SINGLE BARREL 20'-0" X 12'-0"
CONCRETE BOX CULVERT
STA 13+55
DEER CROSSING UNDERPASS
SAGE JUNCTION EAST

N121098

PRELIMINARY

N121098

GENERAL NOTES


DIMENSIONS: Longitudinal dimensions are along flow line. Slopes are vertical/ horizontal.

REINFORCING STEEL: Ensure reinforcing steel conforms to ASTM A 615 (Grade 60) for all bars, including ties and stirrups. Concrete cover to face of reinforcing steel is 2" unless noted. Dimensions for bent bars are cut to out. Ensure bars marked with an asterisk (*) are coated.

BAR MARKS:

- Straight Bars
- Bent Bars

Size \( \times \) Length \( \times \) Designation

EYEBOLTS: Use galvanized bar conforming to ASTM A 709 (Grade 36). Work necessary for the eyebolts is incidental to the contract pay item Class A Concrete.

WEEP HOLE ASSEMBLIES: Work necessary for the weep hole assemblies is incidental to the contract pay item Class A Concrete.

PREFORMED EXPANSION JOINT FILLER: Work necessary for the preformed expansion joint filler is incidental to the contract pay item Class A Concrete.

CULVERT EXCAVATION: The estimated quantity of culvert excavation is 3060 CY and is incidental to the contract pay item Class A Concrete.

CULVERT SUBEXCAVATION: The bottom limits of culvert subexcavation is 3'-0" below the bottom of the culvert. Line the bottom of the culvert subexcavation with geotextile material separation. Backfill with pit-run subbase conforming to grading J. The estimated quantity of culvert subexcavation is calculated in accordance with Standard Plan 206-5. Culvert and Trench Excavation.

CULVERT BOTTOM BACKFILL: Backfill the bottom of the culvert with 2'-0"± of excavated material from the adjacent highway embankment. Work necessary for backfilling is incidental to the contract pay item Class A Concrete.

BRIDGE OFFICE NOTIFICATION: The engineer will notify the State Bridge Engineer in writing within 14 calendar days after work has been completed at this structure.

DESIGN DATA


ADT: 1945 (Year 2005)

LOADING:

- Live Load: HL93
- Dead Load: Design fill: 2.0 ft
  - (1) Vertical earth pressure: 120 psf
  - (2) Vertical earth pressure: 72 psf
  - Lateral earth pressure: 20 psf

REINFORCED CONCRETE: Load and Resistance Factor Design - Class A Concrete \( f_c = 6000 \) psi

APPROACH ROADWAY WIDTH: 40'-0"

REFERENCES

Supplementary Specifications:
- SS-100K Adjustment for Structural Steel
- SS-500G Structural Concrete with Quality Control and Quality Acceptance

Standard Plans:
- 206-1A Culvert and Trench Excavation

STRUCTURE NO. LFN
ML128, RM 30.05

ESTIMATED QUANTITIES - CODE 08

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<tr>
<th>ITEM NO.</th>
<th>ITEM DESCRIPTION</th>
<th>UNIT</th>
<th>TOTAL QUANTITY</th>
<th>ESTIMATE</th>
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<td>CULVERT EXCAVATION</td>
<td>CY</td>
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<td>PIT RUN SUBBASE</td>
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<tr>
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<td>LUMP SUM</td>
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Section 4.01 - Preliminary

SINGLE BARREL 20'-0" X 12'-0"
CONCRETE BOX CULVERT

STA 13+55
Deer Crossing Underpass
Sage Junction East

LOCATION PLAN

EXISTING HIGHWAY R/W LIMIT (TYP)

LOCATION PLAN

CLEAR ZONE

PROFILE GRADE

TYPICAL ROADWAY SECTION

SINGLE BARREL 20'-0" X 12'-0"
CONCRETE BOX CULVERT

STA 13+55
Deer Crossing Underpass
Sage Junction East

LONGITUDINAL SECTION
SINGLE BARREL 20'-0" X 12'-0"
CONCRETE BOX CULVERT
STA 13+55
DEER CROSSING UNDERPASS
SAGE JUNCTION EAST

N121098

GENERAL NOTES


DIMENSIONS: Longitudinal dimensions are along flow line. Slopes are vertical: horizontal.

REINFORCING STEEL: Ensure reinforcing steel conforms to ASTM A 615 (Grade 60) for all bars, including ties and stirrups. Concrete cover to face of reinforcing steel is 2" unless noted. Dimensions for bent bars are out to out. Ensure bars marked with an asterisk (*) are coated.

BAR MARKS

EYEBOLTS: Use galvanized bar conforming to ASTM A 709 (Grade 36). Work necessary for the eyebolts is incidental to the contract pay item Class A Concrete.

WEEP HOLE ASSEMBLIES: Work necessary for the weep hole assemblies is incidental to the contract pay item Class A Concrete.

PREFORMED EXPANSION JOINTER: Work necessary for the preformed expansion joint filler is incidental to the contract pay item Class A Concrete.

CULVERT EXCAVATION: The estimated quantity of culvert excavation is 3060 CY and is incidental to the contract pay item Class A Concrete.

CULVERT SUBEXCAVATION: The bottom limits of culvert subexcavation is 3'-0" below the bottom of the culvert. Line the bottom of the culvert subexcavation with geotextile material separation. Backfill with pit run subbase conforming to grading J. The estimated quantity of culvert subexcavation is calculated in accordance with Standard Plan 206-1, Culvert and Trench Excavation.

CULVERT BOTTOM BACKFILL: Backfill the bottom of the culvert with 2'-0"± of excavated material from the adjacent highway embankment. Work necessary for backfilling is incidental to the contract pay item Class A Concrete.

BRIDGE OFFICE NOTIFICATION: The engineer will notify the State Bridge Engineer in writing within 14 calendar days after work has been completed at this structure.

REFERENCES

Supplementary Specifications:
- SS-100K Adjustment for Structural Steel
- SS-500G Structural Concrete with Quality Control and Quality Acceptance

Standard Plans:
- 206-1A Culvert and Trench Excavation

ESTIMATED QUANTITIES - CODE 08

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<th>TOTAL QUANTITY</th>
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DEVELOPMENT

WYOMING DEPARTMENT OF TRANSPORTATION
DEPARTMENT OF TRANSPORTATION

4.02 - Example

Nov 2018
Section 4.17 - Culverts

CULVERT DETAILS

SINGLE BARREL 20'-0" X 12'-0"
CONCRETE BOX CULVERT
STA 13+55

Deer Crossing Underpass
Sage Junction East

LOCATION PLAN

EXISTING HIGHWAY R/W LIMITS

SURVEY

CENTER OF CULVERT

N121098

HORIZONTAL CURVE DATA

4 = 13°25'59.2"
D = 1°30'00.1"
T = 449.83'
L = 895.53'
R = 3819.68'
e0 = 0.054 ft/ft

PI STA 14+49.83

PC STA 10+02.07

Subexcavation
Limits of Culvert

Center of Culvert

Survey

5'-0" 22'-0" 14+00 13+00

To Kenneres

22'-0" 54'-0" 32'-0"

To SAGE IC

Rural Electric Underground Power Line

Existing Highway R/W Line (Typ)

RURAL ELECTRIC

PL POWER LINE

13+55.00
Section 4.17 - Culverts

**CULVERT DETAILS**

**SINGLE BARREL 20'-0" X 12'-0"**

**CONCRETE BOX CULVERT**

STA 60 + 45

**Deer Crossing Underpass**

**Sage Junction East**

**WYOMING DEPARTMENT OF TRANSPORTATION**

**BRIDGE PROGRAM**

**Nov 2018**

N121098

**Note:**
1) Place long leg of 8C1 bars in walls.
2) Either inlet or outlet may be built first. If outlet is built first, reverse longitudinal reinforcing steel in walls and top slab.
3) For Bridge Railing Details, see Sheets No. 5 and 6.
Section 4.17 - Culverts

CULVERT DETAILS

SINGLE BARREL 20'-0" x 12'-0"
CONCRETE BOX CULVERT
STA 13+55
Deer Crossing Underpass
Sage Junction East

Note:
1) Place short leg of 8C3 bars in footing.
2) Place Set 1 Bars and 714-2 bars with 8C3 bars.
3) Each weep hole assembly consists of a pipe 4 STD through the wingwall, one 6" x 6" piece of aluminum or galvanized steel wire 4 mesh hardware cloth (Minimum wire diameter 0.03") centered over pipe end and firmly anchored to rear face of wingwall, and one cubic foot of coarse aggregate in a securely tied burlap sack.

WINGWALL PLAN

Weep Hole Pipe (Typ)

Set 2 Bars
31'-0"

WINGWALL ELEVATION

Typical Wingwall Elevation

WINGWALL SECTION

Typical Wingwall Section

WEEP HOLE ASSEMBLY DETAIL

Weep Hole Pipe 4 STD x 1"-0"

BENDING DIAGRAMS

Set 2 Bars

DATA OF REINFORCEMENT

Location
Mark
Number Required

Top Slab and Cap (11,085 LB)
4C2 74
413-6 102
819-6 2
521-4 2
621-4 4
626-10 44
629-0 44
821-4 102
413-6 108
438-0 40
453-0 40
509-4 292
8C1 216
8C3 273
821-4 108
821-4 108
838-0 48
714-2 4
8C1 216
430-8 32
Walls (11,958 LB)
412-10 216
429-10 48
429-9 48
714-2 4
8C1 216
430-8 32
Set 2 Bars 4
714-1 8
Set 1 Bars 4
Wingwalls (967 LB)
Bending Diagrams

Set 1 Bars
8C3 (14'-3")
(7-4")

Set 2 Bars
8C3 (7-6")

Note:
1) Place short leg of 8C3 bars in footing.
2) Place Set 1 Bars and 714-2 bars with 8C3 bars.
3) Each weep hole assembly consists of a pipe 4 STD through the wingwall, one 6" x 6" piece of aluminum or galvanized steel wire 4 mesh hardware cloth (Minimum wire diameter 0.03") centered over pipe end and firmly anchored to rear face of wingwall, and one cubic foot of coarse aggregate in a securely tied burlap sack.

WEEP HOLE ASSEMBLY DETAIL

Weep Hole Pipe 4 STD x 1"-0"

BENDING DIAGRAMS

Set 1 Bars
8C3 (14'-3")
(7-4")

Set 2 Bars
8C3 (7-6")

Note:
1) Place short leg of 8C3 bars in footing.
2) Place Set 1 Bars and 714-2 bars with 8C3 bars.
3) Each weep hole assembly consists of a pipe 4 STD through the wingwall, one 6" x 6" piece of aluminum or galvanized steel wire 4 mesh hardware cloth (Minimum wire diameter 0.03") centered over pipe end and firmly anchored to rear face of wingwall, and one cubic foot of coarse aggregate in a securely tied burlap sack.
**Section 4.10 - Bridge Railing**

**BRIDGE RAILING DETAILS**

**SINGLE BARREL 20'-0" x 12'-0"**

**CONCRETE BOX CULVERT**

**STA 13+15**

**Deer Crossing Underpass**

**Sage Junction East**

**WYOMING DEPARTMENT OF TRANSPORTATION**

**Bridge Program**

**No Approach Guardrail (Typ)**

**Note:**

1. Ensure the expansion splice is located in the railing panel which passes over the bridge expansion joint as indicated on the plan.

2. Anchor bolts may be tack welded to anchorage expansion joint as indicated on the plan.

3. At post locations, drill two 1\(\frac{1}{4}\)" holes in each rail to receive rail bolts (Shop or field). See Post Details for hole spacing.

4. Paint surfaces of the railing components that have been out, drilled, or otherwise damaged with two coats of zinc-rich paint conforming to ASTM A 780.

5. After installing rails, panic exposed bolt threads with two coats of zinc-rich paint conforming to ASTM A 780.

**SIDE VIEW**

**FRONT VIEW**

**POST DETAILS**

(See View A-A for anchor bolt hole spacing)

**SECTION B-B**

(Not galvanized)

(Anchor bolts and slab not shown)

**VIEW A-A**

(Anchor bolts, rails, and rail bolts not shown)

**RAIL BOLT DETAIL**

(Anchor bolts and slab not shown)

**VIEW B-B**

(Typ)
**SECTION 4.10 - Bridge Railing**

**BRIDGE RAILING DETAILS**

- **Concrete Box Culvert STA 13+55 Deer Crossing Underpass Sage Junction East**

### Terminal Component Requirements

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<th>Required</th>
<th>Connection</th>
<th>Guardrail</th>
<th>Approach Guardrail</th>
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<tr>
<td>Terminal Cover Assembly</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Rail Caps</td>
<td>Yes (Without bolts)</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>HSS 6 x 2 x ¾</td>
<td>No</td>
<td>No</td>
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</table>

### Splice Details

#### Expansion Splice

- **Top and bottom rail**
- **Typ**: 1"ø hole (Centered)
- **Slot**: 1" x 3 ½"
- **Bent 1"ø Holes in rail (Centered)** for ¾"ø x 3 ½" HSS bolt w/ Hex Nut, Washer & Lock Nut & 2 Washers. Wrench tight, do not crush rail. (Typ) (All splices)

#### Standard Splice

- **Top or bottom rail**
- **Typ**: 1"ø hole (Centered)
- **Slot**: 1" x 3 ½"
- **Bent 1"ø Holes in rail (Centered)** for ¾"ø x 3 ½" HSS bolt w/ Hex Nut, Washer & Lock Nut & 2 Washers. Wrench tight, do not crush rail. (Typ) (All splices)

#### Double-Bolted Splice

- **Top or bottom rail**
- **Typ**: 1"ø hole (Centered)
- **Slot**: 1" x 3 ½"
- **Bent 1"ø Holes in rail (Centered)** for ¾"ø x 3 ½" HSS bolt w/ Hex Nut, Washer & Lock Nut & 2 Washers. Wrench tight, do not crush rail. (Typ) (All splices)

### Sleeve Details

- **Standard Sleeve**
- **Typ**: 1"ø hole (Top & Bott)
- **Slot**: 1" x 3 ½"
- **Bent 1"ø Holes in rail (Top & Bott)**

- **Expansion Sleeve**
- **Typ**: 1"ø hole (Top & Bott)
- **Slot**: 1" x 3 ½"
- **Bent 1"ø Holes in rail (Top & Bott)**

### Rail Cap Details

- **Rail Cap (Typ)**
- **Connection**: Guardrail
- **Approach Guardrail**: No

### Section 4.10 - Bridge Railing Details

- **Concrete Box Culvert STA 13+55 Deer Crossing Underpass Sage Junction East**

### Notes

1. Ensure each rail length is continuous over a minimum of two posts.
2. In rehabilitation work, ensure railing that cannot feasibly be made continuous over a minimum of two posts has a double-bolted splice.
3. Splices may be located on either side of post.
4. Not more than one splice is permitted per side of post, except at expansion splices.
5. Bolts may be omitted in standard sleeves where bolts are required on one side of splice only.
6. Do not shop splice rails.
7. Terminal components removed during rehabilitation work must remain the property of the department.
8. Installation of MGS approach guardrail will require other fabricated assemblies to be connected to end post. See road plans for details and pay item.