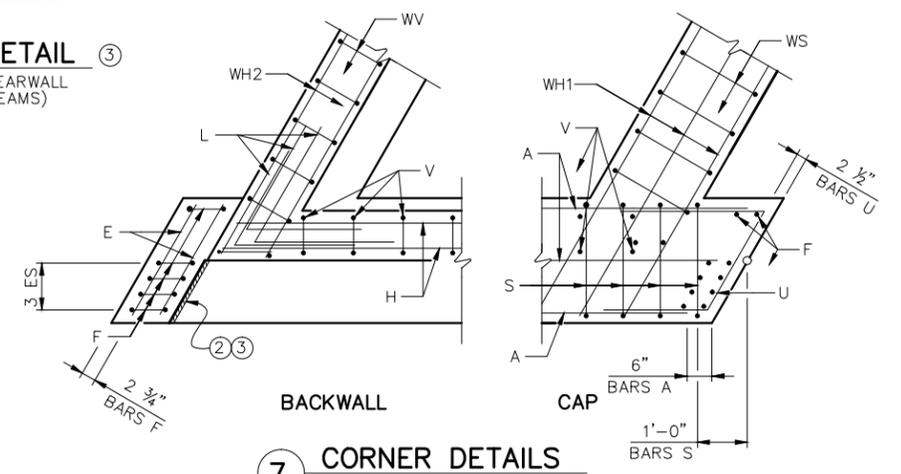
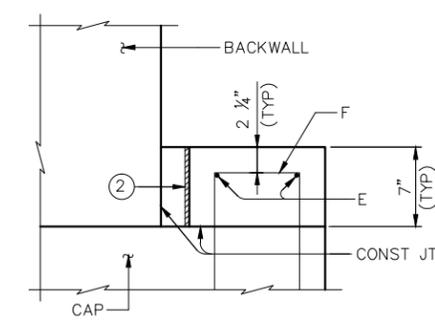
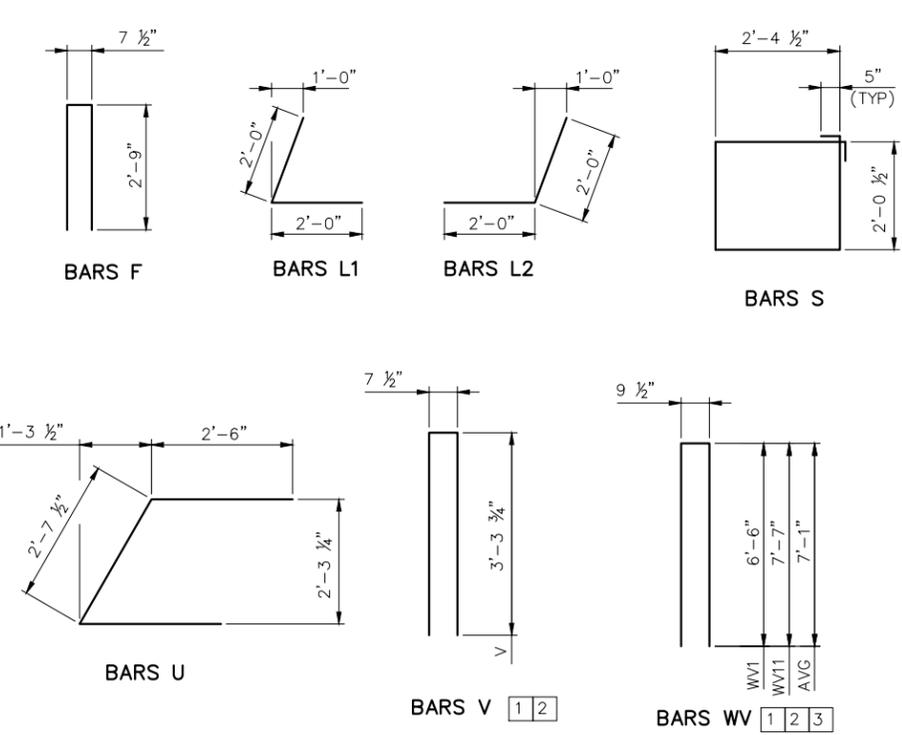
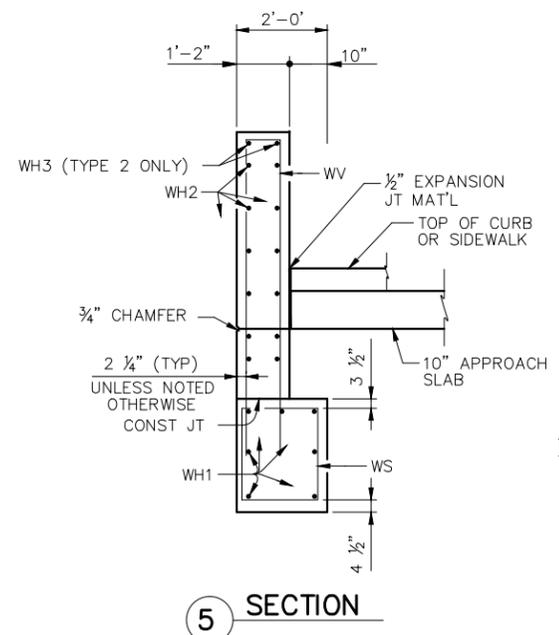
TYPE 2 - COMBINATION RAIL SIDE

4 WINGWALL ELEVATION [1]
(EARWALL OMITTED FOR CLARITY)

- 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.

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

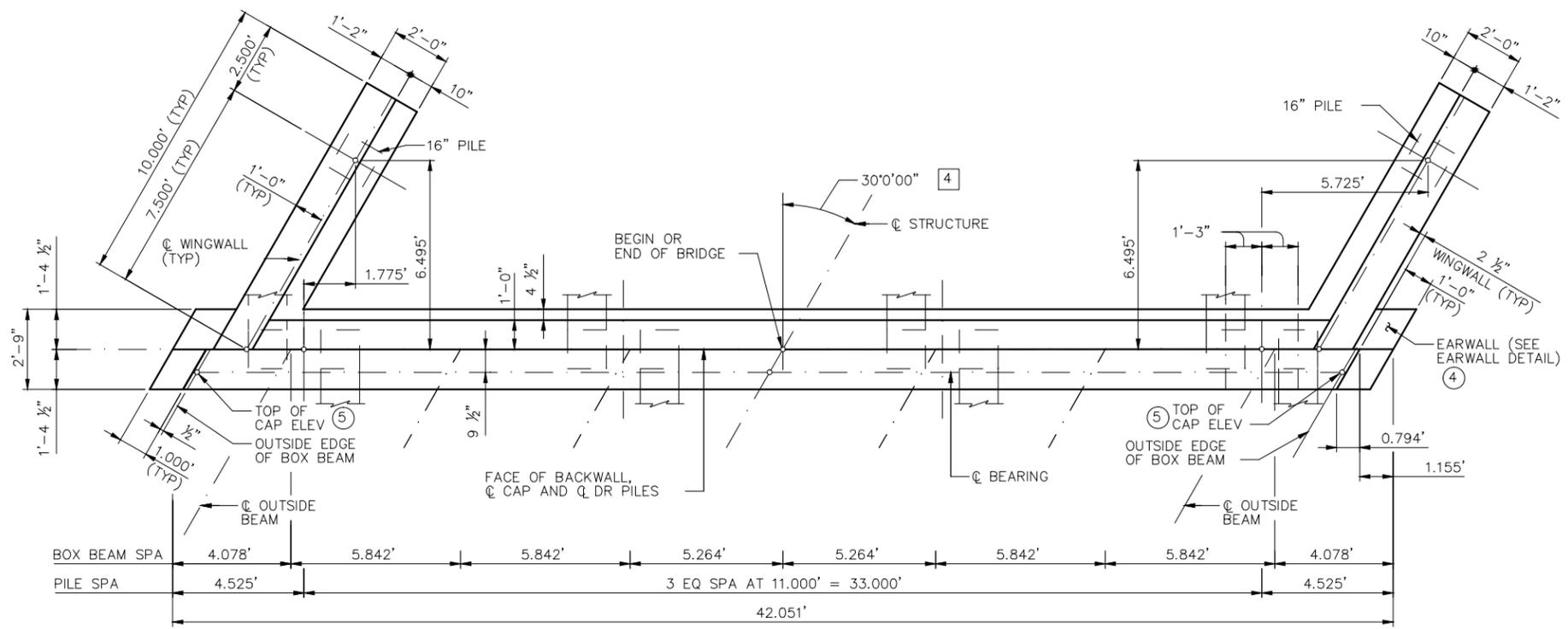


FIRM INFO

SEAL
NOTE

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

HL93 LOADING



1 PLAN

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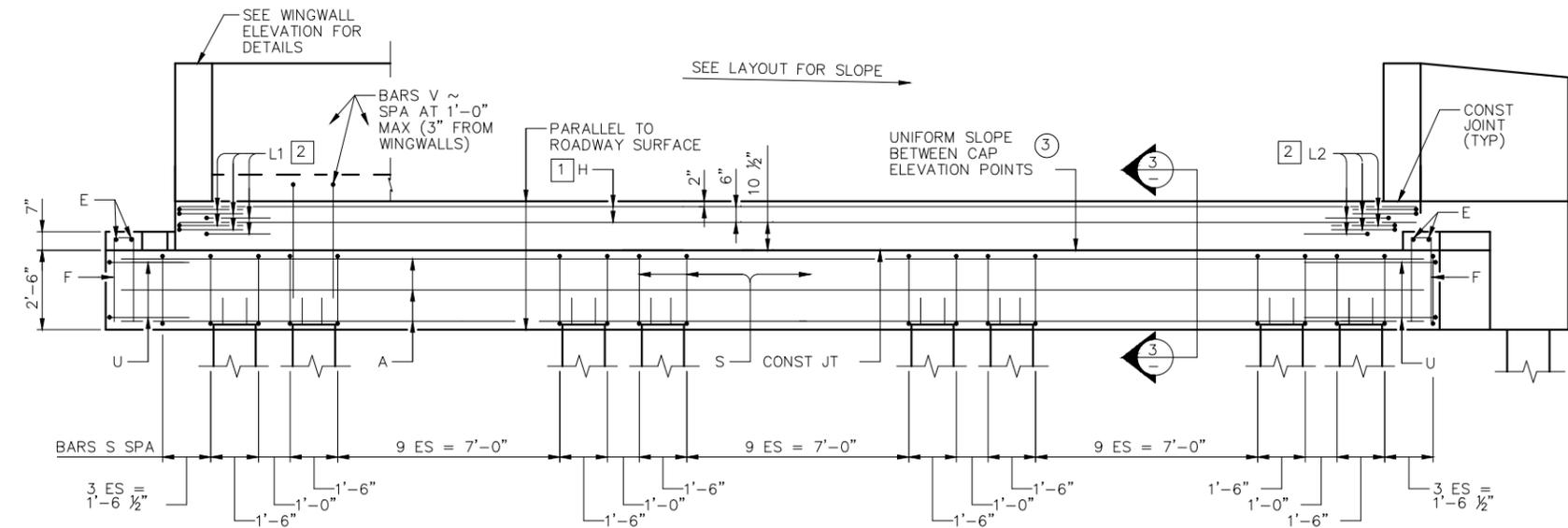
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ABUTMENT NOTES

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- 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.



2 ELEVATION

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.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY
ENGINEERING DEPARTMENT



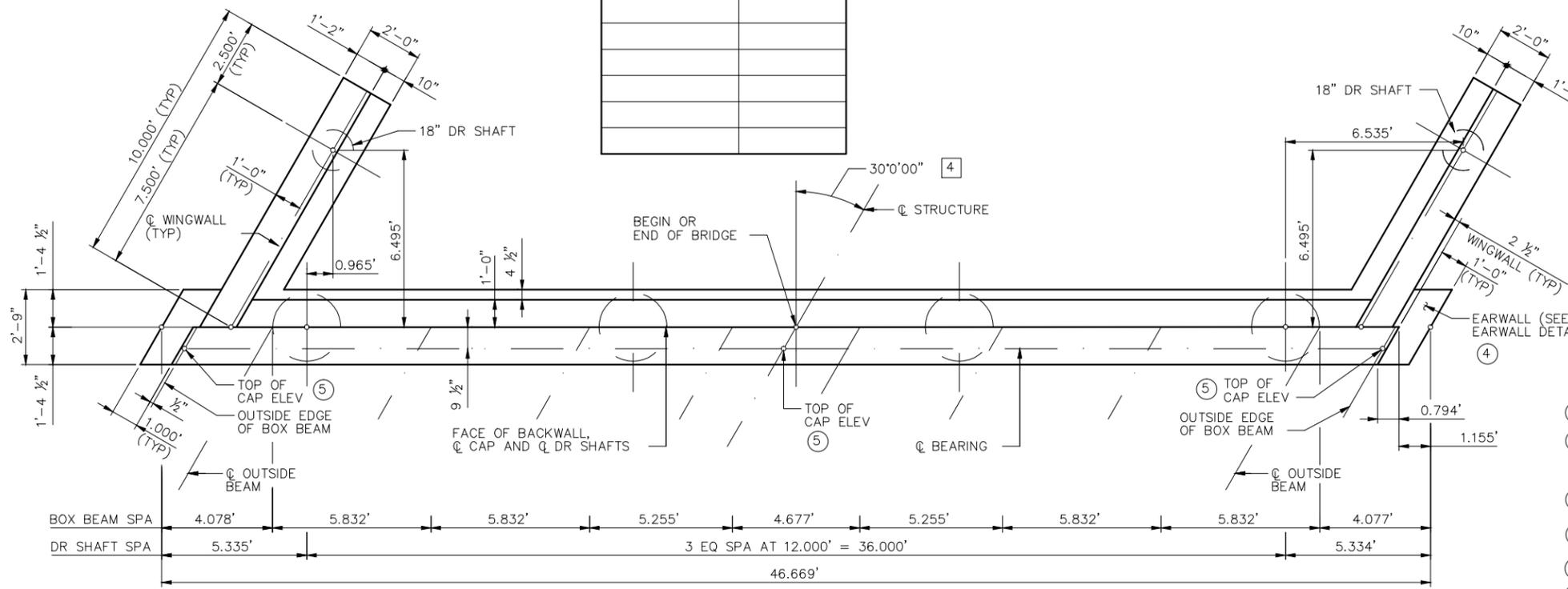
FIRM INFO

SEAL
NOTE

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

HL93 LOADING

TOP OF CAP ELEVATIONS ⑥	
WORKING POINT	ELEVATION



① PLAN

- NOTES TO DESIGN ENGINEER:
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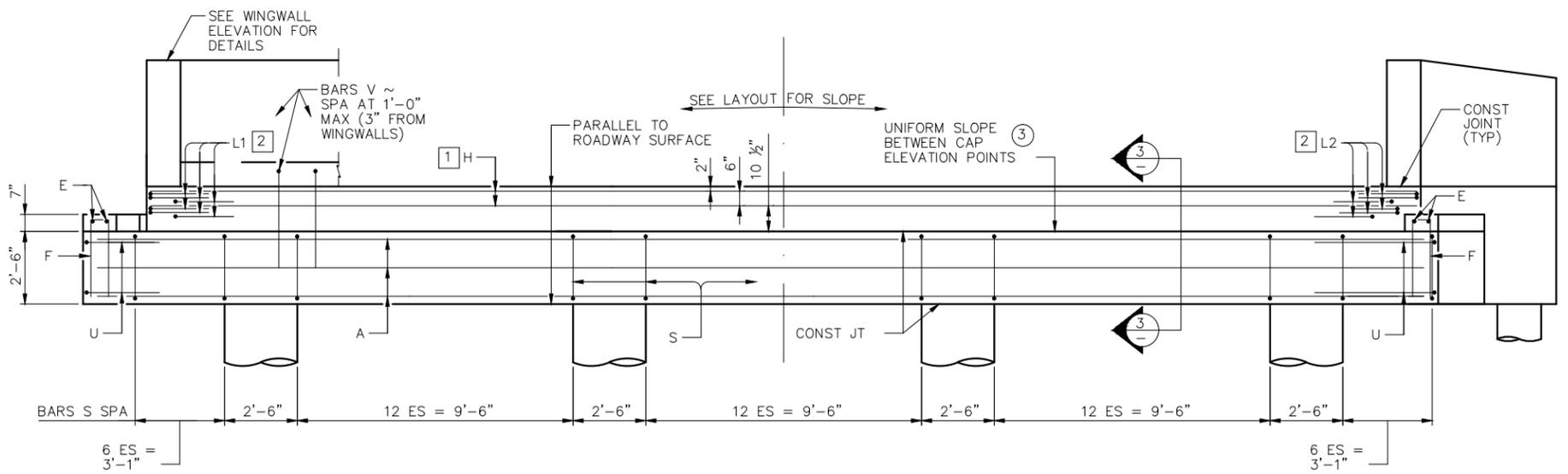
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7. MAXIMUM CALCULATED FOUNDATION LOADS:
X TONS PER SHAFT.

NOTES TO ENGINEER

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② 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:	JOB NO.:	
	DESIGN GUIDELINES-ABUTMENT		
	BOX BEAM-DR SHAFTS	FILE NAME:	
	TWO-WAY ROAD, 30°SKEW	FILE NO.:	
	(1 OF 2)	SHT NO.:	50

HL93 LOADING

BILL OF REINFORCING STEEL [1]

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

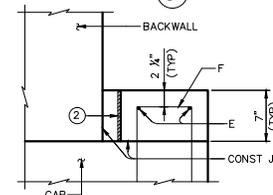
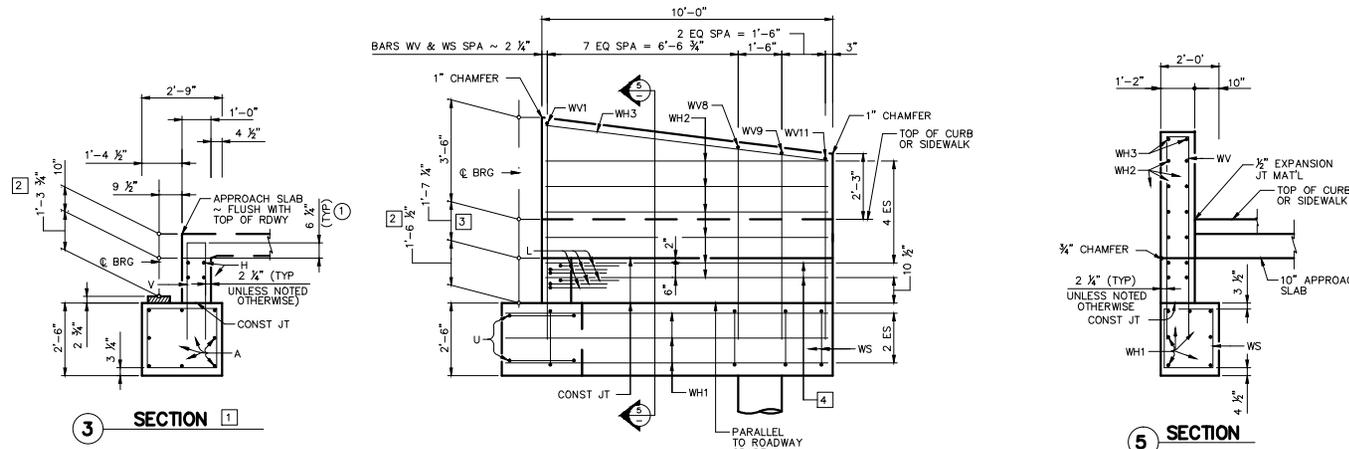
ESTIMATED QUANTITIES [1]

REINFORCING STEEL	LB	4,160
CLASS B1 CONCRETE	CY	23.3

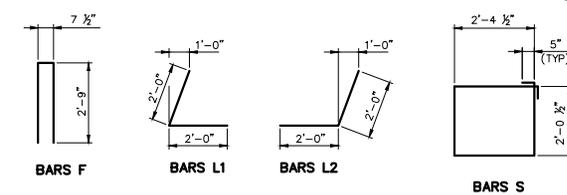
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NOTES TO ENGINEER

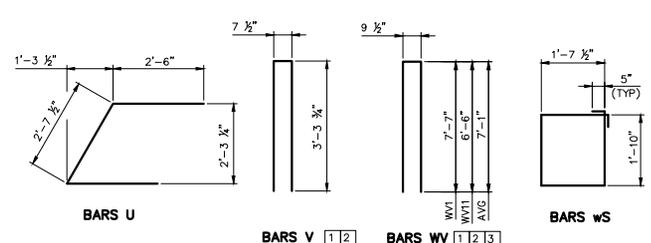
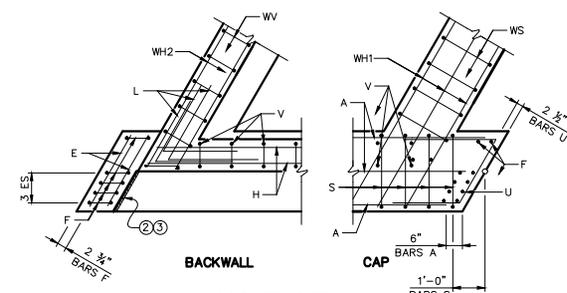
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- THE ENGINEER SHALL DETERMINE WINGWALL HEIGHT BASED ON ROADWAY AND SIDEWALK CROSS SLOPES.
- ADJUST NUMBER OF WH2 BARS TO MATCH NUMBER OF H BARS IN BACKWALL.



4 WINGWALL ELEVATION [1]
(EARWALL OMITTED FOR CLARITY)



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



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

**HARRIS COUNTY
ENGINEERING DEPARTMENT**

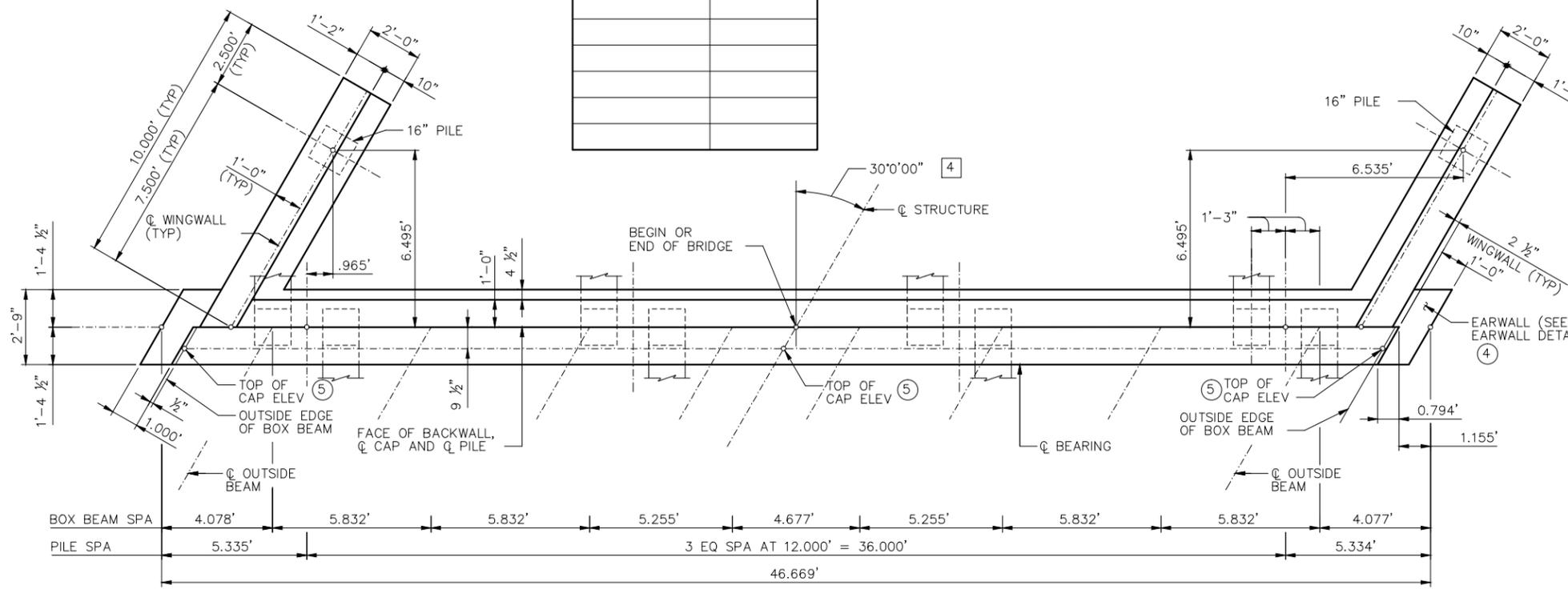


FIRM INFO

SEAL
NOTE

PROJECT FILE		FILE NO.
DESIGN BY	DESIGN GUIDELINES-ABUTMENT	FILE NO.
APP BY	BOX BEAM-DR SHAFTS	FILE NO.
SCALE	TWO-WAY ROAD, 30°SKEW	FILE NO.
DATE	APPROVED BY	DATE

TOP OF CAP ELEVATIONS ⑥	
WORKING POINT	ELEVATION



① PLAN

NOTES TO DESIGN ENGINEER:

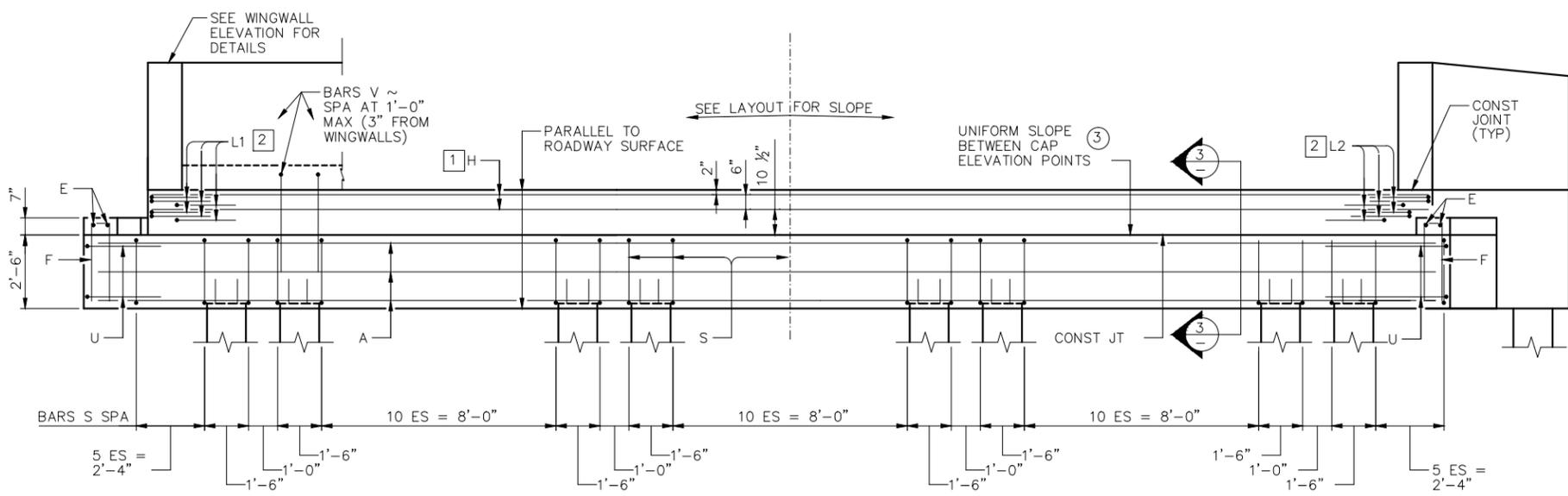
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② ELEVATION

ABUTMENT 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

- 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.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

HARRIS COUNTY
ENGINEERING DEPARTMENT

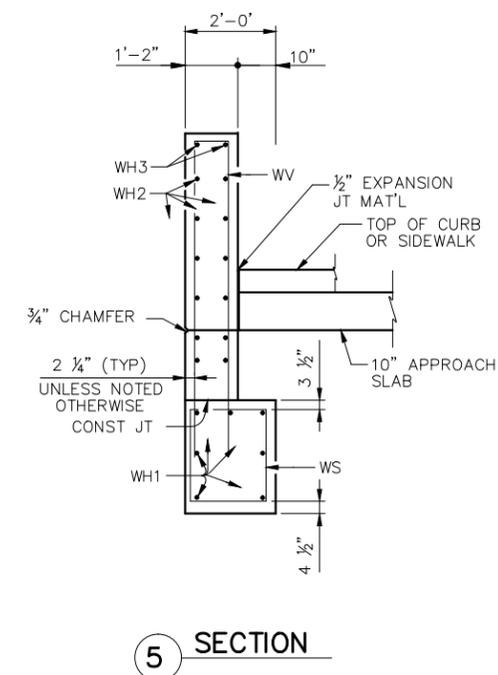
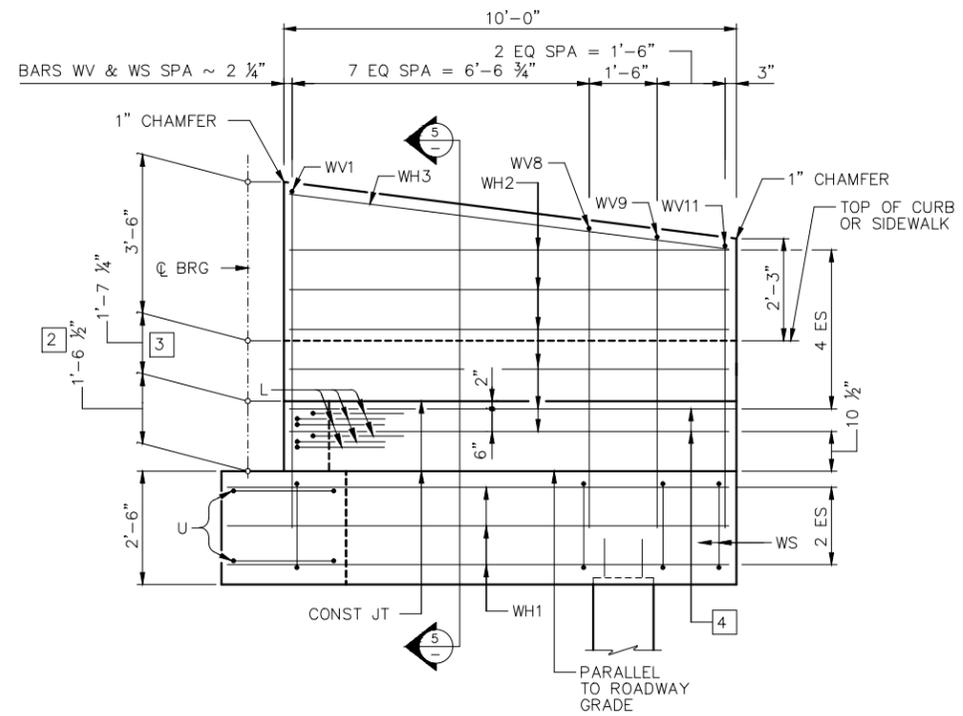
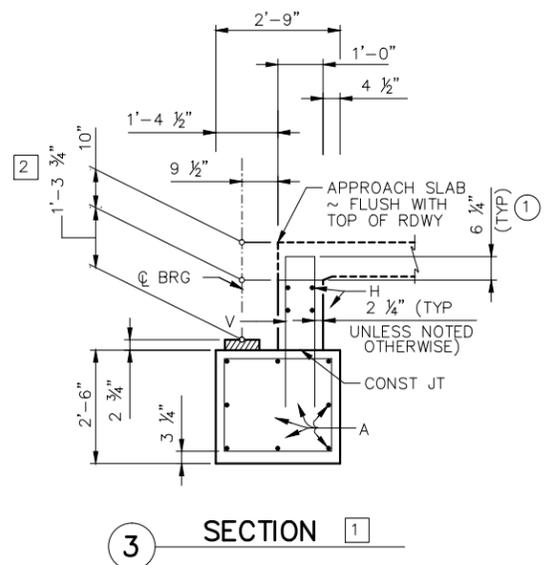


FIRM INFO

SEAL
NOTE

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

HL93 LOADING

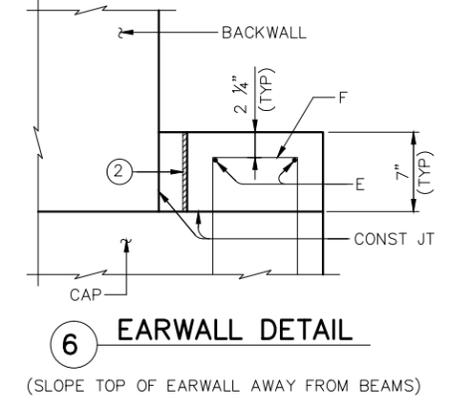
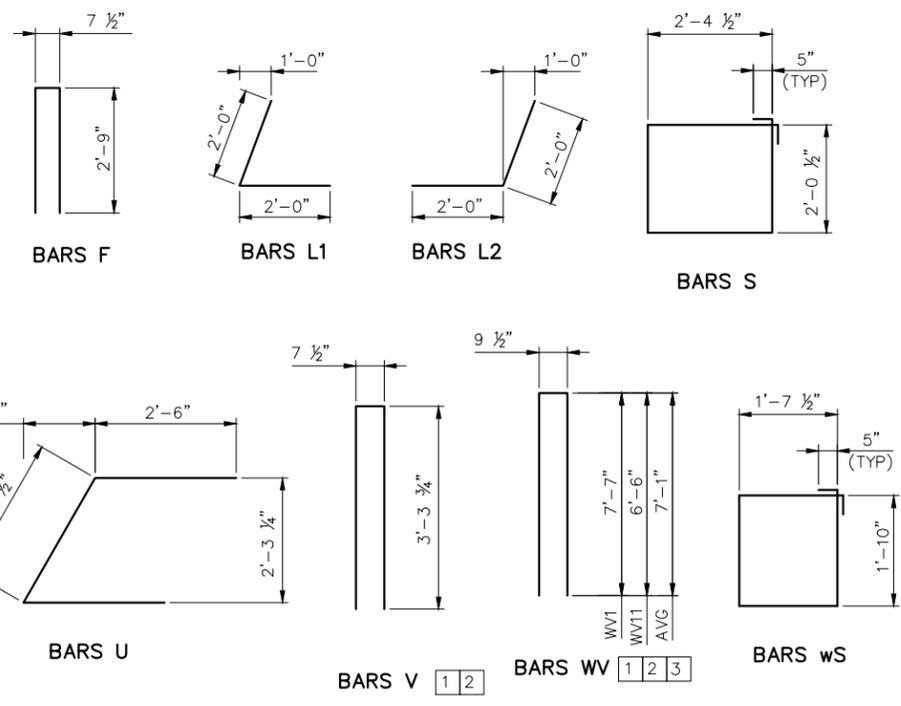


BILL OF REINFORCING STEEL					
BAR	NO.	SIZE	LENGTH	WEIGHT	
A	8	# 11	45'-8"	1,941	
E	4	# 5	2'-10"	12	
F	10	# 5	6'-2"	64	
H	4	# 6	43'-6"	261	
L1	6	# 6	4'-0"	36	
L2	6	# 6	4'-0"	36	
S	53	# 4	9'-8"	342	
U	4	# 6	7'-8"	46	
V	43	# 5	7'-3"	325	
WH1	14	# 6	11'-1"	232	
WH2	24	# 6	9'-8"	348	
WH3	4	# 6	9'-9"	59	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

ESTIMATED QUANTITIES		
REINFORCING STEEL	LB	4,160
CLASS B1 CONCRETE	CY	23.3

4 WINGWALL ELEVATION (EARWALL OMITTED FOR CLARITY)

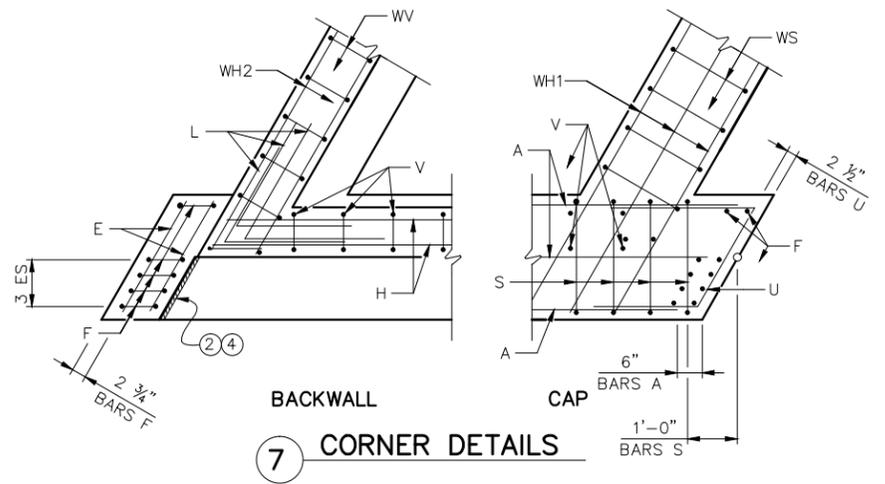
5 SECTION



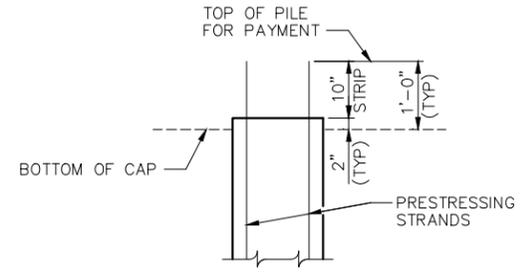
- 1 INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE. 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- 2 DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.

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.



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

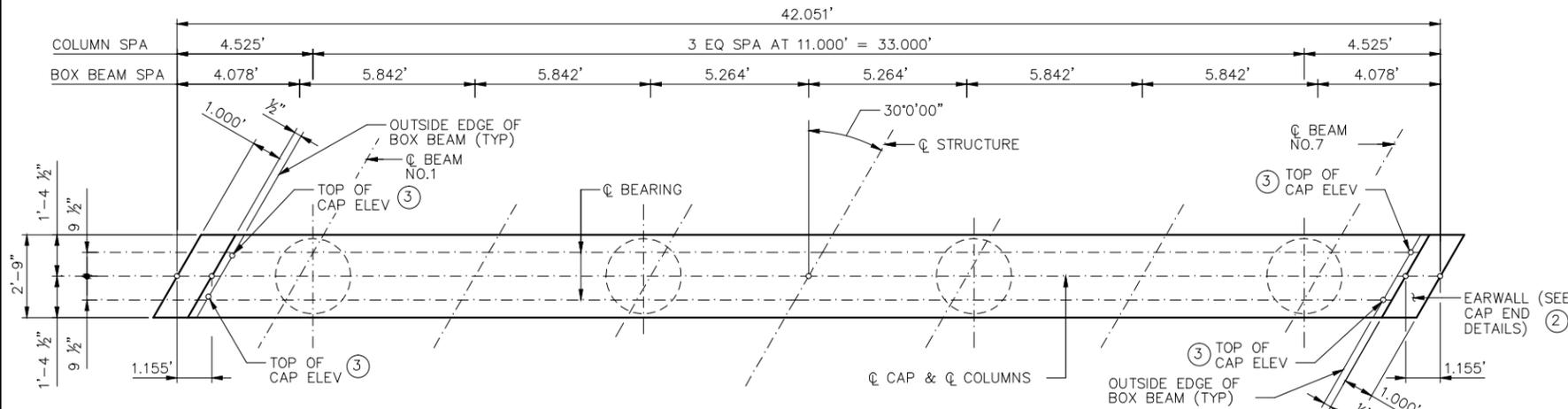
HARRIS COUNTY ENGINEERING DEPARTMENT



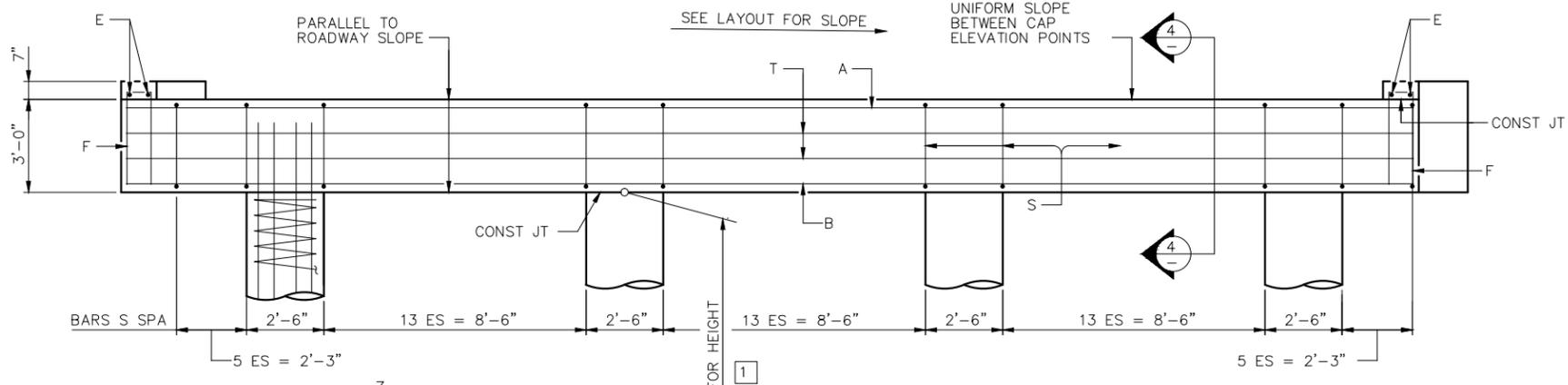
FIRM INFO

SEAL NOTE

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



1 PLAN



2 ELEVATION

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

NOTES TO DESIGN ENGINEER:

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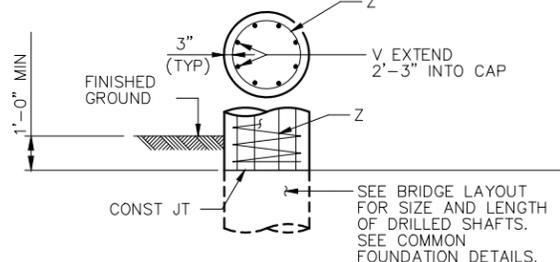
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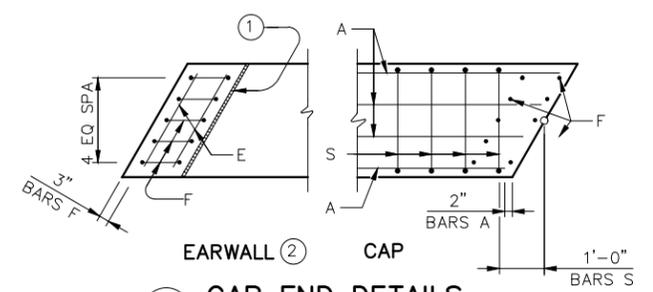
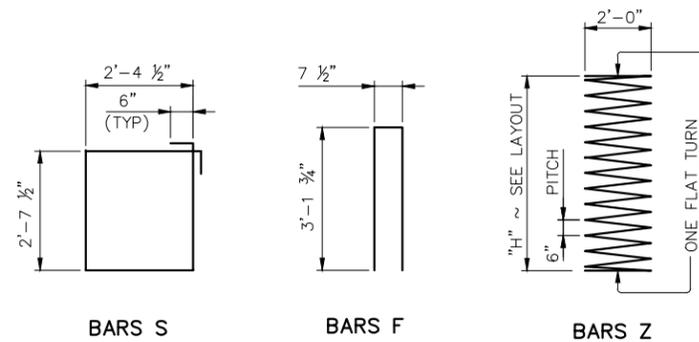
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- 2 DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- 3 TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- 4 FOR EACH LINEAR FOOT VARIATION IN "H" VALUE MAKE FOLLOWING ADJUSTMENTS:
 BARS V: 1'-0"
 BARS 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.

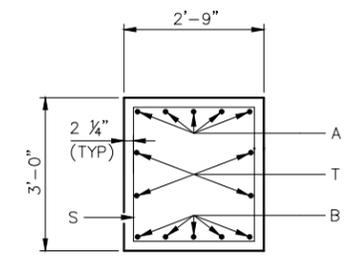


TOP OF CAP ELEVATIONS (5)	
WORKING POINT	ELEVATION

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 - SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
 - MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER SHAFT.



3 CAP END DETAILS



4 BENT CAP SECTION

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

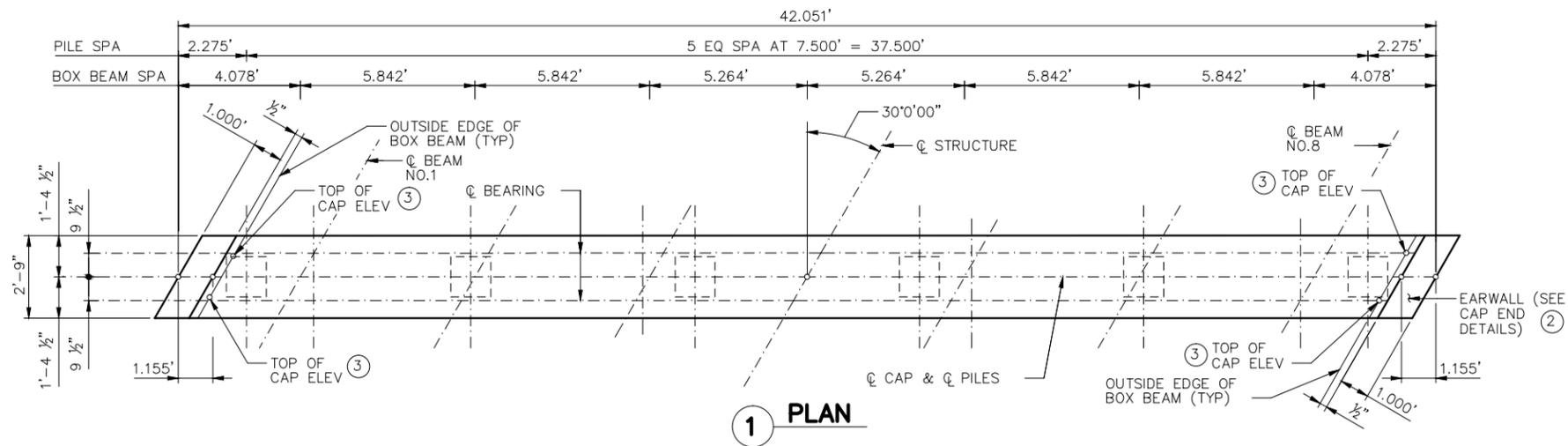


FIRM INFO

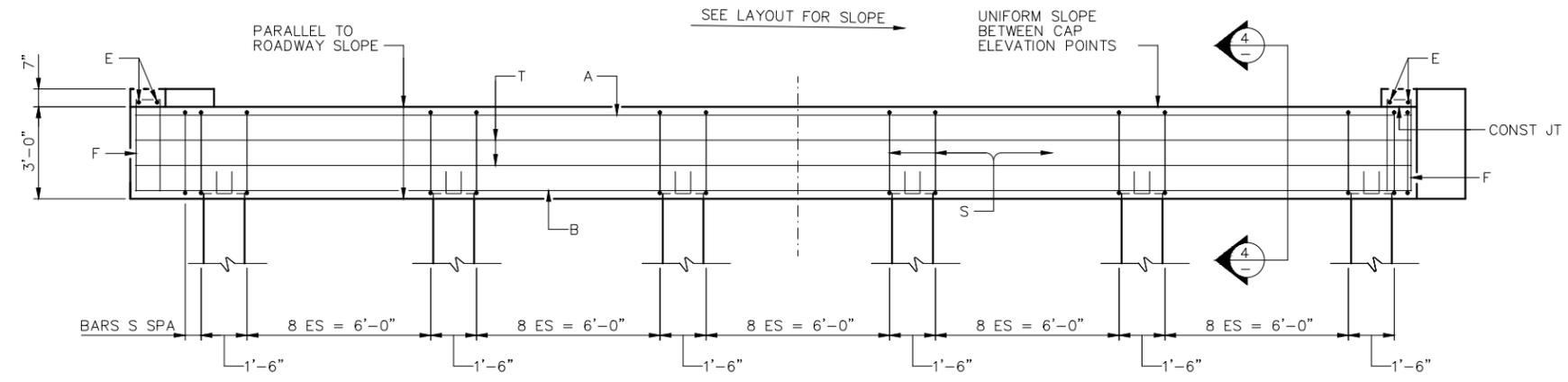
SEAL
NOTE

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

HL93 LOADING



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	
WORKING POINT	ELEVATION

NOTES TO DESIGN ENGINEER:

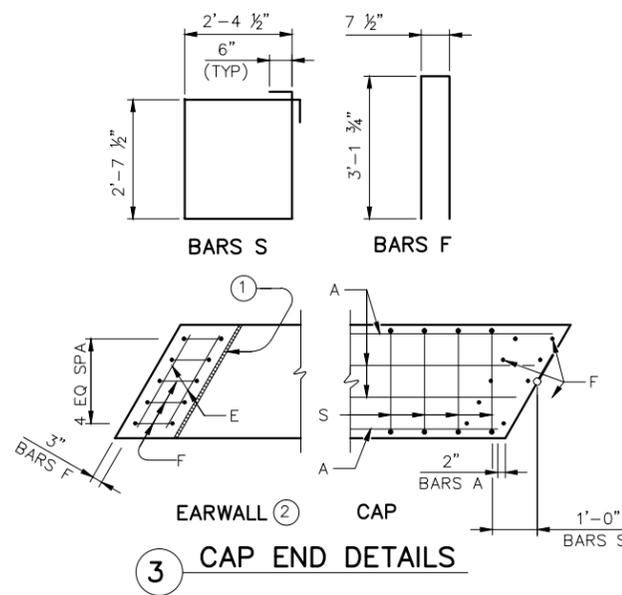
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- 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- TOP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

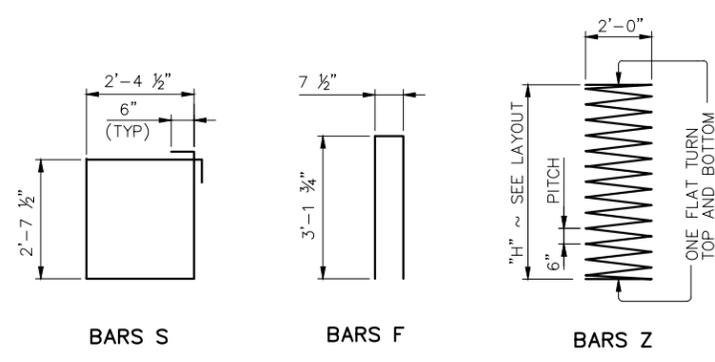
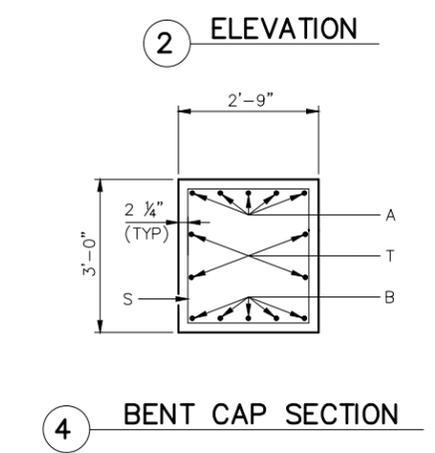
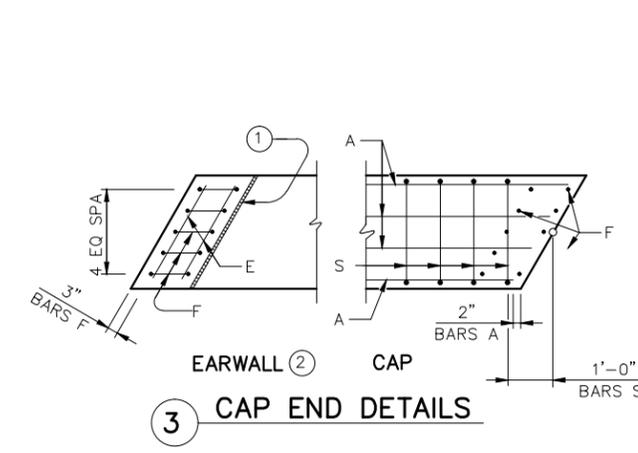
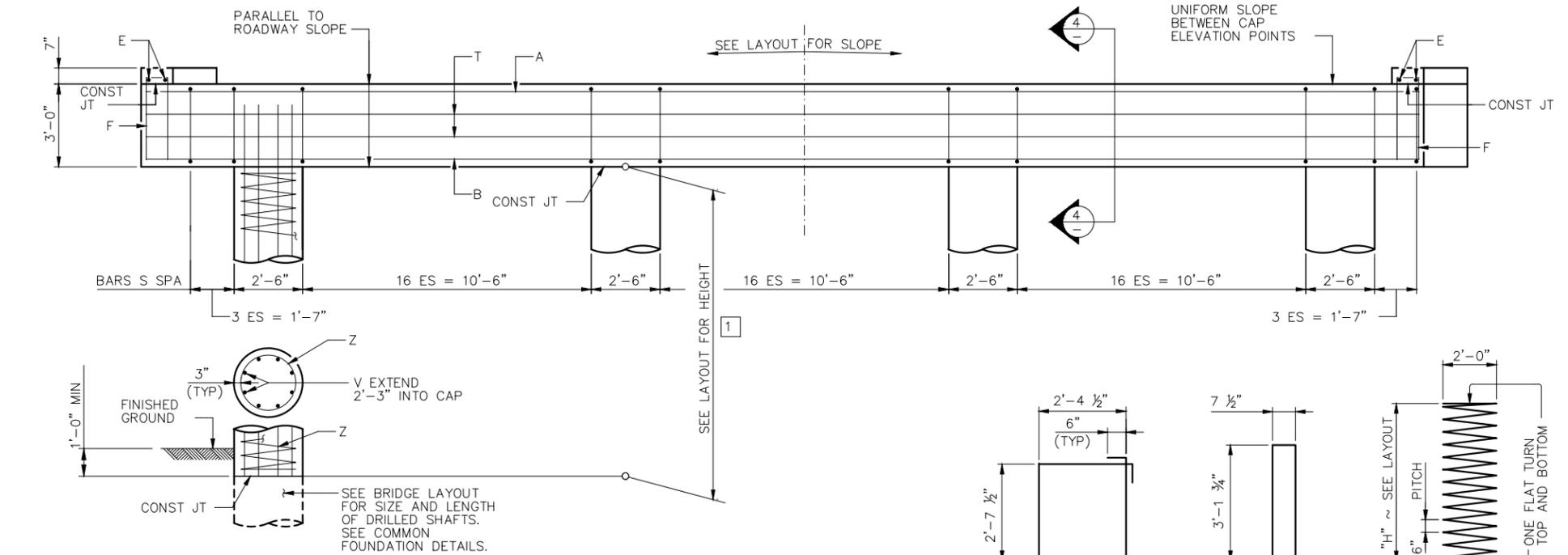
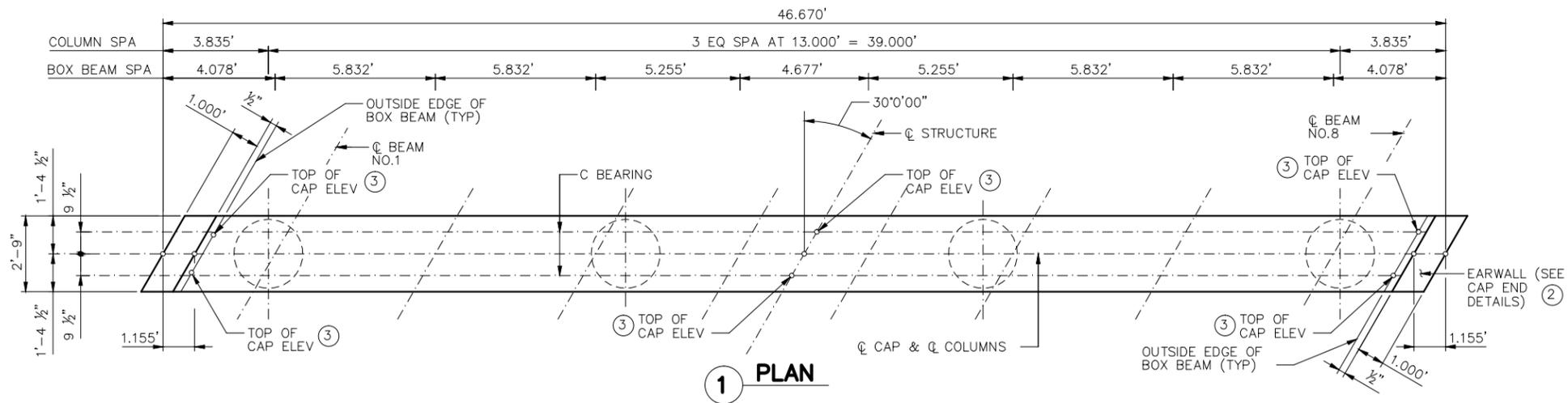


FIRM INFO

SEAL NOTE

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

HL93 LOADING



TOP OF CAP ELEVATIONS ⑤	
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.
- 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

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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.
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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.

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

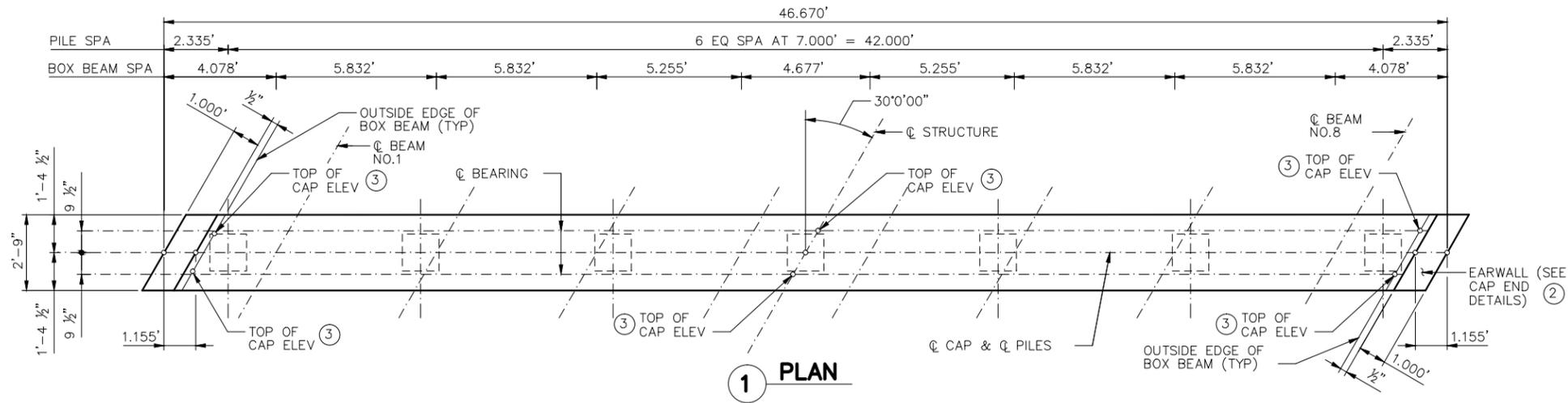
HARRIS COUNTY ENGINEERING DEPARTMENT



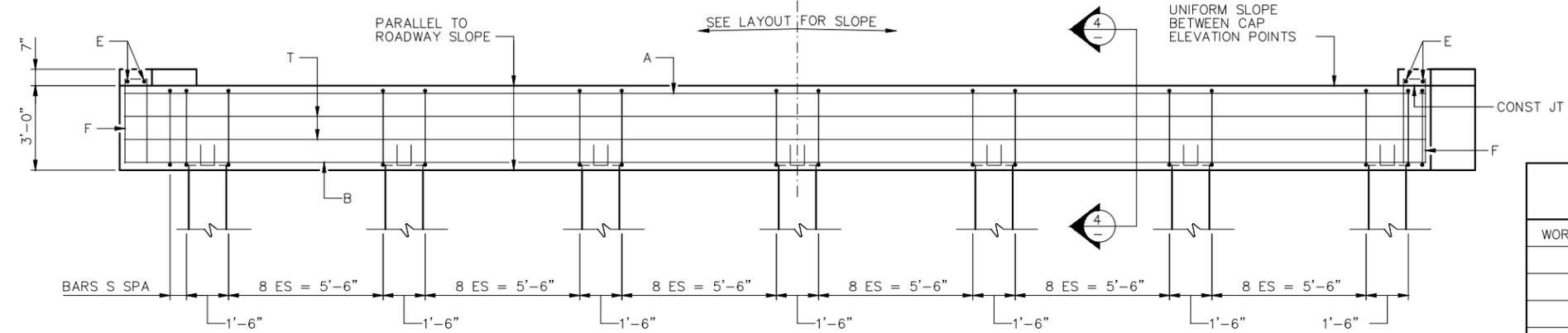
FIRM INFO

SEAL NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	DESIGN GUIDELINES-BENT	
DATE:	APPROVED BY:	BOX BEAMS-DR SHAFTS	
		TWO-WAY ROAD, 30'SKEW	
		FILE NO.:	
		FILE NO.:	
		SHT NO.:	56



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



NOTES TO DESIGN ENGINEER:

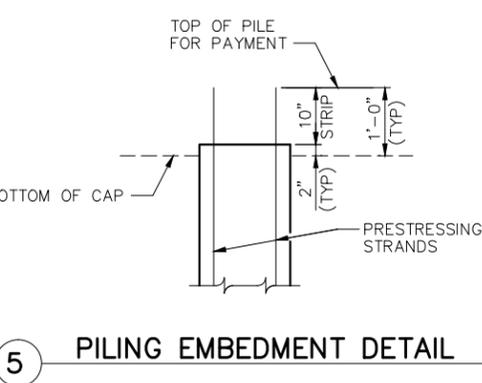
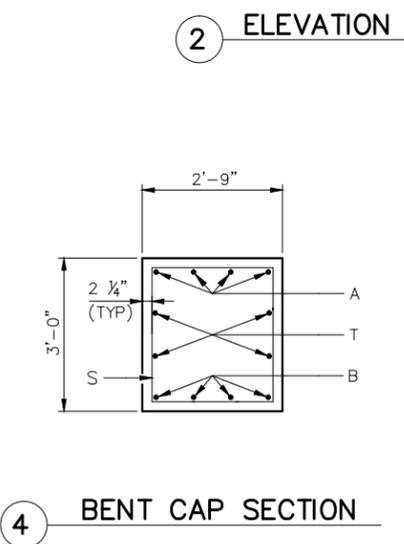
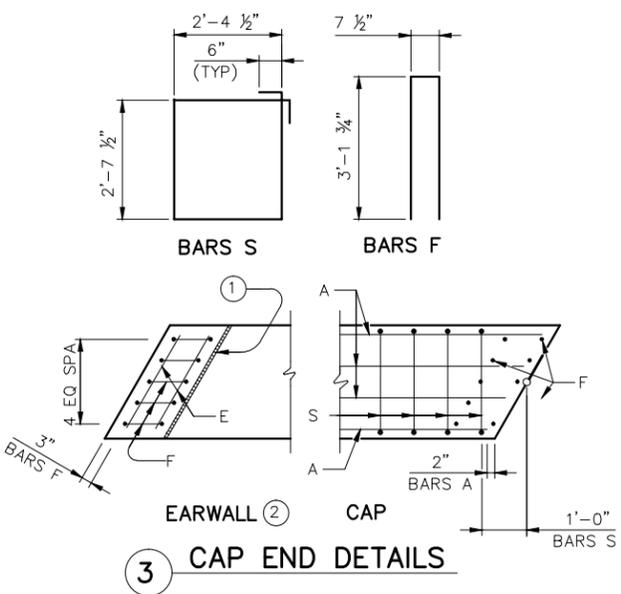
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- 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- TOP 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 14" 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

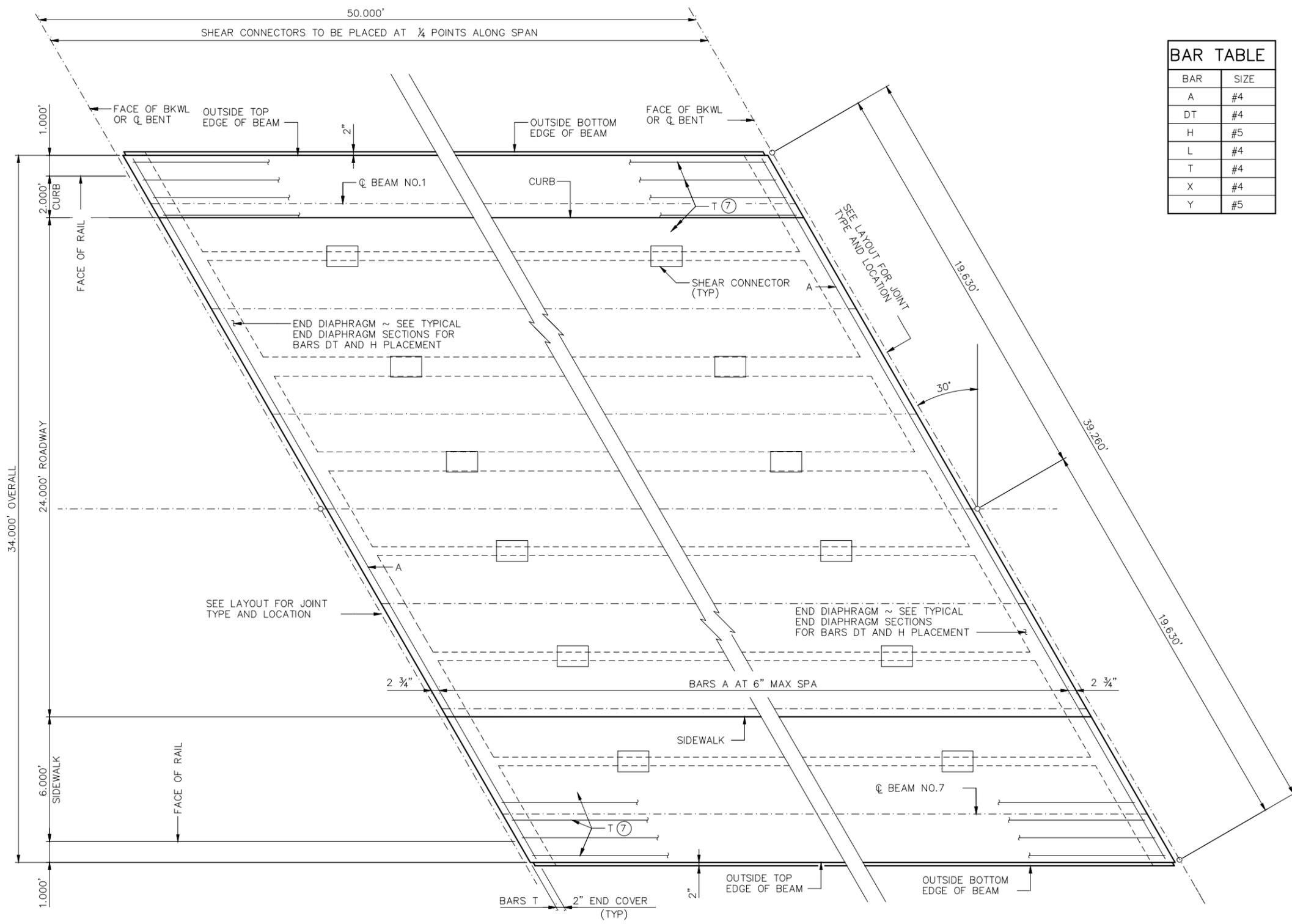


FIRM INFO

SEAL NOTE

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

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.

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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.

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

HL93 LOADING

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

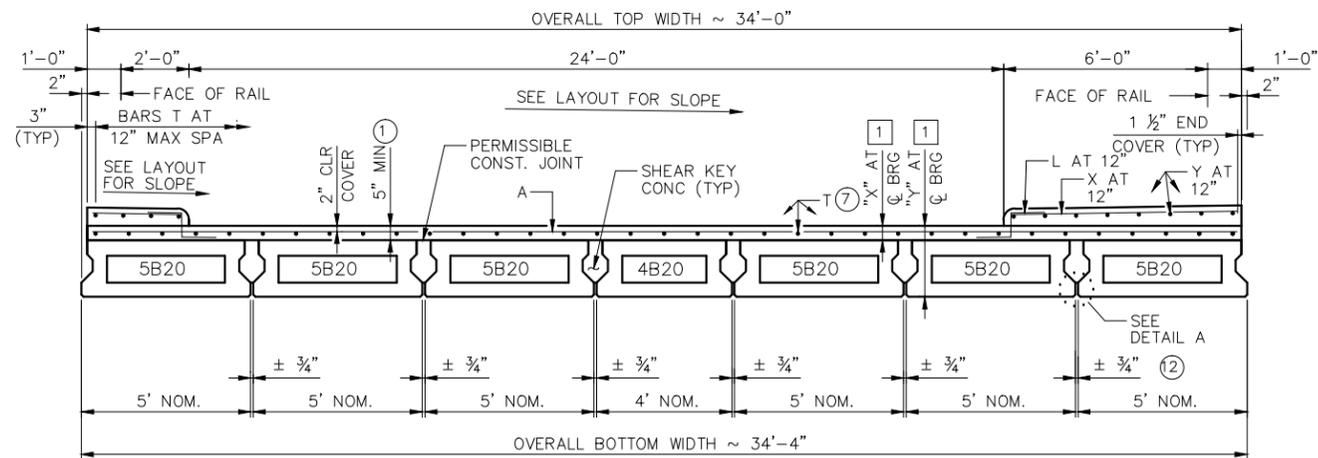
**HARRIS COUNTY
ENGINEERING DEPARTMENT**



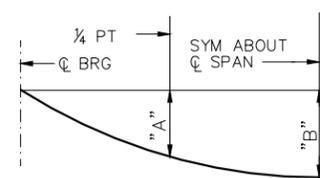
FIRM INFO

**SEAL
NOTE**

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



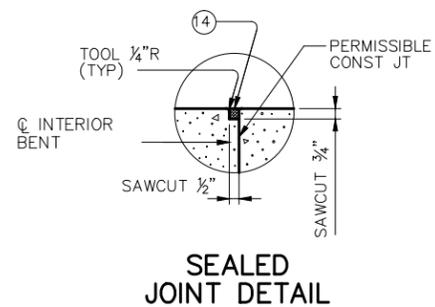
TYPICAL TRANSVERSE SECTION



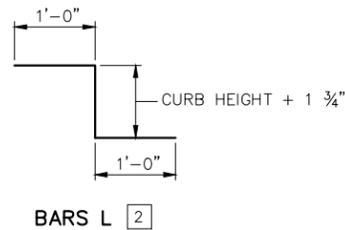
NOTE: DEFLECTIONS SHOWN ARE DUE TO SHEAR KEY AND CONCRETE SLAB ONLY, ($E_c = 5 \times 10^3$ KSI). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DIMENSION MAY BE LESS. DEFLECTIONS MAY BE ADJUSTED BASED ON FIELD OBSERVATION.

DEAD LOAD DEFLECTION DIAGRAM

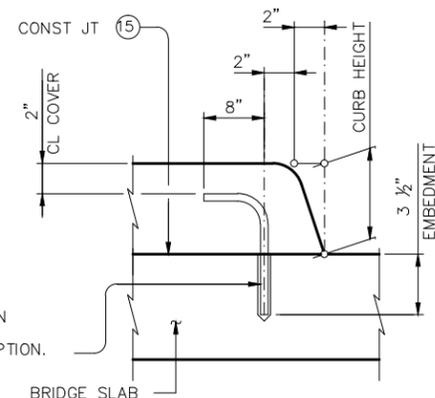
SPAN LENGTH (FT)	BEAM NO.	POINT	DEAD LOAD DEFLECTIONS(FT)			SECTION DEPTHS	
			SHEAR KEY	SLAB	TOTAL	"X" AT ϕ BRG	"Y" AT ϕ BRG
50	ALL	"A" "B"				5 3/4"	2'-1 3/4"



SEALED JOINT DETAIL



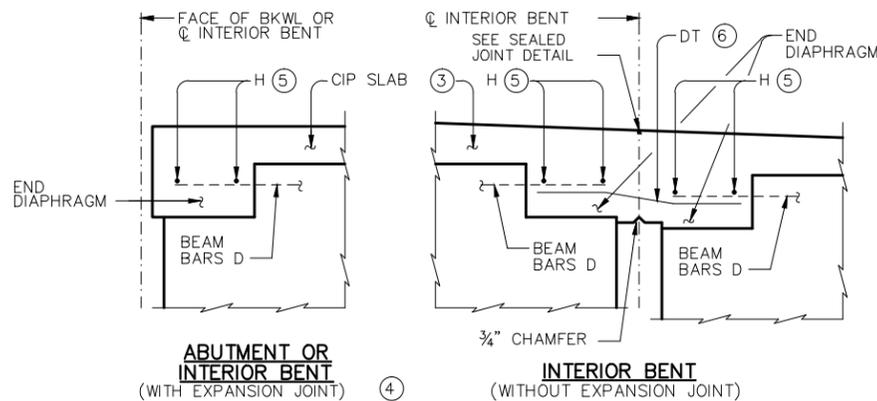
BARS L 2



OPTIONAL EPOXY ANCHORS

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

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)

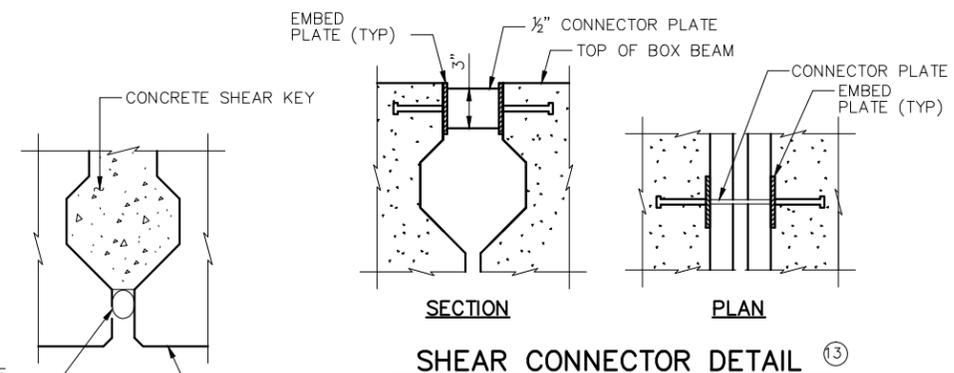
TABLE OF ESTIMATED QUANTITIES

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.
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- 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.
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NOTES TO ENGINEER

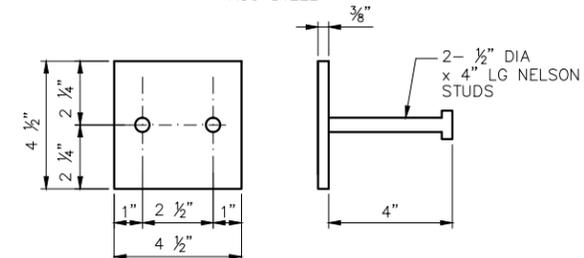
- THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB, SHEAR KEY AND THE EFFECT OF VERTICAL CURVE.
- THE ENGINEER SHALL DETERMINE BRIDGE CURB HEIGHT.



SHEAR CONNECTOR DETAIL

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

DETAIL "A"



EMBED PLATE DETAIL

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

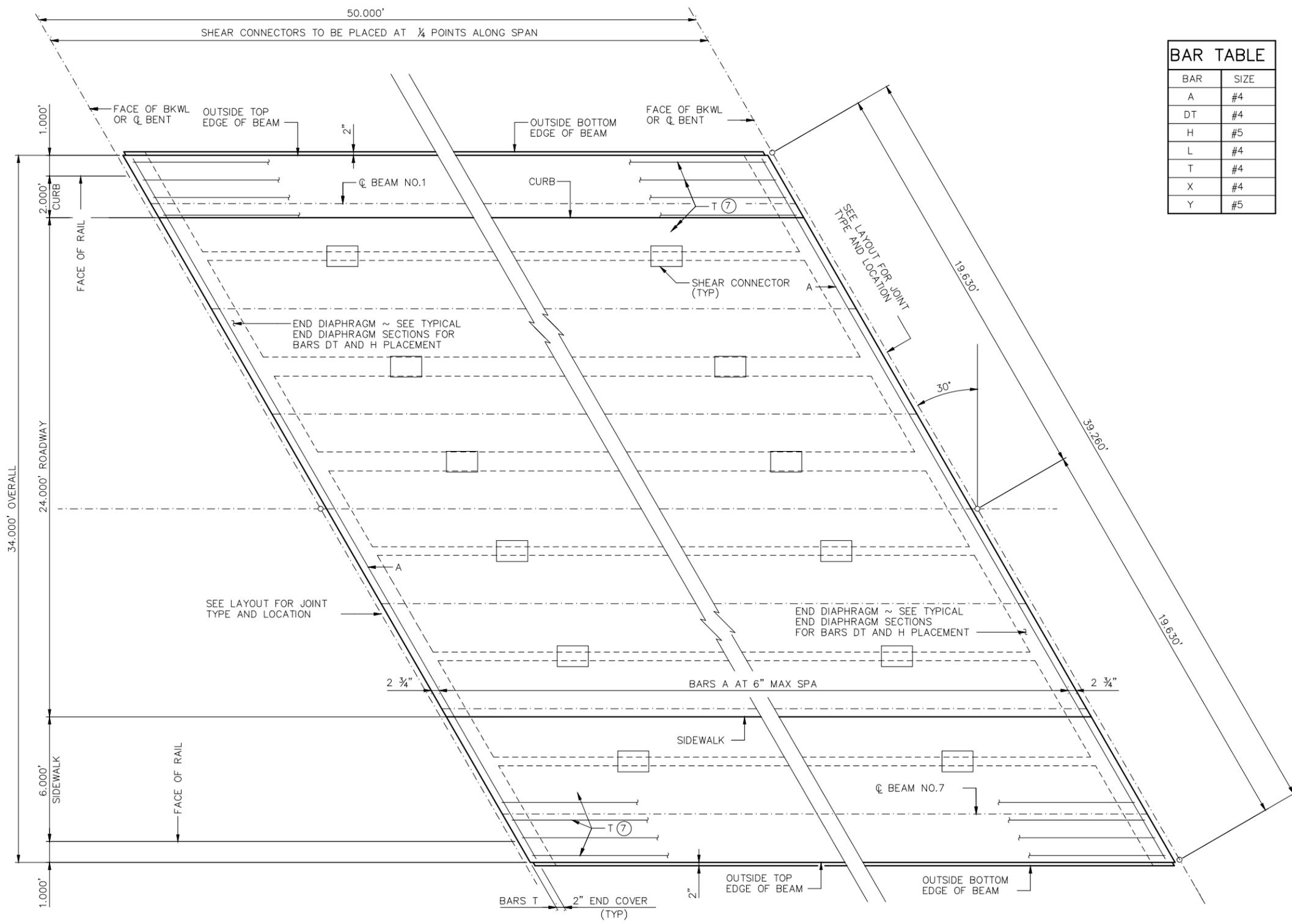
HARRIS COUNTY ENGINEERING DEPARTMENT



FIRM INFO

SEAL NOTE

PROJECT TITLE		JOB NO.
DRAWN BY:	SHEET DESCRIPTION: DESIGN GUIDELINES	FILE NAME:
CHK'D BY:	BOX BEAMS-SPAN DETAILS	FILE NO.:
SCALE:	HALF BOULEVARD, 30' SKEW	DATE:
DATE:	APPROVED BY:	SHT NO: 59



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

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SLAB NOTES

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PLAN

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

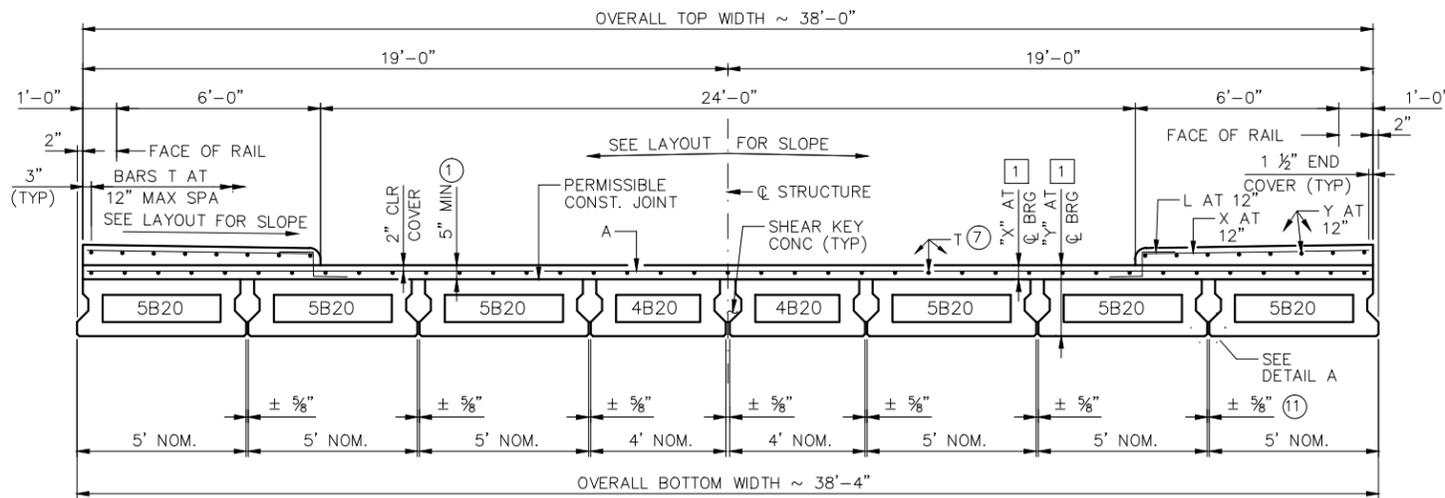


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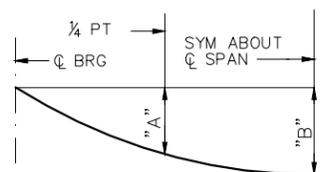
**SEAL
NOTE**

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

HL93 LOADING



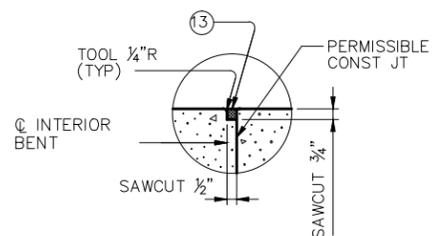
TYPICAL TRANSVERSE SECTION



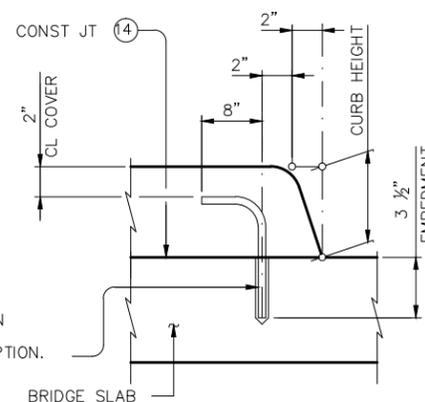
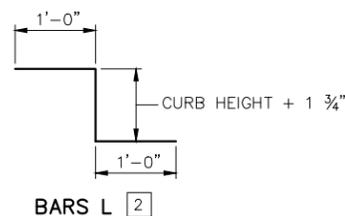
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DEAD LOAD DEFLECTION DIAGRAM

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"

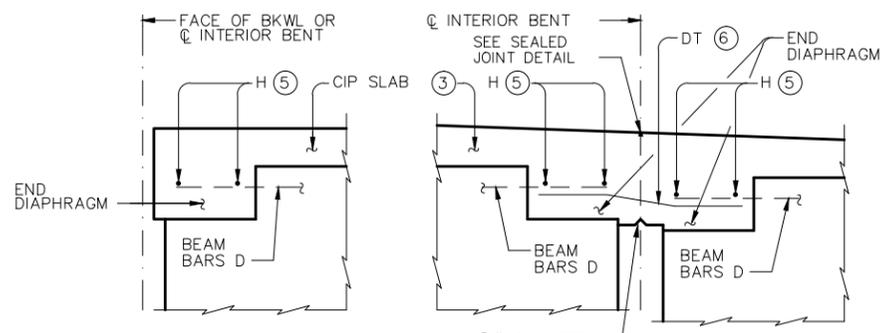


SEALED JOINT DETAIL



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

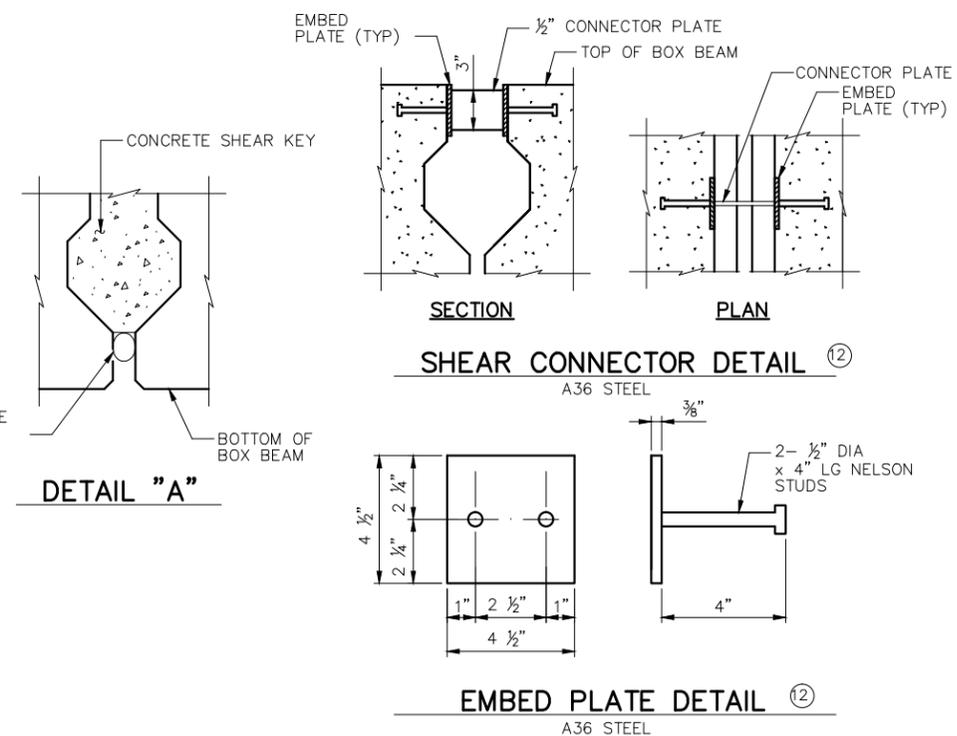
(ALONG CENTERLINE OF BOX BEAM)

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	15.7	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.
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- REINFORCING STEEL WEIGHT IS BASED ON AN APPROXIMATE FACTOR OF 1.8 LBS PER SQUARE FOOT OF SIDEWALK.
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NOTES TO ENGINEER

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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

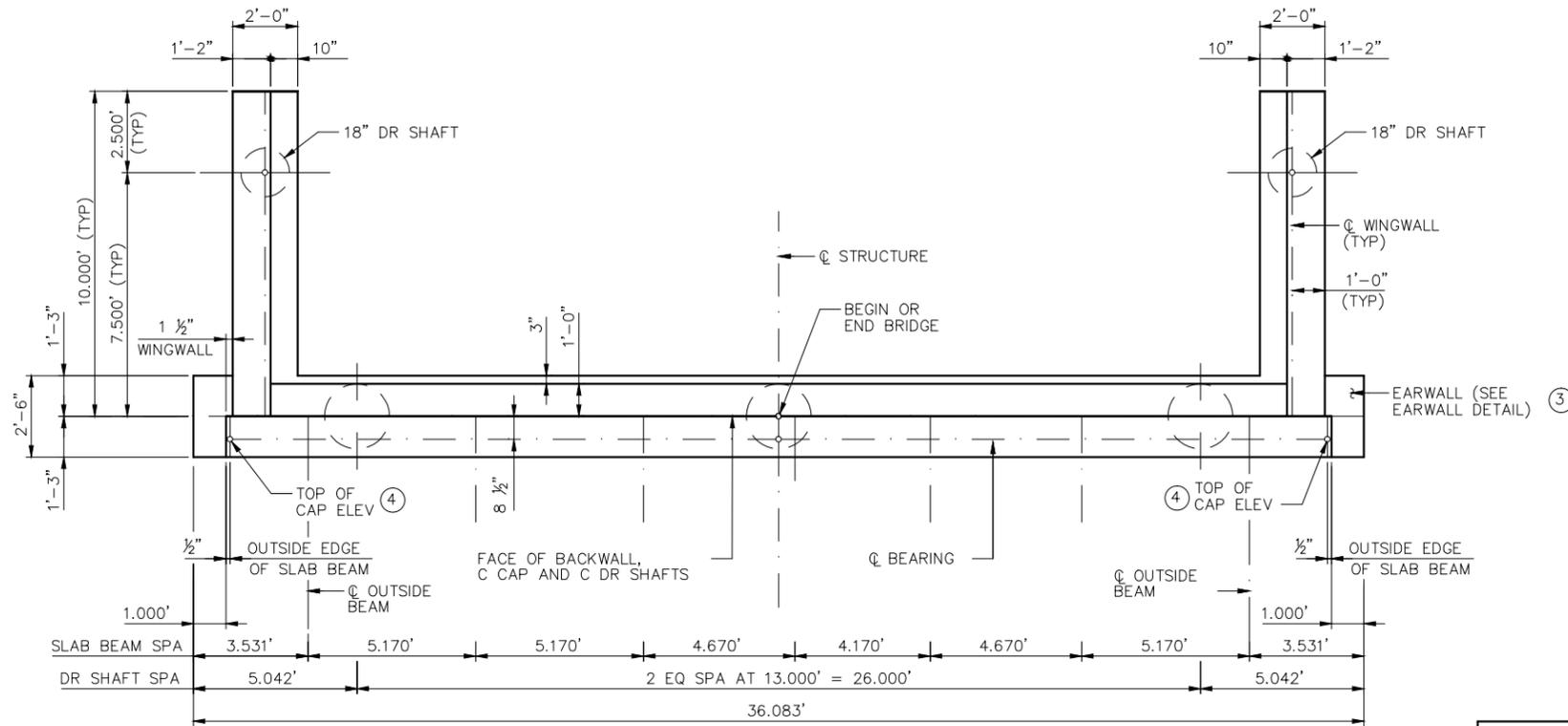
SEAL NOTE

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

HL93 LOADING

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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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) 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.

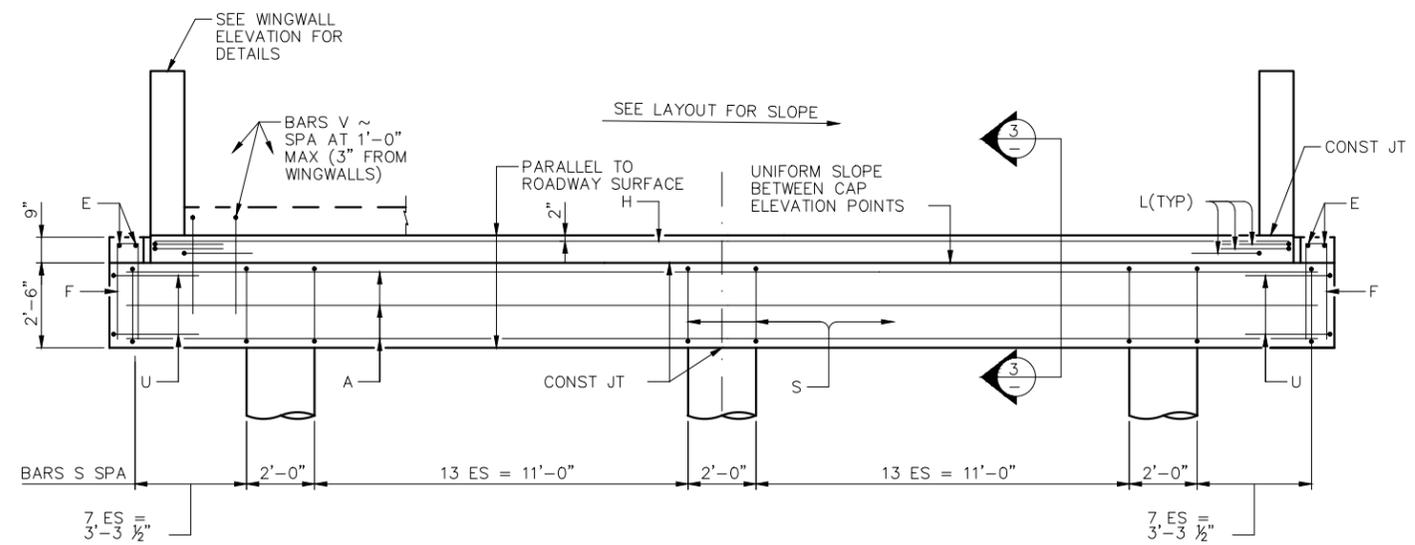
TOP OF CAP ELEVATIONS (5)	
WORKING POINT	ELEVATION

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 SHAFT.



2 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.:
CHK'D BY:	FILE NAME:	SLAB BEAM-DR SHAFT	FILE NO.:
SCALE:	FILE NO.:	HALF BOULEVARD, 0° SKEW	FILE NO.:
DATE:	APPROVED BY:	(1 OF 2)	SHT NO. 62

NOTES TO DESIGN ENGINEER:

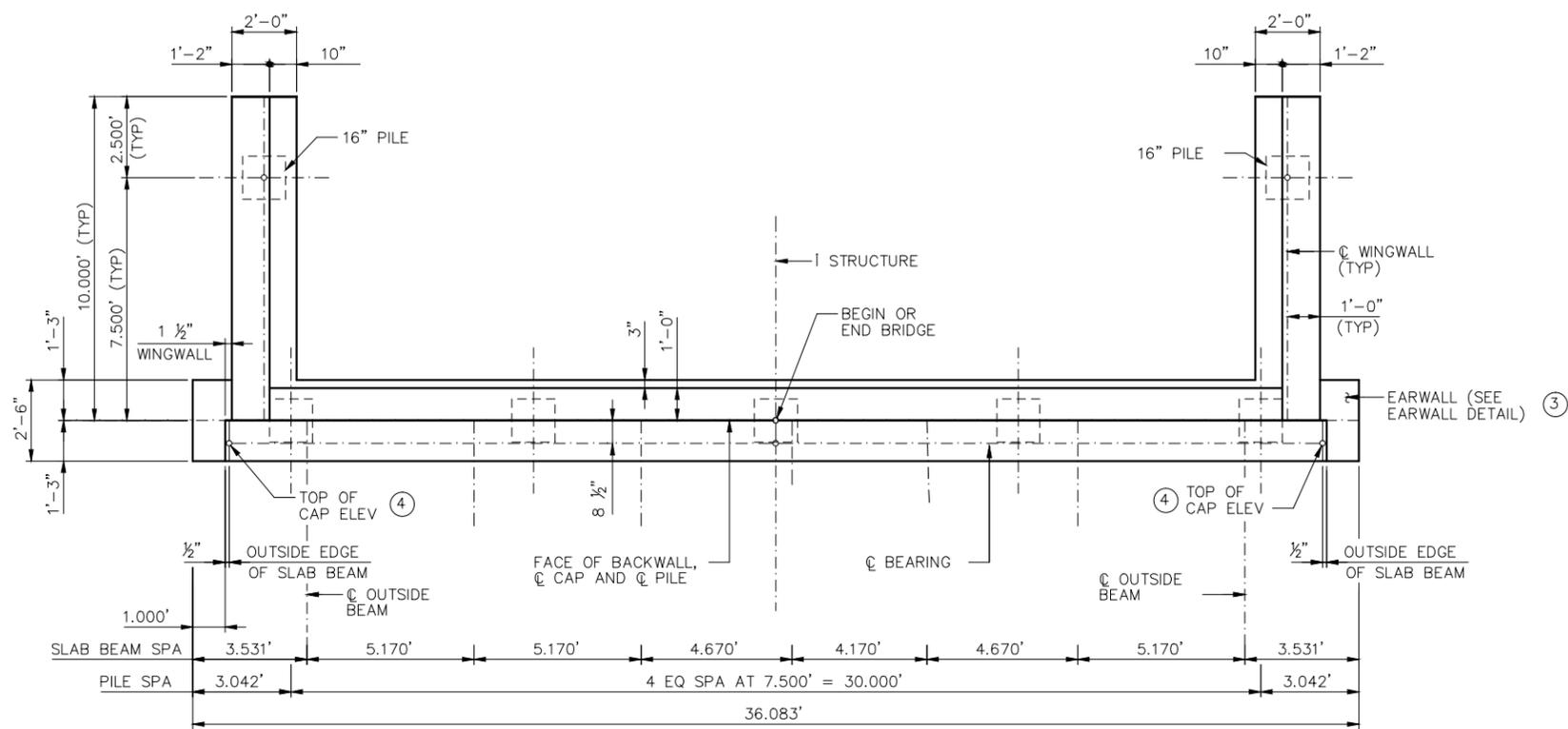
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1 PLAN

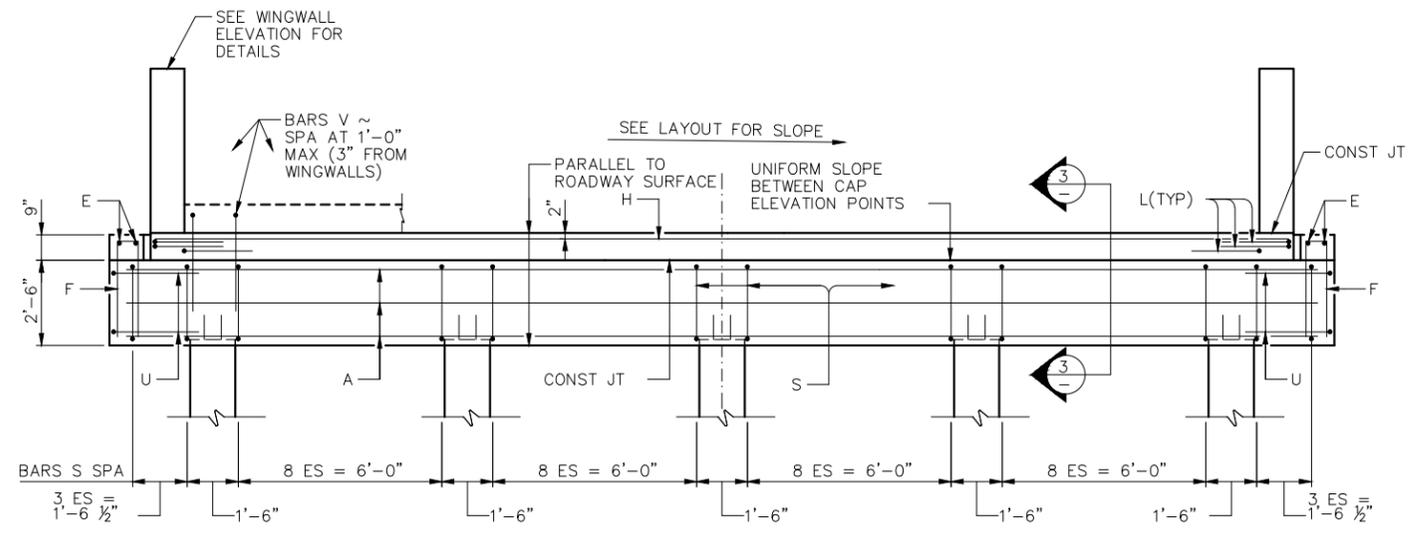
- ① INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE.
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7. MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER PILE.



2 ELEVATION

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

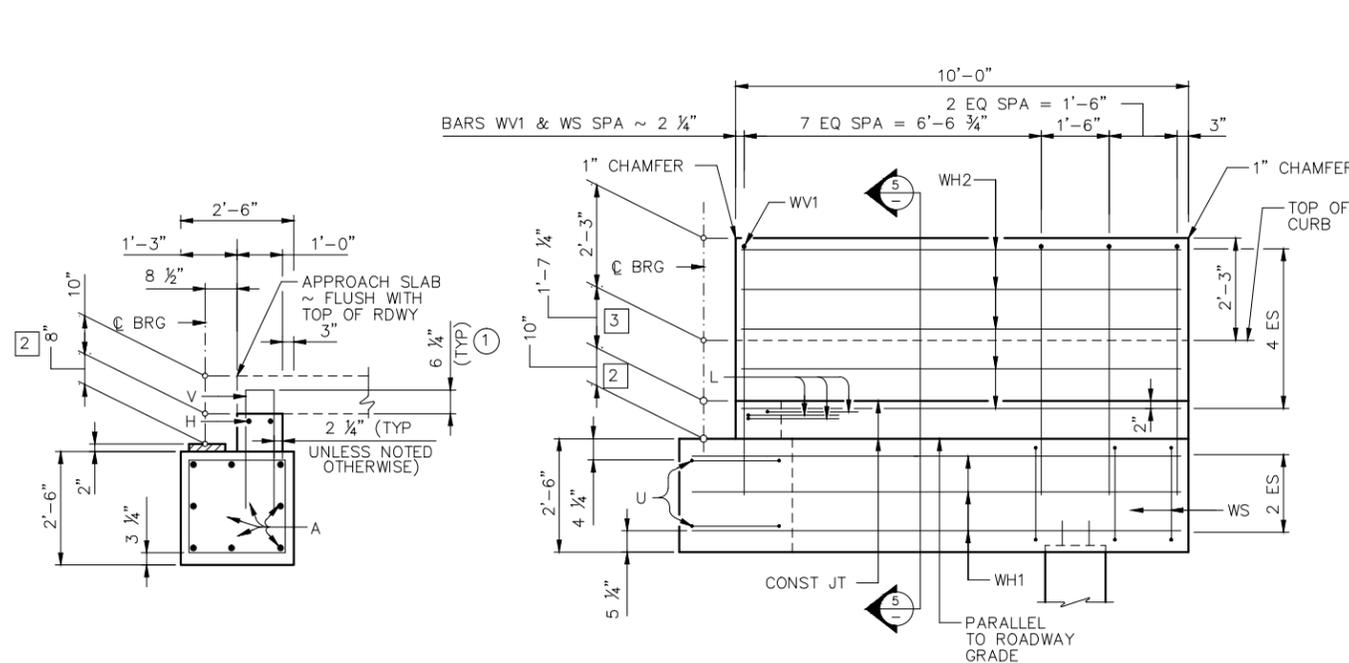


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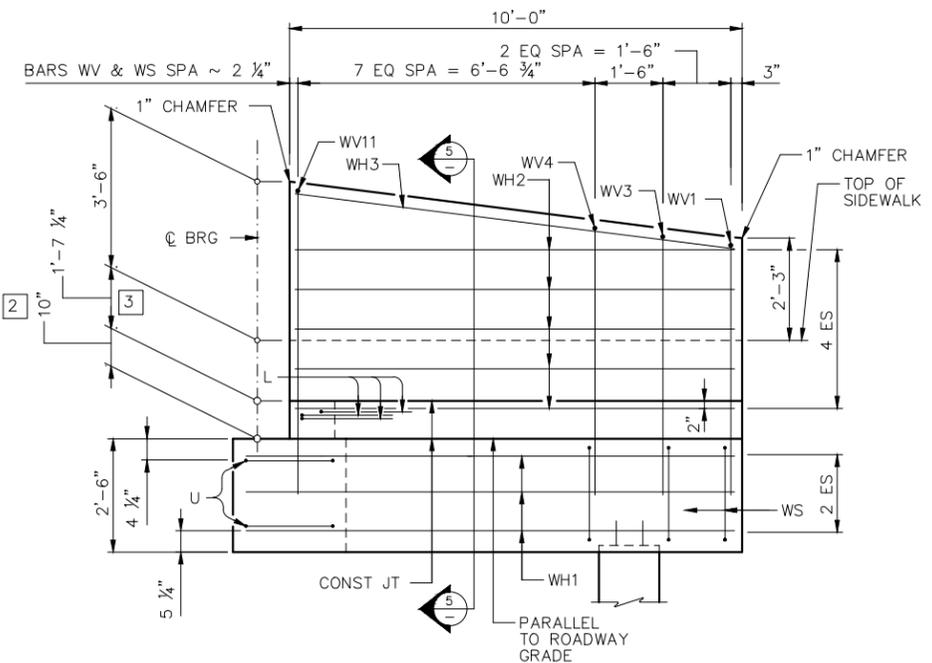
SEAL
NOTE

PROJECT TITLE		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO.:
	DESIGN GUIDELINES-ABUTMENT	
	SLAB BEAM-PILE	
	HALF BOULEVARD, 0° SKEW	
DATE:	APPROVED BY:	SHT NO.:
		64

HL93 LOADING



3 SECTION 1



TYPE 2 - COMBINATION RAIL SIDE

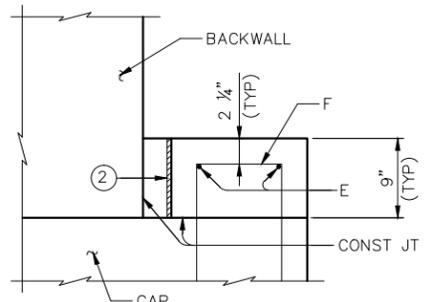
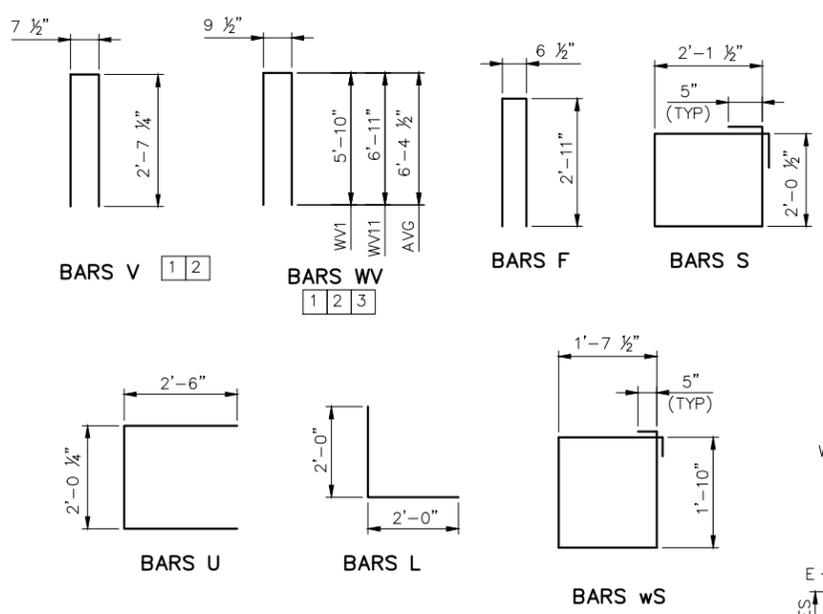
BILL OF REINFORCING STEEL 1

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 1

REINFORCING STEEL	LB	3,152
CLASS B1 CONCRETE	CY	17.5

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

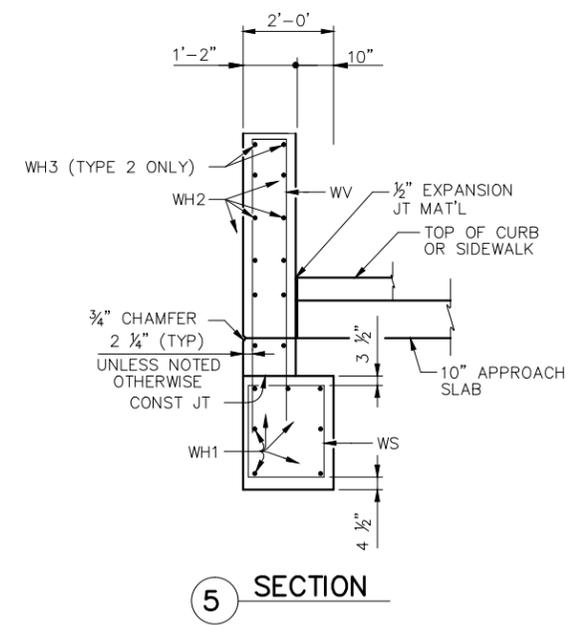


6 EARWALL DETAIL 3
(SLOPE TOP OF EARWALL AWAY FROM BEAMS)

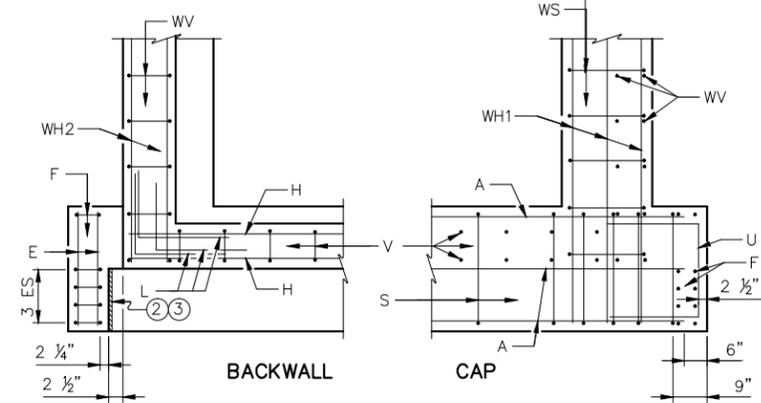
- 1 INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE. 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
- 2 DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.

NOTES TO ENGINEER

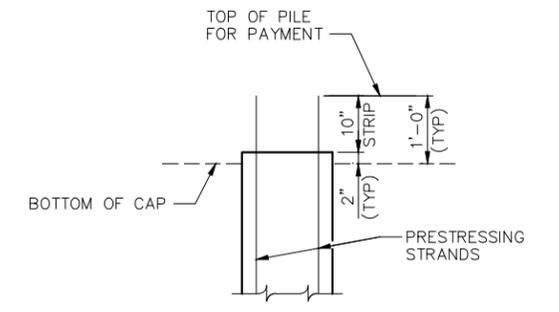
- 1 GUIDELINE DRAWINGS ARE FOR B12 BEAMS. ADJUST DIMENSIONS AND QUANTITIES ACCORDING TO SPECIFIC BEAMS.
- 2 THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB AND THE EFFECT OF VERTICAL CURVE.
- 3 THE ENGINEER SHALL DETERMINE WINGWALL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



5 SECTION



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			
DRAWN BY:	SHEET DESCRIPTION:	JOB NO.:	
CHKD BY:	DESIGN GUIDELINES-ABUTMENT	FILE NAME:	
SCALE:	SLAB BEAM-PILE	FILE NO.:	
DATE:	HALF BOULEVARD, 0° SKEW	SHT NO.:	
	(2 OF 2)	65	

HL93 LOADING

NOTES TO DESIGN ENGINEER:

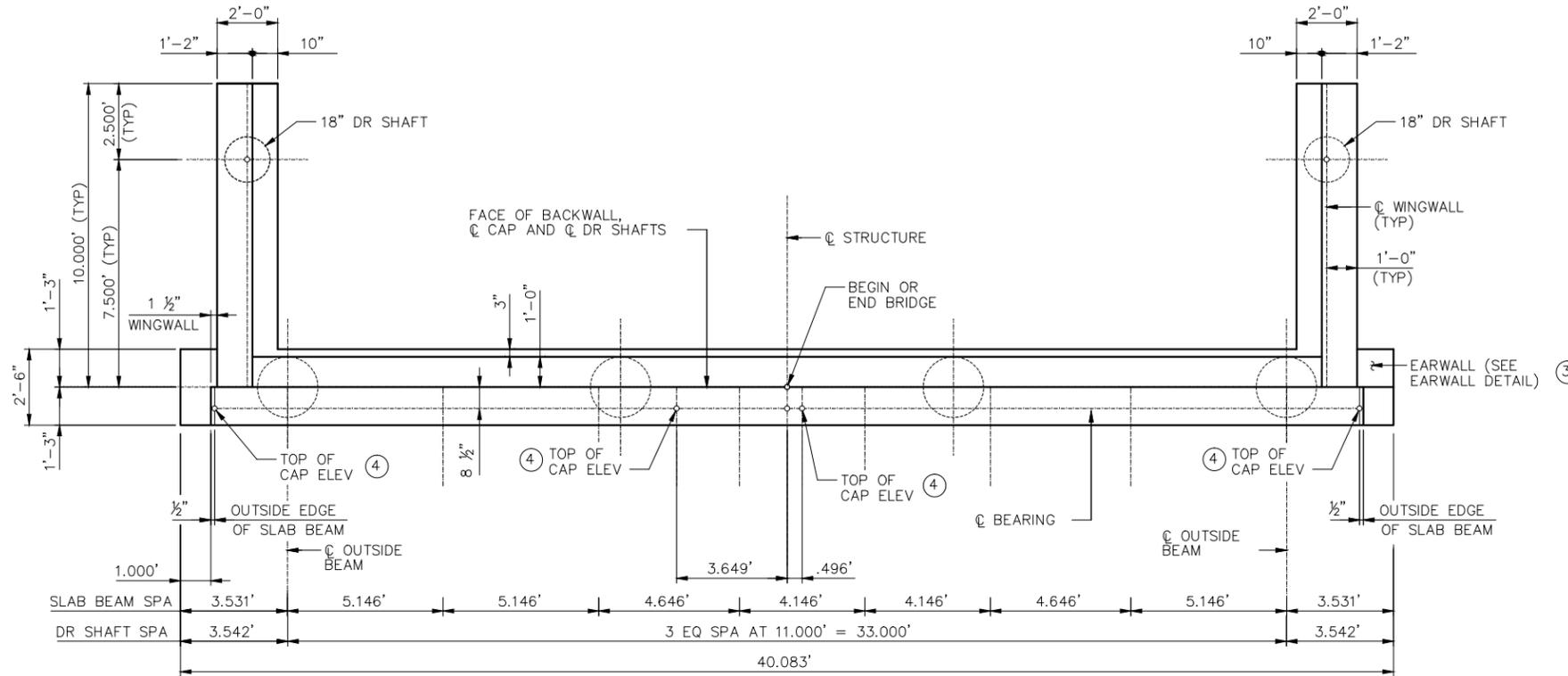
A. THESE DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF HARRIS COUNTY BRIDGES. THEIR INTENDED USE IS TO BE A FRAMEWORK FOR THE DESIGN ENGINEER TO DEVELOP SPECIFIC DESIGNS.

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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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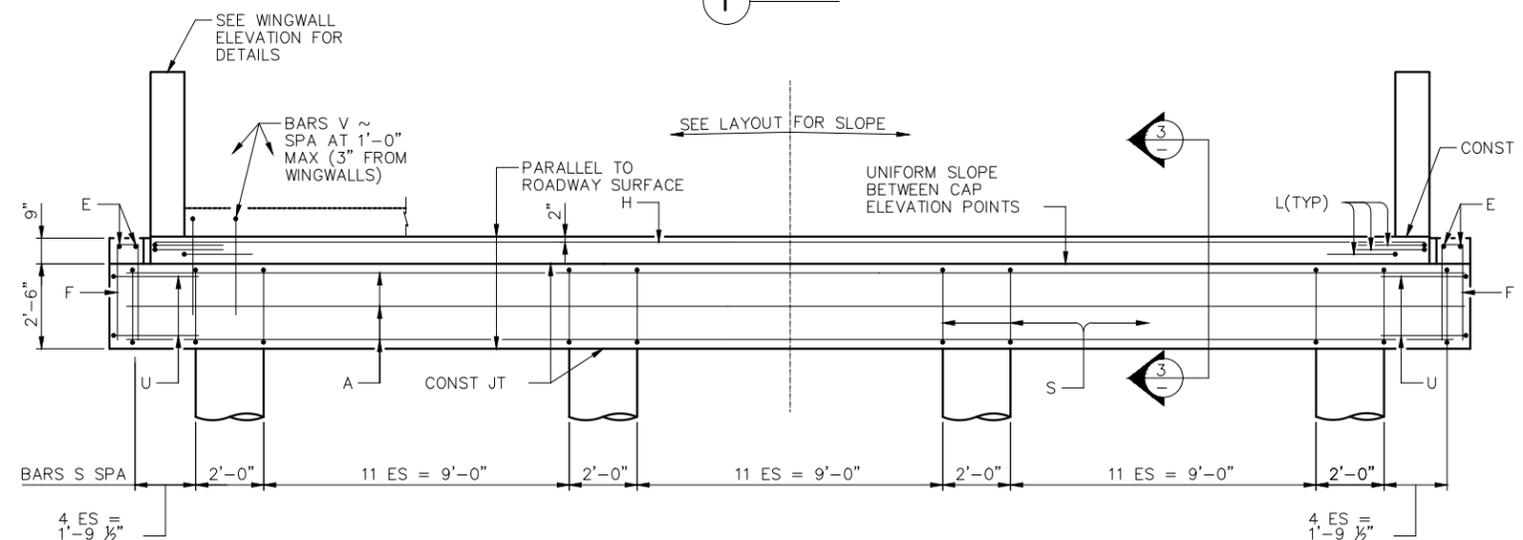


1 PLAN

- 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 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.



2 ELEVATION

TOP OF CAP ELEVATIONS ⑤	
WORKING POINT	ELEVATION

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.

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

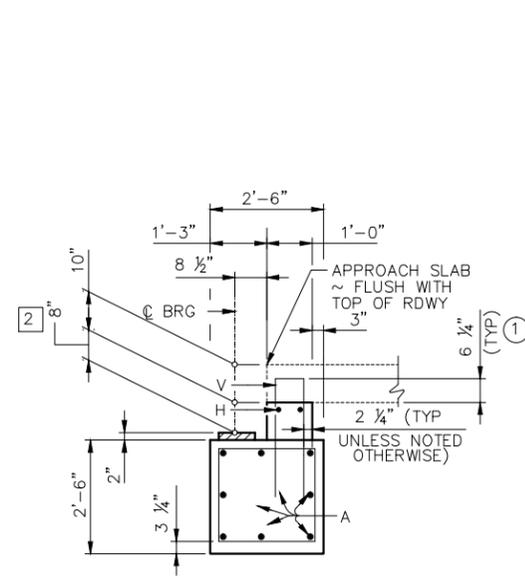
HARRIS COUNTY
ENGINEERING DEPARTMENT



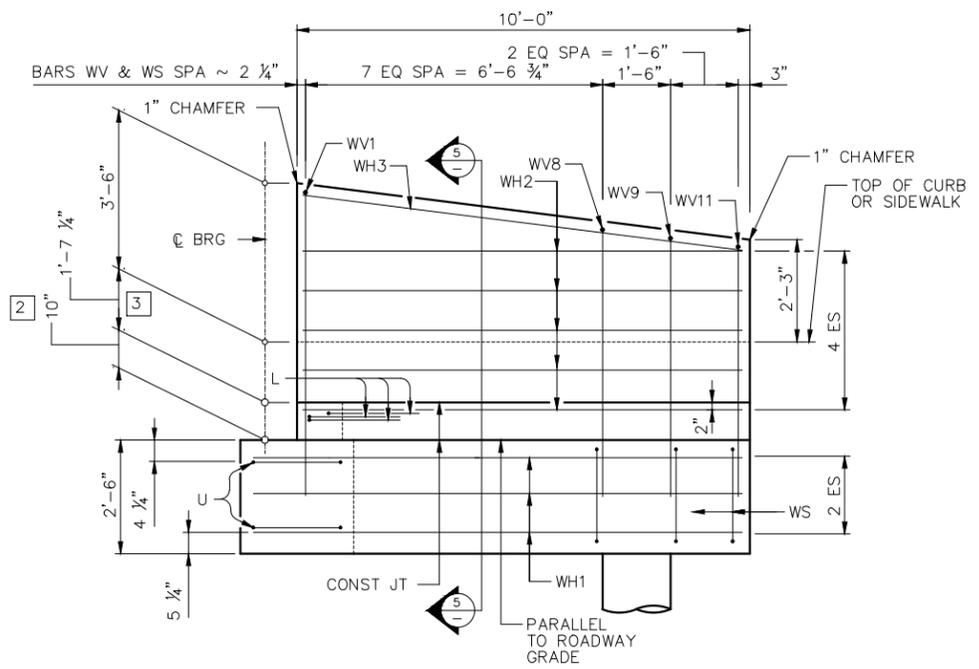
PROJECT TITLE		FILE NO.
DRAWN BY:	SHEET DESCRIPTION:	FILE NO.
	DESIGN GUIDELINES-ABUTMENT	
	SLAB BEAM-DR SHAFTS	
	TWO-WAY ROAD, 0° SKEW	
DATE:	APPROVED BY:	SHT NO. 66
		(1 OF 2)

HL93 LOADING

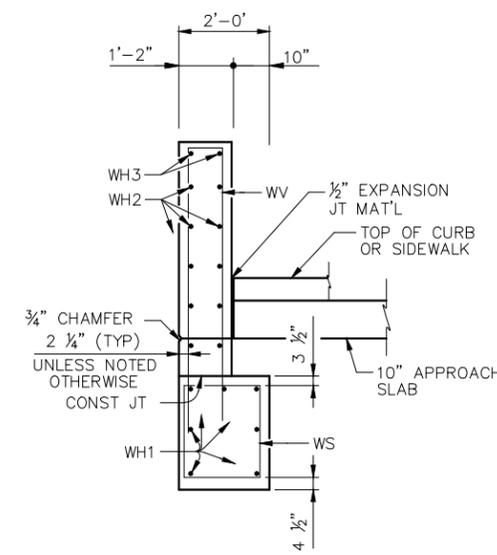
BILL OF REINFORCING STEEL ¹				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	8	# 11	39'-1"	1,661
E	4	# 4	2'-2"	6
F	10	# 4	6'-5"	43
H	2	# 6	37'-8"	113
L	6	# 6	4'-0"	36
S	46	# 4	9'-2"	282
U	4	# 6	7'-0"	42
V	37	# 5	5'-10"	225
WH1	14	# 6	11'-0"	231
WH2	20	# 6	9'-8"	290
WH3	4	# 6	9'-9"	59
WS	22	# 4	7'-9"	114
WV (AVG)	22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



3 SECTION ¹



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

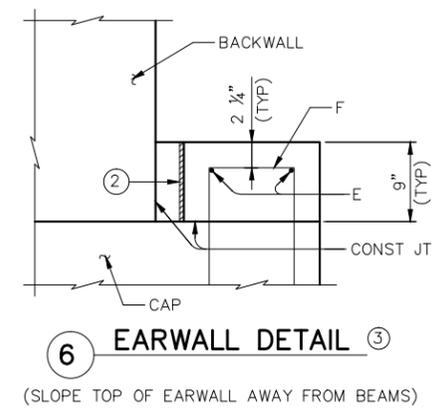
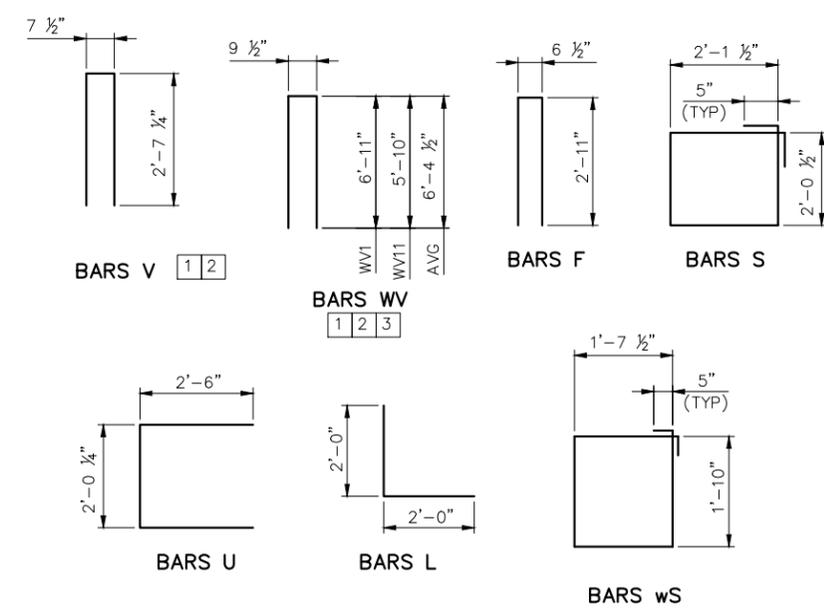


5 SECTION

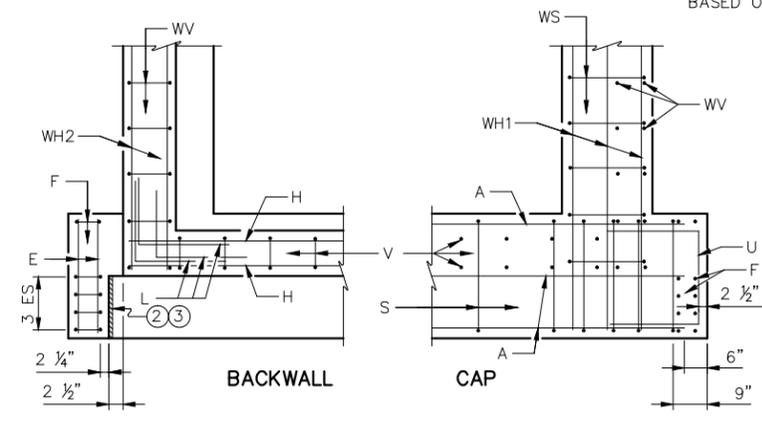
- ① INCREASE AS REQUIRED TO MAINTAIN 3 3/4" FROM FINISHED GRADE. 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM.
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NOTES TO ENGINEER

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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



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

HL93 LOADING

NOTES TO DESIGN ENGINEER:

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- ⑤ WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

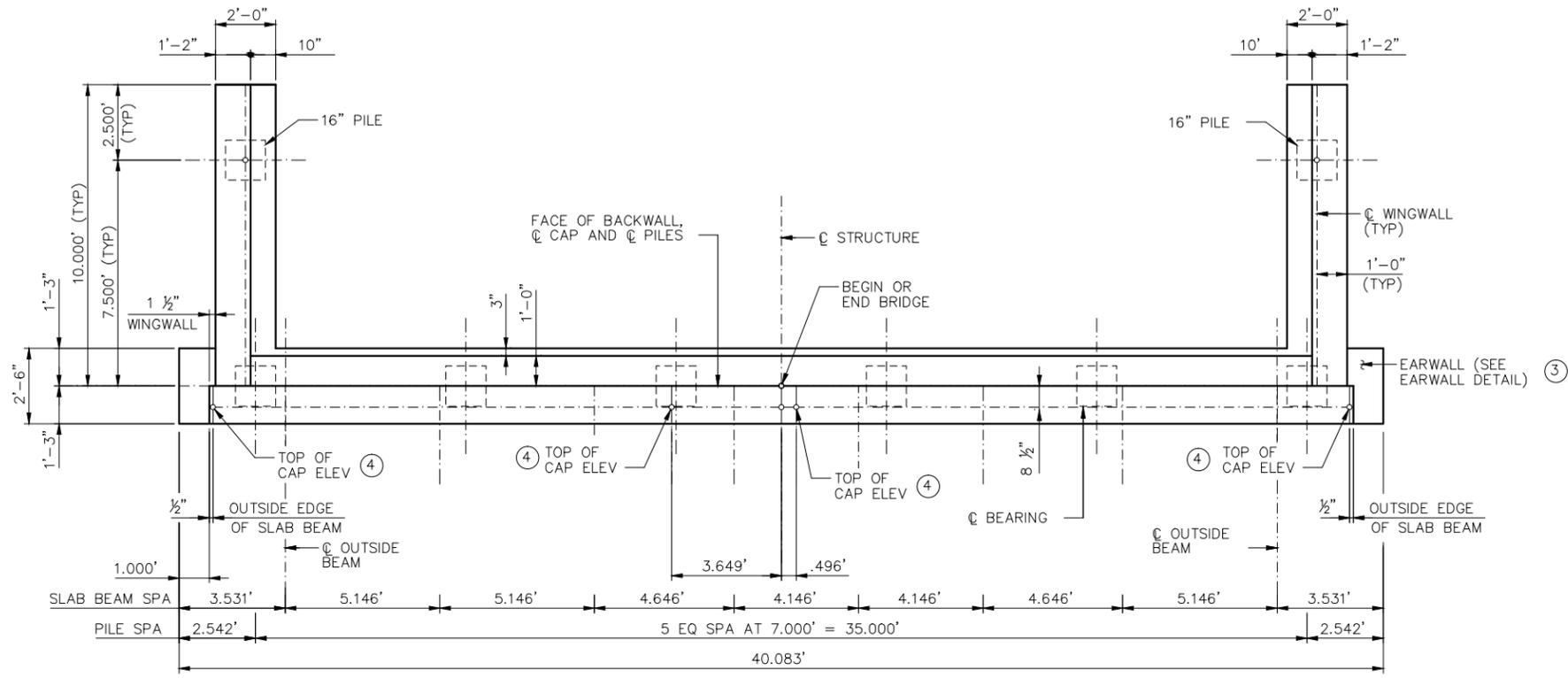
NOTES TO ENGINEER

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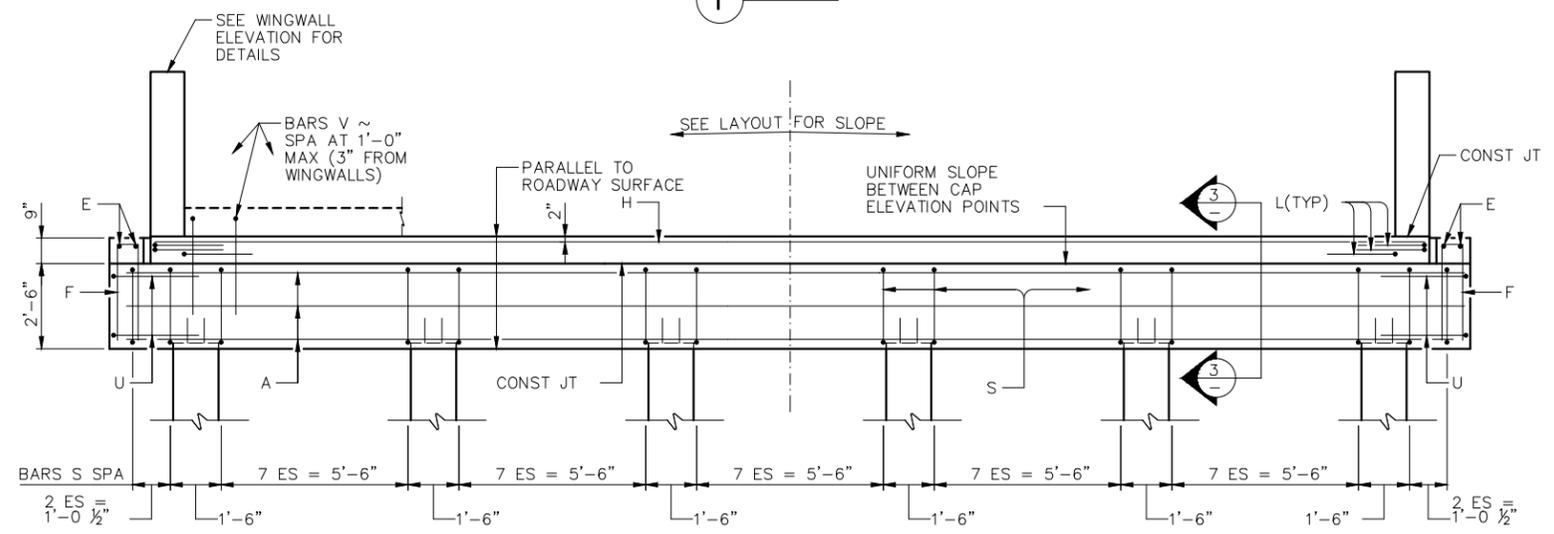
ABUTMENT NOTES

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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.

TOP OF CAP ELEVATIONS ⑤	
WORKING POINT	ELEVATION



① PLAN



② 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

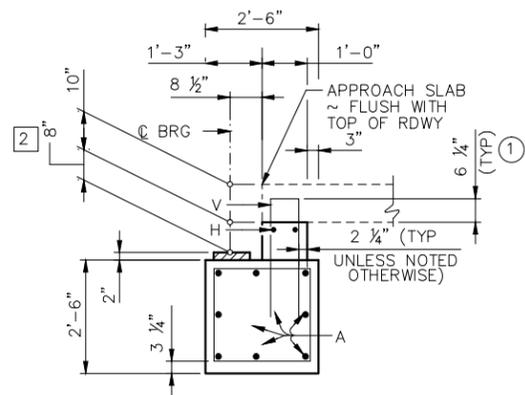


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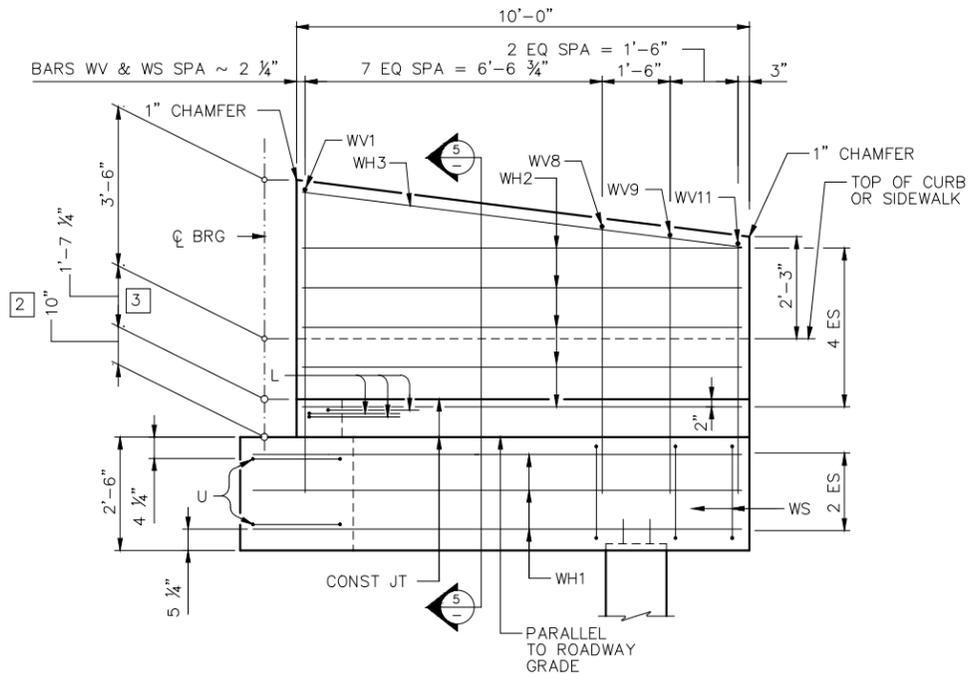
SEAL
NOTE

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

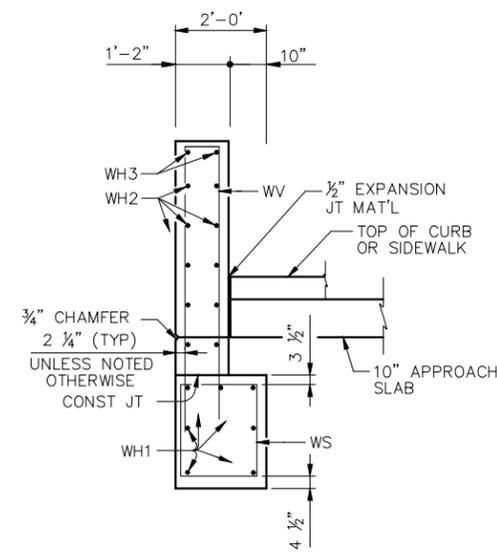
HL93 LOADING



3 SECTION 1



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



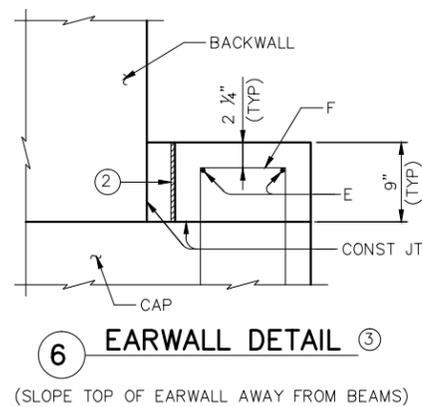
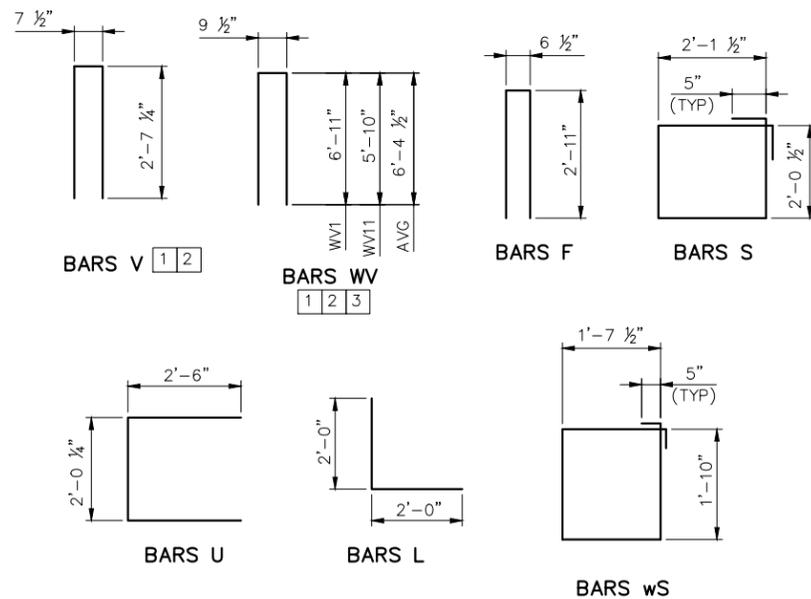
5 SECTION

BILL OF REINFORCING STEEL 1				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	8	# 11	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"	311
REINFORCING STEEL			LB	3,414
ESTIMATED QUANTITIES 1				
REINFORCING STEEL			LB	3,414
CLASS B1 CONCRETE			CY	18.8

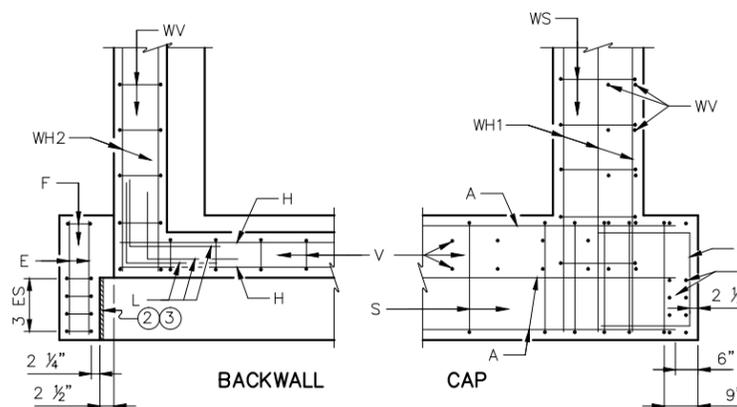
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NOTES TO ENGINEER

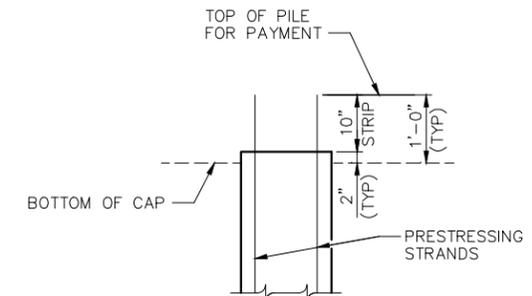
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6 EARWALL DETAIL 3
(SLOPE TOP OF EARWALL AWAY FROM BEAMS)



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

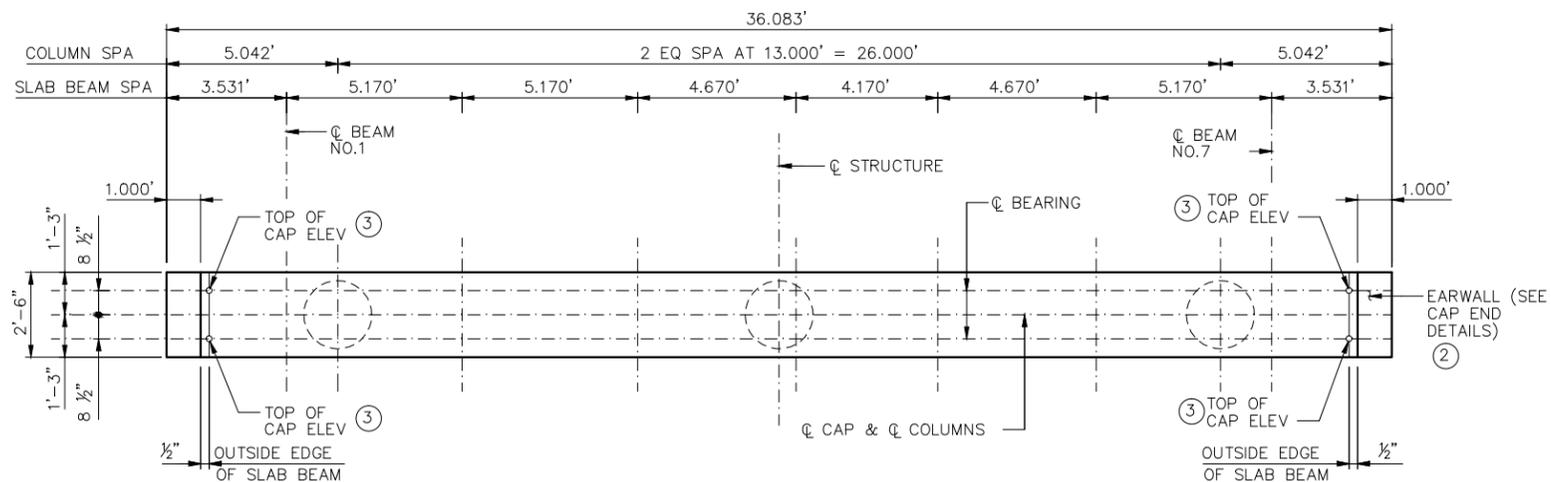


FIRM INFO

SEAL
NOTE

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

HL93 LOADING



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

- NOTES TO DESIGN ENGINEER:
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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.
- 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
- WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

TOP OF CAP ELEVATIONS (5)

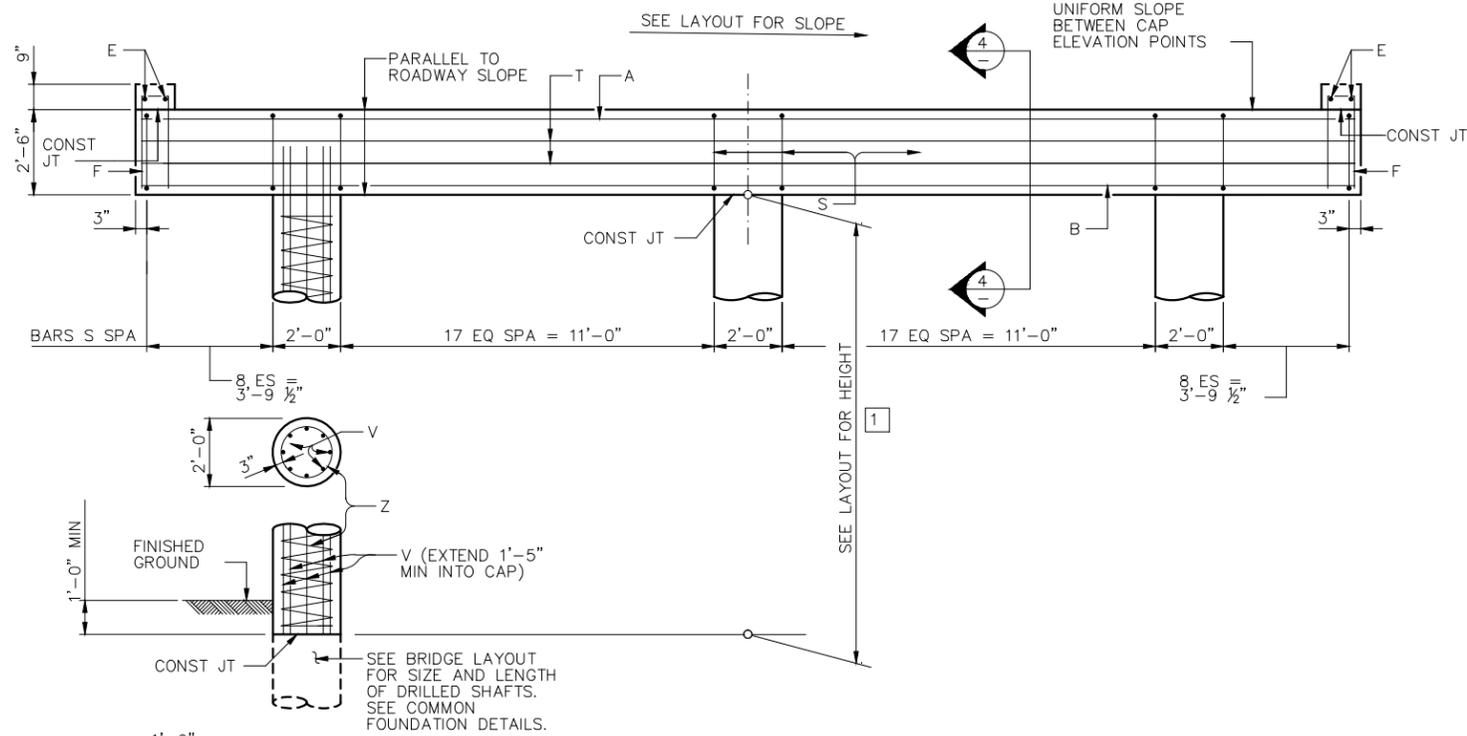
WORKING POINT	ELEVATION

INTERIOR BENT NOTES

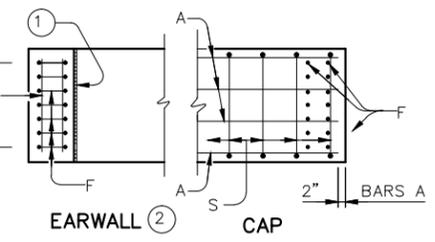
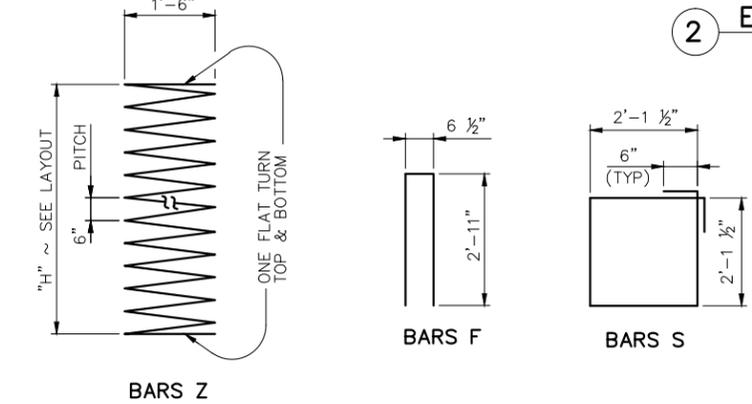
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- MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER SHAFT.

NOTES TO ENGINEER

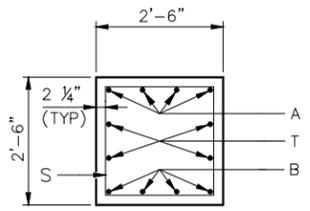
1 QUANTITIES SHOWN ARE BASED ON AN "H" DIMENSION OF 20'.



2 ELEVATION



3 CAP END DETAILS



4 BENT CAP SECTION

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

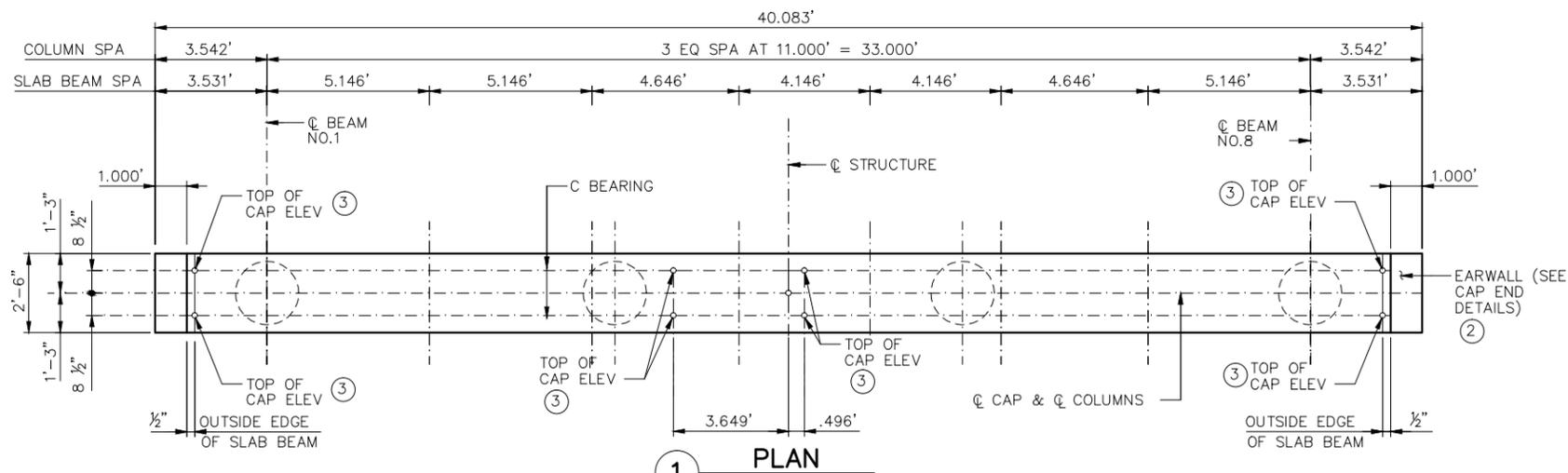


FIRM INFO

SEAL
NOTE

PROJECT TITLE		JOB NO.
DRAWN BY:	DESIGN GUIDELINES-BENT	
CHK'D BY:	SLAB BEAMS-DR SHAFTS	FILE NAME:
SCALE:	HALF BOULEVARD, 0° SKEW	FILE NO.:
DATE:	APPROVED BY:	SHT NO.:

HL93 LOADING



1 PLAN

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

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.

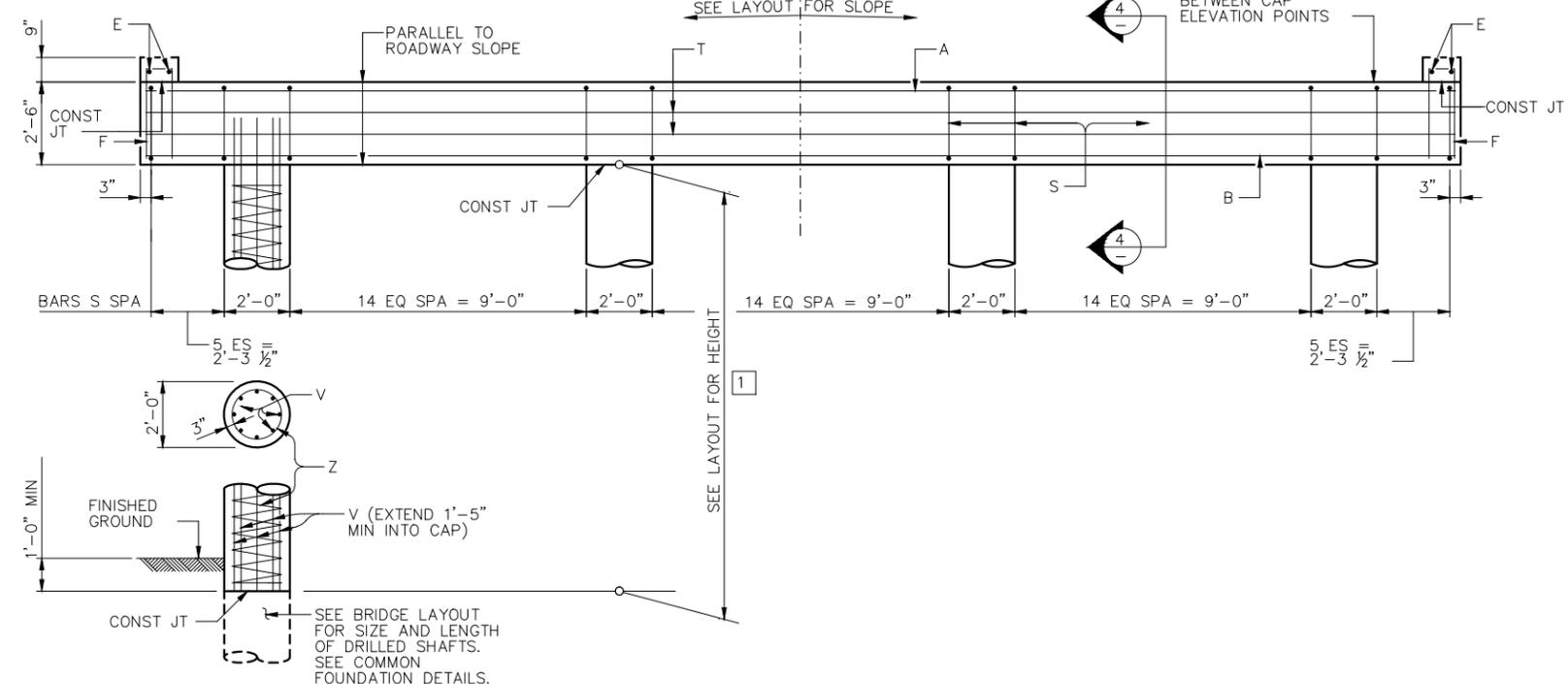
IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC PROJECT REQUIREMENTS.

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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.

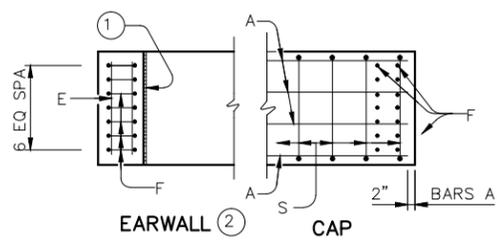
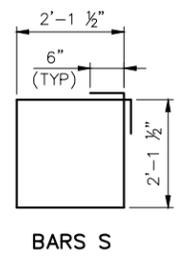
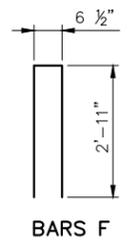
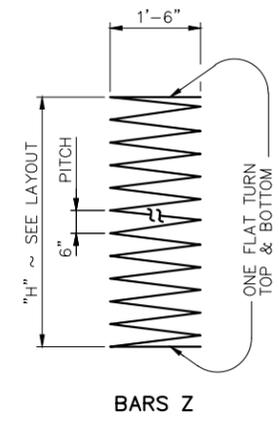
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- ② DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- ③ TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- ④ FOR EACH LINEAR FOOT VARIATION IN "H" VALUE MAKE FOLLOWING ADJUSTMENTS:
 BARS V: 1'-0"
 BARS 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.



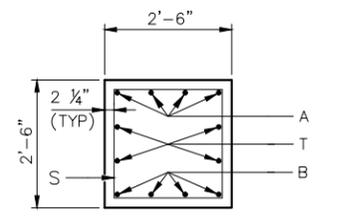
2 ELEVATION

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.
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 - ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
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 - SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
 - MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER SHAFT.



3 CAP END DETAILS



4 BENT CAP SECTION

NOTES TO ENGINEER

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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

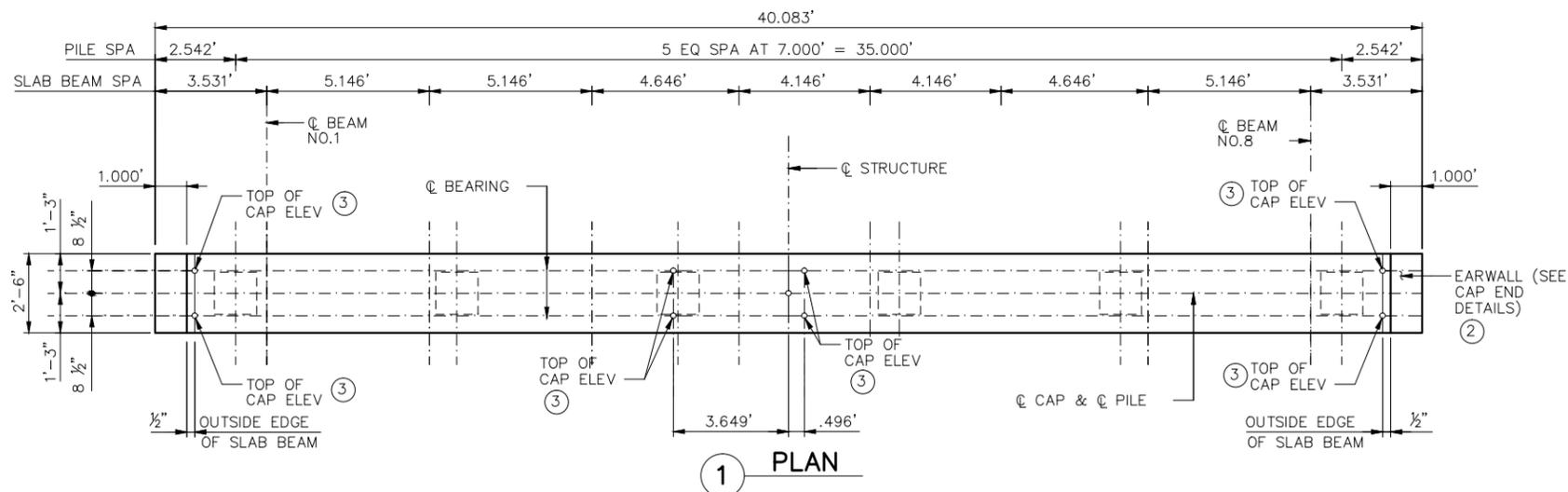


FIRM INFO

SEAL
NOTE

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

HL93 LOADING



1 PLAN

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

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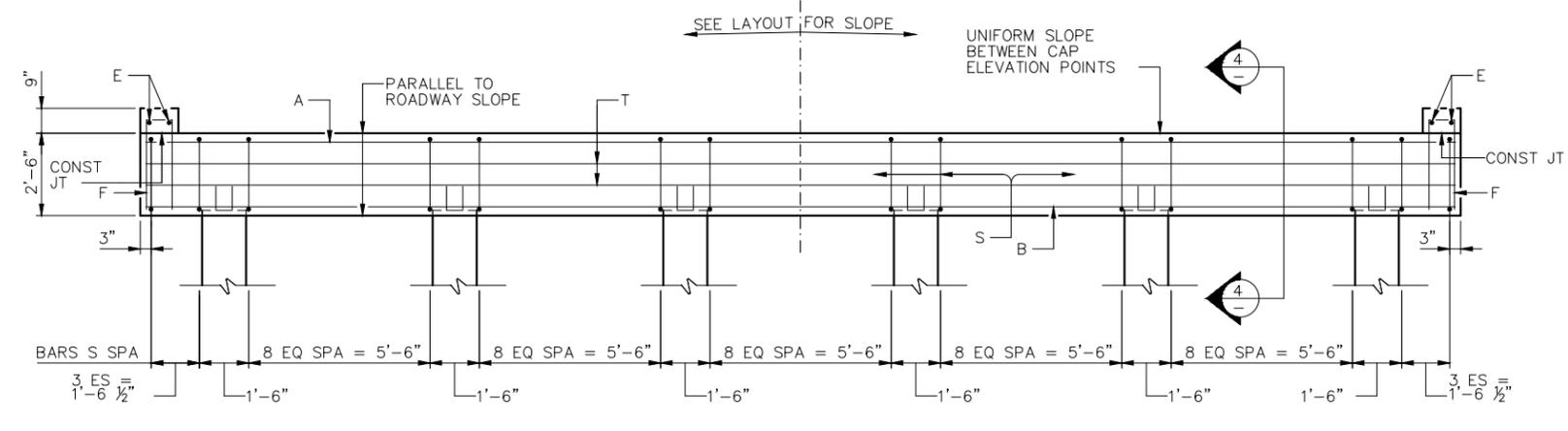
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TOP OF CAP ELEVATIONS	
WORKING POINT	ELEVATION

- 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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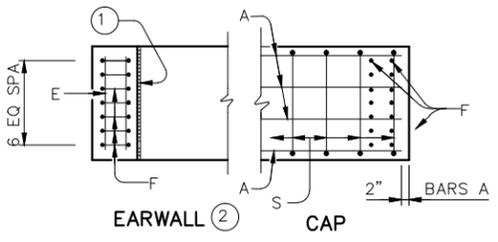
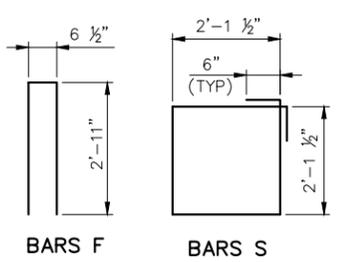
2 ELEVATION 1

INTERIOR BENT NOTES

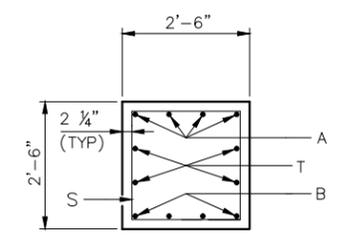
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6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
7. MAXIMUM CALCULATED FOUNDATION LOADS: X TONS PER PILE.

NOTES TO ENGINEER

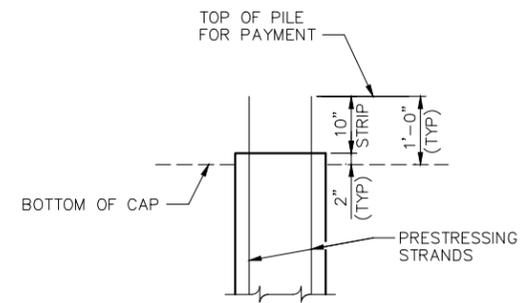
- 1 EXPOSED PILE HEIGHT SHALL NOT EXCEED 16' FOR 16" PILING, AND 20' FOR 18" PILING.



3 CAP END DETAILS



4 BENT CAP SECTION



5 PILING EMBEDMENT DETAIL

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

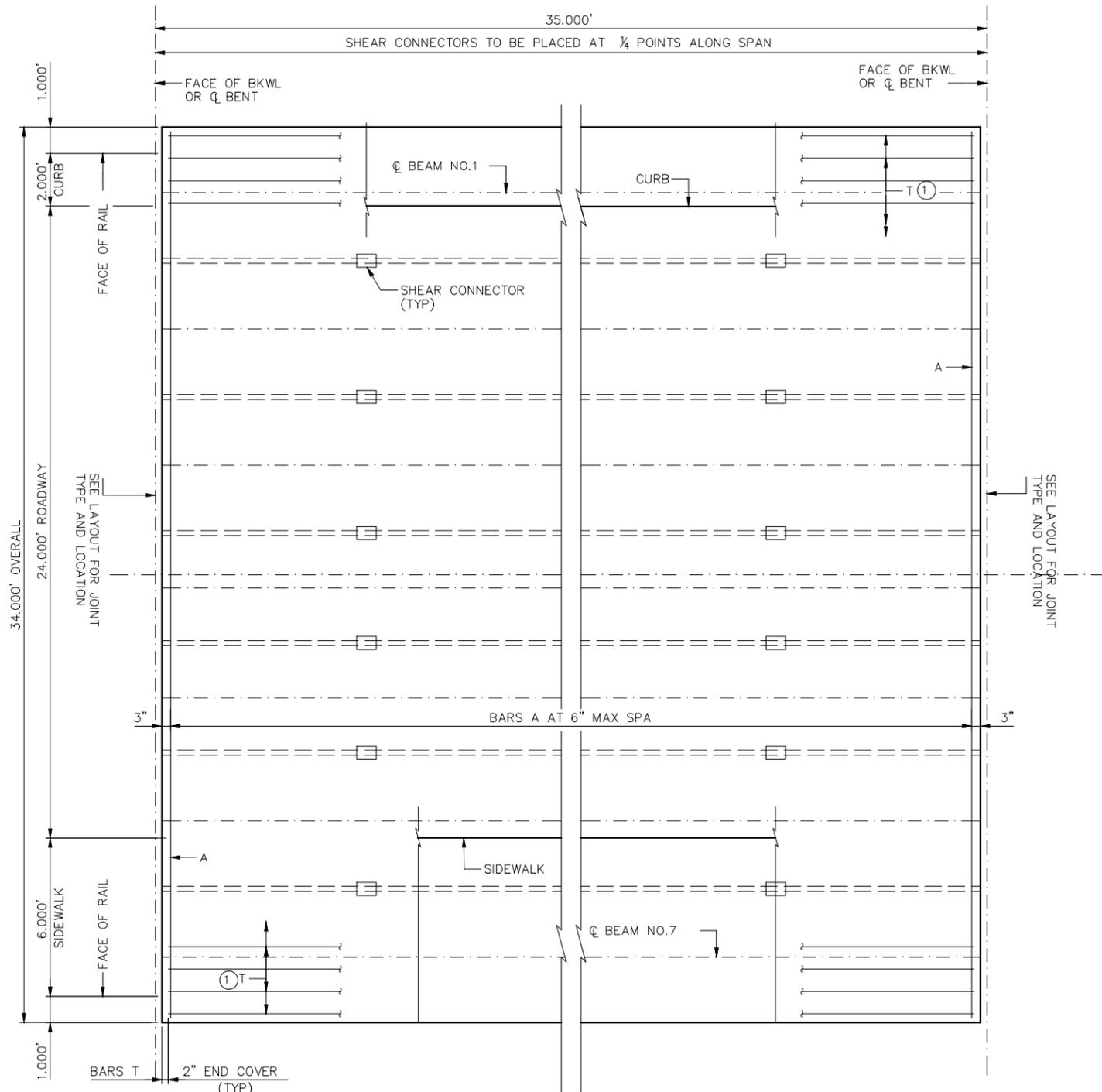
HARRIS COUNTY
ENGINEERING DEPARTMENT



FIRM INFO

SEAL
NOTE

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



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

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5. THE QUANTITIES GIVEN FOR REINFORCING STEEL AND CONCRETE ARE PRESENTED FOR CONTRACTORS INFORMATION ONLY.
6. 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

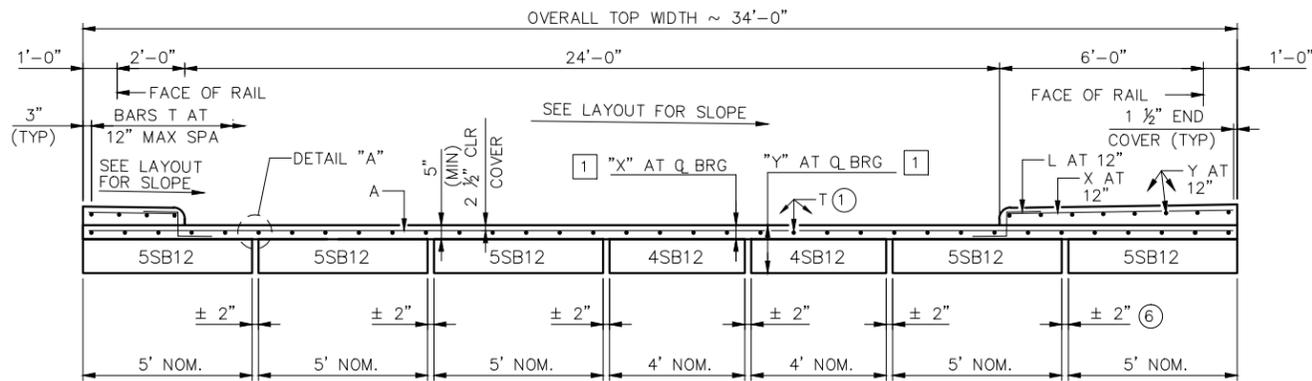


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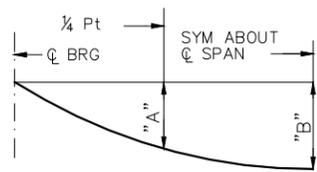
SEAL
NOTE

PROJECT TITLE		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO.:
	DESIGN GUIDELINES	
	SPAN DETAILS-SLAB BEAMS	FILE NAME:
	HALF BOULEVARD, 0'SKEW	FILE NO.:
DATE:	APPROVED BY:	SHT NO.:
		74

HL93 LOADING



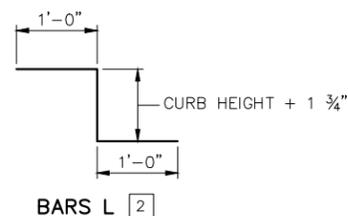
TYPICAL TRANSVERSE SECTION



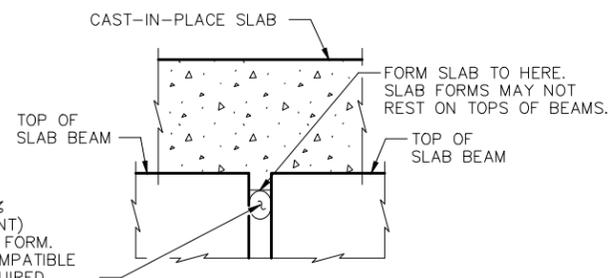
NOTE: DEFLECTIONS SHOWN ARE DUE TO SHEAR KEY AND CONCRETE SLAB ONLY. ($E_c = 5 \times 10^4$ KSI). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DIMENSION MAY BE LESS. DEFLECTIONS MAY BE ADJUSTED BASED ON FIELD OBSERVATION.

TABLE OF VARIABLE VALUES

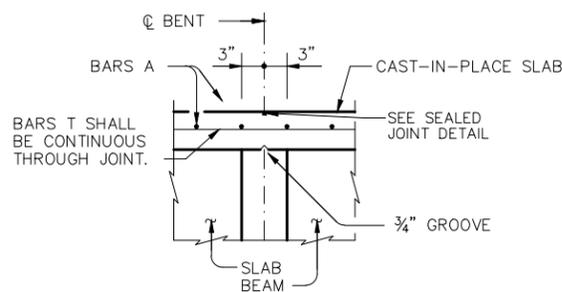
SPAN LENGTH	BEAM TYPE	DEAD LOAD DEFLECTION		SECTION DEPTHS ¹	
		"A"	"B"	"X"	"Y"
FT		FT	FT	IN	FT/IN
50	4SB12			6"	1'-6"
50	5SB12			6"	1'-6"



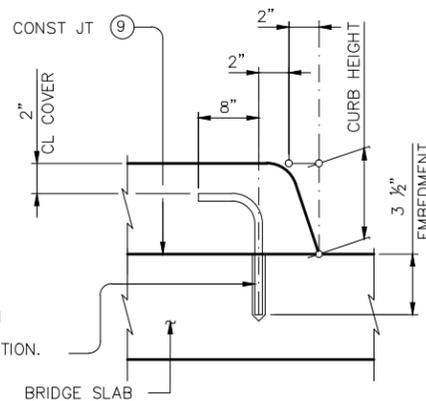
DEAD LOAD DEFLECTION DIAGRAM



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.

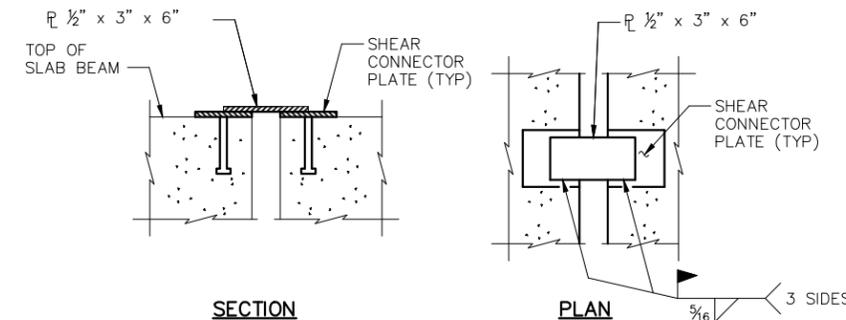
TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	CLASS "A1" CONCRETE (SLAB) ¹	CLASS "A1" CONCRETE (SDWK) ²	CLASS "A1" CONCRETE (CURB) ³	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.

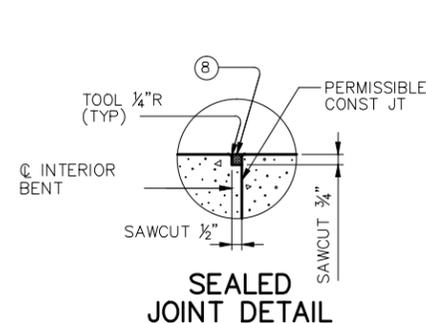


SECTION

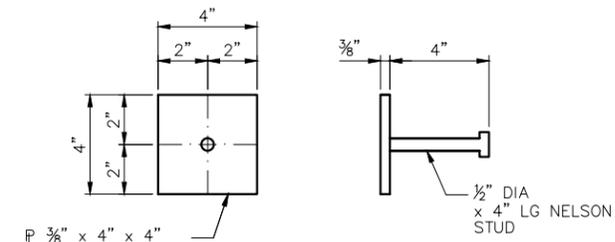
PLAN

SHEAR CONNECTION DETAIL

A36 STEEL



SEALED JOINT DETAIL



SHEAR CONNECTOR PLATE ⁷

A36 STEEL

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

HARRIS COUNTY ENGINEERING DEPARTMENT

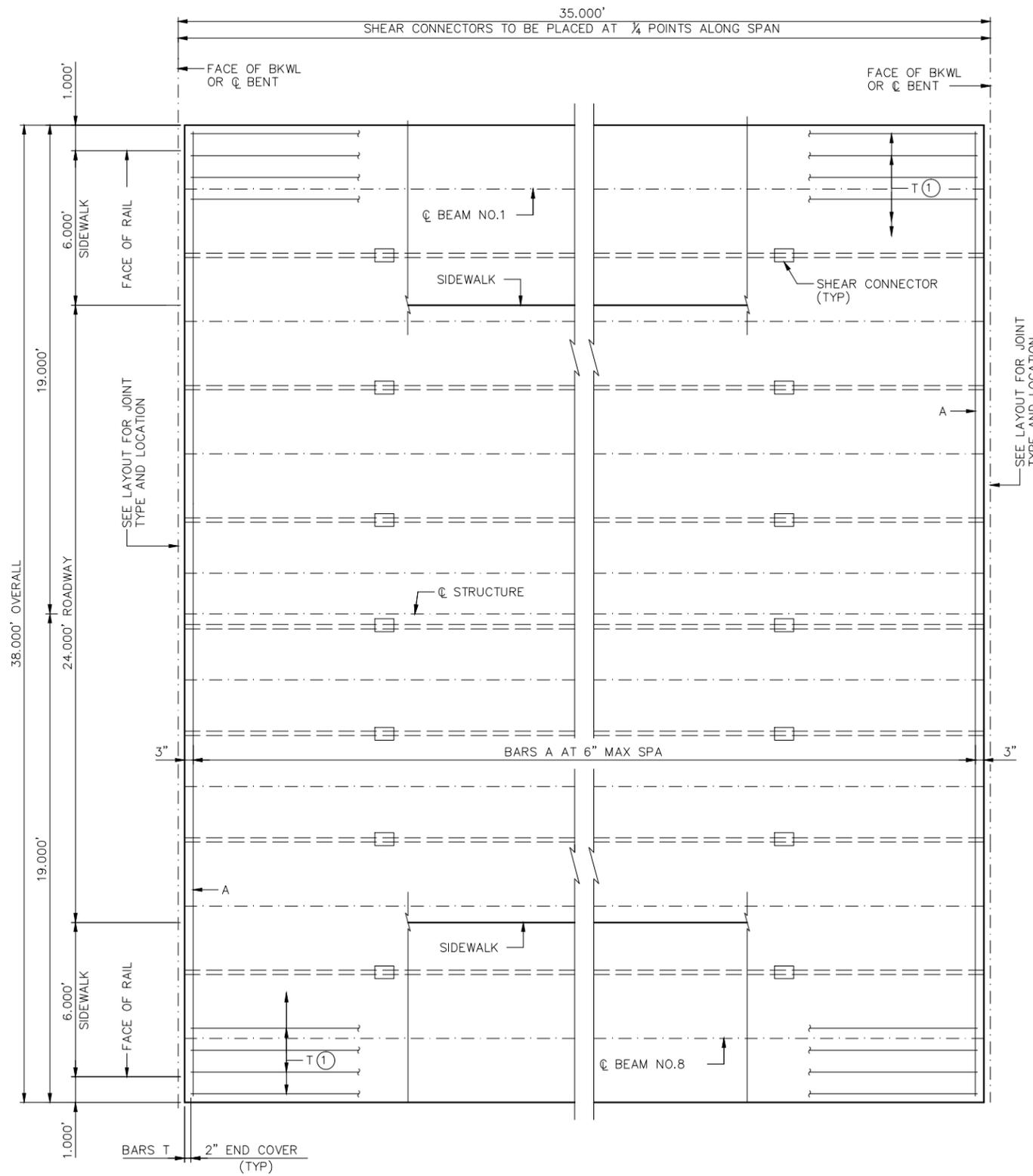


FIRM INFO

SEAL NOTE

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

HL93 LOADING



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

NOTES TO DESIGN ENGINEER:

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 ~ #4 = 1'-5"
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PLAN

HL93 LOADING

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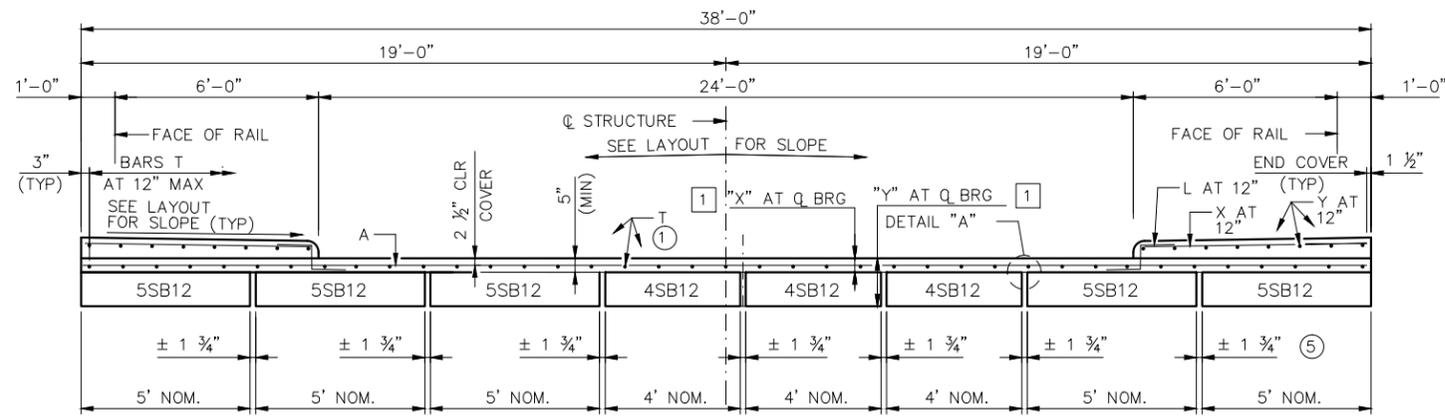
HARRIS COUNTY
ENGINEERING DEPARTMENT



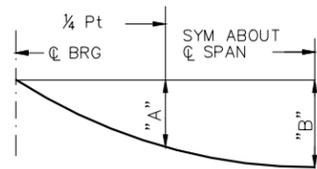
FIRM INFO

SEAL
NOTE

PROJECT TITLE		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO.:
CHK'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



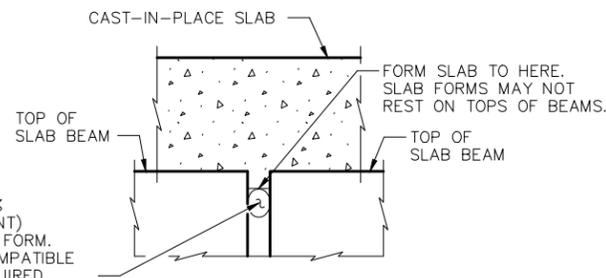
TYPICAL TRANSVERSE SECTION



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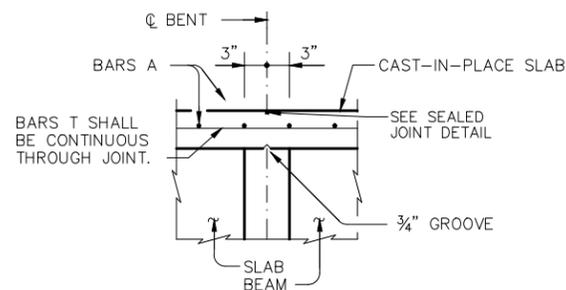
SPAN LENGTH	BEAM TYPE	DEAD LOAD DEFLECTION		SECTION DEPTHS	
		"A"	"B"	"X"	"Y"
FT		FT	FT	IN	FT/IN
50	4SB12			6"	1'-6"
50	5SB12			6"	1'-6"

DEAD LOAD DEFLECTION DIAGRAM

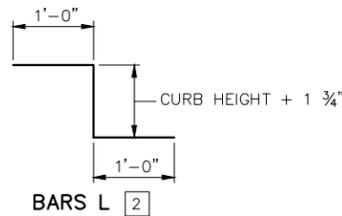


DETAIL "A"

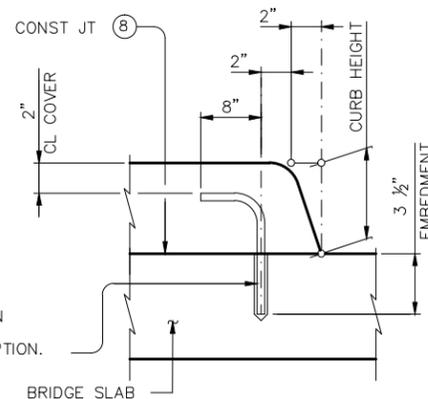
BACKER ROD (25% LARGER THAN JOINT) MAY BE USED AS FORM. SECURE WITH COMPATIBLE ADHESIVE AS REQUIRED



CONTINUOUS SLAB 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.

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

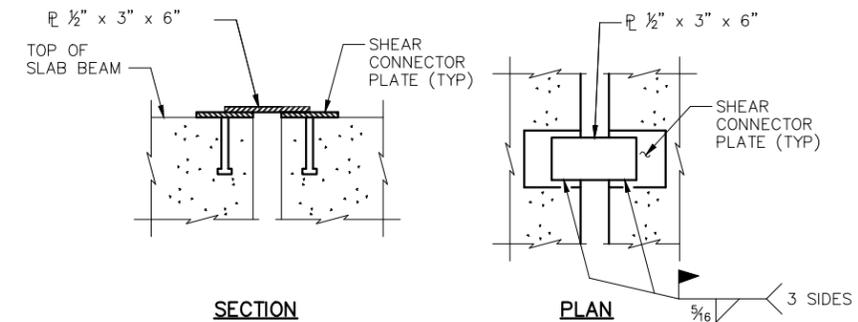
TABLE OF ESTIMATED QUANTITIES

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
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.
- 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.

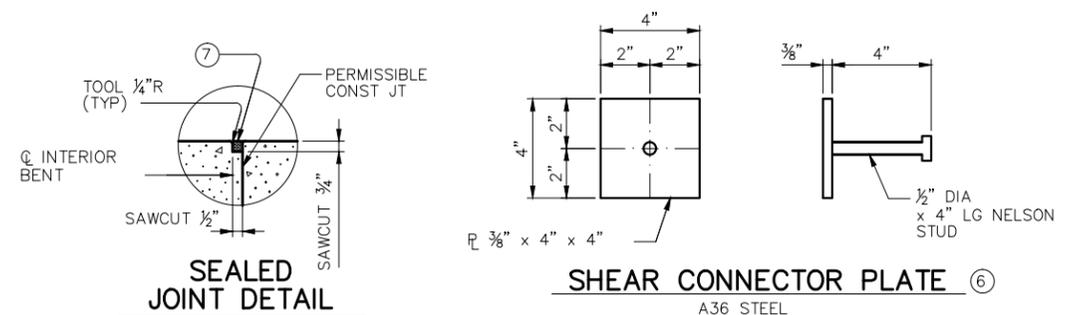


SECTION

PLAN

SHEAR CONNECTION DETAIL

A36 STEEL



SEALED JOINT DETAIL

SHEAR CONNECTOR PLATE

A36 STEEL

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



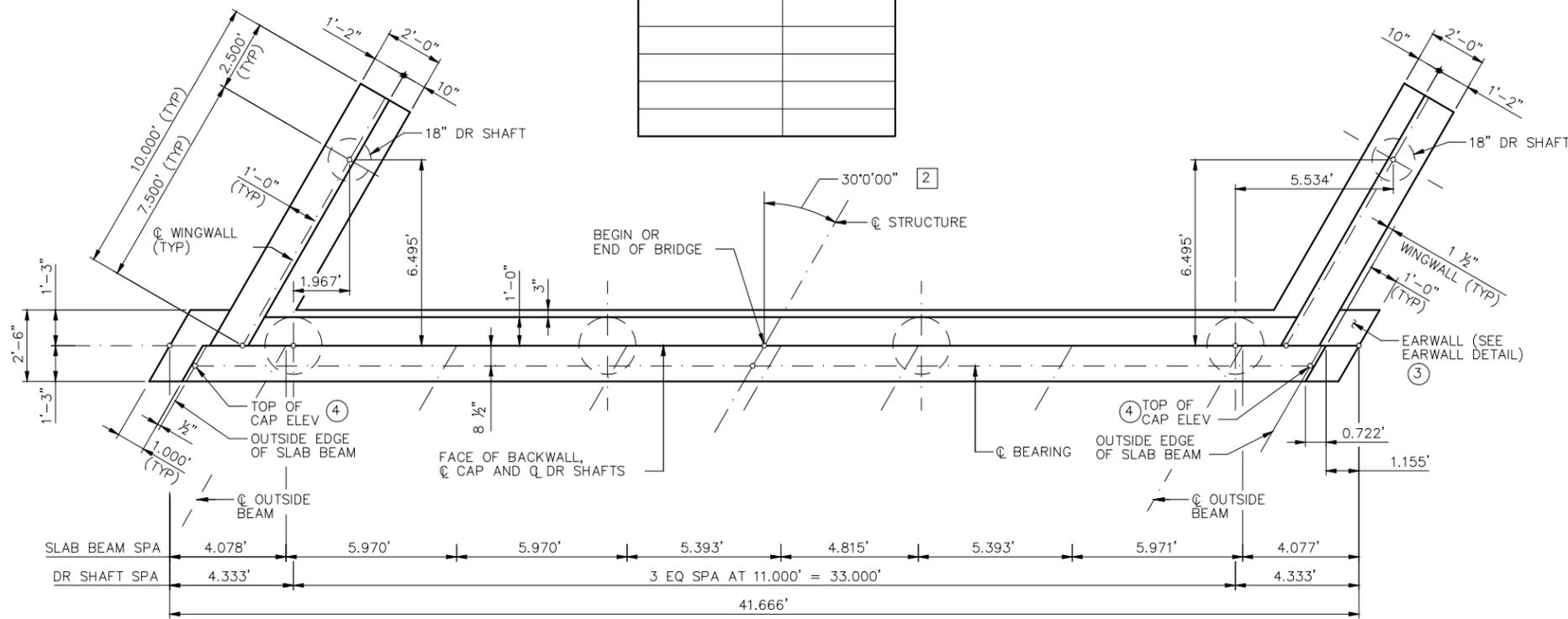
FIRM INFO

SEAL
NOTE

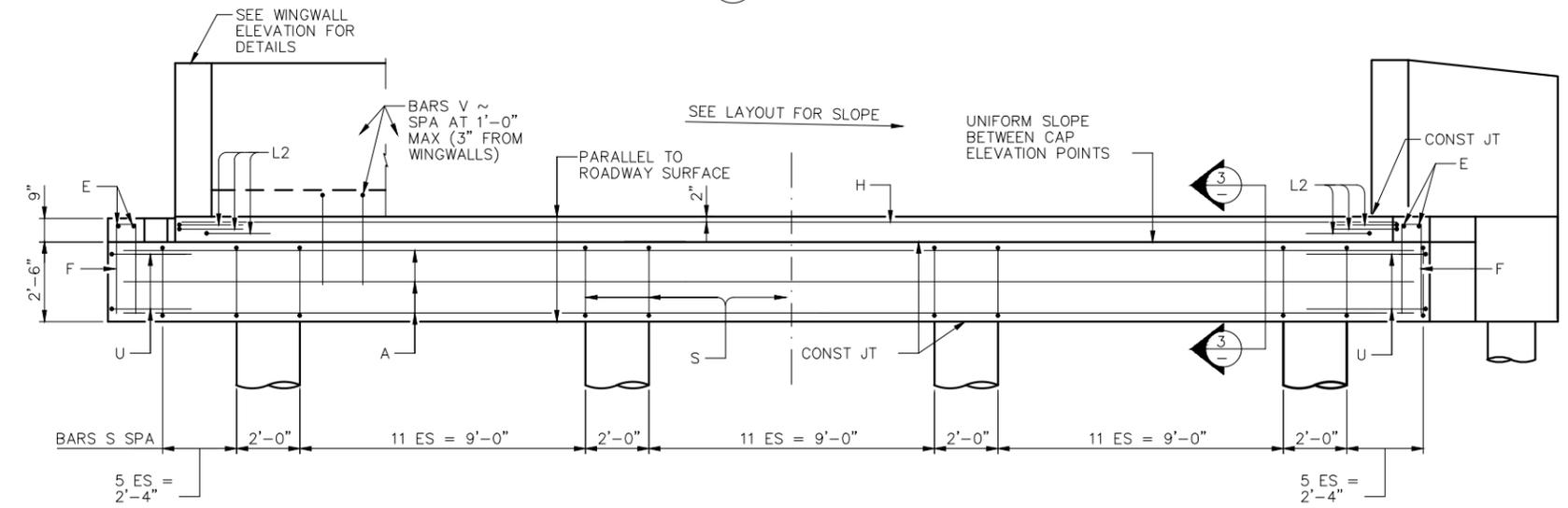
PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	DESIGN GUIDELINES	
DATE:	APPROVED BY:	SPAN DETAILS-SLAB BEAMS	
		TWO-WAY ROAD, 0° SKEW	
		(2 OF 2)	

HL93 LOADING

TOP OF CAP ELEVATIONS ^⑤	
WORKING POINT	ELEVATION



① PLAN



② 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.
- 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

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ABUTMENT 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.
- 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.

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

HARRIS COUNTY
ENGINEERING DEPARTMENT

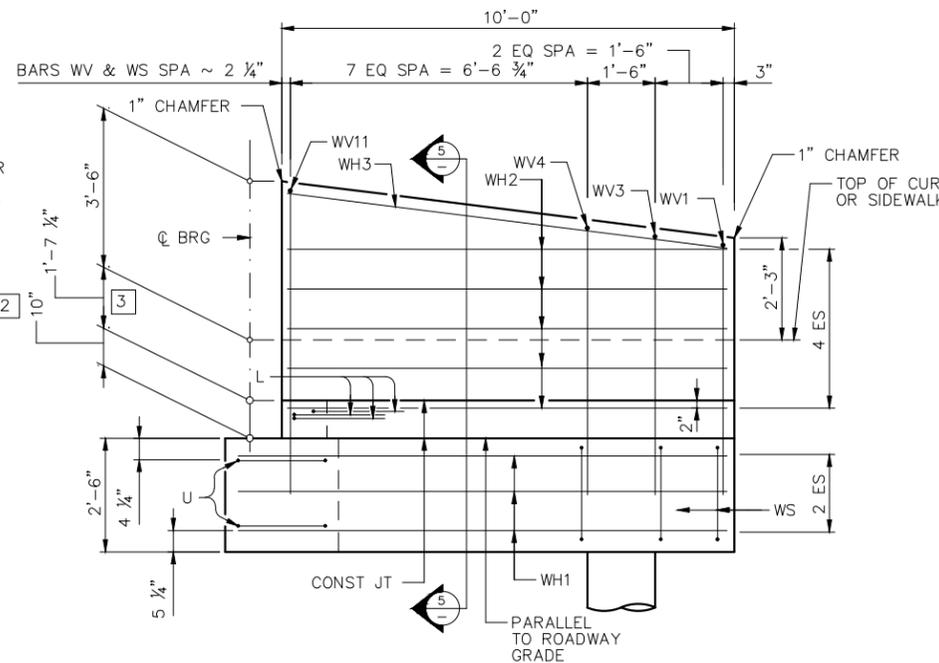
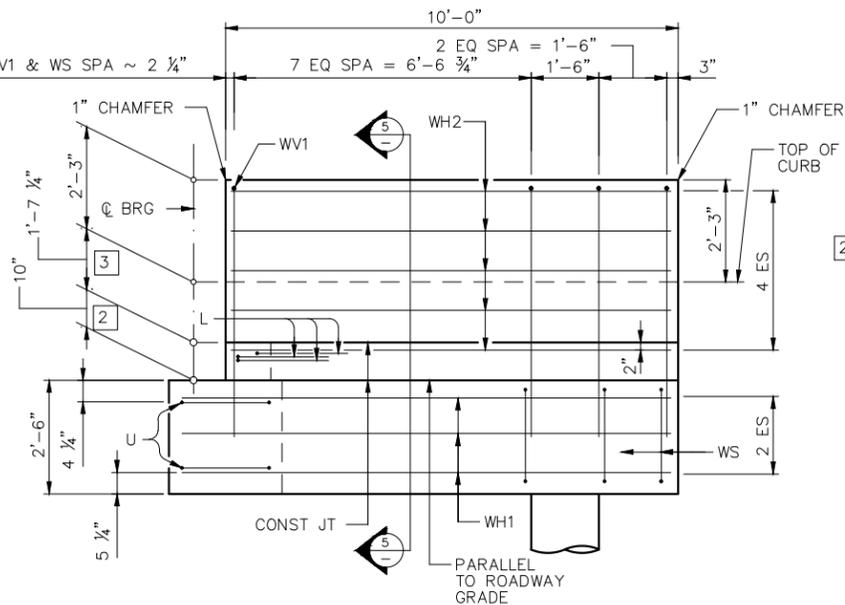
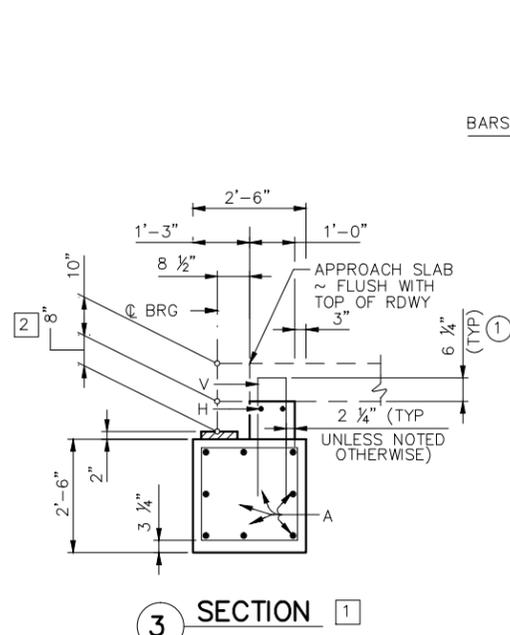


FIRM INFO

SEAL
NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	DESIGN GUIDELINES-ABUTMENT	
CHK'D BY:	FILE NAME:	SLAB BEAM-DR SHAFT	
SCALE:	FILE NO.:	HALF BOULEVARD, 30° SKEW	
DATE:	APPROVED BY:	SHT NO. 78	
		(SHEET 1 OF 2)	

HL93 LOADING

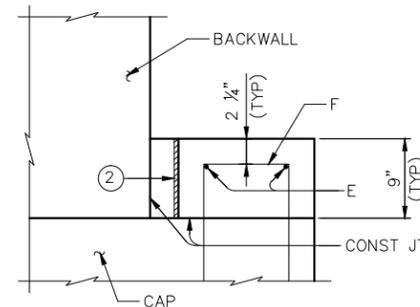
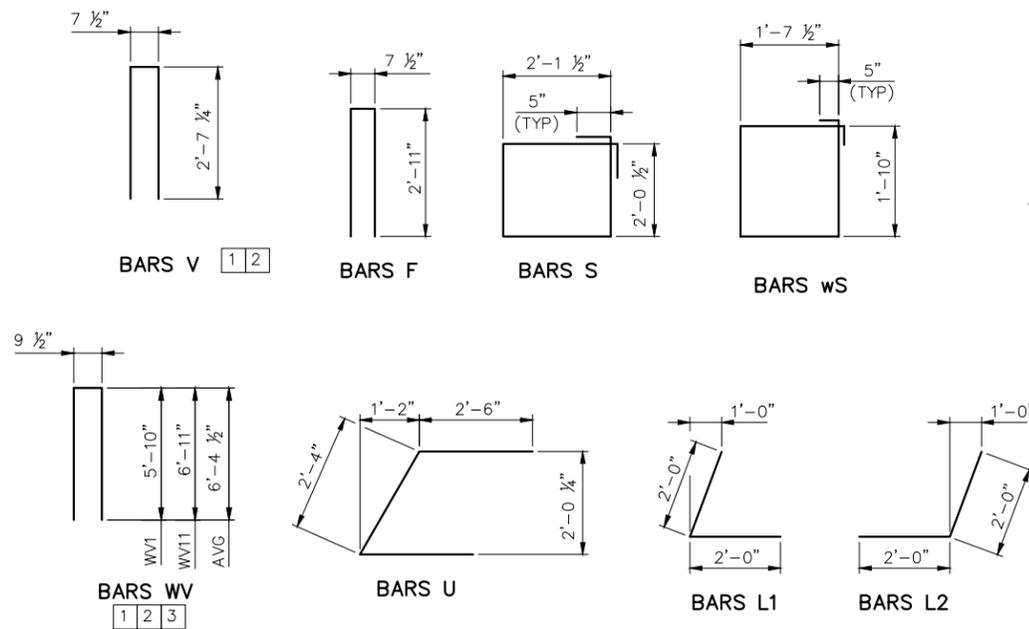
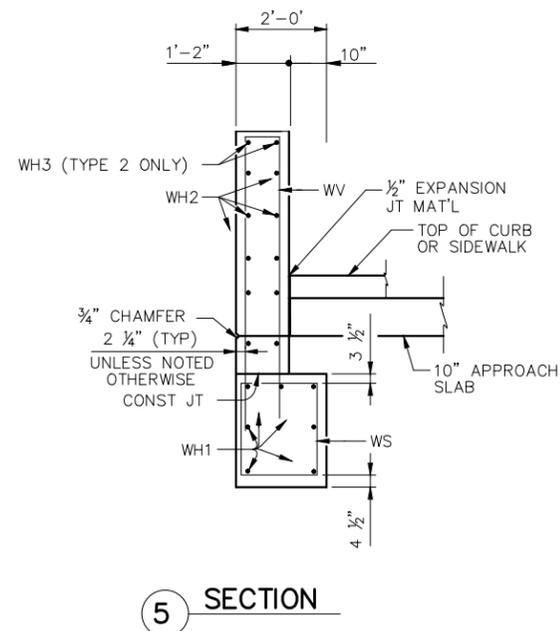


BILL OF REINFORCING STEEL ¹				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	8	#11	40'-8"	1,728
E	4	# 4	2'-6"	7
F	10	# 4	6'-6"	43
H	2	# 6	38'-11"	117
L1	3	# 6	4'-0"	18
L2	3	# 6	4'-0"	18
S	48	# 4	9'-2"	294
U	4	# 6	7'-4"	44
V	38	# 5	5'-10"	231
WH1	14	# 6	11'-0"	231
WH2	20	# 6	9'-8"	290
WH3	2	# 6	9'-9"	29
WS	22	# 4	7'-9"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

TYPE 1 - TRAFFIC RAIL SIDE

TYPE 2 - COMBINATION RAIL SIDE

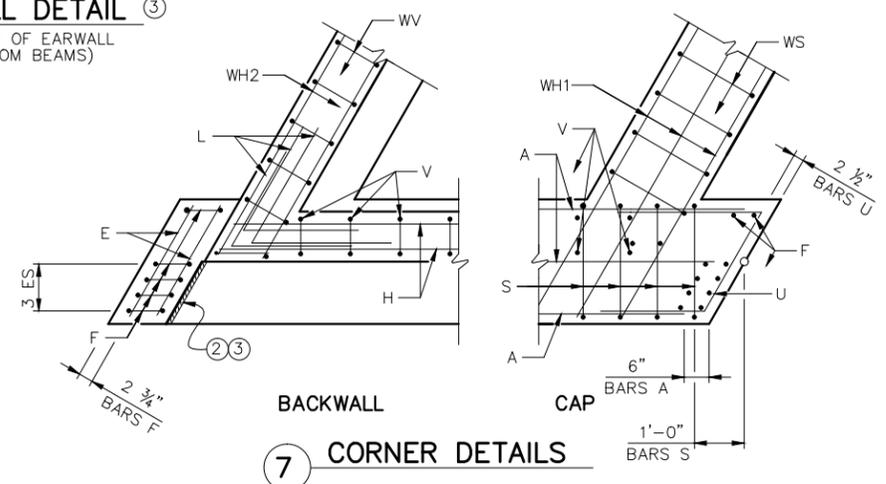
4 WINGWALL ELEVATION ¹
(EARWALL NOT SHOWN FOR CLARITY.)



- 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.
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NOTES TO ENGINEER

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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



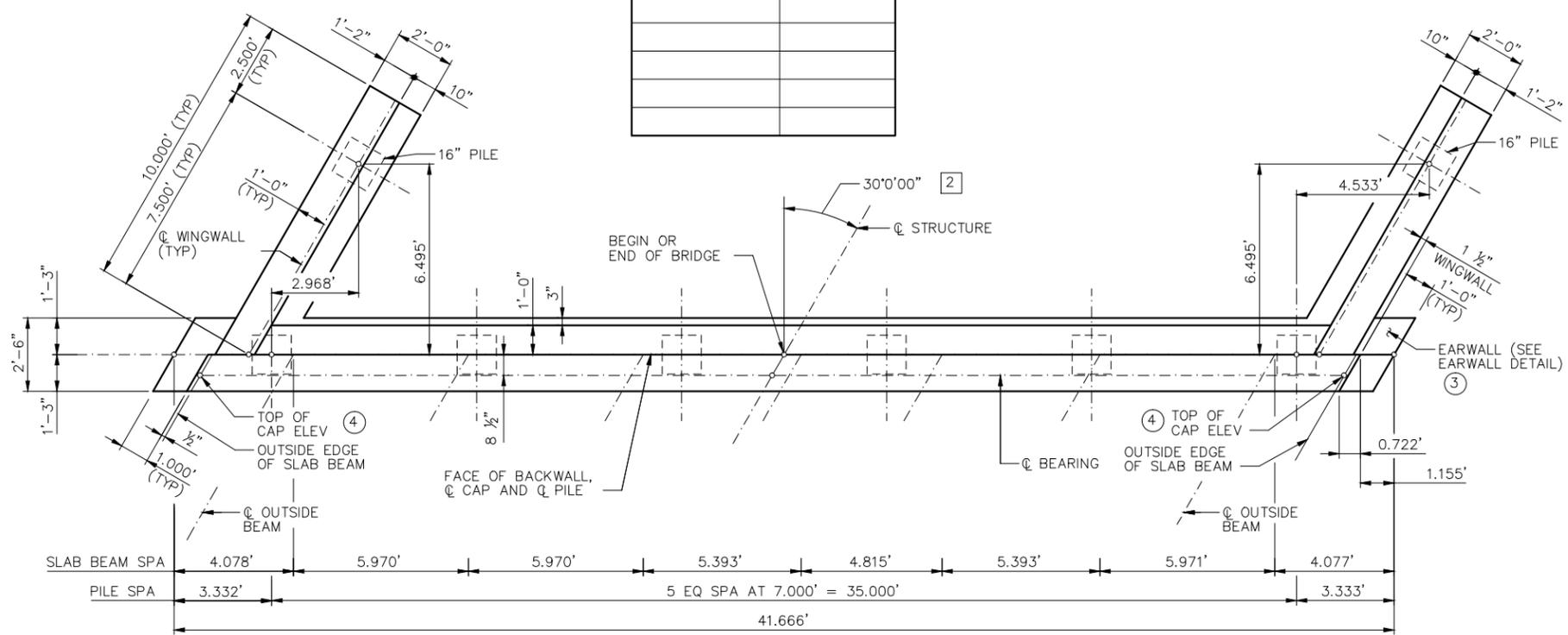
FIRM INFO

SEAL
NOTE

PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	DESIGN GUIDELINES-ABUTMENT	
CHK'D BY:	FILE NAME:	SLAB BEAM-DR SHAFT	
SCALE:	FILE NO.:	HALF BOULEVARD, 30° SKEW	
DATE:	APPROVED BY:	(SHEET 2 OF 2)	
			SHT NO. 79

HL93 LOADING

TOP OF CAP ELEVATIONS ⑤	
WORKING POINT	ELEVATION



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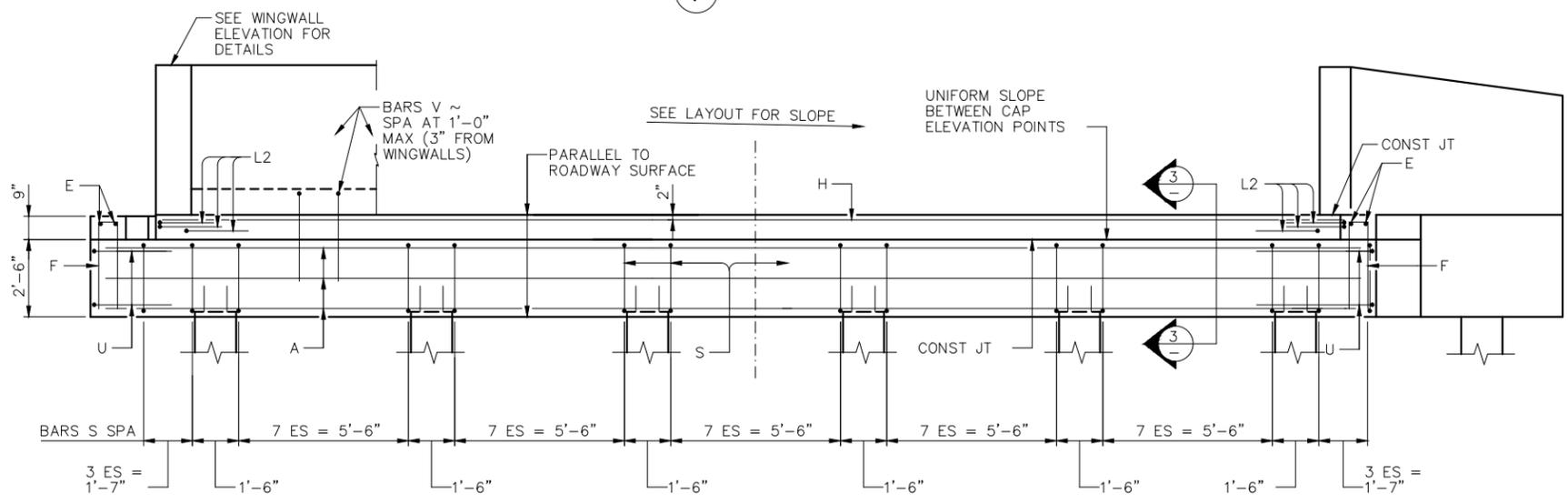
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1 PLAN



2 ELEVATION

NOTES TO ENGINEER

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

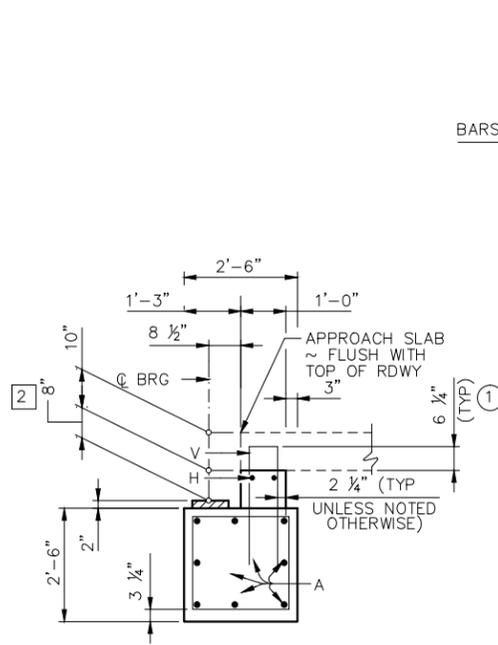


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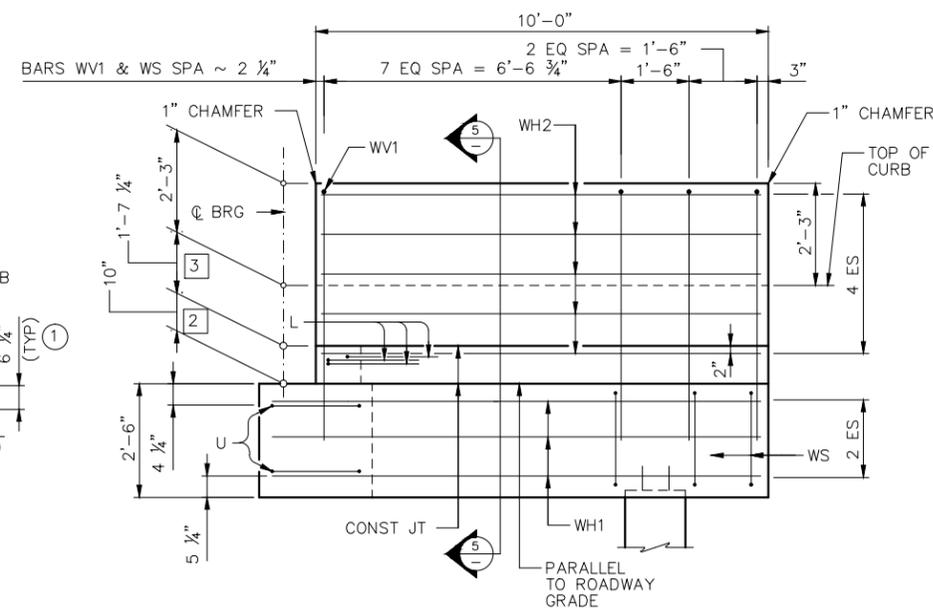
SEAL
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PROJECT TITLE			
DRAWN BY:	SHEET DESCRIPTION:	DESIGN GUIDELINES-ABUTMENT	JOB NO.:
CHK'D BY:	FILE NAME:	SLAB BEAM-PILES	FILE NO.:
SCALE:	FILE NO.:	HALF BOULEVARD, 30° SKEW	FILE NO.:
DATE:	APPROVED BY:	(SHEET 1 OF 2)	SHT NO. 80

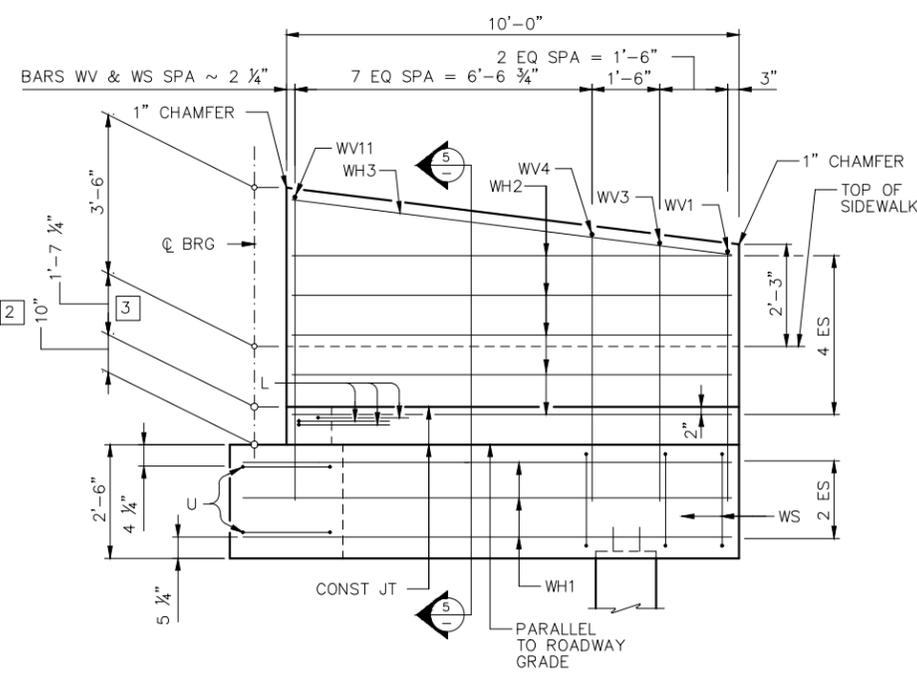
HL93 LOADING



3 SECTION 1

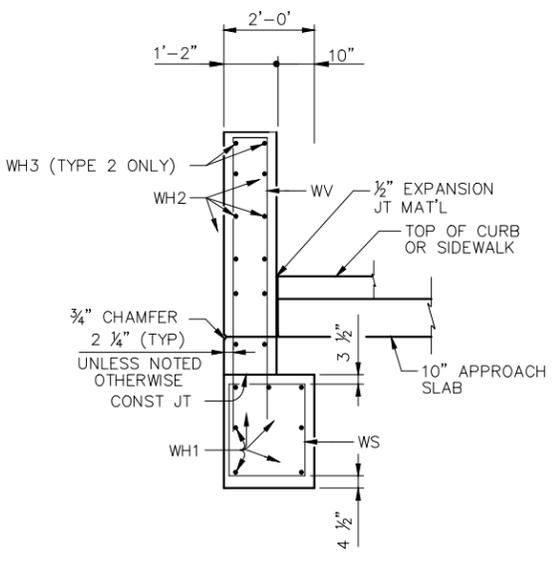


TYPE 1 - TRAFFIC RAIL SIDE

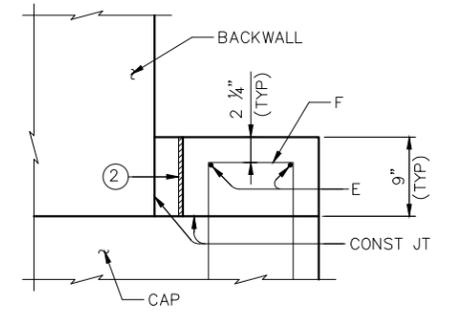
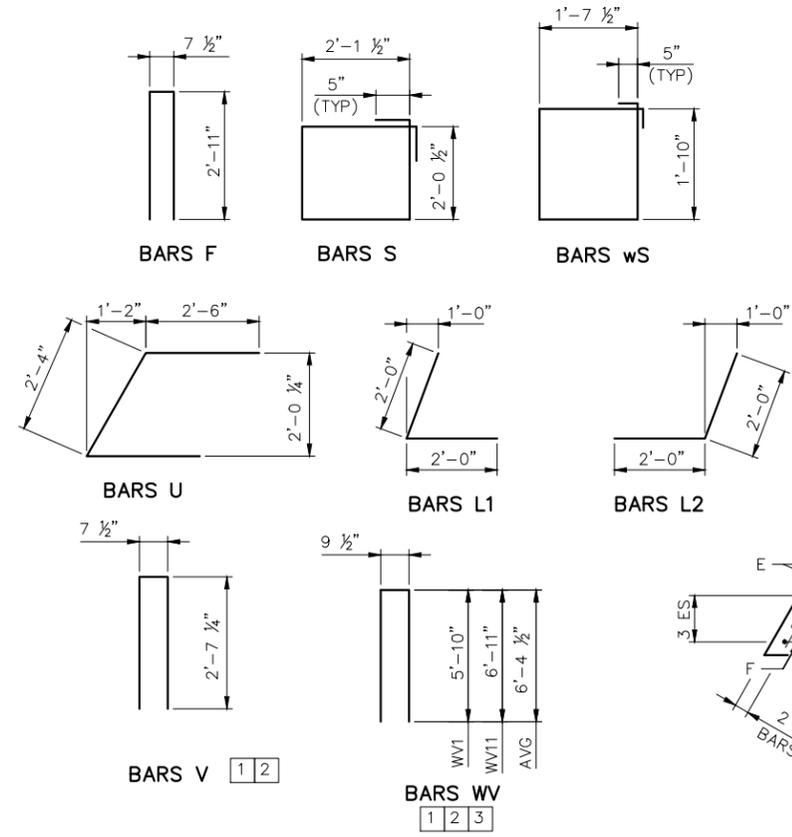


TYPE 2 - COMBINATION RAIL SIDE

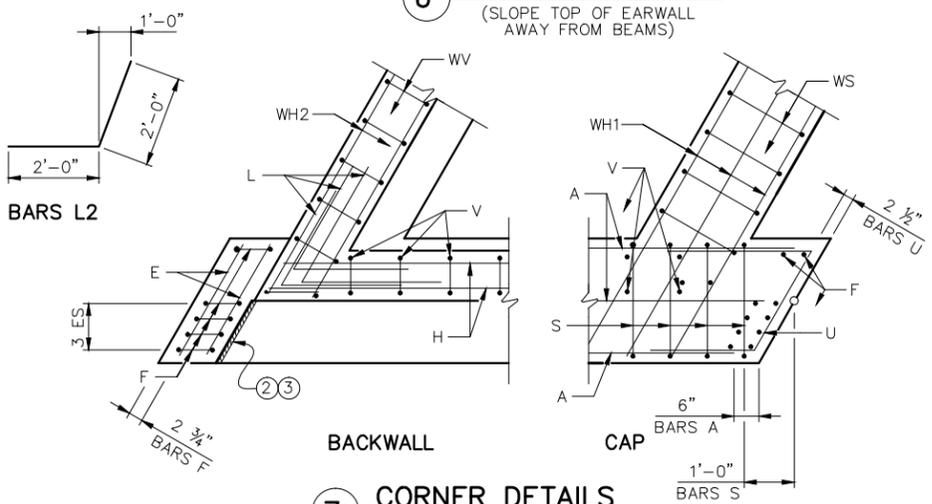
4 WINGWALL ELEVATION 1
(EARWALL NOT SHOWN FOR CLARITY.)



5 SECTION



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

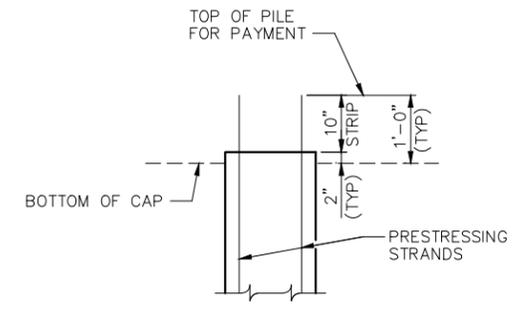


7 CORNER DETAILS

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8 PILING EMBEDMENT DETAIL

BILL OF REINFORCING STEEL 1				
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
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S	48	# 4	9'-2"	294
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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	3,457
ESTIMATED QUANTITIES 1				
REINFORCING STEEL			LB	3,457
CLASS B1 CONCRETE			CY	19.0

NO.	REVISIONS	DATE	NAME
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ENGINEERING DEPARTMENT



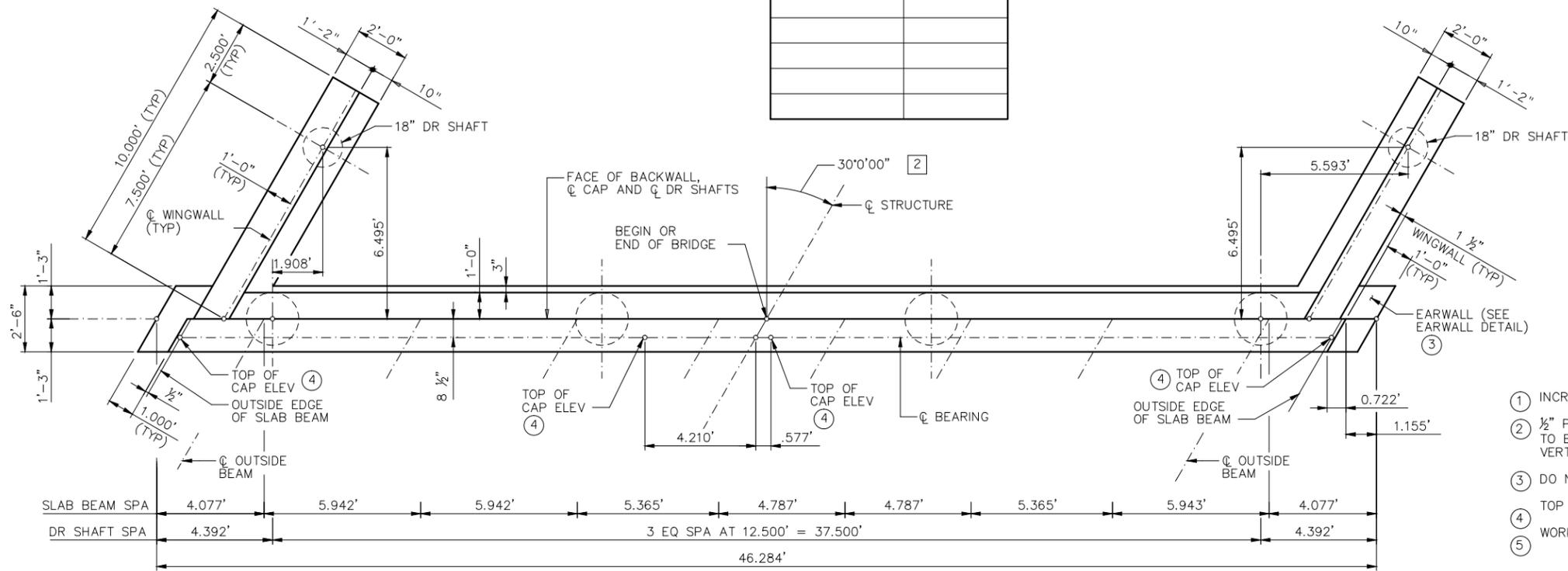
FIRM INFO

SEAL
NOTE

PROJECT TITLE			
DESIGN GUIDELINES-ABUTMENT	FILE NO.:		
SLAB BEAM-PILES	FILE NO.:		
HALF BOULEVARD, 30' SKEW	FILE NO.:		
(SHEET 2 OF 2)	SHT NO.:	81	

HL93 LOADING

TOP OF CAP ELEVATIONS ⑤	
WORKING POINT	ELEVATION



① PLAN

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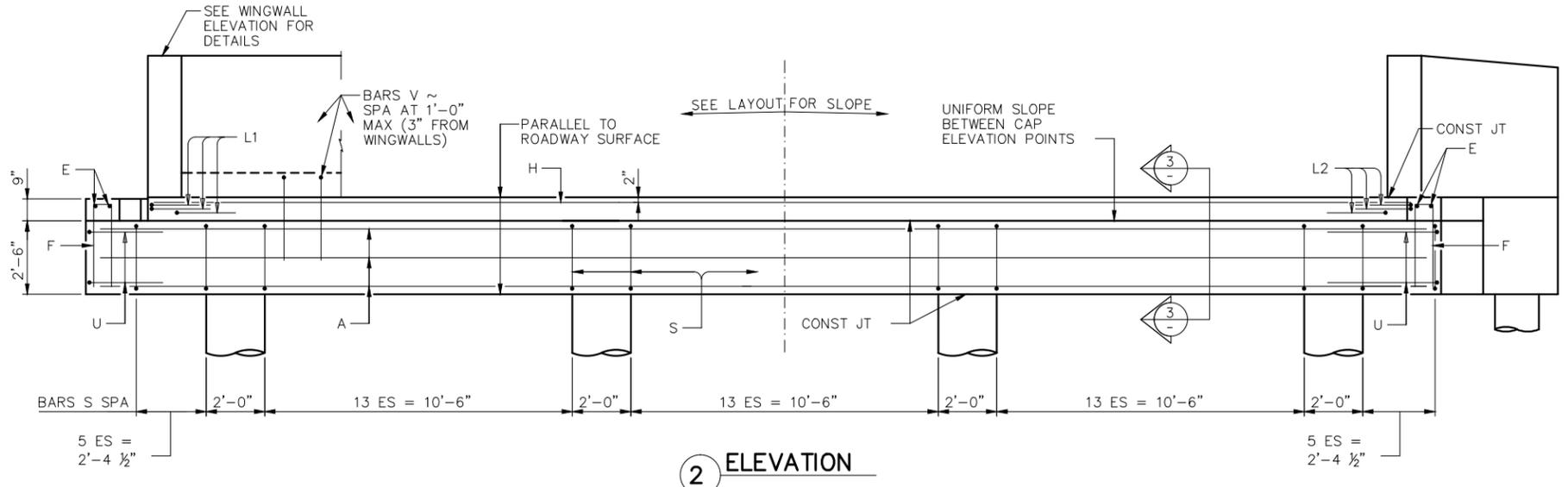
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② ELEVATION

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1	UPDATED DEPARTMENT NAME	2/17/2015	RS

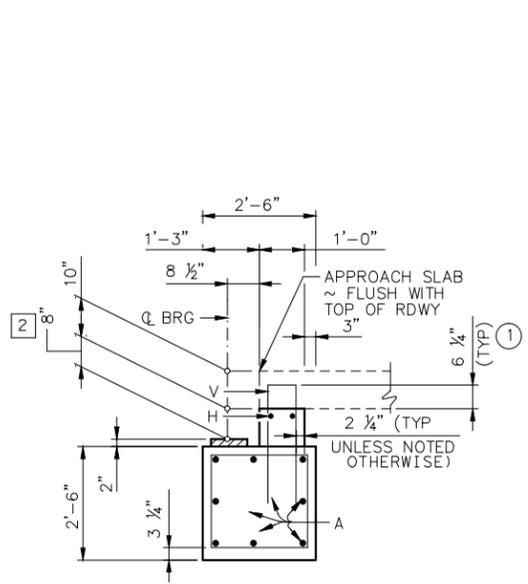
HARRIS COUNTY
ENGINEERING DEPARTMENT



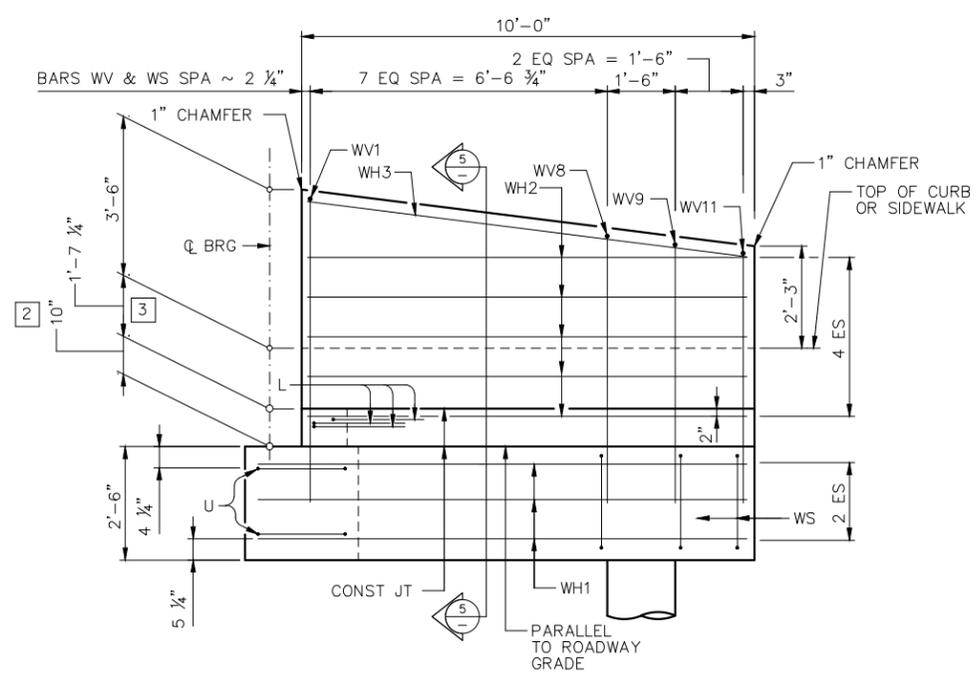
FIRM INFO

SEAL
NOTE

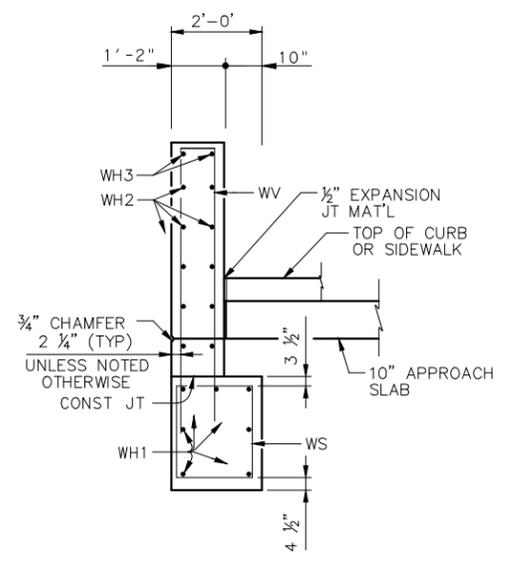
PROJECT TITLE		HL93 LOADING
DRAWN BY:	SHEET DESCRIPTION	JOB NO.:
	DESIGN GUIDELINES-ABUTMENT	
	SLAB BEAM-DR SHAFT	FILE NAME:
	TWO-WAY ROAD, 30° SKEW	FILE NO.:
	(SHEET 1 OF 2)	SHT NO.:
		82



3 SECTION 1

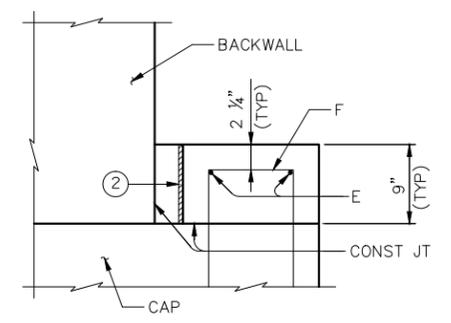
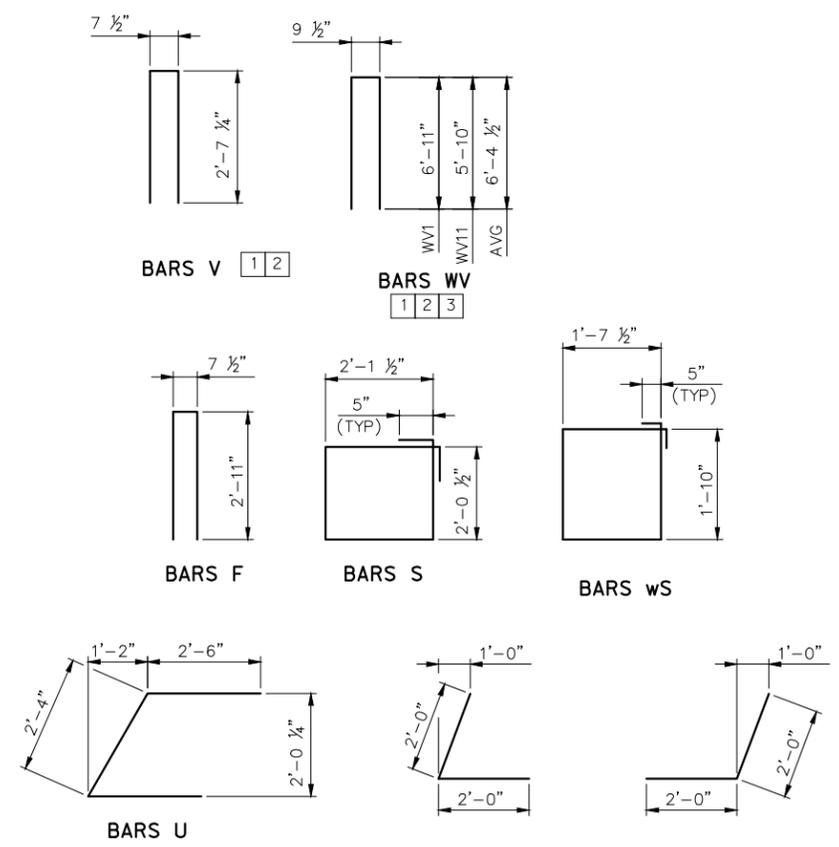


4 WINGWALL ELEVATION (EARWALL NOT SHOWN FOR CLARITY.)

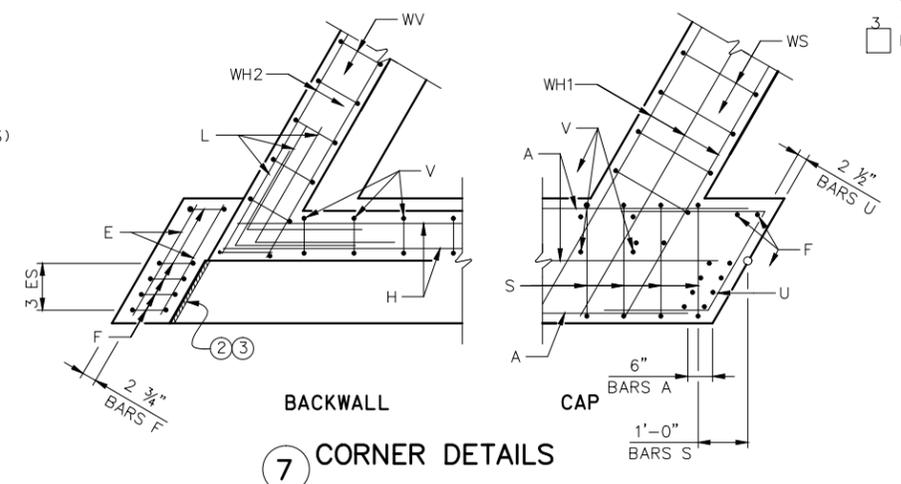


5 SECTION

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	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 1				
REINFORCING STEEL			LB	3,777
CLASS B1 CONCRETE			CY	20.5



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



7 CORNER DETAILS

- 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.

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.
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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



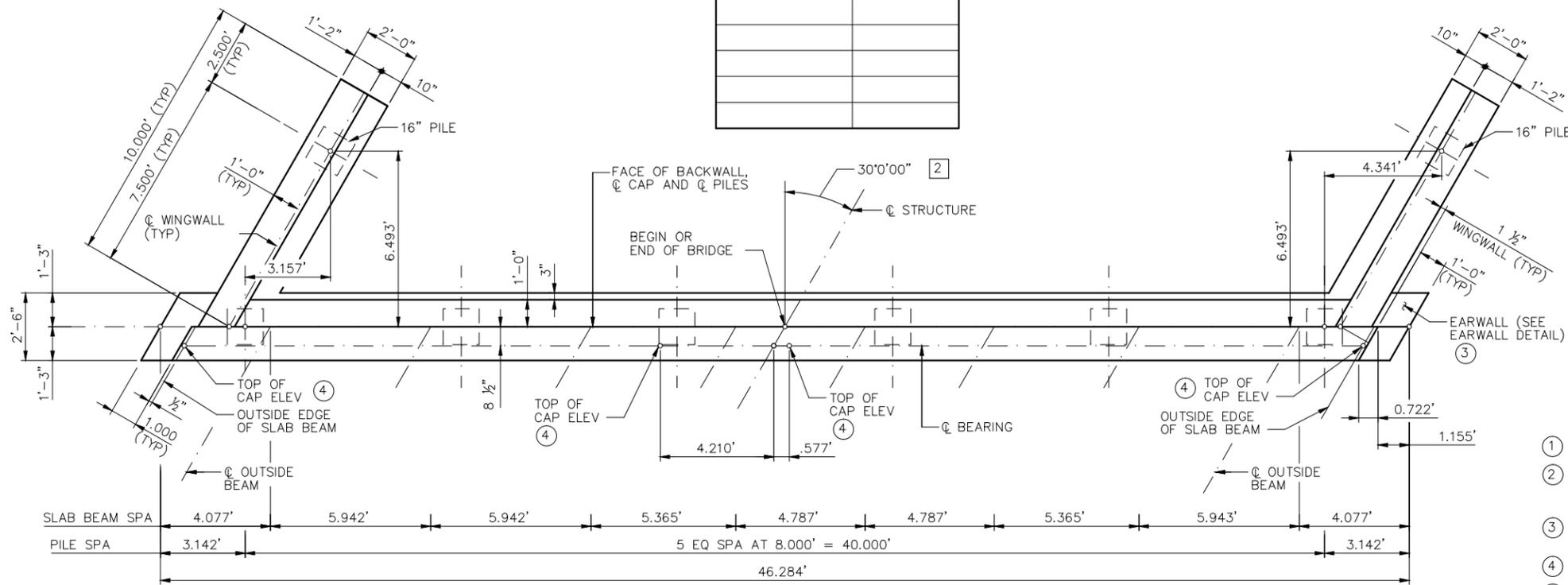
FIRM INFO

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.:

HL93 LOADING

TOP OF CAP ELEVATIONS ⑤	
WORKING POINT	ELEVATION

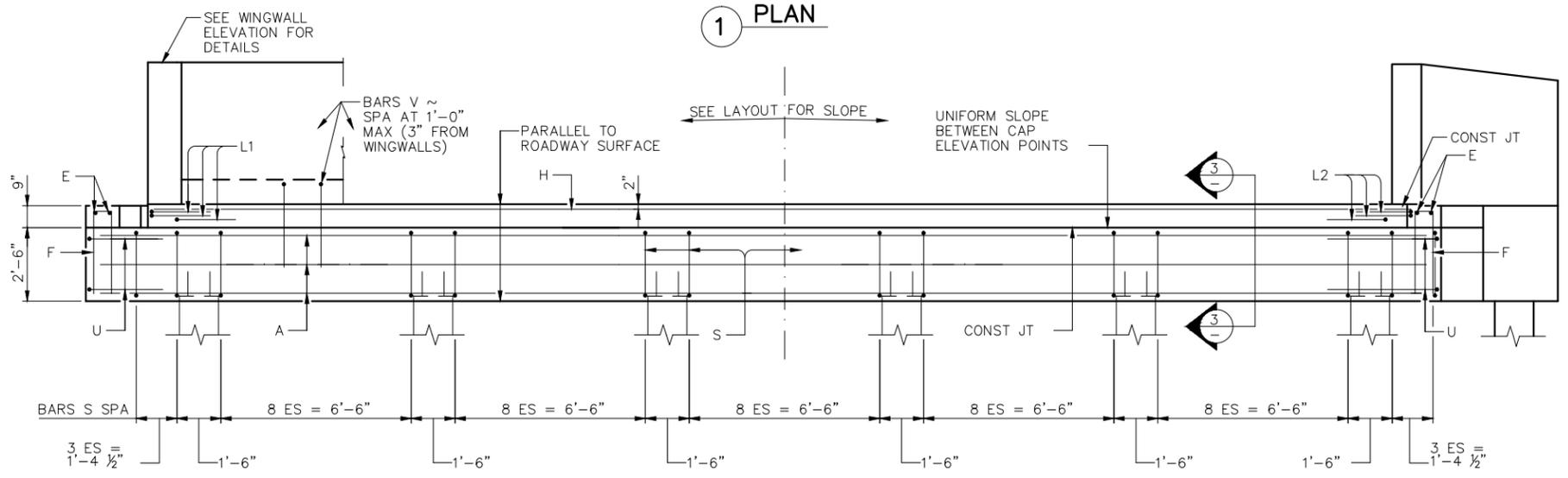


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- ③ DO NOT CAST EARWALLS UNTIL BEAMS ARE ERECTED IN THEIR FINAL POSITION.
- ④ TOP OF CAP ELEVATIONS ARE BASED ON SECTIONS DEPTH AT CENTERLINE BEARING.
- ⑤ WORKING POINTS ARE LABELED FROM LEFT TO RIGHT LOOKING UPSTATION.

1 PLAN



2 ELEVATION

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.

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

HARRIS COUNTY
ENGINEERING DEPARTMENT

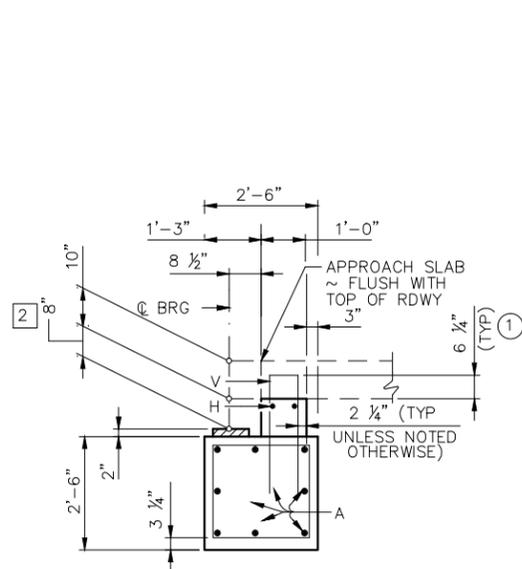


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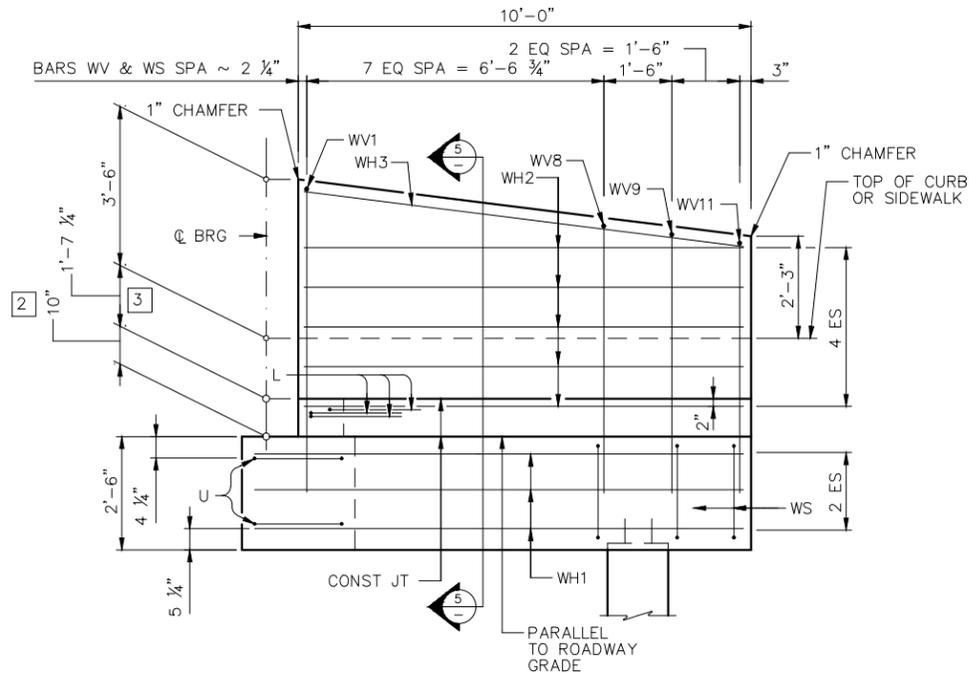
SEAL
NOTE

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

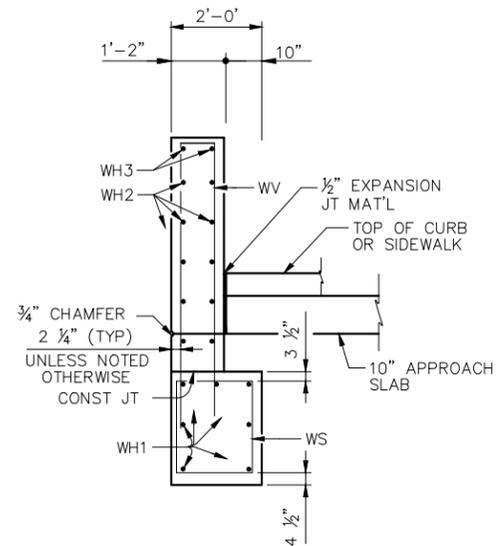
HL93 LOADING



3 SECTION 1



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



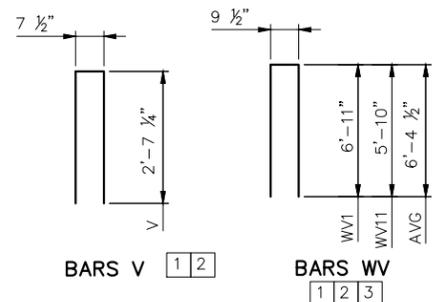
5 SECTION

BILL OF REINFORCING STEEL 1				
BAR	NO.	SIZE	LENGTH	WEIGHT
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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

- 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.
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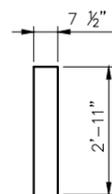
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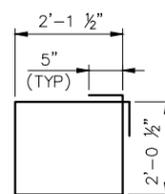


BARS V 1 2

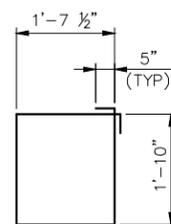
BARS WV 1 2 3



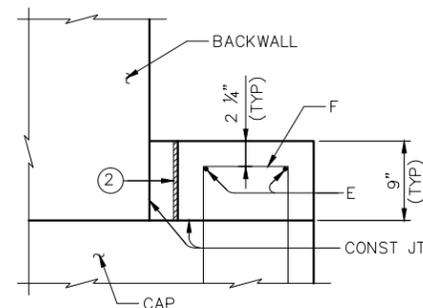
BARS F



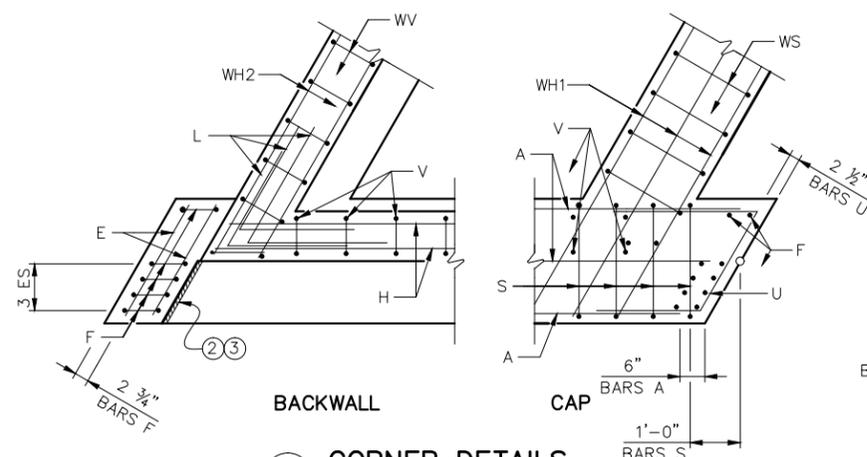
BARS S



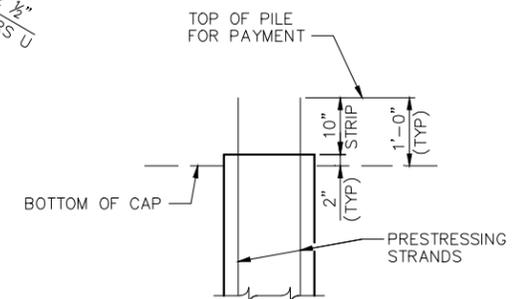
BARS WS



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

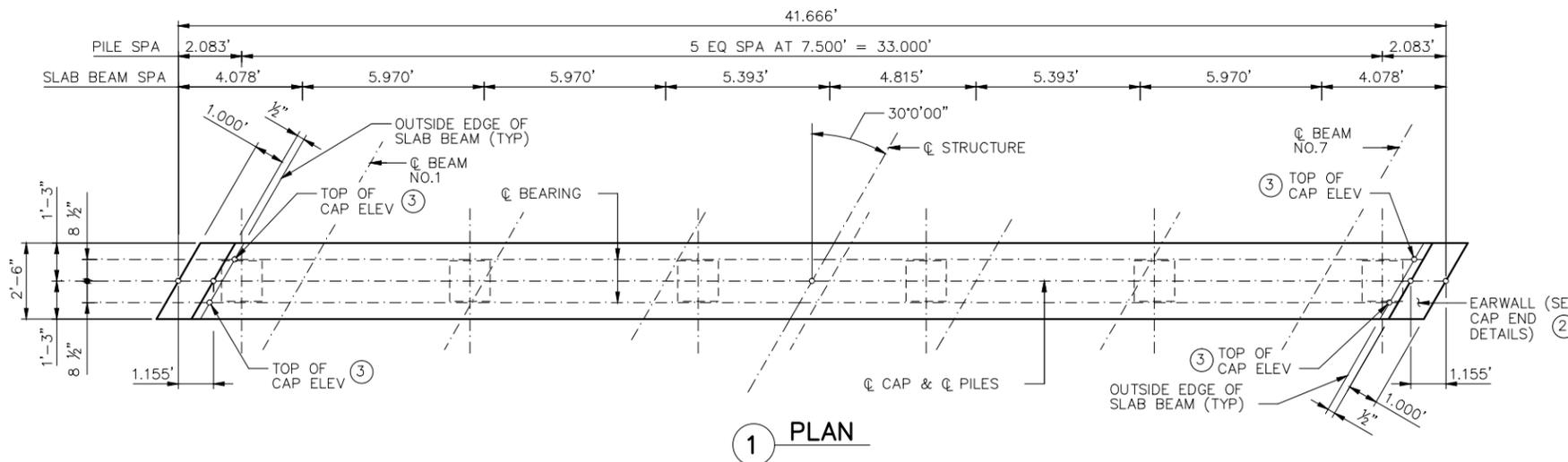


FIRM INFO

SEAL
NOTE

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

HL93 LOADING



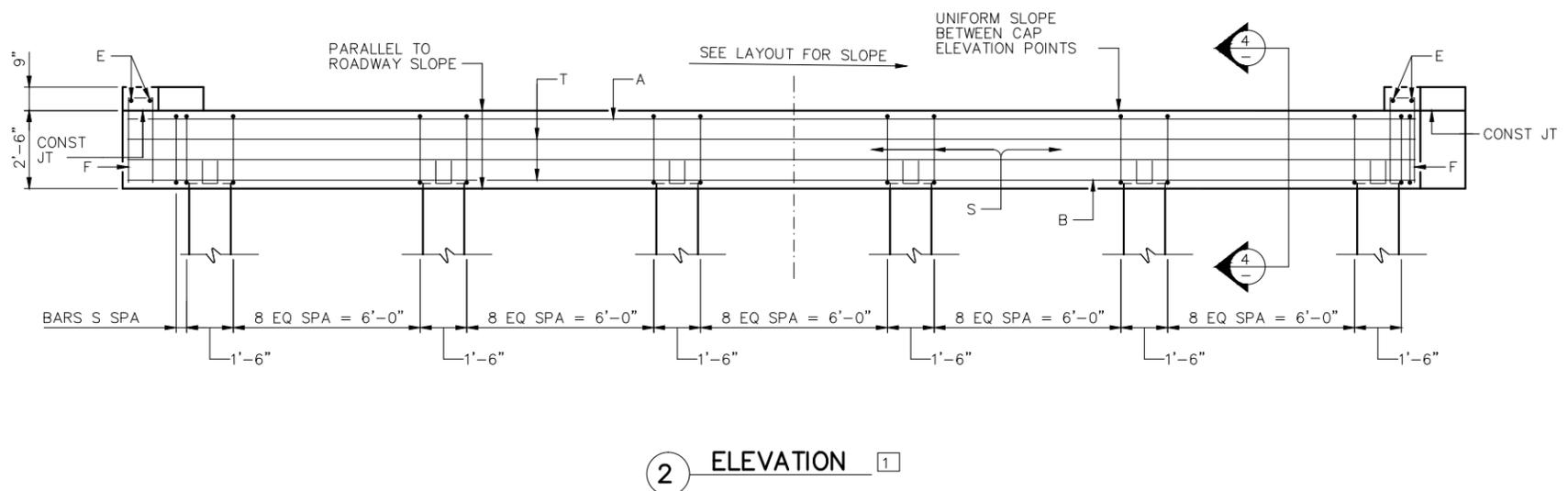
1 PLAN

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.

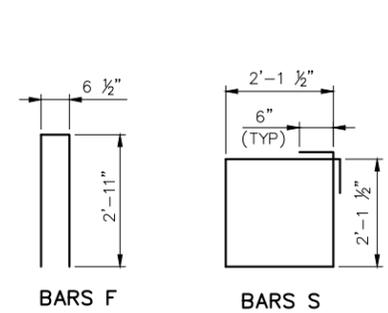
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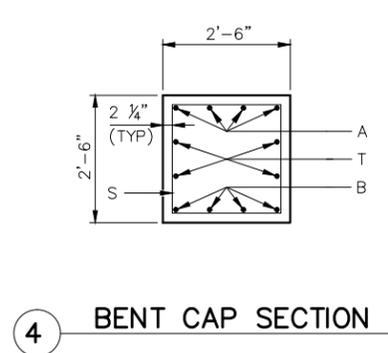


2 ELEVATION 1

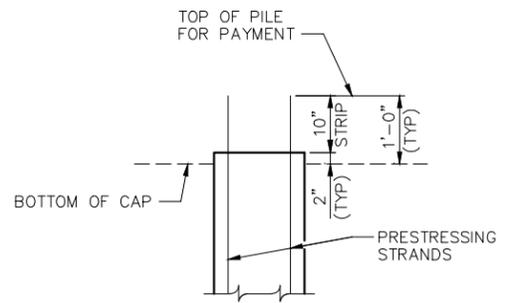
TOP OF CAP ELEVATIONS ④	
WORKING POINT	ELEVATION



3 CAP END DETAILS



4 BENT CAP SECTION



5 PILING EMBEDMENT DETAIL

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 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.AGUIRRE
1	UPDATED DEPARTMENT NAME	2/17/2015	RS

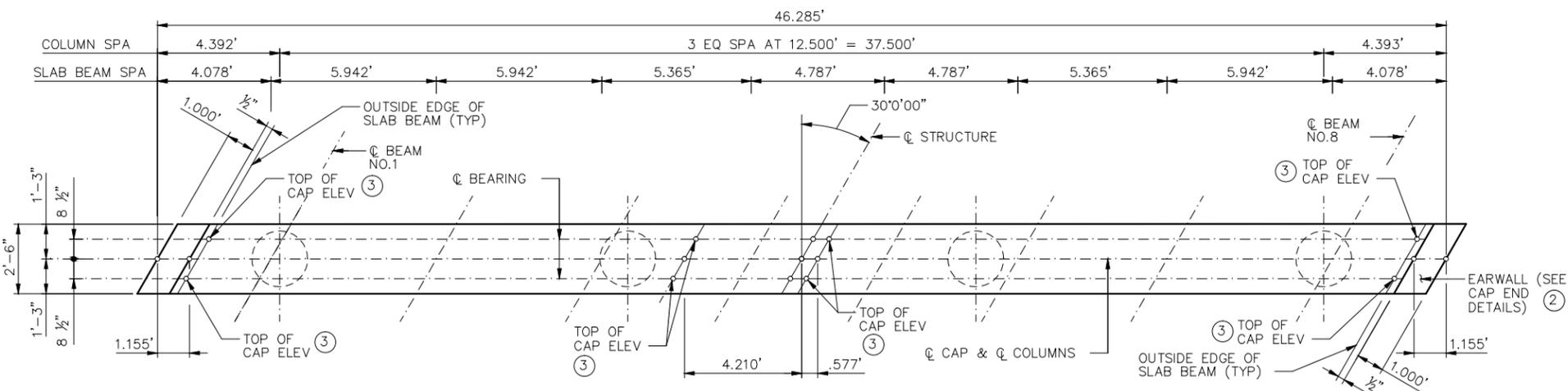
HARRIS COUNTY
ENGINEERING DEPARTMENT



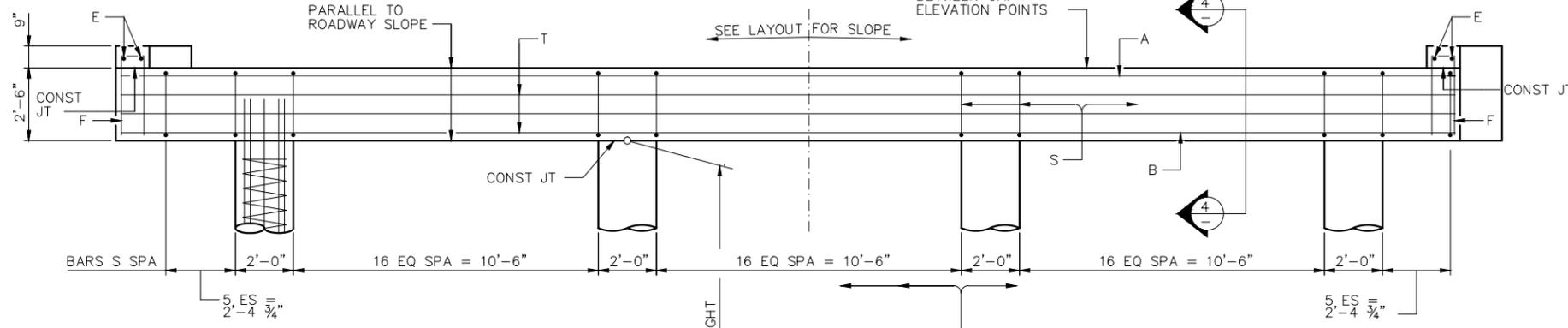
FIRM INFO

SEAL
NOTE

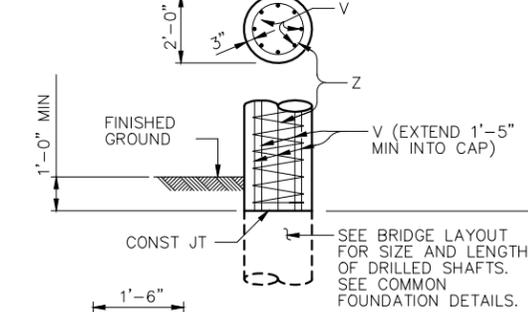
PROJECT TITLE		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO.:
	DESIGN GUIDELINES-BENT	
	SLAB BEAMS-PILES	
	HALF BOULEVARD, 30° SKEW	
DATE:	APPROVED BY:	SHT NO.:
		87



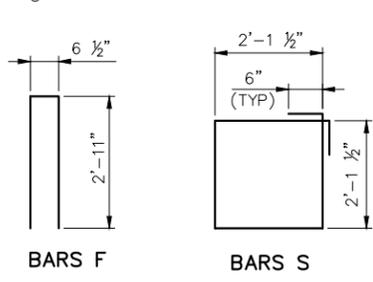
1 PLAN



2 ELEVATION



3 CAP END DETAILS



4 BENT CAP SECTION

TOP OF CAP ELEVATIONS ⑤	
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.
- 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

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4. ALL REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60 STEEL.
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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



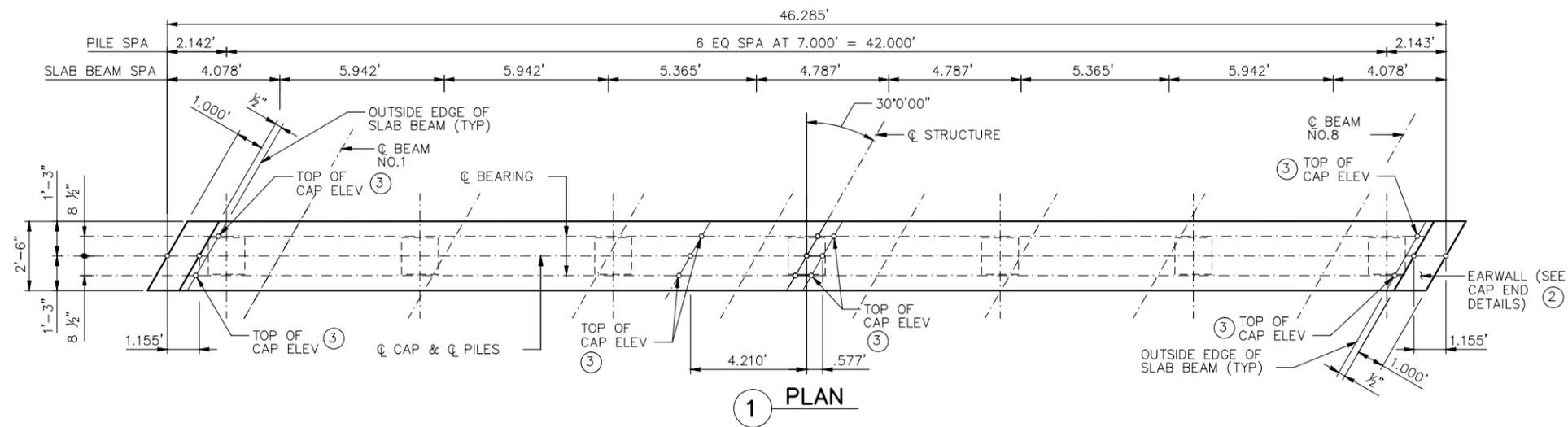
FIRM INFO

SEAL NOTE

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

HL93 LOADING

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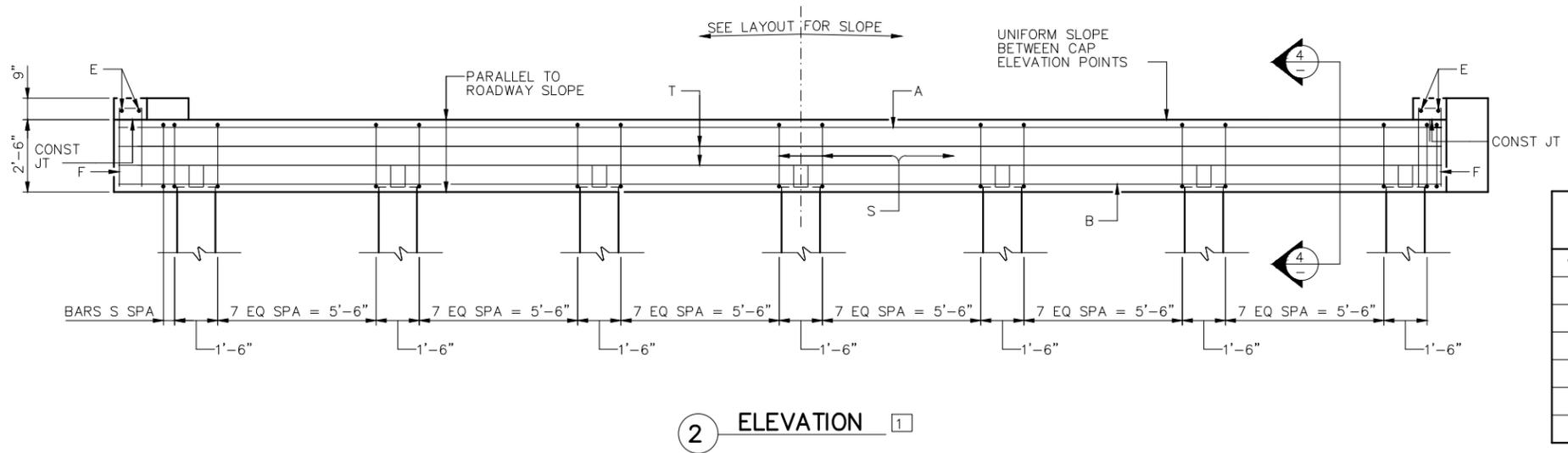
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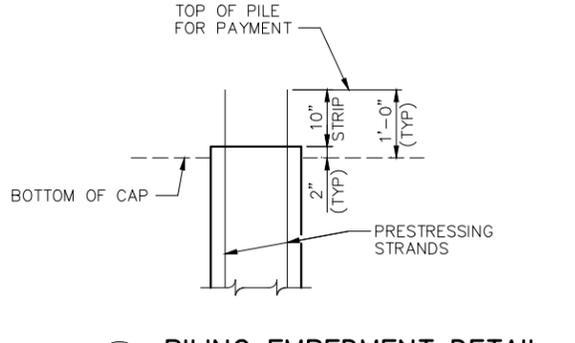
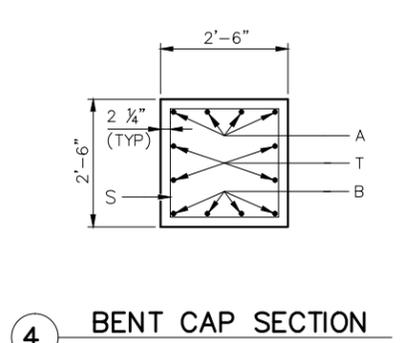
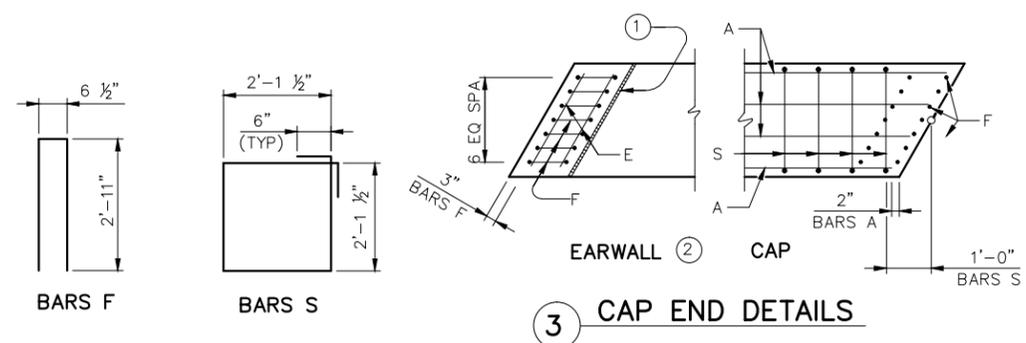
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C. THE DESIGN ENGINEER SHALL CONSULT THE HARRIS COUNTY DESIGN MANUAL AND SPECIFICATIONS FOR INFORMATION PERTINENT TO THESE DESIGN GUIDELINE DRAWINGS.

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



- 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 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

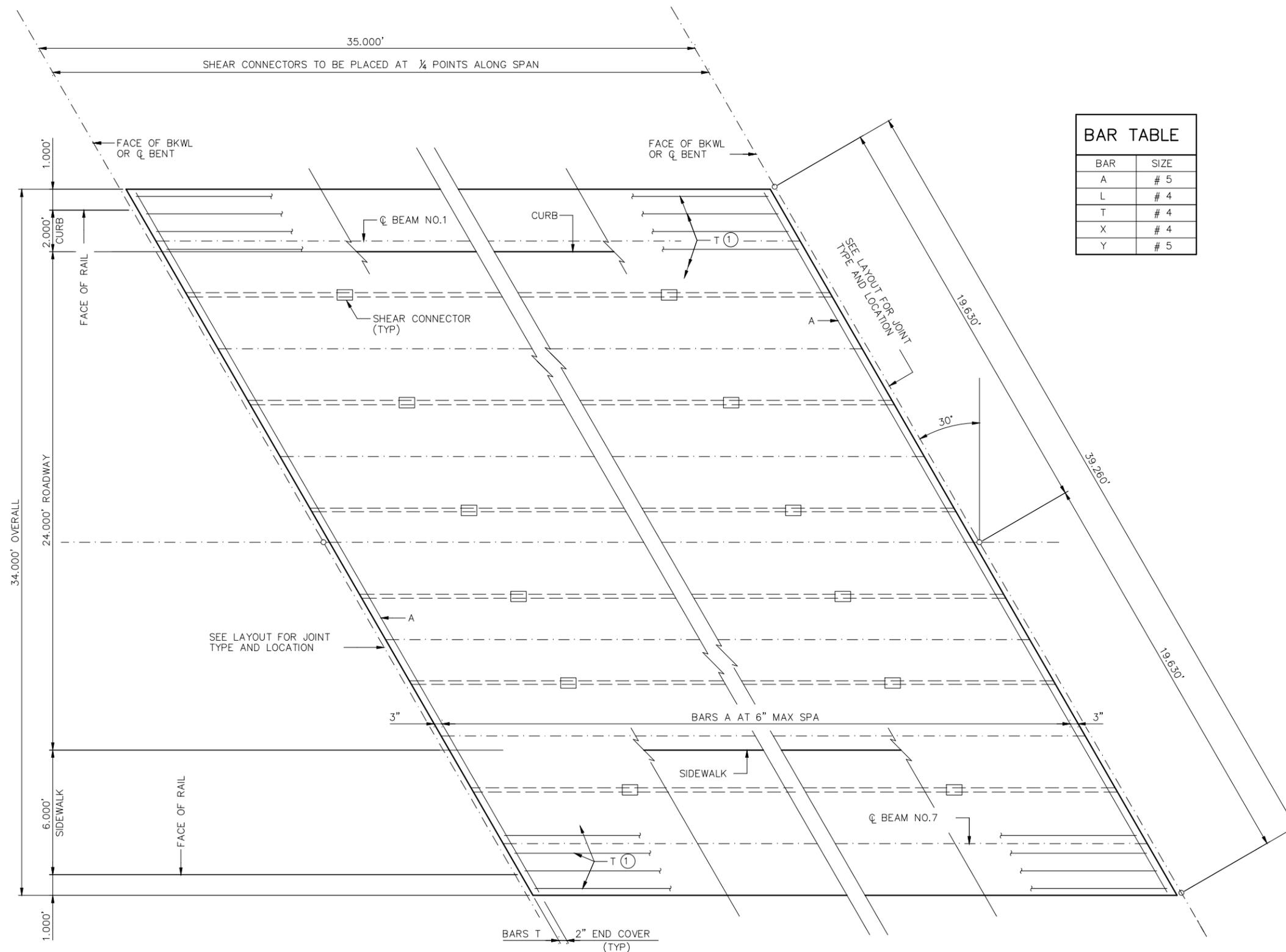
PROJECT TITLE		
DRAWN BY:	SHEET DESCRIPTION:	JOB NO.:
CHK'D BY:	DESIGN GUIDELINES-BENT	FILE NAME:
SCALE:	SLAB BEAMS-PILES	FILE NO.:
DATE:	TWO-WAY ROAD, 30'SKEW	SHT NO.:
APPROVED BY:		89

HL93 LOADING

NOTES TO DESIGN ENGINEER:

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



SLAB NOTES

1. DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS.
2. 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.
3. ALL REINFORCING STEEL SHALL BE ASTM.A615 GRADE 60 STEEL.
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5. THE QUANTITIES GIVEN FOR REINFORCING STEEL AND CONCRETE ARE PRESENTED FOR CONTRACTORS INFORMATION ONLY.
6. BAR LAPS, WHERE REQUIRED, SHALL BE AS FOLLOWS:
 ~ #4 = 1'-5"
 ~ #5 = 1'-9"

PLAN

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

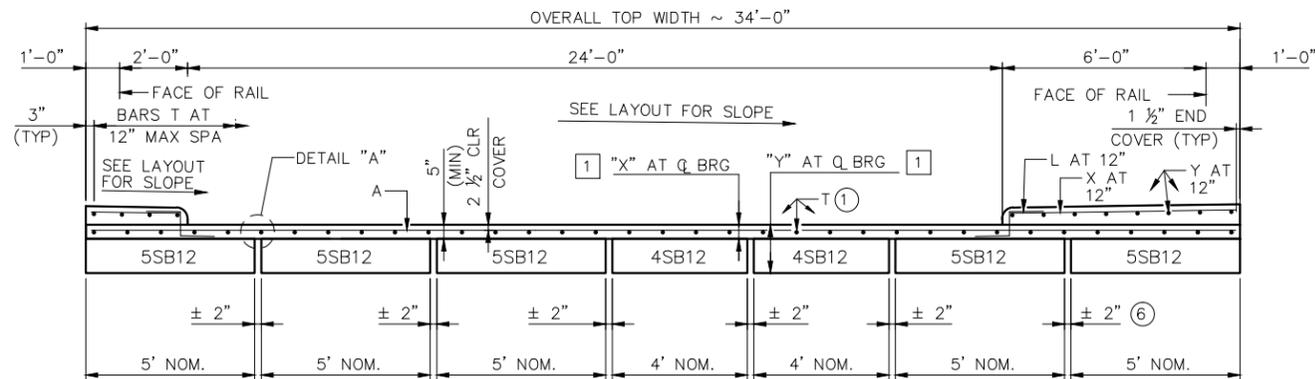
HARRIS COUNTY
ENGINEERING DEPARTMENT



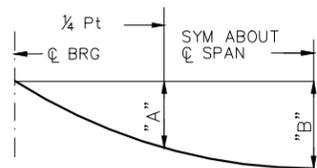
FIRM INFO

SEAL
NOTE

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



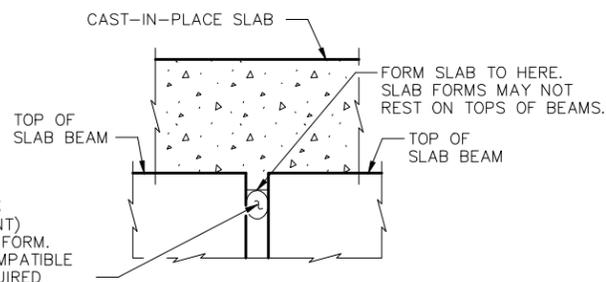
TYPICAL TRANSVERSE SECTION



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.

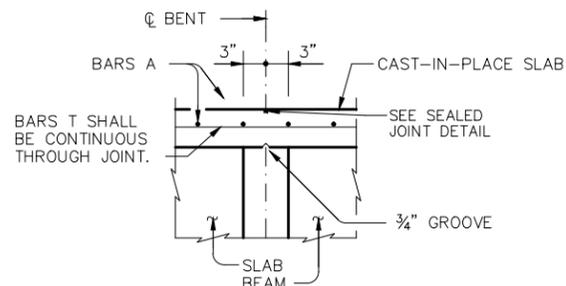
SPAN LENGTH	BEAM TYPE	DEAD LOAD DEFLECTION		SECTION DEPTHS [1]	
		"A"	"B"	"X"	"Y"
FT		FT	FT	IN	FT/IN
50	4SB12			6"	1'-6"
50	5SB12			6"	1'-6"

DEAD LOAD DEFLECTION DIAGRAM

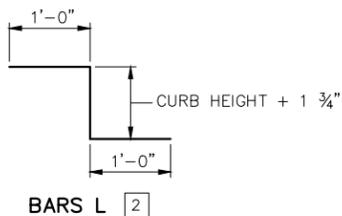


DETAIL "A"

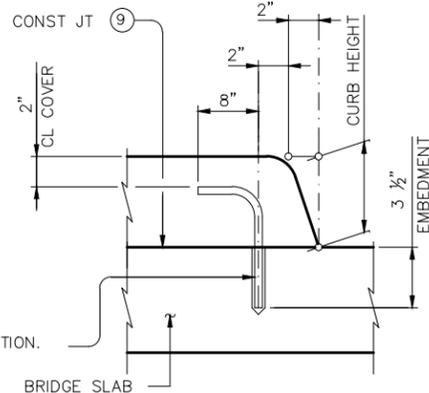
BACKER ROD (25% LARGER THAN JOINT) MAY BE USED AS FORM. SECURE WITH COMPATIBLE ADHESIVE AS REQUIRED



CONTINUOUS SLAB DETAIL



BARS L [2]



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.

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

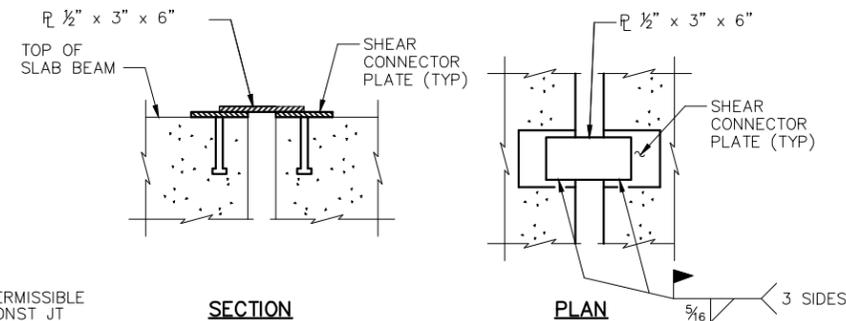
TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	CLASS "A1" CONCRETE (SLAB) [1]	CLASS "A1" CONCRETE (SDWK) [3]	CLASS "A1" CONCRETE (CURB) [4]	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

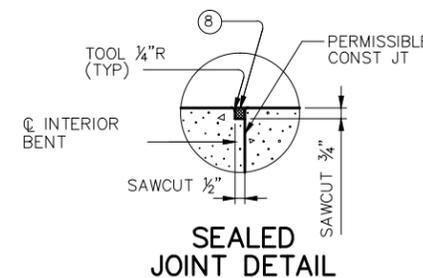
- [1] THE ENGINEER SHALL DETERMINE SECTION DEPTHS BASED ON THEORETICAL BEAM CAMBER, DEAD LOAD DEFLECTIONS OF 5" CAST-IN-PLACE SLAB AND THE EFFECT OF VERTICAL CURVE.
- [2] THE ENGINEER SHALL DETERMINE BRIDGE CURB HEIGHT.



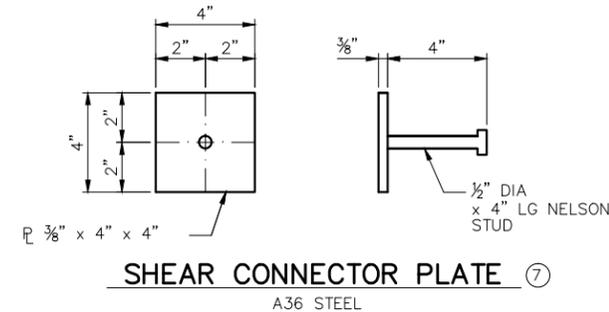
SECTION

SHEAR CONNECTION DETAIL

A36 STEEL



SEALED JOINT DETAIL



SHEAR CONNECTOR PLATE [7]

A36 STEEL

HL93 LOADING

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	FILE NAME:
SCALE:	SPAN DETAILS-SLAB BEAMS	FILE NO.:
DATE:	HALF BOULEVARD, 30 DEG SKEW	SHT NO.:
APPROVED BY:		91

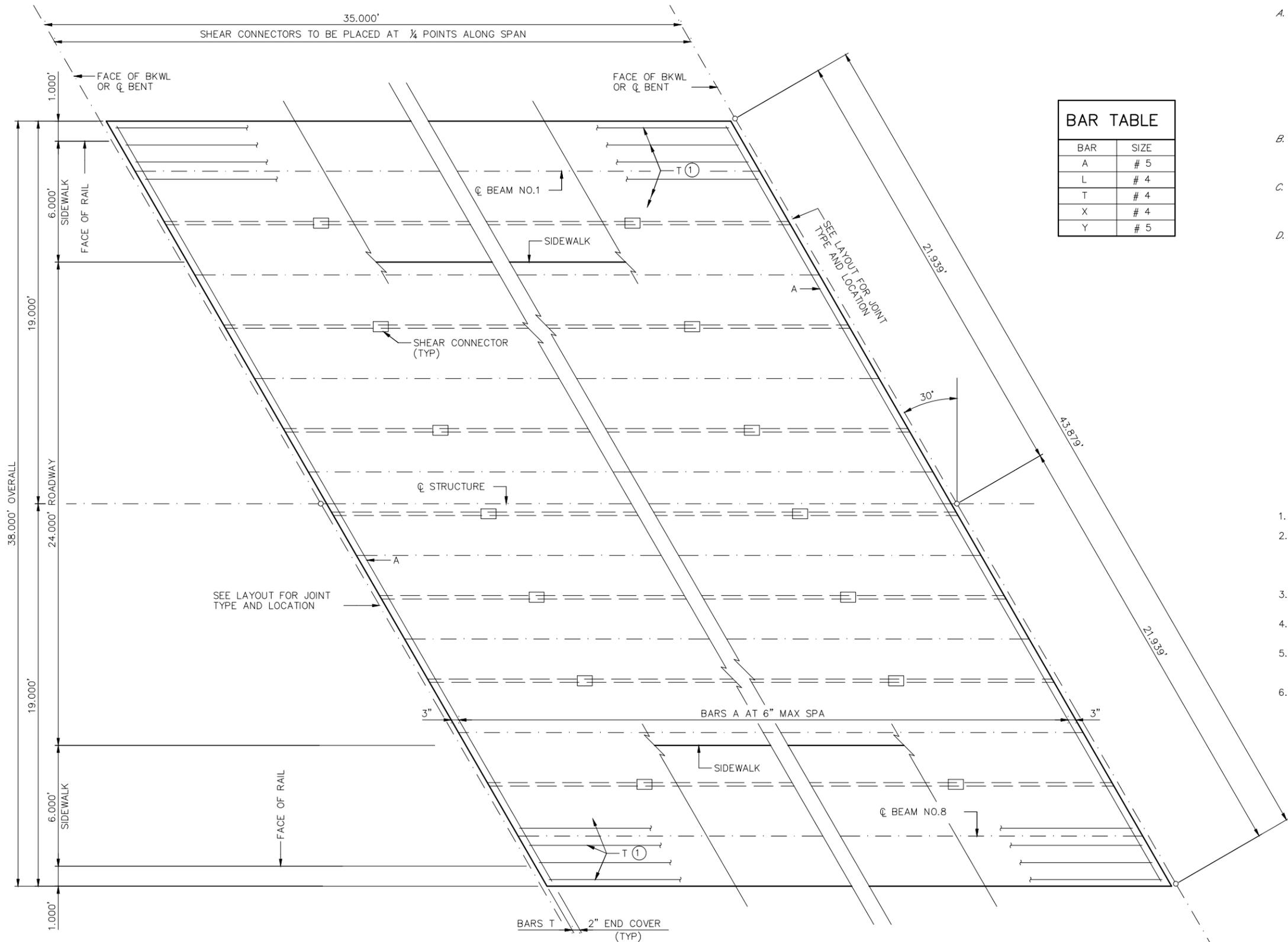
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BAR TABLE	
BAR	SIZE
A	# 5
L	# 4
T	# 4
X	# 4
Y	# 5

SLAB NOTES

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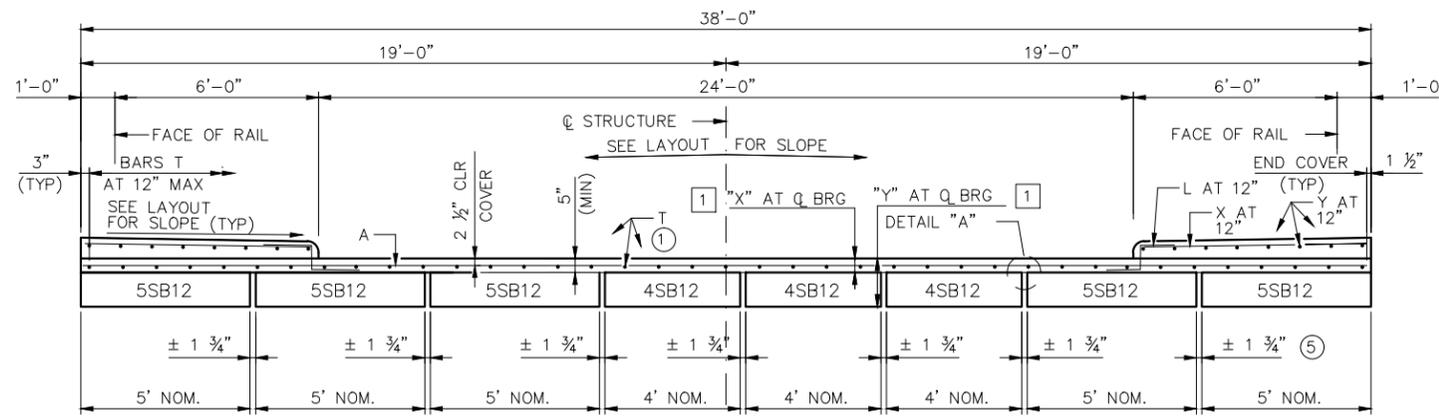
HARRIS COUNTY
ENGINEERING DEPARTMENT



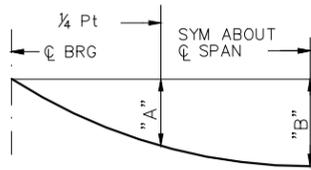
FIRM INFO

SEAL
NOTE

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

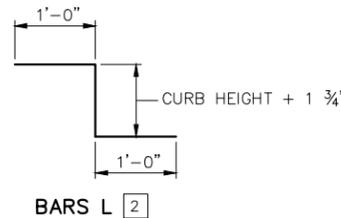


TYPICAL TRANSVERSE SECTION

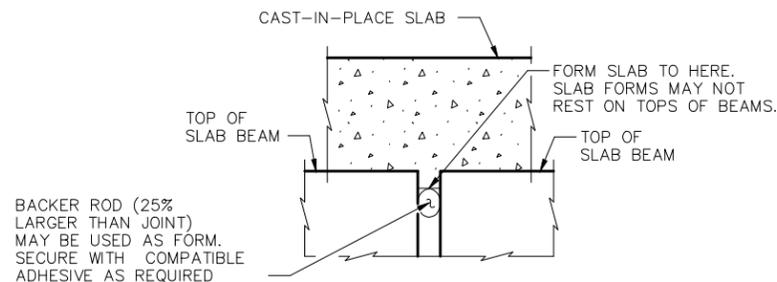


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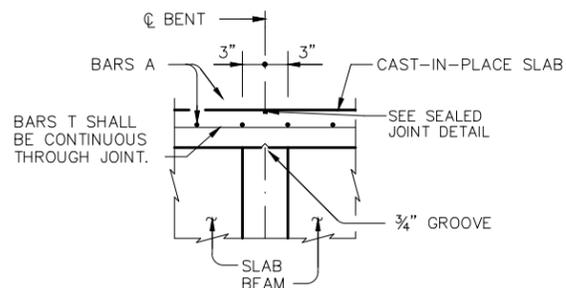
SPAN LENGTH	BEAM TYPE	DEAD LOAD DEFLECTION		SECTION DEPTHS [1]	
		"A"	"B"	"X"	"Y"
FT		FT	FT	IN	FT/IN
50	4SB12			6"	1'-6"
50	5SB12			6"	1'-6"



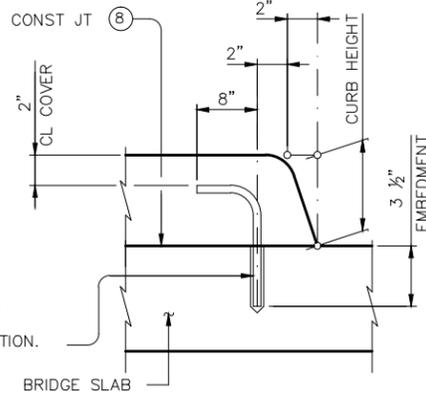
DEAD LOAD DEFLECTION DIAGRAM



DETAIL "A"

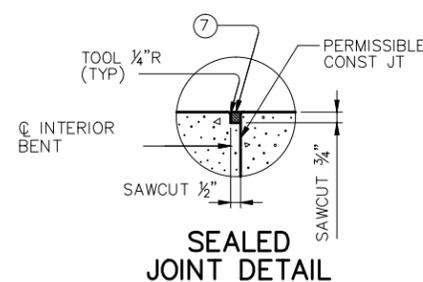


CONTINUOUS SLAB DETAIL

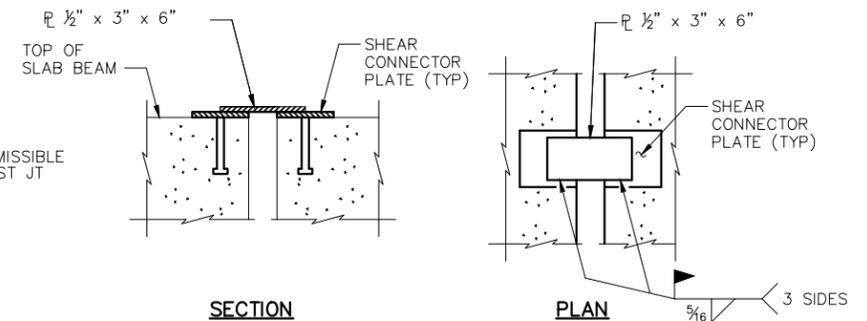


OPTIONAL EPOXYED ANCHORS EA (#4) CAN REPLACE BARS L AT THE CONTRACTOR'S OPTION.

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 EPOXYED ANCHOR BARS.



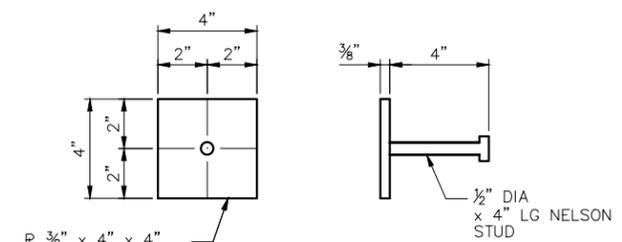
SEALED JOINT DETAIL



SECTION

SHEAR CONNECTION DETAIL

A36 STEEL



SHEAR CONNECTOR PLATE [6]

A36 STEEL

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

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NOTES TO ENGINEER

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HARRIS COUNTY
ENGINEERING DEPARTMENT



FIRM INFO

SEAL
NOTE

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

HL93 LOADING