56 Prospect Street
P.O. Box 270
Hartford, CT 06103

Kathleen M. Shanley
Manager – Transmission Siting
Tel: (860) 728-4527

September 15, 2017

Robert Stein, Chairman
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

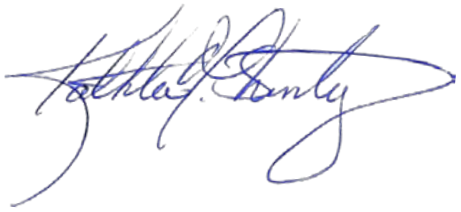
Dear Chairman Stein:

Attached are an original and fifteen (15) copies of a petition submitted on behalf of The Connecticut Light and Power Company doing business as Eversource Energy ("Eversource" or the "Company") requesting a Declaratory Ruling that no Certificate of Environmental Compatibility and Public Need is required for the proposed replacement of one existing omnidirectional tower mounted whip antenna ("Petition"). An electronic version on a CD-ROM of the Petition is also enclosed.

Prior to submitting this Petition, representatives from Eversource met with the Birchwood Condominium Association to discuss the proposed work. Written notice has been provided to the City of Danbury and the Birchwood Condominium Association notifying them of the Petition being filed with the Council. The notification letter and Affidavit of Service are provided in Attachment 2: Notification Letter and Affidavit.

A check in the amount of $625 for the required filing fee is also attached.

Sincerely,



Attachment 1: Petition
Attachment 2: Notification Letter and Affidavit

CC: The Honorable Mark Boughton, Mayor, City of Danbury
Birchwood Condominium Association

EVERSOURCE ENERGY

P.O.Box 270
Hartford, CT 06141-0270

September 15, 2017

Dear Neighbor,

As part of our everyday effort to deliver reliable energy and superior service to our customers and communities, Eversource is planning to reconfigure and upgrade the telecommunications system at one of its facilities in your area.

Eversource will be submitting a Petition to the Connecticut Siting Council (CSC) to reconfigure and upgrade the existing telecommunications system located within the Eversource easement at 27 Crow's Nest Lane in Danbury, Connecticut.

The proposed upgrades are necessary to improve reliability of the electrical system serving our state, including restoration work during a power outage.

The proposed reliability improvements include:

- Removing the existing communication antenna and tower-mounted equipment and replacing it with an updated communications antenna and ground-mounted equipment that will allow for system upgrades and newer technologies.
- Installing a 30-foot by 28-foot gravel-base for the ground-mounted equipment surrounded by a 12-foot high vinyl fence surrounded by and arborvitae plantings.
- Installing an 11-foot by 16-foot equipment shelter placed on a concrete slab.
- The equipment would also include a back-up power generator installed on a concrete pad with an above ground propane tank placed on a concrete pad, both of which would be located within the fenced enclosure.
- The total height for the pole and communications antenna would be approximately 102 feet above ground.
- The cables between the enclosure and the structure will be placed underground.

If approved, the work is scheduled to begin in the fourth quarter of 2017, with restoration of the affected areas expected to be completed in the second quarter of 2018. This schedule is subject to change due to weather delays or unexpected circumstances.

If you would like to send comments or concerns about the Project, please send them to the CSC at the following address: Melanie Bachman, Acting Executive Director; Connecticut Siting Council; Ten Franklin Square; New Britain, CT 06051. You may also email them at siting.council@ct.gov.

We are committed to being a good neighbor and doing our work with respect for you and your property. If you have questions about this work, please contact Ryan Ericson at 781-441-8708 or send an email to ryan.ericson@eversource.com

Thank you.

Sincerely,

Ryan Ericson

Ryan Ericson
Eversource Telecommunications Engineer

AFFIDAVIT OF SERVICE OF NOTICE

STATE OF CONNECTICUT)
) ss. Hartford
COUNTY OF HARTFORD)

Sec. 16-SOj-40 of the Regulations of Connecticut State Agencies ("RCSA") provides that proof of notice to the affected municipalities, property owners and abutters shall be submitted with a petition for declaratory ruling to the Connecticut Siting Council ("Council"). In accordance with that RCSA section, I hereby certify that I caused notice of proposed construction of The Connecticut Light and Power Company doing business as Eversource Energy to be served by mail or courier upon the following municipal official:

The Honorable Mark Boughton
Mayor of Danbury
Danbury City Hall
155 Deer Hill Avenue
Danbury CT 06810

I also certify that I caused notice of the proposed modifications to be served by mail or courier upon the Birchwood Condominium Association.

Susan J. Bellion
Project Siting Specialist

On this the 12 day of September, 2017, before me, the undersigned representative, personally appeared, Susan J. Bellion, known to me (or satisfactorily proven) to be the person whose name is subscribed to the foregoing instrument and acknowledged that he executed the same for the purposes therein contained.

In witness whereof, I hereunto set my hand and official seal.

Kathy L. Schmidt
Notary Public
My Commission expires: 9-30-19

THE CONNECTICUT LIGHT AND POWER COMPANY
Doing Business As
EVERSOURCE ENERGY

PETITION TO THE CONNECTICUT SITING COUNCIL
FOR A DECLARATORY RULING OF
NO SUBSTANTIAL ADVERSE ENVIRONMENTAL EFFECT
FOR THE PROPOSED REPLACEMENT OF ONE EXISTING
OMNIDIRECTIONAL TOWER MOUNTED WHIP ANTENNA
IN THE TOWN OF DANBURY, CONNECTICUT

A. Introduction

Pursuant to Sections 16-50j-38 and 16-50j-39 of the Regulations of Connecticut State Agencies ("R.C.S.A."), The Connecticut Light and Power Company doing business as Eversource Energy ("Eversource" or the "Company"), hereby petitions the Connecticut Siting Council (the "Council") for a declaratory ruling ("Petition") that no Certificate of Environmental Compatibility and Public Need ("Certificate") is required under Section 16-50k(a) of the Connecticut General Statutes ("C.G.S.") to replace and upgrade an existing radio communications facility ("Replacement Facility" or "Project") within an existing electric transmission right-of-way in Danbury, Connecticut. See Figure 1, *Site Location Map*.

B. Background

Eversource currently owns and operates a telecommunications facility ("Existing Facility") mounted to an electric transmission structure within the 110-foot wide Company utility right-of-way ("ROW") located within the northern portion of the Birchwood Condominium Complex ("Complex") property at 27 Crows Nest Lane in Danbury, Connecticut ("Site"). The utility ROW and multiple electric transmission towers transect the northern portion of the Complex in an east to west route. The Existing Facility is collocated atop an 85-foot tall galvanized steel electric transmission structure (Eversource transmission structure #9950) and consists of a ±9-foot omnidirectional whip antenna mounted near the top of the transmission tower. The total height of the existing transmission structure, including the top mounted antenna, is approximately 92 feet above ground level ("AGL").

Legend

- Site
- Municipal Boundary

Base Map Source: USGS 7.5 Minute Topographic Quadrangle Maps, Bethel and Danbury, CT (1984)
Site is located on the Danbury, CT Quadrangle
Map Date: May 2017
Map Scale: 1:24,000

1,000 500 0 1,000 Feet

Figure 1
Site Location Map

Danbury OpenSky Installation Project
at Birchwood Condominiums
Eversource Structure No. 9950
27 Crows Nest Lane Danbury, CT

EVERSOURCE ENERGY

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Eversource is in the process of upgrading its communications system across the State of Connecticut. For the Existing Facility in Danbury, this upgrade includes removing the existing communication antenna and tower-mounted equipment and replacing it with an omnidirectional communications antenna and ground-mounted equipment compound that would allow for system upgrades and newer technologies. The Replacement Facility would continue to provide Distribution System Control and Data Acquisition ("DSCADA") systems for electric distribution operations to allow control and monitoring of switching devices from a remote location.

C. Description of the Project

The Company, currently referring to this Project as "Danbury OpenSky at Birchwood Condominiums," proposes to remove the Existing Facility and replace it with a ±19-foot omnidirectional whip antenna with a tower top amplifier utilizing the existing antenna mount on the same Eversource transmission structure. A ±30-foot by ±28-foot gravel-base equipment compound surrounded by a 12-foot high vinyl fence and arborvitae plantings is proposed at the base of the existing tower to provide space for an ±11-foot by ±16-foot equipment shelter placed on a concrete slab. The equipment compound would also include a 20-kilowatt propane-fueled, back-up power generator installed on a ±3-foot by ±4.5-foot concrete pad with a 500-gallon above ground propane tank placed on a ±4-foot by ±12-foot concrete pad, both of which would be located within the fenced equipment compound. The existing Site ground elevation is approximately 580 feet above mean sea level. The height of the existing antenna mount is ±83 feet AGL and the height of the new whip antenna would extend a maximum of ±17 feet above the top of the transmission structure, raising the total height of the Replacement Facility to approximately 102 feet AGL. See Figure 2, *Site Schematic* and Attachment 1, *Project Plans* (completed by the Centek Engineering; dated June 26, 2017). Eversource would own and maintain the Replacement Facility once completed.

C:\GIS\Projects\Eversource\Danbury\mxd\Figure2_SiteSchematic.mxd

Legend

- Subject Property
- Transmission Structure
- Approximate Transmission Right-of-Way
- Approximate Transmission Line
- Proposed Equipment Compound
- Municipal Boundary
- Approximate Parcel Boundary (CTDEEP)

N W E S

300 150 0 300 Feet

Base Map: 2016 Aerial Photograph (CTECO)
Map Scale: 1 inch = 300 feet
Map Date: July 2017

Figure 2
Site Schematic

Danbury OpenSky Installation Project
at Birchwood Condominiums
Eversource Structure No. 9950
27 Crows Nest Lane Danbury, CT

EVERSOURCE ENERGY

ALL-POINTS TECHNOLOGY CORPORATION

Coax cables for the replacement antenna would extend down the transmission structure to a conduit within an underground duct bank for connection to the equipment shelter. Electrical power would be provided via a new underground conduit duct bank from the existing service meter located at the base of the transmission structure. The Replacement Facility would use the proposed propane-powered, emergency standby generator for back-up power.

Table 1, *Antenna Schedule*, summarizes the proposed antenna type and vertical location proposed on the Replacement Facility. Specifications for the Company's new antennas are included in Attachment 2, *Antenna Specifications.*

Table 1: Antenna Schedule

Antenna Type	Antenna Make/Model	Antenna Center Line Elevation (feet AGL)	Comments	Frequency
19-feet,, 1.5 inch Diameter Omni	DB Spectra DS9A09F36D-N	±92.5	DSCADA	900 MHz

For additional elevation information and location drawings of the proposed installation, please refer to the Project Plans in Attachment 1.

A structural loading analysis has been performed to ensure that the transmission structure would be structurally capable of supporting the loading from the new antenna and appurtenances. A review of the design and structural analysis for the Replacement Facility is included in Attachment 3, *Structural Analysis of Transmission Pole*, which was completed by Centek Engineering on March 6, 2017.

D. Environmental Discussion

The Project would not have a substantial adverse environmental effect because the antenna and appurtenances would be constructed on top of an existing electric transmission structure and the equipment compound would be located adjacent to the structure footings within the Company's ROW, where prior ground disturbances have occurred.

1) Wetlands and Watercourses

No wetlands or watercourses are located on or adjacent to the Site. The closest wetland resource, an intermittent water course, is located approximately 970 feet to the southwest of the Site while the nearest perennial river, the Sympaug Brook, is located ±2,000 feet to the southwest. Additional information regarding these wetland resources is provided in Attachment 4, *Wetland Desktop Review*.

2) Soil Erosion, Sediment Control, and Soil Remediation

Minor ground disturbances would be associated with the construction of the new equipment compound, but excavations would not exceed a depth of 4 feet below grade. Groundwork associated with the Project would include regrading/leveling of the Site and trenching for the installation of new coax cables, concrete pads and fence posts. The leveling of the site would employ a cut and fill technique. The uphill side would be excavated and the excavated soil would be used to build up the downhill side. This would minimize the need to remove soil from the site. To the extent necessary, during construction activities associated with the Project the Company would incorporate soil erosion and sediment control measures in accordance with the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control*.

3) Wildlife and Vegetation

According to the available Connecticut Department of Energy & Environmental Protection ("CTDEEP") Wildlife Division Natural Diversity Data Base ("NDDB") maps, the Project is located within a shaded NDDB area. APT submitted a review request with respect to this Project to confirm what known populations of Federal or State Endangered, Threatened or Special Concern Species may occur on this Site. The CTDEEP responded in writing on June 26, 2017 indicating that one (1) State Special Concern species, the Eastern Box Turtle[1] (*Terrapene Carolina),* is "known to have extant populations…in the vicinity of the project site." A copy of the agency's response is included in Attachment 5, *CTDEEP and USFWS*[2] *Correspondence.*

Eastern Box Turtle

The Project would be located within an existing electrical transmission ROW that is

[1] Eastern Box Turtle (*Terrapene Carolina)* inhabit old fields and deciduous forests, which can include power lines and logged woodlands. They are often found near small streams and ponds. The adults are completely terrestrial but the young may be semiaquatic, and hibernate on land by digging down in the soil from October to April. They have an extremely small home range and can usually be found in the same area year after year.

[2] United States Fish and Wildlife Service.

maintained as lawn by the underlying and surrounding condominium development and as a result will not require vegetative clearing or wetlands impacts. Based on this information, it is APT's opinion that the Project is not likely to adversely affect the Eastern Box Turtle. However, Eversource will comply with and employ the Recommended Protection Strategies for Turtles as outlined in the CTDEEP June 26, 2017 letter during the construction of the Replacement Facility. *See* Attachment 5.

A desktop analysis of the Site performed by APT also identified two federally-listed[3] threatened species known to occur within the vicinity of the Site. The documented species are the northern long-eared bat ("NLEB"; *Myotis septentrionalis*) and bog turtle (*Clemmys muhlenbergii*). The northern long-eared bat's range encompasses the entire State of Connecticut, while bog turtle is known to occur in wetland habitats located in the towns of Ridgefield and Danbury. The USFWS did not respond to APT's determination of "No Adverse Effect" to the NLEB and bog turtle; consistent with agency's protocols, Eversource presumes that the USFWS concurs with APT's assessment. A copy of the USFWS Compliance Statement is included in Attachment 5.

NLEB

The Project is not located near known NLEB hibernacula or maternity roost trees and because of its proposed location within the maintained area of the Complex, vegetative clearing will not be required. Consultation with the CTDEEP Wildlife Division revealed that the Replacement Facility would not be located within 150 feet of a known occupied maternity roost tree nor within 0.25 mile of a known NLEB hibernaculum. The nearest NLEB habitat resource to the Site is located in the towns of New Milford, Bridgewater and Roxbury, approximately 11.5 miles to the northeast. Relying on this information, the Project is not likely to adversely affect NLEB.

Bog Turtle

The Site is located within an existing maintained lawn surrounded by development. No wetlands or watercourses occur within or adjacent to the Project. The nearest wetland

[3] Listing under the federal Endangered Species Act.

resource area is located ±970 feet to the east (intermittent watercourse)[4]. Therefore, no adverse effect to bog turtle, a wetland dependent species, would result from the Project.

Migratory Birds

No migratory bird species are anticipated to be impacted by the Project. The Replacement Facility would comply with the USFWS' recommended guidelines for reducing impacts to migratory birds for operation and maintenance of an existing tower as follows:

- *Existing Tower Lighting.* The Existing Facility is unlit and will remain unlit with the proposed Project improvements.
- *Infrastructure Lighting.* The proposed compound would follow recommendations to minimize light trespass by using motion sensors and down-shielding with minimum intensity light for security and operation lighting.
- *Vegetation Management.* Since the Replacement Facility will be located within an existing maintained lawn, no impact to breeding birds would result from the Project.
- *Birds Nesting on Towers.* There are currently no known birds nesting on the Existing Facility. It is unlikely birds would use the Replacement Facility because the proposed whip antenna has no additional structure on which to affix nesting material.
- *Tower Access.* Representatives from the USFWS or researchers would be allowed access to the Replacement Facility to evaluate bird use, conduct dead-bird searches, and conduct other research, as necessary with prior written request for access submitted to and approval granted by Eversource.

The Project would not have a significant adverse effect on wildlife or vegetation because the replacement antenna and equipment compound would be confined to areas that are developed and previously disturbed. Ground disturbance would be minor and take place

[4] The "Bog Turtle (Clemmys muhlenbergii), Northern Population, Recovery Plan" (M.W. Klemens, compiler, May 15, 2001) and Amphibians and Reptiles of Connecticut and Adjacent Regions (M.W. Klemens, 1993) identifies bog turtle habitat as "calcareous wet meadows, pastures, and fens, usually bordered by shrub and red-maple swamps… [that are] characterized by a continuous flow of water seeping through the saturated surface soil and [contain] an extremely diverse vegetational community" and "Bog Turtles inhabit small pockets of open-canopy habitat located within these diverse and dynamic wetland ecosystems."

within an area that does not support any significant wildlife habitat. Therefore, the Replacement Facility would not result in an adverse impact to wildlife or vegetation. However, in order to satisfy Federal Communications Commission ("FCC") rules implementing the National Environmental Policy Act ("NEPA") and Section 7 of the Endangered Species Act, a NLEB streamlined consultation form was submitted to the USFWS. The USFWS did not respond to this request within 30 days (received on June, 20, 2017) and, as such, it is presumed that no adverse effect would occur to NLEB from the Project[5]. A copy of the Company's submission is included in Attachment 5.

4) Safety and Health

The Project would not create any safety or health hazards to persons or property. Eversource does not anticipate the need for specific traffic control measures during construction. The Site will be accessed via the condominium parking lot immediately to the east of the transmission tower and Eversource has agreed to limit work hours as not to interfere with school bus pick up schedules during the school year. Subsequent to completion of construction, the Replacement Facility would not generate any additional traffic to the area other than routine, periodic maintenance visits.

Radio-signal emissions from the proposed equipment after installation on the Site would not exceed the total radio-frequency ("RF") electromagnetic power density level permitted by the Federal Communications Commission ("FCC"). To ensure compliance with the applicable standard, the Company commissioned C Squared Systems to conduct RF power density calculations for the Replacement Facility using site-specific data and the methodology prescribed by the FCC's Office of Engineering and Technology Bulletin No. 65, Edition 97-01 (August 1997). The calculations indicate that the cumulative power density level for the Replacement Facility would be 0.41% (vs 0.44% for the Existing Facility) of the FCC Standard for public exposure to RF emissions. Please refer to Attachment 6, *Calculated Radio Frequency Emissions Report*, dated July 26, 2017 for a copy of the methodology and calculations.

[5] If the USFWS does not respond within 30 days from submittal of the Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form, it is presumed that the USFWS concurs with the consultant's determination of no adverse effect and project responsibilities under 7(a)(2) of the Endangered Species Act with respect to the NLEB are fulfilled in accordance with the USFWS January 5, 2016 intra-Service Programmatic Biological Opinion (BO).

5) Visual

The Existing Facility includes one mounted whip antenna mounted on an existing transmission structure extending to a height of approximately 92 feet AGL. The existing whip antenna would be replaced with a 10-foot taller whip antenna utilizing the same antenna mount on the same transmission structure extending approximately 102 feet AGL. The outer diameter of the replacement antenna would be 1.5 inches and as such would not be highly visible beyond the immediate area of the Site. The Replacement Facility would also include the addition of a new gravel based equipment compound, surrounded by a 12-foot high vinyl fence, located at the base of the existing tower.

The replacement antenna would not result in a change in the character of existing views and would not alter the current viewshed footprint of the Existing Facility. Any views associated with the proposed equipment area would be limited as the compound would be surrounded by a solid vinyl fence and arborvitae plantings located adjacent to the existing tower. For a visual comparison of the Existing Facility and Replacement Facility, please refer to the *Photo-simulations* in Attachment 7.

6) Historical and Archaeological Resources

A review of relevant historic and archaeological information was conducted to determine whether the Project area holds potential historical and/or archaeological significance.

No Historic Properties[6] previously listed or deemed eligible for the National Register of Historic Places were identified within the Area of Potential Effect ("APE" - 0.5 mile) for Direct or Visual Effects. A review of cultural resources on file with the Connecticut State Historic Preservation Office ("SHPO") revealed that no previously recorded archaeological sites have been identified on the Site or within the APE. It is evident that the Project area has been thoroughly disturbed and no intact soils remain. Thus, this area retains no potential to yield intact prehistoric or historic period cultural deposits.

Eversource submitted historic/cultural information to SHPO for agency review and

[6] The Nationwide Programmatic Agreement defines a "Historic Property" as "Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or NHO that meet the National Register criteria."

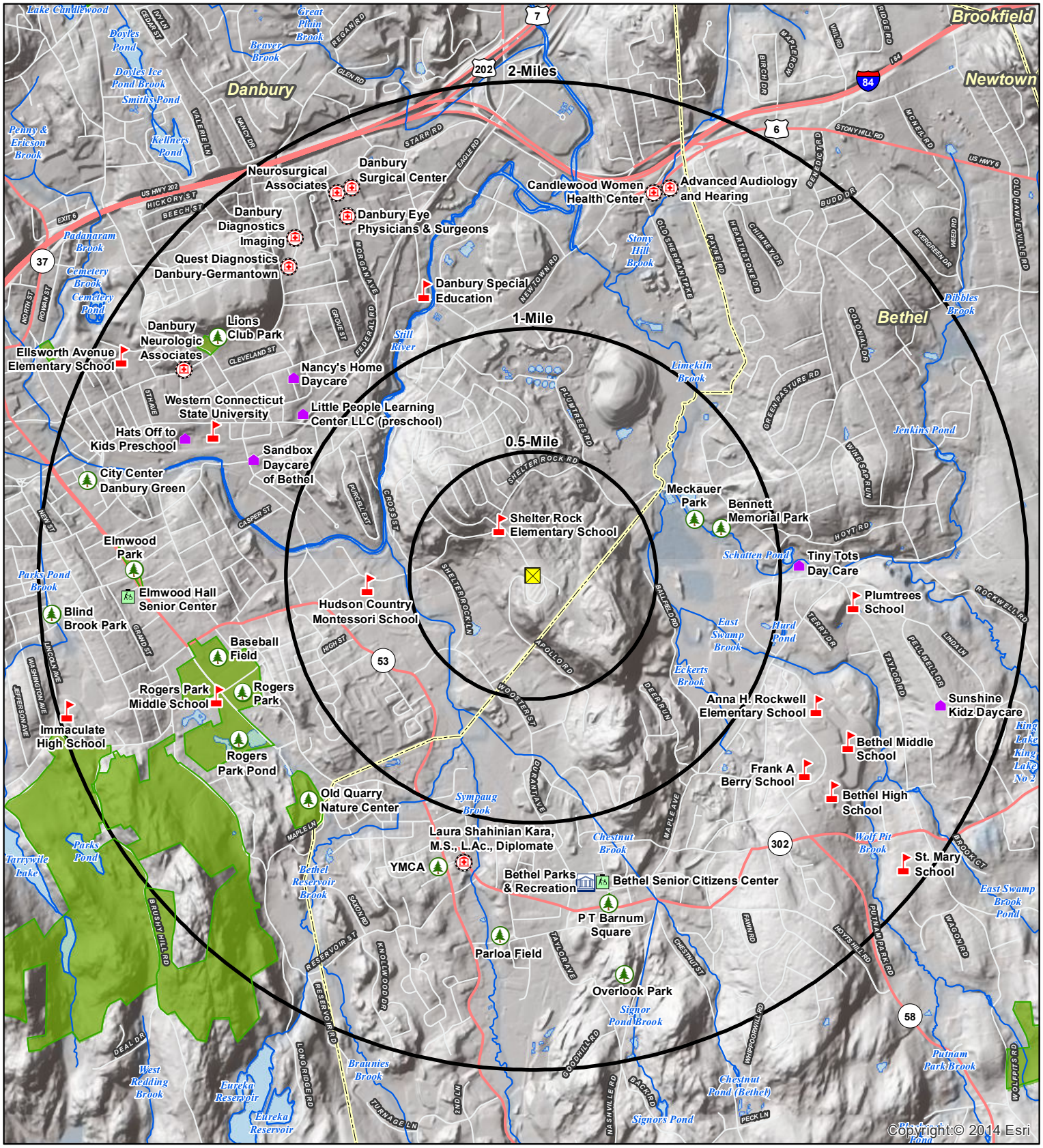
comment. The submission included a determination that the Project would have no adverse effect on historic properties. Similarly, the Project area has low archaeological potential and no additional research of the Site appears warranted prior to construction. SHPO has not responded to the Company's submission as of the date of this filing. A copy of the agency's response will be provided to the Council upon its receipt. A copy of the SHPO submission is included in Attachment 8, *SHPO Correspondence*.

7) Forests and Parks

The Site contains no publicly accessible areas of recreation or public interest administered by any federal, state, local, or private agencies. No State or locally designated scenic roads or other scenic areas are located proximate to the Site. Meckauer Park is located approximately 0.7 mile east of the Site. The locations of non-residential development and other resources within two miles of the Site are listed in Table 2 on the following page and depicted on Figure 3, *Surrounding Features Map*.

Table 2: Surrounding Features within 2 Miles of the Site

Resource Type	Name	Address	Distance from Project Area
Daycare			
	Sandbox Daycare of Bethel	44 Chestnut St, Bethel, CT	1.22 miles NW
	Tiny Tots Day Care	79 Taylor Rd, Bethel, CT	1.08 miles E
	Sunshine Kidz Daycare	30 Pell Mell Dr, Bethel, CT	1.73 miles SE
	Hats Off To Kids	190 White St, Danbury, CT	1.47 miles NW
	Nancy's Home Daycare	17 Crown St #1, Danbury, CT	1.26 miles NW
	Little People Learning Center LLC	6 Federal Rd, Danbury, CT	1.14 miles NW
Community Center			
	Bethel Parks & Recreation	1 School St, Bethel, CT	1.26 miles E
Senior Facility			
	Elmwood Hall Senior Center	10 Elmwood Place, Danbury, CT	1.64 miles W
	Bethel Senior Citizens Center	1 School St, Bethel, CT	1.26 miles E
Hospital			
	Quest Diagnostics Danbury-Germantown	7 Germantown Rd, Danbury, CT	1.60 miles NW
	Laura Shahinian Kara, M.S., L.Ac., Diplomate	268 Greenwood Avenue #200, Bethel, CT	1.19 miles S
	Advanced Audiology and Hearing	107 Newtown Rd, Danbury, CT	1.66 miles NE
	Danbury Diagnostics Imaging	20 Germantown Rd, Danbury, CT	1.67 miles NW
	Danbury Neurologic Associates	85 Osborne St, Danbury, CT	1.64 miles NW
	Candlewood Women Health Center	103 Newtown Rd, Danbury, CT	1.63 miles NE
	Danbury Surgical Center	73 Sand Pit Rd #101, Danbury, CT	1.75 miles NW
	Neurosurgical Associates	67 Sand Pit Rd #208, Danbury, CT	1.74 miles NW
	Danbury Eye Physicians & Surgeons	69 Sand Pit Rd, Danbury, CT	1.64 miles NW
School			
	St. Mary School	24 Dodgingtown Rd, Bethel, CT	1.90 miles SE
	Bethel High School	300 Whittlesey Drive, Bethel, CT	1.49 miles SE
	Bethel Middle School	600 Whittlesey Dr, Bethel, CT	1.45 miles SE
	Frank a Berry School	Bethel, CT	1.34 miles SE
	Anna H. Rockwell Elementary School	400 Whittlesey Drive, Bethel, CT	1.26 miles SE
	Rogers Park Middle School	21 Memorial Drive, Danbury, CT	1.35 miles SW
	Immaculate High School	73 Southern Blvd, Danbury, CT	1.96 miles SW
	Hudson Country Montessori School	44 A Shelter Rock Road, Danbury, CT	0.66 miles W
	Ellsworth Avenue Elementary School	7 Danbury, CT	1.88 miles NW
	Western Connecticut State University	181 White Street, Danbury, CT	1.46 miles NW
	Plumtrees School	Bethel, CT	1.31 miles E
	Shelter Rock Elementary School	2 Crows Nest Lane, Danbury, CT	0.26 miles NW
	Danbury Special Education	63 Beaver Brook Rd, Danbury, CT	1.24 miles NW
Recreational / Park			
	YMCA	57 Grassy Plain St, Bethel, CT	1.23 miles SW
	City Center Danbury Green	Danbury, CT	1.85 miles NW
	Blind Brook Park	William St, Danbury, CT	1.96 miles W
	Elmwood Park	Danbury, CT	1.62 miles W
	Rogers Park Pond	Danbury, CT	1.31 miles SW
	Parloa Field	Bethel, CT	1.44 miles S
	Overlook Park	31 Nashville Rd, Bethel, CT	1.63 miles S
	Bennett Memorial Park	14 Shelter Rock Rd, Bethel, CT	0.80 miles NE
	Meckauer Park	16 Shelter Rock Rd, Bethel, CT	0.71 miles NE
	Lions Club Park	Danbury, CT	1.71 miles NW
	Old Quarry Nature Center	Danbury, CT	1.27 miles SW
	Baseball Field	South Avenue, Danbury, CT	1.31 miles W
	Rogers Park	Danbury, CT	1.31 miles SW
	P T Barnum Square	Bethel, CT	1.35 miles S
Youth Camp			
	None located within 2 miles		



Legend

- Site
- 0.5-2-Mile Radii
- National Register of Historic Places District
- Municipal and Private Open Space
- State Forest/Park
- Open Water
- Municipal Boundary

Surrounding Features

- Community Center
- Day Care
- Health Care
- Recreation
- School
- Senior Center

N W E S

2,800 1,400 0 2,800 Feet

Base Map Source: ESRI & CTECO Shaded Relief
Map Scale:1 in = 2,800 ft Map Date: June 2017

Figure 3
Surrounding Features Map

Danbury OpenSky Installation Project
at Birchwood Condominiums
Eversource Structure No. 9950
27 Crows Nest Lane Danbury, CT

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8) Physical Environmental Effects

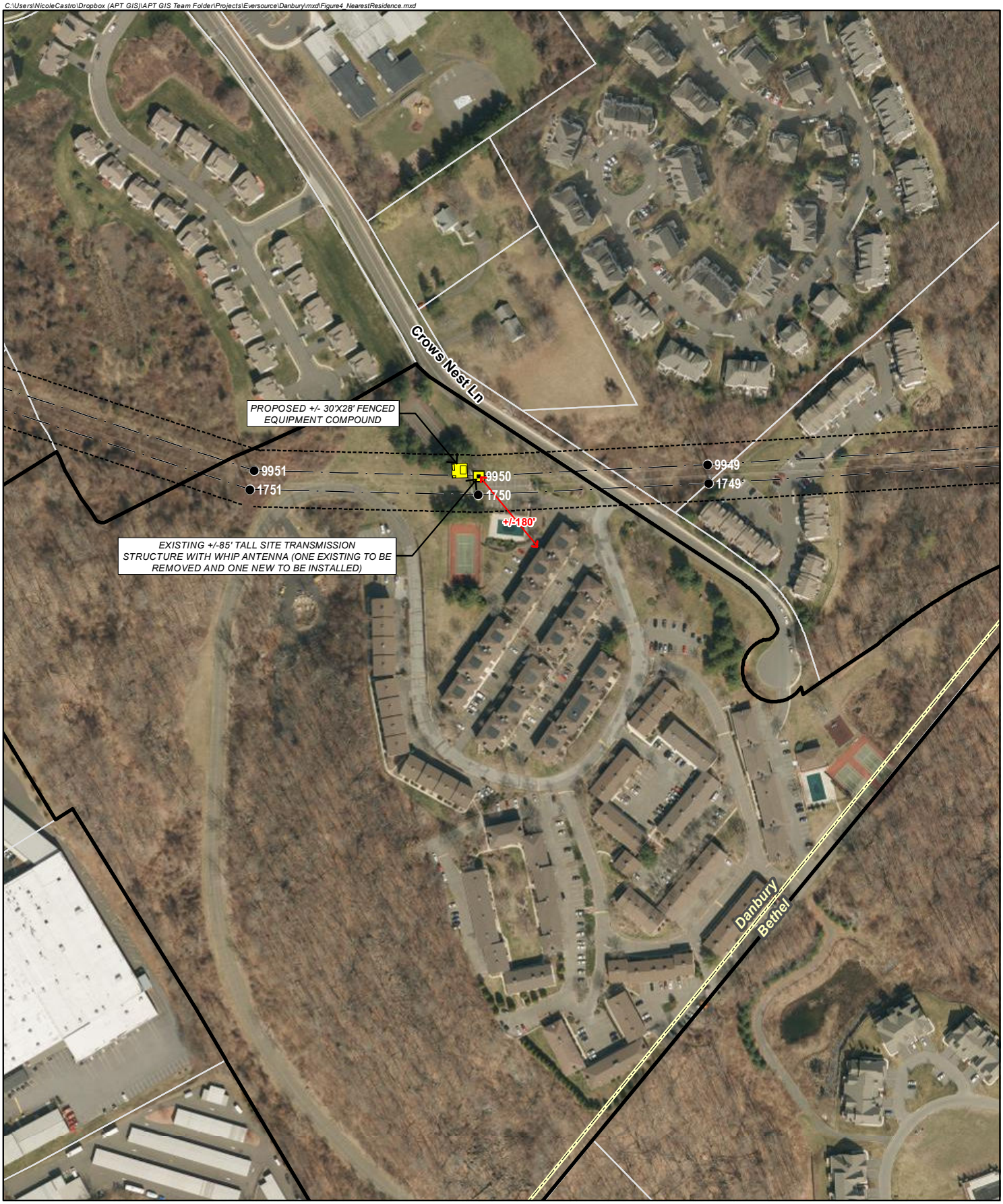
Eversource respectfully submits that the construction of the Replacement Facility associated with an existing electric transmission structure within a utility right-of-way, would not involve a significant alteration in the physical or environmental characteristics of the Site or the surrounding area. Minor ground disturbance in the form of regrading/leveling of existing topography is required for construction of the Replacement Facility but excavations would not exceed 4 feet and would take place in an area that has been previously disturbed and developed. Silt fence and straw bales would be used to minimize potential sediment transport in the event of heavy rain events during the construction phase. Vehicular access to the Site would not change or require modifications; construction of a new permanent Site access road would not be required.

9) Location of Nearest Residence

The Site is currently accessed from Crows Nest Lane, which is the main entrance to the Complex. The surrounding area is densely developed with additional condominium complexes and residential neighborhoods. The nearest residential structure to the Site is condominium Building 2 located within the Complex approximately 180 feet to the southeast. See Figure 4, *Nearest Residence*.

10) Restoration

The existing antenna and appurtenances would be removed from the electric transmission tower and replaced with one new whip antenna, coax cables and the fenced equipment compound surrounded with arborvitaes. The installation of the equipment compound, fence, shelter, emergency generator and propane tank would require minimal Site work, including shallow excavations and trenching as well as the proposed plantings of arborvitaes to provide an additional natural screen from nearby Complex recreational facilities. Disturbed areas would be restored and seeded to maintain grass lawn, similar to current conditions.



Legend

- Site
- Subject Property
- Transmission Structure
- Approximate Transmission Right-of-Way
- Approximate Transmission Line
- Proposed Equipment Compound
- Municipal Boundary
- Approximate Parcel Boundary (CTDEEP)

N W E S

250 125 0 250 Feet

Base Map: 2016 Aerial Photograph (CTECO)
Map Scale: 1 inch = 250 feet
Map Date: August 2017

Figure 4
Nearest Residence

Danbury OpenSky Installation Project
at Birchwood Condominiums
Eversource Structure No. 9950
27 Crows Nest Lane Danbury, CT

EVERSOURCE ENERGY

ALL-POINTS TECHNOLOGY CORPORATION

E Community Outreach

Eversource met with the Birchwood Condominium Association Board ("Board") in March of 2017 to review the proposed Project and listen to their concerns. The Board requested Eversource stake out the scope of work, provide a copy of the easement, and send an aerial depiction of the Project for their review, all of which was done. The Board also requested that the fence be as tall as the height of the proposed equipment shelter. Eversource agreed to this modification and changed the original height of the ±8-foot vinyl fence to ±12 feet. The selection of the actual vinyl fence to be used will be done in consultation with the Board. Additional requests that were agreed to were; (1) work hours will be modified in order to avoid morning school bus pick up schedules that take place near the Project; (2) placing conduit underground between the equipment compound and the transmission tower. One open item exists. The use of an anti-graffiti covering on the fence was requested by the Board. While anti-graffiti paints are on the market, there does not appear to be one that would accomplish the intended goal on vinyl fencing; therefore, Eversource will not use such paints unless a suitable product is made available.

F. Schedule

Provided the Council grants the requested declaratory ruling, construction of the Replacement Facility would begin in fourth quarter, extend approximately three months in duration, and be completed in first quarter 2018.

G. Conclusion

Connecticut General Statutes Section 16-50k(a) indicates that a Certificate of Environmental Compatibility and Public Need is needed for projects that the Council determines may have a "substantial adverse environmental effect." Based on the Company's evaluation of the environmental effect of the Project, Eversource respectfully submits that the installation of the Replacement Facility would not result in a substantial adverse effect on the environment or ecology, nor would it damage existing scenic, historical or recreation values.

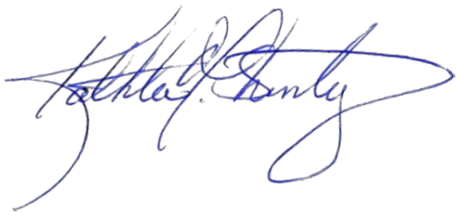
Accordingly, Eversource requests that the Council issue a declaratory ruling that no Certificate is required because the Project would not have a substantial adverse environmental effect.

H. Communications with Company

Communications regarding this Petition for a Declaratory Ruling should be directed to:

Kathleen M. Shanley
Manager – Transmission Siting
Eversource Energy
56 Prospect Street
Hartford, CT 06103
Telephone: (860) 728-4527

EVERSOURCE ENERGY by:



Kathleen M. Shanley
Manager – Transmission Siting

Attachment 1 – Project Plans

EVERSOURCE ENERGY

BIRCHWOOD CONDOMINIUMS
EVERSOURCE STRUCTURE NO. 9950
27 CROWS NEST LANE
DANBURY, CT 06810

PROJECT SUMMARY

THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:

1. ONE (1) EXISTING WHIP ANTENNA TO BE REMOVED FROM THE EXISTING 85' TALL EVERSOURCE POWER TRANSMISSION POLE AND A ONE (1) WHIP ANTENNA AND ONE (1) TTA ARE TO BE INSTALLED. REFER TO ACCOMPANYING DRAWINGS FOR SPECIFIC ANTENNA MOUNTING ELEVATIONS.
2. A FENCED EQUIPMENT COMMUNICATIONS COMPOUND TO BE CONSTRUCTED ADJACENT TO THE SUBJECT EVERSOURCE TRANSMISSION POLE. COMPOUND TO ENCLOSE AN EVERSOURCE EQUIPMENT SHELTER, A PROPANE FUELED BACKUP POWER GENERATOR AND ASSOCIATED 500 GALLON ABOVE-GROUND PROPANE TANK.
3. POWER & TELCO UTILITIES WILL BE ROUTED UNDERGROUND TO THE EVERSOURCE EQUIPMENT SHELTER FROM THEIR RESPECTIVE DEMARCS LOCATED ADJACENT TO THE EXISTING TRANSMISSION TOWER.
4. EXISTING EVERSOURCE POLE MOUNTED EQUIPMENT SHALL BE REMOVED UPON COMPLETION OF THE EVERSOURCE COMMUNICATIONS FACILITY CONSTRUCTION.

PROJECT INFORMATION

SITE NAME:	BIRCHWOOD CONDOMINIUMS
EVERSOURCE STRUCTURE NO.:	9950
SITE ADDRESS:	27 CROWS NEST LANE DANBURY, CT 06810
TOWER OWNER/APPLICANT:	EVERSOURCE 56 PROSPECT STREET HARTFORD, CT 06103
CONTACT PERSON:	STEVE FLORIO EVERSOURCE ENERGY (860) 665-5611
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-23'-26.15" N LONGITUDE: 73°-25'-2.12" W GROUND ELEVATION: 582'± AMSL SITE COORDINATES AND ELEVATION REFERENCED FROM THE CSC DATABASE.

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT STATE SUPPLEMENT, INCLUDING THE EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2016 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND "MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE EVERSOURCE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

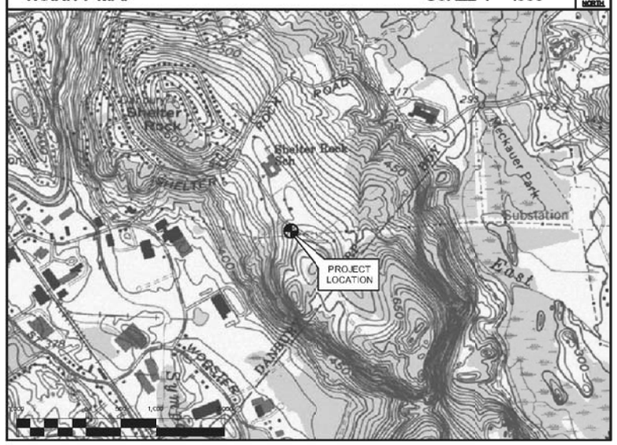
SITE DIRECTIONS

FROM: 56 PROSPECT STREET HARTFORD, CT 06103 **TO:** 27 CROWS NEST LANE DANBURY, CT 06810

1.	HEAD SOUTH ON PROSPECT ST TOWARD BOB STEELE ST	72 FT.
2.	TURN LEFT ONTO BOB STEELE ST	0.1 MI.
3.	CONTINUE ONTO GROVE ST	302 FT.
4.	KEEP LEFT AT THE FORK, FOLLOW SIGNS FOR WATERBURY/I-84 W AND MERGE ONTO I-84	0.6 MI.
5.	MERGE ONTO I-84	1.1 MI.
6.	KEEP LEFT TO STAY ON I-84	52.3 FT.
7.	TAKE EXIT 8 TO MERGE ONTO NEWTOWN RD TOWARD BETHEL	0.2 MI.
8.	MERGE ONTO NEWTOWN RD	0.2 MI.
9.	CONTINUE STRAIGHT TO STAY ON NEWTOWN RD	0.8 MI.
10.	TURN LEFT ONTO PLUMTREES RD	0.9 MI.
11.	TURN RIGHT ONTO SHELTER ROCK RD	0.6 MI.
12.	TURN LEFT ONTO CROWS NEST LN	0.3 MI.
13.	TURN RIGHT TO STAY ON CROWS NEST LN, AND DESTINATION WILL BE ON THE LEFT	0.1 MI.

VICINITY MAP

SCALE: 1" = 1000'



SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	7
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C-2	SITE DETAILS	7
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C-4	ENVIRONMENTAL NOTES	7
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E-3	ELECTRICAL SCHEMATIC DIAGRAM	7
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REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
7	7/27/17	TJL	CFC	CONSTRUCTION DRAWINGS - COMPOUND FENCE HEIGHT CHANGED
6	7/14/17	DMD	CFC	CONSTRUCTION DRAWINGS - SHEET C-4 "ENVIRONMENTAL NOTES" ADDED
5	6/28/17	TJL	CFC	CONSTRUCTION DRAWINGS - TOP OF TOWER ANTENNA ELEVATIONS ADDED
4	3/09/17	DMD	CFC	CONSTRUCTION DRAWINGS - I - I
3	3/09/17	TJL	CFC	CONSTRUCTION DRAWINGS - REVISED ANTENNA CONFIGURATION
2	11/15/16	HMR	CFC	CONSTRUCTION DRAWINGS - REVISED GENERATOR LOCATION
1	11/09/16	HMR	CFC	CONSTRUCTION DRAWINGS - I - I
0	11/08/16	HMR	CFC	CONSTRUCTION DRAWINGS - ISSUED FOR CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

EVERSOURCE ENERGY

CENTEK engineering
Centered on Solutions
(203) 488-0580
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www.CentekEng.com
63-2 North Branford Road, Branford, CT 06405

EVERSOURCE ENERGY
BIRCHWOOD CONDOMINIUMS
EVERSOURCE STRUCT. NO: 9950
27 CROWS NEST LANE
DANBURY, CT 06810

DATE: 09/28/16
SCALE: AS NOTED
JOB NO. 16144.00

TITLE SHEET

T-1

Sheet No. 1 of 16

SITE AND FOUNDATION SPECIFICATIONS

DESIGN BASIS

GOVERNING CODE/STANDARD(S): 2012 INTERNATIONAL BUILDING CODE; (IBC) AS MODIFIED BY THE 2016 CT STATE SUPPLEMENT/ASCE 7-10

RISK CATEGORY: II (ASCE 7-10 TABLE 1.5-1)

SNOW LOAD

GROUND SNOW LOAD (Pg)	30 PSF	(2016 CSBC/2016 AMENDMENT: APPENDIX 'N')
IMPORTANCE FACTOR (Is)	1.1	(ASCE 7-10 TABLE 1.5-2)
EXPOSURE FACTOR (Ce)	1.0	(ASCE 7-10 TABLE 7-2)
THERMAL FACTOR (Ct)	1.0	(ASCE 7-10 TABLE 7-3)

TRANSMISSION TOWER

WIND LOAD: PER NESC C2-2012 SECTION 25 RULE 250C (TOWER & FOUNDATION) 110 MPH (3 SECOND GUST)

SPECIAL INSPECTIONS

1. SPECIAL INSPECTIONS ARE TO BE PROVIDED BY AN APPROVED AGENCY HIRED BY EVERSOURCE. REFER TO THE STATEMENT OF SPECIAL INSPECTIONS PREPARED BY CENTEK ENGINEERING, INC. DATED 11.08.16.

GENERAL NOTES

1. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.
2. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST THE PRE MANUFACTURED EQUIPMENT BUILDING SHOP DRAWINGS.
3. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
4. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

SITE NOTES

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ACTIVE EXISTING UTILITIES, WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY, PRIOR TO PROCEEDING, SHOULD ANY UNCOVERED EXISTING UTILITY PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. ALL RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED OFF SITE AND BE LEGALLY DISPOSED, AT NO ADDITIONAL COST.
4. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE EQUIPMENT AND TOWER AREAS.
5. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
6. THE SUBGRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
7. THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.
8. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
9. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.
10. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST THE PRE MANUFACTURED EQUIPMENT BUILDING SHOP DRAWINGS.

EARTH-WORK NOTES

1. COMPACTED GRAVEL FILL SHALL BE FURNISHED AND PLACED AS A FOUNDATION FOR STRUCTURES, WHERE SHOWN ON THE CONTRACT DRAWINGS OR DIRECTED BY THE ENGINEER.
2. CRUSHED STONE FILL SHALL BE PLACED IN 12" MAX. LIFTS AND CONSOLIDATED USING A HAND OPERATED VIBRATORY PLATE COMPACTOR WITH A MINIMUM OF 2 PAQSSES OF COMPACTOR PER LIFT.
3. COMPACTED GRAVEL FILL TO BE WELL GRADED BANK RUN GRAVEL MEETING THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE DESIGNATION	% PASSING
1 ½"	100
No. 4	40-70
No. 100	5-20
No. 200	4-8

4. CRUSHED STONE TO BE UNIFORMLY GRADED, CLEAN, HARD PROCESS AGGREGATE MEETING THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE DESIGNATION	% PASSING
1"	100
¾"	90-100
½"	0-15
⅜"	0-5

5. SELECT BACKFILL FOR FOUNDATION WALLS SHALL BE FREE OF ORGANIC MATERIAL, TOPSOIL, DEBRIS AND BOULDERS LARGER THAN 6".
6. GRAVEL AND GRANULAR FILL SHALL BE INSTALLED IN 8" MAX. LIFTS. COMPACTED TO 95% MIN. AT MAX. DRY DENSITY.
7. NON WOVEN GEOTEXTILE FOR SEPARATION PURPOSES SHALL BE MIRAFI 140N, OR ENGINEER APPROVED EQUAL.

FOUNDATION CONSTRUCTION NOTES

1. ALL FOOTINGS SHALL BE PLACED ON SUITABLE, COMPACTED SOIL HAVING ADEQUATE BEARING CAPACITY AND FREE OF ORGANIC CONTENT, CLAY, OR OTHER UNSUITABLE MATERIAL. ADDITIONAL EXCAVATION MAY BE REQUIRED BELOW FOOTING ELEVATIONS INDICATED IF UNSUITABLE MATERIAL IS ENCOUNTERED.
2. SUBGRADE PREPARATION: IF UNSUITABLE SOIL IS ENCOUNTERED, REMOVE ALL UNSUITABLE MATERIALS FROM BELOW PROPOSED STRUCTURE FOUNDATIONS AND COMPACT EXPOSED SOIL SURFACES. PLACE AND COMPACT APPROVED GRAVEL FILL. PLACEMENT OF ALL COMPACTED FILL MUST BE UNDER SUPERVISION OF AN APPROVED TESTING LABORATORY. FILL SHALL BE COMPACTED IN LAYERS NOT TO EXCEED 10" BEFORE COMPACTION. DETERMINE MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D1557-70 AND MAKE ONE (1) FIELD DENSITY TEST IN ACCORDANCE WITH ASTM D2167-66 FOR EACH 50 CUBIC YARDS OF COMPACTED FILL. BUT NOT LESS THAN ONE (1) PER LAYER, TO INSURE COMPACTION TO 95% OF MAX. DRY DENSITY.
3. ALL SOIL SURROUNDING AND UNDER ALL FOOTINGS SHALL BE KEPT REASONABLY DRY AND PROTECTED FROM FREEZING AND FROST ACTION DURING THE COURSE OF CONSTRUCTION.
4. WHERE GROUNDWATER IS ENCOUNTERED, DEWATERING SHALL BE ACCOMPLISHED CONTINUOUSLY AND COMPLETELY DURING FOUNDATION CONSTRUCTION. PROVIDE CRUSHED STONE AS REQUIRED TO STABILIZE FOOTING SUBGRADE.
5. ALL FOOTINGS ARE TO REST ON FIRM SOIL, REGARDLESS OF ELEVATIONS SHOWN ON THE DRAWINGS, BUT IN NO CASE MAY FOOTING ELEVATIONS BE HIGHER THAN INDICATED ON THE FOUNDATION PLAN, UNLESS SPECIFICALLY DIRECTED BY THE ENGINEER.
6. FOUNDATION WATERPROOFING AND DAMPPROOFING SHALL COMPLY WITH BUILDING CODE REQUIREMENTS UNLESS A MORE SUBSTANTIAL SYSTEM IS INDICATED OR SPECIFIED.

CONCRETE CONSTRUCTION NOTES

1. CONCRETE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING STANDARDS:

   ACI 211 - STANDARD PRACTICE FOR SELECTING PROPORTIONS FOR NORMAL AND HEAVYWEIGHT CONCRETE.

   ACI 301 - SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS.

   ACI 302 - GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION

   ACI 304 - RECOMMENDED PRACTICE FOR MEASURING, MIXING, TRANSPORTING, AND PLACING CONCRETE.

   ACI 306.1 STANDARD SPECIFICATION FOR COLD WEATHER CONCRETING

   ACI 318 - BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.

2. CONCRETE SHALL DEVELOP COMPRESSIVE STRENGTH IN 28 DAYS AS FOLLOWS:

SLABS ON GRADE	4,000 PSI
ALL OTHER CONCRETE	3,000 PSI

   - PORTLAND CEMENT: ASTM C150, TYPE II, (540 LBS/CUBIC YARD)
   - AGGREGATE: ASTM C33, No. 67, TYPICAL
   - WATER: POTABLE WITH MAXIMUM WATER CEMENT RATIO OF .55
   - SLUMP: 3" TO 4"
   - ADMIXTURES: USE AIR ENTRAINING ADGENT CONFORMING TO ASTM C260 WITH 4 TC 6% TOTAL AIR. USE WATER REDUCING AGENT CONFORMING TO ASTM C494, TYPE A, IN ALL CONCRETE. CALCIUM CHLORIDE MAY NOT BE USED TO ACCELERATE THE CONCRETE SETTING TIME.

3. REINFORCING STEEL SHALL BE 60,000 PSI YIELD STRENGTH.
4. WELDED WIRE FABRIC SHALL CONFORM TO ASTM- A-185.
5. ALL DETAILING, FABRICATION, AND ERECTION OF REINFORCING BARS, UNLESS OTHERWISE NOTED, MUST FOLLOW THE LATEST ACI CODE AND LATEST ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES".
6. CONCRETE COVER OVER REINFORCING SHALL CONFORM TO THE FOLLOWING, UNLESS OTHERWISE SHOWN:

BOTTOM OF FOOTINGS	3 INCHES
SURFACES NOT EXPOSED TO EARTH OR WEATHER	1-1/2 INCHES

7. NO STEEL WIRE, METAL FORM TIES, OR ANY OTHER METAL SHALL REMAIN WITHIN THE REQUIRED COVER OF ANY CONCRETE SURFACE.
8. ALL REINFORCEMENT SHALL BE CONTINUOUS UNLESS OTHERWISE NOTED. SPLICES SHALL BE WELL STAGGERED. ADDITIONAL BARS AND SPECIAL BENDING DETAILS ARE REQUIRED AT INTERSECTING WALLS AND AT JOINTS. SUCH DETAILS SHALL COMPLY WITH ACI 315 RECOMMENDATIONS UNLESS OTHERWISE SHOWN.
9. NO TACK WELDING OF REINFORCING WILL BE PERMITTED.
10. NO CALCIUM CHLORIDE OR ADMIXTURES CONTAINING MORE THAN 1% CHLORIDE BY WEIGHT OF ADMIXTURE SHALL BE USED IN THE CONCRETE.
11. UNLESS OTHERWISE NOTED, ALL LAP SPLICES SHALL BE 48 BAR DIAMETERS.
12. SLAB ON GRADE FINISHES:

    EXTERIOR SLAB: NON-SLIP BROOM FINISH
    INTERIOR SLAB: STEEL TROWEL FINISH

13. INSPECTION AND TESTING OF CONCRETE WORK SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY, PAID BY THE OWNER, AND APPROVED BY THE ENGINEER. THE INSPECTOR SHALL OBSERVE CONDITION OF SOILS AND FORMWORK BEFORE FOOTINGS ARE PLACED, SIZE, SPACING AND LOCATION OF REINFORCEMENT, AND PLACEMENT OF CONCRETE.
14. THE TESTING COMPANY SHALL ALSO OBTAIN A MINIMUM OF THREE (3) COMPRESSIVE STRENGTH TEST SPECIMENS FOR EACH CONCRETE MIX DESIGN. ONE SPECIMEN TESTED AT 7 DAYS, ONE AT 28 DAYS, AND ONE HELD IN RESERVE FOR FUTURE TESTING, IF NEEDED.
15. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD).
2. MATERIAL SPECIFICATIONS

   A. STRUCTURAL STEEL (W SHAPES)----ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)----ASTM A36 (FY = 36 KSI).
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)----ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)----ASTM A500 GRADE B,(FY = 42 KSI)
   E. PIPE----ASTM A53 GRADE B (FY = 35 KSI)

3. FASTENER SPECIFICATIONS

   A. CONNECTION BOLTS---ASTM A325-N, UNLESS OTHERWISE SCHEDULED.
   B. U-BOLTS---ASTM A307
   C. ANCHOR RODS----ASTM F1554
   D. WELDING ELECTRODES----ASTM E70XX FOR A36 & A572_GR50 STEELS, ASTM E80XX FOR A572_GR65 STEEL.

4. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
5. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
6. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
7. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
8. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
9. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
10. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
11. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
12. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING THE SCHEDULED ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN. PROVIDE THE MINIMUM SIZE PER TABLET J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.
13. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
14. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
15. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
16. LOCK WASHER ARE NOT PERMITTED FOR A325 BOLTED STEEL ASSEMBLIES.
17. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
18. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
19. FABRICATE BEAMS WITH MILL CAMBER UP.
20. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
21. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
7	7/27/17	TJL	CFC	CONSTRUCTION DRAWINGS - COMPOUND FENCE HEIGHT CHANGED
6	7/14/17	DMD	CFC	CONSTRUCTION DRAWINGS - SHEET C-4 "ENVIRONMENTAL NOTES" ADDED
5	6/28/17	DMD	CFC	CONSTRUCTION DRAWINGS - TOP OF TOWER ANTENNA ELEVATIONS ADDED
4	3/09/17	TJL	CFC	CONSTRUCTION DRAWINGS - REVISED ANTENNA CONFIGURATION
3	11/15/16	HMR	CFC	CONSTRUCTION DRAWINGS - REVISED GENERATOR LOCATION
2	11/09/16	HMR	CFC	CONSTRUCTION DRAWINGS
1	11/09/16	HMR	CFC	CONSTRUCTION DRAWINGS
0	11/08/16	HMR	CFC	CONSTRUCTION DRAWINGS - ISSUED FOR CLIENT REVIEW

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EVERSOURCE ENERGY

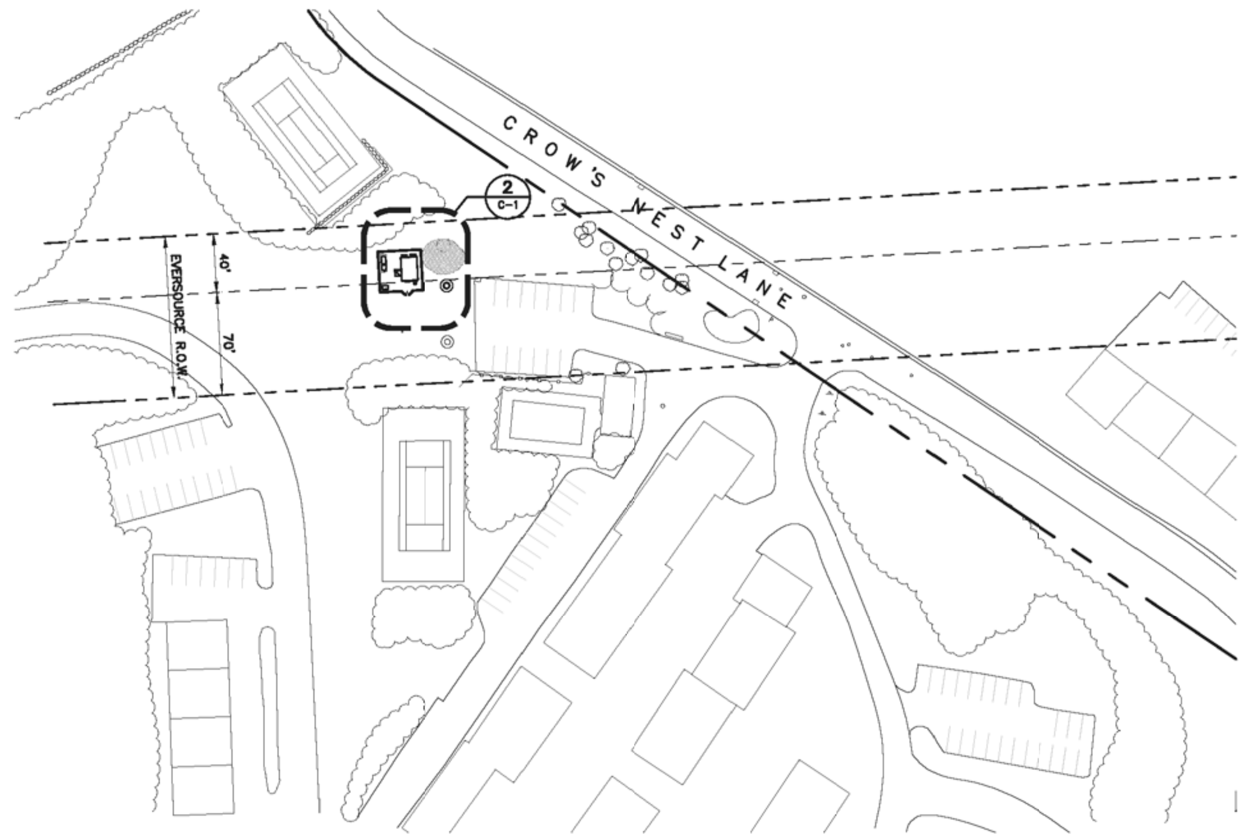
BIRCHWOOD CONDOMINIUMS
EVERSOURCE STRUCT. NO: 9950
27 CROWS NEST LANE
DANBURY, CT 06810

DATE: 09/28/16
SCALE: AS NOTED
JOB NO. 16144.00

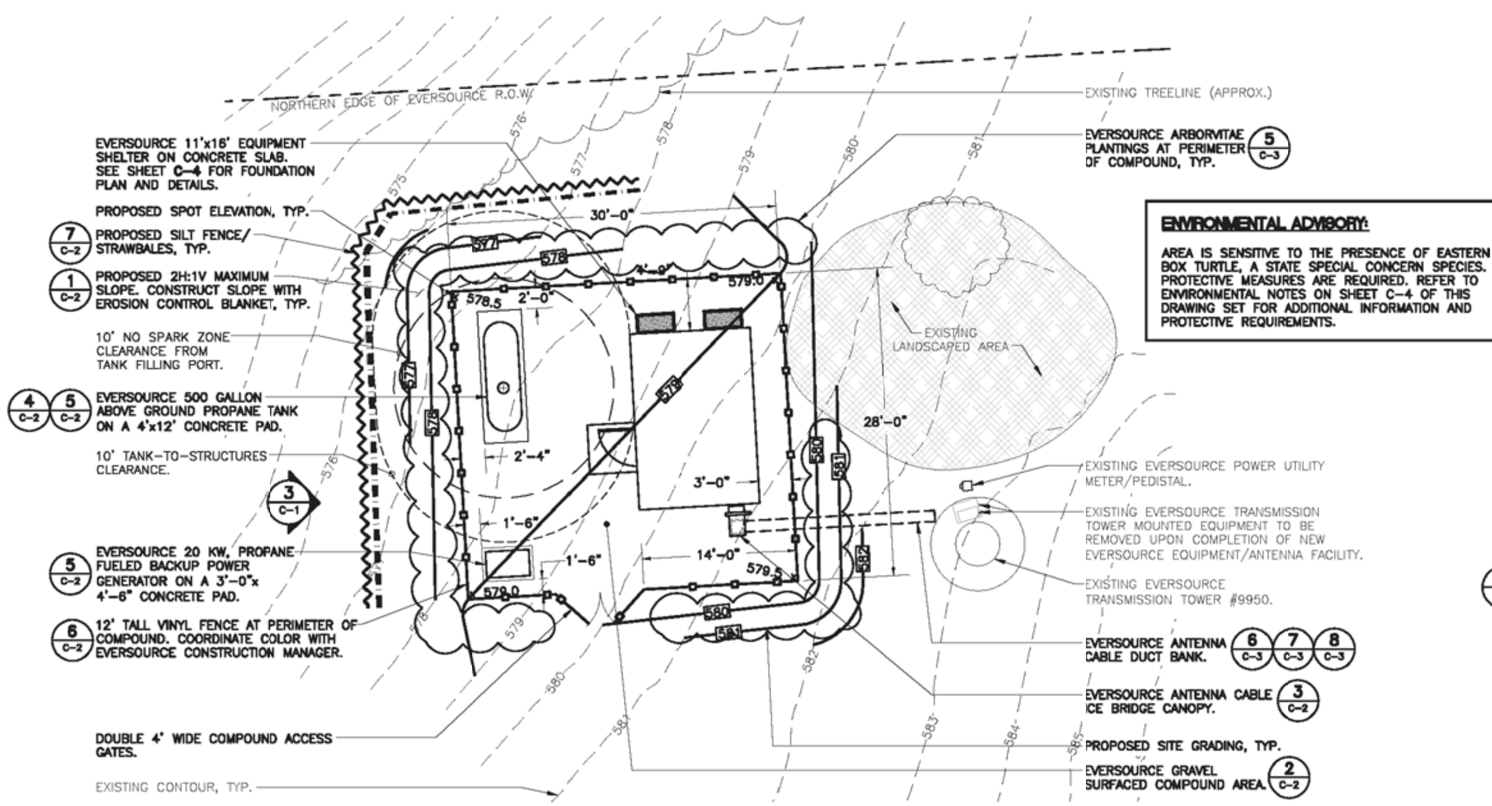
DESIGN BASIS AND STRUCTURAL SPECIFICATIONS

N-1

Sheet No. 2 of 16



1 C-1 **SITE LOCATION PLAN**
SCALE: 1" = 60'
TRUE NORTH

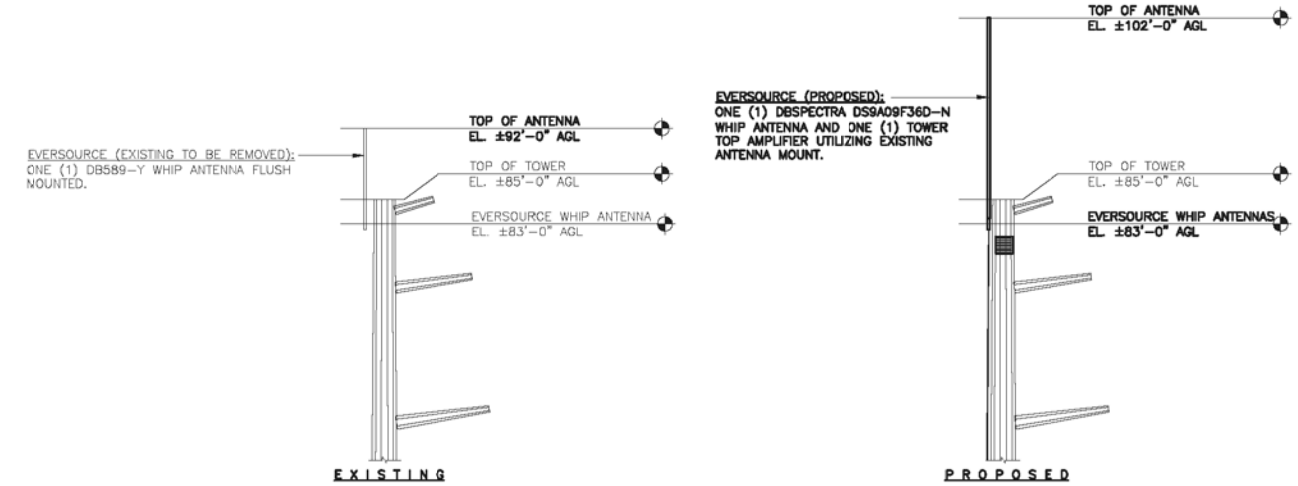


ENVIRONMENTAL ADVISORY:

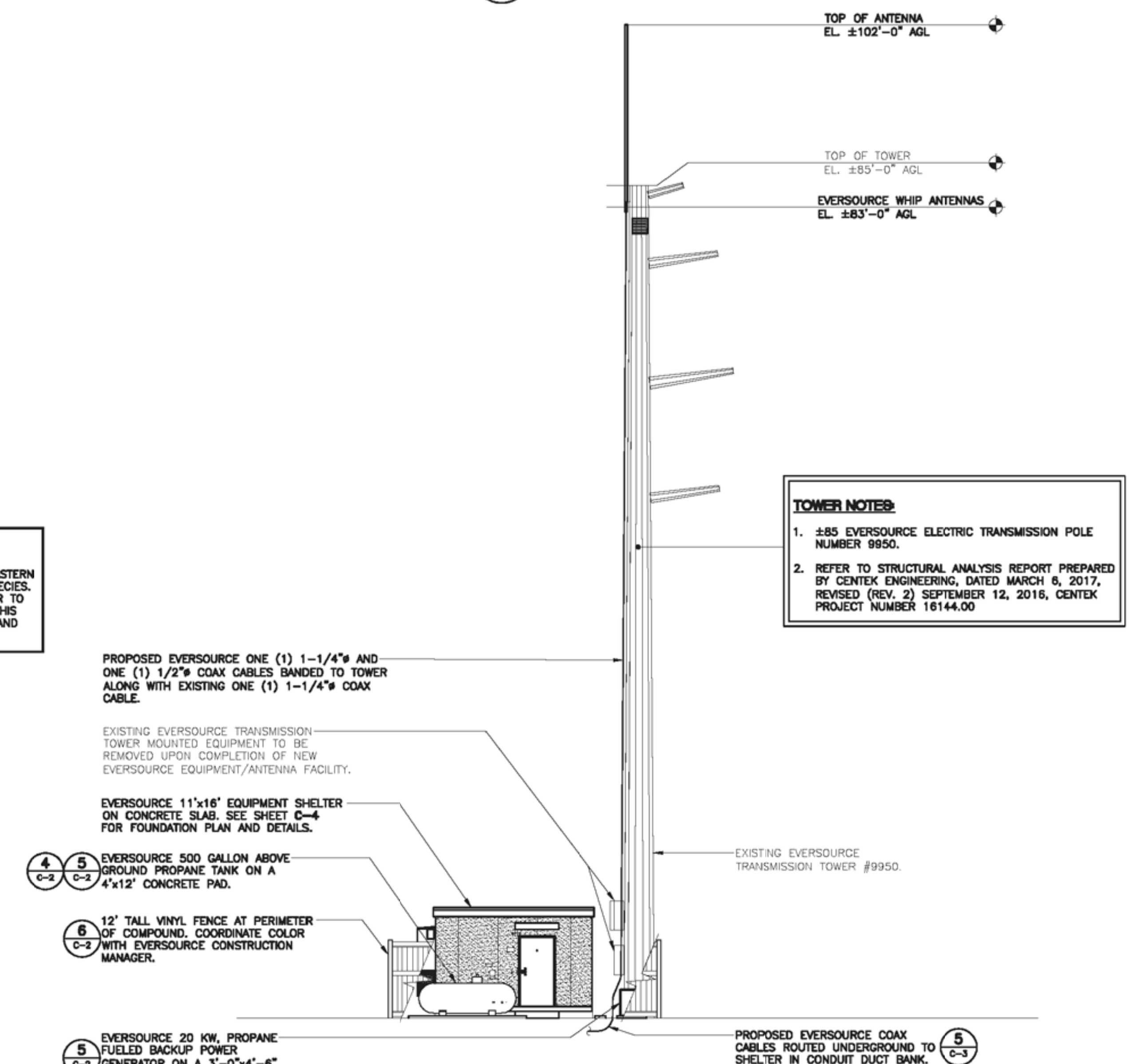
AREA IS SENSITIVE TO THE PRESENCE OF EASTERN BOX TURTLE, A STATE SPECIAL CONCERN SPECIES. PROTECTIVE MEASURES ARE REQUIRED. REFER TO ENVIRONMENTAL NOTES ON SHEET C-4 OF THIS DRAWING SET FOR ADDITIONAL INFORMATION AND PROTECTIVE REQUIREMENTS.

2 C-1 **COMPOUND PLAN**
SCALE: 1/8" = 1'- 0"
TRUE NORTH

GRAPHIC SCALE
(IN FEET)
1 inch = 8 ft.



3A C-1 **ANTENNA CONFIGURATIONS**
NOT TO SCALE



TOWER NOTES:

1. ±85 EVERSOURCE ELECTRIC TRANSMISSION POLE NUMBER 9950.
2. REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, DATED MARCH 6, 2017, REVISED (REV. 2) SEPTEMBER 12, 2016, CENTEK PROJECT NUMBER 16144.00

3 C-1 **WEST ELEVATION - PROPOSED**
SCALE: 1/8" = 1'- 0"

GRAPHIC SCALE
(IN FEET)
1 inch = 8 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
7	7/27/17	TJL	CFC	CONSTRUCTION DRAWINGS - COMPOUND FENCE HEIGHT CHNAGED
6	7/14/17	DMD	CFC	CONSTRUCTION DRAWINGS - SHEET C-4 "ENVIRONMENTAL NOTES" ADDED
5	6/26/17	TJL	CFC	CONSTRUCTION DRAWINGS - TOP OF TOWER ANTENNA ELEVATIONS ADDED
4	4/06/17	DMD	CFC	CONSTRUCTION DRAWINGS - UG CABLE DUCT BANK & PLANTINGS ADDED
3	3/09/17	TJL	CFC	CONSTRUCTION DRAWINGS - REVISED ANTENNA CONFIGURATION
2	11/15/16	HMR	CFC	CONSTRUCTION DRAWINGS - REVISED GENERATOR LOCATION
1	11/09/16	HMR	CFC	CONSTRUCTION DRAWINGS
0	11/08/16	HMR	CFC	CONSTRUCTION DRAWINGS - ISSUED FOR CLIENT REVIEW

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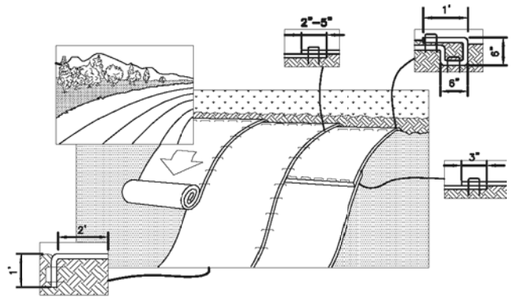
SCALE:	AS NOTED
JOB NO.	16144.00

SITE PLANS, ELEVATION AND ANTENNA CONFIG.

C-1

Sheet No. 3 of 16

EROSION CONTROL BLANKET STABILIZATION



1 C–2 **TYPICAL EROSION MAT INSTALLATION ON SLOPE**
NOT TO SCALE

STABILIZATION CRITERIA

1. CONTRACTOR SHALL IMPLEMENT EROSION CONTROL BLANKET SLOPE STABILIZATION & SWALE CONSTRUCTION WHEN STABLE EARTH CUTS ARE PREVALENT (IN LOCATIONS WITHOUT LEDGE OR LARGE AMOUNTS OF SUBGRADE ROCK)

STABILIZATION PRODUCT SPECIFICATION

NORTH AMERICAN GREEN, PRODUCT NUMBER S150BN, 12 MONTH BIODEGARDABLE.

EROSION MAT ON SLOPES

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.

   NOTE: WHEN USING CELL–O–SEED DO NOT SEED PREPARED AREA. CELL–O–SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.

2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" DEEP BY 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UP–SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLE/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE BLANKET.

3. ROLL THE BLANKET DOWN OR HORIZONTALLY ACROSS THE SLOPE. BLANKET WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL ROLLED EROSION CONTROL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM[TM], STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.

4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY A 2"–5" OVERLAP DEPENDING ON BLANKET TYPE.

5. CONSECUTIVE ROLLED EROSION CONTROL BLANKET SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE BLANKET WIDTH.

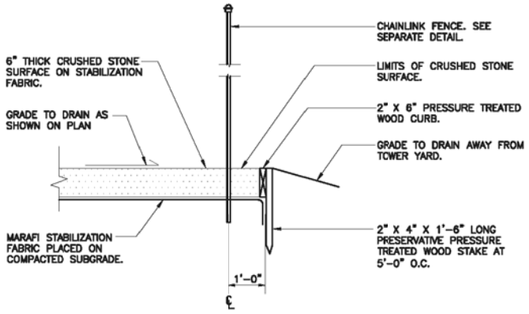
   * IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY SECURE THE BLANKET.

6. THE EDGE OF THE BLANKET IS TO EXTEND A MINIMUM 24 INCHES BEYOND THE TOE OF THE SLOPE AND ANCHORED BY PLACING THE STAPLES/STAKES IN A 12 INCH DEEP x 6 INCH WIDE ANCHOR TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12 INCH APART IN THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING (STONE OR SOIL MAY BE USED AS BACKFILL).

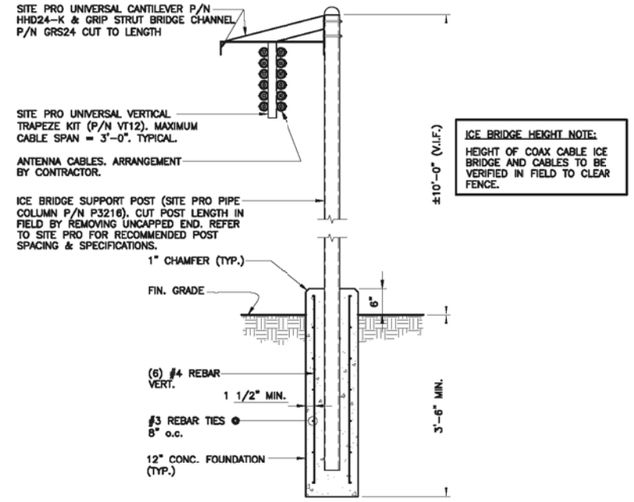
7. REFER TO MANUFACTURERS STAPLE GUIDE FOR CORRECT STAPLE PATTERN. MINIMUN 4 SPIKES PER ONE SQ. FT.

MAINTENANCE

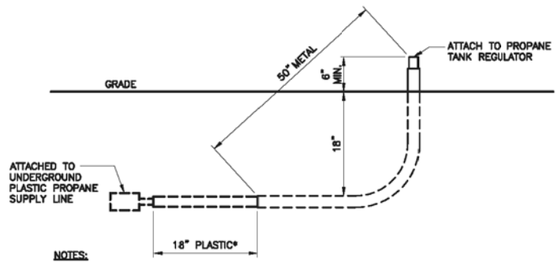
THE CONTRACTOR SHALL MAINTAIN THE BLANKET UNTIL ALL WORK ON THE CONTRACT HAS BEEN COMPLETED AND ACCEPTED. MAINTENANCE SHALL CONSIST OF THE REPAIR OF AREAS WHERE DAMAGED BY ANY CAUSE. ALL DAMAGED AREAS SHALL BE REPAIRED TO RE–ESTABLISH THE CONDITIONS AND GRADE OF THE SOIL PRIOR TO APPLICATION OF THE COVERING AND SHALL BE REFERTILIZED, RESEEDED, AND REMULCHED AS DIRECTED.



2 C–2 **COMPOUND SURFACING DETAIL**
NOT TO SCALE



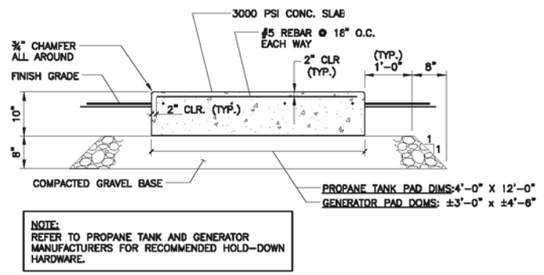
3 C–2 **ICE BRIDGE CANOPY DETAIL**
NOT TO SCALE



NOTES:

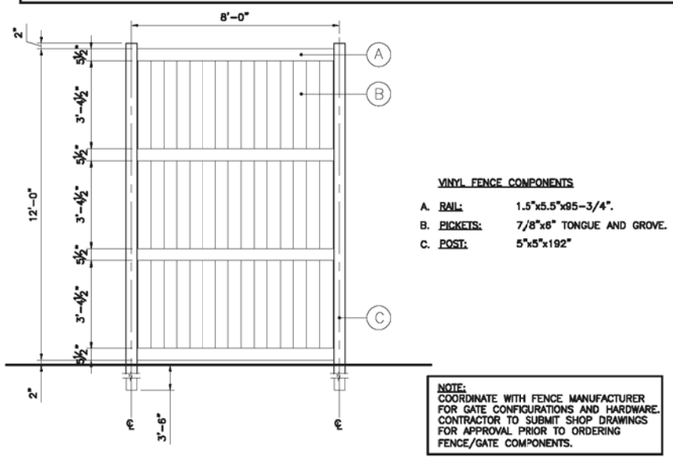
1. *PLASTIC PROPANE SUPPLY LINE MUST BE PROTECTED WITH CONDUIT IF IT CAN NOT BE BURIED 18" OR MORE DEEP WITH SAND TO PROTECT IT (AT LEAST 1" OF SAND AROUND THE PIPE REQUIRED FOR PLASTIC)
2. POLYETHYLENE PIPE AND TUBING AND THERMOPLASTIC COMPRESSION–TYPE MECHANICAL FITTINGS SHALL BE INSTALLED OUTSIDE UNDERGROUND WITH A MINIMUM 18 IN. (460mm) OF COVER. THE COVER SHALL BE PERMITTED TO BE REDUCED TO 12 IN. (300mm) IF EXTERNAL DAMAGE TO THE PIPE OR TUBING IS NOT LIKELY TO RESULT. IF A MINIMUM OF 12 IN. (300mm) OF COVER CANNOT BE MAINTAINED, THE PIPING SHALL BE INSTALLED IN CONDUIT OR BRIDGED (SHIELDED). UNDERGROUND POLYETHYLENE PIPING SYSTEMS SHALL REQUIRE ASSEMBLED ANODELESS RISERS TO TERMINATE ABOVE GROUND. THE HORIZONTAL PORTION OF RISERS SHALL BE BURIED AT LEAST 12 IN. (300mm) BELOW GRADE AND THE CASING MATERIAL USED FOR THE RISERS SHALL BE PROTECTED AGAINST CORROSION.

4 C–2 **PROPANE SUPPLY LINE DETAIL**
SCALE: 1" = 1'– 0"



NOTE:
REFER TO PROPANE TANK AND GENERATOR MANUFACTURERS FOR RECOMMENDED HOLD–DOWN HARDWARE.

5 C–2 **PROPANE TANK/ GENERATOR PAD DETAIL**
NOT TO SCALE

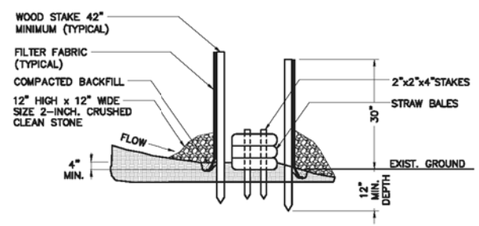


VINYL FENCE COMPONENTS

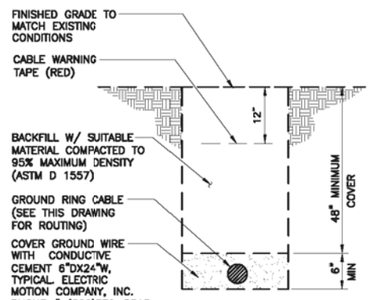
A.	RAIL:	1.5"x5.5"x95–3/4".
B.	PICKETS:	7/8"x6" TONGUE AND GROVE.
C.	POST:	5"x5"x192"

NOTE:
COORDINATE WITH FENCE MANUFACTURER FOR GATE CONFIGURATIONS AND HARDWARE. CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR APPROVAL PRIOR TO ORDERING FENCE/GATE COMPONENTS.

6 C–2 **TYPICAL VINYL FENCE DETAIL**
NOT TO SCALE



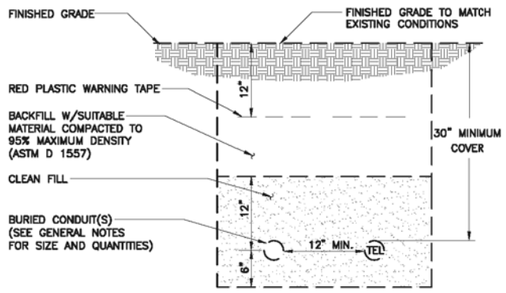
7 C–2 **SILTATION FENCE/STRAW BALE SILTATION FENCE "SANDWICH" EROSION CONTROL**
NOT TO SCALE



NOTES:

1. BACK FILL SHALL NOT CONTAIN ASHES, CINDERS, SHELLS, FROZEN MATERIAL, LOOSE DEBRIS OR STONES LARGER THAN 2" IN MAXIMUM DIMENSION.
2. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.

8 C–2 **TYPICAL BURIAL GROUND CABLE DETAIL**
NOT TO SCALE



NOTES:

1. THE CLEAN FILL SHALL PASS THROUGH A 3/8" MESH SCREEN AND SHALL NOT CONTAIN SHARP STONES. OTHER BACKFILL SHALL NOT CONTAIN ASHES, CINDERS, SHELLS, FROZEN MATERIAL, LOOSE DEBRIS OR STONES LARGER THAN 2" IN MAXIMUM DIMENSION.
2. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.

9 C–2 **TYPICAL ELECTRICAL/TEL TRENCH DETAIL**
NOT TO SCALE

REV.	DATE	DRAWN BY	CH'K'D BY	DESCRIPTION
7	7/27/17	TJL	CFC	CONSTRUCTION DRAWINGS – COMPOUND FENCE HEIGHT CHNAGED
6	7/14/17	DMD	CFC	CONSTRUCTION DRAWINGS – SHEET C–4 "ENVIRONMENTAL NOTES" ADDED
5	6/08/17	TJL	CFC	CONSTRUCTION DRAWINGS – TOP OF TOWER ANTENNA ELEVATIONS ADDED
4	3/09/17	TJL	CFC	CONSTRUCTION DRAWINGS – REVISED ANTENNA CONFIGURATION
3	11/15/16	HMR	CFC	CONSTRUCTION DRAWINGS – REVISED GENERATOR LOCATION
2	11/09/16	HMR	CFC	CONSTRUCTION DRAWINGS
1	11/09/16	HMR	CFC	CONSTRUCTION DRAWINGS
0	11/08/16	DMD	CFC	CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW

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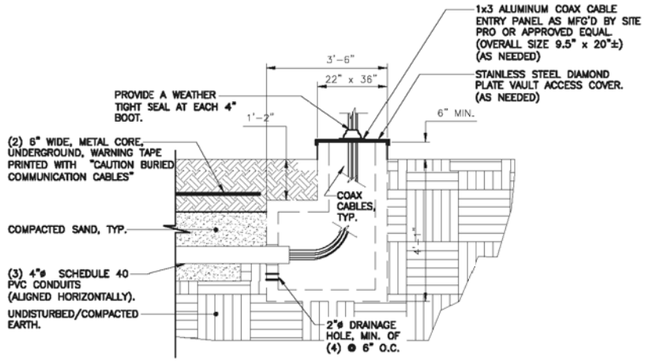
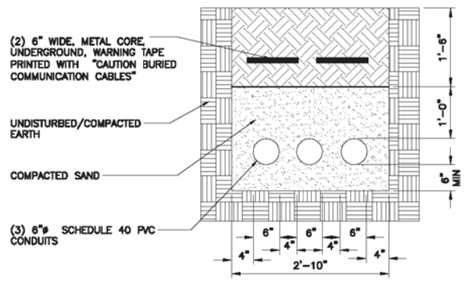
SITE DETAILS

C–2

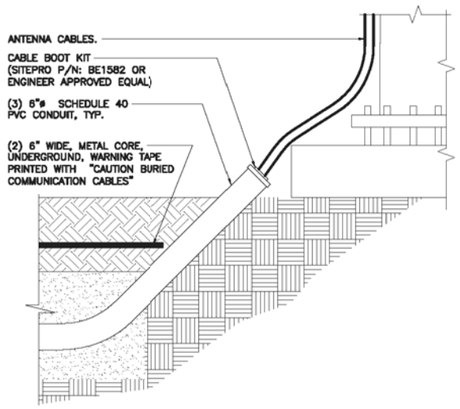
Sheet No. 4 of 16



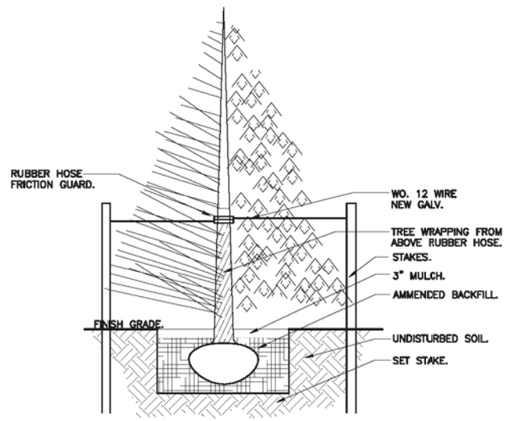
6 C-3 **TYP. ANTENNA CABLE DUCT BANK VAULT SECTION**
SCALE: 1/2" = 1'- 0" ADJACENT TO EQUIPMENT SHELTER



7 C-3 **TYP. COAX DUCT BANK SECTION**
NOT TO SCALE



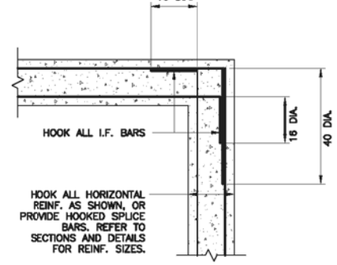
8 C-3 **TYP. CONDUIT RISER AT POLE**
NOT TO SCALE



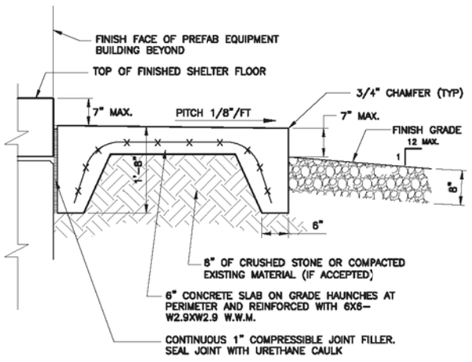
TREE & SHRUB PLANTING SPECIFICATIONS:

1. GUY WIRES (WO.12 NEW GALV.) SHALL BE REQUIRED FOR ALL TREES 3 GAL. AND LARGER.
2. SOIL MIX SHALL CONSIST OF: 3 PARTS TOP SOIL, 3 PART PEAT MOSS, 10 ONE PART COMPOSTED COW MANURE, AND 1 OZ. SOIL MOIST PER EVERY 12 IN. OF LINEAR DIM. OF ROOT BALL. COVER WITH LANDSCAPE FABRIC, AND A MINIMUM OF 3" CEDAR MULCH.
3. TREES 6' AND OVER SHALL BE STAKED WITH 2 OAK STAKES 2" X 2" X 6' AND GUY WIRE TO STAKES.
4. ALL TREES AND SHRUBS MUST MEET OR EXCEED STANDARDS SET BY THE NATIONAL ASSOCIATION OF NURSERYMEN, YEAR OF LATEST REVISION.

5 C-3 **TYPICAL TREE PLANTING DETAIL**
NOT TO SCALE



3 C-3 **FOUNDATION WALL REBAR OVERLAP PLAN**
NOT TO SCALE



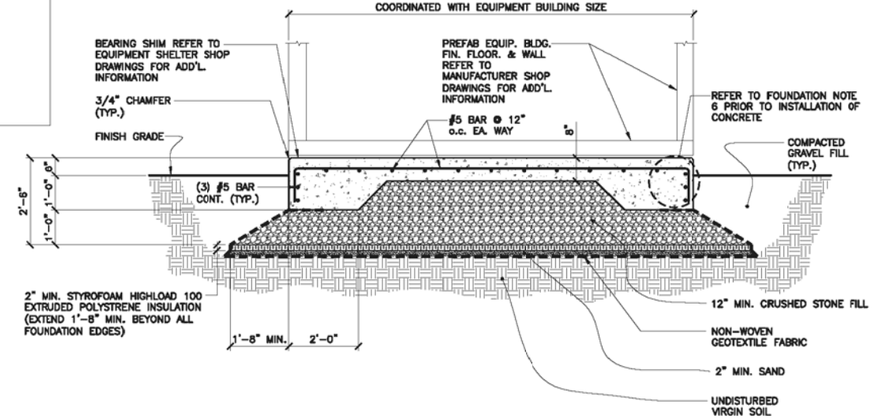
4 C-3 **ENTRY STOOP DETAIL - SECTION**
SCALE: 3/16"=1'-0"

FOUNDATION PLAN NOTES:

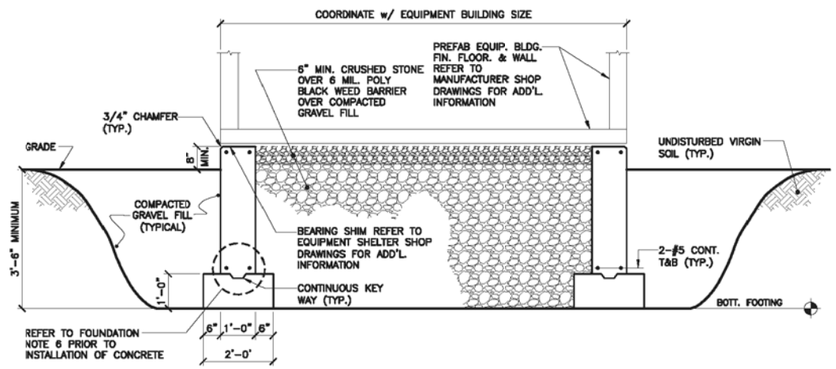
1. B/FTG. ELEVATION AT 3'-6" MINIMUM BELOW FINISHED GRADE, (TYP)
2. BEARING SHIMS, TIE-DOWN PLATES AND ASSOCIATED INSTALLATION ANCHORS PROVIDED BY CELLXION. CONTRACTOR SHALL VERIFY ALL SHIM & TIE-DOWN QUANTITIES AND LOCATIONS WITH CELLXION PRIOR TO PERFORMING FOUNDATION WORK.
3. SLAB/ TOP OF WALL TOLERANCE IS 1/4"±
4. TOP 8" OF FOUNDATION SIDES MUST BE FORMED FLAT TO ACCEPT TIE-DOWN PLATES.
5. REFER TO NOTES ON DWG. S-2 FOR ADDITIONAL REQUIREMENTS.
6. PER NEC REQUIREMENTS, THE REBAR IN FOUNDATION AND FOOTING SHALL BE BONDED TO GROUND RING WITH A #2 AWG SOLID CONDUCTOR USING LISTED AND APPROVED METHODS.
7. PROVIDE PVC SLEEVES FOR UTILITY CONDUIT PASSAGE THROUGH FOUNDATION OR CAST CONDUITS IN PLACE. REFER TO ELECTRICAL DRAWINGS FOR CONDUIT SIZES AND QUANTITIES.

VERIFY ALL SHELTER DIMENSIONS, EQUIPMENT DIMENSIONS, EQUIPMENT LOCATIONS AND UTILITY OPENINGS WITH BUILDING SHOP DRAWINGS PRIOR TO COMMENCEMENT OF WORK.

SLAB ON GRADE FOUNDATION DESIGN CONFORMS TO THE REQUIREMENTS OF THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE SUPPLEMENT SECTION 1809.5 'FROST PROTECTION' AND SEI/ASCE STANDARD 32-01 SECTION 7.1 'SLAB ON GRADE CONSTRUCTION'.



1 C-3 **FOUNDATION PLAN SLAB ON GRADE (OPTION A)**
SCALE: 1/2"=1'-0"



2 C-3 **FOUNDATION WALL WITH FOOTING (OPTION B)**
SCALE: 1/2"=1'-0"

REV.	DATE	DRAWN BY	CH'D BY	DESCRIPTION
7	7/27/17	TJL	CFC	CONSTRUCTION DRAWINGS – COMPOUND FENCE HEIGHT CHNAGED
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5	6/28/17	TJL	CFC	CONSTRUCTION DRAWINGS – TOP OF TOWER ANTENNA ELEVATIONS ADDED
4	3/09/17	DMD	CFC	CONSTRUCTION DRAWINGS – REVISED ANTENNA CONFIGURATION
3	3/09/17	TJL	CFC	CONSTRUCTION DRAWINGS – REVISED GENERATOR LOCATION
2	11/15/16	HMR	CFC	CONSTRUCTION DRAWINGS
1	11/09/16	HMR	CFC	CONSTRUCTION DRAWINGS
0	11/08/16	DMD	CFC	CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW

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SHELTER FOUNDATION PLAN AND SITE DETAILS

C-3

Sheet No. 5 of 16

ENVIRONMENTAL NOTES

EASTERN BOX TURTLE PROTECTION PROGRAM

EASTERN BOX TURTLE (TERRAPENE CAROLINA), A STATE SPECIAL CONCERN SPECIES AFFORDED PROTECTION UNDER THE CONNECTICUT ENDANGERED SPECIES ACT, IS KNOWN TO OCCUR WITHIN THE VICINITY OF THE SITE. THE FOLLOWING RARE SPECIES PROTECTIVE MEASURES SATISFY REQUIREMENTS FROM THE CONNECTICUT DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION ("CTDEEP") WILDLIFE DIVISION'S JUNE 26, 2017 NDDB DETERMINATION LETTER (NO. 201705107) AND FOLLOWS PROTOCOLS DEVELOPED FROM PREVIOUS RARE SPECIES CONSULTATIONS AND STATE-APPROVED PROTECTION PLANS. THE PROTECTION PLAN IS VALID FOR TWO YEARS FROM THE DATE OF CTDEEP'S LETTER, AT WHICH POINT IF CONSTRUCTION HAS NOT BEEN INITIATED, A NEW NATURAL DIVERSITY DATA BASE REVIEW REQUEST FROM CTDEEP IS REQUIRED.

IT IS OF THE UTMOST IMPORTANCE THAT THE CONTRACTOR COMPLIES WITH THE REQUIREMENT FOR IMPLEMENTATION OF THESE PROTECTIVE MEASURES AND THE EDUCATION OF ITS EMPLOYEES AND SUBCONTRACTORS PERFORMING WORK ON THE PROJECT SITE IF WORK WILL OCCUR DURING THE EASTERN BOX TURTLE'S ACTIVE PERIOD (APRIL 1st TO SEPTEMBER 30th). THE MONTH OF JUNE IS PARTICULARLY SENSITIVE WHEN TURTLES ARE ACTIVE SELECTING NESTING SITES. EVERSOURCE ENERGY ("EVERSOURCE") WILL ASSIGN A QUALIFIED HERPETOLOGIST OR BIOLOGIST EXPERIENCED IN EASTERN BOX TURTLE IDENTIFICATION AND IMPLEMENTATION OF CONSTRUCTION PROTECTION MEASURES (IDENTIFIED HEREIN AFTER AS THE ENVIRONMENTAL MONITOR) FOR THIS PROJECT TO ENSURE THAT EASTERN BOX TURTLE PROTECTION MEASURES ARE IMPLEMENTED PROPERLY.

THE PROPOSED EASTERN BOX TURTLE SPECIES PROTECTION PROGRAM CONSISTS OF SEVERAL COMPONENTS: EDUCATION OF ALL CONTRACTORS AND SUB-CONTRACTORS PRIOR TO INITIATION OF WORK ON THE SITE; PROTECTIVE MEASURES; PERIODIC INSPECTION OF THE CONSTRUCTION PROJECT; AND, REPORTING.

1. ISOLATION MEASURES & SEDIMENTATION AND EROSION CONTROLS

   a. INSTALLATION OF SEDIMENTATION AND EROSION CONTROLS, REQUIRED FOR EROSION CONTROL COMPLIANCE AND CREATION OF A BARRIER TO POSSIBLE MIGRATING/DISPERSING TURTLES ("EXCLUSIONARY FENCING"), SHALL BE PERFORMED BY THE CONTRACTOR PRIOR TO ANY EARTHWORK. EXCLUSIONARY FENCING MUST BE AT LEAST 20 INCHES TALL AND MUST BE SECURED TO AND REMAIN IN CONTACT TO THE GROUND AND BE REGULARLY MAINTAINED TO SECURE ANY GAPS OR OPENINGS AT GROUND LEVEL THAT MAY LET ANIMAL PASS THROUGH.

   b. THE INTENT OF THE EXCLUSIONARY FENCING IS TO SEGREGATE THE WORK ZONE'S LIMIT OF DISTURBANCE AND ISOLATE IT FROM FORAGING/MIGRATING/DISPERSING TURTLES, SNAKES AND OTHER HERPETOFAUNA. OFTENTIMES COMPLETE ISOLATION OF A WORK ZONE MAY NOT BE FEASIBLE DUE TO ACCESSIBILITY NEEDS AND LOCATIONS OF STAGING/MATERIAL STORAGE AREAS, ETC. IN THOSE INSTANCES, THE EXCLUSIONARY FENCING WILL BE POSITIONED TO DEFLECT MIGRATING/DISPERSAL ROUTES AWAY FROM THE WORK ZONE TO MINIMIZE POTENTIAL ENCOUNTERS WITH TURTLES, SNAKES AND OTHER HERPETOFAUNA.

   c. THE ENVIRONMENTAL MONITOR WILL INSPECT THE WORK ZONE AREA PRIOR TO AND FOLLOWING EROSION CONTROL BARRIER INSTALLATION TO ENSURE THE AREA IS FREE OF EASTERN BOX TURTLE AND DOCUMENT EXCLUSIONARY FENCING HAS BEEN SATISFACTORILY INSTALLED.

   d. PLASTIC NETTING USED IN A VARIETY OF EROSION CONTROL PRODUCTS (I.E., EROSION CONTROL BLANKETS, FIBER ROLLS [WATTLES], REINFORCED SILT FENCE) HAS BEEN FOUND TO ENTANGLE WILDLIFE, INCLUDING REPTILES, AMPHIBIANS, BIRDS AND SMALL MAMMALS, BUT PARTICULARLY SNAKES. NO PERMANENT EROSION CONTROL PRODUCTS OR REINFORCED SILT FENCE WILL BE USED ON THE EVERSOURCE PROJECT. TEMPORARY EROSION CONTROL PRODUCTS WILL USE EITHER EROSION CONTROL BLANKETS AND FIBER ROLLS COMPOSED OF PROCESSED FIBERS MECHANICALLY BOUND TOGETHER TO FORM A CONTINUOUS MATRIX (NETLESS) OR NETTING COMPOSED OF PLANAR WOVEN NATURAL BIODEGRADABLE FIBER TO AVOID/MINIMIZE WILDLIFE ENTANGLEMENT.

   e. THE CONTRACTOR IS RESPONSIBLE FOR DAILY INSPECTIONS OF THE SEDIMENTATION AND ERCSION CONTROLS FOR TEARS OR BREECHES AND ACCUMULATION LEVELS OF SEDIMENT, PARTICULARLY FOLLOWING STORM EVENTS THAT GENERATE A DISCHARGE. THE ENVIRONMENTAL MONITOR WILL PROVIDE PERIODIC INSPECTIONS OF THE SEDIMENTATION AND EROSION CONTROLS THROUGHOUT THE DURATION OF CONSTRUCTION ACTIVITIES ONLY AS IT PERTAINS TO PROTECTION OF RARE SPECIES AND NEARBY WETLANDS. THIRD PARTY MONITORING OF SEDIMENTATION AND EROSION CONTROLS WILL BE PERFORMED BY OTHER PARTIES, AS NECESSARY, UNDER APPLICABLE LOCAL, STATE AND/OR FEDERAL REGULATIONS.

   f. THE EXTENT OF THE SEDIMENTATION AND EROSION CONTROLS WILL BE AS SHOWN ON THE SITE PLANS. THE CONTRACTOR SHALL HAVE ADDITIONAL SEDIMENTATION AND EROSION CONTROLS STOCKPILED ON SITE SHOULD FIELD OR CONSTRUCTION CONDITIONS WARRANT EXTENDING THE CONTROLS AS DIRECTED BY THE ENVIRONMENTAL MONITOR.

   g. NO EQUIPMENT, VEHICLES OR CONSTRUCTION MATERIALS SHALL BE STORED OUTSIDE OF THE EXCLUSIONARY FENCING OR WITHIN 50 FEET OF WETLANDS OR WATERCOURSES.

   h. ALL SEDIMENTATION AND EROSION CONTROLS SHALL BE REMOVED WITHIN 30 DAYS OF COMPLETION OF WORK AND PERMANENT STABILIZATION OF SITE SOILS SO THAT REPTILE AND AMPHIBIAN MOVEMENTS ARE NOT RESTRICTED.

2. CONTRACTOR EDUCATION

   a. PRIOR TO WORK ON SITE, INCLUDING EQUIPMENT MOBILIZATION TO THE SITE, THE CONTRACTOR SHALL ATTEND AN EDUCATIONAL SESSION AT THE PRE-CONSTRUCTION MEETING WITH THE ENVIRONMENTAL MONITOR. THIS ORIENTATION AND EDUCATIONAL SESSION WILL CONSIST OF AN INTRODUCTORY MEETING WITH THE ENVIRONMENTAL MONITOR. THIS ORIENTATION AND EDUCATIONAL SESSION WILL CONSIST OF AN INTRODUCTORY MEETING WITH THE ENVIRONMENTAL MONITOR WHO WILL PROVIDE PHOTOS OF THE EASTERN BOX TURTLES, EMPHASIZING THE NON-AGGRESSIVE NATURE OF THESE TURTLES, THE ABSENCE OF NEED TO DESTROY ANIMALS THAT MIGHT BE ENCOUNTERED AND THE NEED TO FOLLOW PROTECTIVE MEASURES AS DESCRIBED IN SECTION 4 BELOW.

   b. THE EDUCATION SESSION WILL ALSO FOCUS ON MEANS TO DISCRIMINATE BETWEEN THE SPECIES OF CONCERN AND OTHER NATIVE SPECIES TO AVOID UNNECESSARY "FALSE ALARMS". WORKERS WILL ALSO BE PROVIDED INFORMATION REGARDING THE IDENTIFICATION OF OTHER TURTLE SPECIES THAT COULD BE ENCOUNTERED. ENCOUNTERS WITH ANY SPECIES OF TURTLES WILL BE DOCUMENTED.

   c. THE CONTRACTOR WILL BE PROVIDED WITH CELL PHONE AND EMAIL CONTACTS FOR THE ENVIRONMENTAL MONITOR TO IMMEDIATELY REPORT ANY ENCOUNTERS WITH EASTERN BOX TURTLE OR OTHER TURTLE SPECIES. EDUCATIONAL POSTER MATERIALS WILL BE PROVIDED BY THE ENVIRONMENTAL MONITOR AND DISPLAYED ON THE JOB SITE TO MAINTAIN WORKER AWARENESS AS THE PROJECT PROGRESSES.

3. PETROLEUM MATERIALS STORAGE AND SPILL PREVENTION

   a. CERTAIN PRECAUTIONS ARE NECESSARY TO STORE PETROLEUM MATERIALS, REFUEL AND CONTAIN AND PROPERLY CLEAN UP ANY INADVERTENT FUEL OR PETROLEUM (I.E., OIL, HYDRAULIC FLUID, ETC.) SPILL TO AVOID POSSIBLE IMPACT TO NEARBY HABITATS.

   b. A SPILL CONTAINMENT KIT CONSISTING OF A SUFFICIENT SUPPLY OF ABSORBENT PADS AND ABSORBENT MATERIAL WILL BE MAINTAINED BY THE CONTRACTOR AT THE CONSTRUCTION SITE THROUGHOUT THE DURATION OF THE PROJECT. IN ADDITION, A WASTE DRUM WILL BE KEPT ON SITE TO CONTAIN ANY USED ABSORBENT PADS/MATERIAL FOR PROPER AND TIMELY DISPOSAL OFF SITE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL LAWS.

   c. THE FOLLOWING PETROLEUM AND HAZARDOUS MATERIALS STORAGE, REFUELING RESTRICTIONS AND SPILL RESPONSE PROCEDURES WILL BE ADHERED TO BY THE CONTRACTOR.

      c.a. PETROLEUM AND HAZARDOUS MATERIALS STORAGE AND REFUELING

         c.a.a. REFUELING OF VEHICLES OR MACHINERY SHALL OCCUR A MINIMUM OF 130 FEET FROM WETLANDS OR WATERCOURSES AND SHALL TAKE PLACE ON AN IMPERVIOUS PAD WITH SECONDARY CONTAINMENT DESIGNED TO CONTAIN FUELS.

         c.a.b. ANY FUEL OR HAZARDOUS MATERIALS THAT MUST BE KEPT ON SITE SHALL BE STORED ON AN IMPERVIOUS SURFACE UTILIZING SECONDARY CONTAINMENT A MINIMUM OF 100 FEET FROM WETLANDS OR WATERCOURSES.

      c.b. INITIAL SPILL RESPONSE PROCEDURES

         c.b.a. STOP OPERATIONS AND SHUT OFF EQUIPMENT.

         c.b.b. REMOVE ANY SOURCES OF SPARK OR FLAME.

         c.b.c. CONTAIN THE SOURCE OF THE SPILL.

         c.b.d. DETERMINE THE APPROXIMATE VOLUME OF THE SPILL.

         c.b.e. IDENTIFY THE LOCATION OF NATURAL FLOW PATHS TO PREVENT THE RELEASE OF THE SPILL TO SENSITIVE NEARBY WATERWAYS OR WETLANDS

         c.b.f. ENSURE THAT FELLOW WORKERS ARE NOTIFIED OF THE SPILL.

      c.c. SPILL CLEAN UP & CONTAINMENT

         c.c.a. OBTAIN SPILL RESPONSE MATERIALS FROM THE ON-SITE SPILL RESPONSE KIT. PLACE ABSORBENT MATERIALS DIRECTLY ON THE RELEASE AREA.

         c.c.b. LIMIT THE SPREAD OF THE SPILL BY PLACING ABSORBENT MATERIALS AROUND THE PERIMETER OF THE SPILL.

         c.c.c. ISOLATE AND ELIMINATE THE SPILL SOURCE.

         c.c.d. CONTACT THE APPROPRIATE LOCAL, STATE AND/OR FEDERAL AGENCIES, AS NECESSARY.

         c.c.e. CONTACT A DISPOSAL COMPANY TO PROPERLY DISPOSE OF CONTAMINATED MATERIALS.

      c.d. REPORTING

         c.d.a. COMPLETE AN INCIDENT REPORT.

         c.d.b. SUBMIT A COMPLETED INCIDENT REPORT TO THE CONNECTICUT SITING COUNCIL.

4. TURTLE PROTECTIVE MEASURES

   a. PRIOR TO THE START OF CONSTRUCTION EACH DAY, THE CONTRACTOR SHALL SEARCH THE ENTIRE WORK AREA FOR TURTLES.

   b. IF A TURTLE IS FOUND, IT SHALL BE IMMEDIATELY MOVED, UNHARMED, BY CAREFULLY GRASPED IN BOTH HANDS, ONE ON EACH SIDE OF THE SHELL, BETWEEN THE TURTLE'S FORELIMBS AND THE HIND LIMBS, AND PLACED JUST OUTSIDE OF THE ISOLATION BARRIER IN THE SAME APPROXIMATE DIRECTION IT WAS WALKING.

   c. SPECIAL CARE SHALL BE TAKEN BY THE CONTRACTOR DURING EARLY MORNING AND EVENING HOURS SO THAT POSSIBLE BASKING OR FORAGING TURTLES ARE NOT HARMED BY CONSTRUCTION ACTIVITIES.

5. REPORTING

   a. DAILY COMPLIANCE MONITORING REPORTS (BRIEF NARRATIVE AND APPLICABLE PHOTOS) DOCUMENTING EACH APT INSPECTION WILL BE SUBMITTED BY THE ENVIRONMENTAL MONITOR TO EVERSOURCE FOR COMPLIANCE VERIFICATION FOR EACH INSPECTION PERFORMED. ANY DIRECT OBSERVATIONS OF TURTLES OR REPORTS OF TURTLE BY THE CONTRACTOR WILL BE INCLUDED IN THE REPORTS.

   b. FOLLOWING COMPLETION OF THE CONSTRUCTION PROJECT, THE ENVIRONMENTAL MONITOR WILL PROVIDE A COMPLIANCE MONITORING SUMMARY REPORT TO EVERSOURCE DOCUMENTING IMPLEMENTATION OF THE TURTLE PROTECTION PROGRAM, MONITORING AND ANY TURTLE OBSERVATIONS. EVERSOURCE WILL PROVIDE A COPY OF THE COMPLIANCE MONITORING SUMMARY REPORT TO THE CONNECTICUT SITING COUNCIL FOR COMPLIANCE VERIFICATION.

   c. ANY OBSERVATIONS OF EASTERN BOX TURTLE WILL BE REPORTED TO CTDEEP BY EVERSOURCE, WITH PHOTO-DOCUMENTATION (IF POSSIBLE) AND WITH SPECIFIC INFORMATION ON THE LOCATION AND DISPOSITION OF THE ANIMAL.

REV.	DATE	DRAWN BY	CH'K'D BY	DESCRIPTION
7	7/27/17	TJL	CFC	CONSTRUCTION DRAWINGS – COMPOUND FENCE HEIGHT CHANGED
6	7/14/17	DMD	CFC	CONSTRUCTION DRAWINGS – SHEET C-4 "ENVIRONMENTAL NOTES" ADDED
5	6/28/17	TJL	CFC	CONSTRUCTION DRAWINGS – TOP OF TOWER ANTENNA ELEVATIONS ADDED
4	3/09/17	TJL	CFC	CONSTRUCTION DRAWINGS – REVISED ANTENNA CONFIGURATION
3	11/15/16	HMR	CFC	CONSTRUCTION DRAWINGS – REVISED GENERATOR LOCATION
2	11/09/16	HMR	CFC	CONSTRUCTION DRAWINGS –
1	11/09/16	HMR	CFC	CONSTRUCTION DRAWINGS –
0	11/08/16	DMD	CFC	CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW

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ENVIRONMENTAL NOTES

C-4

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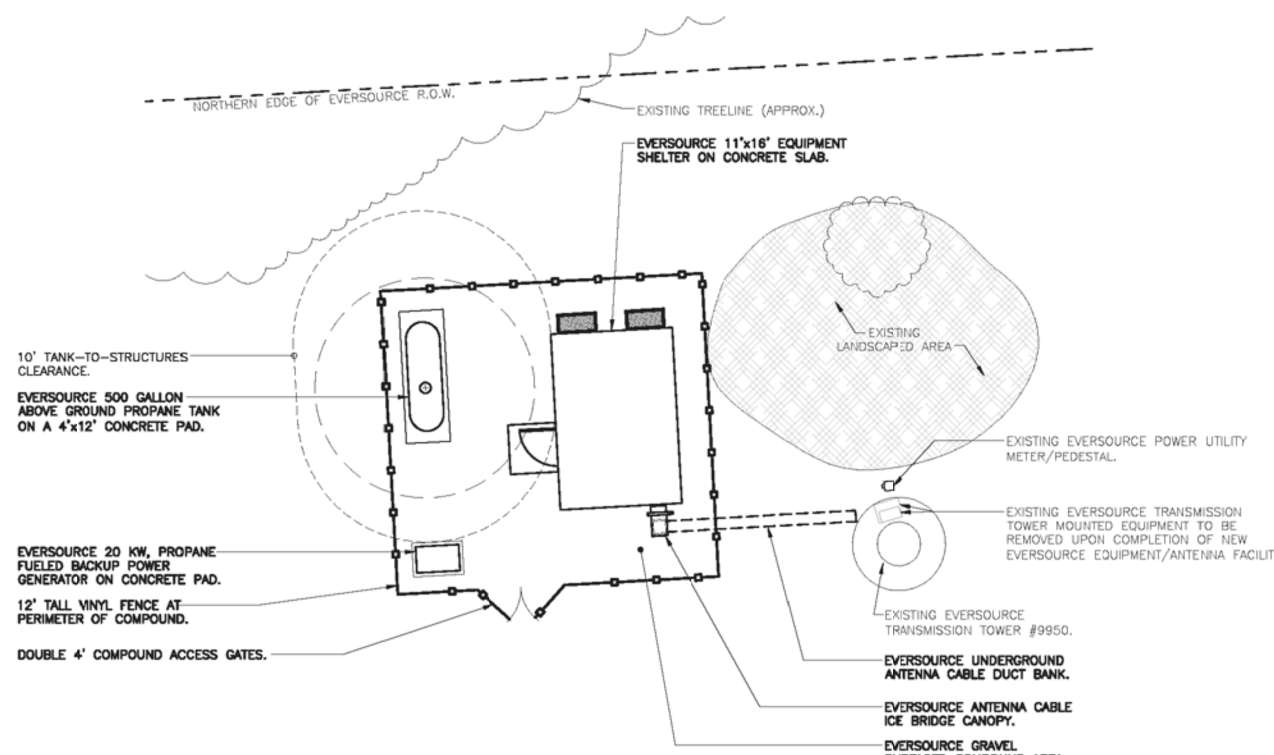
GENERAL NOTES

1. REFER TO CIVIL DRAWINGS FOR ACTUAL LOCATIONS OF STRUCTURES ON SITE.
2. COORDINATION, LAYOUT AND FURNISHING OF CONDUIT, CABLE AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL / TELECOMMUNICATIONS SERVICES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
3. THE EXACT BUILDING FOUNDATION SIZE AND BUILDING WALL PENETRATIONS FOR UTILITIES SHALL BE CONFIRMED WITH THE BUILDING SPECIFICATIONS AND PLANS PRIOR TO LAYOUT.
4. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
5. PROVIDE CADWELD CONNECTION STYLES: THROUGH (CABLE TO CABLE) TYPE "TA"
   (CABLE TO SURFACE) TYPE "LA" OR "VS" (PIPE)
   (CABLE TO ROD) TYPE "GT" OR "NC"
   (CABLE TO CABLE) TYPE "SS"
6. EXTEND UTILITY SERVICES TO UTILITY BACKBOARD IN OWNER'S EQUIPMENT SHELTER. COORDINATE WITH SHELTER SHOP DRAWINGS FOR LOCATION. CONTRACTOR TO COORDINATE ALL UTILITY SERVICES TO NEW EQUIPMENT SHELTER.

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
— — —	GROUND RING
—T———T—	UNDERGROUND COMMUNICATION CONDUIT
—E———E—	UNDERGROUND ELECTRICAL CONDUIT
	GROUND BAR
—□———□—	PERIMETER CHAIN LINK FENCE
⊗	5/8" DIAMETER x 10'-0" COPPER GROUND ROD **OR** 24"x24" GROUND PLATE ABOVE MATT FOUNDATION.
⊠	5/8" DIAMETER x 10'-0" COPPER GROUND ROD WITH ACCESS.
■	EXOTHERMIC WELD TYPE "TA"



1 / E-1 **COMPOUND PLAN**
SCALE: 1/8" = 1'-0"
NORTH

GRAPHIC SCALE
(IN FEET)
1 inch = 8 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
7	7/27/17	TJL	CFC	CONSTRUCTION DRAWINGS – COMPOUND FENCE HEIGHT CHNAGED
6	7/14/17	DMD	CFC	CONSTRUCTION DRAWINGS – SHEET C-4 "ENVIRONMENTAL NOTES" ADDED
5	6/26/17	TJL	CFC	CONSTRUCTION DRAWINGS – TOP OF TOWER ANTENNA ELEVATIONS ADDED
4	4/06/17	DMD	CFC	CONSTRUCTION DRAWINGS – UG CABLE DUCT BANK & PLANTINGS ADDED
3	3/09/17	JTL	CKD	CONSTRUCTION DRAWINGS – REVISED ANTENNA CONFIGURATION
2	11/15/16	TJB	CKD	CONSTRUCTION DRAWINGS – REVISED GENERATOR LOCATION
1	11/09/16	TJB	CKD	CONSTRUCTION DRAWINGS
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COMPOUND UTULITY PLAN AND NOTES

E-1

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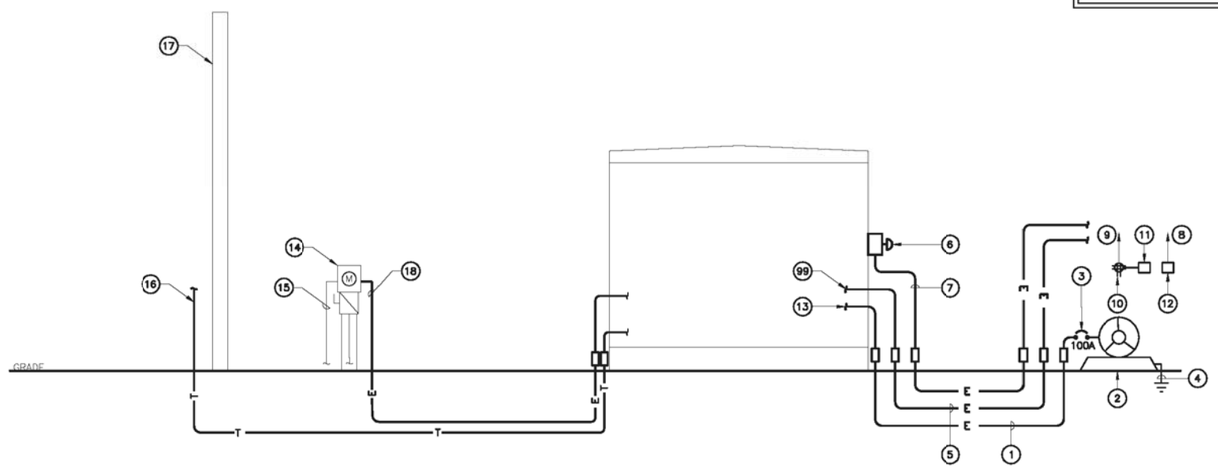
GENERAL NOTES

1. CONTRACTOR TO VERIFY ALL CONDUIT ROUTING AND INSTALLATION REQUIREMENTS WITH LOCAL UTILITIES PRIOR TO INSTALLATION.
2. ALL CONDUITS SHALL HAVE EXPANSION COUPLINGS WHERE EXTENDING ABOVE GRADE.
3. TELEPHONE EQUIPMENT SHOWN APPROXIMATE. COORDINATE WITH OWNER AND PROVIDE ALL SPECIFIED EQUIPMENT.
4. COORDINATE SERVICE EQUIPMENT INTERRUPTING RATING WITH AVAILABLE FAULT CURRENT FROM UTILITY COMPANY. EQUIPMENT SHALL NOT BE RATED LESS THAN 65 KAIC.
5. ALL TELEPHONE AND ELECTRIC UTILITY WORK MUST BE COORDINATED WITH UTILITY COMPANY, AND ALL EQUIPMENT MUST BE UTILITY COMPANY APPROVED. CONTRACTOR SHALL PROVIDE ALL ELEMENTS NOT PROVIDED BY UTILITY COMPANIES.
6. CONDUCTOR SIZES SHALL NOT BE REDUCED OR SUBSTITUTED WITHOUT ENGINEERS APPROVAL.
7. ALL CONDUCTORS AND CONDUCTOR TERMINATIONS SHALL BE RATED FOR 75° C OPERATION.
8. PROVIDE ALL NEC REQUIRED SIGNAGE AT SERVICE EQUIPMENT TO IDENTIFY OWNER AND TYPE AND LOCATION OF ONSITE GENERATOR.

RISER DIAGRAM WORK NOTES

1. (3) #1 AWG, (1) #8 AWG GND, MIN 1-1/2" CONDUIT.
2. 20KW PROPANE FUELED GENERATOR. (DESIGN BASED ON KOHLER MODEL 20RES).
3. 100A, 240V, MAIN CIRCUIT BREAKER AT GENERATOR OUTPUT.
4. GROUND GENERATOR PER NEC AND MANUFACTURER'S SPECIFICATIONS.
5. 1" CONDUIT WITH CONTROL AND ALARM CONDUCTORS FROM GENERATOR TO TRANSFER SWITCH AND ALARM PANEL IN SHELTER. INSTALL CONDUCTORS AS REQUIRED BY MANUFACTURER.
6. REMOTE GENERATOR SHUT OFF SWITCH IN BREAK GLASS ENCLOSURE MOUNTED TO THE EXTERIOR OF THE SHELTER IN LOCATION APPROVED BY LOCAL FIRE MARSHAL. INSTALL ALL REQUIRED SIGNAGE.
7. 3/4" CONDUIT AND CONDUCTORS REQUIRED FOR PROPER OPERATION OF EMERGENCY GENERATOR SHUT OFF SWITCH.
8. DEDICATED 20A, 120V, CIRCUIT IN 3/4" CONDUIT FROM OWNER'S ELECTRIC PANEL TO GENERATOR BLOCK HEATER.
9. DEDICATED 20A, 120V, CIRCUIT IN 3/4" CONDUIT FROM OWNER'S ELECTRIC PANEL TO GENERATOR BATTERY CHARGER AND DUPLEX RECEPTACLE.
10. DUPLEX GFCI RECEPTACLE IN WEATHERPROOF ENCLOSURE MOUNTED IN CONVENIENT LOCATION AT GENERATOR.
11. GENERATOR BATTERY CHARGER.
12. GENERATOR BLOCK HEATER.
13. EXTEND GENERATOR POWER OUTPUT CONDUCTORS TO EMERGENCY LUGS IN TRANSFER SWITCH.
14. EXISTING SERVICE METER AND DISCONNECT FOR 200A, 120/240V, SINGLE PHASE ELECTRIC SERVICE TO REMAIN. SERVICE DISCONNECT ASSUMED TO BE RATED 200A. EVALUATE IN FIELD. (IF DEVICE IS RATED LESS THAN 200A, PROVIDE NEW 200A, 240V, 2P, SE RATED, NEMA-32, HEAVY DUTY FUSED DISCONNECT WITH 200A FUSES.)
15. EXISTING FEEDER CONDUCTORS AND CONDUIT TO TO BE REMOVED AFTER CUTOVER OF NEW EQUIPMENT IN SHELTER. EXISTING CONDUCTORS, AND EQUIPMENT SERVED, SHALL REMAIN ACTIVE UNTIL NEW EQUIPMENT IS CUTOVER AND APPROVED BY OWNER.
16. COMMUNICATION CONDUCTORS IN 4" CONDUIT EXTENDED FROM OWNER'S EXISTING COMMUNICATION EQUIPMENT LOCATED ON TRANSMISSION TOWER TO TELCO EQUIPMENT IN SHELTER. COORDINATE ALL REQUIREMENTS WITH OWNER.
17. EXISTING TRANSMISSION TOWER TO REMAIN. UPON FINAL CUTOVER AND ACCEPTANCE OF NEW EQUIPMENT IN SHELTER, EXISTING RADIO EQUIPMENT MOUNTED NEAR BASE OF TRANSMISSION TOWER SHALL BE REMOVED.
18. (3) #3/0 AWG, (1) #6 AWG GROUND, 2-1/2" CONDUIT FROM SERVICE DISCONNECT TO NORMAL POWER LUGS IN TRANSFER SWITCH.

EQUIPMENT SHELTER BY OWNER. VERIFY ALL SHELTER DIMENSIONS, EQUIPMENT DIMENSIONS, EQUIPMENT LOCATIONS AND UTILITY OPENINGS WITH BUILDING SHOP DRAWINGS PRIOR TO COMMENCEMENT OF WORK.



1 / E-2 **ELECTRICAL POWER RISER DIAGRAM**
NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
7	7/27/17	TJL	CFC	CONSTRUCTION DRAWINGS – COMPOUND FENCE HEIGHT CHANGED
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ELECTRICAL RISER DIAGRAM AND NOTES

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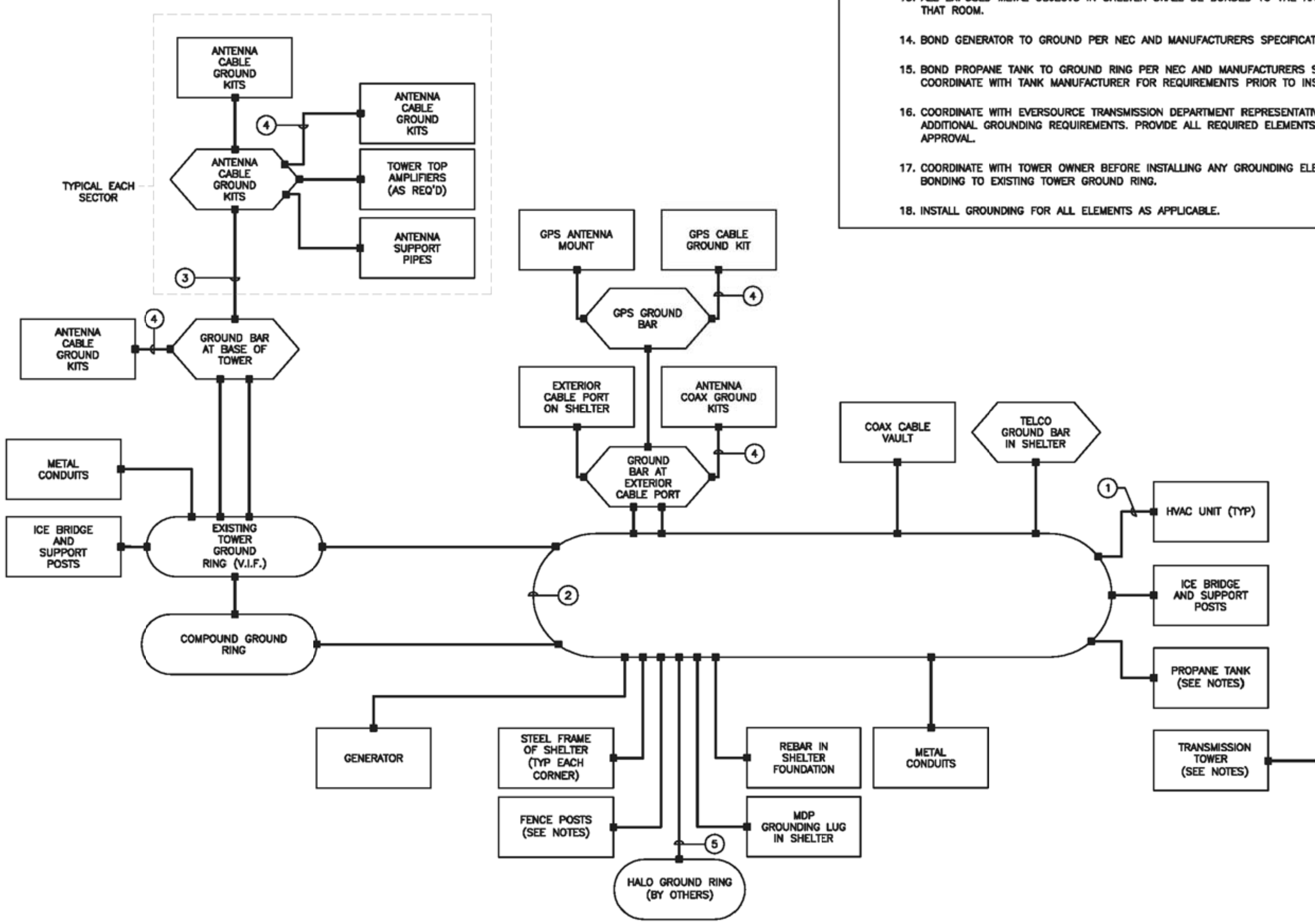

GROUNDING SCHEMATIC NOTES

① #2 AWG GREEN INSULATED

② GROUND RING, #2 AWG BCW

③ #2/0 GREEN INSULATED

④ #6 AWG

⑤ BOND ALL HALO GROUND RING TAILS TO GROUND RING. COORDINATE LOCATION AND QUANTITY WITH EQUIPMENT ROOM/SHELTER DRAWINGS

GENERAL NOTES:

1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
2. UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW – EXTERIOR; STRANDED GREEN INSULATED – INTERIOR).
3. BOND CABLE TRAY AND ICE BRIDGE SECTIONS TOGETHER WITH #6 AWG STRANDED GREEN INSULATED JUMPERS.
4. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
5. BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
6. ALL BONDS TO TOWER SHALL BE MADE IN STRICT ACCORDANCE WITH SPECIFICATIONS OF TOWER MANUFACTURER OR STRUCTURAL ENGINEER.
7. REFER TO GROUNDING PLAN FOR LOCATION OF GROUNDING DEVICES.
8. REFER TO ALL ELECTRICAL AND GROUNDING DETAILS.
9. COORDINATE ALL TOWER MOUNTED EQUIPMENT WITH OWNER.
10. ALL TOWER MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
11. ALL FENCE POSTS WITHIN 6' OF EQUIPMENT SHELTER SHALL BE BONDED TO GROUND RING.
12. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.
13. ALL EXPOSED METAL OBJECTS IN SHELTER SHALL BE BONDED TO THE HALO GROUND WITHIN THAT ROOM.
14. BOND GENERATOR TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS
15. BOND PROPANE TANK TO GROUND RING PER NEC AND MANUFACTURERS SPECIFICATIONS. COORDINATE WITH TANK MANUFACTURER FOR REQUIREMENTS PRIOR TO INSTALLATION.
16. COORDINATE WITH EVERSOURCE TRANSMISSION DEPARTMENT REPRESENTATIVE TO DETERMINE ADDITIONAL GROUNDING REQUIREMENTS. PROVIDE ALL REQUIRED ELEMENTS TO MEET EVERSOURCE APPROVAL.
17. COORDINATE WITH TOWER OWNER BEFORE INSTALLING ANY GROUNDING ELEMENTS ON TOWER OR BONDING TO EXISTING TOWER GROUND RING.
18. INSTALL GROUNDING FOR ALL ELEMENTS AS APPLICABLE.

GROUNDING NOTES

OBJECTIVE

PROVIDE A GROUNDING SYSTEM WITH MAXIMUM ALTERNATING CURRENT RESISTANCE OF 5 OHMS BETWEEN ANY POINT ON THE GROUNDING SYSTEM AND REFERENCE GROUND. PROVIDE EXTERIOR GROUNDING SCHEME WITH OWNER'S ENGINEER APPROVAL AS REQUIRED TO ACHIEVE DESIRED MAXIMUM AC RESISTANCE TO GROUND.

TESTING

CONTRACTOR TO PROVIDE AN INDEPENDENT TESTING CONTRACTOR TO DETERMINE THE GROUNDING SYSTEM RESISTANCE BY USE OF THE THREE POINT TEST AND AN AEMC MODEL 4500, OR APPROVED EQUAL. TEST TO BE PERFORMED PRIOR TO CONNECTION OF POWER SUPPLY TO THE CELL SITE AND CONNECTION OF THE GROUNDING SYSTEM TO THE WATER MAIN OR AC SUPPLY AS APPLICABLE. IF 5 OHM LIMIT IS EXCEEDED, CONTACT ENGINEER FOR ADDITIONAL INSTRUCTIONS TO ACHIEVE 5 OHMS OR LESS.

CONDUCTOR USED FOR GROUNDING SYSTEM

EGR – #2 AWG ANNEALED SOLID TINNED BARE COPPER
IGR – #2 AWG ANNEALED STRANDED (7 STRAND) 'THW' GREEN COLORED INSULATION
INTER–BUS EXTENSION (FROM IGR TO EGR) – SEE DETAILS
EXTERNAL BOND CONNECTIONS TO EGR – #2 ANNEALED SOLID TINNED BARE COPPER
INTERIOR BOND CONNECTIONS TO IGR – #6 ANNEALED STRANDED (7 STRAND) 'THW' GREEN COLORED INSULATION

MINIMUM BENDING RADIUS

IGR #2 : 1'–0" NOMINAL AND 8" MINIMUM
EGR #2 : 2'–0" NOMINAL AND 8" MINIMUM
GROUNDING CONDUCTOR SHALL BE AS STRAIGHT AS POSSIBLE WITH MINIMUM 6" BENDING RADIUS.

FASTENER FOR GROUNDING CONDUCTOR

USE NON–METALLIC FASTENER AND STANDOFF 'CLIC' (AVAIL. FROM NEFCO 800–969–0285) TO SURFACE SUPPORT CONDUCTOR 3" AWAY FROM SURFACES.

SPACING OF FASTENERS: 2'–0" O.C. OUTSIDE BUILDING
3'–0" O.C. INSIDE BUILDING

GROUNDING ELECTRODE

GROUNDING ELECTRODE SHALL BE 5/8" DIA. x 10'–0" l. COPPER CLAD STEEL ROD. ADJUST LOCATION OF GROUNDING ELECTRODE IF SOIL CONDITION IS NOT CONDUCTIVE (GRAVEL, SANDY SOIL, ROCKS). SPACE GROUNDING ELECTRODES 20'–0" APART (SPACING MAY BE REDUCED WHERE REQUIRED TO ACCOMMODATE FIELD CONDITIONS BUT SHALL NOT BE LESS THAN 10'–0"). ELECTRODES SHALL BE DRIVEN ONLY WITH PROPER DRIVER SLEEVE TO PREVENT MUSHROOMING TOP OF ROD. WHEN ROCK BOTTOM IS ENCOUNTERED, THE ELECTRODE SHALL BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45° FROM THE VERTICAL AWAY FROM STRUCTURES. TOP OF GROUNDING ELECTRODE SHALL BE MIN. 3'–6" BELOW FINISH GRADE.

CONNECTIONS ABOVE GRADE (MECHANICAL)

COMPRESSION LUG CONNECTOR – 15 TON COMPRESSION, 2 HOLE, LONG BARREL, ELECTRO TINNED PLATED, HIGH CONDUCTIVITY, COPPER 600V RATED. USE 1/4" ø BOLT, 3/4" SPACING LUGS TO BOND OBJECTS FROM THE IGR. (CONNECTOR SHALL BE BURNDY HYLUG SERIES OR EQUAL.)

EXOTHERMIC WELD LUG CONNECTOR – 2 HOLE, OFFSET, ELECTRO TINNED PLATED, HIGH CONDUCTIVITY, COPPER 600V. USE 1/2"ø BOLT, 1–3/4" SPACING LUGS. CONNECTOR SHALL BE CADWELD CONNECTION STYLE (CABLE TO SURFACE) TYPE LA, LUG SIZE 1/8 x 1. EXOTHERMIC WELD TO LUG AS REQUIRED.

C–TAP COMPRESSION CONNECTOR – HIGH CONDUCTIVITY COPPER FOR MAIN TO BRANCH LINE TAPPING. (CONNECTOR SHALL BE BURNDY HYTAP SERIES OR EQUAL.)

MECHANICAL CONNECTIONS

USE MATCHING MANUFACTURER TOOL AND DIE FOR COMPRESSION CONNECTION.

APPLY ANTI–OXIDANT CONDUCTIVITY ENHANCER COMPOUND ON SURFACES THAT ARE COMPRESSED.

SURFACES INTENDED TO BE CONNECTED WITH MECHANICAL CONNECTORS SHALL BE BARE METAL TO BARE METAL. PRIME AND PAINT OVER BONDED AREA TO PREVENT CORROSION.

WHEN BONDING #2 TO #2

EXTERIOR OF BUILDING – USE EXOTHERMIC WELD CONNECTION
INTERIOR OF BUILDING – USE COMPRESSION CONNECTION ON STRANDED CONDUCTORS ONLY.
– USE EXOTHERMIC WELD CONNECTION ON SOLID CONDUCTOR.

WHEN BONDING #2 TO FENCE POST

USE EXOTHERMIC WELD (CADWELD TYPE 'VS') CONNECTION TO FENCE POST STEEL SURFACE. TEST WELD FOR POSSIBLE BURN THRU. PATCH WELDED AREA WITH GALVANIZED COATING AS REQUIRED FOR PROPER WELDED PERMANENT BOND. REFER TO MANUFACTURER'S REQUIREMENTS FOR DETAILS

GROUNDING SYSTEM INTERCONNECTION

BOND THE EGR DOWN CONDUCTORS, AND/OR BURIED GROUND RING TO ANY METALLIC OBJECT OR EXISTING GROUNDING SYSTEM WITHIN 6'.

WHEN BONDING #2 TO TOWER GROUND PLATE

TOWER GROUND PLATE SHALL BE 6" x 8" x 1/4" COPPER AND BE MADE AVAILABLE TO TOWER CONTRACTOR TO BE INSTALLED DURING TOWER CONSTRUCTION. USE EXOTHERMIC WELD (CADWELD TYPE 'HS') TO TOWER GROUND PLATE TEST WELD FOR POSSIBLE BURN THRU. COORDINATE THE SIZE OF THE MOUNTING HOLE WITH TOWER CONTRACTOR.

METALLIC CONDUITS

BOND ALL STEEL CONDUITS TO PANELS AT POINT OF CONTACT WITH APPROVED GROUNDING BUSHING.

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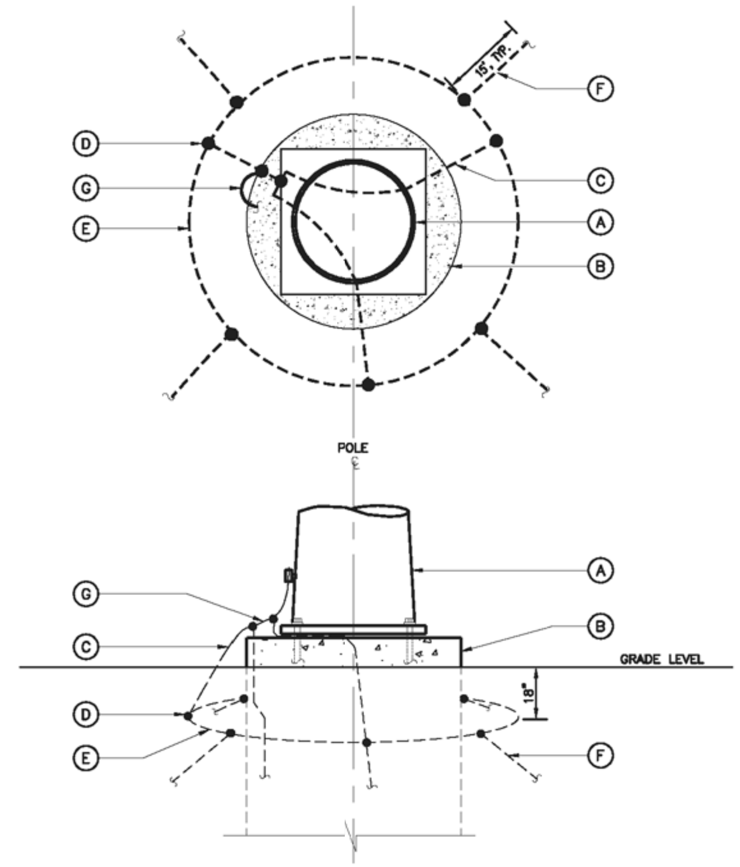
ELECTRICAL SCHEMATIC DIAGRAM

E–3

Sheet No. 10 of 16



1 / E-4 EVERSOURCE TOWER GROUNDING DETAIL

NOT TO SCALE

EVERSOURCE TOWER GROUNDING NOTES:

(EVERSOURCE REQUIREMENTS)

- (A) STEEL HYBRID POLE.
- (B) CONCRETE CAISSON TYPE FOUNDATION.
- (C) STRANDED COPPERWELD SPOKE FROM POLE GROUND TO GRADING RING. SPOKES ARE A CONTINUATION OF STRANDED COPPERWELD COUNTERPOISE CONNECTING GRADING RING TO POLE GROUND. SPOKES TO SLOPE ON STRAIGHT LINE FROM GROUND LEVEL TO GRADING RING.
- (D) PARALLEL GROVE CONNECTOR, NU SC190052.
- (E) GROUNDING RING @ 18" MINIMUM BELOW GRADE AND 24" TO 30" FROM TOWER FOUNDATION. GRADING RING TO BE 3 NO. 8 STRANDED ANNEALED COPPERWELD.
- (F) COUNTERPOISE, 3 NO. 8 STRANDED ANNEALED COPPERWELD (TYPICAL).
- (G) COPPERWELD POLE GROUND.

GENERAL NOTES:

1. THE INFORMATION ON THIS SHEET REPRESENTS TYPICAL EVERSOURCE GROUNDING REQUIREMENTS. CONTRACTOR MUST COORDINATE WITH EVERSOURCE SITE MANAGER FOR SPECIFIC (AND CURRENT) GROUNDING REQUIREMENTS AT THIS SITE.

EVERSOURCE - TOWER GROUNDING SYSTEM NOTES

GENERAL–

1. THE OWNER WILL FURNISH THE WIRE, CONNECTORS, AND MISCELLANEOUS MATERIAL ASSOCIATED WITH THE COUNTERPOISE GROUNDING SYSTEM.
2. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY TO INSTALL THE GROUNDING SYSTEM AND TO REHABILITATE THE RIGHT–OF–WAY AS CLOSE AS POSSIBLE TO ITS ORIGINAL CONDITION.
3. THE CONTRACTOR SHALL HANDLE AND TRANSPORT THE OWNER SUPPLIED MATERIAL FROM THE OWNER'S STOREROOMS AND YARDS TO THE JOB SITE AND SHALL RETURN SURPLUS MATERIAL AND EMPTY REELS TO DESIGNATED STOREROOMS AND YARDS UPON COMPLETION OF THE CONTRACT.
4. EVERSOURCE WILL BE RESPONSIBLE FOR PERFORMING TESTS FOR SURGE IMPEDANCE AND WAVE IMPENDENCE.

INSTALLATION–

1. UNLESS OTHERWISE DIRECTED BY THE OWNER'S REPRESENTATIVE, COUNTERPOISE SHALL BE BURIED A MINIMUM OF 24" IN CULTIVATED AREAS AND 18" IN WOODED OR OTHER AREAS. IN ROCKY AREAS OR WHERE OBSTRUCTIONS ARE ENCOUNTERED, THE COUNTERPOISE SHALL BE DIVERTED AROUND SUCH OBSTRUCTIONS. ALL INSTALLATIONS SHALL INCLUDE CONNECTIONS TO EXISTING OR PROPOSED STRUCTURES, AND SUCH CONNECTIONS SHALL BE MADE BELOW GROUND USING BOLTED PARALLEL GROVE CONNECTORS.
2. WHERE MULTIPLE STRUCTURE GROUNDS EXIST AT MULTI POLE STRUCTURES, THEY SHALL BE CONNECTED TOGETHER WITH BURIED COPPERWELD WIRE, BUT ONLY IF SUCH GROUNDS HAVE METALLIC CONNECTIONS UP THE POLES TO THE SHIELD WIRE(S). AT STRUCTURES THAT HAVE PALE GROUNDS AND ALSO POLE GUY GROUNDS, CONNECTIONS SHALL BE MADE ONLY TO THE POLE GROUNDS, AND THE MINIMUM SPACING BETWEEN THE COUNTERPOISE AND ANCHOR RODS SHALL BE 10'. AT WOOD POLE STRUCTURES WHERE NO SUCH POLE GROUND EXISTS, COUNTERPOISE CONNECTIONS SHALL BE MADE TO THE POLE TOP GUYS.
3. FOR SINGLE CONTINUOUS (TYPE A) AND SINGLE BROKEN (TYPE B) COUNTERPOISE, THE WIRE SHALL IN GENERAL BE LAYED AT THE CENTERLINE OF THE TRANSMISSION LINE. FOR DOUBLE CONTINUOUS (TYPE C) AND DOUBLE BROKEN (TYPE D) COUNTERPOISE, THE WIRES SHALL IN GENERAL SHALL BE LAYED UNDER THE OUTSIDE PHASE WIRES OF THE TRANSMISSION LINE. COUNTERPOISE SHALL NOT BE INSTALLED ACROSS BROOKS, RIVERS, HIGHWAYS, RAILROADS, OR IN THE VICINITY OF TELEPHONE CABLES OR PIPELINES.
4. AT STEEL POLE STRUCTURES, A BURIED GRADING RING AND SPOKES SHALL ALSO BE INSTALLED AROUND THE STRUCTURE UNLESS THE STRUCTURE HAS A PAD AND PIER FOUNDATION OR UNLESS A RING ALREADY EXISTS. COUNTERPOISE WIRE SHALL BE CONNECTED AT TWO PLACES TO EACH RING, AND COPPERWELD SPOKES SHALL SLOPE LINEARLY UP TO THE STRUCTURE GROUND.
5. AT WOOD POLE STRUCTURES, AN 8' LENGTH OF PLASTIC MOLDING SHALL BE STAPLED OVER THE BOTTOM WITH 8' OF DOWNLEAD.

GROUND RODS–

1. WHERE GROUND RODS ARE REQUIRED, THEY SHALL BE SINGLE OR SECTIONAL WITH THE LENGTH SPECIFIED. THEY SHALL BE DRIVEN VERTICALLY INTO THE GROUND TO A DEPTH WHICH WILL LEAVE THE TOP OF THE ROD AT LEAST 12" BELOW GRADE. ALL RODS SHALL BE CONNECTED TO COUNTERPOISE OR TO POLE GROUNDS USING BOLTED CONNECTORS.

REHABILITATION–

1. SELECTIVE CLEARING PROCEDURES WERE USED IN THE DEVELOPMENT OF THE RIGHT–OF–WAY, AND GROWTH OF SELECTED SPECIES HAS BEEN SAVED. THE CONTRACTOR SHALL NOT VIOLATE THE OWNER'S INTENT TO SAVE SELECTIVE SPECIES AND IMPOSE THE MINIMUM ENVIRONMENTAL IMPACT ON THE RIGHT OF WAY DURING THE EXECUTION OF THE WORK. THE CONTRACTOR SHALL REVIEW THE ROUTING OF EACH SECTION OF COUNTERPOISE WITH THE OWNER'S REPRESENTATIVE PRIOR TO ITS FIELD SPECIFIED LOCATION. THE CONTRACTOR IS RESPONSIBLE TO THE OWNER FOR DAMAGES TO THE RIGHT–OF–WAY IN OTHER THAN THE FIELD SPECIFIED LOCATIONS.
2. ANY BRUSH ALONG THE FIELD SPECIFIED COUNTERPOISE ROUTES WHICH IS LEFT IN AN UNSIGHTLY CONDITION BY THE INSTALLATION WORK WILL BE CUT TO THE GROUND BY THE CONTRACTOR AND LEFT IN SMALL, NEAT PILES IN PLACE WHERE CUT.
3. IN LOCATIONS WHERE EXCAVATION FOR THE INSTALLATION OF COUNTERPOISE BRINGS TO THE SURFACE ANY SMALL BOULDERS, THEY WILL BE BACKFILLED BELOW GRADE OR DISPERSED ON THE RIGHT–OF–WAY AS THE OWNER'S REPRESENTATIVE MAY DIRECT. INSTALLATION OF THE COUNTERPOISE SHALL NOT RESULT IN A PATH OF SMALL BOULDERS ON THE FINISHED SURFACE.
4. THE OWNER ANTICIPATES THAT SEASONAL CONDITIONS MAY NOT ALLOW PERMANENT REHABILITATION OF WORK SITES AND THE RIGHT–OF–WAY UPON COMPLETION OF THE INSTALLATION OF THE COUNTERPOISE. WHERE TEMPORARY REHABILITATION HAS BEEN COMPLETED IN ADVERSE SEASON, THE CONTRACTOR SHALL TAKE THE FOLLOWING STEPS:
   - A. WATERBARS WILL BE CONSTRUCTED ON ACCESS ROADS AND TRENCH LINES TO SHUNT WATER OFF THIS LINE OF DISTURBED SURFACES AND CONTROL EROSION ALONG THE DISTURBED SURFACE.
   - B. ALL DISTURBED SURFACES OF FOUNDATION SITES OR ALONG TRENCH LINES OR ACCESS ROADS WILL BE GRADED AND COVERED WITH HAY MULCH. SUCH DISTURBED SY=URFACES ON SLOPES GREATER THAN ONE (VERTICAL) ON FOUR (HORIZONTAL) SHALL BE COVERED WITH WOOD CHIPS.
5. AS DRYING CONDITIONS PERMIT IN THE SPRING, FOLLOWING COMPLETION OF THE INSTALLATION OF COUNTERPOISE, PERMANENT REHABILITATION OF ALL DISTURBED OR ERODED SURFACES SHALL BE ACCOMPLISHED AS FOLLOWS:
   - A. LAWNS, GOLF COURSES, CEMETERIES AND OTHER SIMILAR OCCUPANCIES SHALL BE LOAMED, GRADED, FERTILIZED, SEEDED AND WHERE APPROPRIATE, MULCHED, TO ESTABLISH A REHABILITATION CONSISTENT WITH THE USE ESTABLISHED BY THE OCCUPANT.
   - B. GARDENS, OTHER CULTIVATED AREAS AND PASTURES, SHALL BE GRADED AND TOPSOILED TO RESTORE THE DEPTH OF FERTILE SOIL COMMON TO THE ADJACENT GROUND. WHERE APPROPRIATE, SEEDING SHALL BE DONE IN ACCORDANCE WITH STEP C BELOW.
   - C. THE CONTRACTOR SHALL SEED ALL DISTURBED AREAS ALONG THE NEW COUNTERPOISE ROUTES. SEED SHALL BE SPREAD AT THE RATE OF 100 LBS. PER ACRE AND SHALL BE AS FOLLOWS OR APPROVED EQUAL:

	% BY WEIGHT	% BY GERMINATION	% BY PURITY
CREEPING RED FESCUE	30	85	98
DOMESTIC RYE	20	90	98
KENTUCKY TALL FESCUE	50	--	--
	100		

   - D. ALL OTHER DISTURBED AREAS INCLUDING REMAINING FOUNDATION SITES, ACCESS ROADS, AND REPAIR OF EROSION OF SITUATION SHALL BE SEEDED WITH MIXED SPECIFICATION ABOVE. IN REMOTE AREAS, A CONSERVATION MIX, AS USED BY THE CONNECTICUT STATE PARKS AND FOREST COMMISSION MAY BE SUBSTITUTED. ALL AREAS WHICH EXPERIENCED EROSION DAMAGE AND ALL SLOPES OVER ONE (VERTICAL) AND FOUR (HORIZONTAL) WHERE TEMPORARY REHABILITATION WORK HAS BEEN DONE SHALL BE REMULCHED.
6. IT IS IMPERATIVE THAT PERMANENT REHABILITATION BE ACCOMPLISHED IN GOOD TIME, WHICH WILL ALLOW THE OCCUPANT FULL AND UNDISTURBED USE OF THE SITE IN THE SUCCEEDING SEASON, AND TO PREVENT UNNECESSARY AND UNREASONABLE SPREADING OF CONTINUATION OF DISTURBED SURFACES.
7. ANY BRUSH ALONG THE ACCESS ROADS WHICH IS LEFT IN AN UNSIGHTLY CONDITION BY THE WORK CONDUCTED, SHALL BE CUT TO THE GROUND BY THE CONTRACTOR AND LEFT IN SMALL NEAT PILES IN PLACE WHERE CUT.

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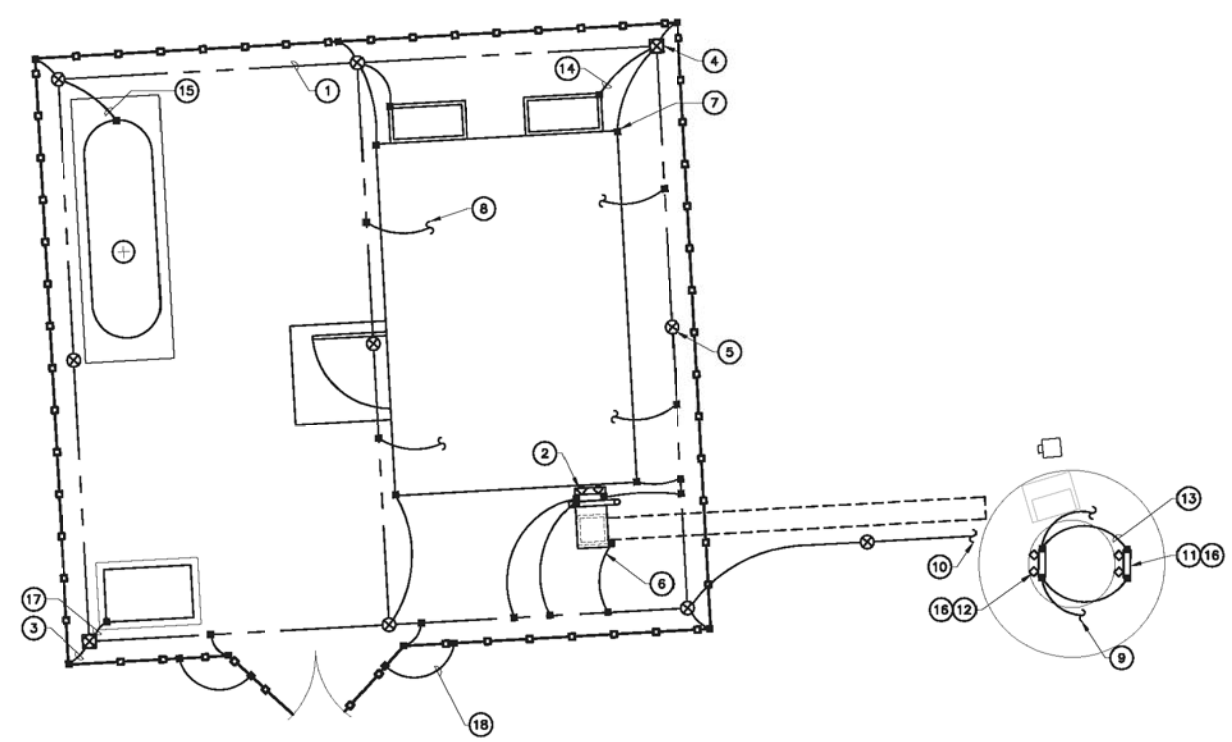
TOWER GROUNDING AND NOTES

E-4

Sheet No. 11 of 16



1 / E-5 **COMPOUND PLAN**
SCALE: 1/4" = 1'- 0"

TRUE NORTH

GRAPHIC SCALE
(IN FEET)
1 inch = 4 ft.

GROUNDING PLAN NOTES:

1. #2 SOLID TINNED BCW GROUND RING (2'–0" FROM OUTSIDE EDGE OF EQUIPMENT SHELTER WHERE ROUTED ALONG SHELTER PERIMETER.
2. WAVEPORT GROUND BAR PER DETAILS.
3. CONNECT FENCE TO GROUNDING RING PER DETAILS (TYP).
4. GROUNDING ROD WITH ACCESS (TYP.) PER DETAILS.
5. GROUNDING ROD (TYP.) PER DETAILS.
6. ICE BRIDGE POST AND COVER. BOND EACH SECTION AND SUPPORT TO GROUND RING PER DETAILS.
7. CADWELD EQUIPMENT BUILDING TO GROUND RING (TYP EACH CORNER).
8. EXTEND GROUND RING PIGTAIL THROUGH SHELTER AND BOND TO HALO GROUND DOWNLEAD. (TYP 4 PLACES).
9. BOND GROUND BAR TO EXISTING TOWER GROUND RING (TYP OF 2). CONTRACTOR TO VERIFY LOCATION IN FIELD.
10. BOND NEW COMPOUND GROUND RING TO EXISTING TOWER GROUND RING WITH #2 AWG BCW.
11. UPPER TOWER MOUNTED GROUND BAR PER DETAILS.
12. LOWER TOWER MOUNTED GROUND BAR PER DETAILS.
13. BOND UPPER TOWER MOUNTED GROUND BAR TO LOWER TOWER MOUNTED GROUND BAR (2 GROUND LEADS) PER DETAILS.
14. BOND HVAC UNIT TO GROUND RING (TYP).
15. BOND PROPANE TANK TO GROUND RING PER NEC AND MANUFACTURERS SPECIFICATIONS. (COORDINATE WIT TANK MFG PRIOR TO INSTALLING.)
16. TOWER MOUNTED GROUND BAR TO BE BONDED TO TOWER PER TOWER MANUFACTURERS SPECIFICATIONS AND IN ACCORDANCE WITH EIA/TIA REQUIREMENTS. COORDINATE WITH STRUCTURAL ENGINEER AND TOWER MANUFACTURER FOR APPROVED BONDING METHODS.
17. BOND GENERATOR TO GROUND PER MANUFACTURERS SPECIFICATIONS.
18. BOND GATE TO FENCE POST PER DETAILS. (TYPICAL)

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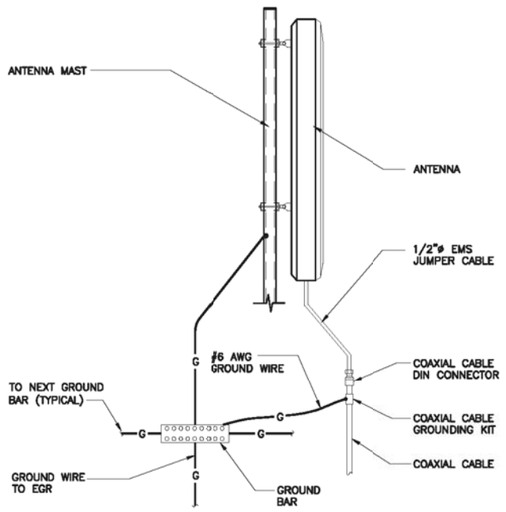
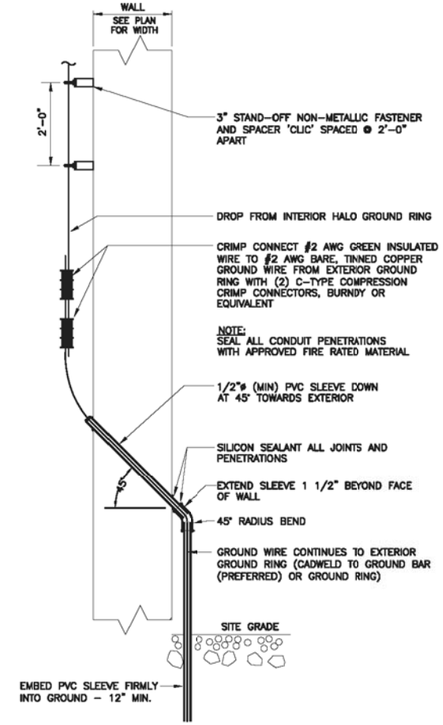
ELECTRICAL GROUNDING PLAN AND NOTES

E-5

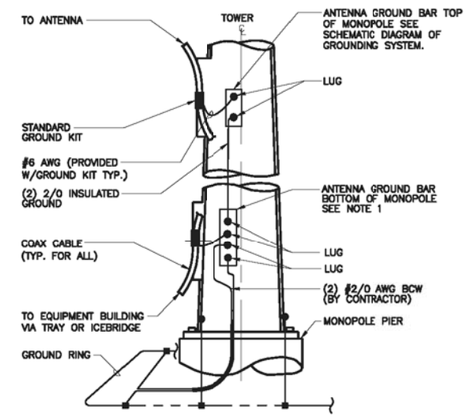
Sheet No. 12 of 16



1 E-6 **TYPICAL ANTENNA GROUNDING DETAIL**
NOT TO SCALE



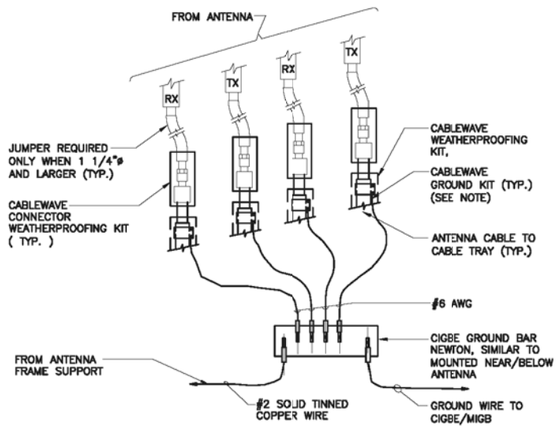
2 E-6 **GROUNDING CONDUCTOR SECURED ON WALL**
N.T.S.



NOTES:

1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED.

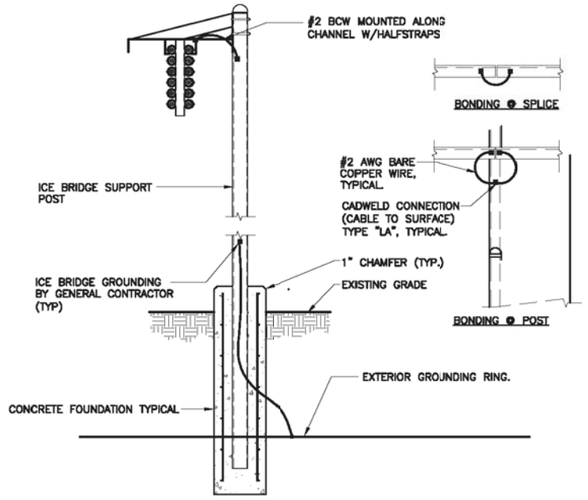
3 E-6 **ANTENNA CABLE GROUNDING**
NOT TO SCALE



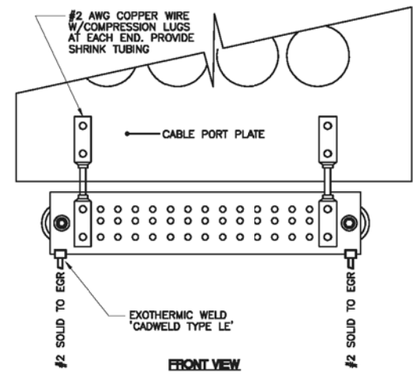
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

4 E-6 **CONNECTION OF GROUND WIRES TO GROUND BAR**
NOT TO SCALE



5 E-6 **ICE BRIDGE CANOPY BONDING DETAIL**
NOT TO SCALE



FRONT VIEW

6 E-6 **CABLEPORT GROUND BAR LUG CONNECTION**
NOT TO SCALE

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EVERSOURCE ENERGY
BIRCHWOOD CONDOMINIUMS
EVERSOURCE STRUCT. NO: 9950
27 CROWS NEST LANE
DANBURY, CT 06810

DATE: 09/28/16
SCALE: AS NOTED
JOB NO. 16144.00

ELECTRICAL DETAILS

E-6

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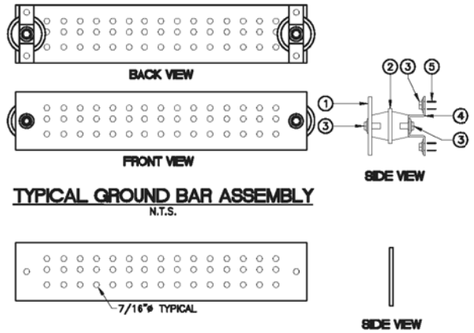
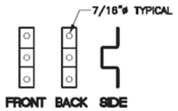


TYPICAL GROUND BAR ASSEMBLY
N.T.S.

TYPICAL GROUND BAR - DIMENSIONS
N.T.S.

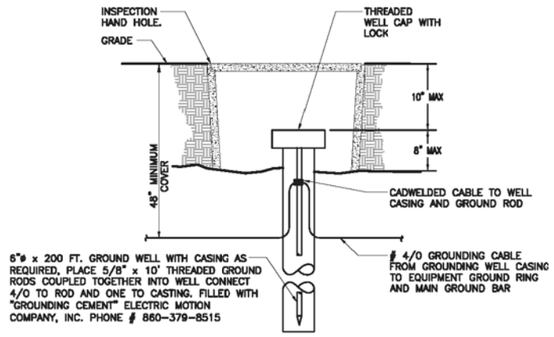
NOTES

1. HIGH CONDUCTIVITY TINNED COPPER BAR 1'-8"Lx4"Wx1/4"D.
2. RED COLORED STANDOFF INSULATOR PLASTIC #1872-1A.
3. STAINLESS STEEL TRUSS SPANNER MACHINE SCREWS, SPLIT LOCKWASHER AND FLAT WASHER.
4. 1"Wx1/8"T STAINLESS STEEL TYPE 304 BRACKET.
5. STAINLESS STEEL TYPE 304 HARDWARE - 3/8"ø EXPANSION BOLT FOR CONCRETE.



BRACKET FOR GROUND BAR-DIMENSIONS
N.T.S.

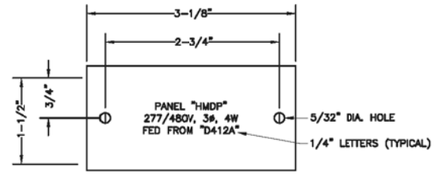
1 / E-7 MASTER/EQUIPMENT GROUND BAR DETAILS
N.T.S.



NOTES:

1. INSPECTION HAND HOLE MAY BE CONCRETE OR PVC AND SHALL BE A MINIMUM OF 12" DIA X 18" DEEP.
2. TO BE INCORPORATED INTO PROJECT IF 5 OHMS CAN NOT BE ACHIEVED AT THE PROJECT SITE

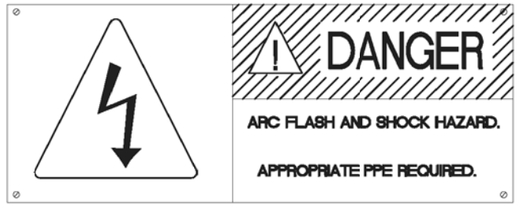
2 / E-7 GROUNDING WELL DETAIL
NOT TO SCALE



NOTES:

1. REFER TO SPECIFICATIONS FOR ADDITIONAL NAMEPLATE REQUIREMENTS.
2. NAMEPLATE TO BE 1/16" WHITE PLASTIC WITH BLACK CENTER LAMINATION. FACE TO BE WHITE, ENGRAVED LETTERS TO BE BLACK.
3. SECURE NAMEPLATE TO SURFACES WITH (2) FLAT HEAD BRASS SCREWS.

3 / E-7 DETAIL OF TYPICAL NAMEPLATE
NOT TO SCALE



NOTES:

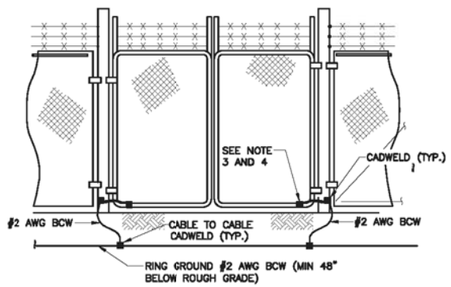
1. REFER TO SPECIFICATIONS FOR FOR ADDITIONAL NAMEPLATE REQUIREMENTS.
2. PROVIDE WARNING LABEL ON ALL SWITCHBOARDS, DISTRIBUTION PANELS, PANELBOARDS IN ACCORDANCE WITH 2005 NEC 110.16.

4 / E-7 DETAIL OF TYPICAL FLASH PROTECTION WARNING SIGN
NOT TO SCALE

NOTES:

1. REFER TO SPECIFICATIONS FOR FOR ADDITIONAL NAMEPLATE REQUIREMENTS.
2. PROVIDE WARNING LABEL ON ALL SERVICE EQUIPMENT IN ACCORDANCE WITH 2011 NEC 110.24.
3. PROVIDE FAULT SHORT CIRCUIT AND COORDINATION STUDY TO ENSURE COMPLIANCE WITH NEC 110.9 & 110.10

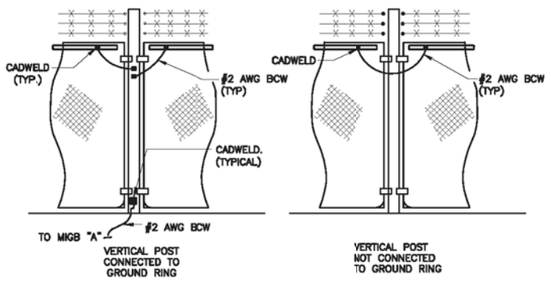
5 / E-7 DETAIL OF TYPICAL FAULT CURRENT SIGN
NOT TO SCALE



NOTES:

1. THE #2 AWG, BCW, FROM THE RING GROUND SHALL BE CADWELDED TO THE POST, ABOVE GRADE.
2. BOND EACH HORIZONTAL POLE/BRACE TO EACH OTHER AND TO EACH VERTICAL POLE BONDED TO THE EXTERIOR GROUND RING.
3. GATE JUMPER SHALL BE #4/0 AWG WELDING CABLE OR FLEXIBLE COPPER BRAID BURNDY TYPE B WITH SLEEVES ON EACH END DESIGNED FOR EXOTHERMIC WELDING.
4. GATE JUMPER SHALL BE INSTALLED SO THAT IT WILL NOT BE SUBJECTED TO DAMAGING STRAIN WHEN GATE IS FULLY OPEN IN EITHER DIRECTION.

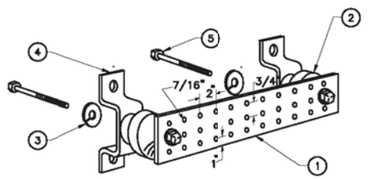
6 / E-7 FENCE GATE GROUNDING
NOT TO SCALE



NOTES:

1. VERTICAL POSTS SHALL BE BONDED TO THE RING AT EACH CORNER AND AT EACH GATE POST. AS A MINIMUM ONE VERTICAL POST SHALL BE BONDED TO THE GROUND RING IN EVERY 100 FOOT STRAIGHT RUN OF FENCE.
2. HORIZONTAL POLES SHALL BE BONDED TO EACH OTHER.
3. BOND EACH HORIZONTAL POLE / BRACE TO EACH OTHER AND TO EACH VERTICAL POST THAT IS BONDED TO THE EXTERIOR GROUND RING.

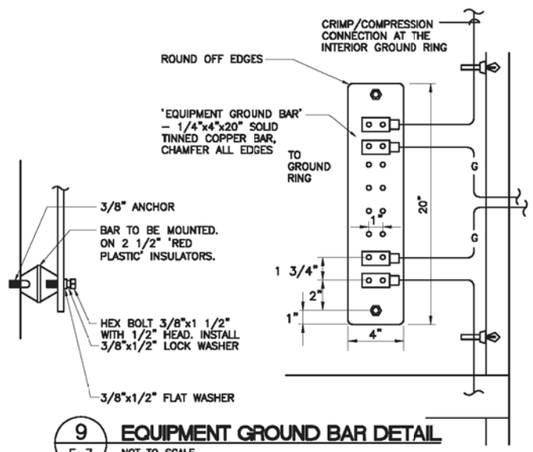
7 / E-7 GROUND-STD. DETAIL FENCE GROUNDING
NOT TO SCALE



NOTES

1. TINNED COPPER GROUND BAR, 1/4" x 4" x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4.
3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056.
5. 5/8-11 x 1" STAINLESS STEEL TRUSS SPANNER MACHINE SCREWS.

8 / E-7 GROUND BAR DETAIL
NOT TO SCALE



9 / E-7 EQUIPMENT GROUND BAR DETAIL
NOT TO SCALE

REV.	DATE	DRAWN BY	CH'K'D BY	DESCRIPTION
7	7/27/17	TJL	CFC	CONSTRUCTION DRAWINGS - COMPOUND FENCE HEIGHT CHANGED
6	7/14/17	DMD	CFC	CONSTRUCTION DRAWINGS - SHEET C-4 "ENVIRONMENTAL NOTES" ADDED
5	6/28/17	TJL	CFC	CONSTRUCTION DRAWINGS - TOP OF TOWER ANTENNA ELEVATIONS ADDED
4	3/09/17	DMD	CFC	CONSTRUCTION DRAWINGS - REVISED ANTENNA CONFIGURATION
3	3/06/17	JTL	CKD	CONSTRUCTION DRAWINGS - REVISED ANTENNA CONFIGURATION
2	11/15/16	TJB	CKD	CONSTRUCTION DRAWINGS - REVISED GENERATOR LOCATION
1	11/09/16	TJB	CKD	CONSTRUCTION DRAWINGS
0	11/08/16	TJB	CKD	CONSTRUCTION DRAWINGS - ISSUED FOR CLIENT REVIEW

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ELECTRICAL DETAILS

E-7

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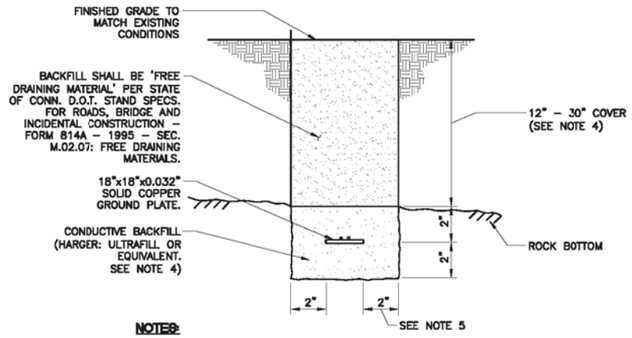
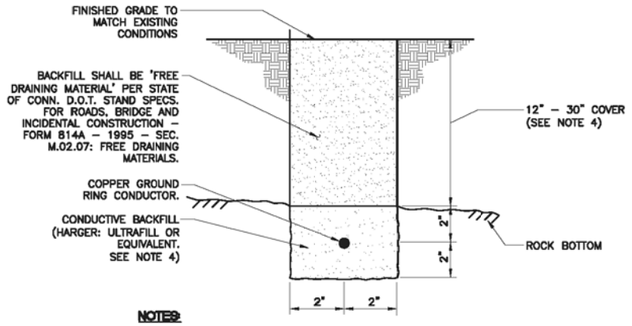


NOTES:

1. ENGINEER SHALL INSPECT PLACEMENT OF EGR CONDUCTOR PRIOR TO BACKFILLING.
2. MAINTAIN MIN. 2'–0" LINEAR CLEARANCE BETWEEN BACKFILL AND THE FOLLOWING: FOUNDATION, UNDERGROUND PIPING/CONDUIT, UNDERGROUND SERVICES. IN THE CLEARANCE AREAS, USE EARTH BACKFILL INSTEAD.
3. EXERCISE HANDLING AND USE PRECAUTION OF BACKFILL MATERIAL PER MFR'S REQUIREMENTS.
4. FOR LOCATIONS WHERE ROCK BOTTOM DEPTH IS LESS THAN 12" CONDUCTIVE CONCRETE SHALL BE USED INSTEAD OF CONDUCTIVE BACKFILL.
5. PROVIDE MIN 2" CLEARANCE ON ALL SIDES OF GROUND PLATE.

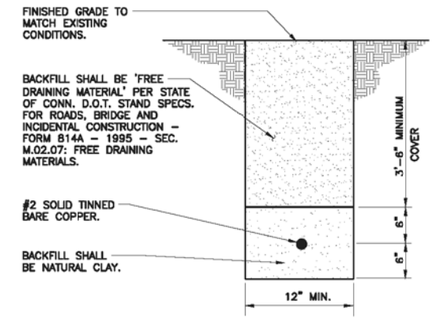
1 / E-8 **GROUND PLATE TRENCH/BACKFILL DETAIL (SHALLOW TOPSOIL)**
NOT TO SCALE



NOTES:

1. ENGINEER SHALL INSPECT PLACEMENT OF EGR CONDUCTOR PRIOR TO BACKFILLING.
2. MAINTAIN MIN. 2'–0" LINEAR CLEARANCE BETWEEN BACKFILL AND THE FOLLOWING: FOUNDATION, UNDERGROUND PIPING/CONDUIT, UNDERGROUND SERVICES. IN THE CLEARANCE AREAS, USE EARTH BACKFILL INSTEAD.
3. EXERCISE HANDLING AND USE PRECAUTION OF BACKFILL MATERIAL PER MFR'S REQUIREMENTS.
4. FOR LOCATIONS WHERE ROCK BOTTOM DEPTH IS LESS THAN 12" CONDUCTIVE CONCRETE SHALL BE USED INSTEAD OF CONDUCTIVE BACKFILL.

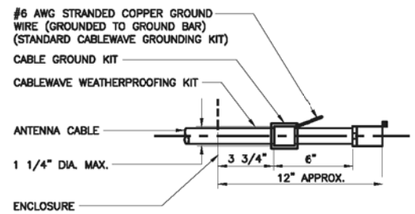
2 / E-8 **EGR TRENCH/BACKFILL DETAIL (SHALLOW TOPSOIL)**
NOT TO SCALE



NOTES:

1. ENGINEER SHALL INSPECT PLACEMENT OF EGR CONDUCTOR PRIOR TO BACKFILLING.
2. MAINTAIN MIN. 2'–0" LINEAR CLEARANCE BETWEEN NATURAL CLAY BACKFILL AND THE FOLLOWING: FOUNDATION, UNDERGROUND PIPING/CONDUIT, UNDERGROUND SERVICES. IN THE CLEARANCE AREAS, USE EARTH BACKFILL INSTEAD.
3. EXERCISE HANDLING AND USE PRECAUTION OF BACKFILL MATERIAL PER MFR'S REQUIREMENTS.

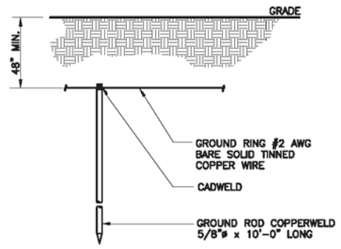
3 / E-8 **EGR TRENCH/BACKFILL DETAIL**
NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

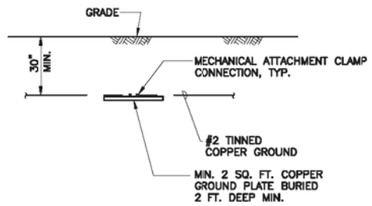
4 / E-8 **ANTENNA CABLE GROUNDING DETAIL**
NOT TO SCALE



NOTES:

1. USE GROUND PLATE DETAIL IF 10 FT. GROUND ROD DEPTH CANNOT BE ACHIEVED DUE TO LEDGE CONDITION OR IF EXISTING TOWER FOUNDATION IS ENCOUNTERED.

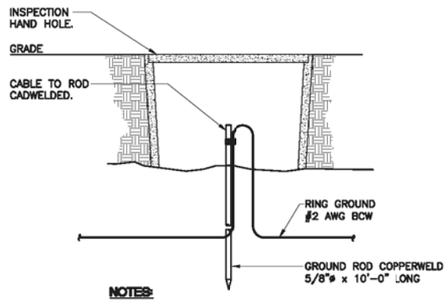
5 / E-8 **GROUND ROD DETAIL**
NOT TO SCALE



NOTES:

1. GROUND PLATE DETAIL TO BE USED ONLY IF 10 FT. GROUND ROD DEPTH CANNOT BE ACHIEVED DUE TO LEDGE CONDITION OR IF EXISTING TOWER FOUNDATION IS ENCOUNTERED.

5A / E-8 **GROUND PLATE DETAIL**
NOT TO SCALE



NOTES:

1. INSPECTION HAND HOLE MAY BE CONCRETE OR PVC AND SHALL BE A MINIMUM OF 12" DIA x 18" DEEP.

6 / E-8 **GROUND ROD WITH ACCESS DETAIL**
NOT TO SCALE

REV.	DATE	DRAWN BY	CH'D BY	DESCRIPTION
7	7/27/17	TJL	CFC	CONSTRUCTION DRAWINGS – COMPOUND FENCE HEIGHT CHNAGED
6	7/14/17	DMD	CFC	CONSTRUCTION DRAWINGS – SHEET C-4 "ENVIRONMENTAL NOTES" ADDED
5	6/28/17	TJL	CFC	CONSTRUCTION DRAWINGS – TOP OF TOWER ANTENNA ELEVATIONS ADDED
4	3/09/17	JTL	CHD	CONSTRUCTION DRAWINGS – REVISED ANTENNA CONFIGURATION
3	11/15/16	TJB	CHD	CONSTRUCTION DRAWINGS – REVISED GENERATOR LOCATION
2	11/09/16	TJB	CHD	CONSTRUCTION DRAWINGS
1	11/08/16	TJB	CHD	CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW
0	11/08/16	TJB	CHD	CONSTRUCTION DRAWINGS

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ELECTRICAL DETAILS

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Sheet No. 15 of 16

ELECTRICAL SPECIFICATIONS

SECTION 16010

1.01. SCOPE OF WORK

A. WORK SHALL INCLUDE ALL LABOR, EQUIPMENT AND SERVICES REQUIRED TO COMPLETE (MAKE READY FOR OPERATION) ALL THE ELECTRICAL WORK INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING:

1. EXTEND EXISTING 200A, 240/120V, 1P, 3 WIRE ELECTRIC SERVICE WITH REVENUE METER TO EQUIPMENT SHELTER. (AS REQUIRED BY UTILITY CO.)
2. EXTEND EXISTING COMMUNICATIONS CABLING TO EQUIPMENT SHELTER.
3. GENERATOR/TRANSFER SWITCH.
4. FEEDERS AND BRANCH CIRCUIT WIRING TO PANELS, RECEPTACLES, EQUIPMENT, LIGHTING FIXTURES, ETC. AS INDICATED OR NOTED ON PLANS.
5. POWER AND TEMPERATURE CONTROL WIRING FOR HVAC EQUIPMENT.
   a. FURNISH AND INSTALL ALL POWER WIRING FOR ALL HEATING, VENTILATING, AIR CONDITIONING, MOTORS AND DEVICES, AND FIRE PROTECTION EQUIPMENT INDICATED ON THE PLANS OR CALLED FOR IN THIS SPECIFICATION, EITHER ELECTRICAL OR MECHANICAL INCLUDING ALL CONTROL WIRING. ALL MAGNETIC STARTERS SHALL BE FURNISHED UNDER DIVISION 15 AND HAVE INSTALLED THEREIN A PROPER OVERLOAD HEATER FOR EACH MOTOR.
   b. ALL WIRING, BOTH POWER AND CONTROL, FOR SUCH ITEMS AS UNIT HEATERS, EXHAUST FANS, ETC., NOT SPECIFICALLY CALLED FOR IN THE TEMPERATURE CONTROL SPECIFICATIONS, SHALL BE WIRED UNDER DIVISION 16.
   c. ALL CONTROLS WHICH ARE TO BE WIRED BY THIS CONTRACTOR SHALL BE DELIVERED TO HIM BY THE CONTRACTOR/VENDOR FURNISHING THEM.
5. SITE ALARMS, ASSOCIATED WIRING AND DEVICES.
7. GROUNDING SYSTEMS, CONSISTING OF ANTENNA GROUNDING, INTERIOR GROUNDING RING, GROUND BARS, ETC.
8. FIELD MEASURE EXISTING ELECTRICAL SERVICES TO CONFIRM AVAILABLE EXISTING POWER.
9. COORDINATE ALL WORK SHOWN, ON THESE PLANS WITH LOCAL UTILITY COMPANIES.

B. LOCAL UTILITY COMPANIES SHALL PROVIDE THE FOLLOWING:

1. SHUTDOWN OF SERVICE (COORDINATE WITH OWNER).

C. CONTRACTOR SHALL CONFER WITH LOCAL UTILITY COMPANIES TO ASCERTAIN THE LIMITS OF THEIR WORK AND SHALL INCLUDE IN BID ANY CHARGES OR FEES MADE BY THE UTILITY COMPANIES FOR THEIR PORTION OF THE WORK AND SHALL PROVIDE AND INSTALL ALL ITEMS REQUIRED, BUT NOT PROVIDED BY UTILITY COMPANY.

D. ELECTRICAL CONTRACTOR SHALL COORDINATE ELECTRICAL INSTALLATION WITH ELECTRIC UTILITY CO. PRIOR TO INSTALLATION.

E. CONTRACTOR SHALL COORDINATE WITH TELEPHONE UTILITY COMPANY FOR LOCATION OF TELEPHONE SERVICE AND TO DETERMINE ANY REQUIRED EQUIPMENT TO BE INSTALLED BY CONTRACTOR.

1.02. GENERAL REQUIREMENTS

A. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.

B. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNERS REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES THAT MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS THAT MAY BE REQUIRED BY THE LOCAL AUTHORITY.

D. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.

E. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH LOCAL TELEPHONE COMPANY THAT MAY BE REQUIRED FOR THE INSTALLATION OF TELEPHONE SERVICE TO THE PROPOSED SITE.

F. NO MATERIAL OTHER THAN THAT CONTAINED IN THE "LATEST LIST OF ELECTRICAL FITTINGS" APPROVED BY THE UNDERWRITERS' LABORATORIES, SHALL BE USED IN ANY PART OF THE WORK. ALL MATERIAL FOR WHICH LABEL SERVICE HAS BEEN ESTABLISHED SHALL BEAR THE U.L. LABEL.

G. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.

H. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.

I. THE ELECTRICAL CONTRACTOR SHALL SUPPLY THREE (3) COMPLETE SETS OF APPROVED DRAWINGS, ENGINEERING DATA SHEETS, MAINTENANCE AND OPERATING INSTRUCTION MANUALS FOR ALL SYSTEMS AND THEIR RESPECTIVE EQUIPMENT. THESE MANUALS SHALL BE INSERTED IN VINYL COVERED 3-RING BINDERS AND TURNED OVER TO OWNER'S REPRESENTATIVE ONE (1) WEEK PRIOR TO FINAL PUNCH LIST.

J. ALL WORK SHALL BE INSTALLED IN A NEAT AND WORKMAN LIKE MANNER AND WILL BE SUBJECT TO THE APPROVAL OF THE OWNER'S REPRESENTATIVE.

K. ALL EQUIPMENT AND MATERIALS TO BE INSTALLED SHALL BE NEW, UNLESS OTHERWISE NOTED.

L. BEFORE FINAL PAYMENT, THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF PRINTS (AS-BUILTS), LEGIBLY MARKED IN RED PENCIL TO SHOW ALL CHANGES FROM THE ORIGINAL PLANS.

M. PROVIDE TEMPORARY POWER AND LIGHTING IN WORK AREAS AS REQUIRED.

N. SHOP DRAWINGS:

1. CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF SHOP DRAWINGS ON ALL EQUIPMENT AND MATERIALS PROPOSED FOR USE ON THIS PROJECT, GIVING ALL DETAILS, WHICH INCLUDE DIMENSIONS, CAPACITIES, ETC.
2. CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF ALL TEST REPORTS CALLED FOR IN THE SPECIFICATIONS AND DRAWINGS.

O. ENTIRE ELECTRICAL INSTALLATION SHALL BE IN ACCORDANCE WITH OWNER'S SPECIFICATIONS, AND REQUIREMENTS OF ALL LOCAL AUTHORITIES HAVING JURISDICTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH APPROPRIATE INDIVIDUALS TO OBTAIN ALL SUCH SPECIFICATIONS AND REQUIREMENTS. NOTHING CONTAINED IN, OR OMITTED FROM, THESE DOCUMENTS SHALL RELIEVE CONTRACTOR FROM THIS OBLIGATION.

SECTION 16111

1.01. CONDUIT

A. MINIMUM CONDUIT SIZE FOR BRANCH CIRCUITS, LOW VOLTAGE CONTROL AND ALARM CIRCUITS SHALL BE 3/4". ALL CONDUIT RUNS LOCATED WITHIN THE OWNER'S EQUIPMENT ROOM SHALL ORIGINATE FROM THE WIREWAY AND RUN VERTICALLY TO ITS DESTINATION. NO BENDS WILL BE ACCEPTED. CONDUITS SHALL BE PROPERLY FASTENED TO THE WALLS AND CEILINGS AS REQUIRED BY THE N.E.C.

CONDUIT MATERIAL SHALL BE AS FOLLOWS:

1. ELECTRIC METALLIC TUBING (EMT) – BRANCH CIRCUITS INSIDE WIRELESS ROOM
2. GALVANIZED RIGID CONDUIT (GRC) – FEEDERS AND CIRCUITS EXPOSED TO EXTERIOR & UNDERGROUND.
3. LIQUID TIGHT FLEXIBLE METAL CONDUIT – FOR SHORT LENGTHS (MAX. 3'-0") WIRING TO VIBRATING EQUIPMENT (HVAC UNITS, MOTORS, ETC.) IN WET LOCATIONS.
4. FLEXIBLE METAL CONDUIT – FOR SHORT LENGTHS (MAX. 3'-0") WIRING TO VIBRATING EQUIPMENT IN DRY LOCATIONS.
5. PVC CONDUIT – WHERE SHOWN ON GROUNDING DETAILS.

SECTION 16114

1.01. CABLE TRAY

A. CABLE TRAY SHALL BE SOLID SIDE BAR, 18" WIDE (NEWTON INSTRUMENT COMPANY, INC.). TRAY SHALL BE INSTALLED AS SHOWN ON CONTRACT DOCUMENTS.

B. CROSSWISE RUNS SHALL BE COORDINATED WITH THE SPECIFIC EQUIPMENT THE TRAY SHALL SERVE.

C. ALL PROTRUDING CABLE TRAY SUPPORT RODS SHALL BE FILED SMOOTH WITH NO SHARP EDGES. ALL SUPPORT RODS SHALL BE CAD-PLATED FOR RUST RESISTANCE AND A MINIMUM 1/2" DIAMETER.

SECTION 16123

1.01. CONDUCTORS

A. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS. #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:

	120/208/240V	277/480V
LINE	COLOR	COLOR
A	BLACK	BROWN
B	RED	ORANGE
C	BLUE	YELLOW
N	CONTINUOUS WHITE	GREY
G	CONTINUOUS GREEN	GREEN WITH YELLOW STRIPE

B. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.

SECTION 16130

1.01. BOXES

A. FURNISH AND INSTALL OUTLET BOXES FOR ALL DEVICES, SWITCHES, RECEPTACLES, ETC.. BOXES TO BE ZINC COATED STEEL.

B. FURNISH AND INSTALL PULL BOXES IN MAIN FEEDERS RUNS WHERE REQUIRED. PULL BOXES SHALL BE GALVANIZED STEEL WITH SCREW REMOVABLE COVERS, SIZE AND QUANTITY AS REQUIRED. PROVIDE WEATHERPROOF CONSTRUCTION IN WET LOCATIONS.

SECTION 16170

1.01. DISCONNECT SWITCHES

A. FUSIBLE AND NON-FUSIBLE, 600V, HEAVY DUTY DISCONNECT SWITCHES SHALL BE AS MANUFACTURED BY SQUARE "D". PROVIDE FUSES AS CALLED FOR ON THE CONTRACT DRAWINGS. AMPERE RATING SHALL BE CONSISTENT WITH LOAD BEING SERVED. DISCONNECT SWITCH COVER SHALL BE MECHANICALLY INTERLOCKED TO PREVENT COVER FROM OPENING WHEN THE SWITCH IS IN THE "ON" POSITION. EXTERIOR APPLICATIONS SHALL BE NEMA 3R CONSTRUCTION WITH PADLOCK FEATURE.

SECTION 16190

1.01. SEISMIC RESTRAINT

A. ALL DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH ZONE 2 SEISMIC REQUIREMENTS.

SECTION 16195

1.01. LABELING AND IDENTIFICATION NOMENCLATURE FOR ELECTRICAL EQUIPMENT

A. CONTRACTOR SHALL FURNISH AND INSTALL NON-METALLIC ENGRAVED BACK-LIT NAMEPLATES ON ALL PANELS AND MAJOR ITEMS OF ELECTRICAL EQUIPMENT.

B. LETTERS TO BE WHITE ON BLACK BACKGROUND WITH LETTERS 1-1/2 INCH HIGH WITH 1/4 INCH MARGIN.

C. IDENTIFICATION NOMENCLATURE SHALL BE IN ACCORDANCE WITH OWNER'S STANDARDS.

D. PROVIDE NAMEPLATE FOR PORTABLE ENGINE/GENERATOR CONNECTION SHOWING VOLTAGE KVA/KW RATING, # PHASE, AND # OF WIRES. PLATE TO BE PLASTIC ENGRAVED, RED WITH WHITE LETTERS.

E. ALL RECEPTACLES, SWITCHES, DISCONNECT SWITCHES, ETC. SHALL BE LABELED WITH THE CORRECT BRANCH CIRCUIT NUMBER SERVED BY MEANS OF PERMANENT PRESSED TYPE BLACK 1/4" TRANSFER LETTERING. (FOR EXAMPLE: "MDP-5", ETC.).

F. PROVIDE A NAMEPLATE AT THE SERVICE EQUIPMENT INDICATING THE TYPE AND LOCATION OF THE ON SITE GENERATOR.

SECTION 16450

1.01. GROUNDING

A. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.

B. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.

C. GROUNDING OF PANELBOARDS:

1. PANELBOARD SHALL BE GROUNDED BY TERMINATING THE PANELBOARD FEEDER'S EQUIPMENT GROUND CONDUCTOR TO THE EQUIPMENT GROUND BAR KIT(S) LUGGED TO THE CABINET. ENSURE THAT THE SURFACE BETWEEN THE KIT AND CABINET ARE BARE METAL TO BARE METAL. PRIME AND PAINT OVER TO PREVENT CORROSION.
2. CONDUIT(S) TERMINATING INTO THE PANELBOARD SHALL HAVE GROUNDING TYPE BUSHINGS. THE BUSHINGS SHALL BE BONDED TOGETHER WITH BARE #10 AWG COPPER CONDUCTOR WHICH IN TURN IS TERMINATED INTO THE PANELBOARD'S EQUIPMENT GROUND BAR KIT(S).

D. EQUIPMENT GROUNDING CONDUCTOR:

1. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122.
2. THE MINIMUM SIZE OF EQUIPMENT GROUND CONDUCTOR SHALL BE #12 AWG COPPER.
3. REFER TO PANEL SCHEDULE "BRANCH CIRCUIT" DATA FOR EQUIPMENT GROUND CONDUCTOR SIZE FOR EACH BRANCH CIRCUIT.
4. EACH FEEDER OR BRANCH CIRCUIT SHALL HAVE EQUIPMENT GROUND CONDUCTOR(S) INSTALLED IN THE SAME RACEWAY(S).

E. GROUNDING SYSTEM:

CONTRACTOR SHALL PROVIDE A GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 5 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

PROVIDE THE GROUNDING SYSTEM AS SPECIFIED ON DRAWINGS, INCLUDING, BUT NOT LIMITED TO:

1. GROUND BARS
2. INTERIOR GROUND RING
3. EXTERIOR GROUNDING (WHERE REQUIRED DUE TO MEASURED AC RESISTANCE GREATER THAN SPECIFIED).
4. ANTENNA GRCUND CONNECTIONS AND PLATES.

F. CONTRACTOR, AFTER COMPLETION OF THE COMPLETE GROUNDING SYSTEM BUT PRIOR TO CONCEALMENT/BURIAL OF SAME, SHALL NOTIFY OWNER'S WIRELESS PROJECT ENGINEER WHO WILL HAVE A DESIGN ENGINEER VISIT SITE AND MAKE A VISUAL INSPECTION OF THE GROUNDING GRID AND CONNECTIONS OF THE SYSTEM.

G. ALL EQUIPMENT SHALL BE BONDED TO GROUND AS REQUIRED BY N.E.C., MFG. SPECIFICATIONS, AND OWNER'S SPECIFICATIONS.

SECTION 16470

1.01. DISTRIBUTION EQUIPMENT

A. REFER TO CONTRACT DRAWINGS FOR DETAILS AND SCHEDULES.

SECTION 16477

1.01. FUSES

A. FUSES SHALL BE NONRENEWABLE TYPE AS MANUFACTURED BY "BUSSMAN" OR APPROVED EQUAL. FUSES RATED TO 1/10 AMPERE UP TO 600 AMPERES SHALL BE EQUIVALENT TO BUSSMAN TYPE LPN-RK (250V) UL CLASS RK1, LOW PEAK, DUAL ELEMENT, TIME-DELAY FUSES. FUSES SHALL HAVE SEPARATE SHORT CIRCUIT AND OVERLOAD ELEMENTS AND HAVE AN INTERRUPTING RATING OF 200 KAIC. UPON COMPLETION OF WORK, PROVIDE ONE SPARE SET OF FUSES FOR EACH TYPE INSTALLED.

SECTION 16620
(SUPPLIED BY OWNER, INSTALLED BY CONTRACTOR)

1.01. GENERATOR SET

A. REFER TO CONTRACT DRAWINGS FOR DETAILS AND SCHEDULES.

SECTION 16700

1.01. BUILDING ALARMS (SIGNAL COMMUNICATIONS)

A. ALARM BOX SHALL BE 12" W x 12" H x 6" D NEMA 1 ENCLOSURE, MCKINSTRY #30-1216LP WITH ACCESSORIES:

- "T" HANDLE LATCH KIT
- 14 GAUGE STEEL PANEL, PAINTED WHITE ENAMEL
- (6) 1/2"-3/4" K.OS ON EACH SIDE/TOP/BOTTOM WALLS
- (2) 3/4" RUBBER GROMMETS AS SLEEVES
- PROVIDE WIRING SCHEMATIC IN REMOVABLE PLASTIC COVER, TAPED TO BACK SIDE OF HINGED DOOR.

B. ALARM SENSORS' RELAY SHALL BE NORMALLY CLOSED. UPON ALARM CONDITION, THE RELAY SHALL REVERSE STATE TO OPEN. CONFIRM INSTALLATION AND LOCATION REQUIREMENTS FOR BUILDING'S ALARM SENSORS.

ALARM SENSORS SHALL BE:

1. FIRE ALARM CONTROL PANEL: FROM C CONTACT RELAY.
2. DOOR CONTACT SENSOR (SENTROL #1085T): SPDT MAGNETIC FORM C CONTACT – OPEN/CLOSE LOOP, MAX 1" GAP.
3. LOW TEMPERATURE SENSOR (HONEYWELL #T631C1103): SPDT AIR SWITCH CONTROLLER – COILED COPPER TUBE IN NEMA 1 ENCLOSURE. SET AT 50 DEGREES F., MOUNT LAMINATED, BACK-LIT NAMEPLATE WITH LEGIBLE DESCRIPTION "LOW TEMP 50 DEGREE F" BELOW SENSOR.
4. HIGH TEMPERATURE SENSOR (HONEYWELL #T631C1103): SPDT AIR SWITCH CONTROLLER – COILED COPPER TUBE IN NEMA 1 ENCLOSURE. SET AT 80 DEGREES F., MOUNT LAMINATED, BACK-LIT NAMEPLATE WITH LEGIBLE DESCRIPTION "HI TEMP 80 DEGREES F" BELOW SENSOR.

C. CONFIRM REQUIREMENTS FOR ALL BUILDING ALARM SENSORS INSTALLATION, AND LOCATION OF EACH SENSOR. ALARM WIRING SHALL BE ROUTED TO ALARM BOX AND SPADE CONNECTED TO RESPECTIVE TERMINAL BLOCK. EACH PAIR OF ALARM WIRING SHALL BE PERMANENTLY AND UNIQUELY TAGGED AT EACH TERMINAL STRIP LOCATION AND AT SPLICE/JUNCTION/BOXES/WIRING TROUGH.

D. REFER TO "WIRING SCHEMATIC FOR ALARM SENSORS" ON DRAWINGS.

SECTION 16960

1.01. TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:

TEST 1: THERMAL OVERLOAD AND MAGNETIC TRIP TEST, AND CABLE INSULATION TEST FOR ALL CIRCUIT BREAKERS RATED 100 AMPS OR GREATER.

TEST 2: RESISTANCE TO GROUND TEST ON THE GROUNDING SYSTEM.

THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:

1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.
2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.
3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

B. THESE TESTS SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNER'S CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION REPRESENTATIVE AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM'S REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.

D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

SECTION 16961

1.01. TESTS BY CONTRACTOR

A. ALL TESTS AS REQUIRED UPON COMPLETION OF WORK, SHALL BE MADE BY THIS CONTRACTOR. THESE SHALL BE CONTINUITY AND INSULATION TESTS; TEST TO DETERMINE THE QUALITY OF MATERIALS, ETC. AND SHALL BE MADE IN ACCORDANCE WITH N.E.C. RECOMMENDATIONS. ALL FEEDERS AND BRANCH CIRCUIT WIRING (EXCEPT CLASS 2 SIGNAL CIRCUITS) MUST BE TESTED FREE FROM SHORT CIRCUIT AND GROUND FAULT CONDITIONS AT 500V IN A REASONABLY DRY AMBIENT OF APPROXIMATELY 70 DEGREES F.

B. CONTRACTOR SHALL PERFORM LOAD PHASE BALANCING TESTS. CIRCUITS SHALL BE SO CONNECTED TO THE PANELBOARDS SUCH THAT THE NEW LOAD IS DISTRIBUTED AS EQUALLY AS POSSIBLE BETWEEN EACH LOAD AND NEUTRAL. 10% SHALL BE CONSIDERED AS A REASONABLE AND ACCEPTABLE ALLOWANCE. BRANCH CIRCUITS SHALL BE BALANCED ON THEIR OWN PANELBOARDS; FEEDER LOADS SHALL, IN TURN, BE BALANCED ON THE SERVICE EQUIPMENT. REASONABLE LOAD TEST SHALL BE ARRANGED TO VERIFY LOAD BALANCE IF REQUESTED BY THE ENGINEER.

C. ALL TESTS, UPON REQUEST, SHALL BE REPEATED IN THE PRESENCE OF OWNER'S REPRESENTATIVE. ALL TESTS SHALL BE DOCUMENTED AND TURNED OVER TO OWNER. OWNER SHALL HAVE THE AUTHORITY TO STOP ANY OF THE WORK NOT BEING PROPERLY INSTALLED. ALL SUCH DETECTED WORK SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL EXPENSE TO THE OWNER AND THE TESTS SHALL BE REPEATED.

REV.	DATE	DRAWN BY	CH'D BY	DESCRIPTION
7	7/27/17	TJL	CFC	CONSTRUCTION DRAWINGS – COMPOUND FENCE HEIGHT CHANGED
6	7/14/17	DMD	CFC	CONSTRUCTION DRAWINGS – SHEET C-4 "ENVIRONMENTAL NOTES" ADDED
5	6/28/17	TJL	CFC	CONSTRUCTION DRAWINGS – TOP OF TOWER ANTENNA ELEVATIONS ADDED
4	3/09/17	JTL	CHD	CONSTRUCTION DRAWINGS – REVISED ANTENNA CONFIGURATION
3	11/15/16	TJB	CHD	CONSTRUCTION DRAWINGS – REVISED GENERATOR LOCATION
2	11/09/16	TJB	CHD	CONSTRUCTION DRAWINGS
1	11/09/16	TJB	CHD	CONSTRUCTION DRAWINGS
0	11/08/16	TJB	CHD	CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW

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27 CROWS NEST LANE
DANBURY, CT 06810

DATE: 09/28/16
SCALE: AS NOTED
JOB NO. 16144.00

ELECTRICAL SPECIFICATIONS

E-9

Sheet No. 16 of 16

Attachment 2 – Antenna and Emergency Backup Generator Specifications

Product Specifications

DB589-Y

Andrew® Omni Antenna, 890–960 MHz, 360° horizontal beamwidth, fixed electrical tilt, fits on 38–51 mm (1-1/2 to 2 in) OD pipe

- Light weight, low profile omnidirectional antenna ideal for low to moderate gain applications
- Integral dual purpose mount allows top or side mounting

Note: Existing Antenna To Be Removed

Electrical Specifications

Frequency Band, MHz	**890–960**
Gain, dBi	11.1
Beamwidth, Horizontal, degrees	360
Beamwidth, Vertical, degrees	9.0
Beam Tilt, degrees	0
VSWR | Return Loss, dB	1.5 | 14.0
PIM, 5th Order, 2 x 20 W, dBc	-153
Input Power per Port, maximum, watts	400
Polarization	Vertical
Impedance	50 ohm

General Specifications

Antenna Brand	Andrew®
Antenna Type	Omni
Band	Single band
Operating Frequency Band	890 – 960 MHz
Includes	V-bolts
Performance Note	Outdoor usage

Mechanical Specifications

Color	Horizon blue
Lightning Protection	dc Ground
Radiator Material	Brass
Radome Material	Fiberglass, UV resistant
RF Connector Interface	N Female
RF Connector Location	Bottom
RF Connector Quantity, total	1
Wind Loading, maximum	176.1 N @ 100 mph 39.6 lbf @ 100 mph
Wind Speed, maximum	201 km/h | 125 mph

Dimensions

Length	2794.0 mm | 110.0 in
Outer Diameter	38.1 mm | 1.5 in
Net Weight	5.2 kg | 11.5 lb

Product Specifications

DB589-Y

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

900 MHz Omni Antennas (890-960 MHz)

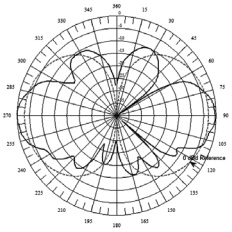
dbSpectra

Note: Proposed Antenna To Be Installed

		890-960 MHz															
	Model Number	**DS9A03F36U-N**	**DS9A03F36U-D**	**DS9A06F36U-N**	**DS9A06F36U-D**	**DS9A09F36U-N**	**DS9A09F36U-D**	**DS9A10F36U-N**	**DS9A10F36U-D**	**DS9A12F36U-N**	**DS9A12F36U-D**	**DS9A03F36D-N**	**DS9A03F36D-D**	**DS9A06F36D-N**	**DS9A06F36D-D**	**DS9A09F36D-N**	**DS9A09F36D-D**	**DS9A06F36T-N**	**DS9A06F36T-D**
	Input Connector	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN
	Type	Single		Single		Single		Single		Single		Dual		Dual		Dual		Triple	
ELECTRICAL	**Bandwidth**, MHz	70		70		70		70		70		70		70		70		70	
ELECTRICAL	**Power**, Watts	500		500		500		500		500		350		350		350		250	
ELECTRICAL	**Gain**, dBd	3		6		9		10		12		3		6		9		6	
ELECTRICAL	**Horizontal Beamwidth**, degrees	360		360		360		360		360		360		360		360		360	
ELECTRICAL	**Vertical Beamwidth**, degrees	30		16		8		6		3		30		16		8		16	
ELECTRICAL	**Beam Tilt**, degrees	0		0		0		0		0		0		0		0		0	
ELECTRICAL	**Isolation (minimum)**, dB	N/A		N/A		N/A		N/A		N/A		40		40		45		40	
MECHANICAL	**Number of Connectors**	1		1		1		1		1		2		2		2		3	
MECHANICAL	**Flat Plate Area**, $ft^2(m^2)$	0.24 (0.02)		1.28 (0.12)		2.26 (0.21)		3.25 (0.3)		4.33 (0.4)		1.38 (0.13)		2.27 (0.21)		3.83 (0.36)		3.47 (032)	
MECHANICAL	**Lateral Windload Thrust**, lbf(N)	11 (48)		48 (214)		85 (377)		122 (543)		163 (723)		31 (139)		85 (374)		144 (641)		87 (385)	
MECHANICAL	**Survival Wind Speed**																		
MECHANICAL	**without ice**, mph(kph)	437 (703)		250 (402)		150 (241)		105 (169)		75 (121)		379 (610)		150 (241)		90 (145)		136 (219)	
MECHANICAL	**with 0.5" radial ice**, mph(kph)	319 (513)		225 (362)		127 (204)		88 (142)		60 (97)		294 (473)		125 (201)		75 (121)		106 (171)	
MECHANICAL	**Mounting Hardware** included	DSH2V3R		DSH2V3R		DSH3V3R		DSH3V3N		DSH3V3N		DSH2V3R		DSH3V3R		DSH3V3N		DSH3V3N	
DIMENSIONS	**Length**, ft(m)	2.9 (0.9)		6.7 (2)		11.4 (3.5)		16.3 (5)		21.8 (6.6)		8 (2.4)		11.4 (3.5)		19.2 (5.9)		15.3 (4.7)	
DIMENSIONS	**Radome O.D.**, in(cm)	2 (5.1)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)	
DIMENSIONS	**Mast O.D.**, in(cm)	2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		3.2 (8.13)	
DIMENSIONS	**Net Weight** w/o bracket, lb(kg)	5.5 (2.5)		18 (8.2)		30 (13.6)		45 (20.4)		52 (23.6)		21 (9.5)		31 (14.1)		50 (22.7)		40 (18.1)	
DIMENSIONS	**Shipping Weight**, lb(kg)	9.6 (4.4)		28 (12.7)		60 (27.2)		75 (34)		82 (37.2)		51 (23.1)		61 (27.7)		80 (36.3)		50 (22.7)	

VERTICAL PATTERNS

DS9A03F36U-N
DS9A03F36U-D



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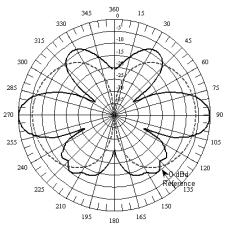

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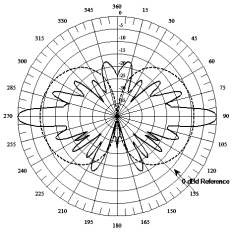

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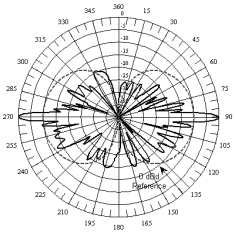

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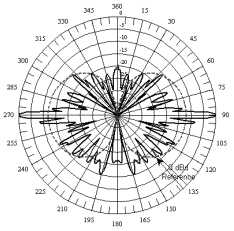

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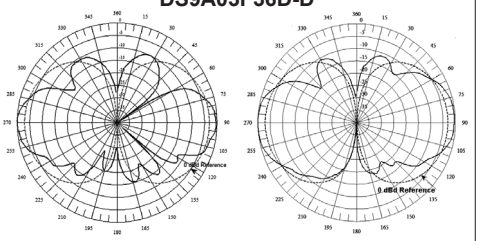

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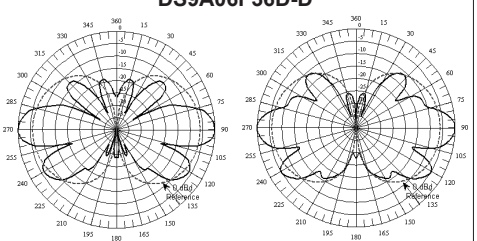

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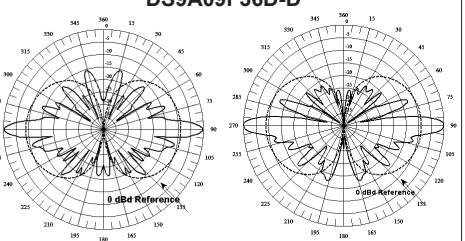

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900 MHz Omni Antennas (890-960 MHz)

		890-960 MHz					
	Model Number	**DS9A06F36U3N**	**DS9A06F36U3D**	**DS9A06F36U6N**	**DS9A06F36U6D**	**DS9A10F36U3N**	**DS9A10F36U3D**
	Input Connector	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN
	Type	Beamtilt		Beamtilt		Beamtilt	
ELECTRICAL	**Bandwidth**, MHz	70		70		70	
	Power, Watts	500		500		500	
	Gain, dBd	6		6		10	
	Horizontal Beamwidth, degrees	360		360		360	
	Vertical Beamwidth, degrees	16		16		6	
	Beam Tilt, degrees	3 Down		6 Down		3 Down	
	Isolation (minimum), dB	N/A		N/A		N/A	
MECHANICAL	**Number of Connectors**	1		1		1	
	Flat Plate Area, $ft^2(m^2)$	1.28 (0.12)		1.28 (0.12)		2.5 (0.23)	
	Lateral Windload Thrust, lbf(N)	48 (214)		48 (214)		122 (543)	
	Survival Wind Speed **without ice**, mph(kph) **with 0.5" radial ice**, mph(kph)	 250 (402) 225 (362)		 250 (402) 225 (362)		 105 (169) 88 (142)	
	Mounting Hardware included	DSH2V3R		DSH2V3R		DSH3V3N	
DIMENSIONS	**Length**, ft(m)	6.7 (2)		6.7 (2)		16.3 (5)	
	Radome O.D., in(cm)	3 (7.6)		3 (7.6)		3 (7.6)	
	Mast O.D., in(cm)	2.5 (6.4)		2.5 (6.4)		2.5 (6.4)	
	Net Weight w/o bracket, lb(kg)	18 (8.2)		18 (8.2)		45 (20.4)	
	Shipping Weight, lb(kg)	28 (12.7)		28 (12.7)		75 (34)	

VERTICAL PATTERNS

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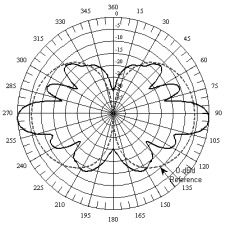

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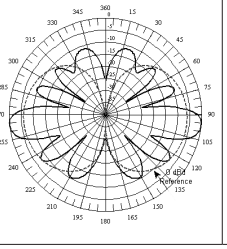

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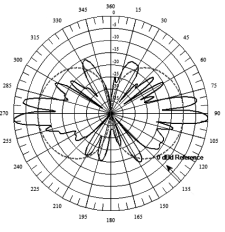
DS9A10F36U3D



Models: 20RESD

KOHLER Power Systems

Multi-Fuel
LPG/Natural Gas

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED

GreenBuilder EDITORS' CHOICE THE HOT 50 PRODUCTS 2010

MVP AWARD MOST VALUABLE PRODUCT 2010

ARCHITECTURAL RECORD PRODUCT REPORTS 2011

The Kohler® Advantage

- **High Quality Power**
  Kohler home generators provide advanced voltage and frequency regulation along with ultra-low levels of harmonic distortion for excellent generator power quality to protect your valuable electronics.
- **Extraordinary Reliability**
  Kohler is known for extraordinary reliability and performance and backs that up with a premium 5-year or 2000 hour limited warranty.
- **Perfect for Tight Lot Lines**
  Can be placed as close as 18 inches from your home or small business, providing installation flexibility even on smaller lots. *
- **Powerful Performance**
  Exclusive PowerBoost™ technology provides excellent starting power.*
- **Fast Response**
  Kohler generators restore power to your home quickly and reliably.
- **Quiet Operation**
  Kohler home generators provide quiet, neighborhood-friendly performance.

Standard Features

- **RDC2 Controller**
  - One digital controller manages both the generator set and transfer switch functions (with optional Model RXT transfer switch)
  - Designed for today's most sophisticated electronics
  - Electronic speed control responds quickly to varying household demand
  - Digital voltage regulation protects your sensitive electronics from harmonic distortion and unstable power quality
  - Two-line, backlit LCD display with adjustable contrast is easy to read, even in direct sunlight or low light
- **Kohler Command PRO Engine Features**
  - Kohler Command PRO® OHV engine with hydraulic valve lifters for reliable performance without routine valve adjustment or lengthy break-in requirements
  - Powerful, reliable air-cooled performance
  - Simple field conversion between natural gas and LPG fuels while maintaining emission certification
- **Aluminum Sound Enclosure and Skid**
  - Wind rated up to 181 mph
  - Weather-resistant cashmere textured finish
- **Designed for Easy Installation**
  - Hinged, locking roof
  - Fuel and electrical connections through the enclosure wall eliminate the need for stub-ups through the bottom
  - Load connection terminal block allows easy field wiring
  - Designed for outdoor installation only
- **Certifications**
  - Meets emission regulations for U.S. Environmental Protection Agency (EPA) with both natural gas and LPG **Note:** CARB does not regulate emergency standby generators with outputs less than 50 HP. Only the EPA standards apply.
  - UL 2200/cUL listed (60 Hz model)
  - CSA certification available (60 Hz model)
  - Accepted by the Massachusetts Board of Registration of Plumbers and Gas Fitters
- Approved for stationary standby applications in locations served by a reliable utility source.
- **Warranty**
  - 5-year/2000 hour warranty for on-grid (standby) applications in locations served by a reliable utility source

Generator Ratings

					Standby Ratings			
					Natural Gas		LPG	
Model	Voltage	Phase	Hz	Alternator	kW/kVA	Amps	kW/kVA	Amps
20RESD	120/240	1	60	2F7	18/18	75.0	20/20	83.3
	115/230	1	50	2F7	14/14	60.8	15/15	65.2

RATINGS: Standby ratings apply to installations served by a reliable utility source. All single-phase units are rated at 1.0 power factor. The standby rating is applicable to variable loads with an average load factor of 80% for the duration of the power outage. No overload capacity is specified at this rating. Ratings are in accordance with ISO-3046/1, BS5514, AS2789, and DIN 6271. GENERAL GUIDELINES FOR DERATING: *ALTITUDE*: Derate 4% per 305 m (1000 ft.) elevation above 153 m (500 ft.). *TEMPERATURE*: Derate 2% per 5.5°C (10°F) temperature increase above 16°C (60°F). Availability is subject to change without notice. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local Kohler Co. generator distributor for availability.

* The required distance from a structure is dependent on state and local codes. Generator must be located away from doors, windows, and fresh air intakes. See the installation manual for guidelines.

Alternator Specifications

Alternator Specifications

Specifications	PowerBoost™ Generator 1-Phase
Manufacturer	Kohler
Output reconnectable	120/240
Type	2-Pole, Rotating Field
Leads, quantity	4
Voltage regulator	Digital
Insulation:	NEMA MG1-1.66
Material	Class H
Temperature rise	Class H
Bearing: quantity, type	1, Sealed Ball
Coupling	Direct
Amortisseur windings	Full
Voltage regulation, no-load to full-load RMS	±1.0%
One-step load acceptance	100% of Rating
Peak motor starting kVA @ 240 V:	
20RESD	40.5

Alternator Features

- Compliance with NEMA, IEEE, and ANSI standards for temperature rise
- Self-ventilated and drip-proof construction
- Windings are vacuum-impregnated with epoxy varnish for dependability and long life.
- Superior voltage waveform and minimum harmonic distortion from skewed alternator construction
- Digital voltage regulator with ±1.0% no-load to full-load RMS regulation
- Rotating-field alternator with static exciter for excellent load response
- Total harmonic distortion (THD) from no load to full load with a linear load is less than 5%

Application Data

Engine

Engine Specifications	
Manufacturer	Kohler
Engine: model, type	CH1000 4-Cycle
Cylinder arrangement	V-2
Displacement, cm^3 (cu. in.)	999 (61)
Bore and stroke, mm (in.)	90 x 78.5 (3.54 x 3.1)
Compression ratio	8.8:1
Main bearings: quantity, type	2, Parent Material
Rated RPM	
60 Hz	3600
50 Hz	3000
Max. engine power at rated rpm, kW (HP)	
LPG, 60 Hz	23.0 (30.9)
LPG, 50 Hz	20.0 (26.8)
Natural gas, 60 Hz	20.2 (27.1)
Natural gas, 50 Hz	16.8 (22.5)
Cylinder head material	Aluminum
Valve material	Steel/Stellite®
Piston type and material	Aluminum Alloy
Crankshaft material	Heat Treated, Ductile Iron
Governor: type	Electronic
Frequency regulation, no load to full load	Isochronous
Frequency regulation, steady state	±0.5%
Air cleaner type	Dry

Exhaust

Exhaust System	
Exhaust temperature exiting the enclosure at rated kW, dry, °C (°F)	260 (500)

Engine Electrical

Engine Electrical System	
Ignition system	Electronic, Capacitive Discharge
Starter motor rated voltage (DC)	12
Battery (purchased separately):	
Ground	Negative
Volts (DC)	12
Battery quantity	1
Recommended cold cranking amps:	
(CCA) rating for -18°C (0°F)	500
Group size	26

Lubrication

Lubricating System	
Type	Full Pressure
Oil capacity (with filter), L (qt.)	1.9 (2.0)
Oil filter: quantity, type	1, Cartridge
Oil cooler	Integral

Fuel Pipe Size

Minimum Gas Pipe Size Recommendation, in. NPT

Pipe Length, m (ft.)	Natural Gas 281,000 Btu/hr.	LPG 340,000 Btu/hr.
8 (25)	1	3/4
15 (50)	1	1
30 (100)	1 1/4	1
46 (150)	1 1/4	1 1/4
61 (200)	1 1/4	1 1/4

Fuel Requirements

Fuel System	20RESD
Fuel types	Natural Gas or LPG
Fuel supply inlet	1/2 NPT
Fuel supply pressure, kPa (in. H_2O):	
Natural gas	0.9–2.7 (3.5-11)
LP	1.7–2.7 (7-11)

Fuel Composition Limits *	Nat. Gas	LPG
Methane, % by volume (minimum)	90 min.	—
Ethane, % by volume (maximum)	4.0 max.	—
Propane, % by volume	1.0 max.	85 min.
Propene, % by volume (maximum)	0.1 max.	5.0 max.
C_4 and higher, % by volume	0.3 max.	2.5 max.
Sulfur, ppm mass (maximum)	25 max.	
Lower heating value, MJ/m^3 (Btu/ft^3), (minimum)	33.2 (890)	84.2 (2260)

* Contact your local distributor for suitability and rating derates based on fuel compositions outside these limits.

Operation Requirements

Fuel Consumption

Model	Fuel Type	% Load	Fuel Consumption, m^3/hr. (cfh) 60 Hz		50 Hz	
20RESD	Natural Gas	100	8.0	(281)	6.4	(225)
		75	6.9	(243)	5.4	(189)
		50	4.6	(161)	3.9	(139)
		25	3.6	(127)	2.9	(103)
		Exercise	2.0	(71)	2.0	(71)
	LPG	100	3.9	(136)	2.9	(102)
		75	3.1	(109)	2.4	(85)
		50	2.3	(82)	1.8	(63)
		25	1.7	(59)	1.3	(47)
		Exercise	1.0	(35)	1.0	(35)

Nominal fuel rating: Natural gas: 37 MJ/m^3 (1000 $Btu/ft.^3$)
LPG: 93 MJ/m^3 (2500 $Btu/ft.^3$)

LPG conversion factors: 8.58 $ft.^3$ = 1 lb.
0.535 m^3 = 1 kg
36.39 $ft.^3$ = 1 gal.

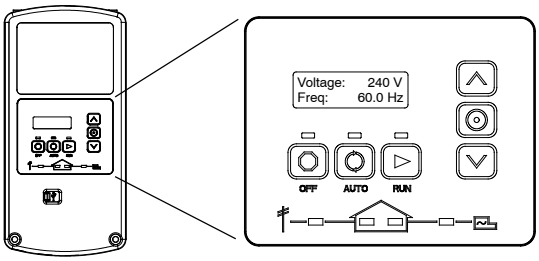
Sound Data

Model 20RESD 8 point logarithmic average sound levels are 64 dB(A) during weekly engine exercise and 69 dB(A) during full-speed generator diagnostics and normal operation. For comparison to competitor ratings, the lowest sound levels are 62 dB(A) and 67 dB(A) respectively.*

All sound levels are measured at 7 meters with no load.

* Lowest of 8 points measured around the generator. Sound levels at other points around generator may vary depending on installation parameters.

RDC2 Controller



The RDC2 controller provides integrated control for the generator set, Kohler® Model RXT transfer switch, programmable interface module (PIM), and load shed kit.

The RDC2 controller's 2-line LCD screen displays status messages and system settings that are clear and easy to read, even in direct sunlight or low light.

RDC2 Controller Features

- Membrane keypad
  - OFF, AUTO, and RUN push buttons
  - Select and arrow buttons for access to system configuration and adjustment menus
- LED indicators for OFF, AUTO, and RUN modes
- LED indicators for utility power and generator set source availability and ATS position (Model RXT transfer switch required)
- LCD display
  - Two lines x 16 characters per line
  - Backlit display with adjustable contrast for excellent visibility in all lighting conditions
- Scrolling system status display
  - Generator set status
  - Voltage and frequency
  - Engine temperature
  - Oil pressure
  - Battery voltage
  - Engine runtime hours
- Date and time displays
- Smart engine cooldown senses engine temperature
- Digital isochronous governor to maintain steady-state speed at all loads
- Digital voltage regulation: ±1.0% RMS no-load to full-load
- Automatic start with programmed cranking cycle
- Programmable exerciser can be set to start automatically on any future day and time, and run every week or every two weeks
- Exercise modes
  - Unloaded weekly exercise with complete system diagnostics
  - Unloaded full-speed exercise
  - Loaded full-speed exercise (Model RXT ATS required)
- Front-access mini USB connector for SiteTech™ or USB Utility connection
- Integral Ethernet connector for Kohler® OnCue® Plus
- Built-in 2.5 amp battery charger
- Remote two-wire start/stop capability for optional connection of a Model RDT transfer switch

See additional controller features on the next page.

KOHLER CO., Kohler, Wisconsin 53044 USA
Phone 920-457-4441, Fax 920-459-1646
For the nearest sales and service outlet in the
US and Canada, phone 1-800-544-2444
KOHLERPower.com

Kohler Power Systems
Asia Pacific Headquarters
7 Jurong Pier Road
Singapore 619159
Phone (65) 6264-6422, Fax (65) 6264-6455

Additional RDC2 Controller Features

- Diagnostic messages
  - Displays diagnostic messages for the engine, generator, Model RXT transfer switch, programmable interface module (PIM), and load shed kit
  - Over 70 diagnostic messages can be displayed
- Maintenance reminders
- System settings
  - System voltage, frequency, and phase
  - Voltage adjustment
  - Measurement system, English or metric
- ATS status (Model RXT ATS required)
  - Source availability
  - ATS position (normal/utility or emergency/generator)
  - Source voltage and frequency
- ATS control (Model RXT ATS required)
  - Source voltage and frequency settings
  - Engine start time delay
  - Transfer time delays
  - Voltage calibration
  - Fixed pickup and dropout settings
- Programmable Interface Module (PIM) status displays
  - Input status (active/inactive)
  - Output status (active/inactive)
- Load control menus
  - Load status
  - Test function

Generator Set Standard Features

- Battery cables
- EPA certified fuel system
- Aluminum sound enclosure
- Critical silencer
- Field-connection terminal block
- Fuel solenoid valve and secondary regulator
- Line circuit breaker, 100 amps
- Multi-fuel system, LPG/natural gas, field-convertible
- Oil drain extension with shutoff valve
- Premium 5-year/2000 hour limited warranty
- RDC2 generator set/ATS controller
- Rodent-resistant construction
- Sound-deadening, flame-retardant foam per UL 94, class HF-1

Available Options

Approvals and Listings

❑ CSA Approval

Communication Accessories

❑ OnCue® Plus Generator Management System
❑ OnCue® Plus Wireless Generator Management System

Electrical System

❑ Battery
❑ Battery heater
❑ Emergency stop kit

Available Options, Continued

Controller Accessories

❑ Programmable Interface Module (PIM) (provides 2 digital inputs and 6 relay outputs)
❑ PowerSync® Automatic Paralleling Module (APM) (single phase only)

Fuel System

❑ Flexible fuel line

Literature

❑ General maintenance literature kit
❑ Overhaul literature kit
❑ Production literature kit

Starting Aids

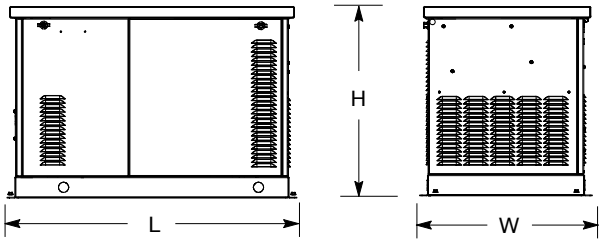
❑ Carburetor heater (recommended for reliable starting at temperatures below 0°C [32°F])
❑ Fuel regulator heater pad (recommended for reliable starting at temperatures below −18°C [0°F])

Automatic Transfer Switches and Accessories

❑ Model RDT ATS
❑ Model RXT ATS
❑ Model RXT ATS with combined interface/load management board
❑ Load shed kit for RXT or RDT
❑ Power relay modules (use up to 4 relay modules for each load management device)
❑ Other Kohler® ATS

Generator Set Dimensions and Weights

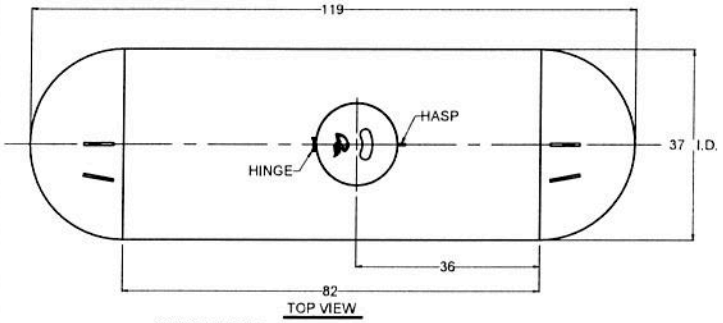
Overall Size, L x W x H:	1215 x 733 x 802 mm (47.9 x 28.8 x 31.6 in.)
Shipping Weight (with aluminum enclosure)	240 kg (530 lb.)



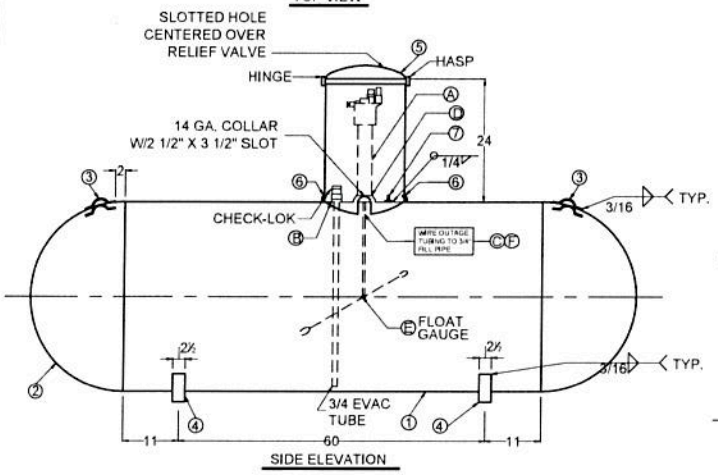
NOTE: Dimensions are provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

DISTRIBUTED BY:

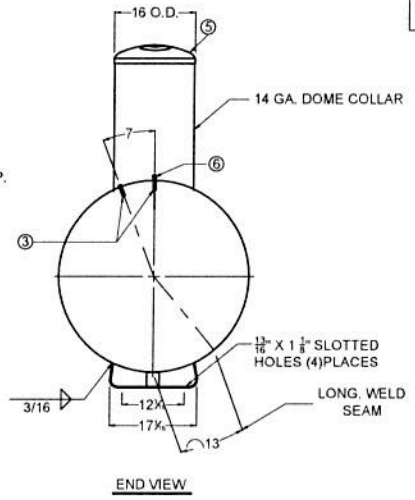
THIS VESSEL IS DESIGNED FOR THE STORAGE OF LIQUEFIED PETROLEUM GAS ONLY



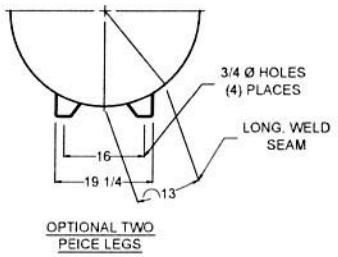
TOP VIEW



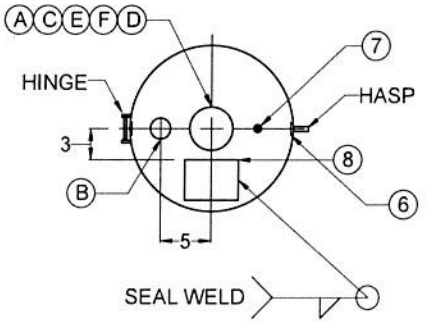
SIDE ELEVATION



END VIEW



OPTIONAL TWO PEICE LEGS



FITTING LAYOUT

TANKS SOLD WITH COMPOSITE DOME MUST HAVE UL MARK REMOVED AND DATA REPORT CORRECTED

SER. NO.

CERTIFIED BY: AMERICAN WELDING &TANK LLC

FREMONT, OHIO AND WEST JORDAN, UTAH

MAX. ALLOW. WORKING PRESS. 250 PSI AT 400 °F

MDMT -20 °F AT 250 PSI PLANT NO.

U W RT4

SERIAL NO.	D	YEAR BUILT	20
LENGTH	119 IN.	OUTSIDE DIA.	37.4 IN.
HEAD THK.	.185 IN.	SHELL THK.	.218 IN.
UNDER GROUND TYPE	AWT-UG	SURFACE AREA	97.5 SQ. FT.
U L LISTED CONTAINER ASSEMBLY FOR LP GAS 695A		HEAD D.R.	HEMI
		WATER CAPACITY	500 GALS.

THIS CONTAINER SHALL NOT CONTAIN A PRODUCT HAVING A VAPOR PRESSURE IN EXCESS OF 215 PSI AT 100°F.

DIP TUBE LENGTH-89% FULL @ 50 DEG. F. D.T.= 7.5 IN.

DATA PLATE DETAIL

GENERAL NOTES:

1. LIFTING LUGS DESIGNED FOR TOTAL LIFTING WEIGHT OF 1500#
2. TOTAL EMPTY WEIGHT IS 976#
3. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED
4. COMPLETE TANK DRIED TO REMOVE ALL MOISTURE.
5. ALL WEIGHTS AND CAPACITIES ARE APPROXIMATE
6. EXTERIOR OF TANK TO BE GRIT BLASTED
7. PAINT PER SHOP ORDER
8. VACUUM PURGE TANK
9. DIMENSIONS ARE SUBJECT TO CHANGE WITH OUT NOTICE. (NON-PRESSURE RETAINING COMPONENTS ONLY)
10. 10. THREADS OF ALL FITTINGS TO BE COATED WITH COMPOUND SUITABLE FOR USE WITH LP GAS.
11. FLOAT GAUGE TO BE INSTALLED WITH FLOAT ARM 45 ° OFF LONGITUDINAL CENTERLINE OF TANK.
12. DOUBLE LIFTING LUGS ON LONG RISER TANKS ONLY

GENERAL SPECIFICATIONS		
WATER CAPACITY (GALLONS)		500
ALLOWABLE WORKING PRESSURE (PSIG)		250
JOINT EFFICIENCY:	ASME UW-51 LONG SEAM	100 %
	ASME UW-52 HEAD TO SHELL	80 %
HYDROSTATIC TEST PRESSURE (PSIG)		325
SURFACE AREA (SQ. FT.)		97.5
RELIEF VALVE SETTING (PSIG)		250
RELIEF DISCHARGE RATE - (CFM REQ'D.)		684
CODE:	ASME SECTION VIII DIV. I	
STANDARDS:	UNDERWRITERS LABORATORIES INC.	MH-5127
	N.F.P.A. 58 LP GAS CODE	
MATERIAL SPECS.:		
	COUPLINGS SA-105	
	TANK FLANGES SA-105 OR SA-181	
	ADAPTOR SA-105	
	PIPE - SA53B OR SA106B	

PART NUMBER: 0105004x LONG RISER
0105003x SHORT RISER

MARK	QTY.	SIZE	TYPE	FITTINGS REGO	FITTINGS SHERWOOD	SERVICE
A	1	2 1/2	SCHED. 80 PIPE T.O.E. X 15 1/8" LG. & DOME HT. +24"	G8475RV	PV2098P	MULTIVALVE
A (ALT.)	1	2 1/2	SCHED. 80 PIPE T.O.E. X 9 1/8" LG. & DOME HT. + 14"	G8475RV	PV2098P	MULTIVALVE
B	1	3/4	XH FLG. W/ EVAC TUBE	7590U	PV5136	CHEK-LOK
C	1	3/4	SCH. 40 PIPE (T.O.E.)			FILL PIPING X 12 7/8" (W/ 135° 3/4" RISER PIPE ATTACHMENT
D	1	2 1/2	XH SOCKET WELD FLG.			
E	1	1 1/4	4 - BOLTS	Sherwood F-31281-007 or Rochester 86281-493 or Squibb Taylor J81705		FLOAT GAUGE (Long Riser)
E(ALT.)	1	1 1/4	4 - BOLTS	Sherwood F-31281-003 or Rochester 86281-494 or Squibb Taylor J82964		FLOAT GAUGE (Short Riser)
F	1	1/8	BRASS TUBE			EVAC TUBE 17 1/16" SR 24 1/16" LR

MARK	QTY.	DESCRIPTION	DWG. NO.
1	1	SHELL- 0.218" X 81 1/2" X 116 13/16" - SA414G	
2	2	HEADS - 37" I.D. X 0.185" - HEMI SA414C	
3	4	LIFTING LUGS	D - 2
4	2	TANK LEGS (SINGLE PIECE LEGS)	D - 3
4 OPT	4	TANK LEGS, 1/4" X 2/12"	D - 2
5	1	DOME, 2 PIECE, HINGED	D - 5
6	2	SNAP-LOCK CLIPS	D-29&D-30
7	1	ANODE ATTACHMENT	D-7&D-17
8	1	DATA PLATE . 1000 GAL. . U/G	

REV.	BY	DESCRIPTION	DATE
14	wlo	CHANGED GROUNDING METHOD	4/12/01
15	CDH	NEW NAMEPLATE & CHEK-LOK	10/19/01
16	CDH	REVISED LEGS & MOVED "B"	10/22/01
17	CDH	REVISED FILL PIPE LENGTHS	12/13/01
18	CDH	ADDED FLOAT GA. DESCRIPTIONS CHANGED MDMT PRESSURE TO 250 PSI	5/21/02
19	CDH	REMOVED DOME CLIPS, ADDED SNAP LOCKS	8/28/02
20	CDH	REPOSITIONED SNAP LOCKS & REMOVED DETAIL	10/21/02
21	SEA	ADD SA-181 AS OPTION FOR FLANGES	6/26/05
22	RGA	REVISED COMPANY NAME	12/08/07
23	wlo	STANDARDIZE DRAWINGS	05/30/11

500 W.G. UNDERGROUND PROPANE TANK-TYPE-AWT-UG

AMERICAN WELDING & TANK LLC

DATE	DRAWN BY	APPROVED BY	REVISION	DRAWING No.
01 / 03 / 00	RAC	CDH	23	R-500MW

UG STANDARD

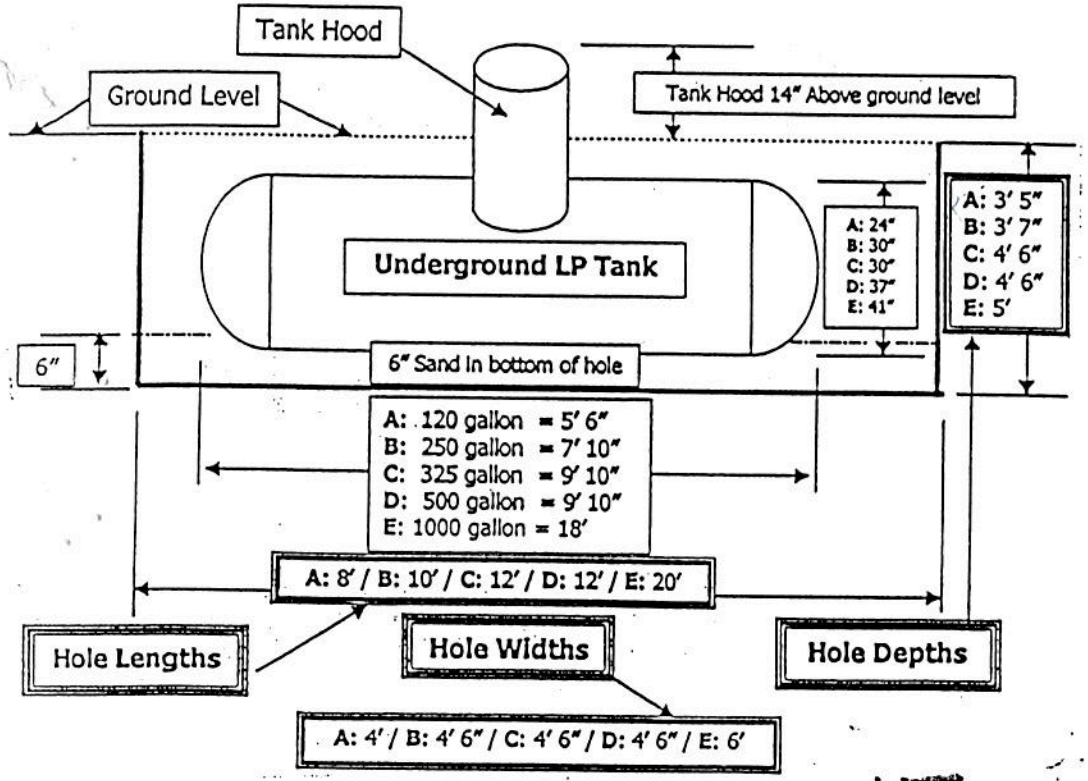
Suburban Propane

Hole Specs for Underground Propane Tanks

Hole & Sand to be provided by Customer for Suburban Propane

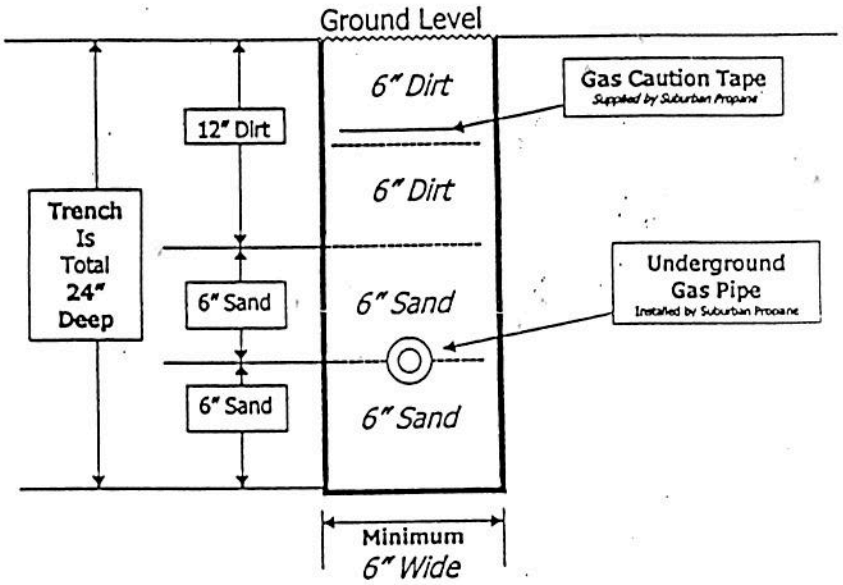
KEY:	Tank Size	Propane Capacity	Weight Empty	Weight Full	Length	Width	Hole Specifications Depth	Width	Length
A:	120	100	288	420	5' 6"	24"	3' 5"	4'	8'
B:	250	200	542	840	7' 10"	30"	3' 7"	4' 6"	10'
C:	325	260	672	1092	9' 10"	30"	4' 6"	4' 6"	12'
D:	500	400	1062	1680	9' 10"	37"	4' 6"	4' 6"	12'
E:	1000	800	1983	3360	18'	41"	5'	6'	20'

1) All tanks must be within 100' of driveway so tank can be refilled
2) All tanks must be at least 10' away from any:
   Enclosed Structure, Property Line or Source of Ignition
3) Excavation Specifications for hole see chart above
4) Hole needs 6" Sand in bottom & Hood heeds to be 14" above ground



Trench Specs for Underground Propane Line

Trench and Sand to be provided by Customer for Suburban Propane



[redacted]
Account Manager
2544 Carmel Avenue, Brewster, NY 10512
Office: 845.279.6650 Fax: 845.279.7916
Cell: 914.804.0554 Pager: 914.545.0649

Attachment 3 - Independent Structural Engineer's Review

CENTEK engineering

Centered on Solutions℠

April 13, 2017

Mr. Steven Florio
IT Telecommunications Engineering
Eversource Energy
Building NUE2, 2nd Floor
107 Selden Street
Berlin, CT 06037

Re: Structural Summary Letter
Eversource Energy ~ Birchwood Condominium
27 Crows Nest Lane
Danbury, CT 06810

Centek Project No. 16144.00 ~ Rev. 1

Dear Mr. Florio,

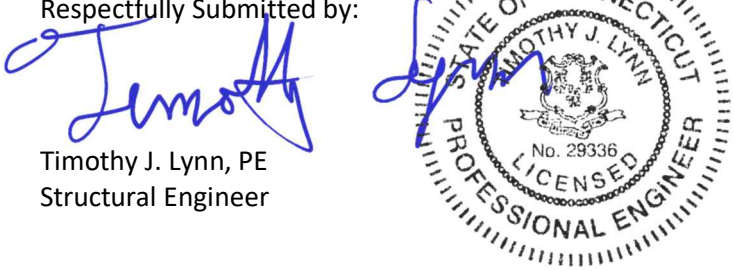
Centek Engineering has been authorized by Eversource Energy to perform a structural analysis of the proposed antenna upgrade on the existing 85-ft electric transmission pole structure at the above referenced site. The results of the analysis are summarized in this letter. Refer to structural analysis prepared by Centek; Job. No. 16144.00, dated March 6, 2017 signed and sealed by Timothy Lynn, PE (CT PE License No. 29336) for detailed calculations.

The analysis considered the effects of wind load, dead load and ice load in accordance with NESC "National Electrical Safety Code" and Northeast Utilities Overhead Transmission Standard OTRM-059 for "Communication Antennas on Transmission Structures". The proposed antenna installation meets the requirements of OTRM-059 considering a wind speed (3-second gust) of 110 mph.

The maximum tower steel usage ratio is **0.596** (**59.6%**). The foundation was found to be in conformance with OTRM-051.

Based on our structural analysis the proposed installation is in conformance with the applicable structural requirements of the State Building Code. Should you have any questions, please do not hesitate to contact us.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

CENTEK engineering

Centered on Solutions℠

Structural Analysis of Transmission Pole

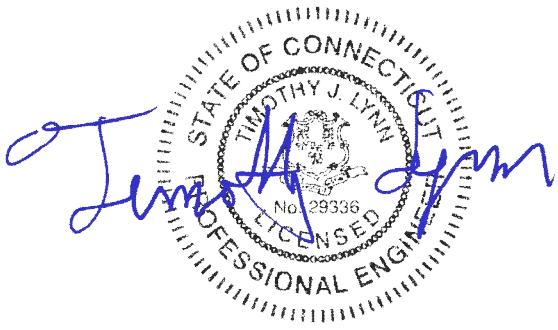
Site Ref: Birchwood Condominium

Eversource Structure No. 9950
85' Electric Transmission Pole

27 Crows Nest Lane
Danbury, CT

CENTEK Project No. 16144.00

~~Date: September 8, 2016~~
~~Rev 1: September 12, 2016~~
~~Rev 2: December 13, 2016~~
Rev 3: March 6, 2017



Prepared for:

Eversource Energy
56 Prospect Street
Hartford, CT 06103

Table of Contents

Introduction

The purpose of this report is to analyze the existing 85' utility pole located at 27 Crows Nest Lane in Danbury, CT for the proposed antenna and equipment upgrade by Eversource.

The existing/proposed loads consist of the following:

- EVERSOURCE (Existing to Remain):

  Equipment: Two (2) equipment boxes located at 8-ft above the base of the tower.
  Coax Cables: One (1) 1-1/4" ∅ coax cable running on the exterior of the pole.

- EVERSOURCE (Existing to Remove):

  Antennas: One (1) DB589-Y whip antenna flush mounted to the pole with an elevation of 83-ft above grade level.

- **EVERSOURCE (Proposed):**

  Antennas: One (1) dbSpectra DS9A09F36D-N whip antenna and one (1) Bird 430-94C-09168-M-110/48 tower top amplifier flush mounted to the pole with an elevation of 83-ft above grade level.
  Coax Cables: One (1) 1-1/4" ∅ and one (1) 1/2" ∅ coax cables running on the exterior of the pole.

Primary assumptions used in the analysis

- Allowable steel stresses are defined by AISC-ASD 9th edition for design of the antenna Mast and antenna supporting elements.
- ASCE Manual No. 72, "Design of Steel Transmission Pole Structures Second Edition", defines allowable steel stresses for evaluation of the utility pole.
- All utility pole members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- Pipe mast will be properly installed and maintained.
- No residual stresses exist due to incorrect pole erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- Pipe mast and utility pole will be in plumb condition.
- Utility pole was properly installed and maintained and all members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
- Any deviation from the analyzed loading will require a new analysis for verification of structural adequacy.

Analysis

Antenna and coax cable loading were calculated using NESC design criteria. These loads are developed in Section 5 of this report. The calculated loads were applied to the pole using PLS-Pole. Maximum usage for the pole was calculated considering the additional forces from the mast and associated appurtenances.

Design Basis

Our analysis was performed in accordance with TIA-222-G, ASCE Manual No. 72 – "Design of Steel Transmission Pole Structures Second Edition", NESC C2-2007 and Northeast Utilities Design Criteria.

- UTILITY POLE ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility pole to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the NU Design Criteria Table, NESC C2-2007 ~ Construction Grade B, and ASCE Manual No. 72.

  Load cases considered:

  Load Case 1: NESC Heavy
  Wind Pressure..... 4.0 psf
  Radial Ice Thickness..... 0.5"
  Vertical Overload Capacity Factor..... 1.50
  Wind Overload Capacity Factor..... 2.50
  Wire Tension Overload Capacity Factor..... 1.65

  Load Case 2: NESC Extreme
  Wind Speed..... 110 mph (1)
  Radial Ice Thickness..... 0"

  Note 1: NESC C2-2007, Section25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-second gust)

Results

- UTILITY POLE

  This analysis finds that the subject utility pole is adequate to support the proposed antenna mast and related appurtenances. The pole stresses meet the requirements set forth by the ASCE Manual No. 72, "Design of Steel Transmission Pole Structures Second Edition", for the applied NESC Heavy and Hi-Wind load cases. The detailed analysis results are provided in Section 9 of this report. The analysis results are summarized as follows:

  A maximum usage of **59.56%** occurs in the utility pole base plate under the **NESC Extreme** loading condition.

  POLE SECTION:

  The utility pole was found to be within allowable limits.

Tower Section	Elevation	Stress Ratio (% of capacity)	Result
Tube Number 2	0'-40.00' (AGL)	59.56%	**PASS**

BASE PLATE:

The base plate was found to be within allowable limits from the PLS output based on 24 bend lines.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Base Plate	Bending	44.42%	**PASS**

- FOUNDATION AND ANCHORS

The existing foundation information was unavailable. The proposed based reactions were compared to the original design reactions. The base of the tower is connected to the foundation by means of (12) 2.25"∅, ASTM A615-75 anchor bolts embedded into the concrete foundation structure.

BASE REACTIONS:

From PLS-Pole analysis of pole based on NESC/NU prescribed loads.

Load Case	Shear	Axial	Moment
NESC Heavy Wind	16.91 kips	37.81 kips	930.78 ft-kips
NESC Extreme Wind	23.81 kips	20.35 kips	1335.35 ft-kips

Note 1 – 10% increase applied to tower base reactions per OTRM 051

ANCHOR BOLTS:

The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (% of capacity)	Result
Anchor Bolts	Tension	49.3%	**PASS**

FOUNDATION:

The foundation was found to be within allowable limits.

Design Limit	Original Design Reaction	Proposed Reaction (1)	Result
Shear	27.29 kips	26.2 kips	**PASS**
Axial	45.44 kips	41.6 kips	**PASS**
Moment	2133.7 ft-kips	1468.9 ft-kips	**PASS**

Note 1: 10% increase to PLS base reactions used in foundation analysis per OTRM 051.

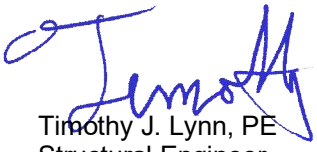
C o n c l u s i o n

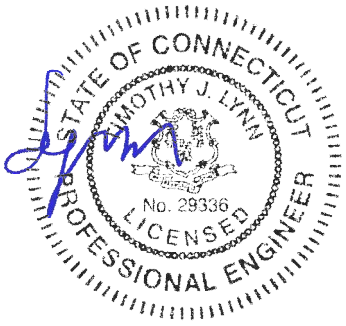
This analysis shows that the subject utility pole **is adequate** to support the proposed equipment upgrade.

The analysis is based, in part on the information provided to this office by Eversource. If the existing conditions are different than the information in this report, CENTEK engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:





Timothy J. Lynn, PE
Structural Engineer

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING STRUCTURES

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.

- Information from the field and/or drawings in the possession of CENTEK engineering, Inc. or generated by field inspections or measurements of the structure.

- It is the responsibility of the client to ensure that the information provided to CENTEK engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.

- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222.

- All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. CENTEK engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

G E N E R A L D E S C R I P T I O N O F S T R U C T U R A L A N A L Y S I S P R O G R A M ~ R I S A - 3 D

RISA-3D Structural Analysis Program is an integrated structural analysis and design software package for buildings, bridges, tower structures, etc.

Modeling Features:

- Comprehensive CAD-like graphic drawing/editing capabilities that let you draw, modify and load elements as well as snap, move, rotate, copy, mirror, scale, split, merge, mesh, delete, apply, etc.
- Versatile drawing grids (orthogonal, radial, skewed)
- Universal snaps and object snaps allow drawing without grids
- Versatile general truss generator
- Powerful graphic select/unselect tools including box, line, polygon, invert, criteria, spreadsheet selection, with locking
- Saved selections to quickly recall desired selections
- Modification tools that modify single items or entire selections
- Real spreadsheets with cut, paste, fill, math, sort, find, etc.
- Dynamic synchronization between spreadsheets and views so you can edit or view any data in the plotted views or in the spreadsheets
- Simultaneous view of multiple spreadsheets
- Constant in-stream error checking and data validation
- Unlimited undo/redo capability
- Generation templates for grids, disks, cylinders, cones, arcs, trusses, tanks, hydrostatic loads, etc.
- Support for all units systems & conversions at any time
- Automatic interaction with RISASection libraries
- Import DXF, RISA-2D, STAAD and ProSteel 3D files
- Export DXF, SDNF and ProSteel 3D files

Analysis Features:

- Static analysis and P-Delta effects
- Multiple simultaneous dynamic and response spectra analysis using Gupta, CQC or SRSS mode combinations
- Automatic inclusion of mass offset (5% or user defined) for dynamic analysis
- Physical member modeling that does not require members to be broken up at intermediate joints
- State of the art 3 or 4 node plate/shell elements
- High-end automatic mesh generation — draw a polygon with any number of sides to create a mesh of well-formed quadrilateral (NOT triangular) elements.
- Accurate analysis of tapered wide flanges - web, top and bottom flanges may all taper independently
- Automatic rigid diaphragm modeling
- Area loads with one-way or two-way distributions
- Multiple simultaneous moving loads with standard AASHTO loads and custom moving loads for bridges, cranes, etc.
- Torsional warping calculations for stiffness, stress and design
- Automatic Top of Member offset modeling
- Member end releases & rigid end offsets
- Joint master-slave assignments
- Joints detachable from diaphragms
- Enforced joint displacements
- 1-Way members, for tension only bracing, slipping, etc.

- 1-Way springs, for modeling soils and other effects
- Euler members that take compression up to their buckling load, then turn off.
- Stress calculations on any arbitrary shape
- Inactive members, plates, and diaphragms allows you to quickly remove parts of structures from consideration
- Story drift calculations provide relative drift and ratio to height
- Automatic self-weight calculations for members and plates
- Automatic subgrade soil spring generator

Graphics Features:

- Unlimited simultaneous model view windows
- Extraordinary “true to scale” rendering, even when drawing
- High-speed redraw algorithm for instant refreshing
- Dynamic scrolling stops right where you want
- Plot & print virtually everything with color coding & labeling
- Rotate, zoom, pan, scroll and snap views
- Saved views to quickly restore frequent or desired views
- Full render or wire-frame animations of deflected model and dynamic mode shapes with frame and speed control
- Animation of moving loads with speed control
- High quality customizable graphics printing

Design Features:

- Designs concrete, hot rolled steel, cold formed steel and wood
- ACI 1999/2002, BS 8110-97, CSA A23.3-94, IS456:2000,EC 2-1992 with consistent bar sizes through adjacent spans
- Exact integration of concrete stress distributions using parabolic or rectangular stress blocks
- Concrete beam detailing (Rectangular, T and L)
- Concrete column interaction diagrams
- Steel Design Codes: AISC ASD 9th, LRFD 2nd & 3rd, HSS Specification, CAN/CSA-S16.1-1994 & 2004, BS 5950-1-2000, IS 800-1984, Euro 3-1993 including local shape databases
- AISI 1999 cold formed steel design
- NDS 1991/1997/2001 wood design, including Structural Composite Lumber, multi-ply, full sawn
- Automatic spectra generation for UBC 1997, IBC 2000/2003
- Generation of load combinations: ASCE, UBC, IBC, BOCA, SBC, ACI
- Unbraced lengths for physical members that recognize connecting elements and full lengths of members
- Automatic approximation of K factors
- Tapered wide flange design with either ASD or LRFD codes
- Optimization of member sizes for all materials and all design codes, controlled by standard or user-defined lists of available sizes and criteria such as maximum depths
- Automatic calculation of custom shape properties
- Steel Shapes: AISC, HSS, CAN, ARBED, British, Euro, Indian, Chilean
- Light Gage Shapes: AISI, SSMA, Dale / Incor, Dietrich, Marino\WARE
- Wood Shapes: Complete NDS species/grade database
- Full seamless integration with RISAFoot (Ver 2 or better) for advanced footing design and detailing
- Plate force summation tool

Results Features:

- Graphic presentation of color-coded results and plotted designs
- Color contours of plate stresses and forces with quadratic smoothing, the contours may also be animated
- Spreadsheet results with sorting and filtering of: reactions, member & joint deflections, beam & plate forces/stresses, optimized sizes, code designs, concrete reinforcing, material takeoffs, frequencies and mode shapes
- Standard and user-defined reports
- Graphic member detail reports with force/stress/deflection diagrams and detailed design calculations and expanded diagrams that display magnitudes at any dialed location
- Saved solutions quickly restore analysis and design results.

G E N E R A L D E S C R I P T I O N O F S T R U C T U R A L A N A L Y S I S P R O G R A M ~ P L S - T O W E R

PLS-TOWER is a Microsoft Windows program for the analysis and design of steel latticed towers used in electric power lines or communication facilities. Both self-supporting and guyed towers can be modeled. The program performs design checks of structures under user specified loads. For electric power structures it can also calculate maximum allowable wind and weight spans and interaction diagrams between different ratios of allowable wind and weight spans.

Modeling Features:

- Powerful graphics module (stress usages shown in different colors)
- Graphical selection of joints and members allows graphical editing and checking
- Towers can be shown as lines, wire frames or can be rendered as 3-d polygon surfaces
- Can extract geometry and connectivity information from a DXF CAD drawing
- CAD design drawings, title blocks, drawing borders or photos can be tied to structure model
- XML based post processor interface
- Steel Detailing Neutral File (SDNF) export to link with detailing packages
- Can link directly to line design program PLS-CADD
- Automatic generation of structure files for PLS-CADD
- Databases of steel angles, rounds, bolts, guys, etc.
- Automatic generation of joints and members by symmetries and interpolations
- Automated mast generation (quickly builds model for towers that have regular repeating sections) via graphical copy/paste
- Steel angles and rounds modeled either as truss, beam or tension-only elements
- Guys are easily handled (can be modeled as exact cable elements)

Analysis Features:

- Automatic handling of tension-only members
- Automatic distribution of loads in 2-part suspension insulators (v-strings, horizontal vees, etc.)
- Automatic calculation of tower dead, ice, and wind loads as well as drag coefficients according to:
    - ASCE 74-1991
    - NESC 2002
    - NESC 2007
    - IEC 60826:2003
    - EN50341-1:2001 (CENELEC)
    - EN50341-3-9:2001 (UK NNA)
    - EN50341-3-17:2001 (Portugal NNA)
    - ESAA C(b)1-2003 (Australia)
    - TPNZ (New Zealand)
    - REE (Spain)
    - ANSI/TIA 222-G
    - CSA S37-01
- Automated microwave antenna loading as per ANSI/TIA 222-G
- Minimization of problems caused by unstable joints and mechanisms
- Automatic bandwidth minimization and ability to solve large problems
- Design checks according to (other standards can be added easily):
    - ASCE Standard 10-90
    - AS 3995 (Australian Standard 3995)

- BS 8100 (British Standard 8100)
- EN50341-1 (CENELEC, both empirical and analytical methods are available)
- ECCS 1985
- NGT-ECCS
- PN-90/B-03200
- ANSI/TIA 222-G
- CSA S37-01
- EDF/RTE Resal
- IS 802 (India Standard 802)

Results Features:

- Design summaries printed for each group of members
- Easy to interpret text, spreadsheet and graphics design summaries
- Automatic determination of allowable wind and weight spans
- Automatic determination of interaction diagrams between allowable wind and weight spans
- Capability to batch run multiple tower configurations and consolidate the results
- Automated optimum angle member size selection and bolt quantity determination

Tool for interactive angle member sizing and bolt quantity determination.

Criteria for Design of PCS Facilities On or Extending Above Metal Electric Transmission Towers & Analysis of Transmission Towers Supporting PCS Masts (1)

Introduction

This criteria is the result from an evaluation of the methods and loadings specified by the separate standards, which are used in designing telecommunications towers and electric transmission towers. That evaluation is detailed elsewhere, but in summary; the methods and loadings are significantly different. This criteria specifies the manner in which the appropriate standard is used to design PCS facilities including masts and brackets (hereafter referred to as "masts"), and to evaluate the electric transmission towers to support PCS masts. The intent is to achieve an equivalent level of safety and security under the extreme design conditions expected in Connecticut and Massachusetts.

ANSI Standard TIA-222-G covering the design of telecommunications structures specifies a working strength/allowable stress design approach. This approach applies the loads from extreme weather loading conditions, and designs the structure so that it does not exceed some defined percentage of failure strength (allowable stress).

ANSI Standard C2-2007 (National Electrical Safety Code) covering the design of electric transmission metal structures is based upon an ultimate strength/yield stress design approach. This approach applies a multiplier (overload capacity factor) to the loads possible from extreme weather loading conditions, and designs the structure so that it does not exceed its ultimate strength (yield stress).

Each standard defines the details of how loads are to be calculated differently. Most of the NU effort in "unifying" both codes was to establish what level of strength each approach would provide, and then increasing the appropriate elements of each to achieve a similar level of security under extreme weather loadings.

Two extreme weather conditions are considered. The first is an extreme wind condition (hurricane) based upon a 50-year recurrence (2% annual probability). The second is a winter condition combining wind and ice loadings.

The following sections describe the design criteria for any PCS mast extending above the top of an electric transmission tower, and the analysis criteria for evaluating the loads on the transmission tower from such a mast from the lower portions of such a mast, and loads on the pre-existing electric lower portions of such a mast, and loads on the pre-existing electric transmission tower and the conductors it supports.

Note 1: Prepared from documentation provide from Northeast Utilities.

E L E C T R I C T R A N S M I S S I O N T O W E R

The electric transmission tower shall be analyzed using yield stress theory in accordance with the attached table titled “NU Design Criteria”. This specifies uniform loadings (different from the TIA loadings) on the each of the following components of the installed facility:

- PCS mast for its total height above ground level, including the initial and planned future support platforms, antennas, etc. above the top of an electric transmission structure.
- Conductors are related devices and hardware.
- Electric transmission structure. The loads from the PCS facility and from the electric conductors shall be applied to the structure at conductor and PCS mast attachment points, where those load transfer to the tower.

The uniform loadings and factors specified for the above components in the table are based upon the National Electrical Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to TIA and its loads and factors with the exceptions noted above. (Note that the NESC does not require the projected wind surfaces of structures and equipment to be increased by the ice covering.)

In the event that the electric transmission tower is not sufficient to support the additional loadings of the PCS mast, reinforcement will be necessary to upgrade the strength of the overstressed members.

Attachment A

NU Design Criteria

			Basic Wind Speed	Pressure	Height Factor	Gust Factor	Load or Stress Factor	Force Coef - Shape Factor
			V (MPH)	Q (PSF)	Kz	Gh		
Ice Condition	TIA/EIA	Antenna Mount	TIA	TIA (.75Wi)	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
	NESC Heavy	Tower/Pole Analysis with antennas extending above top of Tower/Pole (Yield Stress)	------	4	1.00	1.00	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with Antennas below top of Tower/Pole (on two faces)	-----	4	1.00	1.00	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
		Conductors:	Conductor loads provided by NU					
High Wind Condtion	TIA/EIA	Antenna Mount	85	TIA	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
	NESC Extreme Wind	Tower/Pole Analysis with antennas extending above top of Tower/Pole	Use NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading 1.25 x Gust Response Factor Height above ground level based on top of Mast/Antenna					1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with Antennas below top of Tower/Pole	Use NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading Height above ground level based on top of Tower/Pole					1.6 Flat Surfaces 1.3 Round Surfaces
		Conductors:	Conductor loads provided by NU					
NESC Extreme Ice with Wind Conditon*		Tower/Pole Analysis with antennas extending above top of Tower/Pole	Use NESC C2-2007, Section 25, Rule 250D: Extreme Ice with Wind Loading 4PSF Wind Load 1.25 x Gust Response Factor Height above ground level based on top of Mast/Antenna					1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with Antennas below top of Tower/Pole	Use NESC C2-2007, Section 25, Rule 250D: Extreme Ice with Wind Loading 4PSF Wind Load Height above ground level based on top of Tower/Pole					1.6 Flat Surfaces 1.3 Round Surfaces
		Conductors:	Conductor loads provided by NU					
		* Only for Structures Installed after 2007						

Shape Factor Criteria shall be per TIA Shape Factors.

2) STEP 2 - The electric transmission structure analysis and evaluation shall be performed in accordance with NESC requirements and shall include the mast and antenna loads determined from NESC applied loading conditions (not TIA/EIA Loads) on the structure and mount as specified below, and shall include the wireless communication mast and antenna loads per NESC criteria)

The structure shall be analyzed using yield stress theory in accordance with Attachment A, "NU Design Criteria." This specifies uniform loadings (different from the TIA loadings) on each of the following components of the installed facility:

a) Wireless communication mast for its total height above ground level, including the initial and any planned future equipment (Support Platforms, Antennas, TMA's etc.) above the top of an electric transmission structure.

b) Conductors and related devices and hardware (wire loads will be provided by NU).

c) Electric Transmission Structure

i) The loads from the wireless communication equipment components based on NESC and NU Criteria in Attachment A, and from the electric conductors shall be applied to the structure at conductor and wireless communication mast attachment points, where those loads transfer to the tower.

ii) Shape Factor Multiplier:

NESC Structure Shape	Cd
Polyround (for polygonal steel poles)	1.3
Flat	1.6
Open Lattice	3.2

iii) When Coaxial Cables are mounted along side the pole structure, the shape multiplier shall be:

Mount Type	Cable Cd	Pole Cd
Coaxial Cables on outside periphery (One layer)	1.45	1.45
Coaxial Cables mounted on stand offs	1.6	1.3

d) The uniform loadings and factors specified for the above components in Attachment A, "NU Design Criteria" are based upon the National Electric Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to the TIA and its loads and factors with the exceptions noted above.

Note: The NESC does not require ice load be included in the supporting structure. (Ice on conductors and shield wire only, and NU will provide these loads).

e) Mast reaction loads shall be evaluated for local effects on the transmission structure members at the attachment points.

Northeast Utilities System

Job :	PLUMTREE-TRIANGLE	**Spec. Number**	T05-11		
Description:	115kV LINE UPGRADE	**Computed by**	FAM	**Date**	11/28/05
	WIRE WIND LOADING	**Checked by**		**Date**	

WIRE LOADING AT ATTACHMENTS

TOWER ID: Type T3C

Wind Span =	1,000 ft	Broken Wire Span =	AHEAD SPAN
Weight Span =	1,200 ft	Type of Insulator Attachment =	SUSPENSION
Total Angle =	5 degrees		

1. NESC Heavy:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	2,134 lb	0 lb	2,001 lb	1,067 lb	6,319 lb	1,001 lb
Conductor =	3,783 lb	0 lb	5,796 lb	1,892 lb	14,361 lb	2,898 lb

2. Extreme Wind:

	Horizontal	Longitudinal	Vertical
Shield Wire =	1,981 lb	0 lb	505 lb
Conductor =	4,508 lb	0 lb	2,461 lb

3. Longitudinal Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	174 lb	0 lb	505 lb
Conductor =	541 lb	0 lb	2,461 lb

4. 1" Ice:

	Horizontal	Longitudinal	Vertical
Shield Wire =	692 lb	0 lb	3,346 lb
Conductor =	1,455 lb	0 lb	6,916 lb

5. NESC w/o OLF's

	Horizontal	Longitudinal	Vertical
Shield Wire =	711 lb	0 lb	1,334 lb
Conductor =	1,335 lb	0 lb	3,864 lb

6. Raking

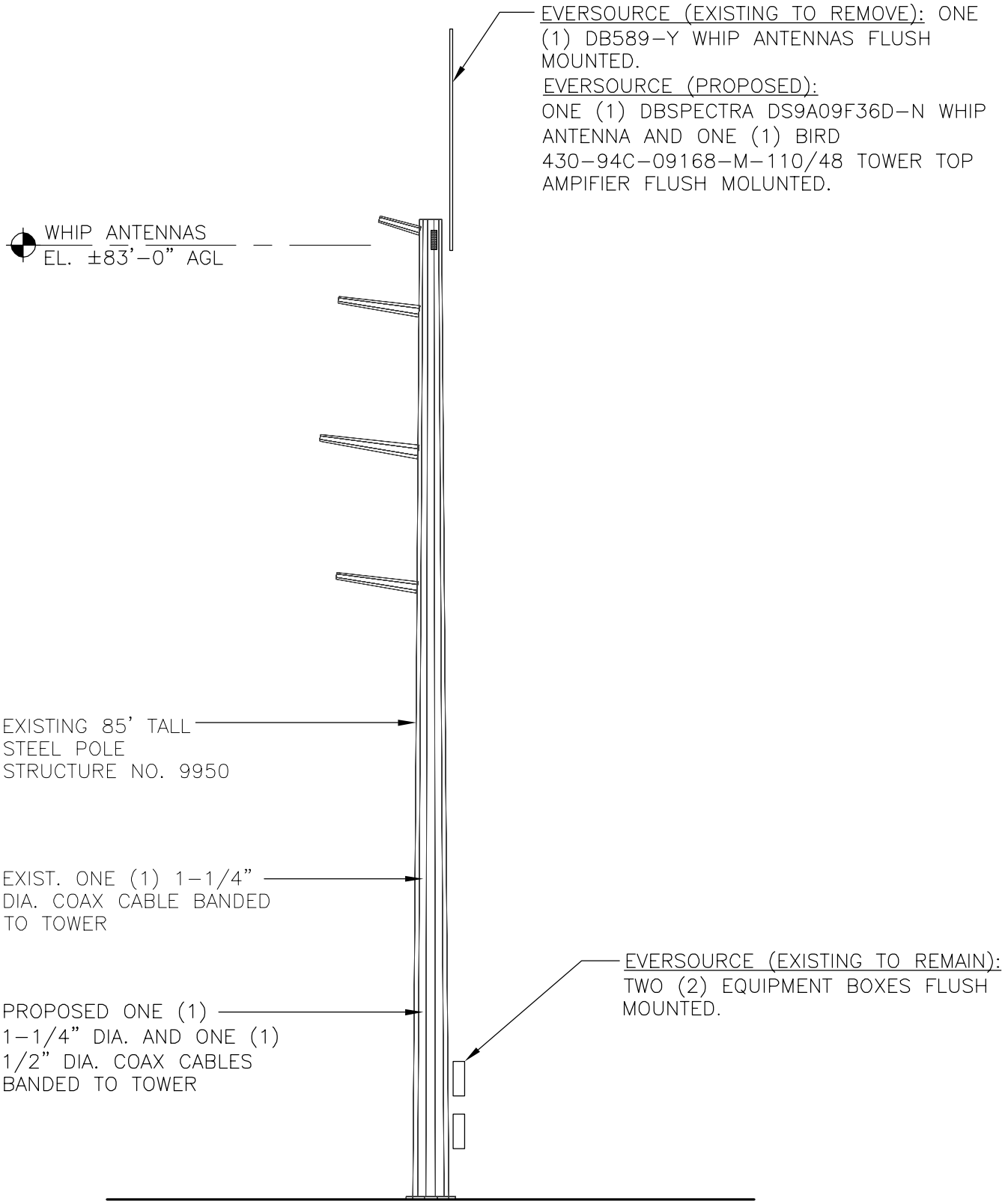
	Horizontal	Longitudinal	Vertical
Shield Wire =	174 lb	0 lb	505 lb
Conductor =	541 lb	0 lb	2,461 lb

7. Construction

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	349 lb	0 lb	1,010 lb	174 lb	3,996 lb	505 lb
Conductor =	1,082 lb	0 lb	4,922 lb	541 lb	12,388 lb	2,461 lb

8. ASCE Combined

	Horizontal	Longitudinal	Vertical
Shield Wire =	1,781 lb	0 lb	2,028 lb
Conductor =	2,935 lb	0 lb	4,846 lb



1 / EL-1 TOWER ELEVATION

SCALE: NOT TO SCALE

REVISIONS		
00	9/8/16	ISSUED FOR REVIEW
01	9/12/16	ISSUED FOR REVIEW
02	3/6/17	CONSTRUCTION

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BIRCHWOOD CONDOMINIUM
EVERSOURCE 9950

27 CROWS NEST LANE
DANBURY, CT 06810

PROJECT NO:	16144.00
DRAWN BY:	TJL
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	9/8/16

TOWER AND MAST ELEVATION

EL-1

DWG. 1 OF 1

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Subject: Load Analysis of Equipment on Structure # 9950

Location: Danbury, CT

Rev. 3: 3/6/17

Prepared by: T.J.L Checked by: C.F.C.
Job No. 16144.00

Basic Components

Heavy Wind Pressure =	p := 4.00	psf	(User Input NESC 2007 Figure 250-1 & Table 250-1)
Basic Windspeed =	V := 110	mph	(User Input NESC 2007 Figure 250-2(e))
Radial Ice Thickness =	Ir := 0.50	in	(User Input)
Radial Ice Density =	Id := 56.0	pcf	(User Input)

Factors for Extreme Wind Calculation

Elevation of Top of Mast Above Grade =	TME := 85	ft	(User Input)
Multiplier Gust Response Factor =	m := 1.25		(User Input - Only for NESC Extreme wind case)
NESC Factor =	kv := 1.43		(User Input from NESC 2007 Table 250-3 equation)
Importance Factor =	I := 1.0		(User Input from NESC 2007 Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.223$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.32$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.873$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.884$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 33.5$ psf (NESC 2007 Section 250.C.2)

Shape Factors

NUS Design Criteria Issued April 12, 2007

Shape Factor for Round Members =	$Cd_R := 1.3$	(User Input)
Shape Factor for Flat Members =	$Cd_F := 1.6$	(User Input)
Shape Factor for Coax Cables Attached to Outside of Pole =	$Cd_{coax} := 1.45$	(User Input)

Overload Factors

NU Design Criteria Table

Overload Factors for Wind Loads:

NESC Heavy Loading =	**2.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

Overload Factors for Vertical Loads:

NESC Heavy Loading =	**1.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	dbspectra DS9A09F36D-N		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 231$	in	(User Input)
Antenna Diameter =	$d_{ant} := 3$	in	(User Input)
Antenna Weight =	$WT_{ant} := 50$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)

Wind Load (NESC Extreme)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot d_{ant}}{144} = 4.8$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 4.8$	sf
Total Antenna Wind Force =	$F_{ant1} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 322$	lbs

Wind Load (NESC Heavy)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (d_{ant} + 1)}{144} = 6.4$	sf
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 6.4$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant1} := p \cdot Cd_F \cdot A_{ICEant} = 41$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$W_{ant1} := WT_{ant} \cdot N_{ant} = 50$	lbs

Gravity Load (ice only)

Volume of Ice on Each Antenna =	$V_{ice} := L_{ant} \cdot \frac{\pi}{4} \cdot \left[(d_{ant} + 1)^2 - d_{ant}^2 \right] = 1270$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot ld = 41$	lbs
Weight of Ice on All Antennas =	$W_{iceant1} := W_{ICEant} \cdot N_{ant} = 41$	lbs

Development of Wind & Ice Load on TTAs

TTA Data:

TTA Model =	Bird 430-94C-09168-M-110/48 TTA		
TTA Shape =	Flat		(User Input)
TTA Height =	$L_{TTA} := 20$	in	(User Input)
TTA Width =	$W_{TTA} := 6$	in	(User Input)
TTA Thickness =	$T_{TTA} := 6$	in	(User Input)
TTA Weight =	$WT_{TTA} := 20$	lbs	(User Input)
Number of TTAs =	$N_{TTA} := 1$		(User Input)

Wind Load (NESC Extreme)

Surface Area for One TTA = $SA_{TTA} := \frac{L_{TTA} \cdot W_{TTA}}{144} = 0.8$ sf

TTA Projected Surface Area = $A_{TTA} := SA_{TTA} \cdot N_{TTA} = 0.8$ sf

Total TTA Wind Force = $F_{TTA1} := qz \cdot Cd_F \cdot A_{TTA} \cdot m = 56$ lbs

Wind Load (NESC Heavy)

Surface Area for One TTA w/ Ice = $SA_{ICETTA} := \frac{(L_{TTA} + 1) \cdot (W_{TTA} + 1)}{144} = 1$ sf

TTA Projected Surface Area w/ Ice = $A_{ICETTA} := SA_{ICETTA} \cdot N_{TTA} = 1$ sf

Total TTA Wind Force w/ Ice = $Fi_{TTA1} := p \cdot Cd_F \cdot A_{ICETTA} = 7$ lbs

Gravity Load (without ice)

Weight of All TTAs = $W_{TTA1} := WT_{TTA} \cdot N_{TTA} = 20$ lbs

Gravity Load (ice only)

Volume of Each TTA = $V_{TTA} := L_{TTA} \cdot W_{TTA} \cdot T_{TTA} = 720$ cu in

Volume of Ice on Each TTA = $V_{ice} := (L_{TTA} + 1)(W_{TTA} + 1) \cdot (T_{TTA} + 1) - V_{TTA} = 309$ cu in

Weight of Ice on Each TTA = $W_{ICETTA} := \frac{V_{ice}}{1728} \cdot Id = 10$ lbs

Weight of Ice on All TTAs = $W_{iceTTA1} := W_{ICETTA} \cdot N_{TTA} = 10$ lbs

Development of Wind & Ice Load on Equipment

Equipment Data:

Equipment Model =	Equipment Box 1		
Equipment Shape =	Flat		(User Input)
Equipment Height =	$L_{eb} := 36$	in	(User Input)
Equipment Width =	$W_{eb} := 36$	in	(User Input)
Equipment Thickness =	$T_{eb} := 12$	in	(User Input)
Equipment Weight =	$WT_{eb} := 350$	lbs	(User Input)
Number of Equipments =	$N_{eb} := 1$		(User Input)

Wind Load (NESC Extreme)

Surface Area for One Equipment =	$SA_{eb} := \frac{L_{eb} \cdot W_{eb}}{144} = 9$	sf
Equipment Projected Surface Area =	$A_{eb} := SA_{eb} \cdot N_{eb} = 9$	sf
Total Equipment Wind Force =	$F_{eb1} := qz \cdot Cd_F \cdot A_{eb} = 482$	lbs

Wind Load (NESC Heavy)

Surface Area for One Equipment w/ Ice =	$SA_{ICEeb} := \frac{(L_{eb} + 1) \cdot (W_{eb} + 1)}{144} = 9.5$	sf
Equipment Projected Surface Area w/ Ice =	$A_{ICEeb} := SA_{ICEeb} \cdot N_{eb} = 9.5$	sf
Total Equipment Wind Force w/ Ice =	$Fi_{eb1} := p \cdot Cd_F \cdot A_{ICEeb} = 61$	lbs

Gravity Load (without ice)

Weight of All Equipment =	$W_{eb1} := WT_{eb} = 350$	lbs

Gravity Load (ice only)

Volume of Each Equipment =	$V_{eb} := L_{eb} \cdot W_{eb} \cdot T_{eb} = 2 \times 10^4$	cu in
Volume of Ice on Each Equipment =	$V_{ice} := (L_{eb} + 1)(W_{eb} + 1) \cdot (T_{eb} + 1) - V_{eb} = 2245$	cu in
Weight of Ice on Each Equipment =	$W_{ICEeb} := \frac{V_{ice}}{1728} \cdot Id = 73$	lbs
Weight of Ice on All Equipment =	$W_{iceeb1} := W_{ICEeb} \cdot N_{eb} = 73$	lbs

Development of Wind & Ice Load on Equipment

Equipment Data:

Equipment Model =	Equipment Box 2		
Equipment Shape =	Flat		(User Input)
Equipment Height =	$L_{eb} := 36$	in	(User Input)
Equipment Width =	$W_{eb} := 24$	in	(User Input)
Equipment Thickness =	$T_{eb} := 12$	in	(User Input)
Equipment Weight =	$WT_{eb} := 250$	lbs	(User Input)
Number of Equipments =	$N_{eb} := 1$		(User Input)

Wind Load (NESC Extreme)

Surface Area for One Equipment =	$SA_{eb} := \frac{L_{eb} \cdot W_{eb}}{144} = 6$	sf
Equipment Projected Surface Area =	$A_{eb} := SA_{eb} \cdot N_{eb} = 6$	sf
Total Equipment Wind Force =	$F_{eb2} := qz \cdot Cd_F \cdot A_{eb} = 321$	lbs

Wind Load (NESC Heavy)

Surface Area for One Equipment w/ Ice =	$SA_{ICEeb} := \frac{(L_{eb} + 1) \cdot (W_{eb} + 1)}{144} = 6.4$	sf
Equipment Projected Surface Area w/ Ice =	$A_{ICEeb} := SA_{ICEeb} \cdot N_{eb} = 6.4$	sf
Total Equipment Wind Force w/ Ice =	$Fi_{eb2} := p \cdot Cd_F \cdot A_{ICEeb} = 41$	lbs

Gravity Load (without ice)

Weight of All Equipment =	$W_{eb2} := WT_{eb} = 250$	lbs

Gravity Load (ice only)

Volume of Each Equipment =	$V_{eb} := L_{eb} \cdot W_{eb} \cdot T_{eb} = 1 \times 10^4$	cu in
Volume of Ice on Each Equipment =	$V_{ice} := (L_{eb} + 1)(W_{eb} + 1) \cdot (T_{eb} + 1) - V_{eb} = 1657$	cu in
Weight of Ice on Each Equipment =	$W_{ICEeb} := \frac{V_{ice}}{1728} \cdot Id = 54$	lbs
Weight of Ice on All Equipment =	$W_{iceeb2} := W_{ICEeb} \cdot N_{eb} = 54$	lbs

Total Equipment Loads:

Whip @ 83-ft AGL

NESC Heavy Wind Vertical = $\left(W_{ant1} + W_{iceant1} + W_{TTA1} + W_{iceTTA1}\right)\cdot 1.5 = 182$

NESC Heavy Wind Trasnsverse = $\left(Fi_{ant1} + Fi_{TTA1}\right)\cdot 2.5 = 119$

NESC Extreme Wind Vertical = $W_{ant1} + W_{TTA1} = 70$

NESC Extreme Wind Trasnsverse = $F_{ant1} + F_{TTA1} = 378$

Equipment Boxes @ 8-ft ATB

NESC Heavy Wind Vertical = $\left(W_{eb1} + W_{iceeb1} + W_{eb2} + W_{iceeb2}\right)\cdot 1.5 = 1090$

NESC Heavy Wind Trasnsverse = $\left(Fi_{eb1} + Fi_{eb2}\right)\cdot 2.5 = 255$

NESC Extreme Wind Vertical = $\left(W_{eb1} + W_{eb2}\right) = 600$

NESC Extreme Wind Trasnsverse = $\left(F_{eb1} + F_{eb2}\right) = 804$

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Subject:	Coax Cable on Pole #9950
Location:	Danbury, CT
Rev. 3: 3/6/17	Prepared by: T.J.L Checked by: C.F.C. Job No. 16144.00

Coax Cable on Pole

Distance Between Coax Cable Attach Points =

Coaxial Cable Span = $Coax_{Span} := \begin{pmatrix} 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \end{pmatrix} \cdot ft$ *(User Input)*

Diameter of Coax Cable = $D_{coax} := 1.55 \cdot in$ *(User Input)*

Weight of Coax Cable = $W_{coax} := 0.66 \cdot plf$ *(User Input)*

Number of Coax Cables = $N_{coax} := 3$ *(User Input)*

Number of Projected Coax Cables = $NP_{coax} := 1$ *(User Input)*

Extreme Wind Pressure = $qz := 33.5 \cdot psf$ *(User Input)*

Heavy Wind Pressure = $p := 4 \cdot psf$ *(User Input)*

Radial Ice Thickness = $Ir := 0.5 \cdot in$ *(User Input)*

Radial Ice Density = $Id := 56 \cdot pcf$ *(User Input)*

Shape Factor = $Cd_{coax} := 1.6$ *(User Input)*

Overload Factor for NESC Heavy Wind Load = $OF_{HW} := 2.5$ *(User Input)*

Overload Factor for NESC Extreme Wind Load = $OF_{EW} := 1.0$ *(User Input)*

Overload Factor for NESC Heavy Vertical Load = $OF_{HV} := 1.5$ *(User Input)*

Overload Factor for NESC Extreme Vertical Load = $OF_{EV} := 1.0$ *(User Input)*

Wind Area with Ice = $A_{ice} := \left(NP_{coax} \cdot D_{coax} + 2 \cdot Ir\right) = 2.55 \cdot in$

Wind Area without Ice = $A := \left(NP_{coax} \cdot D_{coax}\right) = 1.55 \cdot in$

Ice Area per Liner Ft = $Ai_{coax} := \frac{\pi}{4} \cdot \left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^2\right] = 0.022\,ft^2$

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 3.757 \cdot plf$

Heavy Vertical Load =

$$Heavy_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax} + W_{ice}\right) \cdot Coax_{Span} \cdot OF_{HV}\right]}$$

Heavy Transverse Load =

$$Heavy_{Trans} := \overrightarrow{\left(p \cdot A_{ice} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{HW}\right)}$$

$$Heavy_{Vert} = \begin{pmatrix} 86 \\ 86 \\ 86 \\ 86 \\ 86 \\ 86 \\ 86 \\ 86 \end{pmatrix} lb \qquad Heavy_{Trans} = \begin{pmatrix} 34 \\ 34 \\ 34 \\ 34 \\ 34 \\ 34 \\ 34 \\ 34 \end{pmatrix} lb$$

Extreme Vertical Load =

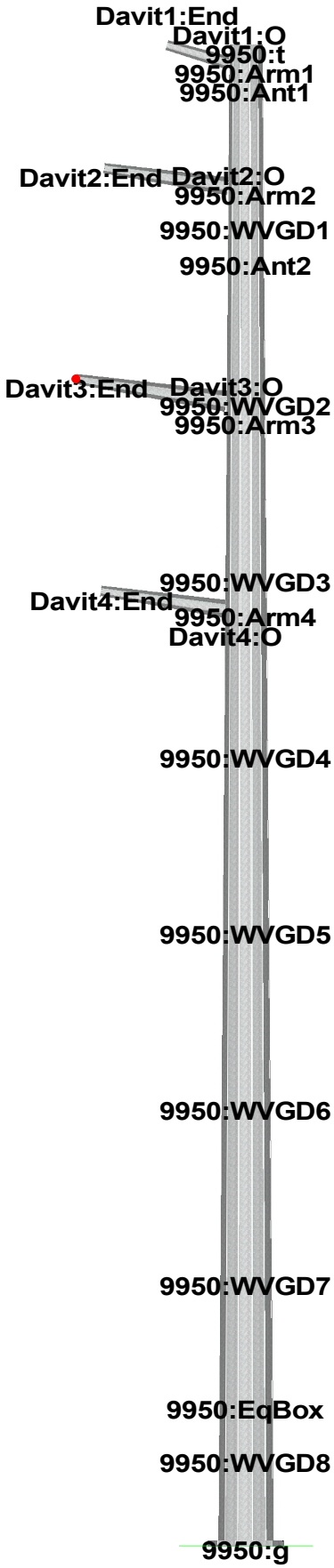
$$Extreme_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax}\right) \cdot Coax_{Span} \cdot OF_{EV}\right]}$$

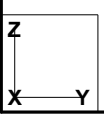
Extreme Transverse Load =

$$Extreme_{Trans} := \overrightarrow{\left[\left(qz \cdot A \cdot Cd_{coax}\right) \cdot Coax_{Span} \cdot OF_{EW}\right]}$$

$$Extreme_{Vert} = \begin{pmatrix} 20 \\ 20 \\ 20 \\ 20 \\ 20 \\ 20 \\ 20 \\ 20 \end{pmatrix} lb \qquad Extreme_{Trans} = \begin{pmatrix} 69 \\ 69 \\ 69 \\ 69 \\ 69 \\ 69 \\ 69 \\ 69 \end{pmatrix} lb$$

Centek Engineering Inc, Project: "cl&p structure # 9950"
PLS-POLE Version 12.50, 11:49:56 AM Monday, March 06, 2017
Undeformed geometry displayed





Project Name : 16144.00 - Danbury, CT
Project Notes: Str # 9950 / Birchwood Conominium
Project File : J:\Jobs\1614400.WI\04_Structural\Backup Documentation\Calcs\Rev (3)\PLS Pole\cl&p structure # 9950.pol
Date run : 11:49:27 AM Monday, March 06, 2017
by : PLS-POLE Version 12.50
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.

Loads from file: j:\jobs\1614400.wi\04_structural\backup documentation\calcs\rev (3)\pls pole\cl&p # 9950.lca

*** Analysis Results:

Maximum element usage is 59.56% for Steel Pole "9950" in load case "NESC Extreme"
Maximum insulator usage is 8.65% for Clamp "clamp2" in load case "NESC Heavy"

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint Label	Long. Force (kips)	Tran. Force (kips)	Vert. Force (kips)	Shear Force (kips)	Tran. Moment (ft-k)	Long. Bending Moment (ft-k)	Vert. Moment (ft-k)	Found. Usage %
NESC Heavy	9950:g	-0.07	-16.91	-37.81	16.91	930.78	-3.01	930.79	-0.02	0.00
NESC Extreme	9950:g	-0.02	-23.81	-20.35	23.81	1335.35	-0.91	1335.35	-0.00	0.00

Summary of Tip Deflections For All Load Cases:

Note: postive tip load results in positive deflection

Load Case	Joint Label	Long. Defl. (in)	Tran. Defl. (in)	Vert. Defl. (in)	Resultant Defl. (in)	Long. Rot. (deg)	Tran. Rot. (deg)	Twist (deg)
NESC Heavy	9950:t	0.06	18.91	-0.24	18.91	0.00	-1.53	0.00
NESC Extreme	9950:t	0.02	29.80	-0.55	29.81	0.00	-2.60	0.00

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)
9950	1	3697	NESC Extreme	47.32	477.07
9950	2	5494	NESC Extreme	59.56	1335.35

*** Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
9950	59.56	NESC Extreme	24	10796.4

Summary of Tubular Davit Usages:

Tubular Davit	Maximum	Load Case	Segment	Weight

Label	Usage %		Number	(lbs)
Davit1	7.92	NESC Heavy	1	72.4
Davit2	32.68	NESC Heavy	1	166.7
Davit3	22.70	NESC Heavy	1	282.8
Davit4	32.73	NESC Heavy	1	166.7

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	42.33	9950	Steel Pole
NESC Extreme	59.56	9950	Steel Pole

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	42.33	9950	24
NESC Extreme	59.56	9950	24

Summary of Base Plate Usages by Load Case:

Load Case	Pole Label	Bend Line #	Length (in)	Vertical Load (kips)	X Moment (ft-k)	Y Moment (ft-k)	Bending Stress (ksi)	Bolt Moment Sum (ft-k)	# Bolts Acting On Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC Heavy	9950	24	16.637	36.209	930.782	-3.006	19.051	33.290	2	85.282	1.550	31.75
NESC Extreme	9950	24	16.637	18.747	1335.345	-0.913	26.653	46.575	2	119.583	1.833	44.42

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy	32.73	Davit4	1
NESC Extreme	11.18	Davit4	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
clamp1	Clamp	3.66	NESC Heavy	0.0
clamp2	Clamp	8.65	NESC Heavy	0.0
clamp3	Clamp	8.65	NESC Heavy	0.0
clamp4	Clamp	8.65	NESC Heavy	0.0
clamp5	Clamp	0.12	NESC Heavy	0.0
clamp6	Clamp	0.12	NESC Heavy	0.0
clamp7	Clamp	0.12	NESC Heavy	0.0
clamp8	Clamp	0.12	NESC Heavy	0.0

clamp9	Clamp	0.12	NESC Heavy	0.0
clamp10	Clamp	0.12	NESC Heavy	0.0
clamp11	Clamp	0.12	NESC Heavy	0.0
clamp12	Clamp	0.12	NESC Heavy	0.0
clamp13	Clamp	0.48	NESC Extreme	0.0
clamp14	Clamp	0.00	NESC Heavy	0.0
clamp15	Clamp	1.40	NESC Heavy	0.0

*** Weight of structure (lbs):

Weight of Tubular Davit Arms:	688.6
Weight of Steel Poles:	10796.4
Total:	11485.0

*** End of Report

```
**************************************************************************
*                                                                        *
*                              PLS-POLE                                  *
*                    POLE AND FRAME ANALYSIS AND DESIGN                  *
*                Copyright Power Line Systems, Inc. 1999-2011            *
*                                                                        *
**************************************************************************

Project Name : 16144.00 - Danbury, CT
Project Notes: Str # 9950 / Birchwood Conominium
Project File : J:\Jobs\1614400.WI\04_Structural\Backup Documentation\Calcs\Rev (3)\PLS Pole\cl&p structure # 9950.pol
Date run     : 11:49:26 AM Monday, March 06, 2017
by           : PLS-POLE Version 12.50
Licensed to  : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.
```

```
Modeling options:
  Offset Arms from Pole/Mast:   Yes
  Offset Braces from Pole/Mast: Yes
  Offset Guys from Pole/Mast:   Yes
  Offset Posts from Pole/Mast:  Yes
  Offset Strains from Pole/Mast:  Yes
  Use Alternate Convergence Process: No
  Steel poles checked with ASCE/SEI 48-05


Default Modulus of Elasticity for Steel = 29000.00 (ksi)
Default Weight Density for Steel = 490.00 (lbs/ft^3)
```

Steel Pole Properties:

Steel Pole Property	Stock Length Number	Default Embedded	Base Plate	Shape Diameter	Tip Diameter	Base Drag	Taper Default	Tubes Modulus of Elasticity	Weight Density	Shape At	Strength Check	Distance From Ultimate	Ultimate

Label	Length (ft)	Length (ft)		(in)	(in)	Coef. (in/ft)		Override (ksi)	Override (lbs/ft^3)	Base	Type	Tip (ft)	Trans. Load (kips)	Long. Load (kips)
9950	9950	85.00	0	Yes	12F	22.87	37.38	0	1.3	2 tubes	0	0	Calculated	0.000	0.0000	0.0000

Steel Tubes Properties:

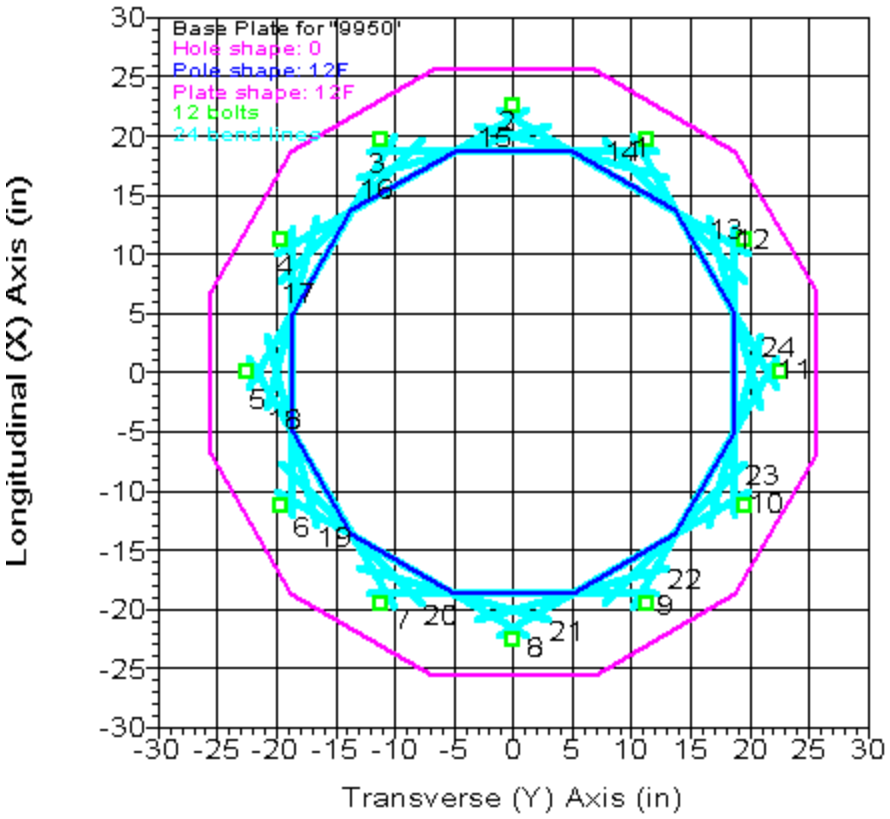
Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)	Actual Overlap (ft)
9950	1	50	0.25	5.000	0.000	0.000	65.000	0.000	3697	26.36	0.17659	22.87	31.70	3.900	5.000
9950	2	40	0.375	0.000	0.000	0.000	65.000	0.000	5494	20.70	0.17659	30.32	37.38	0.000	0.000

Base Plate Properties:

Pole Property	Plate Diam. (in)	Plate Shape	Plate Thick. (in)	Plate Weight (lbs)	Bend Line Length Override (in)	Hole Diam. (in)	Hole Shape	Steel Density (lbs/ft^3)	Steel Yield Stress (ksi)	Bolt Diam. (in)	Bolt Pattern Diam. (in)	Num. Of Bolts	Bolt Cage X Inertia (in^4)	Bolt Cage Y Inertia (in^4)
9950	51.190	12F	2.750	1605	0.000	0.000	0	490.00	60.000	2.250	45.200	12	12200.55	12200.55

Base Plate Bolt Coordinates for Property "9950":

Bolt X Coord.	Bolt Y Coord.	Bolt Angle (deg)
0	1	0
0.4978	0.8684	0
0.8684	0.4978	0
1	0	0



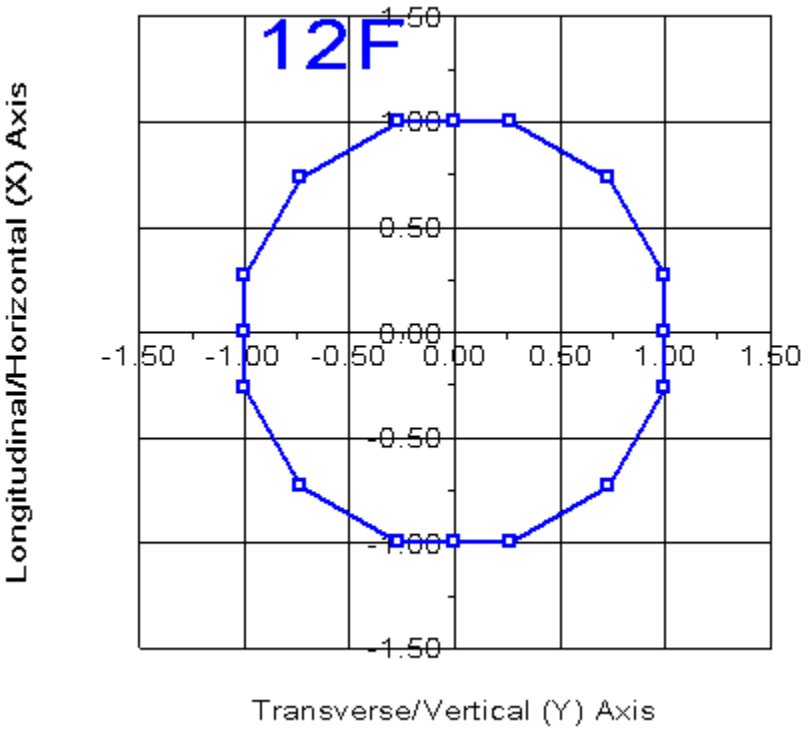
Steel Pole Connectivity:

Pole Label	Tip Joint	Base Joint	X of Base (ft)	Y of Base (ft)	Z of Base (ft)	Inclin. About X (deg)	Inclin. About Y (deg)	Property Set	Attach. Labels	Base Connect	Embed % Override	Embed C. Override (ft)
9950			0	0	0	0	0	9950	15 labels		0.00	0

Relative Attachment Labels for Steel Pole "9950":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
9950:Arm1	0.00	84.00
9950:Arm2	0.00	77.00
9950:Arm3	0.00	64.75
9950:Arm4	0.00	53.00
9950:WVGD1	0.00	75.00

9950:WVGD2	0.00	65.00
9950:WVGD3	0.00	55.00
9950:WVGD4	0.00	45.00
9950:WVGD5	0.00	35.00
9950:WVGD6	0.00	25.00
9950:WVGD7	0.00	15.00
9950:WVGD8	0.00	5.00
9950:Ant1	0.00	83.00
9950:Ant2	0.00	73.00
9950:EqBox	0.00	8.00



Pole Steel Properties:

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	T-Moment Inertia (in^4)	L-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	T-Moment Capacity (ft-k)	L-Moment Capacity (ft-k)
9950	9950:t	9950:t Ori	0.00	22.87	18.18	1190.93	1190.93	0.00	21.8	65.00	65.00	564.13	564.13
9950	9950:Arm1	9950:Arm1 End	1.00	23.05	18.32	1219.03	1219.03	0.00	22.0	65.00	65.00	573.02	573.02
9950	9950:Arm1	9950:Arm1 Ori	1.00	23.05	18.32	1219.03	1219.03	0.00	22.0	65.00	65.00	573.02	573.02
9950	9950:Ant1	9950:Ant1 End	2.00	23.22	18.47	1247.58	1247.58	0.00	22.2	65.00	65.00	581.98	581.98
9950	9950:Ant1	9950:Ant1 Ori	2.00	23.22	18.47	1247.58	1247.58	0.00	22.2	65.00	65.00	581.98	581.98
9950	#9950:0	Tube 1 End	5.00	23.75	18.89	1335.89	1335.89	0.00	22.8	65.00	65.00	609.28	609.28
9950	#9950:0	Tube 1 Ori	5.00	23.75	18.89	1335.89	1335.89	0.00	22.8	65.00	65.00	609.28	609.28

9950	9950:Arm2	9950:Arm2 End	8.00	24.28	19.32	1428.27	1428.27	0.00	23.3	65.00	65.00	637.20	637.20
9950	9950:Arm2	9950:Arm2 Ori	8.00	24.28	19.32	1428.27	1428.27	0.00	23.3	65.00	65.00	637.20	637.20
9950	9950:WVGD1	9950:WVGD1 End	10.00	24.64	19.60	1492.16	1492.16	0.00	23.7	65.00	65.00	656.16	656.16
9950	9950:WVGD1	9950:WVGD1 Ori	10.00	24.64	19.60	1492.16	1492.16	0.00	23.7	65.00	65.00	656.16	656.16
9950	9950:Ant2	9950:Ant2 End	12.00	24.99	19.89	1557.93	1557.93	0.00	24.1	65.00	65.00	675.40	675.40
9950	9950:Ant2	9950:Ant2 Ori	12.00	24.99	19.89	1557.93	1557.93	0.00	24.1	65.00	65.00	675.40	675.40
9950	#9950:1	Tube 1 End	16.00	25.70	20.45	1695.21	1695.21	0.00	24.9	65.00	65.00	714.71	714.71
9950	#9950:1	Tube 1 Ori	16.00	25.70	20.45	1695.21	1695.21	0.00	24.9	65.00	65.00	714.71	714.71
9950	9950:WVGD2	9950:WVGD2 End	20.00	26.40	21.02	1840.33	1840.33	0.00	25.6	65.00	65.00	755.14	755.14
9950	9950:WVGD2	9950:WVGD2 Ori	20.00	26.40	21.02	1840.33	1840.33	0.00	25.6	65.00	65.00	755.14	755.14
9950	9950:Arm3	9950:Arm3 End	20.25	26.45	21.06	1849.67	1849.67	0.00	25.7	65.00	65.00	757.70	757.70
9950	9950:Arm3	9950:Arm3 Ori	20.25	26.45	21.06	1849.67	1849.67	0.00	25.7	65.00	65.00	757.70	757.70
9950	#9950:2	Tube 1 End	25.13	27.31	21.75	2038.07	2038.07	0.00	26.6	65.00	65.00	808.56	808.56
9950	#9950:2	Tube 1 Ori	25.13	27.31	21.75	2038.07	2038.07	0.00	26.6	65.00	65.00	808.56	808.56
9950	9950:WVGD3	9950:WVGD3 End	30.00	28.17	22.44	2238.85	2238.85	0.00	27.5	65.00	65.00	861.07	861.07
9950	9950:WVGD3	9950:WVGD3 Ori	30.00	28.17	22.44	2238.85	2238.85	0.00	27.5	65.00	65.00	861.07	861.07
9950	9950:Arm4	9950:Arm4 End	32.00	28.52	22.73	2324.90	2324.90	0.00	27.9	65.00	65.00	883.09	883.09
9950	9950:Arm4	9950:Arm4 Ori	32.00	28.52	22.73	2324.90	2324.90	0.00	27.9	65.00	65.00	883.09	883.09
9950	#9950:3	Tube 1 End	36.00	29.23	23.29	2503.54	2503.54	0.00	28.6	65.00	65.00	927.96	927.96
9950	#9950:3	Tube 1 Ori	36.00	29.23	23.29	2503.54	2503.54	0.00	28.6	65.00	65.00	927.96	927.96
9950	9950:WVGD4	9950:WVGD4 End	40.00	29.93	23.86	2691.11	2691.11	0.00	29.4	65.00	65.00	973.95	973.95
9950	9950:WVGD4	9950:WVGD4 Ori	40.00	29.93	23.86	2691.11	2691.11	0.00	29.4	65.00	65.00	973.95	973.95
9950	#9950:4	SpliceT End	45.00	30.82	24.57	2938.46	2938.46	0.00	30.3	65.00	64.50	1025.05	1025.05
9950	#9950:4	SpliceT Ori	45.00	30.82	24.57	2938.46	2938.46	0.00	30.3	65.00	64.50	1025.05	1025.05
9950	9950:WVGD5	9950:WVGD5 End	50.00	31.20	37.17	4520.57	4520.57	0.00	19.6	65.00	65.00	1569.67	1569.67
9950	9950:WVGD5	9950:WVGD5 Ori	50.00	31.20	37.17	4520.57	4520.57	0.00	19.6	65.00	65.00	1569.67	1569.67
9950	#9950:5	Tube 2 End	55.00	32.08	38.23	4920.23	4920.23	0.00	20.2	65.00	65.00	1661.42	1661.42
9950	#9950:5	Tube 2 Ori	55.00	32.08	38.23	4920.23	4920.23	0.00	20.2	65.00	65.00	1661.42	1661.42
9950	9950:WVGD6	9950:WVGD6 End	60.00	32.97	39.30	5342.78	5342.78	0.00	20.9	65.00	65.00	1755.79	1755.79
9950	9950:WVGD6	9950:WVGD6 Ori	60.00	32.97	39.30	5342.78	5342.78	0.00	20.9	65.00	65.00	1755.79	1755.79
9950	#9950:6	Tube 2 End	65.00	33.85	40.36	5788.85	5788.85	0.00	21.5	65.00	65.00	1852.75	1852.75
9950	#9950:6	Tube 2 Ori	65.00	33.85	40.36	5788.85	5788.85	0.00	21.5	65.00	65.00	1852.75	1852.75
9950	9950:WVGD7	9950:WVGD7 End	70.00	34.73	41.43	6259.09	6259.09	0.00	22.1	65.00	65.00	1952.33	1952.33
9950	9950:WVGD7	9950:WVGD7 Ori	70.00	34.73	41.43	6259.09	6259.09	0.00	22.1	65.00	65.00	1952.33	1952.33
9950	#9950:7	Tube 2 End	73.50	35.35	42.17	6602.97	6602.97	0.00	22.6	65.00	65.00	2023.58	2023.58
9950	#9950:7	Tube 2 Ori	73.50	35.35	42.17	6602.98	6602.98	0.00	22.6	65.00	65.00	2023.58	2023.58
9950	9950:EqBox	9950:EqBox End	77.00	35.97	42.92	6959.23	6959.23	0.00	23.0	65.00	65.00	2096.11	2096.11
9950	9950:EqBox	9950:EqBox Ori	77.00	35.97	42.92	6959.23	6959.23	0.00	23.0	65.00	65.00	2096.11	2096.11
9950	9950:WVGD8	9950:WVGD8 End	80.00	36.50	43.55	7274.60	7274.60	0.00	23.4	65.00	65.00	2159.30	2159.30
9950	9950:WVGD8	9950:WVGD8 Ori	80.00	36.50	43.55	7274.61	7274.61	0.00	23.4	65.00	65.00	2159.30	2159.30
9950	9950:g	9950:g End	85.00	37.38	44.62	7821.16	7821.16	0.00	24.0	65.00	65.00	2266.70	2266.70

Tubular Davit Properties:

Davit Property Label	Stock Number	Steel Shape	Thickness (in)	Base Diameter or Depth (in)	Tip Diameter or Depth (in)	Taper (in/ft)	Drag Coef.	Modulus of Elasticity (ksi)	Geometry Check Type	Strength Vertical Capacity (lbs)	Tension Capacity (lbs)	Compres. Capacity (lbs)	Long. Capacity (lbs)	Yield Stress (ksi)	Weight Steel Density Override (lbs/ft^3)
1019849	1019849	6T	0.25	8	6	0	1.3	29000	1 point Calculated	0	0	0	0	65	0
1019851	1019851	6T	0.3125	12.5	6	0	1.3	29000	1 point Calculated	0	0	0	0	65	0
1019852	1019852	6T	0.25	10.5	6	0	1.3	29000	1 point Calculated	0	0	0	0	65	0

Intermediate Joints for Davit Property "1019849":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	3.5	-1

Intermediate Joints for Davit Property "1019851":

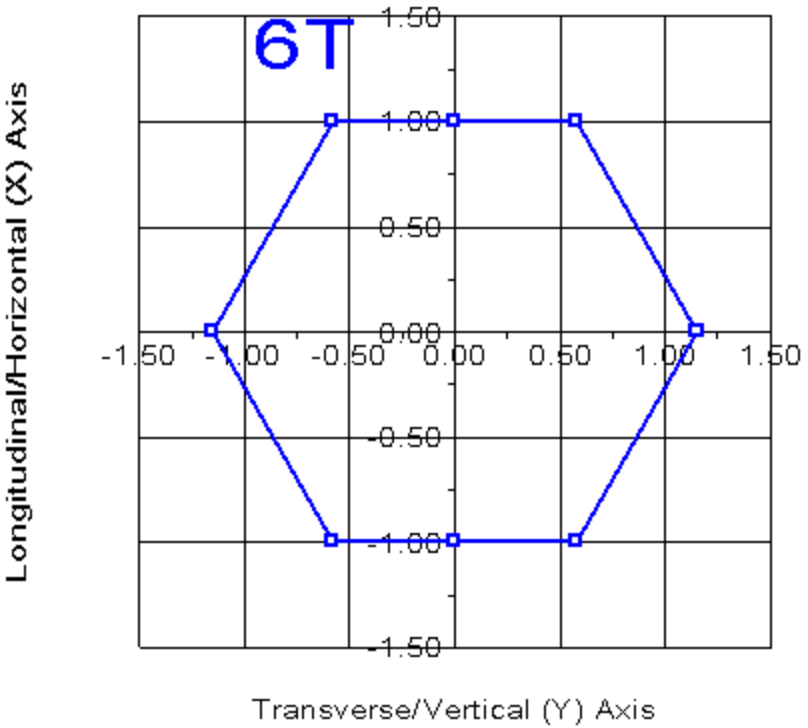
Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	8.5	-1.25

Intermediate Joints for Davit Property "1019852":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	7	-1

Tubular Davit Arm Connectivity:

Davit Label	Attach Label	Davit Property Set	Azimuth (deg)
Davit1	9950:Arm1	1019849	180
Davit2	9950:Arm2	1019852	180
Davit3	9950:Arm3	1019851	180
Davit4	9950:Arm4	1019852	180



Tubular Davit Arm Steel Properties:

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	V-Moment Inertia (in^4)	H-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	V-Moment Capacity (ft-k)	H-Moment Capacity (ft-k)
Davit1	Davit1:O	Origin	0.00	8.00	6.71	56.04	56.04	0.00	12.7	65.00	65.00	65.73	75.89
Davit1	Davit1:End	End	3.64	6.00	4.98	22.91	22.91	0.00	8.1	65.00	65.00	35.82	41.36
Davit2	Davit2:O	Origin	0.00	10.50	8.88	129.60	129.60	0.00	18.5	65.00	65.00	115.80	133.71
Davit2	#Davit2:0	End	3.54	8.25	6.93	61.64	61.64	0.00	13.3	65.00	65.00	70.10	80.94
Davit2	#Davit2:0	Origin	3.54	8.25	6.93	61.64	61.64	0.00	13.3	65.00	65.00	70.10	80.94
Davit2	Davit2:End	End	7.07	6.00	4.98	22.91	22.91	0.00	8.1	65.00	65.00	35.82	41.36
Davit3	Davit3:O	Origin	0.00	12.50	13.19	272.34	272.34	0.00	17.3	65.00	65.00	204.41	236.03
Davit3	#Davit3:0	End	4.30	9.25	9.67	107.46	107.46	0.00	11.3	65.00	65.00	109.00	125.86
Davit3	#Davit3:0	Origin	4.30	9.25	9.67	107.46	107.46	0.00	11.3	65.00	65.00	109.00	125.86
Davit3	Davit3:End	End	8.59	6.00	6.16	27.74	27.74	0.00	5.3	65.00	65.00	43.38	50.09
Davit4	Davit4:O	Origin	0.00	10.50	8.88	129.60	129.60	0.00	18.5	65.00	65.00	115.80	133.71
Davit4	#Davit4:0	End	3.54	8.25	6.93	61.64	61.64	0.00	13.3	65.00	65.00	70.10	80.94
Davit4	#Davit4:0	Origin	3.54	8.25	6.93	61.64	61.64	0.00	13.3	65.00	65.00	70.10	80.94
Davit4	Davit4:End	End	7.07	6.00	4.98	22.91	22.91	0.00	8.1	65.00	65.00	35.82	41.36

*** Insulator Data

Clamp Properties:

Label	Stock Number	Holding Capacity (lbs)
clamp	clamp1	8e+004

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift) (lbs)
clamp1	Davit1:End	clamp	No Limit
clamp2	Davit2:End	clamp	No Limit
clamp3	Davit3:End	clamp	No Limit
clamp4	Davit4:End	clamp	No Limit
clamp5	9950:WVGD1	clamp	No Limit
clamp6	9950:WVGD2	clamp	No Limit
clamp7	9950:WVGD3	clamp	No Limit
clamp8	9950:WVGD4	clamp	No Limit
clamp9	9950:WVGD5	clamp	No Limit
clamp10	9950:WVGD6	clamp	No Limit
clamp11	9950:WVGD7	clamp	No Limit
clamp12	9950:WVGD8	clamp	No Limit
clamp13	9950:Ant1	clamp	No Limit
clamp14	9950:Ant2	clamp	No Limit
clamp15	9950:EqBox	clamp	No Limit

*** Loads Data

Loads from file: j:\jobs\1614400.wi\04_structural\backup documentation\calcs\rev (3)\pls pole\cl&p # 9950.lca

Insulator dead and wind loads are already included in the point loads printed below.

Loading Method Parameters:

Structure Height Summary (used for calculating wind/ice adjust with height):

Z of ground for wind height adjust	0.00	(ft)	and structure Z coordinate that will be put on the centerline ground profile in PLS-CADD.
Ground elevation shift	0.00	(ft)	
Z of ground with shift	0.00	(ft)	
Z of structure top (highest joint)	85.00	(ft)	
Structure height	85.00	(ft)	
Structure height above ground	85.00	(ft)	

Vector Load Cases:

Load Case Description	Dead Load Factor	Wind Area Factor	SF for Steel Poles and Towers	SF for Wood Poles	SF for Conc. Poles	SF for Conc. Ult.	SF for First Crack	SF for Zero Tens.	SF for Guys and Cables	SF For Non Tubular Arms	Braces	Insuls.	Found.	Point Loads	Wind/Ice Model	Trans. Wind Pressure (psf)	Longit. Wind Pressure (psf)	Ice Thick. (in)	Ice Density (lbs/ft^3)	Temperature (deg F)	Pole Deflection Check	Pole Deflection Limit % or (ft)
NESC Heavy	1.5000	2.5000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	14 loads	Wind on All	4	0	0.000	56.000	0.0	No Limit	0
NESC Extreme	1.0000	1.0000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	14 loads	NESC 2007	31	0	0.000	0.000	0.0	No Limit	0

Point Loads for Load Case "NESC Heavy":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	2001	2134	0	Shield Wire
Davit2:End	5796	3783	0	Conductor
Davit3:End	5796	3783	0	Conductor
Davit4:End	5796	3783	0	Conductor
9950:Ant1	182	119	0	Antenna 1
9950:WVGD1	86	34	0	Coax Cable
9950:WVGD2	86	34	0	Coax Cable
9950:WVGD3	86	34	0	Coax Cable
9950:WVGD4	86	34	0	Coax Cable
9950:WVGD5	86	34	0	Coax Cable
9950:WVGD6	86	34	0	Coax Cable
9950:WVGD7	86	34	0	Coax Cable
9950:WVGD8	86	34	0	Coax Cable
9950:EqBox	1090	255	0	Equipment Boxes

Point Loads for Load Case "NESC Extreme":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	505	1981	0	Shield Wire
Davit2:End	2461	4508	0	Conductor
Davit3:End	2461	4508	0	Conductor
Davit4:End	2461	4508	0	Conductor
9950:Ant1	70	378	0	Antenna 1
9950:WVGD1	20	69	0	Coax Cable
9950:WVGD2	20	69	0	Coax Cable
9950:WVGD3	20	69	0	Coax Cable
9950:WVGD4	20	69	0	Coax Cable
9950:WVGD5	20	69	0	Coax Cable
9950:WVGD6	20	69	0	Coax Cable
9950:WVGD7	20	69	0	Coax Cable
9950:WVGD8	20	69	0	Coax Cable
9950:EqBox	600	804	0	Equipment Boxes

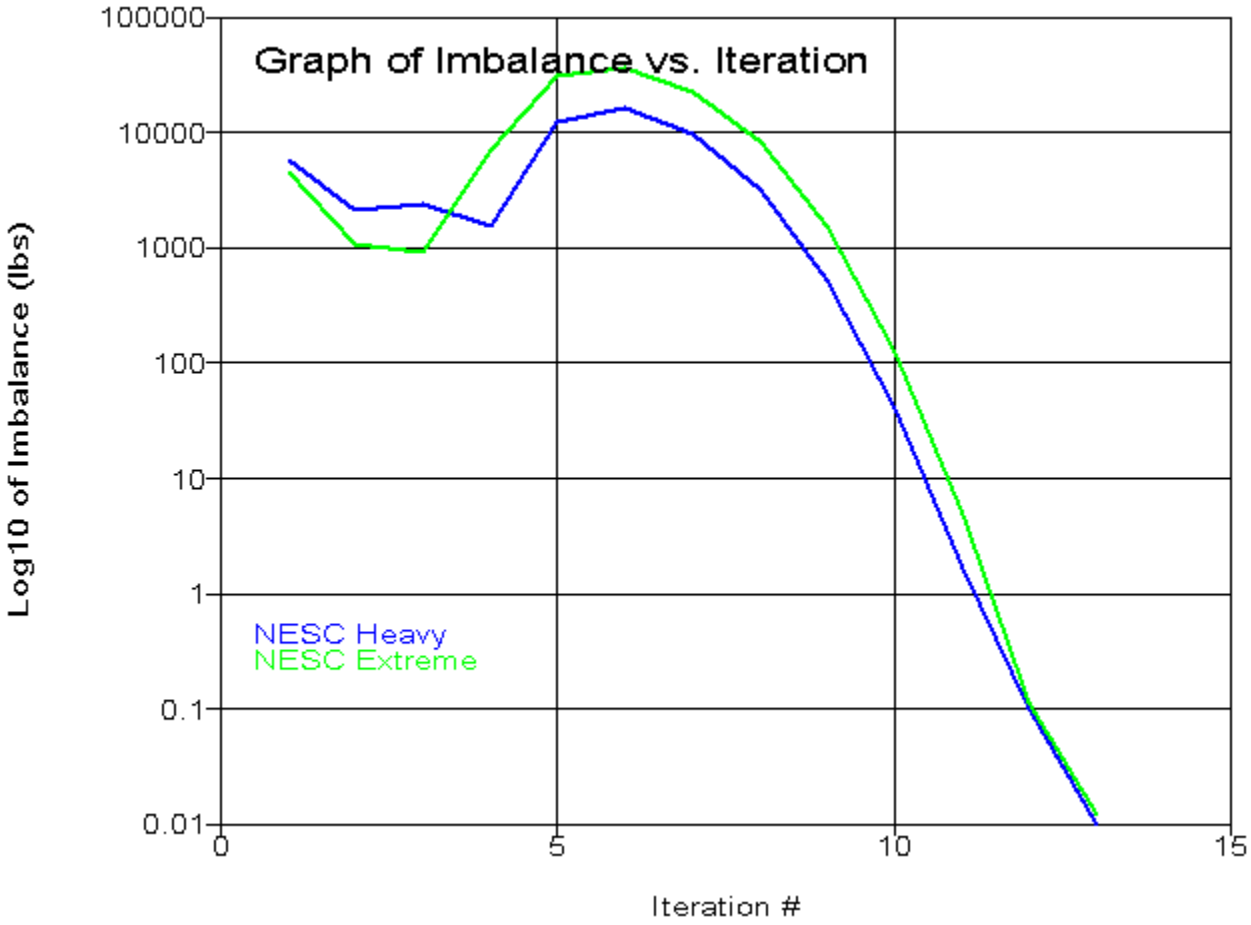
Detailed Pole Loading Data for Load Case "NESC Extreme":

Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

Pole Label	Top Joint	Bottom Joint	Section Top Z (ft)	Section Bottom Z (ft)	Section Average Elevation (ft)	Outer Diameter (in)	Reynolds Number	Drag Coef.	Adjusted Wind Pressure (psf)	Adjusted Ice Thickness (in)	Pole Vert. Load (lbs)	Pole Wind Load (lbs)	Pole Ice Vertical Load (lbs)	Pole Ice Wind Load (lbs)	Tran. Wind Load (lbs)	Long. Wind Load (lbs)
9950	9950:t	9950:Arm1	85.00	84.00	84.50	22.958	1.91e+006	1.000	30.78	0.00	62.11	58.88	0.00	0.00	58.88	0.00
9950	9950:Arm1	9950:Ant1	84.00	83.00	83.50	23.135	1.92e+006	1.000	30.78	0.00	62.60	59.34	0.00	0.00	59.34	0.00
9950	9950:Ant1		83.00	80.00	81.50	23.488	1.95e+006	1.000	30.78	0.00	190.69	180.72	0.00	0.00	180.72	0.00
9950		9950:Arm2	80.00	77.00	78.50	24.018	1.99e+006	1.000	30.78	0.00	195.04	184.80	0.00	0.00	184.80	0.00
9950	9950:Arm2	9950:WVGD1	77.00	75.00	76.00	24.459	2.03e+006	1.000	30.78	0.00	132.44	125.46	0.00	0.00	125.46	0.00
9950	9950:WVGD1	9950:Ant2	75.00	73.00	74.00	24.812	2.06e+006	1.000	30.78	0.00	134.37	127.28	0.00	0.00	127.28	0.00
9950	9950:Ant2		73.00	69.00	71.00	25.342	2.1e+006	1.000	30.78	0.00	274.54	259.99	0.00	0.00	259.99	0.00
9950		9950:WVGD2	69.00	65.00	67.00	26.049	2.16e+006	1.000	30.78	0.00	282.27	267.23	0.00	0.00	267.23	0.00
9950	9950:WVGD2	9950:Arm3	65.00	64.75	64.88	26.424	2.19e+006	1.000	30.78	0.00	17.90	16.94	0.00	0.00	16.94	0.00
9950	9950:Arm3		64.75	59.88	62.31	26.876	2.23e+006	1.000	30.78	0.00	355.05	336.04	0.00	0.00	336.04	0.00
9950		9950:WVGD3	59.88	55.00	57.44	27.737	2.3e+006	1.000	30.78	0.00	366.53	346.80	0.00	0.00	346.80	0.00
9950	9950:WVGD3	9950:Arm4	55.00	53.00	54.00	28.344	2.35e+006	1.000	30.78	0.00	153.69	145.39	0.00	0.00	145.39	0.00
9950	9950:Arm4		53.00	49.00	51.00	28.874	2.4e+006	1.000	30.78	0.00	313.18	296.22	0.00	0.00	296.22	0.00
9950		9950:WVGD4	49.00	45.00	47.00	29.580	2.46e+006	1.000	30.78	0.00	320.91	303.47	0.00	0.00	303.47	0.00
9950	9950:WVGD4		45.00	40.00	42.50	30.375	2.52e+006	1.000	30.78	0.00	412.01	389.52	0.00	0.00	389.52	0.00
9950		9950:WVGD5	40.00	35.00	37.50	31.008	2.58e+006	1.000	30.78	0.00	1047.38	397.64	0.00	0.00	397.64	0.00
9950	9950:WVGD5		35.00	30.00	32.50	31.641	2.63e+006	1.000	30.78	0.00	641.42	405.76	0.00	0.00	405.76	0.00
9950		9950:WVGD6	30.00	25.00	27.50	32.524	2.7e+006	1.000	30.78	0.00	659.53	417.08	0.00	0.00	417.08	0.00
9950	9950:WVGD6		25.00	20.00	22.50	33.407	2.77e+006	1.000	30.78	0.00	677.64	428.40	0.00	0.00	428.40	0.00
9950		9950:WVGD7	20.00	15.00	17.50	34.290	2.85e+006	1.000	30.78	0.00	695.76	439.72	0.00	0.00	439.72	0.00
9950	9950:WVGD7		15.00	11.50	13.25	35.040	2.91e+006	1.000	30.78	0.00	497.81	314.54	0.00	0.00	314.54	0.00
9950		9950:EqBox	11.50	8.00	9.75	35.658	2.96e+006	1.000	30.78	0.00	506.68	320.09	0.00	0.00	320.09	0.00
9950	9950:EqBox	9950:WVGD8	8.00	5.00	6.50	36.232	3.01e+006	1.000	30.78	0.00	441.36	278.78	0.00	0.00	278.78	0.00
9950	9950:WVGD8	9950:g	5.00	0.00	2.50	36.939	3.07e+006	1.000	30.78	0.00	750.10	473.69	0.00	0.00	473.69	0.00

*** Analysis Results:

Maximum element usage is 59.56% for Steel Pole "9950" in load case "NESC Extreme"
Maximum insulator usage is 8.65% for Clamp "clamp2" in load case "NESC Heavy"



*** Analysis Results for Load Case No. 1 "NESC Heavy" - Number of iterations in SAPS 13

Equilibrium Joint Positions and Rotations for Load Case "NESC Heavy":

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
9950:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
9950:t	0.004819	1.575	-0.01968	-1.5256	0.0049	0.0001	0.004819	1.575	84.98
9950:Arm1	0.004733	1.549	-0.01932	-1.5256	0.0049	0.0001	0.004733	1.549	83.98

9950:Ant1	0.004648	1.522	-0.01897	-1.5269	0.0049	0.0001	0.004648	1.522	82.98
9950:Arm2	0.004138	1.362	-0.0168	-1.5236	0.0049	0.0001	0.004138	1.362	76.98
9950:WVGD1	0.003968	1.309	-0.01606	-1.5338	0.0049	0.0001	0.003968	1.309	74.98
9950:Ant2	0.003799	1.255	-0.0153	-1.5387	0.0048	0.0001	0.003799	1.255	72.98
9950:WVGD2	0.003132	1.041	-0.01231	-1.5120	0.0047	0.0001	0.003132	1.041	64.99
9950:Arm3	0.003111	1.035	-0.01222	-1.5101	0.0047	0.0001	0.003111	1.035	64.74
9950:WVGD3	0.002338	0.781	-0.008656	-1.4426	0.0044	0.0001	0.002338	0.781	54.99
9950:Arm4	0.002188	0.731	-0.007978	-1.4137	0.0043	0.0001	0.002188	0.731	52.99
9950:WVGD4	0.001624	0.5412	-0.005435	-1.2835	0.0038	0.0001	0.001624	0.5412	44.99
9950:WVGD5	0.001024	0.3377	-0.003031	-1.0372	0.0031	0.0000	0.001024	0.3377	35
9950:WVGD6	0.0005473	0.1776	-0.001488	-0.7832	0.0024	0.0000	0.0005473	0.1776	25
9950:WVGD7	0.0002061	0.06558	-0.000593	-0.4887	0.0015	0.0000	0.0002061	0.06558	15
9950:EqBox	6.091e-005	0.01907	-0.0002498	-0.2660	0.0008	0.0000	6.091e-005	0.01907	8
9950:WVGD8	2.447e-005	0.007594	-0.0001451	-0.1675	0.0005	0.0000	2.447e-005	0.007594	5
Davit1:O	0.004738	1.549	0.006242	-1.5256	0.0049	0.0001	0.004738	0.5889	84.01
Davit1:End	0.004839	1.576	0.09644	-1.4626	0.0049	0.0001	0.004839	-2.884	85.1
Davit2:O	0.004142	1.363	0.0101	-1.5236	0.0049	0.0001	0.004142	0.3508	77.01
Davit2:End	0.004256	1.386	0.159	-1.0160	0.0049	0.0001	0.004256	-6.626	78.16
Davit3:O	0.003115	1.035	0.01682	-1.5101	0.0047	0.0001	0.003115	-0.06697	64.77
Davit3:End	0.00325	1.065	0.205	-1.0919	0.0047	0.0001	0.00325	-8.537	66.21
Davit4:O	0.002192	0.7314	0.02134	-1.4137	0.0043	0.0001	0.002192	-0.457	53.02
Davit4:End	0.002287	0.7523	0.1568	-0.9053	0.0043	0.0001	0.002287	-7.436	54.16

Joint Support Reactions for Load Case "NESC Heavy":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Z Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
9950:g	-0.07	0.0	-16.91	0.0	0.0	-37.81	0.0	0.0	41.42	0.0	930.78	0.0	-3.0	0.0	0.0	-0.02	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC Heavy":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
9950	9950:t	Origin	0.00	18.91	0.06	-0.24	-0.00	0.00	-0.0	-0.05	0.01	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	5
9950	9950:Arm1	End	1.00	18.59	0.06	-0.23	0.01	-0.00	-0.0	-0.05	0.01	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	2
9950	9950:Arm1	Origin	1.00	18.59	0.06	-0.23	-6.76	-0.00	0.0	-2.19	2.23	-0.00	-0.12	0.77	0.06	0.00	0.89	1.4	2
9950	9950:Ant1	End	2.00	18.27	0.06	-0.23	-4.53	-0.00	0.0	-2.19	2.23	-0.00	-0.12	0.51	0.06	0.00	0.63	1.0	2
9950	9950:Ant1	Origin	2.00	18.27	0.06	-0.23	-4.53	-0.00	0.0	-2.56	2.41	-0.00	-0.14	0.51	0.07	0.00	0.66	1.0	2
9950	Tube 1	End	5.00	17.31	0.05	-0.21	2.70	-0.01	0.0	-2.56	2.41	-0.00	-0.14	0.08	0.25	0.00	0.48	0.7	4
9950	Tube 1	Origin	5.00	17.31	0.05	-0.21	2.70	-0.01	0.0	-2.85	2.50	-0.00	-0.15	0.08	0.26	0.00	0.51	0.8	4
9950	9950:Arm2	End	8.00	16.35	0.05	-0.20	10.19	-0.02	0.0	-2.85	2.50	-0.00	-0.15	1.04	0.07	0.00	1.19	1.8	2
9950	9950:Arm2	Origin	8.00	16.35	0.05	-0.20	-32.72	-0.03	0.0	-9.03	6.51	-0.01	-0.47	3.34	0.18	0.00	3.82	5.9	2
9950	9950:WVGD1	End	10.00	15.71	0.05	-0.19	-19.70	-0.04	0.0	-9.03	6.51	-0.01	-0.46	1.95	0.18	0.00	2.43	3.7	2
9950	9950:WVGD1	Origin	10.00	15.71	0.05	-0.19	-19.70	-0.04	0.0	-9.32	6.61	-0.01	-0.48	1.95	0.18	0.00	2.45	3.8	2
9950	9950:Ant2	End	12.00	15.06	0.05	-0.18	-6.48	-0.06	0.0	-9.32	6.61	-0.01	-0.47	0.17	0.65	0.00	1.30	2.0	4
9950	9950:Ant2	Origin	12.00	15.06	0.05	-0.18	-6.48	-0.06	0.0	-9.62	6.70	-0.01	-0.48	0.17	0.66	0.00	1.32	2.0	4
9950	Tube 1	End	16.00	13.77	0.04	-0.17	20.31	-0.10	0.0	-9.62	6.70	-0.01	-0.47	1.85	0.17	0.00	2.34	3.6	2
9950	Tube 1	Origin	16.00	13.77	0.04	-0.17	20.31	-0.10	0.0	-10.04	6.82	-0.01	-0.49	1.85	0.18	0.00	2.36	3.6	2
9950	9950:WVGD2	End	20.00	12.49	0.04	-0.15	47.58	-0.16	0.0	-10.04	6.82	-0.01	-0.48	4.10	0.17	0.00	4.59	7.1	2
9950	9950:WVGD2	Origin	20.00	12.49	0.04	-0.15	47.58	-0.16	0.0	-10.36	6.92	-0.02	-0.49	4.10	0.17	0.00	4.60	7.1	2
9950	9950:Arm3	End	20.25	12.41	0.04	-0.15	49.31	-0.16	0.0	-10.36	6.92	-0.02	-0.49	4.23	0.17	0.00	4.73	7.3	2
9950	9950:Arm3	Origin	20.25	12.41	0.04	-0.15	-2.71	-0.16	0.0	-16.75	10.94	-0.02	-0.80	0.01	1.06	0.00	2.00	3.1	5
9950	Tube 1	End	25.13	10.88	0.03	-0.12	50.64	-0.25	0.0	-16.75	10.94	-0.02	-0.77	4.08	0.27	0.00	4.87	7.5	2
9950	Tube 1	Origin	25.13	10.88	0.03	-0.12	50.64	-0.25	0.0	-17.30	11.09	-0.02	-0.80	4.08	0.27	0.00	4.89	7.5	2

9950	9950:WVGD3	End	30.00	9.37	0.03	-0.10	104.72	-0.36	0.0	-17.30	11.09	-0.02	-0.77	7.91	0.26	0.00	8.69	13.4	2
9950	9950:WVGD3	Origin	30.00	9.37	0.03	-0.10	104.72	-0.36	0.0	-17.78	11.23	-0.02	-0.79	7.91	0.26	0.00	8.72	13.4	2
9950	9950:Arm4	End	32.00	8.77	0.03	-0.10	127.17	-0.41	0.0	-17.78	11.23	-0.02	-0.78	9.37	0.26	0.00	10.16	15.6	2
9950	9950:Arm4	Origin	32.00	8.77	0.03	-0.10	83.14	-0.41	0.0	-24.09	15.25	-0.03	-1.06	6.13	0.35	0.00	7.21	11.1	2
9950	Tube 1	End	36.00	7.61	0.02	-0.08	144.13	-0.52	0.0	-24.09	15.25	-0.03	-1.03	10.11	0.35	0.00	11.16	17.2	2
9950	Tube 1	Origin	36.00	7.61	0.02	-0.08	144.13	-0.52	0.0	-24.58	15.36	-0.03	-1.06	10.11	0.35	0.00	11.18	17.2	2
9950	9950:WVGD4	End	40.00	6.49	0.02	-0.07	205.56	-0.64	0.0	-24.58	15.36	-0.03	-1.03	13.73	0.34	0.00	14.77	22.7	2
9950	9950:WVGD4	Origin	40.00	6.49	0.02	-0.07	205.56	-0.64	0.0	-25.25	15.51	-0.03	-1.06	13.73	0.34	0.00	14.80	22.8	2
9950	SpliceT	End	45.00	5.21	0.02	-0.05	283.11	-0.82	0.0	-25.25	15.51	-0.03	-1.03	17.83	0.33	0.00	18.86	29.2	2
9950	SpliceT	Origin	45.00	5.21	0.02	-0.05	283.11	-0.82	0.0	-26.37	15.64	-0.04	-1.07	17.83	0.34	0.00	18.91	29.3	2
9950	9950:WVGD5	End	50.00	4.05	0.01	-0.04	361.32	-1.01	0.0	-26.37	15.64	-0.04	-0.71	14.97	0.22	0.00	15.69	24.1	2
9950	9950:WVGD5	Origin	50.00	4.05	0.01	-0.04	361.32	-1.01	0.0	-27.76	15.81	-0.04	-0.75	14.97	0.23	0.00	15.73	24.2	2
9950	Tube 2	End	55.00	3.02	0.01	-0.03	440.37	-1.23	0.0	-27.76	15.81	-0.04	-0.73	17.24	0.22	0.00	17.97	27.6	2
9950	Tube 2	Origin	55.00	3.02	0.01	-0.03	440.37	-1.23	0.0	-28.77	15.94	-0.05	-0.75	17.24	0.22	0.00	18.00	27.7	2
9950	9950:WVGD6	End	60.00	2.13	0.01	-0.02	520.07	-1.47	0.0	-28.77	15.94	-0.05	-0.73	19.27	0.21	0.00	20.00	30.8	2
9950	9950:WVGD6	Origin	60.00	2.13	0.01	-0.02	520.07	-1.47	0.0	-29.90	16.10	-0.05	-0.76	19.27	0.22	0.00	20.03	30.8	2
9950	Tube 2	End	65.00	1.38	0.00	-0.01	600.54	-1.73	0.0	-29.90	16.10	-0.05	-0.74	21.08	0.21	0.00	21.83	33.6	2
9950	Tube 2	Origin	65.00	1.38	0.00	-0.01	600.54	-1.73	0.0	-30.97	16.21	-0.06	-0.77	21.08	0.21	0.00	21.86	33.6	2
9950	9950:WVGD7	End	70.00	0.79	0.00	-0.01	681.60	-2.01	0.0	-30.97	16.21	-0.06	-0.75	22.71	0.21	0.00	23.46	36.1	2
9950	9950:WVGD7	Origin	70.00	0.79	0.00	-0.01	681.60	-2.01	0.0	-31.99	16.34	-0.06	-0.77	22.71	0.21	0.00	23.49	36.1	2
9950	Tube 2	End	73.50	0.47	0.00	-0.00	738.79	-2.22	0.0	-31.99	16.34	-0.06	-0.76	23.75	0.20	0.00	24.51	37.7	2
9950	Tube 2	Origin	73.50	0.47	0.00	-0.00	738.79	-2.22	0.0	-32.77	16.42	-0.06	-0.78	23.75	0.21	0.00	24.53	37.7	2
9950	9950:EqBox	End	77.00	0.23	0.00	-0.00	796.25	-2.45	0.0	-32.77	16.42	-0.06	-0.76	24.71	0.20	0.00	25.48	39.2	2
9950	9950:EqBox	Origin	77.00	0.23	0.00	-0.00	796.25	-2.45	0.0	-34.60	16.75	-0.07	-0.81	24.71	0.21	0.00	25.52	39.3	2
9950	9950:WVGD8	End	80.00	0.09	0.00	-0.00	846.49	-2.65	0.0	-34.60	16.75	-0.07	-0.79	25.50	0.20	0.00	26.30	40.5	2
9950	9950:WVGD8	Origin	80.00	0.09	0.00	-0.00	846.49	-2.65	0.0	-35.62	16.86	-0.07	-0.82	25.50	0.20	0.00	26.32	40.5	2
9950	9950:g	End	85.00	0.00	0.00	0.00	930.78	-3.01	0.0	-35.62	16.86	-0.07	-0.80	26.71	0.20	0.00	27.51	42.3	2

Detailed Tubular Davit Arm Usages for Load Case "NESC Heavy":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Davit1	Davit1:O	Origin	0.00	18.59	0.06	0.07	-4.81	0.00	0.0	-2.65	1.32	-0.00	-0.40	4.75	0.00	0.00	5.15	7.9	1
Davit1	Davit1:End	End	3.64	18.92	0.06	1.16	-0.00	0.00	0.0	-2.65	1.32	-0.00	-0.53	0.00	0.57	0.00	1.12	1.7	3
Davit2	Davit2:O	Origin	0.00	16.35	0.05	0.12	-36.90	0.00	0.0	-4.72	5.27	-0.00	-0.53	20.71	0.00	0.00	21.24	32.7	1
Davit2	#Davit2:0	End	3.54	16.51	0.05	1.12	-18.27	0.00	0.0	-4.72	5.27	-0.00	-0.68	16.94	0.00	0.00	17.62	27.1	1
Davit2	#Davit2:0	Origin	3.54	16.51	0.05	1.12	-18.27	0.00	0.0	-4.67	5.17	-0.00	-0.67	16.94	0.00	0.00	17.62	27.1	1
Davit2	Davit2:End	End	7.07	16.63	0.05	1.91	-0.00	0.00	0.0	-4.67	5.17	-0.00	-0.94	0.00	2.22	0.00	3.96	6.1	3
Davit3	Davit3:O	Origin	0.00	12.42	0.04	0.20	-45.28	0.01	0.0	-4.76	5.36	-0.00	-0.36	14.40	0.00	0.00	14.76	22.7	1
Davit3	#Davit3:0	End	4.30	12.62	0.04	1.43	-22.23	0.00	0.0	-4.76	5.36	-0.00	-0.49	13.26	0.00	0.00	13.75	21.2	1
Davit3	#Davit3:0	Origin	4.30	12.62	0.04	1.43	-22.23	0.00	0.0	-4.70	5.18	-0.00	-0.49	13.26	0.00	0.00	13.74	21.1	1
Davit3	Davit3:End	End	8.59	12.78	0.04	2.46	-0.00	0.00	0.0	-4.70	5.18	-0.00	-0.76	0.00	1.81	0.00	3.22	5.0	3
Davit4	Davit4:O	Origin	0.00	8.78	0.03	0.26	-36.96	0.00	0.0	-4.71	5.28	-0.00	-0.53	20.75	0.00	0.00	21.28	32.7	1
Davit4	#Davit4:0	End	3.54	8.92	0.03	1.17	-18.30	0.00	0.0	-4.71	5.28	-0.00	-0.68	16.97	0.00	0.00	17.65	27.2	1
Davit4	#Davit4:0	Origin	3.54	8.92	0.03	1.17	-18.30	0.00	0.0	-4.66	5.18	-0.00	-0.67	16.97	0.00	0.00	17.64	27.1	1
Davit4	Davit4:End	End	7.07	9.03	0.03	1.88	-0.00	0.00	0.0	-4.66	5.18	-0.00	-0.94	0.00	2.23	0.00	3.97	6.1	3

Summary of Clamp Capacities and Usages for Load Case "NESC Heavy":

Clamp Label	Force Input Holding Capacity	Factored Holding Capacity	Usage

	(kips)	(kips)	(kips)	%
clamp1	2.925	80.00	80.00	3.66
clamp2	6.921	80.00	80.00	8.65
clamp3	6.921	80.00	80.00	8.65
clamp4	6.921	80.00	80.00	8.65
clamp5	0.092	80.00	80.00	0.12
clamp6	0.092	80.00	80.00	0.12
clamp7	0.092	80.00	80.00	0.12
clamp8	0.092	80.00	80.00	0.12
clamp9	0.092	80.00	80.00	0.12
clamp10	0.092	80.00	80.00	0.12
clamp11	0.092	80.00	80.00	0.12
clamp12	0.092	80.00	80.00	0.12
clamp13	0.217	80.00	80.00	0.27
clamp14	0.000	80.00	80.00	0.00
clamp15	1.119	80.00	80.00	1.40

*** Analysis Results for Load Case No. 2 "NESC Extreme" - Number of iterations in SAPS 13

Equilibrium Joint Positions and Rotations for Load Case "NESC Extreme":

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
9950:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
9950:t	0.001453	2.483	-0.04594	-2.6032	0.0015	0.0000	0.001453	2.483	84.95
9950:Arm1	0.001427	2.438	-0.04491	-2.6032	0.0015	0.0000	0.001427	2.438	83.96
9950:Ant1	0.001401	2.393	-0.04388	-2.6030	0.0015	0.0000	0.001401	2.393	82.96
9950:Arm2	0.001248	2.121	-0.0377	-2.5903	0.0015	0.0000	0.001248	2.121	76.96
9950:WVGD1	0.001197	2.03	-0.03564	-2.5857	0.0015	0.0000	0.001197	2.03	74.96
9950:Ant2	0.001146	1.94	-0.0336	-2.5756	0.0015	0.0000	0.001146	1.94	72.97
9950:WVGD2	0.0009453	1.586	-0.02569	-2.4864	0.0014	0.0000	0.0009453	1.586	64.97
9950:Arm3	0.0009391	1.575	-0.02545	-2.4825	0.0014	0.0000	0.0009391	1.575	64.72
9950:WVGD3	0.0007064	1.167	-0.0168	-2.2807	0.0013	0.0000	0.0007064	1.167	54.98
9950:Arm4	0.0006611	1.088	-0.01523	-2.2234	0.0013	0.0000	0.0006611	1.088	52.98
9950:WVGD4	0.0004911	0.7952	-0.009728	-1.9482	0.0011	0.0000	0.0004911	0.7952	44.99
9950:WVGD5	0.0003101	0.4911	-0.004937	-1.5308	0.0009	0.0000	0.0003101	0.4911	35
9950:WVGD6	0.0001658	0.2566	-0.002052	-1.1398	0.0007	0.0000	0.0001658	0.2566	25
9950:WVGD7	6.251e-005	0.09434	-0.000591	-0.7049	0.0005	0.0000	6.251e-005	0.09434	15
9950:EqBox	1.849e-005	0.02739	-0.000171	-0.3823	0.0003	0.0000	1.849e-005	0.02739	8
9950:WVGD8	7.431e-006	0.0109	-8.352e-005	-0.2405	0.0002	0.0000	7.431e-006	0.0109	5
Davit1:O	0.001429	2.439	-0.001297	-2.6032	0.0015	0.0000	0.001429	1.479	84
Davit1:End	0.001461	2.488	0.1569	-2.6090	0.0015	0.0000	0.001461	-1.972	85.16
Davit2:O	0.00125	2.122	0.008028	-2.5903	0.0015	0.0000	0.00125	1.11	77.01
Davit2:End	0.001287	2.172	0.3117	-2.4299	0.0015	0.0000	0.001287	-5.84	78.31
Davit3:O	0.0009408	1.576	0.02228	-2.4825	0.0014	0.0000	0.0009408	0.4739	64.77
Davit3:End	0.000985	1.636	0.378	-2.3496	0.0014	0.0000	0.000985	-7.966	66.38
Davit4:O	0.0006626	1.089	0.03088	-2.2234	0.0013	0.0000	0.0006626	-0.09927	53.03
Davit4:End	0.0006937	1.131	0.2898	-2.0600	0.0013	0.0000	0.0006937	-7.057	54.29

Joint Support Reactions for Load Case "NESC Extreme":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Uplift Usage %	Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
9950:g	-0.02	0.0	-23.81	0.0	0.0	-20.35	0.0	0.0	31.32	0.0	1335.35	0.0	-0.9	0.0	0.0	-0.00	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC Extreme":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
9950	9950:t	Origin	0.00	29.80	0.02	-0.55	-0.00	-0.00	-0.0	-0.03	0.03	-0.00	-0.00	0.00	0.00	0.00	0.01	0.0	5
9950	9950:Arm1	End	1.00	29.26	0.02	-0.54	0.03	-0.00	-0.0	-0.03	0.03	-0.00	-0.00	0.00	0.00	0.00	0.01	0.0	4
9950	9950:Arm1	Origin	1.00	29.26	0.02	-0.54	0.01	-0.00	0.0	-0.57	2.10	-0.00	-0.03	0.00	0.23	0.00	0.40	0.6	5
9950	9950:Ant1	End	2.00	28.71	0.02	-0.53	2.11	-0.00	0.0	-0.57	2.10	-0.00	-0.03	0.00	0.23	0.00	0.40	0.6	5
9950	9950:Ant1	Origin	2.00	28.71	0.02	-0.53	2.11	-0.00	0.0	-0.75	2.61	-0.00	-0.04	0.00	0.29	0.00	0.50	0.8	5
9950	Tube 1	End	5.00	27.08	0.02	-0.49	9.93	-0.00	0.0	-0.75	2.61	-0.00	-0.04	1.06	0.07	0.00	1.11	1.7	2
9950	Tube 1	Origin	5.00	27.08	0.02	-0.49	9.93	-0.00	0.0	-0.94	2.80	-0.00	-0.05	1.06	0.08	0.00	1.12	1.7	2
9950	9950:Arm2	End	8.00	25.45	0.01	-0.45	18.33	-0.01	0.0	-0.94	2.80	-0.00	-0.05	1.87	0.08	0.00	1.92	3.0	2
9950	9950:Arm2	Origin	8.00	25.45	0.01	-0.45	4.14	-0.01	0.0	-3.52	7.58	-0.00	-0.18	0.00	0.80	0.00	1.39	2.1	5

9950	9950:WVGD1	End	10.00	24.36	0.01	-0.43	19.30	-0.01	0.0	-3.52	7.58	-0.00	-0.18	1.91	0.20	0.00	2.12	3.3	2
9950	9950:WVGD1	Origin	10.00	24.36	0.01	-0.43	19.30	-0.01	0.0	-3.67	7.78	-0.00	-0.19	1.91	0.21	0.00	2.13	3.3	2
9950	9950:Ant2	End	12.00	23.28	0.01	-0.40	34.87	-0.02	0.0	-3.67	7.78	-0.00	-0.18	3.36	0.21	0.00	3.56	5.5	2
9950	9950:Ant2	Origin	12.00	23.28	0.01	-0.40	34.87	-0.02	0.0	-3.88	7.99	-0.00	-0.20	3.36	0.21	0.00	3.57	5.5	2
9950	Tube 1	End	16.00	21.13	0.01	-0.35	66.81	-0.03	0.0	-3.88	7.99	-0.00	-0.19	6.08	0.21	0.00	6.28	9.7	2
9950	Tube 1	Origin	16.00	21.13	0.01	-0.35	66.81	-0.03	0.0	-4.17	8.26	-0.00	-0.20	6.08	0.21	0.00	6.29	9.7	2
9950	9950:WVGD2	End	20.00	19.03	0.01	-0.31	99.84	-0.05	0.0	-4.17	8.26	-0.00	-0.20	8.60	0.21	0.00	8.80	13.5	2
9950	9950:WVGD2	Origin	20.00	19.03	0.01	-0.31	99.84	-0.05	0.0	-4.34	8.47	-0.00	-0.21	8.60	0.21	0.00	8.81	13.6	2
9950	9950:Arm3	End	20.25	18.90	0.01	-0.31	101.96	-0.05	0.0	-4.34	8.47	-0.00	-0.21	8.75	0.21	0.00	8.96	13.8	2
9950	9950:Arm3	Origin	20.25	18.90	0.01	-0.31	84.59	-0.05	0.0	-7.07	13.28	-0.01	-0.34	7.26	0.33	0.00	7.61	11.7	2
9950	Tube 1	End	25.13	16.40	0.01	-0.25	149.31	-0.07	0.0	-7.07	13.28	-0.01	-0.32	12.00	0.32	0.00	12.34	19.0	2
9950	Tube 1	Origin	25.13	16.40	0.01	-0.25	149.31	-0.07	0.0	-7.45	13.62	-0.01	-0.34	12.00	0.33	0.00	12.36	19.0	2
9950	9950:WVGD3	End	30.00	14.00	0.01	-0.20	215.71	-0.11	0.0	-7.45	13.62	-0.01	-0.33	16.29	0.32	0.00	16.63	25.6	2
9950	9950:WVGD3	Origin	30.00	14.00	0.01	-0.20	215.71	-0.11	0.0	-7.75	13.93	-0.01	-0.35	16.29	0.33	0.00	16.64	25.6	2
9950	9950:Arm4	End	32.00	13.06	0.01	-0.18	243.57	-0.12	0.0	-7.75	13.93	-0.01	-0.34	17.93	0.32	0.00	18.28	28.1	2
9950	9950:Arm4	Origin	32.00	13.06	0.01	-0.18	228.70	-0.12	0.0	-10.46	18.76	-0.01	-0.46	16.84	0.44	0.00	17.31	26.6	2
9950	Tube 1	End	36.00	11.24	0.01	-0.15	303.73	-0.15	0.0	-10.46	18.76	-0.01	-0.45	21.28	0.43	0.00	21.74	33.4	2
9950	Tube 1	Origin	36.00	11.24	0.01	-0.15	303.73	-0.15	0.0	-10.82	19.04	-0.01	-0.46	21.28	0.43	0.00	21.76	33.5	2
9950	9950:WVGD4	End	40.00	9.54	0.01	-0.12	379.89	-0.19	0.0	-10.82	19.04	-0.01	-0.45	25.36	0.42	0.00	25.82	39.7	2
9950	9950:WVGD4	Origin	40.00	9.54	0.01	-0.12	379.89	-0.19	0.0	-11.26	19.43	-0.01	-0.47	25.36	0.43	0.00	25.84	39.8	2
9950	SpliceT	End	45.00	7.61	0.00	-0.08	477.07	-0.24	0.0	-11.26	19.43	-0.01	-0.46	30.02	0.42	0.00	30.49	47.3	2
9950	SpliceT	Origin	45.00	7.61	0.00	-0.08	477.07	-0.24	0.0	-12.06	19.81	-0.01	-0.49	30.02	0.43	0.00	30.52	47.3	2
9950	9950:WVGD5	End	50.00	5.89	0.00	-0.06	576.10	-0.30	0.0	-12.06	19.81	-0.01	-0.32	23.86	0.28	0.00	24.19	37.2	2
9950	9950:WVGD5	Origin	50.00	5.89	0.00	-0.06	576.10	-0.30	0.0	-13.00	20.26	-0.01	-0.35	23.86	0.29	0.00	24.21	37.3	2
9950	Tube 2	End	55.00	4.38	0.00	-0.04	677.39	-0.37	0.0	-13.00	20.26	-0.01	-0.34	26.51	0.28	0.00	26.85	41.3	2
9950	Tube 2	Origin	55.00	4.38	0.00	-0.04	677.39	-0.37	0.0	-13.72	20.64	-0.01	-0.36	26.51	0.29	0.00	26.87	41.3	2
9950	9950:WVGD6	End	60.00	3.08	0.00	-0.02	780.58	-0.44	0.0	-13.72	20.64	-0.01	-0.35	28.90	0.28	0.00	29.25	45.0	2
9950	9950:WVGD6	Origin	60.00	3.08	0.00	-0.02	780.58	-0.44	0.0	-14.48	21.09	-0.02	-0.37	28.90	0.28	0.00	29.27	45.0	2
9950	Tube 2	End	65.00	1.99	0.00	-0.01	886.05	-0.52	0.0	-14.48	21.09	-0.02	-0.36	31.09	0.28	0.00	31.45	48.4	2
9950	Tube 2	Origin	65.00	1.99	0.00	-0.01	886.05	-0.52	0.0	-15.25	21.48	-0.02	-0.38	31.09	0.28	0.00	31.47	48.4	2
9950	9950:WVGD7	End	70.00	1.13	0.00	-0.01	993.46	-0.61	0.0	-15.25	21.48	-0.02	-0.37	33.08	0.27	0.00	33.45	51.5	2
9950	9950:WVGD7	Origin	70.00	1.13	0.00	-0.01	993.46	-0.61	0.0	-15.93	21.88	-0.02	-0.38	33.08	0.28	0.00	33.47	51.5	2
9950	Tube 2	End	73.50	0.67	0.00	-0.00	1070.05	-0.67	0.0	-15.93	21.88	-0.02	-0.38	34.38	0.27	0.00	34.76	53.5	2
9950	Tube 2	Origin	73.50	0.67	0.00	-0.00	1070.05	-0.67	0.0	-16.50	22.16	-0.02	-0.39	34.38	0.28	0.00	34.77	53.5	2
9950	9950:EqBox	End	77.00	0.33	0.00	-0.00	1147.61	-0.74	0.0	-16.50	22.16	-0.02	-0.38	35.59	0.27	0.00	35.98	55.4	2
9950	9950:EqBox	Origin	77.00	0.33	0.00	-0.00	1147.61	-0.74	0.0	-17.63	23.23	-0.02	-0.41	35.59	0.29	0.00	36.01	55.4	2
9950	9950:WVGD8	End	80.00	0.13	0.00	-0.00	1217.28	-0.80	0.0	-17.63	23.23	-0.02	-0.40	36.65	0.28	0.00	37.06	57.0	2
9950	9950:WVGD8	Origin	80.00	0.13	0.00	-0.00	1217.28	-0.80	0.0	-18.32	23.61	-0.02	-0.42	36.65	0.29	0.00	37.07	57.0	2
9950	9950:g	End	85.00	0.00	0.00	0.00	1335.35	-0.91	0.0	-18.32	23.61	-0.02	-0.41	38.30	0.28	0.00	38.71	59.6	2

Detailed Tubular Davit Arm Usages for Load Case "NESC Extreme":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Davit1	Davit1:O	Origin	0.00	29.27	0.02	-0.02	0.44	0.00	0.0	-2.05	-0.12	-0.00	-0.31	0.44	0.00	0.00	0.74	1.1	1
Davit1	Davit1:End	End	3.64	29.86	0.02	1.88	-0.00	0.00	0.0	-2.05	-0.12	-0.00	-0.41	0.00	0.05	0.00	0.42	0.6	3
Davit2	Davit2:O	Origin	0.00	25.46	0.01	0.10	-11.74	0.00	0.0	-4.91	1.70	-0.00	-0.55	6.59	0.00	0.00	7.14	11.0	1
Davit2	#Davit2:0	End	3.54	25.77	0.02	1.95	-5.75	0.00	0.0	-4.91	1.70	-0.00	-0.71	5.33	0.00	0.00	6.04	9.3	1
Davit2	#Davit2:0	Origin	3.54	25.77	0.02	1.95	-5.75	0.00	0.0	-4.89	1.63	-0.00	-0.71	5.33	0.00	0.00	6.03	9.3	1
Davit2	Davit2:End	End	7.07	26.06	0.02	3.74	-0.00	0.00	0.0	-4.89	1.63	-0.00	-0.98	0.00	0.70	0.00	1.56	2.4	3
Davit3	Davit3:O	Origin	0.00	18.91	0.01	0.27	-14.58	0.00	0.0	-4.93	1.76	-0.00	-0.37	4.64	0.00	0.00	5.01	7.7	1
Davit3	#Davit3:0	End	4.30	19.28	0.01	2.43	-7.02	0.00	0.0	-4.93	1.76	-0.00	-0.51	4.18	0.00	0.00	4.69	7.2	1
Davit3	#Davit3:0	Origin	4.30	19.28	0.01	2.43	-7.02	0.00	0.0	-4.90	1.63	-0.00	-0.51	4.18	0.00	0.00	4.69	7.2	1
Davit3	Davit3:End	End	8.59	19.63	0.01	4.54	-0.00	0.00	0.0	-4.90	1.63	-0.00	-0.80	0.00	0.57	0.00	1.27	2.0	3

Davit4	Davit4:O	Origin	0.00	13.07	0.01	0.37	-11.97	0.00	0.0	-4.90	1.73	-0.00	-0.55	6.72	0.00	0.00	7.27	11.2	1
Davit4	#Davit4:0	End	3.54	13.33	0.01	1.96	-5.86	0.00	0.0	-4.90	1.73	-0.00	-0.71	5.43	0.00	0.00	6.14	9.4	1
Davit4	#Davit4:0	Origin	3.54	13.33	0.01	1.96	-5.86	0.00	0.0	-4.88	1.66	-0.00	-0.70	5.43	0.00	0.00	6.14	9.4	1
Davit4	Davit4:End	End	7.07	13.57	0.01	3.48	-0.00	0.00	0.0	-4.88	1.66	-0.00	-0.98	0.00	0.71	0.00	1.58	2.4	3

Summary of Clamp Capacities and Usages for Load Case "NESC Extreme":

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
clamp1	2.044	80.00	80.00	2.56
clamp2	5.136	80.00	80.00	6.42
clamp3	5.136	80.00	80.00	6.42
clamp4	5.136	80.00	80.00	6.42
clamp5	0.072	80.00	80.00	0.09
clamp6	0.072	80.00	80.00	0.09
clamp7	0.072	80.00	80.00	0.09
clamp8	0.072	80.00	80.00	0.09
clamp9	0.072	80.00	80.00	0.09
clamp10	0.072	80.00	80.00	0.09
clamp11	0.072	80.00	80.00	0.09
clamp12	0.072	80.00	80.00	0.09
clamp13	0.384	80.00	80.00	0.48
clamp14	0.000	80.00	80.00	0.00
clamp15	1.003	80.00	80.00	1.25

*** Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
9950	59.56	NESC Extreme	24	10796.4

Base Plate Results by Bend Line:

Pole Label	Load Case	Bend Line #	Start X (ft)	Start Y (ft)	End X (ft)	End Y (ft)	Length (in)	Bending Stress (ksi)	Bolt Mom. Sum (ft-k)	# Bolts Acting	Bolt Max Load (kips)	Min Plate Thickness (in)	Actual Thickness (in)	Usage %
9950	NESC Heavy	1	1.662	0.839	-0.100	1.856	24.419	13.169	33.777	3	85.282	1.288	2.750	21.95
9950	NESC Heavy	2	1.856	-0.100	0.839	1.662	24.419	7.757	19.896	3	74.324	0.989	2.750	12.93
9950	NESC Heavy	3	1.557	-1.016	1.557	1.016	24.372	2.845	7.284	3	43.738	0.599	2.750	4.74
9950	NESC Heavy	4	0.839	-1.662	1.856	0.100	24.419	6.883	17.654	3	-68.553	0.931	2.750	11.47
9950	NESC Heavy	5	-0.100	-1.856	1.662	-0.839	24.419	12.102	31.040	3	-79.247	1.235	2.750	20.17
9950	NESC Heavy	6	-1.016	-1.557	1.016	-1.557	24.372	14.256	36.493	3	-79.247	1.340	2.750	23.76
9950	NESC Heavy	7	-1.662	-0.839	0.100	-1.856	24.419	12.055	30.920	3	-79.247	1.233	2.750	20.09
9950	NESC Heavy	8	-1.856	0.100	-0.839	-1.662	24.419	6.832	17.522	3	-68.289	0.928	2.750	11.39
9950	NESC Heavy	9	-1.557	1.016	-1.557	-1.016	24.372	2.913	7.457	3	44.199	0.606	2.750	4.85
9950	NESC Heavy	10	-0.839	1.662	-1.856	-0.100	24.419	7.839	20.105	3	74.588	0.994	2.750	13.06
9950	NESC Heavy	11	0.100	1.856	-1.662	0.839	24.419	13.216	33.897	3	85.282	1.291	2.750	22.03
9950	NESC Heavy	12	1.016	1.557	-1.016	1.557	24.372	15.391	39.401	3	85.282	1.393	2.750	25.65
9950	NESC Heavy	13	1.086	1.378	-0.253	1.737	16.637	19.019	33.235	2	85.282	1.548	2.750	31.70
9950	NESC Heavy	14	1.635	0.645	0.645	1.635	16.812	13.837	24.433	2	74.324	1.321	2.750	23.06
9950	NESC Heavy	15	1.737	-0.253	1.378	1.086	16.637	5.581	9.752	2	43.738	0.839	2.750	9.30
9950	NESC Heavy	16	1.378	-1.086	1.737	0.253	16.637	4.911	8.582	2	-38.165	0.787	2.750	8.19
9950	NESC Heavy	17	0.645	-1.635	1.635	-0.645	16.812	12.507	22.086	2	-68.553	1.256	2.750	20.85
9950	NESC Heavy	18	-0.253	-1.737	1.086	-1.378	16.637	17.612	30.776	2	-79.247	1.490	2.750	29.35
9950	NESC Heavy	19	-1.086	-1.378	0.253	-1.737	16.637	17.580	30.720	2	-79.247	1.489	2.750	29.30
9950	NESC Heavy	20	-1.635	-0.645	-0.645	-1.635	16.812	12.422	21.935	2	-68.289	1.251	2.750	20.70
9950	NESC Heavy	21	-1.737	0.253	-1.378	-1.086	16.637	4.919	8.595	2	-37.703	0.787	2.750	8.20
9950	NESC Heavy	22	-1.378	1.086	-1.737	-0.253	16.637	5.699	9.959	2	44.199	0.848	2.750	9.50
9950	NESC Heavy	23	-0.645	1.635	-1.635	0.645	16.812	13.922	24.583	2	74.588	1.325	2.750	23.20
9950	NESC Heavy	24	0.253	1.737	-1.086	1.378	16.637	19.051	33.290	2	85.282	1.550	2.750	31.75
9950	NESC Extreme	1	1.662	0.839	-0.100	1.856	24.419	18.409	47.216	3	119.583	1.523	2.750	30.68
9950	NESC Extreme	2	1.856	-0.100	0.839	1.662	24.419	10.664	27.353	3	104.011	1.159	2.750	17.77
9950	NESC Extreme	3	1.557	-1.016	1.557	1.016	24.372	3.768	9.646	3	60.243	0.689	2.750	6.28
9950	NESC Extreme	4	0.839	-1.662	1.856	0.100	24.419	10.197	26.155	3	-100.967	1.134	2.750	17.00
9950	NESC Extreme	5	-0.100	-1.856	1.662	-0.839	24.419	17.846	45.774	3	-116.459	1.500	2.750	29.74
9950	NESC Extreme	6	-1.016	-1.557	1.016	-1.557	24.372	20.972	53.688	3	-116.459	1.626	2.750	34.95
9950	NESC Extreme	7	-1.662	-0.839	0.100	-1.856	24.419	17.832	45.737	3	-116.459	1.499	2.750	29.72
9950	NESC Extreme	8	-1.856	0.100	-0.839	-1.662	24.419	10.182	26.115	3	-100.887	1.133	2.750	16.97
9950	NESC Extreme	9	-1.557	1.016	-1.557	-1.016	24.372	3.789	9.699	3	60.383	0.691	2.750	6.31
9950	NESC Extreme	10	-0.839	1.662	-1.856	-0.100	24.419	10.689	27.416	3	104.092	1.161	2.750	17.82
9950	NESC Extreme	11	0.100	1.856	-1.662	0.839	24.419	18.423	47.253	3	119.583	1.524	2.750	30.70
9950	NESC Extreme	12	1.016	1.557	-1.016	1.557	24.372	21.561	55.193	3	119.583	1.648	2.750	35.93
9950	NESC Extreme	13	1.086	1.378	-0.253	1.737	16.637	26.644	46.559	2	119.583	1.833	2.750	44.41
9950	NESC Extreme	14	1.635	0.645	0.645	1.635	16.812	19.251	33.993	2	104.011	1.558	2.750	32.08
9950	NESC Extreme	15	1.737	-0.253	1.378	1.086	16.637	7.414	12.955	2	60.243	0.967	2.750	12.36
9950	NESC Extreme	16	1.378	-1.086	1.737	0.253	16.637	7.055	12.329	2	-57.259	0.943	2.750	11.76
9950	NESC Extreme	17	0.645	-1.635	1.635	-0.645	16.812	18.544	32.745	2	-100.967	1.529	2.750	30.91

9950	NESC Extreme	18	-0.253	-1.737	1.086	-1.378	16.637	25.908	45.274	2	-116.459	1.807	2.750	43.18
9950	NESC Extreme	19	-1.086	-1.378	0.253	-1.737	16.637	25.899	45.257	2	-116.459	1.807	2.750	43.16
9950	NESC Extreme	20	-1.635	-0.645	-0.645	-1.635	16.812	18.518	32.699	2	-100.887	1.528	2.750	30.86
9950	NESC Extreme	21	-1.737	0.253	-1.378	-1.086	16.637	7.057	12.333	2	-57.118	0.943	2.750	11.76
9950	NESC Extreme	22	-1.378	1.086	-1.737	-0.253	16.637	7.450	13.018	2	60.383	0.969	2.750	12.42
9950	NESC Extreme	23	-0.645	1.635	-1.635	0.645	16.812	19.276	34.038	2	104.092	1.559	2.750	32.13
9950	NESC Extreme	24	0.253	1.737	-1.086	1.378	16.637	26.653	46.575	2	119.583	1.833	2.750	44.42

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Davit1	7.92	NESC Heavy	1	72.4
Davit2	32.68	NESC Heavy	1	166.7
Davit3	22.70	NESC Heavy	1	282.8
Davit4	32.73	NESC Heavy	1	166.7

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	42.33	9950	Steel Pole
NESC Extreme	59.56	9950	Steel Pole

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	42.33	9950	24
NESC Extreme	59.56	9950	24

Summary of Base Plate Usages by Load Case:

Load Case	Pole Label	Bend Line #	Length (in)	Vertical Load (kips)	X Moment (ft-k)	Y Moment (ft-k)	Bending Stress (ksi)	Bolt Moment Sum (ft-k)	# Bolts Acting On Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC Heavy	9950	24	16.637	36.209	930.782	-3.006	19.051	33.290	2	85.282	1.550	31.75
NESC Extreme	9950	24	16.637	18.747	1335.345	-0.913	26.653	46.575	2	119.583	1.833	44.42

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy	32.73	Davit4	1
NESC Extreme	11.18	Davit4	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
clamp1	Clamp	3.66	NESC Heavy	0.0
clamp2	Clamp	8.65	NESC Heavy	0.0
clamp3	Clamp	8.65	NESC Heavy	0.0
clamp4	Clamp	8.65	NESC Heavy	0.0
clamp5	Clamp	0.12	NESC Heavy	0.0
clamp6	Clamp	0.12	NESC Heavy	0.0
clamp7	Clamp	0.12	NESC Heavy	0.0
clamp8	Clamp	0.12	NESC Heavy	0.0
clamp9	Clamp	0.12	NESC Heavy	0.0
clamp10	Clamp	0.12	NESC Heavy	0.0
clamp11	Clamp	0.12	NESC Heavy	0.0
clamp12	Clamp	0.12	NESC Heavy	0.0
clamp13	Clamp	0.48	NESC Extreme	0.0
clamp14	Clamp	0.00	NESC Heavy	0.0
clamp15	Clamp	1.40	NESC Heavy	0.0

Loads At Insulator Attachments For All Load Cases:

Load Case	Insulator Label	Insulator Type	Structure Attach Label	Structure Attach Load X (kips)	Structure Attach Load Y (kips)	Structure Attach Load Z (kips)	Structure Attach Load Res. (kips)
NESC Heavy	clamp1	Clamp	Davit1:End	0.000	2.134	2.001	2.925
NESC Heavy	clamp2	Clamp	Davit2:End	0.000	3.783	5.796	6.921
NESC Heavy	clamp3	Clamp	Davit3:End	0.000	3.783	5.796	6.921
NESC Heavy	clamp4	Clamp	Davit4:End	0.000	3.783	5.796	6.921
NESC Heavy	clamp5	Clamp	9950:WVGD1	0.000	0.034	0.086	0.092
NESC Heavy	clamp6	Clamp	9950:WVGD2	0.000	0.034	0.086	0.092
NESC Heavy	clamp7	Clamp	9950:WVGD3	0.000	0.034	0.086	0.092
NESC Heavy	clamp8	Clamp	9950:WVGD4	0.000	0.034	0.086	0.092
NESC Heavy	clamp9	Clamp	9950:WVGD5	0.000	0.034	0.086	0.092
NESC Heavy	clamp10	Clamp	9950:WVGD6	0.000	0.034	0.086	0.092
NESC Heavy	clamp11	Clamp	9950:WVGD7	0.000	0.034	0.086	0.092
NESC Heavy	clamp12	Clamp	9950:WVGD8	0.000	0.034	0.086	0.092
NESC Heavy	clamp13	Clamp	9950:Ant1	0.000	0.119	0.182	0.217
NESC Heavy	clamp14	Clamp	9950:Ant2	0.000	0.000	-0.000	0.000
NESC Heavy	clamp15	Clamp	9950:EqBox	0.000	0.255	1.090	1.119
NESC Extreme	clamp1	Clamp	Davit1:End	0.000	1.981	0.505	2.044
NESC Extreme	clamp2	Clamp	Davit2:End	0.000	4.508	2.461	5.136
NESC Extreme	clamp3	Clamp	Davit3:End	0.000	4.508	2.461	5.136
NESC Extreme	clamp4	Clamp	Davit4:End	0.000	4.508	2.461	5.136
NESC Extreme	clamp5	Clamp	9950:WVGD1	0.000	0.069	0.020	0.072
NESC Extreme	clamp6	Clamp	9950:WVGD2	0.000	0.069	0.020	0.072
NESC Extreme	clamp7	Clamp	9950:WVGD3	0.000	0.069	0.020	0.072
NESC Extreme	clamp8	Clamp	9950:WVGD4	0.000	0.069	0.020	0.072
NESC Extreme	clamp9	Clamp	9950:WVGD5	0.000	0.069	0.020	0.072
NESC Extreme	clamp10	Clamp	9950:WVGD6	0.000	0.069	0.020	0.072
NESC Extreme	clamp11	Clamp	9950:WVGD7	0.000	0.069	0.020	0.072
NESC Extreme	clamp12	Clamp	9950:WVGD8	0.000	0.069	0.020	0.072
NESC Extreme	clamp13	Clamp	9950:Ant1	0.000	0.378	0.070	0.384
NESC Extreme	clamp14	Clamp	9950:Ant2	0.000	0.000	-0.000	0.000
NESC Extreme	clamp15	Clamp	9950:EqBox	0.000	0.804	0.600	1.003

Overturning Moments For User Input Concentrated Loads:

Moments are static equivalents based on central axis of 0,0 (i.e. a single pole).

Load Case	Total Tran. Load (kips)	Total Long. Load (kips)	Total Vert. Load (kips)	Transverse Overturning Moment (ft-k)	Longitudinal Overturning Moment (ft-k)	Torsional Moment (ft-k)
NESC Heavy	14.129	0.000	21.349	794.747	-0.000	-0.000
NESC Extreme	17.239	0.000	8.718	1055.104	-0.000	-0.000

*** Weight of structure (lbs):
Weight of Tubular Davit Arms: 688.6
Weight of Steel Poles: 10796.4
Total: 11485.0

*** End of Report

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	Anchor Bolt Analysis Pole #9950
Location:	Danbury, CT
Rev. 3: 3/6/17	Prepared by: T.J.L. Checked by: C.F.C. Job No. 16144.00

Anchor Bolt Analysis:

Input Data:

Bolt Force:

Maximum Tensile Force = $T_{Max} := 120 \cdot kips$ (User Input from PLS-Pole)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts = $N := 12$ (User Input)

Bolt "Column" Distance = $l := 3.0 \cdot in$ (User Input)

Bolt Ultimate Strength = $F_u := 100 \cdot ksi$ (User Input)

Bolt Yeild Strength= $F_y := 75 \cdot ksi$ (User Input)

Bolt Modulus = $E := 29000 \cdot ksi$ (User Input)

Diameter of Anchor Bolts = $D := 2.25 \cdot in$ (User Input)

Threads per Inch = $n := 4.5$ (User Input)

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 = 3.248 \cdot in^2$

Bolt Tension Check:

Allowable Tensile Force (Net Area) = $T_{ALL.Net} := 1.0 \cdot \left(A_n \cdot F_y \right) = 243.576 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Net}} = 49.27 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Net}} \le 1.00, "OK", "Overstressed" \right)$

Condition1 = "OK"

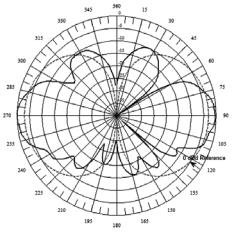
dbSpectra

900 MHz Omni Antennas (890-960 MHz)

		890-960 MHz															
	Model Number	**DS9A03F36U-N**	**DS9A03F36U-D**	**DS9A06F36U-N**	**DS9A06F36U-D**	**DS9A09F36U-N**	**DS9A09F36U-D**	**DS9A10F36U-N**	**DS9A10F36U-D**	**DS9A12F36U-N**	**DS9A12F36U-D**	**DS9A03F36D-N**	**DS9A03F36D-D**	**DS9A06F36D-N**	**DS9A06F36D-D**	**DS9A09F36D-N**	**DS9A09F36D-D**	**DS9A06F36T-N**	**DS9A06F36T-D**
	Input Connector	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN
	Type	Single		Single		Single		Single		Single		Dual		Dual		Dual		Triple	
ELECTRICAL	**Bandwidth**, MHz	70		70		70		70		70		70		70		70		70	
ELECTRICAL	**Power**, Watts	500		500		500		500		500		350		350		350		250	
ELECTRICAL	**Gain**, dBd	3		6		9		10		12		3		6		9		6	
ELECTRICAL	**Horizontal Beamwidth**, degrees	360		360		360		360		360		360		360		360		360	
ELECTRICAL	**Vertical Beamwidth**, degrees	30		16		8		6		3		30		16		8		16	
ELECTRICAL	**Beam Tilt**, degrees	0		0		0		0		0		0		0		0		0	
ELECTRICAL	**Isolation (minimum)**, dB	N/A		N/A		N/A		N/A		N/A		40		40		45		40	
MECHANICAL	**Number of Connectors**	1		1		1		1		1		2		2		2		3	
MECHANICAL	**Flat Plate Area**, $ft^2(m^2)$	0.24 (0.02)		1.28 (0.12)		2.26 (0.21)		3.25 (0.3)		4.33 (0.4)		1.38 (0.13)		2.27 (0.21)		3.83 (0.36)		3.47 (032)	
MECHANICAL	**Lateral Windload Thrust**, lbf(N)	11 (48)		48 (214)		85 (377)		122 (543)		163 (723)		31 (139)		85 (374)		144 (641)		87 (385)	
MECHANICAL	**Survival Wind Speed**																		
MECHANICAL	**without ice**, mph(kph)	437 (703)		250 (402)		150 (241)		105 (169)		75 (121)		379 (610)		150 (241)		90 (145)		136 (219)	
MECHANICAL	**with 0.5" radial ice**, mph(kph)	319 (513)		225 (362)		127 (204)		88 (142)		60 (97)		294 (473)		125 (201)		75 (121)		106 (171)	
MECHANICAL	**Mounting Hardware** included	DSH2V3R		DSH2V3R		DSH3V3R		DSH3V3N		DSH3V3N		DSH2V3R		DSH3V3R		DSH3V3N		DSH3V3N	
DIMENSIONS	**Length**, ft(m)	2.9 (0.9)		6.7 (2)		11.4 (3.5)		16.3 (5)		21.8 (6.6)		8 (2.4)		11.4 (3.5)		19.2 (5.9)		15.3 (4.7)	
DIMENSIONS	**Radome O.D.**, in(cm)	2 (5.1)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)	
DIMENSIONS	**Mast O.D.**, in(cm)	2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		3.2 (8.13)	
DIMENSIONS	**Net Weight** w/o bracket, lb(kg)	5.5 (2.5)		18 (8.2)		30 (13.6)		45 (20.4)		52 (23.6)		21 (9.5)		31 (14.1)		50 (22.7)		40 (18.1)	
DIMENSIONS	**Shipping Weight**, lb(kg)	9.6 (4.4)		28 (12.7)		60 (27.2)		75 (34)		82 (37.2)		51 (23.1)		61 (27.7)		80 (36.3)		50 (22.7)	

VERTICAL PATTERNS

DS9A03F36U-N
DS9A03F36U-D



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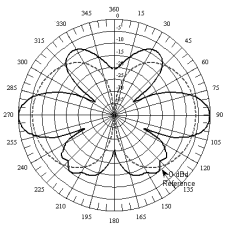

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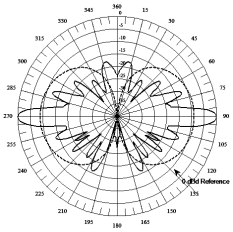

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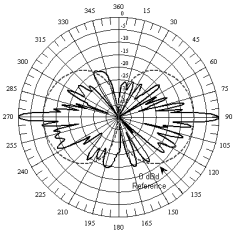

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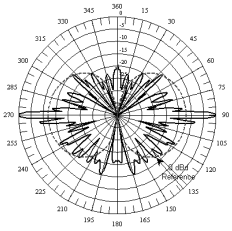

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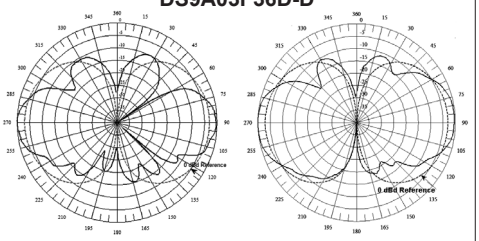

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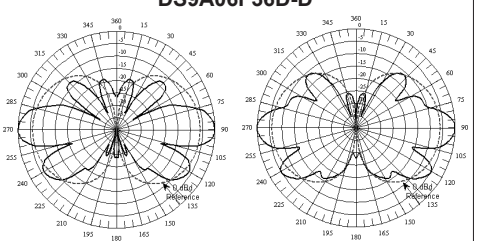

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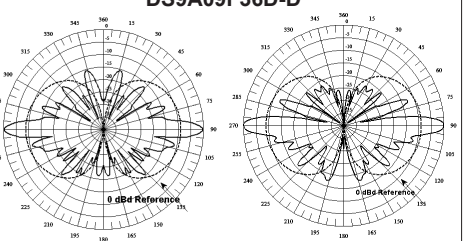


Top Bottom

YOU'RE HEARD, LOUD AND CLEAR.

Installation and Operation Manual for Tower-Top Amplifier System Model 430-94C-09168-M-110/48

Manual Part Number

7-9476

8625 Industrial Parkway, Angola, NY 14006 Tel: 716-549-4700 Fax: 716-549-4772 sales@birdrf.com www.bird-technologies.com

ratio. The quadrature amplifiers have a separate power circuit for each half of the amplifier which provides component redundancy as well as unsurpassed IM performance. Microprocessor controlled fault detection circuitry in the tower top box provides continuous monitoring and switching of each quad amplifier while sending operational data to the base unit front panel for at-a-glance status reporting and form-C contact switching for alarm integration. Included in the tower top box is a preselector/postselector filter, amplifier "A" and amplifier "B," switching circuitry, control board and lightning arresters (see **Figure 1**). The specifications for the tower box are listed in **Table 2**.

Electrical Specifications	
Frequency Range	896 to 901 MHz
Maximum Input	- 20 dBm
Net Gain	20 dB (nominal)
Noise Figure (typ /max)	2.7 / 3.0 dB
Backup Amplifier Switching	Solid State RF Switch
Integrated Test Port Isolation	45 dB
Preselector Postselector Maximum Preselector Loss Minimum Rejection	4-pole Bandpass with cross-coupling 5-pole Bandpass with cross-coupling and 40 dB Cellular Notch 0.8 dB 110 dB at 935 - 940 MHz 40 dB at 894 MHz
LNA Type Gain Noise Figure 3rd Order Input IP	2-stage Quadrature integrated into filter 26 dB 1.2 dB 18 dBm
Impedance	50 Ohms
Antenna Port VSWR	2 : 1 max
Power Requirements	12 VDC @ 1.25 A
Lightning Protection	Impulse Suppressor on all external connectors
Operating Temp Range (non-condensing humidity)	-30° C to +60° C
Mechanical Specifications	
Enclosure	Modified NEMA 4x: Stainless steel weather resistant
Connectors	N -female
Dimensions (HWD) not including mounting tabs and connectors	20" x 6" x 6" (508 x 152 x 152 mm)
Net Weight	20 lbs (9.1 kg)

Table 2: Tower box specifications. Values are typical unless noted otherwise.

Electrical Specifications	
Frequency Range	896 to 901 MHz
Control Unit Net Gain	+1 dB typ; 0 dB min
Distribution Amp Type Gain Noise Figure 1 dB compression point 3rd Order Output IP	Quad-Coupled dual stage 23 dB 4 dB 27 dBm 46 dBm
Number of Outputs Split Loss	8 18 dB
Impedance	50 Ohms
VSWR	2 : 1 (max)
Connectors to TTA to BTS Test Port input	 N - Female BNC - Female BNC - Female
TTA NET GAIN electronic attenuator	0 to 15.5 dB in 0.5 dB steps
DISTRIBUTION electronic attenuator	0 to 15.5 db in 0.5 dB steps
Alarm Contacts	Two sets of Form-C Contacts Nominal 2A @ 30 VDC or 0.5A @125 VAC
I/O	Ethernet
Power Requirements Model 430-94C-09168-M-110 Model 430-94C-09168-M-48	 90 - 240 VAC @ 50 - 60 Hz -48VDC
Operating Temp Range (non-condensing humidity)	0° C to + 50° C
Mechanical Specifications	
Enclosure	Standard EIA 19" Rack Mount
Dimensions (HWD)	1 RU x 19" x 18" (38 x 483 x 457 mm)
Net Weight	< 15 lbs (6.8 kg)

Table 3: Control Unit specifications. Values are typical unless noted otherwise.

Attachment 4 – Wetlands Desktop Review

WETLAND DESKTOP REVIEW

June 11, 2017 **APT Project No.: CT259350**

Prepared For: Eversource Energy
56 Prospect Street
Hartford, CT 06103

Eversource Project Name: Danbury OpenSky at Birchwood Condominiums

Site Address: 27 Crows Nest Lane, Danbury, CT 06810

Wetlands Identified on Subject Property:	Yes ☐ No ☒	
Nearest Wetland Resource:	±970 feet to the east	
Remote Sensing Identification Methods:	Type: CTDEEP Wetland Mapping	Type: Aerial Photograph
Municipal Upland Review Area:	**Wetlands:** 100 feet	**Watercourses:** 200 feet

Conclusion/Recommendation:

The proposed replacement of an existing omnidirectional whip antenna mounted at the top of Structure #9950 and a new equipment compound at the base of the structure does not appear to result in an adverse impact to wetland or watercourse resources or consist of activities within the municipal upland review area. Therefore, no wetland field inspection is recommended based on the results of this desktop review.

Proposed Site Conditions:

Developed ☒ **Type: Utility & Condominium Complex**

Paved ☐	Gravel ☐	Maintained Lawn ☒
Agriculture ☐	Cultivated ☐	Hayfield/Pasture ☐
Comments: Area surrounding Str. #9950 consists of well drained till soils (Paxton and Montauk find sandy loams).		

Nearest Wetland/Watercourse Type:

Emergent ☐	Scrub-shrub ☐	Forested ☐
Open Water ☐	Disturbed ☐	Wet Meadow ☐
Perennial Watercourse ☐	Intermittent Watercourse ☒	Potential Vernal Pool ☐
Comments: None		

Floodplain/Rare Species Habitat:

100-year Floodplain ☐	500-year Floodplain ☐	NDDB Buffer Area ☒
Comments: Potential impact to rare species may result from the proposed development due to its location within a NDDB Buffer Area. Consultation with DEEP is ongoing.		

This document is provided as a preliminary determination on the potential presence of wetlands or watercourses on or in proximity to proposed ground work associated with Eversource Energy's Project. This analysis is based on a review of publically available remote sensing resources (i.e., wetland mapping, soil mapping, aerial photographs, hydrology mapping, etc.), recognizing the data precision/ommission limitations inherent in these resources, and information gathered by other All-Points Technology Corp., P.C. staff and does not represent an actual field investigation performed by a qualified soil/wetland scientist.

Attachment

- Environmental Resources Screen
- Photo Documentation

Legend

- Subject Property
- Transmission Tower
- Approximate Transmission Right-of-Way
- Approximate Transmission Line
- Proposed Equipment Compound
- Approximate Parcel Boundary (CTDEEP GIS)
- 10-foot Contour Line
- 2-foot Contour Line
- Natural Diversity Database Area (Dec. 2016)
- Critical Habitat (CTDEEP; July 2009)*
- Watercourse (CTDEEP)
- Open Water (CTDEEP)*
- Wetlands (CTDEEP)

FEMA Flood Zones

- 100-Year Flood Zone
- 500-Year Flood Zone
- Floodway

Aquifer Protection Area (CTDEEP, Dec. 2015)*

- Final Adopted Aquifer Protection Area
- Final Aquifer Protection Area
- Preliminary Aquifer Protection Area

Map Notes:
**Legend item not in mapped area*
Base Map Source: 2016 Aerial Photograph (CTECO)
Map Scale: 1 inch = 300 feet
Map Date: May 2017

N W E S

300 150 0 300 Feet

Environmental Resources Screen

Danbury OpenSky Installation Project
at Birchwood Condominiums
Eversource Structure No. 9950
27 Crows Nest Lane
Danbury, CT

EVERSOURCE ENERGY

ALL-POINTS TECHNOLOGY CORPORATION

Photo 1: View of Structure No. 9950 (right structure, note whip type antenna at top of tower), looking west from tennis courts and pool parking lot.

Photo 2: View of Structure No. 9950 looking northeast. Proposed equipment compound would be located on left side of tower and in front of juniper bushes in maintained lawn area.

Photo 3: View of Structure No. 9950 (left structure) looking north across tennis court (fenced area in foreground).

Photo 4: View of Structure No. 9950 (left structure) looking east.

Attachment 5 – CTDEEP & USFW Correspondence

Connecticut Department of

ENERGY &
ENVIRONMENTAL
PROTECTION

June 26, 2017

Mr. Dean Gustafson
All-Points Technology Corporation, P.C.
3 Saddlebrook Drive
Killingworth, CT 06419
dgustafson@allpointstech.com

Project: Eversource Energy Company, LLC Danbury OpenSky Installation Project at Birchwood Condominiums Located at 27 Crows Nest Lane in Danbury, Connecticut
NDDB Determination No.: 201705107

Dear Dean,

I have reviewed Natural Diversity Data Base maps and files regarding the area delineated on the map you provided for the proposed Eversource Energy Company, LLC Danbury OpenSky Installation Project at Birchwood Condominiums Located at 27 Crows Nest Lane in Danbury, Connecticut. According to our records we have known extant populations of State Special Concern *Terrapene carolina* (eastern box turtle) in the vicinity of the project site.

Eastern Box Turtle: Eastern box turtles inhabit old fields and deciduous forests, which can include power lines and logged woodlands. They are often found near small streams and ponds. The adults are completely terrestrial but the young may be semiaquatic, and hibernate on land by digging down in the soil from October to April. They have an extremely small home range and can usually be found in the same area year after year. Eastern box turtles have been negatively impacted by the loss of suitable habitat. Some turtles may be killed directly by construction activities, but many more are lost when important habitat areas for shelter, feeding, hibernation, or nesting are destroyed. As remaining habitat is fragmented into smaller pieces, turtle populations can become small and isolated. Reducing the frequency that motorized vehicles enter box turtle habit**a**t would be beneficial in minimizing direct mortality of adults.

Recommended Protection Strategies for Turtles:

Work should occur when these turtles are active (April 1st to September 30th). Conducting land clearing while the turtle is active will allow the animal to move out of harm's way and minimize mortality to hibernating individuals. I recommend the additional following protection strategies in order to protect these turtles:

- Hiring a qualified herpetologist to be on site to ensure these protection guidelines remain in effect and prevent turtles from being run over when moving heavy equipment. This is especially important in the month of June when turtles are selecting nesting sites.
- Exclusionary practices will be required to prevent any turtle access into construction areas. These measures will need to be installed at the limits of disturbance.
- Exclusionary fencing must be at least 20 in tall and must be secured to and remain in contact with the ground and be regularly maintained (at least bi-weekly and after major weather events) to

secure any gaps or openings at ground level that may let animal pass through. Do not use plastic or netted silt-fence.

- All staging and storage areas, outside of previously paved locations, regardless of the duration of time they will be utilized, must be reviewed to remove individuals and exclude them from re-entry.
- All construction personnel working within the turtle habitat must be apprised of the species description and the possible presence of a listed species, and instructed to relocate turtles found inside work areas or notify the appropriate authorities to relocate individuals.
- Any turtles encountered within the immediate work area shall be carefully moved to an adjacent area outside of the excluded area and fencing should be inspected to identify and remove access point.
- In areas where silt fence is used for exclusion, it shall be removed as soon as the area is stable to allow for reptile and amphibian passage to resume.
- No heavy machinery or vehicles may be parked in any turtle habitat.
- Special precautions must be taken to avoid degradation of wetland habitats including any wet meadows and seasonal pools.
- The Contractor and consulting herpetologist must search the work area each morning prior to any work being done.
- Avoid and limit any equipment use within 50 feet of streams and brooks.
- Any confirmed sightings of box, wood or spotted turtles should be reported and documented with the NDDB (nddbrequestdep@ct.gov) on the appropriate special animal form found at (http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323460&depNav_GID=1641)

If these protection strategies are followed then the proposed activities will lessen the impact on this state-listed species. This determination is good for two years. Please re-submit an NDDB Request for Review if the scope of work changes or if work has not begun on this project by June 26, 2019.

Natural Diversity Data Base information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Natural History Survey and cooperating units of DEEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the Data Base should not be substitutes for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available.

Please contact me if you have further questions at (860) 424-3592, or dawn.mckay@ct.gov . Thank you for consulting the Natural Diversity Data Base. A more detailed review may be conducted as part of any subsequent environmental permit applications submitted to DEEP for the proposed site.

Sincerely,

Dawn M. McKay

Dawn M. McKay
Environmental Analyst 3

WILDLIFE IN CONNECTICUT

STATE SPECIES OF SPECIAL CONCERN

Eastern Box Turtle

Terrapene carolina carolina

Description

The eastern box turtle is probably the most familiar of the 8 species of turtles found in Connecticut's landscape. It is known for its high-domed carapace (top shell). The carapace has irregular yellow or orange blotches on a brown to black background that mimic sunlight dappling on the forest floor. The plastron (under shell) may be brown or black and may have an irregular pattern of cream or yellow. The length of the carapace usually ranges from 4.5 to 6.5 inches, but can measure up to 8 inches long. The shell is made up of a combination of scales and bones, and it includes the ribs and much of the backbone.

Each individual turtle has distinctive head markings. Males usually have red eyes and a concave plastron, while females have brown eyes and a flat plastron. Box turtles also have a horny beak, stout limbs, and feet that are webbed at the base. This turtle gets its name from its ability to completely withdraw into its shell, closing itself in with a hinged plastron. Box turtles are the only Connecticut turtle with this ability.

Range

Eastern box turtles are found throughout Connecticut, except at the highest elevations. They range from southeastern Maine to southeastern New York, west to central Illinois, and south to northern Florida.

Habitat and Diet

In Connecticut, this terrestrial turtle inhabits a variety of habitats, including woodlands, field edges, thickets, marshes, bogs, and stream banks. Typically, however, box turtles are found in well-drained forest bottomlands and open deciduous forests. They will use wetland areas at various times during the season. During the hottest part of a summer day, they will wander to find springs and seepages where they can burrow into the moist soil. Activity is restricted to mornings and evenings during summer, with little to no nighttime activity, except for egg-laying females. Box turtles have a limited home range where they spend their entire life, ranging from 0.5 to 10 acres (usually less than 2 acres).

Box turtles are omnivorous and will feed on a variety of food items, including earthworms, slugs, snails, insects, frogs, toads, small snakes, carrion, leaves, grass, berries, fruits, and fungi.

Life History

From October to April, box turtles hibernate by burrowing into loose soil, decaying vegetation, and mud. They tend to hibernate in woodlands, on the edge of woodlands, and sometimes near closed canopy wetlands in the forest. Box turtles may return to the same place to hibernate year after year. As soon as they come out of hibernation, box turtles begin feeding and searching for mates.

The breeding season begins in April and may continue through fall. Box turtles usually do not breed until they are about 10 years old. This late maturity is a result of their long lifespan, which can range up to 50 to even over 100 years of age. The females do not have to mate every year to lay eggs as they can store sperm for up

to 4 years. In mid-May to late June, the females will travel from a few feet to more than a mile within their home range to find a location to dig a nest and lay their eggs. The 3 to 8 eggs are covered with dirt and left to be warmed by the sun. During this vulnerable time, skunks, foxes, snakes, crows, and raccoons often raid nests. Sometimes, entire nests are destroyed. If the eggs survive, they will hatch in late summer to early fall (about 2 months after being laid). If they hatch in the fall, the young turtles may spend the winter in the nest and come out the following spring.

As soon as the young turtles hatch, they are on their own and receive no care from the adults. This is a dangerous time for young box turtles because they do not develop the hinge for closing into their shell until they are about 4 to 5 years old. Until then, they cannot entirely retreat into their shells. Raccoons, skunks, foxes, dogs, and some birds will prey on young turtles.

Conservation Concerns

The eastern box turtle was once common throughout the state, mostly in the central Connecticut lowlands. However, its distribution is now spotty, although where found, turtles may be locally abundant. Because of the population decline in Connecticut, the box turtle was added to the state's List of Endangered, Threatened, and Special Concern Species when it was revised in 1998. It is currently listed as a species of special concern. The box turtle also is protected from international trade by the 1994 CITES treaty. It is of conservation concern in all the states where it occurs at its northeastern range limit, which includes southern New England and southeastern New York.

Many states have laws that protect box turtles and prohibit their collection. In Connecticut, eastern box turtles **cannot** be collected from the wild (DEP regulations 26-66-14A). Another regulation (DEP regulations 26-55-3D) "grandfathers" those who have a **box turtle collected before 1998**. This regulation limits possession to a single turtle collected before 1998. These regulations provide some protection for the turtles, but not enough to combat some of the even bigger threats these animals face. The main threats in Connecticut (and other states) are loss and fragmentation of habitat due to deforestation and spreading suburban development; vehicle strikes on the busy roads that bisect the landscape; and indiscriminate (and now illegal) collection of individuals for pets.

Loss of habitat is probably the greatest threat to turtles. Some turtles may be killed directly by construction activities, but many more are lost when important habitat areas for shelter, feeding, hibernation, or nesting are destroyed. As remaining habitat is fragmented into smaller pieces, turtle populations can become small and isolated.

Adult box turtles are relatively free from predators due to their unique shells. The shell of a box turtle is extremely hard. However, the shell is not hard enough to survive being run over by a vehicle. Roads bisecting turtle habitat can seriously deplete the local population. Most vehicle fatalities are pregnant females searching for a nest site.

How You Can Help

- *Leave turtles in the wild. They should never be kept as pets. Whether collected singly or for the pet trade, turtles that are removed from the wild are no longer able to be a reproducing member of a population. Every turtle removed reduces the ability of the population to maintain itself.*
- *Never release a captive turtle into the wild. It probably would not survive, may not be native to the area, and could introduce diseases to wild populations.*
- *Do not disturb turtles nesting in yards or gardens.*
- *As you drive, watch out for turtles crossing the road. Turtles found crossing roads in June and July are often pregnant females and they should be helped on their way and not collected. Without creating a traffic hazard or compromising safety, drivers are encouraged to avoid running over turtles that are crossing roads. Also, still keeping safety precautions in mind, you may elect to pick up turtles from the road and move them onto the side they are headed. Never relocate a turtle to another area that is far from where you found it.*
- *Learn more about turtles and their conservation concerns. Spread the word to others on how they can help Connecticut's box turtle population.*

State of Connecticut
Department of Environmental Protection
Bureau of Natural Resources
Wildlife Division
www.ct.gov/dep

The production of this Endangered and Threatened Species Fact Sheet is made possible by donations to the Connecticut Endangered Species/Wildlife Income Tax Checkoff Fund.

5/2008

August 16, 2017

APT Project No.: CT259350

Eversource Energy Service Company
56 Prospect Street
Hartford, CT 06103

Re: Proposed Antenna Replacement
Danbury OpenSky at Birchwood Condominiums Project
27 Crows Nest Lane
Danbury, Fairfield County, CT

On behalf of Eversource Energy Service Company ("Eversource"), All-Points Technology Corporation, P.C. ("APT") performed an evaluation with respect to possible federally-listed, threatened or endangered species in order to determine if the proposed referenced communications facility would result in a potential adverse effect to federally-listed species. This consultation was completed in accordance with FCC rules implementing the National Environmental Policy Act ("NEPA"; Federal agency nexus) and Section 7 of the Endangered Species Act through the U.S. Fish and Wildlife Service's ("USFWS") Information, Planning, and Conservation System ("IPaC") for a proposed communications facility at the referenced Site.

Two federally-listed threatened species were identified to potentially occur in the vicinity of the proposed facility documented as the northern long-eared bat ("NLEB"; *Myotis septentrionalis*) and bog turtle (*Clemmys muhlenbergii*). Northern long-eared bat's range encompasses the entire State of Connecticut while bog turtle is known to occur in wetland habitats located in the towns of Ridgefield and Danbury. As a result of this preliminary finding and in accordance with USFWS New England Field Office's Section 7 consultation policy, habitat supported by the subject parcel and an evaluation of whether it is suitable for northern long-eared bat or bog turtle was performed.

APT submitted a NLEB 4(d) Rule Streamlined Consultation Form to USFWS on June 20, 2017 that determined the proposed project is not likely to adversely affect NLEB. If the USFWS does not respond within 30 days from the NLEB submittal, it is presumed that the USFWS concurs with the consultant's determination of no adverse effect to NLEB in accordance with USFWS' NLEB consultation policy. Therefore, since the USFWS did not respond within 30 days, the project responsibilities under Section 7(a)(2) of the Endangered Species Act with respect to the NLEB are fulfilled in accordance with the USFWS January 5, 2016 intra-Service Programmatic Biological Opinion ("BO").

To minimize adverse effects on the NLEB, the Federal Communications Commission encourages the industry to follow these USFWS recommendations:

- Conduct tree removal activities outside of the NLEB pup season (June 1-July 31) and active season (April 1-October 31) to minimize impacts to pups at roosts not yet identified. Not applicable to this project.
- Avoid clearing suitable spring staging and fall swarming habitat within a five-mile radius of known or assumed NLEB hibernacula during the staging and swarming seasons (April 1-May 15 and August 15-November 14, respectively). Not applicable to this project.
- Maintain dead trees and large trees when possible. Not applicable to this project.
- Use herbicides and pesticides only if unavoidable.
- Minimize exterior lighting, opting for down-shielded, motion-sensor security lights under towers instead of constant illumination.

Bog turtle habitat consists of specific wetland habitat types comprised of calcareous wet meadows, pastures and fens. The proposed Eversource antenna replacement project would be located within an existing maintained lawn surrounded by development. No wetlands or watercourses occur within or adjacent to the proposed project with the nearest resource area located ±970 feet to the east (intermittent watercourse). Therefore, no effect to bog turtle, a wetland dependent species, would result from the proposed project and no further consultation with USFWS is required.

For these reasons, we conclude that the proposed project will have no effect on federally-listed species, their habitats, or proposed or designated critical habitat.

Sincerely,

Dean Gustafson

Dean Gustafson
Senior Environmental Scientist

Attachment 6 – Calculated Radio Frequency Emissions Report

C Squared Systems, LLC
65 Dartmouth Drive
Auburn, NH 03032
(603) 644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions Report

EVERSOURCE ENERGY

27 Crow's Nest Lane, Danbury, CT 06810

July 26, 2017

Table of Contents

List of Tables

List of Figures

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed antenna modifications on the existing high tension utility pole located at 27 Crow's Nest Lane in Danbury, CT. The coordinates of the pole are 41° 23' 26.15" N, 73° 25' 02.12" W.

Eversource is proposing the following modifications:

1) Remove one existing 938 MHz omnidirectional antenna;
2) Install one replacement 938 MHz omnidirectional antenna;
3) Install one tower top amplifier (TTA).

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{1.6^2 \times EIRP}{4\pi \times R^2} \right) \text{x Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and power, and that all channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the final site configuration.

4. Calculation Results

Table 1 below outlines the power density information for the site. The proposed Eversource omnidirectional antenna has a relatively narrow vertical beamwidth which causes the majority of the RF power to be focused out towards the horizon, with respect to the vertical plane. As a result, there will be less RF power directed below the antenna relative to the horizon, and consequently lower power density levels around the base of the pole. Please refer to Attachment C for the vertical pattern of the proposed Eversource antenna. The calculated results in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antenna.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm^2)	Limit	%MPE
CL&P	*85*	*938*	*2*	*240*	*0.0277*	*0.6253*	*0.44%*
Eversource	87.8	938	2	240	0.0258	0.6253	0.41%
						Total	**0.41%**

Table 1: Carrier Information[1,2]

[1] The existing CSC filing for CL&P should be removed and replaced with the updated Eversource values provided in Table 1. Existing power density information for Eversource was taken directly from the CSC database dated 6/1/2017.

[2] Please note that as of February 2, 2015, CL&P is operating in the marketplace as Eversource Energy. Table 1 has been updated to reflect the company name change.

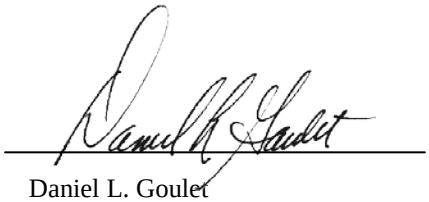
5. Conclusion

The above analysis verifies that RF emissions from the site, after the proposed modifications have been completed, will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed antenna configuration is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **0.41% of the FCC General Population/Uncontrolled limit**.

As noted previously, obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the final site configuration.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.



July 26, 2017

Daniel L. Goulet
C Squared Systems, LLC

Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

IEEE C95.1-2005, IEEE Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz IEEE-SA Standards Board

IEEE C95.3-2002 (R2008), IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz-300 GHz IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure[3]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure[4]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

[3] Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

[4] General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

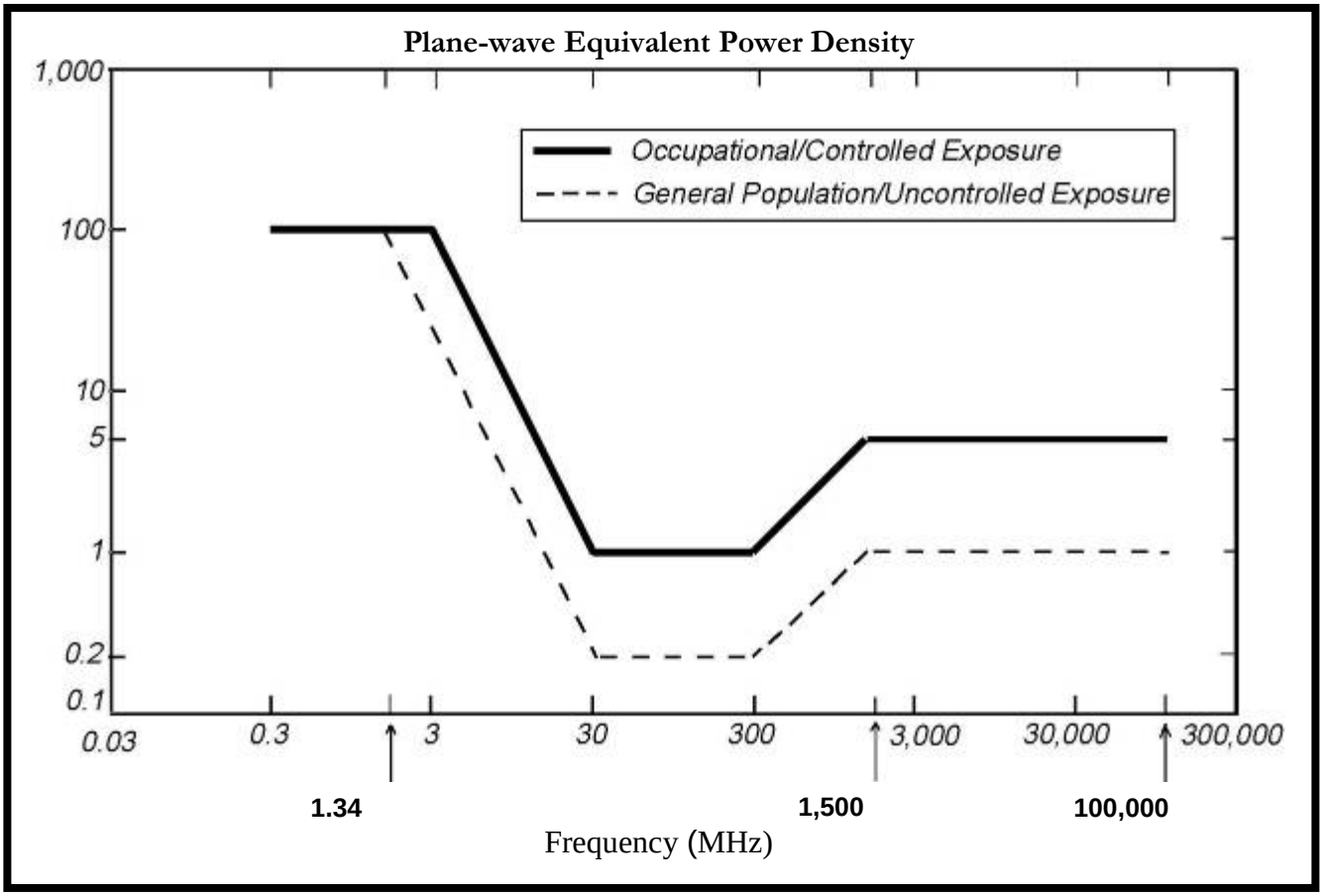
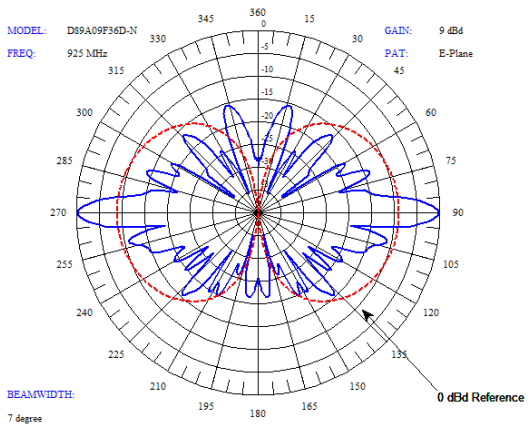


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: Antenna Data Sheet and Electrical Pattern

938 MHz

Manufacturer:	dbSpectra
Model #:	DS9A09F36D-N
Frequency Band:	890-960 MHz
Gain:	9.0 dBd
Vertical Beamwidth:	8°
Horizontal Beamwidth:	360°
Polarization:	Vertical
Length:	230.4”



Attachment 7 – Visibility Analysis

Photographic Simulations

BIRCHWOOD CONDOMINIUMS
EVERSOURCE STRUCTURE NO. 9950
27 CROWS NEST LANE
DANBURY, CT 06810

Prepared in June 2017 by:
All-Points Technology Corporation, P.C.
3 Saddlebrook Drive
Killingworth, CT 06419

Prepared for Eversource Energy

ALL-POINTS
TECHNOLOGY CORPORATION

PHOTO LOG

Legend

Site ● Photo Location

N W E S

150 75 0 150 Feet

1 inch = 150 feet

ALL-POINTS TECHNOLOGY CORPORATION

EVERSOURCE ENERGY

EXISTING

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
1	**BIRCHWOOD CONDOMINIUMS**	**WEST**	**+/- 102 FEET**

ALL-POINTS TECHNOLOGY CORPORATION

EVERSOURCE ENERGY

PROPOSED

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
1	**BIRCHWOOD CONDOMINIUMS**	**WEST**	**+/- 102 FEET**

ALL-POINTS TECHNOLOGY CORPORATION

EVERSOURCE ENERGY

EXISTING

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
2	**BIRCHWOOD CONDOMINIUMS**	**NORTHEAST**	**+/- 93 FEET**

ALL-POINTS TECHNOLOGY CORPORATION

EVERSOURCE ENERGY

PROPOSED

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
2	**BIRCHWOOD CONDOMINIUMS**	**NORTHEAST**	**+/- 93 FEET**

ALL-POINTS TECHNOLOGY CORPORATION

EVERSOURCE ENERGY

EXISTING

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
3	**BIRCHWOOD CONDOMINIUMS**	**NORTHEAST**	**+/- 381 FEET**

ALL-POINTS TECHNOLOGY CORPORATION

EVERSOURCE ENERGY

PROPOSED

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
3	**BIRCHWOOD CONDOMINIUMS**	**NORTHEAST**	**+/- 381 FEET**

EXISTING

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
4	**BIRCHWOOD CONDOMINIUMS**	**EAST**	**+/- 344 FEET**

ALL-POINTS TECHNOLOGY CORPORATION

EVERSOURCE ENERGY

PROPOSED

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
4	**BIRCHWOOD CONDOMINIUMS**	**EAST**	**+/- 344 FEET**

ALL-POINTS TECHNOLOGY CORPORATION

EVERSOURCE ENERGY

EXISTING

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
5	**CROWS NEST LANE**	**WEST**	**+/- 321 FEET**

ALL-POINTS TECHNOLOGY CORPORATION

EVERSOURCE ENERGY

PROPOSED

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
5	**CROWS NEST LANE**	**WEST**	**+/- 321 FEET**

ALL-POINTS TECHNOLOGY CORPORATION

EVERSOURCE ENERGY

EXISTING

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
6	**TOBINS COURT AT CROWS NEST LANE**	**SOUTHEAST**	**+/- 0.12 MILE**

ALL-POINTS TECHNOLOGY CORPORATION

EVERSOURCE ENERGY

PROPOSED

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
6	**TOBINS COURT AT CROWS NEST LANE**	**SOUTHEAST**	**+/- 0.12 MILE**

ALL-POINTS TECHNOLOGY CORPORATION

EVERSOURCE ENERGY

Attachment 8 – SHPO Correspondence

Department of Economic and Community Development

Connecticut
still revolutionary

July 19, 2017

Ms. Nicole Castro
Project Manager
All Points Technology Corp.
3 Saddlebrook Drive
Killingworth, CT 06419

Subject: Proposed Wireless Telecommunications Facility
27 Crows Nest Lane
Danbury, CT
Site # CT259350 – Birchwood Condominiums
Eversource Energy

Dear Ms. Castro:

The State Historic Preservation Office is in receipt of the submitted proposal for the above-referenced project, submitted for review and comment pursuant to the National Historic Preservation Act and in accordance with Federal Communications Commission regulations.

The proposed undertaking includes the replacement of one pole-mounted whip antennas, installed at a height of 92' above ground level (AGL) with a pole-mounted whip antenna installed at a height of 102' AGL. A fenced, 30 foot by 28 foot equipment compound is also proposed to be constructed at the base of the Transmission Pole. The SHPO concurs with All Point's determination that the work proposed will not impact historic resources. Based on the information provided to this office, no historic properties will be affected.

The State Historic Preservation Office appreciates the opportunity to review and comment upon this project. These comments are provided in accordance with the Connecticut Environmental Policy Act and Section 106 of the National Historic Preservation Act. For further information please contact Marena Wisniewski, Environmental Reviewer, at (860) 256-2754 or marena.wisniewski@ct.gov.

Sincerely,

Mary B. Dunne

Mary B. Dunne
Deputy State Historic Preservation Officer