BEFORE THE NEW MEXICO PUBLIC REGULATION COMMISSION

IN THE MATTER OF SOUTHWESTERN PUBLIC SERVICE COMPANY'S APPLICATION REQUESTING: (1) ISSUANCE OF A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY AUTHORIZING CONSTRUCTION AND OPERATION OF A 345 KV TRANSMISSION LINE AND ASSOCIATED FACILITIES IN EDDY AND LEA COUNTIES, NEW MEXICO; (2) APPROVAL OF THE LOCATION OF THE 345 KV TRANSMISSION LINE; (3) DETERMINATION OF RIGHT OF WAY WIDTH AND (4) AUTHORIZATION TO ACCRUE AN ALLOWANCE FOR FUNDS USED DURING CONSTRUCTION FOR THE TRANSMISSION LINE AND ASSOCIATED FACILITIES,	)	**CASE NO. 16-_____-UT**
SOUTHWESTERN PUBLIC SERVICE COMPANY,	)	
APPLICANT.	)	

DIRECT TESTIMONY

of

JASON F. BRUNNER

on behalf of

SOUTHWESTERN PUBLIC SERVICE COMPANY

TABLE OF CONTENTS

GLOSSARY OF ACRONYMS AND DEFINED TERMS

Acronym/Defined Term	Meaning
Commission	New Mexico Public Regulation Commission
FERC	Federal Energy Regulatory Commission
kV	Kilovolt
NESC	National Electric Safety Code
Proposed Project	345 kV transmission line extending from SPS's Hobbs Generating Substation to its China Draw Substation, and associated facilities in Eddy and Lea Counties, New Mexico
PUA	Public Utility Act (NMSA 1978, § 62-3-1, *et al.*)
ROW	Right-of-Way
SPS	Southwestern Public Service Company, a New Mexico corporation
Xcel Energy	Xcel Energy Inc.

LIST OF ATTACHMENTS

Attachment	Description
JFB-1	345 kV Transmission Structure Drawings

Case No. 16-____-UT
Direct Testimony
of
Jason F. Brunner

I. WITNESS IDENTIFICATION AND QUALIFICATIONS

Q. Please state your name and business address.

A. My name is Jason F. Brunner and my business address is 970 South 29th Street West, Billings, Montana 59102.

Q. On whose behalf are you testifying?

A. I am filing testimony on behalf of Southwestern Public Service Company, a New Mexico corporation ("SPS") and wholly-owned subsidiary of Xcel Energy Inc. ("Xcel Energy"). Xcel Energy is a utility holding company that owns several electric and natural gas utility operating companies, a regulated natural gas pipeline company, and three electric transmission companies.[1]

Q. By whom are you employed and in what position?

A. I am employed by HDR Engineering, Inc. as a Senior Technical Transmission Engineer.

[1] Xcel Energy is the parent company of four utility operating companies: Northern States Power Company, a Minnesota corporation; Northern States Power Company, a Wisconsin corporation; Public Service Company of Colorado, a Colorado corporation; and SPS. Xcel Energy's natural gas pipeline company is WestGas Interstate, Inc. Through a subsidiary, Xcel Energy Transmission Holding Company, LLC, Xcel Energy also owns three transmission-only operating companies: Xcel Energy Southwest Transmission Company, LLC; Xcel Energy Transmission Development Company, LLC; and Xcel Energy West Transmission Company, LLC, all of which are either currently regulated by the Federal Energy Regulatory Commission ("FERC") or expected to be regulated by FERC.

Q. Please briefly outline your responsibilities as a Senior Technical Transmission Engineer.

A. I supervise the design and related activities that involve the construction and maintenance of transmission lines in New Mexico, Texas, Washington, Colorado, Idaho, North Dakota, South Dakota, Wisconsin, Minnesota, and Montana.

Q. Describe your educational background.

A. I received a Bachelor of Science degree in Electrical Engineering from Montana State University in May 2000.

Q. Please describe your professional experience.

A. I began my employment with HDR Engineering, Inc. as a transmission design engineer working on the design of new power lines operated at 345-kilovolt ("kV") and below. In 2006, I became a Project Manager/Team Lead where I supervise the design and coordinate construction-related activities for new transmission and distribution lines. From 2000 to 2006, I worked on the design of over 100 projects consisting of over 200 miles of transmission lines ranging from 69-kV to 345-kV. Since becoming a Project Manager/Team Lead, I have led numerous transmission line projects where I have been responsible for determining structure types, required right-of-way ("ROW") widths, design criteria, etc. Since 2010, I have completed two projects, each approximately 40

miles in length, where I was the Project Manager and responsible for all aspects of the project including routing the transmission line, ROW calculations and acquisition, environmental and permitting, design of the transmission line, and construction support. I also recently completed duties as the Senior Technical Engineer and the Engineer of Record for the design and construction of the 41-mile Potash Junction to Roadrunner 345-kV SPS transmission line that was designed in 2013 and 2014, and constructed and placed in service in 2015.

Q. Do you hold any professional licenses?

A. Yes, I am a registered professional engineer in the states of New Mexico, Texas, Florida, Michigan, North Dakota, South Dakota, Minnesota, Wisconsin, Washington, and Montana.

Q. Have you filed testimony before any regulatory authorities?

A. Yes. I filed testimony with the New Mexico Public Regulation Commission ("Commission") in Case No. 14-00114-UT, regarding SPS's application for a certificate of convenience and necessity for the Potash Junction to Roadrunner 345-kV transmission line and associated substation facilities.

II. ASSIGNMENT AND DESCRIPTION OF PROJECT

Q. What is the purpose of your testimony?

A. My testimony supports SPS's request for a Commission determination, in accordance with Section 62-9-3.2 of the New Mexico Public Utility Act (NMSA 1978, § 62-3-1, et al. ("PUA")), that a minimum 150-foot ROW width will be necessary to constuct, operate, and maintain the proposed 345-kV transmission line that will extend from SPS's Hobbs Generating Substation to its China Draw Substation, and associated facilities in Eddy and Lee Counties, New Mexico (i.e., "Proposed Project"). Specifically, my testimony will: (1) provide a general description of the Proposed Project; (2) describe the circuit design and construction of the Proposed Project; and (3) discuss the statutory requirements for approval of ROW widths in excess of 100-feet, and the need for a ROW of at least 150-feet and up to 170-feet for the Proposed Project.

Q. Please briefly describe the Proposed Project.

A. The Proposed Project involves the construction and operation of a new 345-kV transmission line extending from SPS's existing Hobbs Generating Substation to its existing China Draw Substation with terminations at the proposed Kiowa Substation and the existing North Loving Substation. The proposed 345-kV transmission line is comprised of three segments: (1) extending from the Hobbs

Generating Substation, located 10 miles west of Hobbs, New Mexico, to the new Kiowa Substation; (2) extending from the new Kiowa Substation to the North Loving Substation, located 2 miles northeast of Loving, New Mexico; and (3) extending from the North Loving Substation to the China Draw Substation, located 25 miles southeast of Carlsbad, New Mexico.

At the existing Hobbs Generating Substation, a new 345-kV yard will be added with two terminal breaker ring configuration, expandable to a breaker and one-half configuration with termination points for a 560 MVA, 345/230 kV autotransformer, and a 345-kV line.

At the proposed Kiowa Substation, a new 345-kV yard will be built with four terminal breaker ring configuration, expandable to a breaker and one-half with termination points for a 448 MVA, 345/115 kV autotransformer, a 50 MVAR reactor, and two 345-kV lines.

At the existing North Loving Substation, a new 345-kV yard will be added with three terminal breaker ring configuration, expandable to a breaker and one-half with termination points for a 448 MVA, 345/115 kV autotransformer, and two 345-kV lines.

At the existing China Draw Substation, a new 345-kV yard will be added with three terminal breaker ring configuration, expandable to a breaker and one-

half with termination points for a 448 MVA, 345/115 kV autotransformer, a 25 MVAR reactor, and a 345-kV line.

III. CIRCUIT DESIGN AND CONSTRUCTION FOR THE PROPOSED TRANSMISSION LINE

Q. Please briefly describe the design of the circuit for the Proposed Project.

A. The 345-kV transmission line will utilize self-supporting steel structures installed on concrete foundations at corners and terminations of the transmission line. The remaining tangent (in-line) structures will typically be direct buried H-frame steel structures. If there are locations that require a narrower base to avoid existing oil wells and terrain restrictions, single-pole steel structures on concrete foundations may be installed.

Typical structure configuration drawings are shown in Attachment JFB-1. The conductors will typically be 27 feet apart on both single-pole structures and H-frame structures. The conductors will be bundled 795 kcmil ACSS for the 345-kV transmission line. The new shield wires will be a combination of 3/8 inch extra high strength steel and optical ground wire.

Q. Please describe the tangent structures and how many will be installed.

A. The single-circuit tangent structures (both H-frame and, if necessary, single-pole structures) will utilize steel arms to support the transmission line conductors. These structures will typically be spaced approximately 850 to 1,000 feet apart and will be fabricated of self-weathering steel. The total line length of the 345-kV

transmission line will be approximately 87 miles and approximately 440 steel tangent structures will be installed.

Q. Please describe the corner and termination structures and how many will be installed.

A. The most common structures used at corners and terminations of the 345-kV transmission line will be self-supporting steel 3-pole structures installed on concrete foundations as shown in Attachment JFB-1. Approximately 65 of these structures will be used along the route. Vertical, self-supporting single-pole steel structures may be utilized in congested areas where reduced horizontal space is available and near substations for phasing purposes. The steel structures will be fabricated of self-weathering steel.

Q. What is the construction timetable for the Proposed Project?

A. Preliminary transmission line design began in June 2015 and is ongoing. Material requests will be submitted, beginning about halfway through the design process (in mid to late 2016). All material should be available approximately 9 to 12 months after the material requests are initiated. Construction should take approximately 11 months to complete. The expected in-service date of the Proposed Project is June 2018.

IV. NEED FOR ROW WIDTH IN EXCESS OF 150 FEET

Q. Has SPS determined the ROW width required for the proposed 345-kV transmission line?

A. Yes. The proposed 345-kV transmission line will require a minimum 150-foot ROW width, 75 feet on either side of the centerline, and up to 170-feet for the transmission line that will cross federal, state, and the majority of the private lands along the proposed route.

Q. What are the statutory requirements regarding ROW widths in relation to the proposed 345-kV transmission line?

A. Section 62-9-3.2(A) of the PUA requires utilities to obtain a Commission determination that any proposed ROW width greater than 100 feet is necessary before construction of any transmission line and associated facilities can commence. Utilities are required to file an application that sets forth the facts necessary to allow the Commission to make a determination that the requested ROW width is necessary (see NMSA 1978, § 62-9-3.2(C)). Applicants are also required to provide notice of the time and place of the hearing on the application to all landowners and occupants of the property impacted by the requested ROW (*see* NMSA 1978, § 62-9-3.2(D)).

Q. Please explain why a minimum 150-foot ROW width is required for the Proposed Project.

A. A minimum 150-feet ROW is required to comply with the requirements of Rules 234 A-2, B-1, and G of the National Electric Safety Code ("NESC"). Specifically, the NESC specifies minimum horizontal and vertical clearance requirements for overhead lines, which vary depending on the size of the transmission line. For the Proposed Project, the ROW width must be sufficient for the transmission line, which incorporates a basic phase spacing of 27 feet for 345 kV design. The horizontal displacement of the 795 kcmil ACSS bundled conductors due to a six-pound per square foot wind loading on a 900-foot span, along with the applicable safety clearances, will be contained within the boundaries of this ROW easement. In some localized circumstances, additional easement width above 150-feet may be needed for compliance with the North American Electric Reliability Corporation and other engineering criteria, or to accommodate a request from private landowner.

The proposed 150-foot ROW also allows for flexibility during design and construction by allowing spans to be longer than 900 feet and phase spacing wider than 27 feet as necessary without violating NESC requirements. Further, it is customary in the utility industry to have a ROW that is slightly larger than the

calculated minimum under the NESC to account for construction tolerances and to provide for the general safety of the public. Finally, a minimum 150-foot ROW will be necessary to provide adequate access for maintenance of the transmission line.

Q. Are there any areas where a ROW width greater than 150-feet is required?

A. Yes. To accommodate the request of a private landowner concerning placement of transmission structures on their development property, additional ROW width is required to allow for conductor blowout that would exceed the minimum design clearance requirements of the Proposed Project. The landowner requested only one transmission structure be installed on their property, which required the next structure to be placed further away than the typical span length, thereby increasing the conductor blowout. To accommodate the longer span length, a ROW width of 170 feet was obtained from the landowner to comply with Proposed Project clearance requirements.

V. CONCLUSION

Q. Was Attachment JFB-1 prepared by you or under your supervision?

A. Yes.

Q. Does this conclude your pre-filed testimony?

A. Yes.

VERIFICATION

STATE OF MONTANA)
) **ss.**
COUNTY OF YELLOWSTONE)

Jason F. Brunner, first being sworn on his oath, states:

I am the witness identified in the preceding testimony. I have read the testimony and the accompanying attachments and am familiar with their contents. Based upon my personal knowledge, the facts stated in the direct testimony are true. In addition, in my judgment and based upon my professional experience, the opinions and conclusions stated in the testimony are true, valid, and accurate.

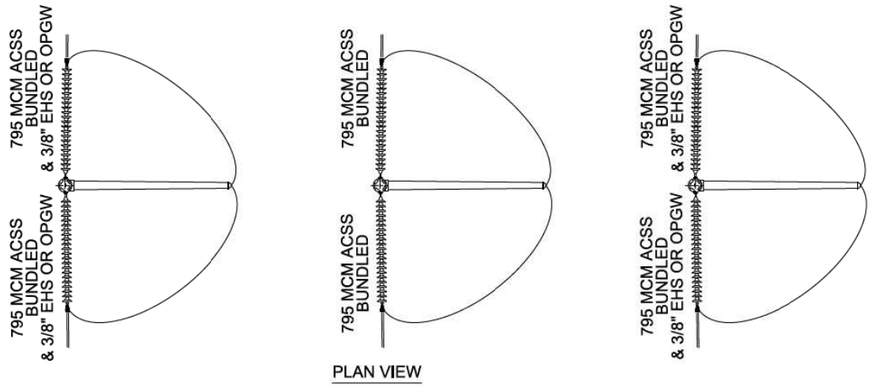
JASON F. BRUNNER

SUBSCRIBED AND SWORN TO before me this 5th day of May, 2016.

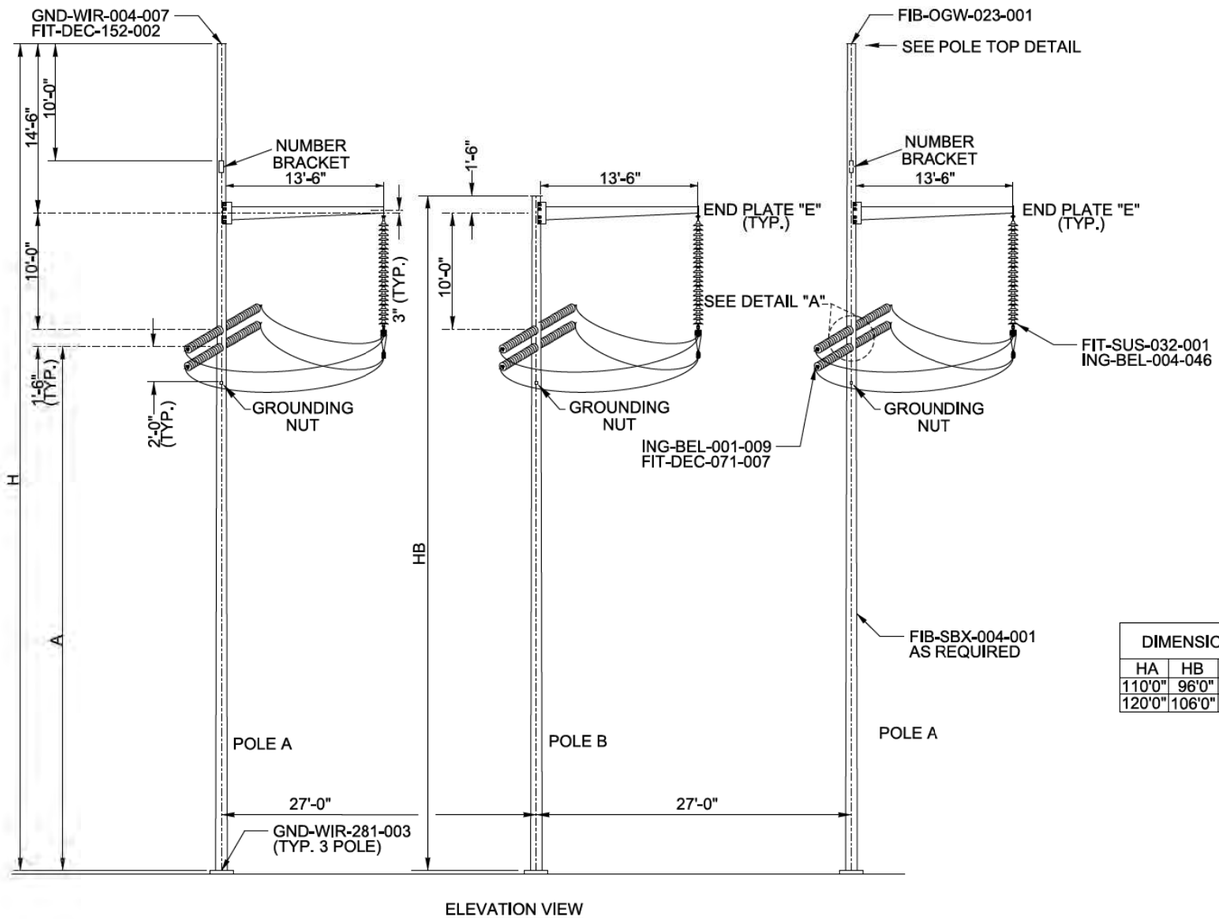
CASSIDY PUTMAN NOTARIAL SEAL STATE OF MONTANA

CASSIDY PUTMAN
NOTARY PUBLIC for the
State of Montana
Residing at Billings, Montana
My Commission Expires
August 26, 2017

Notary Public, State of Montana
My Commission Expires: 8-26-17



PLAN VIEW



ELEVATION VIEW

DIMENSIONS		
HA	HB	A
110'0"	96'0"	95'0"
120'0"	106'0"	105'0"

GENERAL NOTES

1. 1" DIAMETER HOLE WITH 1/8" CHAMFER BOTH SIDES, TYPICAL.
2. (2) 1/2" ALL THREAD STUDS, 1-1/2" APART, 1" MINIMUM PROTRUSION. INSTALL 3" X 1-1/4" COVER PLATE WITH NUTS. FOR PAINTED POLES PRIME, BUT DO NOT PAINT AREA UNDER COVER PLATE. COVER PLATE SHALL BE INSTALLED WHEN WEATHERING STEEL IS SPECIFIED.
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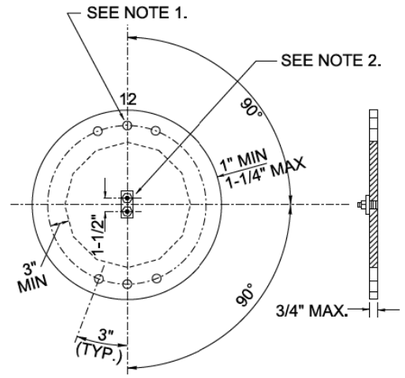
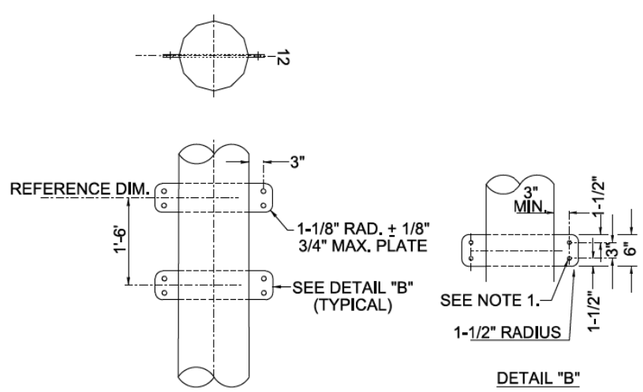


POLE TOP DETAIL



DETAIL "A"

DETAIL "B"

CONDUCTOR ATTACHMENT & INSULATOR ATTACHMENT BRACKET

CERTIFICATION

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W.O.- 11937122

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ADAM ROLLER DSGN.
PH NO: (406) 656-8100

HDR

DWN: ZMJ DATE: 1-5-14
CHK'D: DATE:
FILMED:

JASON F. BRUNNER NEW MEXICO 20837 PROFESSIONAL ENGINEER

0° - 5° DEADEND - FIBER SPLICE 345kV
STRUCTURE DRAWING
STEEL 3-POLE - FOUNDATION

Xcel Energy® SD-T40-707 SCALE NONE REV NONE

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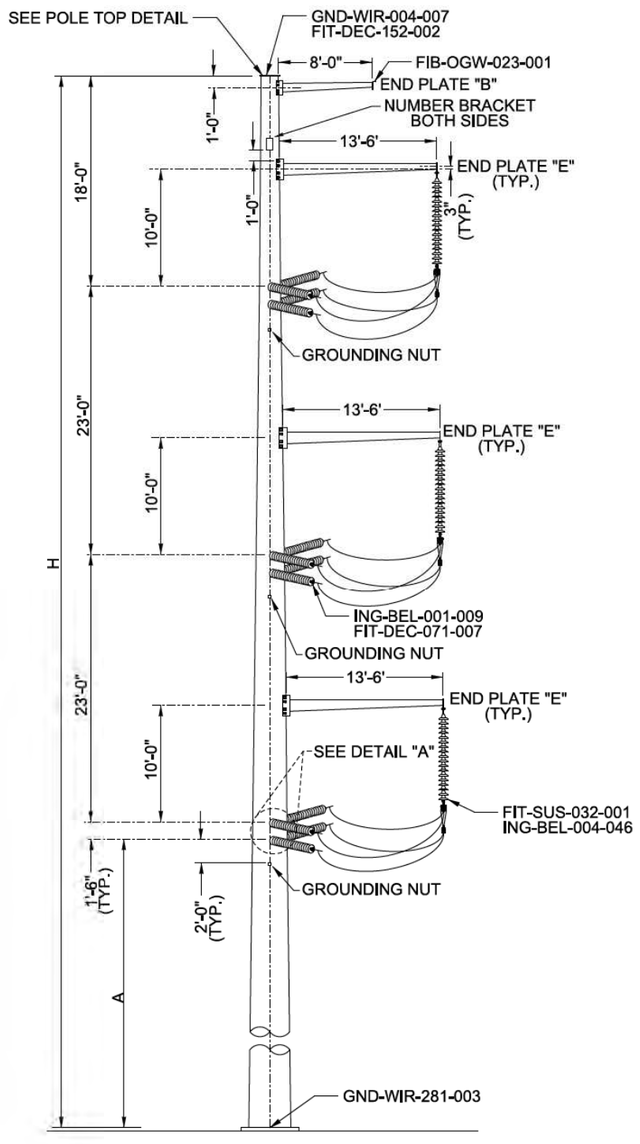

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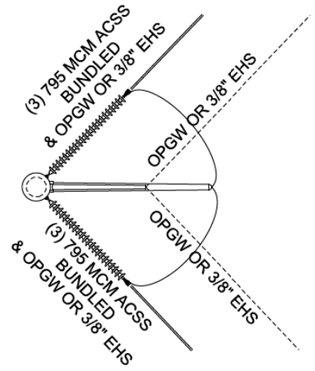

PLAN VIEW

DIM.	
H	A
120'	54'-6"
125'	59'-6"
130'	64'-6"
135'	69'-6"
140'	74'-6"
145'	79'-6"
150'	84'-6"
155'	89'-6"
160'	94'-6"
165'	99'-6"

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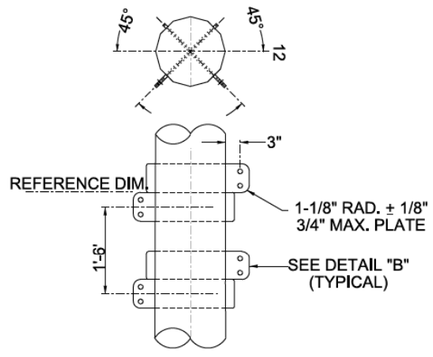
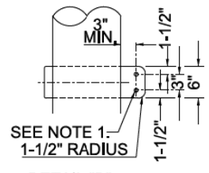


DETAIL "A"

CONDUCTOR ATTACHMENT &
INSULATOR ATTACHMENT BRACKET



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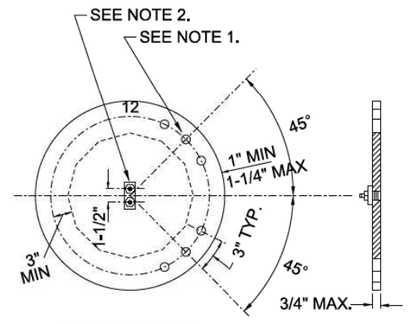

POLE TOP DETAIL

CERTIFICATION

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75° - 100° DEADEND 345kV
STRUCTURE DRAWING
STEEL SINGLE POLE - FOUNDATION

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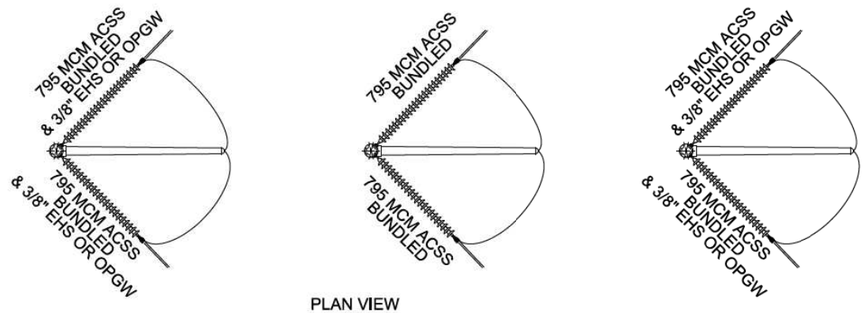

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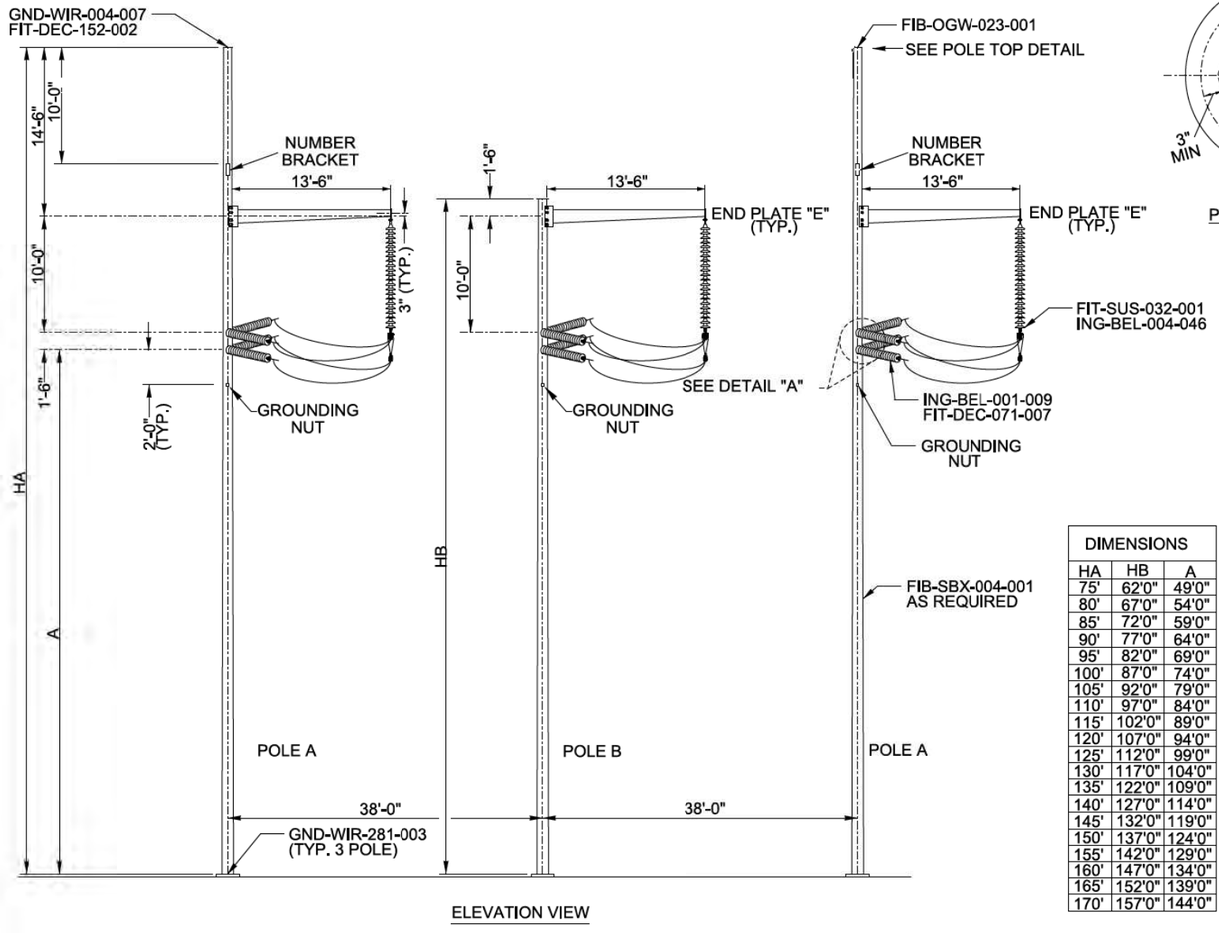

ELEVATION VIEW

DIMENSIONS		
HA	HB	A
75'	62'0"	49'0"
80'	67'0"	54'0"
85'	72'0"	59'0"
90'	77'0"	64'0"
95'	82'0"	69'0"
100'	87'0"	74'0"
105'	92'0"	79'0"
110'	97'0"	84'0"
115'	102'0"	89'0"
120'	107'0"	94'0"
125'	112'0"	99'0"
130'	117'0"	104'0"
135'	122'0"	109'0"
140'	127'0"	114'0"
145'	132'0"	119'0"
150'	137'0"	124'0"
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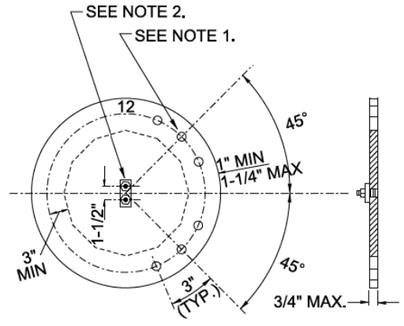
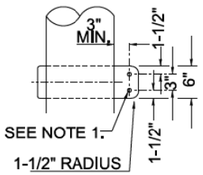


POLE TOP DETAIL



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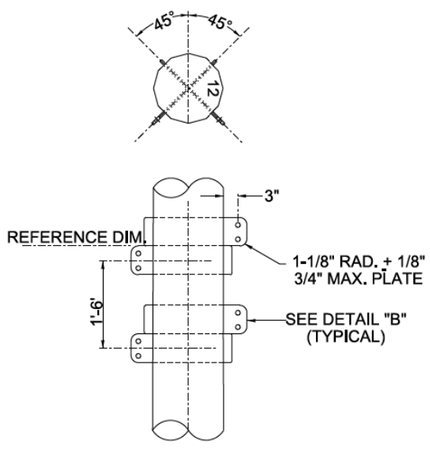

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JASON F. BRUNNER NEW MEXICO 20837 PROFESSIONAL ENGINEER

75° - 100° DEADEND - FIBER SPLICE 345kV
STRUCTURE DRAWING
STEEL 3-POLE - FOUNDATION

Xcel Energy® | SD-T40-709 | SCALE NONE | REV NONE

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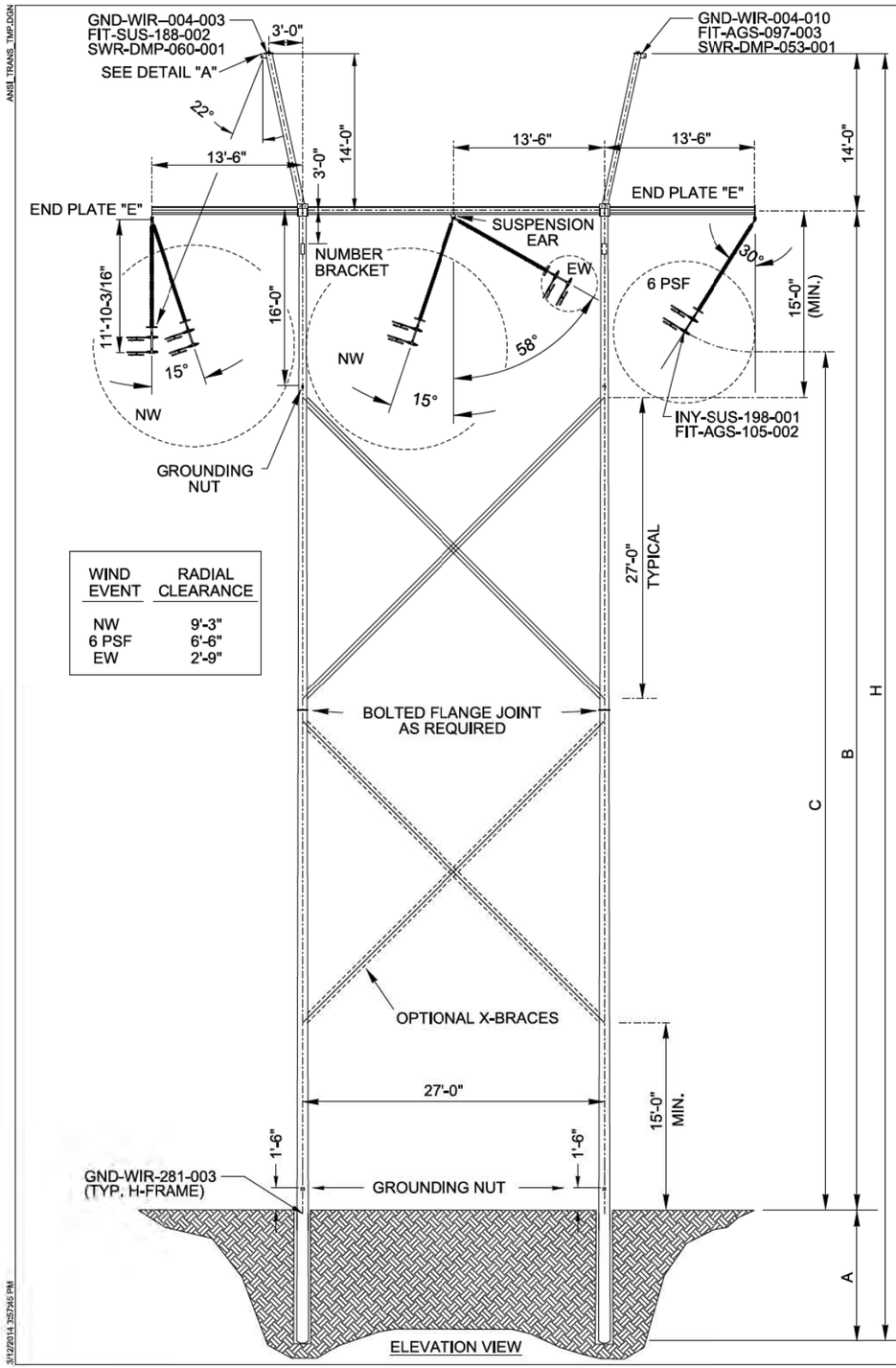
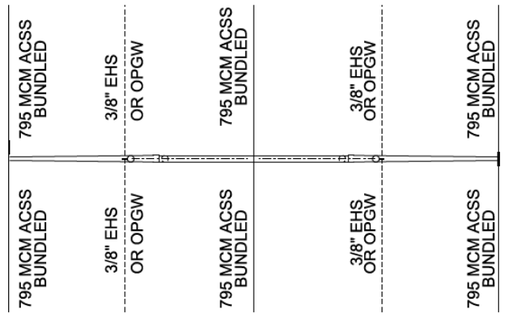


ELEVATION VIEW

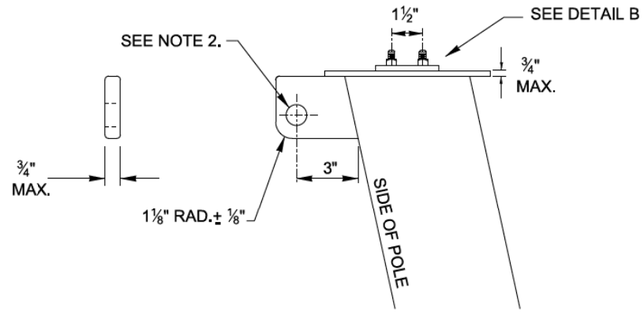
WIND EVENT	RADIAL CLEARANCE
NW	9'-3"
6 PSF	6'-6"
EW	2'-9"



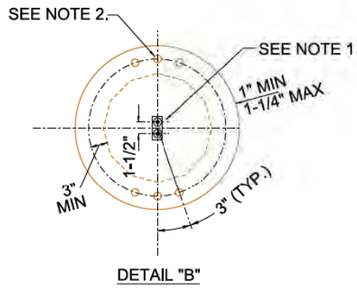
PLAN VIEW

GENERAL NOTES

1. (2) 1/2" ALL THREAD STUDS, 1-1/2" APART, 1" MINIMUM PROTRUSION. INSTALL 3" X 1-1/4" COVER PLATE WITH NUTS. FOR PAINTED POLES PRIME, BUT DO NOT PAINT AREA UNDER COVER PLATE. COVER PLATE SHALL BE INSTALLED WHEN WEATHERING STEEL IS SPECIFIED.
2. 1" DIAMETER HOLE WITH 1/8" CHAMFER BOTH SIDES.
3. INSTALL STEP LUGS FROM 85' ABOVE GROUND LINE TO TOP OF POLE.
4. POLE HOLE DEPTH SHALL BE ACCURATE. WHEN HOLES DO NOT ALLOW STRUCTURE TO BE EVEN AND LEVEL, THE DEEP HOLE SHALL BE BACKFILLED AND THOROUGHLY TAMPED TO PROPER DEPTH.
5. POLE NUMBER SHALL BE INSTALLED ON EACH POLE AS REQUIRED.
6. SEE SHEET T-0-400 FOR GENERAL DETIALS.
7. SEE SHEET T-0-400A FOR ARM AND END PLATE DETAILS.
8. SUSPENSION INSULATORS TO BE 345kV POLYMER INSULATORS.
9. STRUCTURE DESIGN SHOWN IS FOR CONFIGURATION ONLY. ENGINEERING STRENGTH CALCULATIONS AND STRUCTURE DESIGN DETAILS MUST BE PERFORMED FOR EACH PROJECT.
10. BEARING PLATES TO BE MINIMUM 12" LARGER THAN POLE DIAMTER. PLATE THICKNESS IS TO BE 3/4".

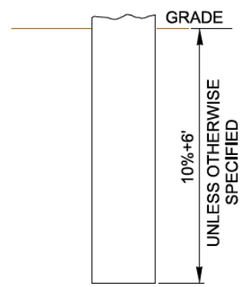


DETAIL "A"



DETAIL "B"

DIMENSIONS			
HA	A	B	C
90'0"	15'0"	61'0"	48'6"
100'0"	16'0"	70'0"	57'6"
105'0"	16'6"	74'6"	62'0"
110'0"	17'0"	79'0"	66'6"
115'0"	17'6"	83'6"	71'0"
120'0"	18'0"	88'0"	75'6"
125'0"	18'6"	92'6"	80'0"
130'0"	19'0"	97'0"	84'6"
135'0"	19'6"	101'6"	89'0"
140'0"	20'0"	106'0"	93'6"
145'0"	20'6"	110'6"	98'0"
150'0"	21'0"	115'0"	102'6"
155'0"	21'6"	119'6"	107'0"
160'0"	22'0"	124'0"	111'6"



DIRECT BURIAL DETAIL

CERTIFICATION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF: NEW MEXICO

W.O.- 11937122

(SIGNED)
DATE:
JASON F. BRUNNER ENG.
REG. NO. PE-20837
PH NO: (406) 656-8100
ADAM ROLLER DSGN.
PH NO: (406) 656-8100

HDR

DWN: ZMJ DATE: 1-5-14
CHK'D: DATE:
FILMED:

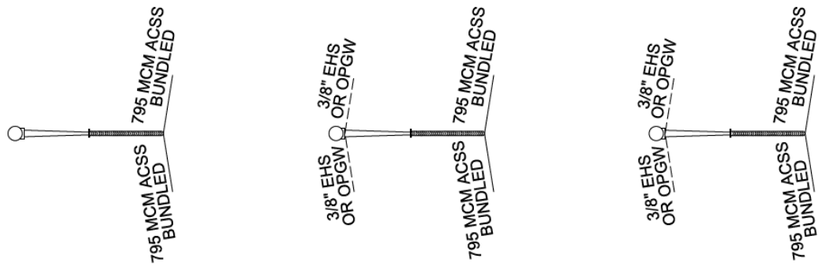
JASON F. BRUNNER NEW MEXICO 20837 PROFESSIONAL ENGINEER

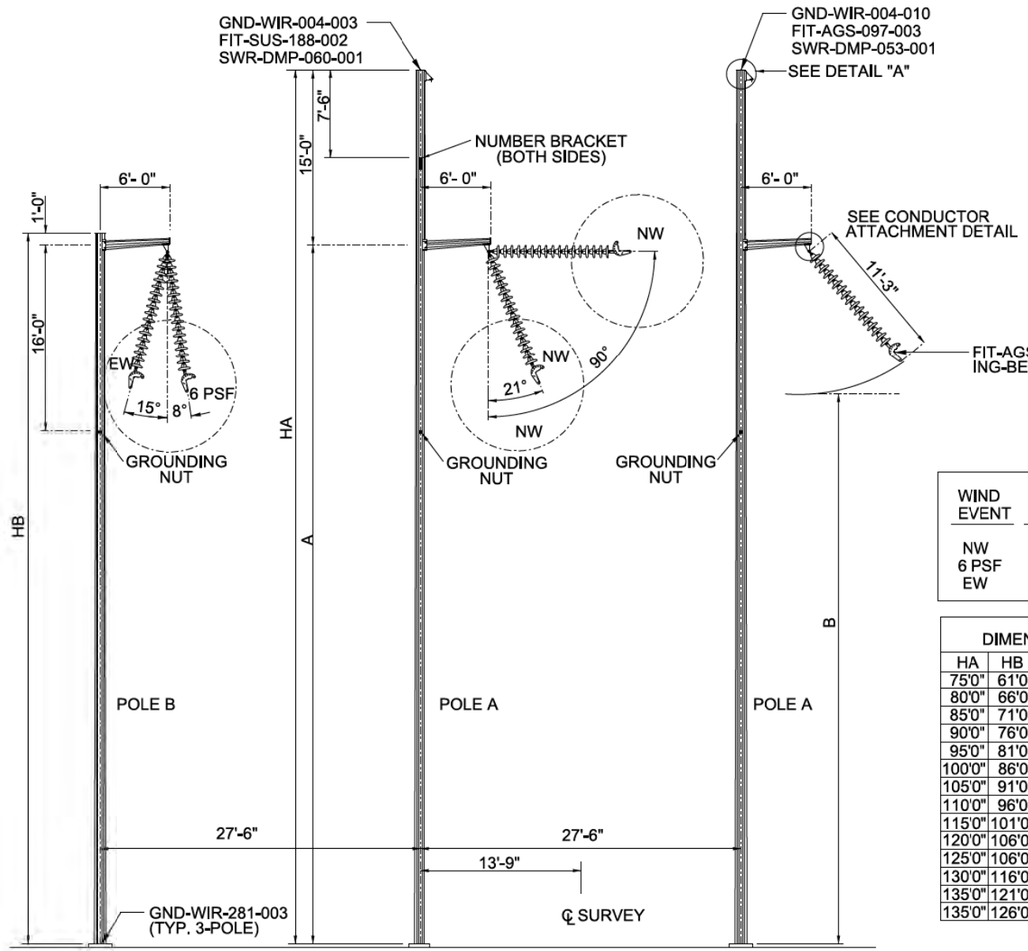
0° - 2° TANGENT 345kV
STRUCTURE DRAWING
STEEL H-FRAME - EMBEDDED

Xcel Energy® SD-T40-710 SCALE NONE REV NONE

3/12/2014 3:57:45 PM

ANSI_TRANS_TMP.DGN





WIND EVENT	RADIAL CLEARANCE
NW	9'-3"
6 PSF	6'-6"
EW	2'-9"

DIMENSIONS			
HA	HB	A	B
75'0"	61'0"	60'0"	46'0"
80'0"	66'0"	65'0"	51'0"
85'0"	71'0"	70'0"	56'0"
90'0"	76'0"	75'0"	61'0"
95'0"	81'0"	80'0"	66'0"
100'0"	86'0"	85'0"	71'0"
105'0"	91'0"	90'0"	76'0"
110'0"	96'0"	95'0"	81'0"
115'0"	101'0"	100'0"	86'0"
120'0"	106'0"	105'0"	91'0"
125'0"	106'0"	110'0"	96'0"
130'0"	116'0"	115'0"	101'0"
135'0"	121'0"	120'0"	106'0"
135'0"	126'0"	125'0"	111'0"

GENERAL NOTES

1. 1" DIAMETER HOLE WITH 1/8" CHAMFER BOTH SIDES, TYPICAL.
2. (2) 1/2" ALL THREAD STUDS, 1-1/2" APART, 1" MINIMUM PROTRUSION. INSTALL 3" X 1-1/4" COVER PLATE WITH NUTS. FOR PAINTED POLES PRIME, BUT DO NOT PAINT AREA UNDER COVER PLATE. COVER PLATE SHALL BE INSTALLED WHEN WEATHERING STEEL IS SPECIFIED.
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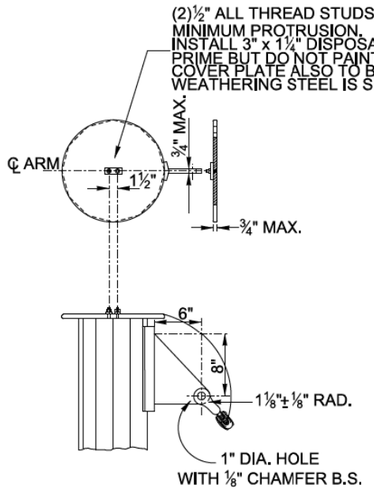
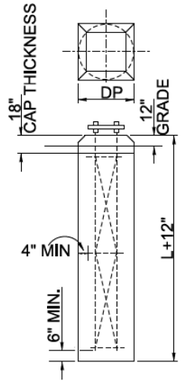
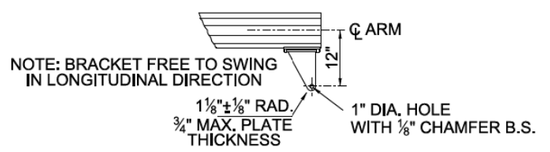
4. POLE NUMBER SHALL BE INSTALLED ON EACH POLE AS REQUIRED.
5. SEE SHEET T-0-400 FOR GENERAL DETAILS.
6. SEE SHEET T-0-400A FOR END PLATE DETAILS.
7. SEE SHEET T-0-400C FOR ANCHOR BOLT CAGE DETAILS.
8. SUSPENSION INSULATORS ARE TO BE 345KV TOUGHENED GLASS INSULATORS.
9. RUCTURE DESIGN SHOWN IS FOR CONFIGURATION ONLY. ENGINEERING STRENGTH CALCULATIONS AND STRUCTURE DESIGN DETAILS MUST BE PERFORMED FOR EACH PROJECT.



STATIC CONNECTION
DETAIL "A"



FOOTING DATA



CONDUCTOR ATTACHMENT

CERTIFICATION

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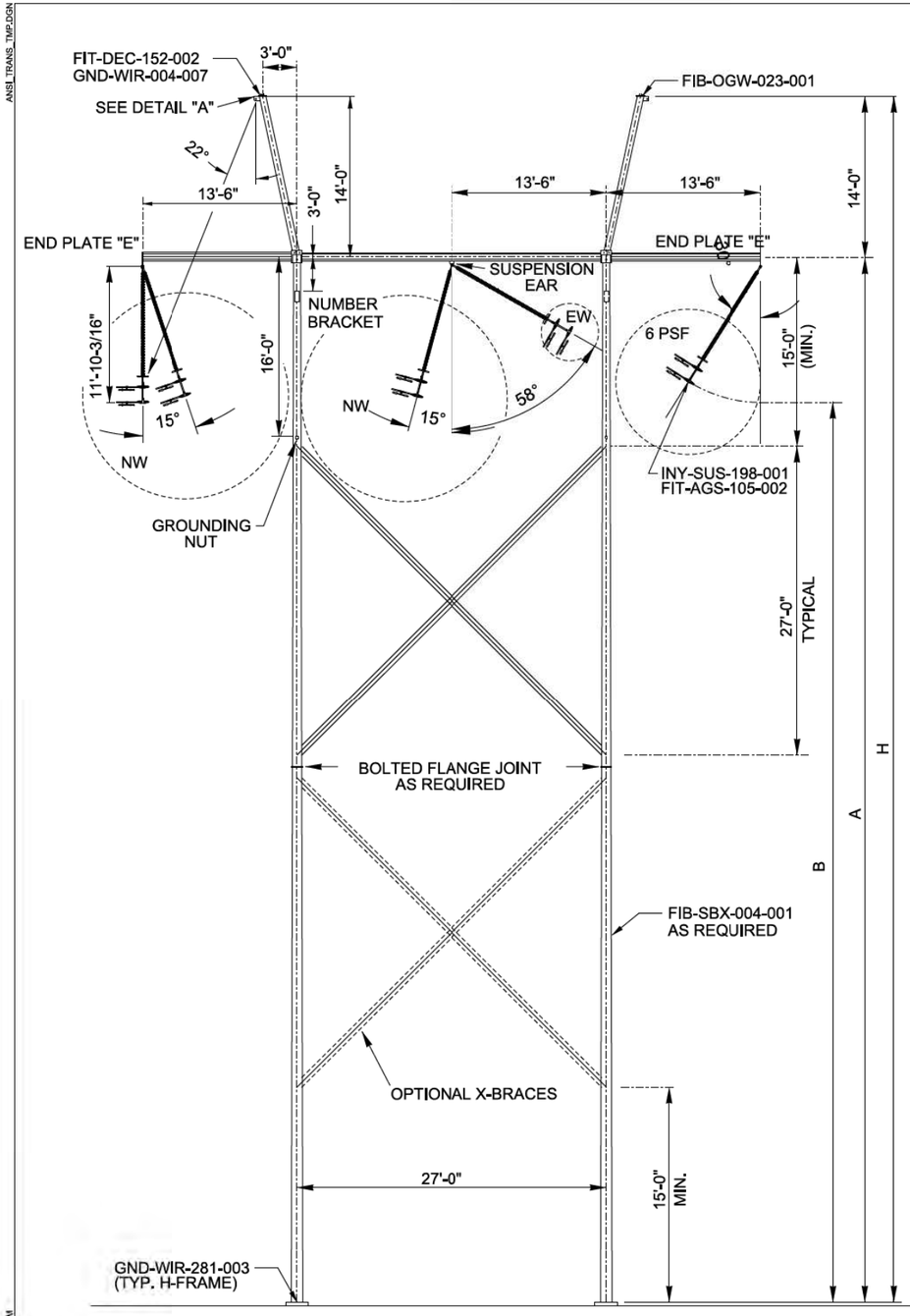
CHK'D:	DATE:
FILMED:	

JASON F. BRUNNER NEW MEXICO 20837 PROFESSIONAL ENGINEER

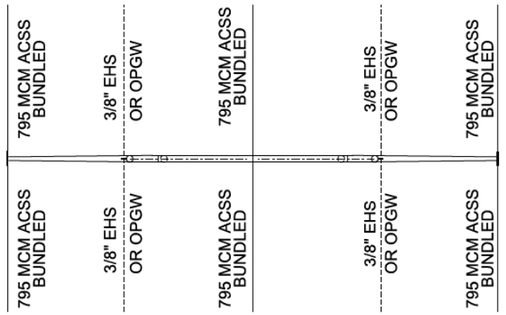
10° - 18° RUNNING ANGLE 345kV
STRUCTURE DRAWING
STEEL 3-POLE - FOUNDATION

Xcel Energy® SD-T40-711 SCALE NONE REV NONE

3/12/2014 3:57:45 PM



ELEVATION VIEW



PLAN VIEW

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8. SEE SHEET T-0-400D FOR FIBER OPTIC CPLICE DETAILS.
9. SUSPENSION INSULATORS ARE TO BE 345KV POLYMER INSULATORS.
10. STRUCTURE DESIGN SHOWN IS FOR CONFIGURATION ONLY. ENGINEERING STRENGTH CALCULATIONS AND STRUCTURE DESIGN DETAILS MUST BE PERFORMED FOR EACH PROJECT.

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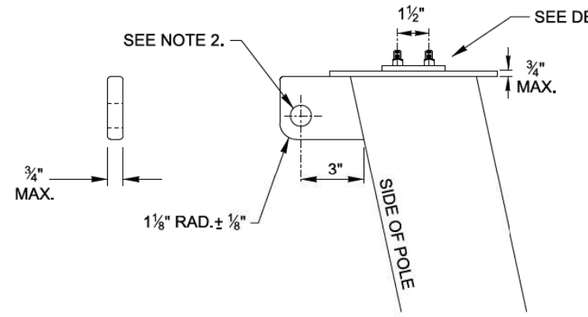
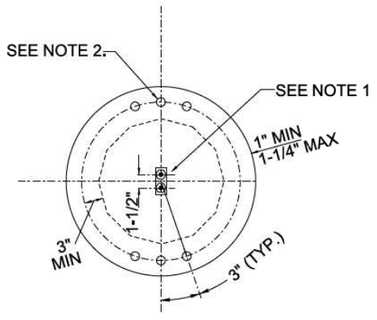
FILMED:
JASON F. BRUNNER NEW MEXICO 20837 PROFESSIONAL ENGINEER

WIND EVENT	RADIAL CLEARANCE
NW	9'-3"
6 PSF	6'-6"
EW	2'-9"

DIMENSIONS		
HA	A	B
95'0"	81'0"	68'6"
105'0"	91'0"	78'6"
110'0"	96'0"	83'6"
115'0"	101'0"	88'6"
120'0"	106'0"	93'6"
125'0"	111'0"	98'6"
130'0"	116'0"	103'6"
135'0"	121'0"	108'6"
140'0"	126'0"	113'6"
145'0"	131'0"	118'6"
150'0"	136'0"	123'6"
155'0"	141'0"	128'6"
160'0"	146'0"	133'6"
165'0"	151'0"	138'6"
170'0"	156'0"	143'6"
175'0"	161'0"	148'6"
180'0"	166'0"	153'6"
185'0"	171'0"	158'6"
190'0"	176'0"	163'6"



DETAIL "A"



DETAIL "B"

0° - 2° TANGENT - FIBER SPLICE 345kV
STRUCTURE DRAWING
STEEL H-FRAME - FOUNDATION

Xcel Energy® | SD-T40-712 | SCALE NONE | REV NONE

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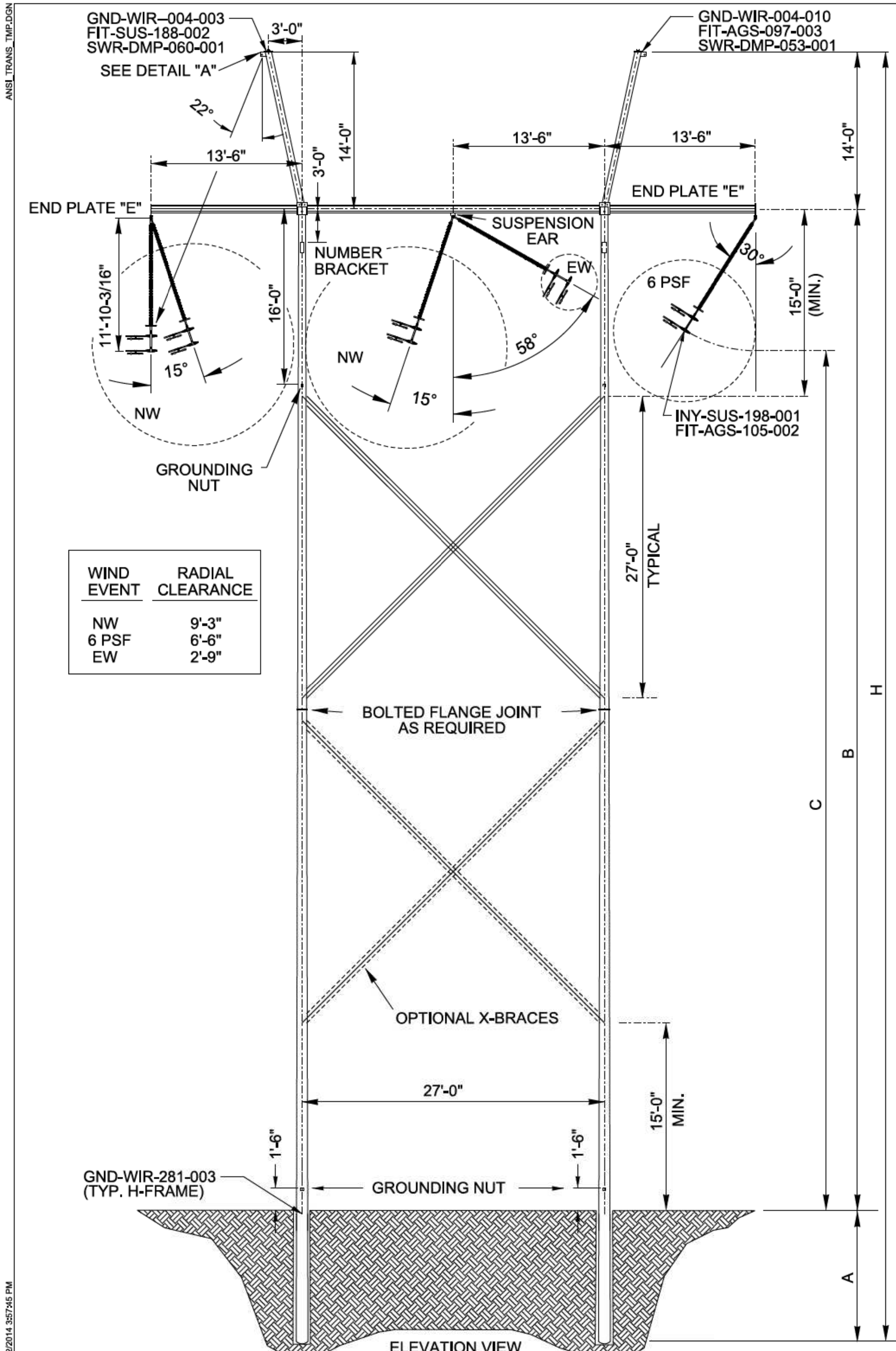
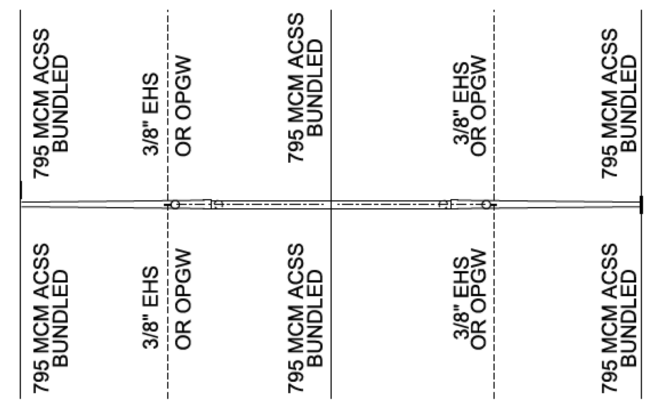


WIND EVENT	RADIAL CLEARANCE
NW	9'-3"
6 PSF	6'-6"
EW	2'-9"



PLAN VIEW

GENERAL NOTES

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7. SEE SHEET T-0-400A FOR ARM AND END PLATE DETAILS.
8. SUSPENSION INSULATORS TO BE 345kV POLYMER INSULATORS.
9. STRUCTURE DESIGN SHOWN IS FOR CONFIGURATION ONLY. ENGINEERING STRENGTH CALCULATIONS AND STRUCTURE DESIGN DETAILS MUST BE PERFORMED FOR EACH PROJECT.
10. BEARING PLATES TO BE MINIMUM 12" LARGER THAN POLE DIAMTER. PLATE THICKNESS IS TO BE 3/4".

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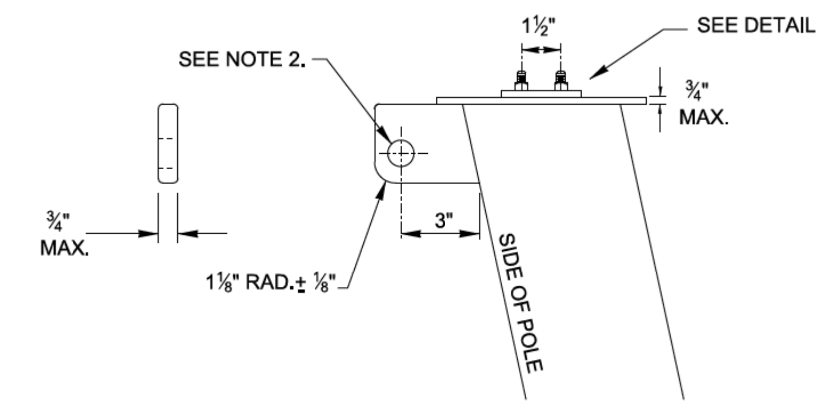
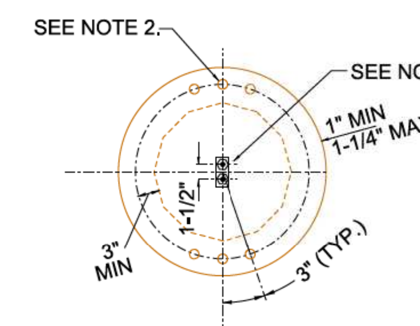
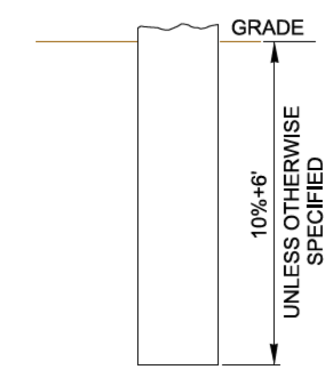


DETAIL "A"



DETAIL "B"



DIRECT BURIAL DETAIL

DIMENSIONS			
HA	A	B	C
90'0"	15'0"	61'0"	48'6"
100'0"	16'0"	70'0"	57'6"
105'0"	16'6"	74'6"	62'0"
110'0"	17'0"	79'0"	66'6"
115'0"	17'6"	83'6"	71'0"
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125'0"	18'6"	92'6"	80'0"
130'0"	19'0"	97'0"	84'6"
135'0"	19'6"	101'6"	89'0"
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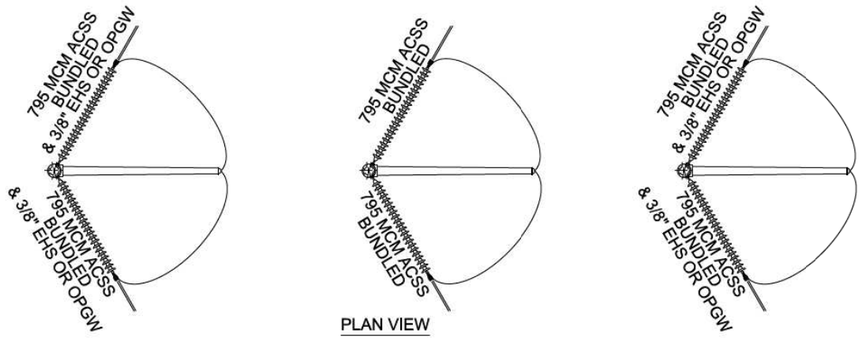
150'0"	21'0"	115'0"	102'6"
155'0"	21'6"	119'6"	107'0"
160'0"	22'0"	124'0"	111'6"

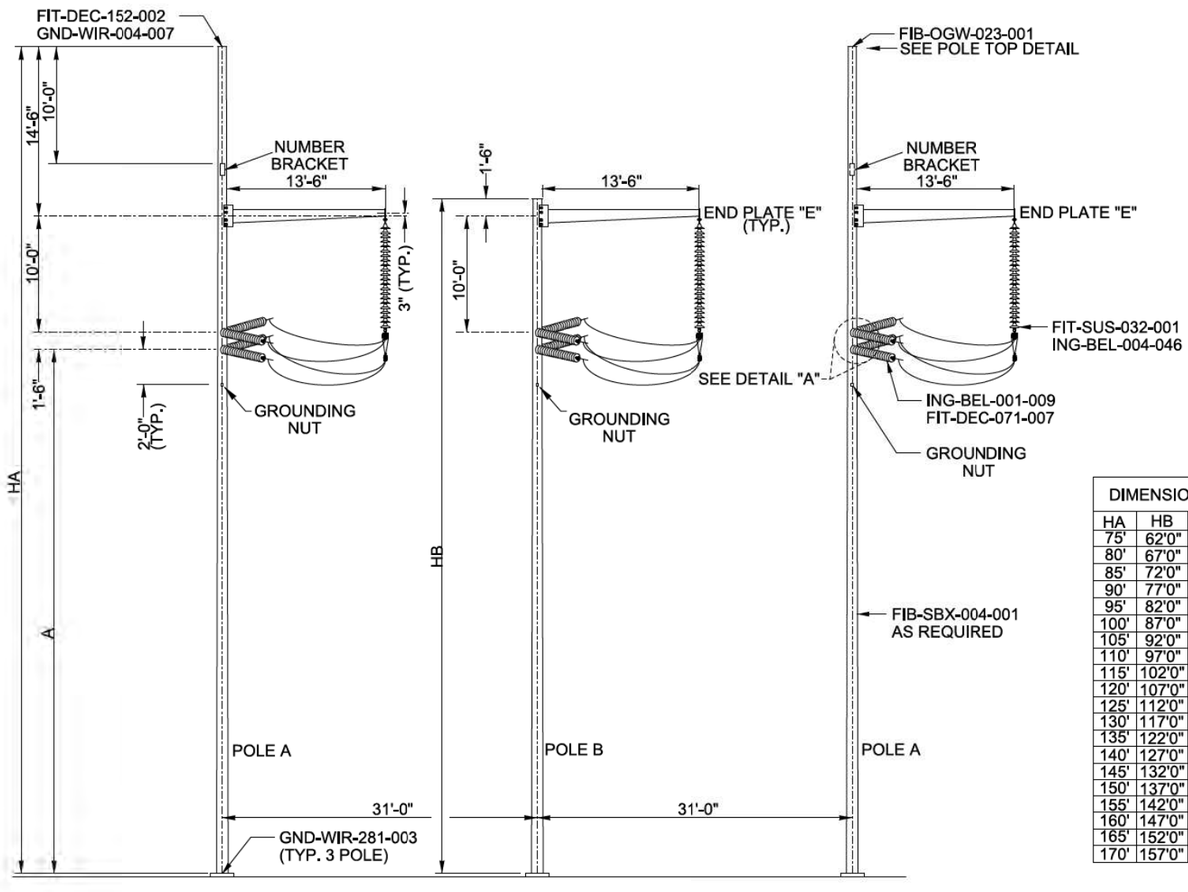
0° - 2° TANGENT 345kV
STRUCTURE DRAWING
STEEL H-FRAME - EMBEDDED

Xcel Energy | SD-T40-710 | SCALE NONE | REV NONE

ANSI_TRANS_TMP.DGN



PLAN VIEW



ELEVATION VIEW

DIMENSIONS		
HA	HB	A
75'	62'0"	49'0"
80'	67'0"	54'0"
85'	72'0"	59'0"
90'	77'0"	64'0"
95'	82'0"	69'0"
100'	87'0"	74'0"
105'	92'0"	79'0"
110'	97'0"	84'0"
115'	102'0"	89'0"
120'	107'0"	94'0"
125'	112'0"	99'0"
130'	117'0"	104'0"
135'	122'0"	109'0"
140'	127'0"	114'0"
145'	132'0"	119'0"
150'	137'0"	124'0"
155'	142'0"	129'0"
160'	147'0"	134'0"
165'	152'0"	139'0"
170'	157'0"	144'0"

GENERAL NOTES

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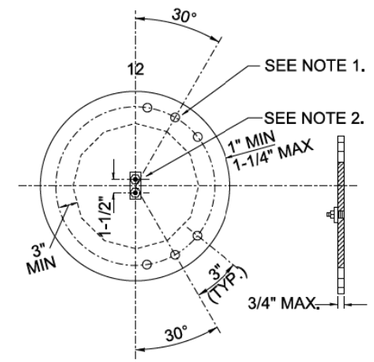
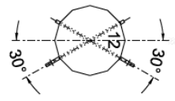
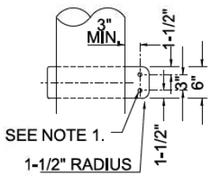
7. SEE SHEET T-0-400C FOR ANCHOR BOLT CAGE DETAILS.
8. SEE SHEET T-0-400D FOR FIBER OPTIC SPLICE DETAILS.
9. STRAIN INSULATORS ARE TO BE 345KV TOUGHENED GLASS INSULATORS. SUSPENSION INSULATORS ARE TO BE 345KV TOUGHENED GLASS INSULATORS.
10. STRUCTURE DESIGN SHOWN IS FOR CONFIGURATION ONLY. ENGINEERING STRENGTH CALCULATIONS AND STRUCTURE DESIGN DETAILS MUST BE PERFORMED FOR EACH PROJECT.

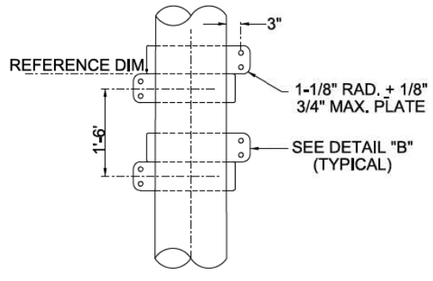


POLE TOP DETAIL





DETAIL "B"



DETAIL "A"

CONDUCTOR ATTACHMENT & INSULATOR ATTACHMENT BRACKET

CERTIFICATION

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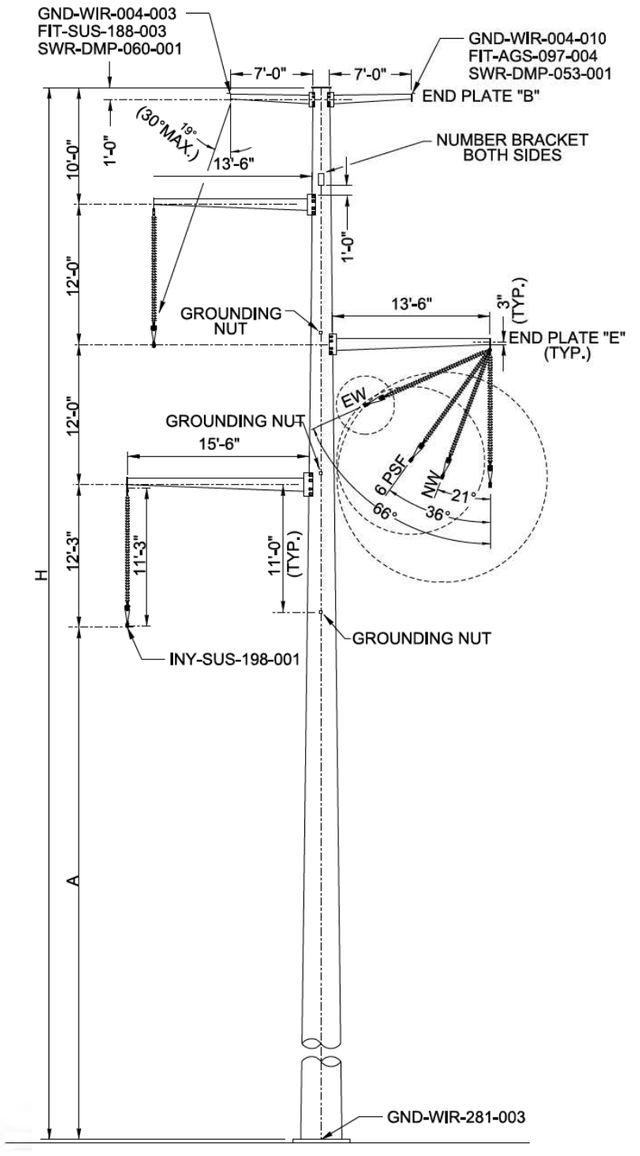
JASON F. BRUNNER NEW MEXICO 20837 PROFESSIONAL ENGINEER

45° - 75° DEADEND - FIBER SPLICE 345kV
STRUCTURE DRAWING
STEEL 3-POLE - FOUNDATION

Xcel Energy® | SD-T40-714 | SCALE NONE | REV NONE

3/12/2014 3:57:45 PM

ANSI_TRANS_TMP.DGN



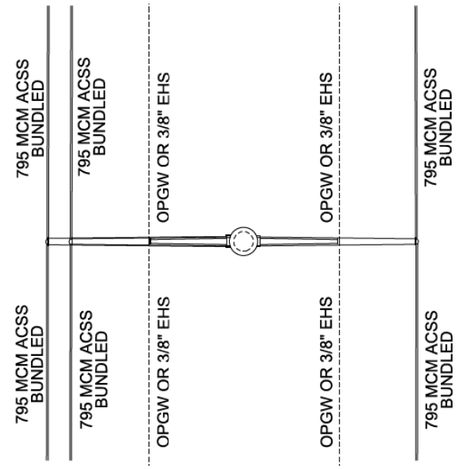
ELEVATION VIEW

WIND EVENT	RADIAL CLEARANCE
NW	9'-3"
6 PSF	6'-6"
EW	2'-9"

DIMENSIONS	
H	A
115'0"	68'3"
120'0"	73'3"
125'0"	78'3"
130'0"	83'3"
135'0"	88'3"
140'0"	93'3"
145'0"	98'3"
150'0"	103'3"
155'0"	108'3"
160'0"	113'3"
165'0"	118'3"

GENERAL NOTES

1. INSTALL STEP LUGS FROM 85' ABOVE BASE PLATE TO TOP OF POLE.
2. POLE NUMBER SHALL BE INSTALLED ON EACH POLE AS REQUIRED.
3. SEE SHEET T-0-400 FOR GENERAL DETAILS.
4. SEE SHEET T-0-400A FOR ARM END PLATE AND DEADEND EAR DETAILS.
5. SEE SHEET T-0-400C FOR ANCHOR BOLT CAGE DETAILS.
6. SUSPENSION INSULATORS ARE TO BE 345KV POLYMER INSULATORS.
7. STRUCTURE DESIGN SHOWN IS FOR CONFIGURATION ONLY. ENGINEERING STRENGTH CALCULATIONS AND STRUCTURE DESIGN DETAILS MUST BE PERFORMED FOR EACH PROJECT.



PLAN VIEW

CERTIFICATION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF:

NEW MEXICO

W.O.- 11937122

(SIGNED)

DATE:

JASON F. BRUNNER ENG.
REG. NO. PE-20837
PH NO: (406) 656-8100

ADAM ROLLER DSGN.
PH NO: (406) 656-8100

HDR

DWN: ZMJ DATE: 1-5-14
CHK'D: DATE:
FILMED:

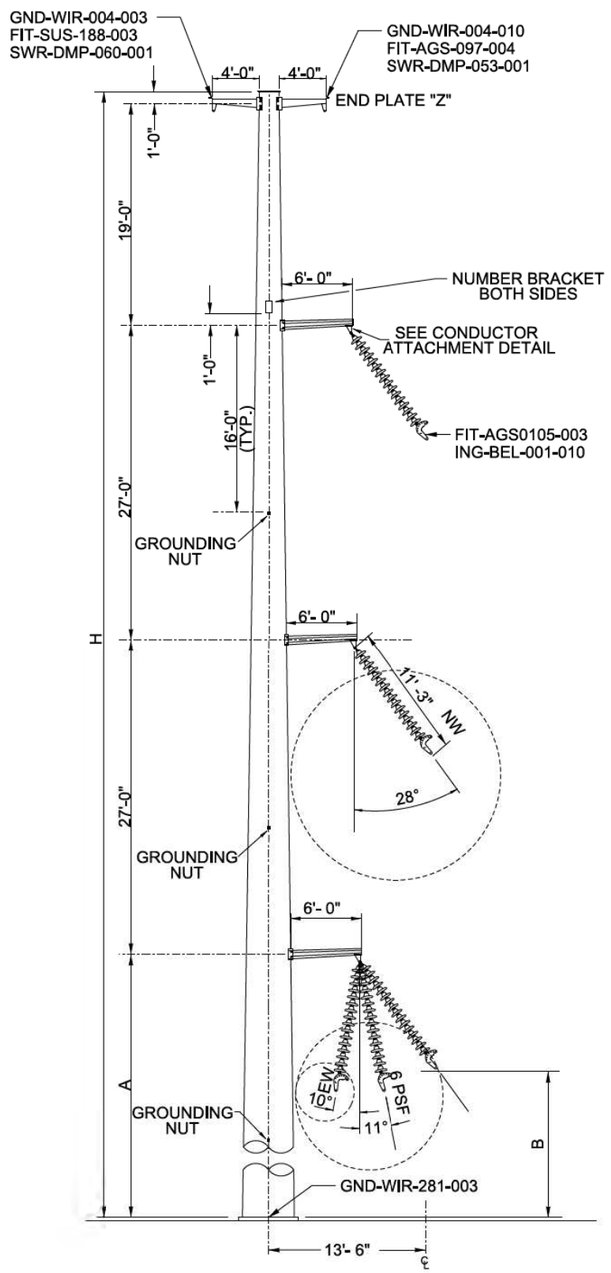
JASON F. BRUNNER NEW MEXICO 20837 PROFESSIONAL ENGINEER

0° - 2° TANGENT 345kV
STRUCTURE DRAWING
STEEL SINGLE POLE - FOUNDATION

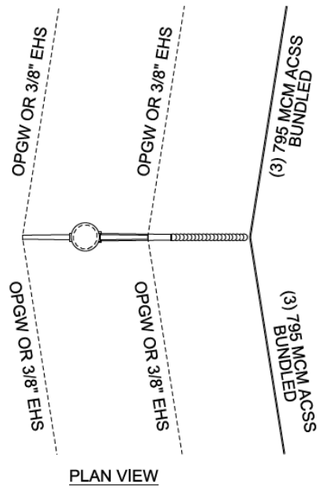
Xcel Energy® | SD-T40-715 | SCALE NONE | REV NONE

3/12/2014 3:57:45 PM

ANSI_TRANS_TMP.DGN



ELEVATION VIEW



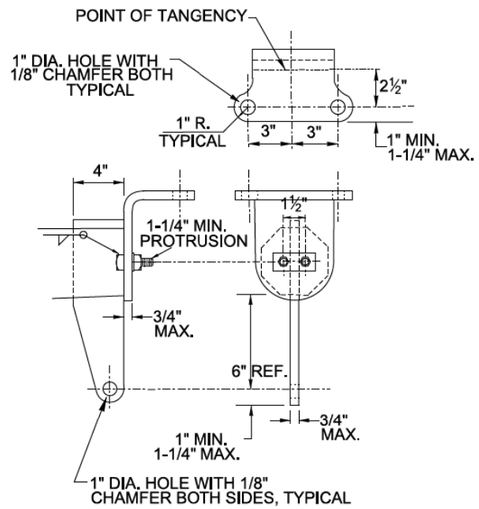
PLAN VIEW

WIND EVENT	RADIAL CLEARANCE
NW	9'-3"
6 PSF	6'-6"
EW	2'-9"

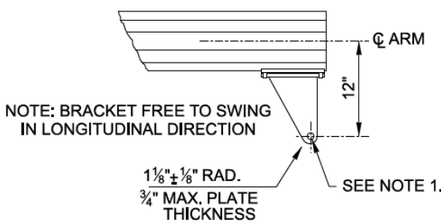
DIMENSIONS		
H	A	B
120'	46'-0"	35'-9"
125'	51'-0"	40'-9"
130'	56'-0"	45'-9"
135'	61'-0"	50'-9"
140'	66'-0"	55'-9"
145'	71'-0"	60'-9"
150'	76'-0"	65'-9"
155'	81'-0"	70'-9"
160'	86'-0"	75'-9"
165'	91'-0"	80'-9"

GENERAL NOTES

1. INSTALL STEP LUGS FROM 85' ABOVE BASE PLATE TO TOP OF POLE.
2. POLE NUMBER SHALL BE INSTALLED ON EACH POLE AS REQUIRED.
3. SEE SHEET T-0-400 FOR GENERAL DETAILS.
4. SEE SHEET T-0-400A FOR ARM END PLATE AND DEADEND EAR DETAILS.
5. SEE SHEET T-0-400C FOR ANCHOR BOLT CAGE DETAILS.
6. SUSPENSION INSULATORS ARE TO BE 345KV TOUGHENED GLASS INSULATORS.
7. STRUCTURE DESIGN SHOWN IS FOR CONFIGURATION ONLY. ENGINEERING STRENGTH CALCULATIONS AND STRUCTURE DESIGN DETAILS MUST BE PERFORMED FOR EACH PROJECT.



END PLATE "Z"



CONDUCTOR ATTACHMENT

CERTIFICATION

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HDR

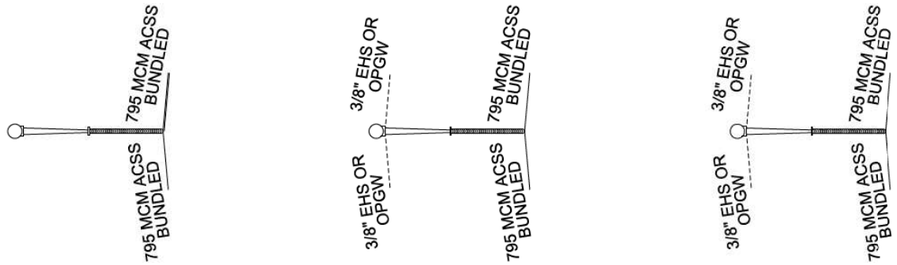
DWN: ZMJ — DATE: 1-5-14
CHK'D: — DATE:
FILMED:

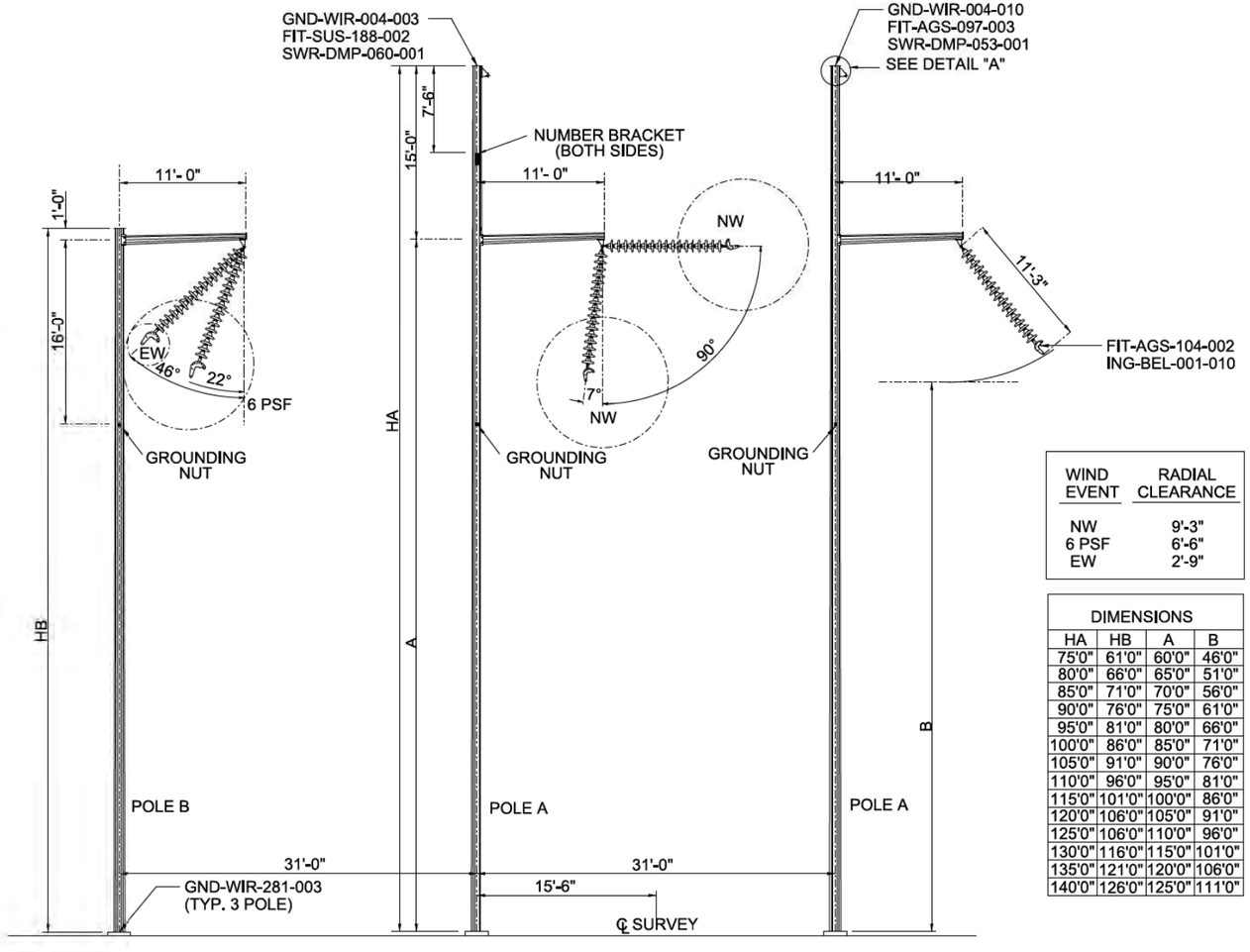
JASON F. BRUNNER NEW MEXICO 20837 PROFESSIONAL ENGINEER

6° - 16° RUNNING ANGLE — 345kV
STRUCTURE DRAWING
STEEL SINGLE POLE - FOUNDATION

Xcel Energy® | SD-T40-716 | SCALE: NONE | REV: NONE

3/12/2014 3:57:45 PM



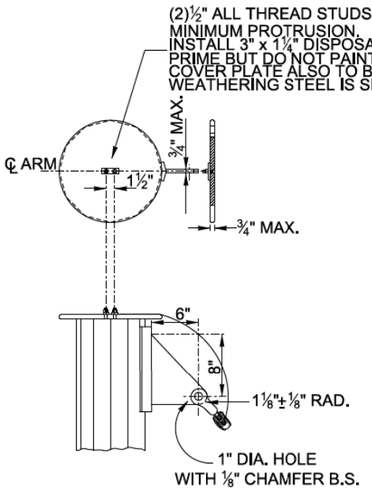


GENERAL NOTES

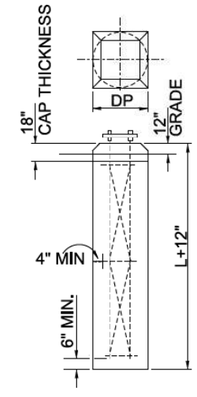
1. 1" DIAMETER HOLE WITH 1/8" CHAMFER BOTH SIDES, TYPICAL.
2. (2) 1/2" ALL THREAD STUDS, 1-1/2" APART, 1" MINIMUM PROTRUSION. INSTALL 3" X 1-1/4" COVER PLATE WITH NUTS. FOR PAINTED POLES PRIME, BUT DO NOT PAINT AREA UNDER COVER PLATE. COVER PLATE SHALL BE INSTALLED WHEN WEATHERING STEEL IS SPECIFIED.
3. INSTALL STEP LUGS FROM 85' ABOVE BASE PLATE TO TOP OF POLE.
4. POLE NUMBER SHALL BE INSTALLED ON EACH POLE AS REQUIRED.
5. SEE SHEET T-0-400 FOR GENERAL DETAILS.
6. SEE SHEET T-0-400A FOR END PLATE DETAILS.
7. SEE SHEET T-0-400C FOR ANCHOR BOLT CAGE DETAILS.
8. SUSPENSION INSULATORS ARE TO BE 345KV TOUGHENED GLASS INSULATORS.
9. STRUCTURE DESIGN SHOWN IS FOR CONFIGURATION ONLY. ENGINEERING STRENGTH CALCULATIONS AND STRUCTURE DESIGN DETAILS MUST BE PERFORMED FOR EACH PROJECT.

WIND EVENT	RADIAL CLEARANCE
NW	9'-3"
6 PSF	6'-6"
EW	2'-9"

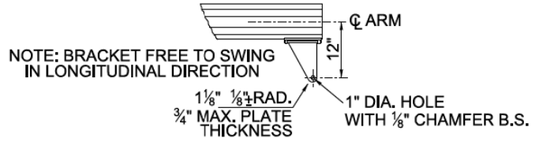
DIMENSIONS			
HA	HB	A	B
75'0"	61'0"	60'0"	46'0"
80'0"	66'0"	65'0"	51'0"
85'0"	71'0"	70'0"	56'0"
90'0"	76'0"	75'0"	61'0"
95'0"	81'0"	80'0"	66'0"
100'0"	86'0"	85'0"	71'0"
105'0"	91'0"	90'0"	76'0"
110'0"	96'0"	95'0"	81'0"
115'0"	101'0"	100'0"	86'0"
120'0"	106'0"	105'0"	91'0"
125'0"	106'0"	110'0"	96'0"
130'0"	116'0"	115'0"	101'0"
135'0"	121'0"	120'0"	106'0"
140'0"	126'0"	125'0"	111'0"



STATIC CONNECTION
DETAIL "A"



FOOTING DATA



CONDUCTOR ATTACHMENT

CERTIFICATION

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ADAM ROLLER DSGN.
PH NO: (406) 656-8100

HDR

DWN: ZMJ	DATE: 1-5-14
CHK'D:	DATE:
FILMED:	

JASON F. BRUNNER NEW MEXICO 20837 PROFESSIONAL ENGINEER

4° - 10° RUNNING ANGLE 345kV
STRUCTURE DRAWING
STEEL 3-POLE - FOUNDATION

Xcel Energy® | SD-T40-717 | SCALE NONE | REV NONE

ANSI_TRANS_TMP.DGN
3/12/2014 3:57:45 PM

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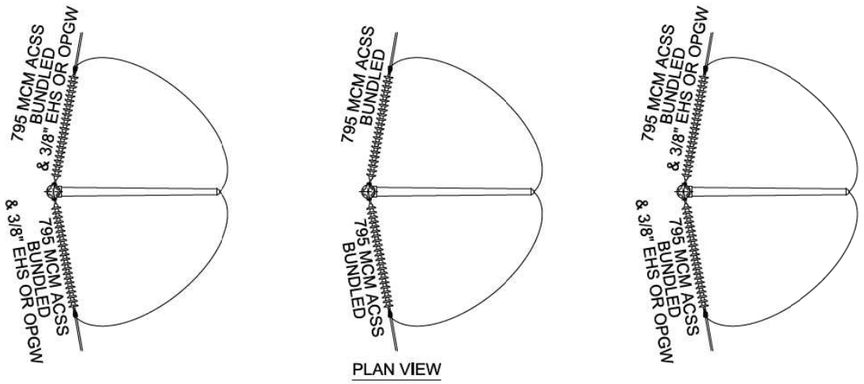
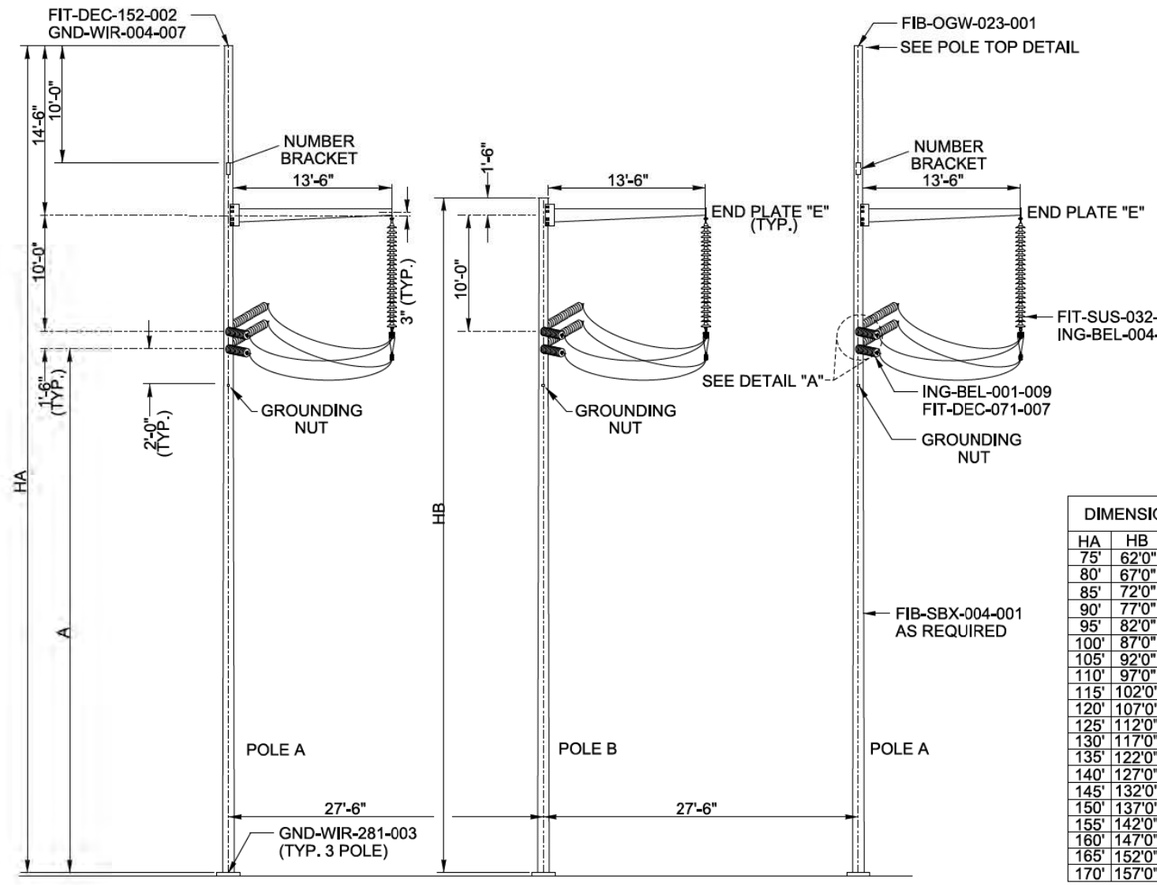


PLAN VIEW

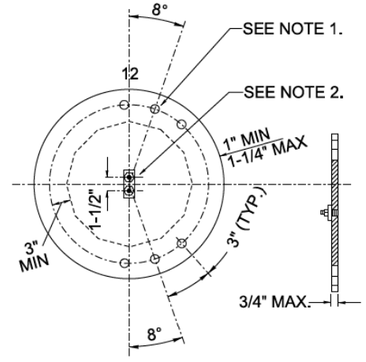


ELEVATION VIEW

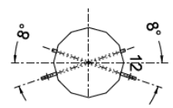
DIMENSIONS		
HA	HB	A
75'	62'0"	49'0"
80'	67'0"	54'0"
85'	72'0"	59'0"
90'	77'0"	64'0"
95'	82'0"	69'0"
100'	87'0"	74'0"
105'	92'0"	79'0"
110'	97'0"	84'0"
115'	102'0"	89'0"
120'	107'0"	94'0"
125'	112'0"	99'0"
130'	117'0"	104'0"
135'	122'0"	109'0"
140'	127'0"	114'0"
145'	132'0"	119'0"
150'	137'0"	124'0"
155'	142'0"	129'0"
160'	147'0"	134'0"
165'	152'0"	139'0"
170'	157'0"	144'0"

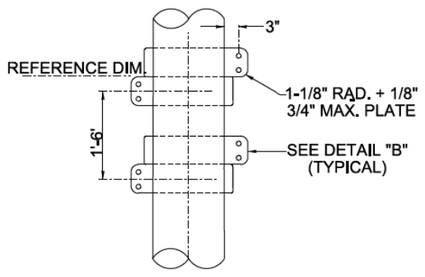
GENERAL NOTES

1. (2) 1/2" ALL THREAD STUDS, 1-1/2" APART, 1" MINIMUM PROTRUSION. INSTALL 3" X 1-1/4" COVER PLATE WITH NUTS. FOR PAINTED POLES PRIME, BUT DO NOT PAINT AREA UNDER COVER PLATE. COVER PLATE SHALL BE INSTALLED WHEN WEATHERING STEEL IS SPECIFIED.
2. 1" DIAMETER HOLE WITH 1/8" CHAMFER BOTH SIDES.
3. INSTALL STEP LUGS FROM 85' ABOVE BASE PLATE TO TOP OF POLE.
4. POLE NUMBER SHALL BE INSTALLED ON EACH POLE AS REQUIRED.
5. SEE SHEET T-0-400 FOR GENERAL DETAILS.
6. SEE SHEET T-0-400A FOR ARM AND END PLATE DETAILS.
7. SEE SHEET T-0-400D FOR FIBER OPTIC SPLICE DETAILS.
8. STRAIN INSULATORS ARE TO BE 345kV TOUGHENED GLASS INSULATORS. SUSPENSION INSULATORS TO BE 345kV TOUGHENED GLASS INSULATORS.
9. STRUCTURE DESIGN SHOWN IS FOR CONFIGURATION ONLY. ENGINEERING STRENGTH CALCULATIONS AND STRUCTURE DESIGN DETAILS MUST BE PERFORMED FOR EACH PROJECT.



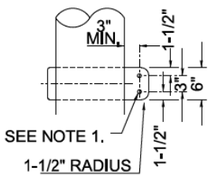
POLE TOP DETAIL





DETAIL "A"

CONDUCTOR ATTACHMENT & INSULATOR ATTACHMENT BRACKET



DETAIL "B"

CERTIFICATION

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NEW MEXICO

W.O.- 11937122

(SIGNED)

DATE:

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REG. NO. PE-20837
PH NO: (406) 656-8100

ADAM ROLLER DSGN.
PH NO: (406) 656-8100

HDR

DWN: ZMJ	DATE: 1-5-14
CHK'D:	DATE:
FILMED:	

JASON F. BRUNNER NEW MEXICO 20837 PROFESSIONAL ENGINEER

10° - 18° DEADEND - FIBER SPLICE 345kV
STRUCTURE DRAWING
STEEL 3-POLE - FOUNDATION

Xcel Energy® | SD-T40-718 | SCALE NONE | REV NONE

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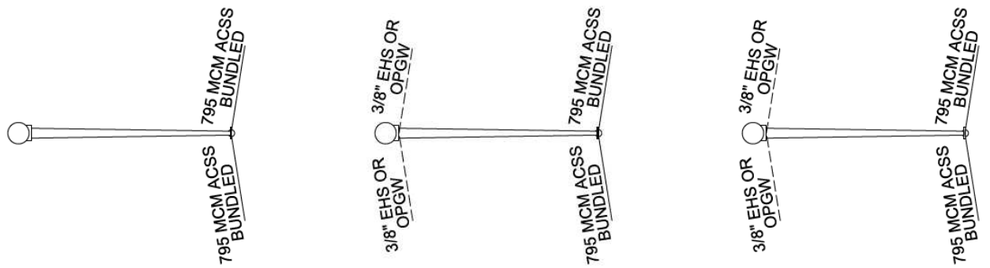
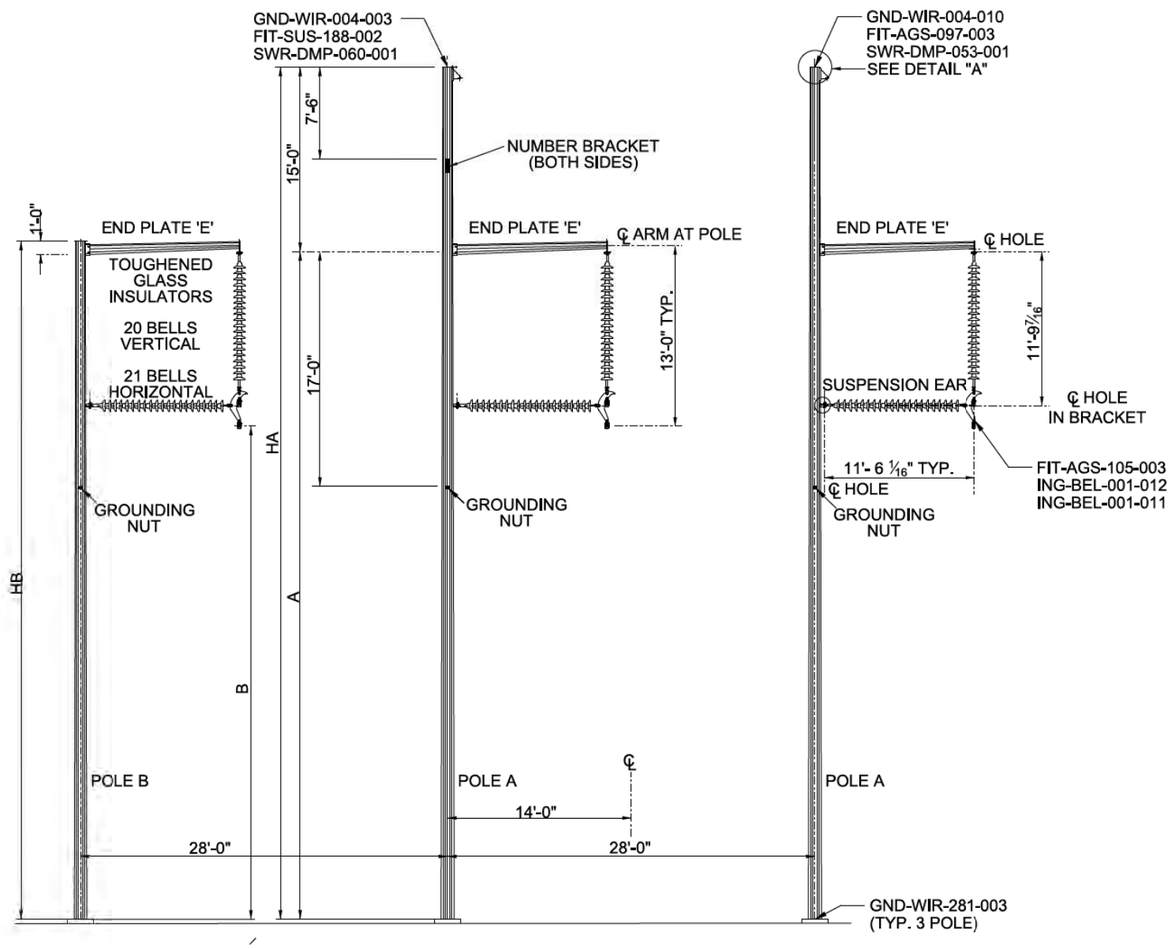
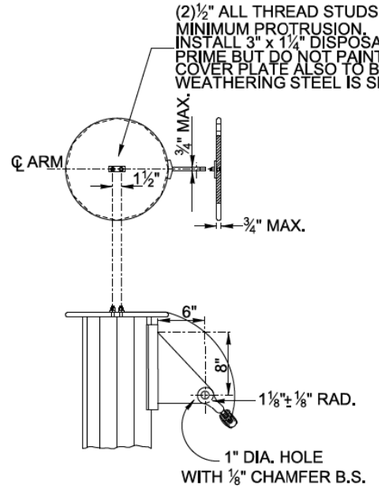


PLAN VIEW



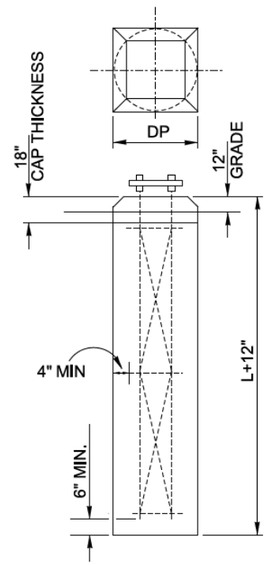
GENERAL NOTES

1. (2) 1/2" ALL THREAD STUDS, 1-1/2" APART, 1" MINIMUM PROTRUSION. INSTALL 3" X 1-1/4" COVER PLATE WITH NUTS. FOR PAINTED POLES PRIME, BUT DO NOT PAINT AREA UNDER COVER PLATE. COVER PLATE SHALL BE INSTALLED WHEN WEATHERING STEEL IS SPECIFIED.
2. 1" DIAMETER HOLE WITH 1/8" CHAMFER BOTH SIDES.
3. INSTALL STEP LUGS FROM 85' ABOVE BASE PLATE TO TOP OF POLE.
4. POLE NUMBER SHALL BE INSTALLED ON EACH POLE AS REQUIRED.
5. SEE SHEET T-0-400 FOR GENERAL DETAILS.
6. SEE SHEET T-0-400A FOR ARM AND END PLATE DETAILS.
7. SUSPENSION INSULATORS TO BE 345kV TOUGHENED GLASS INSULATORS.
8. STRUCTURE DESIGN SHOWN IS FOR CONFIGURATION ONLY. ENGINEERING STRENGTH CALCULATIONS AND STRUCTURE DESIGN DETAILS MUST BE PERFORMED FOR EACH PROJECT.



STATIC CONNECTION
DETAIL "A"

DIMENSIONS			
HA	HB	A	B
75'0"	61'0"	60'0"	46'0"
80'0"	66'0"	65'0"	51'0"
85'0"	71'0"	70'0"	56'0"
90'0"	76'0"	75'0"	61'0"
95'0"	81'0"	80'0"	66'0"
100'0"	86'0"	85'0"	71'0"
105'0"	91'0"	90'0"	76'0"
110'0"	96'0"	95'0"	81'0"
115'0"	101'0"	100'0"	86'0"
120'0"	106'0"	105'0"	91'0"
125'0"	106'0"	110'0"	96'0"
130'0"	116'0"	115'0"	101'0"
135'0"	121'0"	120'0"	106'0"
140'0"	126'0"	125'0"	111'0"



FOOTING DATA

CERTIFICATION

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PH NO: (406) 656-8100

HDR

DWN: ZMJ DATE: 1-5-14
CHK'D: DATE:
FILMED:

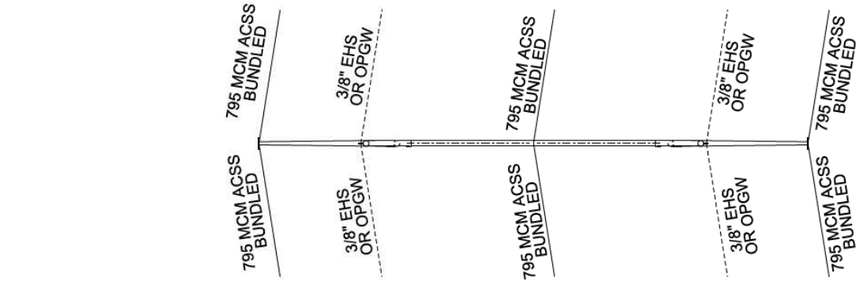
JASON F. BRUNNER NEW MEXICO 20837 PROFESSIONAL ENGINEER

18° - 30° RUNNING ANGLE 345kV
STRUCTURE DRAWING
STEEL 3-POLE - FOUNDATION

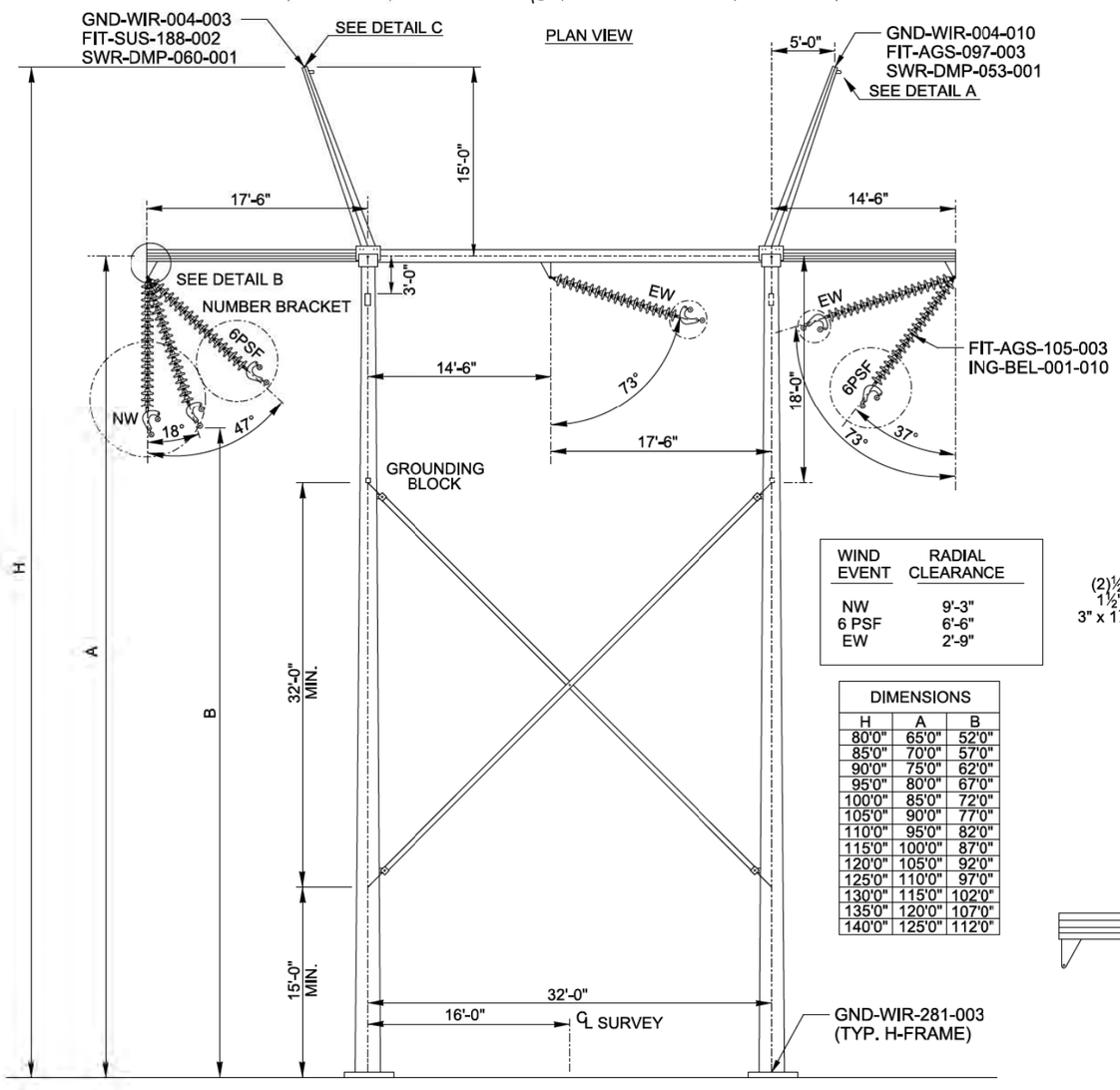
Xcel Energy® SD-T40-719 SCALE NONE REV NONE

3/12/2014 365745 RM

ANSI_TRANS_TMP.DGN



PLAN VIEW

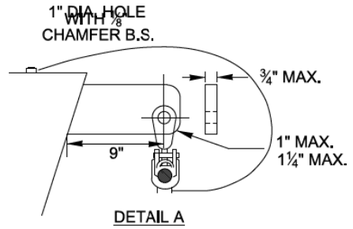


WIND EVENT	RADIAL CLEARANCE
NW	9'-3"
6 PSF	6'-6"
EW	2'-9"

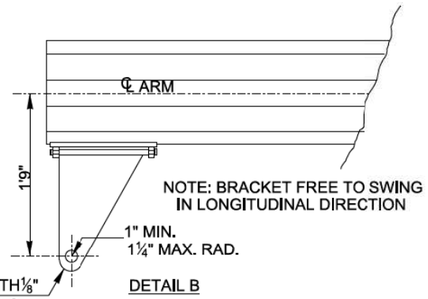
DIMENSIONS		
H	A	B
80'0"	65'0"	52'0"
85'0"	70'0"	57'0"
90'0"	75'0"	62'0"
95'0"	80'0"	67'0"
100'0"	85'0"	72'0"
105'0"	90'0"	77'0"
110'0"	95'0"	82'0"
115'0"	100'0"	87'0"
120'0"	105'0"	92'0"
125'0"	110'0"	97'0"
130'0"	115'0"	102'0"
135'0"	120'0"	107'0"
140'0"	125'0"	112'0"

GENERAL NOTES

1. (2) 1/2" ALL THREAD STUDS, 1-1/2" APART, 1" MINIMUM PROTRUSION. INSTALL 3" X 1-1/4" COVER PLATE WITH NUTS. FOR PAINTED POLES PRIME, BUT DO NOT PAINT AREA UNDER COVER PLATE. COVER PLATE SHALL BE INSTALLED WHEN WEATHERING STEEL IS SPECIFIED.
2. 1" DIAMETER HOLE WITH 1/8" CHAMFER BOTH SIDES.
3. INSTALL STEP LUGS FROM 85' ABOVE BASE PLATE TO TOP OF POLE.
4. POLE NUMBER SHALL BE INSTALLED ON EACH POLE AS REQUIRED.
5. SEE SHEET T-0-400 FOR GENERAL DETAILS.
6. SEE SHEET T-0-400A FOR ARM AND END PLATE DETAILS.
7. SUSPENSION INSULATORS TO BE 345kV TOUGHENED GLASS INSULATORS.
8. STRUCTURE DESIGN SHOWN IS FOR CONFIGURATION ONLY. ENGINEERING STRENGTH CALCULATIONS AND STRUCTURE DESIGN DETAILS MUST BE PERFORMED FOR EACH PROJECT.

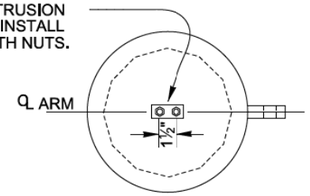


DETAIL A

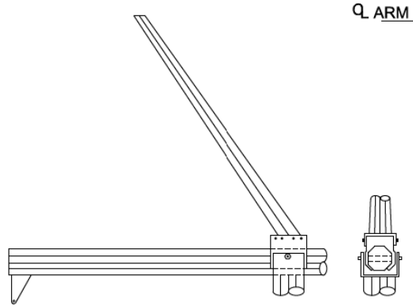


DETAIL B

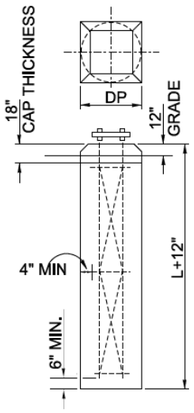
(2)½" STUD ALL THREAD,¾" MIN. PROTRUSION
1½" APART WITH TWO (2) HEX NUTS. INSTALL
3" x 1¼" DISPOSABLE COVER PLATE WITH NUTS.



DETAIL C



ARM CONNECTION DETAIL



FOOTING DATA

CERTIFICATION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF:

NEW MEXICO

W.O.- 11937122

(SIGNED)

DATE:

JASON F. BRUNNER ENG.
REG. NO. PE-20837
PH NO: (406) 656-8100

ADAM ROLLER DSGN.
PH NO: (406) 656-8100

HDR

DWN: ZMJ DATE: 1-5-14
CHK'D: DATE:
FILMED:

JASON F. BRUNNER NEW MEXICO 20837 PROFESSIONAL ENGINEER

1/2° - 4° TANGENT 345kV
STRUCTURE DRAWING
STEEL H-FRAME - FOUNDATION

Xcel Energy® | SD-T40-720 | SCALE NONE | REV NONE

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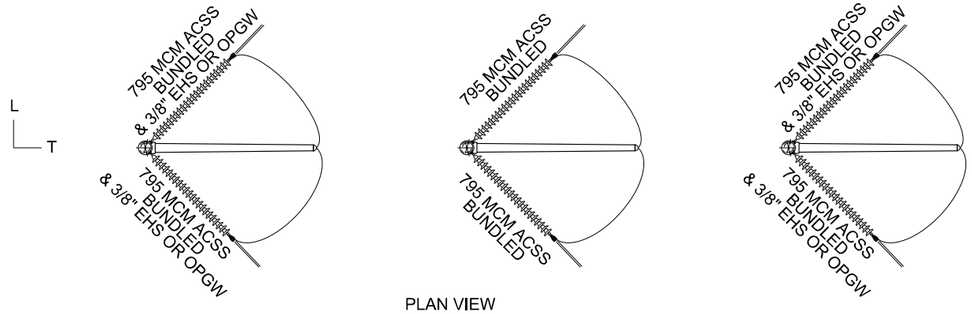
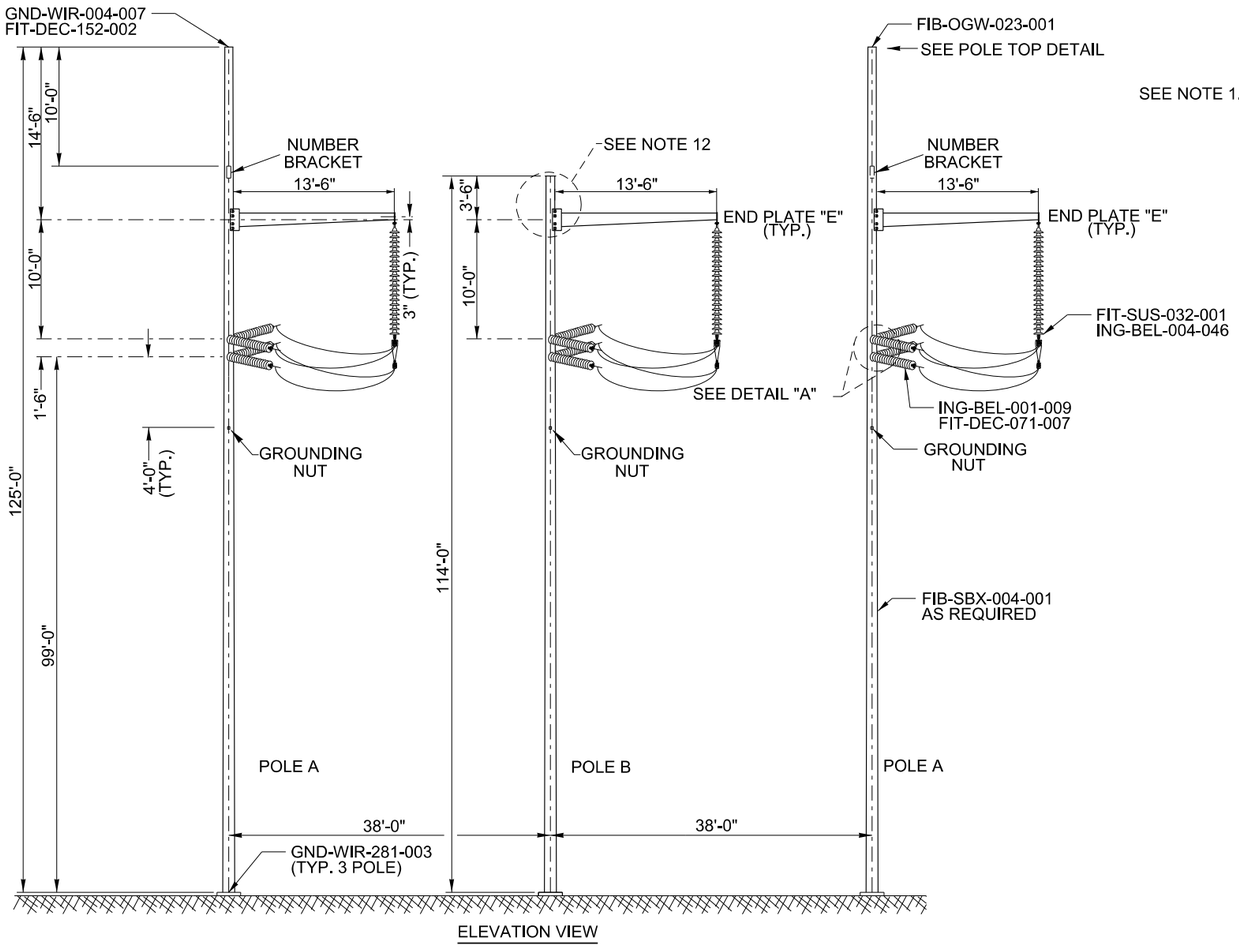
ANSI TRANS TMP.DGN

90° ORIENTATION



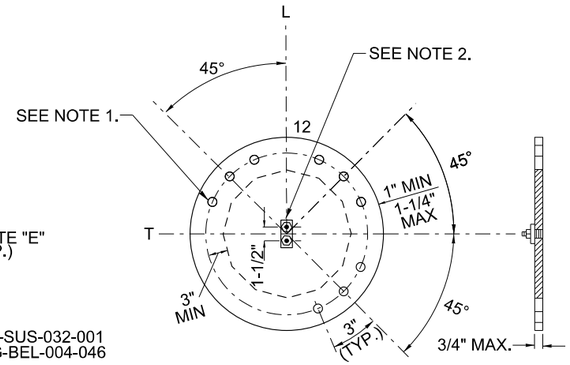
PLAN VIEW



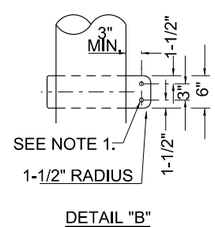
ELEVATION VIEW

GENERAL NOTES

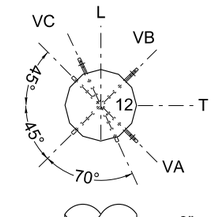
1. 1" DIAMETER HOLE WITH 1/8" CHAMFER BOTH SIDES, TYPICAL.
2. (2) 1/2" ALL THREAD STUDS, 1-1/2" APART, 1" MINIMUM PROTRUSION. INSTALL 3" X 1-1/4" COVER PLATE WITH NUTS. FOR PAINTED POLES PRIME, BUT DO NOT PAINT AREA UNDER COVER PLATE. COVER PLATE SHALL BE INSTALLED WHEN WEATHERING STEEL IS SPECIFIED.
3. INSTALL STEP LUGS FROM 85' ABOVE BASE PLATE TO TOP OF POLE.
4. POLE NUMBER SHALL BE INSTALLED ON EACH POLE AS REQUIRED.
5. SEE SHEET T-0-400 FOR GENERAL DETAILS.
6. SEE SHEET T-0-400A FOR END PLATE DETAILS.
7. SEE SHEET T-0-400C FOR ANCHOR BOLT CAGE DETAILS.
8. SEE SHEET T-0-400D FOR FIBER OPTIC SPLICE DETAILS.
9. STRAIN INSULATORS ARE TO BE 345KV TOUGHENED GLASS INSULATORS. SUSPENSION INSULATORS ARE TO BE 345KV TOUGHENED GLASS INSULATORS.
10. STRUCTURE DESIGN SHOWN IS FOR CONFIGURATION ONLY. ENGINEERING STRENGTH CALCULATIONS AND STRUCTURE DESIGN DETAILS MUST BE PERFORMED FOR EACH PROJECT.
11. INITIALLY STRUCTURE WILL BE 90° DEADEND CORNER USING VANGS "VA" AND "VB" FROM DETAIL "A". FUTURE UPGRADE WILL ELIMINATE 90° CORNER AND UTILIZE THIS STRUCTURE AS A 20° DEADEND, WHERE VANGS "VA" AND "VC" WILL BE USED. STRUCTURE ORIENTATION AND PLACEMENT WILL NOT CHANGE WITH THE UPGRADE.
12. JUMPER ARMS WILL NEED BRACKETS ON BISECTOR OF 90° AND 20° ANGLES. POLE HEIGHT HAS BEEN ADJUSTED TO ALLOW ADEQUATE SPACING. MINIMUM JUMPER ARM HEIGHT ABOVE PHASE TO BE 10'-0".
13. SEE SD-T40-763-1 AND LD-T40-763-1 FOR 90° ORIENTATION. SEE SD-T40-763-2 AND LD-T40-763-2 FOR 20° ORIENTATION.

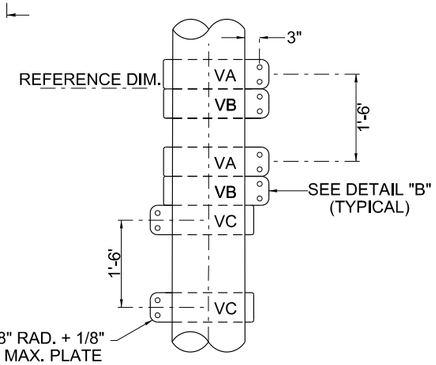


POLE TOP DETAIL



DETAIL "B"





DETAIL "A"

CONDUCTOR ATTACHMENT & INSULATOR ATTACHMENT BRACKET

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NEW MEXICO

W.O.- 11937122

JASON F. BRUNNER (SIGNED)

DATE: 3/5/15

JASON F. BRUNNER ENG.
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ADAM ROLLER DSGN.
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HDR

DWN: ZMJ DATE: 3-5-15

CHK'D: DATE:

FILMED:

JASON F. BRUNNER NEW MEXICO 20837 PROFESSIONAL ENGINEER

90°/20° DEADEND - FIBER SPLICE 345kV
STRUCTURE DRAWING
STEEL 3-POLE - FOUNDATION

Xcel Energy® | SD-T40-763-1 | SCALE NONE | REV 0

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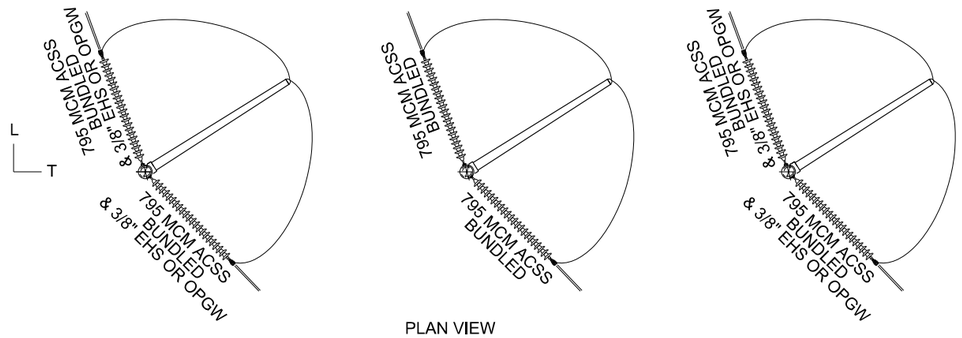
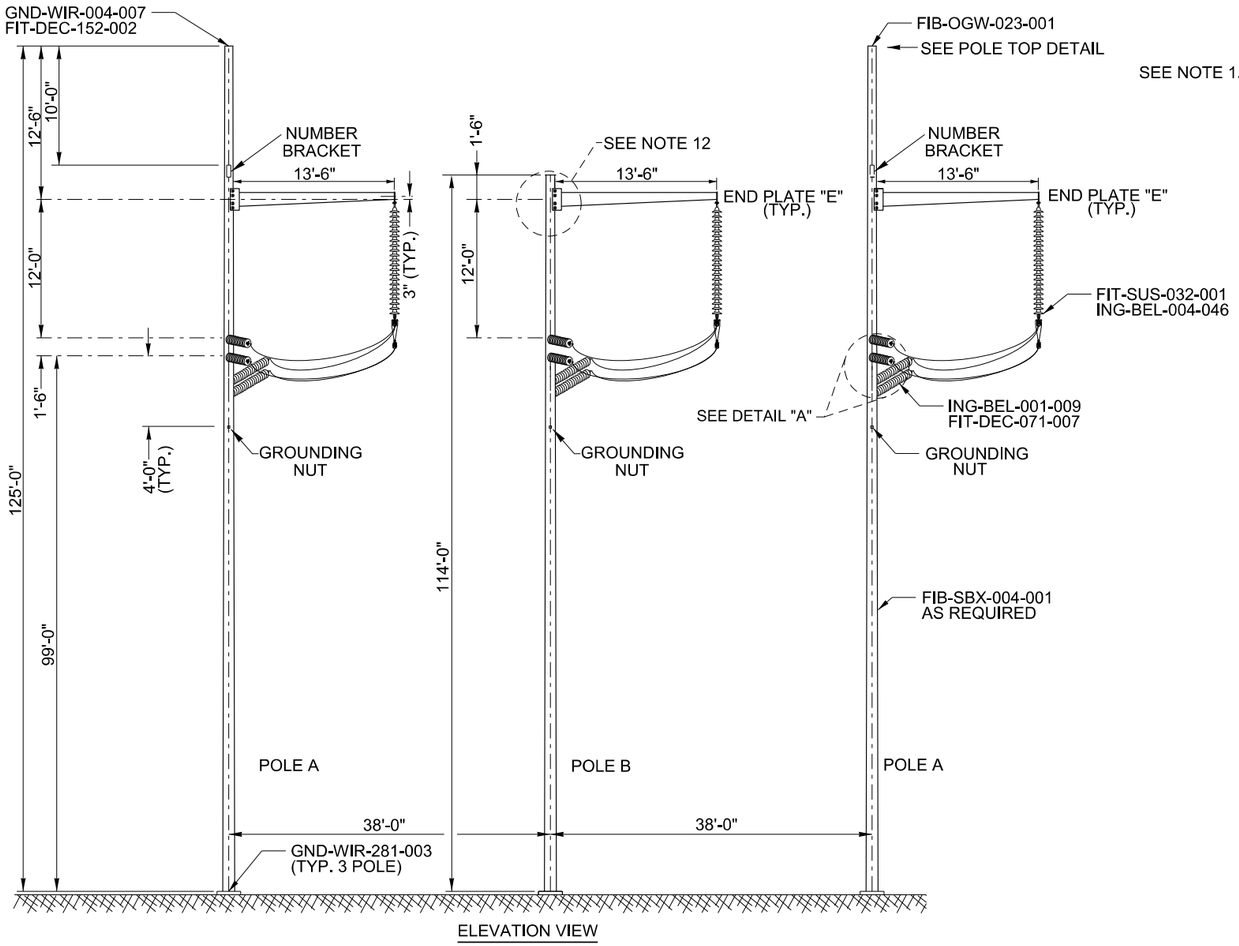
ANSI TRANS TMP.DGN

20° ORIENTATION (FUTURE TO KIOWA)



PLAN VIEW



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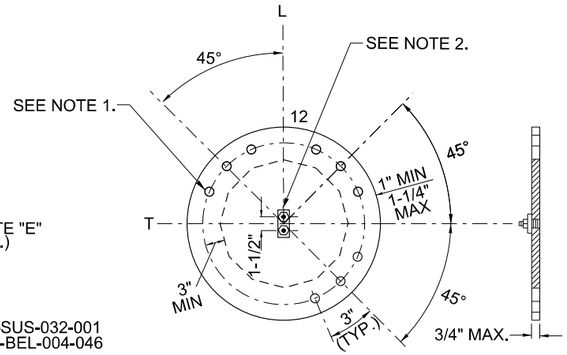
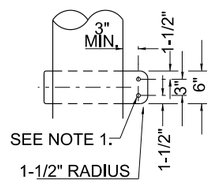
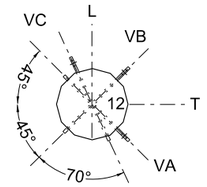
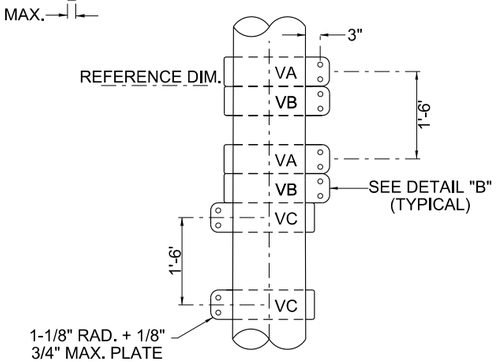


POLE TOP DETAIL



DETAIL "B"





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STEEL 3-POLE - FOUNDATION

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