

Standard Bridges

Jose Luis Lugo, E.I.T., M.S.C.E.

TxDOT - Bridge Division



Table of contents

- 1 What is a Standard Drawing and Standard Bridge
- 2 Location of the Standards/Standard Bridge Spreadsheet
- 3 Using the Standard Bridge Spreadsheet
- 4 Overview of the Output Files
- 5 Selecting the Applicable Standards
- 6 Summary of the Estimated Quantities
- 7 Take Aways

What is a Standard Drawing



Per TxDOT PS&E manual, Section 2, Standard Drawing Reliability,

Plan sheets of TxDOT standard drawings are considered a product of the company which have evolved and been **developed by many people over a considerable number of years**, and the details shown on the drawings have **proven to be reliable** through their years of use.

- Two kinds of standard
 - Statewide Standard Drawings
 - **District** Standard Drawings
- There are working drawing now on the Standards Website for bridge repairs.
- TxDOT Bridge Division currently maintains:
 - **801 standards** (1268 sheets)

Standard Drawings

- Statewide Standard Drawing Drawings are not considered to be an available standard until they are **issued via the TxDOT internet site**. The original version is kept on file in the Bridge Design Section of the Bridge Division. The electronic file of this original is available <u>here</u> on TxDOT's Internet web site. Any **reproducible** copies made from the electronic file may be **used in plan sets** and are **not required to be signed or sealed**.
- Modified Standard Drawing Any change, however minor, to a standard drawing for use in a specific project, must be briefly described and dated in the revision block of the plan sheet. This sheet must be signed and sealed by the engineer of record. Additionally, the designation "(MOD)" must be placed after the standard name inside the title block.
- <u>District Standard Drawing</u> Any drawings used regularly within a district that were developed by that district, or statewide standards that are revised to fit the individual needs of that district, may be considered a district standard. Each district must identify their standards by including the district name in the title block. Only the issuing district may use this drawing as a standard without signing and sealing.

Per the Bridge Detailing Guide: Chapter 2, Section 3 (https://ftp.txdot.gov/pub/txdot-info/brg/design/bridge-detailing-guide.pdf)

Bridge Division Standard Drawings

*

- Designed for HL93 live load in accordance with AASHTO LRFD Bridge Design Specifications
- Superstructure types
- Various beam sizes
- Various Roadway widths available (e.g., 24, 28, 30, 32, 34, 38, 40, and 44-ft)
- Various skew angle (e.g., 0, 15, 30, and 45-degree)
- Span lengths of 40 ft. through 135 ft. in 5 ft. increments (Not all girder types accommodate all span lengths)
- Roadway surface is a cast-in-place concrete slab
 - varies by superstructure type(e.g., 8 ½ -in. Tx-Girder)
- Most standard rail types

Types of Standard Bridges



SUPERSTRUCTURE	BEAM SIZE	SKEW	ROADWAY WIDTH
Prestressed I-Girders	Tx28, Tx34, Tx40, Tx46, Tx54, Tx62,	0°, 15°,30°, or 45°	24', 28', 30', 32', 34', 38', 40', 44'
Prestressed Box Beams	4B20, 5B20, 4B28, 5B28, 4B34, 5B34, 4B40, 5B40	0°	24', 28', 30'
Prestressed Slab Beams	4SB12, 4SB15, 5SB12, 5SB15,	0°, 15°, or 30°	24', 28', 30'
Cast in Place Concrete Slab Span	Unit (25'), Unit(25'-25'), Unit(25.5'-25.5'), Unit(25'-25'-25'), Unit(25.5'-25.5'-25.5'), Unit(25'-30-25'), Unit(25.5'-30.5'-25.5')	0°, 15°, or 30°	24', 28', 30', 38', 44'
Concrete Slab and Girder (Pan Form)	CG-30'4"-24', CG-40'-24'	0°, 14°2′,26°34′, 36°52′, or 45°	24'
Prestressed Decked Slab Beams	6DS20, 7DS20, 8DS20, 6DS23, 7DS23, 8DS23	0°, 15°, or 30°	24', 28', 30'
Prestressed X-Beams	5XB20, 5XB28, 5XB34, 5XB40	0°, 15°, or 30°	32', 38', 40', 44'
Steel Beams	Varies (W18x130 thru W40x149)	0°, 15°, or 30°	24', 28', 30'

Winter Bridge Webinar 2024 January 25, 2024

Bridge Division Standard Drawings

*

- Details are provided to construct 2 or 3 span units with slabs continuous over interior bents
 - reducing the number of expansion joints
- Details for Abutment header slopes of 2:1 and 3:1
- Drawings support these foundation options:
 - Drilled shafts (36-and 42-in)
 - Multi-pile footings
 - Prestressed concrete piling (18-,20-,24-in)
 - Steel H-piling (HP 14x117 and HP 18x135)

Restrictions – **BRG Standard Drawings**



- Do not change girder type within a bridge
 - (for example, Tx28 to Tx40)
- Do not change skew angle within a bridge
- Maximum allowed column height, allowed exposed pile height, and maximum allowed pile loads are <u>listed on bent</u> <u>details</u>
- Do not use rail: T66, T80HT, T80SS, C412, C66, or T224
 - Their width or weight precludes their use on standard roadway width spans

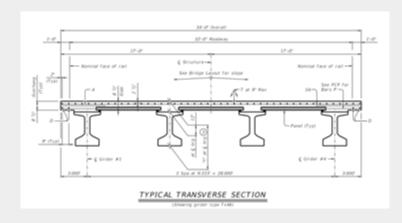
Restrictions – **BRG Standard Drawings**

*

- The maximum number of spans per unit is three, and the maximum unit length cannot exceed the limits shown on standard drawing IGCS
 - based on applied unit length factor determined by roadway grade
- Some unit lengths are too great to use sealed or open armor joints and Type A joints
- Do not use single-sided crash cushions (see Design Division standard drawing SSCC-16) with abutment wingwalls lengths less than 7 ft
- Drawings do not accommodate raised sidewalks and medians or rails not on edge of slab If adding a raised sidewalk, median or rail, check standard drawing for additional loading

What is a Standard Bridge?

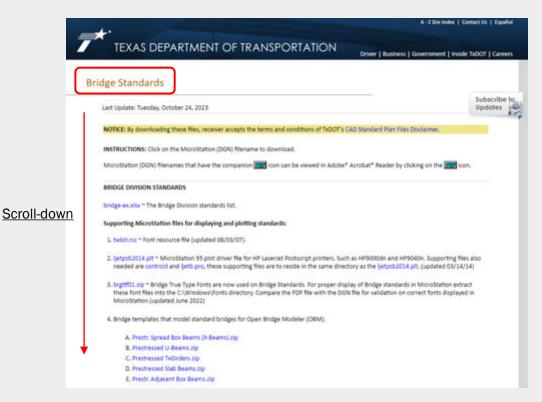
- A standard bridge is a bridge were plan sheets are comprised of non-modified Bridge TxDOT standard drawings. These Bridge TxDOT standards are selected by:
 - Superstructure Type
 - Roadway width
 - Girder size
 - Skew angle
- Bridge Layout
- Summary Estimated Quantities
- More info on Standard Bridge criteria in standard bridge guide per superstructure



https://ftp.dot.state.tx.us/pub/txdot-info/cmd/cserve/standard/bridge/guideste.pdf

Bridge Standards Website







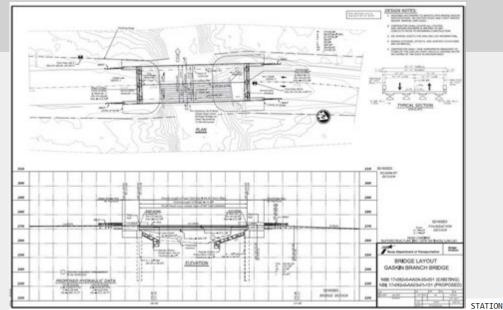
- Standard Drawing
- OBM Standard Templates
- Memorandums
- Guide to Bridge Standard Drawings
- Standard Bridge Spreadsheet

https://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/bridge-e.htm #PRESTRESSEDCONCRETEI-GIRDERS

Standards Spreadsheet

Information Needed:

- Alignment Info
 - Vertical
- Cross slope
 - Crown
 - Full Superelevation
 - Transitioning slope
- Preliminary Bridge Layout



954+59.000 R1	0.020	Normal Crown
955+40.000 R1	0.054	Full Super
980+31.000 R1	0.054	Full Super
981+13.000 R1	0.020	Normal Crown
1021+70.000 R1	0.020	Normal Crown
1023+45.000 R1	-0.053	Full Super
1063+30.000 R1	-0.053	Full Super
1065+06.000 R1	0.020	Normal Crown
1110+37.093 R1	0.020	Full Super
1110+48.613 R1	0.020	Normal Crown

START VPC Tangent Grade: Tangent Length:	1123+00.0000 R1 1125+28.2194 R1 0.0034 228.2194	39.0574 39.8423
VPC	1125+28.2194 R1	39.8423
VPI	1126+10.7194 R1	40.1261
VPT	1126+93.2194 R1	39.5898
VHP	1125+85.3167 R1	39.9405
Length:	165.0000	
Entrance Grade:	0.0034	
Exit Grade:	-0.0065	
K Value =:	166.0041	
Middle Ordinate (E):	-0.2050	

Winter Bridge Webinar 2024 January 25, 2024



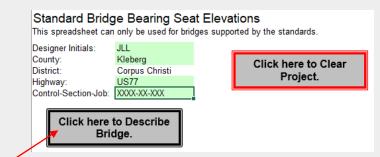
ELEVATION

12



Steps:

- 1. <u>Describe the project</u> being designed
 - Designer's Initials (up to 5 characters)
 - County
 - District: automatically found based on the County
 - Highway: (up to 10 characters)
 - C-S-J: typed input in the form "XXXX-XXX-XXX"
- 2. Click on the "Click Here to Describe Bridge" Button



Note:

- Green cell require input
- Macros must be enabled on the spreadsheet
- Instructions found on spreadsheet

Project Instructions Output



Span Length

55 ft

55 ft

3. <u>Describe the bridge</u> being designed

- Name of Bridge
- Roadway Width (32' roadway prestressed concrete l-girders)
- Superstructure Type Beam
- Skew Skew Direction
 - "Left-Forward" is a skew to the left end of a bent or abutment is up-station
 - "Right-Forward" is a skew to the right end of a bent or abutment is up-station
- Roadway Type (TYP 8.5" slab thickness)
- Rail Type
- Number of Spans/Units
- Stationing
 - Input only the station of Abutment 1 bents will be calculated based on the span lengths

Define Bridge Name of Bridge US77 Overpass at BUS77 Click here when done **Bridge Discription:** Roadway Width 32 ft Prestressed Concrete I-Girden Superstructure Type: Beam Type: 15 Deg Left-Forward 8.5" Slab Roadway Type: Rail Type: Bent Stations: Span Arrangements:

Step 4. Click here when completed

(Sample Input data for demonstration purposes only)

1125 + 28.22

1125 + 83.22

1126 + 38.22

1126 + 93.22

Abutment 1:

Abutment 4:

Bent 2:

Bent 3:

Number of Span

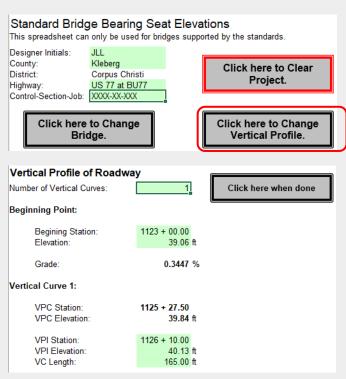
Span 1:

Span 2:

Span 3:



- 6. Describe the vertical profile of the roadway (input):
 - Number of Vertical Curves: (value can only be changed if the standards allow a vertical curve with the selected superstructure type)
 - Beginning station: The station down-station of the first abutment of the bridge. It must be before the beginning of the first vertical curve (VPC), if a vertical curve is defined
 - Ending Station: The station up-station of the last abutment of the bridge. It must be after the end of the last vertical curve (VPT)
 - Elevations (elevation of the Profile Grade Line (PGL) at the Station given
 - VPI Station
 - VPI Elevations: This is the elevation of the VPI at the PGL



(Sample Input data for demonstration purposes only)

6. Auto-populates:

- VPC/VPT Station: the station at the Point of Tangency at the beginning of the VC (VPC) or ending of the VC (VPT)
- VPC/VPT Elevation: Elevation of the PGL at the VPC or VPT
- VC Length: Vertical curve length (only supports the use of symmetric parabolic vertical curves)



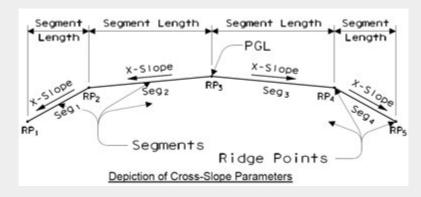
Step 7. Click here when completed Vertical Profile of Roadway Number of Vertical Curves: Click here when done Beginning Point: 1123 + 00.00Begining Station: 39.06 Elevation: Grade: 0.3447 % Vertical Curve 1: VPC Station: 1125 + 27.50 VPC Elevation 39.84 ft VPI Station: 1126 + 10.00 VPI Elevation: 40.13 VC Length: 165.00 Ext -0.2040 ft VPT Station: 1126 + 92.50VPT Elevation: 39.59 ft Grade -0.6444 % Ending Point: Ending Station: 1126 + 93.22 39.59

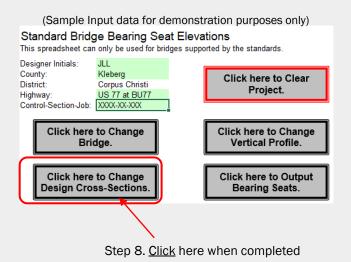
(Sample Input data for demonstration purposes only)

Note: Station input can be either numerically (1234.56) or station format (12+34.56)

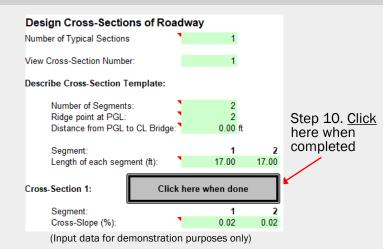
Winter Bridge Webinar 2024

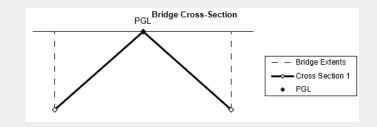
- 8. On the "Project" page, click on the "Click here to Describe Design Cross-Sections" Button
- 9. Describe the roadway template on the "X-Section" page
 - Number of Typical Sections : cross-slope transition allowed with certain superstructure types
 - View Cross-Section Number: picture at the top right of the page shows the corresponding cross-section





- Number of Segments: (there must be at least one segment on either side of the PGL)
- Ridge Point at PGL: designation of the point at PGL, point numbers increase from left to right. Point 1 is the point on the left side of the segment on the far left of the crosssection
- Distance from PGL to CL Bridge: measured transversely from the PGL, CL positive to the right and negative to the left of the PGL (feet)
- Length of Each Segment: in feet, measured in plan-view in the transverse direction
 - The length of the segments on either side of the PGL must extends to or beyond the left and right edges of the bridge
- Cross-Slope : in percent, down away from the PGL are positive, and up away from the PGL are negative

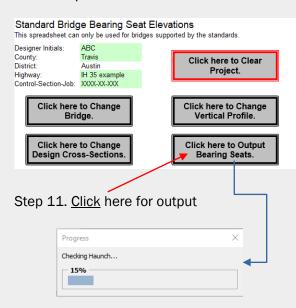


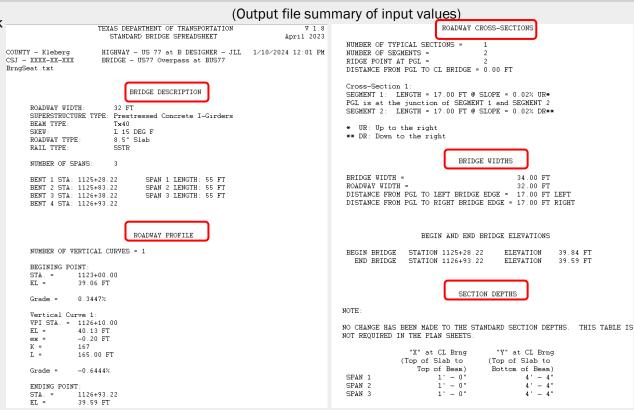




20

- 11. On the "Project" page, click on the "Click here to Output Bearing Seats" Button.
 Once the progress bar has disappeared, the program has finished running
- 12. Output as .txt file





Winter Bridge Webinar 2024 January 25, 2024



Output file:

Verify:

- Input values
- Bearing Seat Elevations

(BrngSeat file direct import to Microstation for use on the plan sheets)

- Beam Slopes
- List of Standards
 - Bridge type details
 - Miscellaneous detail sheets

	BEAR	ING SEAT ELI	EVATIONS (FI	г)	
ABUT 1 (FWD)	GIRDER 1 35.294	GIRDER 2 35.288	GIRDER 3 35.280	GIRDER 4 35.270	
BENT 2 (BK) (FWD)		35.377	GIRDER 3 35.377 35.377	GIRDER 4 35.374 35.375	
BENT 3 (BK) (FWD)		35.292	GIRDER 3 35.300 35.293	GIRDER 4 35.305 35.299	
ABUT 4 (BK)			GIRDER 3 35.041	GIRDER 4 35.055	
	BE <i>i</i>	AM SLOPES (1	FT/FT)		
SPAN 1	GIRDER 1 0.0015	GIRDER 2 0.0017	GIRDER 3 0.0018	GIRDER 4 0.0020	
SPAN 2			GIRDER 3 -0.0015	GIRDER 4 -0.0013	
SPAN 3			GIRDER 3 -0.0048		

STANDARDS LIST

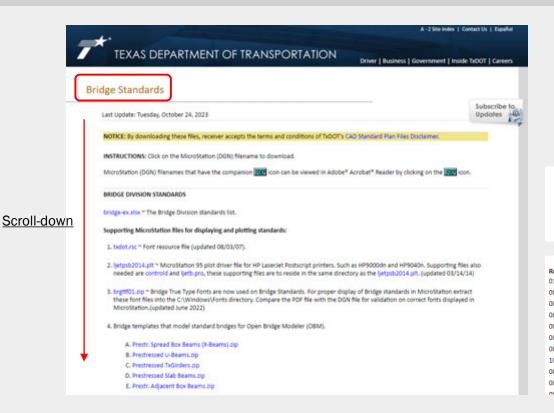
* The following list may not be entirely relevant nor all inclusive.

- * Determine which other standards are needed and which standards
- * included here are not required for your project

```
AIG-32-15
BIG-32-15
              *Verify applicability
BTIG-32-15
              *Verify applicability
SIG-32-15
IGSD-32
IGCS
IGD
IGEB
IGFRP
         *Verify applicability
IGMS
IGSK
         *Verify applicability
IGTS
         *Verify applicability
BAS-A
         *Verify applicability
         *Verify applicability
         *Verify applicability
CP
         *Verify applicability
CRR
         *Verify applicability
CSAB
         *Verify applicability
FD
MEBR(C)
NBIS
PBC-P
         *Verify applicability
PPBC-RC
         *Verify applicability
         *Verify applicability
PBC-RC
SD-EBR
PCP
PCP-FAB
PMDF
SEJ-B
         *Verify applicability
SEJ-M
         *Verify applicability
SRR
         *Verify applicability
SSTR
```

Bridge Standards Spreadsheet





BEAM TYPE: Tx40	tressed Concrete I-Girders
ROADWAY TYPE: 8.5"	Slab
RAIL TYPE: SSTR	!
NUMBER OF SPANS: 3	
BENT 1 STA: 1125+28.22	SPAN 1 LENGTH: 55 FT
BENT 2 STA: 1125+83.22	SPAN 2 LENGTH: 55 FT
BENT 3 STA: 1126+38.22	SPAN 3 LENGTH: 55 FT
BENT 4 STA: 1126+93.22	

Miscellaneous Standards | Bridge Railing Standards | Retaining Walls | Culvert And Drainage Prestressed Concrete X-Beams | Cast-In-Place Concrete Slab Spans | Prestressed U-Beam Detail | Prestressed Concrete I-Girders

Steel Beams | Prestressed Slab Beams | Prestressed Box Beams | Prestressed Decked Slab Beams

Concrete Slab & Girder (Pan Form) | Working Drawings

		PRESTRESSED CONCRETE I-GIRDER 40' ROADW	/AY DETAILS
Rev Date	Std Name	Description	File Name
01-21	IGSD-40	Std Designs,Ty Tx28 Thru Tx62 Girders,40' Rdwy	IG-IGSD40-21.dgn
08-17	AIG-40	Abut,Ty Tx28 Thru Tx54 Girders,40' Rdwy	IG-AIG4000-17.dgn
08-17	AIG-62-40	Abut,Ty Tx62 Girders,40' Rdwy	IG-AIG624000-17.dgn
08-17	AIG-40-15	Abut,Ty Tx28 Thru Tx54 Girders,40' Rdwy,15 Deg	IG-AIG4015-17.dgn
08-17	AIG-62-40-15	Abut,Ty Tx62 Girders,40' Rdwy,15 Deg	IG-AIG624015-17.dgn
08-17	AIG-40-30	Abut,Ty Tx28 Thru Tx54 Girders,40' Rdwy,30 Deg	IG-AIG4030-17.dgn
08-17	AIG-62-40-30	Abut,Ty Tx62 Girders,40' Rdwy,30 Deg	IG-AIG624030-17.dgn
10-23	AIG-40-45	Abut,Ty Tx28 Thru Tx54 Girders,40' Rdwy,45 Deg	IG-AIG4045-23.dgn
08-17	AIG-62-40-45	Abut,Ty Tx62 Girders,40' Rdwy,45 Deg	IG-AIG624045-17.dgn
08-17	BIG-40	Bent,Ty Tx28 Thru Tx54 Girders,40' Rdwy	IG-BIG4000-17.dgn
10 17	DIG 63 VO	Builting Ciden Ad Balin	विद्या

January 25, 2024 Winter Bridge Webinar 2024

STANDARDS LIST

```
* The following list may not be entirely relevant nor all inclusive.
* Determine which other standards are needed and which standards
* included here are not required for your project.
AIG-32-15
     BIG-32-15
                  *Verify applicability
                  *Verify applicability
     BTIG-32-15
     SIG-32-15
     IGSD-32
     IGCS
     IGD
     IGEB
             *Verify applicability
     IGFRP
     IGMS
             *Verify applicability
     IGSK
     IGTS
     AJ
             *Verify applicability
     BAS-A
             *Verify applicability
             *Verify applicability
     BAS-C
     BMCS
             *Verify applicability
     CP
             *Verify applicability
     CRR
             *Verify applicability
             *Verify applicability
     CSAB
     FD
     MEBR(C)
     NBIS
             *Verify applicability
     PBC-P
     PPBC-RC
             *Verify applicability
             *Verify applicability
     PBC-RC
     SD-EBR
     PCP
     PCP-FAB
     PMDF
     SEJ-B
             *Verify applicability
             *Verify applicability
     SEJ-M
     SRR
              *Verify applicability
     SSTR
```



Superstructure: Beams

- IGSD-32
- Prestressed Concrete Girder
- 32' Roadway
- 55' Span Girder Design

(1) Based o	n the fo	ollowing	allowab	le stre	sses	(ksi):					
	Com	pression	= 0.65	f'ci								
	Tens	sion = 0	.24 $\sqrt{f'}$	ci								
	Optional											
(3	2) Portion of full HL93.											
(2	2) 1 57 (10)1 61 1 (11) 11235.											
			DES	IGNED	GIRDE	RS			i			
			CIADEA		PRES	TRESSI	NG STRA	WDS				
STRUCTURE	SPAN NO.	GIRDER GIRDER NO. TYPE		NOV- STD STRAND	TOTAL NO.	SIZE	STRGTH		"e" END			
				PATTERS		(in)	fpu (ksi)	(in)	(in)			
	40 45	ALL ALL	Tx40 Tx40		12 14	0.6 0.6	270 270	15.60 15.60	15.60 15.60			
	50	ALL	Tx40 Tx40		16	0.6	270	15.60	15.60			
Type Tx40 Girders 32 Roadway 8.5° Slab	60 65 70 75 80	ALL ALL ALL ALL	Tx40 Tx40 Tx40 Tx40 Tx40 Tx40		18 18 20 24 28	0.6 0.6 0.6 0.6	270 270 270 270 270 270	15.16 15.16 15.00 14.77 14.60	13.82 13.82 13.40 9.77 10.60			
	85 90	ALL	Tx40		32 36	0.6	270 270	14.23 13.93	9.27			

			26	SHEARS	61406	A5	N/ 3/N/			DEPH	ESSED- MANO	CON	OMETY	200		AL DESIGN		-		PACT	AT ING		
STRUCTURE	75	- Eu	122	200	Total Mg	9170		ĭ	ň	PACE TO	7898	100	127	77	700 100 100 100 100 100 100 100 100 100	1000 1000 1000 1000 1000	120	0.00	170	MOY!	100000		ART
Programme Total Street	:	-	7-09 7-09 7-09		-	::	333	55	15	2 2	***	E	iii	1.00	1,190	100 100 100 200 200	Arriv Arriv Arriv	1,570 1,670 1,680 1,680	1.00 1.00 1.00 1.00	15,800	100		
27.10	**	2	Autor Autor Autor		2	**	200	100 100 100	2.8 7.97 7.01	1	21	1.600	1,000	3 100 F	15/007	J715 J884	APP	Umi Umi Umi	1.74	1,40	100	0=	-
Trans Publications To Problem		-	Auto Auto Auto Auto Auto		2 2 2	**	2222	100	11.74	:	::	*****	12	1.000 1.000 1.000 1.700	-0,000 -0,000 -0,000 -0,000	1046 1046 1046	ATT.	Committee Commit	144 144 144 144	11.13	0.40 0.41 1.40 1.40		Conson Female
3730	20 20 20 20 20 20 20 20 20 20 20 20 20 2	-	Tube Tube Tube Tube		20 20 20 20 20 20 20 20 20 20 20 20 20 2	::	210 210 210 210	100	500 500 140 500	1	20.1 20.1 20.1 20.1	4.700 4.700 1.200 1.800	0.000 0.000 0.000 1.000	1000 1000 1000	-2009 -2009 -2009 -2009	2017 2018 2017	ACTO ACTO ACTO ACTO	1,000 1,000 1,000	1.00	1,41	1.00	o~	romer s
	0 2	2	7.60 7.60 7.60 7.60		N N N	**	3333	747 747 747	1140			4,000 4,100 4,000 4,000	1.600 1.600 1.600 1.600	0.768 0.967 1.965	-0/87 -0/87 -1/87 -1/87	200 200 200 200	April	1,6100 1,6400 1,6400 1,6500	7.60 7.61 1.61	0.40	0.60 0.60 0.00		Dec star
Total Telephone Total Strategie E F State	2	-	7.40 7.40 7.40 7.40 7.40		*****	::	2222	15.00 15.00 15.00 15.07 15.07	1140 1140 1140 1140	:	30.5 30.5 30.5 30.5 30.5	4.000 4.000 4.000 4.000 4.000	12	100	-2100 -2100 -2100 -2100 -2100	,077 ,077 ,006 ,006 ,006	April April April April April	Later Later Later Later Later	111	1,76 1,66 2,67 1,68	100		
_	:	2	7.00 7.00 7.00 7.00	Н	N N	::	200	1000	7.07 7.07 7.00 7.00	-	34.1	1.00	1.00	2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	-0.000 -0.000 -0.000 -0.000	100 100 200	APP APP APP	LEN LEN LEN	1.00 1.00 1.00	1277	1.00 2.07		ARK!
Name Code Streets	+	-	110				20	100	10	1	11	100	1	170	1,40	107	ACT.	UNI UNI	11 00	100	100		100
Top Top Street	2		Total Total Total Total			::	333333	154 156 167 167 166 167	11.00	1	30 30 40 40	100	1.00	2000 2000 2000 2000	-100F -100F -100F -100F	3616 6716 1100 1100	April A/W A/W A/W	1,000 1,000 1,000 1,000 1,000	1.20	140	100		Ī
	-	2	33		ä	**	12	200	1.0];	343	1:2	1.00	591	419	417	ACM ACM	=	100	2.0	1.00		ABBOT TO THE PROPERTY OF THE P
To the second se	17.5	Ţ.,;		1 A 1	7 10 10 10 10 10	Secretary Secret		17.54	7234	1	100	The Charles	The second secon		Tx40) 				13	Y TANK		
DEPR			Ī	со	N/C	0.5		ī	ī			(OPTI	IONAL		IGN					II	LOAD RATI	
	RANE)		ELEA	SE	RIT	VINU I DA		6	LDAD COMP			DESM LOAD TERSI)	REQUIR HINIM ULTIMA	100		LIVE DISTRI FAC			7 -	FACTOR	5

				_	140	7 40	40 3-40		-	573	ANO	CONC	METE	2000	2000	Married A	1.00			FACTO	its .	ATAMA ARMADIANA
STAUCTURE	75	copes m.	1702*					~			1981	5110	1000	100	200 100 100 100 100 100 100 100 100 100	10000 10000 10000	100	100				ANTERN STREET ANTERNAL ANTERNA
	- "			200	10	1	Γ	i	nie	-	700	0	77	777	2000 2007 July 1	1000	(0	1790	m:	-	
					_	100	ă.	Ac	200	100	26.		200	100.0	1800	1000	Ame.	-ine	-	-0.	- 10	
	- 00	- 11	7108			111	-	2.0	2.00		44.6	100	11.000	1.000	-1.198	1000	0.8797	18,8795	1.58	0.64	10,811	
Name Profit Streets	- 0	-	200		1 2	11	2	10.00	134	13	8.0	100	1.600	1.607	1200	2049	A,600 A,600	UMP.	1.00	1.00	100	
Tops Troff Streams ST Streams AST State		At a	Pulse.		-	4.0	200	TWY	2.81		53.6	4.100	0.600	100	14 989	2007	1,780	N/MI	1.26	1988	1.65	
	-	-	hote hote		100	11		91/9 91/91	7.00	1:1		1.600	1.60	3100	1,0407	2705	A/W	APRIL NAME	1.74	100	100	
_	-	-	Auto	-	-	1.0		100	100	H		1.00	1.800	4.004	10.000	1873	AME	N/W		14/19	2.85	(C) Record on the following alternative obvectors that's
	40	Att.	7109		34	**	/m	10441	101/01	1.5	8.0	4.000	1.69	1.180	-0.00	3100	April 1	1,000	X	1.01	0.77	Compression at 640 CV
	-	-	7109		1 :	**		197	11.74	1:	**	***	1.00	1107	1507	1046	Aprile Aprile	L/MIT	144		1.67	Fernism = 8.34 \sqrt{reV}
Tops Tubb Street	- 40	AL.	August 1		-	446	270	10181	11.00	1.5	88.8	4.000	11.600	.1 0968	-2496	2000	APR	MPE	1.50		0.07	Optional designs must diseafue contains.
		70	Tube Tube		20	**	2	1947	500	13	30.5	1.700	0.000	1404	12/08	107	ACTO	APP	1.10	140	1.34	(2) Partha of Full HURS
	70	81	1400			440		70.00	7.60	1	.00.0	1.700	6.590	.01000	1,000	2000	5.790	1,180	3.89	11.67	11.62	Question or constant
_		81	Autor	-	24	44	201	11.00	140	-	30.5	1.807	Public .	1617	16277	1079	4.790	1.000	1.27	145	1.60	
	-	70	240		20	10		196	11.60		- 1	100	1.69	0.768	-0.00	,000 ,000	AARON	UNIV.	AAF AAFT	(140	0.65	
	34	At a	140		154	4.0		1740	2.00		- 1	4.500	11,000	1.000	-1.104	2008	0,800	1,540	1,61	0.40	11,788	
		-	240		1 :	10	2	10,00	14.0	1.5	8.0	4,000 4,000	1.60	1.007	1000	,660 ,667	0.800 0.800	1,650	1.07	0.87	176	DESIGN MOTES
Frage Full Straters St. Bradesa B.F. State	40	Att.	7.60		-	44		15,00	1190	131	55.5	4.000	1.600	1.078	-21607	ART	0.800	3,560	ART	1,74	1.67	Prospect according to ARDHO LIND Bridge Dealer Specify/Specifys, Load rather some Load and Recovered Patiest Rating according to
47 Feb.	20	2	7.60		20	**	2	1949	10.40		33.5	4.000	1.59	1000	10/87	200	4/W 6/W	April 1	1.12	146	1.00	delicate thereof the divides distinction. Surface designs for girdens UN feet or larger must have a
	2	70	1.00		2	1	2	1997	2.7	1:	30.0	1	0.00	1000	1000	100	A/36	UMP.	V-	1,44	1.00	
	-	ALC:	7.49		N/	4.0	274	190,07	240	1.5	.00.0	1.100	0.000	3100	-1000	100	APR	1,676	1.79	2,64	1.00	divergency genture. A frontiering discount for the generalized gift-being Agent been calculated for a relative beautiful formation of the patriosis. Signiful enough to see
		AL.	1-00	_	-	**	274	10167	9.57		.16.1	1.800	0.670	.1 1000	1291	1,000	ATTE	MPE	1.10	1277	1.67	for a relative turning of 60 pircent, diplinal dealpre mon thouse contains.
		-	200		32	**	2	1500	7.0		- 1	4.00	1.00	1070	1.000	100	A,ROF	A REST	A.07	1,89	3.67	FARRICATION NOTES
	-	-	1.00		100	100		17,900				4.000	1.00	1490	-0.098	80.0	4,690	1,610	140	1.00	140	Principle Code of American plant term.
		- 11	100		1.5	1.00		200	4.0	1.1	41	100	100	1,007	-1,467	107	MIN	U.S.	1/2	1,00	2.00	Size fee refusation stransis, back protonulosed to 79 percent of
Total Trade Streets Str. Streets A P. State	-	75	2-8		1 =	111	201	1767	13.60	1.0	20.2	100	1.69	1.792	11,967	369	Arm	Men	1.00	180	1.00	Drawn asserting must comply with them distributed fruit comple- sions and all complete are only asserting on particular market a. Studio
27.70	20	-	7-8		1 2	**	2	15/4	13.60	1:1	55.0		1.60	1000	1000	200	A400 A700	LINE LINE	1.00	1981	1.00	answered process are only partitional or partitions market & . Department of the control of the
		.51	2-4		24	440	201	20.77	DOM:	13	20.0	4.000	1.100	41079	12,997	6700	4.790	1,898	1.28	140	0.04	After alone on this alone, the flatitudes has the nation of
	:	-	146		-	446		1990	11.00	1:	41.5	100	1.00	490	-6109	100	4,010	1,696	1.00	100	1.04	furnishing effect the designed protes or an approprial optional design. All springer design publishes must be object, souther and
	-	-	246		20	**	2	14.0	146	1:	40.5	1	1.60	A1004	-5400	4117	A/W	Umin Umin	15		1.00	
	100	ALC:	1-46		-	44	279	2000	11.76		34.5	1400	0.690	5991	4109	4676	4/10	1,000	ART	1/9	1987	Their shapes in pinter and considing 6,000 in width as directed to the frequency. The right state or periodical to discusse the saming of data is not to providing authorize than to hope test
																						spacing of dates it and it to providing anythings have to help limit chart width provided the decimant spacing results in no less than
																						their anith provider the declinease ligating results in to him than it has deleased signs. The lagricular signs of the an algorithm controller aniths if contain greater than \$100° form or a regulation
																						Section .
																						DEPARTSHIO STAANO OFFICIAS
																						All ring 10 F, then ring 16 F, then ring 16 F, all, degreeing each ring in the 16° publish and working ealways with the required number.
																						of accepts to reached the advanta to the "P position and the approximal mannaturing the "F searing on the, of the July owner, the signer two advantas are to the position about the table of the other signer.
																						the upper that already are in the position about to the sales.
																		r ass	-	-	#_	
												-		_				1 (0)		_	#1	18
								_		_	1	- 1	25			20		100		=		
_			_	-	T	813	-	$\overline{}$	1		ids -		84-		Ŧ	-40		1.86		=	ΗI	
r su	-	#7	_	-J.	J.	8E					-90	- 3	3		1		1	188			Ħ	ALEX CONDING SHEET 1 OF
V 81	\rightarrow	17		78	- 31	월드			#1			- 3	33=		#		- 1	100			#	These desertment of Deservation Section 1
4 53	_	#1			31	ni=			ŧL.			- 1	8=		#1			1 100		7	#X	
8 1	1.1	##>			- 51	10		1	14.			- 1	8	1.0	14.			1 (0:	1	44	HHe	PRESTRESSED CONCRETE
1 1 7	.eeffill	HH#4	H.		-1	11-	13	+1111	IIII lee			- 1	11-		HIII-e.	1		1 83	10	HH		I-GIRDER STANDARD
- 5	-	11112	##		- +	- 75=	- H	-	111	#		- 1-	11-					- 332	- #	441		DESIGNS
					-1				*****			- 10				-					******	
4		23.0	_		~		- 1		157	J		-4			100				- 1		23.20	32 ROADWAY
			_				-			-				_					-			IGSD-32
	TYPE	7x2	4					TYPE	Tx34					TYPE	Tx40					TYPI	Tx46	- Marie 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1
																						Dist 1917 11
								- 1	1				OT	ONA	DEC	LCM.					- 11	LOAD DATING
DEPR	ESS	EDI		CO	MA	0.0	TC	- 1	I			(111	ONAL	DES	ION					- 11	LOAD RATING
677		;"I	ш	CU	wc	ME	ıΕ	- 1	\vdash					_							-11	FACTORS
5//	RANE	,	L							YE 510	V		DESIG		REDUTA	60		LIVE	0040)	- 11	FACTORS
DAT	TER	,, I		ELEAS	SE I	877	VOR.	v	1	LDAD			CAGS		HINDR	200		DISTR	BUTA	ON	-11	

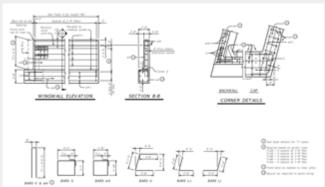
1		TYPE TX2	ď		771	P.E	7×34	771	PE 7 x 40		TYPE T	146			0
		ESSED AND		CONC	RETE		DESIGN	OPTION	AL DESIGN	1015				AD R	ATING ORS
		TERN FND		RELEASE STRETH TO	RENIRUM 28 DAY CORP STAGTH FC		LOAD COMP STRESS (TOP G) (SERVICE I)	LOAD TERSILE STRESS (BOTT Q) (SERVICE III)	REQUIRED HINIMUM ULTIMATE MONERT CAPACITY (STRENGTH I)	DISTRI			STREW		SERVICE III
_		(in)	U	(ksi)	(ksi)	l	fct(ksi)	řcb(ksi)	(kip-ft)	Moment	Shear	匚	tor	Opr	.fev
				4.000 4.700 4.500	5.000 5.000 5.000		0.768 0.967 1.195	-1.053 -1.282 -1.554	2052 2430 2558	0.910 0.880 0.860	1.030 1.040 1.040		2.0.2 2.01 1.91	2.62 2.61 2.48	2.88 2.63 2.29
	- 4	8.5	L	4.000	5.000		1.442	-1.834	2685	0.830	1.050	l i	1.60	2,07	1.79
	4 4 4 6 6	10.5 10.5 12.5 34.5 32.5 36.5 34.5		4,000 4,000 4,000 4,100 4,900 5,100 5,900	5.000 5.000 5.200 5.700 6.000 6.200 6.600		1.687 1.978 2.288 2.619 2.964 3.328 3.695	-2.118 -2.447 -2.783 -3.135 -3.509 -3.900 -4.294	287.5 327.7 366.6 406.4 449.8 494.4 539.4	0.810 0.800 0.780 0.760 0.750 0.740 0.730	1.050 1.060 1.060 1.060 1.070 1.070	2 2 2	1.57 1.31 1.13 1.60 1.27 1.29 1.33	2.03 1.70 1.68 2.07 1.99 2.04 1.75	1.61 1.22 1.08 1.26 1.14 1.08 1.07

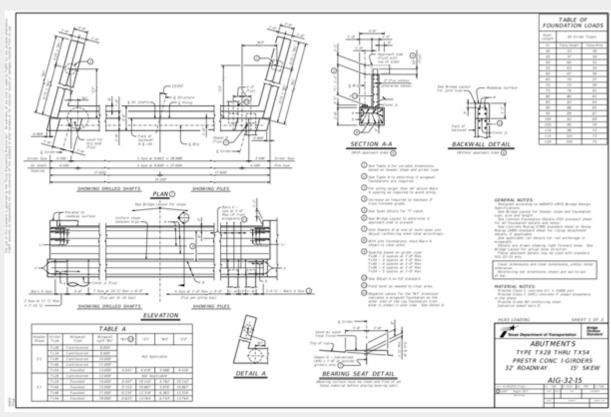


Abutments: AIG-32-15



- Abutments Prestressed Girder
- 32' Roadway
- 15-degree skew
- 2:1 header slope
 - Breakback details (included in applicable skew)
 - Header slope dependent





Abutments: AIG-32-15 (cont.)



2:1 Header Slope

	TYPE	Tx4	0 Gir	ders	
Bar	No.	Size	Len	gth	Weight
Α	10	#11	34'	-3"	1,820
D(7)	2	#9	1'-	-8"	11
Н	10	#6	34'-	-10"	523
L1	9	#6	4'-	54	
L2	9	#6	4'-	54	
S	30	#5	11'	-6"	360
U	4	#6	8'-	-2"	49
V	34	#5	13'	473	
wH1	14	#6	11'	-5"	240
wH2	24	#6	9'-	-8"	348
wS	22	#4	7'-	10"	115
wV	22	#5	13'	-4"	306
Reinfo	orcing St	eel		Lb	4,353
Class	"C" Conc		CY	22.3	

Notes (Tx40)

- 5 See Span details for "Y" value.
- 9 Spacing based on girder type: Tx28 ~ 3 spaces at 1'-0" Max Tx34 ~ 3 spaces at 1'-0" Max Tx40 ~ 4 spaces at 1'-0" Max Tx46 ~ 4 spaces at 1'-0" Max Tx54 ~ 5 spaces at 1'-0" Max
- 1) Field bend as needed to clear piles.
- 13 Adjust as required to avoid piling.

			TABLE	. A							
Header Slope	Girder Type	Wingwall Type	Wingwall Lgth "WL"	"W1"(12)	"Z1"	"W2"	"Z2"				
	Tx28	Cantilevered	8.000								
	T v 3/1	Cantilovered	9,000'		Not Applicable						
2:1	T x 40	Cantilevered	10.000	Not Applicable							
	1 x 46	Cantilevered	11.000								
	Tx54	Founded	13.000'	0.541'	9.418'	5.588'	9.418'				
	Tx28	Cantilevered	12.000'		Not App	olicable					
	Tx34	Founded	14.000'	0.347'	10.142'	5.782'	10.142'				
3:1	Tx40	Founded	15.000'	0.153	10.867'	5.976'	10.867'				
	Tx46	Founded	17.000'	-0.235'	12.316'	6.365'	12.316'				
	Tx54	Founded	19.000'	-0.623'	13.764'	6.753	13.764				

Foundation Loads (55' Span)

	TABLE OF FOUNDATION LOADS						
	Span Length	All Girder Types					
	Ft	Tons/Shaft	Tons/Pile				
	40	53	49				
	45	57	50				
1	50 60 52						
ı	55	63	54				
	60	67	56				
	65	70	57				
	70	73	59				
	75	76	61				
	80	80	62				
	85	83	64				
	90	86	65				
ı	95	89	67				
1	100	92	69				
ı	105	95	70				
	110	98	72				
ı	115	101	73				
	120	105	75				

Interior Bents: BIG-32-15



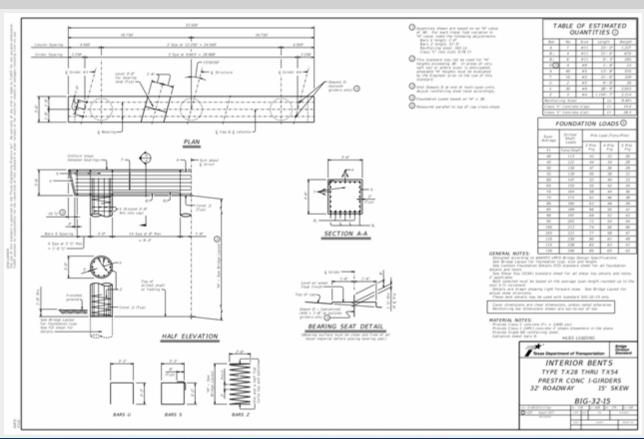
- TYP Multiple Column Bent
- Standard Design for cap and columns
 - Dimensioning
 - Bar layout
 - Bar detailing

Notes:

Foundation Loads based on column height:

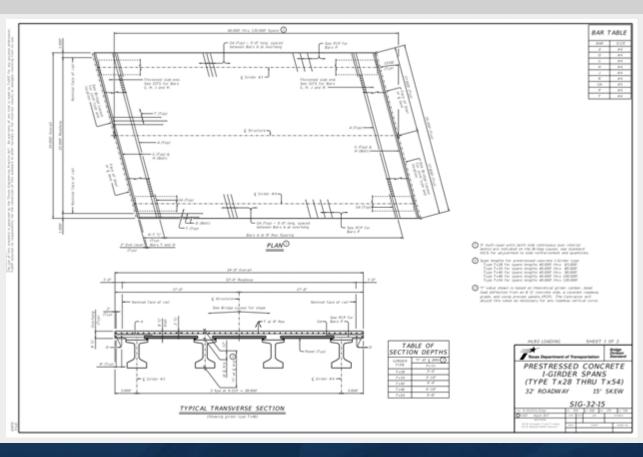
H = 36 ft

Estimated Quantities



Spans: SIG-32-15





- If multi-span units (with slab continuous over interior bents) are indicated on the Bridge Layout, see standard IGCS for adjustment to slab reinforcement and quantities,
- 2) Span lengths for prestressed concrete I-Girder type:
 Type Tx28 for spans lengths 40.000 thru 65.000.
 Type Tx34 for spans lengths 40.000 thru 80.000
 Type Tx40 for spans lengths 40.000 thru 90.000.
 Type Tx46 for spans lengths 40.000 thru 100.000.
 Type Tx54 for spans lengths 40.000 thru 120.000.
- "Y" value shown is based on theoretical girder camber, dead load deflection from an 8 ½" concrete slab, a constant roadway grade, and using precast panels (PCP). The Contractor will adjust this value as necessary for any roadway vertical curve.

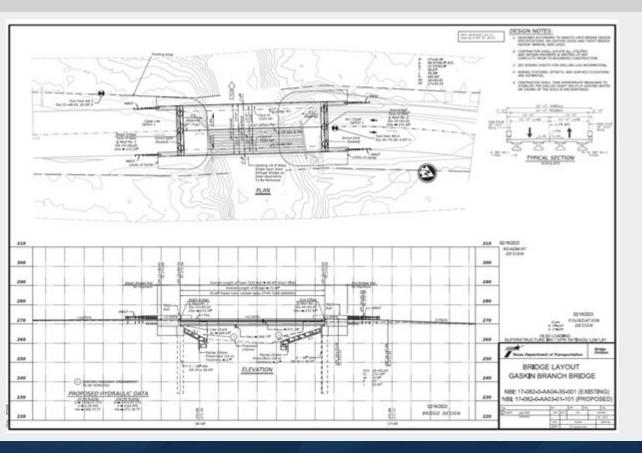
TABLE OF ESTIMATED QUANTITIES

		77050705	onders	6		
SPAN LENGTH	REINF CONCRETE SLAB	ABUT TO (4) INT BT	INT BT TO (4)	ABUT TO ABUT	TOTAL REINF STEEL	
Ft	SF	LF	LF	LF	Lb	
40	1,360	158.00	158.00	158.00	3,128	
45	1,530	178.00	178.00	178.00	3,519	
50	1,700	198.00	198.00	198.00	3,910	
55	1,870	218.00	218.00	218.00	4,301	
60	2,040	238.00	238.00	238.00	4,692	
65	2,210	258.00	258.00	258.00	5,083	
70	2,380	278.00	278.00	278.00	5,474	
75	2,550	298.00	298.00	298.00	5,865	
80	2,720	318.00	318.00	318.00	6,256	
85	2,890	338.00	338.00	338.00	6,647	
90	3,060	358.00	358.00	358.00	7,038	
95	3,230	378.00	378.00	378.00	7,429	
100	3,400	398.00	398.00	398.00	7,820	
105	3,570	418.00	418.00	418.00	8,211	
110	3,740	438.00	438.00	438.00	8,602	
115	3,910	458.00	458.00	458.00	8,993	
120	4,080	478.00	478.00	478.00	9,384	

- (4) Fabricator will adjust lengths for girder slopes as required.
- S Reinforcing steel weight is calculated using an approximate factor of 2.3 lbs/Sf.

Bridge Layout – Applicable Standards





- Shear Key: IGSK (Stream Crossing Bridge)
- Bridge Mounted Clearance Sign (BMCS)
- Joints:
 - Sealed expansion joint (Type B): SEJ-B
 - Sealed expansion joint (Type M): SEJ-M
 - Armored Joint with/without seal: AJ
- Riprap:
 - Stone: SRR or Concrete: CRR
- Columns:
 - Precast option(PBC-RC) vs Prestressed, precast option (PPBC-RC)
- Approach slab:
 - ACP or Concrete
- Cement stabilized abutment backfill (CSAB)
- GRFP Slab Top Mat Reinforcement: IGFRP
- Prestressed concrete piling

Winter Bridge Webinar 2024 January 25, 2024

Estimated Quantities

- Generate Summary Table for Estimated Quantities
 - Most found in standard or bridge layout
- Bid Item bridge detailing guide for tolerances

① Indudes 0.3 CY of shear key concrete per abutment

② Includes 0.6 CY of shear key concrete.

Bid Item#	Common Item	Show to Nearest
400	Structural Excavation	ICY
400	Cement Stabilized Backfill	1 CY
402	Trench Excavation Protection	1 LF
409	Prestressed Concrete Piling	1 LF
416	Drilled Shaft Foundations	1 LF
420	Concrete	0.1 CY
422	Reinforced Concrete Slab	1 SF
425	Prestressed Concrete Beams	0.01 LF
432	Riprap	1CY
434	Elastomeric Bearings	EA
442	Structural Steel	See Estimated Quantities in Appendix I
450	Railing	0.1 LF
454	Expansion Joint	1 LF
514	Permanent Concrete Traffic Barrier	0.1 LF
786	Carbon Fiber Reinforced Polymer	0.1 SF

SUMMARY OF ESTIMATED QUANTITIES

	0416 6004	0420 6013	0420 6029	0420 6037	0422 6001	0425 6037	0432 6026	0450 6006	0454 6004	0496 6010
BID ITEM DESCRIPTION BRIDGE ELEMENT	DRILL SHAFT (36 IN)	CL C CONC (ABUT)	CL C CONC (CAP)	CL C CONC (COLUMN)		PRESTR CONC GIRDER (TX40)	RIPRAP (STONE COMMON) (DRY) (18 IN)	RAIL (TY223)	ARMOR JOINT (SEALED)	REMOV STR (BRIDGE 100- 499 FT LENGTH)
ELEMENT	LF	44.0	CY	CY	SF	LF	CY	LF	LF	EA
2 - ABUTMENTS	332	44.0 ①						40.0	54	
1 - INTERIOR BENT	126		13.7 ②	7.9						
1 - 130' PRESTRESSED CONC. I-GIRDER UNIT					3900	515.92		260.0		
OVERALL TOTALS:	458	44.0 ①	13.7 ②	7.9	3900	515.92	144	300.0	54	1

Take Aways

*

- Appropriate use of standards sheet
 - Applicability and restrictions
- Standard Bridge Spreadsheet
 - Location, use, compilation of standards
- Signing and sealing set plan
 - Bridge Layout
 - Sheet including bearing seat elevations or any other sheet including elevations
 - MOD standard sheets



Contact Information for Standards

Taya Retterer, P.E.

Email: Taya.Retterer@txdot.gov

Phone: (512) 416-2191

Questions???



