FAYETTE COUNTY PROJECT NUMBER: HDP-CO33(176)--71-33

RCB CULVERT REPLACEMENT - TWIN BOX

Letting Date: 12/15/2026

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

Alpine Communications
Attn: Chad Ruegnitz
(563) 245-4471
cruegnitz@alpine-communications.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

HDP-CO33(176)--71-33

Twin 12'x10'x35' Reinforced Concrete Box Culvert with Flared Wing Headwalls, 0° Skew

On Dogwood Rd, Over Mink Cr S9 T93N R07W

Project Number: HDP-CO33(176)--71-33

INDEX OF SHEETS (8 Sheets)

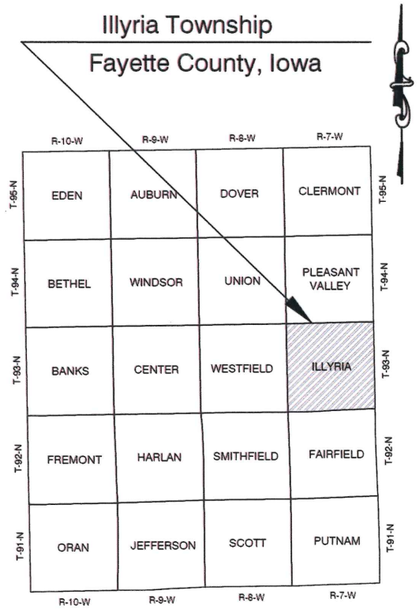
No.	Description
A.1	Title Sheet, Location Map and Mileage Summary
C.1	Estimated Project Quantities and Estimate Reference Notes
D.1	Plan and Profile
U.1-U.4	Flared Wing Headwall Details
V.1	Bridge Plan and Hydraulic Data

MILEAGE SUMMARY

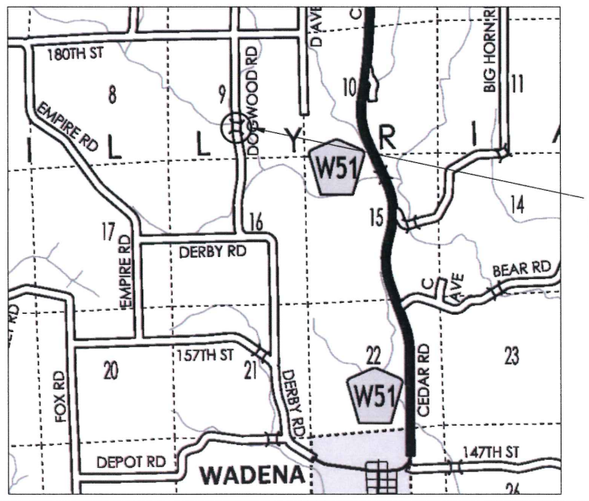
Div.	Location	Lin. Feet	Miles
1	Station 42+00.00 to 48+00.00	600.00	0.114
	TOTAL	600.00	0.114

Approved by the Fayette County Board of Supervisors

Illyria Township
Fayette County, Iowa



LOCATION MAP
(Not to Scale)



STA. 45+20.00
PROPOSED TWIN 12'x10'x35'
RCB CULVERT, 0° SKEW
FHWA NO. 150920

	101-4	
DESIGN DATA RURAL		
2022 AADT	39	VPD
2042 AADT	40	VPD
Trucks		%

DO NOT SCALE

LICENSED PROFESSIONAL ENGINEER
LUKE B. BOWDISH
24108
IOWA

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 8/5/2026

My license renewal date is December 31, 2026

Pages or sheets covered by this seal:
ALL – SEE INDEX OF SHEETS

ESTIMATED QUANTITIES

Twin 12'x10'35' RCB

Item No.	Item Code	Item	Unit	Total	As Built Qty
0010	2401-6745625	Removal of Existing Bridge	LS	1	
0020	2402-2720000	Excavation, Class 20	CY	890	
0030	2403-0100020	Structural Concrete (RCB Culvert)	CY	170.4	
0040	2404-7775005	Reinforcing Steel, Epoxy Coated	LB	27,603	
0050	2418-0000010	Temporary Stream Diversion	EACH	1	
0060	2507-6800061	Revetment, Class E	TON	160	
0070	2528-2518000	Safety Closures	EACH	4	
0080	2528-8445110	Traffic Control	LS	1	
0090	2533-4980005	Mobilization	LS	1	

ESTIMATED REFERENCE INFORMATION

Item No.	Item Code	Description
0010	2401-6745625	Removal of Existing Bridge
		Removal included in the contract consists of removing the existing 53'x18' concrete slab bridge with reinforced concrete pier and reinforced concrete high wall abutments. Contractor is responsible for disposal of demolition materials. Broken concrete from existing bridge meeting Specification 4310.02.C may be used as Class E Revetment. There was no suspect asbestos or lead detected on this structure.
0020	2402-2720000	Excavation, Class 20
		Excess materials to be wasted on site. No payment for overhaul or fuel adjustments shall be made on this project.
0030	2403-0100020	Structural Concrete (RCB Culvert)
		All concrete shall consist of a Class "C" mix. The Contractor shall provide certified plant inspection.
0040	2404-7775005	Reinforcing Steel, Epoxy Coated
		Culvert barrel reinforcing quantities were estimated using the fill=3' formula.
0050	2418-0000010	Temporary Stream Diversion
0060	2507-6800061	Revetment, Class E
		See sheet V.1 for details and Sheet C.1 for tabulation.
0070	2528-2518000	Safety Closure
		See Sheet C.1 for tabulation.
0080	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.
0090	2533-4980005	Mobilization

SAFETY CLOSURES

Station	Closure Type		Remarks
	Road Qty.	Hazard Qty.	
1+00	1		West End
42+00		1	West End of Bridge
48+00		1	East End of Bridge
52+00	1		East End
TOTALS	2	2	Locations to be Field Verified

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 on Sheet A.1.
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".
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 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.

IOWA DEPT. OF TRANSPORTATION BRIDGE STANDARDS

(May be obtained at the Iowa Department of Transportation Electronic Reference Library)

Standard	Date Issued	Latest Revision	Standard	Date Issued	Latest Revision
TWRCB G1-20	July 2020		TWRCB 12-10-20	July 2020	
TWRCB G2-20	July 2020		TWFWH G1-21	February 2021	
TWRCB G3-20	July 2020				

RCB Culvert Quantities

Location	Concrete CY				Rein. Steel
	Slab	Walls	Floor	Total	
Twin 12'x10' Inlet; 0º Skew	2.0	7.0	23.6	32.6	4,644
35'-0 Barrel Section (Fill=3')	29.3	31.0	31.3	91.6	16,765
Twin 12'x10' Outlet; 0º Skew	2.0	7.0	23.6	32.6	4,644
5r1 Constr. Joint Bars (1 Joints)	-	-	-	-	95
			Totals:	156.8	26,148

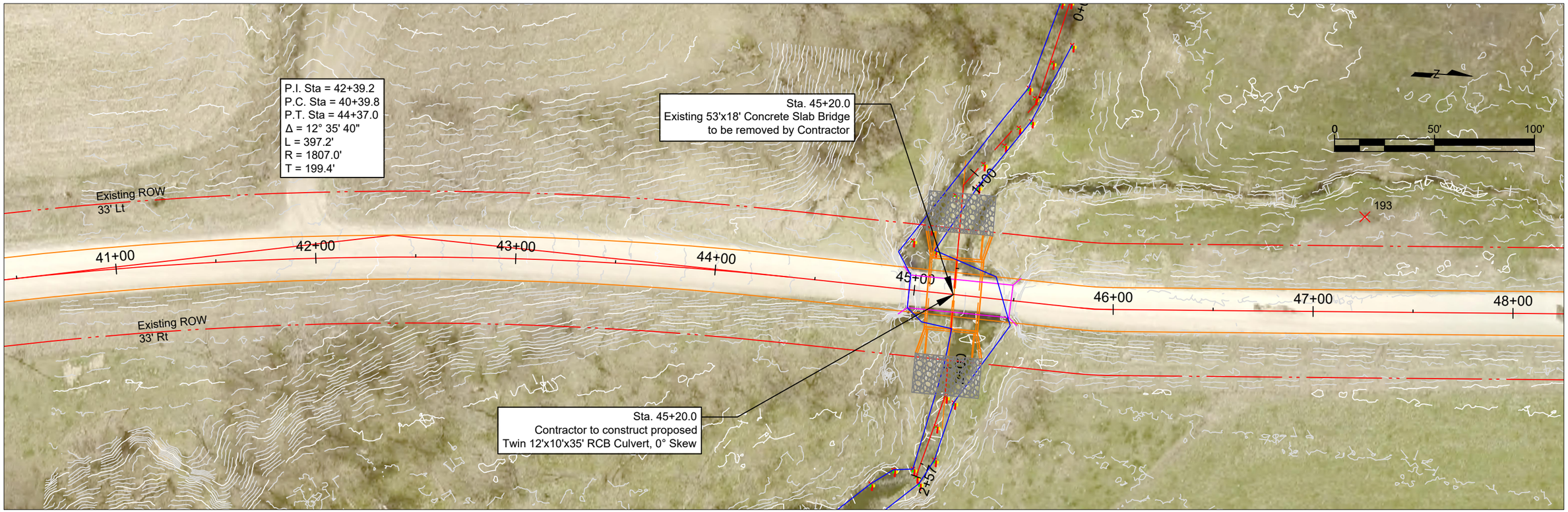
STANDARD ROAD PLANS

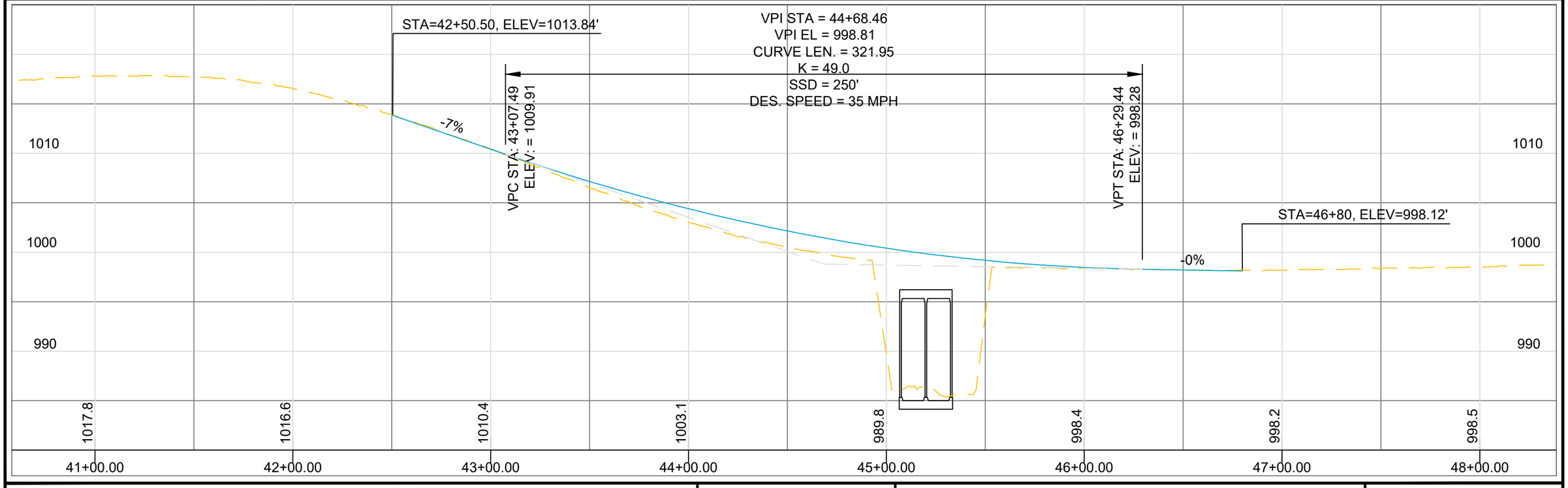
The following Standard Road Plans apply to construction work on this project.

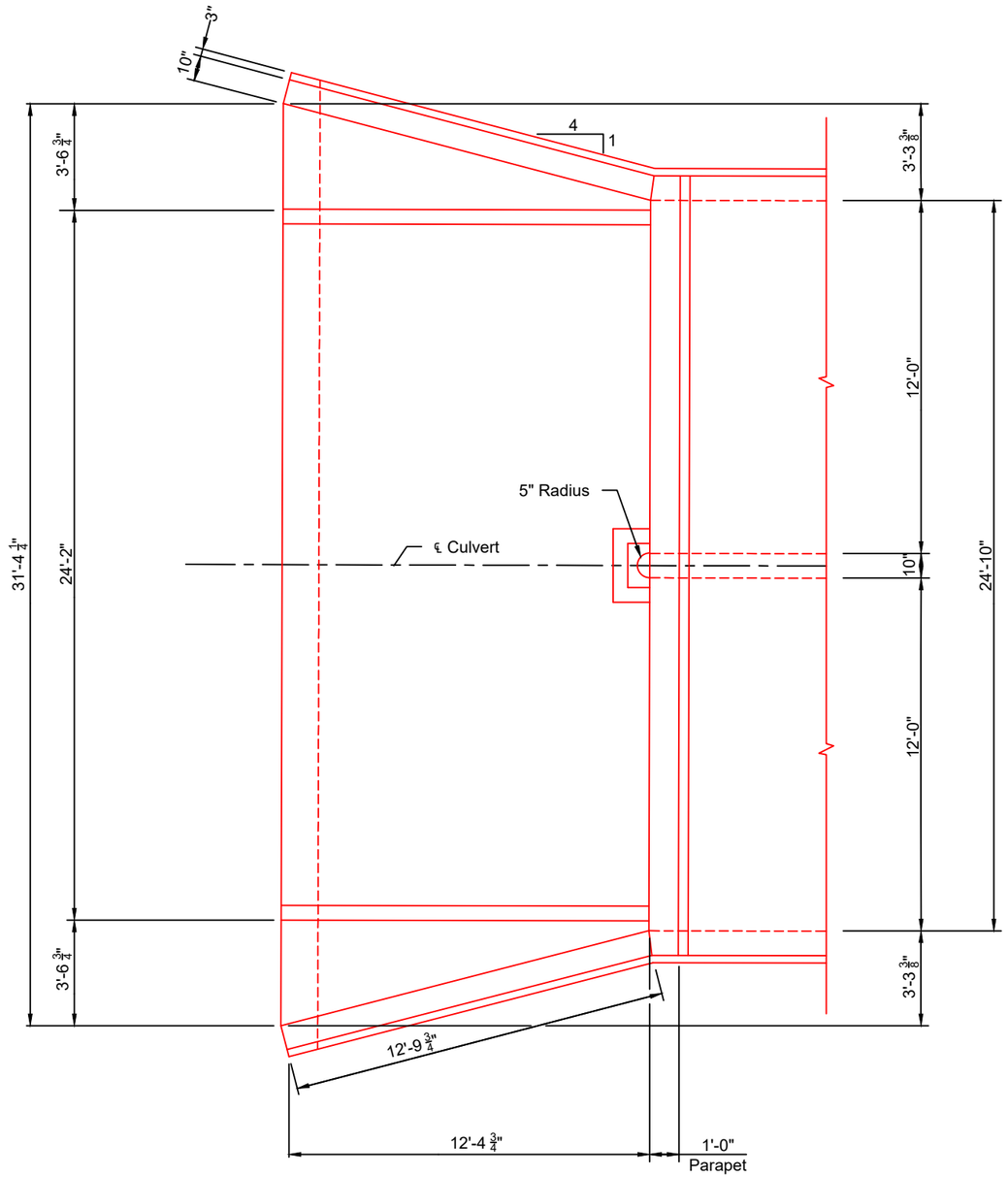
Number	Date	Title
EW-402	4-18-17	Temporary Stream Diversion
TC-252	10-20-26	Routes Closed to Traffic

SUMMARY OF REVETMENT QUANTITIES

Revetment Type - Location	Revetment Class E (TON)
Berm Lining - West Inlet	80
Berm Lining - East Outlet	80
Total	160


P.I. Sta = 42+39.2
P.C. Sta = 40+39.8
P.T. Sta = 44+37.0
Δ = 12° 35' 40"
L = 397.2'
R = 1807.0'
T = 199.4'
Sta. 45+20.0
Existing 53'x18' Concrete Slab Bridge
to be removed by Contractor
Sta. 45+20.0
Contractor to construct proposed
Twin 12'x10'x35' RCB Culvert, 0° Skew
Existing ROW
33' Lt
Existing ROW
33' Rt
41+00
42+00
43+00
44+00
45+00
46+00
47+00
48+00
0+00
1+00
2+51
193
N
0
50'
100'


STA=42+50.50, ELEV=1013.84'
VPI STA = 44+68.46
VPI EL = 998.81
CURVE LEN. = 321.95
K = 49.0
SSD = 250'
DES. SPEED = 35 MPH
VPC STA: 43+07.49
ELEV: = 1009.91
VPT STA: 46+29.44
ELEV: = 998.28
STA=46+80, ELEV=998.12'
-7%
-0%
1010
1000
990
1017.8
1016.6
1010.4
1003.1
989.8
998.4
998.2
998.5
41+00.00
42+00.00
43+00.00
44+00.00
45+00.00
46+00.00
47+00.00
48+00.00



Plan View

Notes:

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

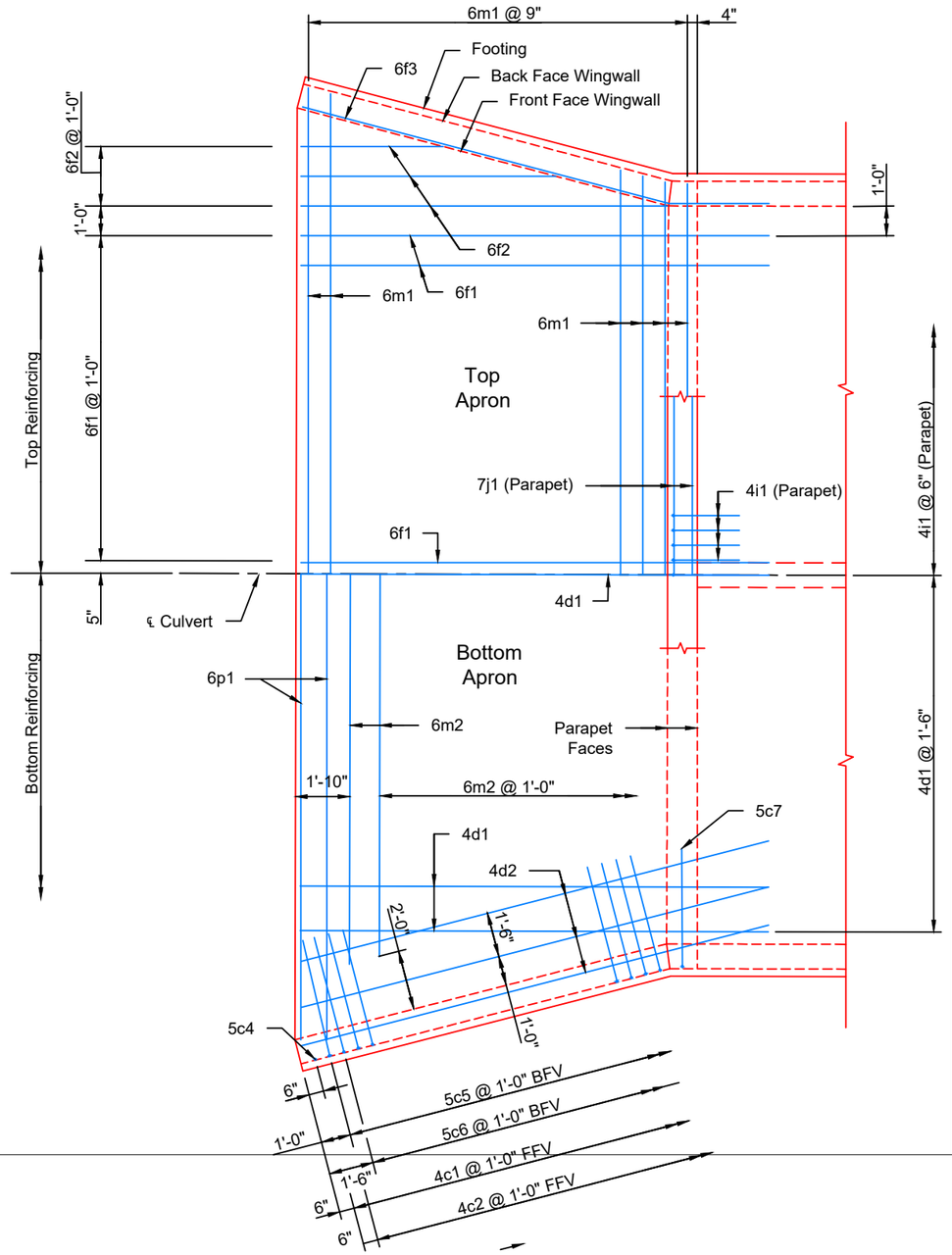
Modifications:
1. Length of apron shortened.
2. Wingwall slopes adjusted to 2:1.
3. Interior wingwall removed from apron and rounded at parapet.

Modified

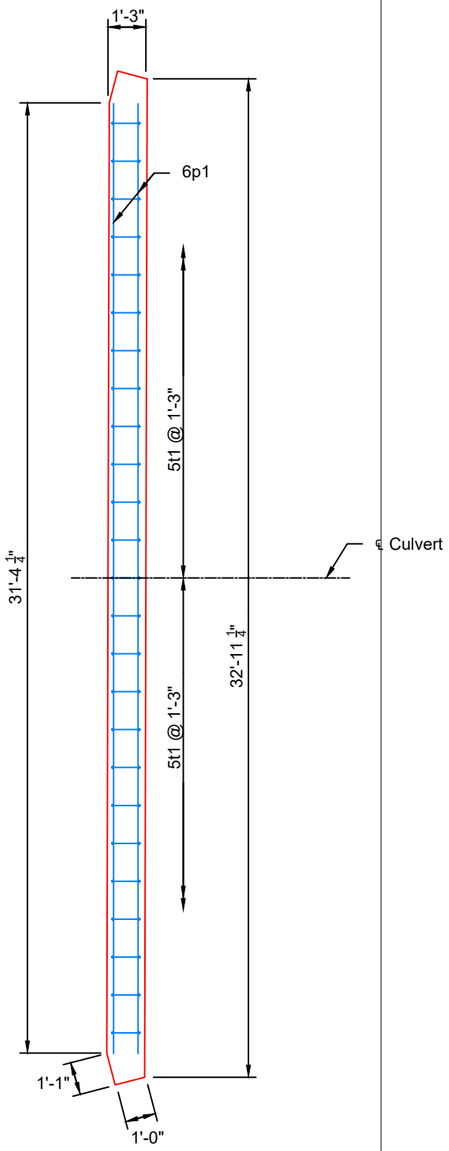
Standard Design - Twin Reinforced Concrete Box Culverts

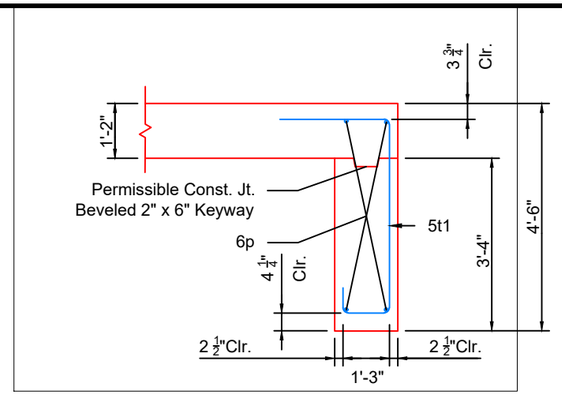
Flared Wing Headwalls

Dimension Plan 0° Skew	TWFWH 0-1-21

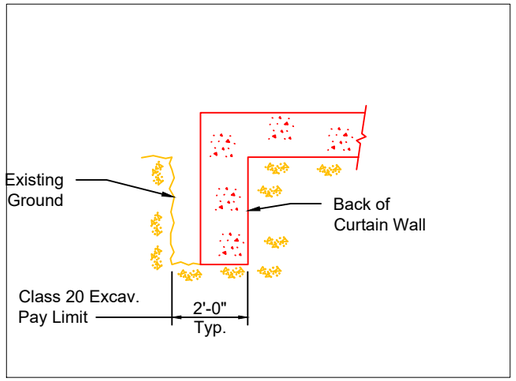


Plan View - Top & Bottom of Apron Reinforcing





Curtain Wall Details



Curtain Wall
Class 20 Excavation

Notes:

1. See Sheet TWFWH G1-21 for General Notes, Specifications, and Design Stresses.
2. Wingwall bars consistently referenced from end of wing.

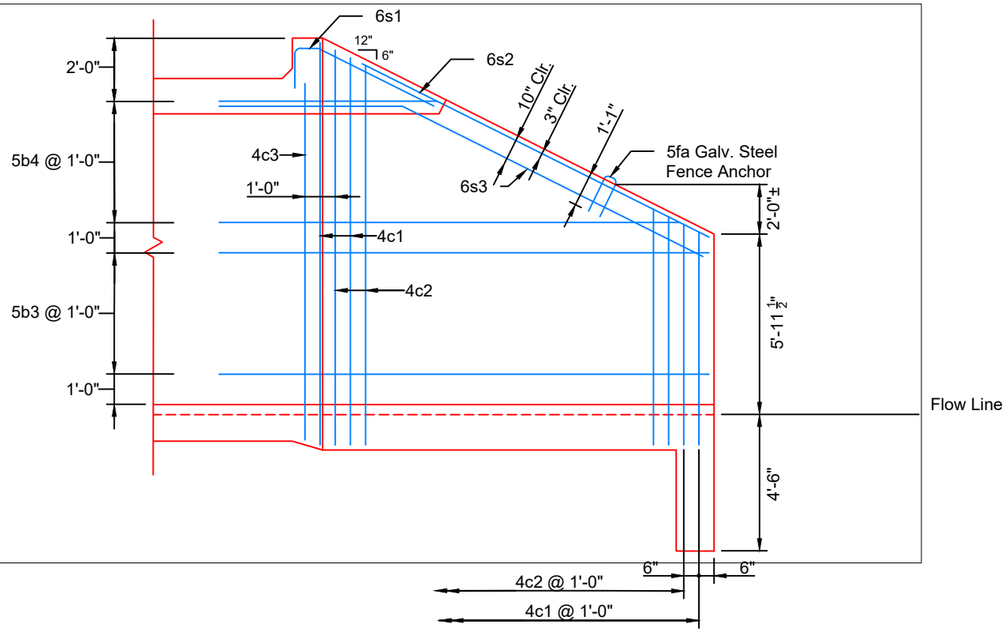
Modifications:
1. Length of apron shortened.
2. Wingwall slopes adjusted to 2:1.
3. Interior wingwall removed from apron and rounded at parapet.

Modified

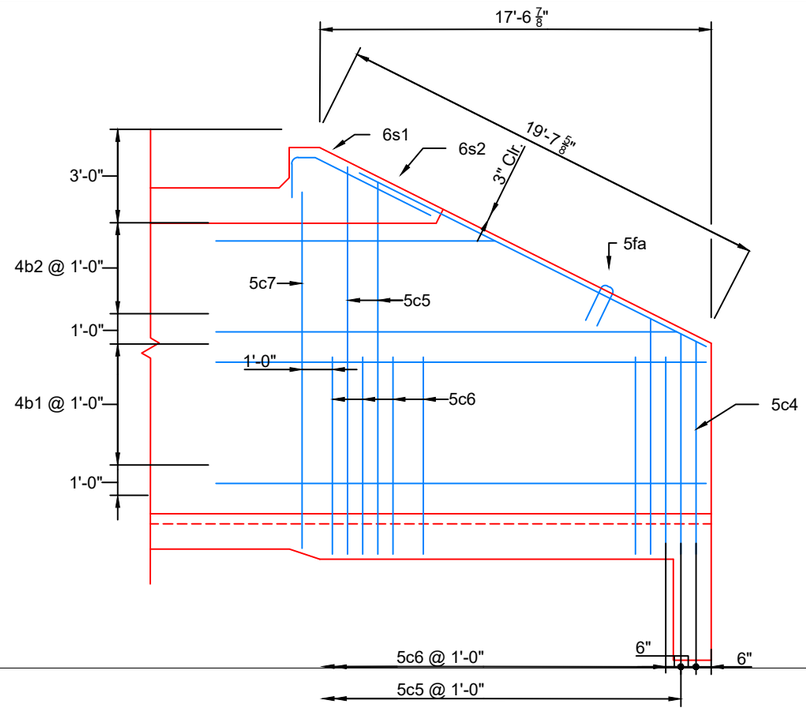
Standard Design - Twin Reinforced Concrete Box Culverts
Flared Wing Headwalls
February, 2021

Apron & Curtain Wall Details
0° Skew

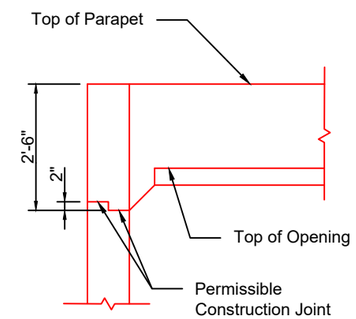
TWFWH
0-2-21

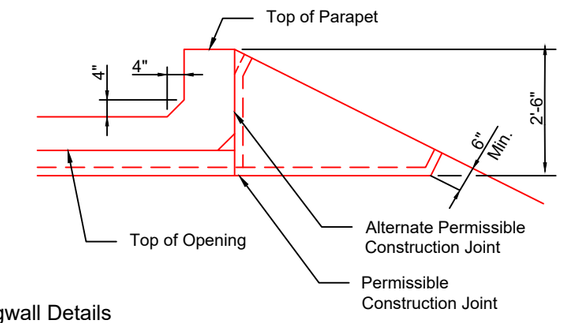


Typical View - Front Face Wingwall Reinforcing

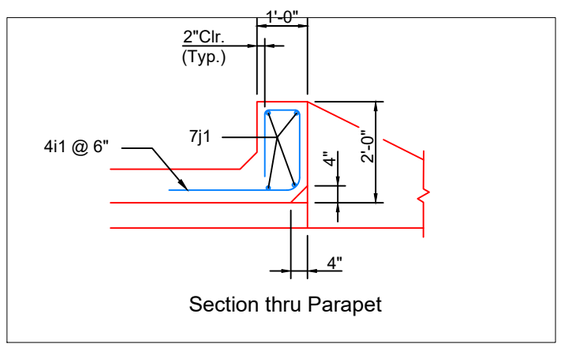


Typical View - Back Face Wingwall Reinforcing

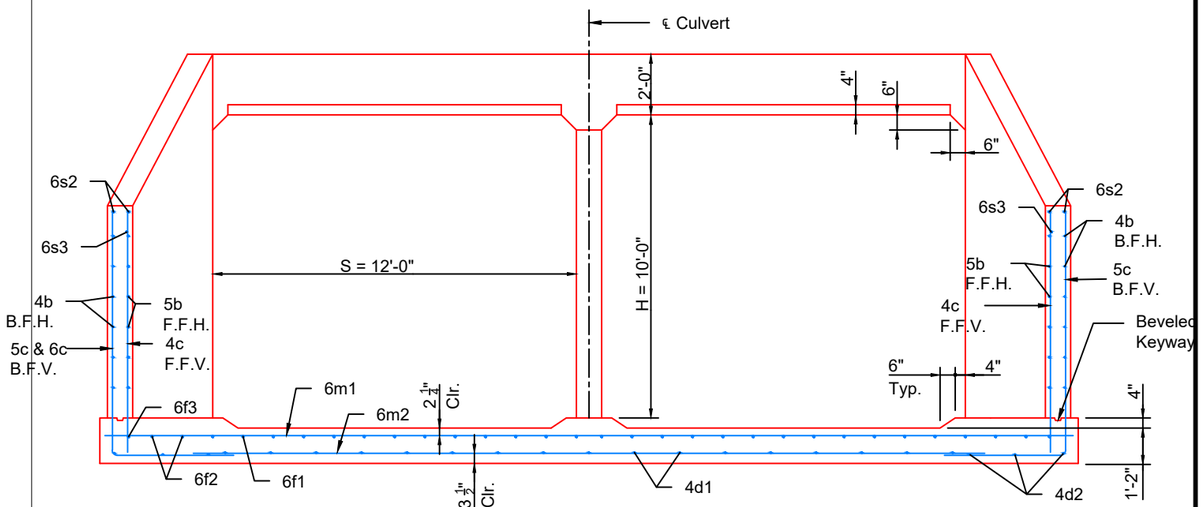




Top of Wingwall Details



Section thru Parapet



Typical Section - Near Center of Apron

Notes:

1. See Sheet TWFWH G1-21 for General Notes, Specifications, and Design Stresses.
2. Wingwall bars consistently referenced from end of wing.
3. For reinforcing in curtain wall see Curtain Wall Details on Sheet U.2.

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

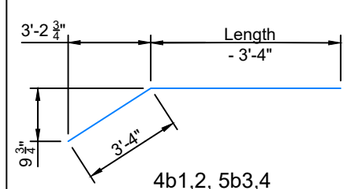
Wingwall & Parapet Details 0° Skew

TWFWH 0-3-21

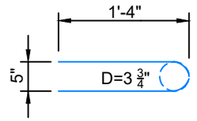
Bill of Reinforcing for One Headwall 12'x10'					
Bar	Location	Shape	12' x 10'		
			No.	Length	Weight
5fa	Fence Anchor (Galv.)		2	2'-10	6
4b1	Wingwall, BFH		10	16'-2	108
4b2	Wingwall, BFH		8 Var.	2 Each 9'-3 to 15'-3	67
5b3	Wingwall, FFH		10	16'-2	216
5b4	Wingwall, FFH		10 Var.	2 Each 7'-3 to 15'-3	117
4c1	Wingwall, FFV		26 Var.	2 Each 7'-0 to 13'-0	174
4c2	Wingwall, FFV		26 Var.	2 Each 7'-3 to 13'-3	178
4c3	Wingwall, FFV		2	11'-9	16
5c4	Wingwall, BFV		2	7'-0	15
5c5	Wingwall, BFV		24 Var.	2 Each 11'-3 to 16'-9	351
5c6	Wingwall, BFV		24	10'-6	263
5c7	Wingwall, BFV		2	15'-9	33
4d1	Apron, Longit., Bott.		17	15'-9	179
4d2	Apron, Longit., Bott.		6	16'-3	65
6f1	Apron, Longit., Top		24	15'-9	568
6f2	Apron, Longit., Top		6 Var.	2 Each 4'-9 to 12'-4	78
6f3	Apron, Longit., Top		2	16'-1	48
4i1	Parapet, Vertical		49	6'-1	199
7j1	Parapet, Horizontal		4	26'-2	214
6m1	Apron, Trans., Top		18 Var.	26'-4 to 32'-8	795
6m2	Apron, Trans., Bott.		12 Var.	20'-6 to 26'-3	422
6p1	Curtain, Horizontal		4	31'-4	189
6s1	Wing Slope, Both F.		2	6'-3	19
6s2	Wing Slope, Both F.		4	12'-9	77
6s3	Wing Slope, FF		2	17'-2	51
5t1	Curtain, Vertical		25	7'-6	196

Estimated Quantities One Headwall	Reinf. Steel		4644	
	Concrete	Parapet	2.0	32.6 CY
		Wingwalls	7.0	
		Apron	23.6	

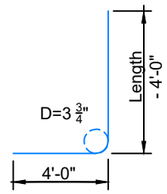
Bent Bar Details



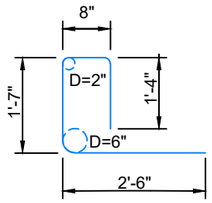
4b1,2, 5b3,4 & 6f3



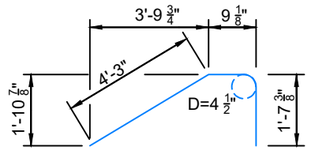
5fa



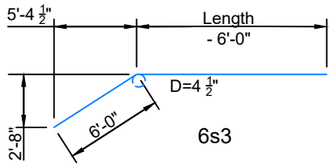
5c5,6,7



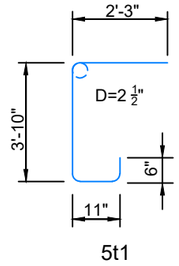
4i1



6s1



6s3



5t1

Headwall Notes:

1. See Sheet TWFWH G1-21 for General Notes, Specifications, and Design Stresses.
2. This headwall is based on a 2:1 slope normal to centerline of roadway.
3. The sides of the apron are to be formed to ensure correct line and grade.
4. 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.
5. 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.
6. Concrete quantities are estimated from back of parapet.
7. 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.
8. Dimensions are in feet and inches unless otherwise noted.

Note:
All dimensions are out to out.
D = pin diameter.

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

Modified

Standard Design - Twin Reinforced Concrete Box Culverts

Flared Wing Headwalls

Quantity Tabulation
12'-0" Span
0° Skew

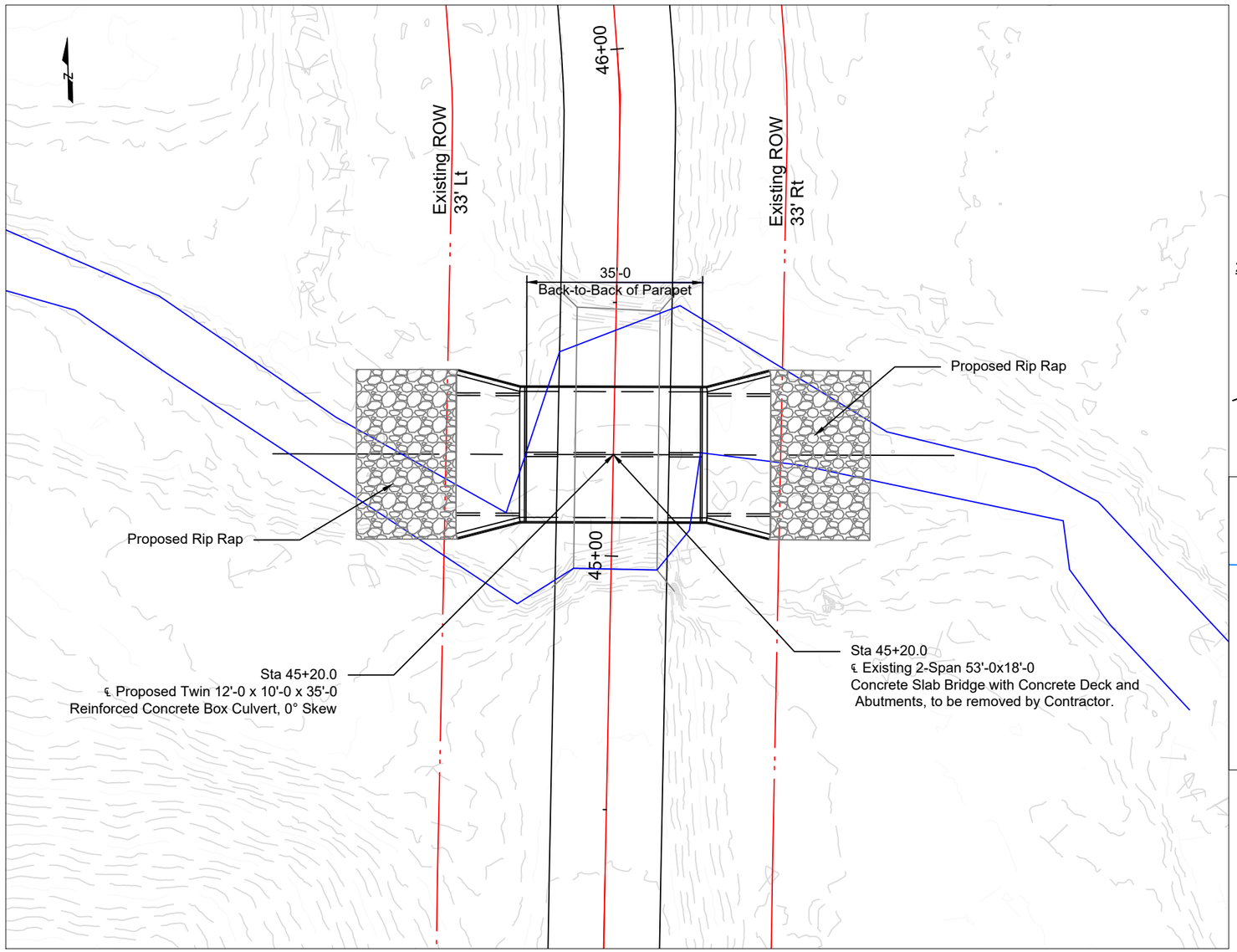
TWFWH
0-4-21

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



LONGITUDINAL SECTION ALONG ℄ CULVERT

DESIGN FILL HEIGHT = 3 FOOT



SITUATION PLAN

TRAFFIC ESTIMATE

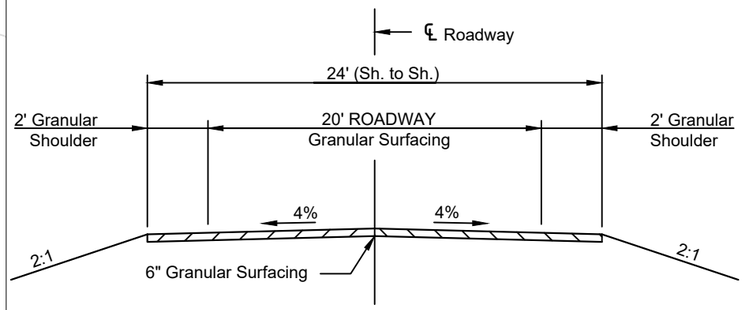
2022 ADT, 39 VPD

HYDRAULIC DATA

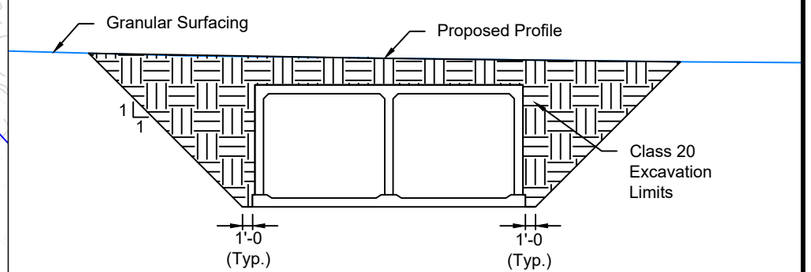
Drainage Area= 4.5 Sq. Mi.
Design Discharge, Q50= 2,264 CFS
Design High Water Elevation, Q50= 996.1
Stream Slope = 65.5 Ft./Mi.
Design Velocity = 11.9 Ft/s
Q25 = 1,850 CFS Stage Elev. = 994.7
Q50 = 2,264 CFS Stage Elev. = 996.1
Q100 = 2,730 CFS Stage Elev. = 998.6
Q500 = 5,719 CFS Stage Elev. = 1,013.8
Anticipated Scour Elev. = 982.0

LOCATION

On Dogwood Rd over Mink Creek
T-93-N, R-7-W
Section 9
Illyria Township
Fayette County
Latitude 42.88025838
Longitude -91.67652113



TYPICAL APPROACH SECTION



UTILITIES

IOWA ONE CALL

DESIGN FOR 0° SKEW

TWIN 12'-0 X 10'-0 X 35'-0
REINFORCED CONCRETE BOX CULVERT

SITUATION PLAN

STA. 45+20.0 2026

FAYETTE COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION