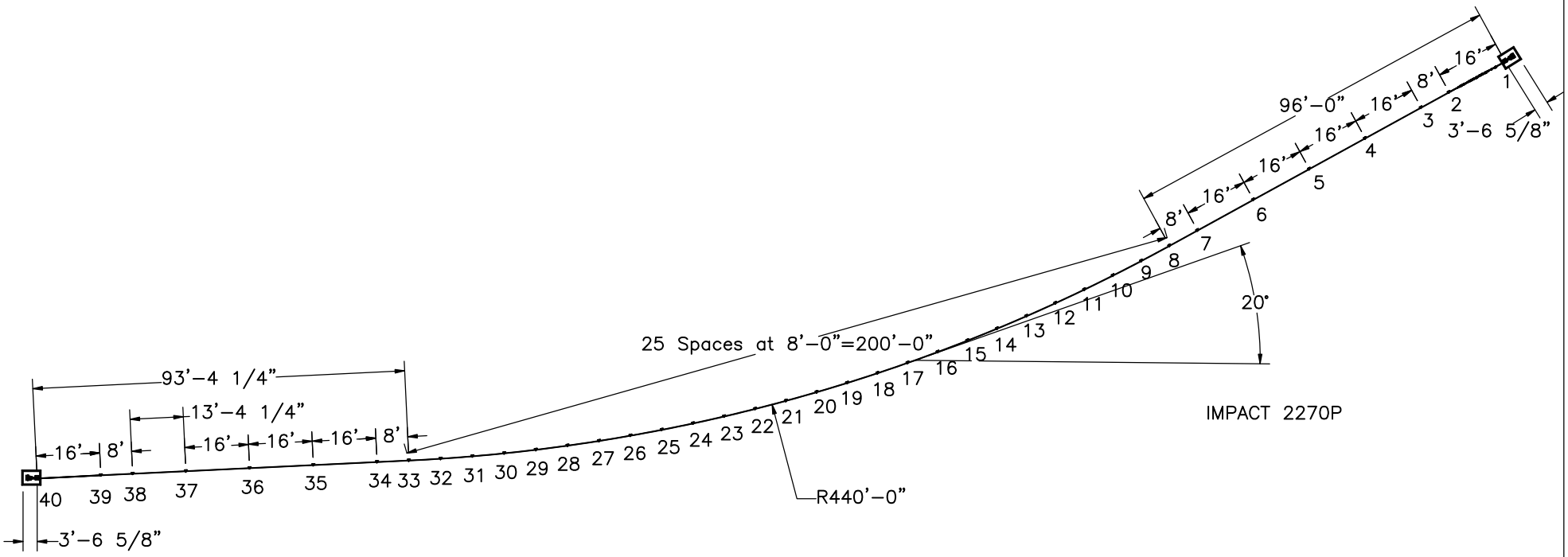
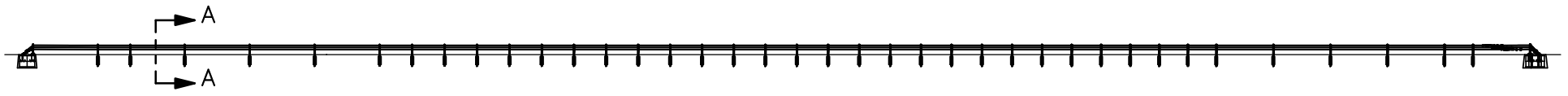


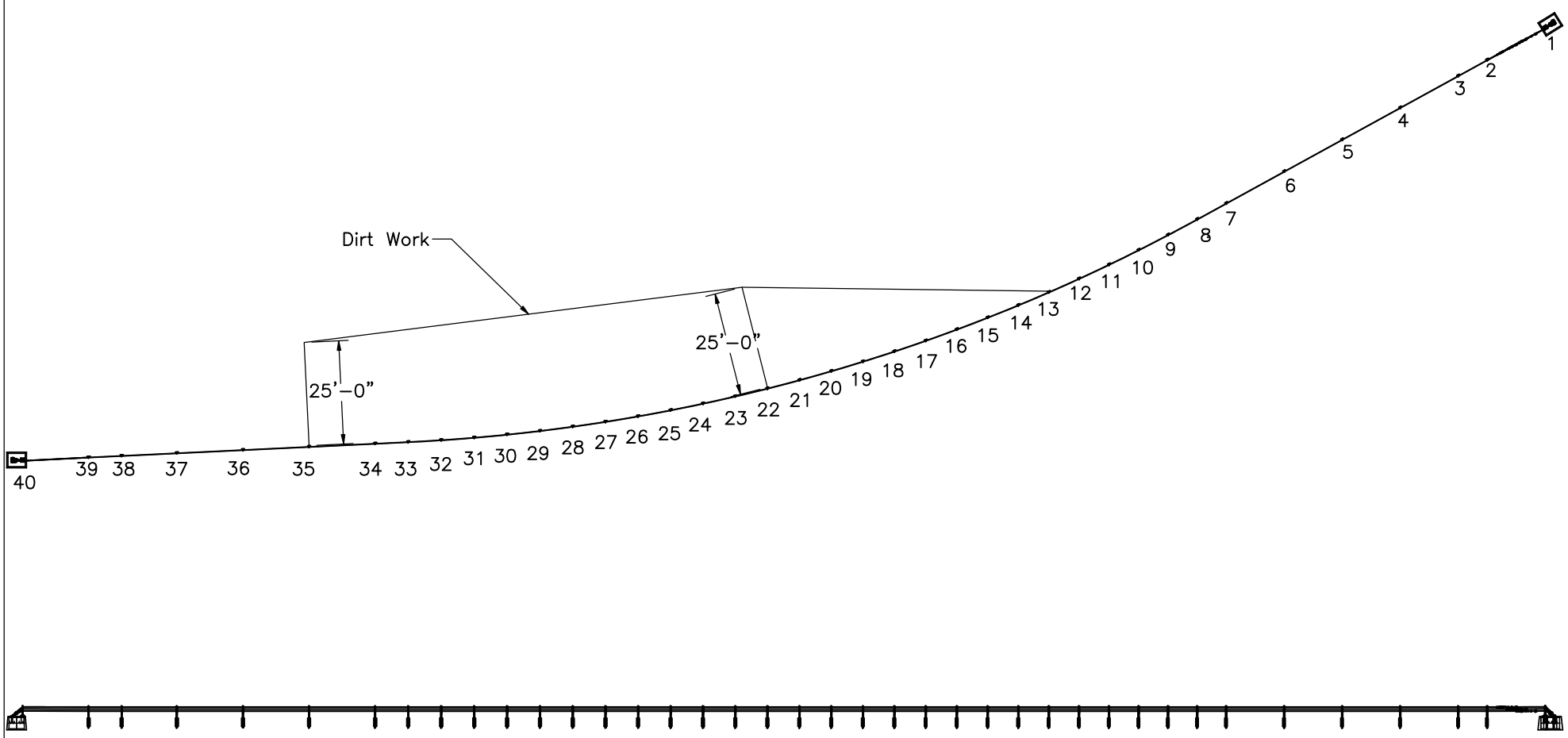


NOTE: (1) Impact coordinates are x–127'–3 5/16", y–23'–0 15/16" from center of post no. 33.

(2) Impact takes place 2' upstream of post no. 17 20° from tangent and 70' downstream of post no. 8.

(3) Post hole diameter is 18".

MWRSF Midwest Roadside Safety Facility	NY Curved Cable–440' Radius System Layout	SHEET: 1 of 17 DATE: 8/15/2012 DRAWN BY: MDM/CWP
	DWG. NAME. NY curved cable–440–R7 SCALE: 1:460 UNITS: Inches	REV. BY: KAL/CLM



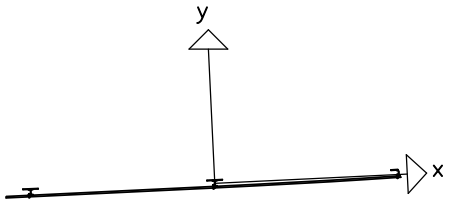
NOTE: (1) Critical region extends from post no. 6 to post no. 35.

(2) Dirt work needs to extend 25' behind the back face of post no. 35, 25' perpendicular to to the back face of post no. 22, and to the centerline of post no. 13.

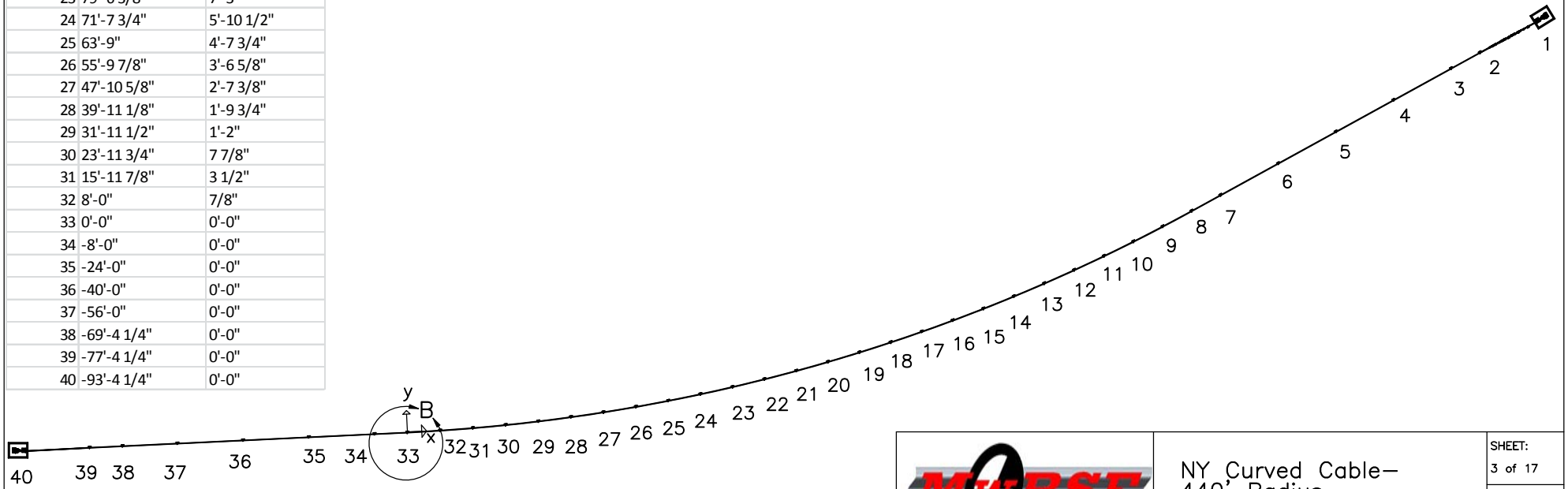
MwRSF Midwest Roadside Safety Facility	NY Curved Cable–440' Radius System Layout	SHEET: 2 of 17 DATE: 8/15/2012 DRAWN BY: MDM/CWP
	DWG. NAME. NY curved cable–440–R7 SCALE: 1:440 UNITS: Inches	REV. BY: KAL/CLM

Post No.	X-Coordinates	Y-Coordinates
1	279'-4 1/4"	86'-9 1/2"
2	264'-11 7/8"	79'-9 1/4"
3	257'-9 1/2"	76'-3 1/8"
4	243'-5"	69'-2 7/8"
5	229'-1/2"	62'-2 1/2"
6	214'-8"	55'-2 1/4"
7	200'-3 1/2"	48'-2"
8	193'-1 1/4"	44'-7 7/8"
9	185'-10 5/8"	41'-2 1/2"
10	178'-7 3/8"	37'-10 3/4"
11	171'-3 1/4"	34'-8 5/8"
12	163'-10 1/2"	31'-8 1/8"
13	156'-5 1/4"	28'-9 1/8"
14	148'-11 1/4"	25'-11 3/4"
15	141'-4 5/8"	23'-4 1/8"
16	133'-9 1/2"	20'-10 1/8"
17	126'-1 3/4"	18'-5 3/4"
18	118'-5 5/8"	16'-3"
19	110'-9"	14'-2"
20	102'-11 7/8"	12'-2 3/4"
21	95'-2 3/8"	10'-5 1/8"
22	87'-4 3/4"	8'-9 1/4"
23	79'-6 3/8"	7'-3"
24	71'-7 3/4"	5'-10 1/2"
25	63'-9"	4'-7 3/4"
26	55'-9 7/8"	3'-6 5/8"
27	47'-10 5/8"	2'-7 3/8"
28	39'-11 1/8"	1'-9 3/4"
29	31'-11 1/2"	1'-2"
30	23'-11 3/4"	7 7/8"
31	15'-11 7/8"	3 1/2"
32	8'-0"	7/8"
33	0'-0"	0'-0"
34	-8'-0"	0'-0"
35	-24'-0"	0'-0"
36	-40'-0"	0'-0"
37	-56'-0"	0'-0"
38	-69'-4 1/4"	0'-0"
39	-77'-4 1/4"	0'-0"
40	-93'-4 1/4"	0'-0"

Note: (1) Reference for coordinates is the center of post no. 33.



DETAIL B
SCALE 1 : 100



Midwest Roadside Safety Facility

NY Curved Cable–440' Radius Post Layout

SHEET: 3 of 17

DATE: 8/15/2012

DRAWN BY: MDM/CWP

DWG. NAME. NY curved cable–440–R7

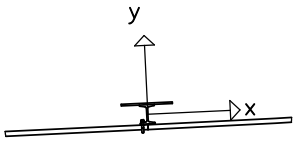
SCALE: 1:440

UNITS: Inches

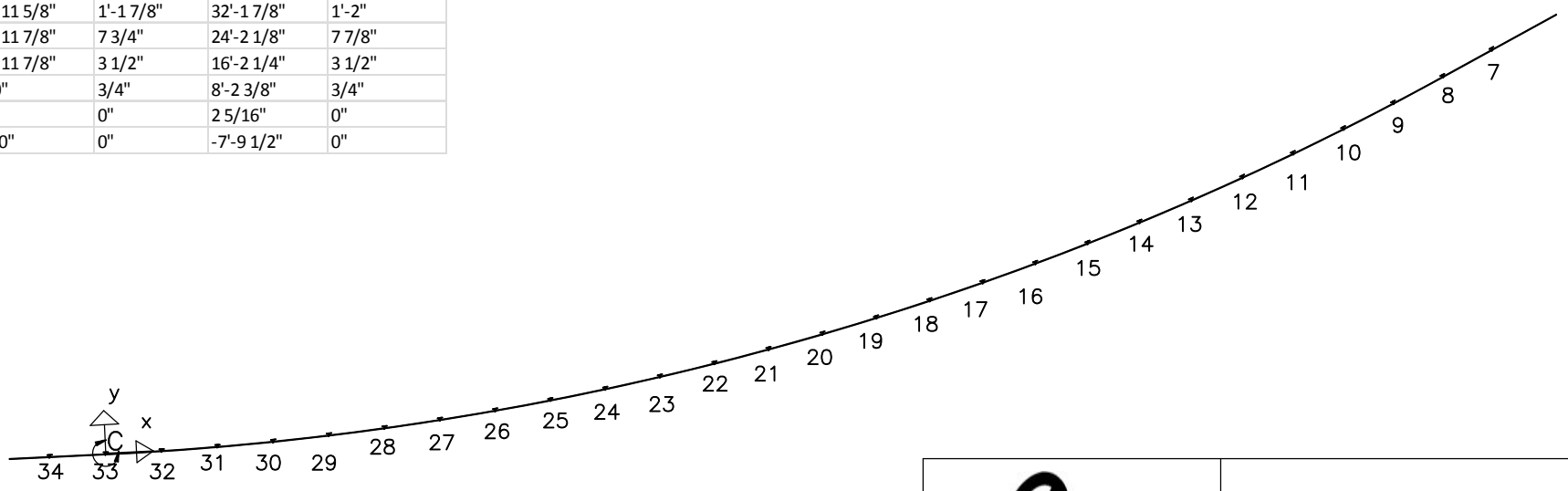
REV. BY: KAL/CLM

Post No.	Front Face D.S. Edge X	Front Face D.S. Edge Y	Front Face U.S. Edge X	Front Face U.S. Edge Y
7	200'-4 1/4"	47'-10 1/4"	200'-6 3/8"	47'-11 1/4"
8	193'-2"	44'-4 1/8"	193'-4 1/8"	44'-5 1/4"
9	185'-11 3/8"	41'-2 1/8"	186'-1 1/2"	41'-3 1/8"
10	178'-8"	37'-10 3/8"	178'-10 1/8"	37'-11 3/8"
11	171'-4"	34'-8 1/4"	171'-6 1/8"	34'-9 1/8"
12	163'-11 1/4"	31'-7 5/8"	164'-1 5/8"	31'-8 1/2"
13	156'-5 3/4"	28'-8 3/4"	156'-8"	28'-9 5/8"
14	148'-11 3/4"	25'-11 1/2"	149'-2"	26'-1/4"
15	141'-5 1/8"	23'-3 3/4"	141'-7 3/8"	23'-4 1/2"
16	133'-10"	20'-9 3/4"	134'-1/4"	20'-10 1/2"
17	126'-2 1/4"	18'-5 1/2"	126'-4 1/2"	18'-6 1/8"
18	118'-6 1/8"	16'-2 3/4"	118'-8 3/8"	16'-3 3/8"
19	110'-9 3/8"	14'-1 3/4"	110'-11 5/8"	14'-2 3/8"
20	103'-1/4"	12'-2 1/2"	103'-2 1/2"	12'-3"
21	95'-2 3/4"	10'-4 7/8"	95'-5"	10'-5 3/8"
22	87'-4 7/8"	8'-9"	87'-7 1/8"	8'-9 1/2"
23	79'-6 5/8"	7'-2 3/4"	79'-8 7/8"	7'-3 1/4"
24	71'-8"	5'-10 3/8"	71'-10 3/8"	5'-10 3/4"
25	63'-9 1/4"	4'-7 5/8"	63'-11 1/2"	4'-7 7/8"
26	55'-10 1/8"	3'-6 1/2"	56'-3/8"	3'-6 7/8"
27	47'-10 3/4"	2'-7 1/4"	48'-1 1/8"	2'-7 1/2"
28	39'-11 1/4"	1'-9 3/4"	40'-1 5/8"	1'-9 7/8"
29	31'-11 5/8"	1'-1 7/8"	32'-1 7/8"	1'-2"
30	23'-11 7/8"	7 3/4"	24'-2 1/8"	7 7/8"
31	15'-11 7/8"	3 1/2"	16'-2 1/4"	3 1/2"
32	8'-0"	3/4"	8'-2 3/8"	3/4"
33	0"	0"	2 5/16"	0"
34	-8'-0"	0"	-7'-9 1/2"	0"

Note: (1) All distances referenced to the DS front face of post no. 33



DETAIL C
SCALE 1 : 30



Midwest Roadside Safety Facility

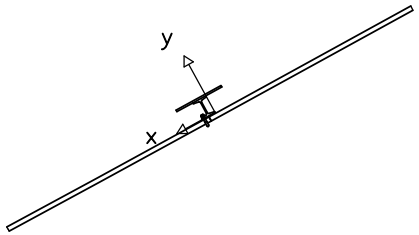
NY Curved Cable–440' Radius Post Layout

SHEET: 4 of 17
DATE: 8/15/2012
DRAWN BY: MDM/CWP
REV. BY: KAL/CLM

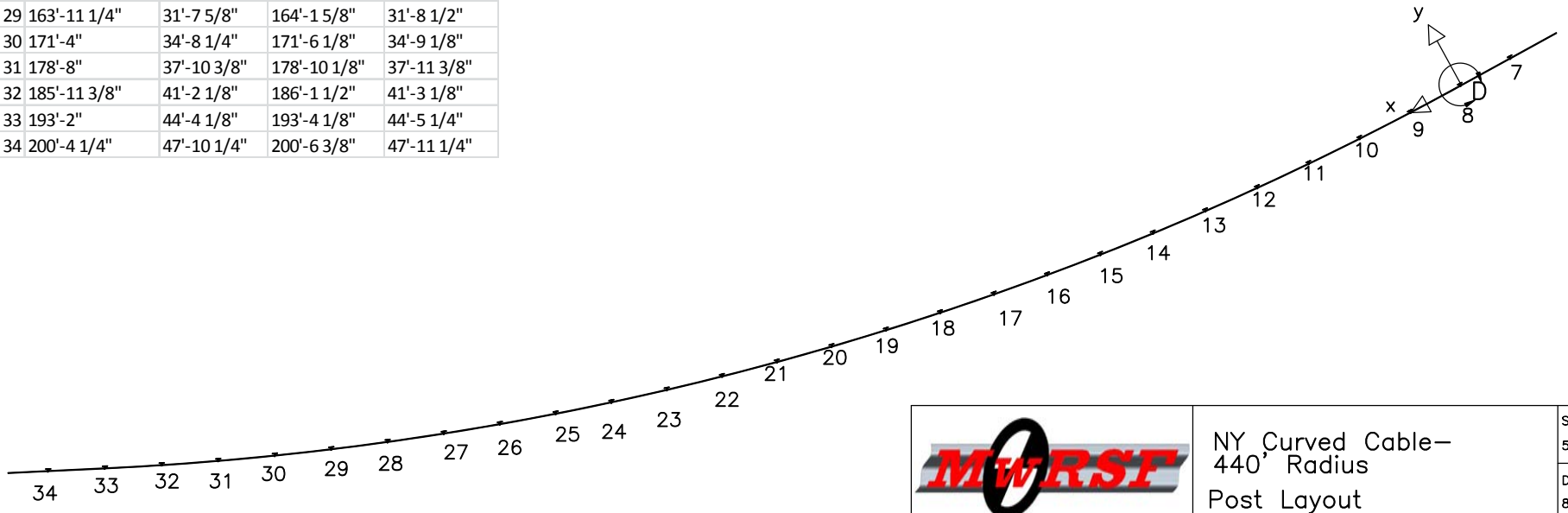
DWG. NAME. NY curved cable–440–R7
SCALE: 1:440
UNITS: Inches

Post No.	Front Face U.S. Edge X	Front Face U.S. Edge Y	Front Face D.S. Edge X	Front Face D.S. Edge Y
7	-8'-0"	0"	-7'-9 1/2"	0"
8	0"	0"	2 5/16"	0"
9	8'-0"	3/4"	8'-2 3/8"	3/4"
10	15'-11 7/8"	3 1/2"	16'-2 1/4"	3 1/2"
11	23'-11 7/8"	7 3/4"	24'-2 1/8"	7 7/8"
12	31'-11 5/8"	1'-1 7/8"	32'-1 7/8"	1'-2"
13	39'-11 1/4"	1'-9 3/4"	40'-1 5/8"	1'-9 7/8"
14	47'-10 3/4"	2'-7 1/4"	48'-1 1/8"	2'-7 1/2"
15	55'-10 1/8"	3'-6 1/2"	56'-3/8"	3'-6 7/8"
16	63'-9 1/4"	4'-7 5/8"	63'-11 1/2"	4'-7 5/8"
17	71'-8"	5'-10 3/8"	71'-10 3/8"	5'-10 3/4"
18	79'-6 5/8"	7'-2 3/4"	79'-8 7/8"	7'-3 1/4"
19	87'-4 7/8"	8'-9"	87'-7 1/8"	8'-9 1/2"
20	95'-2 3/4"	10'-4 7/8"	95'-5"	10'-5 3/8"
21	103'-1/4"	12'-2 1/2"	103'-2 1/2"	12'-3"
22	110'-9 3/8"	14'-1 3/4"	110'-11 5/8"	14'-2 3/8"
23	118'-6 1/8"	16'-2 3/4"	118'-8 3/8"	16'-3 3/8"
24	126'-2 1/4"	18'-5 1/2"	126'-4 1/2"	18'-6 1/8"
25	133'-10"	20'-9 3/4"	134'-1/4"	20'-10 1/2"
26	141'-5 1/8"	23'-3 3/4"	141'-7 3/8"	23'-4 1/2"
27	148'-11 3/4"	25'-11 1/2"	149'-2"	26'-1/4"
28	156'-5 3/4"	28'-8 3/4"	156'-8"	28'-9 5/8"
29	163'-11 1/4"	31'-7 5/8"	164'-1 5/8"	31'-8 1/2"
30	171'-4"	34'-8 1/4"	171'-6 1/8"	34'-9 1/8"
31	178'-8"	37'-10 3/8"	178'-10 1/8"	37'-11 3/8"
32	185'-11 3/8"	41'-2 1/8"	186'-1 1/2"	41'-3 1/8"
33	193'-2"	44'-4 1/8"	193'-4 1/8"	44'-5 1/4"
34	200'-4 1/4"	47'-10 1/4"	200'-6 3/8"	47'-11 1/4"

Note: (1) All distances reference to the US front face of post no. 8



DETAIL D
SCALE 1 : 30

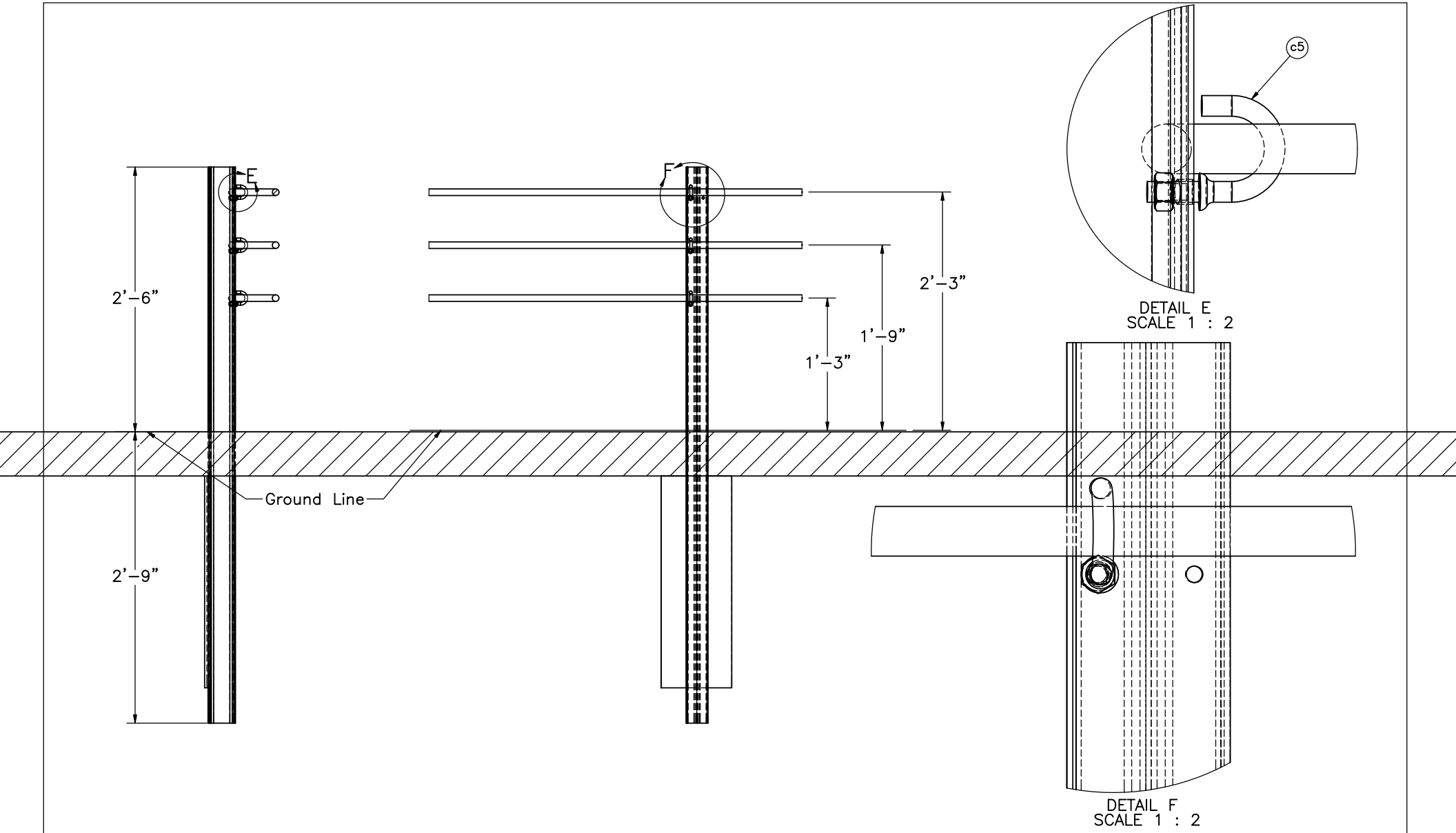


Midwest Roadside Safety Facility

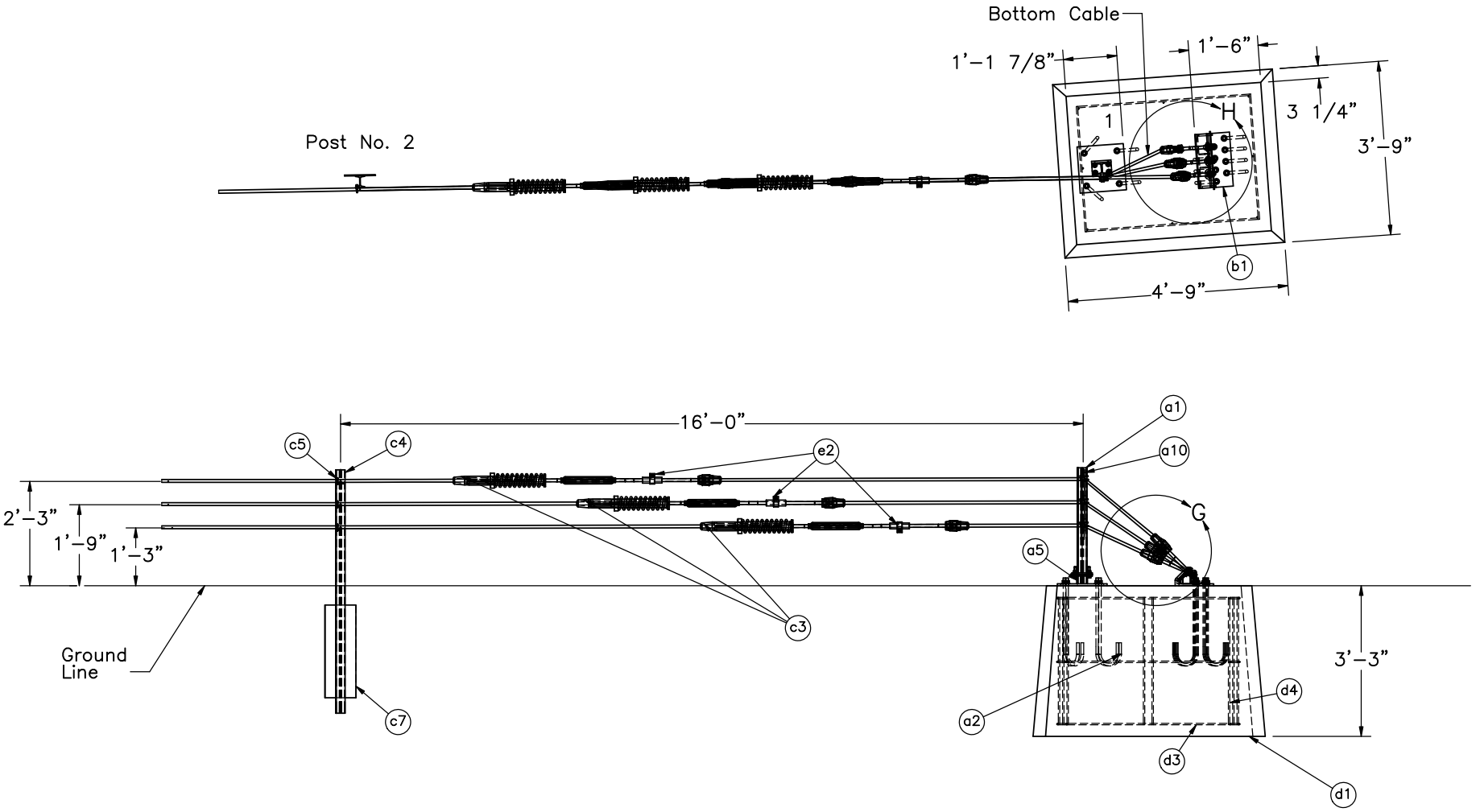
NY Curved Cable–440' Radius
Post Layout

SHEET: 5 of 17
DATE: 8/15/2012
DRAWN BY: MDM/CWP
REV. BY: KAL/CLM

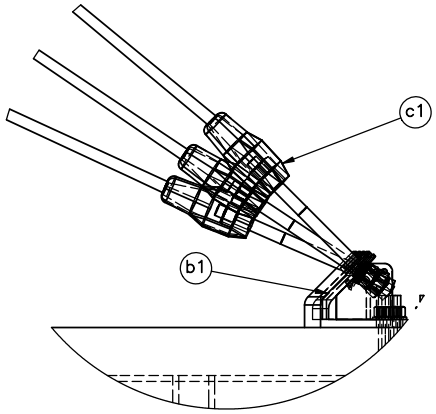
DWG. NAME. NY curved cable–440–R7
SCALE: 1:280
UNITS: Inches



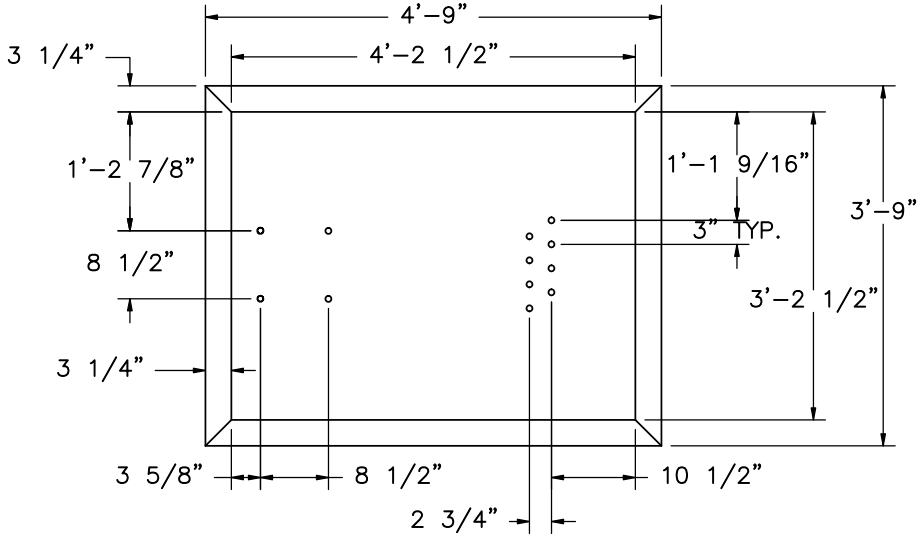
Midwest Roadside Safety Facility	NY Curved Cable–440' Radius S3x5.7 Post Assembly	SHEET: 6 of 17
		DATE: 8/15/2012
		DRAWN BY: MDM/CWP
	DWG. NAME. NY curved cable–440–R7 / SCALE: 1:15 / UNITS: Inches	REV. BY: KAL/CLM

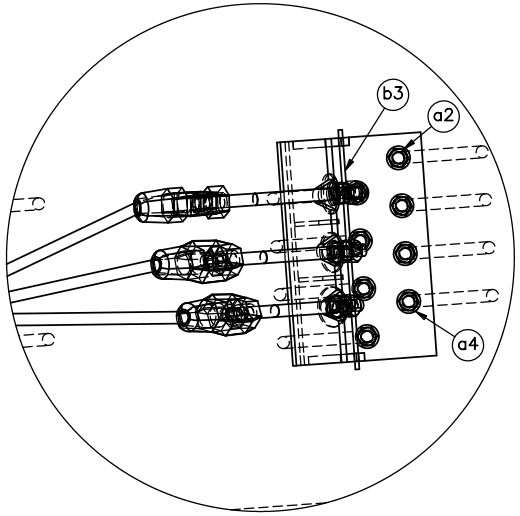


Midwest Roadside Safety Facility	NY Curved Cable–440' Radius Cable Terminal Detail	SHEET: 7 of 17
		DATE: 8/15/2012
		DRAWN BY: MDM/CWP
	DWG. NAME. NY curved cable–440–R7 / SCALE: 1:40 / UNITS: Inches	REV. BY: KAL/CLM

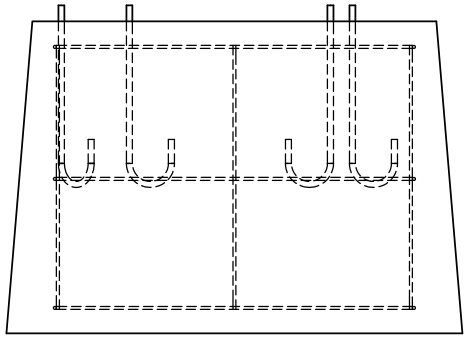


DETAIL G
SCALE 1 : 12



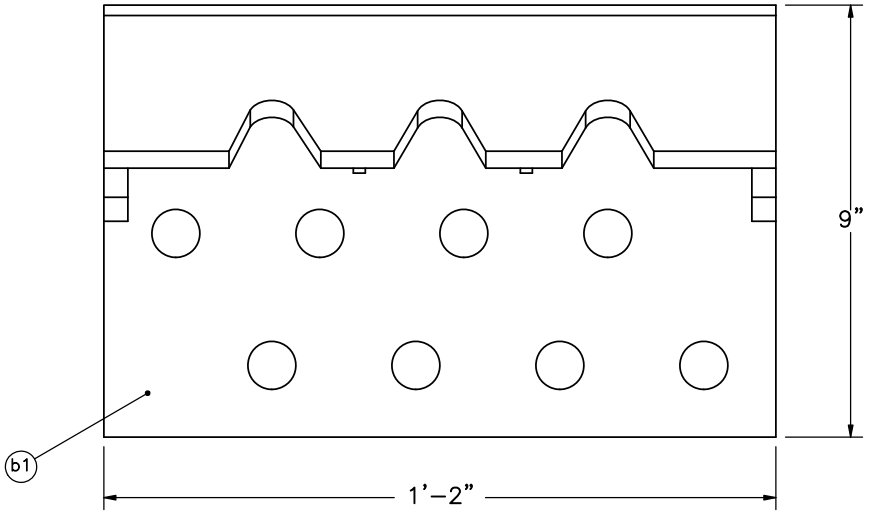


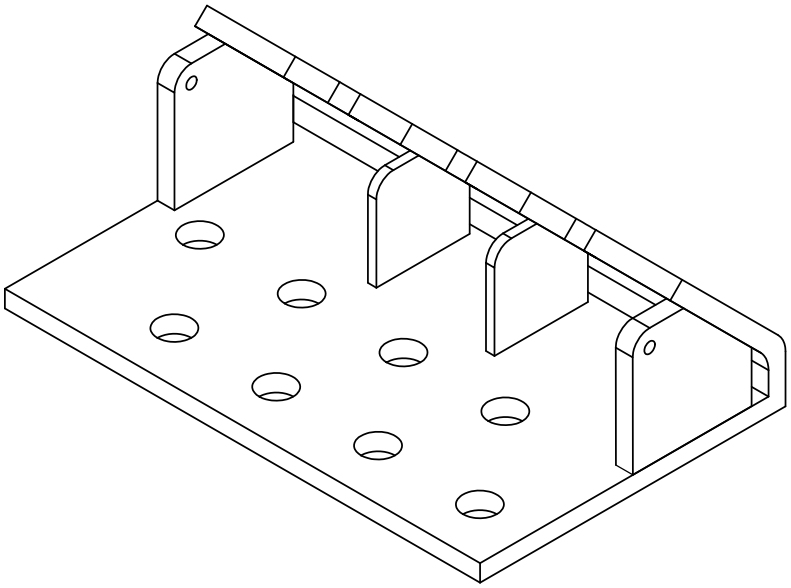
DETAIL H
SCALE 1 : 12

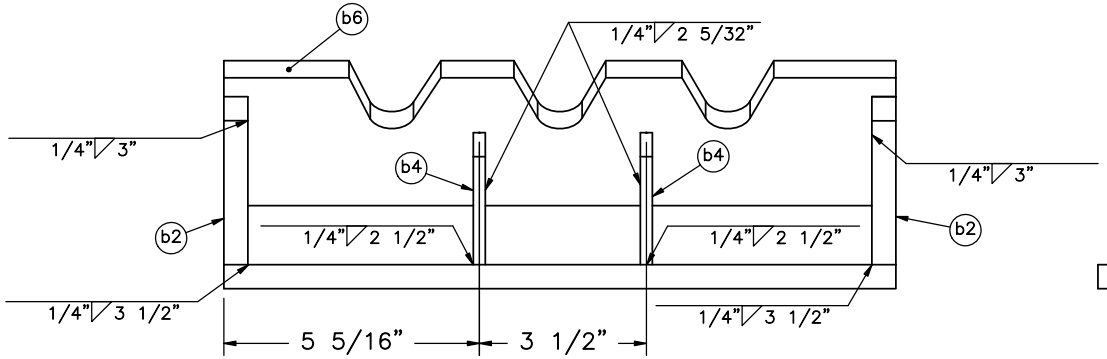


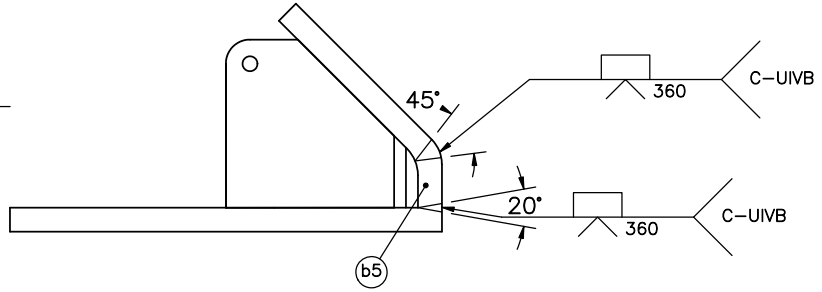
Concrete Anchor Block and
Hooked Anchor Studs
Parts a2 and d1

MwRSF	NY Curved Cable–440' Radius Anchor Details	SHEET: 8 of 17
		DATE: 8/15/2012
Midwest Roadside Safety Facility		DRAWN BY: MDM/CWP
	DWG. NAME. NY curved cable–440–R7 / SCALE: 1:24 / UNITS: Inches	REV. BY: KAL/CLM

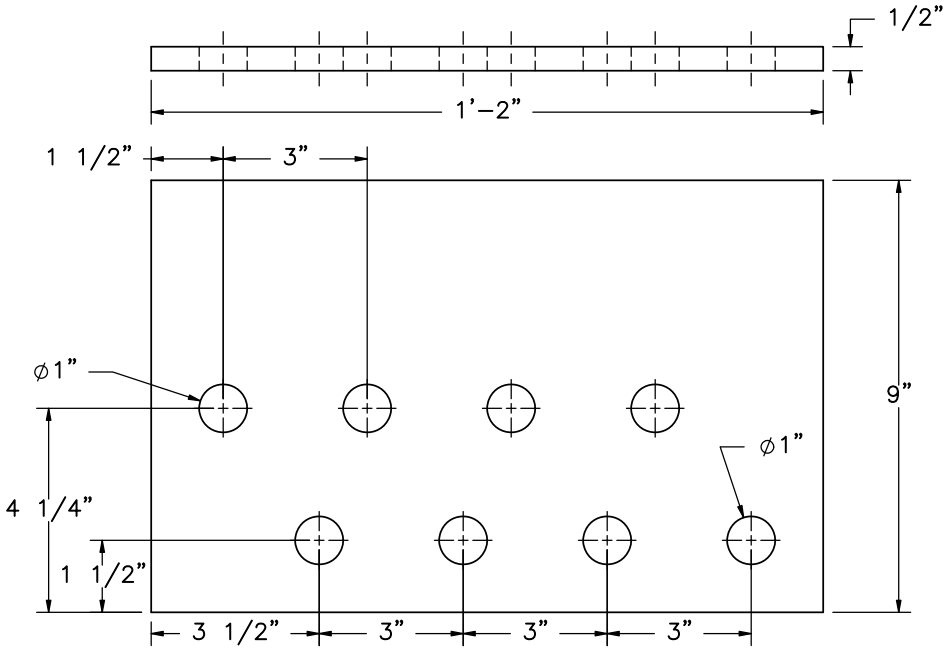




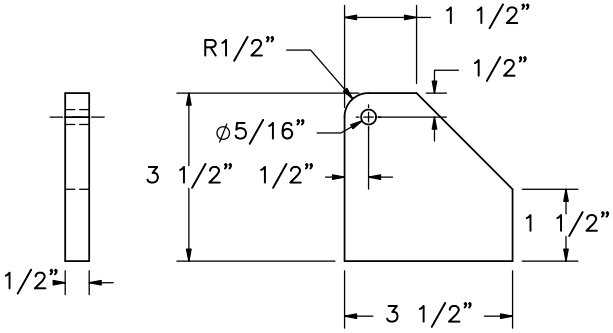




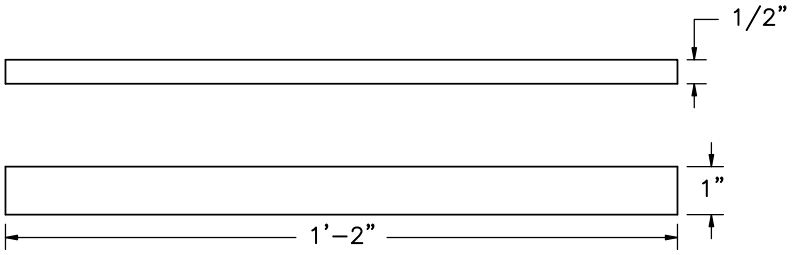
Midwest Roadside Safety Facility	NY Curved Cable–440' Radius Welded Plate Anchor Angle Detail	SHEET: 9 of 17 DATE: 8/15/2012 DRAWN BY: MDM/CWP
	DWG. NAME. NY curved cable–440–R7 SCALE: 1:4 UNITS: Inches	REV. BY: KAL/CLM



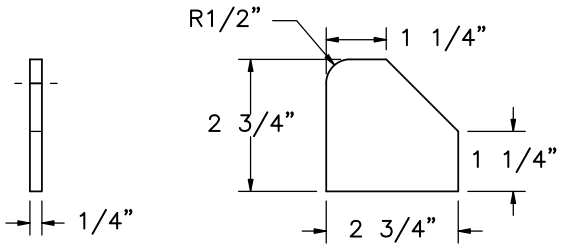
Anchor Bracket Plate
Part b1



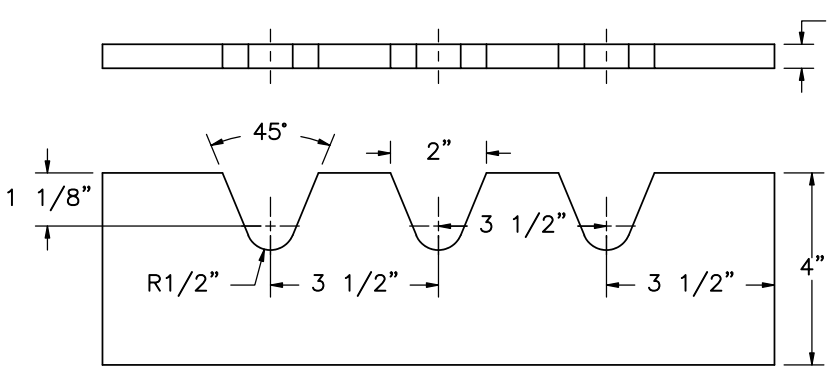
External Stiffener
Part b2



Anchor Angle Middle Plate
Part b5



Internal Stiffener
Part b4



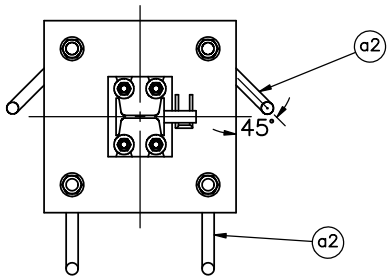
Cable Plate
Part b6

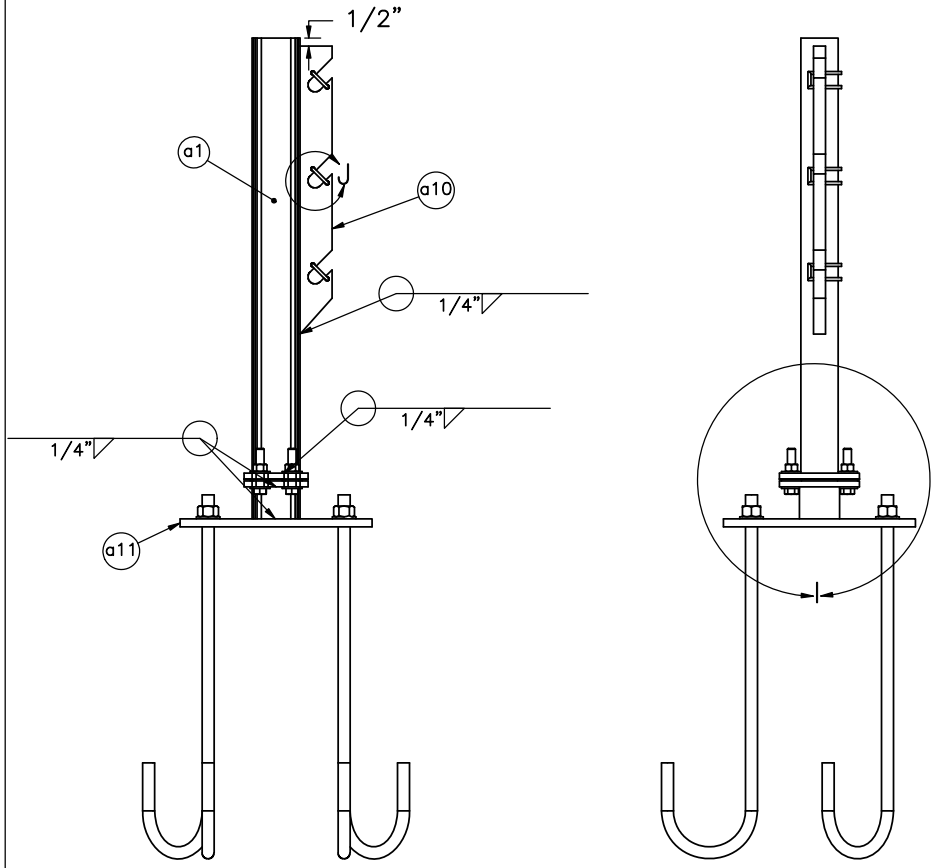
Midwest Roadside Safety Facility

NY Curved Cable–440' Radius
Welded Plate Anchor Angle Components

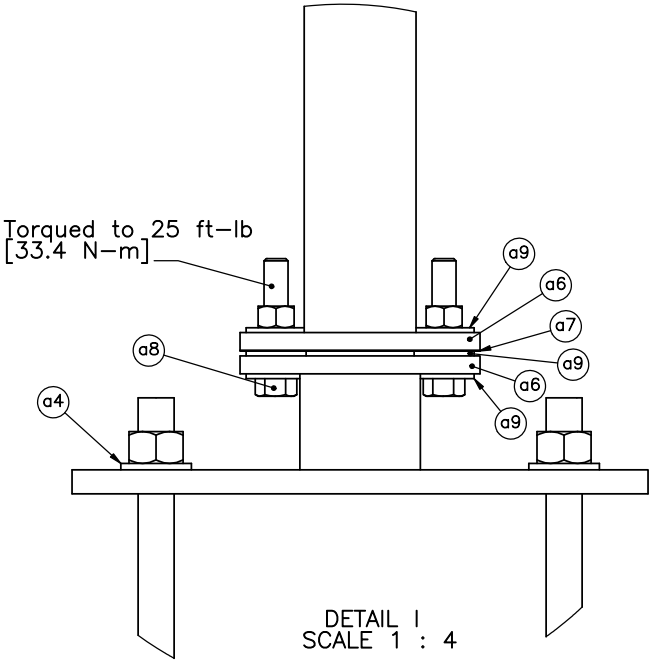
SHEET: 10 of 17
DATE: 8/15/2012
DRAWN BY: MDM/CWP
REV. BY: KAL/CLM

DWG. NAME. NY curved cable–440–R7
SCALE: 1:4
UNITS: Inches

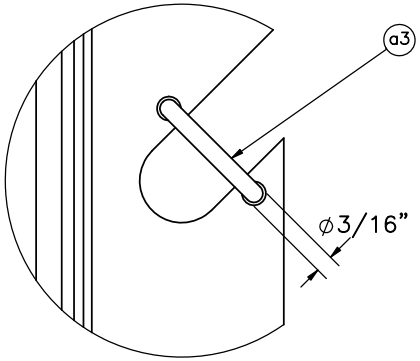




Post nos. 1 and 40



DETAIL I
SCALE 1 : 4



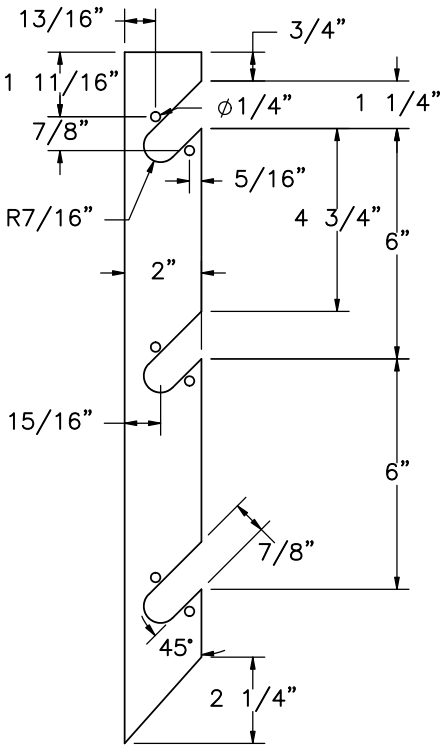
DETAIL J
SCALE 1 : 2

Midwest Roadside Safety Facility

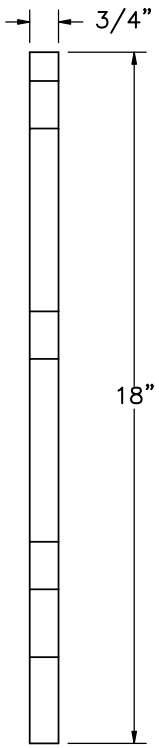
NY Curved Cable–
440' Radius
Anchor Post Assembly

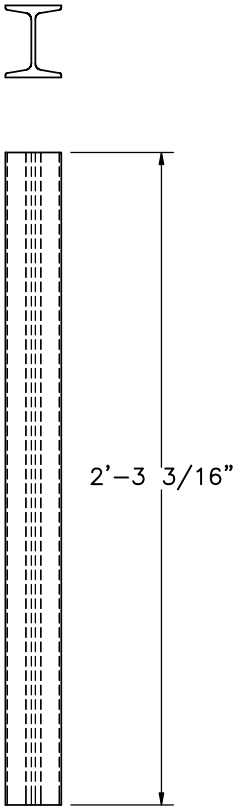
SHEET: 11 of 17
DATE: 8/15/2012
DRAWN BY: MDM/CWP
REV. BY: KAL/CLM

DWG. NAME. NY curved cable–440–R7
SCALE: 1:12
UNITS: Inches

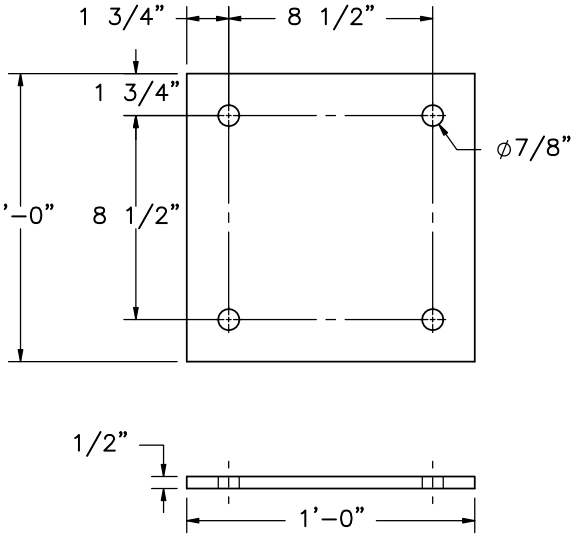


Anchor Post Support
Part a10

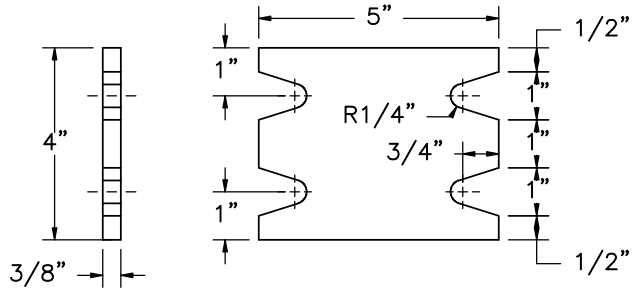




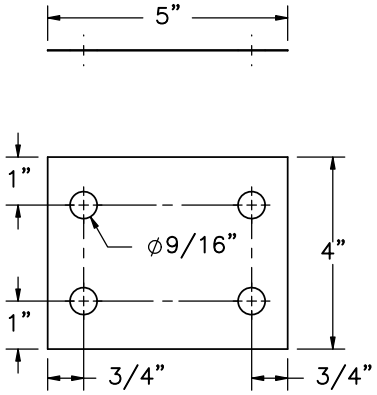
Upper Anchor Post
Part a1



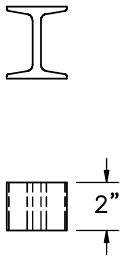
Anchor Post Base
Part a11



Slip Impact Base
Part a6



Keeper Plate
28 Gauge
Part a7



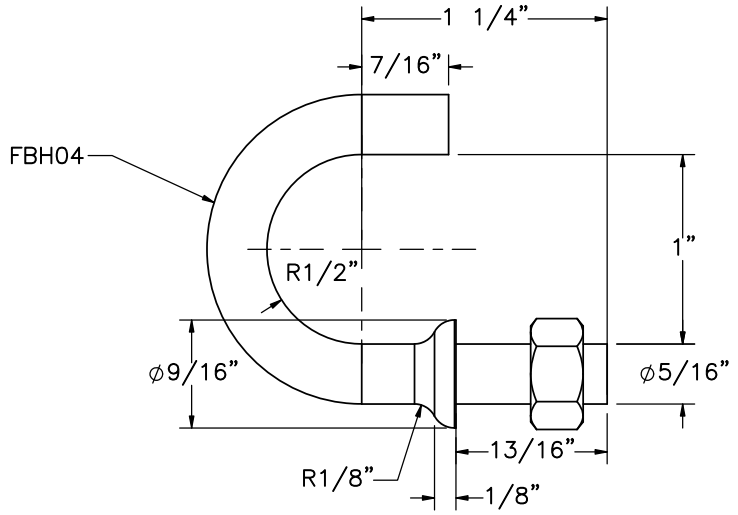
S3x7.5 Anchor Stub
Part a5

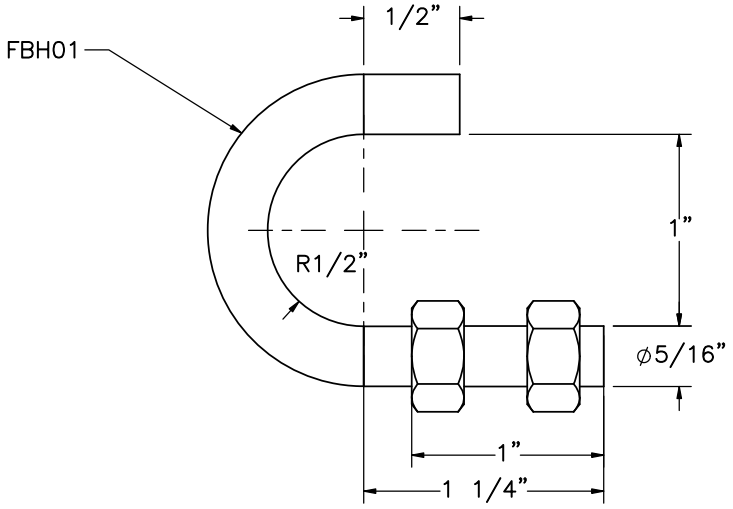
Midwest Roadside Safety Facility

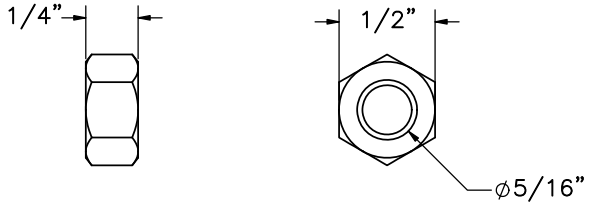
NY Curved Cable–
440' Radius
Anchor Post Components

SHEET: 12 of 17
DATE: 8/15/2012
DRAWN BY: MDM/CWP
REV. BY: KAL/CLM

DWG. NAME. NY curved cable–440–R7
SCALE: None
UNITS: Inches

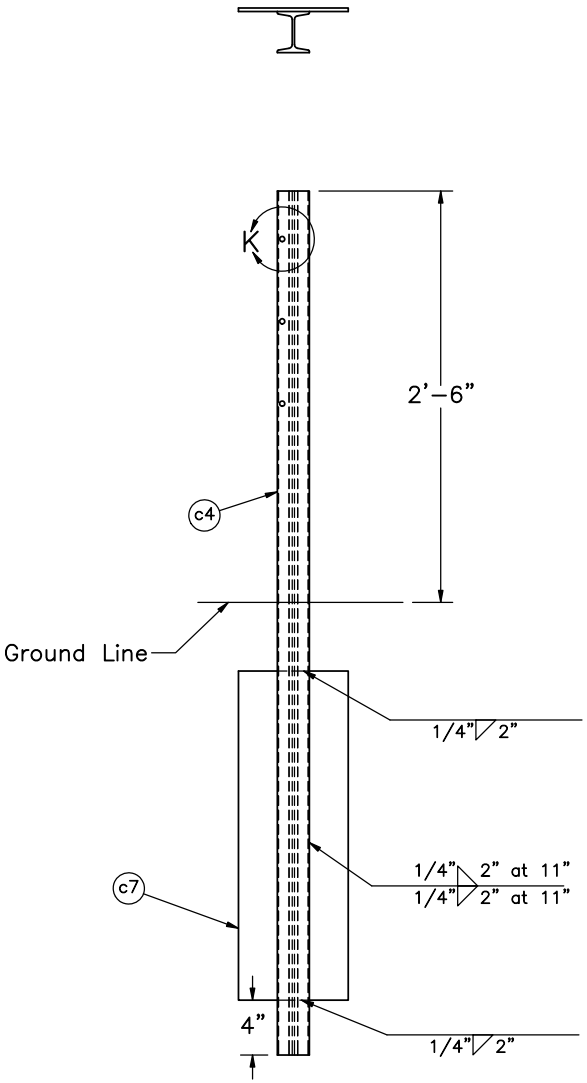




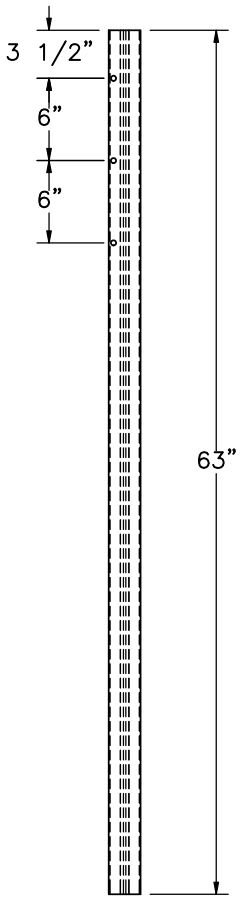


Note: (1) Either FBH01 or FBH04 can be utilized for the New York Curved Cable System.

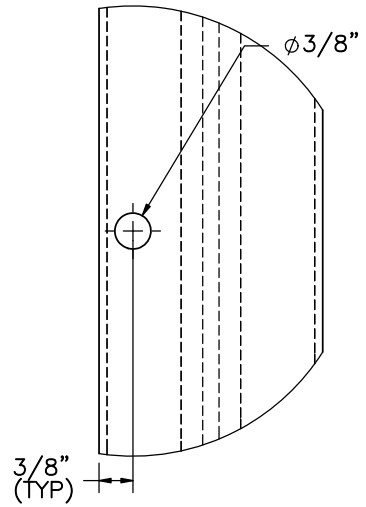
Midwest Roadside Safety Facility	NY Curved Cable–440' Radius U–Bolt Details	SHEET: 13 of 17 DATE: 8/15/2012 DRAWN BY: MDM/CWP
	DWG. NAME. NY curved cable–440–R7 SCALE: 1:1 UNITS: Inches	REV. BY: KAL/CLM



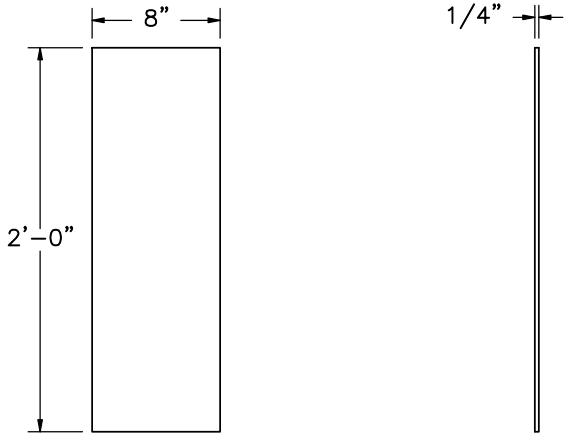
Line Post
Assembly
FRONT VIEW



S3x5.7 Post
c4



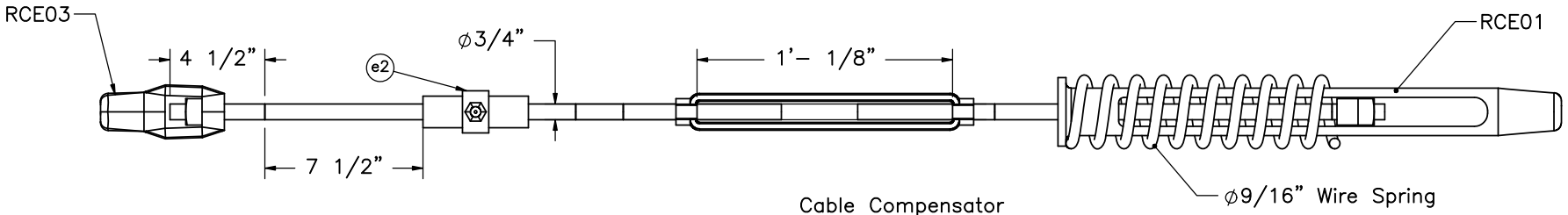
DETAIL K
SCALE 1 : 2



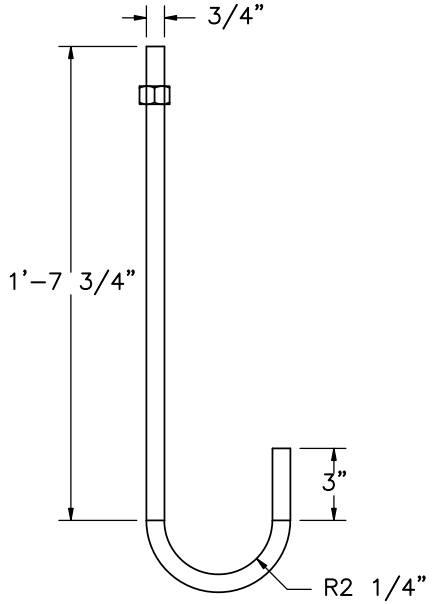
Soil Plate
Part c7

NOTE: (1) Soil plate on non-impact side

Midwest Roadside Safety Facility	NY Curved Cable-440' Radius Line Post	SHEET: 14 of 17
		DATE: 8/15/2012
		DRAWN BY: MDM/CWP
	DWG. NAME. NY curved cable-440-R7 / SCALE: 1:14 / UNITS: Inches	REV. BY: KAL/CLM

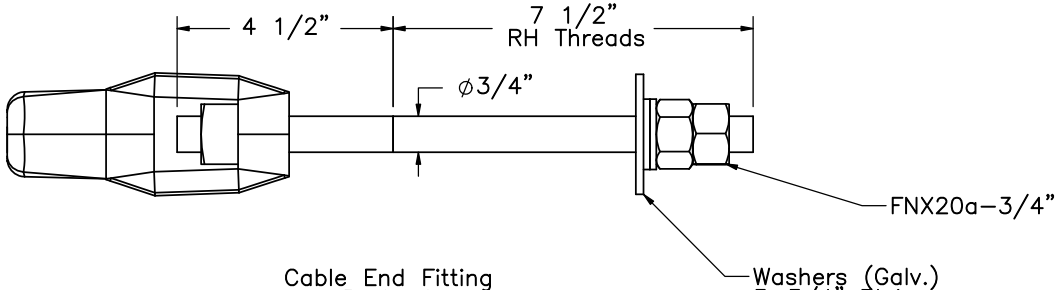


Cable Compensator
Part c3
SCALE 1:8

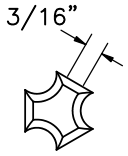


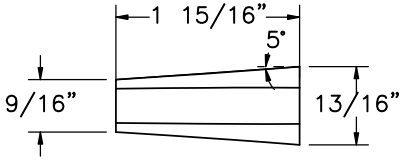
25" Total Length

Hooked Anchor Stud
and Nut
Part a2
SCALE 1:8

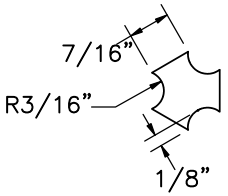


Cable End Fitting
Part c1





Cable Wedge
Part e1
SCALE 1:2



Washer	Washer Series	Inside Diameter "A"			Outside Diameter "B"			Thickness "C"		
		Basic	Tolerance		Basic	Tolerance		Basic	Max.	Min.
			Plus	Minus		Plus	Minus			
3/4"	Regular	0.812	0.03	0.007	1.469	0.03	0.007	0.134	0.16	0.108
	Wide	0.812	0.03	0.007	2	0.03	0.007	0.165	0.192	0.136
1/2"	Narrow	0.531	0.015	0.005	1.062	0.03	0.007	0.095	0.121	0.074

Midwest Roadside Safety Facility

NY Curved Cable–440' Radius
Anchor Stud and Cable Compensating

SHEET: 15 of 17
DATE: 8/15/2012
DRAWN BY: MDM/CWP
REV. BY: KAL/CLM

DWG. NAME. NY curved cable–440–R7
SCALE: 1:4
UNITS: Inches

New York Curved Cable System				
Item No.	QTY.	Description	Material Spec	Hardware Guide
a1	2	S3x5.7 27 3/16" long Anchor Post	ASTM A36 Galvanized	–
a2	24	Hooked Anchor J–Bolt and Nut	ASTM A36 and ASTM A–563 DH Galvanized	FRH20a
a3	6	∅3/16" 5 1/4" Long Brass Rod	Brass	–
a4	36	∅3/4" Plain Round Washer–OD 1.5"	Grade 2 Galvanized	FWC20a
a5	2	S3x7.5 Anchor Post Stub	ASTM A36 Galvanized	–
a6	4	Slip Impact Base	ASTM A36 Galvanized	–
a7	2	4"x5" 28 Gauge Keeper Plate	ASTM A36 Galvanized	–
a8	8	∅1/2" x2 1/2" Long Bolt and Nut	Grade 2 Galvanized	FBX14a
a9	24	∅1/2" Narrow Washer–OD 1"	Grade 2 Galvanized	FWC12a
a10	2	3/4" Anchor Post Support Plate	A707 Grade 36 Galvanized	–
a11	2	Anchor Post Base	A709 Grade 36 Galvanized	–
b1	2	Anchor Bracket Plate	ASTM A709 Grade 36 Galvanized	–
b2	4	1/2" Thick External Stiffener	ASTM A709 Grade 36 Galvanized	–
b3	2	∅1/4"x15" Brass Rod	Brass	–
b4	4	1/4" Thick Internal Stiffener	ASTM A709 Grade 36 Galvanized	–
b5	2	Anchor Angle Middle Plate	ASTM A709 Grade 36 Galvanized	–
b6	2	Cable Plate	ASTM A709 Grade 36 Galvanized	–
c1	6	Cable End Fitting	ASTM A27 Galvanized	RCE03
c2	6	∅3/4" Plain Round Washer–OD 2"	Grade 2 Galvanized	FWC20a
c3	3	Compensating Cable End Assembly	ASTM A27 Galvanized	RCE01 & RCE03
c4	38	S3x5.7 63 in. long Line Post	ASTM A36 Galvanized	–
c5	114	Cable Hook Bolt and Nuts	ASTM F568 Class 4.6 and Grade A307 Galvanized	FBH04
c6	1	∅3/4" Cable Approx. 392'	AASHTO M30 Type 1 Class A Galvanized	RCM01
c7	38	2'x8"x0.25" Soil Plate	ASTM A36 Galvanized	–
d1	2	Concrete Anchor Block	3000 psi Compressive Strength	–
d2	12	#3 Rebar 32.5" long	Grade 60	–
d3	12	#3 Rebar 44.5" long	Grade 60	–
d4	16	#3 Rebar 33" long	Grade 60	–
e1	12	Cable Wedge	ASTM A47 Grade 32510	FMM01
e2	3	50,000–lb Load Cell	N/A	–

Midwest Roadside Safety Facility

NY Curved Cable–440' Radius
Bill of Materials

SHEET: 16 of 17
DATE: 8/15/2012
DRAWN BY: MDM/CWP
REV. BY: KAL/CLM

DWG. NAME. NY curved cable–440–R7
SCALE: None
UNITS: Inches

(1) All posts shall be s3x5.7 rolled steel section. The anchor post stub shall be s3x7.5. Where the rail is parallel to the edge of the pavement, every sixth post starting with the first shall be reflectorized. Do not reflectorize posts in the intermediate anchorage section, typical approach and terminal section, or when used as a median barrier.

(2) Reflectors shall be aluminum alloy 1/16" thick with reflective sheeting. The reflective sheeting shall be white when installed on the right side of traffic and fluorescent yellow when on the left.

(3) 3/4" round wire cable shall consist of three strans (7 wires per strand) and have a minimum tensile strength of 25,000 lbf.

(4) Cable ends shall be fabricated from malleable iron or cast steel. The cable splice and wedge shall be fabricated from malleable iron or ASTM A536 ductile.

(5) All cable ends and splices shall be designed to use the wedge shown on sheet 15 and shall develop the full strength of the 3/4" round cable (25000 lbs.). The cables, ends, and splices shall be hot dipped galvanized as indicated in material specification for cable guide rail. The wedge shall not be galvanized.

(6) Stagger cable splices, provide a minimum of 20' between any pair. Provide a minimum of 100' between cable splices on the same cable.

(7) Alternate designs for the steel turnbuckle cable end assembly or spring cable end assembly shall be submitted for approval.

(8) For arrangement of spring cable end assemblies (compensating device) and turnbuckle cable end assemblies, the following criteria shall apply:
=Length of cable runs up to 1000'—use compensating device (RCE01) on one end, and turnbuckle (RCE03) on the other end of each individual cable.
—Length of cable runs 1000' to 2000'=use compensating device (RCE01) on the ends of each individual cable.
—Length of cable runs over 2000'—start a new stretch by interlacing at last parallel post (see typical intermediate anchorage details).

Prior to final acceptance by the state, the following values shall be used ot tighten the turnbuckles, depending on the temperature at the time of adjustment.

Temperature (degrees Farenheit)													
120 to 110	109 to 100	99 to 90	89 to 80	79 to 70	69 to 60	59 to 50	49 to 40	39 to 30	29 to 20	19 to 10	9 to 0	-1 to -19	-20 to -29
Spring Compression from Unloaded Position in Each Spring-Measured in Inches													
1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/2

(9) The concrete anchor shall be set into the excavation as detailed. The bottom of the anchor shall have a full and even bearing on the surface under it. The top shall be back filled in accordance with the requirements of 203—3.15 "fill and back fill at structures, culverts, pipes, conduits, and direct burial cables."

(10) Do not install cable guide railing on curves with a centerline radius of less than 440'.

(11) Curbs greater than 3" high are not to be retained or placed if design, posted, or operating speed exceeds 35 mph. Rail mounting height is to be measured from pavement if offset between pavement and curb is less than or equal to 9" and from ground beneath raiil if offset > 9".

(12) Lifting devices, if embedded in concrete, shall be rated by their manufacturer as having a "safe working load" of four tons for the one piece anchor and two tons each for each of the halves of the two piece anchor unit.

(13) At all locations where the cable is connected to a cable socket with a wedge type connection., one wire of the wire rope shall be crimped over the base of the wedge to hold it firmly in place.

Midwest Roadside Safety Facility

NY Curved Cable—440' Radius Notes

SHEET: 17 of 17
DATE: 8/15/2012
DRAWN BY: MDM/CWP
DWG. NAME. NY curved cable—440—R7
SCALE: None
UNITS: Inches
REV. BY: KAL/CLM