
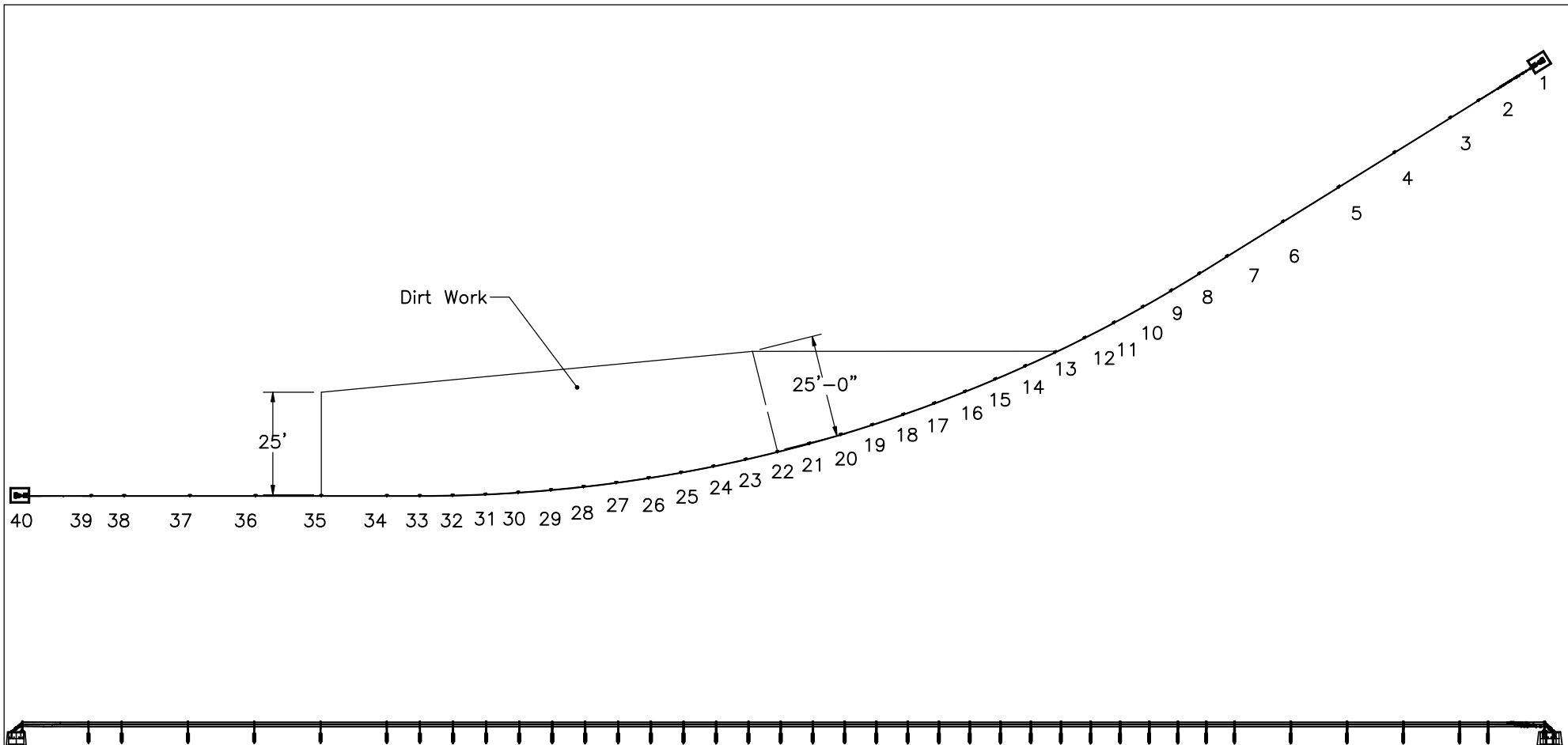



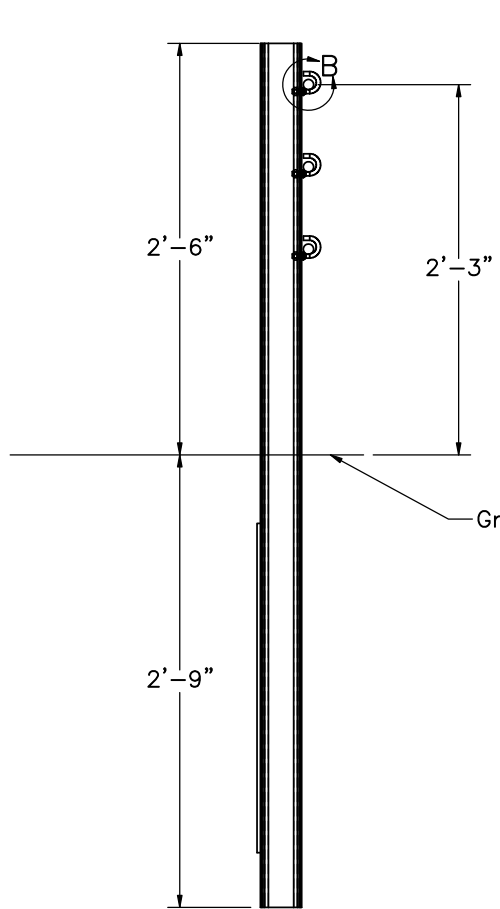
- Notes: (1) Impact coordinates are  $x-127'-3 \frac{5}{16}"$ ,  $y-23'-0 \frac{15}{16}"$  from center of post no. 33.  
 (2) Impact takes place 2' upstream of post no. 17 20° from tangent and 70' downstream of post no. 8.  
 (3) Post hole diameter is 18".

 <b>Midwest Roadside Safety Facility</b>	NY Curved Cable System Layout		SHEET: 1 of 14
	DWG. NAME: NY curved cable-R21		DATE: 1/31/2013
SCALE: 1:460 UNITS: Inches		DRAWN BY: MDM/CWP/JGP	REV. BY: KAL/RJT/CLM/JCH



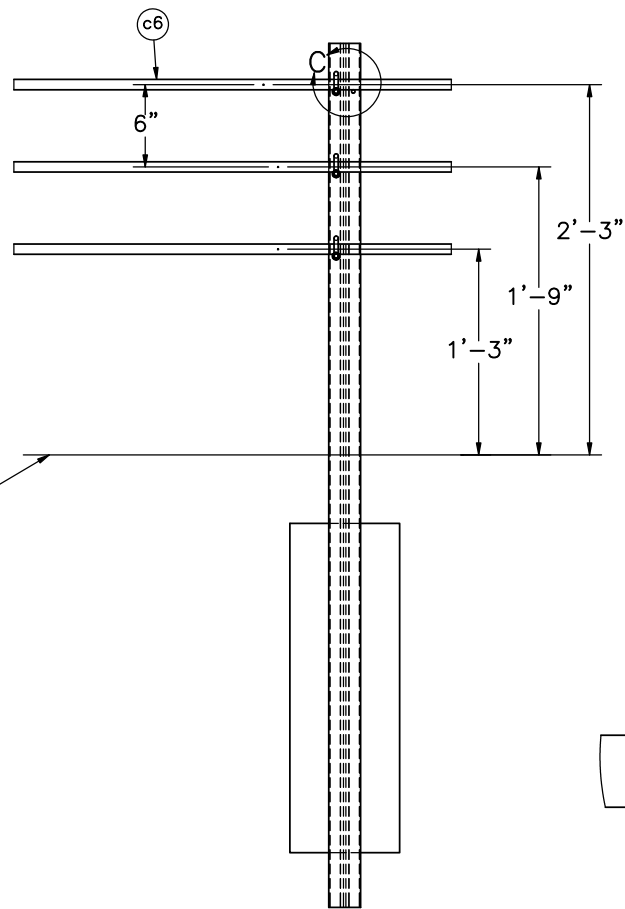
- NOTE: (1) Critical region extends from post no. 6 to post no. 35.  
 (2) Dirt work needs to extend 25' behind the back face of post no. 35, 25' perpendicular to the back of post no. 22 and to the centerline of post no. 13.

 <b>Midwest Roadside Safety Facility</b>	NY Curved Cable System Layout		SHEET: 2 of 14
	DWG. NAME: NY curved cable-R21		DATE: 1/31/2013
SCALE: 1:440 UNITS: Inches		DRAWN BY: MDM/CWP/JGP	
		REV. BY: KAL/RJT/ CLM/JCH	

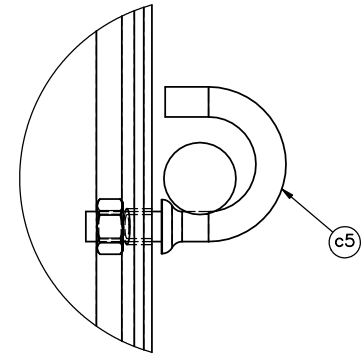


Downstream View

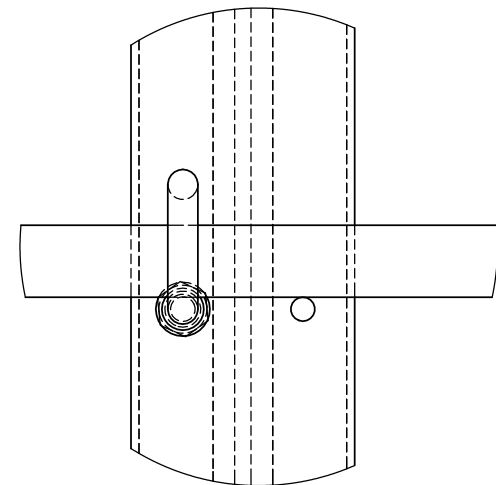
SECTION A-A  
SCALE 1 : 14



Front View



DETAIL B  
SCALE 1 : 2



DETAIL C  
SCALE 1 : 2



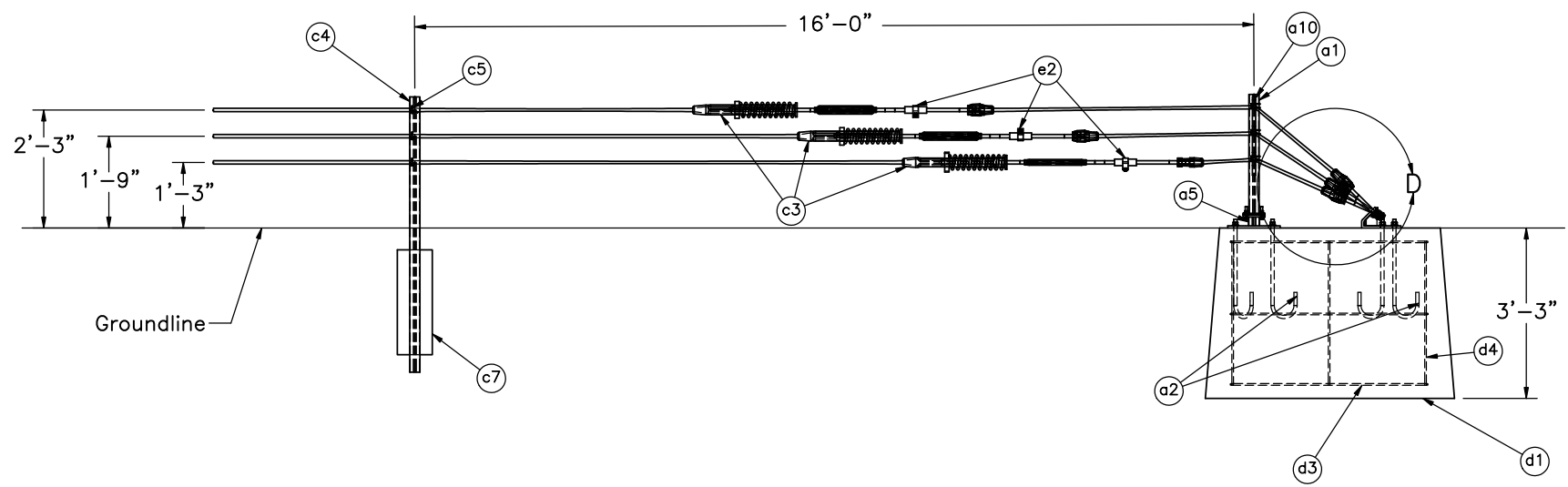
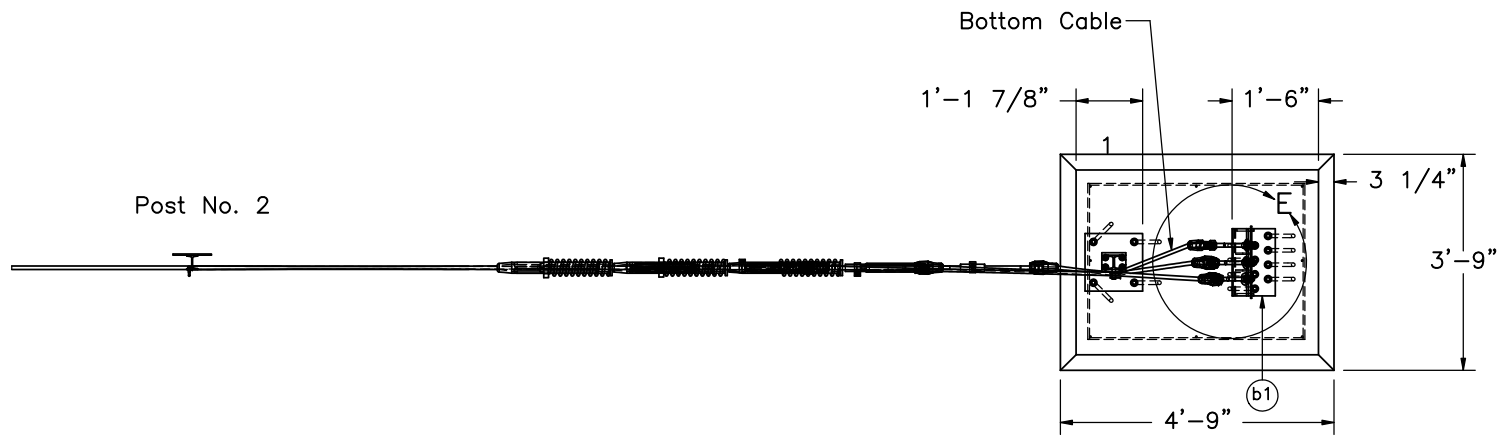
Midwest Roadside  
Safety Facility

NY Curved Cable  
S3x5.7 Post Assembly

DWG. NAME.  
NY curved cable-R21

SCALE: None  
UNITS: Inches

SHEET:  
3 of 14  
DATE:  
1/31/2013  
DRAWN BY:  
MDM/CWP/  
JGP  
REV. BY:  
KAL/RJT/  
CLM/JCH



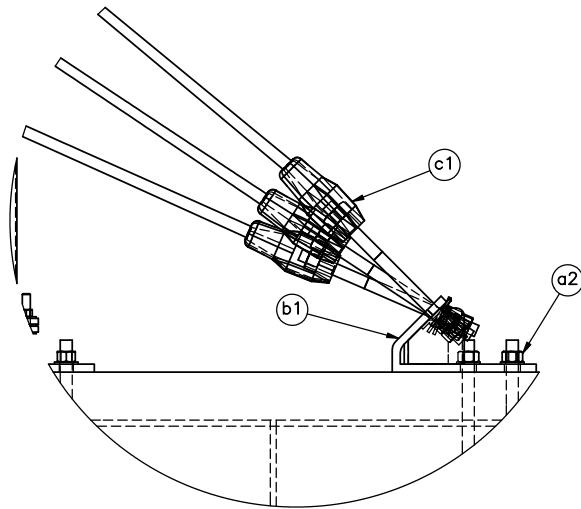
Midwest Roadside  
Safety Facility

NY Curved Cable  
Cable Terminal Detail

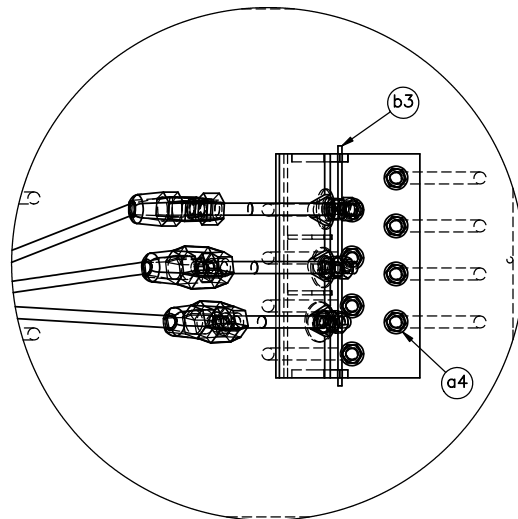
DWG. NAME.  
NY curved cable-R21

SCALE: 1:40  
UNITS: Inches

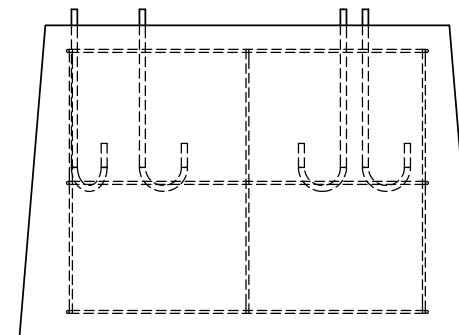
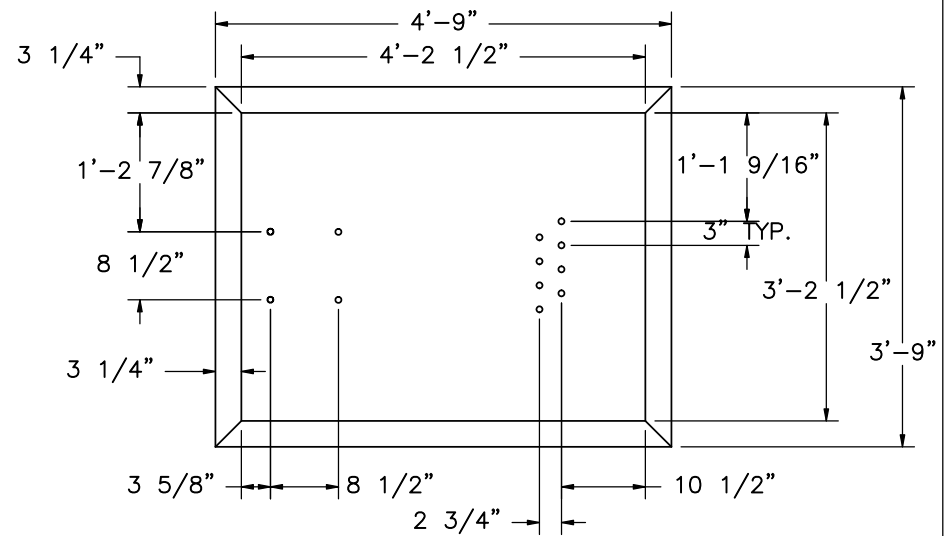
SHEET:  
4 of 14  
DATE:  
1/31/2013  
DRAWN BY:  
MDM/CWP/  
JGP  
REV. BY:  
KAL/RJT/  
CLM/JCH



DETAIL D  
SCALE 1 : 12



DETAIL E  
SCALE 1 : 12



Concrete Anchor Block and  
Hooked Anchor Studs  
Parts a2 and d1



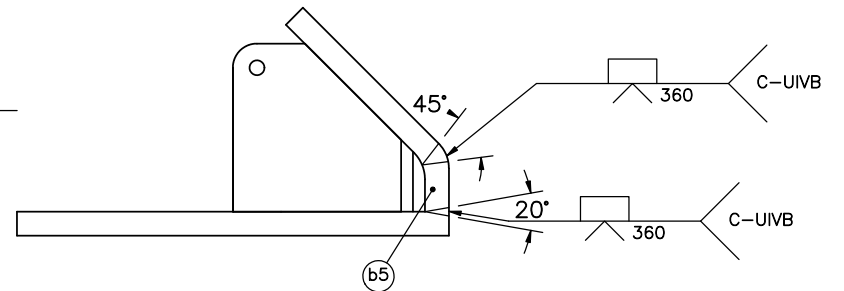
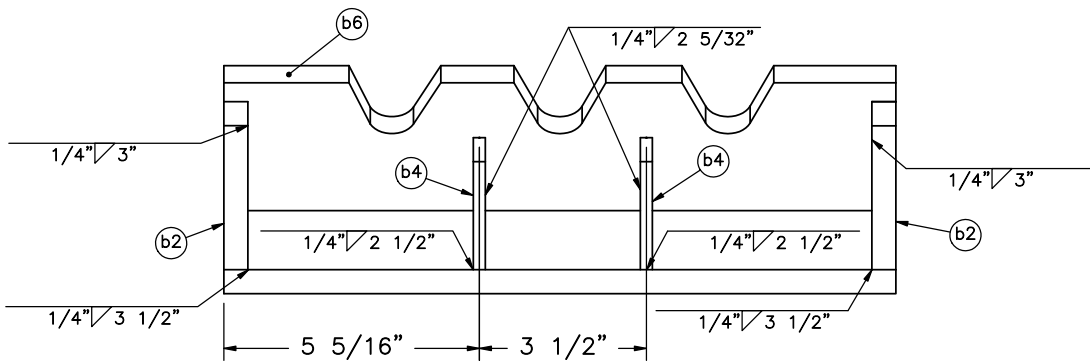
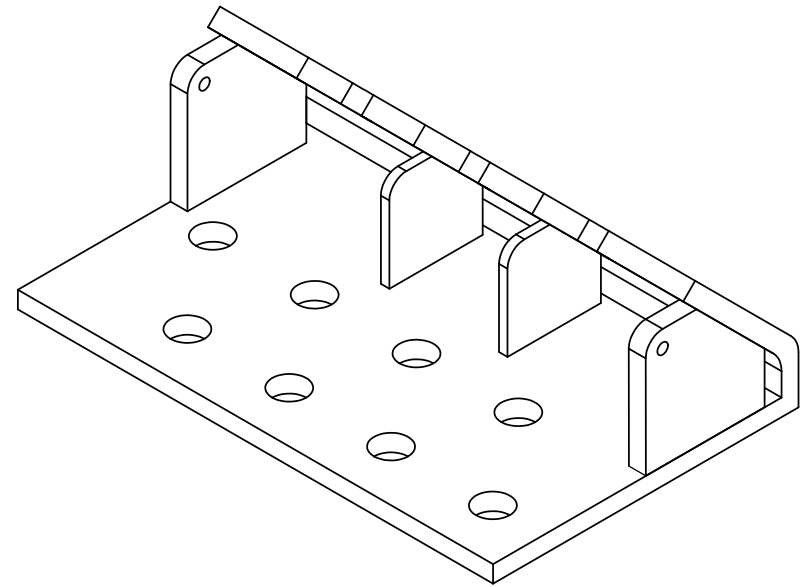
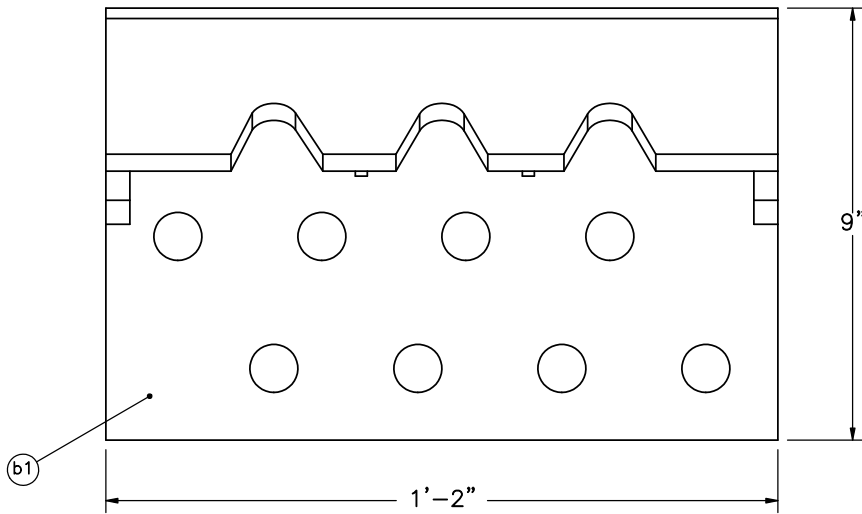
Midwest Roadside  
Safety Facility

NY Curved Cable  
Anchor Details

DWG. NAME.  
NY curved cable-R21

SCALE: 1:24  
UNITS: Inches

SHEET:  
5 of 14  
DATE:  
1/31/2013  
DRAWN BY:  
MDM/CWP/  
JGP  
REV. BY:  
KAL/RJT/  
CLM/JCH



Midwest Roadside  
Safety Facility

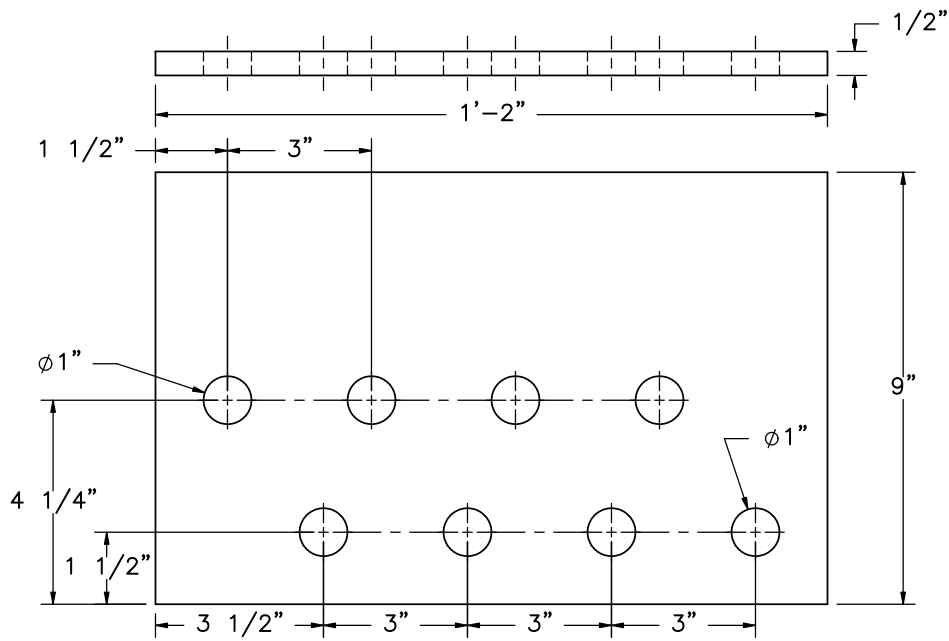
NY Curved Cable

Welded Plate Anchor Angle  
Detail

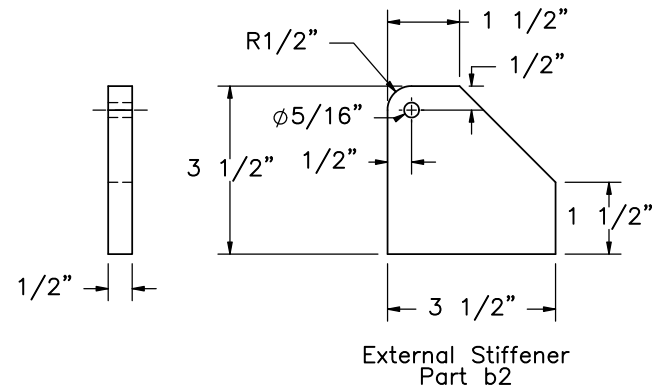
DWG. NAME.  
NY curved cable-R21

SCALE: 1:4  
UNITS: Inches

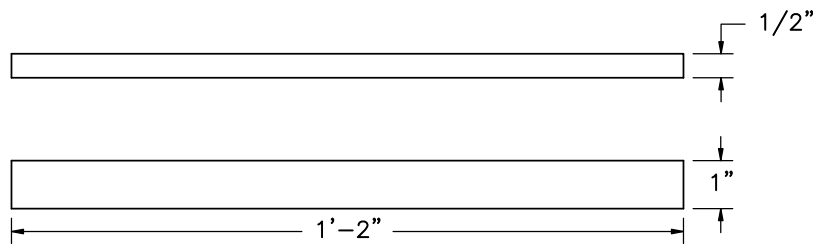
SHEET:  
6 of 14  
DATE:  
1/31/2013  
DRAWN BY:  
MDM/CWP/  
JGP  
REV. BY:  
KAL/RJT/  
CLM/JCH



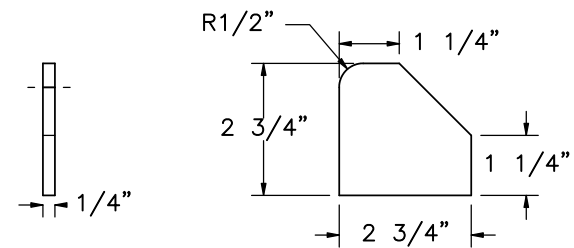
Anchor Bracket Plate  
Part b1



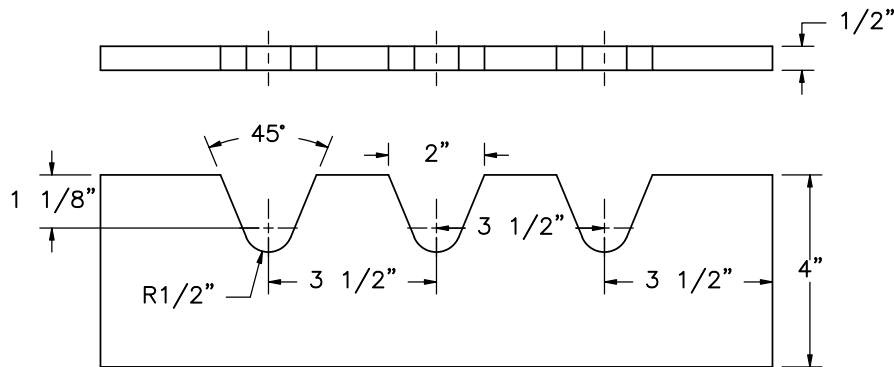
External Stiffener  
Part b2



Anchor Angle Middle Plate  
Part b5



Internal Stiffener  
Part b4



Cable Plate  
Part b6



Midwest Roadside  
Safety Facility

NY Curved Cable

Welded Plate Anchor Angle  
Components

SHEET:  
7 of 14

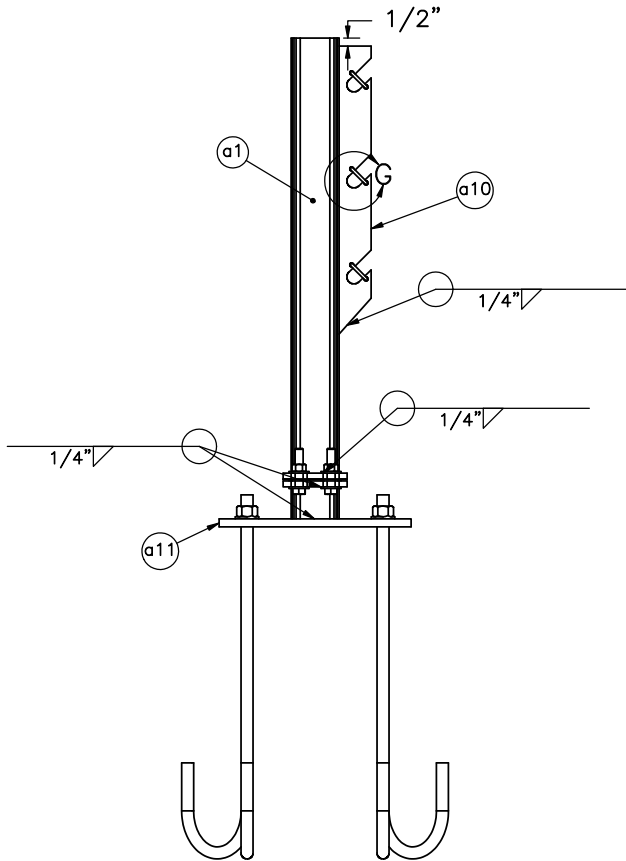
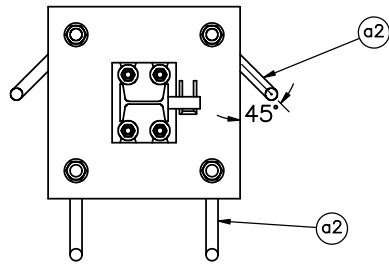
DATE:  
1/31/2013

DRAWN BY:  
MDM/CWP/  
JGP

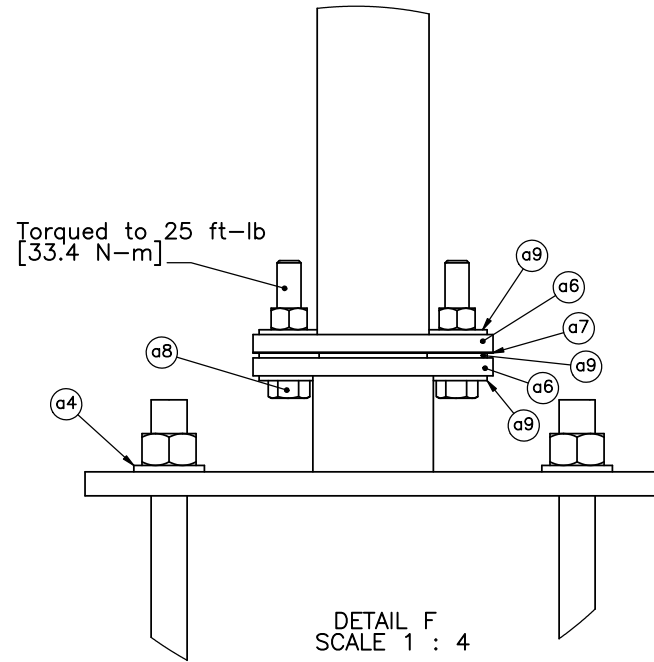
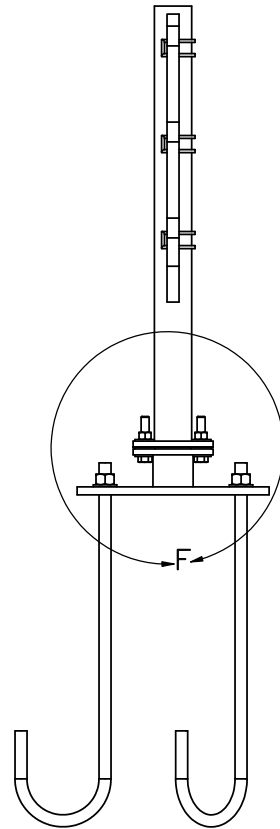
REV. BY:  
KAL/RJT/  
CLM/JCH

DWG. NAME:  
NY curved cable-R21

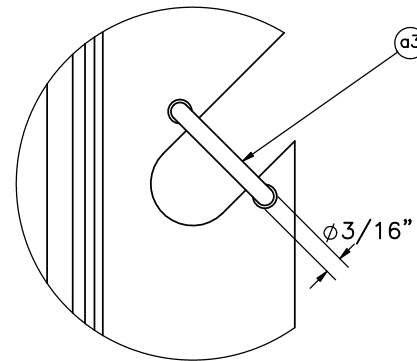
SCALE: 1:4  
UNITS: Inches



Post nos. 1 and 40



DETAIL F  
SCALE 1 : 4



DETAIL G  
SCALE 1 : 2



Midwest Roadside  
Safety Facility

NY Curved Cable  
Anchor Post Assembly

SHEET:  
8 of 14

DATE:  
1/31/2013

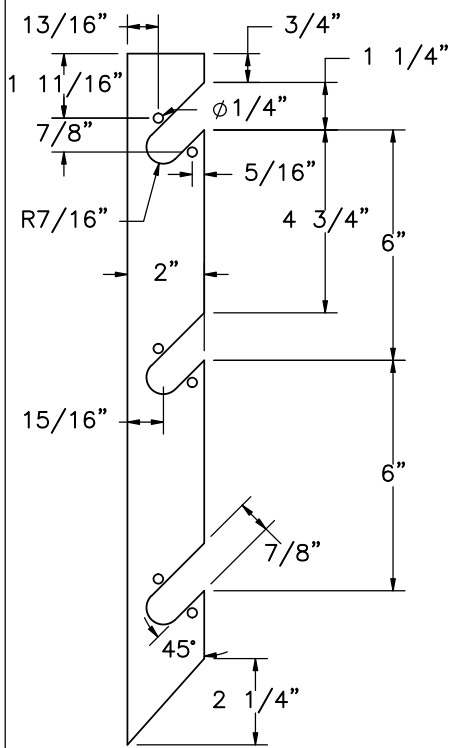
DRAWN BY:  
MDM/CWP/  
JGP

REV. BY:  
KAL/RJT/  
CLM/JCH

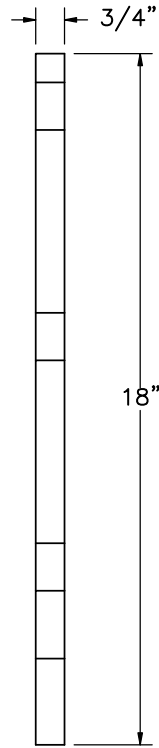
DWG. NAME:  
NY curved cable-R21

SCALE: 1:12  
UNITS: Inches

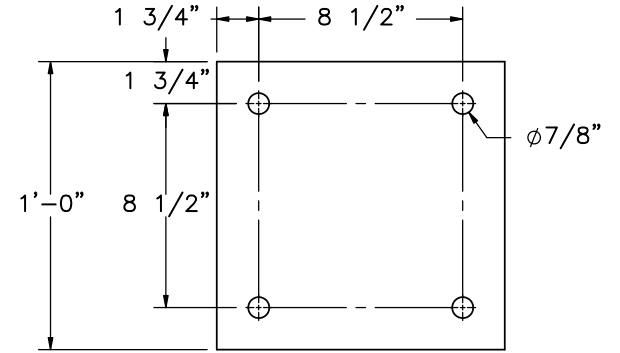




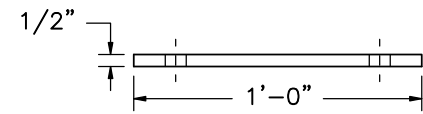
Anchor Post Support  
Part a10



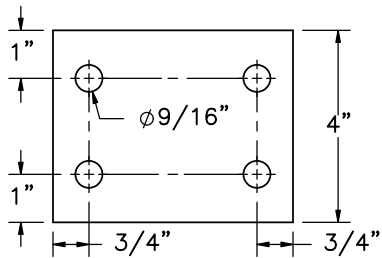
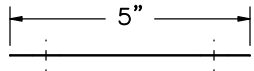
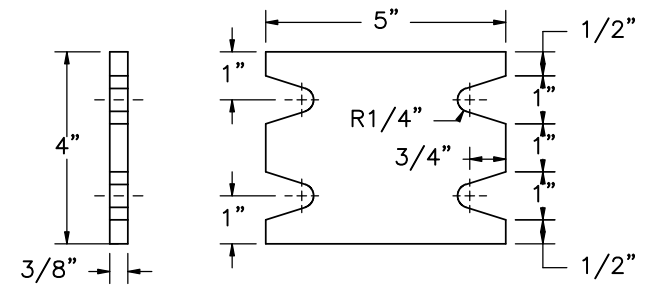
Upper Anchor Post  
Part a1



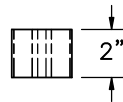
Anchor Post Base  
Part a11



Slip Impact Base  
Part a6



Keeper Plate  
28 Gauge  
Part a7



S3x7.5 Anchor Stub  
Part a5



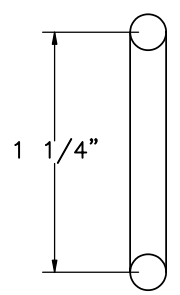
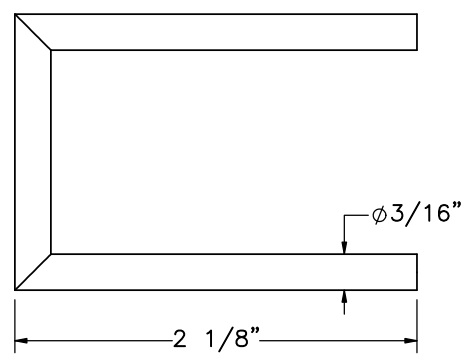
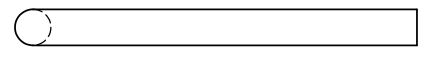
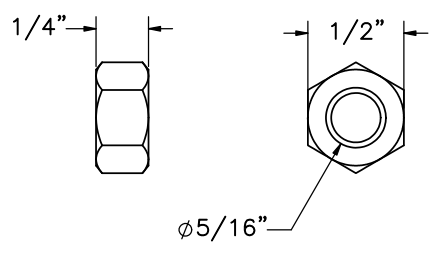
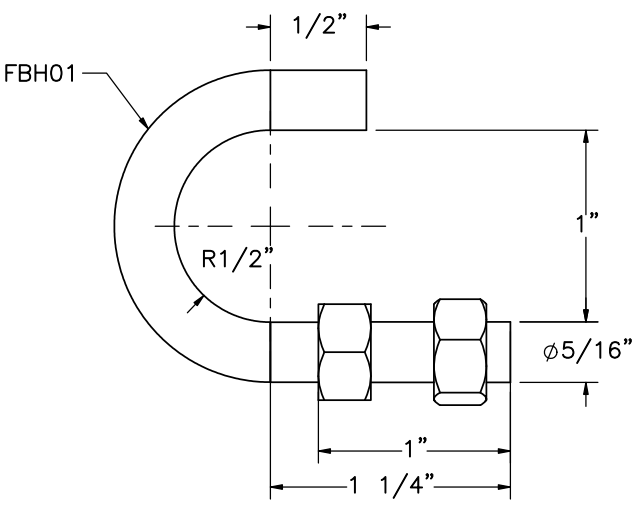
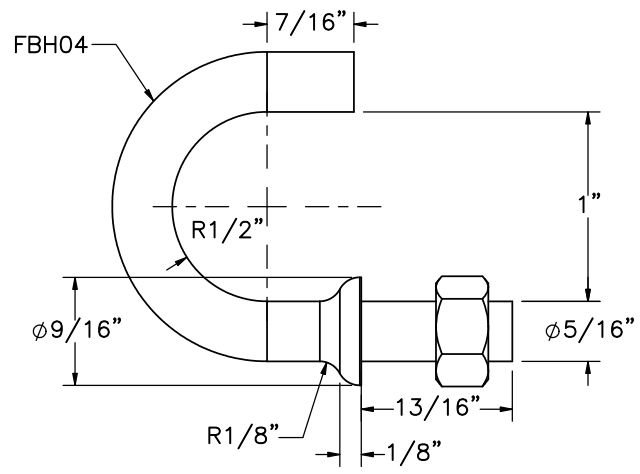
Midwest Roadside  
Safety Facility

NY Curved Cable  
Anchor Post Components

DWG. NAME.  
NY curved cable-R21


SCALE: None  
UNITS: Inches

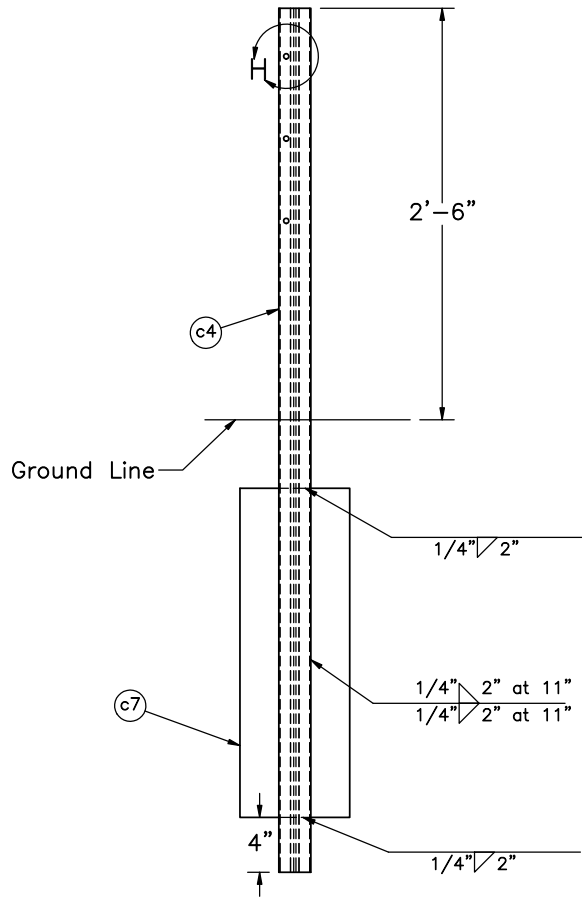
SHEET:  
9 of 14  
DATE:  
1/31/2013  
DRAWN BY:  
MDM/CWP/  
JGP  
REV. BY:  
KAL/RJT/  
CLM/JCH



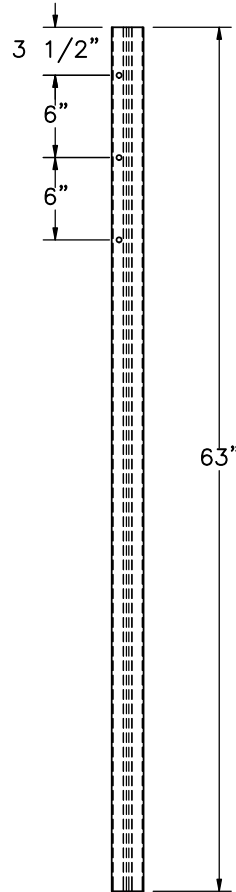
Part a3

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

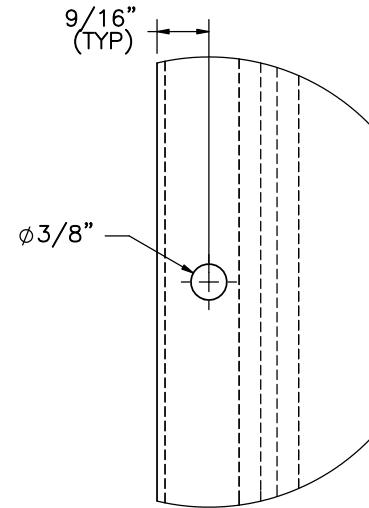
 Midwest Roadside Safety Facility	NY Curved Cable J-Bolt and Brass Rod Details		SHEET: 10 of 14
	DWG. NAME: NY curved cable-R21		DATE: 1/31/2013
SCALE: 1:1 UNITS: Inches		DRAWN BY: MDM/CWP/ JGP	REV. BY: KAL/RJT/ CLM/JCH



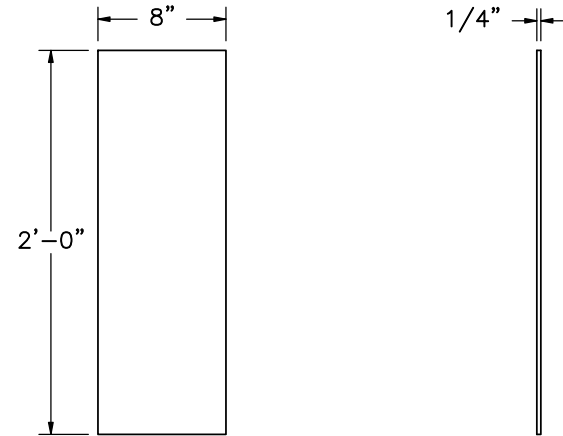
Line Post Assembly  
FRONT VIEW



S3x5.7 Post  
c4



DETAIL H  
SCALE 1 : 2



Soil Plate  
Part c7

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



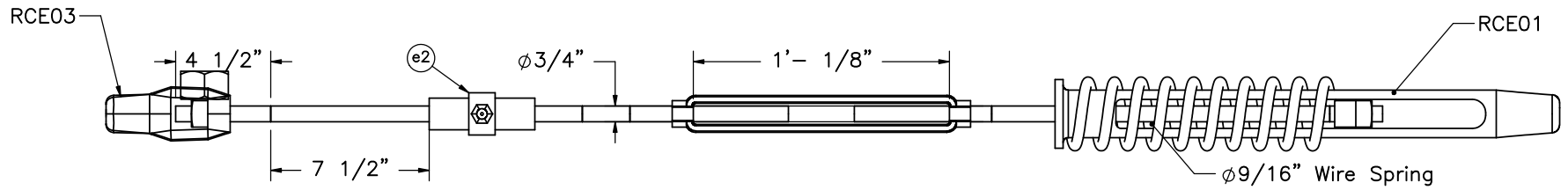
Midwest Roadside  
Safety Facility

NY Curved Cable  
Line Post

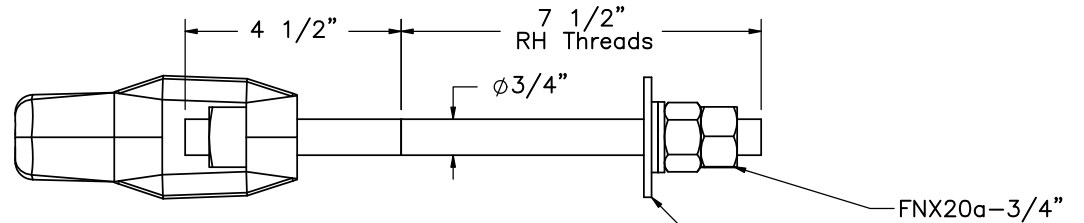
DWG. NAME.  
NY curved cable-R21

SCALE: 1:14  
UNITS: Inches

SHEET:  
11 of 14  
DATE:  
1/31/2013  
DRAWN BY:  
MDM/CWP/  
JGP  
REV. BY:  
KAL/RJT/  
CLM/JCH

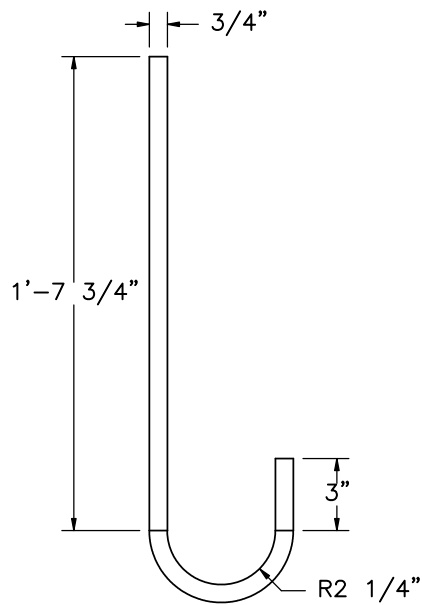


Cable Compensator  
Part c3  
SCALE 1:8

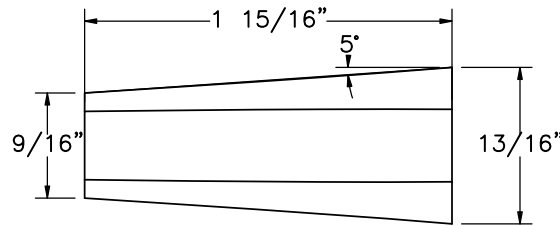
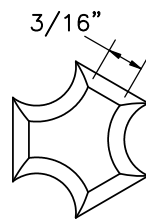


Cable End Fitting  
Part c1

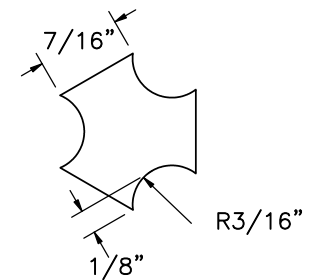
Washers (Galv.)  
3-0.75" Plain  
Consisting of:  
1-Wide (c2)  
2-Regular



25" Total Length  
Hooked Anchor Stud  
and Nut  
Part a2



Cable Wedge  
Part e1



Midwest Roadside  
Safety Facility

NY Curved Cable  
Anchor Stud and Cable  
Compensating Device

DWG. NAME.  
NY curved cable-R21

SCALE: 1:4  
UNITS: Inches

SHEET:  
12 of 14  
DATE:  
1/31/2013  
DRAWN BY:  
MDM/CWP/  
JGP  
REV. BY:  
KAL/RJT/  
CLM/JCH

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 Stud and Nut	ASTM A36 and ASTM A563 DH Galvanized	FRH20a
a3	6	φ3/16" 5 1/4" Long Brass Rod	Brass	-
a4	36	φ3/4" Plain Round Washer-OD 1.5"	Grade 2	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	φ1/2" x2 1/2" Long Bolt and Nut	Grade 2 Galvanized	FBX14a
a9	24	φ1/2" Narrow Washer-OD 1"	Grade 2 Galvanized	FWC12a
a10	2	3/4" Anchor Post Support Plate	ASTM A707 Grade 36 Galvanized	-
a11	2	Anchor Post Base	ASTM 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	φ1/4"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	φ3/4" Plain Round Washer-OD 2"	Grade 2 Galvanized	FWC20a
c3	3	Compensating Cable End Assembly	ASTM A27 Galvanized	RCE01
c4	38	S3x5.7 63 in. long Line Post	ASTM A36 Galvanized	-
c5	114	Cable Hook Bolt	ASTM F568 Class 4.6 and ASTM A563 Galvanized	FBH04
c6	3	φ3/4" 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  
Bill of Materials

SHEET:  
13 of 14

DATE:  
1/31/2013

DRAWN BY:  
MDM/CWP/  
JGP

DWG. NAME.  
NY curved cable-R21

SCALE: None  
UNITS: Inches

REV. BY:  
KAL/RJT/  
CLM/JCH

- (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 strands (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 12 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 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 to tighten the turnbuckles, depending on the temperature at the time of adjustment.

Temperature (degrees Farenheit)													
120	109	99	89	79	69	59	49	39	29	19	9	-1	-20
to	to	to	to	to	to	to	to	to	to	to	to	to	to
110	100	90	80	70	60	50	40	30	20	10	0	-19	-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 rail 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 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  
Notes

SHEET:  
14 of 14

DATE:  
1/31/2013

DRAWN BY:  
MDM/CWP/  
JGP

DWG. NAME:  
NY curved cable-R21

SCALE: None  
UNITS: Inches

REV. BY:  
KAL/RJT/  
CLM/JCH