

WILLIAMSON COUNTY, TEXAS

CHANGE ORDER NUMBER: 7

1. CONTRACTOR: Capital Excavation
2. Change Order Work Limits: Sta. 54+93.6 RT to Sta. 55+27.6 RT
3. Type of Change(on federal-aid non-exempt projects): Minor (Major/Minor)
4. Reasons: 1B (3 Max. - In order of importance - Primary first)

Project: 221FB39
Roadway: FM 1460 - SH 130
CSJ Number: _____

5. Describe the work being revised:

1B. Design Error or Omission. Other: This Change Order provides additional items to the Contract for adjusting an existing headwall, wingwalls and adding concrete rail along an existing culvert that is to remain in place. Due to the height of the existing culvert, the proposed roadway can not be built to the proposed width. Raising the headwall and constructing the rail will allow for the roadway portion to be constructed to the proposed width. This rail will mirror the existing rail along the upstream portion of the existing culvert.

6. Work to be performed in accordance with Items: See Attached.
7. New or revised plan sheet(s) are attached and numbered: Revised Sheets: 2, 15, 17, 92, 113A-C
8. New Special Provisions/Specifications to the contract are attached: ☐ Yes ☒ No
9. New Special Provisions to Item N/A No. N/A, Special Specification Item N/A are attached.
- Each signatory hereby warrants that each has the authority to execute this Change Order (CO).

The contractor must sign the Change Order and, by doing so, agrees to waive any and all claims for additional compensation due to any and all other expenses; additional changes for time, overhead and profit; or loss of compensation as a result of this change.

THE CONTRACTOR

Date

12.1.22

By

Typed/Printed Name

Typed/Printed Title

JOE CHESNEY
V.P.

The following information must be provided

Time Ext. #: _____ Days added on this CO: 0

Amount added by this change order: \$28,440.00

RECOMMENDED FOR EXECUTION:

[Signature]

Project Manager

12/2/2022

Date

N/A

Design Engineer

Date

[Signature]

Program Manager

12/2/2022

Date

Design Engineer's Seal:

see attached plan sheets

County Commissioner Precinct 1

Date

☐

APPROVED

☐

REQUEST APPROVAL

County Commissioner Precinct 2

Date

☐

APPROVED

☐

REQUEST APPROVAL

County Commissioner Precinct 3

Date

☐

APPROVED

☐

REQUEST APPROVAL

County Commissioner Precinct 4

Date

☐

APPROVED

☐

REQUEST APPROVAL

[Signature]
Bill Gravell (Dec 14, 2022 14:57 CST)

County Judge

Dec 14, 2022

Date

CHANGE ORDER REASON(S) CODE CHART

1. Design Error or Omission	1A. Incorrect PS&E 1B. Other
2. Differing Site Conditions (unforeseeable)	2A. Dispute resolution (expense caused by conditions and/or resulting delay) 2B. Unavailable material 2C. New development (conditions changing after PS&E completed) 2D. Environmental remediation 2E. Miscellaneous difference in site conditions (unforeseeable)(Item 9) 2F. Site conditions altered by an act of nature 2G. Unadjusted utility (unforeseeable) 2H. Unacquired Right-of-Way (unforeseeable) 2I. Additional safety needs (unforeseeable) 2J. Other
3. County Convenience	3A. Dispute resolution (not resulting from error in plans or differing site conditions) 3B. Public relations improvement 3C. Implementation of a Value Engineering finding 3D. Achievement of an early project completion 3E. Reduction of future maintenance 3F. Additional work desired by the County 3G. Compliance requirements of new laws and/or policies 3H. Cost savings opportunity discovered during construction 3I. Implementation of improved technology or better process 3J. Price adjustment on finished work (price reduced in exchange for acceptance) 3K. Addition of stock account or material supplied by state provision 3L. Revising safety work/measures desired by the County 3M. Other
4. Third Party Accommodation	4A. Failure of a third party to meet commitment 4B. Third party requested work 4C. Compliance requirements of new laws and/or policies (impacting third party) 4D. Other
5. Contractor Convenience	5A. Contractor exercises option to change the traffic control plan 5B. Contractor requested change in the sequence and/or method of work 5C. Payment for Partnering workshop 5D. Additional safety work/measures desired by the contractor 5E. Other
6. Untimely ROW/Utilities	6A. Right-of-Way not clear (third party responsibility for ROW) 6B. Right-of-Way not clear (County responsibility for ROW) 6C. Utilities not clear 6D. Other

Williamson County Road Bond Program

CR 111 Westinghouse Rd Williamson County Project No. 22IFB39 Change Order No. 7

Reason for Change

This Change Order provides payment to the Contractor for additional work needed to adjust an existing headwall and wingwalls to allow for the roadway to be constructed to the proposed plan width. The existing Culvert 4 is to remain in place, but due to the location of the existing headwall it will not allow for the roadway to be built to plan width as there is no support for the roadway section at the culvert. RFI 27 addresses the issue and provides additional plan sheets to extend the headwall, wingwalls and adds traffic rail so that the roadway portion can be constructed to the proposed width.

The following is a list of new items required for this Change Order.

ITEM	DESCRIPTION	QTY	UNIT
0450-6006	Rail TYPE T223	34	LF
0540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	2	EA
999-WC05	Drill, Dowel, and Extend Existing Wingwalls and Headwall	1	LS

This Change Order results in an increase of \$28,440.00 to the Contract amount, for an adjusted Contract total of \$21,833,559.18. The original Contract amount was \$21,024,332.88. As a result of this and previous Change Orders, \$809,226.30 has been added to the Contract, resulting in an 3.85% increase in the Contract cost. As a result of this Change Order, (0) days will be added to the Contract.

HNTB Corporation

Oscar Salazar-Bueno, P.E.



PO Box 1301
Austin, TX 78767
Email: Estimating@CapitalExcavation.com

Change Request # 16

Date: 9/28/2022

QuoteTo: Chuck Evans
HNTB CORPORATION

Project: CR 111 / 110 (1024)

Capital Project #: 1024

Description: Existing Culvert 4 Wall Extension & 223 Rail Addition

Item	Description	Quantity	Unit	Unit Price	Amount
999-WC05	Drill, Dowel, and Extend Existing Wingwall Height	1.00	LS	14,000.00	14,000.00
450-6006	Rail (TY T223)	34.00	LF	260.00	8,840.00
540-6006	MTL W-BEAM DG FEN TRANSITION THRIE BEAM	2.00	EA	2,800.00	5,600.00

GRAND TOTAL 28,440.00

Scope: Price to extend the headwall and wingwall heights of existing culvert #4 to allow for proposed roadway construction.
Price for the addition of T223 traffic rail, and changes to the proposed MBGF.

Capital Excavation Requests an additional : Yes-TBD day(s)

The Ty T223 Rail and MTL Beam Thrie Beam Transitions are in line with TxDOT Low Bid Averages and our current projects under construction. The lump sum price for the headwall and wingwall extensions are also a reasonable price for this work.



CHANGE ORDER BREAKDOWN

Capital Excavation Company

PROJECT: CR 111
DESCRIPTION: Extending Culv 4 Headwall & T223 Rail

DATE: 10/14/2022

	<u>REGULAR</u> <u>HRS</u>	<u>OVERTIME</u> <u>HRS</u>	<u>UNIT</u>	<u>REG.</u> <u>UNIT</u> <u>PRICE</u>	<u>OT. UNIT PRICE</u>	<u>TOTALS</u>
LABOR						
Concrete Foreman	50	0	HR	\$45.00	\$67.50	\$2,250.00
Concrete Finisher	100	0	HR	\$21.00	\$31.50	\$2,100.00
Concrete Formsetter	150	0	HR	\$20.00	\$30.00	\$3,000.00
Survey Party Chief	10	0	HR	\$42.00	\$63.00	\$420.00
Survey Laborer	20	0	HR	\$18.00	\$27.00	\$360.00
					Total:	\$8,130.00
					Burden 30%	\$2,539.00
LABOR TOTAL						\$10,669.00
EQUIPMENT						
Excavator 420	50		HR	\$18.00		\$900.00
Backhoe 420	50		HR	\$35.00		\$1,750.00
	38.75					\$1,356.25
EQUIPMENT TOTAL						\$2,650.00
MATERIALS						
CI C Concrete	12.71		CY	\$135.00		\$1,715.85
Rebar	2054		LB	\$0.85		\$1,745.90
Formwork	526		SF	\$2.00		\$1,052.00
MATERIALS TOTAL						\$4,513.75
SUBS						
Subcontractor	2		DAY	\$2,000.00		\$4,000.00
SUBS TOTAL						\$4,000.00
TOTAL COST						\$17,219.00
MARKUP						\$7,000.00
TOTAL PRICE						\$24,219.00
						\$14,000.00

This is a reasonable price for extending the existing headwall and wingwalls.



REQUEST FOR INFORMATION FORM

RFI NO.: 27 DATE: 8/15/2022
PROJECT: 22IFB39 - CR 111 / Westinghouse RESPONSE REQUESTED BY
DATE: 8/22/2022
TO: HNTB: Chuck Evans; Eddie Church, P.E.

REFERENCE: Existing Culvert 4 Conflict

PROBLEM:

The existing culvert 4 headwall at STA 55+44 on the southern side is in conflict with the proposed roadway, curb, and metal beam guard fence installation. The existing culvert needs to be addressed for safety and constructability. Please review and advise.

RECOMMENDED SOLUTION:

Andy Wynes
Originator

Supervisor

RESPONSE:

We revised the design to be in line with the recommended solution provided by HNTB; extend the existing headwall and wingwall height and install a concrete traffic rail. Sheets showing the plan revisions, standard details, and updated quantities are attached.

Bryan Moore
Responder

9/16/2022
Date

Sign, Date & Return to HNTB via e-mail.

Mail original to: HNTB Corporation
101 E. Old Settlers Blvd.
Round Rock, Texas 78664

Attachments to RFI: Sheets 92, 292

Cc:

SHEET NO.	DESCRIPTION	SHEET NO.	DESCRIPTION
1	GENERAL	186	DRAINAGE STANDARDS (CONT.)
2	TITLE SHEET	187 - 188	PDD
3	SUPPLEMENTAL INDEX OF SHEETS	189 - 190	PCO - PCO
4	GENERAL NOTES	191	PSL
5	TYPICAL SECTIONS		
6	GENERAL NOTES AND SPECIFICATIONS	192	EROSION CONTROL
7	ESTIMATE & QUANTITIES	193 - 202	STORM WATER POLLUTION PREVENTION PLAN (SWPP)
8	GENERAL NOTES AND SPECIFICATIONS		EROSION CONTROL PLAN
9	ESTIMATE & QUANTITIES		
10	GENERAL NOTES AND SPECIFICATIONS	203 - 205	EROSION STANDARDS
11	SUMMARY OF ROADWAY QUANTITIES	206 - A-C	EC(1)-16 THRU EC(13)-16
12	SUMMARY OF DRAINAGE QUANTITIES		EC(19) - 18
13	SUMMARY OF SIGNING, STRIPING AND DELINEATION QUANTITIES		
14	SUMMARY OF TRAFFIC SIGNAL QUANTITIES	206 - 215	TRAFFIC STRIPING AND DELINEATION
15	SUMMARY OF TRAFFIC SIGNAL QUANTITIES	216 - 217	STANDARD
16	SUMMARY OF TRAFFIC SIGNAL QUANTITIES	218	EXISTING SIGNAL LAYOUT - CR 111 (WESTINGHOUSE RD) ● FM 1460
17	SUMMARY OF TRAFFIC SIGNAL QUANTITIES	219	PROPOSED SIGNAL LAYOUT - CR 111 (WESTINGHOUSE RD) ● FM 1460
18	SUMMARY OF TRAFFIC SIGNAL QUANTITIES	220	PROPOSED SIGNAL ELEVATION - CR 111 (WESTINGHOUSE RD) ● FM 1460
19	SUMMARY OF TRAFFIC SIGNAL QUANTITIES		
20	SUMMARY OF TRAFFIC SIGNAL QUANTITIES		
21	SUMMARY OF TRAFFIC SIGNAL QUANTITIES		
22	SUMMARY OF TRAFFIC SIGNAL QUANTITIES		
23	SUMMARY OF TRAFFIC SIGNAL QUANTITIES		
24	SUMMARY OF TRAFFIC SIGNAL QUANTITIES		
25	SUMMARY OF TRAFFIC SIGNAL QUANTITIES		
26	TRAFFIC CONTROL		
27	TRAFFIC CONTROL PLAN SIGNAGE		
28	TRAFFIC CONTROL PLAN TYPICAL SECTIONS		
29	TRAFFIC CONTROL PLAN PHASE I		
30	TRAFFIC CONTROL PLAN PHASE II		
31	TRAFFIC CONTROL PLAN PHASE III		
32	TRAFFIC CONTROL PLAN PHASE IV		
33	TRAFFIC CONTROL PLAN PHASE V		
34	TRAFFIC CONTROL PLAN PHASE VI		
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41	TRAFFIC CONTROL PLAN PHASE XIII		
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185	TRAFFIC CONTROL PLAN PHASE LXXXXXXVII		

REVISION 2, 6, & 8 ONLY

09/16/2022

SEAL

STATE OF TEXAS

COUNTY OF WILLIAMSON

REGISTERED PROFESSIONAL ENGINEER

NO. 10889

DATE: 09/16/2022

SIGNATURE: [Signature]

THE STANDARDS AND SPECIFICATIONS IDENTIFIED HEREIN HAVE BEEN SELECTED BY ME OR UNDER MY SUPERVISION AND ARE APPLICABLE TO THIS PROJECT.

10/12/16

SEAL

STATE OF TEXAS

COUNTY OF WILLIAMSON

REGISTERED PROFESSIONAL ENGINEER

NO. 10889

DATE: 10/12/16

SIGNATURE: [Signature]

WILLIAMSON COUNTY

10/12/16

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STEGER & BIZZELL

10/12/16

WILLIAMSON COUNTY

CR 111 IMPROVEMENTS

SUPPLEMENTAL

INDEX OF SHEETS

DATE: 8/26/2022 DWG: CR 111 IMPROVEMENTS SHEET NO. 2

DIV. NO. 6 FEDERAL AID PROJECT NO. 111

STATE: TEXAS COUNTY: WILLIAMSON

CONT. --- SECT. --- JOB --- HIGHWAY NO. CR 111

ITEM CODE			DESCRIPTION			TOTAL		ITEM CODE			TOTAL		
ITEM NO.	DESC.	SP NO.	DESCRIPTION			UNIT	EST.	FINAL	ITEM NO.	DESC.	SP NO.	UNIT	EST.
100	6002		PREPARING ROW			SQA	217		500	6011		LF	1,040
106	6002		OBLITERATING ABANDONED ROAD			SQ	40,673		506	6020		SY	240
110	6001		EXCAVATION (ROADWAY)			CY	107,513		506	6024		SY	240
132	6003		EMBANKMENT (FINAL) (ORD CONC) (TY B)			CY	42,149		506	6038		LF	195
160	WC02		FURNISHING AND PLACING TOPSOIL (4")			SY	149,530		506	6039		LF	195
161	WC001		EROSION CONTROL COMPOST (3")			SY	37,133		506	6040		LF	23,660
162	WC103		MULCH TOPDRESSING (5")			SY	37,133		506	6043		LF	23,660
164	WC04		SEEDING FOR EROSION CONTROL (TEMP) (COOL) (TY 4)			SY	74,271		508	6001		SY	3,775
164	WC11		SEEDING FOR EROSION CONTROL (TEMP & PERM) (TY 11)			SY	222,801		512	6009		LF	1,240
166	6002		FERTILIZER			TON	9,228		512	6010		LF	120
169	WC01		VEGETATIVE WATERING			MG	4,456		512	6057		LF	120
169	6001		SOIL RETENTION BLANKETS (CL 1) (TY A)			SY	40,000		512	6058		LF	120
169	6006		SOIL RETENTION BLANKETS (CL 2) (TY F)			SY	1,620		529	6001		SY	954
247	6044		FL BS (CMP IN PLC) (TY A GR 4) (FINAL POS			CY	36,060		529	6008		LF	24,461
260	6002		LIME (HYDRATED LIME (SLURRY))			TON	2,075		530	6038		LF	755
260	6073		LIME TRC (SUBGRADE) (8")			SY	115,225		530	6044		SY	975
310	6001		PRIME COAT (MULTI OPTION)			GAL	20,391		530	6005		SY	4,523
316	6193		ASGR (TY-D GR-5 SAC-B)			CY	613		531	6001		SY	87
316	6413		ASPH (AC-15P, HPS-2P OR CRS-2P)			GAL	25,305		531	6010		EA	5
341	6008		D-GR HMA TY-S PG64-22/28			TON	23,640		540	6001		LF	643
341	6042		D-GR HMA TY-D SAC-B PG70-28			TON	12,049		544	6001		EA	3
351	6006		FLEXIBLE PAVEMENT STRUCTURE REPAIR (10")			SY	500		560	6004		EA	18
354	6041		PLANE ASPH CONC PAV (1.5")			SY	2,273		560	6005		EA	2
354	6044		PLANE ASPH CONC PAV (7")			SY	386		560	6006		EA	2
402	6001		TRENCH EXCAVATION PROTECTION			LF	525		618	6023		LF	25
432	6002		RIPRAP (CONC) (5 IN)			CY	867		620	6007		EA	25
432	6031		RIPRAP (CONC) (6 IN W/ 6 X 6 X #6 WELDED WIRE)			CY	46		628	6001		EA	1
432	6045		RIPRAP (CONC STRIP) (4 IN)			CY	1,954		644	6001		EA	16
460	6006		RALL (TY 1223)			LF	40		644	6004		EA	2
460	6002		CMP (GAL STL 18 IN)			LF	34		644	6007		EA	14
460	6003		CMP (GAL STL 24 IN)			LF	673		658	6046		EA	23
462	6004		CONC BOX CULV (4 FT X 3 FT)			LF	180		662	6004		LF	33,412
462	6007		CONC BOX CULV (5 FT X 3 FT)			LF	600		662	6012		LF	3,389
462	6010		CONC BOX CULV (6 FT X 3 FT)			LF	2,373		662	6016		EA	11
464	6003		RC PIPE (CL III) (18 IN)			LF	4,453		662	6029		EA	11
464	6005		RC PIPE (CL III) (24 IN)			LF	2,332		662	6032		EA	19
464	6007		RC PIPE (CL III) (30 IN)			LF	3,078		662	6034		LF	53,873
464	6008		RC PIPE (CL III) (36 IN)			LF	1,433		662	6041		LF	1,931
464	6009		RC PIPE (CL III) (42 IN)			LF	174		666	6035		LF	5,347
465	6005		JCTBOX (COMPL) (FIB) (3FTX3FT)			EA	3		666	6041		LF	370
465	6006		JCTBOX (COMPL) (FIB) (4FTX4FT)			EA	1		666	6047		LF	606
465	6009		JCTBOX (COMPL) (FIB) (5FTX5FT)			EA	1		666	6047		EA	27
465	6014		INLET (COMPL) (PCO) (3FT) (LEFT)			EA	3		666	6077		EA	19
465	6015		INLET (COMPL) (PCO) (3FT) (RIGHT)			EA	4		666	6146		LF	1,359
465	6016		INLET (COMPL) (PCO) (3FT) (BOTH)			EA	20		666	6299		LF	800
465	6020		INLET (COMPL) (PCO) (4FT) (BOTH)			EA	6		666	6302		LF	23,127
465	6126		HEADWALL (CH-FW-0) (DIA=18 IN)			EA	1		666	6311		LF	2,747
466	6009		HEADWALL (CH-FW-0) (DIA=36 IN)			EA	3		666	6314		LF	47,414
466	6010		HEADWALL (CH-FW-0) (DIA=42 IN)			EA	1		666	6314		EA	146
466	6022		HEADWALL (CH-FW-15) (DIA=30 IN)			EA	2		666	6314		EA	623
466	6037		HEADWALL (CH-FW-30) (DIA=30 IN)			EA	1		666	6314		EA	116
466	6054		HEADWALL (CH-FW-45) (DIA=36 IN)			EA	1		666	6314		EA	1
466	6132		HEADWALL (CH-FW-S) (DIA=30 IN)			EA	1		666	6314		EA	1
466	6134		HEADWALL (CH-FW-S) (DIA=36 IN)			EA	1		666	6314		EA	1
466	6165		WINGWALL (FW-S) (HW=4FT)			EA	3		666	6314		EA	1
466	6179		WINGWALL (FW-1) (HW=4FT)			EA	9		666	6314		EA	1
466	6207		WINGWALL (FW-0) (HW=4FT)			EA	3		666	6314		EA	1
467	6014		SET (TY II) (36 IN) (3:1) (C)			EA	1		666	6314		EA	1
467	6356		SET (TY II) (18 IN) (RCP) (3:1) (C)			EA	1		666	6314		EA	1
467	6362		SET (TY II) (18 IN) (RCP) (6:1) (C)			EA	1		666	6314		EA	1
467	6365		SET (TY II) (18 IN) (RCP) (6:1) (P)			EA	1		666	6314		EA	1
467	6395		SET (TY II) (24 IN) (RCP) (6:1) (P)			EA	41		666	6314		EA	1
467	6423		SET (TY II) (30 IN) (RCP) (6:1) (C)			EA	1		666	6314		EA	1
467	6423		SET (TY II) (30 IN) (RCP) (6:1) (P)			EA	17		666	6314		EA	1
467	6454		SET (TY II) (36 IN) (RCP) (6:1) (P)			EA	4		666	6314		EA	1
467	6454		REMOV STR (PIPE)			EA	17		666	6314		EA	1
500	6001		MOBILIZATION			LS	1		666	6314		EA	1
502	6001		BARRICADES, SIGNS AND TRAFFIC HANDLING			MO	18		666	6314		EA	1
506	6002		ROCK FILTER DAMS (INSTALL) (TY 2)			LF	1,040		666	6314		EA	1



WILLIAMSON COUNTY
1840



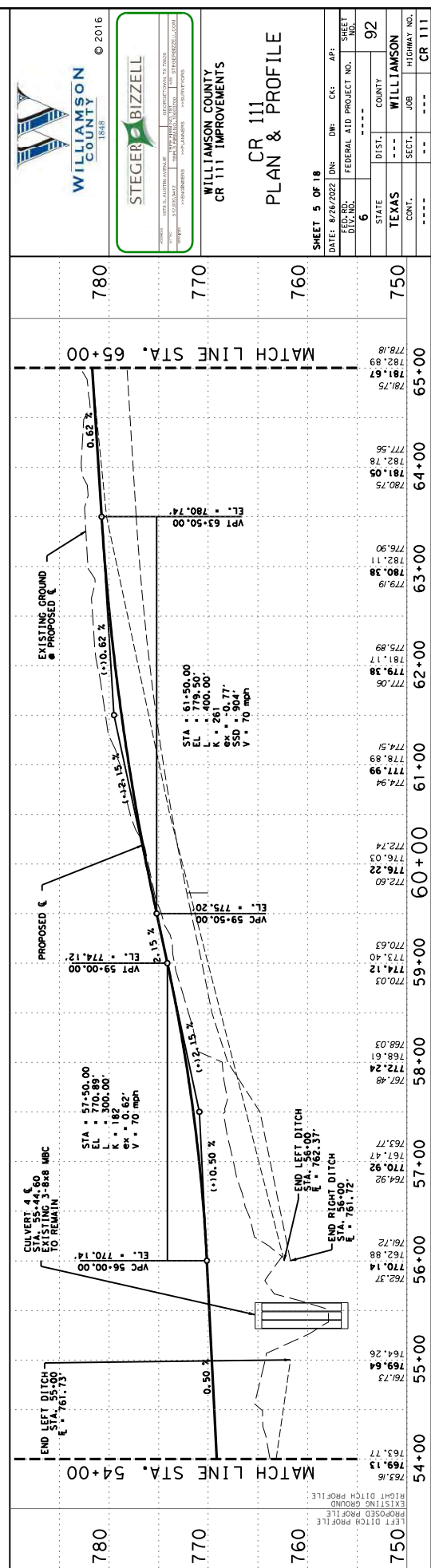
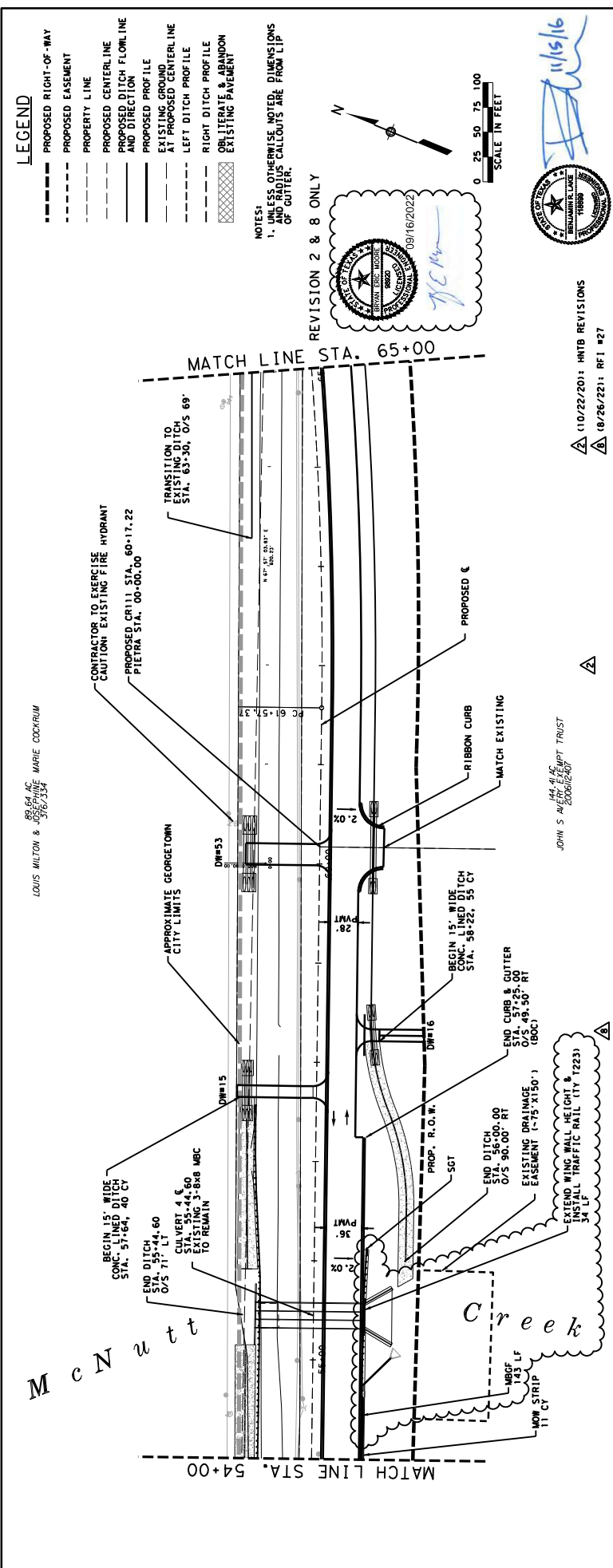
STEEGER BIZZELL

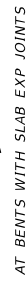
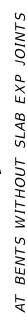
WILLIAMSON COUNTY
CR 111 IMPROVEMENTS

ESTIMATE &
QUANTITIES

DATE: 8/26/2022	DN:	DN:	CY:	AP:
SHEET NO.	FEDERAL AID PROJECT NO.			
6	----	STATE	COUNTY	15
TEXAS	----	WILLIAMSON		
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CR 111				

LOUIS MILTON & JOSEPHINE MARIE COCKRUM
89.64 AC
376/334



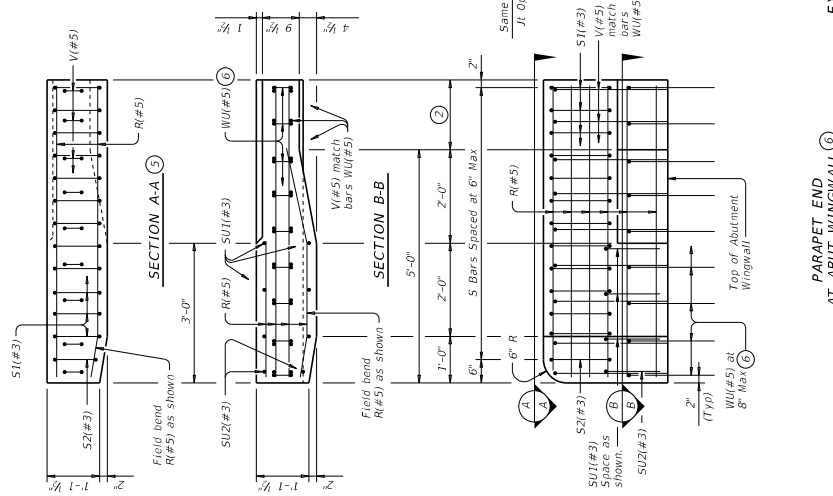


ROADWAY ELEVATION OF RAIL ON BRIDGE

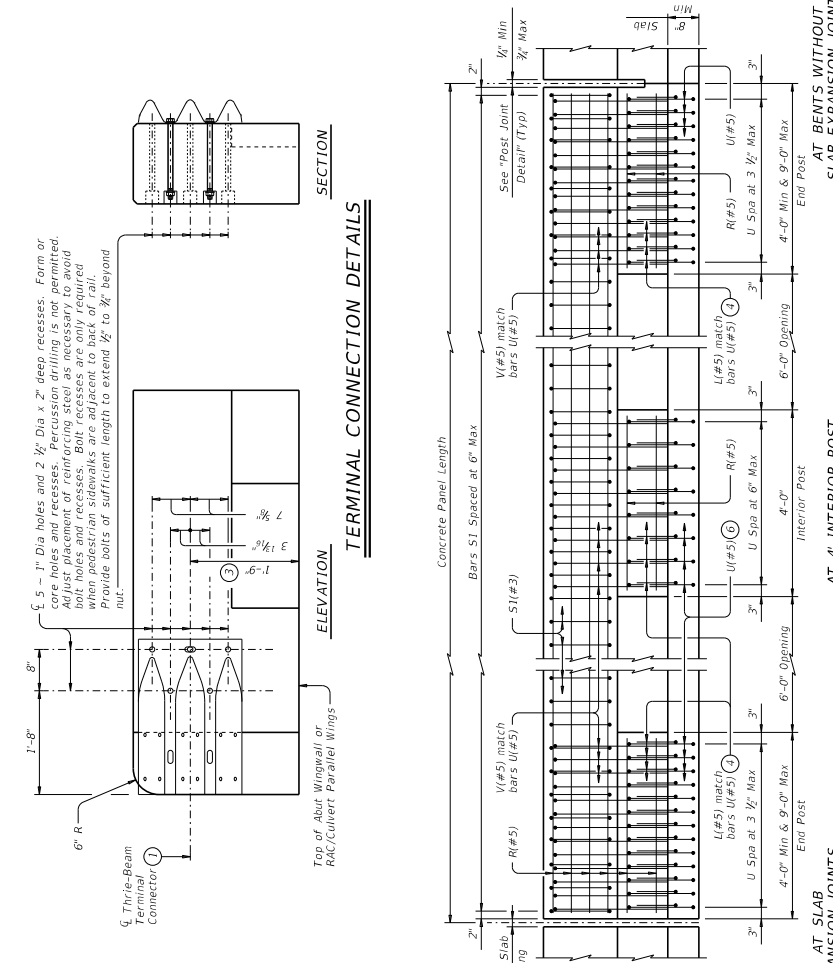


ROADWAY ELEVATION OF RAIL ON BOX CULVERTS

Showing 0° skew culvert. Skewed culverts similar. See RAC standard for details not shown.
Vertical joints in concrete rail are not required, unless shown elsewhere.



PARAPET END
AT ABUT WINGWALL ⑥

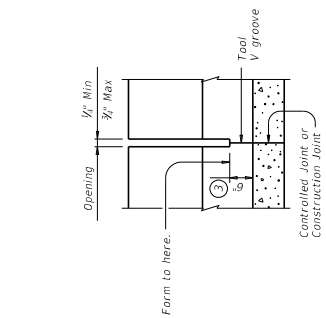


AT SLAB
EXPANSION JOINTS

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

Showing rail on slab. Rail on box culvert similar.

AT BENTS WITHOUT
SLAB EXPANSION JOINTS



POST JOINT DETAIL
Provide at all interior bents
without slab expansion joints.

TERMINAL CONNECTION DETAILS

SECTION

ELEVATION

TRAFFIC RAIL

TYPE T223

FILE: T223-19-000-19-000	DATE: September 2019	REVISED: 09/19/2019	DESIGN: JTB	CHECK: JTB	APPROVE: JTB	COUNTY: JTB	SHEET NO: 113B
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- Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- Wingwall Length minus 5'-0" (Varies)
- Increase 2' for structures with overlay.
- Bars U(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.
- Bars SU1(#3), SU2(#3), and WU(#5) not shown for clarity.
- Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on a curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.



SECTION D-D
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS

Sections on box culverts similar.

AT OPENING
ON BRIDGE SLAB

Box culvert parallel wings or rail anchorage curb similar.

DISCUSSION NOTES:

BUCTION NOTES:

For rail and parapet must be vertical transversely unless shown in the plans or approved by the Engineer. Side water barriers at openings draining onto undersides and sidewalks. They may be cast-in-place or precast in lengths and bonded to the bridge deck with an approved cement.

IAI NOTES:

Use Class "C" concrete. Provide Class "C" (HPC) if required.
 Use Grade 60 reinforcing steel.
 Coat or galvanize all reinforcing steel if slab bars are coated or galvanized.
 Use Welded Wire Reinforcing (WWR) (ASTM A1064) of equal spacing may be substituted for Bars U, V, and WU unless otherwise. Provide the same laps as required for reinforcing bar laps, where required, as follows:

AI NOTES:

NOTE: This rail has been evaluated by full-scale crash test to meet TL-2 criteria. This rail can be used for speeds of 50 mph and less when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can be used for speeds of 45 mph and less.

Use this railing on bridges with expansion joints providing for 5" movement. Anchor details shown on this standard may require modification for select structure types. See appropriate details in plans for these modifications.

*Drawings are not required for this rail.
The weight of railing with no overlay is 358 plf.*

dimensions are clear dimensions, unless noted otherwise.
 Recurring bar dimensions shown are out-to-out of bar.

Example showing Slab Expansion Joints without breakbacks.



BARS S (#3)

BARS V (#5) ⑨

BARS WU (#5)