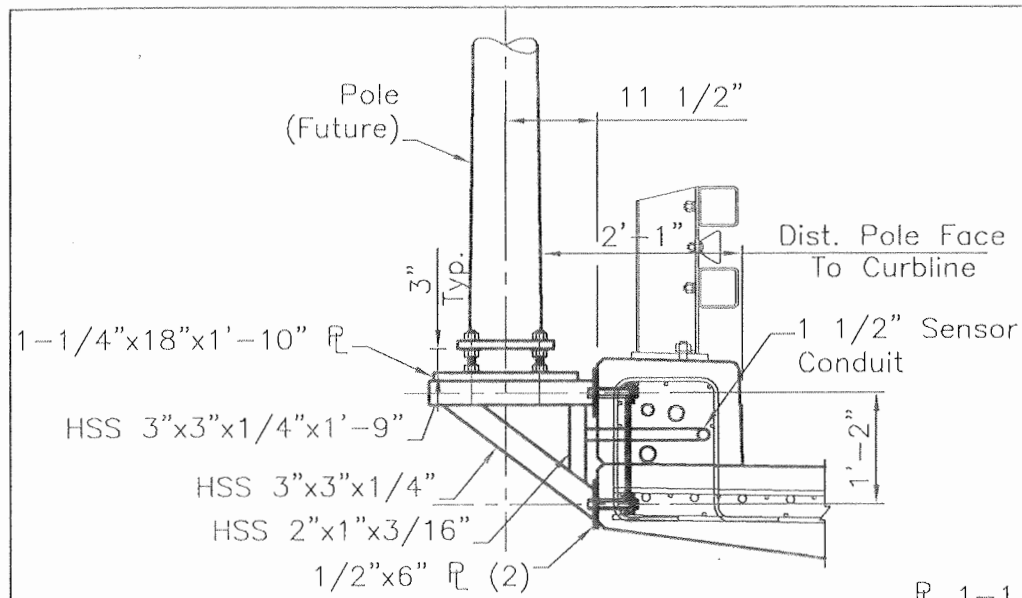
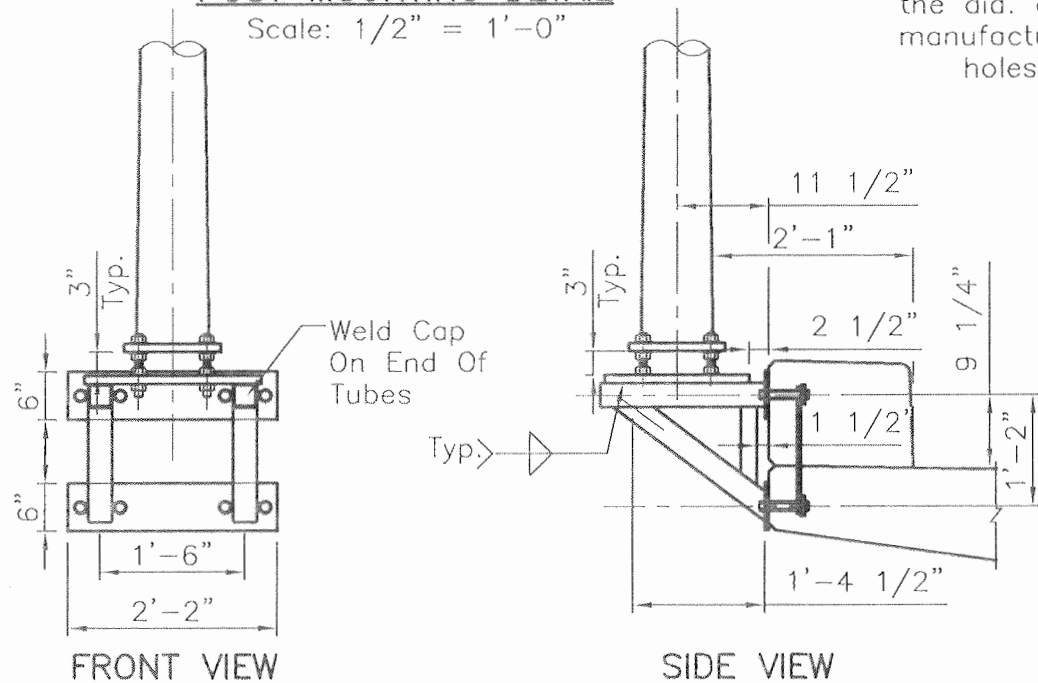


Design	INITIAL	DATE	Quantity	INITIAL	DATE
	Designed By	07/08		Checked By	MM/YY
Detail	INITIAL	DATE	Quantity	INITIAL	DATE
	Detailed By	07/08		Checked By	MM/YY



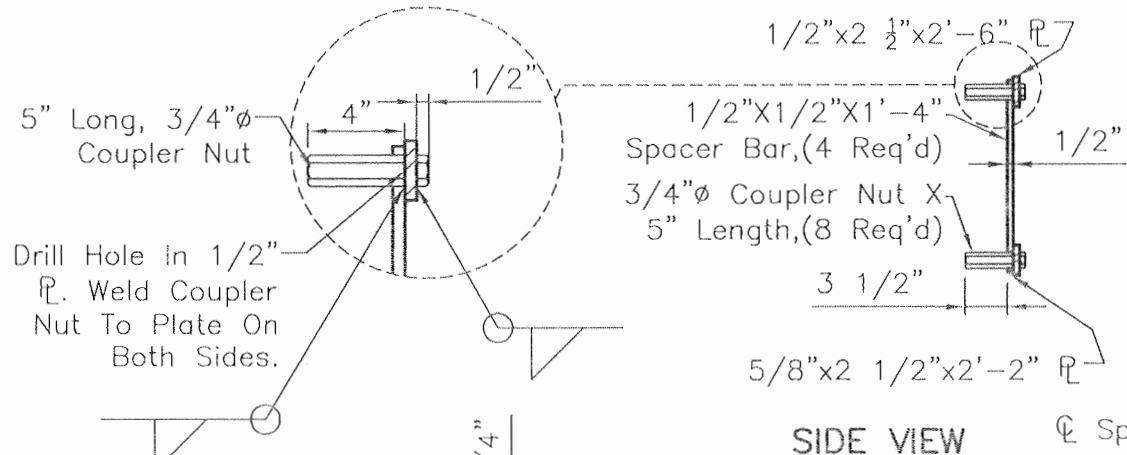
POST MOUNTING DETAIL

Scale: 1/2" = 1'-0"



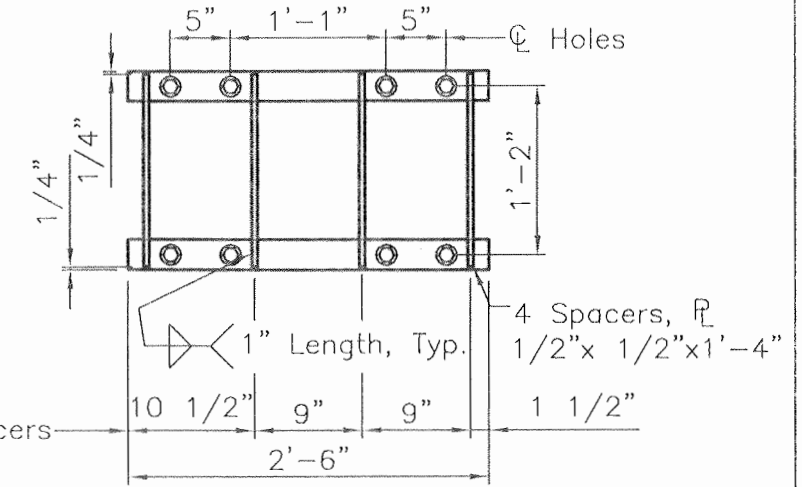
OUTSIDE MOUNTING BRACKET

Scale: 1/2" = 1'-0"



BARRIER INSERT DETAIL

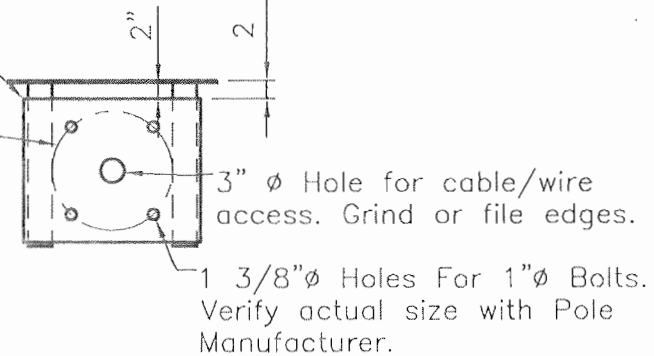
Scale: 3/4" = 1'-0"



FRONT VIEW

1-1/4 x 18 x 1-10

Bolt Circle. 15" Dia. Match the dia. of the pole manufacturer. Orient holes as shown.

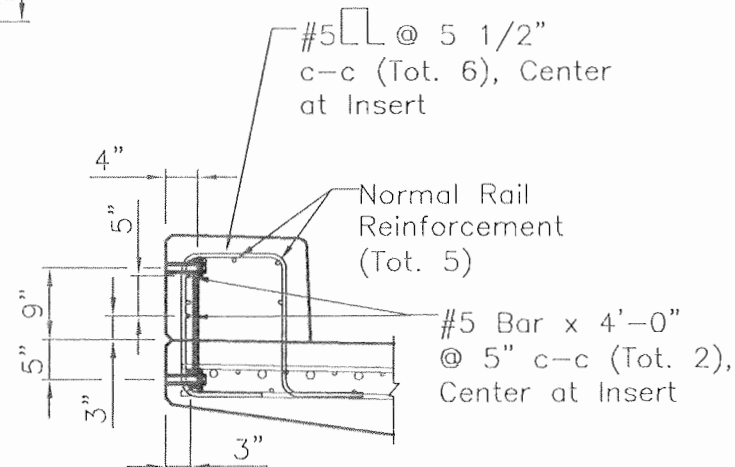


PLAN VIEW OF MOUNTING BRACKET

Scale: 1/2" = 1'-0"

STRUCTURAL STEEL AND METAL EMBEDMENTS FOR CONCRETE STRUCTURES

- Miscellaneous steel items in the structures shall be fabricated from structural steel conforming to ASTM A36 or A572. Welding shall meet requirements of AWS D1.1. The finished fabrication shall be hot-dip galvanized in accordance with ASTM A123.
- All Bolts, Nuts and Washers shall be A325, and shall be galvanized.
- All HSS Round or Rectangular Sections shall conform to ASTM A500, Grade B or C structural tubing.
- All welds shall be 1/4" minimum effective throat welds, or to the thickness of the smaller material being welded, whichever is smaller, based on 70 ksi electrode strength. HSS members may require flare bevel welds.
- 3/4" Coupler Nuts shall be 5" minimum in length, and shall meet the requirements of A325.
- Bolts to connect the Bracket to the barrier shall be 3 1/2" in length with washers.
- Pole Mounting Bracket is designed for following conditions:
 - Maximum wind velocity of 100 mph.
 - Maximum height of pole not to exceed 30 feet from top of mounting bracket plate.
 - Top of pole shall not exceed 100 feet as measured above the local ground elevation.
 - Horizontal projected area of installed equipment shall not exceed 4.5 SF mounted at 27 Feet above the top of the mounting plate (or equivalent produced moment).
 - Base of the pole shall not exceed 8" diameter, Bolt circle shall not exceed 15".



BARRIER WITH BRACKET INSERTS

Scale: 1/2" = 1'-0"

Print Date: Wednesday, September 01, 2010	
File Name: 0208005.08P101-RAMP D.DWG	
Horiz. Scale: As Noted Vert. Scale: As Noted	
Unit Information Unit Leader Initials	

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

As Constructed
No Revisions: 11/1/09
Revised:
Void:

SENSOR POLE ANCHORAGE			
Designer: Daniel Hull	Structure: P-05-Y		
Detailer: Rick Keller	Numbers:		
Sheet Subset: Anti-Icing	Subset Sheets: AIS5 of AIS5		

Project No./Code
NH 1602-114
16042
Sheet Number 346

GENERAL NOTES

THESE PLANS ARE TO BE USED IN CONJUNCTION WITH BOOK 4 - WALL PLANS. HORIZONTAL AND VERTICAL GEOMETRY, COPING DETAILS, PRECAST PANEL DETAILS, LEVELING PAD, AND RETURN WALL DETAILS ARE TO BE CONSTRUCTED FROM THIS SET OF PLANS. GROUND NAIL WALL DETAILS ARE TO BE CONSTRUCTED USING BOOK 4 - WALL PLANS.

GENERAL NOTES FROM BOOK 4, SHEET 53, APPLY TO THIS SET OF PLANS, AS APPLICABLE. ADDITIONAL INFORMATION, AS REQUIRED HAS BEEN PROVIDED ON THIS SHEET.

FOR ENGINEERING GEOLOGY, REFER TO BOOK 4 - WALL PLANS.

FOR STRUCTURAL CONCRETE COATING COLORS, REFER TO BOOK 4, SHEET 116.

GRADE 60 REINFORCING STEEL IS REQUIRED.

THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR EPDXY COATED REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS B CONCRETE	1'-3"	1'-7"	2'-6"	3'-5"	4'-6"	5'-8"	7'-2"	8'-10"
SPLICE LENGTH FOR CLASS D CONCRETE	1'-3"	1'-7"	2'-5"	2'-10"	3'-8"	4'-8"	5'-11"	7'-3"

WHEN THE CONTRACTOR ELECTS TO SUBSTITUTE EPDXY COATED REINFORCEMENT FOR BLACK REINFORCING BARS, THE MINIMUM LAP SPLICE SHALL BE AS DESCRIBED ABOVE.

THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR BLACK REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS B CONCRETE	1'-1"	1'-4"	1'-8"	2'-4"	3'-0"	3'-10"	4'-10"	5'-11"
SPLICE LENGTH FOR CLASS D CONCRETE	1'-1"	1'-4"	1'-7"	1'-11"	2'-6"	3'-1"	3'-11"	4'-10"

THE ABOVE SPLICE LENGTHS MAY BE REDUCED BY 20% WHEN 3" OF CLEAR COVER EXISTS AND BAR SPACING IS 6" OR GREATER ON CENTER.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION.

E.F. = EACH FACE
 B.F. = BACK FACE
 F.F. = FAR FACE
 ABUT = ABUTMENT
 N.F. = NEAR FACE
 LDL = LAYOUT LINE

LEVEL II SULFATE RESISTANT CEMENT IS REQUIRED FOR STRUCTURAL CONCRETE.

DESIGN DATA (PRECAST PANELS, COPING, AND LEVELING PADS)

DESIGN METHOD:

PANELS: LRFD STRENGTH I LIMIT STATE & SERVICE I LIMIT STATE: AASHTO LRFD FOURTH EDITION

GEO TECHNICAL DATA:
 WALL FOUNDATION ON BEDROCK
 ULTIMATE BEARING CAPACITY = 11,500 psf
 RESISTANCE FACTOR FOR BEARING = 0.45
 ULTIMATE COEFFICIENT OF FRICTION = 0.53
 RESISTANCE FACTOR FOR SLIDING = 0.85

UNSUITABLE FOUNDATION MATERIAL SHALL BE REPLACED WITH SUITABLE FOUNDATION MATERIAL IN ACCORDANCE WITH 206.03 OF THE STANDARD SPECIFICATIONS.

REINFORCED CONCRETE:

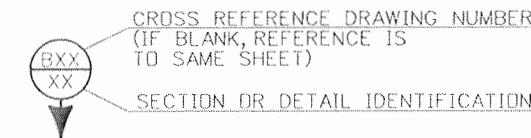
CLASS B CONCRETE: f'c = 4,500 psi
 CLASS D CONCRETE: f'c = 4,500 psi
 REINFORCING STEEL: fy = 60,000 psi

INDEX OF DRAWINGS

W-1	SUPPLEMENTAL GENERAL NOTES/SUMMARY OF QUANTITIES
W-2	GROUND NAIL WALL P-05-F PLAN & ELEVATION (1 OF 3)
W-3	GROUND NAIL WALL P-05-F PLAN & ELEVATION (2 OF 3)
W-4	GROUND NAIL WALL P-05-F PLAN & ELEVATION (3 OF 3)
W-5	GROUND NAIL WALL P-05-K PLAN & ELEVATION (1 OF 2)
W-6	GROUND NAIL WALL P-05-K PLAN & ELEVATION (2 OF 2)
W-7	GROUND NAIL WALL ARCHITECTURAL DETAILS (1 OF 2)
W-8	GROUND NAIL WALL ARCHITECTURAL DETAILS (2 OF 2)
W-9	GROUND NAIL WALL PRECAST PANEL DETAILS
W-10	GROUND NAIL WALL COPING DETAILS
W-11	GROUND NAIL WALL MISCELLANEOUS DETAILS

SUMMARY OF QUANTITIES (PRECAST PANELS AND COPING)

Item No.	Description	Units	Wall P-05-F	Wall P-05-K
504	Full Ht. Precast Concrete Panel Facing	SF	37,560	9,843
601	Concrete Class B (Wall)	CY	178	88
602	Reinforcing Steel (Epoxy Coated)	LB	20,770	10,320



Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
AML	08/08	AML	08/08	AML	08/08
Designed By		Detailed By		Quantities By	
Checked By		Checked By		Checked By	

Print Date: 9/23/2010	Sheet Revisions			Colorado Department of Transportation		As Constructed		GROUND NAIL WALL SUPPLEMENTAL GENERAL NOTES/ SUMMARY OF QUANTITIES		Project No./Code
File Name: 16042F_GenNotes_01.dgn	Date:	Comments:	Init.	3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365		No Revisions: 9/10		Designer: T. Melton Structure WALL P-05-F		NH 1602-114
Horiz. Scale: 1:1 Vert. Scale: As Noted				Region 5 EJA		Revised:		Detailer: R. Artman Numbers WALL P-05-K		16042
Unit Information 0221 Unit Leader STW						Void:		Sheet Subset: Bridge Subset Sheets: W1 of 11		Sheet Number 347
SEMA CONSTRUCTION	WILSON & COMPANY			DOT DEPARTMENT OF TRANSPORTATION						

CURVE DATA

C-1
 $\Delta = 12^\circ 33'12.34''$
 $D = 5^\circ 49'32.53''$
 $L = 108.17'$
 $T = 215.48'$
 $R = 983.50'$

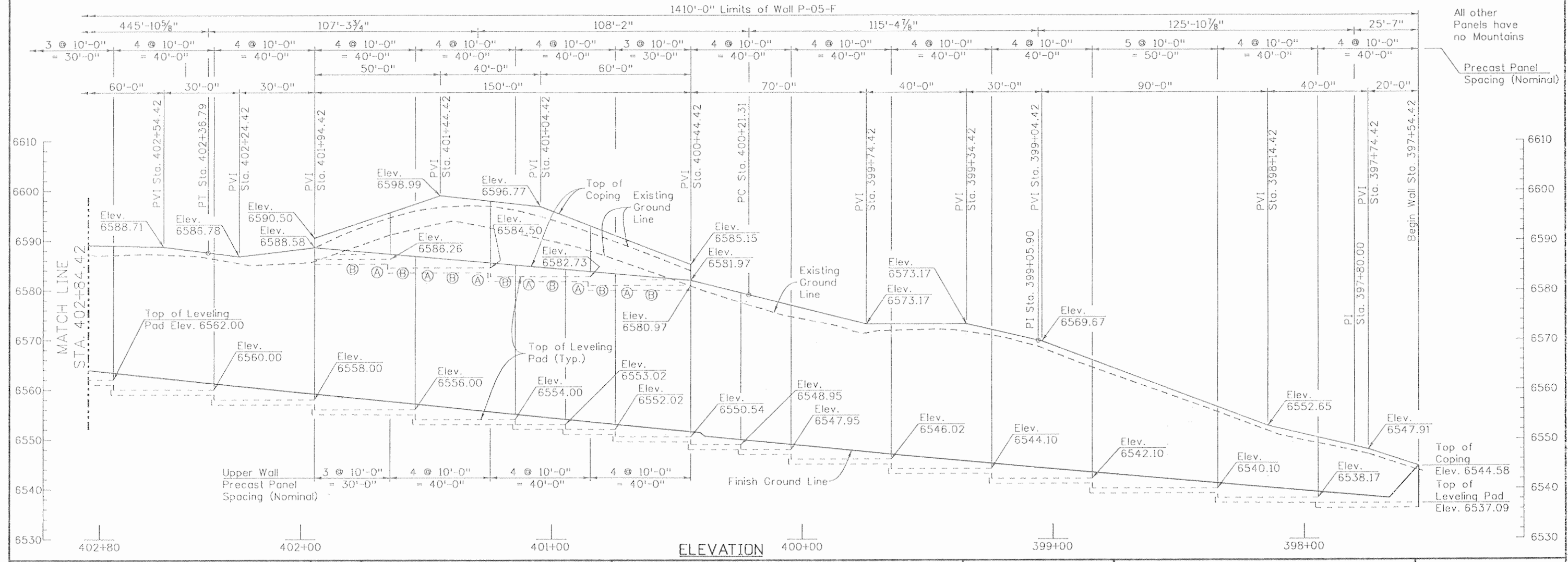
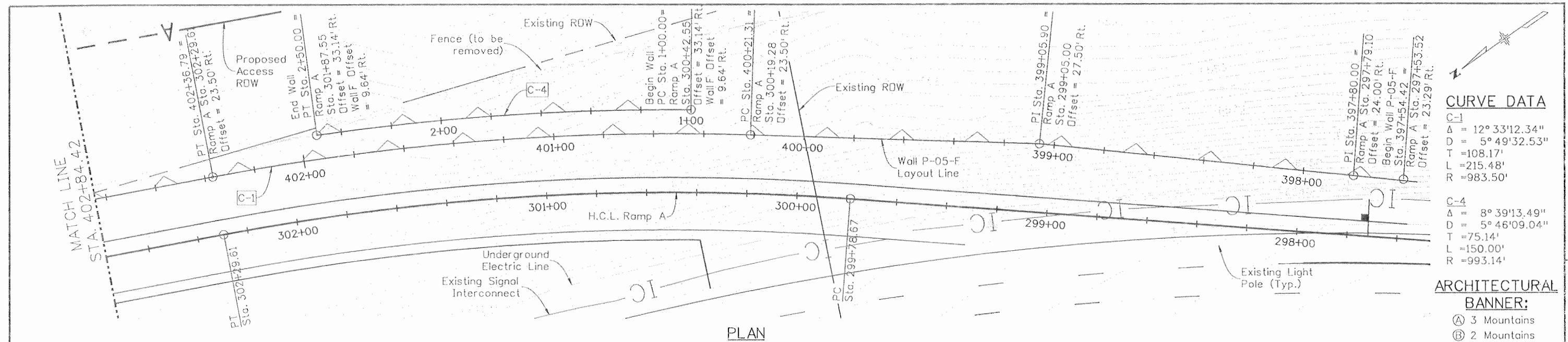
C-4
 $\Delta = 8^\circ 39'13.49''$
 $D = 5^\circ 46'09.04''$
 $L = 75.14'$
 $T = 150.00'$
 $R = 993.14'$

ARCHITECTURAL BANNER:

- Ⓐ 3 Mountains
- Ⓑ 2 Mountains

All other Panels have no Mountains

Precast Panel Spacing (Nominal)



Design		Detail		Quantity	
Designed By	TRJ	INITIAL	DATE	INITIAL	DATE
Checked By		DRA	8-08	SRB	7-08
		JMB	8-08	ARR	7-08
		Checked By		Checked By	

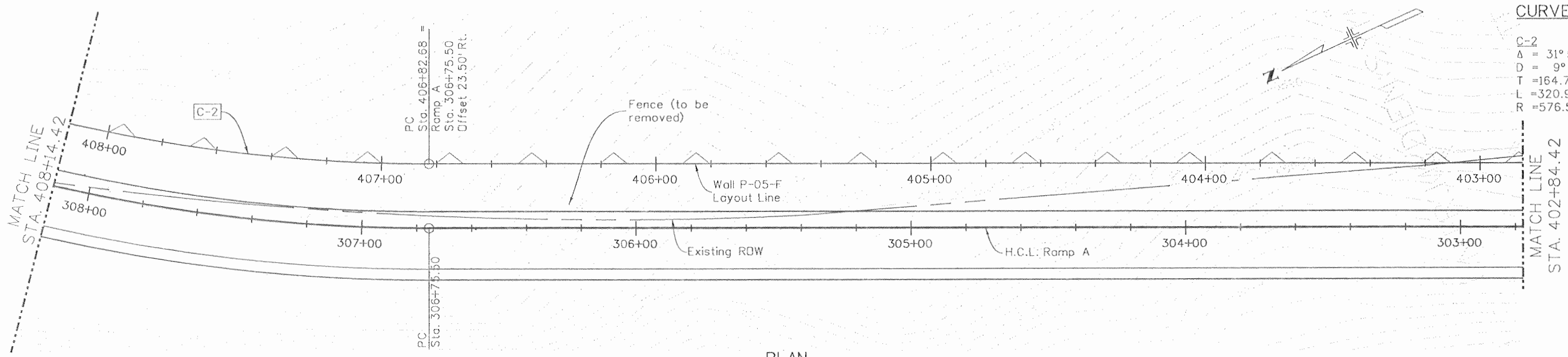
Print Date: 9/23/2010 File Name: 16042F_GenLayout_01.dgn Horiz. Scale: 1:1 Unit Information 0221	Vertical Scale: As Noted Unit Leader STW	Sheet Revisions <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Date:</th> <th>Comments</th> <th>Init.</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	Date:	Comments	Init.				Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5	As Constructed No Revisions: 9/10 Revised: Void:	GROUND NAIL WALL P-05-F PLAN & ELEVATION (1 OF 3) Designer: B. Hearn Detailer: D. Anderson Sheet Subset: Wall Subset Sheets: W2 of 11	Project No./Code NH 1602-114 16042 Sheet Number 348
Date:	Comments	Init.										



EJA

CURVE DATA

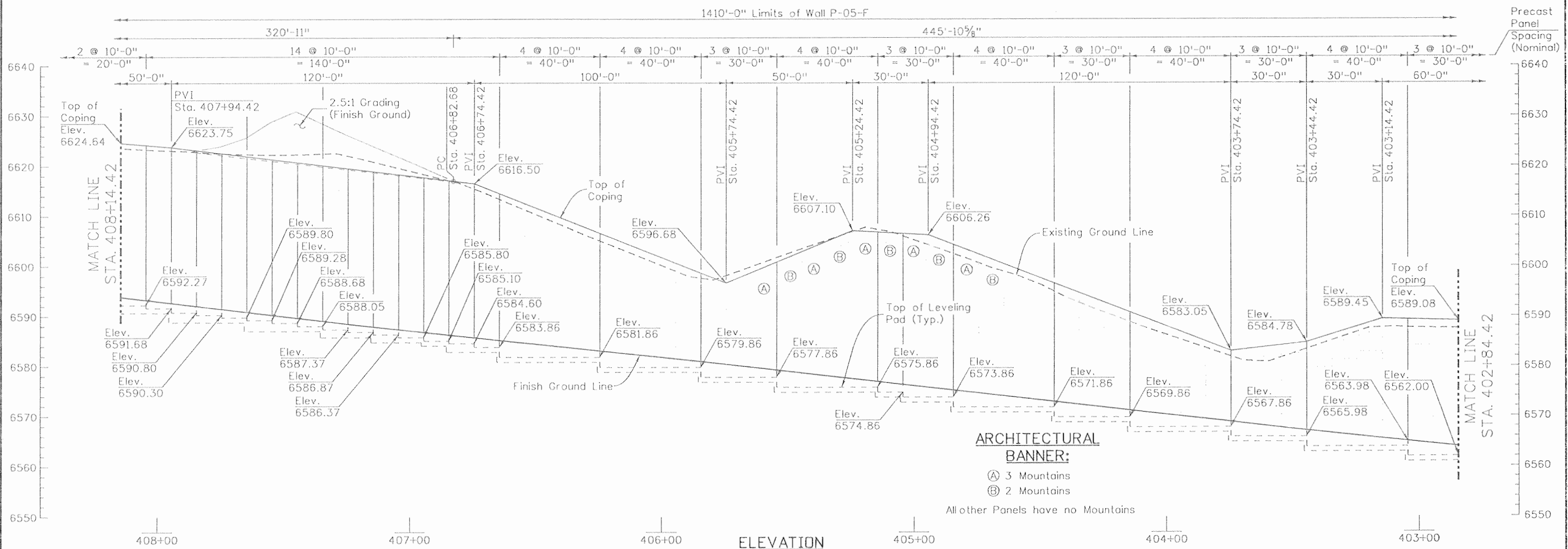
C-2
 Δ = 31° 53' 43.67"
 D = 9° 56' 18.80"
 T = 164.74'
 L = 320.93'
 R = 576.50'



PLAN

1410'-0" Limits of Wall P-05-F

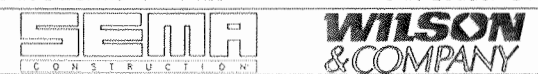
Design		Detail		Quantities	
Designed By	TRJ	Initial	JMB	Initial	SRB
Checked By	TRJ	Date	8-08	Date	7-08
		Checked By	JMB	Checked By	AAR

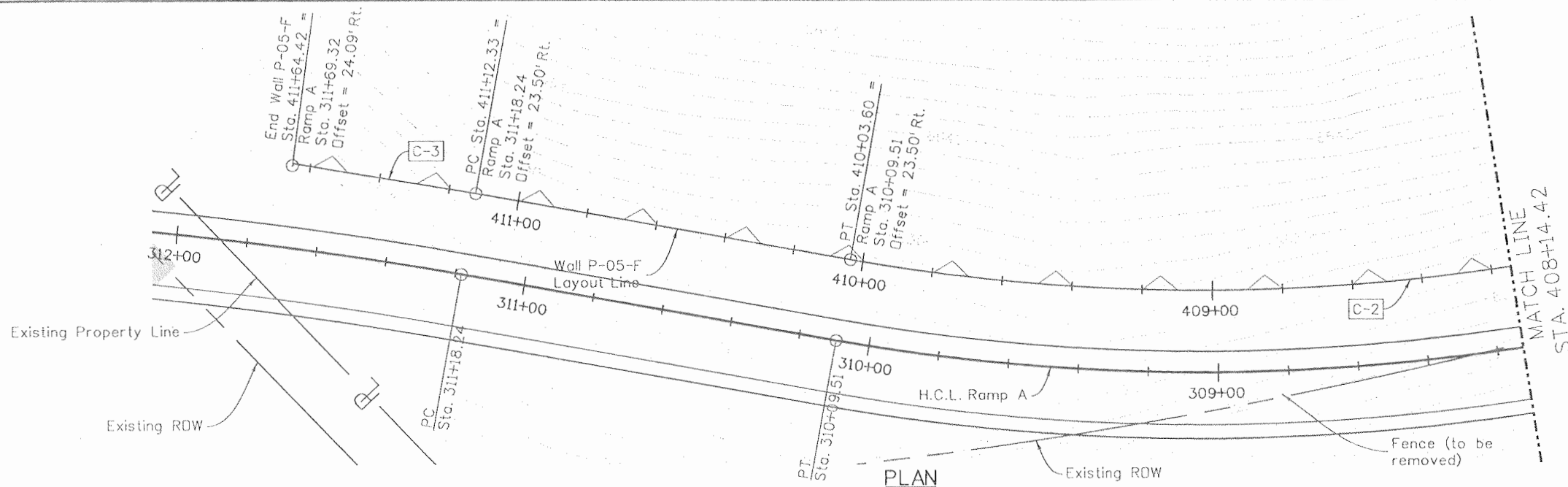


ARCHITECTURAL BANNER:

- (A) 3 Mountains
- (B) 2 Mountains
- All other Panels have no Mountains

Print Date: 9/23/2010 File Name: i6042F_GenLayout_02.dgn Horiz. Scale: 1:1 Unit Information 0221	Vert. Scale: As Noted Unit Leader STW	Sheet Revisions Date: Comments Init.	Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5 EJA	As Constructed No Revisions: 9/10 Revised: Void:	GROUND NAIL WALL P-05-F PLAN & ELEVATION (2 OF 3) Designer: B. Hearn Detailer: D. Anderson Sheet Subset: Wall	Project No./Code NH 1602-114 16042 Sheet Number 349
---	--	--	---	--	---	--





CURVE DATA

C-2
 Δ = 31° 53' 43.67"
 D = 9° 56' 18.80"
 T = 164.74'
 L = 320.93'
 R = 576.50'

C-3
 Δ = 9° 15' 36.42"
 D = 4° 40' 58.59"
 T = 99.09'
 L = 197.74'
 R = 1223.50'

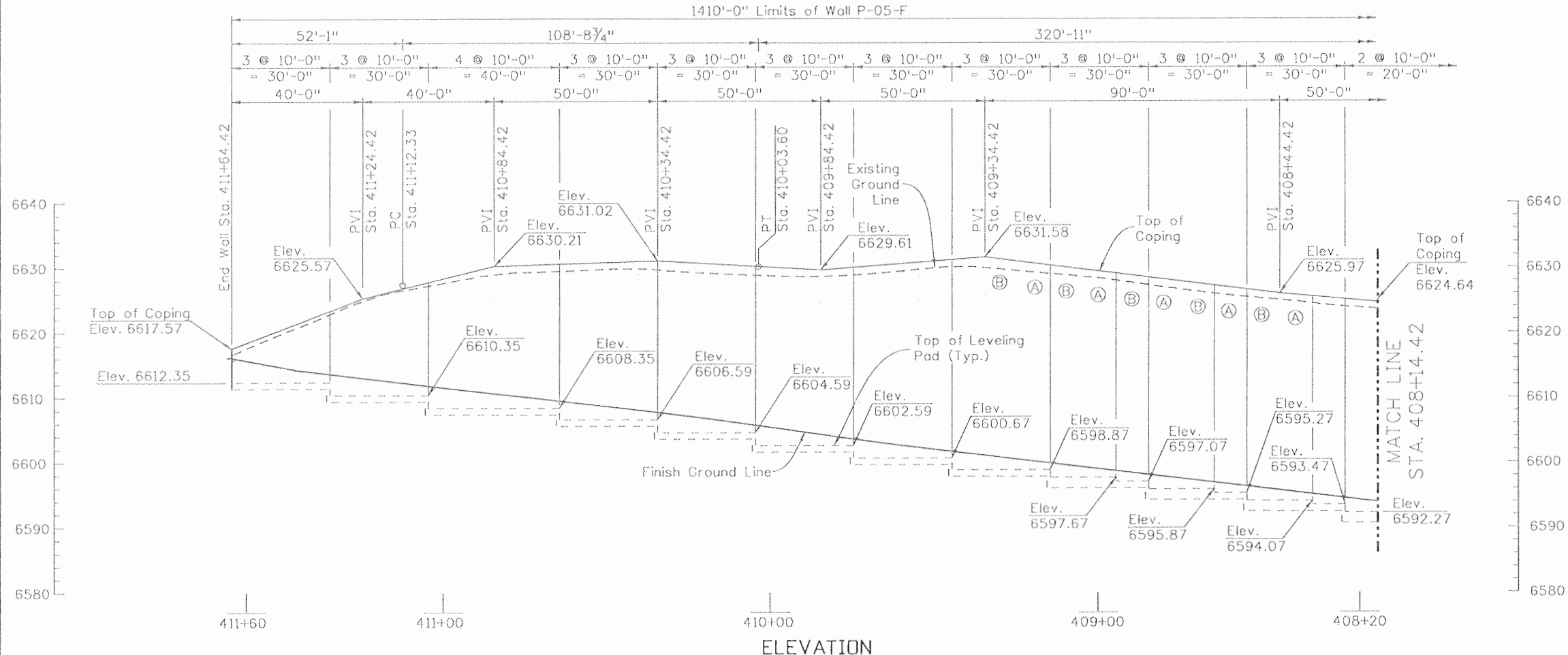
ARCHITECTURAL BANNER:

- Ⓐ 3 Mountains
- Ⓑ 2 Mountains

All other Panels have no Mountains

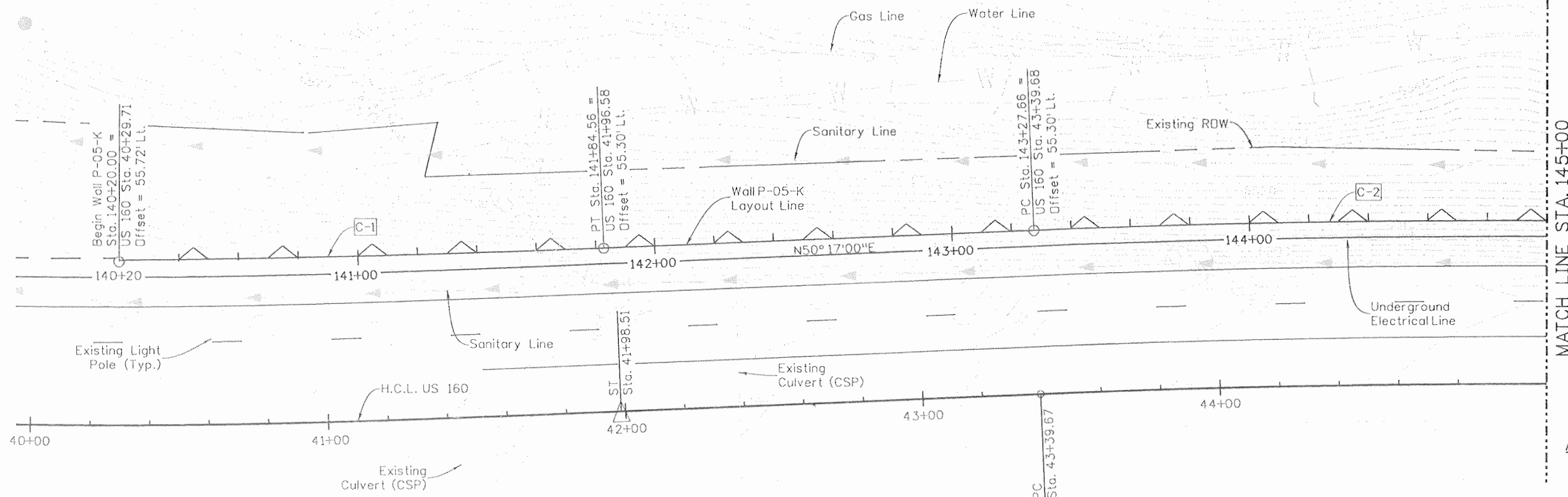
PLAN

Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
Designed By	TWM	8-08	DR	8-08	SRB
Checked By	TRJ	8-08	JMB	8-08	AAR



ELEVATION

Print Date: 9/23/2010	Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5	As Constructed No Revisions: 9/10 Revised: Void:	GROUND NAIL WALL P-05-F PLAN & ELEVATION (3 OF 3)		Project No./Code
File Name: 16042F_GenLayout_03.dgn	Date:	Comments:	Init.			Designer: B. Hearn Detailer: D. Anderson Sheet Subset: Wall	Structure: WALL P-05-F Subset Sheets: W4 of 11	NH 1602-114
Horiz. Scale: 1:1 Unit Information 0221	Vert. Scale: As Noted						16042	Sheet Number 350



CURVE DATA

C-1
Δ = 2° 13' 46.18"
D = 1° 08' 45.30"
T = 97.29'
L = 194.56'
R = 5000.00'
C-2
Δ = 6° 30' 29.35"
D = 1° 28' 01.66"
T = 222.04'
L = 443.60'
R = 3905.30'

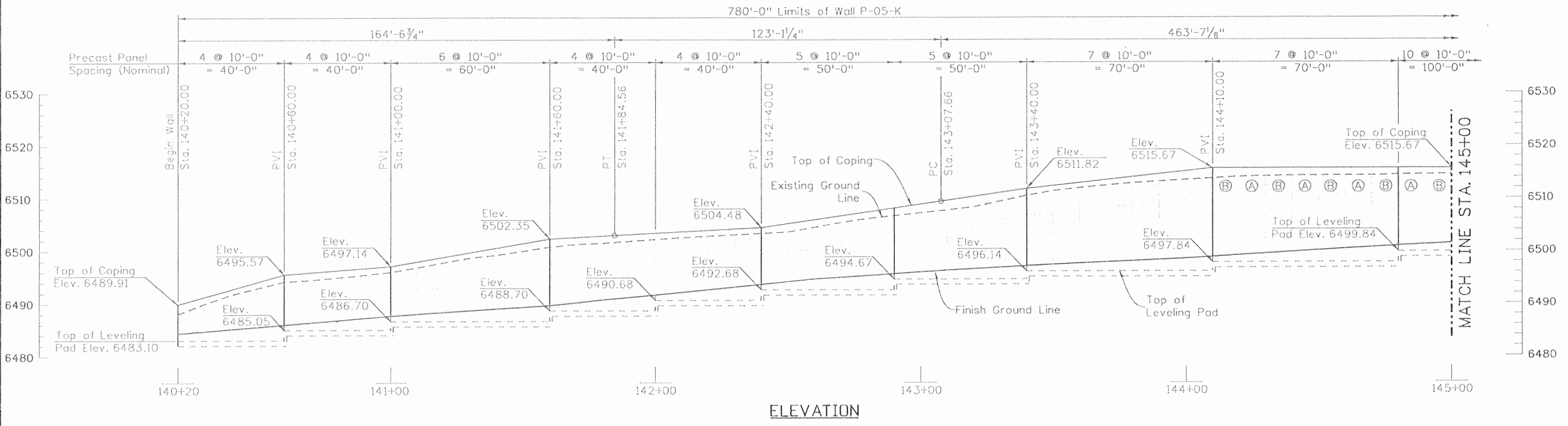
ARCHITECTURAL BANNER:

- Ⓐ 3 Mountains
- Ⓑ 2 Mountains

All other Panels have no Mountains

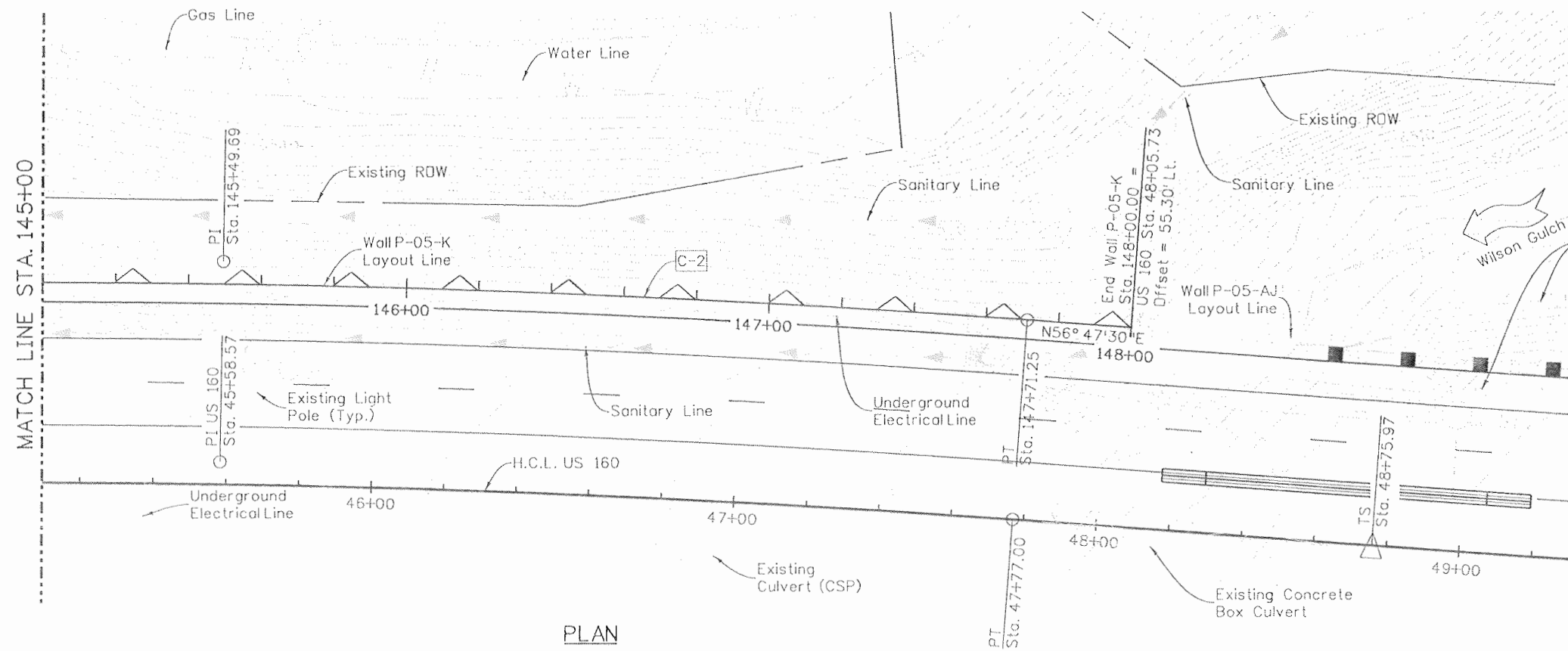
PLAN

Design		Detail		Quantities	
Designed By	TRJ	INITIAL	JMB	INITIAL	SRB
Checked By		DATE	8-08	DATE	7-08
		By		By	



ELEVATION

Print Date: 9/23/2010	Sheet Revisions			Colorado Department of Transportation	As Constructed	GROUND NAIL WALL		Project No./Code
File Name: 16042K_GenLayout_01.dgn	Date:	Comments:	Init.			P-05-K PLAN & ELEVATION		
Horiz. Scale: 1:1				3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365	No Revisions: 9/10	Designer: B. Hearn Structure: WALL P-05-K		16042
Unit Information 0221					Revised:	Detailer: D. Anderson Numbers:		
				Region 5	EJA	Sheet Subset: Wall Subset Sheets: W5 of 11		



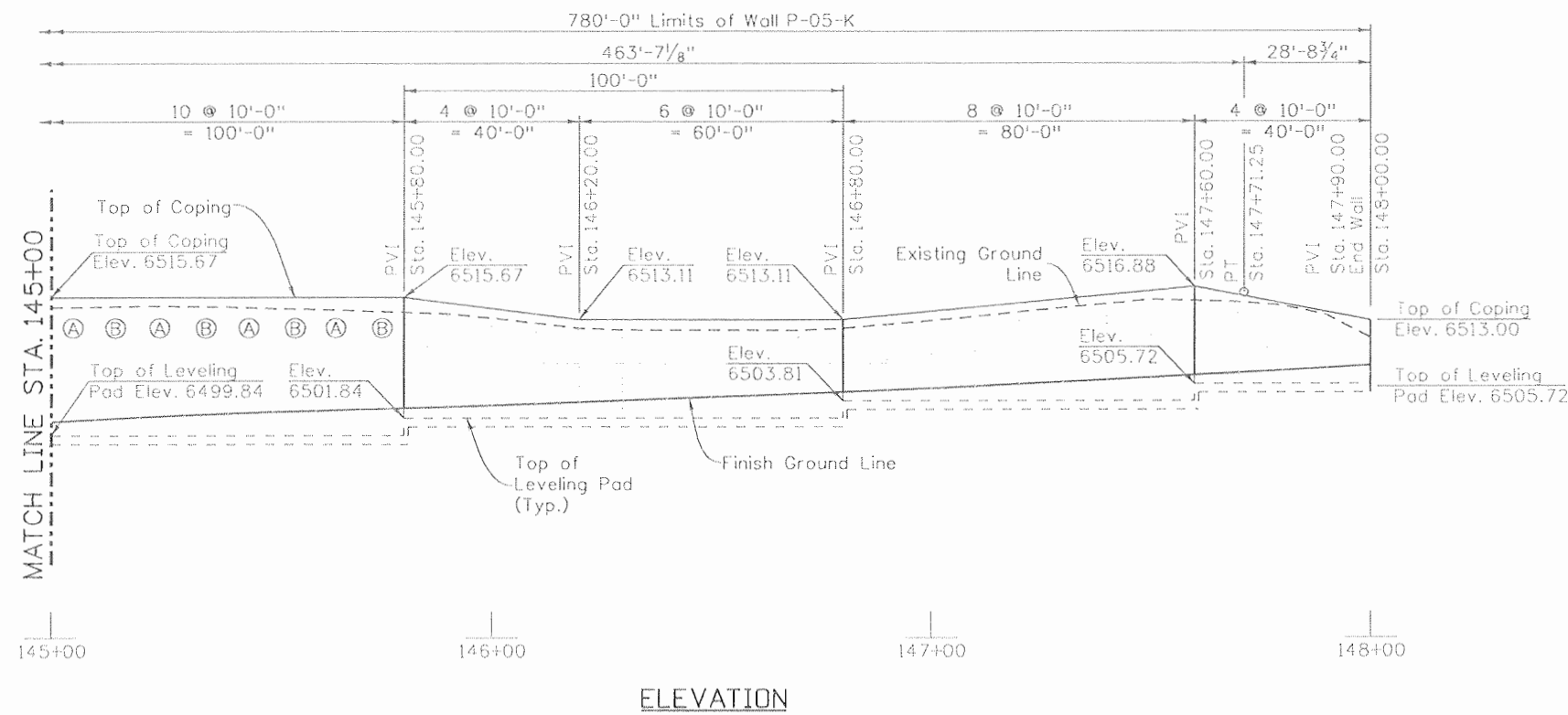
CURVE DATA

C-2
 Δ = 6° 30' 29.35"
 D = 1° 28' 01.66"
 T = 222.04'
 L = 443.60'
 R = 3905.30'

ARCHITECTURAL BANNER:

- Ⓐ 3 Mountains
- Ⓑ 2 Mountains

All other Panels have no Mountains



Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
Designed By	TWM	Detailed By	DRA	Quantities By	SRB
Checked By	TRJ	Checked By	JWB	Checked By	AAR
	8-08		8-08		7-08

Print Date: 9/23/2010
 File Name: 16042K_GenLayout_02.dgn
 Horiz. Scale: 1:1 Vert. Scale: As Noted
 Unit Information 0221 Unit Leader STW

Sheet Revisions		
Date:	Comments	Init.

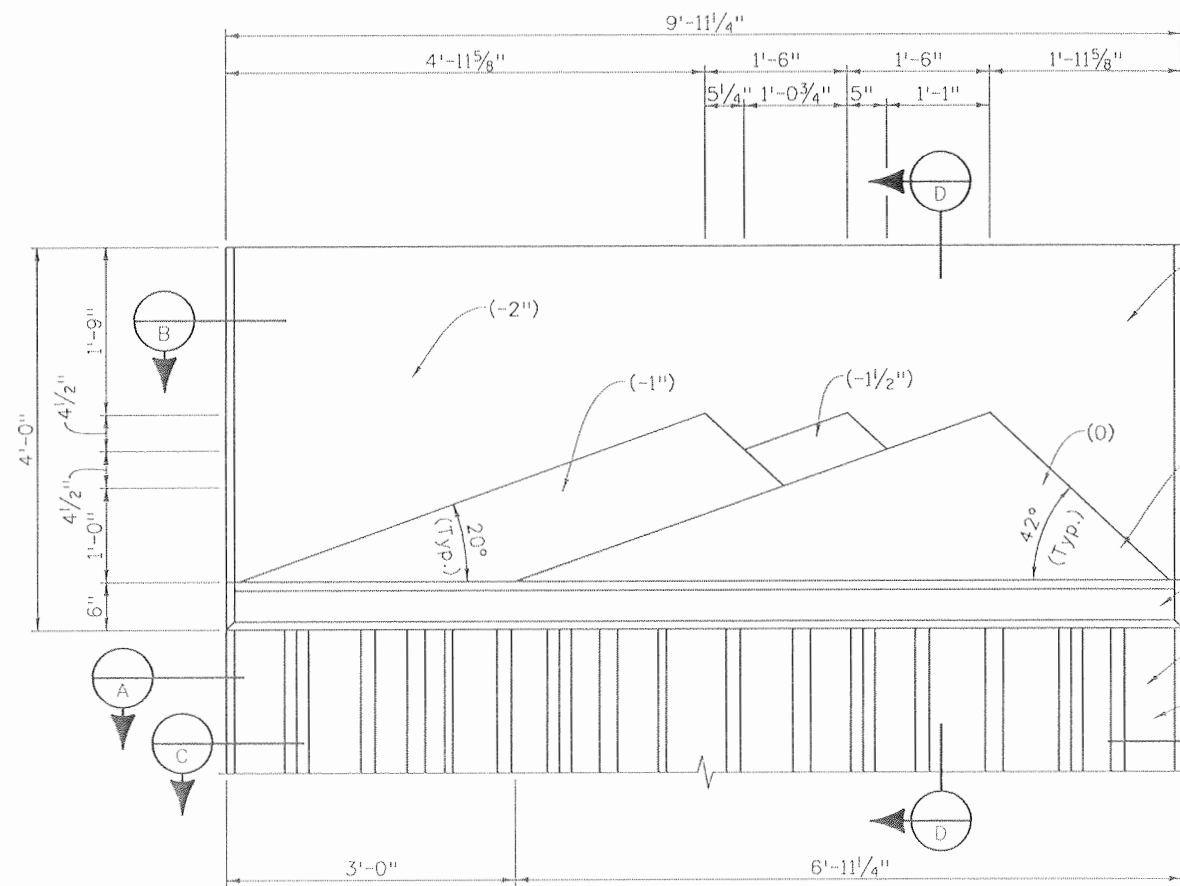
Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

As Constructed	
No Revisions:	9/10
Revised:	
Void:	

GROUND NAIL WALL P-05-K PLAN & ELEVATION (2 OF 2)			
Designer:	B. Hearn	Structure Numbers	WALL P-05-K
Detailer:	D. Anderson		
Sheet Subset:	Wall	Subset Sheets:	W6 of 11

Project No./Code	
NH 1602-114	
16042	
Sheet Number	352

Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MRM	8-08	RGA	8-08	MRM	8-08
SAG	8-08	TWM	8-08	AAR	7-08
Designed By	Detailed By	Checked By	Checked By	Checked By	Checked By
Checked By	Checked By	Checked By	Checked By	Checked By	Checked By



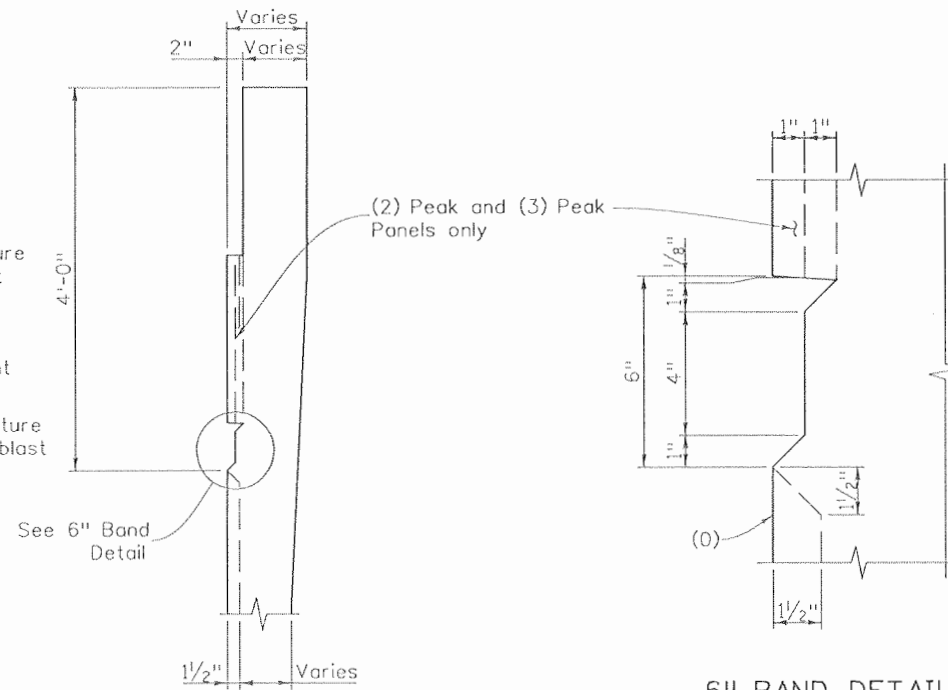
FINISHED FACE OF (3) PEAK MTN. BANNER TEXTURE

Background Texture
#1 Light Sandblast

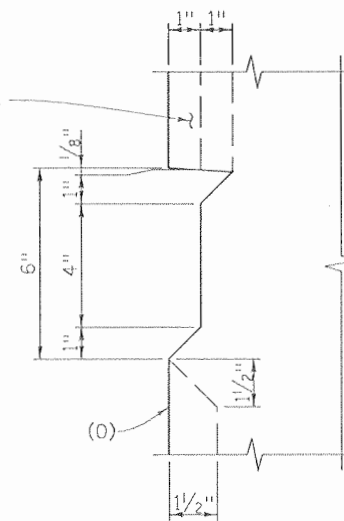
1" Chamfer at
Vertical Edge
Typical Full Height

Mtn. Banner Texture
#3 Heavy Sandblast
Typ. U.N.O.

#145 Colorado
Drag Aggregate



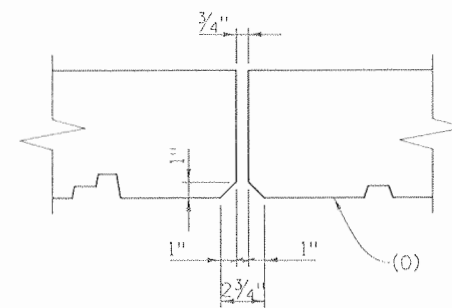
SECTION D
(3) Peak shown, (2) Peak
and No MTN. Banner similar



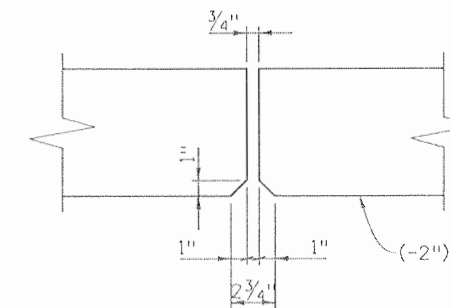
6" BAND DETAIL

NOTES:

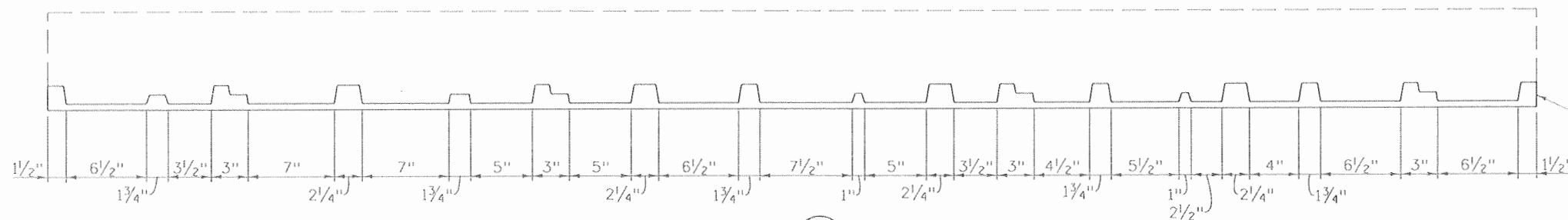
1. For structure concrete coating colors, refer to Sheet 116, Book 4.
2. For (2) Peak MTN. Banner texture and no MTN. Banner texture, see Architectural Details Sheet (2 of 2).
3. For top of panel slope, refer to Wall Plan and Elevations.



DETAIL A
Joint Detail
at #145 Colo. Drag



DETAIL B
Joint Detail
at Background



SECTION C

Ends can be modified to match Section A (Typ.)

Print Date: 9/23/2010
File Name: 16042K_WallDetails_01.dgn
Horiz. Scale: 1:1
Unit Information 0221

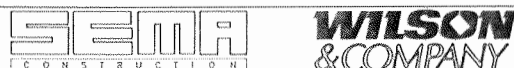
Sheet Revisions		
Date:	Comments	Init.

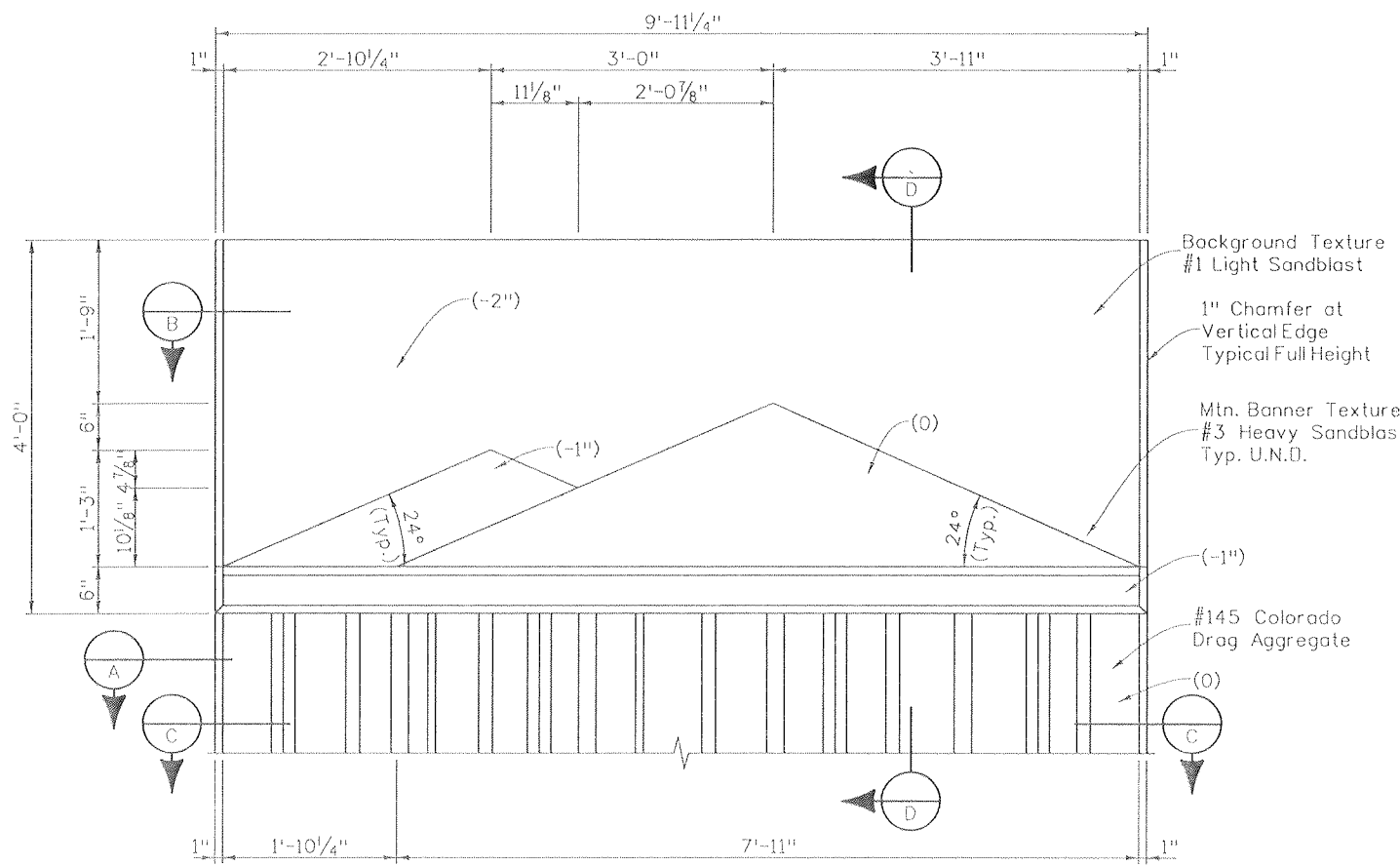
Colorado Department of Transportation
3803 North Main Avenue
Suite 200
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365
Region 5 EJA

As Constructed
No Revisions: 9/10
Revised:
Void:

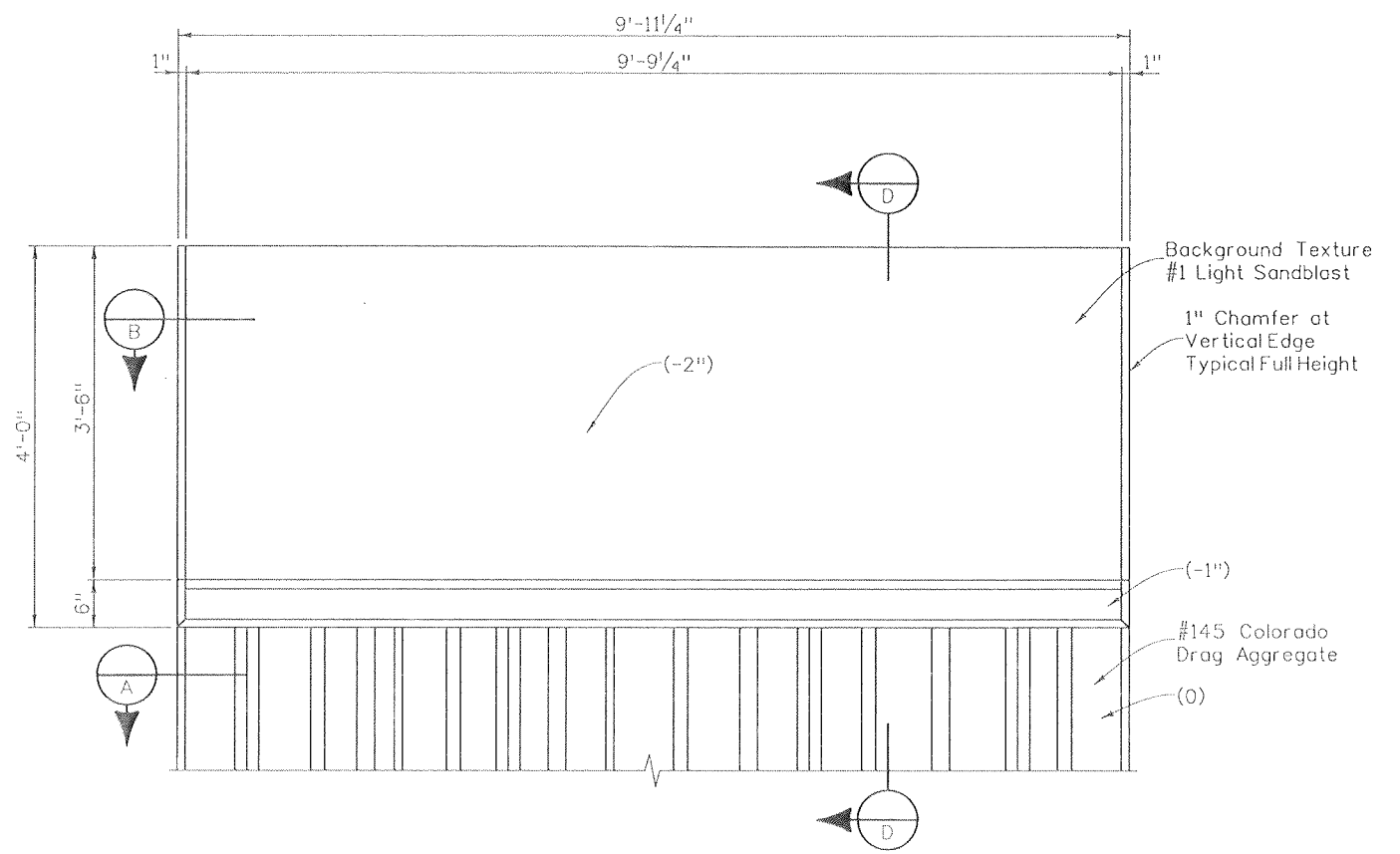
GROUND NAIL WALL
ARCHITECTURAL DETAILS
(1 OF 2)
Designer: T. Melton
Detailer: R. Artman
Sheet Subset: Wall
Structure Numbers: WALL P-05-F
WALL P-05-K
Subset Sheets: W7 of 11

Project No./Code
NH 1602-114
16042
Sheet Number 353





FINISHED FACE OF (2) PEAK MTN. BANNER TEXTURE



FINISHED FACE WITH NO MTN. BANNER TEXTURE

NOTES:

1. Refer to Architectural Details Sheet (1 of 2) for sections.

Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MRM	8-08	RGA	8-08	MRM	8-08
SAB	6-08	TWM	8-08	AAR	7-08
Designed By	Detailed By	Checked By	Checked By	Quantities By	Checked By

Print Date: 9/23/2010	File Name: 16042K_WallDetails_02.dgn
Horiz. Scale: 1:1	Vert. Scale: As Noted
Unit Information 0221	Unit Leader STW
SEMA CONSTRUCTION	WILSON & COMPANY

Sheet Revisions		
Date:	Comments	Init.

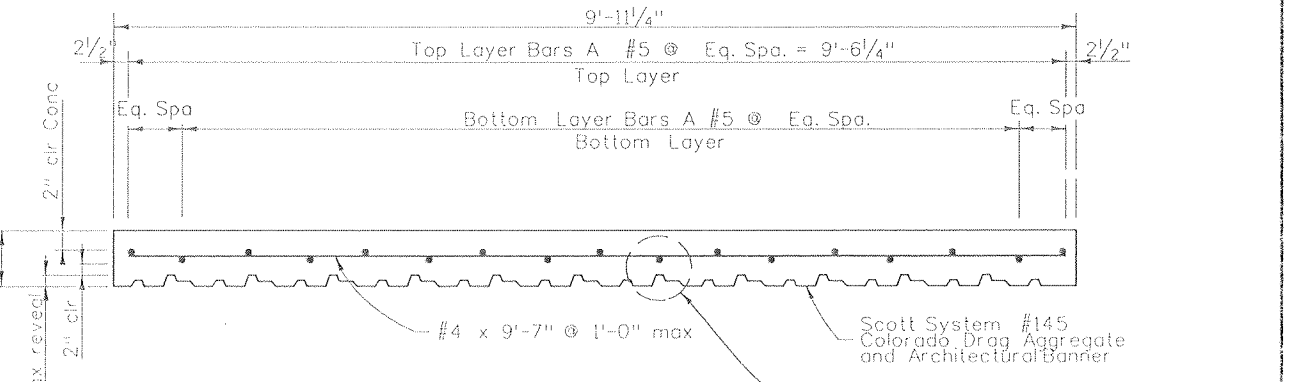
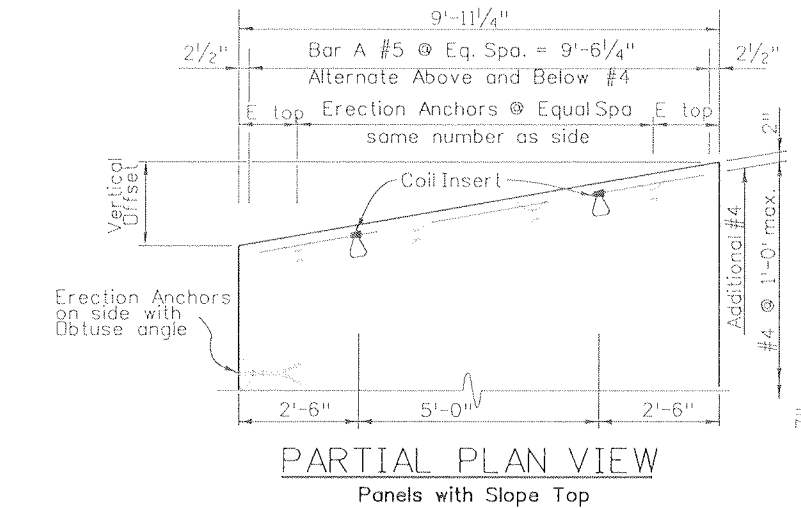
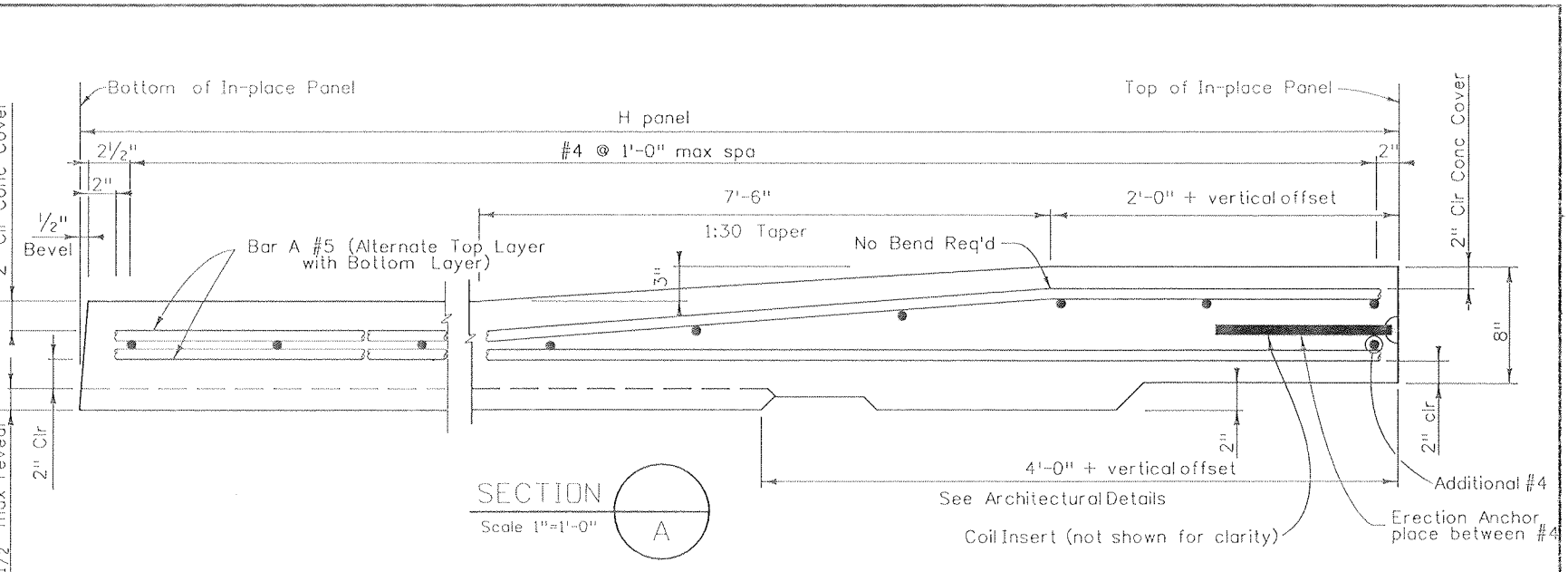
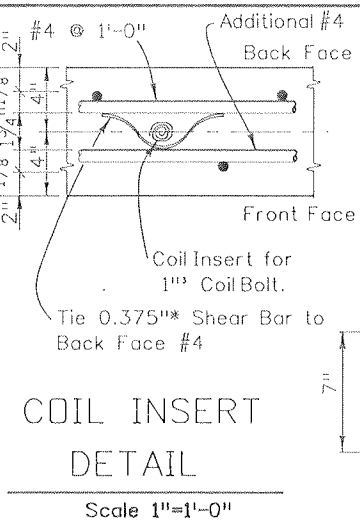
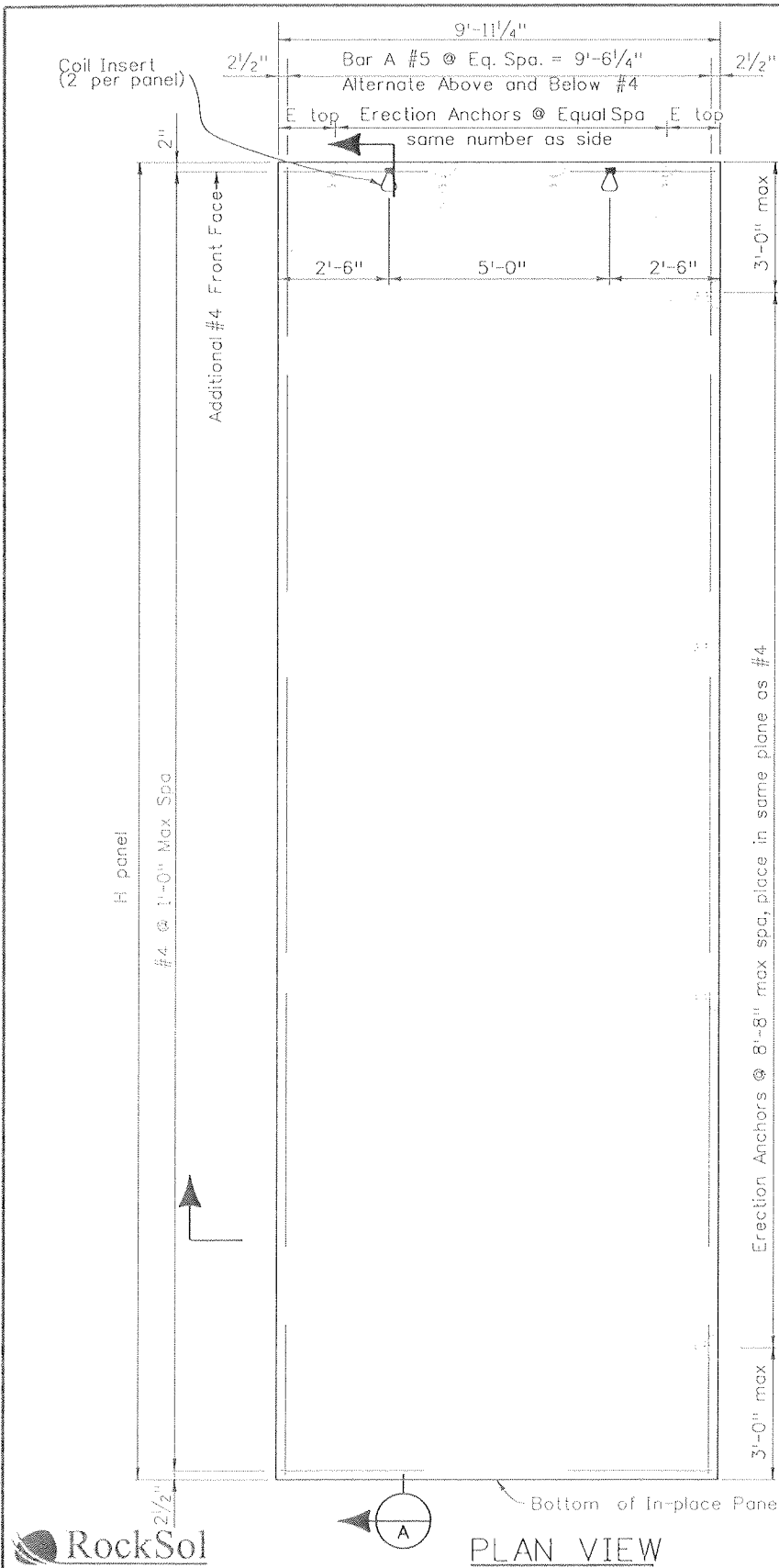
Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

As Constructed	No Revisions: 9/10
Revised:	
Void:	

GROUND NAIL WALL ARCHITECTURAL DETAILS (2 OF 2)			
Designer:	T. Melton	Structure Numbers	WALL P-05-F
Detailer:	R. Artman	Structure Numbers	WALL P-05-K
Sheet Subset:	Wall	Subset Sheets:	W8 of 11

Project No./Code	NH 1602-114
	16042
Sheet Number	354

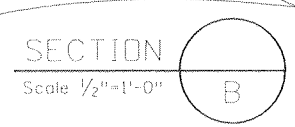
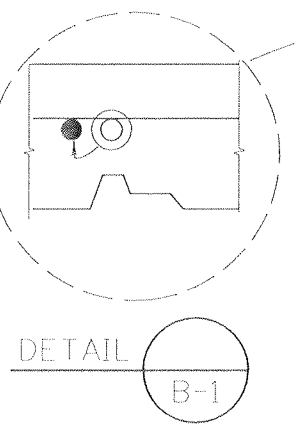
Design	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
	MRM	07-08	EJB	07-08	SAB	08-08
Detail	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
	SAB	07-08	MRM	07-08	AAR	08-08
Checked By	Checked By	Checked By	Checked By	Checked By	Checked By	Checked By
	SAB	07-08	MRM	07-08	AAR	08-08



H Panel	Bars A	Top Layer	Bottom Layer
< 26'	15 #5	8 #5	7 #5
26' to 32'	21 #5	11 #5	10 #5

ERECTION ANCHORS			
Panel Weight	Side number, size	Top number, size	E top
< 16 Kips	(2) 4 ton	(2) 4 ton	2'-0"
16 kips to 32 kips	(4) 4 ton	(4) 4 ton	1'-4"
32 kips to 48 kips	(4) 6 ton	(4) 6 ton	1'-4"

Dayton Superior/ Richmond Fleet Lift P-32 erection anchors or equal.



Notes:
 Concrete Class D f'c = 4,500 psi, release = 2,500psi
 Reinforcing Steel epoxy coated Grade 60
 Panel design valid to maximum H panel=32'
 Removal of panel from casting bed requires casting bed inclined to 66 degrees min.

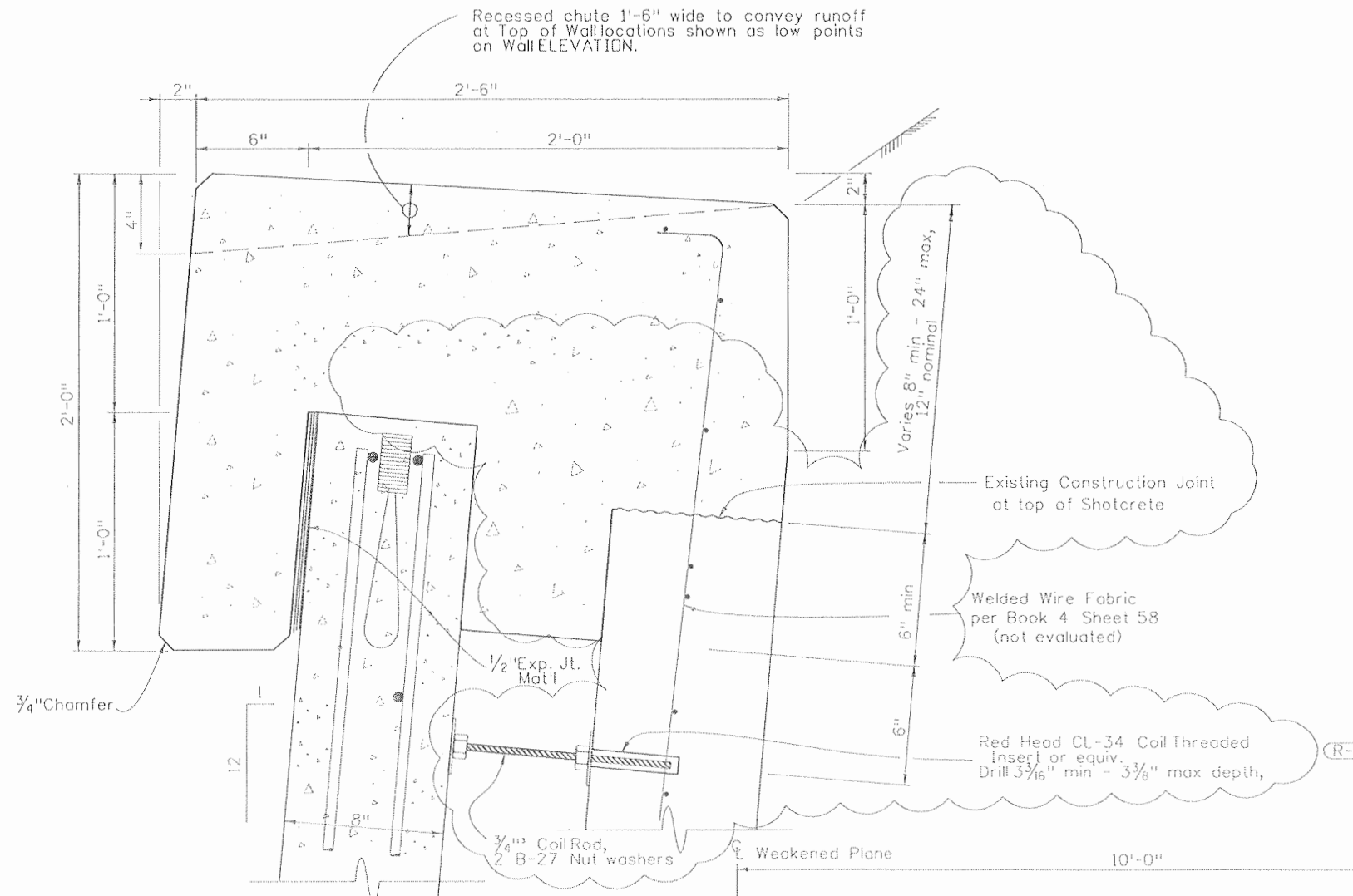


PLAN VIEW

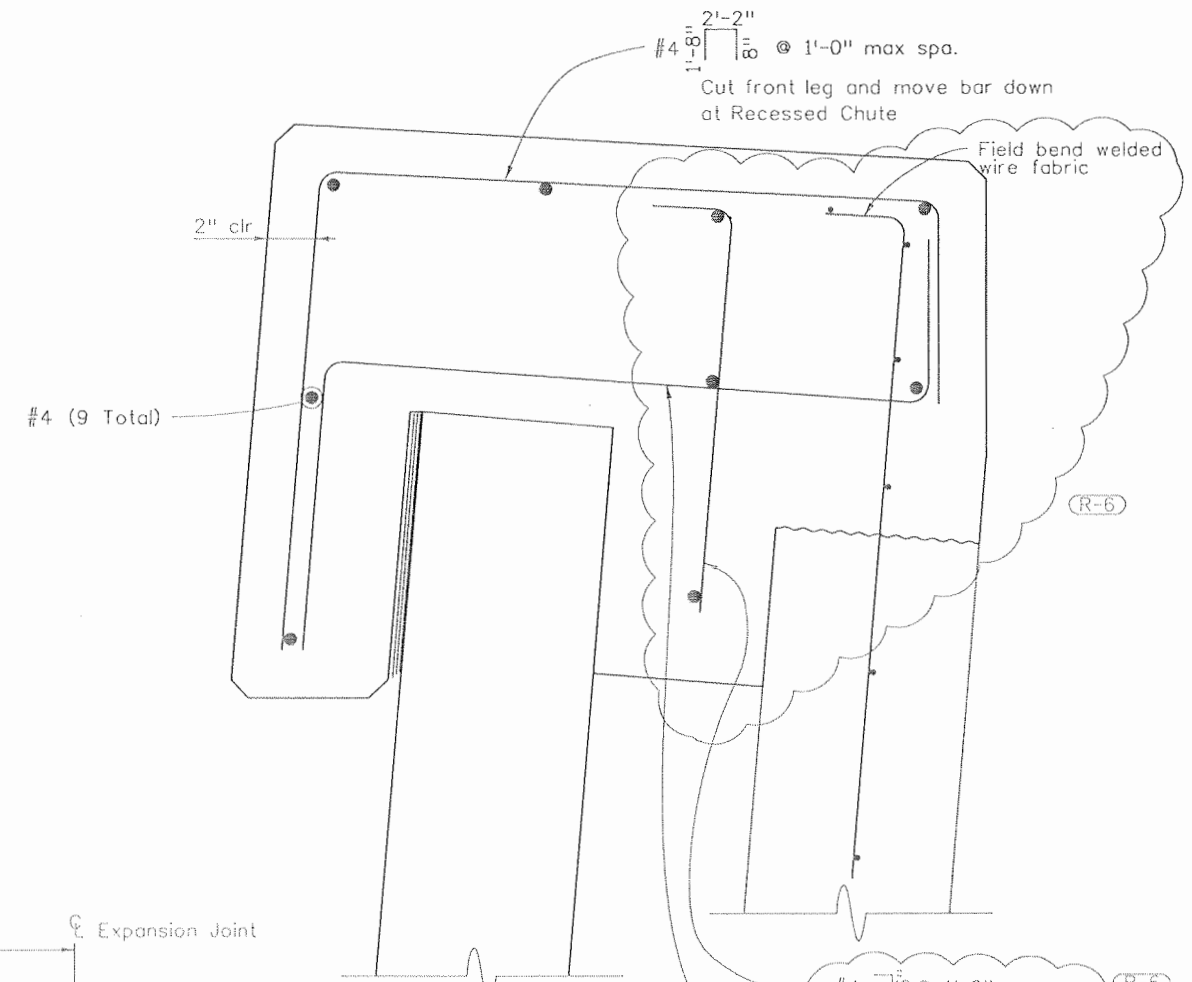
Print Date: 9/23/2010	Sheet Revisions			As Constructed		GROUND NAIL WALL PRECAST PANEL DETAILS		Project No./Code
File Name: 16042_WD354.dgn	Date:	Comments	Init.	No Revisions:	9/10			NH 1602-114
Horiz. Scale: 1:1				Revised:		Designer:	M. Merklinger	Structure
Unit Information 0221				Void:		Detailer:	E. Bearden	Numbers
Unit Leader STW						Sheet Subset:	Wall	Subst Sheets:
SEMA CONSTRUCTION								W-9 of 11
WILSON & COMPANY								Sheet Number
								355

Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

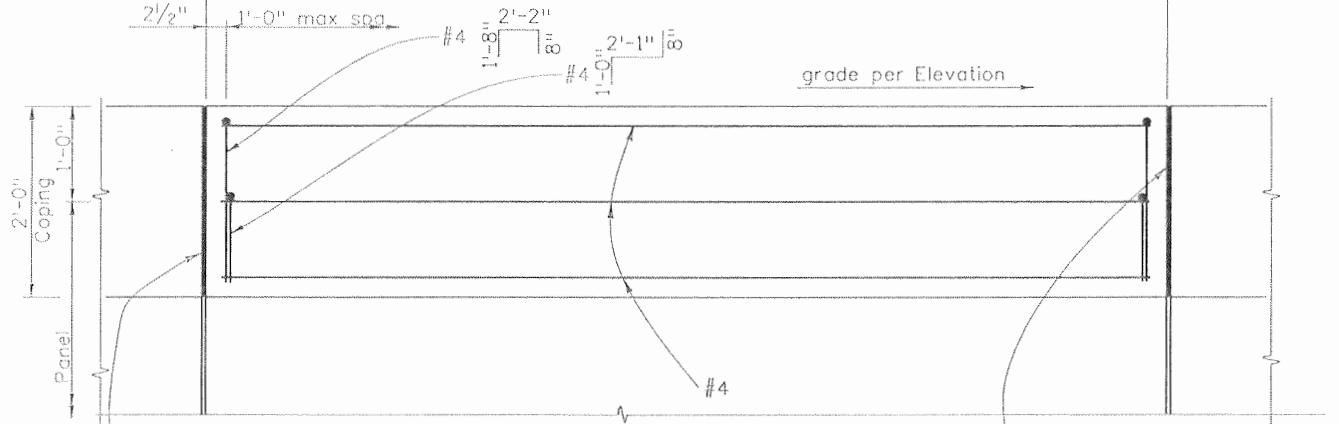
Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MRM	07-08	EJB	07-08	SAB	08-08
Checked By	Checked By	Checked By	Checked By	Checked By	Checked By
SAB	07-08	MRM	07-08	AAR	08-08



INSTALLATION DETAIL



TYPICAL SECTION



COPING ELEVATION

Notes:
 Concrete Class B (Wall)
 Reinforcing Steel (Epoxy Coated) Grade 60
 3/4" Coil Rod Grade 100 with B-27 Nut washers
 Temporary connection coil rod strut is adequate up to wind speed 75mph; Coping must be completed prior to wind speeds exceeding 75mph.



Print Date: 9/23/2010
 File Name: 16042_WD355.dgn
 Horiz. Scale: 1:1 Vert. Scale: As Noted
 Unit Information 0221 Unit Leader STW

Sheet Revisions			
Date:	Comments	Init.	
11/06/08	Temporary Connection	MRM	

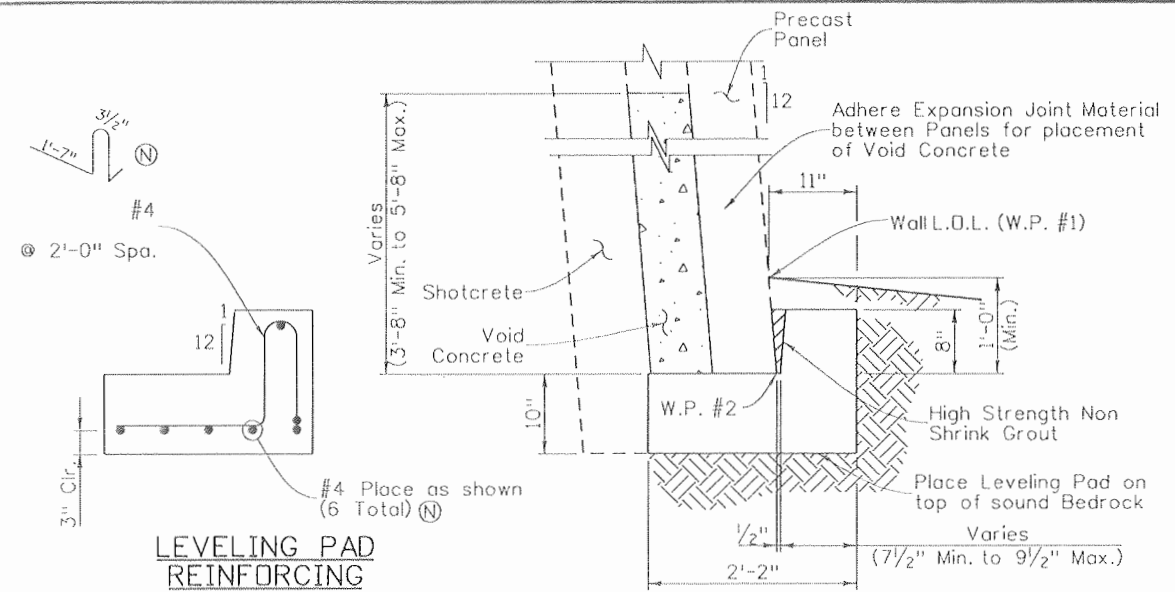
Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

As Constructed	No Revisions: 9/10
Revised:	
Void:	

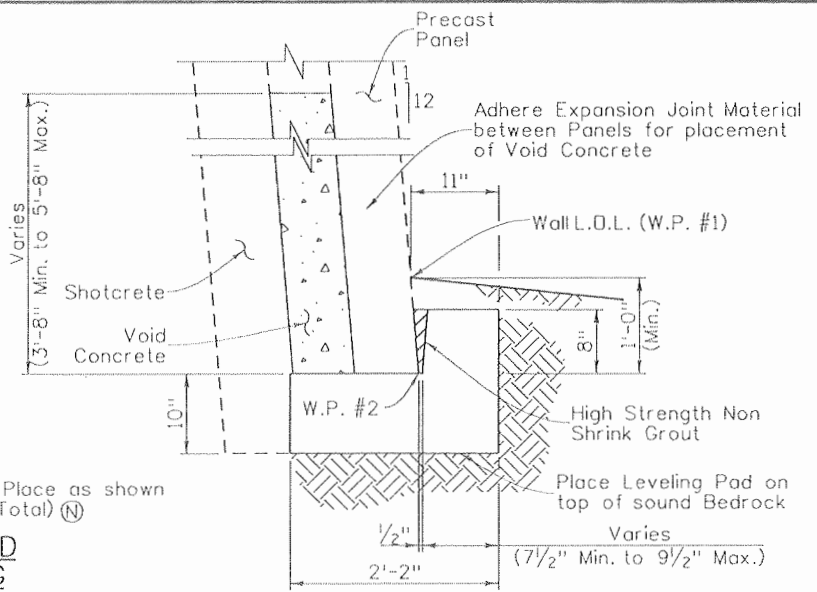
GROUND NAIL WALL COPING DETAILS			
Designer:	M. Merklinger	Structure Numbers:	WALL-P-05-F
Detailer:	E. Bearden	Structure Numbers:	WALL-P-05-K
Sheet Subset:	Wall	Subset Sheets:	W-10 of 11

Project No./Code	NH 1602-114
Sheet Number	356

Design	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
Designed By	TWM	8-08	ORA	8-08	SRB	7-08
Checked By	TRJ	8-08	JMB	8-08	AAR	7-08
Detail	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
Quantities	SRB	7-08	AAR	7-08		



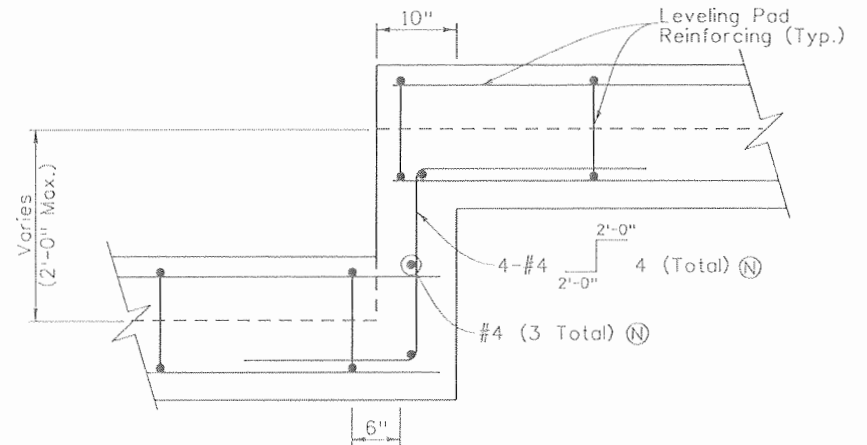
LEVELING PAD REINFORCING



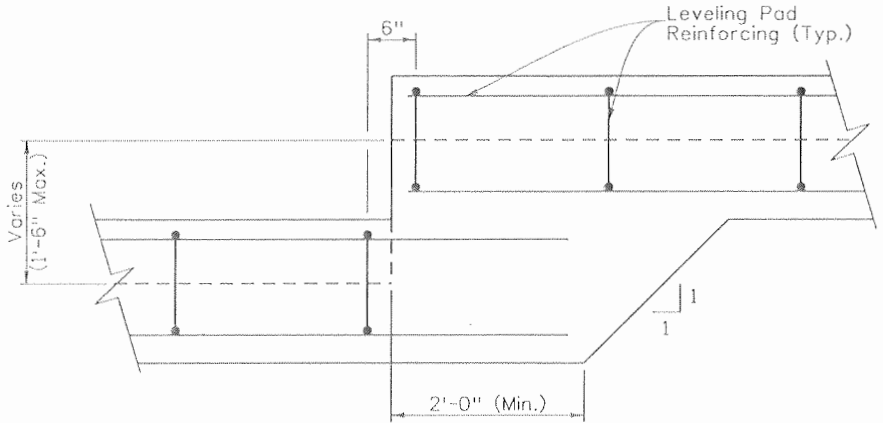
LEVELING PAD DETAIL

WORKING POINTS (W.P.)

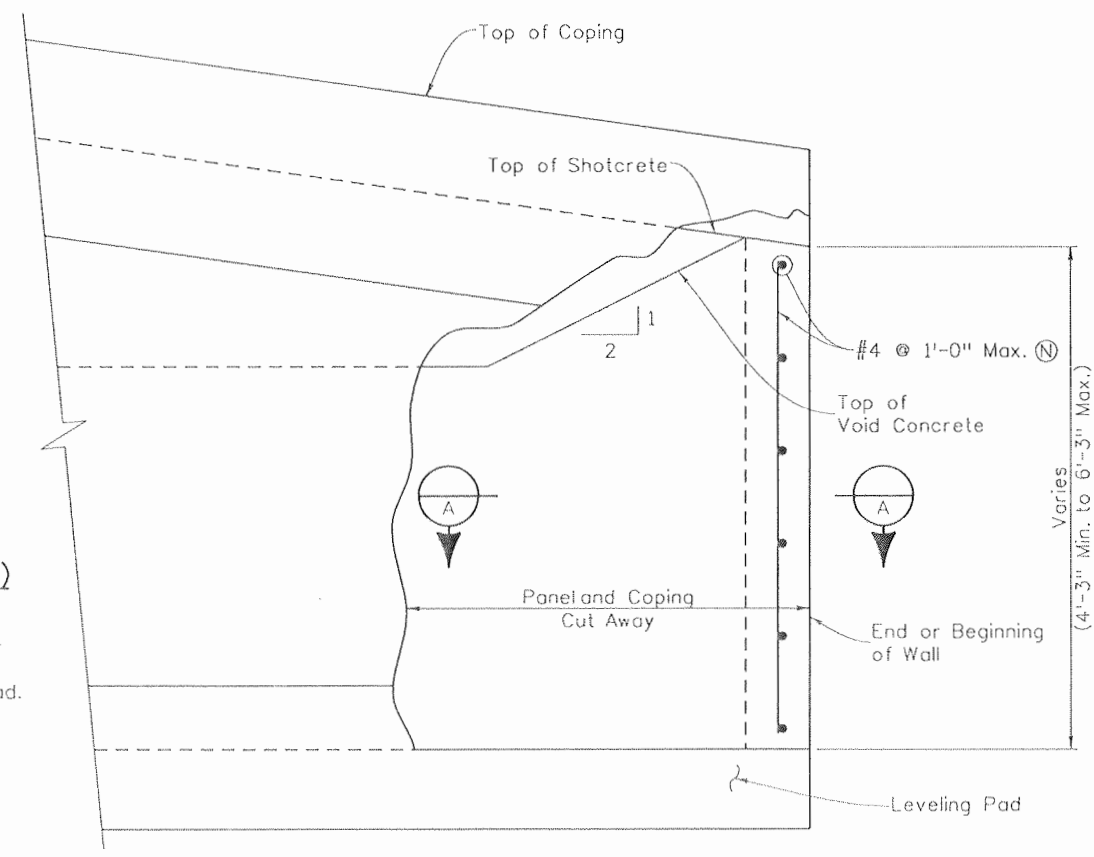
- #1 Wall L.O.L.
- #2 Front Face of Panel at top of Leveling Pad.



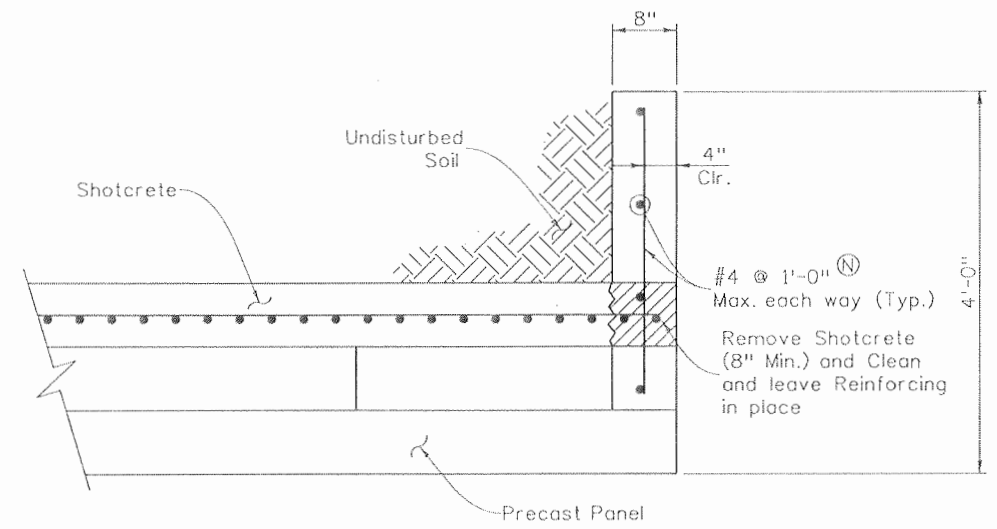
LEVELING PAD STEP-A



LEVELING PAD STEP-B



RETURN WALL DETAIL ELEVATION



SECTION A
(Coping not shown)

NOTES:

1. Void Concrete: If panel height \leq 15 ft. place void concrete in maximum 2 ft. lifts. If panel height is $>$ 15 ft. place void concrete in maximum 3 ft. lifts. Concrete in first lift must be hardened before next lift is placed.
2. Place void concrete after panels are securely fastened to shotcrete.
3. Excavation for return wall shall not disturb soil adjacent to soil nails.
4. Leveling pad shall be placed against undisturbed shale/sandstone bedrock. Where bedrock does not exist, Engineer will be notified prior to proceeding with construction of leveling pad at said location.
5. Concrete used for leveling pad, filling void, and return wall shall be Concrete Class B.
6. Perforated drain pipe to drain shotcrete shall not be placed under leveling pad except to cross at about 90° to \perp leveling pad.
7. High strength, non shrink grout shall be placed after panels are set and before void concrete is placed. Grout shall be approved by Engineer.
8. Leveling pad steps A or B can be used up to the maximum step height shown on details.

Print Date: 9/23/2010
 File Name: 16042F_WallDetails_01.dgn
 Horiz. Scale: 1:1 Vert. Scale: As Noted
 Unit Information Unit Leader Initials

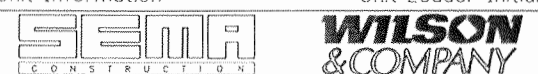
Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

As Constructed	No Revisions: 9/10
Revised:	
Void:	

GROUND NAIL WALL MISCELLANEOUS DETAILS			
Designer:	T. Melton	Structure	WALL P-05-F
Detailer:	R. Artman	Numbers	WALL P-05-K
Sheet Subset:	Wall	Subset Sheets:	W11 of 11

Project No./Code	NH 1602-114
	16042
Sheet Number	357



GENERAL NOTES

STRUCTURE EXCAVATION AND BACKFILL SHALL BE IN ACCORDANCE WITH DETAILS SHOWN ON M.S.E. WALL DETAILS (1 OF 3).

STRUCTURAL CONCRETE COATING COLORS: REFER TO BOOK 4, SHEET 116

EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPECIFICATION M213.

GRADE 60 REINFORCING STEEL IS REQUIRED.

ALL REINFORCING STEEL SHALL BE EPOXY COATED UNLESS OTHERWISE NOTED.

Ⓝ DENOTES NON COATED REINFORCING STEEL.

THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR EPOXY COATED REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS B CONCRETE	1'-3"	1'-7"	2'-6"	3'-5"	4'-6"	5'-8"	7'-2"	8'-10"
SPLICE LENGTH FOR CLASS D CONCRETE	1'-3"	1'-7"	2'-5"	2'-10"	3'-8"	4'-8"	5'-11"	7'-3"

WHEN THE CONTRACTOR ELECTS TO SUBSTITUTE EPOXY COATED REINFORCEMENT FOR BLACK REINFORCING BARS, THE MINIMUM LAP SPLICE SHALL BE AS DESCRIBED ABOVE.

THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR BLACK REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS B CONCRETE	1'-1"	1'-4"	1'-8"	2'-4"	3'-0"	3'-10"	4'-10"	5'-11"
SPLICE LENGTH FOR CLASS D CONCRETE	1'-1"	1'-4"	1'-7"	1'-11"	2'-6"	3'-1"	3'-11"	4'-10"

THE ABOVE SPLICE LENGTHS SHALL BE INCREASED BY 20 PERCENT FOR 3 BAR BUNDLES AND 33 PERCENT FOR 4 BAR BUNDLES.

THE ABOVE SPLICE LENGTHS MAY BE REDUCED BY 20% WHEN 3" OF CLEAR COVER EXISTS AND BAR SPACING IS 6" OR GREATER ON CENTER.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION.

M.S.E. = MECHANICALLY STABILIZED EARTH

E.F. = EACH FACE
 F.F. = FAR FACE
 N.F. = NEAR FACE
 B.F. = BACK FACE
 ABUT = ABUTMENT
 LOL = LAYOUT LINE

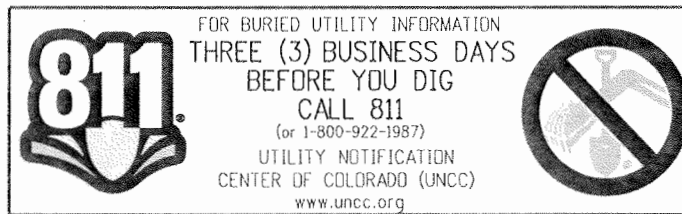
LEVEL II SULFATE RESISTANT CEMENT IS REQUIRED FOR STRUCTURAL CONCRETE.

UNSUITABLE FOUNDATION MATERIAL SHALL BE REPLACED WITH SUITABLE FOUNDATION MATERIAL IN ACCORDANCE WITH SECTION 206.03 OF THE STANDARD SPECIFICATIONS.

FOR STRUCTURE NUMBER INSTALLATION, SEE STANDARD S-614-12.

STATIONS, ELEVATIONS, AND DIMENSIONS CONTAINED IN THESE PLANS ARE CALCULATED FROM A RECENT FIELD SURVEY. THE CONTRACTOR SHALL VERIFY ALL DEPENDENT DIMENSIONS IN THE FIELD BEFORE ORDERING OR FABRICATING ANY MATERIAL.

THE INFORMATION SHOWN ON THESE PLANS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING HIS OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO AT 1-800-922-1987 AT LEAST 2 DAYS (NOT INCLUDING THE DAY OF NOTIFICATION) PRIOR TO ANY EXCAVATION OR OTHER EARTHWORK.



INDEX OF DRAWINGS

- W-1 GENERAL INFORMATION
- W-2 SUMMARY OF QUANTITIES LOCATION PLAN
- W-3 RETAINING WALL AT US 550 BRIDGE WALL-P-05-T GENERAL LAYOUT (1 of 2)
- W-4 RETAINING WALL AT US 550 BRIDGE WALL-P-05-T GENERAL LAYOUT (2 of 2)
- W-5 RETAINING WALL AT RAMP A BRIDGE WALL-P-05-AK GENERAL LAYOUT *
- W-6 M.S.E. WALL ARCHITECTURAL DETAILS (1 of 2)
- W-7 M.S.E. WALL ARCHITECTURAL DETAILS (2 of 2)
- W-8 M.S.E. WALL PRECAST PANEL DETAILS
- W-9 M.S.E. WALL PRECAST PANEL CORNERS
- W-10 M.S.E. WALL COPING DETAILS
- W-11 RETAINING WALL AT US 550 BRIDGE M.S.E. WALL DETAILS (1 of 3)
- W-12 RETAINING WALL AT US 550 BRIDGE M.S.E. WALL DETAILS (2 of 3)
- W-13 RETAINING WALL AT US 550 BRIDGE M.S.E. WALL DETAILS (3 of 3)

* For WALL-P-05-AK PLAN and ELEVATION refer to Book 4 Sheet 80

DESIGN DATA

DESIGN METHOD:

MSE: SERVICE LOAD DESIGN; AASHTO SIXTEENTH EDITION

PANELS: LRFD STRENGTH I LIMIT STATE & SERVICE I LIMIT STATE; AASHTO LRFD FOURTH EDITION

SEISMIC DESIGN CRITERIA:

SEISMIC ZONE 1 A=0.25
 SOIL PROFILE TYPE I
 GEOTECHNICAL DATA PROVIDED BY OTHERS:
 WALL FOUNDATION ON SHALE BEDROCK
 ULTIMATE BEARING CAPACITY = 8,000 psf
 RESISTANCE FACTOR FOR BEARING = 0.50
 ULTIMATE COEFFICIENT OF FRICTION = 0.45
 RESISTANCE FACTOR FOR SLIDING = 0.85

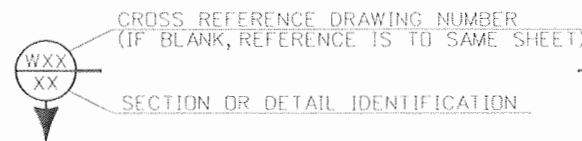
REINFORCED CONCRETE:

CLASS B CONCRETE: f'c = 4,500 psi
 CLASS D CONCRETE: f'c = 4,500 psi
 REINFORCING STEEL: fy = 60,000 psi

ERECTION ANCHORS:
 RATED FOR APPLIED LOAD MINIMUM

RETAINING WALL TYPES

THE RETAINING WALL TYPE IS SHOWN IN THE RETAINING WALL TABLE FOR PRECAST PANEL FACE M.S.E. WALLS, THE GEOMETRY IS DEFINED ON THE GENERAL LAYOUT, AND THE LONG TERM DESIGN STRENGTH DETAILS AND CRITERIA ARE SHOWN ON THE M.S.E. WALL DETAILS.



MAJOR STRUCTURE	TYPE	LENGTH	EXPOSED HEIGHT (MAX)
WALL-P-05-T	Precast Panel Face M.S.E. Wall	254'-7"	28'-10"
WALL-P-05-AK	Precast Panel Face M.S.E. Wall	334'-4"	29'-0"

Design	INITIAL	DATE	Checked By
	MRM	06-08	
	SAB	07-08	
	Checked By		
Detail	INITIAL	DATE	Checked By
	EJB	06-08	
	MRM	06-08	
	Checked By		
Quantities	INITIAL	DATE	Checked By
	MRM	07-08	
	AAR	07-08	
	Checked By		



Print Date: 9/23/2010
 File Name: 16042_T_GN.dgn
 Horiz. Scale: 1:1
 Unit Information 0221
 Unit Leader STW



Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

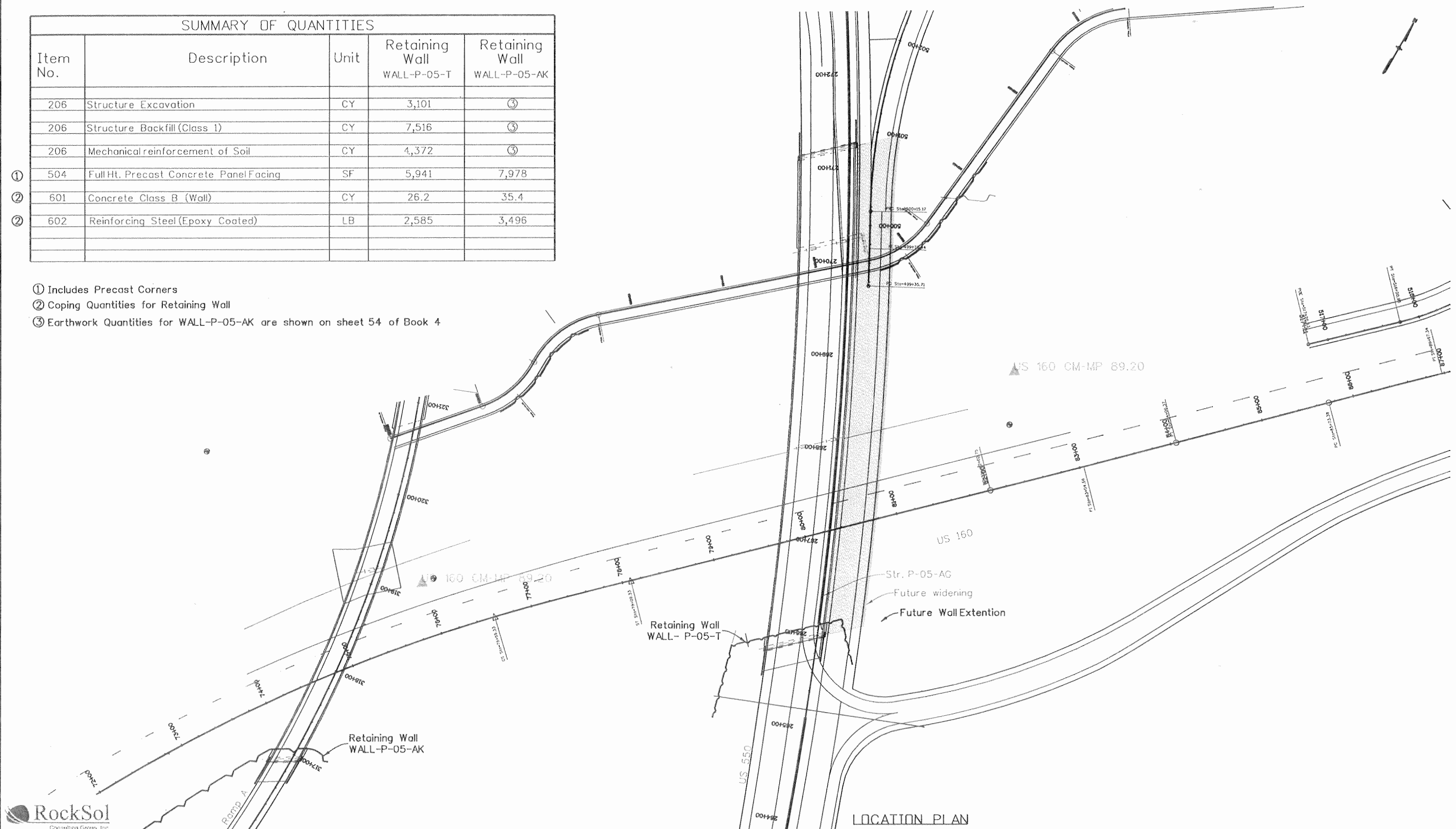
As Constructed	Retaining Walls			Project No./Code
	GENERAL INFORMATION			
No Revisions: 9/10	Near Durango	Sec. 10	T34N R9W	NH 1602-114
Revised:	Designer: M. Merklinger	Structure	WALL-P-05-T	16042
Void:	Detailer: E. Bearden	Numbers	WALL-P-05-AK	Sheet Number 358
	Sheet Subset: Wall	Subset Sheets:	W-1 of 13	

SUMMARY OF QUANTITIES

Item No.	Description	Unit	Retaining Wall WALL-P-05-T	Retaining Wall WALL-P-05-AK
206	Structure Excavation	CY	3,101	③
206	Structure Backfill (Class 1)	CY	7,516	③
206	Mechanical reinforcement of Soil	CY	4,372	③
① 504	Full Ht. Precast Concrete Panel Facing	SF	5,941	7,978
② 601	Concrete Class B (Wall)	CY	26.2	35.4
② 602	Reinforcing Steel (Epoxy Coated)	LB	2,585	3,496

- ① Includes Precast Corners
- ② Coping Quantities for Retaining Wall
- ③ Earthwork Quantities for WALL-P-05-AK are shown on sheet 54 of Book 4

Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MRM	06-08	EJB	06-08	MRM	07-08
SAB	07-08	MRM	06-08	AAR	07-08



Print Date: 9/23/2010
 File Name: 16042_GS002.dgn
 Horiz. Scale: 1:1 Vert. Scale: As Noted
 Unit Information 0221 Unit Leader STW

SEMA CONSTRUCTION
WILSON & COMPANY

Sheet Revisions		
Date:	Comments	Init.

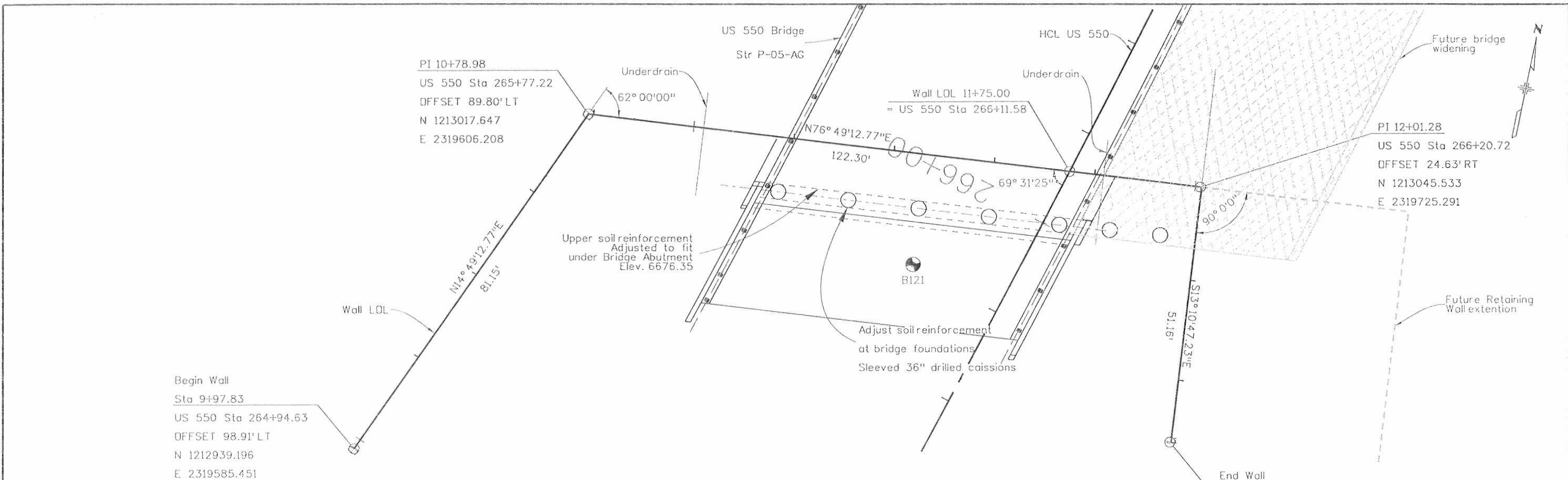
Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

As Constructed	No Revisions: 9/10
Revised:	
Void:	

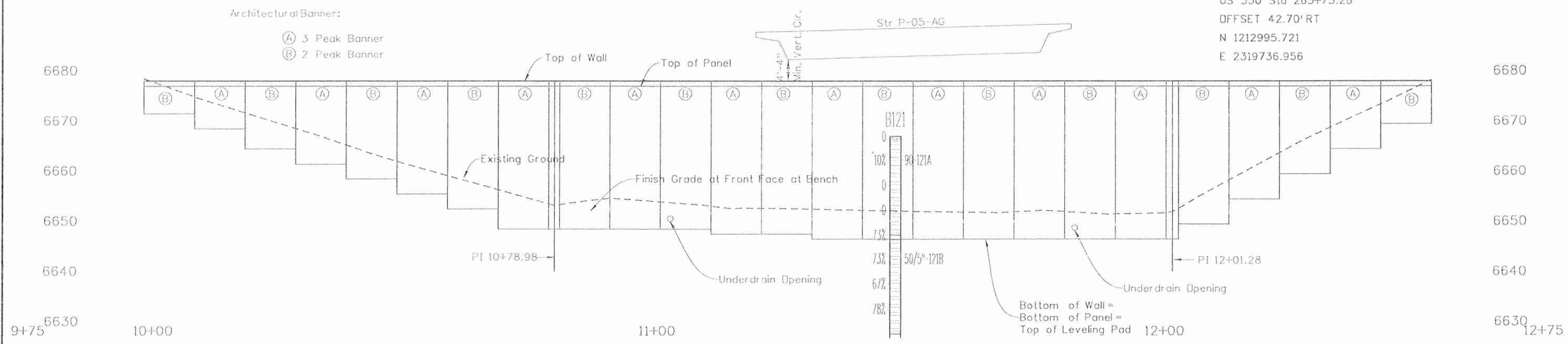
Retaining Walls SUMMARY OF QUANTITIES LOCATION PLAN			
Designer:	M. Merklinger	Structure Numbers	WALL-P-05-T
Detailer:	E. Bearden	Structure Numbers	WALL-P-05-AK
Sheet Subset:	Wall	Subset Sheets:	W-2 of 13

Project No./Code	NH 1602-114
	16042
Sheet Number	359

Design	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
	MRM	06-08	EJB	06-08	MRM	07-08
Detail	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
	MRM	06-08	EJB	06-08	MRM	07-08
Quantities	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
	MRM	06-08	EJB	06-08	MRM	07-08
Designed By	Checked By	Designed By	Checked By	Designed By	Checked By	Designed By
MRM	SAB	MRM	MRM	MRM	MRM	MRM



PLAN



ELEVATION
(Taken Along Wall HCL)



Print Date: 9/23/2010

File Name: 16042T_GenLayout_01.dgn

Horiz. Scale: 1:20 Vert. Scale: As Noted

Unit Information 0221 Unit Leader STW

SEMA CONSTRUCTION **WILSON & COMPANY**

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation

3803 North Main Avenue
Suite 200
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365

DOT DEPARTMENT OF TRANSPORTATION

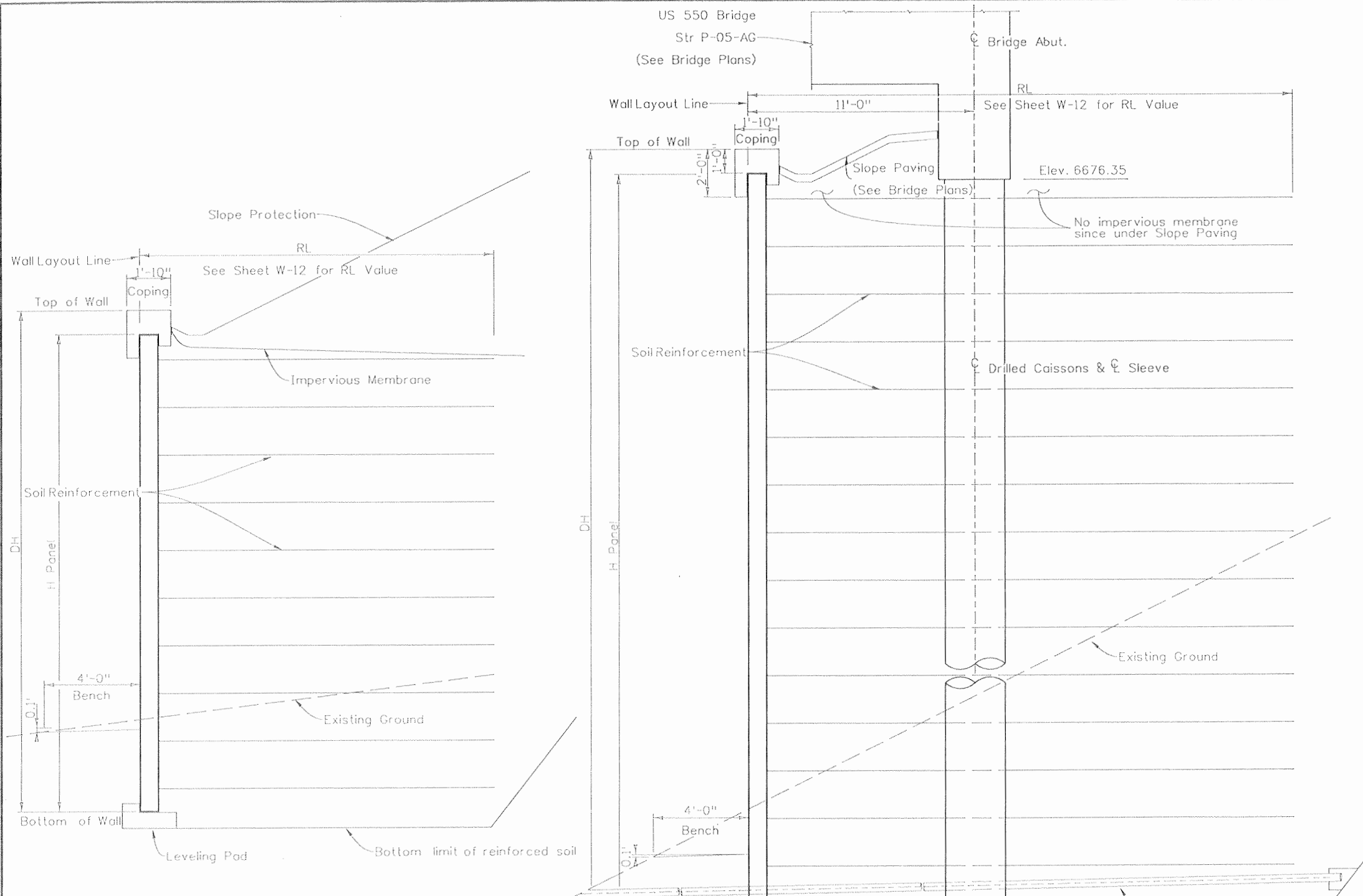
Region 5 EJA

As Constructed	No Revisions: 9/10
Revised:	
Void:	

RETAINING WALL AT US 550 BRIDGE WALL-P-05-T GENERAL LAYOUT 1 of 2			
Designer:	M. Merklinger	Structure Numbers	WALL-P-05-T
Detailer:	E. Bearden		
Sheet Subset:	Wall	Subset Sheets:	W-3 of 13

Project No./Code	NH 1602-114
	16042
Sheet Number	360

Design	INITIAL	DATE	Quantity	DATE
Designed By	MRM	06-08	Checked By	MRM
Checked By	SAB	07-08	Checked By	AAR
Detail	INITIAL	DATE	Quantity	DATE
Detailled By	EJB	06-08	Checked By	MRM
Checked By	MRM	06-08	Checked By	AAR



TYPICAL SECTION
 Sta 9+97.83 to 11+16.50
 Sta 11+84.00 to 12+52.44
 Grade ditch to drain
 (0.5% maximum slope)

TYPICAL SECTION
 Sta 11+16.50 to 11+84.00



Print Date: 9/23/2010	
File Name: 16042_WY001.dgn	
Horiz. Scale: 1:20 Vert. Scale: As Noted	
Unit Information 0221 Unit Leader STW	

Sheet Revisions		
Date:	Comments	Init.

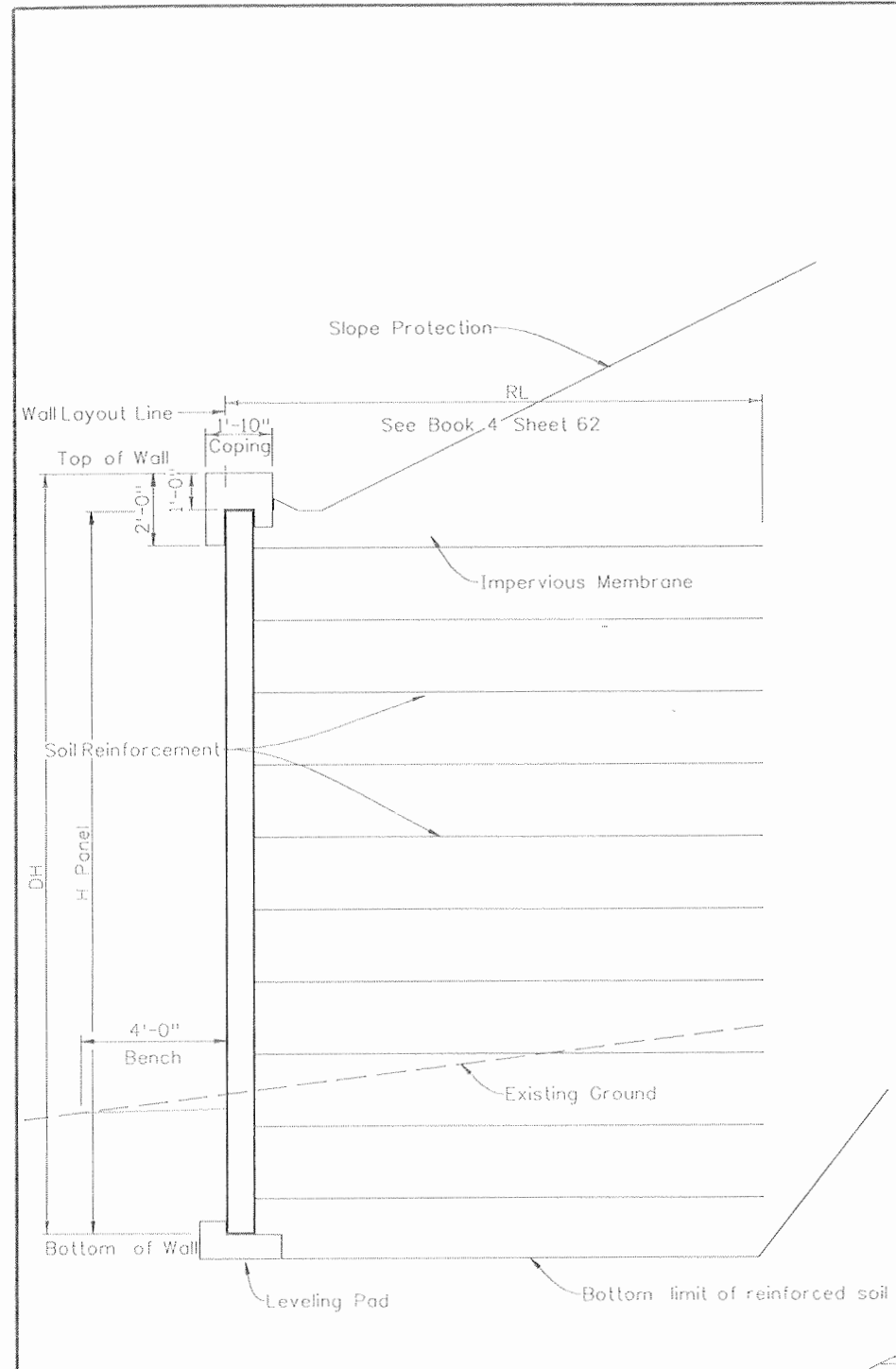
Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

As Constructed
No Revisions: 9/10
Revised:
Void:

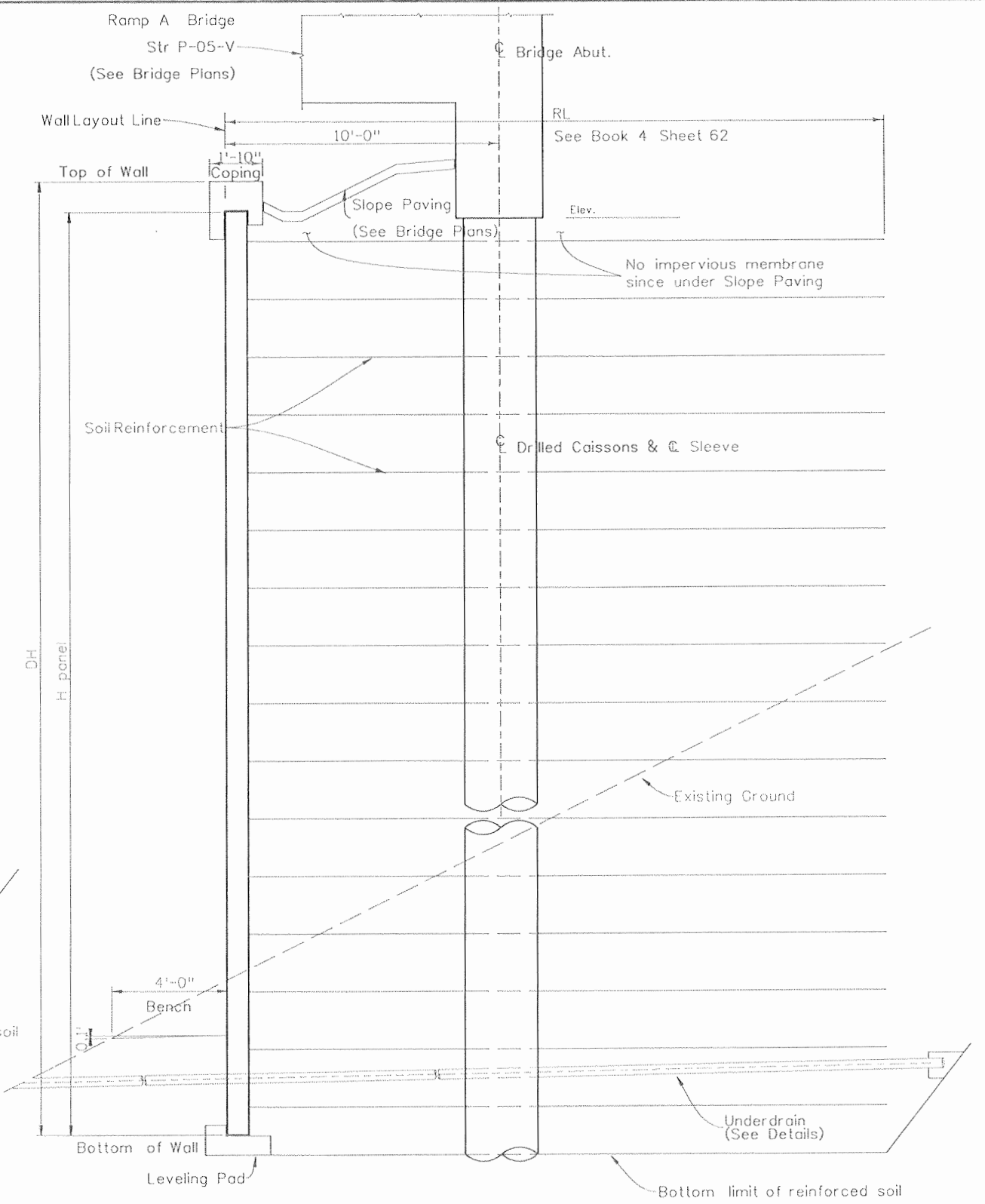
RETAINING WALL AT US 550 BRIDGE	
WALL-P-05-T GENERAL LAYOUT	
Designer: M. Merklinger	Structure Numbers: WALL-P-05-T
Detailer: E. Bearden	Sheet Subset: Wall
Subst Sheets: W-4 of 13	

Project No./Code	NH 1602-114
Sheet Number	361

Design	INITIAL	DATE	Checked By	Checked By
	MRM	06-08		
Detail	INITIAL	DATE	Checked By	Checked By
	EJB	06-08		
Quantity	II	DATE	Checked By	Checked By
	MRM	08-08		



TYPICAL SECTION
Sta 471+04.00 to 473+69.69
Sta 474+08.00 to 474+36.00



TYPICAL SECTION
Sta 473+69.69 to 474+08.00

For PLAN and ELEVATION, refer to Book 4 Sheet 80



Print Date: 9/27/2010	
File Name: 16042_WY300.dgn	
Horiz. Scale: 1:20 Vert. Scale: As Noted	
Unit Information 0221 Unit Leader STW	

Sheet Revisions		
Date:	Comments	Init.

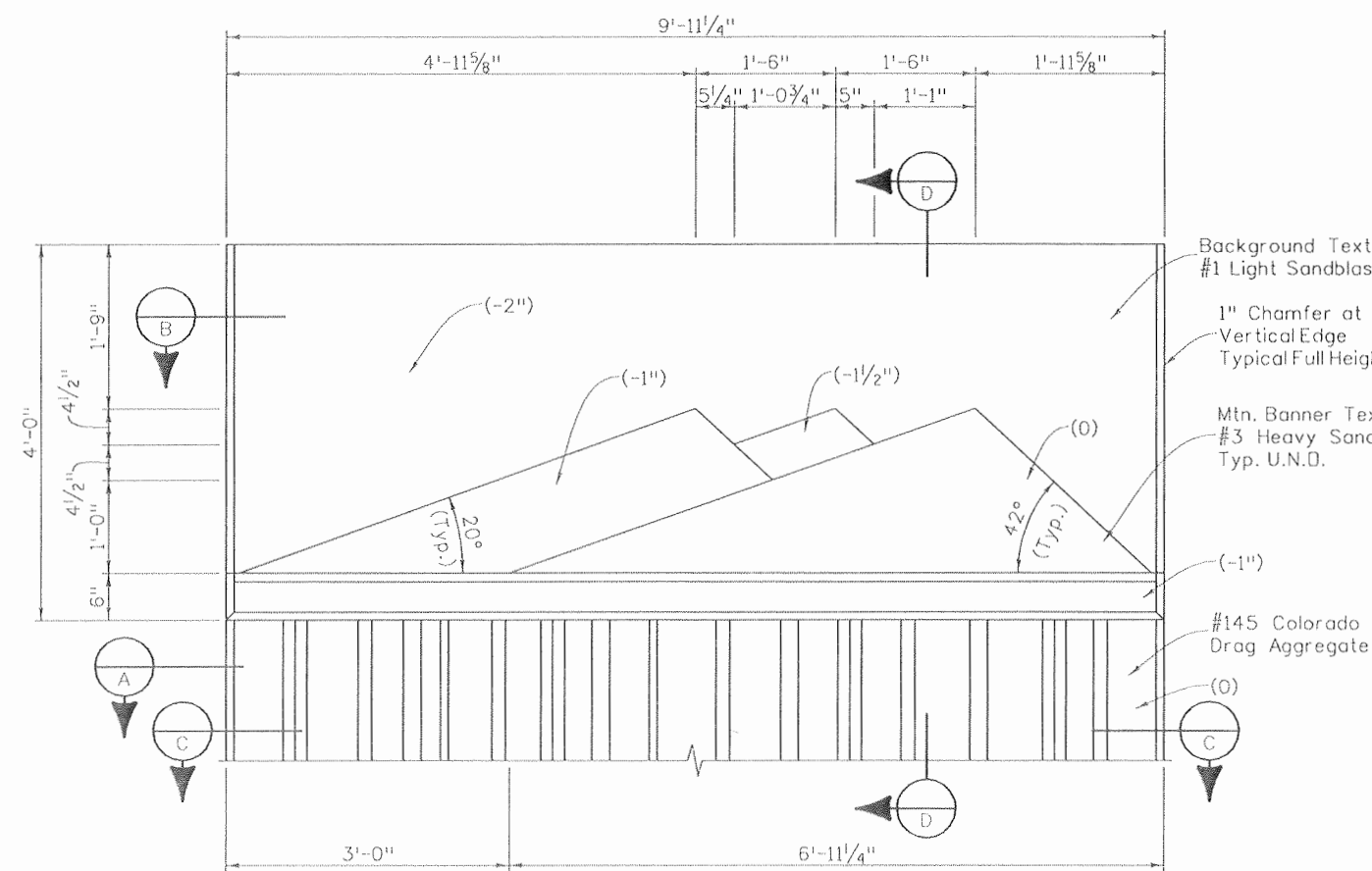
Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

As Constructed
No Revisions: 9/10
Revised:
Void:

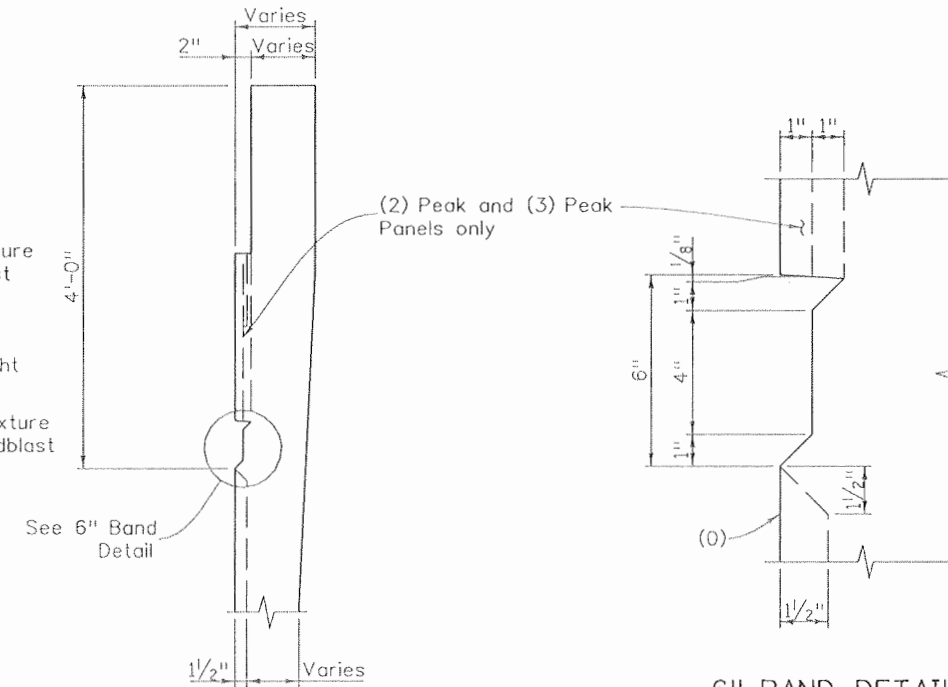
RETAINING WALL AT RAMP A BRIDGE	
WALL P-05-AK GENERAL LAYOUT	
Designer: M. Merklinger	Structure Numbers
Detailer: E. Bearden	WALL-P-05-AK
Sheet Subset: Wall	Subset Sheets: W-5 of 13

Project No./Code
NH 1602-114
16042
Sheet Number 362

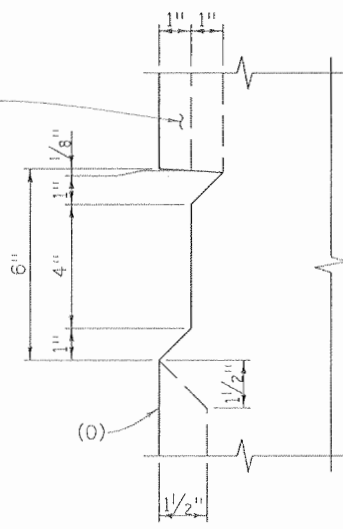
Design	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
	MRM	B-08	RCA	B-08	MRM	B-08
Detail	Checked By	Checked By	Checked By	Checked By	Checked By	Checked By
	SAB	B-08	TWM	B-08	AAR	7-08
Quantities	By	By	By	By	By	By
	MRM	MRM	MRM	MRM	MRM	MRM



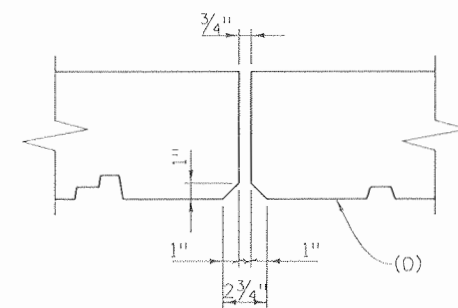
FINISHED FACE OF (3) PEAK MTN. BANNER TEXTURE



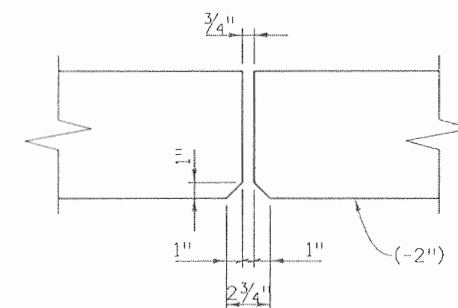
SECTION D
(3) Peak shown, (2) Peak and No MTN. Banner similar



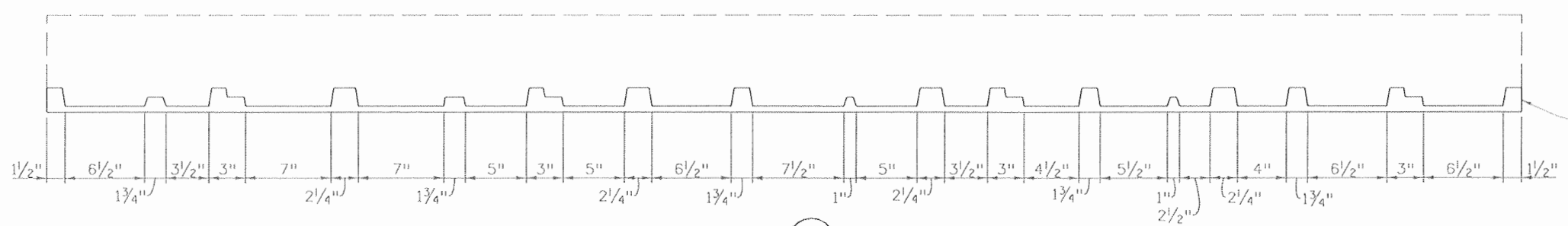
6\"/>



DETAIL A
Joint Detail at #145 Colo. Drag



DETAIL B
Joint Detail at Background

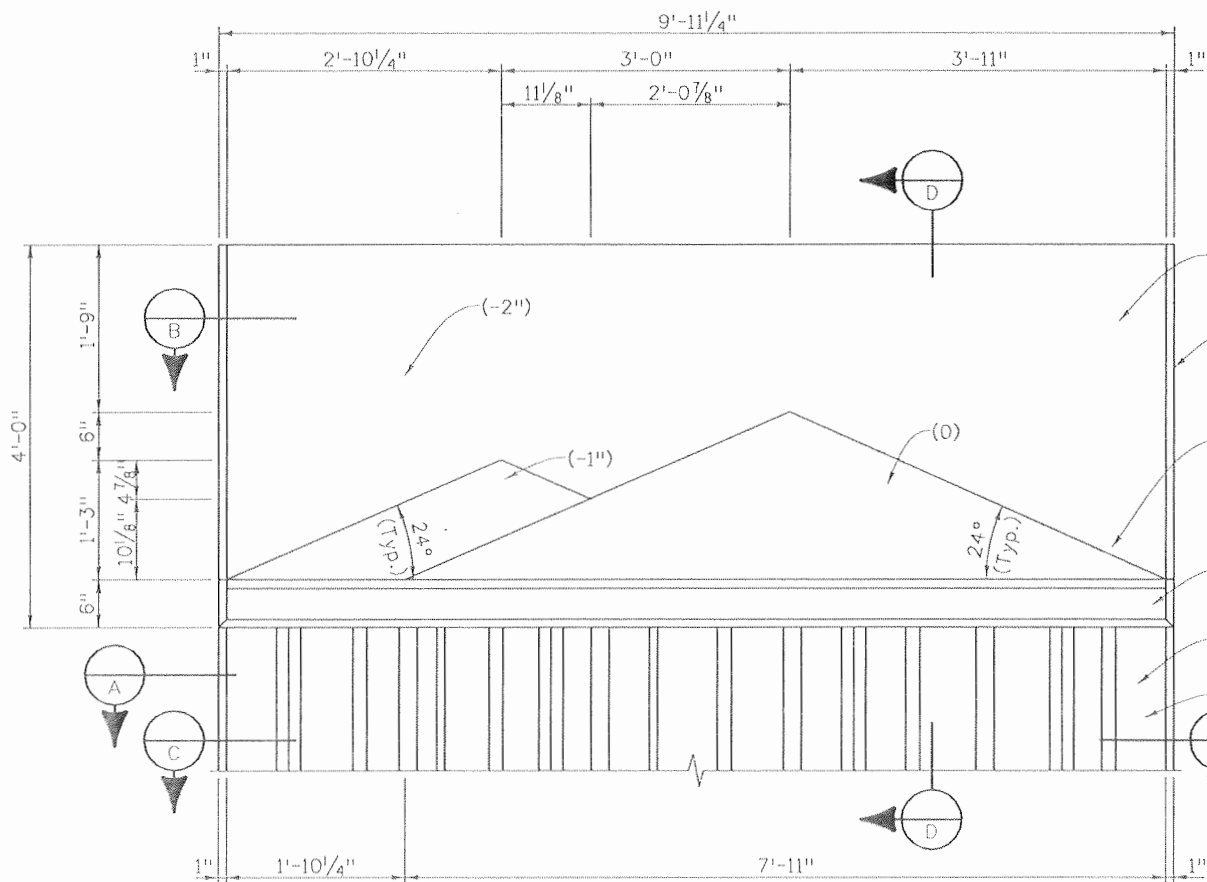


SECTION C

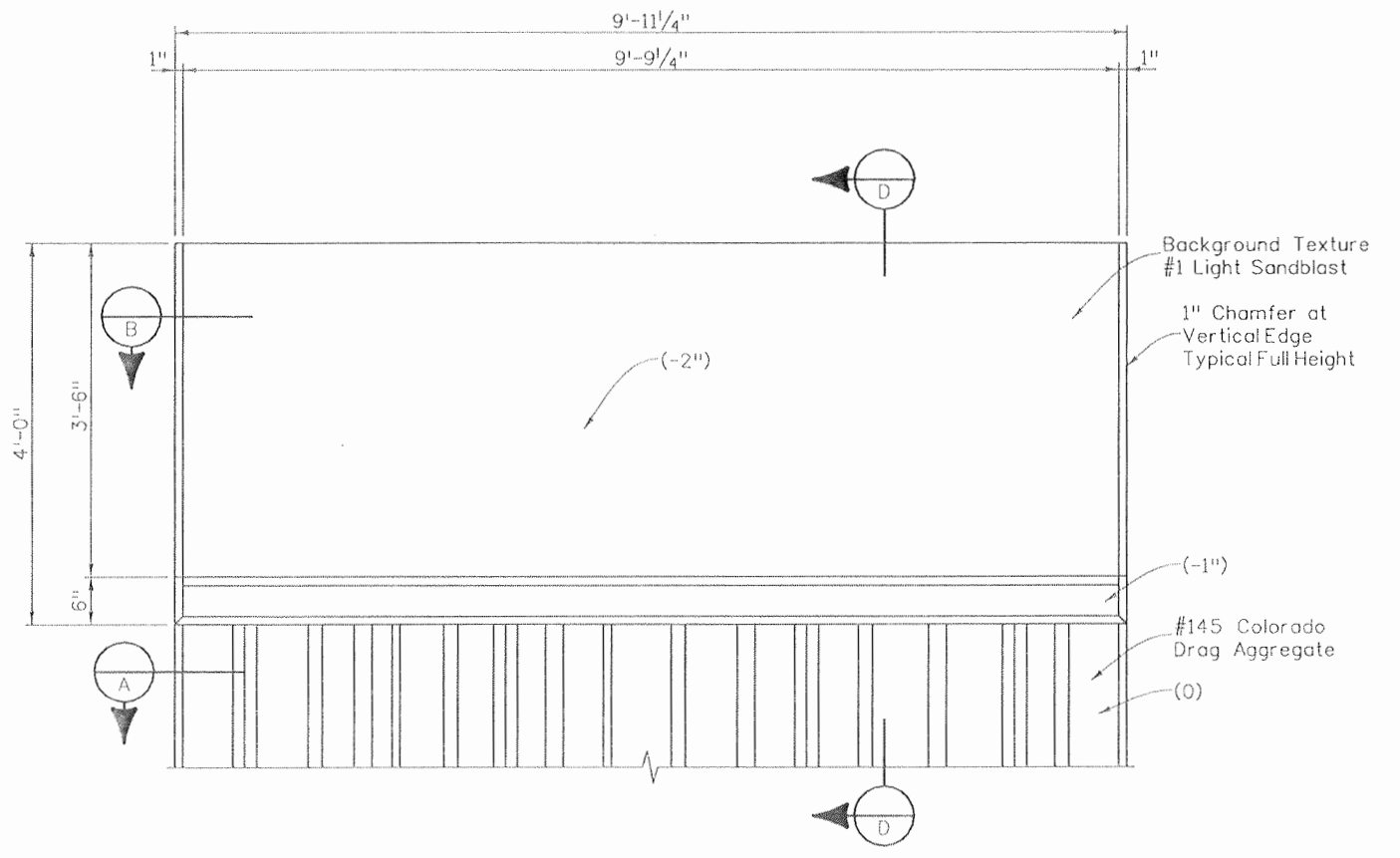
Ends can be modified to match Section A (Typ.)

- NOTES:**
1. For structure concrete coating colors, refer to Sheet 116, Book 4.
 2. For (2) Peak MTN. Banner texture and no MTN. Banner texture, see Architectural Details Sheet (2 of 2).
 3. For top of panelslope, refer to Wall Plan and Elevations.

Print Date: 9/27/2010		Sheet Revisions		Colorado Department of Transportation		As Constructed		M.S.E. WALL ARCHITECTURAL DETAILS (1 OF 2)		Project No./Code	
File Name: 16042T_WallDetails_01.dgn		Date:	Comments	Init.	3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365		No Revisions: 9/10		NH 1602-114		
Horiz. Scale: 1:1 Vert. Scale: As Noted					Region 5 EJA		Revised:		16042		
Unit Information 0221 Unit Leader STW							Void:		Sheet Number 363		
						Designer: T. Melton Detailer: R. Artrman		Structure Numbers: WALL P-05-T WALL P-05-AK		Subst Sheets: W-6 of 13	



FINISHED FACE OF (2) PEAK MTN. BANNER TEXTURE

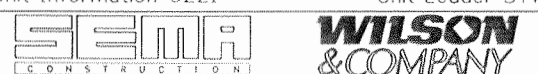


FINISHED FACE WITH NO MTN. BANNER TEXTURE

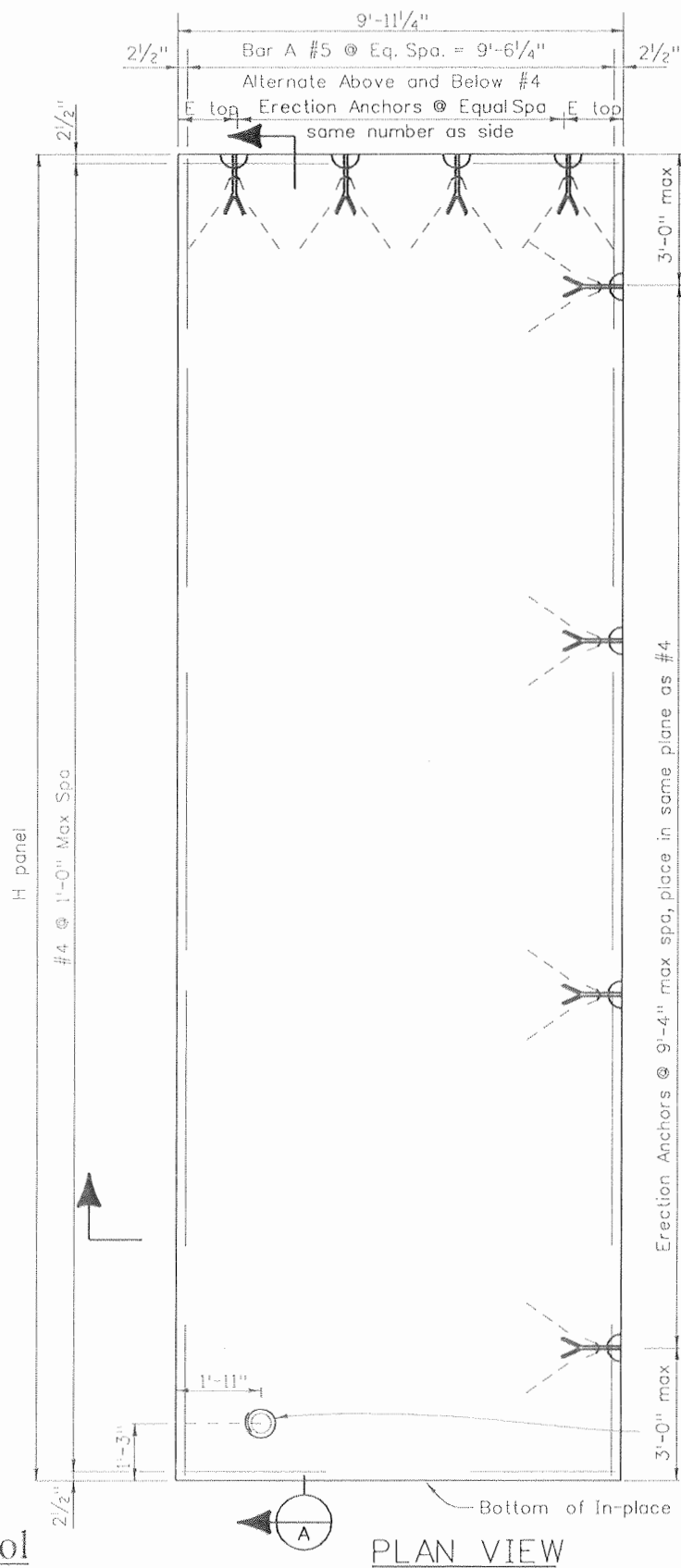
NOTES:
 1. Refer to Architectural Details Sheet (1 of 2) for sections.

Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MRM	B-08	RGA	B-08	MRM	B-08
SAB	B-08	TWM	B-08	AAR	7-08
Designed By	Detailed By	Checked By	Checked By	Checked By	Checked By

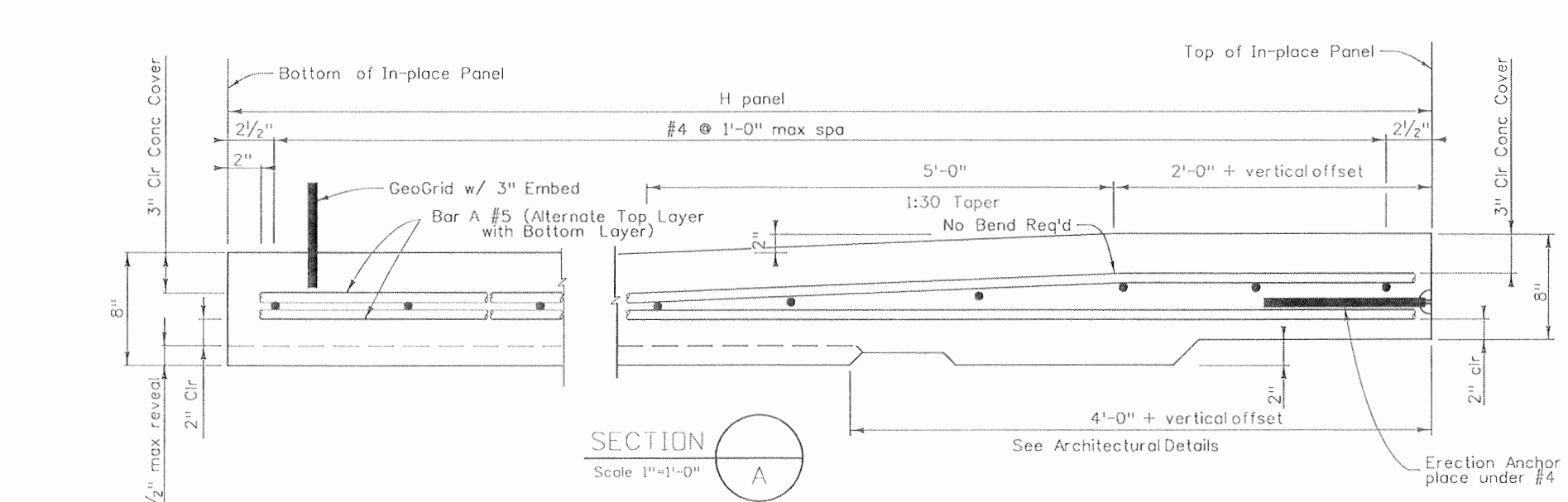
Print Date: 9/27/2010	Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5 EJA	As Constructed	M.S.E. WALL ARCHITECTURAL DETAILS (2 OF 2)		Project No./Code
File Name: 16042T_WallDetails_02.dgn	Date:	Comments	Init.		No Revisions: 9/10			NH 1602-114
Horiz. Scale: 1:1					Revised:	Designer: T. Melton	Structure Numbers: WALL P-05-T	16042
Unit Information 0221					Void:	Detailer: R. Artman	Structure Numbers: WALL P-05-AK	Sheet Number 364
Unit Leader STW					Sheet Subset: Wall	Subset Sheets: W-7 of 13		



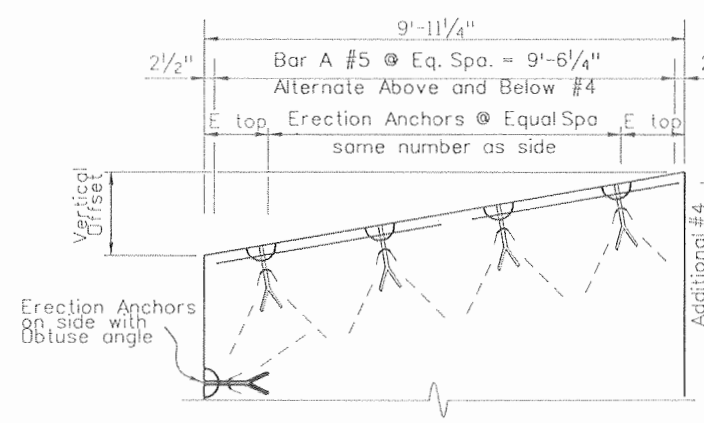
Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MRM	06-08	EJB	06-08	MRM	07-08
SAB	07-08	MRM	06-08	AAR	07-08
Designed By	Detailed By	Checked By	Checked By	Checked By	Checked By



PLAN VIEW



SECTION A
Scale 1"=1'-0"



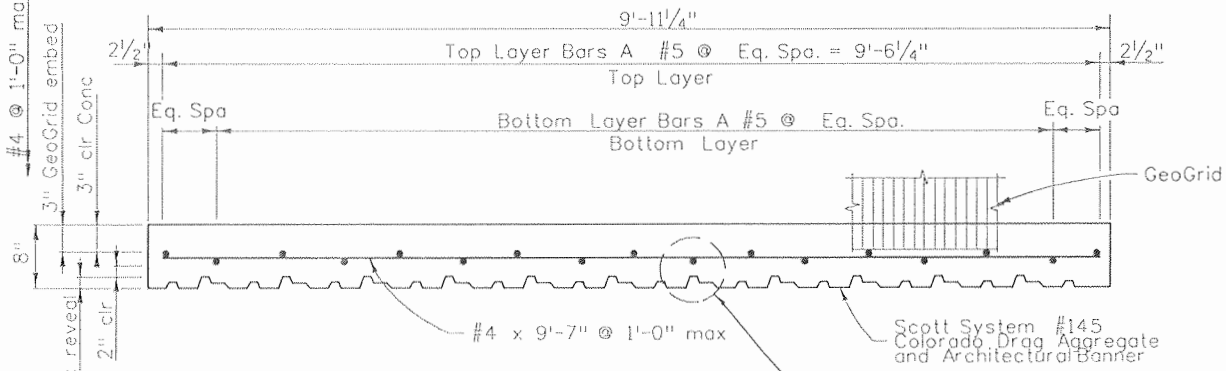
PARTIAL PLAN VIEW
Panels with Slope Top

H Panel	Bars A	Top Layer	Bottom Layer
< 28'	15 #5	8 #5	7 #5
28' to 34'	21 #5	11 #5	10 #5

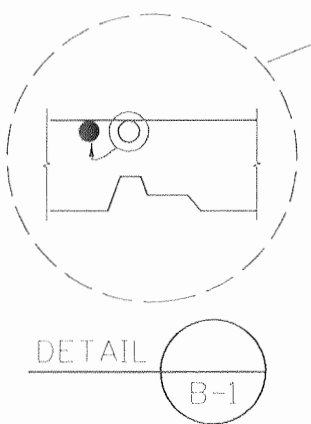
ERECTION ANCHORS			
Panel Weight	Side number, size	Top number, size	E top
< 16 Kips	(2) 4 ton	(2) 4 ton	2'-0"
16 kips to 32 kips	(4) 4 ton	(4) 4 ton	1'-4"
32 kips to 48 kips	(4) 6 ton	(4) 6 ton	1'-4"

Dayton Superior/ Richmond Fleet Lift P-32 erection anchors or equal.

Panels with 4.5" underdrain opening only:
#4 9" around 4.5" underdrain opening, place #4 in the same plane as #4



SECTION B
Scale 1/2"=1'-0"



DETAIL B-1

Adjust #5 laterally to avoid max reveals;
Adjust to achieve 2" clear to form
See Detail B-1

Notes:
Concrete Class D f'c = 4,500 psi, release = 2,500psi
Reinforcing Steel epoxy coated Grade 60
Panel design valid to maximum H panel = 34'
GeoGrid tabs per MSE internal design
Removal of panel from casting bed requires casting bed inclined to 66 degrees minimum.



Print Date: 9/30/2010	File Name: 16042_WD154.dgn
Horiz. Scale: 1:1	Vert. Scale: As Noted
Unit Information 0221	Unit Leader STW
SEMA CONSTRUCTION	WILSON & COMPANY

Sheet Revisions		
Date:	Comments	Init.

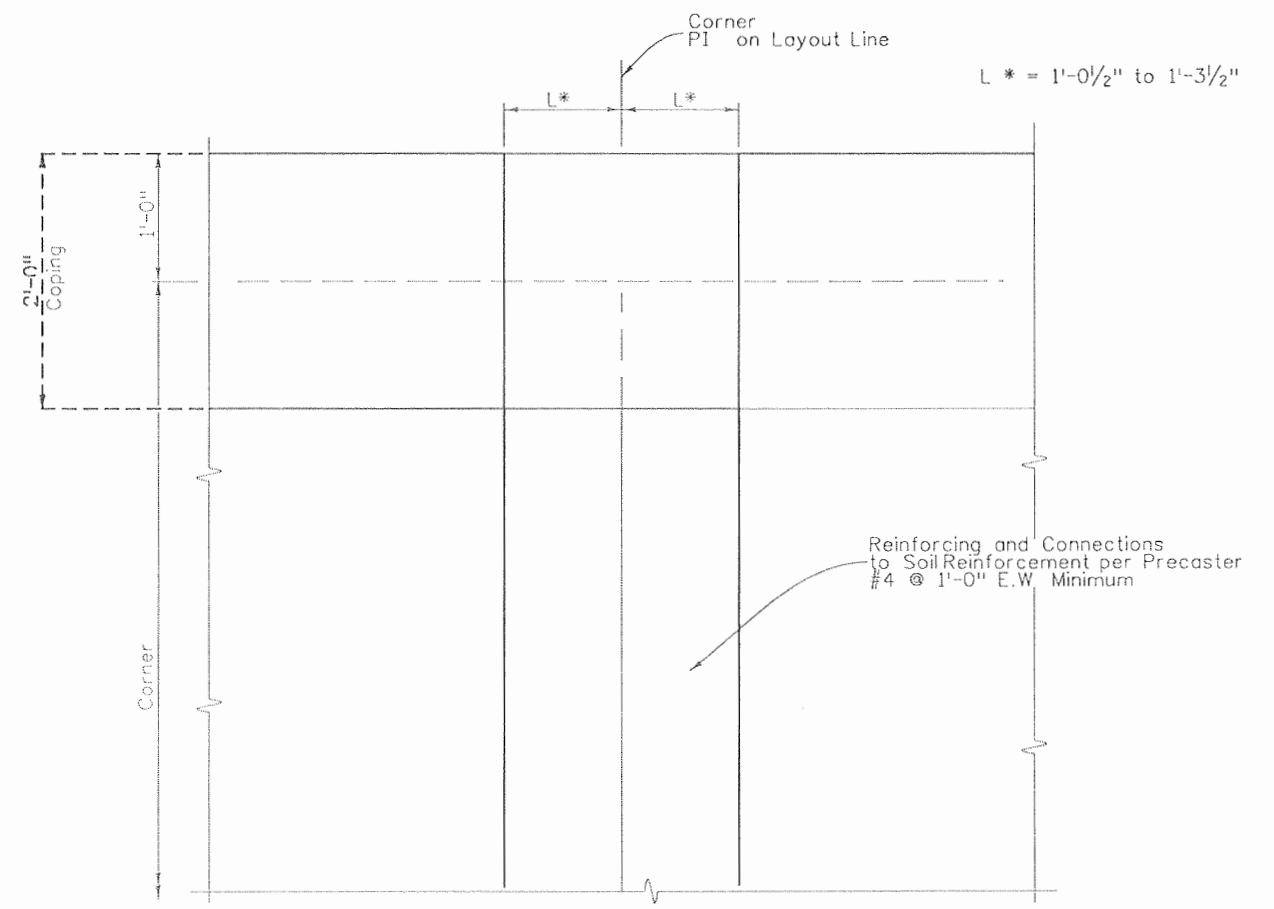
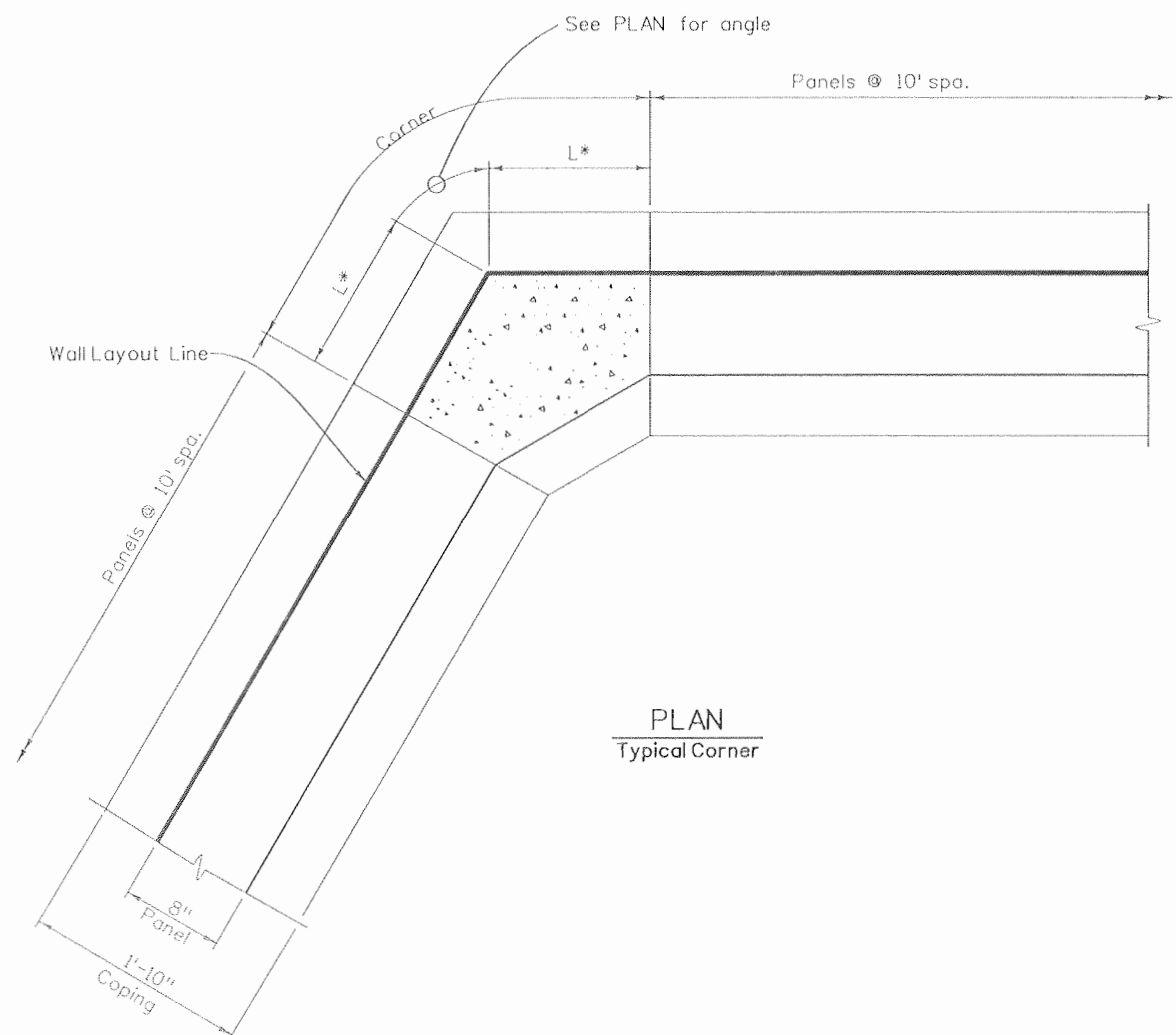
Colorado Department of Transportation
3803 North Main Avenue
Suite 200
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365
Region 5 EJA

As Constructed	No Revisions: 9/10
Revised:	
Void:	

M.S.E WALL PRECAST PANEL DETAILS			
Designer: M. Merklinger	Structure Numbers	WALL-P-05-T	
Detailer: E. Bearden		WALL-P-05-AK	
Sheet Subset: Wall	Subset Sheets: W-8 of 13		

Project No./Code	NH 1602-114
	16042
Sheet Number	365

Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MRM	08-08	EJB	08-08	MRM	08-08
SAB	08-08	MRM	08-08	AAR	08-08
Designed By	Detailed By	Checked By	Checked By	Quantities By	Checked By



Note:

- Concrete Class D (Wall)
- Reinforcing Steel (Epoxy Coated)



Print Date: 9/27/2010	
File Name: 16042_WD156.dgn	
Horiz. Scale: 1:1 Vert. Scale: As Noted	
Unit Information 0221 Unit Leader STW	

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation

3803 North Main Avenue
Suite 200
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365

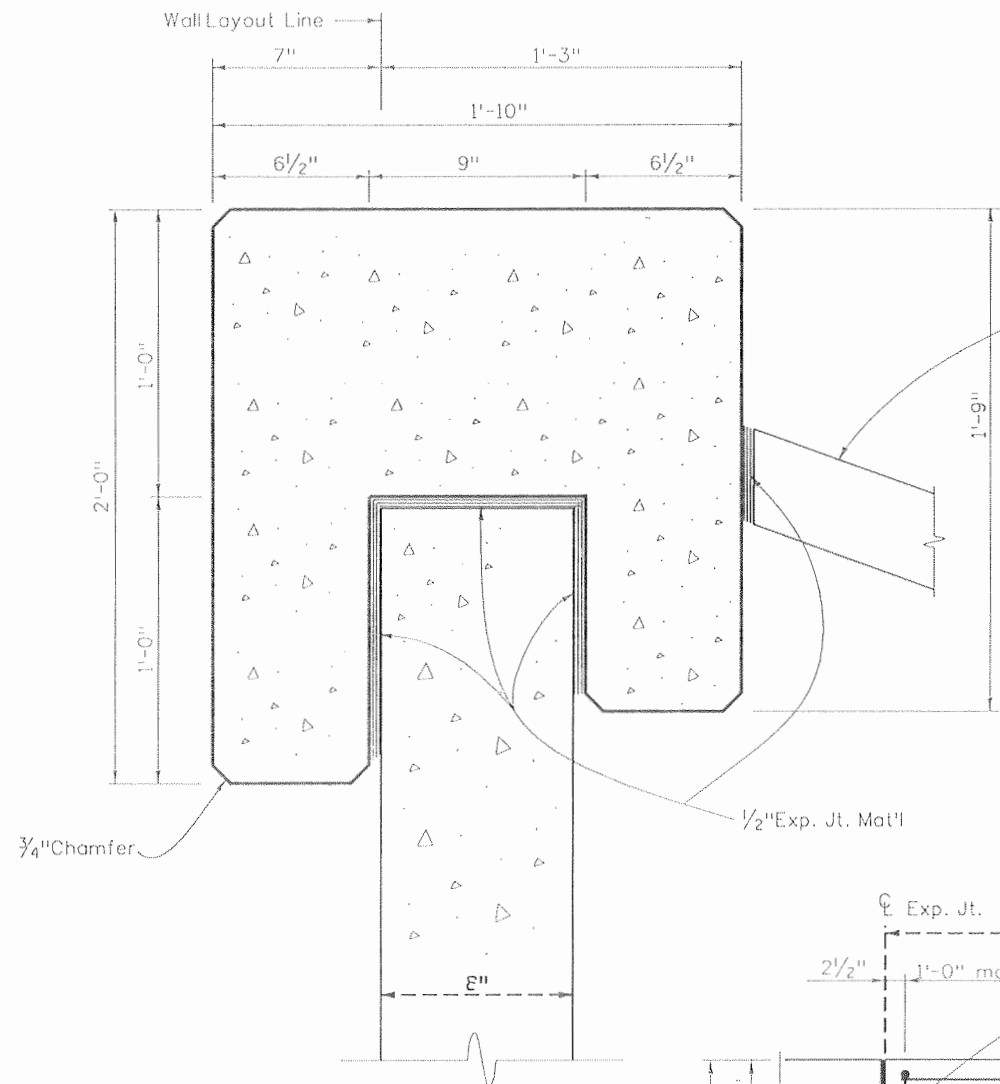
Region 5 EJA

As Constructed
No Revisions: 9/10
Revised:
Void:

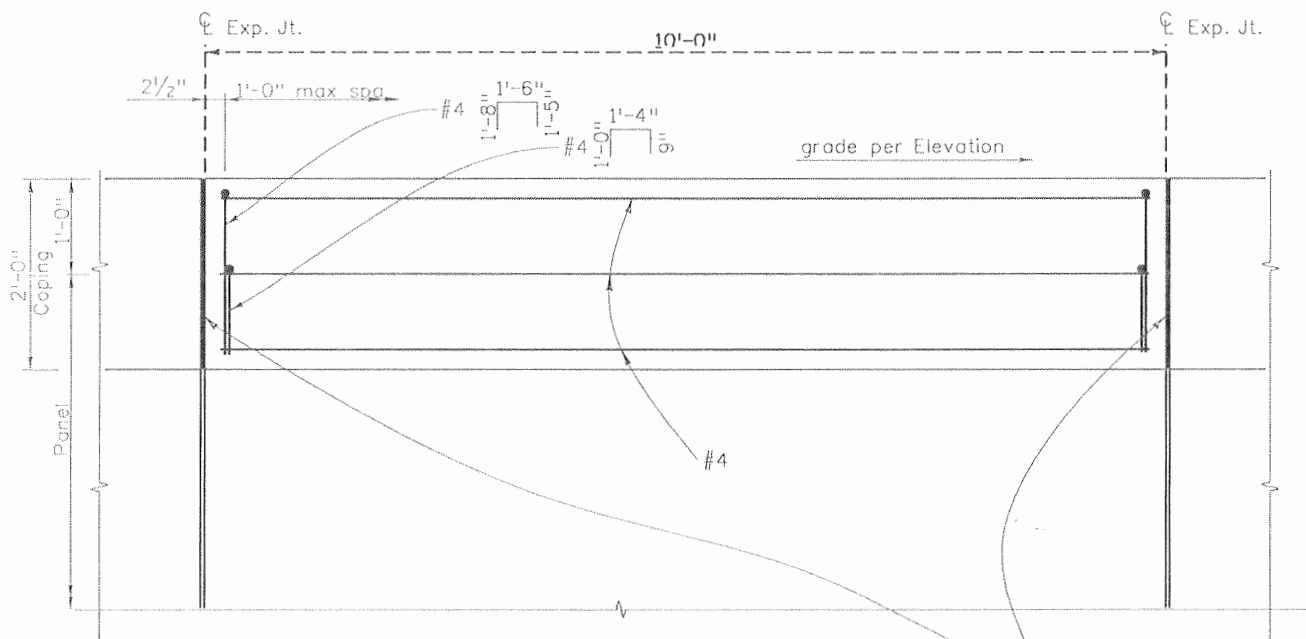
M.S.E. WALL PRECAST PANEL CORNERS			
Designer:	M. Merklinger	Structure Numbers	WALL-P-05-T
Detailer:	E. Bearden	Structure Numbers	WALL-P-05-AK
Sheet Subset:	Walls	Subset Sheets:	W-9 of 13

Project No./Code	NH 1602-114
Sheet Number	366

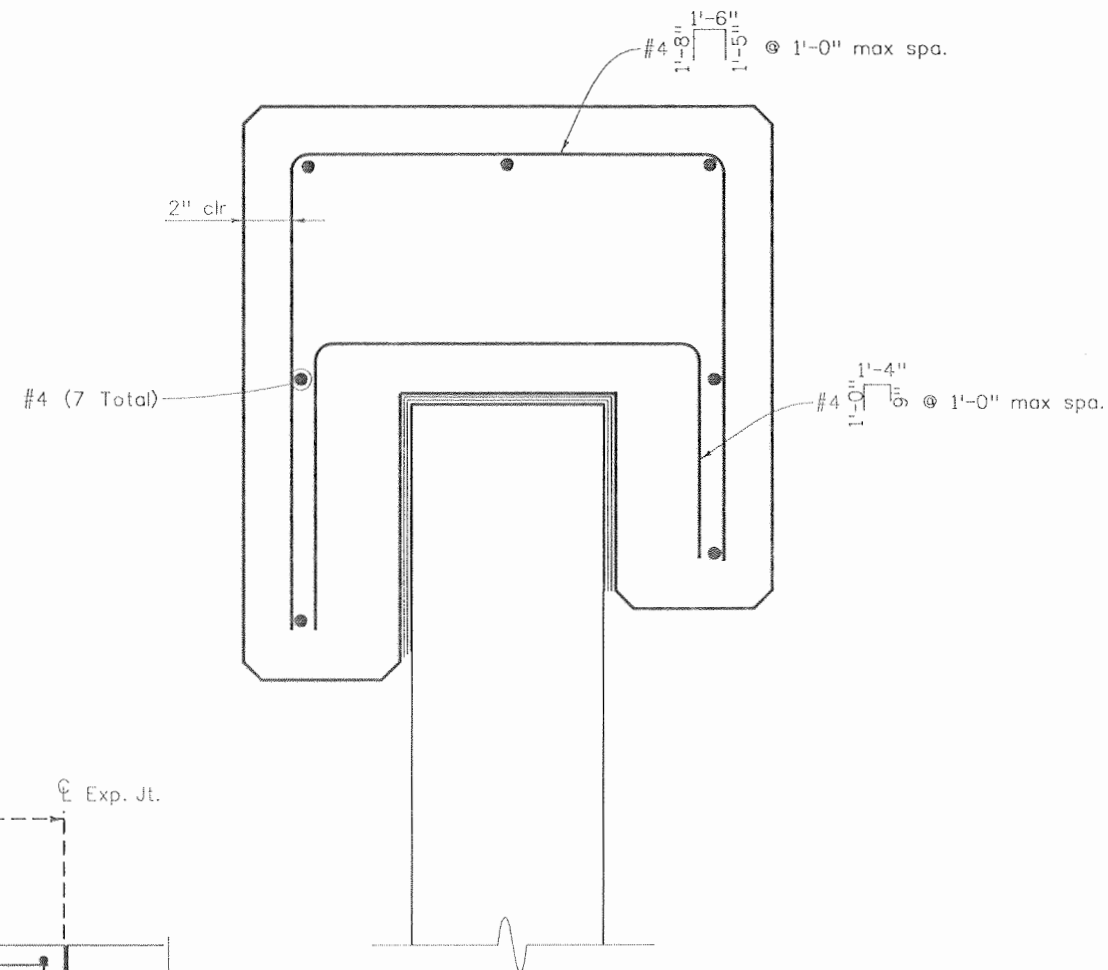
Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MRM	06-08	EJB	06-08	MRM	07-08
SAB	07-08	MRM	06-08	AAR	07-08
Designed By	Detailed By	Checked By	Checked By	Checked By	Checked By



INSTALLATION DETAIL



COPING ELEVATION



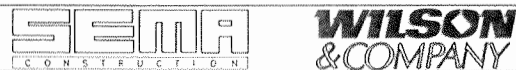
TYPICAL SECTION

Notes:
 Concrete Class B (Wall)
 Reinforcing Steel (Epoxy Coated)

1/2" Exp. Jt. Mat'l
 and Joint aligned
 vertically at each
 Panel joint
 Nail in place on first side cast.



Print Date: 9/27/2010
 File Name: 16042_WD155.dgn
 Horiz. Scale: 1:1 Vert. Scale: As Noted
 Unit Information 0221 Unit Leader STW



Sheet Revisions		
Date:	Comments	Init.

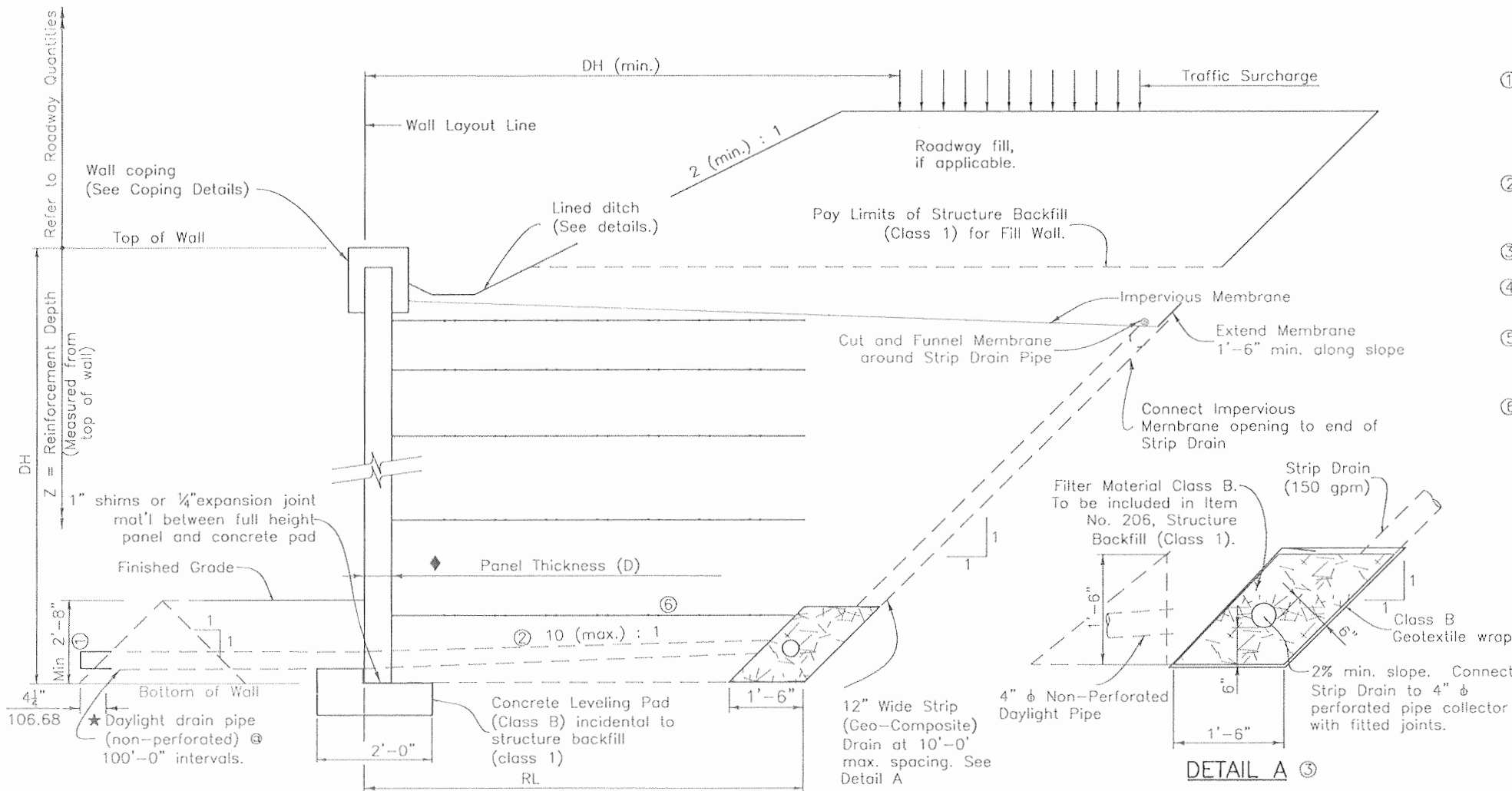
Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

As Constructed
 No Revisions: 9/10
 Revised:
 Void:

M.S.E. WALL
 COPING DETAILS
 Designer: M. Merklinger
 Detailer: E. Bearden
 Sheet Subset: Wall
 Structure Numbers: WALL-P-05-T
 WALL-P-05-AK
 Subset Sheets: W-10 of 13

Project No./Code
 NH 1602-114
 16042
 Sheet Number 367

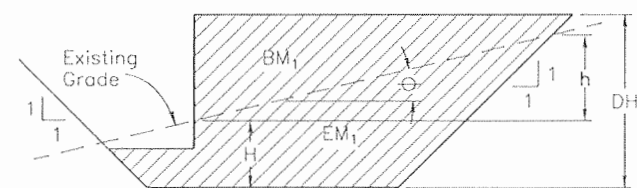
Design	INITIAL	DATE	EJB	DATE	DAVE
	MRM	06-08			
Quantities	INITIAL	DATE	MRM	DATE	MRM
	MRM	06-08			



★ Quantities of perforated pipes (in.), and drain pipes (in.) shall be based on the wall length in the layout plan.

◆ Refer to Precast Panel Details.

TYPICAL SECTION
RETAINING WALL-P-05-T



$$EM_1 = [(H + \frac{h}{2})(h/TAN\theta) + 0.75H + \frac{(H - 1.5 \frac{TAN\theta}{1 + TAN\theta})(0.5H + 0.75)}{1 + TAN\theta} - 0.5(H+h)^2]/27$$

$$h = (H+RL) \frac{TAN\theta}{1 - TAN\theta}$$

$$BM_1 = [DH(RL) + 0.5(DH)^2 + 1.5(1.50)^2]/27$$

⊖ = Average angle of existing ground line

EARTHWORK QUANTITIES
(For wall without Shoring)

- See Plan & Profile sheets for embedment elevations. Embedment shall be 2'-8" (min.) Structure Backfill (Class 2) for frost depth, erosion control and to conceal and protect a stepped leveling pad. This material shall be included in the quantity for Structure Backfill (Class 1).
- Soil Reinforcement may be cut to accommodate pipe installation. The cut shall be made in a direction parallel to the pipe centerline, as seen in a plan view.
- All Pipes and Connectors shall be schedule 40 H.D.P.E.
- Wall coping shall not be paid for separately but shall be included in Item 504 Precast Panel Facing.
- One side temporary forming board is required to build detail A. The filter material shall be wrapped with erosion control Class B Geotextiles.
- Bottom layer of Soil reinforcement is required no more than 1'-4" above bottom of precast panel for external stability and global stability.

ABBREVIATIONS USED

- BM = Quantities of Structure Backfill (Class 1) without Shoring (c.y./ft.)
- BM1 = Quantities of Structure Backfill (Class 1) with Shoring (c.y./ft.)
- BP2 = Maximum Required Allowable Bearing Pressure (ksf)
- DH = Design Height (or, Avg. ht. for qty. calculations) (ft.)
- EM = Quantity of Structure Excavation without Shoring (c.y./ft.)
- EM1 = Quantity of Structure Excavation with Shoring (c.y./ft.)
- H 2 = Depth of Excavation at Wall Layout Line (ft.)
- LTDS = Required Long Term Design Strength (lb./in.)
- MARV = Minimum Average roll Value (lb./in.)
- RL = Reinforcement Length (ft.)
- S = Tributary reinforcement spacing (ft.)
- Total = Sum of required LTDS for all layers (lb/in)

DESIGN DATA

AASHTO, 16th EDITION without interims for internal design only

Unit weight of γ_{conc} = 150 pcf

Unit weight of γ_{soil} = 125 pcf is assumed.

Internal friction angle of soil for Structure Backfill (Class 1) is assumed to be $\phi = 34^\circ$. $K_a = 0.4067$ for 2:1 slope.
 $K_a = 0.2827$, $K_o = 0.4408$. for horizontal slope

Coefficient of resistance to direct sliding $\left\{ \begin{array}{l} = 0.9 \text{ (Geogrid)} \\ = 0.6 \text{ (Geotextile)} \end{array} \right.$

See project Special Provisions for the relationship between LTDS and MARV of Geosynthetic soil reinforcement, and sacrificial thickness of metallic soil reinforcement.

Foundation design parameters provided by others for MSE Wall founded on Shale Bedrock:
 Ultimate bearing capacity = 8,000 psf
 Resistance factor for bearing = 0.50
 Ultimate coefficient of friction for sliding = 0.45
 Resistance factor for sliding = 0.85



Print Date: 9/27/2010	Unit Leader STW
File Name: 16042_WD150.dgn	
Horiz. Scale: 1:1	Vert. Scale: As Noted
Unit Information 0221	
SEMA CONSTRUCTION	WILSON & COMPANY

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation

3803 North Main Avenue
Suite 200
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365

DOT DEPARTMENT OF TRANSPORTATION

Region 5 EJA

As Constructed	RETAINING WALL AT US 550 BRIDGE	Project No./Code
No Revisions: 9/10	M.S.E. WALL DETAILS 1 of 3	NH 1602-114
Revised:	Designer: M. Merklinger	16042
Void:	Detailer: E. Bearden	Sheet Number 368
	Sheet Subset: Wall	Subset Sheets: W-11 of 13

GENERAL NOTES

The required LTDS for different reinforcement layer depths (Z) is determined with the following equations;

$$LTDS \geq (K) \cdot (\sigma_v) \cdot S / 12$$

Where A. (Geosynthetic reinforcement)
 $\sigma_v = (Z + Z') \cdot \gamma_{soil}$ as depicted in the Loading Diagram.
 K = Ka = 0.393

NOTES:

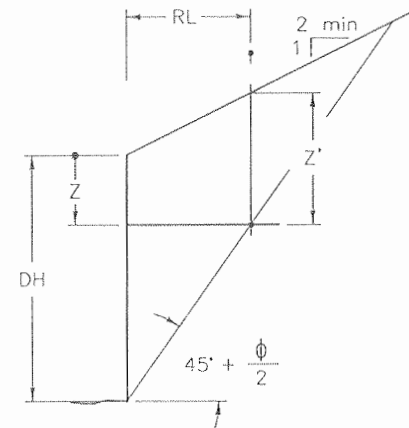
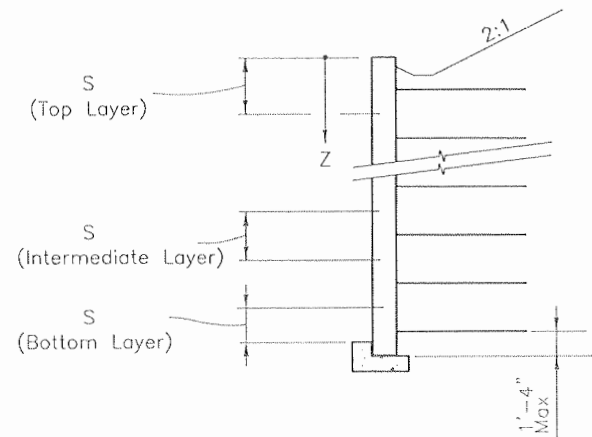
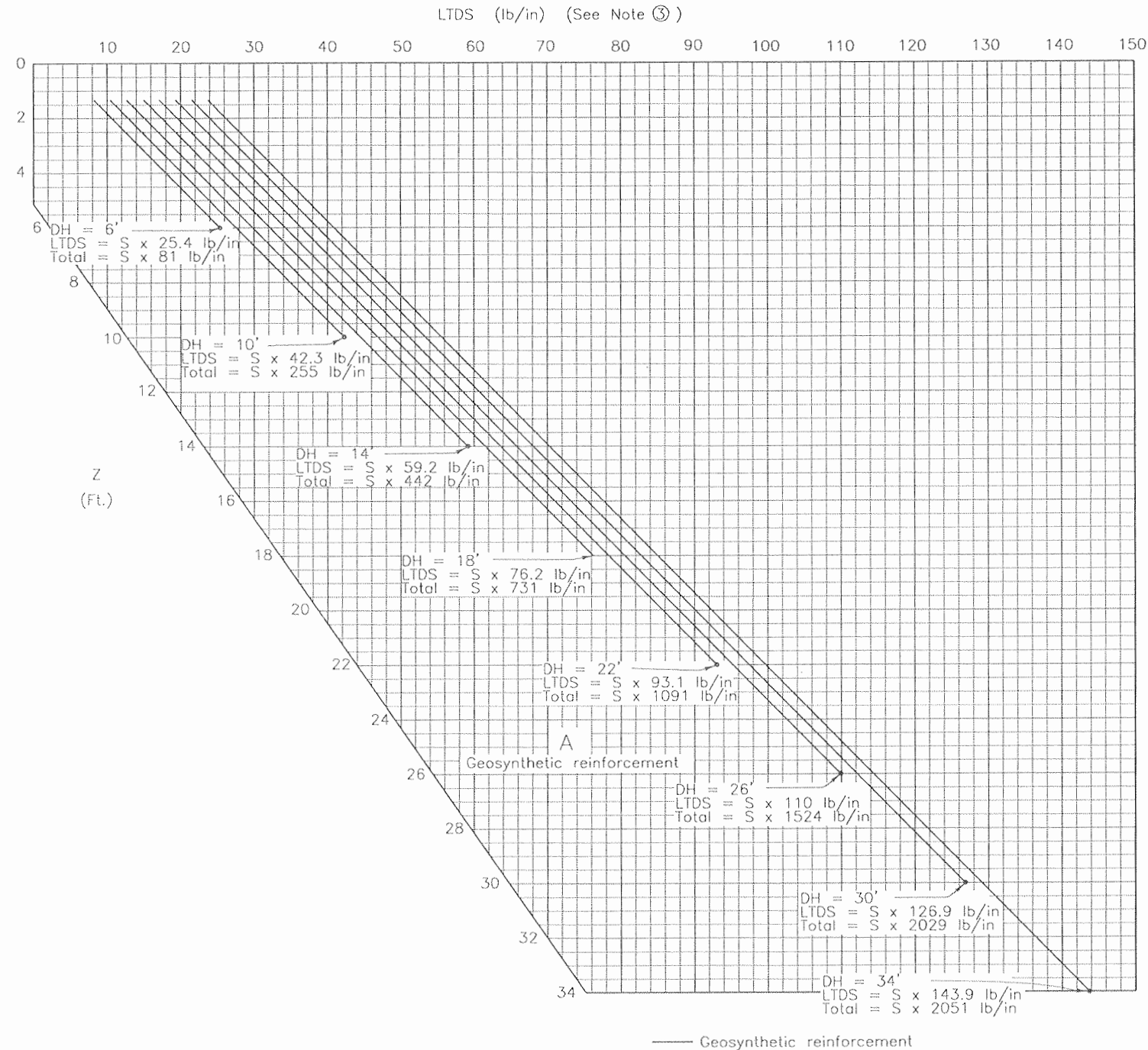
- ① See Project Special Provisions for minimum reinforcement lengths.
- ② Spacing S in the vertical distance from the center of reinforced fill layers.
- ③ Graph values must be multiplied by S in feet to obtain the required LTDS.

TABLE

DESIGN PARAMETERS FOR WALL HEIGHTS FROM 3.00' TO 34.00'

DH (ft)	RL** (ft)	BP (ksf)
3.0	6.00	0.65
4.0	6.00	0.87
5.0	6.00	1.09
6.0	6.00	1.31
7.0	7.00	1.52
8.0	8.00	1.75
9.0	8.00	1.96
10.0	8.00	2.18
11.0	8.00	2.40
12.0	8.40	2.62
13.0	9.10	2.83
14.0	9.80	3.06
15.0	10.50	3.27
16.0	11.20	3.49
17.0	11.90	3.71
18.0	12.60	3.93
19.0	13.30	4.14
20.0	14.00	4.37
21.0	14.70	4.58
22.0	15.40	4.80
23.0	16.10	5.02
24.0	16.80	5.24
25.0	17.50	5.46
26.0	18.20	5.67
27.0	18.90	5.90
28.0	19.60	6.11
29.0	20.30	6.33
30.0	21.00	6.55
31.0	21.70	6.77
32.0	22.40	6.99
33.0	23.10	7.21
34.0	23.80	7.43

** See Project Special Provisions for minimum RL requirements.



LOADING DIAGRAM

An additional fill surcharge behind abutment other than shown on Loading Diagram shall be included in the stability design and in the determination of the additional RL. The design calculations and shop drawings shall be submitted for approval prior to construction

Design		Detail		Quantities	
Designed By	Checked By	INITIAL	DATE	INITIAL	DATE
MRM	SAB	EJB	06-08	MRM	07-08
Checked By	Checked By	Checked By	Checked By	Checked By	Checked By
MRM	SAB	MRM	06-08	AAR	07-08



Print Date: 9/27/2010	File Name: 16042_WD152.dgn
Horiz. Scale: 1:1	Vert. Scale: As Noted
Unit Information 0221	Unit Leader STW
SEMA CONSTRUCTION	WILSON & COMPANY

Sheet Revisions		
Date:	Comments	Init.

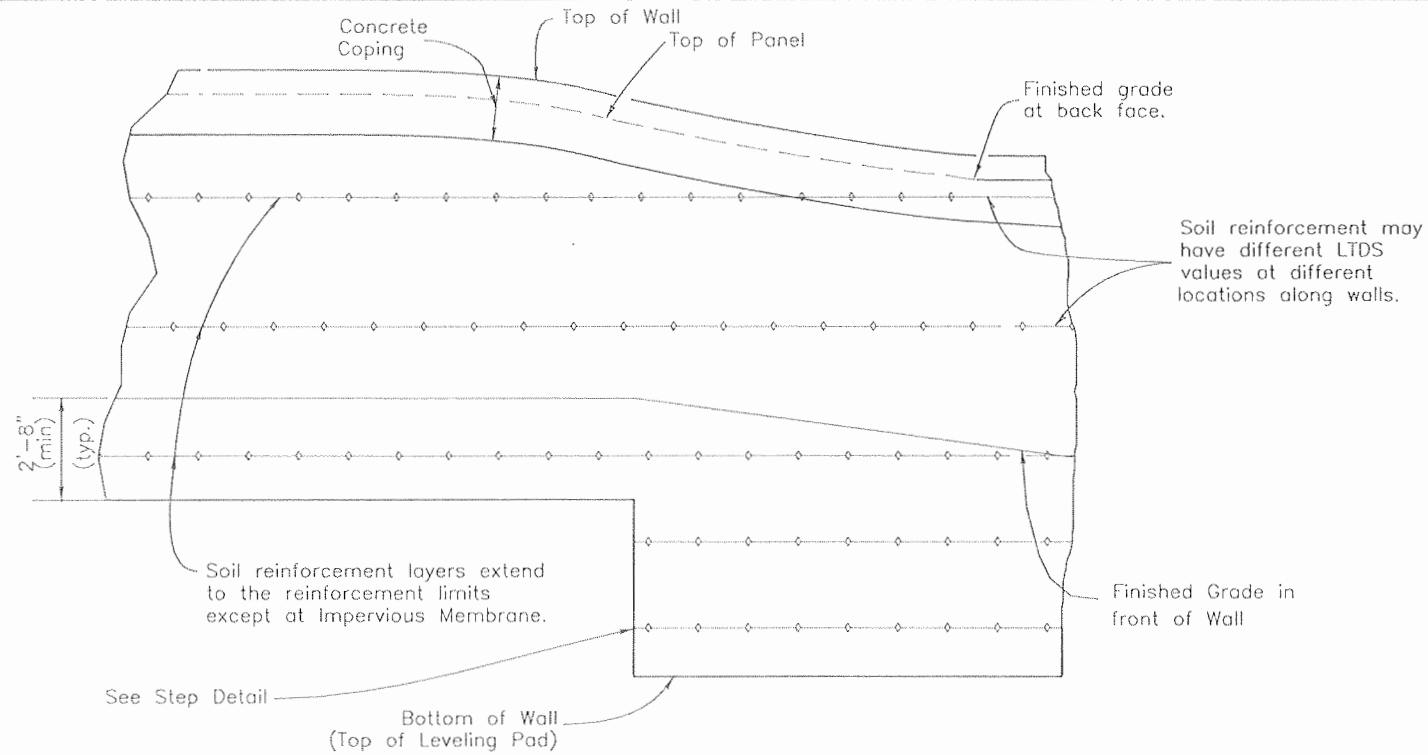
Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
Region 5 **EJA**

As Constructed	No Revisions: 9/10
Revised:	
Void:	

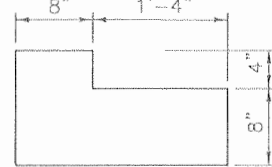
RETAINING WALL AT US 550 BRIDGE			
M.S.E. WALL DETAILS			
Designer: M. Merklinger	Structure: WALL- P-05-T	2 of 3	
Detailer: E. Bearden	Numbers:		
Sheet Subset: Wall	Subset Sheets: W-12 of 13		

Project No./Code	NH 1602-114
	16042
Sheet Number	369

Design	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
	MRM	06-08	EJB	06-08	MRM	07-08
Detail	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
	MRM	06-08	EJB	06-08	MRM	07-08
Quantities	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
	MRM	06-08	EJB	06-08	MRM	07-08
Designed By	Checked By	Checked By	Checked By	Checked By	Checked By	Checked By
	SAB	MRM	MRM	MRM	MRM	MRM

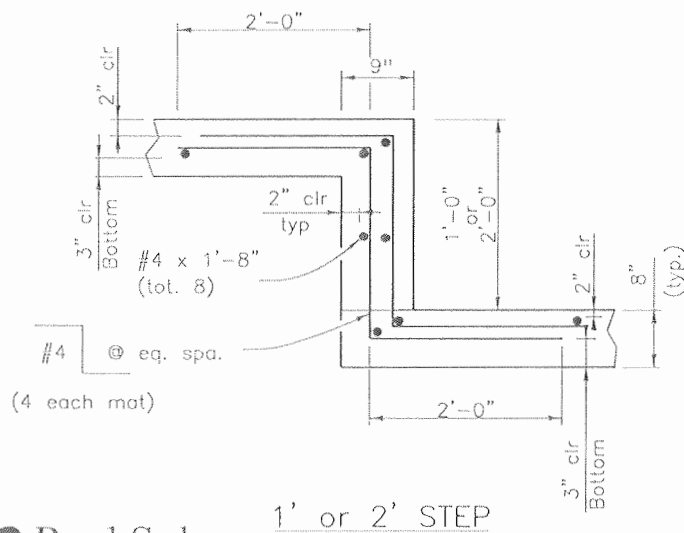


TYPICAL ELEVATION (WALL)

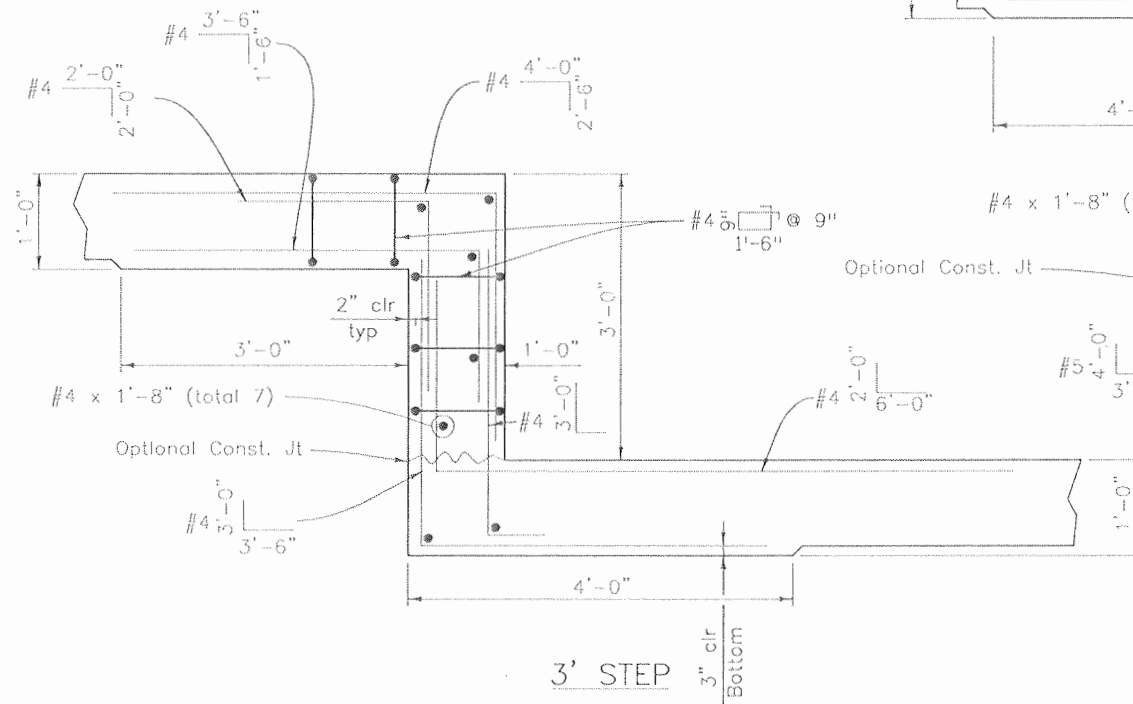


LEVELING PAD TYPICAL SECTION

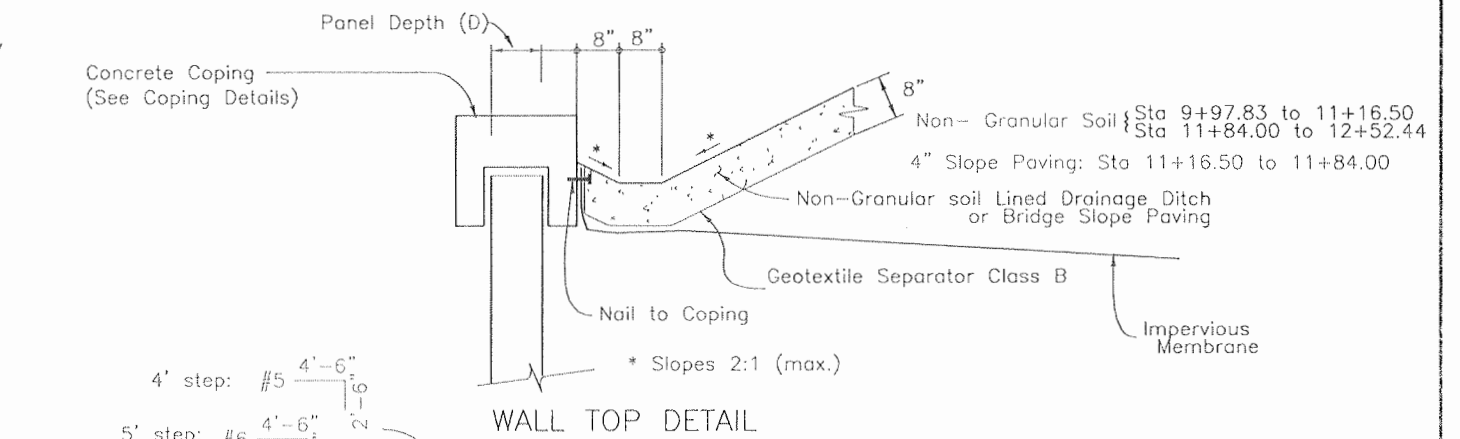
Except Near Step



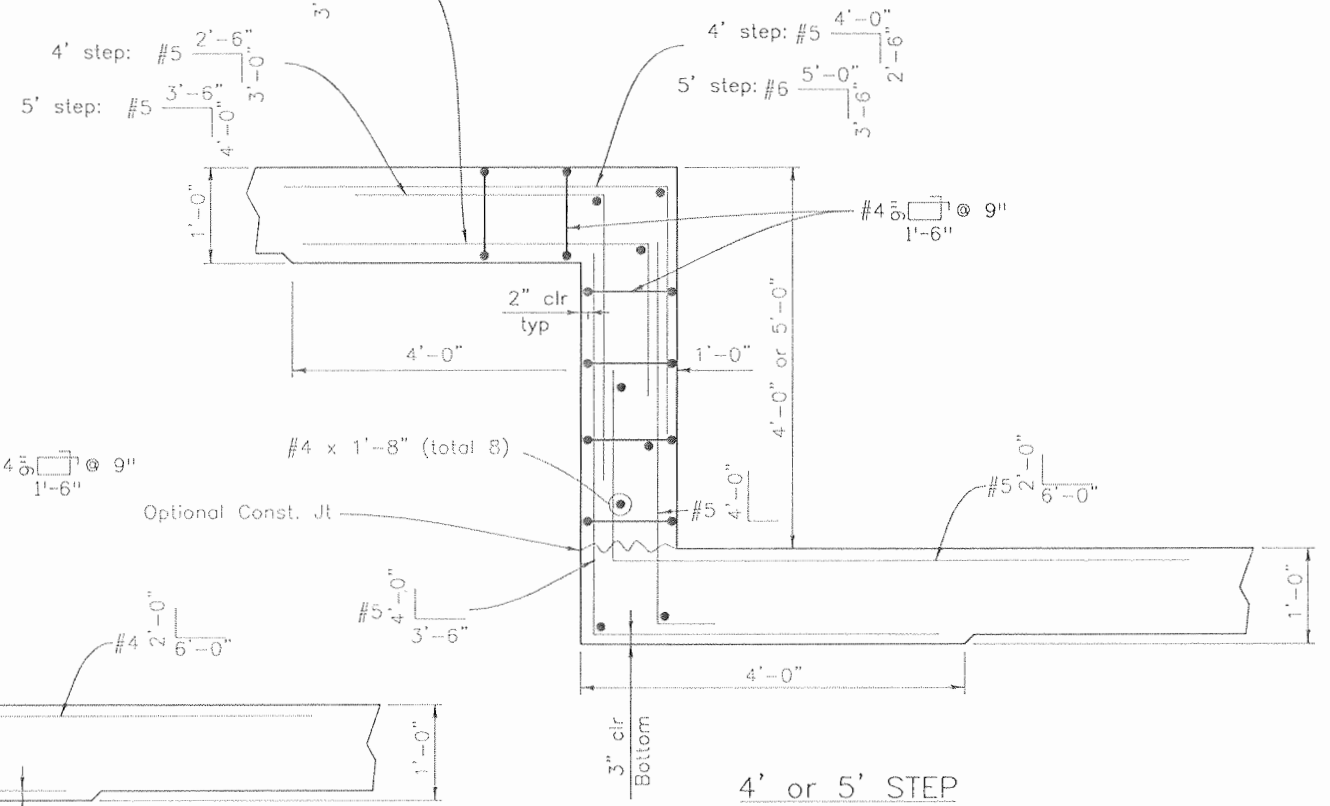
1' or 2' STEP



3' STEP



WALL TOP DETAIL



4' or 5' STEP

Note:

3' Step, 4' Step, and 5' Step only are allowed where steps are excavated in competent bedrock, which is anticipated at WALL-P-05-T.

Excavation steps shall be neat lines.



Print Date: 9/27/2010

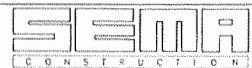
File Name: 16042_WD153.dgn

Horiz. Scale: 1:1

Vert. Scale: As Noted

Unit Information 0221

Unit Leader STW



Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation



3803 North Main Avenue
Suite 200
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365

Region 5

EJA

As Constructed

No Revisions: 9/10

Revised:

Void:

RETAINING WALL AT US 550 BRIDGE
M.S.E. WALL DETAILS 3 of 3

Designer: M. Merklinger

Detailer: E. Bearden

Sheet Subset: Wall

Structure Numbers

WALL-P-05-T

Subset Sheets: W-13 of 13

Project No./Code

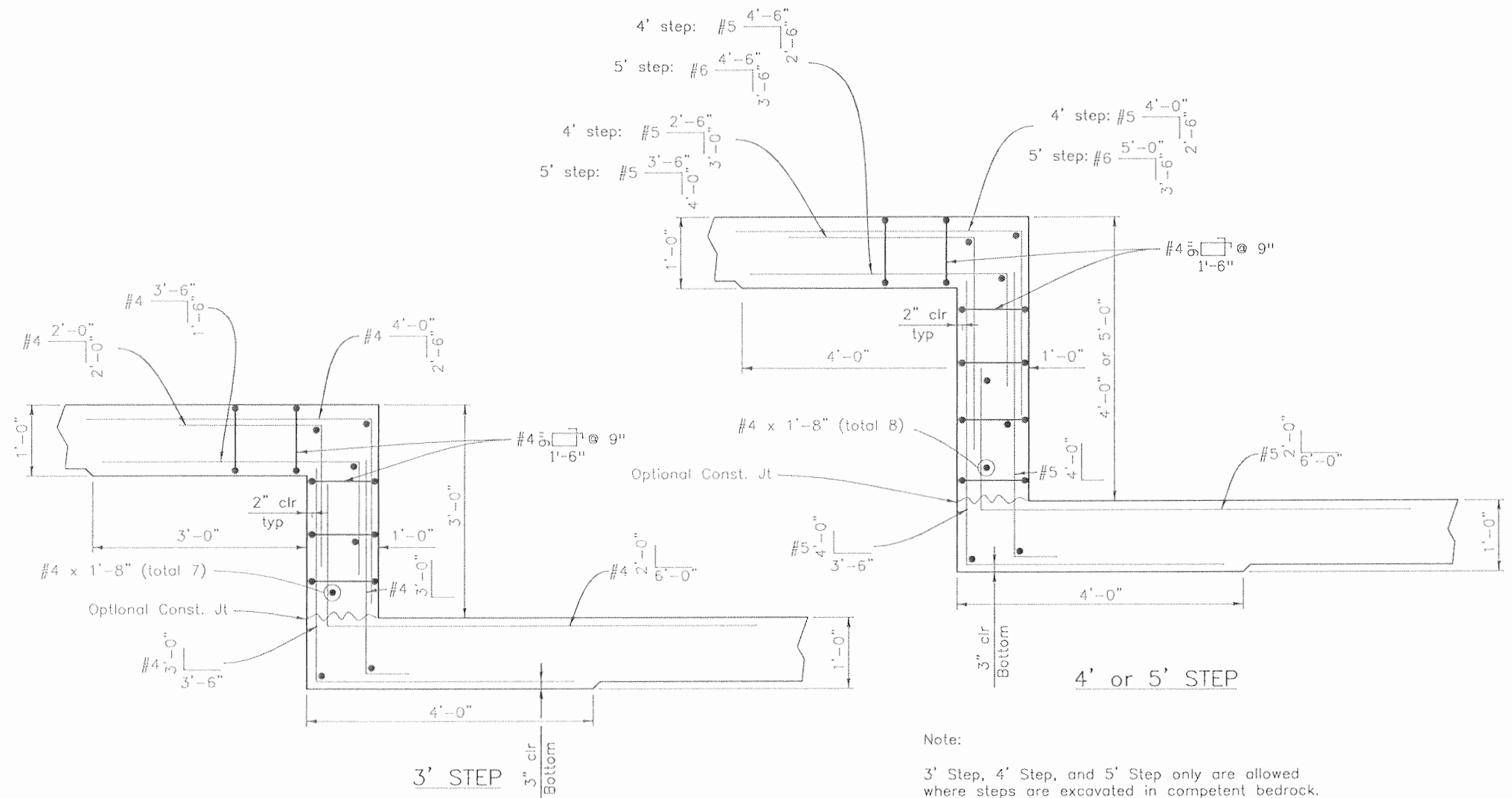
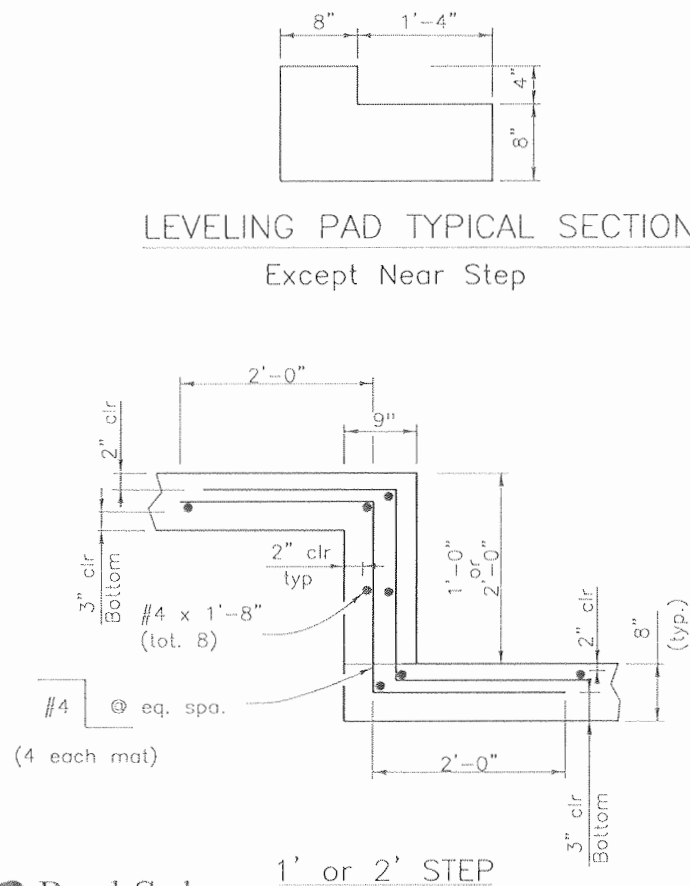
NH 1602-114

16042

Sheet Number 370

Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MRM	06-08	MRM	06-08	MRM	07-08
SAG	07-08	MRM	06-08	AAR	07-08
Designed By	Detailed By	Checked By	Checked By	Checked By	Checked By
Checked By	Checked By	Checked By	Checked By	Checked By	Checked By

LEVELING PAD TYPICAL SECTION
Except Near Step



Note:
3' Step, 4' Step, and 5' Step only are allowed where steps are excavated in competent bedrock.
Excavation steps shall be neat lines.



Print Date: 9/30/2010
File Name: 16042_WD153AK.dgn
Horiz. Scale: 1:1
Unit Information 0221
Unit Leader STW



Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
3803 North Main Avenue
Suite 200
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365
Region 5 EJA



As Constructed
No Revisions:
Revised:
Void:

RETAINING WALL AT RAMP A BRIDGE
LEVELING PAD DETAILS
Designer: M. Merklinger
Detailer: E. Bearden
Structure Numbers: WALL-P-05-AK
Sheet Subset: Wall
Subset Sheets: W-13A of 13

Project No./Code
NH 1602-114
16042
Sheet Number 371

GENERAL NOTES

STRUCTURE EXCAVATION AND BACKFILL SHALL BE IN ACCORDANCE WITH DETAILS SHOWN ON M.S.E. WALL DETAILS (1 OF 3).

ALL STRUCTURAL STEEL NOT OTHERWISE NOTED SHALL BE PAINTED IN ACCORDANCE WITH SECTION 509 OF THE STANDARD SPECIFICATIONS. THE COLOR SHALL BE AS SHOWN IN BOOK 4, SHEET 116, FEDERAL STANDARD 595B COLOR EQUIVALENT, AND IS TO BE SELECTED FROM TEST PANELS PROVIDED BY THE CONTRACTOR.

ALL EXPOSED CONCRETE SURFACES OF PEDESTRIAN RAIL ANCHORAGE BEAM SHALL RECEIVE CLASS I ORDINARY SURFACE FINISH TO 1 FOOT BELOW GROUND LINE.

STRUCTURAL STEEL TUBES SHALL CONFORM TO ASTM A-500 GRADE B.

STRUCTURAL STEEL PLATES AND BARS SHALL CONFORM TO AASHTO M270 GRADE 36.

STRUCTURAL CONCRETE COATING COLORS: REFER TO BOOK 4, SHEET 116

EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPECIFICATION M213.

GRADE 60 REINFORCING STEEL IS REQUIRED.

ALL REINFORCING STEEL SHALL BE EPOXY COATED UNLESS OTHERWISE NOTED.

(N) DENOTES NON COATED REINFORCING STEEL.

THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR EPOXY COATED REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS B CONCRETE	1'-3"	1'-7"	2'-5"	2'-10"	3'-8"	4'-8"	5'-11"	7'-3"
SPLICE LENGTH FOR CLASS D CONCRETE	1'-3"	1'-7"	2'-5"	2'-10"	3'-8"	4'-8"	5'-11"	7'-3"

WHEN THE CONTRACTOR ELECTS TO SUBSTITUTE EPOXY COATED REINFORCEMENT FOR BLACK REINFORCING BARS, THE MINIMUM LAP SPLICE SHALL BE AS DESCRIBED ABOVE.

THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR BLACK REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS B CONCRETE	1'-1"	1'-4"	1'-7"	1'-11"	2'-6"	3'-1"	3'-11"	4'-10"
SPLICE LENGTH FOR CLASS D CONCRETE	1'-1"	1'-4"	1'-7"	1'-11"	2'-6"	3'-1"	3'-11"	4'-10"

THE ABOVE SPLICE LENGTHS SHALL BE INCREASED BY 20 PERCENT FOR 3 BAR BUNDLES AND 33 PERCENT FOR 4 BAR BUNDLES.

THE ABOVE SPLICE LENGTHS MAY BE REDUCED BY 20% WHEN 3" OF CLEAR COVER EXISTS AND BAR SPACING IS 6" OR GREATER ON CENTER.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION.

M.S.E. = MECHANICALLY STABILIZED EARTH

SUP = SHARED USE PATH

E.F. = EACH FACE
F.F. = FAR FACE
N.F. = NEAR FACE

B.F. = BACK FACE
ABUT = ABUTMENT
LOL = LAYOUT LINE

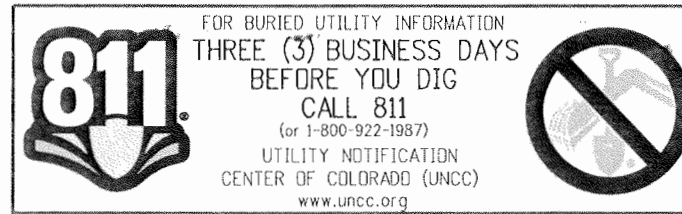
LEVEL II SULFATE RESISTANT CEMENT IS REQUIRED FOR STRUCTURAL CONCRETE.

UNSUITABLE FOUNDATION MATERIAL SHALL BE REPLACED WITH SUITABLE FOUNDATION MATERIAL IN ACCORDANCE WITH SECTION 206.03 OF THE STANDARD SPECIFICATIONS.

FOR STRUCTURE NUMBER INSTALLATION, SEE STANDARD S-614-12.

STATIONS, ELEVATIONS, AND DIMENSIONS CONTAINED IN THESE PLANS ARE CALCULATED FROM A RECENT FIELD SURVEY. THE CONTRACTOR SHALL VERIFY ALL DEPENDENT DIMENSIONS IN THE FIELD BEFORE ORDERING OR FABRICATING ANY MATERIAL.

THE INFORMATION SHOWN ON THESE PLANS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING HIS OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO AT 1-800-922-1987 AT LEAST 2 DAYS (NOT INCLUDING THE DAY OF NOTIFICATION) PRIOR TO ANY EXCAVATION OR OTHER EARTHWORK.



INDEX OF DRAWINGS

W-1	GENERAL INFORMATION
W-2	SUMMARY OF QUANTITIES LOCATION PLAN
W-3	GENERAL LAYOUT TYPICAL SECTION
W-4	SUP-5 GENERAL LAYOUT PLAN & ELEVATION
W-5	SUP-1 GENERAL LAYOUT PLAN & ELEVATION
W-6	SUP-3 GENERAL LAYOUT PLAN & ELEVATION
W-7	SUP-4 GENERAL LAYOUT PLAN & ELEVATION
W-8	PEDESTRIAN RAIL DETAILS
W-9	PEDESTRIAN RAIL ANCHORAGE DETAILS
W-10	M.S.E. WALL DETAILS (1 of 3)
W-11	M.S.E. WALL DETAILS (2 of 3)
W-12	M.S.E. WALL DETAILS (3 of 3)

DESIGN DATA

DESIGN METHOD:

MSE: SERVICE LOAD DESIGN: AASHTO SIXTEENTH EDITION (PER BOOK 2-TECHNICAL REQUIREMENTS, SECTION 15.4.4

PEDESTRIAN RAILING: LRFD STRENGTH I LIMIT STATE & SERVICE I LIMIT STATE: AASHTO LRFD FOURTH EDITION WITH 2008 INTERIMS

SEISMIC DESIGN CRITERIA:

SEISMIC ZONE 1
SITE CLASS D, $A_s=0.098g$ $SDS=0.216g$ $SD1=0.098g$

GEOTECHNICAL DATA PROVIDED BY OTHERS:

WALL FOUNDATIONS ON MEDIUM STIFF TO STIFF, SILTY SAND CLAY
NOMINAL BEARING CAPACITY = 5.0ksf
RESISTANCE FACTOR FOR BEARING = 0.50
NOMINAL COEFFICIENT OF FRICTION = 0.45
RESISTANCE FACTOR FOR SLIDING = 0.85

GLOBAL STABILITY CHECK WAS BY SHANNON & WILSON, INC., GEOTECHNICAL DESIGN LETTER 005

REINFORCED CONCRETE:

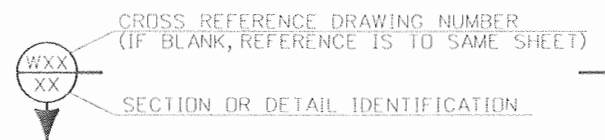
CLASS B CONCRETE: $f'_c = 4,500$ psi
CLASS D CONCRETE: $f'_c = 4,500$ psi
REINFORCING STEEL: $f_y = 60,000$ psi

RETAINING WALL TYPES

THE RETAINING WALL TYPE IS SHOWN IN THE RETAINING WALL TABLE. FOR BLOCK FACE M.S.E. WALLS, THE GEOMETRY IS DEFINED ON THE GENERAL LAYOUT, AND THE LONG TERM DESIGN STRENGTH DETAILS AND CRITERIA ARE SHOWN ON THE M.S.E. WALL DETAILS.

RETAINING WALL TABLE

WALL NUMBER	STRUCTURE NUMBER	TYPE	LENGTH	EXPOSED HEIGHT (MAX)	DESIGN HEIGHT (MAX)
SUP - 5	WALL-P-05-AS	Block Face M.S.E. Wall	131.31'	10.0'	12.0'
SUP - 1	WALL-P-05-AP	Block Face M.S.E. Wall	164.77'	8.56'	10.56'
SUP - 3	WALL-P-05-AQ	Block Face M.S.E. Wall	240.64'	9.75'	11.75'
SUP - 4	WALL-P-05-AR	Block Face M.S.E. Wall	279.95'	7.36'	9.36'



Design	INITIAL	DATE	Checked By
	MRM	02-09	
	AAR	02-09	
Detail	INITIAL	DATE	Checked By
	EJB	02-09	
	MRM	02-09	
Quantities	INITIAL	DATE	Checked By
	MRM	03-09	
	AAR	04-09	



Print Date: 9/22/2010	File Name: 16042_T_GN.dgn
Horiz. Scale: 1:1	Vert. Scale: As Noted
Unit Information	Unit Leader Initials
SEMA CONSTRUCTION	WILSON & COMPANY

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation

3803 North Main Avenue
Suite 200
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365

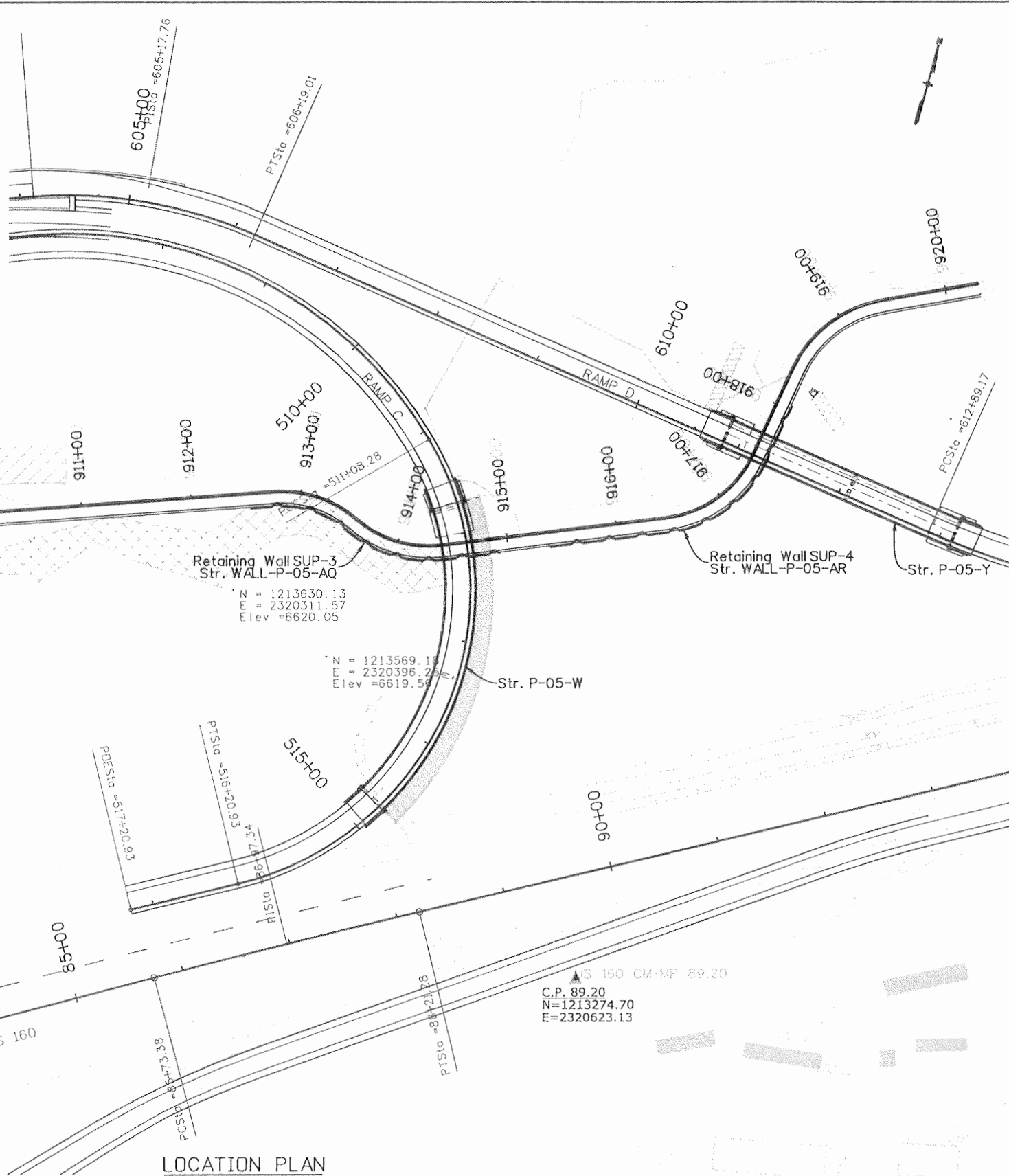
Region 5 EJA

As Constructed	SUP Retaining Walls			Project No./Code	
	GENERAL INFORMATION				
	No Revisions: 9/10	Designer: M. Merklinger	Structure: WALL-P-05-AP		NH 1602-114
	Revised:	Detailer: E. Bearden	Numbers: thru WALL-P-05-AS		16042
Void:	Sheet Subset: SUP Walls	Subset Sheets: W-1 of 12	Sheet Number 372		

SUMMARY OF QUANTITIES

Item No.	Description	Unit	Retaining Wall SUP-5 WALL-P-05-AS	Retaining Wall SUP-1 WALL-P-05-AP	Retaining Wall SUP-3 WALL-P-05-AQ	Retaining Wall SUP-4 WALL-P-05-AR
206	Structure Excavation	CY	154	501	628	1,510
206	Structure Backfill (Class 1)	CY	667	771	1,083	1,904
206	Mechanical Reinforcement of Soil	CY	293	368	539	1,350
504	Block Facing	SF	1,050	1,318	1,922	2,025
514	Pedestrian Railing Type 1	LF	134	168	244	283
① 601	Concrete Class D (Wall)	CY	44	56	81	95
② 601	Structural Concrete Coating	SY	68	86	125	145
① 602	Reinforcing Steel (Epoxy Coated)	LB	1,390	1,740	2,550	2,960

- ① Quantities for moment slab, including coping and curb.
 - ② Quantities for curb and coping.
- Leveling pad quantities are incidental to retaining wall construction and not quantified.



Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MRM	02-09	MRM	02-09	MRM	03-09
AAR	02-08	AAR	02-09	AAR	04-09



Print Date: 9/22/2010
File Name: 16042_GS003.dgn
Horiz. Scale: 1:120 Vert. Scale: As Noted
Unit Information Unit Leader Initials

Sheet Revisions		
Date:	Comments	Init.

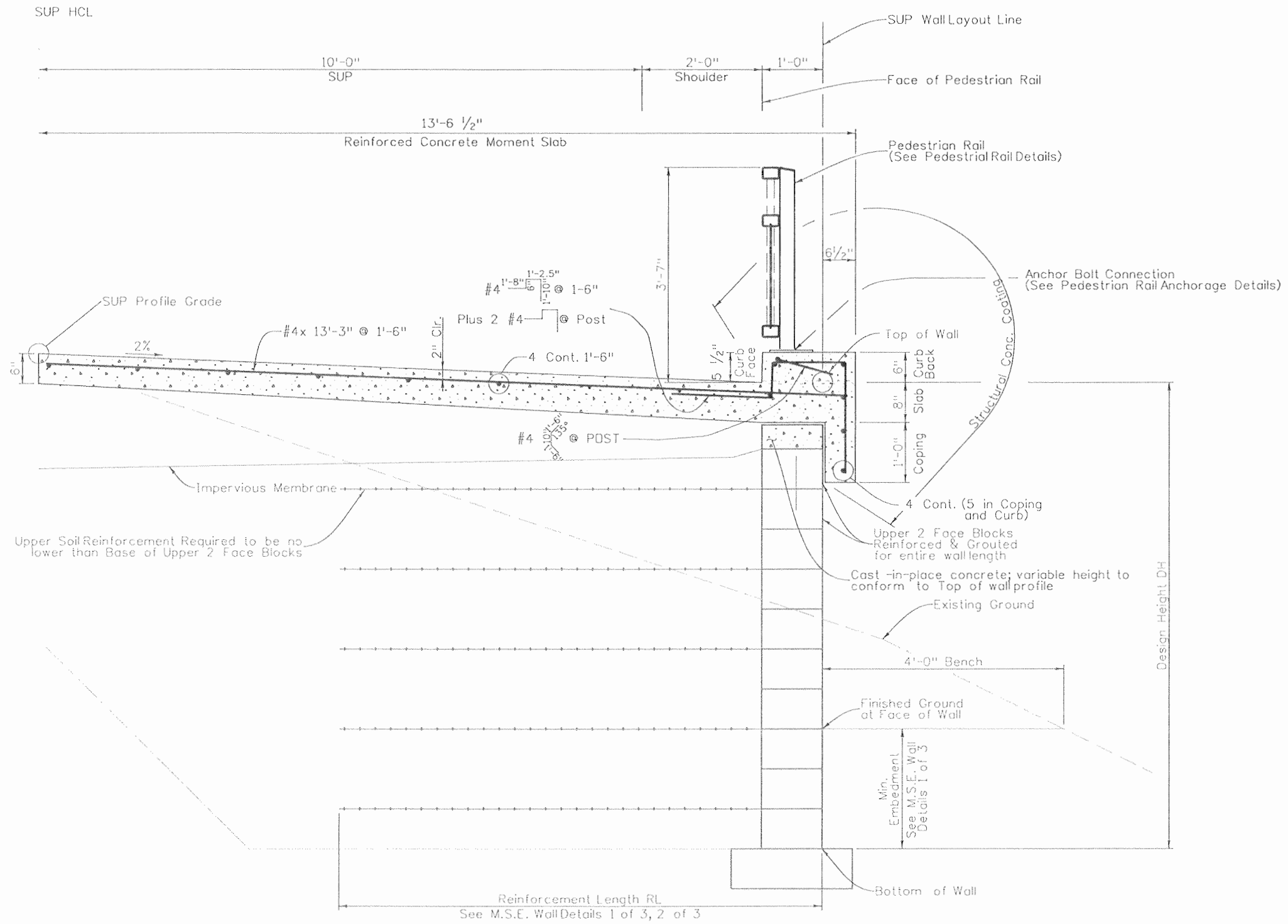
Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

As Constructed
No Revisions: 9/10
Revised:
Void:

SUP Retaining Walls SUMMARY OF QUANTITIES LOCATION PLAN			
Designer:	M. Merklinger	Structure	WALL-P-05-AP
Detailer:	D. Knight	Numbers	thru WALL-P-05-AS
Sheet Subset:	SUP Walls	Subset Sheets:	W-2 of 12

Project No./Code
NH 1602-114
16042
Sheet Number 373

Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MRM	02-09	DAK	02-09	MRM	03-09
AAR	02-09	MRM	02-09	AAR	04-09

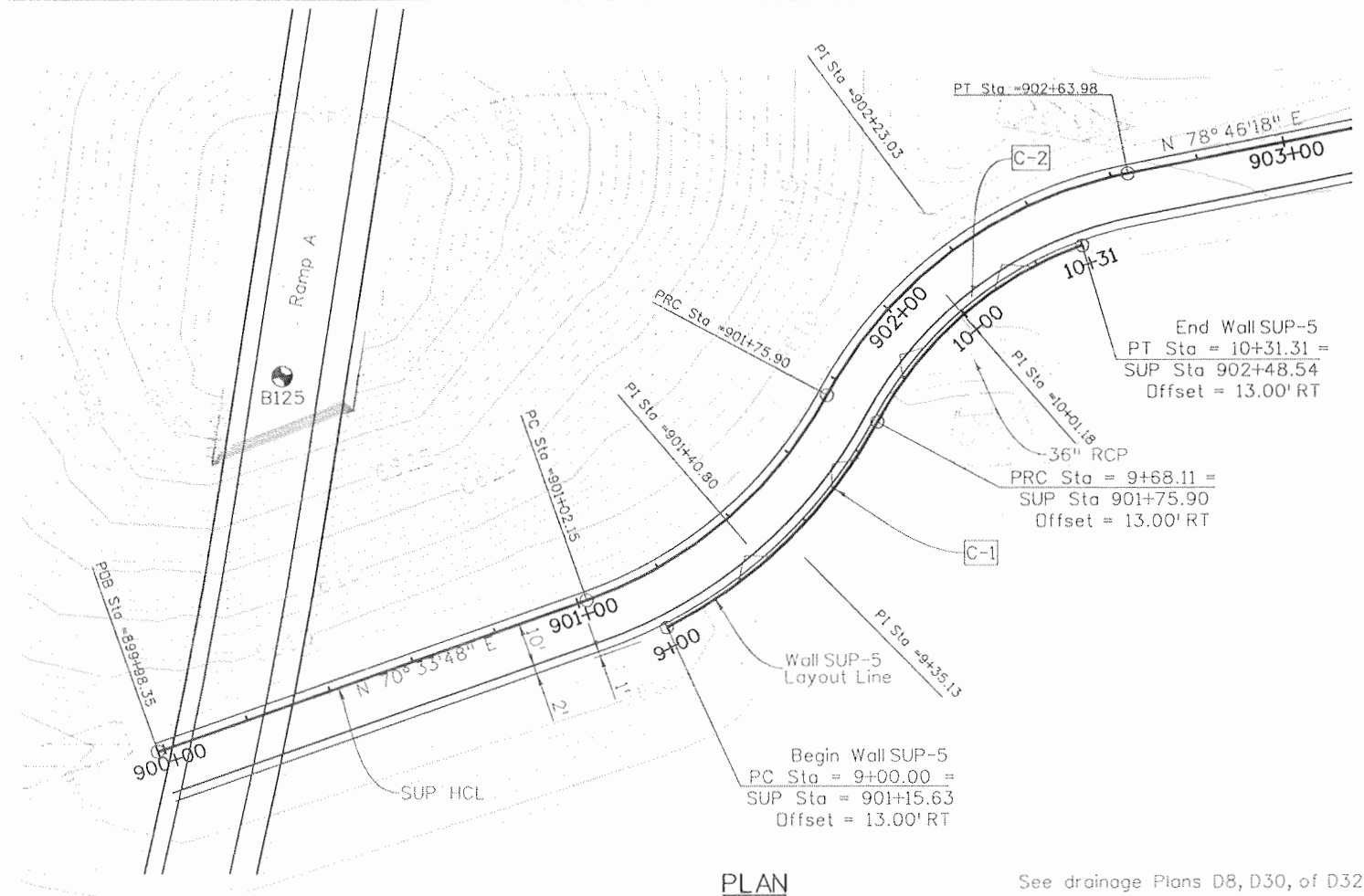


Reinforced concrete moment slab, including coping and curb, is Concrete Class D (Wall). All reinforcing steel is epoxy coated.

TYPICAL SECTION

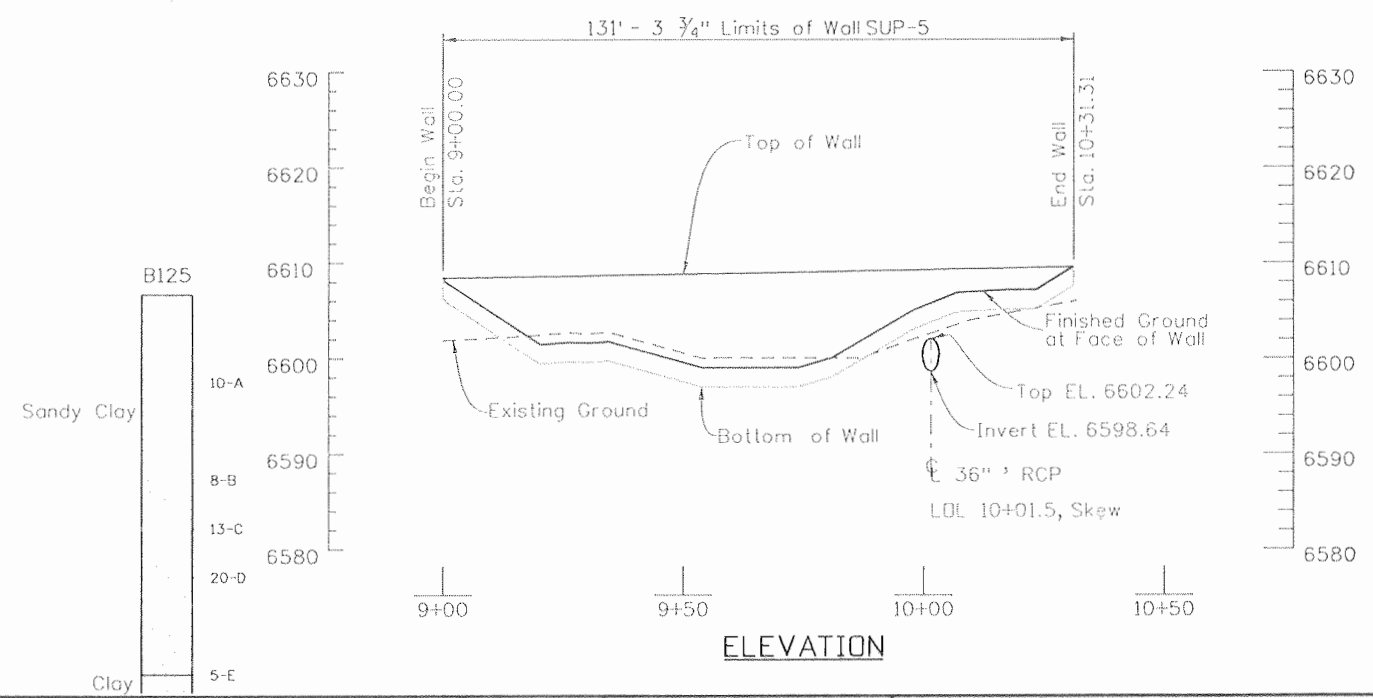
Print Date: 9/22/2010	Sheet Revisions			Colorado Department of Transportation		As Constructed		SUP Retaining Walls GENERAL LAYOUT TYPICAL SECTION		Project No./Code
File Name: 16042 TypSection.dgn	Date:	Comments	Init.	3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365		No Revisions: 9/10				NH 1602-114
Horiz. Scale: 1:2 Vert. Scale: As Noted				Region 5		Revised:		Designer: M. Merklinger Structure: WALL-P-05-AP		16042
Unit Information Unit Leader Initials				EJA		Void:		Detailer: D. Knight Numbers thru WALL-P-05-AS		Sheet Number 374
SEMA CONSTRUCTION	WILSON & COMPANY			DOT DEPARTMENT OF TRANSPORTATION		Sheet Subset: SUP Walls		Subset Sheets: W-3 of 12		

Retaining Wall SUP-5 Layout Station	SUP Station	Top of Wall Elevation (ft)	Bottom of Wall Elevation (ft)	Design Height (DH) (ft)
9+00.00	901+15.63	6608.41	6606.41	2.00
9+20.00	901+33.33	6608.56	6599.30	9.26
9+40.00	901+51.03	6608.71	6599.10	9.61
9+60.00	901+68.73	6608.86	6597.00	11.86
9+80.00	901+89.57	6609.04	6598.00	11.04
10+00.00	902+12.55	6609.23	6603.50	5.73
10+20.00	902+35.54	6609.43	6605.00	4.43
10+31.31	902+48.54	6609.54	6607.54	2.00



LAYOUT LINE CURVE DATA

Curve	Delta	Diameter	Tangent	Length	Radius
C-1	34° 32' 13.78" Left	50° 42' 15.23"	35.13'	68.11'	113.00'
C-2	41° 37' 07.00" Right	65° 51' 25.98"	33.06'	63.20'	87.00'



Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MRM	02-09	MRM	02-09	MRM	03-09
AAR	02-09	AAR	02-09	AAR	04-09



Print Date: 9/22/2010
 File Name: 16042_G_705.dgn
 Horiz. Scale: 1:39.9999 Vert. Scale: As Noted
 Unit Information Unit Leader Initials

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

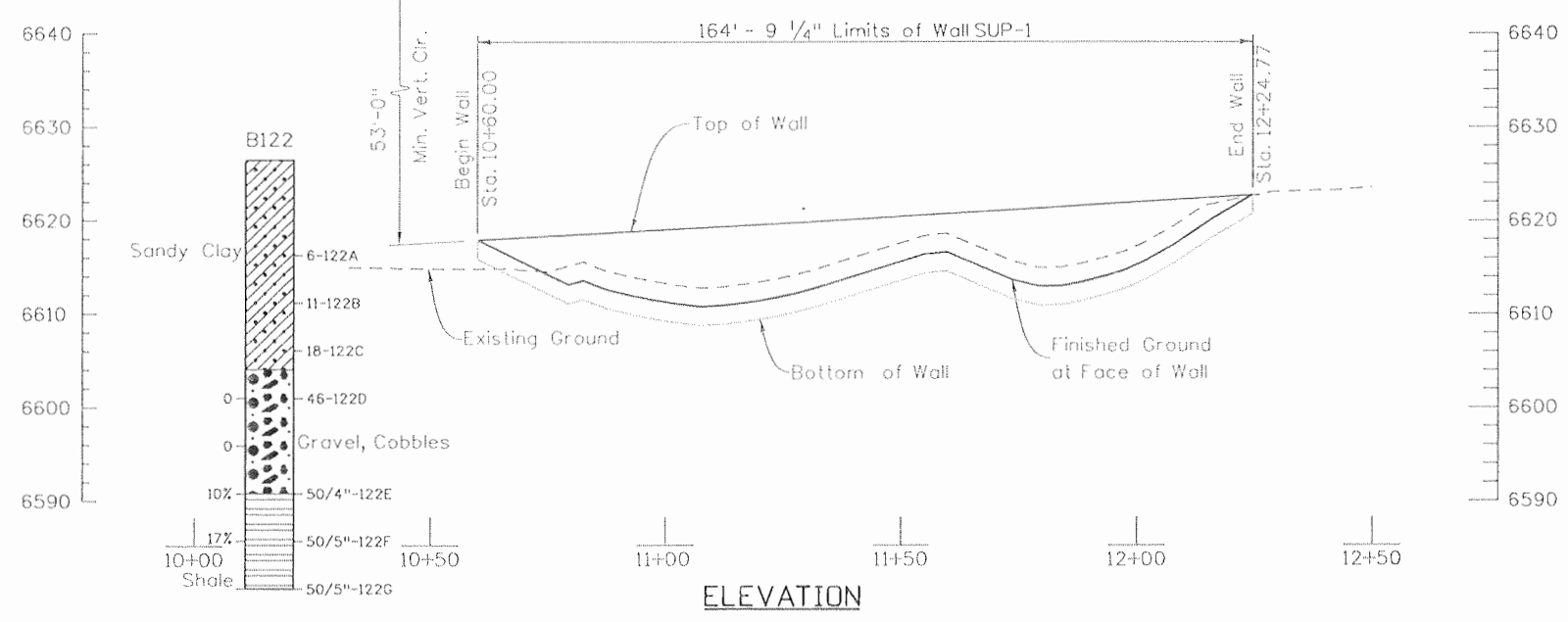
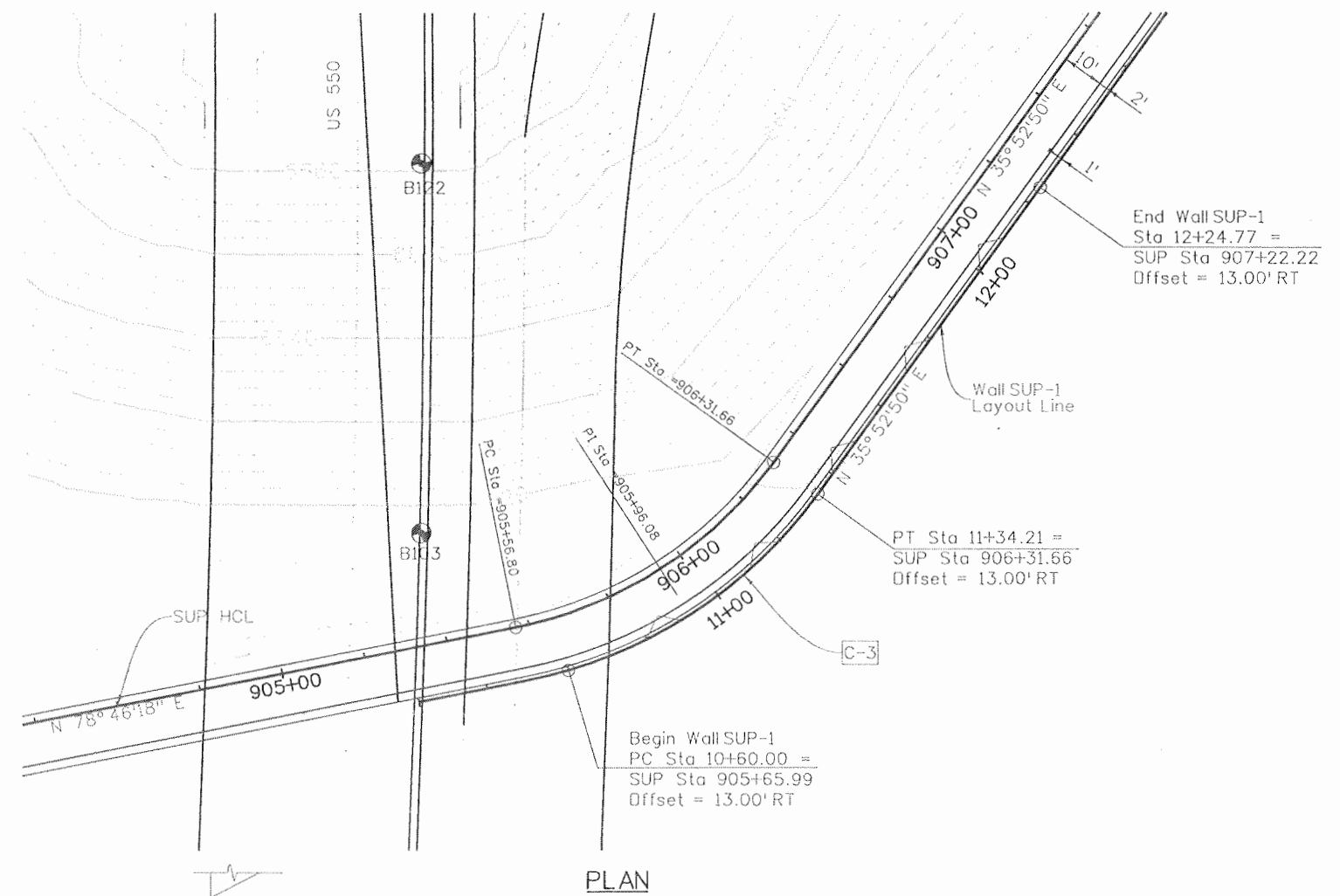
As Constructed	
No Revisions:	9/10
Revised:	
Void:	

SUP Retaining Walls SUP-5 GENERAL LAYOUT PLAN & ELEVATION			
Designer:	M. Merklinger	Structure Numbers	WALL-P-05-AS
Detailer:	D. Knight	Subset Sheets:	W-4 of 12

Project No./Code	
NH 1602-114	
16042	
Sheet Number	375



Retaining Wall SUP-1 Layout Station	SUP Station	Top of Wall Elevation (ft)	Bottom of Wall Elevation (ft)	Design Height (DH) (ft)
10+60.00	905+65.99	6617.93	6615.93	2.00
10+80.00	905+83.69	6618.48	6611.00	7.48
11+00.00	906+01.39	6619.02	6609.10	9.92
11+20.00	906+19.09	6619.57	6609.20	10.37
11+40.00	906+37.45	6620.13	6611.90	8.23
11+60.00	906+57.45	6620.75	6614.40	6.35
11+80.00	906+77.45	6621.36	6610.80	10.56
12+00.00	906+97.45	6621.98	6613.10	8.88
12+20.00	907+17.45	6622.59	6618.00	4.59
12+24.77	907+22.22	6622.74	6620.74	2.00



Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MRM	02-09	DAK	02-09	MRM	02-09
Checked By	AMR	Checked By	MRM	Checked By	AAR
Designed By	AMR	Detailed By	MRM	Quantities By	MRM
Checked By	AMR	Checked By	MRM	Checked By	AAR



Print Date: 9/22/2010	Unit Information
File Name: 16042_G_701.dgn	Unit Leader Initials
Horiz. Scale: 1:39.9999	Vert. Scale: As Noted
SEMA CONSTRUCTION	WILSON & COMPANY

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation

3803 North Main Avenue
Suite 200
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365

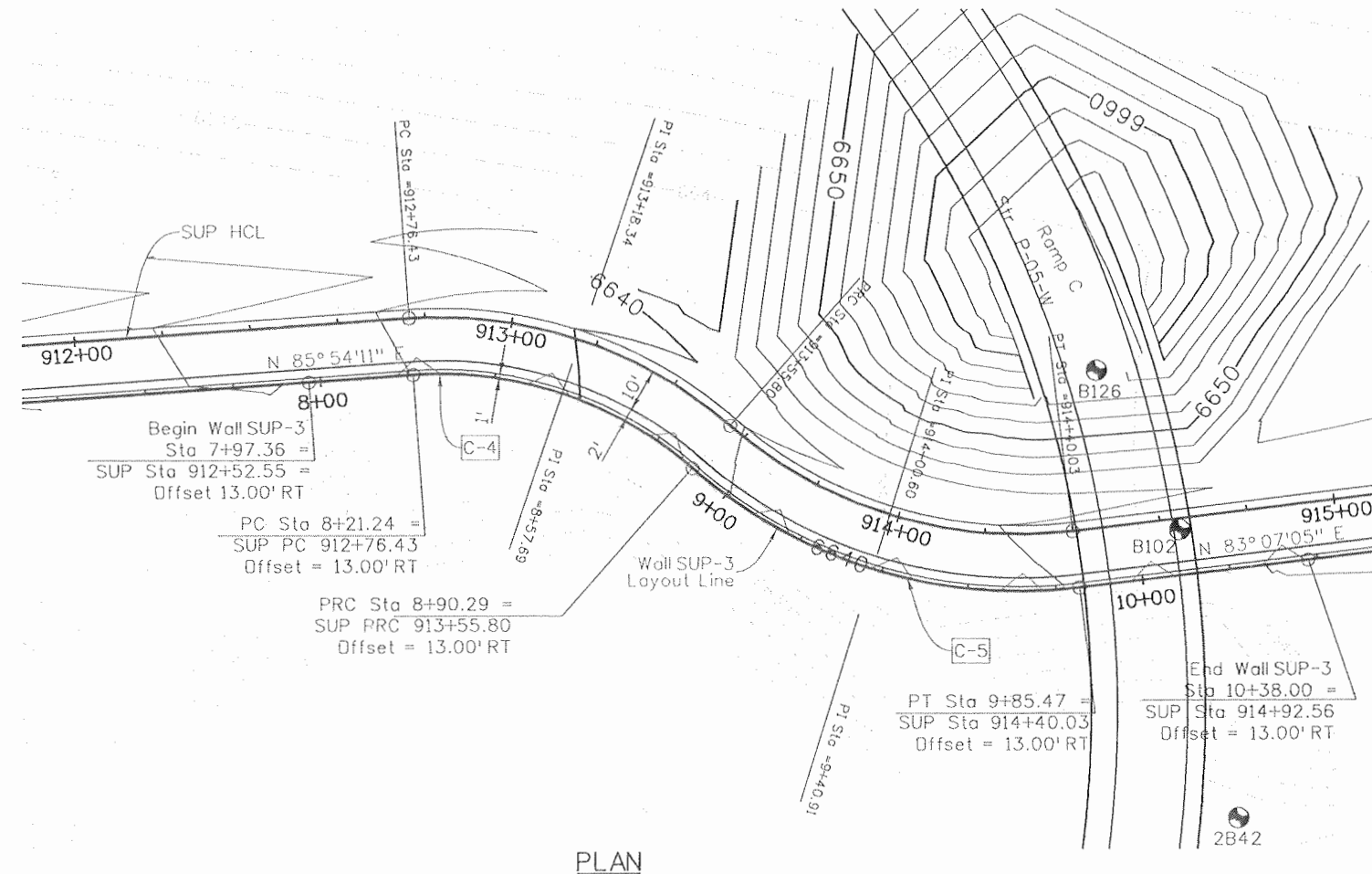
Region 5 EJA

As Constructed	No Revisions: 9/10
Revised:	
Void:	

SUP Retaining Walls SUP-1 GENERAL LAYOUT PLAN & ELEVATION			
Designer:	M. Merklinger	Structure Numbers	WALL-P-05-AP
Detailer:	D. Knight	Subsets	
Sheet Subset:	SUP Walls	Subsets	W-5 of 12

Project No./Code	NH 1602-114
Sheet Number	376

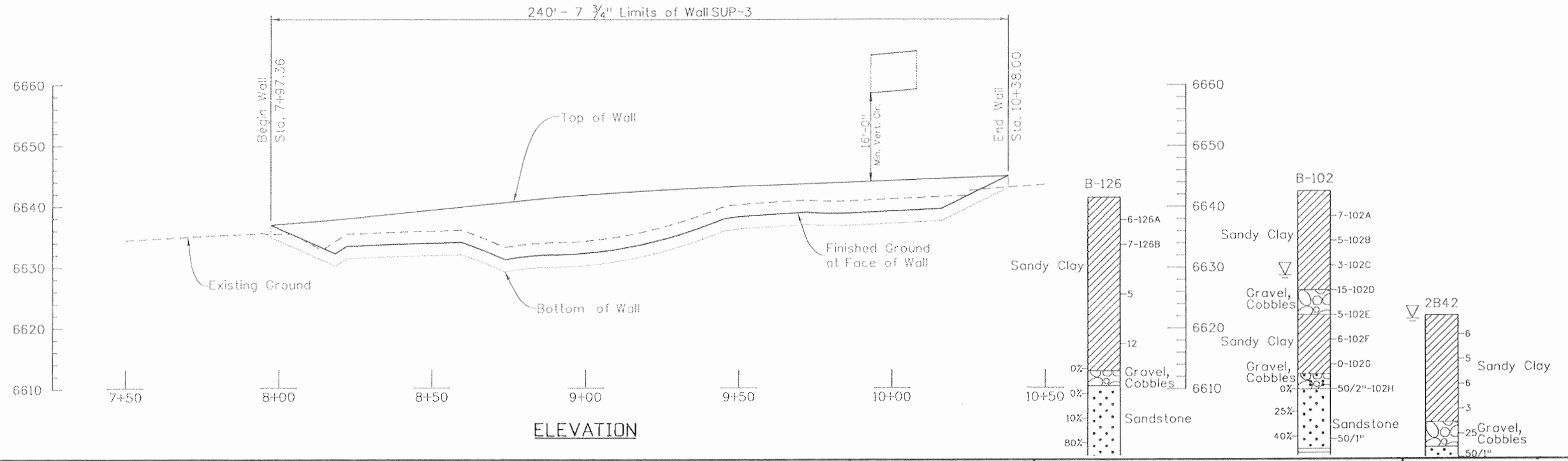
Retaining Wall SUP-3 Layout Station	SUP Station	Top of Wall Elevation (ft)	Bottom of Wall Elevation (ft)	Design Height (DH) (ft)
7+97.36	912+52.55	6637.02	6635.02	2.00
8+17.36	912+72.55	6637.85	6629.80	8.05
8+37.36	912+94.96	6638.84	6631.80	7.04
8+57.36	913+17.95	6639.88	6632.00	7.88
8+77.36	913+40.94	6640.91	6629.30	11.61
8+97.36	913+62.05	6641.85	6630.10	11.75
9+17.36	913+79.75	6642.55	6631.60	10.95
9+37.36	913+97.45	6643.11	6634.40	8.71
9+57.36	914+15.15	6643.54	6636.60	6.94
9+77.36	914+32.85	6643.89	6636.90	6.99
9+97.36	914+51.92	6644.27	6637.20	7.07
10+17.36	914+71.92	6644.67	6637.70	6.97
10+38.00	914+92.56	6645.09	6643.09	2.00



LAYOUT LINE CURVE DATA

C-4
Δ = 45° 28' 38.15" Right
D = 65° 51' 25.98"
T = 36.46'
L = 69.05'
R = 87.00'

C-5
Δ = 48° 15' 43.95" Left
D = 50° 42' 15.3"
T = 50.62'
L = 95.18'
R = 113.00'



Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MRM	02-09	DAK	02-09	MRM	03-09
AAR	02-09	MRM	02-09	AAR	04-09



Print Date: 10/1/2010
File Name: 16042_G_703.dgn
Horiz. Scale: 1:39.9999 Vert. Scale: As Noted
Unit Information Unit Leader Initials

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
3803 North Main Avenue
Suite 200
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365
Region 5 EJA

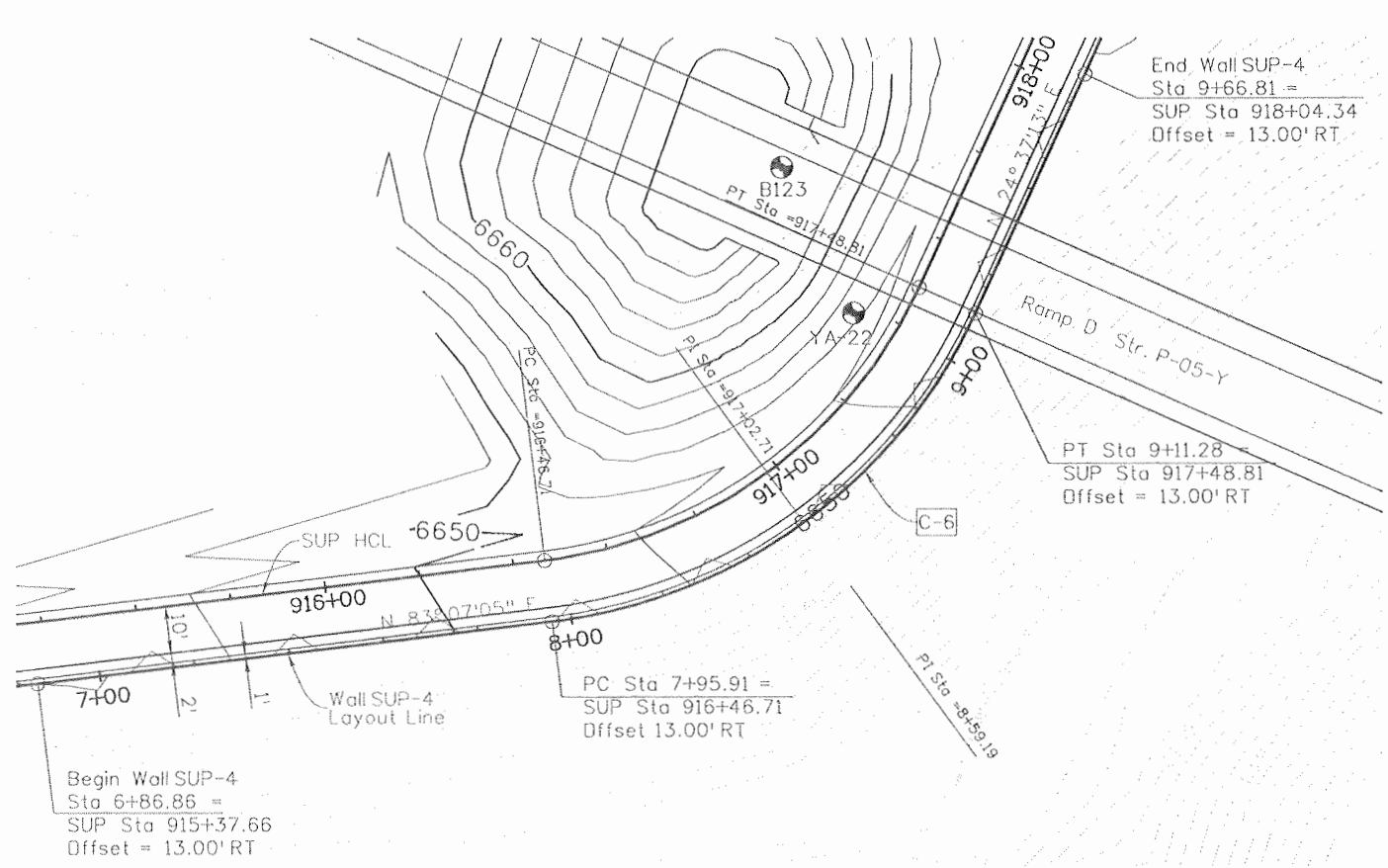
As Constructed
No Revisions: 9/10
Revised:
Void:

SUP Retaining Walls
SUP-3 GENERAL LAYOUT PLAN & ELEVATION
Designer: M. Merklinger Structure: WALL-P-05-AQ
Detailer: D. Knight Numbers:
Sheet Subset: SUP Walls Subset Sheets: W-6 of 12

Project No./Code
NH 1602-114
16042
Sheet Number 377



Retaining Wall SUP-4 Layout Station	SUP Station	Top of Wall Elevation (ft)	Bottom of Wall Elevation (ft)	Design Height (DH) (ft)
6+86.86	915+37.66	6646.32	6644.32	2.00
7+06.86	915+57.66	6647.11	6640.90	6.21
7+26.86	915+77.66	6647.95	6641.20	6.75
7+46.86	915+97.66	6648.80	6641.40	7.40
7+66.86	916+17.66	6649.64	6641.70	7.94
7+86.86	916+37.66	6650.48	6642.20	8.28
8+06.86	916+56.40	6651.27	6643.10	8.17
8+26.86	916+74.10	6652.01	6643.90	8.11
8+46.86	916+91.80	6652.76	6644.30	8.46
8+66.86	917+09.50	6653.42	6644.40	9.02
8+86.86	917+27.20	6653.96	6644.60	9.36
9+06.86	917+44.90	6654.39	6647.00	7.39
9+26.86	917+64.39	6654.78	6648.40	6.38
9+46.86	917+84.39	6655.18	6649.40	5.78
9+66.81	918+04.34	6655.58	6653.58	2.00

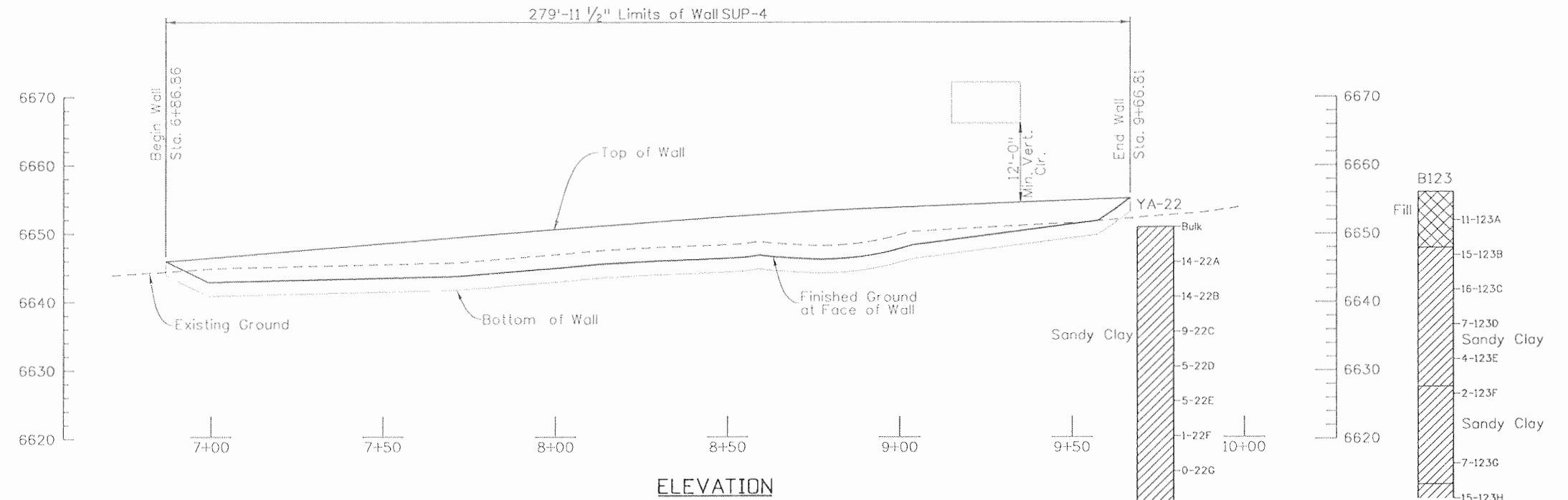


LAYOUT LINE CURVE DATA

C-6
 $\Delta = 58^\circ 29' 51.50''$ Left
 $D = 50^\circ 42' 15.3''$
 $T = 63.28'$
 $L = 115.37'$
 $R = 113.00'$

Global Stability requires Soil Reinforcement length RL= 18' minimum (even if internal stability calcs require a shorter RL length)

Design	INITIAL	DATE	Checked By	Checked By
	MRM	02-09		
Detail	INITIAL	DATE	Checked By	Checked By
	MRM	02-09		
Quantities	INITIAL	DATE	Checked By	Checked By
	MRM	03-09		



Print Date: 10/1/2010
File Name: 16042_G_704.dgn
Horiz. Scale: 1:39.9999 Vert. Scale: As Noted
Unit Information Unit Leader Initials

SEMA CONSTRUCTION
WILSON & COMPANY

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
3803 North Main Avenue
Suite 200
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365
Region 5 EJA

As Constructed	No Revisions: 9/10
Revised:	
Void:	

SUP Retaining Walls SUP-4 GENERAL LAYOUT PLAN & ELEVATION			
Designer:	M. Merklinger	Structure Numbers	WALL-P-05-AR
Detailer:	D. Knight	Sheet Subset:	SUP Walls
		Subset Sheets:	W-7 of 12

Project No./Code	NH 1602-114
	16042
Sheet Number	378

ALL TUBE RAILING SHALL CONFORM TO A.S.T.M. A-500 GRADE B. PLATES AND BARS SHALL CONFORM TO AASHTO M270 GRADE 36.

RAILING COMPONENTS SHALL BE EITHER PAINTED PER STD SPECIFICATIONS OR GALVANIZED IN ACCORDANCE WITH ASTM A123. PAINTING OF RAILING SHALL CONFORM TO SECTION 509.

ALL RAIL PANELS SHALL BE SHDP FABRICATED. ENDS OF RAILS MAY BE FIELD TRIMMED AS SHOWN. GRIND SMOOTH ANY FIELD CUT EDGES.

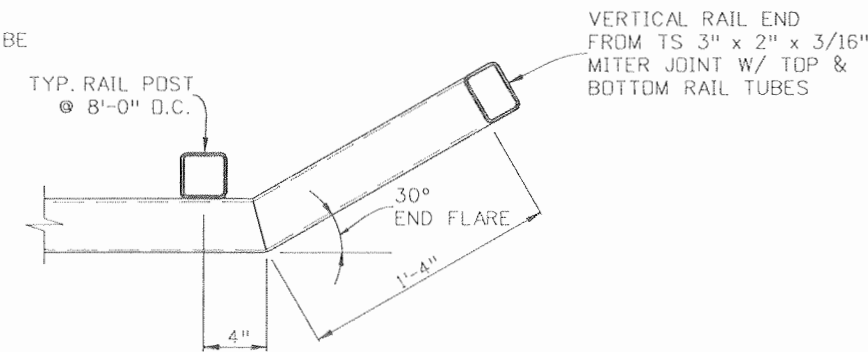
EXPANSION JOINTS IN RAILING SHALL BE SPACED NO GREATER THAN 60 FEET APART, UNLESS USING 8' PANELS.

ALL RAIL POST AND PICKETS SHALL BE SET IN A PLUMB POSITION WITHIN A TOLERANCE OF 3/8" HORIZ: 2'-10" VERT

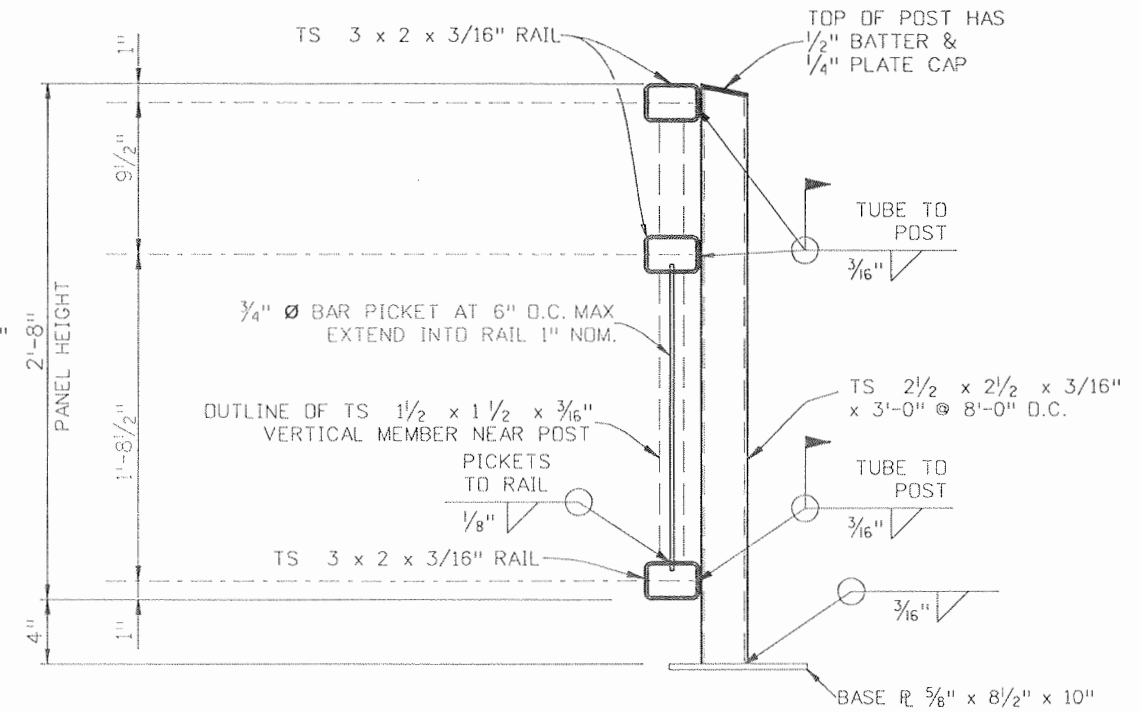
THE UNIT PRICE FOR PEDESTRIAN RAILING TYPE 1 SHALL INCLUDE ALL NECESSARY MATERIAL, FABRICATION, INSTALLATION, AND HARDWARE AS SHOWN FOR THE COMPLETE RAILING, IN PLACE.

ALL RAILING MATERIAL IS REQUIRED TO BE CERTIFIED BY THE CONTRACTOR AS "AMERICAN SOURCE" MATERIAL.

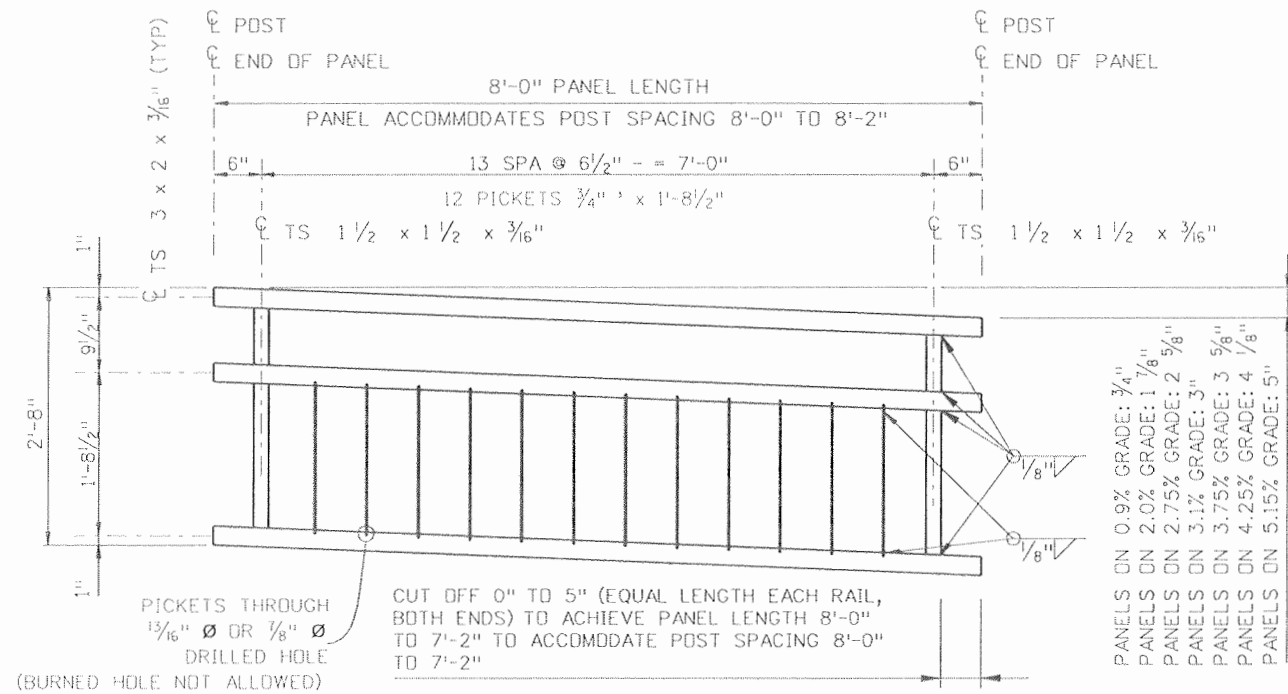
ALL PEDESTRIAN RAIL NOT ATTACHED WITH ANCHOR BOLTS TO A RETAINING WALL SHALL BE ATTACHED TO A CONCRETE FOOTING. THE CONCRETE FOOTING SHALL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCIDENTAL TO ITEM 514.



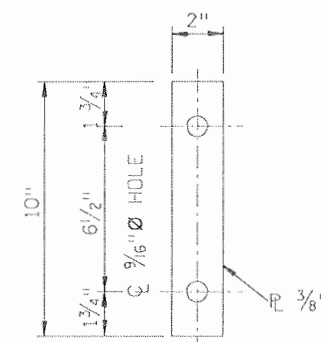
RAIL TERMINATION DETAIL - PLAN VIEW
N.T.S.



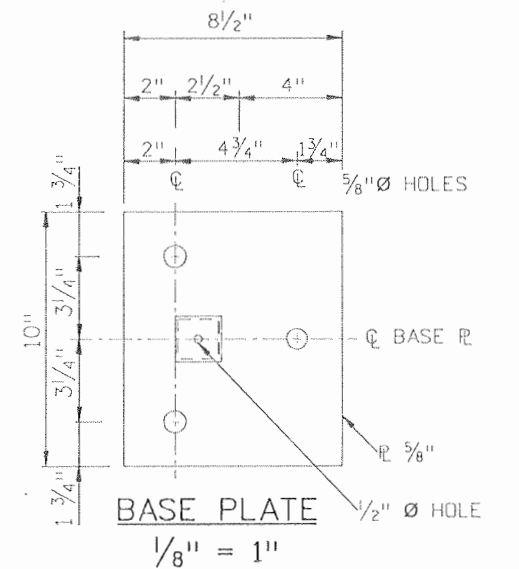
PEDESTRIAN RAIL ASSEMBLY DETAIL
1" = 1'



PANEL ELEVATION
1/2" = 1'



ANCHORAGE PLATE
1/8" = 1"



BASE PLATE
1/8" = 1"

COMMON GRADES.
A FEW ARE REQUIRED BETWEEN THESE GRADES.

SUMMARY OF APPROXIMATE QUANTITIES (FOR INFORMATION ONLY)
STRUCTURAL STEEL 26.8 lb/ft

Design	INITIAL	DATE	Detail	INITIAL	DATE	Quantities	INITIAL	DATE
Designed By	MRM	02-09	Delivered By	MRM	02-09	Quantities By	MRM	03-09
Checked By	ARR	02-09	Checked By	ARR	02-09	Checked By	ARR	04-09

Print Date: 10/1/2010

File Name: 16042 PedRailDetails.dgn

Horiz. Scale: 1:1

Vert. Scale: As Noted

Unit Information

Unit Leader Initials



Sheet Revisions

Date:	Comments	Init.

Colorado Department of Transportation



3803 North Main Avenue
Suite 200
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365

Region 5

EJA

As Constructed

No Revisions: 9/10

Revised:

Void:

SUP Retaining Walls
PEDESTRIAN RAIL DETAILS

Designer:	M. Merklinger	Structure	WALL-P-05-AP
Detailer:	D. Knight	Numbers	thru WALL-P-05-AS
Sheet Subset:	SUP Walls	Subset Sheets:	W-8 of 12

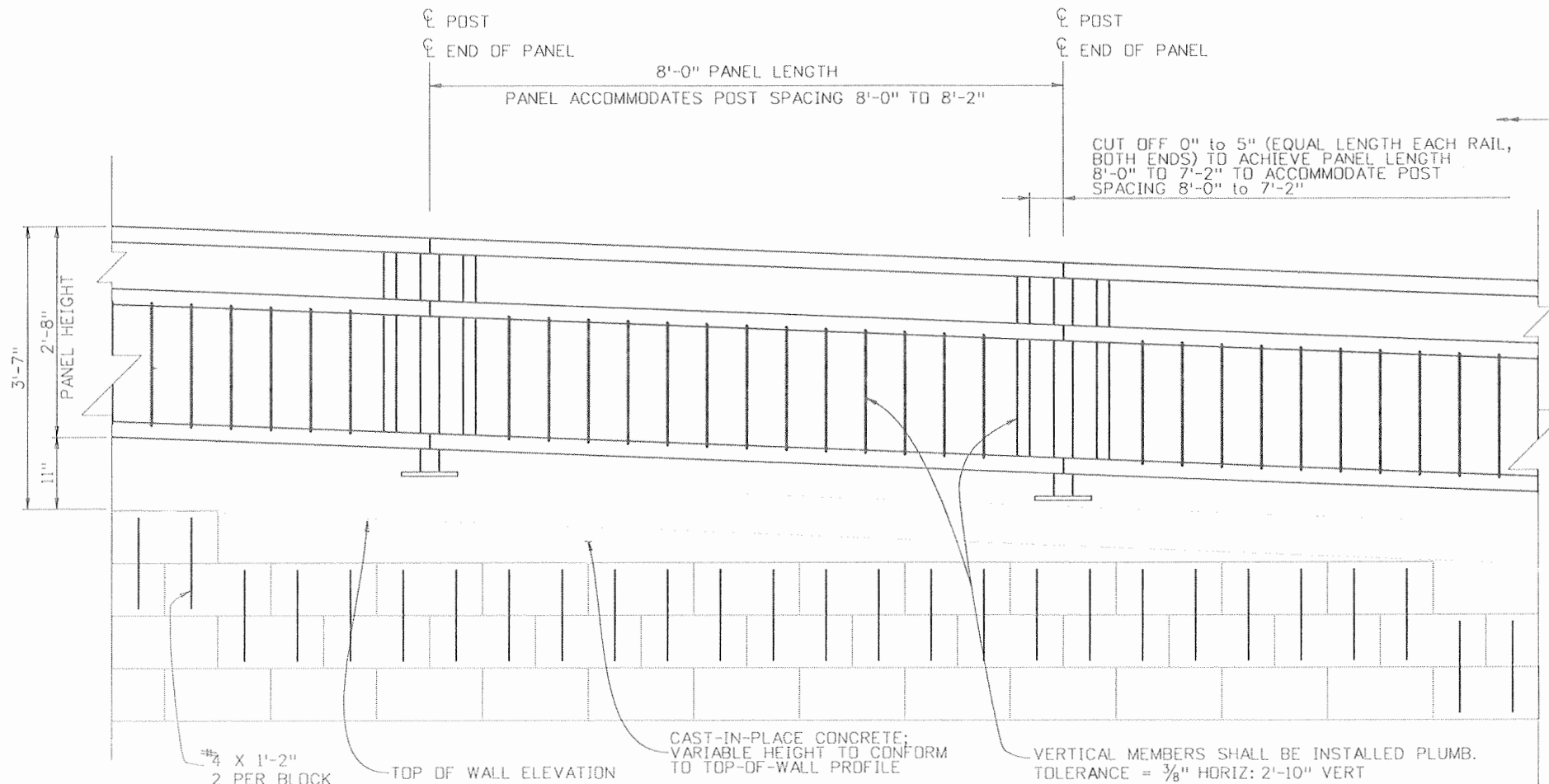
Project No./Code

NH 1602-114

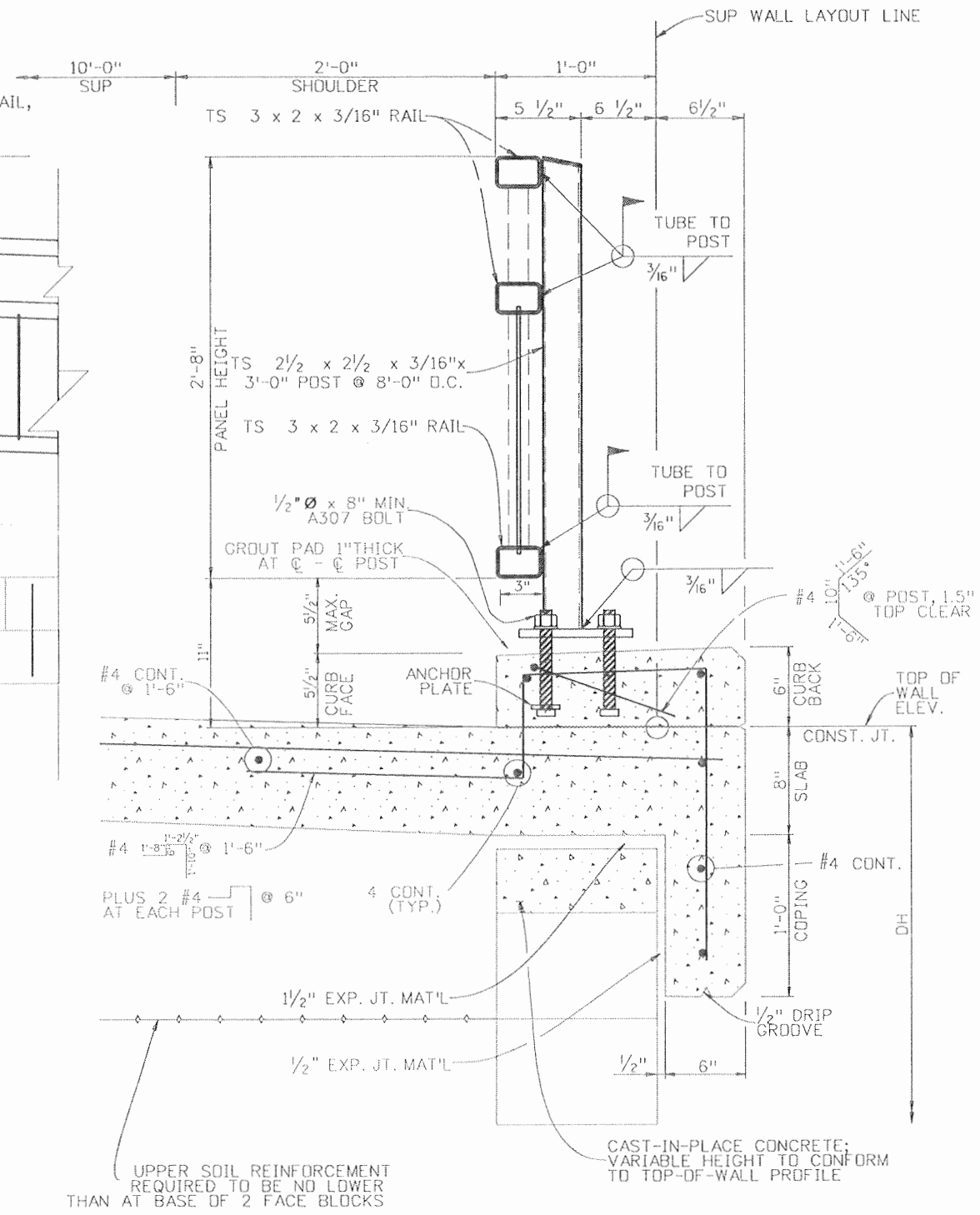
16042

Sheet Number 379

Design	INITIAL	DATE	Quantities	INITIAL	DATE
	MRM	02-09		MRM	03-09
Detail	INITIAL	DATE	Checked By	INITIAL	DATE
	MRM	02-09		AAR	04-09



ELEVATION
1/2" = 1'



PEDESTRIAN RAIL ANCHORAGE DETAIL
1" = 1'

ALL RAIL POST AND PICKETS SHALL BE SET IN A PLUMB POSITION.
ALL REINFORCING STEEL IS EPOXY COATED.

Print Date: 9/22/2010	Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5 EJA	As Constructed No Revisions: 9/10 Revised: Void:	SUP Retaining Walls PEDESTRIAN RAIL ANCHORAGE DETAILS				Project No./Code NH 1602-114
File Name: 16042 RailAnchrgeDetails.dgn	Date:	Comments:	Init.:			Designer: M. Merklinger	Structure: WALL P-05-AP	Sheet No. / Code		16042
Horiz. Scale: 1:1	Unit Information			Region 5 EJA	Revised: D. Knight	Structure Numbers: thru WALL-P-05-AS	Sheet Number		380	
Vert. Scale: As Noted	Unit Leader Initials					Sheet Subset: SUP Walls	Subset Sheets: W-9 of 12	Sheet Number		380



DESIGN DATA

Internal Stability: AASHTO, 16th EDITION
 Railing Loads: AASHTO LFRD 4th Edition with 2008 Interims
 Unit weight of γ_{soil} = 125 pcf is assumed for Structure Backfill (Class 1)
 Internal friction angle of soil for Structure Backfill (Class 1) is assumed to be $\phi = 34^\circ$. $k_a = 0.2827$, $K_D = 0.4408$.
 For Pedestrian Rail, the 600 lb. Load is applied to the upper row of reinforcement, and distributed longitudinally 32 inches (2 blocks).
 Coefficient of resistance to direct sliding $\left\{ \begin{array}{l} = 0.9 \text{ (Geogrid)} \\ = 0.6 \text{ (Geotextile)} \end{array} \right.$ (Used Herein)
 Allowable bearing capacity = 2500psf (Resistance factor 0.50 times nominal bearing Capacity 5000psf) per Geotechnical Design Letter 005

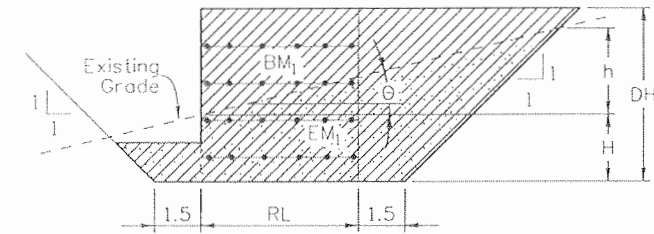
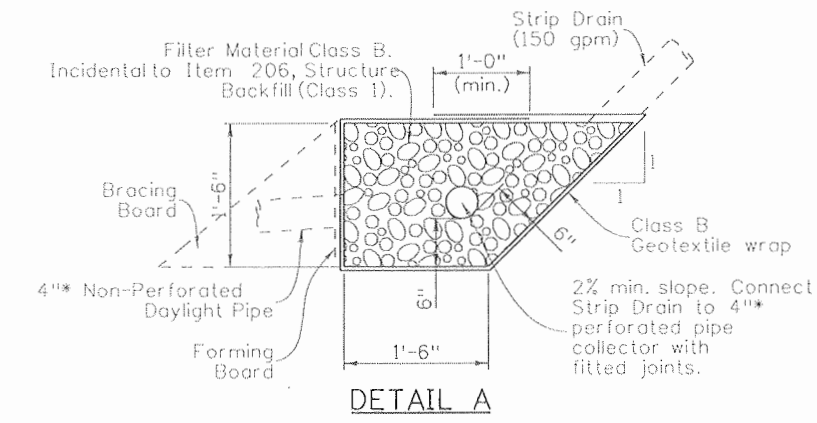
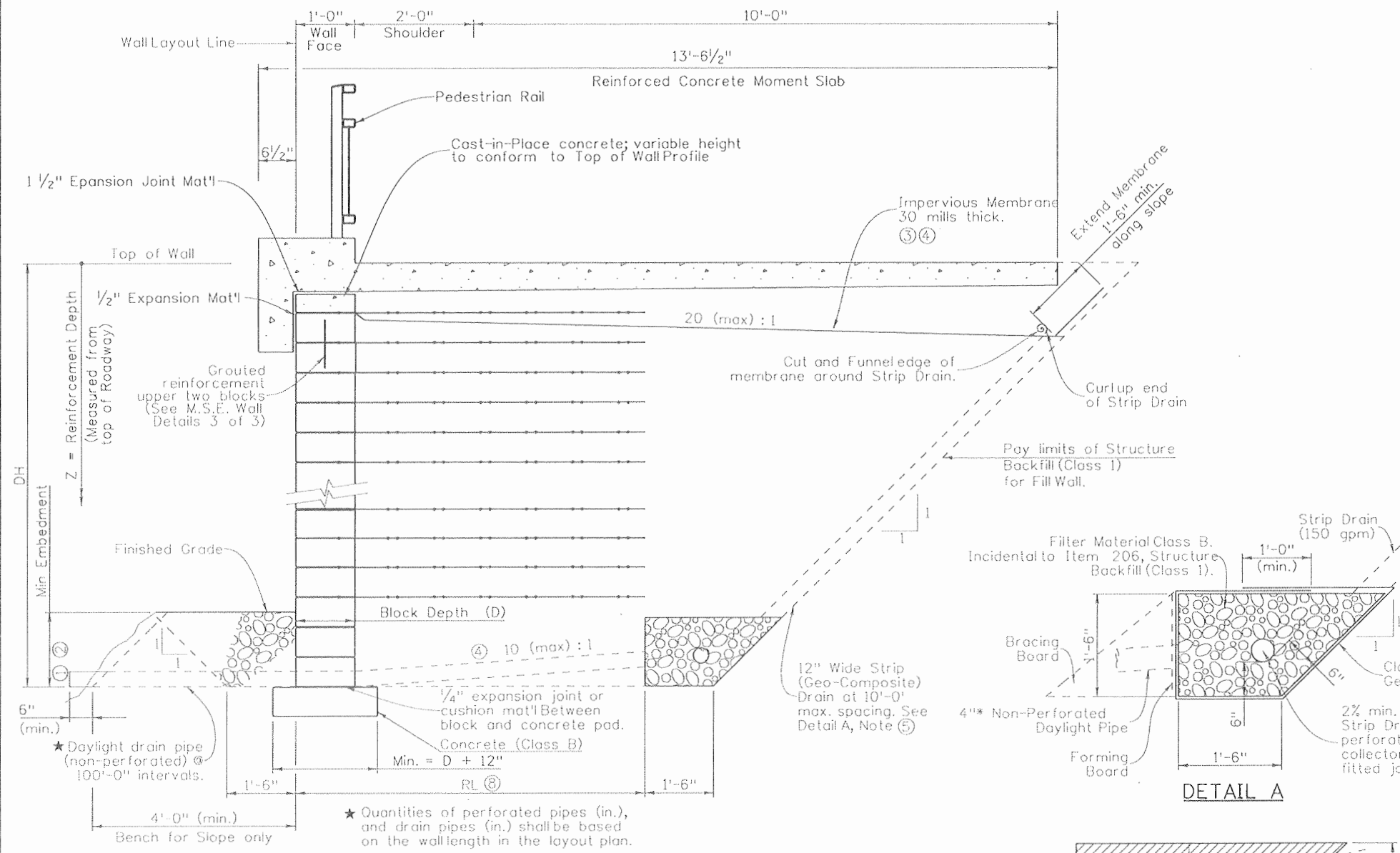
See project Special Provisions for the relationship between LTDS and MARV of Geosynthetic soil reinforcement, and sacrificial thickness of metallic soil reinforcement.

ABBREVIATIONS USED

- BM₁ = Quantities of Structure Backfill (Class 1) without Shoring (c.y./ft.)
- BM₂ = Quantities of Structure Backfill (Class 1) with Shoring (c.y./ft.)
- BP = Maximum Required Allowable Bearing Pressure (ksf)
- DH = Design Height (or, Avg. ht. for qty. calculations) (ft.)
- EM₁ = Quantity of Structure Excavation without Shoring (c.y./ft.)
- EM₂ = Quantity of Structure Excavation with Shoring (c.y./ft.)
- H = Depth of Excavation at Wall Layout Line (ft.)
- LTDS = Required Long Term Design Strength (lb./in.)
- MARV = Minimum Average roll Value (lb./in.)
- NB = Total Number of Blocks
- RL = Reinforcement Length (ft.)
- S = Tributary reinforcement spacing (ft.)
- Total = Sum of required LTDS for all layers (lb./in.)
- MRS = Quantity of mechanical reinforcement for prescribed Soil zone (c.y./ft.)
- H = Horizontal
- V = Vertical

NOTES:

- ① Minimum vertical embedment is listed in the table.
- ② Structure Backfill (Class 2) is required for erosion control and to conceal and protect a stepped leveling pad. The cost for this material shall be included in the cost for Structure Backfill (Class 1).
- ③ Impervious membrane and pipe collector for metal or geosynthetic reinforced walls.
- ④ Soil Reinforcement may be cut to accommodate pipe installation. The cut shall be made in a direction parallel to the pipe centerline, as seen in a plan view.
- ⑤ The membrane can be installed with a constant slope from the facing block allway to the back in conjunction with the geo-composite down drains at and along the temporary cut slope. The geo-composite drains that connect to the water collector system shall be minimum 12" in width with 10' maximum spacing.
- ⑥ All Pipes and Connectors shall be schedule 40 H.D.P.E.
- ⑦ One side temporary forming board is required to build Detail A. The filter material shall be wrapped with erosion control Class B Geotextiles.
- ⑧ Global stability requires Soil Reinforcement length RL = 18' minimum for Wall SUP-4 (even if internal stability calcs require a shorter RL length).



$$EM_1 = \left[(H + \frac{h}{2})(h/\tan\theta) + 0.75H + \frac{(H - 1.5 \tan\theta)(0.5H + 0.75)}{1 + \tan\theta} \right] - 0.5(H+h) / 27$$

$$h = (H + RL + 1.5) \frac{\tan\theta}{1 - \tan\theta}$$

$$BM_1 = [DH(RL + 1.5) + 0.5(DH) + 1.5(1.5)] / 27$$

θ = Average angle of existing ground line

$$MRS = (DH)(RL) / 27$$

EARTHWORK QUANTITIES
(for wall without shoring)

TYPICAL SECTION

Minimum Vertical Embedment	
Slope in Front of Structures	Minimum Embedment Depth
Horizontal	DH/20.0, 1.5 ft min
3.0 H : 1.0 V	DH/10.0, 2.0 ft min
2.0 H : 1.0 V	DH/7.0, 2.0 ft min
1.5 H : 1.0 V	DH/5.0, 2.0 ft min

Design	Quantities		DATE	DATE	DATE	
	INITIAL	DATE				INITIAL
Designed By	MRM	02-09	DAK	02-09	MRM	02-09
Checked By	AAR	02-09	MRM	02-09	MRM	02-09

Print Date: 9/22/2010	Sheet Revisions			Colorado Department of Transportation	As Constructed	SUP Retaining Walls		Project No./Code
File Name: 16042 WallDetails-1.dgn	Date:	Comments	Init.			M.S.E. WALL DETAILS		
Horiz. Scale: 1:1				3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365	No Revisions: 9/10	1 OF 3		16042
Unit Information					Revised:	Designer: M. Merklinger	Structure: WALL-P-05-AP	
SEMA CONSTRUCTION				Region 5	Void:	Detailer: D. Knight	Numbers: thru WALL-P-05-AS	Sheet Number 381
WILSON & COMPANY				EJA	Sheet Subset: SUP Walls	Subset Sheets: W-10 of 12		

GENERAL NOTES

The required LTDS for different reinforcement layer depths is determined with the following equations, using the values as depicted in the Loading Diagram.

$$\alpha_v = (Z + 2) \cdot \gamma_{soil}$$

$$LTDS \geq (K) \cdot (\alpha_v) \cdot (S) / 12 + \text{Rail Impact (See note 3)}$$

Where K = K_a for Geosynthetic reinforcement or

K = K₀ to K_a for metallic reinforcement - see AASHTO fig. 5.8.4.1A

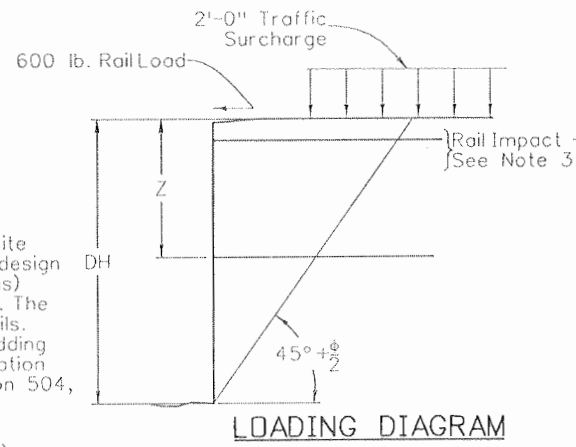
TABLE

*DESIGN PARAMETERS FOR WALL HEIGHTS FROM 2.67' TO 30.00'

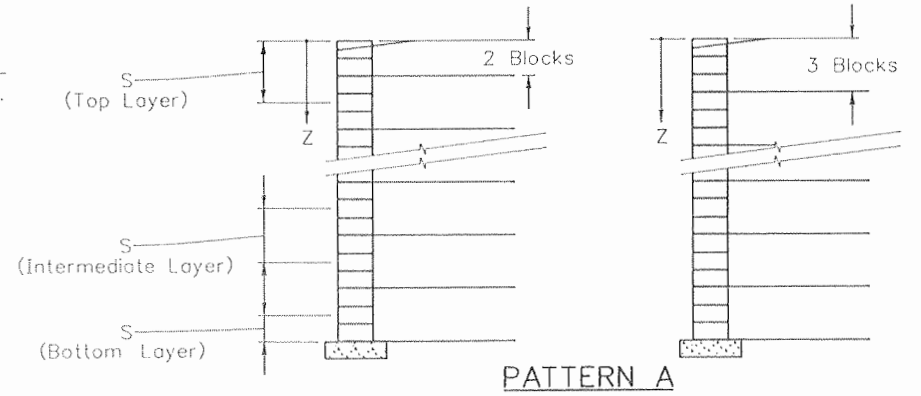
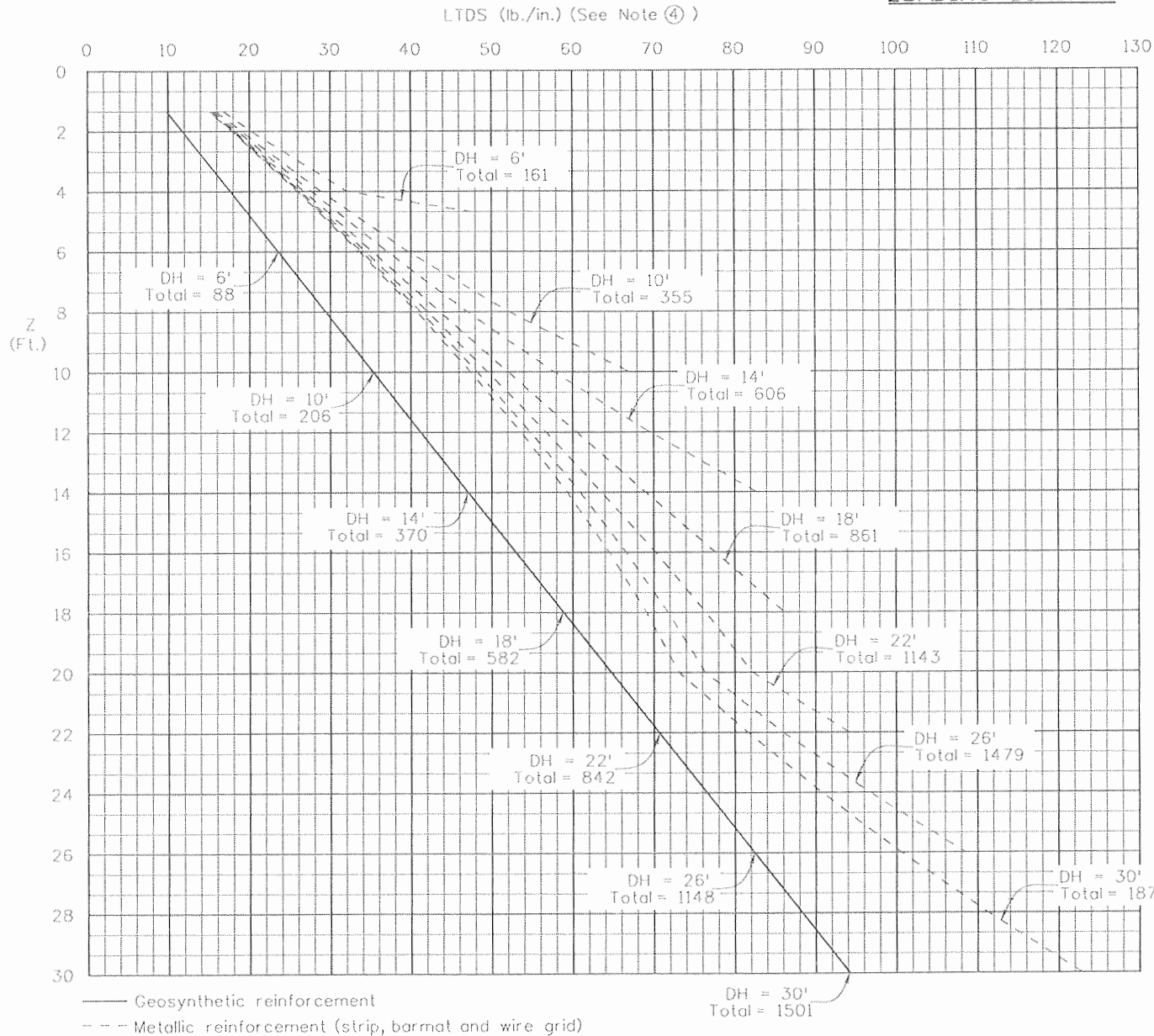
DH (ft)	NB	RL** (ft)	BP (ksf)	BM ₁ (cy/ft)	BM ₂ (cy/ft)
2.67	4	6.00	0.67	1.00	1.00
3.33	5	6.00	1.05	1.26	1.26
4.00	6	6.00	1.20	1.53	1.53
4.67	7	6.00	1.33	1.82	1.82
5.33	8	6.00	1.45	2.13	1.82
6.00	9	6.00	1.56	2.46	1.82
6.67	10	6.67	1.64	2.96	2.18
7.33	11	7.33	1.71	3.52	2.59
8.00	12	8.00	1.79	4.12	3.05
8.67	13	8.00	1.87	4.57	3.33
9.33	14	8.00	1.95	5.02	3.63
10.00	15	8.00	2.03	5.50	3.93
10.67	16	8.00	2.12	5.99	4.24
11.33	17	7.93	2.21	6.46	4.53
12.00	18	8.40	2.29	7.19	5.07
12.67	19	8.87	2.38	7.96	5.64
13.33	20	9.33	2.47	8.77	6.23
14.00	21	9.80	2.57	9.61	6.87
14.67	22	10.27	2.66	10.50	7.53
15.33	23	10.73	2.75	11.43	8.23
16.00	24	11.20	2.84	12.39	8.96
16.67	25	11.67	2.94	13.40	9.72
17.33	26	12.13	3.03	14.44	10.51
18.00	27	12.60	3.12	15.53	11.33
18.67	28	13.07	3.22	16.65	12.19
19.33	29	13.53	3.31	17.81	13.08
20.00	30	14.00	3.41	19.01	14.00
20.67	31	14.47	3.50	20.26	14.96
21.33	32	14.93	3.59	21.54	15.94
22.00	33	15.40	3.69	22.86	16.96
22.67	34	15.87	3.79	24.22	18.01
23.33	35	16.33	3.88	25.62	19.09
24.00	36	16.80	3.98	27.06	20.21
24.67	37	17.27	4.07	28.54	21.35
25.33	38	17.73	4.17	30.06	22.53
26.00	39	18.20	4.26	31.61	23.74
26.67	40	18.67	4.36	33.21	24.99
27.33	41	19.13	4.45	34.85	26.26
28.00	42	19.60	4.55	36.52	27.57
28.67	43	20.07	4.65	38.24	28.91
29.33	44	20.53	4.74	40.00	30.28
30.00	45	21.00	4.84	41.79	31.69

* Based on a nominal block height of 8".

** See project special provisions for minimum RL requirements.



The soil reinforcement requirements specified herein do not address site anomalies such as inclined bedding planes or weak soil strata. The design geotechnical investigation (information limited to the test hole locations) revealed no evidence of inclined bedding planes or weak soil strata. The specified design parameters are appropriate for the known in situ soils. However, if the excavation during wall construction reveals inclined bedding planes or weak soil strata, the Engineer may require remedial foundation work as described in the Project Special Provisions, Revision of Section 504, Mechanically Stabilized Earth Walls, Construction Requirements.



NOTES:

- For the installation of an impervious membrane, the reinforcement shall be started 3 blocks from the top of the wall when the wall top is stepped or when the wall height is greater than 10'-0".
- Spacing S for computation of LTDS is shown for pattern A with the top layer starting 2 blocks down. Use similar logic to determine S for other reinforcement patterns.
- For Pedestrian Rail, the top layer shall take an additional rail impact load of 600 lb distributed longitudinally 32 inches (2 blocks)
- Graph values must be multiplied by S in feet to obtain the required LTDS.
- WALL SUP-4 requires RL=18' min to satisfy global stability.

Design	INITIAL	DATE	INITIAL	DATE
	MRM	02-09	MRM	02-09
Detail	INITIAL	DATE	INITIAL	DATE
	MRM	02-09	MRM	02-09
Quantities	INITIAL	DATE	INITIAL	DATE
	MRM	03-09	MRM	04-09

Print Date: 9/22/2010
 File Name: 16042 WallDetails-2.dgn
 Horiz. Scale: 1:0.999998 Vert. Scale: As Noted
 Unit Information Unit Leader Initials

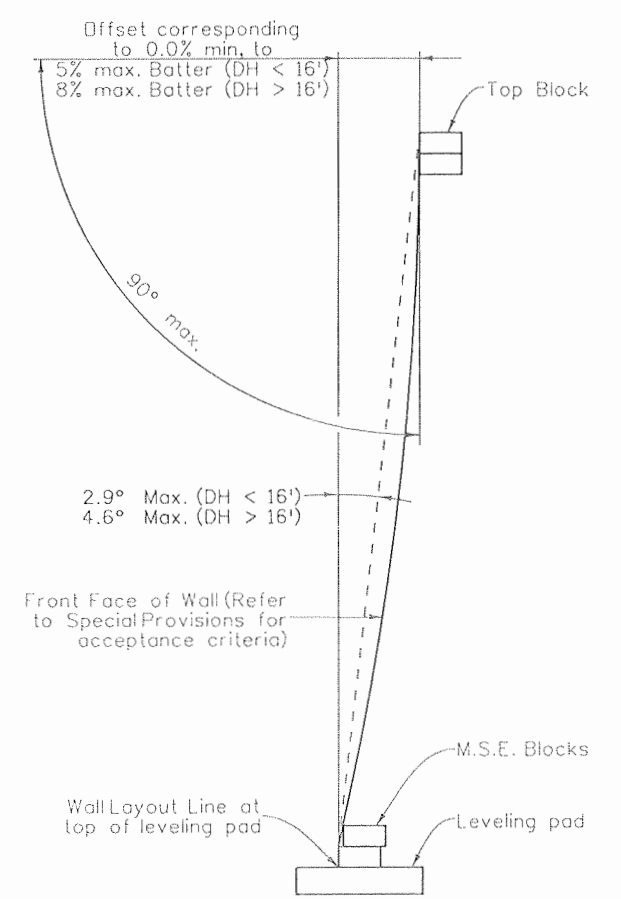
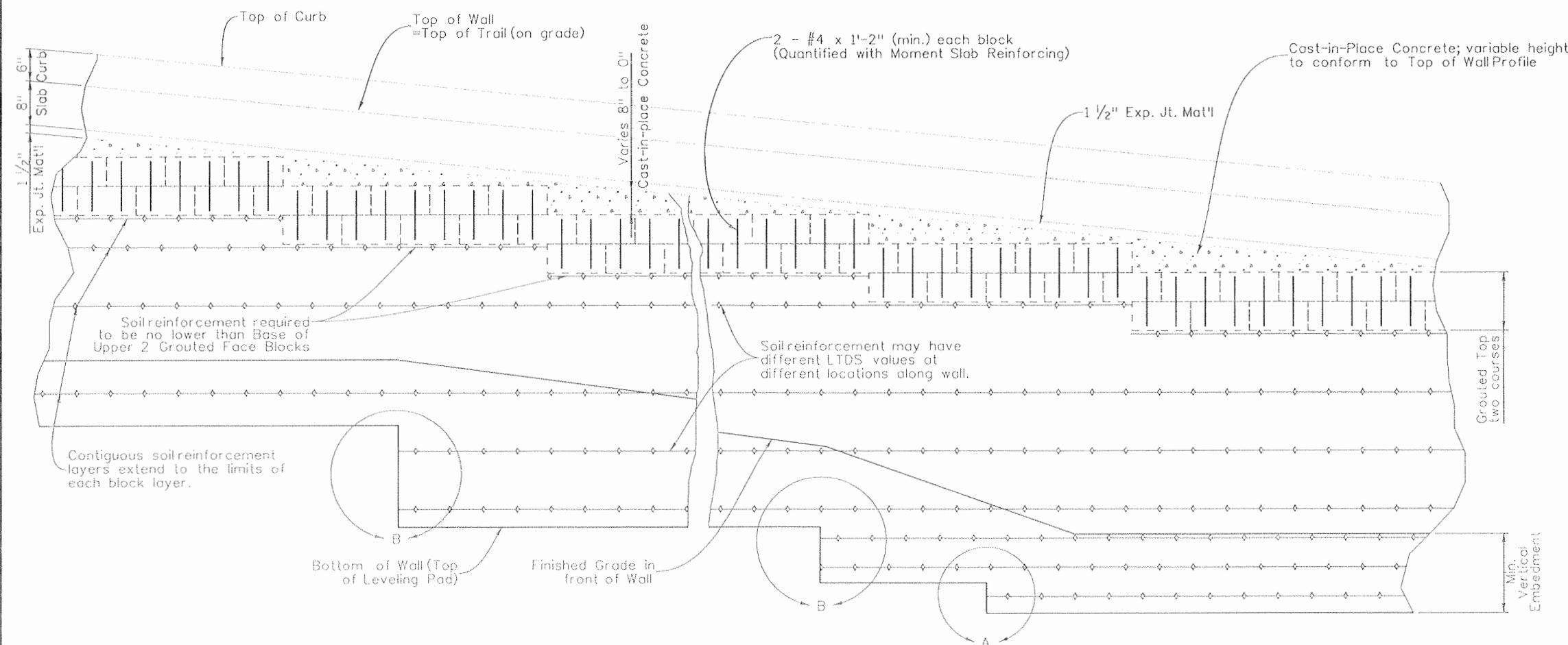
Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

As Constructed	
No Revisions:	9/10
Revised:	
Void:	

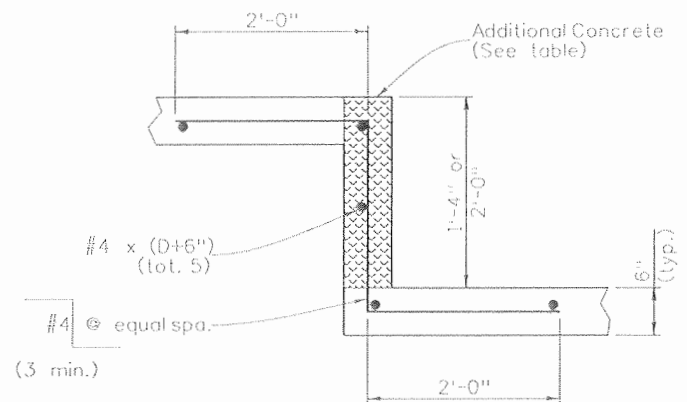
SUP Retaining Walls			
M.S.E. WALL DETAILS			
2 OF 3			
Designer:	M. Merklinger	Structure	WALL-P-05-AP
Detailer:	D. Knight	Numbers	thru WALL-P-05-AS
Sheet Subset:	SUP Walls	Subset Sheets:	W-11 of 12

Project No./Code	
NH 1602-114	
16042	
Sheet Number	382

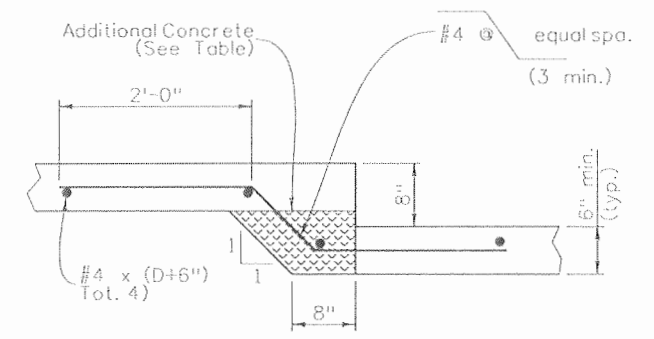


TYPICAL ELEVATION (WALL)

WALL OFFSET



DETAIL B
(2 or 3 Block Step)



DETAIL A
(1 Block Step)

LEVELING PAD AND STEP QUANTITIES*
(For Information Only)

DESCRIPTIONS		UNIT	QUANTITIES
LEVELING PAD CONCRETE		c.y./ft.	0.036
1 BLOCK STEP	STEEL	lb/step	14.17
	ADDITIONAL CONCRETE	c.y./step	0.049
2 BLOCK STEP	STEEL	lb/step	16.00
	ADDITIONAL CONCRETE	c.y./step	0.049
3 BLOCK STEP	STEEL	lb/step	17.34
	ADDITIONAL CONCRETE	c.y./step	0.074

* Based on 1'-0" nominal block depth (D).
Leveling Pad is incidental to Item 504 Block Facing

Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MRM	02-09	DAK	02-09	MRM	03-09
AAR	02-09	MRM	02-09	AAR	04-09

Print Date: 9/22/2010
File Name: 16042 WallDetails-3.dgn
Horiz. Scale: 1:1
Unit Information

Vert. Scale: As Noted
Unit Leader Initials

SEMA CONSTRUCTION
WILSON & COMPANY

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
3803 North Main Avenue
Suite 200
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365
Region 5 EJA

As Constructed	
No Revisions:	9/10
Revised:	
Void:	

SUP Retaining Walls
M.S.E. WALL DETAILS
3 OF 3

Designer: M. Merklinger
Detailer: D. Knight
Sheet Subset: SUP Walls

Structure: WALL-P-05-AP
Numbers: thru WALL-P-05-AS
Subset Sheets: W-12 of 12

Project No./Code	
NH 1602-114	16042
Sheet Number	383

GENERAL NOTES

EXCEPT AS SHOWN ON THE PLANS, STRUCTURE EXCAVATION AND BACKFILL SHALL BE IN ACCORDANCE WITH M-206-1.

EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPECIFICATION M213.

GRADE 60 REINFORCING STEEL IS REQUIRED.

ALL REINFORCING STEEL SHALL BE NON COATED UNLESS OTHERWISE NOTED.

THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR EPOXY COATED REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS D CONCRETE	1'-3"	1'-7"	2'-5"	2'-10"	3'-8"	4'-8"	5'-11"	7'-3"

WHEN THE CONTRACTOR ELECTS TO SUBSTITUTE EPOXY COATED REINFORCEMENT FOR BLACK REINFORCING BARS, THE MINIMUM LAP SPLICE SHALL BE AS DESCRIBED ABOVE.

THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR BLACK REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS D CONCRETE	1'-1"	1'-4"	1'-7"	1'-11"	2'-6"	3'-1"	3'-11"	4'-10"

THE ABOVE SPLICE LENGTHS MAY BE REDUCED BY 20% WHEN 3" OF CLEAR COVER EXISTS AND BAR SPACING IS 6" OR GREATER ON CENTER.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION.

P.G.L. = PROFILE GRADE LINE
H.C.L. = HORIZONTAL CONTROL LINE

STATIONS, ELEVATIONS, AND DIMENSIONS CONTAINED IN THESE PLANS ARE CALCULATED FROM THE "AS CONSTRUCTED PLANS" AND A RECENT FIELD SURVEY. THESE STATIONS, ELEVATIONS, AND DIMENSIONS MAY BE ADJUSTED TO MEET THE EXISTING STRUCTURE. THE CONTRACTOR SHALL VERIFY ALL DEPENDENT DIMENSIONS IN THE FIELD BEFORE ORDERING OR FABRICATING ANY MATERIAL.

THE INFORMATION SHOWN ON THESE PLANS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING THEIR OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO AT 1-800-922-1987 AT LEAST 2 DAYS (NOT INCLUDING THE DAY OF NOTIFICATION) PRIOR TO ANY EXCAVATION OR OTHER EARTHWORK.

DESIGN DATA

DESIGN METHOD: LOAD AND RESISTANCE FACTOR DESIGN
AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 4TH ED. 2007 W/2008 & 2009 INTERIMS.

REINFORCED CONCRETE:

CLASS D CONCRETE (WALL): $f'_c = 4,500$ psi
REINFORCING STEEL: $f_y = 60,000$ psi

SEISMIC DESIGN CRITERIA:

SEISMIC ZONE 1 $A_s = 0.098g$

LIVE LOADS:

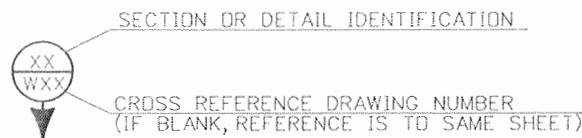
ROADWAY = 2 ft SURCHARGE

GEOTECHNICAL DATA PROVIDED BY OTHERS

RESISTANCE FACTOR FOR BEARING: 0.55
RESISTANCE FACTOR FOR SLIDING: 1.0

INDEX OF DRAWINGS

- W1 GENERAL NOTES
- W2 PLAN AND ELEVATION
- W3 WALL DETAILS (1 OF 2)
- W4 WALL DETAILS (2 OF 2)
- W5 ARCHITECTURAL DETAILS

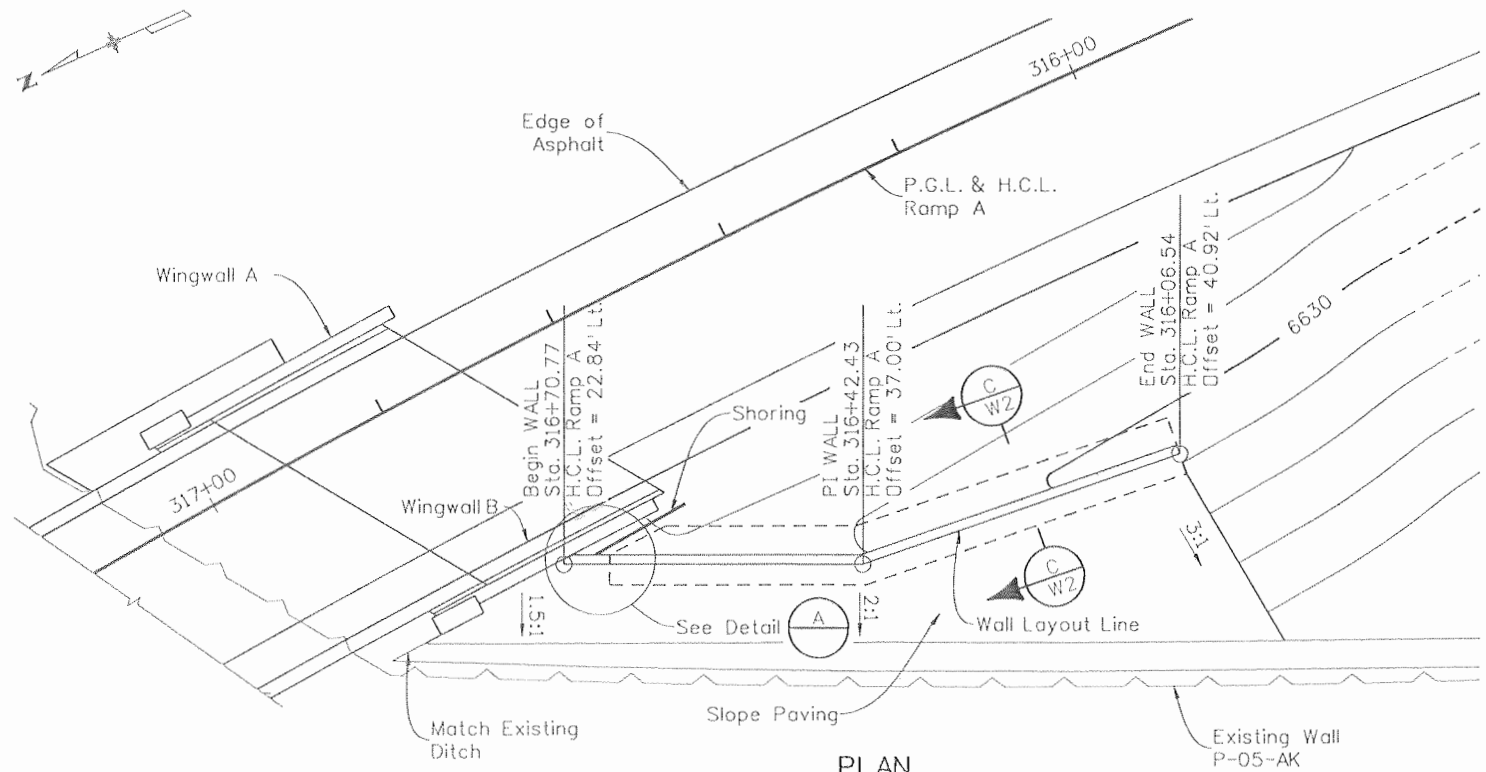


Design	INITIAL	DATE	Checked By
	MUN	6/10	
Detail	INITIAL	DATE	Checked By
	RGA	6/10	
Quantities	INITIAL	DATE	Checked By
	MUN	6/10	

SUMMARY OF QUANTITIES

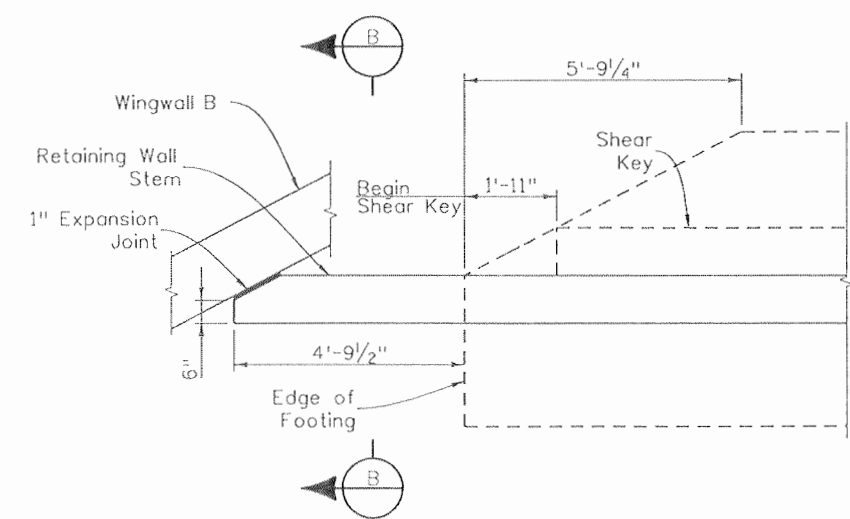
ITEM NO.	DESCRIPTION	UNITS	RAMP A WALL
206-00000	STRUCTURE EXCAVATION	CY	156
206-00100	STRUCTURE BACKFILL (CLASS 1)	CY	120
206-01750	SHORING	LS	1
507-00100	CONCRETE SLOPE AND DITCH PAVING (REINFORCED)	CY	24
601-03050	CONCRETE CLASS D (WALL)	CY	35
601-40400	STRUCTURAL CONCRETE STAIN	SY	118
602-00000	REINFORCING STEEL	LB	3344

Print Date: 9/23/2010	Sheet Revisions			Colorado Department of Transportation	As Constructed	RAMP A WALL GENERAL NOTES		Project No./Code
File Name: 16042V_GenNotes_01.dgn	Date:	Comments	Init.		No Revisions: 9/10			NH 1602-114
Horiz. Scale: 1:1 Unit Information 0221	Vert. Scale: As Noted	3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365			Revised:	Designer: M. Nork	Structure Numbers	16042
	Region 5			EJA	Void:	Detailer: R. Arlman	Sheet Subset: Wall	Subset Sheets: W1 of 5
							Sheet Number	384

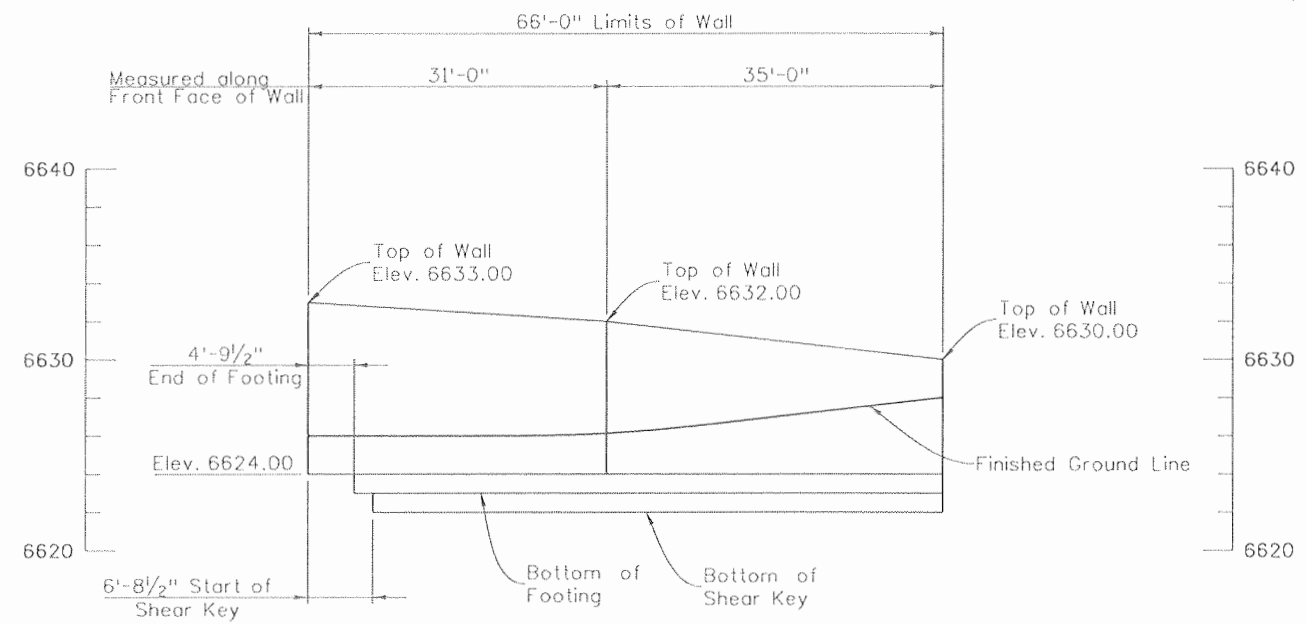


**RAMP A
HORIZONTAL
CURVE DATA**

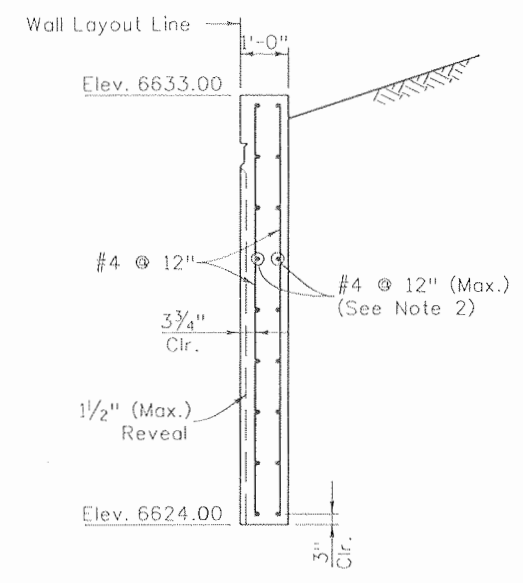
$\Delta c = 47^\circ 49' 49''$ LT.
 $T_c = 532.15'$
 $L_c = 1001.76'$
 $R_c = 1200.00'$
 $PI = \text{Sta. } 316+50.39$



DETAIL A



ELEVATION



SECTION B

NOTES:

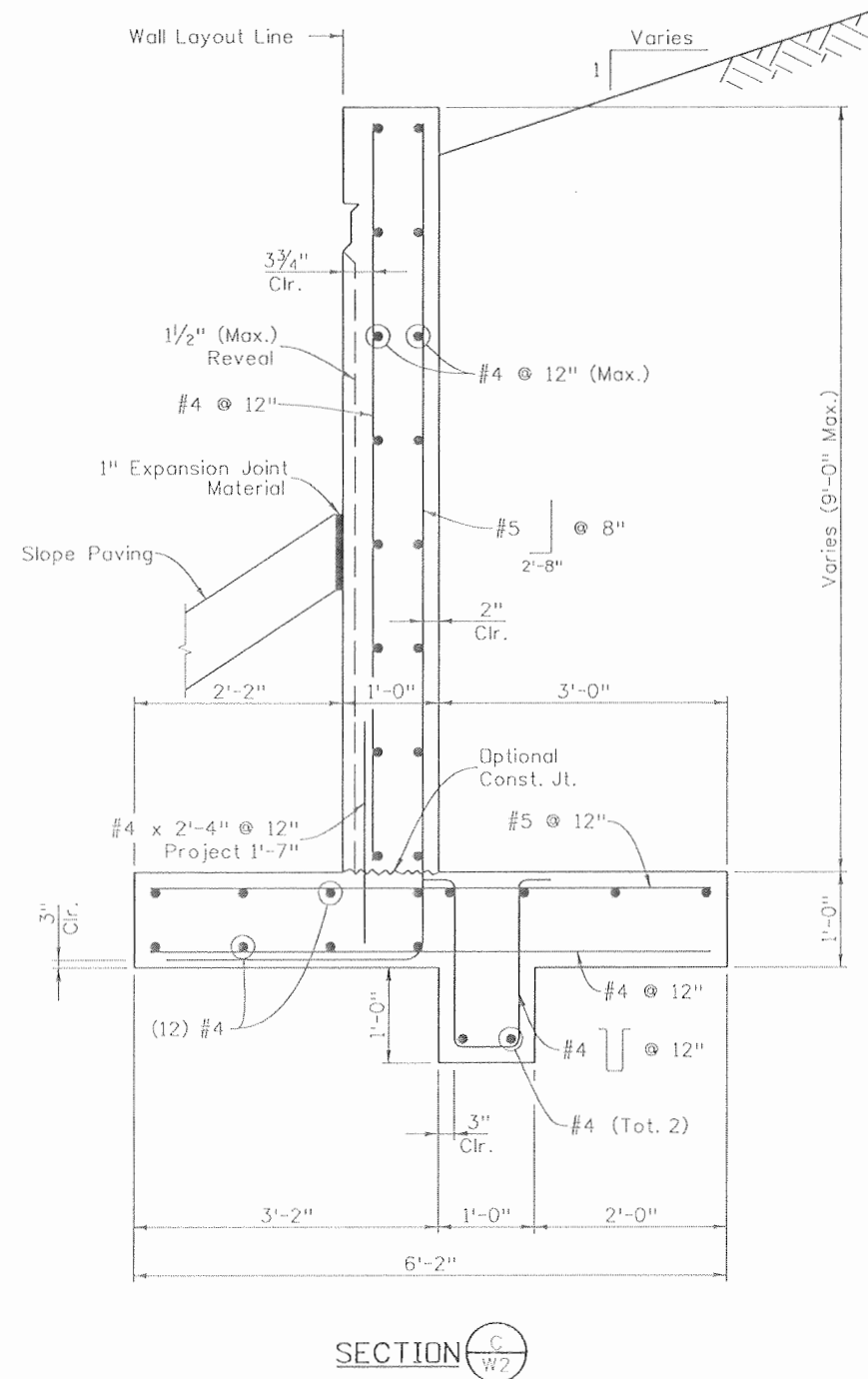
1. Stations and Offsets are taken from the HCL of Ramp A to the front face of the proposed retaining wall.
2. No bar splices allowed within 15 feet of end of wall.

Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MJN	6/10	JAR	6/10	MJN	6/10
Checked By	Checked By	Checked By	Checked By	Checked By	Checked By
JAR	6/10	JAR	6/10	JAR	6/10

Print Date: 9/23/2010	Sheet Revisions			Colorado Department of Transportation	As Constructed	RAMP A WALL PLAN AND ELEVATION		Project No./Code
File Name: 16042V_GPE_01.dgn	Date:	Comments:	Init.		No Revisions: 9/10			NH 1602-114
Horiz. Scale: 1:1				3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365	Revised:	Designer: M. Nork	Structure	16042
Unit Information 0221					Region 5	EJA	Detailer: R. Ariman	Numbers
Unit Leader STW					Void:	Sheet Subset: Wall	Subset Sheets: W2 of 5	

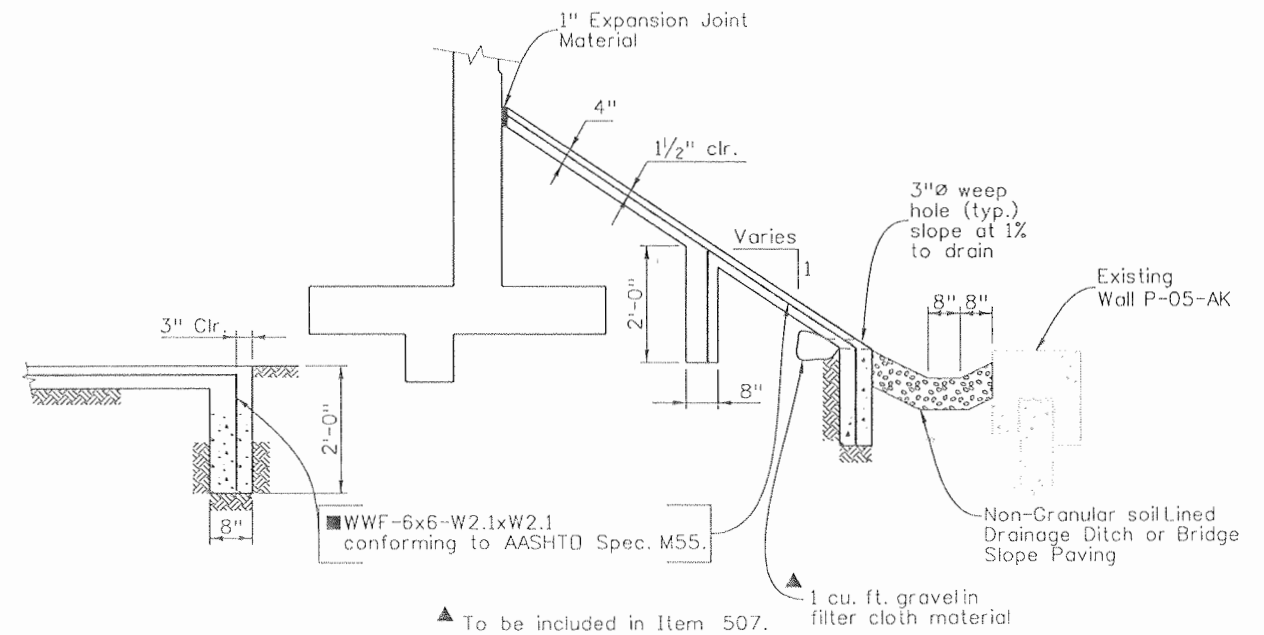


Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MUN	6/10	RCA	6/10	MUN	6/10
JAR	6/10	JAR	6/10	JAR	6/10



RETAINING WALL NOTES:

1. Concrete shall be Concrete Class D (Wall).
2. All reinforcing is 2" clear unless noted otherwise.
3. Finished grade shall be a minimum of 3'-0" above bottom of footing elevations.
4. For architectural details, see Architectural Details sheet.
5. Pay limits for Structure Backfill (Class 1) shall be in accordance with M-206-1.
6. Field bend #4 bars at deflection angle to provide continuous reinforcing at bend in wall.



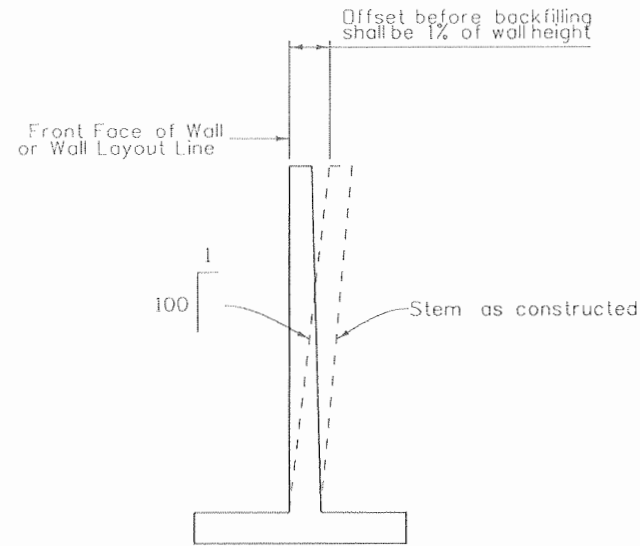
TYPICAL SECTION THRU CUT-OFF WALL

TYPICAL SECTION THRU SLOPE PAVING

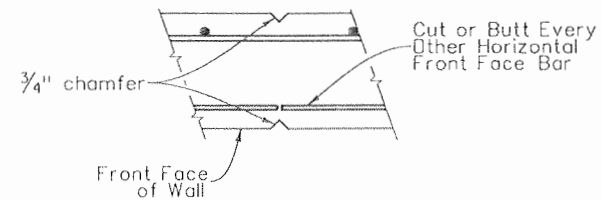
SLOPE PAVING NOTES:

1. Slope paving shall be poured in 10 ft. transverse sections with a tooled construction joint at each section.
2. Wire fabric shall be 2" from the end of joints and shall lap 8" at splices.
3. Where slope or berm paving butts against structural concrete, separate with 1" expansion joint material.
4. Expansion joint material and welded wire fabric shall not be paid for separately, but shall be included in the work.
5. Structure excavation for concrete slope and ditch paving shall be limited to the actual volume occupied by the slope paving concrete.
6. 2.5 lbs. of an approved polypropylene fiber, per cubic yard of concrete, may be substituted for the WWF in this slope paving. If this substitution is made, a continuous #5 reinforcing bar shall be added near the top and bottom of the cutoff wall. The fiber shall be added to the concrete mix in such a fashion that the fibers are uniformly dispersed in the concrete without visible balls or clumps in either the finished slope paving or in the plastic concrete delivered from the concrete truck.
7. Weep holes to be spaced at 20' max and to be no closer than 10' from edge of slope paving.

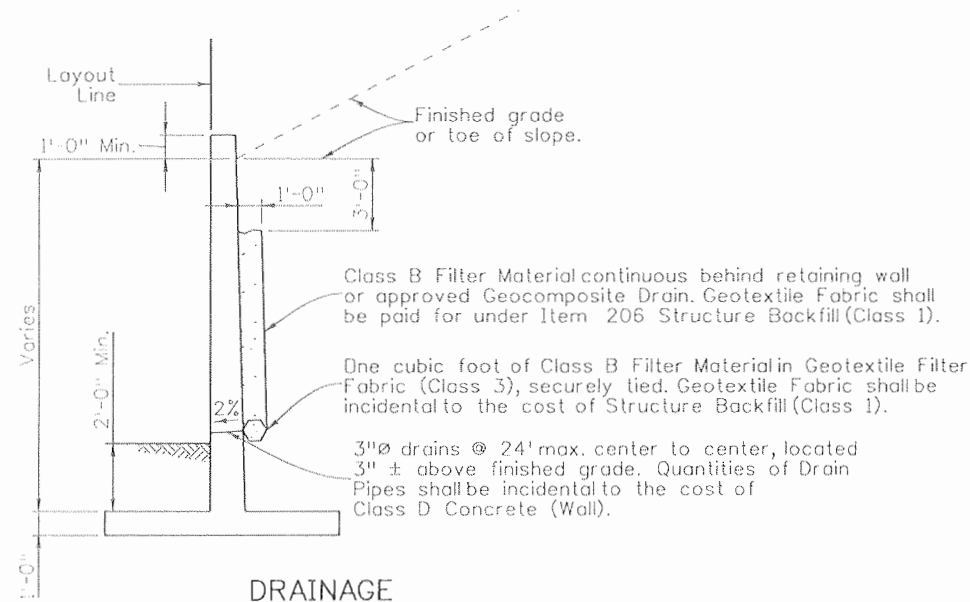
Print Date: 9/23/2010	Sheet Revisions			Colorado Department of Transportation		As Constructed		RAMP A WALL WALL DETAILS (1 OF 2)		Project No./Code	
File Name: 16042V_Wall_Details_01.dgn	Date:	Comments:	Init.	3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365		No Revisions: 9/10		Designer: M. Nork Structure Numbers		NH 1602-114	
Horiz. Scale: 1:1 Vert. Scale: As Noted				Region 5 EJA		Revised:		Detailer: R. Artman		16042	
Unit Information 0221 Unit Leader STW						Void:		Sheet Subset: Wall Subset Sheets: W3 of 5		Sheet Number 386	
SEMA CONSTRUCTION	WILSON & COMPANY			DOT DEPARTMENT OF TRANSPORTATION							



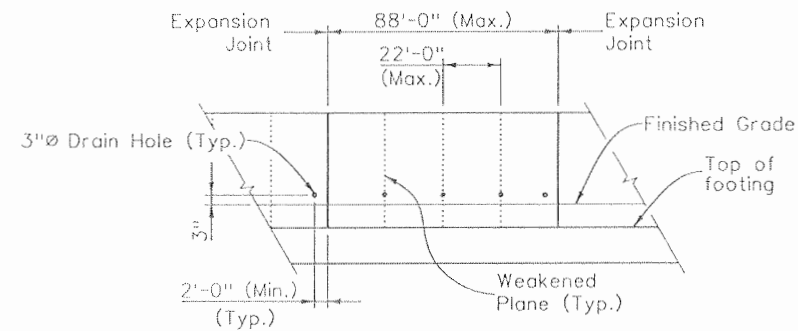
WALL OFFSETS



WEAKENED PLANE DETAIL



DRAINAGE



WALL EXPANSION JOINTS AND WEAKENED PLANES
(Do Not Extend Joints Through Footing)

Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MUN	6/10	RCA	6/10	MUN	6/10
JAR	6/10	JAR	6/10	JAR	6/10

Print Date: 9/23/2010	File Name: 16042V_Wall_Details_02.dgn
Horiz. Scale: 1:1	Vert. Scale: As Noted
Unit Information 0221	Unit Leader STW
SEMA CONSTRUCTION	WILSON & COMPANY

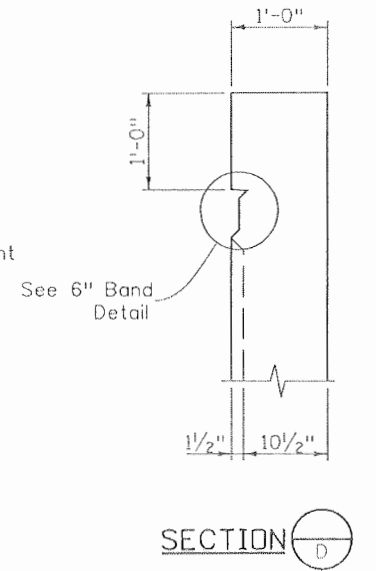
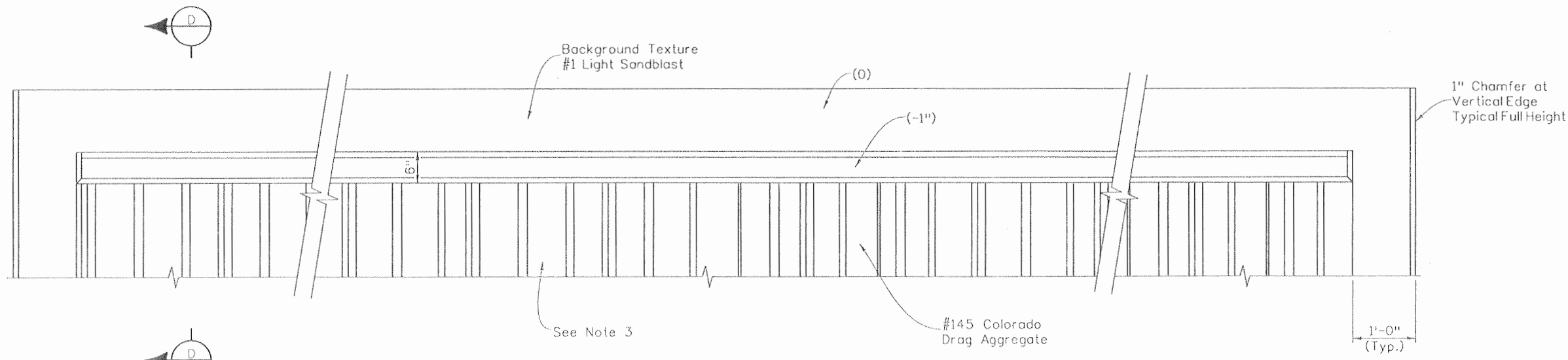
Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
Region 5 **EJA**

As Constructed
No Revisions: 9/10
Revised:
Void:

RAMP A WALL WALL DETAILS (2 OF 2)			
Designer:	M. Nork	Structure	
Detailer:	R. Artman	Numbers	
Sheet Subset:	Wall	Subset Sheets:	W4 of 5

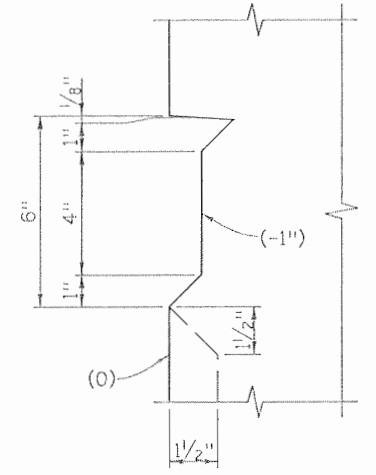
Project No./Code
NH 1602-114
16042
Sheet Number 387



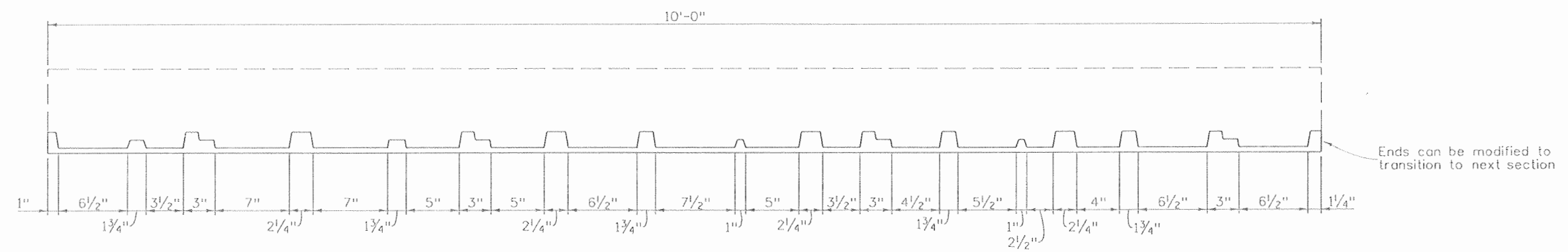
FINISHED FACE TEXTURE

NOTES:

1. Match existing structure concrete coating colors.
2. Repeat this pattern in 10 foot lengths from beginning to end of wall.
3. Pattern ends at base of wall.
4. Apply Structural Concrete Stain to concrete slope paving in front of wall.



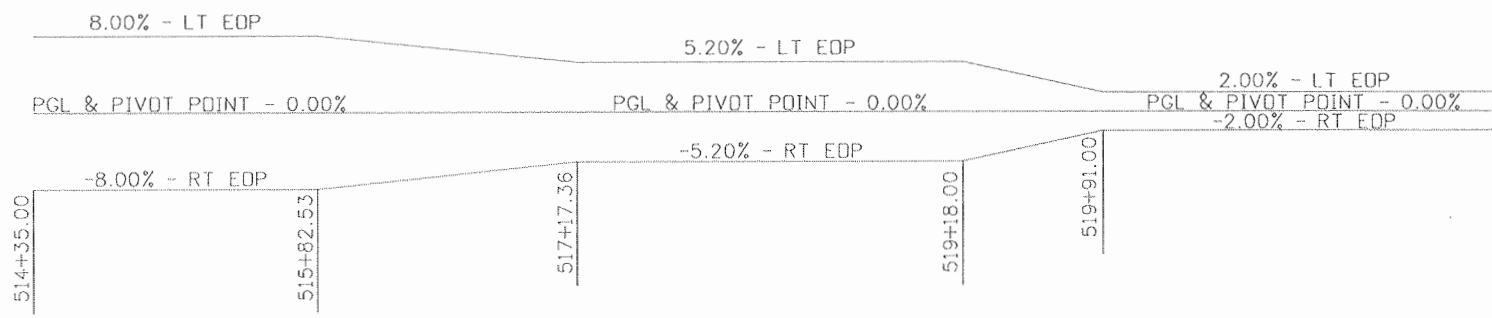
6\"/>



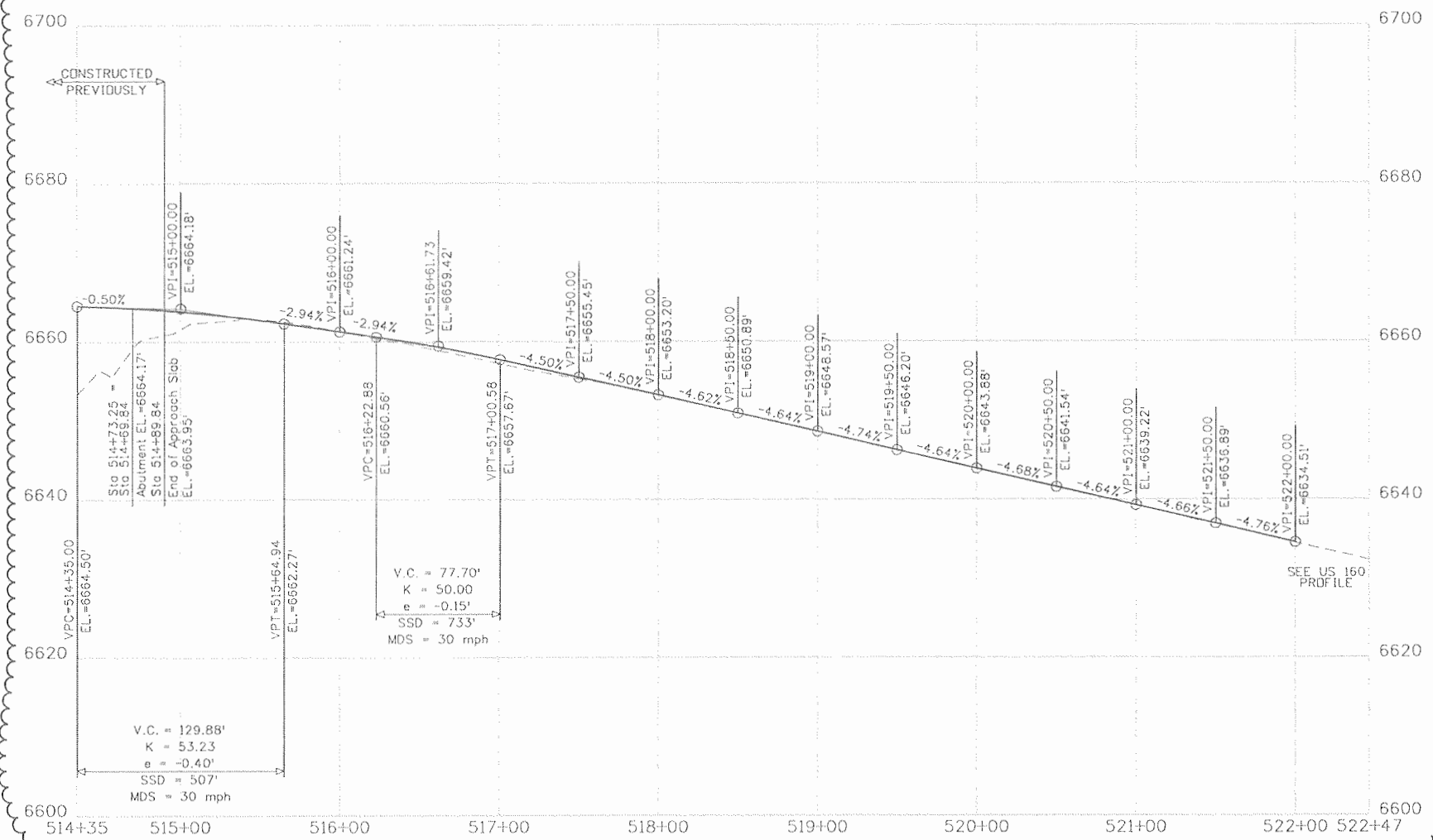
SECTION

Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
MUN	6/10	RCA	6/10	MUN	6/10
JAR	6/10	JAR	6/10	JAR	6/10

Print Date: 9/23/2010	Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365	As Constructed		RAMP A WALL ARCHITECTURAL DETAILS		Project No./Code
File Name: 16042V_Wall_Details_03.dgn	Date:	Comments:	Init.:		No Revisions: 9/10			NH 1602-114	
Horiz. Scale: 1:1				Region 5	Revised:	Designer: M. Nork	Structure Numbers	16042	
Unit Information 0221					Void:	Detailer: R. Artman	Sheet Subset: Wall	Subset Sheets: W5 of 5	Sheet Number
				EJA					



SUPERELEVATION DIAGRAM



Print Date: 9/23/2010
Drawing File Name: 17280_GF501.dgn
Horiz. Scale: 1:100 Vert. Scale: As Noted
Unit Information Project Manager: spc

Sheet Revisions		
Date:	Comments	Init.
04/01/10	Ramp C Profile Sheet, New Sheet	JMB
04/15/10	Ramp C Profile Modified	JMB

Colorado Department of Transportation

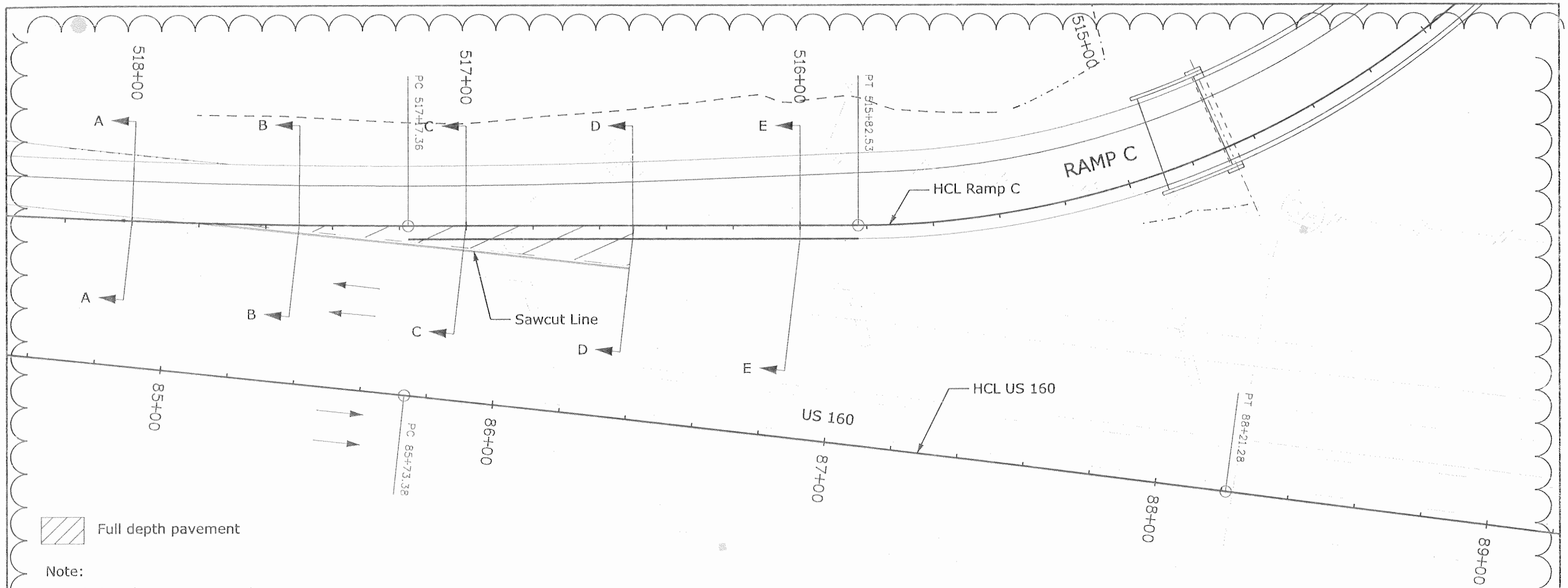
3803 North Main Avenue
Suite 200
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365

Region 5 EJA

As Constructed
No Revisions: 9/10
Revised:
Void:

RAMP C PROFILE SHEET		
Designer: JMB	Structure	
Detailer: JMB	Numbers	
Sheet Subset: profile	Subset Sheets:	1 of 1

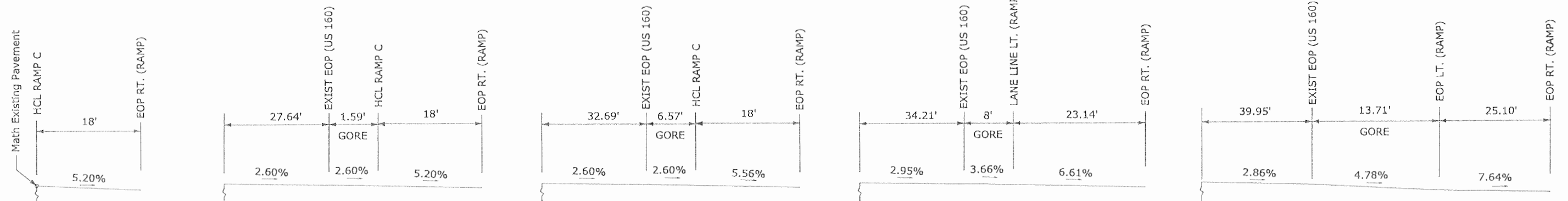
Project No./Code
NH 1602-114
16042
Sheet Number 389



Full depth pavement

Note:

-Existing slopes are approximate



SECTION A-A
US 160 STA. 84+86.94 =
RAMP C STA. 518+00.00

SECTION B-B
US 160 STA. 85+36.79 =
RAMP C STA. 517+50.00

SECTION C-C
US 160 STA. 85+86.47 =
RAMP C STA. 517+00.00

SECTION D-D
US 160 STA. 86+36.34 =
RAMP C STA. 516+50.00

SECTION E-E
US 160 STA. 86+85.73 =
RAMP C STA. 516+00.00

Print Date: 9/23/2010
File Name: 17280_GQ501.dgn
Horiz. Scale: 1:30 Vert. Scale: As Noted
Unit Information Unit Leader Initials

Sheet Revisions		
Date:	Comments	Init.
04/15/10	Ramp C Gore Grading & Detail Sheet	JMB

Colorado Department of Transportation

3803 North Main Avenue
Suite 200
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365

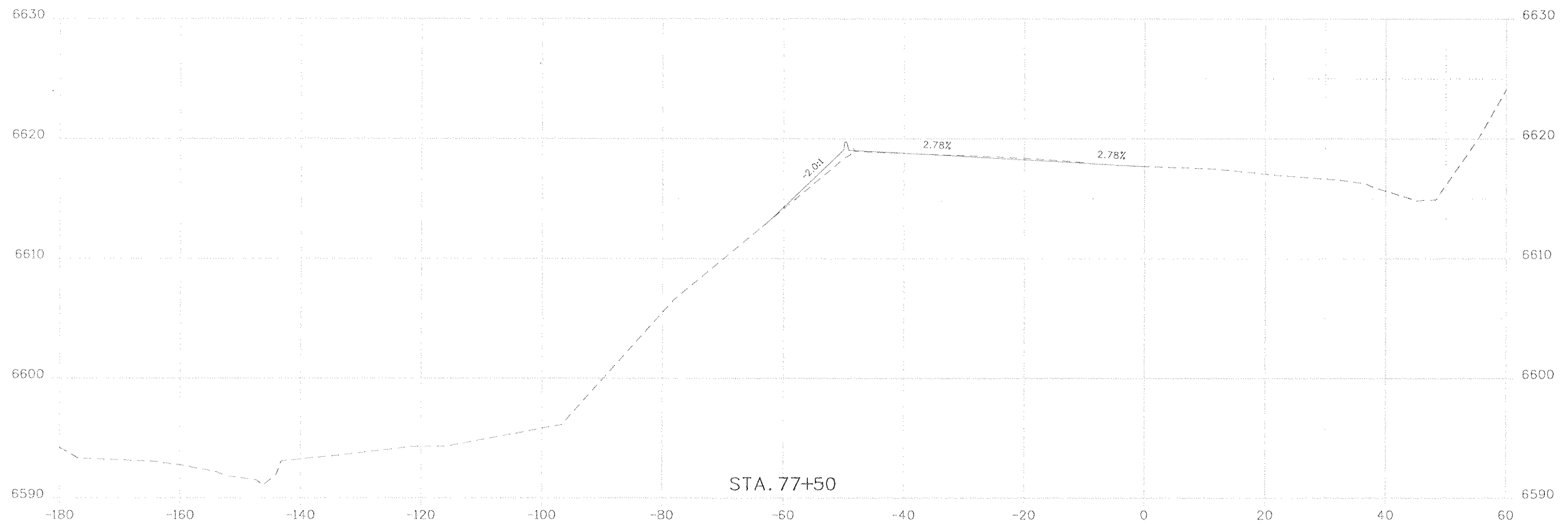
Region 5 EJA

As Constructed	
No Revisions:	9/10
Revised:	
Void:	

RAMP C GORE DETAILS			
Designer:	JMB	Structure	
Detailer:	JMB	Numbers	
Sheet Subset:	Gore	Subset Sheets:	1 of 1

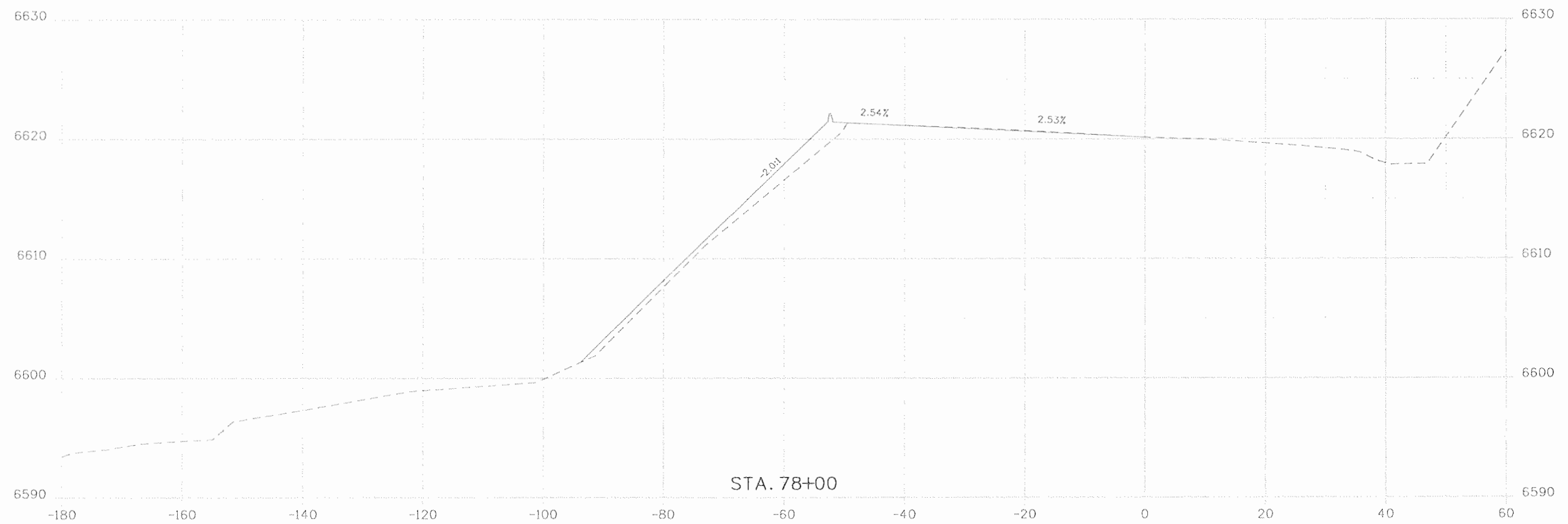
Project No./Code	
NH 1602-114	
16042	
Sheet Number	390

N:\08-100-302-01\16042\Plet...Sets\As-Built\Change No. 1\Roadway\Electronic Drawings\17280 X-S-
 dgn
 9/23/2010 11:58:55



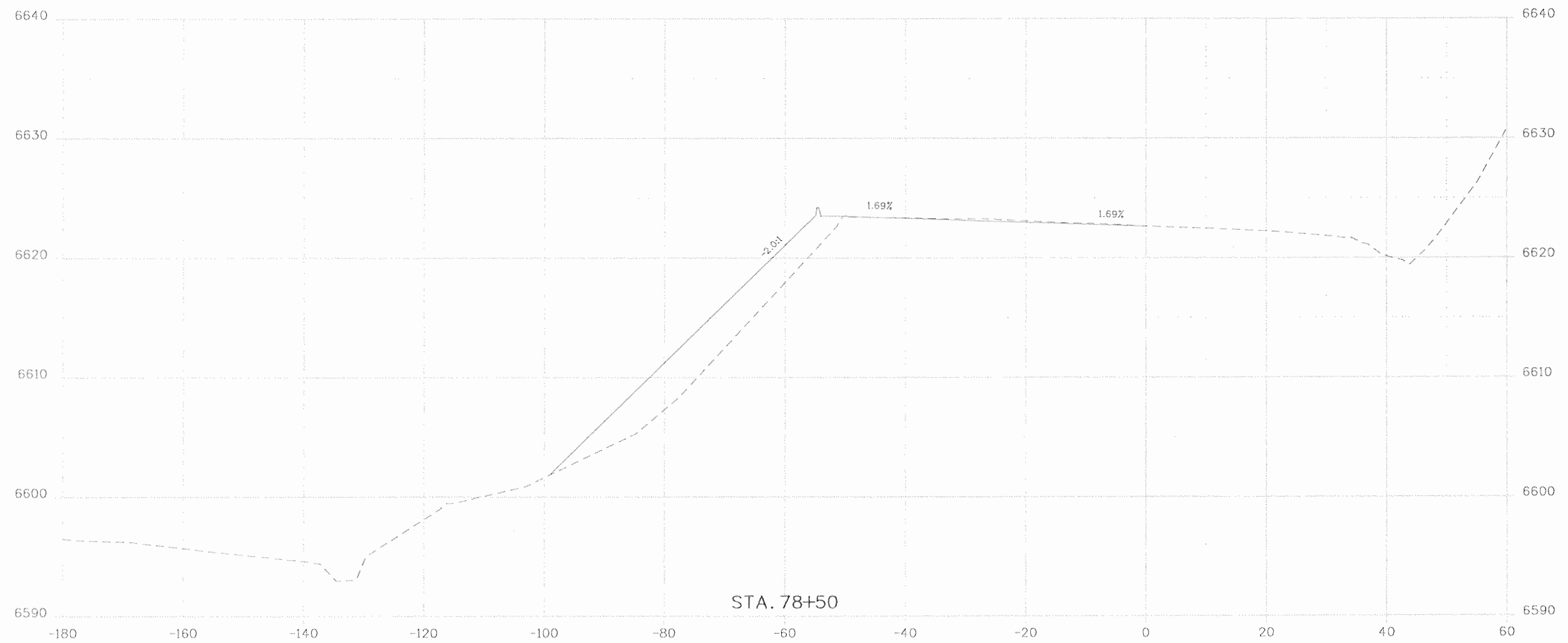
Print Date: 9/23/2010		Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5 EJA	As Constructed		Cross Sections		Project No./Code	
File Name: 17280 X-Sections.dgn		Date:	Comments	Init.		No Revisions: 9/10	Ramp C Along US 160		NH 1602-114		
Horiz. Scale: 1:20 Vert. Scale: As Noted						Revised:	Designer: JMB	Structure	16042		
Unit Information Unit Leader Initials						Void:	Detailer: JMB	Numbers	Sheet Number 391		
						Sheet Subset: X-Sections	Subset Sheets: 1 of 19				

N:\02-100-302-0\16042\Plg_L_Sets\As-Built\Change No. 1\Roadway\Electronic Drawings\17280 X-S.dgn
 9/23/2010 1:59:00



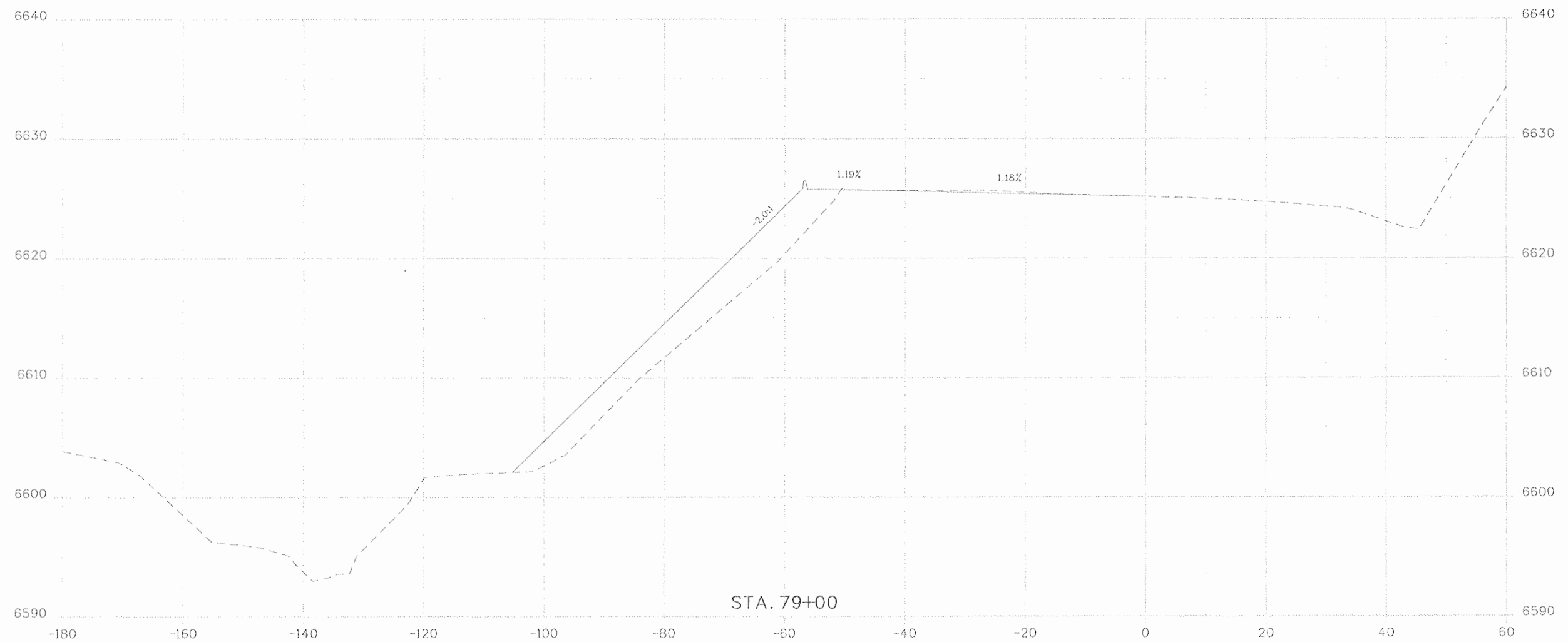
Print Date: 9/23/2010		Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5	As Constructed		Cross Sections		Project No./Code	
File Name: 17280 X-Sections.dgn		Date:	Comments	Init.		No Revisions: 9/10	Ramp C Along US 160		NH 1602-114		
Horiz. Scale: 1:20 Vert. Scale: As Noted						Revised:	Designer: JMB	Structure	16042		
Unit Information Unit Leader Initials						Void:	Detailer: JMB	Numbers	Sheet Number 392		
						Sheet Subset: X-Sections	Subset Sheets: 2 of 19				

N:\08-100-302-01\16042\Plot_Sets\As-Built\Change No. 1\Roadway\Electronic Drawings\17280 X-S-
 rgarman 1:59:42 .dgn



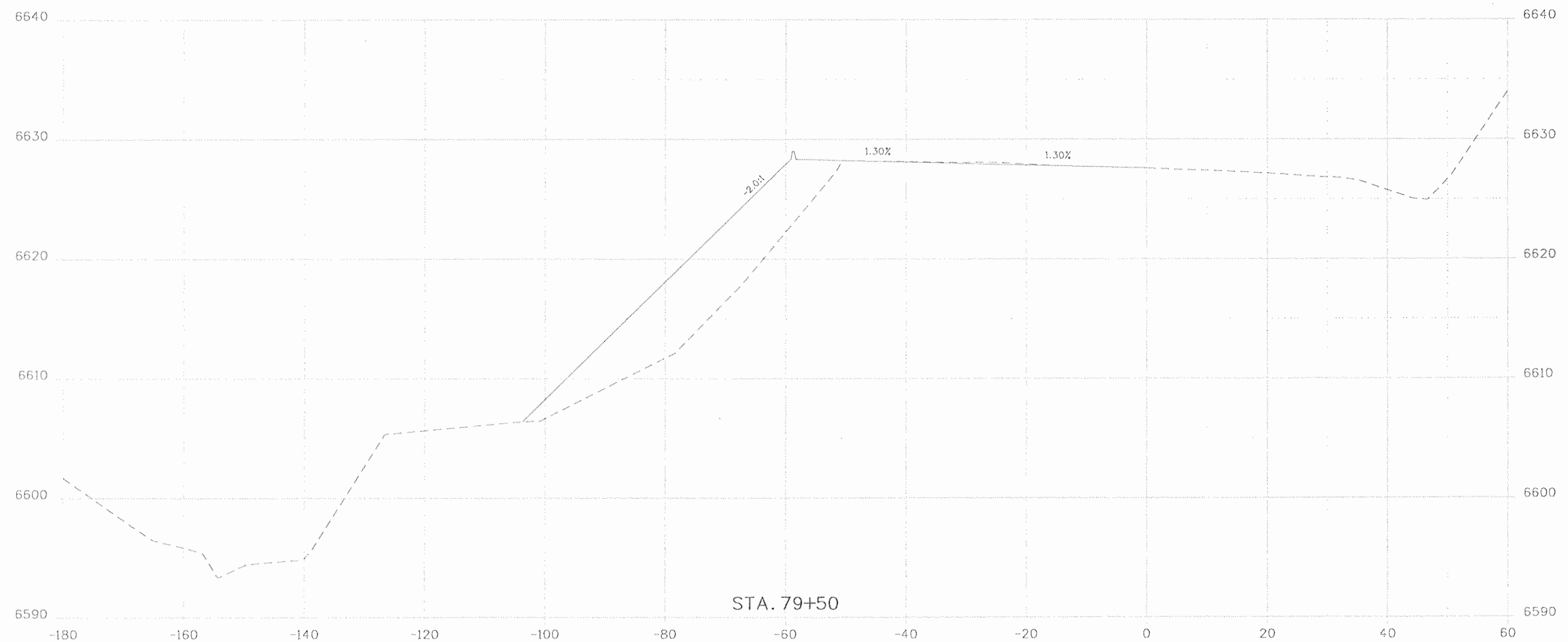
Print Date: 9/23/2010		Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5	As Constructed		Cross Sections		Project No./Code	
File Name: 17280 X-Sections.dgn		Date:	Comments	Init.		No Revisions: 9/10	Ramp C Along US 160		NH 1602-114		
Horiz. Scale: 1:20 Vert. Scale: As Noted						Revised:	Designer: JMB	Structure	16042		
Unit Information Unit Leader Initials						Void:	Detailer: JMB	Numbers	Sheet Number 393		
						Sheet Subset: X-Sections	Subset Sheets: 3 of 19				

I:\00-100-302-01\16042\Plan_Sets\As-Built\Change No. 1\Roadway\Electronic Drawings\17280 X-5a.dgn
 rger:men 1:58:4



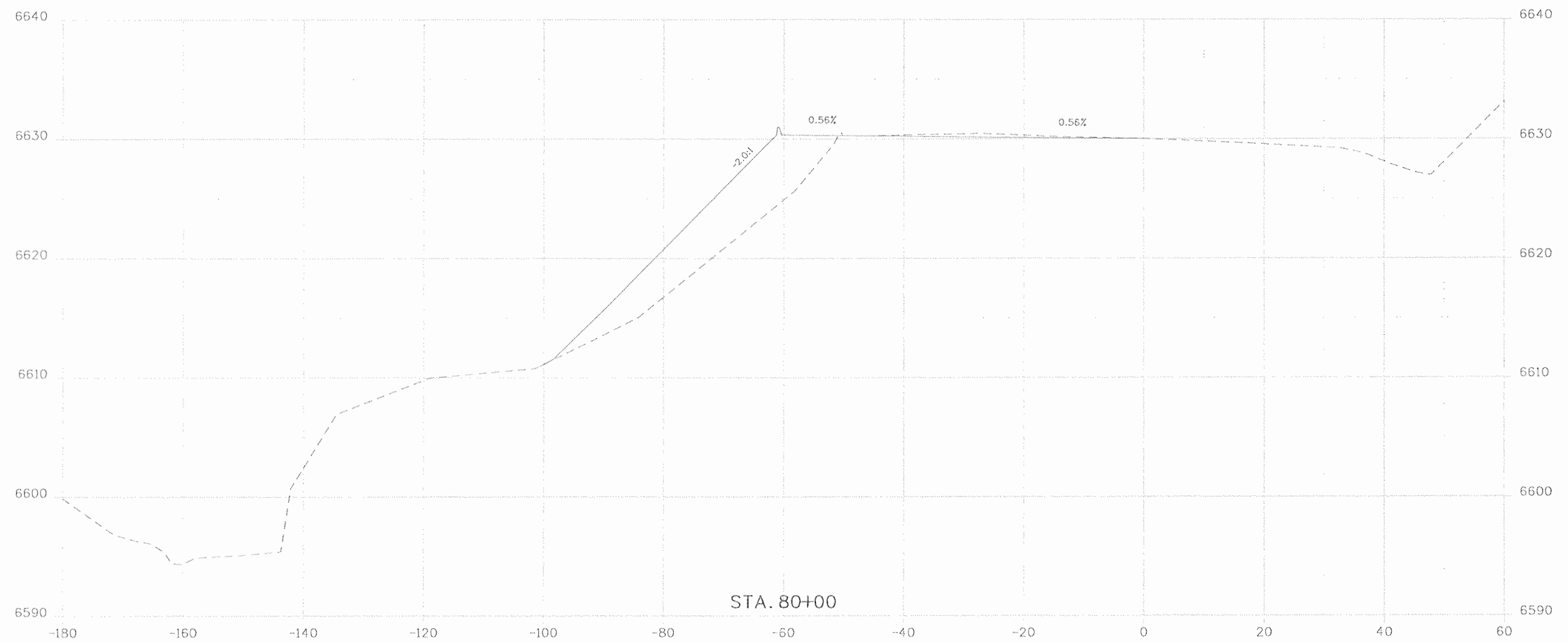
Print Date: 9/23/2010		Sheet Revisions			Colorado Department of Transportation		As Constructed		Cross Sections		Project No./Code	
File Name: 17280 X-Sections.dgn		Date:	Comments	Init.	3803 North Main Avenue Suite 200 Durango, CD 81301 Phone: 970-385-1440 FAX: 970-385-8365		No Revisions: 9/10		Ramp C Along US 160		NH 1602-114	
Horiz. Scale: 1:20 Vert. Scale: As Noted							Revised:		Designer: JMB	Structure	16042	
Unit Information Unit Leader Initials					Region 5 EJA		Void:		Detailer: JMB	Numbers	Sheet Number 394	
								Sheet Subset: X-Sections	Subset Sheets: 4 of 19			


rgarman 1:59:55 N:\08-100-302-01\16042\Plot_Sets\As-Built\Change No. 1\Roadway\Electronic Drawings\17280 X-Sections.dgn



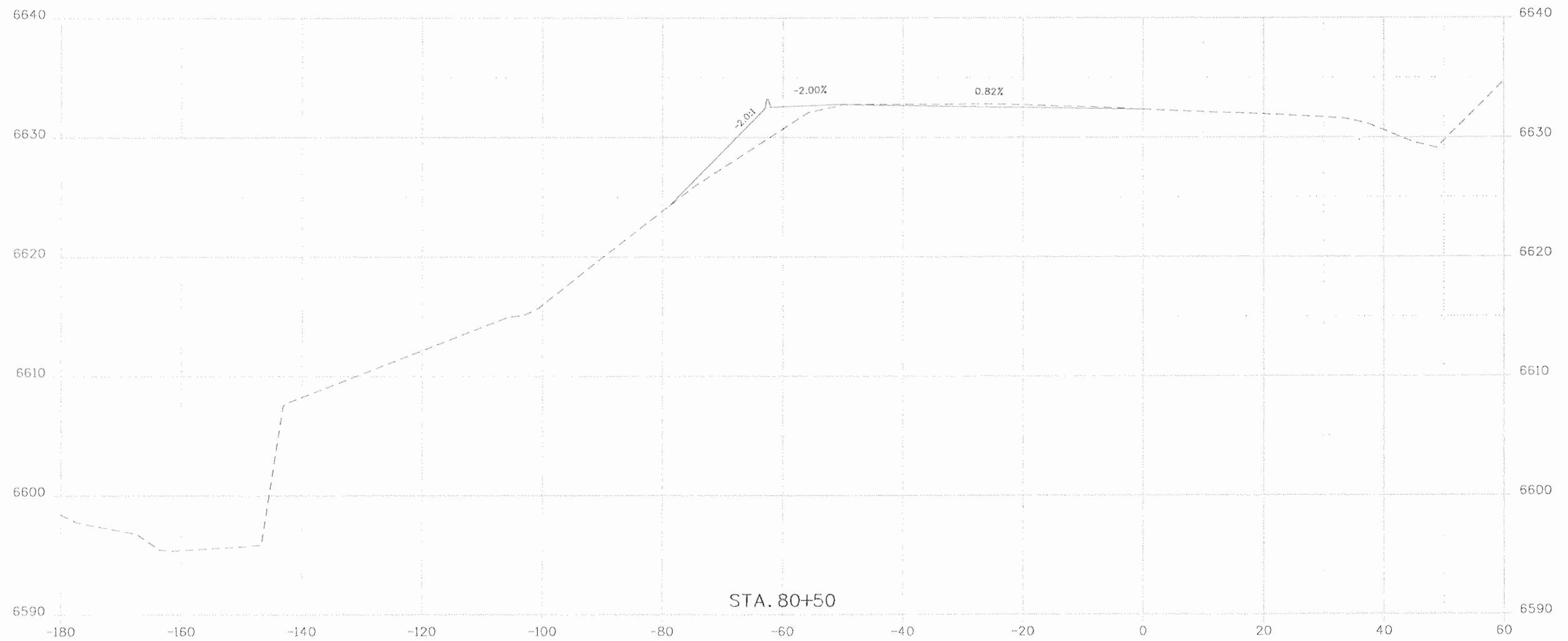
Print Date: 9/23/2010		Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5 EJA	As Constructed		Cross Sections		Project No./Code	
File Name: 17280 X-Sections.dgn		Date:	Comments	Init.		No Revisions: 9/10	Ramp C Along US 160		NH 1602-114		
Horiz. Scale: 1:20 Vert. Scale: As Noted						Revised:	Designer: JMB	Structure			
Unit Information Unit Leader Initials						Void:	Detailer: JMB	Numbers			
						Sheet Subset: X-Sections	Subset Sheets: 5 of 19	Sheet Number 395			

rgerman 2:00:00 N:\08-100-302-01\160+2\Plot_Sets\Aa-Bujits\Change No. 1\Roadway\Electronic Drawings\17280 X-S .dgn

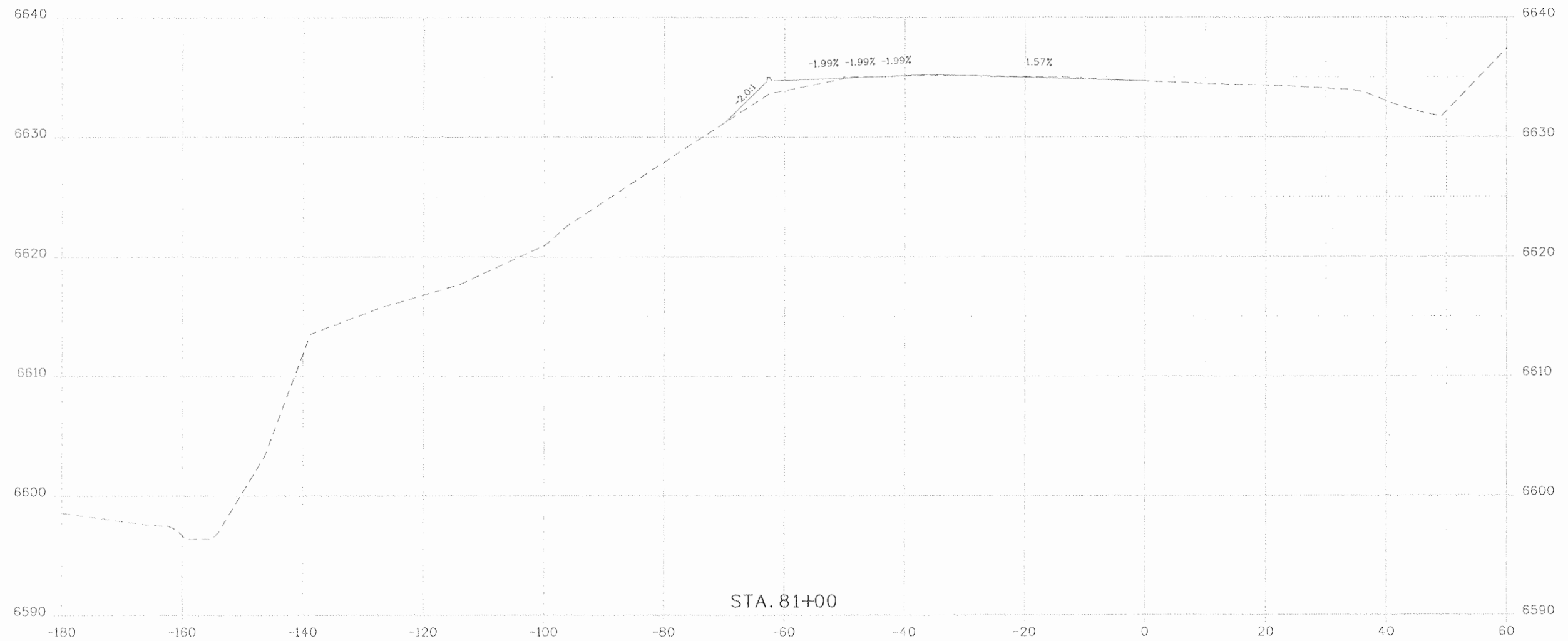


Print Date: 9/23/2010	(R-X) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Sheet Revisions			Colorado Department of Transportation  3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5	As Constructed		Cross Sections		Project No./Code	
File Name: 17280 X-Sections.dgn		Date:	Comments	Init.		No Revisions: 9/10	Ramp C Along US 160		NH 1602-114		
Horiz. Scale: 1:20 Vert. Scale: As Noted						Revised:	Designer: JMB	Structure	16042		
Unit Information Unit Leader Initials						Void:	Detailer: JMB	Numbers	Sheet Number 396		
						Sheet Subset: X-Sections	Subset Sheets: 6 of 19				

rjg:man 2:00:27 M:\08-100-302-01\1004-2\Plot_Sets\Aa-Bulbs\Change No. 1\Roadway\Electronic Drawings\17280 X-5.dgn



Print Date: 9/23/2010		Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5 EJA	As Constructed		Cross Sections		Project No./Code	
File Name: 17280 X-Sections.dgn		Date:	Comments	Init.		No Revisions: 9/10	Ramp C Along US 160		NH 1602-114		
Horiz. Scale: 1:20 Vert. Scale: As Noted						Revised:	Designer: JMB	Structure	16042		
Unit Information Unit Leader Initials						Void:	Detailer: JMB	Numbers	Sheet Number 397		
						Sheet Subset: X-Sections	Subset Sheets: 7 of 19				



STA. 81+00

Print Date: 9/23/2010
 File Name: 17280 X-Sections.dgn
 Horiz. Scale: 1:20 Vert. Scale: As Noted
 Unit Information Unit Leader Initials

R-X
 O
 O
 O

Sheet Revisions		
Date:	Comments	Init.

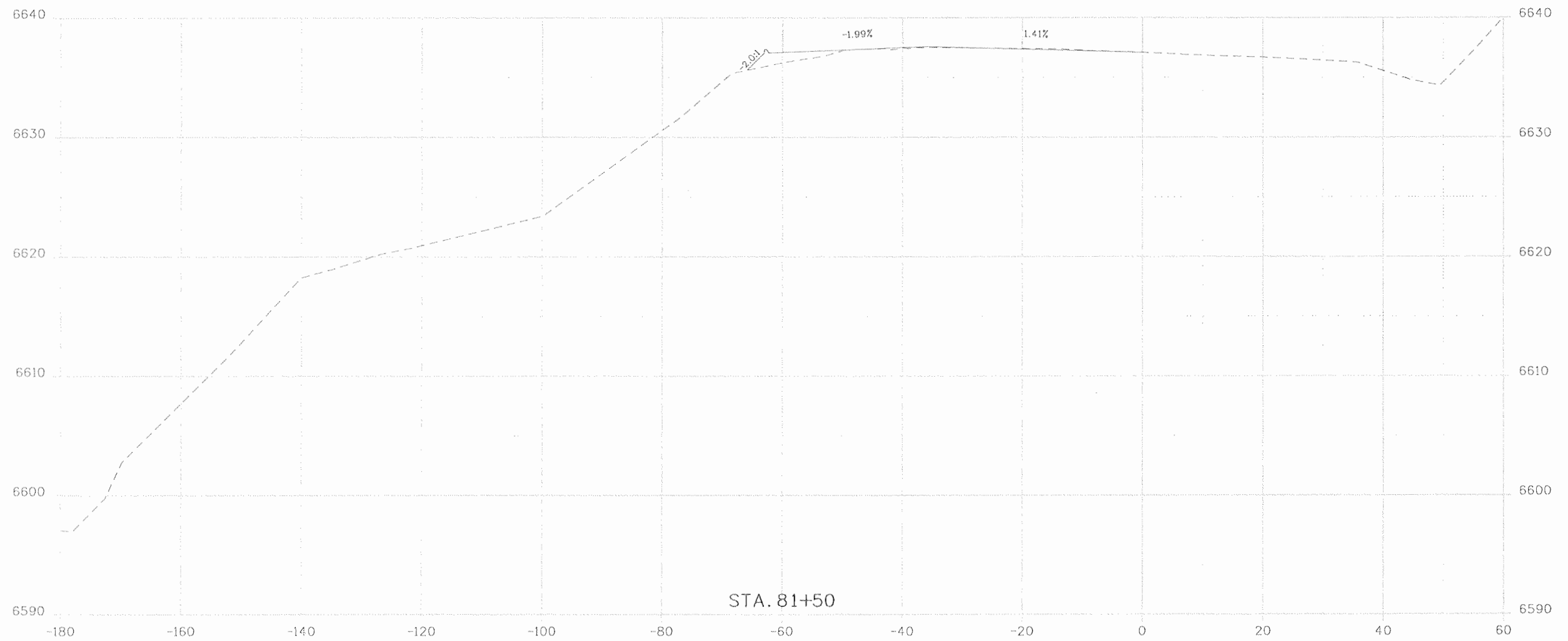
Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

As Constructed
 No Revisions: 9/10
 Revised:
 Void:

Cross Sections
 Ramp C Along US 160
 Designer: JMB Structure
 Detailer: JMB Numbers
 Sheet Subset: X-Sections Subset Sheets: 8 of 19

Project No./Code
 NH 1602-114
 16042
 Sheet Number 398


N:\08-100-302-01\18042\Plot\Set\As-Built\Change No. 1\Roadway\Electronic Drawings\17280 X-5.dgn
 r:\g:\man 2:00



Print Date: 9/23/2010
 File Name: 17280 X-Sections.dgn
 Horiz. Scale: 1:20 Vert. Scale: As Noted
 Unit Information Unit Leader Initials

(R-X)
 OOO

Sheet Revisions		
Date:	Comments	Init.

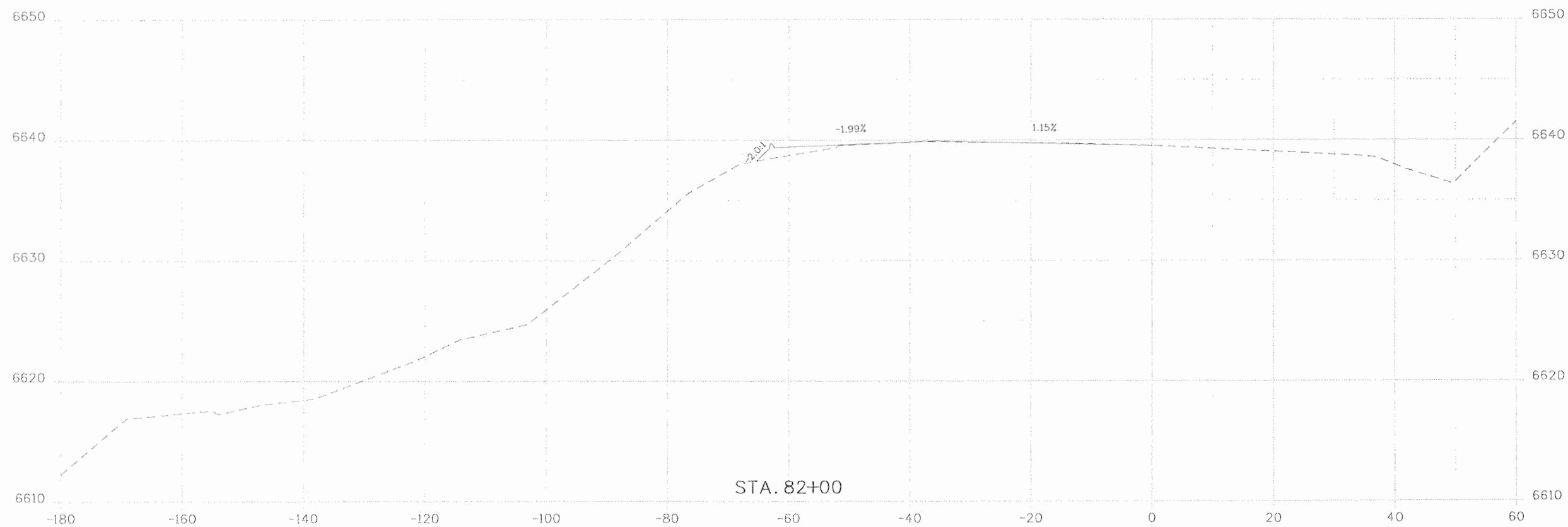
Colorado Department of Transportation

 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

As Constructed
 No Revisions: 9/10
 Revised:
 Void:

Cross Sections
 Ramp C Along US 160
 Designer: JMB Structure Numbers
 Detailer: JMB
 Sheet Subset: X-Sections Subset Sheets: 9 of 19

Project No./Code
 NH 1602-114
 16042
 Sheet Number 399

\08-100-302-01\16042\Plot_Sets\As-Built\Change No. 1\Roadway\Electronic Drawings\17280 X-sec.dgn
 rgr:man 2:01:01



Print Date: 9/23/2010
 File Name: 17280 X-Sections.dgn
 Horiz. Scale: 1:20 Vert. Scale: As Noted
 Unit Information Unit Leader Initials

Sheet Revisions		
Date:	Comments	Init.

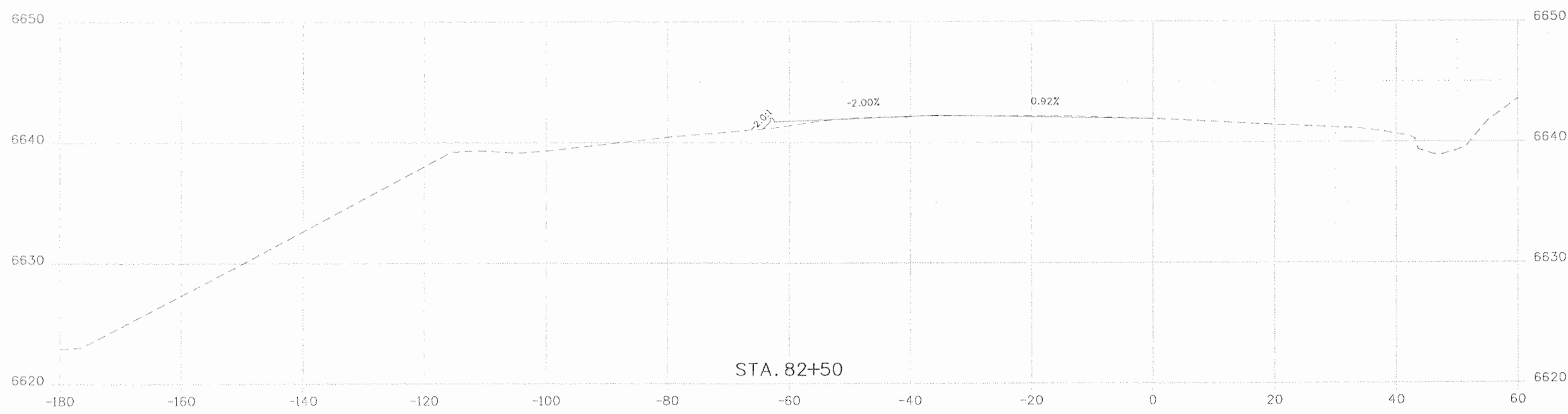
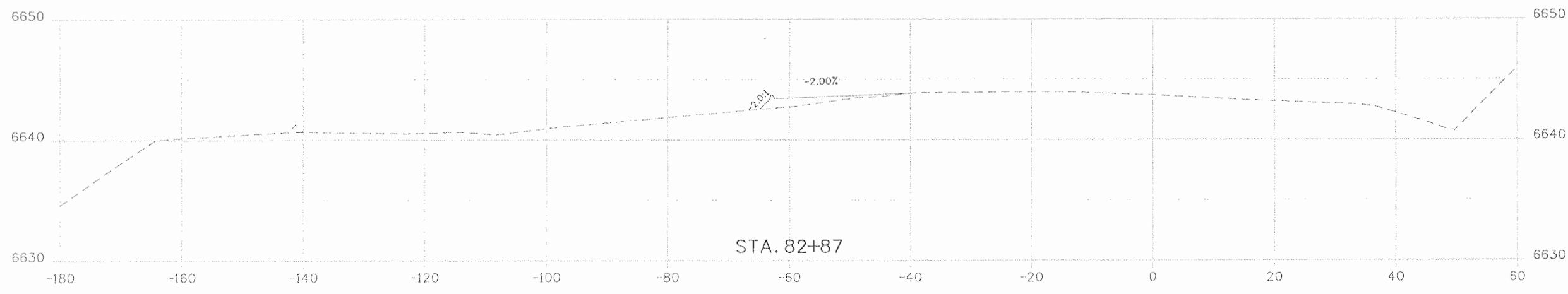
Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

As Constructed	
No Revisions:	9/10
Revised:	
Void:	

Cross Sections Ramp C Along US 160		
Designer:	JMB	Structure Numbers
Detailer:	JMB	
Sheet Subset: X-Sections	Subset Sheets: 10 of 19	

Project No./Code	
NH 1602-114	
16042	
Sheet Number	400

I:\08-100-302-01\19042\Plot_Sets\As-Built\Change No. 1\Roadway\Electronic Drawings\17280 X-Section.dgn
 2:05:11



Print Date: 9/23/2010
 File Name: 17280 X-Sections.dgn
 Horiz. Scale: 1:20 Vert. Scale: As Noted
 Unit Information Unit Leader Initials

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

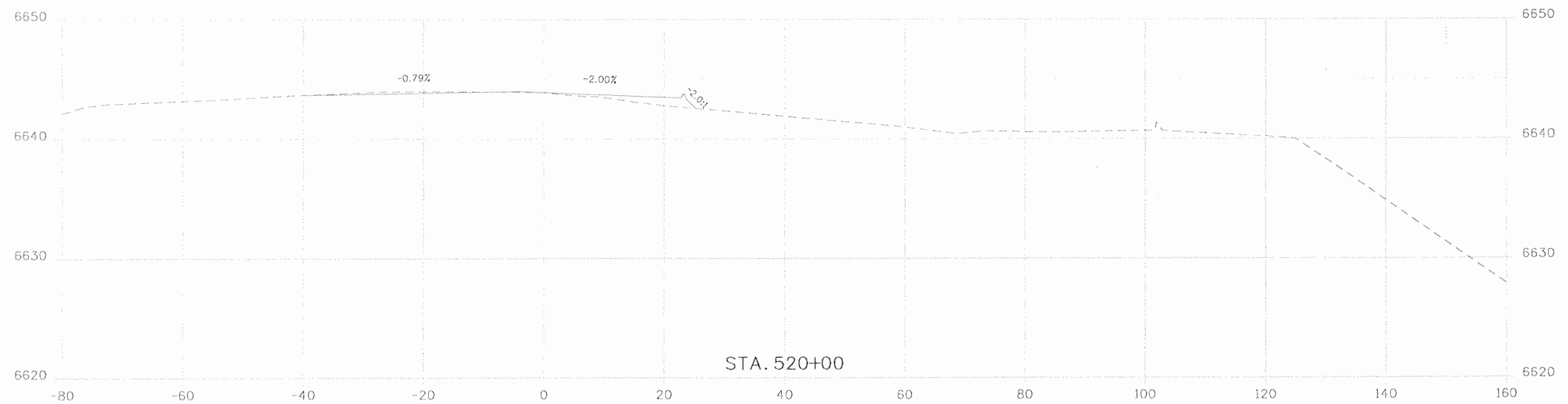
As Constructed
 No Revisions: 9/10
 Revised:
 Void:





Cross Sections Ramp C Along US 160		
Designer: JMB	Structure	
Detailer: JMB	Numbers	
Sheet Subset: X-Sections	Subset Sheets: 11 of 19	

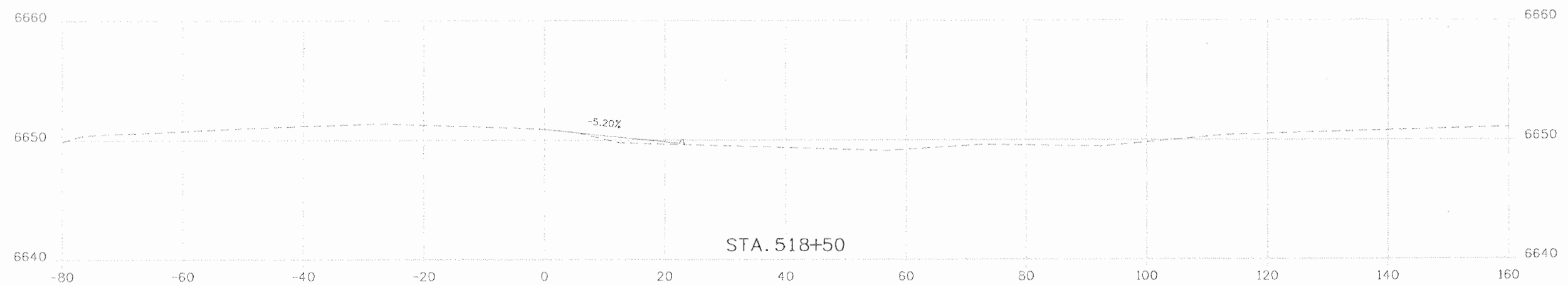
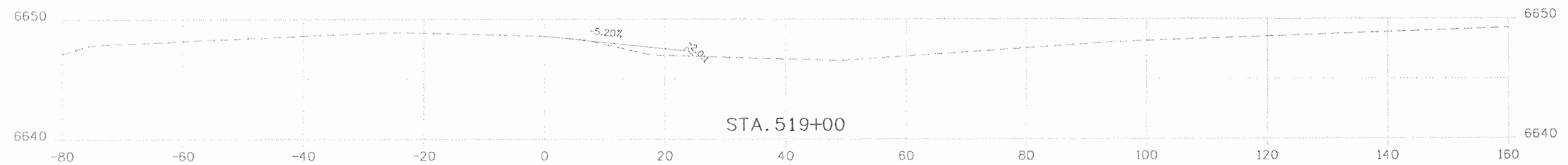
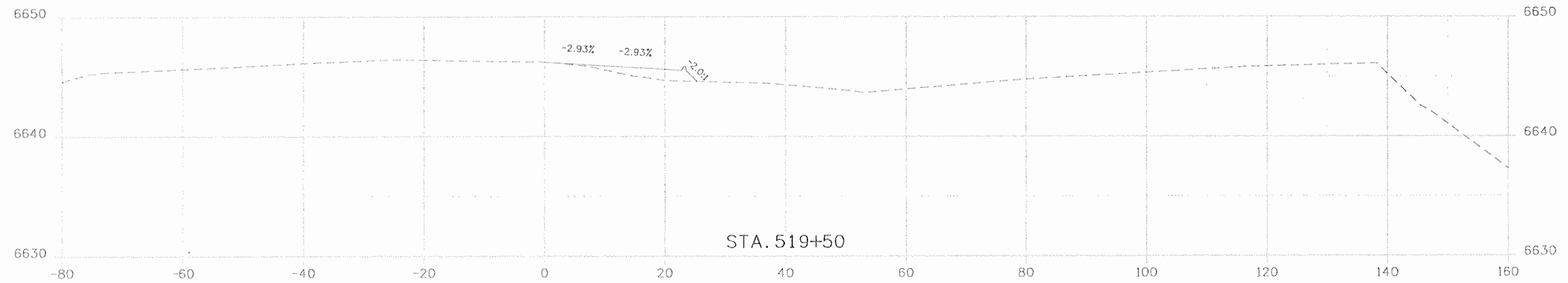
Project No./Code
 NH 1602-114
 16042
 Sheet Number 401

N:\08-100-302-01\16042\Plot_Sets\Ae-Bujita\Change No. 1\Roadway\Electronic Drawings\17280 X-Sections.dgn
 rgerman 2:05:

r:\partman 2:0812\1\AD8-100-362-01\16042\Plot_Sets\As-Built\Change No. 1\Roadway\Electronic Drawings\17280 X-Section.dgn
 Department 2:0812



Print Date: 9/23/2010	  	Sheet Revisions			Colorado Department of Transportation		As Constructed	Cross Sections		Project No./Code
File Name: 17280 X-Sections.dgn		Date:	Comments	Init.	3803 North Main Avenue		No Revisions: 9/10	Ramp C Along US 160		NH 1602-114
Horiz. Scale: 1:20 Vert. Scale: As Noted					Suite 200		Revised:	Designer: JMB	Structure	16042
Unit Information Unit Leader Initials					Durango, CO 81301		Void:	Detailer: JMB	Numbers	Sheet Number 402
				 DEPARTMENT OF TRANSPORTATION Region 5		Phone: 970-385-1440 FAX: 970-385-8365 EJA		Sheet Subset: X-Sections	Subset Sheets: 12 of 19	



Print Date: 9/23/2010
 File Name: 17280 X-Sections.dgn
 Horiz. Scale: 1:20 Vert. Scale: As Noted
 Unit Information Unit Leader Initials

R-X
 O
 O
 O

Sheet Revisions		
Date:	Comments	Init.

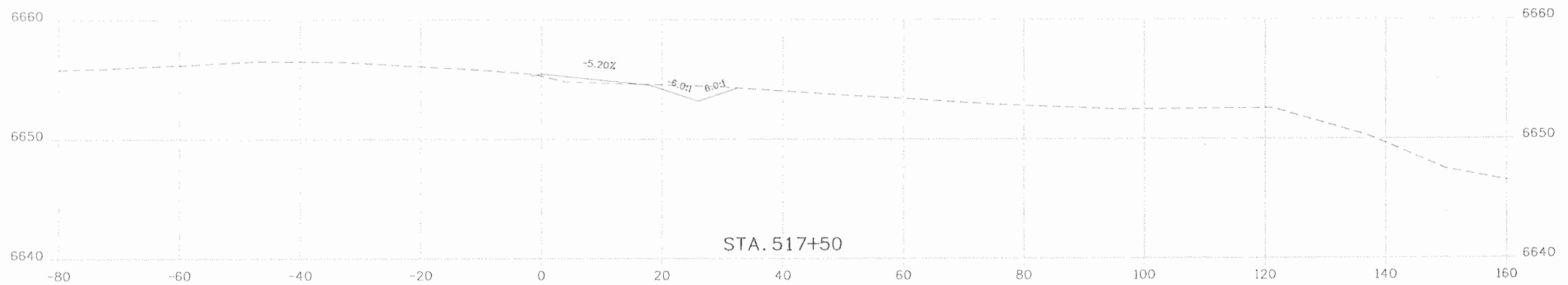
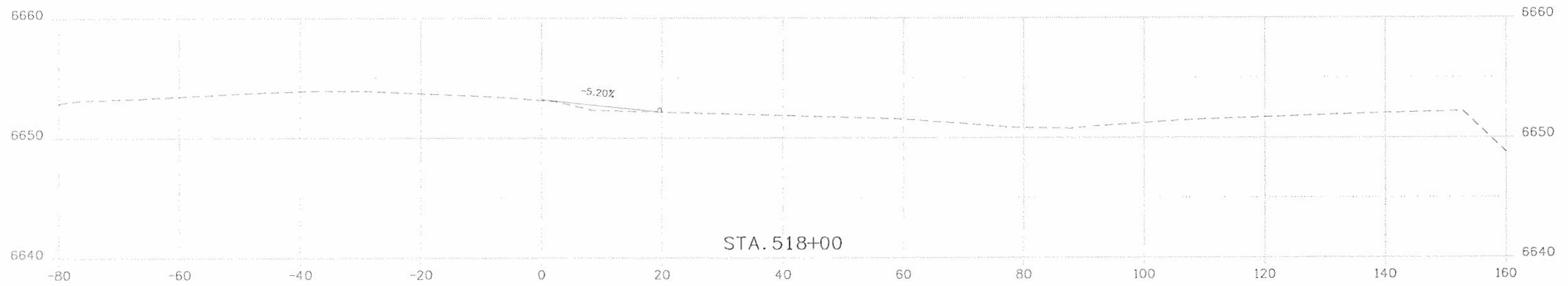
Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

As Constructed
 No Revisions: 9/10
 Revised:
 Void:

Cross Sections
 Ramp C Along US 160
 Designer: JMB Structure Numbers
 Detailer: JMB
 Sheet Subset: X-Sections Subset Sheets: 13 of 19

Project No./Code
 NH 1602-114
 16042
 Sheet Number 403


r:\p1man 2:08:22 N:\08-100-202-01\16042\Plot_Sets\As-Built\Change No. 1\Roadway\Electronic Drawings\17280 X-Sections.dgn



Print Date: 9/23/2010
File Name: 17280 X-Sections.dgn
Horiz. Scale: 1:20 Vert. Scale: As Noted
Unit Information Unit Leader Initials

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation



3803 North Main Avenue
Suite 200
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365

Region 5 EJA

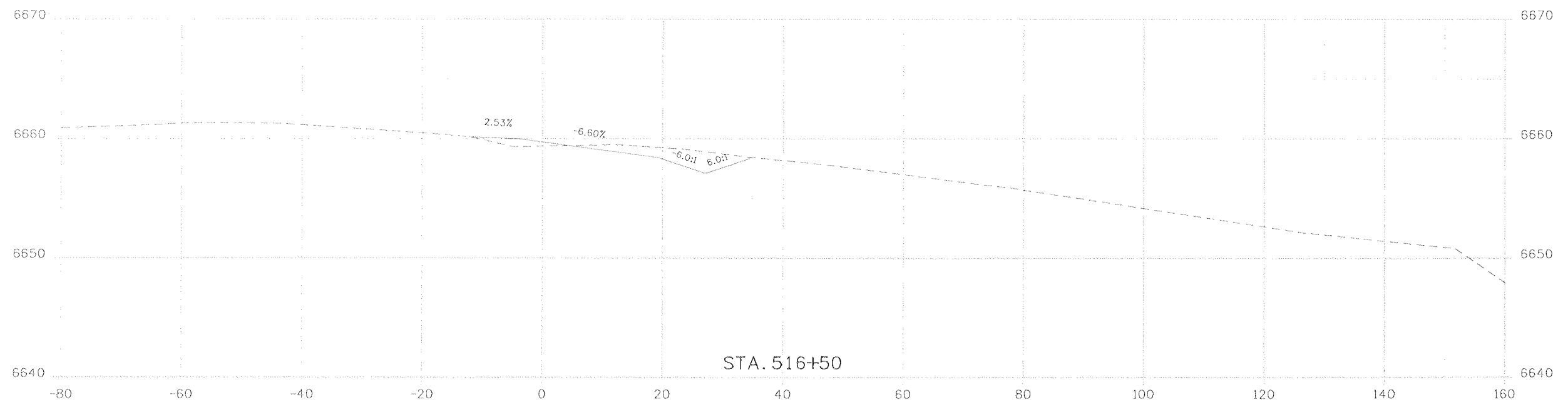
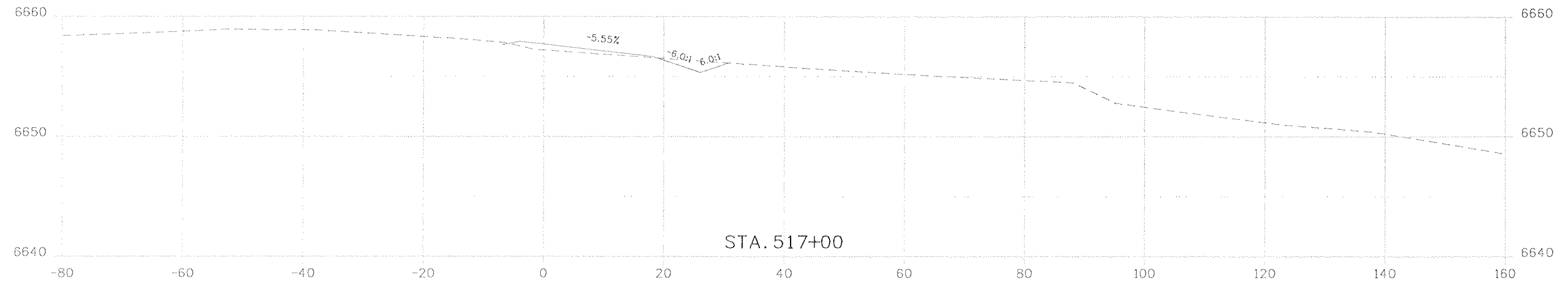
As Constructed
No Revisions: 9/10
Revised:
Void:

Cross Sections	
Ramp C Along US 160	
Designer: JMB	Structure Numbers
Detailer: JMB	
Sheet Subset: X-Sections	Subset Sheets: 14 of 19

Project No./Code
NH 1602-114
16042
Sheet Number 404

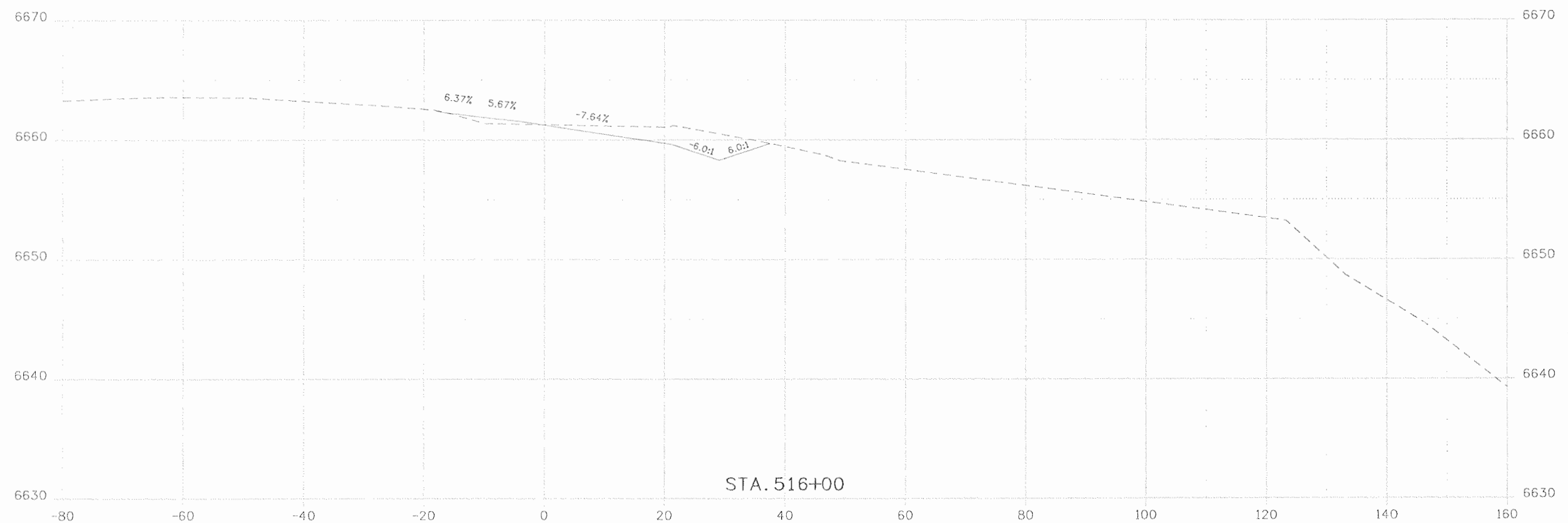
I:\08-100-302-01\16042\Plan\Set\Ag-Bulbs\Change No. 1\Roadway\Electronic Drawings\17280 X-Sr.dgn
 2:05:33

N:\06-100-302-01\16042\Plot\Set\As-Built\Change No. 1\Roadway\Electronic Drawings\17280 X-S dgn
 rjg:tan 2:06:5



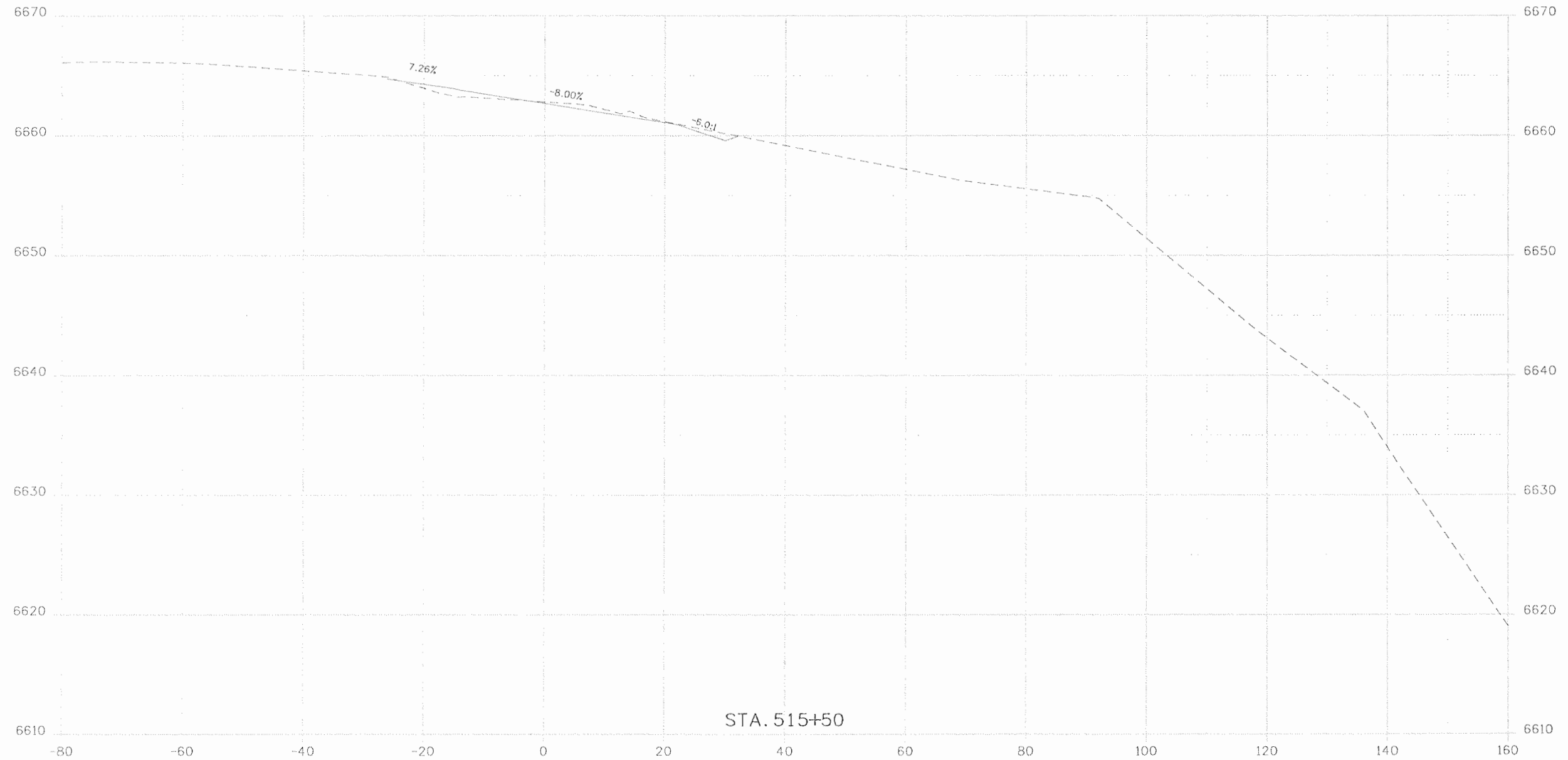
Print Date: 9/23/2010		Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5 EJA	As Constructed		Cross Sections		Project No./Code	
File Name: 17280 X-Sections.dgn		Date:	Comments	Init.		No Revisions: 9/10		Ramp C Along US 160		NH 1602-114	
Horiz. Scale: 1:20 Vert. Scale: As Noted						Revised:	Designer: JMB	Structure		16042	
Unit Information Unit Leader Initials						Void:	Detailer: JMB	Numbers		Sheet Number 405	
						Sheet Subset: X-Sections	Subset Sheets: 15 of 19				

N:\08-100-302-01\16042\Plots\Ae-Gullis\Change No. 1\Roadway\Electronic Drawings\17280 X-Sections.dgn
 rgarman 2:07:10

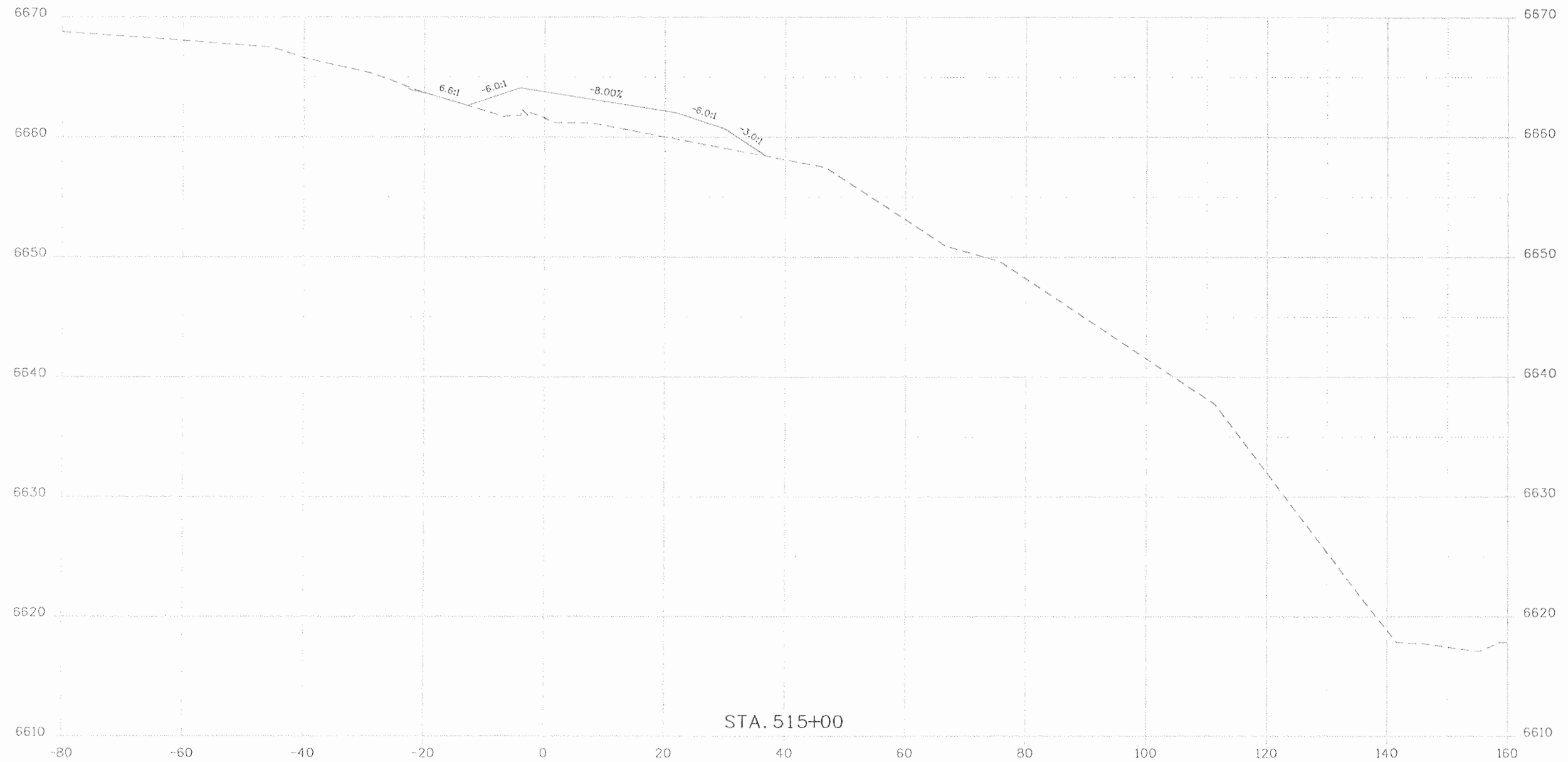


Print Date: 9/23/2010		Sheet Revisions			 Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5 EJA	As Constructed		Cross Sections		Project No./Code	
File Name: 17280 X-Sections.dgn		Date:	Comments	Init.		No Revisions: 9/10	Ramp C Along US 160		NH 1602-114		
Horiz. Scale: 1:20 Vert. Scale: As Noted						Revised:	Designer: JMB	Structure	16042		
Unit Information Unit Leader Initials						Void:	Detailer: JMB	Numbers	Sheet Number 406		
					Sheet Subset: X-Sections	Subset Sheets: 16 of 19					

N:\08-100-302-01\16042\Plot_Sets\As-Built\Electronic Drawings\17280 X-Sections.dgn
 rgarman 2:07:2



Print Date: 9/23/2010		Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5 EJA	As Constructed		Cross Sections		Project No./Code	
File Name: 17280 X-Sections.dgn		Date:	Comments	Init.		No Revisions: 9/10	Ramp C Along US 160		NH 1602-114		
Horiz. Scale: 1:20 Vert. Scale: As Noted						Revised:	Designer: JMB	Structure	16042		
Unit Information Unit Leader Initials						Void:	Detailer: JMB	Numbers	Sheet Number 407		
						Sheet Subset: X-Sections	Subset Sheets: 17 of 19				



Print Date: 9/23/2010	
File Name: 17280 X-Sections.dgn	
Horiz. Scale: 1:20	Vert. Scale: As Noted
Unit Information	Unit Leader Initials

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

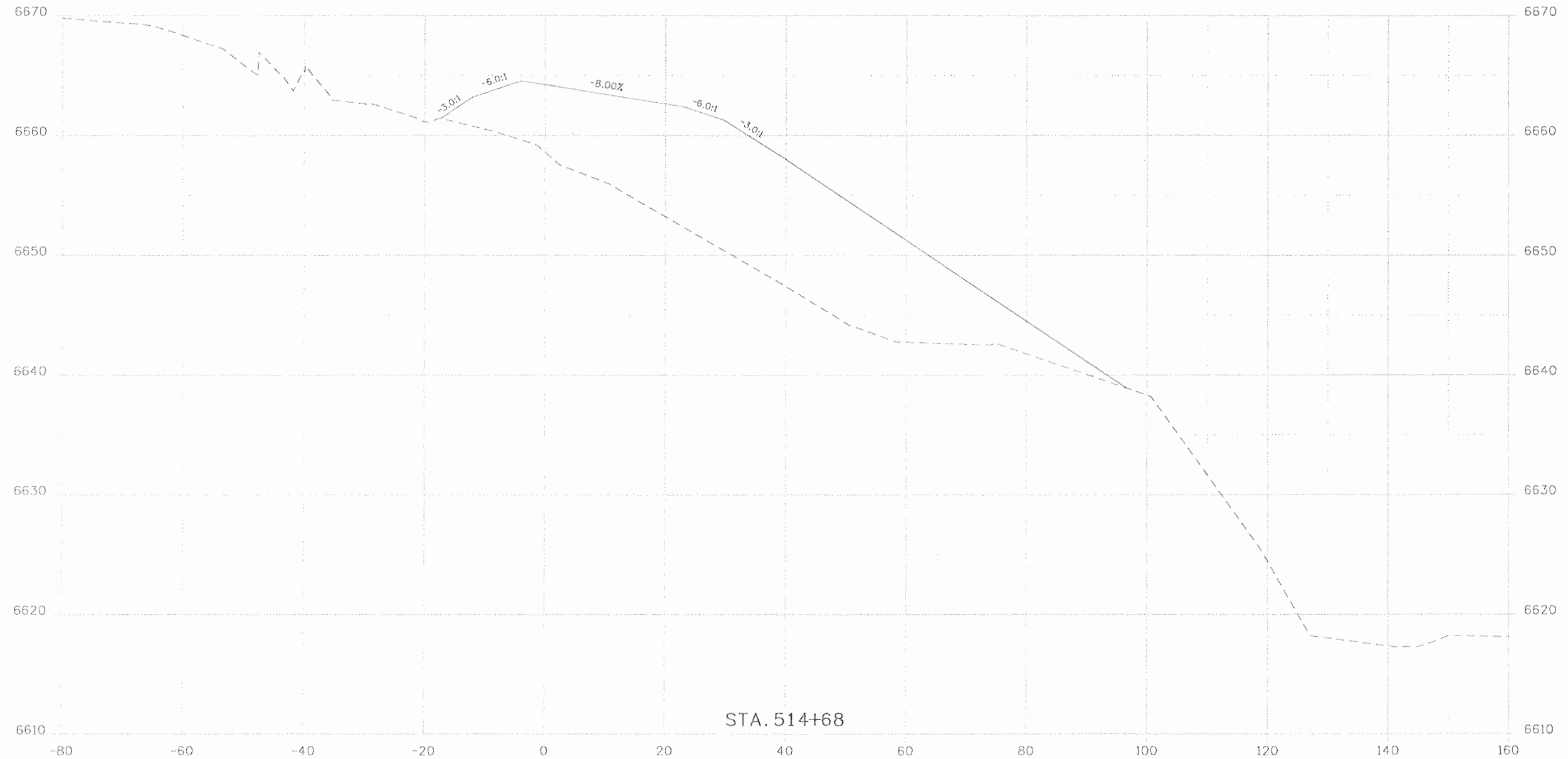
As Constructed	
No Revisions:	9/10
Revised:	
Void:	

Cross Sections Ramp C Along US 160			
Designer:	JMB	Structure	
Detailer:	JMB	Numbers	
Sheet Subset:	X-Sections	Subset Sheets:	18 of 19

Project No./Code	
NH 1602-114	
16042	
Sheet Number	408

N:\08-100-302-01\180-2\Plot\Set\As-Built\Change No. 1\Roadway\Electronic Drawings\17280 X-S .dgn
 rpartman 2:07:


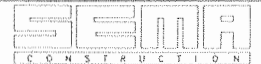
N:\08-100-302-01\160+2\Plot_Sets\As-Built\Change No. 1\Roadway\Electronic Drawings\17280 X-S.dgn
 9/23/2010 2:07:51



Print Date: 9/23/2010		Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5	As Constructed		Cross Sections		Project No./Code	
File Name: 17280 X-Sections.dgn		Date:	Comments	Init.		No Revisions: 9/10	Ramp C Along US 160		NH 1602-114		
Horiz. Scale: 1:20 Vert. Scale: As Noted						Revised:	Designer: JMB	Structure	16042		
Unit Information Unit Leader Initials						Void:	Detailer: JMB	Numbers	Sheet Number 409		
						Sheet Subset: X-Sections	Subset Sheets: 19 of 19				

SHEET NO.	INDEX OF SHEETS
D1	DRAINAGE INDEX OF SHEETS
D2	STANDARD PLANS LIST
D3	DRAINAGE QUANTITIES
D4	DRAINAGE PLAN
D5	DRAINAGE PLAN
D6	WATER QUALITY POND SECTION & DETAILS
D7	MISCELLANEOUS DRAINAGE DETAILS
D8	STRUCTURE CROSS SECTIONS
D9	STRUCTURE CROSS SECTIONS
D10	STRUCTURE CROSS SECTIONS

FINAL DESIGN PLANS

Print Date: 9/23/2010	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Sheet Revisions			 Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5	As Constructed		US 160 / US 550 DRAINAGE INDEX OF SHEETS		Project No./Code	
File Name: 17280_DN001.dgn		Date:	Comments	Init.		No Revisions: 9/10			NH-1602-114		
Horiz. Scale: 1:1 Vert. Scale: As Noted						Revised:	Designer: E. VALDEZ	Structure			
Unit Information Unit Leader: VSF						Void:	Detailer: E. VALDEZ	Numbers	16042		
 					Sheet Subset: DRAINAGE-1	Subset Sheets: D1 of D10	Sheet Number 410				

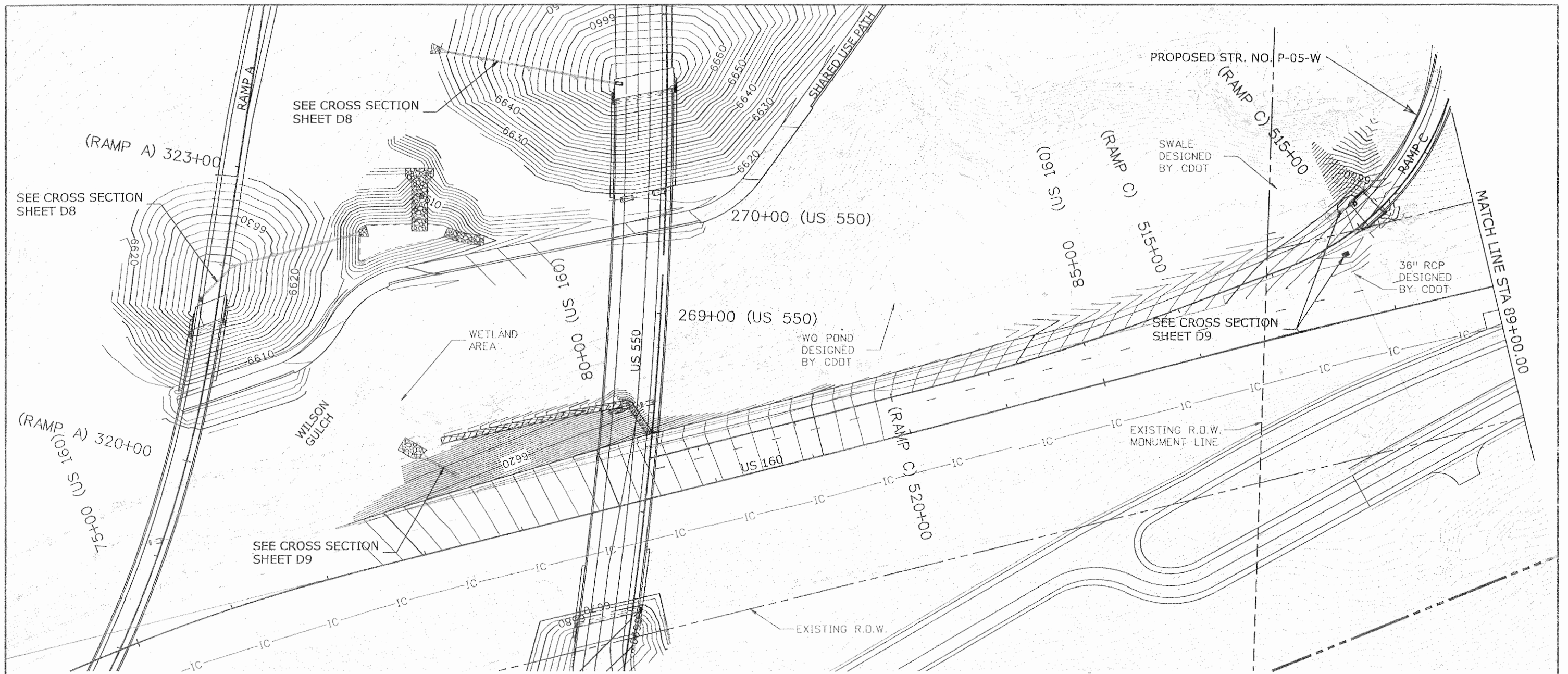
PLAN NUMBER	NEW OR REVISED	M STANDARD TITLE	PAGE NUMBER	PLAN NUMBER	NEW OR REVISED	M STANDARD TITLE	PAGE NUMBER	PLAN NUMBER	NEW OR REVISED	S STANDARD TITLE	PAGE NUMBER
<input checked="" type="checkbox"/> M-100-1	<input type="checkbox"/>	STANDARD SYMBOLS (3 SHEETS).....	1-3	<input type="checkbox"/> M-607-1	<input type="checkbox"/>	WIRE FENCES AND GATES (3 SHEETS).....	84-86	<input type="checkbox"/> S-612-1	<input type="checkbox"/>	DELINEATOR INSTALLATIONS (5 SHEETS).....	131-135
<input type="checkbox"/> M-203-1	<input type="checkbox"/>	APPRDACH ROADS	4	<input type="checkbox"/> M-607-2	<input type="checkbox"/>	CHAIN LINK FENCE (3 SHEETS).....	87-89	<input type="checkbox"/> S-614-1	<input type="checkbox"/>	GROUND SIGN PLACEMENT (2 SHEETS).....	136-137
<input checked="" type="checkbox"/> M-203-2	<input type="checkbox"/>	DITCH TYPES.....	5	<input type="checkbox"/> M-607-3	<input type="checkbox"/>	BARRIER FENCE.....	90	<input type="checkbox"/> S-614-2	<input type="checkbox"/>	CLASS I SIGNS.....	138
<input type="checkbox"/> M-203-11	<input type="checkbox"/>	SUPERELEVATION CROWNED AND DIVIDED HIGHWAYS (3 SHEETS).....	6-8	<input type="checkbox"/> M-607-4	<input type="checkbox"/>	DEER FENCE AND GATES (2 SHEETS).....	91-92	<input type="checkbox"/> S-614-3	<input type="checkbox"/>	CLASS II SIGNS.....	139
<input type="checkbox"/> M-203-12	<input type="checkbox"/>	SUPERELEVATION STREETS (2 SHEETS).....	9-10	<input type="checkbox"/> M-607-10	<input type="checkbox"/>	PICKET SNOW FENCE	93	<input type="checkbox"/> S-614-4	<input type="checkbox"/>	CLASS III SIGNS (3 SHEETS).....	140-142
<input checked="" type="checkbox"/> M-206-1	<input type="checkbox"/>	EXCAVATION AND BACKFILL FOR STRUCTURES (2 SHEETS).....	11-12	<input type="checkbox"/> M-607-15	<input type="checkbox"/>	ROAD CLOSURE GATE (9 SHEETS).....	94-102	<input type="checkbox"/> S-614-5	<input type="checkbox"/>	BREAK-AWAY SIGN SUPPORT DETAILS FOR GROUND SIGNS (2 SHEETS).....	143-144
<input type="checkbox"/> M-206-2	<input type="checkbox"/>	EXCAVATION AND BACKFILL FOR BRIDGES (2 SHEETS).....	13-14	<input type="checkbox"/> M-608-1	<input type="checkbox"/>	CURB RAMPS (4 SHEETS).....	103-106	<input type="checkbox"/> S-614-6	<input type="checkbox"/>	CONCRETE FOOTINGS AND SIGN ISLANDS FOR CLASS III SIGNS (2 SHEETS).....	145-146
<input type="checkbox"/> M-208-1	<input type="checkbox"/>	TEMPORARY EROSION CONTROL (7 SHEETS).....	15-21	<input type="checkbox"/> M-609-1	<input type="checkbox"/>	CURBS, GUTTERS, AND SIDEWALKS (3 SHEETS).....	107-109	<input type="checkbox"/> S-614-8	<input type="checkbox"/>	TUBULAR STEEL SIGN SUPPORT DETAILS (5 SHEETS).....	147-151
<input type="checkbox"/> M-210-1	<input type="checkbox"/>	MAILBOX SUPPORTS (2 SHEETS).....	22-23	<input type="checkbox"/> M-611-1	<input type="checkbox"/>	CATTLE GUARD (2 SHEETS).....	110-111	<input type="checkbox"/> S-614-10	<input type="checkbox"/>	MARKER ASSEMBLY INSTALLATIONS	152
<input type="checkbox"/> M-214-1	<input type="checkbox"/>	PLANTING DETAILS.....	24	<input type="checkbox"/> M-613-1	<input type="checkbox"/>	ROADWAY LIGHTING (4 SHEETS).....	112-115	<input type="checkbox"/> S-614-12	<input type="checkbox"/>	STRUCTURE NUMBER INSTALLATION	153
<input type="checkbox"/> M-412-1	<input type="checkbox"/>	CONCRETE PAVEMENT JOINTS (5 SHEETS).....	25-29	<input type="checkbox"/> M-614-1	<input type="checkbox"/>	RUMBLE STRIPS (3 SHEETS).....	116-118	<input type="checkbox"/> S-614-14	<input type="checkbox"/>	FLASHING BEACON AND SIGN INSTALLATIONS (3 SHEETS).....	154-156
<input type="checkbox"/> M-510-1	<input type="checkbox"/>	STRUCTURAL PLATE PIPE H-20 LOADING.....	30	<input type="checkbox"/> M-614-2	<input type="checkbox"/>	SAND BARREL ARRAYS (2 SHEETS).....	119-120	<input type="checkbox"/> S-614-20	<input type="checkbox"/>	TYPICAL POLE MOUNT SIGN INSTALLATIONS.....	157
<input type="checkbox"/> M-601-1	<input type="checkbox"/>	SINGLE CONCRETE BOX CULVERT (2 SHEETS).....	31-32	<input type="checkbox"/> M-615-1	<input type="checkbox"/>	EMBANKMENT PROTECTOR TYPE 3.....	121	<input type="checkbox"/> S-614-21	<input type="checkbox"/>	CONCRETE BARRIER SIGN POST INSTALLATIONS.....	158
<input type="checkbox"/> M-601-2	<input type="checkbox"/>	DOUBLE CONCRETE BOX CULVERT (2 SHEETS).....	33-34	<input checked="" type="checkbox"/> M-615-2	<input type="checkbox"/>	EMBANKMENT PROTECTOR TYPE 5.....	122	<input type="checkbox"/> S-614-22	<input type="checkbox"/>	TYPICAL MULTI-SIGN INSTALLATIONS.....	159
<input type="checkbox"/> M-601-3	<input type="checkbox"/>	TRIPLE CONCRETE BOX CULVERT (2 SHEETS).....	35-36	<input type="checkbox"/> M-616-1	<input type="checkbox"/>	INVERTED SIPHON.....	123	<input type="checkbox"/> S-614-40	<input type="checkbox"/>	TYPICAL TRAFFIC SIGNAL INSTALLATION DETAILS (7 SHEETS).....	160-166
<input type="checkbox"/> M-601-10	<input type="checkbox"/>	HEADWALL FOR PIPES.....	37	<input type="checkbox"/> M-620-1	<input type="checkbox"/>	FIELD LABORATORY CLASS 1.....	124	<input type="checkbox"/> S-614-40A	<input type="checkbox"/>	ALTERNATIVE TRAFFIC SIGNAL INSTALLATION DETAILS (5 SHEETS).....	167-171
<input type="checkbox"/> M-601-11	<input type="checkbox"/>	TYPE "S" SADDLE HEADWALLS FOR PIPE.....	38	<input type="checkbox"/> M-620-2	<input type="checkbox"/>	FIELD LABORATORY CLASS 2	125	<input type="checkbox"/> S-614-50	<input type="checkbox"/>	MONOTUBE OVERHEAD SIGNS (14 SHEETS).....	172-185
<input type="checkbox"/> M-601-12	<input type="checkbox"/>	HEADWALLS AND PIPE OUTLET PAVING	39	<input type="checkbox"/> M-620-11	<input type="checkbox"/>	FIELD OFFICE CLASS 1.....	126	<input type="checkbox"/> S-627-1	<input type="checkbox"/>	PAVEMENT MARKINGS (5 SHEETS).....	186-190
<input type="checkbox"/> M-601-20	<input type="checkbox"/>	WINGWALLS FOR PIPE OR BOX CULVERTS.....	40	<input type="checkbox"/> M-620-12	<input type="checkbox"/>	FIELD OFFICE CLASS 2.....	127	<input type="checkbox"/> S-630-1	<input type="checkbox"/>	TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION (12 SHEETS) REVISED ON 03/05/07.....	191-202
<input type="checkbox"/> M-603-1	<input type="checkbox"/>	METAL AND PLASTIC PIPE (2 SHEETS).....	41-42	<input type="checkbox"/> M-629-1	<input type="checkbox"/>	SURVEY MONUMENTS (2 SHEETS).....	128-129	<input type="checkbox"/> S-630-2	<input type="checkbox"/>	BARRICADES, DRUMS, CONCRETE BARRIERS (TEMP) AND VERTICAL PANELS.....	203
<input checked="" type="checkbox"/> M-603-2	<input type="checkbox"/>	REINFORCED CONCRETE PIPE.....	43					<input type="checkbox"/> S-630-3	<input type="checkbox"/>	FLASHING BEACON (PORTABLE) DETAILS.....	204
<input type="checkbox"/> M-603-3	<input type="checkbox"/>	PRECAST CONCRETE BOX CULVERT.....	44								
<input checked="" type="checkbox"/> M-603-10	<input type="checkbox"/>	CONCRETE AND METAL END SECTIONS (2 SHEETS).....	45-46								
<input type="checkbox"/> M-604-10	<input type="checkbox"/>	INLET, TYPE C.....	47								
<input checked="" type="checkbox"/> M-604-11	<input type="checkbox"/>	INLET, TYPE D.....	48								
<input type="checkbox"/> M-604-12	<input type="checkbox"/>	CURB INLET TYPE R (2 SHEETS).....	49-50								
<input type="checkbox"/> M-604-13	<input type="checkbox"/>	CONCRETE INLET TYPE 13.....	51								
<input checked="" type="checkbox"/> M-604-20	<input type="checkbox"/>	MANHOLES (3 SHEETS).....	52-54								
<input checked="" type="checkbox"/> M-604-25	<input type="checkbox"/>	VANE GRATE INLET (5 SHEETS).....	55-59								
<input type="checkbox"/> M-605-1	<input type="checkbox"/>	SUBSURFACE DRAINS	60								
<input type="checkbox"/> M-606-1	<input type="checkbox"/>	GUARDRAIL TYPE 3 W-BEAM (16 SHEETS).....	61-76								
<input type="checkbox"/> M-606-13	<input type="checkbox"/>	GUARDRAIL TYPE 7 F-SHAPE BARRIER (4 SHEETS).....	77-80								
<input type="checkbox"/> M-606-14	<input type="checkbox"/>	PRECAST TYPE 7 CONCRETE BARRIER (3 SHEETS).....	81-83								

THE STANDARD PLAN SHEETS INDICATED HEREON BY A MARKED BOX ARE TO BE USED TO CONSTRUCT THIS PROJECT.

ALL OF THE M&S STANDARD PLANS, AS SUPPLEMENTED AND REVISED, APPLY TO THIS PROJECT WHEN USED BY DESIGNATED PAY ITEM OR SUBSIDIARY ITEM.

COLORADO
DEPARTMENT OF TRANSPORTATION
STANDARD PLANS LIST
M&S STANDARDS
July 04, 2006

Print Date: 9/23/2010	Sheet Revisions			Colorado Department of Transportation		As Constructed		STANDARD PLANS LIST		Project No./Code	
File Name: 17280_G002.dgn	Date:	Comments	Init.	3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365		No Revisions: 9/10				NH-1602-114	
Horiz. Scale: 1:1				Region 5		Revised:		Designer: E. VALDEZ		16042	
Unit Information				EJA		Void:		Detailer: E. VALDEZ		Sheet Number 411	
						Sheet Subset: DRAINAGE-1		Structure Numbers		Subset Sheets: D2 of D10	



NOTE:
PROTECT WETLAND AREAS WHERE CONSTRUCTION IS NOT ALLOWED AND THAT ARE ADJACENT TO CONSTRUCTION ZONES, WITH ORANGE PLASTIC FENCING AND BMPS AS OUTLINED IN THE STORMWATER MANAGEMENT PLAN FOR THE PROJECT.

STA. 321+62.4, 19' LT (RAMP A)
REQUIRED: BUILD 3" VANE GRATE INLET PER M-604-25, PLACE 171 LF 24" RCP W/ PRE-FAB. VERTICAL BEND AND FES AT DOWNSTREAM END AND 4.5 CY D₅₀=9" RIPRAP AND 14 SY CLASS 'A' EROSION CONTROL GEOTEXTILE OUTLET PROTECTION. INSTALL 4' DIAMETER MANHOLE PER M-604-20.
SEE CROSS SECTION SHEET D8.

STA. 322+24, RT (RAMP A)
REQUIRED: CONSTRUCT WQ POND. MODIFY EXISTING DROP INLET BY CORE DRILLING A 3" DIAMETER WQ ORIFICE. SEE WATER QUALITY POND SHEET D6.

STA. 322+63, 187.8' RT TO STA. 323+26, 178.2' RT (RAMP A)
LINE TRAPEZOIDAL DITCH WITH 16' WIDE, 3' THICK D₅₀=18" RIPRAP (130 CY) AND 190 SY CLASS 'A' EROSION CONTROL GEOTEXTILE. SEE WATER QUALITY POND SHEET D6

STA. 322+66.6, 214.2' RT TO STA. 322+63.7, 253.0' RT (RAMP A)
LINE DITCH WITH 10' WIDE, 3' THICK D₅₀=18" RIPRAP (45 CY) AND 78 SY CLASS 'A' EROSION CONTROL GEOTEXTILE. SEE WATER QUALITY POND SHEET D6

STA. 78+47, 71.1' LT (US 160)
REQUIRED: REMOVE EXISTING CMP END SECTION.
INSTALL 4' DIAMETER MANHOLE PER M-604-20, PLACE 50 LF 30" RCP W/ FES DOWNSTREAM AND 27 CY D₅₀=12" RIPRAP AND 58 SY CLASS 'A' EROSION CONTROL GEOTEXTILE FOR OUTLET PROTECTION. SEE CROSS SECTION SHEET D9.

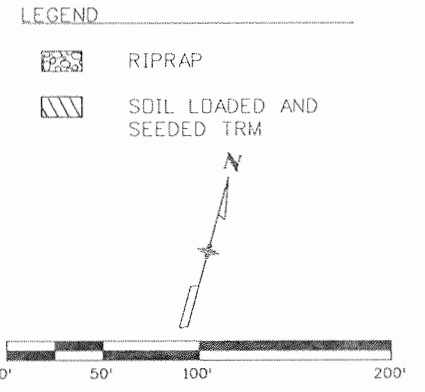
STA. 78+43.0, 106.9' LT TO STA. 80+26, 98.9' LT (US 160)
REQUIRED: LINE 18" DEEP V DITCH/BERM WITH 6' WIDE SOIL LOADED AND SEEDED TRM. SEE DETAIL SHEET D7

STA. 80+46.85, 62.6' LT (US 160)
REQUIRED: BUILD EMBANKMENT PROTECTOR TYPE 5 W/ CONCRETE PAVING PER M-615-2, PLACE 7 CY D₅₀=9" RIPRAP AND 22 SY CLASS 'A' EROSION CONTROL GEOTEXTILE OUTLET PROTECTION. SEE DETAIL SHEET D7.

STA. 271+30.9, 51.5' LT (US 550)
REQUIRED: BUILD APPROACH SLAB INLET WITH 6' VANE GRATE. SEE BRIDGE SHEET B8.
PLACE 179.5 LF 24" RCP WITH PRE-FAB. VERTICAL BEND AND FES AT DOWNSTREAM END AND 6 CY D₅₀=12" RIPRAP AND 25 SY CLASS 'A' EROSION CONTROL GEOTEXTILE OUTLET PROTECTION. SEE CROSS SECTION SHEET D8.

STA. 514+88.2, 22.5' RT (RAMP C)
REQUIRED: BUILD APPROACH SLAB INLET WITH 3" WIDE VANE GRATE. SEE BRIDGE SHEET B8.
PLACE 26 LF 24" RCP AND INSTALL 6' DIAMETER MANHOLE PER M-604-20 WITHIN CDDT DESIGNED 36" RCP STORM DRAIN. SEE SHEET D9.

STA. 515+26.9, 14.7' LT (RAMP C)
REQUIRED: INSTALL TYPE 'D' INLET PER M-604-11, CENTERED ON CDDT DESIGNED 36" RCP STORM DRAIN. SEE CROSS SECTION SHEET D9.



Print Date: 9/28/2010
File Name: 17280_DP201.dgn
Horiz. Scale: 1:100
Unit Information
Unit Leader: VSF

SEMA CONSTRUCTION
WILSON & COMPANY

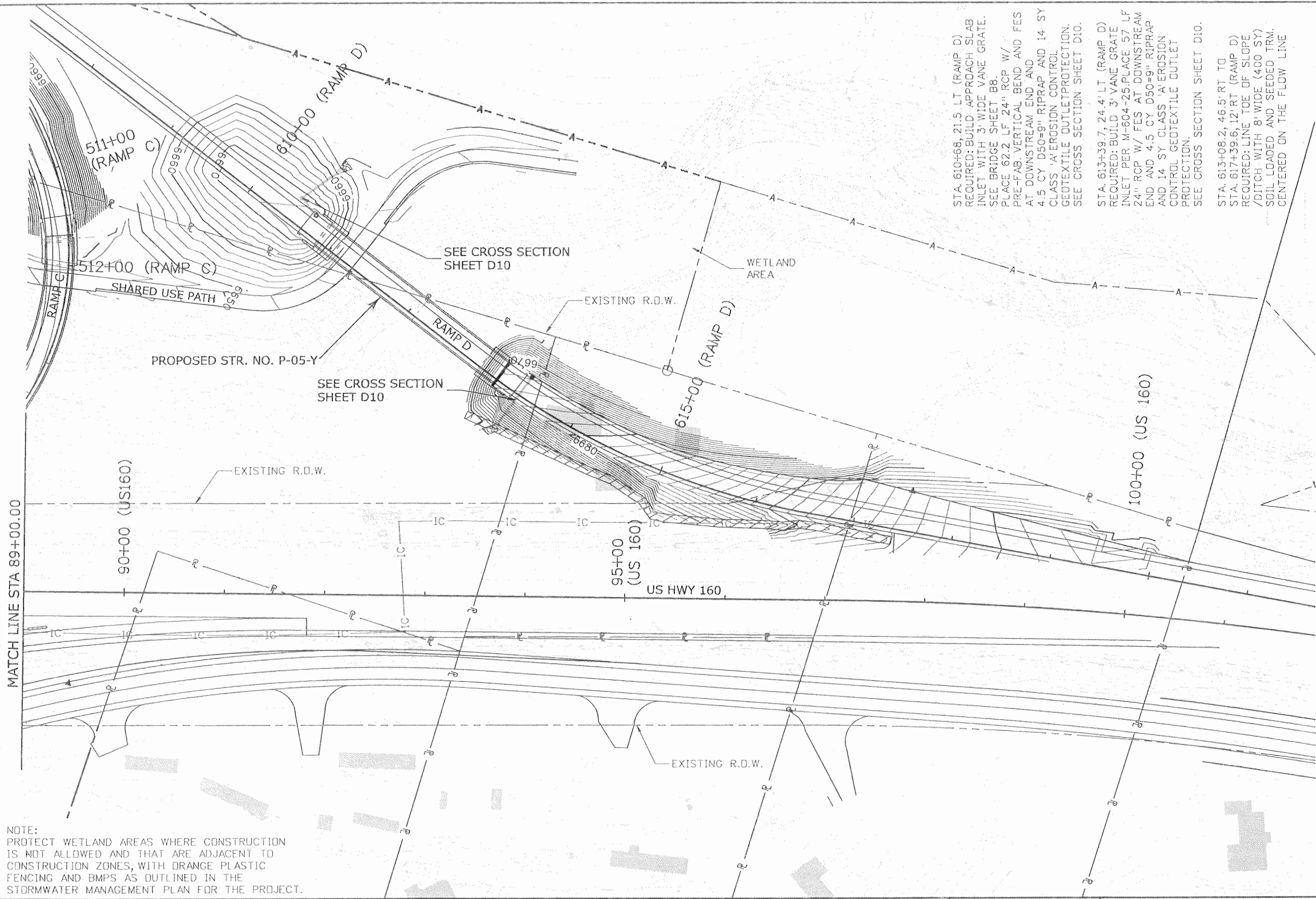
Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
3803 North Main Avenue
Suite 200
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365
Region 5 EJA

As Constructed	No Revisions: 9/10
Revised:	
Void:	

US 160 - DRAINAGE PLAN RAMP A, US 550, RAMP C & US 160	
Designer: E. VALDEZ	Structure Numbers
Detailer: E. VALDEZ	
Sheet Subset: DRAINAGE-1	Subset Sheets: D4 of D10

Project No./Code	NH-1602-114
	16042
Sheet Number	413



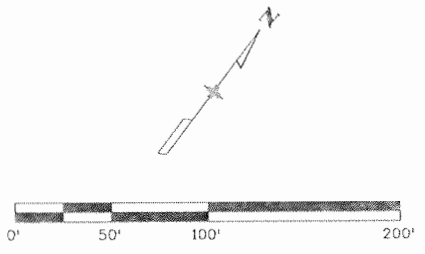
STA. 610+68, 21.5' LT. (RAMP D)
 REQUIRED: BUILD APPROACH SLAB
 INLET WITH 3' WIDE VANE GRATE.
 SEE BRIDGE SHEET BB.
 PLACE 62.2 LF 24" RCP W/
 PRE-FAB. VERTICAL BEND AND FES
 AT DOWNSTREAM END AND
 4.5 CY D50=9" RIPRAP AND 14' SY
 CLASS 'A' EROSION CONTROL
 GEOTEXTILE OUTLET PROTECTION.
 SEE CROSS SECTION SHEET D10.

STA. 613+39.7, 24.4' LT. (RAMP D)
 REQUIRED: BUILD 3' VANE GRATE
 INLET PER M-604-25. PLACE 57 LF
 24" RCP W/ FES AT DOWNSTREAM
 END AND 4.5 CY D50=9" RIPRAP
 AND 14' SY CLASS 'A' EROSION
 CONTROL GEOTEXTILE OUTLET
 PROTECTION.
 SEE CROSS SECTION SHEET D10.

STA. 617+39.6, 12' RT. (RAMP D)
 REQUIRED: LINE TOE OF SLOPE
 /DITCH WITH 8' WIDE (400 SY)
 SOIL LOADED AND SEEDED TRM.
 CENTERED ON THE FLOW LINE

LEGEND

- RIPRAP
- SOIL LOADED AND SEEDED TRM



NOTE:
 PROTECT WETLAND AREAS WHERE CONSTRUCTION
 IS NOT ALLOWED AND THAT ARE ADJACENT TO
 CONSTRUCTION ZONES, WITH ORANGE PLASTIC
 FENCING AND BMPs AS OUTLINED IN THE
 STDRM WATER MANAGEMENT PLAN FOR THE PROJECT.

Print Date: 9/28/2010
File Name: 17280_DP202.dgn
Horiz. Scale: 1:100 Vert. Scale: As Noted
Unit Information Unit Leader: VSF

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation

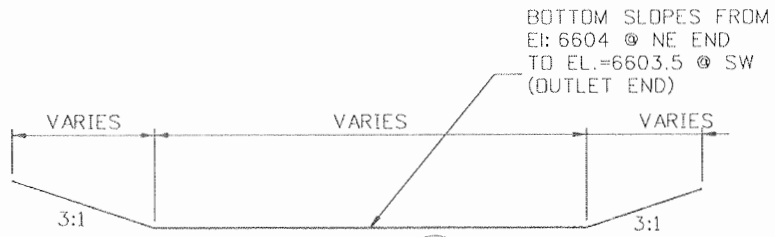
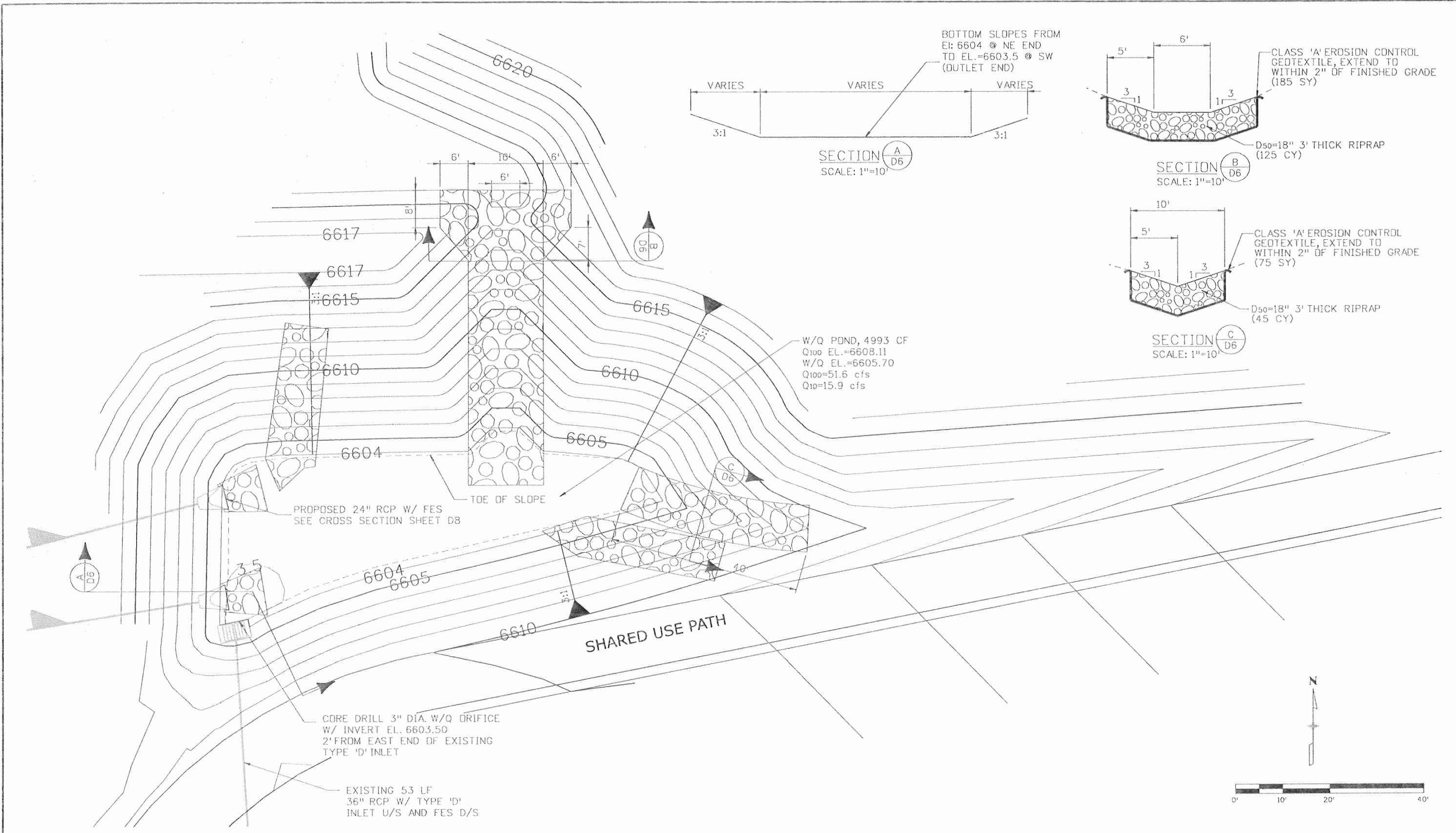
3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365

Region 5 EJA

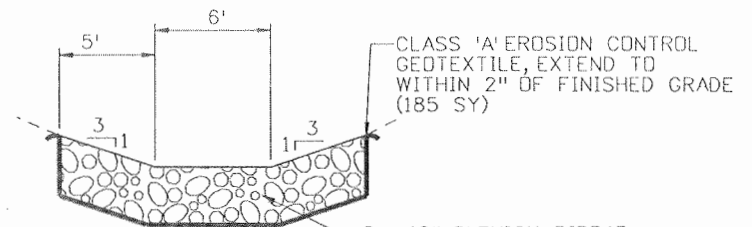
As Constructed
No Revisions: 9/10
Revised:
Void:

US 160 - DRAINAGE PLAN	
RAMP D	
Designer: E. VALDEZ	Structure Numbers
Detailer: E. VALDEZ	
Sheet Subset: DRAINAGE-1	Subset Sheets: D5 of D10

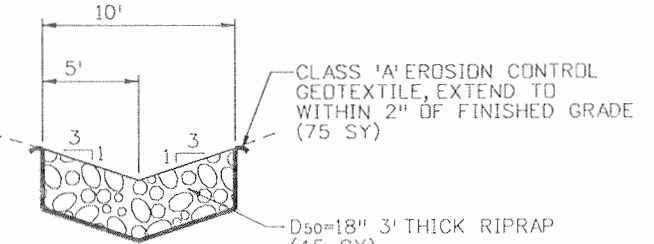
Project No./Code
NH-1602-114
16042
Sheet Number 414



SECTION **A**
 D6
 SCALE: 1"=10'



SECTION **B**
 D6
 SCALE: 1"=10'



SECTION **C**
 D6
 SCALE: 1"=10'

Print Date: 9/28/2010
 File Name: 17280_DD201.dgn
 Horiz. Scale: 1:20
 Unit Information
 Vert. Scale: As Noted
 Unit Leader VSF

Sheet Revisions		
Date:	Comments	Init.

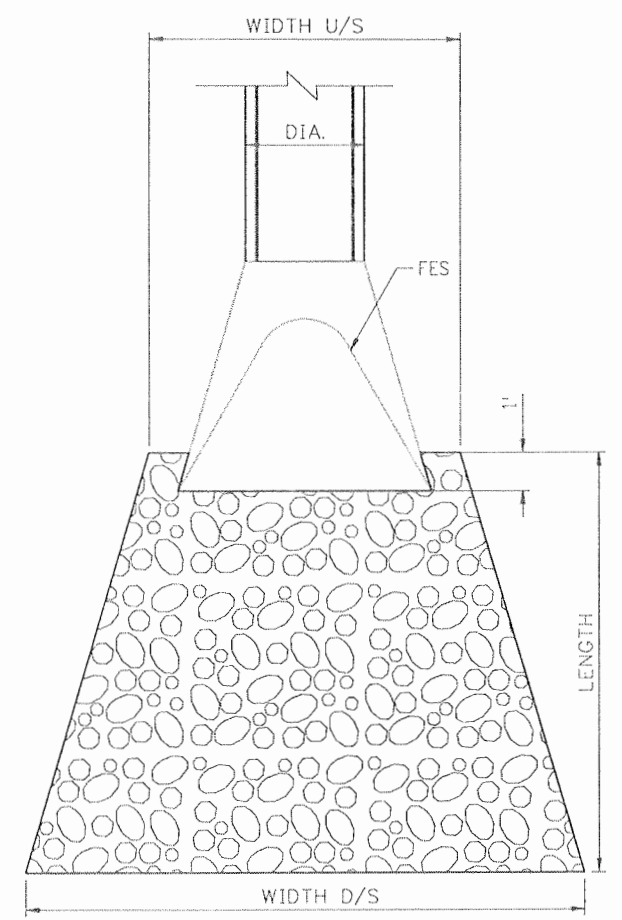
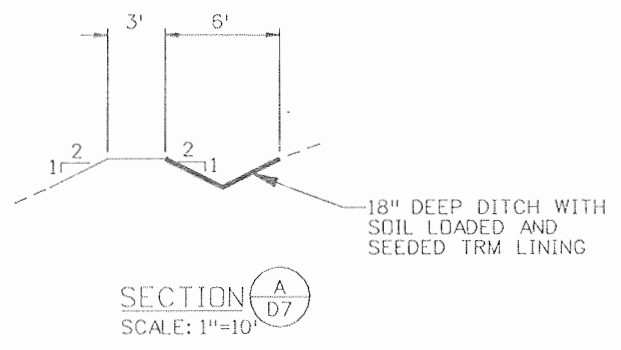
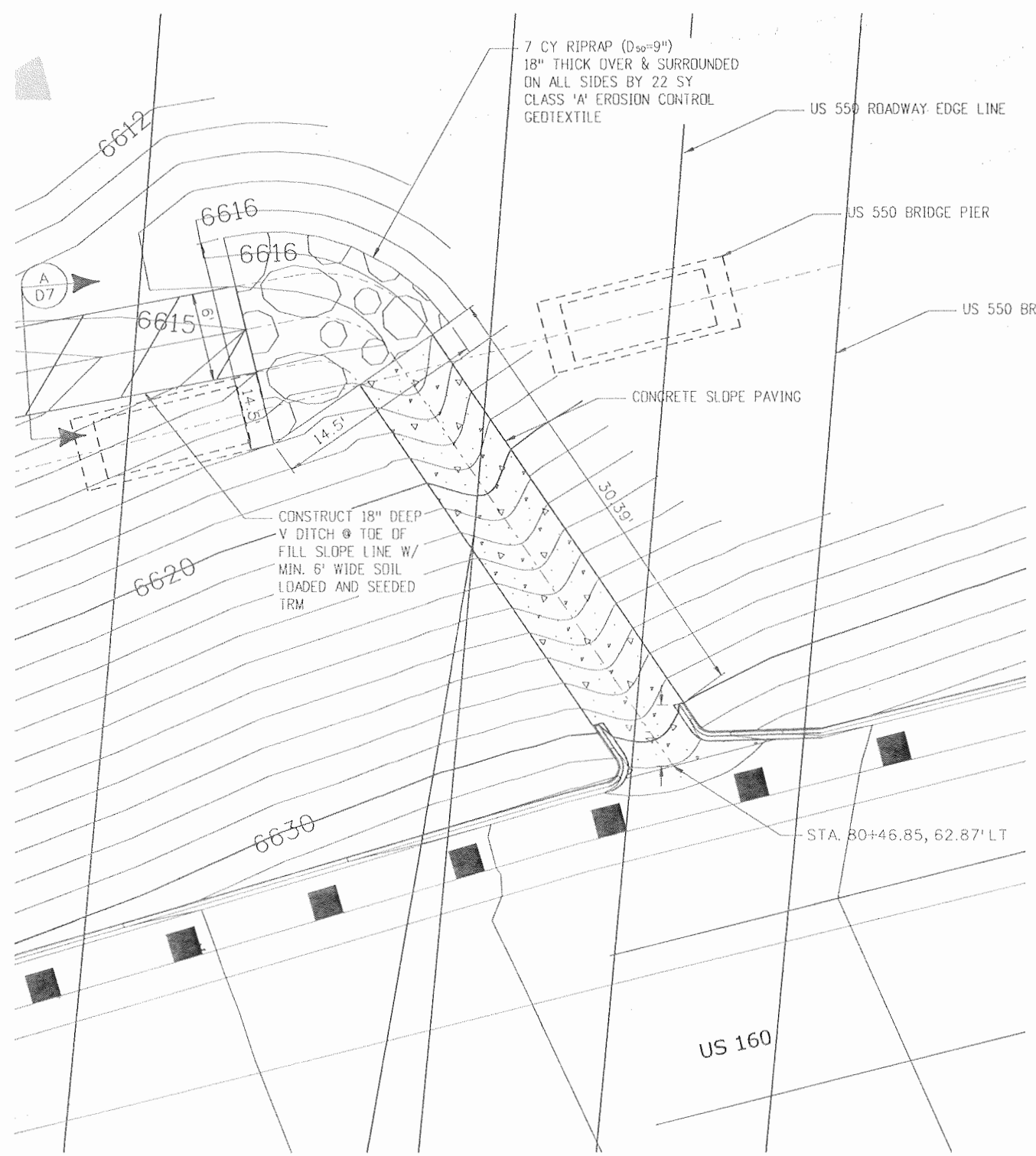
Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

As Constructed
 No Revisions: 9/10
 Revised:
 Void:

WATER QUALITY POND
 SECTION & DETAILS
 Designer: E. VALDEZ
 Detailer: E. VALDEZ
 Sheet Subset: DRAINAGE-1
 Structure Numbers
 Subset Sheets: D6 of D10

Project No./Code
 NH-1602-114
 16042
 Sheet Number 415





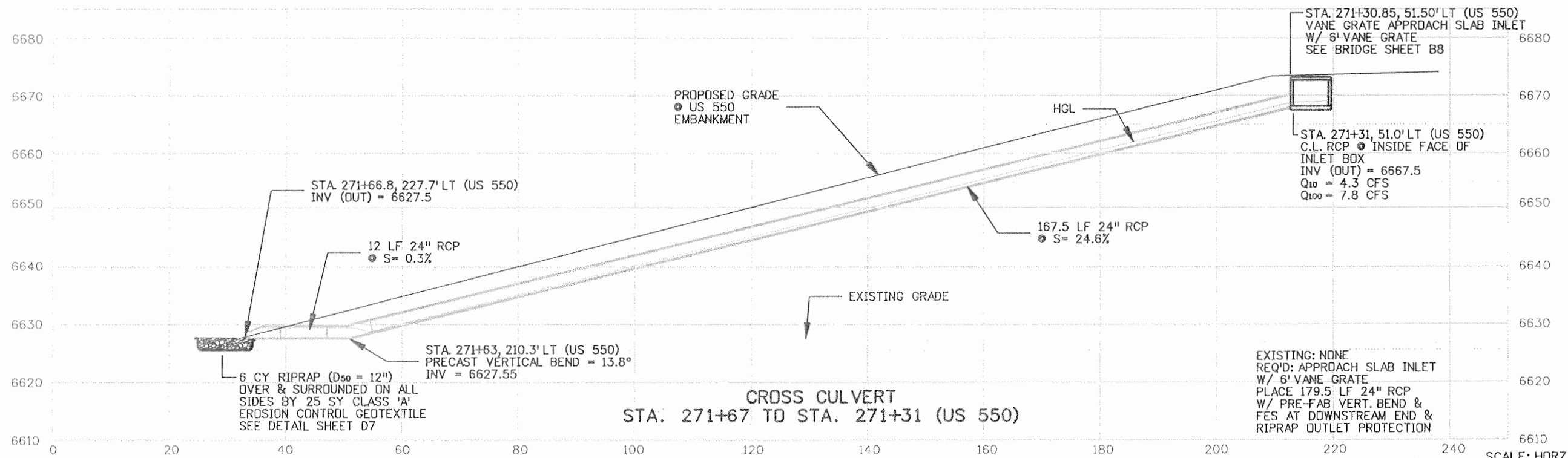
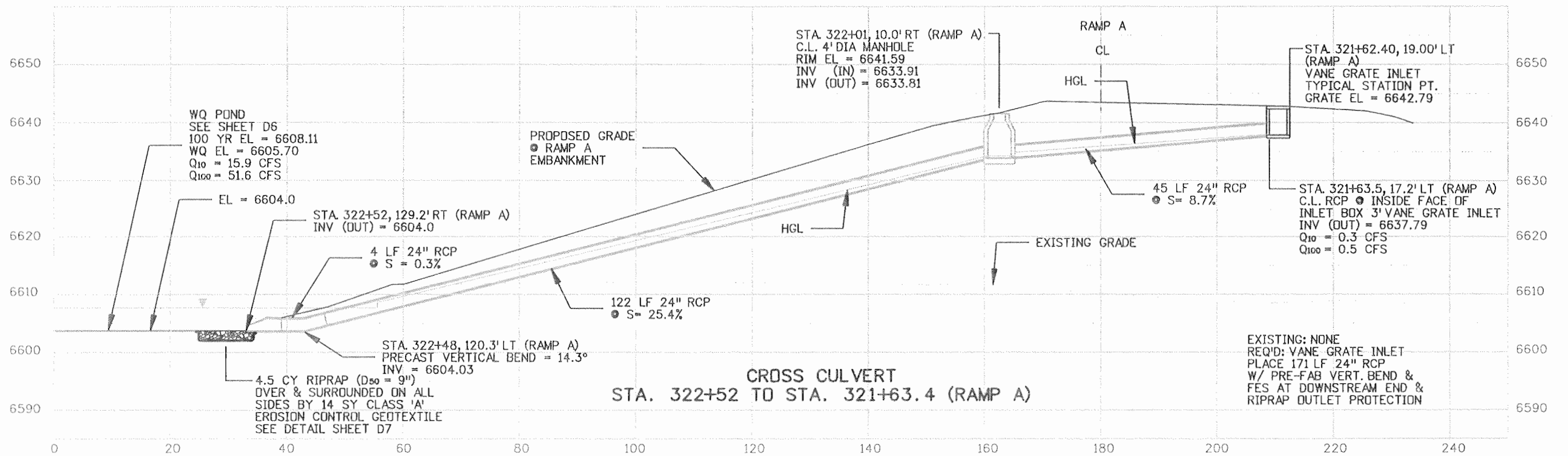
TYPICAL RIPRAP APRON LAYOUT
SCALE: 1"=5'

Location	Station	Diameter	D ₅₀	Length	Width U/S	Width D/S	Depth	Total Volume	Geotextile
		ft.	in.	ft.	ft.	ft.	ft.	yd ³	yd ²
Ramp A	322+52, 129.2' RT	2	9	9	6	10.5	1.50	4.5	14
Ramp S50	271+67, 227.7' LT	2	12	9	6	10.5	2.00	6.0	25
Ramp D D/S	610+60, 72.2' LT	2	9	9	6	10.5	1.50	4.5	14
Ramp D U/S	613+36, 41.0' RT	2	9	9	6	10.5	1.50	4.5	14

RIPRAP APRON DATA

EMBANKMENT PROTECTOR TYPE 5
STA. 80+46.85 (US-160)
SCALE: 1"=10'

Print Date: 9/28/2010	Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365	As Constructed		MISCELLANEOUS DRAINAGE DETAILS		Project No./Code		
File Name: 17280_DD101.dgn	Date:	Comments	Init.		No Revisions: 9/10			NH-1602-114			
Horiz. Scale: 1:10					Revised:	Designer: E. VALDEZ		Structure		16042	
Unit Information					Void:	Detailer: E. VALDEZ		Numbers		Sheet Number 416	
Unit Leader: VSF				Region 5	EJA		Sheet Subset: DRAINAGE-1		Subset Sheets: D7 of D10		



SCALE: HORZ. 1"=20'
VERT. 1"=20'

Print Date: 9/28/2010
File Name: 16042_Dr-section1.dgn
Horiz. Scale: 1:20
Vert. Scale: As Noted
Unit Information
Unit Leader Initials

SEMA
CONSTRUCTION

WILSON
& COMPANY

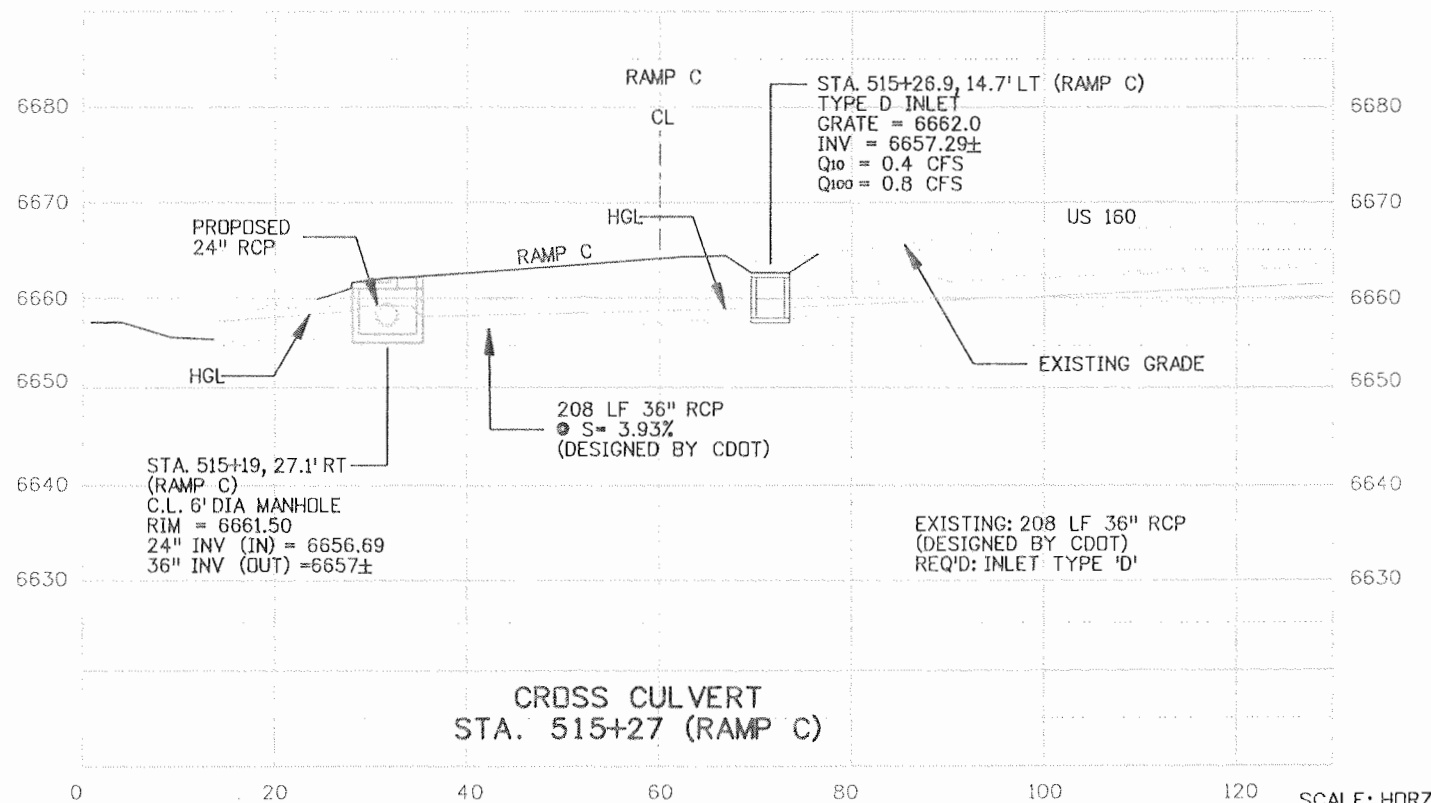
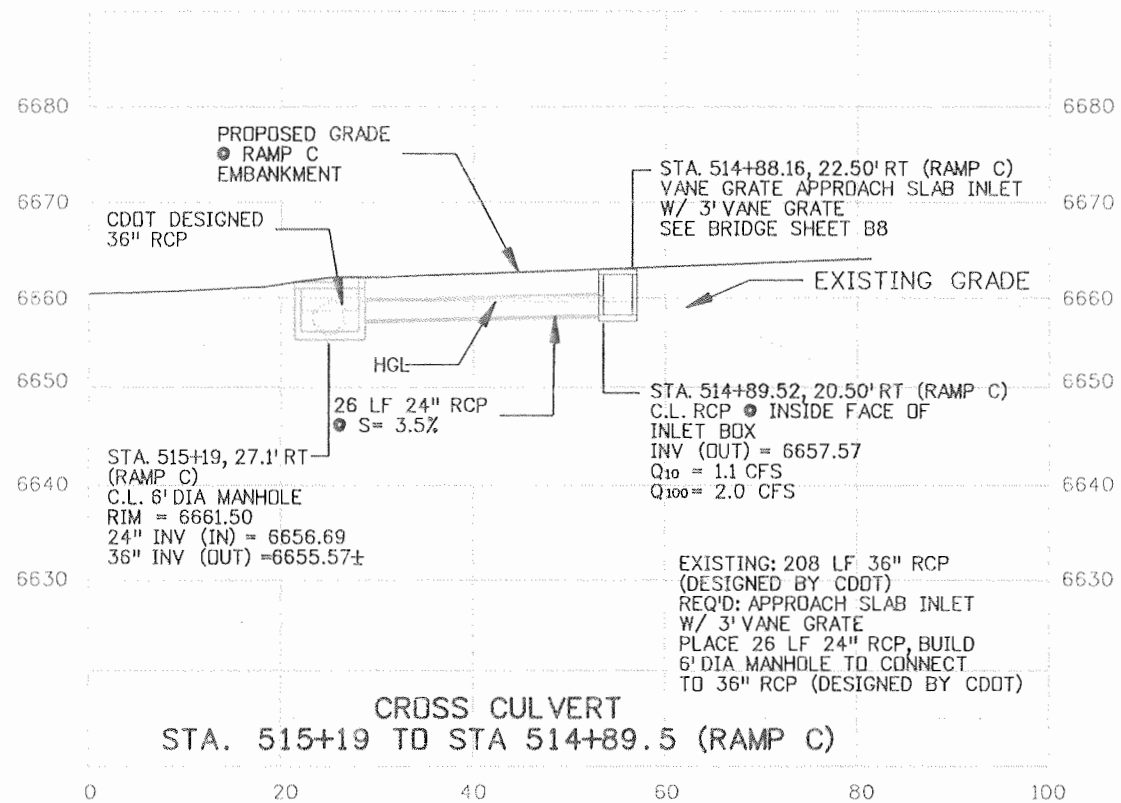
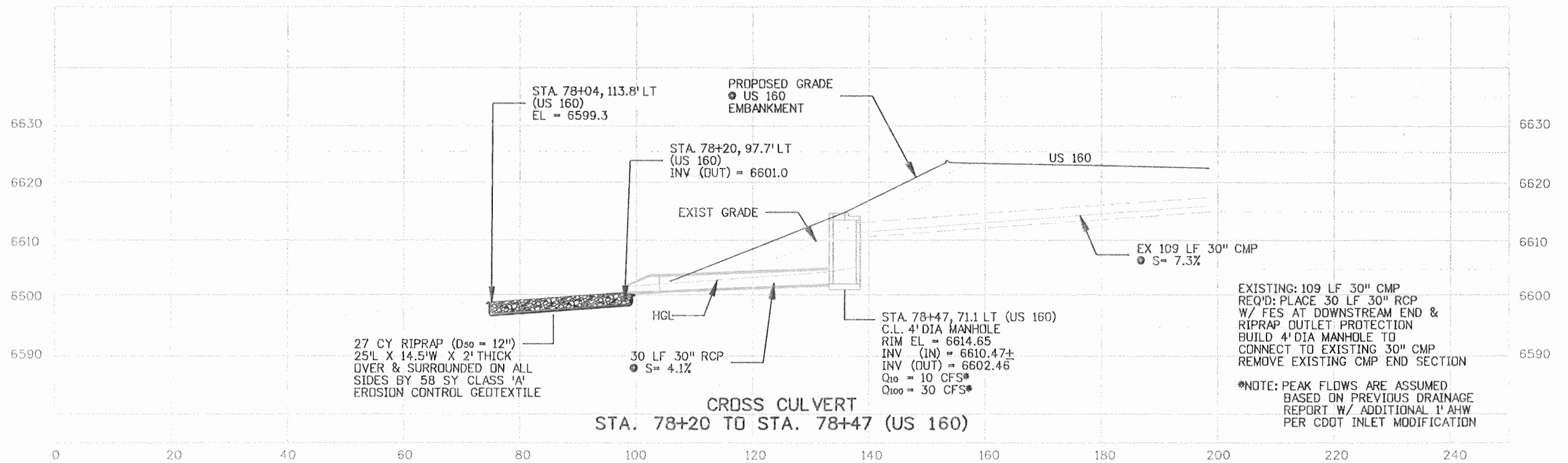
Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
3803 North Main Avenue
Suite 200
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365
Region 5 EJA


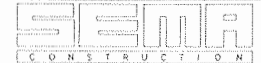

As Constructed	No Revisions: 9/10
Revised:	
Void:	

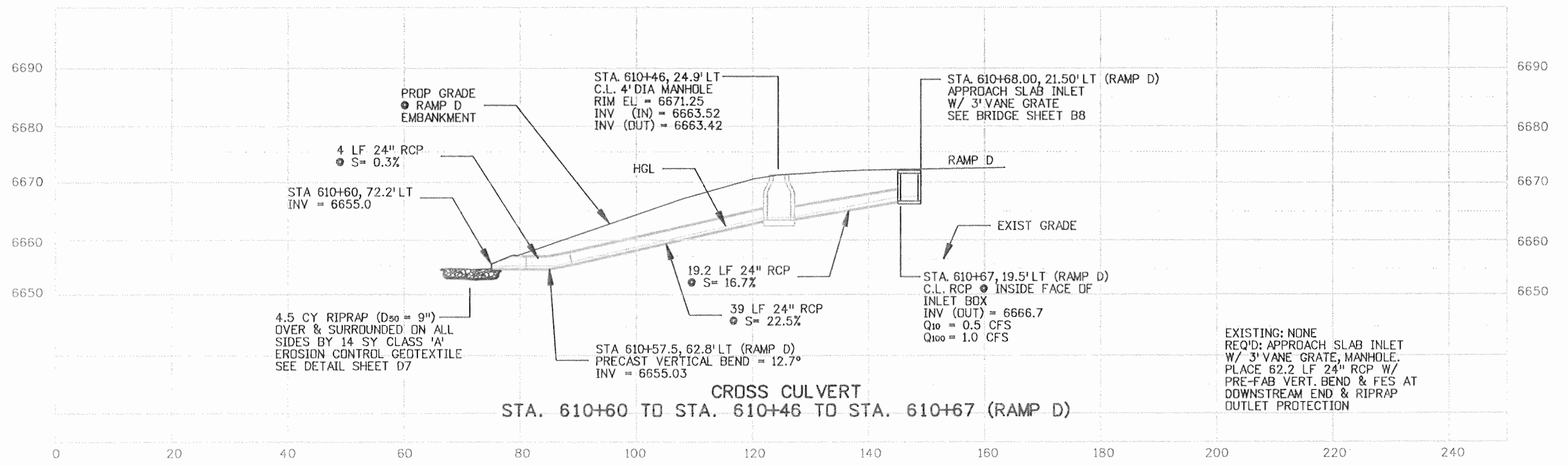
US 160 / 550 DRAINAGE CROSS CULVERT SECTIONS	
Designer: EEV	Structure Numbers
Detailer: MAB	
Sheet Subset: DRAINAGE-1	Subset Sheets: D8 OF D10

Project No./Code	NH 1602-114
	16042
Sheet Number	417



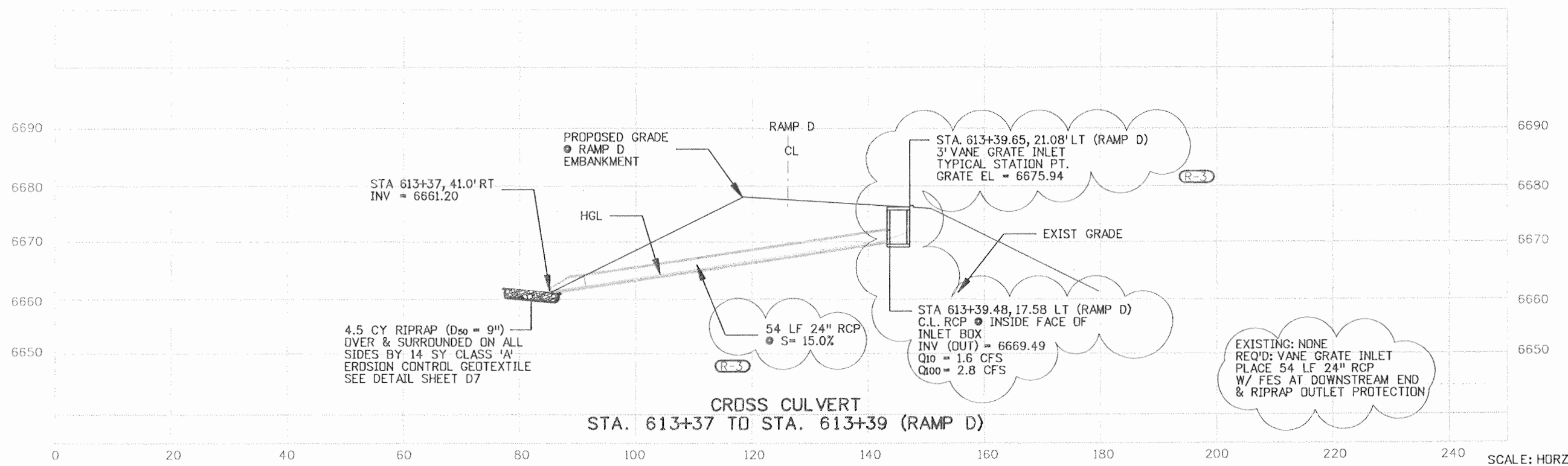
SCALE: HORZ. 1"=20'
VERT. 1"=20'

Print Date: 9/28/2010		Sheet Revisions			Colorado Department of Transportation		As Constructed		US 160 / 550 DRAINAGE CROSS CULVERT SECTIONS		Project No./Code	
File Name: 16042_Dr-section2.dgn		Date:	Comments	Init.	3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365		No Revisions: 9/10		Designer: EEV		NH 1602-114	
Horiz. Scale: 1:20					 Region 5		Revised:		Structure		16042	
Vert. Scale: As Noted							Void:		Detailer: MAB		Subset Sheets: D9 OF D10	
Unit Information									Sheet Subset: DRAINAGE-1			
Unit Leader Initials												
 												



CROSS CULVERT
STA. 610+60 TO STA. 610+46 TO STA. 610+67 (RAMP D)

EXISTING: NONE
REQ'D: APPROACH SLAB INLET
W/ 3' VANE GRATE, MANHOLE.
PLACE 62.2 LF 24" RCP W/
PRE-FAB VERT. BEND & FES AT
DOWNSTREAM END & RIPRAP
OUTLET PROTECTION



CROSS CULVERT
STA. 613+37 TO STA. 613+39 (RAMP D)

EXISTING: NONE
REQ'D: VANE GRATE INLET
PLACE 54 LF 24" RCP
W/ FES AT DOWNSTREAM END
& RIPRAP OUTLET PROTECTION

SCALE: HORZ. 1"=20'
VERT. 1"=20'

Print Date: 9/28/2010	Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365	As Constructed No Revisions: 9/10 Revised: Void:	US 160 / 550 DRAINAGE CROSS CULVERT SECTIONS		Project No./Code
File Name: 16042_Dr-section3.dgn	Date: 07/08/10	Comments: INLET OFFSET CHANGE	Init.: VSF					NH 1602-114
Horiz. Scale: 1:20	Vert. Scale: As Noted						Designer: EEV	Structure
Unit Information	Unit Leader Initials						Detailer: MAB	Numbers
					Region 5		EJA	Sheet Number: 419
							Sheet Subset: DRAINAGE-1	Subset Sheets: D10 DF D10

GENERAL NOTES

LIMITS OF STRUCTURE EXCAVATION AND BACKFILL SHALL BE AS REQUIRED TO SPLICE CONDUITS AND CONSTRUCT INLETS. STRUCTURE EXCAVATION, BACKFILL, AND MECHANICAL REINFORCEMENT OF SOIL SHALL NOT BE PAID FOR SEPERATELY, BUT SHALL BE INCLUDED IN THE COST OF THE WORK.

EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPECIFICATION M213.

A COLORED STRUCTURAL CONCRETE STAIN FINISH WILL BE REQUIRED, AS SHOWN ON THE PLANS, ON EXPOSED CONCRETE SURFACES. THESE SURFACES SHALL BE STAINED TO MATCH THE EXISTING STRUCTURE. THE COLORED STRUCTURAL CONCRETE STAIN IS TO BE SELECTED FROM TEST PANELS PROVIDED BY THE CONTRACTOR. A CLASS 2 FINISH SHALL BE PROVIDED FOR ALL CONCRETE SURFACES TO RECEIVE CONCRETE STAIN. A CLASS 1 FINISH SHALL BE PROVIDED FOR ALL OTHER SURFACES TO 1 FOOT BELOW THE GROUND LINE.

ALL THE PROVISIONS FOR BRIDGE DECK CONCRETE SHALL APPLY TO APPRDACH SLAB CONCRETE.

ALL CONCRETE SHALL BE LEVEL II SULFATE RESISTANT.

GRADE 60 REINFORCING STEEL IS REQUIRED.

ALL REINFORCING STEEL SHALL BE NON-COATED UNLESS OTHERWISE NOTED.

ⓔ DENOTES EPOXY COATED REINFORCING STEEL.

THE FOLLOWING STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 36 (ASTM A36): EXPANSION DEVICES.

ALL BOLTS SHALL BE 1/8" DIAMETER, HIGH STRENGTH, UNLESS OTHERWISE NOTED.

DESIGN DATA

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, FOURTH EDITION WITH 2008 INTERIMS

DESIGN METHOD: LOAD AND RESISTANCE FACTOR DESIGN

LIVE LOAD: HL-93 (DESIGN TRUCK OR TANDEM, AND DESIGN LANE LOAD)

REINFORCED CONCRETE

CLASS D CONCRETE: f'_c = 4,500 psi
 REINFORCING STEEL: f_y = 60,000 psi

THE FOLLWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR EPDXY COATED REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS D CONCRETE	1'-3"	1'-7"	2'-5"	2'-10"	3'-8"	4'-8"	5'-11"	7'-3"

WHEN THE CONTRACTOR ELECTS TO SUBSTITUTE EPOXY COATED REINFORCEMENT FOR BLACK REINFORCING BARS, THE MINIMUM LAP SPLICE SHALL BE AS DESCRIBED ABOVE.

THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR BLACK REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS D CONCRETE	1'-1"	1'-4"	1'-7"	1'-11"	2'-6"	3'-1"	3'-11"	4'-10"

THE ABOVE SPLICE LENGTHS MAY BE REDUCED BY 20% WHEN 3" OF CLEAR COVER EXISTS AND BAR SPACING IS 6" ON CENTER OR GREATER.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION.

STATIONS, ELEVATIONS, AND DIMENSIONS CONTAINED IN THESE PLANS ARE CALCULATED FROM A RECENT FIELD SURVEY. THE CONTRACTOR SHALL VERIFY ALL DEPENDENT DIMENSIONS IN THE FIELD BEFORE ORDERING OR FABRICATING ANY MATERIAL.

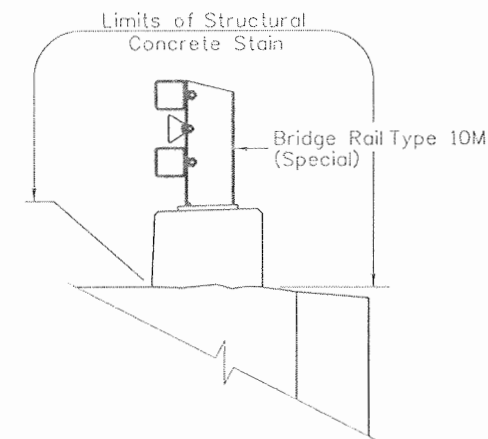
THE INFORMATION SHOWN ON THESE PLANS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING HIS OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO AT 1-800-922-1987 AT LEAST 2 DAYS (NOT INCLUDING THE DAY OF NOTIFICATION) PRIOR TO ANY EXCAVATION OR OTHER EARTHWORK.

INDEX OF DRAWINGS

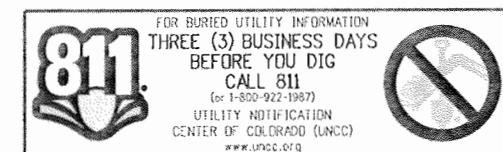
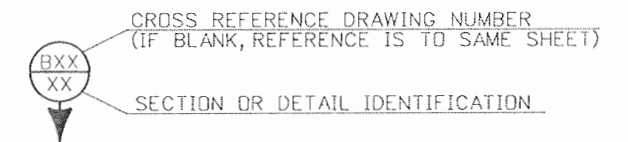
Sheet No.	Sheet Title
B1	General Notes
B2	Summary of Quantities
B3	Approach Slab Layout
B4	Bridge Rail Type 10M (Special) (1 of 2)
B5	Bridge Rail Type 10M (Special) (2 of 2)
B6	Approach Slab Details Type I
B7	Approach Slab Details Type II
B8	Approach Slab Drain Details P-05-Y
B9	Approach Slab Drain Details P-05-W
B10	Approach Slab Drain Details P-05-AG (1 of 2)
B11	Approach Slab Drain Details P-05-AG (2 of 2)
B12	Bridge Expansion Device (0-4 Inch) (1 of 2)
B13	Bridge Expansion Device (0-4 Inch) (2 of 2)
B14	Mechanically Stabilized Backfill

STRUCTURE NUMBERS

- P-05-AG
- P-05-V
- P-05-W
- P-05-Y



STAIN DETAIL



Design	INITIAL	DATE	Checked By		Checked By	
			BY	DATE	BY	DATE
Designed By	BJA	01/10	Checked By	TRJ	01/10	Checked By
Checked By	AVL	01/10	Checked By	BJA	01/10	Checked By

Print Date: 9/23/2010	Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5	As Constructed No Revisions: 9/10	GENERAL NOTES		Project No./Code NH 1602-114
File Name: 16042_GenNotes_01.dgn	Date:	Comments:	Init.			Revised:	Designer: B. Allen	
Horiz. Scale: 1:1					Void:	Detailer: D. Anderson		16042
Unit Information 0221						Sheet Subset: Bridge	Subset Sheets: B1 of 14	Sheet Number 420

SUMMARY OF APPROXIMATE QUANTITIES P-05-AG

Item No.	Description	Units	Approach Slab
403	Hot Mix Asphalt	TON	19
515	Waterproofing Membrane	SY	117
518	Bridge Expansion Device (0-4 inch)	LF	59
601	Concrete Class D (Bridge)	CY	58
601	Structural Concrete Stain	SY	19
602	Reinforcing Steel	LB	9061
602	Reinforcing Steel(Epoxy Coated)	LB	473
604	Vane Grate Inlet (Special)	EA	1
606	Bridge Rail Type 10M (Special)	LF	47
613	1.5" Conduit (Anti-Icing System)	LF	70
613	2" Conduit (Anti-Icing System)	LF	47
613	2" Electrical Conduit	LF	47
613	6" Electrical Conduit	LF	110

SUMMARY OF APPROXIMATE QUANTITIES P-05-V

Item No.	Description	Units	Approach Slab
403	Hot Mix Asphalt	TON	9
515	Waterproofing Membrane	SY	54
518	Bridge Expansion Device (0-4 inch)	LF	32
601	Concrete Class D (Bridge)	CY	29
601	Structural Concrete Stain	SY	19
602	Reinforcing Steel	LB	4214
606	Bridge Rail Type 10M (Special)	LF	47
613	1.5" Conduit (Anti-Icing System)	LF	47
613	2" Conduit (Anti-Icing System)	LF	23
613	2" Electrical Conduit	LF	47
613	6" Electrical Conduit	LF	100

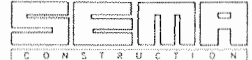

SUMMARY OF APPROXIMATE QUANTITIES P-05-W

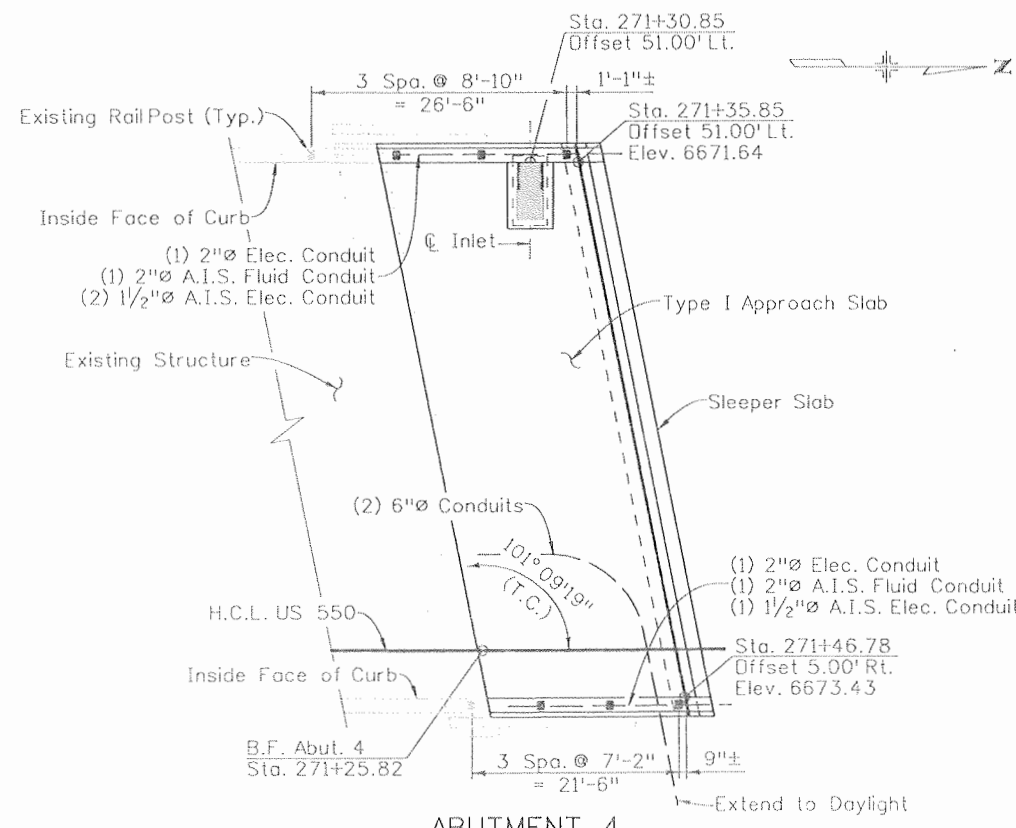
Item No.	Description	Units	Approach Slab
403	Hot Mix Asphalt	TON	17
515	Waterproofing Membrane	SY	108
518	Bridge Expansion Device (0-4 inch)	LF	57
601	Concrete Class D (Bridge)	CY	55
601	Structural Concrete Stain	SY	36
602	Reinforcing Steel	LB	8581
602	Reinforcing Steel(Epoxy Coated)	LB	259
604	Vane Grate Inlet (Special)	EA	1
606	Bridge Rail Type 10M (Special)	LF	90
613	1.5" Conduit (Anti-Icing System)	LF	71
613	2" Conduit (Anti-Icing System)	LF	47
613	2" Electrical Conduit	LF	90
613	6" Electrical Conduit	LF	216

SUMMARY OF APPROXIMATE QUANTITIES P-05-Y

Item No.	Description	Units	Approach Slab
518	Bridge Expansion Device (0-4 inch)	LF	56
601	Concrete Class D (Bridge)	CY	54
601	Structural Concrete Stain	SY	38
602	Reinforcing Steel	LB	6053
602	Reinforcing Steel(Epoxy Coated)	LB	2110
604	Vane Grate Inlet (Special)	EA	1
606	Bridge Rail Type 10M (Special)	LF	93
613	1.5" Conduit (Anti-Icing System)	LF	70
613	2" Conduit (Anti-Icing System)	LF	47
613	2" Electrical Conduit	LF	93
613	6" Electrical Conduit	LF	196

Design	INITIAL	DATE	Checked By
	TRJ	01/10	
Detail	INITIAL	DATE	Checked By
	RGJ	01/10	
Quantities	INITIAL	DATE	Checked By
	TRJ	01/10	

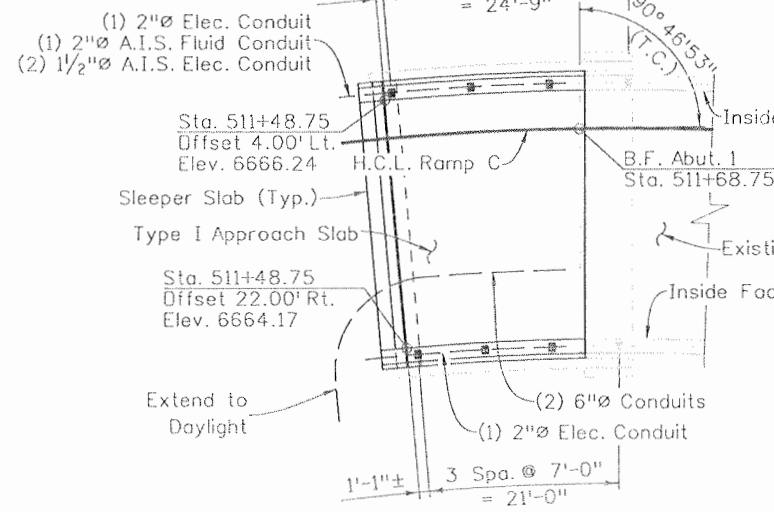
Print Date: 9/23/2010	Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365	As Constructed	SUMMARY OF QUANTITIES		Project No./Code
File Name: 16042_SumApproxQuant_01.dgn	Date:	Comments	Init.		No Revisions: 9/10	NH 1602-114		
Horiz. Scale: 1:1				Revised:	Designer: T. Johnson	Structure		16042
Unit Information 0221				Void:	Detailer: R. Artman	Numbers		
				Region 5	EJA	Sheet Subset: Bridge	Subset Sheets: B2 of 14	Sheet Number 421



ABUTMENT 4

P-05-AG

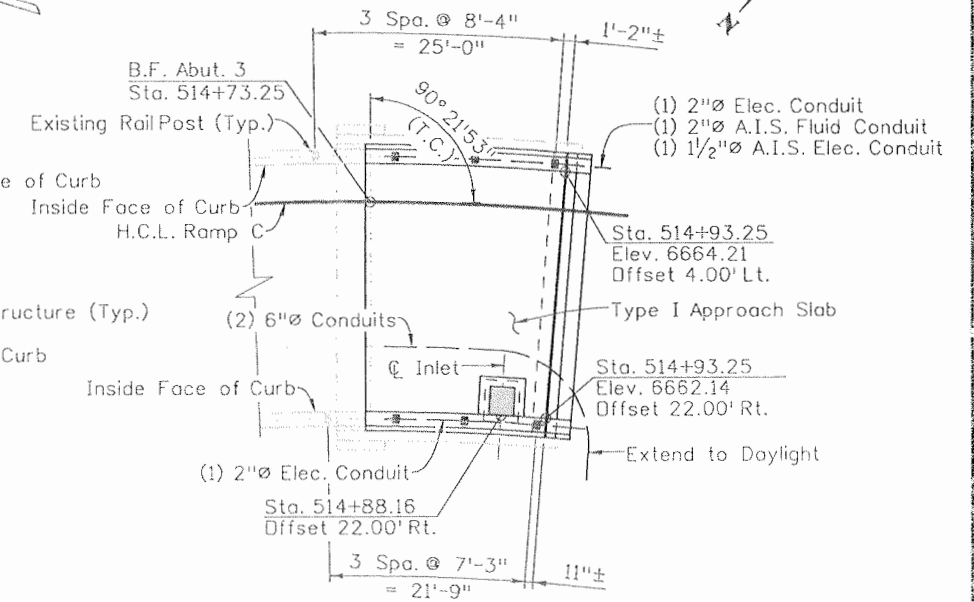
Ahead
Station



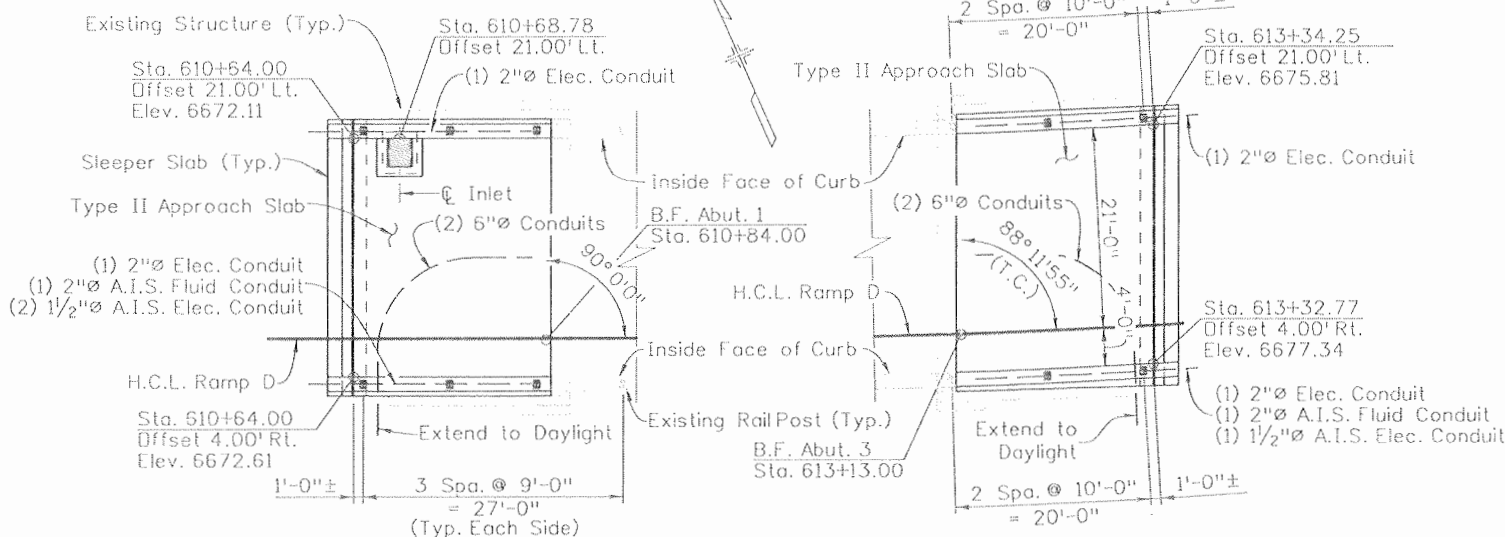
ABUTMENT 1

P-05-W

Ahead
Station



ABUTMENT 3

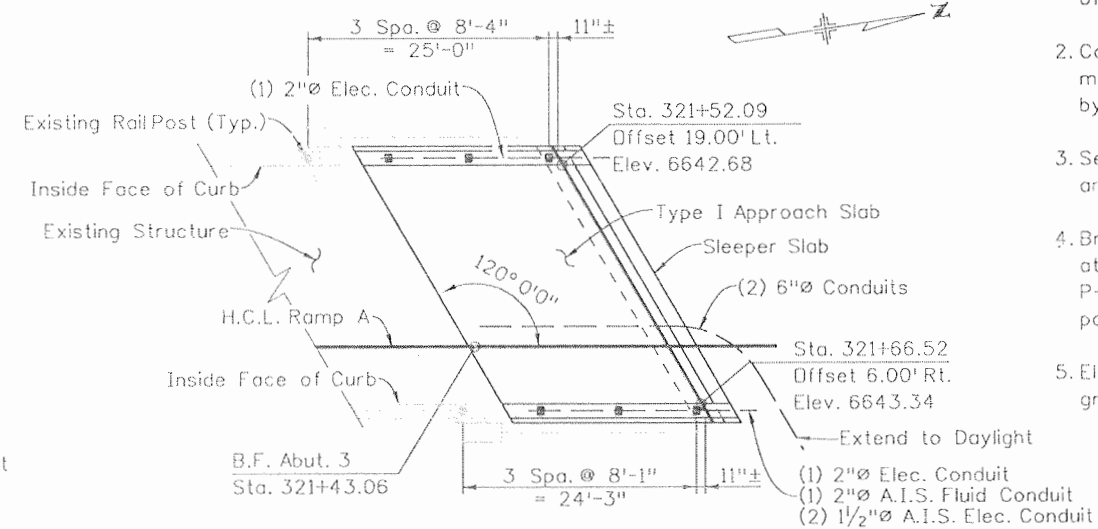


ABUTMENT 1

ABUTMENT 3

P-05-Y

Ahead
Station



ABUTMENT 3

P-05-V

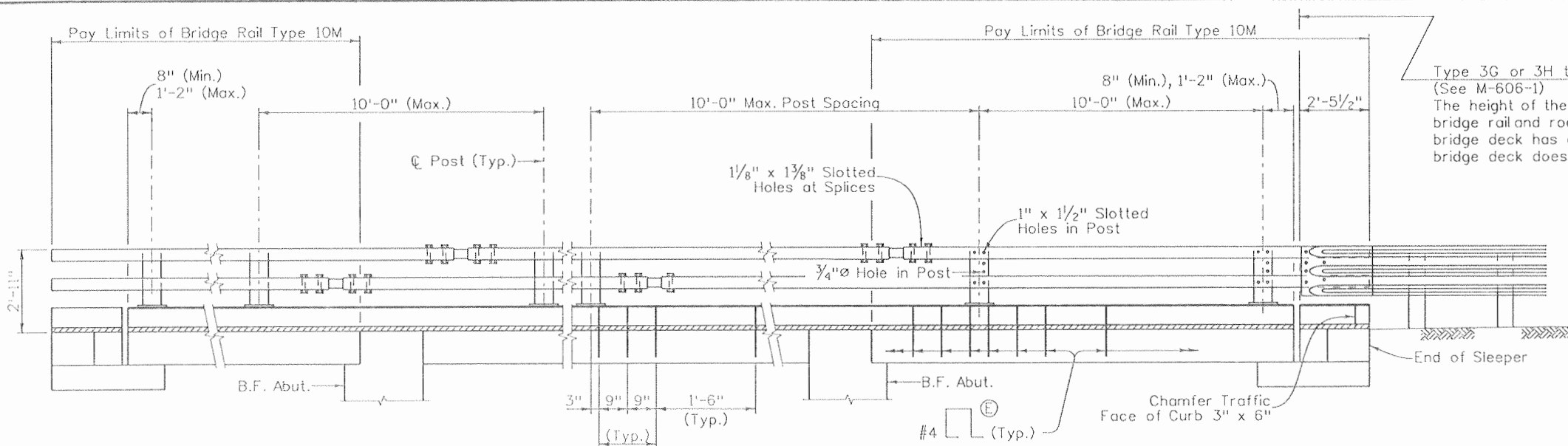
Ahead
Station

NOTES:

1. Splice all conduits to existing and project 2'-0" past end of curb or extend to daylight.
2. Conduits extended to daylight may be modified as directed by the Engineer.
3. See Bridge Plans for locations and depths of 6" conduits.
4. Bridge rails on approach slab at Abutment 3 of Structure P-05-Y shall be constructed parallel to the H.C.L. of Ramp D.
5. Elevation are given at finished grade.

Design	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
	Designed By	01/10	Checked By	01/10	Quantity By	01/10
Detail	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
	Detailed By	01/10	Checked By	01/10	Quantity By	01/10
Quantity	INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
	Quantity By	01/10	Checked By	01/10	Quantity By	01/10

Print Date: 9/23/2010	Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5	As Constructed	APPROACH SLAB LAYOUT		Project No./Code
File Name: 16042_ApproachSlab_Layout_01.dgn	Date:	Comments	Init.		No Revisions: 9/10			NH 1602-114
Horiz. Scale: 1:1				Revised:	Designer: B. Allen	Structure		16042
Unit Information 0221				Void:	Detailer: D. Anderson	Numbers		Sheet Number 422
SEMA CONSTRUCTION	WILSON & COMPANY				Sheet Subset: Bridge	Subset Sheets: B3 of B14		



RAIL PANEL AT TERMINAL SECTION

(See Roadway Plans for ends not attached to guard rail)

TYPICAL RAIL PANEL

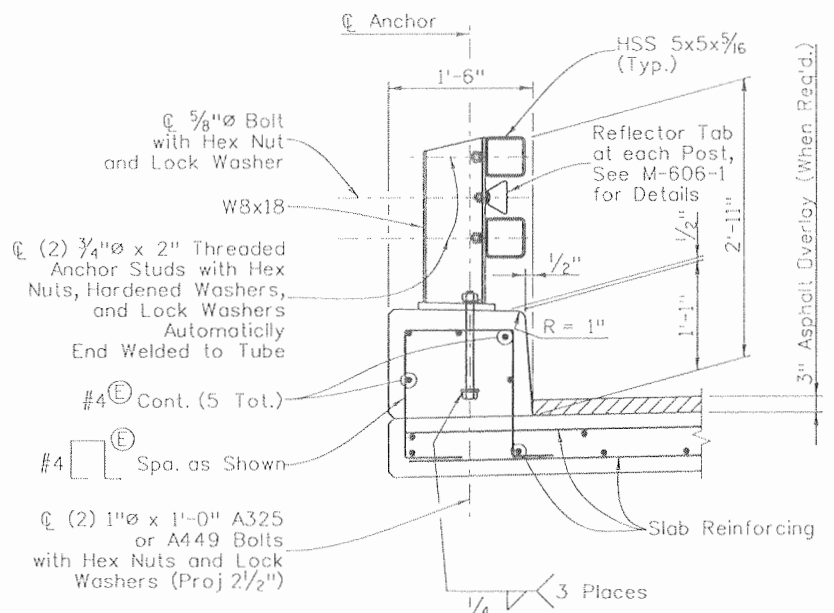
ELEVATION - BRIDGE RAIL

RAIL PANEL AT TRANSITION SECTION

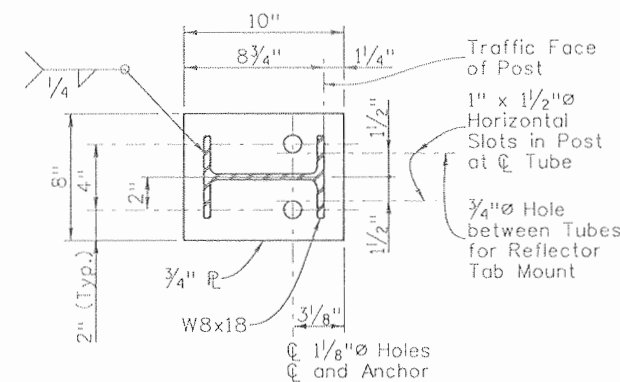
(See Roadway Plans for ends requiring attachment to guard rail)

NOTES:

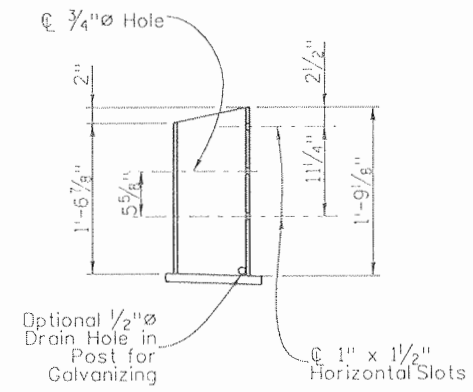
- All tubes shall be ASTM A-847 unless noted otherwise. All other steel shall be ASTM A-588 Grade 50.
- Structural Steel Design Values:
AASHTO M-222 (ASTM A-588) Grade 50: $f_y = 50,000$ psi
Cold Formed ASTM A-847: $f_y = 46,000$ psi
- All anchor bolts and miscellaneous bolts, nuts, and washers shall be galvanized after fabrication in accordance with Section 509. Concrete, reinforcing steel, and structural steel elements shall conform to the requirements of sections 601, 602, and 509, respectively.
- Post anchor shall be ASTM A-36 (AASHTO M-183) steel and need not be galvanized.
- Tubes shall be shop bent or fabricated to fit horizontal curve when radius is less than 1,500 feet.
- Tubes shall be continuous over not less than two posts. No welded butt splices will be allowed in the tube sections.
- The centerline of the tube splice shall be 1'-8" minimum and 2'-6" maximum from the centerline of the posts.
- All bolts that have lock washers shall be tightened to snug only.
- Posts shall be perpendicular to the longitudinal roadway grade.
- One or more 10'-0" post spacings may be reduced (6'-8" min.) in order to maintain dimensions from the end of the rail and expansion joints.
- Prior to fabrication of this item, three sets of working drawings which comply with the requirements of Section 105, shall be submitted to the Engineer for information only.
- Bridge Rail shall be fabricated to tie-in with the existing bridge rail on all structures. The Contractor shall verify the fabrication.
- Refer to Anti-Icing System Plans for additional reinforcing and concrete insert requirements. Coordinate location of anti-icing equipment and conduits with bridge rail reinforcing and hardware. Move conduit or equipment if a conflict exists.
- For additional details see Sheet 2 of 2.
- The Contractor shall verify the locations of the existing rails posts and tube splice locations prior to fabrication.



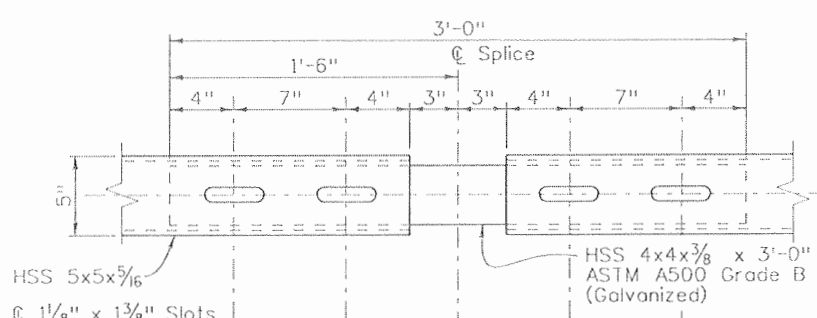
SECTION



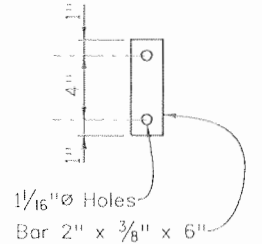
PLAN - POST DETAIL



ELEVATION



PLAN - TUBE SPLICE



POST ANCHOR DETAIL

INFORMATION ONLY

DESCRIPTION	UNIT	PER LIN. FT.
Structural Steel	LB.	45.1
Concrete Class D (Bridge)	CU.YD.	0.06
Reinforcing Steel (Epoxy Coated)	LB.	6.6

Design	Initial		Date	
	By	Checked By	By	Checked By
Designed By	BJA	AWL	01/10	01/10
Checked By	AWL	AWL	01/10	01/10
Detail	Initial		Date	
	By	Checked By	By	Checked By
Designed By	TRJ	BJA	01/10	01/10
Checked By	BJA	AWL	01/10	01/10
Quantities	Initial		Date	
	By	Checked By	By	Checked By
Designed By	TRJ	BJA	01/10	01/10
Checked By	BJA	AWL	01/10	01/10

Print Date: 9/23/2010
 File Name: 16042_BridgeRailType10M_01.dgn
 Horiz. Scale: 1:1 Vert. Scale: N/A
 Unit Information 0221 Unit Leader STW

SEMA CONSTRUCTION
WILSON & COMPANY

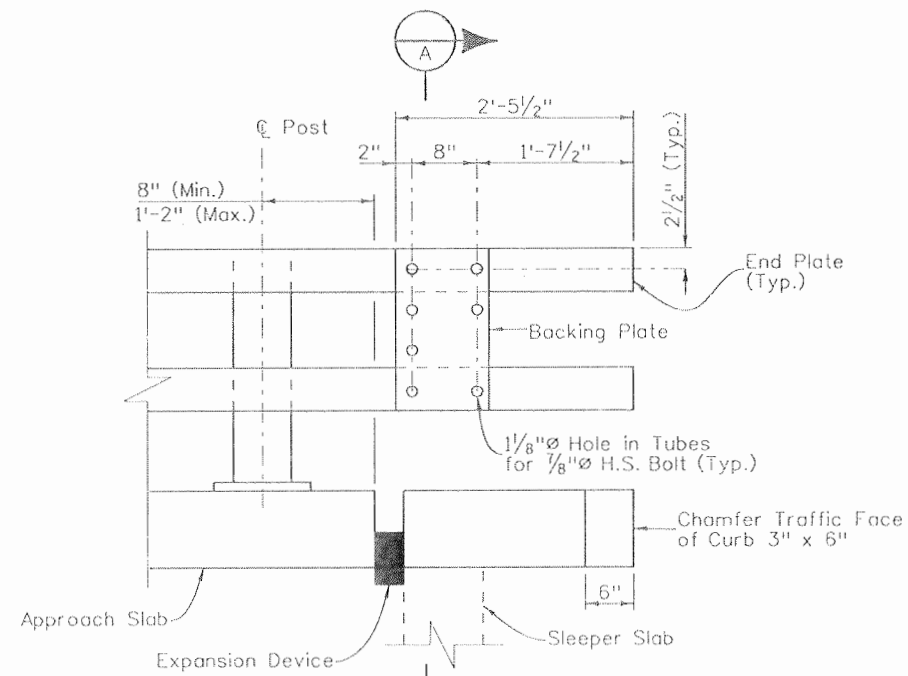
Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
 Region 5 EJA

As Constructed	
No Revisions:	9/10
Revised:	
Void:	

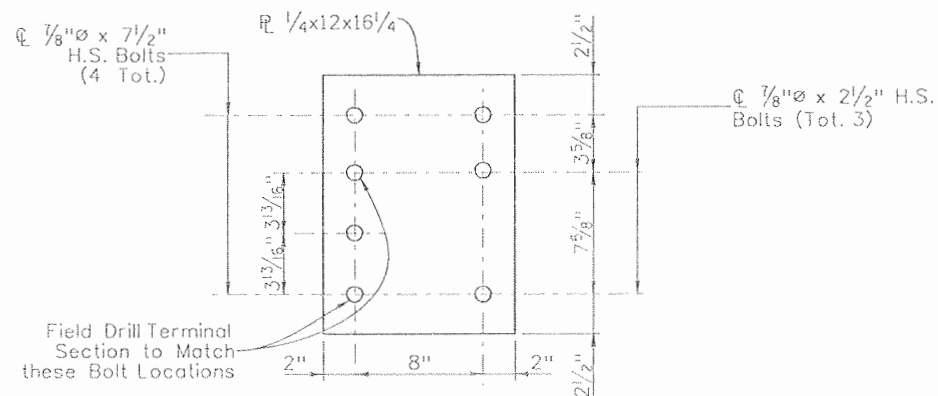
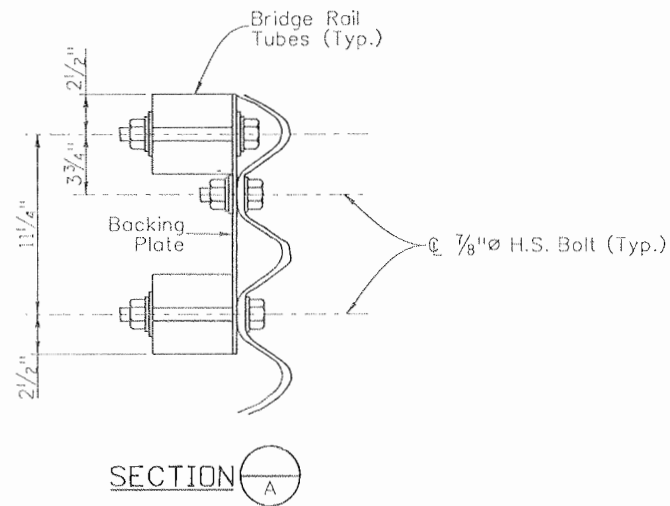
BRIDGE RAIL TYPE 10M (SPECIAL) (1 OF 2)			
Designer:	B. Allen	Structure	
Detailer:	D. Anderson	Numbers	
Sheet Subset:	Bridge	Subset Sheets:	B4 of B14

Project No./Code	
NH 1602-114	
16042	
Sheet Number	423



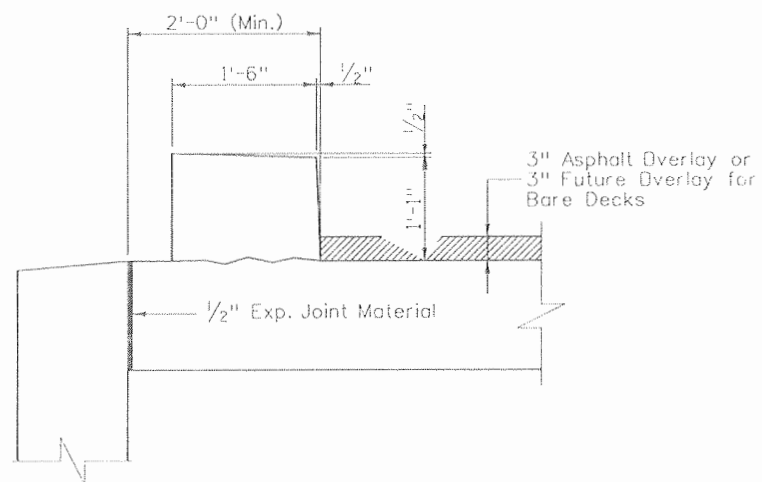
RAIL TUBE DETAILS

(Thrie Beam not shown)
(Req'd at Approach Slab Ends Only)



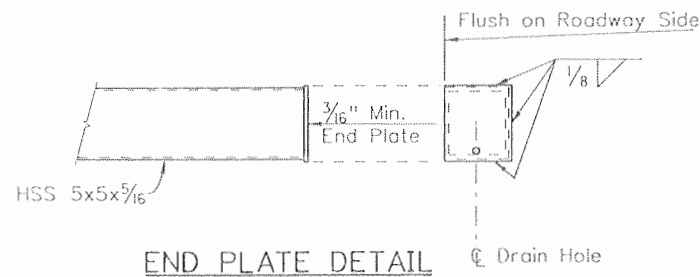
BACKING PLATE

Holes are 1 1/8" for 1/8" H. S. Bolts with Hex Nuts, 2 Plate Washers, and 1 Lock Washer



SECTION

(Approach Slab Location Only)



END PLATE DETAIL

Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
Designed By	01/10	DRA	01/10	TRJ	01/10
Checked By	01/10	AVL	01/10	BJA	01/10
Designed By	01/10	DRA	01/10	TRJ	01/10
Checked By	01/10	AVL	01/10	BJA	01/10

Print Date: 9/23/2010
 File Name: 16042_BridgeRailType10M_02.dgn
 Horiz. Scale: 1:1 Vert. Scale: N/A
 Unit Information 0221 Unit Leader STW

SEMA CONSTRUCTION
WILSON & COMPANY

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
 3803 North Main Avenue
 Suite 200
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365

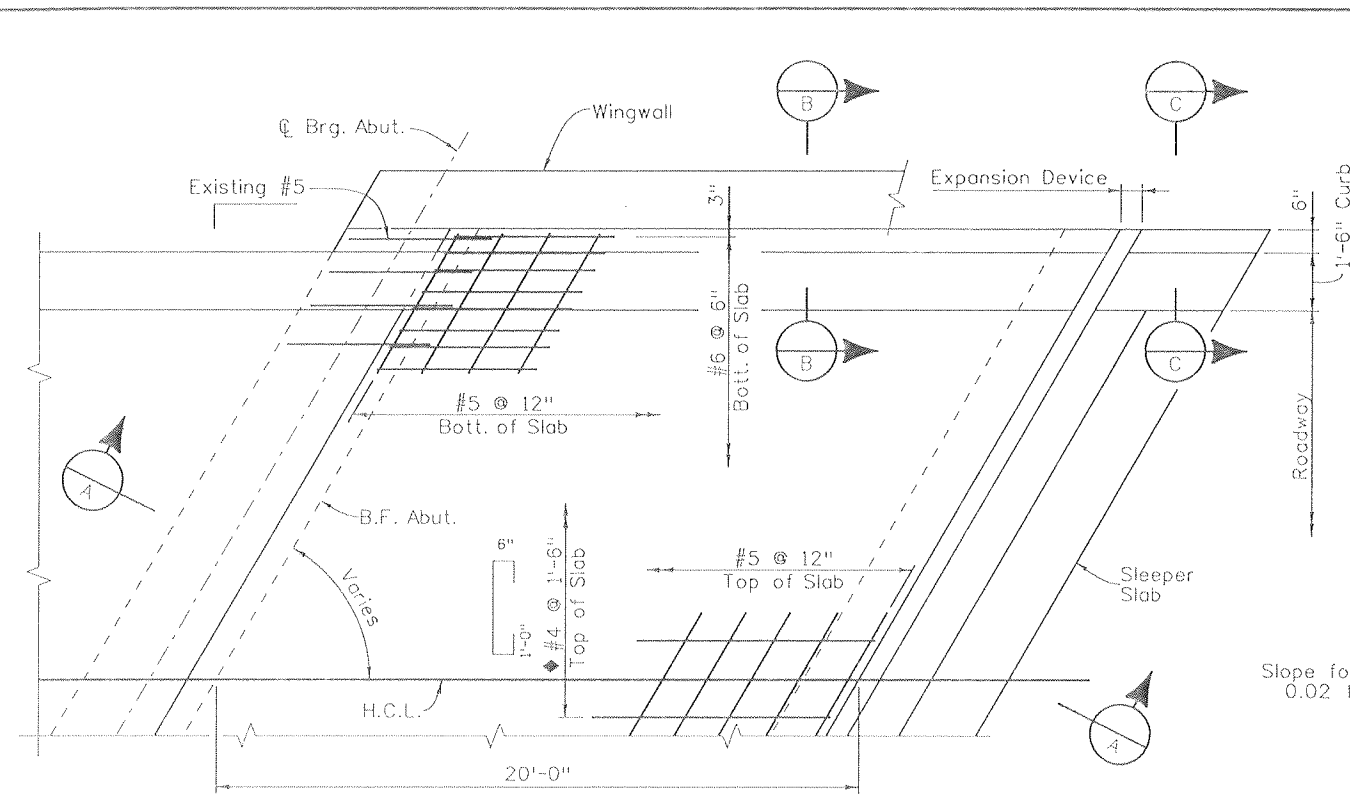
DOT
 DEPARTMENT OF TRANSPORTATION

Region 5 EJA

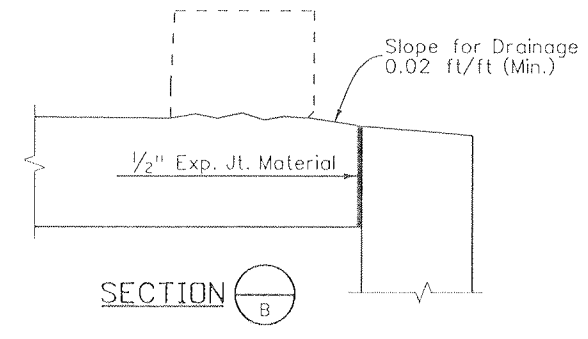
As Constructed
No Revisions: 9/10
Revised:
Void:

BRIDGE RAIL TYPE 10M (SPECIAL) (2 OF 2)	
Designer: B. Allen	Structure Numbers
Detailer: D. Anderson	
Sheet Subset: Bridge	Subset Sheets: B5 of B14

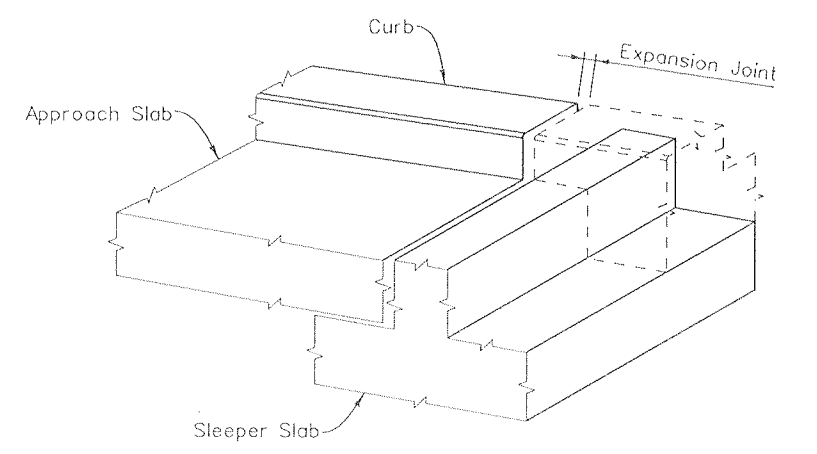
Project No./Code
NH 1602-114
16042
Sheet Number 424



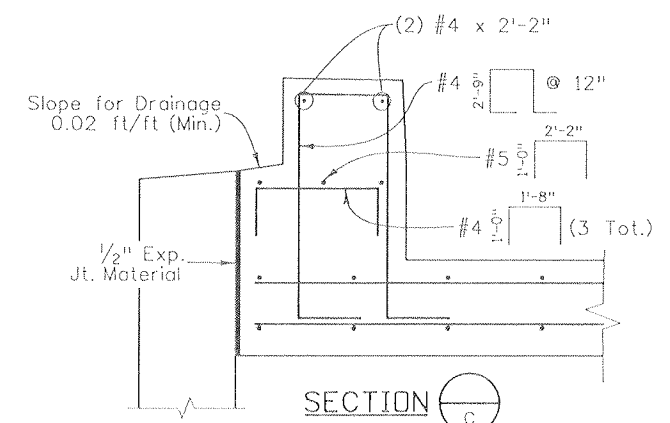
PLAN



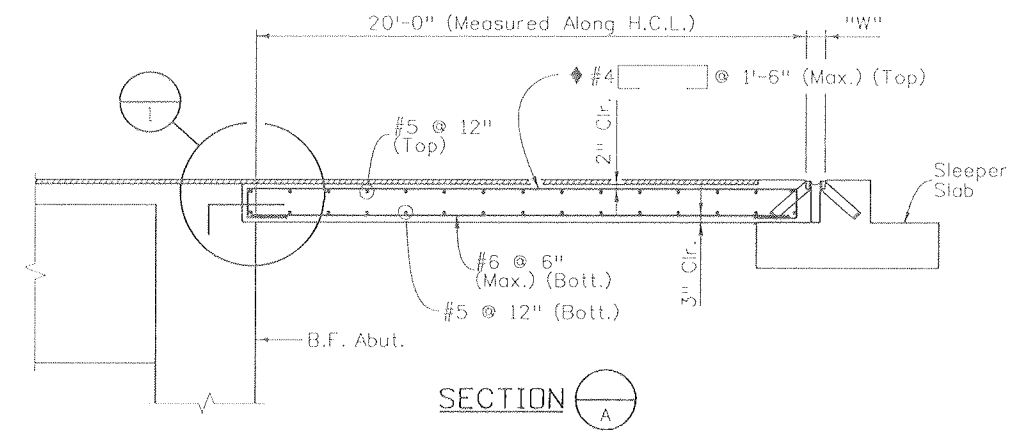
SECTION B



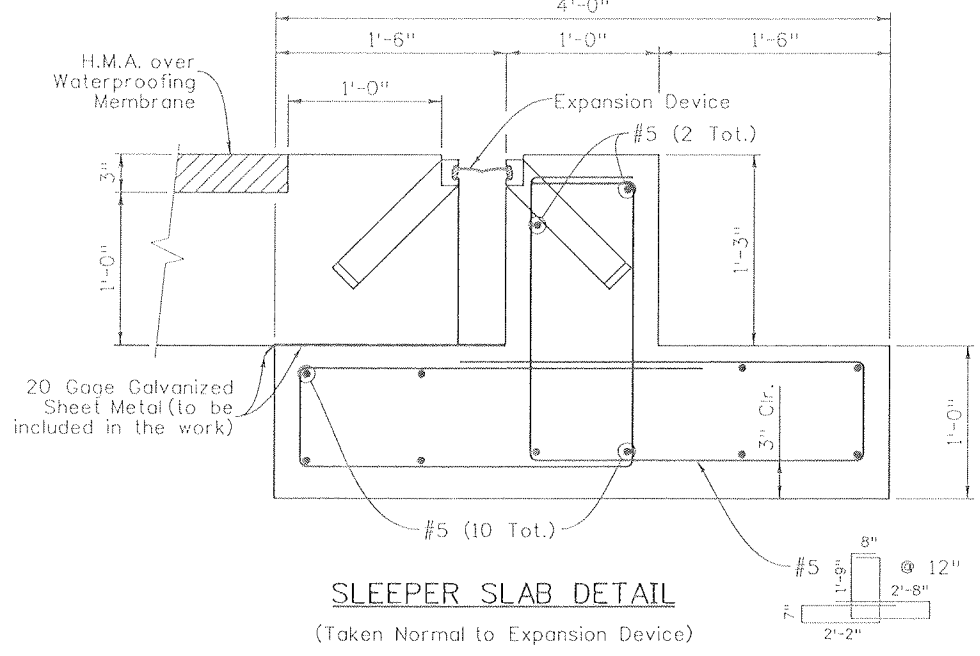
ISOMETRIC VIEW TYPE 10 RAILS



SECTION C

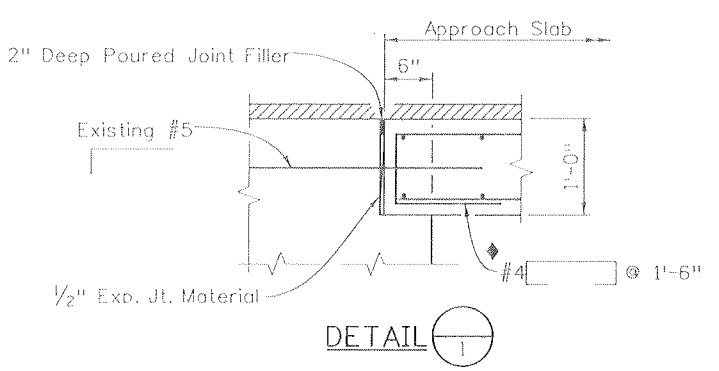


SECTION A



SLEEPER SLAB DETAIL

(Taken Normal to Expansion Device)



DETAIL 1

NOTES:

1. Concrete Class D (Bridge) shall be used for approach slabs.
2. Approach slab concrete shall be cured in accordance with the provisions for Bridge Deck Concrete in Section 601 of the Standard Specifications.
3. For expansion device details and dimension 'W', see Sheets B12 and B13.
4. For curb and rail details, see Sheets B4 and B5.
5. For inlet details, see Sheets B9, B10, and B11.
6. Approach slab reinforcing is non-epoxy coated unless noted otherwise.

◆ Contractor may use



Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
Designed By	01/10	DRA	01/10	Quantities By	01/10
Checked By	01/10	AML	01/10	Checked By	01/10

Print Date: 9/23/2010	Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Suite 200 Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5	As Constructed	APPROACH SLAB DETAILS		Project No./Code NH 1602-114
File Name: 16042_ApproachSlab_Det_01.dgn	Date:	Comments:	Init.		No Revisions: 9/10	TYPE I		
Horiz. Scale: 1:1					Revised:	Designer: B. Allen	Structure Numbers:	16042
Unit Information 0221					Void:	Detailer: D. Anderson	Subset Sheets: B6 of B14	Sheet Number: 425