Weather Station Installation on Distribution, Joint and Standalone Wood Poles

094671

Asset Type:	Telecommunications	**Function:**	Design
Issued by:	[redacted]	**Date:**	08-07-2020

Rev. #00: No revisions currently exist as this is the first issuance of this document.

1. Purpose and Scope

This document provides design criteria for solar powered weather station equipment mounted on PG&E electric distribution only, joint, and standalone wood poles. It does not provide detailed requirements concerning all weather station subsystems. For example, specifics concerning power and communications components installed inside the communications box can vary and are omitted.

2. General Information

- Below is general information concerning weather station equipment:
  - Monitors weather conditions in real-time providing meteorologists and electric operations the information needed to make accurate and timely decisions. The need for this ability was prompted by the implementation of the Public Safety Power Shutoff (PSPS) program developed to mitigate weather related wildfire risks.
  - Includes a suite of weather instruments that measure temperature, wind speed, wind direction, and humidity.
  - Communicates to a third-party weather group server via a RV50 or RV50X Sierra Wireless Airlink 4G Industrial LTE gateway using a Universal 3G/4G LTE 3dBi whip antenna contained in the communications box or a Multiple-Input Multiple-Output (MIMO) Shark Fin antenna and/or Wilson directional antennas. An L-band satellite connection can also be used at locations where a usable 3G/4G signal is not present.
  - In most cases, operates from a DC power source that includes a 20W solar panel, CH200 12V charging regulator and a sealed 12V rechargeable battery rated at 24Ah. The system provides power to the weather station independent of secondary power sources, limiting impact due to power interruptions. The power system is installed in a NEMA4X control box that is designed for outdoor installation in harsh environments. Sites using input power of 120-240VAC rather than DC solar are not addressed in this document.

3. References

Document Title	Location	Document
Streetlight Installation on Wood Poles	OH: Streetlights	015132
Secondary Aerial Cable Construction 0-750 Volts	OH: Framing	057875
Miscellaneous Hardware for Overhead Line Construction	OH: Framing	057875

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Equipment Clearances	OH: Clearance	066198
Antenna and DCU Installation Details for SmartMeter Network	OH: Services	068190
SmartMeter Electric SSN Network Nodes on Overhead	OH: Services	072145
Distribution Infrastructure Antennas on Distribution and Streetlight Poles	Bulletin	TD-027911B-001
Installation Details for Service to Pole-Mounted Communication Equipment	OH: Services	027911
G. O. S and Regulations	OH	G.O. 95

4. Design Criteria

4.1. Weather Stations shall not be installed on poles containing a three-phase transformer, booster, service restorer, capacitor, regulator, primary metering, hookstick or gang-operated switch, cutouts or primary risers without Telecom Work Methods and Procedures approval.

4.2. Relative equipment positioning shall be as shown in Figure 1 using the corresponding material listed in Table 1. Deviations from the configuration shown shall only occur where explicitly permitted within this document to comply with a specific constraint, such as GO95 or sensor positioning requirements.

4.3. Placement of equipment on standalone, PG&E electric distribution only, and joint wood poles shall adhere to clearance requirements provided in Figures 2, 3, and 4 respectively. Placement of wind sensor at 20-foot level is preferred, if clearance requirements can be met. If not, note provided in figures should be referenced.

4.4. All equipment is to be installed within the same quadrant except in the following cases:

- Installations on standalone poles. In these cases, all equipment is to be installed in the same quadrant except for the solar panel bracket, which is to be installed in either adjacent quadrant as shown in Figure 2.
- When necessary to comply with other installation requirements, equipment can occupy up to a maximum of two adjacent quadrants provided climbing space requirements are met.

4.5 All equipment positioning must comply with GO95 climbing space requirements to include the following:

4.5.1 Climbing space shall be provided on all jointly used poles with the provisions of GO95 Rules 54.7 and 84.7 directly applicable.

4.5.2 Sensors mounting bracket may only extend one–half their diameter into climbing space (See GO95, Rule 54.7(3)b).

4.5.3 Climbing space on jointly used poles shall not change by more than 90 degrees in a vertical distance of less than 8 feet (See GO95, Rule 93) and must be maintained within the same quadrant for a minimum of four feet above and four feet below each transition.

4.5.4 Climbing space shall be maintained from the ground level (See GO95, Rule 93).

4.6 Radial clearances must be maintained from unattached supply and communication lines as specified in GO95 Rule 37, Table 1, and Case 10.

4.7 Radial clearance of 24-inches must be maintained from all span wires, guys, and messengers (See GO95, Section 3, Table 2, Case 21).

4.8 The below installation guidelines apply to the sensors and the associated sensors mounting bracket:

4.8.1 Relative to the pole, wind sensor MUST be installed at an azimuth within the “Preferred” range (between 330 and 110 degrees) or “Acceptable” ranges (between 320 and 330 degrees or 110 and 120 degrees) shown in Figure 5. Sites that require placement outside of the specified ranges require meteorology department approval.

4.8.2 Standard installations shall have the wind monitor installed on the left periphery of the sensors mounting bracket horizontal cross arm and the temperature probe installed on the right. These locations can be switched, if necessary, to meet wind sensor positioning requirements provided in above section 4.6.1.

4.8.3 The four-foot aluminum cross arm shall be placed in a level position one-inch from the end of the sensors mounting bracket (See Figure 1).

4.8.4 Optional right and left sensors mounting brackets can be used where needed to achieve proper wind sensor placement while still mounting bracket in the desired quadrant (See Figure 6).

4.8.5 Wind monitor and temperature probe cabling shall be secured with tie wraps to the sensor cross arm. (See Figure 1).

4.8.6 In addition to the loop necessary for the installation of the ferrite, there shall be a wind sensor cable slack loop with a diameter of approximately six-inches located near the cross-over fitting to allow for wind sensor removal during calibrations (See Figure 1).

4.8.7 Ferrite, included with 05103-L RM Young Wind Monitor, shall be installed within one-foot of wind sensor and attached to crossarm using an outdoor rated cable tie (See Figure 3).

4.8.8 Temperature probe solar radiation shield shall be mounted at the end of the sensor crossarm extending past the crossarm edge so that the temperature probe can be easily lowered and removed without contacting the crossarm (See Figure 1).

4.9 Wildlife protection guard shall be utilized in the following locations, as shown in Figure 1:

4.9.1 Over wind sensor and temperature probe cabling from the top entry point of sensors mounting bracket to the top of PVC conduit located below bracket. Wildlife protection guard shall be secured to sensors mounting bracket using cold shrink.

4.9.2 Over solar panel cabling from PVC conduit to solar panel mounted on communications bracket. In most cases, a small hole must be drilled into conduit to allow cable exit.

4.10 To prevent damage to critical components due to moisture and insect intrusion, duct seal shall be used around cables inside communications box to seal entry point.

4.11 When attaching PVC conduit to pole, conduit straps shall be placed within six-inches of conduit ends and spaced no more than every two-feet thereafter.

4.12 Through bolts must not extend more than one inch beyond nuts. Bolts that protrude beyond one inch shall be cut and filed to remove sharp edges.

4.13 Communications box must be labeled as PG&E equipment and include ENOC contact information inside.

4.14 MIMO-Black Shark Fin and Wilson Directional antennas may be used to improve 3G/4G signal quality where needed. Where usable 3G/4G signals are not present, L-Band terminals can be used. Antenna and L-Band installations shall be as shown in Figure 7. If antenna is mounted separately from solar panel, conduit will be needed for coaxial cable run and installation must comply with the aforementioned requirements.

4.15 The Telecom Work Methods and Procedures Team shall provide support concerning design and installation questions and shall have the sole discretion to make modifications to this standard in collaboration with relevant line of business partners.

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Figure 1 Weather Station Equipment Configuration

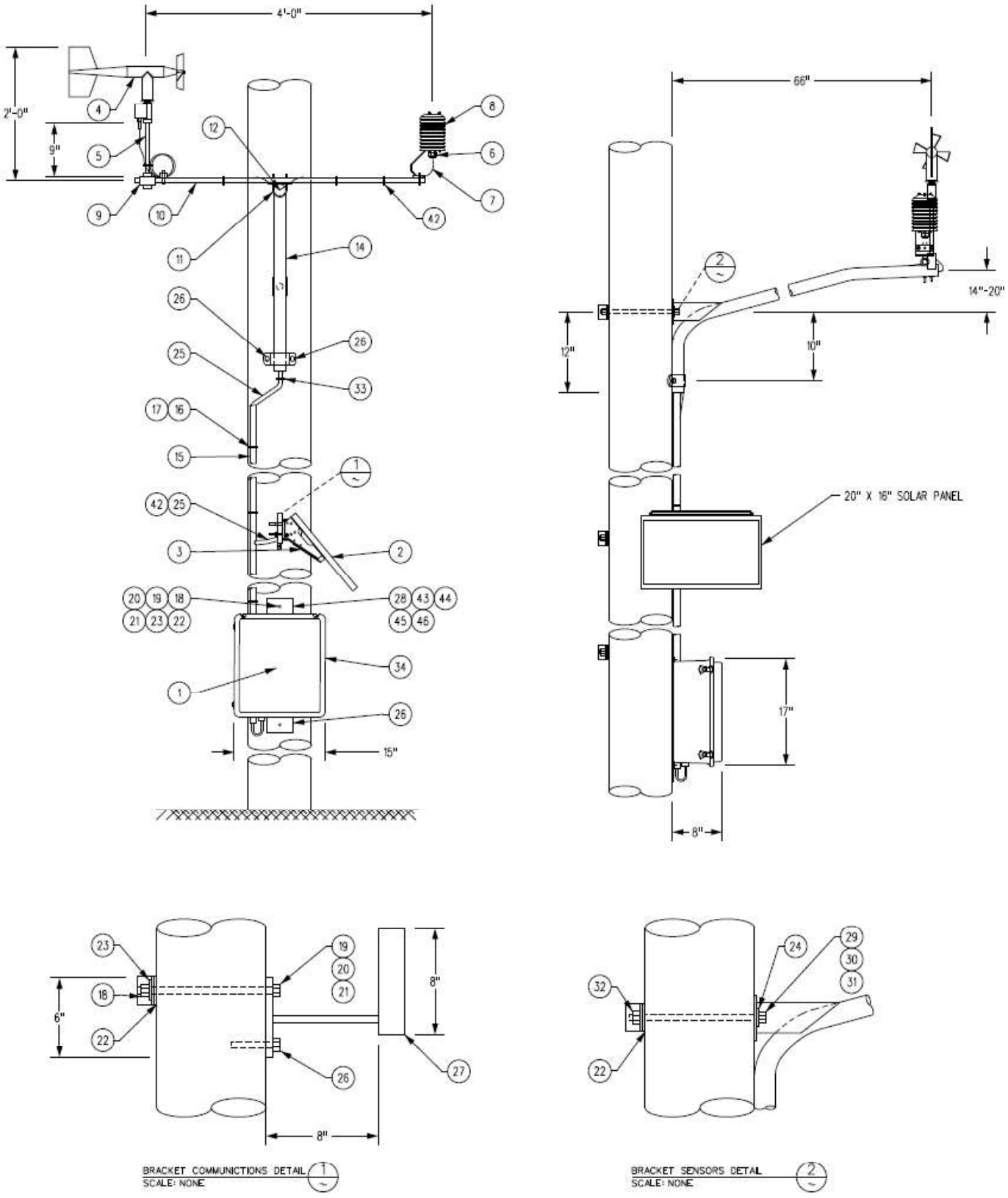

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Table 1 Weather Station Bundle Material List

IT WEATHER STATION BUNDLE MATERIAL LIST						
ITEM NO.	PART NUMBER	MATERIAL CODE	QTY	DESCRIPTION	VENDER	NOTES
1	ENC14/16	N/A	1	ENC14/16 WEATHER-RESISTANCE 14 X 16 INCH ENCLOSURE	WESTERN WEATHER GROUP	
2	SP20	N/A	1	20W SOLAR PANEL, 15 FT CABLE	WESTERN WEATHER GROUP	
3	SP20R-L-31478	N/A	1	-SM STD MOUNTING KIT	WESTERN WEATHER GROUP	
4	05103-L	N/A	1	05103-L RM YOUNG WIND MONITOR (30 FEET OF CABLE PER SENSOR)	WESTERN WEATHER GROUP	
5	3659	N/A	1	1 IPS UNTHREADED ALUMINUM PIPE, 12 INCHES LONG	WESTERN WEATHER GROUP	
6	EE181-L	N/A	1	E+E TEMPERATURE/RH PROBE	WESTERN WEATHER GROUP	
7	EE181-L-9721	N/A	30 FT	TEMP/RH SENSOR CABLE	WESTERN WEATHER GROUP	
8	RAD10E 32360	N/A	1	METSPEC 10 PLATE SOLAR RADIATION SHIELD FOR EE181	WESTERN WEATHER GROUP	
9	17953	N/A	1	1 X 1 INCH NURAIL CROSSOVER FITTING	WESTERN WEATHER GROUP	
10	CM204-17904	N/A	1	SENSOR CROSSARM W/ONE CM210 MOUNTING KIT, 4FT	WESTERN WEATHER GROUP	
11	25315	N/A	2	FAB SCREW U-BOLT V-SHAPED 5/16-1.8 X 2.5000 SS W/NUTS SB	WESTERN WEATHER GROUP	
12	8429-6	N/A	1	COLD SHRINK CONNECTOR INSULATORS - 3M CO.-ELECTRICAL	3M	
13	314411	N/A	1	WILSON ANTENNA - DIRECTIONAL	WILSON	OPTIONAL
14	N/A	M358125	1	BRACKET SENSORS 6' WOOD POLE	N/A	
15	N/A	M360305	AS REQ	CONDUIT PLASTIC 1" PVC 2 SCHEDULE 80	N/A	
16	N/A	M176018	AS REQ	STRAP 2-HOLE 1" RIGID CONDUIT	N/A	
17	N/A	M197035	AS REQ	NAIL 8D GALVANIZED HOT DIPPED COM WIRE	N/A	
18	N/A	M195059	2	NUT SQ 1/2" DIA GALV STL 13 TPI	N/A	
19	N/A	M192294	2	BOLT MACH 1/2"DIA 12"LG GALVS SQ HD	N/A	BOLT USED BASED ON POLE DIAMETER BETWEEN ITEMS 19, 20, 21
20	N/A	M192295		BOLT MACH 1/2"DIA 14"LG GALVS SQ HD	N/A	
21	N/A	M192406		BOLT MACH 1/2"DIA 16"LG GALVS SQ HD	N/A	
22	N/A	M033320	3	WASHER SPRING CLIP GALVS	N/A	
23	N/A	M195273	2	WASHER FLAT 1/2" GALV WRT STL ROUND	N/A	
24	N/A	M195286	1	WASHER FLAT 5/8" GLAV SQ	N/A	
25	N/A	M560331	10 FT	COVER JUMPER/LEADWIRE WILDLIFE PROTECT	N/A	
26	N/A	M196031	4	SCREW LAG 1/2" DIA 4" LG GALV STL	N/A	
27	N/A	M376632	1	BRACKET COMMUNICATIONS	N/A	
28	N/A	M231955	2	BOLT BRACKET SOLAR PANEL AND ANT DCU	N/A	
29	N/A	M192317	1	BOLT MACH 5/8"DIA 12"LG GALVS SQ HD	N/A	BOLT USED BASED ON POLE DIAMETER BETWEEN ITEMS 29, 30, 31
30	N/A	M192319		BOLT MACH 5/8"DIA 14"LG GALVS HW HD	N/A	
31	N/A	M192321		BOLT MACH 5/8"DIA 16"LG GALVS SQ HD	N/A	
32	N/A	M195060	2	NUT SQ 5/8" DIA GALV STL 11 TPI	N/A	
33	N/A	M197156	6	STAPLE 2-1/2"X29/32"X.187" GALV STEEL	N/A	
34	N/A	M016583	1	PADLOCK SHACKLE STAMPED PG&E 1-1/4"	N/A	
35	N/A	M370170	1	DIGI RADIO ANTENNA MIMO - BLACK SHARK FIN	N/A	OPTIONAL
36	N/A	M358131	1	BRACKET SENSOR 6' WOOD POLE (LEFT HAND)	N/A	OPTIONAL
37	N/A	M358132	1	BRACKET SENSOR 6' WOOD POLE (RIGHT HAND)	N/A	OPTIONAL
38	2097	N/A	1	FLEXCOM THURAYA (L-BAND) TERMINAL	X2N	OPTIONAL
39	2146	N/A	1	THURAYA (L-BAND) TERMINAL MOUNT KIT	X2N	OPTIONAL
40	2160	N/A	1	FLEXCOM 5M ETHERNET CABLE (OUTDOOR RATED)	X2N	OPTIONAL
41	2116	N/A	1	FLEXCOM 10M ETHERNET CABLE (OUTDOOR RATED)	X2N	OPTIONAL
42	N/A	N/A	AS REQ	CABLE TIES UV OUTDOOR RATED	N/A	
43	31CNFHS	N/A	1	HEX NUT 5/16-18 NC FIN STAINLESS	UNIVERSAL PART NUMBER	
44	31C75HCSS	N/A	1	HEX C/S 5/16-18 X 3/4 NC STAINLESS	UNIVERSAL PART NUMBER	
45	31NWSFS	N/A	1	F/W 5/16 STAINLESS	UNIVERSAL PART NUMBER	
46	31NWSLS	N/A	1	SPLIT L/W 5/16 STAINLESS	UNIVERSAL PART NUMBER	

Weather Station Installation on Distribution, Joint and Standalone Wood Poles

Figure 2 Weather Station Installation on Standalone Wood Pole

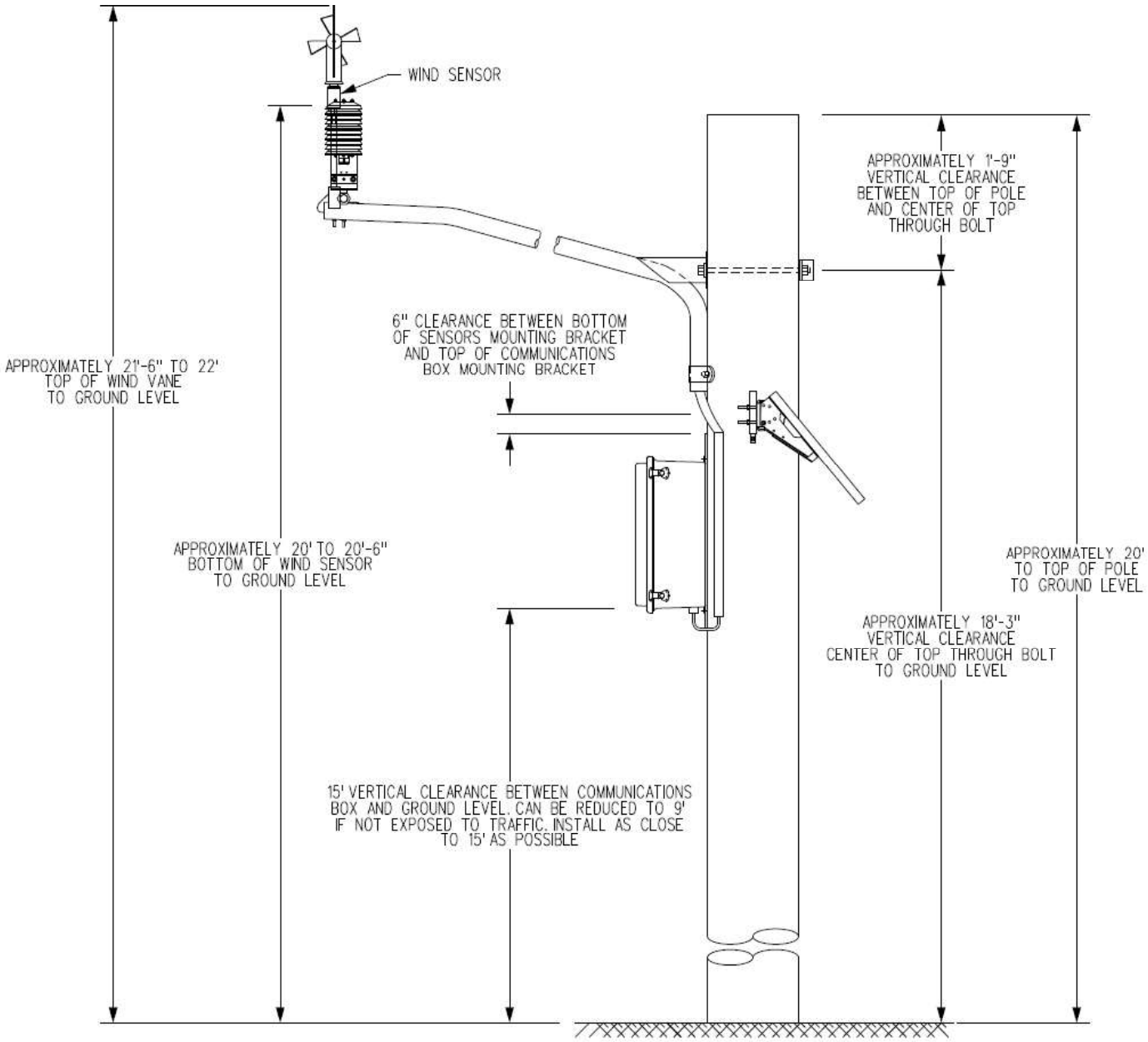

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Figure 3 Weather Station Installation on PG&E Electric Distribution Only Pole

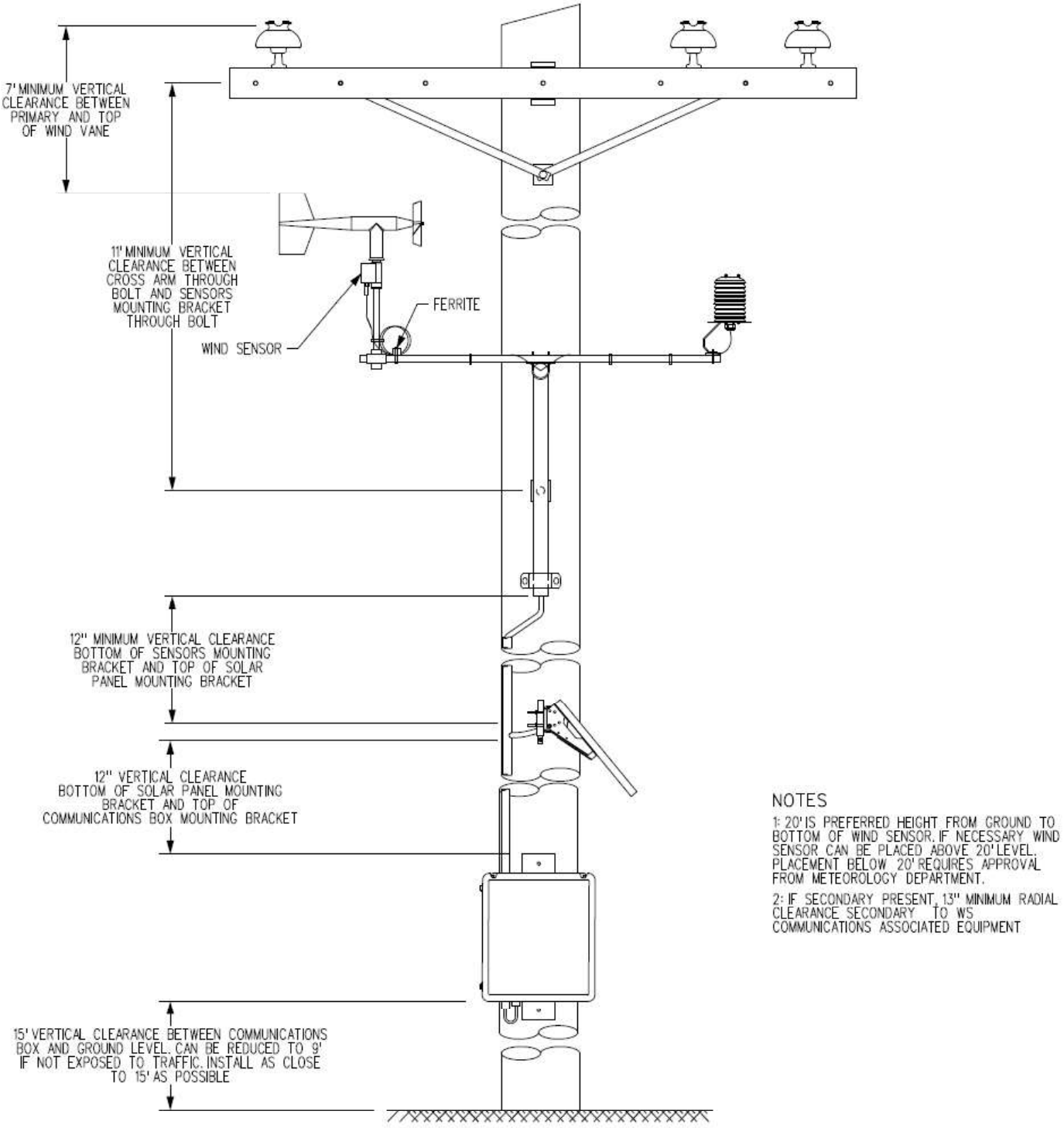

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Figure 4 Weather Station Installation on Joint Pole

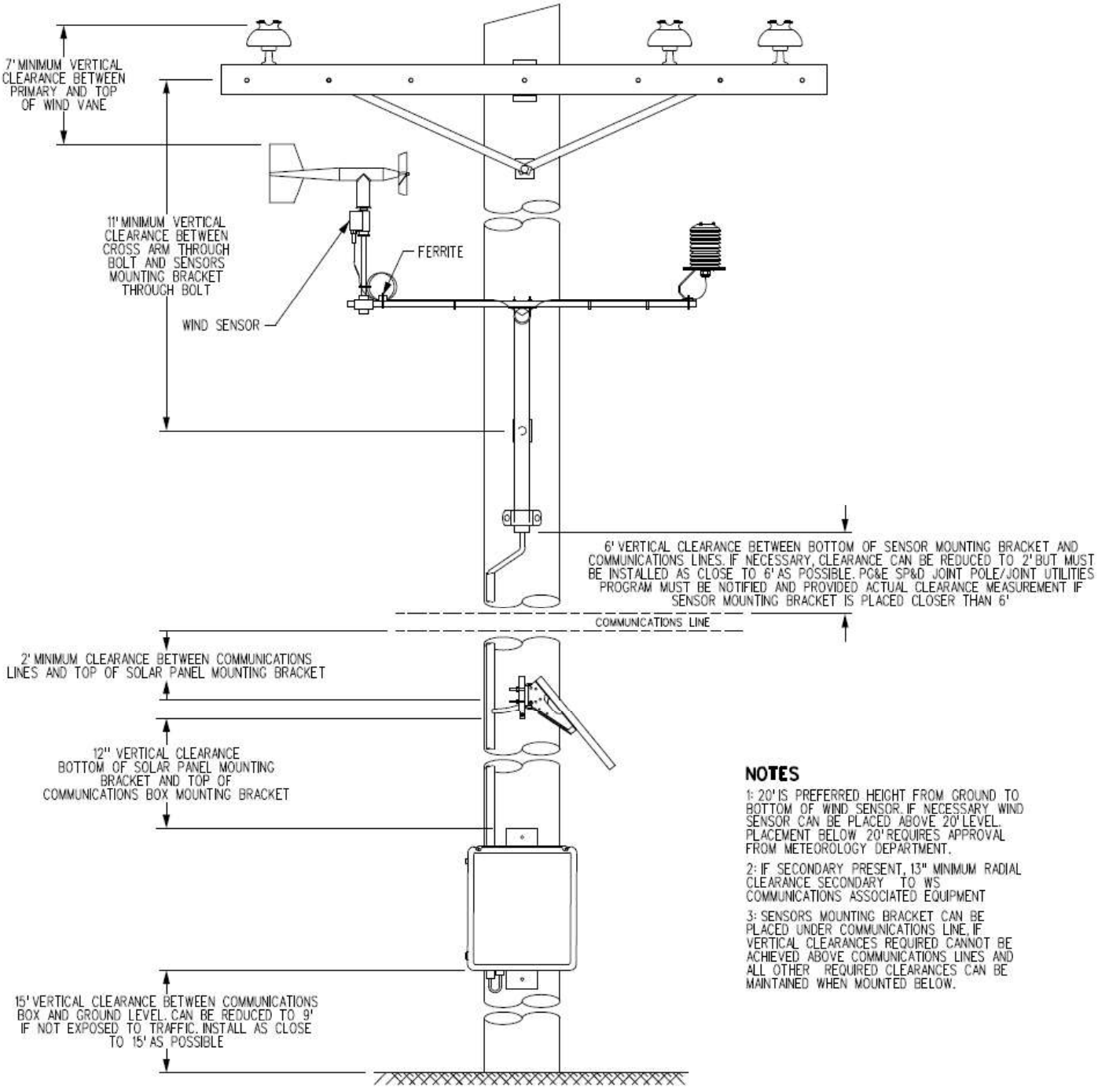

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Figure 5 Wind Sensor Azimuth Range Relative to Pole

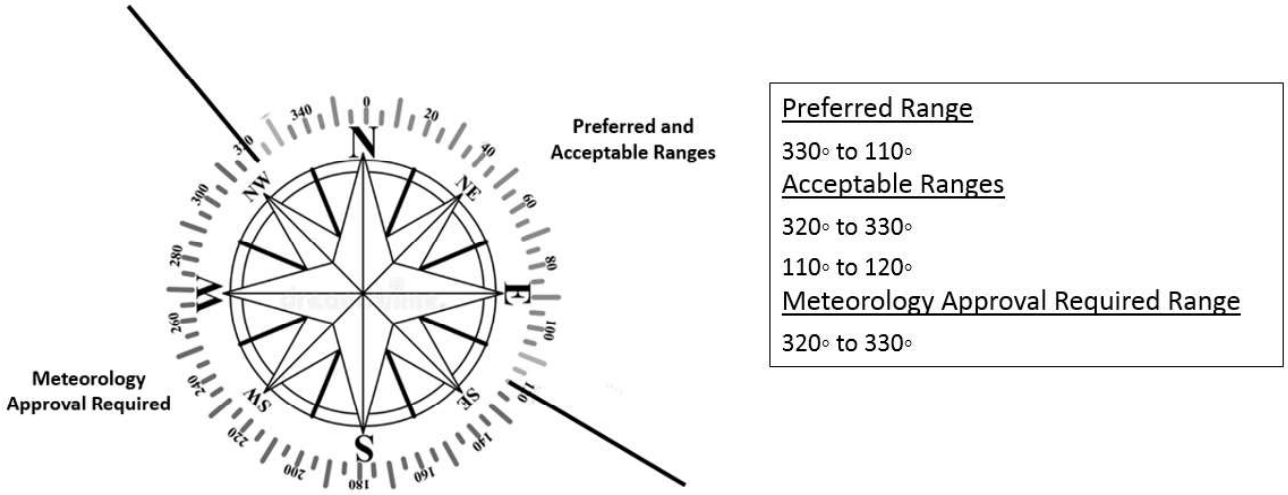

Figure 6 Optional Right and Left Sensors Mounting Bracket

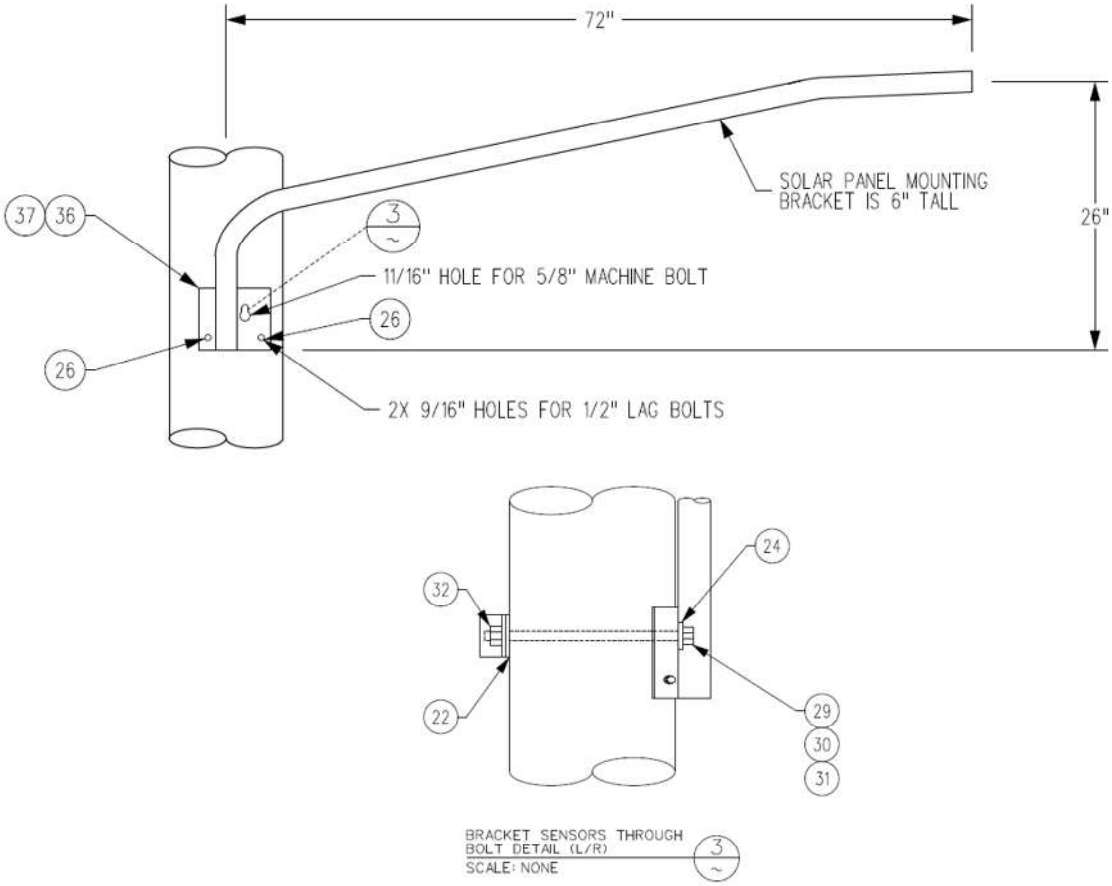

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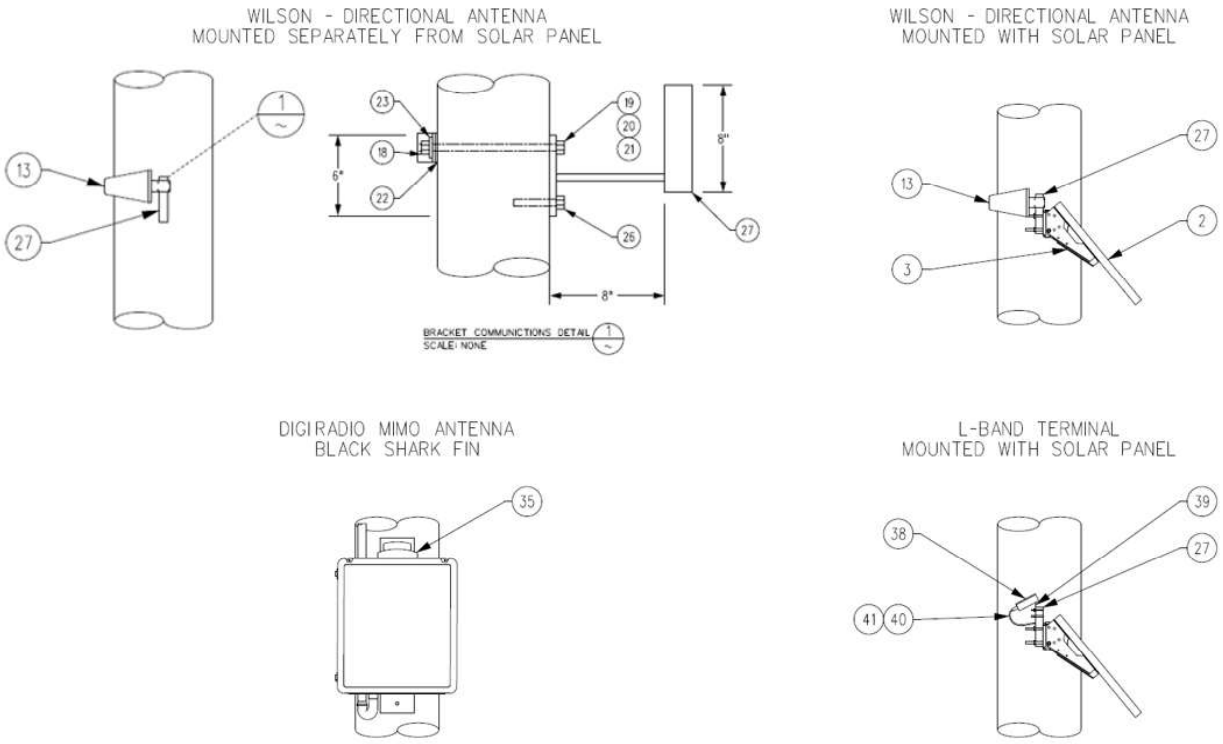
Figure 7 Optional Wilson Directional and MIMO-Black Shark Fin Antenna Installations



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