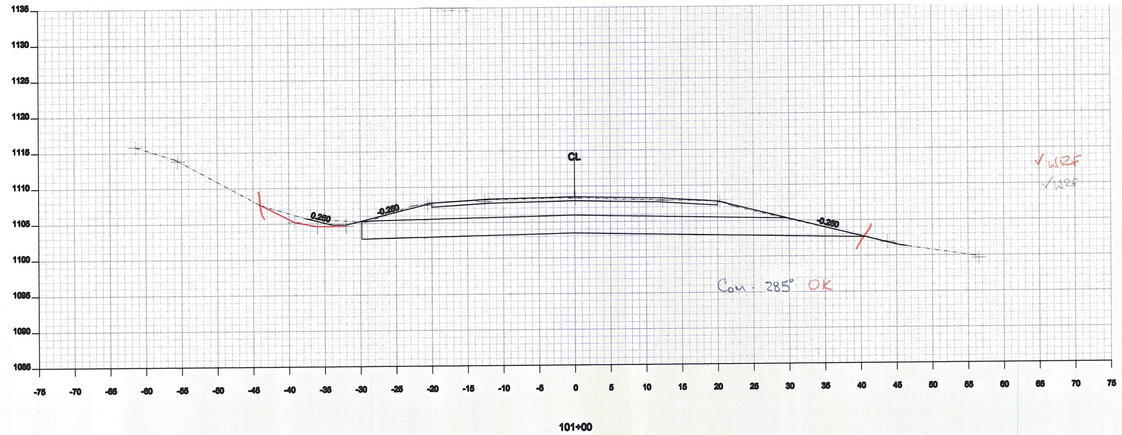
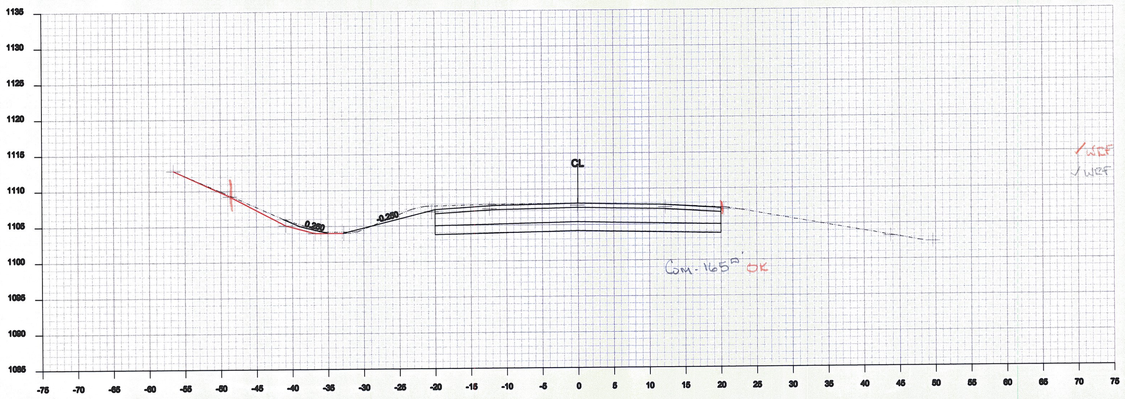
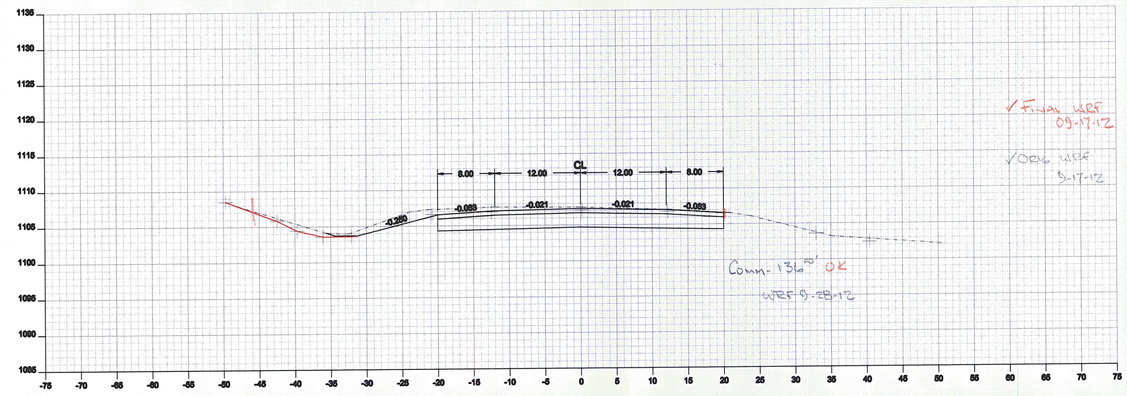


101+00

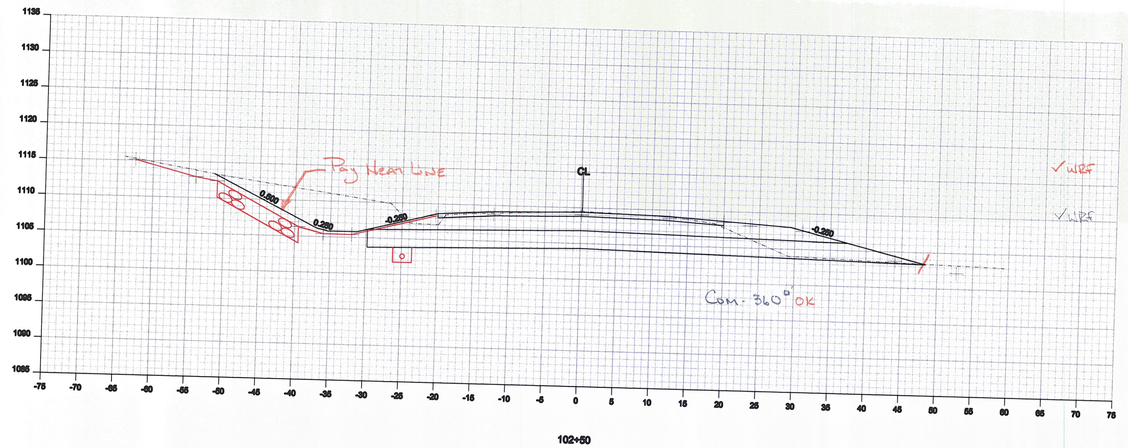


100+50

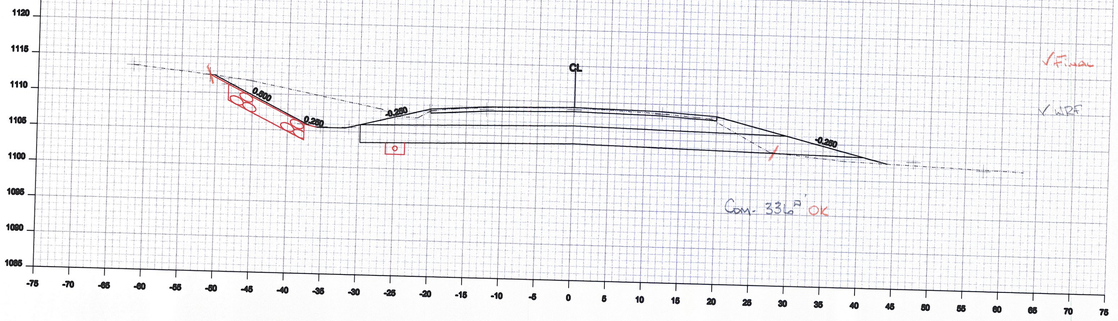


100+00

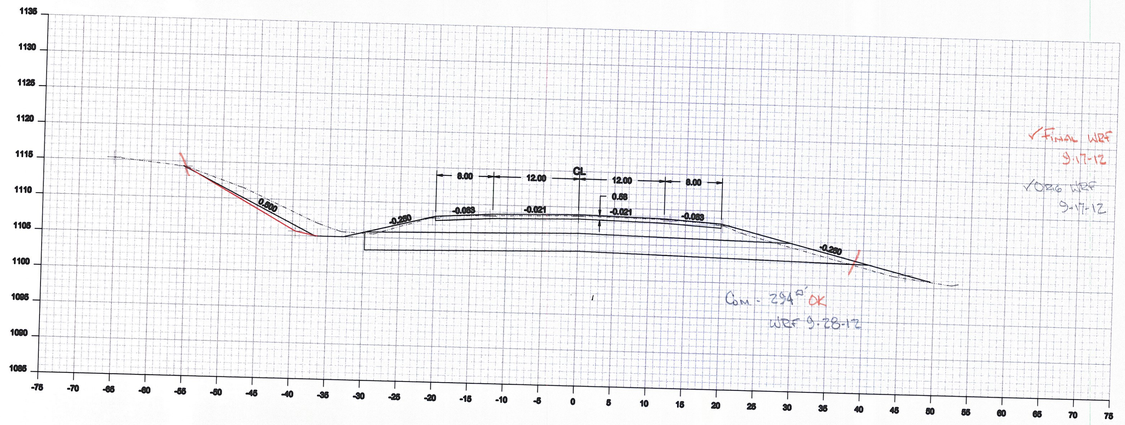
Drawing:	Cross Section 100+00 - 101+00
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-13-2011	Date:
Scale: 1 : 10	Sheet: of



102+50

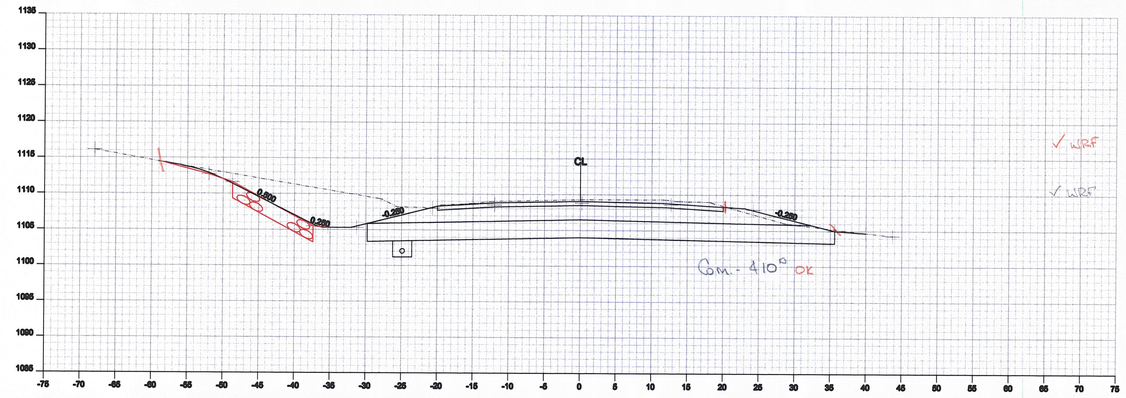


102+00

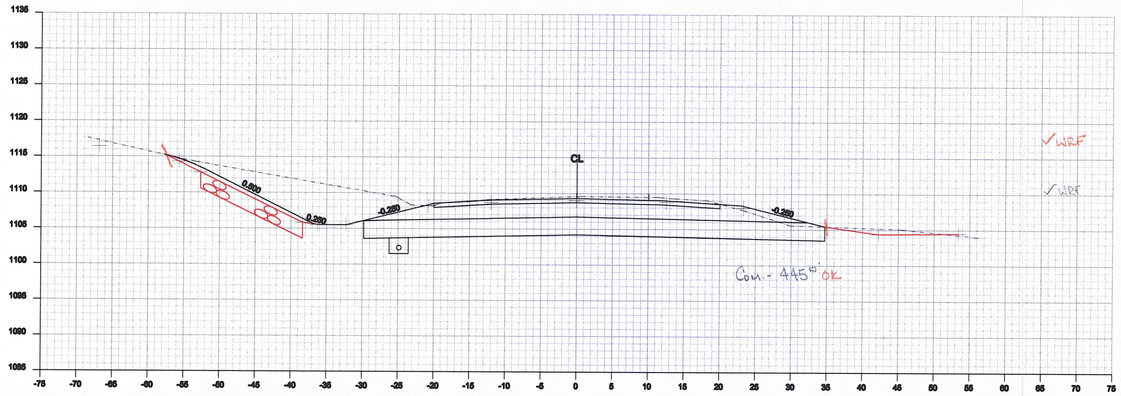


101+50

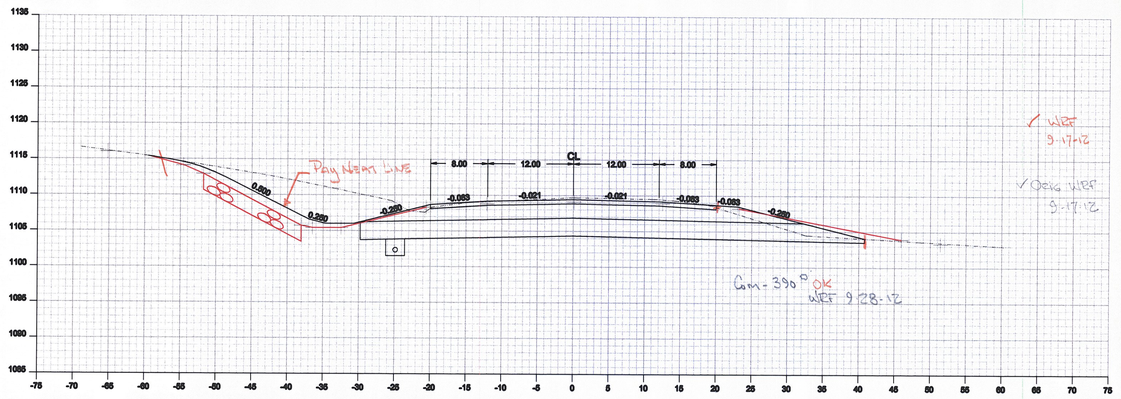
Drawing: Cross Section 101+50 - 102+50
Project: Cabot Danville
Drawn By: JMR
Date: 09-13-2012
Checked By:
Date:
Scale: 1 : 10
Sheet: of



104+00



103+50

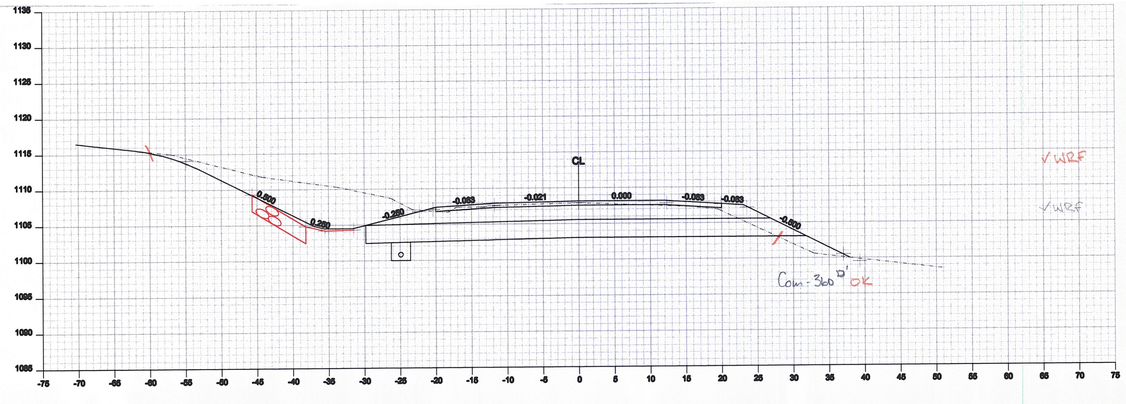


103+00

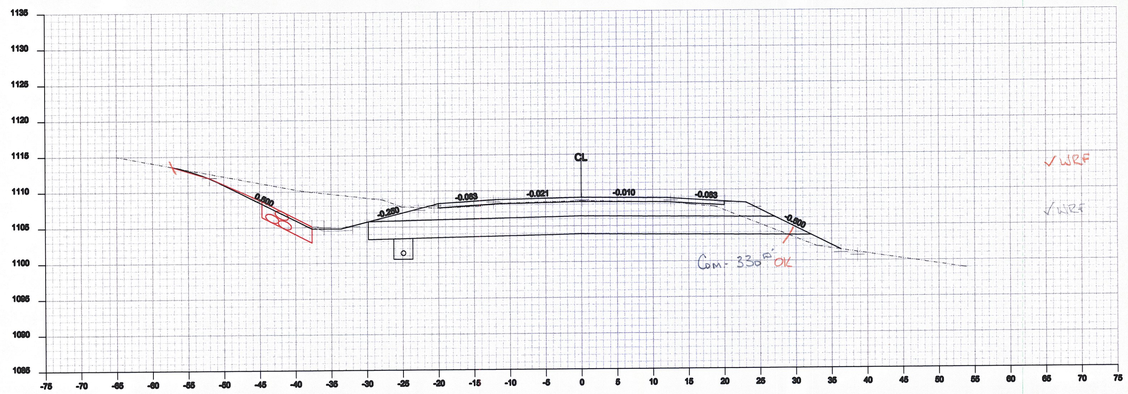
Drawing: Cross Section 103+00 - 104+00
Project: Cabot Danville

Drawn By: JMR | Checked By:
Date: 09-13-2012 | Date:

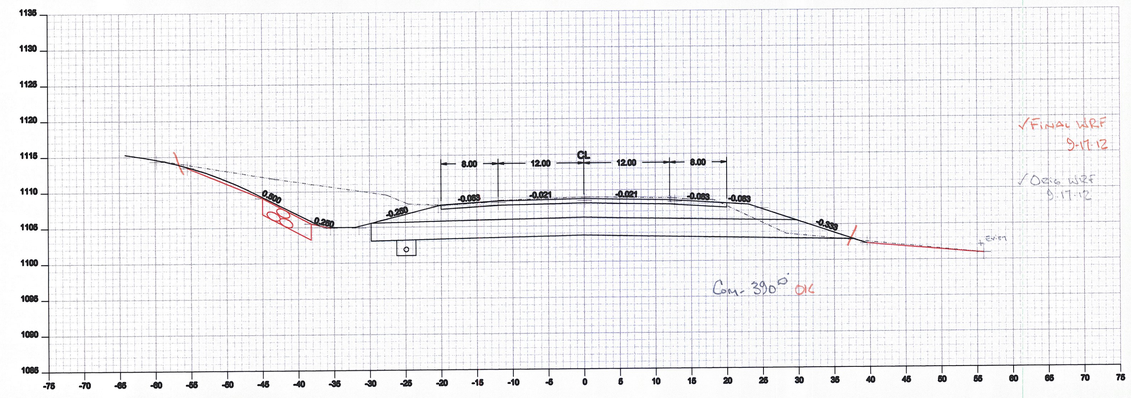
Scale: 1 : 10 | Sheet: of



105+50

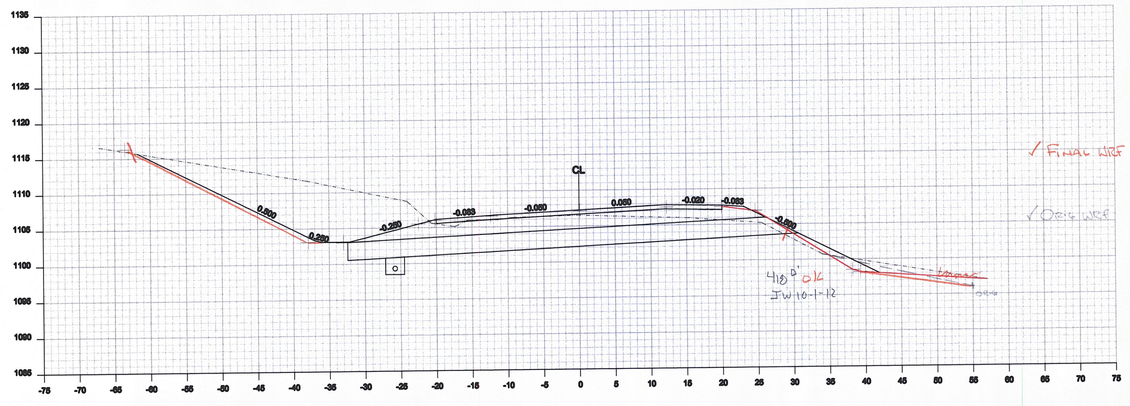


105+00

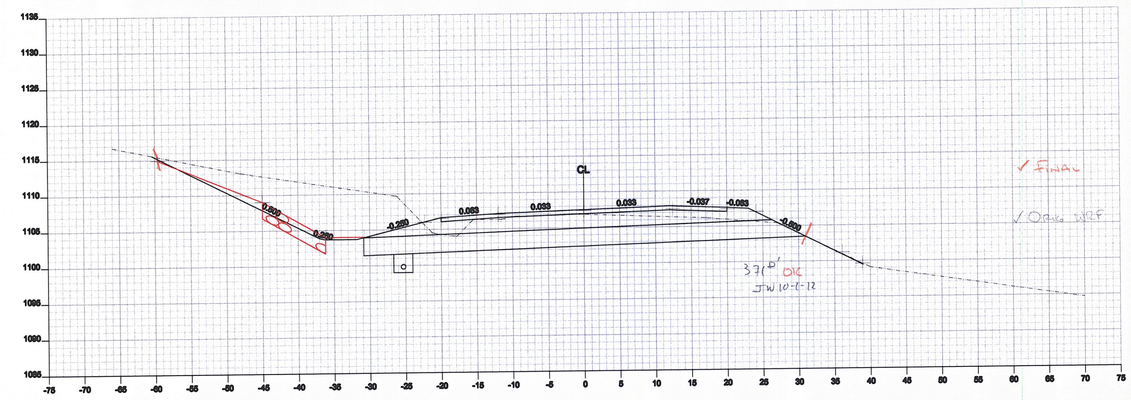


104+50

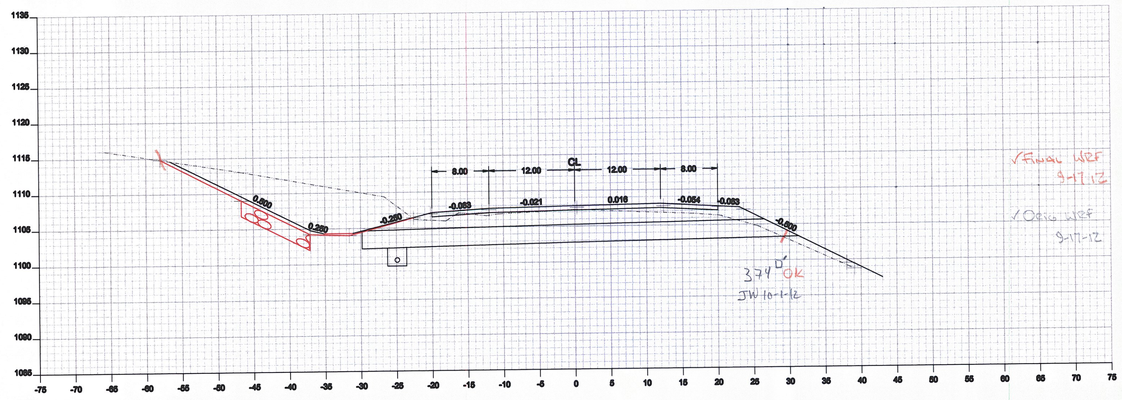
Drawing:	Cross Section 104+50 - 105+50		
Project:	Cabot Danville		
Drawn By:	JMR	Checked By:	
Date:	09-13-2012	Date:	
Scale:	1 : 10	Sheet:	of



107+00

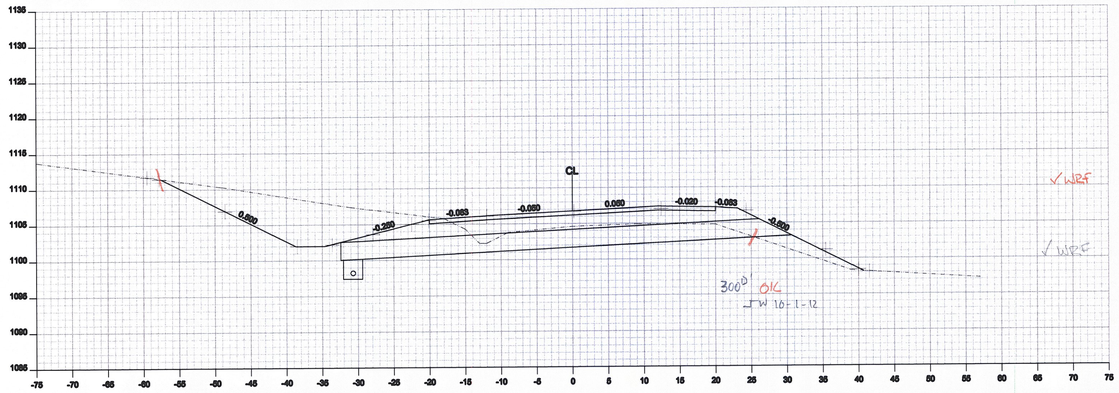


106+50

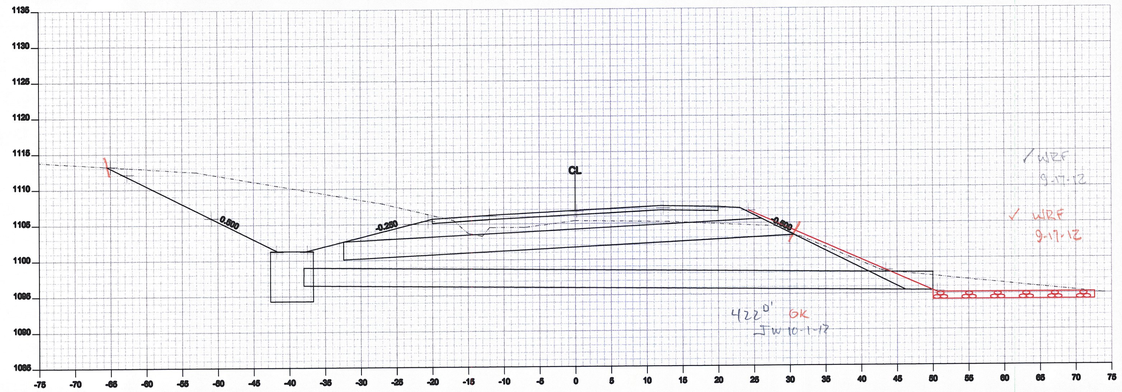


106+00

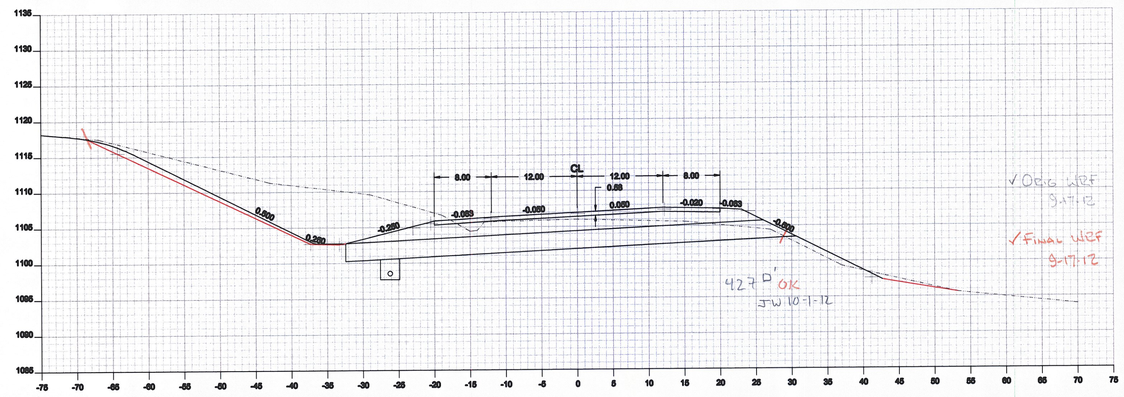
Drawing: Cross Section 106+00 - 107+00	
Project: Cabot Danville	
Drawn By: JMR	Checked By:
Date: 09-13-2012	Date:
Scale: 1 : 10	Sheet: of



108+50

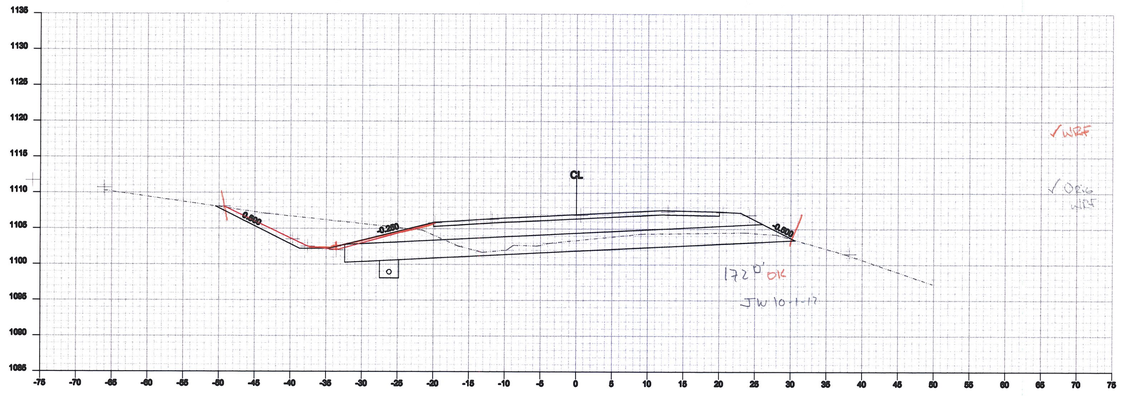


108+00

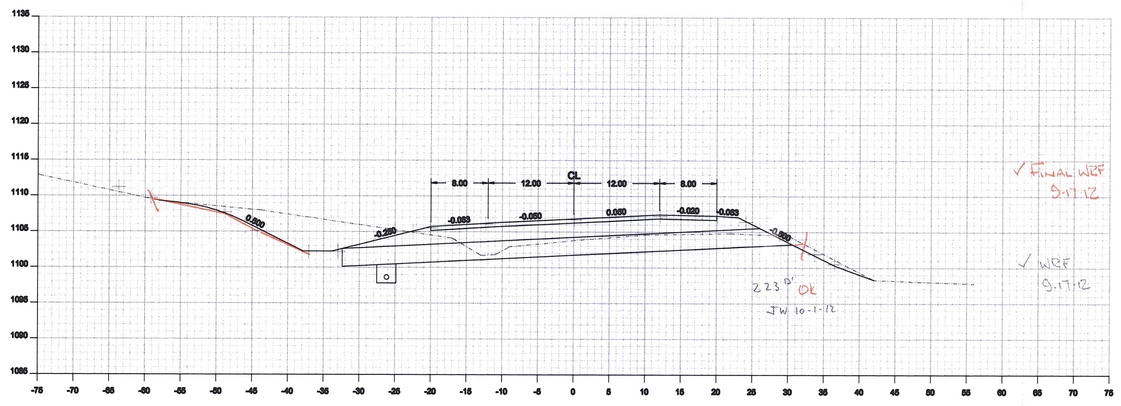


107+50

Drawing:	Cross Section 107+50 - 108+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 12-16-2011	Date:
Scale: 1 : 10	Sheet: of

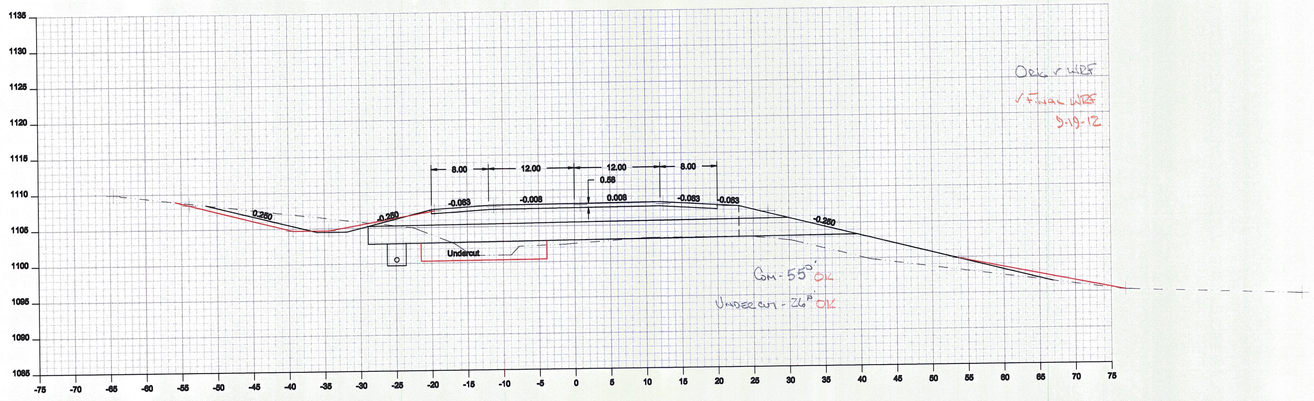


109+50

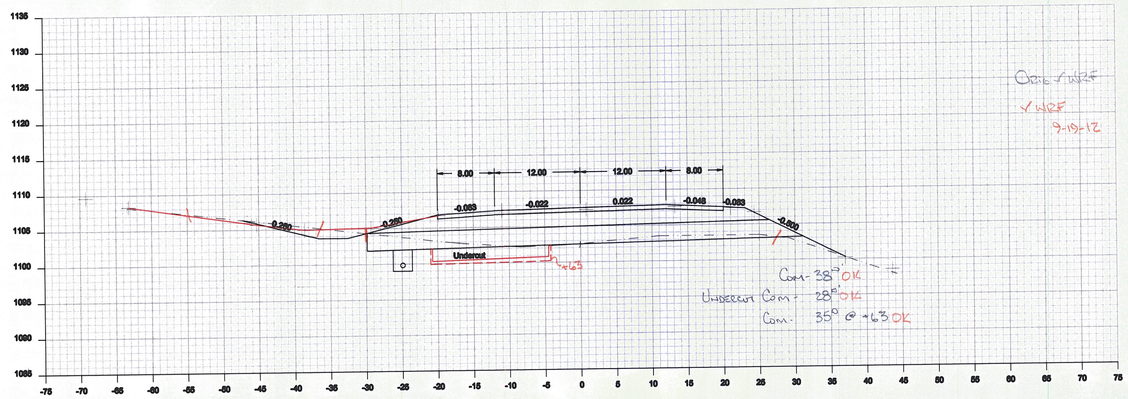


109+00

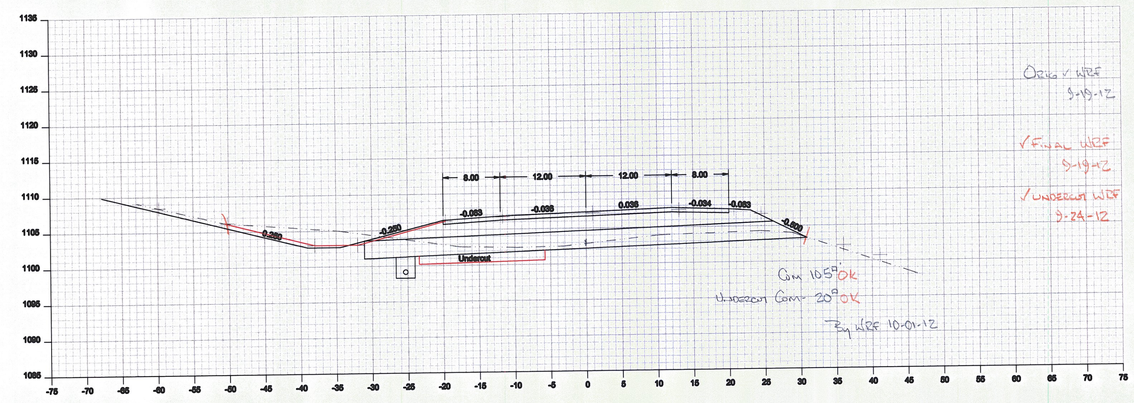
Drawing:	Cross Section 109+00 - 109+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 12-16-2011	Date:
Scale: 1 : 10	Sheet: of



111+00

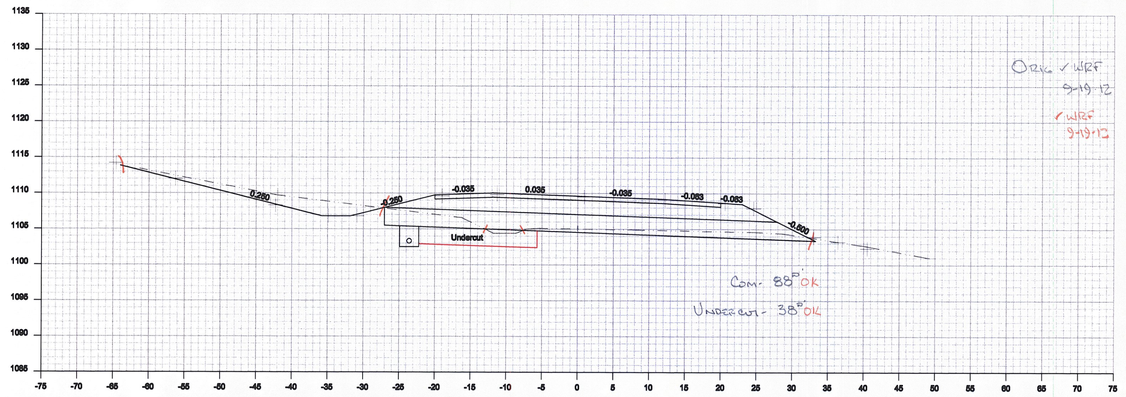


110+50

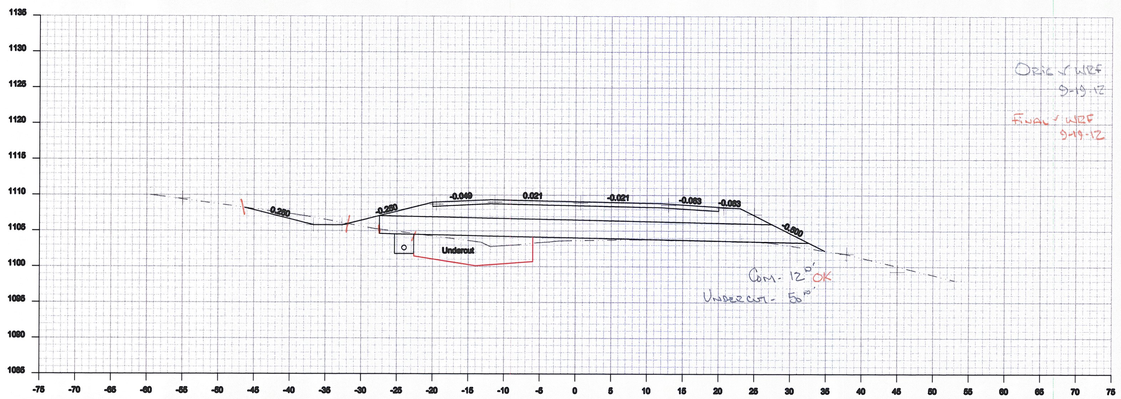


110+00

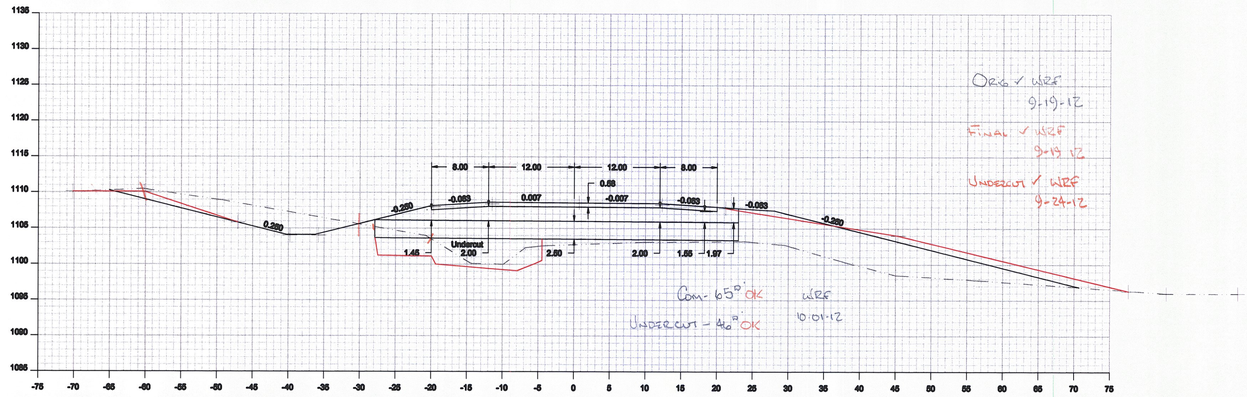
Drawing: Cross Section 110+00 - 111+00	
Project: Cabot Danville	
Drawn By: JMR	Checked By:
Date: 09-18-2012	Date:
Scale: 1 :10	Sheet: of



112+50

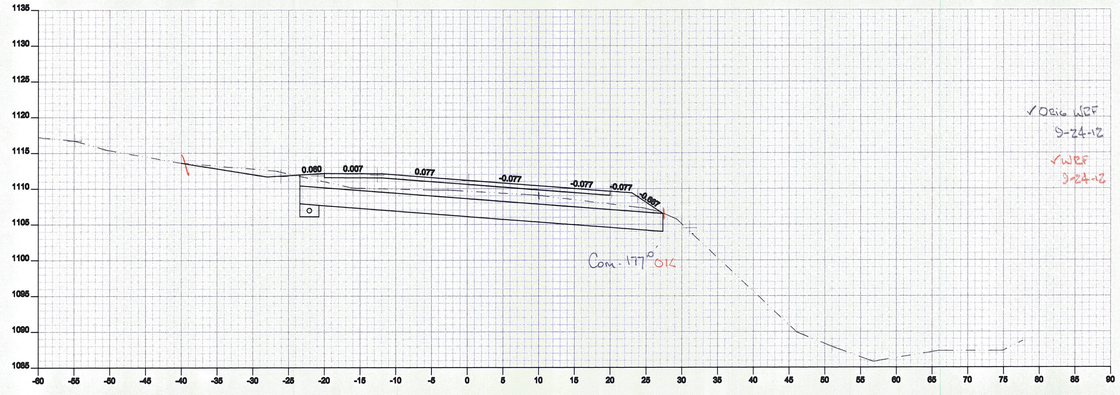


112+00

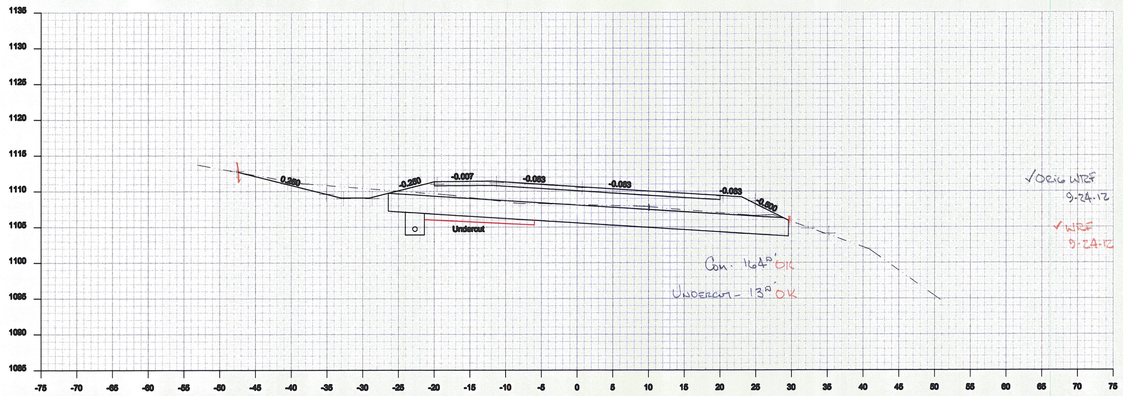


111+50

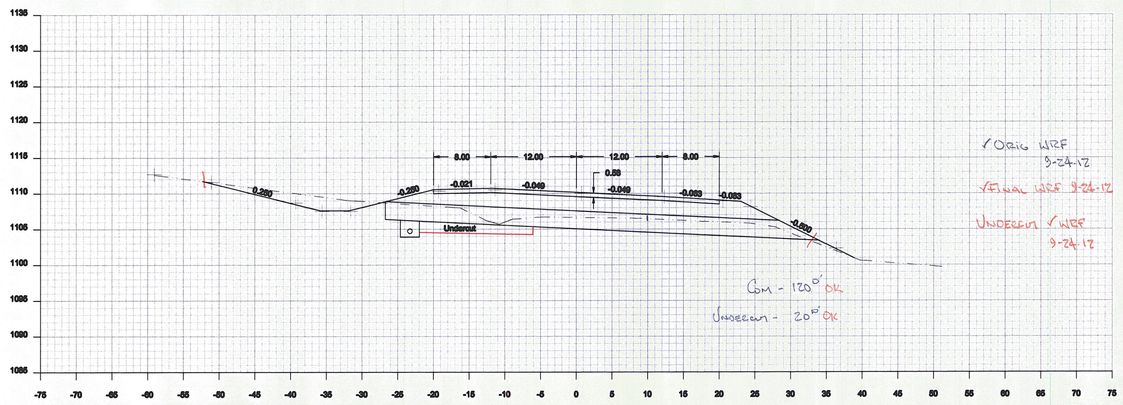
Drawing:	Cross Section 111+50 - 112+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-18-2012	Date:
Scale: 1:10	Sheet: of



114+00

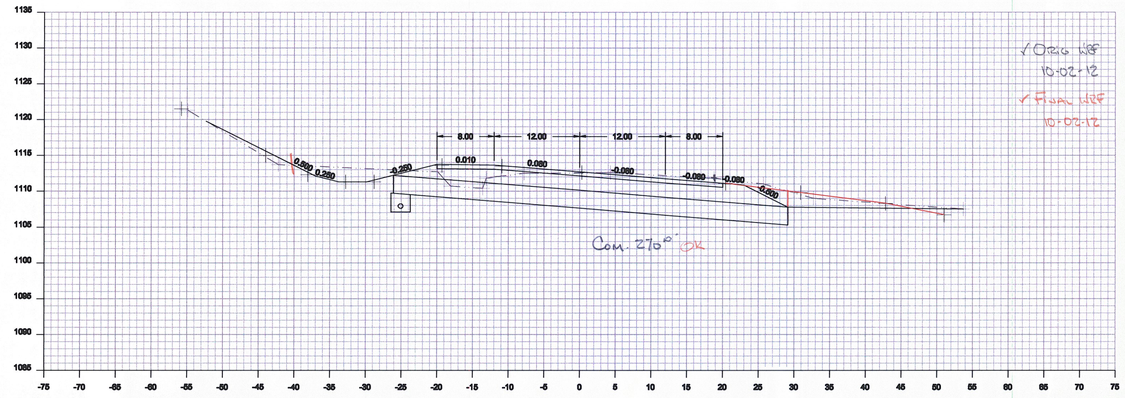


113+50

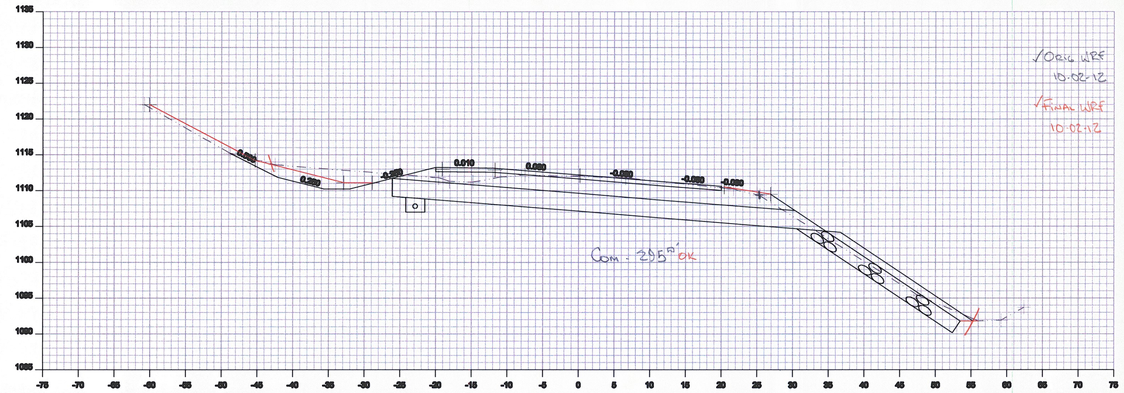


113+00

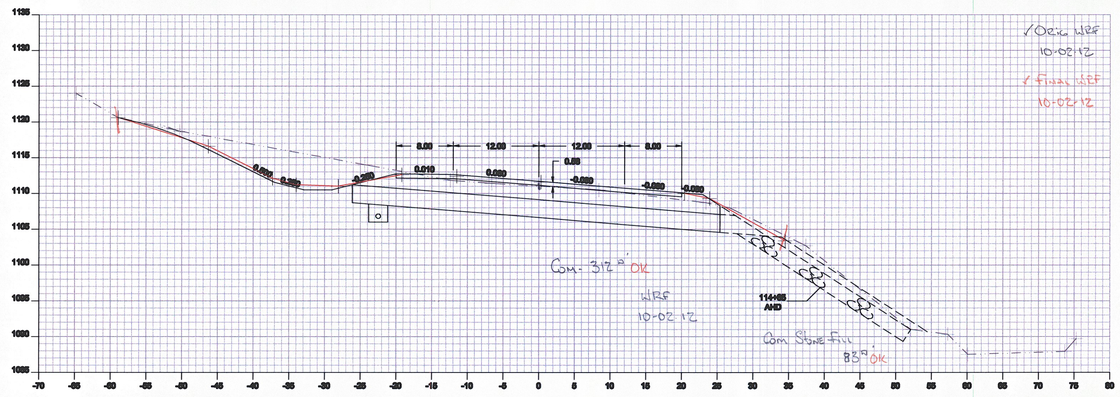
Drawing:	Cross Section 113+00 - 114+00
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-18-2012	Date:
Scale: 1 :10	Sheet: of



115+50

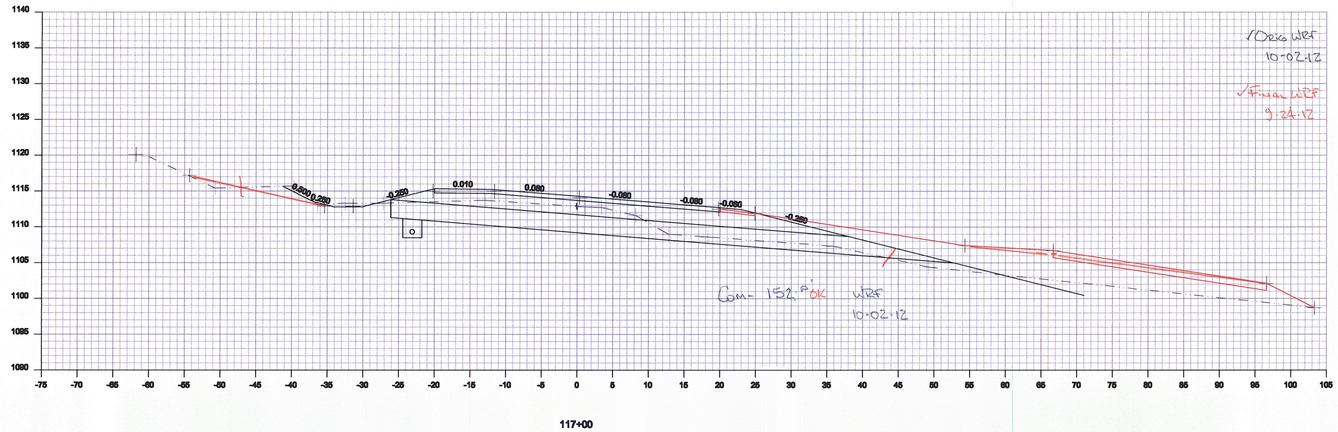


115+00

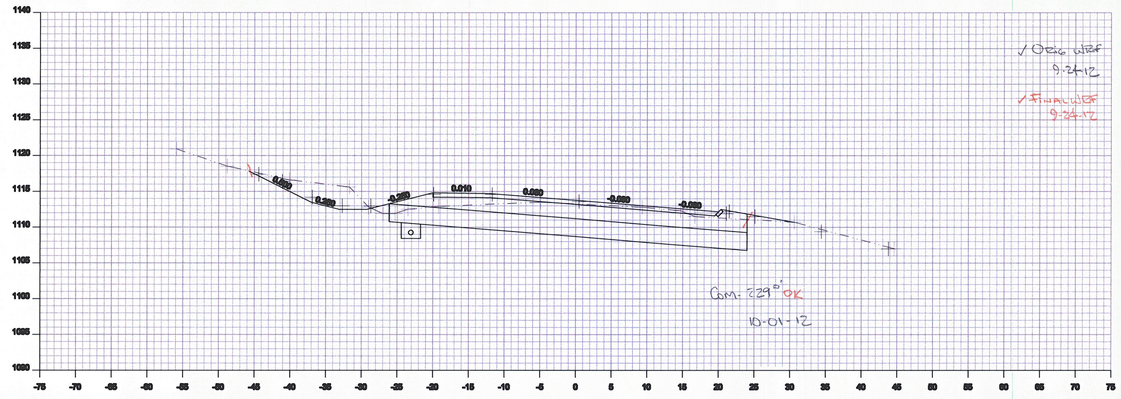


114+50

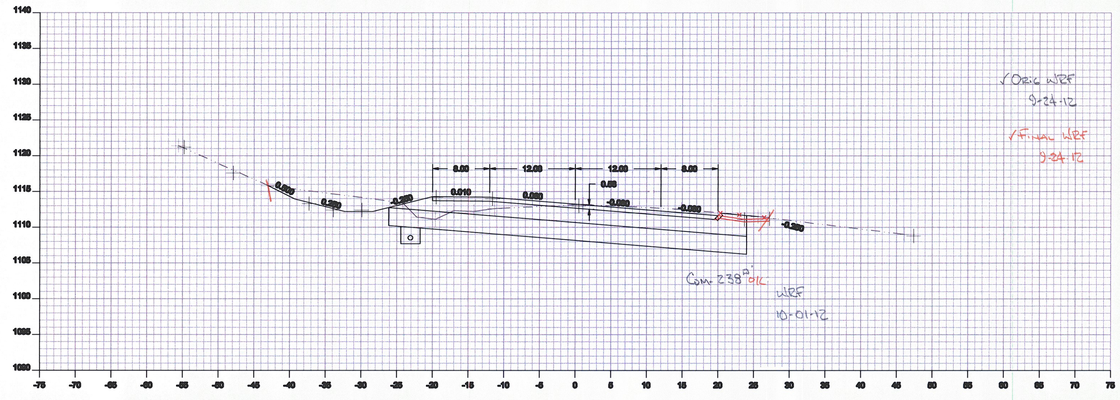
Drawing:	Cross Section 114+50 - 115+50		
Project:	Cabot Danville		
Drawn By:	JMR	Checked By:	
Date:	09-18-2012	Date:	
Scale:	1 :10	Sheet:	of



117+00

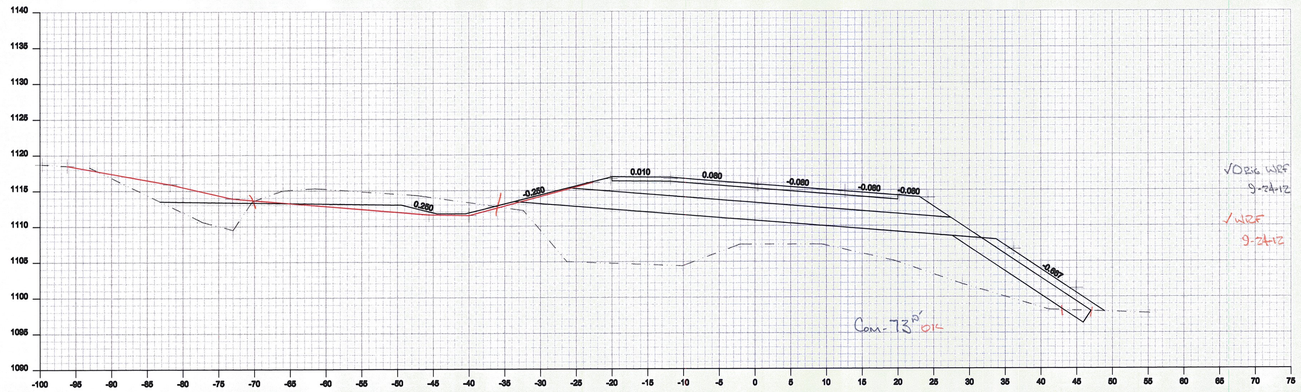


116+50

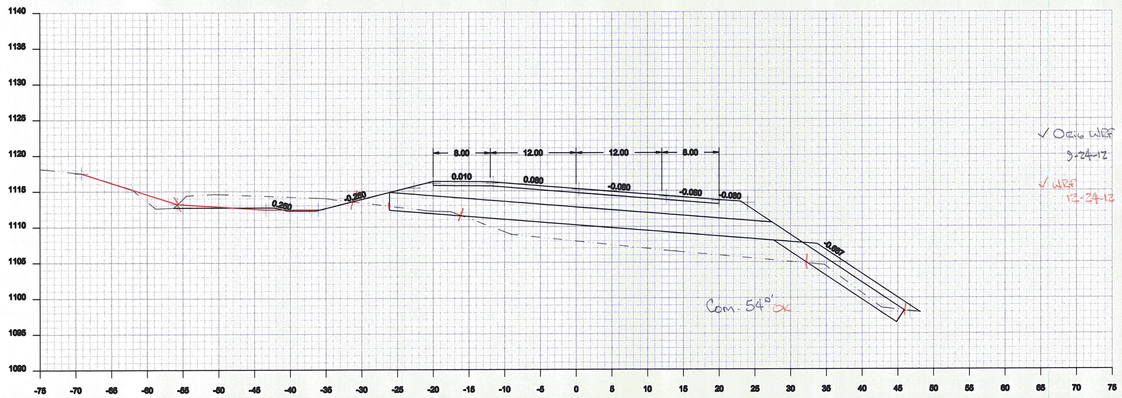


116+00

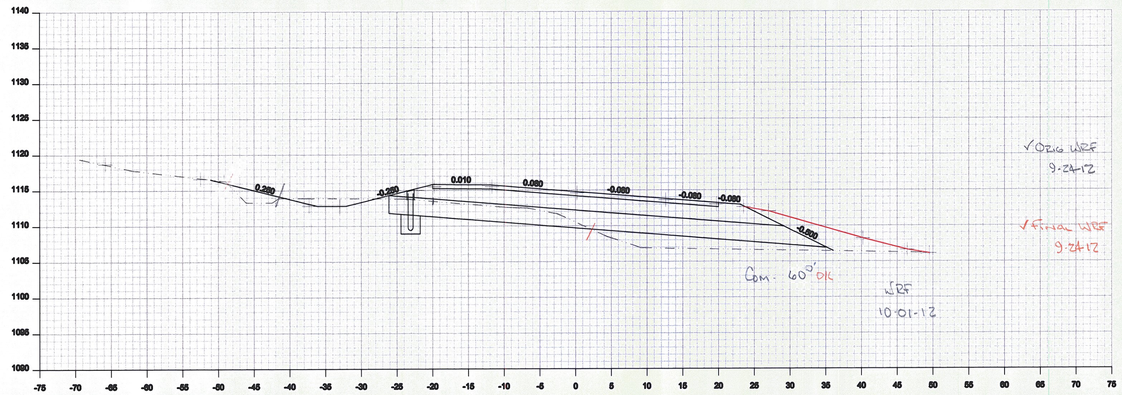
Drawing:	Cross Section 116+00 - 117+00		
Project:	Cabot Danville		
Drawn By:	JMR	Checked By:	
Date:	09-18-2012	Date:	
Scale:	1 :10	Sheet:	of



118+50

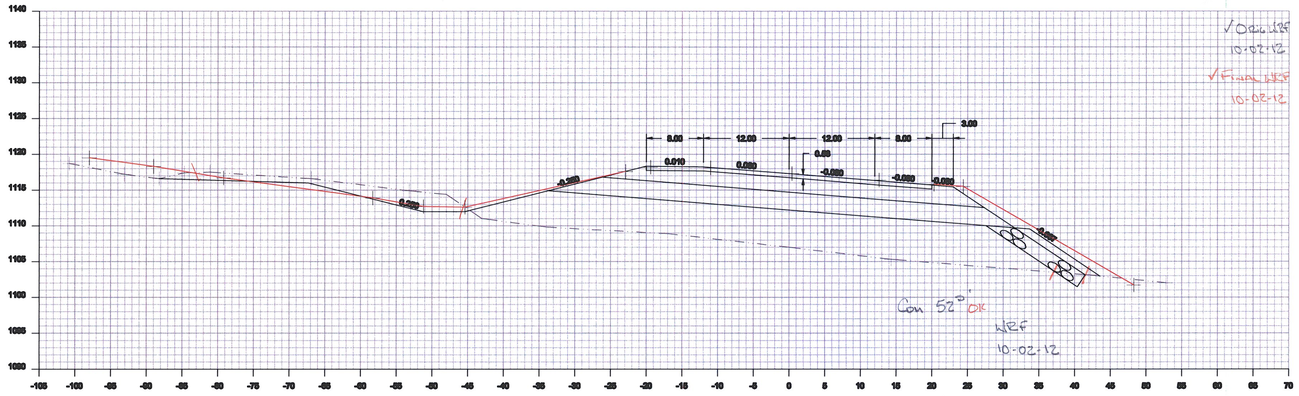


118+00

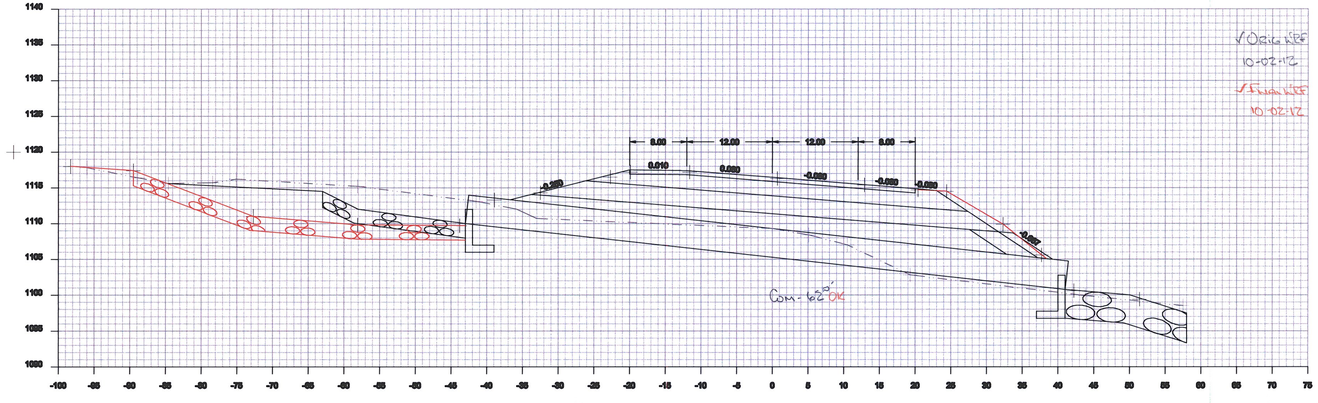


117+50

Drawing:	Cross Section 117+50 - 118+50
Project:	Cabot Denville
Drawn By: JMR	Checked By:
Date: 09-18-2012	Date:
Scale: 1:10	Sheet: of

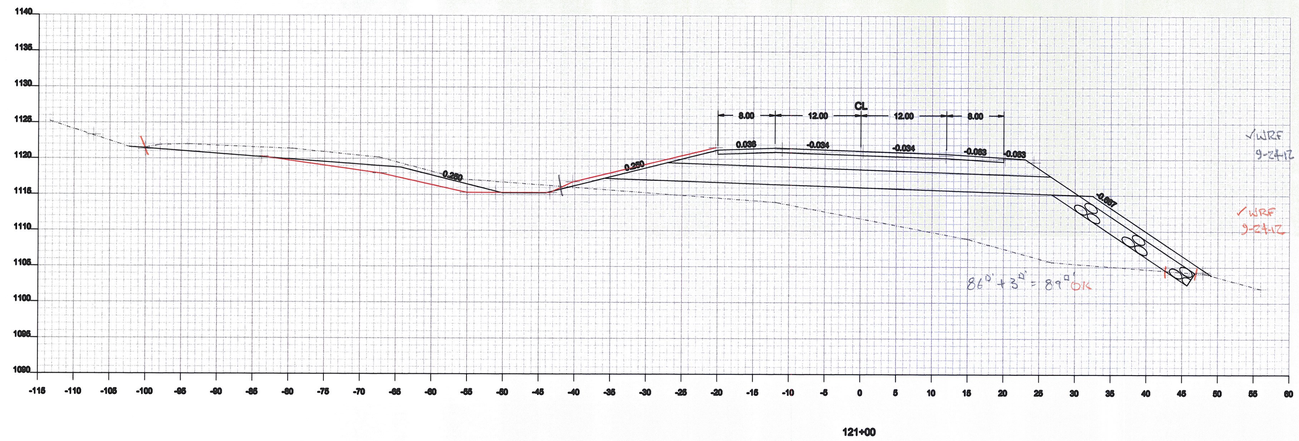


119+00

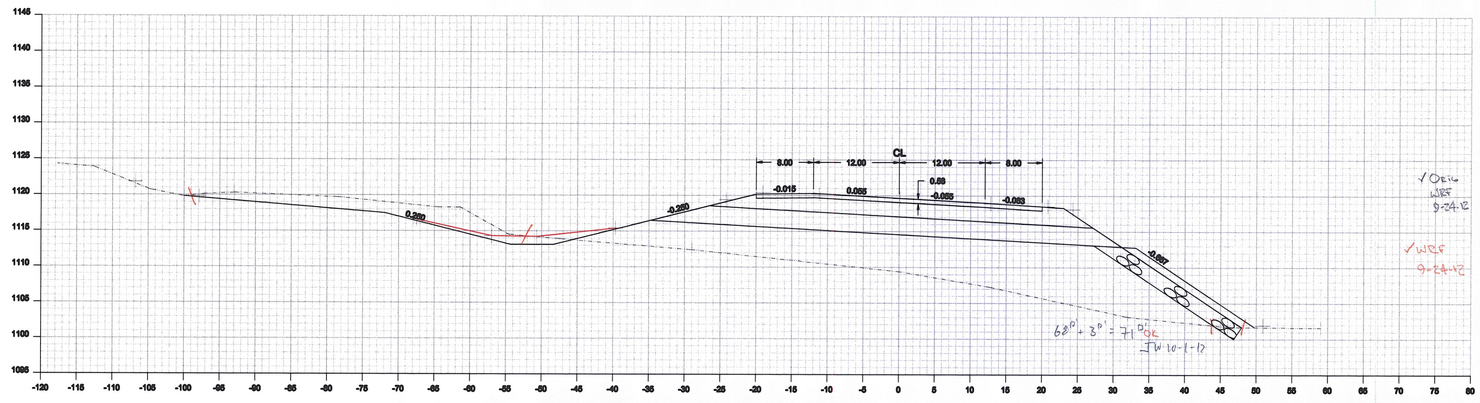


119+00

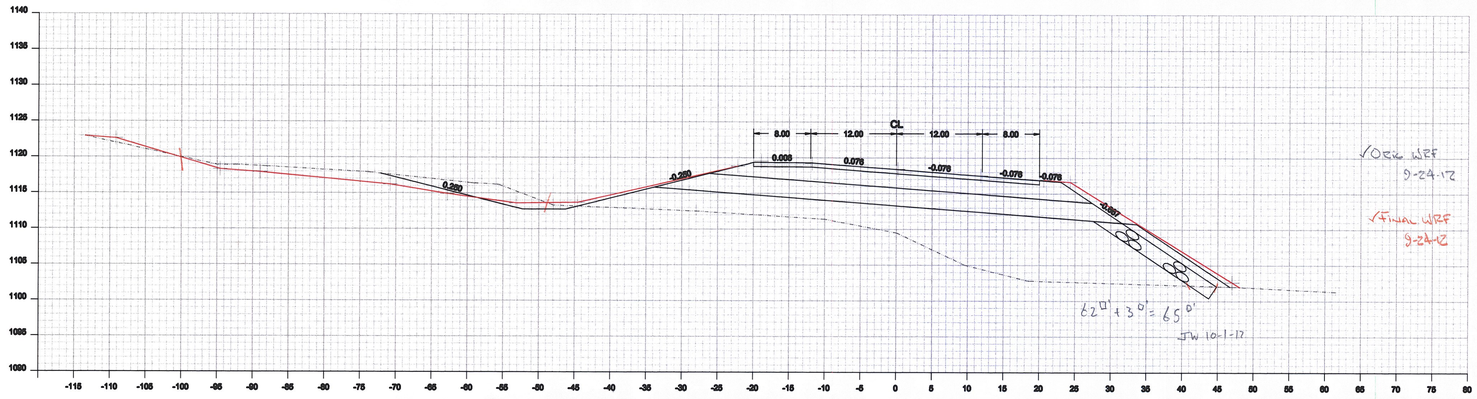
Drawing:	Cross Section 119+00 - 119+50		
Project:	Cabot Danville		
Drawn By:	JMR	Checked By:	
Date:	09-18-2012	Date:	
Scale:	1 :10	Sheet:	of



121+00

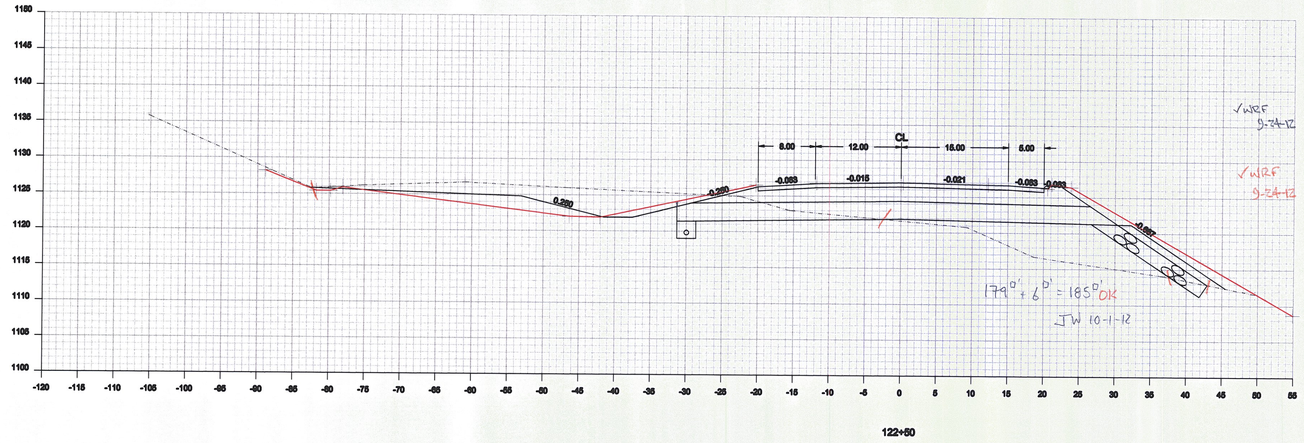


120+50

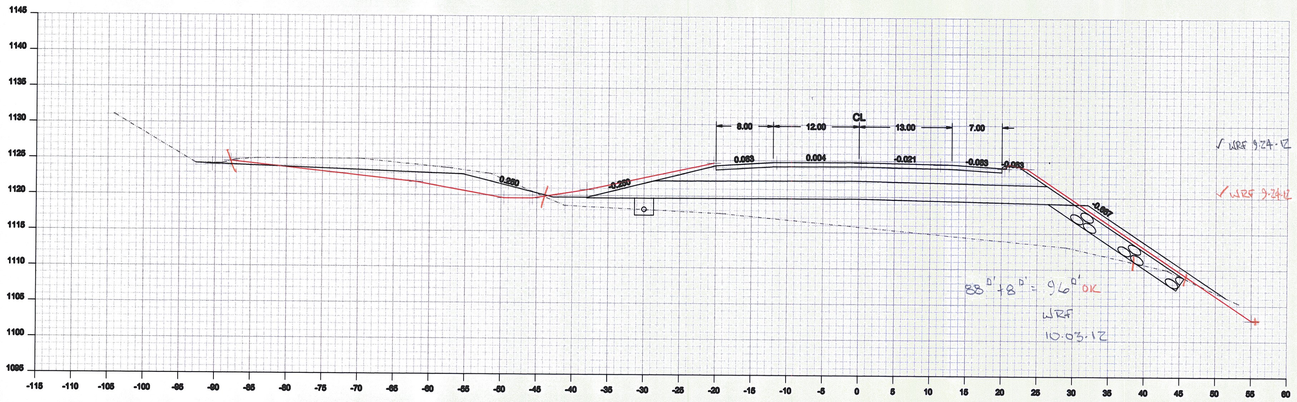


120+00

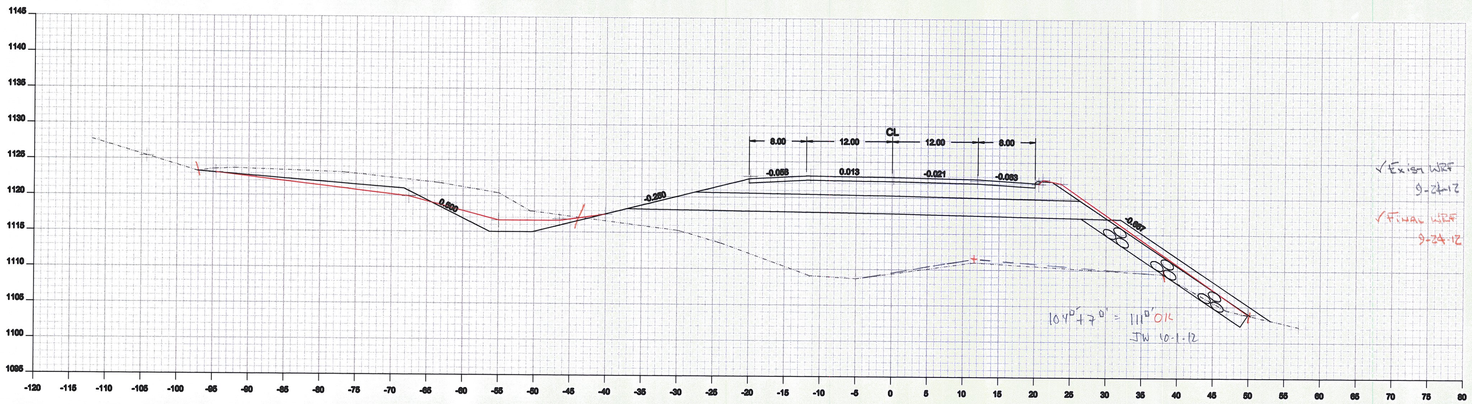
Drawing:	Section 120+00 - 121+00
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-19-2012	Date:
Scale: 1 : 10	Sheet: of



122+50

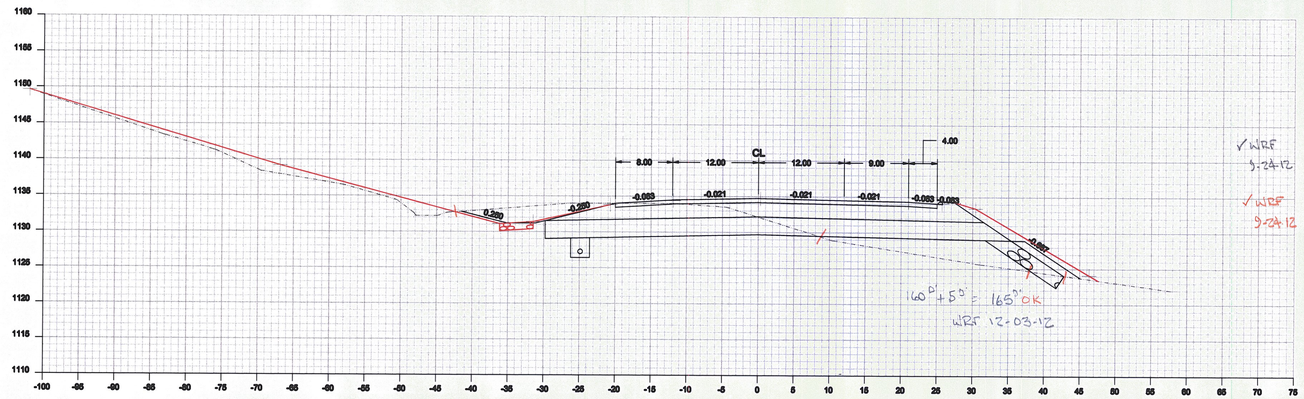


122+00

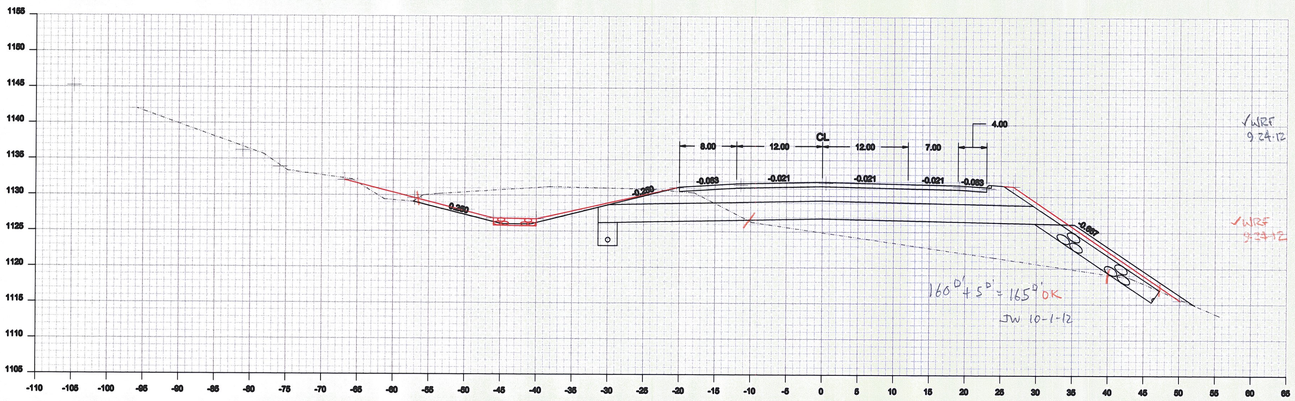


121+50

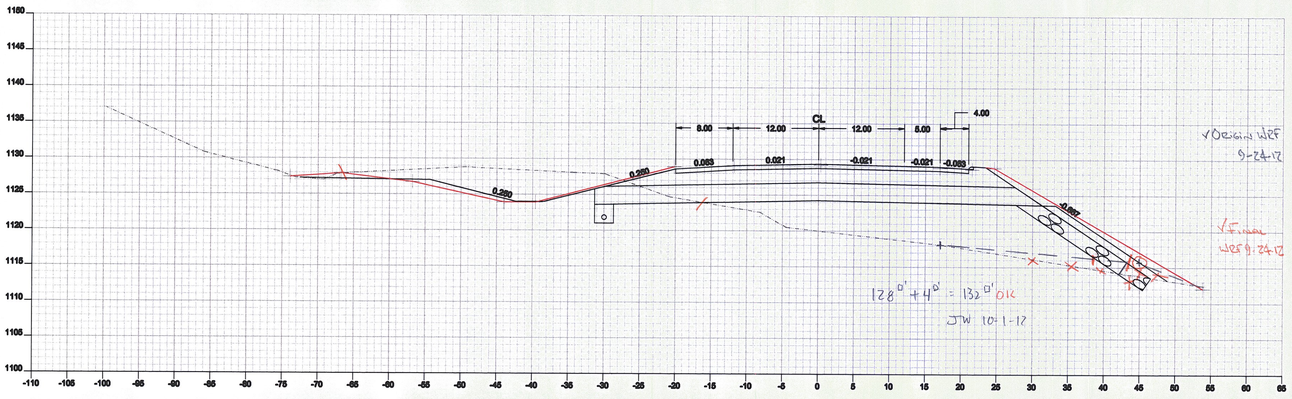
Drawing:	Section 121+50 - 122+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-19-2012	Date:
Scale: 1 : 10	Sheet: of



124+00

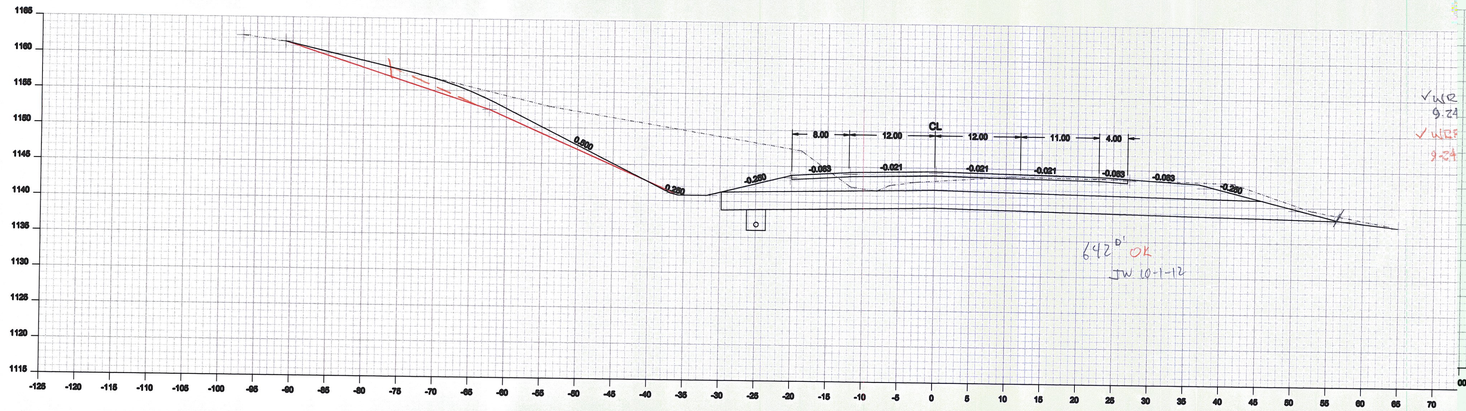


123+50



123+00

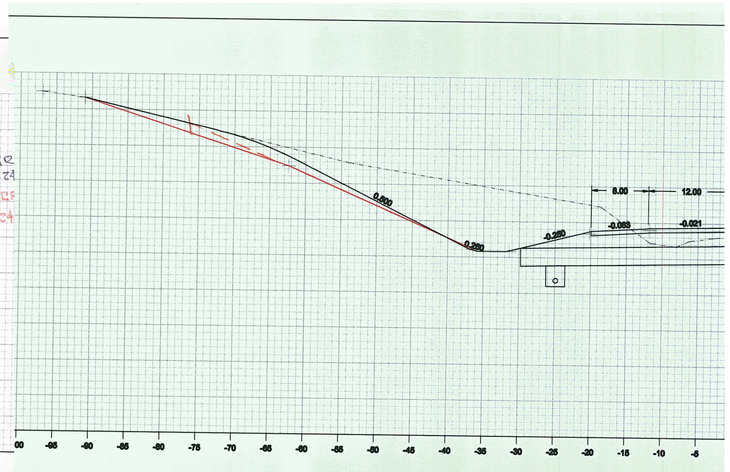
Drawing:	Section 123+00 - 124+00
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-19-2012	Date:
Scale: 1 : 10	Sheet: of



642' OK
JW 10-1-12

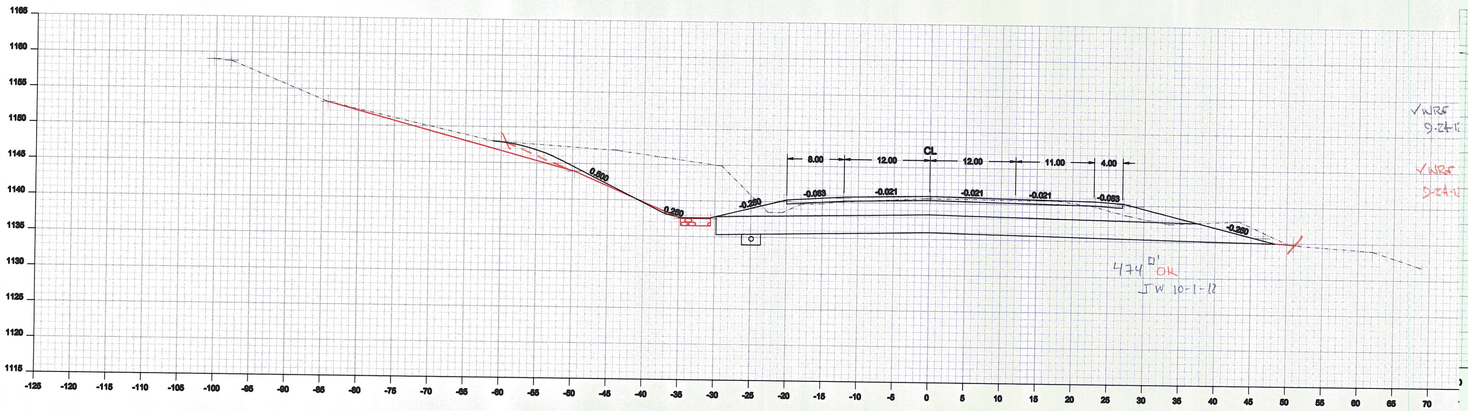
√WRF
9-24-12

125+50



√WRF
9-24-12

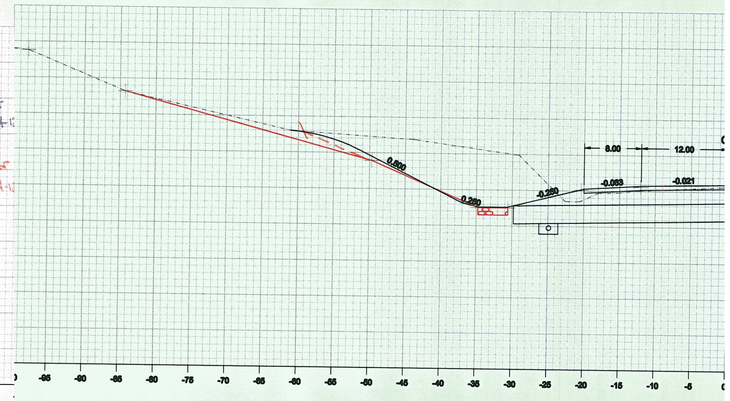
12



474' OK
JW 10-1-12

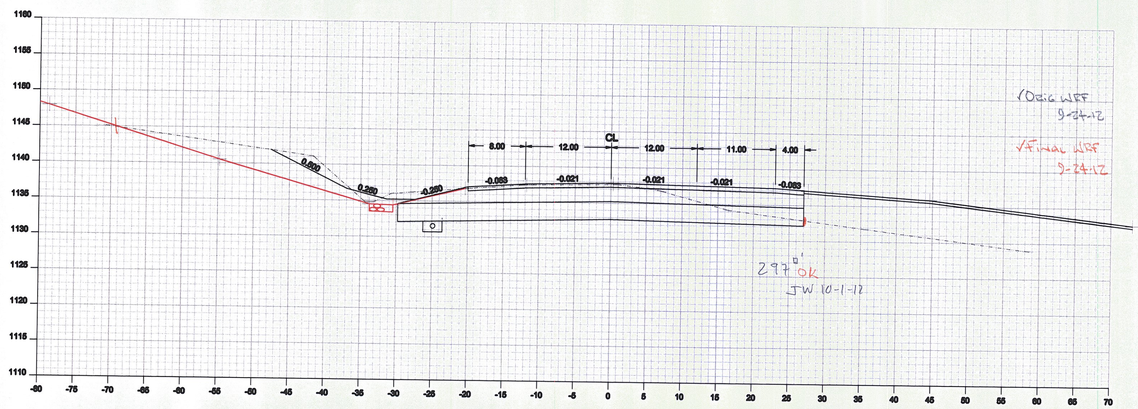
√WRF
9-24-12

125+00



√WRF
9-24-12

125

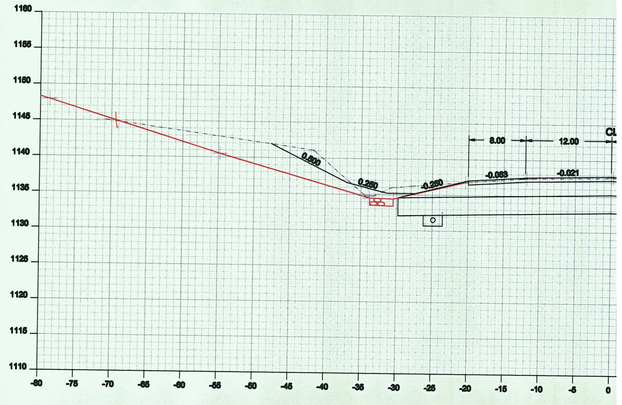


297' OK
JW 10-1-12

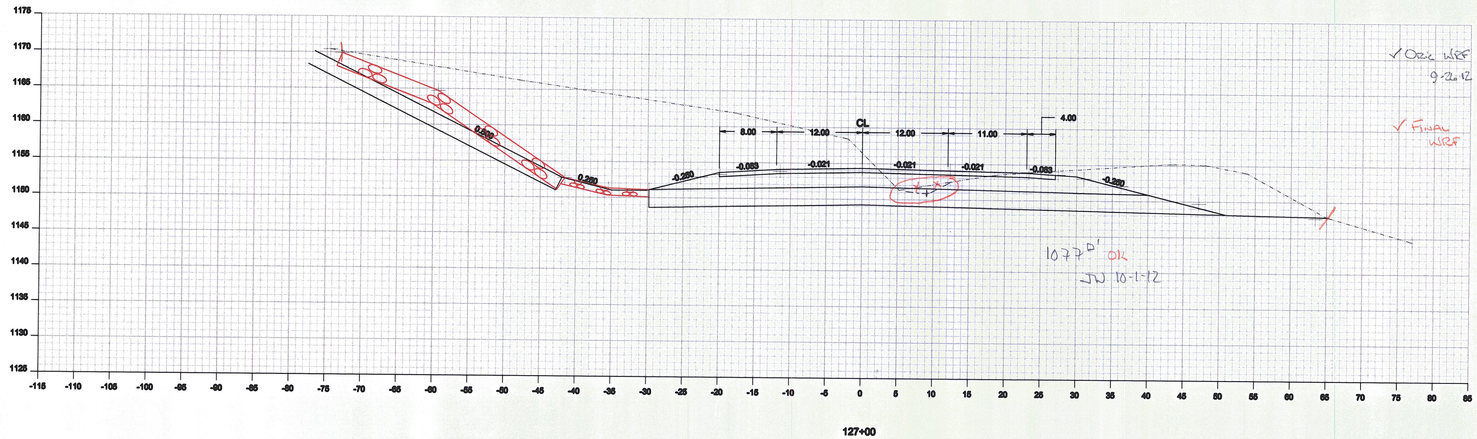
√Orig WRF
9-24-12

√Final WRF
9-24-12

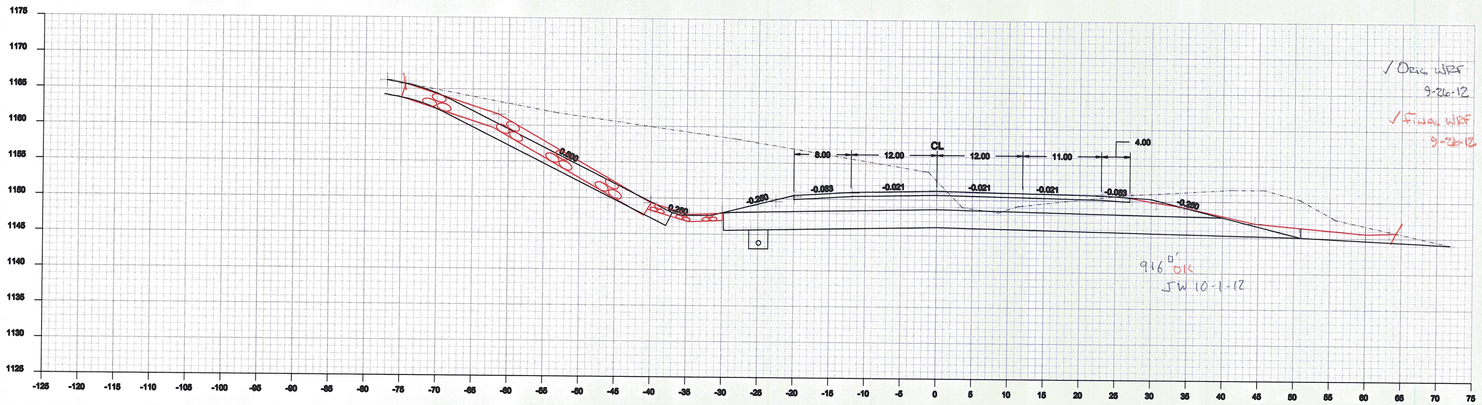
124+50



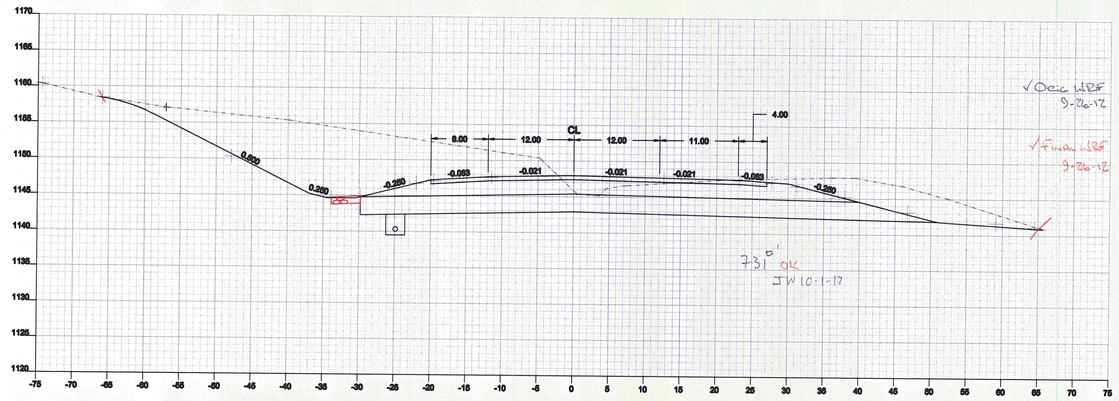
124+5



127+00

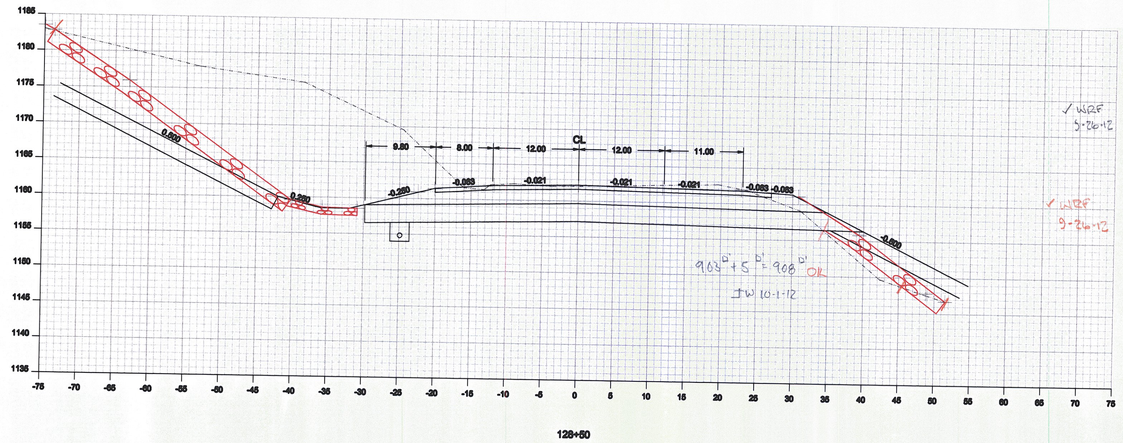


126+50

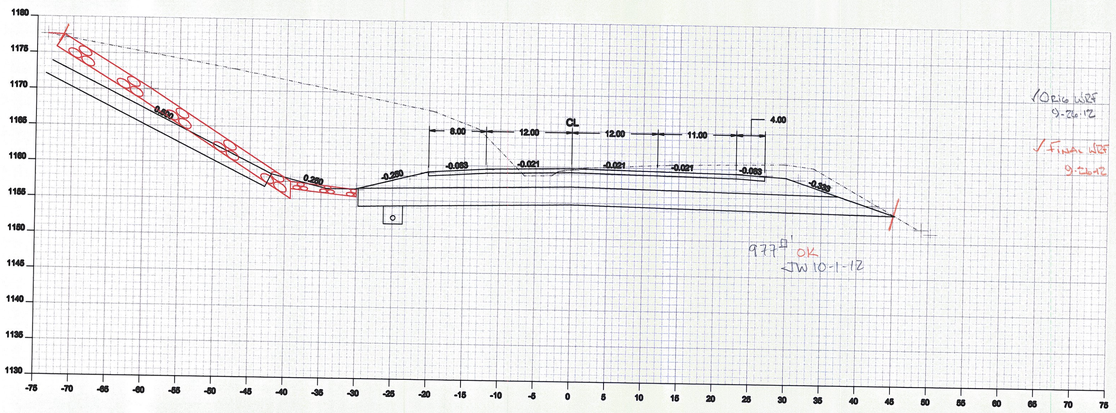


126+00

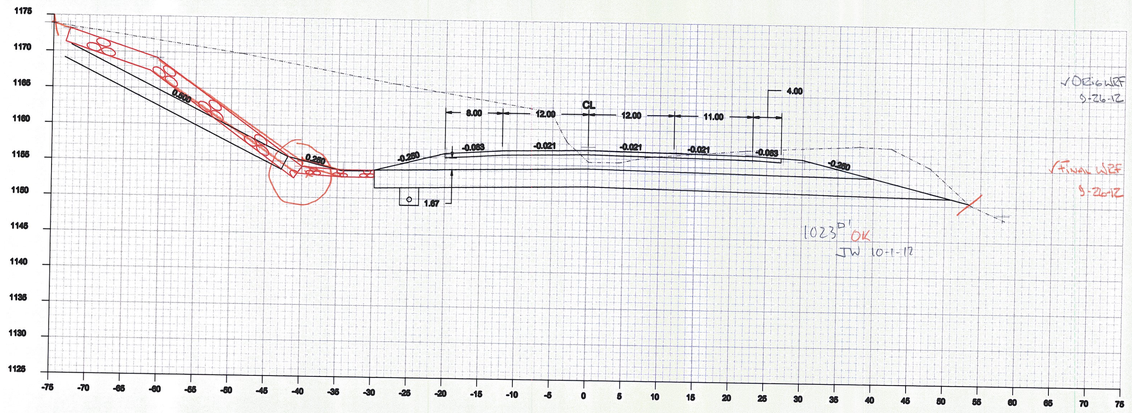
Drawing:	Section 126+00- 127+00
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-19-2012	Date:
Scale: 1 : 10	Sheet: of



128+50

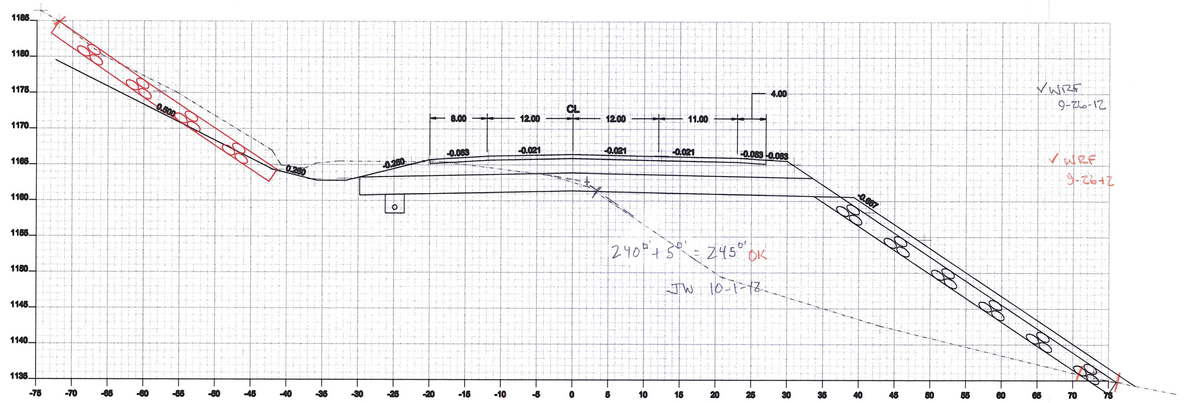


128+00

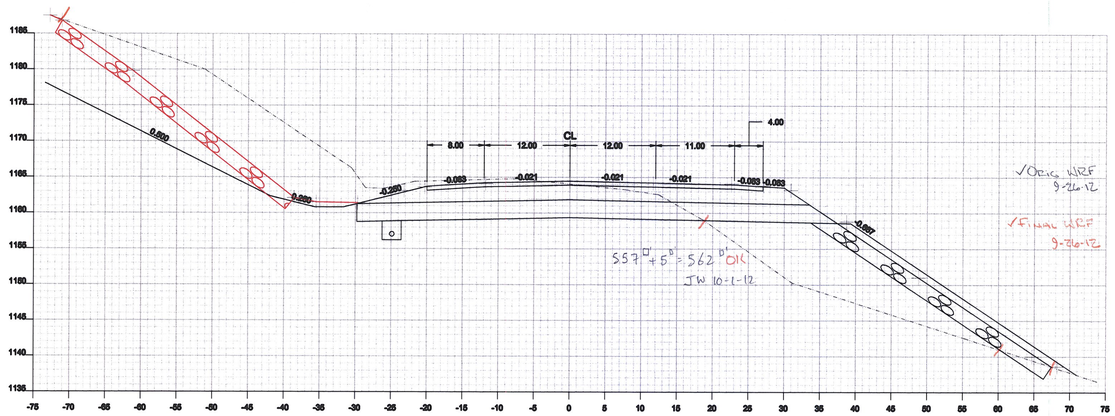


127+50

Drawing:	Section 127+50 - 128+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-19-2012	Date:
Scale: 1 : 10	Sheet: of

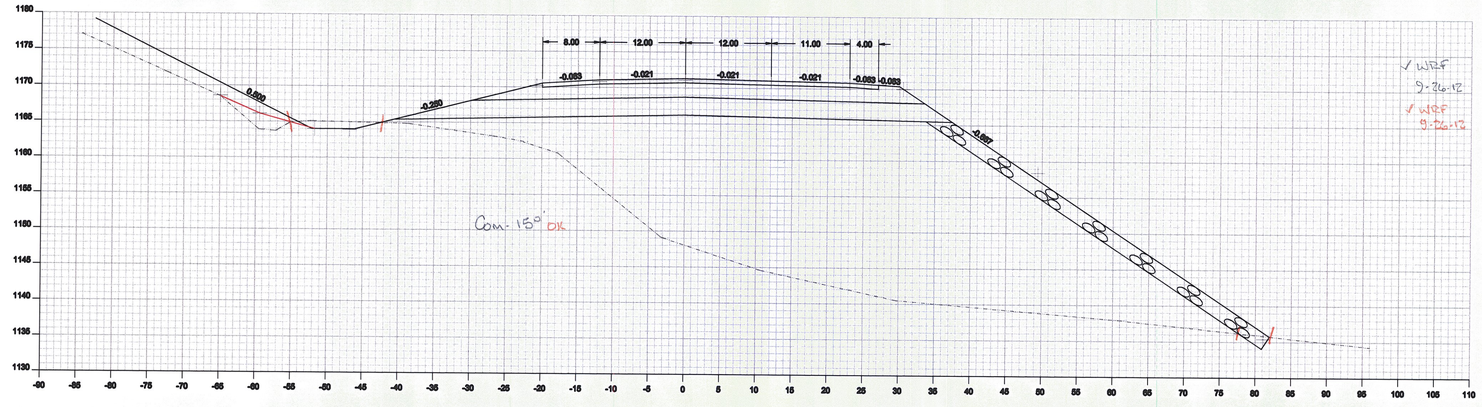


129+50

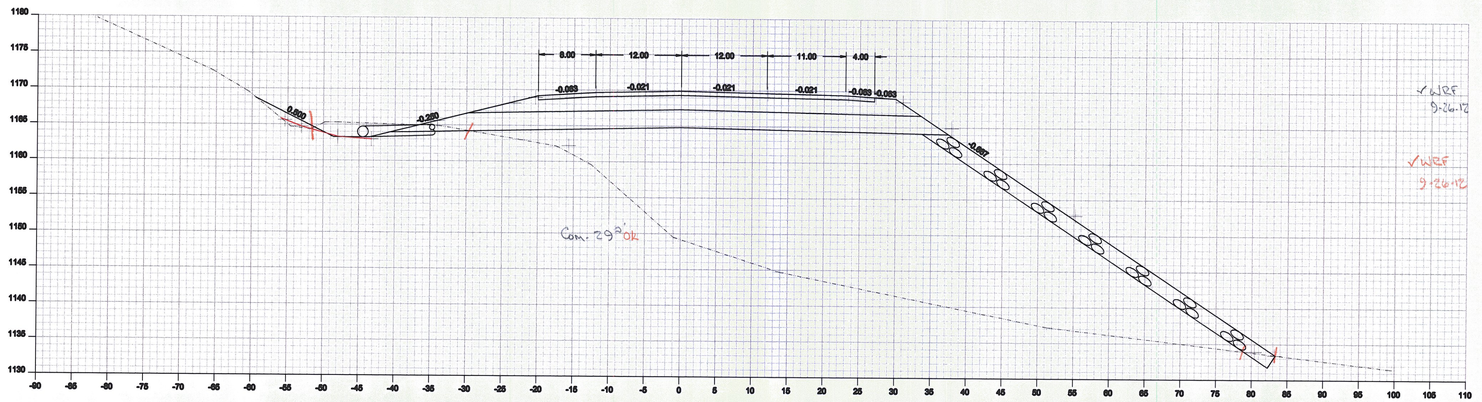


129+00

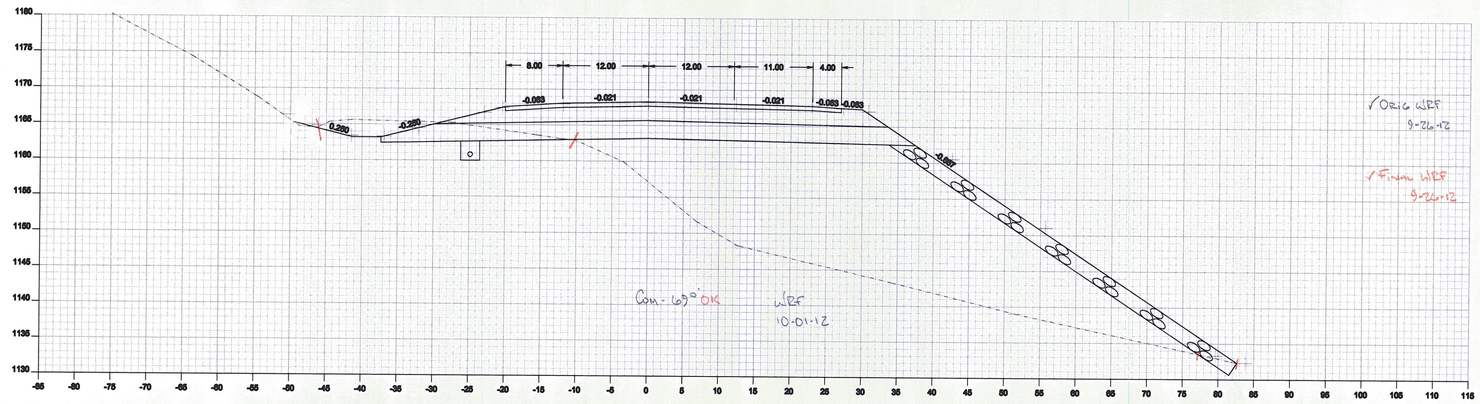
Drawing:	Section 129+00 - 129+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-19-2012	Date:
Scale: 1 : 10	Sheet: of



131+00

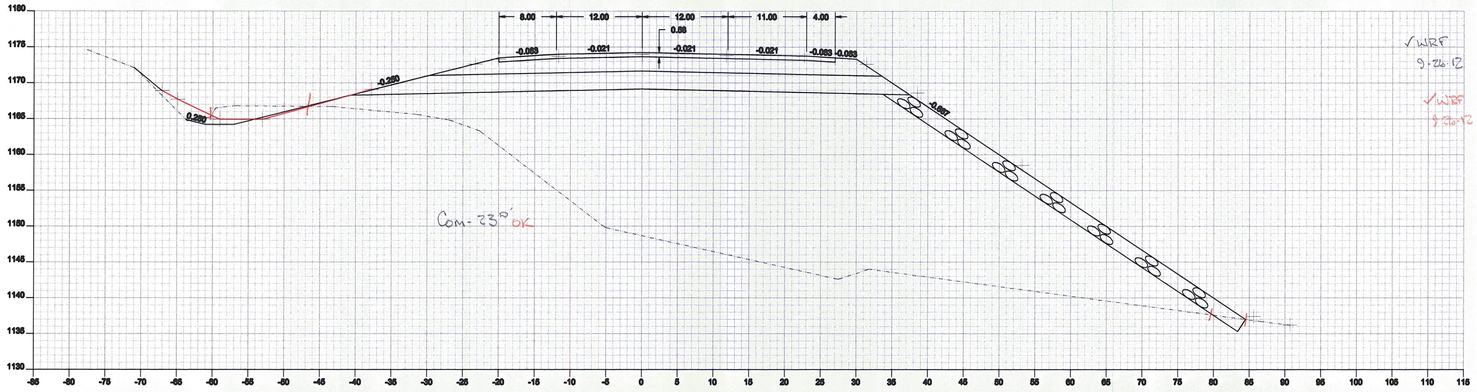


130+50

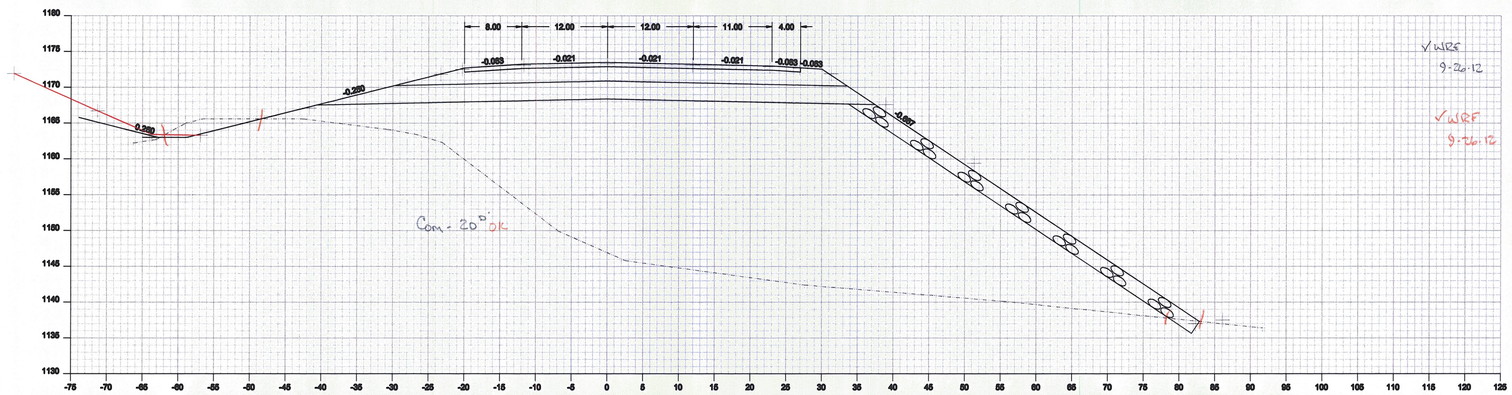


130+00

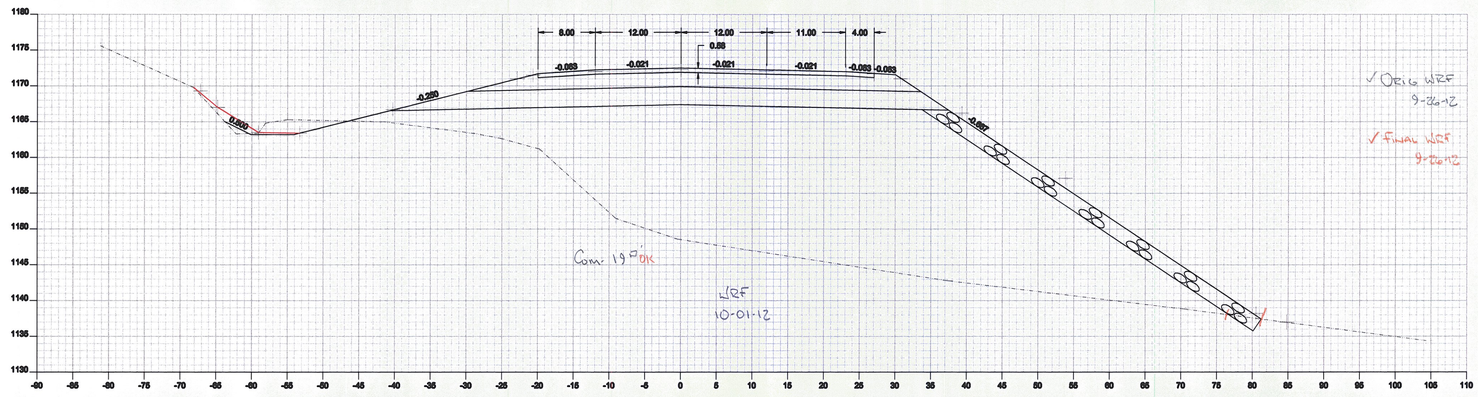
Drawing:	Cross Section 130+00 to 131+00
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 08-21-2012	Date:
Scale: 1 : 10	Sheet: of



132+50

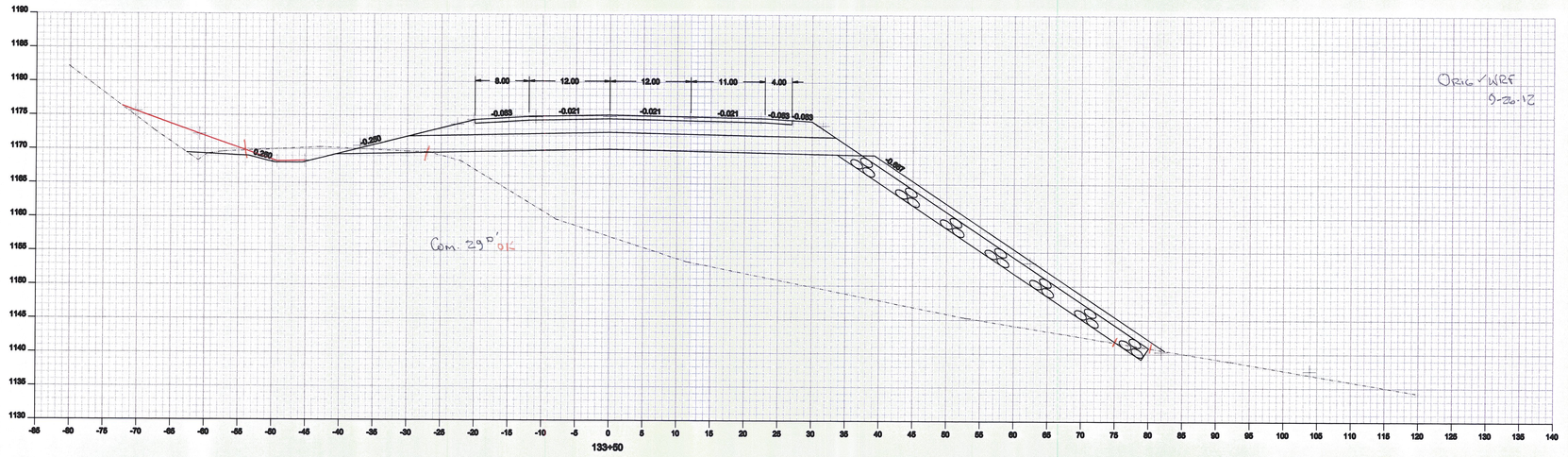


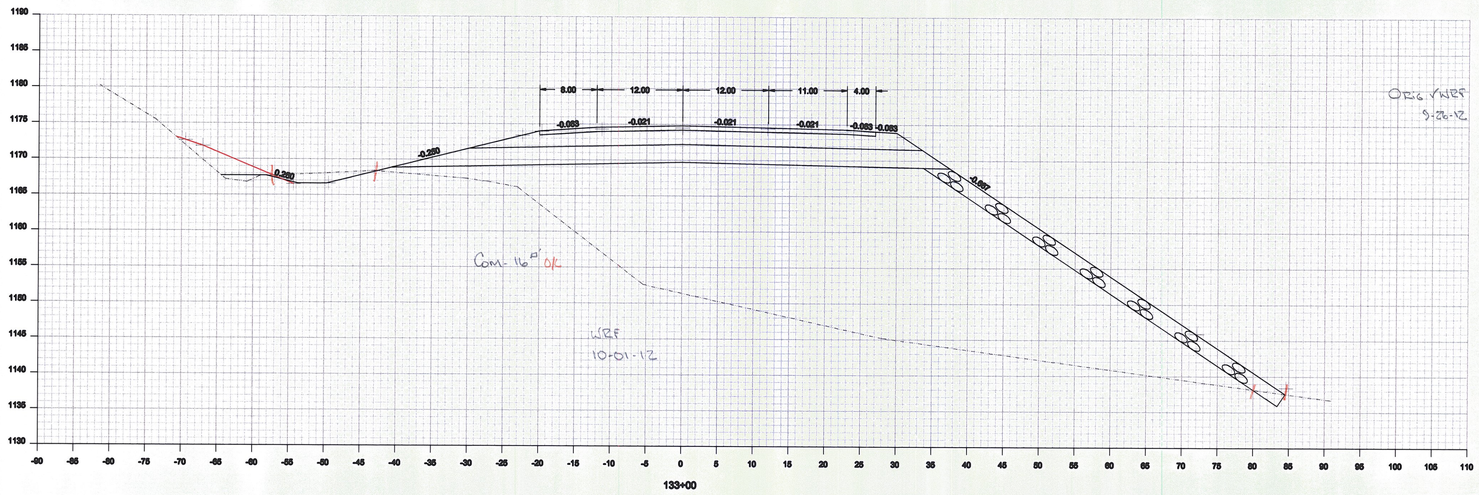
132+00



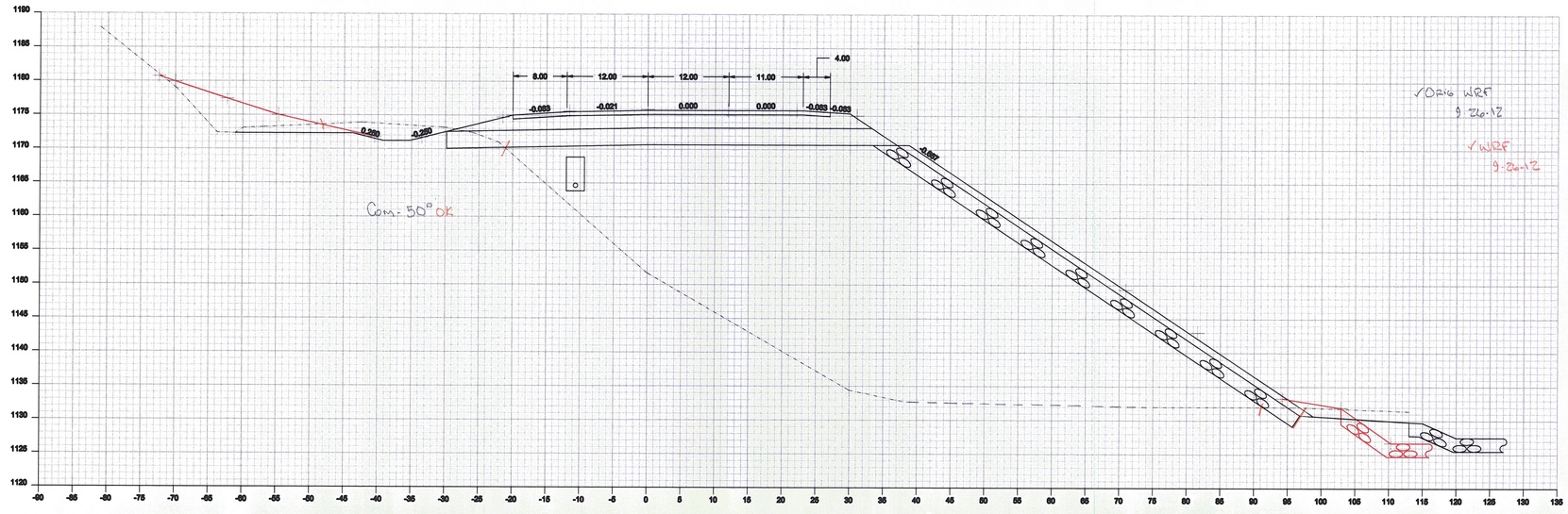
131+50

Drawing:	Cross Section 131+50 to 132+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-21-2012	Date:
Scale: 1 : 10	Sheet: of

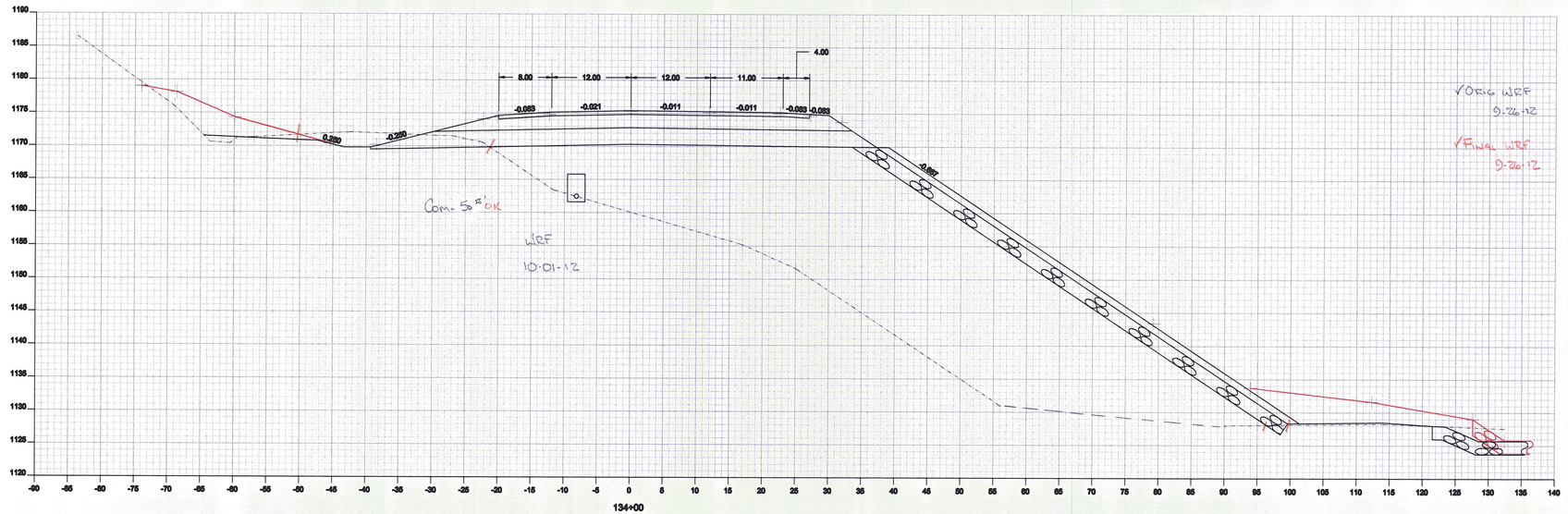




Drawing:	Cross Section 133+00 to 133+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-21-2012	Date:
Scale: 1 : 10	Sheet: of

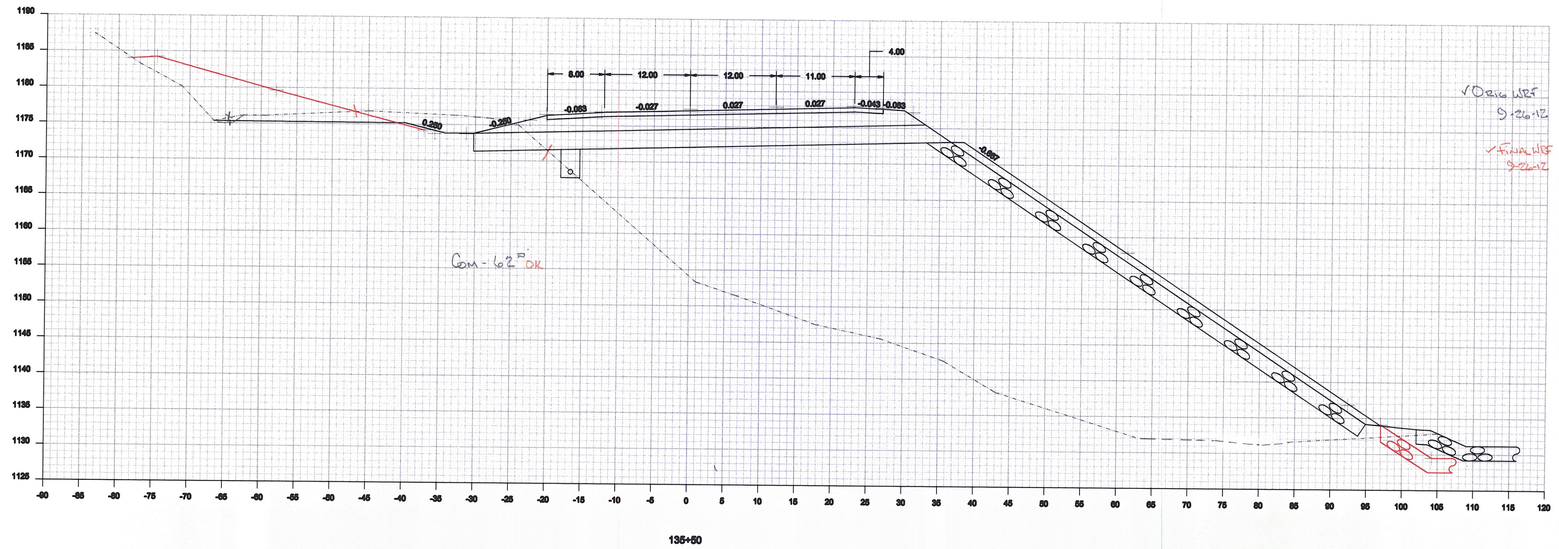


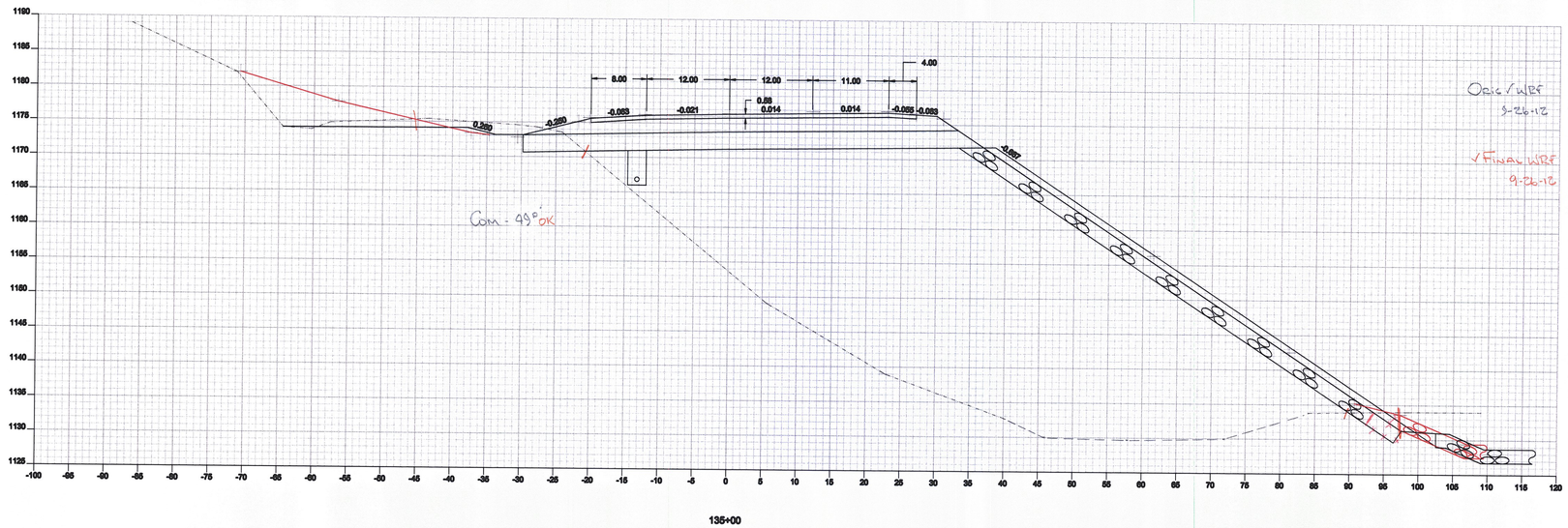
134+50



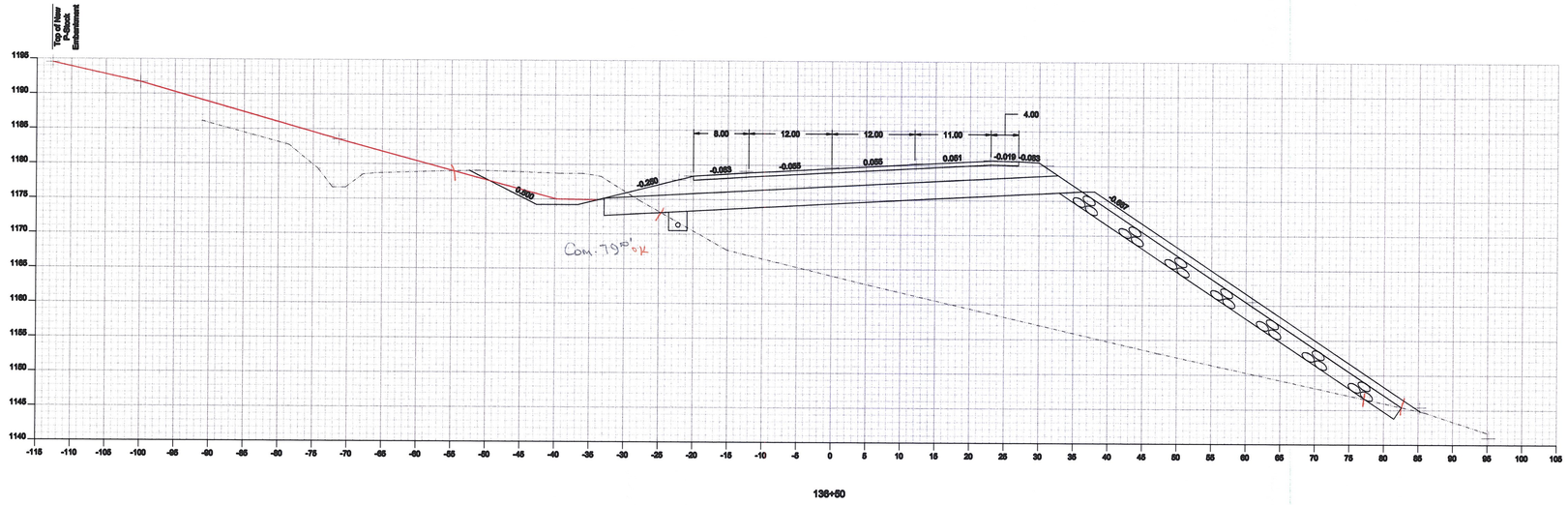
134+00

Drawing:	Cross Section 134+00 to 134+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-21-2012	Date:
Scale: 1 : 10	Sheet: of

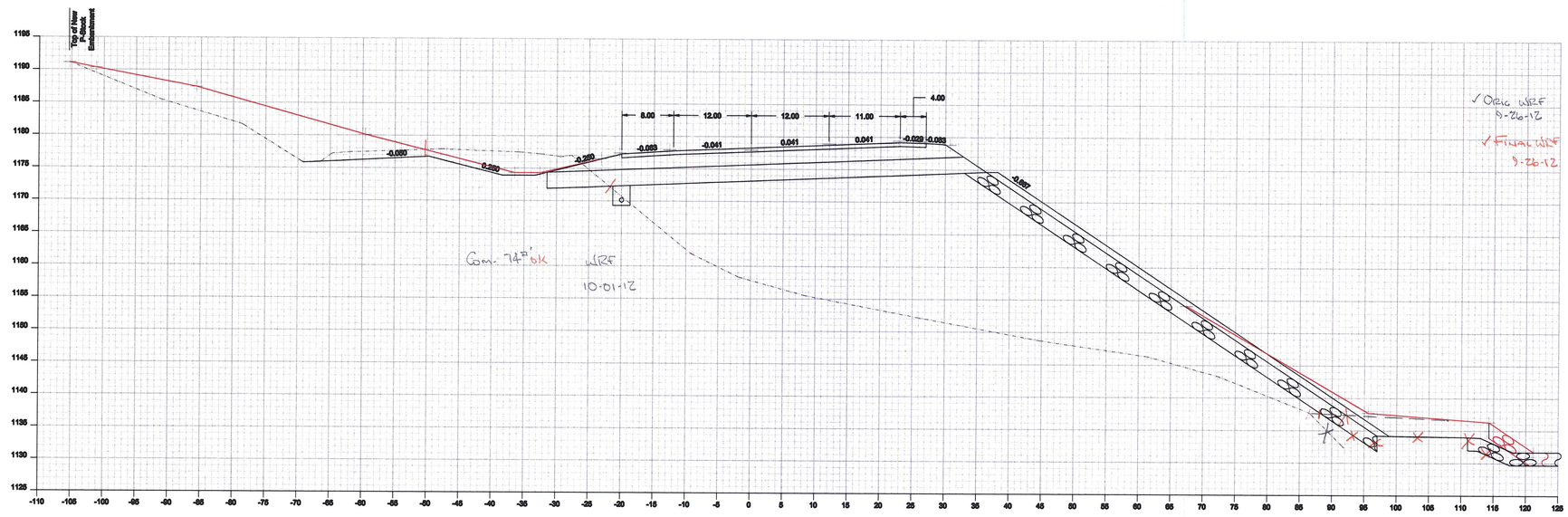




Drawing:	Cross Section 135+00 to 135+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-21-2012	Date:
Scale: 1 : 10	Sheet: of

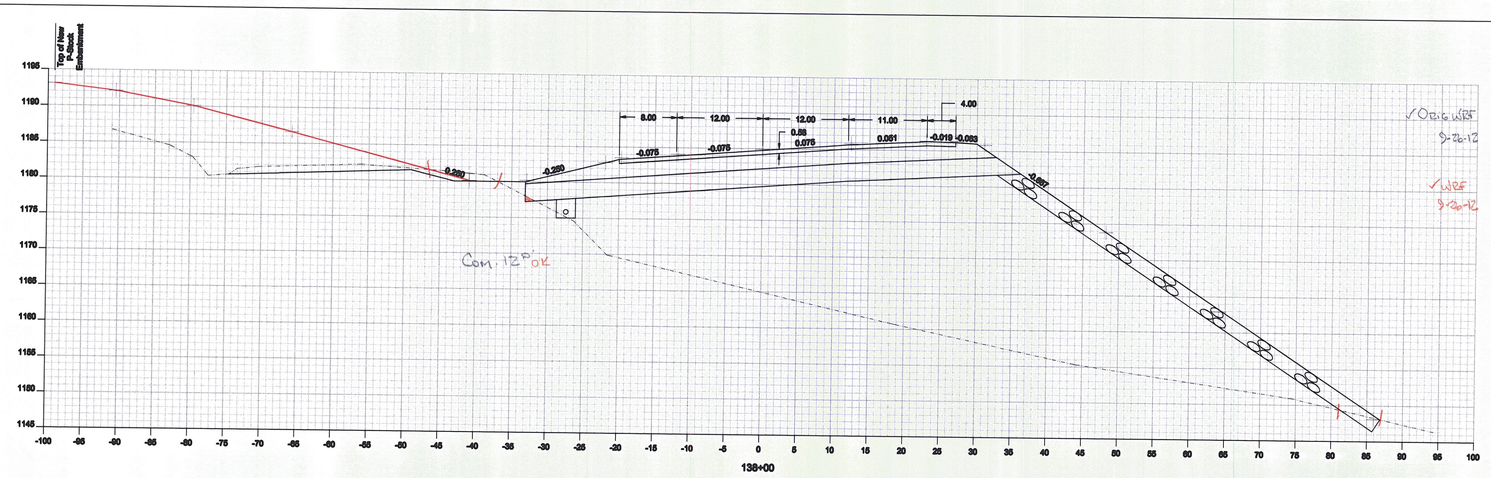


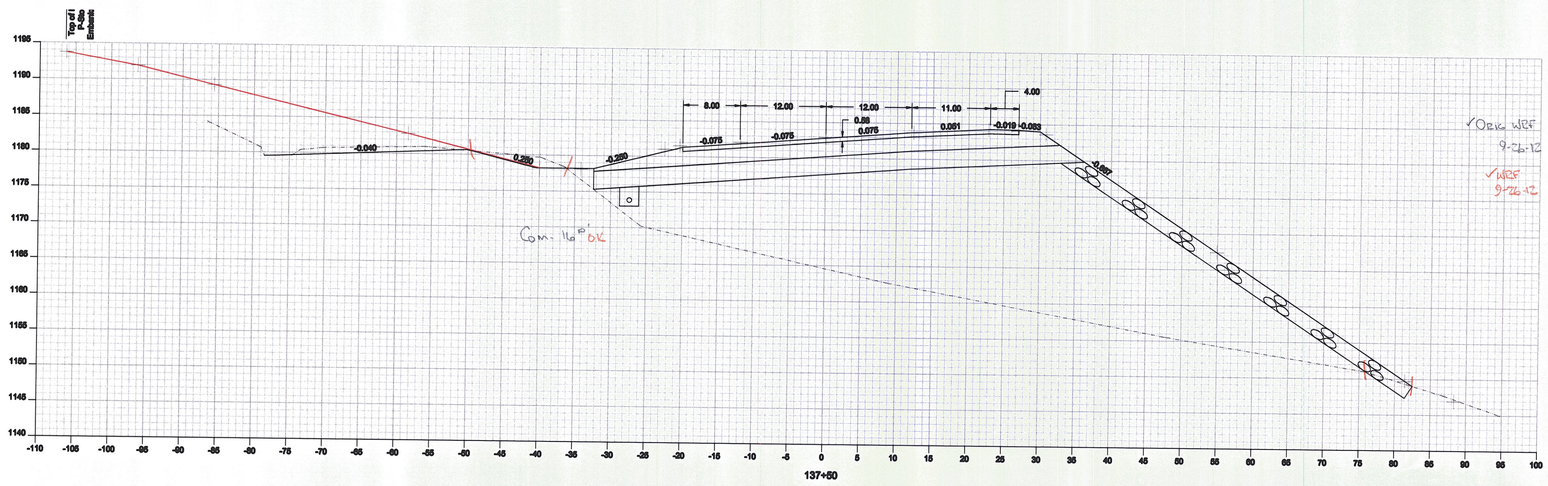
136+50

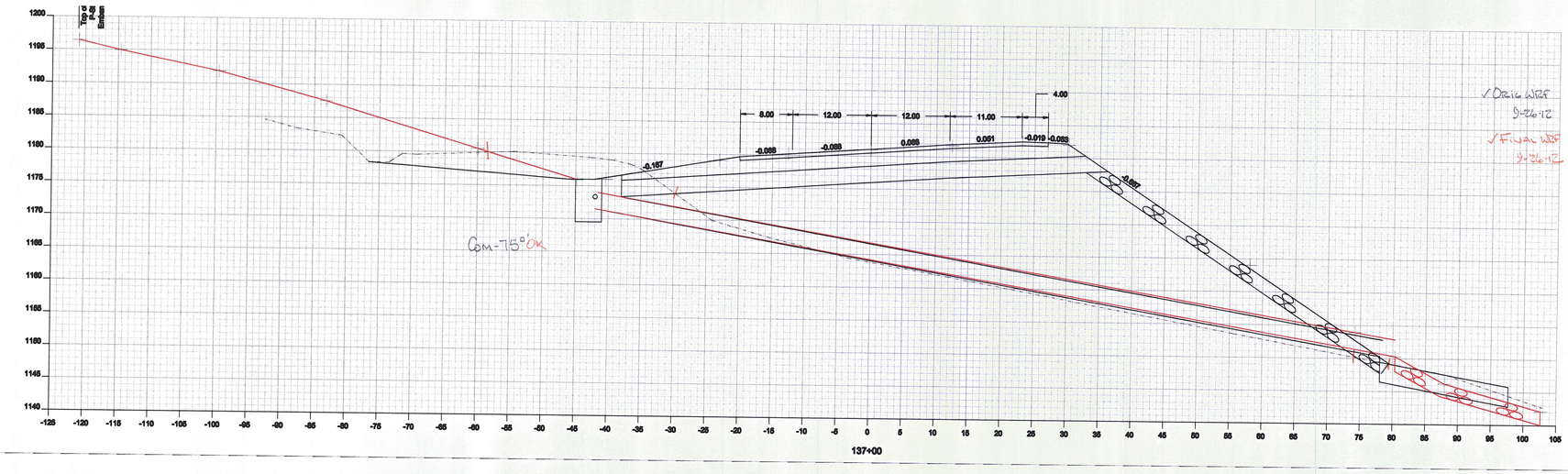


136+00

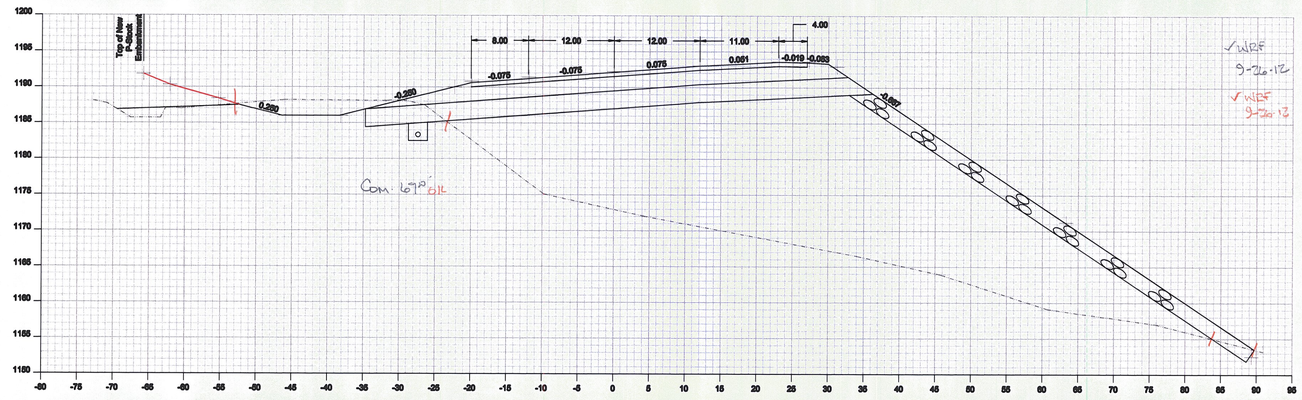
Drawing:	Cross Section 136+00 to 136+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-21-2012	Date:
Scale: 1 : 10	Sheet: of



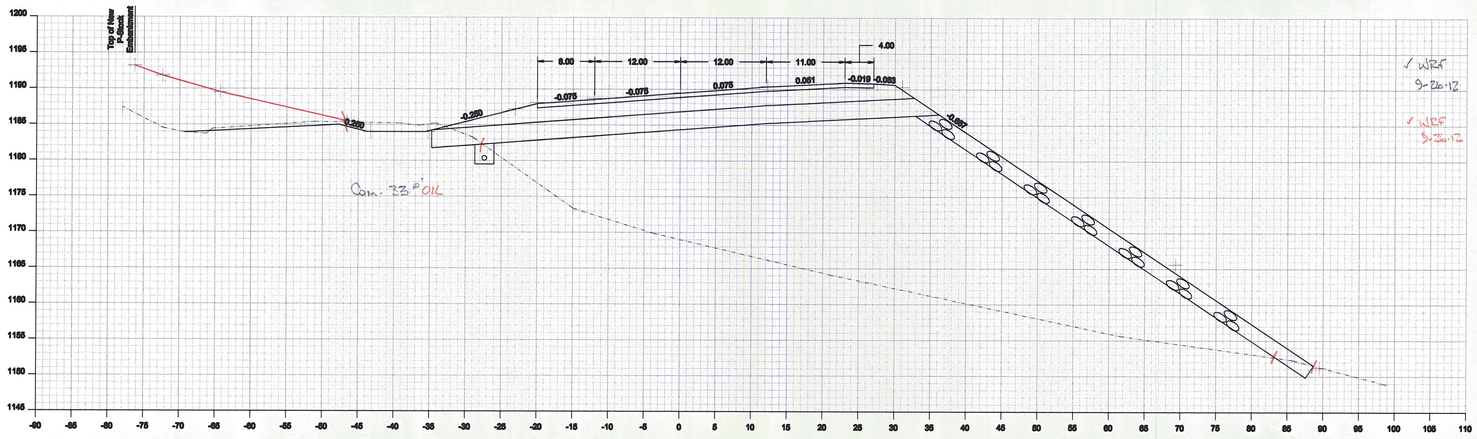




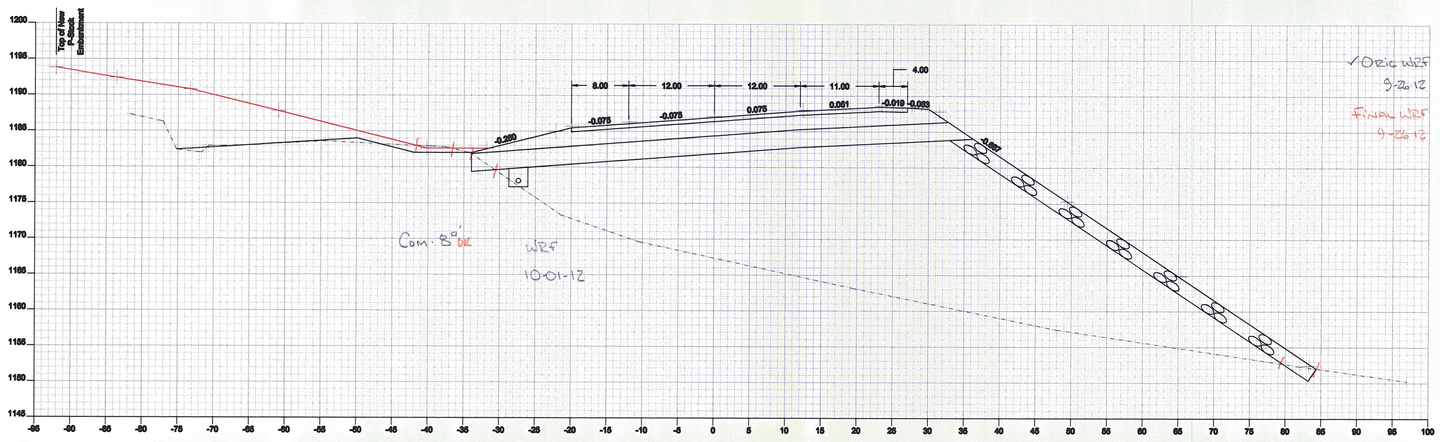
Drawing:	Cross Section 137+00 to 138+00
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-21-2012	Date:
Scale: 1 : 10	Sheet: of



139+50

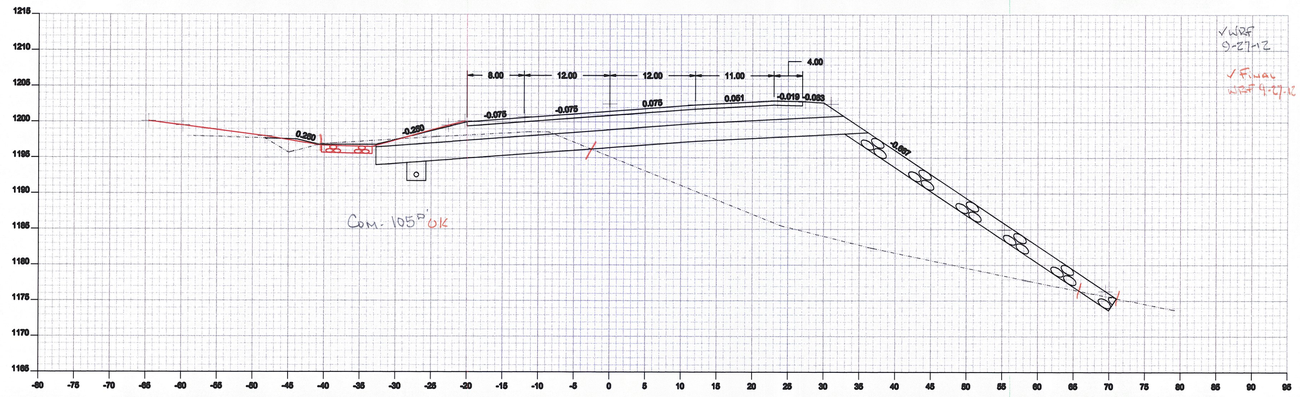


139+00



138+50

Drawing:	Cross Section 138+50 to 139+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-21-2012	Date:
Scale: 1 : 10	Sheet: of

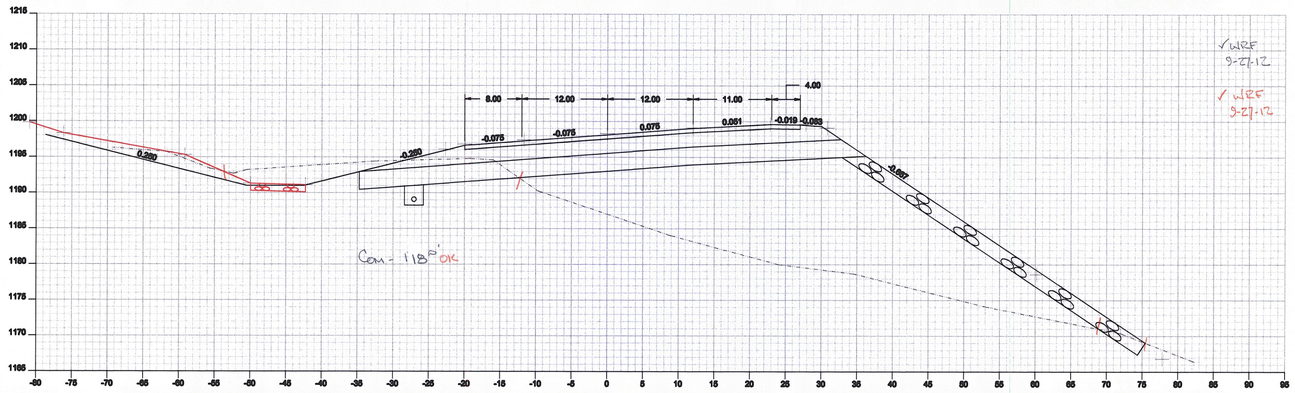


Com. 105° OK

✓ WRF 9-27-12

✓ Final WRF 9-27-12

141+00

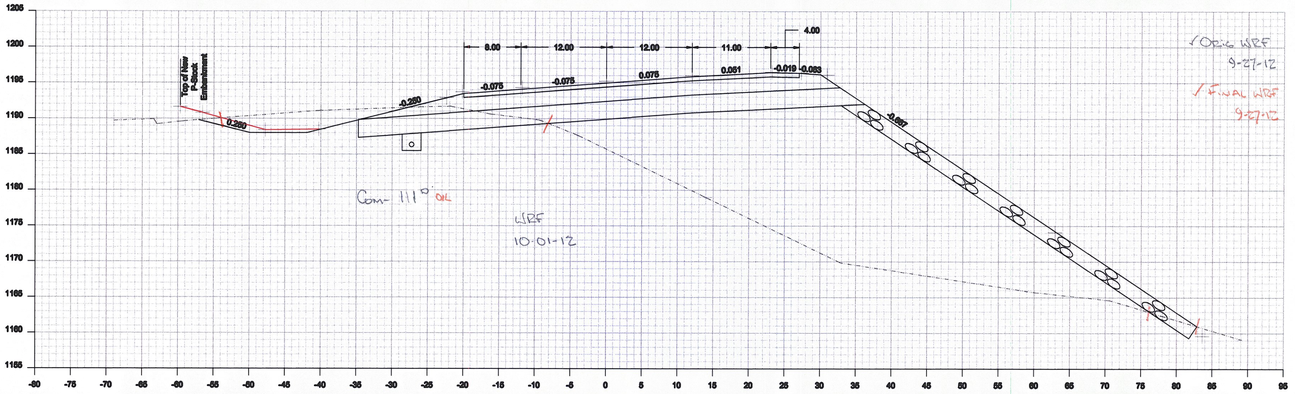


Com - 118° OK

✓ WRF 9-27-12

✓ WRF 9-27-12

140+50



Com - 111° OK

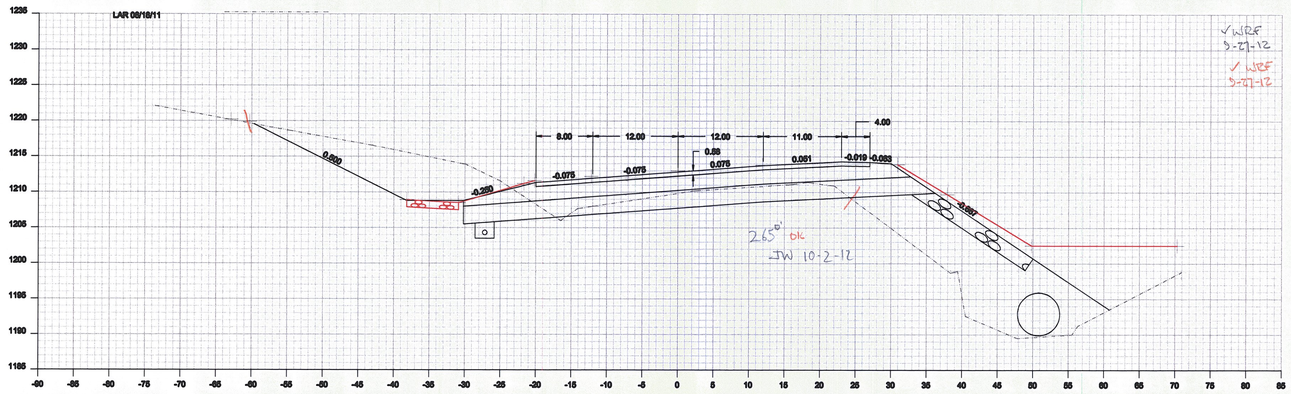
WRF 10-01-12

✓ Orig WRF 9-27-12

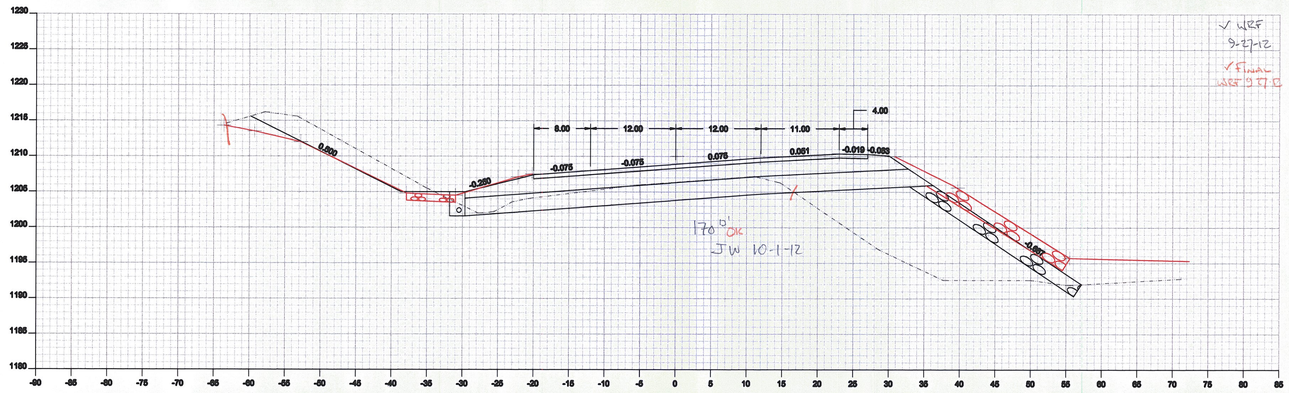
✓ Final WRF 9-27-12

140+00

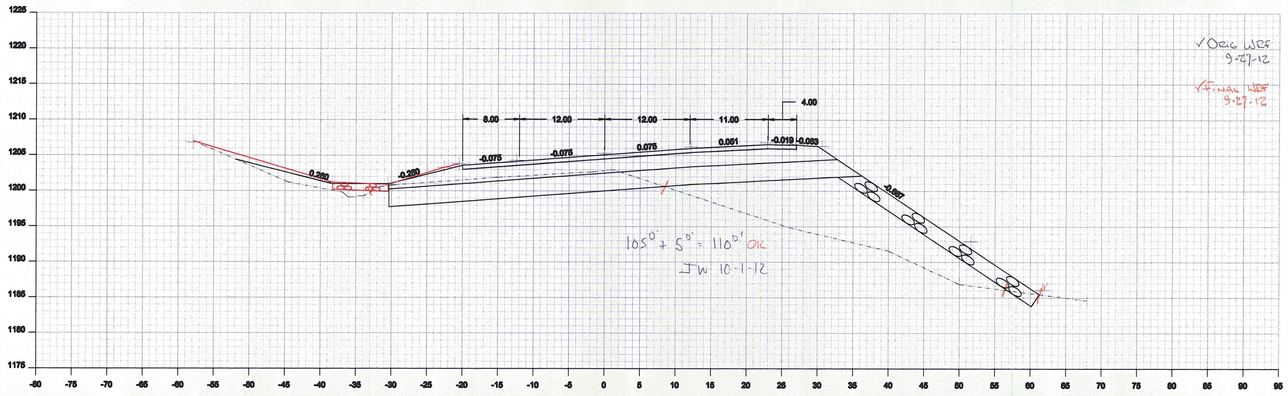
Drawing:	Cross Sections 140+00 - 141+00
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-24-2012	Date:
Scale: 1 : 10	Sheet: of



142+50

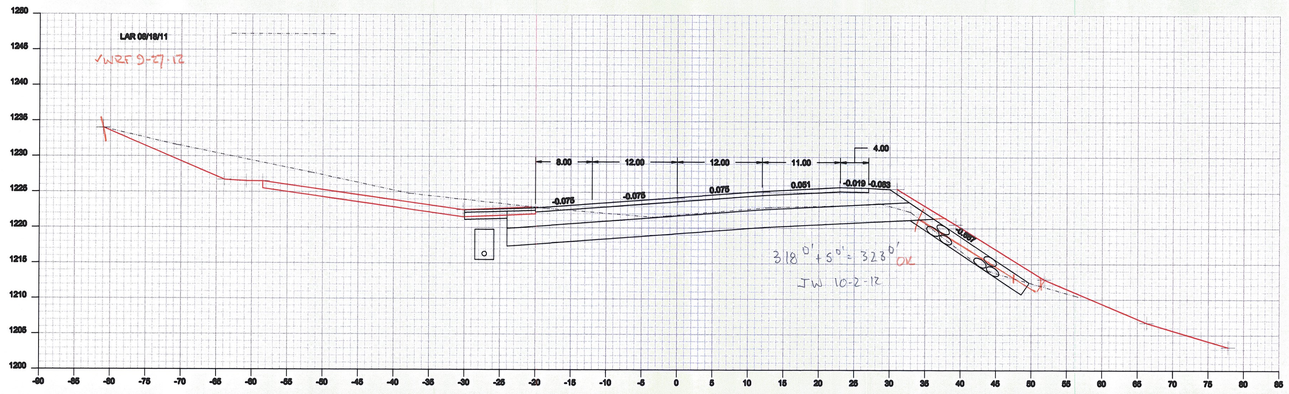


142+00

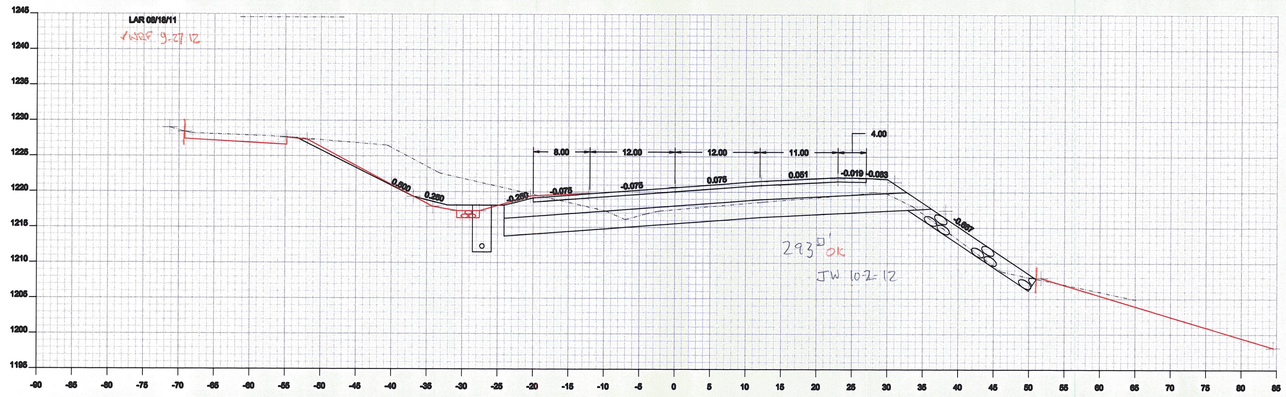


141+50

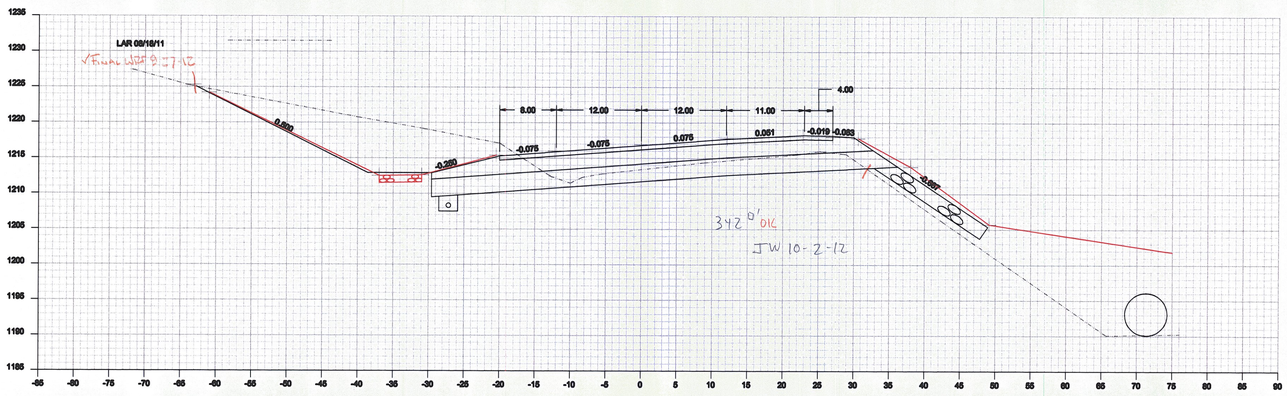
Drawing:	Cross Sections 141+50 - 142+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-24-2012	Date:
Scale: 1 : 10	Sheet: of



144+00

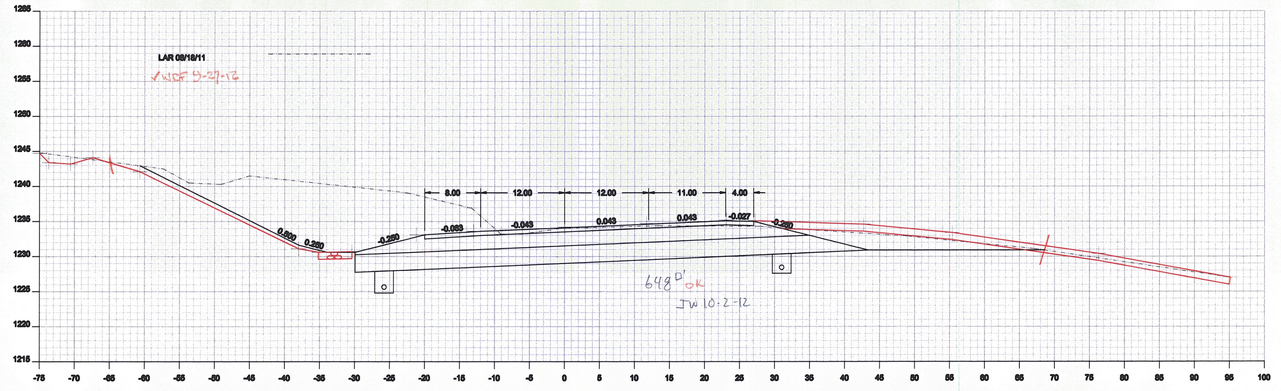


143+50

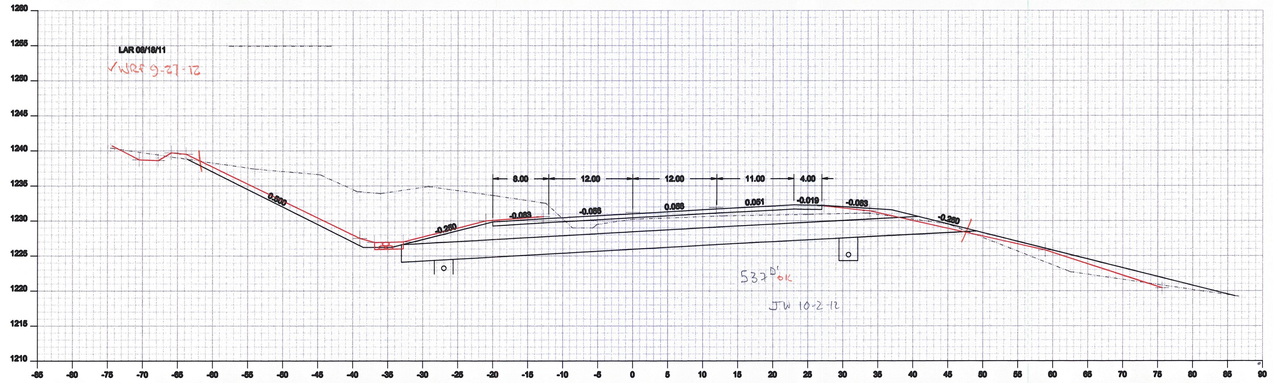


143+00

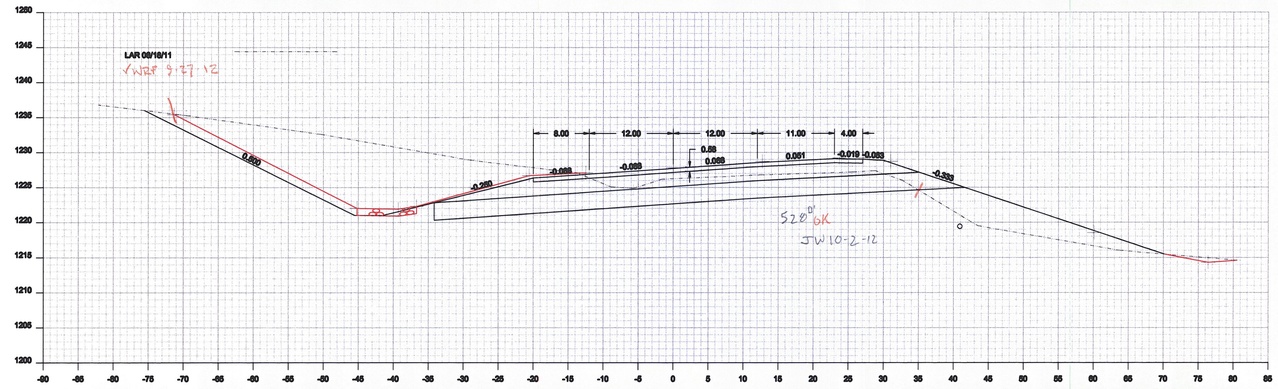
Drawing:	Cross Sections 143+00 - 144+00
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-24-2012	Date:
Scale: 1 : 10	Sheet: of



145+50

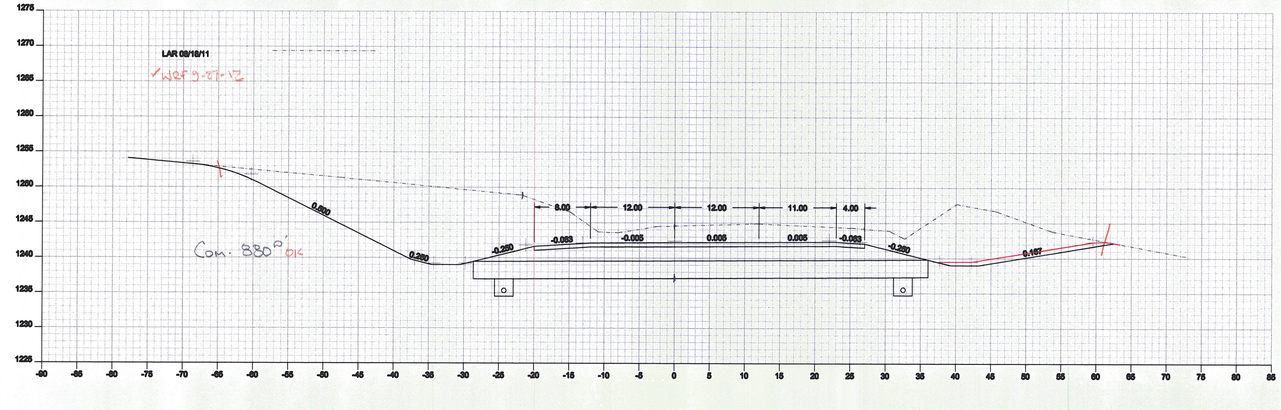


145+00

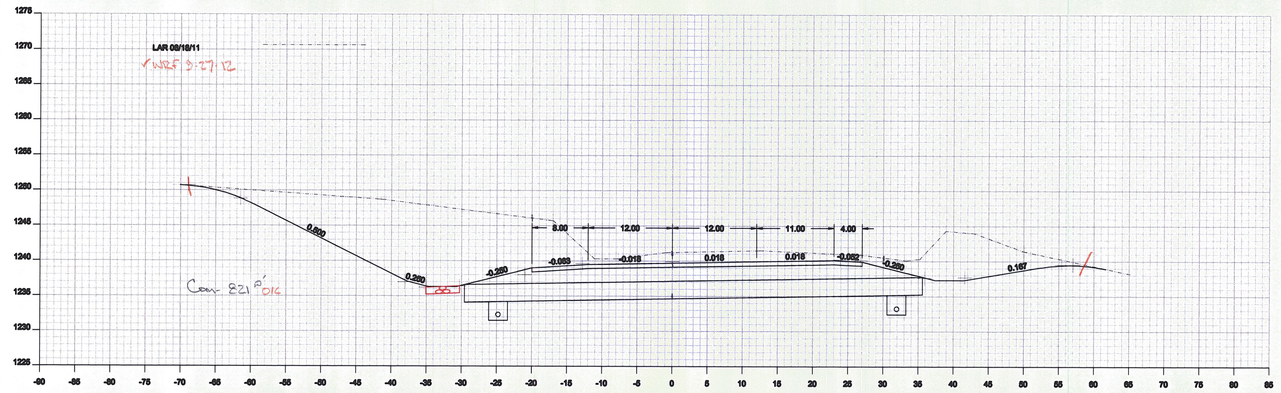


144+50

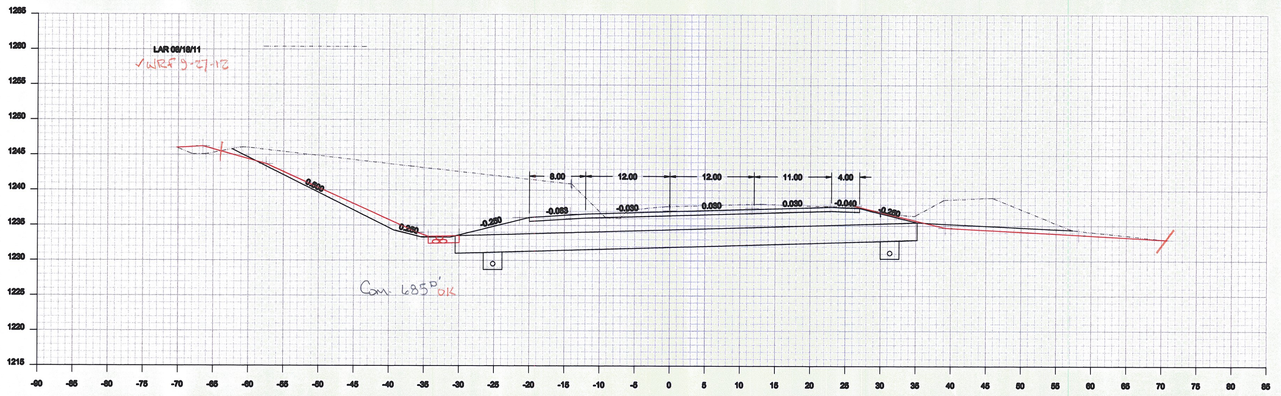
Drawing:	Cross Sections 144+50 - 145+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-24-2012	Date:
Scale: 1 : 10	Sheet: of



147+00



146+50



146+00

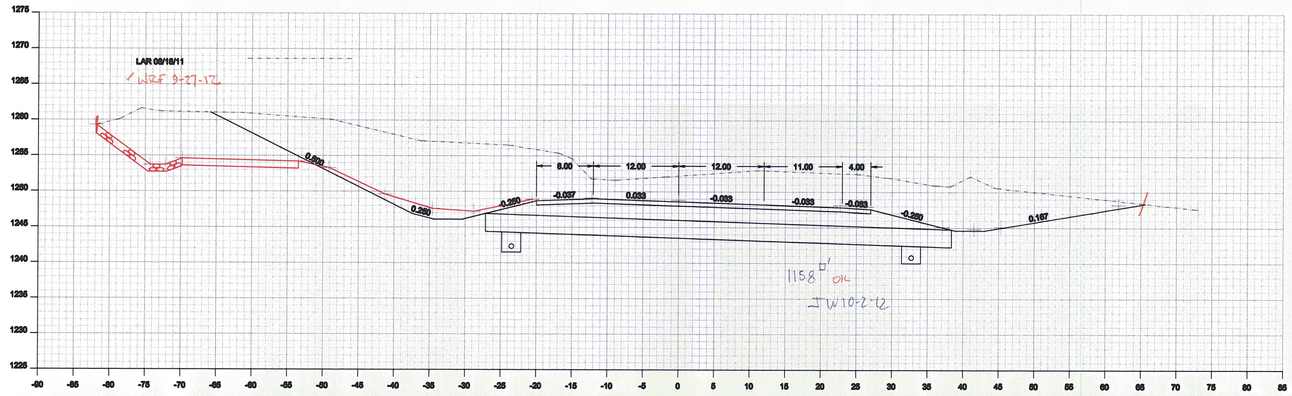
Drawing: Cross Sections 146+00 - 147+00
Project: Cabot Danville

Drawn By: JMR
Date: 09-24-2012

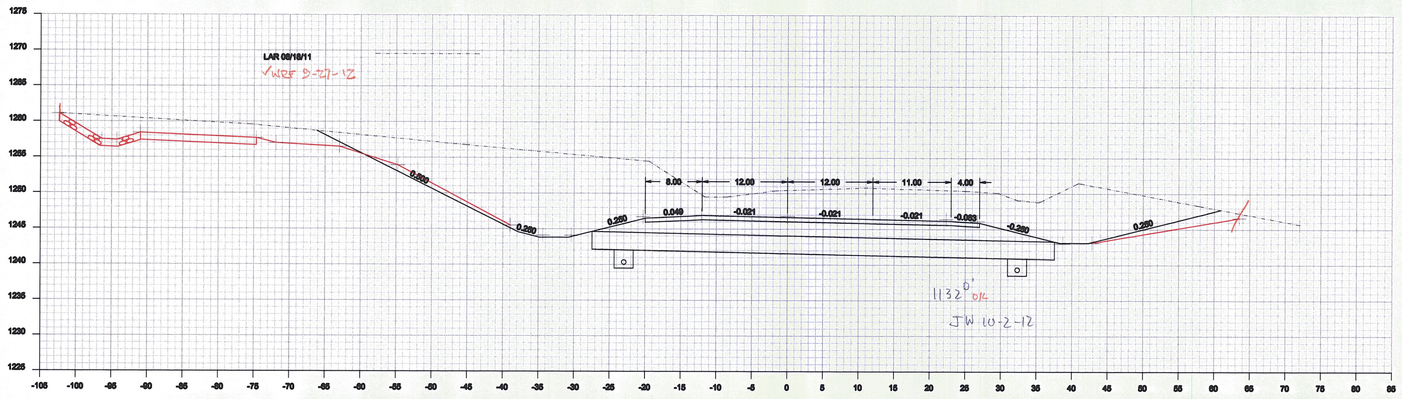
Checked By:
Date:

Scale: 1 : 10

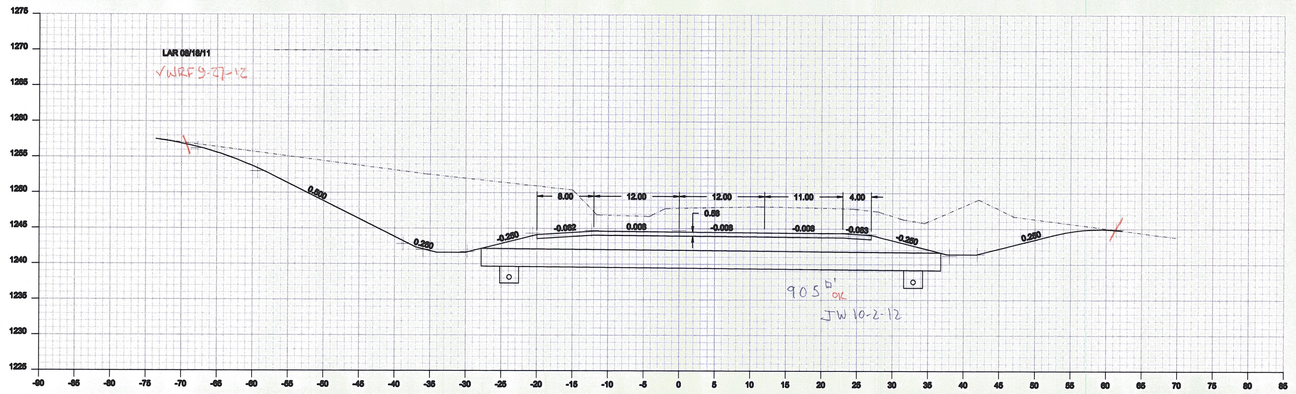
Sheet: of



148+50

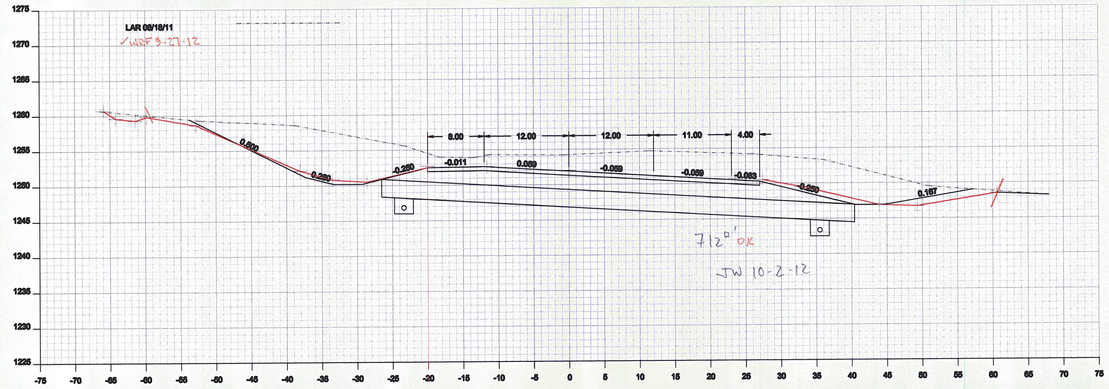


148+00

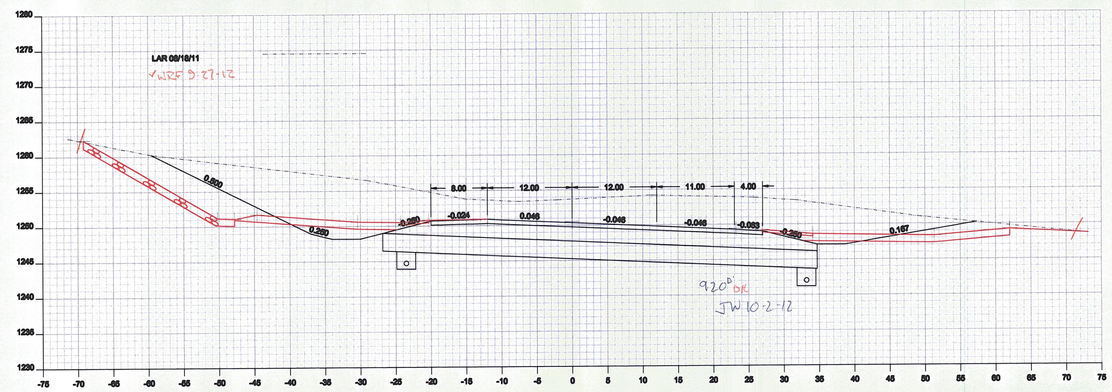


147+50

Drawing:	Cross Sections 147+50 - 148+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-24-2012	Date:
Scale: 1 : 10	Sheet: of

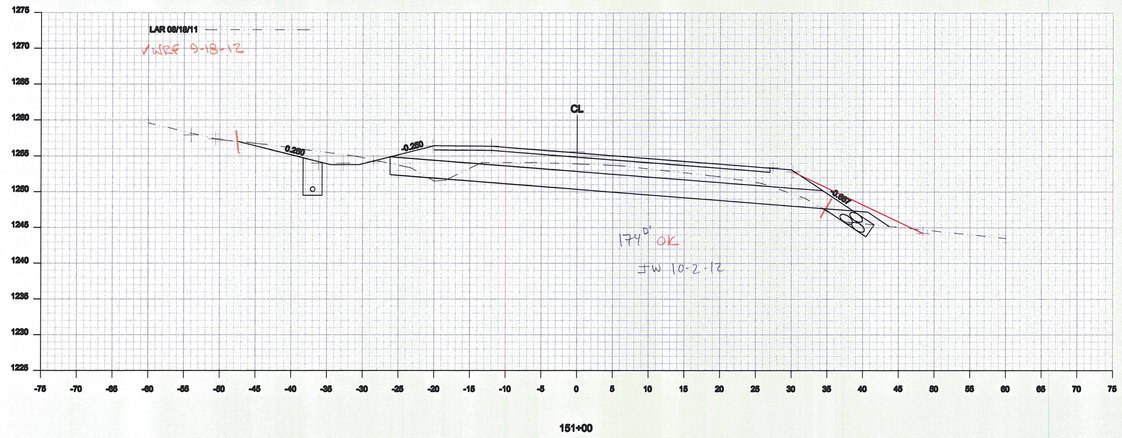


149+50

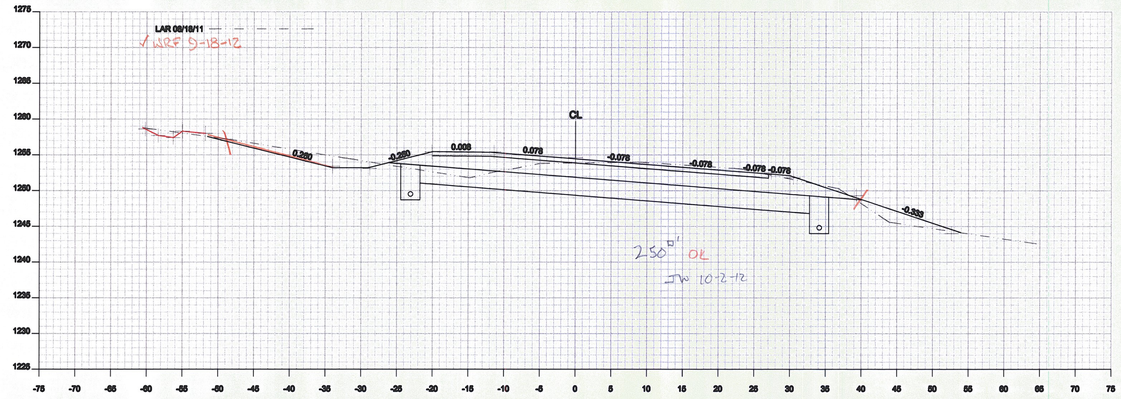


149+00

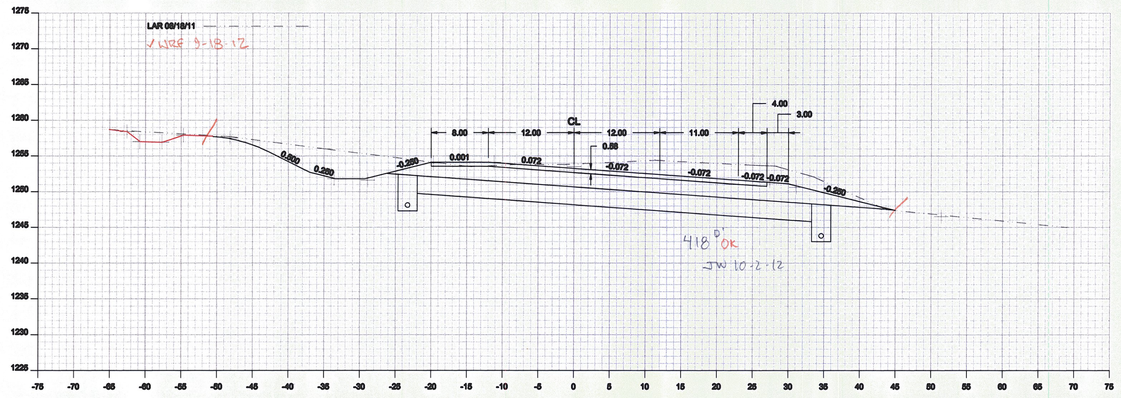
Drawing:	Cross Sections 149+00 - 149+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-24-2012	Date:
Scale: 1 : 10	Sheet: of



151+00

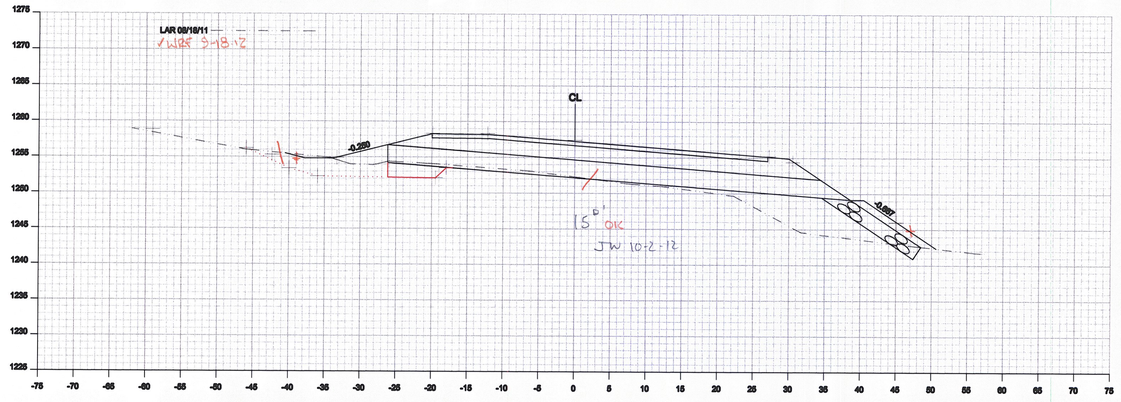


150+50

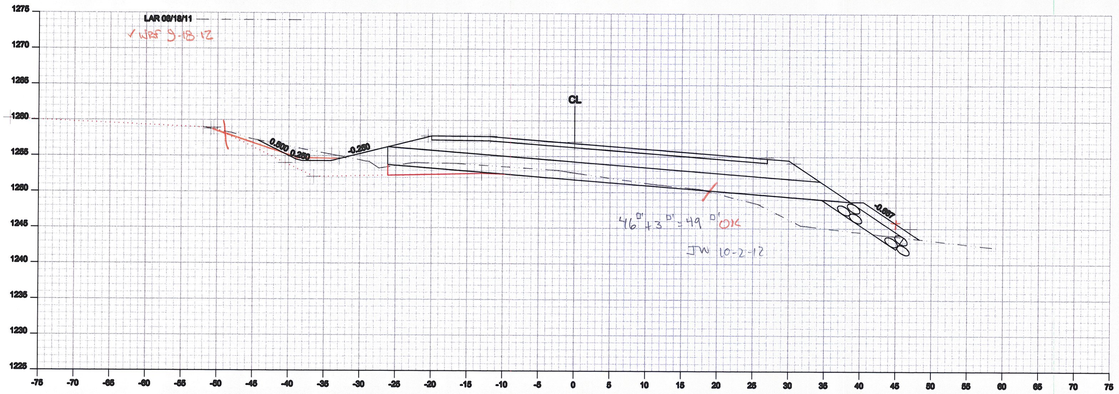


150+00

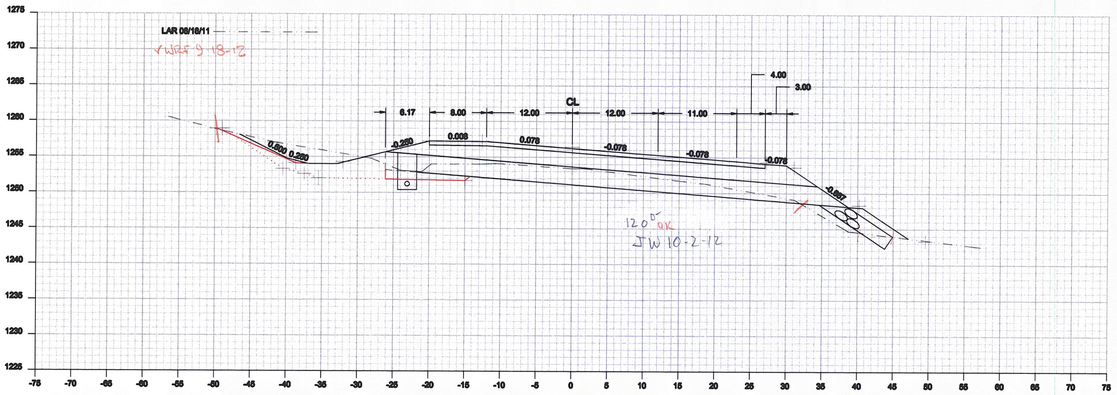
Drawing:	Cross Section 150+00 - 151+00
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 08-12-2012	Date:
Scale: 1 : 10	Sheet: of



152+50

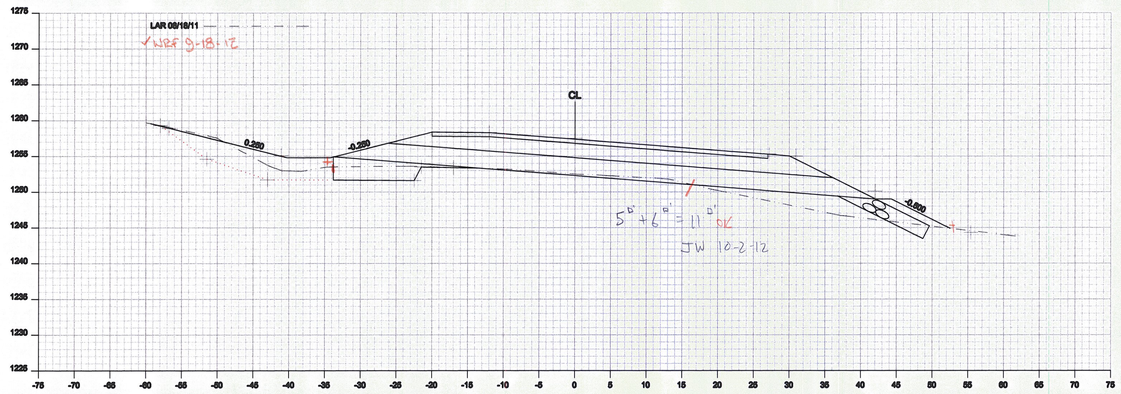


152+00

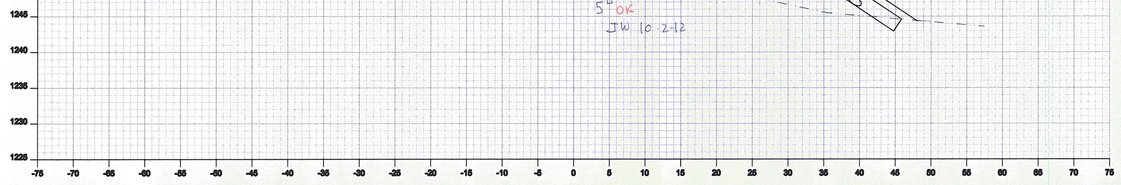


151+50

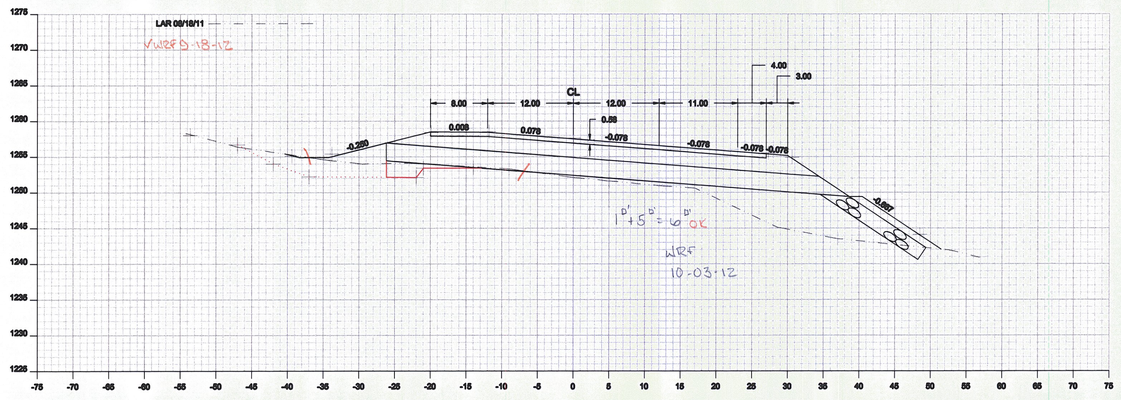
Drawing:	Cross Section 151+50 - 152+50		
Project:	Cabot Danville		
Drawn By:	JMR	Checked By:	
Date:	09-12-2012	Date:	
Scale:	1 : 10	Sheet:	of



154+00

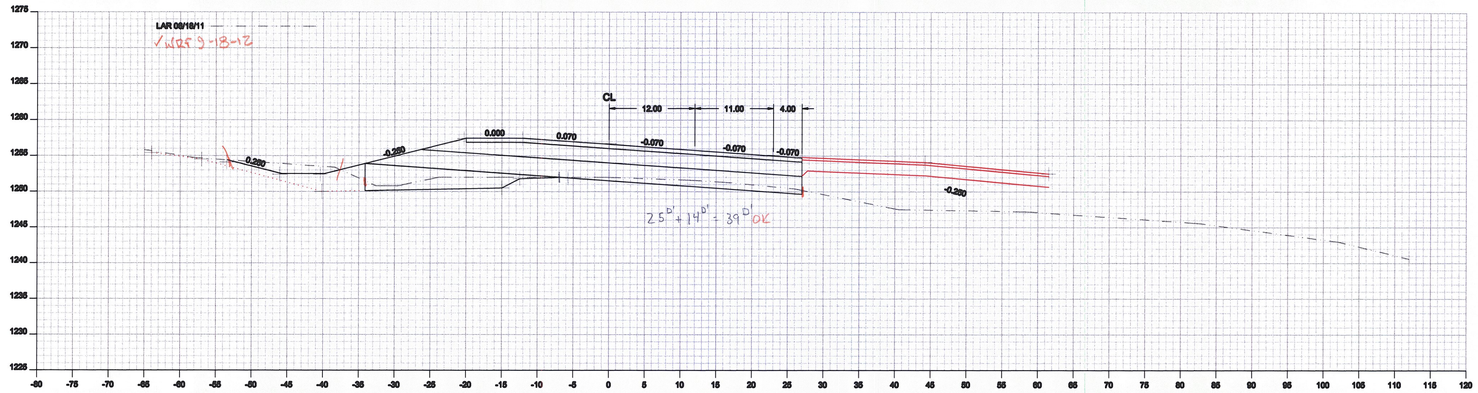


153+50

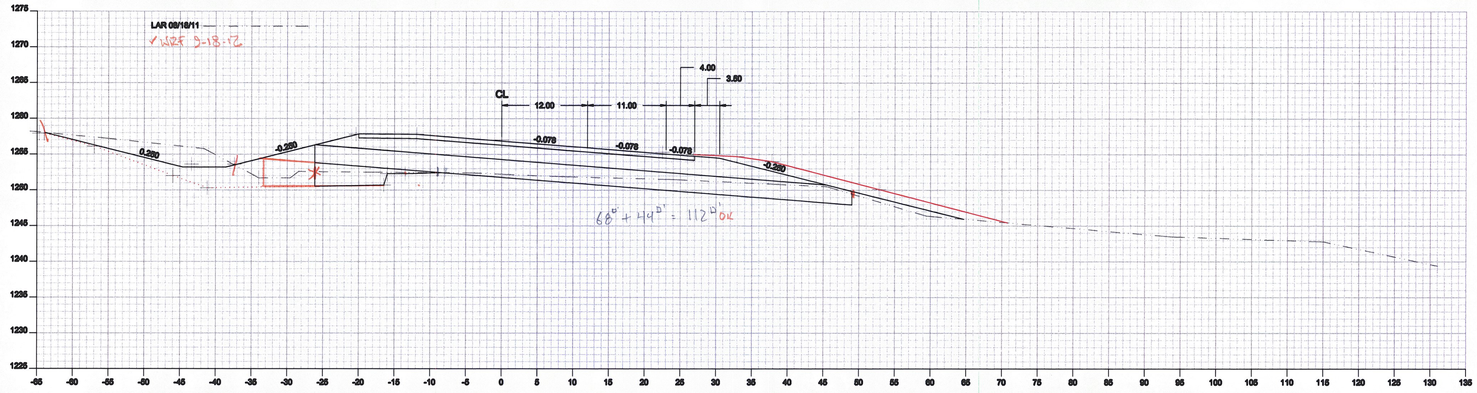


153+00

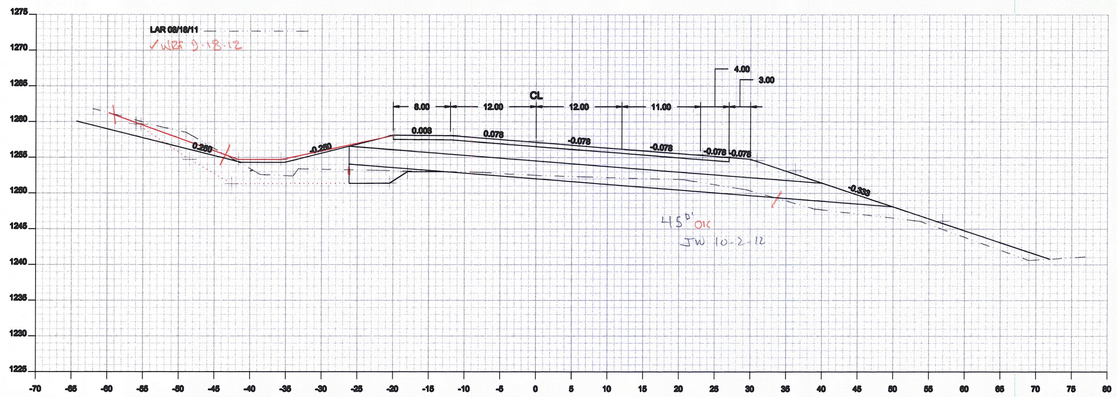
Drawing:	Cross Section 153+00 - 154+00
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-12-2012	Date:
Scale: 1 : 10	Sheet: of



155+50

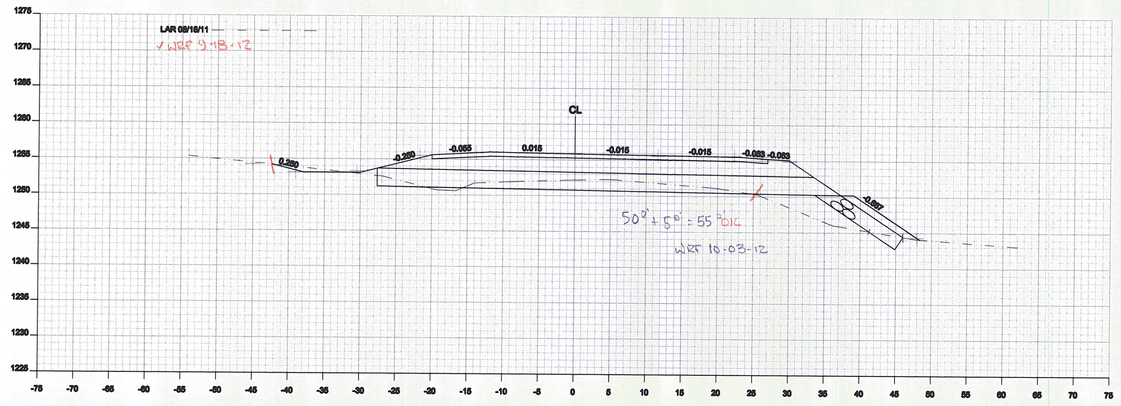


155+00

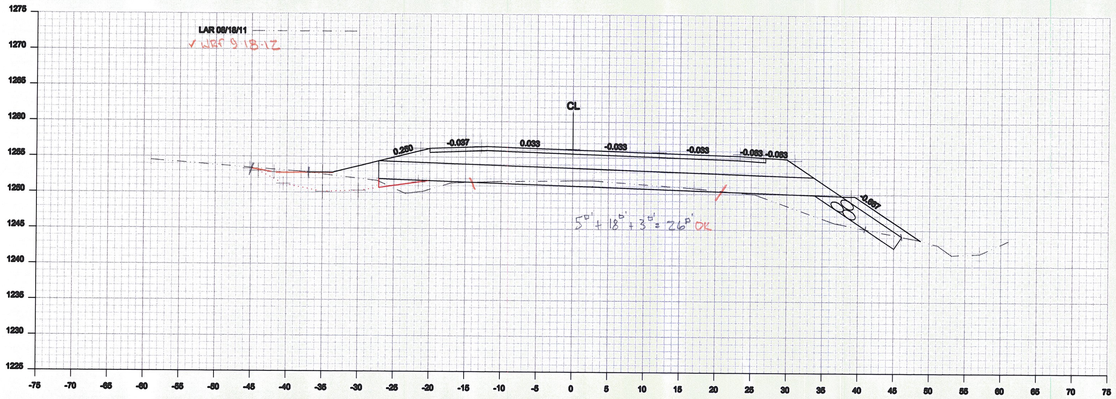


154+50

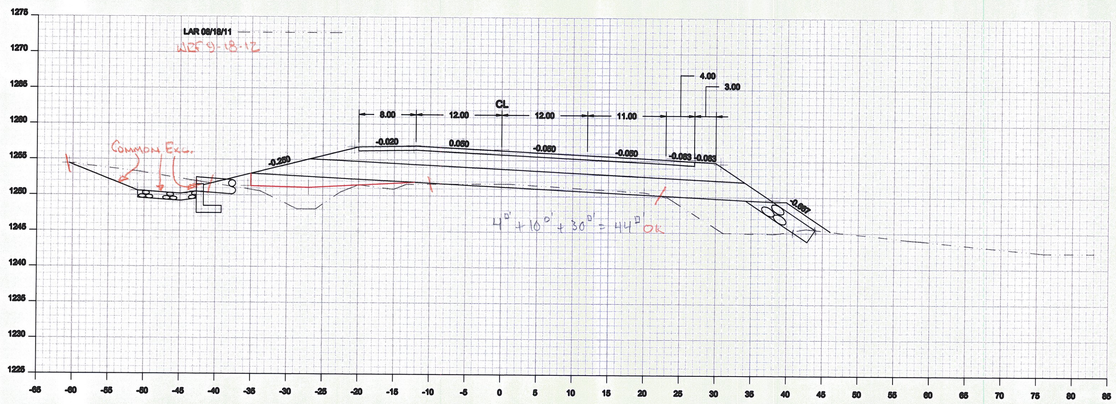
Drawing:	Cross Section 154+50 - 155+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-12-2012	Date:
Scale: 1 : 10	Sheet: of



157+00

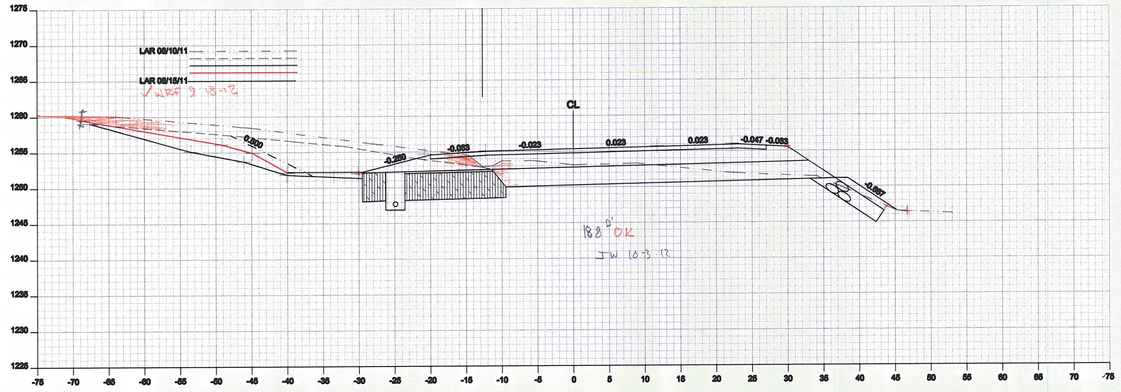


156+50

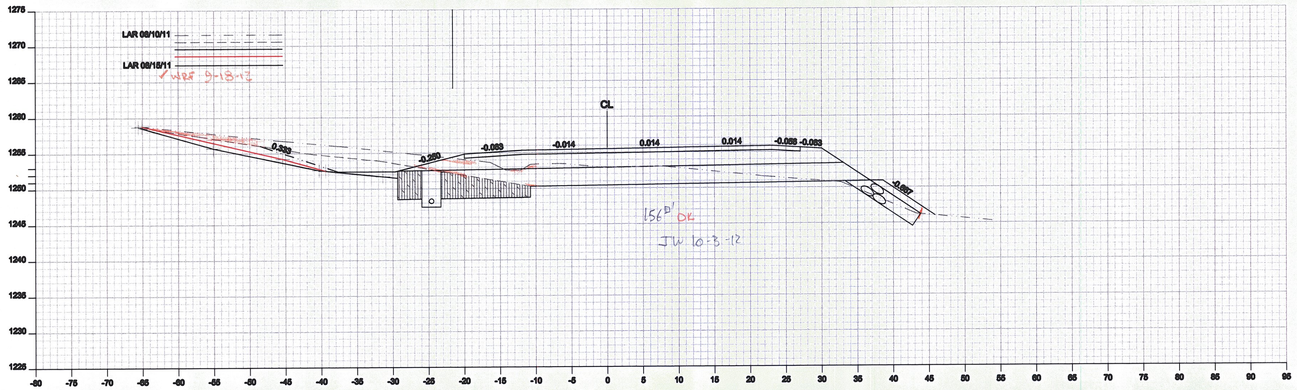


156+00

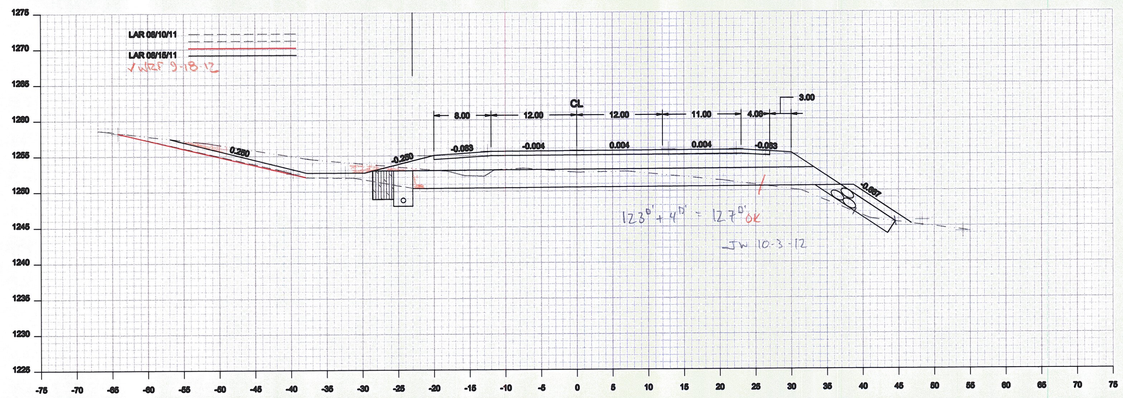
Drawing:	Cross Section 156+00 - 157+00
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 08-12-2012	Date:
Scale: 1 : 10	Sheet: of



158+00

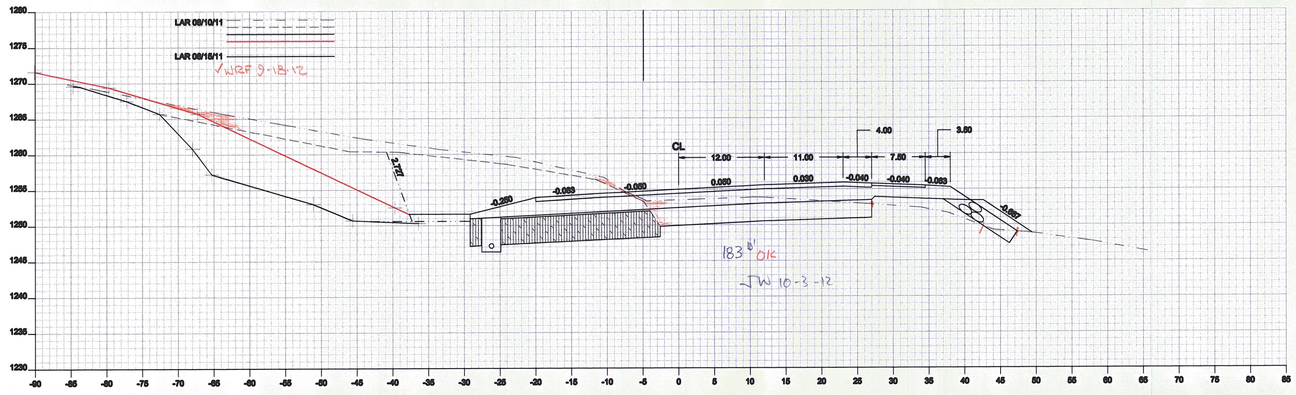


157+75

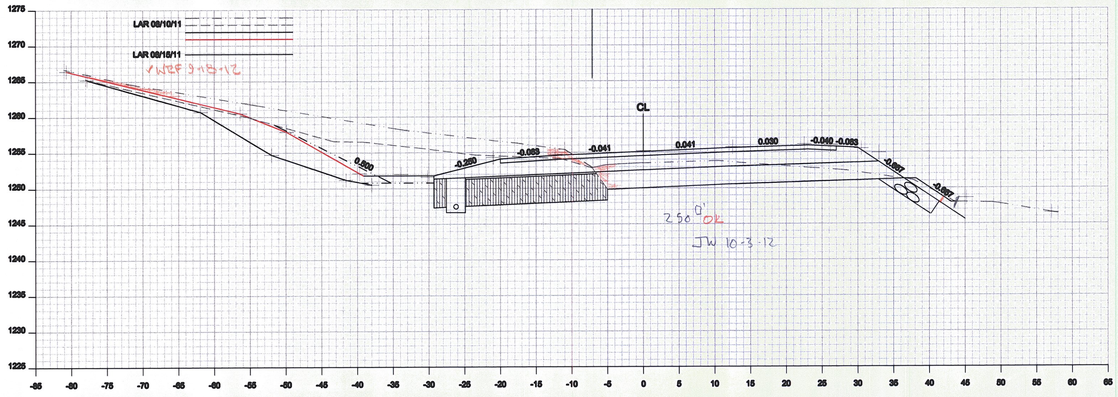


157+50

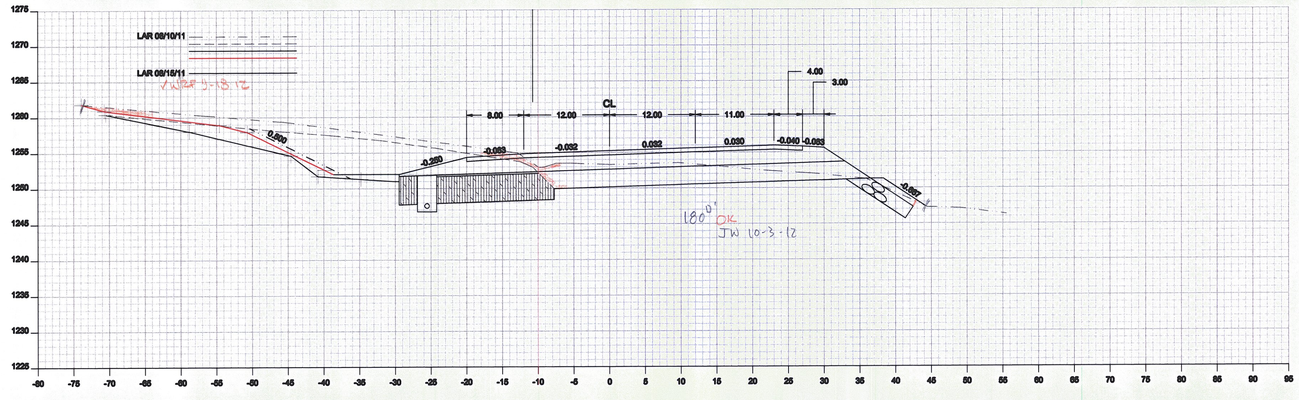
Drawing:	Cross Section 157+50 - 158+00
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-12-2012	Date:
Scale: 1 : 10	Sheet: of



158+75

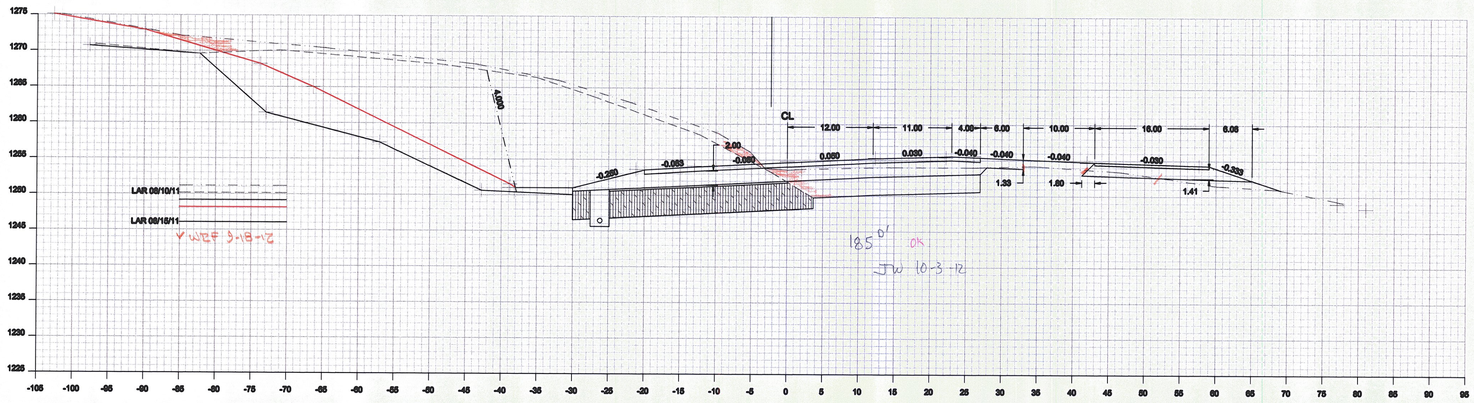


158+50

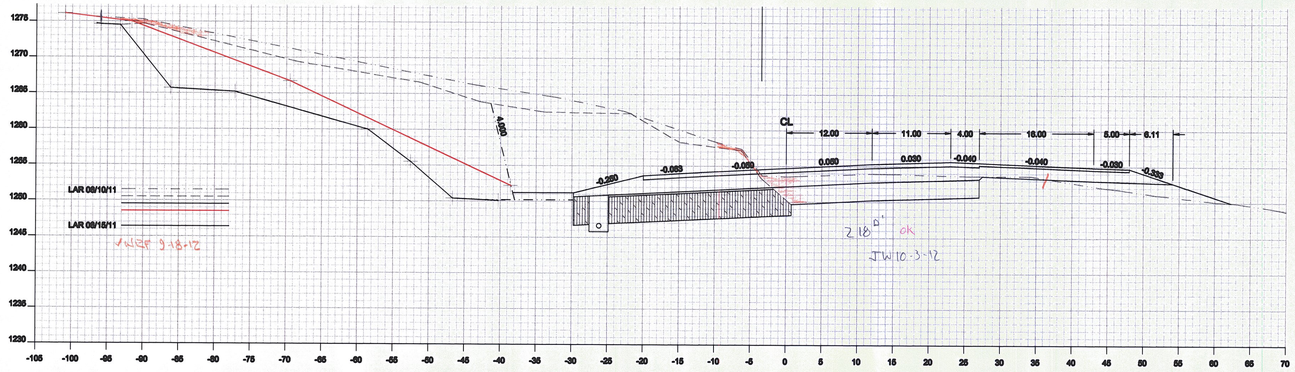


158+25

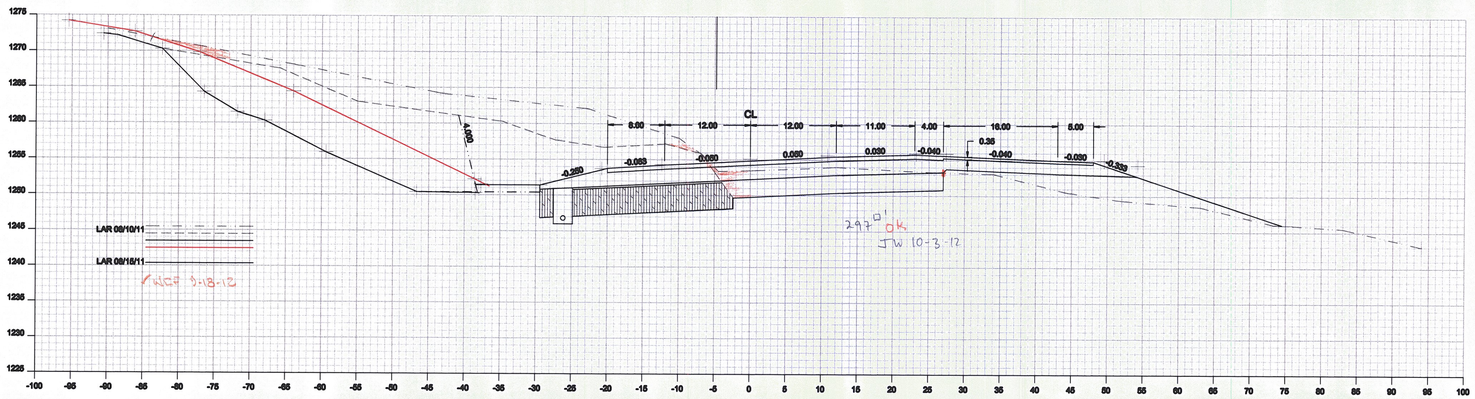
Drawing:	Cross Section 158+25 - 158+75
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-12-2012	Date:
Scale: 1 : 10	Sheet: of



159+50

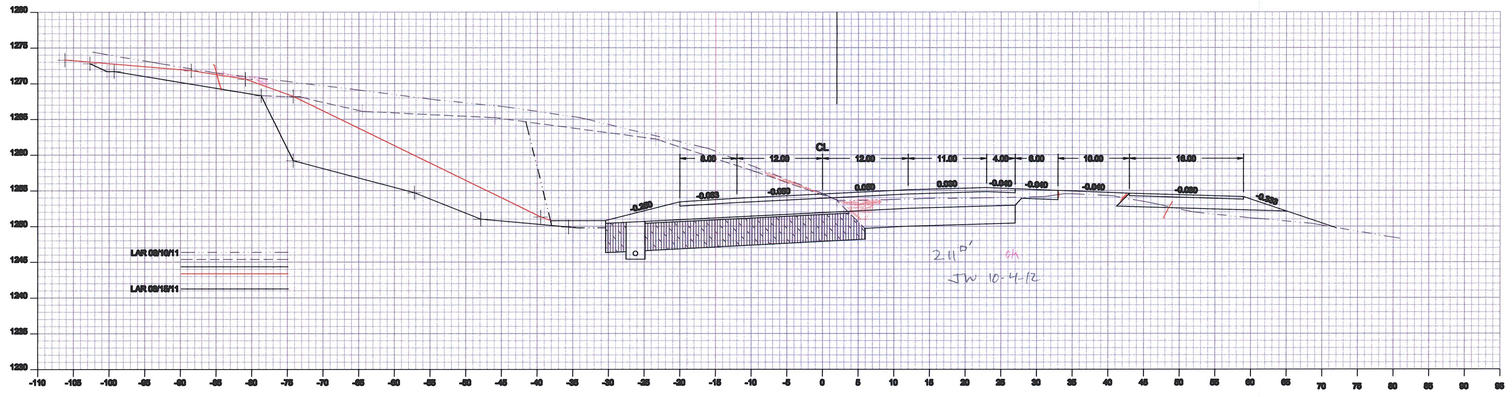


159+25



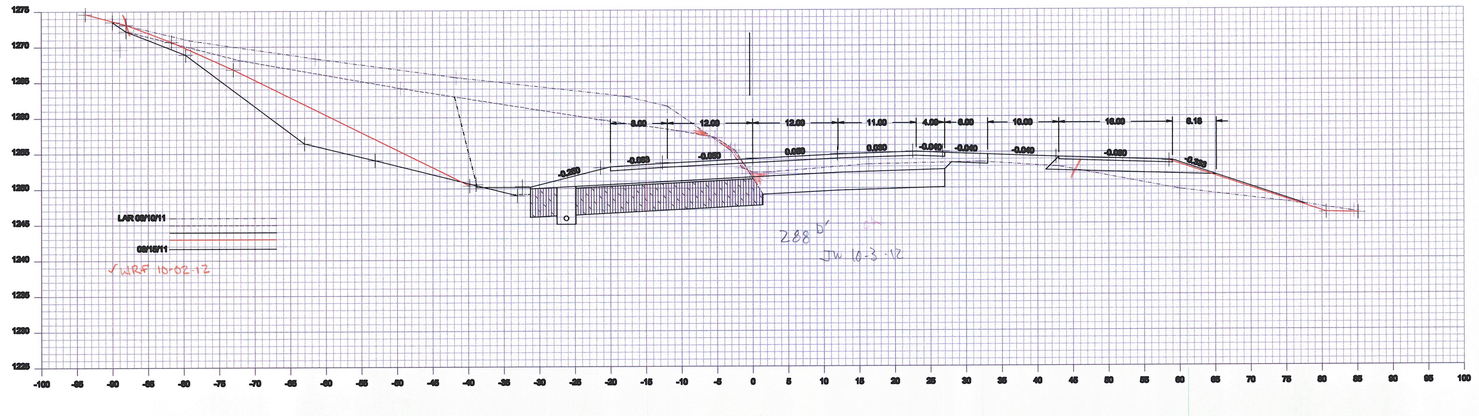
159+00

Drawing:	Cross Section 159+00 - 159+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-12-2012	Date:
Scale: 1 : 10	Sheet: of

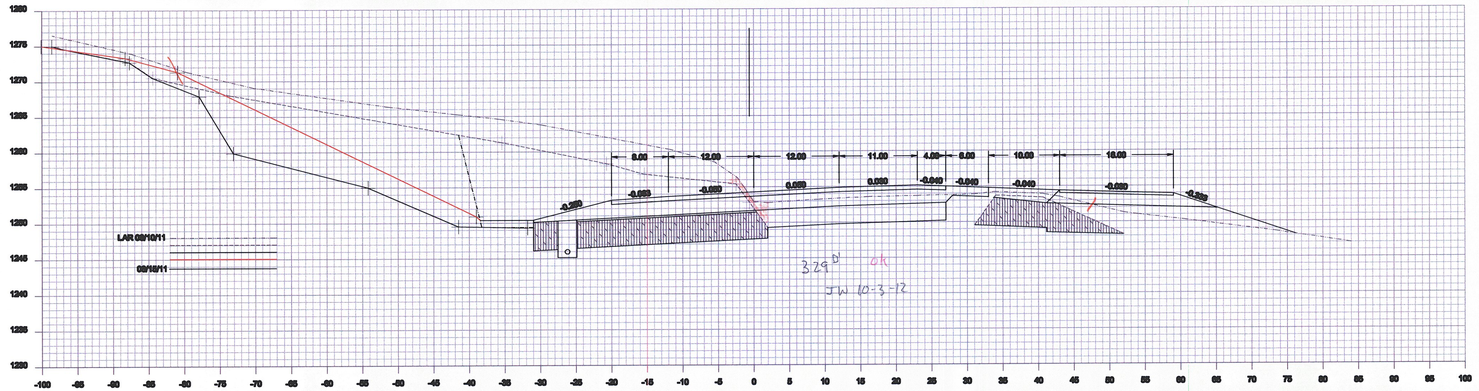


159+75

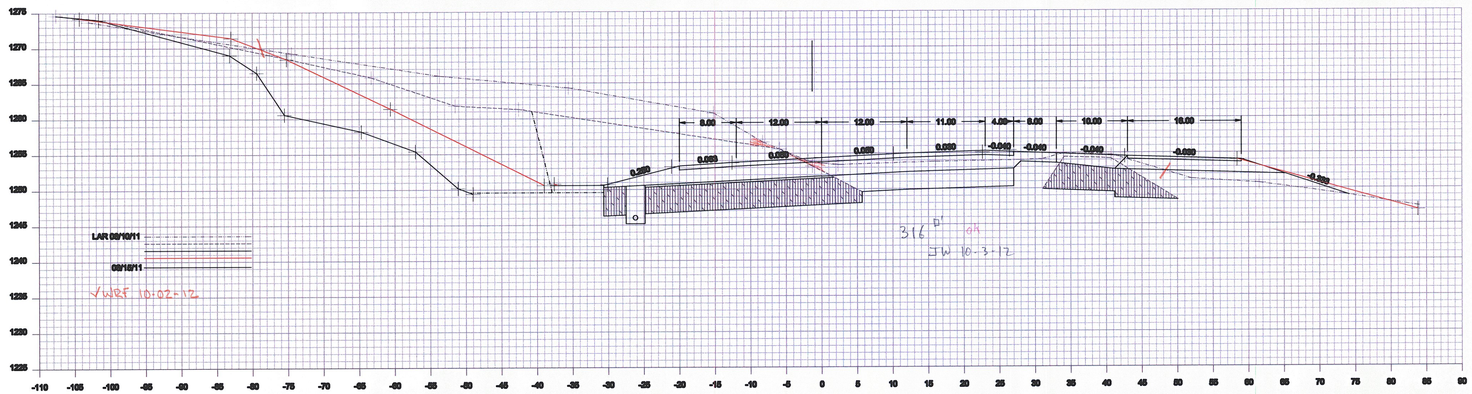
Drawing:	Cross Section 159+75		
Project:	Cabot Danville		
Drawn By:	JMR	Checked By:	
Date:	09-12-2012	Date:	
Scale:	1 : 10	Sheet:	of



160+50

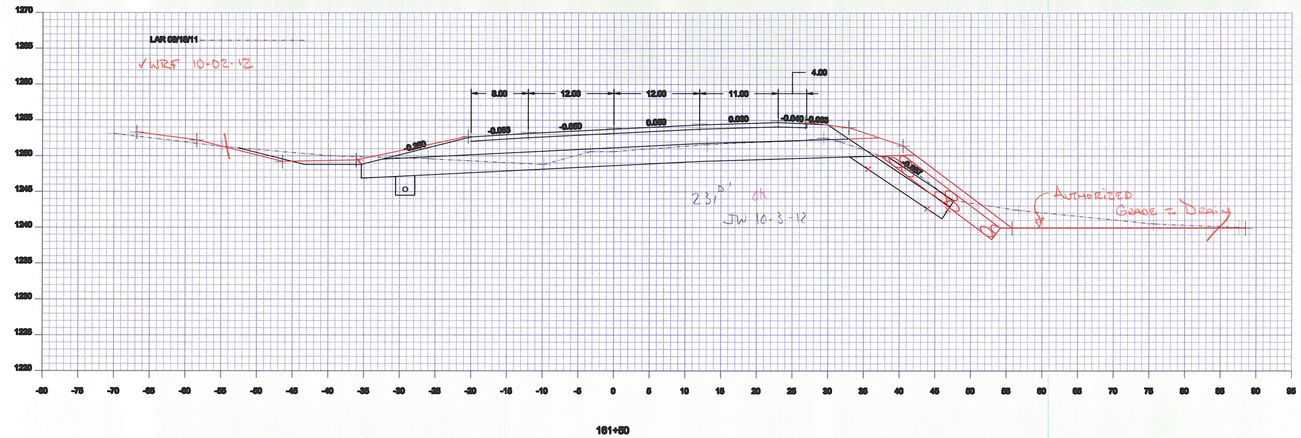


160+25

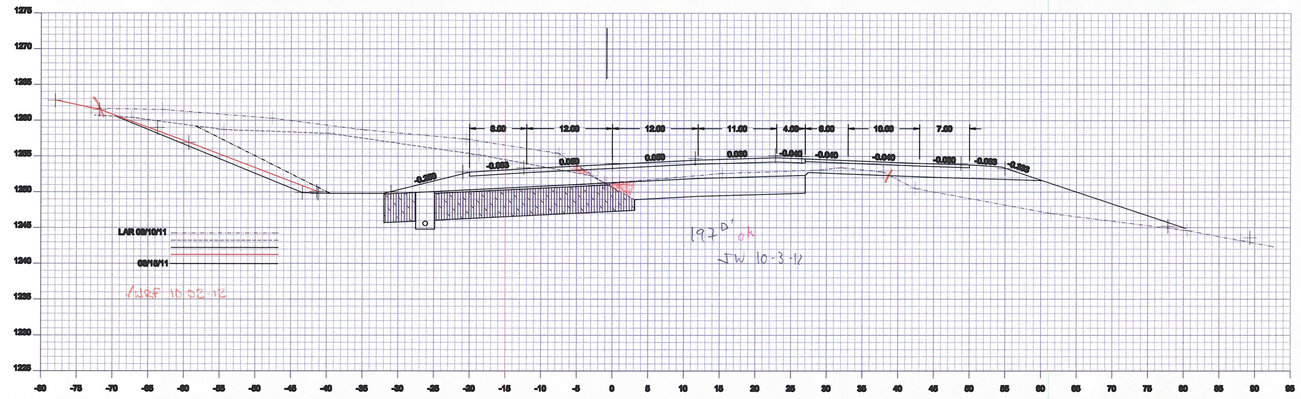


160+00

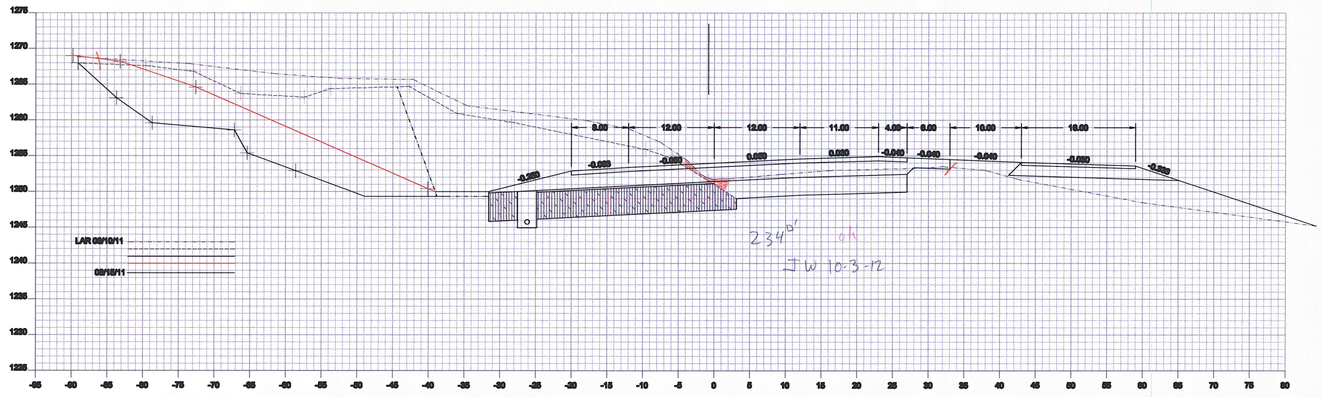
Drawing:	Cross Section 160+00 - 160+50		
Project:	Cabot Danville		
Drawn By:	JMR	Checked By:	
Date:	09-25-2012	Date:	
Scale:	1 : 10	Sheet:	of



161+50

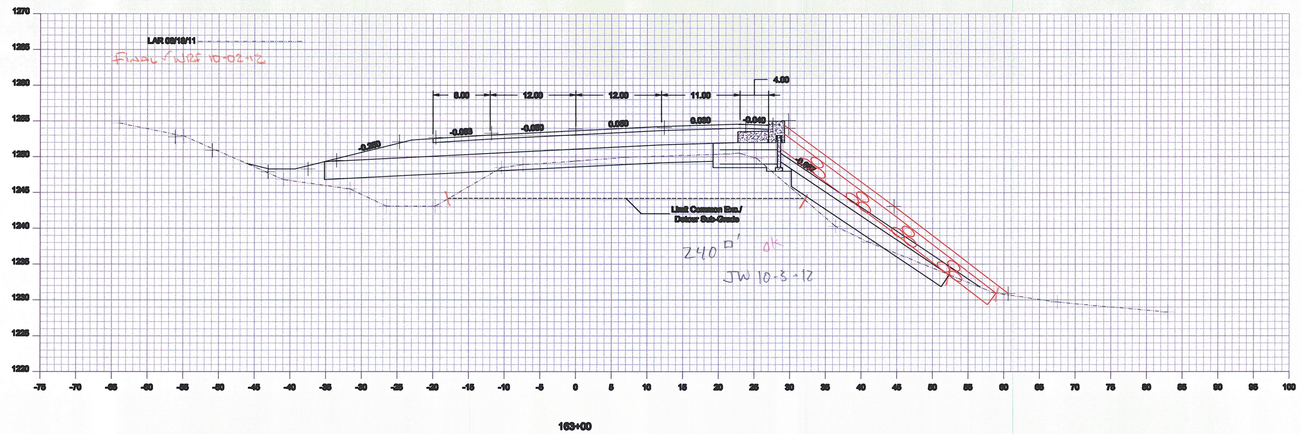


161+00

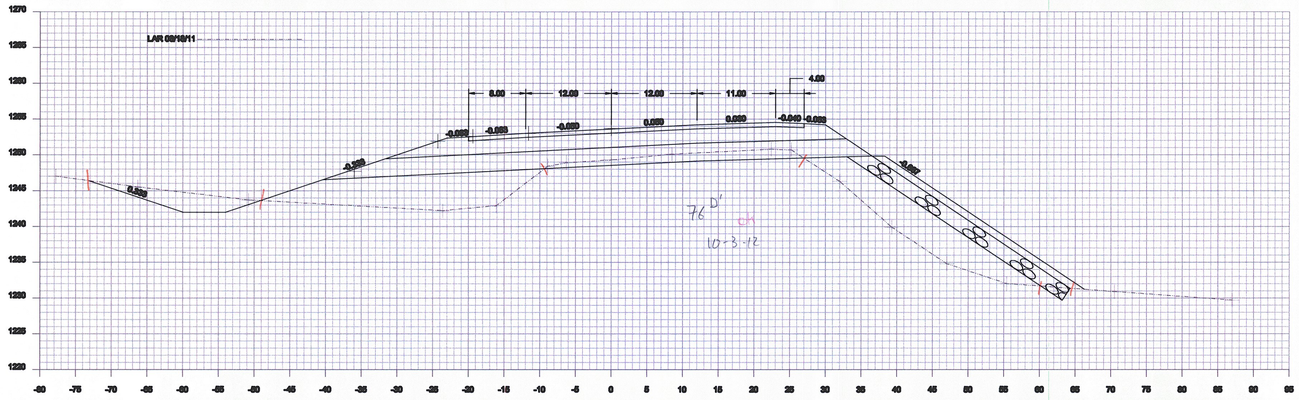


160+75

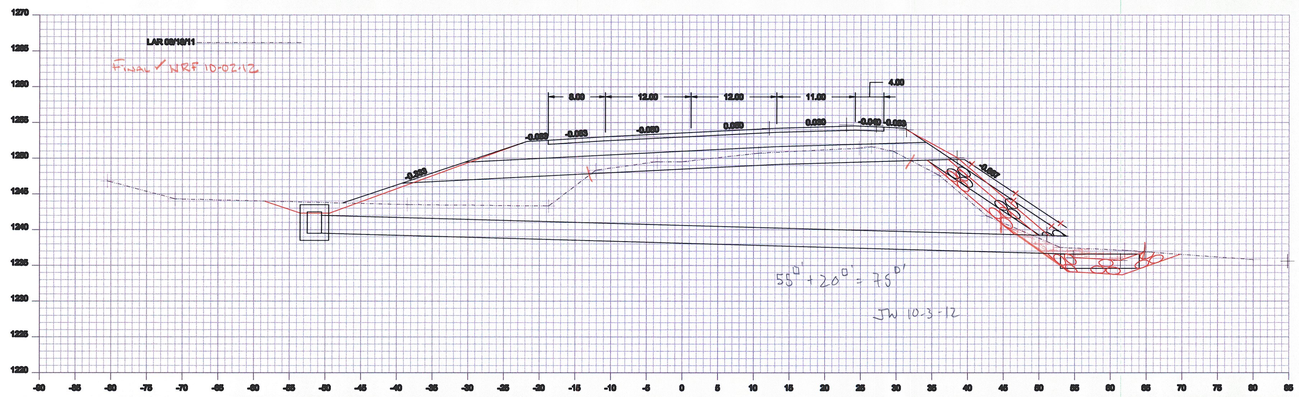
Drawing:	Cross Section 160+75 - 161+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-25-2012	Date:
Scale: 1 : 10	Sheet: of



163+00

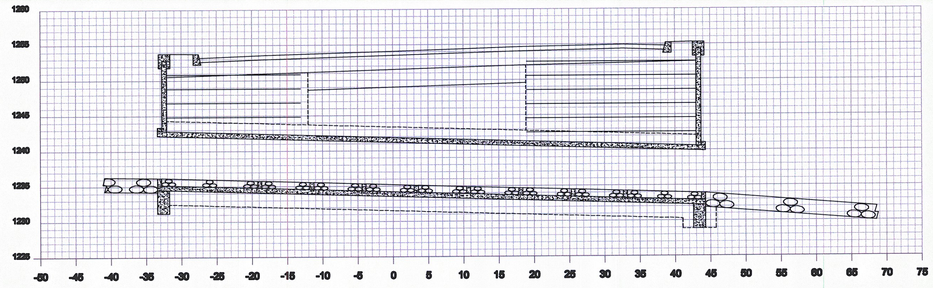


162+50

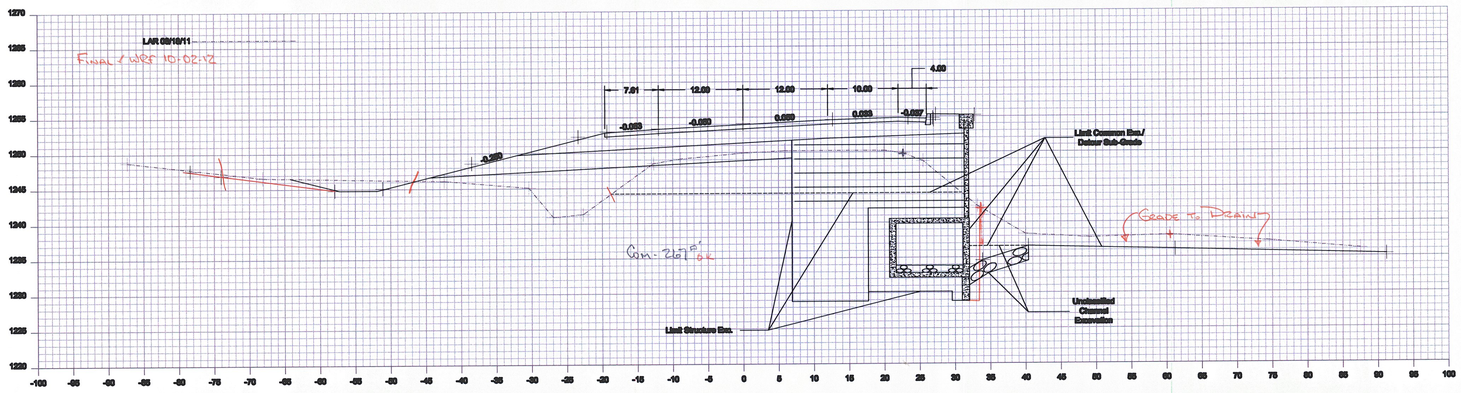


162+00

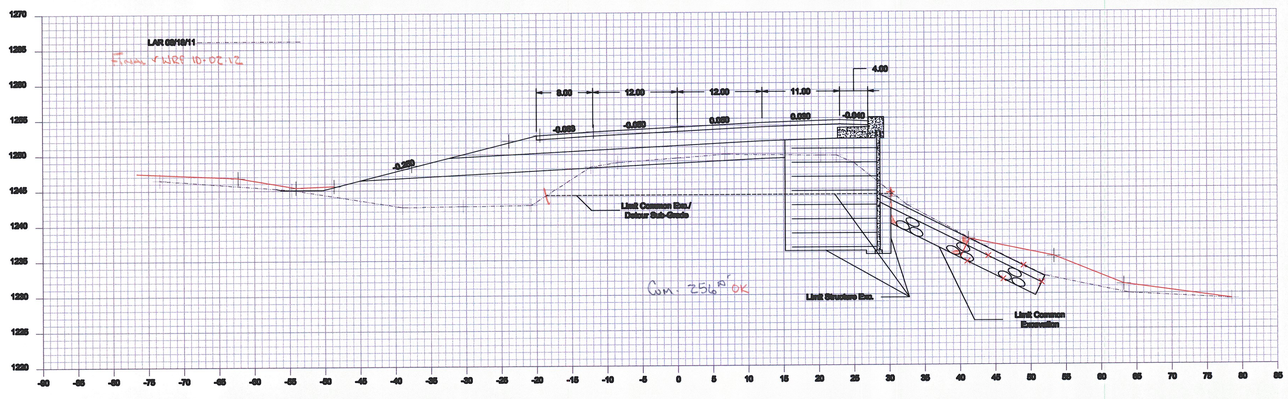
Drawing:	Cross Section 162+00 - 163+00		
Project:	Cabot Danville		
Drawn By:	JMR	Checked By:	
Date:	09-25-2012	Date:	
Scale:	1 : 10	Sheet:	of



164+28
Skewed

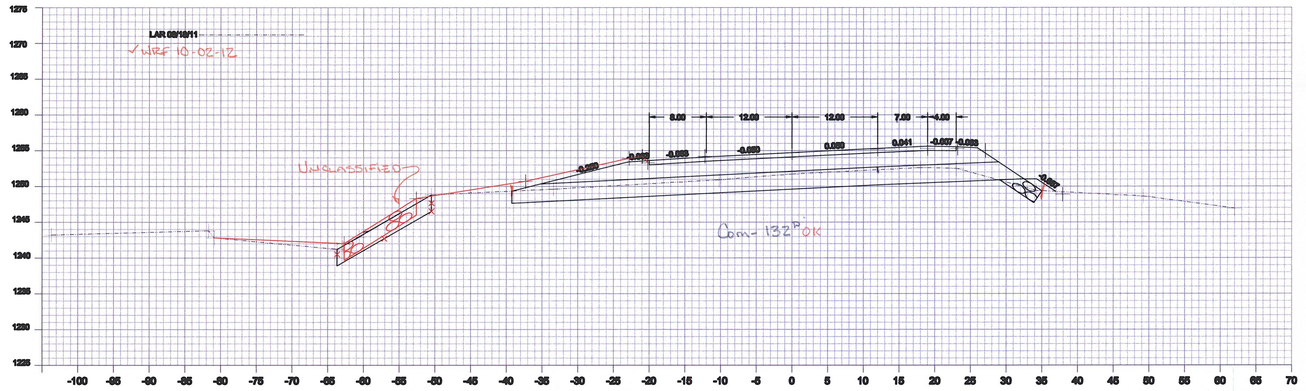


164+00

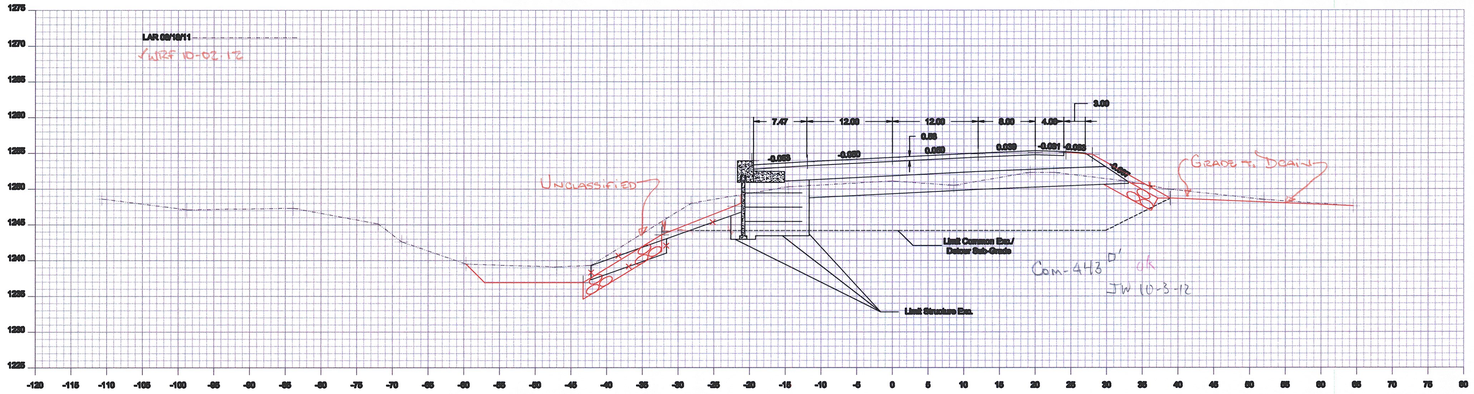


163+60

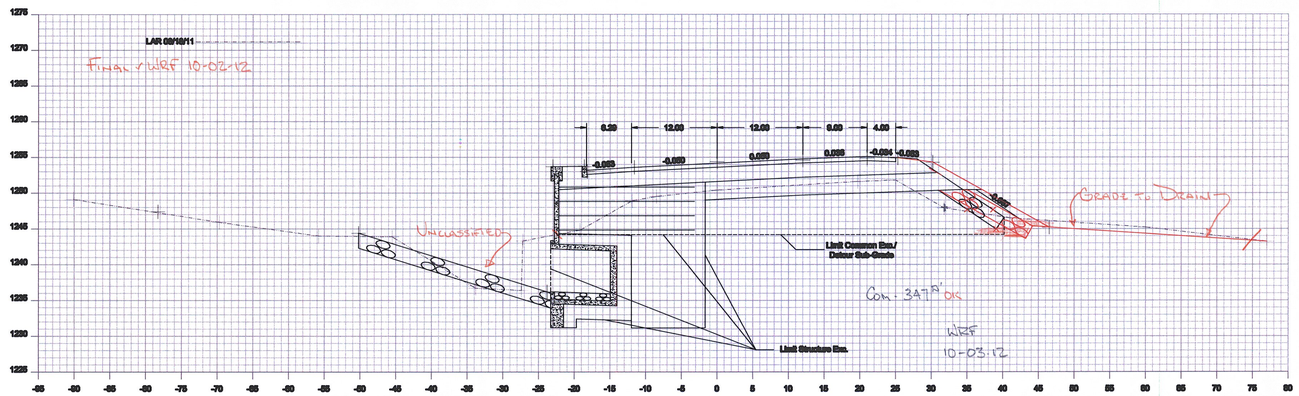
Drawing:	Cross Section 163+50 - 164+28
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-25-2012	Date:
Scale: 1 : 10	Sheet: of



165+50

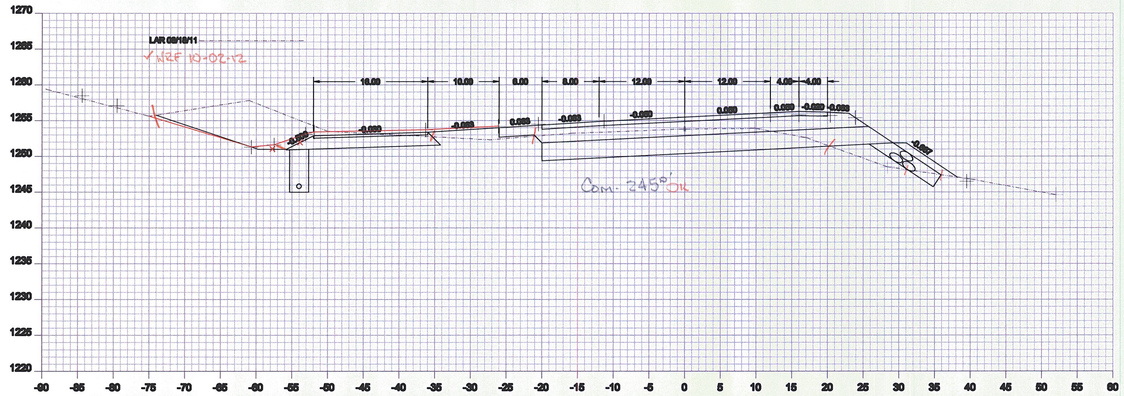


165+00

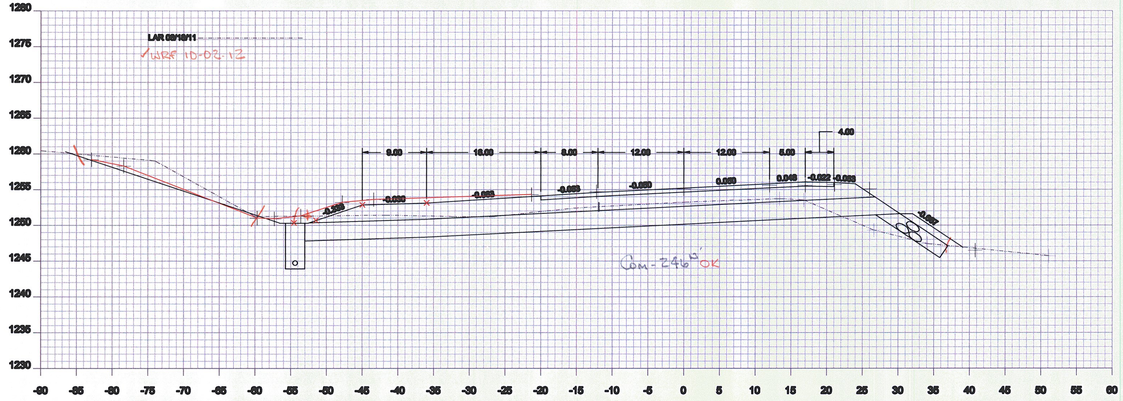


164+50

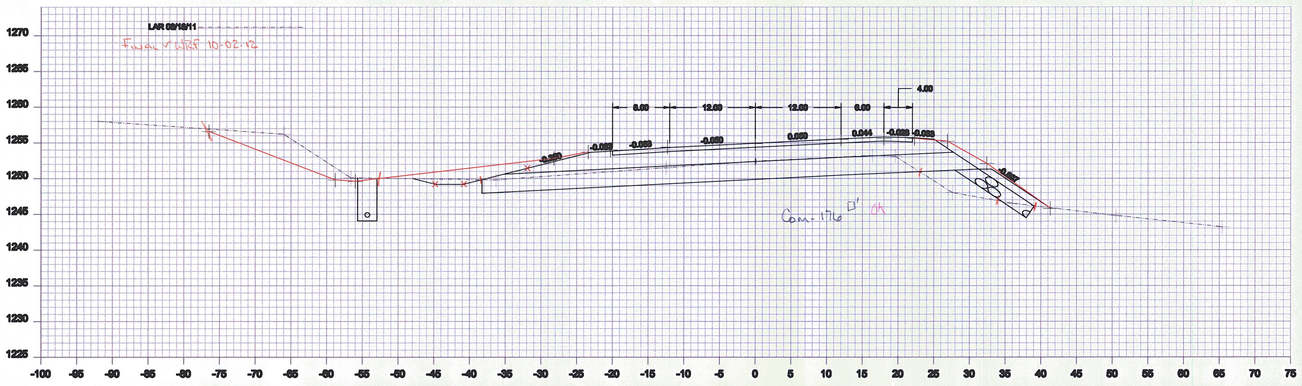
Drawing:	Cross Section 164+50 - 165+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-25-2012	Date:
Scale: 1 : 10	Sheet: of



167+00

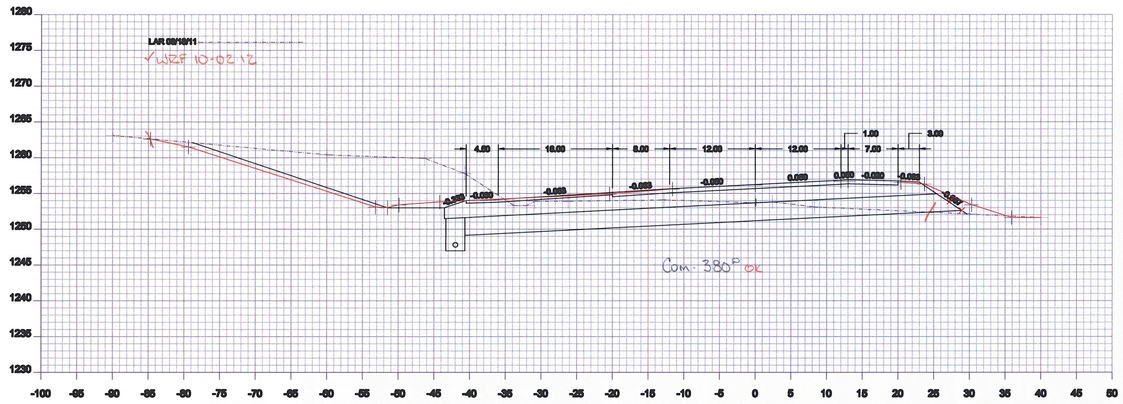


166+50

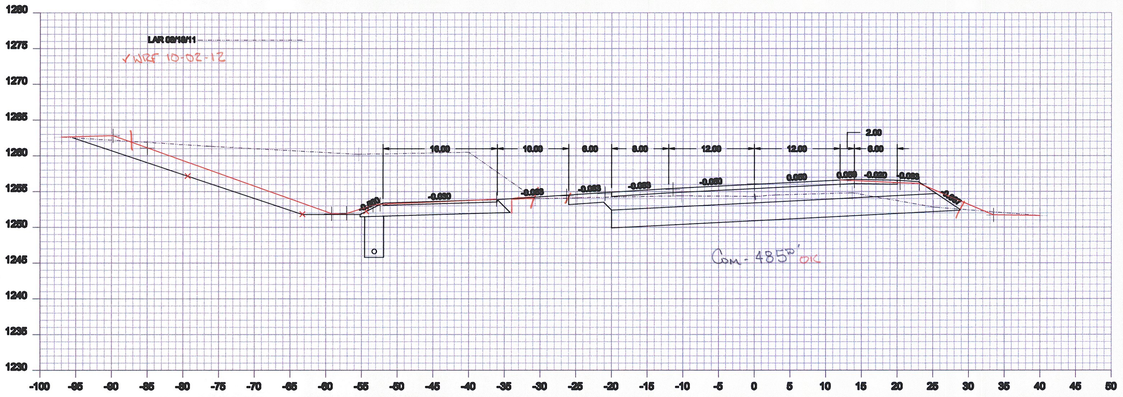


166+00

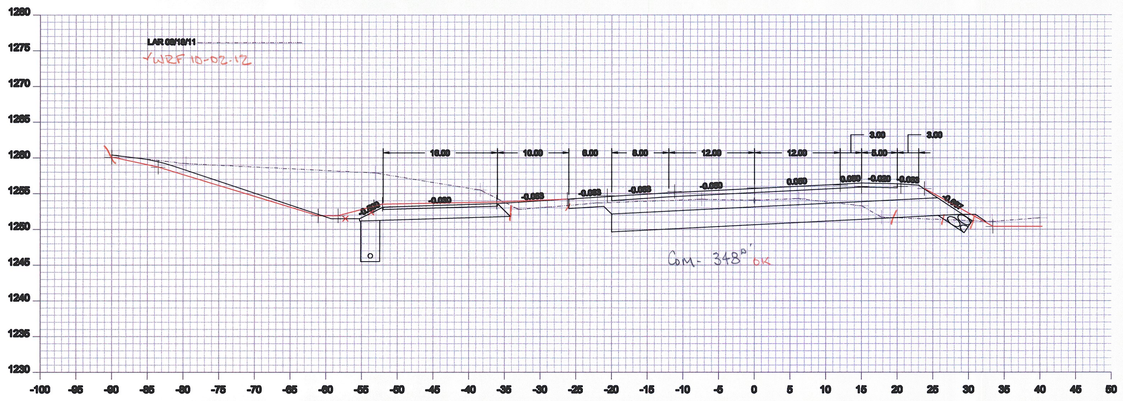
Drawing:	Cross Section 166+00 - 167+00
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-25-2012	Date:
Scale: 1 : 10	Sheet: of



168+50

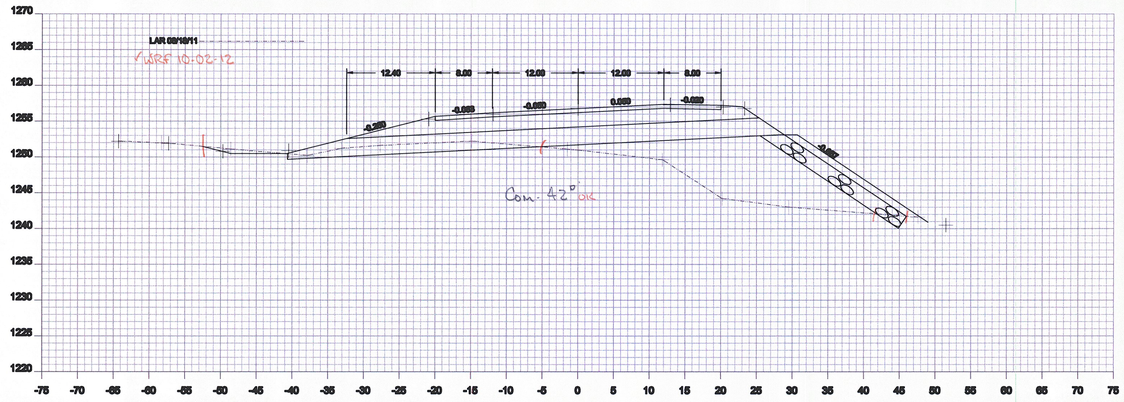


168+00

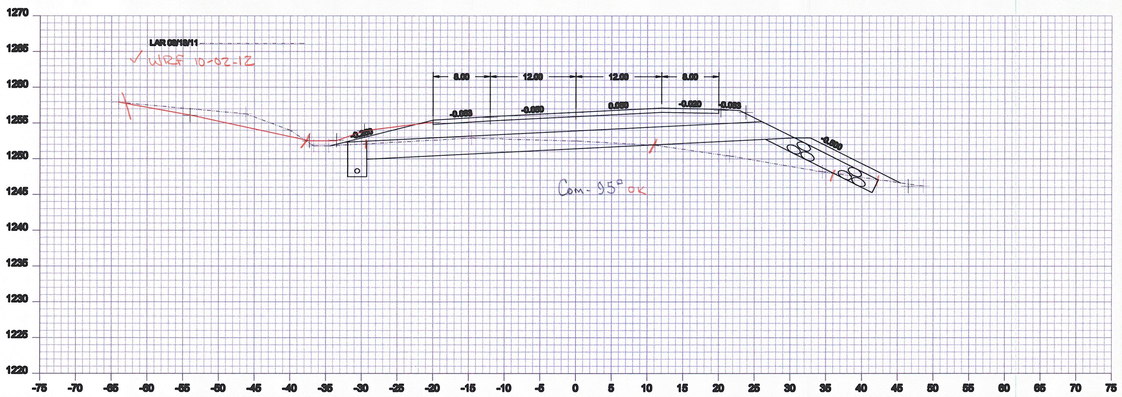


167+50

Drawing:	Cross Section 167+50 - 168+50		
Project:	Cabot Danville		
Drawn By:	JMR	Checked By:	
Date:	09-25-2012	Date:	
Scale:	1 : 10	Sheet:	of

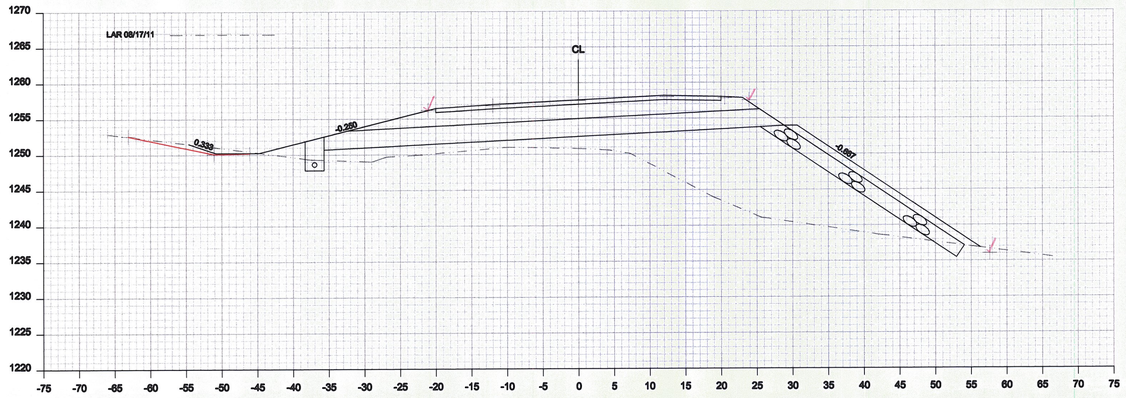


169+50

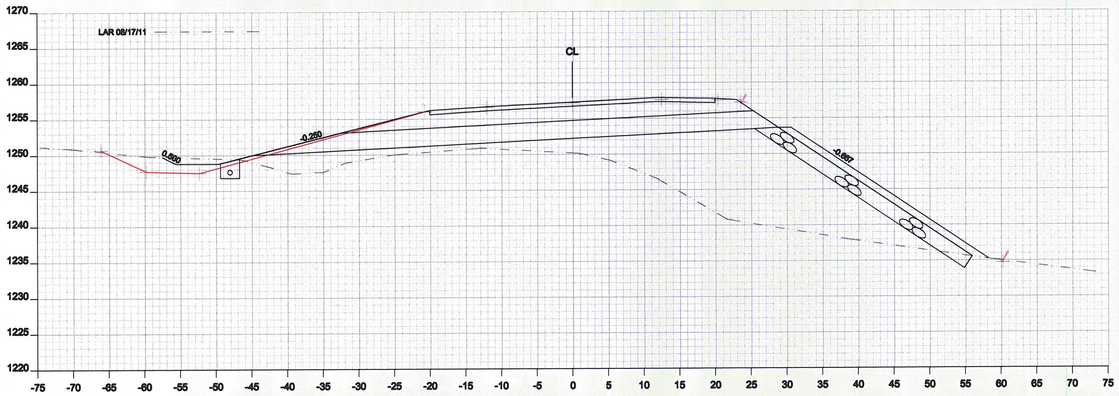


169+00

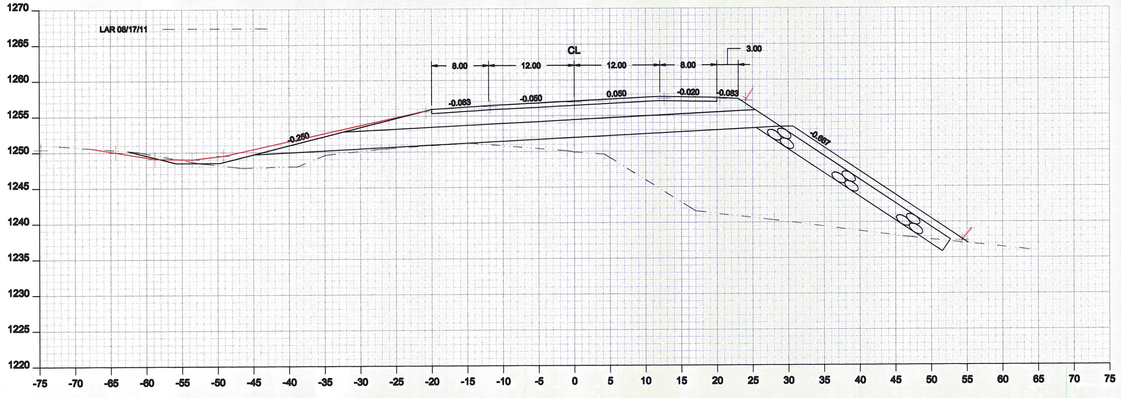
Drawing:	Cross Section 169+00 - 169+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 09-25-2012	Date:
Scale: 1 : 10	Sheet: of



171+00



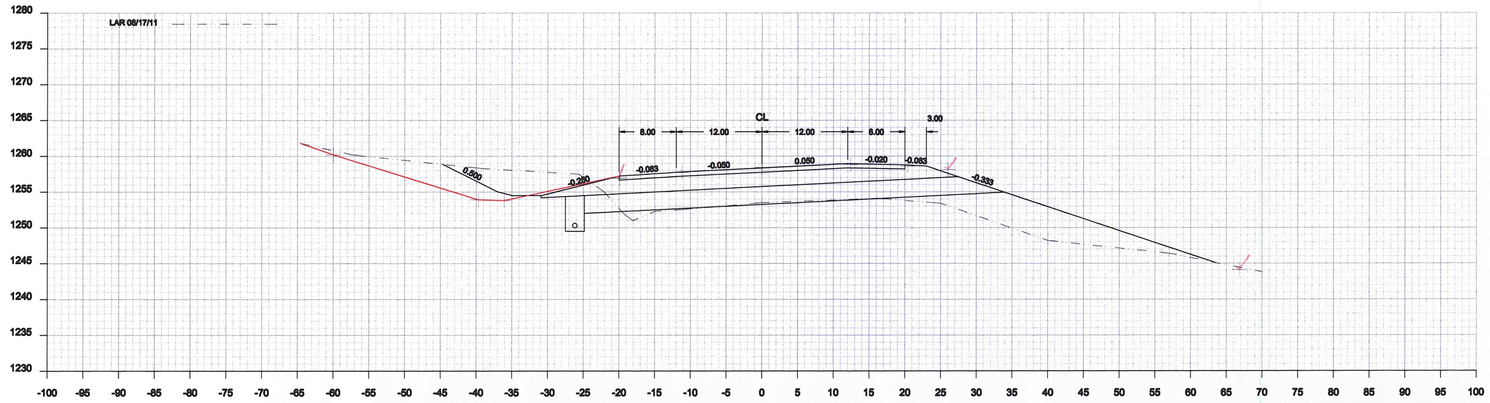
170+50



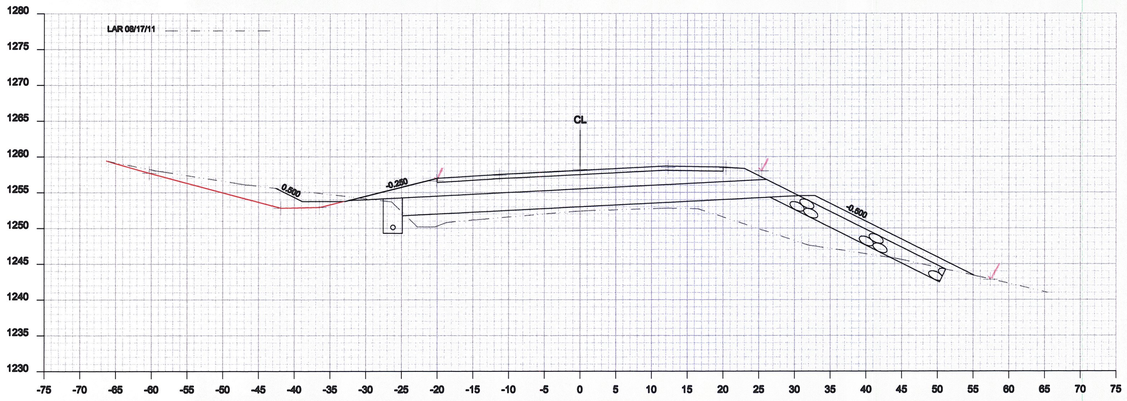
170+00

√ PLOT WRF 12-19-11
√ AREA WRF 12-21-11

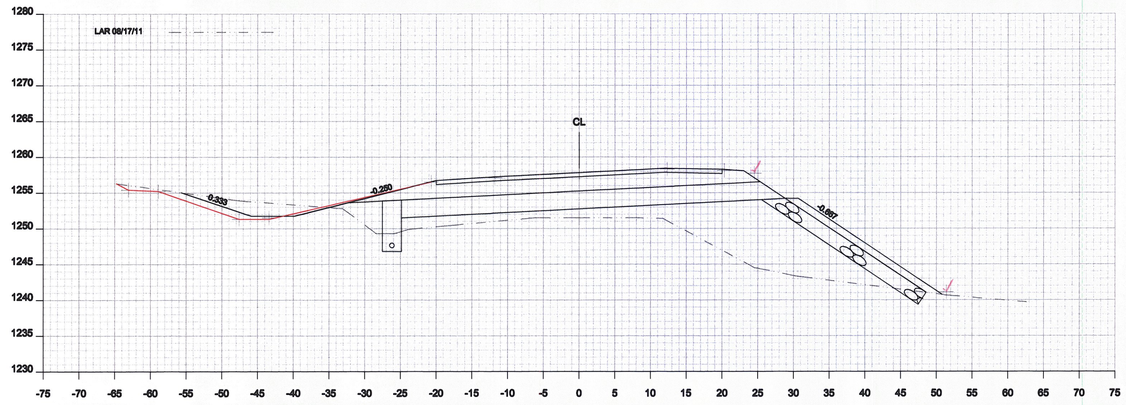
Drawing: Cross Section 170+00 - 171+00	
Project: Cabot Danville	
Drawn By: JMR	Checked By:
Date: 12-16-2011	Date:
Scale: 1 : 10	Sheet: of



172+50



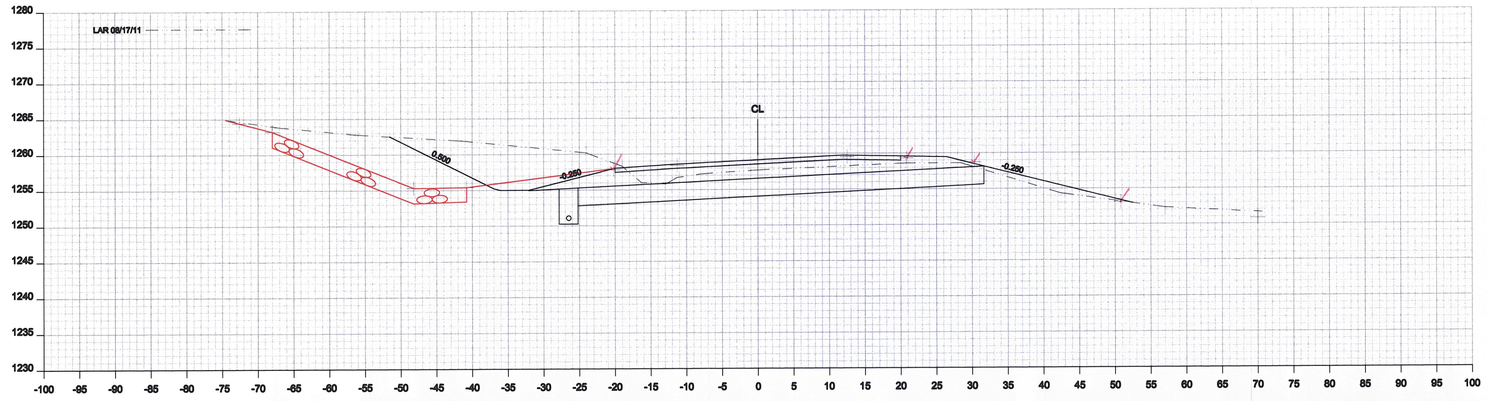
172+00



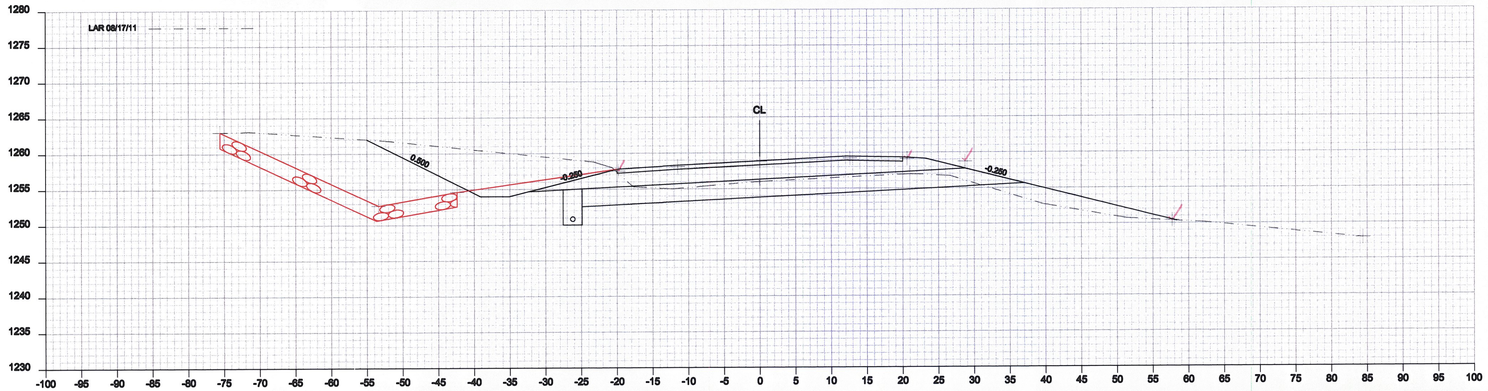
171+50

√Plot 12-19-11
√Area 12-21-11

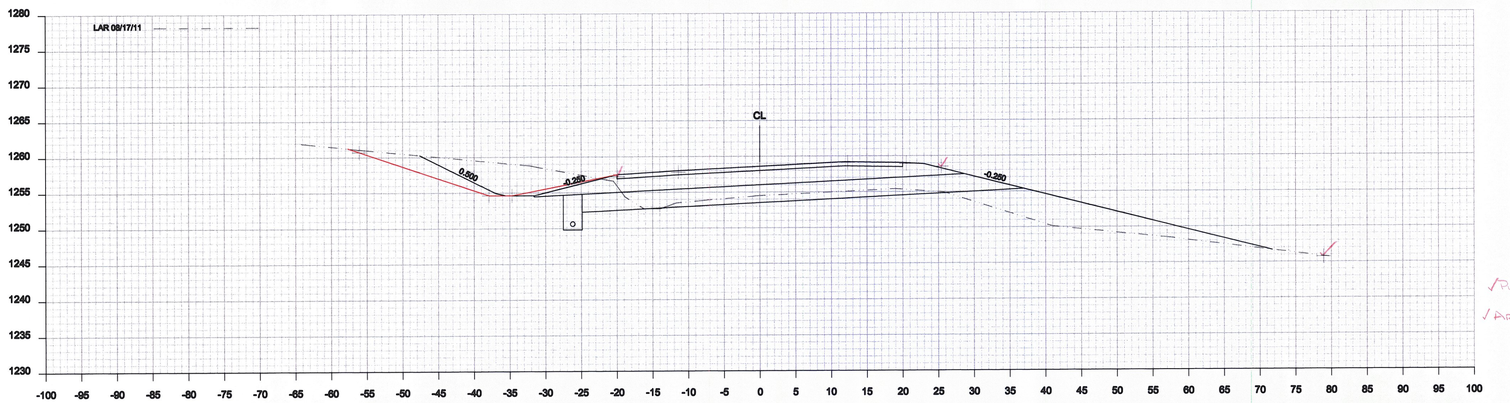
Drawing:	Cross Section 171+50 - 172+50
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 12-16-2011	Date:
Scale: 1 : 10	Sheet: of



174+00



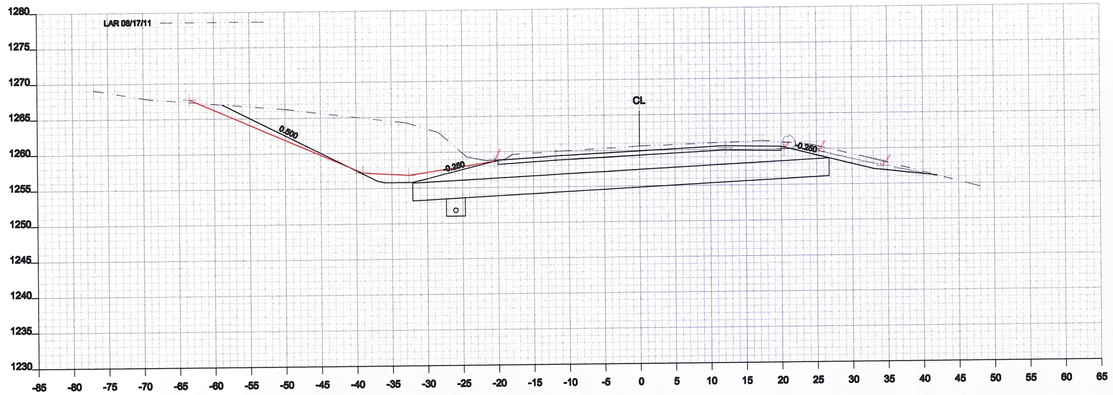
173+50



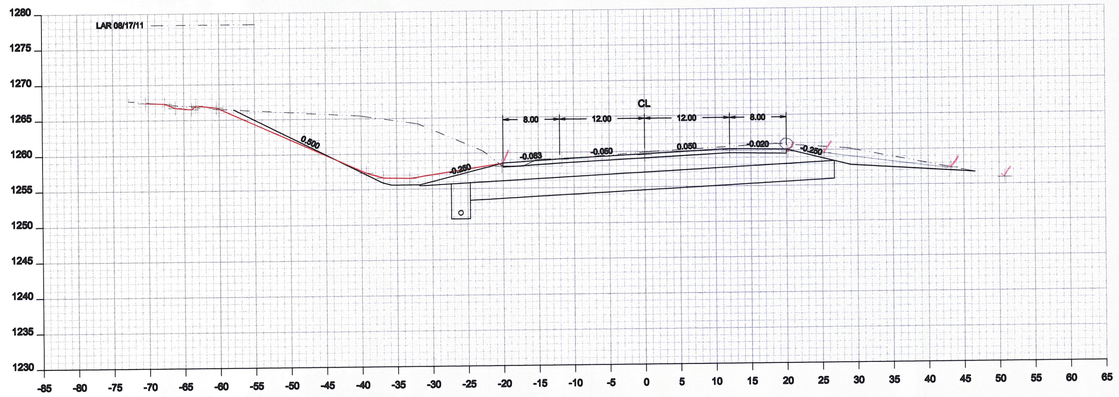
173+00

√Run 12-19-11
√Area 12-21-11

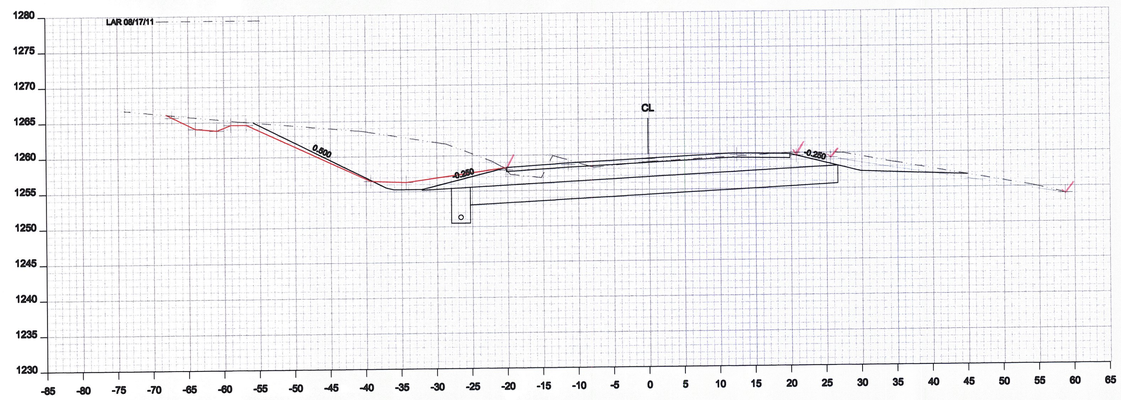
Drawing:	Cross Section 173+00 - 174+00
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 12-16-2011	Date:
Scale: 1 : 10	Sheet: of



175+50



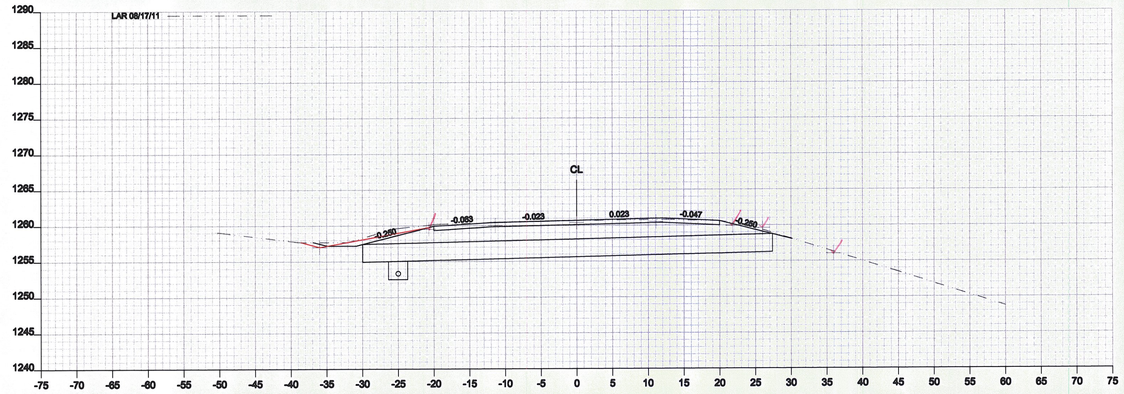
175+00



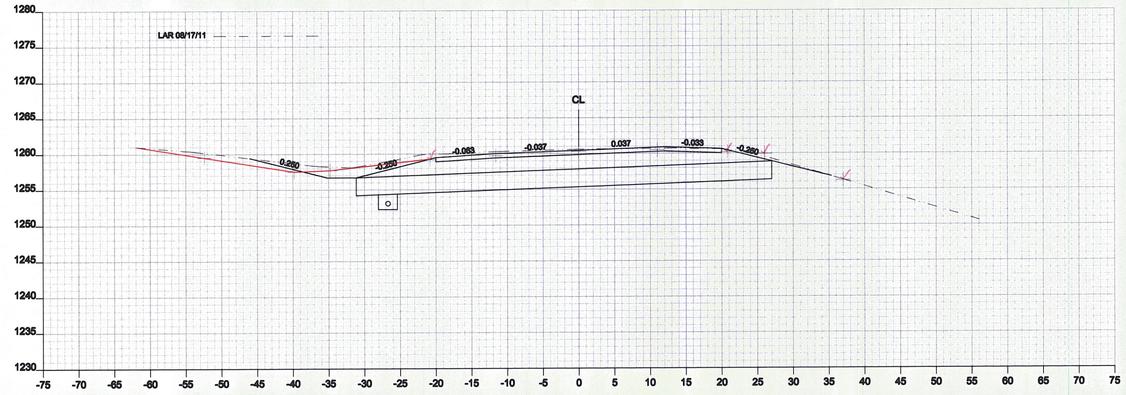
174+50

✓ Plot WRT 12-19-11
✓ Area WRT 12-21-11

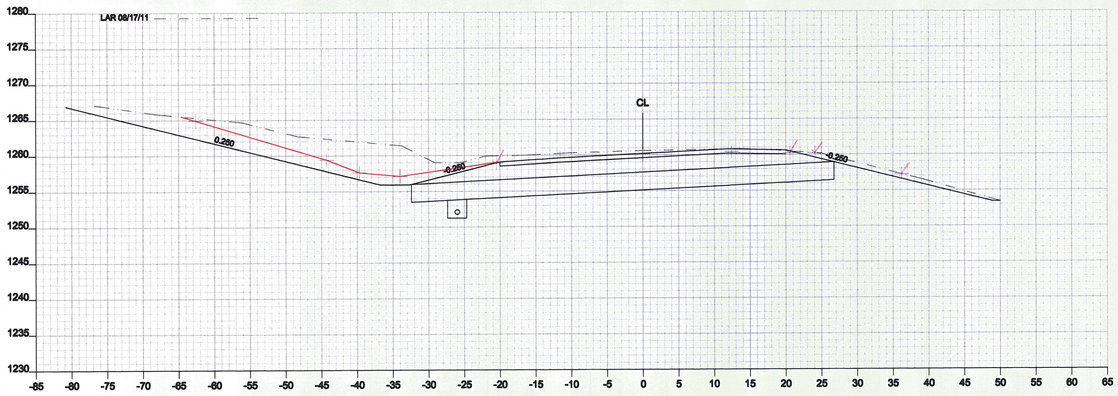
Drawing: Cross Section 174+50 - 175+50	
Project: Cabot Danville	
Drawn By: JMR	Checked By:
Date: 12-16-2011	Date:
Scale: 1 : 10	Sheet: of



177+00



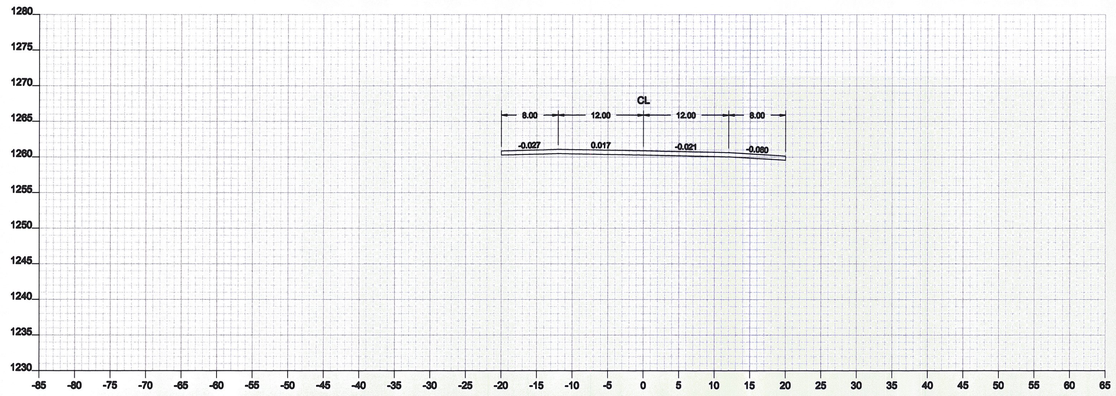
176+50



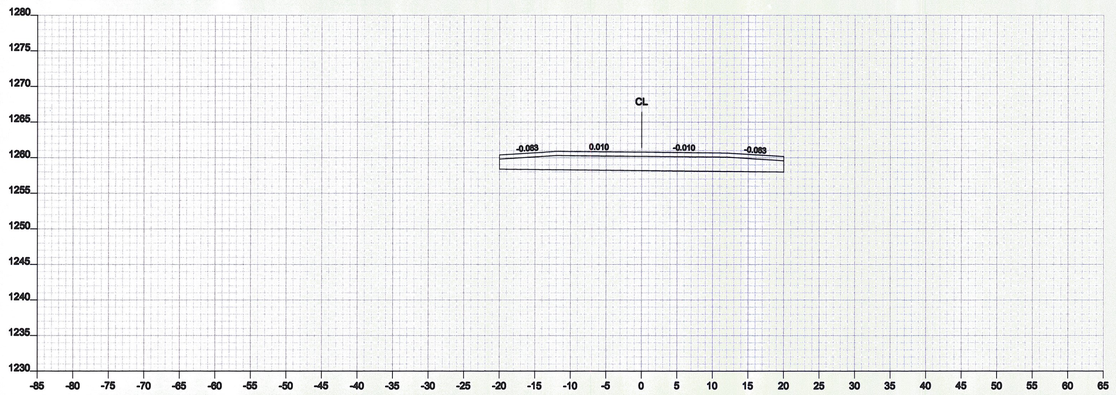
176+00

✓ Plot WRF 12-19-11
✓ Acen WRF 12-21-11

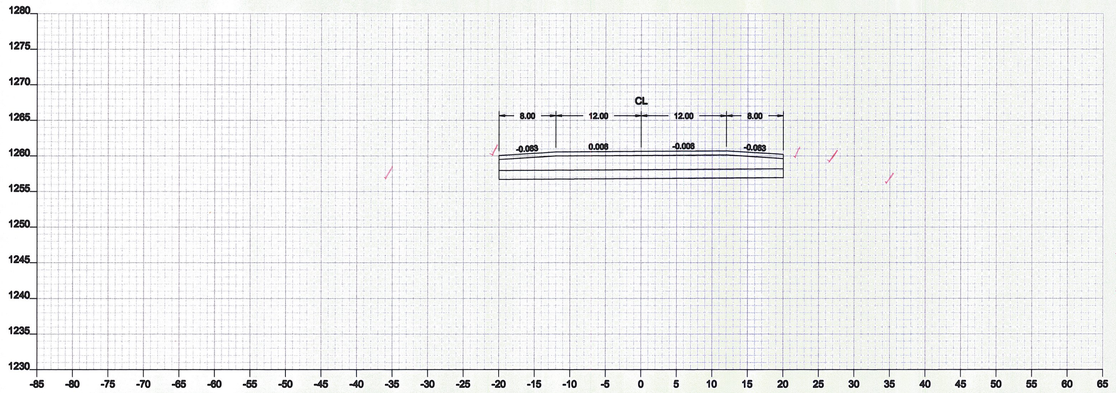
Drawing: Cross Section 176+00 - 177+00	
Project: Cabot Danville	
Drawn By: JMR	Checked By:
Date: 12-16-2011	Date:
Scale: 1 : 10	Sheet: of



178+50



178+00

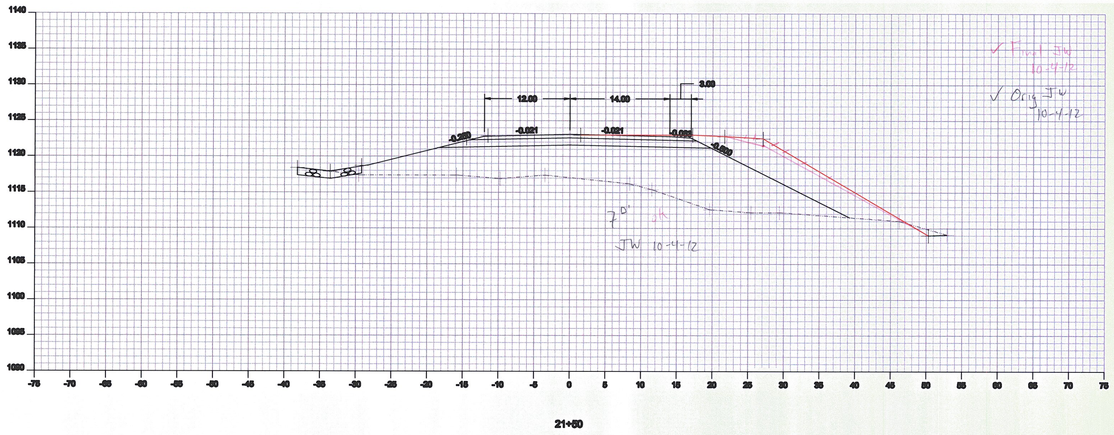


177+50

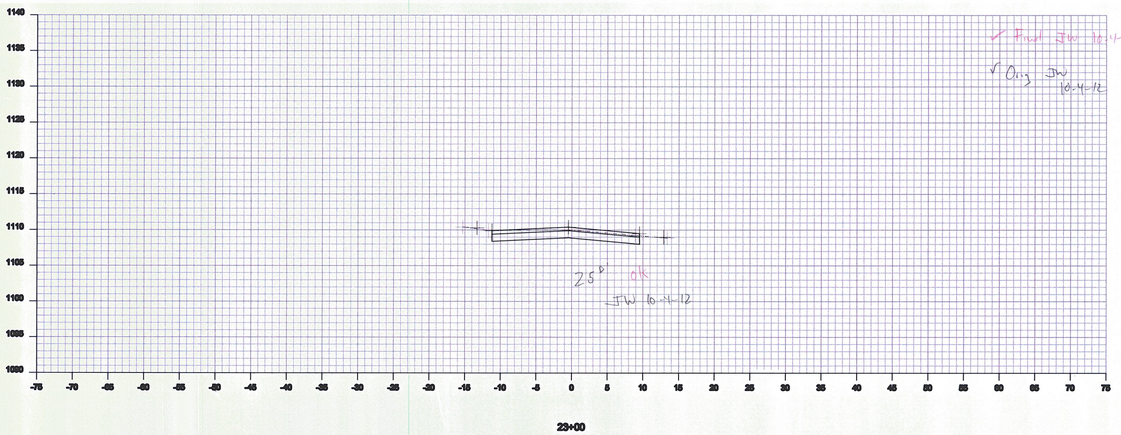
✓ Plot WRF 12-19-11

✓ Area WRF 12-21-11

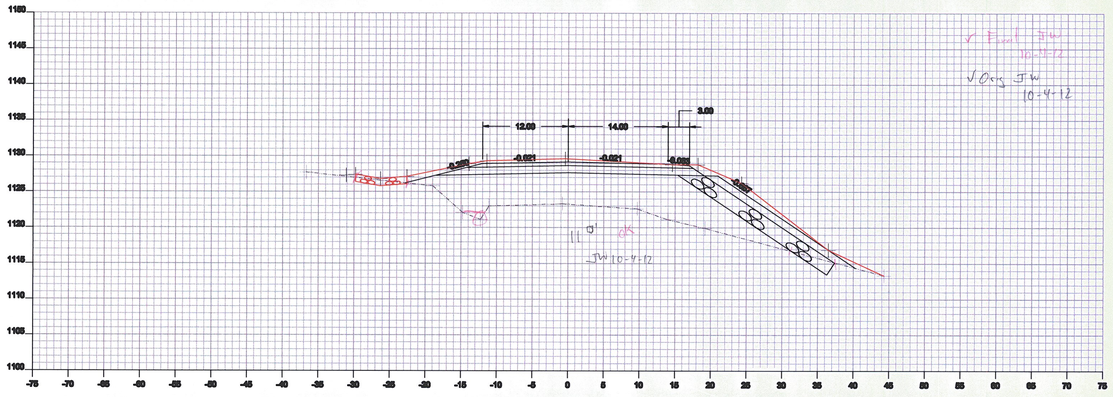
Drawing: Cross Section 177+50 - 178+50	
Project: Cabot Danville	
Drawn By: JMR	Checked By:
Date: 12-16-2011	Date:
Scale: 1 : 10	Sheet: of



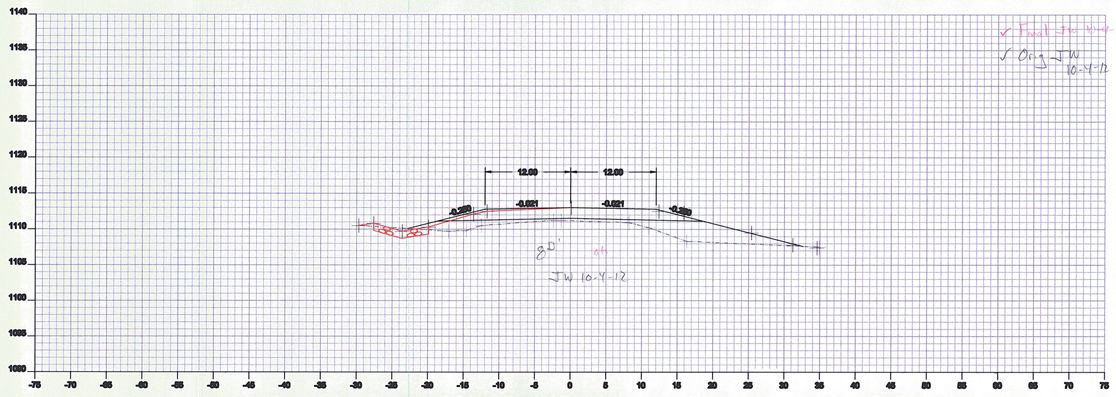
21+50



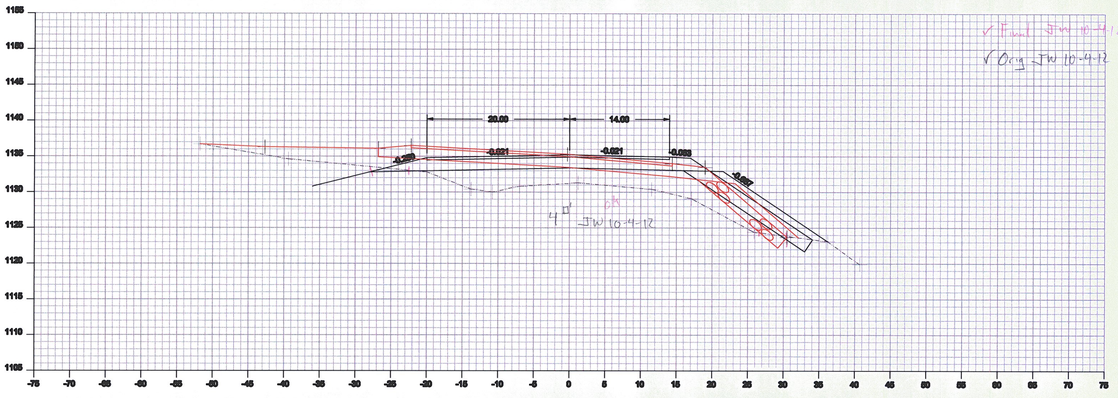
23+00



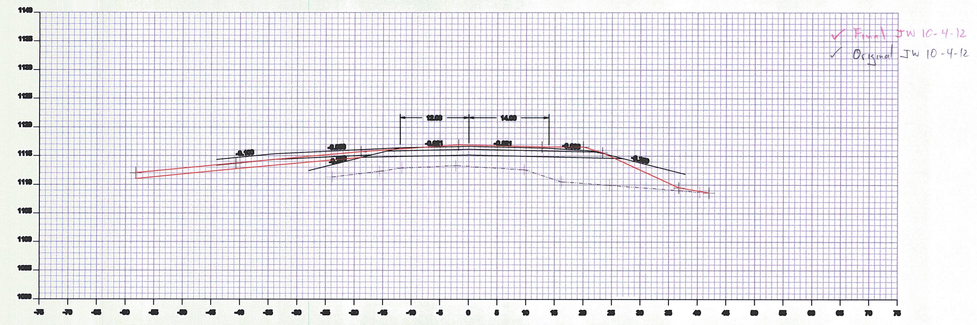
21+00



22+50

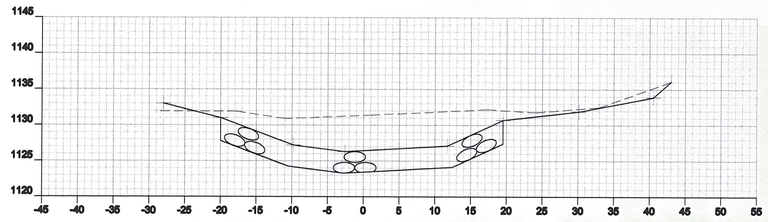


20+50



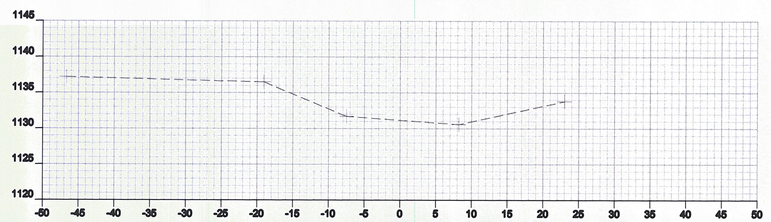
22+00

Drawing:	Cross Section 20+50 - 23+00
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 10-01-2012	Date:
Scale: 1 : 10	Sheet: of

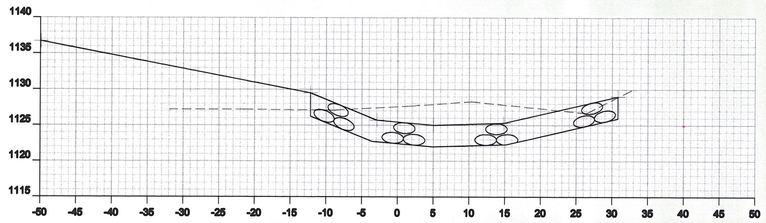


Orig ✓
Final ✓

2+50

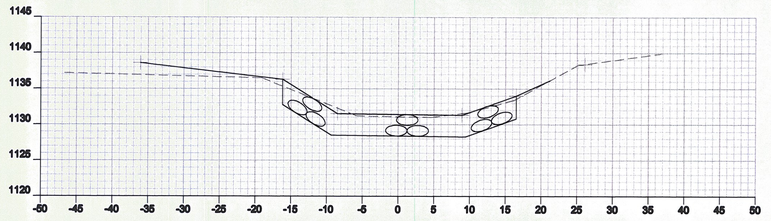


4+25



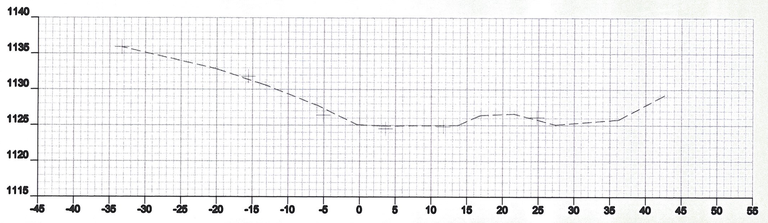
Orig ✓
Final ✓
WRF 5-10-12

2+00

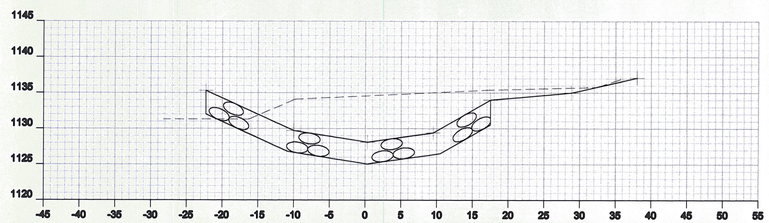


Orig ✓
Final ✓
WRF
05-10-12

4+00

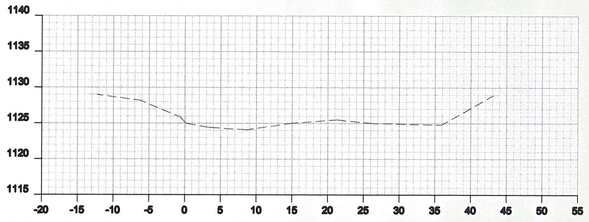


1+75

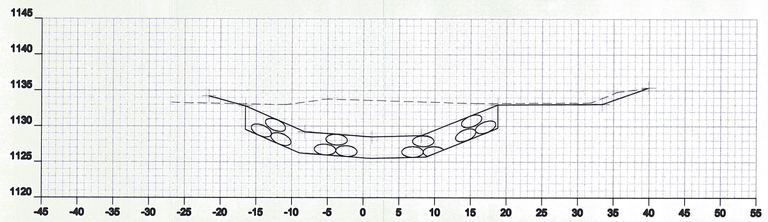


Orig ✓
Final ✓

3+50



1+50



✓ Orig
✓ Final

3+00

Drawing:	Channel Relocation
Project:	Cabot Danville
Drawn By: JMR	Checked By:
Date: 04-27-2012	Date:
Scale: 1:10	Sheet: of

PLATE 3-TYPE CROSS SECTION-HULL LINE
HIGHWAY SERVICE NO SHEET
PRINTED IN U.S.A.

Placed in Ditchline

1102.9 — 1103.3

1101+33.31 L.T. (40'L 18" CPEP)

1101+33+11.5' L.T.

1100

Ditchline

Pole

Inlet

Outlet

+57

+45

+03

99.00

Ditchline Grade

1105.80

1105+94

(5' Lined 60'-33 1/2")

Remove Exist 15" CGMP

1100

Tension Length = $\left(\frac{33'}{2}\times\frac{33.1}{12}\right)+\left(\frac{11'}{2}\times\frac{11.0}{12}\right)+\left(\frac{11'}{2}\times\frac{9.6}{12}\right)\times 4.25\div 360=2^{3}\times 1\frac{1}{2}+13.5^{\#}$ WRF 6-22-12

7-11-12

Pipe

Ditch

1103.0

1102.2

1100

+56

+03

Existing Outlet

1107.44

1106+67

58.5 + 3.0

T.E. = $\left(\frac{0.0+18.0}{2}\times 39\right)+\left(\frac{36+15}{2}\times 4\right)+6.5\times 4.25+28.6\times\frac{1}{12}=10.6^{SY}$

Remove Exist 15" CGMP

Say 11SY T.E.= 2.7 EA

WRF 6-21-12

7-18-12

1100

1101+67

T.E. = Dep

$\left(\frac{42.4+20.4}{2}\times 25\right)+\left(\frac{42.4+10.58}{2}\times 12\right)\times 4.25\div 28^{2}\times 1\frac{1}{2}=38.7^{SY}$

T.E. = Dep

$\left(\frac{42.4+20.4}{2}\times 25\right)+\left(\frac{42.4+10.58}{2}\times 12\right)\times 4.25\div 28^{2}\times 1\frac{1}{2}=38.7^{SY}$

Remove Exist 15" CGMP

#2 Bar, 6 Stirrups Spaced 6" Each End

#3 Bar, 2 Stirrups Spaced 6" Each End

7-13-12

Tension Length Conc. Apron (6-5)

CB: 5.0 + 3.0 + 0.5 = 8.5'

A: $4.9^{2}\times 3.14\div 4=6.8^{SF}\times 5=34^{SF}$

A: $1.5(\text{Apr Depth})\times 6.8^{SF}\times L.F.=\frac{132^{SF}}{477^{SF}}$

1100

Ditchline

Pipe

Inlet

Outlet

Ditchline Grade

1108+55

Remove Exist 15" CGMP & Provide 15" B Gasketed Pipe

Tension Length Pipe (30°)

(Over 5) $\left(\frac{30.0+18.0}{2}\times 39\right)+\left(\frac{18.0+15.0}{2}\times 4\right)+\left(\frac{15.0+10.0}{2}\times 59\right)\times 5.5\times 1.15=$

$\left(\frac{46.4+27.4}{2}\times 39\right)+\left(\frac{27.4+25.0}{2}\times 4\right)+\left(\frac{25.0+18.0}{2}\times 59\right)\times 5.5\times 1.15=$

$=\frac{464^{SF}}{2480^{SF}}=2957^{SF}\times\frac{1}{27}=109.5^{SY}$

109.5 SY = 16.2 EA = 110.7

WRF 6-13-12

7-18-12

JPD 07-12-12

Pipe

Ditch

1103.6

1102.2

1100

+56

+03

Existing Outlet

MEANDER - STONE FILL TYPE I

1100

Tension Length = $\left(\frac{30'}{2}\times 18.46^{3}\right)+\left(\frac{25'}{2}\times 18.25^{3}\right)+\left(\frac{18.0'}{2}\times 6\times 5\right)(1)=2741.5^{3}$

$2741.5\div 27=101.5^{CY}$

T.E. AT STONE FILL TYPE

7-19-12

WRF 7-19-12

Cabot Danville
FEGC F028-3(26) C/1
Drawing Sheet # 1

PLATE 3-FULL CROSS SECTION-FULL LINE
HIGHWAY, BRIDGE AND AIRFIELD

FINAL SURVEY
NOTE BOOK
PAGE
INITIALS
STARTED
FINISHED
ORIGINAL
NO.
PAGES CHECKED
BY
DATE

T.E. Pipe, CB, Headwall & Stone Fill

304.0+218.9+621.0+146.0+1567.4+2333.2+296.4+640 = 5540.9 ft³ x 1/27 = 205.2 cy WRF 6-20-12

Elev 1102.75

1100

Elev 1099.00

(111+65 (30° Lt) (Rebid)

T.E. CB (6.0 ft²)

0'-0" = 6.0 ft² x 5 ft = 304.0 ft³

Over 5' = 6.0 ft² x 24 ft x 1.5 = 216.0 ft³

T.E. - CB to NB (5.5 w)

0-5' [(5 x 17) + (85/12 x 17) + (41/12 x 2) x 5.5] = 621.0 ft³

Over 5' [(1.2 x 2.5) + (9/12 x 2.5 x 1.5) + (0.2 x 3.8) + (0.8/2 x 3.8 x 1.5) + (1.8 x 1.2) + (1.8/2 x 1.2 x 1.5)] x 5.5 x 1.5 = 182.6 ft³

WRF 6-20-12

T.E. 6'-5" Pipe M Right (Add 1 Extra Width)

[(16.8/12 x 215/12) + (13.8/12 x 215/12)] x 5.5 x 6.5 = 1557.4 ft³

Over 5' 146 223 262 168 7.7 3.5

[(6.0 x 1.5) + (11+22/12 x 1.5) + (28+26/12 x 1.5) + (28+23/12 x 1.5)] x 6.5 x 1.5 = 1233.2 ft³

239.5 x 6.5 x 1.5 = 2333.2 ft³

T.E. Headwall (6.5' Lang)

3.5 x 6.5 x 48/3 = 296.4 ft³

- Stone Fill - Type IV

8.0' x 40.0 w x 20.0 h = 640 ft³

(Concrete Headwall)

Conc. Pipe 6'-5" Dia

Plan: 9.5 x 6.5 x 0.5 = 30.8

Back: 9.5 x 1.5 x 1.0 = 14.2

Top Base: 4.5 x 4 x 4.3 = 163.4

208.4 ft³ / 27 = 7.7 cy

WRF 6-20-12

111 x 65 (Skewed 73° 52' Rt)

New 30" x 116' CMP w/ Prefab w/ Flared End Section

Stone Fill Bed Type IV 4 w x 10' L

Remove Exist 18" CSMP

111+65 (Skewed 73° 52' Rt)

New 42" x 26' PCCSP .109

Pipe 0'-5'

[(6.5/2 x 4.6 x 15) + (4.6/2 x 5.0 x 1) + (282.5/2 x 5.0 x 5.0) + (21.6/2 x 5.0 x 8) - (7.6/2 x 0.4 x 1.1 x 3.5)] x 6.5 = 2423.2 ft³

Over 5'

[(84.2/2 x 0.4 x 8) + (7.2/2 x 2.9 x 5.0)] x 6.5 x 1.5 = 880.2 ft³

Total = 356.8 + 1162.9 + 2423.2 + 880.2 + 307.8 + 423.3 = 4284.3 x 1/27 = 158.7 cy WRF 7-06-12

Plus Measured Trench Rock = 4 x 4 x 2 x 1/27 = 1.2 cy

159.9 cy

Pipe & Headwalls

Type I-S.F. = 12.0 cy

Type IV S.F. = 42.7 cy / 212.2 cy 7-10-12 WRF 7-09-12

Elev 1102.75

1100

Elev 1099.00

44 Rt

T.E. Pipe from Grey Section

Reduced Width at T.E.

115+28 (Skewed 88° 29' Rt) (Plan)

New 42" x 82' PCCSP .109

3/Grade Adj. at Inlet + Outlet

Stone Fill Bed, Type IV 5' w x 20' L @ Outlet

Remove Exist. 24" RCP

Removal T.E.

[(60.0+19)/2 x 2.5] + [(11.5+15.5/12 x 1.5) + (11.5+28.8/12 x 4 x 1.5) + (28.8+50.0/12 x 4.5 x 1.5)] + [(28.8+50.0/12 x 4.5 x 1.5)] = 586.6 x 1/27 = 22.4 cy

WRF 7-06-12

88° 29 Rt

Exist 24" Culvert

115+28 (Skewed 88° 29 Rt)

115+20 (Skewed 85° Lt)

1110

1090

1112.48

115+26 (Skewed 88° 29' Lt) (Skewed)

New 42" x 54' PCCSP .109

T.E. Outlet Head

7'w x 10.5' L x 5.0' H = 367.5 ft³

Over 5'

1'w x 10.5' L x 1.2 H x 1.5 = 132.3 ft³

Trench Earth Stone Fill Type IV

[(5.0 x 10.5) + (2.5 x 10.5/2)] x 10 = 1037 ft³

Over 5'

[(5.5 x 5.0 + 1.2/2) + (10 x 50/2) + (2.5 x 10.5/2)] x 10 x 1.5 = 1170 ft³

1/2 x (1037 + 1170) = 427 cy WRF 7-09-12

1'-0" Stone Fill Type IV

1' x 8' x 16' L = 32 x 1/27 = 1.2 cy

T.E. 7-09-12

1110

T.E. 27.5

[(6.2/2 x 4.1) + (5.5 x 5.0)] x 10.5 = 358.8 ft³

Over 5'

(6.8+19")/2 x 3.5 x 10.5 x 1.5 = 116.9 ft³

Type 18 x 20 x 5 ft

115+23

41' Lt

1106.75

Elev 1102.75

Elev Pipe x Feet

5' Undercut

1' Undercut

115+20 (Skewed 80° Lt) (Rebid)

New 42" x 26' PCCSP .109

1112.41

115+11

5:1 / 2:1

1095.68

Elev Pipe x Feet

Elev Pipe Stone

Elev 1102.75

1100

Elev 1099.00

(Skewed 73° 52' Rt)

Concrete Headwall

Plan: 9.5 x 6.5 x 0.5 = 30.8

Back: 9.5 x 1.5 x 1.0 = 14.2

Top Base: 4.5 x 4 x 4.3 = 163.4

208.4 ft³ / 27 = 7.7 cy

WRF 6-20-12

111 x 65 (Skewed 73° 52' Rt)

New 30" x 116' CMP w/ Prefab w/ Flared End Section

Stone Fill Bed Type IV 4 w x 10' L

Remove Exist 18" CSMP

111+65 (Skewed 73° 52' Rt)

Pipe 0'-5'

[(6.5/2 x 4.6 x 15) + (4.6/2 x 5.0 x 1) + (282.5/2 x 5.0 x 5.0) + (21.6/2 x 5.0 x 8) - (7.6/2 x 0.4 x 1.1 x 3.5)] x 6.5 = 2423.2 ft³

Over 5'

[(84.2/2 x 0.4 x 8) + (7.2/2 x 2.9 x 5.0)] x 6.5 x 1.5 = 880.2 ft³

Total = 356.8 + 1162.9 + 2423.2 + 880.2 + 307.8 + 423.3 = 4284.3 x 1/27 = 158.7 cy WRF 7-06-12

Plus Measured Trench Rock = 4 x 4 x 2 x 1/27 = 1.2 cy

159.9 cy

Pipe & Headwalls

Type I-S.F. = 12.0 cy

Type IV S.F. = 42.7 cy / 212.2 cy 7-10-12 WRF 7-09-12

CABOT DANVILLE
FEGC F-028-3(26) C/I
DRAINAGE SHEET # 2

PLATE 3-FULL CROSS SECTION-HULL LINE
HIGHWAY LEGEND PID SHEET
NATIONAL PERMANENT
PRINTED IN U.S.A.

FINAL SURVEY
NOTE BOOK
PAGES CHECKED
STATUS
INITIALS
DATE
BY
DESIGNED
DRAWN
TRACED
CHECKED
CHECKED BY

✓ Template
✓ Existing

Over 5' Neglect = HDWL
HDWL - T.E. = [(15.1+7.4)/2 x 1.5) + ((68.4+0.5)/2 x 34') + ((48.8+5.9)/2 x 32') + ((15.9+3.0)/2 x 15') + ((3.0+0.5)/2 x 30')] x 5 = 260.8 ft³
Pipe = 100% - [(3.3+5.6)/2 x 4) + ((45.5+15.2)/2 x 30') + ((30.5+8.5)/2 x 15') + (0.5+0.8)/2 x 8) + ((0.8+2.3)/2 x 12') + ((2.3+10.6)/2 x 6) + (0.5+2.0)/2 x 25') x 7] = 223.1 ft³
Over 5' = 100% - [(0.0+15.5)/2 x 5) + ((15.5+22.3)/2 x 30') + ((22.3+31.6)/2 x 15') x 7 x 1.5 = 128.8 ft³

HDWL T.E. = 100% = (5 x 7 x 5) = 280 ft³
T.E. = 150% = [(7.4+3.0)/2 x 5) + ((3.0+0.5)/2 x 30') x 5 x 1.5 = 154.8 ft³
Stone Fill & Other = [(5.7+4.8)/2 x 5) + ((4.8+1.5)/2 x 15') x 6 = 418.5 ft³
Over 5' Neglect
Total T.E. = 260.8 + 223.1 + 128.8 + 154.8 + 418.8 = 1186.3 x 1/27 = 43.9 cy
2295.0'
2295.0 + 2295.0 = 4590.0
4590.0 x 1/27 = 170.0 cy
SAY 170 cy
10/20/11
Under 12-02-11

Unclassified Channel
0+0 — 12.3' — 66.3' — 2238.3' — 12.6' — 30.2' — 2302.2' — 12.3' — 154.3 cy — Used 12-08-11 JPD 12-08-11

Unclassified Channel & Ditches 118+08

0+045		8.5	41.6	448
+10		10	63.8	1040
+20		10	64.2	1040
+30		10	102.1	832
+40		10	141.1	1225.6
+50		10	145.1	1451.0

Ave. x 1/27 = 170.6
Used 12-08-11 JPD 12-08-11

End Unclass Channel @ Sta. 50+00 - Same Price as Sta 46+60

Grade Headwalls & Inlets, Stone Fill Pad
Headwall - Under - 7'4" x 11' = 770
Pipe - [(60+48)/2 x 46) - (3'11" x 11')] x 11' = 533.7
Trans 11.5' - 3'4" x 11' = 59.4
Pipe - [(48+60)/2 x 3'4" x 46) - (3'4" x 11')] x 7' = 511.2
1903.3 ft³ x 1/27 = 35.1 cy Used 11-17-11

See 111/30 / 2011 EPR
For Type of Stone, Geotextile

Unclass
(12+0.5/2 x 4) + (5.3+5.5/2 x 4) = 42.2 sy
40+00
(12+0.5/2 x 4) + (7.8+5.7/2 x 8) + (5.7+4.2/2 x 8) = 145.1 sy
Unclass
(20.0+0.4/2 x 16) + (7.8+5.7/2 x 4) + (5.7+4.2/2 x 8) = 102.1 sy
30+00
Unclass
(22+5.3/2 x 4) + (5.3+5.5/2 x 4) + (0.5+0.8/2 x 8) = 44.2 sy
20+00
Unclass
(13.6+22/2 x 8) + (4.9+5.5/2 x 8) + (4.9+3.2/2 x 8) = 62.8 sy
10+00
Unclass
(20+35/2 x 4) + (3.4+5.8/2 x 16) + (5.8+3.0/2 x 8) = 41.6 sy
0+00 @ 1:1

Over 5' Neglect
Headwall 0-03 5'x7'x11'(6) = 385 ft³
Over 5' (10.5+10.4/2 x 3.0) + (32+20.4/2 x 4) x 11 x 1.5 = 344.8 ft³
Pipe = [(40+39/2 x 3) + (5.1+10.2/2 x 5) + (23+31/2 x 5)] x 7 = 296.1 ft³
10259 ft³ x 1/27 = 380 cy Used 11-17-11

Drain Under Pedestal
TE - Box 11-14-11 Work #8 CULVERT ROCK HAUL ITEM
Headwall 0-03 5'x7'x11'(6) = 385 ft³
Over 5' (10.5+10.4/2 x 3.0) + (32+20.4/2 x 4) x 11 x 1.5 = 344.8 ft³
Pipe = [(40+39/2 x 3) + (5.1+10.2/2 x 5) + (23+31/2 x 5)] x 7 = 296.1 ft³
10259 ft³ x 1/27 = 380 cy Used 11-17-11

Grade Headwalls & Inlets
Headwall - Under - 7'4" x 11' = 770
Pipe - [(60+48)/2 x 46) - (3'11" x 11')] x 11' = 533.7
Trans 11.5' - 3'4" x 11' = 59.4
Pipe - [(48+60)/2 x 3'4" x 46) - (3'4" x 11')] x 7' = 511.2
1903.3 ft³ x 1/27 = 35.1 cy Used 11-17-11

Summarized
Diesel & IDR Fuel Haul - TE - 86
- Asph. & Conc. Pipe & Haul - Grav. Backfill - 28
Grav. Borrow - 58
Haul - TE

Unclassified Channel
Headwall - Under - 7'4" x 11' = 770
Pipe - [(60+48)/2 x 46) - (3'11" x 11')] x 11' = 533.7
Trans 11.5' - 3'4" x 11' = 59.4
Pipe - [(48+60)/2 x 3'4" x 46) - (3'4" x 11')] x 7' = 511.2
1903.3 ft³ x 1/27 = 35.1 cy Used 11-17-11

Unclassified Ditches
(20+35/2 x 4) + (3.4+5.8/2 x 16) + (5.8+3.0/2 x 8) = 41.6 sy

Common Excavation
Begin Unclass Chan @ Sta 0+00 @ 1:1

Minus TE - Below Culvert Pipe - 12'x12' Culvert / 3'x3' Culvert / 39' Long
5' High x 8' Wide (5'-1.2'+1.5') x 39' Long = 1560 ft³
Minus Grade Box 5'x5'x3' = - 975 ft³
Minus TE - Outlet 12.3' x 3' x 3' Wide = - 111 ft³
Minus TE - Inlet (11+11/2) x 3' x 3' Wide = - 148.5 ft³
= 325.5 ft³ x 1/27 = 12.1 cy
TIR DIM HDR 12-01-11 (5+5) + 12' x 5' + 39' x 4 x 1/27 = 73.1 cy
Used 12-07-11 JPD 12-07-11

118+58 Lt
Exist 3'x2' Box Culvert (Remove)
- New Roadway Section for Reference -

Grade Headwalls & Inlets, Stone Fill Pad
Type II, 6'0"x16'1" Outlet / Type III, 12'x7'
Headwall - Under - 7'4" x 11' = 770
Pipe - [(60+48)/2 x 46) - (3'11" x 11')] x 11' = 533.7
Trans 11.5' - 3'4" x 11' = 59.4
Pipe - [(48+60)/2 x 3'4" x 46) - (3'4" x 11')] x 7' = 511.2
1903.3 ft³ x 1/27 = 35.1 cy Used 11-17-11

See 111/30 / 2011 EPR
For Type of Stone, Geotextile

Grade Headwalls & Inlets, Stone Fill Pad
Type II, 6'0"x16'1" Outlet / Type III, 12'x7'
Headwall - Under - 7'4" x 11' = 770
Pipe - [(60+48)/2 x 46) - (3'11" x 11')] x 11' = 533.7
Trans 11.5' - 3'4" x 11' = 59.4
Pipe - [(48+60)/2 x 3'4" x 46) - (3'4" x 11')] x 7' = 511.2
1903.3 ft³ x 1/27 = 35.1 cy Used 11-17-11

HDWL T.E. = 100% = (5 x 7 x 5) = 280 ft³
T.E. = 150% = [(7.4+3.0)/2 x 5) + ((3.0+0.5)/2 x 30') x 5 x 1.5 = 154.8 ft³
Stone Fill & Other = [(5.7+4.8)/2 x 5) + ((4.8+1.5)/2 x 15') x 6 = 418.5 ft³
Over 5' Neglect
Total T.E. = 260.8 + 223.1 + 128.8 + 154.8 + 418.8 = 1186.3 x 1/27 = 43.9 cy
2295.0'
2295.0 + 2295.0 = 4590.0
4590.0 x 1/27 = 170.0 cy
SAY 170 cy
10/20/11
Under 12-02-11

Grade Headwalls & Inlets, Stone Fill Pad
Type II, 6'0"x16'1" Outlet / Type III, 12'x7'
Headwall - Under - 7'4" x 11' = 770
Pipe - [(60+48)/2 x 46) - (3'11" x 11')] x 11' = 533.7
Trans 11.5' - 3'4" x 11' = 59.4
Pipe - [(48+60)/2 x 3'4" x 46) - (3'4" x 11')] x 7' = 511.2
1903.3 ft³ x 1/27 = 35.1 cy Used 11-17-11

Grade Headwalls & Inlets

PLATE 3-FULL CROSS SECTION-FULL LINE
HIGHWAY FEDERAL AID SHEET
MATERIAL WARRANTY
PRINTED IN U.S.A.

DESIGNED
DETAILED
TRACED
CHECKED
QUANTITIES
STRUCTURE
DETAILS
QUANTITIES
CHECKED
DATE
BY
STATE
NO.
FIELD BOOK
PAGES
FIELD BOOK
PAGES
CHECKED
DATE
BY
STATE

1170.35
1168.00
1163.75
1170
Trench Earth
$\left(\frac{8.0+12.0}{2}\times 4\right)\left(\frac{11.0\times 11}{2}\right)+\left(12.0\times\frac{8.0\times 4}{2}\right)\times 4.5\times 6.75\times\frac{1}{27}=25.5\,cy$
Sta. 130+50 Lt - 130+75 Rt
New 18" RCP
S/PRECAST w/ Type B Grate & Inlet
Type B
7-10-12
7-12-12
Remove Old
Type B
7-11-12
9/15/2012
Sta. 126+24 Rt
Existing 18" RCP (Remove)
1170
1160
1150
1140
1130
1120
1110
1100
1090
1080
1070
1060
1050
1040
1030
1020
1010
1000
990
980
970
960
950
940
930
920
910
900
890
880
870
860
850
840
830
820
810
800
790
780
770
760
750
740
730
720
710
700
690
680
670
660
650
640
630
620
610
600
590
580
570
560
550
540
530
520
510
500
490
480
470
460
450
440
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
260
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
1180.95
1178.55
1180
1150
Trench Earth Catch Basin
0'-5' - $(4.4')^2\times 3.14\times 5.0 = 304\,cf$
Over 5' - $(4.4')^2\times 3.14\times 20\times 1.5 = 1824\,cf$
Trench Earth Last 18' of Pipe
0'-5' - $\left(\frac{6.0+18.0}{2}\times 18\right)+\left(\frac{6.0+18.0}{2}\times 20\times 18\right)\times 4.5\times\frac{1}{27}=335.5\,cy$
Over 5' - $\left(\frac{8.0+18.0}{2}\times 4\right)+\left(\frac{18.0+35}{2}\times 35\right)\times 4.5\times\frac{1}{27}=72.0\,cy$
Area $304+1824+335.5+72.0 = 8923\,cf/27 = 33.1\,sy$
Sta. 136+12 Lt - New Sheet
New 30" x 122' CPEP
Energie Dissipator & Outlet w/ Type IV 8'W x 30'L Stone Fill Pad
New PRECAST Type B Grates & Inlet
137+00
Inv. 1156.1
Stone Fill Type IV - $12'\times 30'\times 3.5'/27 = 30.1\,cy$ Fill w/ Hand Placed Stone
Geo. $16'\times 34'\times\frac{1}{9} = 60.4\,sy$
Geo. $5.5'\times 5.5'\times\frac{1}{9} = 3.4\,sy$
Total = 33.1 sy
Hand Placed 10/26/11
0'-5' Trench Earth Pipe - $\left(\frac{6.0+18.0}{2}\times 18\right)+\left(\frac{6.0+18.0}{2}\times 20\times 18\right)\times 4.5\times\frac{1}{27}=335.5\,cy$
Over 5' - $\left(\frac{8.0+18.0}{2}\times 4\right)+\left(\frac{18.0+35}{2}\times 35\right)\times 4.5\times\frac{1}{27}=72.0\,cy$
Concrete Encl. - Under Pipe - $(1'\times 80'\times 3')+\left(\frac{1}{2}\times\pi\times 5^2\times 3\right)=495\,cf$
Up 1.25 - Pipe - $\left(\frac{6.0+18.0}{2}\times 18\right)-\left(\frac{1}{2}\times\pi\times 3^2\times 18\right)=423.9\,cf$ - $495\,cf = 915.9\,cf/27 = 34\,cy$ USE 9-10-11
34 cy x 1.15 = 39 cy USE 9-30-11
39 EC4 Hand 10/26/11
USE 10-20-11
Stone Fill Type IV - $12'\times 30'\times 3.5'/27 = 30.1\,cy$ Fill w/ Hand Placed Stone
Geo. $16'\times 34'\times\frac{1}{9} = 60.4\,sy$
Geo. $5.5'\times 5.5'\times\frac{1}{9} = 3.4\,sy$
Total = 33.1 sy
Hand Placed 10/26/11
1140
1130
1120
1110
1100
1090
1080
1070
1060
1050
1040
1030
1020
1010
1000
990
980
970
960
950
940
930
920
910
900
890
880
870
860
850
840
830
820
810
800
790
780
770
760
750
740
730
720
710
700
690
680
670
660
650
640
630
620
610
600
590
580
570
560
550
540
530
520
510
500
490
480
470
460
450
440
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
260
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
1173.55
1168.0
1160
1150
Sta. 130+50 Lt - 130+75 Rt
1149.55
Trench Earth
$\left(\frac{8.0+12.0}{2}\times 18\right)+\left(\frac{12.0+15.0}{2}\times 2.0\right)+\left(\frac{15.0+15.0}{2}\times 2.0\right)\times 4.5\times\frac{1}{27}=51.6\,cy$
Remove Old
Type B
Type B
7-11-12
9/15/2012
Trench Earth
$\left(\frac{8.0+12.0}{2}\times 4\right)\times 4.1\times\frac{1}{27}=24\,cy$
Sta. 126+24 Rt
Existing 18" RCP (Remove)
Trench Earth Catch Basin
0'-5' - $(4.4')^2\times 3.14\times 5.0 = 304\,cf$
Over 5' - $(4.4')^2\times 3.14\times 20\times 1.5 = 1824\,cf$
Trench Earth Last 18' of Pipe
0'-5' - $\left(\frac{6.0+18.0}{2}\times 18\right)+\left(\frac{6.0+18.0}{2}\times 20\times 18\right)\times 4.5\times\frac{1}{27}=335.5\,cy$
Over 5' - $\left(\frac{8.0+18.0}{2}\times 4\right)+\left(\frac{18.0+35}{2}\times 35\right)\times 4.5\times\frac{1}{27}=72.0\,cy$
Area $304+1824+335.5+72.0 = 8923\,cf/27 = 330.5\,sy$
Sta. 136+12 Lt - New Sheet
Hand Placed 10/26/11
New 30" x 122' CPEP
w/ 4'x12' Type II Stone Fill Pad & Outlet
New PRECAST Type B Grates & Inlet
1160
1150
1140
1130
1120
1110
1100
1090
1080
1070
1060
1050
1040
1030
1020
1010
1000
990
980
970
960
950
940
930
920
910
900
890
880
870
860
850
840
830
820
810
800
790
780
770
760
750
740
730
720
710
700
690
680
670
660
650
640
630
620
610
600
590
580
570
560
550
540
530
520
510
500
490
480
470
460
450
440
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
260
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
1139.1
1135.6
1150
Stone Fill Type II - $6'\times 12'\times 1.5'(Max)\times\frac{1}{27}=4\,cy$
USE 6-22-12
Volume = $304+82+1406+1678 = 3490\times\frac{1}{27} = 128.5\,cy$
= 128.1 cy (T.E. Pipe Culvert) From IR IDR 6-30-12
108.4 sy say 108 cy USE 6-22-12
4 cy Stone Fill Outlet
112 cy USE 6-22-12
7-11-12
1351 + 93S
Cabot Danville
FECC F028-3(20) C1
Drainage Sheet #4

PLATE 3-FULL CROSS SECTION-FULL LINE

MINIMUM WARRANTY
PRINTED IN U.S.A.
HIGHWAY LEGEND AND SHEET

ORIGINAL SURVEY

NO. _____ BOOK _____ PAGE _____
PAGE CHECKED _____
STATION _____ TO _____
STATION _____ TO _____
BY _____
DATE _____

FINAL SURVEY

NO. _____ BOOK _____ PAGE _____
PAGE CHECKED _____
STATION _____ TO _____
STATION _____ TO _____
BY _____
DATE _____

148+50 (BUTT LN)

Added Stone Fill, Type 1 @ Outlet
Tie -12 LF 4"x11" Notch 1' Deep x 1'-2" Wide
6"x12"x11" Notch 1' Deep x 1'-2" Wide

Pavement Removed 4-19-12
Culvert Removed 4-19-12

LT - 14'x4"x55' = 80 SY
80 SY x 3.5 = 280 CY

LT Ditch Excavation
Ditch Depth = 2.5'
Ditch Width = 5'
Ditch Length = 24.5'
Ditch Volume = 153 CF

Pipe LT
Pipe Length = 45'
Pipe Diameter = 15"
Pipe Volume = 24.5' x 1.25 SF = 30.6 CF

Over Excavation
Over Excavation Depth = 5'
Over Excavation Width = 5'
Over Excavation Length = 45'
Over Excavation Volume = 1125 CF

Total Excavation = 153 + 30.6 + 1125 = 1308.6 CF
1308.6 CF / 27 = 48.5 CY

Ditch Excavation
Ditch Depth = 2.5'
Ditch Width = 5'
Ditch Length = 45'
Ditch Volume = 563 CF

Pipe LT
Pipe Length = 45'
Pipe Diameter = 15"
Pipe Volume = 45' x 1.25 SF = 56.3 CF

Over Excavation
Over Excavation Depth = 5'
Over Excavation Width = 5'
Over Excavation Length = 45'
Over Excavation Volume = 1125 CF

Total Excavation = 563 + 56.3 + 1125 = 1744.3 CF
1744.3 CF / 27 = 64.6

PLATE 3-FULL CROSS SECTION-FULL LINE
HIGHWAY, LEGEND AND SHEET

STAKED
ORIGINAL
DRAWN
VERIFIED
STAKE BOOK
VERIFIED
STAKE BOOK
VERIFIED
BY
DATE

1250

153+55

Trench Earth - (1.5+1)×(1.5+3.5×2)×(4.0+5.8×2)×(4.0+5.8)×(1.5+3.5×3)×27×1/27 = 33.8 cy
Trench Rock - 18 Rep

Remove Existing 18" RCP
Remove 52 Lf × 2.29 = 119.08 × 1/27 = 5.6 cy

WEF 11-28-11

1250.0

1244.3

1250

New 18"×30" RCCP .064
Type A Grate & Inlet
Stone Fill Pad Type II
Remove Existing 18" RCP

Trench Earth - 63-01
42-18 = 24.0
5.6×42.0 = 235.2
5.6×24.0 = 134.4
369.6 ÷ 27 = 13.7 cy

Trench Earth - Flow Line
(0.5+1.5)×(0.5+3.5×2)×(4.0+5.8×2)×(4.0+5.8)×(2.2+3.5×2)×(1/2×3.5×4.5) = 8388.2 ft³ × 1/27 = 311 cy

Pipe - (16.05×4.5)+(12.05×4.5)+(1/2×π×4.5²)×(1/2×π×6) = 360.4 ft³ × 19 = 6847.6 ft³ × 1/27 = 253.6 cy

Grade Beam
(18.5+1.5)×(1.5+3.5)×1.5 = 152.3 cy

DI - (18.5+1.5)×(1.5+3.5)×(4.0+5.8) = 457.2 ft³ × 1/27 = 16.9 cy

WEF 11-28-11

20.6 cy × 1.15 = 23.7 cy WEF 9-21-11

1244.3

Remove & Replace 18" RCP

T.E. Removal
DI - 7.47 × 3.8 (Lined) = 161.1 ft³ × 1/27 = 6.0 cy
3 cy
2.8 cy WEF 8-25-11

T.E. - DI:
Top (12") + Bottom (18") = 30" = 1.25 ft
5.97' × 4.2' × 4' = 87.52 × 1/27 = 3.24 cy

WEF 8-25-11

T.E. - (6.54×30×19)+(30×9)+(30×3)+(50.33×3)+(25×2)×4.5 = 6847 ft³
T.E. over 3' - (0.0×10×19)+(1.5×30×3)×4.5×1.5 = 486 ft³
6847 + 486 = 7303 ft³ × 1/27 = 271 cy
5.4 cy
27.0 cy WEF 8-25-11

14A - 18"
Remove 18" RCP
T.E. - 18" RCP
Removed 30 Lf × 2.29 × 1/27 = 5.25 cy
WEF 8-25-11

Total T.E. 3.2 cy + 5.4 cy = 8.6 cy
Total T.E. - 3.8 cy + 27.0 cy = 29.4 cy
WEF 8-25-11

1250.3

T.E. - 12×5×2×1/27 = 15 cy
T.E. = 12×11.2×2×1/27 = 15 cy
Calc by LR

44.8' Lf

1250

1242.0

T.E. - 15×9×2×1/27 = 10.0 cy Calc by LR
T.E. - 17×9×2×1/27 = 10.0 cy

1250

Trench Earth - DI - 0.5' = 5'×7'×8' = 315 ft³
Over 5' = (18.5+1.5)/2 × 7 × 1.5 = 156 ft³

Gran. Backfill for Structures
Under Base DI 7×5×1' = 63 ft³
Pipe - 6" Undercut - 36×53×0.5 = 1145 ft³
To Top Pipe - 20×55×2.75 = 2750 ft³ - (π×4.5²/4)×(156+20) = 1165 ft³
63 ft³ + 104.5 ft³ + 63 ft³ = 330.5 × 1/27 = 12.2 cy
WEF 7-28-11

1247.65

0.050

12" Undercut

Inlet 1239.5 — 6" Undercut

Last 20' Backfill - to Top Culvert

162+00

NEW 30"-104" CPEP
w/4'×6' Inlet, DI - Inlet
Stone Fill Pad Type II - 4'×6' - Outlet

1250

Outlet 1236.6

Stone Fill Type III - 8'×17'×2' = 10.1 cy WEF 7-29-11

Pipe - (4.5+4.5)/2 × 24 = 1044 ✓ (33.1)
(4.5+5.5)/2 × 12 = 593 ✓ (29.5)
(5.5+10.5)/2 × 10.5 = 816.4 ft³ (30.4)

Over 5' - (0.0+4.5)/2 × 6.0 = 14.0 ✓
(4.5+8.5)/2 × 12 = 257.2 ✓
(8.5+7.5)/2 × 10.5 = 168.2 ✓
(7.5+5.5)/2 × 4.8 = 32.2 ✓
(5.5+0)/2 × 6.0 = 18.2 ✓
324.3 ✓
324.3 × 1.5 = 486.5 ft³

Excavation Stone Pad 162+00 - (2.7+0)/2 × 8 = 18.8 ✓
(2.7+3.0)/2 × 8 = 23.2 ✓
8 = 8 ✓
384.8 ft³

Total Trench Earth - (315+156+816.4+490.4)×5.5 = 3441.5 ft³ = 8186.7 ft³ × 1/27 = 303.2 cy
7841.9
Trench Rock - 3.5
299.7 cy WEF 7-28-11

Trench Rock - 6×4×2.75 = 66
5'-6" × 1' = 33
99 ft³ × 1/27 = 3.5 cy ✓

LR 11/3/11
Template OK Mark Wilson

156+00 Lt × 156+56 Rt
56 Lf

New 30" x 114 Lf CPEP
w/Grate Headwall & Inlet
Type II Stone Fill Pad Outlet
Type I Stone Fill Pavt Inlet

Trench Earth - Drop Inlet (27)
0.5' - (30×50)+(1.5×18)/2 × 9.5 = 2632
Over 5' - (0.0+1.5)/2 × 5 × 9.5 × 4.5 = 302.4 ft³ WEF 8-18-11

Trench Earth - Pipe 0.5
(8.5+4.5)/2 × 3 = 45 ✓ (24.5)
(4.5+0.0)/2 × 20 = 45 ✓ (96.0)
(0.0+3.2)/2 × 2 = 3.2 ✓ (28.0)
(3.2+3.8)/2 × 1 = 3.5 ✓ (35.0)
(3.8+4.2)/2 × 1 = 4.0 ✓ (38.0)
(4.2+5.0)/2 × 21 = 96.6 ✓ (96.6)
(5.0+5.0)/2 × 19 = 95.0 ✓ (95.0)
(5.0+1.8)/2 × 11.5 = 38.1 ✓ (38.1)
(1.8+1.3)/2 × 15 = 23.2 ✓ (23.2)
(1.3+4.0)/2 × 3.8 = 40.0 ✓ (40.0)
1.3×4.0×3.8 = 19.8 ✓
1833.4 ft³

Over 5' - (0.0+0.4)/2 × 16 × 3 × 5.5 × 1.5 = 31.4 ft³

302.4 + 1833.4 + 31.4 × 1/27 = 80.3 cy WEF 8-18-11
Boulder @ Outlet = 8.6 cy
111.7 cy T.E.

Boulder @ Outlet
11×7×3×1/27 = 8.6 cy FW by LR

176+00

CABOT DANVILLE
FEGC F 028-3(24) C/1
DRAINAGE SHEET # 6

PLATE 3-LOAD CROSS SECTION-LOAD LINE
HIGHWAY LEGEND AID SHEET
NATIONAL NOMOGRAPH
PRINTED IN U.S.A.

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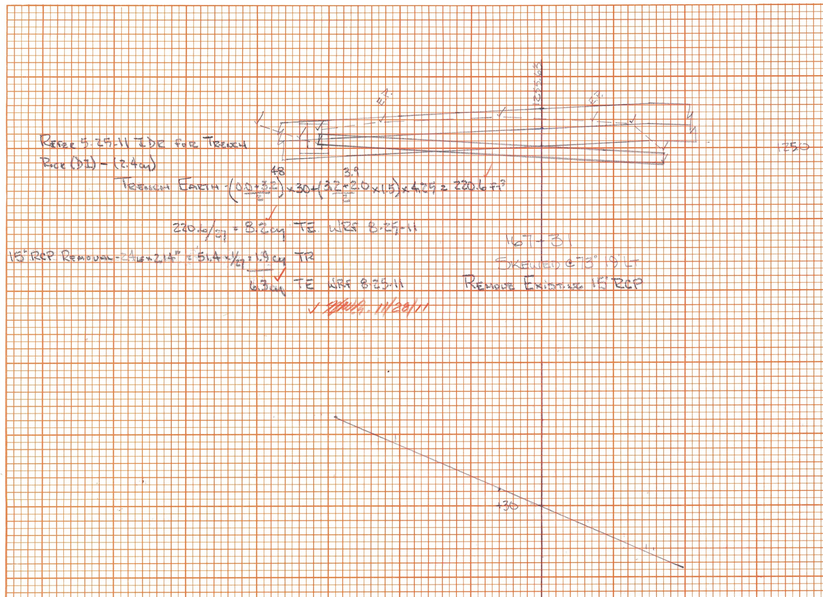

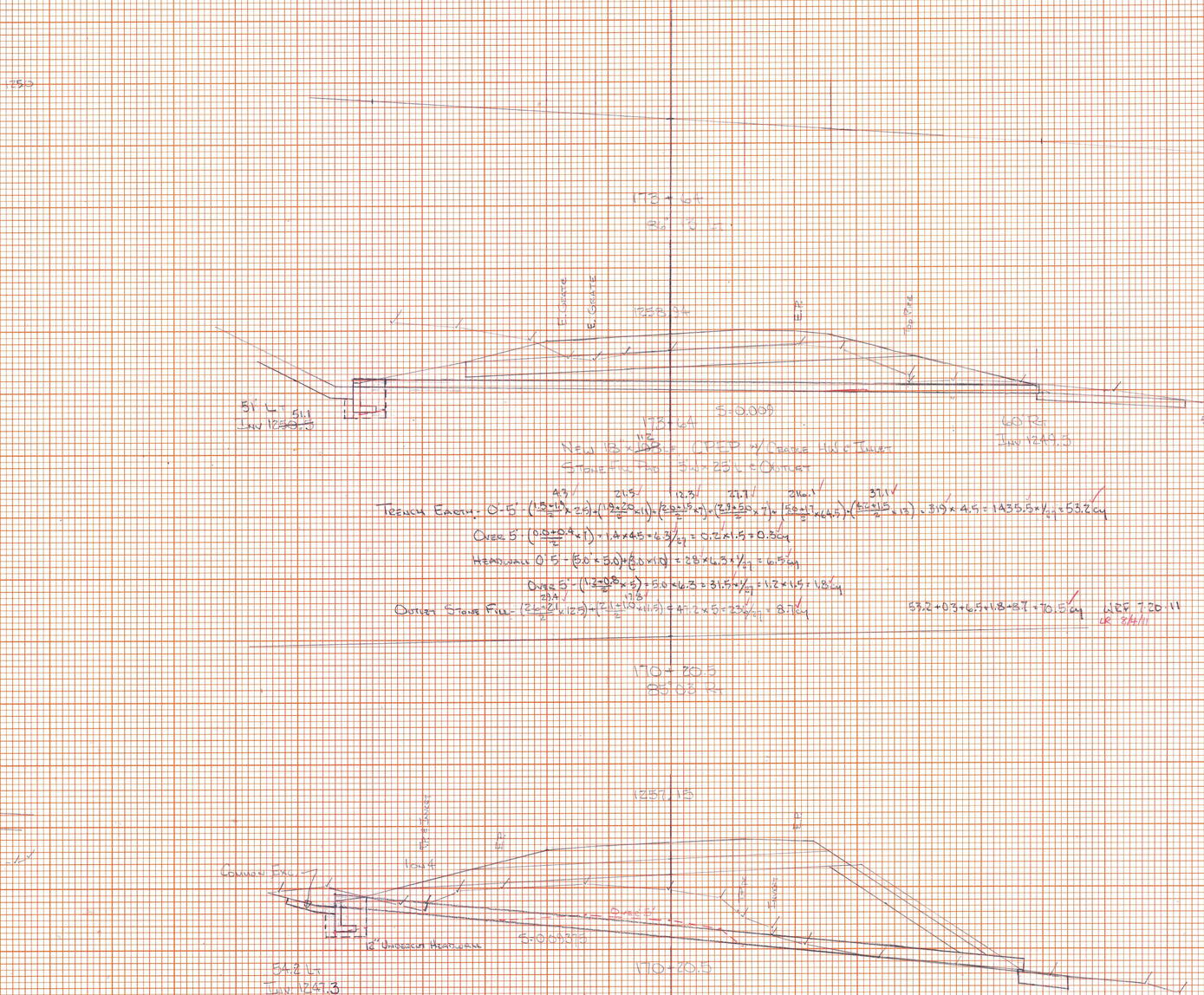
Remove 18" CG MAP
Remove 18" RCP
Remove 15" RCP
Remove 12" RCP
Remove 8" CG MAP
Remove 6" CG MAP
Remove 4" CG MAP
Remove Existing Inlet
Remove Existing Manhole
Remove Existing Headwall
Remove Existing Endwall
Remove Existing Concrete Flume
Remove Existing Concrete Ditch
Remove Existing Concrete Curb
Remove Existing Concrete Gutter
Remove Existing Concrete Sidewalk
Remove Existing Concrete Driveway
Remove Existing Concrete Pavement
Remove Existing Asphalt Pavement
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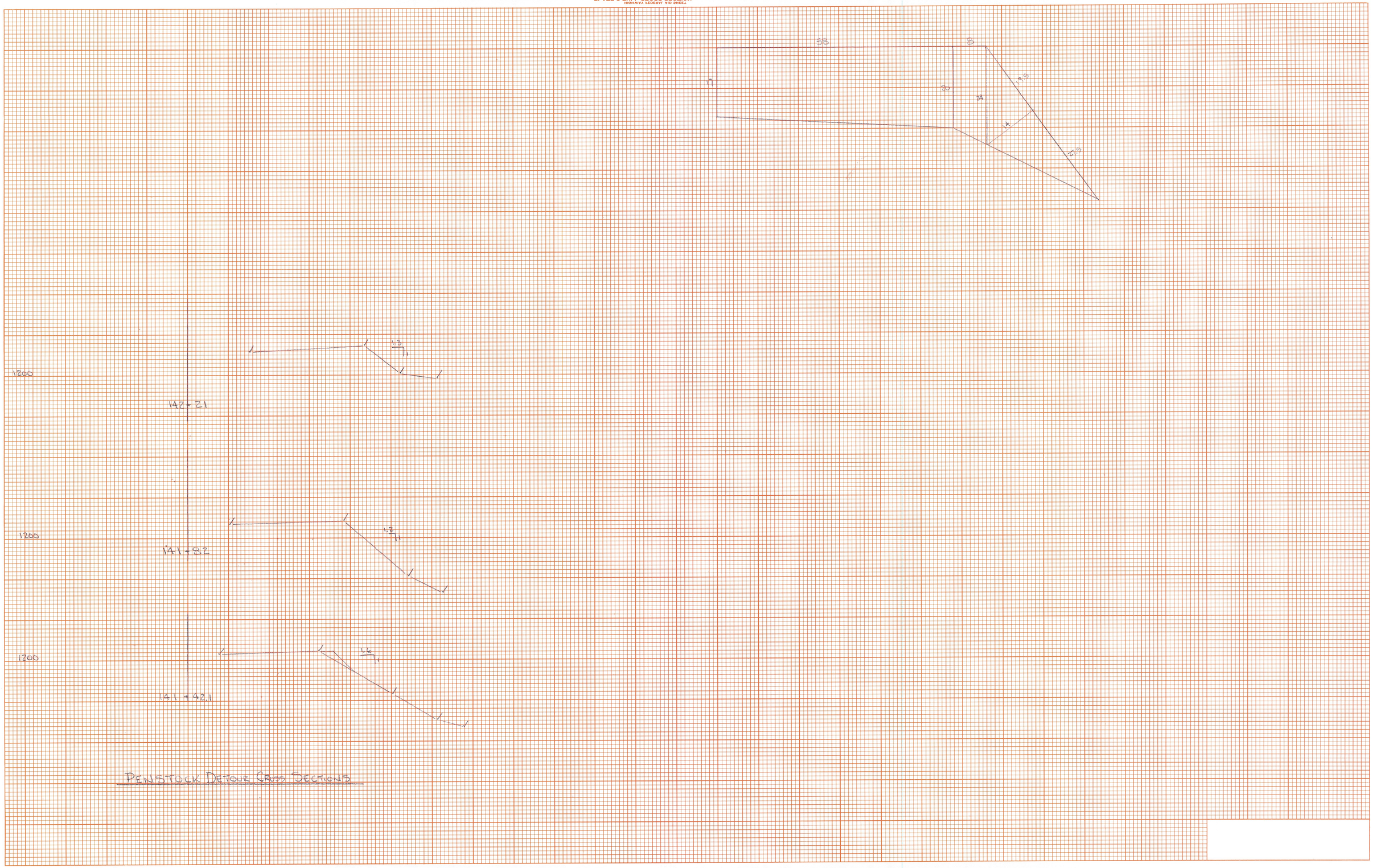

PENSTOCK DETOUR CROSS SECTIONS