

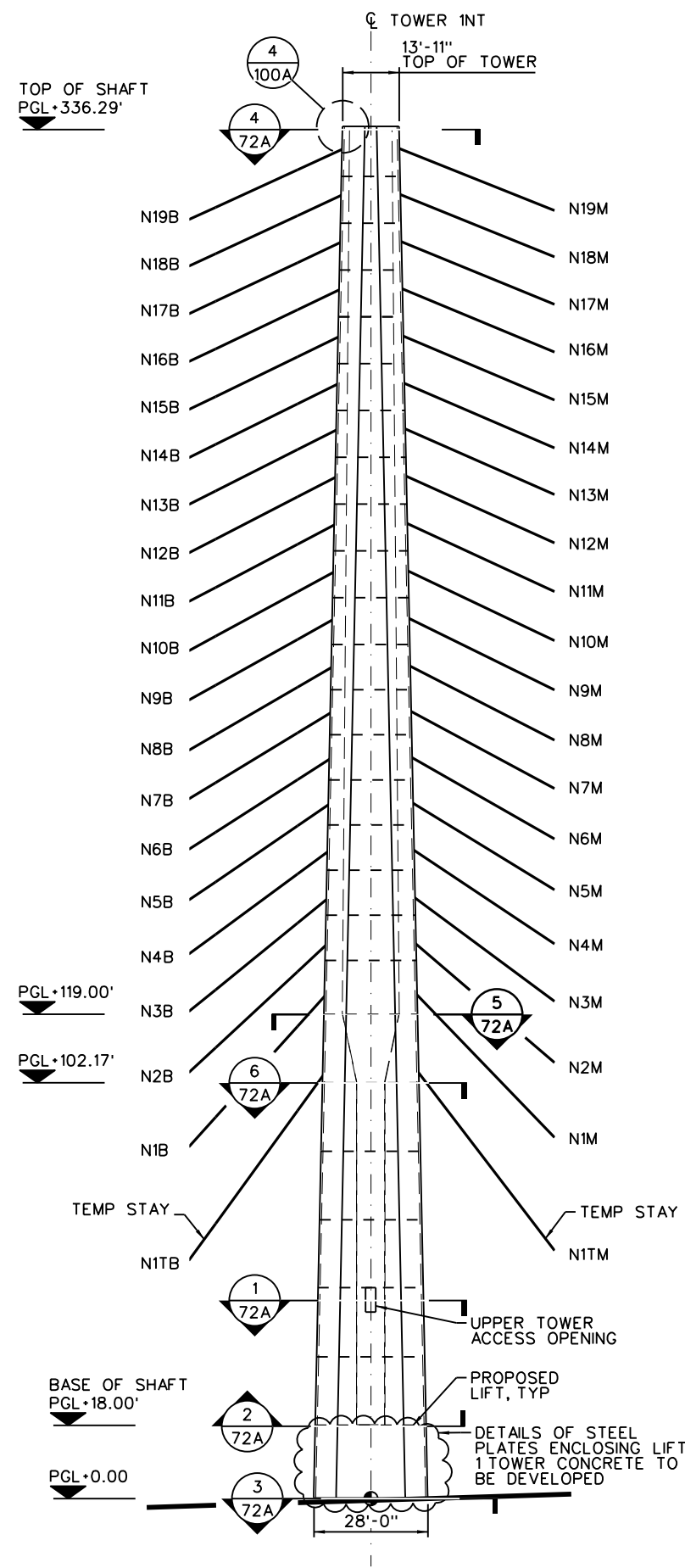
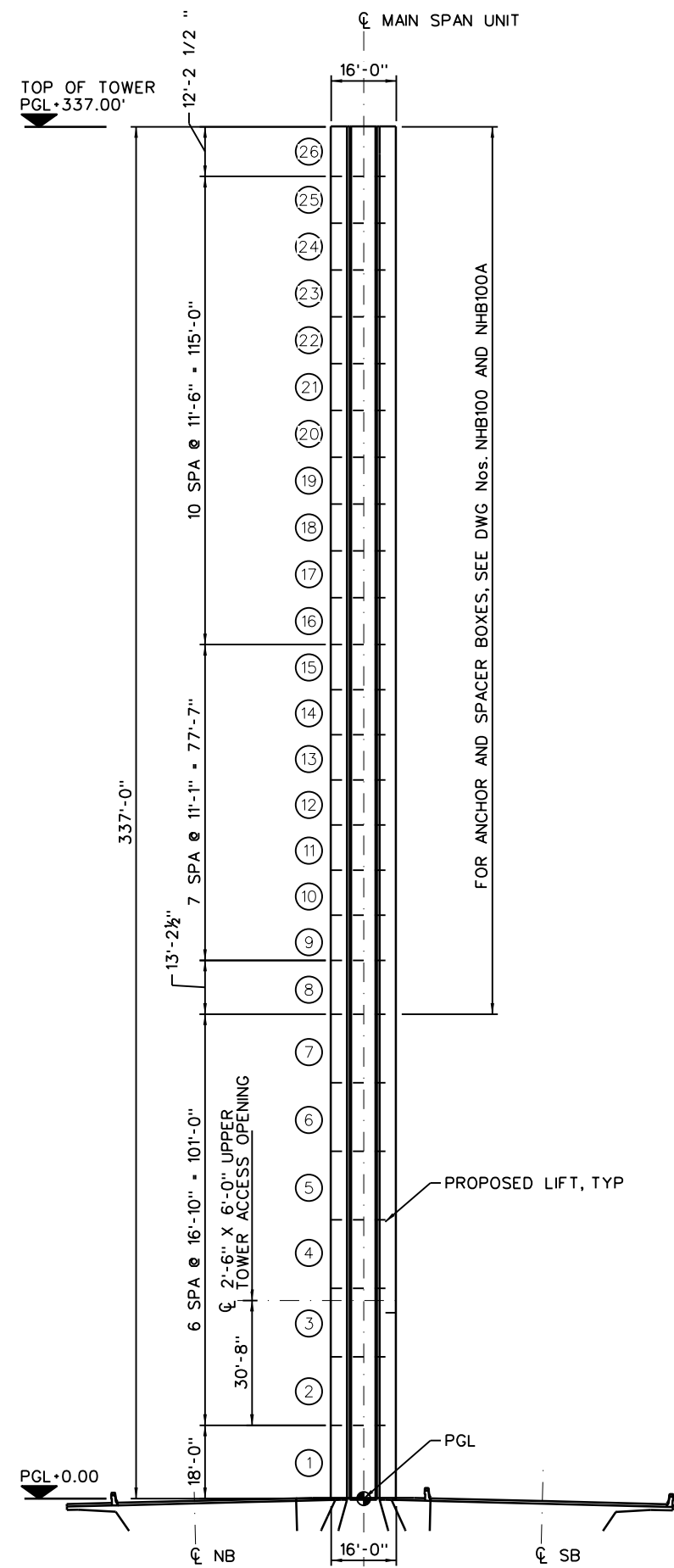


- NOTES:
- FOR UPPER TOWER CROSS SECTIONS, SEE DRAWING NHB072.
 - FOR TOWER ACCESS DETAILS, SEE DRAWING NHB102.
 - FOR DETAILS OF ANCHOR AND SPACER BOXES SEE THE FOLLOWING DRAWINGS:
 - TYPICAL ANCHOR BOX: NHB101A
 - TEMPORARY CABLE ANCHOR BOX: NHB101R
 - TYPICAL SPACER BOX: NHB101M

ADVANCE CHECK PRINT 04-15-2021




SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")				
NO.	DATE	REVISION	APR	
<div> FLATIRON/DRAGADOS LLC</div>			<div></div>	
<div> Texas Department of Transportation</div>				
US-181 HARBOR BRIDGE				
MAIN SPAN TOWER 1NT GENERAL ARRANGEMENT				
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	X	(See Title Sheet)		US-181
CHECK RG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK NT	TEXAS	CRP	NUECES	NHB 71
CHECK MC	CONTROL	SECTION	JOB	
	0101	06	095	

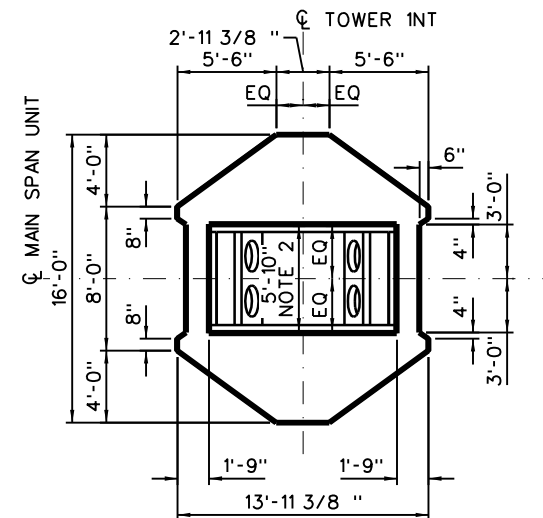


- NOTES:
1. NORTH TOWER 1NT SHOWN. SOUTH TOWER 1ST SIMILAR.
 2. ALL DIMENSIONS ON SECTIONS ARE TO CONCRETE FACES, UNLESS NOTED OTHERWISE.
 3. COORDINATE CONSTRUCTION WITH ELECTRICAL DESIGN DRAWINGS AND DWG No. NHB-111C.
 4. UPPER TOWER SHALL BE CONSTRUCTED TO BE VERTICALLY PLUMB IF IN A STRESS FREE CONDITION.
 5. TOLERANCE ON VERTICALITY SHALL NOT EXCEED H/2000.
 6. TOWER IS NOT VERTICALLY PLUMB AT THE REFERENCE CONDITION. REFER TO ERECTION MANUAL FOR FURTHER INFORMATION.
 7. TOP ELEVATION OF TOWER LIFTS 8 TO 26 SHALL BE CAST WITH A VERTICAL PRECAMBER (ELEVATION OFFSET) TO COMPENSATE FOR AXIAL SHORTENING OF THE TOWER. ANCHOR BOXES SHALL BE SET WITH AN ELEVATION OFFSET THAT MATCHES THE VERTICAL PRECAMBER. REFER TO ERECTION MANUAL FOR FURTHER INFORMATION.

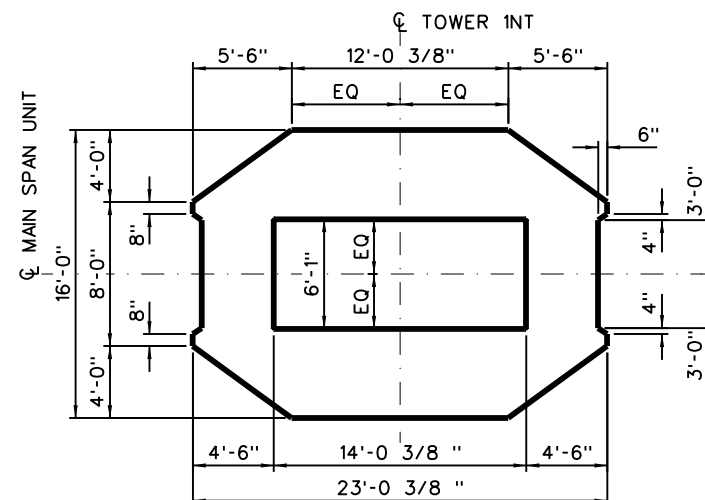
LEGEND
 ① PROPOSED LIFT NUMBER

ADVANCE CHECK PRINT 04-15-2021

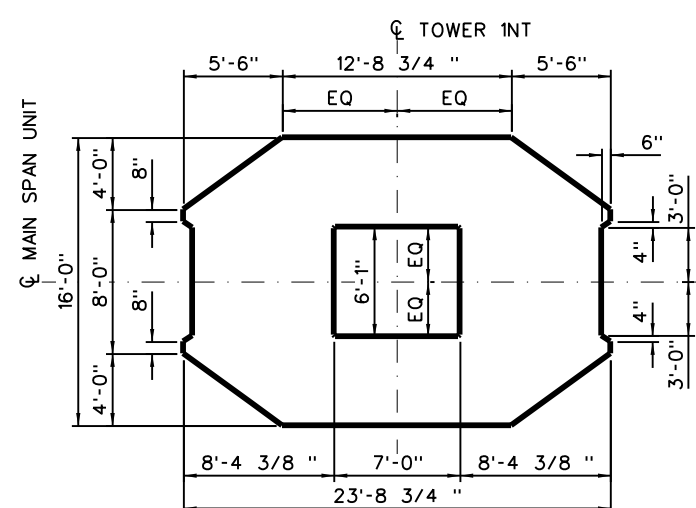
SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")				
NO.	DATE	REVISION		APRV
 FLATIRON/DRAGADOS LLC				
 <i>Texas Department of Transportation</i>				
US-181 HARBOR BRIDGE				
MAIN SPAN UPPER TOWER GENERAL ARRANGEMENT I				
DESIGN NT	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS RG	X	(See Title Sheet)		US-181
CHECK NT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MC	TEXAS	CRP	NUECES	NHB 72
	CONTROL	SECTION	JOB	
	0101	06	095	



SECTION: PGL + 48.67'






SECTION: PGL + 18.00'

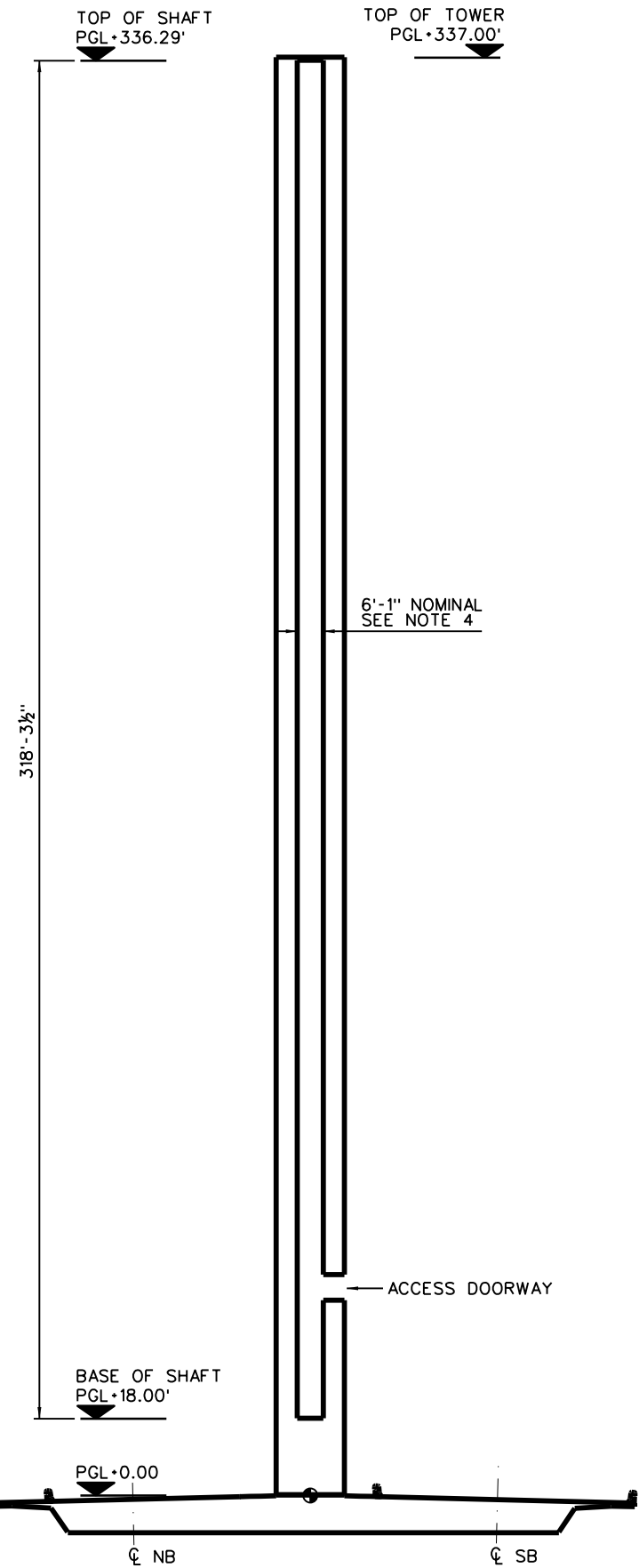


SECTION: PGL +0.00
3/16" = 1'-0"

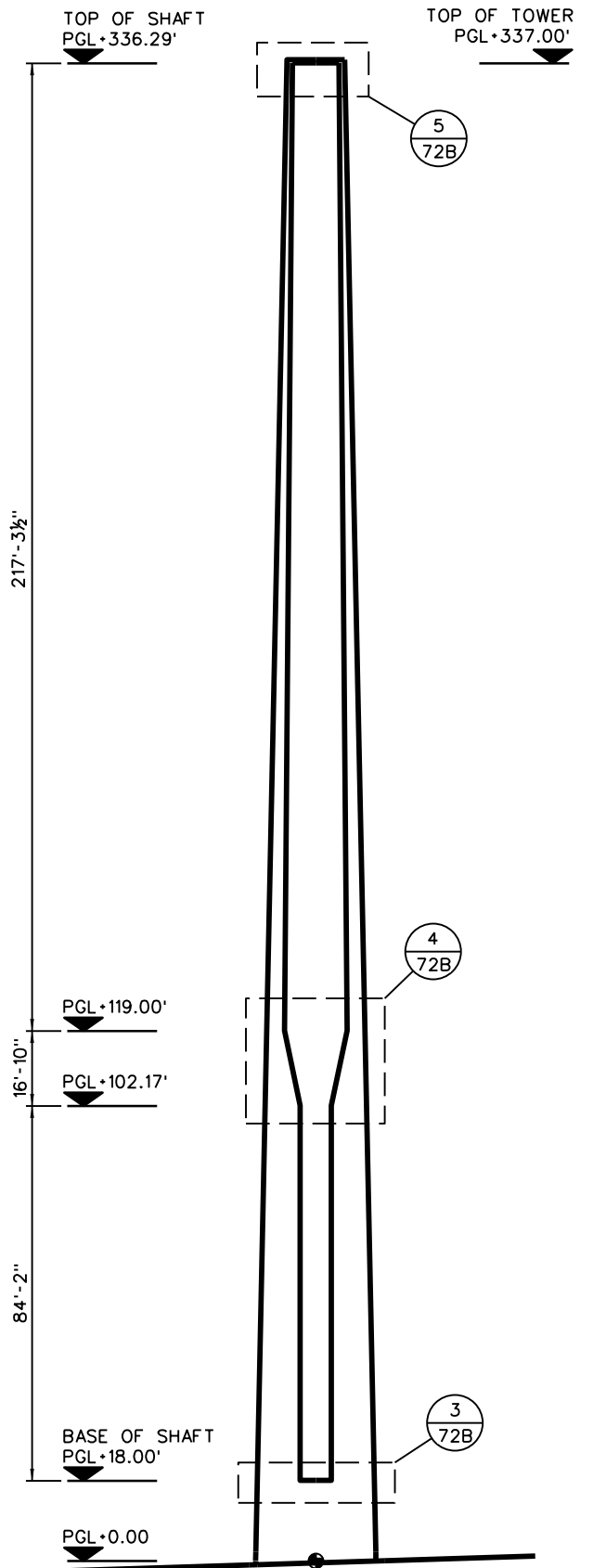
- ADVANCE CHECK PRINT 04-15-2021

SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")			
NO.	DATE	REVISION	APRV
 FLATIRON/DRAGADOS LLC			
 Texas Department of Transportation			
US-181 HARBOR BRIDGE			
MAIN SPAN UPPER TOWER GENERAL ARRANGEMENT II			
DESIGN NT	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
GRAPHICS RC	X	(See Title Sheet)	US-181
CHECK NT	STATE	DISTRICT	COUNTY
CHECK MC	CONTROL	SECTION	JOB
	0101	06	095
			NHB 72A

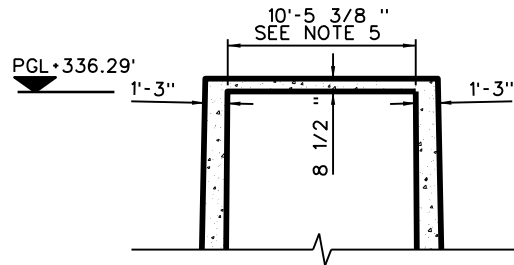
- NOTES:
1. NORTH TOWER 1NT SHOWN. SOUTH TOWER 1ST SIMILAR.
 2. ELEVATIONS SHOWN ARE RELATIVE TO PGL AT TOWER CENTERLINE:
-1NT - PGL = 211.99'
-1ST - PGL = 214.37'
 3. ANCHOR AND SPACER BOXES NOT SHOWN FOR CLARITY.
 4. 6'-1" SHAFT TRANSVERSE DIMENSION IS NOMINAL. ANCHOR BOX AND SPACER BOX PLATE THICKNESSES VARY. ACTUAL TRANSVERSE SHAFT DIMENSION WILL VARY WITH PLATE THICKNESS. SEE PLATE SCHEDULES ON DRAWING NHB101J FOR DETAILS.
 5. SHAFT LONGITUDINAL DIMENSION VARIES LINEARLY BETWEEN THE SECTIONS SHOWN.



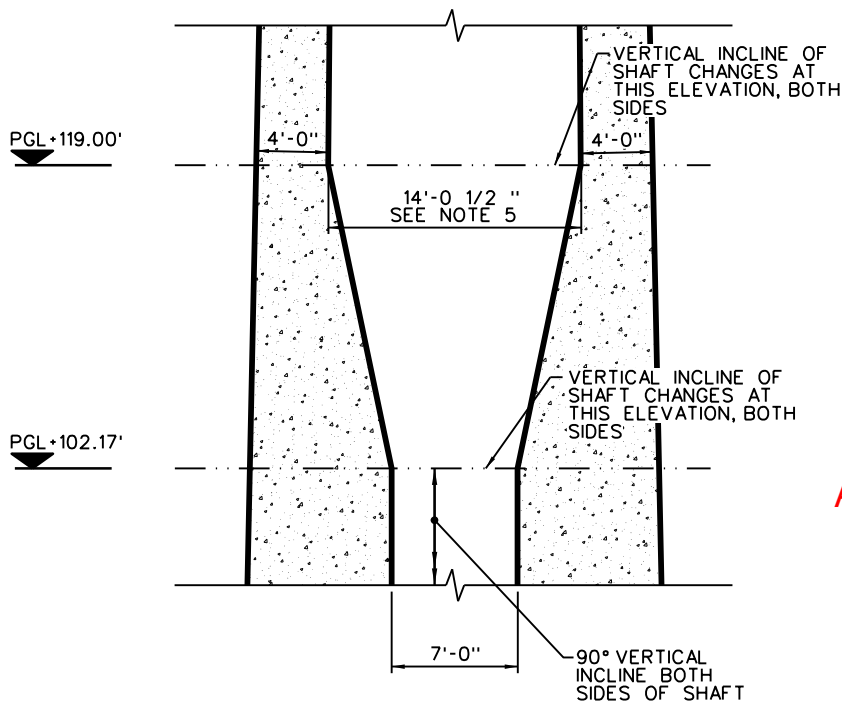
1 CROSS-SECTION TRANSVERSE
72B 1"=20'



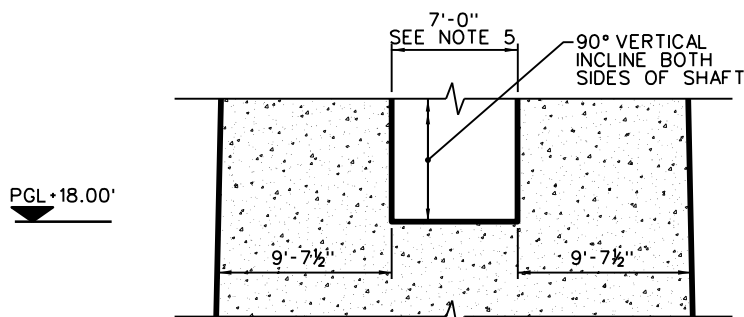
2 CROSS-SECTION LONGITUDINAL
72B 1"=20'



5 SHAFT DETAIL
72B 3/16"=1'-0"





4 SHAFT DETAIL
72B 3/16"=1'-0"



3 SHAFT DETAIL
72B 3/16"=1'-0"



ADVANCE CHECK PRINT 04-15-2021

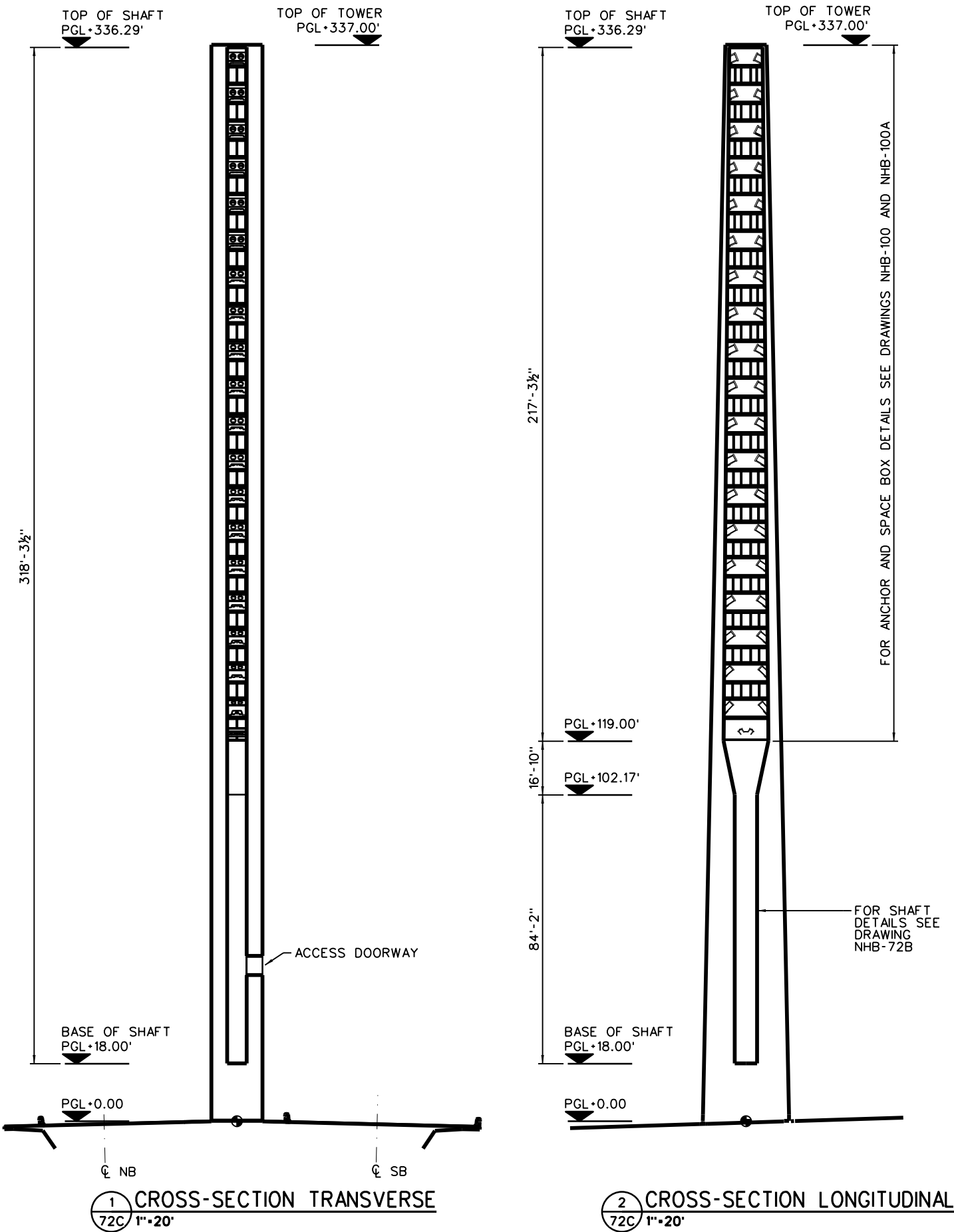
SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")				
NO.	DATE	REVISION	APRV	
				
				
US-181 HARBOR BRIDGE				
MAIN SPAN UPPER TOWER GENERAL ARRANGEMENT III				
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
NT	X	(See Title Sheet)		US-181
GRAPHICS	RG	STATE	DISTRICT	COUNTY
CHECK	NT	TEXAS	CRP	NUECES
CHECK	MC	CONTROL	SECTION	JOB
		0101	06	095
				NHB 72B

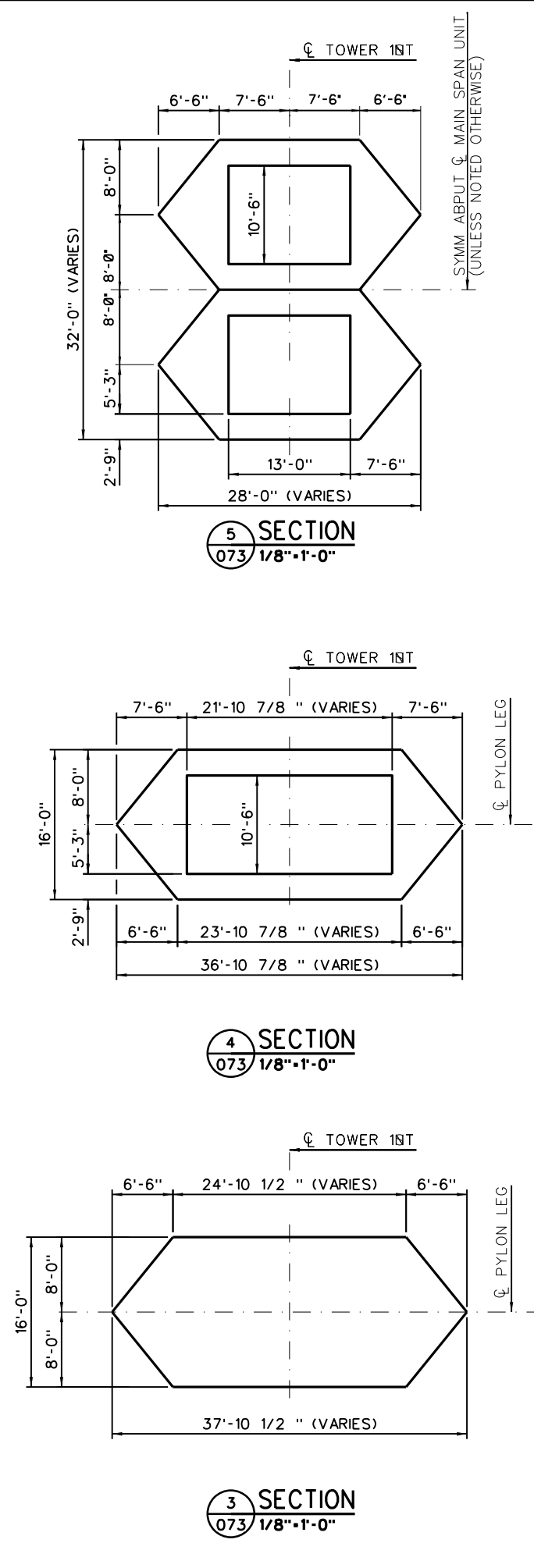
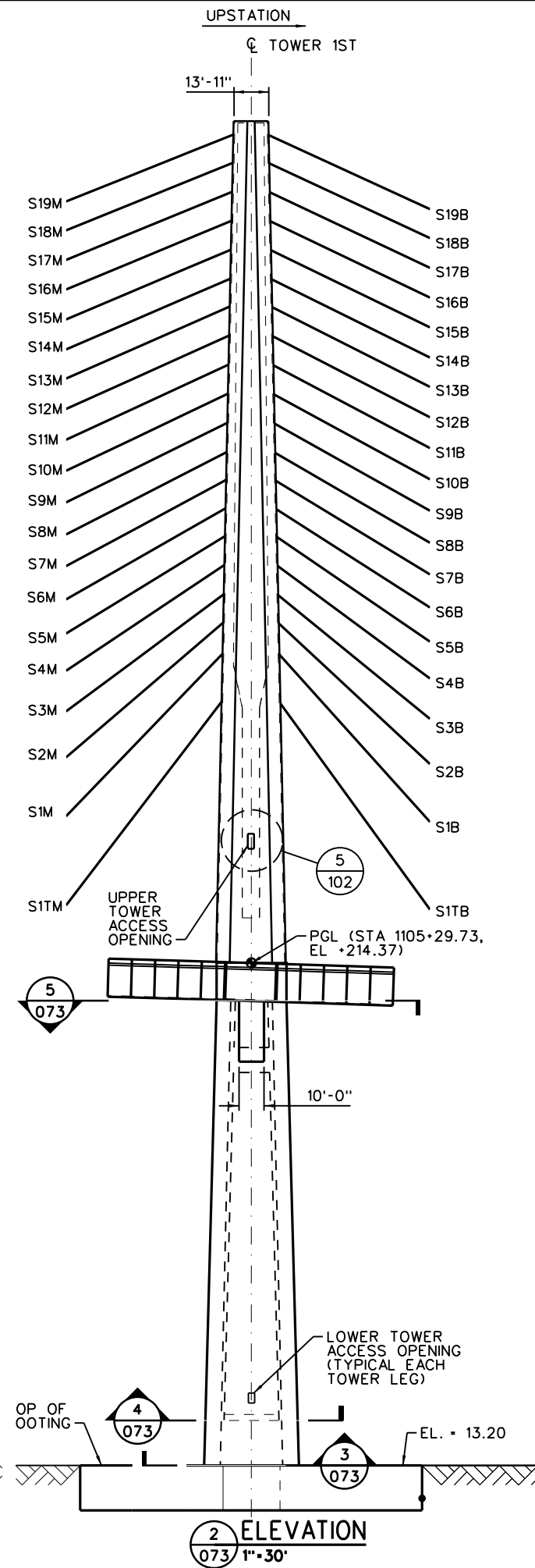
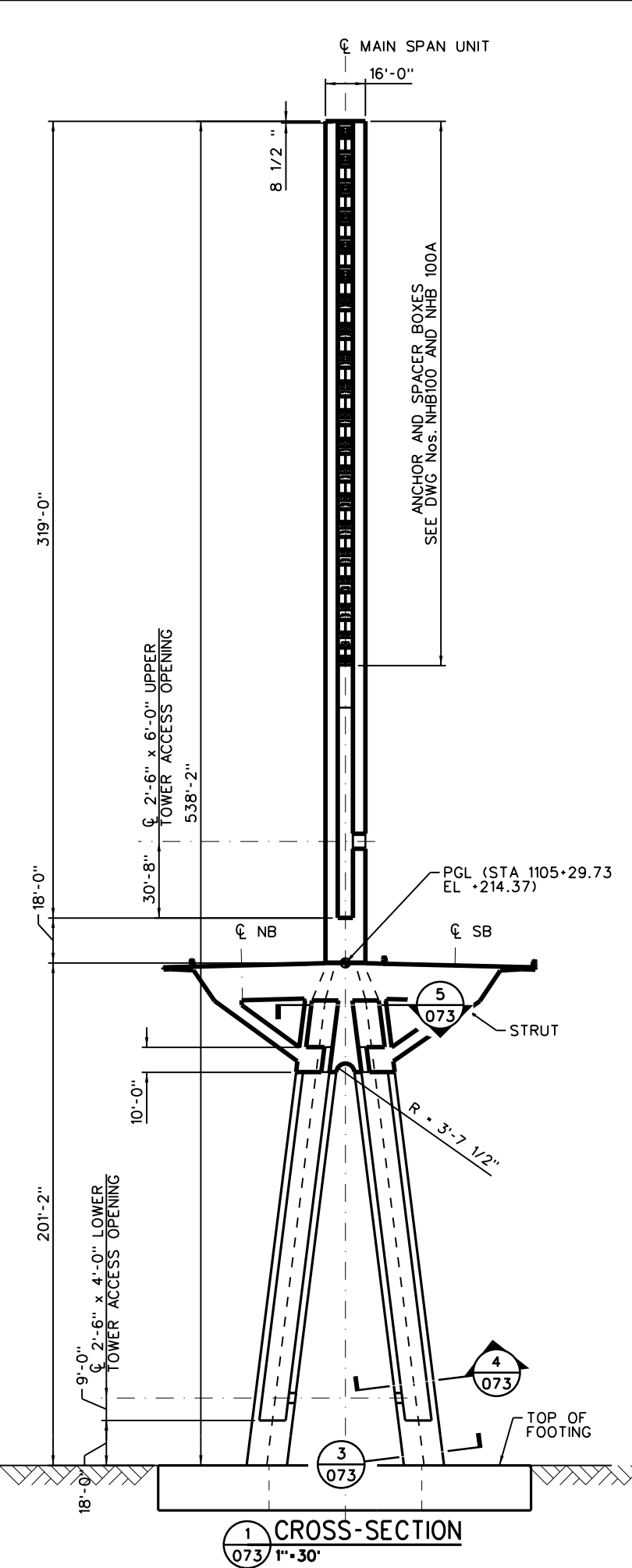
- NOTES:
1. NORTH TOWER 1NT SHOWN. SOUTH TOWER 1ST SIMILAR.
 2. ELEVATIONS SHOWN ARE RELATIVE TO PGL AT TOWER CENTERLINE:
-1NT - PGL = 211.99'
-1ST - PGL = 214.37'

ADVANCE CHECK PRINT 04-15-2021

SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")



NO.	DATE	REVISION	APRV	
<div> FLATIRON/DRAGADOS LLC</div>			<div>ARUP CFC</div>	
<div> <i>Texas Department of Transportation</i></div>				
US-181 HARBOR BRIDGE				
MAIN SPAN UPPER TOWER GENERAL ARRANGEMENT IV				
DESIGN NT	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS RG	X	(See Title Sheet)		US-181
CHECK NT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MC	TEXAS	CRP	NUECES	NHB 72C
	CONTROL	SECTION	JOB	
	0101	06	095	





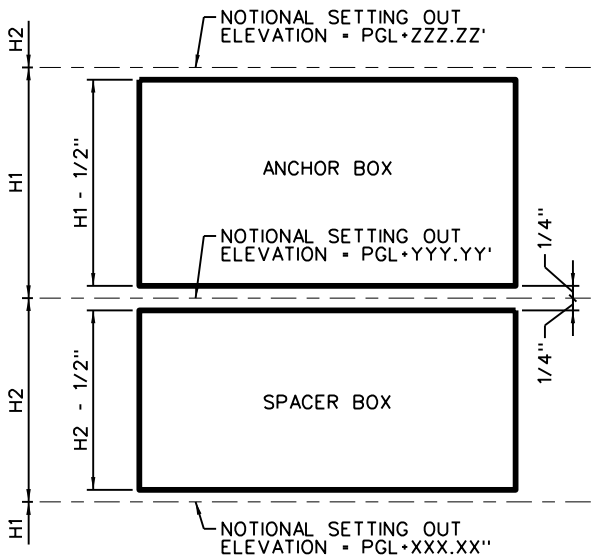
- NOTES:
1. FOR UPPER TOWER CROSS SECTIONS, SEE DRAWING NHB072.
 2. FOR TOWER ACCESS DETAILS, SEE DRAWING NHB102.
 3. FOR DETAILS OF ANCHOR AND SPACER BOXES SEE THE FOLLOWING DRAWINGS:
 - TYPICAL ANCHOR BOX: NHB101A
 - TEMPORARY CABLE ANCHOR BOX: NHB101R
 - TYPICAL SPACER BOX: NHB101M

ADVANCE CHECK PRINT 04-15-2021

SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")				
NO.	DATE	REVISION		APP
<div> FLATIRON/DragADOS LLC</div>			<div>ARUP CFC</div>	
<div> Texas Department of Transportation</div>				
US-181 HARBOR BRIDGE				
MAIN SPAN TOWER 1ST GENERAL ARRANGEMENT				
DESIGN NT	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	X	(See Title Sheet)		US-181
RG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK NT	TEXAS	CRP	NUECES	NHB 73
CHECK	CONTROL	SECTION	JOB	
MC	0101	06	095	

NOTES:
1. NORTH TOWER 1NT SHOWN. SOUTH TOWER 1ST
SIMILAR.

KEY TO SETTING OUT



A. BOX HEIGHTS "H1" AND "H2" ARE MEASURED TO NOTIONAL SETTING OUT ELEVATIONS 1/4" CLEAR OF STEELWORK.
B. STEEL PLATE HEIGHT IS H1-1/2" OR H2-1/2".

ADVANCE CHECK PRINT 04-15-2021

SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")

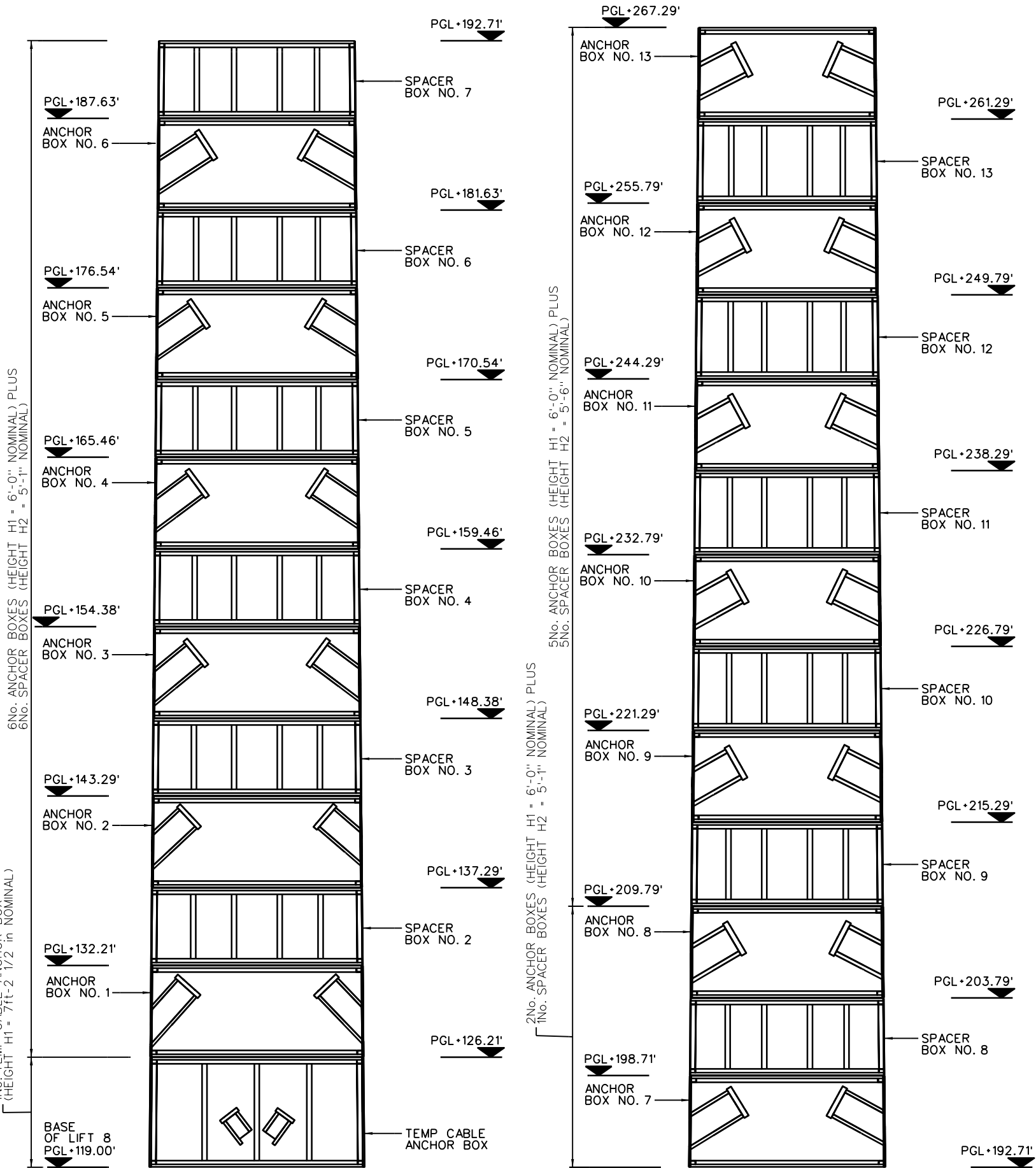
NO.	DATE	REVISION	APRV



US-181 HARBOR BRIDGE

MAIN SPAN
UPPER TOWER
ANCHOR BOX
GENERAL ARRANGEMENT I

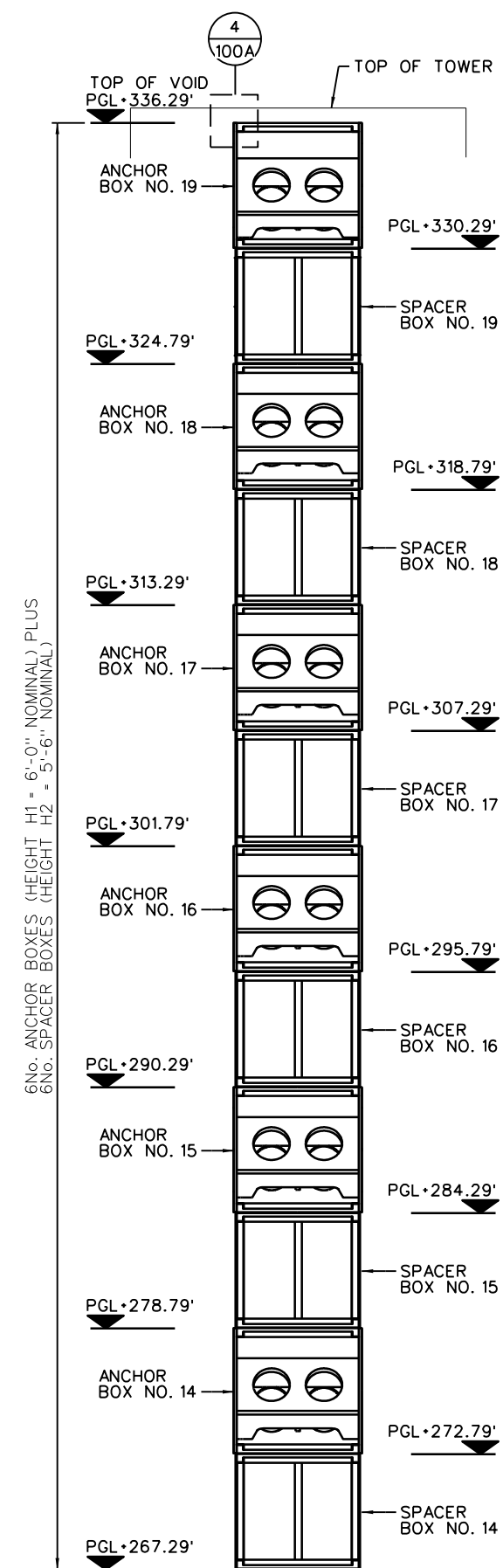
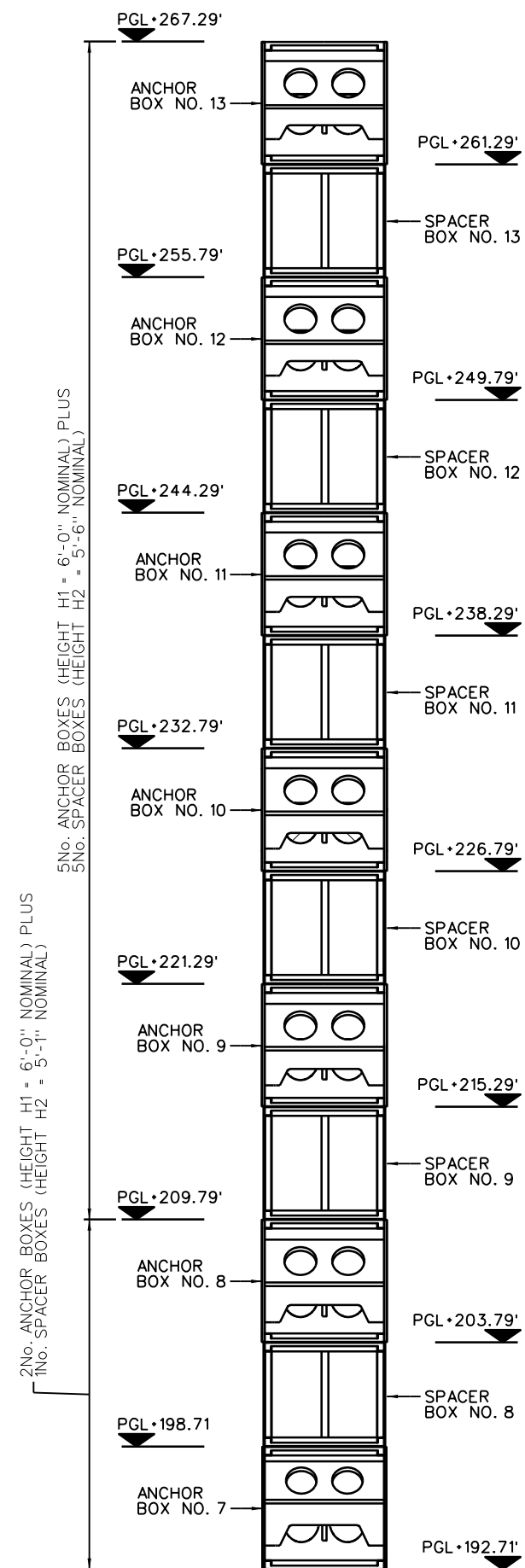
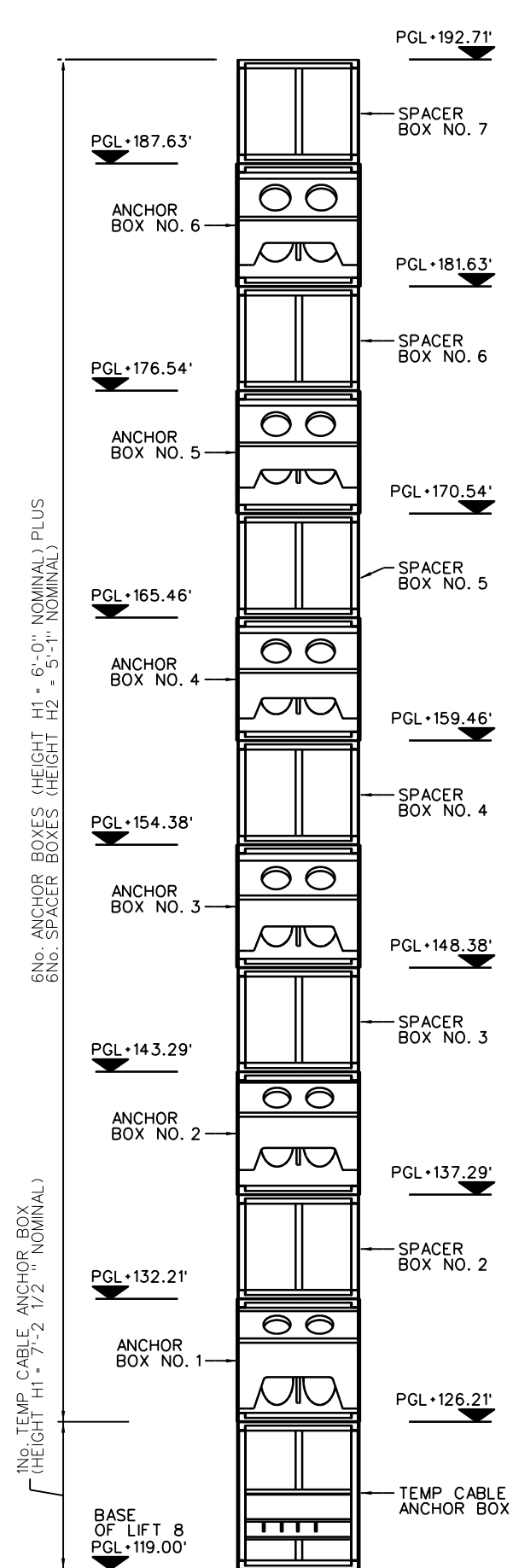
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
NT	X	(See Title Sheet)		US-181
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
RG	TEXAS	CRP	NUECES	NHB
CHECK	CONTROL	SECTION	JOB	100
VR	0101	06	095	
CHECK				
MC				



1 SECTION - LONGITUDINAL
100 1/4"=1'-0"

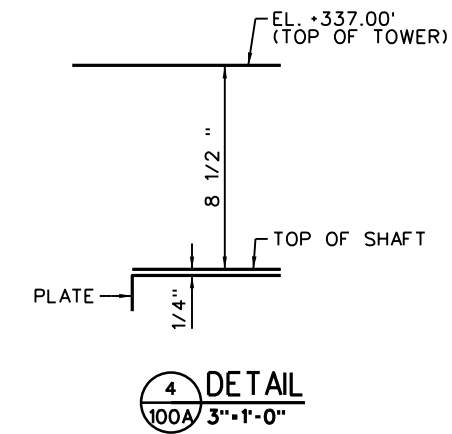
2 SECTION - LONGITUDINAL
100 1/4"=1'-0"

3 SECTION - LONGITUDINAL
100 1/4"=1'-0"






NOTES:

1. NORTH TOWER 1NT SHOWN. SOUTH TOWER 1ST SIMILAR.
2. SEE KEY TO SETTING OUT ON DRAWING NHB100.



ADVANCE CHECK PRINT 04-15-2021

SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")					
NO.	DATE	REVISION			APRV
 FLATIRON/DragADOS LLC			<div style="text-align: right;">  </div>		
 <i>Texas Department of Transportation</i>					
US-181 HARBOR BRIDGE					
MAIN SPAN					
UPPER TOWER					
ANCHOR BOX					
GENERAL ARRANGEMENT II					
DESIGN NT	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.	
GRAPHICS RG	X	(See Title Sheet)		US-181	
CHECK VR	STATE	DISTRICT	COUNTY	SHEET NO.	
CHECK MC	TEXAS CONTROL	CRP SECTION	NUECES JOB	NHB 100A	
	0101	06	095		

STRUCTURAL STEEL NOTES

A. GOVERNING SPECIFICATIONS

- ANCHOR BOXES, SPACER BOXES AND RELATED PARTS SHALL COMPLY WITH THE FOLLOWING SPECIFICATIONS AND THESE GENERAL NOTES.
- PROVIDE STRUCTURAL STEEL IN ACCORDANCE WITH GOVERNING SPECIFICATIONS HARBOR ITEM 441 "STEEL STRUCTURES".
- PROVIDE SHEAR CONNECTORS IN ACCORDANCE WITH GOVERNING SPECIFICATIONS HARBOR ITEM 442 "METAL FOR STRUCTURES".
- PROVIDE GALVANIZING WHERE REQUIRED IN ACCORDANCE WITH GOVERNING SPECIFICATIONS HARBOR ITEM 445 "GALVANIZING".

B. MATERIALS

- STEEL PLATE MATERIAL:
 - THICKNESS 2IN AND THICKER: ASTM A709 HPS 50W
 - THICKNESS LESS THAN 2IN: ASTM A709 GRADE 50
- MAIN STEEL BRIDGE MEMBERS ARE IDENTIFIED ON THE DRAWINGS AS SYSTEM REDUNDANT MEMBERS (SRM), MAIN TENSION MEMBERS (T) OR MAIN COMPRESSION MEMBERS (C).
- ALL ELEMENTS MARKED AS SRM SHALL MEET THE IMPACT TEST REQUIREMENTS OF ASTM A709 TABLE 11 TEMPERATURE ZONE 1
- ALL ELEMENTS MARKED AS T SHALL MEET THE IMPACT TEST REQUIREMENTS OF ASTM A709 TABLE 10 TEMPERATURE ZONE 1
- A THROUGH THICKNESS TENSION TEST SHALL BE CARRIED OUT ON ALL PLATES 1 3/8" THICK OR GREATER IN ACCORDANCE WITH ASTM A770, SUPPLEMENTARY REQUIREMENT S3, 35% MINIMUM REDUCTION IN AREA.
- WIDE FLANGE SECTIONS: ASTM A992, Fy=50KSI.
- ANGLE SECTIONS: ASTM A529, Fy=50KSI.
- RECESS PIPES: ASTM A500 GRADE B. PIPES THAT MEET API STANDARD 5L GRADE X52 MAY BE USED IF PRODUCED BY A MILL IN THE STANDARD APISPECIFICATIONS AS AUTHORIZED TO PRODUCE PIPE WITH THE APIMONOGRAM.
- SHEAR STUDS: AWS D1.5 TYPE B HEADED STUDS IN ACCORDANCE WITH ASTM A108 WITH MINIMUM YIELD STRENGTH OF 50KSI AND MINIMUM TENSILE STRENGTH OF 60KSI.
- TEMPORARY BRACE BOLTED CONNECTIONS SHALL BE MADE WITH HIGH STRENGTH BOLTS CONFORMING TO ASTM F3125 GR.490.

C. WELDING

- ALL WELDING SHALL COMPLY WITH THE PROVISIONS OF AASHTO/AWS D1.5 BRIDGE WELDING CODE.
- ALL WELDING ELECTRODES SHALL BE APPROPRIATELY MATCHED AND SHALL BE STRENGTH GRADE E70.
- WELD DETAILS SHOWN ON THESE DRAWINGS ARE INDICATIVE ONLY. FABRICATOR TO DEVELOP DETAILS IN CONJUNCTION WITH DISTORTION CONTROL PLAN.
- THE CONTRACTOR SHALL DEVELOP PROCEDURES FOR THE CONTROL OF DISTORTION AND SHRINKAGE STRESSES WHICH, IN CONJUNCTION WITH THE OVERALL FABRICATION METHODS, WILL PRODUCE MEMBERS AND STRUCTURES THAT MEET THE DIMENSIONAL AND QUALITY REQUIREMENTS OF THE DESIGN DOCUMENTS. THIS DISTORTION CONTROL PLAN SHALL BE DEVELOPED IN ACCORDANCE WITH AWS D1.5 SECTION 3.4. THESE PROCEDURES AND ANY REVISIONS NECESSARY DURING THE COURSE OF THE WORK SHALL BE SUBMITTED TO THE DESIGNER FOR REVIEW.
- SYSTEM REDUNDANT MEMBERS SHALL BE FABRICATED TO THE REQUIREMENTS FOR FRACTURE CRITICAL MEMBERS AND INSPECTED IN ACCORDANCE WITH AASHTO / AWS D1.5 "FRACTURE CONTROL PLAN FOR NON-REDUNDANT MEMBERS".
- ALL WELDS SHALL RECEIVE 100% VISUAL INSPECTION AFTER THE COMPLETION OF THE WELD. ALL WELDS SHALL ALSO RECEIVE 100% VISUAL INSPECTION AFTER THE FABRICATION OF THE ELEMENT IS COMPLETE. VISUAL INSPECTION SHALL NOT BE CONSIDERED AN NDT METHOD.
- ALL COMPLETE PENETRATION GROOVE WELDS IN TENSION AND STRESS REVERSAL AREAS SHALL BE EVALUATED BY AND CONFORM TO BOTH RADIOGRAPHIC AND ULTRASONIC TESTS AS DESCRIBED IN AWS D1.5. THE TESTING MUST BE COMPLETED BEFORE REPAIRS ARE MADE TO THE WELD.
- COMPLETE PENETRATION GROOVE WELDS IN COMPRESSION SHALL BE EVALUATED IN ACCORDANCE WITH SECTION 6.7.1.2 OF AWS D1.5
- EACH BOX SHALL BE MARKED ON ITS OUTSIDE WITH ITS TOWER NAME, BOX NO. AND ORIENTATION (MAIN SPAN OR BACK SPAN). EACH CABLE ANCHOR SHALL BE MARKED WITH ITS CABLE NO.

D. FABRICATION TOLERANCES

- DIMENSIONS SHOWN ON THE DESIGN DRAWINGS ARE AT A REFERENCE TEMPERATURE OF 70°F. THE NECESSARY DIMENSIONAL ADJUSTMENTS FOR ACTUAL TEMPERATURES AT THE TIME AND PLACE OF FABRICATION SHALL BE MADE.
- DIMENSIONS GIVEN ARE GEOMETRIC DIMENSIONS OF THE FINISHED FABRICATION. ADJUSTMENTS TO PLATE CUTTING DIMENSIONS TO COMPENSATE FOR TOLERANCES, FABRICATION EFFECTS, WELD PREPARATIONS SHALL BE MADE AS NECESSARY.
- FABRICATION TOLERANCES SHALL BE IN ACCORDANCE WITH AASHTO / AWS D1.5 AND AS SPECIFIED IN THE DESIGN DOCUMENTS.
- FABRICATED ELEMENTS THAT DO NOT CONFORM TO THE TOLERANCES SPECIFIED IN THE DESIGN DOCUMENTS SHALL BE REJECTED. ALL TOLERANCES FOR THE ANCHOR BOX SHALL BE COORDINATED WITH TOLERANCES FOR THE STAY CABLES AND ANCHORAGES.
- TOLERANCES (+/-) ON SPECIFIC DIMENSIONS SHALL BE AS GIVEN BELOW:
 - ALIGNMENT OF THE ANCHOR PLATE AT EACH DEAD ANCHOR SHALL BE NO MORE THAN +/- 0.45°.
 - BEARING SURFACE FLATNESS OVER THE DEAD ANCHOR BEARING AREA SHALL BE NO MORE THAN 1/500 OF THE DEAD ANCHOR OD.
 - LENGTH OF VERTICAL EDGES OF EACH SIDE PLATE OR END PLATE SHALL DIFFER BY NO MORE THAN 1/16".
 - LENGTH OF HORIZONTAL EDGES OF EACH SIDE PLATE OR END PLATE SHALL DIFFER BY NO MORE THAN 1/8".
 - THE DIAGONAL DIMENSIONS FOR EACH SIDE PLATE AND END PLATE SHALL BE WITHIN 1/8".
 - EACH BOX SHALL BE SQUARE IN PLAN. THE TWO DIAGONAL DIMENSIONS SHALL BE WITHIN 1/8".
 - AT WORK POINTS T2 AND T3 THE RECESS PIPE CENTER-LINE SHALL BE WITHIN 1/8" OF THE STRAIGHT LINE PASSING THROUGH WORK POINTS T1 AND T3.
 - LOCATION OF SHEAR STUDS SHALL BE WITHIN 3/8".

E. SHOP ASSEMBLY

- PRIOR TO SHOP ASSEMBLY, THE CONTRACTOR SHALL SUBMIT TO THE DESIGNER FOR APPROVAL A DETAILED PLAN SHOWING THE PROPOSED SHOP ASSEMBLY ARRANGEMENT AND PROCEDURES FOR DIMENSIONAL CONTROL. THE PLAN SHALL INCLUDE METHODS TO BE USED FOR MEASURING, RECORDING, AND CONTROLLING THE GEOMETRY OF THE SHOP ASSEMBLY. THE OVERALL METHODOLOGY, LOCATIONS OF ALL SURVEY CONTROL POINTS, TEMPERATURE MEASUREMENT AND COMPENSATION TECHNIQUES, SCHEDULE OF SURVEYS, AND OTHER PERTINENT INFORMATION TO BE USED IN THE SHOP ASSEMBLIES SHALL BE CLEARLY IDENTIFIED ON THE PLAN.
- CABLE ANCHOR BOXES AND SPACER BOXES SHALL BE SHOP ASSEMBLED USING PROGRESSIVE COMPONENT ASSEMBLY. ASSEMBLY SHALL START AT ONE END, AND THERE SHALL BE AT LEAST THREE ANCHOR BOX / SPACER BOX SECTIONS IN ASSEMBLY AT ALL TIMES.
- ALL STEEL REQUIRED TO BE SHOP ASSEMBLED SHALL BE ALIGNED SO THAT THE CONTROL POINTS ARE WITHIN +/- 1/8" FROM THE LOCATIONS ON THE APPROVED SHOP DRAWINGS, UNLESS MORE STRINGENT TOLERANCES ARE PROVIDED ELSEWHERE IN THE DESIGN DOCUMENTS. THIS TOLERANCE SHALL APPLY TO THE X, Y, AND Z COORDINATES (I.E. IN ALL THREE DIMENSIONS).

F. MOCK UP

- THE CONTRACTOR SHALL PROVIDE A MOCK UP OF ONE ANCHOR BOX 19 INCLUDING RECESS PIPES AND SHEAR STUDS. THE MOCK UP AND A DETAILED REPORT AND SURVEY OF ITS FABRICATION SHALL BE SUBMITTED FOR APPROVAL BY BOTH THE DESIGNER AND THE CONSTRUCTION QUALITY ACCEPTANCE MANAGER (CQAM).
- MOCK UP SHALL DEMONSTRATE APPROPRIATENESS OF SHOP ASSEMBLY PROCEDURES, INCLUDING CONTROL OF DISTORTION AND SHRINKAGE, FOR DIMENSIONAL CONTROL AND FABRICATION TOLERANCES, AND WELD PROCEDURES.
- MOCK UP SHALL NOT BE USED IN THE PERMANENT WORKS, UNTIL APPROVED BY BOTH THE DESIGNER AND CQAM. FABRICATION OF OTHER ANCHOR BOXES/SPACER BOXES SHALL NOT BEGIN BEFORE APPROVAL OF MOCK UP.
- DESIGNER RESERVES THE RIGHT TO REQUEST AN ADDITIONAL MOCK UP IF DESIGNER DEEMS THE WORK TO BE SUFFICIENTLY NON-CONFORMING.




G. CORROSION PROTECTION

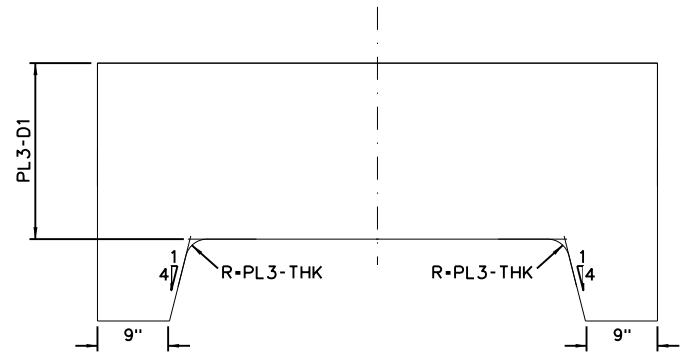
- CORROSION PROTECTION SYSTEM FOR ALL EXPOSED SURFACES OF THE ANCHOR BOXES AND SPACER BOXES SHALL BE AS FOLLOWS:
 - SURFACE PREPARATION: ABRASIVE BLAST CLEAN TO SSPC SP5 (NACE No.1) SURFACE PROFILE 2 TO 3 MIL.
 - PRIMER: ZINC RICH EPOXY COMPLYING WITH SSPC PAINT TYPE 20 AND GOVERNING SPECIFICATIONS HARBOR ITEM 446 SPECIAL PROTECTION SYSTEM DMS-8101 CLAUSE 8101.12.
- CORROSION PROTECTION SYSTEM SHALL EXTEND ONTO THE CAST-IN SURFACES BY 2 INCHES. PLATES RECEIVING CORROSION PROTECTION SYSTEM SHALL HAVE THEIR EDGES RADIUS 1/8 INCH.
- RECESS PIPES AND THE RECESS PIPES BAYONET FLANGES SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH GOVERNING SPECIFICATIONS HARBOR ITEM 445 "GALVANIZING".

H. WORKING DRAWINGS

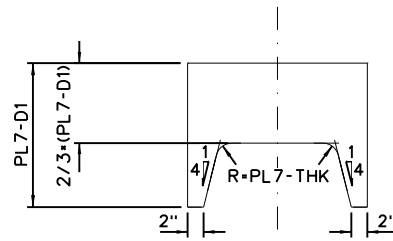
- WORKING DRAWINGS SHALL BE SUBMITTED IN PDF AND CAD FORMAT. 3D MODEL FILE SHALL BE SUBMITTED.

ADVANCE CHECK PRINT 04-15-2021

SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")				
NO.	DATE	REVISION		APRV
 FLATIRON DRAGADOS LLC				
				
US-181 HARBOR BRIDGE				
MAIN SPAN UPPER TOWER STRUCTURAL STEEL NOTES				
DESIGN NT	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS EF	X	(See Title Sheet)		US-181
CHECK NT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MC	TEXAS	CRP	NUECES	NHB 101
	CONTROL	SECTION	JOB	
	0101	06	095	





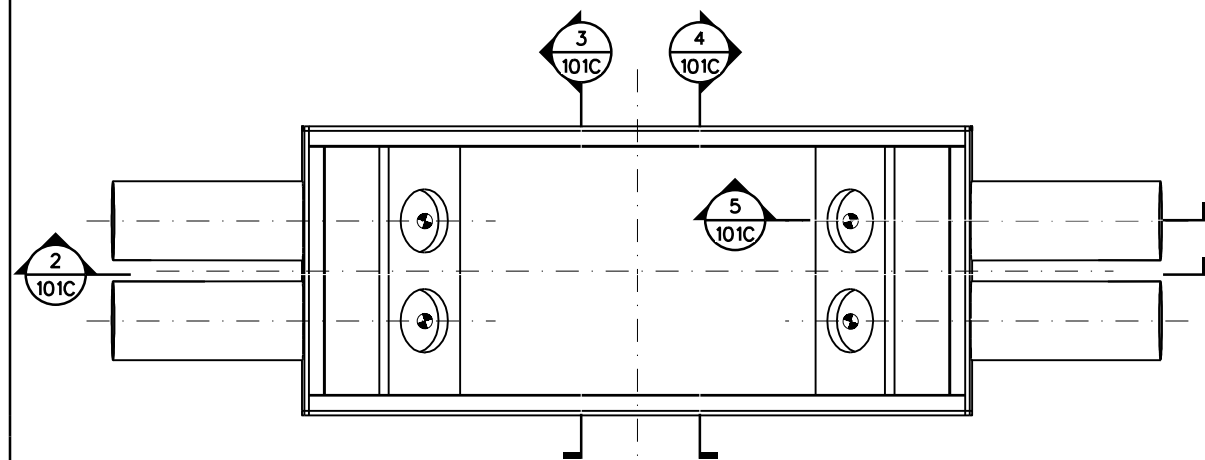
1 VIEW ON BOTTOM WEB PLATE PL 3
101B 1"=1'-0"



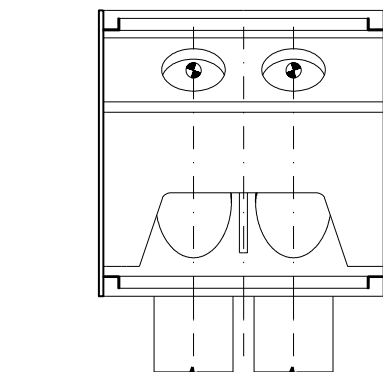
2 VIEW ON SIDE SUPPORT PLATE PL 7
101B 1"=1'-0"

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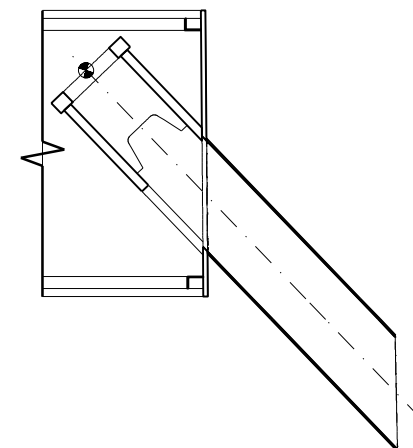
SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")				
NO.	DATE	REVISION	APRV	
<div> FLATIRON/DRAGADOS LLC</div>			<div>ARUP</div> <div>CFC</div>	
<div> Texas Department of Transportation</div>				
US-181 HARBOR BRIDGE				
MAIN SPAN				
UPPER TOWER				
TYPICAL ANCHOR BOX				
ARRANGEMENT II				
DESIGN JS	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS TI	X	(See Title Sheet)		US-181
CHECK NT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MC	TEXAS	CRP	NUECES	NHB 101B
	CONTROL	SECTION	JOB	
	0101	06	095	



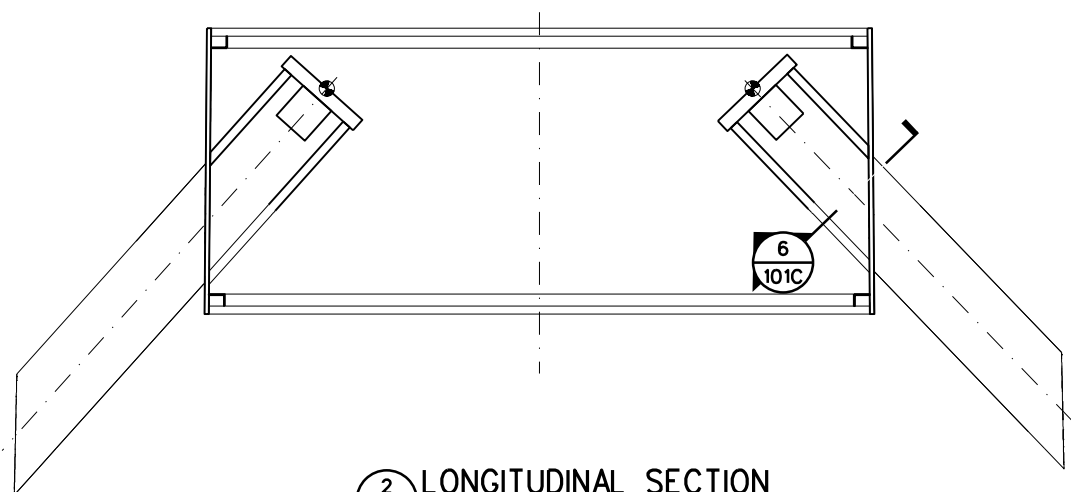
1 PLAN - ANCHOR BOX 1
101C 1/2"=1'-0"



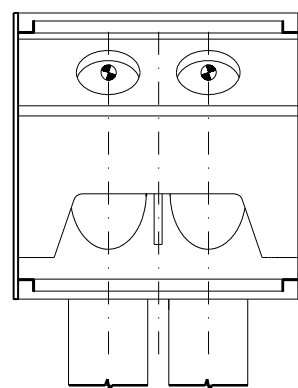
3 TRANSVERSE SECTION 1
101C 1/2"=1'-0"



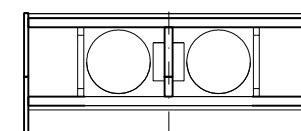
5 SECTION THROUGH ANCHOR BEAM CABLE OPENING
101C 1/2"=1'-0"



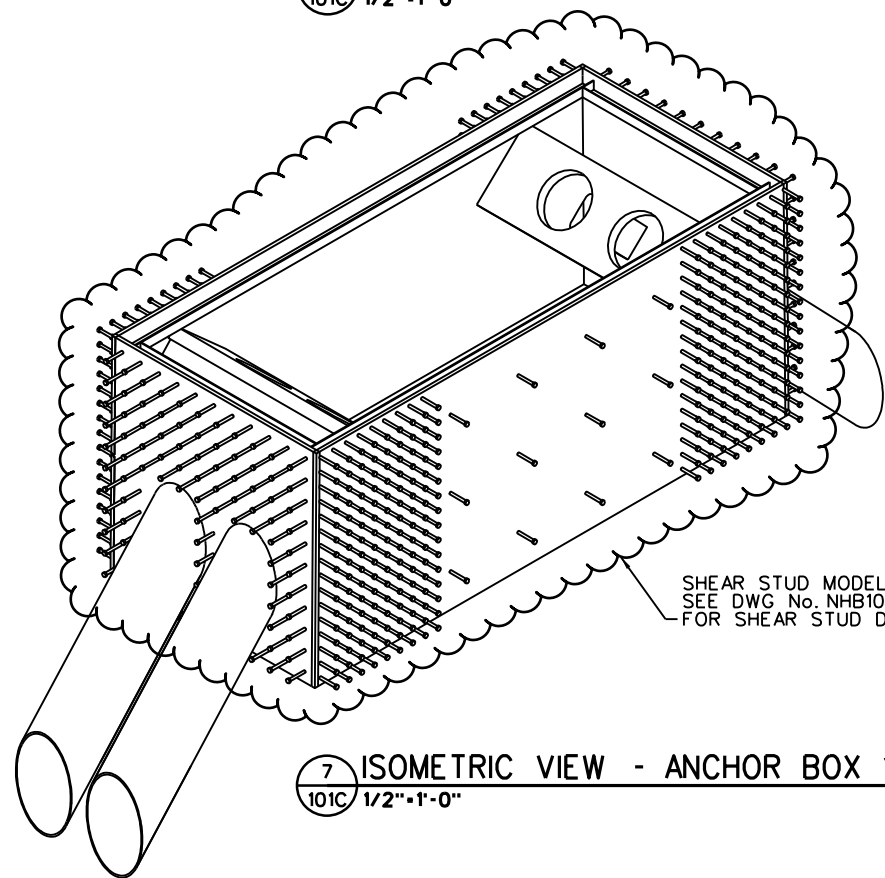
2 LONGITUDINAL SECTION
101C 1/2"=1'-0"



4 TRANSVERSE SECTION 2
101C 1/2"=1'-0"



6 ELEVATION ON UNDERSIDE OF ANCHOR BEAM
101C 1/2"=1'-0"





7 ISOMETRIC VIEW - ANCHOR BOX 1
101C 1/2"=1'-0"

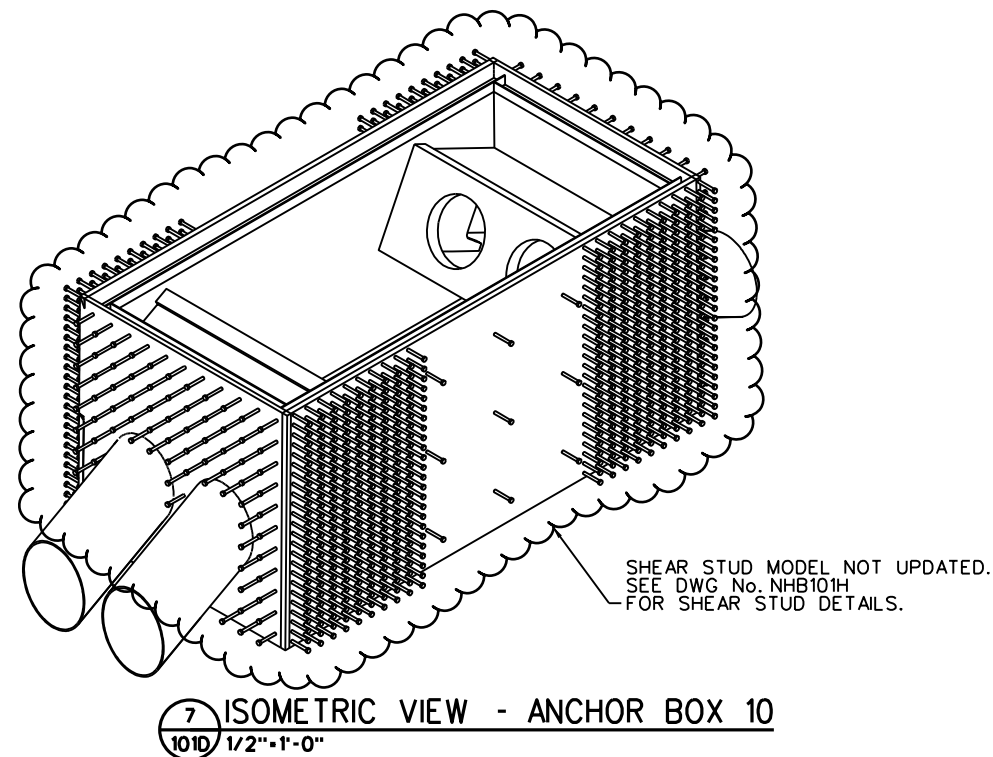
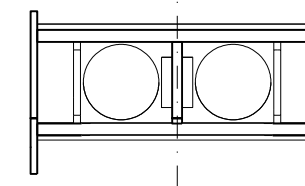
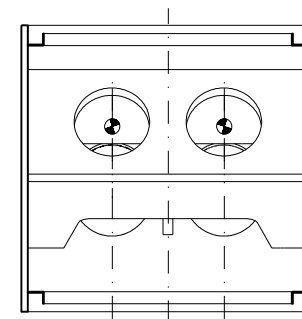
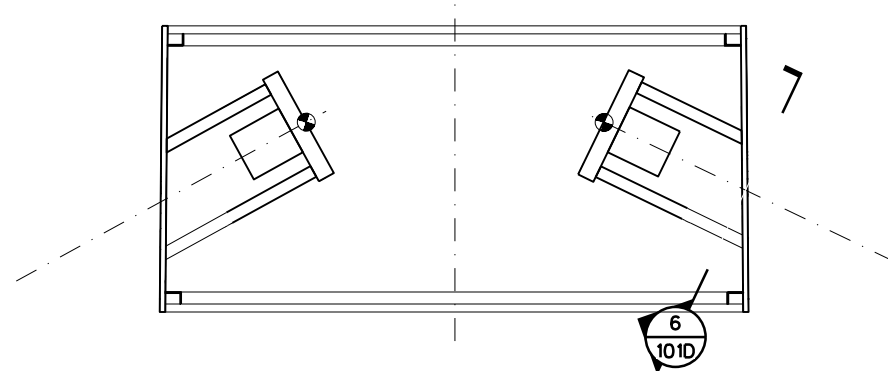
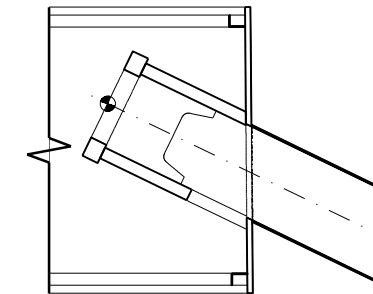
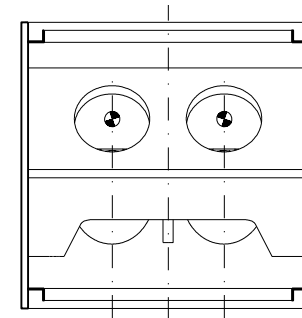
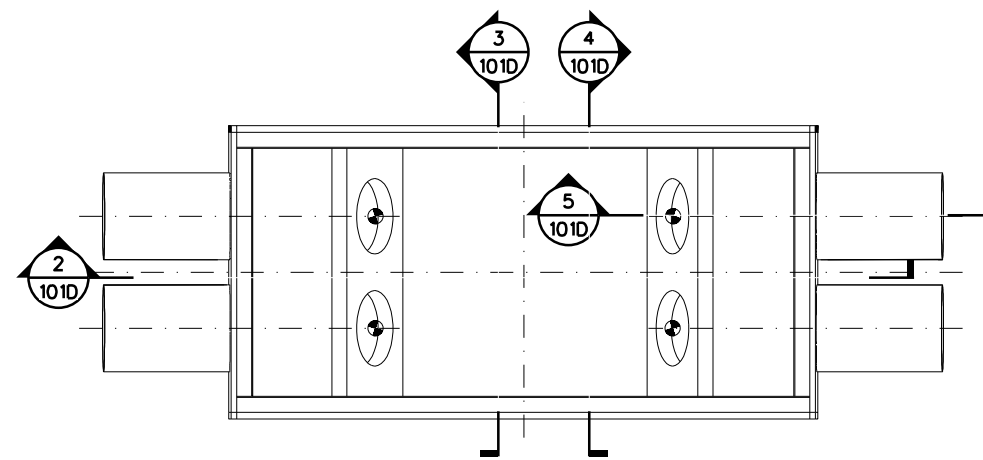
SHEAR STUD MODEL NOT UPDATED.
SEE DWG. NO. NHB101H
FOR SHEAR STUD DETAILS.

- NOTES:
- SEE DWG. NO. NHB101A FOR ANCHOR BOX DETAILS.

ADVANCE CHECK PRINT 04-15-2021

SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")

NO.	DATE	REVISION		APP
<div> FLATIRON/DRAGADOS LLC</div>			<div>ARUP</div> <div>CFC</div>	
<div> Texas Department of Transportation</div>				
US-181 HARBOR BRIDGE				
MAIN SPAN UPPER TOWER ANCHOR BOX 1 LAYOUT				
DESIGN JS	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS TP	X	(See Title Sheet)		US-181
CHECK NT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MC	TEXAS	CRP	NUECES	NHB 101C
	CONTROL	SECTION	JOB	
	0101	06	095	






NOTES:

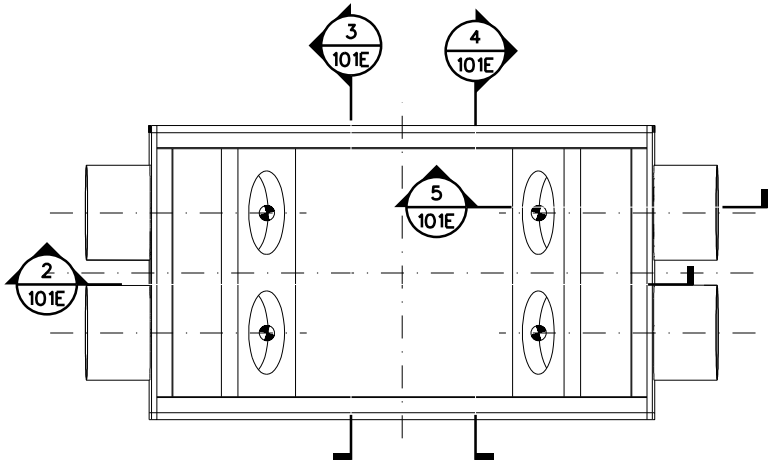
1. SEE DWG. No. NHB101A FOR ANCHOR BOX DETAILS.

ADVANCE CHECK PRINT 04-15-2021

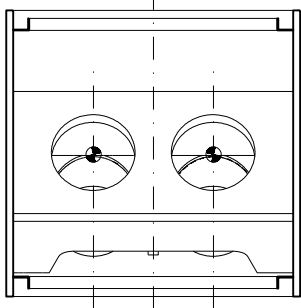
SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")

NO.	DATE	REVISION		APRV
 FLATIRON/DRAGADOS LLC				
 <i>Texas Department of Transportation</i>				
US-181 HARBOR BRIDGE				
MAIN SPAN UPPER TOWER ANCHOR BOX 10 LAYOUT				
DESIGN JS	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS TP	X	(See Title Sheet)		US-181
CHECK NT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MC	TEXAS	CRP	NUECES	NHB 101D
	CONTROL	SECTION	JOB	
	0101	06	095	

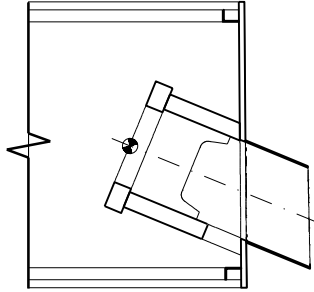
NOTES:
1. SEE DWG. No. NHB101A FOR ANCHOR BOX DETAILS.



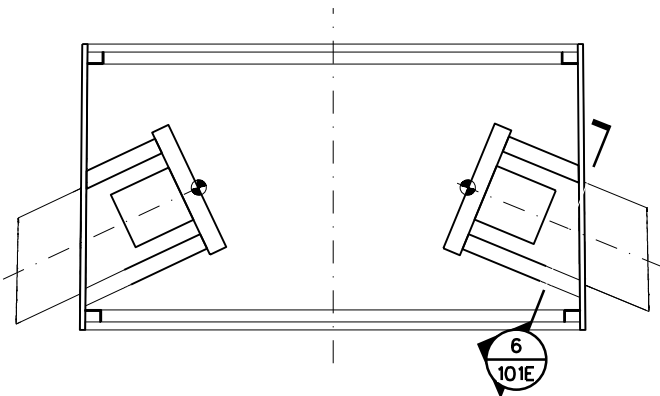
1 PLAN - ANCHOR BOX 19
101E 1/2"=1'-0"



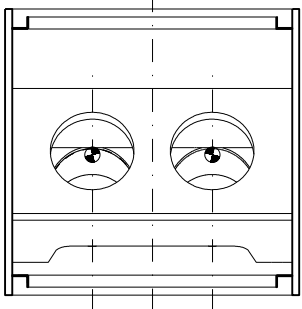
3 TRANSVERSE SECTION 1
101E 1/2"=1'-0"



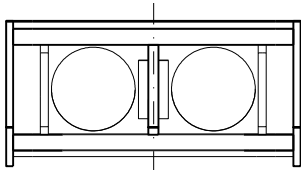
5 SECTION THROUGH ANCHOR BEAM CABLE OPENING
101E 1/2"=1'-0"



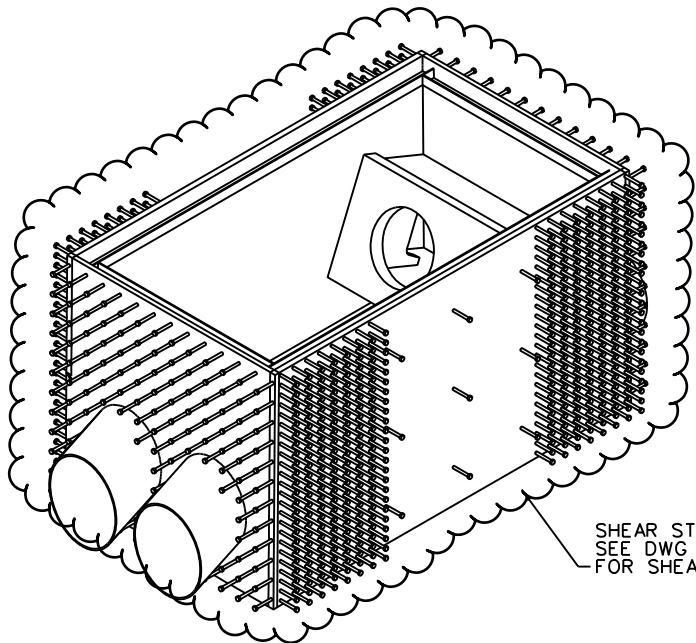
2 LONGITUDINAL SECTION
101E 1/2"=1'-0"



4 TRANSVERSE SECTION 2
101E 1/2"=1'-0"



6 ELEVATION ON UNDERSIDE OF ANCHOR BEAM
101E 1/2"=1'-0"





6 ISOMETRIC VIEW - ANCHOR BOX 19
101E 1/2"=1'-0"

SHEAR STUD MODEL NOT UPDATED.
SEE DWG No. NHB101H
FOR SHEAR STUD DETAILS.

ADVANCE CHECK PRINT 04-15-2021

SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")




NO.	DATE	REVISION	APRV	
<div> FLATIRON/D dragados LLC</div>			<div>ARUP CFC</div>	
<div> Texas Department of Transportation</div>				
US-181 HARBOR BRIDGE				
MAIN SPAN UPPER TOWER ANCHOR BOX 19 LAYOUT				
DESIGN JS	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS TP	X	(See Title Sheet)		US-181
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK NT	TEXAS	CRP	NUECES	NHB 101E
CHECK MC	CONTROL	SECTION	JOB	
	0101	06	095	

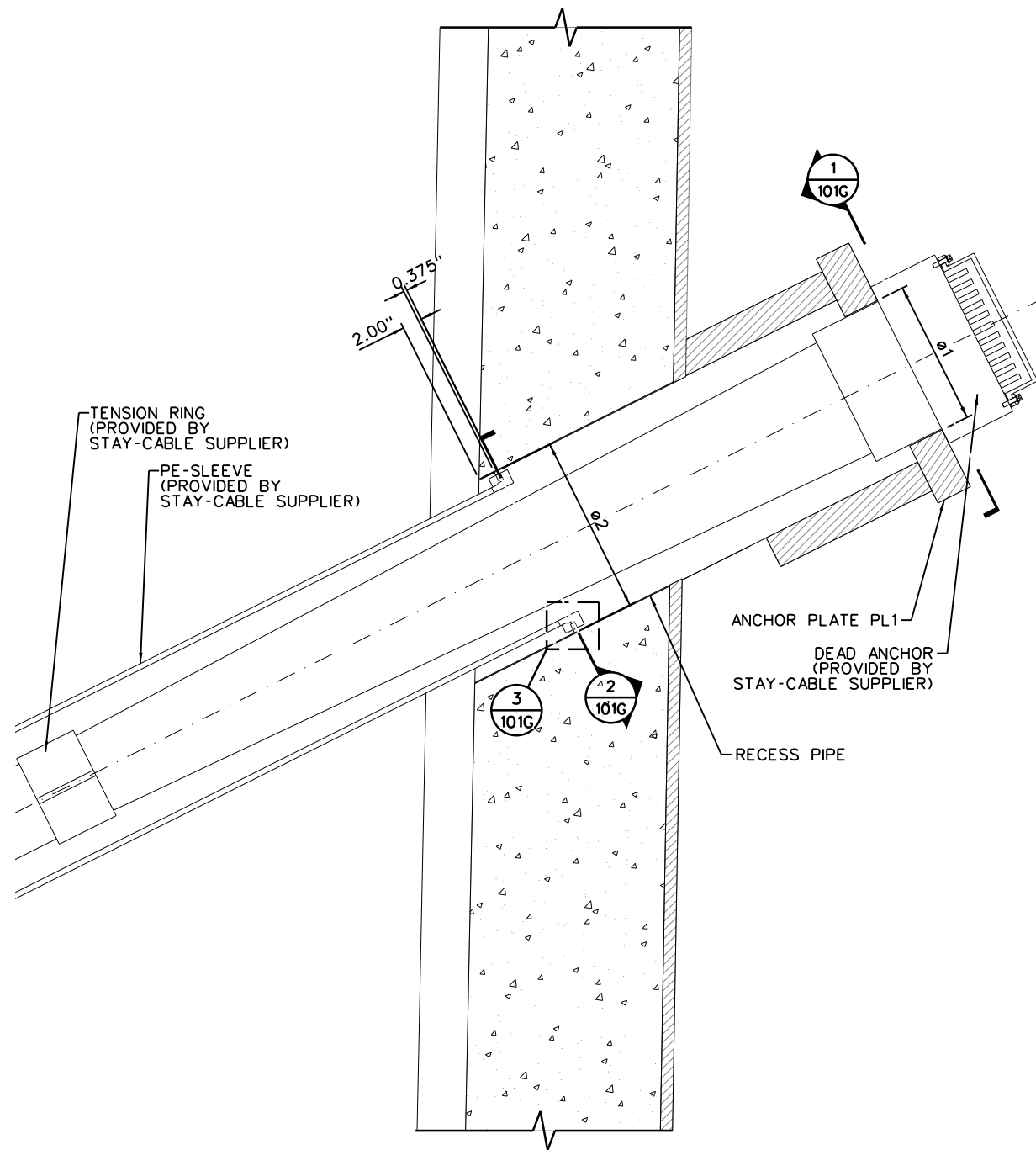
ANCHOR BOX NUMBERS	ANCHOR BOX TYPE	NO. OF CABLE STRANDS	ANCHOR BOX NOMINAL WEIGHT (KIP)	ANCHOR BEAM												ANCHOR BOX					ANGLE STIFFENERS		
				PL1-D1 (IN)	PL1-D1 (IN)	PL1-THK (IN)	PL2-THK (IN)	PL3-D1 (IN)	PL3-THK (IN)	PL6-THK (IN)	PL7-D1 (IN)	PL7-THK (IN)	PL8-D1 (IN)	PL8-D2 (IN)	PL8-THK (IN)	PL4-D1 (FT)	PL4-D2 (FT)	PL4-D3 (FT)	PL4-THK (IN)	PL5-THK (IN)	S1 (IN)	S2 (IN)	TEMP BRACE B1 (IN)
1	1	73	20.55	24.00	15.87	3.50	2.25	28.00	2.25	2.00	12.00	1.50	10.00	9.50	2.88	13.86	13.96	5.96	1.125	1.13	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25
2	1	73	19.74	24.00	15.87	3.50	2.25	28.00	2.25	2.00	12.00	1.50	10.00	9.50	2.88	13.67	13.77	5.96	1.125	1.13	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25
3	2	85	23.17	26.25	16.89	3.75	2.25	27.00	2.25	2.00	13.25	1.63	11.00	10.50	2.75	13.49	13.59	5.96	1.250	1.13	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25
4	2	85	22.81	26.25	16.89	3.75	2.25	27.00	2.25	2.00	13.25	1.63	11.00	10.50	2.75	13.30	13.40	5.96	1.250	1.13	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25
5	2	85	22.57	26.25	16.89	3.75	2.25	27.00	2.25	2.00	13.25	1.63	11.00	10.50	2.75	13.12	13.22	5.96	1.250	1.13	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25
6	3	91	24.64	26.50	17.91	4.00	2.50	26.00	2.50	2.50	14.50	1.63	12.00	11.50	2.50	12.93	13.03	5.96	1.375	1.25	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25
7	3	91	24.57	26.50	17.91	4.00	2.50	26.00	2.50	2.50	14.50	1.63	12.00	11.50	2.50	12.74	12.84	5.96	1.375	1.25	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25
8	4	109	27.38	29.00	18.86	4.25	3.00	24.00	3.00	2.50	17.00	1.75	14.00	12.50	2.63	12.56	12.66	5.96	1.625	1.375	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25
9	4	109	27.08	29.00	18.86	4.25	3.00	24.00	3.00	2.50	17.00	1.75	14.00	12.50	2.63	12.37	12.47	5.96	1.625	1.375	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25
10	4	109	26.96	29.00	18.86	4.25	3.00	24.00	3.00	2.50	17.00	1.75	14.00	12.50	2.63	12.17	12.27	5.96	1.625	1.375	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25
11	4	109	26.75	29.00	18.86	4.25	3.00	24.00	3.00	2.50	17.00	1.75	14.00	12.50	2.63	11.98	12.08	5.96	1.625	1.375	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25
12	4	109	26.51	29.00	18.86	4.25	3.00	24.00	3.00	2.50	17.00	1.75	14.00	12.50	2.63	11.79	11.89	5.96	1.625	1.375	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25
13	4	109	26.27	29.00	18.86	4.25	3.00	24.00	3.00	2.50	17.00	1.75	14.00	12.50	2.63	11.59	11.69	5.96	1.625	1.375	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25
14	5	121	27.73	33.75	20.91	4.50	4.00	21.00	4.00	2.50	19.25	2.00	16.00	14.50	2.50	11.40	11.50	5.96	1.750	1.375	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25
15	5	121	27.41	33.75	20.91	4.50	4.00	21.00	4.00	2.50	19.25	2.00	16.00	14.50	2.50	11.21	11.31	5.96	1.750	1.375	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25
16	5	121	27.38	33.75	20.91	4.50	4.00	21.00	4.00	2.50	19.25	2.00	16.00	14.50	2.50	11.02	11.12	5.96	1.750	1.375	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25
17	5	121	27.18	33.75	20.91	4.50	4.00	21.00	4.00	2.50	19.25	2.00	16.00	14.50	2.50	10.82	10.92	5.96	1.750	1.375	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25
18	5	121	26.94	33.75	20.91	4.50	4.00	21.00	4.00	2.50	19.25	2.00	16.00	14.50	2.50	10.63	10.73	5.96	1.750	1.375	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25
19	5	121	26.70	33.75	20.91	4.50	4.00	21.00	4.00	2.50	19.25	2.00	16.00	14.50	2.50	10.44	10.54	5.96	1.750	1.375	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25

TOWER	ANCHOR BOX	MAIN SPAN CABLE SETTING OUT						BACK SPAN CABLE SETTING OUT					
		DX-MS (FT)	DY-MS (FT)	DZ-MS (FT)	θ1-MS (DEGREES)	θ2-MS (DEGREES)	θ3-MS (DEGREES)	DX-BS (FT)	DY-BS (FT)	DZ-BS (FT)	θ1-BS (DEGREES)	θ2-BS (DEGREES)	θ3-BS (DEGREES)
INT	1	4.43	1.04	4.72	46.10	0.45	0.43	4.43	1.04	4.72	48.18	0.45	0.40
INT	2	4.34	1.04	4.72	40.66	0.34	0.40	4.34	1.04	4.72	43.14	0.34	0.37
INT	3	3.87	1.08	4.35	36.68	0.27	0.36	3.87	1.08	4.35	39.43	0.27	0.32
INT	4	3.78	1.08	4.35	33.83	0.22	0.33	3.78	1.08	4.35	36.76	0.22	0.30
INT	5	3.69	1.08	4.35	31.66	0.19	0.31	3.69	1.08	4.35	34.71	0.19	0.28
INT	6	3.18	1.13	4.32	29.90	0.16	0.28	3.18	1.13	4.32	33.04	0.16	0.25
INT	7	3.09	1.13	4.32	28.55	0.14	0.26	3.09	1.13	4.32	31.74	0.14	0.23
INT	8	3.29	1.17	3.95	27.41	0.12	0.24	3.29	1.17	3.95	30.64	0.12	0.21
INT	9	3.19	1.17	3.95	26.53	0.11	0.22	3.19	1.17	3.95	29.80	0.11	0.20
INT	10	3.09	1.17	3.95	25.80	0.10	0.21	3.09	1.17	3.95	29.07	0.10	0.19
INT	11	3.00	1.17	3.95	25.19	0.10	0.20	3.00	1.17	3.95	28.48	0.10	0.18
INT	12	2.90	1.17	3.95	24.67	0.09	0.19	2.90	1.17	3.95	27.97	0.09	0.17
INT	13	2.80	1.17	3.95	24.20	0.08	0.18	2.80	1.17	3.95	27.47	0.08	0.16
INT	14	3.30	1.25	3.27	23.76	0.07	0.16	3.30	1.25	3.27	27.02	0.07	0.14
INT	15	3.20	1.25	3.27	23.43	0.07	0.15	3.20	1.25	3.27	26.66	0.07	0.13
INT	16	3.11	1.25	3.27	23.13	0.06	0.15	3.11	1.25	3.27	26.33	0.06	0.13
INT	17	3.01	1.25	3.27	22.86	0.06	0.14	3.01	1.25	3.27	26.07	0.06	0.12
INT	18	2.92	1.25	3.27	22.64	0.06	0.14	2.92	1.25	3.27	25.81	0.06	0.12
INT	19	2.82	1.25	3.27	22.41	0.05	0.13	2.82	1.25	3.27	25.56	0.05	0.11
IST	1	4.43	1.04	4.72	46.28	0.46	0.44	4.43	1.04	4.72	48.11	0.45	0.40
IST	2	4.34	1.04	4.72	40.86	0.35	0.41	4.34	1.04	4.72	43.06	0.34	0.37
IST	3	3.87	1.08	4.35	36.89	0.28	0.37	3.87	1.08	4.35	39.34	0.27	0.32
IST	4	3.78	1.08	4.35	34.05	0.23	0.34	3.78	1.08	4.35	36.68	0.22	0.30
IST	5	3.69	1.08	4.35	31.89	0.20	0.32	3.69	1.08	4.35	34.63	0.19	0.28
IST	6	3.18	1.13	4.32	30.13	0.17	0.29	3.18	1.13	4.32	32.96	0.16	0.25
IST	7	3.09	1.13	4.32	28.78	0.15	0.27	3.09	1.13	4.32	31.66	0.14	0.23
IST	8	3.29	1.17	3.95	27.64	0.13	0.25	3.29	1.17	3.95	30.57	0.12	0.21
IST	9	3.19	1.17	3.95	26.77	0.12	0.24	3.19	1.17	3.95	29.71	0.11	0.20
IST	10	3.09	1.17	3.95	26.04	0.11	0.22	3.09	1.17	3.95	28.99	0.10	0.19
IST	11	3.00	1.17	3.95	25.42	0.10	0.21	3.00	1.17	3.95	28.38	0.10	0.18
IST	12	2.90	1.17	3.95	24.90	0.09	0.20	2.90	1.17	3.95	27.85	0.09	0.17
IST	13	2.80	1.17	3.95	24.45	0.09	0.19	2.80	1.17	3.95	27.40	0.08	0.16
IST	14	3.30	1.25	3.27	24.01	0.08	0.17	3.30	1.25	3.27	26.95	0.07	0.14
IST	15	3.20	1.25	3.27	23.67	0.07	0.16	3.20	1.25	3.27	26.59	0.07	0.13
IST	16	3.11	1.25	3.27	23.37	0.07	0.16	3.11	1.25	3.27	26.27	0.06	0.13
IST	17	3.01	1.25	3.27	23.11	0.06	0.15	3.01	1.25	3.27	26.00	0.06	0.12
IST	18	2.92	1.25	3.27	22.90	0.06	0.15	2.92	1.25	3.27	25.74	0.06	0.12
IST	19	2.82	1.25	3.27	22.68	0.06	0.14	2.82	1.25	3.27	25.51	0.05	0.11

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SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")

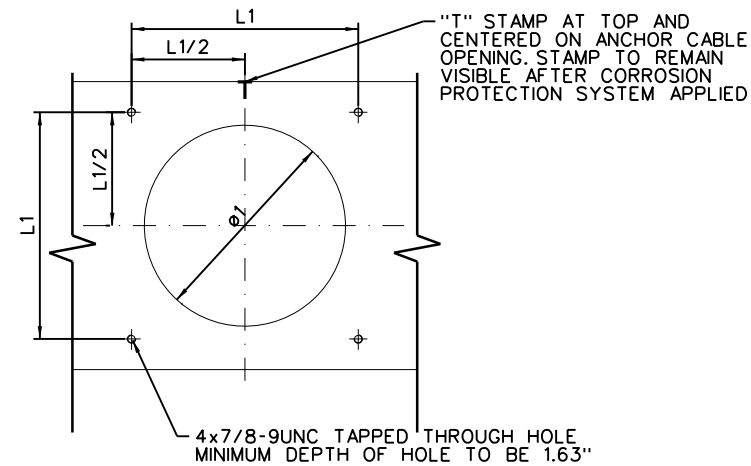
NO.	DATE	REVISION	APRV
			
			
US-181 HARBOR BRIDGE			
MAIN SPAN UPPER TOWER ANCHOR BOX PLATE SCHEDULE			
DESIGN JS	FED.RD. DIV.NO. X	FEDERAL AID PROJECT NO. (See Title Sheet)	
GRAPHICS EF	STATE	DISTRICT	COUNTY
CHECK NT	TEXAS	CRP	NUECES
CHECK MC	CONTROL	SECTION	JOB
	0101	06	095
			HIGHWAY NO. US-181 SHEET NO. NHB 101F



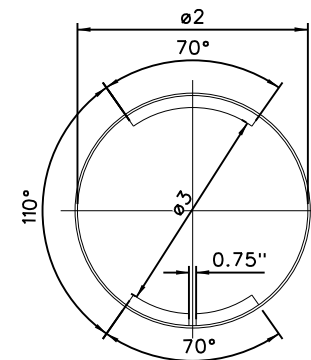
SECTION THROUGH STAY CABLE

ANCHOR BOX TYPE	L1	Ø1	Ø2	Ø3
T	TBD	TBD	TBD	TBD
1	21.26" (+/-0.04")	15.87" (+0.20"/-0.00")	19.00"	16.54" (+/-0.04")
2	23.62" (+/-0.04")	16.89" (+0.20"/-0.00")	19.00"	16.54" (+/-0.04")
3	23.62" (+/-0.04")	17.91" (+0.20"/-0.00")	21.00"	18.50" (+/-0.04")
4	25.59" (+/-0.04")	18.86" (+0.20"/-0.00")	21.00"	18.50" (+/-0.04")
5	27.56" (+/-0.04")	20.91" (+0.20"/-0.00")	23.00"	20.50" (+/-0.04")

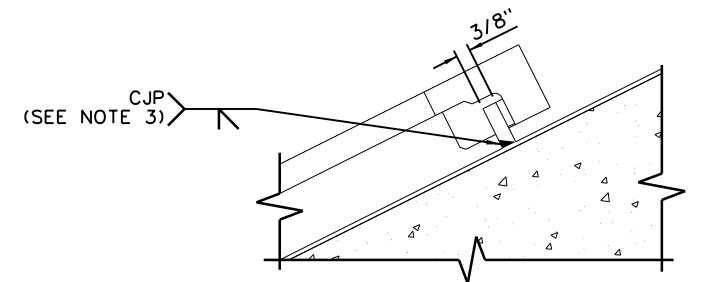
NOTE 1: TOLERANCE ON DIMENSIONS GIVEN IN PARENTHESES



1 ELEVATION ON ANCHOR PLATE PL1
101G 1:10



2 SECTION ON BAYONET
101G 1:10



3 BAYONET WELD DETAIL
101G 1:10

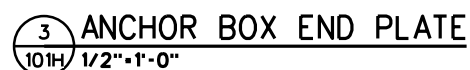
NOTES:

- THE DETAILS PRESENTED ON THIS DRAWINGS HAVE BEEN GIVEN BY THE CABLE SUPPLIER.
- FOR DETAILS OF THE ANCHOR PLATE AND THE GUIDE TUBE SEE DWG. No. NHB101A.
- THE WELDING SEAMS OF ALL BAYONET FLANGES AT SECTION 2 SHOULD FOLLOW DETAIL 3.

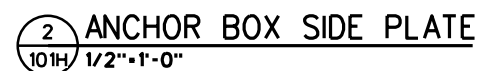
ADVANCE CHECK PRINT 04-15-2021

SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")

NO.	DATE	REVISION	APRV
<div> </div>			
US-181 HARBOR BRIDGE			
<p>MAIN SPAN UPPER TOWER ANCHOR BOX DETAILS I</p>			
DESIGN NT	FED. RD. DIV. NO. X	FEDERAL AID PROJECT NO. (See Title Sheet)	
GRAPHICS MN	STATE	DISTRICT	COUNTY
CHECK NT	TEXAS	CRP	NUECES
CHECK MC	CONTROL	SECTION	JOB
	0101	06	095
<p>US-181 SHEET NO. NHB 101G</p>			

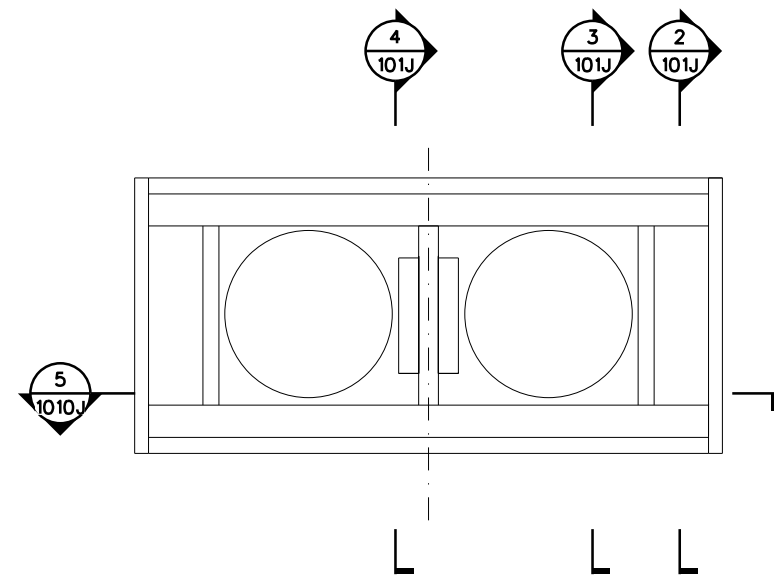


1. SEE DWG NHB-101 FOR SHEAR STUD REQUIREMENTS.
2. THE VERTICAL LINES OF SHEAR STUDS IN ZONE 1 FOLLOW THE SLOPE OF THE INCLINED ANCHOR BOX END PLATE. THE VERTICAL LINES OF SHEAR STUDS IN ZONE 2 ARE VERTICAL.
3. STUD SPACING IN ZONE 3 SHALL BE PROVIDED ON A 7"x6" GRID AS SHOWN. WHERE ANCHOR BOX END PLATE SHEAR STUDS WOULD CONFLICT WITH THE GUIDE PIPES THEY MAY BE OMITTED. ANCHOR BOX END PLATE IS INDICATIVE ONLY. STUDS THAT ARE IN DIRECT CONFLICT WITH THE GUIDE PIPE OR ARE WITHIN 3" CLEAR OF THE GUIDE PIPE SHALL BE OMITTED.

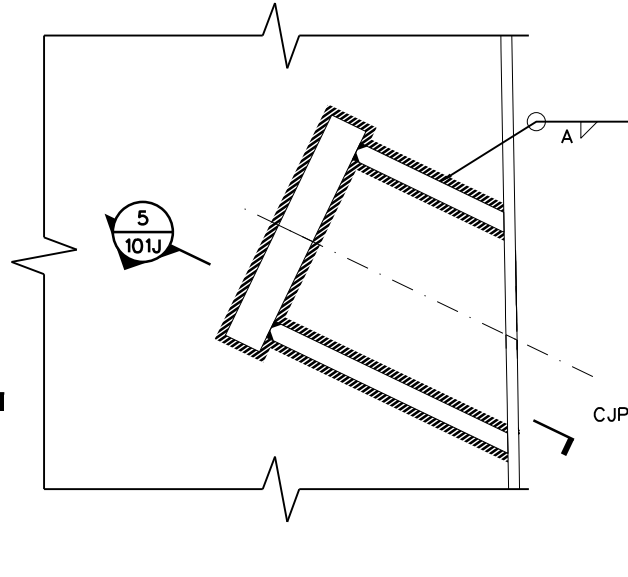


ANCHOR BOX NUMBER	ZONE 3 DIMENSIONS			
	A3 (IN)	B3 (")	C3 (IN)	D3 (IN)
1	1.75	11	6	3.75
2	1.75	11	6	3.75
3	1.75	11	6	3.75
4	1.75	11	6	3.75
5	1.75	11	6	3.75
6	1.75	11	6	3.75
7	1.75	11	6	3.75
8	1.75	11	6	3.75
9	2.75	11	6	2.75
10	2.75	11	6	2.75
11	2.75	11	6	2.75
12	2.75	11	6	2.75
13	2.75	11	6	2.75
14	2.75	11	6	2.75
15	2.75	11	6	2.75
16	2.75	11	6	2.75
17	2.75	11	6	2.75
18	2.75	11	6	2.75
19	2.75	11	6	2.75

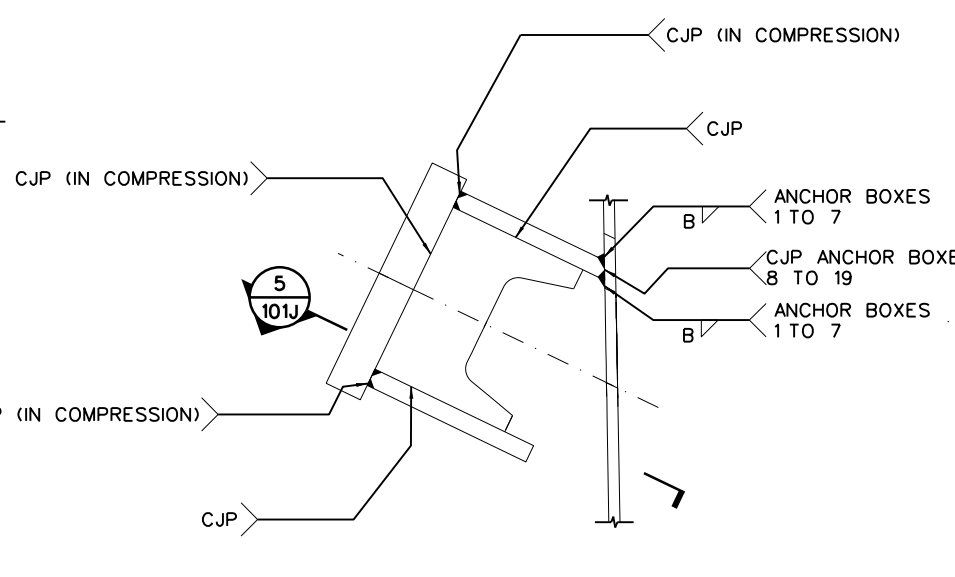
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY
NT	X	(See Title Sheet)		US-181
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MN	TEXAS	CRP	NUECES	NHB 101H
CHECK	CONTROL	SECTION	JOB	
NT	0101	06	095	
CHECK				
MC				



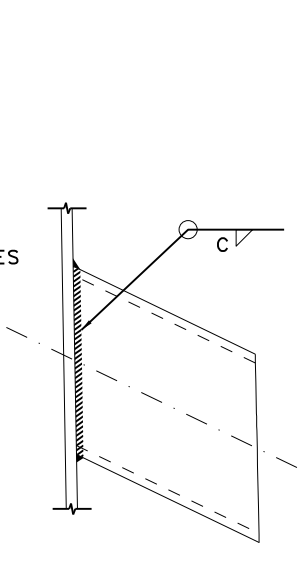
1 ELEVATION ON UNDERSIDE OF ANCHOR BEAM
101J 1'-1'-0"



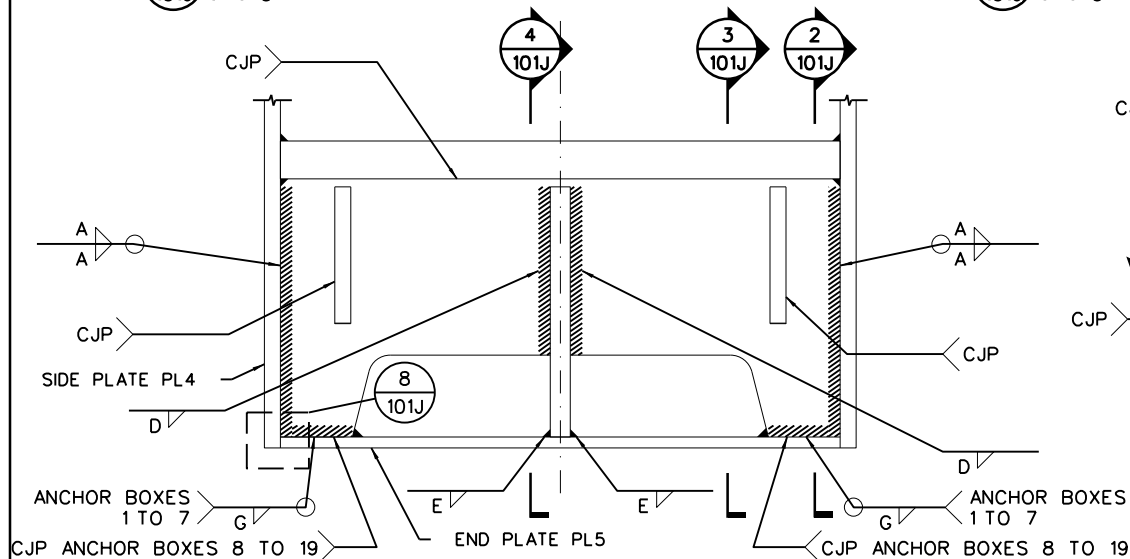
2 VIEW ON SIDE PLATE PL4
101J 1'-1'-0"



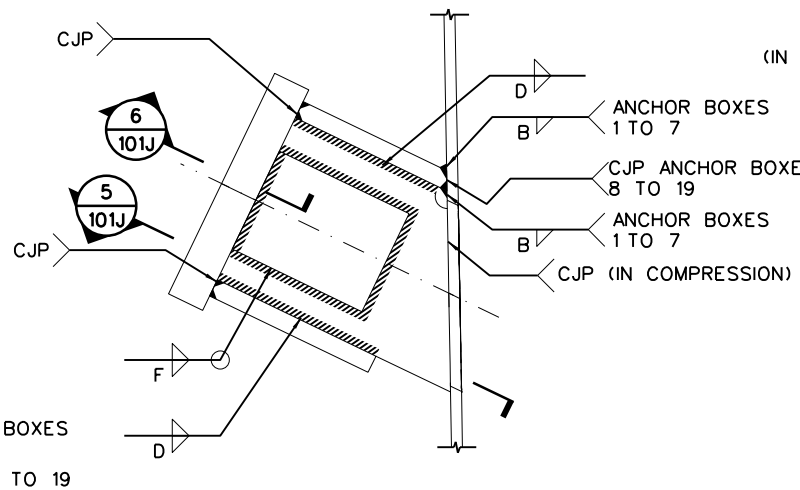
3 VIEW ON SIDE SUPPORT PLATE PL6
101J 1'-1'-0"



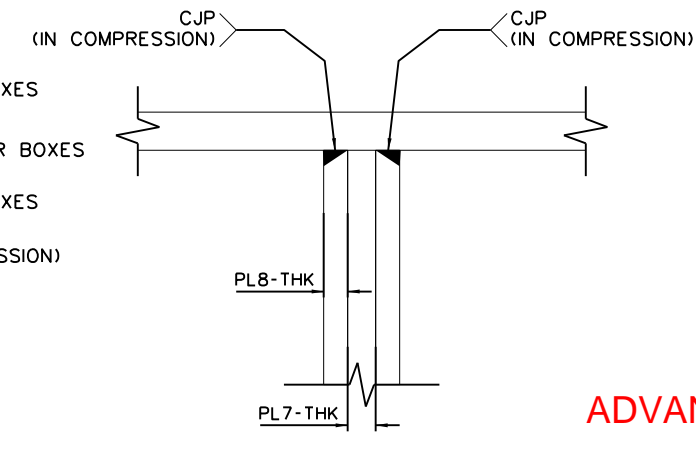
7 RECESS PIPE TO END PLATE P5 WELD
101J 1'-1'-0"



5 VIEW ON BOTTOM WEB PLATE PL3
101J 1'-1'-0"



4 VIEW ON CENTER SUPPORT
PLATE PL7/DOUBLER PLATE PL8
101J 1'-1'-0"

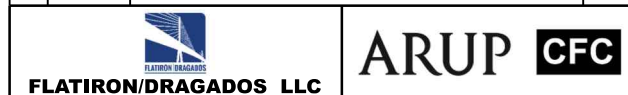


6 SECTION
101J 1'-1'-0"

ADVANCE CHECK PRINT 04-15-2021

SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")

NO.	DATE	REVISION	APRV

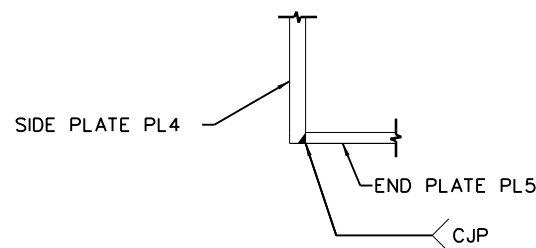


US-181 HARBOR BRIDGE

MAIN SPAN UPPER TOWER ANCHOR BOX DETAILS III

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
NT	X	(See Title Sheet)		US-181
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
NT	TEXAS	CRP	NUECES	NHB 101J
MC	CONTROL	SECTION	JOB	
	0101	06	095	

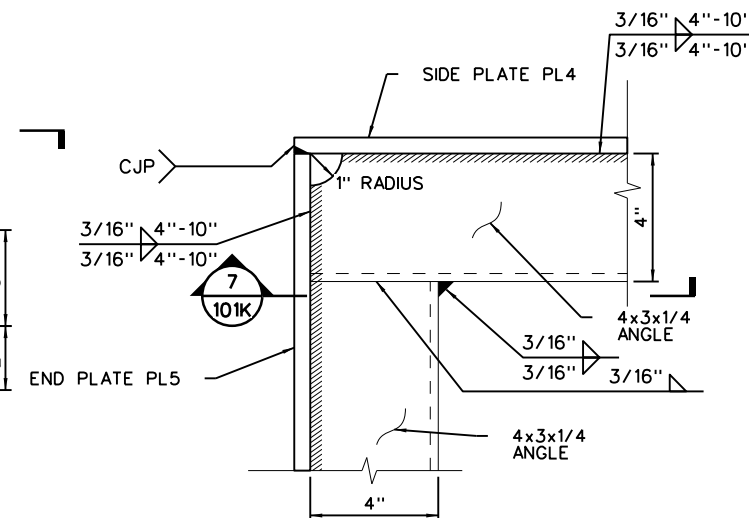
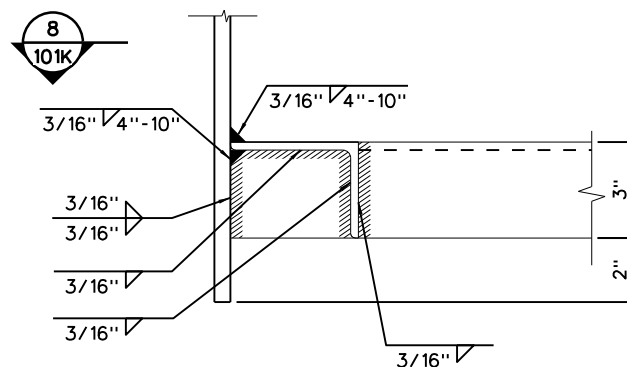
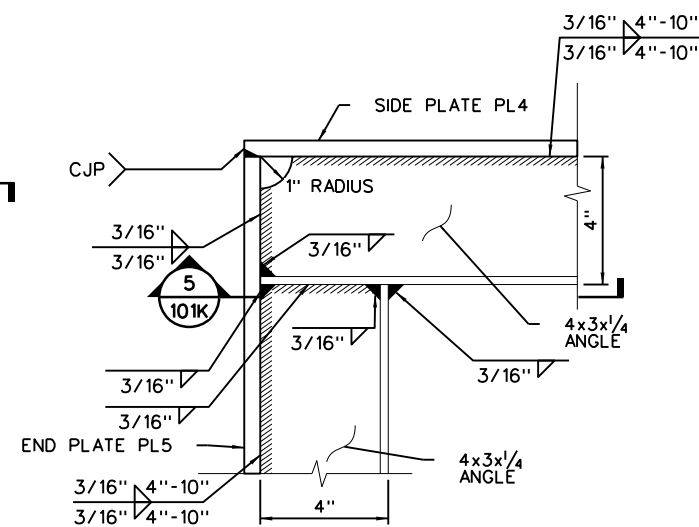
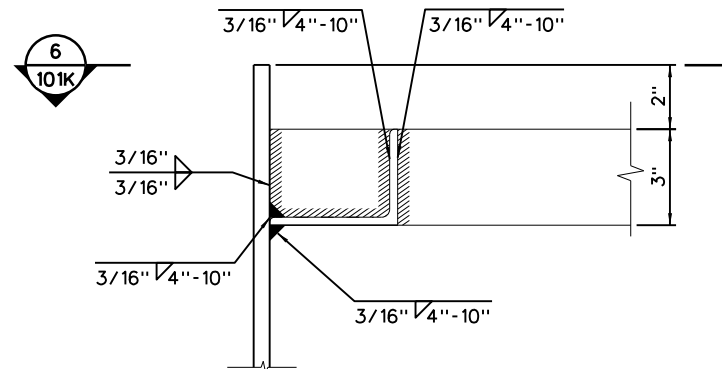
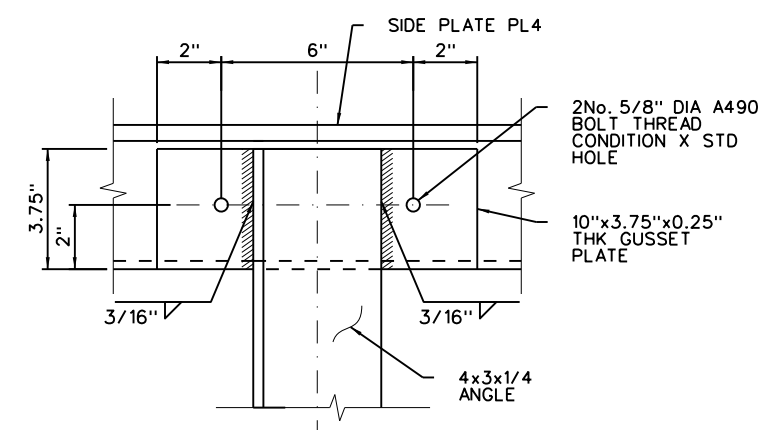
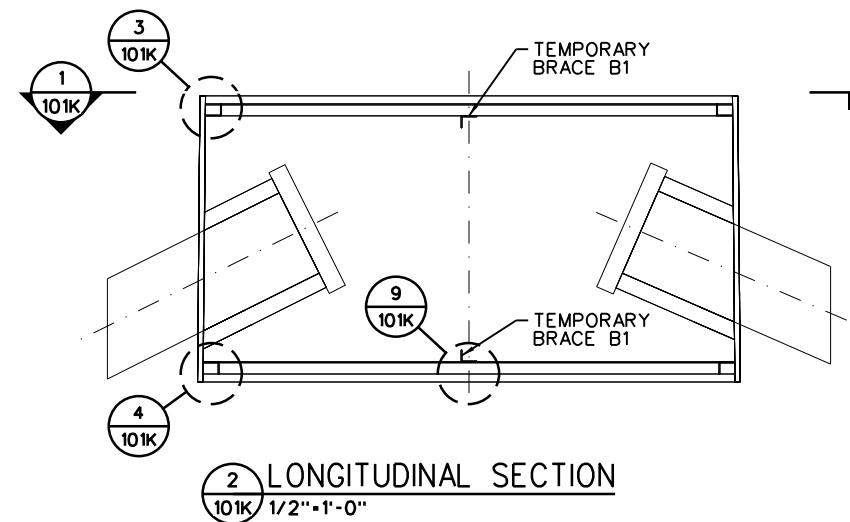
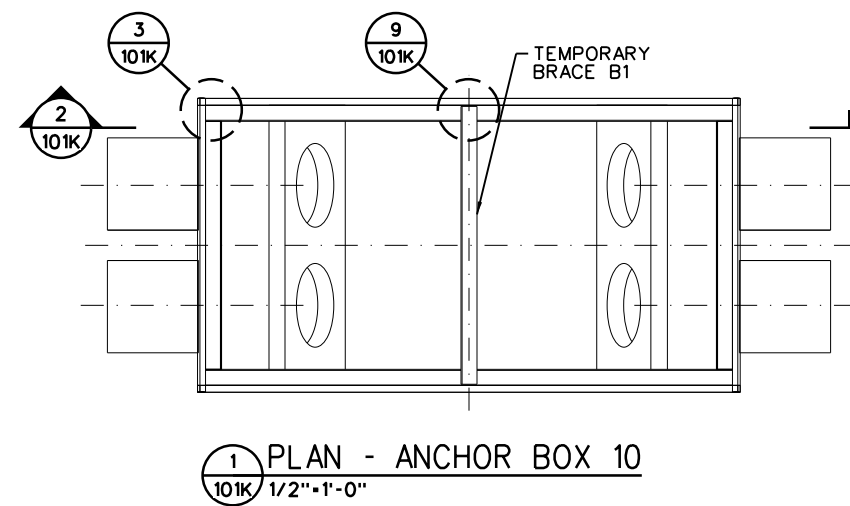
ANCHOR BOX NUMBERS	ANCHOR BEAM FILLET WELD SIZES					
	A (IN)	B (IN)	C (IN)	D (IN)	F (IN)	G (IN)
1	0.875	0.875	0.313	0.75	1.50	1.00
2	0.875	0.875	0.313	0.75	1.50	1.00
3	1.00	1.00	0.313	0.875	1.50	1.063
4	1.00	1.00	0.313	0.875	1.50	1.063
5	1.00	1.00	0.313	0.875	1.50	1.063
6	1.00	1.125	0.313	0.875	1.50	1.125
7	1.00	1.125	0.313	0.875	1.50	1.125
8	1.25	CJP	0.313	1.125	1.50	CJP
9	1.25	CJP	0.313	1.125	1.50	CJP
10	1.25	CJP	0.313	1.125	1.50	CJP
11	1.25	CJP	0.313	1.125	1.50	CJP
12	1.25	CJP	0.313	1.125	1.50	CJP
13	1.25	CJP	0.313	1.125	1.50	CJP
14	1.625	CJP	0.313	1.625	1.50	CJP
15	1.625	CJP	0.313	1.625	1.50	CJP
16	1.625	CJP	0.313	1.625	1.50	CJP
17	1.625	CJP	0.313	1.625	1.50	CJP
18	1.625	CJP	0.313	1.625	1.50	CJP
19	1.625	CJP	0.313	1.625	1.50	CJP



8 BOX CORNER WELD DETAIL
101J 1'-1'-0"

NOTES:




- FOR COMPONENT NAMES SEE DWG. No. NHB 101A.
- FOR GENERAL STEEL SPECIFICATION INCLUDING WELDING REQUIREMENTS SEE DWG. No. NHB 101.
- WELD TYPES "B" AND "C" ARE FILLET WELDS FOR ANCHOR BOXES 1 THROUGH 7 AND CJP WELDS FOR ANCHOR BOXES 8 THROUGH 19.

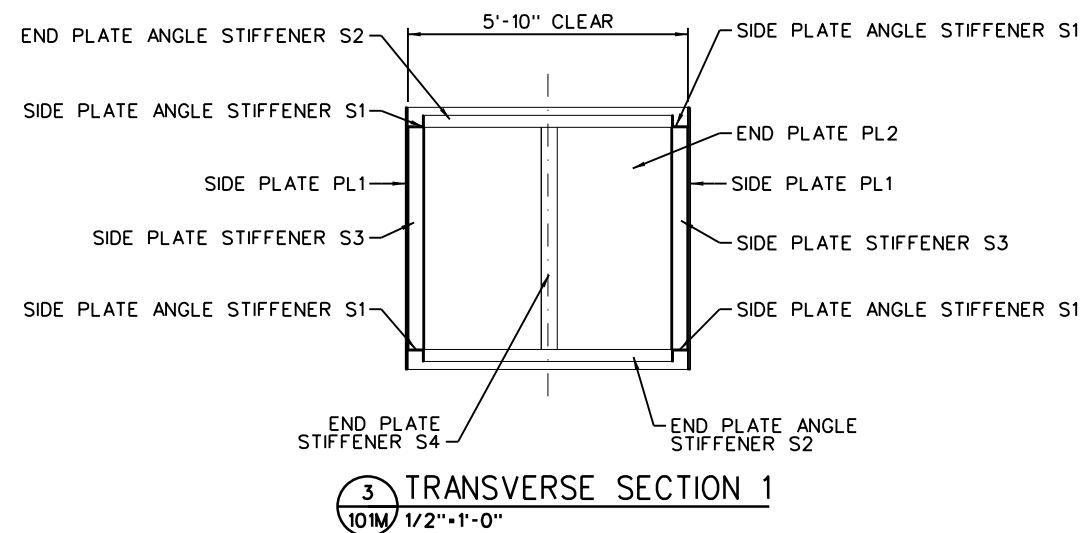


- NOTES:

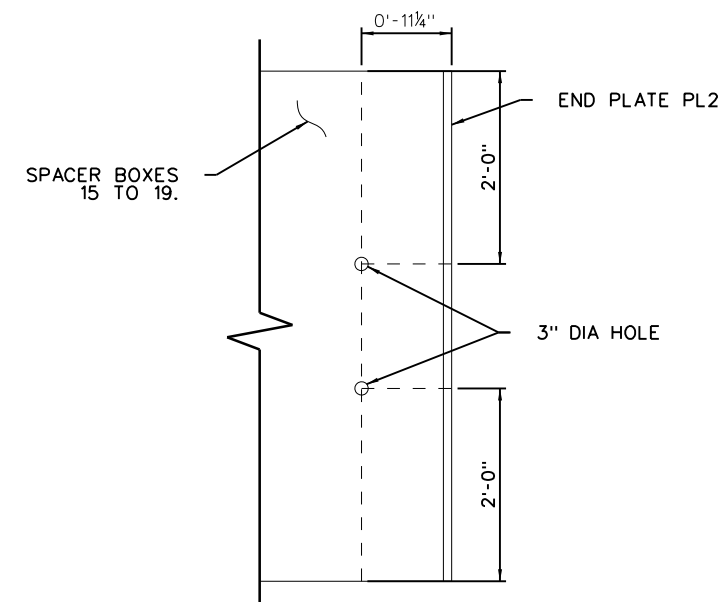
1. FOR GENERAL STEEL SPECIFICATION INCLUDING WELDING REQUIREMENTS SEE DWG. NHB-101.
2. TEMPORARY BRACES B1 ARE TO BE INSTALLED PRIOR TO POURING THE SURROUNDING CONCRETE. THESE BRACES ARE TO BE REMOVED ONCE THE CONCRETE HAS HARDENED AND NO FURTHER POUR WEIGHT PRESSURES ARE BEING APPLIED TO THE ANCHOR BOX.

ADVANCE CHECK PRINT 04-15-2021

SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")				
NO.	DATE	REVISION	APRV	
 FLATIRON/DRAGADOS LLC				
 <i>Texas Department of Transportation</i>				
US-181 HARBOR BRIDGE				
MAIN SPAN UPPER TOWER ANCHOR BOX DETAILS IV				
DESIGN NT GRAPHICS MN CHECK NT CHECK MC	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
	X	(See Title Sheet)		US-181
	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	CRP	NUECES	NHB 101K
	CONTROL	SECTION	JOB	
	0101	06	095	

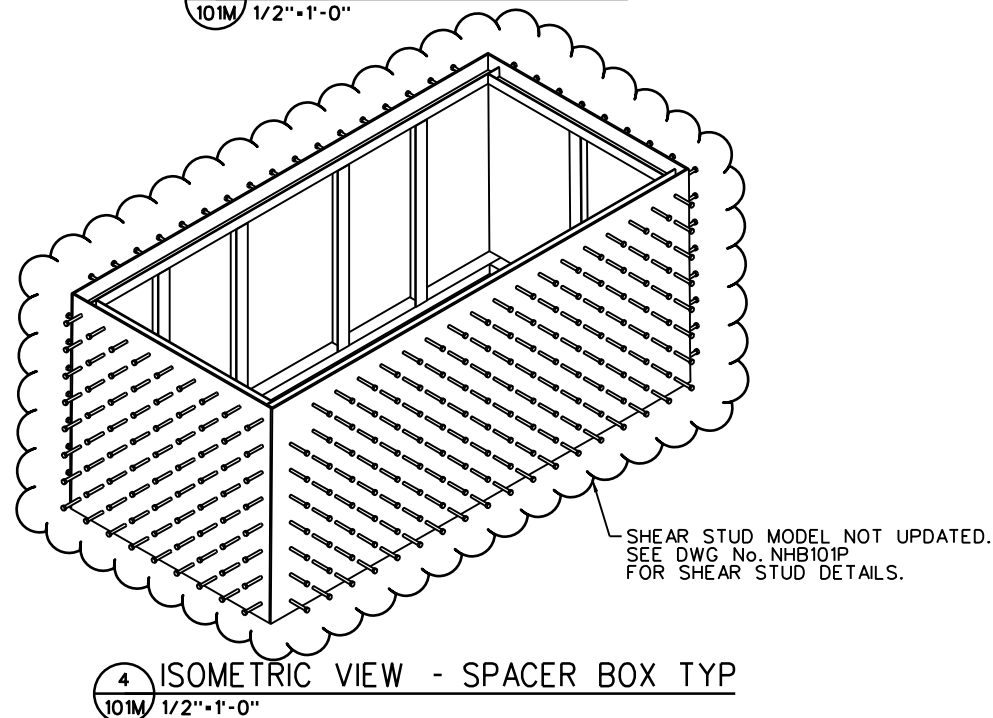





-
- PL1-D1
- END PLATE ANGLE STIFFENER S2
- SIDE PLATE ANGLE STIFFENER S1
- TEMPORARY BRACE B1
- END PLATE ANGLE STIFFENER S2
- END PLATE ANGLE STIFFENER S2
- SIDE PLATE ANGLE STIFFENER S3 (TYP)
- SIDE PLATE ANGLE STIFFENER S1
- END PLATE PL2
- END PLATE ANGLE STIFFENER S2
- PL1-D3 (H-1/2'')
- TEMPORARY BRACE B1
- PL1-D2
- END PLATE ANGLE STIFFENER S2
- 2 LONGITUDINAL SECTION 1
- 101M 1/2'' x 1'-0''



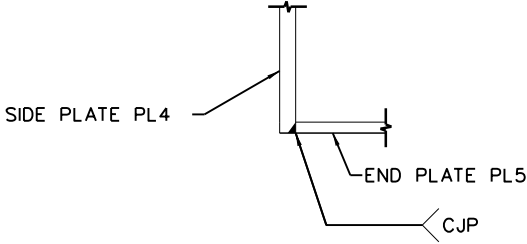
SECTION ON SPACER BOX 15 TO 19
SHOWING ELECTRICAL CONDUIT PENETRATIONS

SECTION 5 DRAWN, SECTION 6 SIMILAR BUT HANDED
1"=1'-0"





SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")			
NO.	DATE	REVISION	APRV
 FLATIRON/DragADOS LLC			
 Texas Department of Transportation			
US-181 HARBOR BRIDGE			
MAIN SPAN UPPER TOWER TYPICAL SPACER BOX ARRANGEMENT			
DESIGN JS	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
GRAPHICS TP	X	(See Title Sheet)	US-181
CHECK NT	STATE TEXAS	DISTRICT CRP	COUNTY NUECES
CHECK MC	CONTROL 0101	SECTION 06	SHEET NO. NHB 101M

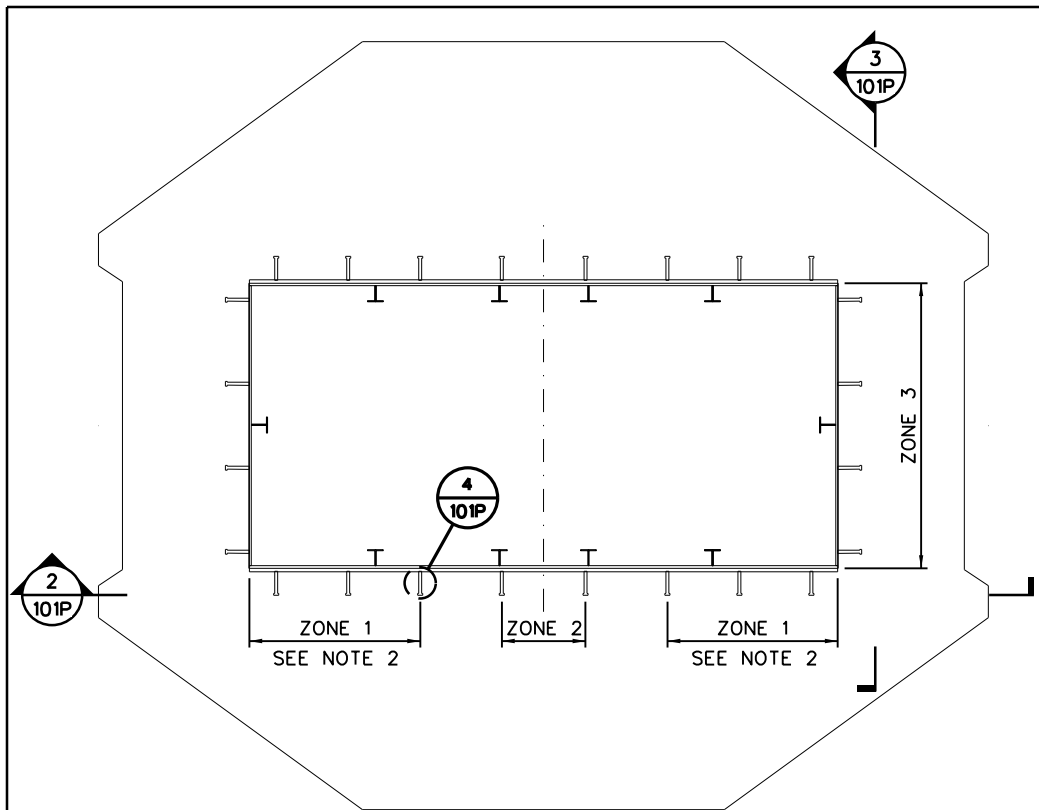
SPACER BOX NUMBER	SPACER BOX					SPACER BOX STIFFENERS			
	PL1-D1 (FT)	PL1-D2 (FT)	PL1-D3 (FT)	PL1-THK (IN)	PL2-THK (IN)	ANGLE S1 (IN)	ANGLE S2 (IN)	TEMP ANGLE BRACE B1 (IN)	WT S3 (IN)
2	13.77	13.86	5.04	0.50	0.50	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25	WT4X5
3	13.59	13.67	5.04	0.50	0.50	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25	WT4X5
4	13.40	13.49	5.04	0.50	0.50	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25	WT4X5
5	13.22	13.30	5.04	0.50	0.50	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25	WT4X5
6	13.03	13.12	5.04	0.50	0.50	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25	WT4X5
7	12.84	12.93	5.04	0.50	0.50	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25	WT4X5
8	12.66	12.74	5.04	0.50	0.50	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25	WT4X5
9	12.47	12.56	5.46	0.50	0.50	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25	WT4X5
10	12.27	12.36	5.46	0.50	0.50	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25	WT4X5
11	12.08	12.17	5.46	0.50	0.50	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25	WT4X5
12	11.89	11.98	5.46	0.50	0.50	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25	WT4X5
13	11.70	11.79	5.46	0.50	0.50	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25	WT4X5
14	11.50	11.59	5.46	0.50	0.50	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25	WT4X5
15	11.31	11.40	5.46	0.50	0.50	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25	WT4X5
16	11.12	11.21	5.46	0.50	0.50	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25	WT4X5
17	10.92	11.02	5.46	0.50	0.50	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25	WT4X5
18	10.73	10.82	5.46	0.50	0.50	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25	WT4X5
19	10.54	10.63	5.46	0.50	0.50	L 4x3x0.25	L 4x3x0.25	L 4x3x0.25	WT4X5



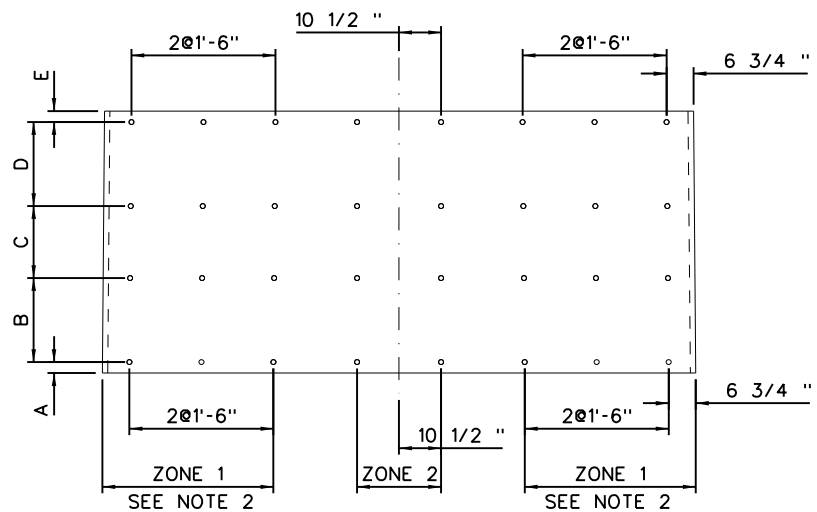
1 BOX CORNER WELD DETAIL
101J 1"-1'-0"

ADVANCE CHECK PRINT 04-15-2021

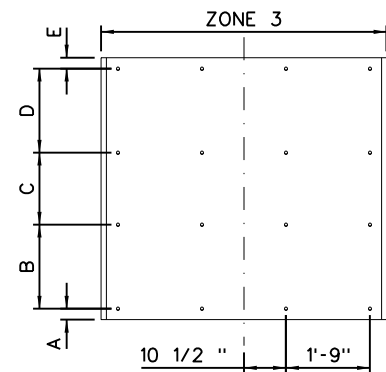
SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")				
NO.	DATE	REVISION	APRV	
<div> FLATIRON/DRAGADOS LLC</div>			<div>ARUP</div> <div>CFC</div>	
<div> Texas Department of Transportation</div>				
US-181 HARBOR BRIDGE				
MAIN SPAN				
UPPER TOWER				
SPACER BOX PLATE				
SCHEDULE & DETAILS I				
DESIGN JS	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS EF	X	(See Title Sheet)		US-181
CHECK NT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MC	TEXAS	CRP	NUECES	NHB 101N
	CONTROL	SECTION	JOB	
	0101	06	095	



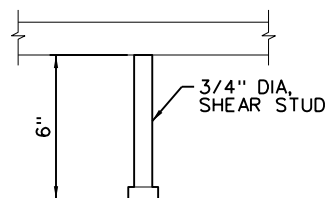
1 PLAN - SPACER BOX TYP
101P 1/2"=1'-0"



2 SPACER BOX SIDE PLATE
101P 1/2"=1'-0"



3 SPACER BOX END PLATE
101P 1/2"=1'-0"



4 TYPICAL SHEAR STUD
101P 3"=1'-0"





NOTES:

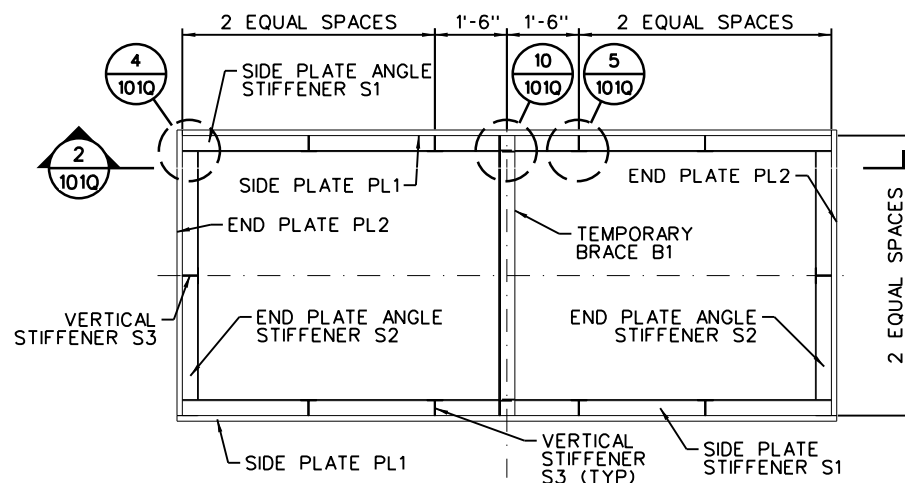
- SEE DWG NHB-101 FOR SHEAR STUD REQUIREMENTS.
- THE VERTICAL LINES OF SHEAR STUDS IN ZONE 1 FOLLOW THE SLOPE OF THE INCLINED ANCHOR BOX END PLATE. THE VERTICAL LINES OF SHEAR STUDS IN ZONE 2 ARE VERTICAL.

SPACER BOX NUMBER	ZONE 1, 2 AND 3 DIMENSIONS				
	A (IN)	B (IN)	C (IN)	D (IN)	E (IN)
2	2.75	18	18	18	3.75
3	2.75	18	18	18	3.75
4	2.75	18	18	18	3.75
5	2.75	18	18	18	3.75
6	2.75	18	18	18	3.75
7	2.75	18	18	18	3.75
8	2.75	18	18	18	3.75
9	2.75	21	18	21	2.75
10	2.75	21	18	21	2.75
11	2.75	21	18	21	2.75
12	2.75	21	18	21	2.75
13	2.75	21	18	21	2.75
14	2.75	21	18	21	2.75
15	2.75	21	18	21	2.75
16	2.75	21	18	21	2.75
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18	2.75	21	18	21	2.75
19	2.75	21	18	21	2.75

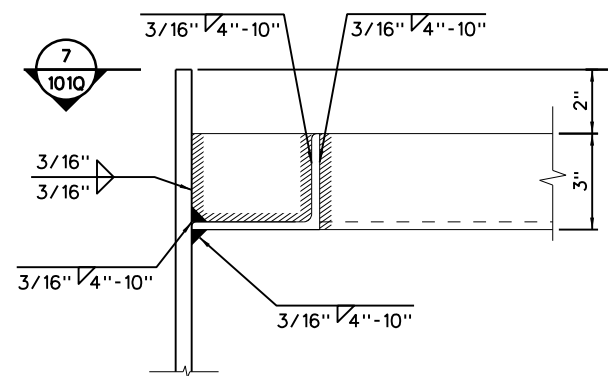
ADVANCE CHECK PRINT 04-15-2021

SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")

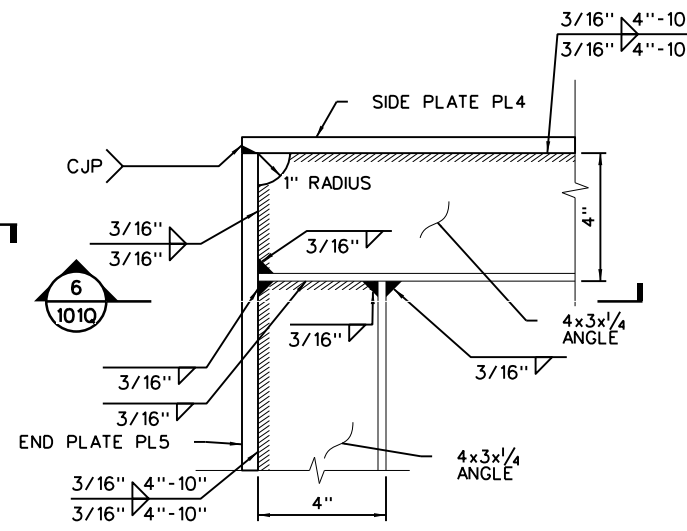
NO.	DATE	REVISION	APRV
<div>  FLATIRON ENGINEERS LLC </div> <div>  ARUP </div> <div>  CFC </div>			
<div>  Texas Department of Transportation </div>			
US-181 HARBOR BRIDGE			
<div> <div>MAIN SPAN</div> <div>UPPER TOWER</div> <div>SPACER BOX DETAILS II</div> </div>			
DESIGN NT	FED. RD. DIV. NO. X	FEDERAL AID PROJECT NO. (See Title Sheet)	HIGHWAY NO. US-181
GRAPHICS MN	STATE TEXAS	DISTRICT CRP	COUNTY NUECES
CHECK NT	CONTROL	SECTION	JOB
CHECK MC	0101	06	095
NHB 101P			



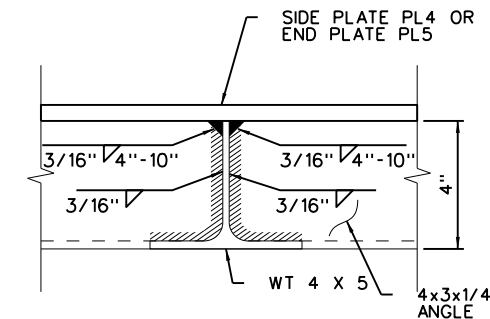
1 PLAN - SPACER BOX (TYP)
101Q 1/2" x 1'-0"



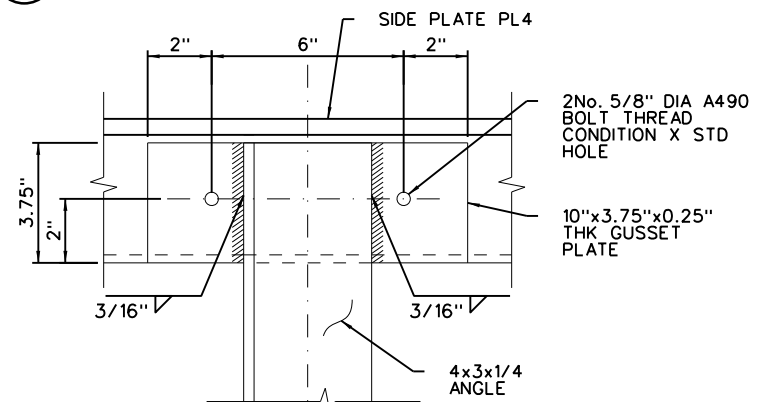
3 TOP ANGLE STIFFENERS - CORNER DETAIL
101Q 1" x 1'-0"



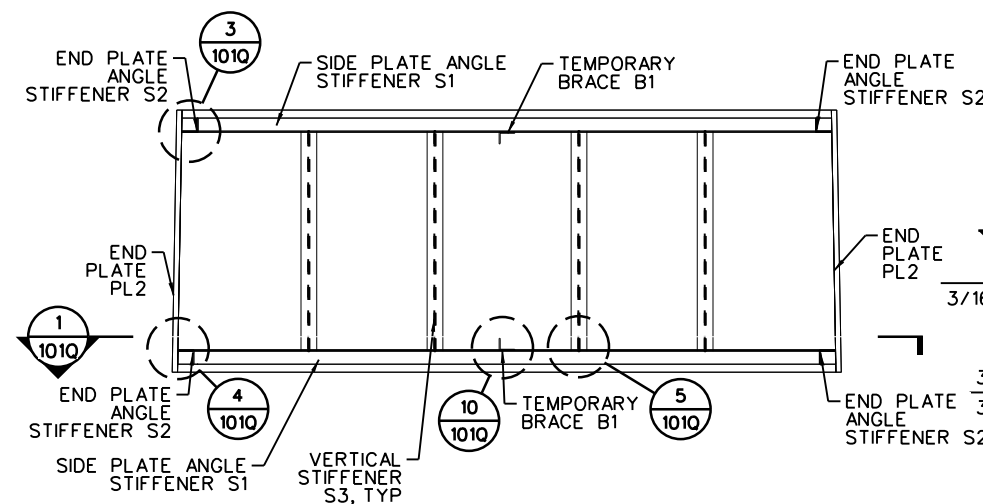
7 - PLAN



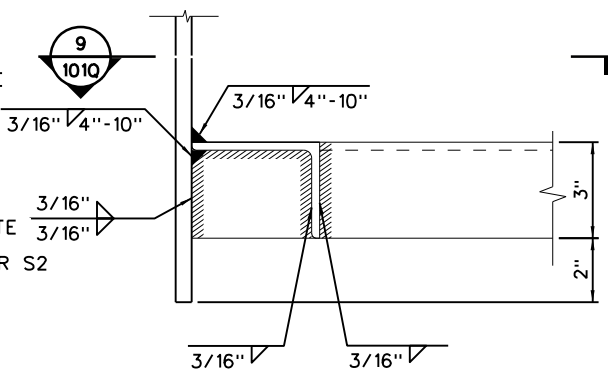
5 VERTICAL STIFFENER CONNECTION DETAIL
101Q 1" x 1'-0"



10 TEMPORARY BRACE CONNECTION DETAIL
101Q 1" x 1'-0"

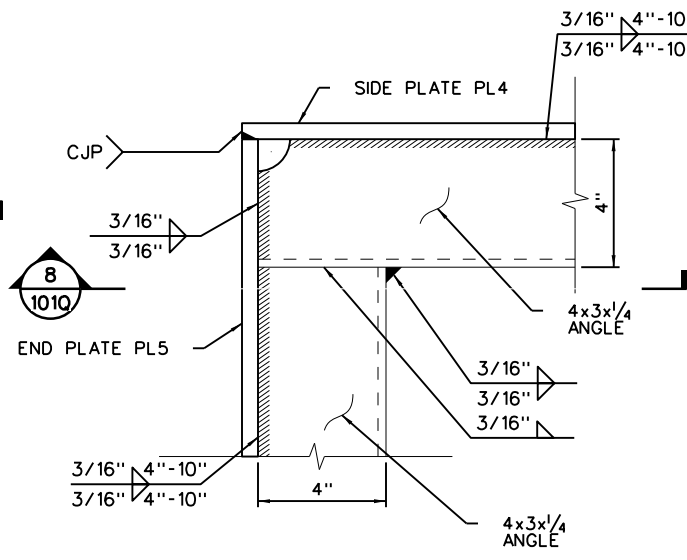


2 LONGITUDINAL SECTION
101Q 1/2" x 1'-0"



8 - SECTION

4 BOTTOM ANGLE STIFFENERS - CORNER DETAIL
101Q 1" x 1'-0"



9 - PLAN

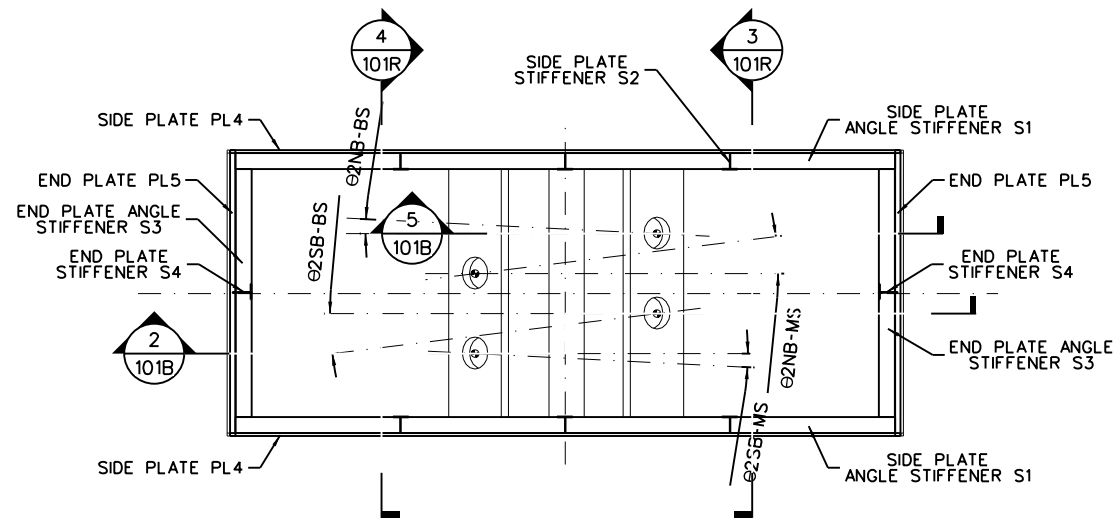
ADVANCE CHECK PRINT 04-15-2021

SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")

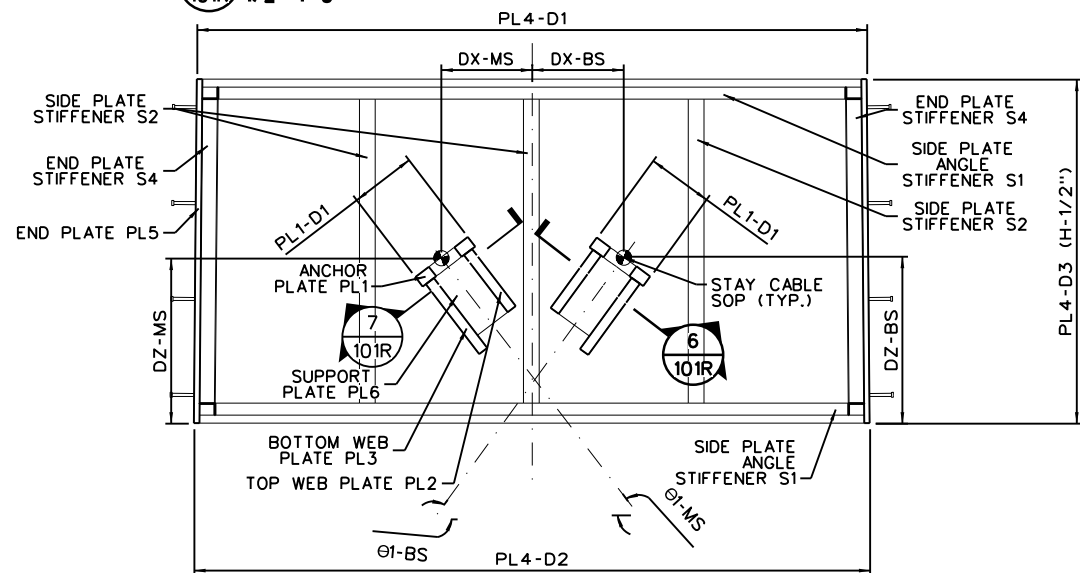
NO.	DATE	REVISION	APRV
<div> </div>			
<div> </div>			
US-181 HARBOR BRIDGE			
MAIN SPAN UPPER TOWER SPACER BOX DETAILS III			
DESIGN NT	FED. RD. DIV. NO. X	FEDERAL AID PROJECT NO. (See Title Sheet)	HIGHWAY NO. US-181
GRAPHICS TI	STATE	DISTRICT	COUNTY
CHECK NT	TEXAS	CRP	NUECES
CHECK MC	CONTROL	SECTION	JOB
	0101	06	095
			NHB 101Q

NOTES:

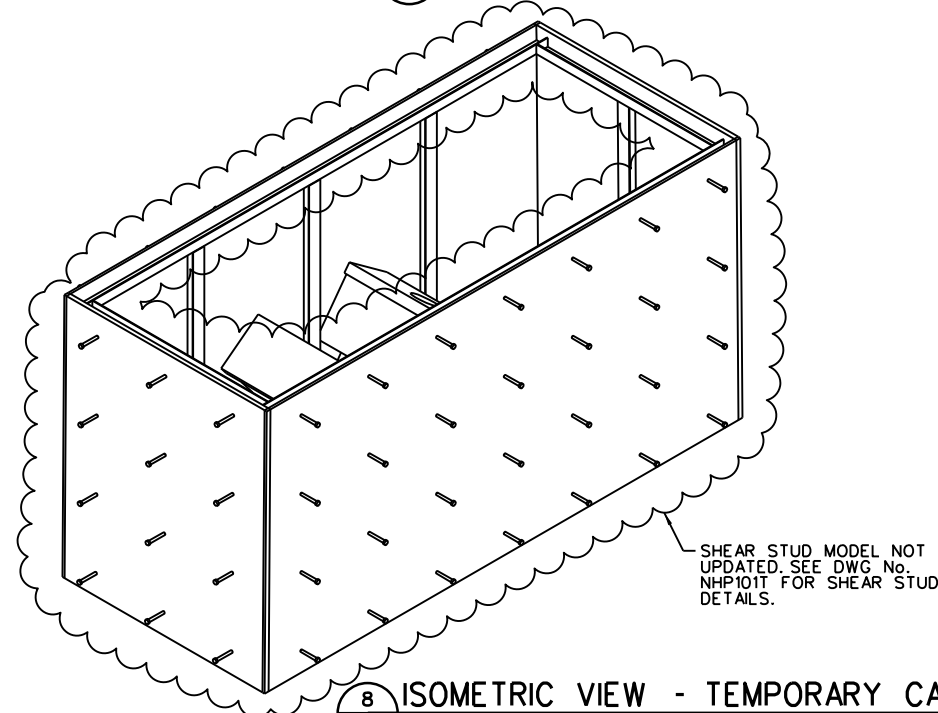
- FOR GENERAL STEEL SPECIFICATION INCLUDING WELDING REQUIREMENTS SEE DWG. No. NHB-101.
- TEMPORARY BRACES B1 ARE TO BE INSTALLED PRIOR TO POURING THE SURROUNDING CONCRETE. THESE BRACES ARE TO BE REMOVED ONCE THE CONCRETE HAS HARDENED AND NO FURTHER POUR WEIGHT PRESSURES ARE BEING APPLIED TO THE SPACER BOX.



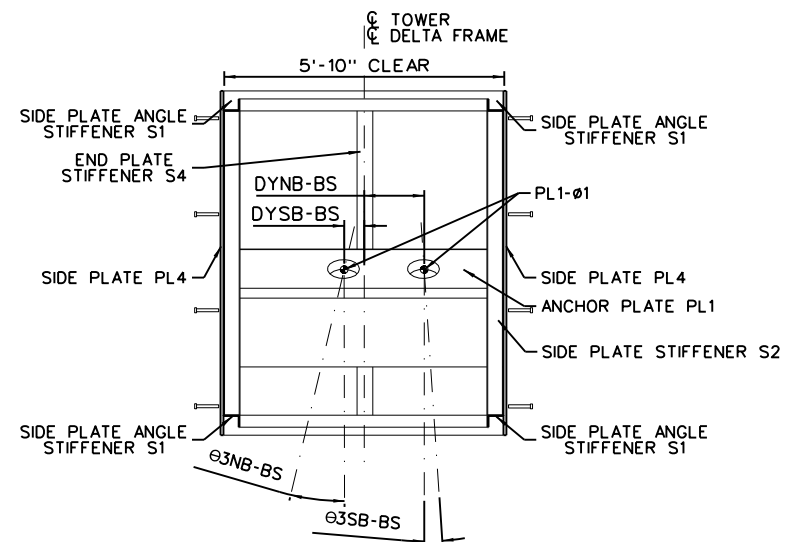
1 PLAN - TEMPORARY CABLE ANCHOR BOX
101R 1/2"=1'-0"



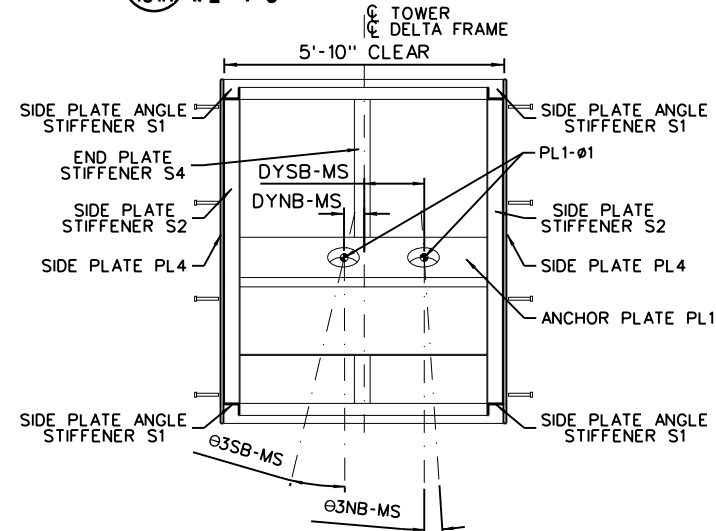
2 LONGITUDINAL SECTION
101R 1/2"=1'-0"



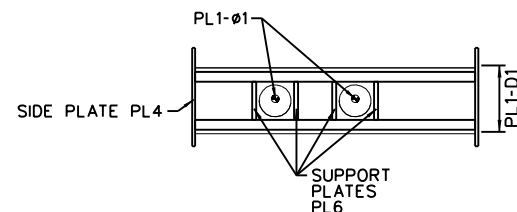
8 ISOMETRIC VIEW - TEMPORARY CABLE ANCHOR BOX
101R 1/2"=1'-0"



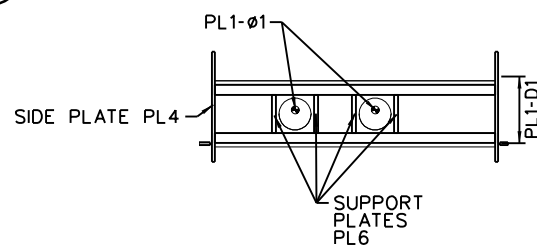
3 TRANSVERSE SECTION 1
101R 1/2"=1'-0"



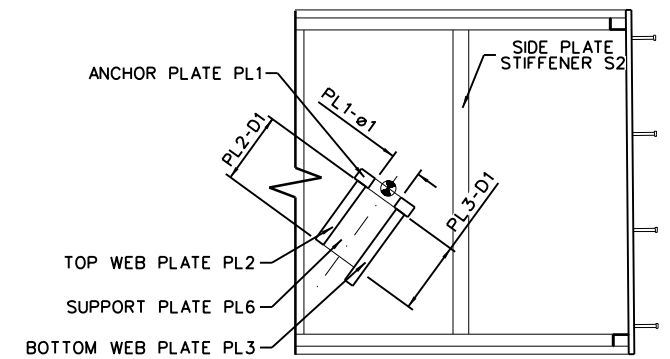
4 TRANSVERSE SECTION 2
101R 1/2"=1'-0"



6 ELEVATION ON UNDERSIDE OF BACK SPAN ANCHOR BEAM
101R 1/2"=1'-0"



7 ELEVATION ON UNDERSIDE OF MAIN SPAN ANCHOR BEAM
101R 1/2"=1'-0"



5 SECTION THROUGH ANCHOR BEAM CABLE
101R 1/2"=1'-0"

NOTES:

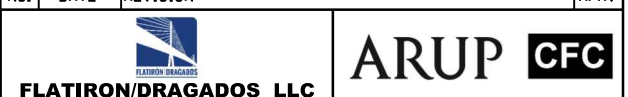
- FOR GENERAL ANCHOR BOX NOTES REFER TO DWG. NO. NHB101A.
- GUIDE PIPES REQUIRED IN LIFT 7 TO ACCOMMODATE TEMPORARY CABLES. (NOT SHOWN).
- FOR DETAILS OF SHEAR STUDS REFER TO DWG. NO. NHB101T.
- NORTH TOWER TEMPORARY CABLE ANCHOR BOX SHOWN. SOUTH TOWER TEMPORARY CABLE ANCHOR BOX MIRRORRED IN PLAN ABOUT BOX CENTERLINE PERPENDICULAR TO BRIDGE AXIS.

IDENTIFICATION OF COMPONENTS

COMPONENTS	PLATE ID
ANCHOR PLATE	PL1
TOP WEB PLATE	PL2
BOTTOM WEB PLATE	PL3
SIDE PLATE	PL4
END PLATE	PL5
SUPPORT PLATE	PL6
SIDE PLATE ANGLE STIFFENER	S1
SIDE PLATE STIFFENER	S2
END PLATE ANGLE STIFFENER	S3
END PLATE STIFFENER	S4

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NO.	DATE	REVISION	APRV

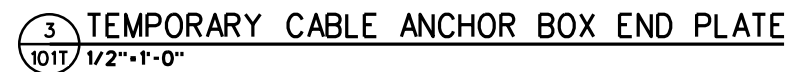
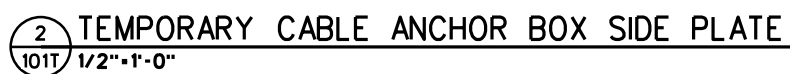
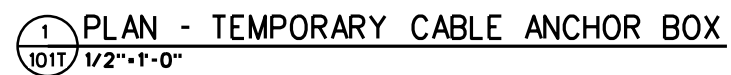


US-181 HARBOR BRIDGE

MAIN SPAN
UPPER TOWER
TEMPORARY CABLE
ANCHOR BOX ARRANGEMENT

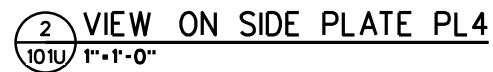
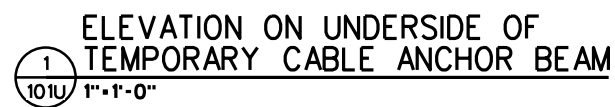
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JS	X	(See Title Sheet)	US-181
GRAPHICS	STATE	DISTRICT	COUNTY
EF	TEXAS	CRP	NUECES
CHECK	CONTROL	SECTION	JOB
NT	0101	06	095
CHECK	MC		

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1. SEE DWG NHB-101 FOR SHEAR STUD REQUIREMENTS.
2. THE VERTICAL LINES OF SHEAR STUDS IN ZONE 1 FOLLOW THE SLOPE OF THE INCLINED ANCHOR BOX END PLATE. THE VERTICAL LINES OF SHEAR STUDS IN ZONE 2 ARE VERTICAL.

DESIGN NT	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS JR	X	(See Title Sheet)		US-181
CHECK NT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MC	TEXAS	CRP	NUECES	NHB 101T
	CONTROL	SECTION	JOB	
	0101	06	095	






NOTES:

1. FOR COMPONENT NAMES SEE DWG. No. NHB 101R
2. FOR GENERAL STEEL SPECIFICATION INCLUDING WELDING REQUIREMENTS SEE DWG. NHB 101.

ANCHOR BOX NUMBERS	ANCHOR BOX TYPE	NO. OF CABLE STRANDS	ANCHOR BOX NOMINAL WEIGHT (KIP)	ANCHOR BEAM								ANCHOR BOX						STIFFENERS			
				PL1-D1 (IN)	PL1-#1 (IN)	PL1-THK (IN)	PL2-D1 (IN)	PL2-THK (IN)	PL3-D1 (IN)	PL3-THK (IN)	PL6-D1 (IN)	PL6-THK (IN)	PL4-D1 (FT)	PL4-D2 (FT)	PL4-D3 (FT)	PL4-THK (IN)	PL5-THK (IN)	S1 (IN)	S2 (IN)	S3 (IN)	S4 (IN)
1T	T	27	18.54	16.50	7.63	3.00	18.00	2.50	26.00	2.50	18.00	1.00	13.96	14.08	7.17	0.750	1.375	L 4x3x0.25	WT 4 x 5	L 4x3x0.25	WT 4 x 5

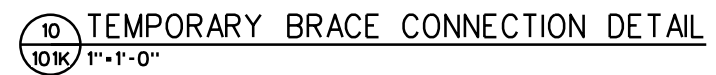
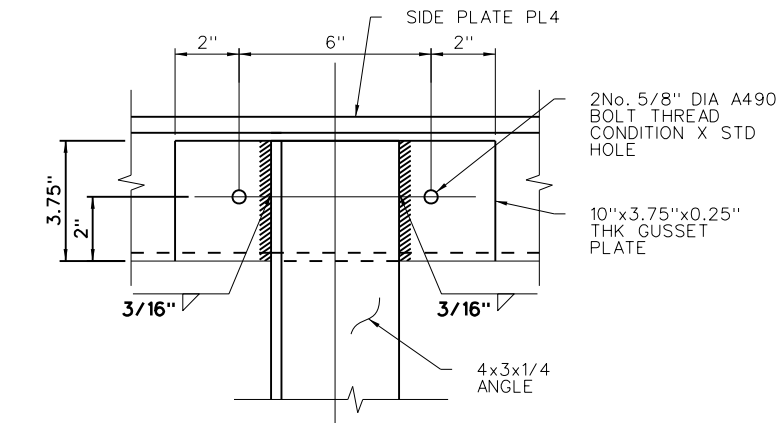
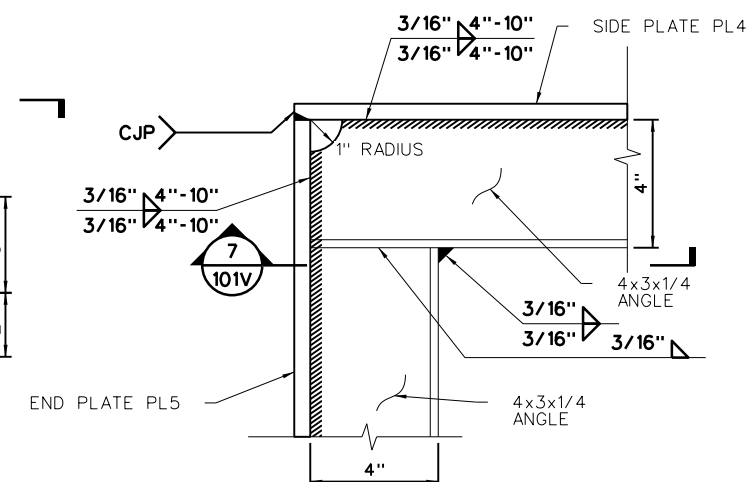
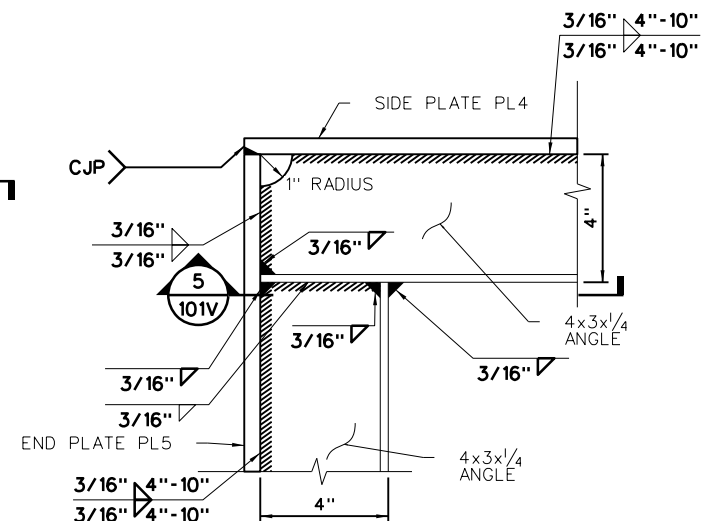
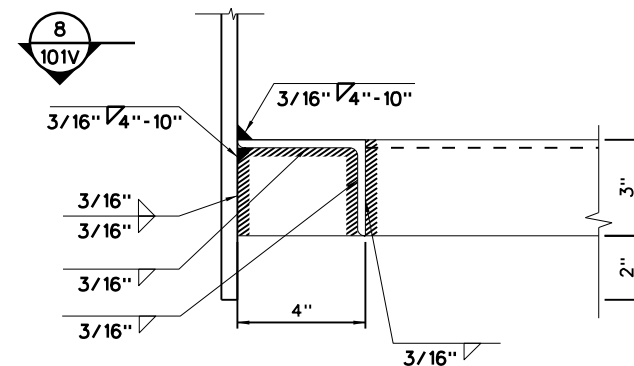
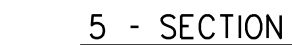
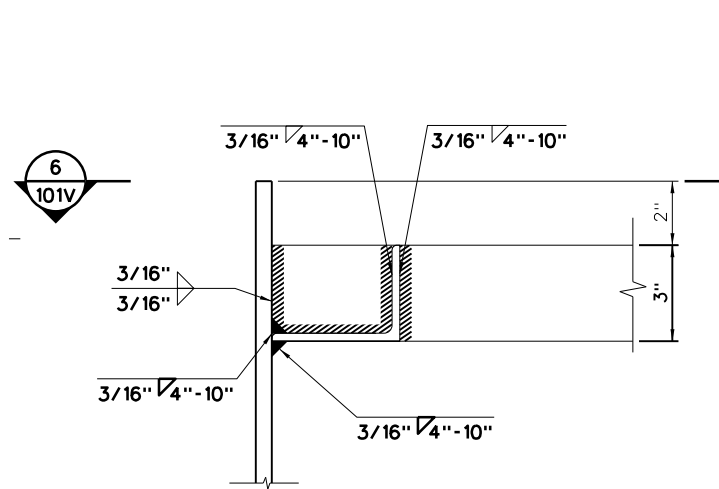
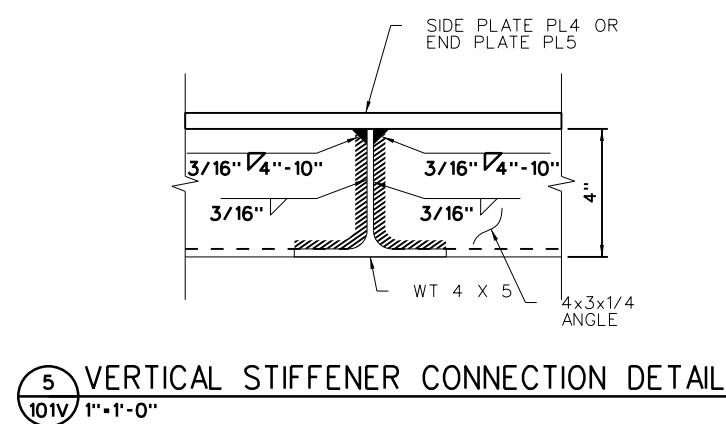
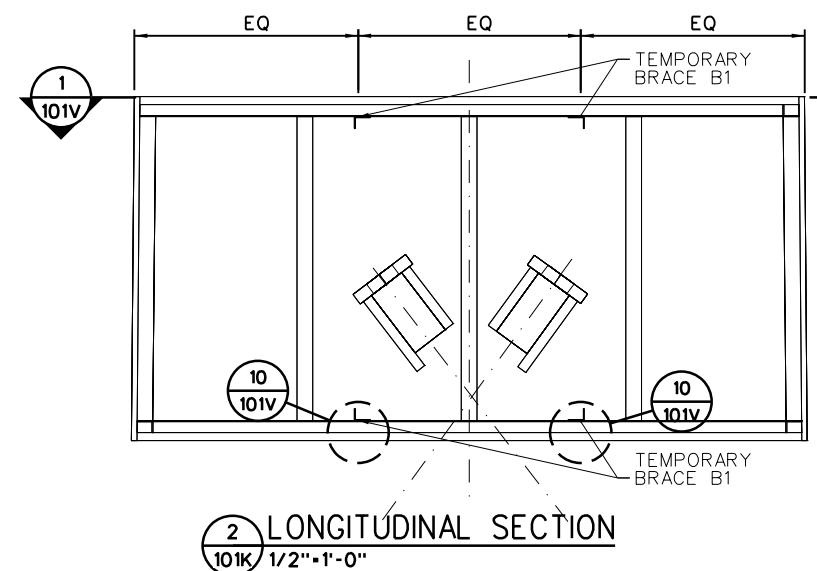
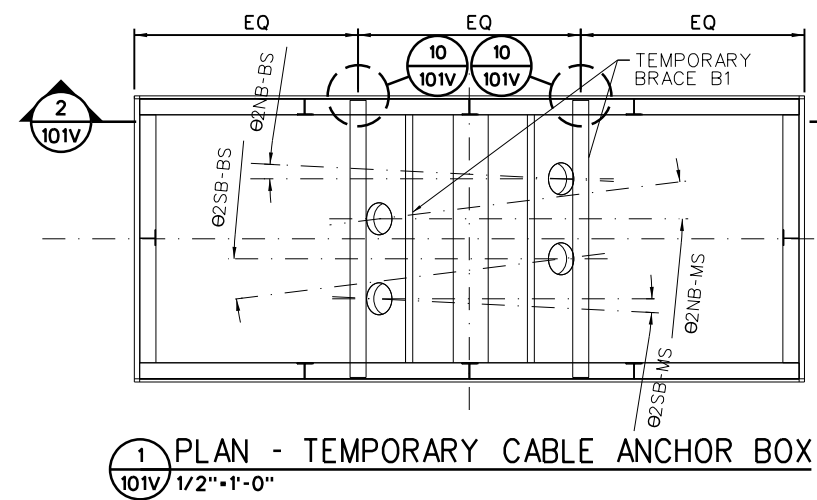
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	FLATIRON/DRAGADOS LLC		
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MAIN SPAN
UPPER TOWER
TEMPORARY CABLE
ANCHOR BOX DETAILS III




DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
NT	X	(See Title Sheet)		US-181
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MN	TEXAS	CRP	NUECES	NHB 101U
CHECK	CONTROL	SECTION	JOB	
NT	0101	06	095	
CHECK	MC			



- NOTES:
1. FOR GENERAL STEEL SPECIFICATION INCLUDING WELDING REQUIREMENTS SEE DWG. NHB-101.
 2. TEMPORARY BRACES B1 ARE TO BE INSTALLED PRIOR TO POURING THE SURROUNDING CONCRETE. THESE BRACES ARE TO BE REMOVED ONCE THE CONCRETE HAS HARDENED AND NO FURTHER POUR WEIGHT PRESSURES ARE BEING APPLIED TO THE ANCHOR BOX.

ADVANCE CHECK PRINT 04-15-2021

SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")

NO.	DATE	REVISION	APRV	
 FLATIRON/DRAGADOS LLC				
 Texas Department of Transportation				
US-181 HARBOR BRIDGE				
MAIN SPAN				
UPPER TOWER				
TEMPORARY CABLE				
ANCHOR BOX DETAILS IV				
DESIGN NT GRAPHICS TI CHECK NT CHECK MC	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
	X	(See Title Sheet)		US-181
	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	CRP	NUECES	NHB 101V
	CONTROL	SECTION	JOB	
	0101	06	095	