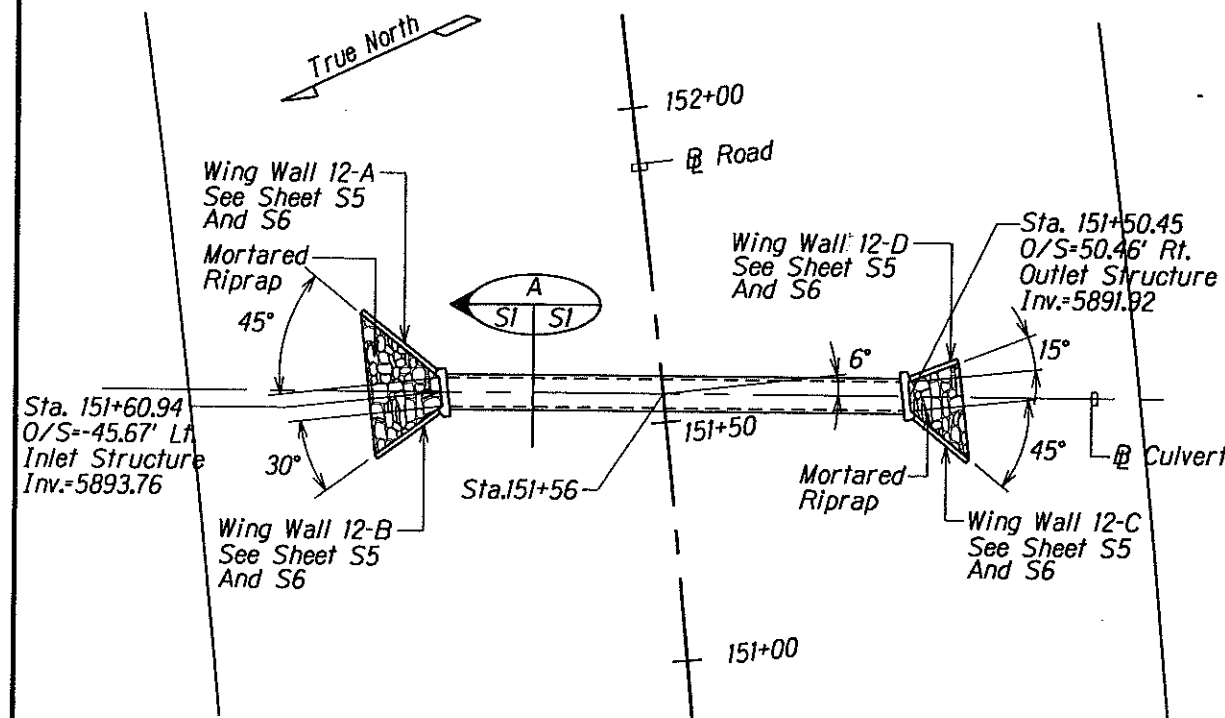
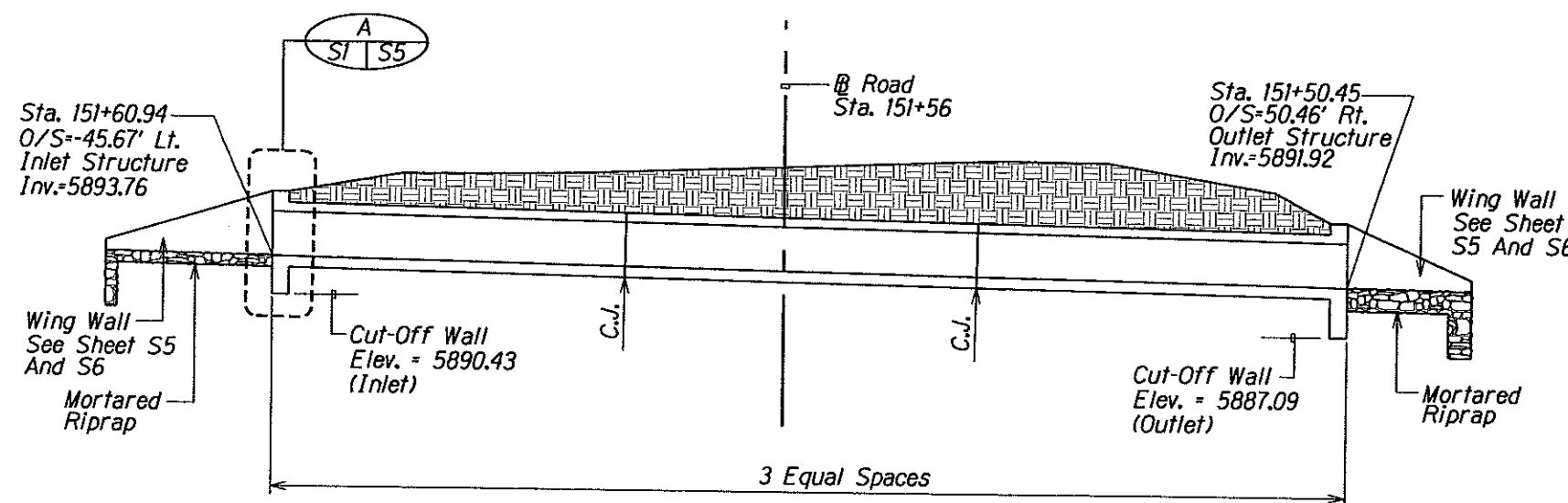


REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	HI	HI-A-AD-6(2) Saddle Road	S1	S7

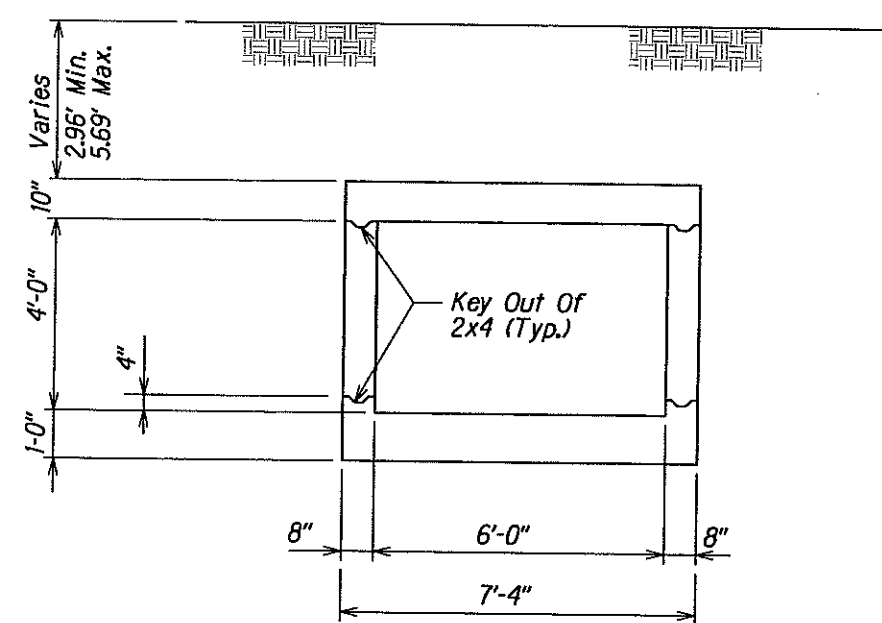


PLAN BOX CULVERT 12 (STA. 151+56)
Scale: 1"=40'-0"



- Notes:
1. C.J. Denotes Construction Joint. See A/S7.
 2. Joints Shall Be Normal To Centerline Of Culverts.

BOX CULVERT 12 ELEVATION (STA. 151+56)
Scale: 1/16"=1'-0"



- Note:
1. See Detail B/S7 For Typical Culvert Reinforcing.

BOX CULVERT 12 SECTION
Scale: 1/4"=1'-0"

Estimated Quantities For Box Culvert 12	
Concrete	150 C.Y.
Reinforcing Steel	31,500 lbs.

Wing Wall Schedule For Box Culvert 12			
Wing Wall	Length "L"	Top Of Wall Elevation "TW"	Top Of Footing Elevation "TF"
Wing Wall 12-A	21 Feet	5897.21	5891.76
Wing Wall 12-B	18 Feet	5896.88	5891.76
Wing Wall 12-C	16 Feet	5893.74	5888.92
Wing Wall 12-D	12 Feet	5892.59	5888.59

Note: For Definition Of Length "L", Top Of Wall Elevation "TW", And Top Of Footing "TF" Refer To Sheet S5.

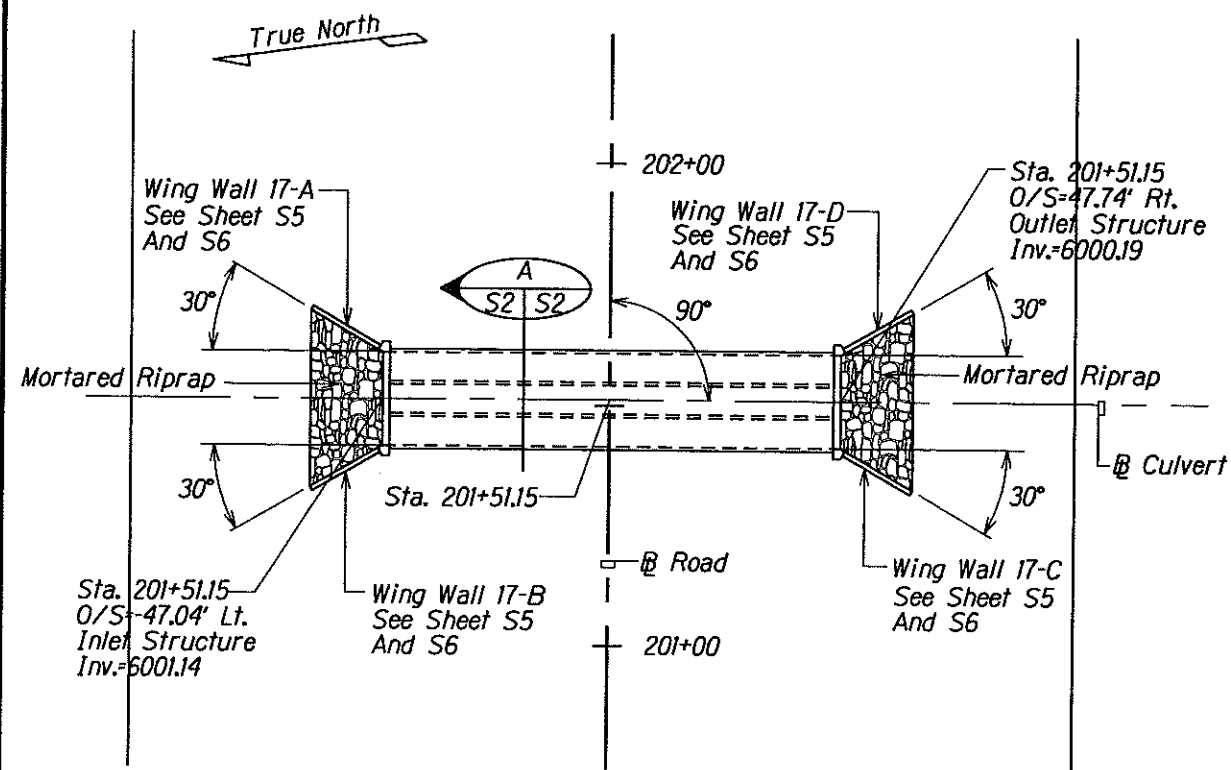
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION

STRUCTURAL-BOX CULVERT 12
LAYOUT & SECTION

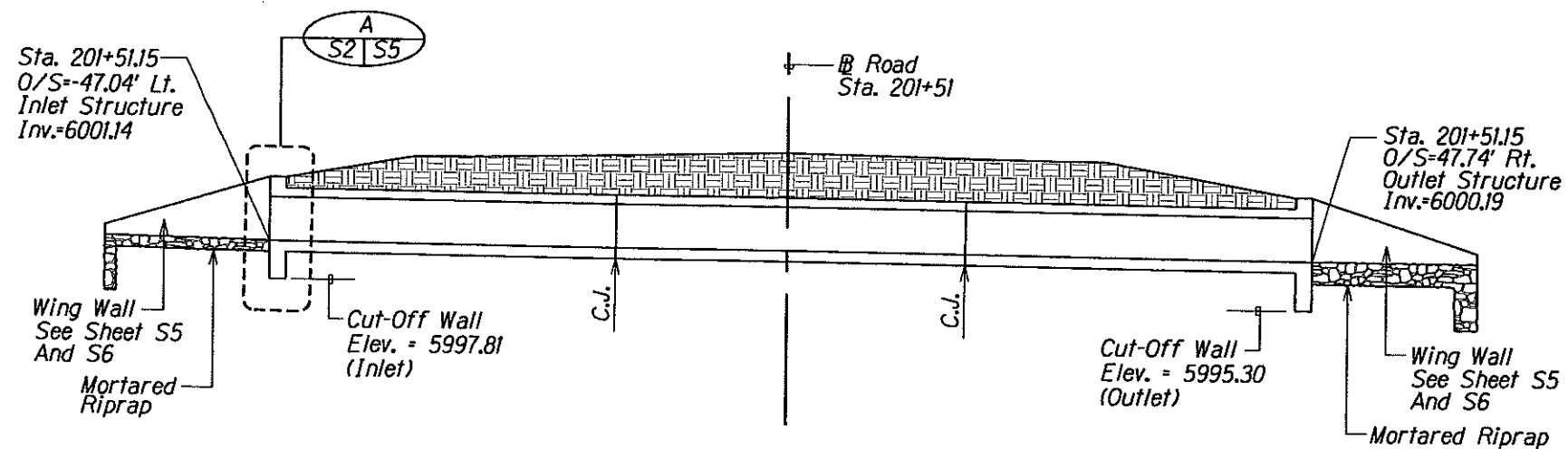
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Date: October 15, 2004

SHEET No. 1 OF 7

REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	HI	HI-A-AD-6(2) Saddle Road	S2	S7

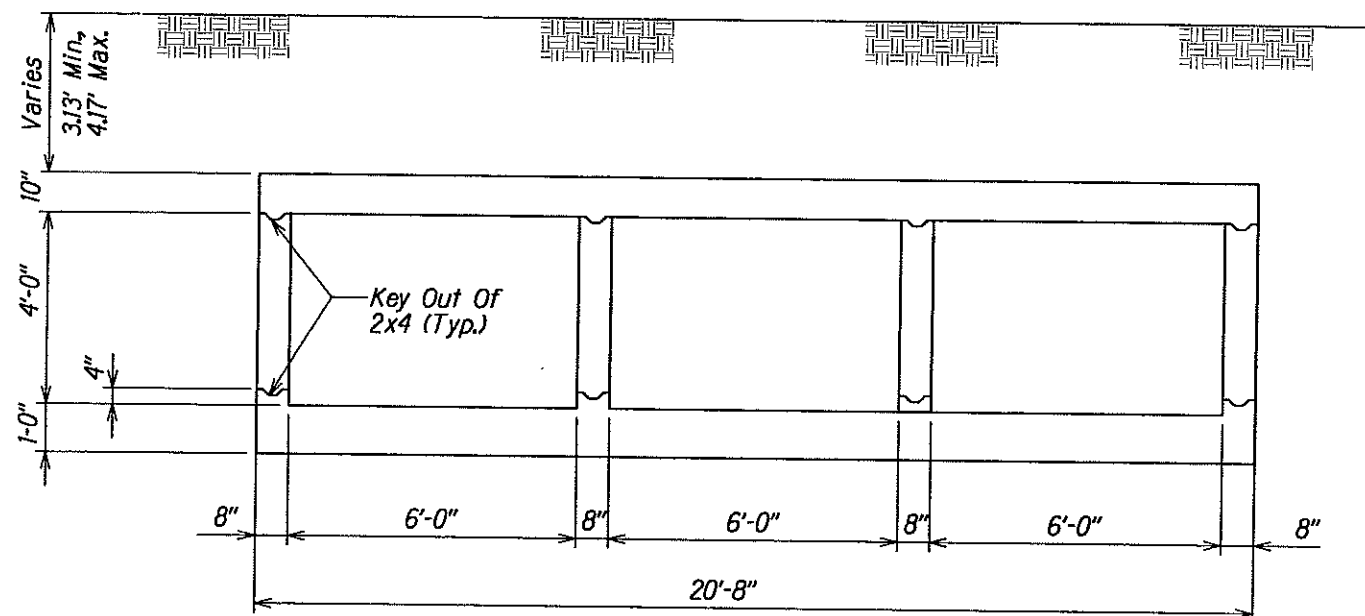


PLAN BOX CULVERT 17 (STA. 201+51)
Scale: 1"=40'-0"



- Notes:
1. C.J. Denotes Construction Joint. See A/S7.
 2. Joints Shall Be Normal To Centerline Of Culverts.

BOX CULVERT 17 ELEVATION (STA. 201+51)
Scale: 1/16"=1'-0"



- Note:
1. See Detail B/S7 For Typical Culvert Reinforcing.

BOX CULVERT 17 SECTION
Scale: 1/4"=1'-0"

Estimated Quantities For Box Culvert 17	
Concrete	275 C.Y.
Reinforcing Steel	53,500 lbs.

Wing Wall Schedule For Box Culvert 17			
Wing Wall	Length "L"	Top Of Wall Elevation "TW"	Top Of Footing Elevation "TF"
Wing Wall 17-A	18 Feet	6002.80	5999.14
Wing Wall 17-B	18 Feet	6002.28	5999.14
Wing Wall 17-C	18 Feet	6000.80	5996.80
Wing Wall 17-D	18 Feet	6001.83	5997.19

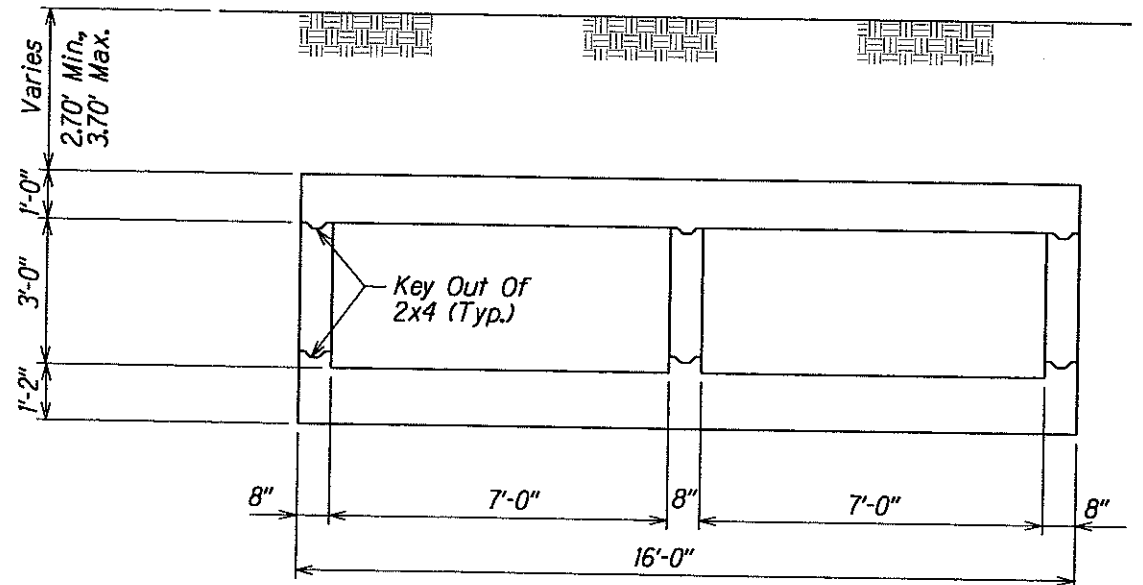
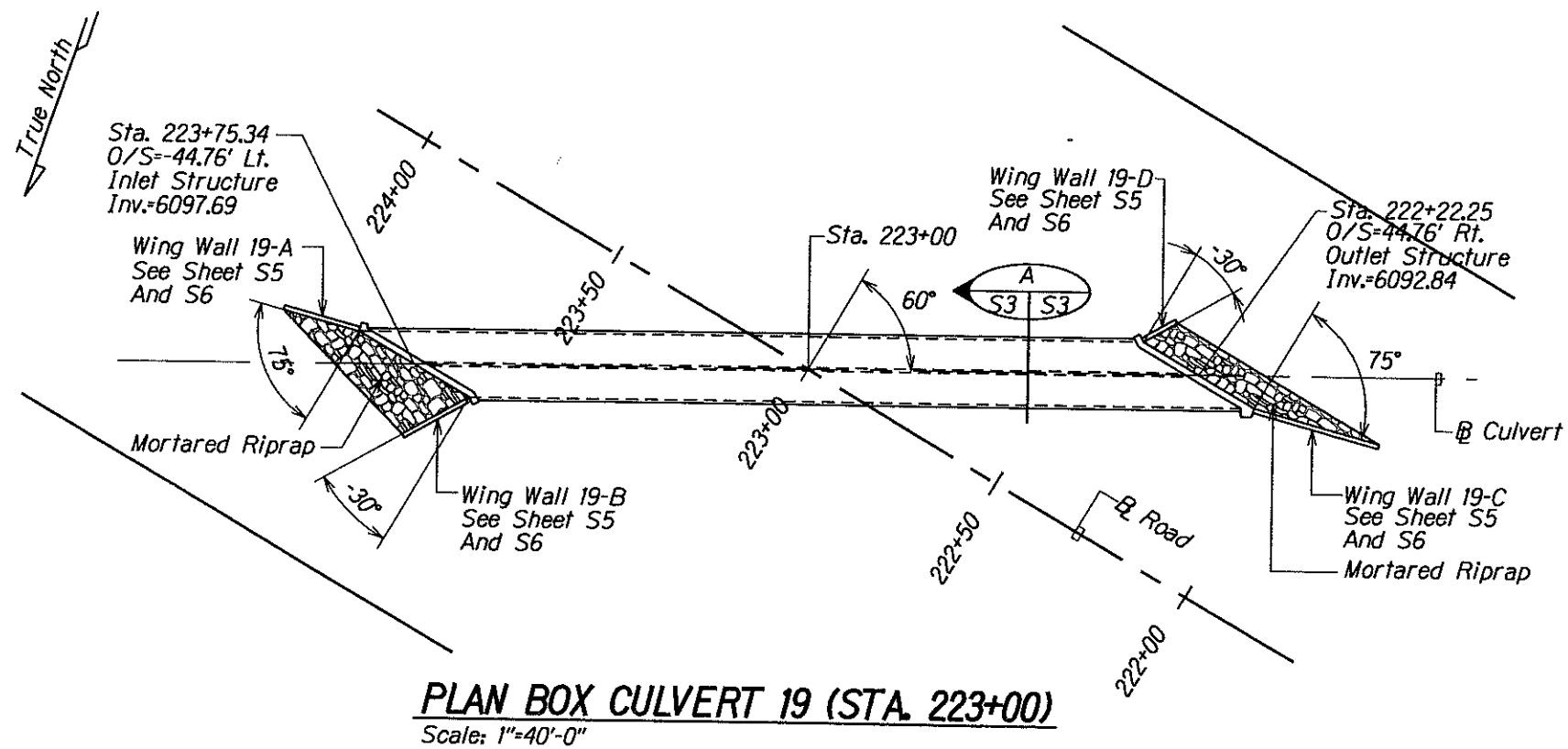
Note: For Definition Of Length "L", Top Of Wall Elevation "TW", And Top Of Footing "TF" Refer To Sheet S5.

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CENTRAL FEDERAL LANDS HIGHWAY DIVISION

STRUCTURAL-BOX CULVERT 17
LAYOUT & SECTION

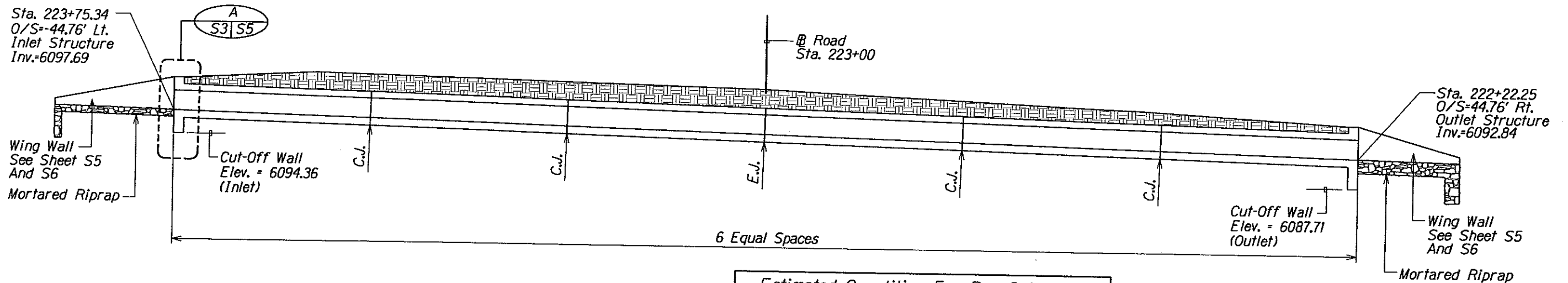
Scale: As Noted Date: October 15, 2004

SHEET No. 2 OF 7



Note:
1. See Detail B/S7 For Typical Culvert Reinforcing.

BOX CULVERT 19 SECTION
Scale: 1/4"=1'-0"



- Notes:
1. C.J. Denotes Construction Joint. See A/S7.
 2. E.J. Denotes Expansion Joint. See A/S7.
 3. Joints Shall Be Normal To Centerline Of Culverts.

BOX CULVERT 19 ELEVATION (STA. 223+00)
Scale: 1/16"=1'-0"

Estimated Quantities For Box Culvert 19	
Concrete	400 C.Y.
Reinforcing Steel	71,500 lbs.

Wing Wall Schedule For Box Culvert 19			
Wing Wall	Length "L"	Top Of Wall Elevation "TW"	Top Of Footing Elevation "TF"
Wing Wall 19-A	18 Feet	6104.20	6095.69
Wing Wall 19-B	18 Feet	6100.80	6095.69
Wing Wall 19-C	30 Feet	6093.04	6089.04
Wing Wall 19-D	9 Feet	6094.69	6089.84

Note: For Definition Of Length "L", Top Of Wall Elevation "TW", And Top Of Footing "TF" Refer To Sheet S5.

STRUCTURAL NOTES

REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	HI	HI-A-AD-6(2) Saddle Road	S4	S7

1. GENERAL SPECIFICATIONS: STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-96), TOGETHER WITH SPECIAL CONTRACT REQUIREMENTS (SCR'S) PREPARED FOR THIS CONTRACT.
2. DESIGN SPECIFICATIONS: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 2ND EDITION, 1998, INCLUDING SUBSEQUENT INTERIM SPECIFICATIONS.
3. LOADS:
 - A. LIVE LOAD: HL-93
 - B. SEISMIC LOAD: ACCELERATION COEFFICIENT = 0.47
SEISMIC PERFORMANCE ZONE = 4
SOIL PROFILE TYPE I (S = 1.0)
 - C. RAILING TEST LEVEL = TL-4
4. MATERIALS: (AS INDICATED BELOW AND AS SPECIFIED IN THE FP-96 AND SCR)
 - A. ALL CONCRETE SHALL BE 4,000 PSI (AT 28 DAYS) MINIMUM.
 - B. ALL REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60.
5. REINFORCEMENT:
 - A. UNLESS OTHERWISE NOTED, THE COVERING MEASURED FROM THE SURFACE OF THE CONCRETE TO THE FACE OF ANY REINFORCING BARS SHALL BE AS FOLLOWS:
 - 1) FORMED SURFACES EXPOSED TO EARTH AND WEATHER = 2" CLEAR
 - 2) BOTTOM AND SIDES OF FOOTINGS AND WHERE CONCRETE IS DEPOSITED ON GRADE = 3" CLEAR.
 - B. MINIMUM CLEAR SPACING BETWEEN PARALLEL BARS SHALL BE 1-1/2 TIMES THE DIAMETER OF THE BAR (FOR NON BUNDLED BARS) OR 1-1/2 TIMES THE DIAMETER DERIVED FROM THE EQUIVALENT AREA OF THE BARS (FOR BUNDLED BARS), BUT IN NO CASE SHALL THE CLEAR DISTANCE BETWEEN THE PARALLEL BARS BE LESS THAN 1-1/2 TIMES THE MAXIMUM SIZE OF THE COARSE AGGREGATE OR 1-1/2 INCHES.
 - C. ALL DIMENSION RELATING TO REINFORCING BARS (E.G. SPACING OF BARS, ETC.) ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
 - D. REINFORCING BARS SHALL BE DETAILED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 2ND EDITION, 1998, INCLUDING SUBSEQUENT INTERIM SPECIFICATIONS.
 - E. REINFORCING BARS SHALL BE SECURELY TIED AT ALL INTERSECTIONS AND LAP SPLICES EXCEPT WHERE THE SPACING OF INTERSECTIONS IS LESS THAN 12 INCHES IN EACH DIRECTION, IN WHICH CASE ALTERNATE INTERSECTIONS SHALL BE TIED.
6. GENERAL CONSTRUCTION NOTES:
 - A. SEE STANDARD SPECIFICATIONS AND SPECIAL CONTRACT REQUIREMENTS.
 - B. ALL ITEMS NOTED INCIDENTAL WILL NOT BE PAID FOR SEPARATELY.
 - C. THE CONTRACTOR SHALL COMPLY WITH ALL CONSTRUCTION PERMITS FOR THIS PROJECT. IN ADDITION, THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LAWS OF THE FEDERAL, STATE AND COUNTY GOVERNMENTS.
 - D. THE CONTRACTOR SHALL UTILIZE APPROPRIATE EROSION CONTROL MEASURES DURING CONSTRUCTION AND SHALL PERFORM CONSTRUCTION ACTIVITIES AFFECTING OR AFFECTED BY THE STREAM ONLY DURING PERIODS OF LOW STREAM FLOW. THE CONTRACTOR SHALL PREVENT DEBRIS AND CONSTRUCTION MATERIALS, INCLUDING CEMENT OR CONCRETE, PETROLEUM PRODUCTS, AND OTHER POLLUTANTS FROM ENTERING THE STREAM. WASH AND DUST CONTROL WATER SHALL BE PROPERLY DISPOSED.
 - E. IN THE EVENT THAT SUBSURFACE CULTURAL REMAINS SUCH AS ARTIFACTS, BURIALS OR DEPOSITS OF SHELLS OR CHARCOAL ARE ENCOUNTERED DURING EXCAVATION WORK, THE CONTRACTOR SHALL STOP WORK IN THE AREA OF THE FIND AND CONTACT THE CO IMMEDIATELY. WORK MAY RECOMMENCE ONLY WITH THE CO'S APPROVAL.
 - F. UNLESS OTHERWISE NOTED, ALL VERTICAL DIMENSIONS ARE MEASURED PLUMB.
 - G. THE CONTRACTOR SHALL VERIFY ALL SITE CONDITIONS BEFORE COMMENCING WITH WORK.
 - H. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UNDERGROUND UTILITY LINES AND NOTIFY THE RESPECTIVE OWNERS BEFORE COMMENCING THE WORK OF EXCAVATION.
 - I. FOR CONCRETE FINISH, SEE STANDARD SPECIFICATIONS.
 - J. UNLESS OTHERWISE NOTED, ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 3/4" X 3/4".

7. FOUNDATION:

THESE FOUNDATION NOTES WERE BASED ON RECOMMENDATIONS CONTAINED IN A SOILS INVESTIGATION REPORT BY GEOLABS, INC. DATED OCTOBER 23, 2002 ALONG WITH FAX MEMORANDUM DATED MAY 27, 2003. THE REPORT SHALL BE CONSIDERED AS PART OF THE CONSTRUCTION DOCUMENTS AND ITS RECOMMENDATIONS SHALL BE IMPLEMENTED UNLESS OTHERWISE DIRECTED BY CO.

 - A. SOIL PARAMETERS:
 - 1) SOIL BEARING PRESSURE:
 - A) EXTREME EVENT LIMIT STATE = 20,000 PSF
 - B) STRENGTH LIMIT STATE = 9,000 PSF
 - C) SERVICE LIMIT STATE = 3,000 PSF
 - 2) COEFFICIENT OF SLIDING FRICTION:
 - A) EXTREME EVENT LIMIT STATE = 0.46
 - B) STRENGTH LIMIT STATE = 0.37
 - 3) PASSIVE EARTH PRESSURE:
 - A) EXTREME EVENT LIMIT STATE = 450 PCF
 - B) STRENGTH LIMIT STATE = 225 PCF
 - 4) HORIZONTAL EARTH PRESSURES:
 - A) LEVEL BACKFILL
 - ACTIVE = 35 PCF
 - AT-REST = 50 PCF
 - B) MAX 2:1 SLOPING BACKFILL
 - ACTIVE HORIZONTAL = 50 PCF
 - ACTIVE VERTICAL = 25 PCF
 - AT-REST HORIZONTAL = 65 PCF
 - AT-REST VERTICAL = 32 PCF
 - 5) SURCHARGE STRESSES:
 - A) ACTIVE = 0.30 x SOIL WEIGHT x SOIL HEIGHT
 - B) AT-REST = 0.45 x SOIL WEIGHT x SOIL HEIGHT
 - 6) SOIL UNIT WEIGHT = 120 PCF
 - 7) DYNAMIC LATERAL EARTH PRESSURE = 32 x (SOIL HEIGHT)²
 - B. BOX CULVERT SUBGRADE LAYER
 - 1) AN 8-INCH GRANULAR BEDDING LAYER CONSISTING OF AASHTO M43 SIZE NO. 67 GRAVEL (ASTM C 33, NO. 67 GRADATION MATERIAL) SHALL BE PROVIDED BETWEEN THE BOTTOM OF THE PLANNED STRUCTURES AND THE UNDERLYING SUBGRADE SOILS TO PROVIDE UNIFORM BEARING SUPPORT.
 - 2) AN 18-INCH STABILIZATION LAYER SHALL BE PROVIDED BELOW THE 8-INCH BEDDING LAYER FOR UNIFORM SUPPORT AT BOX CULVERTS 12 AND 17. THE 18-INCH STABILIZATION LAYER SHALL CONSIST OF 18 INCHES OF BEDDING MATERIAL WRAPPED IN SUBSURFACE DRAINAGE GEOTEXTILE TYPE 1-B SPECIFIED IN TABLE 714 OF THE SCR.
 - 3) SUBGRADE LAYER SHALL BE PLACED IN LEVEL LIFTS NOT EXCEEDING 6 INCHES IN LOOSE THICKNESS, MOISTURE-CONDITIONED TO ABOVE THE OPTIMUM MOISTURE, AND COMPACTED TO 95 PERCENT RELATIVE COMPACTION IN ACCORDANCE WITH ASTM D 1557.
 - C. STRUCTURAL FILL:
 - 1) STRUCTURAL FILL SHALL CONSIST OF SELECT GRANULAR FILL MATERIAL WITH A MAXIMUM PARTICLE SIZE OF 3 INCHES CONFORMING TO SECTION 704.4 OF THE SCR.
 - 2) STRUCTURAL FILL SHALL EXTEND A MINIMUM OF 3 FEET BEHIND THE HEADWALL.
 - 3) STRUCTURAL FILL SHALL EXTEND 1 FOOT BEYOND THE EDGE OF WING WALL FOOTINGS.
 - 4) STRUCTURAL FILL SHALL EXTEND A MINIMUM OF 1 FOOT BEYOND THE EXTERIOR WALLS OF THE BOX CULVERTS.
 - 5) STRUCTURAL FILL SHALL BE PLACED IN LEVEL LIFTS NOT EXCEEDING 12 INCHES IN LOOSE THICKNESS, MOISTURE-CONDITIONED TO ABOVE THE OPTIMUM MOISTURE, AND COMPACTED TO BETWEEN 90 AND 95 PERCENT RELATIVE COMPACTION IN ACCORDANCE WITH ASTM D 1557.
 - D. FILTER MATERIAL:
 - 1) FILTER MATERIAL SHALL CONSIST OF AASHTO M43 SIZE NO. 67 GRAVEL (ASTM C33, NO. 67 GRADATION MATERIAL) PLACED IN LEVEL LIFTS NOT EXCEEDING 6 INCHES IN LOOSE THICKNESS, MOISTURE CONDITIONED TO ABOVE THE OPTIMUM MOISTURE, AND COMPACTED TO BETWEEN 90 AND 95 PERCENT RELATIVE COMPACTION IN ACCORDANCE WITH ASTM D 1557.
 - 2) FILTER FABRIC SHALL BE SUBSURFACE DRAINAGE GEOTEXTILE TYPE 1-B SPECIFIED IN TABLE 714-1 OF THE SCR.

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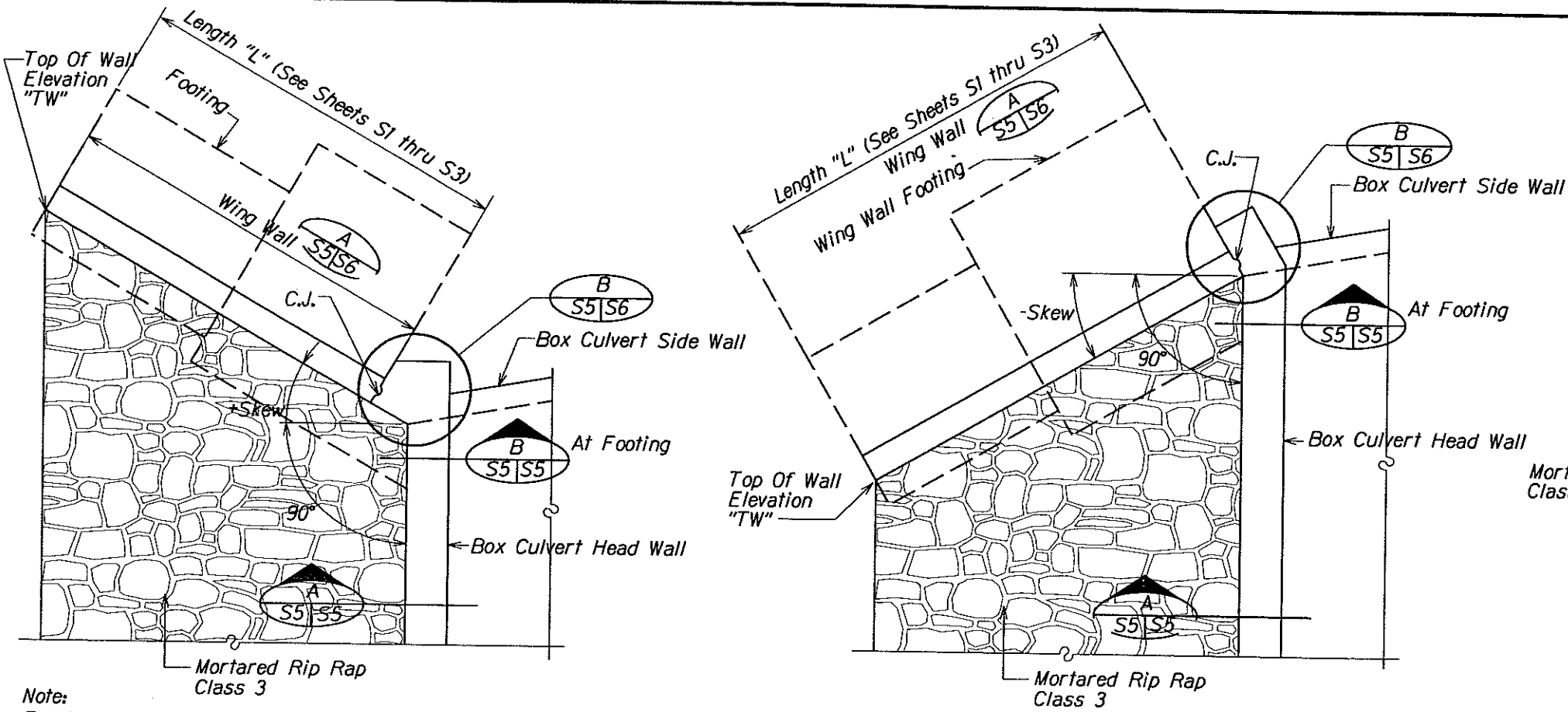
STRUCTURAL-BOX CULVERT STRUCTURAL NOTES

Scale: N/A

Date: October 15, 2004

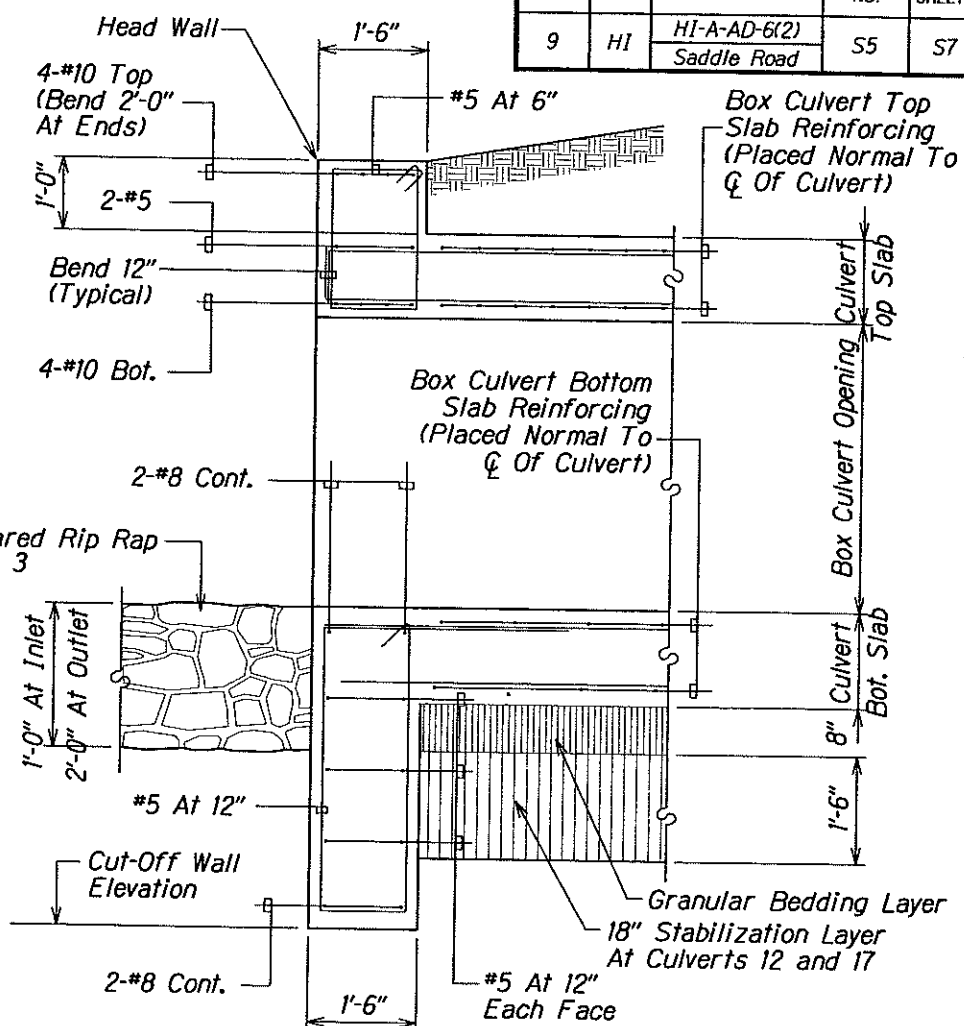
SHEET No. 4 OF 7

REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	HI	HI-A-AD-6(2) Saddle Road	S5	S7

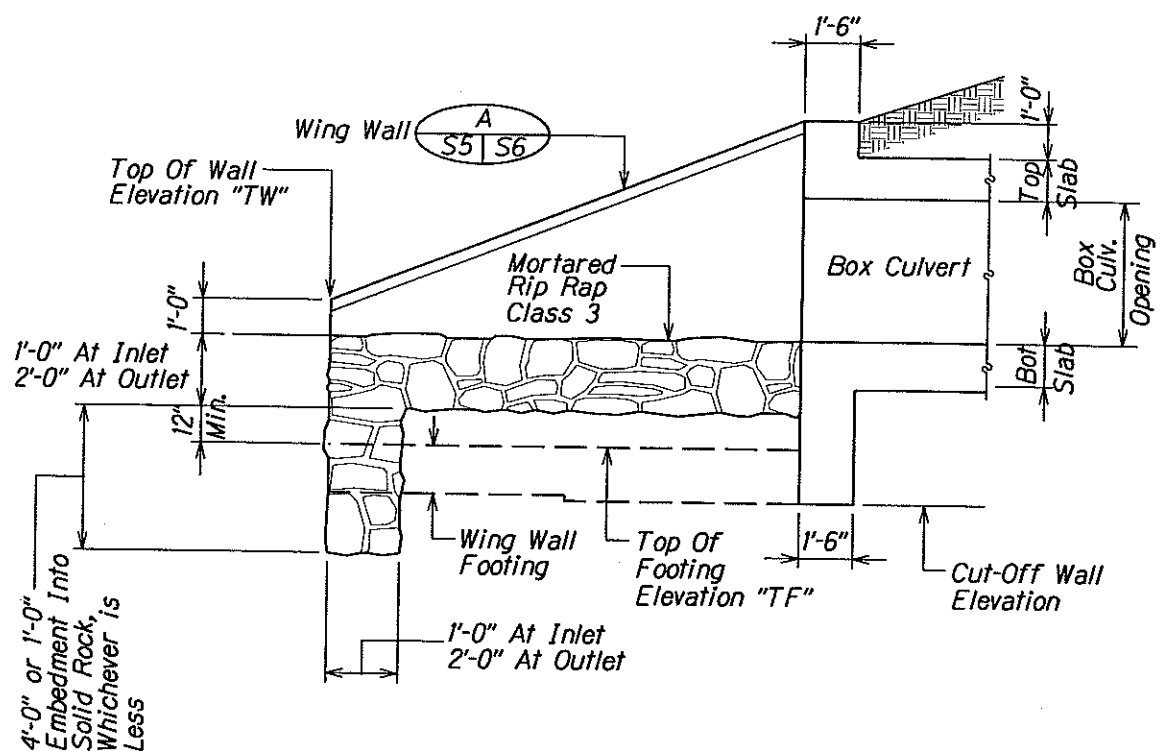


Note:
For Length And Skew Of Wing Wall, See Sheets S1 thru S3.

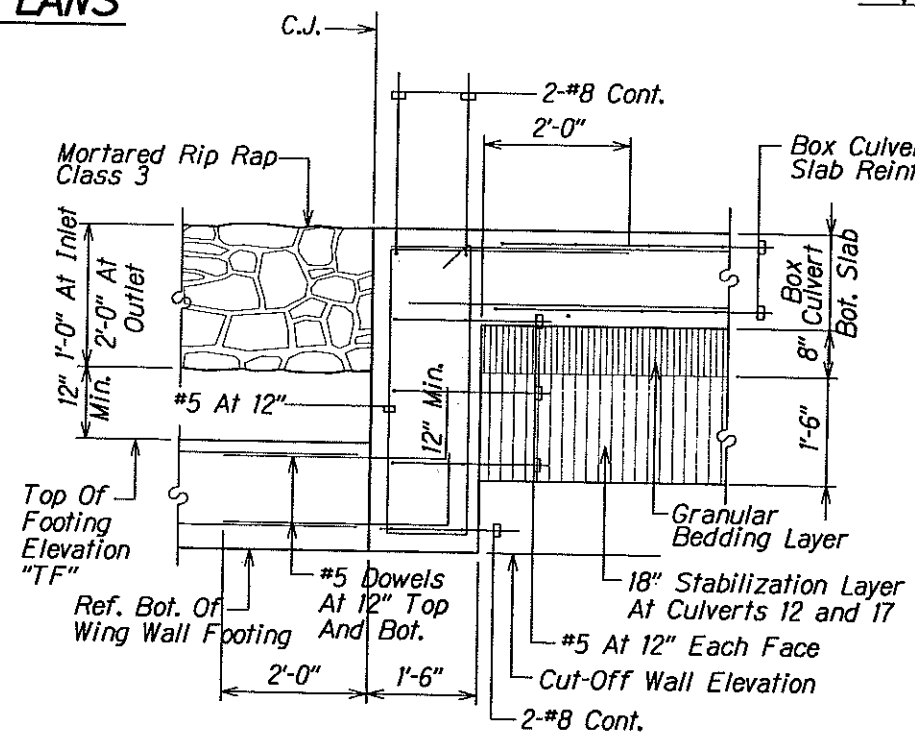
TYPICAL WING WALL PLANS
Not To Scale



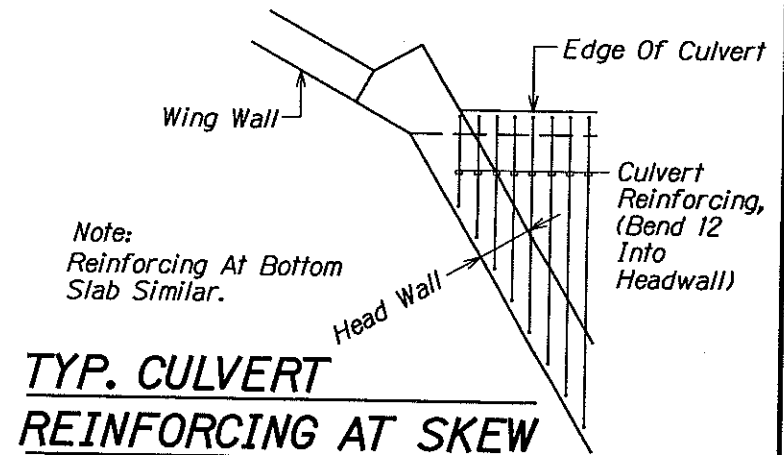
SECTION A
S1, S2, S3, S5
Scale: 3/8"=1'-0"



TYPICAL WING WALL ELEVATION
Not To Scale



SECTION B
S5, S5
Scale: 3/8"=1'-0"



Note:
Reinforcing At Bottom
Slab Similar.

**TYP. CULVERT
REINFORCING AT SKEW**
Not To Scale

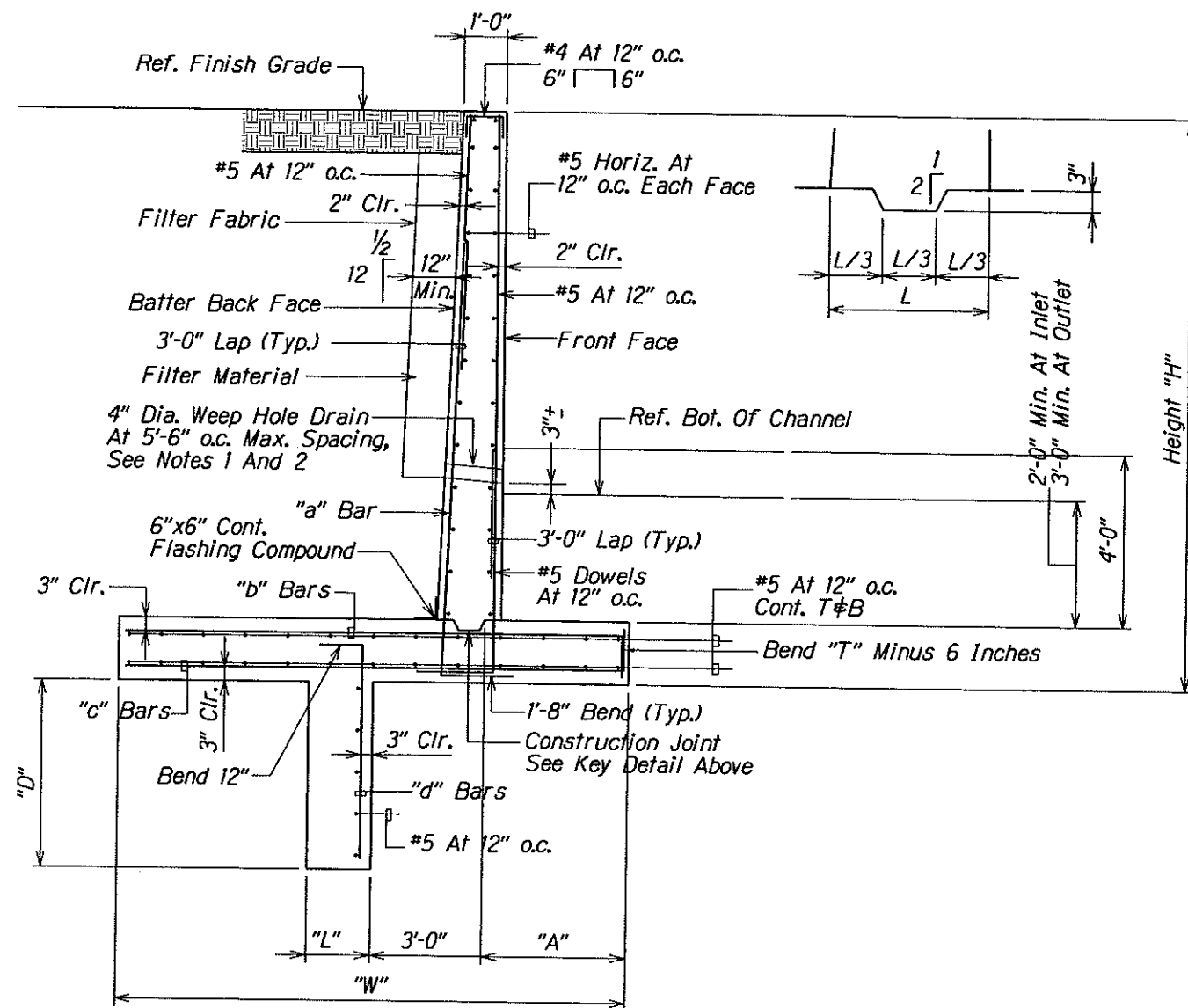
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STRUCTURAL-
WING WALL DETAILS

Scale: As Noted Date: October 15, 2004

SHEET No. 5 OF 7

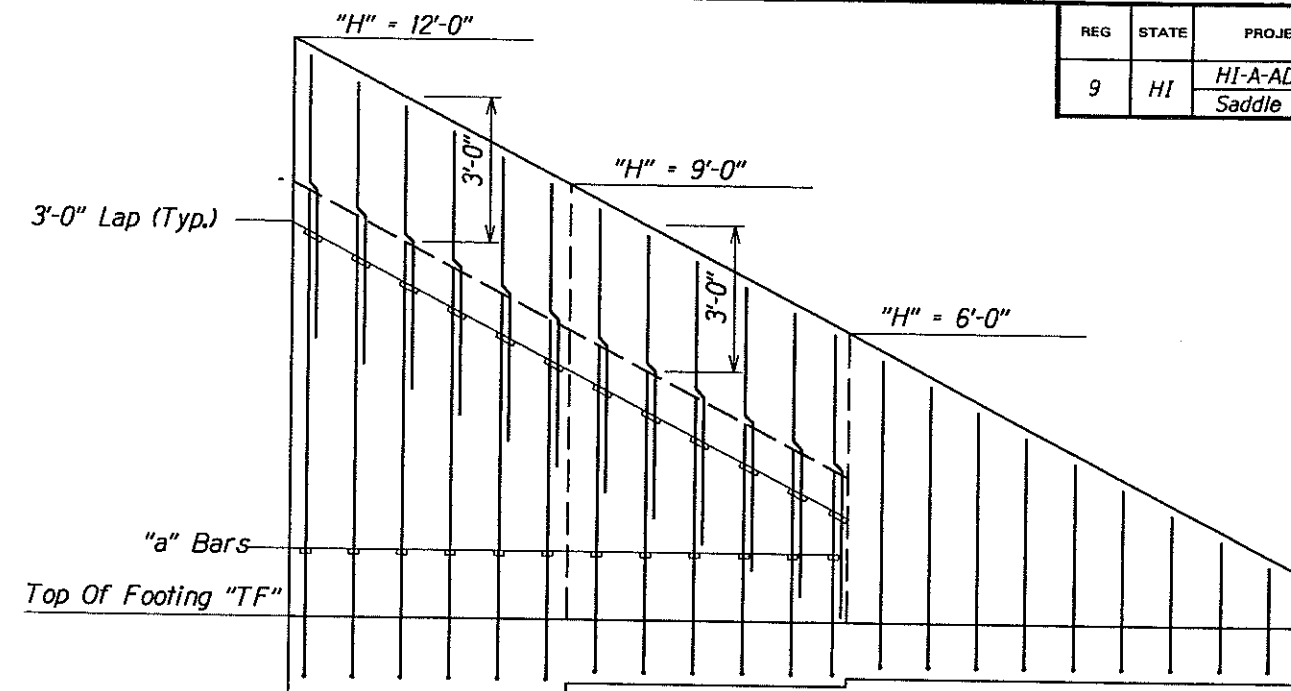
REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	HI	HI-A-AD-6(2) Saddle Road	S6	S7



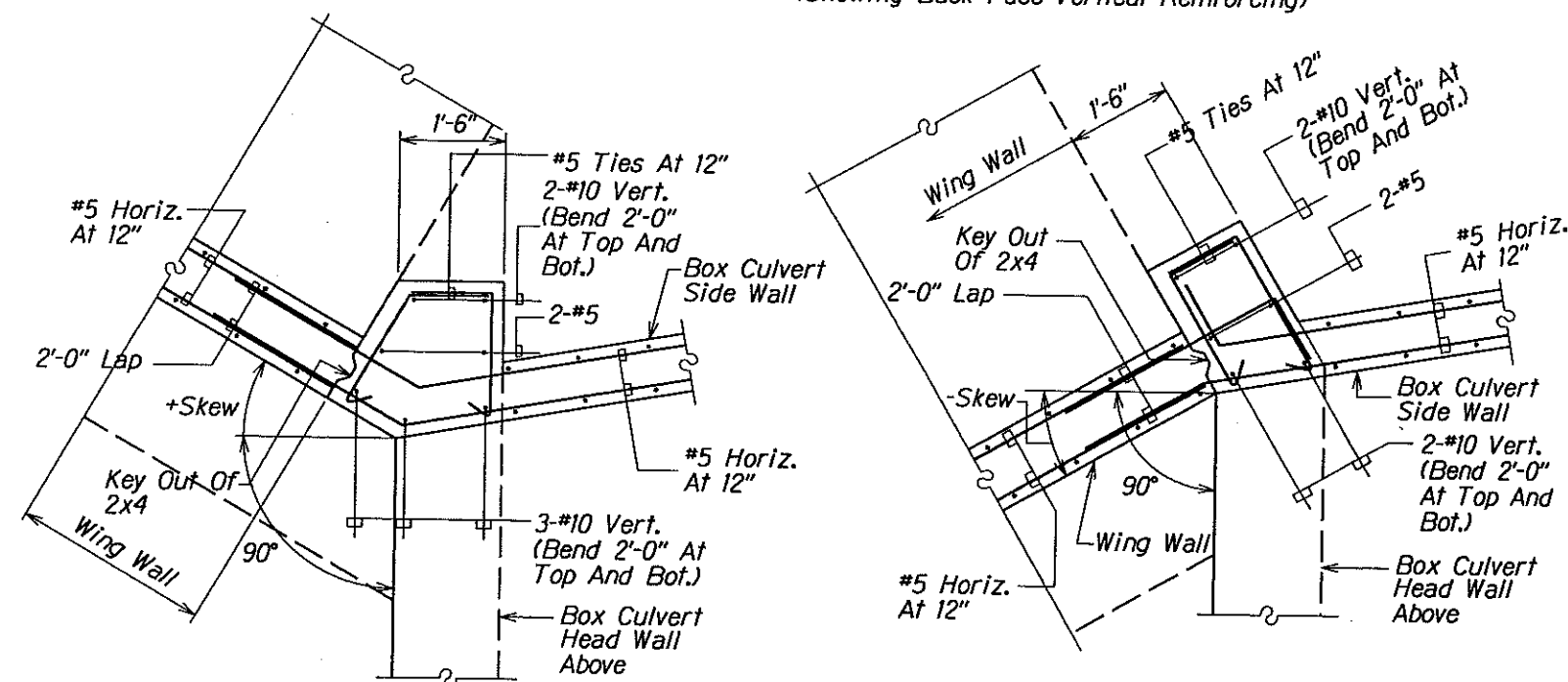
- Exposed Wall Drains Shall Be Located 3"± Above Reference Bottom Of Channel.
- Provide 6" Square Filter Fabric Anchored Firmly To Back Face of Weep Hole Drain.
- Refer To Typical Wing Wall Elevation And Table For Dimensions And Reinforcing.

WING WALL SECTION
Scale: 1/4"=1'-0"

WING WALL TABLE									
Height "H"	"W"	"A"	"T"	"D"	"L"	"a" BAR	"b" BAR	"c" BAR	"d" BAR
"H" ≤ 6'-0"	6'-0"	1'-0"	1'-2"	2'-0"	1'-2"	#5 At 12" o.c.	#5 At 12" o.c.	#5 At 12" o.c.	#5 At 12" o.c.
6'-0" < "H" ≤ 9'-0"	9'-0"	2'-0"	1'-4"	3'-0"	1'-4"	#7 At 12" o.c.	#7 At 12" o.c.	#5 At 12" o.c.	#5 At 12" o.c.
9'-0" < "H" ≤ 12'-0"	12'-0"	3'-0"	1'-6"	4'-6"	1'-6"	#9 At 12" o.c.	#9 At 12" o.c.	#6 At 12" o.c.	#5 At 6" o.c.



TYPICAL WING WALL ELEVATION
Not To Scale (Showing Back Face Vertical Reinforcing)



TYPICAL SECTION AT BOX CULVERT WING WALLS
Scale: 3/8"=1'-0"

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STRUCTURAL-

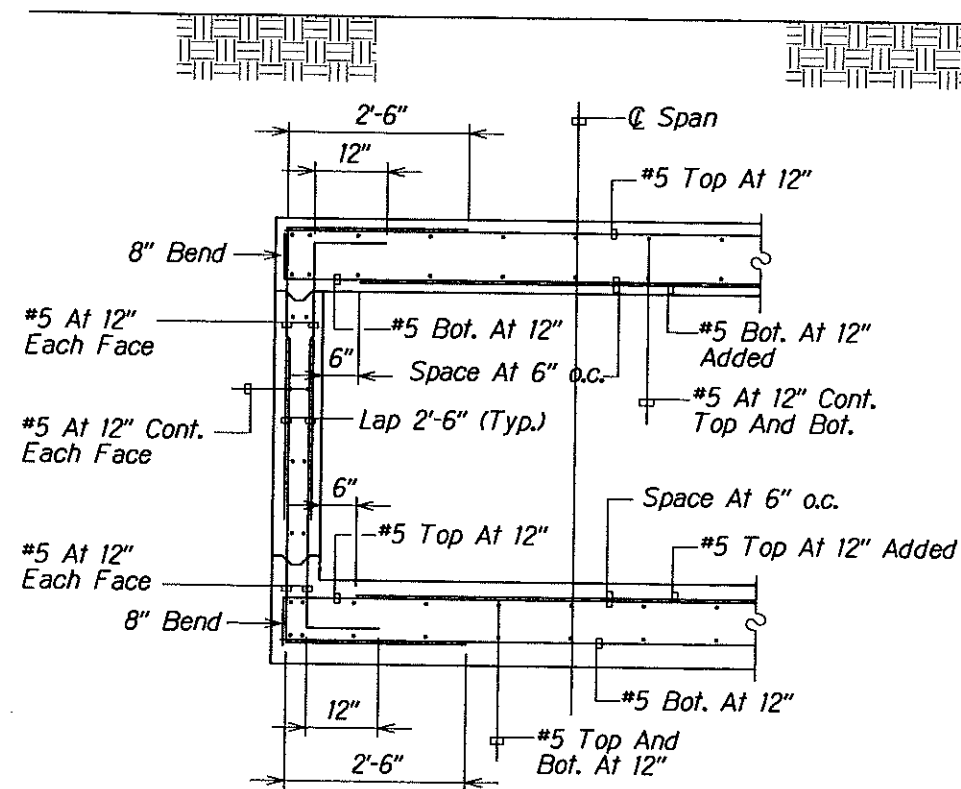
WING WALL DETAILS

Scale: As Noted

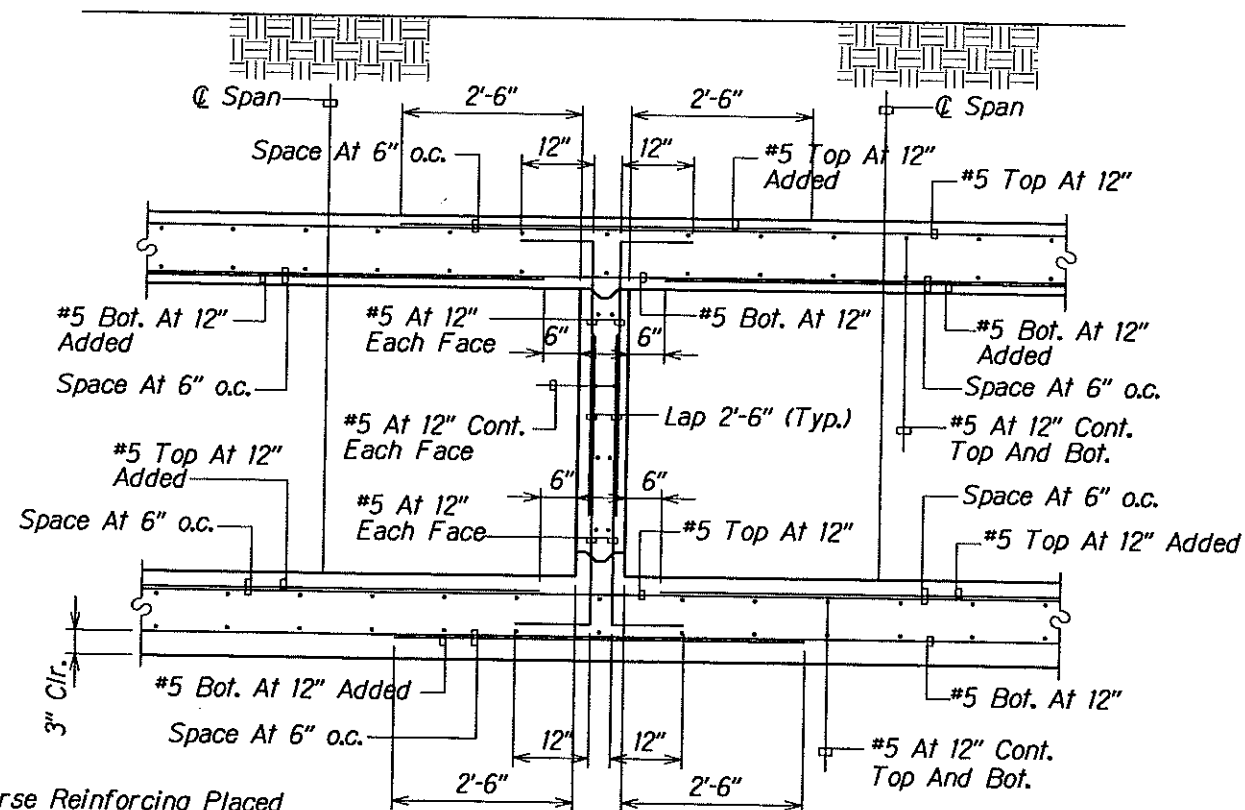
Date: October 15, 2004

SHEET No. 6 OF 7

REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	HI	HI-A-AD-6(2) Saddle Road	S7	S7



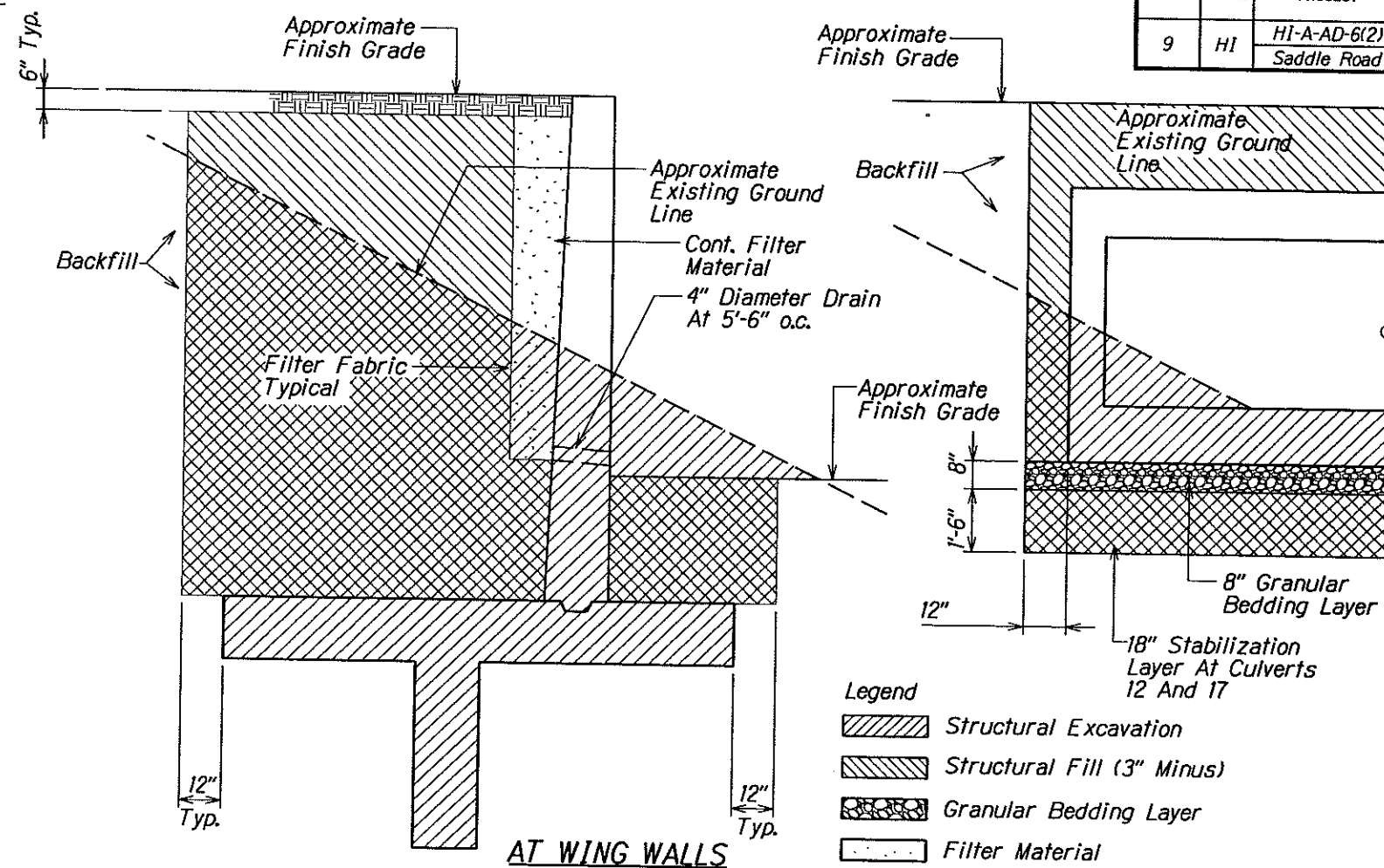
AT EXTERIOR WALL



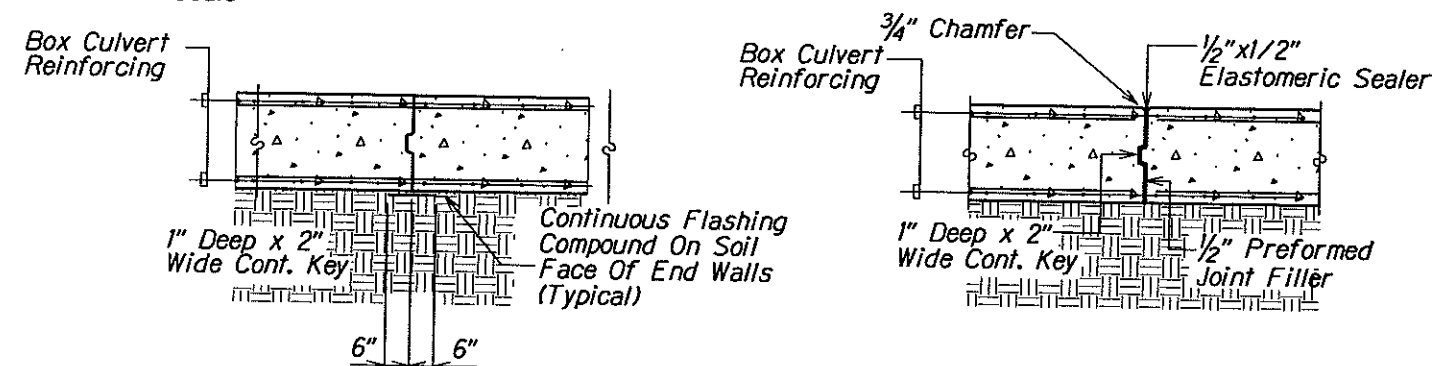
Note:
Transverse Reinforcing Placed
Normal To Culvert.

AT INTERIOR WALL

TYPICAL CULVERT SECTION
Scale: 3/8"=1'-0"



TYPICAL STRUCTURAL EXCAVATION AND BACKFILL PAY LIMITS
Not To Scale



CONSTRUCTION JOINT (C.J.)

EXPANSION JOINT (E.J.)

BOX CULVERT JOINT DETAILS
Scale: 1/4"=1'-0"

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**STRUCTURAL-EXCAVATION &
BACKFILL DETAILS**

Scale: As Noted Date: October 15, 2004

SHEET No. 7 OF 7