

SECTION 404 PERMIT AND CONDITIONS

Construct this project according to the requirements of U.S. Army Corps of Engineers Nationwide Permit No. 14. A Copy of this permit is available from the Iowa DOT website at (<http://envpermits.iowadot.gov/CMEPortalENV/Home.aspx>). The U.S. Army Corps of Engineers reserves the right to visit the site without prior notice.

UTILITY CONTACTS

Alliant Energy
Attn: Alliant Energy Field Engineer
(800) 255-4268
locate_IPL@alliantenergy.com

Hawkeye Telephone Company
Attn: Craig Schmitt
(563) 412-9765
craig.schmitt@hawkeyetelephone.com

Oran Mutual Telephone Company
Attn: Matt Johnson
(319) 638-6006
staff@orantelco.com

IOWA
DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
PLANS OF PROPOSED IMPROVEMENTS ON THE
SECONDARY ROAD SYSTEM
FAYETTE COUNTY
RCB Culvert Replacement - Twin Box

Refer to the Proposal Form for list of applicable Specifications.

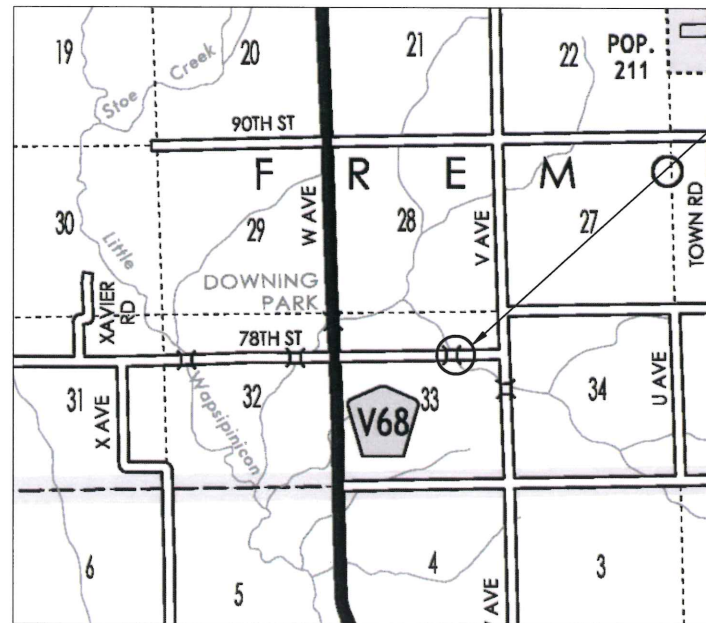
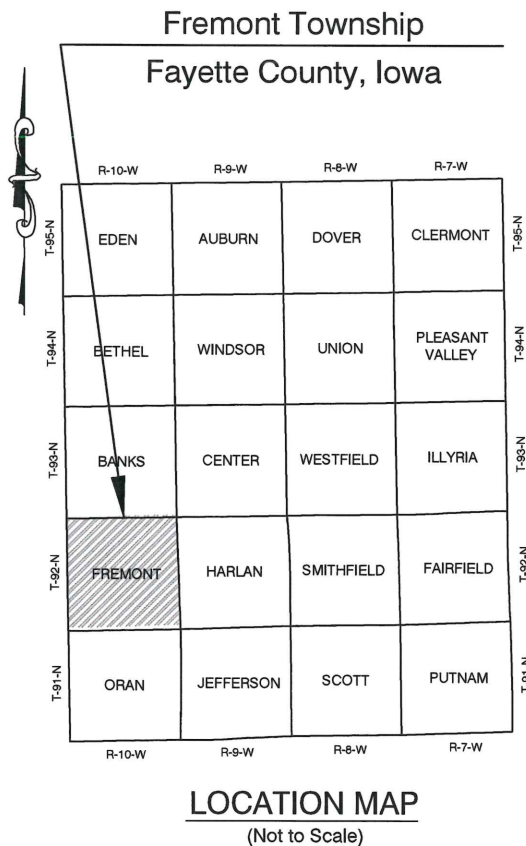
See Sheet C.1 for applicable Standard Plans.

Scales: As Noted

BROS-CO33(184)--8J-33

Twin 12'x9'x40' RCB Culvert
15° Skew Rt. Ahead

On 78TH ST, Over CREEK, S33 T92N R10W



Project Number: BROS-CO33(184)--8J-33

INDEX OF SHEETS

(9 Sheets)

No.	Description
A.1	Title Sheet, Location Map and Mileage Summary
C.1	Estimated Project Quantities and Estimate Reference Notes
D.1	Plan and Profile
U.1-U.5	Flared Wing Headwall Details
V.1	Bridge Plan and Hydraulic Data

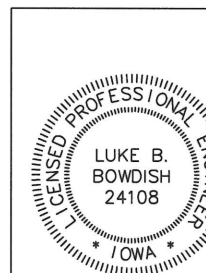
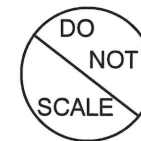
MILEAGE SUMMARY

Div.	Location	Lin. Feet	Miles
1	Station 35+00.00 to 39+00.00	400.00	0.076
	TOTAL	400.00	0.076

Approved by the Fayette County Board of Supervisors

Alex Papadopoulos
John B. Bowdish
Brian L. Lott

101-4		
DESIGN DATA RURAL		
2022 AADT	69	VPD
2044 AADT	70	VPD
Trucks		%



I hereby certify that this engineering document was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Iowa.

LUKE B. BOWDISH Lic. No. 24108

Date

My license renewal date is December 31, 2026

Pages or sheets covered by this seal:

ALL - SEE INDEX OF SHEETS

ESTIMATED QUANTITIES					
Twin 12'x9'x40' RCB Culvert					
Item No.	Item Code	Item	Unit	Total	As Built Qty
0010	2402-2720000	Excavation, Class 20	CY	1,200	
0020	2403-0100020	Structural Concrete (RCB Culvert)	CY	164.8	
0030	2404-7775005	Reinforcing Steel, Epoxy Coated	LB	25,772	
0040	2418-0000010	Temporary Stream Diversion	EACH	1.0	
0050	2528-2518000	Safety Closures	EACH	4	
0060	2528-8445110	Traffic Control	LS	1	
0070	2533-4980005	Mobilization	LS	1	

ESTIMATED REFERENCE INFORMATION		
Item No.	Item Code	Description
0010	2402-2720000	Excavation, Class 20
		See Sheet V.1 for excavation limits. Excess materials to be wasted on site.
0020	2403-0100020	Structural Concrete (RCB Culvert)
		All concrete shall consist of a Class "C" mix. The Contractor shall provide certified plant inspection.
0030	2404-7775005	Reinforcing Steel, Epoxy Coated
		Culvert barrel reinforcing quantities were estimated using the fill=5-7' formula. All concrete shall consist of a Class "C" mix. The Contractor shall provide certified plant inspection.
0040	2418-0000010	Temporary Stream Diversion
0050	2528-2518000	Safety Closure
		See sheet C.1 for tabulation.
0060	2528-8445110	Traffic Control
		All traffic control devices shall be in accordance with the current Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways as adopted by the Iowa Department of Transportation per 761 of the Iowa Administrative Code (IAC), Chapter 130.
0070	2533-4980005	Mobilization

IOWA DEPT. OF TRANSPORTATION BRIDGE STANDARDS					
(May be obtained at the Iowa Department of Transportation Electronic Reference Library)					
Standard	Date Issued	Latest Revision			
TWRCB G1-20	July 2020				
TWRCB G2-20	July 2020				
TWRCB G3-20	July 2020				
TWRCB 12-9-20	July 2020				
TWFWH G1-21	February 2021				

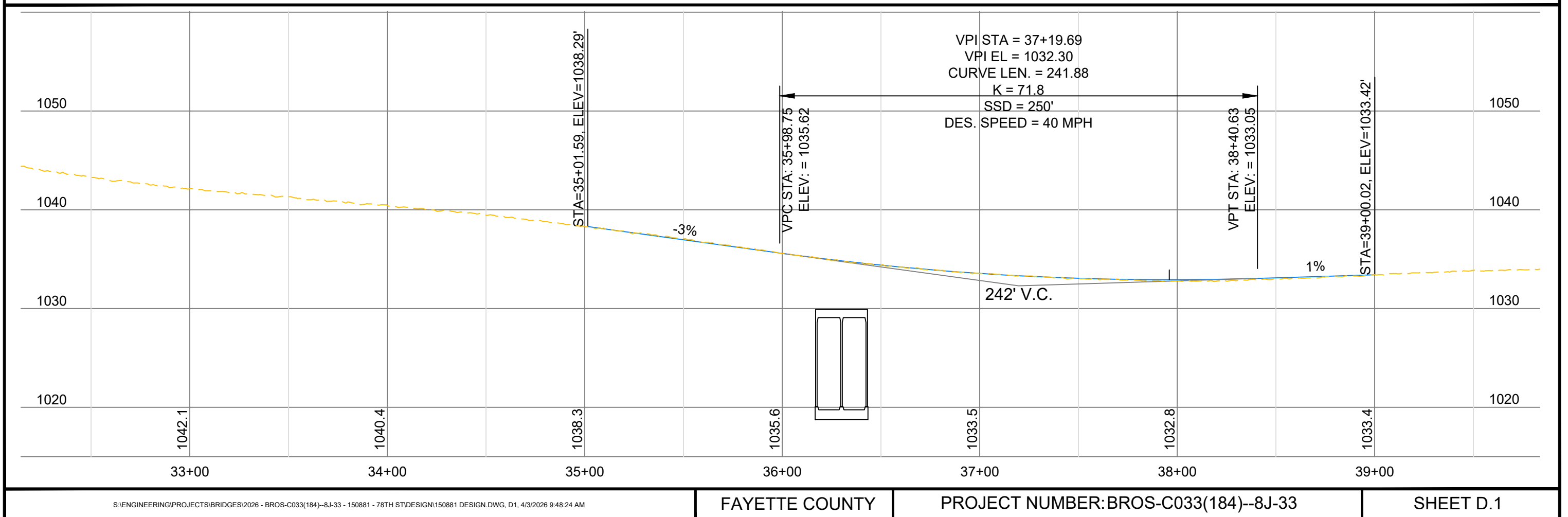
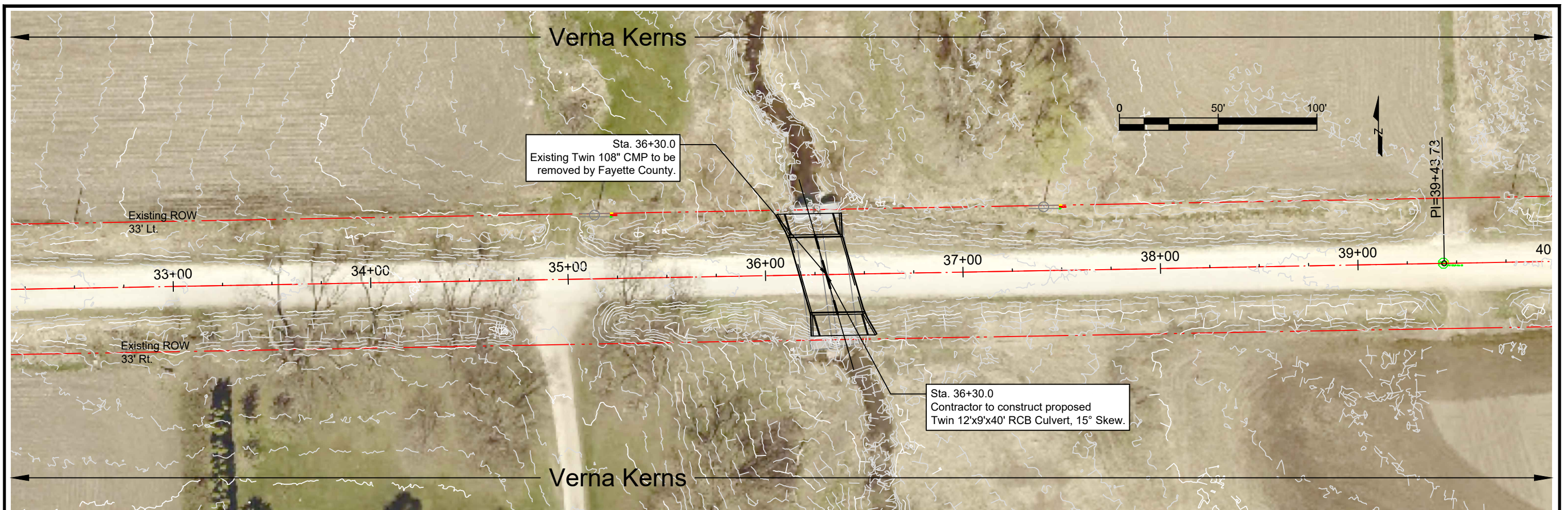
GENERAL NOTES

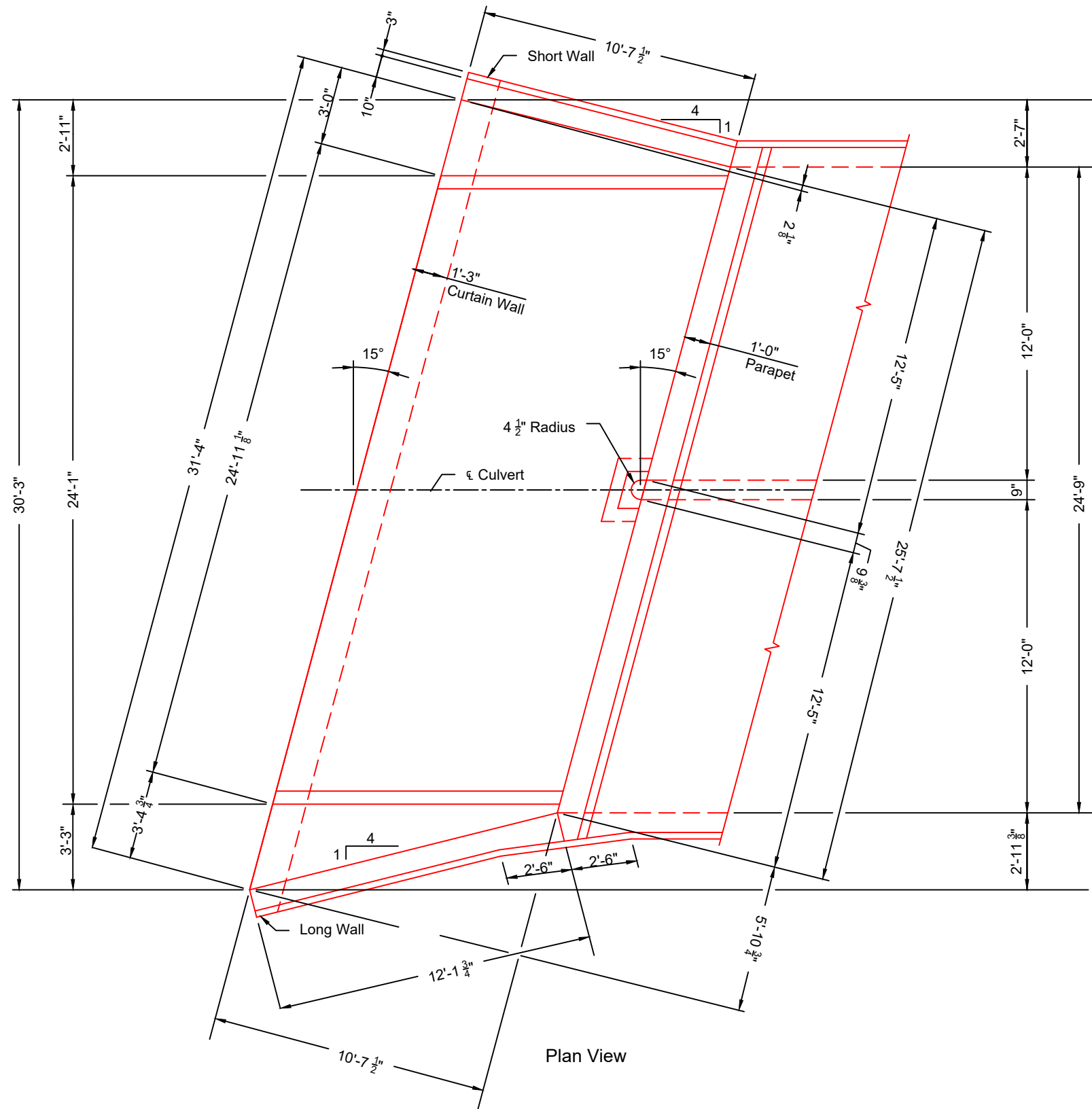
1. This Culvert is designed for HL-93 live loading and shall be constructed in accordance with IDOT Culvert Standard Plans as listed.
2. It is the Contractor's responsibility to provide waste areas or disposal sites for material(s) which are not desirable for incorporation in the project. Contractor provided waste areas or disposal sites shall not impact wetlands or "Waters of the United States". No payment for overhaul will be allowed for material(s) hauled to these sites. No material(s) will be placed within the Right-of-Way unless specifically stated on the plans or approved by the Engineer. Final cleanup of the construction area shall be in accordance with Section 1104.08 of IDOT Standard Specifications.
3. The Contractor shall use caution when working over and around tile lines. Breaks in a tile due to Contractor's carelessness will be replaced at the Contractor's expense. Any tile line disturbed or broken due to cuts will be replaced as directed by the Engineer and paid as extra work.
4. Contractor is to use due caution when working around ROW pins and survey control points which are marked with an oak hub and crossing lathe. Any pins disturbed by the Contractor will be replaced at the Contractor's expense.
5. Fayette County will perform removal of existing bridge, all earthwork except class 20, seeding and mulching, granular surfacing, erosion control, and construction staking for use by Contractor. If the Contractor wishes to start before the late start date, the Contractor is required to give sufficient notice to County (2 weeks minimum) in order to complete demolition and earthwork in advance of construction.
6. The Contractor shall confine all work to within the ROW as shown on the project plans. If the Contractor obtains permission from property owners for storage of equipment and/or materials on private property, copies of written agreements with the property owners will be provided to the Engineer for approval.
7. The Contractor will use caution when working over, under, or around existing utilities. It is the Contractor's responsibility to coordinate all utility relocation work with the respective utility companies in order to avoid unnecessary delays to the project.

SAFETY CLOSURES			
Station	Closure Type		Remarks
	Road Qty.	Hazard Qty.	
1+00	1		West End
35+00		1	West End of Bridge
39+00		1	East End of Bridge
52+00	1		East End
TOTALS	2	2	Locations to be Field Verified

RCB Culvert Quantities					
Location	Concrete CY				Rein. Steel
	Slab	Walls	Floor	Total	
Tw in 12'x9' Inlet; 15° Skew	2.8	6.4	21.4	30.6	4,082
40'-0 Barrel Section (Fill=5-7')	34.7	28.6	40.3	103.6	17,513
Tw in 12'x9' Outlet; 15° Skew	2.8	6.4	21.4	30.6	4,082
5r1 Constr. Joint Bars (1 Joints)	-	-	-	-	95
Totals:				164.8	25,772

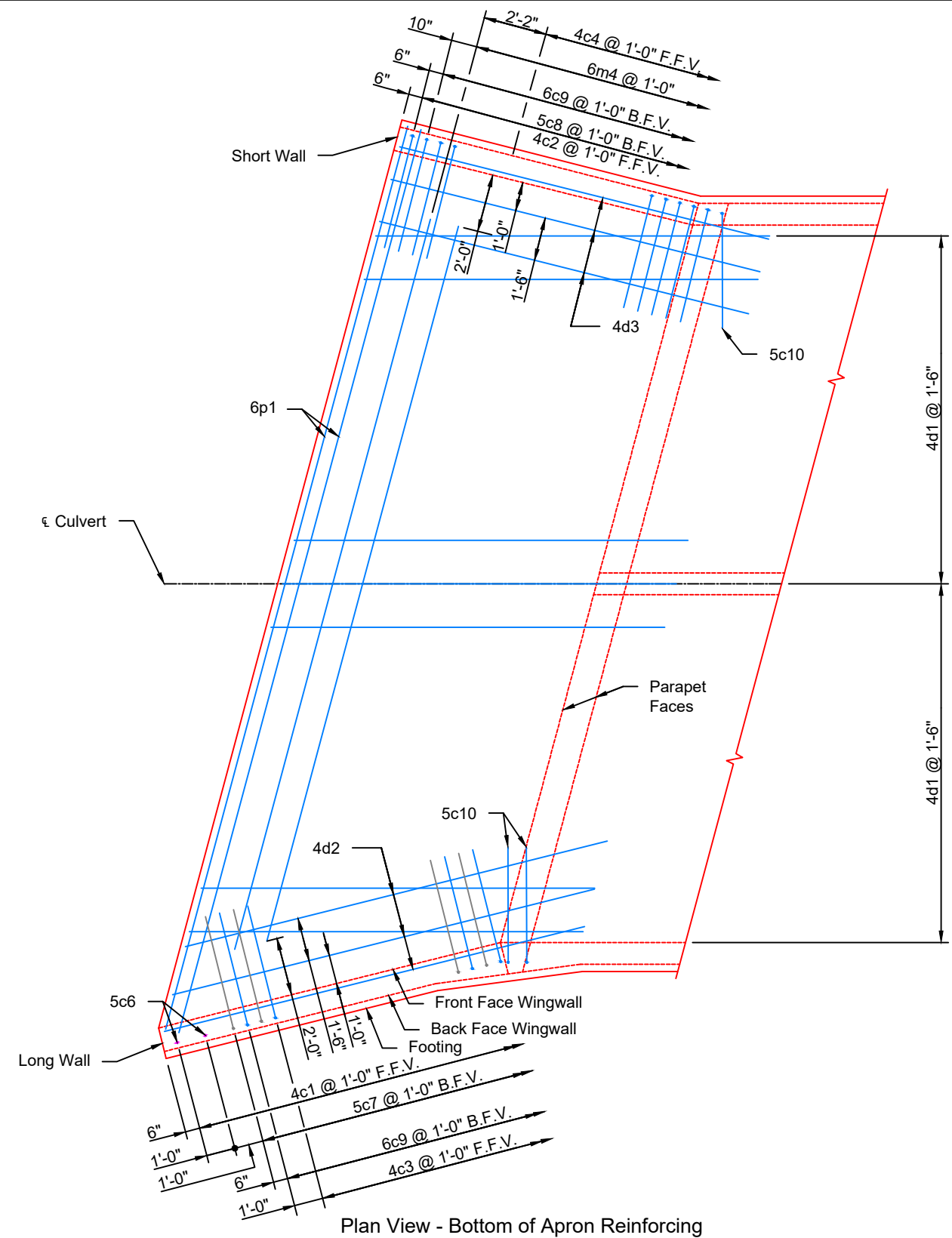
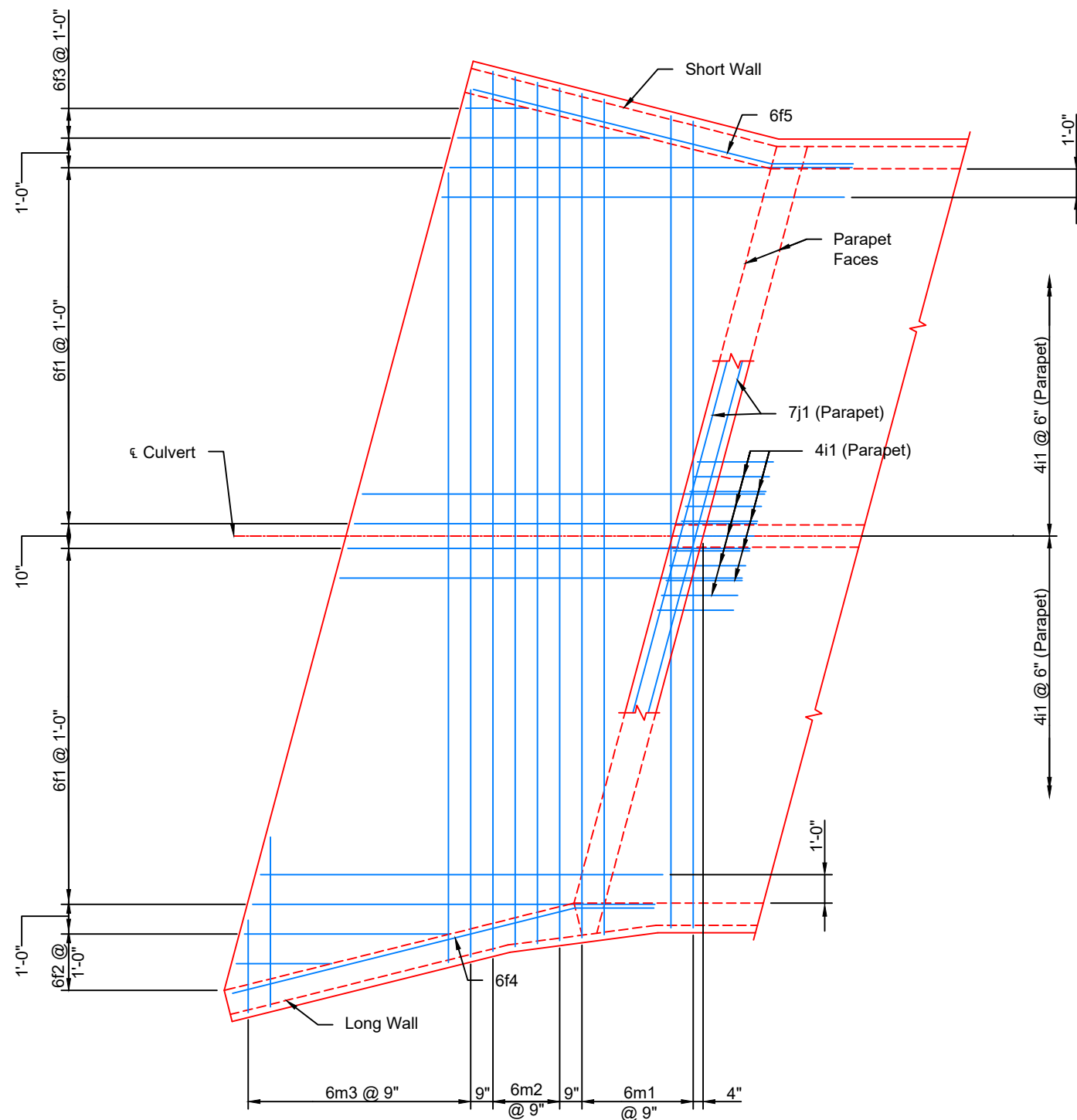
STANDARD ROAD PLANS		
The following Standard Road Plans apply to construction work on this project.		
Number	Date	Title
EW-402	4-18-17	Temporary Stream Diversion
TC-252	10-21-25	Routes Closed to Traffic

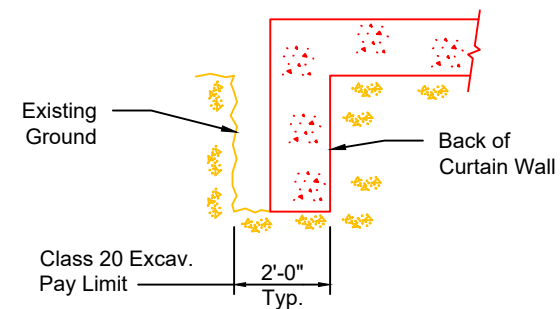
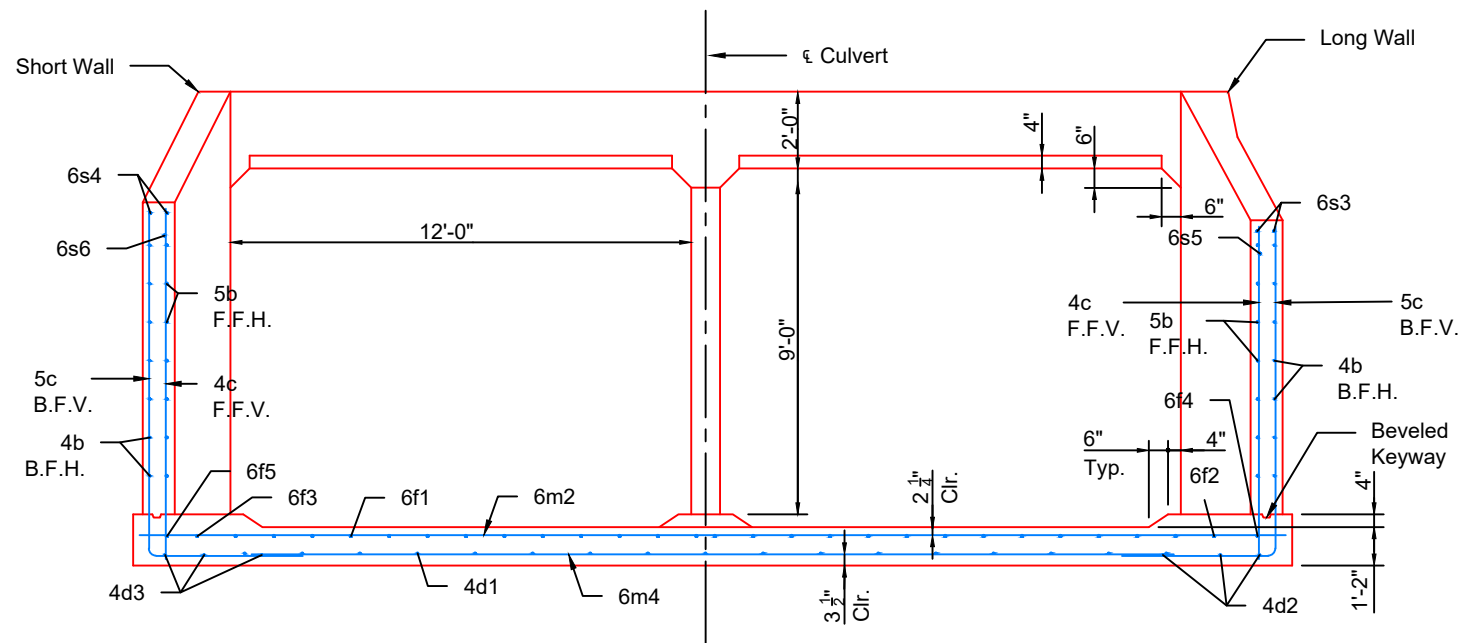




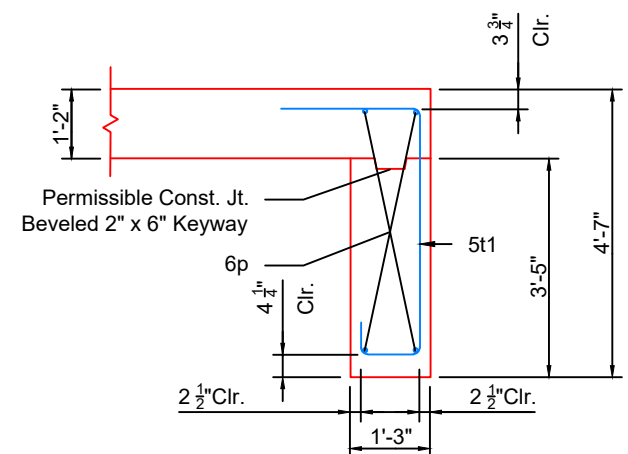
- Notes:
- See Sheet TWFWH G1-21 for General Notes, Specifications, and Design Stresses.

Modifications: 1. Length of apron shortened. 2. Wingwall slopes adjusted to 2:1. 3. Interior wingwall removed from apron and rounded at parapet.		Modified	
		Standard Design - Twin Reinforced Concrete Box Culverts Flared Wing Headwalls February, 2021	
Dimension Plan 15° Skew		TWFWH 15-1-21	

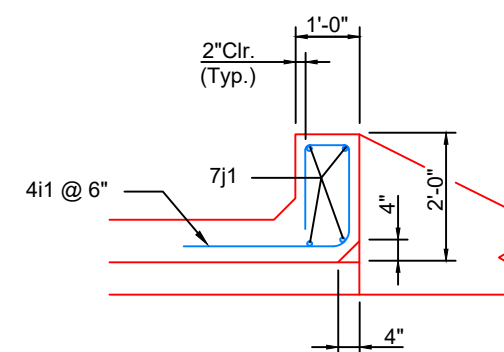




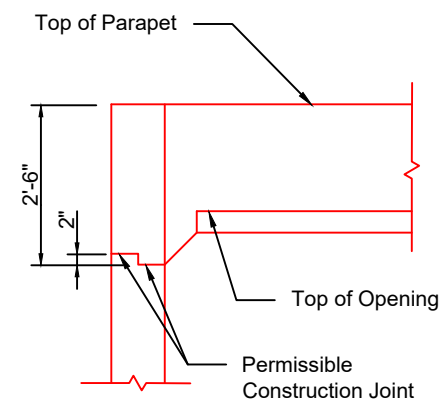
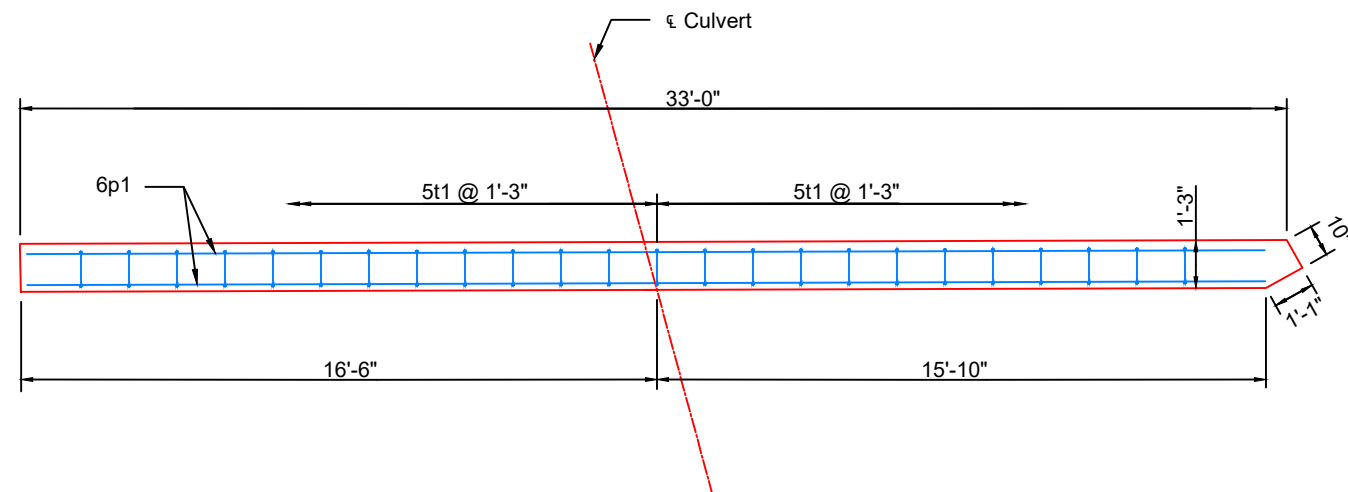
Curtain Wall
Class 20 Excavation



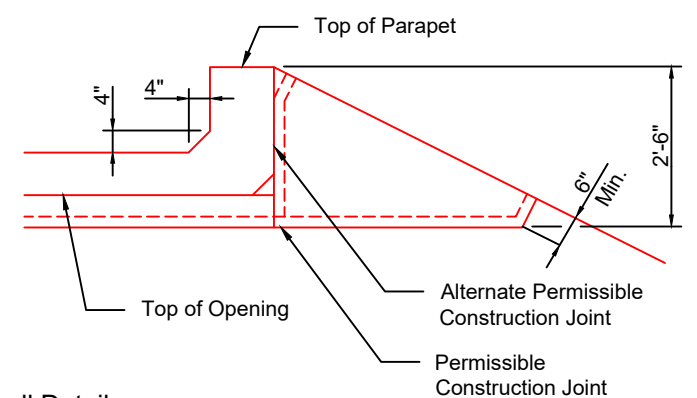
Section thru Curtain Wall



Section thru Parapet



Top of Wingwall Details



Notes:

- See Sheet TWFWH G1-21 for General Notes, Specifications, and Design Stresses.
- Wingwall bars consistently referenced from end of wing.
- For reinforcing in curtain wall see Curtain Wall Details on Sheet TWFWH 15-4-21.

Modifications:

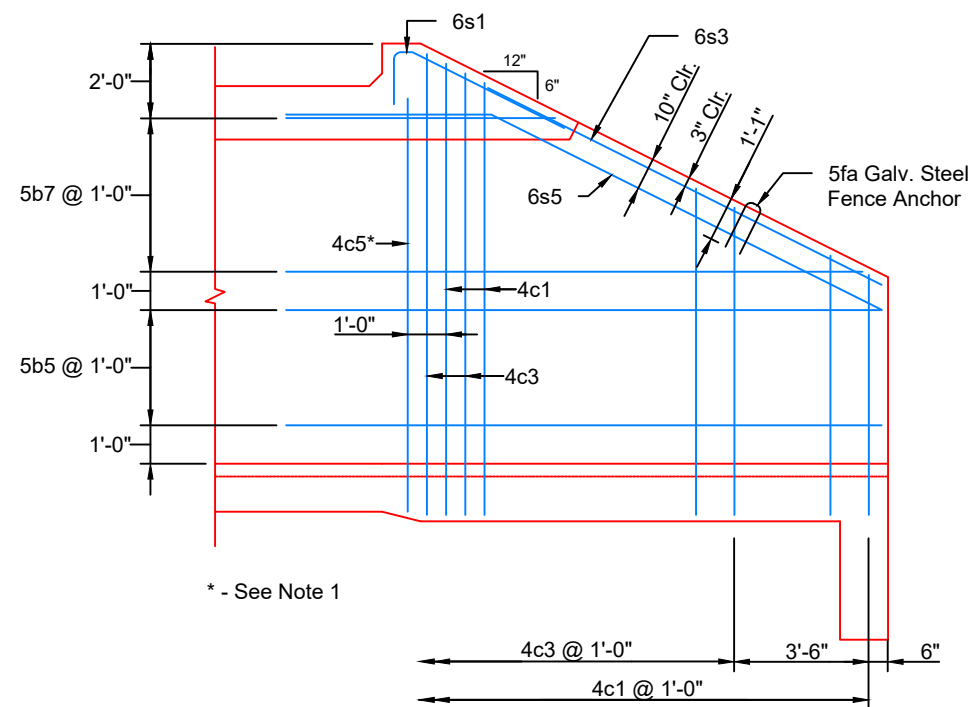
- Length of apron shortened.
- Wingwall slopes adjusted to 2:1.
- Interior wingwall removed from apron and rounded at parapet.

Modified

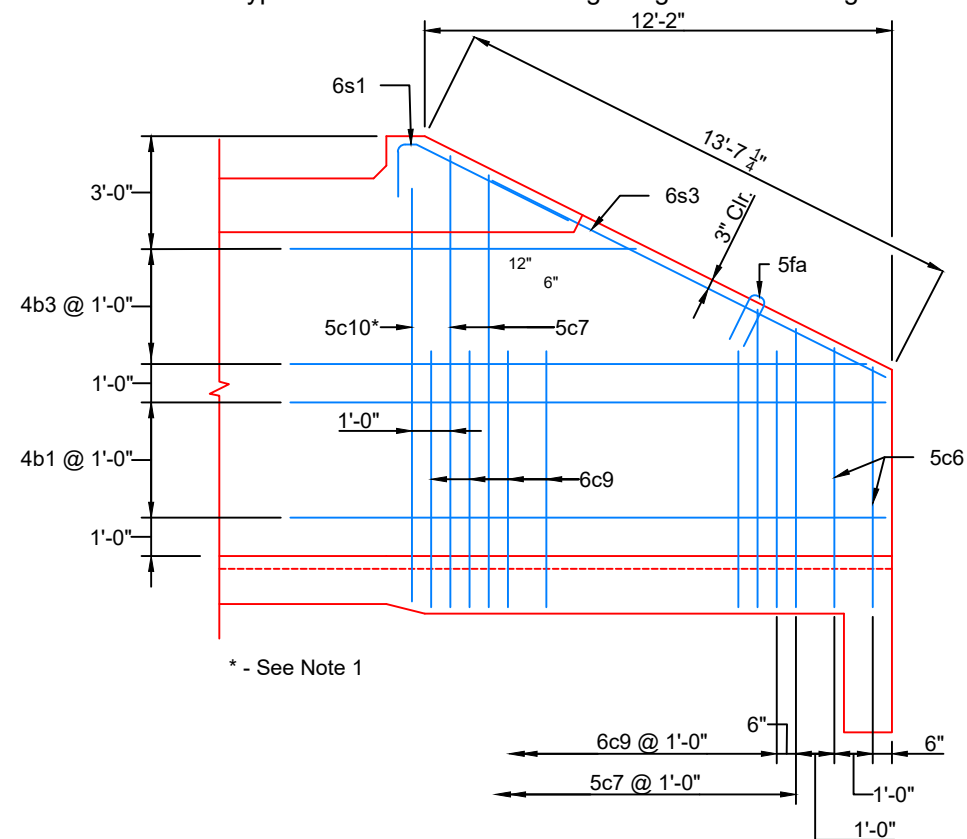
Standard Design - Twin Reinforced Concrete Box Culverts
Flared Wing Headwalls
February, 2021

Parapet & Curtain
Wall Details
15° Skew

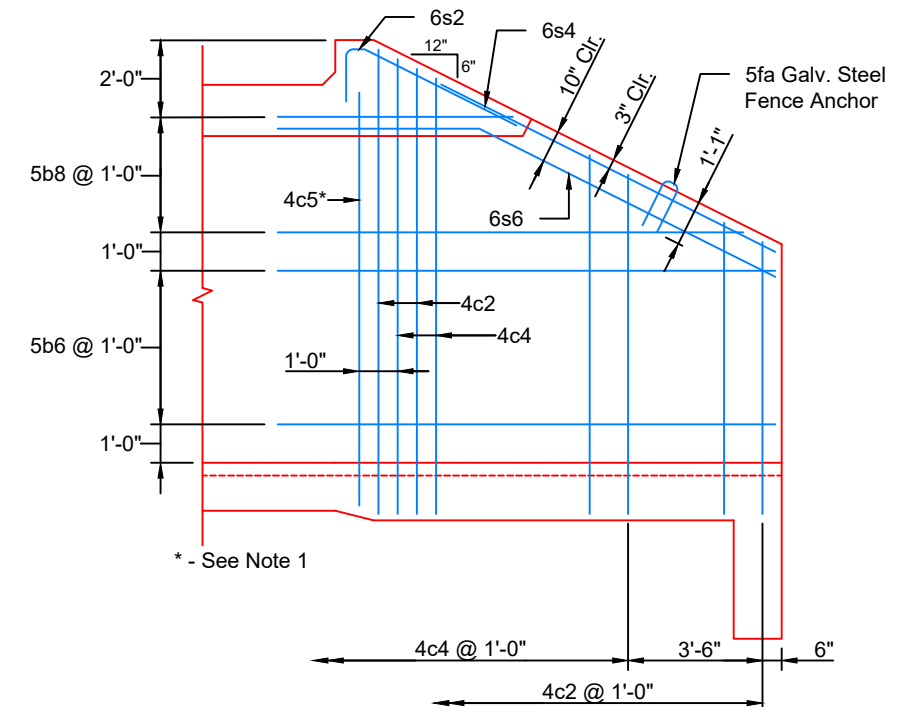
TWFWH
15-4-21



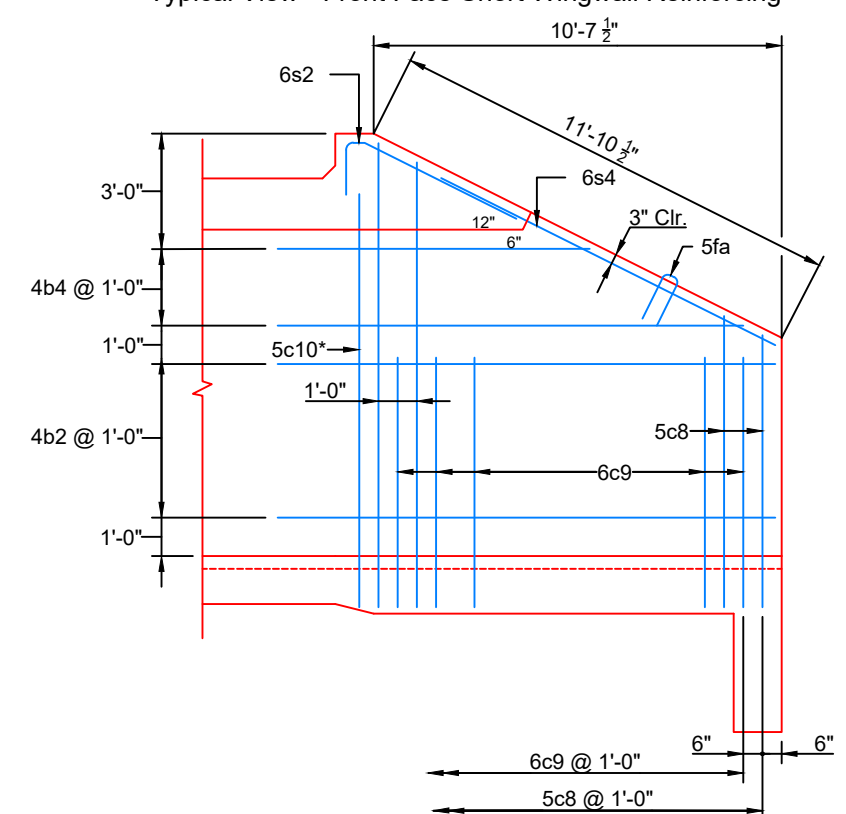
Typical View - Front Face Long Wingwall Reinforcing



Typical View - Back Face Long Wingwall Reinforcing



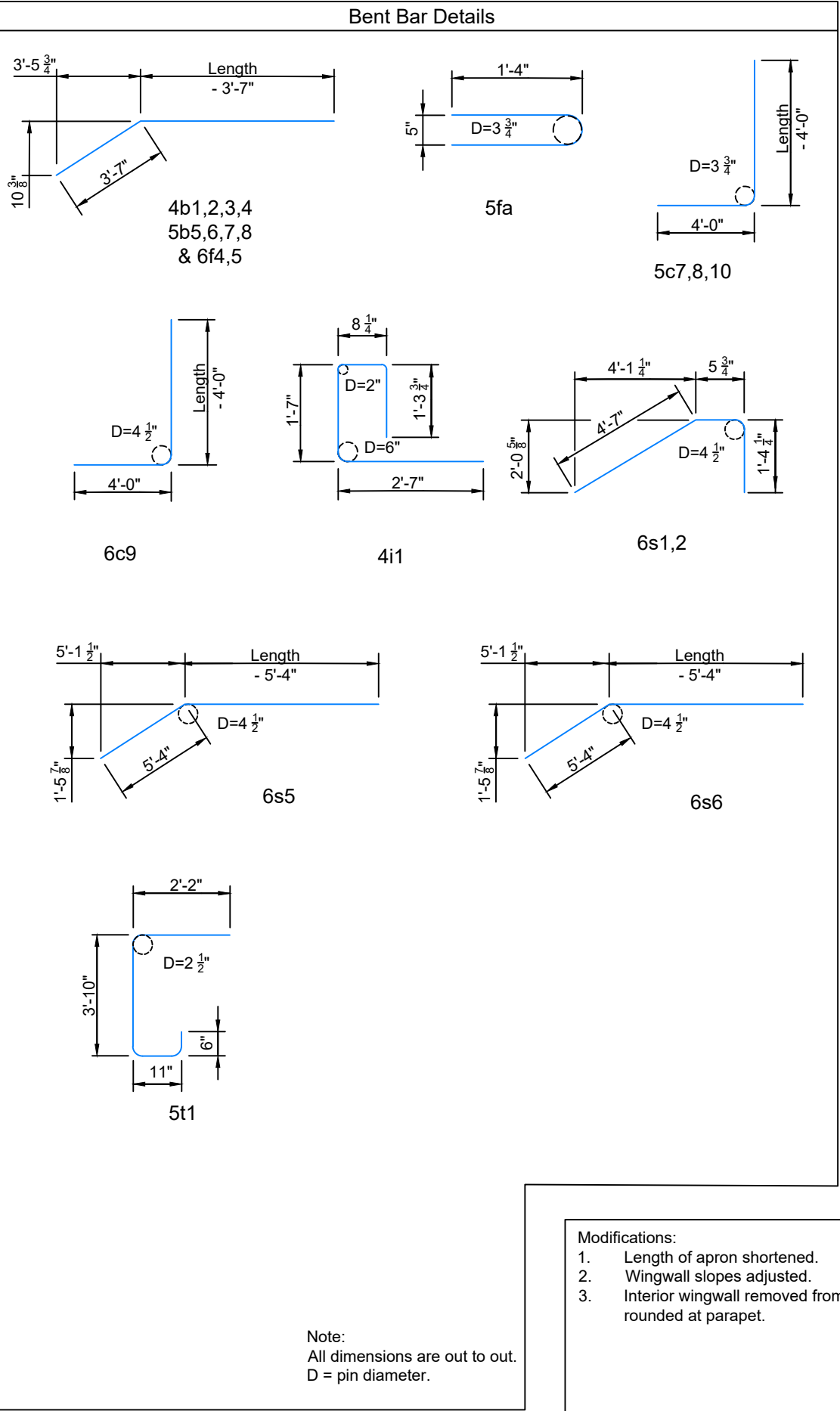
Typical View - Front Face Short Wingwall Reinforcing



Typical View - Back Face Short Wingwall Reinforcing

Modifications: - Length of apron shortened. - Wingwall slopes adjusted. - Interior wingwall removed from apron and rounded at parapet. Notes: - Two 4c5 & two 5c10 bars. - Top of wall slope may be rounded in some instances.	Modified	
	Standard Design - Twin Reinforced Concrete Box Culverts Flared Wing Headwalls February, 2021	
	Dimension Plan 15° Skew	TRFWH 15-5-21

Bill of Reinforcing for One Headwall 15° Skew Span x Culvert Height					
Bar	Location	Shape	12' x 9'		
			No.	Length	Weight
5fa	Fence Anchor (Galv.)		2	2'-10	6
4b1	Wingwall, BFH Long		4	15'-6	41
4b2	Wingwall, BFH Short		5	13'-0	43
4b3	Wingwall, BFH Long		4 Var.	9'-0 to 15'-0	32
4b4	Wingwall, BFH Short		3 Var.	8'-1 to 12'-1	20
5b5	Wingwall, FFH Long		4	15'-6	65
5b6	Wingwall, FFH Short		5	13'-0	68
5b7	Wingwall, FFH Long		5 Var.	7'-0 to 15'-0	57
5b8	Wingwall, FFH Short		4 Var.	6'-1 to 12'-1	38
4c1	Wingwall, FFV Long		12 Var.	6'-3 to 11'-9	72
4c2	Wingwall, FFV Short		11 Var.	7'-7 to 12'-1	70
4c3	Wingwall, FFV Long		9 Var.	8'-0 to 12'-0	60
4c4	Wingwall, FFV Short		7 Var.	8'-10 to 11'-10	48
4c5	Wingwall, FFV Long		2	10'-9	14
4c5	Wingwall, FFV Short		2	10'-9	14
5c6	Wingwall, BFV Long		2 Var.	6'-3 to 6'-9	14
5c7	Wingwall, BFV Long		10 Var.	7'-3 to 11'-9	99
5c8	Wingwall, BFV Short		11 Var.	7'-1 to 12'-1	110
6c9	Wingwall, BFV long		10	10'-6	158
6c9	Wingwall, BFV Short		10	10'-6	158
5c10	Wingwall, BFV Long		2	14'-9	31
5c10	Wingwall, BFV Short		2	14'-9	31
4d1	Apron, Longit., Bott.		17	13'-7	155
4d2	Apron, Longit., Bott. Long		3	13'-1	26
4d3	Apron, Longit., Bott. Short		3	15'-0	30
6f1	Apron, Longit., Top		26	13'-7	530
6f2	Apron, Longit., Top Long		2 Var.	3'-3 to 6'-11	15
6f3	Apron, Longit., Top Short		2 Var.	2'-2 to 6'-5	13
6f4	Apron, Longit., Top Long		1	14'-6	22
6f5	Apron, Longit., Top Short		1	13'-1	20
4i1	Parapet, Vertical		49	6'-2	202
7j1	Parapet, Horizontal		4	27'-1	221
6m1	Apron, Trans., Top		6 Var.	27'-2 to 28'-5	250
6m2	Apron, Trans., Top		4 Var.	28'-9 to 29'-8	175
6m3	Apron, Trans., Top		11 Var.	3'-1 to 29'-3	267
6m4	Apron, Trans. Bott.		11 Var.	20'-8 to 26'-1	386
6p1	Curtain, Horizontal		4	32'-3	194
6s1	Wing Slope, Both F. Long		2	6'-2	19
6s2	Wing Slope, Both F. Short		2	6'-2	19
6s3	Wing Slope, Both F. Long		2	11'-5	35
6s4	Wing Slope, Both F. Short		2	9'-9	29
6s5	Wing Slope, FF Long		1	16'-8	25
6s6	Wing Slope, FF Short		1	13'-10	21
5t1	Curtain, Vertical		24	7'-2	179
Estimated Quantities One Headwall		Reinf. Steel	4082		
		Concrete	Parapet*	2.8	30.6
			Wingwalls	6.4	
			Apron	21.4	



* Includes top of wingwall quantities.

Note: Weight of bars over 40'-0" long include an allowance of 2'-5" for lap. Lengths shown for bars over 40'-0" long do not include lap.

"Short" Denotes Short Wingwall
"Long" Denotes Long Wingwall

Headwall Notes:

- See Sheet TWFWH G1-21 for General Notes, Specifications, and Design Stresses.
- This headwall is based on a 2:1 slope normal to centerline of roadway.
- The sides of the apron are to be formed to ensure correct line and grade.
- All apron reinforcing steel is to be supported by bar chairs at intervals of not more than 3'-0" in either direction as outlined in the Standard Specifications.
- Clear distance from face of concrete to near reinforcing bar is to be 2" unless otherwise noted or shown. Clearance to the bottom ends of vertical bars shall be 3 inches.
- Concrete quantities are estimated from back of parapet.
- Horizontal tails of bars "b" & "s" estimated to extend 2'-5" beyond back of parapet (into end of barrel). Longitudinal bars "d", "6f1", "6f4" and "6f5" estimated to project into end section of barrel a minimum of 2'-5" beyond back of parapet. The "length" column reflects total number of feet necessary to meet these requirements.
- Dimensions are in feet and inches unless otherwise noted.

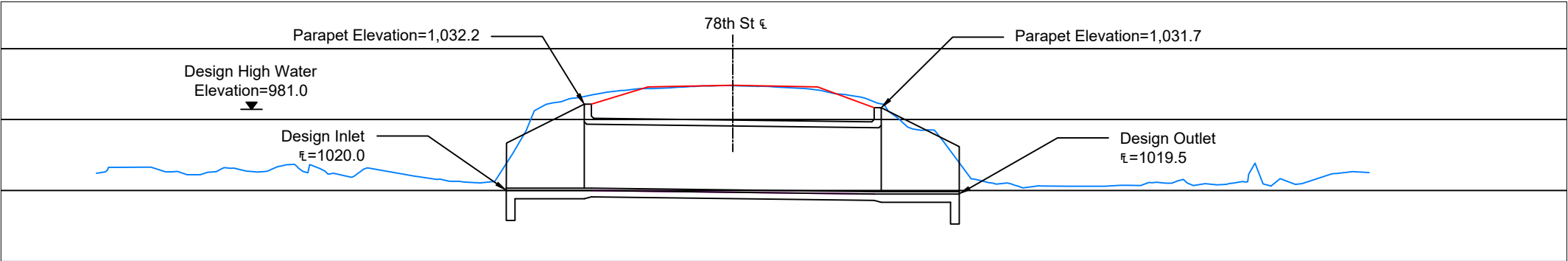
- Modifications:
- Length of apron shortened.
 - Wingwall slopes adjusted.
 - Interior wingwall removed from apron and rounded at parapet.

Modified

Standard Design - Twin Reinforced Concrete Box Culverts
Flared Wing Headwalls
February, 2021

Dimension Plan
15° Skew

TRFWH
15-6-21



LONGITUDINAL SECTION ALONG ϵ CULVERT

DESIGN FILL HEIGHT = 5-7 FOOT

BENCH MARK: TO BE SET AT CONTRACTOR'S DESIRED LOCATION PRIOR TO CONSTRUCTION

TRAFFIC ESTIMATE

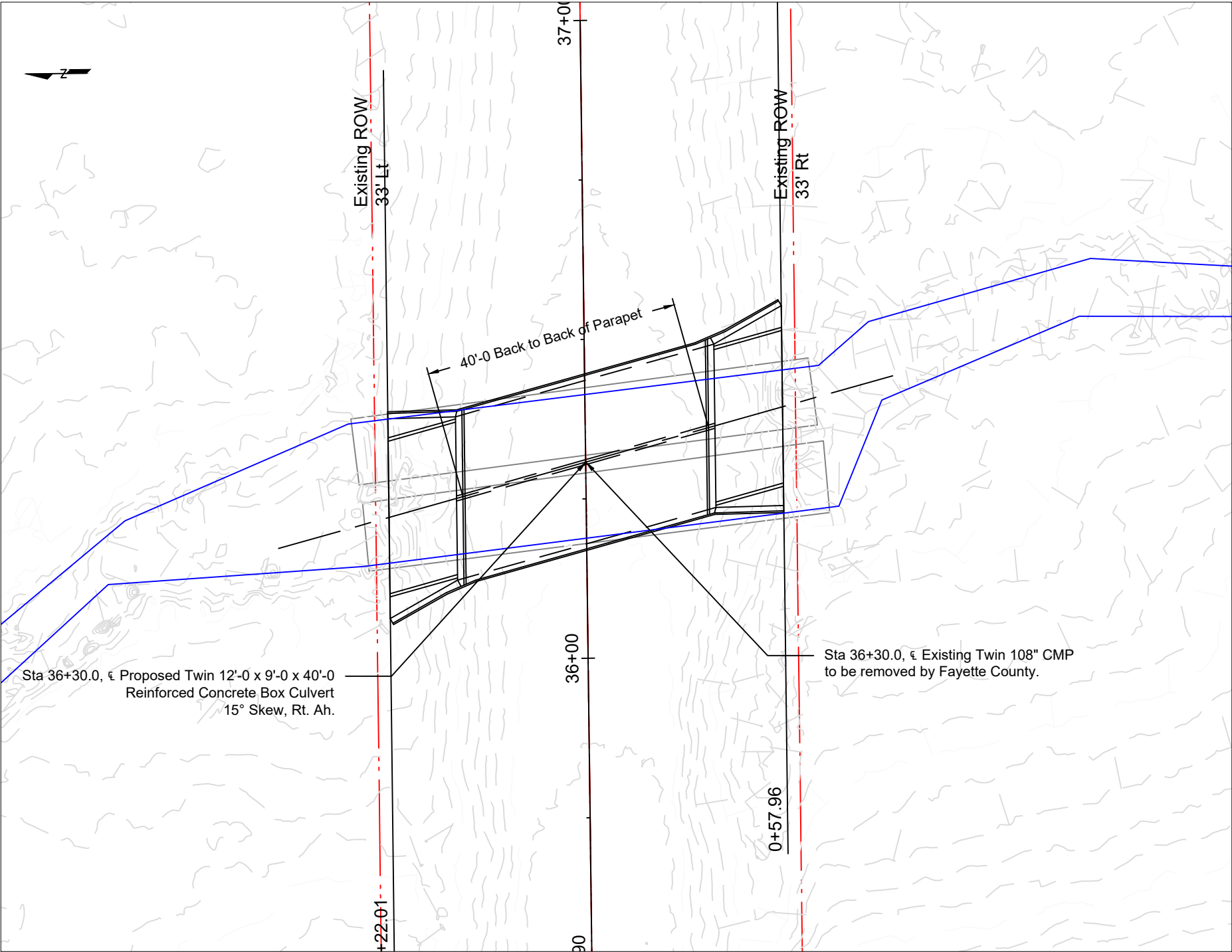
2025 ADT, 69 VPD

HYDRAULIC DATA

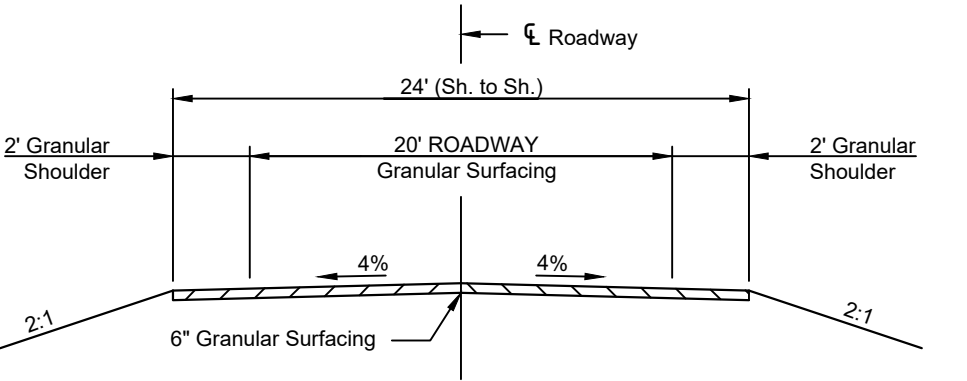
Drainage Area= 2.5 Sq. Mi.
Design Discharge, Q50= 1,654 CFS
Design High Water Elevation, Q50= 1,029.1
Stream Slope = 19.8 Ft./Mi.
Design Velocity = 21.1 Ft/s
Q25 = 1,344 CFS Stage Elev. = 1,028.3
Q50 = 1,654 CFS Stage Elev. = 1,029.1
Q100 = 1,995 CFS Stage Elev. = 1,030.0
Q500 = 3,300 CFS Stage Elev. = 1,034.0
Anticipated Scour Elev. = 1,017.5

LOCATION

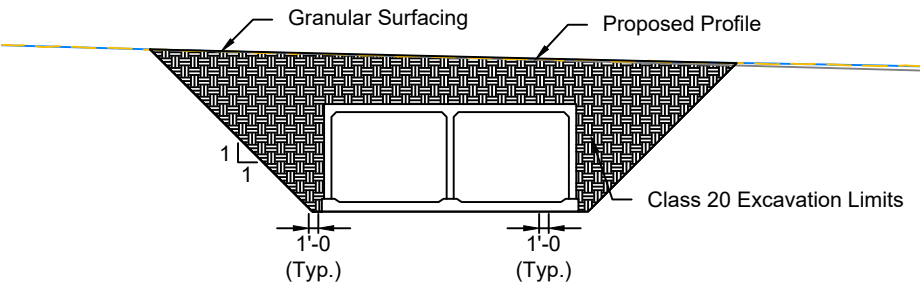
On 78th St over Creek
T-92-N, R-10-W
Section 3
Fremont Township
Fayette County
Latitude 42.74049987
Longitude -92.02738952



SITUATION PLAN



TYPICAL APPROACH SECTION



PROFILE CROSS SECTION
ALONG ROADWAY CENTERLINE

UTILITIES



FO Buried Fiber Optic Line

DESIGN FOR 15° SKEW
TWIN 12'-0 X 9'-0 X 40'-0
REINFORCED CONCRETE BOX CULVERT
SITUATION PLAN
STA. 36+30.0
FAYETTE COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
2026