

# RAS Engineering Solutions

## University of Iowa Department of Civil and Environmental Engineering

### Chatfield Trail Construction Proposed for Lee County

**Description:**

The plans contain drawings for a proposed trail connecting Chatfield Campgrounds to the near by lake due west. The trail is proposed for hiking for the campers between the campgrounds and the lake. The set of plans include culvert designs for the mitigations of a stream that the drains the campgrounds and needs to be crossed by the trail.

**Design Data:**

Begin Sta: 0+00  
 Begin Elv: 669.82  
 Culvert Sta: 10+33.39 cL  
 End Sta: 14+71  
 End Elev: 628.04  
 Total Trail Length: 1471 ft

Design Speed: 10 mi/hr  
 Maximum Grade: 11.66%



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PROJECT:	CEE: 4850
DATE :	5/8/2020
DRAWN BY:	RAS ENGINEERING
REVISION:	

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**CIVIL AND ENVIRONMENTAL ENGINEERING**  
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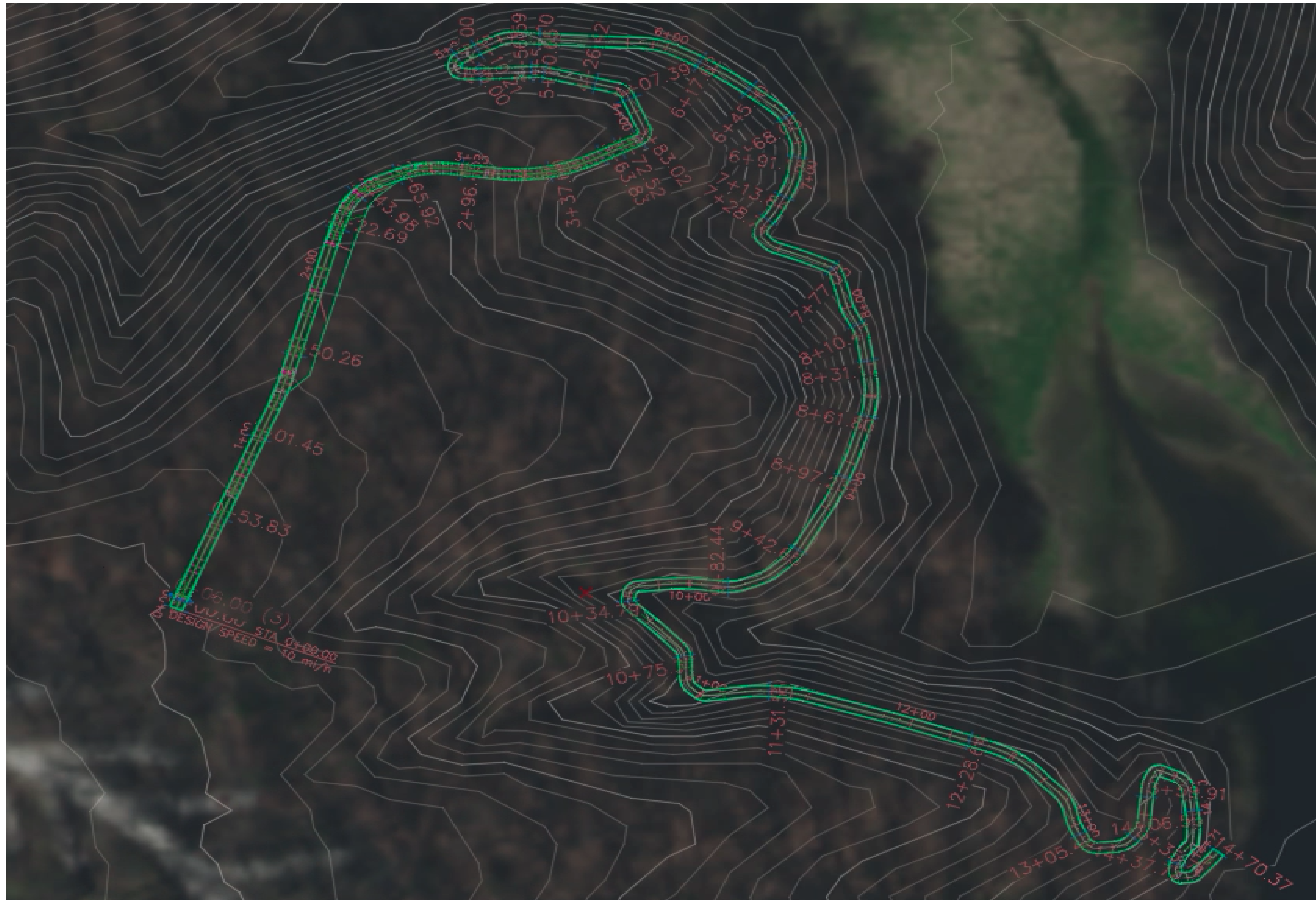


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Chatfield Campground Upgrades  
 Chatfield Trail and Culvert

SHEET NAME  
 Title Sheet

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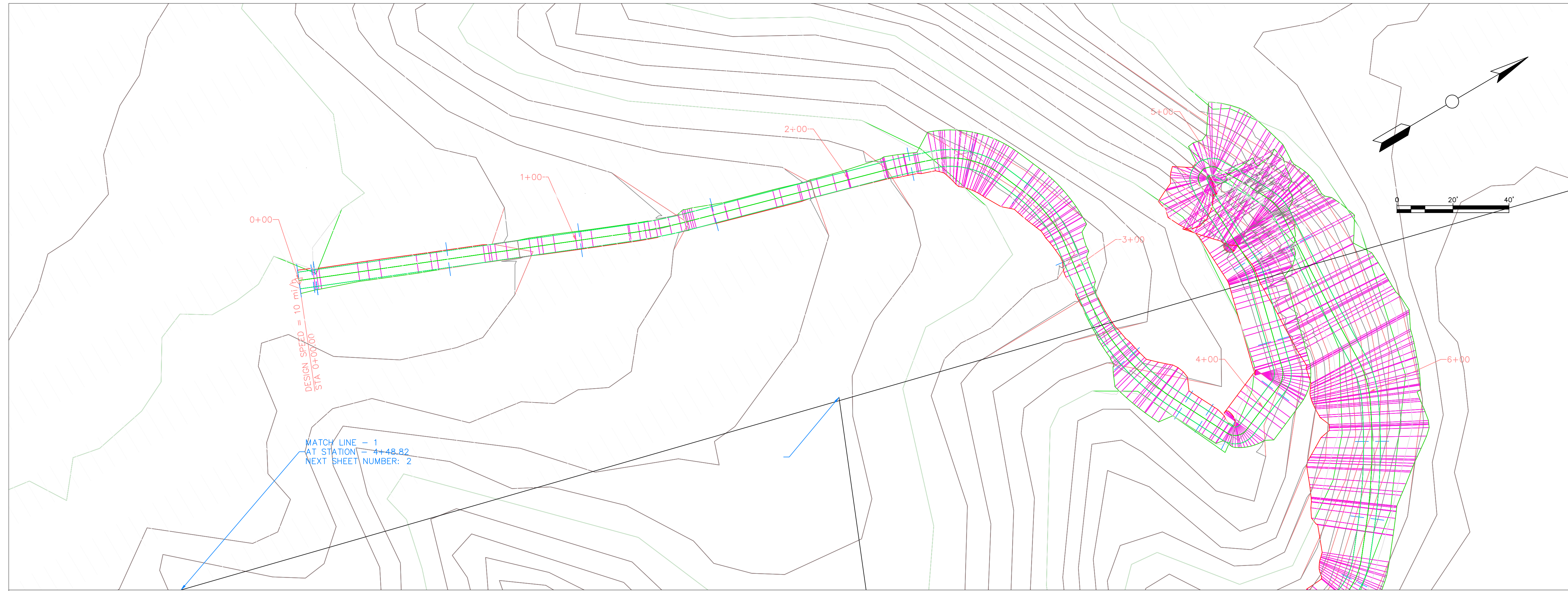


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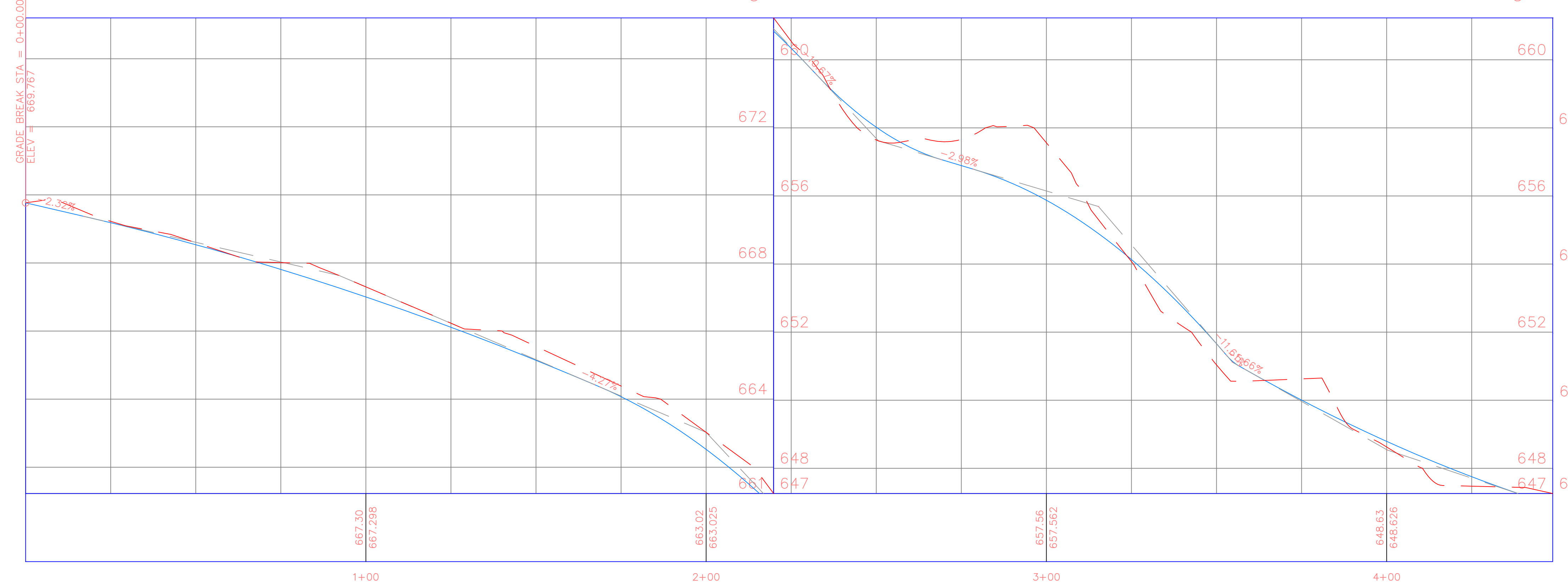
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 Trail Site Plan

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 1



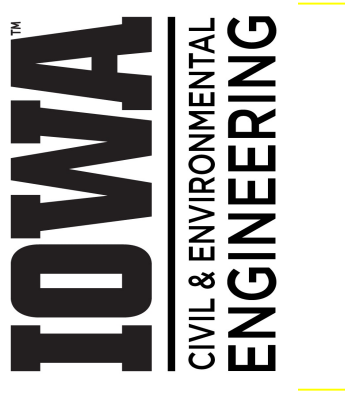
Trail 1 Alignment PROFILE

Trail 1 Alignment



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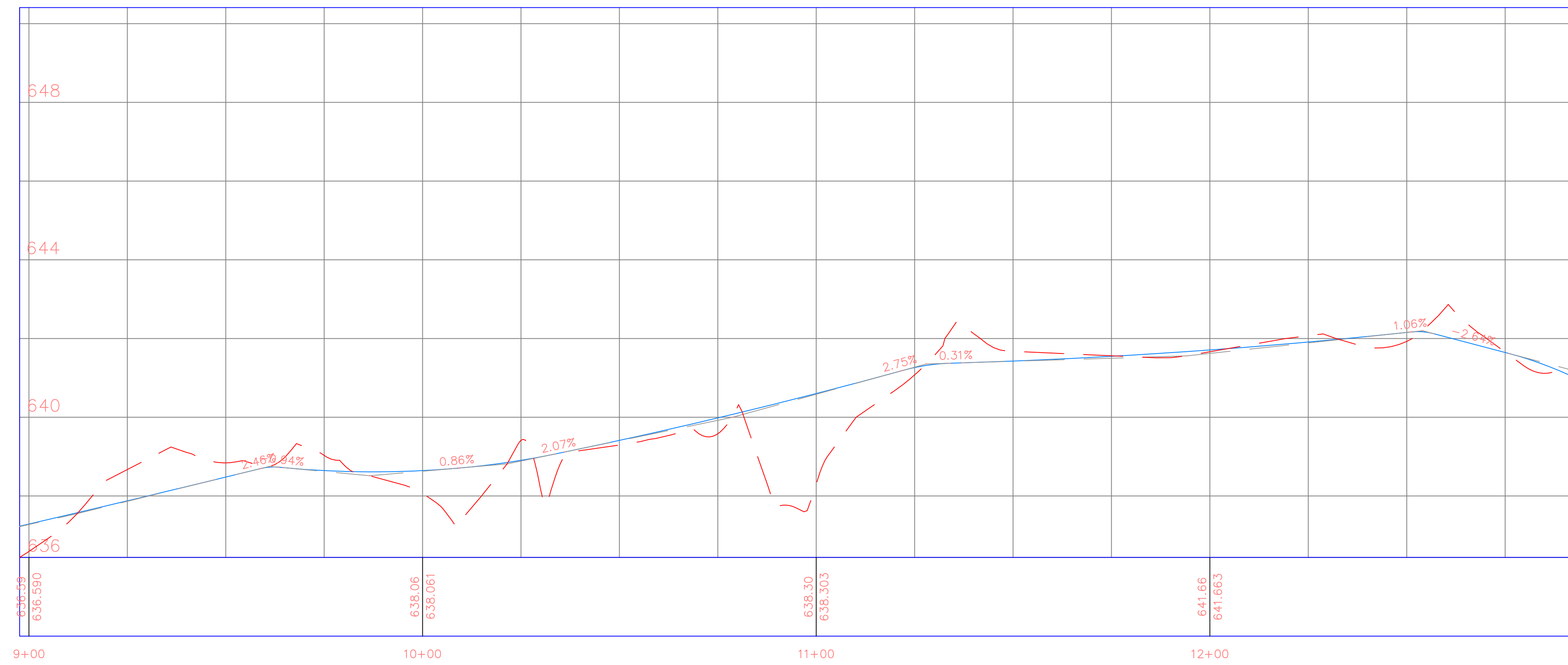
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Trail 1 Alignment PROFILE



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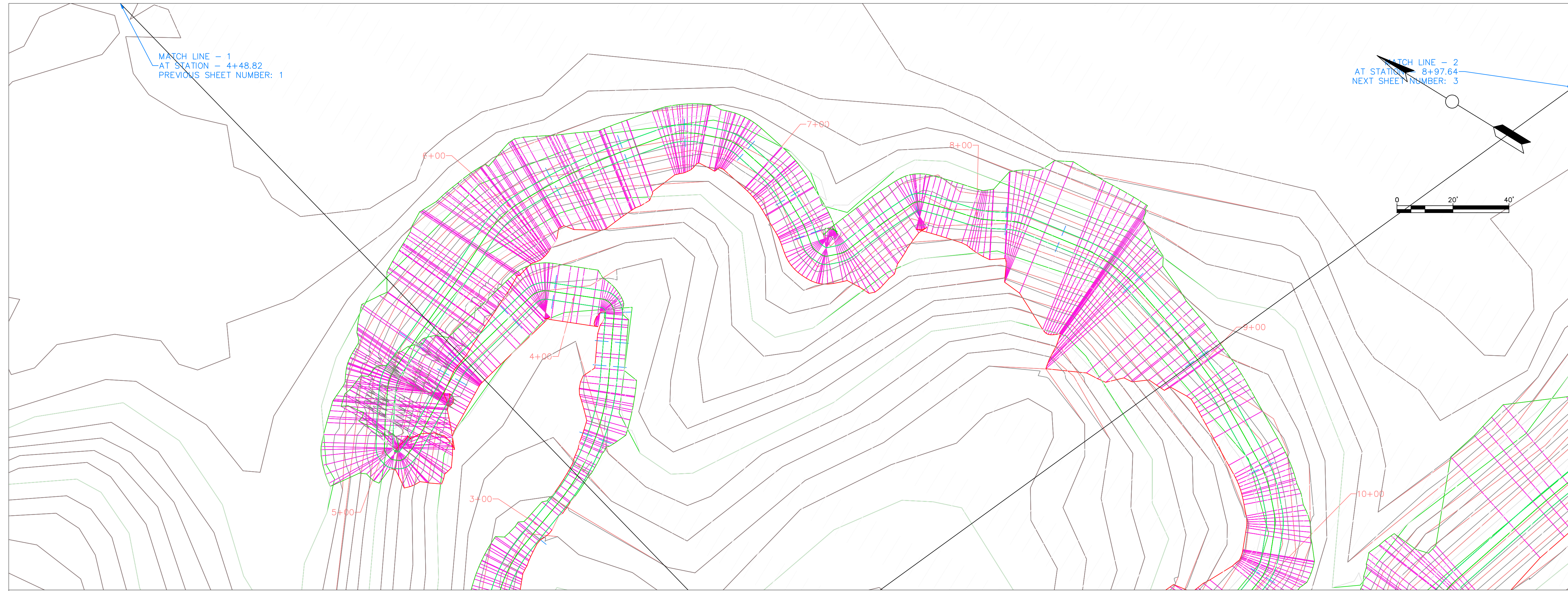


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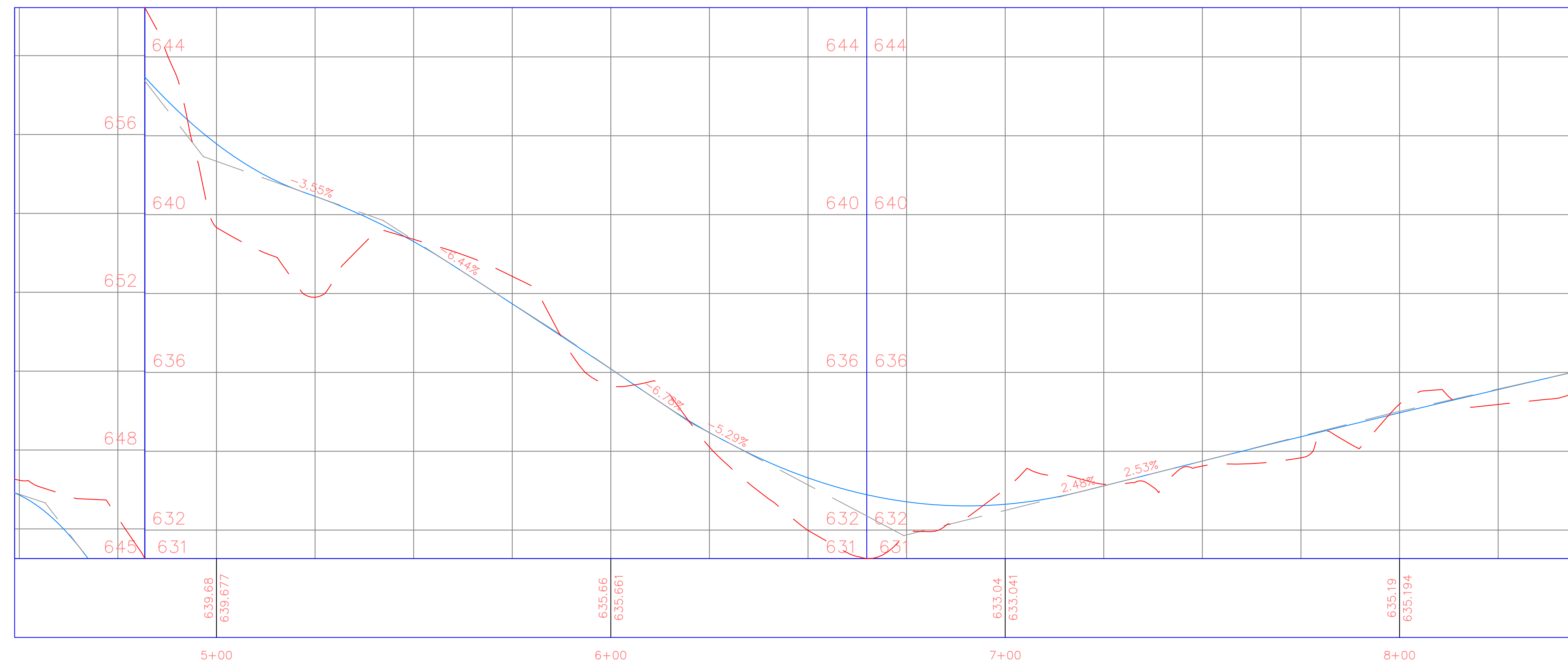
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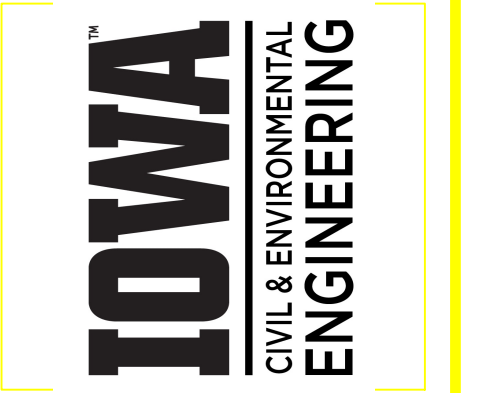


Trail 1 Alignment PROFILE Trail 1 Alignment PROFILE



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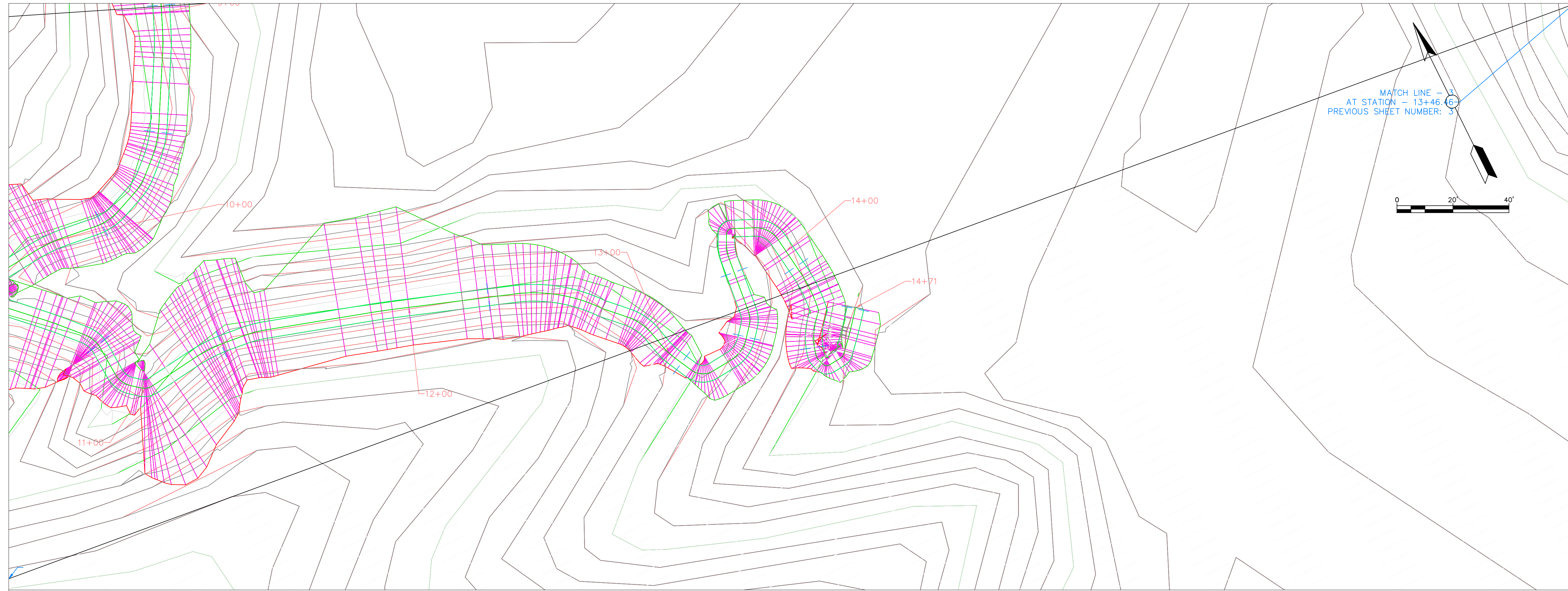


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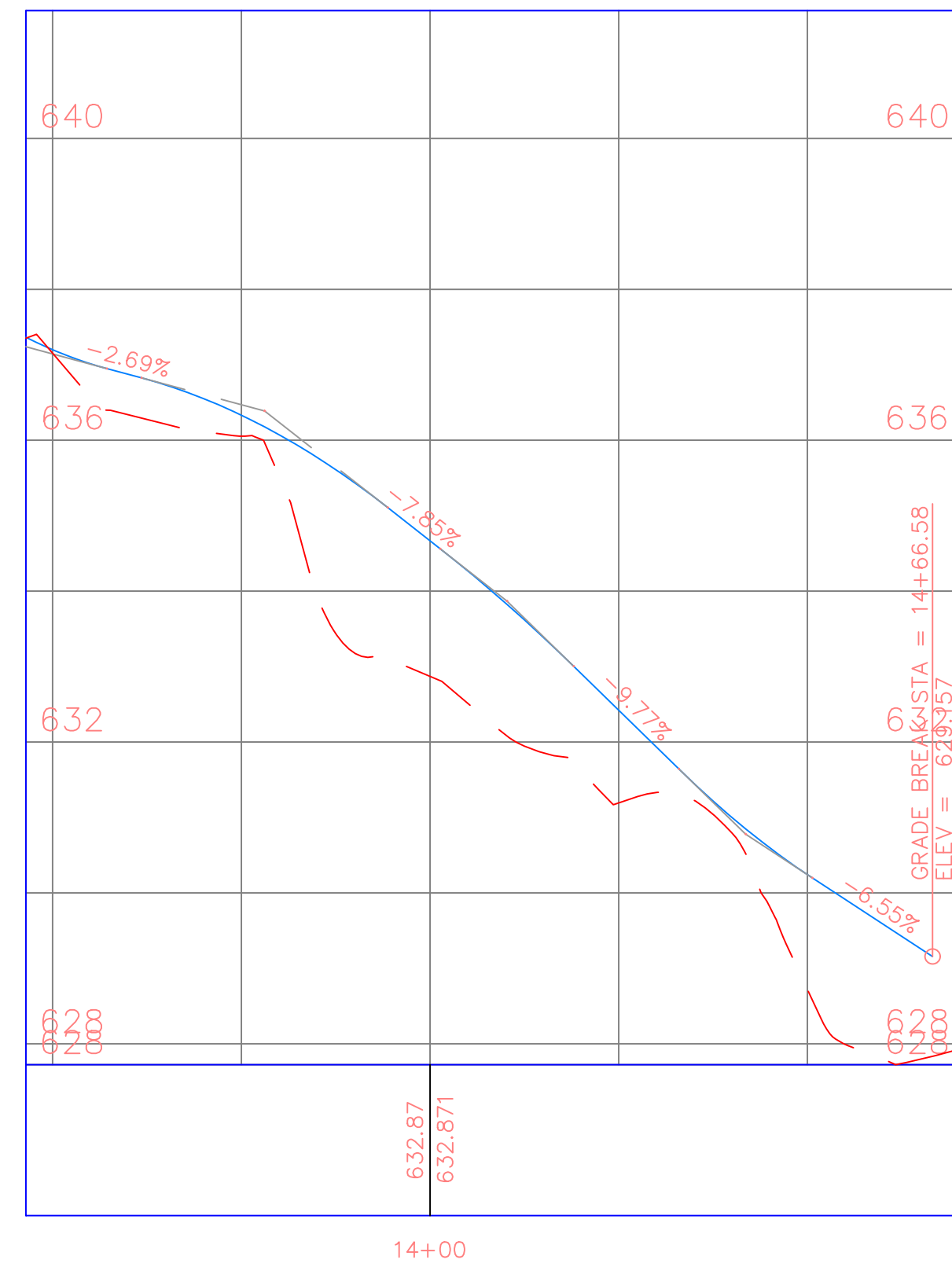
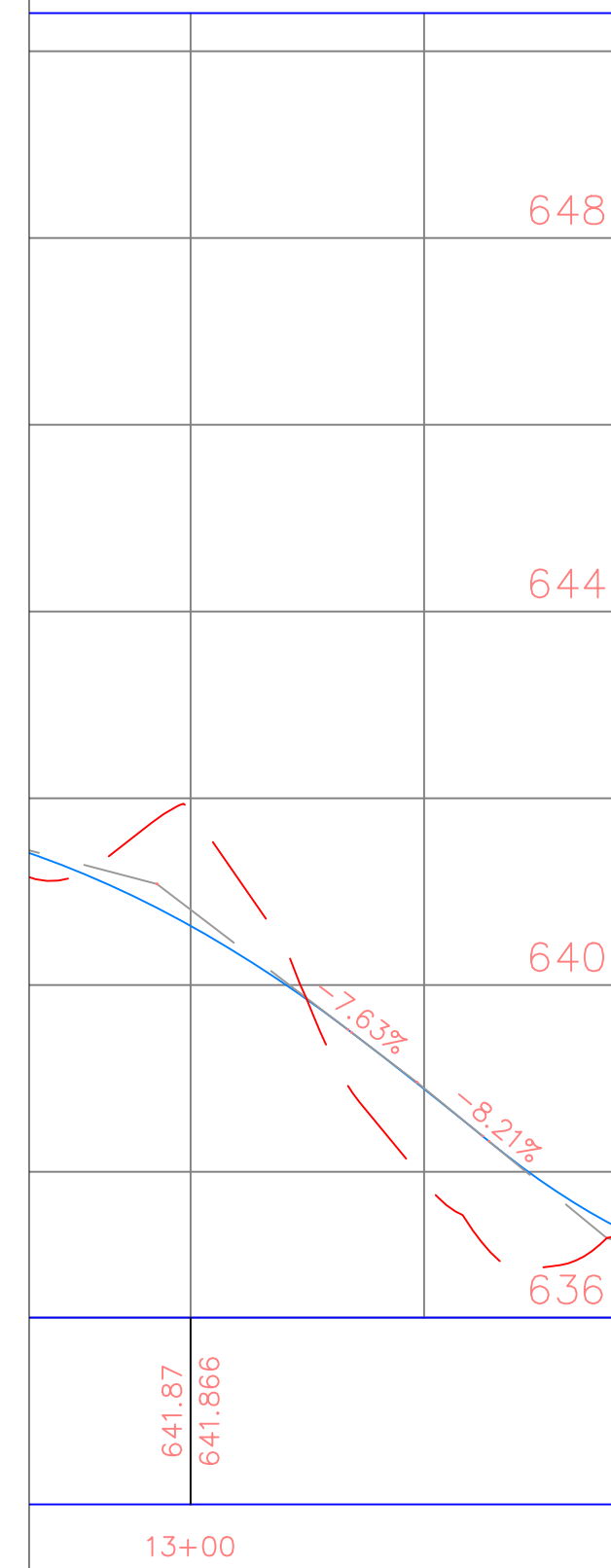
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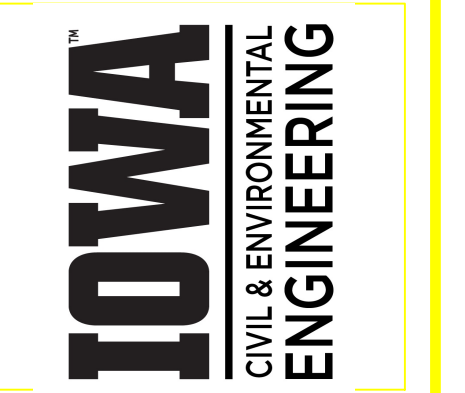


Trail 1 Alignment PROFILE



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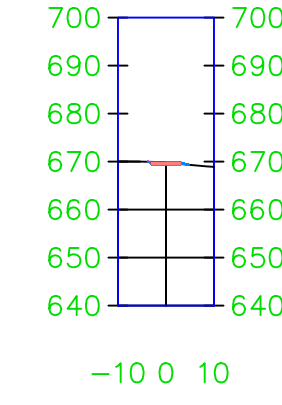
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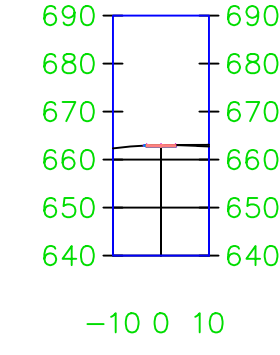
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 Trail Plan and Profile

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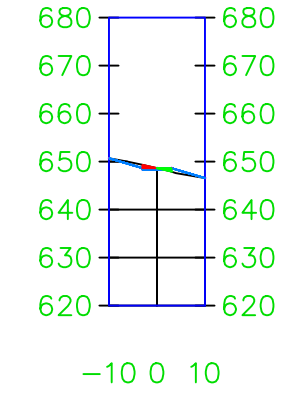
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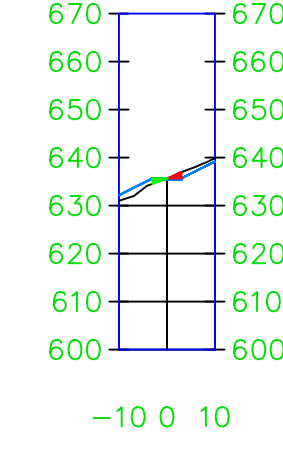
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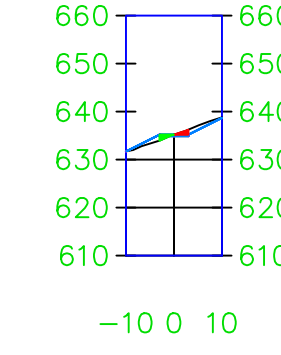
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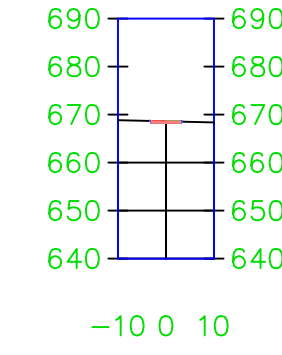
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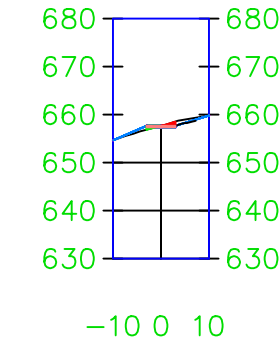
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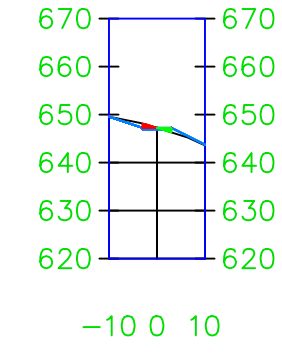
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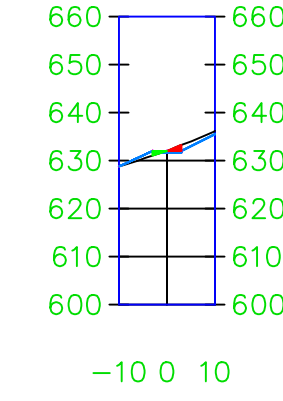
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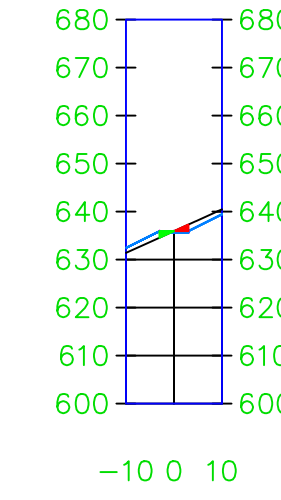
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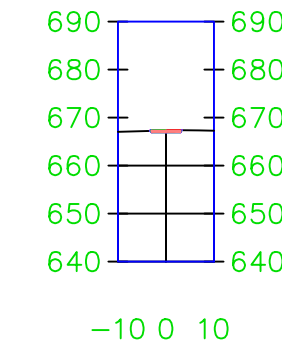
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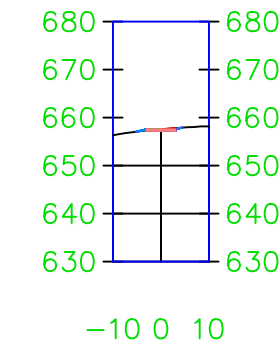
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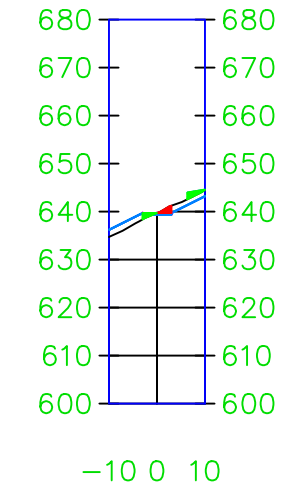
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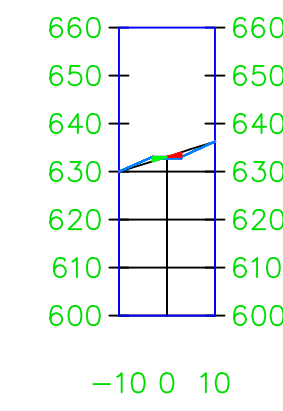
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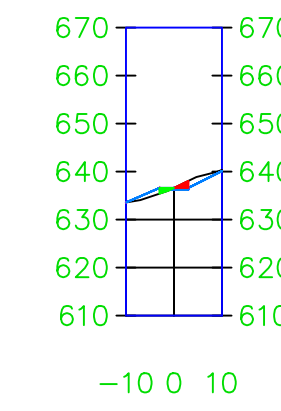
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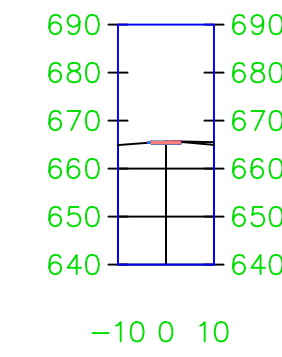
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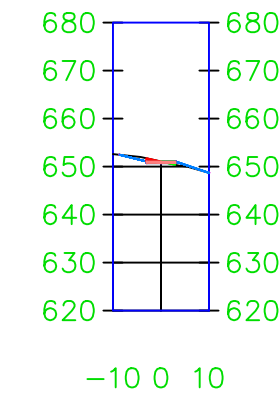
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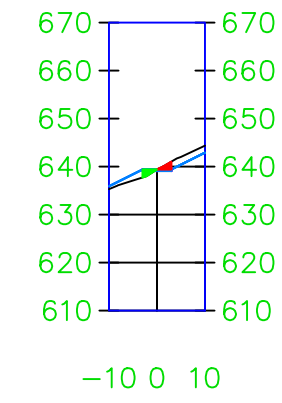
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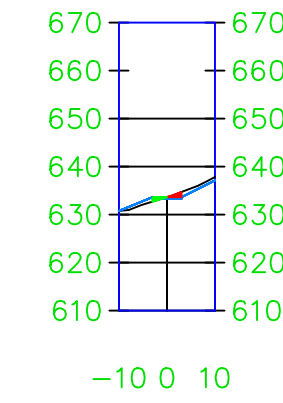
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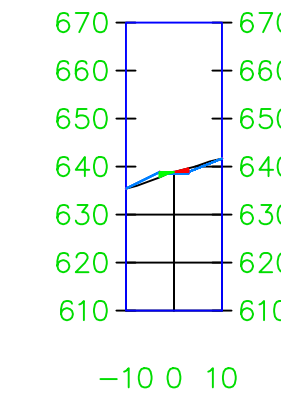
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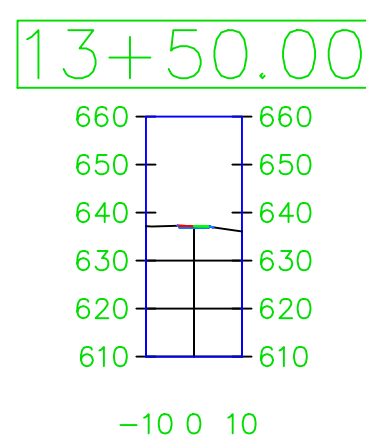
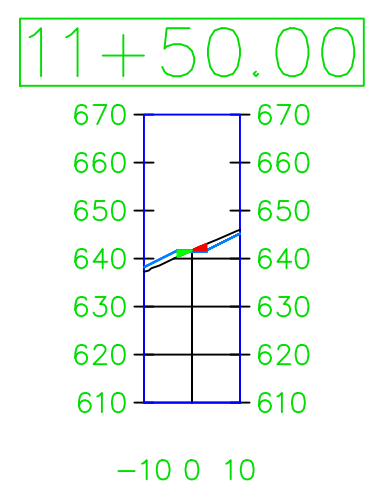
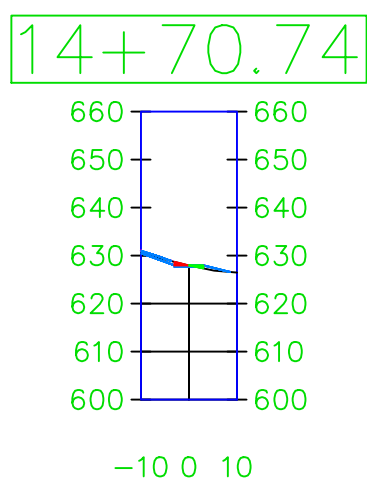
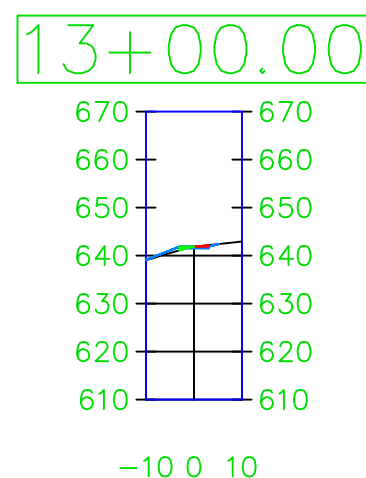
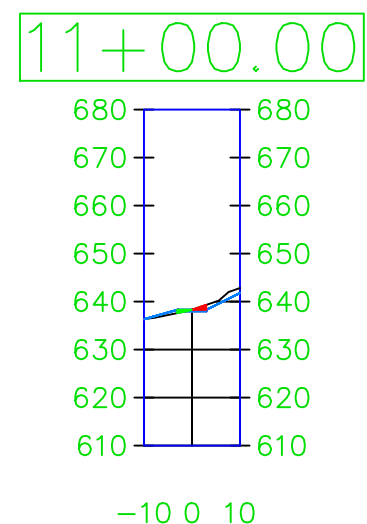
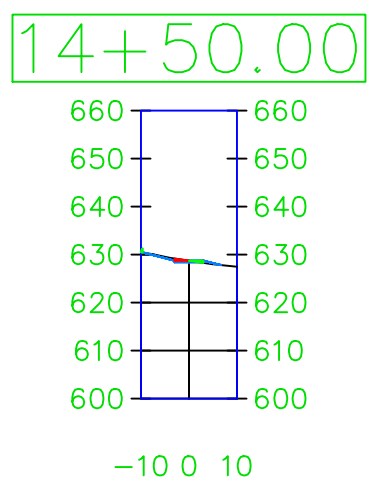
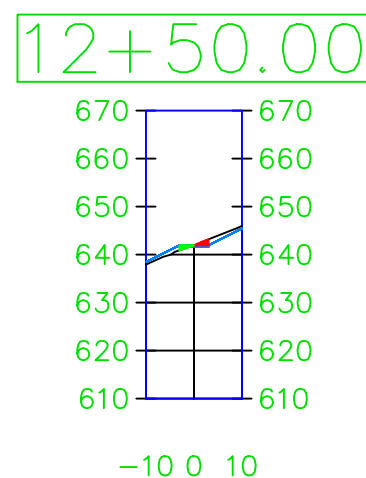
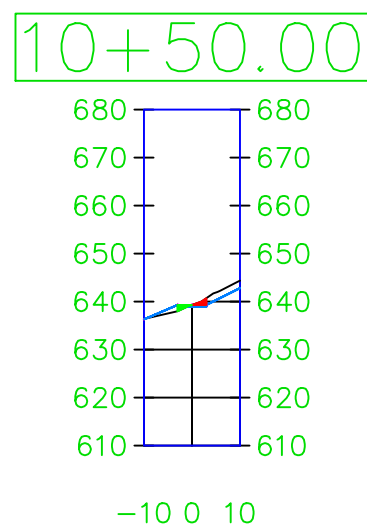
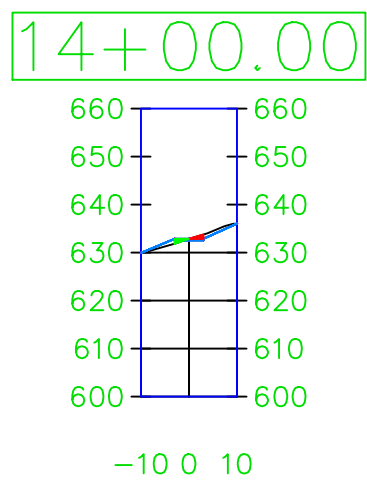
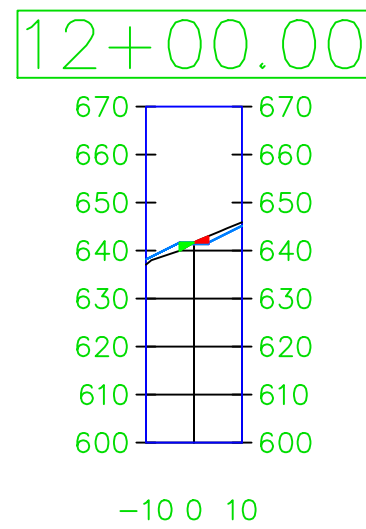
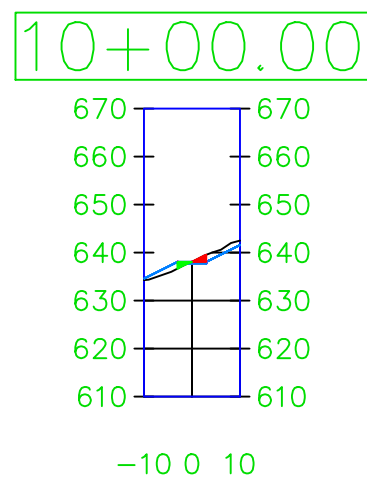
Chatfield Campground Upgrades  
Chatfield Trail and Culvert

SHEET NAME  
Trail Section  
Views

SHEET NO.  
6

# Corresponding Material Tables

## Cut and Fill Total Volume Table (CY)



Total Volume Table						
Station	Fill Area	Cut Area	Fill Volume	Cut Volume	Cumulative Fill Vol	Cumulative Cut Vol
0+00.00	0.41	0.32	0.00	0.00	0.00	0.00
0+50.00	0.11	0.11	0.48	0.39	0.48	0.39
1+00.00	0.09	0.08	0.18	0.17	0.66	0.57
1+50.00	0.13	0.09	0.20	0.15	0.86	0.72
2+00.00	0.10	0.02	0.21	0.10	1.08	0.82
2+50.00	1.19	1.27	1.23	1.16	2.31	1.99
3+00.00	0.36	0.35	1.48	1.45	3.78	3.44
3+50.00	1.03	1.03	1.30	1.27	5.08	4.71
4+00.00	1.03	1.02	2.03	1.78	7.11	6.49
4+50.00	1.41	1.38	2.34	2.15	9.44	8.63
5+00.00	4.73	2.28	4.78	3.31	14.22	11.94
5+50.00	2.76	2.42	6.79	4.24	21.01	16.18
6+00.00	1.68	1.93	4.16	3.98	25.17	20.17
6+50.00	1.42	1.91	2.91	3.51	28.08	23.68
7+00.00	1.37	1.42	2.69	2.95	30.78	26.62
7+50.00	1.38	1.49	2.41	2.85	33.18	29.47
8+00.00	1.80	1.49	3.05	2.66	36.23	32.13
8+50.00	2.07	2.04	3.63	3.23	39.87	35.35
9+00.00	1.94	2.21	3.76	3.88	43.63	39.23
9+50.00	1.42	1.19	3.15	3.10	46.78	42.33

Total Volume Table						
Station	Fill Area	Cut Area	Fill Volume	Cut Volume	Cumulative Fill Vol	Cumulative Cut Vol
10+00.00	2.00	2.30	3.28	3.12	50.06	45.45
10+50.00	1.88	1.76	3.24	4.13	53.30	49.59
11+00.00	1.11	1.51	2.72	3.08	56.02	52.67
11+50.00	2.06	2.12	2.92	3.38	58.95	56.05
12+00.00	2.61	2.12	4.33	3.92	63.27	59.96
12+50.00	1.54	1.87	3.87	3.66	67.14	63.62
13+00.00	1.09	0.43	2.49	2.07	69.64	65.69
13+50.00	0.16	0.16	1.07	0.57	70.71	66.27
14+00.00	1.53	1.34	1.72	1.26	72.42	67.53
14+50.00	0.84	0.67	2.10	1.90	74.52	69.43
14+70.74	0.92	1.10	0.70	0.62	75.22	70.05

## Cut and Fill Ground Removed (CY)

Material Table			
Station	Area	Volume	Cumulative Volume
0+00.00	0.41	0.00	0.00
0+50.00	0.11	0.48	0.48
1+00.00	0.09	0.18	0.66
1+50.00	0.13	0.20	0.86
2+00.00	0.10	0.21	1.08
2+50.00	1.19	1.23	2.31
3+00.00	0.36	1.48	3.78
3+50.00	1.03	1.30	5.08
4+00.00	1.03	2.03	7.11
4+50.00	1.41	2.34	9.44
5+00.00	4.73	4.78	14.22
5+50.00	2.76	6.79	21.01
6+00.00	1.68	4.16	25.17
6+50.00	1.42	2.91	28.08
7+00.00	1.37	2.69	30.78
7+50.00	1.38	2.41	33.18
8+00.00	1.80	3.05	36.23
8+50.00	2.07	3.63	39.87
9+00.00	1.94	3.76	43.63
9+50.00	1.42	3.15	46.78

## Cut and Fill Ground Fill (CY)

Material Table			
Station	Area	Volume	Cumulative Volume
0+00.00	0.32	0.00	0.00
0+50.00	0.11	0.39	0.39
1+00.00	0.08	0.17	0.57
1+50.00	0.09	0.15	0.72
2+00.00	0.02	0.10	0.82
2+50.00	1.27	1.16	1.99
3+00.00	0.35	1.45	3.44
3+50.00	1.03	1.27	4.71
4+00.00	1.02	1.78	6.49
4+50.00	1.38	2.15	8.63
5+00.00	2.28	3.31	11.94
5+50.00	2.42	4.24	16.18
6+00.00	1.93	3.98	20.17
6+50.00	1.91	3.51	23.68
7+00.00	1.42	2.95	26.62
7+50.00	1.49	2.85	29.47
8+00.00	1.49	2.66	32.13
8+50.00	2.04	3.23	35.35
9+00.00	2.21	3.88	39.23
9+50.00	1.19	3.10	42.33

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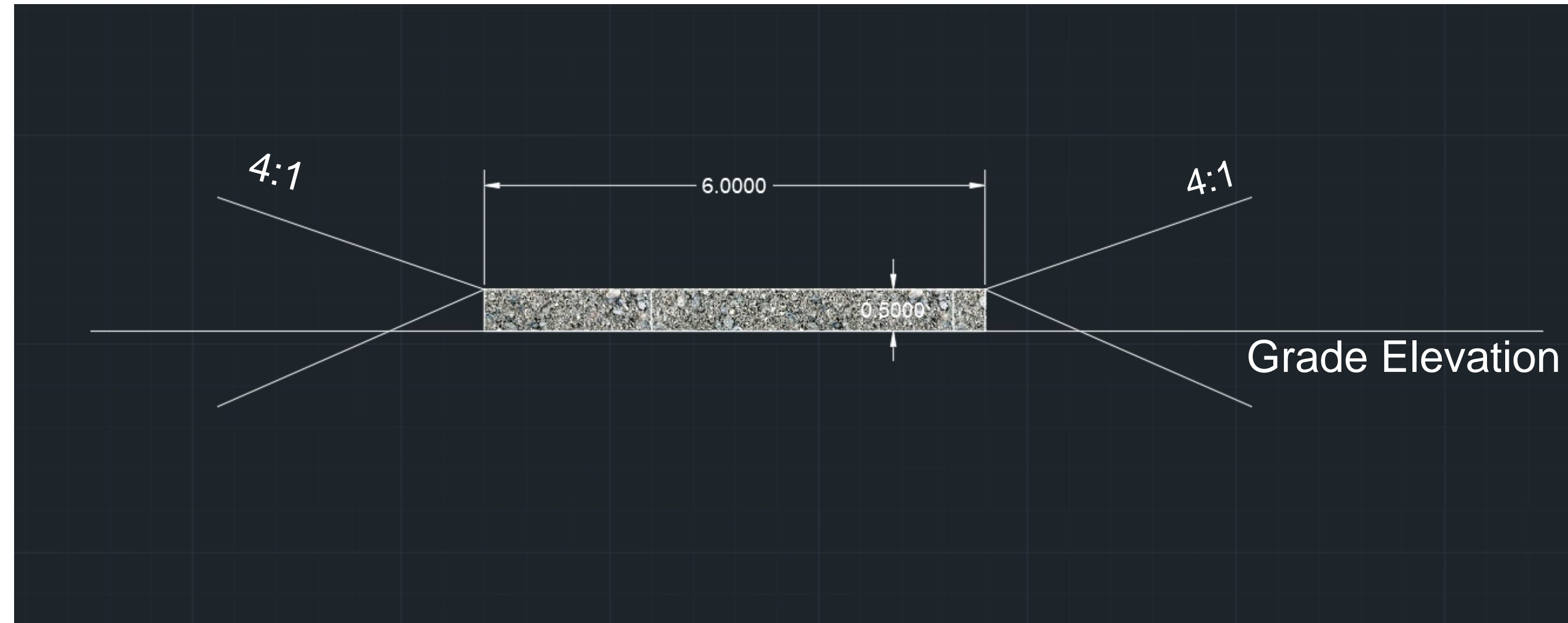
Chatfield Campground Upgrades  
 Chatfield Trail and Culvert

SHEET NAME  
 Trail Section Views

SHEET NO.  
 7



# Trail Cross Section



## Details:

Trail material to be 3/8" crushed stone.

Specific compaction notes TBD via Final Engineering Plan sets.

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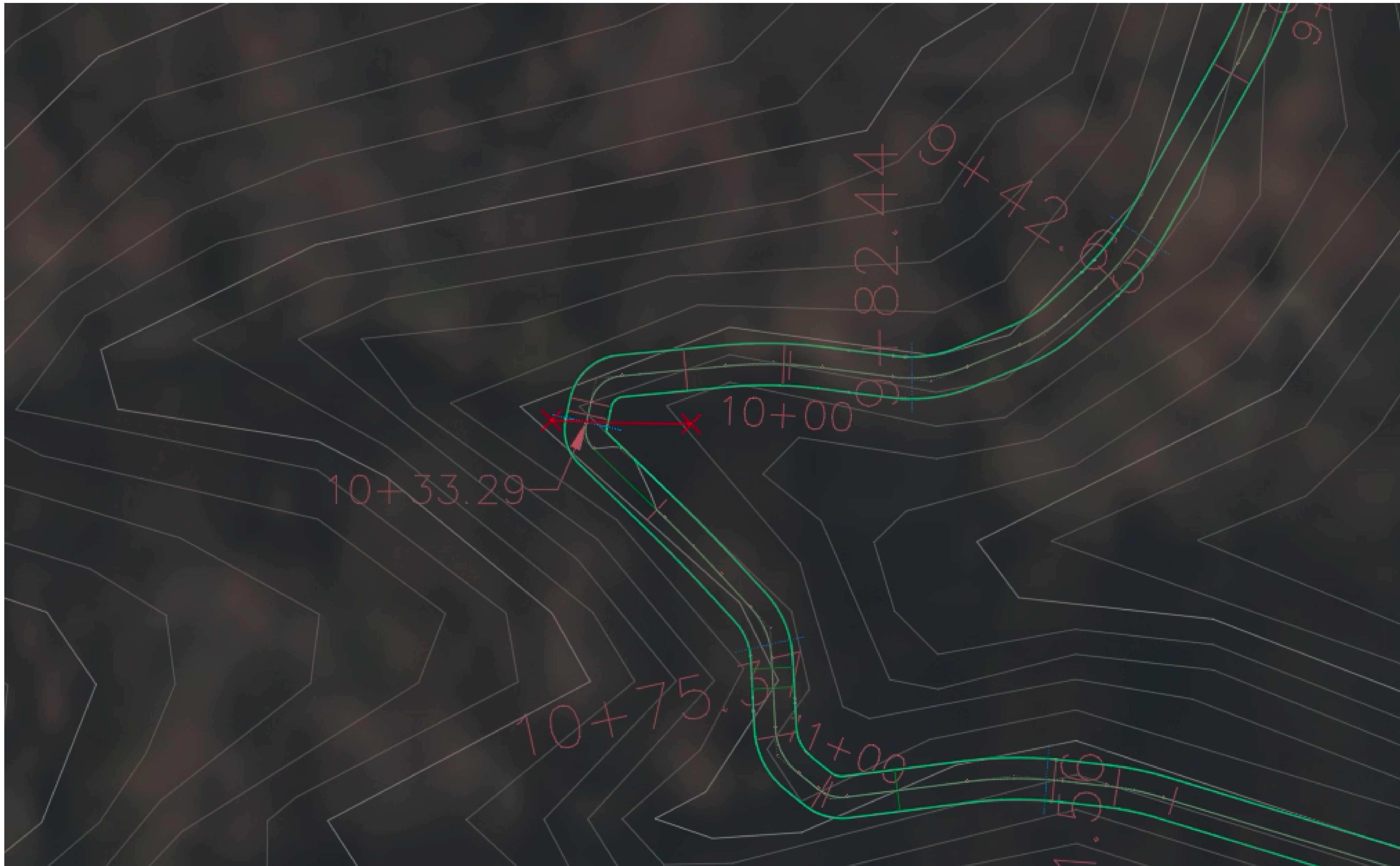


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Chatfield Campground Upgrades  
 Chatfield Trail and Culvert

SHEET NAME  
 Trail Cross Section

SHEET NO.  
 8



**Details:**

Culvert Placement: Sta. 10+33.39 cL

Culvert Inlet: Sta. 10+33.39 + 5' LT

Culvert Outlet: Sta. 10+33.39 + 15' RT

PROJECT:	CEE: 4850
DATE :	5/8/2020
DRAWN BY:	RAS ENGINEERING
REVISION:	

**THE UNIVERSITY OF IOWA**  
**CIVIL AND ENVIRONMENTAL ENGINEERING**  
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FOR CONSTRUCTION

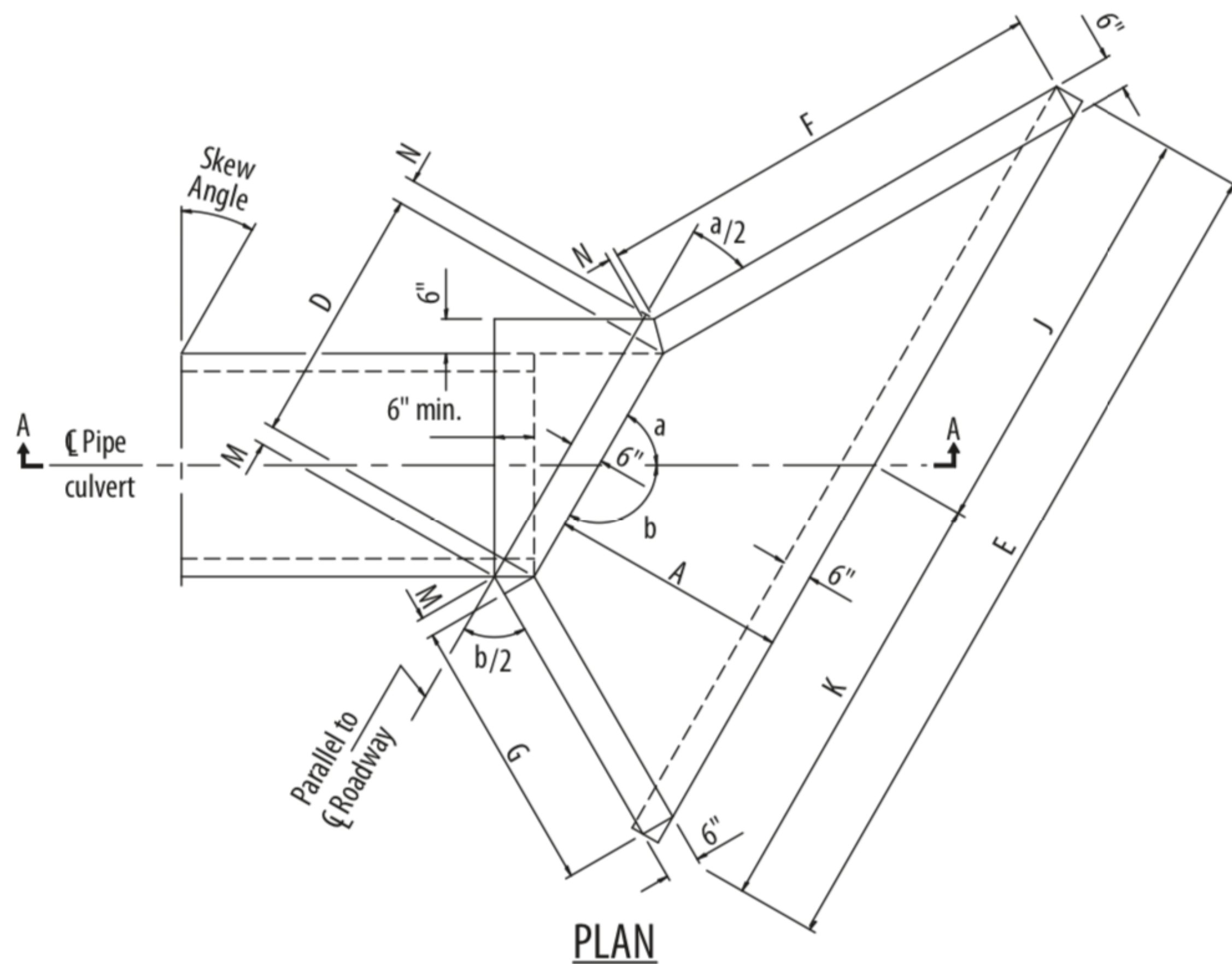
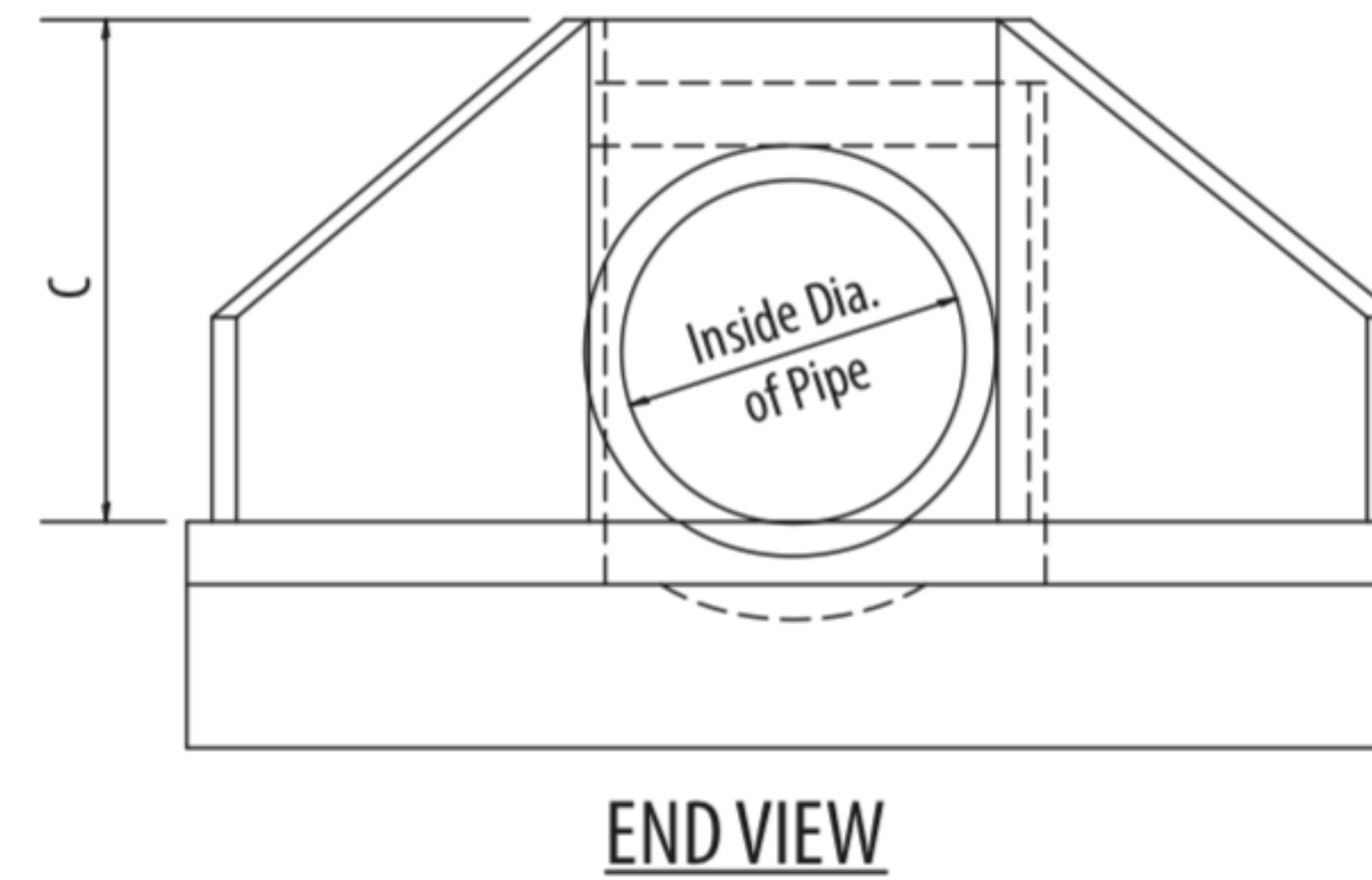
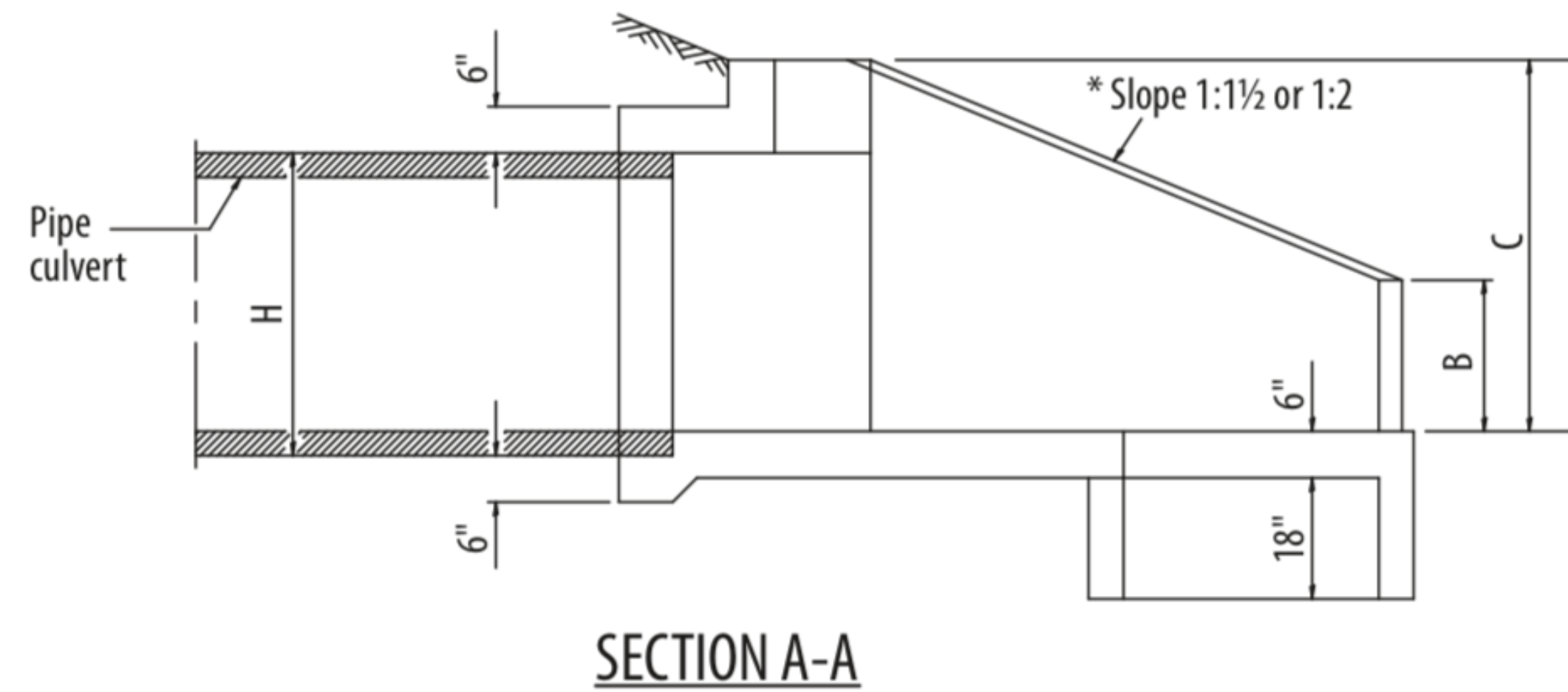
Chatfield Campground Upgrades  
 Chatfield Trail and Culvert

SHEET NAME  
 Culvert Site Plan

SHEET NO.  
**9**

WINGS FOR 1:2 SLOPE

Skew Angle	Design No.	Nominal Pipe Dia.	DIMENSIONS FOR CONCRETE													Concrete 2 End Sections yd <sup>3</sup>
			A	B	C	D	E	F	G	H	J	K	M	N	a	
30	DS15-2	15	38	10	29	22	9'-9 <sup>3</sup> / <sub>4</sub> "	6'-4"	3'-8"	19	4'-9 <sup>3</sup> / <sub>4</sub> "	5'-0"	3 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	60°	2.3



Culvert Details

Location: Sta. 10+33.29

Culvert Inlet: Sta. 10+33.39 + 5' LT

Inlet Elevation: 637.00

Outlet Location: Sta. 10+33.39 + 15' RT

Outlet Elevation: 636.00

Pipe Length: 20ft

Slope % : 5.0

Rise: 15 in

Shape: Circular

Span: 15 in

No. Barrels: 1

Culvert Type: Circular Concrete

Culvert Entrance: Square edge w/headwall (C)

General Note:

Maintenance of the culvert is expected to be done 1 to 2 times per year. This maintenance is expected but not limited to a routine clean out.

Culvert Drawing and Dimensioning contracted from County Materials Corporation

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SHEET NAME  
 Culvert Specs

SHEET NO.