QUANTITIES NEEDED
STRUCTURAL CONCRETE, CULVERT
REINFORCING STEEL
CLASS 20 EXCAVATION
REMOVALS AS PER PLAN
MOBILIZATION

Specifications:

Design:
AASHTO LRFD Bridge Design Specifications, 8th Ed., Series of 2017.

Construction:
Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, current series, plus applicable General Supplemental Specifications, Developmental Specifications, Supplemental Specifications and Special Provisions

Design Stresses:

Design stresses for the following materials are in accordance with the AASHTO LRFD Bridge Design Specifications, 8th Ed., Series of 2017:
Reinforcing steel in accordance with AASHTO LRFD Section 5, Grade 60.
Concrete in accordance with AASHTO LRFD Section 5, f'c = 4.0 ksi.

Standards:
For details and notes not shown refer to the following Iowa D.O.T. - Highway Standards:

Standard	Issued	Revised
**	?	?

** Note: "Top Slab Construction Joint Detail" does not apply.

Summary of Reinforcing Steel

Location	Quantity	Total
Headwalls ? Skew	2 @ ?	?
? Barrel Extension		
? Barrel End Section		
5r1 x 3'-6" Dowel Bars		
Total (LB)		

Concrete Placement Quantities

Location	Footing	Walls	Slab	Total
Headwalls ? Skew	2 @	2 @	* 2 @	?
? Barrel Extension				
? Barrel End Section				
Total (CY)				

* Includes parapet and top of wingwall.

Design History at This Site
(Includes This Design)

Des. No.	Type of Work
X	X
X	X
X	X
X	X

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

REVISED 11-2016 - CHANGED THE SERIES DATE "IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015", (WAS SERIES 2012).
REVISED 02-2017 - CHANGED THE DESIGN STRESSES NOTE TO STATE "AASHTO LRFD" (WAS LRFD AASHTO).
REVISED 01-2021 - CHANGED DESIGN SPECIFICATIONS TO AASHTO LRFD 8TH ED.
ENGLISHSINGLECULVERTS.DGN - 1043 - THIS SHEET REDRAWN 9-8-88

REVISED 03-2019 - UPDATED NOTE REFERING TO COPIES OF ORIGINAL DESIGN PLANS.
REVISED 01-2021 - UPDATED BAR LAP TABLE AND DESIGN SPECIFICATION TO AASHTO LRFD 8TH ED.
ENGLISHSINGLECULVERTS.DGN - 1043s2 - THIS SHEET ISSUED 1048.

General Notes:

It is the intent of this design to extend the existing _____ reinforced concrete box culvert.

Electronic copies of original design plans are available to the Contractor as part of the e-files supplied with the contract documents. Dimensions shown on these plans are based on design plans (Original Design No. ___).

Faint lines on plans indicate existing structure.

Utility companies and municipalities whose facilities are shown on the plans or known to be within the construction limits shall be notified by the Contractor of the construction starting date.

The R.C.B. culvert extension sections are designed for HL-93 live load and earth fills of ____ feet. This design is based on Load and Resistance Factor Design, according to the 2017 AASHTO LRFD Bridge Design Specifications.

Vertical earth pressure, EV=0.120 kcf.

Horizontal earth pressure, EHmax = 0.060 kcf max, EHmin = 0.030 kcf.

The Contractor may submit alternate frost trough dimensions for approval. Any additional costs due to change in the frost trough dimensions is to be paid for by the Contractor.

Floor of barrel is to be finished smooth. Sides of footing are to be formed to ensure correct line and grade.

The permissible construction joint at the top of the walls may be lowered at the Contractor's option with Engineer's approval.

The vertical bars in the walls may be spliced above the footing at the Contractor's option as follows:

Bar Size Number	4	5	6	7	8	9
Minimum Splice Length	20"	24"	29"	34"	38"	47"

This splice, if used will be at the Contractor's expense.

Metal bar chairs spaced at not over 3'-0" C-C in either direction are to be used to support all slab and floor steel as outlined in the Standard Specifications.

The reinforcement supplied for this structure shall be Grade 60. Reinforcing bar clearances will be as follows:

Edge clearances: 2" except
- Top of floor 2½" to near transverse reinforcing bar
- Bottom of floor 3½" to near transverse reinforcing bar

End clearances:
- Vertical top 2"
- Vertical bottom 3" or 3½" if overall height of the culvert is not to a full inch
- Transverse 2"

All reinforcing bars and bars noted as dowels supplied for this structure shall be deformed reinforcement unless otherwise noted or shown.

Class 20 excavation material unsuitable for backfilling shall be disposed of in a manner that will leave the site in a neat condition.

The price bid for "Removals as Per Plan" shall include the cost for removals of portions of the existing culvert, and the setting of the dowel reinforcing bars into existing concrete.

All dimensions and details shown on these plans pertinent to new construction in relation to existing portions of the structure shall be verified in the field by the Contractor before starting construction.

The removal of the existing culvert shall be at the front face of the existing parapet. Removals shall be on a vertical plane parallel with the front face of the existing parapet, and to the width of the floor of the proposed extension. The walls shall be cut normal to the barrel walls and as shown on the "Part Removal Plan". The removal line shall be initiated with a 2½"± deep saw cut on the top and both sides of each wall, and across the top of the floor. This saw cut should cut thru any existing longitudinal reinforcing thereby facilitating a neat non-spalled break line. If existing top of parapets will be within 6" of proposed subgrade elevation, the parapets shall be removed down to an elevation 1"± above the top of the existing slab. Any existing parapet vertical bars exposed during parapet removal shall be cut off flush with the parapet removal line and painted with two coats of zinc rich paint.

All removals shall be carefully accomplished and any concrete damaged by the Contractor that is not to be removed shall be repaired by the Contractor at no extra cost to the state. Removals shall be in accordance with Section 2401 of the Standard Specifications.

The proposed culvert extension shall abut against the front face of the existing parapet. 5z1 x 2'-6" dowel reinforcing bars with a 10" minimum embedment into existing concrete shall be set around the entire periphery of the existing culvert. 5z1 dowel reinforcing bars shall be centered in the existing slab, walls and floor. 5z1 dowel reinforcing bars shall be at 1'-0" maximum spacing C-C of dowels. 5z1 dowel reinforcing bars shall be set with polymer grout in accordance with Article 2301.03, e, of the Standard Specifications, and current Supplemental Specifications of the Iowa D.O.T. Highway Division.

Bench Mark :

The roadway will be open to traffic during construction.

Since the highway will not be closed to traffic during this construction, the Contractor may feel temporary shoring (sheet pile or other) is necessary to ensure that the shoulder will not slough in while culvert is being extended. However, if for any reason such shoring is deemed necessary, the Contractor shall submit the shoring plan to the Engineer for approval. Cost of shoring, if required, will be considered incidental to construction and no direct payment will be made. Therefore, all material used for shoring shall remain the property of the Contractor. In addition to the requirements noted above, Article 1107.07, of the Standard Specifications, still applies.

Keyway dimensions shown on the plans are based on nominal dimensions unless stated otherwise. In addition, the bevel used on the keyway shall be limited to a maximum of 10 degrees from vertical.

These bridge plans label all reinforcing steel with English notation (5a1 is ⅝ inch diameter bar). English reinforcing steel received in the field may display the following "Bar Designation". The "Bar Designation" is the stamped impression on the reinforcing bars, and is equivalent to the bar diameter in millimeters.

English Size	3	4	5	6	7	8	9	10	11
Bar Designation	10	13	16	19	22	25	29	32	36

Traffic will be maintained at all times in accordance with the traffic control plans shown in these plans.

Traffic control adjacent to the culvert will be the responsibility of the Contractor constructing the culvert and is to coordinate construction of the culvert with the Contractor doing the grading.

Any dimensional transition required between existing structure and the extension shall be made in the first ____ of new work.

When de-watering presents a problem for placing the curtain walls as detailed, alternate methods such as steel sheet pile and precast concrete walls may be approved but at no additional cost. The Contractor is to submit to the Engineer for approval complete drawings of the proposed curtain wall alternate before beginning construction.

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	Culvert Extension Details (Sheet 2 of 2)	Standard Sheet 1043s2	COUNTY	PROJECT NUMBER	SHEET NUMBER

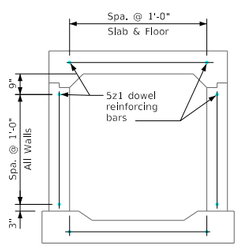
12/29/2020 5:24:54 PM bkloss W:\Highway\Bridge\Standards\Culverts\LRFD\EnglishLRFDSingleCulverts.dgn 1043s2 11x17_pdf.pltcfg

Traffic Control Plan
Note: The roadway will be open to thru traffic. Refer to the Traffic Control Plan on the road plans in these plans.

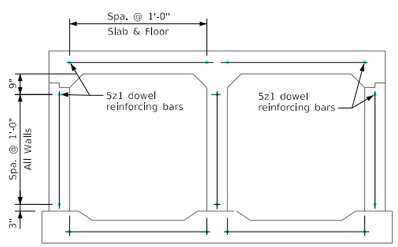
Traffic Control Plan
Note: The roadway will be open to thru traffic. Refer to the Traffic Control Plan on Design Sheet ??.

Traffic Control Plan
Note: The roadway will be closed to thru traffic. Refer to the Traffic Control Plan on the road plans in these plans.

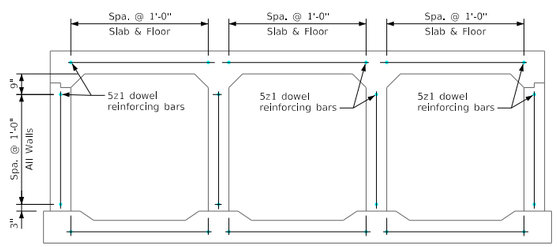
Traffic Control Plan
Note: The roadway will be closed to thru traffic. Road closure will be the responsibility of the road Contractor as shown on the road plans.



Section Near Extension
(Showing spacing of 5z1 dowel reinforcing bars)

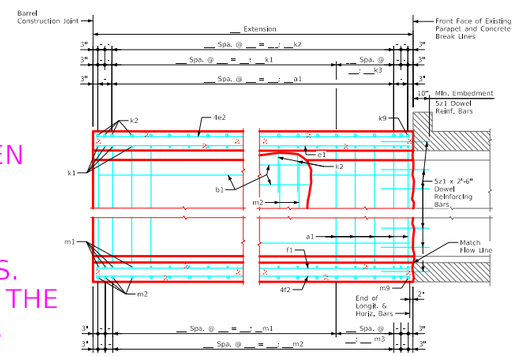


Section Near Twin Extension
(Showing spacing of 5z1 dowel reinforcing bars)



Section Near Triple Extension
(Showing spacing of 5z1 dowel reinforcing bars)

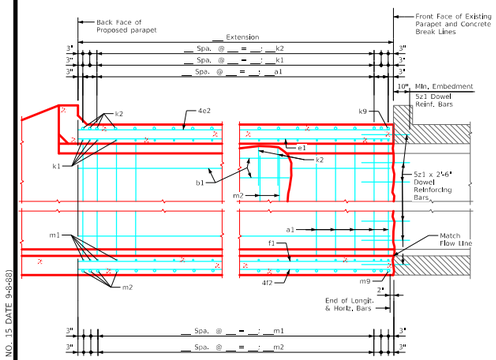
USE THIS DETAIL WHEN EXTENSION LENGTH NEEDS ADDITIONAL BARREL SECTIONS. THE REMAINING SECTS. ARE REFERRED FROM THE CULVERT STANDARDS.



__k3 Slab, Bott., Transv., Flared
__m3 Floor, TOP Transv., Flared

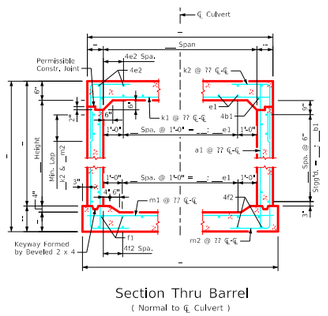
REVISED 7-12" CHANGED TO "11" ON "PART LONGITUDINAL SECTION". TAPE NO. 10 DATED 11-9-92.
REVISED 11-00 - "PART REMOVAL PLAN" CHANGED TO SKEWED PLAN. MINIMUM AND MAXIMUM FLARED BARS ADDED.
REVISED 01-02 - ADDITIONAL TRANSVERSE BARS AND PART LONGITUDINAL SECTION FOR LONGER EXTENSIONS ARE OUTSIDE OF BORDER SHEET.
REVISED 04-02 - NOTE ADDED TO SKEWED PLAN. "TOP LONGIT. BARS TO BE PLACED PARALLEL TO SKEWED HEADWALLS." ADDED THE EXISTING PARAPET AT PART LONGIT. SECTION.
CORRECTION 04-09 - CHANGED THE CONCRETE BREAK LIMITS AT THE CORNERS FOR SKEWED HEADWALLS. ADDED THE EXISTING PARAPET AT PART LONGIT. SECTION.
REVISED 04-13 - CHANGED THE SPACING OF THE BARS TO 6 INCH SPACINGS IN ALL DETAILS. REMOVED BAR SIZES FROM b1, c1, & f1 BARS.
REVISED 07-13 - CHANGED THE ¾"ø DOWELS TO 5z1 DOWEL REINFORCING BARS.

CORRECTION 05-2014 - ADDED THE BAR LABELS k9 & m9 TO THE PART LONGIT. SECTIONS,
REVISED 12-14 - ADDED USE IN SKEWED HEADWALLS TO THE TITLE.
HEET1044-S01 - HSTD01044-S01-LEP- THIS SHEET REDRAWN. DEVICE2Plot@2400.00%1 ARCH.TAPE NO. 15 DATE 9-6-88)



Part Longitudinal Section
(Along to ℄ Culvert)

Note:
All longitudinal barrel steel shall extend at least to the backface of parapet.



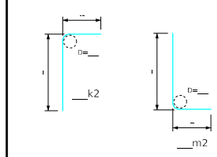
Section Thru Barrel
(Normal to ℄ Culvert)

Note:
All transverse reinforcing bars and horizontal legs of corner bars shall be placed parallel to the concrete break line and new parapet except as shown.
Dimensions shown for ℄℄ of transverse bars, vertical wall bars, and corner bars are measured along ℄ culvert.
Concrete per foot of barrel:
Slab = ___ CY
Walls = ___ CY
Floor = ___ CY
Total = ___ CY

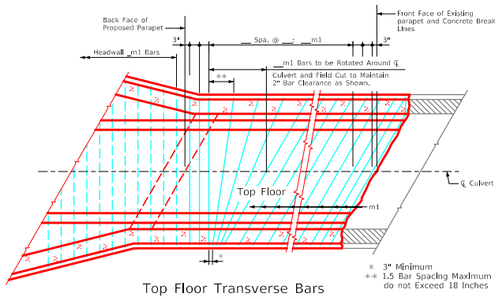
Reinforcing Bar List - One Extension

Bar	Location	Shape	No.	Length	Weight
__a1	Walls, F.F.V.				
__b1	Walls, F.F.H. & B.F.H.				
__e1	Slab, Bott., Longit.				
4e2	Slab, Top Longit.				
__f1	Floor, Top Longit.				
4f2	Floor, Bott. Longit.				
__k1	Slab, Bott. Transv.				
__k2	Slab, Top Corner				
__m1	Floor, Top Transv.				
__m2	Floor, Bott. Corner				
5z1	Dowel Reinforcing Bars			2'-6"	
	Reinforcing Steel - Total (LBS.)				

Bent Bar Details

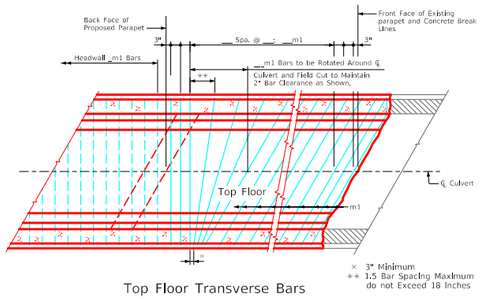


Note: All Dimensions are out to out. D = Pin Diameter.

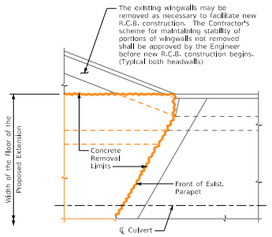


Top Floor Transverse Bars
(Required for Skewed Culverts Only)

FLARED WING EXAMPLE FOR NEW HEADWALL



Top Floor Transverse Bars
(Required for Skewed Culverts Only)



Part Removal Plan

FOR EXISTING SKEWED HEADWALLS USE THIS SHEET.

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ___ OF ___ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	Culvert Extension Details	Standard Sheet 1044	COUNTY	PROJECT NUMBER	SHEET NUMBER

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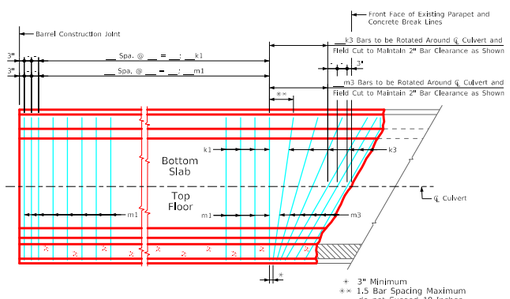
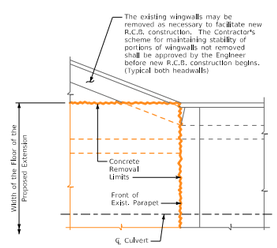
FOR EXISTING SKEWED HEADWALLS USE THIS SHEET.

USE THIS DETAIL WHEN EXTENSION LENGTH NEEDS ADDITIONAL BARREL SECTIONS. THE REMAINING SECTS. ARE REFERRED FROM THE CULVERT STANDARDS.



Slab & Floor Transverse Bars Layout
(Required for Skewed Culverts Only)



Part Removal Plan

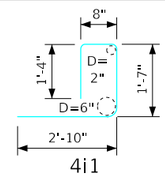
FOR 0° SKEW EXTENSION - PLACE THIS DETAIL ON PLANS

____ End Section Parapet Details

Reinforcing Bar List - End Section Parapet					
Bar	Location	Shape	No.	Length	Weight
4i1	Parapet, Vertical			6'-5"	
7j1	Parapet, Horizontal		4		
				Total - LBS.	

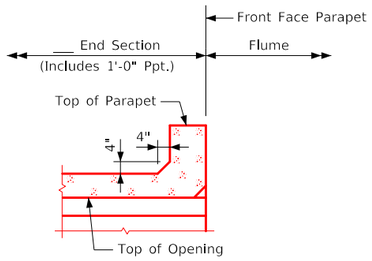
Concrete Above Slab

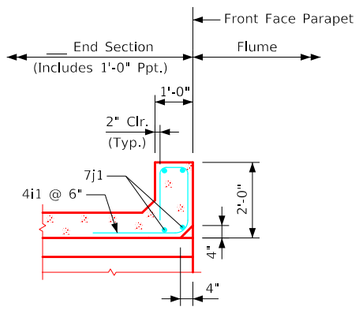
Parapet = ___ CY



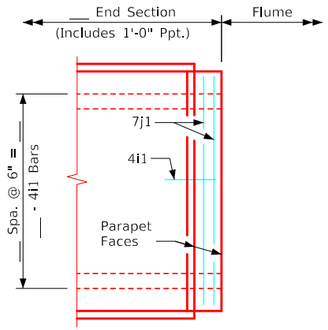
D = Pin diameter
All dimensions are out to out.

Bent Bar Details

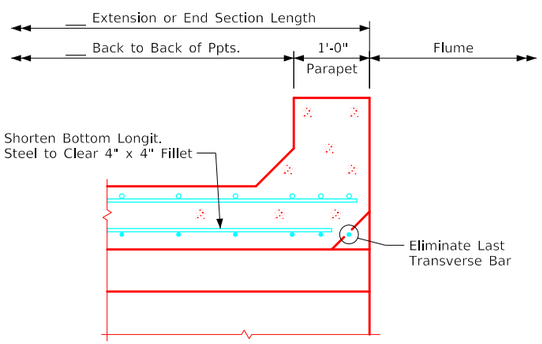




Section Thru Parapet

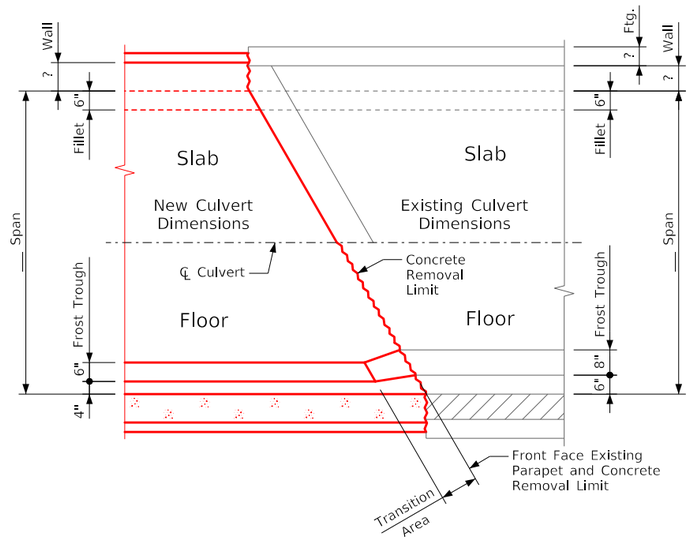


Plan View



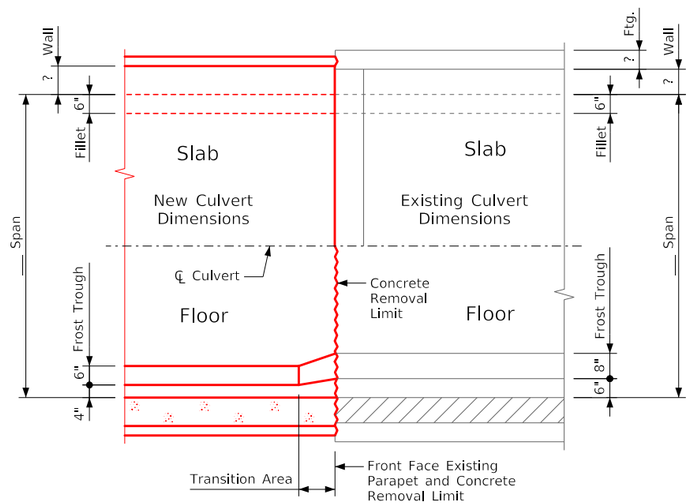
Barrel End Section and Parapet Details With Flume Outlet

Note:
Add parapet concrete and reinforcing steel to barrel end section quantity.



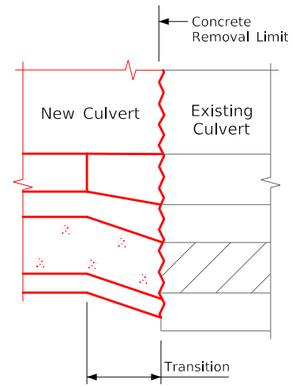
Concrete Transition Details

(Plan View)



Concrete Transition Details

(Plan View)



New barrel concrete thicknesses shall be maintained minimally when transitioning to meet existing barrel interior surfaces. Outside concrete surfaces do not have to be transitioned to match existing surfaces.

Concrete Transition Details

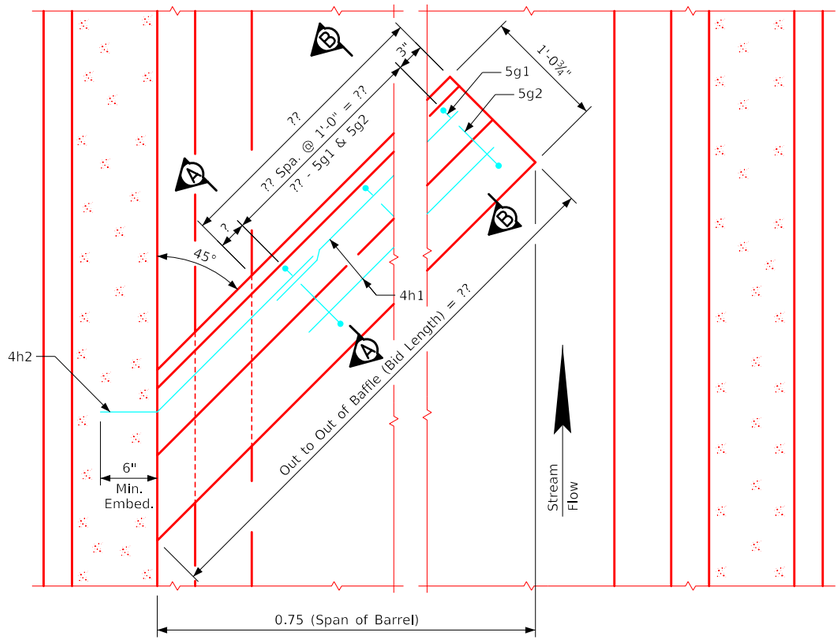
(Wall Transition Shown - Typical for Slab)

Note:
Refer to the Bridge Design Manual, Section 7 for culvert extension details for transition information.

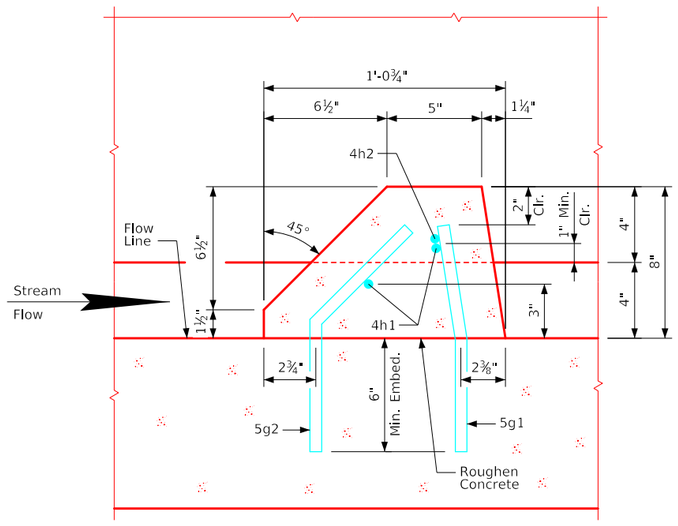
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

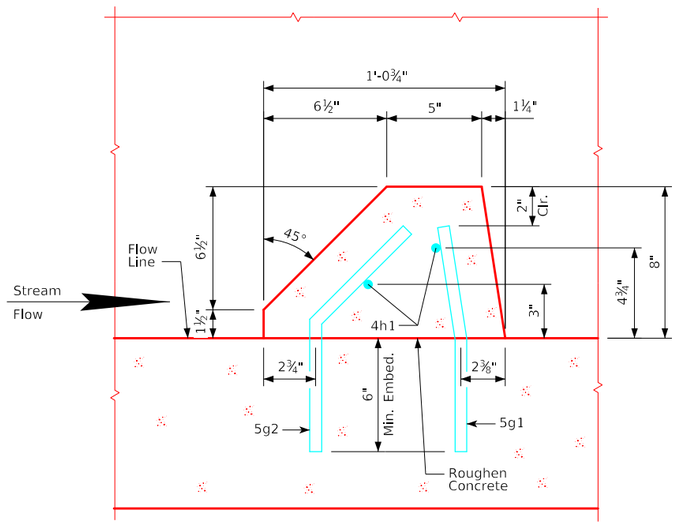
REVISED 3-1-2015: CHANGED BRIDGE DESIGN MANUAL, SECTION 8 TO SECTION 7.
REVISED 1-2016: INCREASED HORIZONTAL LEG LENGTH OF 4i1 BAR 4 INCHES AS WELL AS OVERALL LENGTH 4 INCHES.
REVISED 01-2021 - CHANGED DESIGN SPECIFICATIONS TO AASHTO LRFD 8TH ED.
ENGLISHSINGLECULVERTS.DGN - 1047 - THIS SHEET ISSUED 03-12.



Baffle Plan

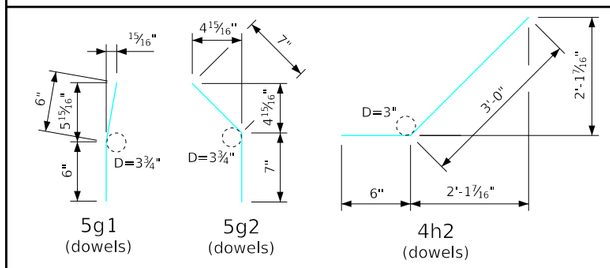


Section A-A



Section B-B

Bent Bar Details



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

Baffle Notes:

1. ?? Baffles are to be placed within the reinforced concrete box culvert spaced as shown elsewhere in these plans. Baffles shall be constructed to the dimensions shown on this sheet.
2. Clear distance from face of concrete to near reinforcing bar is to be 2" unless otherwise noted or shown.
3. All concrete is to be Class C.
4. Minimum splice length for the 4h1 and 4h2 bars is 15".
5. The 5g1, 5g2 and 4h2 bars shall be set as dowels in drilled holes. Holes are to be 6" deep. The dowels shall be installed in accordance with the manufacturer's recommendations. The dowels shall be installed using a polymer grout system in accordance with Article 2301.03,E, of the Standard Specifications.
6. Bonding of the Baffles to the barrel floor shall be in accordance with Article 2403.03,I, of the Standard Specifications.
7. The Baffles are to be bid on a linear foot basis. The number of linear feet of Baffle installed will be paid for at the contract price per linear foot for "Baffle or Weir for Reinforced Concrete Box Culvert" based on plan quantity. Price bid for "Baffle or Weir for Reinforced Concrete Box Culvert" shall be full compensation for furnishing all material and all of the equipment and labor required to construct the baffles in accordance with these plans and current Specifications.
8. Cross sectional area of the Baffle is 0.53 square feet.

Baffle Quantities

Item	Unit	Quantity
Baffle for RCB Culvert	L.F.	

REVISED 04-2012 - UPDATED STANDARD TO LRFD SPECIFICATIONS.
REVISED 01-2021 - UPDATED 4h BAR LAPS PER AASHTO LRFD 8TH ED.
ENGLISHSINGLECULVERTS - 1060 - THIS SHEET ISSUED 09-03.

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	Culvert Baffle Details	Standard Sheet 1060	COUNTY	PROJECT NUMBER	SHEET NUMBER

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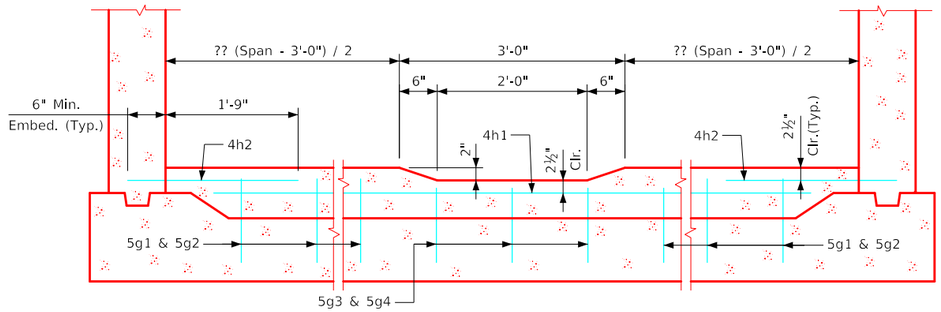
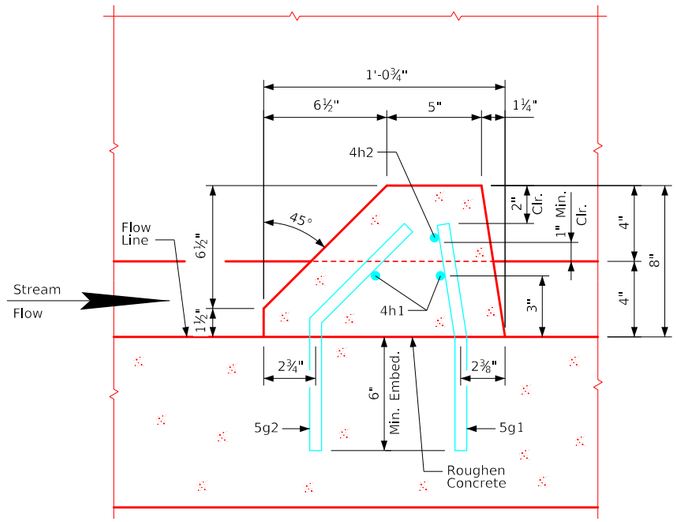
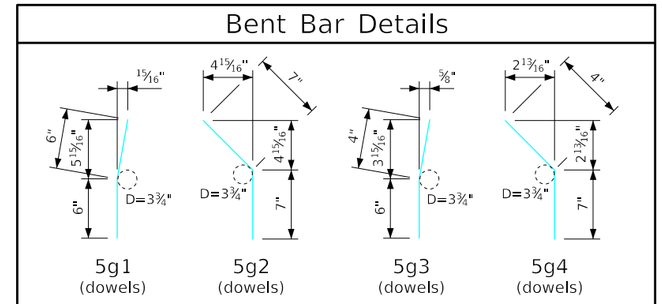


Weir Elevation

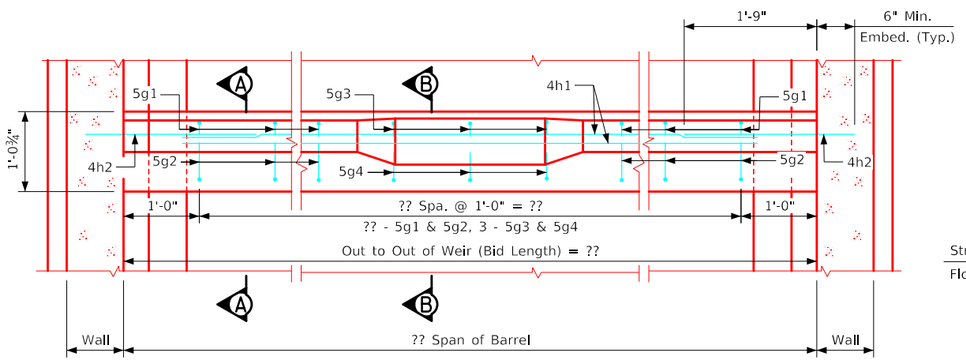


Section A-A

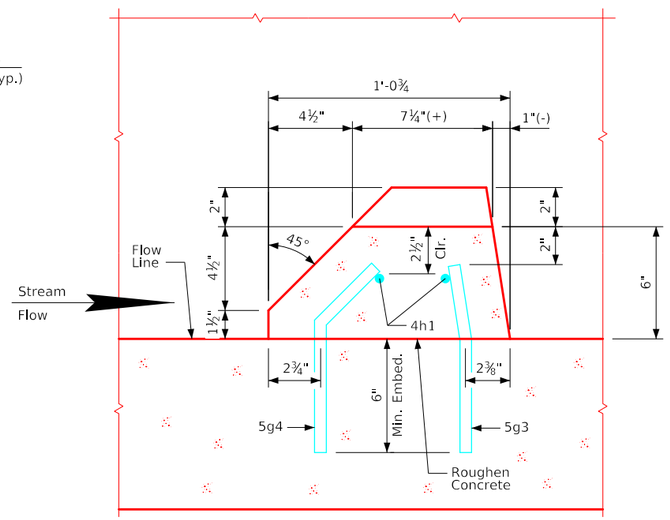


Weir Notes:

1. ?? Weirs are to be placed within the reinforced concrete box culvert spaced as shown elsewhere in these plans. Weirs shall be constructed to the dimensions shown on this sheet.
2. Clear distance from face of concrete to near reinforcing bar is to be 2" unless otherwise noted or shown.
3. All concrete is to be Class C.
4. Minimum splice length for the 4h1 and 4h2 bars is 15".
5. The 5g1, 5g2, 5g3, 5g4 and 4h2 bars shall be set as dowels in drilled holes. Holes are to be 6" deep. The dowels shall be installed in accordance with the manufacturer's recommendations. The dowels shall be installed using a polymer grout system in accordance with Article 2301.03,E, of the Standard Specifications.
6. Bonding of the Weirs to the barrel floor shall be in accordance with Article 2403.03,I, of the Standard Specifications.
7. If barrel span is less than 6'-0" then 4h2 bars shall be field bent to provide 2" min. clear distance from the top of the notch.
8. The Weirs are to be bid on a linear foot basis. The number of linear feet of Weir installed will be paid for at the contract price per linear foot for "Baffle or Weir for Reinforced Concrete Box Culvert" based on plan quantity. Price bid for "Baffle or Weir for Reinforced Concrete Box Culvert" shall be full compensation for furnishing all material and all of the equipment and labor required to construct the Weirs in accordance with these plans and current Specifications.
9. Cross sectional area of the Weir is 0.53 square feet.



Weir Plan



Section B-B

Stream Flow

Weir Quantities

Item	Unit	Quantity
Weir for RCB Culvert	L.F.	

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

REVISED 04-2012 - UPDATED SHEET TO LRFD SPECIFICATIONS.
REVISED 01-2021 - UPDATED 4h BAR LAPS PER AASHTO LRFD 8TH ED.
ENGLISHSINGLECULVERTS - 1061 - THIS SHEET ISSUED 09-03.

DESIGN TEAM	Culvert Weir Details	Standard Sheet 1061	COUNTY	PROJECT NUMBER	SHEET NUMBER

12/29/2020 5:24:59 PM bkloss W:\Highway\Bridge\Standards\Culverts\LRFD\EnglishLRFDSingleCulverts.dgn 1061 11x17_pdf.pltcfg

3:1 SLOPE FLUME

Flume Data

4A = 10'-0"
4C = 1'-10"
B = 9'-9 7/8"
S1 =
W = 2'-6 1/8"
W1 =
H = 2'-3"
T = 1'-0 1/2"
H1 = 1'-6"

Curve Data

CA =
L2 =
L3 = 10'-4 1/8"
D = 9'-4 1/8"
E = 1'-3 1/2"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 1'-7 1/2"
X2 = 1'-7 1/2"
X3 = 1'-6 1/2"
X4 = 1'-4 1/2"
L3-4 = 4'-8 1/8"(+)

4:1 SLOPE FLUME

Flume Data

4A = 14'-0"
4C = 1'-10"
B = 13'-1 7/8"
S1 =
W = 2'-6 1/8"
W1 =
H = 2'-3"
T = 1'-0 1/2"
H1 = 1'-6"

Curve Data

CA =
L2 =
L3 = 25'-10 1/8"
D = 13'-1 1/8"
E = 1'-7 1/8"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 1'-7 1/2"
X2 = 1'-7 1/2"
X3 = 1'-6 1/2"
X4 = 1'-4 1/2"
L3-4 = 4'-8 1/8"(+)

Reinforcing Bar List - Flume

Mark	Location	Grade	No.	Length	Weight
4a1	Walls Ftg.			Varies	
4a2	Walls Ftg.				
4a3	Walls Ftg.				
4a4	Walls Ftg.		2	Varies	
4a5	Walls Ftg.		2	Varies	
5u1	Walls, Floor & Walls Ftg.	Varies			
5c1	Floor Length, Top				
5c2	Floor Length, Bott.				
6m1	Floor Thickness				
7u1	Walls, Bott. & Along Slope				
8u1	Fence Anchors (Galvanized)		2	2'-0"	8
				Total (Lbs.)	

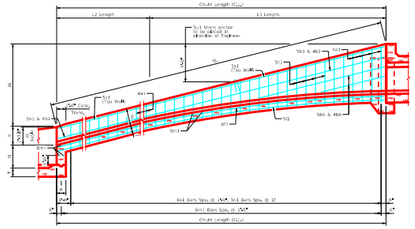
Listed Bars

Bar 4a1
2 Bars
1 @ 7
1 Var. • 2 Ea. Ligth.

Bar 5c1
2 Bars
1 @ 7
1 Var.

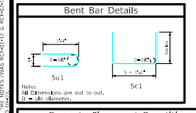
Bar 5&5 and 4&6
4 Bars • 2 Ea. Ligth.

Weight of bars over 40'-0" long include an allowance for a 2'-0" lap but lengths shown for bars over 40'-0" long do not include the lap.



2'x3' Flume Chute - Longitudinal Section

Bent Bar Details



Notes:
All Dimensions are out to out.
Ø = ø in diameter.

Concrete Placement Quantities

Location	Footing	Walls	Total
Flume	—	—	—
Junction Bar			
Wingwall			
Flume Curves			
Total (CY)			

Flume Data

4A = 10'-0"
4C = 1'-10"
B = 9'-9 7/8"
S1 =
W = 2'-6 1/8"
W1 =
H = 2'-3"
T = 1'-0 1/2"
H1 = 1'-6"

Curve Data

CA =
L2 =
L3 = 10'-4 1/8"
D = 9'-4 1/8"
E = 1'-3 1/2"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 1'-7 1/2"
X2 = 1'-7 1/2"
X3 = 1'-6 1/2"
X4 = 1'-4 1/2"
L3-4 = 4'-8 1/8"(+)

Notes:

1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBJ 22-20 for bolt joint information and details not shown.
3. See Sheet RCFB 22-20 for flume basin information and details not shown.

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. OF FILE NO. DESIGN NO.

DESIGN TEAM	Flume Chute Details - 2' Height	Standard Sheet 2020.01	COUNTY	PROJECT NUMBER	SHEET NUMBER

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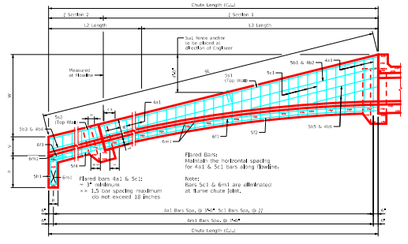
Reinforcing Bar List - Flume
Listed Bars
Bar 4a1
2 Bars
1 @ 7
1 Var. • 2 Ea. Ligth.
Bar 5c1
2 Bars
1 @ 7
1 Var.
Bar 5&5 and 4&6
4 Bars • 2 Ea. Ligth.
Weight of bars over 40'-0" long include an allowance for a 2'-0" lap but lengths shown for bars over 40'-0" long do not include the lap.
Bent Bar Details
Notes:
All Dimensions are out to out.
Ø = ø in diameter.
Concrete Placement Quantities
Flume Chute - Longitudinal Section

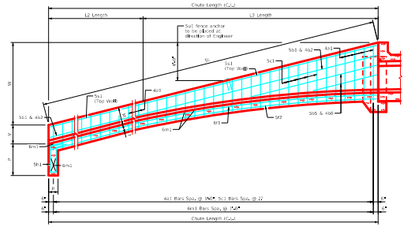


2'x3' Flume Chute - Longitudinal Section

Notes:

1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBJ 22-20 for bolt joint information and details not shown.

Reinforcing Bar List - Flume
Listed Bars
Bar 4a1
2 Bars
1 @ 7
1 Var. • 2 Ea. Ligth.
Bar 5c1
2 Bars
1 @ 7
1 Var.
Bar 5&5 and 4&6
4 Bars • 2 Ea. Ligth.
Weight of bars over 40'-0" long include an allowance for a 2'-0" lap but lengths shown for bars over 40'-0" long do not include the lap.
Bent Bar Details
Notes:
All Dimensions are out to out.
Ø = ø in diameter.
Concrete Placement Quantities
Flume Chute - Longitudinal Section

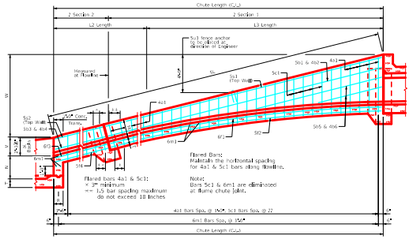


2'x3' Flume Chute - Longitudinal Section

Notes:

1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBJ 22-20 for bolt joint information and details not shown.
3. See Sheet RCFB 22-20 for flume basin information and details not shown.

Reinforcing Bar List - Flume
Listed Bars
Bar 4a1
2 Bars
1 @ 7
1 Var. • 2 Ea. Ligth.
Bar 5c1
2 Bars
1 @ 7
1 Var.
Bar 5&5 and 4&6
4 Bars • 2 Ea. Ligth.
Weight of bars over 40'-0" long include an allowance for a 2'-0" lap but lengths shown for bars over 40'-0" long do not include the lap.
Bent Bar Details
Notes:
All Dimensions are out to out.
Ø = ø in diameter.
Concrete Placement Quantities
Flume Chute - Longitudinal Section



2'x3' Flume Chute - Longitudinal Section

Notes:

1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBJ 22-20 for bolt joint information and details not shown.
3. See Sheet RCFB 22-20 for flume basin information and details not shown.

Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
4a1	Walls FIN		4	Varies	
5b1	Walls FIN		4		
4b2	Walls BTM		4		
5b2	Walls BTM		4	Varies	
4b3	Walls BTM		4		
5b3	Walls BTM		4	Varies	
3c1	Slab, Floor & Walls BTM		Varies	Varies	
5c1	Slab, Floor & Walls BTM + Splices		Varies	Varies	
5c3	Walls BTM		4	Varies	
6f1	Floor Length, Top		Varies		
5f2	Floor Length, Bots.		Varies		
6m1	Floor Transv. Top		Varies		
5m1	Walls Both F. Ares, Slope		Varies		
5s1	Fence Anchors (Galvanized)		4	2'-0"	6
				Total Lbs.	

Weight of bars over 40'-0" long include an allowance for a 2'-0" lap but lengths shown for bars over 40'-0" long do not include the lap.

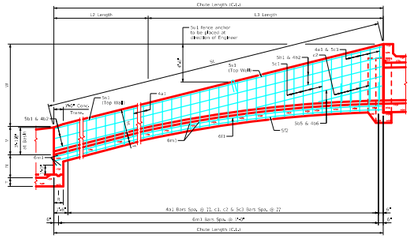
Listed Bars

Bar 4a1
2 Bars
1 @ 1
1 Var. • 2 Ea. Lgth.

Bar 3c1
2 Bars
1 @ 1
1 Var.

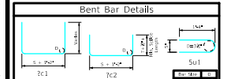
Bar 5b5 and 4b6
4 Bars • 2 Ea. Lgth.

Bar 5c3
2 Bars
1 @ 1
1 Var. • 2 Ea. Lgth.



?'x4' Flume Chute - Longitudinal Section

Bent Bar Details



Notes:
All dimensions are out to out.
D = dia. diameter.

Concrete Placement Quantities

Location	Footing	Walls	Total
Flume	--	--	--
Junction Slab			
Baffle			
Apron Curtain			
Total (cy)			

Flume Data

4A = 18'-0"
4C = 17'-00"
B = 10'-4⅛"
S1 = 4%
V = 4'-0"
W = 2'-0"
M = 2'-0"
T = 0'-11"
H = 4'-0"

Curve Data

C4 = 4
L2 = 20'-0"
L3 = 20'-0"
D = 10'-0⅛"
E = 9'-11⅞"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 2'-0⅛"
X2 = 1'-9⅜"
X3 = 0'-0⅛"
X4 = 0'-0⅛"
L3-X = 19'-11⅞"

Notes:
1. See Sheets RCF 1420 & RCF 2420 for flume information and details not shown.
2. See Sheet FBJ 17420 for ball joint information and details not shown.
3. See Sheet RCFB 17420 for flume basin information and details not shown.

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. OF FILE NO. DESIGN NO.

DESIGN TEAM	Flume Chute Details - 4'-0" Width	Alternative Sheet 1011.01	COUNTY	PROJECT NUMBER	SHEET NUMBER

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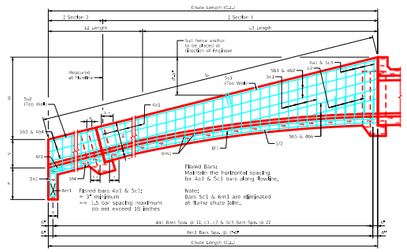
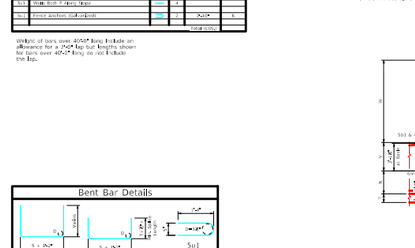
Reinforcing Bar List - Flume
Listed Bars
Bar 4a1
2 Bars
1 @ 1
1 Var. • 2 Ea. Lgth.
Bar 3c1
2 Bars
1 @ 1
1 Var.
Bar 5b5 and 4b6
4 Bars • 2 Ea. Lgth.
Bar 5c3
2 Bars
1 @ 1
1 Var. • 2 Ea. Lgth.
Weight of bars over 40'-0" long include an allowance for a 2'-0" lap but lengths shown for bars over 40'-0" long do not include the lap.
Bent Bar Details
Concrete Placement Quantities
?'x4' Flume Chute - Longitudinal Section



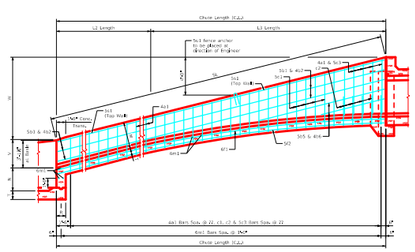
Notes:
1. See Sheets RCF 1420 & RCF 2420 for flume information and details not shown.
2. See Sheet FBJ 17420 for ball joint information and details not shown.

Reinforcing Bar List - Flume
Listed Bars
Bar 4a1
2 Bars
1 @ 1
1 Var. • 2 Ea. Lgth.
Bar 3c1
2 Bars
1 @ 1
1 Var.
Bar 5b5 and 4b6
4 Bars • 2 Ea. Lgth.
Bar 5c3
2 Bars
1 @ 1
1 Var. • 2 Ea. Lgth.
Weight of bars over 40'-0" long include an allowance for a 2'-0" lap but lengths shown for bars over 40'-0" long do not include the lap.
Bent Bar Details
Concrete Placement Quantities
?'x4' Flume Chute - Longitudinal Section



Notes:
1. See Sheets RCF 1420 & RCF 2420 for flume information and details not shown.
2. See Sheet FBJ 17420 for ball joint information and details not shown.

Reinforcing Bar List - Flume
Listed Bars
Bar 4a1
2 Bars
1 @ 1
1 Var. • 2 Ea. Lgth.
Bar 3c1
2 Bars
1 @ 1
1 Var.
Bar 5b5 and 4b6
4 Bars • 2 Ea. Lgth.
Bar 5c3
2 Bars
1 @ 1
1 Var. • 2 Ea. Lgth.
Weight of bars over 40'-0" long include an allowance for a 2'-0" lap but lengths shown for bars over 40'-0" long do not include the lap.
Bent Bar Details
Concrete Placement Quantities
?'x4' Flume Chute - Longitudinal Section



Notes:
1. See Sheets RCF 1420 & RCF 2420 for flume information and details not shown.
2. See Sheet FBJ 17420 for ball joint information and details not shown.
3. See Sheet RCFB 17420 for flume basin information and details not shown.

3:1 SLOPE FLUME

4 x 4

Flume Data
4A = 18'-0"
4C = 17'-00"
B = 10'-4⅛"
S1 = 4%
V = 3'-0"
W = 2'-0"
M = 2'-0"
T = 0'-11"
H = 4'-0"

Curve Data
C4 = 4
L2 = 20'-0"
L3 = 20'-0"
D = 10'-0⅛"
E = 9'-11⅞"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 2'-0⅛"
X2 = 1'-9⅜"
X3 = 0'-0⅛"
X4 = 0'-0⅛"
L3-X = 19'-11⅞"

5 x 4

Flume Data
4A = 18'-0"
4C = 17'-00"
B = 10'-4⅛"
S1 = 4%
V = 3'-0"
W = 2'-0"
M = 2'-0"
T = 0'-11"
H = 4'-0"

Curve Data
C4 = 4
L2 = 20'-0"
L3 = 20'-0"
D = 10'-0⅛"
E = 9'-11⅞"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 2'-0⅛"
X2 = 1'-9⅜"
X3 = 0'-0⅛"
X4 = 0'-0⅛"
L3-X = 19'-11⅞"

6 x 4

Flume Data
4A = 18'-0"
4C = 17'-00"
B = 10'-4⅛"
S1 = 4%
V = 3'-0"
W = 2'-0"
M = 2'-0"
T = 0'-11"
H = 4'-0"

Curve Data
C4 = 4
L2 = 20'-0"
L3 = 20'-0"
D = 10'-0⅛"
E = 9'-11⅞"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 2'-0⅛"
X2 = 1'-9⅜"
X3 = 0'-0⅛"
X4 = 0'-0⅛"
L3-X = 19'-11⅞"

8 x 4

Flume Data
4A = 18'-0"
4C = 17'-00"
B = 10'-4⅛"
S1 = 4%
V = 3'-0"
W = 2'-0"
M = 2'-0"
T = 0'-11"
H = 4'-0"

Curve Data
C4 = 4
L2 = 20'-0"
L3 = 20'-0"
D = 10'-0⅛"
E = 9'-11⅞"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 2'-0⅛"
X2 = 1'-9⅜"
X3 = 0'-0⅛"
X4 = 0'-0⅛"
L3-X = 19'-11⅞"

10 x 4

Flume Data
4A = 18'-0"
4C = 17'-00"
B = 10'-4⅛"
S1 = 4%
V = 3'-0"
W = 2'-0"
M = 2'-0"
T = 0'-11"
H = 4'-0"

Curve Data
C4 = 4
L2 = 20'-0"
L3 = 20'-0"
D = 10'-0⅛"
E = 9'-11⅞"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 2'-0⅛"
X2 = 1'-9⅜"
X3 = 0'-0⅛"
X4 = 0'-0⅛"
L3-X = 19'-11⅞"

12 x 4

Flume Data
4A = 18'-0"
4C = 17'-00"
B = 10'-4⅛"
S1 = 4%
V = 3'-0"
W = 2'-0"
M = 2'-0"
T = 0'-11"
H = 4'-0"

Curve Data
C4 = 4
L2 = 20'-0"
L3 = 20'-0"
D = 10'-0⅛"
E = 9'-11⅞"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 2'-0⅛"
X2 = 1'-9⅜"
X3 = 0'-0⅛"
X4 = 0'-0⅛"
L3-X = 19'-11⅞"

14 x 4

Flume Data
4A = 18'-0"
4C = 17'-00"
B = 10'-4⅛"
S1 = 4%
V = 3'-0"
W = 2'-0"
M = 2'-0"
T = 0'-11"
H = 4'-0"

Curve Data
C4 = 4
L2 = 20'-0"
L3 = 20'-0"
D = 10'-0⅛"
E = 9'-11⅞"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 2'-0⅛"
X2 = 1'-9⅜"
X3 = 0'-0⅛"
X4 = 0'-0⅛"
L3-X = 19'-11⅞"

16 x 4

Flume Data
4A = 18'-0"
4C = 17'-00"
B = 10'-4⅛"
S1 = 4%
V = 3'-0"
W = 2'-0"
M = 2'-0"
T = 0'-11"
H = 4'-0"

Curve Data
C4 = 4
L2 = 20'-0"
L3 = 20'-0"
D = 10'-0⅛"
E = 9'-11⅞"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 2'-0⅛"
X2 = 1'-9⅜"
X3 = 0'-0⅛"
X4 = 0'-0⅛"
L3-X = 19'-11⅞"

4:1 SLOPE FLUME

4 x 4

Flume Data
4A = 14'-00"
4C = 13'-00"
B = 10'-0⅜"
S1 = 4%
V = 3'-0⅛"
W = 2'-0"
M = 2'-0"
T = 0'-11"
H = 4'-0"

Curve Data
C4 = 4
L2 = 23'-0⅜"
D = 12'-11⅛"
E = 12'-10⅝"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 2'-0⅛"
X2 = 1'-9⅜"
X3 = 0'-0⅛"
X4 = 0'-0⅛"
L3-X = 22'-11⅛"

5 x 4

Flume Data
4A = 14'-00"
4C = 13'-00"
B = 10'-0⅜"
S1 = 4%
V = 3'-0⅛"
W = 2'-0"
M = 2'-0"
T = 0'-11"
H = 4'-0"

Curve Data
C4 = 4
L2 = 23'-0⅜"
D = 12'-11⅛"
E = 12'-10⅝"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 2'-0⅛"
X2 = 1'-9⅜"
X3 = 0'-0⅛"
X4 = 0'-0⅛"
L3-X = 22'-11⅛"

6 x 4

Flume Data
4A = 14'-00"
4C = 13'-00"
B = 10'-0⅜"
S1 = 4%
V = 3'-0⅛"
W = 2'-0"
M = 2'-0"
T = 0'-11"
H = 4'-0"

Curve Data
C4 = 4
L2 = 23'-0⅜"
D = 12'-11⅛"
E = 12'-10⅝"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 2'-0⅛"
X2 = 1'-9⅜"
X3 = 0'-0⅛"
X4 = 0'-0⅛"
L3-X = 22'-11⅛"

8 x 4

Flume Data
4A = 14'-00"
4C = 13'-00"
B = 10'-0⅜"
S1 = 4%
V = 3'-0⅛"
W = 2'-0"
M = 2'-0"
T = 0'-11"
H = 4'-0"

Curve Data
C4 = 4
L2 = 23'-0⅜"
L3 = 23'-0⅜"
D = 12'-11⅛"
E = 12'-10⅝"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 2'-0⅛"
X2 = 1'-9⅜"
X3 = 0'-0⅛"
X4 = 0'-0⅛"
L3-X = 22'-11⅛"

10 x 4

Flume Data
4A = 14'-00"
4C = 13'-00"
B = 10'-0⅜"
S1 = 4%
V = 3'-0⅛"
W = 2'-0"
M = 2'-0"
T = 0'-11"
H = 4'-0"

Curve Data
C4 = 4
L2 = 23'-0⅜"
L3 = 23'-0⅜"
D = 12'-11⅛"
E = 12'-10⅝"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 2'-0⅛"
X2 = 1'-9⅜"
X3 = 0'-0⅛"
X4 = 0'-0⅛"
L3-X = 22'-11⅛"

12 x 4

Flume Data
4A = 14'-00"
4C = 13'-00"
B = 10'-0⅜"
S1 = 4%
V = 3'-0⅛"
W = 2'-0"
M = 2'-0"
T = 0'-11"
H = 4'-0"

Curve Data
C4 = 4
L2 = 23'-0⅜"
L3 = 23'-0⅜"
D = 12'-11⅛"
E = 12'-10⅝"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 2'-0⅛"
X2 = 1'-9⅜"
X3 = 0'-0⅛"
X4 = 0'-0⅛"
L3-X = 22'-11⅛"

14 x 4

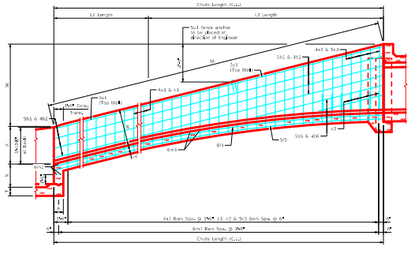
Flume Data
4A = 14'-00"
4C = 13'-00"
B = 10'-0⅜"
S1 = 4%
V = 3'-0⅛"
W = 2'-0"
M = 2'-0"
T = 0'-11"
H = 4'-0"

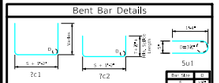
Curve Data
C4 = 4
L2 = 23'-0⅜"
L3 = 23'-0⅜"
D = 12'-11⅛"
E = 12'-10⅝"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 2'-0⅛"
X2 = 1'-9⅜"
X3 = 0'-0⅛"
X4 = 0'-0⅛"
L3-X = 22'-11⅛"

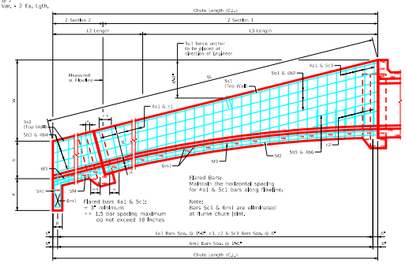
16 x 4

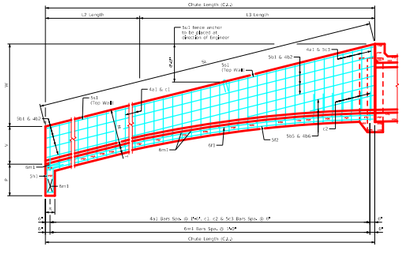
Flume Data
4A = 14'-00"
4C = 13'-00"
B = 10'-0⅜"
S1 = 4%
V = 3'-0⅛"
W = 2'-0"
M = 2'-0"
T = 0'-11"
H = 4'-0"

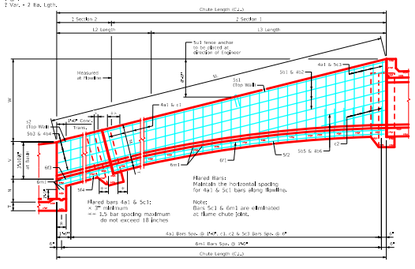
Curve Data
C4 = 4
L2 = 23'-0⅜"
L3 = 23'-0⅜"
D = 12'-11⅛"
E = 12'-10⅝"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 2'-0⅛"
X2 = 1'-9⅜"
X3 = 0'-0⅛"
X4 = 0'-0⅛"
L3-X = 22'-11⅛"











REVISED 04-2016 - CHANGED DESIGNATION TO "SL" IN "FLUME DATA" FROM "S" TO ALLEVIATE CONFUSION WITH THE WORD "SPAN".
REVISED 01-2021 - UPDATED TO STANDARD SHEET 1070-05 (THIS SHEET WAS 1072). UPDATED BAR LAPS PER AASHTO LRFD 8TH ED. CHANGED THE REFERENCE TO STANDARD
SHEETS RCF 1-20 & RCF 2-20 IN THE NOTES (WAS RCF-01-12 & RCF-02-12), AND FBJ ??-20 & RCFB ??-20 (WAS FBJ-??-12 & RCFB-??-12).
HE1072.S01 - THIS SHEET ISSUED 09-03.

Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
4a1	Walls FFV	—		Listed	
5b1	Walls FFH	—	6		
4b2	Walls BFH	—	6		
5b5	Walls FFH	—	4	Listed	
4b6	Walls BFH	—	4	Listed	
?c1	Bott. Floor & Walls BFV	⊔		Listed	
?c2	Bott. Floor & Walls BFV - Spliced	⊔			
5c3	Walls BFV	—		Listed	
6f1	Floor Longit. Top	—			
5f2	Floor Longit. Bott.	—			
6m1	Floor Transv. Top	—			
5s1	Walls Both F Along Slope	—	4		
5u1	Fence Anchors (Galvanized)	⊃	2	2'-10"	6
				Total (LBS.)	

Weight of bars over 40'-0" long include an allowance for a 2'-0" lap but lengths shown for bars over 40'-0" long do not include the lap.

Listed Bars

Bar 4a1
? Bars
? @ ?
? Var. - 2 Ea. Lgth.

Bar ?c1
? Bars
? @ ?
? Var.

Bar 5b5 and 4b6
4 Bars - 2 Ea. Lgth.

Bar 5c3
? Bars
? @ ?
? Var. - 2 Ea. Lgth.

Bent Bar Details

Bar Size	D
5	3¾"
6	4½"
7	5¼"

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

Concrete Placement Quantities

Location	Footing	Walls	Total
Flume	---	---	---
Junction Bell			
Basin			
Basin Curtain			
Total (CY)			

Flume Data

∠A = 18°26'
∠C = 1°00'
B = 11'-2⅝"
SL =
V = 3'-11⅜"
W =
M = 3'-9"
T = 0'-11"
H = 5'-0"

Curve Data

C.L. =
L2 =
L3 = 21'-4⅛"
D = 10'-8 7/16"
E = 10'-7 11/16"
P.C. Elev. =
P.I. Elev. =
P.P. Elev. =
P.T. Elev. =
X1 = 3'-4 5/16"
X2 = 1'-10 11/16"
X3 = 0'-10 1/16"
X4 = 0'-2½"
L3/4 = 5'-4 1/16"(-)

?'x5' Flume Chute - Longitudinal Section

Notes:
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBJ ??-20 for bell joint information and details not shown.
3. See Sheet RCFB ??-20 for flume basin information and details not shown.

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ____ OF ____ FILE NO. ________ DESIGN NO. ________

DESIGN TEAM	Flume Chute Details - 5' Height	Standard Sheet 1070-05	COUNTY	PROJECT NUMBER	SHEET NUMBER

12/29/2020 5:25:06 PM 6kloss W:\Highway\Bridge\Standards\Culverts\LRFD\EnglishLRFDSingleCulverts.dgn 1070-05 11x17_pdf.pltcfg

3:1 SLOPE FLUME

Flume Data

	5 x 5	6 x 5	8 x 5	10 x 5	12 x 5	14 x 5	16 x 5
∠A =	18°26'	18°26'	18°26'	18°26'	18°26'	18°26'	18°26'
∠C =	1°00'	1°00'	1°00'	1°00'	1°00'	1°00'	1°00'
B =	11'-2⅝"	11'-2⅝"	11'-2⅝"	11'-2⅝"	11'-2⅝"	11'-2⅝"	11'-2⅝"
SL =							
V =	3'-11⅜"	3'-11⅜"	3'-11⅜"	3'-11⅜"	3'-11⅜"	3'-11⅜"	3'-11⅜"
W =							
M =	3'-9"	3'-9"	3'-9"	3'-9"	3'-9"	3'-9"	3'-9"
T =	0'-11"	0'-11"	1'-0"	1'-1"	1'-2"	1'-2"	1'-2"
H =	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"

Curve Data

	5 x 5	6 x 5	8 x 5	10 x 5	12 x 5	14 x 5	16 x 5
C.L. =							
L2 =							
L3 =	21'-4⅛"	21'-4⅛"	21'-4⅛"	21'-4⅛"	21'-4⅛"	21'-4⅛"	21'-4⅛"
D =	10'-8 7/16"	10'-8 7/16"	10'-8 7/16"	10'-8 7/16"	10'-8 7/16"	10'-8 7/16"	10'-8 7/16"
E =	10'-7 11/16"	10'-7 11/16"	10'-7 11/16"	10'-7 11/16"	10'-7 11/16"	10'-7 11/16"	10'-7 11/16"
P.C. Elev. =							
P.I. Elev. =							
P.P. Elev. =							
P.T. Elev. =							
X1 =	3'-4 5/16"	3'-4 5/16"	3'-4 5/16"	3'-4 5/16"	3'-4 5/16"	3'-4 5/16"	3'-4 5/16"
X2 =	1'-10 11/16"	1'-10 11/16"	1'-10 11/16"	1'-10 11/16"	1'-10 11/16"	1'-10 11/16"	1'-10 11/16"
X3 =	0'-10 1/16"	0'-10 1/16"	0'-10 1/16"	0'-10 1/16"	0'-10 1/16"	0'-10 1/16"	0'-10 1/16"
X4 =	0'-2½"	0'-2½"	0'-2½"	0'-2½"	0'-2½"	0'-2½"	0'-2½"
L3/4 =	5'-4 1/16"(-)	5'-4 1/16"(-)	5'-4 1/16"(-)	5'-4 1/16"(-)	5'-4 1/16"(-)	5'-4 1/16"(-)	5'-4 1/16"(-)

4:1 SLOPE FLUME

Flume Data

	5 x 5	6 x 5	8 x 5	10 x 5	12 x 5	14 x 5	16 x 5
∠A =	14°02'	14°02'	14°02'	14°02'	14°02'	14°02'	14°02'
∠C =	1°00'	1°00'	1°00'	1°00'	1°00'	1°00'	1°00'
B =	15'-3 11/16"	15'-3 11/16"	15'-3 11/16"	15'-3 11/16"	15'-3 11/16"	15'-3 11/16"	15'-3 11/16"
SL =							
V =	3'-10⅜"	3'-10⅜"	3'-10⅜"	3'-10⅜"	3'-10⅜"	3'-10⅜"	3'-10⅜"
W =							
M =	3'-9"	3'-9"	3'-9"	3'-9"	3'-9"	3'-9"	3'-9"
T =	0'-11"	0'-11"	1'-0"	1'-1"	1'-2"	1'-2"	1'-2"
H =	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"

Curve Data

	5 x 5	6 x 5	8 x 5	10 x 5	12 x 5	14 x 5	16 x 5
C.L. =							
L2 =							
L3 =	29'-9 3/16"	29'-9 3/16"	29'-9 3/16"	29'-9 3/16"	29'-9 3/16"	29'-9 3/16"	29'-9 3/16"
D =	14'-10 15/16"	14'-10 15/16"	14'-10 15/16"	14'-10 15/16"	14'-10 15/16"	14'-10 15/16"	14'-10 15/16"
E =	14'-10¼"	14'-10¼"	14'-10¼"	14'-10¼"	14'-10¼"	14'-10¼"	14'-10¼"
P.C. Elev. =							
P.I. Elev. =							
P.P. Elev. =							
P.T. Elev. =							
X1 =	3'-5 7/16"	3'-5 7/16"	3'-5 7/16"	3'-5 7/16"	3'-5 7/16"	3'-5 7/16"	3'-5 7/16"
X2 =	1'-11 5/16"	1'-11 5/16"	1'-11 5/16"	1'-11 5/16"	1'-11 5/16"	1'-11 5/16"	1'-11 5/16"
X3 =	0'-10 3/16"	0'-10 3/16"	0'-10 3/16"	0'-10 3/16"	0'-10 3/16"	0'-10 3/16"	0'-10 3/16"
X4 =	0'-2 9/16"	0'-2 9/16"	0'-2 9/16"	0'-2 9/16"	0'-2 9/16"	0'-2 9/16"	0'-2 9/16"
L3/4 =	7'-5 5/16"(-)	7'-5 5/16"(-)	7'-5 5/16"(-)	7'-5 5/16"(-)	7'-5 5/16"(-)	7'-5 5/16"(-)	7'-5 5/16"(-)

Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
4a1	Walls FFV	—		Listed	
5b1	Walls FFH - Section 1	—	6		
4b2	Walls BFH - Section 1	—	6		
5b3	Walls FFH - Section 2	—	6		
4b4	Walls BFH - Section 2	—	6		
5b5	Walls FFH - Section 1	—	4	Listed	
4b6	Walls BFH - Section 1	—	4	Listed	
?c1	Bott. Floor & Walls BFV	⊔		Listed	
?c2	Bott. Floor & Walls BFV - Spliced	⊔			
5c3	Walls BFV	—		Listed	
6f1	Floor Longit. Top - Section 1	—			
5f2	Floor Longit. Bott. - Section 1	—			
6f3	Floor Longit. Top - Section 2	—			
5f4	Floor Longit. Bott. - Section 2	—			
5h1	Stub Curtain - Section 2				
6m1	Floor Transv. Top	—			
5s1	Walls Both F Along Slope - Section 1	—	4		
5s2	Walls Both F Along Slope - Section 2	—	4		
5u1	Fence Anchors (Galvanized)	⊃	2	2'-10"	6
				Total (LBS.)	

Weight of bars over 40'-0" long include an allowance for a 2'-0" lap but lengths shown for bars over 40'-0" long do not include the lap.

Listed Bars

Bar 4a1
? Bars
? @ ?
? Var. - 2 Ea. Lgth.

Bar ?c1
? Bars
? @ ?
? Var.

Bar 5b5 and 4b6
4 Bars - 2 Ea. Lgth.

Bar 5c3
? Bars
? @ ?
? Var. - 2 Ea. Lgth.

Bent Bar Details

Bar Size	D
5	3¾"
6	4½"
7	5¼"

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

Concrete Placement Quantities

Location	Footing	Walls	Total
Flume - Section 1	---	---	---
Flume - Section 2			
Junction Bell			
Chute Bell			
Stub Curtain			
Total (CY)			

Flared bars 4a1 & 5c1:
* 3" minimum
** 1.5 bar spacing maximum do not exceed 18 inches

Flared Bars:
Maintain the horizontal spacing for 4a1 & 5c1 bars along flowline.

Note:
Bars 5c1 & 6m1 are eliminated at flume chute joint.

?'x5' Flume Chute - Longitudinal Section

Notes:
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBJ ??-20 for bell joint information and details not shown.

Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
4a1	Walls FFV	—		Listed	
5b1	Walls FFH	—	6		
4b2	Walls BFH	—	6		
5b5	Walls FFH	—	4	Listed	
4b6	Walls BFH	—	4	Listed	
?c1	Bott. Floor & Walls BFV	⊔		Listed	
?c2	Bott. Floor & Walls BFV - Spliced	⊔			
5c3	Walls BFV	—		Listed	
6f1	Floor Longit. Top	—			
5f2	Floor Longit. Bott.	—			
6m1	Floor Transv. Top	—			
5s1	Walls Both F Along Slope	—	4		
5u1	Fence Anchors (Galvanized)	⊃	2	2'-10"	6
				Total (LBS.)	

Weight of bars over 40'-0" long include an allowance for a 2'-0" lap but lengths shown for bars over 40'-0" long do not include the lap.

Listed Bars

Bar 4a1
? Bars
? @ ?
? Var. - 2 Ea. Lgth.

Bar ?c1
? Bars
? @ ?
? Var.

Bar 5b5 and 4b6
4 Bars - 2 Ea. Lgth.

Bar 5c3
? Bars
? @ ?
? Var. - 2 Ea. Lgth.

Bent Bar Details

Bar Size	D
5	3¾"
6	4½"
7	5¼"

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

Concrete Placement Quantities

Location	Footing	Walls	Total
Flume	---	---	---
Junction Bell			
Basin			
Basin Curtain			
Total (CY)			

?'x5' Flume Chute - Longitudinal Section

Notes:
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBJ ??-20 for bell joint information and details not shown.
3. See Sheet RCFB ??-20 for flume basin information and details not shown.

Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
4a1	Walls FFV	—		Listed	
5b1	Walls FFH	—	6		
4b2	Walls BFH	—	6		
5b5	Walls FFH	—	4	Listed	
4b6	Walls BFH	—	4	Listed	
?c1	Bott. Floor & Walls BFV	⊔		Listed	
?c2	Bott. Floor & Walls BFV - Spliced	⊔			
5c3	Walls BFV	—		Listed	
6f1	Floor Longit. Top	—			
5f2	Floor Longit. Bott.	—			
5h1	Stub Curtain				
6m1	Floor Transv. Top	—			
5s1	Walls Both F Along Slope	—	4		
5u1	Fence Anchors (Galvanized)	⊃	2	2'-10"	6
				Total (LBS.)	

Weight of bars over 40'-0" long include an allowance for a 2'-0" lap but lengths shown for bars over 40'-0" long do not include the lap.

Listed Bars

Bar 4a1
? Bars
? @ ?
? Var. - 2 Ea. Lgth.

Bar ?c1
? Bars
? @ ?
? Var.

Bar 5b5 and 4b6
4 Bars - 2 Ea. Lgth.

Bar 5c3
? Bars
? @ ?
? Var. - 2 Ea. Lgth.

Bent Bar Details

Bar Size	D
5	3¾"
6	4½"
7	5¼"

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

Concrete Placement Quantities

Location	Footing	Walls	Total
Flume	---	---	---
Junction Bell			
Stub Curtain			
Total (CY)			

?'x5' Flume Chute - Longitudinal Section

Notes:
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBJ ??-20 for bell joint information and details not shown.

Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
4a1	Walls FFV	—		Listed	
5b1	Walls FFH - Section 1	—	6		
4b2	Walls BFH - Section 1	—	6		
5b3	Walls FFH - Section 2	—	6		
4b4	Walls BFH - Section 2	—	6		
5b5	Walls FFH - Section 1	—	4	Listed	
4b6	Walls BFH - Section 1	—	4	Listed	
?c1	Bott. Floor & Walls BFV	⊔		Listed	
?c2	Bott. Floor & Walls BFV - Spliced	⊔			
5c3	Walls BFV	—		Listed	
6f1	Floor Longit. Top - Section 1	—			
5f2	Floor Longit. Bott. - Section 1	—			
6f3	Floor Longit. Top - Section 2	—			
5f4	Floor Longit. Bott. - Section 2	—			
6m1	Floor Transv. Top	—			
5s1	Walls Both F Along Slope - Section 1	—	4		
5s2	Walls Both F Along Slope - Section 2	—	4		
5u1	Fence Anchors (Galvanized)	⊃	2	2'-10"	6
				Total (LBS.)	

Weight of bars over 40'-0" long include an allowance for a 2'-0" lap but lengths shown for bars over 40'-0" long do not include the lap.

Listed Bars

Bar 4a1
? Bars
? @ ?
? Var. - 2 Ea. Lgth.

Bar ?c1
? Bars
? @ ?
? Var.

Bar 5b5 and 4b6
4 Bars - 2 Ea. Lgth.

Bar 5c3
? Bars
? @ ?
? Var. - 2 Ea. Lgth.

Bent Bar Details

Bar Size	D
5	3¾"
6	4½"
7	5¼"

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

Concrete Placement Quantities

Location	Footing	Walls	Total
Flume - Section 1	---	---	---
Flume - Section 2			
Junction Bell			
Chute Bell			
Basin			
Basin Curtain			
Total (CY)			

?'x5' Flume Chute - Longitudinal Section

Notes:
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBJ ??-20 for bell joint information and details not shown.
3. See Sheet RCFB ??-20 for flume basin information and details not shown.

Reinforcing Bar List - Flume

Bar	Location	Grade	No.	Length	Weight
1u1	Walls, FPD			Uplift	
4u1	Walls, FPD				
4u2	Walls, FPD				
5u1	Walls, FPD			Uplift	
6u1	Walls, FPD			Uplift	
7c1	Walls, Floor & Walls, FPD			Uplift	
7c2	Walls, Floor & Walls, FPD + Splices			Uplift	
5c1	Walls, FPD			Uplift	
6c1	Floor Length, Top				
7c2	Floor Transv. Top				
5h1	Walls, Front + Wing Stops				
5u1	Fence Anchors (Galvanized)			2'-0"	
				Total (Lbs.)	

Weights of bars over 60'-0" long include an allowance for a 2'-0" lap but lengths shown for bars over 60'-0" long do not include the laps.

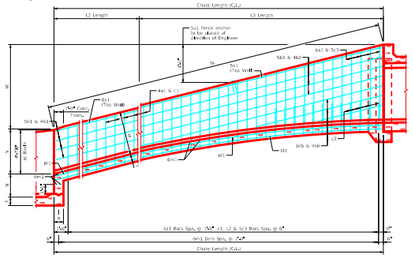
Listed Bars

Bar 4a1
2 Bars
1 @ 7
1 Var. - 2 Ea. Lgth.

Bar 7c1
2 Bars
1 @ 7
1 Var.

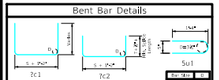
Bar 5b5 and 4b6
6 Bars - 2 Ea. Lgth.

Bar 5c3
2 Bars
1 @ 7
1 Var. - 2 Ea. Lgth.



2'x6' Flume Chute - Longitudinal Section

Bent Bar Details



Bar Mark	Dia.
5	#5
6	#6
7	#7

Note:
All dimensions are out to out.
Ø = dia. diameter.

Concrete Placement Quantities

Location	Footing	Walls	Total
Flume	—	—	—
Junction Slab			
Baffle			
Slab Curtain			
Total (CY)			

Flume Data

<A = 18°26"
<C = 71°00"
B = 11'-10 9/16"
SL =
V = 4'-0 1/8"
W =
M = 4'-0"
T = 4'-0"
H = 4'-0"

Curve Data

CA =
LZ =
L3 = 22'-0"
D = 11'-0 1/2"
R = 11'-10 9/16"
P.C. Elev. =
P.I. Elev. =
P.O. Elev. =
P.Y. Elev. =
X1 = 7'-0 7/8",
X2 = 7'-0 7/8",
X3 = 4'-0 1/8",
X4 = 8'-0 1/8",
L3A = 15'-0"

Notes:

1. See Sheets RCF 1420 & RCF 2420 for flume information and details not shown.
2. See Sheet FBJ 2420 for ball joint information and details not shown.
3. See Sheet RCFB 2720 for flume back information and details not shown.

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. _ OF _ SHEETS | FILE NO. | DESIGN NO.

DESIGN TEAM	Flume Chute Details - 0° Walls	Standard Sheet 107020	COUNTY	PROJECT NUMBER	SHEET NUMBER

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3:1 SLOPE FLUME

5 x 6

Flume Data
<A = 18°26"
<C = 71°00"
B = 11'-10 9/16"
SL =
V = 4'-0 1/8"
W =
M = 4'-0"
T = 4'-0"
H = 4'-0"

Curve Data
CA =
LZ =
L3 = 22'-0"
D = 11'-0 1/2"
R = 11'-10 9/16"
P.C. Elev. =
P.I. Elev. =
P.O. Elev. =
P.Y. Elev. =
X1 = 7'-0 7/8",
X2 = 7'-0 7/8",
X3 = 4'-0 1/8",
X4 = 8'-0 1/8",
L3A = 15'-0"

6 x 6

Flume Data
<A = 18°26"
<C = 71°00"
B = 11'-10 9/16"
SL =
V = 4'-0 1/8"
W =
M = 4'-0"
T = 4'-0"
H = 4'-0"

Curve Data
CA =
LZ =
L3 = 22'-0"
D = 11'-0 1/2"
R = 11'-10 9/16"
P.C. Elev. =
P.I. Elev. =
P.O. Elev. =
P.Y. Elev. =
X1 = 7'-0 7/8",
X2 = 7'-0 7/8",
X3 = 4'-0 1/8",
X4 = 8'-0 1/8",
L3A = 15'-0"

8 x 6

Flume Data
<A = 18°26"
<C = 71°00"
B = 11'-10 9/16"
SL =
V = 4'-0 1/8"
W =
M = 4'-0"
T = 4'-0"
H = 4'-0"

Curve Data
CA =
LZ =
L3 = 22'-0"
D = 11'-0 1/2"
R = 11'-10 9/16"
P.C. Elev. =
P.I. Elev. =
P.O. Elev. =
P.Y. Elev. =
X1 = 7'-0 7/8",
X2 = 7'-0 7/8",
X3 = 4'-0 1/8",
X4 = 8'-0 1/8",
L3A = 15'-0"

10 x 6

Flume Data
<A = 18°26"
<C = 71°00"
B = 11'-10 9/16"
SL =
V = 4'-0 1/8"
W =
M = 4'-0"
T = 4'-0"
H = 4'-0"

Curve Data
CA =
LZ =
L3 = 22'-0"
D = 11'-0 1/2"
R = 11'-10 9/16"
P.C. Elev. =
P.I. Elev. =
P.O. Elev. =
P.Y. Elev. =
X1 = 7'-0 7/8",
X2 = 7'-0 7/8",
X3 = 4'-0 1/8",
X4 = 8'-0 1/8",
L3A = 15'-0"

12 x 6

Flume Data
<A = 18°26"
<C = 71°00"
B = 11'-10 9/16"
SL =
V = 4'-0 1/8"
W =
M = 4'-0"
T = 4'-0"
H = 4'-0"

Curve Data
CA =
LZ =
L3 = 22'-0"
D = 11'-0 1/2"
R = 11'-10 9/16"
P.C. Elev. =
P.I. Elev. =
P.O. Elev. =
P.Y. Elev. =
X1 = 7'-0 7/8",
X2 = 7'-0 7/8",
X3 = 4'-0 1/8",
X4 = 8'-0 1/8",
L3A = 15'-0"

14 x 6

Flume Data
<A = 18°26"
<C = 71°00"
B = 11'-10 9/16"
SL =
V = 4'-0 1/8"
W =
M = 4'-0"
T = 4'-0"
H = 4'-0"

Curve Data
CA =
LZ =
L3 = 22'-0"
D = 11'-0 1/2"
R = 11'-10 9/16"
P.C. Elev. =
P.I. Elev. =
P.O. Elev. =
P.Y. Elev. =
X1 = 7'-0 7/8",
X2 = 7'-0 7/8",
X3 = 4'-0 1/8",
X4 = 8'-0 1/8",
L3A = 15'-0"

16 x 6

Flume Data
<A = 18°26"
<C = 71°00"
B = 11'-10 9/16"
SL =
V = 4'-0 1/8"
W =
M = 4'-0"
T = 4'-0"
H = 4'-0"

Curve Data
CA =
LZ =
L3 = 22'-0"
D = 11'-0 1/2"
R = 11'-10 9/16"
P.C. Elev. =
P.I. Elev. =
P.O. Elev. =
P.Y. Elev. =
X1 = 7'-0 7/8",
X2 = 7'-0 7/8",
X3 = 4'-0 1/8",
X4 = 8'-0 1/8",
L3A = 15'-0"

4:1 SLOPE FLUME

5 x 6

Flume Data
<A = 14°02"
<C = 71°00"
B = 10'-5 7/8"
SL =
V = 3'-5 7/8"
W =
M = 3'-6"
T = 3'-5 1/2"
H = 3'-6"

Curve Data
CA =
LZ =
L3 = 31'-0 1/8",
D = 15'-5 1/16",
R = 15'-5 9/16",
P.C. Elev. =
P.I. Elev. =
P.O. Elev. =
P.Y. Elev. =
X1 = 7'-0 7/8",
X2 = 7'-0 7/8",
X3 = 3'-5 1/2",
X4 = 8'-0 1/8",
L3A = 7'-5 1/8"(+)

6 x 6

Flume Data
<A = 14°02"
<C = 71°00"
B = 10'-5 7/8"
SL =
V = 3'-5 7/8"
W =
M = 3'-6"
T = 3'-5 1/2"
H = 3'-6"

Curve Data
CA =
LZ =
L3 = 31'-0 1/8",
D = 15'-5 1/16",
R = 15'-5 9/16",
P.C. Elev. =
P.I. Elev. =
P.O. Elev. =
P.Y. Elev. =
X1 = 7'-0 7/8",
X2 = 7'-0 7/8",
X3 = 3'-5 1/2",
X4 = 8'-0 1/8",
L3A = 7'-5 1/8"(+)

8 x 6

Flume Data
<A = 14°02"
<C = 71°00"
B = 10'-5 7/8"
SL =
V = 3'-5 7/8"
W =
M = 3'-6"
T = 3'-5 1/2"
H = 3'-6"

Curve Data
CA =
LZ =
L3 = 31'-0 1/8",
D = 15'-5 1/16",
R = 15'-5 9/16",
P.C. Elev. =
P.I. Elev. =
P.O. Elev. =
P.Y. Elev. =
X1 = 7'-0 7/8",
X2 = 7'-0 7/8",
X3 = 3'-5 1/2",
X4 = 8'-0 1/8",
L3A = 7'-5 1/8"(+)

10 x 6

Flume Data
<A = 14°02"
<C = 71°00"
B = 10'-5 7/8"
SL =
V = 3'-5 7/8"
W =
M = 3'-6"
T = 3'-5 1/2"
H = 3'-6"

Curve Data
CA =
LZ =
L3 = 31'-0 1/8",
D = 15'-5 1/16",
R = 15'-5 9/16",
P.C. Elev. =
P.I. Elev. =
P.O. Elev. =
P.Y. Elev. =
X1 = 7'-0 7/8",
X2 = 7'-0 7/8",
X3 = 3'-5 1/2",
X4 = 8'-0 1/8",
L3A = 7'-5 1/8"(+)

12 x 6

Flume Data
<A = 14°02"
<C = 71°00"
B = 10'-5 7/8"
SL =
V = 3'-5 7/8"
W =
M = 3'-6"
T = 3'-5 1/2"
H = 3'-6"

Curve Data
CA =
LZ =
L3 = 31'-0 1/8",
D = 15'-5 1/16",
R = 15'-5 9/16",
P.C. Elev. =
P.I. Elev. =
P.O. Elev. =
P.Y. Elev. =
X1 = 7'-0 7/8",
X2 = 7'-0 7/8",
X3 = 3'-5 1/2",
X4 = 8'-0 1/8",
L3A = 7'-5 1/8"(+)

14 x 6

Flume Data
<A = 14°02"
<C = 71°00"
B = 10'-5 7/8"
SL =
V = 3'-5 7/8"
W =
M = 3'-6"
T = 3'-5 1/2"
H = 3'-6"

Curve Data
CA =
LZ =
L3 = 31'-0 1/8",
D = 15'-5 1/16",
R = 15'-5 9/16",
P.C. Elev. =
P.I. Elev. =
P.O. Elev. =
P.Y. Elev. =
X1 = 7'-0 7/8",
X2 = 7'-0 7/8",
X3 = 3'-5 1/2",
X4 = 8'-0 1/8",
L3A = 7'-5 1/8"(+)

16 x 6

Flume Data
<A = 14°02"
<C = 71°00"
B = 10'-5 7/8"
SL =
V = 3'-5 7/8"
W =
M = 3'-6"
T = 3'-5 1/2"
H = 3'-6"

Curve Data
CA =
LZ =
L3 = 31'-0 1/8",
D = 15'-5 1/16",
R = 15'-5 9/16",
P.C. Elev. =
P.I. Elev. =
P.O. Elev. =
P.Y. Elev. =
X1 = 7'-0 7/8",
X2 = 7'-0 7/8",
X3 = 3'-5 1/2",
X4 = 8'-0 1/8",
L3A = 7'-5 1/8"(+)

Reinforcing Bar List - Flume

Bar	Location	Grade	No.	Length	Weight
1u1	Walls, FPD			Uplift	
4u1	Walls, FPD				
4u2	Walls, FPD				
5u1	Walls, FPD			Uplift	
6u1	Walls, FPD			Uplift	
7c1	Walls, Floor & Walls, FPD			Uplift	
7c2	Walls, Floor & Walls, FPD + Splices			Uplift	
5c1	Walls, FPD			Uplift	
6c1	Floor Length, Top				
7c2	Floor Transv. Top				
5h1	Walls, Front + Wing Stops				
5u1	Fence Anchors (Galvanized)			2'-0"	
				Total (Lbs.)	

Weights of bars over 60'-0" long include an allowance for a 2'-0" lap but lengths shown for bars over 60'-0" long do not include the laps.

Listed Bars
Bar 4a1
2 Bars
1 @ 7
1 Var. - 2 Ea. Lgth.

Bar 7c1
2 Bars
1 @ 7
1 Var.

Bar 5b5 and 4b6
6 Bars - 2 Ea. Lgth.

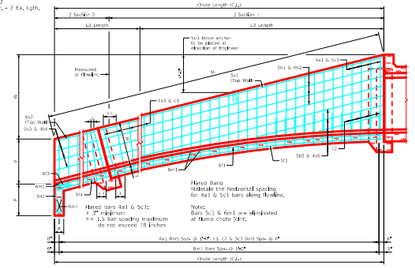
Bar 5c3
2 Bars
1 @ 7
1 Var. - 2 Ea. Lgth.

Bent Bar Details

Note:
All dimensions are out to out.
Ø = dia. diameter.

Concrete Placement Quantities

Location	Footing	Walls	Total
Flume	—	—	—
Junction Slab			
Baffle			
Slab Curtain			
Total (CY)			



?'x6' Flume Chute - Longitudinal Section

Notes:
1. See Sheets RCF 1420 & RCF 2420 for flume information and details not shown.
2. See Sheet FBJ 2420 for ball joint information and details not shown.

Hared Bars
Maintain the horizontal spacing for 4a1 & 5c1 bars along flowlines.

Notes:
Bars 5c1 & 6m1 are eliminated at flume chute joint.
** 1.5 bar spacing maximum do not exceed 18 inches

Reinforcing Bar List - Flume

Bar	Location	Grade	No.	Length	Weight
1u1	Walls, FPD			Uplift	
4u1	Walls, FPD				
4u2	Walls, FPD				
5u1	Walls, FPD			Uplift	
6u1	Walls, FPD			Uplift	
7c1	Walls, Floor & Walls, FPD			Uplift	
7c2	Walls, Floor & Walls, FPD + Splices			Uplift	
5c1	Walls, FPD			Uplift	
6c1	Floor Length, Top				
7c2	Floor Transv. Top				
5h1	Walls, Front + Wing Stops				
5u1	Fence Anchors (Galvanized)			2'-0"	
				Total (Lbs.)	

Weights of bars over 60'-0" long include an allowance for a 2'-0" lap but lengths shown for bars over 60'-0" long do not include the laps.

Listed Bars
Bar 4a1
2 Bars
1 @ 7
1 Var. - 2 Ea. Lgth.

Bar 7c1
2 Bars
1 @ 7
1 Var.

Bar 5b5 and 4b6
6 Bars - 2 Ea. Lgth.

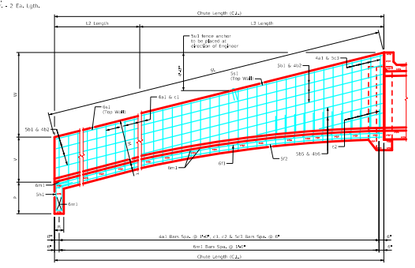
Bar 5c3
2 Bars
1 @ 7
1 Var. - 2 Ea. Lgth.

Bent Bar Details

Note:
All dimensions are out to out.
Ø = dia. diameter.

Concrete Placement Quantities

Location	Footing	Walls	Total
Flume	—	—	—
Junction Slab			
Baffle			
Slab Curtain			
Total (CY)			



7'x6' Flume Chute - Longitudinal Section

Notes:
1. See Sheets RCF 1420 & RCF 2420 for flume information and details not shown.
2. See Sheet FBJ 2420 for ball joint information and details not shown.

Hared Bars
Maintain the horizontal spacing for 4a1 & 5c1 bars along flowlines.

Notes:
Bars 5c1 & 6m1 are eliminated at flume chute joint.
** 1.5 bar spacing maximum do not exceed 18 inches

Reinforcing Bar List - Flume

Bar	Location	Grade	No.	Length	Weight
1u1	Walls, FPD			Uplift	
4u1	Walls, FPD				
4u2	Walls, FPD				
5u1	Walls, FPD			Uplift	
6u1	Walls, FPD			Uplift	
7c1	Walls, Floor & Walls, FPD			Uplift	
7c2	Walls, Floor & Walls, FPD + Splices			Uplift	
5c1	Walls, FPD			Uplift	
6c1	Floor Length, Top				
7c2	Floor Transv. Top				
5h1	Walls, Front + Wing Stops				
5u1	Fence Anchors (Galvanized)			2'-0"	
				Total (Lbs.)	

Weights of bars over 60'-0" long include an allowance for a 2'-0" lap but lengths shown for bars over 60'-0" long do not include the laps.

Listed Bars
Bar 4a1
2 Bars
1 @ 7
1 Var. - 2 Ea. Lgth.

Bar 7c1
2 Bars
1 @ 7
1 Var.

Bar 5b5 and 4b6
6 Bars - 2 Ea. Lgth.

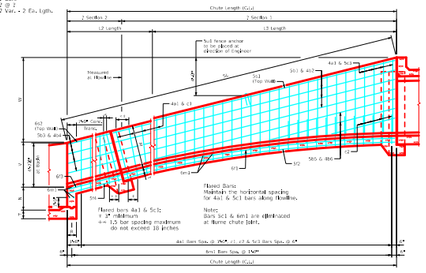
Bar 5c3
2 Bars
1 @ 7
1 Var. - 2 Ea. Lgth.

Bent Bar Details

Note:
All dimensions are out to out.
Ø = dia. diameter.

Concrete Placement Quantities

Location	Footing	Walls	Total
Flume	—	—	—
Junction Slab			
Baffle			
Slab Curtain			
Total (CY)			



7'x6' Flume Chute - Longitudinal Section

Notes:
1. See Sheets RCF 1420 & RCF 2420 for flume information and details not shown.
2. See Sheet FBJ 2420 for ball joint information and details not shown.
3. See Sheet RCFB 2720 for flume back information and details not shown.

REVISED 6/2021 - CHANGED DESIGNATION TO "FLUME" IN FLUME DATA. CHANGED "FLOW" TO "FLUME" IN FLUME DATA. REVISED 12/2021 - CHANGED TO COMPLY WITH THE WORD "FLUME". REVISED 2/2023 - UPDATED TO STANDARD SHEET LAYOUT. ADDED BAR LISTS AND BAR SHAPES FOR EACH FLUME. CHANGED THE REFERENCE TO STANDARD SHEET NUMBERS. ADDED CONCRETE PLACEMENT QUANTITIES. ADDED BENT BAR DETAILS. ADDED 3:1 AND 4:1 SLOPE FLUMES.

Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
Sa1	Wall, FPS		4	Varies	
Sb1	Wall, FPS		4		
Sb2	Wall, RPS		4		
Sb3	Wall, FPS		4	Varies	
Sb4	Wall, RPS		4		
Sc1	Slab, Floor & Wall, RPS		4	Varies	
Sc2	Slab, Floor & Wall, RPS + Splices		4		
Sc3	Wall, RPS		4	Varies	
Sd1	Floor Length, Top		4		
Sd2	Floor Length, Bott.		4		
Se1	Floor Thickness, Top		4		
Sf1	Wall, Bott. + Floor, Slope		4		
Sg1	Fence Anchors (Galvanized)		24	2'-0"	6
				Total Lbs.	

Weight of bars over 40'-0" long include an allowance for lap (2'-0" for 6s bars and 2'-6" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.

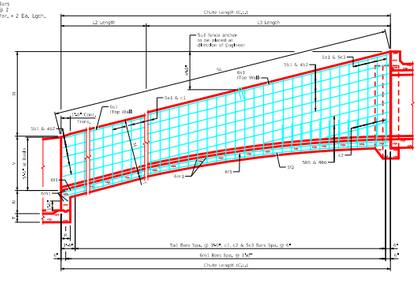
Listed Bars

Bar Sa1
2 Bars
7 @ 7
7 Var. - 2 Ea. Ligth.

Bar Sb5 and 4b6
6 Bars - 2 Ea. Ligth.

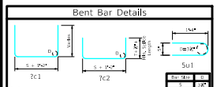
Bar 7c1
2 Bars
7 @ 7
7 Var.

Bar Sc3
2 Bars
7 @ 7
7 Var. - 2 Ea. Ligth.



?'x7' Flume Chute - Longitudinal Section

Bent Bar Details



Bar Size	A
5	1'-0"
6	1'-6"
7	2'-0"

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

Concrete Placement Quantities

Location	Feet	Yards	Yards
Flume	—	—	—
Junction Bell			
Bells			
Bell Collar			
Total Conc.			

Flume Data

6A = 18'-2"
6C = 17'-10"
B = 12'-7½"
SL =
V = 1'-6"
W =
M = 3'-0"
T = 0'-11"
H = 7'-0"

Curve Data

CJ =
L2 =
L3 = 23'-11⅜"
D = 12'-0⅛"
E = 11'-11⅜"
P.C. ELEV. =
P.I. ELEV. =
P.T. ELEV. =
X1 = 7'-0⅜"
X2 = 7'-1⅜"
X3 = 17'-11⅜"
X4 = 17'-0⅜"
L3/4 = 35'-11⅜"(5+)

Notes:

1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBI 17-20 for bell bike information and details not shown.
3. See Sheet RCFB 17-20 for flume basin information and details not shown.

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. — OF — FILE NO. — DESIGN NO.

DESIGN TEAM	Flume Chute Details - 7' Width	Standard Sheet (07/20)	COUNTY	PROJECT NUMBER	SHEET NUMBER

12/29/2020 9:25:37 PM bkrom W:\Highway\Bridge\Standards\Current\DGN\English\RCFB\StrongSCurrentDgn 12/15/07 11x17.pltcfg.dgn

3:1 SLOPE FLUME

6 x 7

Flume Data

6A = 18'-2"
6C = 17'-10"
B = 12'-7½"
SL =
V = 1'-6"
W =
M = 3'-0"
T = 0'-11"
H = 7'-0"

Curve Data

CJ = 1
L2 = 23'-11⅜"
L3 = 23'-11⅜"
D = 12'-0⅛"
E = 11'-11⅜"
P.C. ELEV. =
P.I. ELEV. =
P.T. ELEV. =
X1 = 7'-0⅜"
X2 = 7'-1⅜"
X3 = 17'-11⅜"
X4 = 17'-0⅜"
L3/4 = 35'-11⅜"(5+)

8 x 7

Flume Data

6A = 18'-2"
6C = 17'-10"
B = 12'-7½"
SL =
V = 1'-6"
W =
M = 3'-0"
T = 0'-11"
H = 7'-0"

Curve Data

CJ = 1
L2 = 23'-11⅜"
L3 = 23'-11⅜"
D = 12'-0⅛"
E = 11'-11⅜"
P.C. ELEV. =
P.I. ELEV. =
P.T. ELEV. =
X1 = 7'-0⅜"
X2 = 7'-1⅜"
X3 = 17'-11⅜"
X4 = 17'-0⅜"
L3/4 = 35'-11⅜"(5+)

10 x 7

Flume Data

6A = 18'-2"
6C = 17'-10"
B = 12'-7½"
SL =
V = 1'-6"
W =
M = 3'-0"
T = 0'-11"
H = 7'-0"

Curve Data

CJ = 1
L2 = 23'-11⅜"
L3 = 23'-11⅜"
D = 12'-0⅛"
E = 11'-11⅜"
P.C. ELEV. =
P.I. ELEV. =
P.T. ELEV. =
X1 = 7'-0⅜"
X2 = 7'-1⅜"
X3 = 17'-11⅜"
X4 = 17'-0⅜"
L3/4 = 35'-11⅜"(5+)

12 x 7

Flume Data

6A = 18'-2"
6C = 17'-10"
B = 12'-7½"
SL =
V = 1'-6"
W =
M = 3'-0"
T = 0'-11"
H = 7'-0"

Curve Data

CJ = 1
L2 = 23'-11⅜"
L3 = 23'-11⅜"
D = 12'-0⅛"
E = 11'-11⅜"
P.C. ELEV. =
P.I. ELEV. =
P.T. ELEV. =
X1 = 7'-0⅜"
X2 = 7'-1⅜"
X3 = 17'-11⅜"
X4 = 17'-0⅜"
L3/4 = 35'-11⅜"(5+)

14 x 7

Flume Data

6A = 18'-2"
6C = 17'-10"
B = 12'-7½"
SL =
V = 1'-6"
W =
M = 3'-0"
T = 0'-11"
H = 7'-0"

Curve Data

CJ = 1
L2 = 23'-11⅜"
L3 = 23'-11⅜"
D = 12'-0⅛"
E = 11'-11⅜"
P.C. ELEV. =
P.I. ELEV. =
P.T. ELEV. =
X1 = 7'-0⅜"
X2 = 7'-1⅜"
X3 = 17'-11⅜"
X4 = 17'-0⅜"
L3/4 = 35'-11⅜"(5+)

16 x 7

Flume Data

6A = 18'-2"
6C = 17'-10"
B = 12'-7½"
SL =
V = 1'-6"
W =
M = 3'-0"
T = 0'-11"
H = 7'-0"

Curve Data

CJ = 1
L2 = 23'-11⅜"
L3 = 23'-11⅜"
D = 12'-0⅛"
E = 11'-11⅜"
P.C. ELEV. =
P.I. ELEV. =
P.T. ELEV. =
X1 = 7'-0⅜"
X2 = 7'-1⅜"
X3 = 17'-11⅜"
X4 = 17'-0⅜"
L3/4 = 35'-11⅜"(5+)

4:1 SLOPE FLUME

6 x 7

Flume Data

6A = 14'-10"
6C = 13'-10"
B = 13'-0⅛"
SL =
V = 1'-6"
W =
M = 3'-0"
T = 0'-11"
H = 7'-0"

Curve Data

CJ = 1
L2 = 33'-5⅞"
L3 = 33'-5⅞"
D = 16'-10⅜"
E = 16'-5⅜"
P.C. ELEV. =
P.I. ELEV. =
P.T. ELEV. =
X1 = 7'-0⅜"
X2 = 7'-1⅜"
X3 = 25'-11⅜"
X4 = 25'-0⅜"
L3/4 = 50'-5⅝"(6+)

8 x 7

Flume Data

6A = 14'-10"
6C = 13'-10"
B = 13'-0⅛"
SL =
V = 1'-6"
W =
M = 3'-0"
T = 0'-11"
H = 7'-0"

Curve Data

CJ = 1
L2 = 33'-5⅞"
L3 = 33'-5⅞"
D = 16'-10⅜"
E = 16'-5⅜"
P.C. ELEV. =
P.I. ELEV. =
P.T. ELEV. =
X1 = 7'-0⅜"
X2 = 7'-1⅜"
X3 = 25'-11⅜"
X4 = 25'-0⅜"
L3/4 = 50'-5⅝"(6+)

10 x 7

Flume Data

6A = 14'-10"
6C = 13'-10"
B = 13'-0⅛"
SL =
V = 1'-6"
W =
M = 3'-0"
T = 0'-11"
H = 7'-0"

Curve Data

CJ = 1
L2 = 33'-5⅞"
L3 = 33'-5⅞"
D = 16'-10⅜"
E = 16'-5⅜"
P.C. ELEV. =
P.I. ELEV. =
P.T. ELEV. =
X1 = 7'-0⅜"
X2 = 7'-1⅜"
X3 = 25'-11⅜"
X4 = 25'-0⅜"
L3/4 = 50'-5⅝"(6+)

12 x 7

Flume Data

6A = 14'-10"
6C = 13'-10"
B = 13'-0⅛"
SL =
V = 1'-6"
W =
M = 3'-0"
T = 0'-11"
H = 7'-0"

Curve Data

CJ = 1
L2 = 33'-5⅞"
L3 = 33'-5⅞"
D = 16'-10⅜"
E = 16'-5⅜"
P.C. ELEV. =
P.I. ELEV. =
P.T. ELEV. =
X1 = 7'-0⅜"
X2 = 7'-1⅜"
X3 = 25'-11⅜"
X4 = 25'-0⅜"
L3/4 = 50'-5⅝"(6+)

14 x 7

Flume Data

6A = 14'-10"
6C = 13'-10"
B = 13'-0⅛"
SL =
V = 1'-6"
W =
M = 3'-0"
T = 0'-11"
H = 7'-0"

Curve Data

CJ = 1
L2 = 33'-5⅞"
L3 = 33'-5⅞"
D = 16'-10⅜"
E = 16'-5⅜"
P.C. ELEV. =
P.I. ELEV. =
P.T. ELEV. =
X1 = 7'-0⅜"
X2 = 7'-1⅜"
X3 = 25'-11⅜"
X4 = 25'-0⅜"
L3/4 = 50'-5⅝"(6+)

16 x 7

Flume Data

6A = 14'-10"
6C = 13'-10"
B = 13'-0⅛"
SL =
V = 1'-6"
W =
M = 3'-0"
T = 0'-11"
H = 7'-0"

Curve Data

CJ = 1
L2 = 33'-5⅞"
L3 = 33'-5⅞"
D = 16'-10⅜"
E = 16'-5⅜"
P.C. ELEV. =
P.I. ELEV. =
P.T. ELEV. =
X1 = 7'-0⅜"
X2 = 7'-1⅜"
X3 = 25'-11⅜"
X4 = 25'-0⅜"
L3/4 = 50'-5⅝"(6+)

Reinforcing Bar List - Flume
Listed Bars
Bar Sa1
2 Bars
7 @ 7
7 Var. - 2 Ea. Ligth.
Bar Sb5 and 4b6
6 Bars - 2 Ea. Ligth.
Bar 7c1
2 Bars
7 @ 7
7 Var.
Bar Sc3
2 Bars
7 @ 7
7 Var. - 2 Ea. Ligth.
Weight of bars over 40'-0" long include an allowance for lap (2'-0" for 6s bars and 2'-6" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.
Bent Bar Details
Concrete Placement Quantities
?'x7' Flume Chute - Longitudinal Section
Notes:
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBI 17-20 for bell bike information and details not shown.
3. See Sheet RCFB 17-20 for flume basin information and details not shown.

Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
5a1	Walls FPV			Linear	
5b1	Walls FPH		10		
6b2	Walls FPH		10		
5b3	Walls FPH		10		
6b4	Walls FPH		10		
5c1	Slab, Floor & Walls FPV + Splices	Round		Linear	
5c2	Walls FPV			Linear	
6f1	Floor Lonsit. Top				
5f2	Floor Lonsit. Bots.				
6m1	Floor Transv. Top				
6n1	Walls Bott. Fillets/Slope		4		
5p1	Fence Anchors (Galvanized)		2	2'-0"	4
				Total Wt.=	

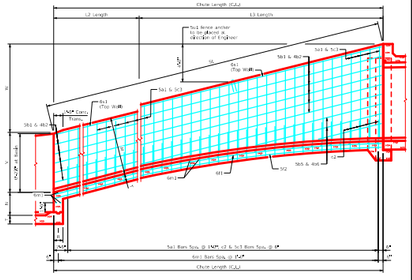
Weight of bars over 40'-0" long include an allowance for lap 2'-0" for 6s bars and 2'-6" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.

Listed Bars

Bar 5a1
2 Bars
1 @ 7
1 Var. • 2 Ea. Lgth.

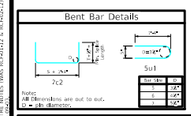
Bar 5c3
2 Bars
1 @ 7
1 Var. • 2 Ea. Lgth.

Bar 5b5 and 4b6
6 Bars • 2 Ea. Lgth.



?'x8' Flume Chute - Longitudinal Section

Bent Bar Details



Notes:
All dimensions are out to out.
Ø = pin diameter.

Bar Mk.	Pin
5	1"
7	1"

Concrete Placement Quantities

Location	Number	Width	Total
Flume	—	—	—
Junction Box			
Basin			
Basin Curtain			
Total (CY)			

Flume Data

<A = 18°26'
<C = 71°00'
B = 135°26"
SL =
V = 6'-3 1/8"
W =
M = 6'-0"
T = 0'-11"
H = 6'-0"

Curve Data

CA =
L2 =
L3 = 213'-3"
<C = 12°45"
C = 12'-7"
P.C. Elev. =
P.I. Elev. =
P.R. Elev. =
P.T. Elev. =
X1 = 71'-11"
X2 = 2'-0"
X3 = 71'-11"
X4 = 0'-0"
L3/4 = 69'-11"

Notes:

1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBI 12-20 for bell joint information and details not shown.
3. See Sheet RCFB 12-20 for flume basin information and details not shown.

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. OF FILE NO. DESIGN NO.

DESIGN TEAM		COUNTY	PROJECT NUMBER	SHEET NUMBER
Flume Chute Length = 6' Module	Concrete Mixed: 6S2(AE)			

12/29/2020 9:52:41 PM BKloss W:\Highway\Bridge\Standards\Current\LRFD\Drgfiles\RFBengSCurrFlu.Dgn 07/07/08 11x17.pat.ptb.cfg

3:1 SLOPE FLUME

6 x 8

Flume Data
<A = 18°26"
<C = 71°00"
B = 135°26"
SL =
V = 6'-3 1/8"
W =
M = 6'-0"
T = 0'-11"
H = 6'-0"

Curve Data
CA =
L2 =
L3 = 213'-3"
<C = 12°45"
C = 12'-7"
P.C. Elev. =
P.I. Elev. =
P.R. Elev. =
P.T. Elev. =
X1 = 71'-11"
X2 = 2'-0"
X3 = 71'-11"
X4 = 0'-0"
L3/4 = 69'-11"

8 x 8

Flume Data
<A = 18°26"
<C = 71°00"
B = 135°26"
SL =
V = 8'-3 1/8"
W =
M = 8'-0"
T = 0'-11"
H = 8'-0"

Curve Data
CA =
L2 =
L3 = 299'-3"
<C = 12°45"
C = 12'-7"
P.C. Elev. =
P.I. Elev. =
P.R. Elev. =
P.T. Elev. =
X1 = 99'-11"
X2 = 2'-0"
X3 = 99'-11"
X4 = 0'-0"
L3/4 = 97'-11"

10 x 8

Flume Data
<A = 18°26"
<C = 71°00"
B = 135°26"
SL =
V = 8'-3 1/8"
W =
M = 8'-0"
T = 0'-11"
H = 8'-0"

Curve Data
CA =
L2 =
L3 = 299'-3"
<C = 12°45"
C = 12'-7"
P.C. Elev. =
P.I. Elev. =
P.R. Elev. =
P.T. Elev. =
X1 = 99'-11"
X2 = 2'-0"
X3 = 99'-11"
X4 = 0'-0"
L3/4 = 97'-11"

12 x 8

Flume Data
<A = 18°26"
<C = 71°00"
B = 135°26"
SL =
V = 8'-3 1/8"
W =
M = 8'-0"
T = 0'-11"
H = 8'-0"

Curve Data
CA =
L2 =
L3 = 299'-3"
<C = 12°45"
C = 12'-7"
P.C. Elev. =
P.I. Elev. =
P.R. Elev. =
P.T. Elev. =
X1 = 99'-11"
X2 = 2'-0"
X3 = 99'-11"
X4 = 0'-0"
L3/4 = 97'-11"

14 x 8

Flume Data
<A = 18°26"
<C = 71°00"
B = 135°26"
SL =
V = 8'-3 1/8"
W =
M = 8'-0"
T = 0'-11"
H = 8'-0"

Curve Data
CA =
L2 =
L3 = 299'-3"
<C = 12°45"
C = 12'-7"
P.C. Elev. =
P.I. Elev. =
P.R. Elev. =
P.T. Elev. =
X1 = 99'-11"
X2 = 2'-0"
X3 = 99'-11"
X4 = 0'-0"
L3/4 = 97'-11"

16 x 8

Flume Data
<A = 18°26"
<C = 71°00"
B = 135°26"
SL =
V = 8'-3 1/8"
W =
M = 8'-0"
T = 0'-11"
H = 8'-0"

Curve Data
CA =
L2 =
L3 = 299'-3"
<C = 12°45"
C = 12'-7"
P.C. Elev. =
P.I. Elev. =
P.R. Elev. =
P.T. Elev. =
X1 = 99'-11"
X2 = 2'-0"
X3 = 99'-11"
X4 = 0'-0"
L3/4 = 97'-11"

4:1 SLOPE FLUME

6 x 8

Flume Data
<A = 14°02"
<C = 71°00"
B = 135°26"
SL =
V = 6'-3 1/8"
W =
M = 6'-0"
T = 0'-11"
H = 6'-0"

Curve Data
CA =
L2 =
L3 = 355'-3"
D = 17°-10"
E = 13'-9"
P.C. Elev. =
P.I. Elev. =
P.R. Elev. =
P.T. Elev. =
X1 = 119'-11"
X2 = 2'-0"
X3 = 119'-11"
X4 = 0'-0"
L3/4 = 115'-11"

8 x 8

Flume Data
<A = 14°02"
<C = 71°00"
B = 135°26"
SL =
V = 8'-3 1/8"
W =
M = 8'-0"
T = 0'-11"
H = 8'-0"

Curve Data
CA =
L2 =
L3 = 355'-3"
D = 17°-10"
E = 13'-9"
P.C. Elev. =
P.I. Elev. =
P.R. Elev. =
P.T. Elev. =
X1 = 119'-11"
X2 = 2'-0"
X3 = 119'-11"
X4 = 0'-0"
L3/4 = 115'-11"

10 x 8

Flume Data
<A = 14°02"
<C = 71°00"
B = 135°26"
SL =
V = 8'-3 1/8"
W =
M = 8'-0"
T = 0'-11"
H = 8'-0"

Curve Data
CA =
L2 =
L3 = 355'-3"
D = 17°-10"
E = 13'-9"
P.C. Elev. =
P.I. Elev. =
P.R. Elev. =
P.T. Elev. =
X1 = 119'-11"
X2 = 2'-0"
X3 = 119'-11"
X4 = 0'-0"
L3/4 = 115'-11"

12 x 8

Flume Data
<A = 14°02"
<C = 71°00"
B = 135°26"
SL =
V = 8'-3 1/8"
W =
M = 8'-0"
T = 0'-11"
H = 8'-0"

Curve Data
CA =
L2 =
L3 = 355'-3"
D = 17°-10"
E = 13'-9"
P.C. Elev. =
P.I. Elev. =
P.R. Elev. =
P.T. Elev. =
X1 = 119'-11"
X2 = 2'-0"
X3 = 119'-11"
X4 = 0'-0"
L3/4 = 115'-11"

14 x 8

Flume Data
<A = 14°02"
<C = 71°00"
B = 135°26"
SL =
V = 8'-3 1/8"
W =
M = 8'-0"
T = 0'-11"
H = 8'-0"

Curve Data
CA =
L2 =
L3 = 355'-3"
D = 17°-10"
E = 13'-9"
P.C. Elev. =
P.I. Elev. =
P.R. Elev. =
P.T. Elev. =
X1 = 119'-11"
X2 = 2'-0"
X3 = 119'-11"
X4 = 0'-0"
L3/4 = 115'-11"

16 x 8

Flume Data
<A = 14°02"
<C = 71°00"
B = 135°26"
SL =
V = 8'-3 1/8"
W =
M = 8'-0"
T = 0'-11"
H = 8'-0"

Curve Data
CA =
L2 =
L3 = 355'-3"
D = 17°-10"
E = 13'-9"
P.C. Elev. =
P.I. Elev. =
P.R. Elev. =
P.T. Elev. =
X1 = 119'-11"
X2 = 2'-0"
X3 = 119'-11"
X4 = 0'-0"
L3/4 = 115'-11"

Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
5a1	Walls FPV			Linear	
5b1	Walls FPH • Section 1		10		
6b2	Walls FPH • Section 1		10		
5b3	Walls FPH • Section 2		10		
6b4	Walls FPH • Section 2		10		
5c1	Slab, Floor & Walls FPV + Splices		8	Linear	
5c2	Walls FPV		8	Linear	
6f1	Floor Lonsit. Top • Section 1				
5f2	Floor Lonsit. Bots. • Section 1				
6f3	Floor Lonsit. Top • Section 2				
5f4	Floor Lonsit. Bots. • Section 2				
6m1	Slab Curtain • Section 2		14		
6m2	Floor Transv. Top				
6n1	Walls Bott. Fillets Slope • Section 1		4		
6n2	Walls Bott. Fillets Slope • Section 2		4		
5p1	Fence Anchors (Galvanized)		2	2'-0"	4
				Total Wt.=	

Weight of bars over 40'-0" long include an allowance for lap 2'-0" for 6s bars and 2'-6" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.

Listed Bars
Bar 5a1
2 Bars
1 @ 7
1 Var. • 2 Ea. Lgth.

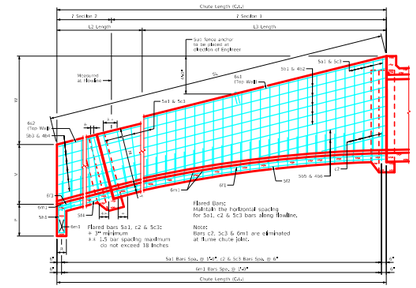
Bar 5c3
2 Bars
1 @ 7
1 Var. • 2 Ea. Lgth.

Bar 5b5 and 4b6
6 Bars • 2 Ea. Lgth.

Bent Bar Details

Concrete Placement Quantities

Location	Number	Width	Total
Flume • Section 1			
Flume • Section 2			
Junction Box			
Chute Wall			
Slab Curtain			
Total (CY)			



?'x8' Flume Chute - Longitudinal Section

Notes:
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBI 12-20 for bell joint information and details not shown.

Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
5a1	Walls FPV			Linear	
5b1	Walls FPH • Section 1		10		
6b2	Walls FPH • Section 1		10		
5b3	Walls FPH • Section 2		10		
6b4	Walls FPH • Section 2		10		
5c1	Slab, Floor & Walls FPV + Splices		8	Linear	
5c2	Walls FPV		8	Linear	
6f1	Floor Lonsit. Top • Section 1				
5f2	Floor Lonsit. Bots. • Section 1				
6f3	Floor Lonsit. Top • Section 2				
5f4	Floor Lonsit. Bots. • Section 2				
6m1	Slab Curtain • Section 2		14		
6m2	Floor Transv. Top				
6n1	Walls Bott. Fillets Slope • Section 1		4		
6n2	Walls Bott. Fillets Slope • Section 2		4		
5p1	Fence Anchors (Galvanized)		2	2'-0"	4
				Total Wt.=	

Weight of bars over 40'-0" long include an allowance for lap 2'-0" for 6s bars and 2'-6" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.

Listed Bars
Bar 5a1
2 Bars
1 @ 7
1 Var. • 2 Ea. Lgth.

Bar 5c3
2 Bars
1 @ 7
1 Var. • 2 Ea. Lgth.

Bar 5b5 and 4b6
6 Bars • 2 Ea. Lgth.

Bent Bar Details

Concrete Placement Quantities

Location	Number	Width	Total
Flume • Section 1			
Flume • Section 2			
Junction Box			
Chute Wall			
Slab Curtain			
Total (CY)			

?'x8' Flume Chute - Longitudinal Section

Notes:
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBI 12-20 for bell joint information and details not shown.

Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
5a1	Walls FPV			Linear	
5b1	Walls FPH • Section 1		10		
6b2	Walls FPH • Section 1		10		
5b3	Walls FPH • Section 2		10		
6b4	Walls FPH • Section 2		10		
5c1	Slab, Floor & Walls FPV + Splices		8	Linear	
5c2	Walls FPV		8	Linear	
6f1	Floor Lonsit. Top • Section 1				
5f2	Floor Lonsit. Bots. • Section 1				
6f3	Floor Lonsit. Top • Section 2				
5f4	Floor Lonsit. Bots. • Section 2				
6m1	Slab Curtain • Section 2		14		
6m2	Floor Transv. Top				
6n1	Walls Bott. Fillets Slope • Section 1		4		
6n2	Walls Bott. Fillets Slope • Section 2		4		
5p1	Fence Anchors (Galvanized)		2	2'-0"	4
				Total Wt.=	

Weight of bars over 40'-0" long include an allowance for lap 2'-0" for 6s bars and 2'-6" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.

Listed Bars
Bar 5a1
2 Bars
1 @ 7
1 Var. • 2 Ea. Lgth.

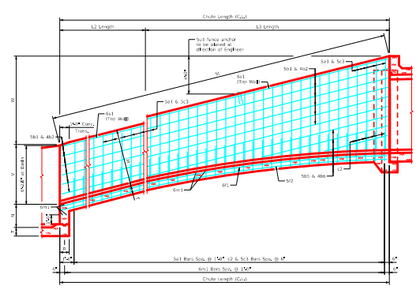
Bar 5c3
2 Bars
1 @ 7
1 Var. • 2 Ea. Lgth.

Bar 5b5 and 4b6
6 Bars • 2 Ea. Lgth.

Bent Bar Details

Concrete Placement Quantities

Location	Number	Width	Total
Flume • Section 1			
Flume • Section 2			
Junction Box			
Chute Wall			
Slab Curtain			
Total (CY)			



?'x8' Flume Chute - Longitudinal Section

Notes:
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBI 12-20 for bell joint information and details not shown.
3. See Sheet RCFB 12-20 for flume basin information and details not shown.

Reinforcing Bar List - Flume

Bar	Description	Shape	No.	Length	Weight
1a1	Width TYP.			Varies	
1b1	Width TYP.		12		
4a1	Width TYP.		12		
5b5	Width TYP.		6	Varies	
6b6	Width TYP.		6	Varies	
2c2	Walls, Floor & Walls TYP. + Splices				
5c3	Width TYP.			Varies	
6f2	Floor Length, Top				
6f2	Floor Length, Bots.				
6m1	Floor Thickness, Top				
6s1	Width Each Footing Slope		4		
5s1	Fence Anchors (Embedded)		2	2'-0"	6
				Total (LBS)	

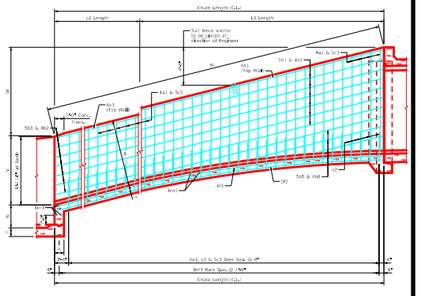
Weight of bars over 40'-0" long include an allowance for lap 12'-0" for 6s bars and 2'-0" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.

Listed Bars

Bar 4a1
2 Bars
@ 7
2 Vert. • 2 Ea. Ligth.

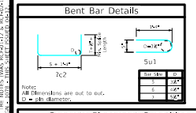
Bar 5c3
2 Bars
@ 7
2 Vert. • 2 Ea. Ligth.

Bar 5b5 and 4b6
6 Bars • 2 Ea. Ligth.



7'x9' Flume Chute - Longitudinal Section

Bent Bar Details



Bar Mark	Size
h	1'-0"
c	1'-0"
u	1'-0"

Notes:
All dimensions are out to out.
Ø = dia. diameter.

Concrete Placement Quantities

Location	Feet/yd	Inch	Total
Flume	—	—	—
Junction Box			
Bath			
Chute Curve			
Total (CY)			

Flume Data

4A = 18'-2½"
4C = 1'-10½"
B = 14'-0"
S1 =
V = 7'-1⅛"
W =
M = 6'-0"
T = 1'-5"
H = 9'-0"

Curve Data

C_{CL} =
L2 =
L3 = 26'-7⅜"
D = 17'-6⅜"
E = 17'-3⅛"
P.C. ELEV. =
P.I. ELEV. =
P.R. ELEV. =
P.T. ELEV. =
X1 = 15'-0⅜"
X2 = 7'-7⅛"
X3 = 7'-7⅛"
X4 = 0'-1⅜"
L3-4 = 15'-0⅜"

Notes;

1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBI 25-20 for bolt joint information and details not shown.
3. See Sheet RCFB 25-20 for flume basin information and details not shown.

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. OF FILE NO. DESIGN NO.

DESIGN TEAM	Bridge Chutes (width in 2' widths)	Concessions Stand (Utilities)	COUNTY	PROJECT NUMBER	SHEET NUMBER

12/24/2020 10:26:49 PM dkrebs W:\Highway\Bridge\Standards\Current\LRFD\Drawings\Chutes\Chute.dgn 12/10/04 11x17.pat.gsf.cfg

3:1 SLOPE FLUME

8 x 9

Flume Data

4A = 18'-2½"
4C = 1'-10½"
B = 14'-0"
S1 =
V = 7'-1⅛"
W =
M = 6'-0"
T = 1'-5"
H = 9'-0"

Curve Data

C_{CL} =
L2 =
L3 = 26'-7⅜"
D = 17'-6⅜"
E = 17'-3⅛"
P.C. ELEV. =
P.I. ELEV. =
P.R. ELEV. =
P.T. ELEV. =
X1 = 15'-0⅜"
X2 = 7'-7⅛"
X3 = 7'-7⅛"
X4 = 0'-1⅜"
L3-4 = 15'-0⅜"

10 x 9

Flume Data

4A = 18'-2½"
4C = 1'-10½"
B = 14'-0"
S1 =
V = 7'-1⅛"
W =
M = 6'-0"
T = 1'-5"
H = 9'-0"

Curve Data

C_{CL} =
L2 =
L3 = 26'-7⅜"
D = 17'-6⅜"
E = 17'-3⅛"
P.C. ELEV. =
P.I. ELEV. =
P.R. ELEV. =
P.T. ELEV. =
X1 = 15'-0⅜"
X2 = 7'-7⅛"
X3 = 7'-7⅛"
X4 = 0'-1⅜"
L3-4 = 15'-0⅜"

12 x 9

Flume Data

4A = 18'-2½"
4C = 1'-10½"
B = 14'-0"
S1 =
V = 7'-1⅛"
W =
M = 6'-0"
T = 1'-5"
H = 9'-0"

Curve Data

C_{CL} =
L2 =
L3 = 26'-7⅜"
D = 17'-6⅜"
E = 17'-3⅛"
P.C. ELEV. =
P.I. ELEV. =
P.R. ELEV. =
P.T. ELEV. =
X1 = 15'-0⅜"
X2 = 7'-7⅛"
X3 = 7'-7⅛"
X4 = 0'-1⅜"
L3-4 = 15'-0⅜"

14 x 9

Flume Data

4A = 18'-2½"
4C = 1'-10½"
B = 14'-0"
S1 =
V = 7'-1⅛"
W =
M = 6'-0"
T = 1'-5"
H = 9'-0"

Curve Data

C_{CL} =
L2 =
L3 = 26'-7⅜"
D = 17'-6⅜"
E = 17'-3⅛"
P.C. ELEV. =
P.I. ELEV. =
P.R. ELEV. =
P.T. ELEV. =
X1 = 15'-0⅜"
X2 = 7'-7⅛"
X3 = 7'-7⅛"
X4 = 0'-1⅜"
L3-4 = 15'-0⅜"

16 x 9

Flume Data

4A = 18'-2½"
4C = 1'-10½"
B = 14'-0"
S1 =
V = 7'-1⅛"
W =
M = 6'-0"
T = 1'-5"
H = 9'-0"

Curve Data

C_{CL} =
L2 =
L3 = 26'-7⅜"
D = 17'-6⅜"
E = 17'-3⅛"
P.C. ELEV. =
P.I. ELEV. =
P.R. ELEV. =
P.T. ELEV. =
X1 = 15'-0⅜"
X2 = 7'-7⅛"
X3 = 7'-7⅛"
X4 = 0'-1⅜"
L3-4 = 15'-0⅜"

4:1 SLOPE FLUME

8 x 9

Flume Data

4A = 14'-0"
4C = 1'-10"
B = 10'-3⅛"
S1 =
V = 6'-1⅛"
W =
M = 4'-6"
T = 1'-1"
H = 9'-0"

Curve Data

C_{CL} =
L2 =
L3 = 31'-10⅛"
D = 10'-9⅛"
E = 10'-6⅛"
P.C. ELEV. =
P.I. ELEV. =
P.R. ELEV. =
P.T. ELEV. =
X1 = 9'-0⅛"
X2 = 7'-5⅛"
X3 = 7'-1⅛"
X4 = 0'-1⅜"
L3-4 = 9'-0⅛"

10 x 9

Flume Data

4A = 14'-0"
4C = 1'-10"
B = 10'-3⅛"
S1 =
V = 6'-1⅛"
W =
M = 4'-6"
T = 1'-1"
H = 9'-0"

Curve Data

C_{CL} =
L2 =
L3 = 31'-10⅛"
D = 10'-9⅛"
E = 10'-6⅛"
P.C. ELEV. =
P.I. ELEV. =
P.R. ELEV. =
P.T. ELEV. =
X1 = 9'-0⅛"
X2 = 7'-5⅛"
X3 = 7'-1⅛"
X4 = 0'-1⅜"
L3-4 = 9'-0⅛"

12 x 9

Flume Data

4A = 14'-0"
4C = 1'-10"
B = 10'-3⅛"
S1 =
V = 6'-1⅛"
W =
M = 4'-6"
T = 1'-1"
H = 9'-0"

Curve Data

C_{CL} =
L2 =
L3 = 31'-10⅛"
D = 10'-9⅛"
E = 10'-6⅛"
P.C. ELEV. =
P.I. ELEV. =
P.R. ELEV. =
P.T. ELEV. =
X1 = 9'-0⅛"
X2 = 7'-5⅛"
X3 = 7'-1⅛"
X4 = 0'-1⅜"
L3-4 = 9'-0⅛"

14 x 9

Flume Data

4A = 14'-0"
4C = 1'-10"
B = 10'-3⅛"
S1 =
V = 6'-1⅛"
W =
M = 4'-6"
T = 1'-1"
H = 9'-0"

Curve Data

C_{CL} =
L2 =
L3 = 31'-10⅛"
D = 10'-9⅛"
E = 10'-6⅛"
P.C. ELEV. =
P.I. ELEV. =
P.R. ELEV. =
P.T. ELEV. =
X1 = 9'-0⅛"
X2 = 7'-5⅛"
X3 = 7'-1⅛"
X4 = 0'-1⅜"
L3-4 = 9'-0⅛"

16 x 9

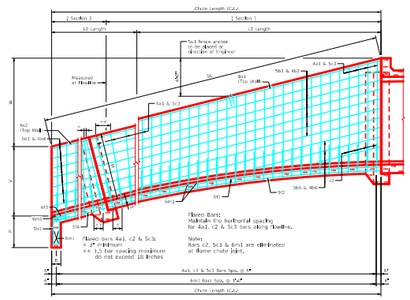
Flume Data

4A = 14'-0"
4C = 1'-10"
B = 10'-3⅛"
S1 =
V = 6'-1⅛"
W =
M = 4'-6"
T = 1'-1"
H = 9'-0"

Curve Data

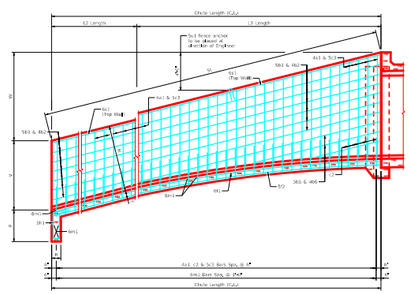
C_{CL} =
L2 =
L3 = 31'-10⅛"
D = 10'-9⅛"
E = 10'-6⅛"
P.C. ELEV. =
P.I. ELEV. =
P.R. ELEV. =
P.T. ELEV. =
X1 = 9'-0⅛"
X2 = 7'-5⅛"
X3 = 7'-1⅛"
X4 = 0'-1⅜"
L3-4 = 9'-0⅛"

Reinforcing Bar List - Flume
Listed Bars
Bar 4a1
2 Bars
@ 7
2 Vert. • 2 Ea. Ligth.
Bar 5c3
2 Bars
@ 7
2 Vert. • 2 Ea. Ligth.
Bar 5b5 and 4b6
6 Bars • 2 Ea. Ligth.
Weight of bars over 40'-0" long include an allowance for lap 12'-0" for 6s bars and 2'-0" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.
Bent Bar Details
Concrete Placement Quantities
Flume Data
Curve Data
Notes;
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBI 25-20 for bolt joint information and details not shown.
3. See Sheet RCFB 25-20 for flume basin information and details not shown.
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION



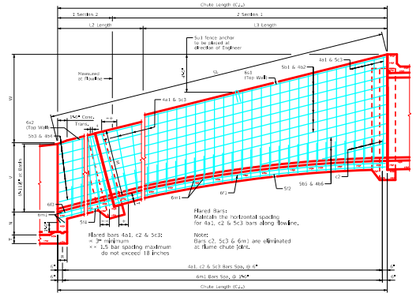
7'x9' Flume Chute - Longitudinal Section

Reinforcing Bar List - Flume
Listed Bars
Bar 4a1
2 Bars
@ 7
2 Vert. • 2 Ea. Ligth.
Bar 5c3
2 Bars
@ 7
2 Vert. • 2 Ea. Ligth.
Bar 5b5 and 4b6
6 Bars • 2 Ea. Ligth.
Weight of bars over 40'-0" long include an allowance for lap 12'-0" for 6s bars and 2'-0" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.
Bent Bar Details
Concrete Placement Quantities
Flume Data
Curve Data
Notes;
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBI 25-20 for bolt joint information and details not shown.
3. See Sheet RCFB 25-20 for flume basin information and details not shown.
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION



?'x9' Flume Chute - Longitudinal Section

Reinforcing Bar List - Flume
Listed Bars
Bar 4a1
2 Bars
@ 7
2 Vert. • 2 Ea. Ligth.
Bar 5c3
2 Bars
@ 7
2 Vert. • 2 Ea. Ligth.
Bar 5b5 and 4b6
6 Bars • 2 Ea. Ligth.
Weight of bars over 40'-0" long include an allowance for lap 12'-0" for 6s bars and 2'-0" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.
Bent Bar Details
Concrete Placement Quantities
Flume Data
Curve Data
Notes;
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBI 25-20 for bolt joint information and details not shown.
3. See Sheet RCFB 25-20 for flume basin information and details not shown.
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION



?'x9' Flume Chute - Longitudinal Section

REVISED 4/24/19 - CHANGED DESIGNATION TO "4:1" & "FLUME DATA" FROM "*" TO ALLEVIATE CONFUSION WITH THE WORD "SKEW".
REVISED 8/23/23 - UPDATED TO STANDARD SHEET LAYOUT, UPDATED BAR LISTS PER ASHTO 2018 STDS.
REVISED 10/25/23 - ATTACHED TO STANDARD SHEET 1 OF 3, UPDATED BAR LISTS PER ASHTO 2018 STDS, CHANGED THE REFERENCE TO STANDARD
SUDAS 2020 Standard Specifications

Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
Sa1	Width, FPU			Uplook	
Sb1	Width, FPU		11		
Sb2	Width, FPU		11		
Sb3	Width, FPU		8	Uplook	
Sb4	Width, FPU		8	Uplook	
Sc1	Slab, Floor & Width, FPU + Splash	Varied		Varied	
Sc2	Width, FPU			Uplook	
Sf1	Floor Length, Top				
Sf2	Floor Length, Slab				
Sm1	Floor Frames, Top				
Sn1	Width, Both + Along Slope		4		
Sp1	Fence Anchors (bidirectional)		4	2'-0"	6
				Total (LBS)	

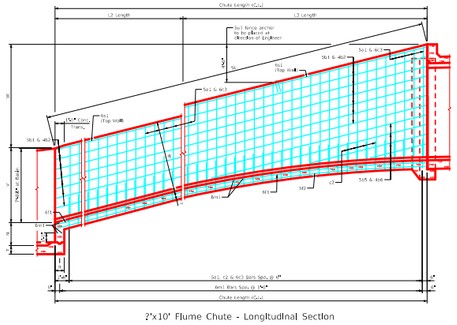
Weight of bars over 40'-0" long include an allowance for lap 2'-0" for 6s bars and 1'-0" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.

Listed Bars

Bar Sa1
2 Bars
1 @ 7
1 Vert. • 2 Ea. Ligth.

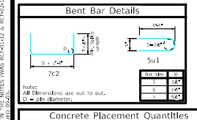
Bar 6c3
2 Bars
1 @ 7
1 Vert. • 2 Ea. Ligth.

Bar Sb5 and 4b6
8 Bars • 2 Ea. Ligth.



?'x10' Flume Chute - Longitudinal Section

Bent Bar Details



Bar Mk.	No.
A	1@#"
B	1@#"
C	1@#"

Notes:
All Dimensions are out to out.
D = all diameter.

Concrete Placement Quantities

Location	Footing	Walls	Total
Flume	—	—	—
Junction Wall			
Bulb			
Bulb Outside			
Total (CY)			

Flume Data

<A = 18°26'
<C = 11°00"
B = 14'-04⅝"
SL =
V = 7'-10⅜"
W =
M = 1'-6"
T = 1'-0"
H = 10'-0"

Curve Data

CA =
L2 =
L3 = 27'-11⅜"
D = 14'-04⅝"
E = 13'-11⅜"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 14'-04⅝"
X2 = 7'-10⅜"
X3 = 1'-6"
X4 = 10'-0"
L3/4 = 6'-11⅜"

Notes:

1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FB1 2-20 for bell joint information and details not shown.
3. See Sheet RCFB 2-20 for flume basin information and details not shown.

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. OF FILE NO. DESIGN NO.

DESIGN TEAM | Flume cross section and notes | Standard Sheet 10/25/23 | COUNTY | PROJECT NUMBER | SHEET NUMBER

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3:1 SLOPE FLUME

8 x 10

Flume Data

<A = 18°26"
<C = 11°00"
B = 14'-04⅝"
SL =
V = 7'-10⅜"
W =
M = 1'-6"
T = 1'-0"
H = 10'-0"

Curve Data

CA =
L2 =
L3 = 27'-11⅜"
D = 14'-04⅝"
E = 13'-11⅜"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 14'-04⅝"
X2 = 7'-10⅜"
X3 = 1'-6"
X4 = 10'-0"
L3/4 = 6'-11⅜"

10 x 10

Flume Data

<A = 18°26"
<C = 11°00"
B = 14'-04⅝"
SL =
V = 7'-10⅜"
W =
M = 1'-6"
T = 1'-0"
H = 10'-0"

Curve Data

CA =
L2 =
L3 = 27'-11⅜"
D = 14'-04⅝"
E = 13'-11⅜"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 14'-04⅝"
X2 = 7'-10⅜"
X3 = 1'-6"
X4 = 10'-0"
L3/4 = 6'-11⅜"

12 x 10

Flume Data

<A = 18°26"
<C = 11°00"
B = 14'-04⅝"
SL =
V = 7'-10⅜"
W =
M = 1'-6"
T = 1'-0"
H = 10'-0"

Curve Data

CA =
L2 =
L3 = 27'-11⅜"
D = 14'-04⅝"
E = 13'-11⅜"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 14'-04⅝"
X2 = 7'-10⅜"
X3 = 1'-6"
X4 = 10'-0"
L3/4 = 6'-11⅜"

14 x 10

Flume Data

<A = 18°26"
<C = 11°00"
B = 14'-04⅝"
SL =
V = 7'-10⅜"
W =
M = 1'-6"
T = 1'-0"
H = 10'-0"

Curve Data

CA =
L2 =
L3 = 27'-11⅜"
D = 14'-04⅝"
E = 13'-11⅜"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 14'-04⅝"
X2 = 7'-10⅜"
X3 = 1'-6"
X4 = 10'-0"
L3/4 = 6'-11⅜"

16 x 10

Flume Data

<A = 18°26"
<C = 11°00"
B = 14'-04⅝"
SL =
V = 7'-10⅜"
W =
M = 1'-6"
T = 1'-0"
H = 10'-0"

Curve Data

CA =
L2 =
L3 = 27'-11⅜"
D = 14'-04⅝"
E = 13'-11⅜"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 14'-04⅝"
X2 = 7'-10⅜"
X3 = 1'-6"
X4 = 10'-0"
L3/4 = 6'-11⅜"

4:1 SLOPE FLUME

8 x 10

Flume Data

<A = 14°02"
<C = 7°00"
B = 20'-03⅛"
SL =
V = 7'-10⅜"
W =
M = 1'-6"
T = 1'-0"
H = 10'-0"

Curve Data

CA =
L2 =
L3 = 39'-6⅛"
D = 20'-03⅛"
E = 19'-6⅛"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 20'-03⅛"
X2 = 7'-10⅜"
X3 = 1'-6"
X4 = 10'-0"
L3/4 = 9'-9 1/16"(+)

10 x 10

Flume Data

<A = 14°02"
<C = 7°00"
B = 20'-03⅛"
SL =
V = 7'-10⅜"
W =
M = 1'-6"
T = 1'-0"
H = 10'-0"

Curve Data

CA =
L2 =
L3 = 39'-6⅛"
D = 20'-03⅛"
E = 19'-6⅛"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 20'-03⅛"
X2 = 7'-10⅜"
X3 = 1'-6"
X4 = 10'-0"
L3/4 = 9'-9 1/16"(+)

12 x 10

Flume Data

<A = 14°02"
<C = 7°00"
B = 20'-03⅛"
SL =
V = 7'-10⅜"
W =
M = 1'-6"
T = 1'-0"
H = 10'-0"

Curve Data

CA =
L2 =
L3 = 39'-6⅛"
D = 20'-03⅛"
E = 19'-6⅛"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 20'-03⅛"
X2 = 7'-10⅜"
X3 = 1'-6"
X4 = 10'-0"
L3/4 = 9'-9 1/16"(+)

14 x 10

Flume Data

<A = 14°02"
<C = 7°00"
B = 20'-03⅛"
SL =
V = 7'-10⅜"
W =
M = 1'-6"
T = 1'-0"
H = 10'-0"

Curve Data

CA =
L2 =
L3 = 39'-6⅛"
D = 20'-03⅛"
E = 19'-6⅛"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 20'-03⅛"
X2 = 7'-10⅜"
X3 = 1'-6"
X4 = 10'-0"
L3/4 = 9'-9 1/16"(+)

16 x 10

Flume Data

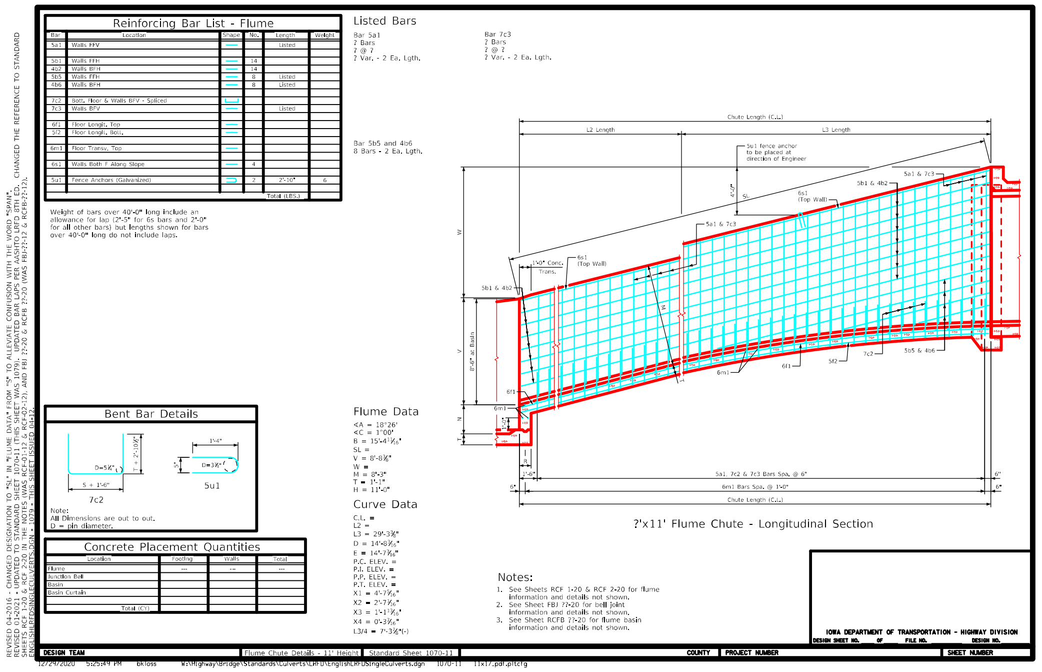
<A = 14°02"
<C = 7°00"
B = 20'-03⅛"
SL =
V = 7'-10⅜"
W =
M = 1'-6"
T = 1'-0"
H = 10'-0"

Curve Data

CA =
L2 =
L3 = 39'-6⅛"
D = 20'-03⅛"
E = 19'-6⅛"
P.C. Elev. =
P.I. Elev. =
P.T. Elev. =
X1 = 20'-03⅛"
X2 = 7'-10⅜"
X3 = 1'-6"
X4 = 10'-0"
L3/4 = 9'-9 1/16"(+)

Reinforcing Bar List - Flume
Listed Bars
Bar Sa1
2 Bars
1 @ 7
1 Vert. • 2 Ea. Ligth.
Bar 6c3
2 Bars
1 @ 7
1 Vert. • 2 Ea. Ligth.
Bar Sb5 and 4b6
8 Bars • 2 Ea. Ligth.
Weight of bars over 40'-0" long include an allowance for lap 1'-0" for 6s bars and 2'-0" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.
Bent Bar Details
Concrete Placement Quantities
?'x10' Flume Chute - Longitudinal Section
Notes:
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FB1 2-20 for bell joint information and details not shown.

Reinforcing Bar List - Flume
Listed Bars
Bar Sa1
2 Bars
1 @ 7
1 Vert. • 2 Ea. Ligth.
Bar 6c3
2 Bars
1 @ 7
1 Vert. • 2 Ea. Ligth.
Bar Sb5 and 4b6
8 Bars • 2 Ea. Ligth.
Weight of bars over 40'-0" long include an allowance for lap 1'-0" for 6s bars and 2'-0" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.
Bent Bar Details
Concrete Placement Quantities
?'x10' Flume Chute - Longitudinal Section
Notes:
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FB1 2-20 for bell joint information and details not shown.
3. See Sheet RCFB 2-20 for flume basin information and details not shown.

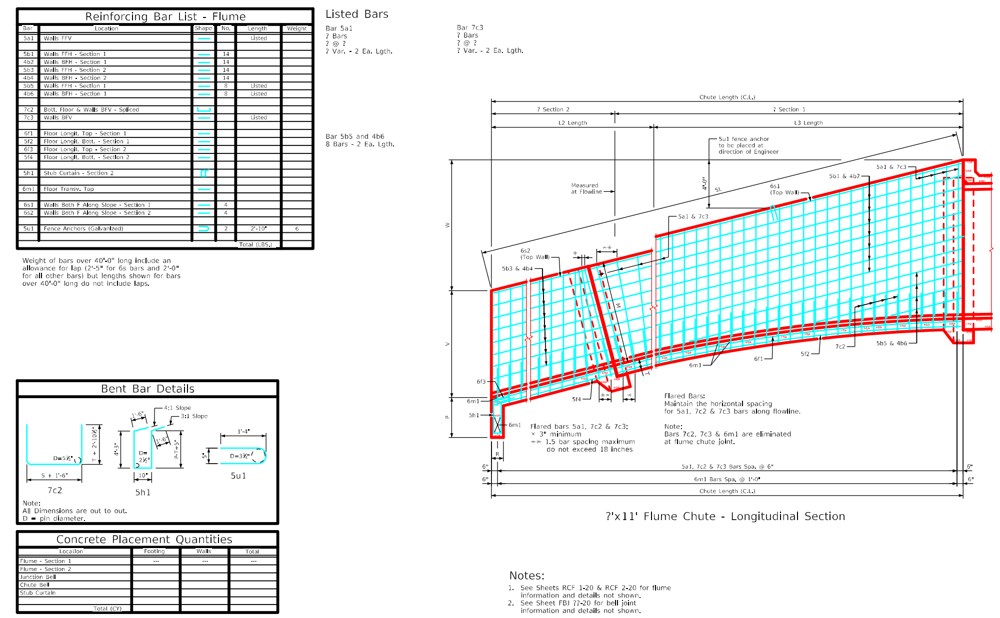


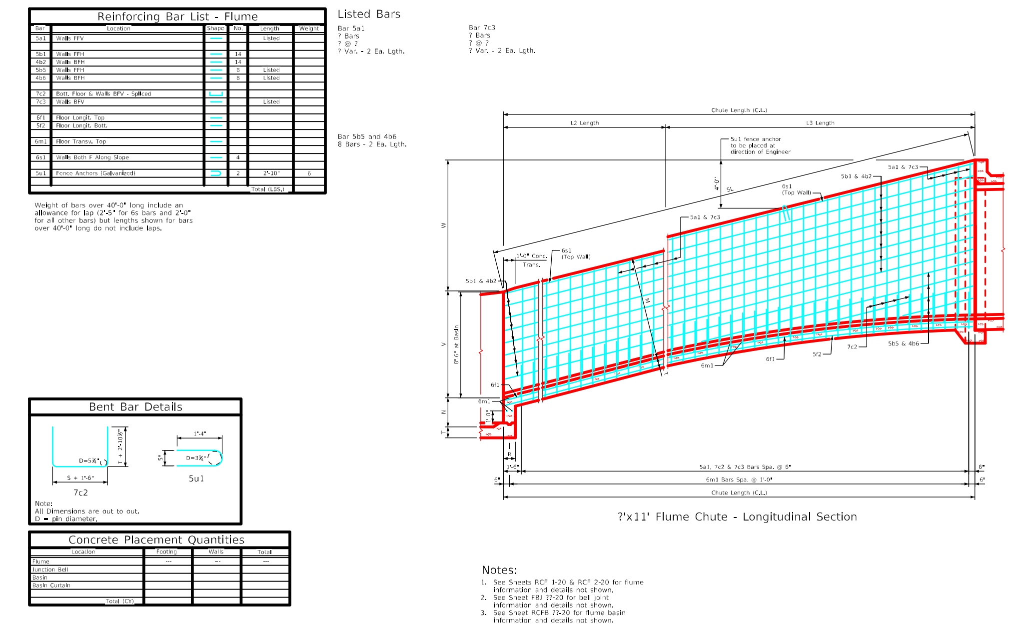
3:1 SLOPE FLUME

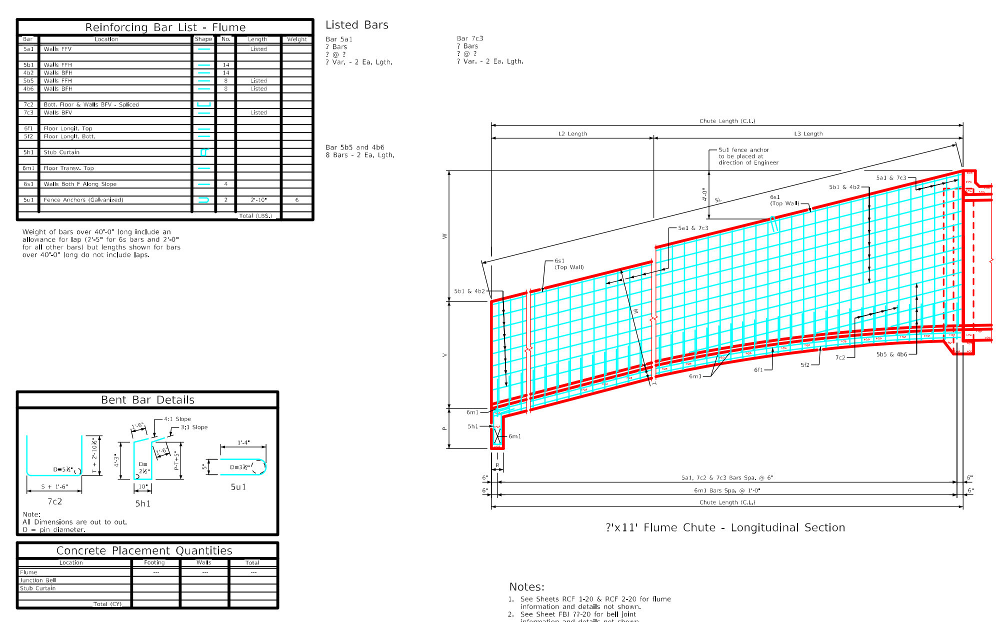
	10 x 11	12 x 11	14 x 11	16 x 11
Flume Data				
∢A =	18°26'	18°26'	18°26'	18°26'
∢C =	1°00'	1°00'	1°00'	1°00'
B =	15'-4 11/16"	15'-4 11/16"	15'-4 11/16"	15'-4 11/16"
SL =				
V =	8'-8 3/8"	8'-8 3/8"	8'-8 3/8"	8'-8 3/8"
W =				
M =	8'-3"	8'-3"	8'-3"	8'-3"
T =	1'-1"	1'-2"	1'-2"	1'-2"
H =	11'-0"	11'-0"	11'-0"	11'-0"
Curve Data				
C.L. =				
L2 =				
L3 =	29'-3 3/8"	29'-3 3/8"	29'-3 3/8"	29'-3 3/8"
D =	14'-8 3/16"	14'-8 3/16"	14'-8 3/16"	14'-8 3/16"
E =	14'-7 3/16"	14'-7 3/16"	14'-7 3/16"	14'-7 3/16"
P.C. ELEV. =				
P.I. ELEV. =				
P.P. ELEV. =				
P.T. ELEV. =				
X1 =	4'-7 5/16"	4'-7 5/16"	4'-7 5/16"	4'-7 5/16"
X2 =	2'-7 1/16"	2'-7 1/16"	2'-7 1/16"	2'-7 1/16"
X3 =	1'-1 13/16"	1'-1 13/16"	1'-1 13/16"	1'-1 13/16"
X4 =	0'-3 7/16"	0'-3 7/16"	0'-3 7/16"	0'-3 7/16"
L3/4 =	7'-3 7/8"(-)	7'-3 7/8"(-)	7'-3 7/8"(-)	7'-3 7/8"(-)

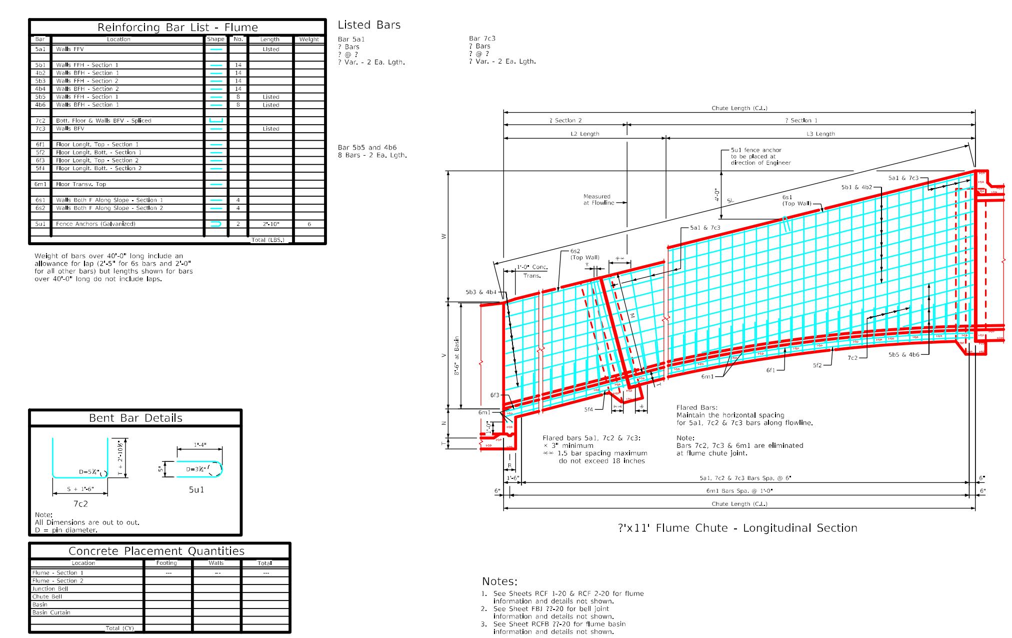
4:1 SLOPE FLUME

	10 x 11	12 x 11	14 x 11	16 x 11
Flume Data				
∢A =	14°02'	14°02'	14°02'	14°02'
∢C =	1°00'	1°00'	1°00'	1°00'
B =	21'-3 7/8"	21'-3 7/8"	21'-3 7/8"	21'-3 7/8"
SL =				
V =	8'-6"	8'-6"	8'-6"	8'-6"
W =				
M =	8'-3"	8'-3"	8'-3"	8'-3"
T =	1'-1"	1'-2"	1'-2"	1'-2"
H =	11'-0"	11'-0"	11'-0"	11'-0"
Curve Data				
C.L. =				
L2 =				
L3 =	41'-5 7/16"	41'-5 7/16"	41'-5 7/16"	41'-5 7/16"
D =	20'-9 3/16"	20'-9 3/16"	20'-9 3/16"	20'-9 3/16"
E =	20'-8 1/4"	20'-8 1/4"	20'-8 1/4"	20'-8 1/4"
P.C. ELEV. =				
P.I. ELEV. =				
P.P. ELEV. =				
P.T. ELEV. =				
X1 =	4'-9 3/4"	4'-9 3/4"	4'-9 3/4"	4'-9 3/4"
X2 =	2'-8 7/16"	2'-8 7/16"	2'-8 7/16"	2'-8 7/16"
X3 =	1'-2 3/8"	1'-2 3/8"	1'-2 3/8"	1'-2 3/8"
X4 =	0'-3 5/8"	0'-3 5/8"	0'-3 5/8"	0'-3 5/8"
L3/4 =	10'-4 3/8"(-)	10'-4 3/8"(-)	10'-4 3/8"(-)	10'-4 3/8"(-)









Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
Sa1	Width TYP			Varies	
Sb1	Width TYP				
Sb2	Width TYP				
Sb3	Width TYP				
Sb4	Width TYP				
Sc1	Walls, Floor & Width TYP + Subbase				
Sc2	Width TYP				
Sd1	Floor Length, Top				
Sd2	Floor Length, Bottom				
Se1	Floor Taxiway, Top				
Sf1	Width Both Footing Steps		4		
Sg1	Fence Anchors (Slotted Rail)		2	2'-0"	6
				Total (LBS)	

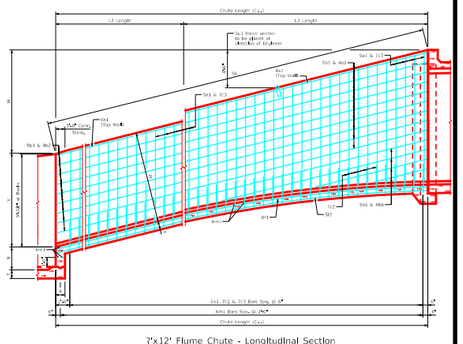
Weight of bars over 40'-0" long include an allowance for lap 2'-0" for 6s bars and 3'-0" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.

Listed Bars

Bar Sa1
2 Bars
1 @ 1
2 Var. - 2 Ea. Lgth.

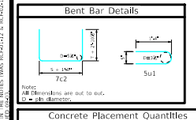
Bar Sb5 and 4b6
8 Bars + 2 Ea. Lgth.

Bar 7c3
2 Bars
1 @ 1
2 Var. - 2 Ea. Lgth.



?'x12' Flume Chute - Longitudinal Section

Bent Bar Details



Note:
All dimensions are out to out.
Ø = dia. diameter.

Concrete Placement Quantities

Location	Feet/In	Yards	Total
Flume	—	—	—
Junction Box			
Basin			
Basin Curtain			
Total (CY)			

Flume Data

CdL =
L2 =
L3 = 30'-1"
D = 10'-0"
SL =
V = 3'-6"
W =
M = 3'-0"
T = 1'-5"
H = 12'-0"

Curve Data

CdL =
L2 =
L3 = 30'-1"
D = 10'-0"
E = 115'-8"
P.C. ELEV. =
P.I. ELEV. =
P.O. ELEV. =
P.T. ELEV. =
X1 = 3'-0"
X2 = 3'-0"
X3 = 3'-0"
X4 = 3'-0"
L3/4 = 7'-7"

Notes:
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBJ 12-20 for bell joint information and details not shown.
3. See Sheet RCFB 12-20 for flume basin information and details not shown.

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. — OF — FILE NO. — DESIGN NO.

DESIGN TEAM	FLUME CHUTE SHEET # - 7'X12' FLUME	STANDARD SHEET SIZE 22"X34"	COUNTY	PROJECT NUMBER	SHEET NUMBER

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3:1 SLOPE FLUME

10 x 12

Flume Data
-6b = 18'-26"
-6c = 1'-10"
D = 10'-1"
SL =
V = 3'-5.8"
W =
M = 3'-0"
T = 1'-5"
H = 12'-0"

Curve Data
CdL =
L2 =
L3 = 30'-1"
D = 10'-0"
E = 115'-8"
P.C. ELEV. =
P.I. ELEV. =
P.O. ELEV. =
P.T. ELEV. =
X1 = 3'-0.9"
X2 = 3'-0.9"
X3 = 3'-0.9"
X4 = 3'-0.9"
L3/4 = 7'-7.9"

12 x 12

Flume Data
-6b = 18'-26"
-6c = 1'-10"
D = 10'-1"
SL =
V = 3'-5.8"
W =
M = 3'-0"
T = 1'-5"
H = 12'-0"

Curve Data
CdL =
L2 =
L3 = 30'-1"
D = 10'-0"
E = 115'-8"
P.C. ELEV. =
P.I. ELEV. =
P.O. ELEV. =
P.T. ELEV. =
X1 = 3'-0.9"
X2 = 3'-0.9"
X3 = 3'-0.9"
X4 = 3'-0.9"
L3/4 = 7'-7.9"

14 x 12

Flume Data
-6b = 18'-26"
-6c = 1'-10"
D = 10'-1"
SL =
V = 3'-5.8"
W =
M = 3'-0"
T = 1'-5"
H = 12'-0"

Curve Data
CdL =
L2 =
L3 = 30'-1"
D = 10'-0"
E = 115'-8"
P.C. ELEV. =
P.I. ELEV. =
P.O. ELEV. =
P.T. ELEV. =
X1 = 3'-0.9"
X2 = 3'-0.9"
X3 = 3'-0.9"
X4 = 3'-0.9"
L3/4 = 7'-7.9"

16 x 12

Flume Data
-6b = 18'-26"
-6c = 1'-10"
D = 10'-1"
SL =
V = 3'-5.8"
W =
M = 3'-0"
T = 1'-5"
H = 12'-0"

Curve Data
CdL =
L2 =
L3 = 30'-1"
D = 10'-0"
E = 115'-8"
P.C. ELEV. =
P.I. ELEV. =
P.O. ELEV. =
P.T. ELEV. =
X1 = 3'-0.9"
X2 = 3'-0.9"
X3 = 3'-0.9"
X4 = 3'-0.9"
L3/4 = 7'-7.9"

4:1 SLOPE FLUME

10 x 12

Flume Data
-6b = 14'-02"
-6c = 2'-10"
B = 22'-5.8"
SL =
V = 3'-4.8"
W =
M = 3'-0"
T = 1'-5"
H = 12'-0"

Curve Data
CdL =
L2 =
L3 = 43'-4.9"
D = 23'-5.8"
R = 21'-7.9"
P.C. ELEV. =
P.I. ELEV. =
P.O. ELEV. =
P.T. ELEV. =
X1 = 3'-0.9"
X2 = 3'-0.9"
X3 = 3'-0.9"
X4 = 3'-0.9"
L3/4 = 10'-10.8"

12 x 12

Flume Data
-6b = 14'-02"
-6c = 3'-10"
B = 22'-5.8"
SL =
V = 3'-4.8"
W =
M = 3'-0"
T = 1'-5"
H = 12'-0"

Curve Data
CdL =
L2 =
L3 = 43'-4.9"
D = 23'-5.8"
E = 21'-7.9"
P.C. ELEV. =
P.I. ELEV. =
P.O. ELEV. =
P.T. ELEV. =
X1 = 3'-0.9"
X2 = 3'-0.9"
X3 = 3'-0.9"
X4 = 3'-0.9"
L3/4 = 10'-10.8"

14 x 12

Flume Data
-6b = 14'-02"
-6c = 3'-10"
B = 22'-5.8"
SL =
V = 3'-4.8"
W =
M = 3'-0"
T = 1'-5"
H = 12'-0"

Curve Data
CdL =
L2 =
L3 = 43'-4.9"
D = 23'-5.8"
E = 21'-7.9"
P.C. ELEV. =
P.I. ELEV. =
P.O. ELEV. =
P.T. ELEV. =
X1 = 3'-0.9"
X2 = 3'-0.9"
X3 = 3'-0.9"
X4 = 3'-0.9"
L3/4 = 10'-10.8"

16 x 12

Flume Data
-6b = 14'-02"
-6c = 3'-10"
B = 22'-5.8"
SL =
V = 3'-4.8"
W =
M = 3'-0"
T = 1'-5"
H = 12'-0"

Curve Data
CdL =
L2 =
L3 = 43'-4.9"
D = 23'-5.8"
E = 21'-7.9"
P.C. ELEV. =
P.I. ELEV. =
P.O. ELEV. =
P.T. ELEV. =
X1 = 3'-0.9"
X2 = 3'-0.9"
X3 = 3'-0.9"
X4 = 3'-0.9"
L3/4 = 10'-10.8"

Reinforcing Bar List - Flume
Listed Bars
Bar Sa1
2 Bars
1 @ 1
2 Var. - 2 Ea. Lgth.
Bar Sb5 and 4b6
8 Bars + 2 Ea. Lgth.
Bar 7c3
2 Bars
1 @ 1
2 Var. - 2 Ea. Lgth.
Weight of bars over 40'-0" long include an allowance for lap 2'-0" for 6s bars and 3'-0" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.
Bent Bar Details
Concrete Placement Quantities
Flume Data
Curve Data
Notes:
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBJ 12-20 for bell joint information and details not shown.
3. See Sheet RCFB 12-20 for flume basin information and details not shown.
?'x12' Flume Chute - Longitudinal Section

3:1 SLOPE FLUME

14 x 13 16 x 13

Flume Data
4A = 18'-2⅜"
4C = 17'-10⅞"
B = 16'-0⅜"
SL =
V = 10'-3⅜"
W =
M = 6'-6"
T = 1'-3"
H = 13'-0"

Curve Data
CA: =
L2 =
L3 = 31'-11⅜"
D = 16°-0'-0"
E = 15'-1.1"
FC: ELEV. =
PI: ELEV. =
PT: ELEV. =
X1 = 15'-6⅜"
X2 = 2'-9⅜"
X3 = 2'-5⅜"
X4 = 0'-3⅜"
LBH = 75'-11⅜"(+)

Flume Data
4A = 18'-2⅜"
4C = 17'-10⅞"
B = 16'-0⅜"
SL =
V = 10'-3⅜"
W =
M = 6'-6"
T = 1'-3"
H = 13'-0"

Curve Data
CA: =
L2 =
L3 = 31'-11⅜"
D = 16°-0'-0"
E = 15'-1.1"
FC: ELEV. =
PI: ELEV. =
PT: ELEV. =
X1 = 15'-6⅜"
X2 = 2'-9⅜"
X3 = 2'-5⅜"
X4 = 0'-3⅜"
LBH = 75'-11⅜"(+)

4:1 SLOPE FLUME

14 x 13 16 x 13

Flume Data
4A = 14'-0"
4C = 13'-0"
B = 12'-0⅜"
SL = 8
V = 10'-0⅜"
W =
M = 6'-6"
T = 1'-3"
H = 13'-0"

Curve Data
CA: =
L2 =
L3 = 45'-4⅜"
D = 22°-0'-0"
E = 20'-1.9"
FC: ELEV. =
PI: ELEV. =
PT: ELEV. =
X1 = 19'-6⅜"
X2 = 3'-11⅜"
X3 = 3'-5⅜"
X4 = 0'-3⅜"
LBH = 117'-6⅜"(+)

Flume Data
4A = 14'-0"
4C = 13'-0"
B = 12'-0⅜"
SL = 8
V = 10'-0⅜"
W =
M = 6'-6"
T = 1'-3"
H = 13'-0"

Curve Data
CA: =
L2 =
L3 = 45'-4⅜"
D = 22°-0'-0"
E = 20'-1.9"
FC: ELEV. =
PI: ELEV. =
PT: ELEV. =
X1 = 19'-6⅜"
X2 = 3'-11⅜"
X3 = 3'-5⅜"
X4 = 0'-3⅜"
LBH = 117'-6⅜"(+)

Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
Su1	Walls TYP.			Varies	
Su1	Walls TYP.		13		
Su2	Walls TYP.		13		
Su3	Walls TYP.		8	Varies	
Su4	Walls TYP.		8	Varies	
Sv1	Walls, Floor & Walls SPV = Sv1&Sv2	Varies			
Sv2	Walls SPV	Varies		Varies	
Sf1	Floor Length, Top				
Sf2	Floor Length, Bot.				
Sw1	Floor Thickness, Top				
Sx1	Walls Both Faces Along Slope		4		
Sy1	Fence Anchors (Slab or Wall)		2	2'-0"	6
				Total (LBS):	

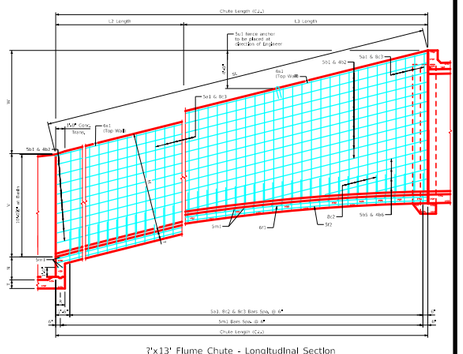
Weight of bars over 40'-0" long include an allowance for lap 2'-0" for 6s bars and 3'-0" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.

Listed Bars

Bar Su1
2 Bars
1 @ 1
2 Vert. = 2 Ea. Ligth.

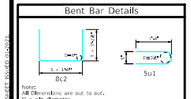
Bar Sb3
2 Bars
1 @ 1
2 Vert. = 2 Ea. Ligth.

Bar Sb5 and 4b6
8 Bars = 2 Ea. Ligth.



?'x13' Flume Chute - Longitudinal Section

Bent Bar Details



Note:
All dimensions are out to out.
Ø = dia. diameter.

Flume Data

4A = 18'-2⅜"
4C = 17'-10⅞"
B = 16'-0⅜"
SL =
V = 10'-3⅜"
W =
M = 6'-6"
T = 1'-3"
H = 13'-0"

Curve Data

CA: =
L2 =
L3 = 31'-11⅜"
D = 16°-0'-0"
E = 15'-1.1"
FC: ELEV. =
PI: ELEV. =
PT: ELEV. =
X1 = 15'-6⅜"
X2 = 2'-9⅜"
X3 = 2'-5⅜"
X4 = 0'-3⅜"
LBH = 75'-11⅜"(+)

Concrete Placement Quantities

Location	Footing	Walls	Total
Flume	—	—	—
Junction Slab			
Baffle			
Slab Curtain			
Total (CY):			

Notes:

1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBJ 12-20 for ball joint information and details not shown.
3. See Sheet RCFB 12-20 for flume basin information and details not shown.

?'x13' Flume Chute - Longitudinal Section

DESIGN TEAM			COUNTY	PROJECT NUMBER	SHEET NUMBER
	Flume Chute Length = 13'-4 1/2"	Elevation Above: 1070.33 ft			
			IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION		
DESIGN SHEET NO.	OF		FILE NO.	DESIGN NO.	

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Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
Su1	Walls TYP.			Varies	
Su1	Walls TYP.		13		
Su2	Walls TYP.		13		
Su3	Walls TYP.		8	Varies	
Su4	Walls TYP.		8	Varies	
Sv1	Walls, Floor & Walls SPV = Sv1&Sv2	Varies			
Sv2	Walls SPV	Varies		Varies	
Sf1	Floor Length, Top				
Sf2	Floor Length, Bot.				
Sw1	Floor Thickness, Top				
Sx1	Walls Both Faces Along Slope		4		
Sy1	Fence Anchors (Slab or Wall)		2	2'-0"	6
				Total (LBS):	

Weight of bars over 40'-0" long include an allowance for lap 2'-0" for 6s bars and 3'-0" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.

Listed Bars
Bar Su1
2 Bars
1 @ 1
2 Vert. = 2 Ea. Ligth.

Bar Sb3
2 Bars
1 @ 1
2 Vert. = 2 Ea. Ligth.

Bar Sb5 and 4b6
8 Bars = 2 Ea. Ligth.

Bent Bar Details

Note:
All dimensions are out to out.
Ø = dia. diameter.

Concrete Placement Quantities

Location	Footing	Walls	Total
Flume	—	—	—
Junction Slab			
Baffle			
Slab Curtain			
Total (CY):			

Notes:
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBJ 12-20 for ball joint information and details not shown.
3. See Sheet RCFB 12-20 for flume basin information and details not shown.

?'x13' Flume Chute - Longitudinal Section

3:1 SLOPE FLUME

14 x 14 16 x 14

Flume Data
4A = 18'-2⅜"
4C = 17'-10"
B = 13'-5⅜"
SL =
V = 13'-6⅛"
W =
M = 10'-6"
N = 10'-6"
T = 1'-5"
H = 16'-6"

Curve Data
CL =
L2 =
L3 = 3'-3⅜"
D = 18'-6⅛"
E = 18'-6⅞"
P.C. ELEV. =
P.I. ELEV. =
P.T. ELEV. =
X1 = 4'-5⅝"
X2 = 2'-11⅜"
X3 = 1'-3⅛"
X4 = 0'-3⅜"
LSH = 8'-5⅜"(+)

Flume Data
4A = 18'-2⅜"
4C = 17'-10"
B = 13'-5⅜"
SL =
V = 13'-6⅛"
W =
M = 10'-6"
N = 10'-6"
T = 1'-5"
H = 16'-6"

Curve Data
CL =
L2 =
L3 = 3'-3⅜"
D = 18'-6⅛"
E = 18'-6⅞"
P.C. ELEV. =
P.I. ELEV. =
P.T. ELEV. =
X1 = 4'-5⅝"
X2 = 2'-11⅜"
X3 = 1'-3⅛"
X4 = 0'-3⅜"
LSH = 8'-5⅜"(+)

4:1 SLOPE FLUME

14 x 14 16 x 14

Flume Data
4A = 14'-0"
4C = 17'-10"
B = 24'-3⅜"
SL =
V = 10'-9⅛"
W =
M = 10'-6"
T = 1'-5"
H = 16'-6"

Curve Data
CL =
L2 =
L3 = 4'-7⅜"
D = 25'-9⅛"
E = 25'-9⅞"
P.C. ELEV. =
P.I. ELEV. =
P.T. ELEV. =
X1 = 7'-5⅝"
X2 = 4'-1⅜"
X3 = 1'-9⅛"
X4 = 0'-4⅜"
LSH = 11'-5⅜"(+)

Flume Data
4A = 14'-0"
4C = 17'-10"
B = 24'-3⅜"
SL =
V = 10'-9⅛"
W =
M = 10'-6"
T = 1'-5"
H = 16'-6"

Curve Data
CL =
L2 =
L3 = 4'-7⅜"
D = 25'-9⅛"
E = 25'-9⅞"
P.C. ELEV. =
P.I. ELEV. =
P.T. ELEV. =
X1 = 7'-5⅝"
X2 = 4'-1⅜"
X3 = 1'-9⅛"
X4 = 0'-4⅜"
LSH = 11'-5⅜"(+)

Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
6a1	Wall, FF2			Varies	
5b1	Wall, FF1		13		
6b2	Wall, FF2		13		
7b5	Wall, FF2		13	Varies	
6b6	Wall, FF2		13	Varies	
8c1	Slab, Floor & Wall, SF2 + Splitter	Varies			
6c3	Wall, SF2			Varies	
6f2	Floor Length, Top				
5f3	Floor Length, Bot.				
5m3	Floor Thickness, Top				
6n1	Wall, Both Faces, Slope		4		
5p1	Fence Anchors (Embedded)		24	2'-6"	6
				Total (LBS)	

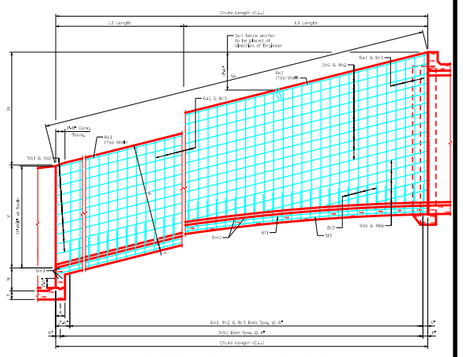
Weight of bars over 40'-0" long include an allowance for lap 1'-7" for 6s bars and 2'-0" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.

Listed Bars

Bar 6a1
2 Bars
1 @ 1
2 Var. - 2 Ea. Lgth.

Bar 8c3
2 Bars
1 @ 1
2 Var. - 2 Ea. Lgth.

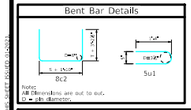
Bar 5b5 and 6b6
10 Bars - 2 Ea. Lgth.



?'x14' Flume Chute - Longitudinal Section

Notes:
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBJ 12-20 for ball joint information and details not shown.
3. See Sheet RCFB 12-20 for flume basin information and details not shown.

Bent Bar Details



Note:
All dimensions are out to out.
Ø = ø dia. diameter.

Concrete Placement Quantities

Location	Feet	Yards	Total
Flume	—	—	—
Junction Box			
Basin			
Basin Curtain			
Total (CY)			

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. OF FILE NO. DESIGN NO.
COUNTY PROJECT NUMBER SHEET NUMBER

DESIGN TEAM | Flume Chute Length = 144'-0" | Expansion Joints @ 20'-0"±

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Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
6a1	Wall, FF2			Varies	
5b1	Wall, FF1		13		
6b2	Wall, FF2		13		
7b5	Wall, FF2		13	Varies	
6b6	Wall, FF2		13	Varies	
8c1	Slab, Floor & Wall, SF2 + Splitter	Varies			
6c3	Wall, SF2			Varies	
6f2	Floor Length, Top				
5f3	Floor Length, Bot.				
5m3	Floor Thickness, Top				
6n1	Wall, Both Faces, Slope		4		
5p1	Fence Anchors (Embedded)		24	2'-6"	6
				Total (LBS)	

Weight of bars over 40'-0" long include an allowance for lap 1'-7" for 6s bars and 2'-0" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.

Listed Bars

Bar 6a1
2 Bars
1 @ 1
2 Var. - 2 Ea. Lgth.

Bar 8c3
2 Bars
1 @ 1
2 Var. - 2 Ea. Lgth.

Bar 5b5 and 6b6
10 Bars - 2 Ea. Lgth.

?'x14' Flume Chute - Longitudinal Section

Notes:
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBJ 12-20 for ball joint information and details not shown.
3. See Sheet RCFB 12-20 for flume basin information and details not shown.

Bent Bar Details

Note:
All dimensions are out to out.
Ø = ø dia. diameter.

Concrete Placement Quantities

Location	Feet	Yards	Total
Flume	—	—	—
Junction Box			
Basin			
Basin Curtain			
Total (CY)			

Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
6a1	Wall, FF2			Varies	
5b1	Wall, FF1		13		
6b2	Wall, FF2		13		
7b5	Wall, FF2		13	Varies	
6b6	Wall, FF2		13	Varies	
8c1	Slab, Floor & Wall, SF2 + Splitter	Varies			
6c3	Wall, SF2			Varies	
6f2	Floor Length, Top				
5f3	Floor Length, Bot.				
5m3	Floor Thickness, Top				
6n1	Wall, Both Faces, Slope		4		
5p1	Fence Anchors (Embedded)		24	2'-6"	6
				Total (LBS)	

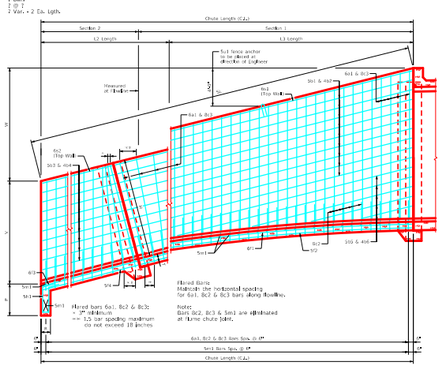
Weight of bars over 40'-0" long include an allowance for lap 1'-7" for 6s bars and 2'-0" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.

Listed Bars

Bar 6a1
2 Bars
1 @ 1
2 Var. - 2 Ea. Lgth.

Bar 8c3
2 Bars
1 @ 1
2 Var. - 2 Ea. Lgth.

Bar 5b5 and 6b6
10 Bars - 2 Ea. Lgth.



?'x14' Flume Chute - Longitudinal Section

Flared Bars:
Maintain the horizontal spacing for 6a1, 8c2 & 8c3 bars along flowline.

Notes:
Flared bars 6a1, 8c2 & 8c3:
= 3" minimum
= 1.5 bar spacing maximum
no not exceed 18 inches

Notes:
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBJ 12-20 for ball joint information and details not shown.

Bent Bar Details

Note:
All dimensions are out to out.
Ø = ø dia. diameter.

Concrete Placement Quantities

Location	Feet	Yards	Total
Flume	—	—	—
Junction Box			
Basin			
Basin Curtain			
Total (CY)			

Reinforcing Bar List - Flume

Bar	Location	Shape	No.	Length	Weight
6a1	Wall, FF2			Varies	
5b1	Wall, FF1		13		
6b2	Wall, FF2		13		
7b5	Wall, FF2		13	Varies	
6b6	Wall, FF2		13	Varies	
8c1	Slab, Floor & Wall, SF2 + Splitter	Varies			
6c3	Wall, SF2			Varies	
6f2	Floor Length, Top				
5f3	Floor Length, Bot.				
5m3	Floor Thickness, Top				
6n1	Wall, Both Faces, Slope		4		
5p1	Fence Anchors (Embedded)		24	2'-6"	6
				Total (LBS)	

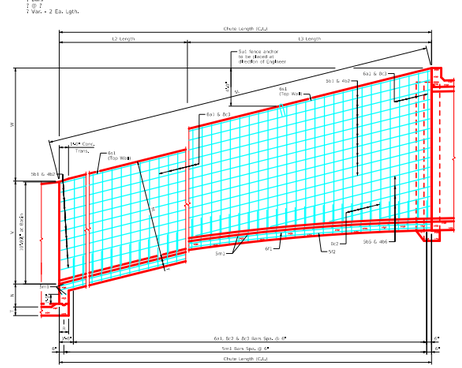
Weight of bars over 40'-0" long include an allowance for lap 1'-7" for 6s bars and 2'-0" for all other bars) but lengths shown for bars over 40'-0" long do not include laps.

Listed Bars

Bar 6a1
2 Bars
1 @ 1
2 Var. - 2 Ea. Lgth.

Bar 8c3
2 Bars
1 @ 1
2 Var. - 2 Ea. Lgth.

Bar 5b5 and 6b6
10 Bars - 2 Ea. Lgth.



?'x14' Flume Chute - Longitudinal Section

Flared Bars:
Maintain the horizontal spacing for 6a1, 8c2 & 8c3 bars along flowline.

Notes:
Bars 8c2, 8c3 & 5m1 are eliminated at flume chute joint.

Notes:
1. See Sheets RCF 1-20 & RCF 2-20 for flume information and details not shown.
2. See Sheet FBJ 12-20 for ball joint information and details not shown.
3. See Sheet RCFB 12-20 for flume basin information and details not shown.

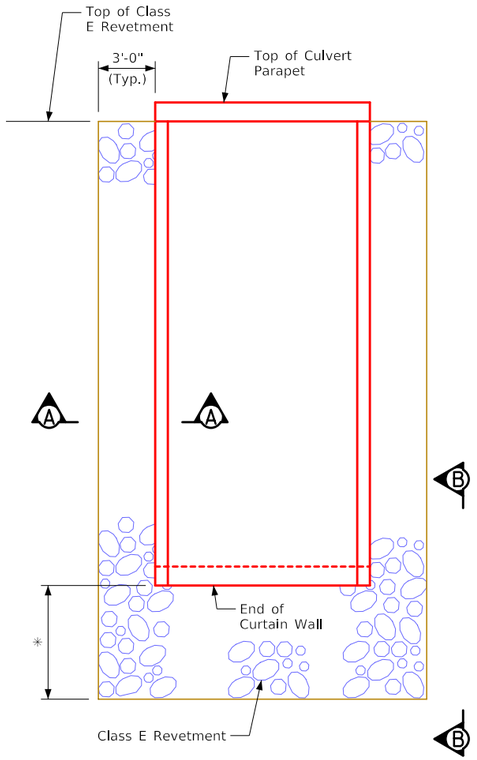
Bent Bar Details

Note:
All dimensions are out to out.
Ø = ø dia. diameter.

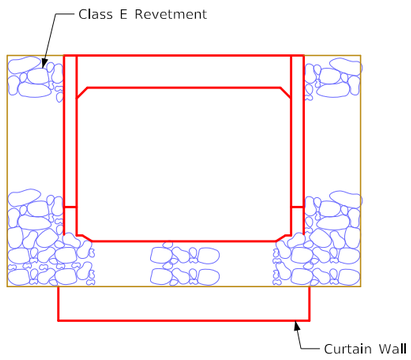
Concrete Placement Quantities

Location	Feet	Yards	Total
Flume	—	—	—
Junction Box			
Basin			
Basin Curtain			
Total (CY)			

✳ = See culvert plans for limits of revetment and engineering fabric.



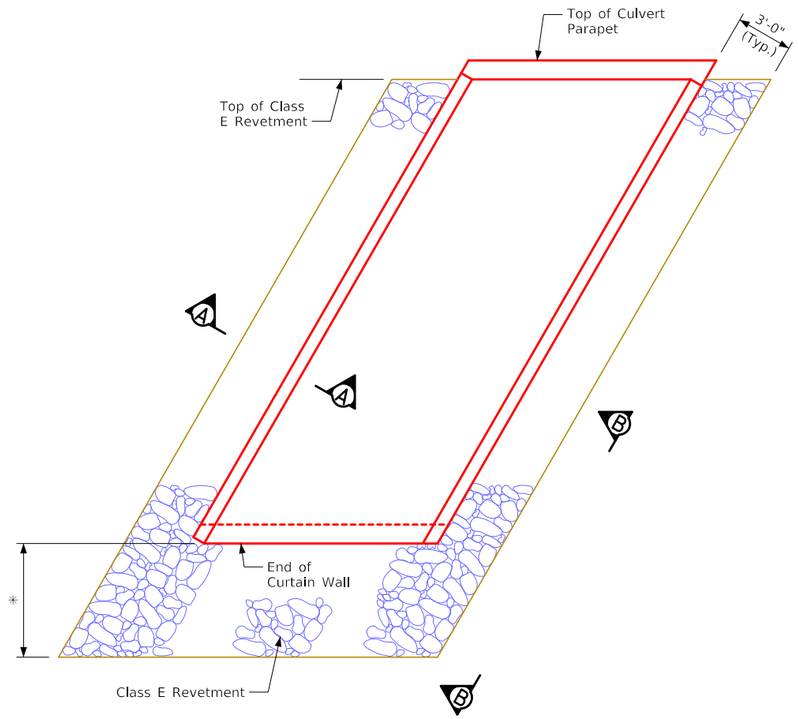
Plan View



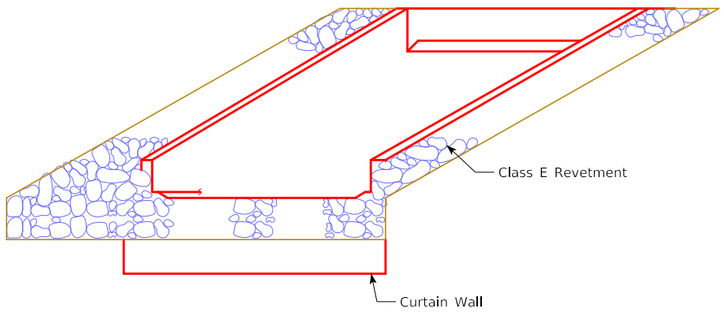
Elevation View

0° Skew Headwalls

✳ = See culvert plans for limits of revetment and engineering fabric.



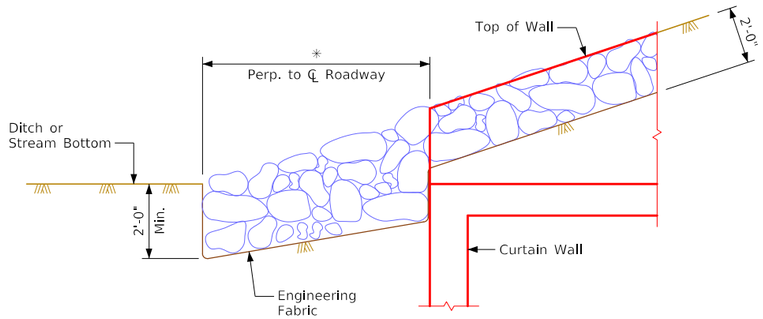
Plan View



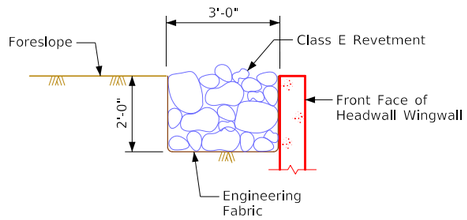
Elevation View

____° Skewed Headwall

✳ = See culvert plans for limits of revetment and engineering fabric.



View B-B



Section A-A

Typical Details

Construction Notes:

Class E Revetment shall be used and placed according to Article 2507.03, of the Standard Specifications. The engineering fabric shall meet the material requirements in accordance with Article 4196.01,B,3, of the Standard Specifications.

Revetment Protection Details

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

REVISED 1-2016 - ADDED NOTE "SEE CULVERT PLANS FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC."
REVISED 02-2017 - ADDED SECTION DIRECTORS "A-A" TO ZERO SKEW PLAN VIEW DETAIL.
REVISION 01-2021 - CHANGED DESIGN SPECIFICATIONS TO AASHTO LRFD 8TH ED.
ENGLISHSINGLECULVERTS.DGN - 1092 - THIS SHEET ISSUED 04-12.

DESIGN TEAM	Cast-In-Place Culvert Revetment Protection Details	Standard Sheet 1092	COUNTY	PROJECT NUMBER	SHEET NUMBER

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