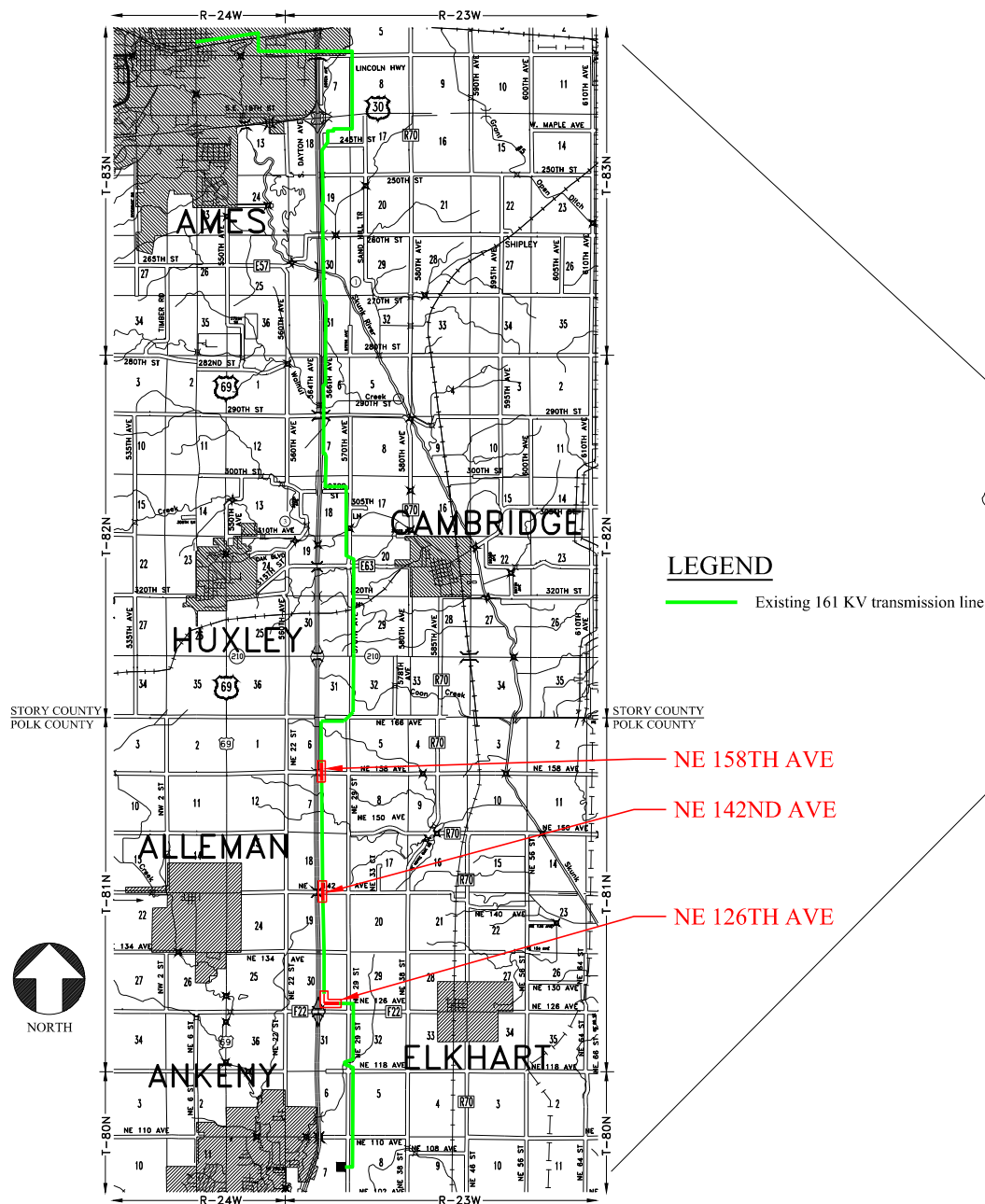


# AMES PLANT TO NORTHEAST ANKENY 161 KV TRANSMISSION LINE RELOCATION IOWA DOT I-35 PROJECT 2022-2023

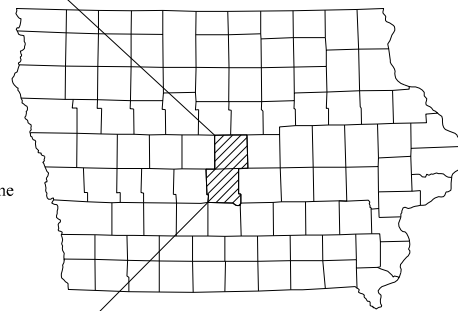
## CITY OF AMES ELECTRIC SERVICES AMES, IOWA

**-PRELIMINARY-  
NOT FOR CONSTRUCTION  
FOR REVIEW 06/30/22**



### LEGEND

Existing 161 KV transmission line



STORY AND POLK COUNTIES, IOWA  
DGR PROJECT NUMBER 419437



ROCK RAPIDS, IOWA  
(712) 472-2531

### DRAWING LIST

- CN - CONSTRUCTION NOTES
- PLAN AND PROFILE DRAWINGS & UNIT SHEETS:
  - NE 158TH AVE
    - UNIT SHEET - 18
    - P&P SHEET - 18
    - P&P SHEET - NE 158TH TEMP
  - NE 142ND AVE
    - UNIT SHEET - 20
    - P&P SHEET - 20
    - P&P SHEET - NE 142ND TEMP
  - NE 126TH AVE
    - UNIT SHEET - 22
    - P&P SHEETS - 22 TO 23
- FDN-1 FOUNDATION DETAILS
- CONSTRUCTION UNITS:
  - TM-1,2,3 DEADEND ASSEMBLIES
  - TP-161-BLP 161 kV TANGENT BRACED LINE POST
  - TP-161B-BLP 161 kV TANGENT STACKED BRACED LINE POST
  - TS-4A-161 161 kV MEDIUM ANGLE WOOD POLE
  - TS-5GLA-161 161 kV VERTICAL DEADEND CORNER
  - TS-5GSA-161 161 kV VERTICAL DEADEND CORNER
  - E3-3, E5, D6 DOWN GUY INSULATED
  - E3-3D, E5, D6 DOUBLE DOWN GUY INSULATED
  - FOS-2 FIBER OPTIC STORAGE - WOOD POLE
  - WPG WOOD POLE GROUND
  - SPG STEEL POLE GROUND
- LAMINATED WOOD POLE LOADING TREES:
  - LWP-232 LAMINATED WOOD POLE #232
  - LWP-234 LAMINATED WOOD POLE #234
  - LWP-262 LAMINATED WOOD POLE #262
  - LWP-264 LAMINATED WOOD POLE #264
  - LWP-289 LAMINATED WOOD POLE #289
  - LWP-291 LAMINATED WOOD POLE #291
  - LWP-293 LAMINATED WOOD POLE #293
  - LWP-296 LAMINATED WOOD POLE #296
- SSSP-292 STEEL POLE LOADING TREE
- EXISTING STEEL POLE DRAWINGS:
  - ANCHOR BOLT DETAILS
  - STRUCTURE DETAILS
- SAG CHARTS

**CONSTRUCTION NOTES:**

**1. GENERAL:**

- 1.1. The Contractor shall modify the existing 161 kV transmission line along I-35 at intersections of NE 158th Ave., NE 142nd Ave., and NE 126th Ave to accommodate the heavy machinery operation for Iowa DOT's road construction projects, completed by Others.
- 1.2. NE 158th Ave and NE 142nd Ave locations:
  - 1.2.1. Install new temporary 161 kV conductor, OPGW and structures for temporary "shoo-fly" alignment as shown on the Drawings.
  - 1.2.2. Remove structures in the existing alignment where shown on the Drawings. The 161 kV and OPGW fiber connection will be maintained via the temporary alignment for the duration of the Iowa DOT's overpass modifications.
  - 1.2.3. After the Iowa DOT work is complete, install new structures and transfer conductor to the final alignment. Transfer the OPGW and phase conductor of the temporary line to the final alignment.
- 1.3. NE 126th Ave location:
  - 1.3.1. Install new structures where required on the Drawings in the new 161 kV transmission alignment. Transfer existing OPGW and phase conductor to the new structures.
  - 1.3.2. Includes the relocation of existing steel pole SSSP-289 to proposed structure #288.
  - 1.3.3. Remove existing concrete foundations to \_\_\_' below existing grade.

**2. CONDUCTOR:**

- 2.1. New Conductor and OPGW shall be furnished for the temporary line installations at NE 158th Ave and NE 142nd Ave. The Contractor shall utilize the OPGW and conductor of the temporary line and transfer to the final 161 kV line configuration.
- 2.2. The Contractor shall sag all conductor according to Sag Charts provided by the Engineer.

**3. PHASING:** The Contractor shall complete verification of phasing before finalizing deadend connections and energization of all circuits.

**4. OUTAGES:** Coordinate all outages with the Owner. See Specifications for outage, constraints and schedule information.

**5. STAKING:**

- 5.1. The staking of the transmission poles will be done once by the Owner's representative. It is the responsibility of the Contractor to safeguard stakes in the field. Additional staking is at the expense of the Contractor.
- 5.2. Contractor shall coordinate timing of staking with the Owner and Engineer. Provide a minimum of 3 weeks notice to the Engineer before stakes are required for construction.
- 5.3. Contractor must receive approval from the Engineer to adjust a staked location.

**6. Right-of-Way:**

- 6.1. The project is located in private easement along the Iowa DOT I-35 ROW. All areas disturbed by the Contractor shall be restored to their original condition. The Contractor shall stay within the easement areas at all times, unless authorized by private landowners or other authorities.
- 6.2. Access to the project site shall be limited to the easement, or as approved by private land owner. The Contractor shall coordinate any necessary private property access with property owners as necessary.
- 6.3. The Contractor shall install silt fence, straw wattles or other measures as required for the control of erosion, runoff, and spills due to storm water or construction activities to the project site. The Contractor is solely responsible for site controls for environmental, storm water systems, waterways, private property and public ROW.
- 6.4. The Contractor shall remove and dispose of all spoils from the site as necessary. Concrete washout shall be completed off-site and is the responsibility of the Contractor.

**7. TRAFFIC CONTROL:**

- 7.1.1. The Contractor is responsible for developing and implementing traffic control plans and measures as needed. Coordinate traffic control plan with the City, County, and State DOT authorities as necessary to complete the construction work specified in the Contract.

**8. LOCATES:**

- 8.1. The Contractor is responsible for calling Iowa One Call and exposing all foreign utilities prior to any excavation.
- 8.2. The Contractor shall be responsible for locating and, if necessary exposing, any foreign utilities prior to any excavation, including any hand digging or vac work as necessary, with costs incidental to the project.

**9. SETTING OF STRUCTURES:**

- 9.1. All tangent direct buried poles shall be installed at embedment depths according to the staking sheets or the supplier-furnished detail and erection drawings. Pole detail drawings by the Engineer are for reference only. The Contractor shall furnish detail drawings for setting of all engineered structures prior to construction for engineering review according to the Specifications.
- 9.2. Typical tangent structure embedment depths are 10%+2' of total pole length, except where noted otherwise on the Unit Sheets, Drawings or Supplier-furnished detail drawings.

**10. POLE RAKE:**

- 10.1. Tangent structures with a line angle of 1 degree or greater shall be field raked a minimum of 12" or as shown on the Unit Sheets or Drawings.
- 10.2. Laminated wood structures shall be raked according to manufacturer recommendations.

**11. TEMP/GUARD STRUCTURES:**

- 11.1. Contractor shall furnish, install and maintain temporary guard structures and guy supports for construction and to protect adjacent foreign utilities as necessary for completion of the Work.

**12. REMOVALS:**

- 12.1. The Contractor is responsible for the disposal and salvage of all removed or unused materials not expressly specified for use on the project.

**13. MATERIAL STORAGE:**

- 13.1. The Contractor is responsible for the storage of all materials utilized on the project, including existing structures and conductor that is to be relocated and re-installed.
- 13.2. The Contractor shall procure, set-up, maintain and secure a project laydown yard for storage of all materials as required for the project.

**14. OPGW:**

- 14.1. OPGW fiber connectivity shall be maintained for the temporary line.
- 14.2. The Contractor shall splice and test all fibers at installation of temporary alignment and again at installation of the final alignment.
- 14.3. Contractor shall leave a minimum OPGW tail length of 100' each way (200' total) for OPGW fiber optic storage loops.

GENERAL DESIGN INFORMATION		PLAN & PROFILE DRAWING LEGEND	
PHASE CONDUCTOR:	161 kV PHASE: T2-397 ACSR IBIS 10,500# NESC HEAVY (UNLESS OTHERWISE NOTED)	PROFILE SHEET STRUCTURE LABEL	EXAMPLE (TYP.)
STATIC CONDUCTOR:	OPGW 24F-1M: 4,7000-5,000# NESC HEAVY (U.N.O.)	1ST LINE STRUCTURE NUMBER	295
RULING SPAN	375' TYPICAL	2ND LINE PRIMARY STRUCTURE FRAMING UNIT. STRUCTURE SIZE [SSSP/LWP AGL - OR - CLASS.LENGTH]	TP-161B-H5.085(LWP)
POLES:	LAMINATED WOOD AND WEATHERING STEEL	3RD LINE - CONSTRUCTION NOTES & UNITS AS NECESSARY	WPG
		BOT. LINE PROJECT STATIONING (FT.)	STA= 0+00

-PRELIMINARY-  
 NOT FOR CONSTRUCTION  
 FOR REVIEW 06/30/22

REV	DATE	DESCRIPTION
0	06-23-2022	PRELIMINARY



Project Manager: DJH  
 Designer: JDL  
 Project Number: 419437  
 Phone: (712) 472-2531

CITY OF AMES ELECTRIC SERVICES  
 AMES, IOWA

**CONSTRUCTION NOTES**  
 AMES-ANKENY 161 kV TRANSMISSION LINE  
 IA DOT I-35 RELOCATION

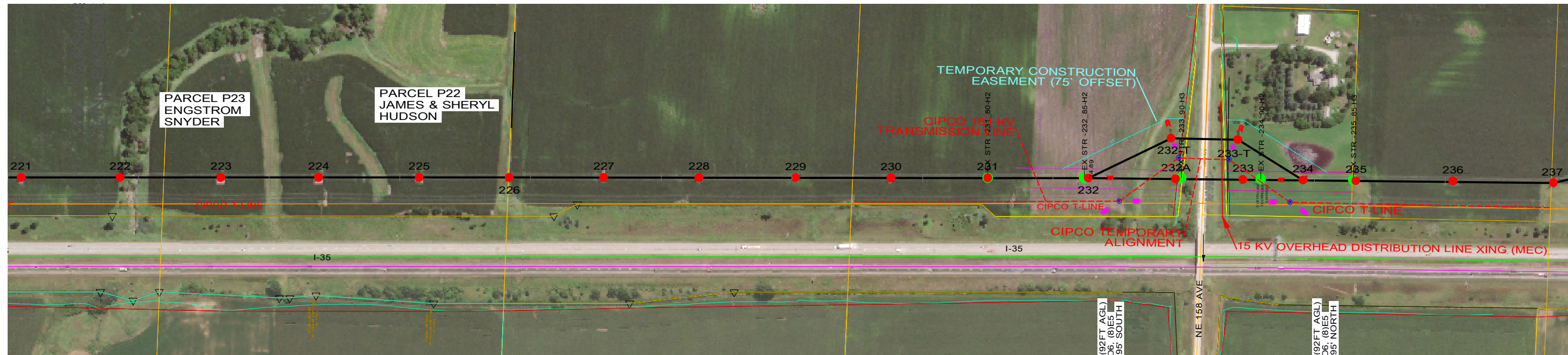
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POLE NUMBER	85-H4 (LWP) 95-H4 (LWP) 100-H2 110-H2 110-H5 (LWP) LWP-232 (92 FT AGL) LWP-234 (92 FT AGL) TP-161: Tangent BLP TS-5GLA-161: 161kV Vertical DE, Large Angle, Lam Pole D6: Screw Anchor, Lam Pole E3-3: Insulated Down Guy E3-3D: Insulated Down Guy E5: 5' Guy Extension FOS-2: Fiber Optic Storage System, Wood Pole XC-161: Transfer 69 kV (3Ø) XC-OPGW: Transfer OPGW WPG: Wood Pole Ground RGA: Remove Guy and Anchor RS: Remove Structure OPGW: 24F OPTICAL GROUND WIRE (Mft.) T2-397 ACSR: CONDUCTOR, T-2-397 ACSR IBIS (Mft.) RC: Remove Conductor, 1Ø, Phase and OPGW, (Mft.)																	CONSTRUCTION NOTES						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17							
230																		No changes to existing structure.						
231	1																	Replace ex Str 231, transfer ex OPGW and 161 kV phase conductor to new structure.						
232				1			1	4	4	8	1	1	1	1	4	1	0.910	2.730	2.800	Replace ex Str 232. Cut and deadend existing OPGW and 161 kV phase conductor. Leave 100' OPGW tails from line to north, install OPGW splice case and storage loop. Remove existing 161 kV phase and OPGW conductor from Strs 232-234. Install temporary structures 232-T & 233-T and conductor. Splice and test OPGW of temporary line. At conclusion of IA DOT work, remove guys & anchors, and transfer conductor from temporary line to Strs 232A-233-234 for final alignment installation. Remove and reattach ahead span deadend connections to south face of pole on back-to-back deadend tees for final in-line deadend.				
232A				1			1												Install new Str 232A, and transfer OPGW and 161 kV phases from temporary structures for final spans between Strs 232-234 after IA DOT work is complete..					
233				1			1												Install new Str 233, and transfer OPGW and 161 kV phases from temporary structures for final spans between Strs 232-234 after IA DOT work is complete..					
234						1	1	4	4	8	1	1	1	1	4	1			Replace ex Str 234. Deadend existing OPGW and 161 kV phase conductor. Leave 100' OPGW tails from line to south, install OPGW splice case and storage loop. At conclusion of IA DOT work, remove guys & anchors, and transfer conductor from temporary line to Strs 232A-233-234 for final alignment installation. Remove and reattach back span deadend connections to north face of pole on back-to-back deadend tees for final in-line deadend.					
235	1																		Replace ex Str 235, transfer ex OPGW and 161 kV phase conductor to new structure.					
236																			No changes to existing structure.					
232-T								1	4	4	8				1	4	1		Temporary structures to provide clearance to IA DOT road work equipment. Remove and salvage structures after IA DOT project is complete.					
233-T			1	1				1	4	4	8				1	4	1		Temporary structures to provide clearance to IA DOT road work equipment. Remove and salvage structures after IA DOT project is complete.					
TOTAL	1	1	1	1	2	1	1	4	2	2	16	8	8	32	2	6	6	8	16	7	1	3	3	

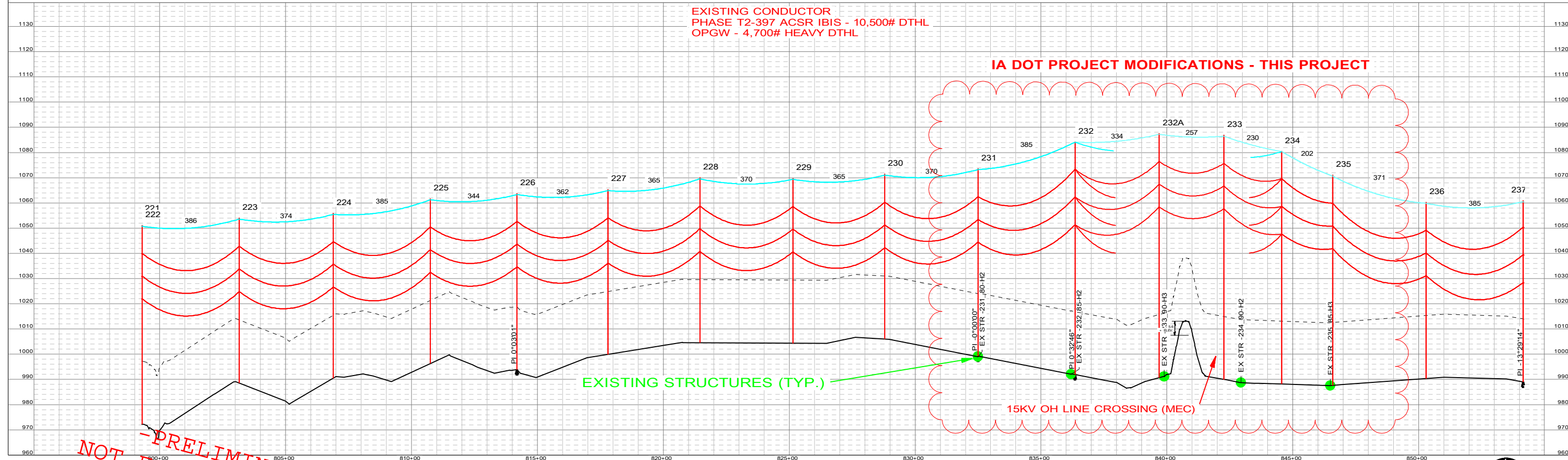
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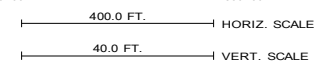


\*\*\*SPECIAL TENSION: OPGW - 4700# MDT (NESC HEAVY) STRUCTURES 212 TO 278\*\*

222 TP-161-H2.090 90-H2 TP-161 STA=799+29.98	223 TP-161-H2.075 75-H2 TP-161 STA=803+15.74	224 TP-161-H2.075 75-H2 TP-161 STA=806+89.55	225 TP-161-H2.075 75-H2 TP-161 STA=810+74.36	226 TP-161-H2.080 80-H2 TP-161 STA=814+18.70	227 TP-161-H2.075 75-H2 TP-161 STA=817+80.30	228 TP-161-H2.075 75-H2 TP-161 STA=821+45.10	229 TP-161-H2.075 75-H2 TP-161 STA=825+14.72	230 TP-161-H2.075 75-H2 TP-161 STA=828+79.72	231 WPG TP-161-H4.085(LWP) STA=832+49.71	232 TS-5GLA-161-LWP 232(92FT AGL) (1)FOS-2, (4)E3-3D, (4)D6, (8)E5 GUY LEADS: 77.83, 89.95' SOUTH (1)RS, (4)RGA WPG STA=836+34.93	233A WPG TP-161-H5.110(LWP) STA=839+69.30	233 WPG TP-161-H5.110(LWP) STA=842+26.61	234 TS-5GLA-161-LWP 234(92FT AGL) (1)FOS-2, (4)E3-3D, (4)D6, (8)E5 GUY LEADS: 77.83, 89.95' NORTH (1)RS, (4)RGA WPG STA=844+56.24	235 WPG TP-161-H4.095(LWP) STA=846+58.49	236 TP-161-H2.080 80-H2 TP-161 STA=850+29.78	237 TP-161B-LWP237 LWP-237 TP-161B
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**NOT FOR CONSTRUCTION - PRELIMINARY - FOR REVIEW 05/30/22**



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REV	DATE	DESCRIPTION
##	6/17/22	PRELIMINARY - 2022 IADOT PROJECT MODS
4	6/21/18	CTCR - REVISED FOR IA DOT HWY 30 & SKUNK RIVER RELOCATION
3	12/30/14	CONFORMING TO CONSTRUCTION RECORDS
2	2/11/13	CONSTRUCTION REVISIONS

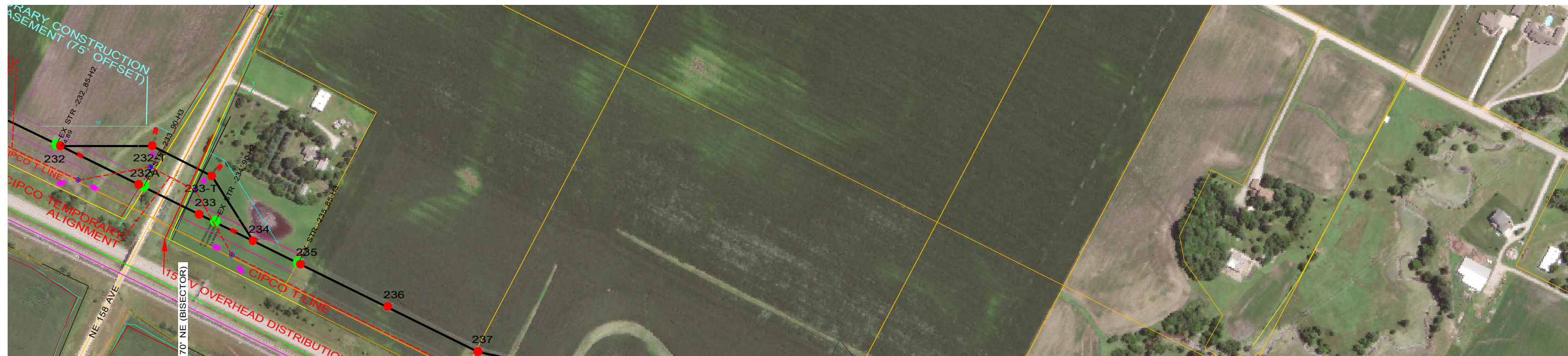


PROJECT MANAGER: DJH  
 DESIGNER: JDL  
 PROJECT NUMBER: 419437  
 PHONE: (712) 472-2531

**CITY OF AMES  
 ELECTRIC SERVICES  
 AMES, IOWA**

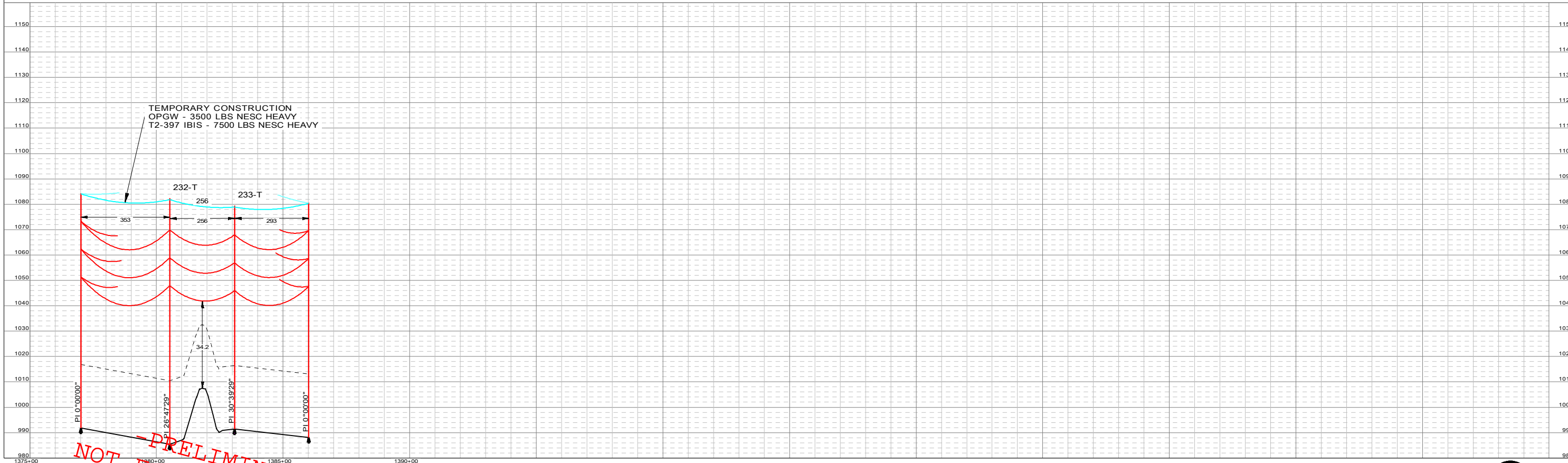
**PLAN & PROFILES  
 AMES PLANT TO NE ANKENY  
 161 KV TRANSMISSION LINE RELOCATION  
 IOWA DOT I-35 PROJECT 2022-2023**





232-T  
 TS-4A-161-H2.110  
 41E3-3D1 (4)D6, 161E5  
 CIPCO TLINE  
 WRS-4 (RGA)  
 WPC  
 STA=1380+52.64

233-T  
 TS-4A-161-H2.100  
 41E3-3D1 (4)D6, 161E5  
 CIPCO TLINE  
 WRS-4 (RGA)  
 WPC  
 STA=1383+08.17



400.0 FT. HORIZ. SCALE  
 40.0 FT. VERT. SCALE

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REV	DATE	DESCRIPTION
##	6/17/22	PRELIMINARY - 2022 IADOT PROJECT MOCS
4	6/21/18	CTCR - REVISED FOR IA DOT HWY 30 & SKUNK RIVER RELOCATION
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PROJECT MANAGER: DJH  
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CITY OF AMES  
 ELECTRIC SERVICES  
 AMES, IOWA

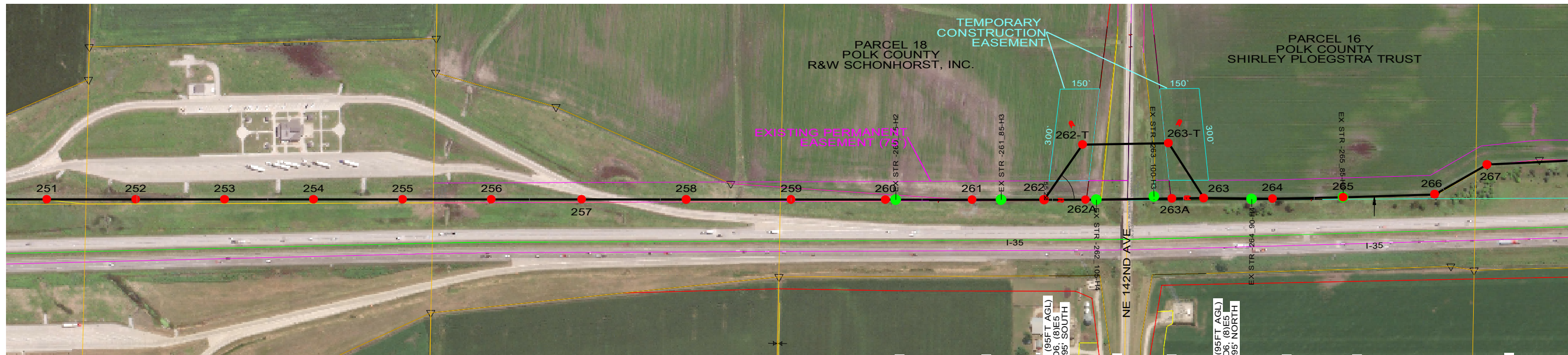
PLAN & PROFILES  
 AMES PLANT TO NE ANKENY  
 161 KV TRANSMISSION LINE RELOCATION  
 IOWA DOT I-35 PROJECT 2022-2023

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NE  
 158TH  
 TEMP

POLE NUMBER	CONSTRUCTION NOTES																								
	80-H3 (LWP)	90-H3 (LWP)	95-H4 (LWP)	115-H4	115-H5 (LWP)	120-H5 (LWP)	LWP-262 (95 FT AGL)	LWP-263 (95 FT AGL)	TP-161B: Small Angle, BLP	TS-5GLA-161: 161kV Vertical DE, Large Angle, Lam Pole	TS-4A-161: 161 Medium Angle, Lam Pole	D6: Screw Anchor, Transmission	E3-3D: Insulated Down Guy, 3/8" EHS, Double	E5: 5' Guy Extension (estimated qty)	FOS-2: Fiber Optic Storage System, Wood Pole	XC-161: Transfer 69 kV (3Ø)	XC-OPGW: Transfer OPGW	WPG: Wood Pole Ground	RGA: Remove Guy and Anchor	RS: Remove Structure	OPGW: 24F OPTICAL GROUND WIRE (Mft.)	T2-397 ACSR: CONDUCTOR, T-2-397 ACSR IBIS (Mft.)	RC: Remove Conductor, 1Ø, Phase and OPGW, (Mft.)		
259																									No changes to existing structure.
260	1						1								1	1	1		1						Replace ex Str 260, transfer ex OPGW and 161 kV phase conductor to new structure.
261			1				1								1	1	1		1						Replace ex Str 261, transfer ex OPGW and 161 kV phase conductor to new structure.
262						1		1						1	1	1	1	4	1	0.840	2.520	2.750			Replace ex Str 262. Cut and deadend existing OPGW and 161 kV phase conductor. Leave 100' OPGW tails from line to north, install OPGW splice case and storage loop. Remove existing 161 kV phase and OPGW conductor from Strs 262-263. Install temporary structures 262-T & 263-T, and conductor. Splice and test OPGW of temporary line. At conclusion of IA DOT work, remove guys & anchors, and transfer conductor from temporary line to Strs 262A-263A-263 for final alignment installation. Remove and reattach ahead span deadend connections to south face of pole on back-to-back deadend tees for final in-line deadend.
262A					1		1								1	1	1								Install new Str 262A, and transfer OPGW and 161 kV phases from temporary structures for final spans between Strs 262-263 after IA DOT work is complete..
263A				1			1								1	1	1								Install new Str 263A, and transfer OPGW and 161 kV phases from temporary structures for final spans between Strs 262-263 after IA DOT work is complete..
263						1	1	4	4	8	1	1	1	1	1	1	4	1							Replace ex Str 263. Deadend existing OPGW and 161 kV phase conductor. Leave 100' OPGW tails from line to south, install OPGW splice case and storage loop. At conclusion of IA DOT work, remove guys & anchors, and transfer conductor from temporary line to Strs 262A-263A-263 for final alignment installation. Remove and reattach back span deadend connections to north face of pole on back-to-back deadend tees for final in-line deadend.
264			1				1	4	4	8				1	1	1		1						Replace ex Str 264, transfer ex OPGW and 161 kV phase conductor to new structure.	
265		1					1							1	1	1		1						Replace ex Str 265, transfer ex OPGW and 161 kV phase conductor to new structure.	
266																									No changes to existing structure.
262-T			1					1	4	4	8						1	4	1					Temporary structures to provide clearance to IA DOT road work equipment. Remove and salvage structures after IA DOT project is complete.	
263-T			1					1	4	4	8						1	4	1					Temporary structures to provide clearance to IA DOT road work equipment. Remove and salvage structures after IA DOT project is complete.	
TOTAL	1	1	2	2	1	1	1	6	2	2	16	16	32	2	8	8	10	16	8	1	3	3			

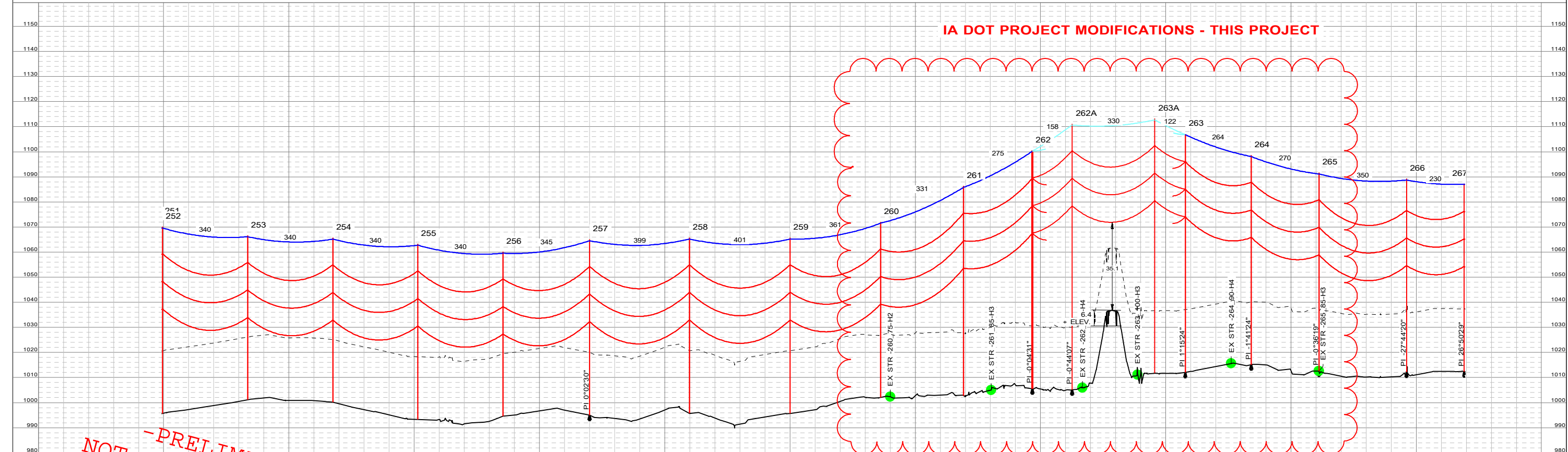
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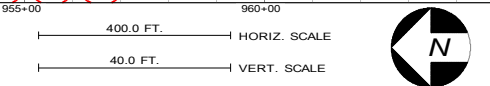
\*\*\*SPECIAL TENSION: OPGW - 4700# MDT (NESC HEAVY) STRUCTURES 212 TO 278\*\*

\*STRUCTURES 267, 268 & 269 STACK POST INSULATORS TO EAST

252 TP-161B-H2.085 85-H2 TP-161B STA=909+95.29	253 TP-161B-H2.075 75-H2 TP-161B STA=913+34.84	254 TP-161B-H2.075 75-H2 TP-161B STA=916+75.20	255 TP-161B-H2.080 80-H2 TP-161B STA=920+14.97	256 TP-161B-H2.075 75-H2 TP-161B STA=923+54.63	257 TP-161B-H3.080 80-H3 TP-161B STA=927+00.04	258 TP-161B-H3.080 80-H3 TP-161B STA=930+99.27	259 TP-161B-H3.080 80-H3 TP-161B STA=935+00.37	260 TP-161B-H3.080 (C:P) EXISTING 75-H2 WPG STA=938+61.37	261 TP-161B-H4.095(LWP) EXISTING 85-H3 WPG STA=941+92.62	262 TS-5GLA-161-LWP.262 (95FT AGL) (1)FOS-2, (4)E3-3D, (4)D6, (8)E5 GUY LEADS: 77.83, 89.95' SOUTH (1)RS, (4)RGA WPG STA=944+67.89	262A TP-161B-H5.120(LWP) WPG STA=946+26.35	263A TP-161B-H5.115(LWP) WPG STA=949+56.04	263 TS-5GLA-161-LWP.263 (95FT AGL) (1)FOS-2, (4)E3-3D, (4)D6, (8)E5 GUY LEADS: 77.83, 89.95' NORTH (1)RS, (4)RGA WPG STA=950+77.77	264 TP-161B-H4.095(LWP) WPG STA=953+41.37	265 TP-161B-H3.090(LWP) WPG STA=956+11.23	266 TS-6A-LWP266 LWP-266 LS-6A STA=959+60.99	267 TS-6XLA-LWP267.POL LWP-267 TS-6XLA STA=961+91.23
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NOT FOR CONSTRUCTION  
FOR REVIEW 06/30/22



P:\041194\04\ANALYSIS\PLS\AMES-ANKENY 161 KV T-LINE (2021-2022 RELOCATION)

REV	DATE	DESCRIPTION
##	6/17/22	PRELIMINARY - 2022 IADOT PROJECT MODS
4	6/21/18	CTCR - REVISED FOR IA DOT HWY 30 & SKUNK RIVER RELOCATION
3	12/30/14	CONFORMING TO CONSTRUCTION RECORDS
2	2/11/13	CONSTRUCTION REVISIONS

**DGR ENGINEERING**

PROJECT MANAGER: DJH  
 DESIGNER: JDL  
 PROJECT NUMBER: 419437  
 PHONE: (712) 472-2531

**CITY OF AMES  
 ELECTRIC SERVICES  
 AMES, IOWA**

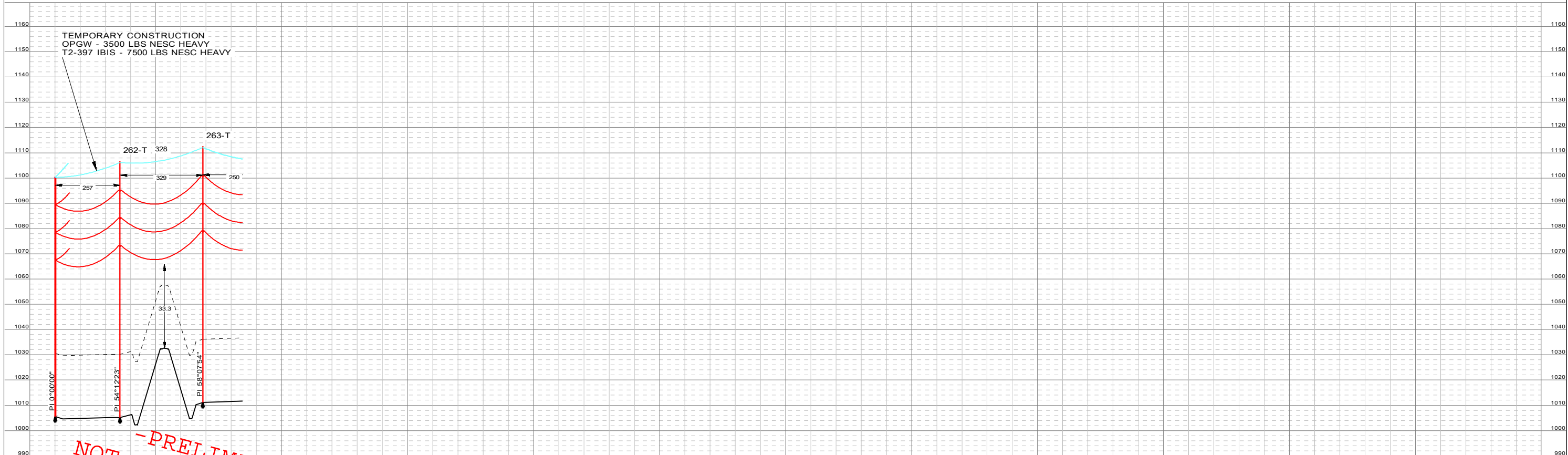
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 IOWA DOT I-35 PROJECT 2022-2023**



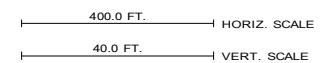


262-T  
 TS=4A-161-H4, 115  
 (4)E3-3, (4)D6, (8)E5  
 GUY LEADS: 82,88,94, 100'  
 (1)RS, 4(RGA)  
 WPG  
 STA=1393+58.41

263-T  
 TS=4A-161-H4, 115  
 (4)E3-3, (4)D6, (8)E5  
 GUY LEADS: 82,88,94, 100'  
 (1)RS, 4(RGA)  
 WPG  
 STA=1396+86.87



NOT FOR CONSTRUCTION - PRELIMINARY -  
 FOR REVIEW 05/30/22



P:\041194\00\ANALYSIS\PLS\AMES-ANKENY 161 KV 2021 I-35 RELOCATION\AMES-ANKENY 161KV T-LINE (2021-2022 RELOCATION)

REV	DATE	DESCRIPTION
##	6/17/22	PRELIMINARY - 2022 IADOT PROJECT MOCS
4	6/21/18	CTCR - REVISED FOR IA DOT HWY 30 & SKUNK RIVER RELOCATION
3	12/30/14	CONFORMING TO CONSTRUCTION RECORDS
2	2/11/13	CONSTRUCTION REVISIONS



PROJECT MANAGER: DJH  
 DESIGNER: JDL  
 PROJECT NUMBER: 419437  
 PHONE: (712) 472-2531

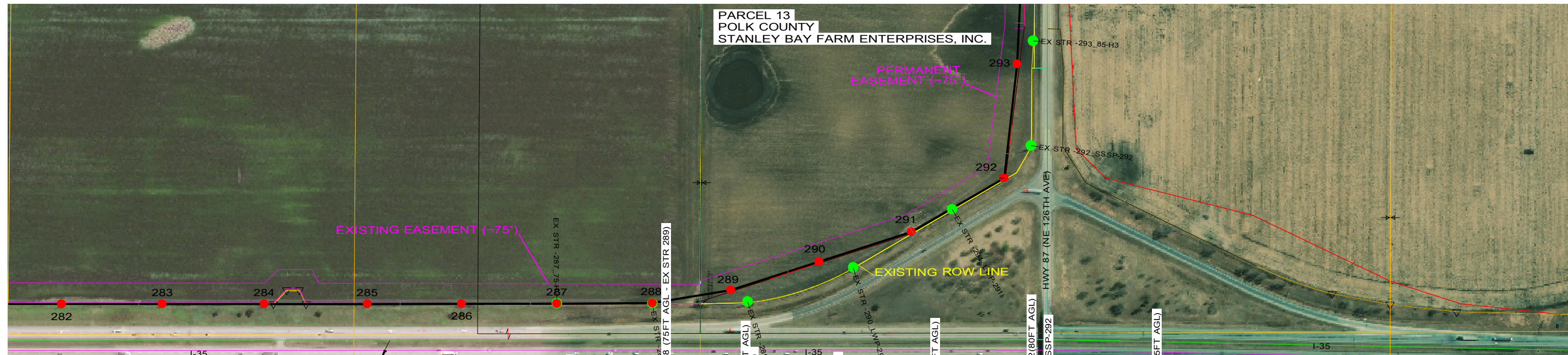
**CITY OF AMES**  
**ELECTRIC SERVICES**  
**AMES, IOWA**

**PLAN & PROFILES**  
**AMES PLANT TO NE ANKENY**  
**161 KV TRANSMISSION LINE RELOCATION**  
**IOWA DOT I-35 PROJECT 2022-2023**

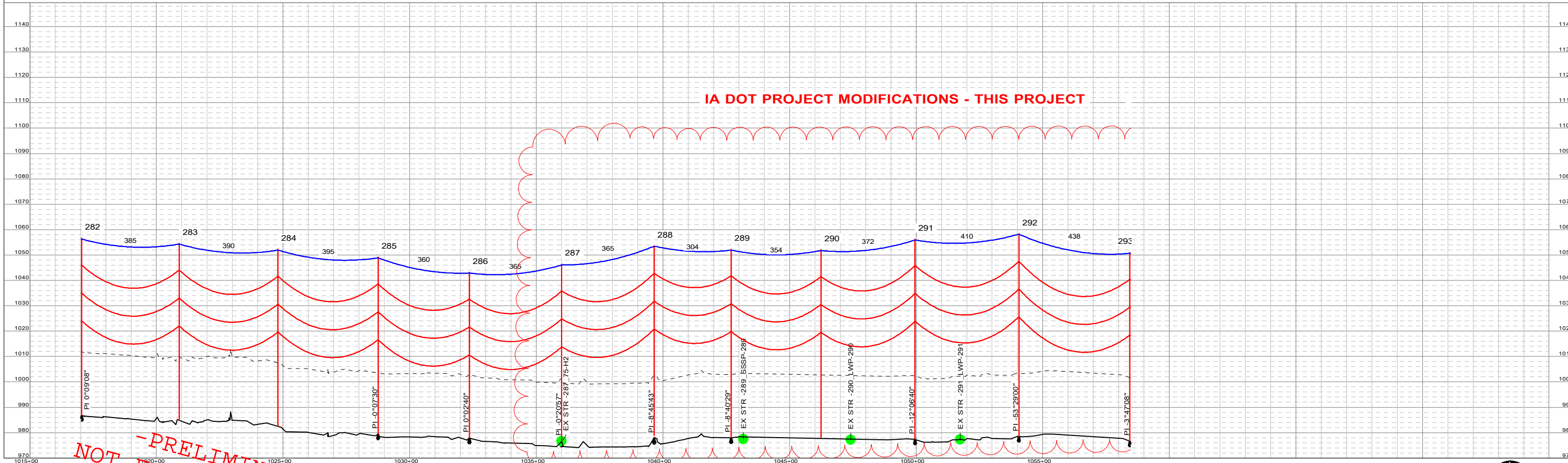
S  
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142ND  
TEMP

POLE NUMBER	STRUCTURE TYPES														CONSTRUCTION NOTES							
	80-H3 (LWP)	85-H2 (LWP)	85-H3 (LWP)	LWP-289 (74FT AGL)	LWP-291 (79FT AGL)	LWP-293 (74.5 FT AGL)	LWP-296 (74.5 FT AGL)	SSSP-288-1	SSSP-292	AB-288	FDN-288	FDN-292	TP-161B: Small Angle, BLP	TS-5GSA-161: 161 Medium Angle, Steel		XC-161: Transfer 69 kV (3Ø)	XC-OPGW: Transfer OPGW	SPG: Steel Pole Ground	WPG: Wood Pole Ground	RCF: Remove Concrete Foundation	RS: Remove Structure	
286																						No changes to existing structure.
287	1											1		1	1			1			1	Replace ex Str 287, transfer ex OPGW and 161 kV phases to new structure.
288								1		1	1			1	2	2	1				1	Relocate existing steel pole SSSP-289 to Str 288. Install new concrete foundation FDN-288 and anchor bolt cage (AB-288). Cut and deadend existing phase conductor. Deadend - do not cut - existing OPGW.
289			1									1		1	1			1	1		1	Install new laminated wood pole. Remove existing concrete foundation. Splice and transfer existing phase conductor. Transfer existing OPGW.
290	1											1		1	1			1			1	Replace ex Str 290, transfer ex OPGW and 161 kV phased to new structure.
291			1									1		1	1			1			1	Replace ex Str 290, transfer ex OPGW and 161 kV phased to new structure.
292								1			1		1	2	2	1			1		1	Furnish and install new steel pole SSSP-292 and concrete foundation FDN-292. Remove existing steel pole and concrete foundation. Transfer existing phase conductor and OPGW.
293				1	1							1		1	1			1			1	Replace ex Str 293, transfer ex OPGW and 161 kV phased to new structure.
294		1										1		1	1			1			1	Replace ex Str 294, transfer ex OPGW and 161 kV phased to new structure.
295		1										1		1	1			1			1	Replace ex Str 295, transfer ex OPGW and 161 kV phased to new structure.
296					1							1		1	1			1			1	Replace ex Str 296, transfer ex OPGW and 161 kV phased to new structure.
297														1	1			1				Existing structure to remain. Remove slack OPGW and phase conductor, re-sag and clamp existing conductor. Utilizing existing splice case, splice and test OPGW.
TOTAL	1	1	2	1	1	1	2	1	1	1	1	1	8	2	13	13	2	9	2	10		

-PRELIMINARY-  
 NOT FOR CONSTRUCTION  
 FOR REVIEW 06/30/22



- 282 TP-161B-H2.080  
80-H2  
TP-161B  
STA=1017+04.57
- 283 TP-161B-H3.080  
80-H3  
TP-161B  
STA=1020+89.76
- 284 TP-161B-H3.080  
80-H3  
TP-161B  
STA=1024+80.20
- 285 TP-161B-H3.080  
80-H3  
TP-161B  
STA=1028+75.10
- 286 TP-161B-H2.075  
75-H2  
TP-161B  
STA=1032+35.54
- 287 TP-161B-H3.080(LWP)  
EXISTING 75-H2  
WPG  
STA=1036+00.32
- 288 TS-5GSA-161-SSSP.288 (75FT AGL - EX STR 289)  
FDN-288, AB-288  
EXISTING 80-H2  
SPG  
STA=1039+65.63
- 289 TP-161B-LWP.289(74FT AGL)  
EX\_SSSP-289 (75' AGL)  
WPG  
STA=1042+69.43
- 290 TP-161B-H2.085 (LWP)  
EXISTING LWP-290  
WPG  
STA=1046+23.92
- 291 TP-161B-LWP.291 (79FT AGL)  
EXISTING LWP-291  
WPG  
STA=1049+95.86
- 292 TS-5GSA-161-SSSP.292(80FT AGL)  
FDN.292  
REPLACE EXISTING SSSP-292  
SPG  
STA=1054+05.54
- 293 TP-161B-LWP-293 (74.5FT AGL)  
EXISTING 85-H3  
WPG  
STA=1058+44.02



NOT FOR CONSTRUCTION  
 FOR REVIEW 05/30/22  
 -PRELIMINARY-

400.0 FT. HORIZ. SCALE  
40.0 FT. VERT. SCALE



P:\041194\04\ANALYSIS\PLS\AMES-ANKENY 161 KV\2021 I-35 RELOCATION\AMES-ANKENY 161KV T-LINE (2021-2022 RELOCATION)

REV	DATE	DESCRIPTION
##	6/17/22	PRELIMINARY - 2022 IADOT PROJECT MODS
4	6/21/18	CTCR - REVISED FOR IA DOT HWY 30 & SKUNK RIVER RELOCATION
3	12/30/14	CONFORMING TO CONSTRUCTION RECORDS
2	2/11/13	CONSTRUCTION REVISIONS



PROJECT MANAGER: DJH  
 DESIGNER: JDL  
 PROJECT NUMBER: 419437  
 PHONE: (712) 472-2531

**CITY OF AMES**  
**ELECTRIC SERVICES**  
**AMES, IOWA**

**PLAN & PROFILES**  
**AMES PLANT TO NE ANKENY**  
**161 KV TRANSMISSION LINE RELOCATION**  
**IOWA DOT I-35 PROJECT 2022-2023**





293  
TP-161B-LWP-293 (74.5FT AGL)  
EXISTING 85-H3  
WPG  
STA=1058+44.02

294  
TP-161B-H3.085(LWP)  
EXISTING 75-H3  
WPG  
STA=1062+75.54

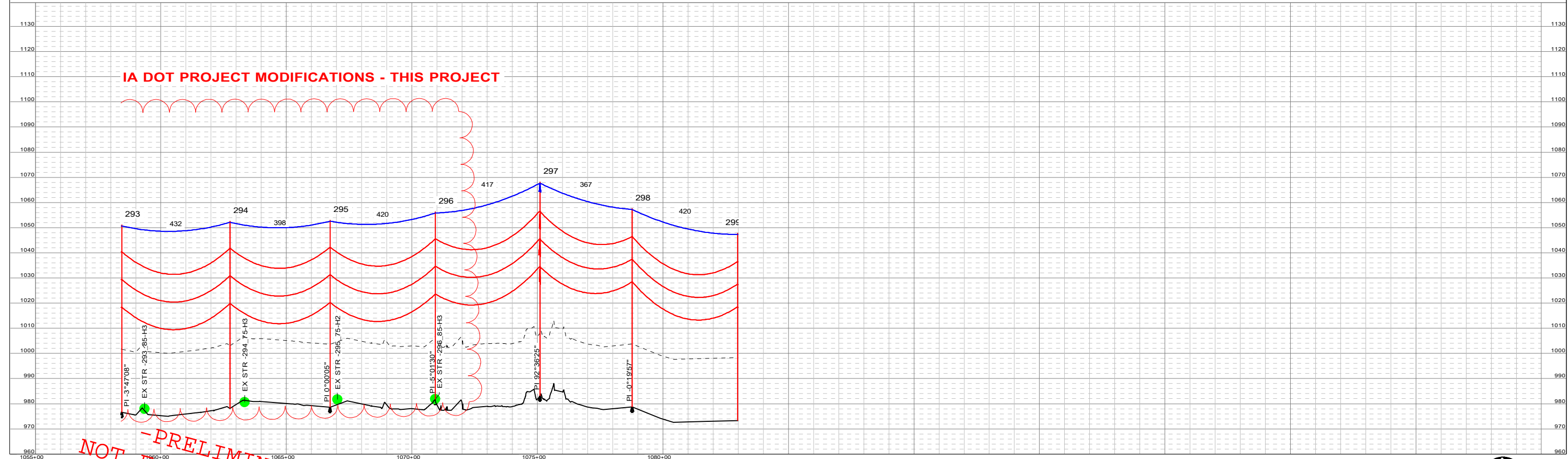
295  
TP-161B-H3.085(LWP)  
EXISTING 75-H2  
WPG  
STA=1066+73.67

296  
TP-161B-LWP-296 (74.5FT AGL)  
EXISTING 85-H3  
WPG  
STA=1070+93.44

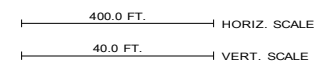
297  
TS-6SX 085 #297 OLD-279  
SSSP-297  
TS-6SX  
OWNER-FURNISHED STEEL POLE  
(OLD #279)  
STA=1075+10.19

298  
TP-161-H3.090 - #298  
90-H3  
TP-161  
STA=1078+77.59

299  
TP-161-H2.085  
85-H2  
TP-161  
STA=1082+97.51



**NOT FOR CONSTRUCTION**  
**FOR REVIEW 05/30/22**  
**-PRELIMINARY-**



P:\041194\04\ANALYSIS\PLS\AMES-ANKENY 161 KV\2021 I-35 RELOCATION\AMES-ANKENY 161KV T-LINE (2021-2022 RELOCATION)

REV	DATE	DESCRIPTION
##	6/17/22	PRELIMINARY - 2022 IADOT PROJECT MODS
4	6/21/18	CTCR - REVISED FOR IA DOT HWY 30 & SKUNK RIVER RELOCATION
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PROJECT MANAGER: DJH  
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PROJECT NUMBER: 419437  
PHONE: (712) 472-2531

**CITY OF AMES**  
**ELECTRIC SERVICES**  
**AMES, IOWA**

**PLAN & PROFILES**  
**AMES PLANT TO NE ANKENY**  
**161 KV TRANSMISSION LINE RELOCATION**  
**IOWA DOT I-35 PROJECT 2022-2023**

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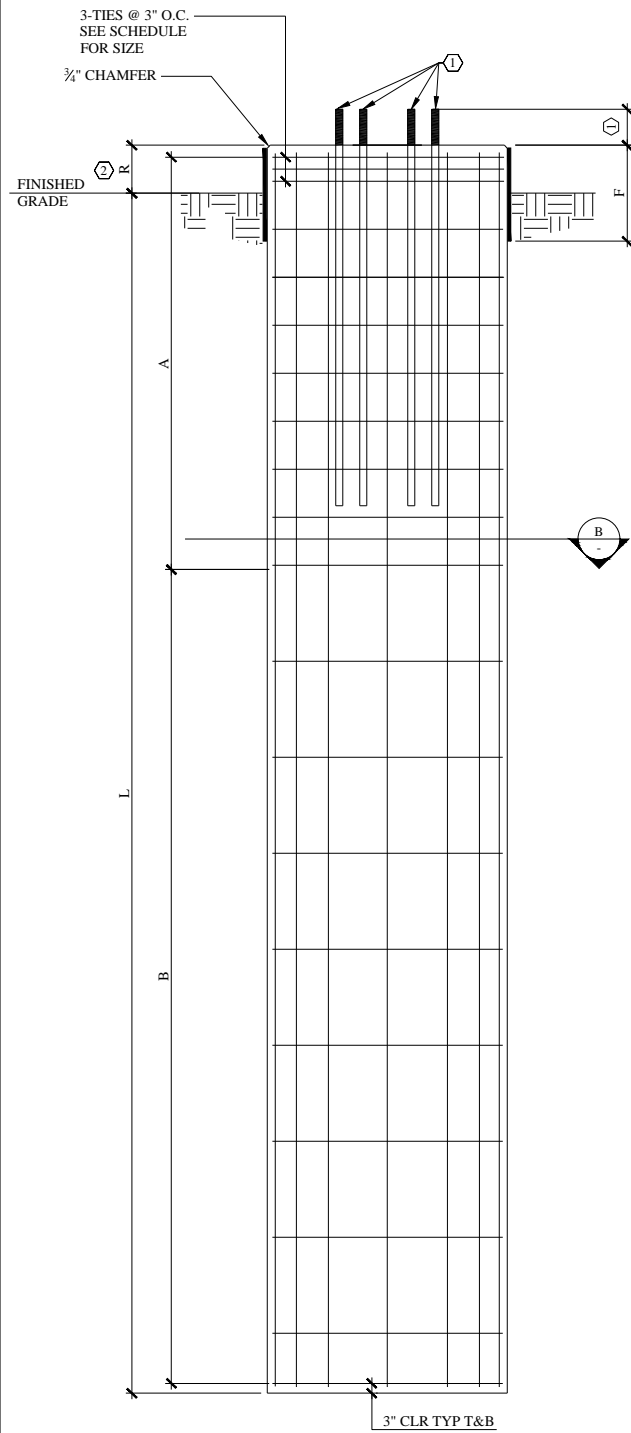
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**DRILLED PIER SCHEDULE**

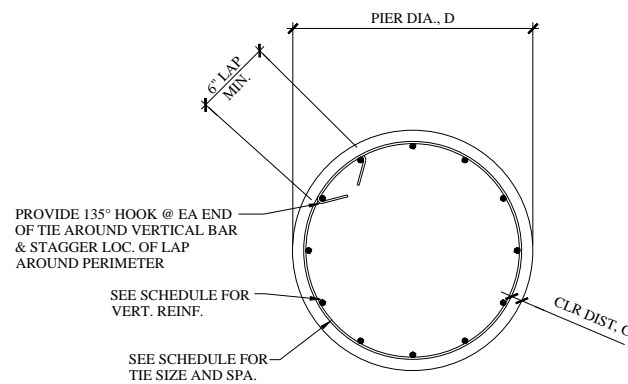
STRUCTURE #	PIER DIAMETER, D	PIER EMBEDMENT, L	PIER REVEAL, R	FORM DEPTH, F	CLEAR DISTANCE, C	VERTICAL REINFORCING		HORIZONTAL REINFORCING, A			HORIZONTAL REINFORCING, B			MAX AB CIRCLE**
						SIZE	QTY	SIZE	QTY*	SPACING	SIZE	QTY	SPACING	
288	72"	29'-0"	1'-0"	3'-0"	5"	#8	31	#4	12	1'-0"	#4	10	2'-0"	SEE DET C
292	90"	30'-0"	1'-0"	3'-0"	6"	#10	36	#4	17	1'-0"	#4	8	2'-0"	68"

\* QUANTITY INCLUDES (3) BARS @ 3" O.C. @ TOP W/ REMAINING BARS @ SPACING INDICATED IN SCHEDULE.

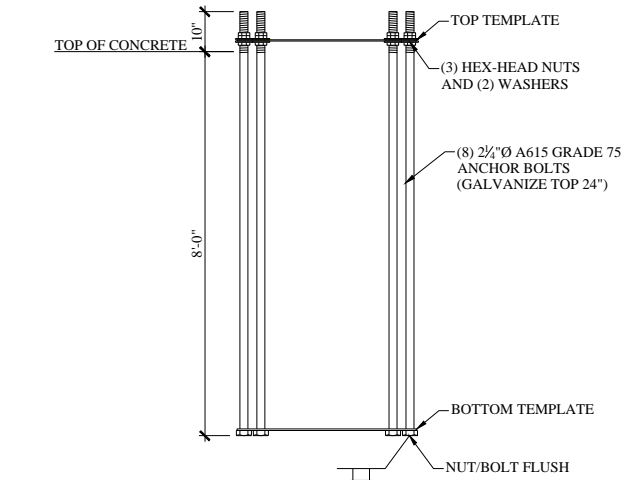
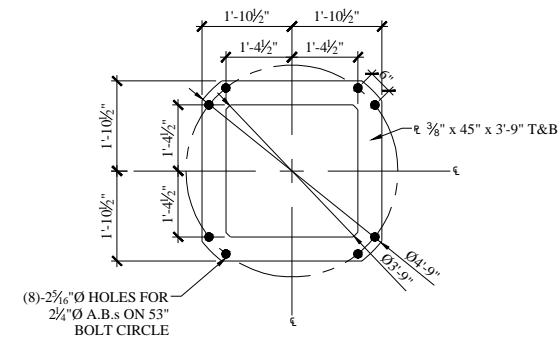
\*\* ANCHOR BOLT TEMPLATE MUST NOT EXCEED THE MAX A.B. CIRCLE LISTED



**(A) TYPICAL PIER DETAIL**  
SCALE (FT.)



**(B) TYPICAL PIER SECTION**  
SCALE (FT.)



**(C) STR 288 ANCHOR BOLT DETAIL**  
SCALE (FT.)

**Sheet Notes:**

- See detail A for typical pier detail.
- See Geotechnical report for summary of subsurface conditions.

**Concrete Notes:**

- Concrete shall conform to American Concrete Institute (ACI) codes and specifications, latest edition.  
ACI 318 "Building Code Requirements For Reinforced Concrete"  
ACI 301 "Specifications For Structural Concrete".
- Cast-in-place concrete shall have a 28 day compressive strengths of 4000 psi - air entrained to a level of 5-7% and slump of 5-7".
- Concrete mix design shall be by an independent testing laboratory.
- Cast-in-place concrete shall be subject to testing by an independent testing laboratory as follows:  
Testing Requirements: 4 - test cylinders per each 50 yards or each days pour.
- All non-welded reinforcing steel shall be grade 60 deformed, billet-steel ASTM A615, U.O.N. All welded wire fabric (WWF) shall be plain, ASTM A185.
- All welded reinforcing steel shall be grade 60, low carbon, ASTM A706.
- Provide adequate support bars and accessories to hold reinforcing bars firmly in place.

**Backfill Notes:**

- Where required, provide Compacted Engineered Fill. Compacted Engineered Fill shall be a well graded aggregate material conforming to IDOT Gradation 14.

**Key Notes:**

- Anchor bolts for drilled piers supplied by Owner and installed by the Contractor. Coordinate anchor bolt quantities and pattern with exiting Str #288 and steel shop drawings for Str #292.
- Where grade is not level at pier, place 1'-0" reveal on the high side of the pier.

**SANDMAN** Structural Engineers  
1587 30th Avenue South - 1st Floor, Minneapolis, MN 55425  
218.227.0022 www.SandmanSE.com Proj # 2287-6

**NOT FOR CONSTRUCTION**  
**FOR REVIEW 06/30/22**



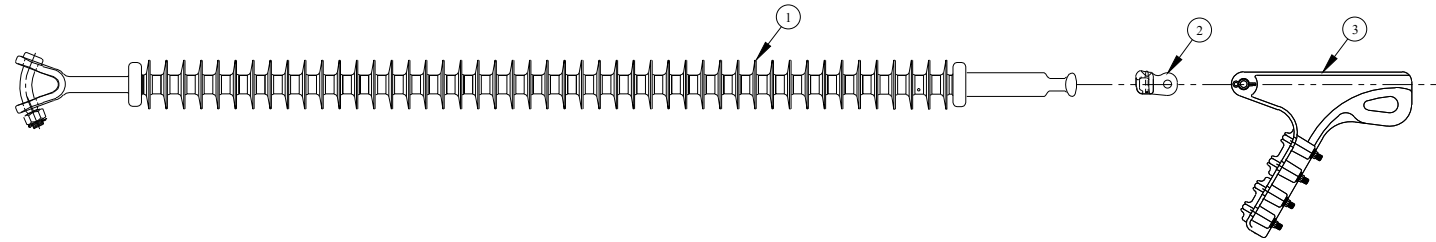
Project Manager: DJH  
Designer: SANDMAN - CVW  
Project Number: 419437  
Phone: (712) 472-2531

CITY OF AMES  
AMES, IOWA

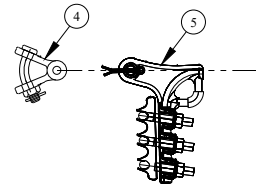
**FOUNDATION DETAILS**  
**AMES PLANT TO NE ANKENY 161 kV TRANSMISSION**  
**LINE RELOCATION - IOWA DOT I-35 PROJECT 2022-2023**

**SHEET**  
**FDN-1**

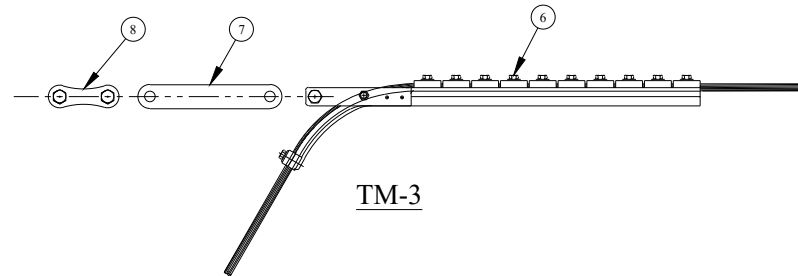
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TM-1



TM-2



TM-3

MATERIAL LIST (TM-1)

ITEM NO.	DESCRIPTION	MANUF.	CAT. NO.	QTY
1	Deadend Insulator, Polymer, 161 KV, 30 Kip	Hubbell	S030077S2010**	1
2	Socket Eye, 30 Kip	Hubbell	SA07**	1
3	Deadend Quadrant Clamp, Twisted Pair Phase (T2-397 Ibis ACSR), 50 Kip	Hubbell	SDT2185N**	1

MATERIAL LIST (TM-2)

ITEM NO.	DESCRIPTION	MANUF.	CAT. NO.	QTY
4	Y-Clevis Eye, 90°, 20 Kip	Hubbell	YCS-05-90**	1
5	Deadend Quadrant Clamp, Static (3/8" EHS)	Hubbell	SWDE55N**	1

MATERIAL LIST (TM-3)

ITEM NO.	DESCRIPTION	MANUF.	CAT. NO.	QTY
6	Deadend Clamp, Static (OPGW)	AFL	ODEC530/539G10	1
7	Deadend Link Plate	AFL	ODELP10	1
8	Clevis Clevis	Hubbell	CCC30	1

\*\* OR APPROVED EQUAL

DEADEND ASSEMBLIES

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REV	DATE	DESCRIPTION
0	06-15-2022	ISSUED FOR CONSTRUCTION

**-PRELIMINARY-  
NOT FOR CONSTRUCTION  
FOR REVIEW 06/30/22**

**DGR ENGINEERING**  
 Project Manager: DJH  
 Designer: JDL  
 Project Number: 419437  
 Phone: (712) 472-2531

CITY OF AMES ELECTRIC SERVICES  
 AMES, IOWA

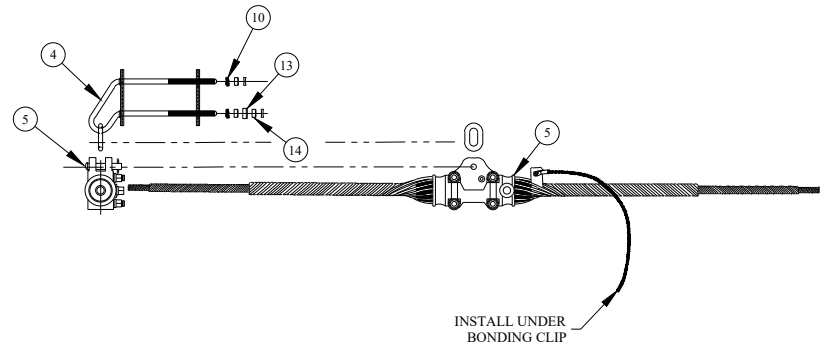
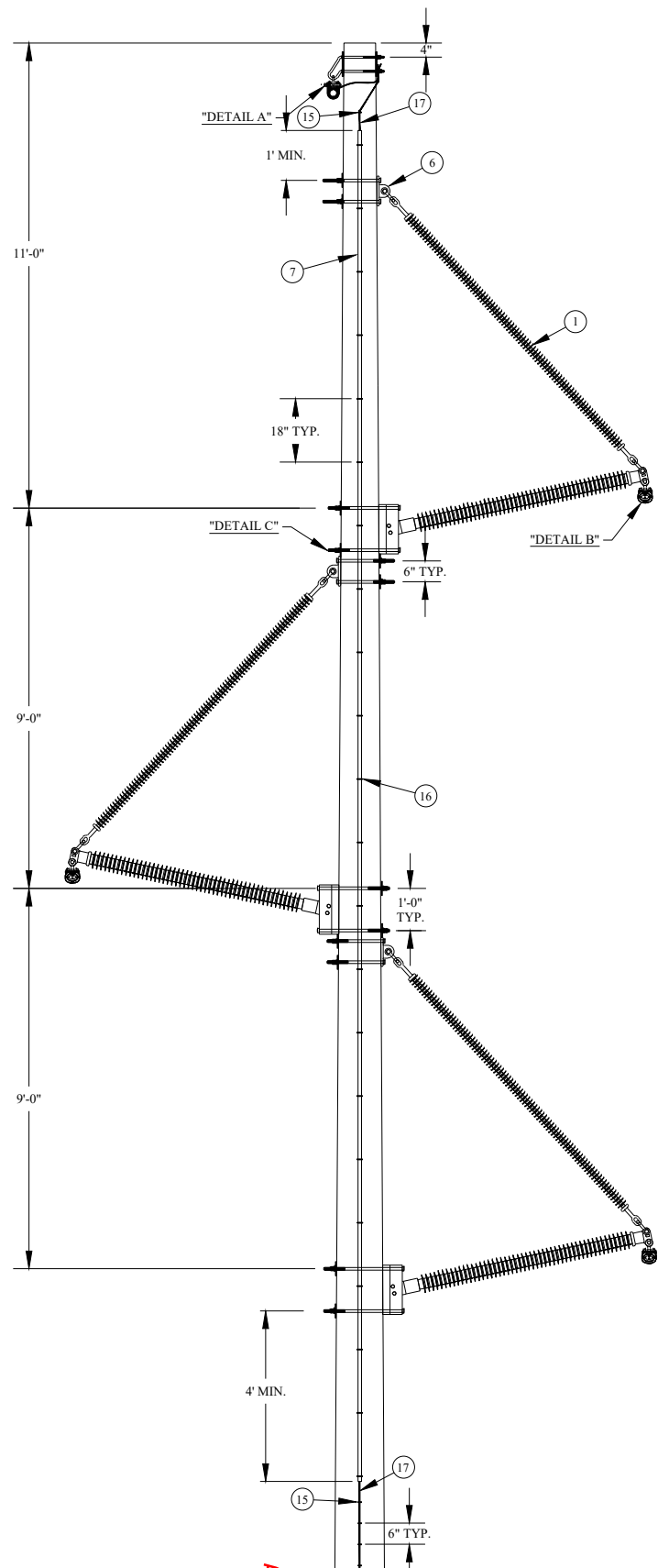
UNIT DRAWING  
 AMES - ANKENY 161 kV TRANSMISSION LINE  
 IA DOT I-35 RELOCATION

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1, 2, 3

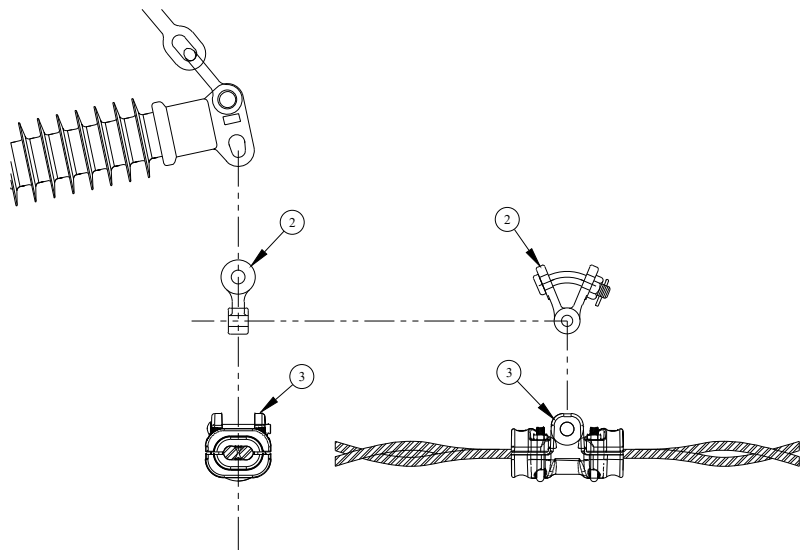


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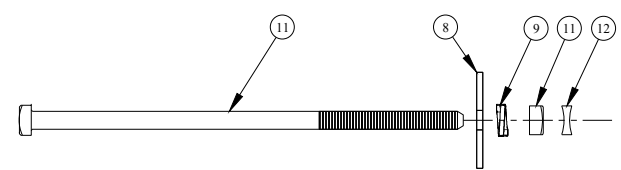
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"DETAIL A"



"DETAIL B"



"DETAIL C"

MATERIAL LIST				
ITEM NO.	DESCRIPTION	MANUF.	CAT. NO.	QTY
1	Braced Line Post Insulator Assembly, 161 kV, with Gain Base and Pole Shims	Hubbell	BLP058G12000**	3
2	Y-clevis eye, 90°, 20 Kip	Hubbell	YCS-05-90**	3
3	Suspension Clamp (T2-397 Ibis ACSR)	Preformed	CCT2-0005	3
4	Shield Wire Support Bracket, Size as Req'd	Hubbell	543_**	1
5	Suspension Clamp Static with Ground Wire Assembly (OPGW)	Preformed	4700112G	1
6	Deadend Tee, 6" Spacing, 7/8" Hardware	Hughes	2817-15**	3
7	Polyglass Round Tube, 11/16" x 28"	Geotek	B-11-336-2**	1
8	Washer, Square Flat, 7/8", 4" x 4" x 1/4"	Hubbell	6819**	12
9	Washer, Double Coil, 7/8"	Hughes	SLW2-80**	12
10	Washer, Double Coil, 5/8"	Hubbell	C2050186**	2
11	Bolt, Machine, 7/8" x Required Length, with Nut	Hubbell	C205025_**	12
12	Locknut, Type MF, 7/8"	Hubbell	3514**	12
13	Bonding Clip, 5/8"	Hughes	2727.6**	1
14	Square Nut, 5/8"	Hubbell	55084P	1
15	Staple, Diamond Point, Copper Coated, 2" x 1/2"	Hubbell	9154**	*
16	Staple, Diamond Point, Galvanized, 3" x 1-1/16"	Hubbell	C2050220**	*
17	Wire, #4 Bare Copper, Soft-Annealed, Stranded	Southwire	#4 CU.**	*

\* AS REQUIRED  
\*\* OR APPROVED EQUAL

161 kV TANGENT  
BRACED LINE LINE POST  
LAMINATED WOOD POLE

REV	DATE	DESCRIPTION
0	06-15-2022	ISSUED FOR CONSTRUCTION

**-PRELIMINARY-  
NOT FOR CONSTRUCTION  
FOR REVIEW 06/30/22**



Project Manager: DJH  
Designer: JDL  
Project Number: 419437  
Phone: (712) 472-2531

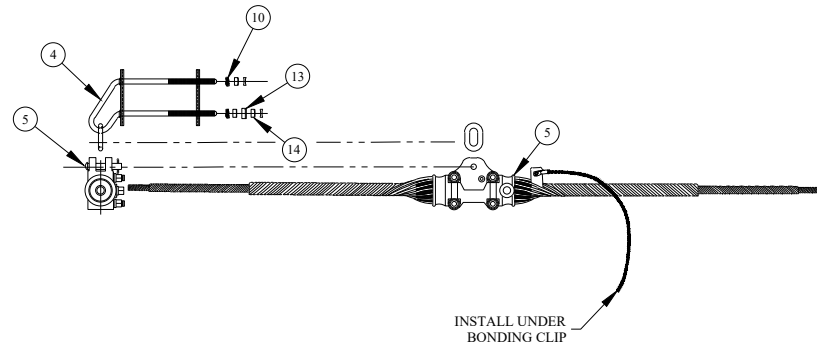
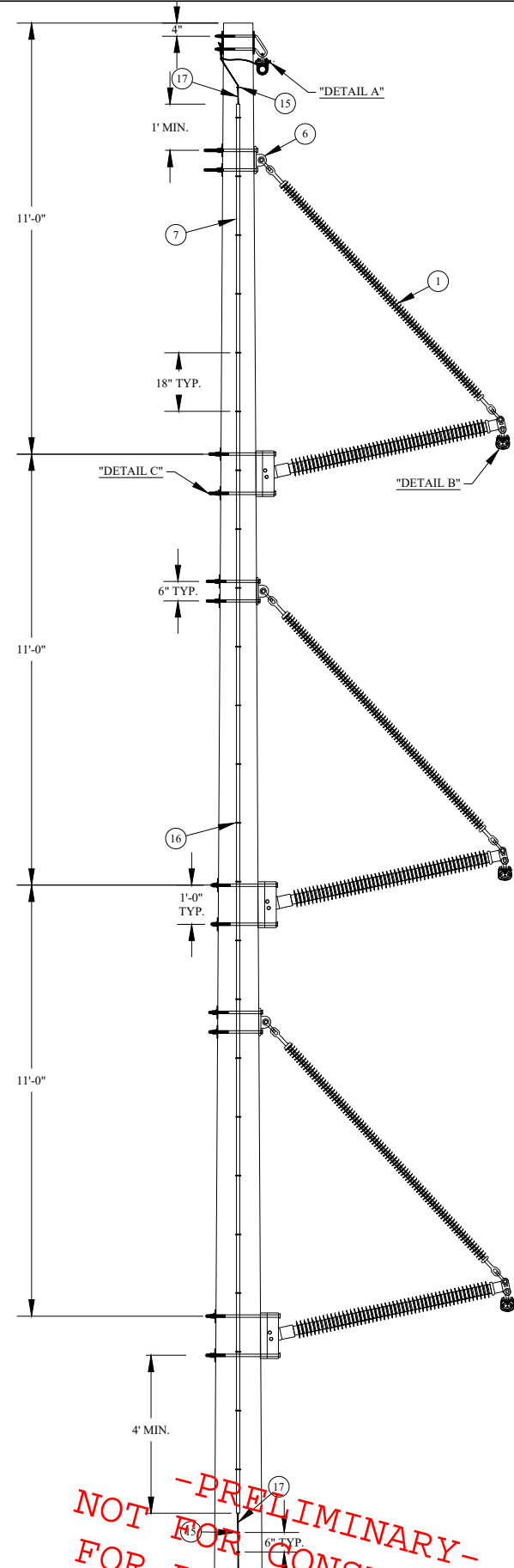
CITY OF AMES ELECTRIC SERVICES  
AMES, IOWA

UNIT DRAWING  
AMES - ANKENY 161 kV TRANSMISSION LINE  
IA DOT I-35 RELOCATION

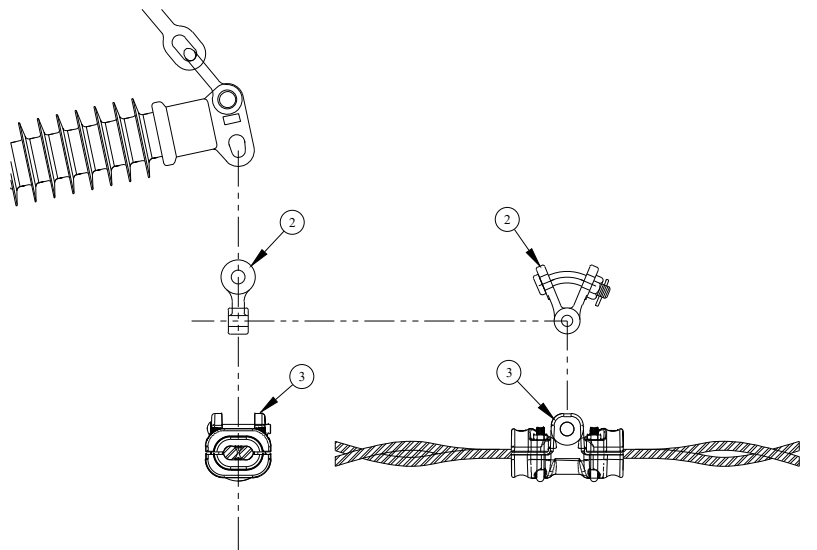
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-BLP

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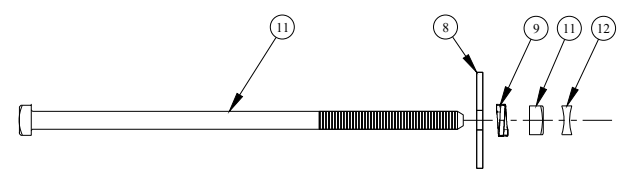
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"DETAIL A"



"DETAIL B"



"DETAIL C"

MATERIAL LIST				
ITEM NO.	DESCRIPTION	MANUF.	CAT. NO.	QTY
1	Braced Line Post Insulator Assembly, 161 kV, with Gain Base and Pole Shims	Hubbell	BLP058G12000**	3
2	Y-clevis eye, 90°, 20 Kip	Hubbell	YCS-05-90**	3
3	Suspension Clamp (T2-397 Ibis ACSR)	Preformed	CCT2-0005	3
4	Shield Wire Support Bracket, Size as Req'd	Hubbell	543_**	1
5	Suspension Clamp Static with Ground Wire Assembly (OPGW)	Preformed	4700112G	1
6	Deadend Tee, 6" Spacing, 7/8" Hardware	Hughes	2817-15**	3
7	Polyglass Round Tube, 11/16" x 28"	Geotek	B-11-336-2**	1
8	Washer, Square Flat, 7/8", 4" x 4" x 1/4"	Hubbell	6819**	12
9	Washer, Double Coil, 7/8"	Hughes	SLW2-80**	12
10	Washer, Double Coil, 5/8"	Hubbell	C2050186**	2
11	Bolt, Machine, 7/8" x Required Length, with Nut	Hubbell	C205025_**	12
12	Locknut, Type MF, 7/8"	Hubbell	3514**	12
13	Bonding Clip, 5/8"	Hughes	2727.6**	1
14	Square Nut, 5/8"	Hubbell	55084P	1
15	Staple, Diamond Point, Copper Coated, 2" x 1/2"	Hubbell	9154**	*
16	Staple, Diamond Point, Galvanized, 3" x 1-1/16"	Hubbell	C2050220**	*
17	Wire, #4 Bare Copper, Soft-Annealed, Stranded	Southwire	#4 CU.**	*

\* AS REQUIRED  
\*\* OR APPROVED EQUAL

161 kV TANGENT STACKED BRACED LINE LINE POST LAMINATED WOOD POLE

REV	DATE	DESCRIPTION
0	06-15-2022	ISSUED FOR CONSTRUCTION

**NOT FOR CONSTRUCTION**  
-PRELIMINARY-  
FOR REVIEW 06/30/22



Project Manager: DJH  
Designer: JDL  
Project Number: 419437  
Phone: (712) 472-2531

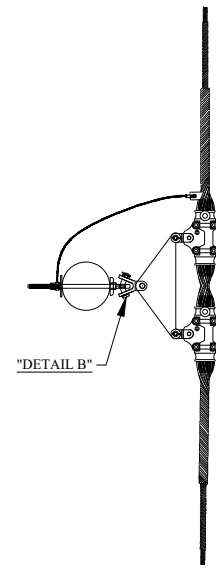
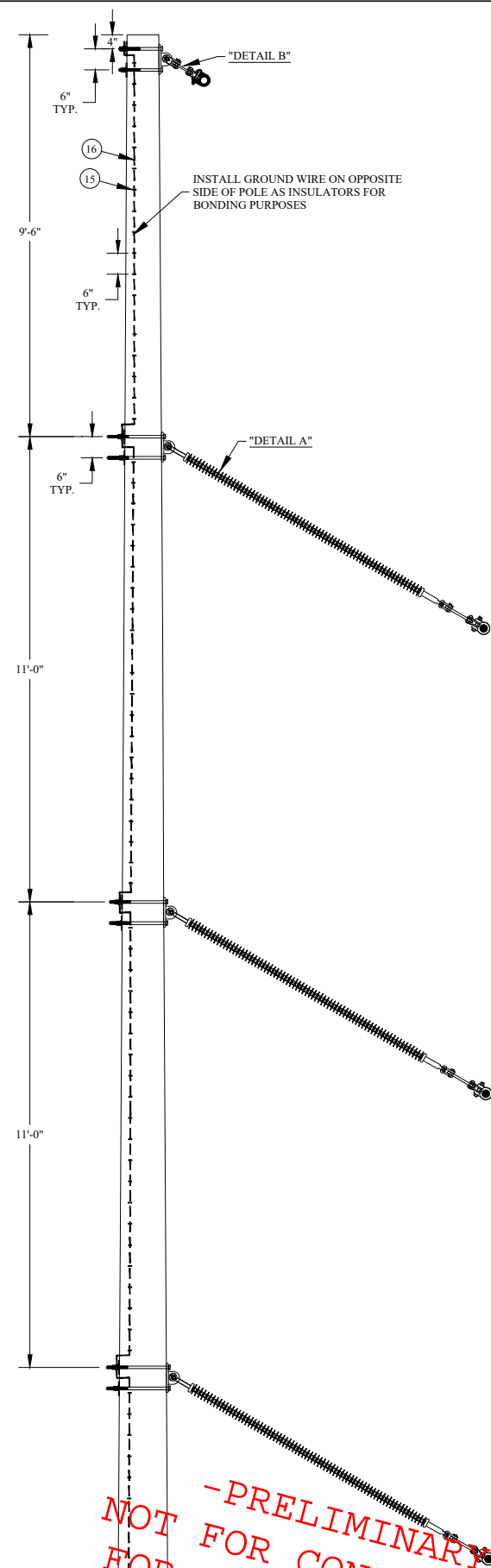
CITY OF AMES ELECTRIC SERVICES  
AMES, IOWA

UNIT DRAWING  
AMES - ANKENY 161 kV TRANSMISSION LINE  
IA DOT I-35 RELOCATION

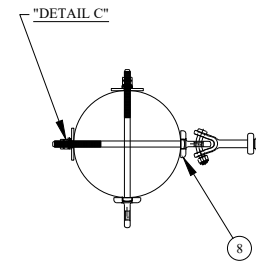
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TP-161B  
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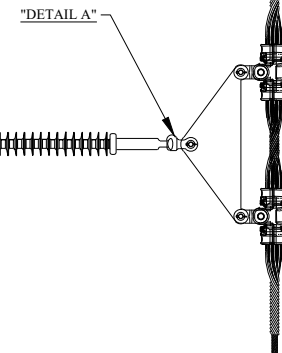
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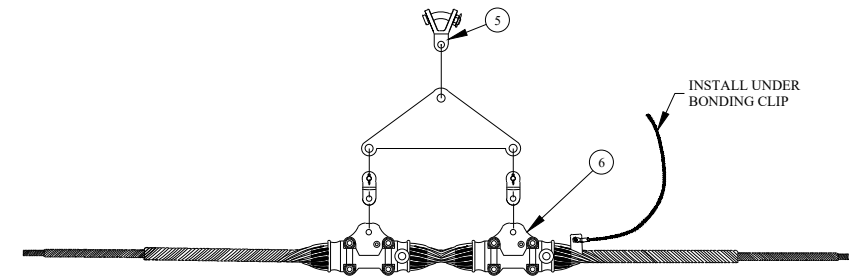
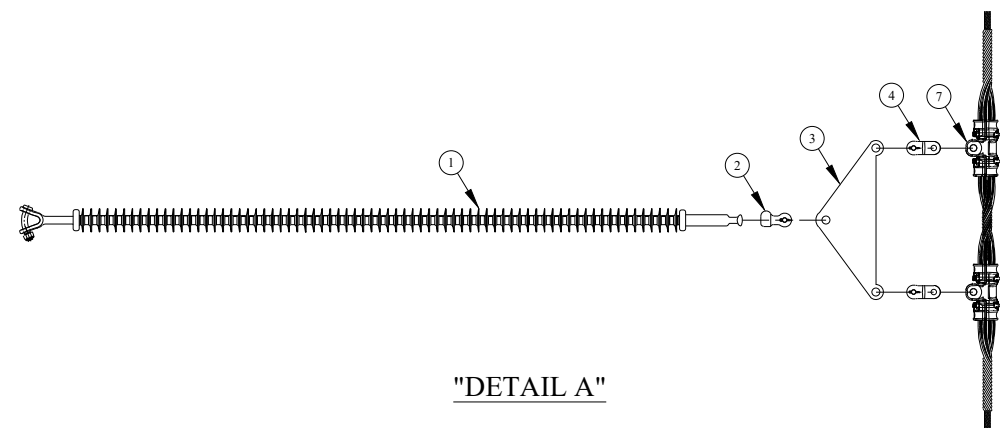
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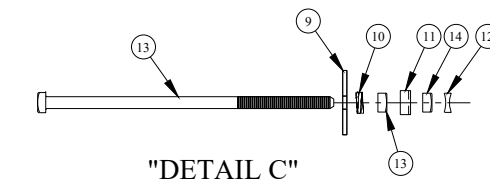
PLAN-PHASE



"DETAIL A"



"DETAIL B"



"DETAIL C"

MATERIAL LIST				
ITEM NO.	DESCRIPTION	MANUF.	CAT. NO.	QTY
1	Suspension Insulator, 161 KV, Polymer, 30 Kip	Hubbell	S030077S2010**	3
2	Socket Clevis, 30 Kip	Hubbell	SC30**	3
3	Yoke Plate, 40 Kip	Preformed	YP-5909**	4
4	Clevis Eye, 25 Kip	Hubbell	CA06**	8
5	Y-Clevis Clevis, 90°, 30 Kip	Hubbell	YCC-30-90**	1
6	Suspension Clamp, Static, Double, with Ground Wire Assembly (OPGW)	Preformed	4700212G	1
7	Suspension Clamp, T2, Phase (T2-397 IBIS ACSR)	Preformed	CCT2-0005	6
8	Deadend Tee, 6" Spacing, 7/8"	Hughes	2817-15**	4
9	Washer, Square Flat, 7/8, 4" x 4" x 1/4"	Hubbell	6819**	8
10	Washer, Double Coil, 7/8"	Hughes	SLW2-80**	8
11	Bonding Clip, 7/8"	Hughes	2727.8**	4
12	Locknut, Type MF, 7/8"	Hubbell	3514**	8
13	Bolt, Machine, 7/8" x Required Length, With Nut	Hubbell	C205025_**	8
14	Square Nut, 7/8"	Hubbell	56538P	4
15	Staples, Diamond Point Copper Coated, 2" x 1/2"	Hubbell	9154**	*
16	Wire, #4 Copper Bare, Soft Annealed, Stranded	Southwire	#4 CU.**	*

\* AS REQUIRED  
\*\* OR APPROVED EQUAL

161 kV MEDIUM ANGLE WOOD POLE

REV	DATE	DESCRIPTION
0	06-15-2022	ISSUED FOR CONSTRUCTION

**-PRELIMINARY-  
NOT FOR CONSTRUCTION  
FOR REVIEW 06/30/22**



Project Manager: DJH  
Designer: JDL  
Project Number: 419437  
Phone: (712) 472-2531

CITY OF AMES ELECTRIC SERVICES  
AMES, IOWA

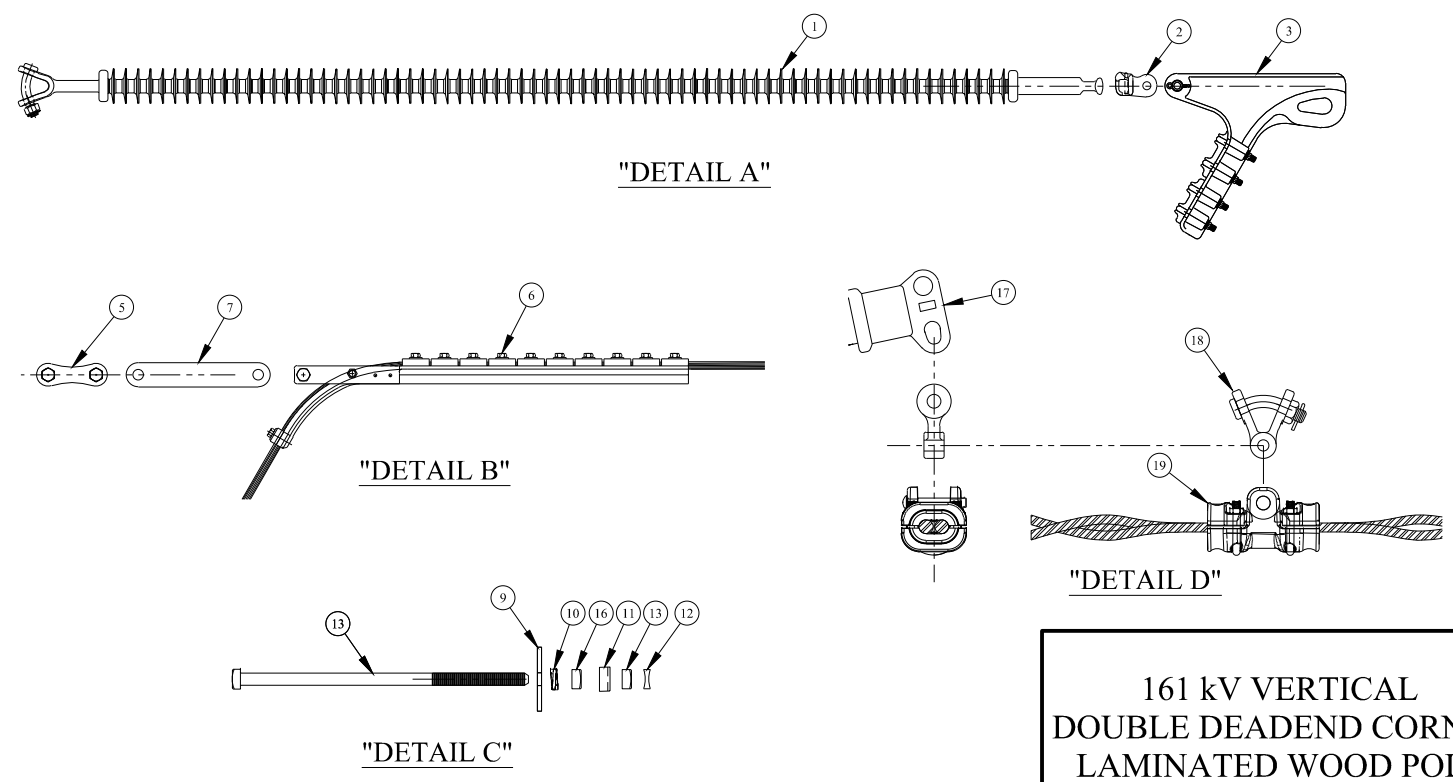
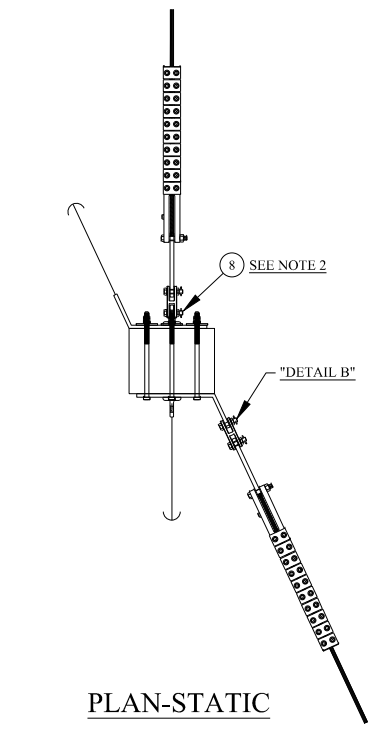
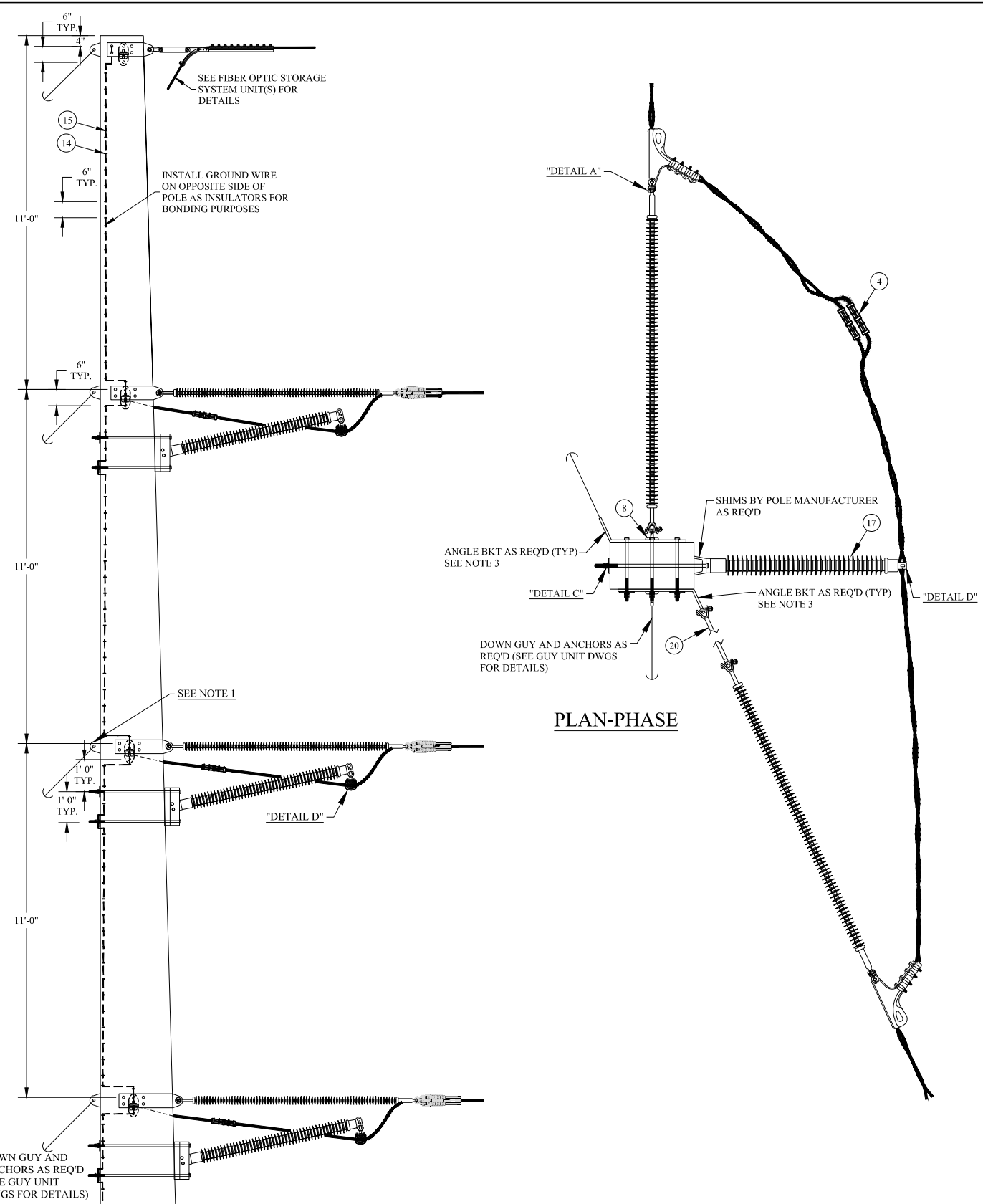
UNIT DRAWING  
AMES - ANKENY 161 kV TRANSMISSION LINE  
IA DOT I-35 RELOCATION

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MATERIAL LIST				
ITEM NO.	DESCRIPTION	MANUF.	CAT. NO.	QTY
1	Deadend Insulator, Polymer, 161 KV, 30 Kip	Hubbell	S030077S2010**	6
2	Socket Eye, 30 Kip	Hubbell	SA07**	6
3	Deadend Quadrant Clamp, Twisted Pair, Phase (T2-397 Ibis ACSR)	Hubbell	SDT2185N**	6
4	Compression Connector, Phase (397 Ibis ACSR)	Burndy	YCS37R	12
5	Clevis-Clevis	Hubbell	CCC30	2
6	Deadend Clamp, Static (OPGW)	AFL	ODEC530/539G10	2
7	Deadend Link Plate	AFL	ODELP10	2
8	Deadend Tee, 6" Spacing, 7/8"	Hughes	2817-15**	8
9	Washer, Square Flat, 7/8", 4" x 4" x 1/4"	Hubbell	6819**	22
10	Washer, Double Coil, 7/8"	Hubbell	SLW2-80**	22
11	Bonding Clip, 7/8"	Hughes	2727.8**	11
12	Locknut, Type MF, 7/8"	Hubbell	3514**	22
13	Bolt, Machine, 7/8" x Required Length, With Nut	Hubbell	C205025_**	22
14	Staples, Diamond Point Copper Coated, 2" x 1/2"	Hubbell	9154**	*
15	Wire, #4 Copper Bare, Soft Annealed, Stranded	Southwire	#4 CU.**	*
16	Square Nut	Hubbell	56538P	11
17	Post Insulator, 161 KV, Gain Base With Shims	Hubbell	250058S0020	3
18	Y-Clevis Eye, 90°, 20 Kip	Hubbell	YCS-05-90	3
19	Suspension Clamp (T2-397 Ibis ACSR)	Preformed	CCT2-0005	3
20	Fiberglass Strain Insulator, 54", Y-Clevis Clevis, 30 Kip	Hughes	CF695-YCC-54	3

\* AS REQUIRED  
 \*\* OR APPROVED EQUAL  
 NOTES:  
 1. Install deadend tees back-to-back when possible for guying and deadend assemblies.  
 2. Additional deadend tees included for final installation of phase and static connections.  
 3. Contractor shall furnish angle brackets with hardware and ground bonding clips as designed by the laminated wood pole manufacturer.

161 kV VERTICAL  
 DOUBLE DEADEND CORNER  
 LAMINATED WOOD POLE

**-PRELIMINARY-  
 NOT FOR CONSTRUCTION  
 FOR REVIEW 06/30/22**

REV	DATE	DESCRIPTION
0	06-15-2022	ISSUED FOR CONSTRUCTION

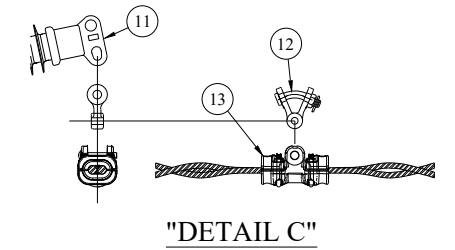
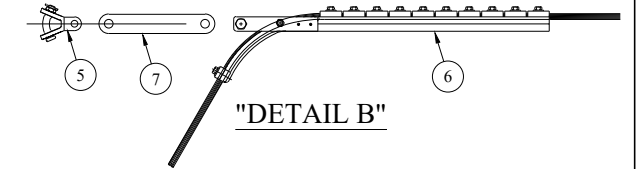
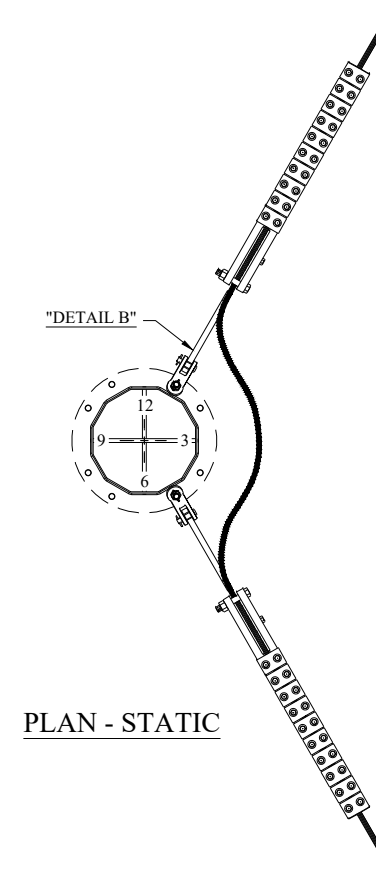
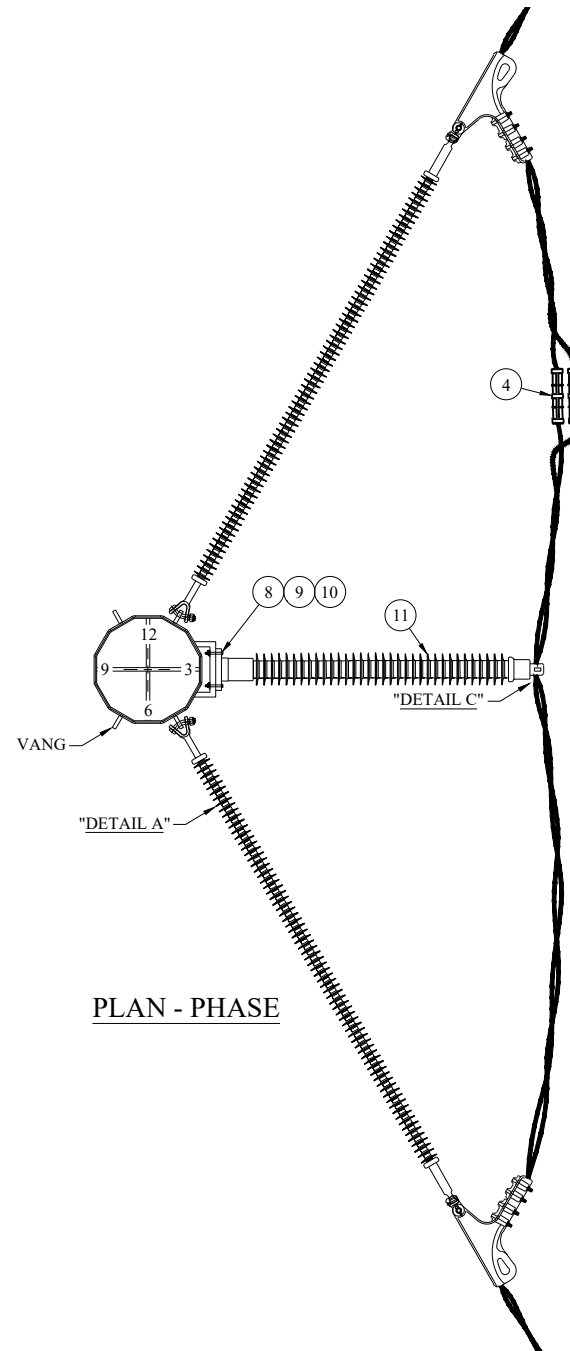
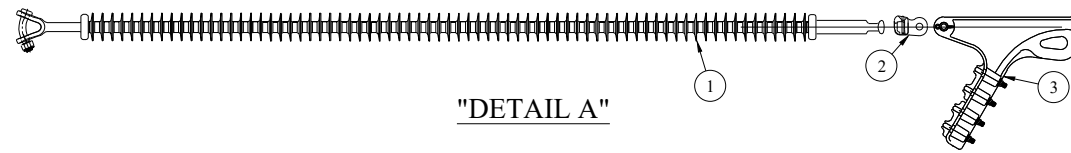
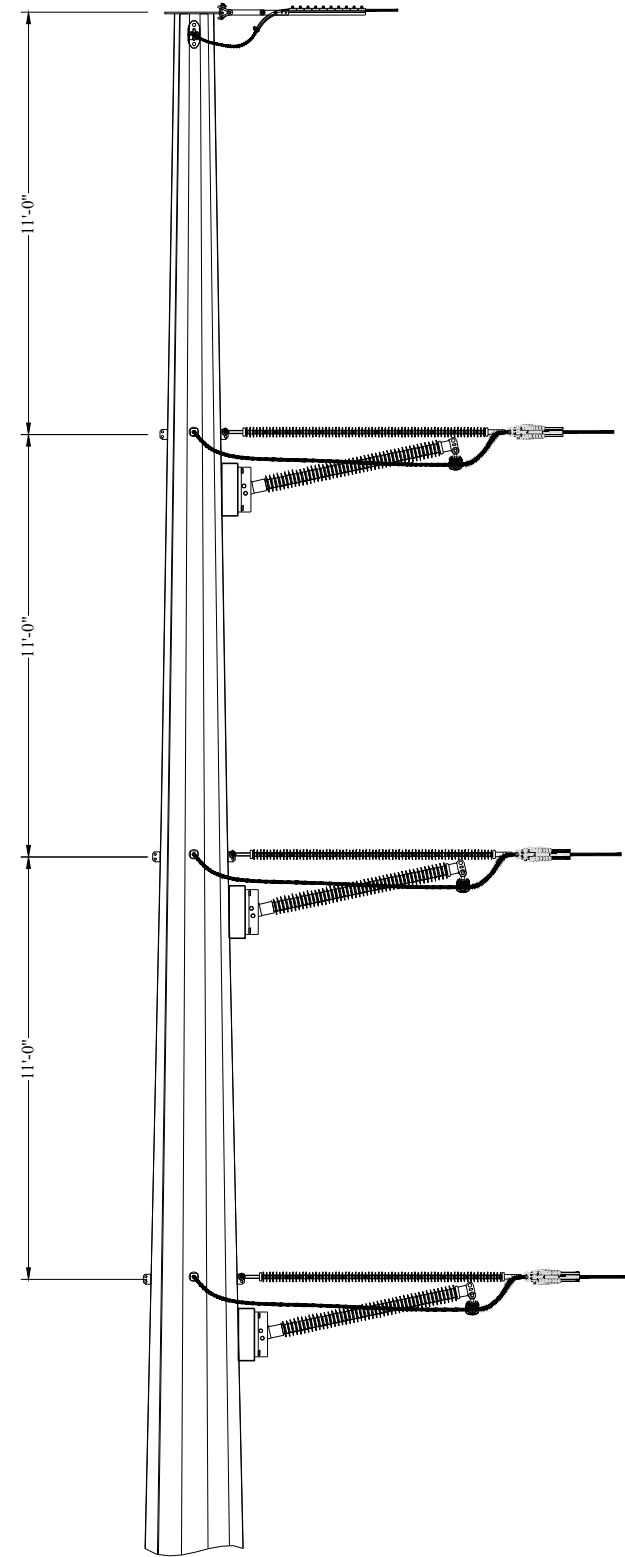


Project Manager: DJH  
 Designer: JDL  
 Project Number: 419437  
 Phone: (712) 472-2531

CITY OF AMES ELECTRIC SERVICES  
 AMES, IOWA

UNIT DRAWING  
 AMES - ANKENY 161 kV TRANSMISSION LINE  
 IA DOT I-35 RELOCATION

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MATERIAL LIST				
ITEM NO.	DESCRIPTION	MANUF.	CAT. NO.	QTY
1	Deadend Insulator, Polymer, 161 KV, 30 Kip	Hubbell	S030077S2010**	6
2	Socket Eye, 30 Kip	Hubbell	SA07**	6
3	Deadend Quadrant Clamp, Twisted Pair, Phase (T2-397 Ibis ACSR)	Hubbell	SDT2185N**	6
4	Compression Connector, Phase (397 Ibis ACSR)	Burndy	YCS37R	6
5	Y-Clevis Clevis, 90° 30 Kip	Hubbell	YCC3090	2
6	Deadend Clamp, Static (OPGW)	AFL	ODEC530/539G10	2
7	Deadend Link Plate	AFL	ODELP10	2
8	Bolt, Machine, 7/8" X 2-1/2" With Nut	Hughes	B82-1/2-2**	12
9	Washer, Round Flat, 7/8", 2" x 1/4"	Hughes	RW2-80**	24
10	Locknut, Type MF, 7/8"	Hubbell	3514**	24
11	Post Insulator, 161 KV, Flat Base	Hubbell	P250058S0030	3
12	Y-Clevis Eye, 90°, 30 Kip	Hubbell	YCS-05-90-30	3
13	Suspension Clamp (T2-397 Ibis ACSR)	Preformed	CCT2-0005	3

\* AS REQUIRED  
\*\* OR APPROVED EQUAL

NOTES:  
1. See steel pole detail drawings from the Supplier for specific dimension and orientation information.

-PRELIMINARY-  
 NOT FOR CONSTRUCTION  
 FOR REVIEW 06/30/22

161 kV VERTICAL DOUBLE  
 DEADEND CORNER  
 SELF-SUPPORTING  
 STEEL POLE

REV	DATE	DESCRIPTION
0	06-15-2022	ISSUED FOR CONSTRUCTION



Project Manager: DJH  
 Designer: JDL  
 Project Number: 419437  
 Phone: (712) 472-2531

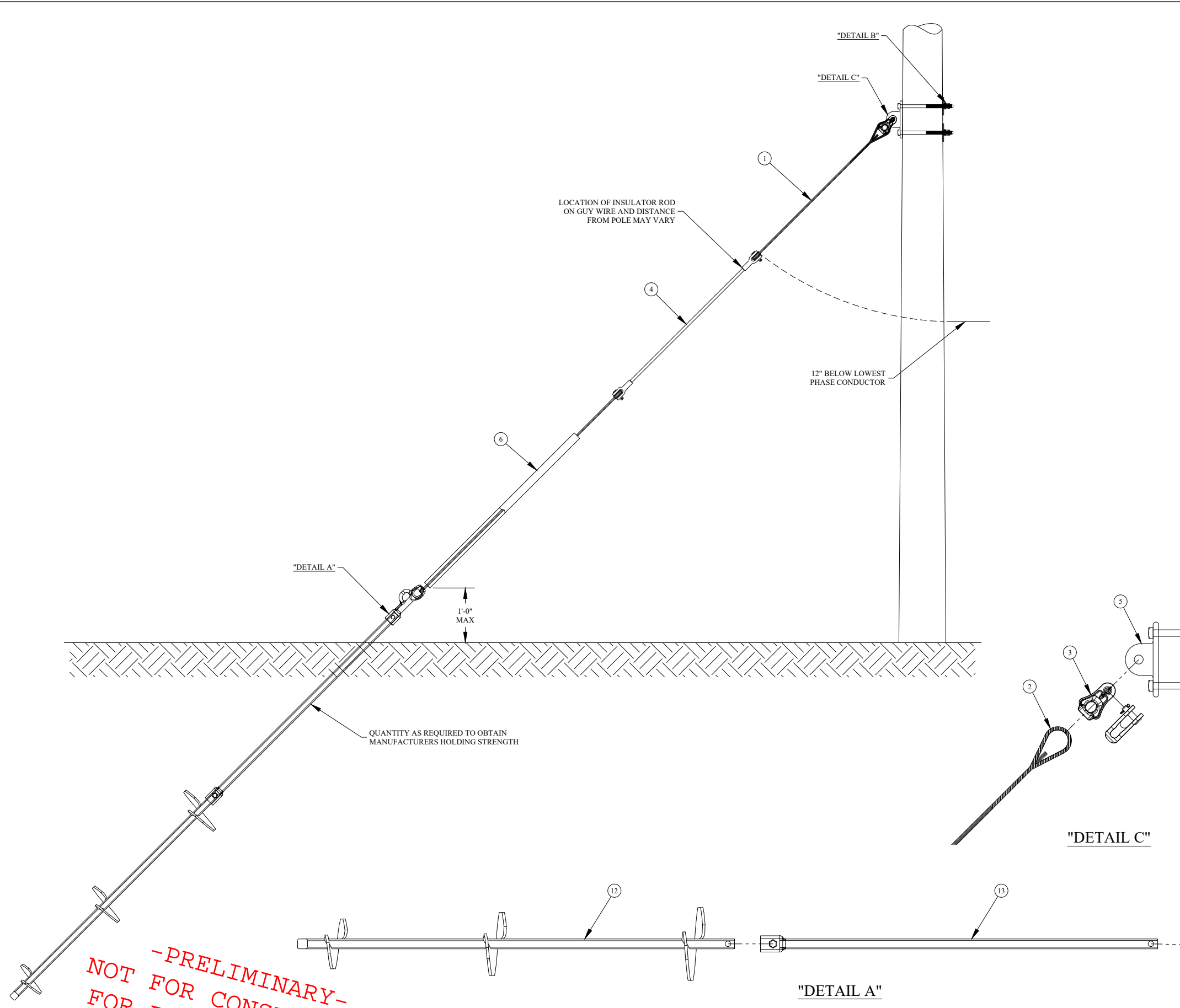
CITY OF AMES ELECTRIC SERVICES  
 AMES, IOWA

UNIT DRAWING  
 AMES - ANKENY 161 kV TRANSMISSION LINE  
 IA DOT I-35 RELOCATION

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Plot Date: 5/18/2022 2:48:44 PM

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MATERIAL LIST (E3-3)				
ITEM NO.	DESCRIPTION	MANUF.	CAT. NO.	QTY
1	Wire, 3/8" Extra High-strength Steel, Class B	National Strand	3/8 EHS **	*
2	Guy Grip, Wrap Type (3/8" EHS)	Preformed	GDE-1107	4
3	Thimble-Clevis, 35 Kip	Maclean	CT-88H**	1
4	Guy Strain Insulator, Clevis-Clevis with Rollers, 30 Kip	Hughes	CF695-78R2**	1
5	Deadend Tee, 6" Spacing	Hughes	2817-13**	1
6	Guy Guard, 8", Plastic, Orange	Preformed	PG5738	1
7	Bolt, Machine, 3/4" x Required Length, with Nut	Hubbell	89_**	2
8	Washer, Square, 3/4", 4" x 4" x 3/16"	Hubbell	6818**	2
9	Washer, Double Coil, 3/4"	Hubbell	C2050187**	2
10	Locknut, Type MF, 3/4"	Hubbell	3513**	2

MATERIAL LIST (D6)				
ITEM NO.	DESCRIPTION	MANUF.	CAT. NO.	QTY
11	Twin Eye Assembly, 1-1/2" Square Shaft	Maclean	D6604US**	1
12	Triple Helix, 8"-10"-12", 5'-6" Long, 1-1/2" Square Shaft	Maclean	D6636**	1

MATERIAL LIST (E5)				
ITEM NO.	DESCRIPTION	MANUF.	CAT. NO.	QTY
13	Rod Extension, 5' Long, 1-1/2" Square Shaft	Maclean	D6620U**	1

\* AS REQUIRED  
 \*\* OR APPROVED EQUAL

**-PRELIMINARY-  
 NOT FOR CONSTRUCTION-  
 FOR REVIEW 06/30/22**



Project Manager: DJH  
 Designer: JDL  
 Project Number: 419437  
 Phone: (712) 472-2531

CITY OF AMES ELECTRIC SERVICES  
 AMES, IOWA

UNIT DRAWING  
 AMES - ANKENY 161 kV TRANSMISSION LINE  
 IA DOT I-35 RELOCATION

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**DOWN GUY  
 INSULATED**



MATERIAL LIST (E3-3D)

ITEM NO.	DESCRIPTION	MANUF.	CAT. NO.	QTY
1	Wire, 3/8" Extra High-strength Steel, Class B	National Strand	3/8 EHS **	*
2	Guy Grip, Wrap Type (3/8" EHS)	Preformed	GDE-1107	4
3	Thimble-Clevis, 35 Kip	Maclean	CT-88H**	1
4	Guy Strain Insulator, Clevis-Clevis with Rollers, 30 Kip	Hughes	CF695-78R2**	1
5	Deadend Tee, 6" Spacing	Hughes	2817-13**	1
6	Guy Guard, 8', Plastic, Orange	Preformed	PG5738	1
7	Bolt, Machine, 3/4" x Required Length, with Nut	Hubbell	89_**	2
8	Washer, Square, 3/4", 4" x 4" x 3/16"	Hubbell	6818**	2
9	Washer, Double Coil, 3/4"	Hubbell	C2050187**	2
10	Locknut, Type MF, 3/4"	Hubbell	3513**	2
11	3-Bolt Connector, Static (3/8" EHS)	Maclean	J929**	2
12	Connecting link, 3/8" x 2" x 9-1/2"	Hughes	3154	2
13	Guy Roller, 7/8" x 2-3/4"	Hughes	28082	2
14	Bolt, Machine, 7/8" x 4", with Nut	Hughes	B84-2	1

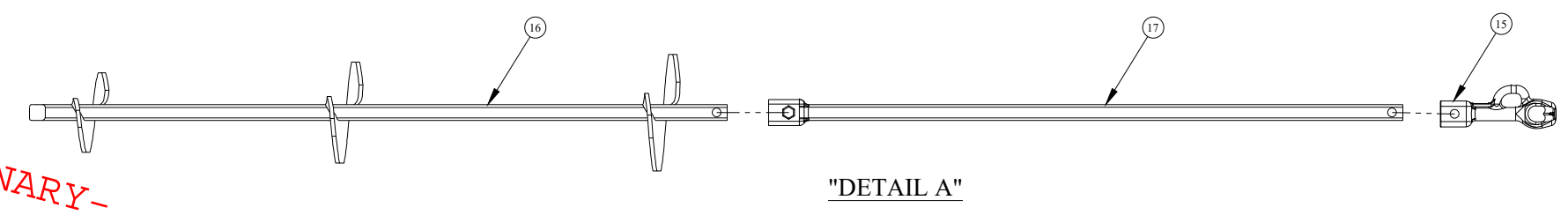
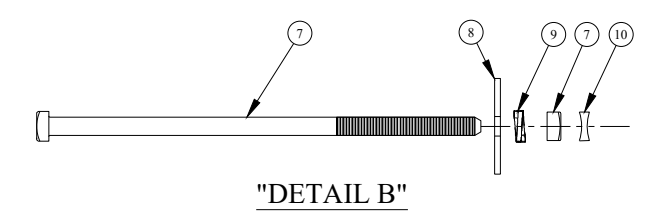
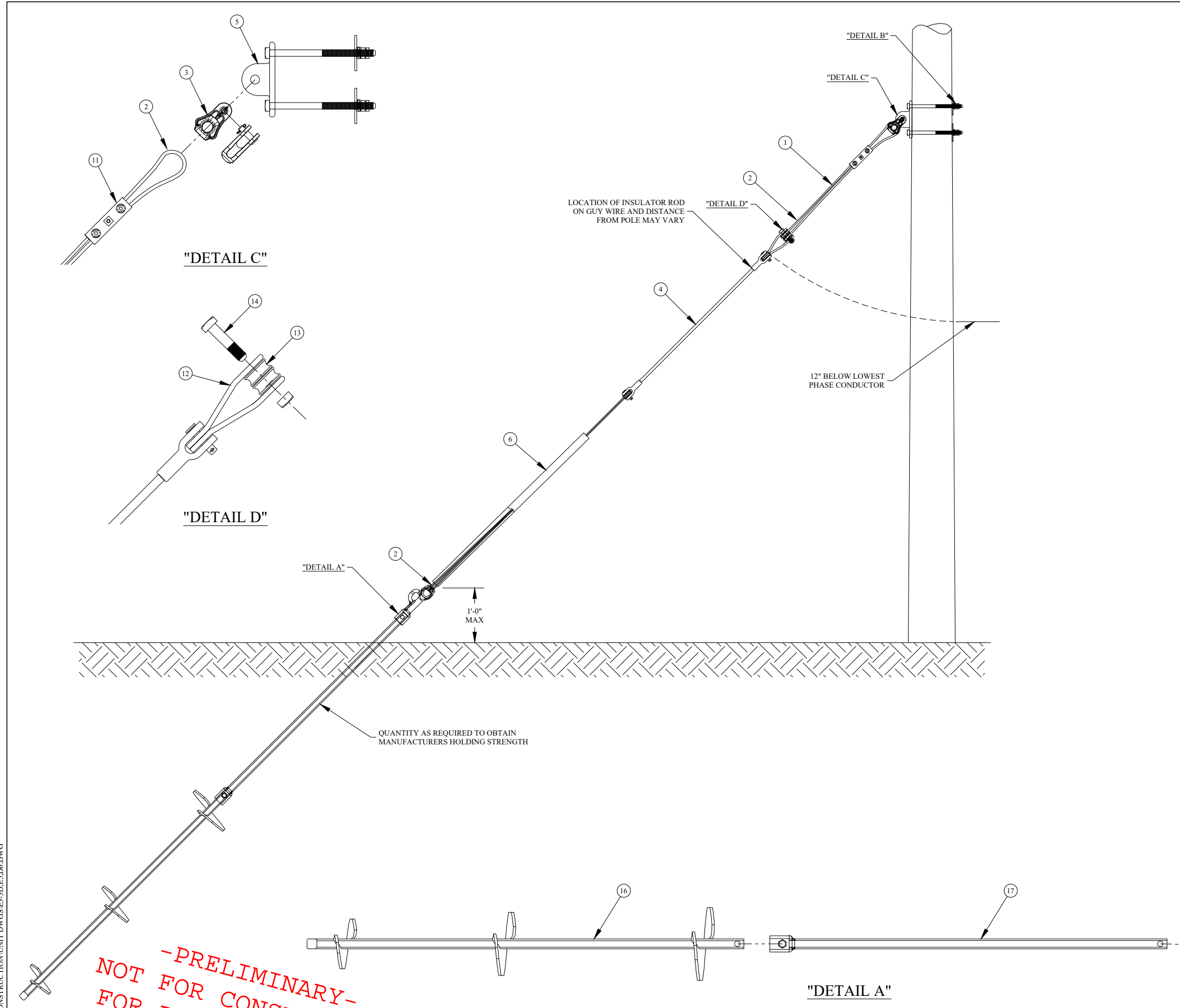
MATERIAL LIST (D6)

ITEM NO.	DESCRIPTION	MANUF.	CAT. NO.	QTY
15	Twin Eye Assembly, 1-1/2" Square Shaft	Maclean	D6604US**	1
16	Triple Helix, 8"-10"-12", 5'-6" Long, 1-1/2" Square Shaft	Maclean	D6636**	1

MATERIAL LIST (E5)

ITEM NO.	DESCRIPTION	MANUF.	CAT. NO.	QTY
17	Rod Extension, 5' Long, 1-1/2" Square Shaft	Maclean	D6620U**	1

\* AS REQUIRED  
\*\* OR APPROVED EQUAL



**DOUBLE  
DOWN GUY  
INSULATED**

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REV	DATE	DESCRIPTION
0	06-15-2022	ISSUED FOR CONSTRUCTION

**-PRELIMINARY-  
NOT FOR CONSTRUCTION  
FOR REVIEW 06/30/22**



Project Manager: DJH  
Designer: JDL  
Project Number: 419437  
Phone: (712) 472-2531

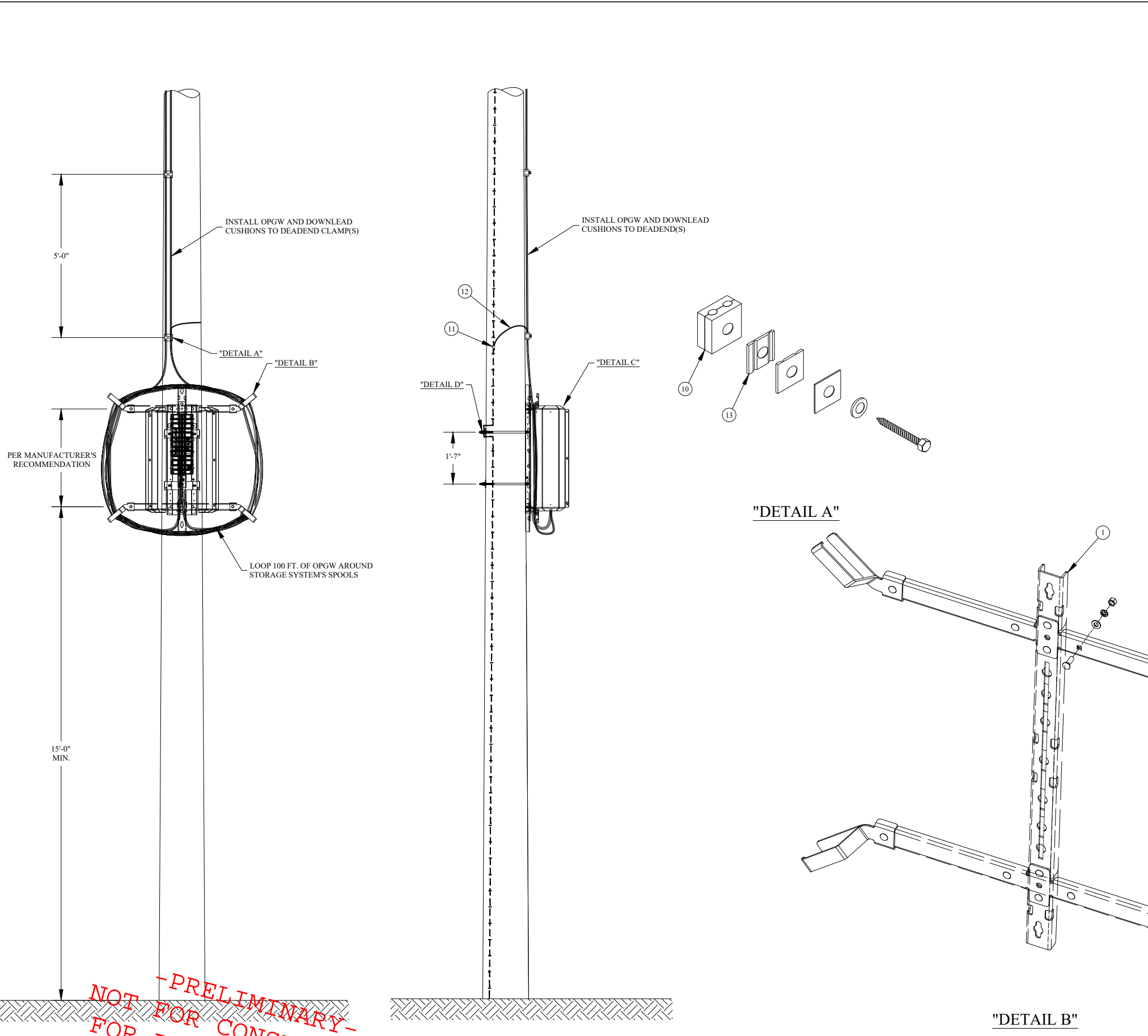
CITY OF AMES ELECTRIC SERVICES  
AMES, IOWA

UNIT DRAWING  
AMES - ANKENY 161 kV TRANSMISSION LINE  
IA DOT I-35 RELOCATION

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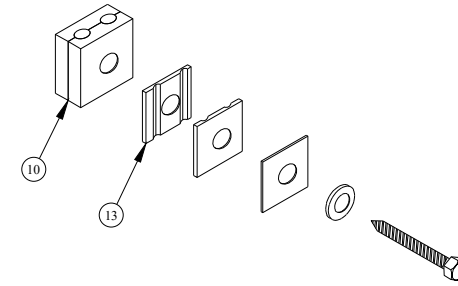
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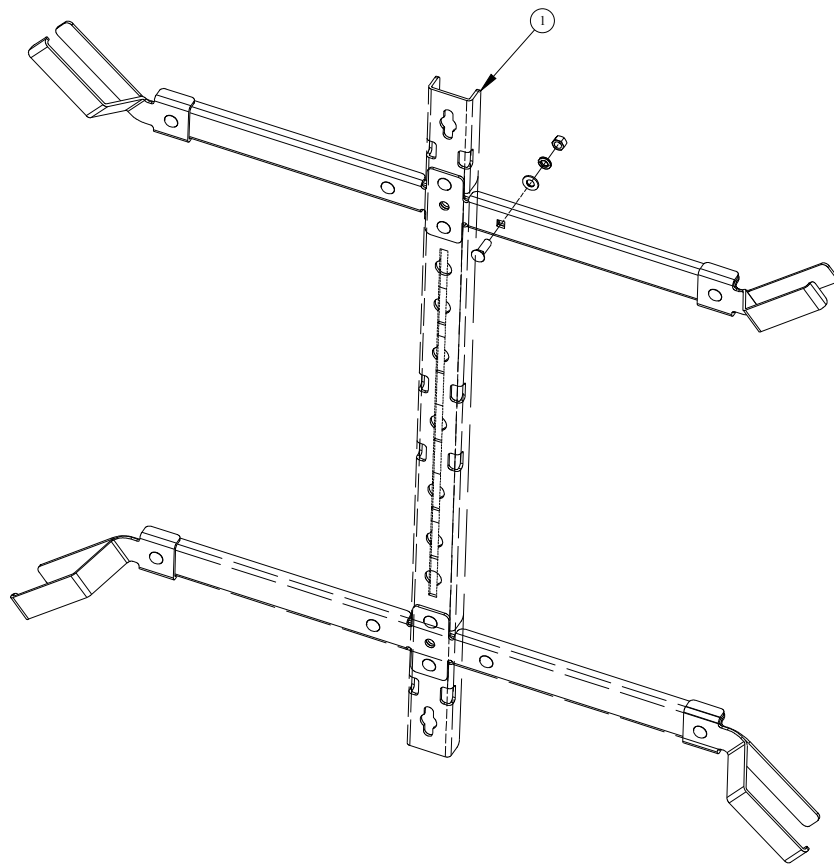


MATERIAL LIST				
ITEM NO.	DESCRIPTION	MANUF.	CAT. NO.	QTY
1	Fiber Storage System, Double Arm	Preformed	80061195	1
2	Fiber Case Protective Enclosure	Preformed	80061194	1
3+	Fiber Storage System Splice Case Kit with 36-Fiber Tray and Accessories	Preformed	COYW622S001	1
4	Bolt, Machine, 5/8" x Required Length, with Nut	Hubbell	88_**	2
5	Washer, Square Flat, 5/8", 2-1/4" x 2-1/4" x 3/16"	Hubbell	6813**	2
6	Washer, Double Coil, 5/8"	Hubbell	C2050186**	2
7	Bonding Clip, 5/8"	Hughes	2727.6**	1
8	Locknut, Type MF, 5/8"	Hubbell	3512**	2
9	Square Nut, 5/8"	Hubbell	55084P**	1
10	Downlead Cushion, Wood Pole Kit	Preformed	8003267H1	*
11	Compression Connector, H-Tap, CU.-CU.	Blackburn	CF22-1**	1
12	Wire, #4 Bare Copper, Soft-Annealed, Stranded	Southwire	#4 CU.**	*
13	Bonding Clip, 5/8"	Hughes	2727.6**	1

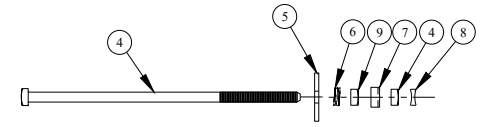
\* AS REQUIRED  
\*\* OR APPROVED EQUAL



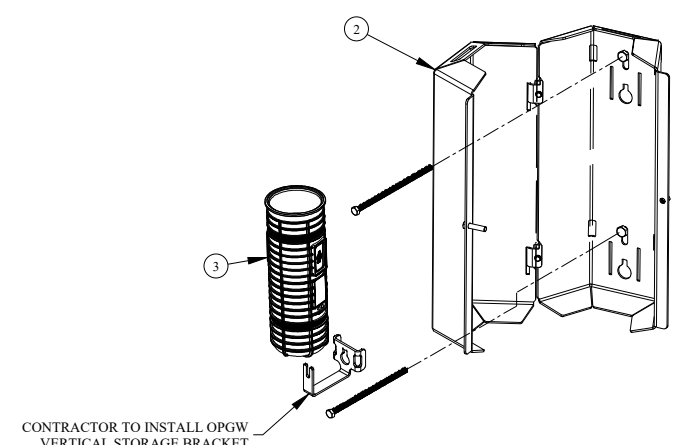
"DETAIL A"



"DETAIL B"



"DETAIL D"



"DETAIL C"

FIBER OPTIC STORAGE  
WOOD POLE

REV	DATE	DESCRIPTION
0	06-15-2022	ISSUED FOR CONSTRUCTION



Project Manager: DJH  
Designer: JDL  
Project Number: 419437  
Phone: (712) 472-2531

CITY OF AMES ELECTRIC SERVICES  
AMES, IOWA

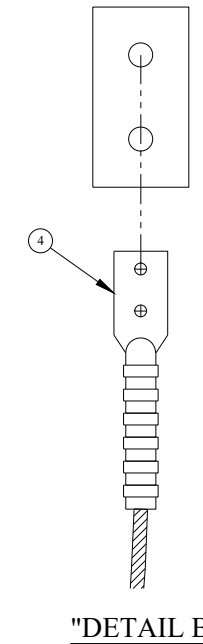
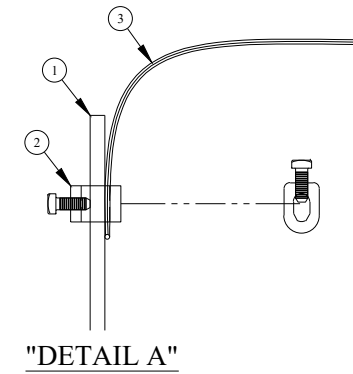
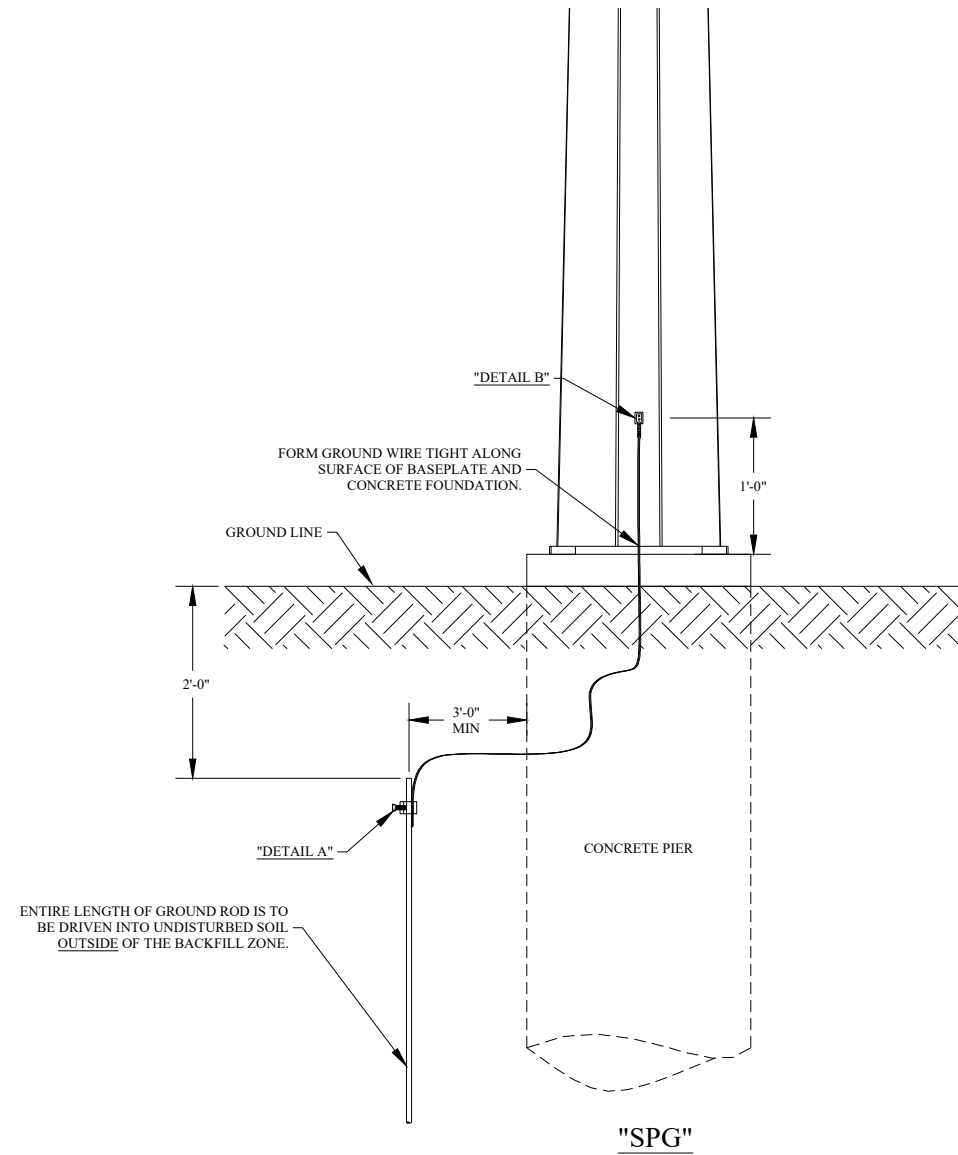
UNIT DRAWING  
AMES - ANKENY 161 kV TRANSMISSION LINE  
IA DOT I-35 RELOCATION

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Plot Date: 5/19/2022 8:03:29 AM

MATERIAL LIST (SPG)				
ITEM NO.	DESCRIPTION	MANUF.	CAT. NO.	QTY
1	Ground Rod 5/8" x 10'	Erico	615803	1
2	Ground Rod Clamp	Erico	CP34	1
3	Wire, #4 Bare Copper, Soft-Annealed, Stranded	Southwire	#4 CU.**	*
4	Ground Clamp, Pole Base Connection to 2-hole pad	Burndy	YGA4C2N	1

\* AS REQUIRED  
 \*\* OR APPROVED EQUAL



STEEL POLE GROUND

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REV	DATE	DESCRIPTION
0	06-15-2022	ISSUED FOR CONSTRUCTION

**-PRELIMINARY-  
 NOT FOR CONSTRUCTION  
 FOR REVIEW 06/30/22**

**DGR ENGINEERING**  
 Project Manager: DJH  
 Designer: JDL  
 Project Number: 419437  
 Phone: (712) 472-2531

CITY OF AMES ELECTRIC SERVICES  
 AMES, IOWA

UNIT DRAWING  
 AMES - ANKENY 161 kV TRANSMISSION LINE  
 IA DOT I-35 RELOCATION

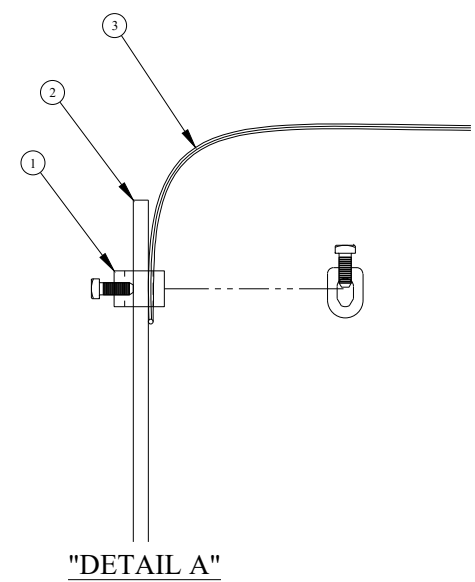
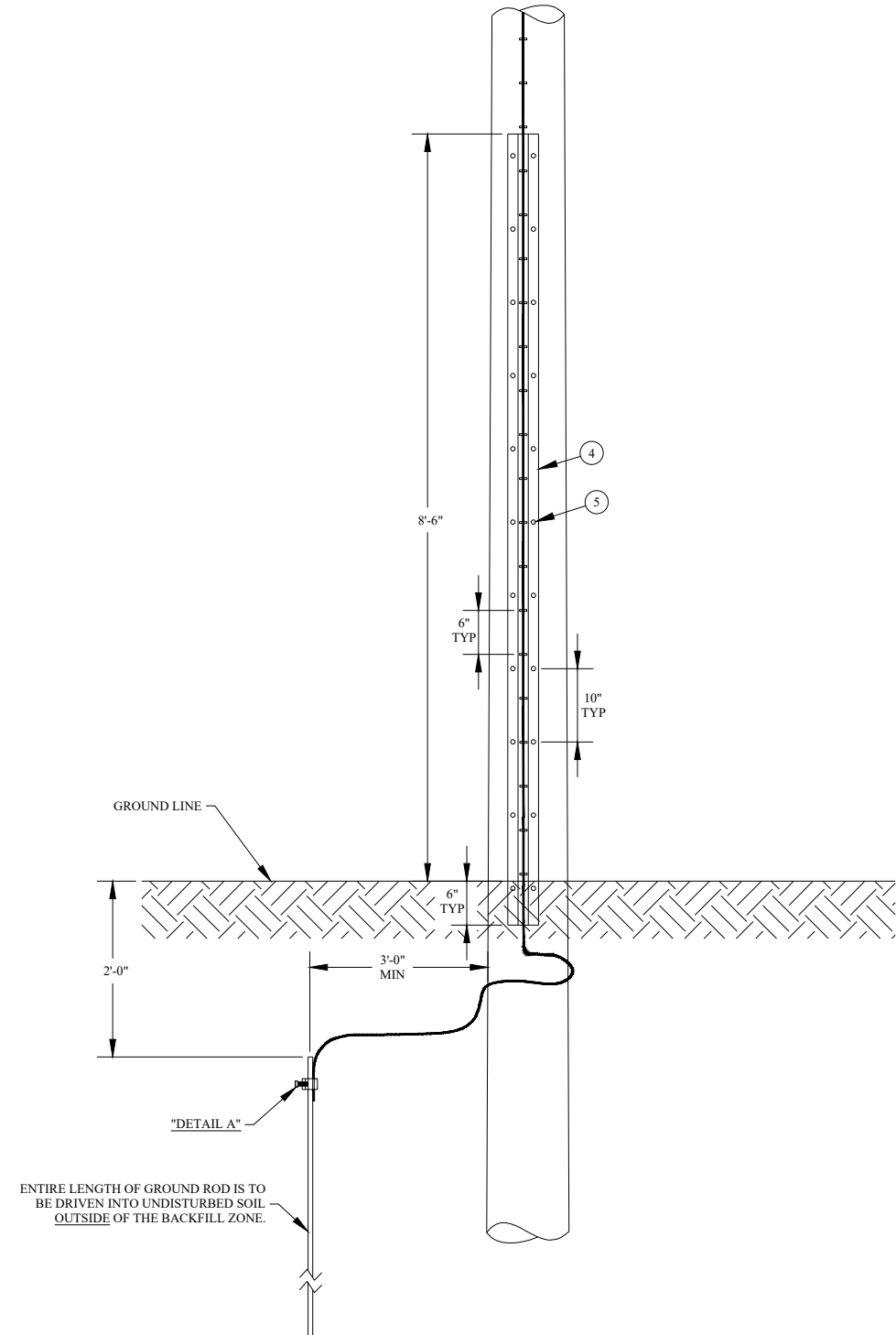
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MATERIAL LIST (WPG)				
ITEM NO.	DESCRIPTION	MANUF.	CAT. NO.	QTY
1	Ground Rod 5/8" x 10'	Erico	615803	1
2	Ground Rod Clamp	Erico	CP34	1
3	Wire, #4 Bare Copper, Soft-Annealed, Stranded	Southwire	#4 CU.**	*
4	Ground Wire Moulding, HDPE, 1/2" X 9'	Electrical Materials Co.	GMFL1/29G	1
5	Lag Screws, 1/4" x 1" Min. Length	-	-	*

\* AS REQUIRED  
 \*\* OR APPROVED EQUAL



WOOD POLE GROUND

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REV	DATE	DESCRIPTION
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**-PRELIMINARY-  
 NOT FOR CONSTRUCTION  
 FOR REVIEW 06/30/22**

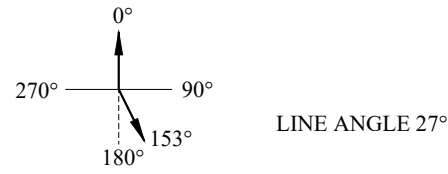
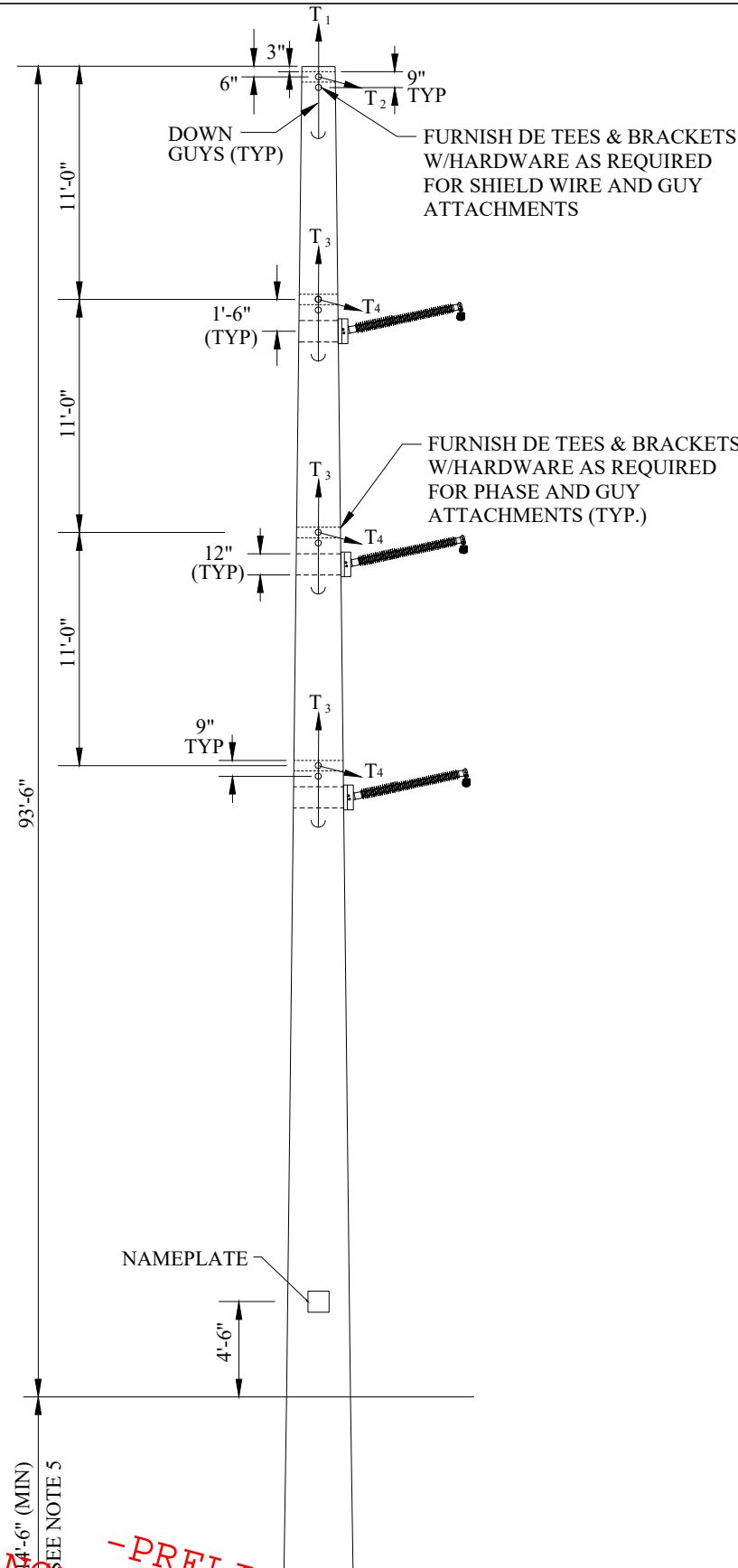


Project Manager: DJH  
 Designer: JDL  
 Project Number: 419437  
 Phone: (712) 472-2531

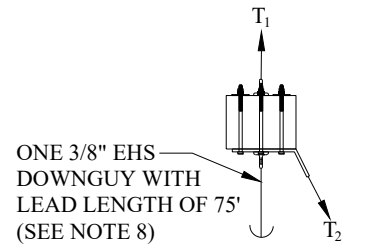
CITY OF AMES ELECTRIC SERVICES  
 AMES, IOWA

UNIT DRAWING  
 AMES - ANKENY 161 kV TRANSMISSION LINE  
 IA DOT I-35 RELOCATION

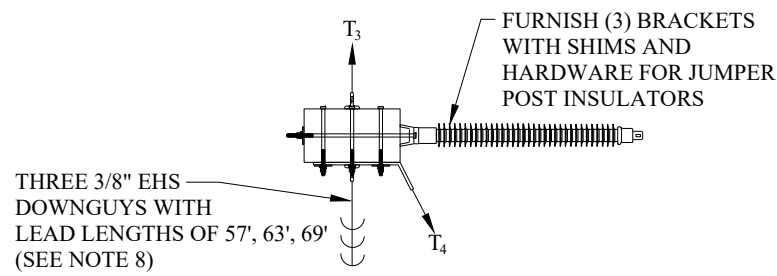
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REF. ANGLE DIAGRAM



STATIC PLAN VIEW



PHASE PLAN VIEW

STRUCTURE #	_____
LENGTH	_____
GRND LINE MOMENT	_____
MANUFACTURER	_____
DATE OF MFG	_____

NAMEPLATE DETAIL

NOTES:

1. Loads do not include wind on pole.
2. Loads do not include overload factors.
3. Structure shall be designed as a terminal deadend.
4. Poles may be single piece or spliced.
5. Pole Supplier shall specify appropriate foundation reinforcement system and embedment depth. See geotechnical report.
6. Pole Supplier shall furnish deadend tees and mounting hardware for insulator and guy attachments.
7. OPGW Characteristics: O.D. = 0.53", WT: 0.374 Lbs/Ft.
8. Initial installation of pole shall include down guys opposite T1 & T3 load Pts for temporary line configuration. At final installation, down guy attachments shall be removed and replaced with static and phase deadends for final configuration at 180° Ref Angle.
9. Contractor shall coordinate all hardware details with the appropriate framing unit drawings, as required.

LOADING CONDITIONS							
LOAD CASE	DESCRIPTION	WIND (MPH)	ICE (IN.)	TEMP. (° F)	WIND LOAD FACTOR	WIRE TENSION OLF	VERTICAL LOAD FACTOR
1	NESC HEAVY	40.00	0.50	0	2.50	1.65	1.50
2	EXTREME WIND (NESC+)	100.00	0.00	60	1.00	1.10	1.00
3	CONSTRUCTION / STRINGING	40.00	0.00	20	1.10	1.00	2.50
4	EXTREME ICE & WIND	50.00	1.50	0	1.00	1.00	1.00
5	DEFLECTION (60° INITIAL)	0.00	0.00	60	1.00	1.00	1.00

SPANS AND TENSIONS								
WEIGHT SPAN = 575			WIND SPAN = 400					
LOAD PT Tn	WIRE SIZE/ TYPE	NO. WIRES	REF. ANGLE (DEGREES)	CASE 1 TENSION (LBS)	CASE 2 TENSION (LBS)	CASE 3 TENSION (LBS)	CASE 4 TENSION (LBS)	CASE 5 TENSION (LBS)
1	OPGW	1	0°	5200	3700	3600	8300	2900
2	OPGW	1	153°	3800	2500	2200	6800	1500
3	T2-397 ACSR IBIS	1	0°	12000	7900	8200	15000	6300
4	T2-397 ACSR IBIS	1	153°	7700	5500	5200	12000	3600

LAMINATED WOOD  
POLE #232

-PRELIMINARY-  
 NOT FOR CONSTRUCTION  
 FOR REVIEW 06/30/22

REV	DATE	DESCRIPTION
0	06-15-2022	ISSUED FOR CONTRACTOR BIDDING

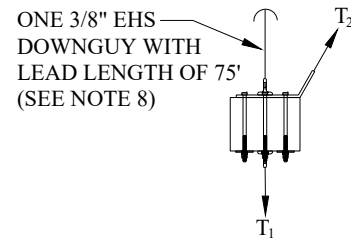
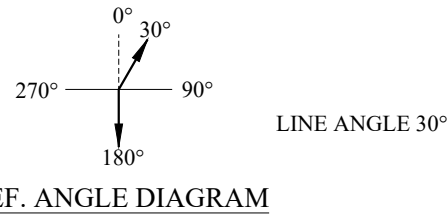
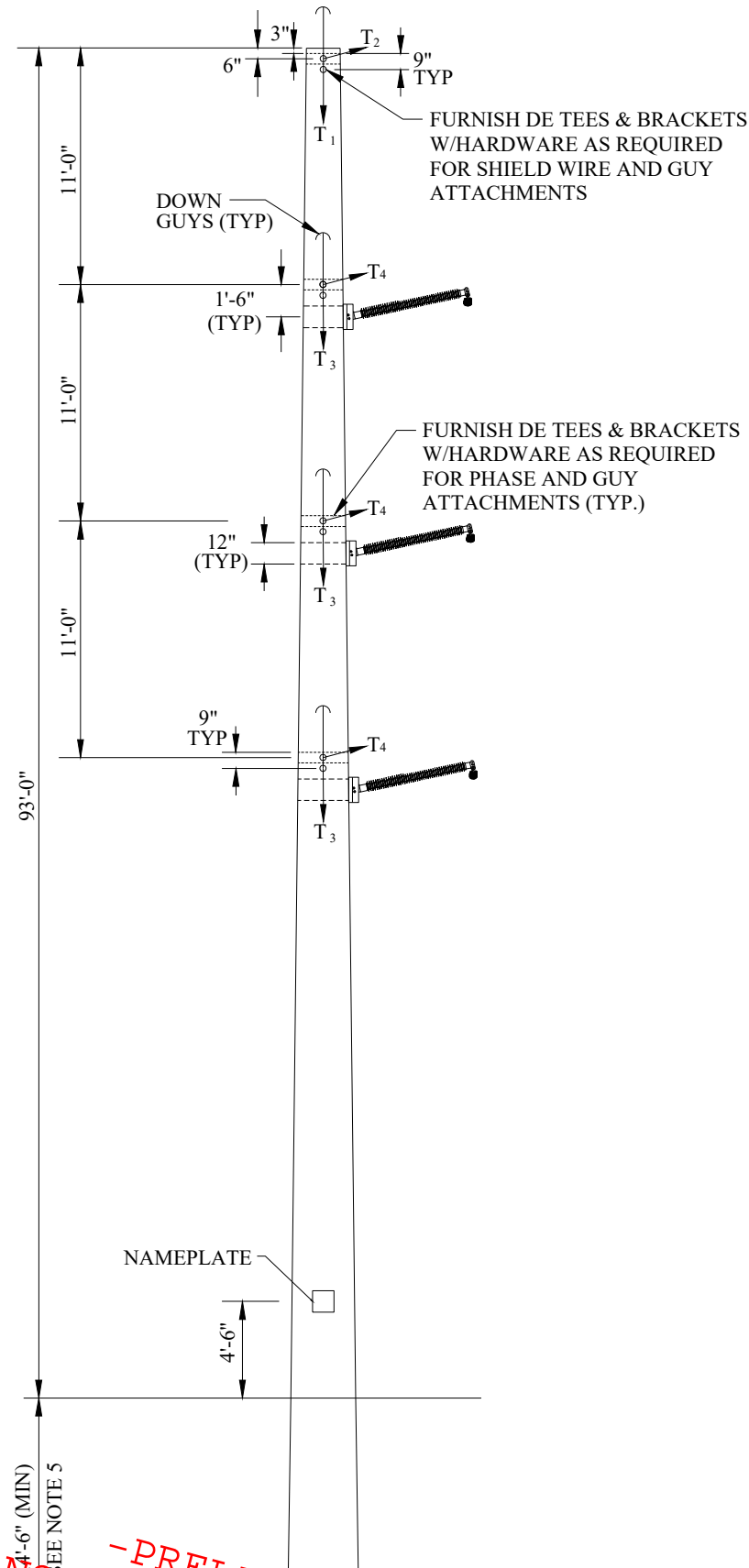


Project Manager: DJH  
 Designer: JDL  
 Project Number: 419437  
 Phone: (712) 472-2531

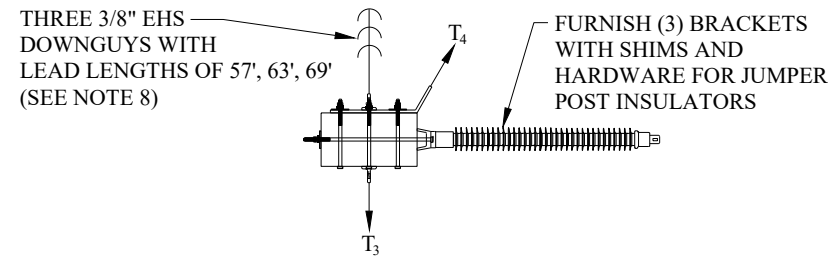
CITY OF AMES ELECTRIC SERVICES  
 AMES, IOWA

LAMINATED WOOD POLE LOADING TREE  
 AMES - ANKENY 161 kV TRANSMISSION LINE  
 IA DOT I-35 RELOCATION

SHEET  
 LWP-232



STATIC PLAN VIEW



PHASE PLAN VIEW

STRUCTURE #	_____
LENGTH	_____
GRND LINE MOMENT	_____
MANUFACTURER	_____
DATE OF MFG	_____

NAMEPLATE DETAIL

**NOTES:**

1. Loads do not include wind on pole.
2. Loads do not include overload factors.
3. Structure shall be designed as a terminal deadend.
4. Poles may be single piece or spliced.
5. Pole Supplier shall specify appropriate foundation reinforcement system and embedment depth. See geotechnical report.
6. Pole Supplier shall furnish deadend tees and mounting hardware for insulator and guy attachments.
7. OPGW Characteristics: O.D. = 0.53", WT: 0.374 Lbs/Ft.
8. Initial installation of pole shall include down guys opposite T1 & T3 load Pts for temporary line configuration. At final installation, down guy attachments shall be removed and replaced with static and phase deadends for final configuration at 180° Ref Angle.
9. Contractor shall coordinate all hardware details with the appropriate framing unit drawings, as required.

LOADING CONDITIONS							
LOAD CASE	DESCRIPTION	WIND (MPH)	ICE (IN.)	TEMP. (° F)	WIND LOAD FACTOR	WIRE TENSION OLF	VERTICAL LOAD FACTOR
1	NESC HEAVY	40.00	0.50	0	2.50	1.65	1.50
2	EXTREME WIND (NESC+)	100.00	0.00	60	1.00	1.10	1.00
3	CONSTRUCTION / STRINGING	40.00	0.00	20	1.10	1.00	2.50
4	EXTREME ICE & WIND	50.00	1.50	0	1.00	1.00	1.00
5	DEFLECTION (60° INITIAL)	0.00	0.00	60	1.00	1.00	1.00

SPANS AND TENSIONS								
WEIGHT SPAN = 500			WIND SPAN = 300					
LOAD PT Tn	WIRE SIZE/ TYPE	NO. WIRES	REF. ANGLE (DEGREES)	CASE 1 TENSION (LBS)	CASE 2 TENSION (LBS)	CASE 3 TENSION (LBS)	CASE 4 TENSION (LBS)	CASE 5 TENSION (LBS)
1	OPGW	1	30°	3800	2500	2200	6800	1500
2	OPGW	1	180°	5200	3700	3600	8300	2900
3	T2-397 ACSR IBIS	1	30°	7700	5500	5200	12000	3600
4	T2-397 ACSR IBIS	1	180°	12000	7900	8200	15000	6300

LAMINATED WOOD  
POLE #234

-PRELIMINARY-  
 NOT FOR CONSTRUCTION  
 FOR REVIEW 06/30/22

REV	DATE	DESCRIPTION
0	06-15-2022	ISSUED FOR CONTRACTOR BIDDING



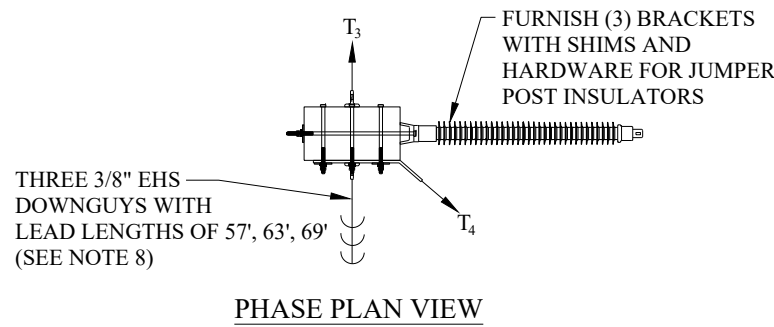
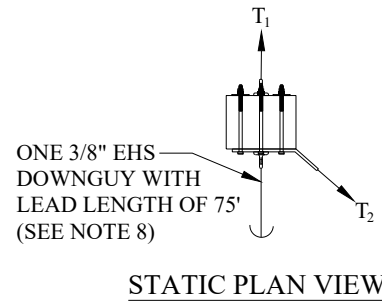
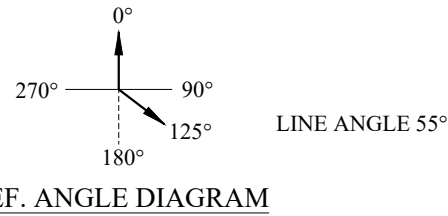
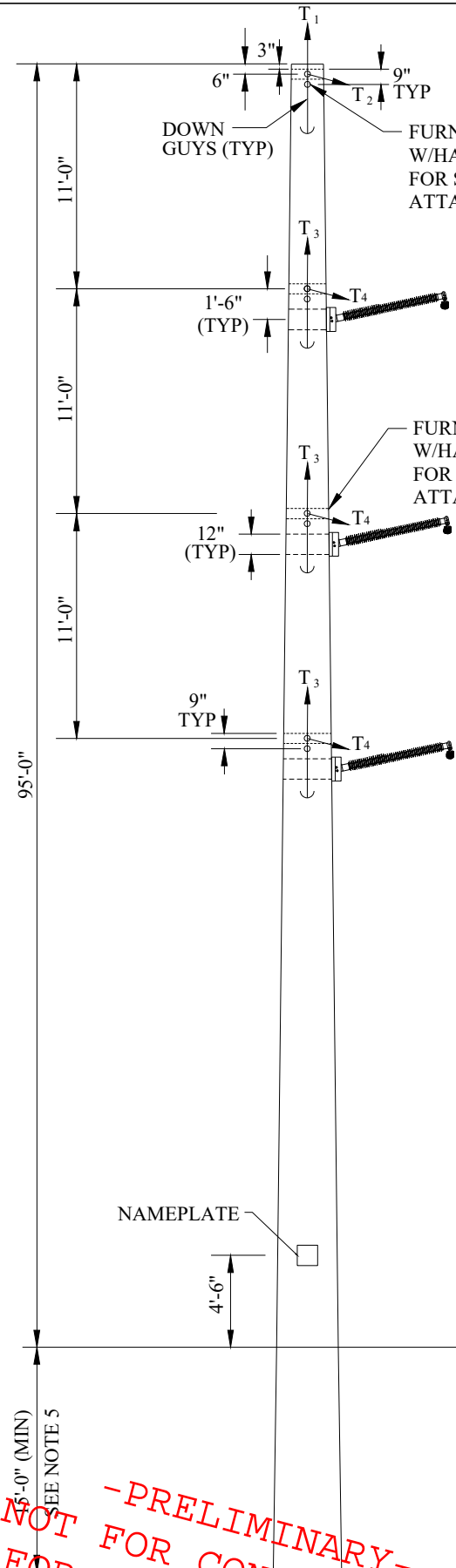
Project Manager: DJH  
 Designer: JDL  
 Project Number: 419437  
 Phone: (712) 472-2531

CITY OF AMES ELECTRIC SERVICES  
 AMES, IOWA

LAMINATED WOOD POLE LOADING TREE  
 AMES - ANKENY 161 kV TRANSMISSION LINE  
 IA DOT I-35 RELOCATION

SHEET  
 LWP-234





STRUCTURE # \_\_\_\_\_  
 LENGTH \_\_\_\_\_  
 GRND LINE MOMENT \_\_\_\_\_  
 MANUFACTURER \_\_\_\_\_  
 DATE OF MFG \_\_\_\_\_

NAMEPLATE DETAIL

**NOTES:**

1. Loads do not include wind on pole.
2. Loads do not include overload factors.
3. Structure shall be designed as a terminal deadend.
4. Poles may be single piece or spliced.
5. Pole Supplier shall specify appropriate foundation reinforcement system and embedment depth. See geotechnical report.
6. Pole Supplier shall furnish deadend tees and mounting hardware for insulator and guy attachments.
7. OPGW Characteristics: O.D. = 0.53", WT: 0.374 Lbs/Ft.
8. Initial installation of pole shall include down guys opposite T1 & T3 load Pts for temporary line configuration. At final installation, down guy attachments shall be removed and replaced with static and phase deadends for final configuration at 180° Ref Angle.
9. Contractor shall coordinate all hardware details with the appropriate framing unit drawings, as required.

LOADING CONDITIONS							
LOAD CASE	DESCRIPTION	WIND (MPH)	ICE (IN.)	TEMP. (° F)	WIND LOAD FACTOR	WIRE TENSION OLF	VERTICAL LOAD FACTOR
1	NESC HEAVY	40.00	0.50	0	2.50	1.65	1.50
2	EXTREME WIND (NESC+)	100.00	0.00	60	1.00	1.10	1.00
3	CONSTRUCTION / STRINGING	40.00	0.00	20	1.10	1.00	2.50
4	EXTREME ICE & WIND	50.00	1.50	0	1.00	1.00	1.00
5	DEFLECTION (60° INITIAL)	0.00	0.00	60	1.00	1.00	1.00

SPANS AND TENSIONS								
WEIGHT SPAN = 500			WIND SPAN = 300					
LOAD PT Tn	WIRE SIZE/ TYPE	NO. WIRES	REF. ANGLE (DEGREES)	CASE 1 TENSION (LBS)	CASE 2 TENSION (LBS)	CASE 3 TENSION (LBS)	CASE 4 TENSION (LBS)	CASE 5 TENSION (LBS)
1	OPGW	1	0°	5200	3700	3600	8300	2900
2	OPGW	1	125°	3800	2500	2200	6500	1500
3	T2-397 ACSR IBIS	1	0°	12000	7500	7700	14000	5700
4	T2-397 ACSR IBIS	1	125°	7700	5500	5200	11500	3600

**LAMINATED WOOD  
POLE #262**

-PRELIMINARY-  
NOT FOR CONSTRUCTION  
FOR REVIEW 06/30/22

REV	DATE	DESCRIPTION
0	06-15-2022	ISSUED FOR CONTRACTOR BIDDING

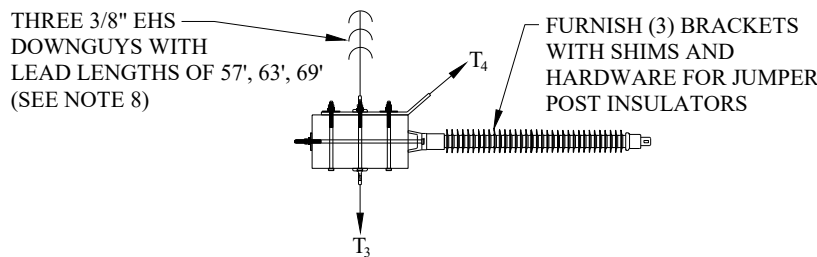
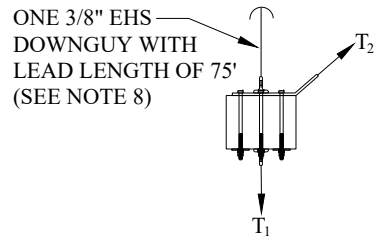
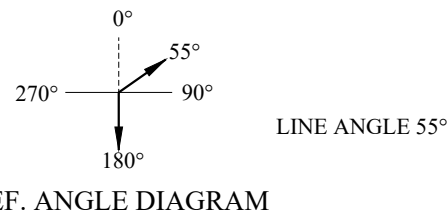
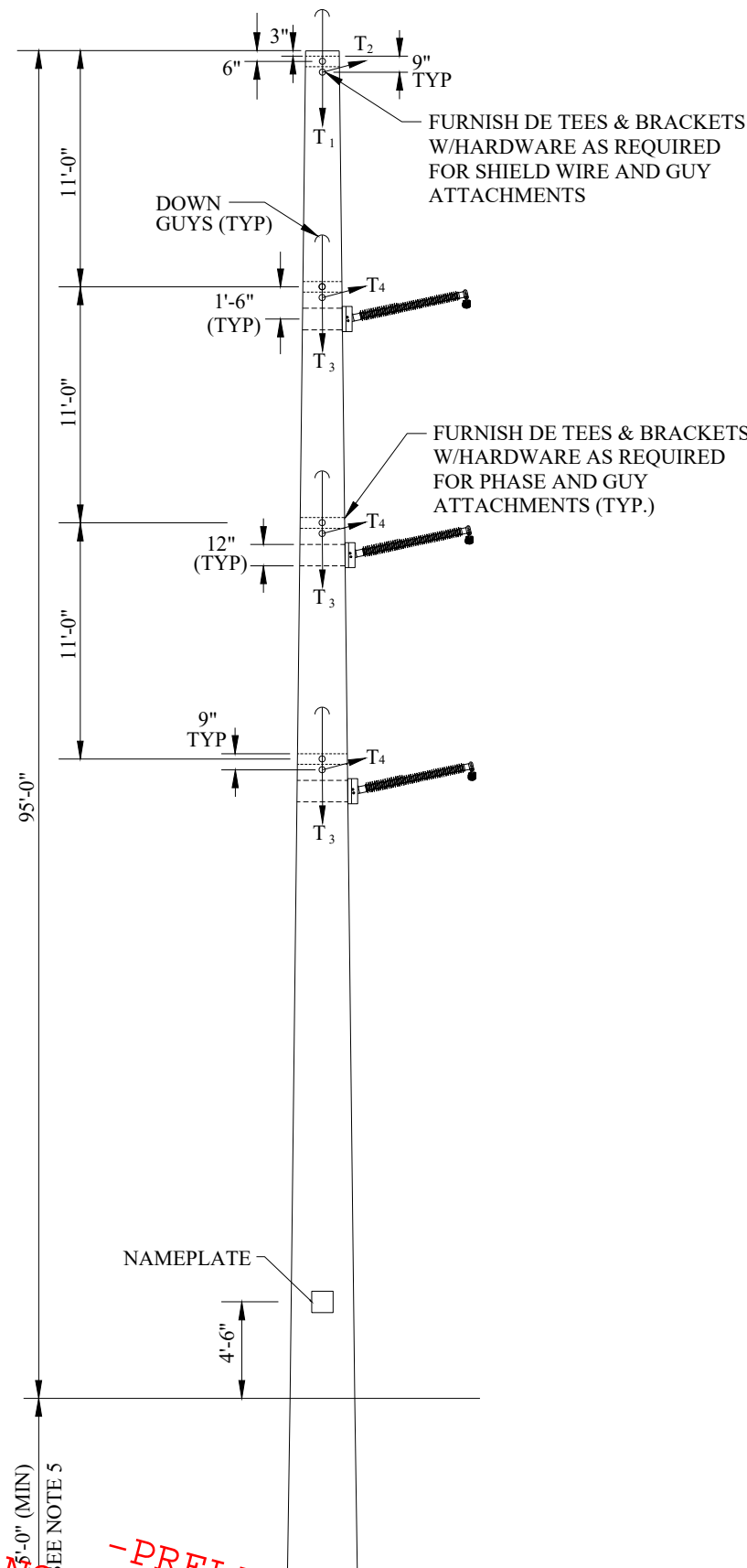


Project Manager: DJH  
 Designer: JDL  
 Project Number: 419437  
 Phone: (712) 472-2531

CITY OF AMES ELECTRIC SERVICES  
AMES, IOWA

LAMINATED WOOD POLE LOADING TREE  
AMES - ANKENY 161 kV TRANSMISSION LINE  
IA DOT I-35 RELOCATION

S  
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LWP-262



STRUCTURE # \_\_\_\_\_  
 LENGTH \_\_\_\_\_  
 GRND LINE MOMENT \_\_\_\_\_  
 MANUFACTURER \_\_\_\_\_  
 DATE OF MFG \_\_\_\_\_

NAMEPLATE DETAIL

NOTES:

1. Loads do not include wind on pole.
2. Loads do not include overload factors.
3. Structure shall be designed as a terminal deadend.
4. Poles may be single piece or spliced.
5. Pole Supplier shall specify appropriate foundation reinforcement system and embedment depth. See geotechnical report.
6. Pole Supplier shall furnish deadend tees and mounting hardware for insulator and guy attachments.
7. OPGW Characteristics: O.D. = 0.53", WT: 0.374 Lbs/Ft.
8. Initial installation of pole shall include down guys opposite T1 & T3 load Pts for temporary line configuration. At final installation, down guy attachments shall be removed and replaced with static and phase deadends for final configuration at 180° Ref Angle.
9. Contractor shall coordinate all hardware details with the appropriate framing unit drawings, as required.

LOADING CONDITIONS							
LOAD CASE	DESCRIPTION	WIND (MPH)	ICE (IN.)	TEMP. (° F)	WIND LOAD FACTOR	WIRE TENSION OLF	VERTICAL LOAD FACTOR
1	NESC HEAVY	40.00	0.50	0	2.50	1.65	1.50
2	EXTREME WIND (NESC+)	100.00	0.00	60	1.00	1.10	1.00
3	CONSTRUCTION / STRINGING	40.00	0.00	20	1.10	1.00	2.50
4	EXTREME ICE & WIND	50.00	1.50	0	1.00	1.00	1.00
5	DEFLECTION (60° INITIAL)	0.00	0.00	60	1.00	1.00	1.00

SPANS AND TENSIONS								
WEIGHT SPAN = 500			WIND SPAN = 300					
LOAD PT Tn	WIRE SIZE/ TYPE	NO. WIRES	REF. ANGLE (DEGREES)	CASE 1 TENSION (LBS)	CASE 2 TENSION (LBS)	CASE 3 TENSION (LBS)	CASE 4 TENSION (LBS)	CASE 5 TENSION (LBS)
1	OPGW	1	55°	3800	2500	2200	6500	1500
2	OPGW	1	180°	5200	3700	3600	8300	2900
3	T2-397 ACSR IBIS	1	55°	7700	5500	5200	11500	3600
4	T2-397 ACSR IBIS	1	180°	12000	7500	8000	14000	6000

LAMINATED WOOD  
POLE #263

-PRELIMINARY-  
 NOT FOR CONSTRUCTION  
 FOR REVIEW 06/30/22

REV	DATE	DESCRIPTION
0	06-15-2022	ISSUED FOR CONTRACTOR BIDDING

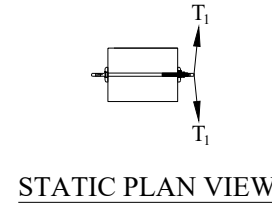
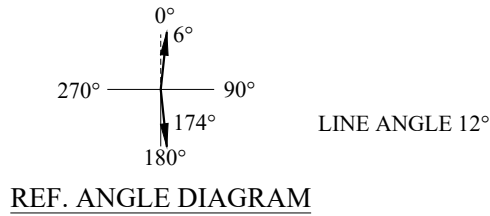
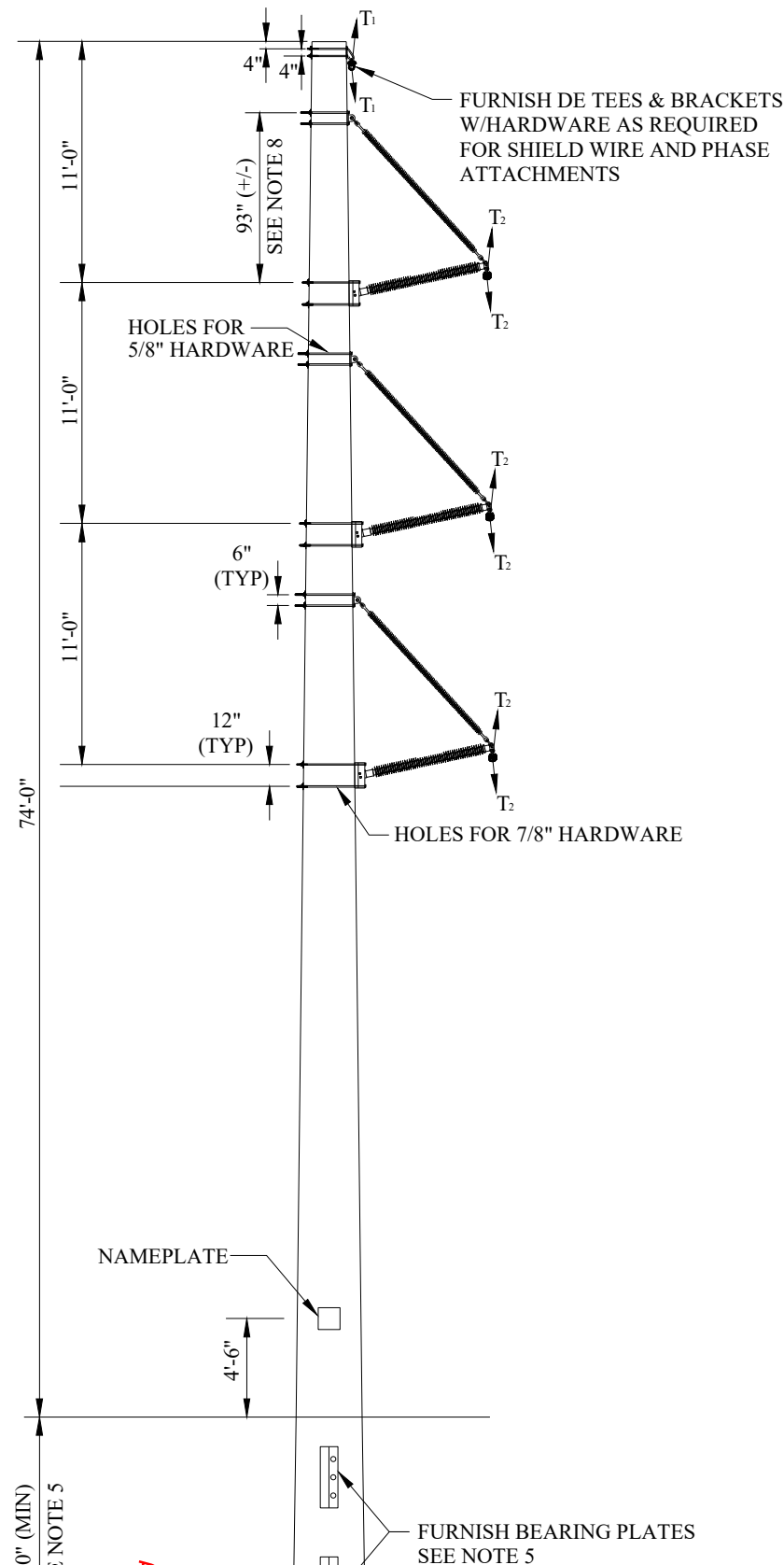


Project Manager: DJH  
 Designer: JDL  
 Project Number: 419437  
 Phone: (712) 472-2531

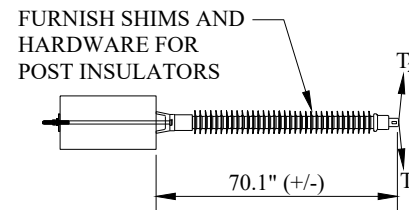
CITY OF AMES ELECTRIC SERVICES  
 AMES, IOWA

LAMINATED WOOD POLE LOADING TREE  
 AMES - ANKENY 161 kV TRANSMISSION LINE  
 IA DOT I-35 RELOCATION

SHEET  
LWP-263



STATIC PLAN VIEW



PHASE PLAN VIEW

STRUCTURE #	_____
LENGTH	_____
GRND LINE MOMENT	_____
MANUFACTURER	_____
DATE OF MFG	_____

NAMEPLATE DETAIL

NOTES:

1. Loads do not include wind on pole.
2. Loads do not include overload factors.
3. Contractor shall coordinate all hardware details with the appropriate framing unit drawings, as required.
4. Poles may be single piece or spliced.
5. Pole Supplier shall specify appropriate foundation reinforcement system and embedment depth. Assume class 6 soils for the design of the foundation system.
6. Pole Supplier shall furnish deadend tees and mounting hardware for insulator and shield wire bracket attachments. Furnish shims for gain base post insulators as necessary.
7. OPGW Characteristics: O.D. = 0.53", WT: 0.374 Lbs/Ft.
8. Contractor shall verify braced post assembly dimensions with insulator furnished for the project. Coordinate dimensions and hardware with the supplier.

LOADING CONDITIONS							
LOAD CASE	DESCRIPTION	WIND (MPH)	ICE (IN.)	TEMP. (°F)	WIND LOAD FACTOR	WIRE TENSION OLF	VERTICAL LOAD FACTOR
1	NESC HEAVY	40.00	0.50	0	2.50	1.65	1.50
2	EXTREME WIND (NESC+)	100.00	0.00	60	1.00	1.10	1.00
3	CONSTRUCTION / STRINGING	40.00	0.00	20	1.10	1.00	2.50
4	EXTREME ICE & WIND	50.00	1.50	0	1.00	1.00	1.00
5	DEFLECTION (60° INITIAL)	0.00	0.00	60	1.00	1.00	1.00

SPANS AND TENSIONS								
LOAD PT Tn	WIRE SIZE/ TYPE	NO. WIRES	LINE ANGLE (DEGREES)	WIND SPAN = 350				
				CASE 1 TENSION (LBS)	CASE 2 TENSION (LBS)	CASE 3 TENSION (LBS)	CASE 4 TENSION (LBS)	CASE 5 TENSION (LBS)
1	OPGW	1	12°	5200	3700	3700	8300	2900
2	T2-397 ACSR IBIS	1	12°	12000	8000	8500	15000	6500

LAMINATED WOOD  
POLE #289

NOT FOR CONSTRUCTION  
 FOR REVIEW 06/30/22  
 -PRELIMINARY-

REV	DATE	DESCRIPTION
0	06-15-2022	ISSUED FOR CONTRACTOR BIDDING



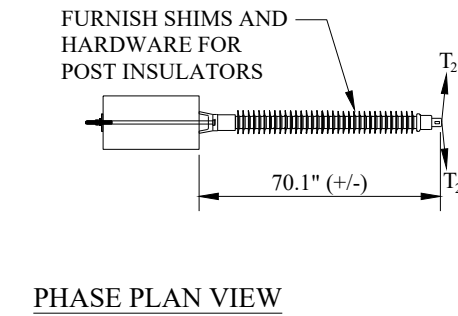
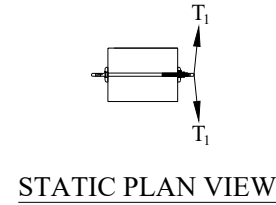
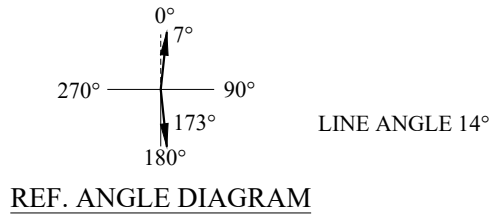
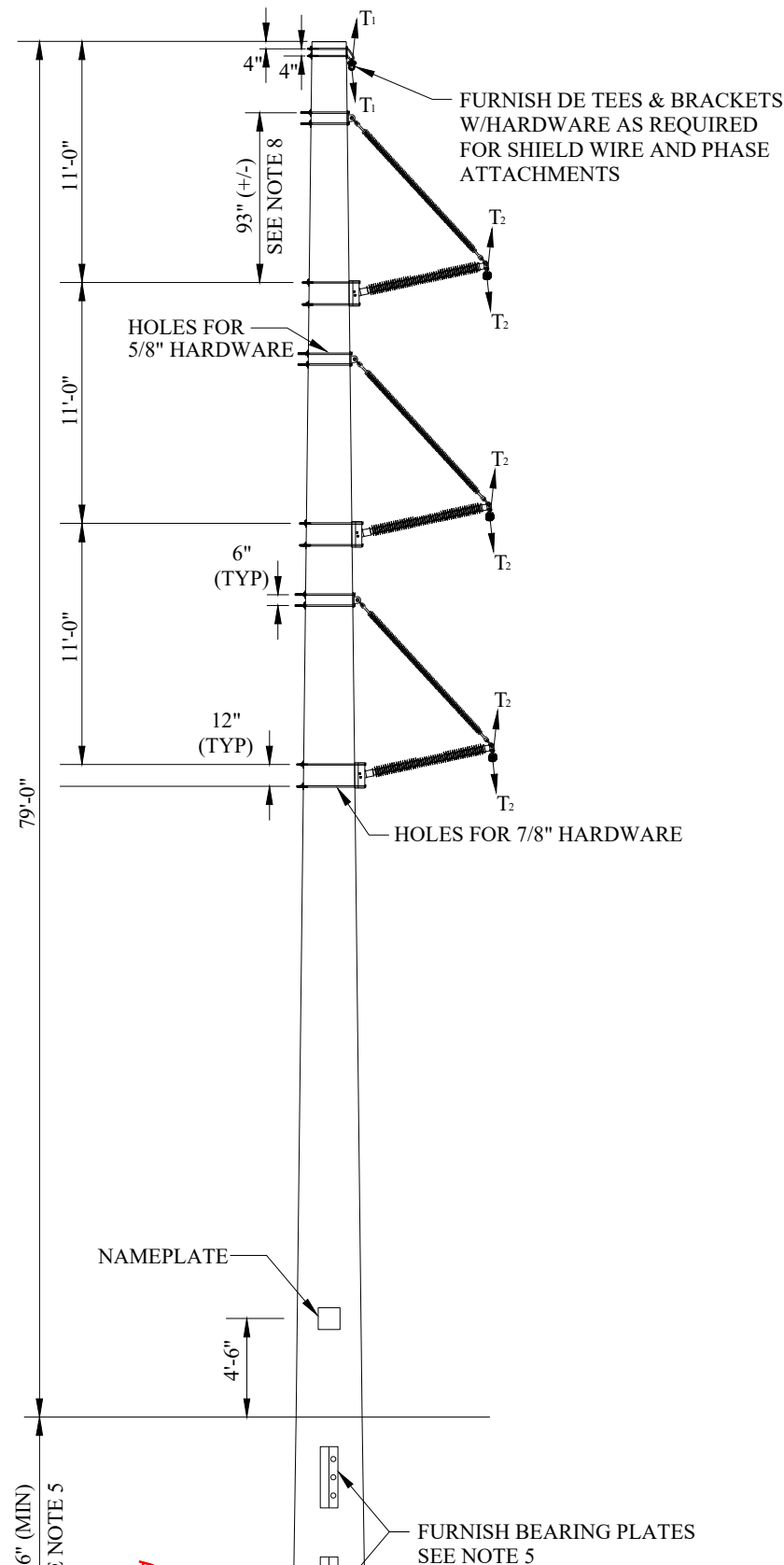
Project Manager: DJH  
 Designer: JDL  
 Project Number: 419437  
 Phone: (712) 472-2531

CITY OF AMES ELECTRIC SERVICES  
 AMES, IOWA

LAMINATED WOOD POLE LOADING TREE  
 AMES - ANKENY 161 kV TRANSMISSION LINE  
 IA DOT I-35 RELOCATION

S  
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E  
T  
LWP-289





STRUCTURE # \_\_\_\_\_  
 LENGTH \_\_\_\_\_  
 GRND LINE MOMENT \_\_\_\_\_  
 MANUFACTURER \_\_\_\_\_  
 DATE OF MFG \_\_\_\_\_

NAMEPLATE DETAIL

**NOTES:**

1. Loads do not include wind on pole.
2. Loads do not include overload factors.
3. Contractor shall coordinate all hardware details with the appropriate framing unit drawings, as required.
4. Poles may be single piece or spliced.
5. Pole Supplier shall specify appropriate foundation reinforcement system and embedment depth. Assume class 6 soils for the design of the foundation system.
6. Pole Supplier shall furnish deadend tees and mounting hardware for insulator and shield wire bracket attachments. Furnish shims for gain base post insulators as necessary.
7. OPGW Characteristics: O.D. = 0.53", WT: 0.374 Lbs/Ft.
8. Contractor shall verify braced post assembly dimensions with insulator furnished for the project. Coordinate dimensions and hardware with the supplier.

LOADING CONDITIONS							
LOAD CASE	DESCRIPTION	WIND (MPH)	ICE (IN.)	TEMP. (° F)	WIND LOAD FACTOR	WIRE TENSION OLF	VERTICAL LOAD FACTOR
1	NESC HEAVY	40.00	0.50	0	2.50	1.65	1.50
2	EXTREME WIND (NESC+)	100.00	0.00	60	1.00	1.10	1.00
3	CONSTRUCTION / STRINGING	40.00	0.00	20	1.10	1.00	2.50
4	EXTREME ICE & WIND	50.00	1.50	0	1.00	1.00	1.00
5	DEFLECTION (60° INITIAL)	0.00	0.00	60	1.00	1.00	1.00

SPANS AND TENSIONS								
WEIGHT SPAN = 465			WIND SPAN = 425					
LOAD PT Tn	WIRE SIZE/ TYPE	NO. WIRES	LINE ANGLE (DEGREES)	CASE 1 TENSION (LBS)	CASE 2 TENSION (LBS)	CASE 3 TENSION (LBS)	CASE 4 TENSION (LBS)	CASE 5 TENSION (LBS)
1	OPGW	1	14°	5200	3700	3700	8300	2900
2	T2-397 ACSR IBIS	1	14°	12000	8000	8500	15000	6500

LAMINATED WOOD  
POLE #291

**NOT FOR CONSTRUCTION - PRELIMINARY - FOR REVIEW**  
06/30/22

REV	DATE	DESCRIPTION
0	06-15-2022	ISSUED FOR CONTRACTOR BIDDING

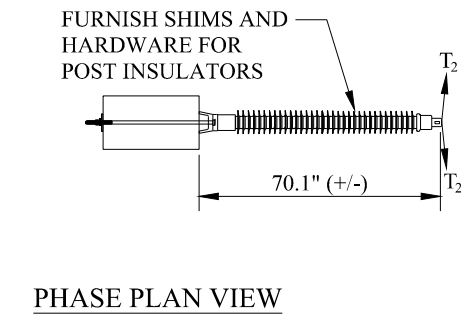
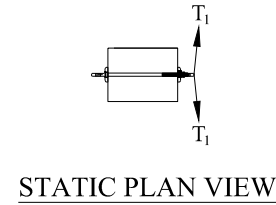
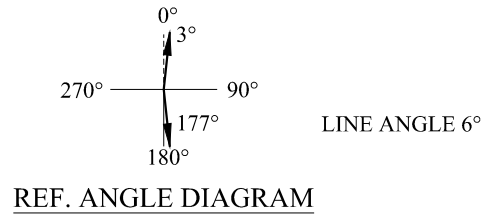
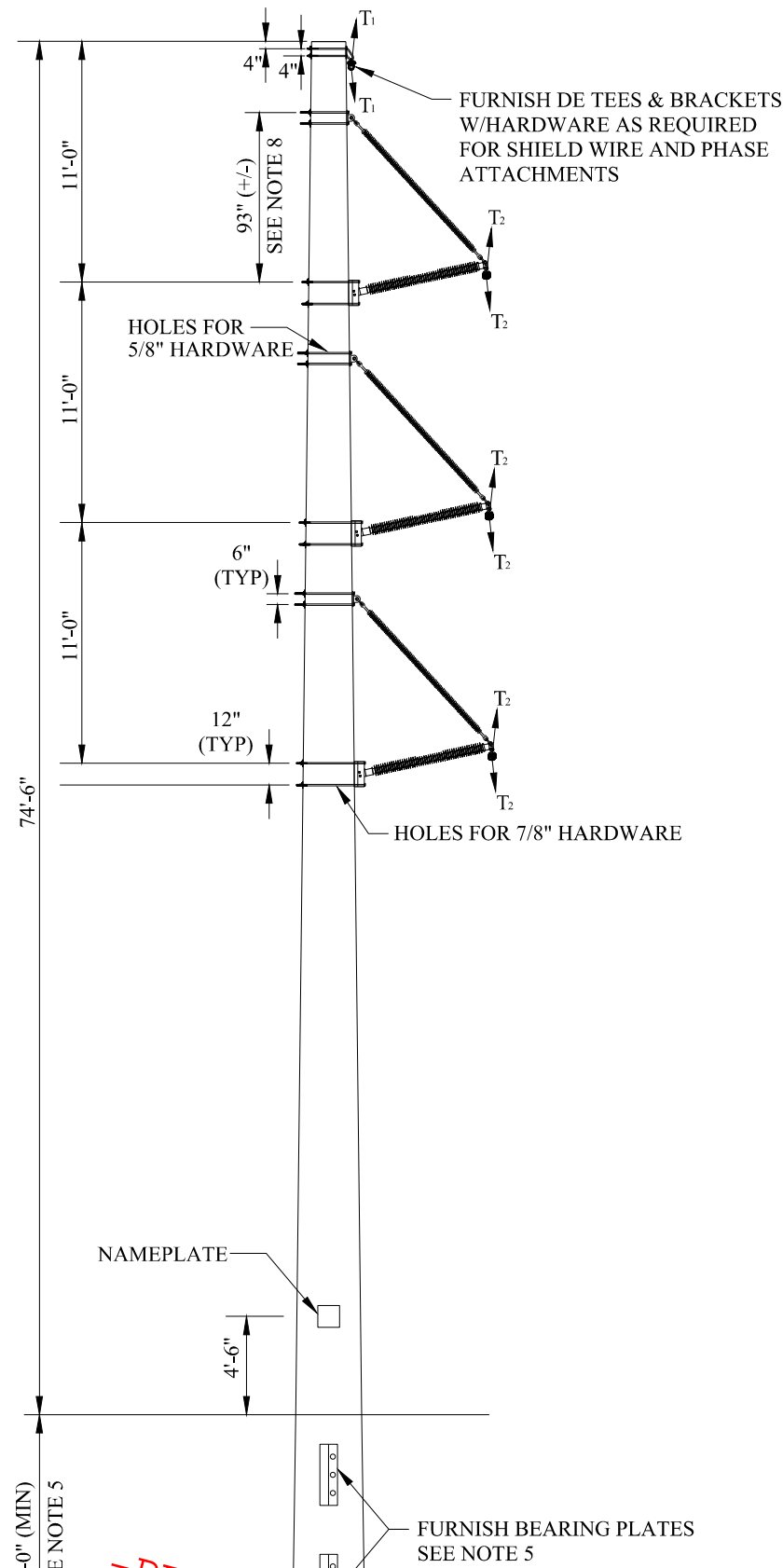


Project Manager: DJH  
 Designer: JDL  
 Project Number: 419437  
 Phone: (712) 472-2531

CITY OF AMES ELECTRIC SERVICES  
 AMES, IOWA

LAMINATED WOOD POLE LOADING TREE  
 AMES - ANKENY 161 kV TRANSMISSION LINE  
 IA DOT I-35 RELOCATION

SHEET  
LWP-291



NAMEPLATE DETAIL

STRUCTURE # \_\_\_\_\_  
 LENGTH \_\_\_\_\_  
 GRND LINE MOMENT \_\_\_\_\_  
 MANUFACTURER \_\_\_\_\_  
 DATE OF MFG \_\_\_\_\_

**NOTES:**

1. Loads do not include wind on pole.
2. Loads do not include overload factors.
3. Contractor shall coordinate all hardware details with the appropriate framing unit drawings, as required.
4. Poles may be single piece or spliced.
5. Pole Supplier shall specify appropriate foundation reinforcement system and embedment depth. Assume class 6 soils for the design of the foundation system.
6. Pole Supplier shall furnish deadend tees and mounting hardware for insulator and shield wire bracket attachments. Furnish shims for gain base post insulators as necessary.
7. OPGW Characteristics: O.D. = 0.53", WT: 0.374 Lbs/Ft.
8. Contractor shall verify braced post assembly dimensions with insulator furnished for the project. Coordinate dimensions and hardware with the supplier.

LOADING CONDITIONS							
LOAD CASE	DESCRIPTION	WIND (MPH)	ICE (IN.)	TEMP. (° F)	WIND LOAD FACTOR	WIRE TENSION OLF	VERTICAL LOAD FACTOR
1	NESC HEAVY	40.00	0.50	0	2.50	1.65	1.50
2	EXTREME WIND (NESC+)	100.00	0.00	60	1.00	1.10	1.00
3	CONSTRUCTION / STRINGING	40.00	0.00	20	1.10	1.00	2.50
4	EXTREME ICE & WIND	50.00	1.50	0	1.00	1.00	1.00
5	DEFLECTION (60° INITIAL)	0.00	0.00	60	1.00	1.00	1.00

SPANS AND TENSIONS								
WEIGHT SPAN = 400			WIND SPAN = 450					
LOAD PT Tn	WIRE SIZE/ TYPE	NO. WIRES	LINE ANGLE (DEGREES)	CASE 1 TENSION (LBS)	CASE 2 TENSION (LBS)	CASE 3 TENSION (LBS)	CASE 4 TENSION (LBS)	CASE 5 TENSION (LBS)
1	OPGW	1	6°	5200	3700	3700	8700	2900
2	T2-397 ACSR IBIS	1	6°	12000	8000	8500	15000	6500

LAMINATED WOOD  
POLE #293

**NOT FOR CONSTRUCTION - PRELIMINARY - FOR REVIEW**  
06/30/22

REV	DATE	DESCRIPTION
0	06-15-2022	ISSUED FOR CONTRACTOR BIDDING

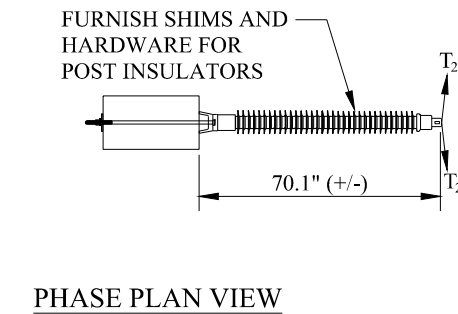
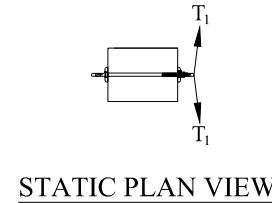
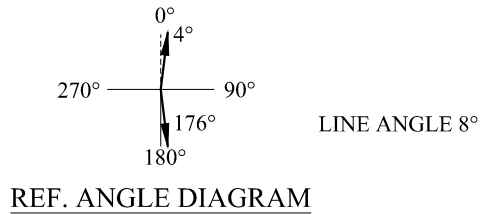
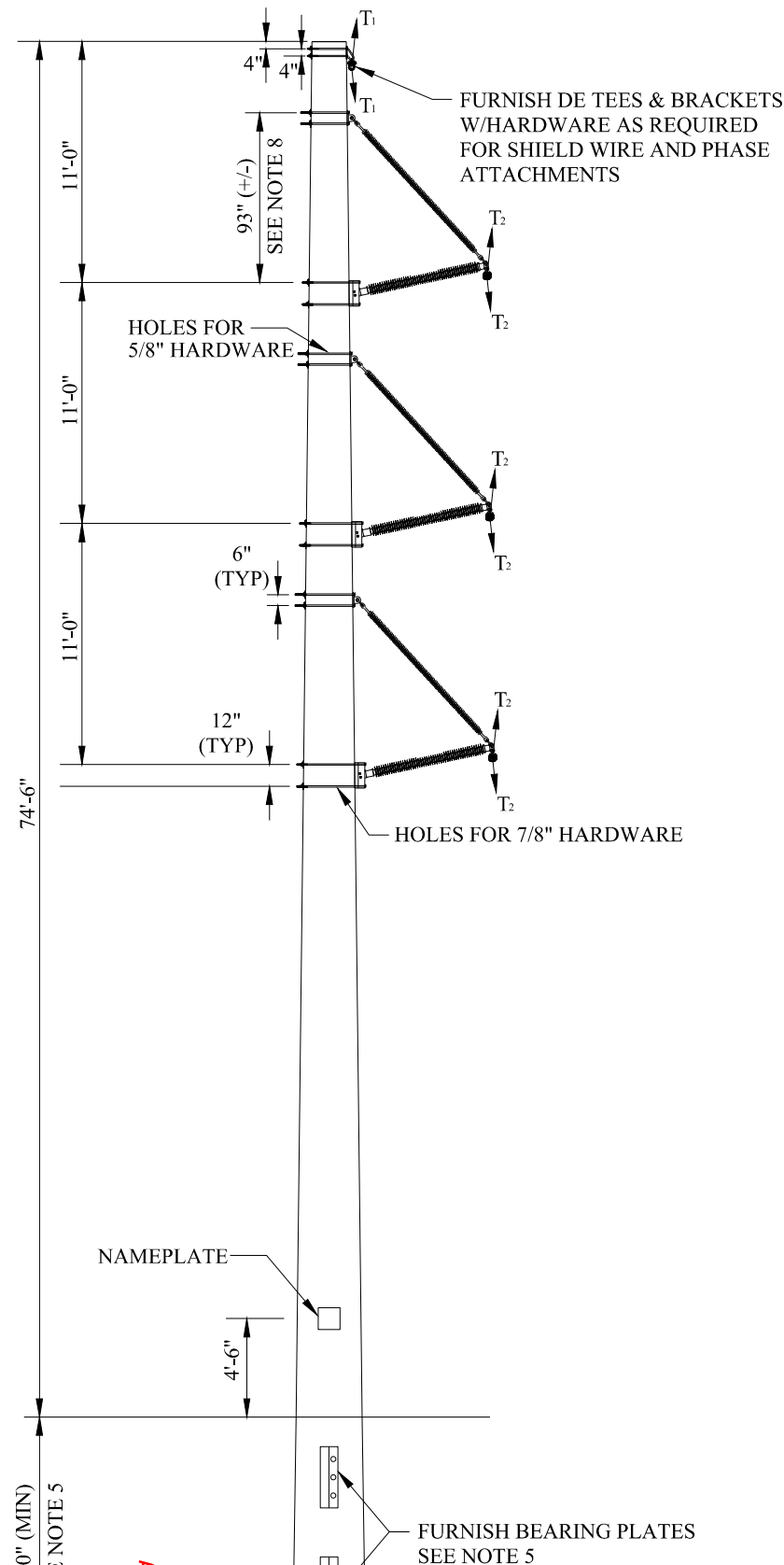


Project Manager: DJH  
 Designer: JDL  
 Project Number: 419437  
 Phone: (712) 472-2531

CITY OF AMES ELECTRIC SERVICES  
 AMES, IOWA

LAMINATED WOOD POLE LOADING TREE  
 AMES - ANKENY 161 kV TRANSMISSION LINE  
 IA DOT I-35 RELOCATION

SHEET  
LWP-293



NAMEPLATE DETAIL

STRUCTURE # \_\_\_\_\_  
 LENGTH \_\_\_\_\_  
 GRND LINE MOMENT \_\_\_\_\_  
 MANUFACTURER \_\_\_\_\_  
 DATE OF MFG \_\_\_\_\_

**NOTES:**

1. Loads do not include wind on pole.
2. Loads do not include overload factors.
3. Contractor shall coordinate all hardware details with the appropriate framing unit drawings, as required.
4. Poles may be single piece or spliced.
5. Pole Supplier shall specify appropriate foundation reinforcement system and embedment depth. Assume class 6 soils for the design of the foundation system.
6. Pole Supplier shall furnish deadend tees and mounting hardware for insulator and shield wire bracket attachments. Furnish shims for gain base post insulators as necessary.
7. OPGW Characteristics: O.D. = 0.53", WT: 0.374 Lbs/Ft.
8. Contractor shall verify braced post assembly dimensions with insulator furnished for the project. Coordinate dimensions and hardware with the supplier.

LOADING CONDITIONS							
LOAD CASE	DESCRIPTION	WIND (MPH)	ICE (IN.)	TEMP. (° F)	WIND LOAD FACTOR	WIRE TENSION OLF	VERTICAL LOAD FACTOR
1	NESC HEAVY	40.00	0.50	0	2.50	1.65	1.50
2	EXTREME WIND (NESC+)	100.00	0.00	60	1.00	1.10	1.00
3	CONSTRUCTION / STRINGING	40.00	0.00	20	1.10	1.00	2.50
4	EXTREME ICE & WIND	50.00	1.50	0	1.00	1.00	1.00
5	DEFLECTION (60° INITIAL)	0.00	0.00	60	1.00	1.00	1.00

SPANS AND TENSIONS								
WEIGHT SPAN = 400			WIND SPAN = 450					
LOAD PT Tn	WIRE SIZE/ TYPE	NO. WIRES	LINE ANGLE (DEGREES)	CASE 1 TENSION (LBS)	CASE 2 TENSION (LBS)	CASE 3 TENSION (LBS)	CASE 4 TENSION (LBS)	CASE 5 TENSION (LBS)
1	OPGW	1	8°	5200	3700	3700	8700	2900
2	T2-397 ACSR IBIS	1	8°	12000	8000	8500	15000	6500

LAMINATED WOOD  
POLE #296

**NOT FOR CONSTRUCTION - PRELIMINARY - FOR REVIEW**  
06/30/22

REV	DATE	DESCRIPTION
0	06-15-2022	ISSUED FOR CONTRACTOR BIDDING

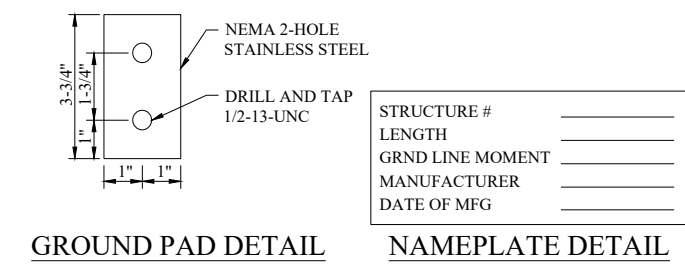
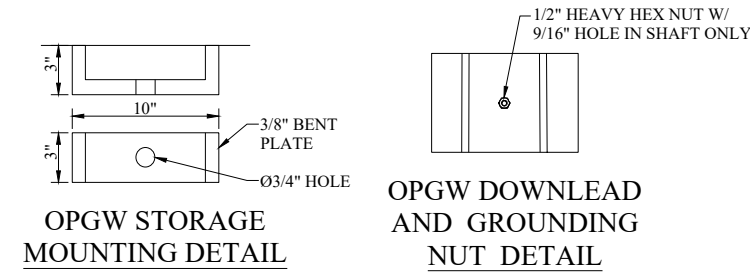
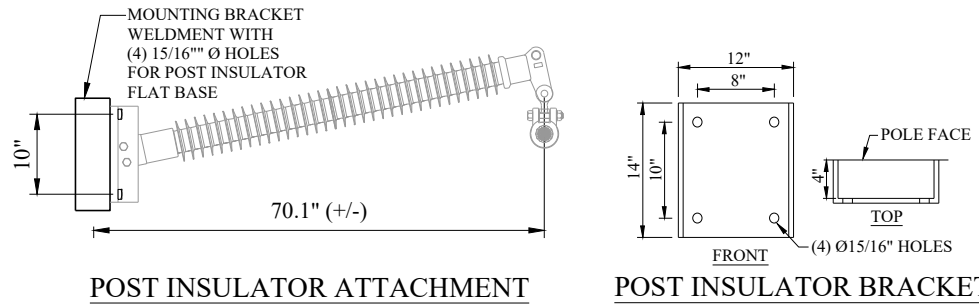
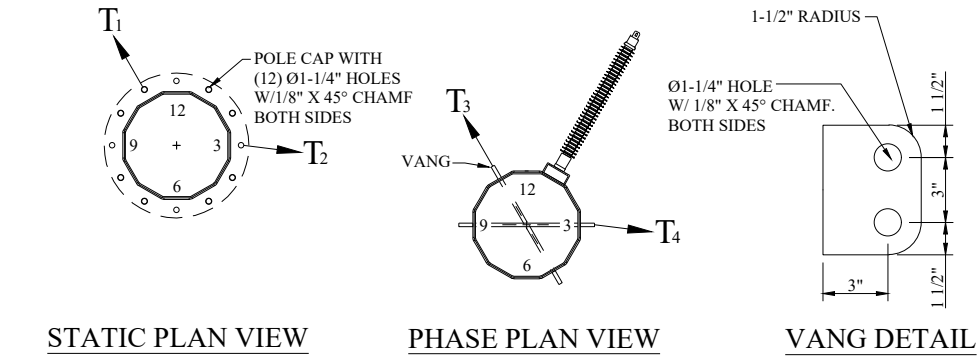
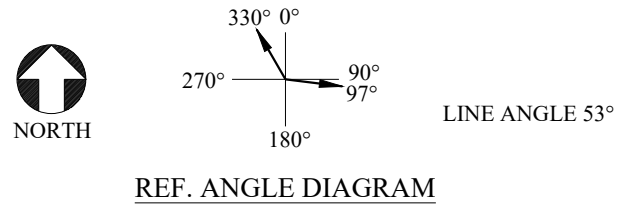
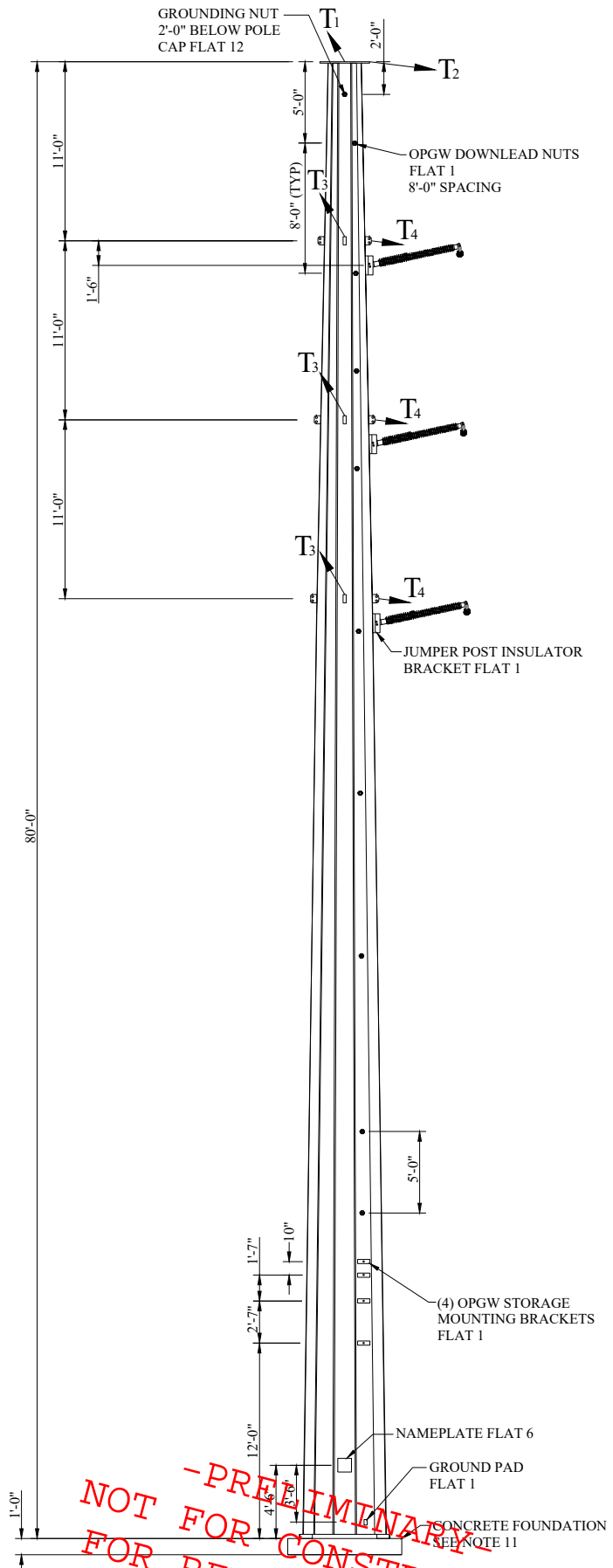


Project Manager: DJH  
 Designer: JDL  
 Project Number: 419437  
 Phone: (712) 472-2531

CITY OF AMES ELECTRIC SERVICES  
AMES, IOWA

LAMINATED WOOD POLE LOADING TREE  
AMES - ANKENY 161 kV TRANSMISSION LINE  
IA DOT I-35 RELOCATION

SHEET  
LWP-296



STRUCTURE #	_____
LENGTH	_____
GRND LINE MOMENT	_____
MANUFACTURER	_____
DATE OF MFG	_____

**NOTES:**

1. Loads do not include wind on pole.
2. Loads do not include overload factors.
3. OPGW Characteristics: O.D.=0.53", WT.=0.374 lbs./ft.
4. Pole shall have self-weathering finish.
5. Structure shall be designed as a terminal deadend. See Load Case 6.
6. Poles may be single piece or have a single slip joint; Longer poles may have two joints.
7. All vangs and structural weldments shall support conductors under load conditions as specified in the load requirements. Orientation angle of vangs shall be determined by the Supplier for optimal design.
8. Furnish anchor bolts and templates designed for the following limitations:
  - A. Concrete pier foundation diameter = 90".
  - B. Maximum anchor bolt circle diameter = 68".

LOADING CONDITIONS							
LOAD CASE	DESCRIPTION	WIND (MPH)	ICE (IN.)	TEMP. (° F)	WIND LOAD FACTOR	WIRE TENSION OLF	VERTICAL LOAD FACTOR
1	NESC HEAVY	40.00	0.50	0	2.50	1.65	1.50
2	EXTREME WIND (NESC+)	100.00	0.00	60	1.00	1.10	1.00
3	CONSTRUCTION / STRINGING	40.00	0.00	20	1.10	1.00	2.50
4	EXTREME ICE & WIND	50.00	1.50	0	1.00	1.00	1.00
5	DEFLECTION (60° INITIAL)	0.00	0.00	60	1.00	1.00	1.00
6	TERMINAL LOAD (NESC HEAVY)	40.00	0.50	0	2.50	1.65	1.50

SPANS AND TENSIONS									
WEIGHT SPAN = 550					WIND SPAN = 500				
LOAD PT Tn	WIRE SIZE/ TYPE	NO. WIRES	REF. ANGLE (DEGREES)	CASE 1 TENSION (LBS)	CASE 2 TENSION (LBS)	CASE 3 TENSION (LBS)	CASE 4 TENSION (LBS)	CASE 5 TENSION (LBS)	CASE 6 TENSION (LBS)
1	OPGW	1	330°	5500	4000	4000	8500	3000	0
2	OPGW	1	97°	5500	4000	4000	9000	3000	5500
3	T2-397 ACSR IBIS	1	330°	12500	8500	8500	16000	7000	0
4	T2-397 ACSR IBIS	1	97°	12500	8500	8500	16000	7000	12500

**SELF-SUPPORTING  
STEEL POLE #292**

**NOT FOR CONSTRUCTION  
-PRELIMINARY  
FOR REVIEW 06/30/22**

REV	DATE	DESCRIPTION
0	06-15-2022	ISSUED FOR CONTRACTOR BIDDING

**DGR ENGINEERING**

Project Manager: DJH  
 Designer: JDL  
 Project Number: 419437  
 Phone: (712) 472-2531

CITY OF AMES ELECTRIC SERVICES  
 AMES, IOWA

**STEEL POLE POLE LOADING TREE  
 AMES - ANKENY 161 kV TRANSMISSION LINE  
 IA DOT I-35 RELOCATION**

SHEET  
 TSSSP-292

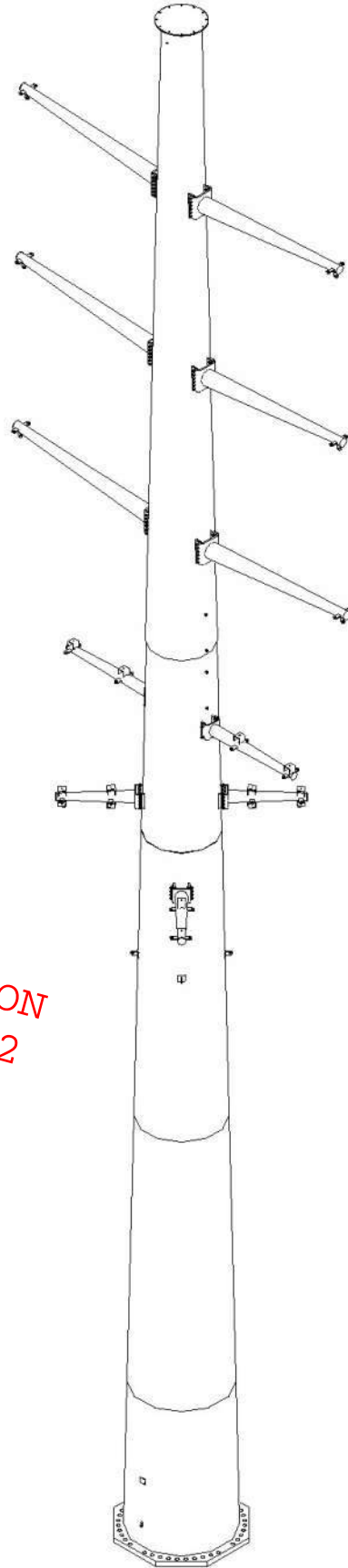


**EXISTING STEEL POLE DRAWINGS**

CITY OF AMES

STANGE ROAD-AMES PLANT-NE ANKENY

Job No. 20722



**-PRELIMINARY-  
NOT FOR CONSTRUCTION  
FOR REVIEW 06/30/22**

**Thomas&Betts**

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8155 T&B Boulevard  
Memphis, TN 38125  
PHONE: (901) 252-5000  
ENGR. FAX: (901) 252-1304

Steel Structures Division


SPECIAL NOTES - WEATHERING

1. MATERIAL SPECIFICATION:  
SEE STANDARD DRAWING SSG001, GENERAL INFORMATION NOTE 1B FOR STEEL SPECIFICATIONS FOR WEATHERING POLES, UNLESS NOTED BELOW.  
EXCEPTION: NONE.
2. PLATE TESTING:  
HEAT LOT:  
SEE SHEET SSG001, GENERAL INFORMATION, NOTE 2.  
EXCEPTION: NONE
3. FINISH:
  - A. WEATHERING:  
POLE BASES AND ARMS TO BE SEALED. BLAST PER SSPC-SP6.  
POLE AND ARMS - BARE  
BOLTS - BARE  
NUTS - BARE
  - B. EMBEDDED PORTION OF POLES PLUS 1'-0" COATED WITH CORROCOTE II CLASSIC PNT 219A AND PNT 219B, MIN. 16 MILS THICK.
4. MARKING:  
SEE SHEET SSG001, GENERAL MANUFACTURING INFORMATION, NOTE 10.  
EXCEPTIONS:  
A. MARK CAMBER DIRECTION WITH AN ARROW ON THE POLE CAP.
5. CLIMBING/WORKING:  
LADDERS: FOR CLIMBING INFORMATION SEE SHEET SSG003 AND ORIENTATION ON INDIVIDUAL ERECTION DRAWINGS.
6. CLIMBING/WORKING DEVICES:  
LADDERS PROVIDED BY CUSTOMER.
7. SLIP JOINTED POLES.  
FOR SLIP JOINT JACKING NUT LOCATION, SLIP JOINT LAP TOLERANCE, SLIP JOINT PROCEDURE AND ASSEMBLY INSTRUCTIONS, SEE SHEETS SSG004 AND SSG005.
8. SPECIAL CUSTOMER REQUIREMENTS:  
NONE.

-PRELIMINARY-  
 NOT FOR CONSTRUCTION  
 FOR REVIEW 06/30/22

REV.	DESCRIPTION	DRFT/DATE

CUSTOMER: CITY OF AMES
CUSTOMER P.O. NO:
JOB NO: 20722
DRAWN/DATE LM 10/2/2006
CHECKED/DATE: BG 10/12/2006
ENGINEER: MANISH SHARMA

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<b>STEEL STRUCTURES DIVISION</b>	
SPECIAL NOTES & DRAWING INDEX	
SHEET 2 OF 4	<b>20722-SPECNOTE</b>

ANCHOR BOLT DRAWING INDEX				
RELEASE	QTY	DESCRIPTION	POLE NO	ANCHOR BOLT DRAWING
A	1	100'-0" STRUCTURE	7	20722-STA007AA
	1	90'-0" STRUCTURE	23	20722-STA023AA
	1	85'-0" STRUCTURE	44	20722-STA044AA
	1	95'-0" STRUCTURE	47	20722-STA047AA
	1	95'-0" STRUCTURE	65	20722-STA065AA
	1	110'-0" STRUCTURE	73	20722-STA073AA
	1	105'-0" STRUCTURE	76	20722-STA076AA
	1	95'-0" STRUCTURE	79	20722-STA079AA
	1	95'-0" STRUCTURE	94	20722-STA094AA
	1	95'-6" STRUCTURE	95	20722-STA095AA
	1	90'-6" STRUCTURE	107	20722-STA107AA
	1	100'-0" STRUCTURE	114	20722-STA114AA
	1	105'-0" STRUCTURE	142-1	20722-STA142AA
	1	100'-6" STRUCTURE	147-1	20722-STA147AA
	1	65'-0" STRUCTURE	X	20722-STA00XAA
	1	90'-0" STRUCTURE	53	20722-STA053AA
1	110'-6" STRUCTURE	144	20722-STA144AA	
C	1	105'-0" STRUCTURE	2	20722-STB002AA
	1	90'-0" STRUCTURE	3	20722-STB003AA
	1	80'-0" STRUCTURE	4	20722-STB004AA
	1	85'-0" STRUCTURE	18	20722-STB018AA
	1	75'-0" STRUCTURE	55	20722-STB055AA
	1	75'-0" STRUCTURE	59	20722-STB059AA
	1	70'-0" STRUCTURE	60	20722-STB060AA
	1	90'-0" STRUCTURE	63	20722-STB063AA
	1	70'-0" STRUCTURE	141	20722-STB141AA
	1	70'-0" STRUCTURE	142	20722-STB142AA
	1	70'-0" STRUCTURE	146	20722-STB146AA
	1	70'-0" STRUCTURE	147	20722-STB147AA
	2	75'-0" STRUCTURE	187, 192	20722-STB187AA
	2	85'-0" STRUCTURE	188, 190	20722-STB188AA
	1	80'-0" STRUCTURE	274	20722-STB274AA
	1	85'-0" STRUCTURE	277	20722-STB277AA
1	75'-0" STRUCTURE	320	20722-STB320AA	
F	1	105'-6" STRUCTURE	132	20722-STA132AA
H	1	75'-0" STRUCTURE	271	20722-STB271AA
L	2	80'-0" H-FRAME	226L, 226R	20722-RLG226AA
	2	85'-0" H-FRAME	227L, 227R	20722-RLG227AA

STRUCTURE 292 ANCHOR BOLTS

STRUCTURE 288 ANCHOR BOLTS

NOT FOR PRELIMINARY  
FOR REVIEW  
FOR CONSTRUCTION  
06/30/22

POLE DRAWING INDEX									
RELEASE	QTY	STRUCTURE TYPE	STRUCTURE LENGTH	EMBEDMENT LENGTH	POLE NO	ERECTION DRAWING	POLE LAYOUT DRAWING	ARM LAYOUT DRAWING	CAMBER AMOUNT
B	1	100'-0" STRUCTURE	100'-0"	N/A	7	20722-STA007AT	20722-3001, 20722-3002	NONE	12"
	1	90'-0" STRUCTURE	90'-0"	N/A	23	20722-STA023AT	20722-3003, 20722-3004	20722-A, 20722-B	12"
	1	85'-0" STRUCTURE	85'-0"	N/A	44	20722-STA044AT	20722-3005, 20722-3006	20722-C, 20722-AD	12"
	1	95'-0" STRUCTURE	95'-0"	N/A	47	20722-STA047AT	20722-3007, 20722-3008	20722-AL, 20722-D	13"
	1	95'-0" STRUCTURE	95'-0"	N/A	65	20722-STA065AT	20722-3009, 20722-3010	20722-E, 20722-AS, 20722-AN	12"
	1	110'-0" STRUCTURE	110'-0"	N/A	73	20722-STA073AT	20722-3011, 20722-3012	20722-G, 20722-HA	14"
	1	105'-6" STRUCTURE	105'-6"	N/A	76	20722-STA076AT	20722-3013, 20722-3014	20722-A, 20722-J	14"
	1	95'-0" STRUCTURE	95'-0"	N/A	79	20722-STA079AT	20722-3015, 20722-3016	20722-K, 20722-L	13"
	1	95'-0" STRUCTURE	95'-0"	N/A	94	20722-STA094AT	20722-3017, 20722-3018	20722-M, 20722-N	12"
	1	95'-6" STRUCTURE	95'-6"	N/A	95	20722-STA095AT	20722-3019, 20722-3020	20722-P, 20722-H, 20722-R	13"
	1	90'-6" STRUCTURE	90'-6"	N/A	107	20722-STA107AT	20722-3021, 20722-3022	20722-AP, 20722-S	12"

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STEEL STRUCTURES DIVISION



SPECIAL NOTES & DRAWING INDEX

SHEET 3 OF 4      **20722-SPECNOTE**

CUSTOMER:	CITY OF AMES
CUSTOMER P.O. NO.:	
JOB NO.:	20722
DRAWN/DATE:	LM 10/2/2006
CHECKED/DATE:	BG 10/12/2006
ENGINEER:	MANISH SHARMA

A	REVISED POLE NUMBER	LW12-01-06
REV.	DESCRIPTION	DRFT/DATE

**POLE DRAWING INDEX**

RELEASE	QTY	STRUCTURE TYPE	STRUCTURE LENGTH	EMBEDMENT LENGTH	POLE NO	ERECTION DRAWING	POLE LAYOUT DRAWING	ARM LAYOUT DRAWING	CAMBER AMOUNT
<b>B</b>	1	100'-0" STRUCTURE	100'-0"	N/A	114	20722-STA114AT	20722-3023, 20722-3024	20722-H, 20722-AP	14"
	1	105'-0" STRUCTURE	105'-0"	N/A	142-1 	20722-STA142AT	20722-3025, 20722-3026	20722-T	15"
	1	100'-6" STRUCTURE	100'-6"	N/A	147-1 	20722-STA147AT	20722-3027, 20722-3028	20722-A, 20722-W	16"
	1	65'-0" STRUCTURE	65'-0"	N/A	X	20722-STA00XAT	20722-3058, 20722-3059	20722-D	10"
	1	90'-0" STRUCTURE	90'-0"	N/A	53	20722-STA053AT	20722-3060, 20722-3061	20722-AE	11"
	1	110'-6" STRUCTURE	110'-6"	N/A	144	20722-STA144AT	20722-3062, 20722-3063	20722-AF	12"
<b>D</b>	1	105'-0" STRUCTURE	105'-0"	N/A	2	20722-STB002AT	20722-3029, 20722-3030	NONE	12"
	1	90'-0" STRUCTURE	90'-0"	N/A	3	20722-STB003AT	20722-3031, 20722-3032	NONE	14"
	1	80'-0" STRUCTURE	80'-0"	N/A	4	20722-STB004AT	20722-3033, 20722-3034	NONE	12"
	1	85'-0" STRUCTURE	85'-0"	N/A	18	20722-STB018AT	20722-3035, 20722-3036	20722-YA	12"
	1	75'-0" STRUCTURE	75'-0"	N/A	55	20722-STB055AT	20722-3037, 20722-3038	NONE	9"
	1	75'-0" STRUCTURE	75'-0"	N/A	59	20722-STB059AT	20722-3037, 20722-3039	NONE	9"
	1	70'-0" STRUCTURE	70'-0"	N/A	60	20722-STB060AT	20722-3040, 20722-3041	NONE	8"
	1	90'-0" STRUCTURE	90'-0"	N/A	63	20722-STB063AT	20722-3042, 20722-3043	20722-Z	11"
	1	70'-0" STRUCTURE	70'-0"	N/A	141	20722-STB141AT	20722-3040, 20722-3041	NONE	8"
	1	70'-0" STRUCTURE	70'-0"	N/A	142	20722-STB142AT	20722-3040, 20722-3041	NONE	8"
	1	70'-0" STRUCTURE	70'-0"	N/A	146	20722-STB146AT	20722-3040, 20722-3041	NONE	8"
	1	70'-0" STRUCTURE	70'-0"	N/A	147	20722-STB147AT	20722-3040, 20722-3041	NONE	8"
	2	75'-0" STRUCTURE	75'-0"	N/A	187, 192	20722-STB187AT	20722-3044, 20722-3045	NONE	15"
<b>E</b>	1	85'-0" STRUCTURE	85'-0"	N/A	273	20722-STB273AT	20722-3050, 20722-3051	NONE	14"
	1	80'-0" STRUCTURE	80'-0"	N/A	274	20722-STB274AT	20722-3051, 20722-3052	NONE	10"
	1	85'-0" STRUCTURE	85'-0"	N/A	277	20722-STB277AT	20722-3053, 20722-3054	NONE	10"
	1	75'-0" STRUCTURE	75'-0"	N/A	320	20722-STB320AT	20722-3056, 20722-3057	NONE	10"
	2	50'-0" H-FRAME	50'-0"	14'-0"	302, 303	20722-LEG302AT	20722-3055	20722-AR, 20722-7602	-
<b>G</b>	1	105'-6" STRUCTURE	105'-6"	N/A	132	20722-STA132AT	20722-3064, 20722-3065	20722-AH, 20722-AG, 20722-AI, 20722-AT	14"
<b>J</b>	1	75'-0" STRUCTURE	75'-0"	N/A	271	20722-STB271AT	20722-3066, 20722-3067	NONE	9"
<b>M</b>	1	80'-0" H-FRAME	80'-0"	N/A	226L, 226R	20722-RLG226AT	20722-3068, 20722-3069, 20722-3768	20722-AA, 20722-7601	NONE
	1	85'-0" H-FRAME	85'-0"	N/A	227L, 227R	20722-RLG227AT	20722-3068, 20722-3768, 20722-3070	20722-AA, 20722-7601	NONE

**STRUCTURE 292  
STEEL POLE**

**STRUCTURE 288  
STEEL POLE**

**-PRELIMINARY-  
FOR CONSTRUCTION  
FOR REVIEW 06/30/22**

**SSG DRAWING INDEX**

STANDARD DRAWINGS	DRAWING NO	REVISION
GENERAL NOTES, ASSEMBLY AND ERECTION INFORMATION	SSG001	B
CLIMBING AND WORKING LADDER CLIP SPACING	SSG003	I
JACKING NUT LOCATIONS	SSG004	A
JACKING INSTRUCTIONS	SSG005	A

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**STEEL STRUCTURES DIVISION**

**SPECIAL NOTES &  
DRAWING INDEX**

CUSTOMER:	CITY OF AMES
CUSTOMER P.O. NO:	
JOB NO:	20722
DRAWN/DATE:	LM 10/2/2006
CHECKED/DATE:	BG 10/12/2006
ENGINEER:	MANISH SHARMA

**SHEET 4 OF 4**

**20722-SPECNOTE**



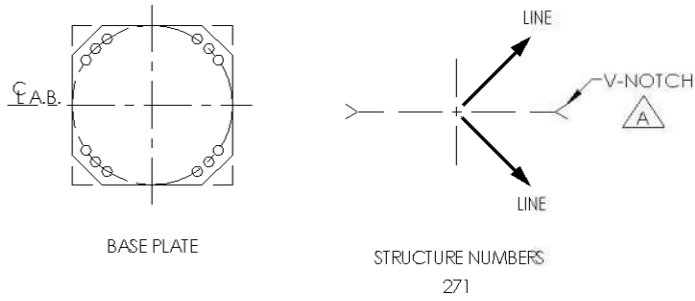
# ANCHOR BOLTS STRUCTURE 288

**NOTES:**

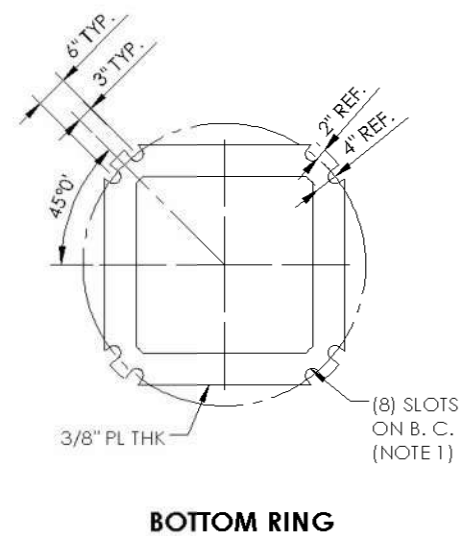
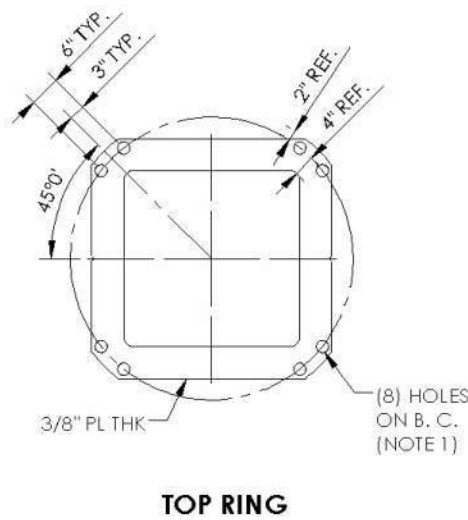
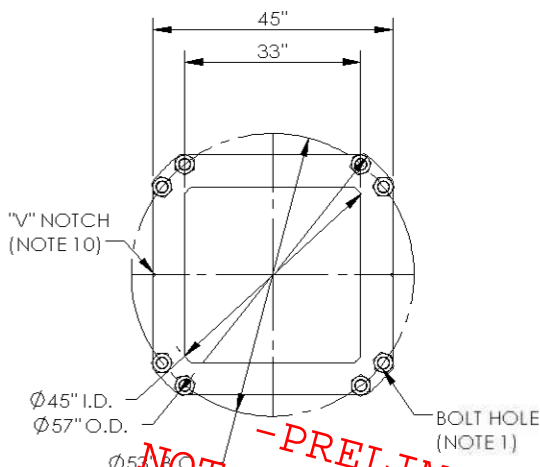
1. TOP RING HOLES: 2 5/16" DIA. ; BOTTOM & MIDDLE RINGS SLOTS: 2 5/8" WIDE
2. ANCHOR BOLT: 2 1/4" DIA REBAR ; NUT: 2 1/4" HEAVY HEX. SEE CHART FOR QUANTITY PER ANCHOR BOLT ASSEMBLY.
3. SPACER: L2 x 2 x 3/16, WHEN REQUIRED.
4. ANGLE STIFFENERS, L2 x 2 x 3/16, ON TOP & BOTTOM RINGS WHEN REQUIRED; 90° APART, ALONG X & Y AXIS WITH 1" OVERLAP.
5. HOLE AND BOLT QUANTITIES ON DETAILS ARE TYPICAL FOR DIMENSIONAL PURPOSES. SEE CHART FOR ACTUAL QUANTITIES.
6. ANCHOR BOLT ASSEMBLY IS TO BE MARKED WITH ASSEMBLY NO. AND STRUCTURE NO. ON TOP RING.
7. NO WELDING IS TO BE DONE ON ANCHOR BOLTS EXCEPT FOR BOTTOM 6".
8. CLUSTERS WHICH ARE TO BE SHIPPED BY RAIL REQUIRE ADDITION OF STANDARD LONGITUDINAL X-BRACING.
9. ALL ANCHOR BOLTS TO HAVE A CHARPY V-NOTCH IMPACT VALUE OF 15 FT-LBS. MINIMUM AT -20° F PER HEAT LOT TEST.
10. 1" WIDE x 1/2" DEEP "V" NOTCH, BISECTOR OF LINE ANGLES, 2-PLACES, ON TOP RING (FOR CONSTRUCTION/INSTALLATION PURPOSES).
11. ANCHOR BOLT ASSEMBLY TO BE SECURED AT MIDDLE RINGS BY MECHANICAL MEANS.
12. SPECIFICATIONS:

ITEM	MIN. YIELD	STEEL	FINISH
ANCHOR BOLTS	75 KSI	ASTM A 615 GRADE 75 MOD	HOT DIP GALVANIZED PER ASTM A 153 (TOP 24")
ANCHOR BOLT NUTS	---	ASTM A 563 GRADE DH	HOT DIP GALVANIZED PER ASTM A 153
ANCHOR BOLT RINGS	36 KSI	ASTM A 36	BARE

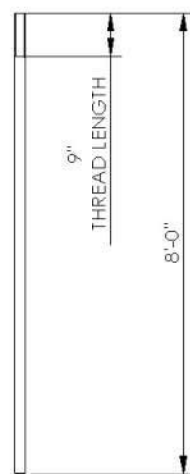
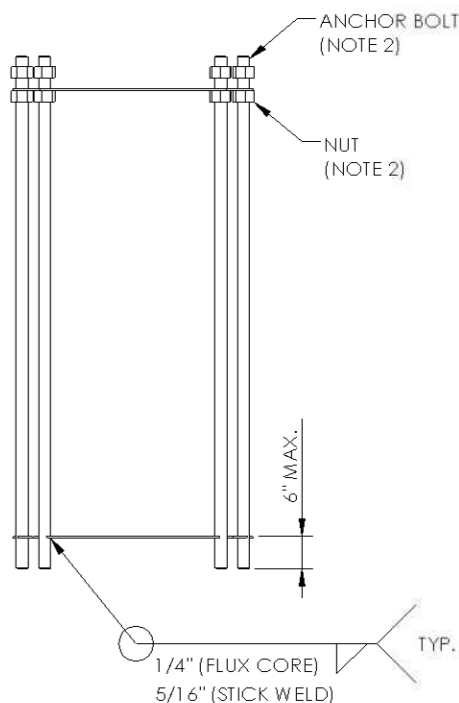
ANCHOR BOLT ASSEMBLY INFORMATION					
REL	BILLABLE	ANCHOR BOLT ASSY PART NO.	QTY	STRUCTURE NUMBER(S)	STRUCTURE DESCRIPTION
H	20722-STB271 AA	20722-3134	1	271	75'-0" STRUCTURE



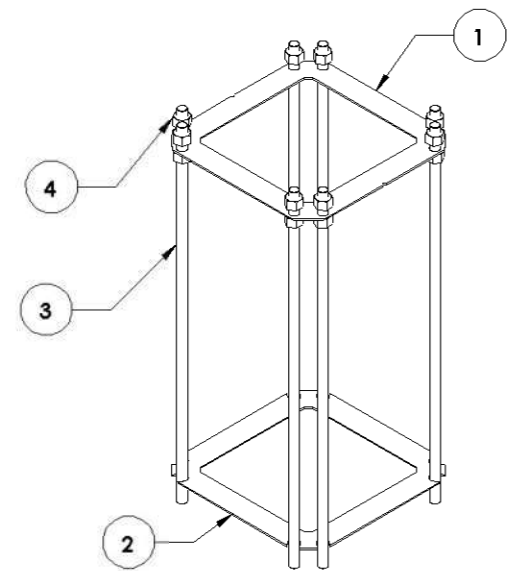
PARTS AND ASSEMBLIES LIST				
ITEM NO.	PART NUMBER	QTY.	DESCRIPTION	WEIGHT
1	20722-6099	1	TOP RING	
2	20722-6100	1	BOTTOM RING	
3	20722-6009	8	ANCHOR BOLT	
4	76144	16	NUT, 2 1/4" DIA.	
TOTAL WEIGHT				1,200



-PRELIMINARY-  
 NOT FOR CONSTRUCTION  
 FOR REVIEW 06/30/22



**ANCHOR BOLT**



REV.	DESCRIPTION	DRFT/DATE
A	ADDED V-NOTCH	LW/10-04-06

CUSTOMER: CITY OF AMES	
CUSTOMER P.O. NO:	
JOB NO: 20722	
DRAWN/DATE	LM 8/23/2006
CHECKED/DATE:	BG 8/30/2006
ENGINEER: MANISH SHARMA	

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**STEEL STRUCTURES DIVISION**  
**ANCHOR BOLT ASSEMBLY**  
**CLUSTERED**  
 SHEET 1 OF 1      **20722-STB271AA**

# ANCHOR BOLTS STRUCTURE 292

**NOTES:**

1. TOP RING HOLES: 2 5/16" DIA. ; BOTTOM & MIDDLE RINGS SLOTS: 2 5/8" WIDE
2. ANCHOR BOLT: 2 1/4" DIA REBAR ; NUT: 2 1/4" HEAVY HEX. SEE CHART FOR QUANTITY PER ANCHOR BOLT ASSEMBLY.
3. SPACER: L2 x 2 x 3/16, WHEN REQUIRED.
4. ANGLE STIFFENERS, L2 x 2 x 3/16, ON TOP & BOTTOM RINGS WHEN REQUIRED; 90° APART, ALONG X & Y AXIS WITH 1" OVERLAP.
5. HOLE AND BOLT QUANTITIES ON DETAILS ARE TYPICAL FOR DIMENSIONAL PURPOSES. SEE CHART FOR ACTUAL QUANTITIES.
6. ANCHOR BOLT ASSEMBLY IS TO BE MARKED WITH ASSEMBLY NO. AND STRUCTURE NO. ON TOP RING.
7. NO WELDING IS TO BE DONE ON ANCHOR BOLTS EXCEPT FOR BOTTOM 6".
8. CLUSTERS WHICH ARE TO BE SHIPPED BY RAIL REQUIRE ADDITION OF STANDARD LONGITUDINAL X-BRACING.
9. ALL ANCHOR BOLTS TO HAVE A CHARPY V-NOTCH IMPACT VALUE OF 15 FT-LBS. MINIMUM AT -20° F PER HEAT LOT TEST.
10. 1" WIDE x 1/2" DEEP "V" NOTCH, BISECTOR OF LINE ANGLES, 2-PLACES, ON TOP RING (FOR CONSTRUCTION/INSTALLATION PURPOSES).
11. ANCHOR BOLT ASSEMBLY TO BE SECURED AT MIDDLE RINGS BY MECHANICAL MEANS.
12. SPECIFICATIONS:

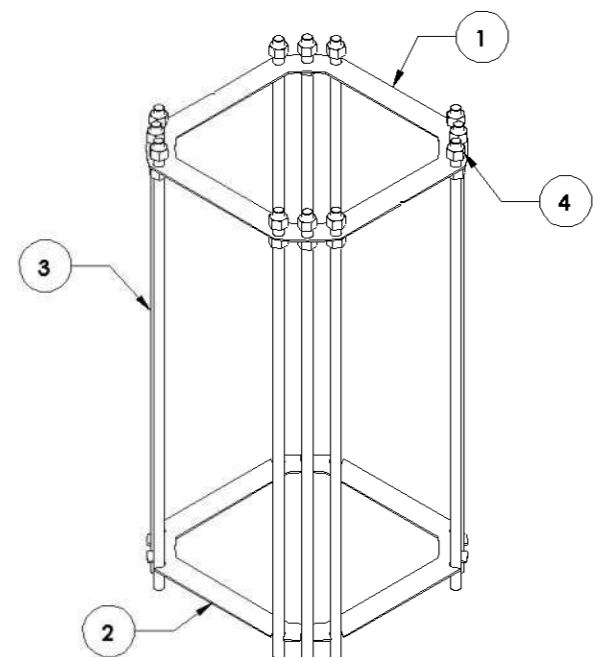
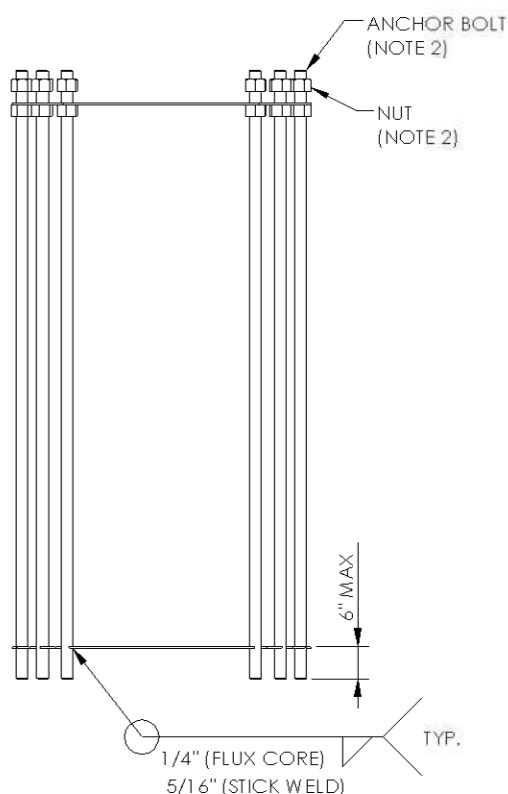
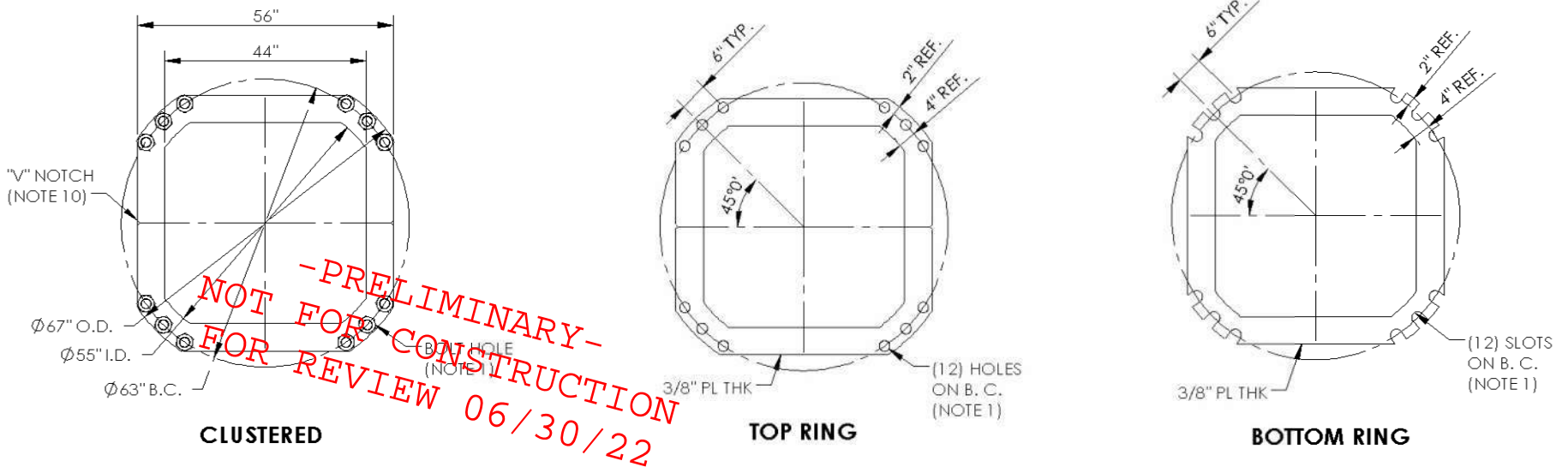
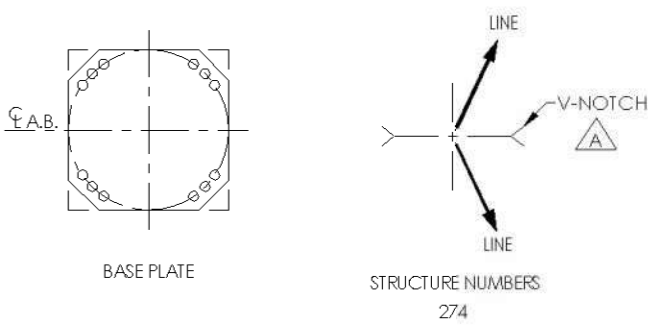
ITEM	MIN. YIELD	STEEL	FINISH
ANCHOR BOLTS	75 KSI	ASTM A 615 GRADE 75 MOD	HOT DIP GALVANIZED PER ASTM A 153 (TOP 24")
ANCHOR BOLT NUTS	---	ASTM A 563 GRADE DH	HOT DIP GALVANIZED PER ASTM A 153
ANCHOR BOLT RINGS	36 KSI	ASTM A 36	BARE

ANCHOR BOLT ASSEMBLY INFORMATION

REL	BILLABLE	ANCHOR BOLT ASSY PART NO.	QTY	STRUCTURE NUMBER(S)	STRUCTURE DESCRIPTION
C	20722-STB274AA	20722-3127	1	274	80'-0" STRUCTURE

PARTS AND ASSEMBLIES LIST

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION	WEIGHT
1	20722-6059	1	TOP RING	
2	20722-6060	1	BOTTOM RING	
3	20722-6012	12	ANCHOR BOLT	
4	76144	24	NUT, 2 1/4" DIA.	
TOTAL WEIGHT				2,000



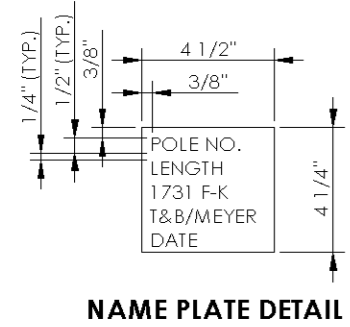
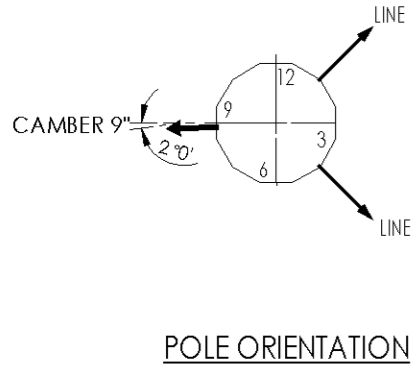
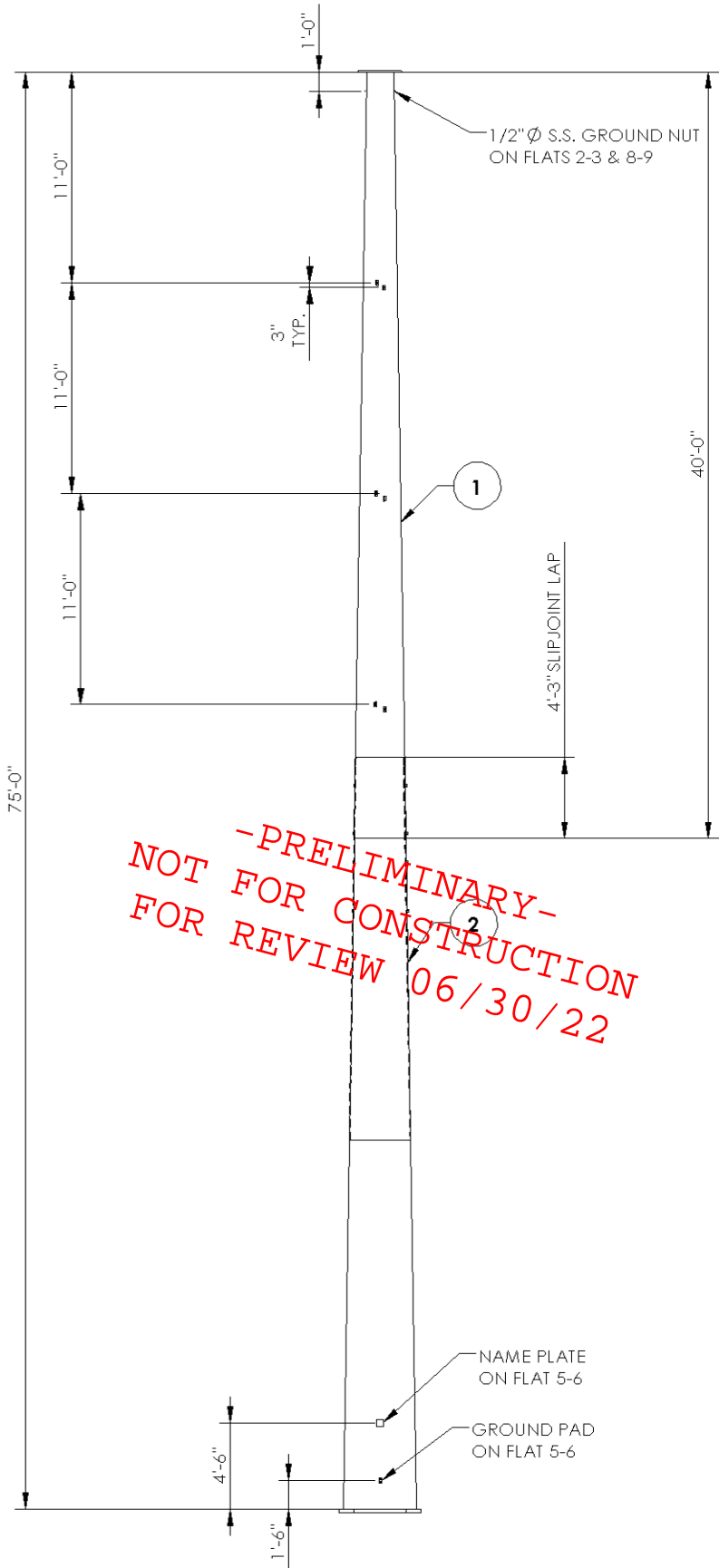
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STEEL STRUCTURES DIVISION  
ANCHOR BOLT ASSEMBLY  
CLUSTERED

CUSTOMER: CITY OF AMES
CUSTOMER P.O. NO:
JOB NO: 20722
DRAWN/DATE LM 8/24/2006
CHECKED/DATE: BG 8/30/2006
ENGINEER: MANISH SHARMA

REV.	DESCRIPTION	DRFT/DATE
A	ADDED V-NOTCH	LW/10-04-06

STRUCTURE INFORMATION					
BILLABLE	POLE NO	HGT. ABOVE GRND. LINE	TOP DIA.	GRND. LINE DIA.	TAPER IN./FT.
20722-STB271 AT	271	75'-0"	17 21/32"	47 5/32"	0.40002

PARTS AND ASSEMBLIES LIST				
ITEM NO.	PART NUMBER	QTY.	DESCRIPTION	WEIGHT
1	20722-3066	1	SHAFT ASSEMBLY, 40'-0" LONG	3,000
2	20722-3067	1	SHAFT ASSEMBLY, 39'-3" LONG	7,300
TOTAL WEIGHT				10,300



**-PRELIMINARY-  
NOT FOR CONSTRUCTION  
FOR REVIEW 06/30/22**

**STEEL POLE  
STRUCTURE 288**

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**STEEL STRUCTURES DIVISION**

POLE ASSEMBLY  
POLE NO 271

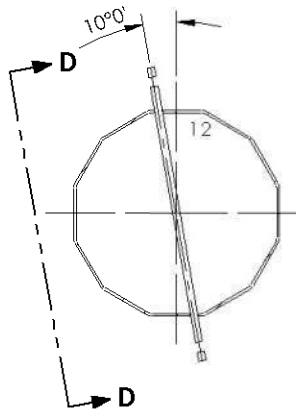
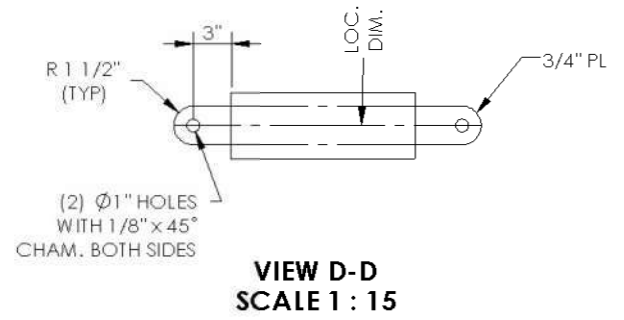
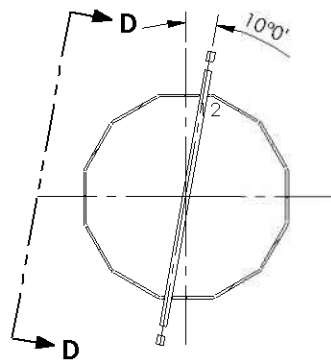
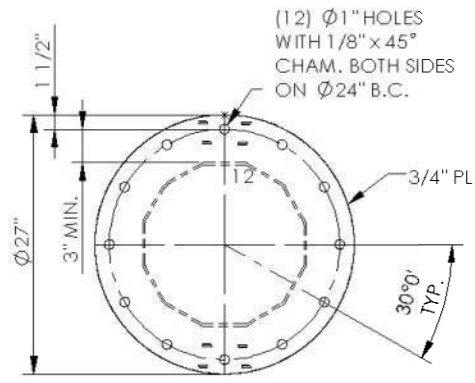
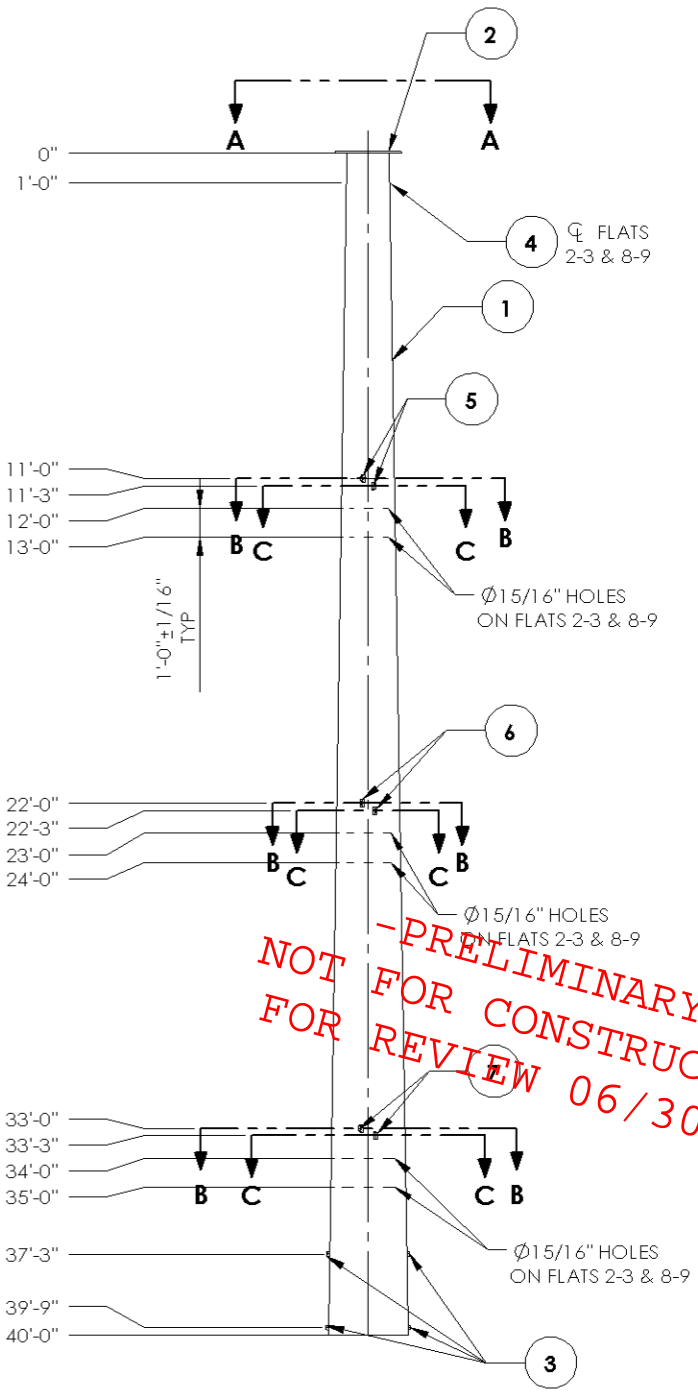
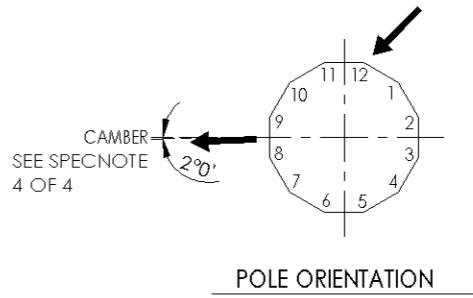
SHEET 1 OF 1      **20722-STB271AT**

CUSTOMER:	CITY OF AMES
CUSTOMER P.O. NO:	
JOB NO:	20722
DRAWN/DATE	LM 9/15/2006
CHECKED/DATE:	BG 9/27/2006
ENGINEER:	MANISH SHARMA

REV.	DESCRIPTION	DRFT/DATE

SHAFT INFORMATION					
TUBE NO.	LENGTH	THICKNESS	TOP DIA	BOTTOM DIA	TAPER IN./FT.
20722-4148	40'-0"	1/4"	17 21/32"	33 21/32"	0.40002

PARTS AND ASSEMBLIES LIST			
ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	20722-4148	1	TOWER PLATE TUBES
2	20722-124	1	POLE CAP
3	74547	4	JACKING NUT, 1" DIA.
4	73515	2	SS NUT, 1/2" DIA.
5	20722-318	2	THROUGH VANG
6	20722-319	2	THROUGH VANG
7	20722-320	2	THROUGH VANG



-PRELIMINARY-  
 NOT FOR CONSTRUCTION  
 FOR REVIEW 06/30/22

FEMALE SLIPJOINT DATA			
SLIPJOINT LAP	12 SIDED	FEMALE END DIA.	
		O.D.	CIRCUMFERENCE
4'-3"	TOP	31.95	8'-3 7/32"
	BOTTOM	33.65	8'-8 1/2"

# STEEL POLE STRUCTURE 288

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CUSTOMER:	CITY OF AMES
CUSTOMER P.O. NO.:	
JOB NO.:	20722
DRAWN/DATE:	LM 9/12/2006
CHECKED/DATE:	BG 9/27/2006
ENGINEER:	MANISH SHARMA

SHAFT ASSEMBLY, 40'-0" LONG
SHEET 1 OF 1
<b>20722-3066</b>

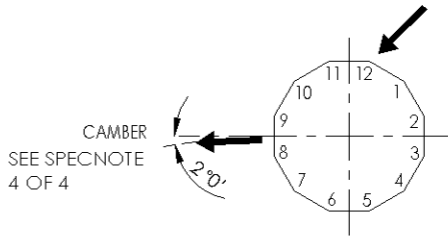
REV.	DESCRIPTION	DRFT/DATE



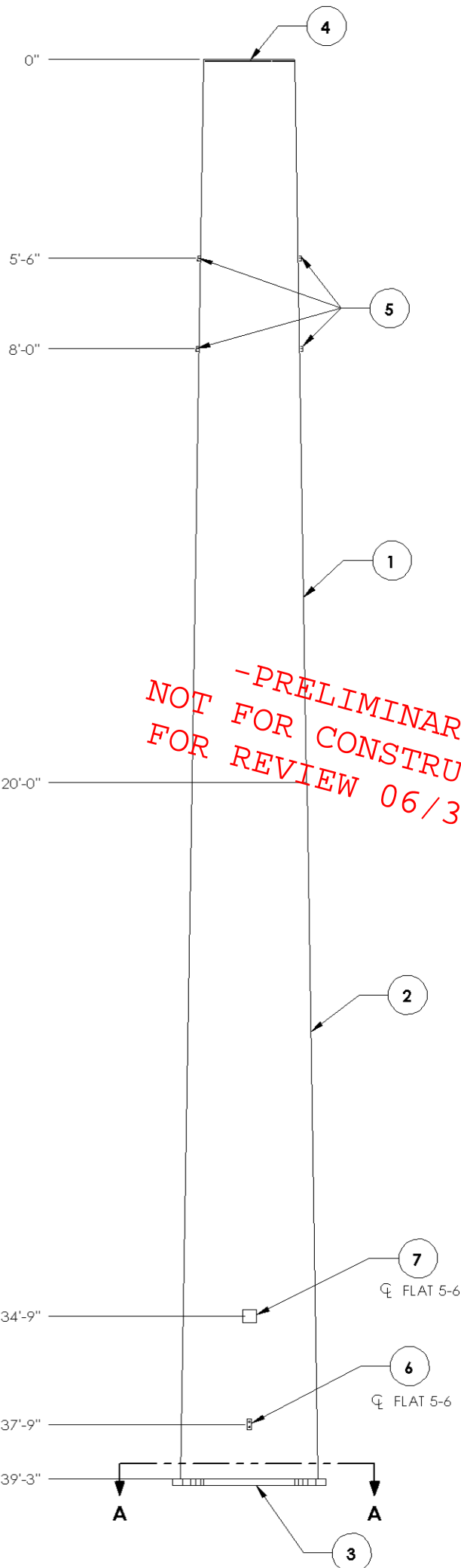
MALE SLIPJOINT DATA			
SLIPJOINT LAP	12 SIDED	MALE END DIA.	
		O.D.	CIRCUMFERENCE
4'-3"	TOP	31.34	8'-1 5/16"
	BOTTOM	33.04	8'-6 19/32"

SHAFT INFORMATION					
TUBE NO.	LENGTH	THICKNESS	TOP DIA	BOTTOM DIA	TAPER IN./FT.
20722-4149	20'-0"	5/16"	31 11/32"	39 11/32"	0.40002
20722-4150	19'-3"	3/8"	39 15/32"	47 5/32"	0.40002

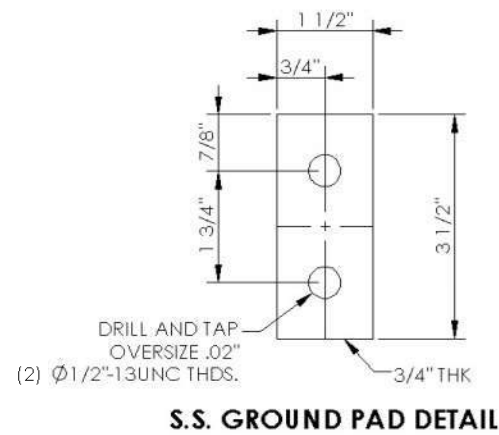
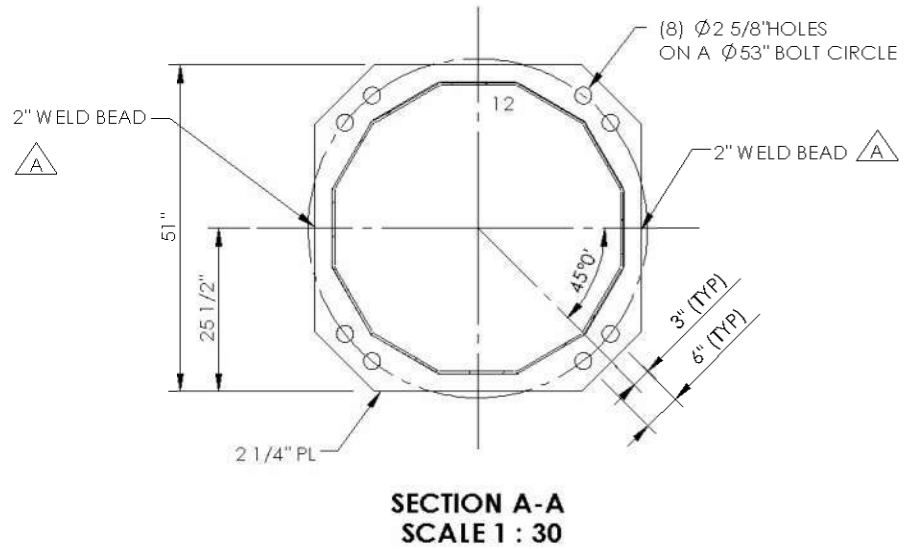
PARTS AND ASSEMBLIES LIST			
ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	20722-4149	1	TOWER PLATE TUBES
2	20722-4150	1	TOWER PLATE TUBES
3	20722-4152	1	BASE PLATE
4	S3WR0305	1	SEALER PLATE
5	74547	4	JACKING NUT, 1" DIA.
6	78131	1	SS GROUND PAD
7	20722-1401	1	NAME PLATE



POLE ORIENTATION



-PRELIMINARY-  
NOT FOR CONSTRUCTION  
FOR REVIEW 06/30/22



## STEEL POLE STRUCTURE 288

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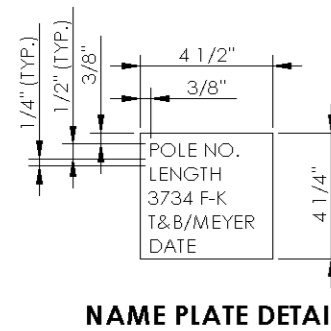
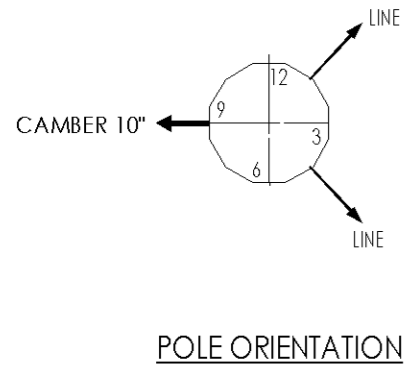
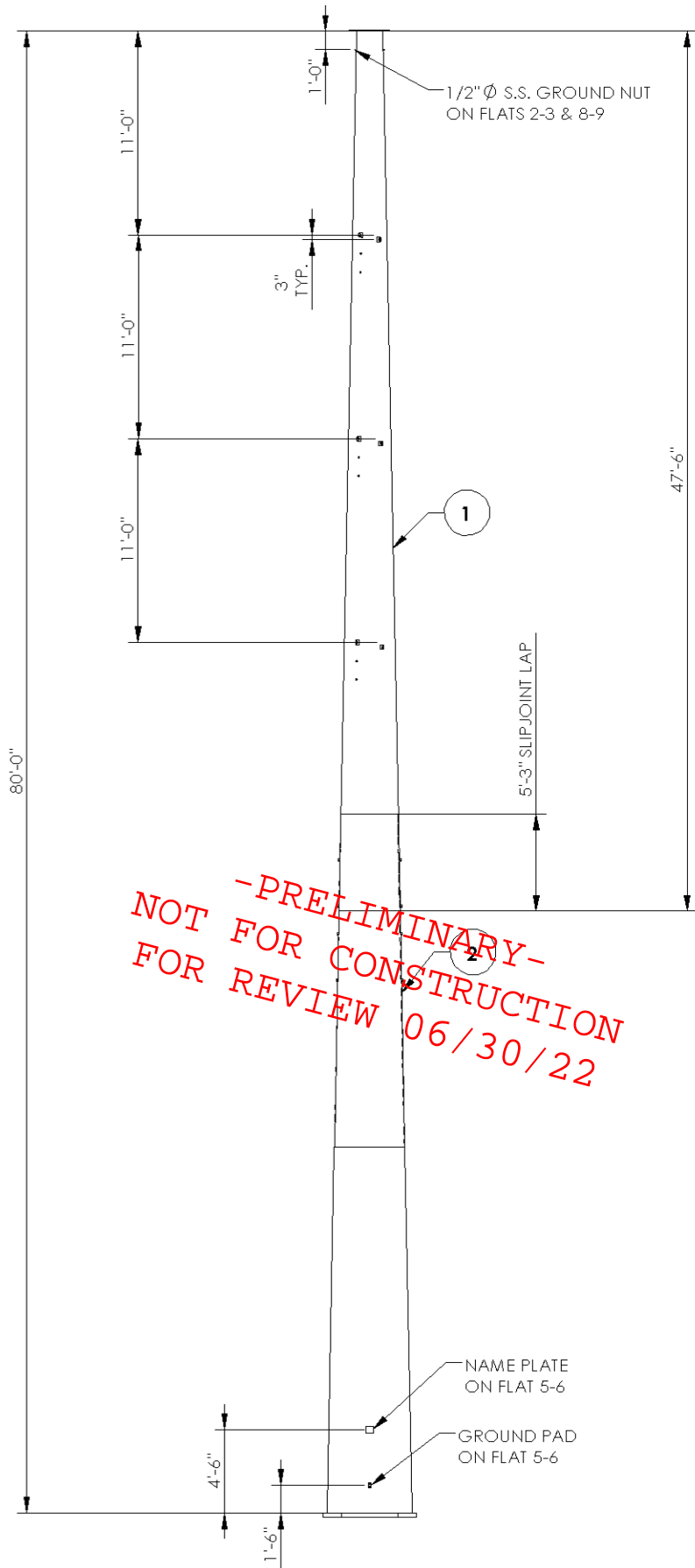
SHAFT ASSEMBLY, 39'-3" LONG

CUSTOMER:	CITY OF AMES
CUSTOMER P.O. NO.:	
JOB NO.:	20722
DRAWN/DATE:	LM 9/25/2006
CHECKED/DATE:	BG 9/27/2006
ENGINEER:	MANISH SHARMA

A	DESCRIPTION	DRFT/DATE
A	ADDED WELD BEAD	LW/10-16-06

STRUCTURE INFORMATION					
BILLABLE	POLE NO	HGT. ABOVE GRND. LINE	TOP DIA.	GRND. LINE DIA.	TAPER IN./FT.
20722-STB274AT	274	80'-0"	17 7/8"	57 1/4"	0.50000

PARTS AND ASSEMBLIES LIST				
ITEM NO.	PART NUMBER	QTY.	DESCRIPTION	WEIGHT
1	20722-3051	1	SHAFT ASSEMBLY, 47'-6" LONG	5,000
2	20722-3052	1	SHAFT ASSEMBLY, 37'-9" LONG	10,300
TOTAL WEIGHT				15,300 *



# STEEL POLE STRUCTURE 292

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POLE ASSEMBLY  
POLE NO 274

CUSTOMER:	CITY OF AMES
CUSTOMER P.O. NO:	
JOB NO:	20722
DRAWN/DATE	LM 9/13/2006
CHECKED/DATE:	BG 9/27/2006
ENGINEER:	MANISH SHARMA

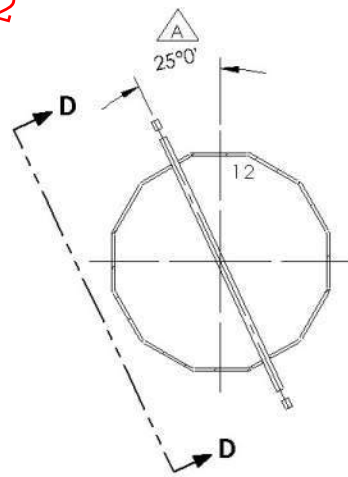
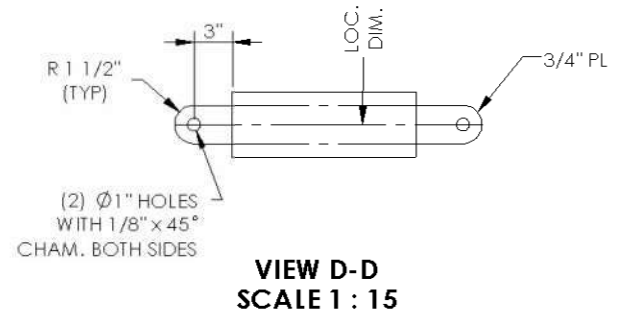
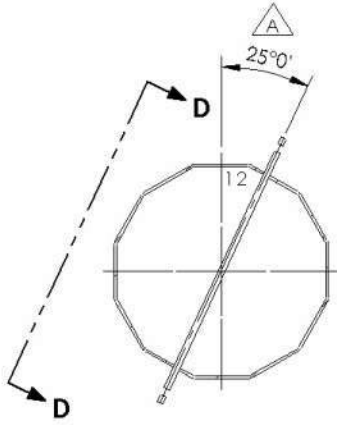
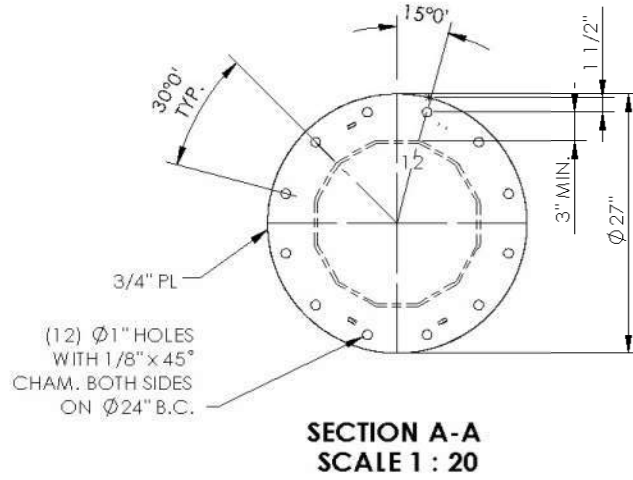
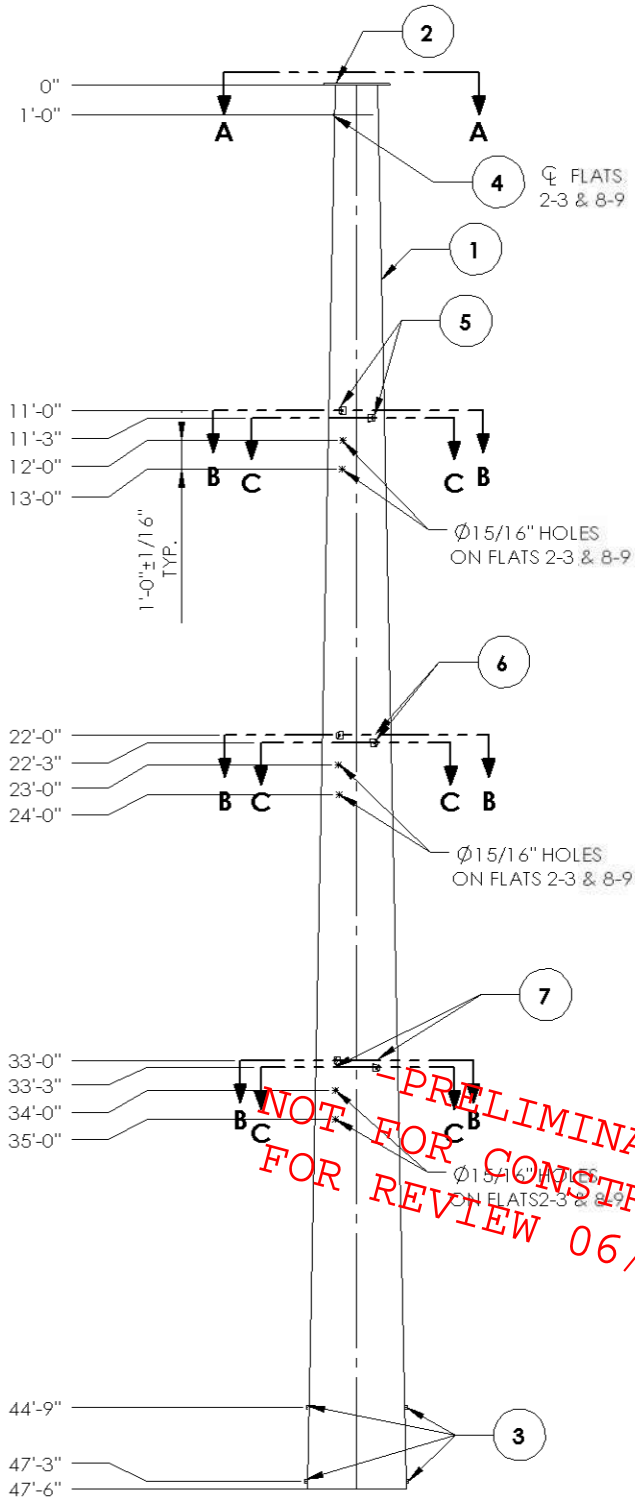
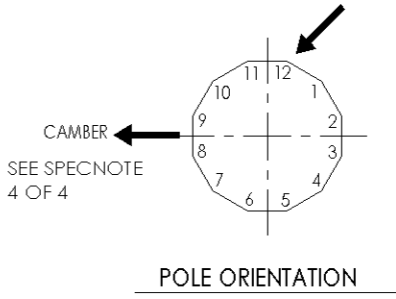
REV.	DESCRIPTION	DRFT/DATE

SHEET 1 OF 1

**20722-STB274AT**

SHAFT INFORMATION					
TUBE NO.	LENGTH	THICKNESS	TOP DIA.	BOTTOM DIA.	TAPER IN./FT.
20722-4117	47'-6"	5/16"	17 7/8"	41 5/8"	0.50000

PARTS AND ASSEMBLIES LIST			
ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	20722-4117	1	TOWER PLATE TUBES
2	20722-124	1	POLE CAP
3	74547	4	JACKING NUT, 1" DIA.
4	73515	2	SS NUT, 1/2" DIA.
5	20722-309	2	THROUGH VANG
6	20722-322	2	THROUGH VANG
7	20722-313	2	THROUGH VANG



-PRELIMINARY-  
NOT FOR CONSTRUCTION  
FOR REVIEW 06/30/22

FEMALE SLIPJOINT DATA			
SLIPJOINT LAP	12 SIDED	FEMALE END DIA.	
		O.D.	CIRCUMFERENCE
5'-3"	TOP	38.99	10'-1 3/32"
	BOTTOM	41.62	10'-9 1/4"

REV.	DESCRIPTION	DRFT/DATE
A	REVISED ORIENTATION	LW/10-17-06

CUSTOMER:	CITY OF AMES
CUSTOMER P.O. NO.:	
JOB NO.:	20722
DRAWN/DATE	LM 9/13/2006
CHECKED/DATE:	BG 9/27/2006
ENGINEER:	MANISH SHARMA

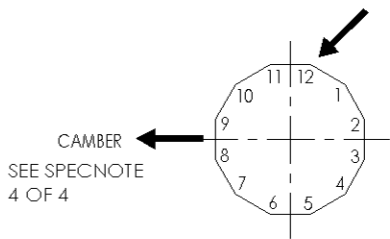
## STEEL POLE STRUCTURE 292

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STEEL STRUCTURES DIVISION  
SHAFT ASSEMBLY, 47'-6" LONG

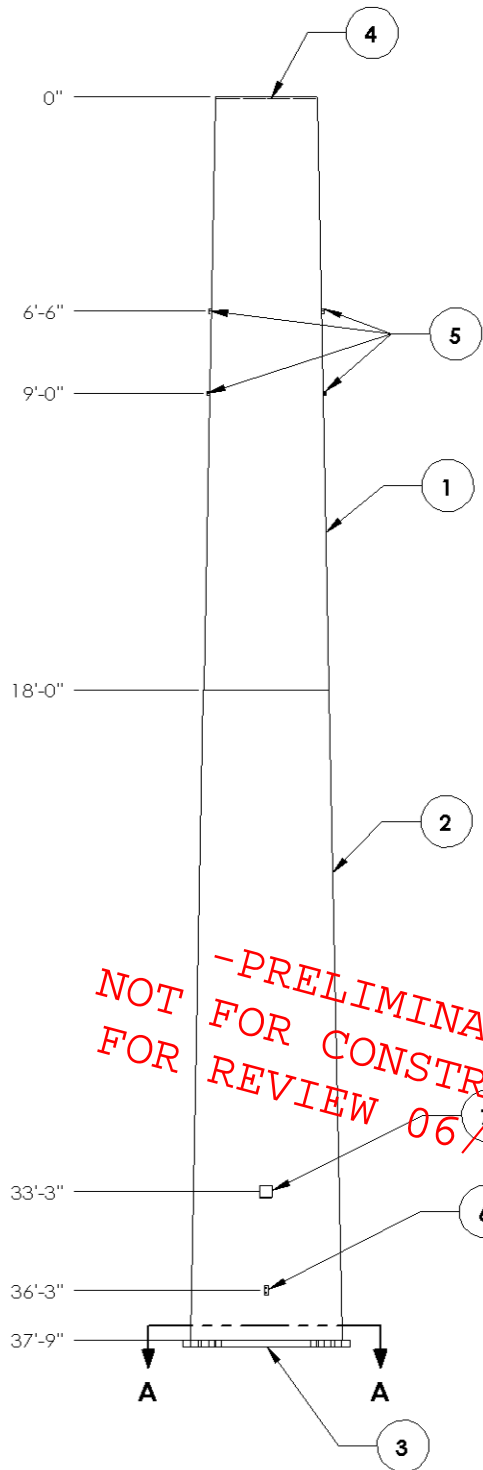
SHEET 1 OF 1	<b>20722-3051</b>
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SHAFT INFORMATION					
TUBE NO.	LENGTH	THICKNESS	TOP DIA.	BOTTOM DIA.	TAPER IN./FT.
20722-4118	18'-0"	3/8"	38 1/4"	47 1/4"	0.50000
20722-4119	19'-9"	7/16"	47 3/8"	57 1/4"	0.50000

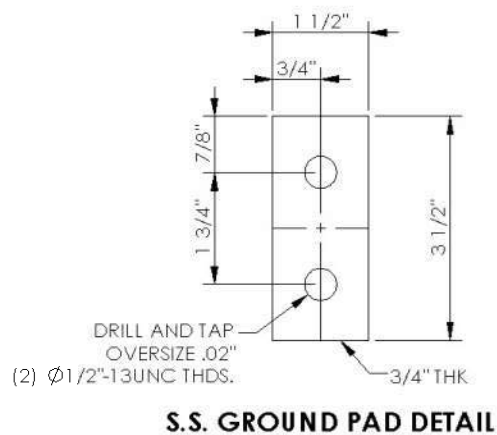
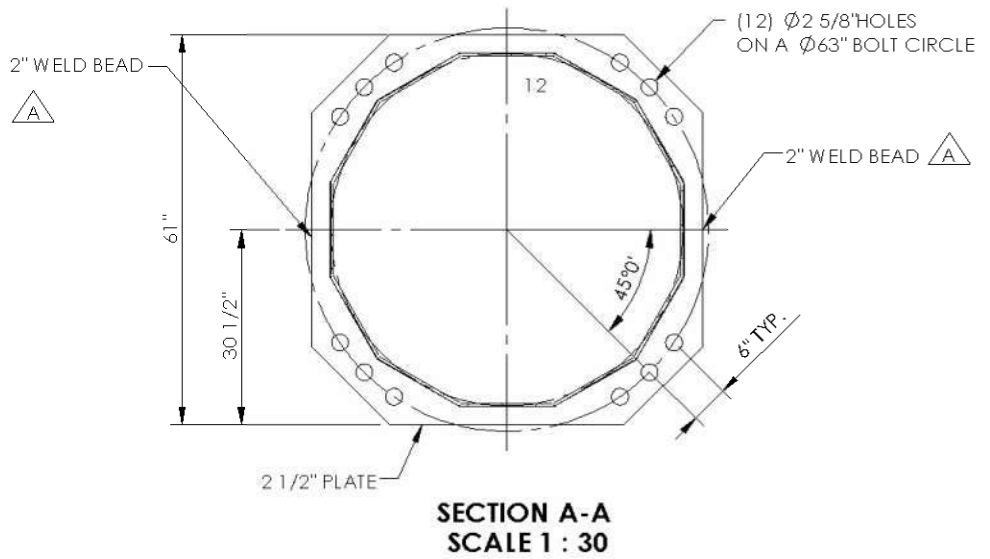
PARTS AND ASSEMBLIES LIST			
ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	20722-4118	1	TOWER PLATE TUBES
2	20722-4119	1	TOWER PLATE TUBES
3	20722-4120	1	BASE PLATE
4	S3WR0374	1	SEALER PLATE
5	74547	4	JACKING NUT, 1" DIA.
6	78131	1	SS GROUND PAD
7	20722-1401	1	NAME PLATE



POLE ORIENTATION



**-PRELIMINARY-  
NOT FOR CONSTRUCTION  
FOR REVIEW 06/30/22**



MALE SLIPJOINT DATA			
SLIPJOINT LAP	12 SIDED	MALE END DIA.	
		O.D.	CIRCUMFERENCE
5'-3"	TOP	38.25	9'-10 25/32"
	BOTTOM	40.88	10'-6 15/16"

# STEEL POLE STRUCTURE 292

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STEEL STRUCTURES DIVISION

SHAFT ASSEMBLY, 37'-9" LONG

CUSTOMER:	CITY OF AMES
CUSTOMER P.O. NO.:	
JOB NO.:	20722
DRAWN/DATE:	LM 9/13/2006
CHECKED/DATE:	BG 9/27/2006
ENGINEER:	MANISH SHARMA

A	ADDED WELD BEAD	LW/10-17-06
REV.	DESCRIPTION	DRFT/DATE

SHEET 1 OF 1

**20722-3052**



GENERAL MANUFACTURING INFORMATION

FOR GALVANIZED, PAINTED, AND PAINT-OVER-GALVANIZED POLES:

1A. STEEL SPECIFICATIONS	MIN. YIELD	A.S.T.M. SPEC
PLATE ≤ 1 1/4"	65 KSI	A-572 MODIFIED
PLATE > 1 1/4"	60 KSI	A-572 MOD., A-633 MOD., A-871, OR A-633 GRADE E
BOLTS ≤ 5/8"	92 KSI	A-449
BOLTS ≥ 3/4" ≤ 2 1/2"	109 KSI	A-354 GRADE B.C. MOD.
BOLTS > 2 1/2"	99 KSI	A-354 GRADE B.C. MOD.
NUTS ≤ 5/8"	-----	A-563 GRADE C
NUTS ≥ 3/4"	-----	A-563 GRADE DH
NUTS (ANCHOR BOLTS)	-----	A-563 GRADE DH
NUTS (SLIPJOINT JACKING NUTS)	-----	A-563 GRADE C3
ANCHOR BOLTS	75 KSI	A-615 GRADE 75 (MOD.)
STEEL SHAPES	36 KSI	A-36
PIPE	36 KSI	A-36, A-53 GRADE B, A-106 GRADE B, OR A-501
STAINLESS STEEL SHAPES	30 KSI	TYPE 304
BOLTS 1/2" DIA. (REM. COVER PL'S)	-----	A-307
NON-STRUCTURAL	36 KSI	A-36

FOR WEATHERING AND PAINT-OVER-WEATHERING POLES:

1B. STEEL SPECIFICATIONS	MIN. YIELD	A.S.T.M. SPEC
PLATE ≤ 3/4"	65 KSI	A-871
PLATE > 3/4"	60 KSI	A-871
BOLTS < 5/8"	92 KSI	A-449
BOLTS 5/8"	92 KSI	A-325 TYPE 3
BOLTS ≥ 3/4" ≤ 2 1/2"	109 KSI	A-354 GRADE B.C. MOD.
BOLTS > 2 1/2"	99 KSI	A-354 GRADE B.C. MOD.
NUTS < 5/8"	-----	A-563 GRADE C
NUTS ≥ 5/8"	-----	A-563 GRADE C3
NUTS (ANCHOR BOLTS)	-----	A-563 GRADE DH
NUTS (SLIPJOINT JACKING NUTS)	-----	A-563 GRADE C3
ANCHOR BOLTS	75 KSI	A-615 GRADE 75 (MOD.)
STEEL SHAPES	50 KSI	A-588 OR EQUIVALENT
PIPE	46 KSI	A-588 OR EQUIVALENT
STAINLESS STEEL SHAPES	30 KSI	TYPE 304
NON-STRUCTURAL	50 KSI	A-588

2. ALL PLATES TO HAVE A CHARPY V-NOTCH IMPACT VALUE OF 15 FT-LBS. MINIMUM AT -20 DEGREES F PER HEAT LOT TEST. (UNLESS OTHERWISE NOTED)
3. PROVIDE PLASTIC PLUGS IN ALL TAPPED HOLES AND NUTS WELDED TO THE STRUCTURE.
4. TO FACILITATE MANUFACTURING, LIKE STRUCTURE TYPES WITH SIMILAR LINE DEFLECTION ANGLES ARE SOMETIMES GROUPED USING A COMMON LINE ANGLE FOR HARDWARE ATTACHMENT ORIENTATION.
5. ARM LENGTHS, WHEN APPLICABLE, ARE FROM FACE OF ARM BRACKET TO END OF ARM SHAFT. HOLE QUANTITIES FOR ARM CONNECTIONS ARE "PER SIDE" UNLESS OTHERWISE NOTED.
6. SHOP TO MAINTAIN A 4 1/2" MINIMUM CLEARANCE FROM THE CENTERLINE OF ANY HOLES THROUGH THE POLE TO THE EDGE OF THE NEAREST WELDED PART IN ORDER TO PROVIDE ADEQUATE CLEARANCE FOR CUSTOMER MOUNTED ATTACHMENTS. EXCEPTION: FOR STANDARD LD ARMS WITH 1 1/8" Ø HOLES, SHOP TO MAINTAIN 7" OF CLEARANCE.
7. EDGE DISTANCES FOR ALL BOLT HOLES ARE SHOWN ON THE DRAWINGS. THESE DISTANCES ARE VALID FOR PUNCHED OR DRILLED HOLES EXCEPT FOR PUNCHED HOLES IN ONE-INCH THICK PLATE. FOR PUNCHED 1-1/8" HOLES IN ONE-INCH PLATE, THE EDGE DISTANCE MUST BE INCREASED FROM 1-7/16" TO 1-9/16".
8. UNLESS OTHERWISE NOTED ON DRAWING, ALL THRU-PIPE TO HAVE A 3/8" MINIMUM OR 1" MAXIMUM PROTRUSION FROM FACE OF SHAFT.
9. LONGSEAM ORIENTATION:
  - A. 12 SIDED SHAPES WITH SINGLE LONGSEAM POINT 9 AND DOUBLE LONGSEAM POINTS 3 AND 9.
  - B. 8 SIDED SHAPES WITH SINGLE LONGSEAM POINT 4 AND DOUBLE LONGSEAM POINTS 4 AND 8.
  - C. 16 SIDED SHAPES WITH SINGLE LONGSEAM POINT 12 AND DOUBLE LONGSEAM POINTS 4 AND 12.
  - D. 4 SIDED SHAPES WITH SINGLE LONGSEAM POINT 4.

TYPICAL LONGSEAM ORIENTATION SHALL BE AS STATED ABOVE. ADJUSTMENTS TO THIS ORIENTATION MAY BE MADE SUCH THAT LONGSEAMS WILL NOT BE INTERRUPTED BY THROUGH PLATE TYPE HARDWARE NOR WILL THEY BE IMMEDIATELY ADJACENT TO THE EDGES OF LARGE DOUBLERS OR WRAP AROUND ARM CONNECTIONS. ALSO, LONGSEAMS OF SINGLE LONGSEAM TUBES MAY BE ORIENTED TO TAKE ADVANTAGE OF THEIR NATURAL CURVATURE FOR CURVED POLES AND CURVED ARMS.
10. UNLESS OTHERWISE STATED ON THE DRAWINGS, MARK STRUCTURES WITH THE FOLLOWING INFORMATION AS SHOWN BELOW:

\*A. MARK POLES ON FACE 5-6, AT 5'-0" ABOVE GROUNDLINE OR BASE PLATE:

FOR ALL POLES EXCEPT LD POLES - MARK POLE NUMBER ONLY WITH 2" WELD BEAD.

E.G.: 12

FOR LD POLES - PROVIDE A NAMEPLATE 1/4" x 4" x 4" (MIN. SIZE), STAMP MEYER LD, LD CLASS, POLE LENGTH, POLE NUMBER, AND DATE MFG. WITH 1/2" HIGH LETTERS.

E.G.: 

MEYER LD
LD 7
100'
12
MO./YR. MFG.

NOTE: ERECTION DRAWINGS TO SHOW ACTUAL EXAMPLE OF SPECIAL INFORMATION.



- B. MARK STRUCTURE NUMBER ON BOTTOM OF BASE PLATE OR BEARING PLATE WITH A 2" WELD BEAD OR CONTRASTING PAINT STICK COLOR.
- C. MARK ARM LETTER ON INSIDE OF ARM BRACKET WITH 2" WELD BEAD. INDIVIDUAL NUMBER OPTIONAL, TO BE MARKED WITH WELD OR CONTRASTING PAINT STICK.
- D. MARK CROSSARMS WITH ASSEMBLY NUMBER WITH 2" WELD BEAD OR 1/2" HIGH STAMPED LETTERS.
- \*E. MARK STRUCTURE NUMBER ON FACE 5-6, 8" ABOVE AND BELOW EACH SLIPJOINT OR FLANGE PLATE WITH 2" WELD BEAD.
- F. MARK FABRICATED SHIPLOOSE ITEMS WITH PIECE MARK OR ASSEMBLY NUMBER USING 2" WELD BEAD OR 1/2" HIGH STAMPED LETTERS.
- G. MARK ASSEMBLY NUMBER ON CROSSBRACING WITH 2" WELD BEAD OR 1/2" HIGH STAMPED NUMBERS.
- H. MARK CENTER OF GRAVITY OF ALL ASSEMBLIES, 20'-0" OR LONGER, WITH 3/4" SPOT OF WELD ALONG LONGSEAM.
- J. CUSTOMER NOTE: INDIVIDUAL MARK IS FOR FABRICATOR TRACKING ONLY.



\* FACE 5-6 PERTAINS TO POLY-ROUND AND POLY 12 POLES.  
USE FACE 3-4 FOR OCTAGONAL POLES AND FACE 7-8 FOR POLY 16 POLES

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			CUSTOMER:
			CUSTOMER P.O. NO.:
B	REVISED CLEARANCE NOTE	PWB/5-4-04	JOB NO.:
A	UPDATED NOTES AND NAME PLATE	MDF/8-29-02	DRAWN/DATE JRB 5-23-94
1	REVISED FOR FINAL ISSUE	JRB/5-10-96	CHECKED/DATE:
REV.	DESCRIPTION	DRFT/DATE	ENGINEER:

GENERAL NOTES, ASSEMBLY  
AND ERECTION INFORMATION

SHEET 1 OF 2

SSG001

ASSEMBLY AND ERECTION INFORMATION

1. CUSTOMER SHALL VERIFY THE FIT OF THEIR EQUIPMENT (INSULATORS, GUY WIRES, ETC.) TO ATTACHMENT PROVIDED.
2. WHEN APPLICABLE, ALL STRUCTURE ARMS SHALL BE DAMPED AT ERECTION TIME. DAMPING MAY BE ACCOMPLISHED BY STRINGING, HANGING INSULATORS OR WEIGHTS, OR TYING ARMS OFF TO THE STRUCTURE AT ATTACHMENT POINTS.
3. BOLT AND NUT TORQUE INFORMATION:  
THE NUTS ON ALL CONNECTION BOLTS SHOULD BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING RECOMMENDATIONS:

- A. AS A MINIMUM, ALL NUTS SHOULD BE INSTALLED SNUG TIGHT. "SNUG TIGHT" IS DEFINED AS THE TIGHTNESS ATTAINED BY A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF A MAN USING AN ORDINARY SPUD WRENCH. SOME BOLTED CONNECTIONS WILL REQUIRE ADDITIONAL TIGHTENING OF THE NUTS.
- B. ALL SHORT ARM CONNECTION BOLTS (L < 8") AND ALL FLANGE CONNECTION BOLTS SHOULD BE TENSIONED TO 70% OF THEIR TENSILE STRENGTH AS RECOMMENDED IN SECTION 5 OF THE LATEST EDITION OF THE AISC MANUAL OF STEEL CONSTRUCTION. THE TURN-OF-NUT TIGHTENING METHOD IS CONSIDERED TO BE THE MOST PRACTICAL METHOD FOR ACHIEVING THESE BOLT TENSIONS. THE FOLLOWING TABLE PROVIDES THE AISC RECOMMENDED NUT ROTATIONS FOR THESE TYPES OF BOLTED CONNECTIONS:  
(FOR USE WITH ASTM A-354 BC OR A-325 BOLTS)

BOLT DIA.	RECOMMENDED TENSION	BOLT LENGTH		
		1/3 NUT TURN	1/2 NUT TURN	2/3 NUT TURN
1"	52 KIPS	0"-4"	4"-8"	8"-12"
1 1/2"	123 KIPS	0"-6"	6"-12"	12"-18"

NOTE: NUTS MUST FIRST BE BROUGHT TO A SNUG TIGHT CONDITION WITH BOLTED SURFACES IN CONTACT WITH EACH OTHER. 

- C. NUTS FOR 2 1/4" DIAMETER ANCHOR BOLTS (ASTM A-615, GRADE 75) SHOULD BE TURNED 1/6 TURN BEYOND SNUG TIGHT.
- D. LONG ARM CONNECTION BOLTS (L > 8") SHOULD NOT BE TENSIONED BEYOND A SNUG TIGHT CONDITION.
- E. CROSSBRACE U-BOLT NUTS SHOULD BE TORQUED PER THE FOLLOWING:

U-BOLT DIA.	3" WIDE U-BOLT PLATE THK.	NUT TORQUE (LUBRICATED)
5/8"	3/8"	75 FT-LBS
5/8"	1/2"	100 FT-LBS
3/4"	3/4"	150 FT-LBS
7/8"	1"	200 FT-LBS
1"	1 1/4"	250 FT-LBS

4. FOR FIELD ASSEMBLY OF MULTISECTION POLES, STRUCTURE NUMBERS ON ADJACENT SECTIONS MUST BE ALIGNED.
5. FOR SLIPJOINTED POLES SEE SHEETS SSG004 AND SSG005.

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NOT FOR CONSTRUCTION  
FOR REVIEW 06/30/22**

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<b>STEEL STRUCTURES DIVISION</b>		
<b>GENERAL NOTES, ASSEMBLY AND ERECTION INFORMATION</b>		
<b>SHEET 2 OF 2</b>		<b>SSG001</b>

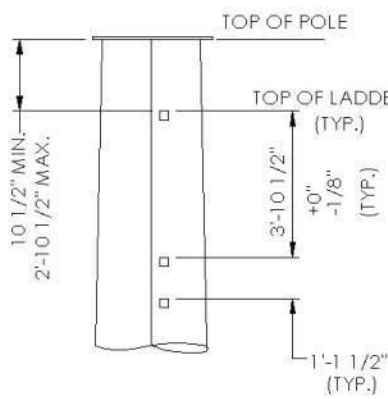
			CUSTOMER:
			CUSTOMER P.O. NO:
			JOB NO:
			DRAWN/DATE JRB 5-23-94
			CHECKED/DATE:
REV.	DESCRIPTION	DRFT/DATE	ENGINEER:



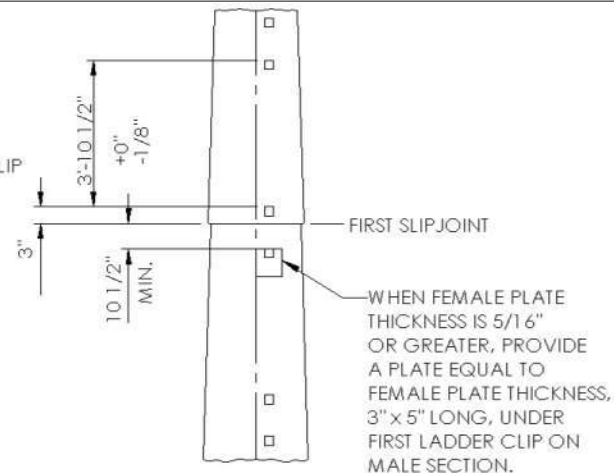
**GENERAL NOTES:**

- SEE ERECTION DRAWINGS FOR LADDER CLIP ORIENTATION AND LOCATIONS.
- ALIGN TRANSFER AND WORKING STEPS WITH CLIMBING BY LOCATING CLIPS 0", 15" OR 30", VERTICALLY, WITH CLIMBING CLIPS.
- PROVIDE TRANSFER LADDER CLIPS FROM CLIMBING TO WORKING LADDERS, BOTH WAYS, AT LOWEST WORKING LOCATION (UNLESS OTHERWISE NOTED). IF WORKING LADDERS ARE NOT CONTINUOUS, PROVIDE TRANSFER LADDERS TO EACH SERIES OF WORKING LADDERS.
  - < 30" DIAMETER OR MAJOR; EVERY FOURTH FACE.
  - > 30" OR < 50" DIAMETER OR MAJOR; EVERY OTHER FACE.
  - > 50" DIAMETER OR MAJOR; EVERY FACE.
- STARTING LOCATION (UNLESS NOTED ON ORIENTATION DETAIL).
  - SINGLE PIECE POLES START 10 1/2" FROM POLE TOP.
  - SLIP JOINT OR FLANGE PLATE POLES START AT FIRST SLIP JOINT OR FLANGE PLATE (SEE DETAIL FOR CLIP LOCATION).
- TRANSFER LADDERS
  - LOCATE TRANSFER LADDER CLIPS TO LEFT OR RIGHT OF CLIMBING, A MINIMUM OF 11" TO OBTAIN MINIMUM CLEARANCE.
  - PROVIDE ONE SET OF TRANSFER CLIPS IF THE LAST CLIMBING CLIP IS < 19" ABOVE FLANGE PLATE OR SLIP JOINT. PROVIDE TWO SETS OF TRANSFER CLIPS IF THE LAST CLIMBING CLIP IS > 19" ABOVE FLANGE PLATE OR SLIP JOINT.
- WORKING LADDERS
 

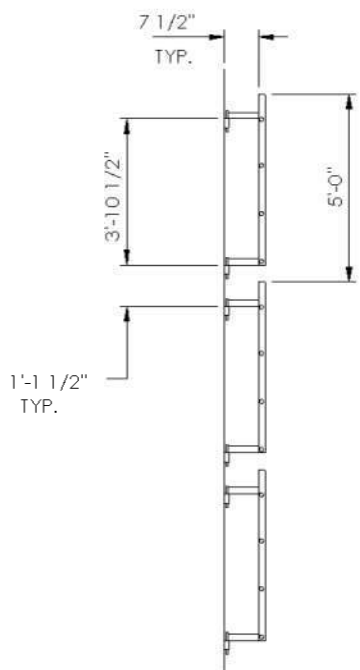
IF LADDER INTERFERES WITH A HARDWARE ATTACHMENT, OMIT THAT LADDER AND RESTART BELOW ATTACHMENT. (SEE DETAIL).



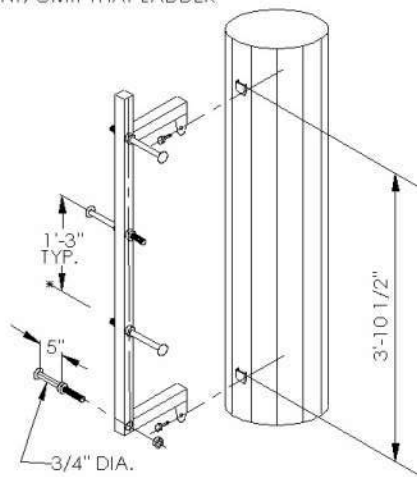
POLE TOP AND TYPICAL SPACING



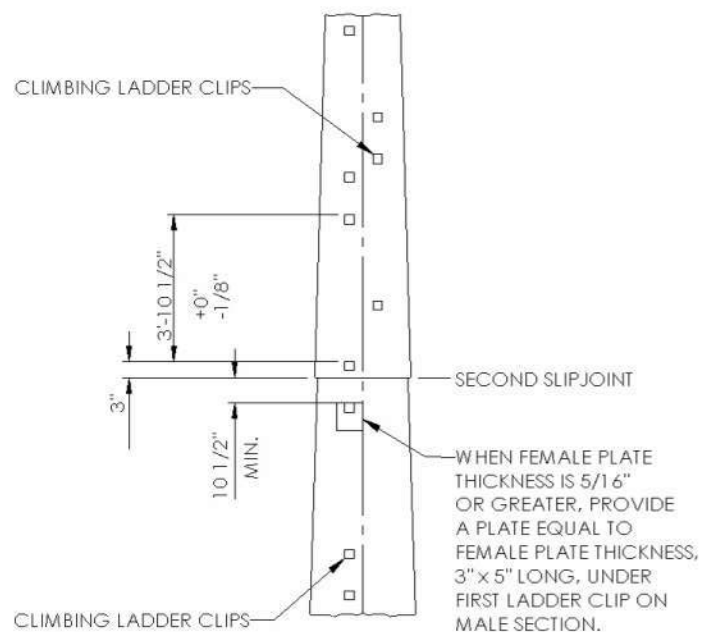
LADDER CLIP LOCATION OVER FIRST SLIPJOINT



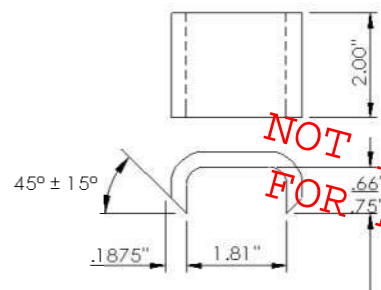
TYPICAL LADDER ORIENTATION



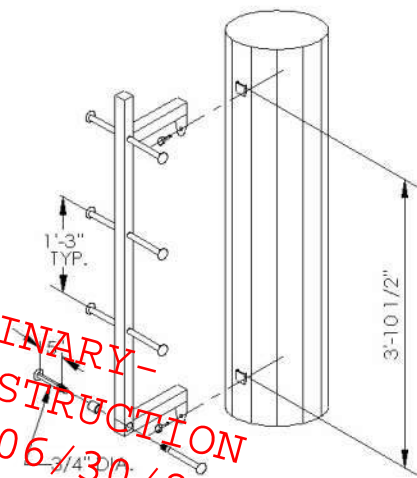
CLIMBING LADDER  
M.I.D. #50921 - GALVANIZED



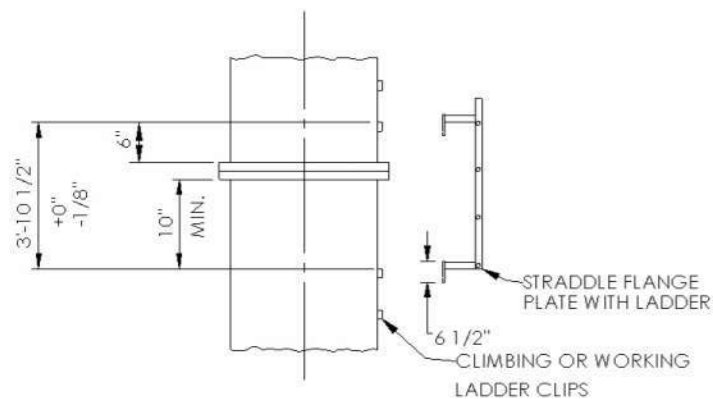
LADDER CLIP LOCATION OVER SECOND SLIPJOINT



LADDER CLIP DETAIL  
M.I.D. #76266 - ALL POLES

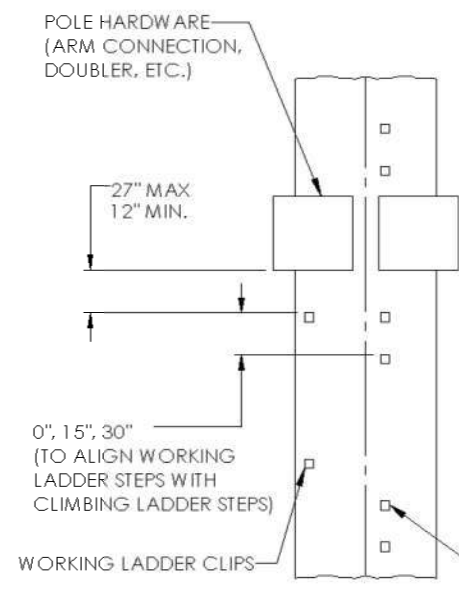


WORKING LADDER  
M.I.D. #52540 - GALVANIZED



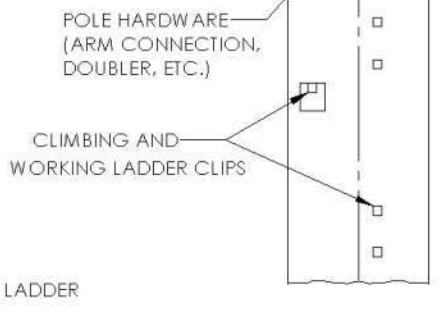
LADDER CLIP LOCATION OVER FIRST FLANGE PLATE

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NOT FOR CONSTRUCTION  
FOR REVIEW 06/30/22

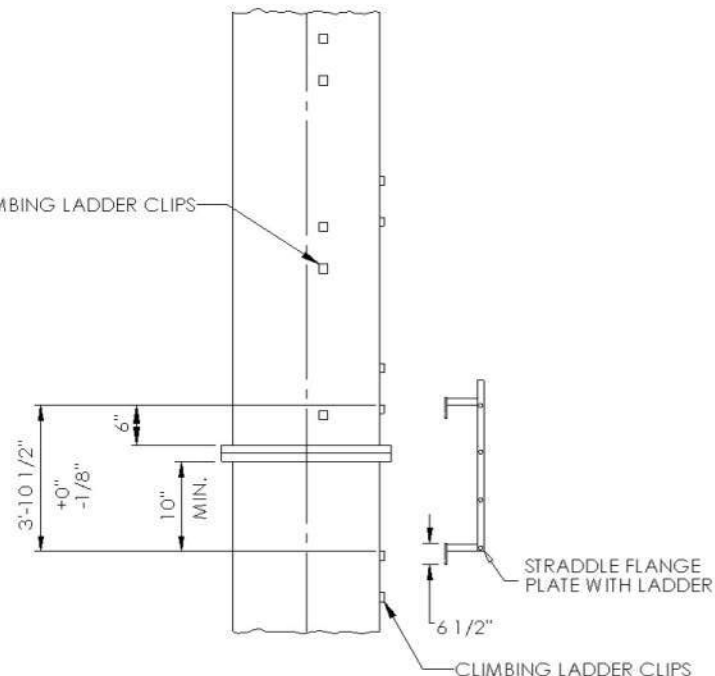


WORKING LADDER LOCATION BELOW HARDWARE

WHERE A CLEARANCE OF 5" ABOVE OR 3 1/2" BELOW LADDER CLIPS AND WRAPAROUND ARM BOX, DOUBLER, ETC., CANNOT BE MAINTAINED, PROVIDE A PLATE, WITH THICKNESS EQUAL TO OBSTRUCTING PLATE 3" x 5" LONG, WELDED UNDER THE INTERFERING LADDER CLIP.



LADDER CLIPS WITH HARDWARE INTERFERENCE



LADDER CLIP LOCATION OVER SECOND FLANGE PLATE

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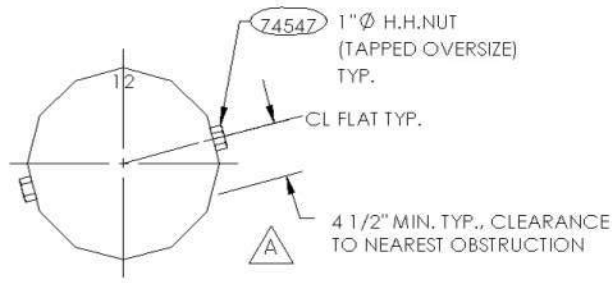
**STEEL STRUCTURES DIVISION**

**CLIMBING AND WORKING LADDER CLIP SPACING**

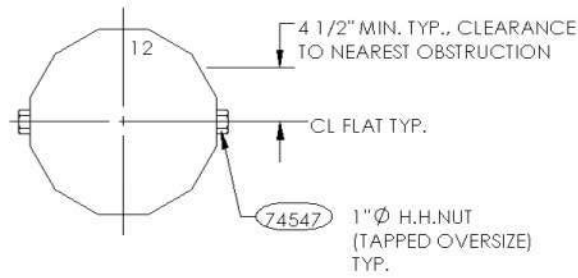
SHEET 1 OF 1

SSG003

			CUSTOMER:
			CUSTOMER P.O. NO:
			JOB NO:
			DRAWN/DATE JRB 5-23-94
1	REVISED FOR FINAL ISSUE	JRB/5-10-96	CHECKED/DATE:
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STANDARD LOCATION (POINT-POINT)



STANDARD LOCATION (FLAT-FLAT)

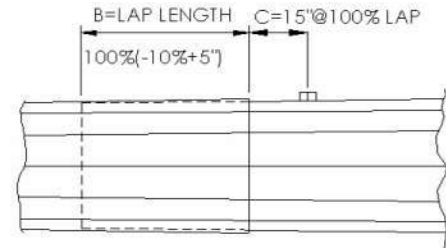
JACKING NUT ORIENTATION  
NUTS MUST BE OPPOSITE EACH OTHER.

NOTES:

1. ALL NUTS MUST BE ORIENTED SO THAT TWO FLATS ARE PERPENDICULAR TO THE POLES LONG AXIS.
2. JACKING NUT JIG MUST BE USED TO MOUNT NUTS.
3. THERE MUST BE TWO JACKING DEVICES ON EACH POLE, AND THE FACES ARE TO BE OPPOSITE EACH OTHER.
4. SHOP TO MOVE NUTS AS REQUIRED TO CLEAR OBSTRUCTION.
5. THE SLIPJOINT SHOULD BE TIGHT WITHOUT ANY MAJOR GAPS OR MISALIGNMENT BETWEEN THE MATING POLE SECTIONS.
6. AT 100% SLIPJOINT LAP, THE DISTANCE BETWEEN THE BOTTOM OF THE FEMALE JOINT AND THE CENTER OF THE TOP JACKING NUT ON THE MALE SECTION WILL BE 15". (SEE DETAIL BELOW)  
LAP TOLERANCES ARE -10%, +5".

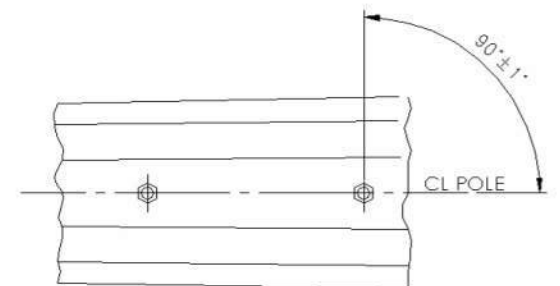
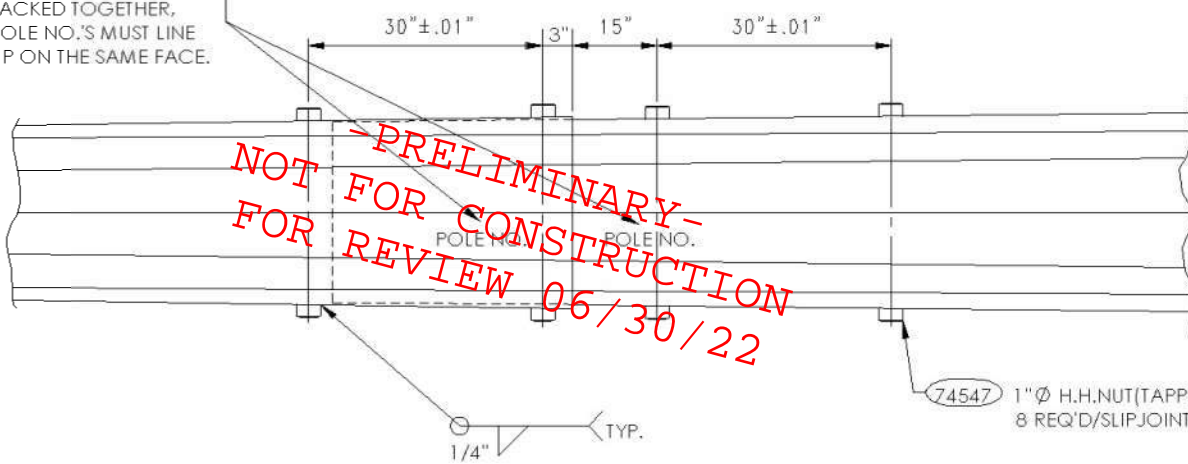
EXAMPLE: 100% LAP = 5'-6" (66")

TO BE WITHIN TOLERANCE, THE SLIPJOINT LAP "B", MUST BE BETWEEN 59.4" (66"-6.6") AND 71" (66"+5"). THUS, THE DISTANCE BETWEEN THE BOTTOM OF THE FEMALE JOINT AND THE CENTER OF THE TOP JACKING NUT ON THE MALE SECTION "C" MUST BE BETWEEN 21.6" (15"+6.6") AND 10" (15"-5").



EXAMPLE:	100% LAP	MIN. LAP (-10%)	MAX. LAP (+5")
B =	66"	59.4"	71"
C =	15"	21.6"	10"

WHEN SECTIONS ARE JACKED TOGETHER, POLE NO.'S MUST LINE UP ON THE SAME FACE.



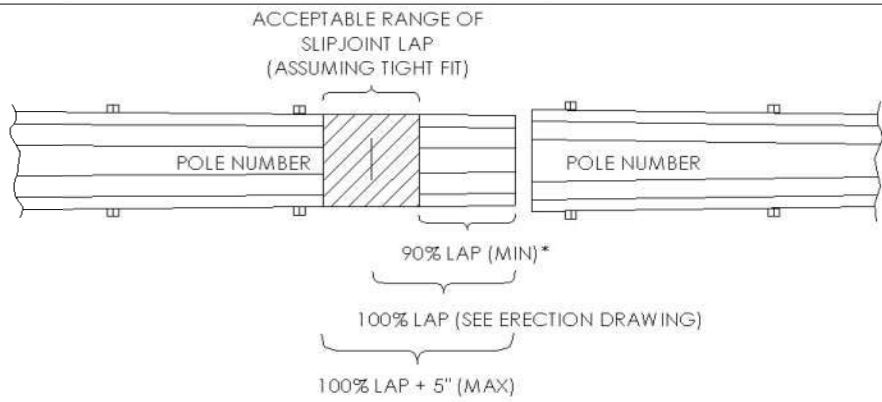
VIEW A-A

JACKING NUT LOCATIONS

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**STEEL STRUCTURES DIVISION**  
**JACKING NUT LOCATIONS**  
 SHEET 1 OF 1      SSG004

			CUSTOMER:
			CUSTOMER P.O. NO:
			JOB NO:
A	ROTATED NUTS ON PT. TO PT. ORIENT.	MDF/8-29-02	DRAWN/DATE    JRB    5-23-94
1	REVISED FOR FINAL ISSUE	JRB/5-10-96	CHECKED/DATE:
REV.	DESCRIPTION	DRFT/DATE	ENGINEER:

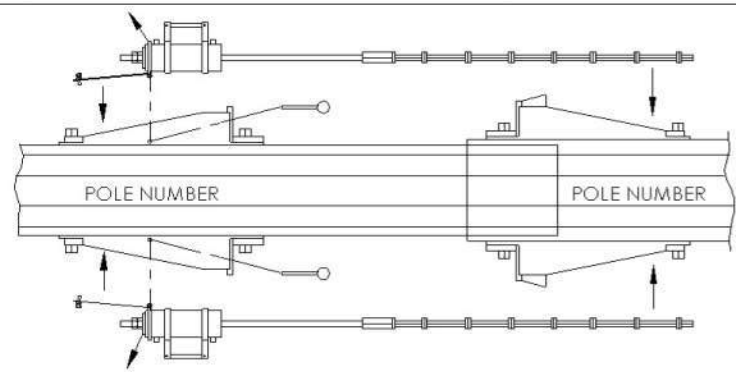




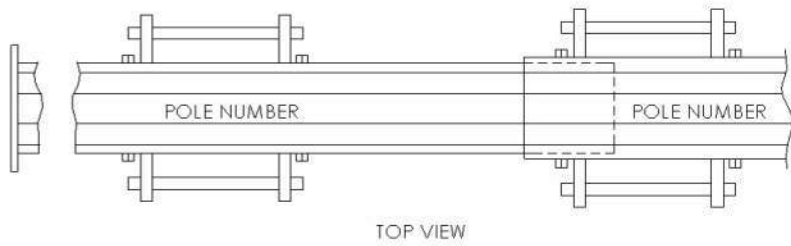
1. CLEAN JOINT (REMOVE ANY FOREIGN MATERIAL). MEASURE AND MARK THE MAXIMUM AND MINIMUM SLIPJOINT LAP ON THE MALE SECTION AS SHOWN ABOVE.

EXAMPLE:  
POLE DRAWINGS SHOW THE THEORETICAL SLIPJOINT LAP (100%) TO BE 5'-6" OR 66".  
THE MINIMUM LAP IS  $0.9 \times 66" = 59.5"$  AND THE MAXIMUM LAP IS  $66" + 5" = 71"$ .

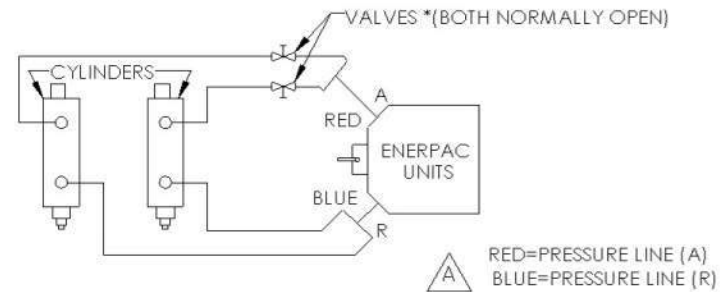
\*CHECK SLIPJOINT LAP ONLY AFTER JOINT IS FULLY SEATED. (SEE NOTE 6)



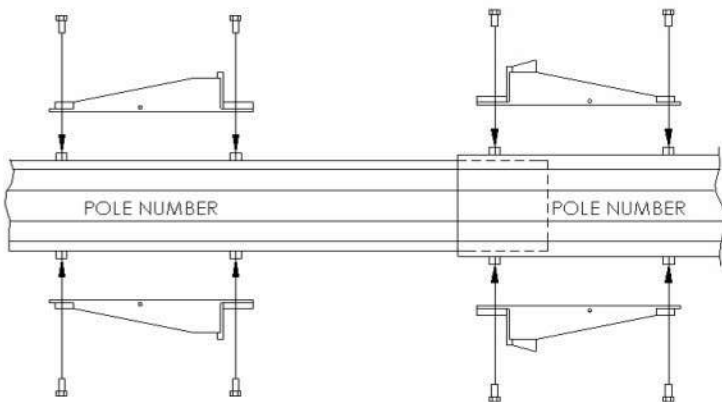
5. ATTACH RAMS TO JACK FRAMES AS SHOWN ABOVE USING 5/8" X 6 1/2" LONG PINS. BEFORE APPLYING FULL JACKING FORCE MAKE CERTAIN THAT BOTH RATCHET BARS ARE FIRMLY SEATED IN THE BOTTOM OF THEIR SLOTS. PARTLY SEATED RATCHETS INTRODUCE UNEVEN FORCES WHICH MAY BEND OR BREAK THE BARS RENDERING THE JACK USELESS. STAND CLEAR AS FULL PRESSURE IS APPLIED.



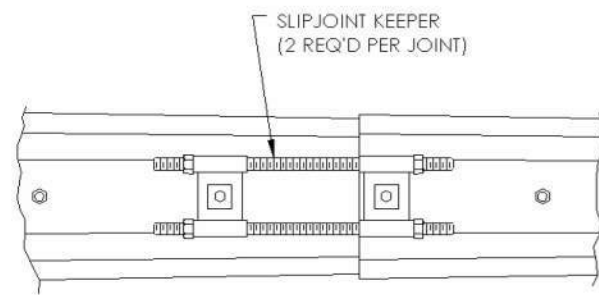
2. ALIGN POLE NUMBERS AND ASSEMBLE JOINT AS FAR AS POSSIBLE WITHOUT USING JACK. NOTE: DO NOT LUBRICATE JOINT.



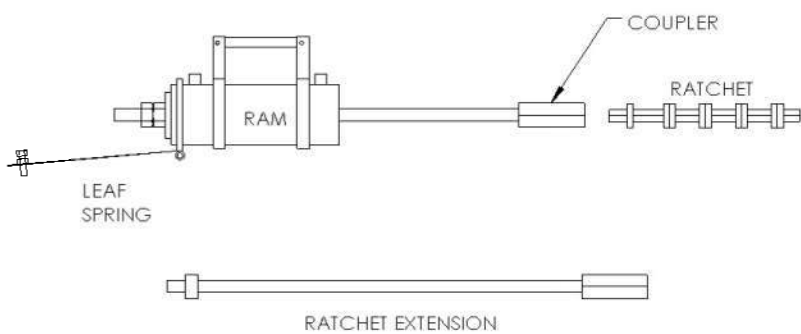
6. ATTACH HYDRAULICS AS SHOWN ABOVE. JACK SECTIONS TOGETHER UNTIL THEY STOP (USING THE FULL JACKING FORCE OF 60 TONS, 30 TONS PER JACK). GENTLY SHAKING THE POLE OR POUNDING THE JOINT AREA DURING JACKING MAY BE HELPFUL IN ATTAINING MINIMUM LAP ON STUBBORN JOINTS. VALVES MAY BE USED TO APPLY UNEQUAL PRESSURE TO KEEP JOINT SECTIONS IN LINE. THE SLIPJOINT SHOULD BE TIGHT WITHOUT ANY MAJOR GAPS OR MISALIGNMENT BETWEEN THE MATING POLE SECTIONS. NOW CHECK TO SEE THAT THE ACTUAL SLIPJOINT LAP FALLS WITHIN THE LIMITS SPECIFIED IN STEP ONE.



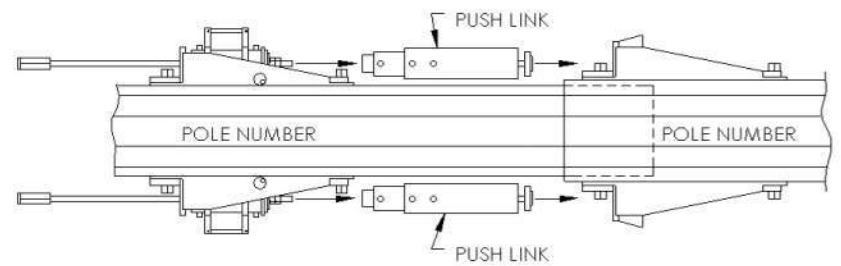
3. ATTACH JACK FRAMES TO JOINT AS SHOWN ABOVE USING (8) 1" DIAMETER HEX HEAD BOLTS TORQUED BETWEEN 95 AND 100 FOOT POUNDS.



7. DO NOT ATTEMPT TO ERECT THE ASSEMBLED POLE BY ATTACHING TO ANY FEMALE SECTION WITHOUT FIRST SECURING ANY LOWER JOINTS BY POSITIVE MECHANICAL MEANS. TWO SETS OF "KEEPERS" ARE FURNISHED WITH JACK FOR THIS PURPOSE AS SHOWN ABOVE. AFTER ERECTION THE KEEPERS SHOULD BE REMOVED.



4. ASSEMBLE RAM TO RATCHET USING FULL 2 1/2" OF THREADS IN COUPLER. (RATCHET EXTENSION IS USED ONLY ON VERY LONG JOINTS).



8. TO JACK POLES APART REMOVE RAM FRAME (CONTAINING RAM) FROM THE POLE. ROTATE 180° AND REINSTALL. INSERT PUSH LINK BETWEEN RAM AND RATCHET FRAME AND ACTIVATE HYDRAULICS AS SHOWN ABOVE.

NOTE: SECURE PUSH LINKS TO THE POLE WITH A CIRCUMFERENTIAL CHAIN AND LOAD BINDER OR WITH A CABLE HOIST.

FOR ADDITIONAL INFORMATION CALL:  
THOMAS & BETTS CORPORATION  
STEEL STRUCTURES GROUP  
ENGINEERING DEPT.  
1-800-888-0211 EXT.3464

10. BEFORE REPACKING RENTAL UNITS CHECK TO SEE THAT ALL PARTS ARE THERE. DRAIN ALL GASOLINE FROM THE ENERPAC UNIT. RETURN UNITS TO:

THOMAS & BETTS  
W8020 150 TH AVENUE  
HAGER CITY, WI. 54014-0126

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JACKING INSTRUCTIONS

SHEET 1 OF 1

SSG005

REV.	DESCRIPTION	DRFT/DATE
A	UPDATED NOTES	MDF/8-29-02
1	REVISED FOR FINAL ISSUE	JRB/5-10-96

CUSTOMER:	
CUSTOMER P.O. NO:	
JOB NO:	
DRAWN/DATE	JRB 5-23-94
CHECKED/DATE:	
ENGINEER:	

SAG CHARTS  
(TO BE ADDED LATER)

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FOR REVIEW 06/30/22