

- Notes: (1) Test shall be performed according to test designation no. 3–11 of NCHRP Report No. 350.
- (2) The impact location is 185" [4699] upstream of post no. 15.
- (3) BCT anchors are placed in ϕ 3' [914] holes, then backfilled and tamped with soil
- (4) Critical region is between post no. 9 and 19.



Midwest Roadside
Safety Facility

G4(2W) Guardrail System
with Arizona PP Round
Post

System Layout

DWG. NAME.
AZ_roundPost_R7

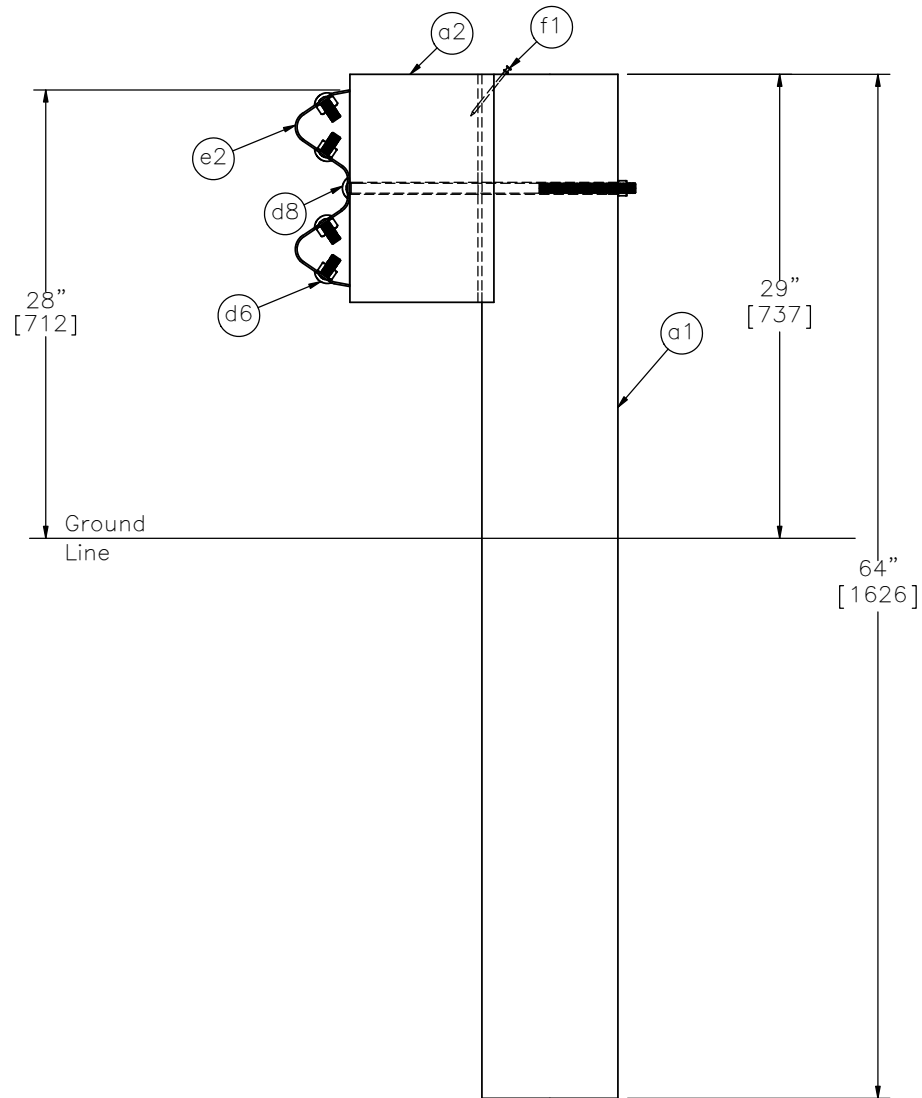
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UNITS: Inches

SHEET:
1 of 14

DATE:
12/23/2015

DRAWN BY:
JEK/TJD

REV. BY:
KAL/RKF/
JCH



SECTION A-A



Midwest Roadside
Safety Facility

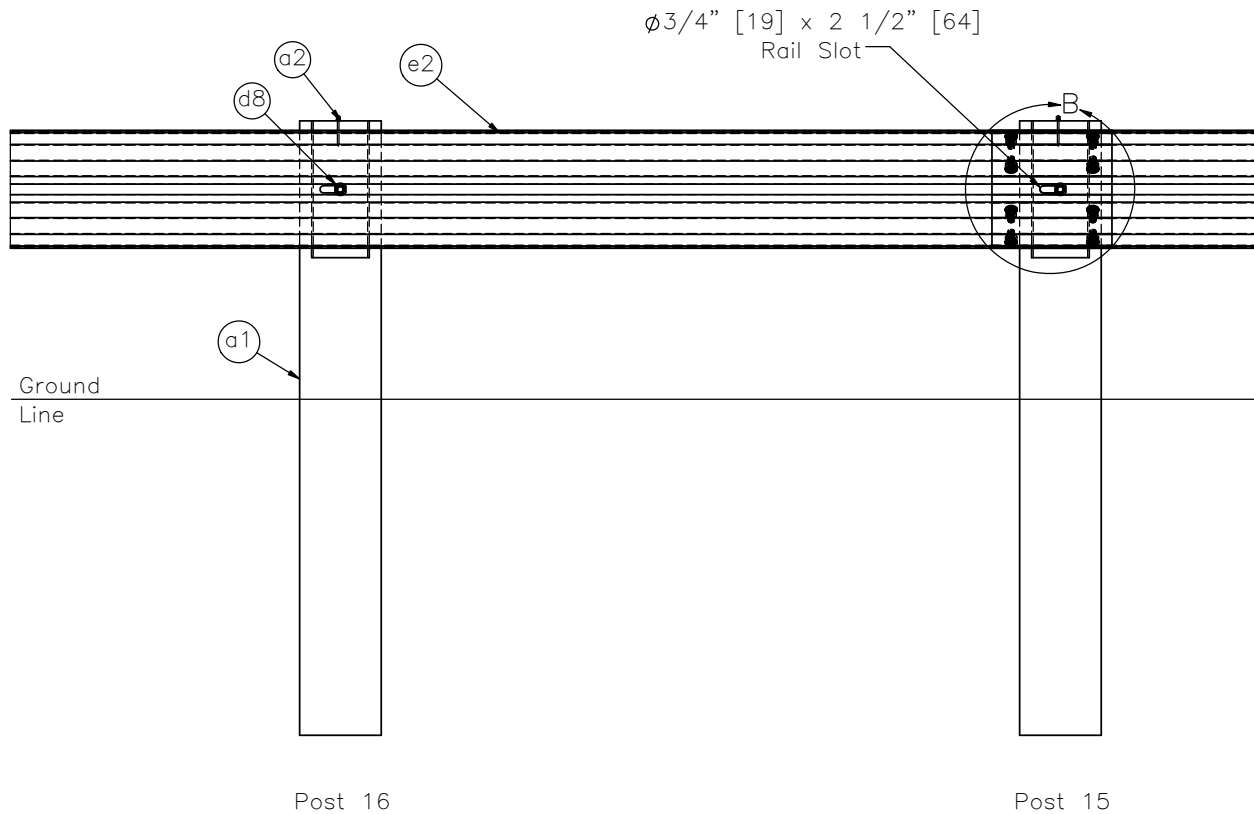
G4(2W) Guardrail System
with Arizona PP Round
Post

Post 3-27 Detail

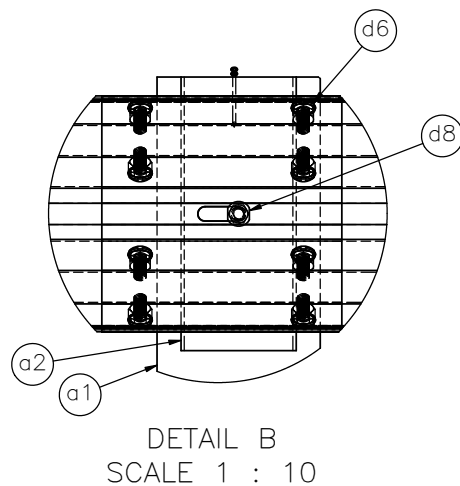
DWG. NAME.
AZ_roundPost_R7

SCALE: 1:12
UNITS: Inches

SHEET:
2 of 14
DATE:
12/23/2015
DRAWN BY:
JEK/TJD
REV. BY:
KAL/RKF/
JCH



SPLICE DETAIL



Midwest Roadside
Safety Facility

G4(2W) Guardrail System
with Arizona PP Round
Post

Splice Detail

DWG. NAME.
AZ_roundPost_R7

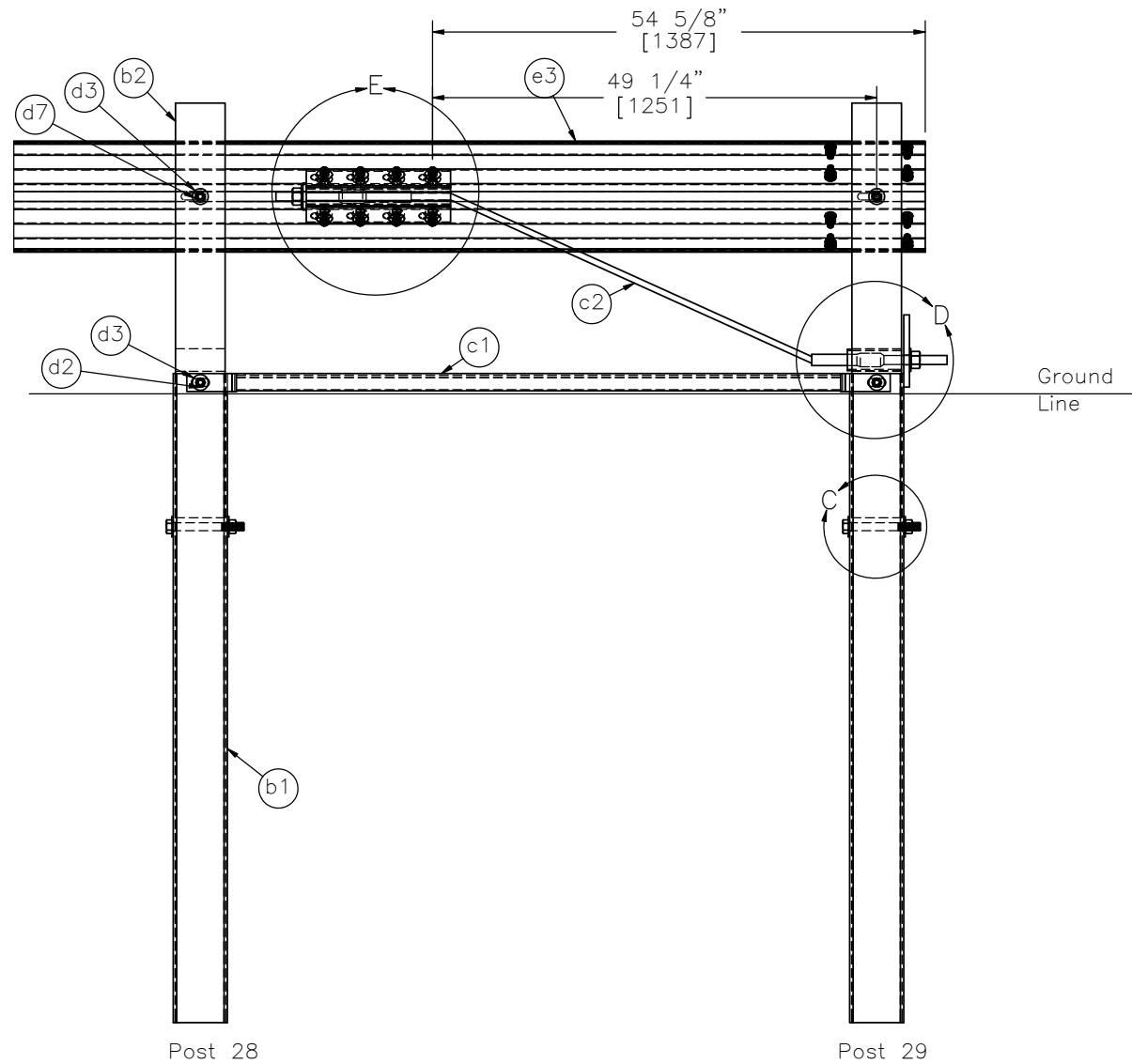
SCALE: 1:20
UNITS: Inches

SHEET:
3 of 14

DATE:
12/23/2015

DRAWN BY:
JEK/TJD

REV. BY:
KAL/RKF/
JCH



END RAIL DETAIL
BACKSIDE



Midwest Roadside
Safety Facility

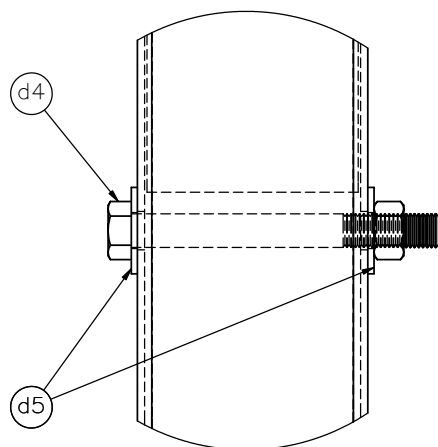
G4(2W) Guardrail System
with Arizona PP Round
Post

End Rail Detail

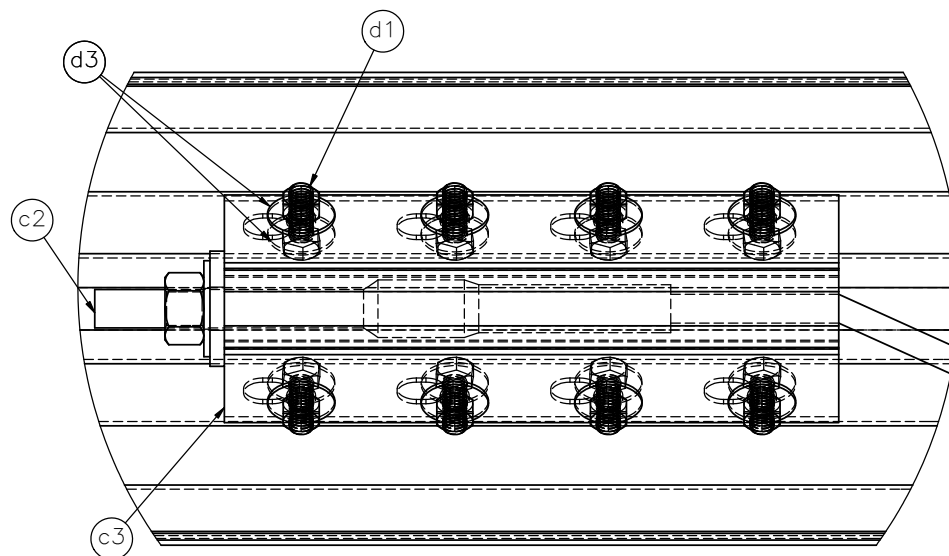
DWG. NAME.
AZ_roundPost_R7

SCALE: 1:20
UNITS: Inches

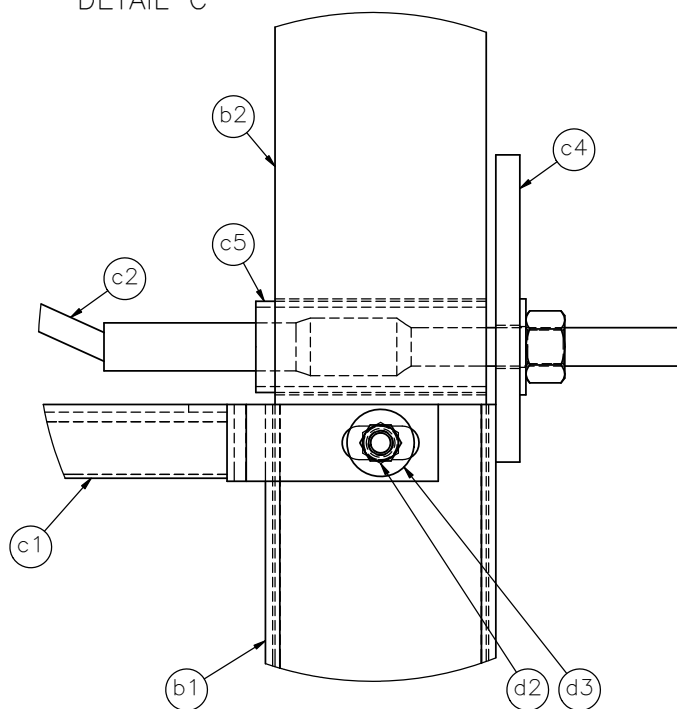
SHEET:
4 of 14
DATE:
12/23/2015
DRAWN BY:
JEK/TJD
REV. BY:
KAL/RKF/
JCH



DETAIL C



DETAIL E



DETAIL D

Note: (1) Two 16d nails are nailed over the plate into the post and bent down to keep the plate from rotating.



Midwest Roadside
Safety Facility

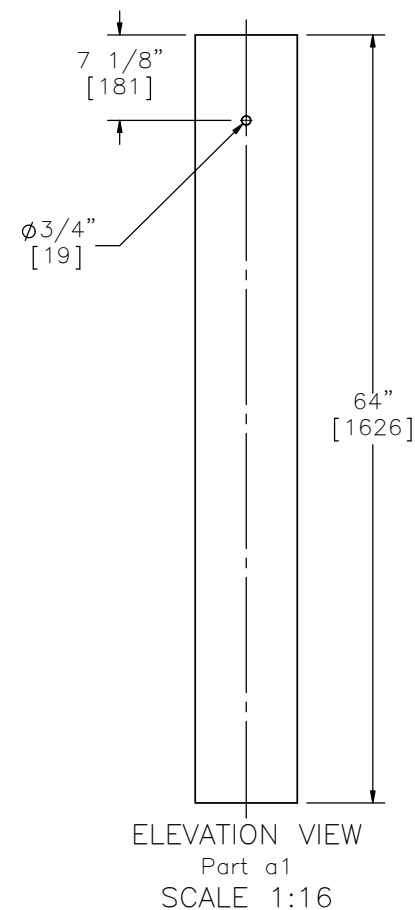
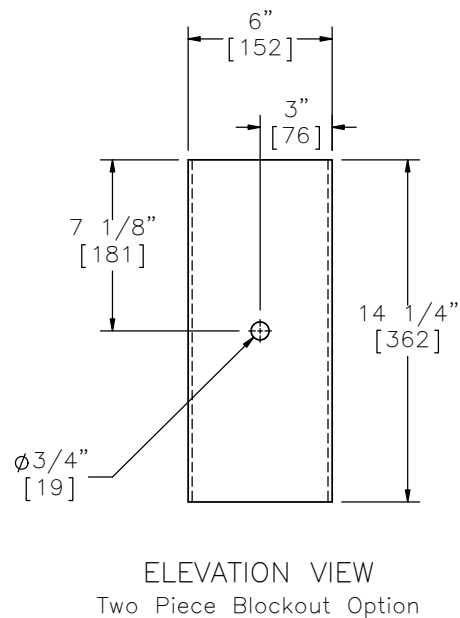
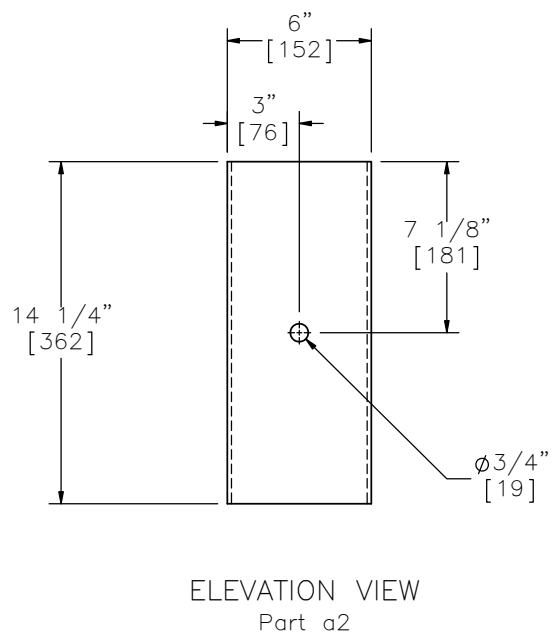
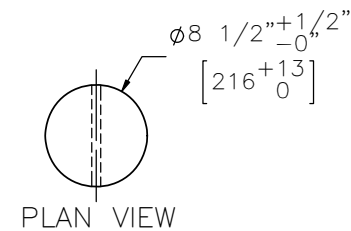
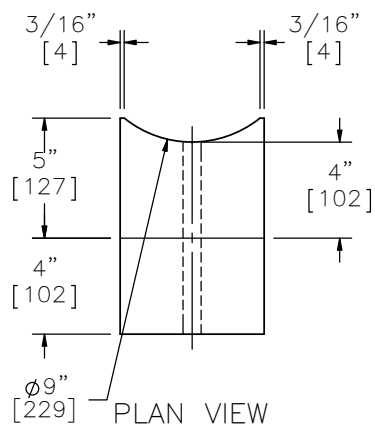
G4(2W) Guardrail System
with Arizona PP Round
Post


End Anchorage Details

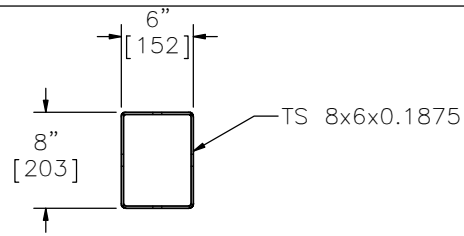
DWG. NAME.
AZ_roundPost_R7

SCALE: 1:5
UNITS: Inches

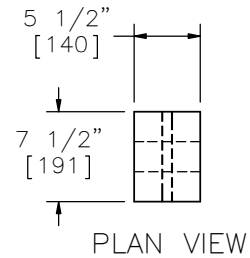
SHEET:
5 of 14
DATE:
12/23/2015
DRAWN BY:
JEK/TJD
REV. BY:
KAL/RKF/
JCH



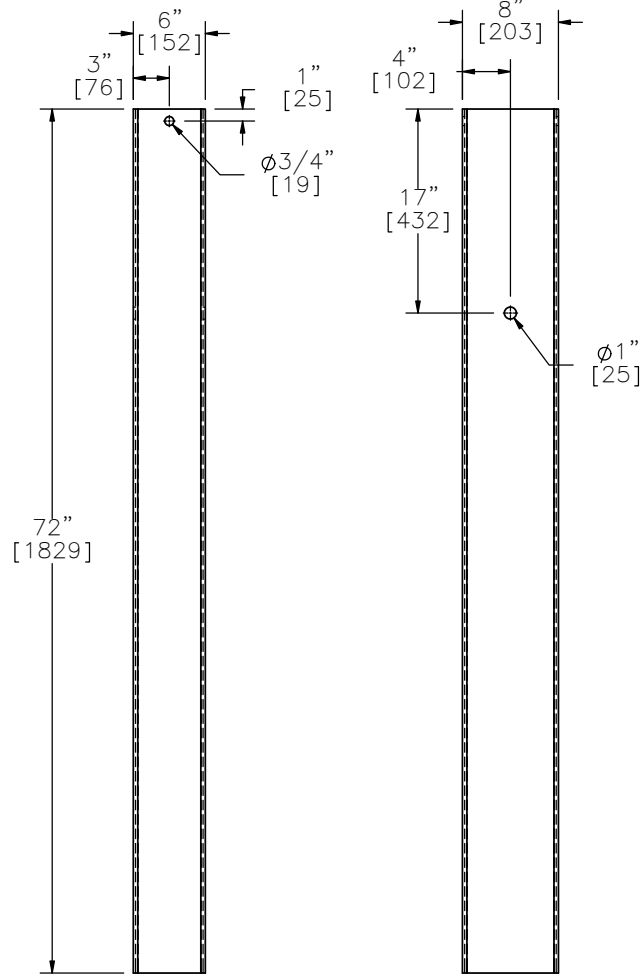
	G4(2W) Guardrail System with Arizona PP Round Post		SHEET: 6 of 14
	Post and Blockout Components		DATE: 12/23/2015
Midwest Roadside Safety Facility	DWG. NAME: AZ_roundPost_R7	SCALE: 1:8 UNITS: Inches	DRAWN BY: JEK/TJD REV. BY: KAL/RKF/ JCH



PLAN VIEW



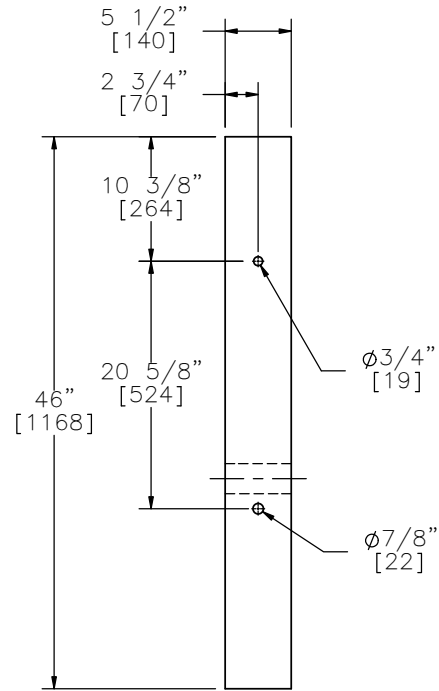
PLAN VIEW



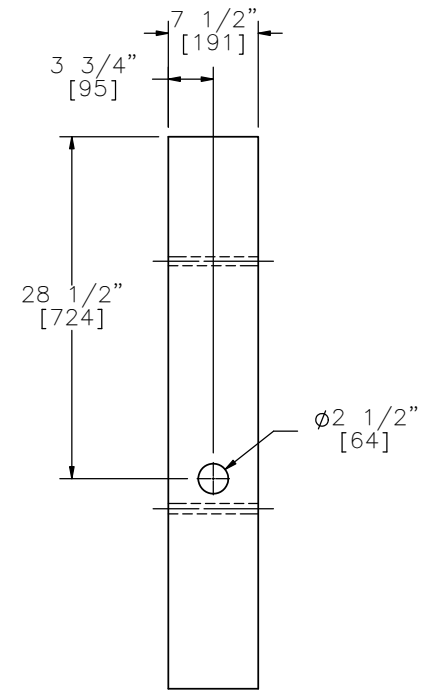
ELEVATION VIEW

Part b1

PROFILE VIEW



ELEVATION VIEW



PROFILE VIEW

Part b2



Midwest Roadside
Safety Facility

G4(2W) Guardrail System
with Arizona PP Round
Post

BCT Post and Foundation Tube
Details

DWG. NAME.
AZ_roundPost_R7

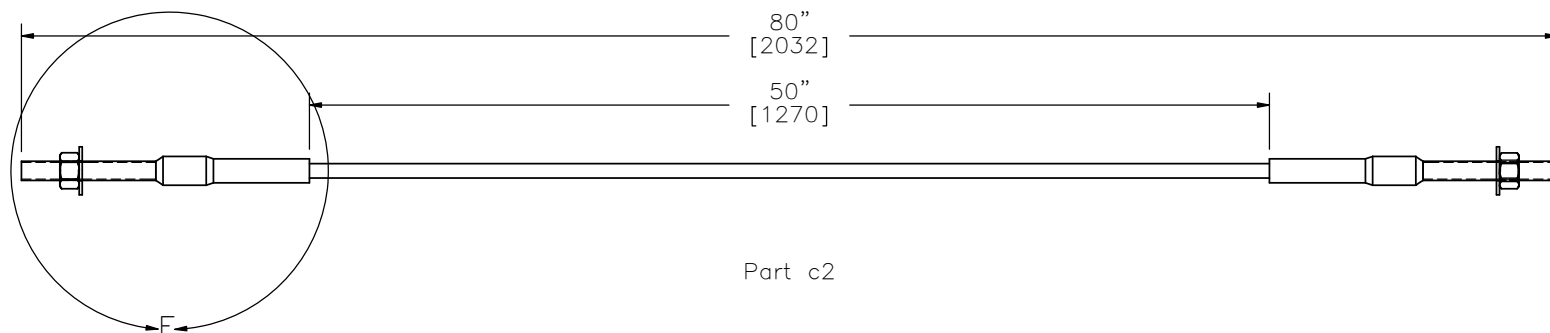
SCALE: 1:16
UNITS: Inches

SHEET:
7 of 14

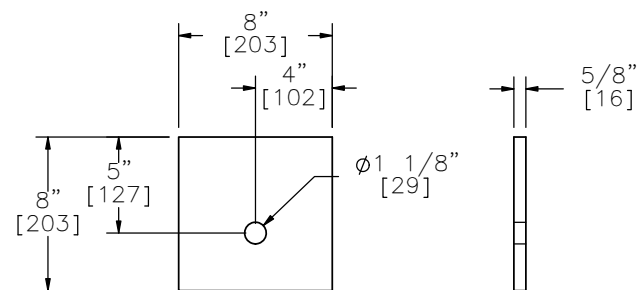
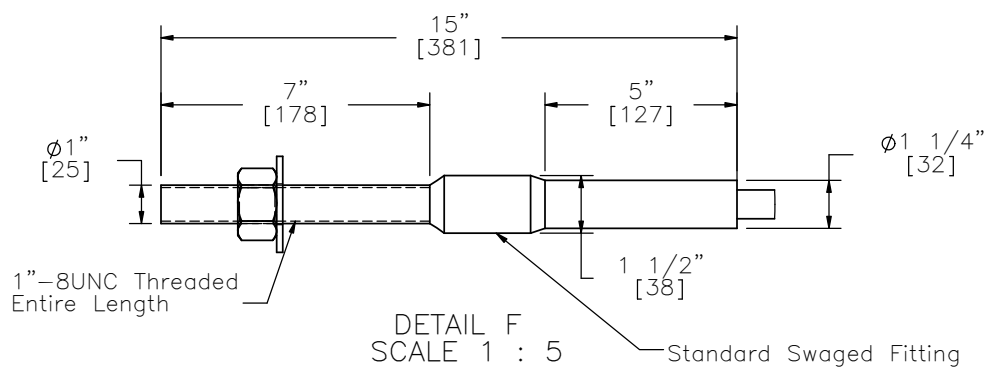
DATE:
12/23/2015

DRAWN BY:
JEK/TJD

REV. BY:
KAL/RKF/
JCH



Part c2



ELEVATION VIEW PROFILE VIEW

Part c4



Midwest Roadside
Safety Facility

G4(2W) Guardrail System
with Arizona PP Round
Post

BCT Cable Anchor Detail

DWG. NAME.
AZ_roundPost_R7

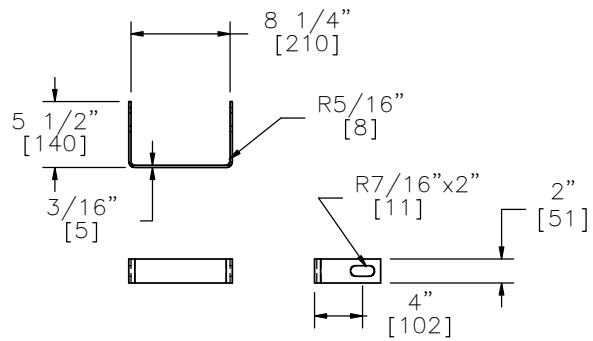
SCALE: 1:10
UNITS: Inches

REV. BY:
KAL/RKF/
JCH

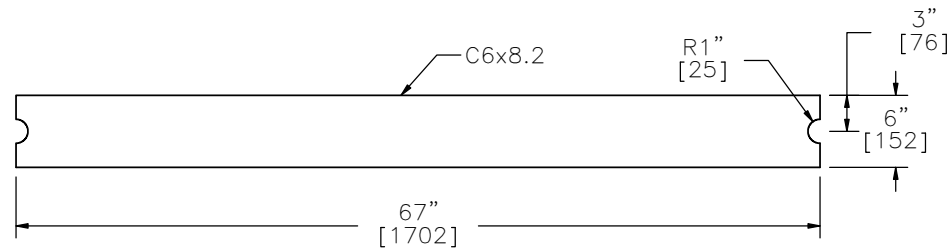
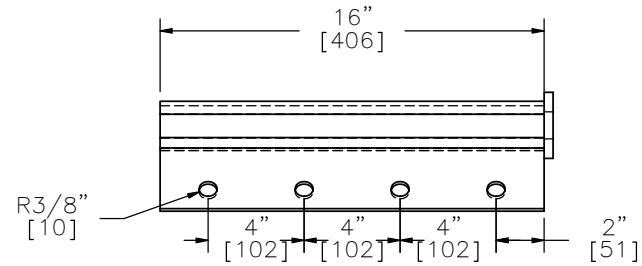
SHEET:
8 of 14

DATE:
12/23/2015

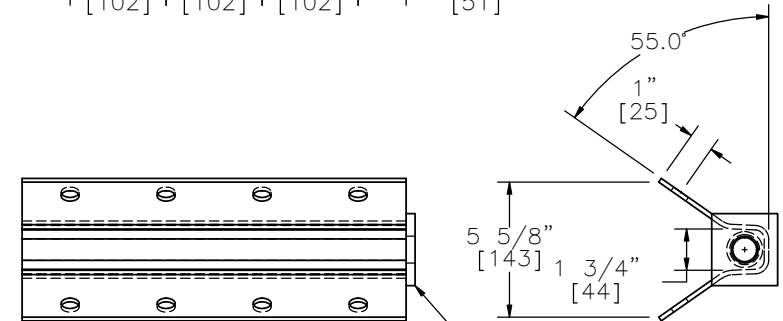
DRAWN BY:
JEK/TJD



Yoke Detail

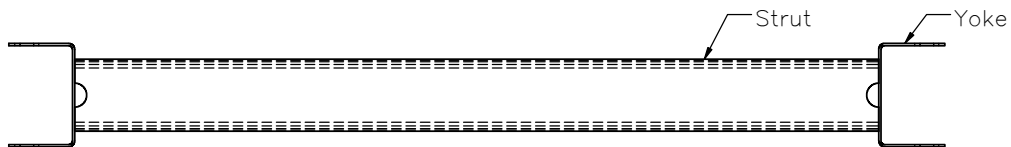


Strut Detail

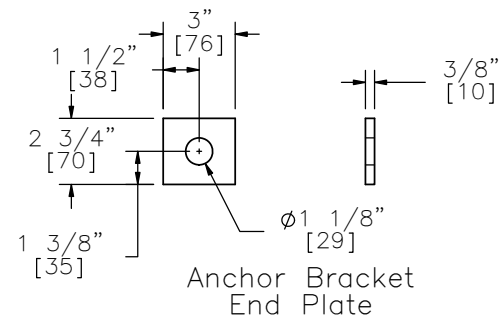


Part c3

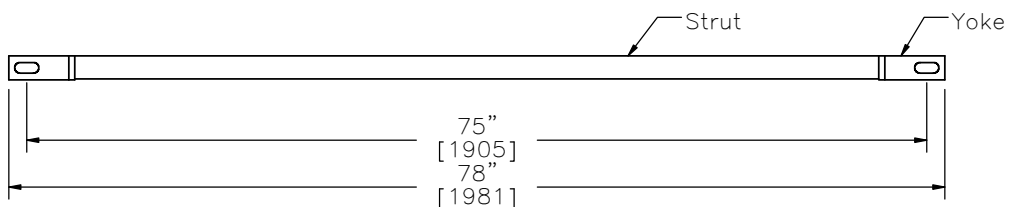
Anchor Bracket End Plate



PLAN VIEW



Anchor Bracket End Plate



ELEVATION VIEW

Part c1



Midwest Roadside
Safety Facility

G4(2W) Guardrail System
with Arizona PP Round
Post

Ground Strut and Anchor
Bracket Details

DWG. NAME:
AZ_roundPost_R7

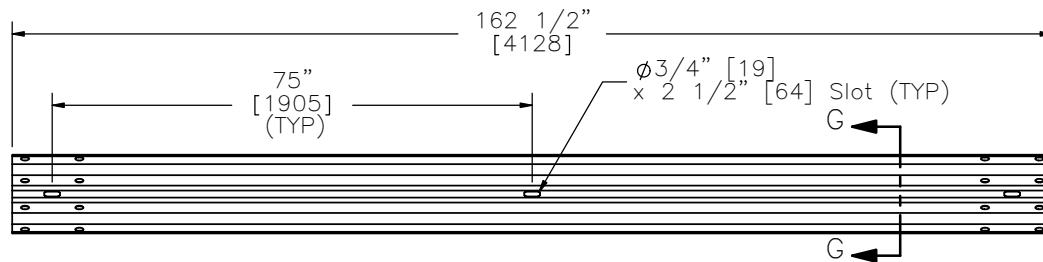
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UNITS: Inches

SHEET:
9 of 14

DATE:
12/23/2015

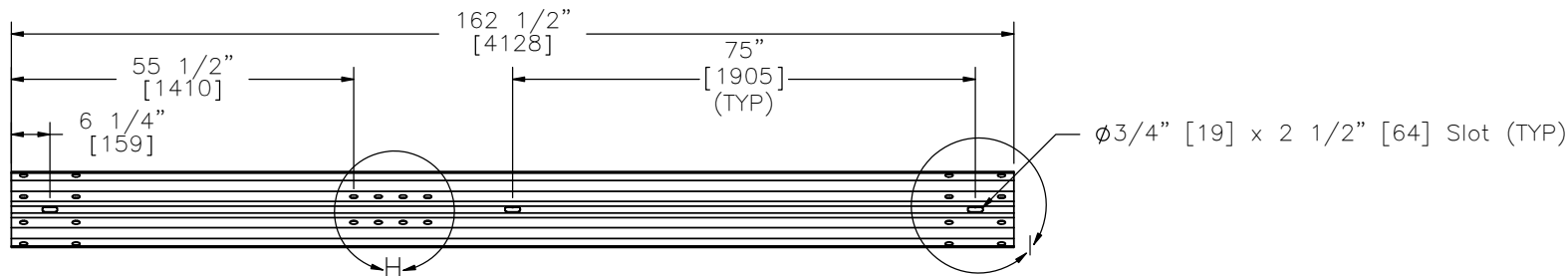
DRAWN BY:
JEK/TJD

REV. BY:
KAL/RKF/
JCH

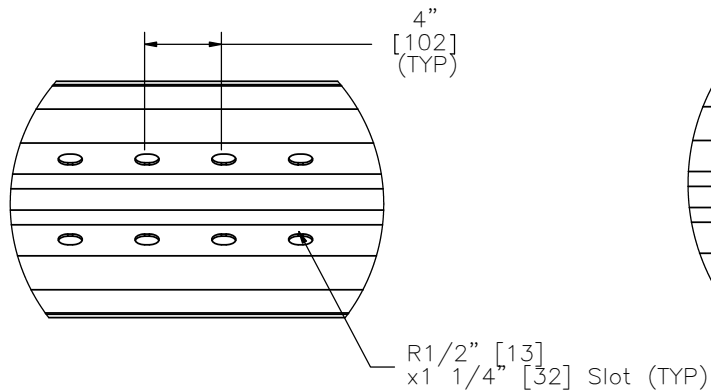


12'-6" W-Beam Section, 12 gauge
Part e2

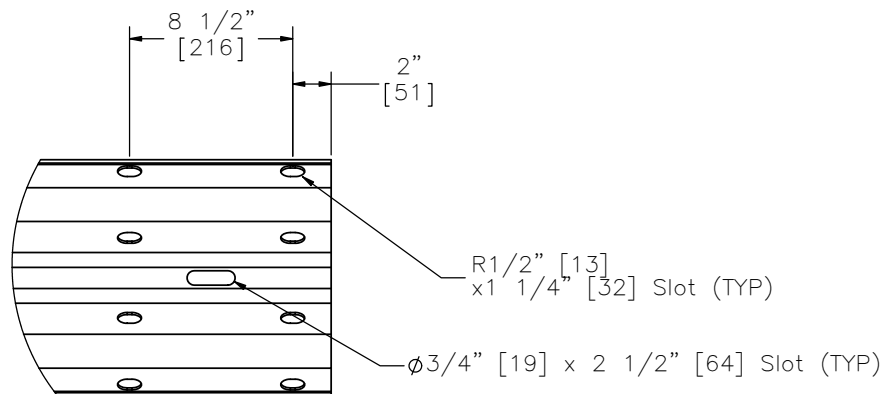
SECTION G-G



12'-6" W-Beam Section, 12 gauge, End Section
Part e3



DETAIL H
SCALE 1 : 10



DETAIL I
SCALE 1 : 10



Midwest Roadside
Safety Facility

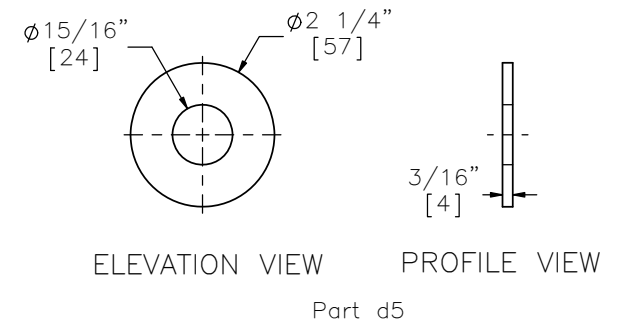
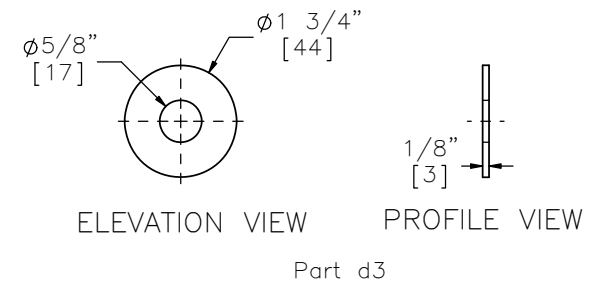
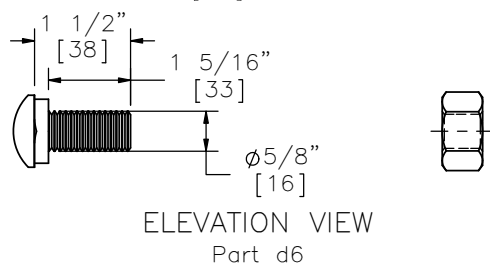
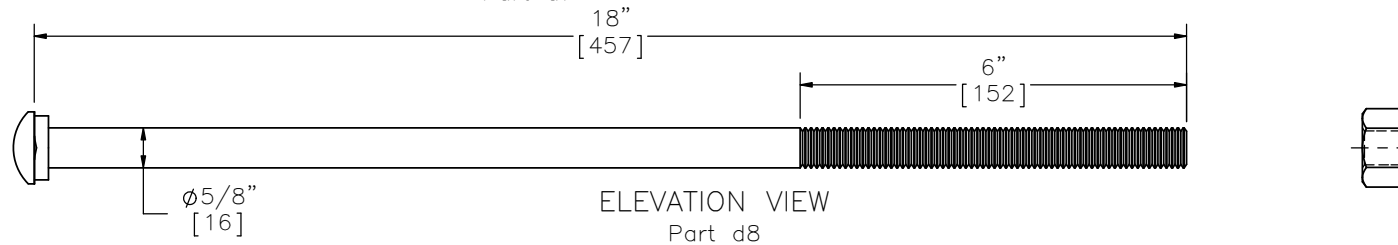
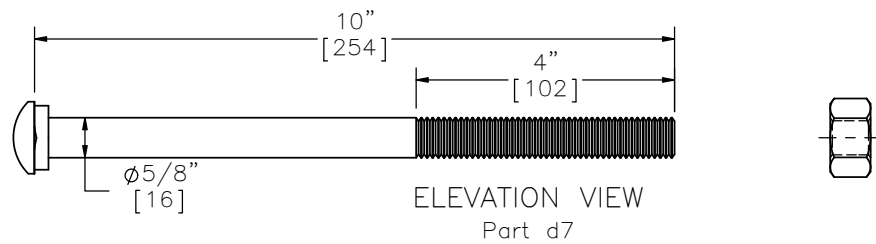
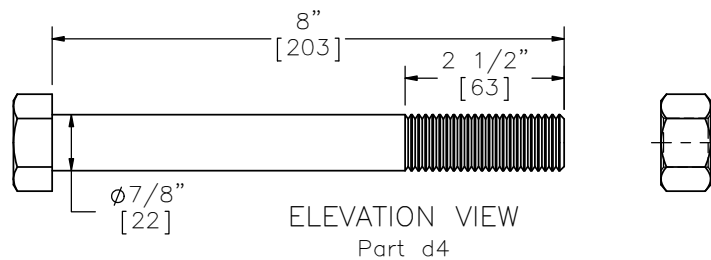
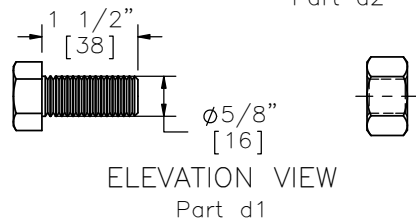
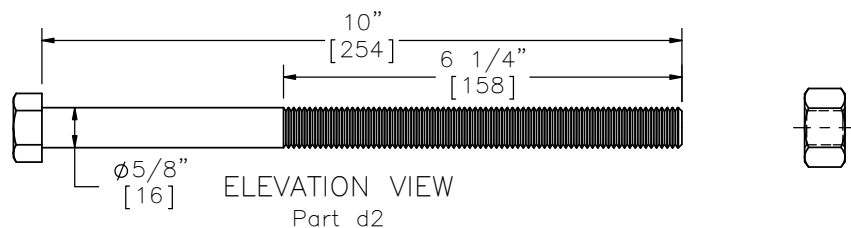
G4(2W) Guardrail System
with Arizona PP Round
Post


Rail Section Details

DWG. NAME.
AZ_roundPost_R7

SCALE: 1:30
UNITS: Inches

SHEET:
10 of 14
DATE:
12/23/2015
DRAWN BY:
JEK/TJD
REV. BY:
KAL/RKF/
JCH



	G4(2W) Guardrail System with Arizona PP Round Post		SHEET: 11 of 14
	Fasteners		DATE: 12/23/2015
Midwest Roadside Safety Facility	DWG. NAME: AZ_roundPost_R7	SCALE: 1:3 UNITS: Inches	DRAWN BY: JEK/TJD
			REV. BY: KAL/RKF/ JCH

SPECIFICATIONS

The Ponderosa Pine (PP) round post is for use in G4(2W) W-beam guardrail systems and shall be manufactured of material that conforms to the guidelines shown below.

General:

All posts shall meet the current quality requirements of the American National Standards Institute (ANSI) 05.1, Wood Poles, except as supplemented herein:

Manufacture:

All posts shall be smooth-shaved by machine. No ringing of the posts, as caused by improperly adjusted peeling machine, is permitted. All outer and inner bark shall be removed during the shaving process. All knots and knobs shall be trimmed smooth and flush with the surface of the posts. The use of peeler cores is prohibited.

Groundline:

The groundline, for the purpose of applying these restrictions of ANSI 05.1 that reference the groundline, shall be defined as being located 35" [889] from the butt end of each post.

Size:

The size of the posts shall be classified based on their diameter at the groundline and their length. The groundline diameter shall be specified by diameter in 1/8" [3] breaks. The length shall be specified in 1" [25] breaks. Dimension shall apply to fully seasoned posts. When measured between their extreme ends, the post shall be no shorter than the specified lengths but may be up to 3" [76] longer.

Scars:


Scars are permitted in the middle third as defined in ANSI 05.1, provided that the depth of the trimmed scar is not more than 1" [25].

Shape and Straightness:

All PP timber posts shall be nominally round in cross section. A straight line drawn from the centerline of the top to the center of the butt of any post shall not deviate from the centerline of the post more than 1 1/4" [32] at any point. Posts shall be free from reverse bends.

Splits, Checks, and Shakes:

Splits or ring shakes are not permitted in the top two thirds of the post. Checks are not permitted in the top two thirds of the post if wider than one third of the diameter if dry and wider than three eighths of the diameter if not dry. Splits exceeding the diameter in length are not permitted in the bottom one third of the post. A shake or check is permitted in the bottom one third of the post as long as it is not wider than one half of the butt diameter. (Note - check size is determined as the average measured penetration over its length.)

	G4(2W) Guardrail System with Arizona PP Round Post		SHEET: 12 of 14
	Post Specifications		DATE: 12/23/2015
	Midwest Roadside Safety Facility		DRAWN BY: JEK/TJD
	DWG. NAME: AZ_roundPost_R7	SCALE: 1:512 UNITS: Inches	REV. BY: KAL/RKF/ JCH

SPECIFICATIONS

Knots:

Knot diameter for Ponderosa Pine posts shall be limited to 3 1/2" [89] or smaller.

Treatment:

Treating - American Wood-Preservers' Association (AWPA) - Book of Standards (BOS) U1-05. Use category system UCS: user specification for treated wood; commodity specification B; Posts; Wood for Highway Construction must be met using the methods outlined in AWPA BOS T1-05 Section 8.2. Each treated post shall have a minimum sapwood depth of 3/4" [19], as determined by examination of the tops and butts of each post. Material that has been air dried or kiln dried shall be inspected for moisture content in accordance with AWPA standard M2 prior to treatment. Tests of representative pieces shall be conducted. The lot shall be considered acceptable when the average moisture content does not exceed 25 percent. Pieces exceeding 29 percent moisture content shall be rejected and removed from the lot.

Decay:

Allowed in knots only.

Holes:

Pin holes 1/16" [1] or less are not restricted.

Slope of Grain:


1 in 10.

Compression Wood:

Not allowed in the outer 1" [25] or if exceeding one quarter of the radius.

Ring Density:

Ring density shall be at least 6 rings-per-inch, as measured over a 3" [76] distance.

	G4(2W) Guardrail System with Arizona PP Round Post		SHEET: 13 of 14
	Post Specifications		DATE: 12/23/2015
	Midwest Roadside Safety Facility		DRAWN BY: JEK/TJD
	DWG. NAME: AZ_roundPost_R7	SCALE: 1:512 UNITS: Inches	REV. BY: KAL/RKF/ JCH

Item No.	QTY.	Description	Material Spec	Hardware Guide
a1	25	8 1/2" [216] Dia. x 64" [1626] Long Post	Ponderosa Pine	PDE21
a2	25	6"x9 1/4"x14 1/4" [152x235x362] Routed Blockout	Ponderosa Pine	PDB23
b1	4	72" [1829] Foundation Tube	ASTM A500 Grade B Galv.	PTE05
b2	4	BCT 46" [1168] Long Timber Post	SYP Grade No. 1 or better	PDF01
c1	2	Strut and Yoke Assembly	ASTM A36 Steel Galv.	PFP01
c2	2	BCT Cable Anchor Assembly	ø3/4" [19] 6x19 IWRC IPS Galvanized Wire Rop	FCA01
c3	2	Anchor Bracket Assembly	ASTM A36 Steel Galv.	FPA01
c4	2	5"x8"x5/8" [127x203x16] Anchor Bearing Plate	ASTM A36 Steel Galv.	FPB01
c5	2	2 3/8" [60] O.D.x 6" [152] Long BCT Hole Insert	P2 Sch. Pipe A36	FMM02
d1	16	5/8" [16] Dia. x 1 1/2" [38] Long Hex Head Bolt and Nut	Bolt ASTM A307 Galv., Nut ASTM A563 Galv.	FBX16a
d2	4	5/8" [16] Dia. x 10" [254] Long Hex Head Bolt and Nut	Bolt ASTM A307 Galv., Nut ASTM A563 Galv.	FBX16a
d3	44	5/8" [16] Dia. Flat Washer	Grade 5	—
d4	4	7/8" [22] Dia. x 7 1/2" [191] Long Hex Head Bolt and Nut	Bolt ASTM A307 Galv., Nut ASTM A563 Galv.	FBX22a
d5	8	7/8" [22] Dia. Flat Washer	ASTM F844 Galv.	FWC22a
d6	104	5/8" [16] Dia. x 1 1/2" [38] Long Guardrail Bolt and Nut	Bolt ASTM A307 Galv., Nut ASTM A563 Galv.	FBB01
d7	4	5/8" [16] Dia. x 10" [254] Long Guardrail Bolt and Nut	Bolt ASTM A307 Galv., Nut ASTM A563 Galv.	FBB03
d8	25	5/8" [16] Dia. x 18" [457] Long Guardrail Bolt and Nut	Bolt ASTM A307 Galv., Nut ASTM A563 Galv.	FBB04
e2	13	12'-6" [3810] W-Beam Standard Guardrail Section	12 gauge [2.7] AASHTO M180 Galv.	RWM02a
e3	2	25' [7620] W-Beam Standard Guardrail End Section	12 gauge [2.7] AASHTO M180 Galv.	RMW22a
f1	29*	16D Double Head Nail	—	—

Note: (1) Order 50 posts for extra to sort through, measure, and investigate.

* Additional nail for every blockout using two pieces. Secure the two with nail.



Midwest Roadside
Safety Facility

G4(2W) Guardrail System
with Arizona PP Round
Post

Bill of Materials

DWG. NAME.
AZ_roundPost_R7

SCALE: 1:512
UNITS: Inches

SHEET:
14 of 14

DATE:
12/23/2015

DRAWN BY:
JEK/TJD

REV. BY:
KAL/RKF/
JCH