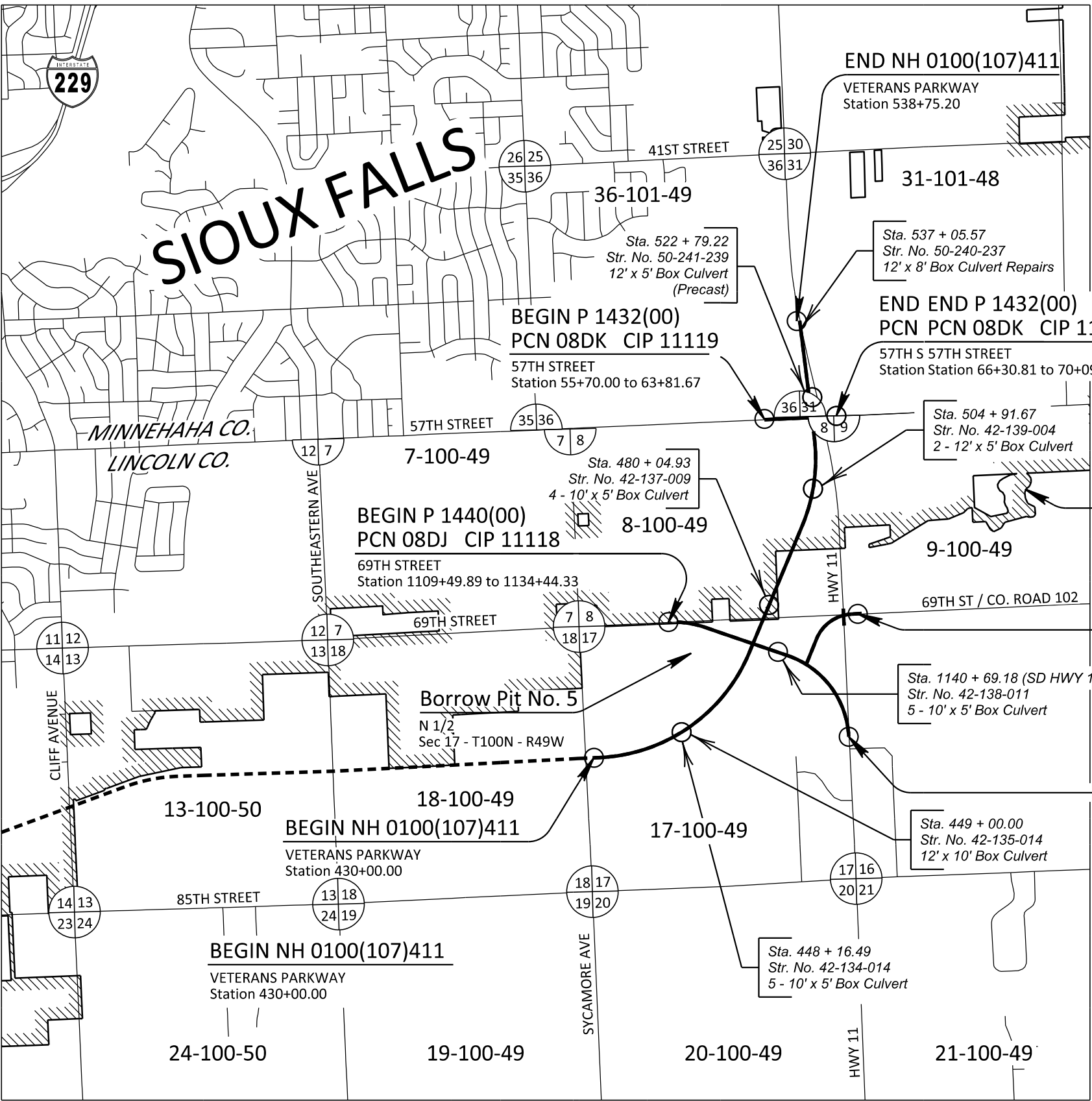
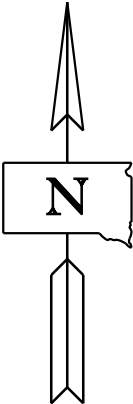


SECTION E: STRUCTURE PLANS

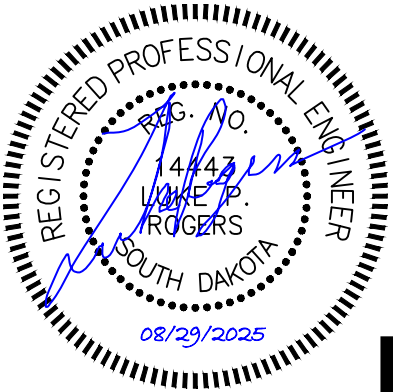
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0100(107)411	E01	E59



INDEX OF SHEETS

Sheet E01	Layout Map and Index
Sheet E02	Estimate of Structure Quantities
Sheet E03-E11	5 - 10' x 5' Box Culvert
Sheet E12-E19	12' x 10' Box Culvert
Sheet E20-E28	4 - 10' x 5' Box Culvert
Sheet E29-E36	2 - 12' x 5' Box Culvert
Sheet E37-E41	12' x 5' Box Culvert (Precast)
Sheet E42-E50	5 - 10' x 5' Box Culvert
Sheet E51-E57	12' x 8' Box Culvert Repairs
Sheet E58-E59	Junction Boxes



STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E02	E59

SECTION E - ESTIMATE OF STRUCTURE QUANTITIES

PCN 01VA

12'x10' RCBC, 12'x5' RCBC (Precast), 12'x8' RCBC Repairs, JB #4, and JB #5

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
420E0200	Structure Excavation, Box Culvert	282	CuYd
421E0200	Box Culvert Undercut	933	CuYd
430E0700	Precast Concrete Headwall for Drain	2	Each
460E0120	Class A45 Concrete, Box Culvert	354.2	CuYd
460E0204	Anti-Graffiti Coating	16,619.0	SqFt
460E0210	Concrete Surface Preparation	1,078.3	SqYd
462E0100	Class M6 Concrete	17.6	CuYd
480E0100	Reinforcing Steel	69,936	Lb
560E0182	12' x 5' Precast Concrete Box Culvert, Furnish	356.0	Ft
560E0183	12' x 5' Precast Concrete Box Culvert, Install	356.0	Ft
560E1182	12' x 5' Precast Concrete Box Culvert End Section, Furnish	2	Each
560E1183	12' x 5' Precast Concrete Box Culvert End Section, Install	2	Each
621E0240	Special 4' Chain Link Fence	200	Ft
680E0040	4" Underdrain Pipe	1,795	Ft
680E2500	Porous Backfill	1,848.5	Ton
700E0210	Class B Riprap	28.0	Ton
831E0110	Type B Drainage Fabric	36	SqYd
831E0300	Reinforcement Fabric (MSE)	739	SqYd

Str. No. 42-134-014

5-10'x5' RCBC (Veterans Pkwy)

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
420E0200	Structure Excavation, Box Culvert	600	CuYd
421E0200	Box Culvert Undercut	1,241	CuYd
460E0120	Class A45 Concrete, Box Culvert	1,322.8	CuYd
480E0100	Reinforcing Steel	209,631	Lb
621E0240	Special 4' Chain Link Fence	133	Ft
700E0210	Class B Riprap	94.2	Ton
831E0110	Type B Drainage Fabric	105	SqYd
831E0300	Reinforcement Fabric (MSE)	1,853	SqYd

Str. No. 42-137-009

4-10'x5' RCBC

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
420E0200	Structure Excavation, Box Culvert	292	CuYd
421E0200	Box Culvert Undercut	787	CuYd
460E0120	Class A45 Concrete, Box Culvert	678.2	CuYd
480E0100	Reinforcing Steel	102,119	Lb
621E0240	Special 4' Chain Link Fence	118	Ft
700E0210	Class B Riprap	77.7	Ton
831E0110	Type B Drainage Fabric	88	SqYd
831E0300	Reinforcement Fabric (MSE)	1,157	SqYd

Str. No. 42-139-004

2-12'x5' RCBC

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
420E0200	Structure Excavation, Box Culvert	228	CuYd
421E0200	Box Culvert Undercut	548	CuYd
460E0120	Class A45 Concrete, Box Culvert	495.6	CuYd
480E0100	Reinforcing Steel	109,951	Lb
621E0240	Special 4' Chain Link Fence	78	Ft
700E0210	Class B Riprap	51.0	Ton
831E0110	Type B Drainage Fabric	60	SqYd

Str. No. 42-138-011

5-10'x5' RCBC (SD HWY 11)

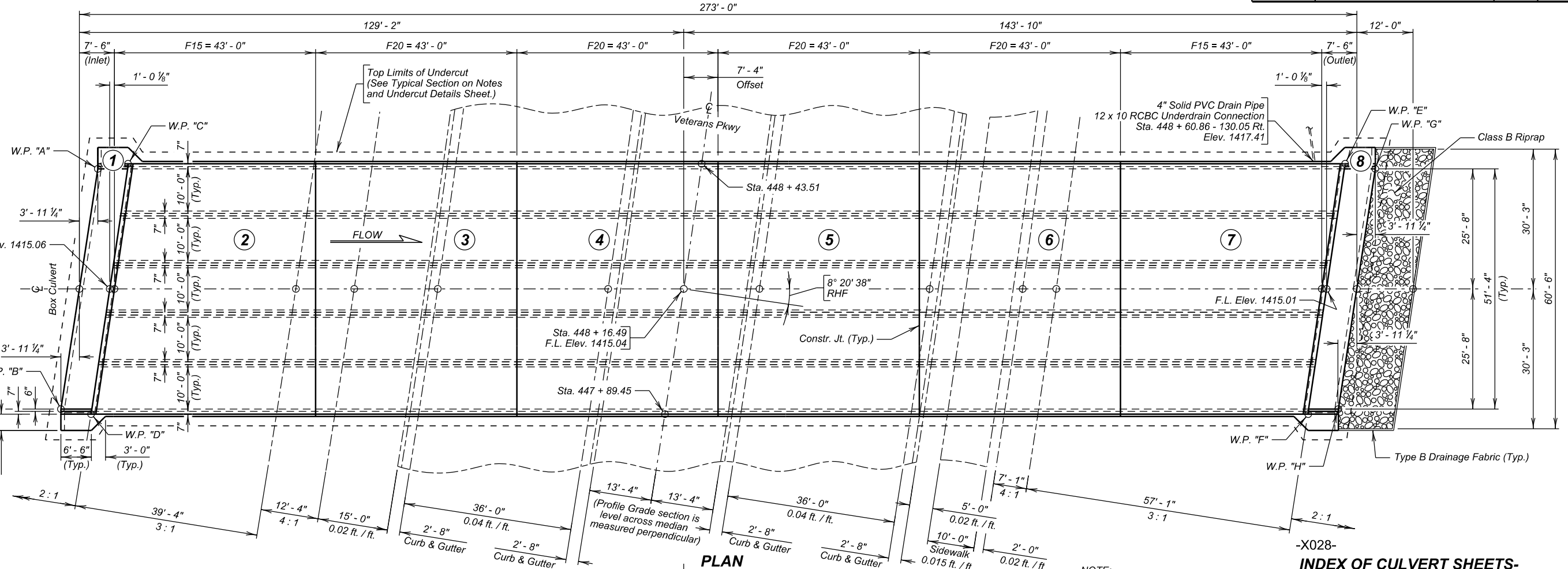
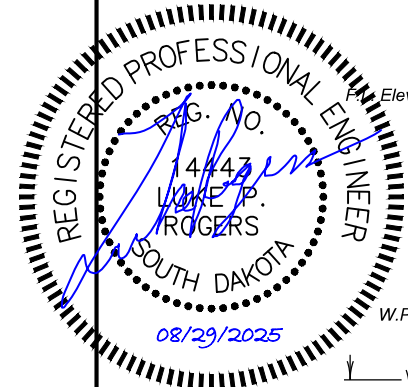
BID ITEM NUMBER	ITEM	QUANTITY	UNIT
420E0200	Structure Excavation, Box Culvert	329	CuYd
421E0200	Box Culvert Undercut	868	CuYd
460E0120	Class A45 Concrete, Box Culvert	728.8	CuYd
480E0100	Reinforcing Steel	114,165	Lb
621E0240	Special 4' Chain Link Fence	134	Ft
700E0210	Class B Riprap	94.2	Ton
831E0110	Type B Drainage Fabric	105	SqYd
831E0300	Reinforcement Fabric (MSE)	1,279	SqYd



The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E03	E59



HYDRAULIC DATA

Q_d	1203 cfs
A_d	200 sq. ft.
V_d	6.1 fps
Q_F	1203 cfs
Q_{100}	1203 cfs

Q_d = Design discharge for the proposed culvert based on 100 year frequency. El. 1420.65

Q_F = Designated peak discharge for the basin approaching proposed project based on 100 year frequency.

Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 1420.65

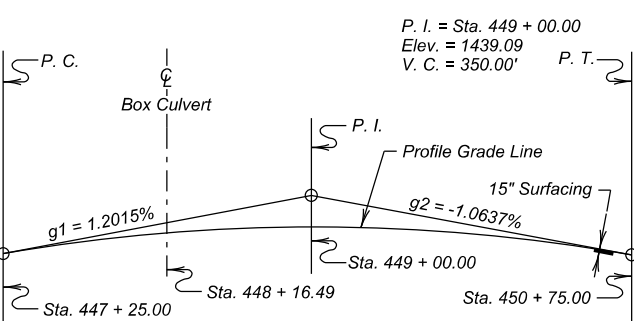
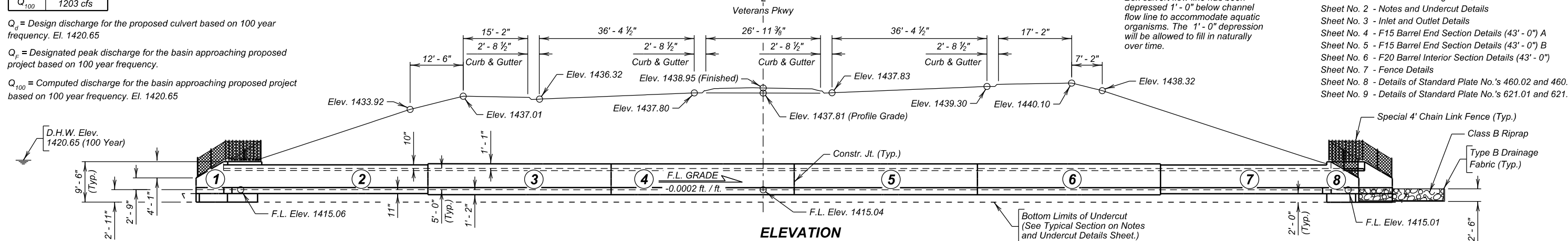
PLAN

NOTE:
Box culvert flow line has been depressed 1'-0" below channel flow line to accommodate aquatic organisms. The 1'-0" depression will be allowed to fill in naturally over time.

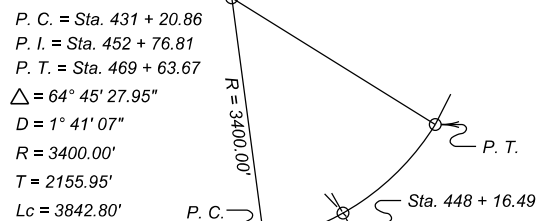
INDEX OF CULVERT SHEETS-

- Sheet No. 1 - General Drawing and Quantities
- Sheet No. 2 - Notes and Undercut Details
- Sheet No. 3 - Inlet and Outlet Details
- Sheet No. 4 - F15 Barrel End Section Details (43'-0") A
- Sheet No. 5 - F15 Barrel End Section Details (43'-0") B
- Sheet No. 6 - F20 Barrel Interior Section Details (43'-0")
- Sheet No. 7 - Fence Details
- Sheet No. 8 - Details of Standard Plate No.'s 460.02 and 460.10
- Sheet No. 9 - Details of Standard Plate No.'s 621.01 and 621.03

ELEVATION



VERTICAL CURVE DATA



HORIZONTAL CURVE DATA

TABLE OF WORKING POINTS		
W. P.	STATION	OFFSET
"A"	448 + 23.99	127.62' Lt.
"B"	447 + 70.03	127.67' Lt.
"C"	448 + 26.06	121.40' Lt.
"D"	447 + 69.98	121.13' Lt.
"E"	448 + 61.65	136.26' Rt.
"F"	448 + 09.66	135.93' Rt.
"G"	448 + 61.44	142.79' Rt.
"H"	448 + 11.60	142.14' Rt.

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Structure Excavation, Box Culvert	Cu. Yd.	600
Box Culvert Undercut	Cu. Yd.	1241
Class A45 Concrete, Box Culvert	Cu. Yd.	1322.8
Reinforcing Steel	Lb.	209631
Special 4' Chain Link Fence	Ft.	133
Class B Riprap	Ton	94.2
Type B Drainage Fabric	Sq. Yd.	105
Reinforcement Fabric (MSE)	Sq. Yd.	1853

* For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yd. to Tons.

GENERAL DRAWING AND QUANTITIES

FOR
5 - 10' X 5' BOX CULVERT
OVER CREEK
STA. 448 + 16.49
STR. NO. 42-134-014
PCN 01VA

8° 20' 38" RHF SKEW
SEC 17-T100N-R49W
NH 0100(107)411
HL-93

LINCOLN COUNTY
S. D. DEPT. OF TRANSPORTATION

-X028-

JUNE 2025

1 OF 9



DESIGNED BY IMM LINC01VA	CK. DES. BY BMW 01VATA01	DRAFTED BY SEM	BRIDGE ENGINEER
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SPECIFICATIONS

- Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.
- Construction Specifications: Standard Specifications for Roads and Bridges, 10-7-26 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at <https://dot.sd.gov/doing-business/contractors/standard-specifications>.

GENERAL NOTES (CAST-IN-PLACE BOX CULVERT)

- Design Live Load: HL-93 and construction load consisting of one 7' - 6" gauge axle with gross weight = 95,850 lbs. The construction load will not be applied until a minimum of 4 feet of fill has been placed over the box culvert. Other construction loads in excess of legal load must be submitted through proper channels to the Office of Bridge Design for analysis.
- The design of the barrel section is based on a minimum fill height of 2 feet and includes all subsequent fill heights up to and including the maximum fill height of 20 feet (F20) for interior sections and 15 feet (F15) for end sections.
- Design Material Strengths: Concrete $f'_c = 4,500$ psi
Reinforcing Steel $f_y = 60,000$ psi
- All concrete will be Class A45 Concrete, Box Culvert conforming to Section 460 of the Construction Specifications.
- All reinforcing steel will conform to ASTM A615 Grade 60.
- All lap splices shown are contact lap splices unless noted otherwise.
- All exposed concrete corners and edges will be chamfered $\frac{3}{4}$ -inch unless noted otherwise in the plans.
- Use 1-inch clear cover on all reinforcing steel EXCEPT as shown.
- The Contractor will imprint on the structure the date of construction as specified and detailed on Standard Plate No. 460.02.
- Care will be taken to establish Working Points (W.P.) as shown on the wings.
- Circled numbers in PLAN and ELEVATION views on the General Drawing are section I.D. Numbers (see SDDOT Materials Manual).
- Cost of Preformed Expansion Joint Filler used in apron construction will be incidental to the other contract items.
- Soils below the bottom of the proposed RCBC consist of soft brown sandy clay.
- Groundwater was encountered in the borings at an elevation of 1414.6 feet during the subsurface investigation conducted in November 2024. Dewatering will be required during construction.

REINFORCEMENT FABRIC (MSE)

- A layer of Reinforcement Fabric (MSE) will be placed at the bottom of the undercut prior to backfilling with granular material.
- Reinforcement Fabric (MSE) will conform to Section 831. The Reinforcement Fabric (MSE) provided will be on the Approved Products List or will be certified by the supplier to meet this specification prior to installation.
- Reinforcement Fabric (MSE) will be paid for at the contract unit price per sq. yd. for Reinforcement Fabric (MSE). Payment will be full compensation for furnishing and installing the Reinforcement Fabric (MSE) only. Granular backfill materials will be paid for as part of the Box Culvert Undercut bid item.
- Place the Reinforcement Fabric (MSE) on as level and smooth of a surface as possible. Any protrusions that might damage the fabric will be removed prior to placing the fabric. All seams in the fabric will be stitched in accordance with the seaming procedure and as shown on the detail labeled "Seam Types." No equipment will be allowed on the fabric until the granular backfill material is in place. The fabric will be kept as taut as possible prior to backfilling. Granular backfill material will be dumped behind the leading edge of the fill and pushed into place with a loader or dozer.

FABRIC SEAMING PROCEDURE

- The sewn seams will consist of two parallel rows of stitching ("prayer" seam, Type SSa-2), or a J-seam (Type SSn-1), using a single row of stitching. The stitching will be a lock type stitch.
- If the Type SSa-2 seam is used, the two rows of stitching will be 1" apart with a tolerance of plus or minus $\frac{1}{2}$ " and will not cross, except for restitching. The minimum seam allowance, i.e., minimum distance from the fabric edge to the stitch line nearest to that edge, will be 1 $\frac{1}{2}$ ".
- If the J-seam (Type SSn-1) is used, the minimum seam allowance will be 1".
- The seam, stitch type, and the equipment used to perform the stitching will be as recommended by the manufacturer of the fabric and approved by the Engineer. The seams will be sewn in such a manner that the seam can be readily inspected by the Engineer.
- The thread used will be high-strength polypropylene, polyester, or Kevlar thread. Nylon threads will not be allowed.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Box Culvert Undercut	Cu. Yd.	1241
Reinforcement Fabric (MSE)	Sq. Yd.	1853

For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.

FOR BIDDING PURPOSES ONLY

REV DATE: 8-28-2026

NTA 45

STATE
OF

S.D.

PROJECT

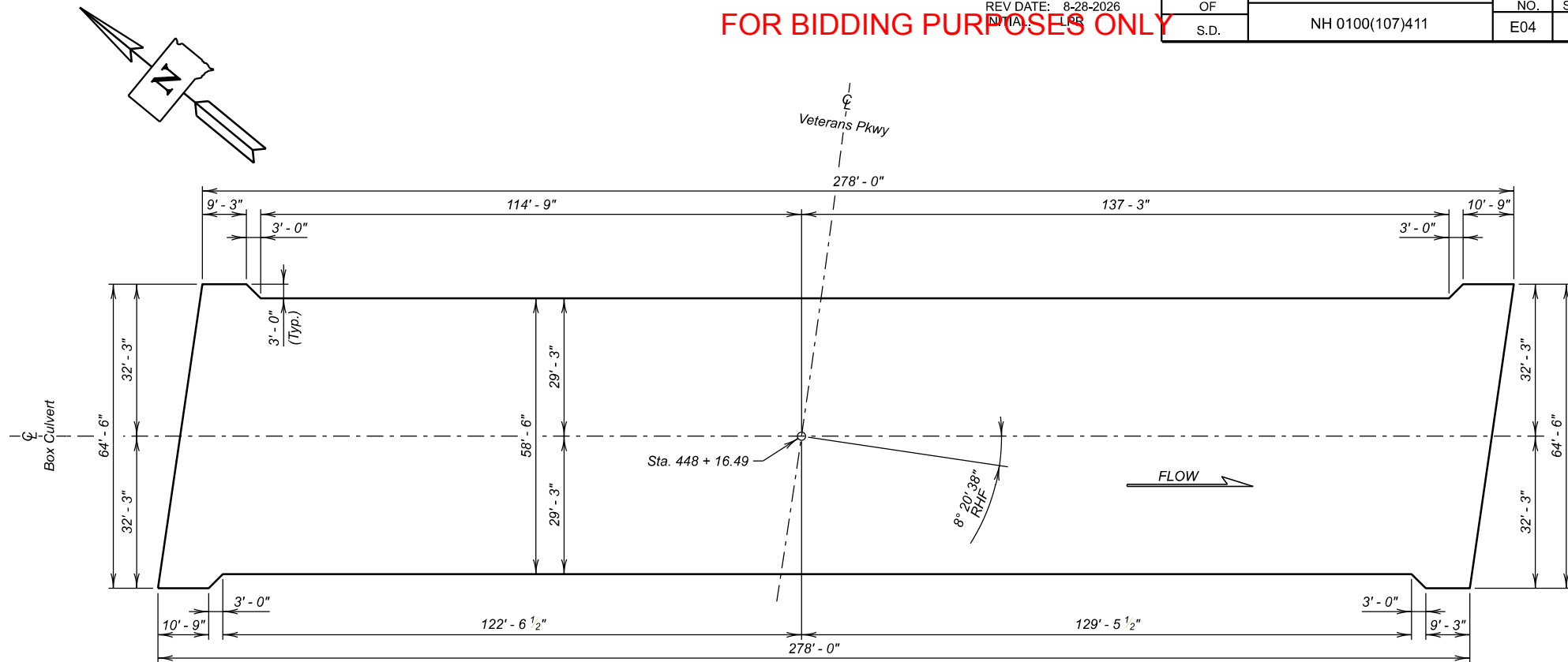
NH 0100(107)411

SHEET
NO.

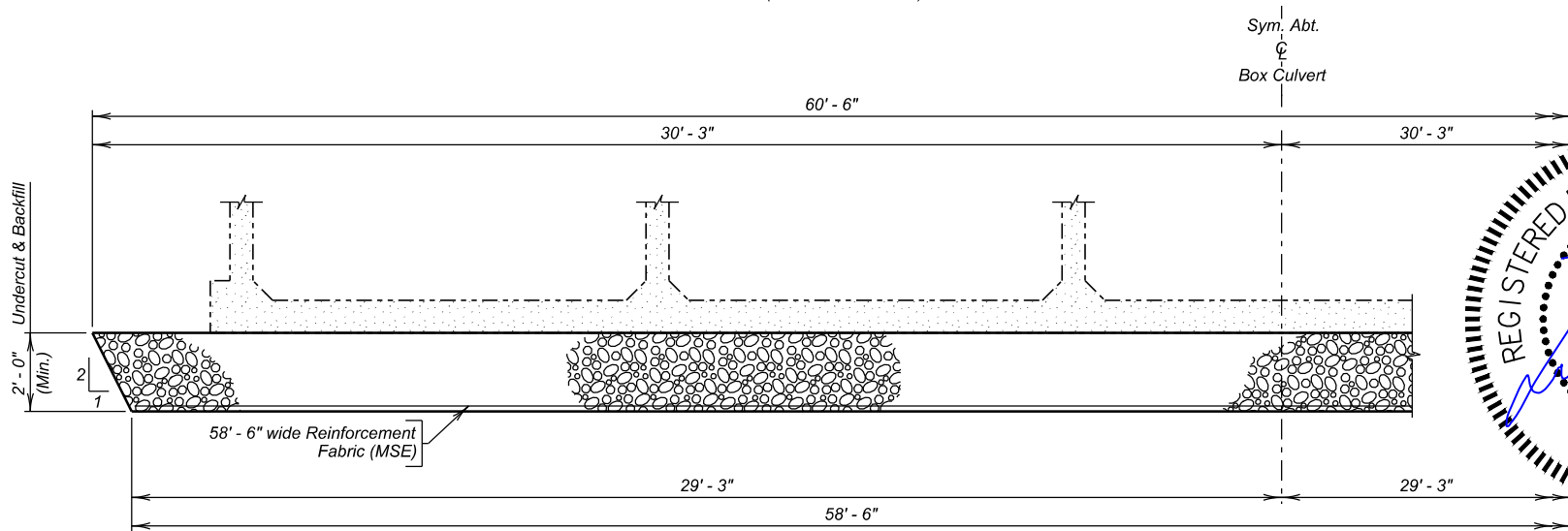
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TOTAL
SHEETS

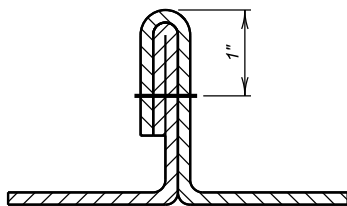
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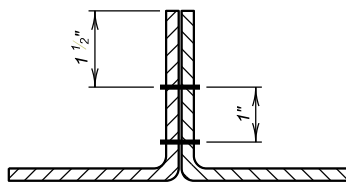
UNDERCUT LAYOUT
(Bottom Dimensions)



TYPICAL SECTION
(For Limits of Undercut)



J seam
Type SSn-1



Flat or "prayer" seam
Type SSa-2

SEAM TYPES

NOTES AND UNDERCUT DETAILS FOR

5 - 10' X 5' BOX CULVERT

OVER CREEK

STA. 448 + 16.49

STR. NO. 42-134-014

8° 20' 38" RHF SKEW

SEC 17-T100N-R49W

NH 0100(107)411

HL-93

LINCOLN COUNTY

S. D. DEPT. OF TRANSPORTATION

JUNE 2025

2 OF 9

DESIGNED BY
IMM
LINC01VA

CK. DES. BY
BMW
01VATA02

DRAFTED BY
SEM

BRIDGE ENGINEER

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E06	E59

REINFORCING SCHEDULE

(For One End Section)

Mk.	No.	Size	Length	Type
h1	88	4	7' - 0"	17A
j0	7	6	56' - 0"	Str.
j1	80	6	52' - 6"	Str.
k1	211	4	11' - 9"	17
m0	9	5	61' - 6"	Str.
m1	94	5	54' - 3"	Str.
n0	9	5	60' - 0"	Str.
n1	94	5	53' - 3"	Str.
p1	10	4	39' - 6"	Str.
p2	9	4	41' - 0"	Str.
p3	9	4	42' - 6"	Str.
p4	9	4	44' - 0"	Str.
p5	9	4	45' - 9"	Str.
p6	10	4	47' - 3"	Str.
p11	19	4	80' - 3"	Str.
p22	19	4	83' - 6"	Str.
p33	19	4	86' - 6"	Str.
p44	19	4	89' - 9"	Str.
p55	19	4	93' - 0"	Str.
s1	346	6	7' - 6"	Str.
w1	172	4	15' - 3"	S11A
z1	118	5	3' - 6"	Str.

2' - 7 1/2" k1

6' - 6" (Exact)

Type 17

6' - 5 1/2" (Exact)

5" (Exact)

12"

w1

10 1/2" h1

Type S11A

Type 17A

31' - 4 1/2" 28' - 7 1/2" n0

32' - 1 1/2" 29' - 4 1/2" m0

7' - 9" 48' - 3" j0

4' - 1 1/2" 1' - 9" min. lap

2' - 7 1/2" k1 (Typ.)

Cut 9 n0

Cut 9 m0

Cut 7 j0

48' - 3" 7' - 9" j0

54' - 3" 7' - 3" m0

53' - 3" 6' - 9" n0

OPTIONAL k1 SPLICE DETAIL

Contractor may use optional reinforcing steel splice as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

45' - 9" 47' - 3" p55

44' - 3" 45' - 6" p44

42' - 3" 44' - 0" p33

41' - 0" 42' - 6" p22

39' - 6" 40' - 9" p11

40' - 9" 39' - 6" p11

42' - 6" 41' - 0" p22

44' - 0" 42' - 6" p33

45' - 6" 44' - 3" p44

47' - 3" 45' - 9" p55

NOTES:

All dimensions are out to out of bars.

See cutting diagram.

Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity shown is for one construction joint.

Request for additional Reinforcing Steel splices at points other than those shown must be submitted to the Engineer for prior approval. If additional splices are allowed, no payment will be allowed for the added quantity of Reinforcing Steel.

ESTIMATED QUANTITIES			
ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
2 - F15 Barrel End Sections @ 43' - 0"	368.9	67686	159

LEGEND FOR PLACING RE-STEEL

T. T. S. - Top of Top Slab
B. T. S. - Bottom of Top Slab
T. B. S. - Top of Bottom Slab
B. B. S. - Bottom of Bottom Slab

F15 BARREL END SECTION DETAILS (43' - 0") A

FOR

5 - 10' X 5' BOX CULVERT

OVER CREEK

STA. 448 + 16.49

STR. NO. 42-134-014

8° 20' 38" RHF SKEW

SEC 17-T100N-R49W

NH 0100(107)411

HL-93

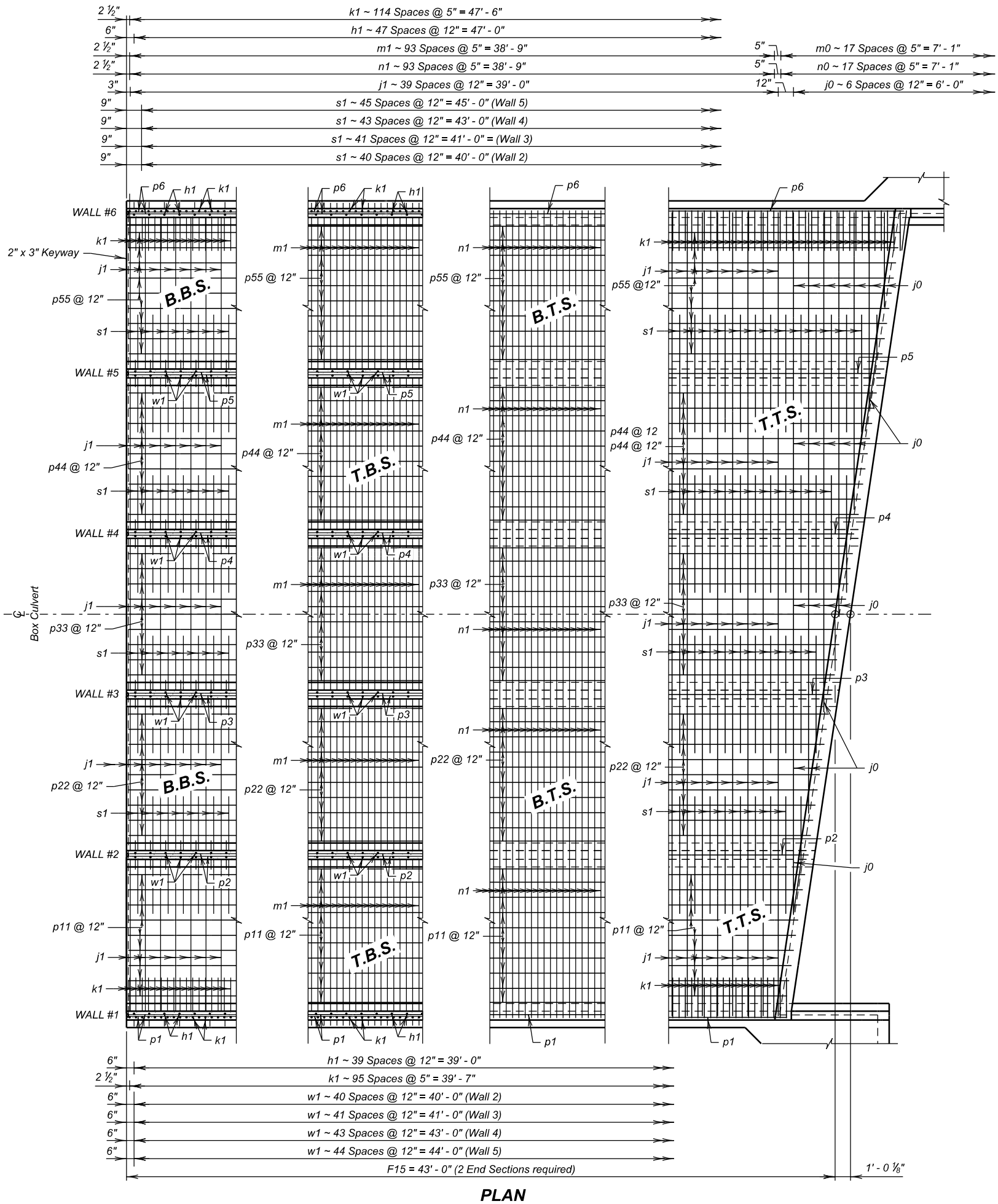
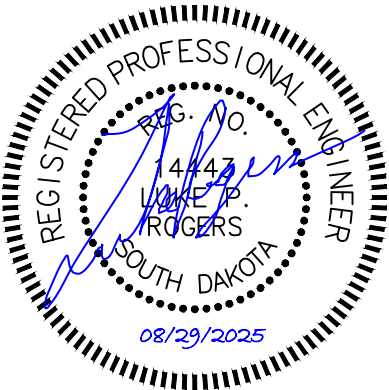
LINCOLN COUNTY

S. D. DEPT. OF TRANSPORTATION

JUNE 2025

4 OF 9

DESIGNED BY IMM LINC01VA	CK. DES. BY BMW 01VATA04	DRAFTED BY SEM	BRIDGE ENGINEER
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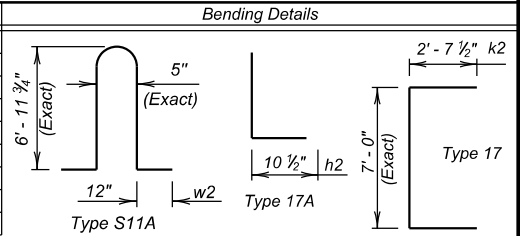
PLAN

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E08	E59

REINFORCING SCHEDULE
(For One Interior Section)

Mk.	No.	Size	Length	Type
h2	86	4	7' - 6"	17A
j1	88	6	52' - 6"	Str.
k2	208	4	12' - 3"	17
m1	104	5	54' - 3"	Str.
n1	104	5	53' - 3"	Str.
p7	246	4	42' - 9"	Str.
s1	344	6	7' - 6"	Str.
w2	172	4	16' - 3"	S11A
z1	118	5	3' - 6"	Str.



NOTES:

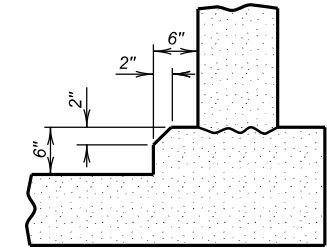
All dimensions are out to out of bars.

Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity shown is for one construction joint.

Request for additional Reinforcing Steel splices at points other than those shown must be submitted to the Engineer for prior approval. If additional splices are allowed, no payment will be allowed for the added quantity of Reinforcing Steel.

OPTIONAL k1 SPLICE DETAIL

Contractor may use optional reinforcing steel splice as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

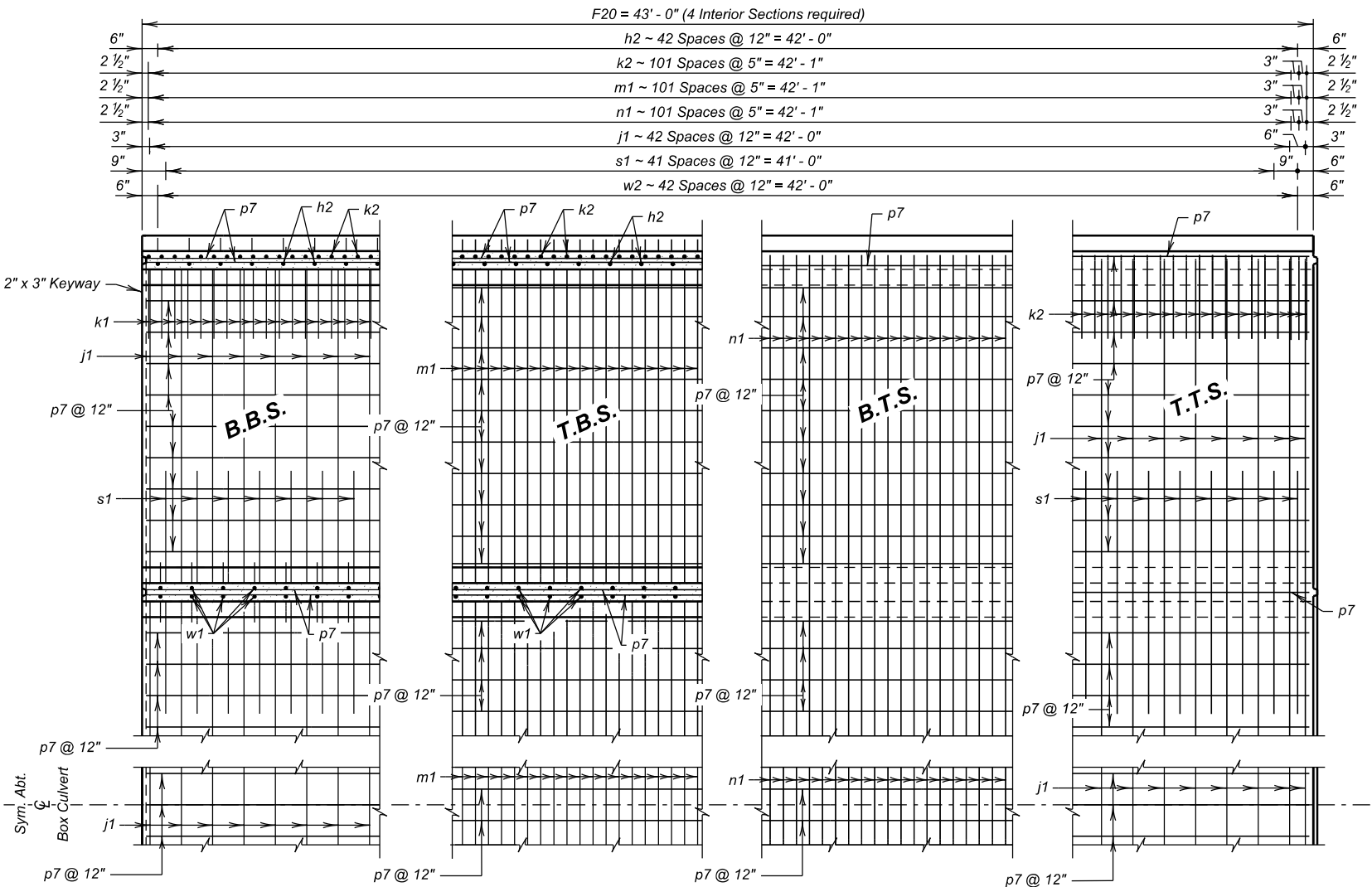


OPTIONAL FILLET DETAIL
(At Bottom Slab)

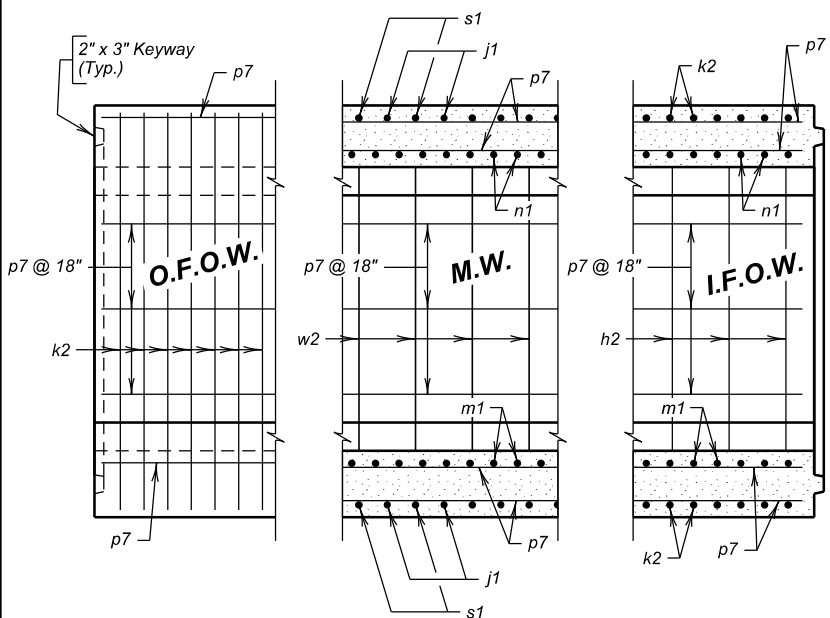
Note: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

OPTIONAL POUR - BOTTOM SLAB

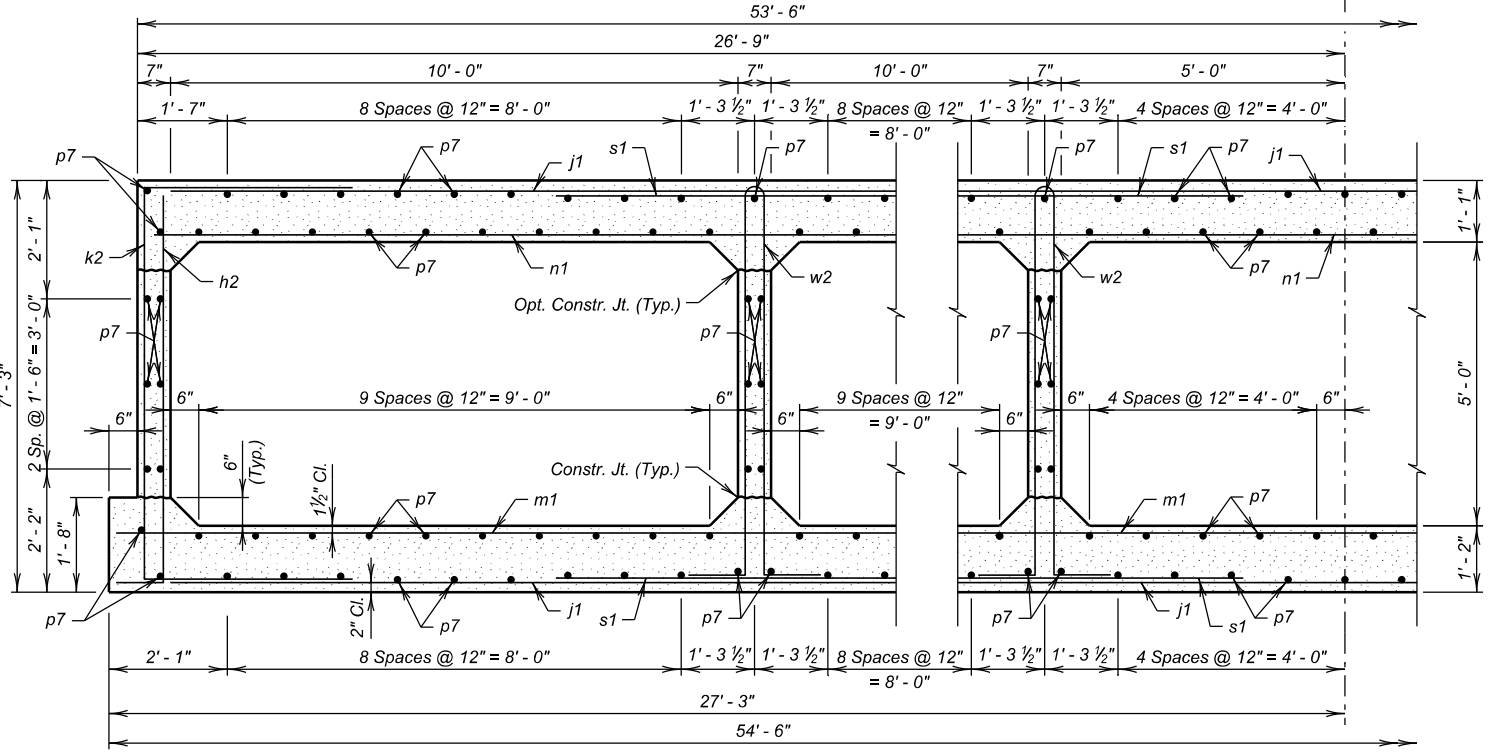
The Bottom Slab may be poured continuously, at the option of the Contractor, with the use of a Preformed Metal keyway conforming to the keyway dimensions and location as shown on the plans. The keyway length will be full width of the bottom slab. Care will be taken to maintain proper alignment of the keyway during the pour sequence. All additional costs of this option will be borne by the Contractor.



HALF PLAN



ELEVATION



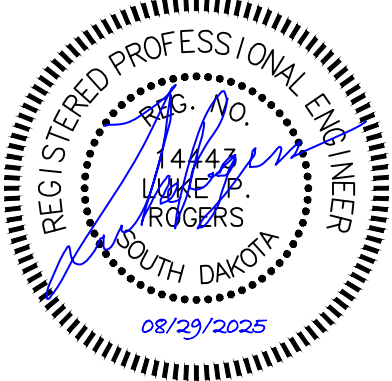
F20 BARREL HALF SECTION
(20' - 0" Maximum Fill)

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
4 - F20 Barrel Interior Sections @ 43' - 0"	904.9	135297	405

LEGEND FOR PLACING RE-STEEL

T. T. S. - Top of Top Slab
B. T. S. - Bottom of Top Slab
T. B. S. - Top of Bottom Slab
B. B. S. - Bottom of Bottom Slab
O. F. O. W. - Outside Face of Outside Wall
I. F. O. W. - Inside Face of Outside Wall
M. W. - Middle Wall



F20 BARREL INTERIOR SECTION DETAILS (43' - 0")

FOR

5 - 10' X 5' BOX CULVERT

OVER CREEK

STA. 448 + 16.49

STR. NO. 42-134-014

8° 20' 38" RHF SKEW

SEC 17-T100N-R49W

NH 0100(107)411

HL-93

LINCOLN COUNTY

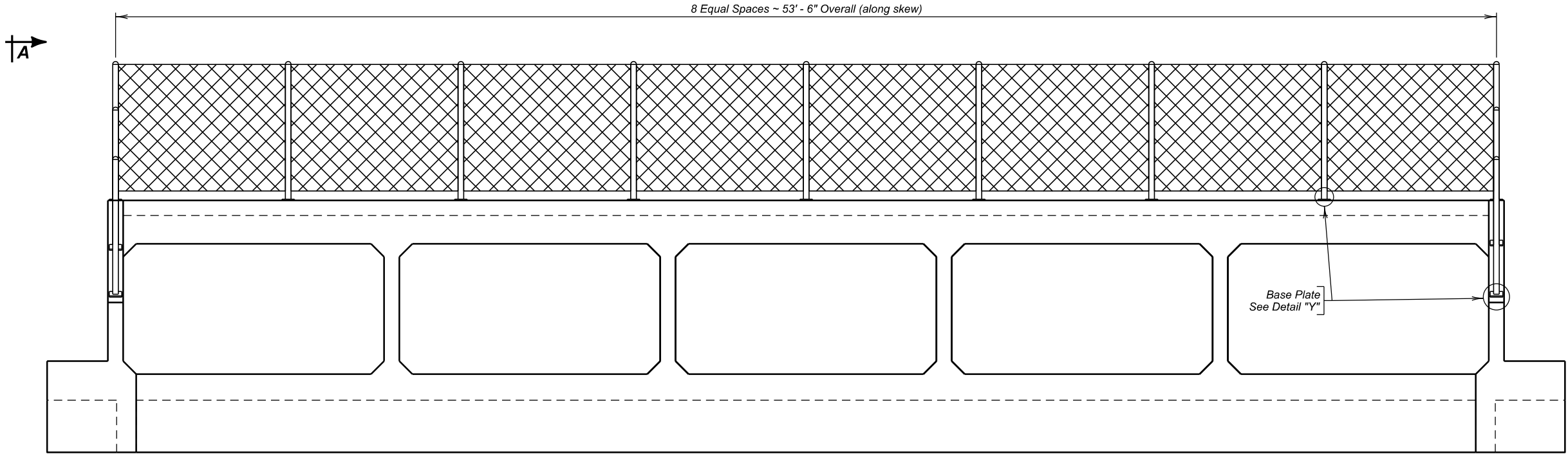
S. D. DEPT. OF TRANSPORTATION

JUNE 2025

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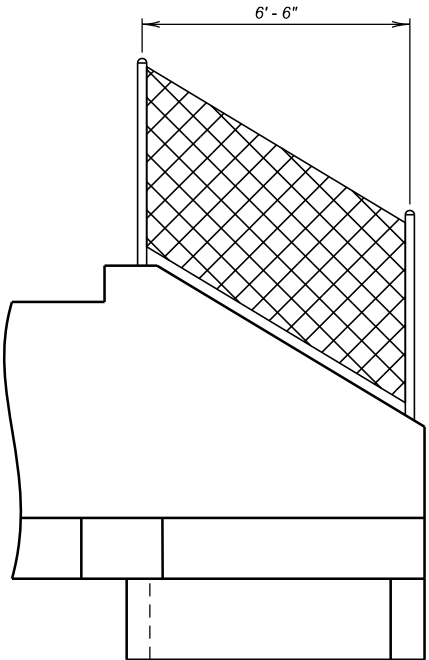
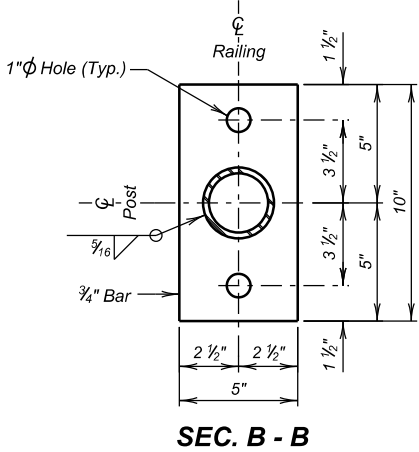
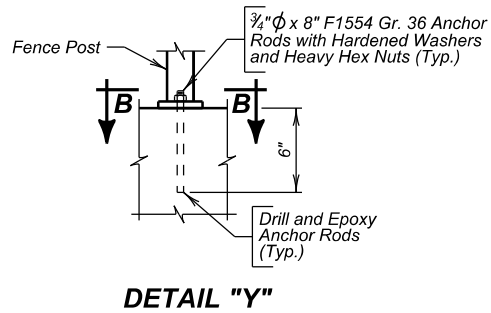
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E09	E59



A

CHAIN LINK FENCE
(Outlet Shown, Inlet Similar)

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Special 4' Chain Link Fence	Ft.	133



CHAIN LINK FENCE

- Special 4' Chain Link Fence will be in accordance with the details on Standard Plate Number 621.01 EXCEPT the rail posts will be set on the top of the wing wall and parapet in accordance with these notes.
- All fence posts will be built vertical.
- Fence post base plates will conform to ASTM A709, Grade 36. Posts, rails, and baseplates will be galvanized in accordance with ASTM A123.
- Anchor rods will conform to ASTM F1554, Grade 36. Nuts and washers will be in accordance with ASTM A563 and ASTM F436, respectively. Hardware will be galvanized in accordance with ASTM F2329. The bolts will be heavy hex head "Structural" with heavy hex lock nuts and round washers.
- All anchor rod nuts will be tightened to a torque of 120 ft-lb (Approximate without the use of a calibrated torque wrench).
- The epoxy resin mixture will be of a type for bonding steel to hardened concrete and will conform to AASHTO M235 Type IV (Equivalent to ASTM C881, Type IV).
- The rail posts and fence fabric color will be an approved black Federal Standard 595C 27040. All steel railing will be galvanized in accordance with ASTM A123, then will be painted in accordance with Section 411 of the Construction Specifications. The galvanized steel railing will be cleaned in accordance with ASTM D6386 before painting.
- Drilled hole diameter will be within the specifications given by the epoxy resin manufacturer. Smooth bore core drilling is not allowed. The drilled holes will be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to epoxy injection.
- All costs for posts, rails, ties, painting, galvanizing, welding, epoxy, fence fabric, and that which is incidental to the fabrication of the Special 4' Chain Link Fence will be included in the contract unit price per foot for "Special 4' Chain Link Fence".

FENCE DETAILS

FOR

5 - 10' X 5' BOX CULVERT

OVER CREEK

STA. 448 + 16.49

STR. NO. 42-134-014

8° 20' 38" RHF SKEW

SEC 17-T100N-R49W

NH 0100(107)411

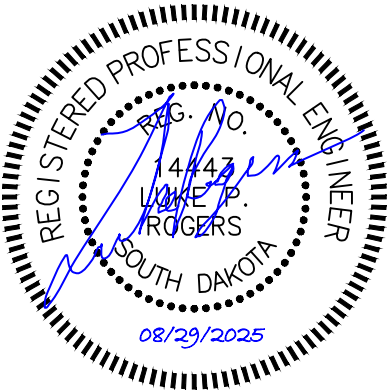
HL-93

LINCOLN COUNTY

S. D. DEPT. OF TRANSPORTATION

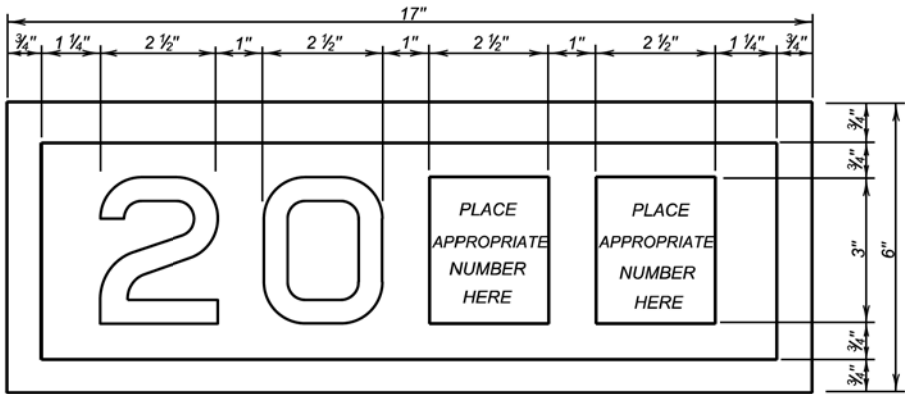
JUNE 2025

7 OF 9



DESIGNED BY IMM LINC01VA	CK. DES. BY BMW 01VATA07	DRAFTED BY SEM	BRIDGE ENGINEER
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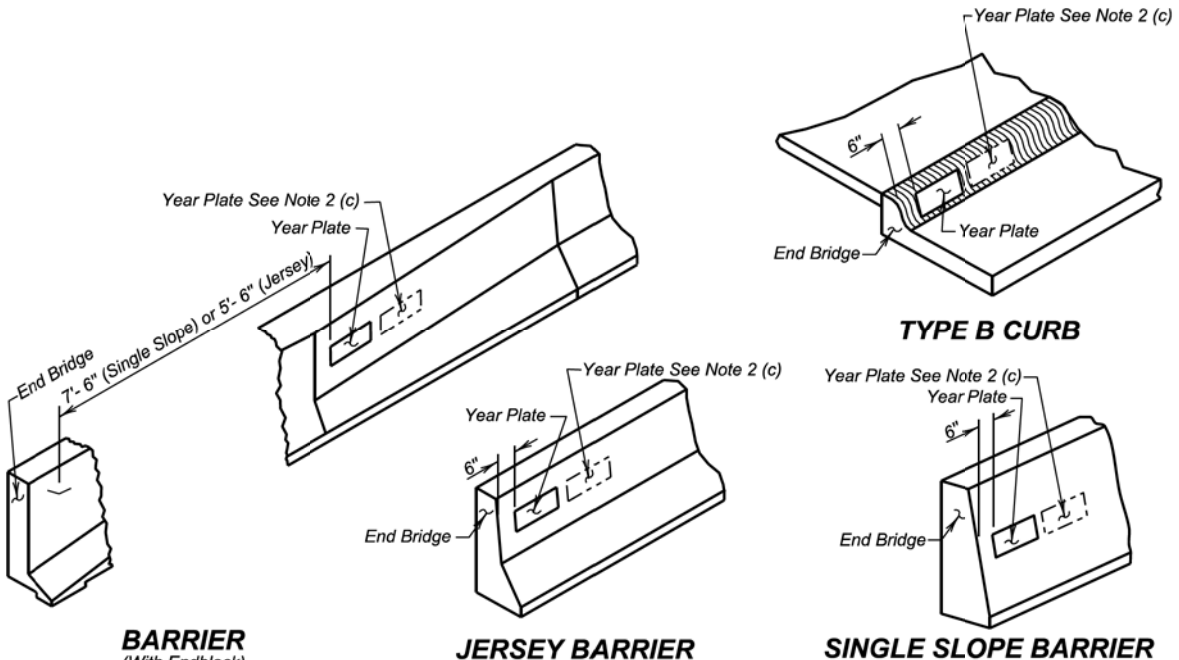
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E10	E59



YEAR PLATE DETAILS

GENERAL NOTES:

- Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.
- Year plates will be located on structure(s) as follows:
 - On cast-in-place box culverts the year plates will be four and one - half (4 1/2) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.
 - On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'-6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.
 - When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.
- There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.



TYPE B CURB

BARRIER
(With Endblock)

JERSEY BARRIER

SINGLE SLOPE BARRIER

January 22, 2021

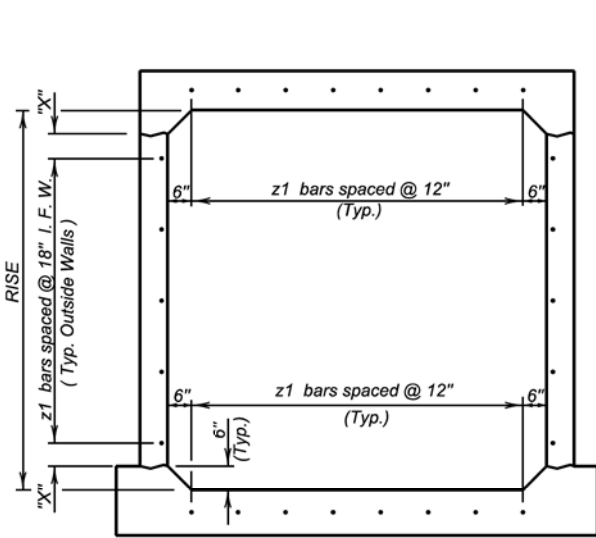
Published Date: 2027

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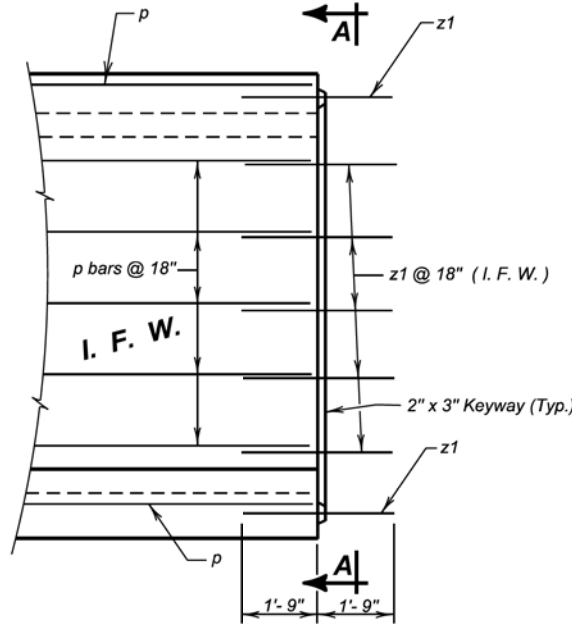
YEAR PLATE DETAILS

PLATE NUMBER
460.02

Sheet 1 Of 1



TYPICAL SINGLE BARREL VIEW A - A



ELEVATION

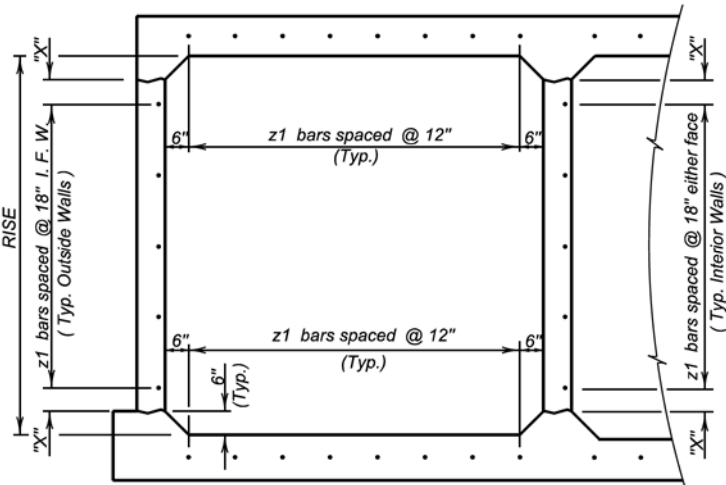
LEGEND FOR PLACING RE-STEEL

I. F. W. - Inside Face Wall

RISE	"X"
3'-0"	3"
4'-0"	9"
5'-0"	6"
6'-0"	3"
7'-0"	9"
8'-0"	6"
9'-0"	3"
10'-0"	9"
11'-0"	6"
12'-0"	3"
13'-0"	9"
14'-0"	6"

GENERAL NOTES:

- z1 bars will be placed in the middle of the 2" X 3" keyway in the top and bottom slabs. z1 bars will be lapped with the longitudinal p bars in the inside face of the wall for outside walls and in either face for interior walls. z1 bars are listed and included elsewhere in plans.
- Drainage Fabric Protection will be placed in accordance with Section 422, or Section 560, whichever is applicable.



TYPICAL MULTIPLE BARREL VIEW A - A

Published Date: 2027

S
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BOX CULVERT BARREL TIE REINFORCEMENT

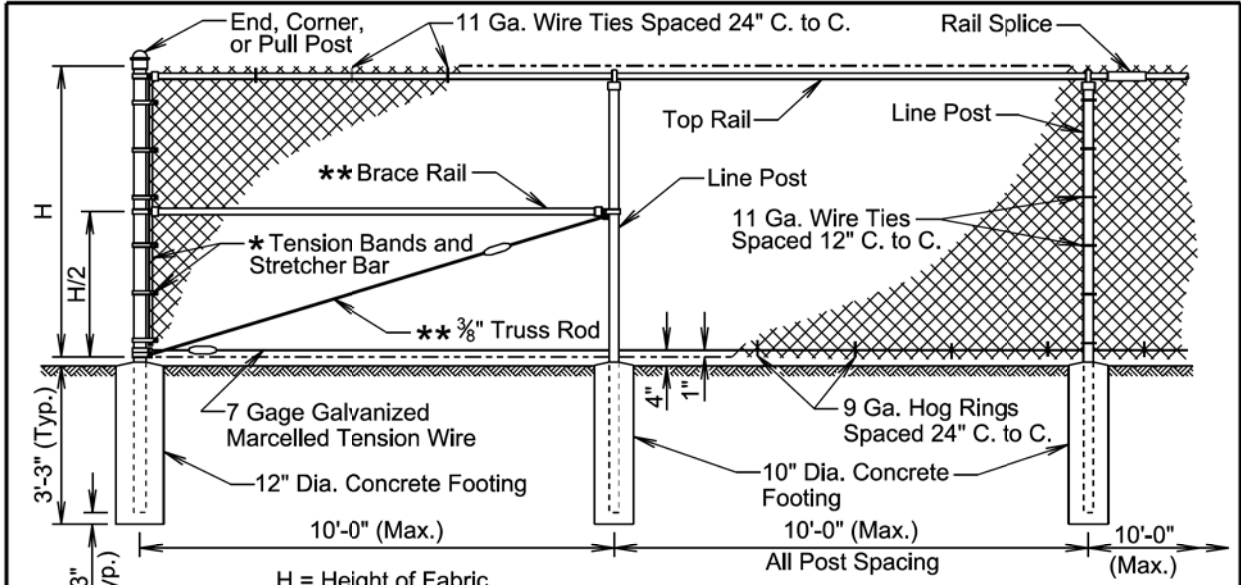
PLATE NUMBER
460.10

Sheet 1 of 1

5 - 10' X 5' BOX CULVERT

STR. NO. 42-134-014

JUNE 2025



H = Height of Fabric
* Tension bands will be spaced 12" c. to c.
** Are not required for 3' through 5' height fences.
○ Tightening device such as shown on standard plate 621.03

COMPONENT	END, CORNER, and PULL POST		LINE POST			TOP and BRACE RAIL	
	Type of Fabrication	Round Pipe Nominal	Roll Formed Steel	Round Pipe Nominal	"C" Section	H Beam Steel	Roll Formed Steel
Size		3.00" O. D.	3.5"x3.5"	2.50" O. D.	1.875"x1.625"	2.25"x1.70"	1.625" O. D.
Weight (lb. / Ft.)		5.79 or 4.64	5.14	3.65 or 3.12	2.34	3.43	2.27 or 1.84

GENERAL NOTES:

Specific details of the component parts of the fence will be approved by the Engineer. Commercially available items produced specifically for the use intended will be used wherever possible in the construction of the fence.

Height of the fabric will be as shown in the plans. Fabric is available at the following heights: 36", 42", 48", 60", 72", 84", 96", 108", 120", and 144". Fabric heights 60 inches and less will be knuckled at both selvages. Fabric heights 72 inches and higher will be knuckled at one selvage and twisted at the other selvage.

Chain link fabric will be 2-inch mesh, No. 9 gage galvanized wire securely fastened to tension wire, line post, rails, braces, and stretcher bars.

Fence may be constructed with either round pipe, "C" section, "H" beam, or roll formed steel components as shown in the table above. Line posts may be round pipe, "C" section, or "H" beam. The corner post and rails will be either round pipe or roll formed steel. The type of components used must be approved by the Engineer prior to installation.

Where fence must cross small bodies of water such as drainage areas or ponds that could freeze during the winter, use 11 gage hog rings. Provide only two ties per tension wire and top rail between line posts.

A suitable method of rail splicing will be used to allow for expansion and contraction while maintaining proper position of the top rail.

Fence grounding will be as shown on standard plate 620.11.

November 19, 2022

Published Date: 2027	S D D O T	CHAIN LINK FENCE WITH TOP RAIL	PLATE NUMBER 621.01
			Sheet 1 of 1

TYPICAL POST TOPS
(Shown for example only)

BRACE AND TRUSS BANDS

BRACE BANDS
(Bands will be rectangular for "C" Section and "H" Beam Posts.)

TENSION BANDS

TIGHTENING DEVICES

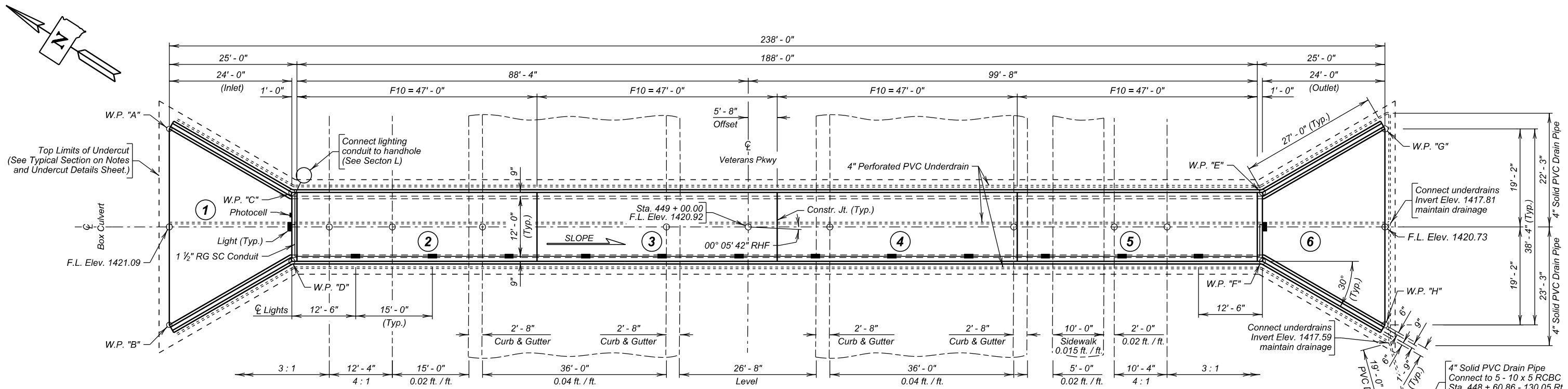
RAIL ENDS

Published Date: 2027		June 26, 2019	
Published Date: 2027	S D D O T	HARDWARE FOR CHAIN LINK FENCE	PLATE NUMBER 621.03
			Sheet 1 of 1

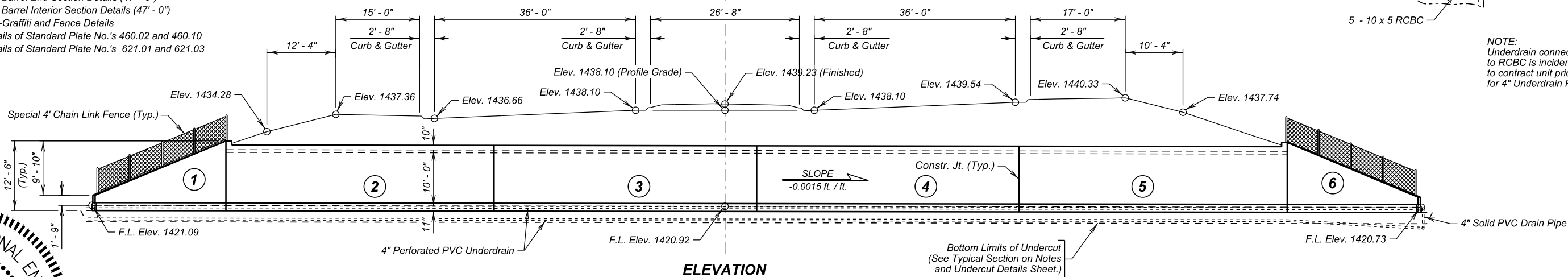
The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

FOR BIDDING PURPOSES ONLY

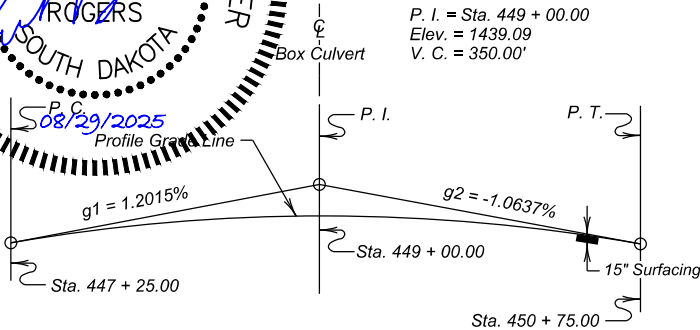
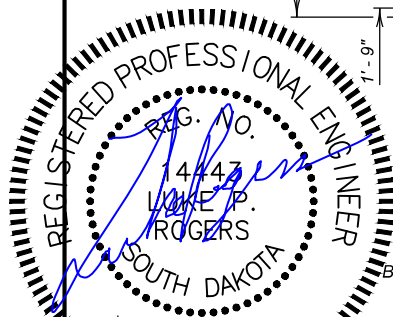
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E12	E59



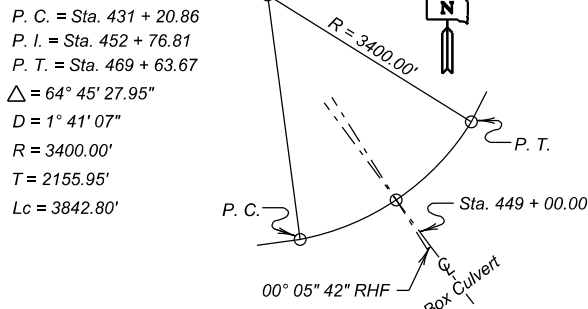
- INDEX OF CULVERT SHEETS-**
- Sheet No. 1 - General Drawing and Quantities
 - Sheet No. 2 - Notes and Undercut Details
 - Sheet No. 3 - Inlet and Outlet Details
 - Sheet No. 4 - F10 Barrel End Section Details (47' - 0")
 - Sheet No. 5 - F10 Barrel Interior Section Details (47' - 0")
 - Sheet No. 6 - Anti-Graffiti and Fence Details
 - Sheet No. 7 - Details of Standard Plate No.'s 460.02 and 460.10
 - Sheet No. 8 - Details of Standard Plate No.'s 621.01 and 621.03



NOTE:
Underdrain connection
to RCBC is incidental
to contract unit price
for 4" Underdrain Pipe



VERTICAL CURVE DATA



HORIZONTAL CURVE DATA

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Structure Excavation, Box Culvert	Cu. Yd.	140
Box Culvert Undercut	Cu. Yd.	410
Class A45 Concrete, Box Culvert	Cu. Yd.	354.2
Anti-Graffiti Coating	Sq. Ft.	6916.0
Reinforcing Steel	Lb.	66342
Special 4' Chain Link Fence	Ft.	134
4" Underdrain Pipe	Ft.	787
Porous Backfill	Ton	714.6

PEDESTRIAN UNDERPASS LIGHTING

The Pedestrian Underpass lighting as detailed on Sheet No. 1 and 6 will be paid for under plans Section L. See plans Section L for all notes and quantities for the Pedestrian Underpass lighting.

TABLE OF WORKING POINTS		
W. P.	STATION	OFFSET
"A"	449 + 19.63	113.31' Lt.
"B"	448 + 79.98	113.24' Lt.
"C"	449 + 06.78	89.34' Lt.
"D"	448 + 92.92	89.31' Lt.
"E"	449 + 06.72	100.66' Rt.
"F"	448 + 93.61	100.68' Rt.
"G"	449 + 18.69	124.69' Rt.
"H"	448 + 81.71	124.75' Rt.

GENERAL DRAWING AND QUANTITIES
FOR
12' X 10' BOX CULVERT
OVER PEDESTRIAN/BIKE PATH 00° 05' 42" RHF SKEW
STA. 449 + 00.00 SEC 17-T100N-R49W
STR. NO. 42-135-014 NH 0100(107)411
PCN 01VA HL-93
LINCOLN COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2025



DESIGNED BY	CK. DES. BY	DRAFTED BY	BRIDGE ENGINEER
ALG LINC01VA	BMW 01VATA01	SEM	

FOR BIDDING PURPOSES ONLY

REV DATE: 8-28-2026
NOTA

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0100(107)411	E13	E59

SPECIFICATIONS

- Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.
- Construction Specifications: Standard Specifications for Roads and Bridges, 10-7-26 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at <https://dot.sd.gov/doing-business/contractors/standard-specifications>.

GENERAL NOTES (CAST-IN-PLACE BOX CULVERT)

- Design Live Load: HL-93 and construction load consisting of one 7'-6" gauge axle with gross weight = 95,850 lbs. The construction load will not be applied until a minimum of 4 feet of fill has been placed over the box culvert. Other construction loads in excess of legal load must be submitted through proper channels to the Office of Bridge Design for analysis.
- The design of the barrel section is based on a minimum fill height of 2 feet and includes all subsequent fill heights up to and including the maximum fill height of 10 feet (F10).
- Design Material Strengths:
Concrete $f'c$ = 4,500 psi
Reinforcing Steel f_y = 60,000 psi
- All concrete will be Class A45 Concrete, Box Culvert conforming to Section 460 of the Construction Specifications.
- All reinforcing steel will conform to ASTM A615 Grade 60.
- All lap splices shown are contact lap splices unless noted otherwise.
- All exposed concrete corners and edges will be chamfered $\frac{3}{4}$ inch unless noted otherwise in the plans.
- Use 1-inch clear cover on all reinforcing steel EXCEPT as shown.
- The Contractor will imprint on the structure the date of construction as specified and detailed on Standard Plate 460.02.
- Care will be taken to establish Working Points (W.P.) as shown on the wings.
- Circled numbers in PLAN and ELEVATION views on the General Drawing are section I.D. numbers (see SDDOT Materials Manual).
- Broom finish concrete on all pedestrian walking surfaces.
- Soils below the bottom of the proposed RCBC consist of soft brown sandy clay.
- Groundwater was encountered in the borings at an elevation of 1414.6 feet during the subsurface investigation conducted in November 2024.

UNDERDRAIN

- The 4-inch diameter Perforated PVC Drain Pipe will be PS 46 Solvent Weld PVC pipe conforming to ASTM F758 or SDR 35 Solvent Weld PVC Pipe conforming to ASTM D3034 with perforations in accordance with ASTM F758. The 4" Dia. Solid PVC Pipe will be Schedule 40 PVC Pipe conforming to ASTM D1785 designated as PVC 1120, PVC 1220, or PVC 2120. Pipe sections will be connected using a PVC Solvent Cement conforming to ASTM D2564. The Drain Sleeve will conform to ASTM D6707.
- Care will be taken to ensure that the 4-inch diameter Perforated PVC Drain Pipe and the 4-inch diameter Solid PVC Pipe are not damaged during construction. Sufficient cover material will be placed over the pipes before compaction equipment is allowed over the underdrain system. Any damaged pipes will be replaced by the Contractor at no additional cost to the Department.
- Maintain positive drainage.
- All labor, tools, equipment, and any incidentals necessary for the installation of 4-inch diameter Perforated PVC Drain Pipe, Vertical Composite Drain, Drain Sleeve, 4-inch diameter Solid PVC Pipe, SDR Solvent Weld PVC Coupling, and PVC Cement will be incidental to the contract unit price per foot for 4" Underdrain Pipe.
- The Vertical Composite Drain will be one of the products from the approved products list for "Vertical Drains". The approved products list can be found at: <https://apps.sd.gov/HC60ApprovedProducts/main.aspx>.

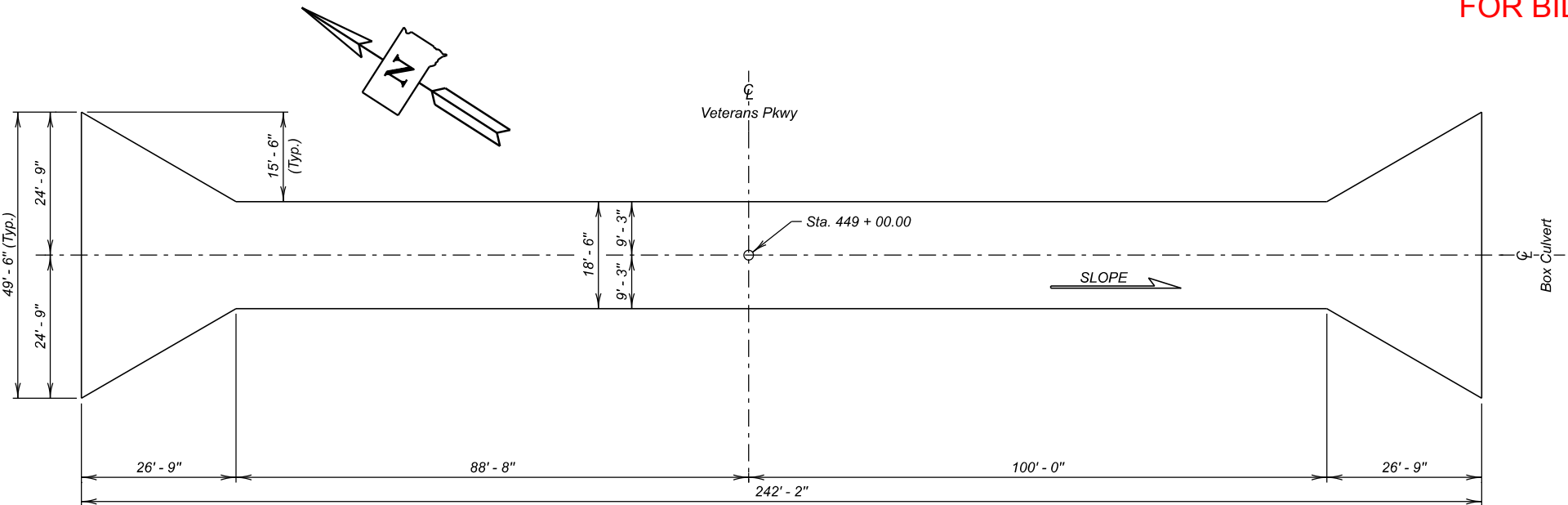
NOTES AND UNDERCUT DETAILS
FOR
12' X 10' BOX CULVERT

OVER PEDESTRIAN/BIKE PATH 00° 05' 42" RHF SKEW
STA. 449 + 00.00 SEC 17-T100N-R49W
STR. NO. 42-135-014 NH 0100(107)411
HL-93

LINCOLN COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2025

2 OF 8

DESIGNED BY ALG LINC01VA	CK. DES. BY BMW 01VATA02	DRAFTED BY SEM	BRIDGE ENGINEER
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UNDERCUT LAYOUT
(Bottom Dimensions)

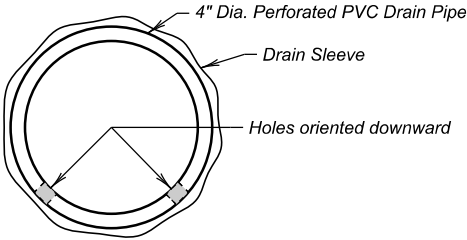
ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Box Culvert Undercut	Cu. Yd.	410
4" Underdrain Pipe	Ft.	787
Porous Backfill	Ton	714.6

For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.

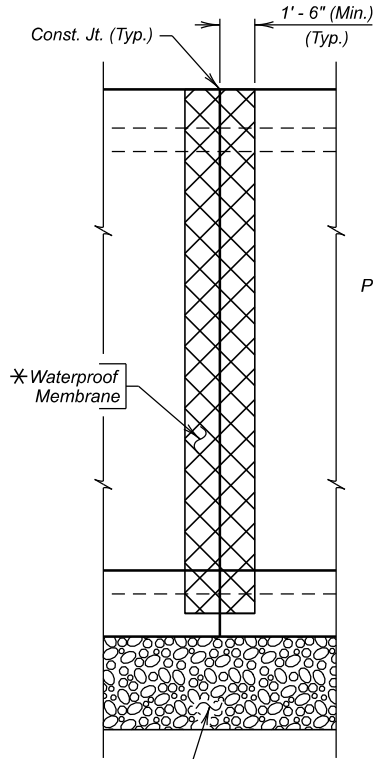
- 722 ft. 4" Dia. Perforated PVC Pipe.
- 65 ft. 4" Dia. Solid PVC Pipe
- 5315 sq. ft. Vertical Composite Drain
- 333 sq. ft. Waterproof Membrane for 3 joints.

Items 1 through 4 are approximate quantities contained in the 4" Underdrain Pipe and are for information only.

For estimating purposes only, a factor of 1.89 Ton / CuYd was used.

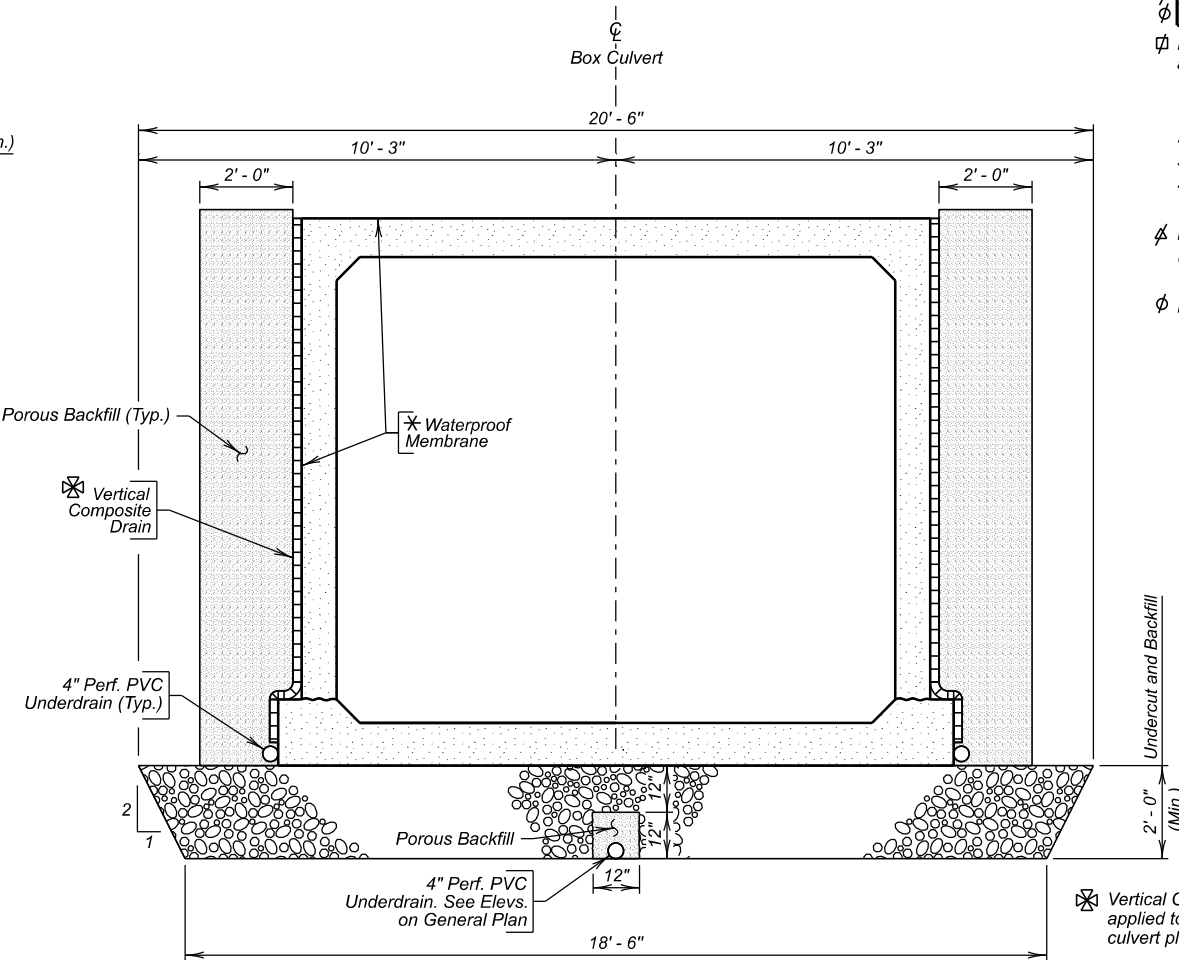


UNDERDRAIN DETAIL



ELEVATION
(For Joint Seal)

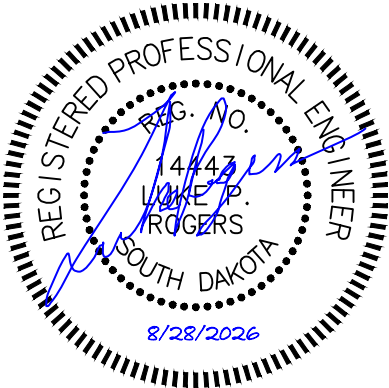
Waterproof Membrane will be applied to the roof and wall joints and is incidental to bid item 4" Underdrain Pipe. Waterproof Membrane will be self-adhered and will be on the SDDOT Approved Products List.



TYPICAL SECTION
(For Limits of Undercut)

Vertical Composite Drain to be applied to entire length of box culvert plus wingwalls.

Top 1 ft along back of wingwalls to be left uncovered for Anti-Graffiti Coating (See Anti-Graffiti and Fence Details) prior to backfill.



FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E14	E59

LEGEND FOR PLACING RE-STEEL

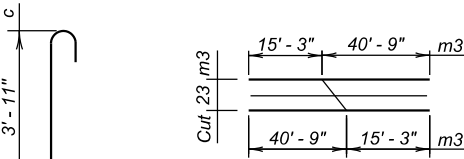
I.F.W.W. - Inside Face of Wing Wall
O.F.W.W. - Outside Face of Wing Wall

REINFORCING SCHEDULE

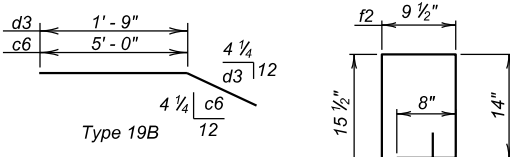
(For One Inlet and One Outlet)

Mk.	No.	Size	Length	Type
a1	8	6	13' - 0"	Str.
c	8	5	4' - 6"	1A
c5	16	5	28' - 6"	Str.
c6	8	5	7' - 0"	19B
d3	16	5	3' - 6"	19B
f2	26	4	5' - 3"	S6A
g0	24	5	5' - 0"	19B
g1	36	4	32' - 6"	19B
g2	8	4	28' - 9"	19B
h4	54	4	17' - 0"	17A
k5	62	4	19' - 6"	17A
p6	20	6	7' - 0"	Str.
p17	56	4	25' - 9"	Str.
p18	48	4	27' - 6"	Str.
p19	8	4	29' - 0"	Str.
m3	46	4	56' - 0"	Str.
m4	4	4	38' - 3"	Str.

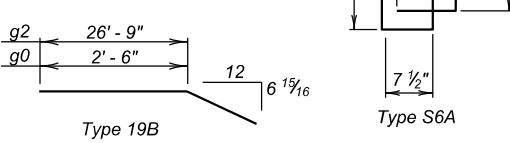
Bending Details



Type 1A

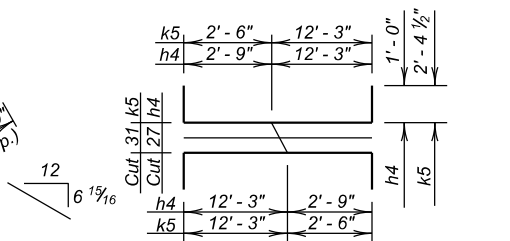


Type 19B



Type 19B

Type S6A



Type 17A

NOTES:

All dimensions are out to out of bars.
See cutting diagram.
Bend in field as necessary to fit.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
1 - Inlet	36.0	3696	24
1 - Outlet	36.0	3696	24

INLET AND OUTLET DETAILS

FOR

12' X 10' BOX CULVERT

OVER PEDESTRIAN/BIKE PATH 00° 05' 42" RHF SKEW
STA. 449 + 00.00 SEC 17-T100N-R49W
STR. NO. 42-135-014 NH 0100(107)411
HL-93

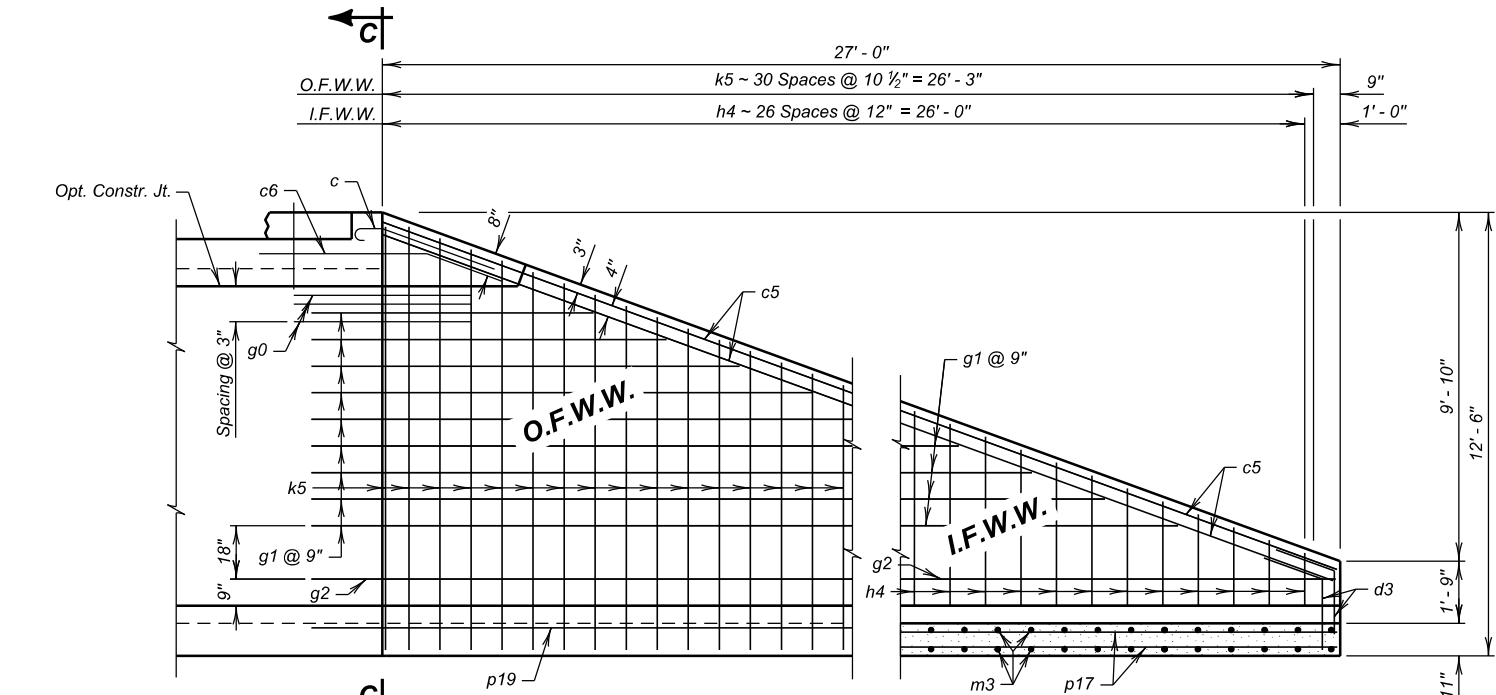
LINCOLN COUNTY

S. D. DEPT. OF TRANSPORTATION

JUNE 2025

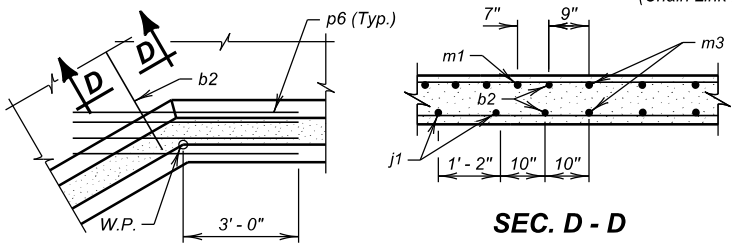
3 OF 8

DESIGNED BY ALG LINC01VA	CK. DES. BY BMW 01VATA03	DRAFTED BY SEM	BRIDGE ENGINEER
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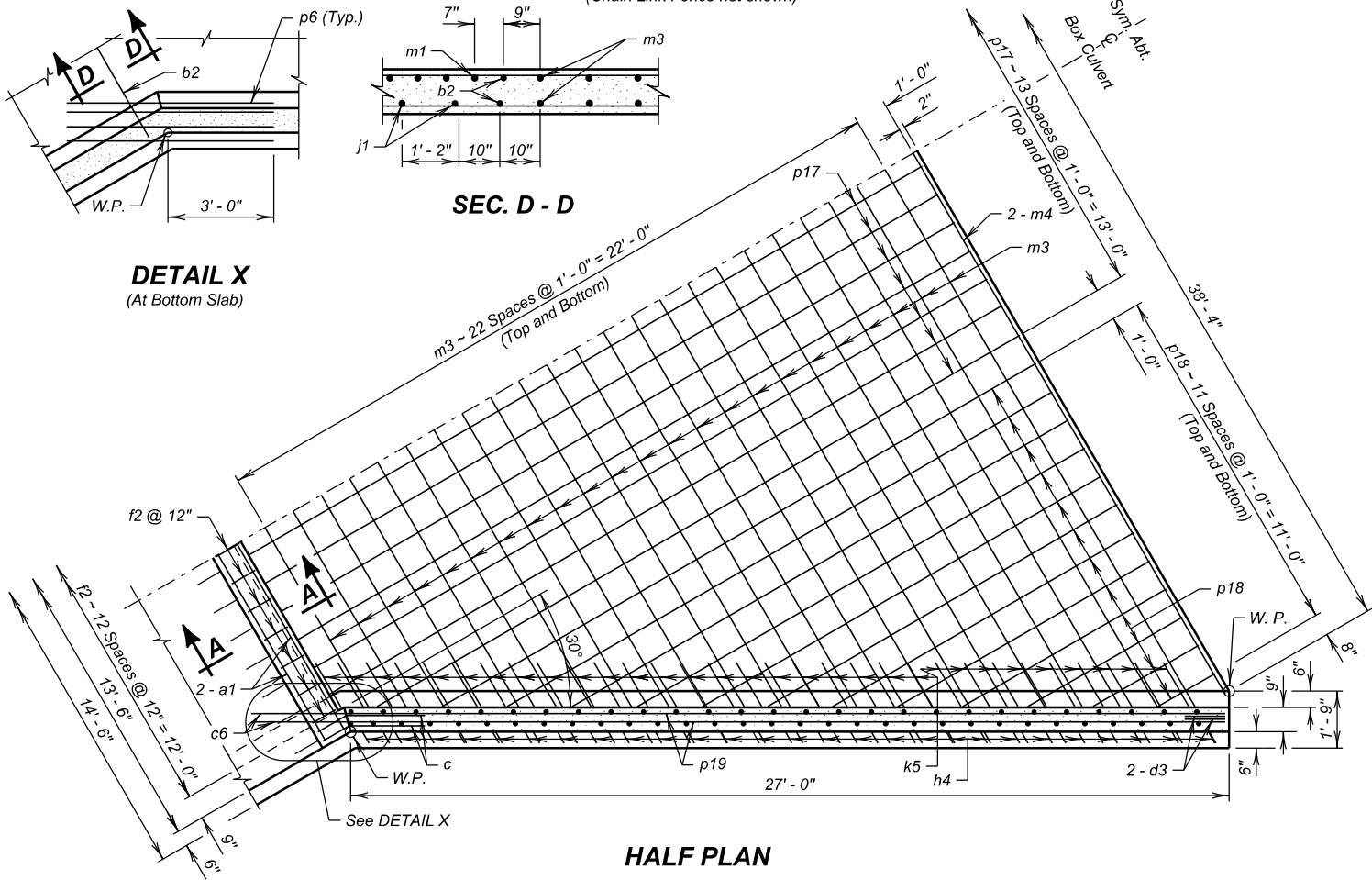
ELEVATION

(Chain Link Fence not shown)

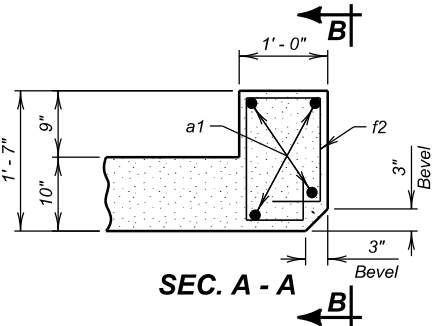


DETAIL X

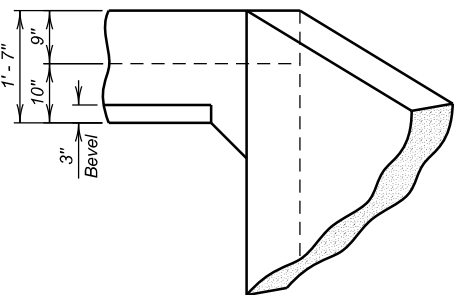
(At Bottom Slab)



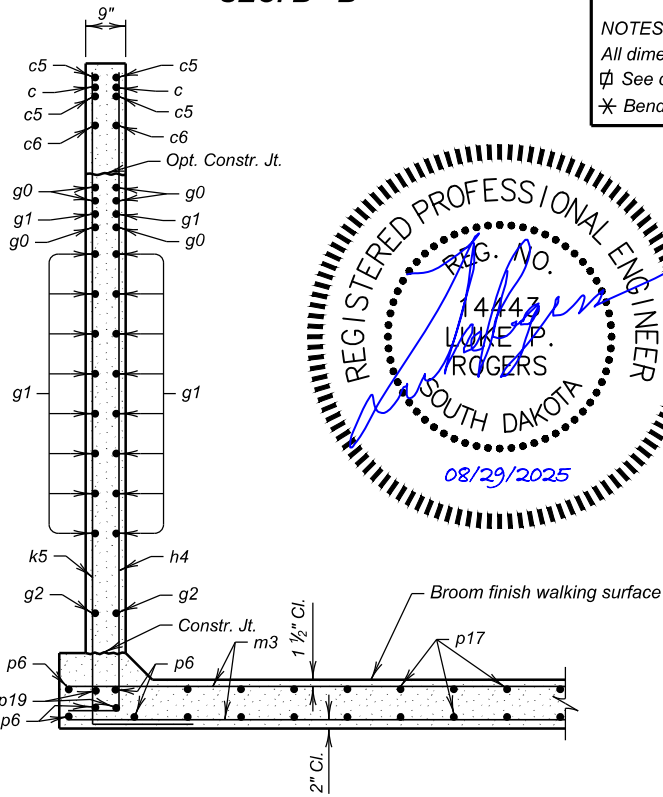
HALF PLAN



SEC. A - A



SEC. B - B



SEC. C - C



F10 = 47' - 0" (2 Interior Sections required)

k1 ~ 79 Spaces @ 7" = 46' - 1"

m1 ~ 79 Spaces @ 7" = 46' - 1"

n1 ~ 93 Spaces @ 6" = 46' - 6"

j1 ~ 39 Spaces @ 1' - 2" = 45' - 6"

h1 ~ 46 Spaces @ 1' - 0" = 46' - 0"

FOR BIDDING PURPOSES ONLY

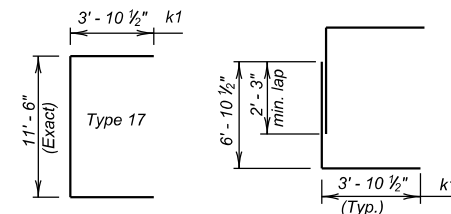
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E16	E59

REINFORCH SCHEDULE

(For One Interior Section)

Mk.	No.	Size	Length	Type	Bending Details
h1	94	4	12' - 3"	17A	
j1	82	5	12' - 0"	Str.	
k1	162	6	19' - 3"	17	
m1	81	8	14' - 3"	Str.	
n1	94	7	13' - 3"	Str.	
p2	78	4	46' - 9"	Str.	
z1	36	5	3' - 6"	Str.	

Type 17A



OPTIONAL k1 SPLICE DETAIL
Contractor may use optional reinforcing steel splice as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

NOTES:

Reinforcing steel extensions are out to out of bars.

Request for additional Reinforcing Steel splices at points other than those shown must be submitted to the Engineer for prior approval. If additional splices are allowed, no payment will be allowed for the added quantity of Reinforcing Steel.

Place z1 bars through construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity shown is for one construction joint.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
2 - F10 Barrel Interior Sections @ 47' - 0"	141.1	29220	46

LEGEND FOR PLACING RE-STEEL

T. T. S. - Top of Top Slab
B. T. S. - Bottom of Top Slab
T. B. S. - Top of Bottom Slab
B. B. S. - Bottom of Bottom Slab
O. F. W. - Outside Face of Wall
I. F. W. - Inside Face of Wall

F10 BARREL INTERIOR SECTION DETAILS (47' - 0")
FOR

12' X 10' BOX CULVERT

OVER PEDESTRIAN/BIKE PATH 00° 05' 42" RHF SKEW
STA. 449 + 00.00 SEC 17-T100N-R49W
STR. NO. 42-135-014 NH 0100(107)411
HL-93

LINCOLN COUNTY
S. D. DEPT. OF TRANSPORTATION

JUNE 2025

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PLAN

OPTIONAL POUR - BOTTOM SLAB

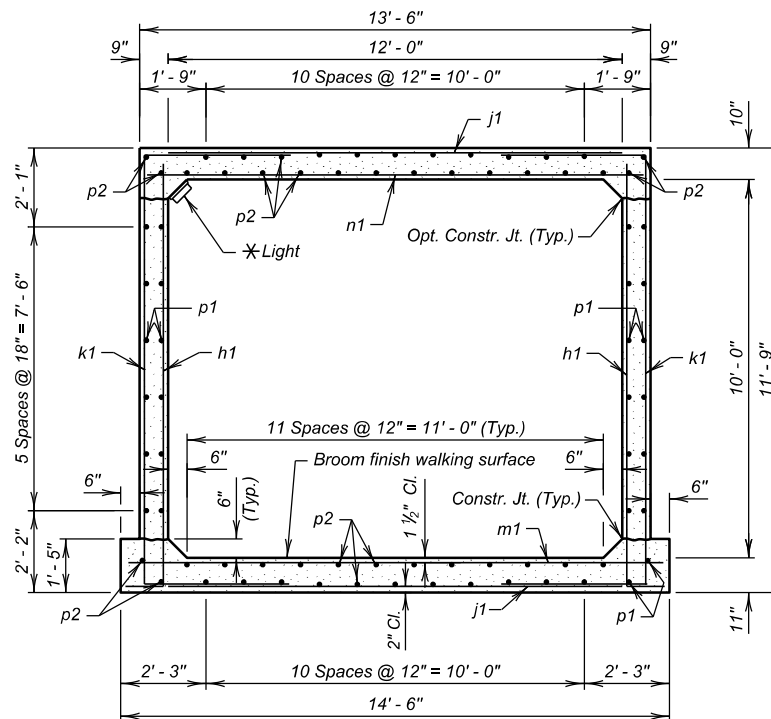
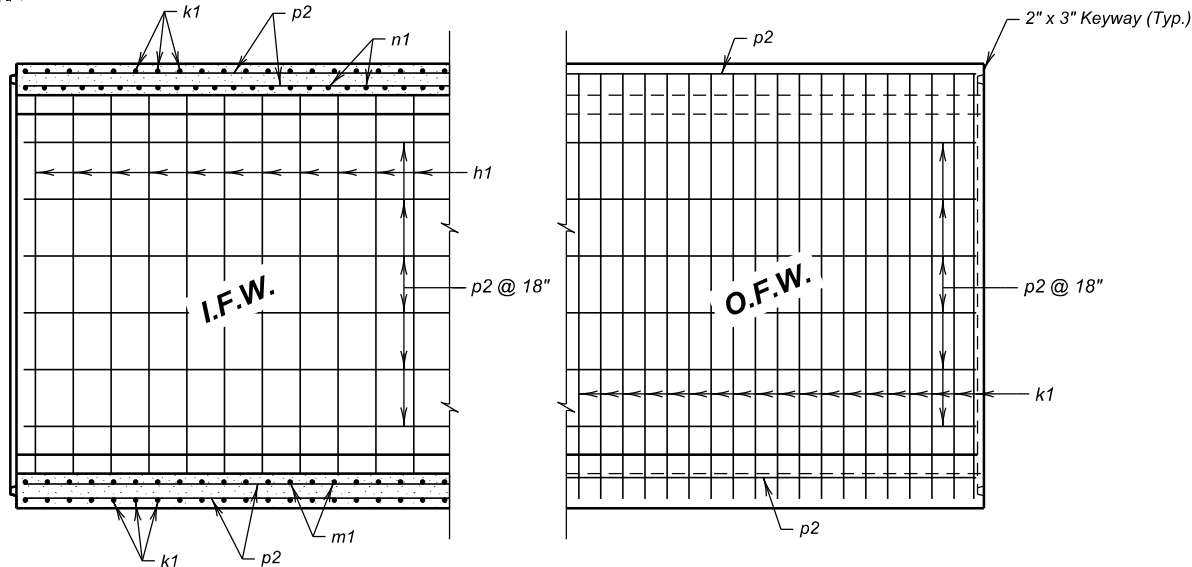
The Bottom Slab may be poured continuously, at the option of the Contractor, with the use of a Preformed Metal keyway conforming to the keyway dimensions and location as shown on the plans. The keyway length will be full width of the bottom slab. Care will be taken to maintain proper alignment of the keyway during the pour sequence. All additional costs of this option will be borne by the Contractor.

ELEVATION

F10 BARREL SECTION

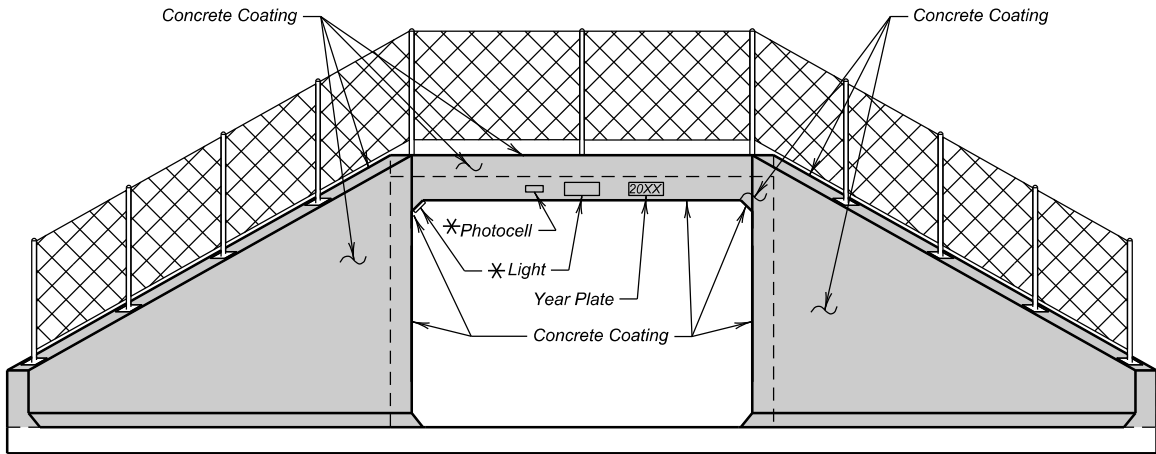
(10' - 0" Maximum Fill)

* See Section L for details



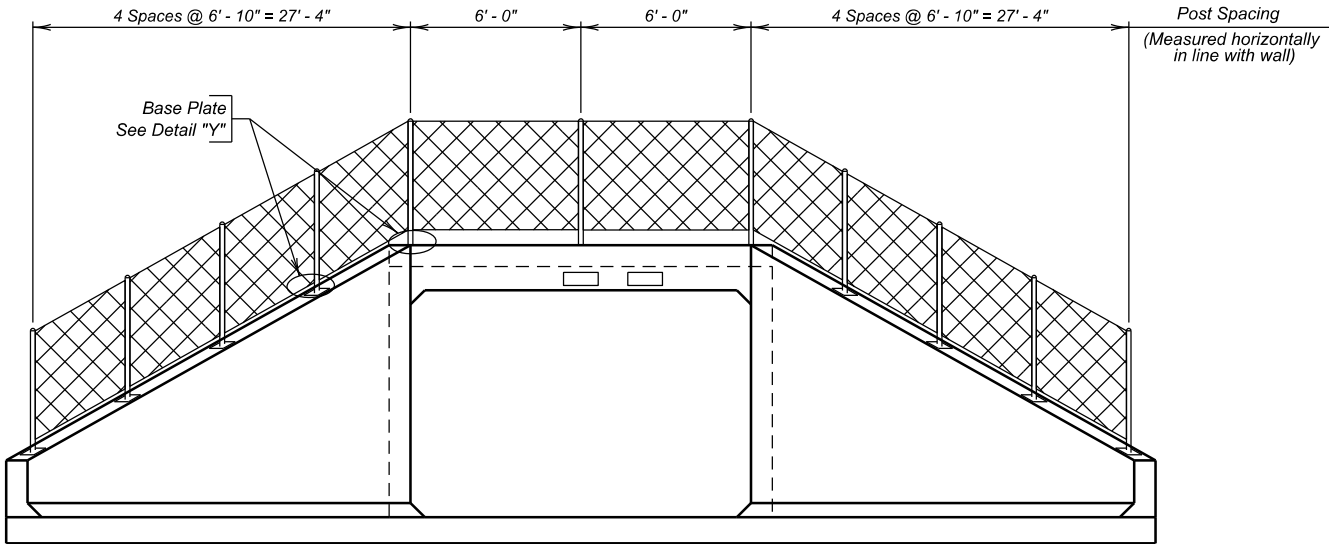
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E17	E59



* See Section L for details

CONCRETE COATING
(Looking Towards Front Face of Wing Wall)
(Outlet Shown, Inlet Similar)



CHAIN LINK FENCE
(Outlet Shown, Inlet Similar)

CHAIN LINK FENCE

- Special 4' Chain Link Fence will be in accordance with the details on Standard Plate Number 621.01 EXCEPT the rail posts will be set on the top of the wing wall and parapet in accordance with these notes.
- All fence posts will be built vertical.
- Fence post base plates will conform to ASTM A709, Grade 36. Posts, rails, and baseplates will be galvanized in accordance with ASTM A123.
- Anchor rods will conform to ASTM F1554, Grade 36. Nuts and washers will be in accordance with ASTM A563 and ASTM F436, respectively. Hardware will be galvanized in accordance with ASTM F2329. The bolts will be heavy hex head "Structural" with heavy hex lock nuts and round washers.
- All anchor rod nuts will be tightened to a torque of 120 ft-lb (Approximate without the use of a calibrated torque wrench).
- The epoxy resin mixture will be of a type for bonding steel to hardened concrete and will conform to AASHTO M235 Type IV (Equivalent to ASTM C881, Type IV).
- The rail posts and fence fabric color will be an approved black Federal Standard 595C 27040. All steel railing will be galvanized in accordance with ASTM A123, then will be painted in accordance with Section 411 of the Construction Specifications. The galvanized steel railing will be cleaned in accordance with ASTM D6386 before painting.
- Drilled hole diameter will be within the specifications given by the epoxy resin manufacturer. Smooth bore core drilling is not allowed. The drilled holes will be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to epoxy injection.
- All costs for posts, rails, ties, painting, galvanizing, welding, epoxy, fence fabric, and that which is incidental to the fabrication of the Special 4' Chain Link Fence will be included in the contract unit price per foot for "Special 4' Chain Link Fence".

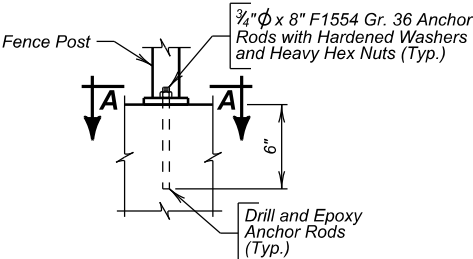
CONCRETE COATING

- Use one of the following systems, or an Engineer approved equal:

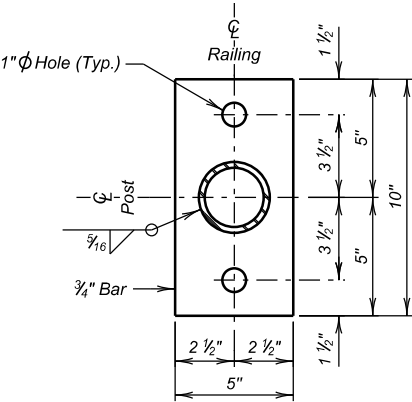
TK-Products:
Base Coat 1st Coat: TK-Tri-Sheen Pigmented Stain 5272 applied at 250 to 350 SF/Gal.
Base Coat 2nd Coat: TK-Tri-Sheen Pigmented Stain 5272 applied at 250 to 350 SF/Gal.
Topcoat Prime: TK-Anti-Graffiti Primer 1450 clear applied at 225 to 335 SF/Gal.
Topcoat Finish: TK-PERMACLEAN VOC 1496 clear applied at 350 to 450 SF/Gal (matte finish).

Tnemec:
Base Coat 1st Coat: Tnemec Series 151-1051 Elasto-Grip FC applied at 180 to 400 SF/Gal.
Base Coat 2nd Coat: Tnemec Series 156 Enviro-Crete applied at 102 to 204 SF/Gal.
Topcoat Finish: Tex-Cote (Tnemec) Graffiti Gard S clear applied at 75 to 125 SF/Gal (satin to semi-gloss finish).

- Concrete Coating is to be applied to the front, top and top one foot of the back of the parapet and wing walls and the walls, fillets, and ceiling of the barrel as shown above.
- All costs in furnishing and applying the Concrete Coating will be included in the contract unit price per square foot for Anti-Graffiti Coating.



DETAIL "Y"



SEC. A - A

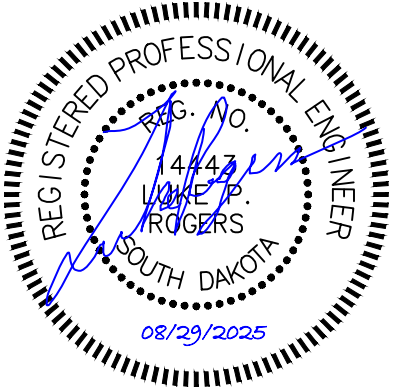
ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Anti-Graffiti Coating	Sq. Ft.	6916
Special 4' Chain Link Fence	Ft.	134

ANTI-GRAFFITI AND FENCE DETAILS
FOR
12' X 10' BOX CULVERT

OVER PEDESTRIAN/BIKE PATH 00° 05' 42" RHF SKEW
STA. 449 + 00.00 SEC 17-T100N-R49W
STR. NO. 42-135-014 NH 0100(107)411
HL-93

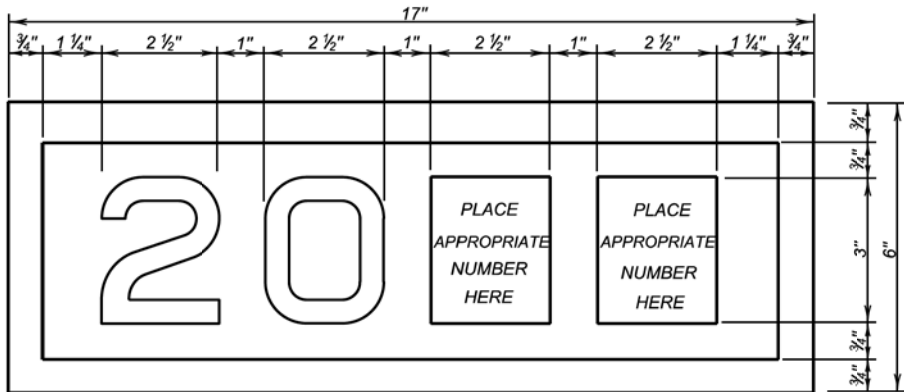
LINCOLN COUNTY
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JUNE 2025

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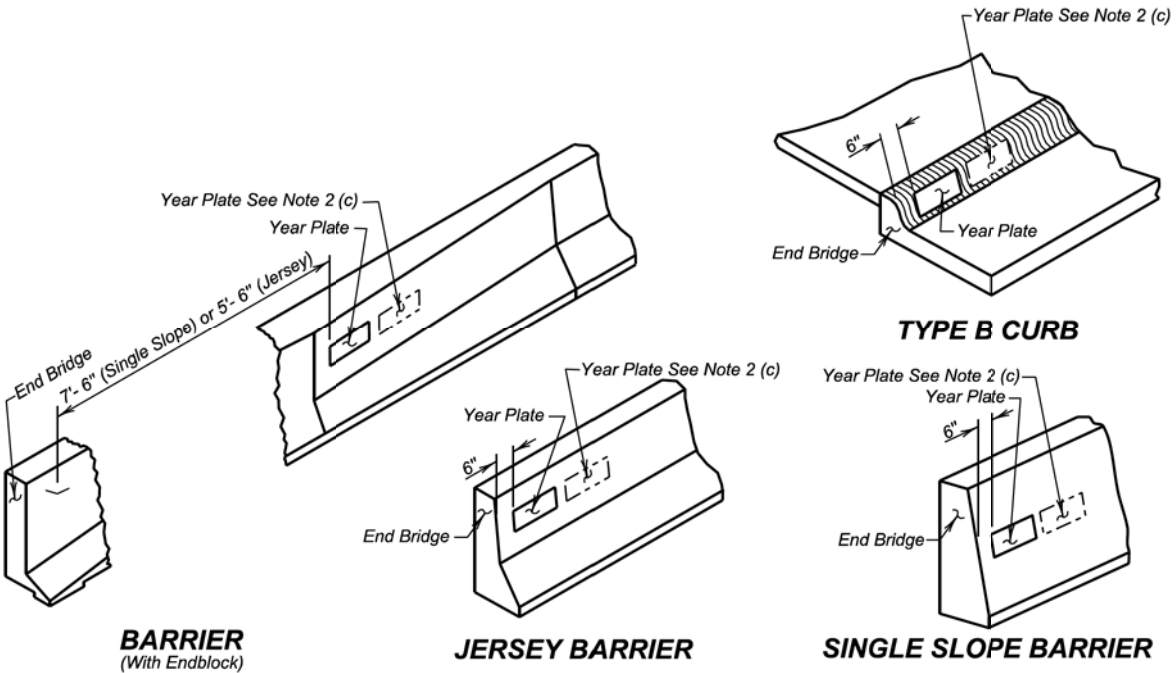
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E18	E59



YEAR PLATE DETAILS

GENERAL NOTES:

- Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.
- Year plates will be located on structure(s) as follows:
 - On cast-in-place box culverts the year plates will be four and one-half (4 1/2) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.
 - On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'-6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.
 - When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.
- There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.



TYPE B CURB

BARRIER
(With Endblock)

JERSEY BARRIER

SINGLE SLOPE BARRIER

January 22, 2021

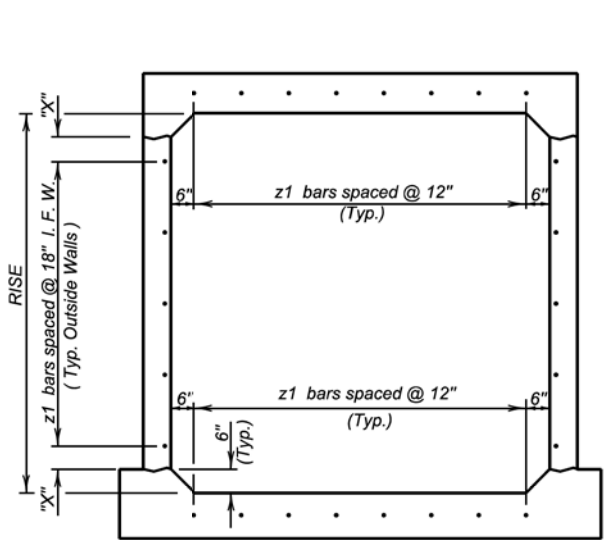
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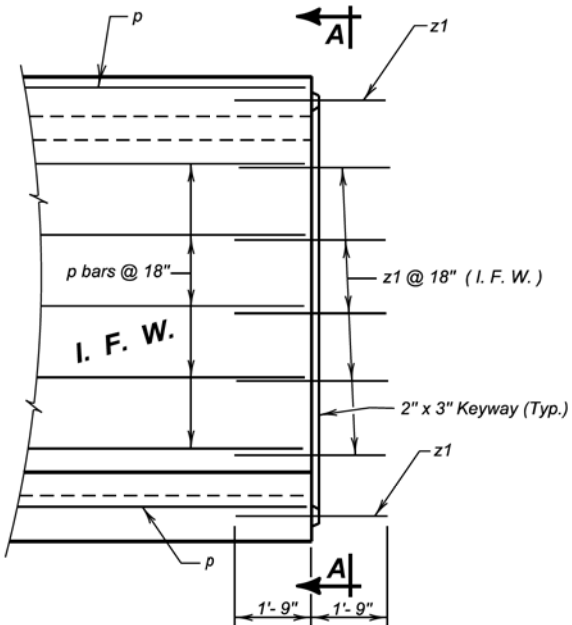
YEAR PLATE DETAILS

PLATE NUMBER
460.02

Sheet 1 Of 1



TYPICAL SINGLE BARREL VIEW A - A



ELEVATION

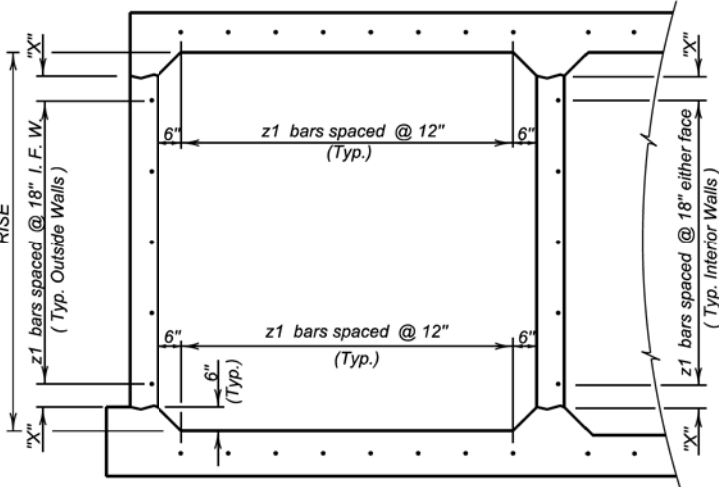
LEGEND FOR PLACING RE-STEEL

I. F. W. - Inside Face Wall

RISE	"X"
3'-0"	3"
4'-0"	9"
5'-0"	6"
6'-0"	3"
7'-0"	9"
8'-0"	6"
9'-0"	3"
10'-0"	9"
11'-0"	6"
12'-0"	3"
13'-0"	9"
14'-0"	6"

GENERAL NOTES:

- z1 bars will be placed in the middle of the 2" X 3" keyway in the top and bottom slabs. z1 bars will be lapped with the longitudinal p bars in the inside face of the wall for outside walls and in either face for interior walls. z1 bars are listed and included elsewhere in plans.
- Drainage Fabric Protection will be placed in accordance with Section 422, or Section 560, whichever is applicable.



TYPICAL MULTIPLE BARREL VIEW A - A

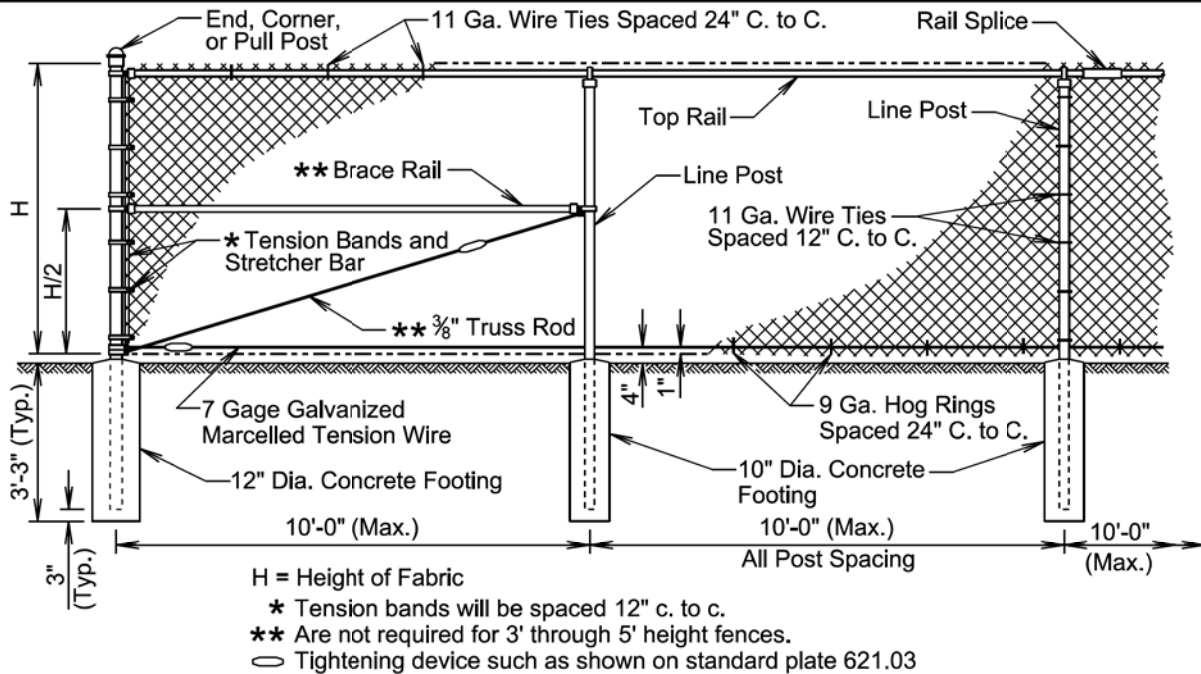
Published Date: 2027

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BOX CULVERT BARREL TIE REINFORCEMENT

PLATE NUMBER
460.10

Sheet 1 of 1



COMPONENT	END, CORNER, and PULL POST		LINE POST			TOP and BRACE RAIL	
	Type of Fabrication	Round Pipe Nominal	Roll Formed Steel	Round Pipe Nominal	"C" Section	H Beam Steel	Round Pipe Nominal
Size		3.00" O. D.	3.5"x3.5"	2.50" O. D.	1.875"x1.625"	2.25"x1.70"	1.625" O. D.
Weight (lb. / Ft.)		5.79 or 4.64	5.14	3.65 or 3.12	2.34	3.43	2.27 or 1.84

GENERAL NOTES:

Specific details of the component parts of the fence will be approved by the Engineer. Commercially available items produced specifically for the use intended will be used wherever possible in the construction of the fence.

Height of the fabric will be as shown in the plans. Fabric is available at the following heights: 36", 42", 48", 60", 72", 84", 96", 108", 120", and 144". Fabric heights 60 inches and less will be knuckled at both selvages. Fabric heights 72 inches and higher will be knuckled at one selvage and twisted at the other selvage.

Chain link fabric will be 2-inch mesh, No. 9 gage galvanized wire securely fastened to tension wire, line post, rails, braces, and stretcher bars.

Fence may be constructed with either round pipe, "C" section, "H" beam, or roll formed steel components as shown in the table above. Line posts may be round pipe, "C" section, or "H" beam. The corner post and rails will be either round pipe or roll formed steel. The type of components used must be approved by the Engineer prior to installation.

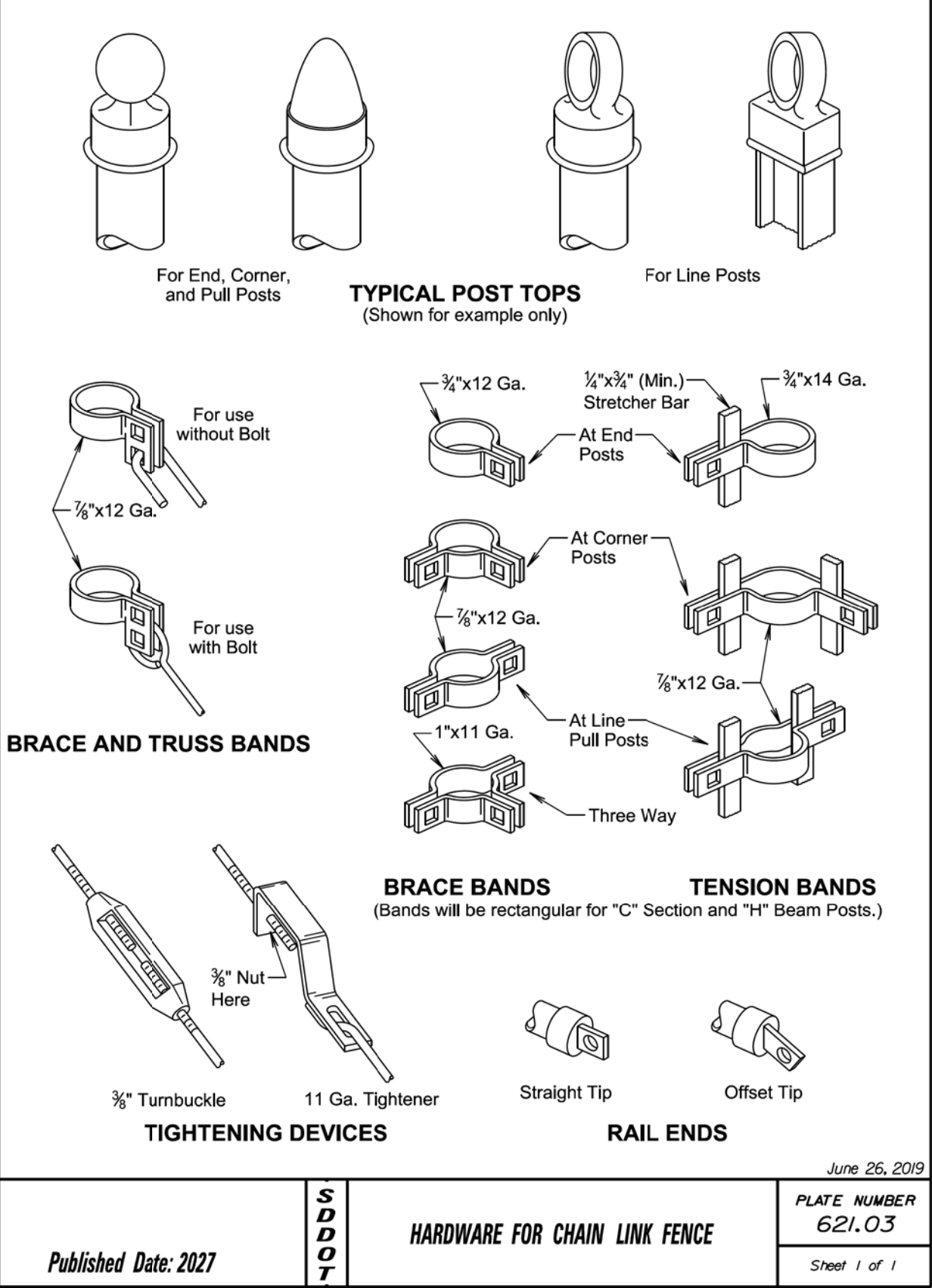
Where fence must cross small bodies of water such as drainage areas or ponds that could freeze during the winter, use 11 gage hog rings. Provide only two ties per tension wire and top rail between line posts.

A suitable method of rail splicing will be used to allow for expansion and contraction while maintaining proper position of the top rail.

Fence grounding will be as shown on standard plate 620.11.

November 19, 2022

Published Date: 2027	S D D O T	CHAIN LINK FENCE WITH TOP RAIL	PLATE NUMBER 621.01
			Sheet 1 of 1

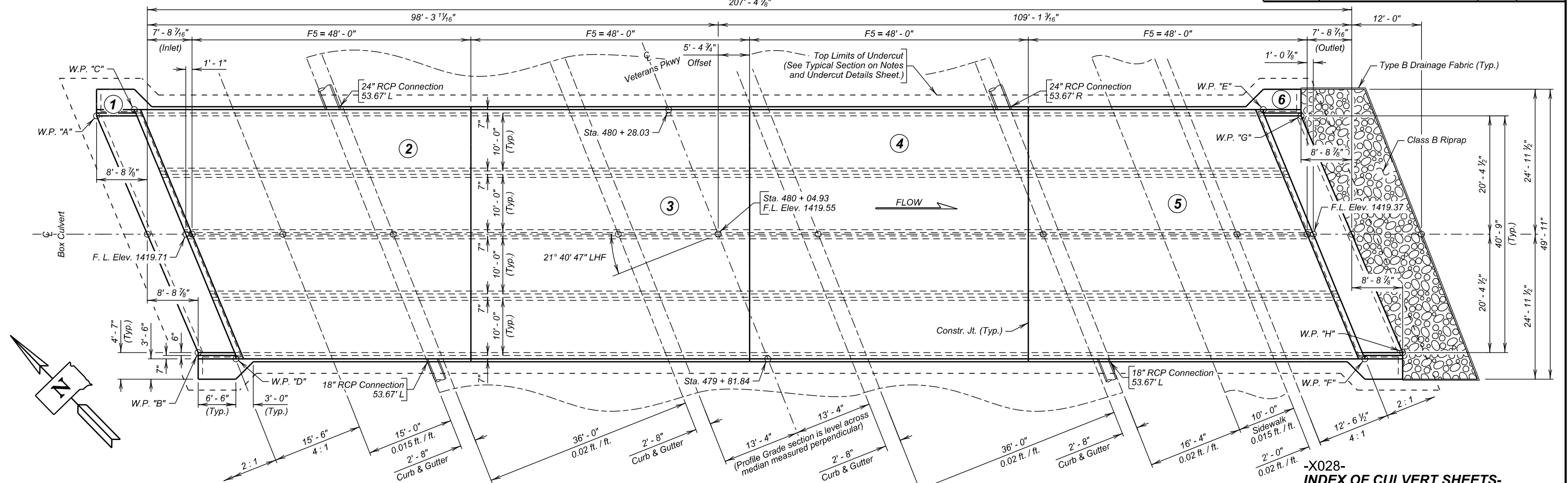


Published Date: 2027	S D D O T	HARDWARE FOR CHAIN LINK FENCE	June 26, 2019 PLATE NUMBER 621.03 Sheet 1 of 1

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E20	E59

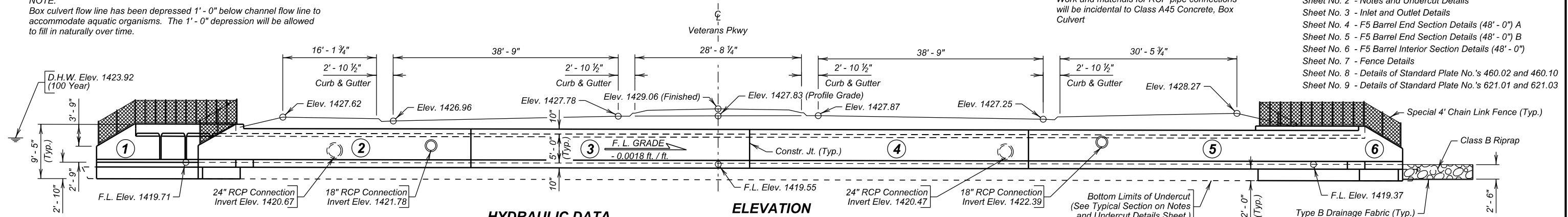


NOTE:
Box culvert flow line has been depressed 1' - 0" below channel flow line to accommodate aquatic organisms. The 1' - 0" depression will be allowed to fill in naturally over time.

PLAN

Work and materials for RCP pipe connections will be incidental to Class A45 Concrete, Box Culvert

-X028- INDEX OF CULVERT SHEETS-
Sheet No. 1 - General Drawing and Quantities
Sheet No. 2 - Notes and Undercut Details
Sheet No. 3 - Inlet and Outlet Details
Sheet No. 4 - F5 Barrel End Section Details (48' - 0") A
Sheet No. 5 - F5 Barrel End Section Details (48' - 0") B
Sheet No. 6 - F5 Barrel Interior Section Details (48' - 0")
Sheet No. 7 - Fence Details
Sheet No. 8 - Details of Standard Plate No.'s 460.02 and 460.10
Sheet No. 9 - Details of Standard Plate No.'s 621.01 and 621.03



ELEVATION

HYDRAULIC DATA

Q_d	532 cfs
A_d	106 sq. ft.
V_d	5.0 fps
Q_F	532 cfs
Q_{100}	532 cfs

Q_d = Design discharge for the proposed culvert based on 100 year frequency. El. 1423.92.
 Q_F = Designated peak discharge for the basin approaching proposed project based on 100 year frequency.
 Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 1423.92.

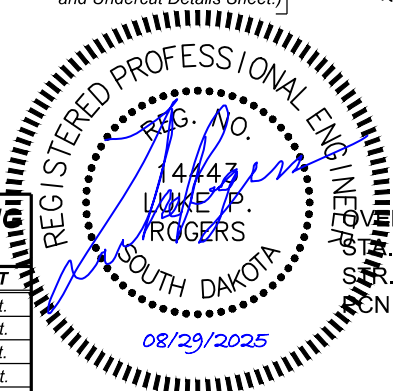
ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Structure Excavation, Box Culvert	Cu. Yd.	292
Box Culvert Undercut	Cu. Yd.	787
Class A45 Concrete, Box Culvert	Cu. Yd.	678.2
Reinforcing Steel	Lb.	102119
Special 4' Chain Link Fence	Ft.	118
Class B Riprap	Ton	77.7
Type B Drainage Fabric	Sq. Yd.	88
Reinforcement Fabric (MSE)	Sq. Yd.	1157

* For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yd. to Tons

TABLE OF WORKING POINTS

W. P.	STATION	OFFSET
"A"	480 + 63.41	91.95' Lt.
"B"	480 + 19.09	91.75' Lt.
"C"	480 + 62.02	85.50' Lt.
"D"	480 + 15.67	85.11' Lt.
"E"	479 + 90.21	95.13' Rt.
"F"	479 + 43.86	95.54' Rt.
"G"	479 + 86.79	100.78' Rt.
"H"	479 + 42.47	101.98' Rt.



GENERAL DRAWING AND QUANTITIES
FOR
4 - 10' X 5' BOX CULVERT

OVER DRAINAGE
Sta. 480 + 04.93
S.R. NO. 42-137-009
CN 01VA

21° 40' 47" LHF SKEW

SEC 8-T100N-R49W
NH 0100(107)411
HL-93

LINCOLN COUNTY
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JUNE 2025

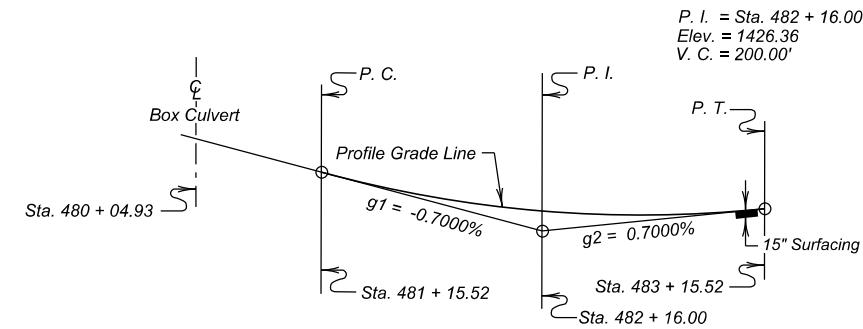
1 OF 9

-X028-



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VERTICAL CURVE DATA



SPECIFICATIONS

- Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.
- Construction Specifications: Standard Specifications for Roads and Bridges, 10-7-26 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at <https://dot.sd.gov/doing-business/contractors/standard-specifications>.

GENERAL NOTES (CAST-IN-PLACE BOX CULVERT)

- Design Live Load: HL-93 and construction load consisting of one 7' - 6" gauge axle with gross weight = 95,850 lbs. The construction load will not be applied until a minimum of 4 feet of fill has been placed over the box culvert. Other construction loads in excess of legal load must be submitted through proper channels to the Office of Bridge Design for analysis.
- The design of the barrel section is based on a minimum fill height of 1 foot and includes all subsequent fill heights up to and including the maximum fill height of 5 feet (F5).
- Design Material Strengths: Concrete $f_c = 4,500$ psi
Reinforcing Steel $f_y = 60,000$ psi
- All concrete will be Class A45 Concrete, Box Culvert conforming to Section 460 of the Construction Specifications.
- All reinforcing steel will conform to ASTM A615 Grade 60.
- All lap splices shown are contact lap splices unless noted otherwise.
- All exposed concrete corners and edges will be chamfered $\frac{3}{4}$ -inch unless noted otherwise in the plans.
- Use 1-inch clear cover on all reinforcing steel EXCEPT as shown.
- The Contractor will imprint on the structure the date of construction as specified and detailed on Standard Plate No. 460.02.
- Care will be taken to establish Working Points (W.P.) as shown on the wings.
- Circled numbers in PLAN and ELEVATION views on the General Drawing are section I.D. Numbers (see SDDOT Materials Manual).
- Cost of Preformed Expansion Joint Filler used in apron construction will be incidental to the other contract items.
- Soils below the bottom of the proposed RCBC consist of soft mottled light brown-gray sandy clay.
- Groundwater was encountered in the borings at an elevation of 1419.3 feet during the subsurface investigation conducted in November 2024. Dewatering will be required during construction.

REINFORCEMENT FABRIC (MSE)

- A layer of Reinforcement Fabric (MSE) will be placed at the bottom of the undercut prior to backfilling with granular material.
- Reinforcement Fabric (MSE) will conform to Section 831. The Reinforcement Fabric (MSE) provided will be on the Approved Products List or will be certified by the supplier to meet this specification prior to installation.
- Reinforcement Fabric (MSE) will be paid for at the contract unit price per sq. yd. for Reinforcement Fabric (MSE). Payment will be full compensation for furnishing and installing the Reinforcement Fabric (MSE) only. Granular backfill materials will be paid for as part of the Box Culvert Undercut bid item.
- Place the Reinforcement Fabric (MSE) on as level and smooth of a surface as possible. Any protrusions that might damage the fabric will be removed prior to placing the fabric. All seams in the fabric will be stitched in accordance with the seaming procedure and as shown on the detail labeled "Seam Types." No equipment will be allowed on the fabric until the granular backfill material is in place. The fabric will be kept as taut as possible prior to backfilling. Granular backfill material will be dumped behind the leading edge of the fill and pushed into place with a loader or dozer.

FABRIC SEAMING PROCEDURE

- The sewn seams will consist of two parallel rows of stitching ("prayer" seam, Type SSa-2), or a J-seam (Type SSn-1), using a single row of stitching. The stitching will be a lock type stitch.
- If the Type SSa-2 seam is used, the two rows of stitching will be 1" apart with a tolerance of plus or minus $\frac{1}{2}$ " and will not cross, except for restitching. The minimum seam allowance, i.e., minimum distance from the fabric edge to the stitch line nearest to that edge, will be 1 $\frac{1}{2}$ ".
- If the J-seam (Type SSn-1) is used, the minimum seam allowance will be 1".
- The seam, stitch type, and the equipment used to perform the stitching will be as recommended by the manufacturer of the fabric and approved by the Engineer. The seams will be sewn in such a manner that the seam can be readily inspected by the Engineer.
- The thread used will be high-strength polypropylene, polyester, or Kevlar thread. Nylon threads will not be allowed.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Box Culvert Undercut	Cu. Yd.	787
Reinforcement Fabric (MSE)	Sq. Yd.	1157

For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.

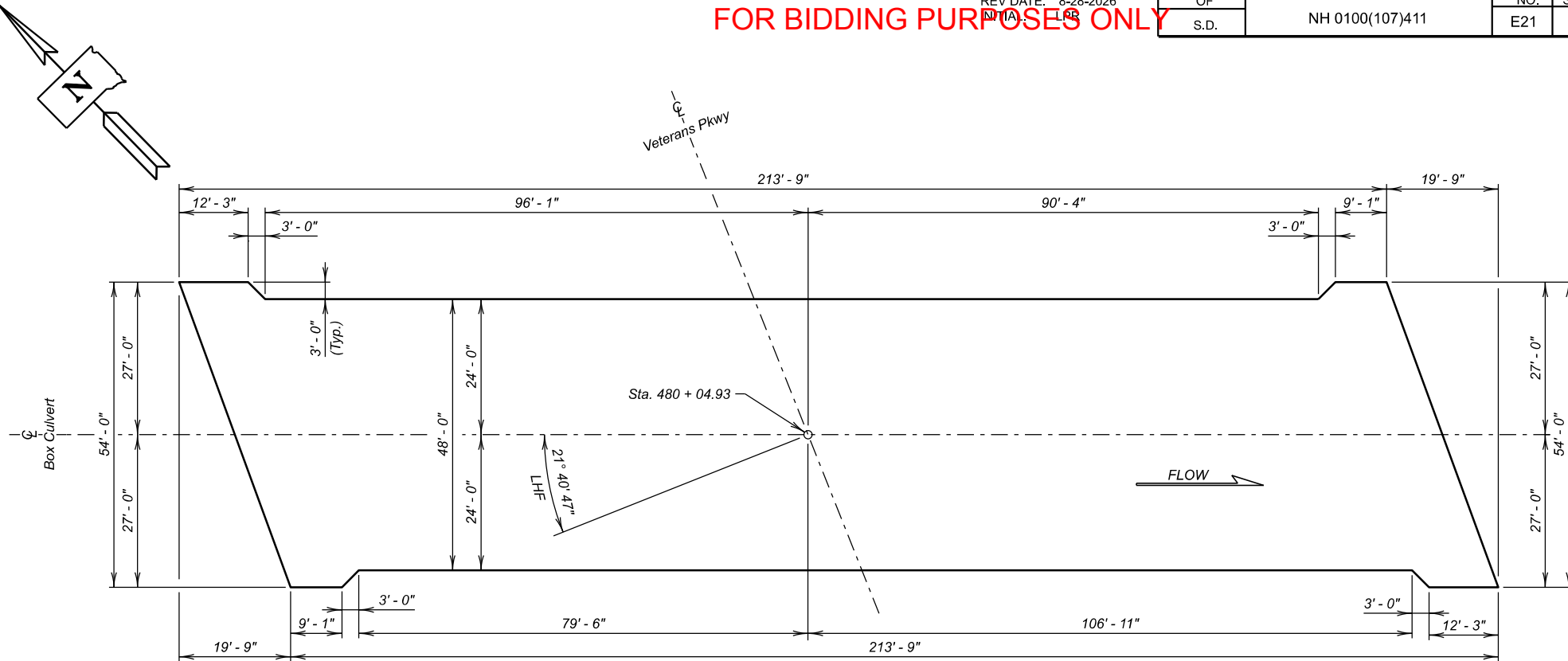


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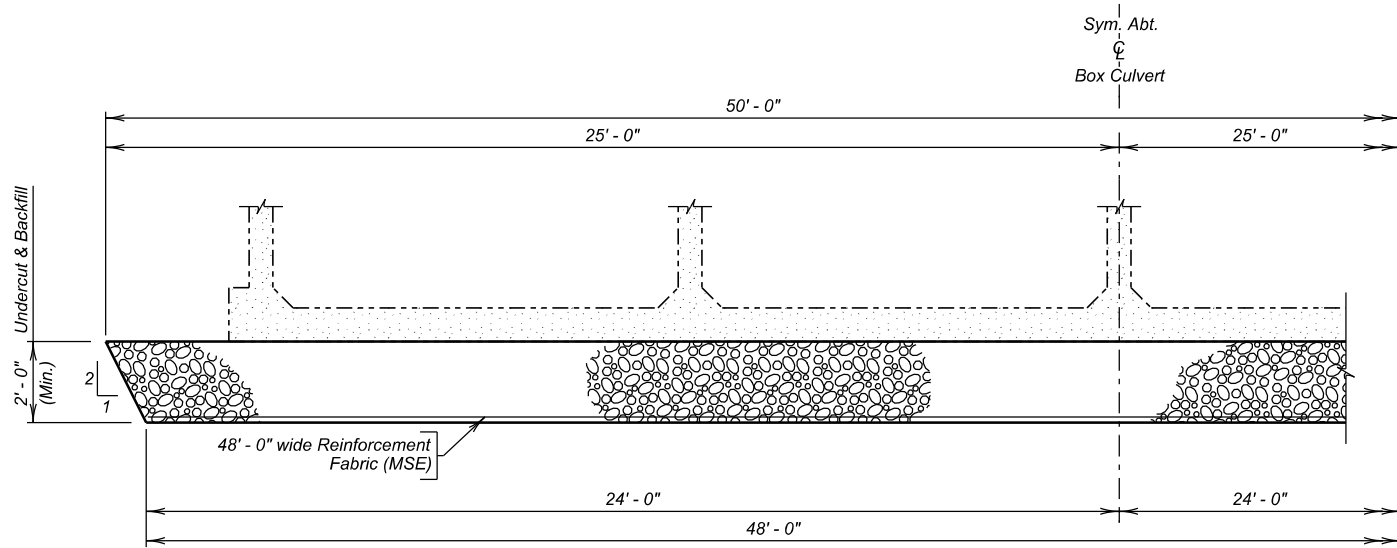
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NTA 45

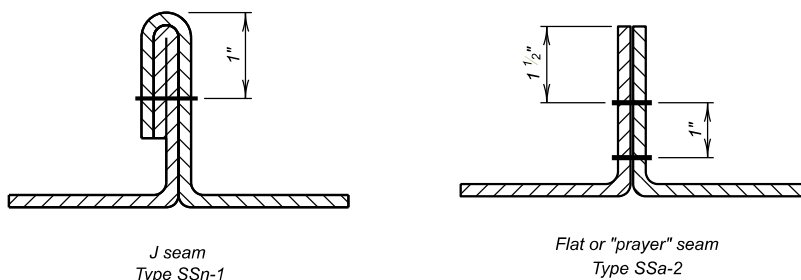
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E21	E59



UNDERCUT LAYOUT
(Bottom Dimensions)



TYPICAL SECTION
(For Limits of Undercut)



SEAM TYPES

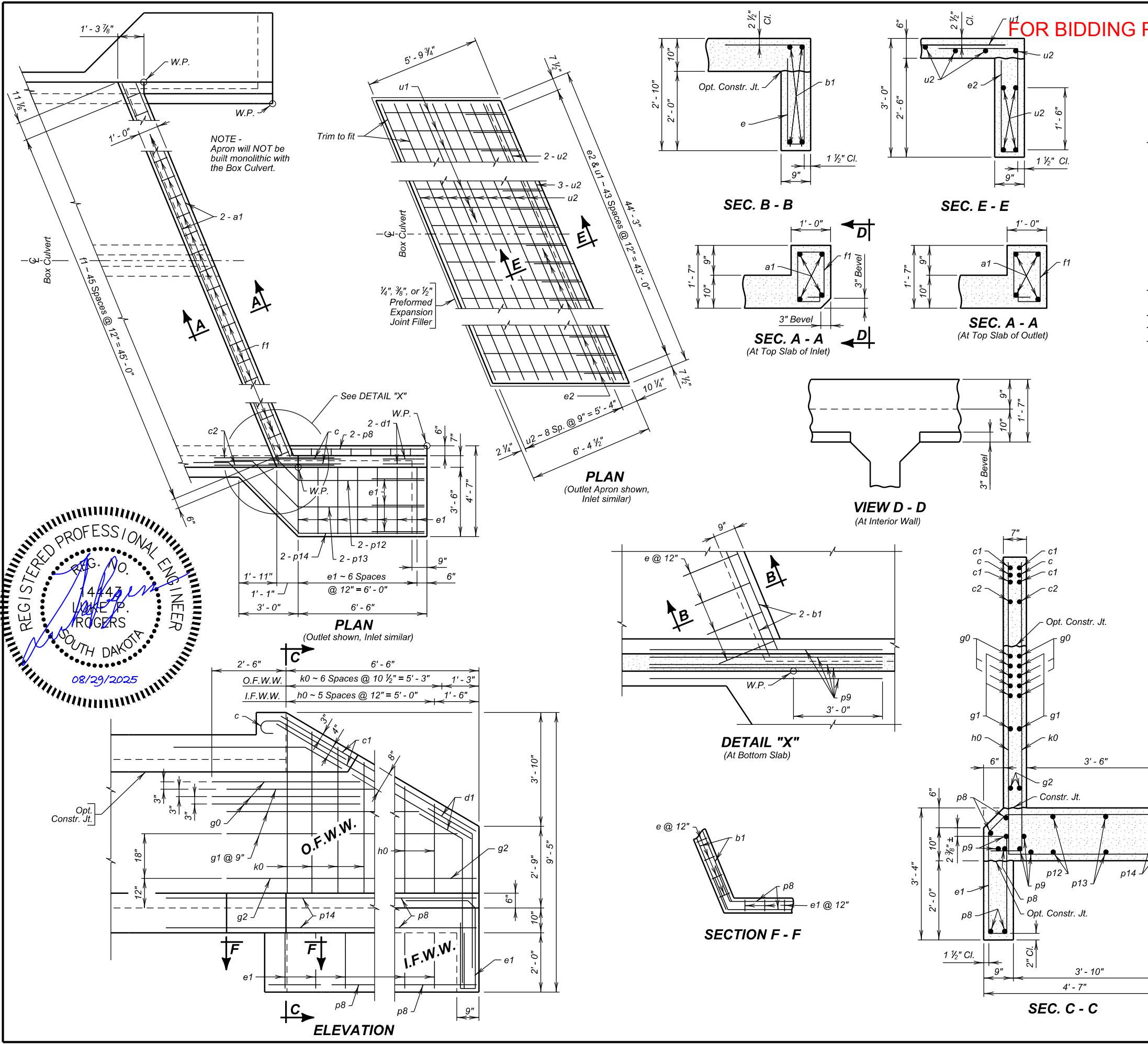
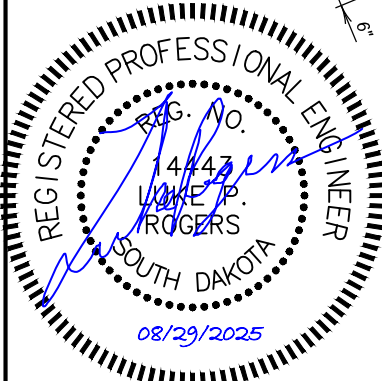
NOTES AND UNDERCUT DETAILS FOR 4 - 10' X 5' BOX CULVERT

OVER DRAINAGE 21° 40' 47" LHF SKEW
STA. 480 + 04.93 SEC 8-T100N-R49W
STR. NO. 42-137-009 NH 0100(107)411
HL-93

LINCOLN COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2025

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FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E22	E59

REINFORCING SCHEDULE

(For One Inlet and One Outlet)

Mk.	No.	Size	Length	Type
a1	8	6	45' - 6"	Str.
b1	8	6	45' - 0"	Str.
c	8	5	4' - 6"	1A
c1	16	5	7' - 6"	Str.
c2	8	5	7' - 0"	19B
d1	16	5	6' - 6"	19B
e	90	4	7' - 0"	S12
e1	40	5	10' - 0"	S12A
f1	92	4	5' - 0"	S6A
g0	24	5	5' - 0"	Str.
g1	12	4	12' - 9"	Str.
g2	8	4	8' - 0"	Str.
h0	12	4	18' - 6"	17A
k0	14	4	12' - 6"	17A
p8	20	4	9' - 0"	Str.
p9	20	6	7' - 0"	Str.
p12	8	4	10' - 3"	Str.
p13	8	4	11' - 6"	Str.
p14	8	4	13' - 3"	Str.

INLET AND OUTLET APRON

e2	88	4	7' - 3"	S12
u1	88	4	6' - 0"	Str.
u2	26	5	44' - 0"	Str.

BENDING DETAILS

Type 1A, Type S12, Type S12A, Type S6A, Type 19B, Type 17A

NOTES:
All dimensions are out to out of bars.
See cutting diagram.
Bend in field as necessary to fit.

ESTIMATED QUANTITIES			
ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
1 - Inlet	13.4	1733	8
1 - Inlet Apron	7.7	987	8
1 - Outlet	13.4	1733	8
1 - Outlet Apron	7.7	987	8

LEGEND FOR PLACING RE-STEEL	
O. F. W. W. - Outside Face of Wing Wall	
I. F. W. W. - Inside Face of Wing Wall	

INLET AND OUTLET DETAILS
FOR
4 - 10' X 5' BOX CULVERT
OVER DRAINAGE
STA. 480 + 04.93
STR. NO. 42-137-009
21° 40' 47" LHF SKEW
SEC 8-T100N-R49W
NH 0100(107)411
HL-93
LINCOLN COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2025

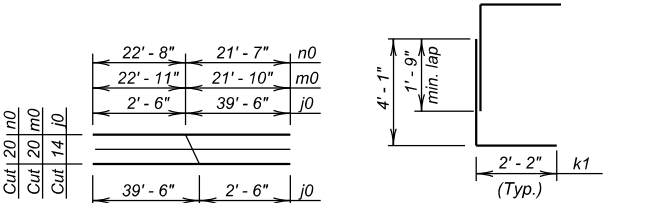
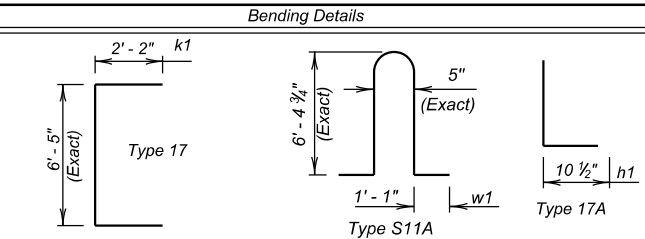
DESIGNED BY ALG LINC01VA	CK. DES. BY BMW 01VATA03	DRAFTED BY SEM	BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E23	E59

REINFORCING SCHEDULE
(For One End Section)

Mk.	No.	Size	Length	Type
h1	117	4	7' - 0"	17A
j0	14	5	42' - 0"	Str.
j1	70	5	41' - 9"	Str.
k1	196	4	10' - 9"	17
m0	20	4	42' - 9"	Str.
m1	96	4	43' - 9"	Str.
n0	20	5	41' - 9"	Str.
n1	96	5	42' - 9"	Str.
p1	10	4	39' - 9"	Str.
p2	9	4	44' - 0"	Str.
p3	9	4	48' - 3"	Str.
p4	9	4	52' - 9"	Str.
p5	10	4	57' - 0"	Str.
p11	19	4	84' - 0"	Str.
p22	19	4	92' - 6"	Str.
p33	19	4	101' - 0"	Str.
p44	19	4	109' - 9"	Str.
s1	246	5	6' - 3"	Str.
w1	174	4	15' - 3"	S11A
z1	95	5	3' - 6"	Str.



OPTIONAL k1 SPLICE DETAIL
Contractor may use optional reinforcing steel splice as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

NOTES:
All dimensions are out to out of bars.

See cutting diagram.

Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity shown is for one construction joint.

Request for additional Reinforcing Steel splices at points other than those shown must be submitted to the Engineer for prior approval. If additional splices are allowed, no payment will be allowed for the added quantity of Reinforcing Steel.

Cut 19 p44	56' - 6"	53' - 3"	p44
Cut 19 p33	52' - 3"	48' - 9"	p33
Cut 19 p22	48' - 0"	44' - 6"	p22
Cut 19 p11	43' - 9"	40' - 3"	p11
	40' - 3"	43' - 9"	p11
	44' - 6"	48' - 0"	p22
	48' - 9"	52' - 3"	p33
	53' - 3"	56' - 6"	p44

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
2 - F5 Barrel End Sections @ 48' - 0"	318.0	48602	130

LEGEND FOR PLACING RE-STEEL

T. T. S. - Top of Top Slab
B. T. S. - Bottom of Top Slab
T. B. S. - Top of Bottom Slab
B. B. S. - Bottom of Bottom Slab

F5 BARREL END SECTION DETAILS (48' - 0") A

FOR
4 - 10' X 5' BOX CULVERT

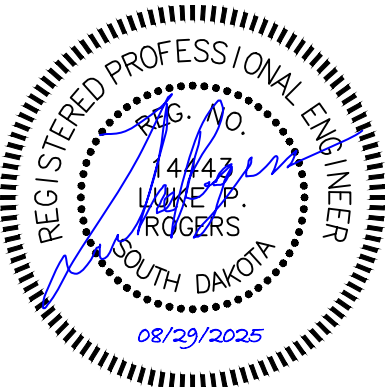
OVER DRAINAGE 21° 40' 47" LHF SKEW
STA. 480 + 04.93 SEC 8-T100N-R49W
STR. NO. 42-137-009 NH 0100(107)411
HL-93

LINCOLN COUNTY
S. D. DEPT. OF TRANSPORTATION

JUNE 2025

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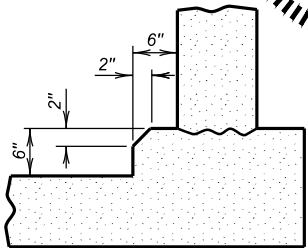
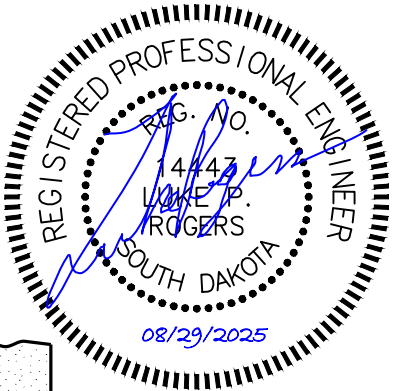
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PLAN

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E24	E59



OPTIONAL FILLET DETAIL
(At Bottom Slab)

Note: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete shall be borne by the Contractor.

OPTIONAL POUR - BOTTOM SLAB

The Bottom Slab may be poured continuously, at the option of the Contractor, with the use of a Preformed Metal keyway conforming to the keyway dimensions and location as shown on the plans. The keyway length shall be full width of the bottom slab. Care shall be taken to maintain proper alignment of the keyway during the pour sequence. All additional costs of this option shall be borne by the Contractor.

LEGEND FOR PLACING RE-STEEL

O. F. O. W. - Outside Face of Outside Wall
I. F. O. W. - Inside Face of Outside Wall
M. W. - Middle Wall

F5 BARREL END SECTION DETAILS (48' - 0") B
FOR

4 - 10' X 5' BOX CULVERT

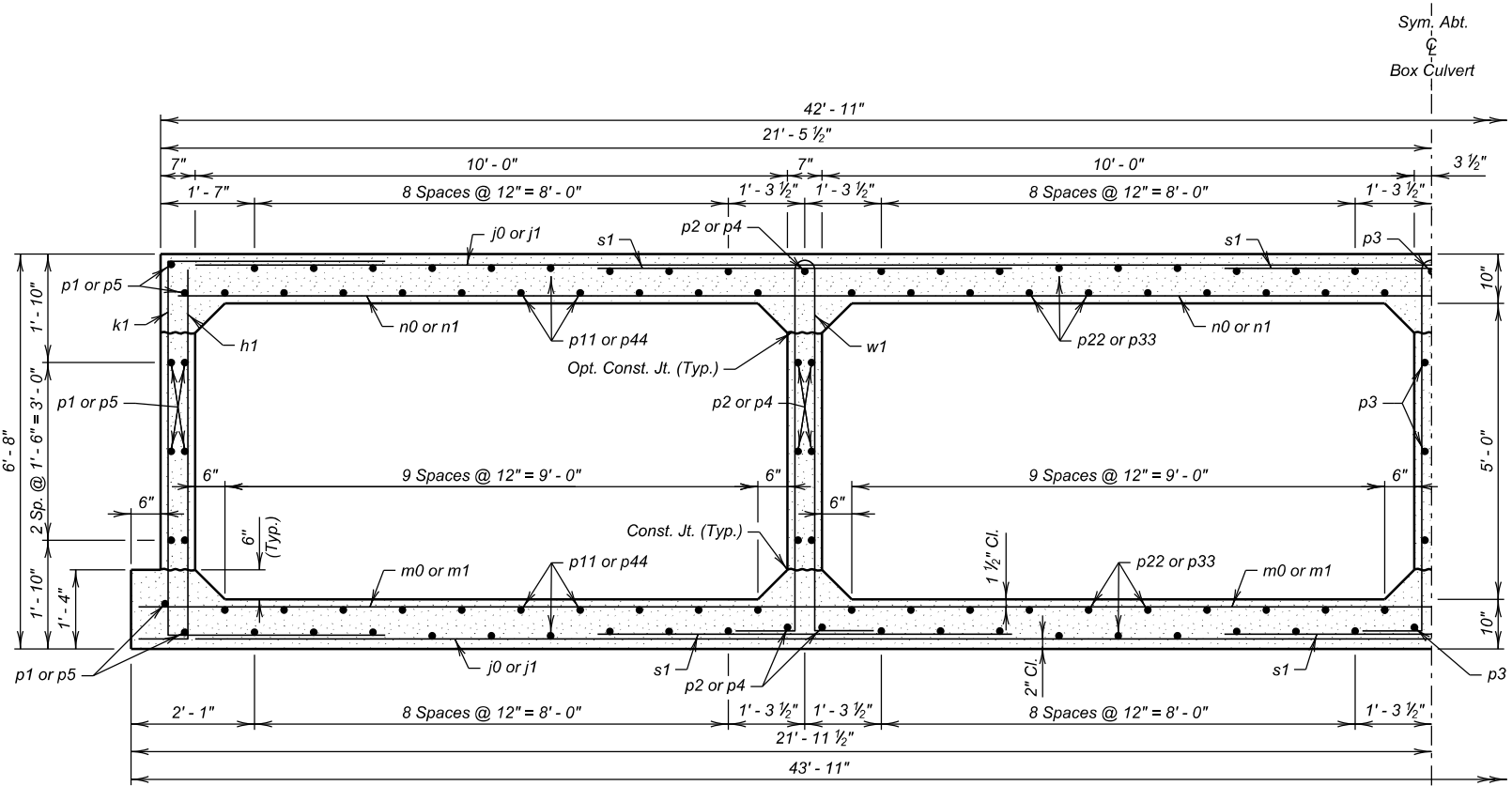
OVER DRAINAGE
STA. 480 + 04.93
STR. NO. 42-137-009

21° 40' 47" LHF SKEW
SEC 8-T100N-R49W
NH 0100(107)411
HL-93

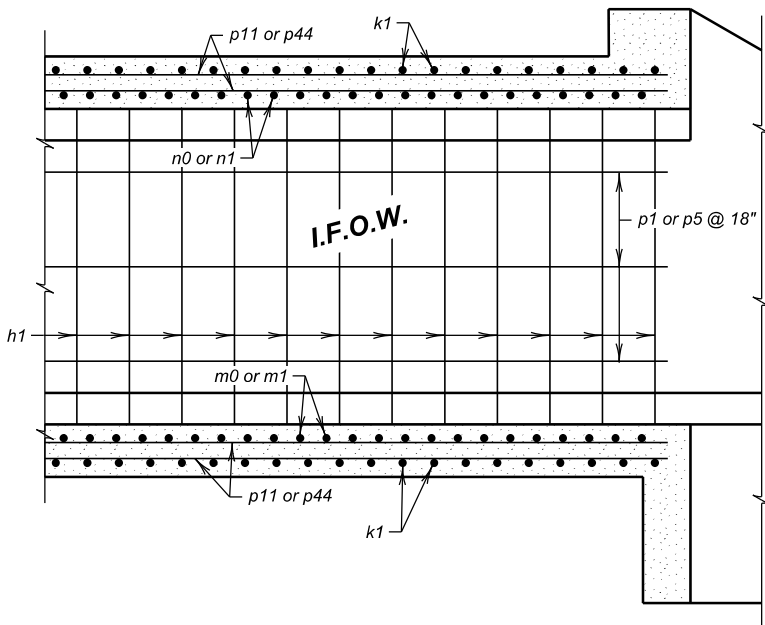
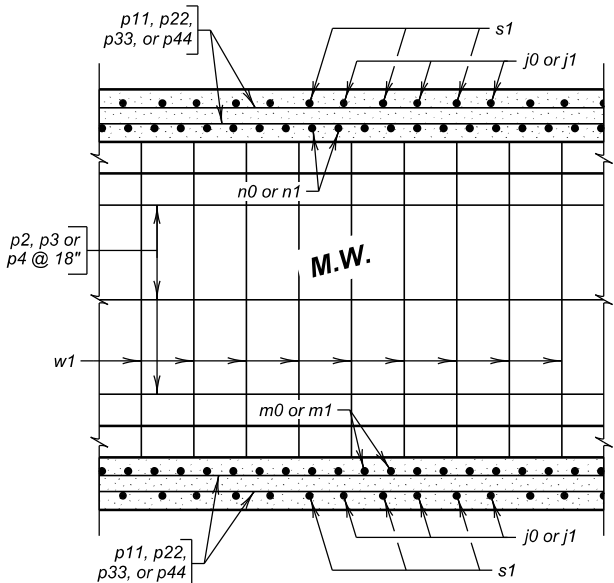
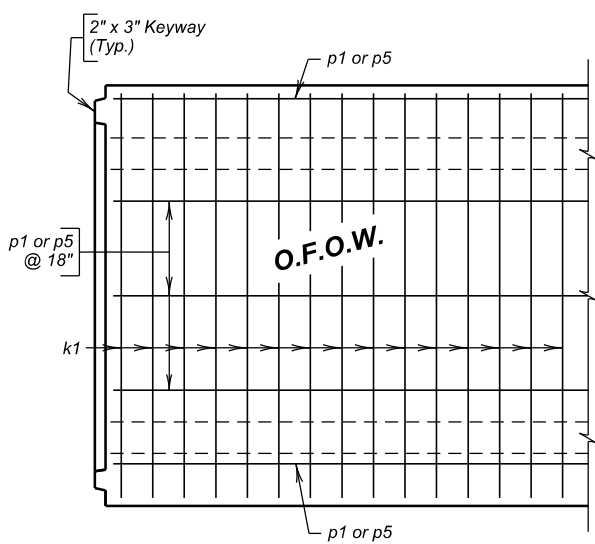
LINCOLN COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2025

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DESIGNED BY ALG LINC01VA	CK. DES. BY BMW 01VATA05	DRAFTED BY SEM	BRIDGE ENGINEER
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F5 BARREL HALF SECTION
(5' - 0" Maximum Fill)



ELEVATION

(For One Interior Section)

Mk.	No.	Size	Length	Type	Bending Details	
h1	116	4	7' - 0"	17A		
j1	84	5	41' - 9"	Str.		
k1	192	4	10' - 9"	17		
m1	116	4	43' - 9"	Str.		
n1	116	5	42' - 9"	Str.		
p6	199	4	47' - 9"	Str.		
s1	246	5	6' - 3"	Str.		
w1	174	4	15' - 3"	S11A		
z1	95	5	3' - 6"	Str.		

NOTES:

All dimensions are out to out of bars.

Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity shown is for one construction joint.

Request for additional Reinforcing Steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are allowed, no payment will be allowed for the added quantity of Reinforcing Steel.

OPTIONAL k1 SPLICE DETAIL

Contractor may use optional reinforcing steel splice as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
2 - F5 Barrel Interior Sections @ 48' - 0"	318.0	48077	130

LEGEND FOR PLACING RE-STEEL

<i>T. T. S. - Top of Top Slab</i>
<i>B. T. S. - Bottom of Top Slab</i>
<i>T. B. S. - Top of Bottom Slab</i>
<i>B. B. S. - Bottom of Bottom Slab</i>
<i>O. F. O. W. - Outside Face of Outside Wall</i>
<i>I. F. O. W. - Inside Face of Outside Wall</i>
<i>M. W. - Middle Wall</i>



FOR

4 - 10' X 5' BOX CULVERT

OVER DRAINAGE 21° 40' 47" LHF SKEW
STA. 480 + 04.93 SEC 8-T100N-R49W
STR. NO. 42-137-009 NH 0100(107)411

STR. NO. 42-137-009
NH 0100(107)411
HL-93

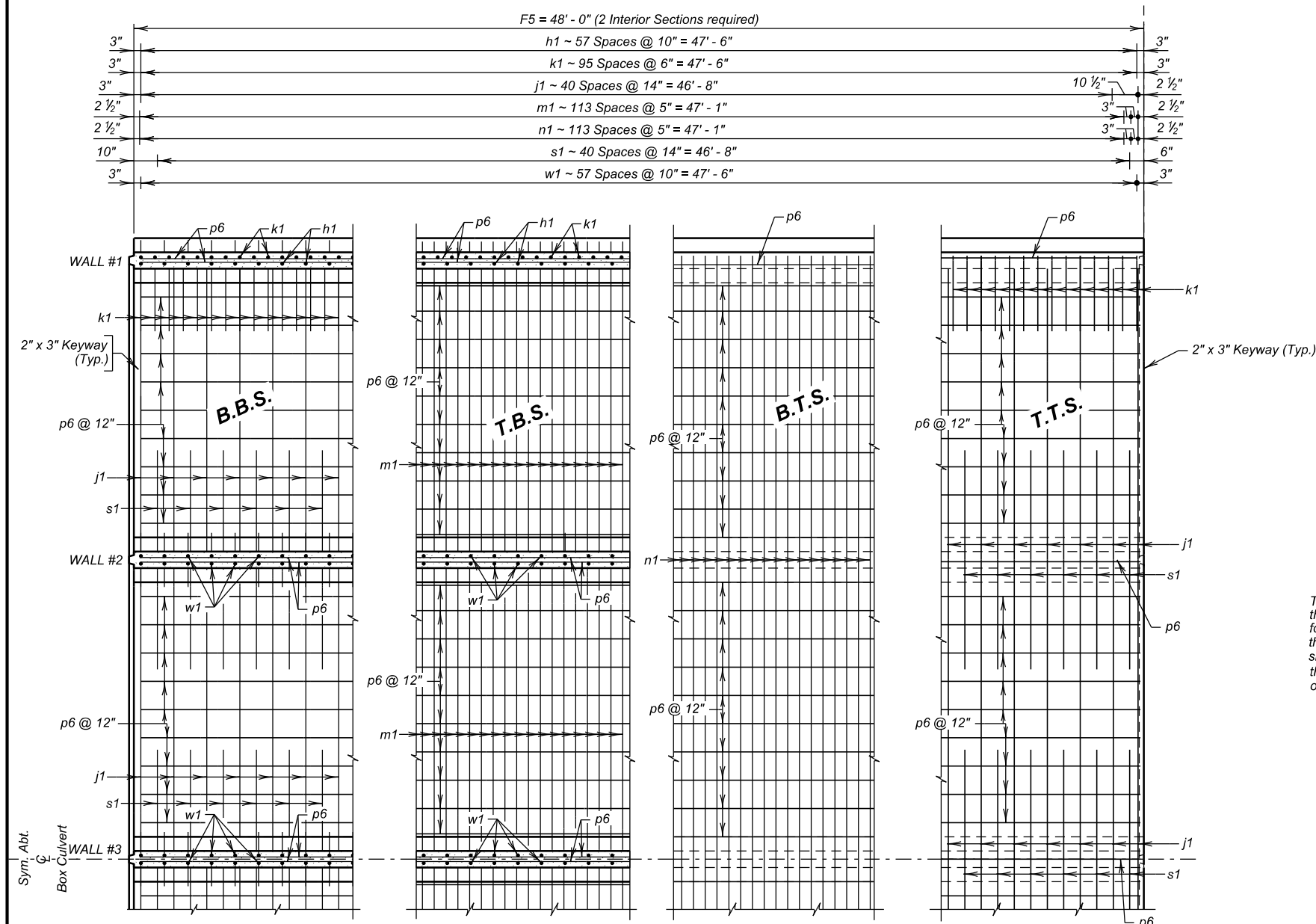
LINCOLN COUNTY

S. D. DEPT. OF TRANSPORTATION

JUNE 2025

6 OF 9

DESIGNED BY ALG	CK. DES. BY BMW	DRAFTED BY SEM	
INC01VA	01VAT006		BRIDGE ENGINEER

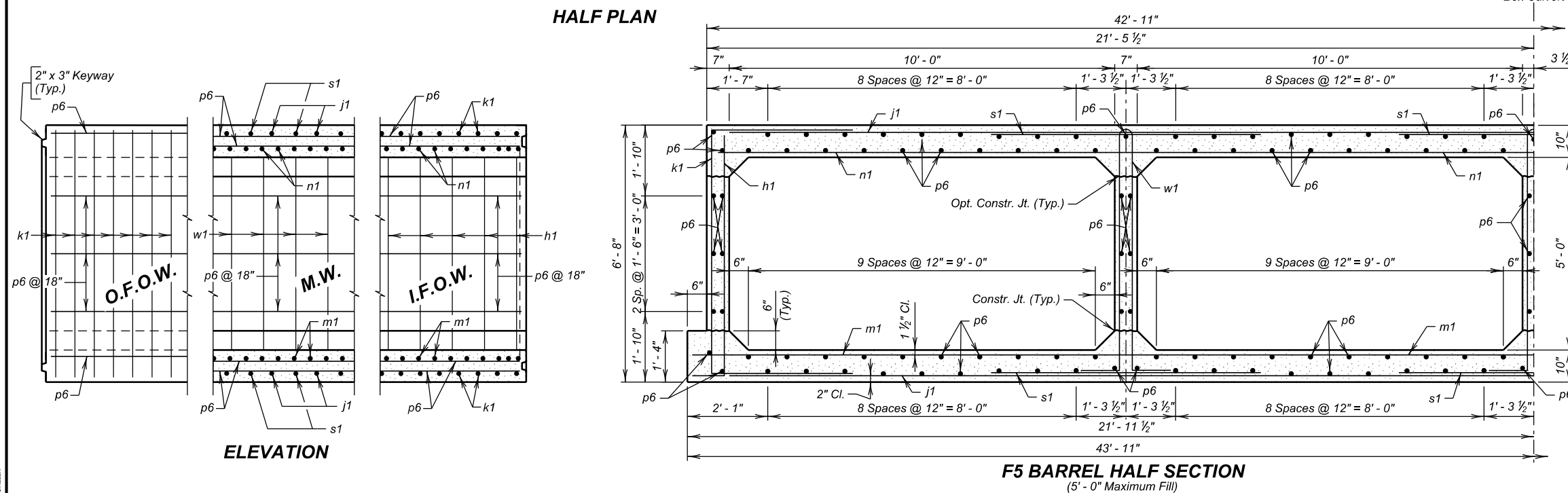


(At Bottom Slab)

Note: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

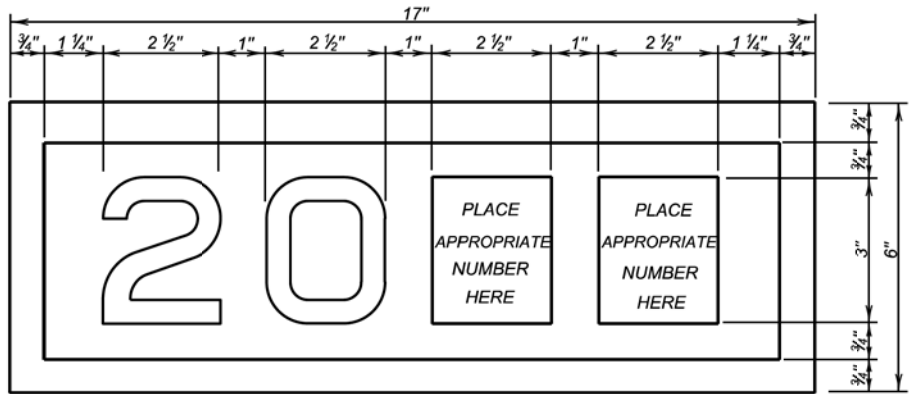
OPTIONAL POUR - BOTTOM SLAB

The Bottom Slab may be poured continuously, at the option of the Contractor, with the use of a Preformed Metal keyway conforming to the keyway dimensions and location as shown on the plans. The keyway length will be full width of the bottom slab. Care will be taken to maintain proper alignment of the keyway during the pour sequence. All additional costs of this option will be borne by the Contractor.



Section E14350 LINCOLN

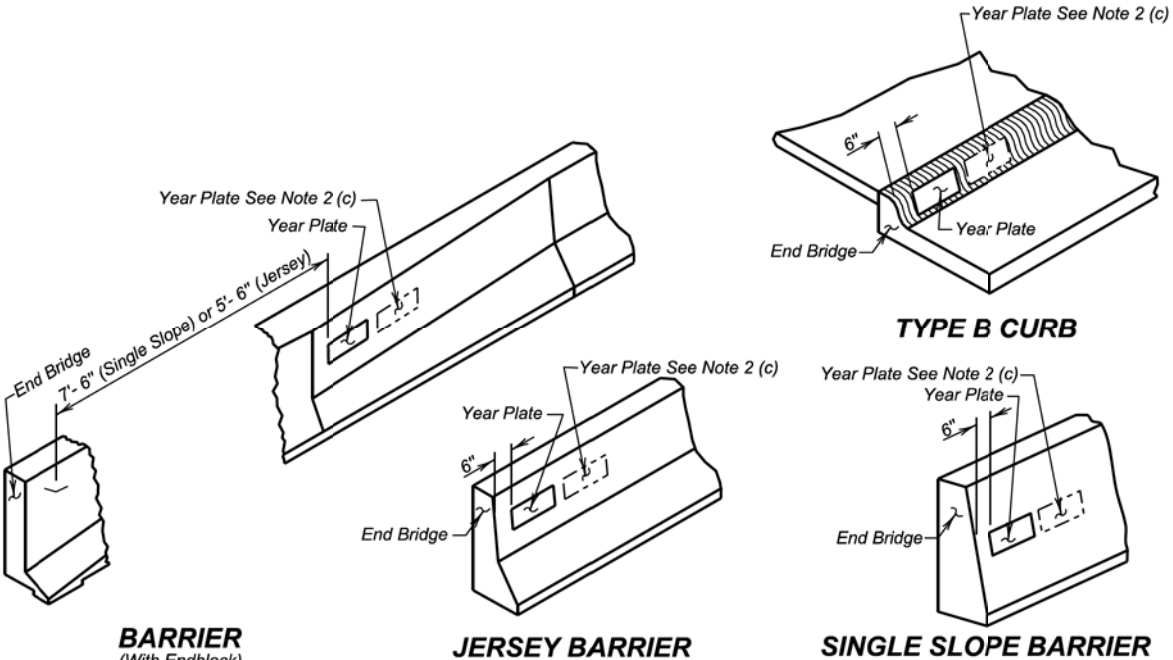
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E27	E59



YEAR PLATE DETAILS

GENERAL NOTES:

- Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.
- Year plates will be located on structure(s) as follows:
 - On cast-in-place box culverts the year plates will be four and one-half (4 1/2) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.
 - On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'-6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.
 - When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.
- There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.



TYPE B CURB

BARRIER
(With Endblock)

JERSEY BARRIER

SINGLE SLOPE BARRIER

January 22, 2021

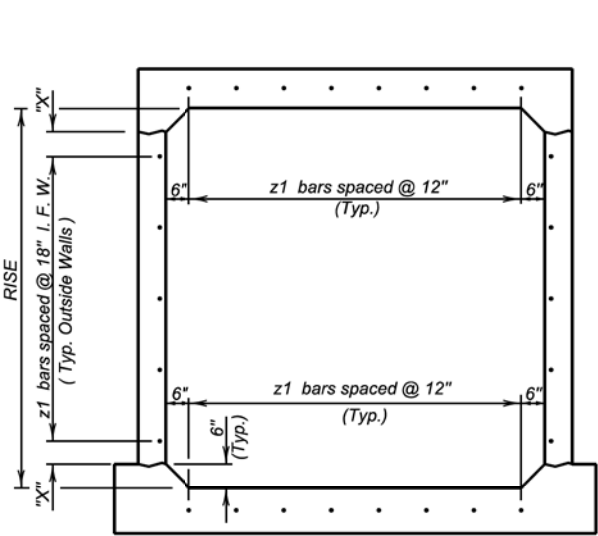
Published Date: 2027

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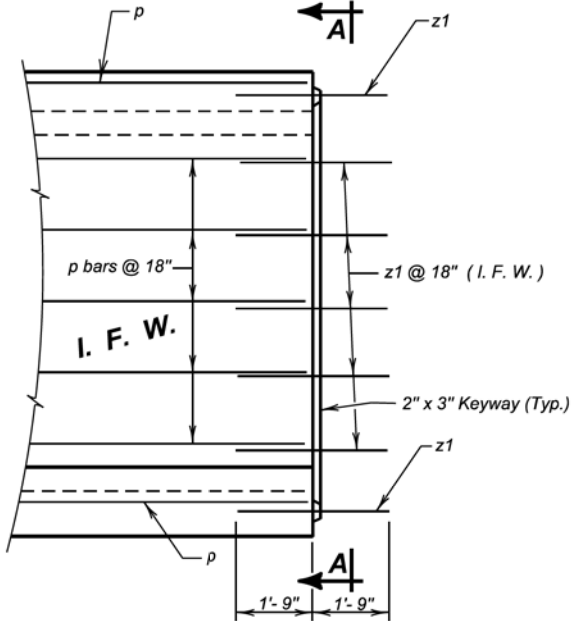
YEAR PLATE DETAILS

PLATE NUMBER
460.02

Sheet 1 Of 1



TYPICAL SINGLE BARREL VIEW A - A

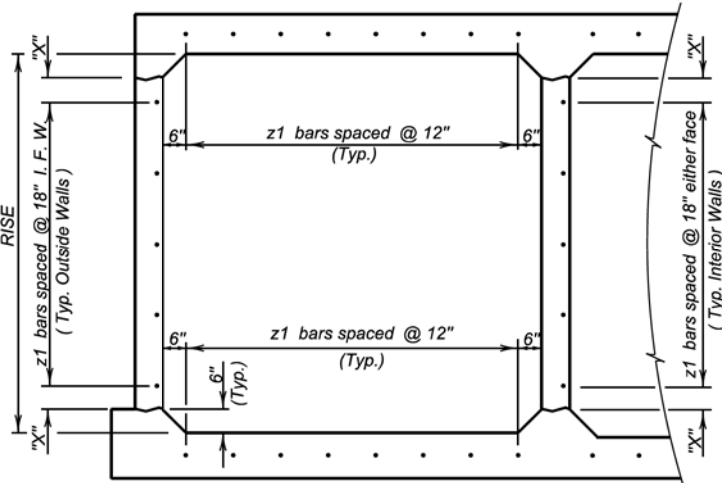


ELEVATION

LEGEND FOR PLACING RE-STEEL

I. F. W. - Inside Face Wall

RISE	"X"
3'-0"	3"
4'-0"	9"
5'-0"	6"
6'-0"	3"
7'-0"	9"
8'-0"	6"
9'-0"	3"
10'-0"	9"
11'-0"	6"
12'-0"	3"
13'-0"	9"
14'-0"	6"



TYPICAL MULTIPLE BARREL VIEW A - A

GENERAL NOTES:

- z1 bars will be placed in the middle of the 2" X 3" keyway in the top and bottom slabs. z1 bars will be lapped with the longitudinal p bars in the inside face of the wall for outside walls and in either face for interior walls. z1 bars are listed and included elsewhere in plans.
- Drainage Fabric Protection will be placed in accordance with Section 422, or Section 560, whichever is applicable.

June 1, 2022

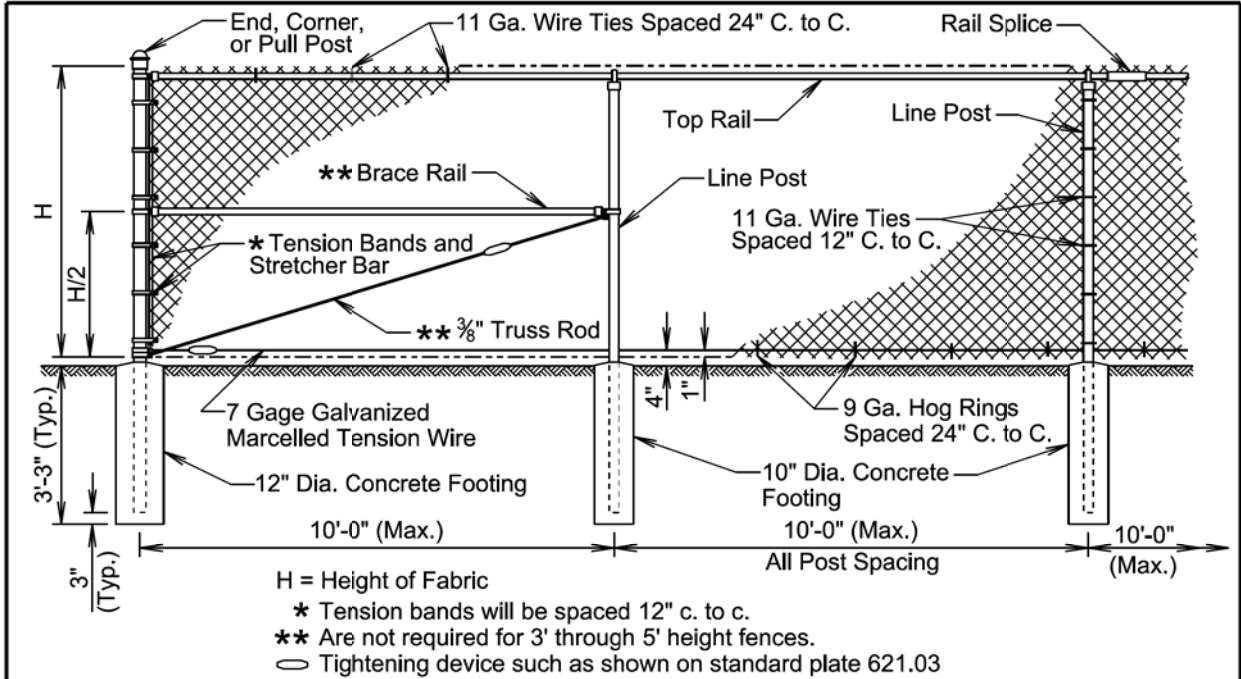
Published Date: 2027

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BOX CULVERT BARREL TIE REINFORCEMENT

PLATE NUMBER
460.10

Sheet 1 of 1



COMPONENT	END, CORNER, and PULL POST		LINE POST			TOP and BRACE RAIL	
	Type of Fabrication	Round Pipe Nominal	Roll Formed Steel	Round Pipe Nominal	"C" Section	H Beam Steel	Roll Formed Steel
Size		3.00" O. D.	3.5"x3.5"	2.50" O. D.	1.875"x1.625"	2.25"x1.70"	1.625" O. D.
Weight (lb. / Ft.)		5.79 or 4.64	5.14	3.65 or 3.12	2.34	3.43	2.27 or 1.84

GENERAL NOTES:

Specific details of the component parts of the fence will be approved by the Engineer. Commercially available items produced specifically for the use intended will be used wherever possible in the construction of the fence.

Height of the fabric will be as shown in the plans. Fabric is available at the following heights: 36", 42", 48", 60", 72", 84", 96", 108", 120", and 144". Fabric heights 60 inches and less will be knuckled at both selvages. Fabric heights 72 inches and higher will be knuckled at one selvage and twisted at the other selvage.

Chain link fabric will be 2-inch mesh, No. 9 gage galvanized wire securely fastened to tension wire, line post, rails, braces, and stretcher bars.

Fence may be constructed with either round pipe, "C" section, "H" beam, or roll formed steel components as shown in the table above. Line posts may be round pipe, "C" section, or "H" beam. The corner post and rails will be either round pipe or roll formed steel. The type of components used must be approved by the Engineer prior to installation.

Where fence must cross small bodies of water such as drainage areas or ponds that could freeze during the winter, use 11 gage hog rings. Provide only two ties per tension wire and top rail between line posts.

A suitable method of rail splicing will be used to allow for expansion and contraction while maintaining proper position of the top rail.

Fence grounding will be as shown on standard plate 620.11.

November 19, 2022

Published Date: 2027	S D D O T	CHAIN LINK FENCE WITH TOP RAIL	PLATE NUMBER
			621.01
			Sheet 1 of 1

TYPICAL POST TOPS
(Shown for example only)

BRACE AND TRUSS BANDS

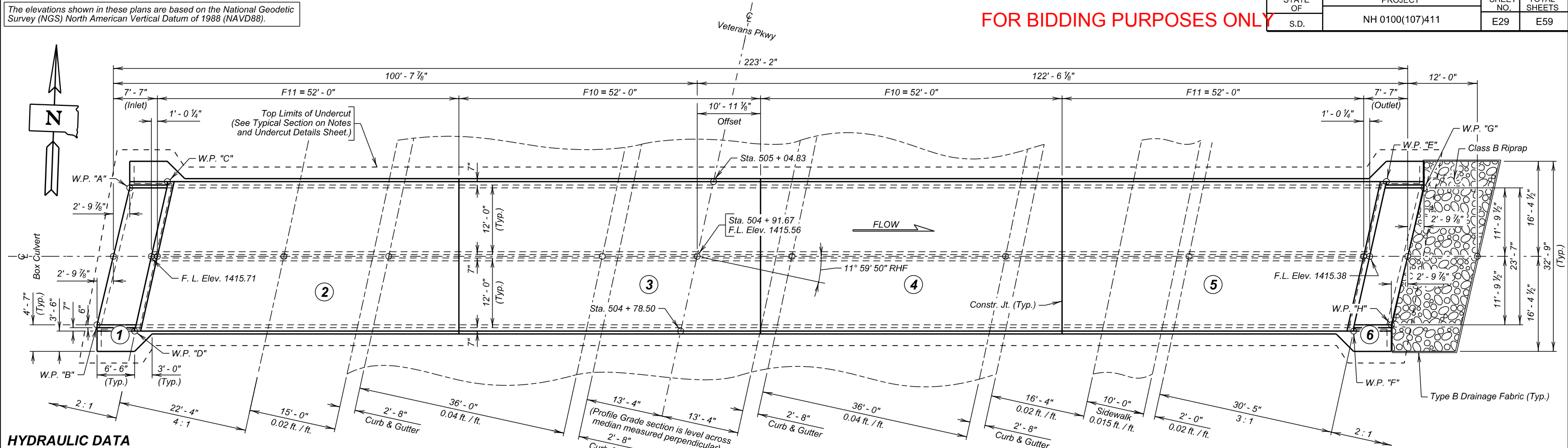
BRACE BANDS
TENSION BANDS
(Bands will be rectangular for "C" Section and "H" Beam Posts.)

TIGHTENING DEVICES
RAIL ENDS

Published Date: 2027	S D D O T	HARDWARE FOR CHAIN LINK FENCE	PLATE NUMBER
			621.03
			Sheet 1 of 1

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E29	E59

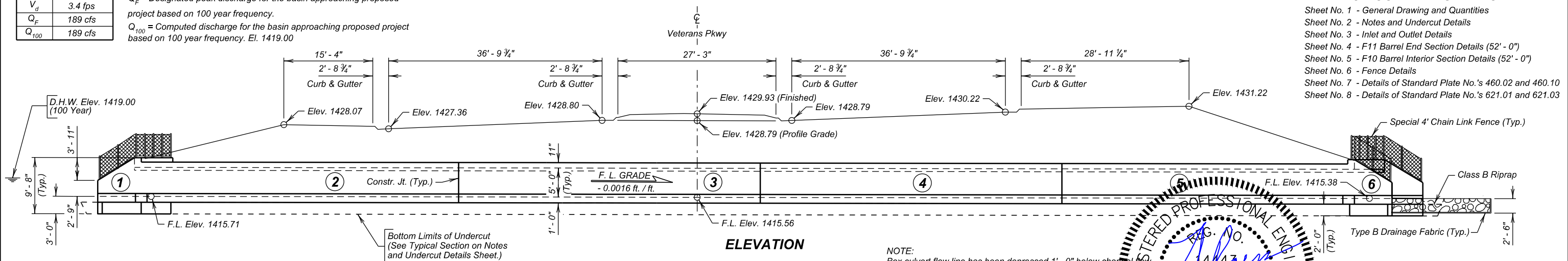


HYDRAULIC DATA

Q_d	189 cfs
A_d	56 sq. ft.
V_d	3.4 fps
Q_F	189 cfs
Q_{100}	189 cfs

Q_d = Design discharge for the proposed culvert based on 100 year frequency. EI. 1419.00
 Q_F = Designated peak discharge for the basin approaching proposed project based on 100 year frequency.
 Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. EI. 1419.00

PLAN



-X028-

INDEX OF CULVERT SHEETS-

Sheet No. 1 - General Drawing and Quantities
Sheet No. 2 - Notes and Undercut Details
Sheet No. 3 - Inlet and Outlet Details
Sheet No. 4 - F11 Barrel End Section Details (52' - 0")
Sheet No. 5 - F10 Barrel Interior Section Details (52' - 0")
Sheet No. 6 - Fence Details
Sheet No. 7 - Details of Standard Plate No.'s 460.02 and 460.10
Sheet No. 8 - Details of Standard Plate No.'s 621.01 and 621.03

ELEVATION

NOTE:
Box culvert flow line has been depressed 1' - 0" below channel flow line to accommodate aquatic organisms. The 1' - 0" depression will be allowed to fill in naturally over time.

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
<i>Structure Excavation, Box Culvert</i>	<i>Cu. Yd.</i>	<i>228</i>
<i>Box Culvert Undercut</i>	<i>Cu. Yd.</i>	<i>548</i>
<i>Class A45 Concrete, Box Culvert</i>	<i>Cu. Yd.</i>	<i>495.6</i>
<i>Reinforcing Steel</i>	<i>Lb.</i>	<i>109951</i>
<i>Special 4' Chain Link Fence</i>	<i>Ft.</i>	<i>78</i>
<i>Class B Riprap</i>	<i>Ton</i>	<i>51.0</i>
<i>Type B Drainage Fabric</i>	<i>Sq. Yd.</i>	<i>60</i>

≠ For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yd. to Tons.

W. P.	STATION	OFFSET
"A"	504 + 82.60	98.14' Lt.
"B"	504 + 57.64	98.61' Lt.
"C"	504 + 85.10	92.01' Lt.
"D"	504 + 58.00	92.03' Lt.
"E"	505 + 27.76	113.76' Rt.
"F"	505 + 02.25	113.341' Rt.
"G"	505 + 27.97	120.35' Rt.
"H"	505 + 04.56	119.55' Rt.

GENERAL DRAWING AND QUANTITIES

FOR

2 - 12' X 5' BOX CULVERT

OVER DRAINAGE

11° 59' 50" RHF SKEW

STA. 504 + 91.67

SEC 8-T100N-R49W

STR. NO. 42-139-004

NH 0100(107)411

PCN 01VA

HL-93

LINCOLN COUNTY

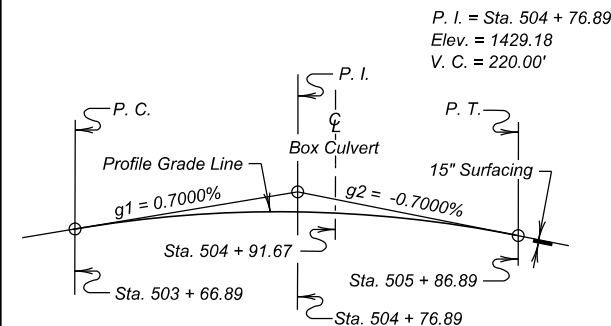
S. D. DEPT. OF TRANSPORTATION

JUNE 2025

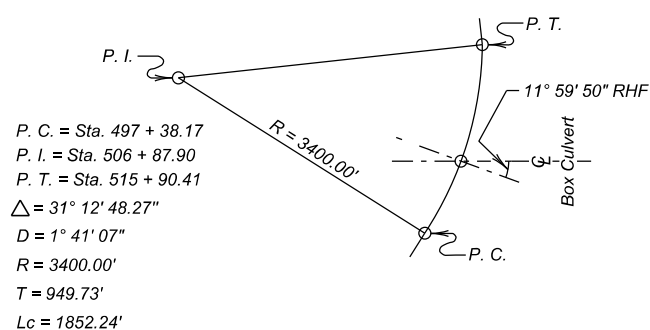
-X028-

1 OF 1

VERTICAL CURVE DATA



HORIZONTAL CURVE DATA



HDR

DESIGNED BY ALG LINC01VA	CK. DES. BY BMW 01VATA01	DRAFTED BY SEM	BRIDGE ENGINEER
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1 OF (

FOR BIDDING PURPOSES ONLY

REV DATE: 8-28-2026
NTA 45

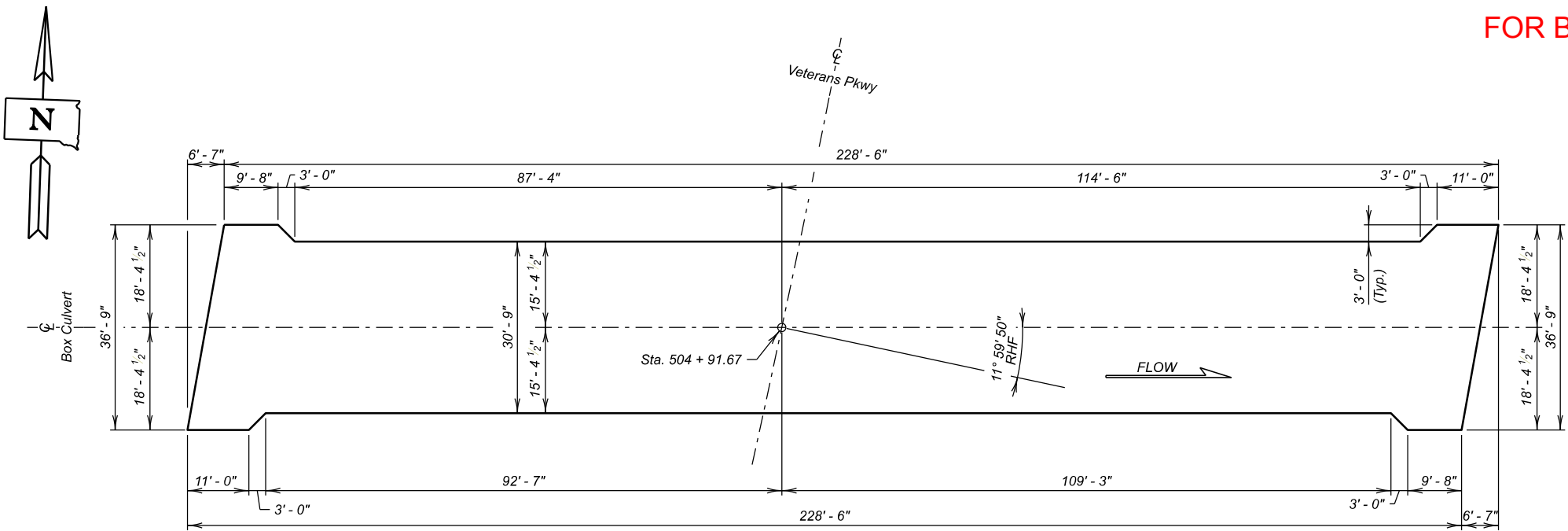
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
		E30	E59

SPECIFICATIONS

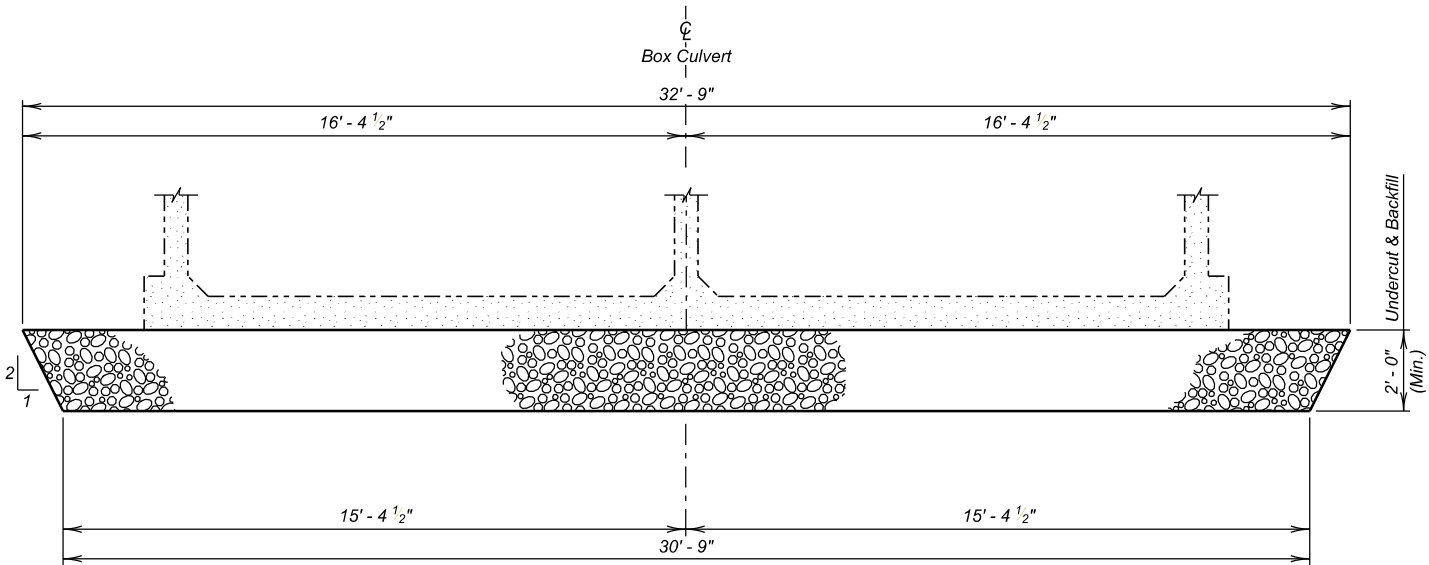
- Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.
- Construction Specifications: Standard Specifications for Roads and Bridges, 10-7-26 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at <https://dot.sd.gov/doing-business/contractors/standard-specifications>.

GENERAL NOTES (CAST-IN-PLACE BOX CULVERT)

- Design Live Load: HL-93 and construction load consisting of one 7'-6" gauge axle with gross weight = 95,850 lbs. The construction load will not be applied until a minimum of 4 feet of fill has been placed over the box culvert. Other construction loads in excess of legal load must be submitted through proper channels to the Office of Bridge Design for analysis.
- The design of the barrel section is based on a minimum fill height of 2 feet and includes all subsequent fill heights up to and including the maximum fill height of 10 feet (F10).
- Design Material Strengths: Concrete $f'_c = 4,500$ psi. Reinforcing Steel $f_y = 60,000$ psi.
- All concrete will be Class A45 Concrete, Box Culvert conforming to Section 460 of the Construction Specifications.
- All reinforcing steel will conform to ASTM A615 Grade 60.
- All lap splices shown are contact lap splices unless noted otherwise.
- All exposed concrete corners and edges will be chamfered $\frac{3}{4}$ -inch unless noted otherwise in the plans.
- Use 1-inch clear cover on all reinforcing steel EXCEPT as shown.
- The Contractor will imprint on the structure the date of construction as specified and detailed on Standard Plate No. 460.02.
- Care will be taken to establish Working Points (W.P.) as shown on the wings.
- Circled numbers in PLAN and ELEVATION views on the General Drawing are section I.D. Numbers (see SDDOT Materials Manual).
- Cost of Preformed Expansion Joint Filler used in apron construction will be incidental to the other contract items.
- Soils below the bottom of the proposed RCBC consist of mottled brown-gray to black silt clay.
- Groundwater was encountered in the borings at an elevation of 1414.6 feet during the subsurface investigation conducted in April 2024. Dewatering will be required during construction.



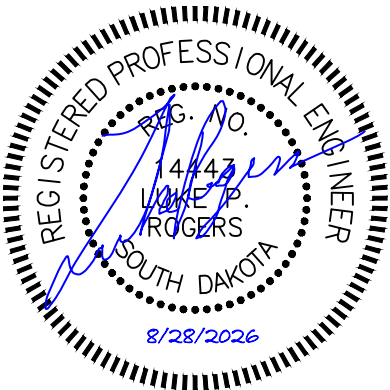
UNDERCUT LAYOUT
(Bottom Dimensions)



TYPICAL SECTION
(For Limits of Undercut)

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Box Culvert Undercut	Cu. Yd.	548

For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.



NOTES AND UNDERCUT DETAILS
FOR
2 - 12' X 5' BOX CULVERT

OVER DRAINAGE 11° 59' 50" RHF SKEW
STA. 504 + 91.67 SEC 8-T100N-R49W
STR. NO. 42-139-004 NH 0100(107)411
HL-93

LINCOLN COUNTY
S. D. DEPT. OF TRANSPORTATION

JUNE 2025 2 OF 8

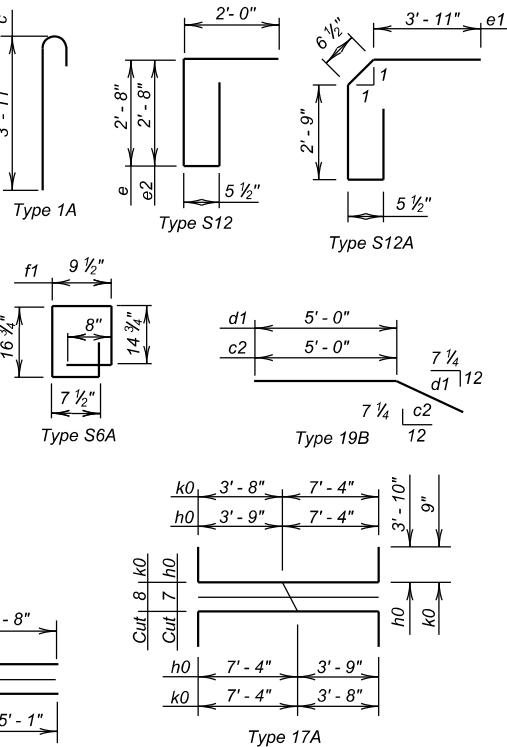
DESIGNED BY ALG LINC01VA	CK. DES. BY BMW 01VATA02	DRAFTED BY SEM	BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY

REINFORCING SCHEDULE
(For One Inlet and One Outlet)

Mk.	No.	Size	Length	Type
a1	8	6	26'-0"	Str.
b1	8	6	25'-6"	Str.
c	8	5	4'-6"	1A
c1	16	5	7'-6"	Str.
c2	8	5	7'-0"	19B
d1	16	5	6'-6"	19B
e	50	4	7'-6"	S12
e1	40	4	10'-3"	S12A
f1	54	4	5'-6"	S6A
g0	24	5	5'-0"	Str.
g1	12	4	12'-9"	Str.
g2	8	4	8'-3"	Str.
h0	14	4	18'-9"	17A
k0	16	4	12'-6"	17A
p8	20	4	9'-0"	Str.
p9	20	6	7'-0"	Str.
p12	8	4	10'-3"	Str.
p13	8	4	11'-6"	Str.
p14	8	4	13'-3"	Str.

INLET AND OUTLET APRON				
e2	48	4	7'-3"	S12
u1	48	4	6'-0"	Str.
u2	22	4	23'-9"	Str.



NOTES:
All dimensions are out to out of bars.
See cutting diagram.
Bend in field as necessary to fit.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
1 - Inlet	10.0	1385	6
1 - Inlet Apron	4.4	387	5
1 - Outlet	10.0	1385	6
1 - Outlet Apron	4.4	387	5

LEGEND FOR PLACING RE-STEEL

O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall

INLET AND OUTLET DETAILS

FOR

2 - 12' X 5' BOX CULVERT

OVER DRAINAGE

STA. 504 + 91.67

STR. NO. 42-139-004

11° 59' 50" RHF SKEW

SEC 8-T100N-R49W

NH 0100(107)411

HL-93

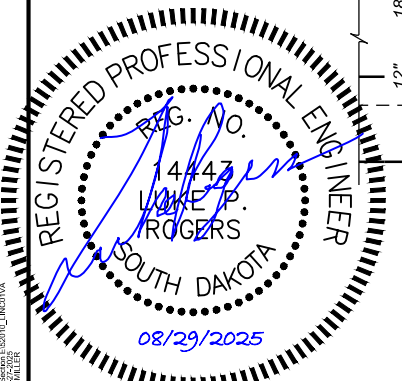
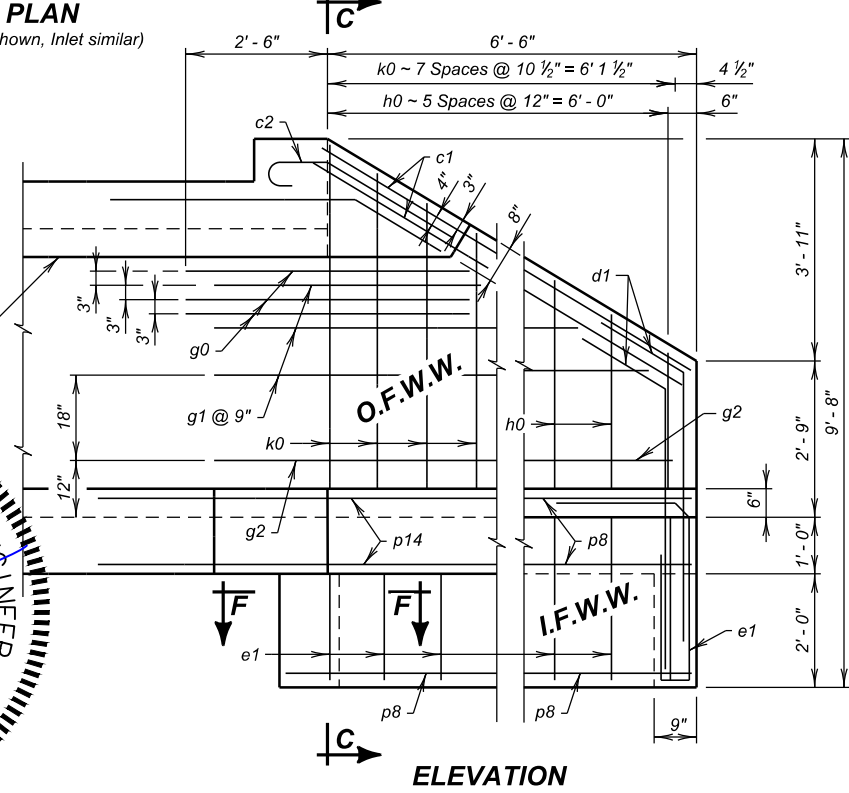
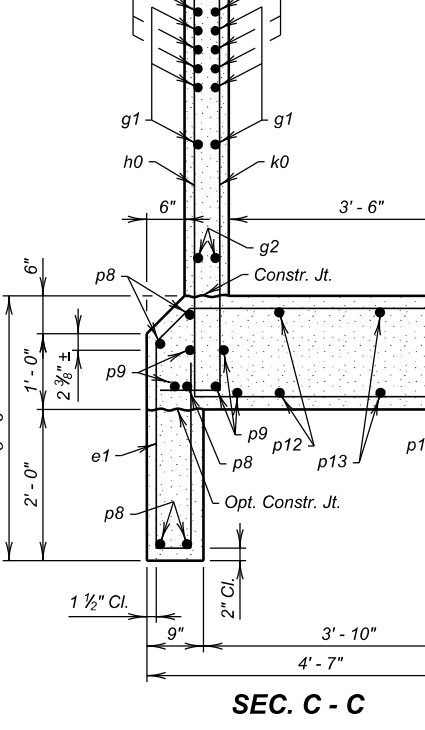
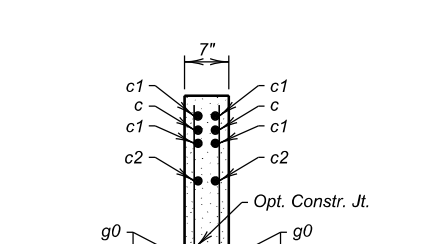
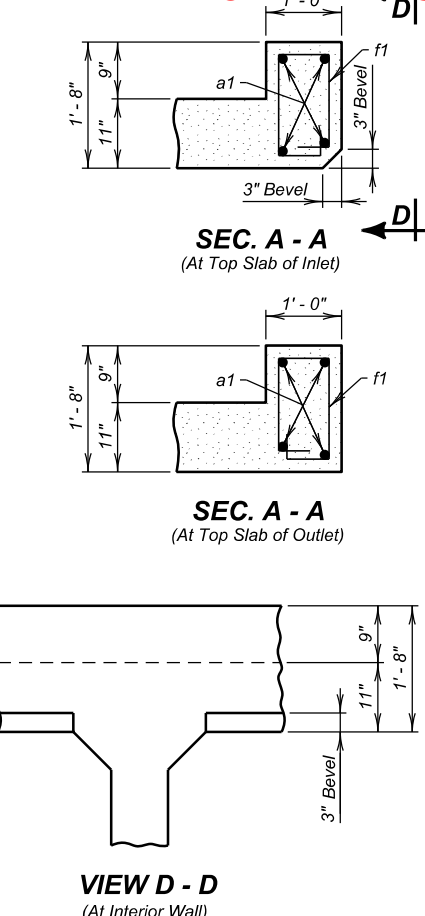
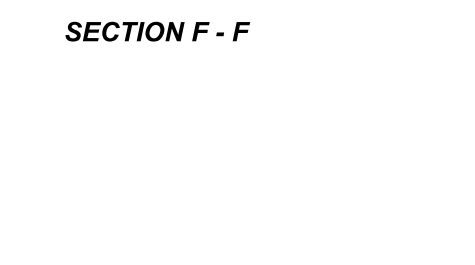
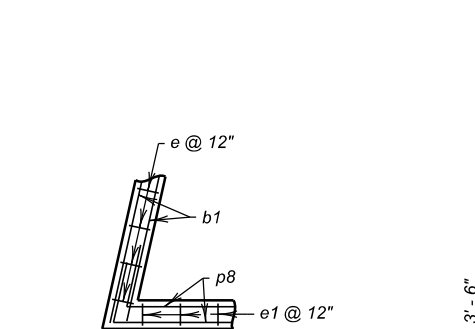
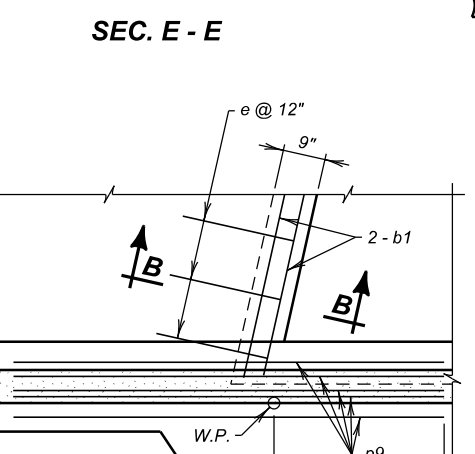
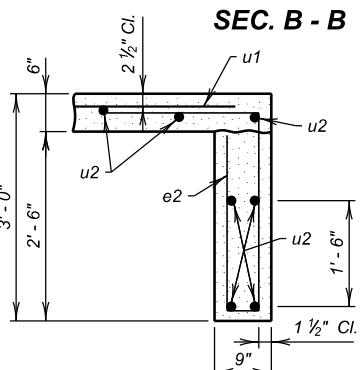
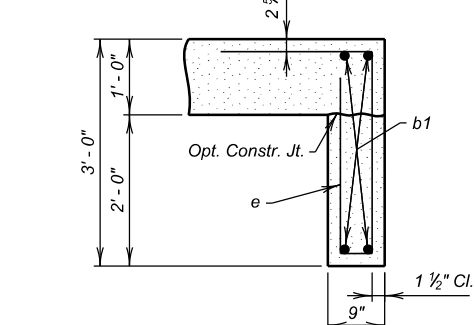
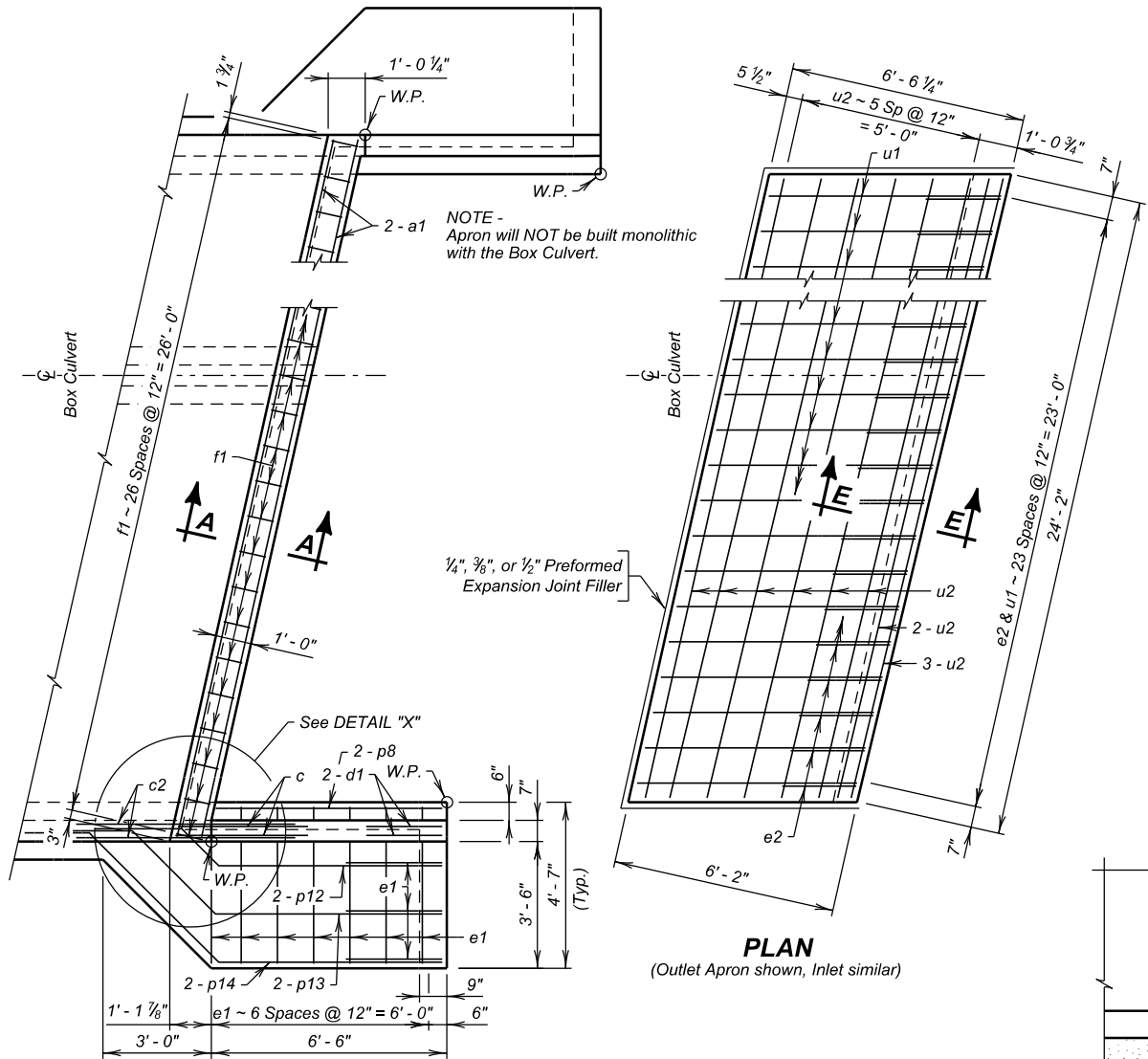
LINCOLN COUNTY

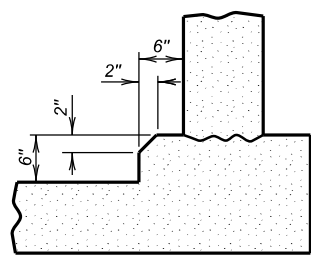
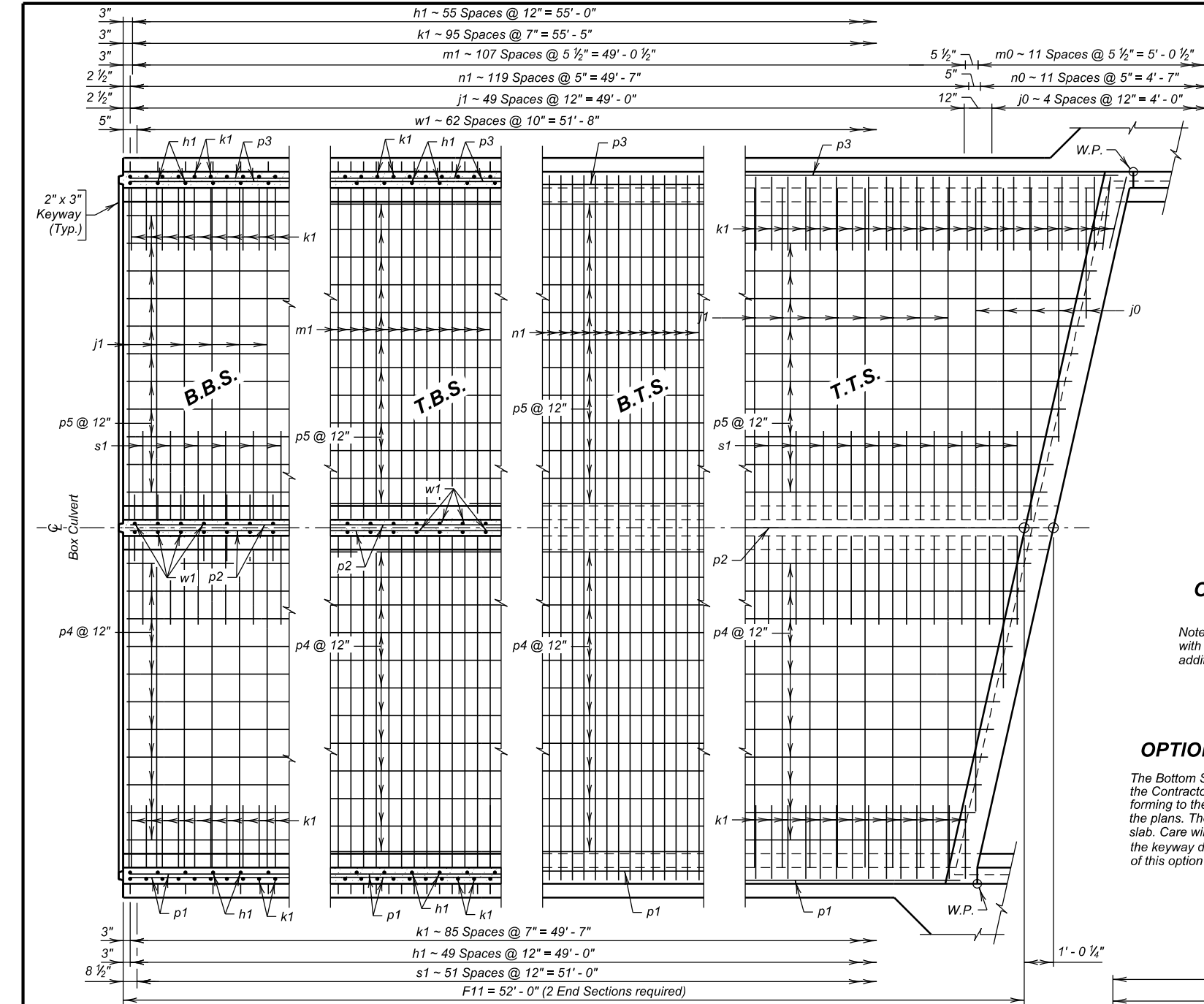
S. D. DEPT. OF TRANSPORTATION

JUNE 2025

3 OF 8

DESIGNED BY ALG LINC01VA	CK. DES. BY BMW 01VATA03	DRAFTED BY SEM	BRIDGE ENGINEER
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OPTIONAL FILLET DETAIL
(At Bottom Slab)

Note: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

OPTIONAL POUR - BOTTOM SLAB

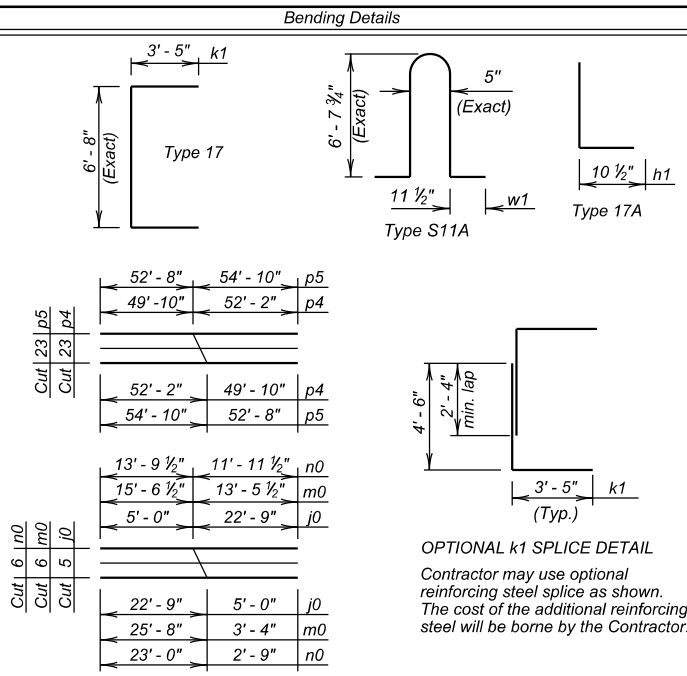
The Bottom Slab may be poured continuously, at the option of the Contractor, with the use of a Preformed Metal keyway conforming to the keyway dimensions and location as shown on the plans. The keyway length will be full width of the bottom slab. Care will be taken to maintain proper alignment of the keyway during the pour sequence. All additional costs of this option will be borne by the Contractor.

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E32	E59

REINFORCING SCHEDULE
(For One End Section)

Mk.	No.	Size	Length	Type
h1	106	4	7' - 3"	17A
j0	5	7	27' - 9"	Str.
j1	100	7	24' - 9"	Str.
k1	182	6	13' - 6"	17
m0	6	5	29' - 0"	Str.
m1	108	5	26' - 6"	Str.
n0	6	7	25' - 9"	Str.
n1	120	7	25' - 6"	Str.
p1	10	4	49' - 9"	Str.
p2	9	4	52' - 3"	Str.
p3	10	4	55' - 0"	Str.
p4	23	4	102' - 0"	Str.
p5	23	4	107' - 6"	Str.
s1	102	7	9' - 6"	Str.
w1	63	5	15' - 6"	S11A
z1	57	5	3' - 6"	Str.



NOTES:
All dimensions are out to out of bars.
See cutting diagram.
Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity shown is for one construction joint.
Request for additional Reinforcing Steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are allowed, no payment will be allowed for the added quantity of Reinforcing Steel.

OPTIONAL k1 SPLICE DETAIL
Contractor may use optional reinforcing steel splice as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
2 - F11 Barrel End Sections @ 52' - 0"	233.4	53450	103

LEGEND FOR PLACING RE-STEEL

T. T. S. - Top of Top Slab
B. T. S. - Bottom of Top Slab
T. B. S. - Top of Bottom Slab
B. B. S. - Bottom of Bottom Slab
O. F. O. W. - Outside Face of Outside Wall
I. F. O. W. - Inside Face of Outside Wall
M. W. - Middle Wall

F11 BARREL END SECTION DETAILS (52' - 0")
FOR
2 - 12' X 5' BOX CULVERT

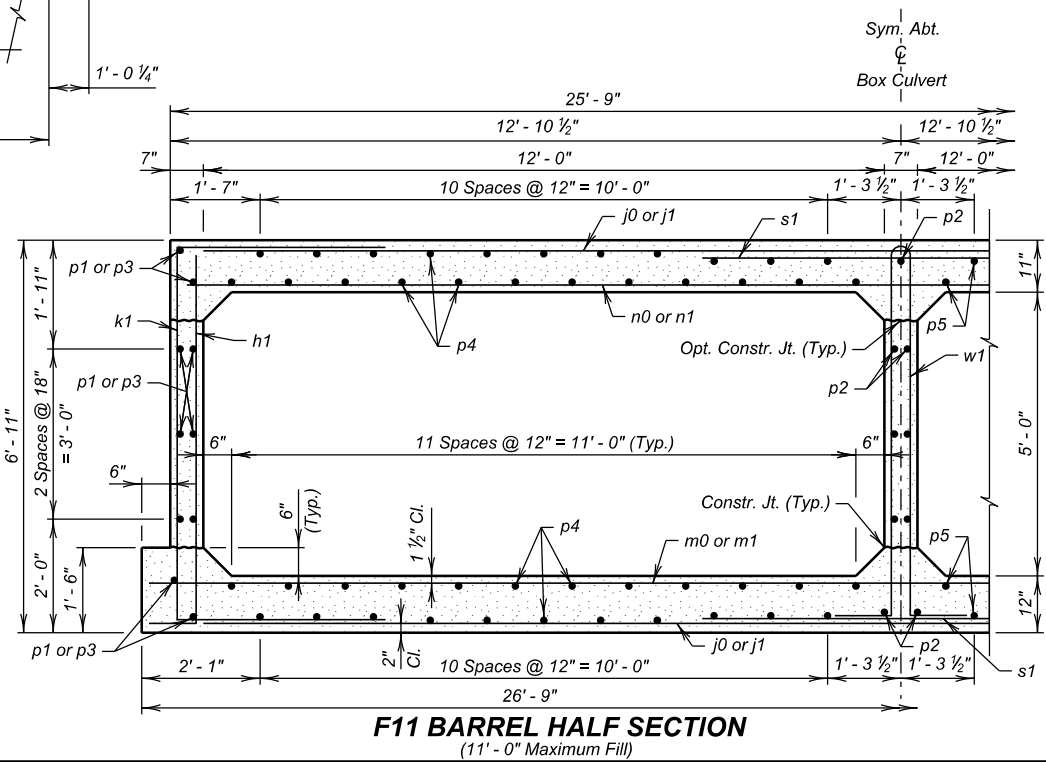
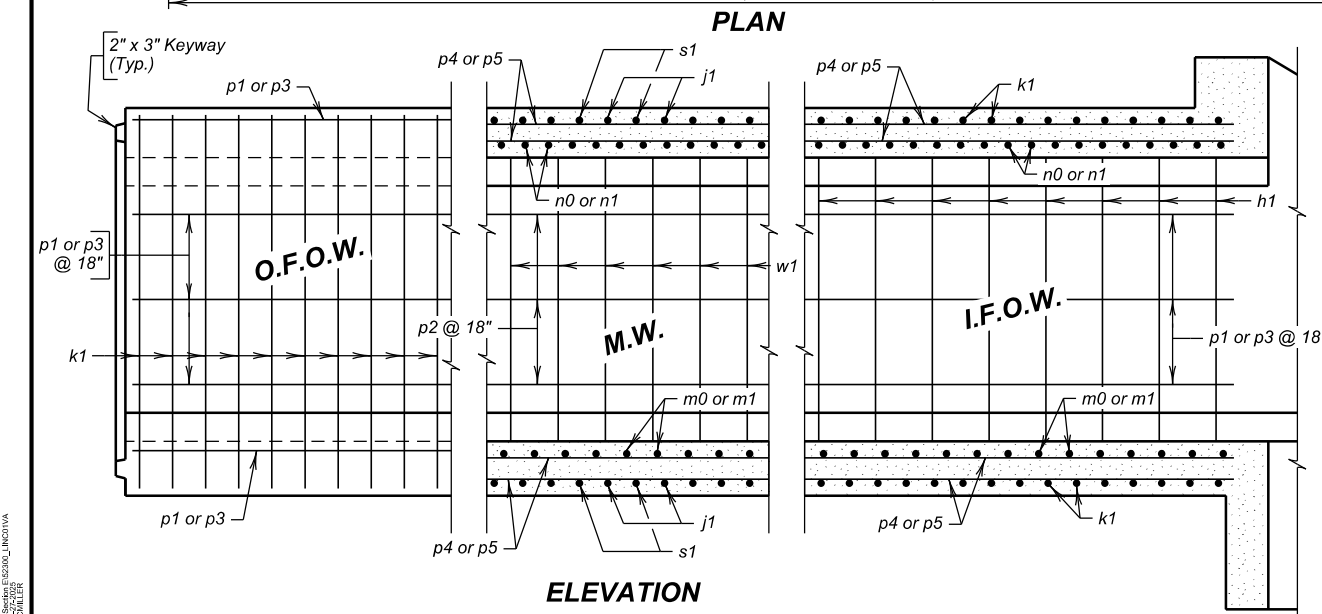
OVER DRAINAGE
STA. 504 + 91.67
STR. NO. 42-139-004

11° 59' 50" RHF SKEW
SEC 8-T100N-R49W
NH 0100(107)411
HL-93

LINCOLN COUNTY
S. D. DEPT. OF TRANSPORTATION

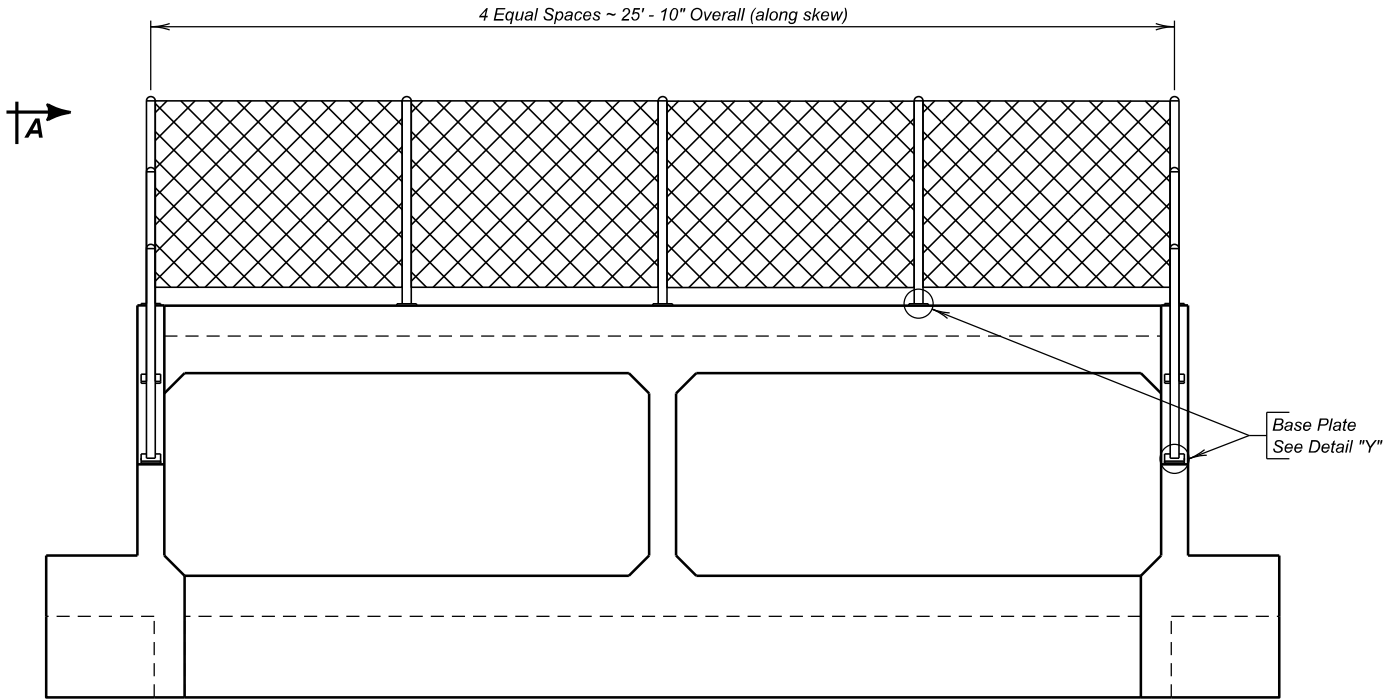
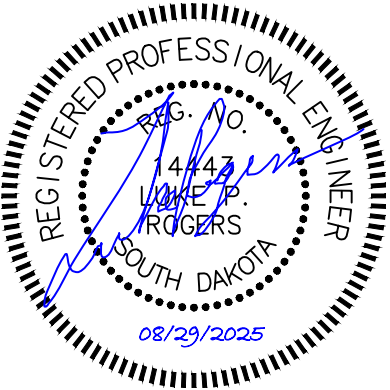
JUNE 2025

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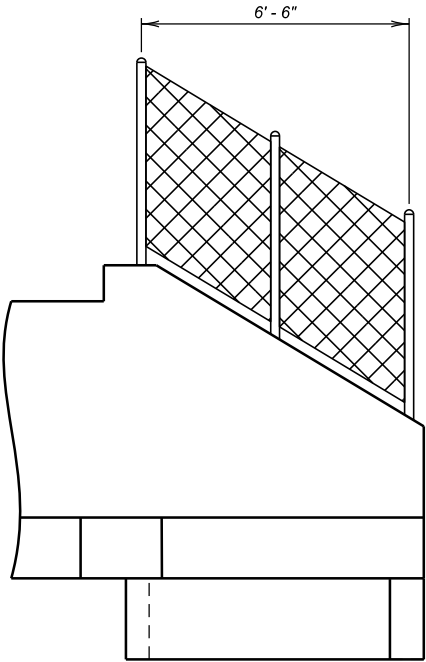


FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E34	E59



CHAIN LINK FENCE
(Outlet Shown, Inlet Similar)

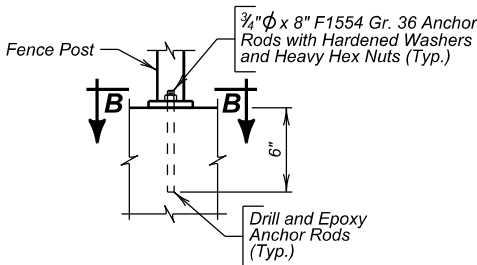


VIEW A - A

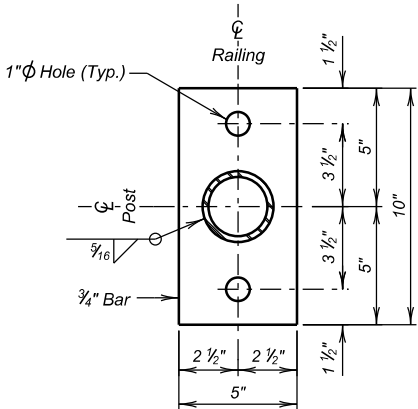
CHAIN LINK FENCE

- Special 4' Chain Link Fence will be in accordance with the details on Standard Plate Number 621.01 EXCEPT the rail posts will be set on the top of the wing wall and parapet in accordance with these notes.
- All fence posts will be built vertical.
- Fence post base plates will conform to ASTM A709, Grade 36. Posts, rails, and baseplates will be galvanized in accordance with ASTM A123.
- Anchor rods will conform to ASTM F1554, Grade 36. Nuts and washers will be in accordance with ASTM A563 and ASTM F436, respectively. Hardware will be galvanized in accordance with ASTM F2329. The bolts will be heavy hex head "Structural" with heavy hex lock nuts and round washers.
- All anchor rod nuts will be tightened to a torque of 120 ft-lb (Approximate without the use of a calibrated torque wrench).
- The epoxy resin mixture will be of a type for bonding steel to hardened concrete and will conform to AASHTO M235 Type IV (Equivalent to ASTM C881, Type IV).
- The rail posts and fence fabric color will be an approved black Federal Standard 595C 27040. All steel railing will be galvanized in accordance with ASTM A123, then will be painted in accordance with Section 411 of the Construction Specifications. The galvanized steel railing will be cleaned in accordance with ASTM D6386 before painting.
- Drilled hole diameter will be within the specifications given by the epoxy resin manufacturer. Smooth bore core drilling is not allowed. The drilled holes will be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to epoxy injection.
- All costs for posts, rails, ties, painting, galvanizing, welding, epoxy, fence fabric, and that which is incidental to the fabrication of the Special 4' Chain Link Fence will be included in the contract unit price per foot for "Special 4' Chain Link Fence".

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Special 4' Chain Link Fence	Ft.	78



DETAIL "Y"



SEC. B - B

FENCE DETAILS

FOR

2 - 12' X 5' BOX CULVERT

OVER DRAINAGE

11° 59' 50" RHF SKEW

STA. 504 + 91.67

SEC 8-T100N-R49W

STR. NO. 42-139-004

NH 0100(107)411

HL-93

LINCOLN COUNTY

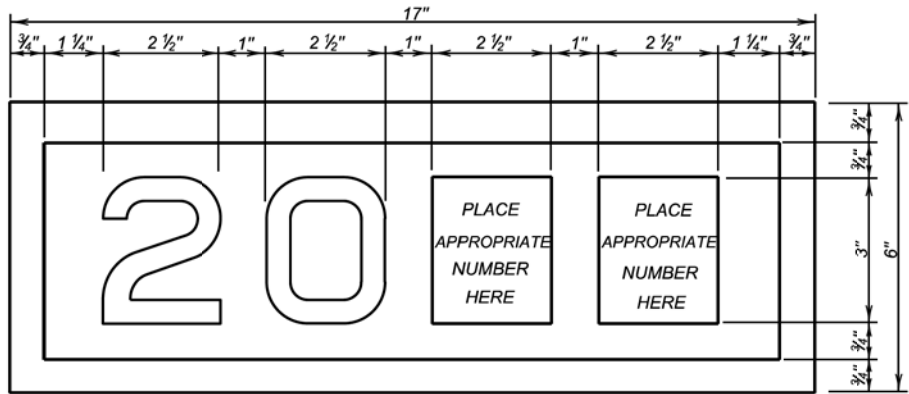
S. D. DEPT. OF TRANSPORTATION

JUNE 2025

6 OF 8

DESIGNED BY ALG LINC01VA	CK. DES. BY BMW 01VATA06	DRAFTED BY SEM	BRIDGE ENGINEER
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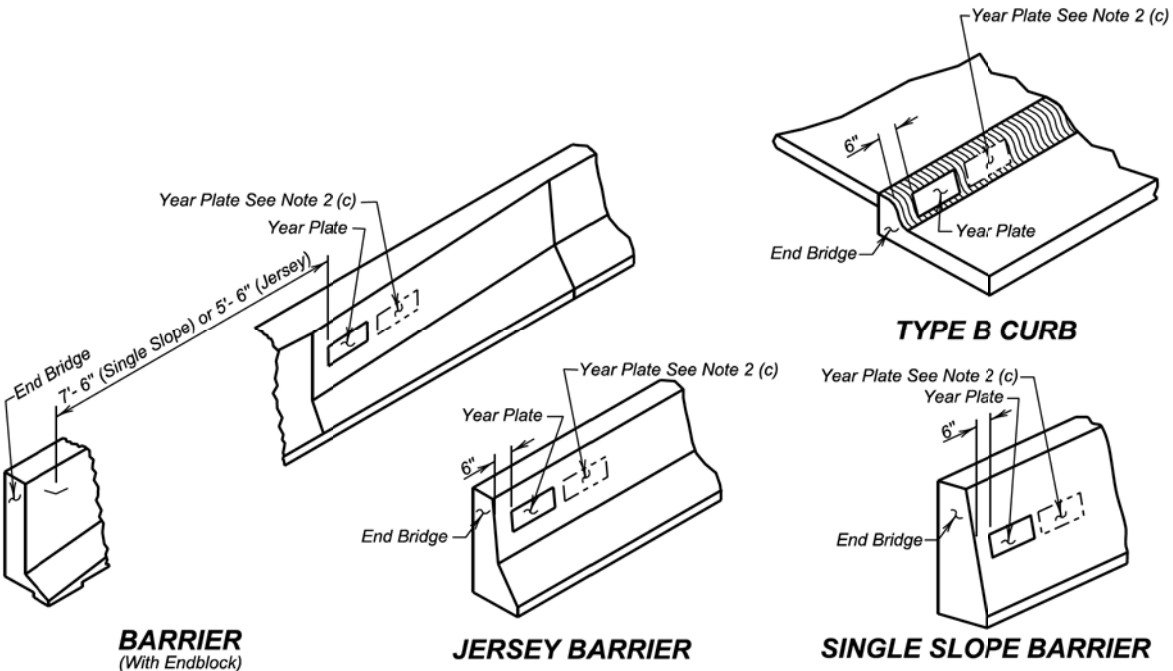
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E35	E59



YEAR PLATE DETAILS

GENERAL NOTES:

- Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.
- Year plates will be located on structure(s) as follows:
 - On cast-in-place box culverts the year plates will be four and one-half (4 1/2) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.
 - On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'-6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.
 - When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.
- There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.



TYPE B CURB

BARRIER
(With Endblock)

JERSEY BARRIER

SINGLE SLOPE BARRIER

January 22, 2021

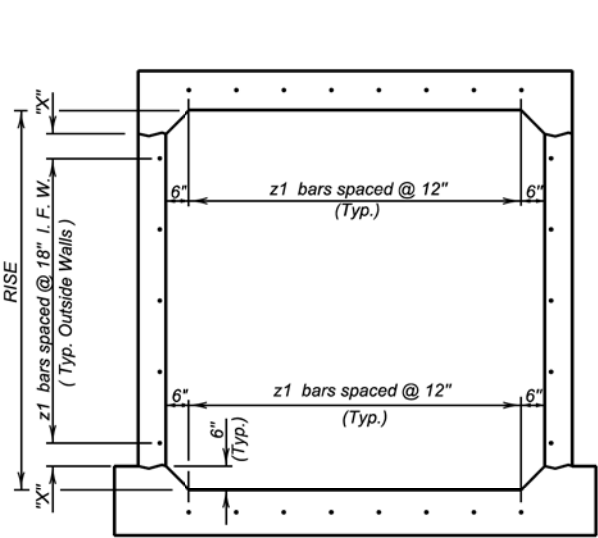
Published Date: 2027

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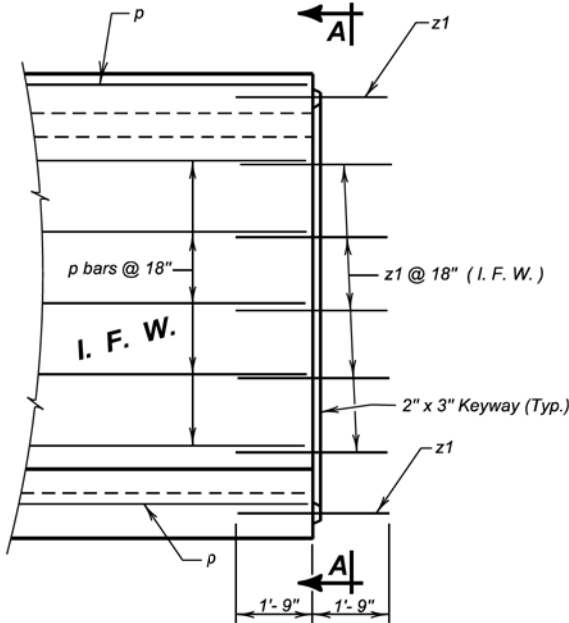
YEAR PLATE DETAILS

PLATE NUMBER
460.02

Sheet 1 Of 1



TYPICAL SINGLE BARREL VIEW A - A

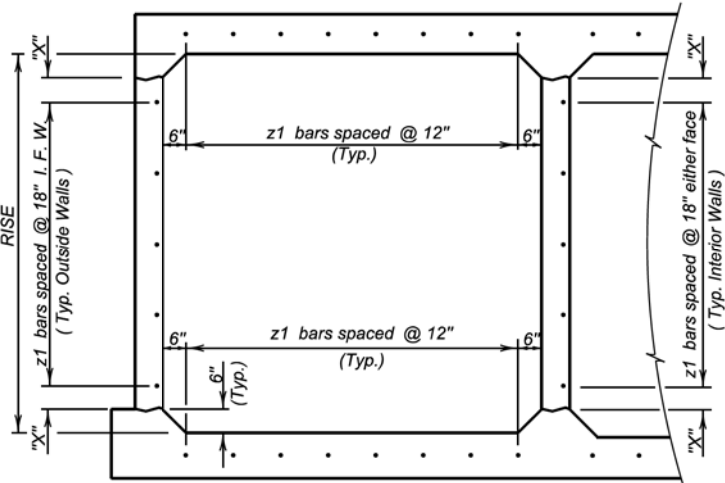


ELEVATION

LEGEND FOR PLACING RE-STEEL

I. F. W. - Inside Face Wall

RISE	"X"
3'-0"	3"
4'-0"	9"
5'-0"	6"
6'-0"	3"
7'-0"	9"
8'-0"	6"
9'-0"	3"
10'-0"	9"
11'-0"	6"
12'-0"	3"
13'-0"	9"
14'-0"	6"



TYPICAL MULTIPLE BARREL VIEW A - A

GENERAL NOTES:

- z1 bars will be placed in the middle of the 2" X 3" keyway in the top and bottom slabs. z1 bars will be lapped with the longitudinal p bars in the inside face of the wall for outside walls and in either face for interior walls. z1 bars are listed and included elsewhere in plans.
- Drainage Fabric Protection will be placed in accordance with Section 422, or Section 560, whichever is applicable.

June 1, 2022

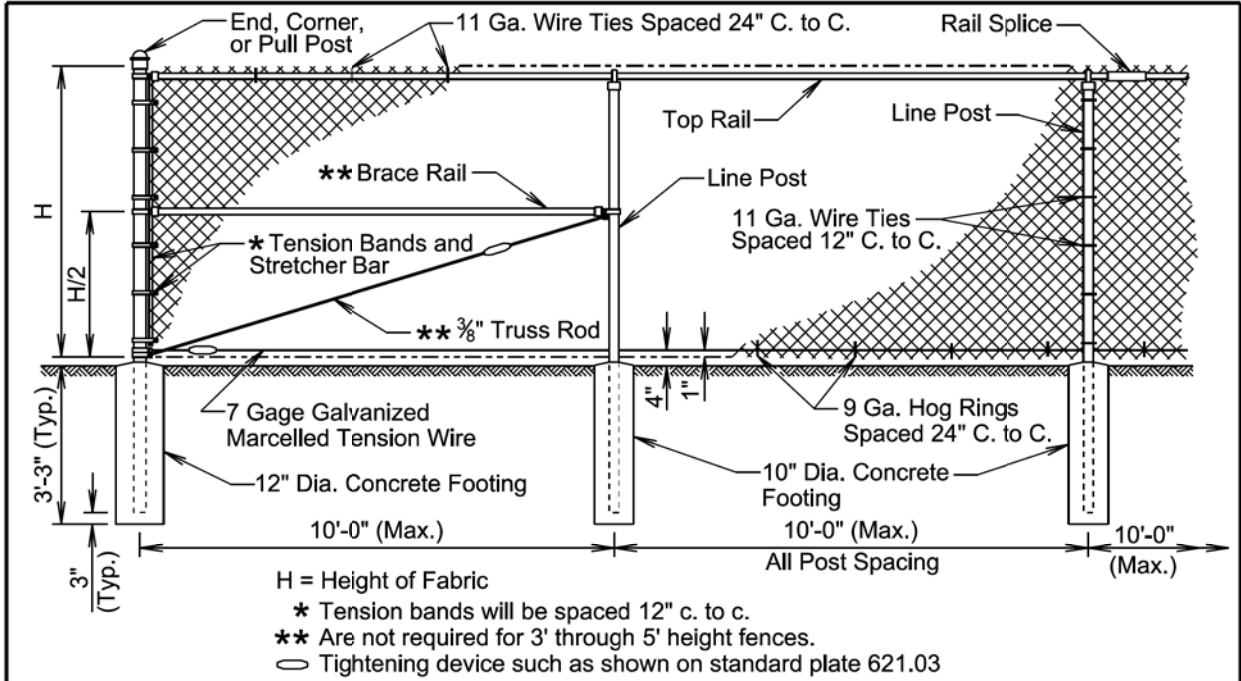
Published Date: 2027

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BOX CULVERT BARREL TIE REINFORCEMENT

PLATE NUMBER
460.10

Sheet 1 of 1



COMPONENT	END, CORNER, and PULL POST		LINE POST			TOP and BRACE RAIL	
	Round Pipe Nominal	Roll Formed Steel	Round Pipe Nominal	"C" Section	H Beam Steel	Round Pipe Nominal	Roll Formed Steel
Type of Fabrication							
Size	3.00" O. D.	3.5"x3.5"	2.50" O. D.	1.875"x1.625"	2.25"x1.70"	1.625" O. D.	1.625"x1.25"
Weight (lb. / Ft.)	5.79 or 4.64	5.14	3.65 or 3.12	2.34	3.43	2.27 or 1.84	1.35

GENERAL NOTES:

Specific details of the component parts of the fence will be approved by the Engineer. Commercially available items produced specifically for the use intended will be used wherever possible in the construction of the fence.

Height of the fabric will be as shown in the plans. Fabric is available at the following heights: 36", 42", 48", 60", 72", 84", 96", 108", 120", and 144". Fabric heights 60 inches and less will be knuckled at both selvages. Fabric heights 72 inches and higher will be knuckled at one selvage and twisted at the other selvage.

Chain link fabric will be 2-inch mesh, No. 9 gage galvanized wire securely fastened to tension wire, line post, rails, braces, and stretcher bars.

Fence may be constructed with either round pipe, "C" section, "H" beam, or roll formed steel components as shown in the table above. Line posts may be round pipe, "C" section, or "H" beam. The corner post and rails will be either round pipe or roll formed steel. The type of components used must be approved by the Engineer prior to installation.

Where fence must cross small bodies of water such as drainage areas or ponds that could freeze during the winter, use 11 gage hog rings. Provide only two ties per tension wire and top rail between line posts.

A suitable method of rail splicing will be used to allow for expansion and contraction while maintaining proper position of the top rail.

Fence grounding will be as shown on standard plate 620.11.

November 19, 2022

Published Date: 2027	S D D O T	CHAIN LINK FENCE WITH TOP RAIL	PLATE NUMBER 621.01
			Sheet 1 of 1

For End, Corner, and Pull Posts

For Line Posts

TYPICAL POST TOPS
(Shown for example only)

For use without Bolt

For use with Bolt

BRACE AND TRUSS BANDS

BRACE BANDS
(Bands will be rectangular for "C" Section and "H" Beam Posts.)

TENSION BANDS
(Bands will be rectangular for "C" Section and "H" Beam Posts.)

TIGHTENING DEVICES

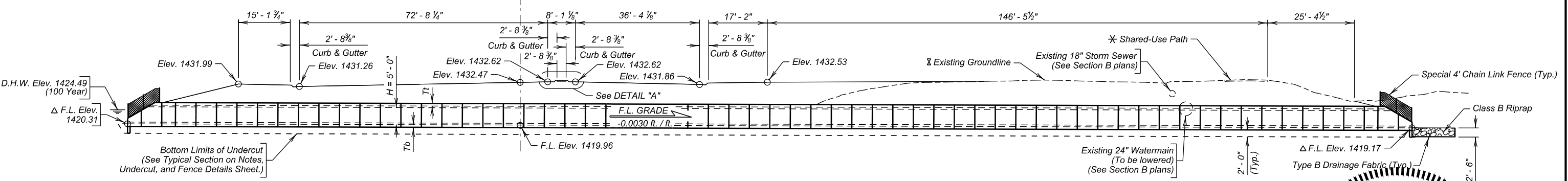
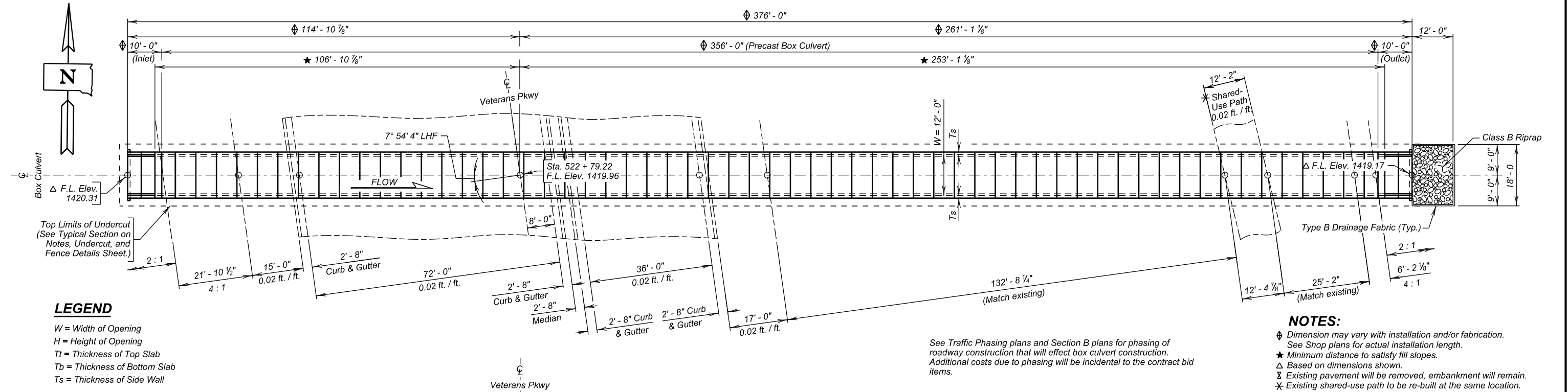
RAIL ENDS

Published Date: 2027	S D D O T	HARDWARE FOR CHAIN LINK FENCE	June 26, 2019 PLATE NUMBER 621.03
			Sheet 1 of 1

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E37	E59



HYDRAULIC DATA

Q_d	237 cfs
A_d	38 sq. ft.
V_d	6.2 fps
Q_F	237 cfs
Q_{100}	237 cfs

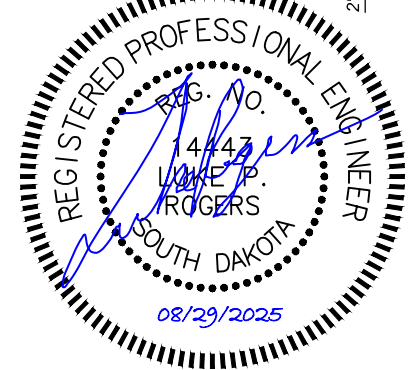
Q_d = Design discharge for the proposed box culvert based on 100 year frequency. El. 1424.49
 Q_F = Designated peak discharge for the basin approaching proposed project based on 100 year frequency.
 Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 1424.49.

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Structure Excavation, Box Culvert	Cu. Yd.	142
Box Culvert Undercut	Cu. Yd.	523
12' x 5' Precast Concrete Box Culvert, Furnish	Ft.	356.0
12' x 5' Precast Concrete Box Culvert, Install	Ft.	356.0
12' x 5' Precast Concrete Box Culvert End Section, Furnish	Each	2
12' x 5' Precast Concrete Box Culvert End Section, Install	Each	2
Special 4' Chain Link Fence	Ft.	66
Class B Riprap	Ton	28.0
Type B Drainage Fabric	Sq. Yd.	36
Reinforcement Fabric (MSE)	Sq. Yd.	739

Quantity is based on 9" bottom slab, 9" top slab, and 8" walls.
For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yd. to Tons.

INDEX OF CULVERT SHEETS-

Sheet No. 1 - General Drawing and Quantities
Sheet No. 2 - Notes, Undercut, and Fence Details
Sheet No. 3 - Details of Standard Plates No's 460.02 & 560.01
Sheet No. 4 - Details of Standard Plates No's 560.10 & 621.01
Sheet No. 5 - Details of Standard Plates No's. 621.03



GENERAL DRAWING AND QUANTITIES
FOR

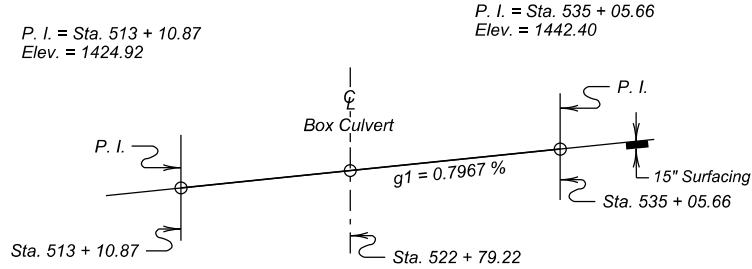
12' X 5' BOX CULVERT (PRECAST)

OVER DRAINAGE 7° 54' 4" LHF SKEW
STA. 522 + 79.22 SEC 31-T101N-R48W
STR. NO. 50-241-239 NH 0100(107)411
PCN 01VA HL-93

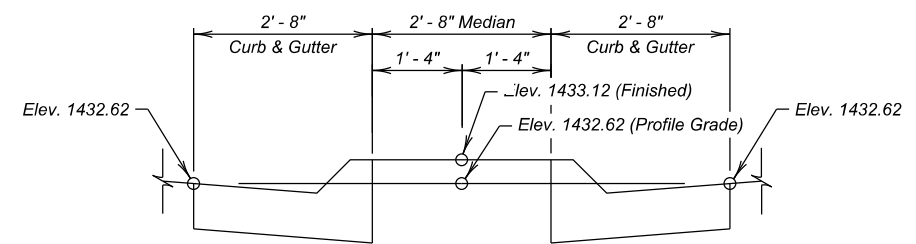
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION

JUNE 2025

1 OF 5



GRADE LINE DATA



DETAIL "A"

(Perpendicular to Centerline)



DESIGNED BY IMM MINN01VA	CK. DES. BY LPR MINNTA01	DRAFTED BY SEM	BRIDGE ENGINEER
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SPECIFICATIONS

Construction Specifications: Standard Specifications for Roads and Bridges, 10-7-26 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at <https://dot.sd.gov/doing-business/contractors/standard-specifications>.

GENERAL NOTES

Design will be in accordance with Section 560 of the Construction Specifications with the following criteria:

- Box culvert and box culvert end section design will conform to the AASHTO LRFD Bridge Design Specifications, 9th Edition.
- Design Live Load: HL-93 and construction loading consisting of one 7'-6" gage axle with gross weight = 95,850 lbs. The construction load will not be applied until a minimum of 4 feet of fill has been placed over the box culvert. If other construction loads in excess of legal load are anticipated by the Contractor, the Contractor will submit a design analysis for the anticipated construction loading, through the proper channels, to the Engineer for approval.
- The box culvert will be load rated in accordance with the AASHTO Manual for Bridge Evaluation, 2018 Edition with latest Interim Revisions using the LRFR method. The rating will include evaluation of the Design HL-93 truck at both Inventory and Operating levels and a Legal Load rating for the three SD legal trucks (Type 3, 3S2, and 3-2) as well as the notional rating load and four specialized hauling vehicles. The structure will also be evaluated for the emergency vehicles, EV2 and EV3, at the legal load rating level. All sections of the box culvert will rate at HL-93 or better (Inventory Level). The three SD Legal Loads, the notional rating load, the four specialized hauling vehicles, and two emergency vehicles will rate greater than 1.0 at legal load rating level. AASHTOWare Bridge Rating (BrR) is required to be used to rate the box culvert. Include the BrR rating model and a load rating summary table with load rating calculations. Submit load rating calculations with the design and independent check design calculations or shop plans, as appropriate.
- The design of the barrel sections will be based on a minimum fill height of 2 feet and include all subsequent fill heights up to and including the maximum fill height of 9 feet over the box culvert.
- Minimum inside corner fillet will be 6-inch.
- Minimum precast barrel section length will be 4-foot sections; however, no more than two 4-foot sections are allowed in any one length of precast barrel.
- Lift holes will be plugged with an approved non-shrinkable grout.
- The fabricator will imprint on the structure the date of construction as specified and detailed on Standard Plate 460.02.
- Alternate end section details will be allowed, subject to the approval of the Engineer. No additional payment will be made for any change in the barrel/end section configuration.
- Installation of the precast sections will be in accordance with the final approved shop plans.
- Care will be taken when placing sections. Sections will be moved only using the lifting holes by approved equipment.
- Soils below the bottom of the proposed RBCB consist of soft gray silt clay at the inlet, to brown sandy clay at the outlet. Groundwater was encountered in the borings at an elevation of 1422.5 feet during the subsurface investigation conducted in November 2024. Dewatering will be required during construction.

DESIGN MIX OF CONCRETE

- Mix will be as per fabricator's design; however, a minimum compressive strength will not be less than 4,500 psi at 28 days.
- Type II cement is required.

REINFORCEMENT FABRIC (MSE)

- A layer of Reinforcement Fabric (MSE) will be placed at the bottom of the undercut prior to backfilling with granular material.
- Reinforcement Fabric (MSE) will conform to Section 831. The Reinforcement Fabric (MSE) provided will be on the Approved Products List or will be certified by the supplier to meet this specification prior to installation.
- Reinforcement Fabric (MSE) will be paid for at the contract unit price per sq. yd. for Reinforcement Fabric (MSE). Payment will be full compensation for furnishing and installing the Reinforcement Fabric (MSE) only. Granular backfill materials will be paid for as part of the Box Culvert Undercut bid item.
- Place the Reinforcement Fabric (MSE) on as level and smooth of a surface as possible. Any protrusions that might damage the fabric will be removed prior to placing the fabric. All seams in the fabric will be stitched in accordance with the seaming procedure and as shown on the detail labeled "Seam Types." No equipment will be allowed on the fabric until the granular backfill material is in place. The fabric will be kept as taut as possible prior to backfilling. Granular backfill material will be dumped behind the leading edge of the fill and pushed into place with a loader or dozer.

GEOTEXTILE SEAMING PROCEDURE

- The sewn seams will consist of two parallel rows of stitching ("prayer" seam, Type SSa-2), or a J-seam (Type SSn-1), using a single row of stitching. The stitching will be a lock type stitch.
- If the Type SSa-2 seam is used, the two rows of stitching will be 1" apart with a tolerance of plus or minus 1/2" and will not cross, except for restitching. The minimum seam allowance, i.e., minimum distance from the fabric edge to the stitch line nearest to that edge, will be 1 1/2".
- If the J-seam (Type SSn-1) is used, the minimum seam allowance will be 1".
- The seam, stitch type, and the equipment used to perform the stitching will be as recommended by the manufacturer of the geotextile and approved by the Engineer. The seams will be sewn in such a manner that the seam can be readily inspected by the Engineer.
- The thread used will be high-strength polypropylene, polyester, or Kevlar thread. Nylon threads will not be allowed.

SHOP PLANS

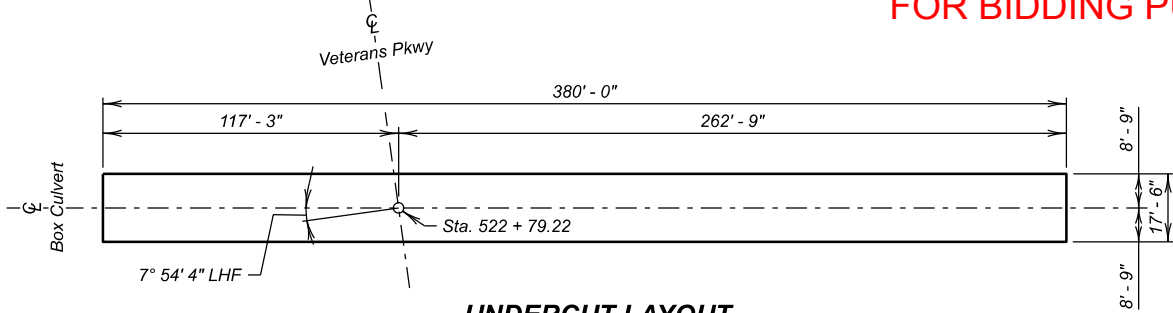
The fabricator will submit shop plans in accordance with the Construction Specifications to HDR Engineering, 101 South Phillips Ave, Suite 401, Sioux Falls, SD 57104 (James.Unruh@hdrinc.com). After review, corrections (if necessary), and approval by HDR Engineering, the Office of Bridge Design will review the submittals, authorize fabrication, arrange for fabrication inspection, and distribute the shop drawings.

FOR BIDDING PURPOSES ONLY

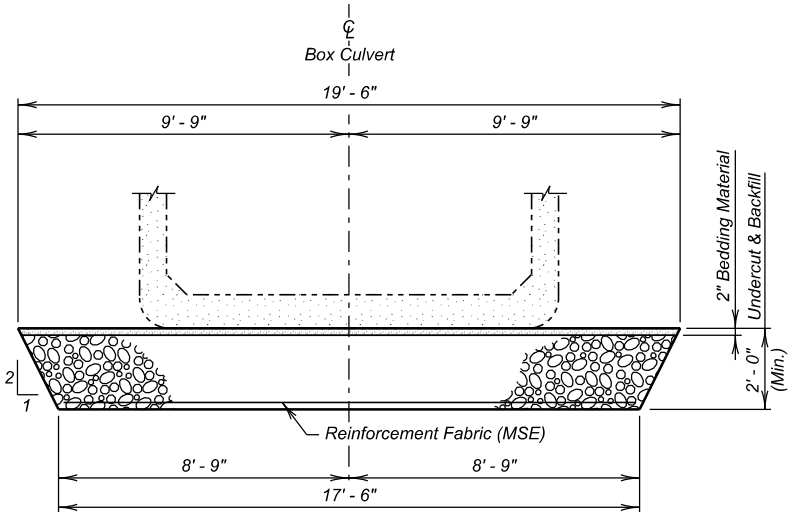
REV DATE: 8-28-2026

NTA

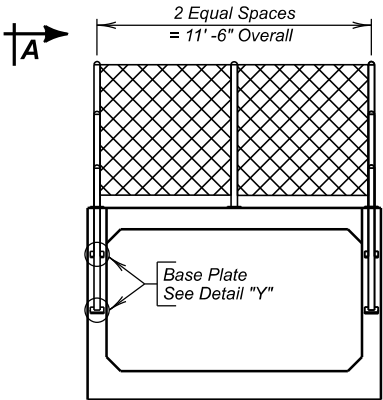
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
		E38	E59



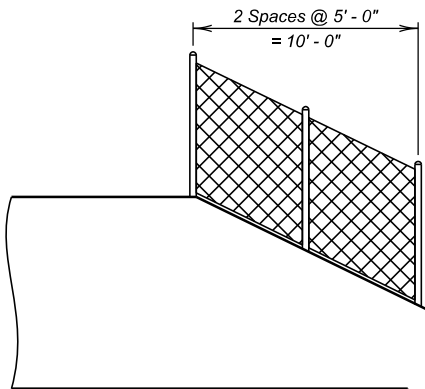
UNDERCUT LAYOUT
(Bottom Dimensions)



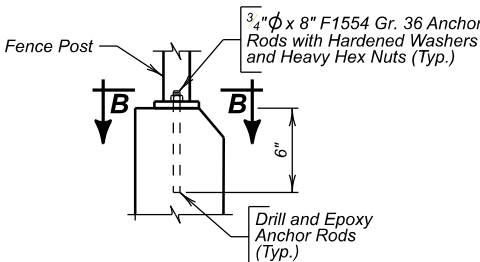
TYPICAL SECTION
(For Limits of Undercut)



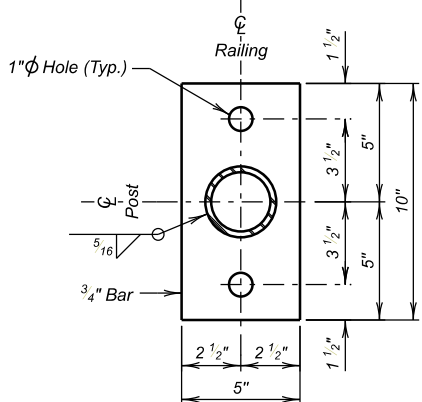
CHAIN LINK FENCE
(Outlet Shown, Inlet Similar)



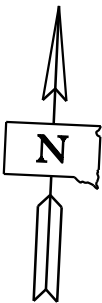
VIEW A - A



DETAIL "Y"



SEC. B - B



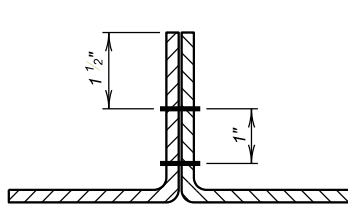
ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Box Culvert Undercut	Cu. Yd.	523
Special 4' Chain Link Fence	Ft.	66
Reinforcement Fabric (MSE)	Sq. Yd.	739

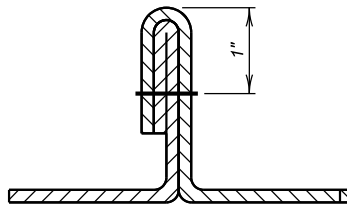
For payment, quantity is based on the plan shown undercut dimensions and will not be measured unless the Engineer orders a change.

CHAIN LINK FENCE

- Special 4' Chain Link Fence will be in accordance with the details on Standard Plate Number 621.01 EXCEPT the rail posts will be set on the top of the wing wall and parapet in accordance with these notes.
- All fence posts will be built vertical.
- Fence post base plates will conform to ASTM A709, Grade 36. Posts, rails, and baseplates will be galvanized in accordance with ASTM A123.
- Anchor rods will conform to ASTM F1554, Grade 36. Nuts and washers will be in accordance with ASTM A563 and ASTM F436, respectively. Hardware will be galvanized in accordance with ASTM F2329. The bolts will be heavy hex head "Structural" with heavy hex lock nuts and round washers.
- All anchor rod nuts will be tightened to a torque of 120 ft-lb (Approximate without the use of a calibrated torque wrench).
- The epoxy resin mixture will be of a type for bonding steel to hardened concrete and will conform to AASHTO M235 Type IV (Equivalent to ASTM C881, Type IV).
- The rail posts and fence fabric color will be an approved black Federal Standard 595C 27040. All steel railing will be galvanized in accordance with ASTM A123, then will be painted in accordance with Section 411 of the Construction Specifications. The galvanized steel railing will be cleaned in accordance with ASTM D6386 before painting.
- Drilled hole diameter will be within the specifications given by the epoxy resin manufacturer. Smooth bore core drilling is not allowed. The drilled holes will be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to epoxy injection.
- All costs for posts, rails, ties, painting, galvanizing, welding, epoxy, fence fabric, and that which is incidental to the fabrication of the Special 4' Chain Link Fence will be included in the contract unit price per foot for "Special 4' Chain Link Fence".

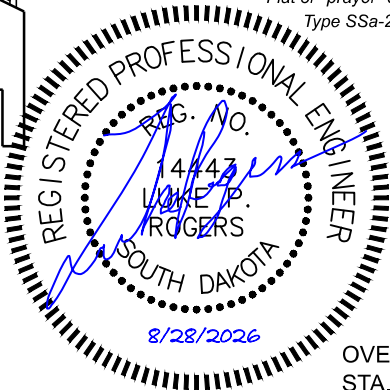


Flat or "prayer" seam
Type SSa-2



J seam
Type SSn-1

SEAM TYPES



NOTES, UNDERCUT, AND FENCE DETAILS FOR

12' X 5' BOX CULVERT (PRECAST)

OVER DRAINAGE

STA. 522 + 79.22

STR. NO. 50-241-239

7° 54' 4" LHF SKEW

SEC 31-T101N-R48W

NH 0100(107)411

HL-93

MINNEHAHA COUNTY

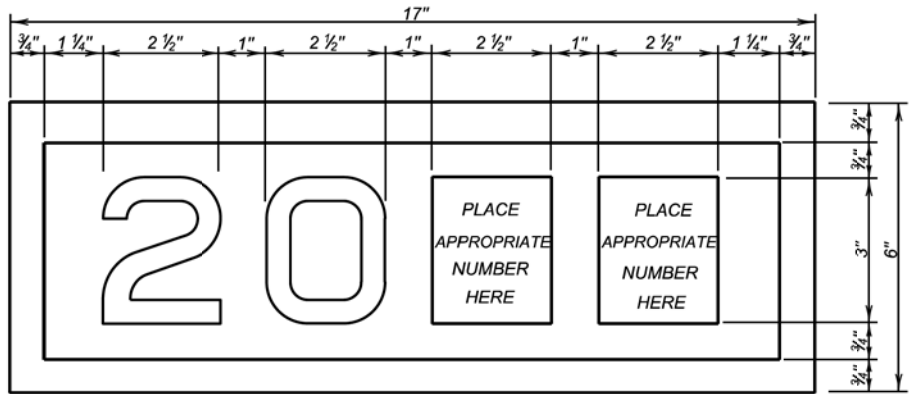
S. D. DEPT. OF TRANSPORTATION

JUNE 2025

2 OF 5

DESIGNED BY IMM	CK. DES. BY LPR	DRAFTED BY SEM	BRIDGE ENGINEER
MINN01VA	MINNTA02		

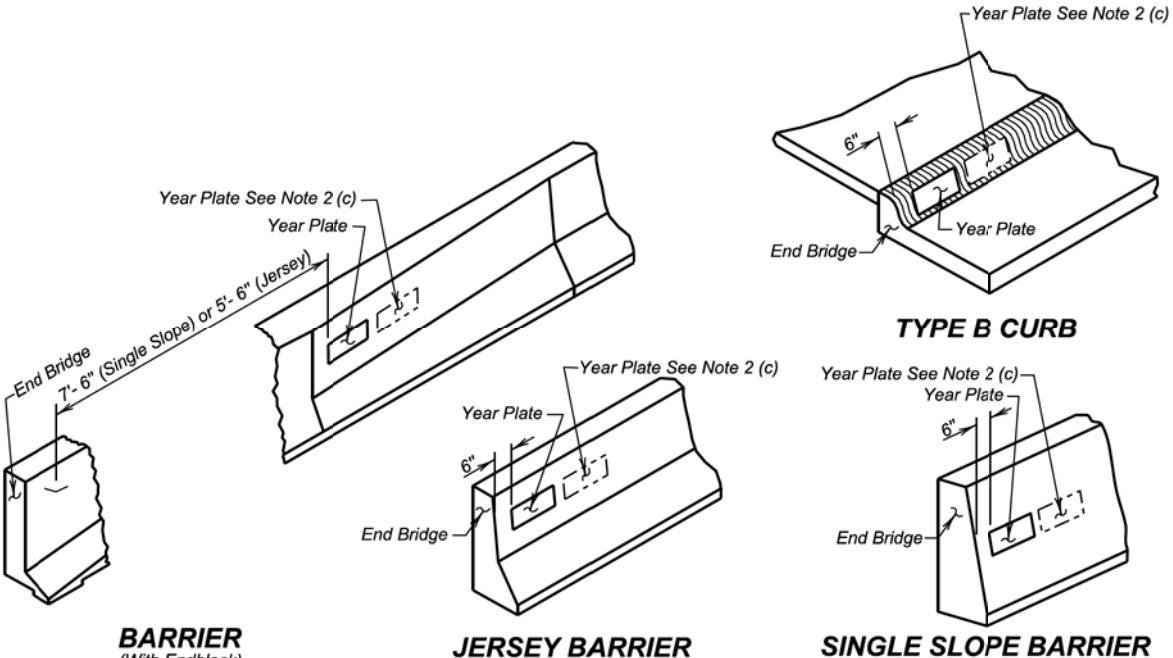
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E39	E59



YEAR PLATE DETAILS

GENERAL NOTES:

- Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.
- Year plates will be located on structure(s) as follows:
 - On cast-in-place box culverts the year plates will be four and one - half (4 1/2) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.
 - On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'-6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.
 - When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.
- There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.



TYPE B CURB

BARRIER
(With Endblock)

JERSEY BARRIER

SINGLE SLOPE BARRIER

January 22, 2021

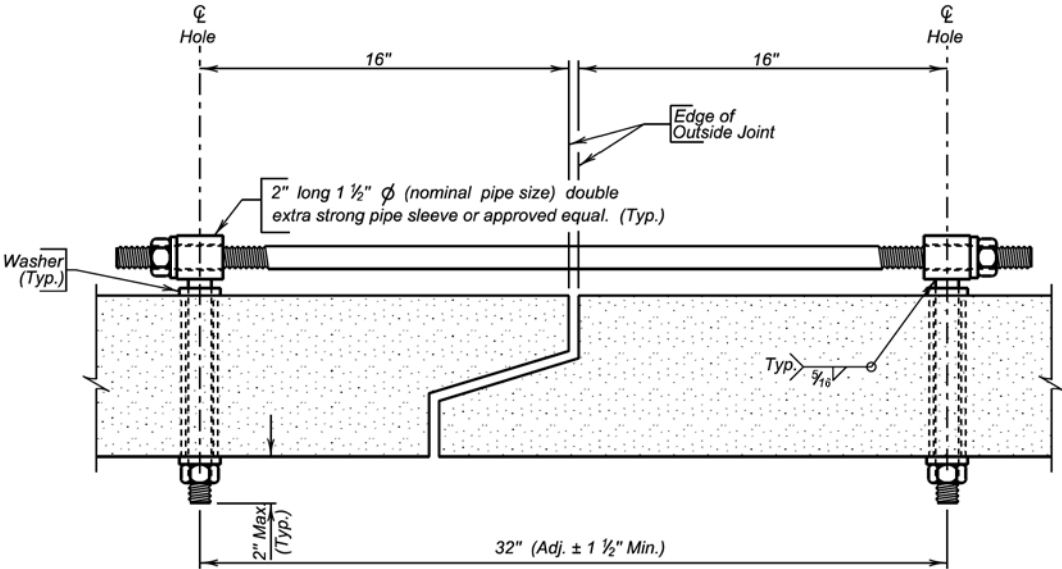
Published Date: 2027

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YEAR PLATE DETAILS

PLATE NUMBER
460.02

Sheet 1 Of 1



TIE BOLT ASSEMBLY

GENERAL NOTES:

- All holes for tie bolts shall be cast-in-place, 16 inches from outside edge of joint. Cast in inserts or sleeves, if used, shall be made of a corrosion resistant material.
- Ties shall be 1 inch phi and conform to the requirements of ASTM A36, ASTM A307, or ASTM F1554, Gr. 36. Nuts shall be heavy hex in conformance with ASTM A563. Washers shall conform to ASTM F436, Type 1. The welded pipe sleeve shall conform to ASTM A53, Grade B.
- Welding and weld inspection shall be in conformance with AWS/ANSI D1.1 - (Current Year) Structural Welding Code - Steel.
- Tie Bolt Assembly shall be galvanized in accordance with ASTM A153 or ASTM F2329 as applicable.
- Tie Bolt Assembly details may vary from that shown, but alternate tie bolt assemblies are subject to testing to demonstrate equal strength. Submit details, through proper channels, to the Office of Bridge Design for approval.
- All costs for furnishing and installing the precast box culvert tie bolt assembly shall be incidental to the contract unit price per Foot for "Precast Concrete Box Culvert, Furnish".

March 21, 2016

Published Date: 2027

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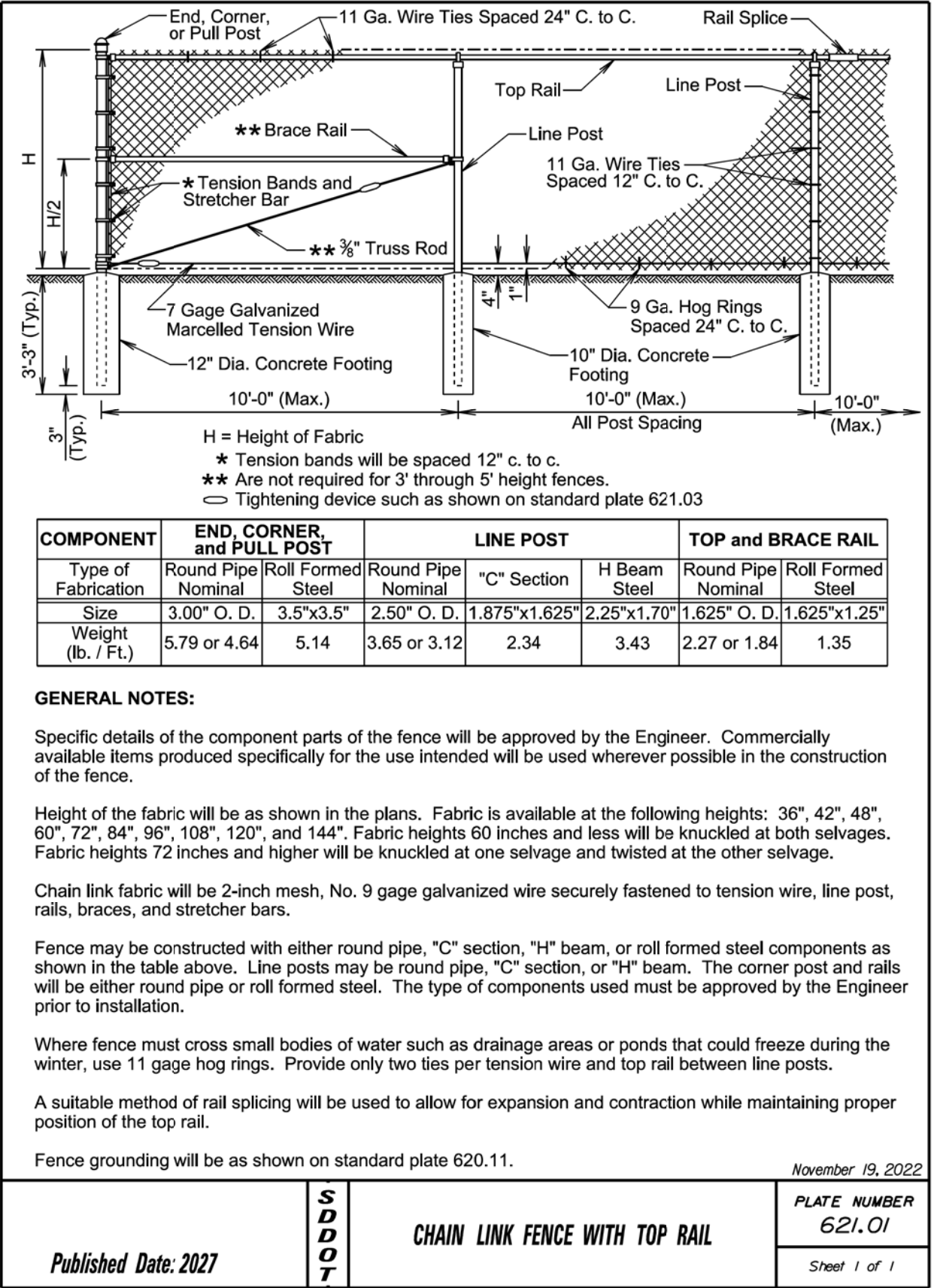
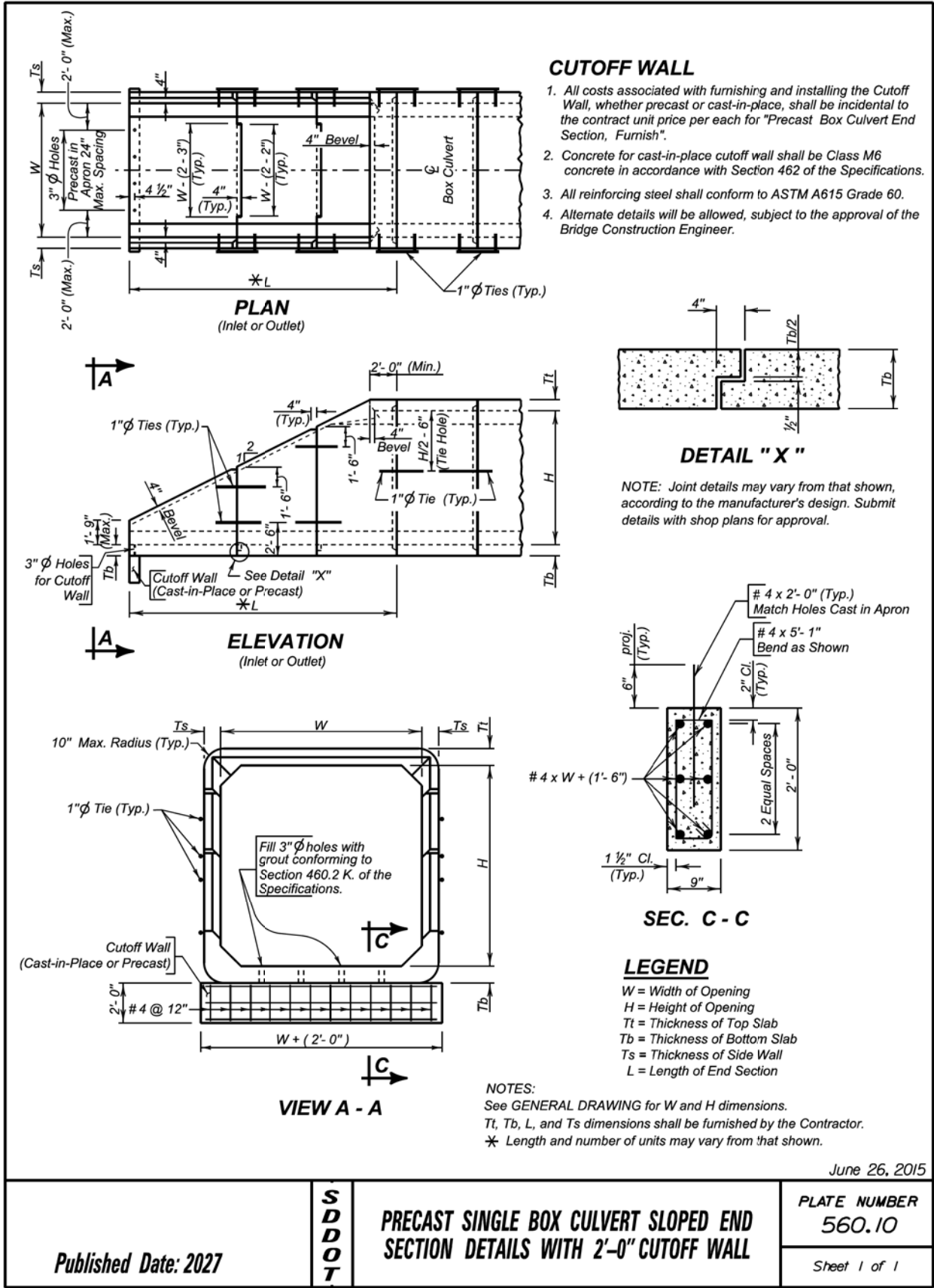
PRECAST BOX CULVERT
TIE BOLT ASSEMBLY DETAILS

PLATE NUMBER
560.01

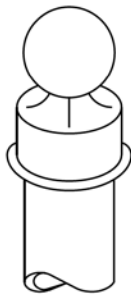
Sheet 1 of 1

12' X 5' BOX CULVERT (PRECAST)

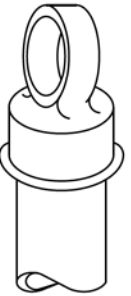
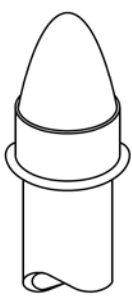
STR. NO. 50-241-239
JUNE 2025



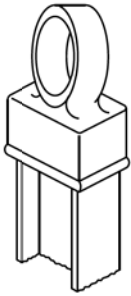
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E41	E59



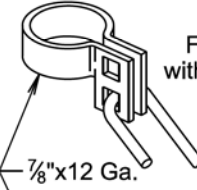
For End, Corner,
and Pull Posts



For Line Posts



TYPICAL POST TOPS
(Shown for example only)



For use
without Bolt

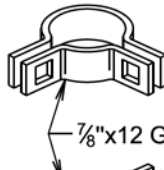
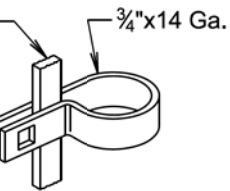


For use
with Bolt

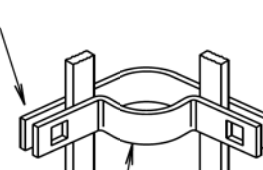
BRACE AND TRUSS BANDS



3/4"x12 Ga.
At End
Posts



At Corner
Posts

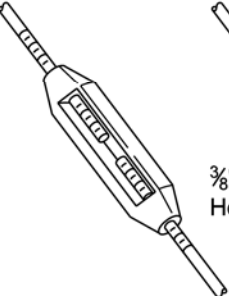


At Line
Pull Posts

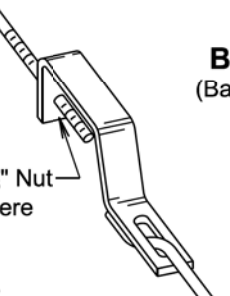


Three Way

BRACE BANDS **TENSION BANDS**
(Bands will be rectangular for "C" Section and "H" Beam Posts.)



3/8" Turnbuckle



11 Ga. Tightener

TIGHTENING DEVICES



Straight Tip



Offset Tip

RAIL ENDS

June 26, 2019

Published Date: 2027

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HARDWARE FOR CHAIN LINK FENCE

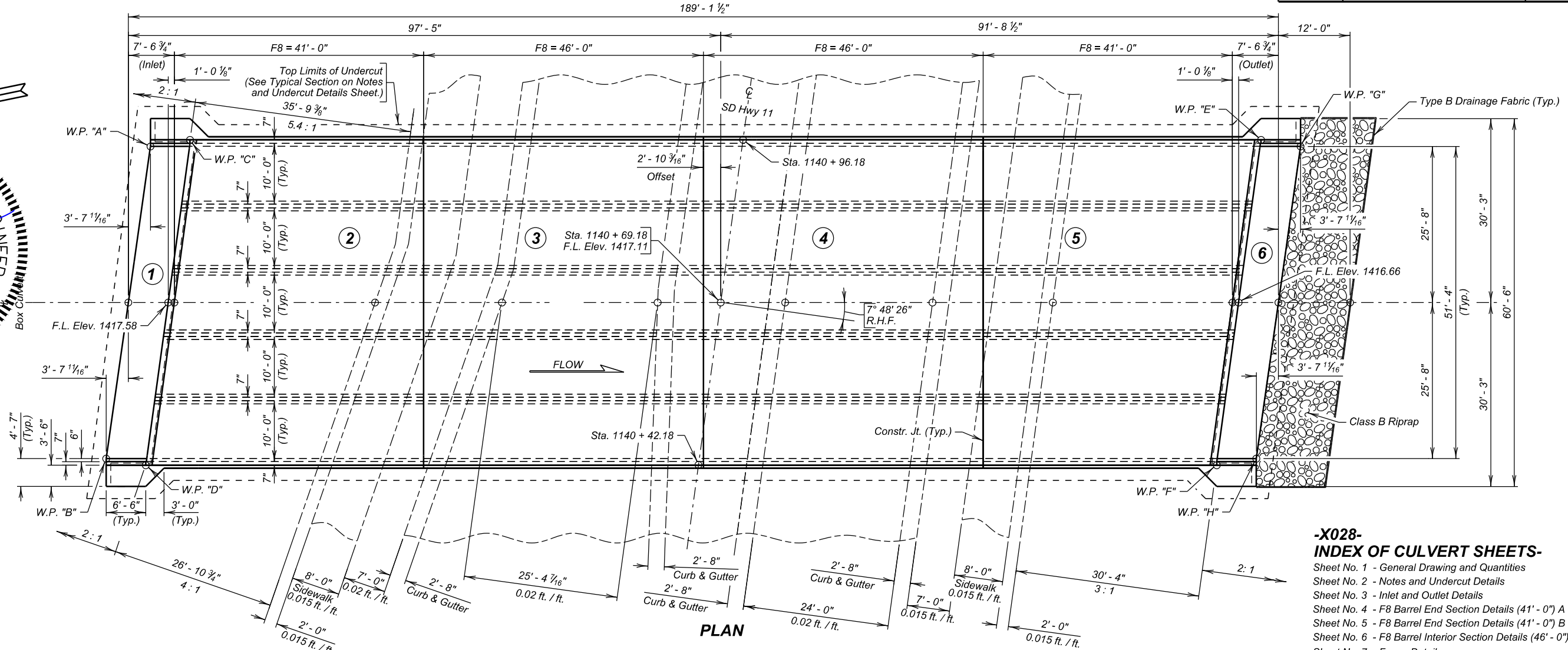
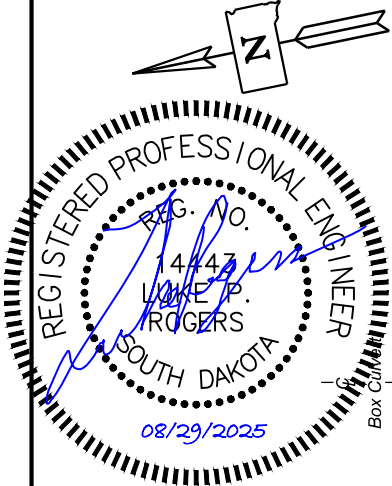
PLATE NUMBER
621.03

Sheet 1 of 1

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E42	E59



HYDRAULIC DATA

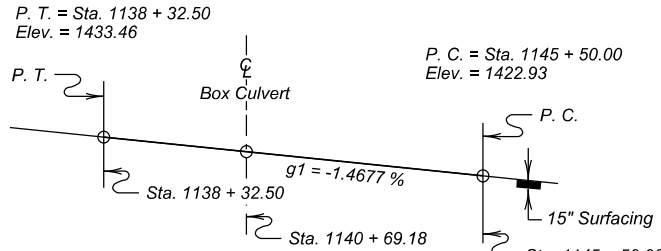
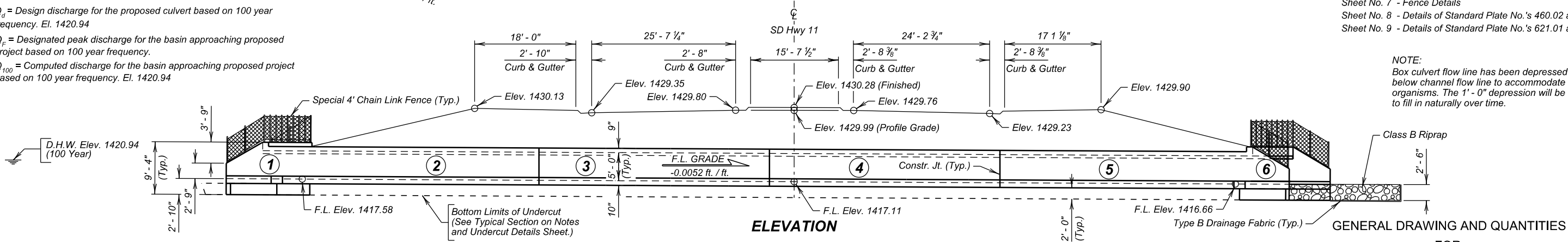
Q_d	532 cfs
A_d	95 sq. ft.
V_d	5.6 fps
Q_F	532 cfs
Q_{100}	532 cfs

Q_d = Design discharge for the proposed culvert based on 100 year frequency. El. 1420.94
 Q_F = Designated peak discharge for the basin approaching proposed project based on 100 year frequency.
 Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 1420.94

-X028- INDEX OF CULVERT SHEETS-

Sheet No. 1 - General Drawing and Quantities
Sheet No. 2 - Notes and Undercut Details
Sheet No. 3 - Inlet and Outlet Details
Sheet No. 4 - F8 Barrel End Section Details (41' - 0") A
Sheet No. 5 - F8 Barrel End Section Details (41' - 0") B
Sheet No. 6 - F8 Barrel Interior Section Details (46' - 0")
Sheet No. 7 - Fence Details
Sheet No. 8 - Details of Standard Plate No.'s 460.02 and 460.10
Sheet No. 9 - Details of Standard Plate No.'s 621.01 and 621.03

NOTE:
Box culvert flow line has been depressed 1' - 0" below channel flow line to accommodate aquatic organisms. The 1' - 0" depression will be allowed to fill in naturally over time.



ITEM	UNIT	QUANTITY
Structure Excavation, Box Culvert	Cu. Yd.	329
Box Culvert Undercut	Cu. Yd.	868
Class A45 Concrete, Box Culvert	Cu. Yd.	728.8
Reinforcing Steel	Lb.	114165
Special 4' Chain Link Fence	Ft.	134
Class B Riprap	Ton	94.2
Type B Drainage Fabric	Sq. Yd.	105
Reinforcement Fabric (MSE)	Sq. Yd.	1279

* For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yd. to Tons

W. P.	STATION	OFFSET
"A"	1140 + 81.87	96.39' Lt.
"B"	1140 + 30.02	96.63' Lt.
"C"	1140 + 83.83	90.10' Lt.
"D"	1140 + 29.83	90.04' Lt.
"E"	1141 + 07.75	84.39' Rt.
"F"	1140 + 53.76	84.45' Rt.
"G"	1141 + 07.56	90.98' Rt.
"H"	1140 + 55.71	90.74' Rt.

5 - 10' X 5' BOX CULVERT
OVER DRAINAGE 7° 48' 26" RHF SKEW
STA. 1140 + 69.18 (SD HWY 11) SEC 17-T100N-R49W
STR. NO. 42-138-011 NH 0100(107)411
PCN 01VA HL-93
LINCOLN COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2025



DESIGNED BY ALG LINC01VA	CK. DES. BY MLJ 01VATA01	DRAFTED BY SEM	BRIDGE ENGINEER
--------------------------------	--------------------------------	-------------------	-----------------

FOR BIDDING PURPOSES ONLY

SPECIFICATIONS

- Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.
- Construction Specifications: Standard Specifications for Roads and Bridges, 10-7-26 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at <https://dot.sd.gov/doing-business/contractors/standard-specifications>.

GENERAL NOTES (CAST-IN-PLACE BOX CULVERT)

- Design Live Load: HL-93 and construction load consisting of one 7' - 6" gauge axle with gross weight = 95,850 lbs. The construction load will not be applied until a minimum of 4 feet of fill has been placed over the box culvert. Other construction loads in excess of legal load must be submitted through proper channels to the Office of Bridge Design of analysis.
- The design of the barrel section is based on a minimum fill height of 2 feet and includes all subsequent fill heights up to and including the maximum fill height of 8 feet (F8).
- Design Material Strengths: Concrete f'c = 4,500 p.s.i.
Reinforcing Steel fy = 60,000 p.s.i.
- All concrete will be Class A45 Concrete, Box Culvert conforming to Section 460 of the Construction Specifications.
- All reinforcing steel will conform to ASTM A615 Grade 60.
- All lap splices will be contact lap splices unless noted otherwise.
- All exposed concrete corners and edges will be chamfered ³/₄-inch unless noted otherwise in the plans.
- Use 1-inch clear cover on all reinforcing steel EXCEPT as shown.
- The Contractor will imprint on the structure the date of construction as specified and detailed on Standard Plate No. 460.02.
- Care will be taken to establish Working Points (W.P.) as shown on the wings.
- Circled numbers in PLAN and ELEVATION views on the General Drawing are section I.D. Numbers (see SDDOT Materials Manual).
- Cost of Preformed Expansion Joint Filler used in apron construction will be incidental to the other contract items.
- It is anticipated the soils below the bottom of the proposed RCBC will consist of soft brown sandy clay at the inlet to black silt clay at the outlet.
- Groundwater was encountered in the borings at an elevation of 1416.5 feet during the subsurface investigation conducted in November 2024. Dewatering will be required during construction.

REINFORCEMENT FABRIC (MSE)

- A layer of Reinforcement Fabric (MSE) will be placed at the bottom of the undercut prior to backfilling with granular material.
- Reinforcement Fabric (MSE) will conform to Section 831. The Reinforcement Fabric (MSE) provided will be on the Approved Products List or will be certified by the supplier to meet this specification prior to installation.
- Reinforcement Fabric (MSE) will be paid for at the contract unit price per sq. yd. for Reinforcement Fabric (MSE). Payment will be full compensation for furnishing and installing the Reinforcement Fabric (MSE) only. Granular backfill materials will be paid for as part of the Box Culvert Undercut bid item.
- Place the Reinforcement Fabric (MSE) on as level and smooth of a surface as possible. Any protrusions that might damage the fabric will be removed prior to placing the fabric. All seams in the fabric will be stitched in accordance with the seaming procedure and as shown on the detail labeled "Seam Types." No equipment will be allowed on the fabric until the granular backfill material is in place. The fabric will be kept as taut as possible prior to backfilling. Granular backfill material will be dumped behind the leading edge of the fill and pushed into place with a loader or dozer.

FABRIC SEAMING PROCEDURE

- The sewn seams will consist of two parallel rows of stitching ("prayer" seam, Type SSa-2), or a J-seam (Type SSn-1), using a single row of stitching. The stitching will be a lock type stitch.
- If the Type SSa-2 seam is used, the two rows of stitching will be 1" apart with a tolerance of plus or minus ¹/₂" and will not cross, except for restitching. The minimum seam allowance, i.e., minimum distance from the fabric edge to the stitch line nearest to that edge, will be 1 ¹/₂".
- If the J-seam (Type SSn-1) is used, the minimum seam allowance will be 1".
- The seam, stitch type, and the equipment used to perform the stitching will be as recommended by the manufacturer of the fabric and approved by the Engineer. The seams will be sewn in such a manner that the seam can be readily inspected by the Engineer.
- The thread used will be high-strength polypropylene, polyester, or Kevlar thread. Nylon threads will not be allowed.

NOTES AND UNDERCUT DETAILS

FOR

5 - 10' X 5' BOX CULVERT

OVER DRAINAGE 7° 48' 26" RHF SKEW
STA. 1140 + 69.18 (SD HWY 11) SEC 17-T100N-R49W
STR. NO. 42-138-011 NH 0100(107)411
HL-93

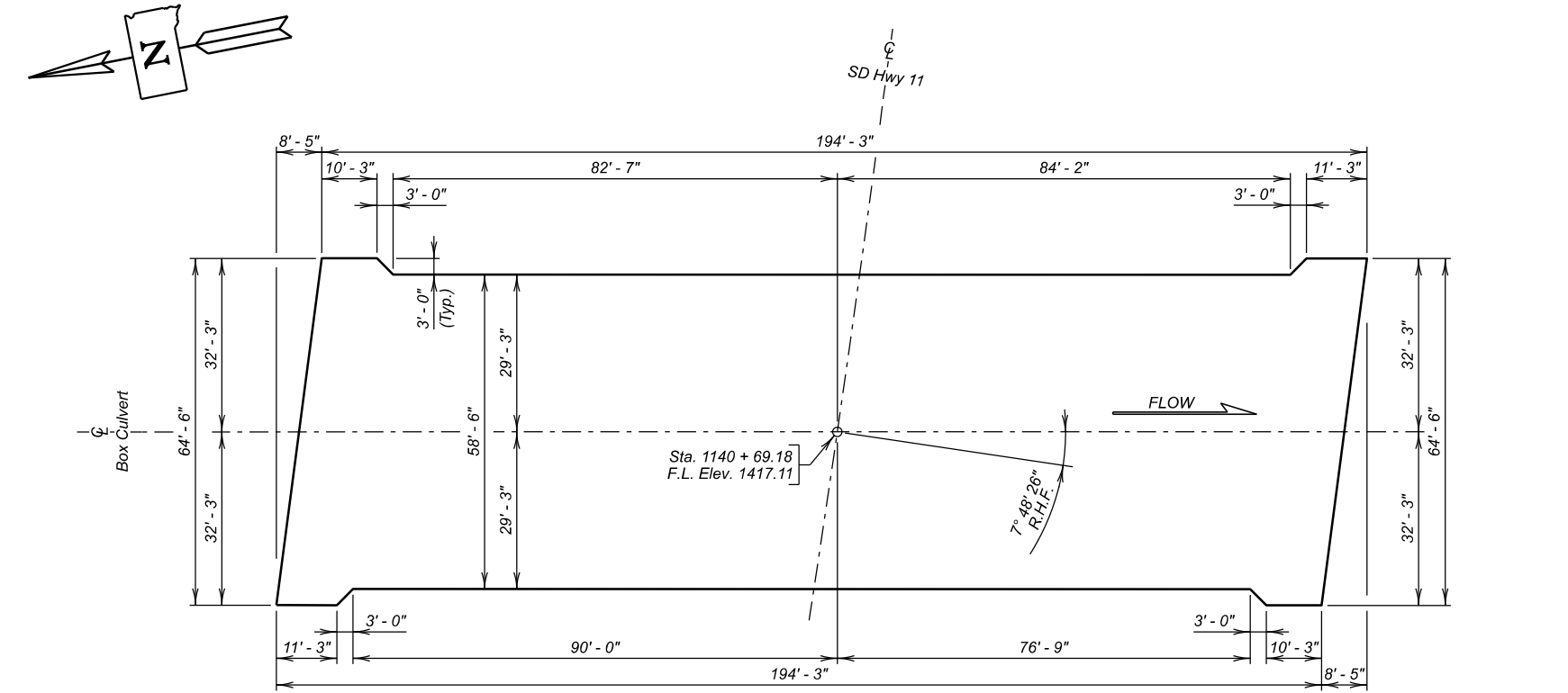
LINCOLN COUNTY

S. D. DEPT. OF TRANSPORTATION

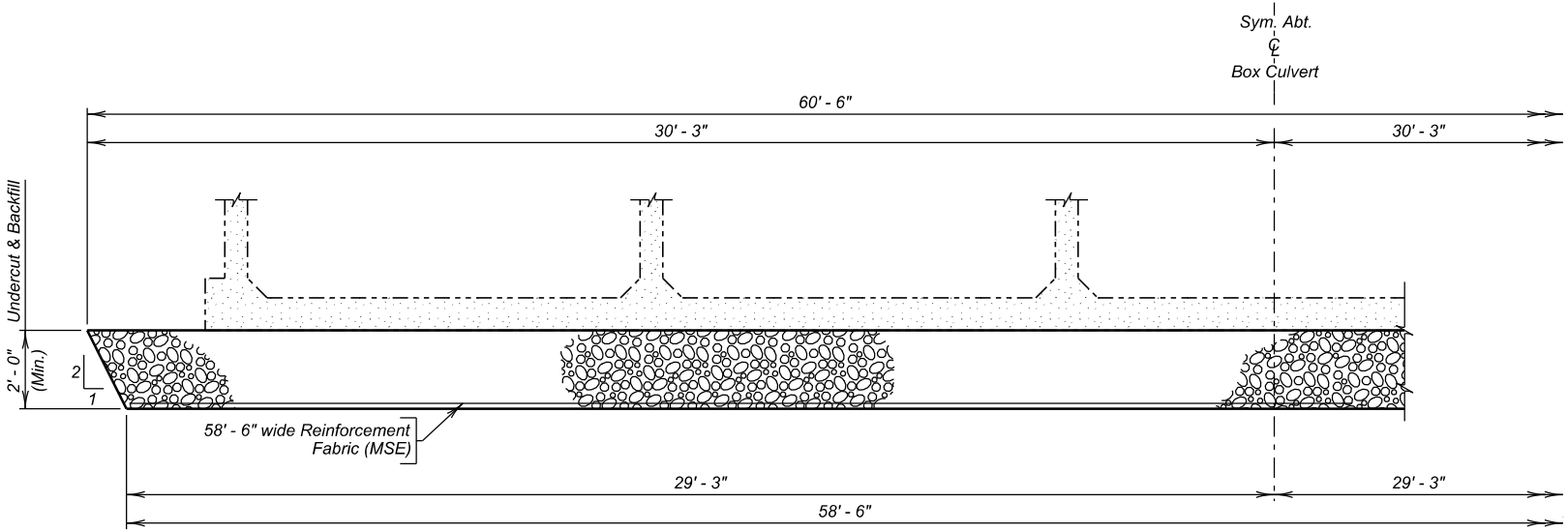
JUNE 2025

2 OF 9

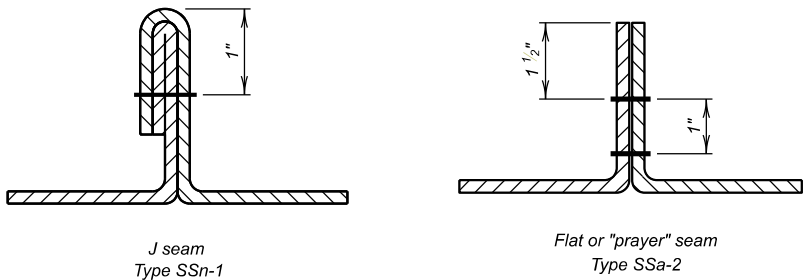
DESIGNED BY ALG LINC01VA	CK. DES. BY MLJ 01VATA02	DRAFTED BY SEM	BRIDGE ENGINEER
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UNDERCUT LAYOUT
(Bottom Dimensions)



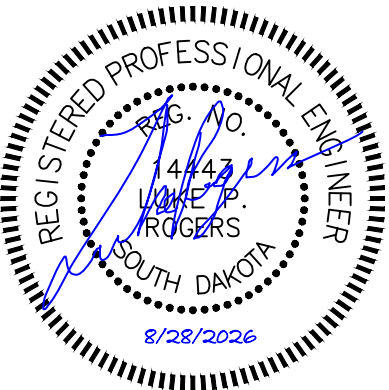
HALF TYPICAL SECTION
(For Limits of Undercut)



SEAM TYPES

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Box Culvert Undercut	Cu. Yd.	868
Reinforcement Fabric (MSE)	Sq. Yd.	1279

For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.



FOR BIDDING PURPOSES ONLY

REINFORCING SCHEDULE
(For One Inlet and One Outlet)

Mk.	No.	Size	Length	Type	Bending Details
a1	8	6	53' - 9"	Str.	
b1	8	6	53' - 3"	Str.	
c	8	5	4' - 6"	1A	
c1	16	5	7' - 6"	Str.	
c2	8	5	7' - 0"	19B	
d1	16	5	6' - 9"	19B	
e	108	4	7' - 0"	S12	
e1	40	4	10' - 0"	S12A	
f1	108	4	5' - 0"	S6A	
g0	24	5	5' - 0"	Str.	
g1	12	4	12' - 9"	Str.	
g2	8	4	8' - 0"	Str.	
h0	12	4	18' - 6"	17A	
k0	14	4	12' - 3"	17A	
p8	20	4	9' - 0"	Str.	
p9	20	6	7' - 0"	Str.	
p12	8	4	10' - 3"	Str.	
p13	8	4	11' - 6"	Str.	
p14	8	4	13' - 3"	Str.	
e2	104	4	7' - 6"	S12	
u1	104	4	6' - 0"	Str.	
u2	34	5	51' - 3"	Str.	

INLET AND OUTLET APRON

e2	104	4	7' - 6"	S12
u1	104	4	6' - 0"	Str.
u2	34	5	51' - 3"	Str.

NOTES:
All dimensions are out to out of bars.
See cutting diagram.
Bend in field as necessary to fit.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
1 - Inlet	13.4	1902	8
1 - Inlet Apron	9.3	1051	10
1 - Outlet	13.4	1902	8
1 - Outlet Apron	9.3	1051	10

LEGEND FOR PLACING RE-STEEL

O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall

INLET AND OUTLET DETAILS

FOR

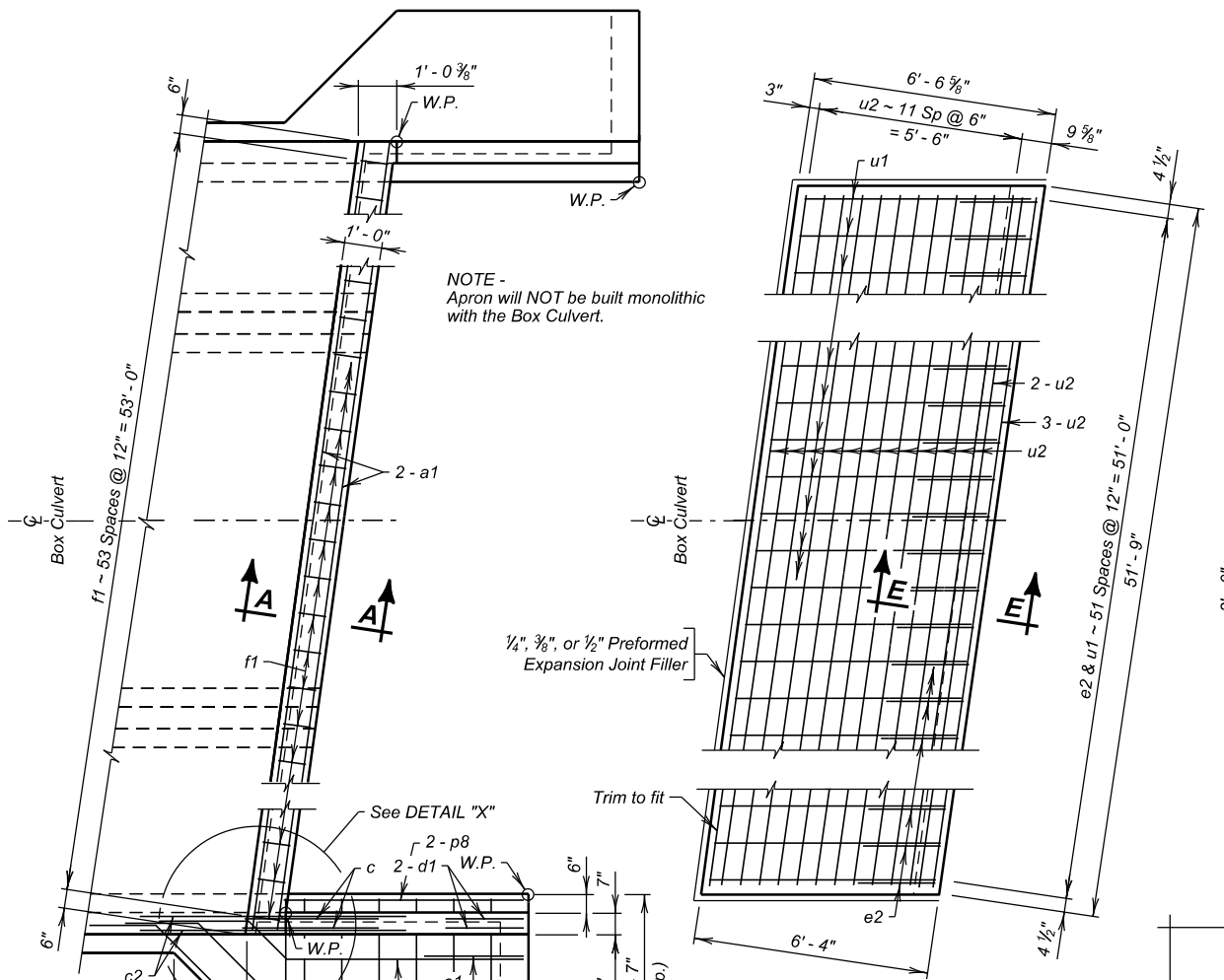
5 - 10' X 5' BOX CULVERT

OVER DRAINAGE 7° 48' 26" RHF SKEW
STA. 1140 + 69.18 (SD HWY 11) SEC 17-T100N-R49W
STR. NO. 42-138-011 NH 0100(107)411
HL-93

LINCOLN COUNTY

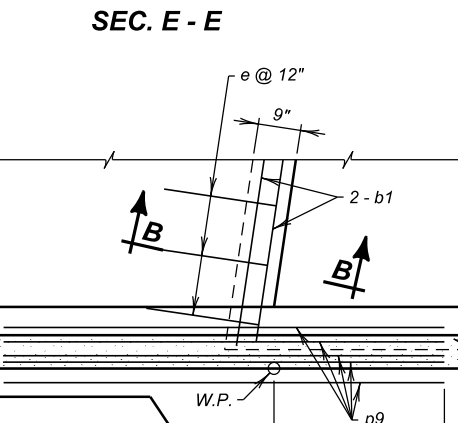
S. D. DEPT. OF TRANSPORTATION

JUNE 2025



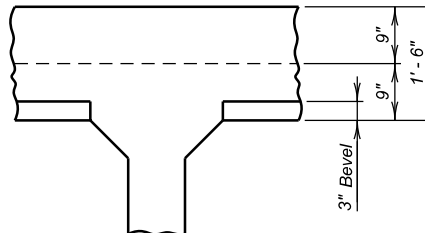
PLAN
(Outlet Apron shown, Inlet similar)

PLAN
(Outlet shown, Inlet similar)



SEC. E - E

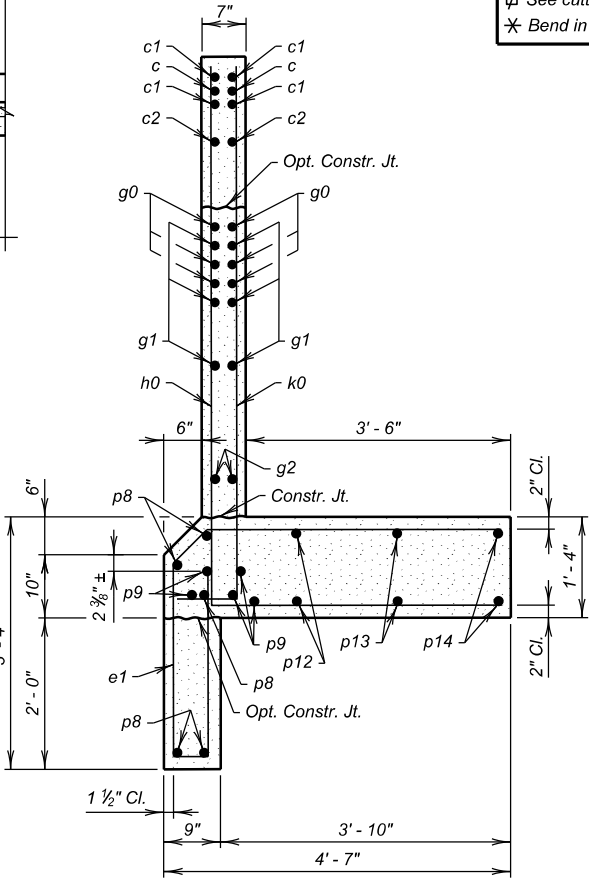
DETAIL "X"
(At Bottom Slab)



SEC. A - A
(At Top Slab of Inlet)

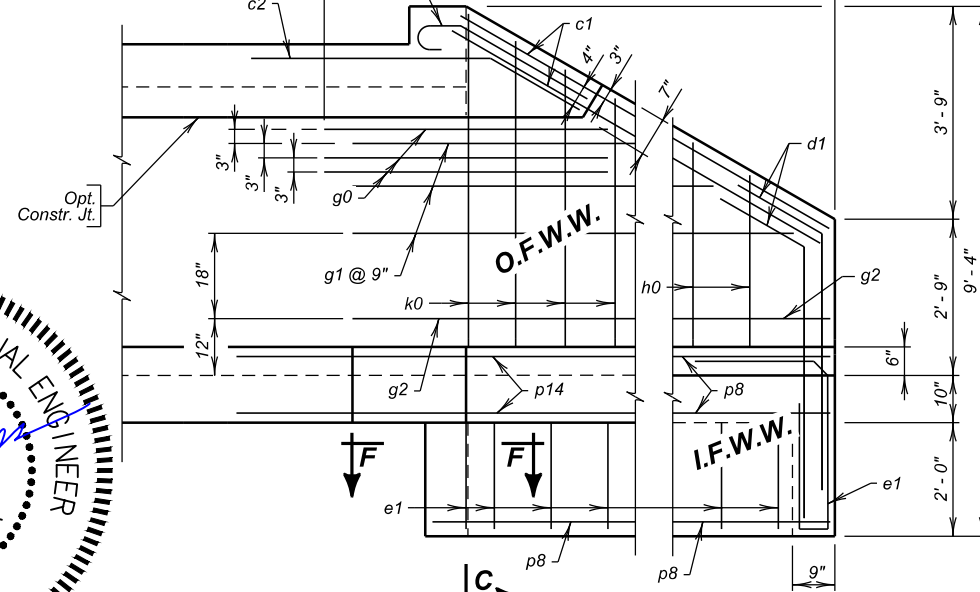
SEC. A - A
(At Top Slab of Outlet)

VIEW D - D
(At Interior Wall)

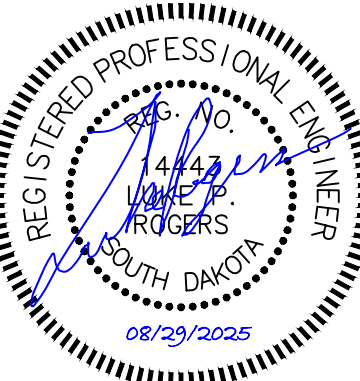


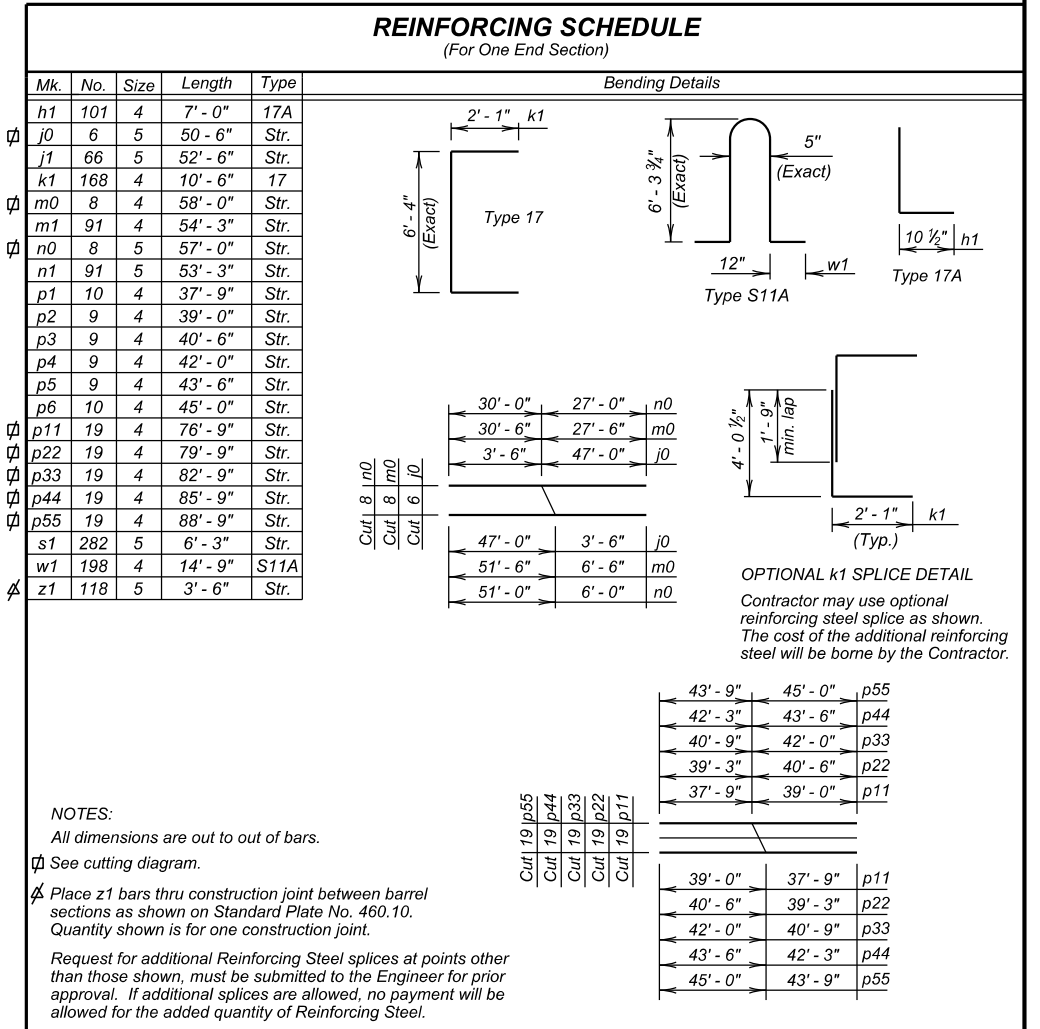
SEC. C - C

SECTION F - F



ELEVATION





LEGEND FOR PLACING RE-STEEL
<i>T. T. S. - Top of Top Slab</i>
<i>B. T. S. - Bottom of Top Slab</i>
<i>T. B. S. - Top of Bottom Slab</i>
<i>B. B. S. - Bottom of Bottom Slab</i>

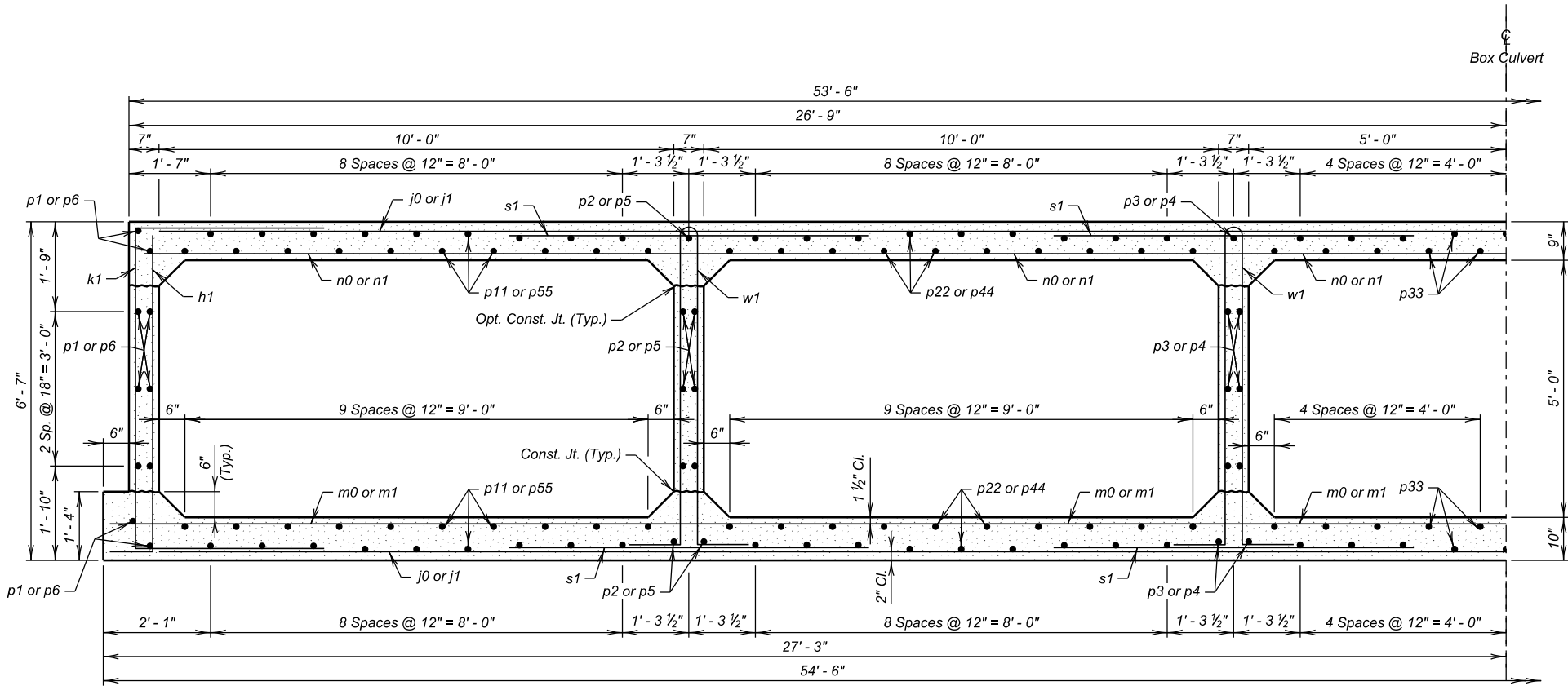
OVER DRAINAGE	7° 48' 26" RHF SKEW
STA. 1140 + 69.18 (SD HWY 11)	SEC 17-T100N-R49W
STR. NO. 42-138-011	NH 0100(107)411
	HL-93

DESIGNED BY ALG I INC01VA	CK. DES. BY MLJ 01VATA04	DRAFTED BY SEM	BRIDGE ENGINEER
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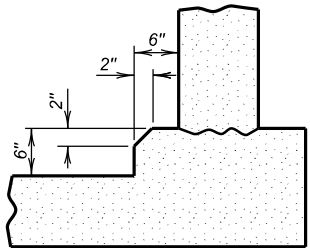
FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E46	E59



F8 BARREL HALF SECTION
(8' - 0" Maximum Fill)

LEGEND FOR PLACING RE-STEEL
O. F. O. W. - Outside Face of Outside Wall
I. F. O. W. - Inside Face of Outside Wall
M. W. - Middle Wall

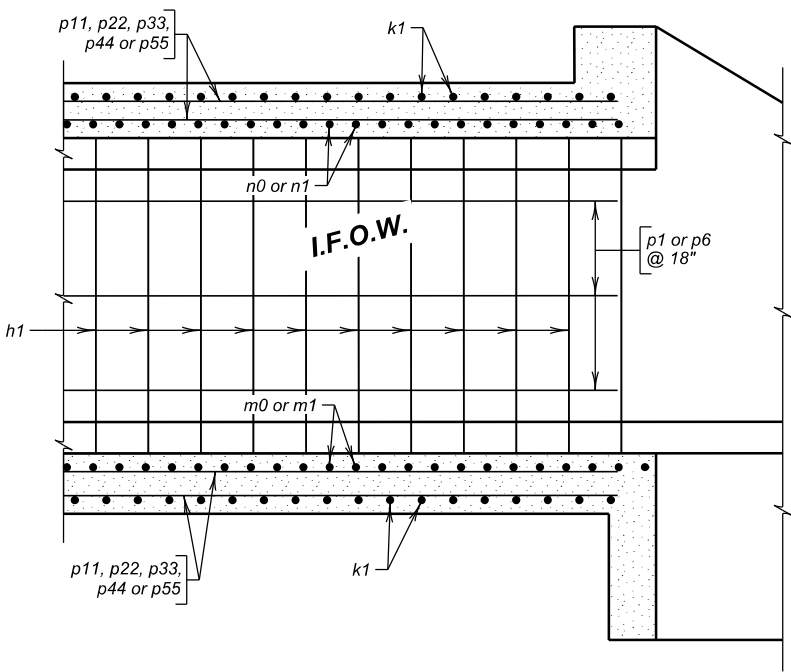
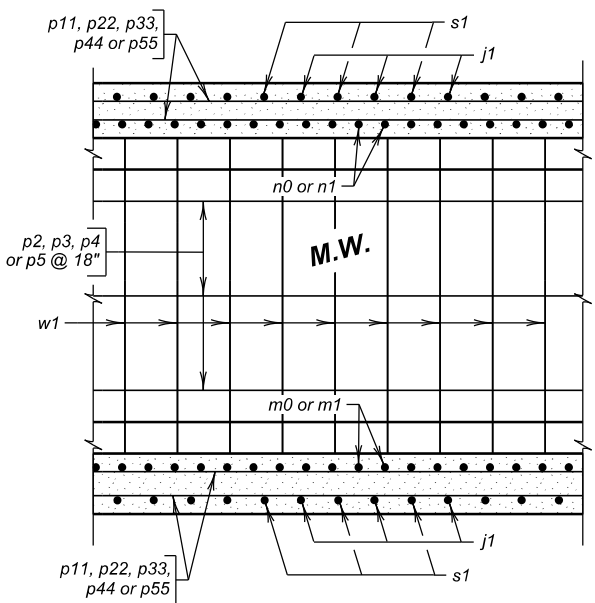
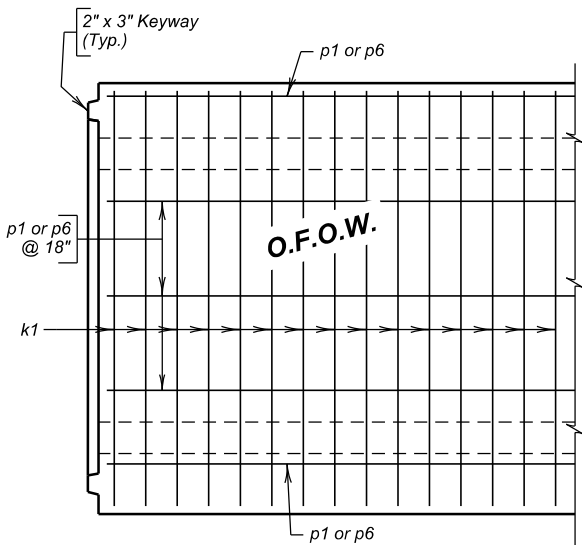


OPTIONAL FILLET DETAIL
(At Bottom Slab)

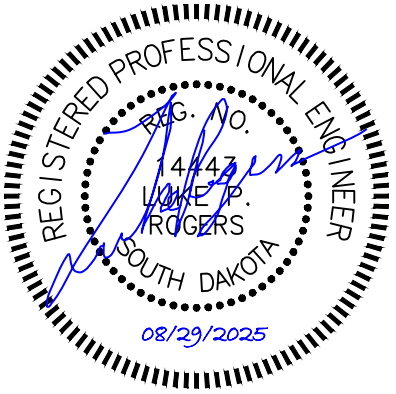
Note: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

OPTIONAL POUR - BOTTOM SLAB

The Bottom Slab may be poured continuously, at the option of the Contractor, with the use of a Preformed Metal keyway conforming to the keyway dimensions and location as shown on the plans. The keyway length will be full width of the bottom slab. Care will be taken to maintain proper alignment of the keyway during the pour sequence. All additional costs of this option will be borne by the Contractor.



ELEVATION



F8 BARREL END SECTION DETAILS (41' - 0") B
FOR

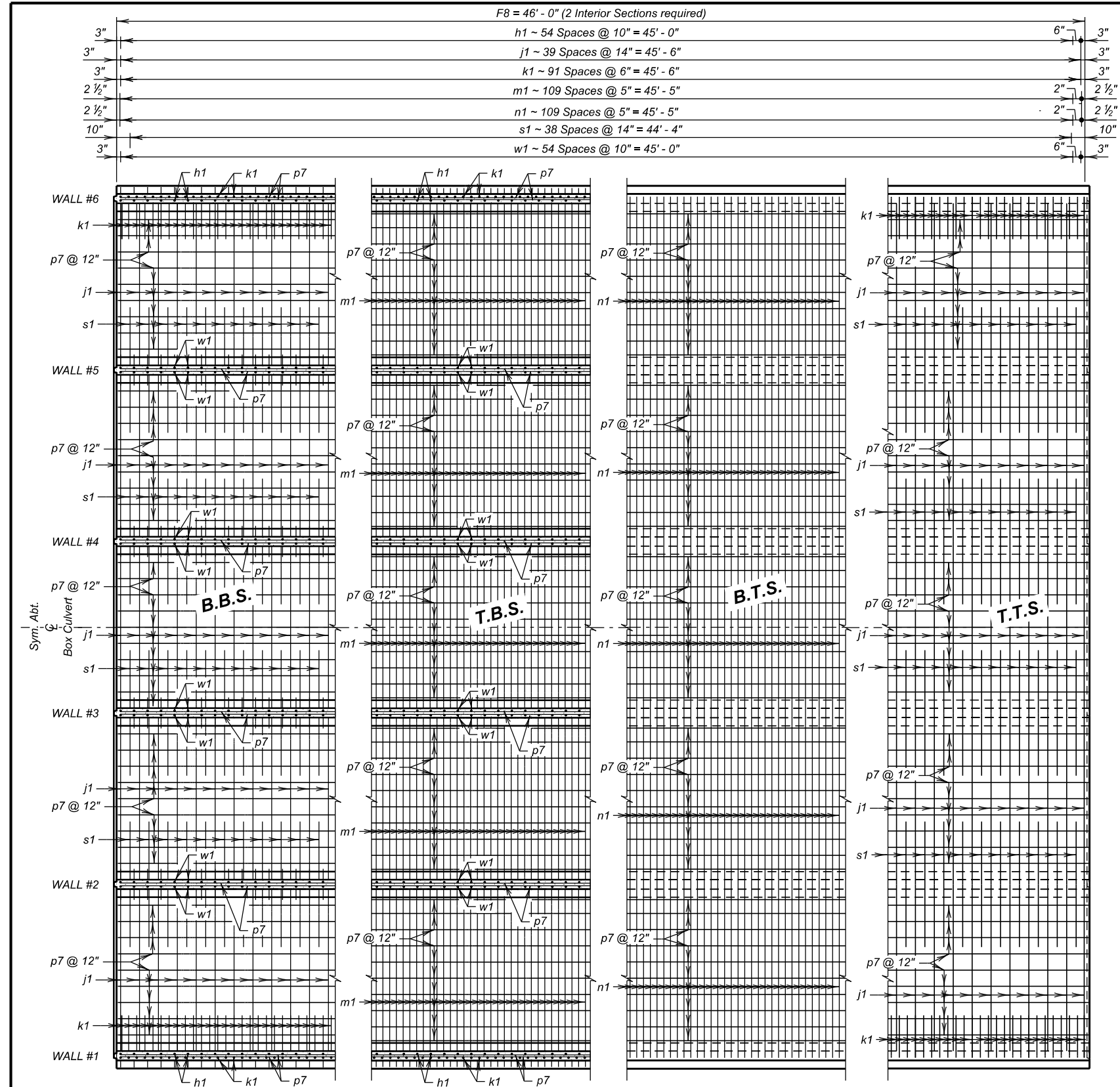
5 - 10' X 5' BOX CULVERT

OVER DRAINAGE 7° 48' 26" RHF SKEW
STA. 1140 + 69.18 (SD HWY 11) SEC 17-T100N-R49W
STR. NO. 42-138-011 NH 0100(107)411
HL-93

LINCOLN COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2025

5 OF 9

DESIGNED BY ALG LINC01VA	CK. DES. BY MLJ 01VATA05	DRAFTED BY SEM	BRIDGE ENGINEER
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PLAN

OPTIONAL FILLET DETAIL
(At Bottom Slab)

Note: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

OPTIONAL POUR - BOTTOM SLAB

The Bottom Slab may be poured continuously, at the option of the Contractor, with the use of a Preformed Metal keyway conforming to the keyway dimensions and location as shown on the plans. The keyway length will be full width of the bottom slab. Care will be taken to maintain proper alignment of the keyway during the pour sequence. All additional costs of this option will be borne by the Contractor.

LEGEND FOR PLACING RE-STEEL

T. T. S. - Top of Top Slab
B. T. S. - Bottom of Top Slab
T. B. S. - Top of Bottom Slab
B. B. S. - Bottom of Bottom Slab
O. F. O. W. - Outside Face of Outside Wall
I. F. O. W. - Inside Face of Outside Wall
M. W. - Middle Wall

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
2 - F8 Barrel Interior Sections @ 46' - 0"	361.3	56789	155

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E47	E59

REINFORCING SCHEDULE

(For One Interior Section)

Mk.	No.	Size	Length	Type
h1	112	4	7' - 0"	17A
j1	80	5	52' - 6"	Str.
k1	184	4	10' - 6"	17
m1	111	4	54' - 3"	Str.
n1	111	5	53' - 3"	Str.
p7	246	4	45' - 9"	Str.
s1	312	5	6' - 3"	Str.
w1	224	4	15' - 0"	S11A
z1	118	5	3' - 6"	Str.

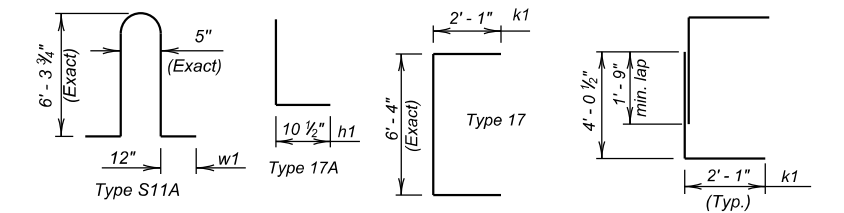
NOTES:

All dimensions are out to out of bars.

Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity shown is for one construction joint.

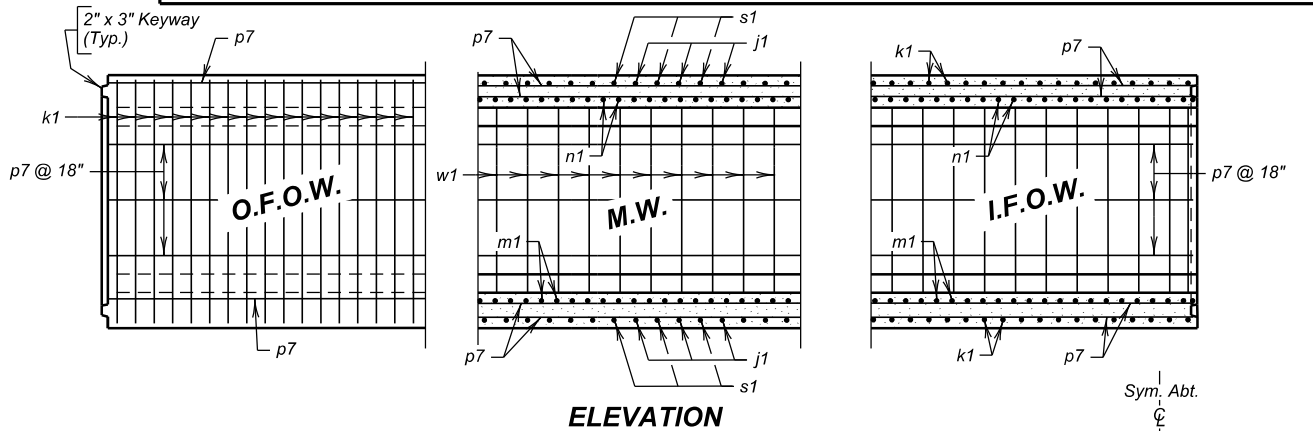
Request for additional Reinforcing Steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are allowed, no payment will be allowed for the added quantity of Reinforcing Steel.

Bending Details



OPTIONAL k1 SPLICE DETAIL

Contractor may use optional reinforcing steel splice as shown. The cost of the additional reinforcing steel will be borne by the Contractor.



F8 BARREL HALF SECTION

(8' - 0" Maximum Fill)

F8 BARREL INTERIOR SECTION DETAILS (46' - 0")

FOR

5 - 10' X 5' BOX CULVERT

OVER DRAINAGE

STA. 1140 + 69.18 (SD HWY 11)

STR. NO. 42-138-011

7° 48' 26" RHF SKEW

SEC 17-T100N-R49W

NH 0100(107)411

HL-93

LINCOLN COUNTY

S. D. DEPT. OF TRANSPORTATION

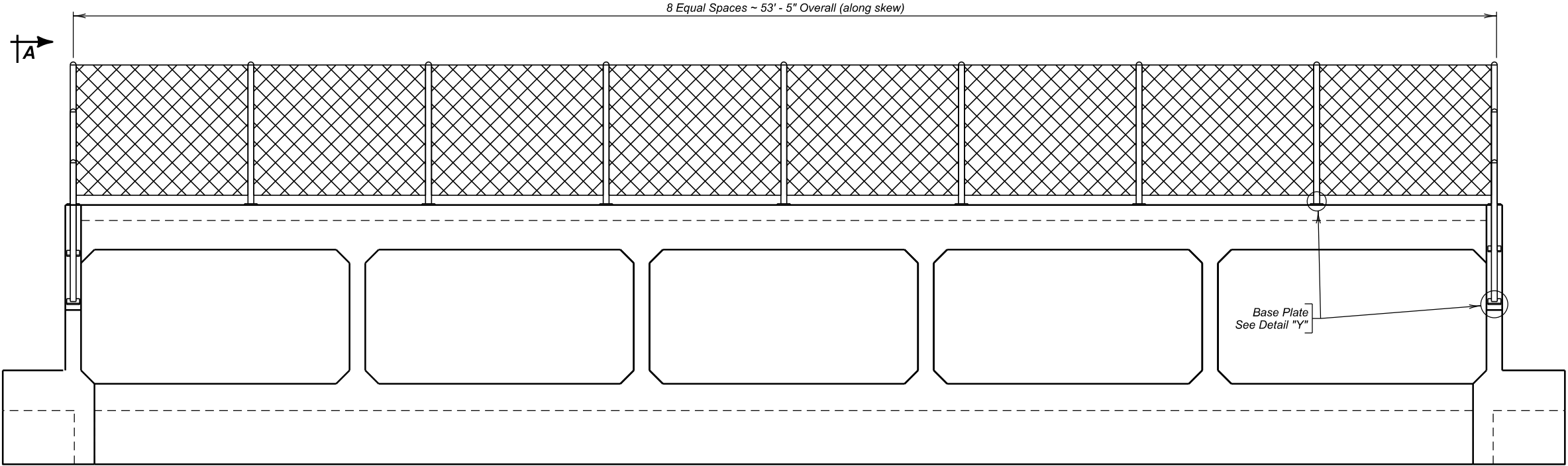
JUNE 2025

6 OF 9

DESIGNED BY ALG LINC01VA	CK. DES. BY MLJ 01VATA06	DRAFTED BY SEM	BRIDGE ENGINEER
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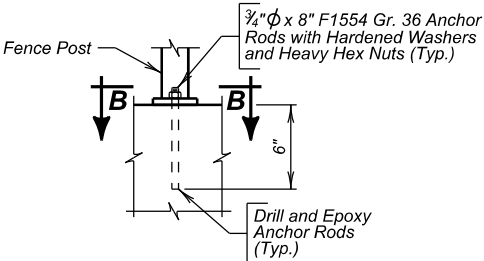
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S.D.	NH 0100(107)411	E48	E59



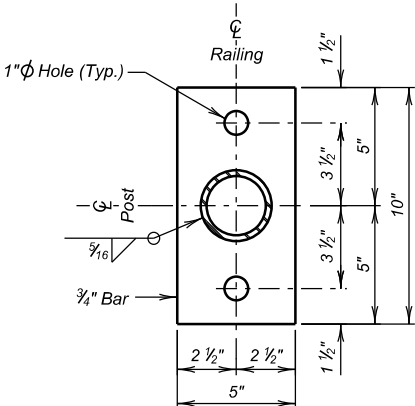
A

CHAIN LINK FENCE
(Outlet Shown, Inlet Similar)

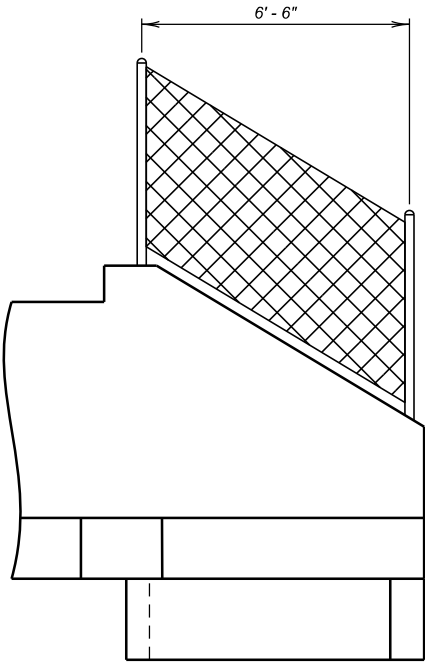
ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Special 4' Chain Link Fence	Ft.	134



DETAIL "Y"



SEC. B - B



VIEW A - A

CHAIN LINK FENCE

- Special 4' Chain Link Fence will be in accordance with the details on Standard Plate Number 621.01 EXCEPT the rail posts will be set on the top of the wing wall and parapet in accordance with these notes.
- All fence posts will be built vertical.
- Fence post base plates will conform to ASTM A709, Grade 36. Posts, rails, and baseplates will be galvanized in accordance with ASTM A123.
- Anchor rods will conform to ASTM F1554, Grade 36. Nuts and washers will be in accordance with ASTM A563 and ASTM F436, respectively. Hardware will be galvanized in accordance with ASTM F2329. The bolts will be heavy hex head "Structural" with heavy hex lock nuts and round washers.
- All anchor rod nuts will be tightened to a torque of 120 ft-lb (Approximate without the use of a calibrated torque wrench).
- The epoxy resin mixture will be of a type for bonding steel to hardened concrete and will conform to AASHTO M235 Type IV (Equivalent to ASTM C881, Type IV).
- The rail posts and fence fabric color will be an approved black Federal Standard 595C 27040. All steel railing will be galvanized in accordance with ASTM A123, then will be painted in accordance with Section 411 of the Construction Specifications. The galvanized steel railing will be cleaned in accordance with ASTM D6386 before painting.
- Drilled hole diameter will be within the specifications given by the epoxy resin manufacturer. Smooth bore core drilling is not allowed. The drilled holes will be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to epoxy injection.
- All costs for posts, rails, ties, painting, galvanizing, welding, epoxy, fence fabric, and that which is incidental to the fabrication of the Special 4' Chain Link Fence will be included in the contract unit price per foot for "Special 4' Chain Link Fence".

FENCE DETAILS

FOR

5 - 10' X 5' BOX CULVERT

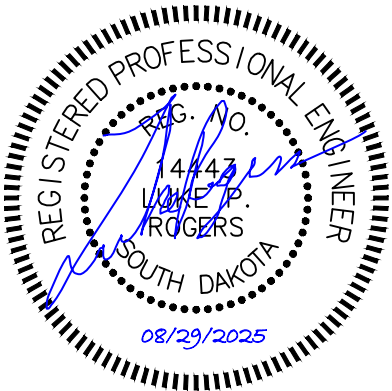
OVER DRAINAGE 7° 48' 26" RHF SKEW
STA. 1140 + 69.18 (SD HWY 11) SEC 17-T100N-R49W
STR. NO. 42-138-011 NH 0100(107)411
HL-93

LINCOLN COUNTY

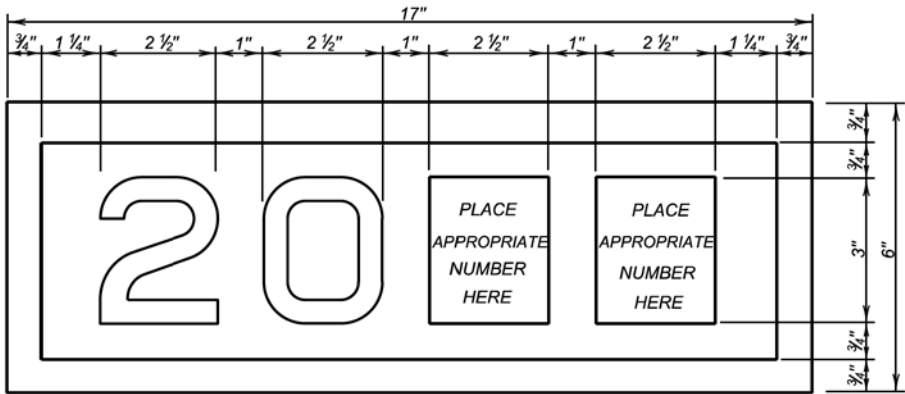
S. D. DEPT. OF TRANSPORTATION

JUNE 2025

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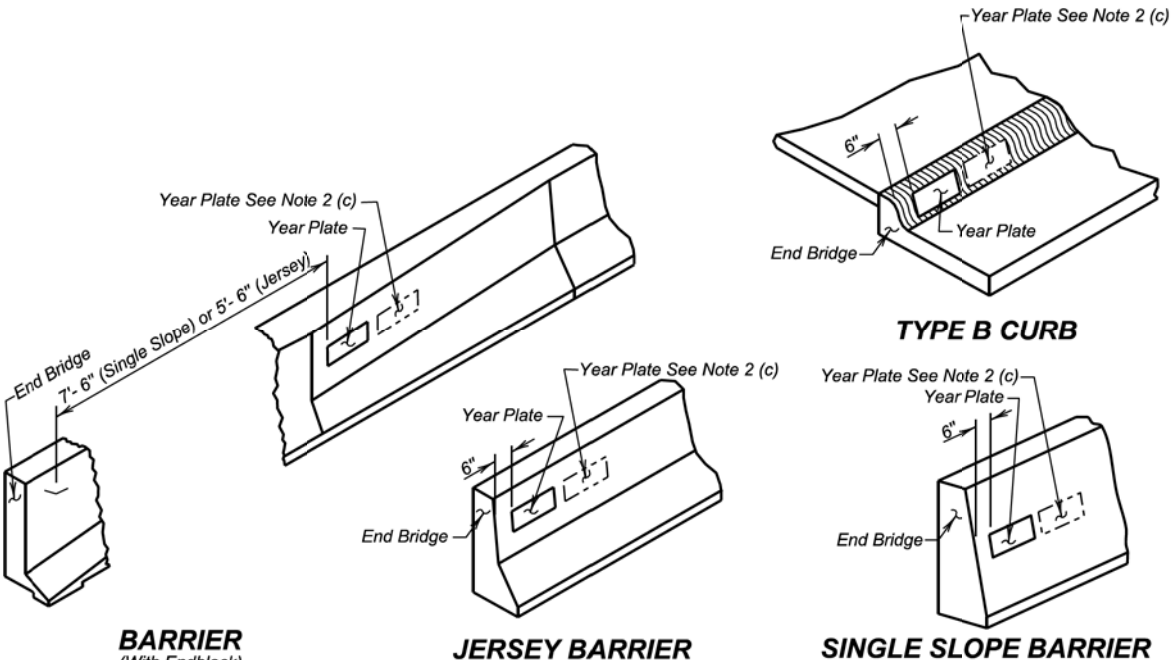
DESIGNED BY ALG LINC01VA	CK. DES. BY MLJ 01VATA07	DRAFTED BY SEM	BRIDGE ENGINEER
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YEAR PLATE DETAILS

GENERAL NOTES:

- Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.
- Year plates will be located on structure(s) as follows:
 - On cast-in-place box culverts the year plates will be four and one - half (4 1/2) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.
 - On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'-6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.
 - When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.
- There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.



TYPE B CURB

BARRIER
(With Endblock)

JERSEY BARRIER

SINGLE SLOPE BARRIER

January 22, 2021

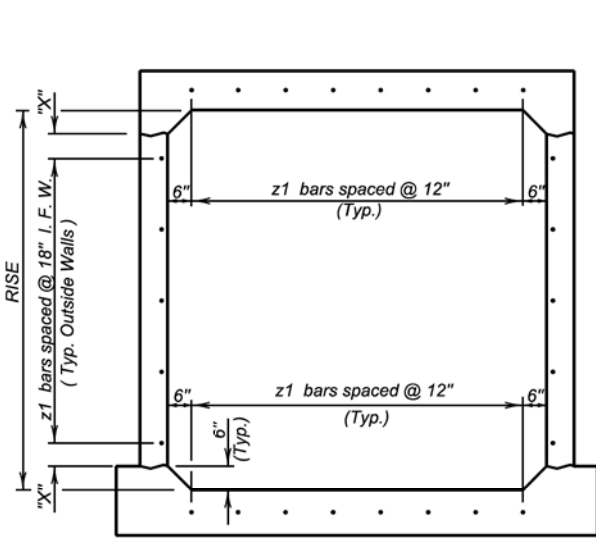
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YEAR PLATE DETAILS

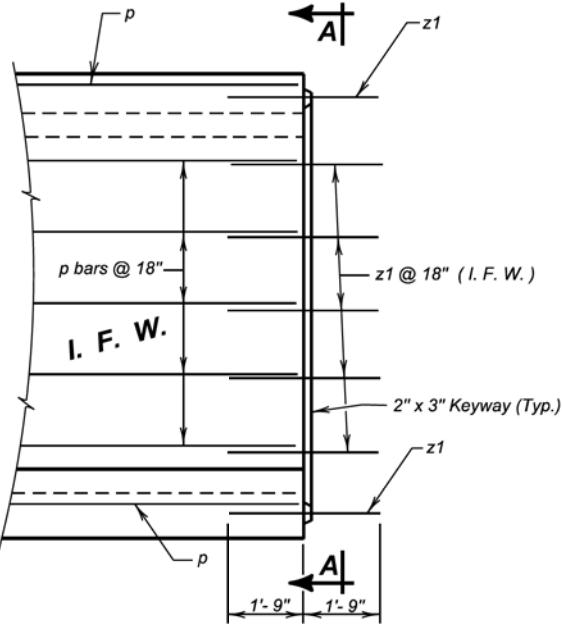
PLATE NUMBER
460.02

Sheet 1 Of 1

Published Date: 2027



TYPICAL SINGLE BARREL VIEW A - A

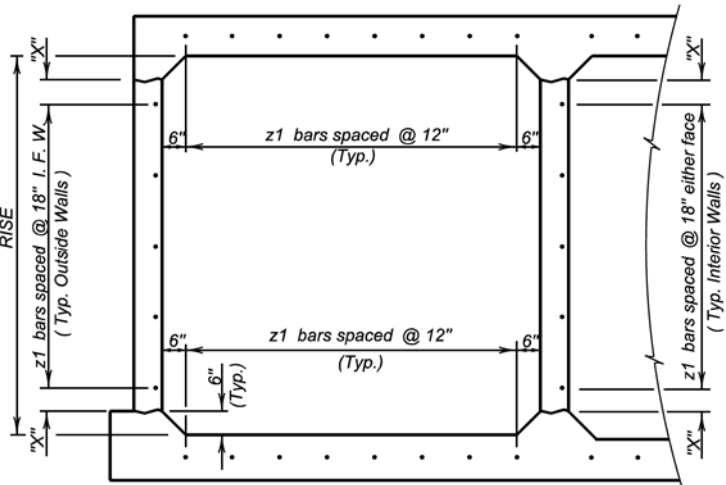


ELEVATION

LEGEND FOR PLACING RE-STEEL

I. F. W. - Inside Face Wall

RISE	"X"
3'-0"	3"
4'-0"	9"
5'-0"	6"
6'-0"	3"
7'-0"	9"
8'-0"	6"
9'-0"	3"
10'-0"	9"
11'-0"	6"
12'-0"	3"
13'-0"	9"
14'-0"	6"



TYPICAL MULTIPLE BARREL VIEW A - A

GENERAL NOTES:

- z1 bars will be placed in the middle of the 2" X 3" keyway in the top and bottom slabs. z1 bars will be lapped with the longitudinal p bars in the inside face of the wall for outside walls and in either face for interior walls. z1 bars are listed and included elsewhere in plans.
- Drainage Fabric Protection will be placed in accordance with Section 422, or Section 560, whichever is applicable.

S
D
D
O
T

BOX CULVERT BARREL TIE REINFORCEMENT

PLATE NUMBER
460.10

Sheet 1 of 1

Published Date: 2027

June 1, 2022

5 - 10' X 5' BOX CULVERT

STR. NO. 42-134-014

JUNE 2025

H = Height of Fabric
* Tension bands will be spaced 12" c. to c.
** Are not required for 3' through 5' height fences.
○ Tightening device such as shown on standard plate 621.03

COMPONENT	END, CORNER, and PULL POST		LINE POST			TOP and BRACE RAIL	
	Type of Fabrication	Round Pipe Nominal	Roll Formed Steel	Round Pipe Nominal	"C" Section	H Beam Steel	Round Pipe Nominal
Size	3.00" O. D.	3.5"x3.5"	2.50" O. D.	1.875"x1.625"	2.25"x1.70"	1.625" O. D.	1.625"x1.25"
Weight (lb. / Ft.)	5.79 or 4.64	5.14	3.65 or 3.12	2.34	3.43	2.27 or 1.84	1.35

GENERAL NOTES:

Specific details of the component parts of the fence will be approved by the Engineer. Commercially available items produced specifically for the use intended will be used wherever possible in the construction of the fence.

Height of the fabric will be as shown in the plans. Fabric is available at the following heights: 36", 42", 48", 60", 72", 84", 96", 108", 120", and 144". Fabric heights 60 inches and less will be knuckled at both selvages. Fabric heights 72 inches and higher will be knuckled at one selvage and twisted at the other selvage.

Chain link fabric will be 2-inch mesh, No. 9 gage galvanized wire securely fastened to tension wire, line post, rails, braces, and stretcher bars.

Fence may be constructed with either round pipe, "C" section, "H" beam, or roll formed steel components as shown in the table above. Line posts may be round pipe, "C" section, or "H" beam. The corner post and rails will be either round pipe or roll formed steel. The type of components used must be approved by the Engineer prior to installation.

Where fence must cross small bodies of water such as drainage areas or ponds that could freeze during the winter, use 11 gage hog rings. Provide only two ties per tension wire and top rail between line posts.

A suitable method of rail splicing will be used to allow for expansion and contraction while maintaining proper position of the top rail.

Fence grounding will be as shown on standard plate 620.11.

SDDOT

CHAIN LINK FENCE WITH TOP RAIL

Published Date: 2027

November 19, 2022

PLATE NUMBER
621.01

Sheet 1 of 1

TYPICAL POST TOPS
(Shown for example only)

BRACE AND TRUSS BANDS

TIGHTENING DEVICES

RAIL ENDS

BRACE BANDS TENSION BANDS
(Bands will be rectangular for "C" Section and "H" Beam Posts.)

SDDOT

HARDWARE FOR CHAIN LINK FENCE

Published Date: 2027

June 26, 2019

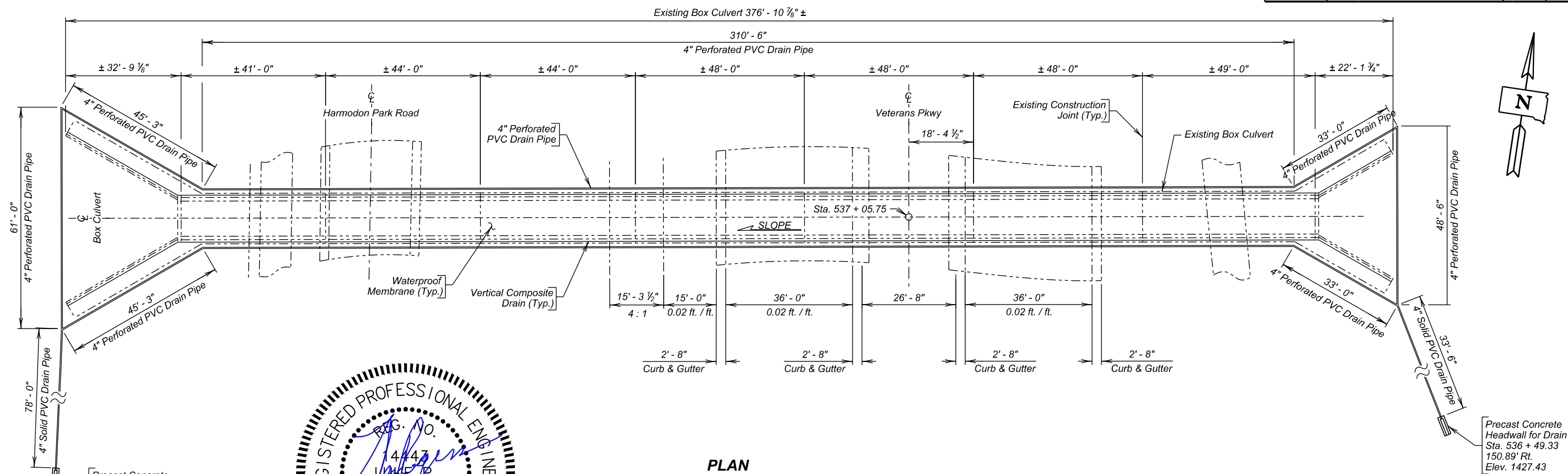
PLATE NUMBER
621.03

Sheet 1 of 1

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

FOR BIDDING PURPOSES ONLY

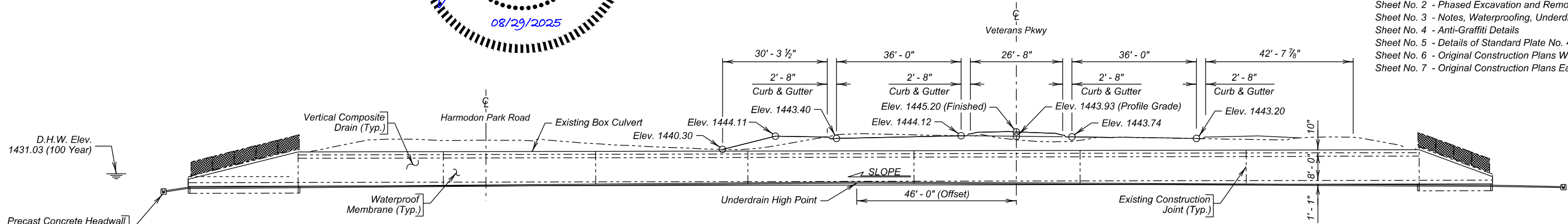
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E51	E59



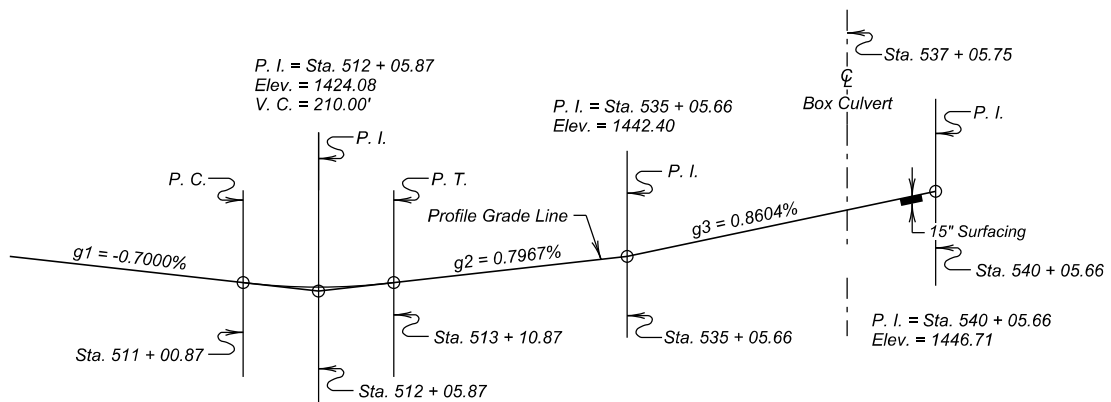
PLAN

INDEX OF CULVERT SHEETS-

- Sheet No. 1 - General Drawing and Quantities
- Sheet No. 2 - Phased Excavation and Removals
- Sheet No. 3 - Notes, Waterproofing, Underdrain, and Backfilling Details
- Sheet No. 4 - Anti-Graffiti Details
- Sheet No. 5 - Details of Standard Plate No. 430.50
- Sheet No. 6 - Original Construction Plans West
- Sheet No. 7 - Original Construction Plans East



ELEVATION



VERTICAL CURVE DATA

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Precast Concrete Headwall for Drain	Each	2
Anti-Graffiti Coating	Sq. Ft.	9703.0
Concrete Surface Preparation	Sq. Yd.	1078.3
4" Underdrain Pipe	Ft.	1008
Porous Backfill	Ton	1133.9

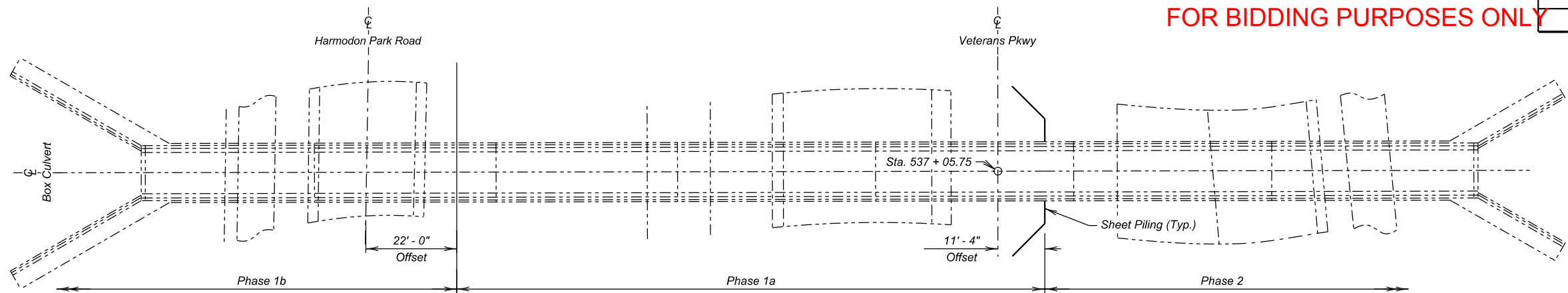
GENERAL DRAWING AND QUANTITIES
FOR
12' X 8' BOX CULVERT REPAIRS
OVER PEDESTRIAN/BIKE PATH 0° SKEW
STA. 537 + 05.57 SEC 36-T101N-R49W
STR. NO. 50-240-237 NH 0100(107)411
PCN 01VA HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2025



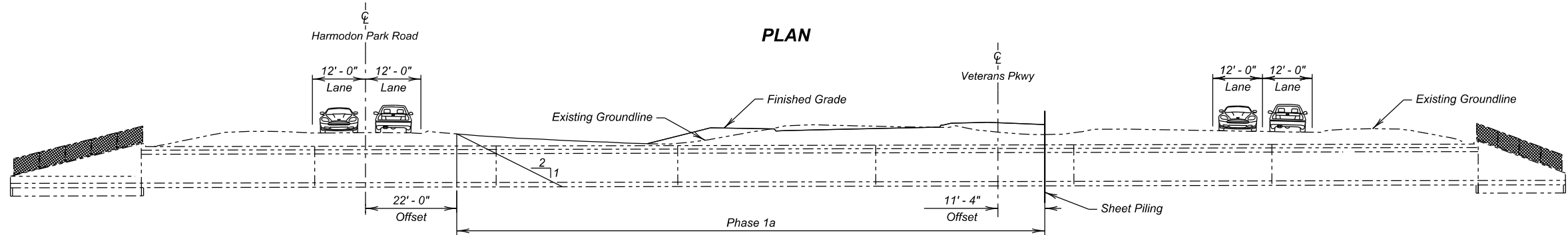
DESIGNED BY ALG LINC01VA	CK. DES. BY BMW 01VATA01	DRAFTED BY SEM	BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY

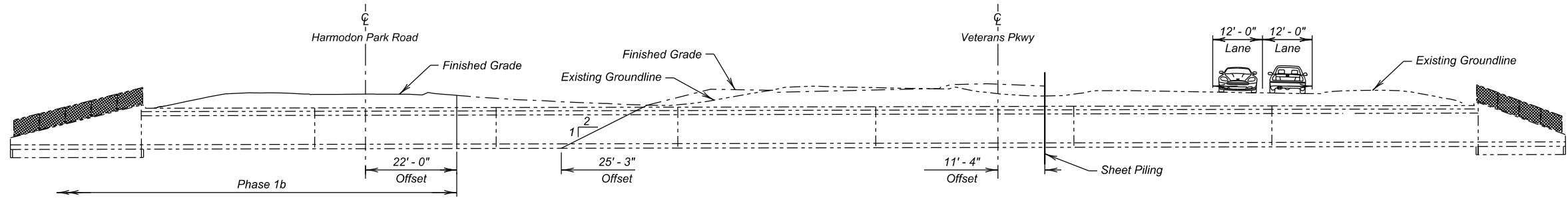
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E52	E59



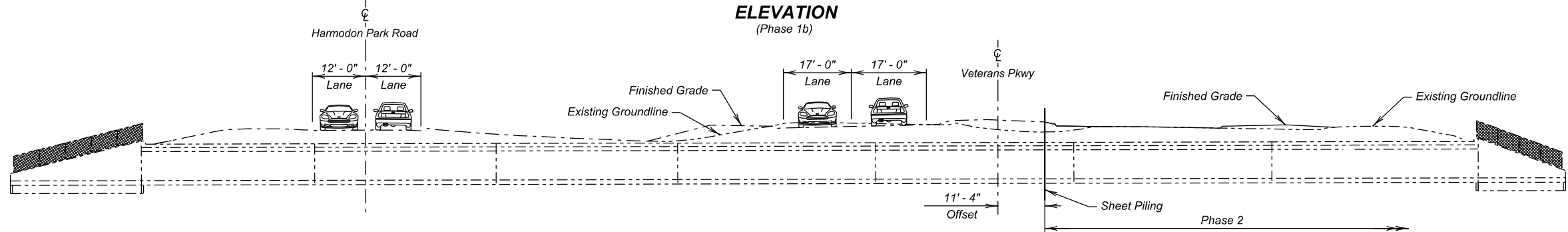
PLAN



ELEVATION
(Phase 1a)



ELEVATION
(Phase 1b)



ELEVATION
(Phase 2)

NOTES:

1. Proposed sheet piling is shown on this sheet as an option for the Contractor to accomplish the box culvert construction. The design and construction of the sheet piling will be the Contractor's responsibility.
2. The Contractor will submit to the Engineer a sheet piling plan and design stamped by a South Dakota Professional Engineer.
3. The Contractor may propose an alternative method to be approved by the Engineer for phasing the box culvert construction and the required means of retaining earth fill during phasing.

PHASED EXCAVATION AND REMOVALS
FOR

12' X 8' BOX CULVERT REPAIRS

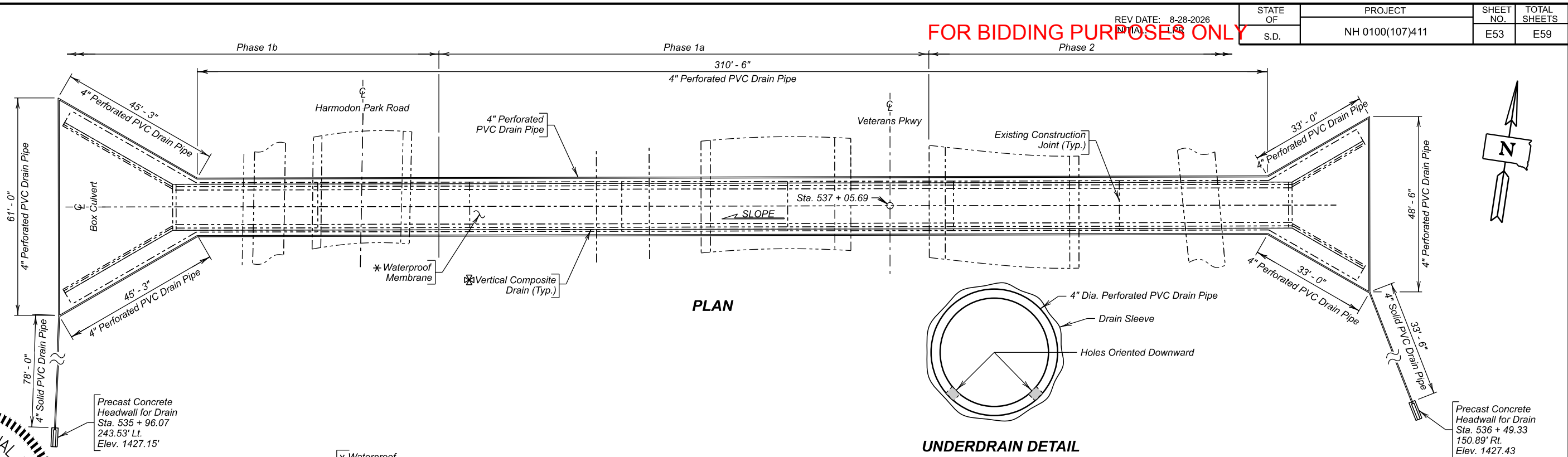
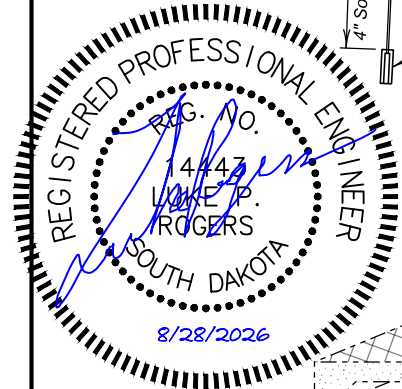
OVER PEDESTRIAN/BIKE PATH 0° SKEW
STA. 537 + 05.57 SEC 36-T101N-R49W
STR. NO. 50-240-237 NH 0100(107)411
HL-93

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2025

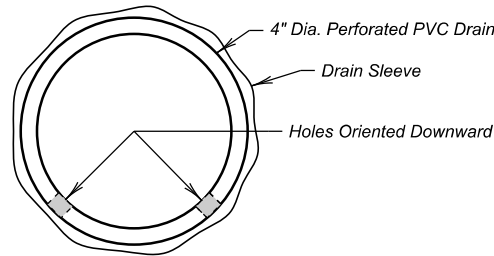
2 OF 7



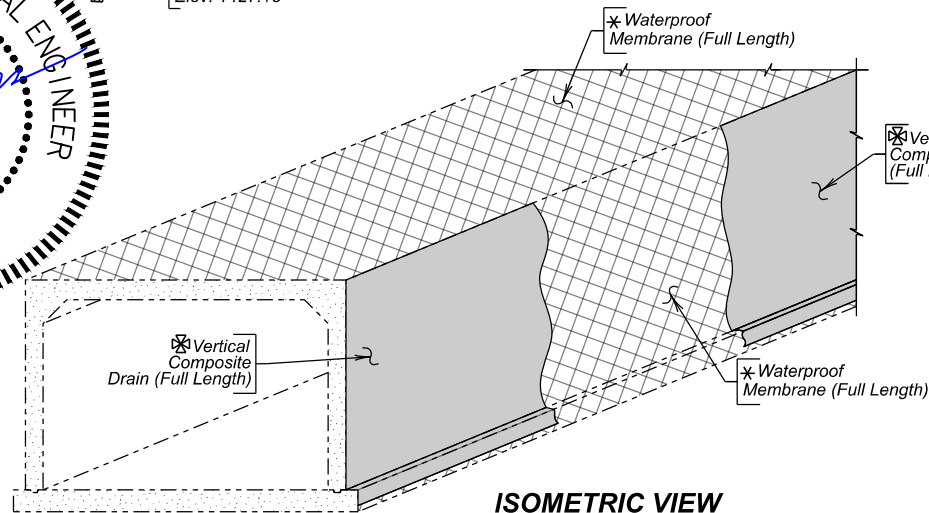
DESIGNED BY ALG LINC01VA	CK. DES. BY BMW 01VATA02	DRAFTED BY SEM	BRIDGE ENGINEER
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PLAN



UNDERDRAIN DETAIL



ISOMETRIC VIEW

SPECIFICATIONS

Construction Specifications: Standard Specifications for Roads and Bridges, 10-7-26 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at <https://dot.sd.gov/doing-business/contractors/standard-specifications>.

UNDERDRAIN

- The 4-inch diameter Perforated PVC Underdrain Pipe will be PS 46 Solvent Weld PVC Pipe conforming to ASTM F758 or SDR 35 Solvent Weld PVC Pipe conforming to ASTM D3034 with perforations in accordance with ASTM F758. The 4" Dia. PVC Outlet Pipe will be Schedule 40 PVC Pipe conforming to ASTM D1785 designated as PVC 1120, PVC 1220, or PVC 2120. Pipe sections will be connected using a PVC Solvent Cement conforming to ASTM D2564. The Drain Sleeve will conform to ASTM D6707.
- The Vertical Composite Drain will be one of the products from the approved products list for "Vertical Drains". The approved products list can be found at: <https://apps.sd.gov/HC60ApprovedProducts/Main.aspx>
- Care will be taken to ensure that the 4-inch diameter Perforated PVC Underdrain Pipe and the 4-inch diameter Solid PVC Outlet Pipe are not damaged during construction. Sufficient cover material will be placed over the pipes before compaction equipment is allowed over the underdrain system. Any damaged pipes will be replaced by the Contractor at no additional cost to the Department.
- Maintain positive drainage.
- All labor, tools, equipment, and any incidentals necessary for the installation of 4-inch diameter Perforated PVC Underdrain Pipe, Vertical Composite Drain, Waterproof Membrane, Drain Sleeve, 4-inch diameter Solid PVC Outlet Pipe, SDR Solvent Weld PVC Coupling, and PVC Cement will be incidental to the contract unit price per foot for 4" Underdrain Pipe.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY		
		PHASE 1a	PHASE 1b	PHASE 2
Precast Concrete Headwall for Drain	Each	0	1	1
4" Underdrain Pipe	Ft.	286	373	349
Porous Backfill	Ton	385.2	362	386.7

Phase 1a	Phase 1b	Phase 2
1. 286 ft.	295 ft.	315 ft. 4" Dia. Perforated PVC Underdrain Pipe.
2. 0 ft.	78 ft.	34 ft. 4" Dia. Solid PVC Underdrain Pipe.
3. 2,969 sq. ft.	2,027 sq. ft.	2,471 sq. ft. Vertical Composite Drain.
4. 4,870 sq. ft.	2,953 sq. ft.	3,779 sq. ft. Waterproof Membrane.

Items 1 through 4 are approximate quantities contained in the 4" Underdrain Pipe and are for information only.

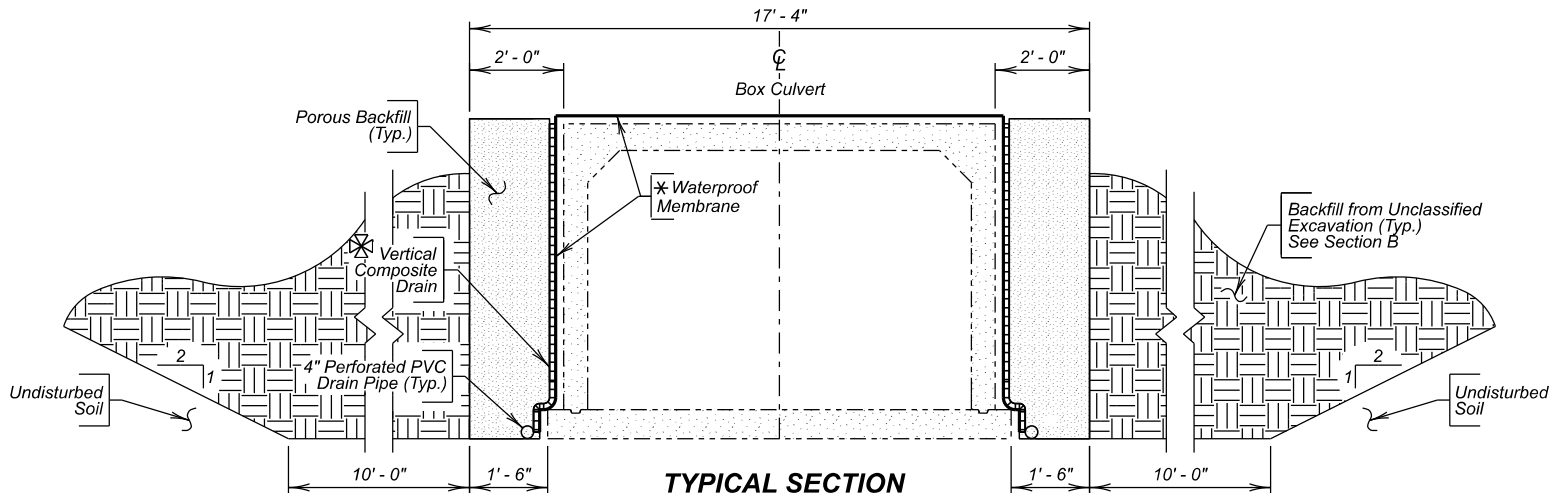
For estimating purposes only, a factor of 1.89 Ton / CuYd was used.

* Waterproof Membrane will be applied to the roof and entire length of box culvert plus wingwalls and is incidental to bid item 4" Underdrain Pipe. Waterproof Membrane will be self-adhering and will be on the SDDOT Approved Products List for "Abutment Backwall Coatings". Pressure wash and dry concrete surface prior to install.

Top 1 ft along back of wingwalls to be left uncovered, prior to backfill, for Anti-Graffiti Coating application (See Anti-Graffiti Details)

* Vertical Composite Drain to be applied to entire length of box culvert plus wingwalls.

Top 1 ft along back of wingwalls to be left uncovered, prior to backfill, for Anti-Graffiti Coating application (See Anti-Graffiti Details)



TYPICAL SECTION
(At Construction Joint)

NOTES, WATERPROOFING, UNDERDRAIN, AND BACKFILLING DETAILS FOR

12' X 8' BOX CULVERT REPAIRS

OVER PEDESTRIAN/BIKE PATH 0° SKEW
STA. 537 + 05.57 SEC 36-T101N-R49W
STR. NO. 50-240-237 NH 0100(107)411
HL-93

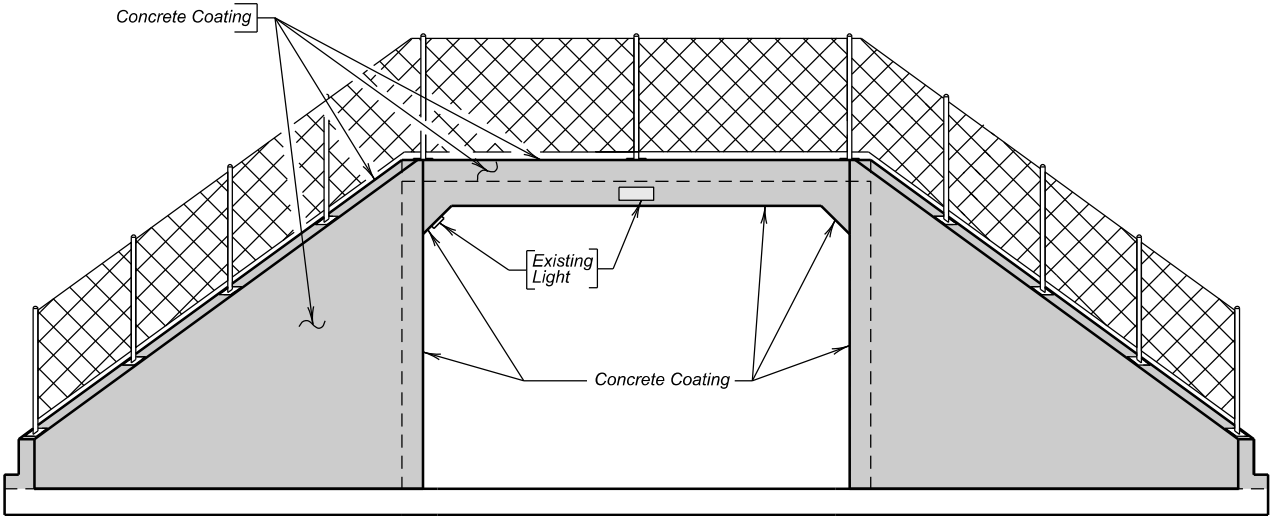
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2025

3 OF 7

DESIGNED BY ALG LINC01VA	CK. DES. BY BMW 01VATA03	DRAFTED BY SEM	BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E54	E59



ELEVATION
(Inlet Shown, Outlet Similar)

CONCRETE COATING

- The existing concrete coating is failing and will be prepped for recoating.
- Use one of the following systems, or an Engineer approved equal:

TK-Products:
Base Coat 1st Coat: TK-Tri-Sheen Pigmented Stain 5272 applied at 250 to 350 SF/Gal.
Base Coat 2nd Coat: TK-Tri-Sheen Pigmented Stain 5272 applied at 250 to 350 SF/Gal.
Topcoat Prime: TK-Anti-Graffiti Primer 1450 clear applied at 225 to 335 SF/Gal.
Topcoat Finish: TK-PERMACLEAN VOC 1496 clear applied at 350 to 450 SF/Gal (matte finish).

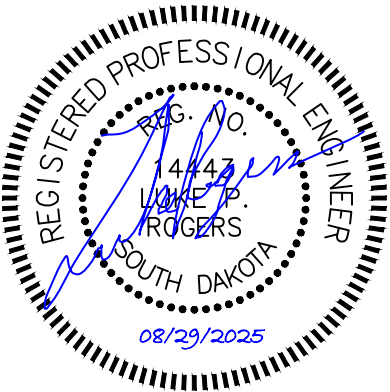
Tnemec:
Base Coat 1st Coat: Tnemec Series 151-1051 Elasto-Grip FC applied at 180 to 400 SF/Gal.
Base Coat 2nd Coat: Tnemec Series 156 Enviro-Crete applied at 102 to 204 SF/Gal.
Topcoat Finish: Tex-Cote (Tnemec) Graffiti Gard S clear applied at 75 to 125 SF/Gal (satin to semi-gloss finish).

- Concrete Coating is to be applied to the front, top and top one foot of the back of the parapet and wing walls and the walls, fillets and ceiling of the barrel as shown above.
- All costs in furnishing and applying the Concrete Coating will be included in the contract unit price per square foot for Anti-Graffiti Coating.

CONCRETE SURFACE PREPARATION

The surfaces to receive Anti-Graffiti Coating will be abrasive blast cleaned to break the surface film, to remove all laitance and to provide a roughened surface for adhesion of the new coating. Pressure washing is not an acceptable method of surface preparation on these surfaces. After abrasive blasting, remove and collect all dust and debris from surfaces to be coated by Anti-Graffiti Coating. Walking surfaces will be clean of debris and loose material prior to project completion.

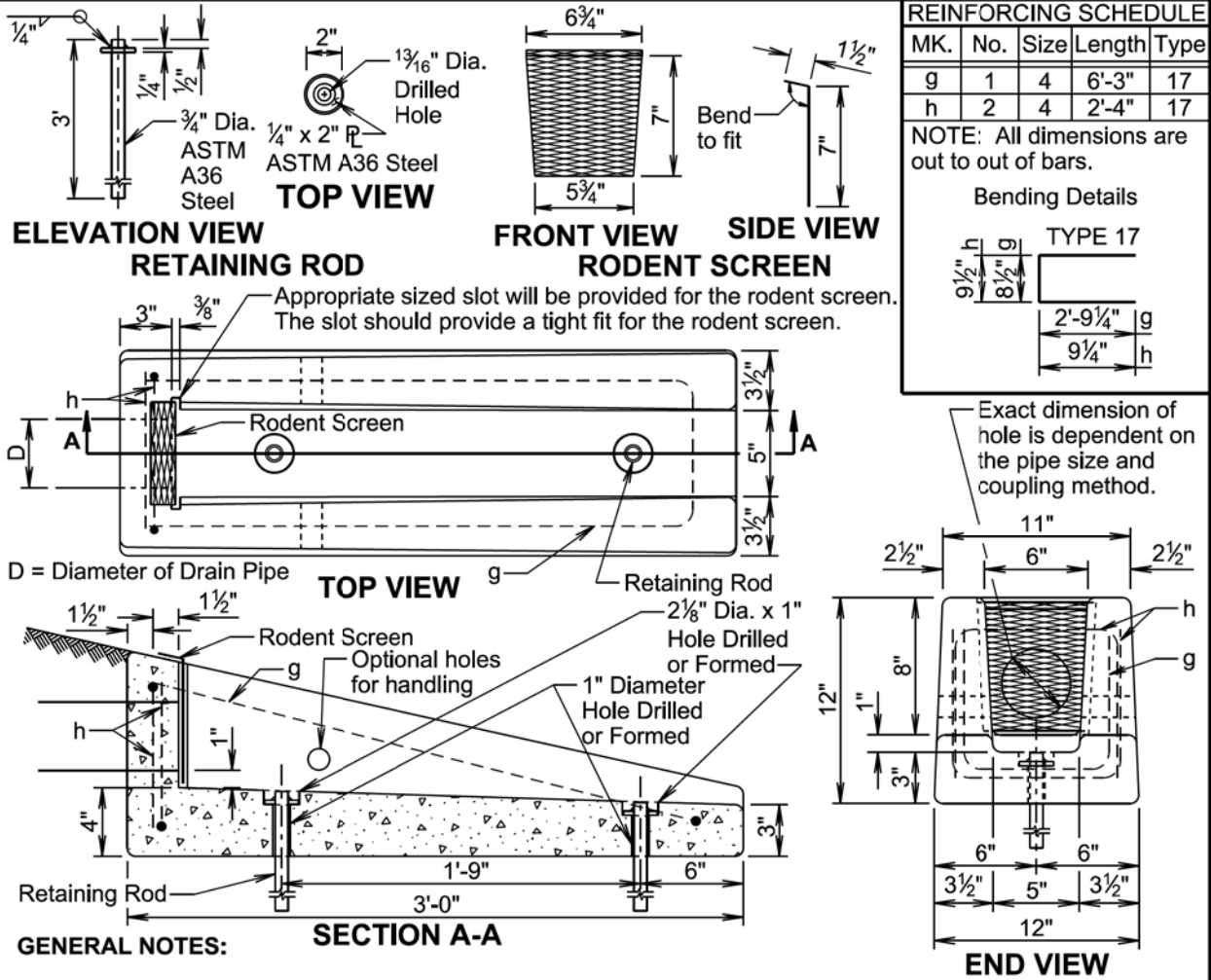
ESTIMATED QUANTITIES				
ITEM	UNIT	QUANTITY		
		PHASE 1a	PHASE 1b	PHASE 2
Anti-Graffiti Coating	Sq. Ft.	3827	2650	3226
Concrete Surface Preparation	Sq. Yd.	425.3	294.5	358.5



ANTI-GRAFFITI DETAILS
FOR
12' X 8' BOX CULVERT REPAIRS
OVER PEDESTRIAN/BIKE PATH 0° SKEW
STA. 537 + 05.57 SEC 36-T101N-R49W
STR. NO. 50-240-237 NH 0100(107)411
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2025 4 OF 7

DESIGNED BY ALG LINC01VA	CK. DES. BY BMW 01VATA04	DRAFTED BY SEM	BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E55	E59



GENERAL NOTES:

The concrete will be Class M6. The concrete will conform to the requirements of Section 462 of the Specifications. It is estimated that each unit weighs approximately 210 pounds.

All reinforcing steel will conform to ASTM A615, Grade 60 and will be epoxy coated. The reinforcing steel will be securely retained to prevent displacement during placement of concrete. It is estimated that 7.3 pounds of reinforcing steel is required for each unit.

The pipe will be placed in the concrete headwall with the pipe end flush with the concrete surface adjacent to the rodent screen.

The rodent screen will be galvanized 13 Ga. steel with a diamond shaped flattened mesh pattern. The size will be 1/2". The size refers to the measurement across the smallest diamond shaped opening measured from the centers of the wires.

The retaining rod will be galvanized in accordance with ASTM A123 after all shop welding has been completed.

The drawing indicates using 1/2" fillets; however, 3/4" chamfers may be substituted for the 1/2" fillets.

All costs for furnishing and installing the concrete headwall including equipment, labor, and materials including concrete, reinforcing steel, retaining rods, and rodent screen will be incidental to the contract unit price per each for "Precast Concrete Headwall for Drain".

November 19, 2021

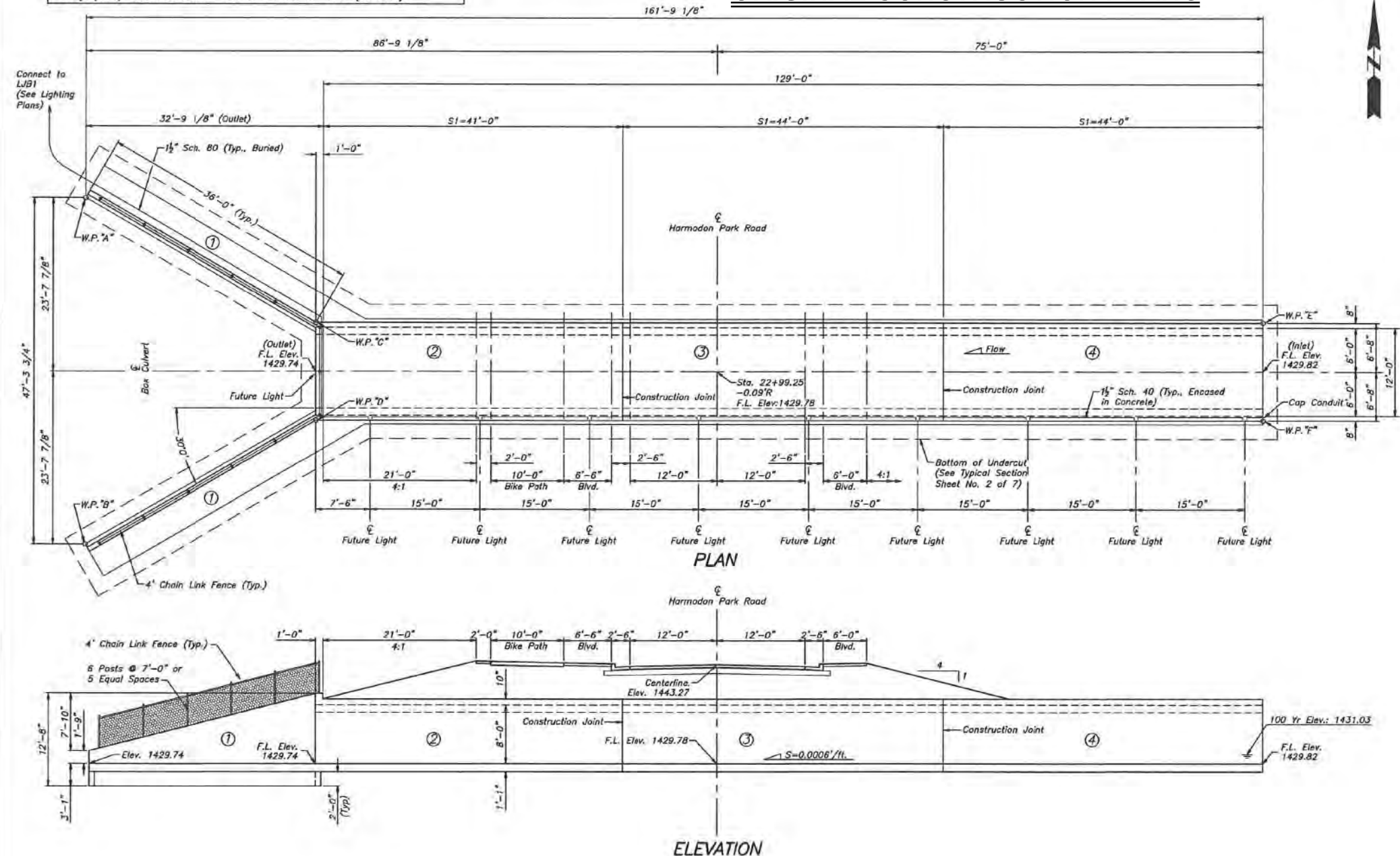
Published Date: 2027	S D O T	PRECAST CONCRETE HEADWALL FOR DRAIN	PLATE NUMBER
			430.50
			Sheet 1 of 1

FOR BIDDING PURPOSES ONLY

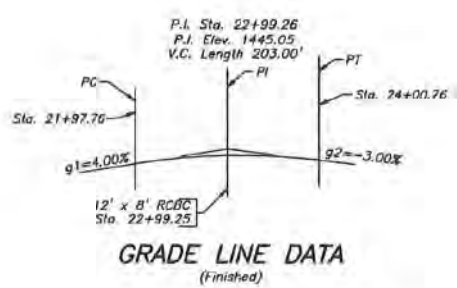
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E56	E59

The Elevations Shown in these Plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

ORIGINAL CONSTRUCTION PLANS



W.P.	STATION	OFFSET
A	23+21.56	87.03' LI
B	22+72.64	86.17' LI
C	23+05.07	55.01' LI
D	22+91.74	54.80' LI
E	23+07.10	74.97' RI
F	22+93.77	75.18' RI



-X028- INDEX OF CULVERT SHEETS-

- Sheet No. 1 - General Drawing and Quantities
- Sheet No. 2 - Notes and Undercut Details
- Sheet No. 3 - Outlet Details
- Sheet No. 4 - Inlet Details
- Sheet No. 5 - Barrel Section Details
- Sheet No. 6 - Barrel Section Details
- Sheet No. 7 - Standard Details

ESTIMATED QUANTITIES			
ITEM	UNIT	QUANTITY	
Class A45 Concrete Box Culvert	CuYd	214.8	
Reinforcing Steel	Lb	32,436	
Structure Excavation, Box Culvert	CuYd	114.2	
Box Culvert Undercut	CuYd	526	
Mill-Grating Coating	Sq.Ft.	4,011	
4" Chain Link Fence W/Top Rail	Lt	85	

For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.

Q _d	34.2	cfs
A _d	13.2	sq.ft.
V _d	2.6	fps
Q _p	34.2	cfs
Q ₁₀₀	34.2	cfs
V _{max}	2.6	fps

HYDRAULIC DATA

- Q_d = Design discharge for the proposed culvert based on 100 year frequency. El. 1431.03
- Q_{OTR} = Overtopping discharge and frequency ≥100 yr. recurrence interval. El. NA
- Q_p = Designated peak discharge for the basin approaching proposed project based on 100 year frequency.
- Q₁₀₀ = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 1431.03
- V_{max} = Maximum computed velocity for the proposed culvert based on 100 year frequency.



GENERAL DRAWING AND QUANTITIES

FOR
12' x 8' PEDESTRIAN BOX CULVERT (C.I.P.)
STA. 22+99.25 0° SKEW
UNDER HARMODON PARK ACCESS RD. SEC. 36-T101N-R49W
STR. NO. HL-93

MINNEHAHA COUNTY
CITY OF SIOUX FALLS
JANUARY 2011



12' X 8' BOX CULVERT REPAIRS
STR. NO. 50-240-237
JUNE 2025

SCHOOL/PARK SITE COORDINATION:
HARMODON PARK ENTRANCE RELOCATION
57TH STREET TO HARMODON PARK
SIOUX FALLS, SOUTH DAKOTA

GENERAL DRAWING
DESIGNED BY: WADE A. HARGREAVES
CHECKED BY: JEFFREY L. STINEBAUGH
DATE: 3/27/2011
BY: JLS
REVISIONS:

CITY OF SIOUX FALLS
PUBLIC WORKS
Providing a Better Quality of Life for You!

SHEET NO.
S-10

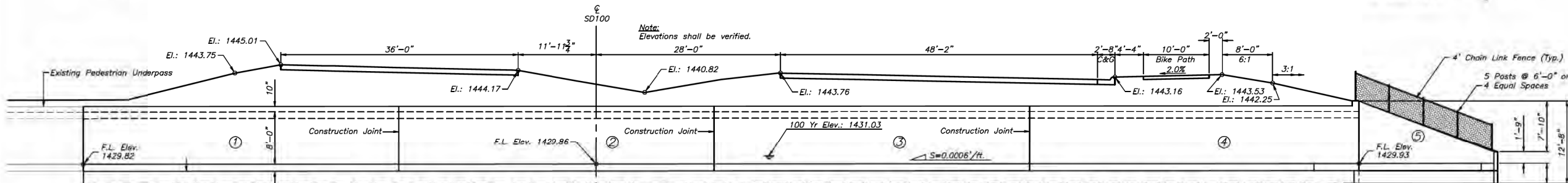
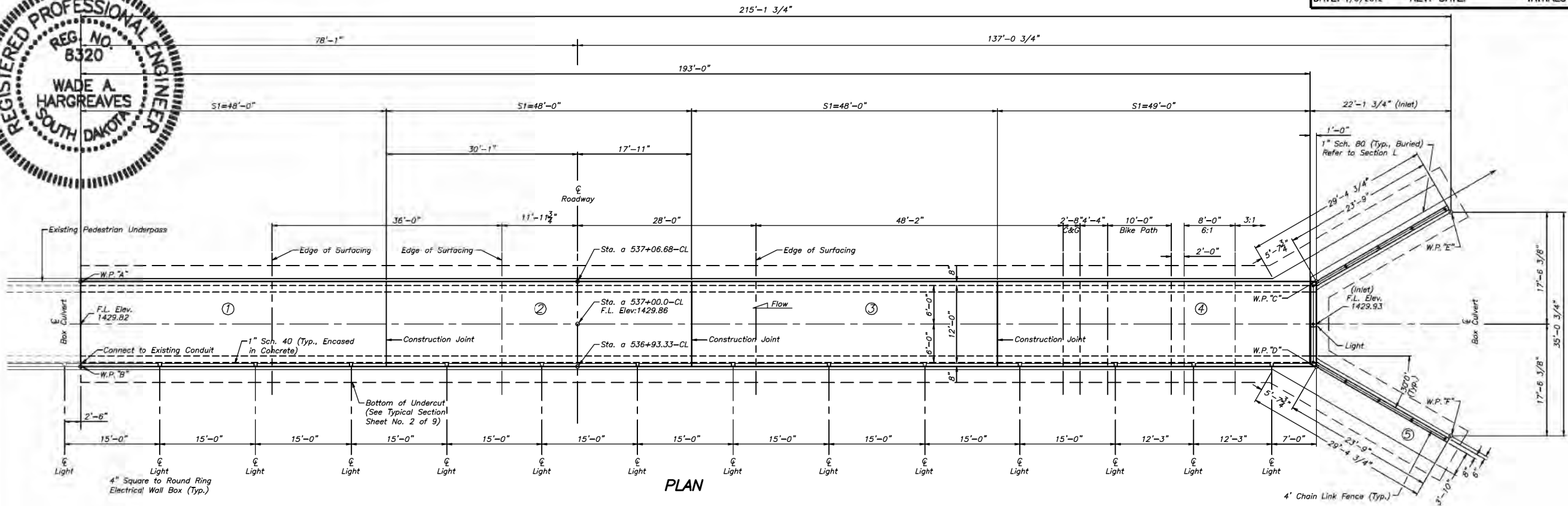
FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0100(107)411	E57	E59

The Elevations Shown in these Plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

ORIGINAL CONSTRUCTION PLANS

STATE OF SOUTH DAKOTA	PROJECT EM-P0011(49)68	SHEET NO. E7	TOTAL SHEETS E24
FILE: C:\PWORKING\DMA\0654983\12'x8' RCB PED_STA 537.DWG DATE: 4/6/2012 REV. DATE: INITIALS			



ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Class A45 Concrete, Box Culvert	CuYd	296.1
Reinforcing Steel	Lb	48,259
Structure Excavation, Box Culvert	CuYd	126.9
Box Culvert Undercut	CuYd	3.29
Anti-Graffiti Coating	Sq.Ft.	4,764
Install Dowel in Concrete	Each	34
Chain Link Fence W/Top Rail	FL	60

For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.

TABLE OF WORKING POINTS		
W.P.	STATION	OFFSET
A	537+06.67	78.09' Lt.
B	536+93.33	78.09' Lt.
C	537+06.67	115.91' Rt.
D	536+93.33	115.91' Rt.
E	537+17.53	132.06' Rt.
F	536+82.47	132.06' Rt.

ELEVATION

Q_d	34.2	cfs
A_d	13.2	sq.ft.
V_d	2.6	fps
Q_c	34.2	cfs
Q_{100}	34.2	cfs
V_{max}	2.6	fps

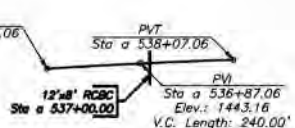
HYDRAULIC DATA

Q_d = Design discharge for the proposed culvert based on 100 year frequency. El. 1431.03
 Q_{100} = Overlapping discharge and frequency ≥ 100 yr. recurrence interval. El. NA
 Q_c = Designated peak discharge for the basin approaching proposed project based on 100 year frequency.
 Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 1431.03
 V_{max} = Maximum computed velocity for the proposed culvert based on 100 year frequency.

INDEX OF CULVERT SHEETS-

Sheet No. 1 - General Drawing and Quantities
Sheet No. 2 - Notes and Undercut Details
Sheet No. 3 - Outlet Details (1 of 2)
Sheet No. 4 - Outlet Details (2 of 2)
Sheet No. 5 - S1 Barrel Section Details (49'-0")
Sheet No. 6 - S1 Barrel Section Details (48'-0")
Sheet No. 7 - Lighting Layout
Sheet No. 8 - Details of Standard Plates (460.02 & 460.10)
Sheet No. 9 - Details of Standard Plates (621.01 & 621.03)

GRADE LINE DATA

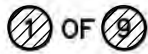


GENERAL DRAWING AND QUANTITIES

FOR 12' x 8' PEDESTRIAN BOX CULVERT EXTENSION (C.I.P.)

STA. 537+00.0 0° SKEW
PEDESTRIAN PATH SEC. 36-T101N-R49W
STR. NO. 50-240-237 EM-P0011(49)68
PCN NO. 00CP HL-93

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2011



PLANS BY:
HDR, INC.
SIOUX FALLS, S.D.

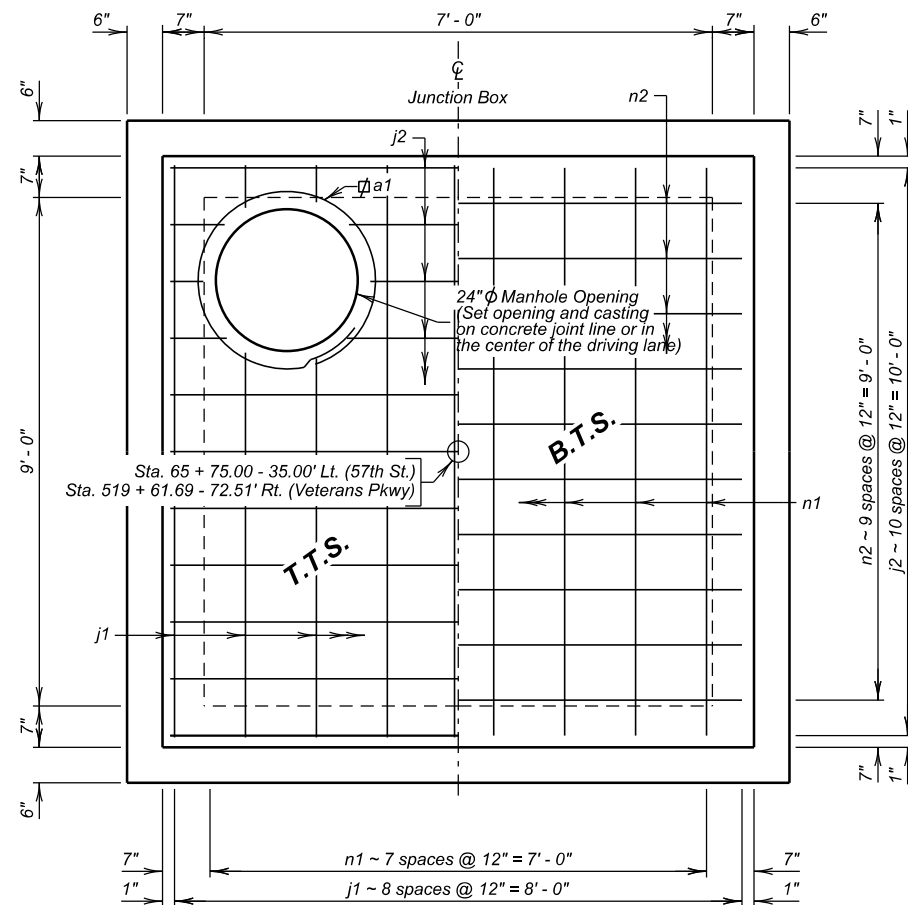
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
WH	RC	SH	
BRIDGE ENGINEER			

12' X 8' BOX CULVERT REPAIRS

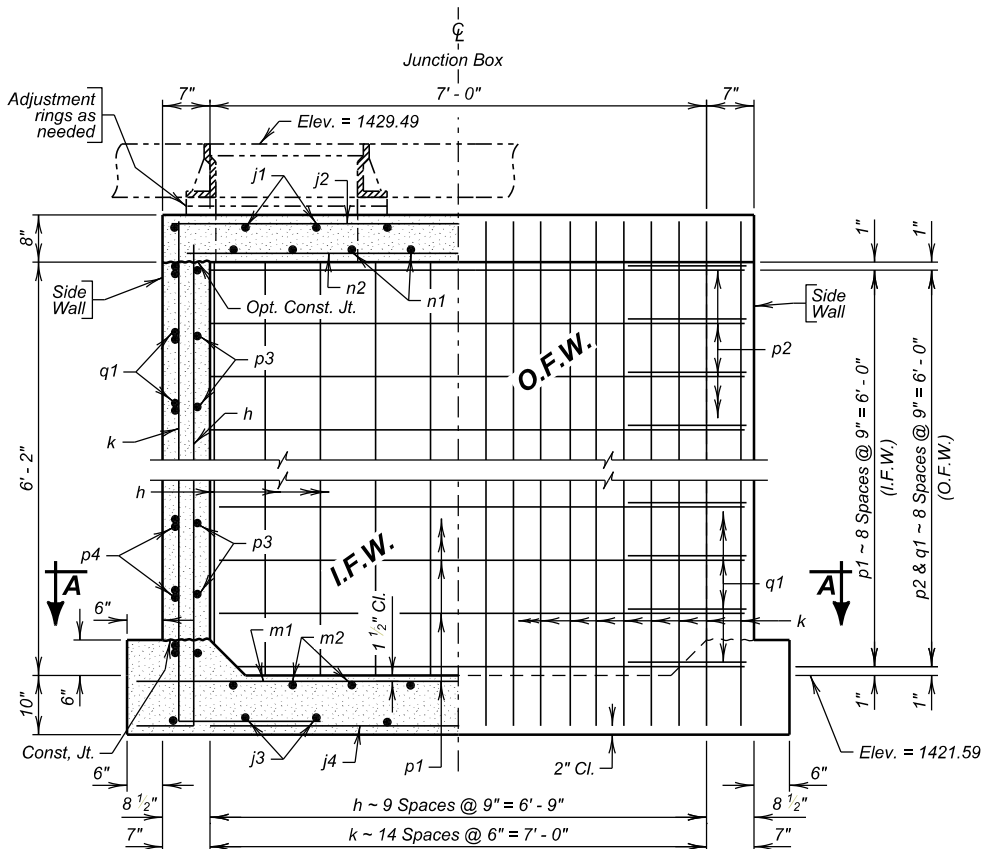
STR. NO. 50-240-237
JUNE 2025

Plot Scale - 1:2,70532

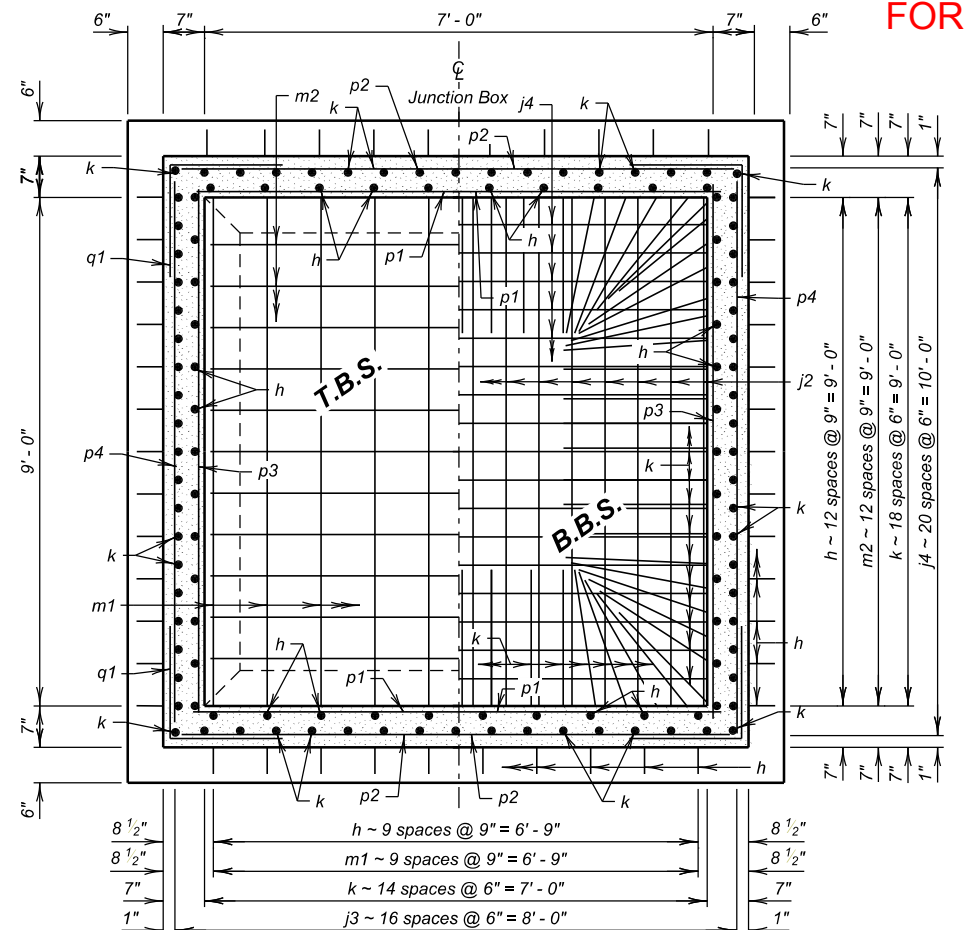
ROGERS
Plotted From -



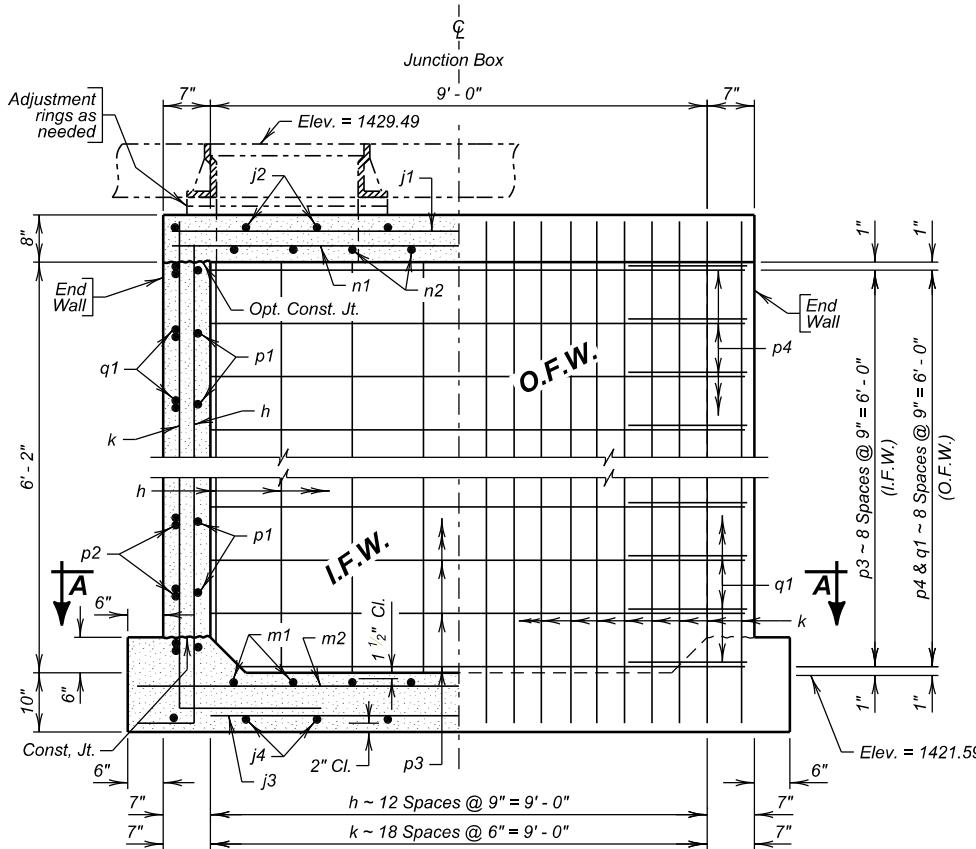
⊗ PLAN VIEW



⊗ ELEVATION VIEW
(Showing Endwall)



⊗ SEC. A - A
(Showing Bottom Slab)



⊗ ELEVATION VIEW
(Showing Sidewall)

FOR BIDDING PURPOSES ONLY

SPECIFICATIONS

- Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.
- Construction Specifications: Standard Specifications for Roads and Bridges, 10-7-26 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at <https://dot.sd.gov/doing-business/contractors/standard-specifications>.

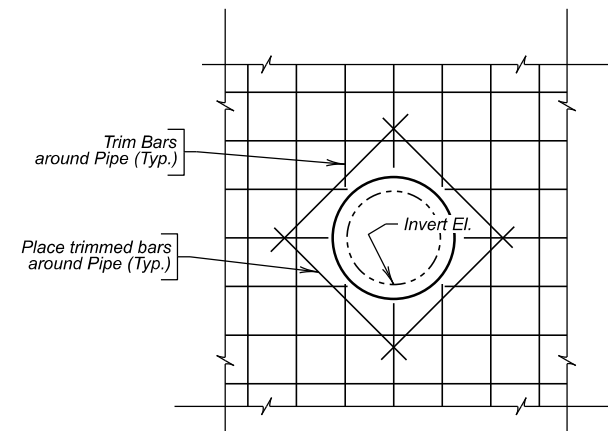
GENERAL NOTES

- Design Live Load: HL-93. No construction loading in excess of legal load was considered.
- Design Material Strengths:
Concrete $f'_c = 4,000$ psi
Reinforcing Steel $f_y = 60,000$ psi
- All reinforcing steel will conform to ASTM A615 Grade 60.
- All exposed concrete corners and edges will be chamfered 3/4-inch.
- Use 1-inch clear cover on all reinforcing steel EXCEPT as shown.
- Pipe connections will not pass through a corner.

LEGEND FOR PLACING RE-STEEL

T.T.S. - Top of Top Slab
B.T.S. - Bottom of Top Slab
T.B.S. - Top of Bottom Slab
B.B.S. - Bottom of Bottom Slab
O.F.W. - Outside Face of Wall
I.F.W. - Inside Face of Wall

⊗ Approximate reinforcement shown for clarity. Do not scale the drawing. Pipe connections not shown, see Table.



PIPE CONNECTION DETAIL
(For connection of pipe to junction box)

PIPE CONNECTIONS

Size/Type	Invert El.	Wall Face
54" RCPA	1421.69	North
54" RCPA	1421.59	South

DETAILS

FOR

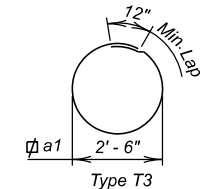
Sta. 65 + 75.00 - 35.00' L
9' - 0" x 7' - 0" JUNCTION BOX #4

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0100(107)411	E58	E59

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type	Bending Details
a1	1	6	9' - 0"	T3	
h	46	4	8' - 0"	17A	
j1	9	4	9' - 11"	Str.	
j2	11	4	7' - 11"	Str.	
j3	17	4	9' - 0"	Str.	
j4	21	4	7' - 0"	Str.	
k	72	4	8' - 11"	17A	
m1	10	4	10' - 11"	Str.	
m2	13	4	8' - 11"	Str.	
n1	8	4	9' - 11"	Str.	
n2	10	4	7' - 11"	Str.	
p1	18	4	7' - 4"	Str.	
p2	18	4	7' - 11"	Str.	
p3	18	4	9' - 4"	Str.	
p4	18	4	9' - 11"	Str.	
q1	36	4	3' - 2"	17A	

Type 17A



NOTES:

- ⊗ Locate in center of top slab with 3" clearance at manhole opening.
- All dimensions are out to out of bars.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
* Class M6 Concrete	Cu. Yd.	9.0
Reinforcing Steel	Lb.	1754

* Quantity has been reduced for volume of concrete displaced due to pipe(s)





SPECIFICATIONS

1. *Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.*
2. *Construction Specifications: Standard Specifications for Roads and Bridges, 10-7-26 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at <https://dot.sd.gov/doing-business/contractors/standard-specifications>.*

GENERAL NOTES

1. *Design Live Load: HL-93. No construction loading in excess of legal load was considered.*
2. *Design Material Strengths:*
Concrete $f'_c = 4,000$ psi
Reinforcing Steel $f_y = 60,000$ psi
3. *All reinforcing steel will conform to ASTM A615 Grade 60.*
4. *All exposed concrete corners and edges will be chamfered 3/4-inch.*
5. *Use 1-inch clear cover on all reinforcing steel EXCEPT as shown.*
6. *Pipe connections will not pass through a corner.*

**LEGEND FOR PLACING
RE-STEEL**

T.T.S. - Top of Top Slab
B.T.S. - Bottom of Top Slab
T.B.S. - Top of Bottom Slab
B.B.S. - Bottom of Bottom Slab
O.F.W. - Outside Face of Wall
I.F.W. - Inside Face of Wall

⊗ Approximate reinforcement shown for clarity. Do not scale the drawing. Pipe connections not shown, see Table.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0100(107)411	E59	E59

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type	Bending Details
Ø	a1	1	9' - 0"	T3	h 0' - 10" k 1' - 7" q1 1' - 7" Type 17A
	h	46	7' - 9"	17A	
	j1	17	9' - 11"	Str.	
	j2	21	7' - 11"	Str.	
	j3	17	9' - 0"	Str.	
	j4	21	7' - 0"	Str.	
	k	72	8' - 8"	17A	
	m1	10	10' - 11"	Str.	
	m2	13	9' - 11"	Str.	
	n1	8	4' - 11"	Str.	
	n2	10	7' - 11"	Str.	
	p1	18	7' - 4"	Str.	
	p2	18	7' - 11"	Str.	
	p3	18	9' - 4"	Str.	
	p4	18	9' - 11"	Str.	
	a1	36	3' - 2"	17A	

NOTES:

Ø Locate in center of top slab with 3" clearance at manhole opening.
All dimensions are out to out of bars.

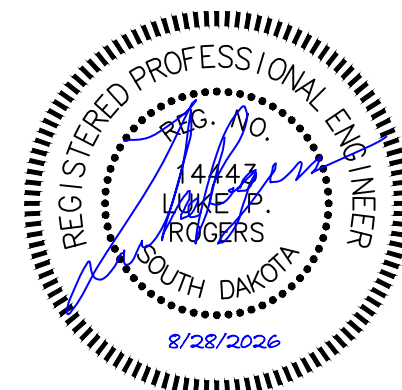
ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
* Class M6 Concrete	Cu. Yd.	8.6
Reinforcing Steel	Lb.	1840

* Quantity has been reduced for volume of concrete displaced due to pipe(s)



PIPE CONNECTIONS		
<i>Size/Type</i>	<i>Invert El.</i>	<i>Wall Face</i>
54" RCPA	1421.24	North
60" RCPA	1421.24	South
18" RCP	1423.05	West



DETAILS

FOR

Sta. 65 - 76.00 - 35.00' R
9' - 0" x 7' - 0" JUNCTION BOX #5

