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 INSTALLATION OF ONE STEEL
POLE FOR COMMUNICATIONS IN THE TOWN OF
CANTON, CONNECTICUT

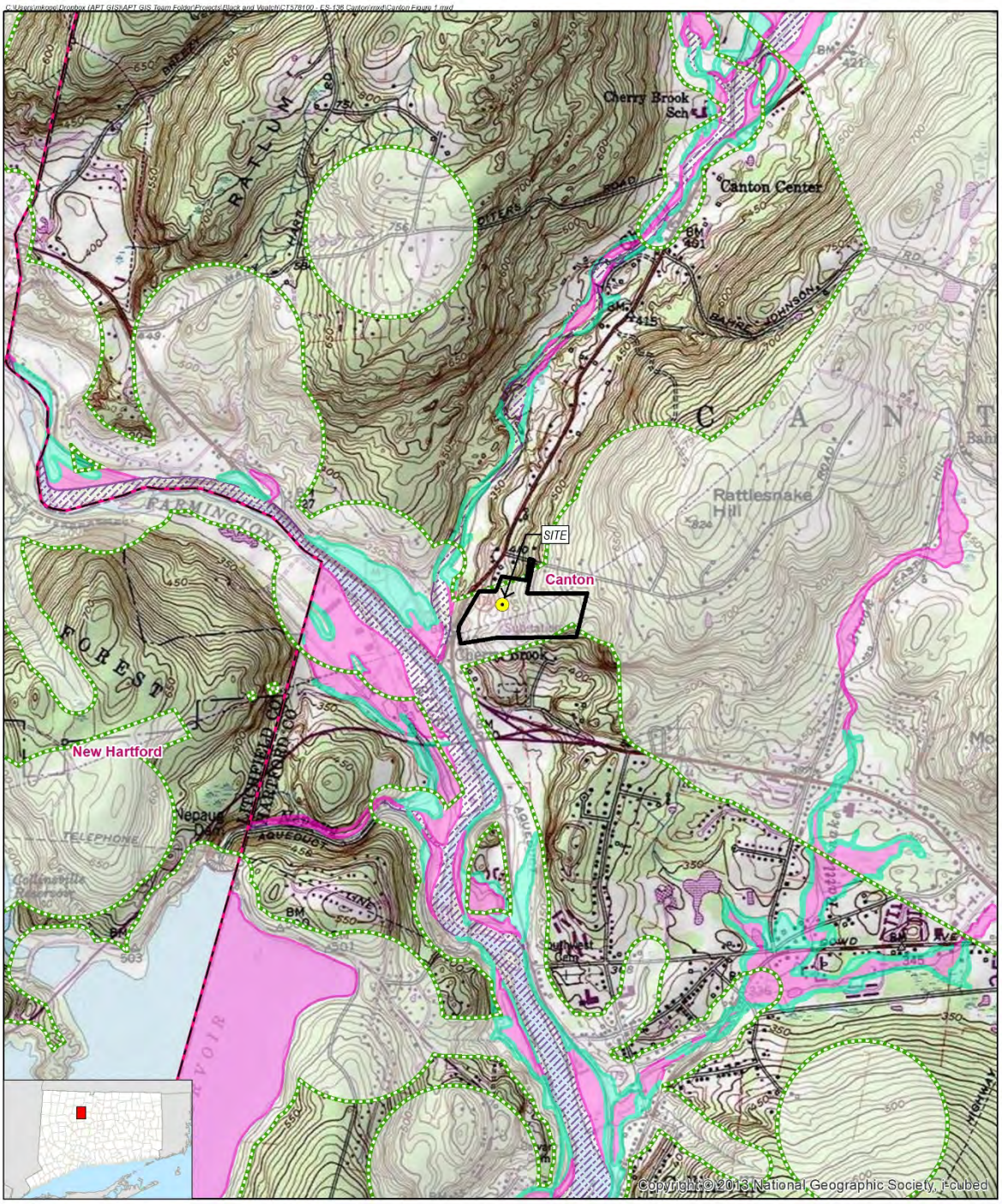
A. Introduction

Pursuant to Sections 16-50j-38 and 16-50j-39 of the Regulations of Connecticut State Agencies, 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 install a new steel pole with appurtenances ("Proposed Facility") to enhance communications in the area surrounding its Canton Substation. See Figure 1, *Overview Map.*

B. Background

Eversource owns an approximately 31-acre parcel at 13 Morgan Road in Canton, Connecticut (the "Site"), which is partially occupied by Eversource's Canton Substation. The Company operates the existing substation in a gravel-based, fenced compound consisting of substation equipment and a control house.

Eversource is in the process of reconfiguring its communications system throughout the State. The proposed installation is part of Eversource's program to update the current obsolete analog voice radio communications system to a modern digital voice communications system. The new system will enable the highest level of voice communications under all operating conditions, including during critical emergency and storm restoration activities. The new radio system will also provide for remote control of distribution safety equipment.



Legend

- Site
- Subject Property
- Natural Diversity Database (updated 6/2020)
- Municipal Boundary
- FEMA 100-Year Flood Zone
- FEMA 500-Year Flood Zone
- Floodway

Map Notes:
Base Map Source: USGS 7.5 Minute Topographic Quadrangle Map, Collinsville, CT (1984)
Map Scale: 1:24,000
Map Date: December 2020

1,000 500 0 1,000 Feet

Figure 1
Overview Map

Proposed Communications Facility
Canton 5R
13 Morgan Road
Canton, Connecticut

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C. Description of the Project

The Company proposes to install one (1) new steel pole in a grassy area adjacent to the substation's existing control house and eastern fence line. The Proposed Facility would be erected approximately 30 feet east of the existing control house building. The ground elevation at this portion of the Site is approximately 428 feet above mean sea level ("AMSL"). The proposed steel pole would rise approximately 45 feet above ground level ("AGL"). One (1) ±24-foot tall omni-directional whip antenna would be mounted near the top of the pole and extend to a height of approximately 67 feet AGL. *See Figure 2, Detailed Site Map and Attachment 1, Site Plans (completed by Black & Veatch on November 23, 2020).* The Proposed Facility will be accessed by a northern extension of the existing substation access drive. Associated cabling will run underground from the steel pole and transition above ground to an ice bridge and into the control house, which will house associated radio equipment. Eversource would own the Proposed Facility.

The Company would maintain its radio equipment and electrical power supply connections inside the existing control house building. No additional underground electrical connections would be required for the Proposed Facility.

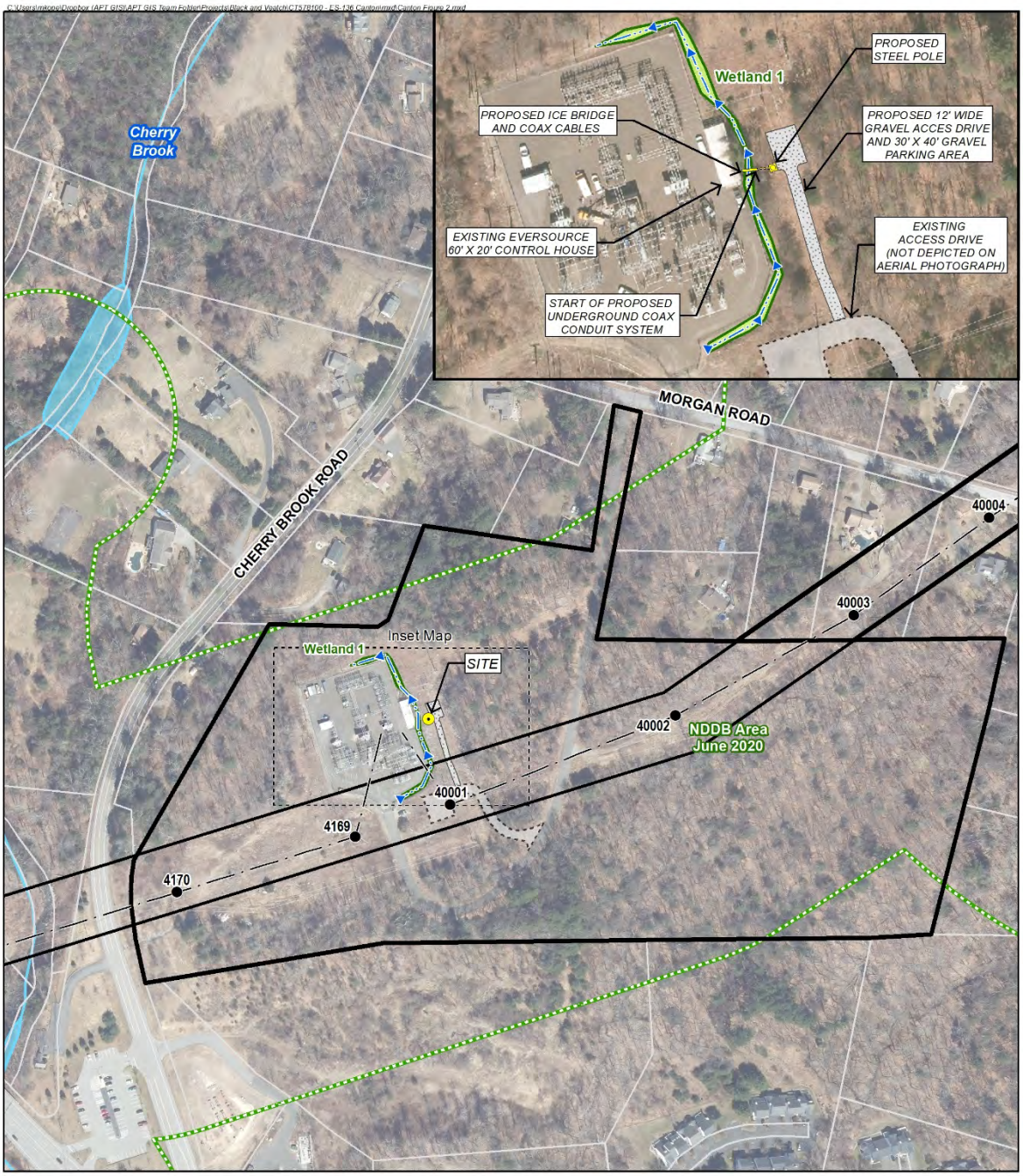
Table 1, *Antenna Schedule* summarizes the antenna type and proposed location on the new pole. Specifications for the Company's new antenna are included in Attachment 2, *Antenna Specifications*.

TABLE 1 - ANTENNA SCHEDULE

Antenna Type	Antenna Make/Model	Antenna Center Line Elevation (ft. AGL)	Comments	Frequency
24' – 3" Omni	DB Spectra DS2C03F36D-D	±55.0	Eversource	217 MHz

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

A structural loading analysis has been performed to confirm that the steel pole would be structurally capable of supporting the loading from the proposed antenna system. A review of the design and structural analysis for the Proposed Facility is included in Attachment 3, *Structural Analysis Report*, which was completed by Black & Veatch on July 15, 2020.



Legend

- Site
- Proposed Gravel Access Drive
- Proposed Equipment (Inset Map)
- Proposed Conduit (Inset Map)
- Existing Eversource Structure
- Overhead Eversource Line
- Existing Eversource Right-of-Way (ROW)
- Intermittent Watercourse
- Delineated Wetland Boundary Outline
- Field Delineated Wetland
- Watercourse (not delineated; CTDEEP)
- Open Water (not delineated; CTDEEP)
- Natural Diversity Database (updated 6/2020)
- Existing Access Drive
- Subject Property
- Parcel Boundary

Map Notes:
Base Map Source: 2019 Aerial Photograph (CTECO)
Map Scale: 1 inch = 300 feet
Map Date: December 2020

300 150 0 300 Feet

Figure 2
Detailed Site Map

Proposed Communications Facility
Canton 5R
13 Morgan Road
Canton, Connecticut

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D. Environmental Discussion

The Proposed Facility would not have a substantial adverse environmental effect. The Facility will be located in a previously cleared and disturbed area. Construction activities associated with its installation will be within cleared and maintained areas around the substation compound and the nearby electrical distribution line[1].

1) Wetlands and Watercourses

Groundwork for the Proposed Facility will occur outside the substation compound for the installation of the ice bridge and steel pole foundations, as well as the proposed access drive extension. One wetland resource ("Wetland 1") was identified adjacent to the proposed work area. Wetland 1 consists of an isolated, man-made curtain drain/drainage swale that was originally constructed around the eastern side of the compound to convey water away from the substation. While constructed for that purpose, Wetland 1 sustains inundation and flows from surface water and seasonally high groundwater for a sufficient period of time to be classified as an intermittent watercourse.

The Proposed Facility avoids any direct impacts to this wetland, as detailed in Attachment 4, *Wetlands Inspection Report*. Development of the Proposed Facility would not result in any adverse impact to wetlands due to Wetland 1's isolated nature, man-made origin, and lack of supporting function and values.

Best Management Practices ("BMPs") will be implemented in accordance with the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control*. Temporary erosion control measures consisting of silt fencing with straw wattle will be installed prior to any grading or disturbance of existing surface material. An Environmental Monitor will inspect the work area prior to and following the erosion control installation. The contractor will be required to attend a pre-construction educational session with the Environmental Monitor that will address: the location and extent of the wetland resource; proper protection measures and the importance of maintaining these controls; and how to avoid unintentional impacts to the resource. All erosion control measures will be removed in accordance with Eversource's BMPs.

The Environmental Monitor will prepare reports documenting each inspection for compliance verification. Any observations of non-compliance with erosion control measures or evidence of erosion or sediment release will be immediately remedied. In the unlikely event of a release of sediment or other materials into Wetland 1, it would be reported within 24 hours to the Town of Canton Wetland Enforcement Officer and the Council. Additional details on erosion and

[1] Overhead transmission lines are also present in the vicinity of the Proposed Facility.

sediment controls can be found in *Attachment 1 – Site Plans* on sheet C-6.

2) Wildlife and Vegetation

The Proposed Facility would not have a significant adverse effect on wildlife or vegetation. The steel pole, appurtenant equipment, and the associated construction work would be primarily confined to the existing cleared and maintained vegetation zone associated with the substation and electrical lines. Ground disturbance would be limited to a relatively small maintained area immediately east of the substation fence. Due to the existing land use activities, the Site does not support any significant wildlife habitat beyond some typical habituated species (i.e., those tolerant of human development and activity). Therefore, the Proposed Facility would not result in an adverse impact to wildlife.

No migratory bird species are anticipated to be impacted by the project. The Proposed Facility is not proximate to any Important Bird Area ("IBA"); the nearest IBA, Barkhamsted Block in Canton, is located approximately 1 mile to the north. Further, the design and siting of the proposed monopole would comply with the U.S. Fish and Wildlife Service ("USFWS") guidelines for minimizing potential impacts to bird species.[2] Therefore, no migratory bird species are anticipated to be impacted by the Proposed Facility.

According to the available Connecticut Department of Energy & Environmental Protection ("DEEP") Wildlife Division Natural Diversity Data Base ("NDDB") maps, the Proposed Facility is partially located within a shaded NDDB buffer area. Eversource submitted a review request to DEEP to confirm the known populations of Federal or State Endangered, Threatened or Special Concern Species at this Site.

No state-listed species occur within the Proposed Facility development areas; however, host plants for a state-listed butterfly are located near the proposed access drive. Eversource is currently in consultation with DEEP regarding Eversource's proposed work in this area and will provide protection measures during construction to avoid impacting the host plants. Any additional protection measures recommended by DEEP will be incorporated into Eversource's BMPs during construction. With these protection measures, no adverse impacts to state-listed rare species are anticipated.

One federally listed threatened species is known to occur in the vicinity of the Site, documented as the northern long-eared bat ("NLEB"; *Myotis septentrionalis*). NLEB's range encompasses the entire State of Connecticut. Based on available NLEB data, the Site is not within 150 feet of a known occupied maternity roost tree and is not within 0.25 mile of a known NLEB

[2] The Proposed Facility would consist of a 45-foot tall steel structure with an antenna extending to 67' AGL, which requires neither guy wires nor lighting and is therefore consistent with USFWS' environmentally preferred "gold standard".

hibernaculum. The nearest NLEB habitat resource to the proposed activity is a hibernaculum located in Winchester ±10.2 miles to the northwest of the Project. The Proposed Facility would not require the removal of any trees that could potentially support NLEB habitat. Based on this information, construction and operation of the Proposed Facility are not likely to adversely affect NLEB.

3) Noise

After construction is complete, no noise audible to locations beyond the Site would be emitted by the Proposed Facility. Electrical components and other supporting telecommunication equipment will be installed within the existing control house building. As a result, noise emissions would be consistent with current levels.

4) Safety and Health

The Proposed Facility 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 activities or equipment and materials delivery to the Site. Subsequent to completion of construction, the Proposed Facility would not generate any additional traffic to the area other than periodic maintenance visits.

Radio signal emissions from the proposed equipment 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 proposed installation 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 proposed installation (1 antenna) would be 5.06% of the FCC Standard for public exposure to RF emissions. Please refer to Attachment 5, *Calculated Radio Frequency Emissions Report,* dated November 13, 2020, for a copy of the methodology and calculations.

5) Visual

The Proposed Facility would not result in a substantial change to existing conditions nor would it have a significant adverse visual impact on the environment or character of the community. The Proposed Facility includes a 45-foot tall steel pole topped with an omni-directional antenna, bringing the total height of the facility to 67 feet AGL. The size and style of the steel pole would not substantially alter the current views of the Site. The substation is currently shielded from Morgan Road and Cherry Brook Road by mixed deciduous trees and varying topography. Numerous wooden

and steel utility poles are present within and in the vicinity of the substation. Please refer to *Attachment 6, Photographic Simulations*, for a visual representation of the Proposed Facility from the substation access drive.

6) Historical and Archaeological Resources

A review of relevant historic and archaeological information was conducted to determine whether the Site holds potential historical and/or archaeological significance. No historic properties previously listed or deemed eligible for listing on the National Register of Historic Places were identified within the Area of Potential Effect (APE), 0.5 mile. Please refer to *Attachment 7, Cultural Resources Screen.*

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. As the Site has been thoroughly disturbed and no intact soils remain, the Site retains no potential to yield intact prehistoric or historic period cultural deposits. The ground disturbance associated with the Proposed Facility would take place within a previously disturbed area.

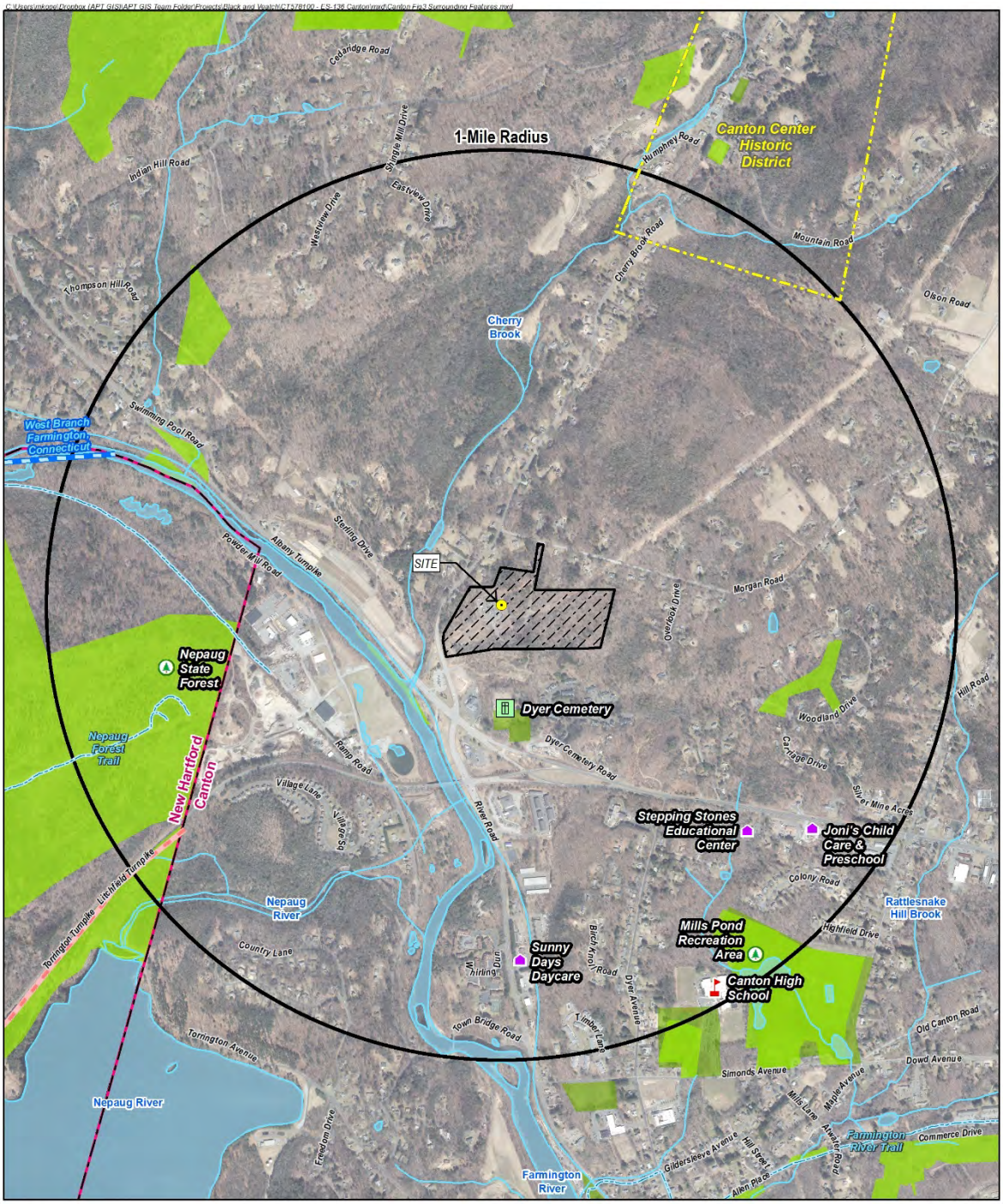
As no historic, archaeological or cultural resources were identified within the APE, no SHPO submission was undertaken.

7) Forests and Parks

The Site contains no 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. Enugu State Forest and the Mills Pond Recreation Area are located approximately 0.59-mile west and 0.81-mile southeast, respectively, of the Site. No views are anticipated from either of these locations. The locations of other resources within one mile of the Site are listed in Table 2 and depicted on Figure 3, *Surrounding Features Map*.

Table 2: SURROUNDING FEATURES WITHIN 2 MILES OF THE SITE

Resource Type	Name	Address	Distance from Site
Daycare	Sunny Days Daycare	85 River Road, Canton, CT	0.79 Mile S
	Stepping Stones Educational Center	370 Albany Turnpike, Canton, CT	0.73 Mile SE
	Joni's Child Care & Preschool	352 Albany Turnpike, Canton, CT	0.85 Mile SE
Community Center	None		
Senior Center	None		
Airport	None		
Hospital	None		
School	Canton High School	76 Simonds Avenue, Canton, CT	0.95 Mile SE
Park / Recreational	Nepaug State Forest	New Hartford, CT	0.59 Mile W
	Mills Pond Recreation Area	14 E Hill Road, Canton, CT	0.81 Mile SE
National Register of Historic Places	Canton Center Historic District	Canton, CT	0.85 Mile N
Youth Camp	None		



Legend

- Site
- 1-mile Radius
- Subject Property
- Municipal Boundary
- Open Water (CTDEEP)
- Open Space Property (CTDEEP)

Surrounding Features

- Park / Recreation / Open Space
- Daycare
- School
- Cemetery
- National Wild and Scenic River
- Scenic Highway
- Trail
- National Register Historic District

1,500 750 0 1,500 Feet

Map Notes:
Base Map Source: 2019 CT ECO Imagery
Map Scale: 1:24,000
Map Date: December 2020

Figure 3
Surrounding Features

Proposed Communications Facility
Canton 5R
13 Morgan Road
Canton, Connecticut

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8) Physical Environmental Effects

Construction of the Proposed Facility would not involve a significant alteration in the physical or environmental characteristics of the Site or the surrounding area. The proposed development would be located adjacent to the existing substation and require minimal earthwork. No trees or mature woody vegetation would need to be removed to accommodate construction or extension of the access drive to the Proposed Facility. Supporting equipment would be located within an existing structure.

9) Federal Aviation Administration ("FAA") Registration

The Proposed Facility's coordinates, height, and structure type were reviewed through the FAA's on-line antenna structure registration screening tool (TOWAIR) to determine if it requires FAA registration and lighting or marking. Based on the results of this screening (September 2, 2020), the proposed monopole does not require registration. A copy of the TOWAIR determination can be found in Attachment 8, *TOWAIR Determination Results*.

10) Location of Nearest Residence

Single-family residential development is located along portions of Cherry Brook Road and Morgan Road. Multi-unit residential development exists south of the Site along Albany Turnpike. The nearest residential property to the Proposed Facility location is approximately 405 feet to the northwest at 35 Cherry Brook Road. See Figure 4, *Abutters Map and Nearest Residence*.

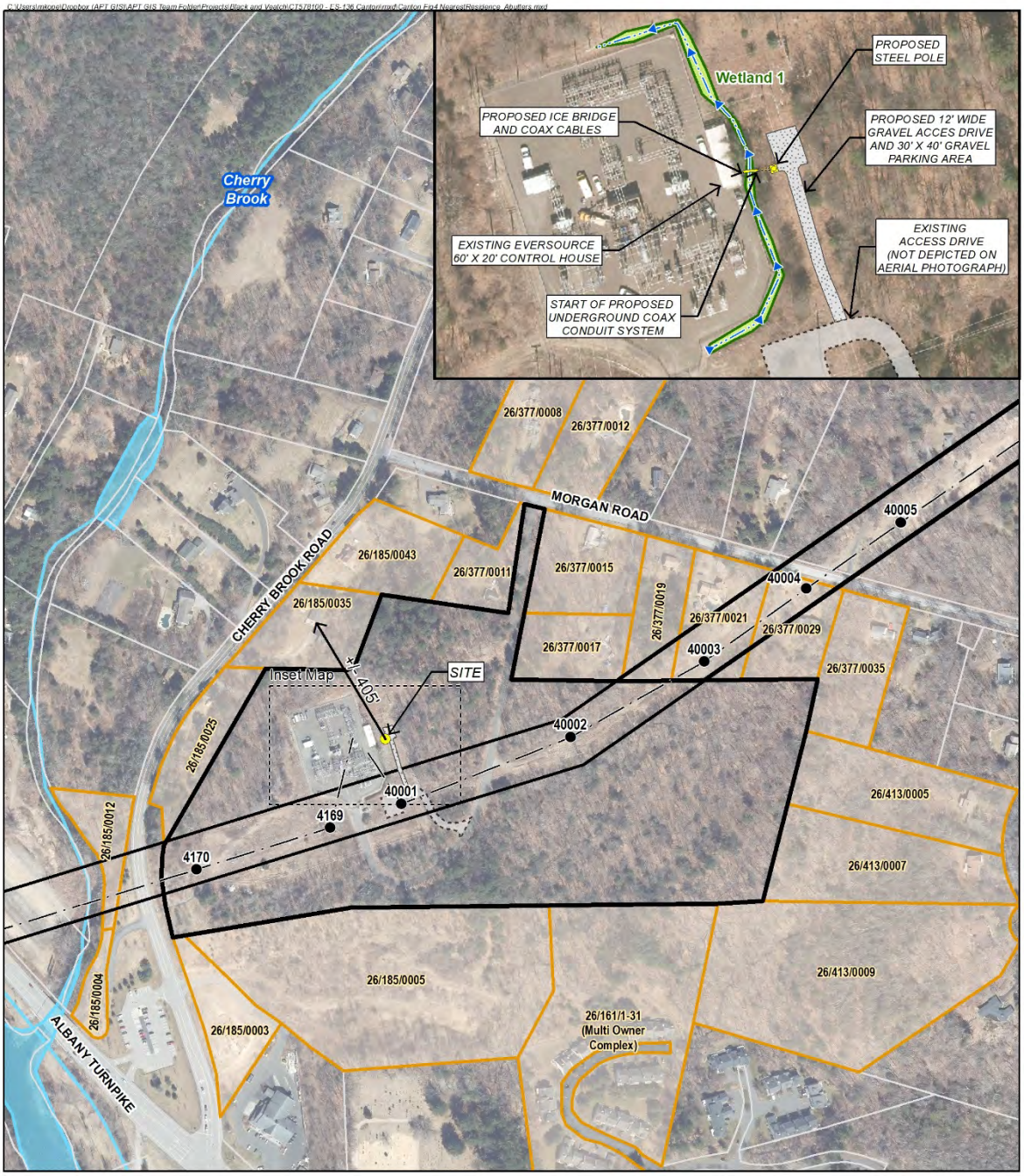
Direct abutters were served notice of this Petition concurrent with its submission to the Council. A list of those abutters is provided in Table 3, *Direct Abutters* and depicted on Figure 4 *Abutters Map and Nearest Residence*.

TABLE 3 – DIRECT ABUTTERS

Parcel ID	Owner Name	Site Address	Town	State
26/185/0003	KWK CANTON LLC	3 CHERRY BROOK ROAD	CANTON	CT
26/185/0004	POTANKA PAUL E	4 CHERRY BROOK ROAD	CANTON	CT
26/185/0005	CANTON RIDGE LLC	5 CHERRY BROOK ROAD	CANTON	CT
26/185/0012	CONN LIGHT & POWER CO INC	12 CHERRY BROOK ROAD	CANTON	CT
26/185/0025	MARIEN JAY W	25 CHERRY BROOK ROAD	CANTON	CT
26/185/0035	STECK SARAH	35 CHERRY BROOK ROAD	CANTON	CT
26/185/0043	JURRAS SUSAN MAE &	43 CHERRY BROOK ROAD	CANTON	CT
26/377/0008	ROTHSCHILD JERYL	8 MORGAN ROAD	CANTON	CT
26/377/0011	WRIGHT EVERLIN E	11 MORGAN ROAD	CANTON	CT
26/377/0012	LATIN THOMAS M	12 MORGAN ROAD	CANTON	CT

TABLE 3 – DIRECT ABUTTERS CONTINUED

26/377/0015	LACROIX MATTHEW	15 MORGAN ROAD	CANTON	CT
26/377/0017	BRISTOL THOMAS S	17 MORGAN ROAD	CANTON	CT
26/377/0019	DAVIS HOWARD F	19 MORGAN ROAD	CANTON	CT
26/377/0021	MONTANO DEBORAH L	21 MORGAN ROAD	CANTON	CT
26/377/0029	HARPER JAMES R TRUSTEE	29 MORGAN ROAD	CANTON	CT
26/377/0035	TEBECIO PATRICK M	35 MORGAN ROAD	CANTON	CT
26/413/0005	TUBACH P DOUGLAS	5 OVERLOOK DRIVE	CANTON	CT
26/413/0007	SLEATH DUANE	7 OVERLOOK DRIVE	CANTON	CT
26/413/0009	RUDDER LYNN H	9 OVERLOOK DRIVE	CANTON	CT
26/161/0001	VENEGAS OSCAR H	1 CAMILLE LANE	CANTON	CT
26/161/0002	FRANKL LINDA C	2 CAMILLE LANE	CANTON	CT
26/161/0003	GAFFNEY MICHELLE B	3 CAMILLE LANE	CANTON	CT
26/161/0004	NEWPECK JANE C	4 CAMILLE LANE	CANTON	CT
26/161/0005	JUHASZ NATALIA	5 CAMILLE LANE	CANTON	CT
26/161/0006	SREEBHASHYAM SAI KIRAN	6 CAMILLE LANE	CANTON	CT
26/161/0007	ROSS PHYLLIS D	7 CAMILLE LANE	CANTON	CT
26/161/0008	LAFLEUR RICHARD L JR	8 CAMILLE LANE	CANTON	CT
26/161/0009	HAYES JAMES O	9 CAMILLE LANE	CANTON	CT
26/161/0010	KANG YANG S	10 CAMILLE LANE	CANTON	CT
26/161/0011	GIBBONS WILLIAM P	11 CAMILLE LANE	CANTON	CT
26/161/0012	YANOK CYNTHIA ANN	12 CAMILLE LANE	CANTON	CT
26/161/0013	EVANICK GEORGE JR	13 CAMILLE LANE	CANTON	CT
26/161/0014	FLEMING MORGAN H.R.	14 CAMILLE LANE	CANTON	CT
26/161/0015	PEET CATHY B	15 CAMILLE LANE	CANTON	CT
26/161/0016	LAFLEUR CHERYL	16 CAMILLE LANE	CANTON	CT
26/161/0017	MARRS TARA B	17 CAMILLE LANE	CANTON	CT
26/161/0018	MALONEY MICHAEL	18 CAMILLE LANE	CANTON	CT
26/161/0019	BIERWAGEN MARTIN	19 CAMILLE LANE	CANTON	CT
26/161/0020	DELKESCAMP KENNETH H	20 CAMILLE LANE	CANTON	CT
26/161/0021	BERRY STEVEN T	21 CAMILLE LANE	CANTON	CT
26/161/0022	ECKERT CHRISTOPHER D	22 CAMILLE LANE	CANTON	CT
26/161/0023	MCCARTHY EVELYN J	23 CAMILLE LANE	CANTON	CT
26/161/0024	BOWEN DANIELLE L	24 CAMILLE LANE	CANTON	CT
26/161/0025	BERKON ILENE	25 CAMILLE LANE	CANTON	CT
26/161/0026	BOSMAN LISE	26 CAMILLE LANE	CANTON	CT
26/161/0027	CHEN WEN	27 CAMILLE LANE	CANTON	CT
26/161/0028	JULIANO ERIC	28 CAMILLE LANE	CANTON	CT
26/161/0029	MELILLO ALLISON LAURA	29 CAMILLE LANE	CANTON	CT
26/161/0030	MCGUNNIGLE ALFRED TRUSTEE	30 CAMILLE LANE	CANTON	CT
26/161/0031	POEHNER SUE ANN	31 CAMILLE LANE	CANTON	CT



Legend

- Site
- Proposed Equipment (Inset Map)
- Proposed Gravel Access Drive
- Proposed Conduit (Inset Map)
- Existing Eversource Structure
- Overhead Eversource Line
- Existing Eversource Right-of-Way (ROW)
- Abutting Property
- Watercourse (not delineated; CTDEEP)
- Intermittent Watercourse (Inset Map)
- Delineated Wetland Boundary Outline (Inset Map)
- Field Delineated Wetland (Inset Map)
- Open Water (not delineated; CTDEEP)
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- Subject Property
- Parcel Boundary

Map Notes:
Base Map Source: 2019 Aerial Photograph (CTECO)
Map Scale: 1 inch = 400 feet
Map Date: December 2020

400 200 0 400 Feet

Figure 4
Abutters Map & Nearest Residence

Proposed Communications Facility
Canton 5R
13 Morgan Road
Canton, Connecticut

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E. Schedule

Construction of the Proposed Facility would begin as soon as practical after issuance of the requested declaratory ruling by the Council and would be approximately three weeks in duration. Eversource anticipates that construction would be completed in the second quarter of 2021.

F. Conclusion

Connecticut General Statutes Section 16-50k(a) provides that a Certificate of Environmental Compatibility and Public Need is needed for installation of a facility that the Council determines would have a "substantial adverse environmental effect." Based on this evaluation of the environmental effect of the Proposed Facility, Eversource respectfully submits that its installation, operation and maintenance would not result in a substantial adverse effect on the environment or ecology, nor would it damage existing scenic, historical or recreation values.

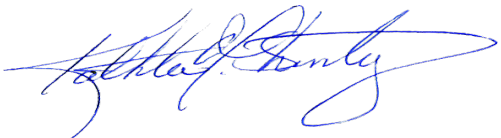
Accordingly, Eversource requests that the Council issue a declaratory ruling that no Certificate is required because the Proposed Facility would not have a substantial adverse environmental effect.

G. 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 – Site Plans

EVERSOURCE ENERGY

CANTON 5R
13 MORGAN RD
CANTON, CT 06019

PROJECT SUMMARY

THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:

1. INSTALL (1) NEW 45'–0"± AGL STEEL POLE
2. INSTALL (1) NEW RACK WITH DMR EQUIPMENT IN EXISTING CONTROL HOUSE
3. INSTALL (1) NEW OMNI/WHIP ANTENNA AT ELEVATION 67'–0"± AGL
4. INSTALL ICE BRIDGE AT ELEVATION 0'–0"± AGL
5. INSTALL NEW SILT FENCING AT ELEVATION 0'–0"± AGL
6. INSTALL NEW ACCESS DRIVE
7. INSTALL RELOCATED 336 AH BATTERIES FROM HARTFORD AWC

GOVERNING CODES

2018 CONNECTICUT STATE BUILDING CODE (2015 IBC BASIS)
2017 NATIONAL ELECTRIC CODE
TIA–222–H

GENERAL NOTES

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

SITE INFORMATION

SITE NAME:	CANTON 5R
SITE ID NUMBER:	#3770013
SITE ADDRESS:	13 MORGAN RD CANTON, CT 06019
MAP:	26
BLOCK:	377
LOT:	0013
ZONE:	MCPF
LATITUDE:	41° 50' 18.92" N
LONGITUDE:	72° 55' 33.91" W
ELEVATION:	444'± AMSL
FEMA/FIRM DESIGNATION:	X
ACREAGE:	31.15± AC (BOOK: 118, PAGE: 636)

CONTACT INFORMATION

APPLICANTS:
EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037

PROPERTY OWNER:
EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037

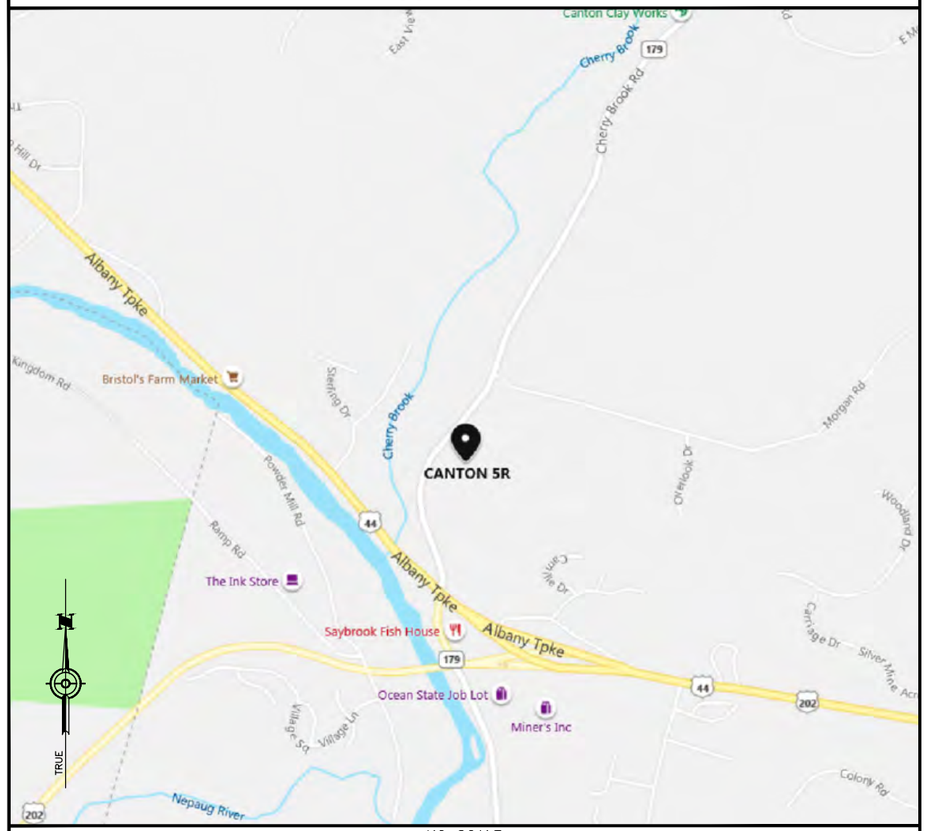
EVERSOURCE ENERGY
PROJECT MANAGER:
NIKOLL PRECI
(860) 655–3079

POWER PROVIDER:
EVERSOURCE ENERGY
(800) 286–2000

TELCO PROVIDER:
FRONTIER
(800) 921–8102

CALL BEFORE YOU DIG:
(800) 922–4455

LOCATION MAP



NO SCALE

DESIGN TYPE

SITE UPGRADE
NEW STEEL POLE

DRAWING INDEX

SHEET NO:	SHEET TITLE
T–1	TITLE SHEET
C–1	ABUTTERS MAP
C–2	PARTIAL SITE PLAN
C–2.1	SITE ACCESS PLAN
C–3	SITE PLAN
C–4	TOWER ELEVATION & ANTENNA EQUIPMENT
C–5	ICE BRIDGE DETAILS
C–6	EARTHWORK DETAILS
G–1	GROUNDING PLAN
G–2	GROUNDING DETAILS
G–3	GROUNDING DETAILS
G–4	GROUNDING DETAILS
N–1	NOTES & SPECIFICATIONS
N–2	NOTES & SPECIFICATIONS
N–3	NOTES & SPECIFICATIONS

DO NOT SCALE DRAWINGS

SUBCONTRACTOR SHALL VERIFY ALL PLANS & EXISTING DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME

UNDERGROUND SERVICE ALERT

UTILITIES PROTECTION CENTER, INC.
811

48 HOURS BEFORE YOU DIG

EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286–2000

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458–3595

PROJECT NO:	403093
DRAWN BY:	TYW
CHECKED BY:	CAG

REV	DATE	DESCRIPTION
0	11/23/20	ISSUED FOR FILING

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
11/23/2020

CANTON 5R
13 MORGAN RD
CANTON, CT 06019

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458-3595

PROJECT NO:	403093
DRAWN BY:	TYW
CHECKED BY:	CAG

REV	DATE	DESCRIPTION
0	11/23/20	ISSUED FOR FILING

STATE OF CONNECTICUT
JOSHUA T. RILEY
LICENSED PROFESSIONAL ENGINEER
33981
11/23/2020

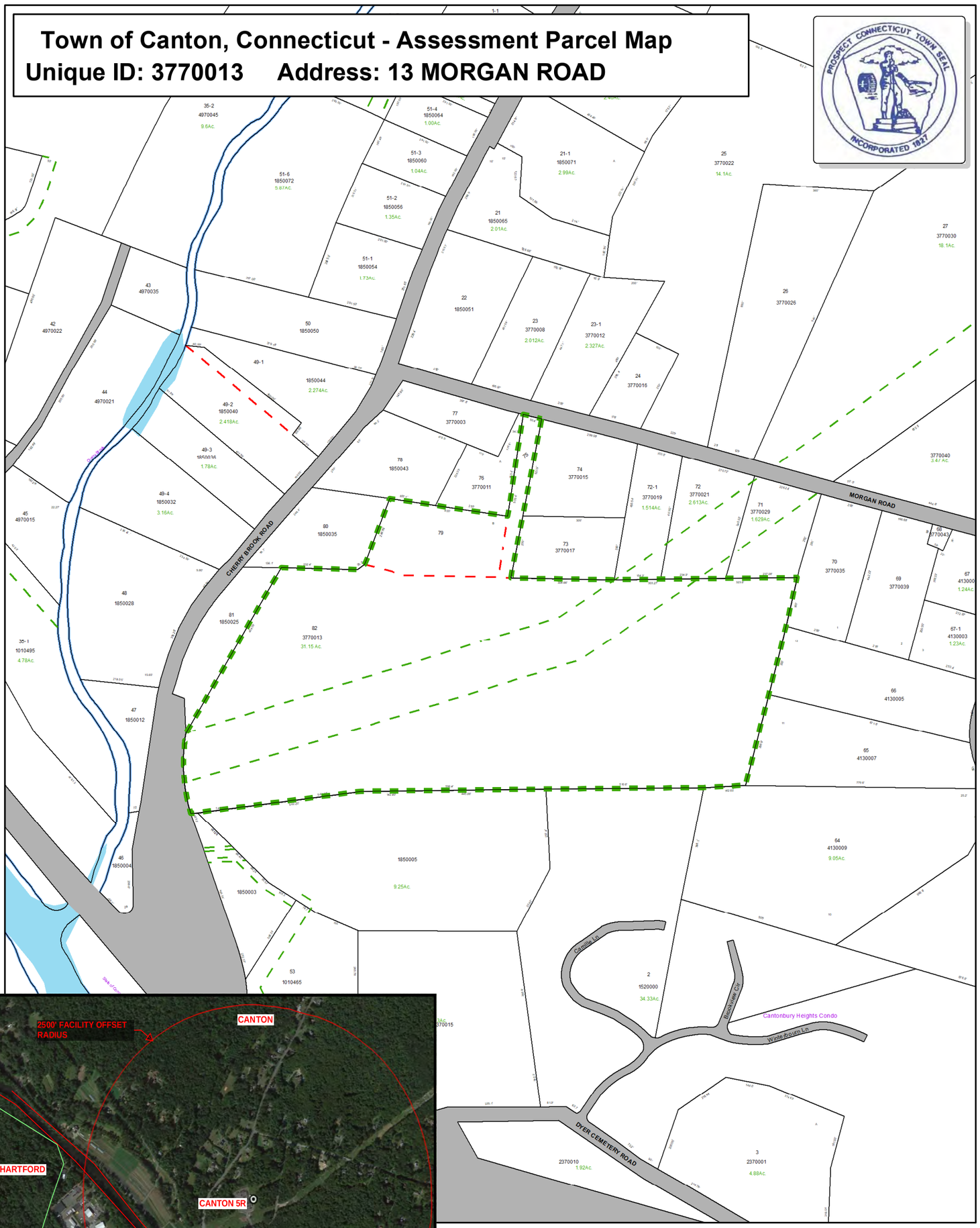
CANTON 5R
13 MORGAN RD
CANTON, CT 06019

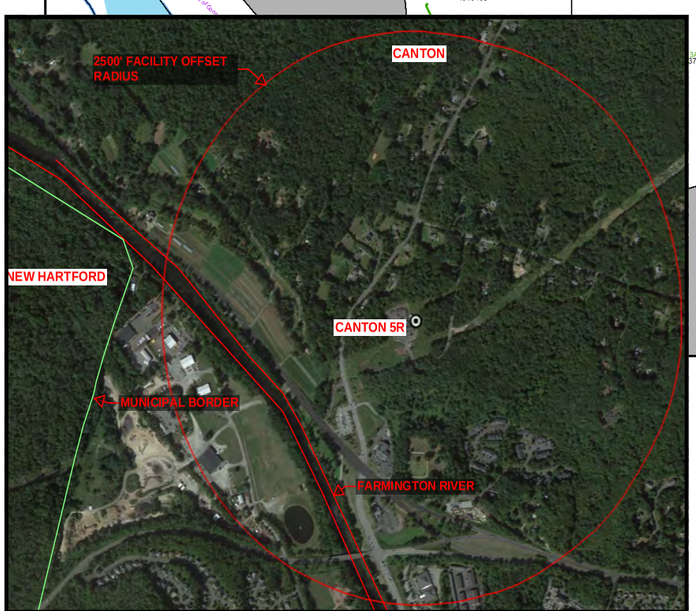
SHEET TITLE
ABUTTERS MAP

SHEET NUMBER
C-1

Town of Canton, Connecticut - Assessment Parcel Map

Unique ID: 3770013 Address: 13 MORGAN ROAD





MUNICIPALITY NOTIFICATION LIMIT MAP

N
W E
S

Approximate Scale:

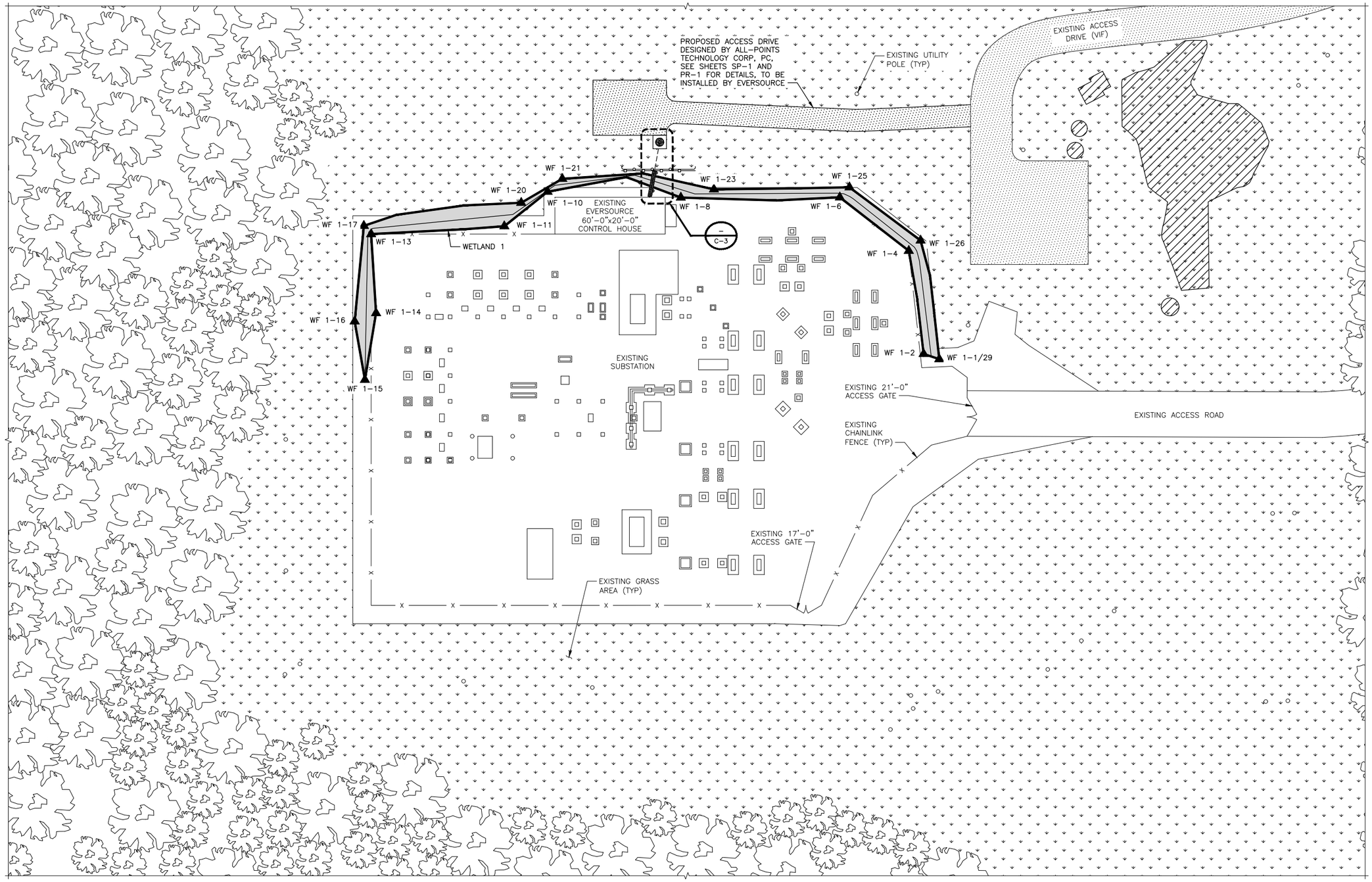
1 inch = 400 feet

Sublot
Easement
4850007 Parcel ID
89' Dimension

Disclaimer:
This map is for informational purposes only.
All information is subject to verification by any user.
The Town of Canton and its mapping contractors assume no legal responsibility for the information contained herein.

Map Produced June 2019

ABUTTERS MAP



PARTIAL SITE PLAN
NO SCALE

LEGEND
- RARE SPECIES HOST PLANT HABITAT
- WETLAND 1

EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
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33208
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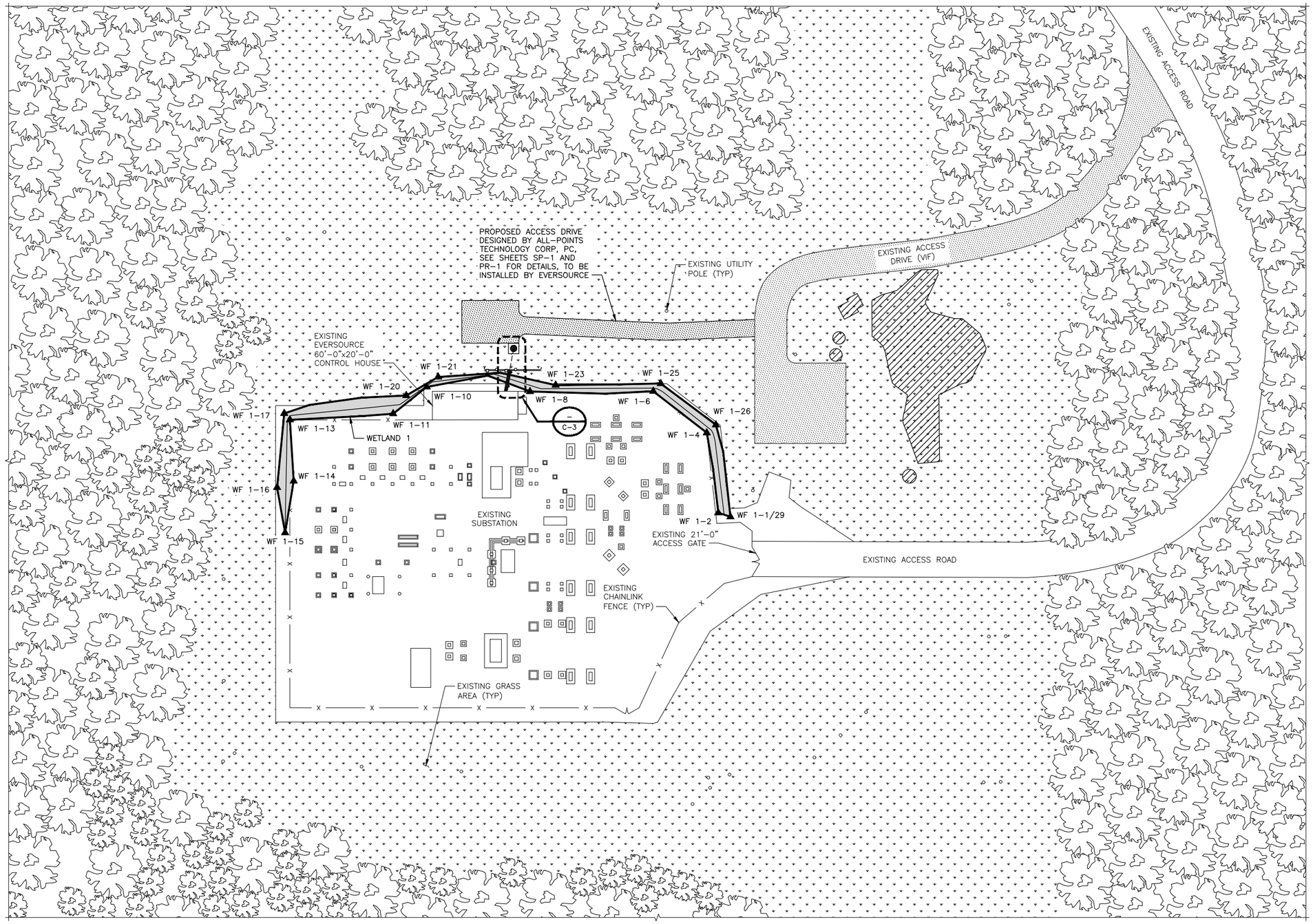
11/23/2020

CANTON 5R
13 MORGAN RD
CANTON, CT 06019

SHEET TITLE
PARTIAL SITE PLAN

SHEET NUMBER
C-2



SITE ACCESS PLAN
NO SCALE

LEGEND
- RARE SPECIES HOST PLANT HABITAT
- WETLAND 1

EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
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13 MORGAN RD
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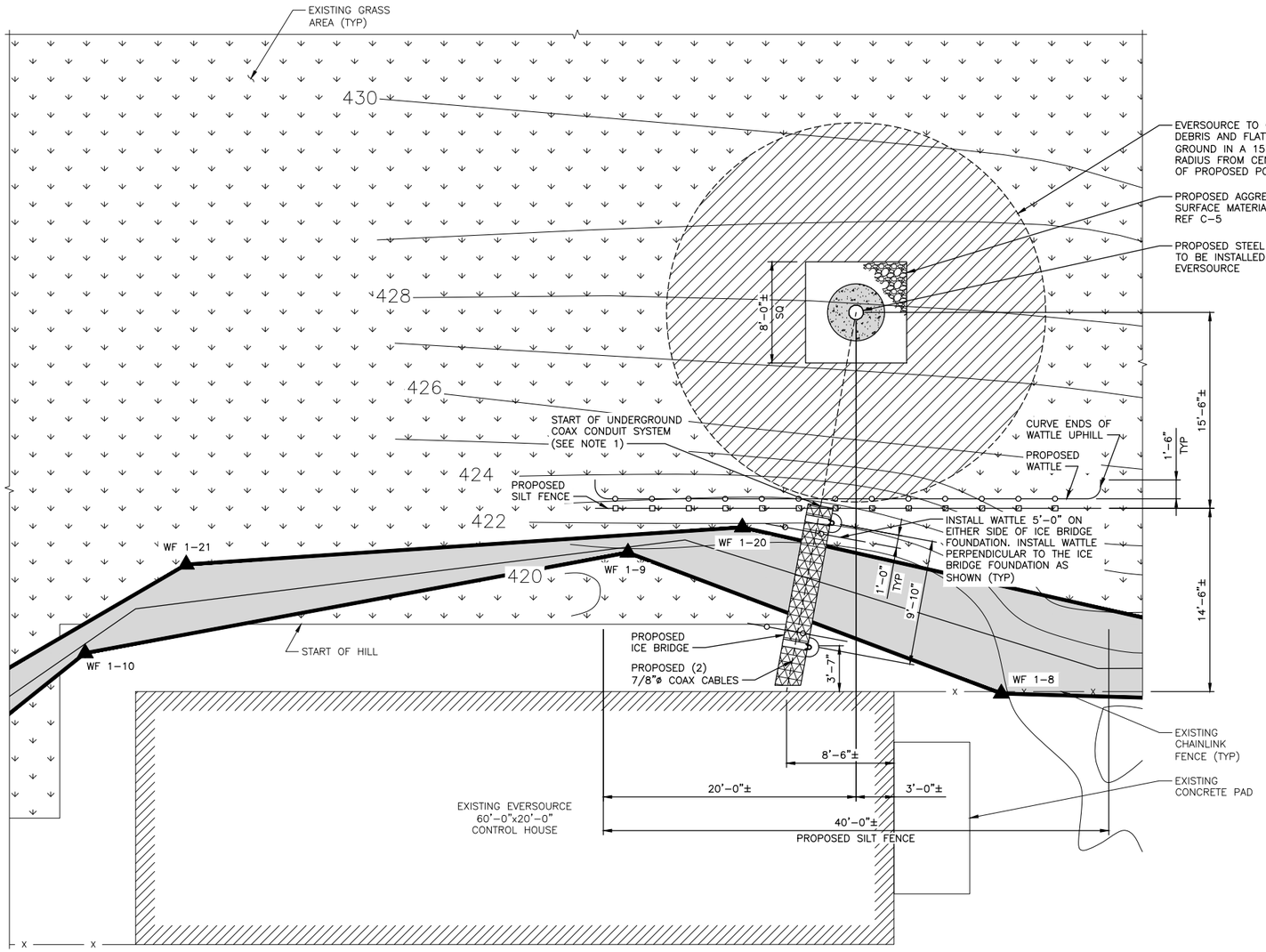
SHEET TITLE
SITE ACCESS PLAN

SHEET NUMBER
C-2.1

NOTES

1. UNDERGROUND CONDUIT SYSTEM TO BE DESIGNED AND INSTALLED BY EVERSOURCE. BLACK & VEATCH RECOMMENDS (4) 6" CONDUITS TO ALLOW FOR FUTURE EXPANSION. CONDUIT STUB-UP BEND RADIUS SHALL BE A MINIMUM OF 12".
2. SILT FENCE TO BE INSTALLED BY EVERSOUCE.
3. CONTOUR LINES WERE PROVIDED BY EVERSOURCE ENERGY. BLACK & VEATCH DOES NOT ASSUME RESPONSIBILITY FOR ITS ACCURACY.
4. PROPOSED ACCESS DRIVE NOT SHOWN FOR CLARITY.



SITE PLAN
NO SCALE

N

EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
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BLACK & VEATCH
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11/23/2020

CANTON 5R
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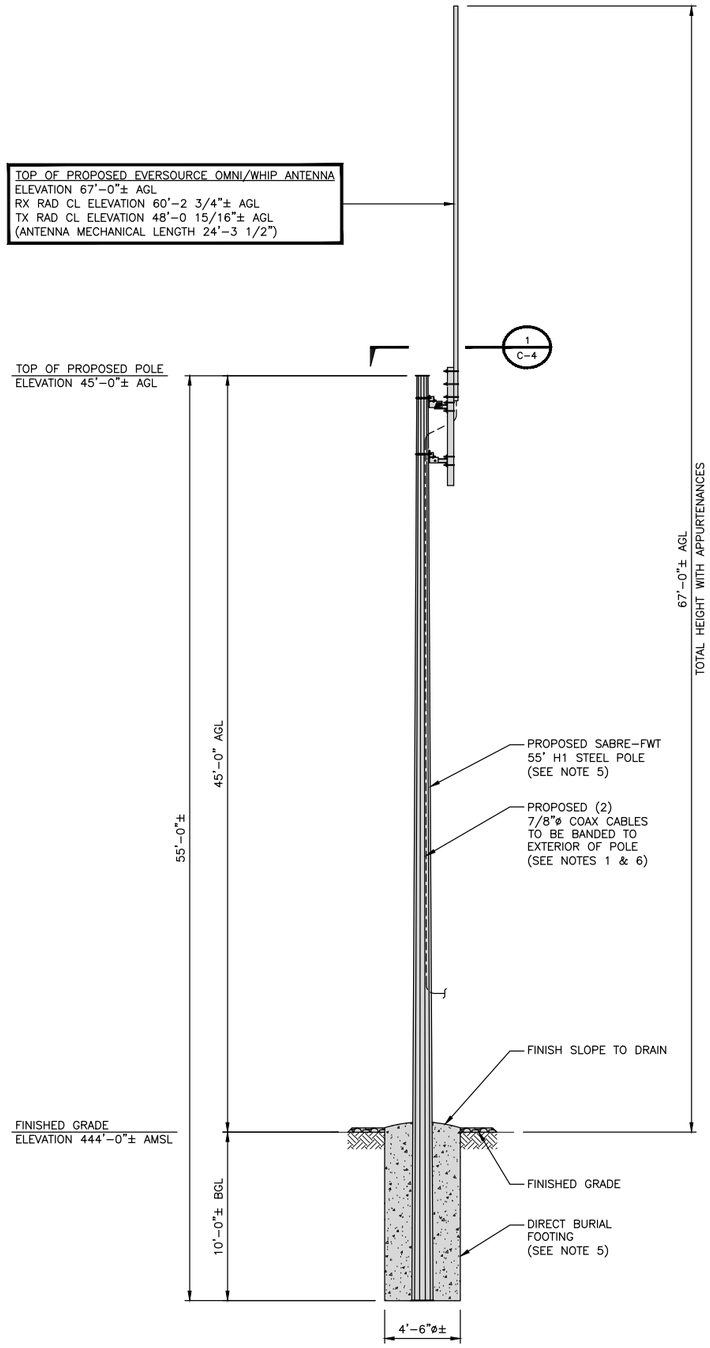
CANTON, CT 06019

SHEET TITLE
SITE PLAN

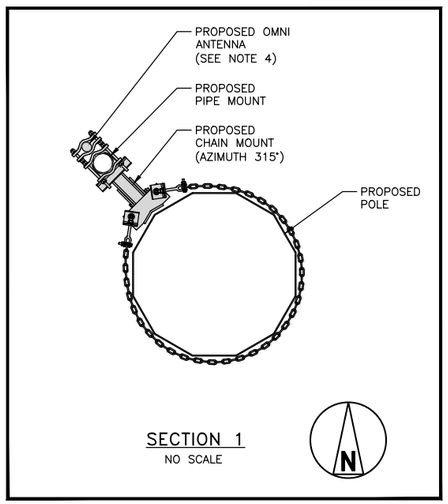
SHEET NUMBER
C-3



TOWER ELEVATION
NO SCALE

NOTES

1. ALL COAXIAL CABLE TO BE SECURED TO THE SUPPORT STRUCTURE AT DISTANCES NOT TO EXCEED 4'-0" OC.
2. CONTRACTOR MUST FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING THE INSTALLATION OF COAXIAL CABLES, CONNECTORS AND ANTENNAS.
3. DESIGN OF THE FOUNDATION WAS BASED ON SUB012 EVERSOURCE SUBSTATION STANDARDS, SECTION 6.D., FOUNDATION STABILITY AND SOIL BEARING CAPACITY. NO SUBGRADE SOIL CONDITIONS WERE AVAILABLE OR ARE KNOWN.
4. PROPOSED OMNI/WHIP ANTENNA SHALL BE INSTALLED USING PROPOSED CLAMP SET SITE PRO 1 P/N: DCP12K. SPACE CLAMPS PER ANTENNA MANUFACTURER'S RECOMMENDATIONS, (3) ATTACHMENTS POINTS (CLAMPS) REQUIRED (TOTAL OF 2 CLAMP SETS).
5. INSTALL POLE PER MANUFACTURER'S RECOMMENDATIONS EXCEPT FOR POLE EMBEDMENT. REFER TO SABRE-FWT ERECTION DRAWINGS – 55' H1-LD2 WPE'S.
6. PROPOSED COAX CABLES TO BE STACKED IN ONE ROW.
7. THE ENGINEER OF RECORD SHALL BE NOTIFIED IMMEDIATELY IF BEDROCK IS ENCOUNTERED, A HIGH GROUND WATER TABLE IS ENCOUNTERED OR THE BOREHOLE (SOIL) IS COLLAPSING INTO ITSELF.



SECTION 1
NO SCALE

EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
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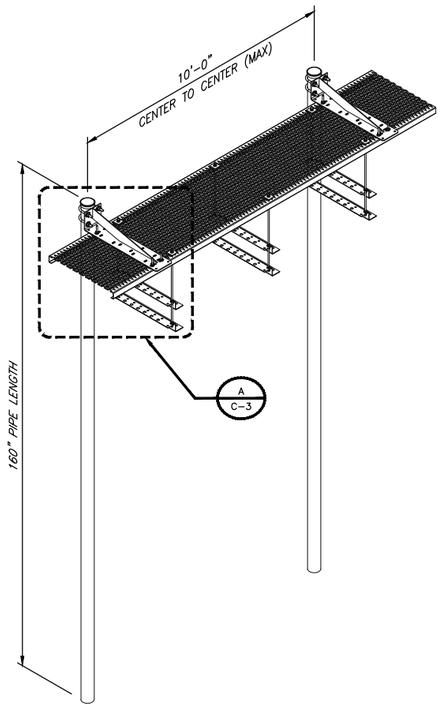
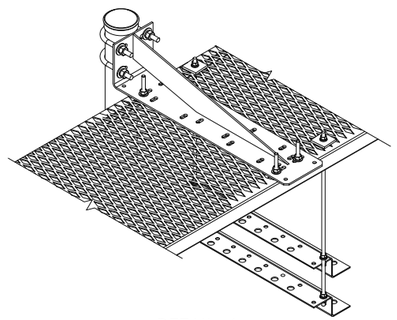
CANTON, CT 06019

SHEET TITLE
TOWER ELEVATION & ANTENNA EQUIPMENT

SHEET NUMBER
C-4



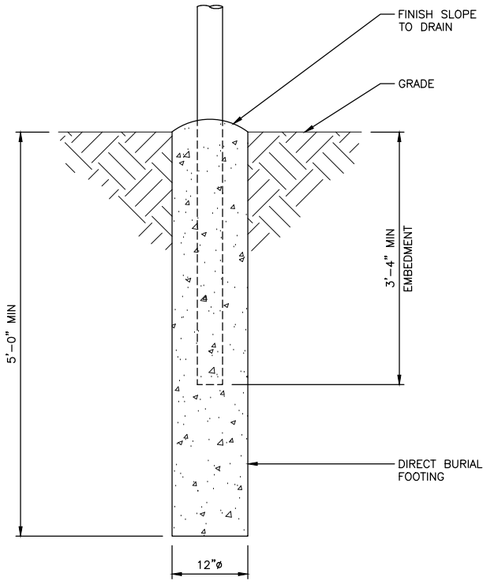
ICE BRIDGE DETAIL
SITE PRO 1 P/N IB24D-V
NO SCALE



DETAIL A
NO SCALE

NOTES

1. THE CLEARANCE BETWEEN THE BOTTOM OF THE FOUNDATION TO THE BOTTOM OF EMBEDDED PIPE SHALL BE A MINIMUM OF 4".



ICE BRIDGE
FOUNDATION DETAIL
NO SCALE

EVERSOURCE ENERGY
107 SELDEN STREET
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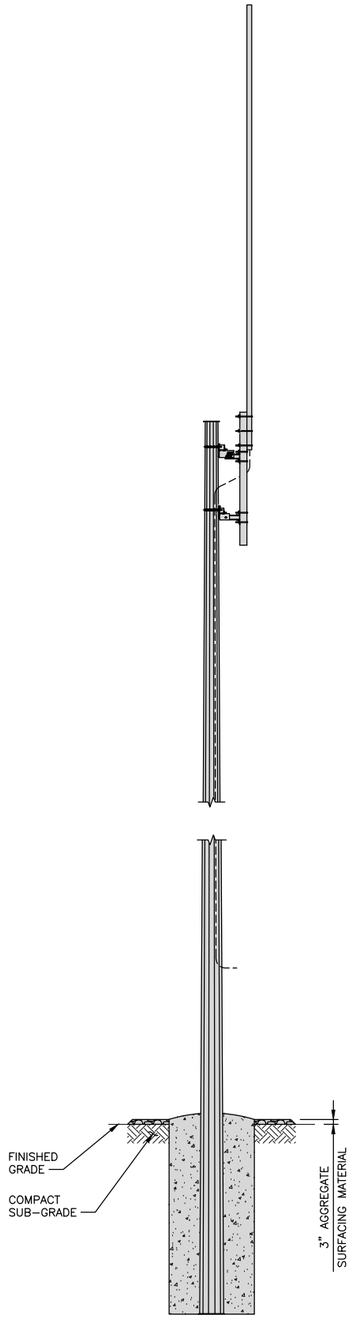
SHEET TITLE
ICE BRIDGE DETAILS

SHEET NUMBER
C-5



COMPOUND GRADING
NO SCALE

ENVIRONMENTAL NOTES

WETLAND PROTECTION PLAN

AS A RESULT OF THE PROPOSED DEVELOPMENT'S LOCATION IN THE VICINITY OF WETLANDS, THE FOLLOWING BEST MANAGEMENT PRACTICES ("BMPS") ARE RECOMMENDED TO AVOID UNINTENTIONAL IMPACT TO WETLAND HABITATS DURING CONSTRUCTION ACTIVITIES. THIS PLAN INCLUDES ELEMENTS THAT WILL PROTECT WETLANDS REGARDLESS OF THE TIME OF YEAR. COMPLETE DETAILS OF THE RECOMMENDED BMPS ARE PROVIDED BELOW, WHICH WILL BE INCORPORATED INTO THE CONSTRUCTION DRAWINGS TO ENSURE THE CONTRACTOR IS FULLY AWARE OF THE PROJECT'S ENVIRONMENTALLY SENSITIVE SETTING.

A WETLAND SCIENTIST FROM ALL–POINTS TECHNOLOGY CORP. ("APT") EXPERIENCED IN COMPLIANCE MONITORING OF CONSTRUCTION ACTIVITIES WILL SERVE AS THE ENVIRONMENTAL MONITOR FOR THIS PROJECT TO ENSURE THAT THE FOLLOWING BMPS ARE IMPLEMENTED PROPERLY. THE PROPOSED WETLAND PROTECTION PROGRAM CONSISTS OF SEVERAL COMPONENTS INCLUDING: PROPER MAINTENANCE OF EROSION AND SEDIMENTATION CONTROLS; PERIODIC INSPECTION OF EROSION CONTROLS; EDUCATION OF ALL CONTRACTORS AND SUB–CONTRACTORS PRIOR TO INITIATION OF WORK ON THE SITE; AWARENESS SIGNAGE; PROTECTIVE MEASURES; AND, REPORTING.

1. EROSION AND SEDIMENTATION CONTROLS
   PLASTIC NETTING WITH LARGE MESH OPENINGS (> 1/4") 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. NO PERMANENT EROSION CONTROL PRODUCTS OR REINFORCED SILT FENCE WILL BE USED ON THE PROJECT. TEMPORARY EROSION CONTROL PRODUCTS THAT WILL BE EXPOSED AT THE GROUND SURFACE REPRESENT A POTENTIAL FOR WILDLIFE ENTANGLEMENT WILL USE EITHER EROSION CONTROL BLANKETS AND FIBER ROLLS COMPOSED OF PROCESSED FIBERS MECHANICALLY BOUND TOGETHER TO FORM A CONTINUOUS MATRIX (NETLESS) OR NETTING WITH A MESH SIZE < 1/4" SUCH AS THAT TYPICALLY USED IN COMPOST FILTER SOCKS TO AVOID/MINIMIZE WILDLIFE ENTANGLEMENT.

   a. INSTALLATION OF EROSION AND SEDIMENTATION CONTROLS, REQUIRED FOR EROSION CONTROL COMPLIANCE, SHALL BE PERFORMED BY THE CONTRACTOR FOLLOWING CLEARING ACTIVITIES AND PRIOR TO ANY EARTHWORK. THE ENVIRONMENTAL MONITOR WILL INSPECT THE WORK ZONE AREA PRIOR TO AND FOLLOWING EROSION CONTROL BARRIER INSTALLATION TO ENSURE THESE CONTROLS ARE SATISFACTORILY INSTALLED.

   b. IF A STAGING AREA FOR EQUIPMENT, VEHICLES OR CONSTRUCTION MATERIALS IS REQUIRED FOR THIS PROJECT, SUCH AREA(S) SHALL BE LOCATED OUTSIDE OF ANY WETLAND RESOURCE BUFFER ZONE.

   c. ALL EROSION CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS OF COMPLETION OF WORK AND PERMANENT STABILIZATION OF SITE SOILS SO THAT HERPETOFAUNA MOVEMENTS BETWEEN UPLANDS AND WETLANDS ARE NOT RESTRICTED.

2. CONTRACTOR EDUCATION:

   a. PRIOR TO WORK ON SITE AND INITIAL DEPLOYMENT/MOBILIZATION OF EQUIPMENT AND MATERIALS, THE CONTRACTOR SHALL ATTEND AN EDUCATIONAL SESSION AT THE PRE–CONSTRUCTION MEETING WITH THE ENVIRONMENTAL MONITOR. THIS ORIENTATION AND EDUCATIONAL SESSION WILL CONSIST OF INFORMATION SUCH AS, BUT NOT LIMITED TO: THE LOCATION AND EXTENTS OF SENSITIVE WETLAND RESOURCES, PROPER PROTECTION MEASURES AND THE IMPORTANCE OF MAINTAINING THESE CONTROLS, AND HOW TO AVOID UNINTENTIONAL IMPACTS TO THESE RESOURCES. THE CONTRACTOR WILL DESIGNATE ONE OF ITS WORKERS AS THE "PROJECT MONITOR", WHO WILL BE RESPONSIBLE FOR DAILY MONITORING OF THESE PROTECTIVE MEASURES.

   b. THE ENVIRONMENTAL MONITOR WILL ALSO POST CAUTION SIGNS THROUGHOUT THE PROJECT SITE AND MAINTAIN THEM FOR THE DURATION OF CONSTRUCTION TO PROVIDE NOTICE OF THE ENVIRONMENTALLY SENSITIVE NATURE OF THE WORK AREA.

   c. THE CONTRACTOR WILL BE PROVIDED WITH THE ENVIRONMENTAL MONITOR'S CELL PHONE AND EMAIL CONTACT INFORMATION TO IMMEDIATELY REPORT ANY ENCOUNTERS WITH HERPETOFAUNA.

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 DUE TO THE PROJECT'S LOCATION IN PROXIMITY TO SENSITIVE WETLAND RESOURCES.

   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 AND REFUELING RESTRICTIONS AND SPILL RESPONSE PROCEDURES WILL BE ADHERED TO BY THE CONTRACTOR.

      i. PETROLEUM AND HAZARDOUS MATERIALS STORAGE AND REFUELING

         1. REFUELING OF VEHICLES OR MACHINERY SHALL TAKE PLACE ON AN IMPERVIOUS PAD WITH SECONDARY CONTAINMENT DESIGNED TO CONTAIN FUELS.

         2. ANY REFUELING DRUMS/TANKS 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.

      ii. INITIAL SPILL RESPONSE PROCEDURES

         1. STOP OPERATIONS AND SHUT OFF EQUIPMENT.

         2. REMOVE ANY SOURCES OF SPARK OR FLAME.

         3. CONTAIN THE SOURCE OF THE SPILL.

         4. DETERMINE THE APPROXIMATE VOLUME OF THE SPILL.

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

         6. ENSURE THAT FELLOW WORKERS ARE NOTIFIED OF THE SPILL.

      iii. SPILL CLEAN UP & CONTAINMENT

         1. OBTAIN SPILL RESPONSE MATERIALS FROM THE ON–SITE SPILL RESPONSE KIT. PLACE ABSORBENT MATERIALS DIRECTLY ON THE RELEASE AREA.

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

         3. ISOLATE AND ELIMINATE THE SPILL SOURCE.

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

         5. CONTACT A DISPOSAL COMPANY TO PROPERLY DISPOSE OF CONTAMINATED MATERIALS.

      iv. REPORTING

         1. COMPLETE AN INCIDENT REPORT.

         2. SUBMIT A COMPLETED INCIDENT REPORT TO LOCAL, STATE AND FEDERAL AGENCIES, AS REQUIRED.

4. REPORTING

   a. INSPECTION REPORTS (BRIEF NARRATIVE AND APPLICABLE PHOTOS) WILL BE PREPARED BY THE ENVIRONMENTAL MONITOR DOCUMENTING EACH INSPECTION AND SUBMITTED TO THE PERMITTEE FOR COMPLIANCE VERIFICATION. ANY NON–COMPLIANCE OBSERVATIONS OF EROSION CONTROL MEASURES OR EVIDENCE OF EROSION OR SEDIMENT RELEASE WILL BE IMMEDIATELY REPORTED TO THE PERMITTEE AND ITS CONTRACTOR AND INCLUDED IN THE REPORTS.

   b. ANY INCIDENTS OF RELEASE OF SEDIMENT OR OTHER MATERIALS INTO WETLAND RESOURCE AREAS SHALL BE REPORTED BY THE PERMITTEE WITHIN 24 HOURS TO THE TOWN OF CANTON WETLAND ENFORCEMENT OFFICER AND THE CONNECTICUT SITING COUNCIL.

   c. FOLLOWING COMPLETION OF THE PROJECT, A SUMMARY REPORT WILL BE PREPARED BY THE ENVIRONMENTAL MONITOR DOCUMENTING COMPLIANCE WITH THE WETLAND PROTECTION PLAN AND SUBMITTED TO THE PERMITTEE, WHO SHALL SUBMIT A COPY TO THE CONNECTICUT SITING COUNCIL.

NOTES

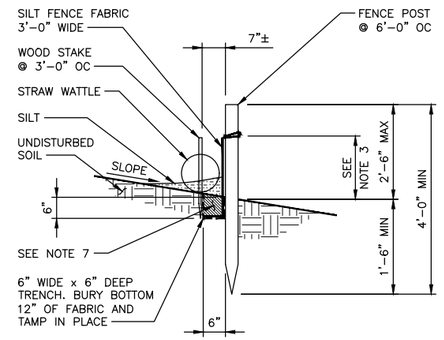
1. EVERSOURCE TO SEED DISTURBED SOIL AROUND PROPOSED GRAVEL FINISH GRADE.
2. EVERSOURCE TO REPLACE TOP SOIL WITH COMPACTED SUBGRADE AND FINISH TO MATCH EXISTING GRADE.
3. EVERSOURCE TO SLOPE GRADE AWAY FROM SUBSTATION.
4. AGGREGATE SURFACING MATERIAL TO BE FOUR (4) LAYERS OF 3/4 INCH, ANGULAR BASALT TRAP ROCK.

SILT FENCE NOTES

1. INSTALL SILT FENCE WHERE SHOWN PRIOR TO ANY ON SITE GRADING OR DISTURBANCE OF EXISTING SURFACE MATERIAL.
2. CONSTRUCT THE SILT FENCE OF FABRIC WITH A MINIMUM TENSILE STRENGTH OF 50LB/LINEAR IN.
3. SILT FENCE HEIGHT SHALL BE A MINIMUM OF 15 INCHES ABOVE GROUND HEIGHT, BUT SHALL NOT EXCEED 18".
4. CONSTRUCT SILT FENCE OF A CONTINUOUS ROLL CUT THE LENGTH OF THE BARRIER TO AVOID JOINTS. FABRIC TO BE FASTENED SECURELY TO FENCE POSTS WITH 1 INCH STAPLES OR TIE WIRES.
5. SUPPORT FABRIC WITH WOVEN WIRE MESH 14.5 GAUGE, 6" MAX. MESH OPENING. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH 1 INCH STAPLES OR TIE WIRES.
6. POSTS FOR SILT FENCE SHALL BE 4 INCH DIAMETER PINE, 2 INCH DIAMETER OAK OR 1.33 LB/LINEAR FOOT STEEL.
7. BACKFILL THE TRENCH WITH COMPACTED SOIL OR GRAVEL PLACED OVER THE SILT FENCE FABRIC.
8. DO NOT ATTACH SILT FENCE FABRIC TO EXISTING FENCES, TREES, ETC.
9. IF THE SILT FENCE FABRIC SHOULD DECOMPOSE OR BECOME INEFFECTIVE DURING THE EXPECTED LIFE OF THE FENCE, THE FABRIC SHALL BE REPLACED IMMEDIATELY.
10. SEDIMENT DEPOSITS THAT ARE REMOVED OR LEFT IN PLACE AFTER SILT FENCE HAS BEEN REMOVED SHALL BE GRADED TO CONFORM WITH THE EXISTING TOPOGRAPHY AND VEGETATION.
11. UPON ESTABLISHMENT OF VEGETATION OF ALL DISTURBED AREAS AND UPON COMPLETION OF CONSTRUCTION, SILT FENCE SHALL BE REMOVED FROM SITE.

WATTLE NOTES

1. STRAW WATTLE TO BE 12" IN DIAMETER.
2. WOOD STAKES TO BE 1"x2", 2'–0" LONG.
3. WOOD STAKES SHALL PROTRUDE 3" ABOVE WATTLE.
4. WOOD STAKES SHALL BE DRIVEN THROUGH CENTER OF STRAW WATTLE.
5. STRAW WATTLE TO BE INSTALLED ALONG WITH SILT FENCE WHERE SHOWN.
6. STRAW WATTLE AND STAKES TO BE REMOVED CONCURRENTLY WITH SILT FENCE UNO.



SILT FENCE DETAIL
NO SCALE

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STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
11/23/2020

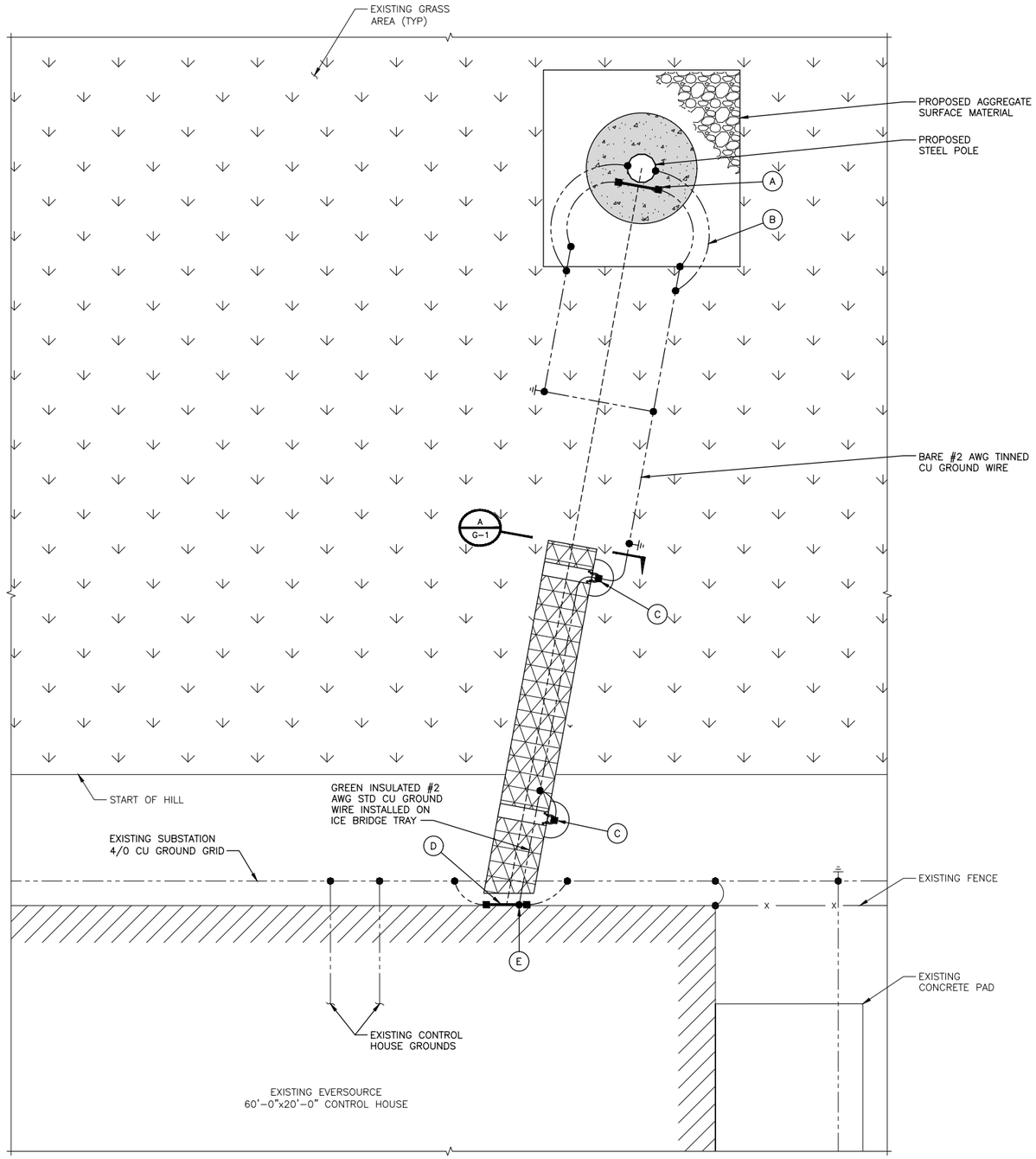
CANTON 5R
13 MORGAN RD
CANTON, CT 06019

SHEET TITLE
EARTHWORK DETAILS

SHEET NUMBER
C-6

LEGEND

- EXOTHERMIC (UNLESS NOTED OTHERWISE).
- 5/8"ø x 10'-0" COPPER CLAD STEEL GROUND ROD.
- GROUND WIRE.



GROUNDING PLAN
NO SCALE

KEY NOTES

(A) POLE GROUND BAR: EXTEND TWO #2 TINNED CU WIRE FROM BURIED GROUND RING UP TO THE POLE GROUND BAR AND MAKE A EXOTHERMIC CONNECTION. SECURE GROUND BAR DIRECTLY TO POLE WITH STAINLESS STEEL MOUNTING MATERIAL.

(B) POLE GROUND: #2 TINNED CU WIRE FROM BURIED GROUND RING UP TO THE POLE AND MAKE AN EXOTHERMIC CONNECTION.

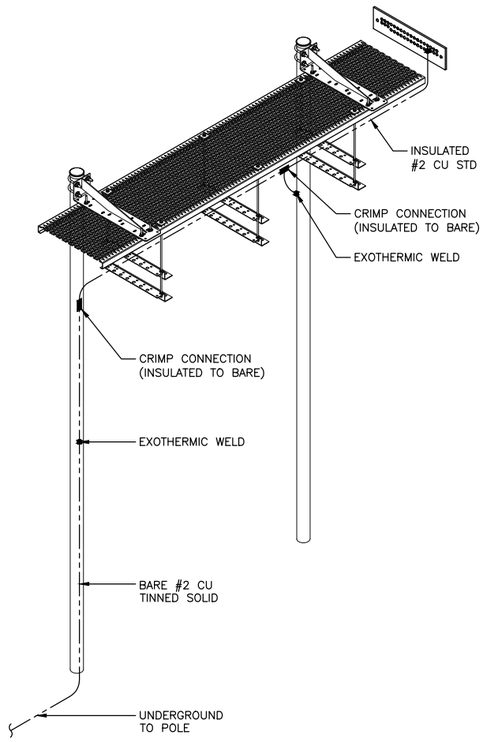
(C) ICE BRIDGE SUPPORT POST GROUNDING: EXTEND #2 TINNED CU WIRE FROM BURIED GROUND RING TO ALL ICE BRIDGE SUPPORT POSTS AND EXOTHERMICALLY WELD.

(D) EXTERIOR GROUND BAR: EXTEND #2 TINNED CU WIRE FROM BURIED GROUND RING UP TO THE EXTERIOR GROUND BAR AND MAKE AN EXOTHERMIC CONNECTION.

(E) STATION GROUND: EXTEND #2 INSULATED STD CU WIRE FROM GROUND BAR AND EXOTHERMIC WELD. RUN GROUND ON ICE BRIDGE. SEE DETAIL A.

NOTES

1. ALL GROUNDING SYSTEM CONDUCTORS AND CONNECTIONS BELOW GRADE SHALL BE THERMAL WELDS AT GROUND RODS AND AT A MINIMUM OF 36" BELOW GRADE, OR 6" BELOW FROST LINE, WHICH EVER IS GREATER OF THE TWO DIMENSIONS.
2. ALL INSTALLATIONS SHALL BE FIELD VERIFIED.
3. ALL GROUND WIRE SHALL BE #2 AWG BARE COPPER TINNED UNLESS NOTED OTHERWISE.
4. ALL GROUND WIRES SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
5. ALL EXOTHERMIC CONNECTIONS SHALL BE INSTALLED UTILIZING THE PROPER CONNECTION/MOLD AND MATERIALS FOR THE PARTICULAR APPLICATION.
6. CONTRACTOR SHALL REPAIR/PLACE EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.



DETAIL A
NO SCALE

EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458-3595

PROJECT NO:	403093
DRAWN BY:	TYW
CHECKED BY:	CAG

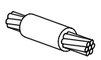
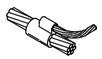
REV	DATE	DESCRIPTION
0	11/23/20	ISSUED FOR FILING

STATE OF CONNECTICUT · MARK P. STILES · 24358 · LICENSED PROFESSIONAL ENGINEER
11/23/2020

CANTON 5R
13 MORGAN RD
CANTON, CT 06019

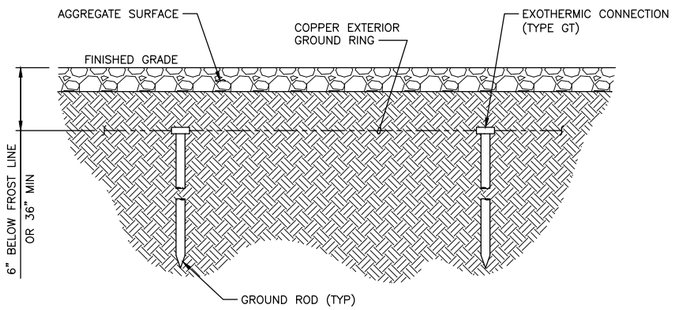
SHEET TITLE
GROUNDING PLAN

SHEET NUMBER
G-1

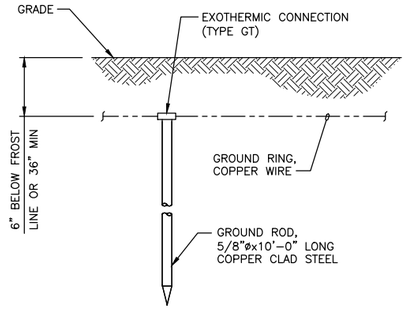
CADWELD CONNECTIONS OR APPROVED EQUAL			BURNDY CONNECTIONS OR APPROVED EQUAL
 HORIZONTAL SPLICE SPLICE OF HORIZONTAL CABLES TYPE SS	 PARALLEL HORIZONTAL CONDUCTORS PARALLEL THROUGH CONNECTION OF HORIZONTAL CABLES TYPE PT	 VERTICAL PIPE CABLE DOWN AT 45° TO RANGE OF VERTICAL PIPES TYPE VS	 BOND JUMPER FIELD FABRICATED GREEN STRANDED INSULATED TYPE 2–YA–2
 HORIZONTAL STEEL SURFACE TO FLAT STEEL SURFACE OR HORIZONTAL PIPE TYPE HS	 PARALLEL HORIZONTAL CONDUCTORS PARALLEL DEAD END TAP OR HORIZONTAL THRU CONDUCTOR TYPE PC	 VERTICAL STEEL SURFACE CABLE DOWN AT 45° TO VERTICAL STEEL SURFACE INCLUDING PIPE TYPE VS	 COPPER LUGS TWO HOLE – LONG BARREL LENGTH TYPE YA–2
 HORIZONTAL TEE TEE OF HORIZONTAL RUN AND TAP CABLES TYPE TA	 THROUGH CABLE TO GROUND ROD THROUGH CABLE TO TOP OF GROUND ROD TYPE GT		

NOTES

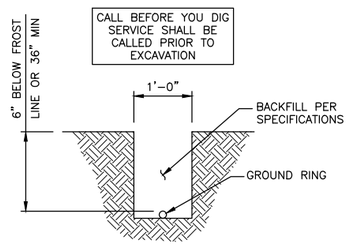
1. REFER TO SHEET G–1 FOR WIRE SIZES.



GROUND RING DETAIL
NO SCALE



GROUND ROD
NO SCALE



NOTES

1. ALL EXOTHERMIC WELD CONNECTIONS SHALL BE BELOW FROST LINE.

GROUND RING TRENCH
NO SCALE

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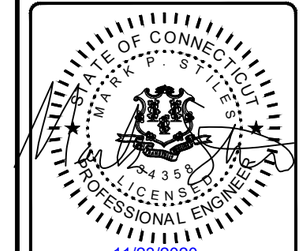
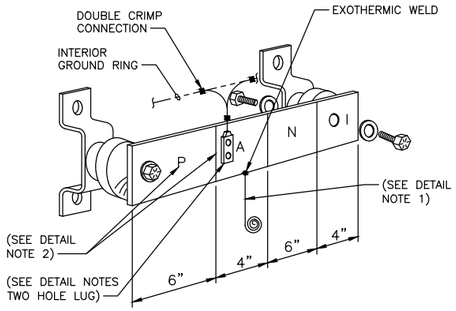


11/23/2020

CANTON 5R
13 MORGAN RD
CANTON, CT 06019

SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
G-2



SITEPRO – 1/4"X4"X20"
TINNED GROUND BAR KIT
TINMG420U–K

EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION

SECTION "P" – SURGE PROTECTORS

CELL REFERENCE GROUND BAR (IF CO–LOCATED)
GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
TELCO GROUND BAR (#2)
COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#3/0)
FIBER GROUND BAR (#2)

SECTION "A" – SURGE ABSORBERS

INTERIOR GROUND RING (#2)
EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)

SECTION "N" – NON–ISOLATED GROUND ZONE EQUIPMENT

MISC NON–ISOLATED GROUND ZONE
BATTERY RACK

SECTION "I" – ISOLATED GROUND ZONE

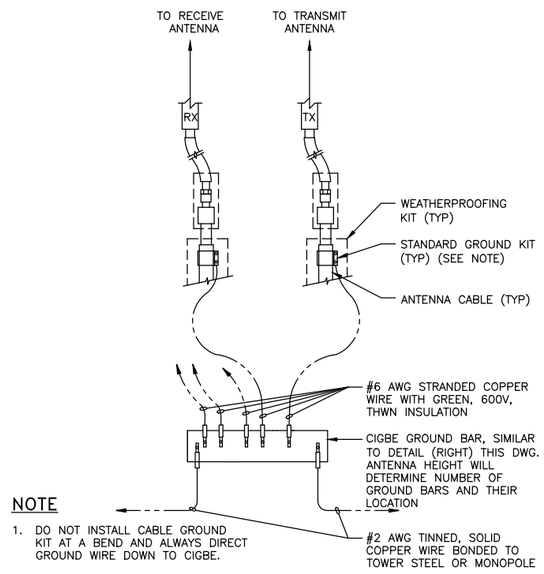
ALL ISOLATED GROUND REFERENCE
GROUND WINDOW BAR

DETAIL NOTES

1. EXOTHERMIC ALLY WELD #2 AWG BARE TINNED SOLID COPPER CONDUCTOR TO GROUND BAR. ROUTE CONDUCTOR TO BURIED GROUND RING AND PROVIDE EXOTHERMIC WELD.
2. EC SHALL USE PERMANENT MARKER TO DRAW THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("P", "A", "N", "I") WITH 1" HIGH LETTERS.

(MGB) REFERENCE GROUND BAR

NO SCALE



NOTE

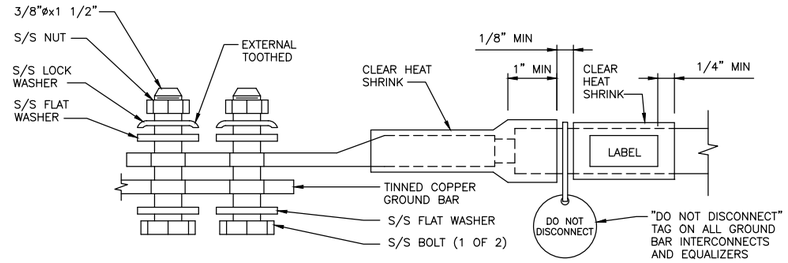
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

CONNECTION OF GROUND WIRE TO EXTERIOR GROUNDING BAR

NO SCALE

NOTES

1. ALL LUGS SHALL BE 2–HOLE, LONG BARREL, TINNED SOLID COPPER UNLESS OTHERWISE SPECIFIED, USING THE PROPER U.L. TOOL AND CIRCUMFERENTIAL HEXAGON DIE. LUGS SHALL BE THOMAS AND BETTS SERIES 548##BE, BURNDY, ERICO OR EQUIVALENT. BOLT HOLE DIAMETER AND SPACING ON ALL GROUND LUGS SHALL MATCH HOLE DIAMETER AND SPACING OF THE GROUND BAR. ANGLE LUGS MAY BE USED IF CONSTRUCTION CONDITIONS DICTATE. REFER TO DETAIL "G".
2. AN ANTI–OXIDATION COMPOUND SHALL BE APPLIED BETWEEN THE LUG AND GROUND BAR ONLY. DO NOT COVER THE LUG. THE ANTI–OXIDATION COMPOUND SHALL BE THOMAS AND BETTS "KOPR–SHIELD" OR BURNDY PENETROX–E.
3. GROUND BARS SHALL BE ATTACHED TO THE ANTENNA SUPPORT STRUCTURES WITH U.L. APPROVED MOUNTING DEVICES. GROUND CLAMPS MAY BE USED TO MOUNT THE GROUND BAR TO AVAILABLE FLANGES, COAX PORT RIMS, ETC. STEEL STRAPS MAY BE USED TO ATTACH GROUND BAR TO A MONOPOLE IF NO CONVENIENT CLAMPING SURFACES ARE PRESENT. ALL CONNECTING SURFACES SHALL BE CLEAN AND FREE OF DIRT, OIL AND CORROSION. GALVANIZED SURFACES SHALL BE POLISHED WITH A STEEL BRUSH. DO NOT DRILL HOLES OR USE EXOTHERMIC WELDS TO CONNECT GROUND LEADS TO A STEEL TOWER EXCEPT ON STEEL TABS OR FLANGES SPECIFICALLY DESIGNED FOR THAT PURPOSE.

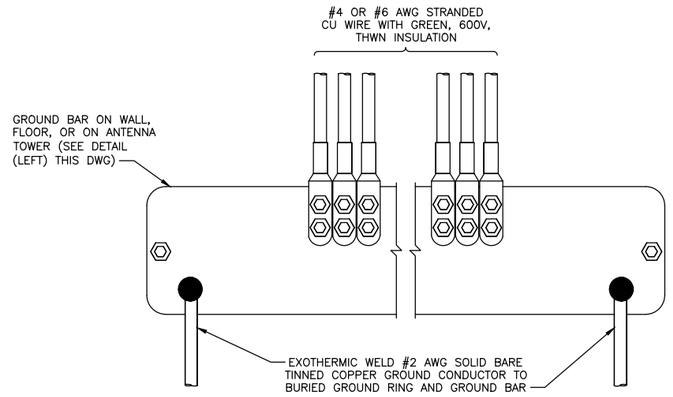


NOTES

1. ALL HARDWARE 18–8 STAINLESS STEEL INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI–OXIDANT COMPOUND BEFORE MATING.
2. ALL HARDWARE SHALL BE S/S 3/8 INCH DIAMETER OR LARGER.
3. FOR GROUND BOND TO STEEL ONLY: INSERT A CADMIUM FLAT WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH AN ANTI–OXIDANT COMPOUND BEFORE MATING.

TWO HOLE LUG

NO SCALE



NOTE

1. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUND BAR AND BOLTED ON THE BACK SIDE.

INSTALLATION OF GROUND WIRE TO EXTERIOR GROUNDING BAR

NO SCALE

EVERSOURCE ENERGY
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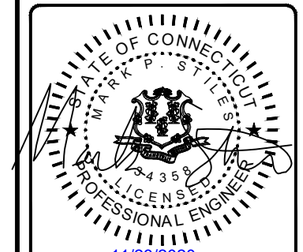
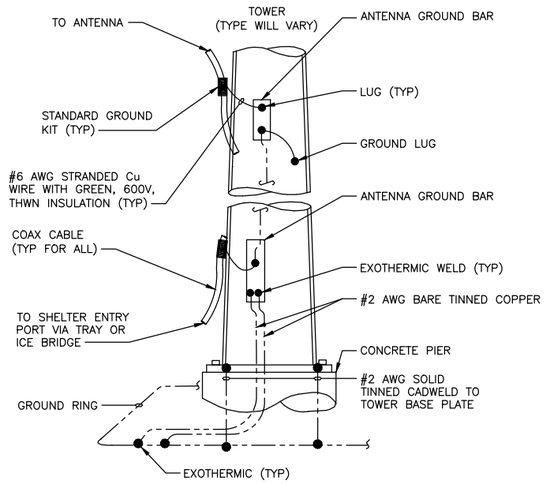


11/23/2020

CANTON 5R
13 MORGAN RD
CANTON, CT 06019

SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
G-3

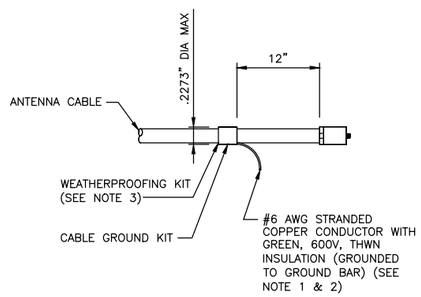


NOTE

1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.

ANTENNA CABLE GROUNDING

NO SCALE

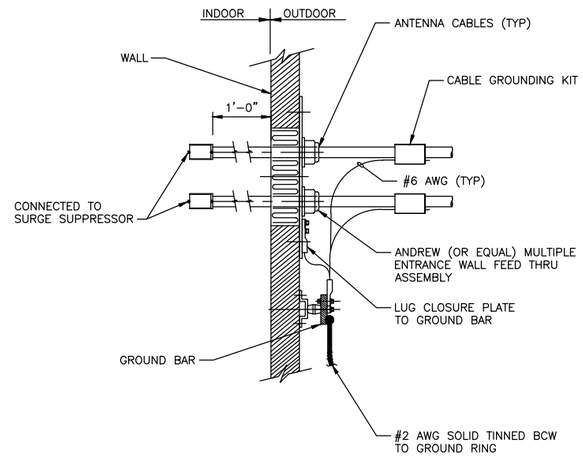


NOTES

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.

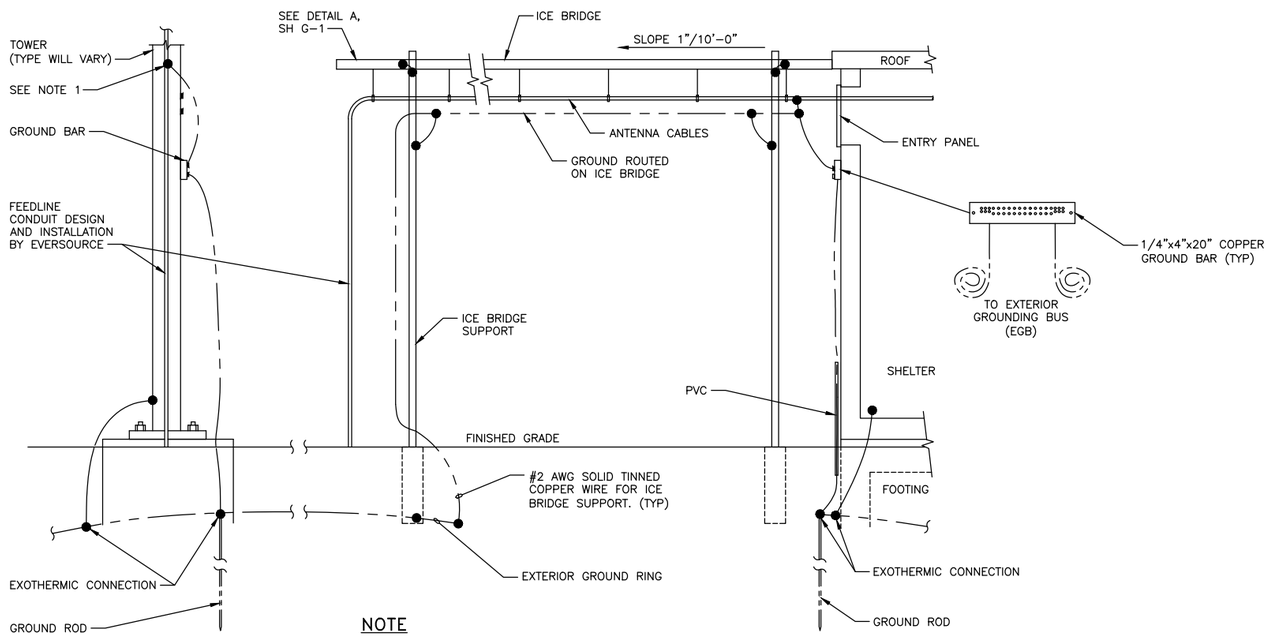
CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NO SCALE



CABLE INSTALLATION WITH WALL FEED THRU ASSEMBLY

NO SCALE



NOTE

1. PROVIDE GROUND KIT 6" BEFORE TURN

ICE BRIDGE AND ANTENNA CABLE DETAIL

NO SCALE

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BERLIN, CT 06037
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CANTON 5R
13 MORGAN RD
CANTON, CT 06019

SHEET TITLE

GROUNDING DETAILS

SHEET NUMBER

G-4

DESIGN BASIS

1. GOVERNING CODE: 2018 CONNECTICUT STATE BUILDING CODE (2015 IBC BASIS).

GENERAL CONDITIONS

1. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL BUILDING CODES, PERMIT CONDITIONS AND SAFETY CODES DURING CONSTRUCTION.

2. THE ENGINEER IS NOT: A GUARANTOR OF THE INSTALLING CONTRACTOR'S WORK; RESPONSIBLE FOR SAFETY IN, ON OR ABOUT THE WORK SITE; IN CONTROL OF THE SAFETY OR ADEQUACY OF ANY BUILDING COMPONENT, SCAFFOLDING OR SUPERINTENDING THE WORK.

3. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL PERMITS, INSPECTIONS, TESTING AND CERTIFICATES NEEDED FOR LEGAL OCCUPANCY OF THE FINISHED PROJECT.

4. THE CONTRACTOR IS RESPONSIBLE TO REVIEW THIS COMPLETE PLAN SET AND VERIFY THE EXISTING CONDITIONS SHOWN IN THESE PLANS AS THEY RELATE TO THE WORK PRIOR TO SUBMITTING PRICE. SIGNIFICANT DEVIATIONS FROM WHAT IS SHOWN AFFECTING THE WORK SHALL BE REPORTED IMMEDIATELY TO THE CONSTRUCTION MANAGER.

5. DETAILS INCLUDED IN THIS PLAN SET ARE TYPICAL AND APPLY TO SIMILAR CONDITIONS.

6. EXISTING ELECTRICAL AND MECHANICAL FIXTURES, PIPING, WIRING, AND EQUIPMENT OBSTRUCTING THE WORK SHALL BE REMOVED AND/OR RELOCATED AS DIRECTED BY THE CONSTRUCTION MANAGER. TEMPORARY SERVICE INTERRUPTIONS MUST BE COORDINATED WITH OWNER.

7. THE CONTRACTOR SHALL DILIGENTLY PROTECT THE EXISTING BUILDING/SITE CONDITIONS AND THOSE OF ANY ADJOINING BUILDING/SITES AND RESTORE ANY DAMAGE CAUSED BY HIS ACTIVITIES TO THE PRE-CONSTRUCTION CONDITION.

8. THE CONTRACTOR SHALL SAFEGUARD AGAINST: CREATING A FIRE HAZARD, AFFECTING TENANT EGRESS OR COMPROMISING BUILDING SITE SECURITY MEASURES.

9. THE CONTRACTOR SHALL REMOVE ALL DEBRIS AND CONSTRUCTION WASTE FROM THE SITE EACH DAY. WORK AREAS SHALL BE SWEPT AND MADE CLEAN AT THE END OF EACH WORK DAY.

10. THE CONTRACTOR'S HOURS OF WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES AND ORDINANCES AND BE APPROVED BY OWNER.

11. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CONSTRUCTION MANAGER IF ASBESTOS IS ENCOUNTERED DURING THE EXECUTION OF HIS WORK. THE CONTRACTOR SHALL CEASE ALL ACTIVITIES WHERE THE ASBESTOS MATERIAL IS FOUND UNTIL NOTIFIED BY THE CONSTRUCTION MANAGER TO RESUME OPERATIONS.

THERMAL & MOISTURE PROTECTION

1. FIRE-STOP ALL PENETRATIONS FOR ELECTRICAL CONDUITS OR WAVEGUIDE CABLING THROUGH BUILDING WALLS, FLOORS, AND CEILINGS SHALL BE FIRESTOPPED WITH ACCEPTED MATERIALS TO MAINTAIN THE FIRE RATING OF THE EXISTING ASSEMBLY. ALL FILL MATERIAL SHALL BE SHAPED, FITTED, AND PERMANENTLY SECURED IN PLACE. FIRESTOPPING SHALL BE INSTALLED IN ACCORDANCE WITH ASTM E814.

2. HILTI CP620 FIRE FOAM OR 3M FIRE BARRIER FILL, VOID OR CAVITY MATERIAL OR ACCEPTED EQUAL SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND ASSOCIATED UNDERWRITERS LABORATORIES (UL) SYSTEM NUMBER.

3. FIRESTOPPING SHALL BE APPLIED AS SOON AS PRACTICABLE AFTER PENETRATIONS ARE MADE AND EQUIPMENT INSTALLED.

4. FIRESTOPPED PENETRATIONS SHALL BE LEFT EXPOSED AND MADE AVAILABLE FOR INSPECTION BEFORE CONCEALING SUCH PENETRATIONS. FIRESTOPPING MATERIAL CERTIFICATES SHALL BE MADE AVAILABLE AT THE TIME OF INSPECTION.

5. ANY BUILDING ROOF PENETRATION AND/OR RESTORATION SHALL BE PERFORMED SO THAT THE ROOF WARRANTY IN PLACE IS NOT COMPROMISED. CONTRACTOR SHALL ARRANGE FOR OWNER'S ROOFING CONTRACTOR TO PERFORM ANY AND ALL ROOFING WORK IF SO REQUIRED BY EXISTING ROOF WARRANTY. OTHERWISE, ROOF SHALL BE MADE WATERTIGHT WITH LIKE CONSTRUCTION AS SOON AS PRACTICABLE AND AT COMPLETION OF CONSTRUCTION.

6. ALL PENETRATIONS INTO AND/OR THROUGH BUILDING EXTERIOR WALLS SHALL BE SEALED WITH SILICONE SEALER.

7. WHERE CONDUIT AND CABLES PENETRATES FIRE RATED WALLS AND FLOORS, FIRE GROUT ALL PENETRATIONS IN ORDER TO MAINTAIN THE FIRE RATING USING A LISTED FIRE SEALING DEVICE OR GROUT.

8. CONTRACTOR TO REMOVE AND RE-INSTALL ALL FIRE PROOFING AS REQUIRED DURING CONSTRUCTION.

SUBMITTALS

1. CONTRACTOR TO SUBMIT SHOP DRAWINGS TO ENGINEER FOR REVIEW PRIOR TO FABRICATION.

2. CONTRACTOR TO NOTIFY ENGINEER FOR INSPECTION PRIOR TO CLOSING PENETRATIONS.

3. CONTRACTORS SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. THE ENGINEER SHALL BE NOTIFIED OF ANY CONDITIONS WHICH PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

4. ALL STEEL MATERIAL EXPOSED TO WEATHER SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 " ZINC (HOT-DIPPED GALVANIZED) COATINGS" ON IRON AND STEEL PRODUCTS.

5. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS FOR REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.

CONCRETE

1. ALL CONCRETE CONSTRUCTION SHALL BE DONE IN ACCORDANCE WITH THE AMERICAN CONCRETE INSTITUTE (ACI) CODES 301 & 318, LATEST REVISION.

2. FOUNDATION WORK SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S DESIGNS AND SPECIFICATIONS.

3. ALL CONCRETE USED SHALL BE 4000 PSI (28 DAY COMPRESSIVE STRENGTH) UNLESS NOTED OTHERWISE. THE CONCRETE MIX DESIGN SHALL USE THE FOLLOWING MATERIALS AND PARAMETERS:

PORTLAND CEMENT:	ASTM C150, TYPE 1
AGGREGATE:	ASTM C33, 1 INCH MIX
WATER:	POTABLE
ADMIXTURE:	NON-CHLORIDE
AIR:	6%*
SLUMP:	4 INCH UNLESS NOTED OTHERWISE

*ALL CONCRETE EXPOSED TO FREEZING WEATHER SHALL CONTAIN ENTRAINED AIR PER ACI 211 TABLE 4.2.1 OF ACI 318-05.

4. ALL REINFORCING STEEL SHALL BE ASTM A615, GR 60 (DEFORMED) UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE. SPLICES SHALL BE CLASS 'B' AND ALL HOOKS SHALL BE ACI STANDARD UNLESS NOTED OTHERWISE. REINFORCING BARS SHALL BE COLD BENT WHERE REQUIRED AND TIES (NOT WELDED).

5. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

CONCRETE CAST AGAINST EARTH = 3 INCHES
CONCRETE EXPOSED TO EARTH OR WEATHER:
#6 AND LARGER = 2 INCHES
#5 AND SMALLER AND WWF = 1 1/2 INCHES
CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:
SLAB AND WALL = 3/4 INCHES
BEAMS AND COLUMNS = 1 1/2 INCHES

6. A 3/4 INCH CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

7. CONCRETE SHALL REPLACED IN A UNIFORM MANNER AND CONSOLIDATED IN PLACE.

8. CONCRETE FOOTINGS SHALL BE CAST AGAINST LEVEL, COMPACTED, NON-FROZEN BASE SOIL FREE OF STANDING WATER.

STEEL

1. MATERIAL:

WIDE FLANGE:	ASTM A572, GR 50
TUBING:	ASTM A500, GR C
PIPE:	ASTM A53, GR B AND ASTM 572, GR 50
ANGLE:	ASTM A570, GR 50 AND ASTM A36
BOLTS:	ASTM A325
GRATING:	TYPE GW-2 (1"x3/16" BARS)
MISC. MATERIAL:	ASTM A36

ALL STEEL SHAPES SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A123 WITH A COATING WEIGHT OF 2 OZ/SF.

2. DAMAGED GALVANIZED SURFACES SHALL BE CLEANED WITH A WIRE BRUSH AND PAINTED WITH TWO COATS OF COLD ZINC, "GALVANOX", "DRY GALV", "ZINC IT", OR APPROVED EQUIVALENT, IN ACCORDANCE WITH MANUFACTURER'S GUIDELINES. TOUCH UP DAMAGED NON GALVANIZED STEEL WITH SAME PAINT IN SHOP OR FIELD.

3. DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC "MANUAL OF STEEL CONSTRUCTION" 13TH EDITION.

4. THE STEEL STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER COMPLETION. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO INSURE THE SAFETY OF THE BUILDING AND ITS COMPONENT PARTS DURING ERECTION.

5. ALL STEEL ELEMENTS SHALL BE INSTALLED PLUMB AND LEVEL.

6. TOWER MANUFACTURER'S DESIGNS SHALL PREVAIL FOR TOWER.

CONNECTIONS

1. CONNECTIONS SHALL BE DESIGNED BY THE FABRICATOR AND CONSTRUCTED IN ACCORDANCE WITH THE AISC "MANUAL OF STEEL CONSTRUCTION" 13TH EDITION. CONNECTIONS SHALL BE PROVIDED TO CONFORM TO THE REQUIREMENTS OF TYPE 2 CONSTRUCTION UNLESS OTHERWISE DETAILED. ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS.

2. DESIGN CONNECTIONS AT BEAM ENDS FOR 10 KIPS (MIN).

3. ALL BUILDING CONNECTION POINTS ARE TO BE CENTERED OVER BEARING WALLS

4. CONNECTIONS SHALL BE MADE USING ASTM A325 BOLTS (SNUG TIGHT OR SLIP CRITICAL) OR WELDS. IF TENSION CONTROL BOLTS ARE USED, CONNECTIONS SHALL BE DESIGNED FOR SLIP CRITICAL BOLT ALLOWABLE LOAD VALUES.

5. NUT LOCKING DEVICES ARE REQUIRED FOR ALL BOLT ASSEMBLIES.

6. GRATING SHALL BE ATTACHED USING FOR GRATING CLAMPS OR 1/4 INCH FILLET WELDS. NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY BE 5/8" DIAMETER GALVANIZED ASTM A307 BOLTS UNLESS OTHERWISE NOTED.

7. ALL BOLTS, ANCHORS, AND MISCELLANEOUS HARDWARE EXPOSED TO WEATHER SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE."

8. 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". UPON COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED. SEE NOTE ABOVE.

9. USE THE LARGER OF 1/4 INCH FILLET WELDS OR MINIMUM SIZE PER AISC REQUIREMENTS WHERE NO WELD SIZE IS SHOWN ON THE DRAWINGS.

10. ALL ARC AND GAS WELDING SHALL BE DONE BY LICENSED AND CERTIFIED WELDER IN ACCORDANCE WITH AMERICAN WELDING SOCIETY.

11. ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND AWS D1.1. UPON THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATINGS SHALL REPAIRED.

12. USE PRECAUTIONS AND PROCEDURES PER AWS D1.1 WHEN WELDING GALVANIZED METALS.

SITE GENERAL

1. CONTRACTOR SHALL FOLLOW CONDITIONS OF ALL APPLICABLE PERMITS AND WORK IN ACCORDANCE WITH OSHA REGULATIONS.

2. THESE PLANS DEPICT KNOWN UNDERGROUND STRUCTURES, CONDUITS, AND/OR PIPELINES. THE LOCATIONS FOR THESE ELEMENTS ARE BASED UPON THE VARIOUS RECORD DRAWINGS AVAILABLE. THE CONTRACTOR IS HEREBY ADVISED THAT THESE DRAWINGS MAY NOT ACCURATELY DEPICT AS-BUILT LOCATIONS AND OTHER UNKNOWN STRUCTURES. THE CONTRACTOR SHALL THEREFORE DETERMINE THE EXACT LOCATION OF EXISTING UNDERGROUND ELEMENTS AND EXCAVATE WITH CARE AFTER CALLING MARKOUT SERVICE AT 1-800-272-4480 48 HOURS BEFORE DIGGING, DRILLING OR BLASTING.

3. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, FIBER OPTIC, AND OTHER UTILITIES WHERE ENCOUNTERED, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION, SHALL BE RELOCATED AS DIRECTED BY ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR PIER DRILLING AROUND OR NEAR UTILITIES. CONTRACTOR SHALL HAND DIG UTILITIES AS NEEDED. CONTRACTOR SHALL PROVIDE, BUT IS NOT LIMITED TO, APPROPRIATE A) FALL PROTECTION, B) CONFINED SPACE ENTRY, C) ELECTRICAL SAFETY, AND D) TRENCHING AND EXCAVATION.

4. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.

5. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC, FIBER OPTIC, OR OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED, AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT THE POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF THE CONSTRUCTION MANAGER.

6. CONTRACTOR IS RESPONSIBLE FOR REPAIRING OR REPLACING STRUCTURES OR UTILITIES DAMAGED DURING CONSTRUCTION.

7. CONTRACTOR SHALL PROTECT EXISTING PAVED AND GRAVEL SURFACES, CURBS, LANDSCAPE AND STRUCTURES AND RESTORE SITE OR PRE-CONSTRUCTION CONDITION WITH AS GOOD, OR BETTER, MATERIALS. NEW MATERIALS SHALL MATCH EXISTING THICKNESS AND TYPE.

8. THE CONTRACTOR SHALL SHORE ALL TRENCH EXCAVATIONS GREATER THAN 5 FEET IN DEPTH OR LESS WHERE SOIL CONDITIONS ARE DEEMED UNSTABLE. ALL SHEETING AND/OR SHORING METHODS SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER.

9. THE CONTRACTOR IS RESPONSIBLE FOR MANAGING GROUNDWATER LEVELS IN THE VICINITY OF EXCAVATIONS TO PROTECT ADJACENT PROPERTIES AND NEW WORK. GROUNDWATER SHALL BE DRAINED IN ACCORDANCE WITH LOCAL SEDIMENTATION AND EROSION CONTROL GUIDELINES.

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PROJECT NO:	403093
DRAWN BY:	TYW
CHECKED BY:	CAG

REV	DATE	DESCRIPTION
0	11/23/20	ISSUED FOR FILING

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
11/23/2020

CANTON 5R
13 MORGAN RD
CANTON, CT 06019

SHEET TITLE
NOTES & SPECIFICATIONS

SHEET NUMBER
N-1

EXCAVATION

1. CONTRACTOR SHALL GRADE ONLY AREAS SHOWN TO BE MODIFIED HEREIN AND ONLY TO THE EXTENT REQUIRED TO SHED OVERLAND WATER FLOW AWAY FROM SITE. SLOPES SHALL NOT BE STEEPER THAN 3:1 (HORIZONTAL:VERITICAL), UNLESS NOTED OTHERWISE. SEDIMENTATION AND EROSION CONTROLS SHOWN AND SPECIFIED SHALL BE ESTABLISHED BEFORE STRIPPING EXISTING VEGETATION.
2. ORGANIC MATERIAL AND DEBRIS SHALL BE STRIPPED AND STOCKPILED BEFORE ADDING FILL MATERIAL.
3. 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.
4. ALL FILL SHALL BE PLACED IN ONE FOOT LIFTS AND COMPACTED IN PLACE. STRUCTURAL FILL SHALL BE COMPACTED TO 95% OF ITS MAXIMUM DRY UNIT WEIGHT TESTED IN ACCORDANCE WITH ASTM D1557.
5. EXCAVATIONS FOR FOOTINGS SHALL BE CUT LEVEL TO THE REQUIRED DEPTH AND TO UNDISTURBED SOIL. REPORT UNSUITABLE SOIL CONDITIONS TO THE CONSTRUCTION MANAGER.
6. TRENCH EXCAVATIONS SHALL BE BACKFILLED AT THE END OF EACH DAY.
7. SURPLUS MATERIAL SHALL BE REMOVED FROM THE SITE.
8. TOWER FOUNDATION EXCAVATION, BACKFILL AND COMPACTION SHALL BE IN ACCORDANCE WITH THE TOWER MANUFACTURER'S DESIGNS AND SPECIFICATIONS.

MATERIAL

1. NATIVE GENERAL MATERIAL MAY BE USED FOR TRENCH BACKFILL WHERE SELECT MATERIAL IS NOT SPECIFIED. GRAVEL MATERIAL FOR CONDUIT TRENCH BACKFILL SHALL NOT CONTAIN ROCK GREATER THAN 2 INCHES IN DIAMETER.
2. BANK OR CRUSHED GRAVEL SHALL CONSIST OF TOUGH, DURABLE PARTICLES OF CRUSHED OR UNCRUSHED GRAVEL FREE OF SOFT, THIN, ELONGATED OR LAMINATED PIECES AND MEET THE GRADATION REQUIREMENTS.
3. PROCESSED AGGREGATE BASE SHALL CONSIST OF COURSE AND FINE AGGREGATES COMBINED AND MIXED SO THAT THE RESULTING MATERIAL CONFORMS TO THE GRADATION REQUIREMENTS. COURSE AGGREGATE SHALL BE EITHER GRAVEL OR BROKEN STONE AND FINE AGGREGATE SHALL CONSIST OF SAND.

	PERCENT PASSING BY WEIGHT		
SQUARE	BANK GRAVEL	BANK GRAVEL PROCESSED	
MESH	FILL	BASE	AGG BASE
SIEVES		100	
PASS 5"		100	90–100
PASS 3 1/2"		100	
PASS 2 1/4"		95–100	
PASS 2"		55–100	
PASS 1 1/2"			
PASS 1"			
PASS 3/4"			50–75
PASS 1/4"	25–60	25–60	25–45
PASS #10	15–45	15–45	
PASS #40	2–25	5–25	5–20
PASS #100	0–10	0–10	2–12
PASS #200	0–5	0–5	

4. FILL MATERIAL SHALL BE FREE OR ORGANIC MATERIAL, ICE, TRASH AND DEBRIS.
5. REFER TO MOST CURRENT GEOTECHNICAL ENGINEERING REPORT FOR ALL FILL MATERIAL REQUIREMENTS.

ELECTRICAL

1. CONTRACTOR SHALL VERIFY EXISTING ELECTRIC SERVICE TYPE AND CAPACITY AND ORDER NEW ELECTRIC SERVICE FROM LOCAL ELECTRIC UTILITY, WHERE APPLICABLE.
2. ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH ALL APPLICABLE CODES, AND SHALL BE ACCEPTABLE TO ALL AUTHORITIES HAVING JURISDICTION. WHERE A CONFLICT EXISTS BETWEEN CODES, PLAN AND SPECIFICATIONS, OR AUTHORITIES HAVING JURISDICTION, THE MORE STRINGENT AUTHORITIES SHALL APPLY.
3. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION, CONSTRUCTION TOOLS, TRANSPORTATION, ETC, FOR A COMPLETE AND PROPERLY OPERATIVE SYSTEM ENERGIZED THROUGHOUT AND AS INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN AND/OR OTHERWISE REQUIRED.
4. ALL ELECTRICAL CONDUCTORS SHALL BE 100% COPPER AND SHALL HAVE TYPE THHN INSULATION UNLESS INDICATED OTHERWISE.
5. CONDUIT SHALL BE THREADED RIGID GALVANIZED STEEL OR EMT WITH ONLY COMPRESSION TYPE COUPLINGS AND CONNECTORS, ALL MADE UP WRENCH TIGHT.
6. ALL BURIED CONDUIT SHALL BE MINIMUM SCH 40 PVC UNLESS NOTED OTHERWISE, OR AS PER LOCAL CODE REQUIREMENTS.
7. PROVIDE FLEXIBLE STEEL CONDUIT OR LIQUID TIGHT FLEXIBLE STEEL CONDUIT TO ALL VIBRATING EQUIPMENT, INCLUDING HVAC UNITS, TRANSFORMERS, MOTORS, ETC, OR WHERE EQUIPMENT IS PLACED UPON A SLAB ON GRADE.
8. ALL BRANCH CIRCUITS AND FEEDERS SHALL HAVE A SEPARATE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR BONDED TO ALL ENCLOSURES, PULLBOXES, ETC.
9. CONDUIT AND CABLE WITHIN CORRIDORS SHALL BE CONCEALED AND EXPOSED ELSEWHERE, UNLESS NOTED OTHERWISE.
10. ELECTRICAL MATERIALS INSTALLED ON ROOFTOP SHALL BE LISTED FOR NEMA 3R USE. –AND ALL WIRING WITHIN A VENTILATION DUCT SHALL BE LISTED FOR SUCH USE. IN GENERAL WIRING METHODS WITHIN A DUCT SHALL BE AN MC CABLE WITH SMOOTH OR CORRUGATED METAL JACKET AND HAVE NO OUTER COVERING OVER THE METAL JACKET. INTERLOCKED ARMOR TYPE OF MC CABLE IS NOT ACCEPTABLE FOR THIS APPLICATION. CONTRACTOR CAN ALSO USE TYPE MI CABLE IN THE VENTILATION DUCT PROVIDED IT DOES NOT HAVE ANY OUTER COVERINGS OVER THE METAL EXTERIOR.
11. WIRING DEVICES SHALL BE SPECIFICATION GRADE, AND WIRING DEVICE COVER PLATES SHALL BE PLASTIC WITH ENGRAVING AS SPECIFIED.
12. GROUNDING SYSTEM RESISTANCE SHALL BE MEASURED, RECORDED, AND DATED USING MEGGER DET14 OR SIMILAR INSTRUMENT. GROUND RESISTANCE SHALL NOT EXCEED 5 OHMS. IF THE RESISTANCE VALUE IS EXCEEDED, NOTIFY CONSTRUCTION MANAGER FOR FURTHER INSTRUCTION.
13. COORDINATE WITH BUILDING MANAGEMENT BEFORE PERFORMING ANY WORK INVOLVING EXISTING SYSTEMS OR EQUIPMENT IN ORDER TO DETERMINE THE EFFECT, IF ANY, ON OTHER TENANTS WITHIN THE BUILDING, AND TO DETERMINE THE APPROPRIATE TIME FOR PERFORMING THIS WORK.
14. THE CONTRACTOR SHALL BE REQUIRED TO VISIT THE SITE PRIOR TO SUBMITTING BID IN ORDER TO DETERMINE THE EXTENT OF THE EXISTING CONDITIONS.
15. ALL CONDUCTOR ENDS SHALL BE TAGGED AND ELECTRICAL EQUIPMENT LABELED WITH ENGRAVED IDENTIFICATION PLATES.
16. CONTRACTOR IS RESPONSIBLE FOR ALL CONTROL WIRING AND ALARM TIE–INS.

GROUNDING

1. #6 THWN SHALL BE STRANDED #6 COPPER WITH GREEN THWN INSULATION SUITABLE FOR WET INSTALLATIONS.
2. #2 THWN SHALL BE STRANDED #2 COPPER WITH THWN INSULATION SUITABLE FOR WET INSTALLATIONS.
3. #2 BARE TINNED SHALL BE SOLID COPPER TINNED. ALL BURIED WIRE SHALL MEET THIS CRITERIA.
4. ALL LUGS SHALL BE 2–HOLE, LONG BARREL, TINNED SOLID COPPER UNLESS OTHERWISE SPECIFIED, LUGS SHALL BE THOMAS AND BETTS SERIES 548##BE OR EQUIVALENT (IE #2 THWN – 54856BE, #2 SOLID – 54856BE, AND #6 THWN – 54852BE).
5. ALL HARDWARE, BOLTS, NUTS, AND WASHERS SHALL BE 18–8 STAINLESS STEEL. EVERY CONNECTION SHALL BE BOLT–FLAT WASHER–BUSS–LUG–FLAT WASHER–BELLEVILLE WASHER–NUT IN THAT EXACT ORDER. BACK–TO–BACK LUGGING, BOLT–FLAT WASHER–LUG–BUSS–LUG–FLAT WASHER–BELLEVILLE WASHER–NUT, IN THAT EXACT ORDER, IS ACCEPTED WHERE NECESSARY TO CONNECT MANY LUGS TO A BUSS BAR. STACKING OF LUGS, BUSS–LUG–LUG, IS NOT ACCEPTABLE.
6. WHERE CONNECTIONS ARE MADE TO STEEL OR DISSIMILAR METALS, A THOMAS AND BETTS DRAGON TOOTH WASHER MODEL DTWXXX SHALL BE USED BETWEEN THE LUG AND THE STEEL, BOLT–FLAT WASHER–STEEL–DRAGON TOOTH WASHER–LUG–FLAT WASHER–BELEVILE WASHER–NUT.
7. ALL CONNECTIONS, INTERIOR AND EXTERIOR, SHALL BE MADE WITH THOMAS AND BETTS KPOR–SHIELD. COAT ALL WIRES BEFORE LUGGING AND COAT ALL SURFACES BEFORE CONNECTING.
8. THE MINIMUM BEND RADIUS SHALL BE 8 INCHES FOR #6 WIRE AND SMALLER AND 12 INCHES FOR WIRE LARGER THAN #6.
9. ALL CONNECTIONS TO THE GROUND RING SHALL BE EXOTHERMIC WELD.
10. BOND THE FENCE TO THE GROUND RING AT EACH CORNER, AND AT EACH GATE POST WITH #2 SOLID TINNED WIRE. EXOTHERMIC WELD BOTH ENDS.
11. GROUND KITS SHALL BE SOLID COPPER STRAP WITH #6 WIRE 2–HOLE COMPRESSION CRIMPED LUGS AND SHALL BE SEALED ACCORDING TO MANUFACTURER INSTRUCTIONS.
12. FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL BE USED.
13. GROUND BARS SHALL BE FURNISHED AND INSTALLED WITH PRE–DRILLED HOLE DIAMETERS AND SPACINGS. GROUND BARS SHALL NEITHER BE FIELD FABRICATED NOR NEW HOLES DRILLED. GROUND LUGS SHALL MATCH THE SPACING ON THE BAR. HARDWARE DIAMETER SHALL BE MINIMUM 3.8 INCH.
14. MGB GROUND CONNECTION SHALL BE EXOTHERMIC WELDED TO THE GROUND SYSTEM.
15. ALL CABLE TRAY AND/OR PLATFORM STEEL SHALL BE BONDED TOGETHER WITH JUMPERS (#6 IN EQUIPMENT ROOM, #2 ELSEWHERE AND HOMERUN).

CABLE TRAY

1. CABLE TRAY SHALL BE MADE OF EITHER CORROSION RESISTANT METAL OR WITH A CORROSION RESISTANT FINISH.
2. CABLE TRAY SHALL BE OF LADDER TRAY TYPE WITH FLAT COVER CLAMPED TO SIDE RAILS.
3. CABLE LADDER SHALL BE SIZED TO FIT ALL CABLES IN ACCORD WITH NEC AND NEMA 11–15–84.
4. CABLE LADDER TRAYS SHALL BE NEMA CLASS 12A BY PW INDUSTRIES, INC OR EQUAL.
5. CABLE LADDER TRAY SHALL BE SUPPORTED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
6. ALL WORKMANSHIP SHALL CONFORM TO THESE REQUIREMENTS AND ALL LOCAL CODES AND STANDARDS TO ENSURE SAFE AND ADEQUATE GROUNDING SYSTEM.

ANTENNA & CABLE NOTES

1. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL TRANSMISSION CABLES, JUMPERS, CONNECTORS, GROUNDING STRAPS, ANTENNAS, MOUNTS AND HARDWARE. ALL MATERIALS SHALL BE INSPECTED BY THE CONTRACTOR FOR DAMAGE UPON DELIVERY. JUMPERS SHALL BE SUPPLIED AT ANTENNAS AND EQUIPMENT INSIDE SHELTER COORDINATE LENGTH OF JUMP CABLES WITH EVERSOURCE. COORDINATE AND VERIFY ALL OF THE MATERIALS TO BE PROVIDED WITH EVERSOURCE PRIOR TO SUBMITTING BID AND ORDERING MATERIALS.
2. AFTER INSTALLATION, THE TRANSMISSION LINE SYSTEM SHALL BE PIM/SWEEP TESTED FOR PROPER INSTALLATION AND DAMAGE WITH ANTENNAS CONNECTED. CONTRACTOR TO OBTAIN LATEST TESTING PROCEDURES FROM EVERSOURCE PRIOR TO BIDDING.
3. ANTENNA CABLES SHALL BE COLOR CODED AT THE FOLLOWING LOCATIONS:
   – AT THE ANTENNAS.
   – AT THE WAVEGUIDE ENTRY PLATE ON BOTH SIDES OF THE EQUIPMENT SHELTER WALL.
   – JUMPER CABLES AT THE EQUIPMENT ENTER.
4. SYSTEM INSTALLATION:
   THE CONTRACTOR SHALL INSTALL ALL CABLES AND ANTENNAS TO THE MANUFACTURER'S SPECIFICATIONS. THE CONTRACTOR IS RESPONSIBLE FOR THE PROCUREMENT AND INSTALLATION OF THE FOLLOWING:
   – ALL CONNECTORS, ASSOCIATED CABLE MOUNTING, AND GROUNDING HARDWARE.
   – WALL MOUNTS, STANDOFFS, AND ASSOCIATED HARDWARE.
   – 1/2 INCH HELIAX ANTENNA JUMPERS OF APPROPRIATE LENGTHS.
5. MINIMUM BENDING RADIUS FOR COAXIAL CABLES:
   – 7/8 INCH, RMIN = 15 INCHES
   – 1 5/8 INCH, RMIN = 25 INCHES
6. CABLE SHALL BE INSTALLED WITH A MINIMUM NUMBER OF BENDS WHERE POSSIBLE. CABLE SHALL NOT BE LEFT UNTERMINATED AND SHALL BE SEALED IMMEDIATELY AFTER BEING INSTALLED.
7. ALL CABLE CONNECTIONS OUTSIDE SHALL BE COVERED WITH WATERPROOF SPLICING KIT.
8. CONTRACTOR SHALL VERIFY EXACT LENGTH AND DIRECTION OF TRAVEL IN FIELD PRIOR TO CONSTRUCTION.
9. CABLE SHALL BE FURNISHED WITHOUT SPLICES AND WITH CONNECTORS AT EACH END.

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PROJECT NO:	403093
DRAWN BY:	TYW
CHECKED BY:	CAG

REV	DATE	DESCRIPTION
0	11/23/20	ISSUED FOR FILING

STATE OF CONNECTICUT · MARK P. STILES · 24358 · LICENSED PROFESSIONAL ENGINEER
11/23/2020

CANTON 5R
13 MORGAN RD
CANTON, CT 06019

SHEET TITLE
NOTES
& SPECIFICATIONS

SHEET NUMBER
N-2

SYMBOLS

●	EXOTHERMIC CONNECTION
■	COMPRESSION CONNECTION
⏚●	5/8"ø x 10'-0" COPPER CLAD STEEL GROUND ROD.
⏚◉	TEST GROUND ROD WITH INSPECTION SLEEVE
- - -	GROUNDING CONDUCTOR
(A)	KEY NOTES
CHAINLINK FENCE	X X X X X
WOOD FENCE	
LEASE AREA	
ICE BRIDGE	
CABLE TRAY	
GAS LINE	G G G G G
UNDERGROUND ELECTRICAL/TELCO	E/T E/T E/T E/T
UNDERGROUND ELECTRICAL/CONTROL	E/C E/C E/C E/C
UNDERGROUND ELECTRICAL	E E E E E
UNDERGROUND TELCO	T T T T T
PROPERTY LINE (PL)	

ABBREVIATIONS

AC	ALTERNATING CURRENT	MGB	MASTER GROUNDING BAR
AIC	AMPERAGE INTERRUPTION CAPACITY	MIN	MINIMUM
ANI	AUXILIARY NETWORK INTERFACE	MW	MICROWAVE
ATM	ASYNCHRONOUS TRANSFER MODE	MTS	MANUAL TRANSFER SWITCH
ATS	AUTOMATIC TRANSFER SWITCH	NEC	NATIONAL ELECTRICAL CODE
AWG	AMERICAN WIRE GAUGE	OC	ON CENTER
AWS	ADVANCED WIRELESS SERVICES	PP	POLARIZING PRESERVING
BATT	BATTERY	PCU	PRIMARY CONTROL UNIT
BBU	BASEBAND UNIT	PDU	PROTOCOL DATA UNIT
BTC	BARE TINNED COPPER CONDUCTOR	PWR	POWER
BTS	BASE TRANSCEIVER STATION	RECT	RECTIFIER
CCU	CLIMATE CONTROL UNIT	RET	REMOTE ELECTRICAL TILT
CDMA	CODE DIVISION MULTIPLE ACCESS	RMC	RIGID METALLIC CONDUIT
CHG	CHARGING	RF	RADIO FREQUENCY
CLU	CLIMATE UNIT	RUC	RACK USER COMMISSIONING
COMM	COMMON	RRH	REMOTE RADIO HEAD
DC	DIRECT CURRENT	RRU	REMOTE RADIO UNIT
DIA	DIAMETER	RWY	RACEWAY
DWG	DRAWING	SFP	SMALL FORM-FACTOR PLUGGABLE
EC	ELECTRICAL CONDUCTOR	SIAD	SMART INTEGRATED ACCESS DEVICE
EMT	ELECTRICAL METALLIC TUBING	SSC	SITE SOLUTIONS CABINET
FIF	FACILITY INTERFACE FRAME	T1	1544KBPS DIGITAL LINE
GEN	GENERATOR	TDMA	TIME-DIVISION MULTIPLE ACCESS
GPS	GLOBAL POSITIONING SYSTEM	TMA	TOWER MOUNT AMPLIFIER
GSM	GLOBAL SYSTEM FOR MOBILE	TVSS	TRANSIENT VOLTAGE SUPPRESSION SYSTEM
HVAC	HEAT/VENTILATION/AIR CONDITIONING	TYP	TYPICAL
ICF	INTERCONNECTION FRAME	UMTS	UNIVERSAL MOBILE TELECOMMUNICATION SYSTEM
IGR	INTERIOR GROUNDING RING (HALO)	UPS	UNINTERRUPTIBLE POWER SUPPLY (DC POWER PLANT)
LTE	LONG TERM EVOLUTION		

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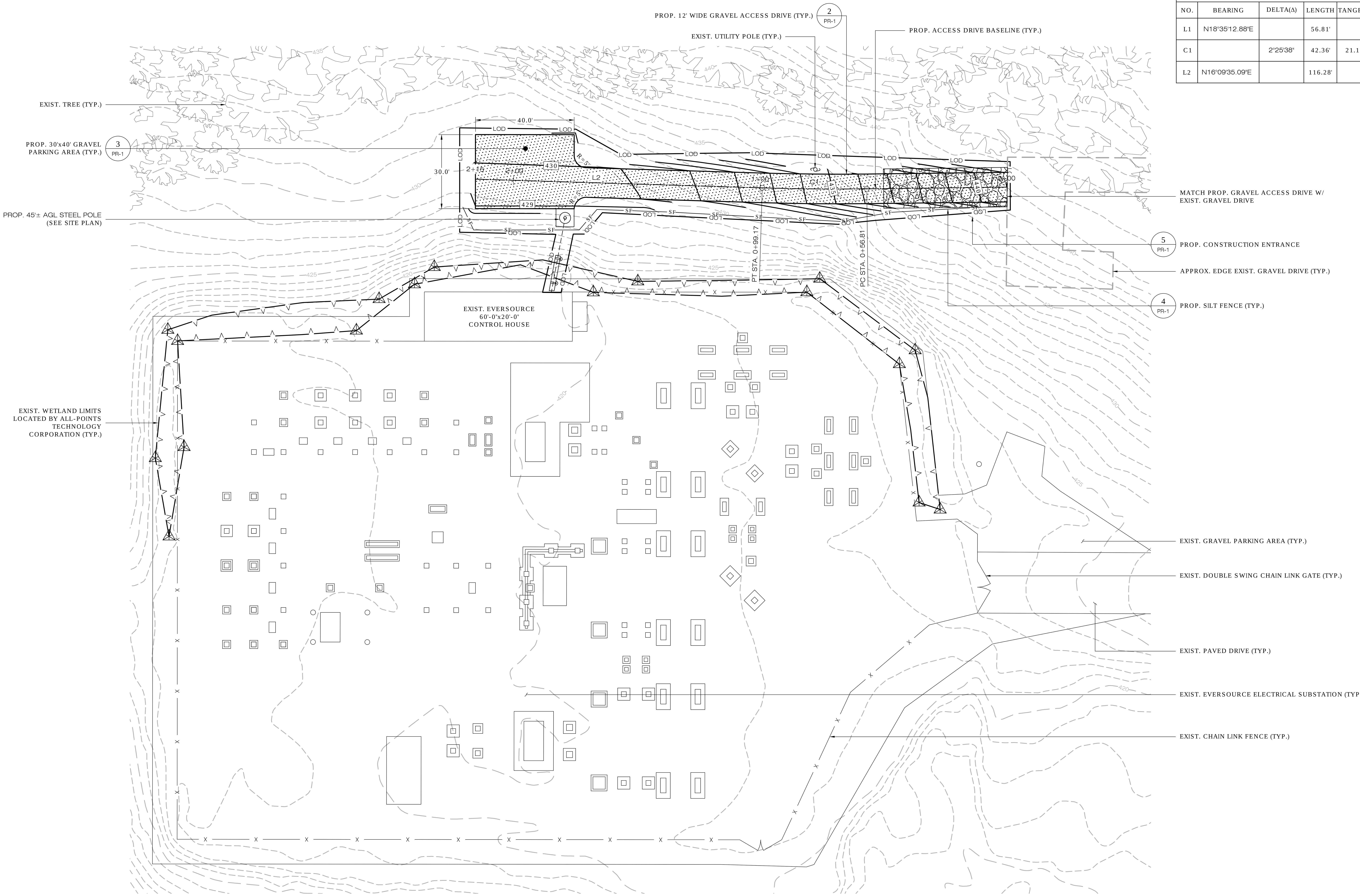
SHEET TITLE
NOTES & SPECIFICATIONS

SHEET NUMBER
N-3

ACCESS DRIVE					
NO.	BEARING	DELTA(Δ)	LENGTH	TANGENT	RADIUS
L1	N18°35'12.88"E		56.81'		
C1		2°25'38"	42.36'	21.18'	1000.0'
L2	N16°09'35.09"E		116.28'		



1
SP-1
SITE & GRADING PLAN
SCALE : 1" = 20'-0"

20 0 10 20 40
(IN FEET) 1 inch = 20 ft.

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CONCEPT

NO	DATE	REVISION
0	05/29/20	FOR REVIEW: EEL
1	06/24/20	REV. POLE HEIGHT: BJP
2	10/28/20	REV. ACCESS DRIVE: BJP
3		
4		
5		
6		

DESIGN PROFESSIONAL OF RECORD
PROF: BRADLEY J. PARSONS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION
ADD: 567 VAUXHAUL STREET EXTENSION - SUITE 311 WATERFORD, CT 06385
OWNER: EVERSOURCE ENERGY
ADDRESS: 107 SELDEN STREET BERLIN, CT 06037

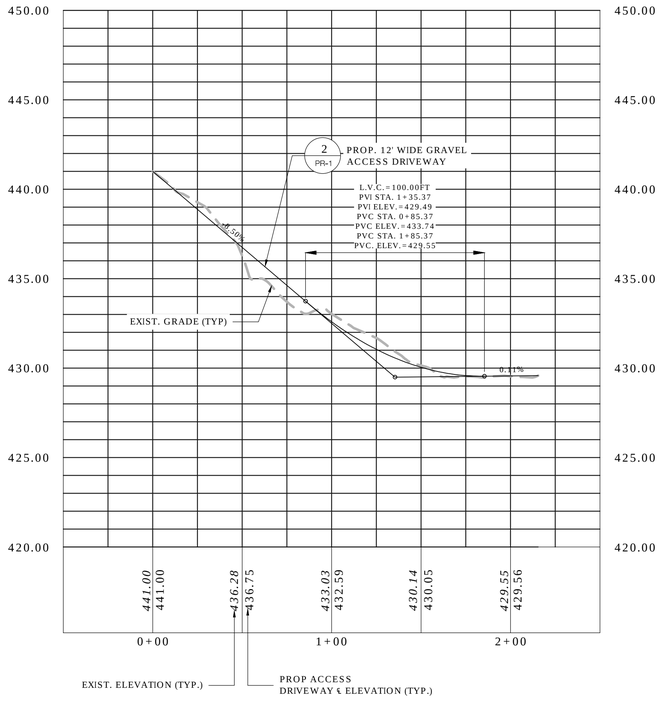
CANTON 5R

SITE ADDRESS: 13 MORGAN RD. CANTON, CT 06019
APT FILING NUMBER: CT578100
DRAWN BY: CSH
DATE: 05/29/20
CHECKED BY: EEL

SHEET TITLE:
ACCESS DRIVE GRADING PLAN

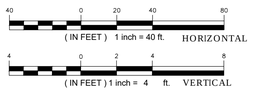
SHEET NUMBER:
SP-1

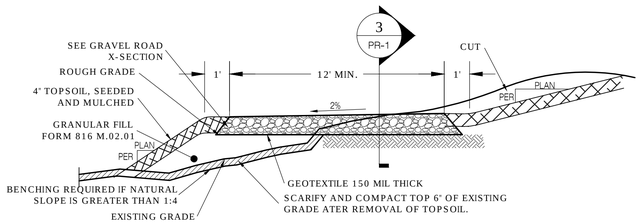
STATE OF CONNECTICUT PROFESSIONAL ENGINEER



1 PR-1 ACCESS DRIVEWAY PROFILE

SCALE : HORIZONTAL: 1" = 40'-0"
VERTICAL: 1" = 4'-0"



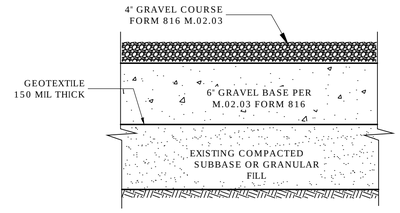


* CROSS SLOPE GRADE SHALL BE 1-2% AS SHOWN ON NEW GRADING

* WHERE CUT OR FILL EMBANKMENTS ARE STEEPER THAN 3:1 USE A STAPLED IN PLACE, BIODEGRADABLE EROSION CONTROL BLANKET OR A BONDED FIBER MATRIX HYDROSEED APPLICATION.

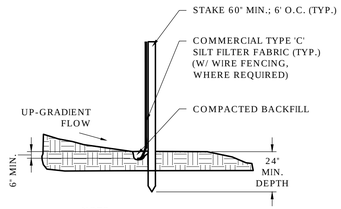
2 PR-1 TYPICAL ROAD CROSS SECTION

SCALE : N.T.S.



3 PR-1 GRAVEL ROAD/PARKING SECTION

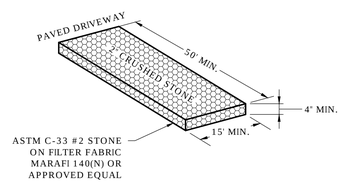
SCALE : N.T.S.



NOTE:
SILT FENCE SHALL BE LAPPED ONLY WHEN NECESSARY PER THE MANUFACTURER RECOMMENDATIONS.

4 PR-1 SILT FENCE DETAIL

SCALE : N.T.S.



5 PR-1 CONSTRUCTION ENTRANCE DETAIL

SCALE : N.T.S.

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5		
6		

DESIGN PROFESSIONAL OF RECORD

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ADD: 567 VAUXHAUL STREET EXTENSION - SUITE 311 WATERFORD, CT 06385

OWNER: EVERSOURCE ENERGY

ADDRESS: 107 SELDEN STREET BERLIN, CT 06037

CANTON 5R

SITE ADDRESS: 13 MORGAN RD. CANTON, CT 06019

APT FILING NUMBER: CT578100

DRAWN BY: CSH

DATE: 05/29/20

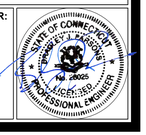
CHECKED BY: EEL

SHEET TITLE:

ACCESS DRIVEWAY PROFILE & DETAILS

SHEET NUMBER:

PR-1



Attachment 2 – Antenna Specifications

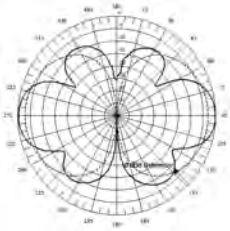
VHF Omni Antennas (160-222 MHz)

		160-174 MHz						217-222 MHz									
	Model Number	**DS1G03F36U-N**	**DS1G03F36U-D**	**DS1G06F36U-N**	**DS1G06F36U-D**	**DS1G03F36D-N**	**DS1G03F36D-D**	**DS2C00F36U-N**	**DS2C00F36U-D**	**DS2C03F36U-N**	**DS2C03F36U-D**	**DS2C06F36U-N**	**DS2C06F36U-D**	**DS2C00F36D-N**	**DS2C00F36D-D**	**DS2C03F36D-N**	**DS2C03F36D-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
	Type	Single		Single		Dual		Single		Single		Single		Dual		Dual	
ELECTRICAL	**Bandwidth**, MHz	14		14		14		5		5		5		5		5	
ELECTRICAL	**Power**, Watts	500		500		350		500		500		500		350		350	
ELECTRICAL	**Gain**, dBd	3		6		3		0		3		6		0		3	
ELECTRICAL	**Horizontal Beamwidth**, degrees	360		360		360		360		360		360		360		360	
ELECTRICAL	**Vertical Beamwidth**, degrees	30		16		30		60		30		16		60		30	
ELECTRICAL	**Beam Tilt**, degrees	0		0		0		0		0		0		0		0	
ELECTRICAL	**Isolation (minimum)**, dB	N/A		N/A		30		N/A		N/A		N/A		30		30	
MECHANICAL	**Number of Connectors**	1		1		2		1		1		1		2		2	
MECHANICAL	**Flat Plate Area**, ft²(m²)	2.53 (0.24)		4.38 (0.41)		4.5 (0.42)		1.9 (0.18)		1.9 (0.18)		2.58 (0.24)		2.4 (0.22)		4.1 (0.38)	
MECHANICAL	**Lateral Windload Thrust**, lbf(N)	95 (423)		164 (730)		169 (752)		53 (236)		69 (307)		108 (480)		90 (400)		169 (752)	
MECHANICAL	**Survival Wind Speed** **without ice**, mph(kph) **with 0.5" radial ice**, mph(kph)	 110 (177) 93 (150)		 75 (121) 60 (97)		 75 (121) 65 (105)		 222 (357) 193 (311)		 172 (277) 150 (241)		 110 (177) 96 (154)		 130 (209) 115 (185)		 75 (121) 65 (105)	
MECHANICAL	**Mounting Hardware** included	DSH3V3R		DSH3V3N		DSH3V3N		DSH2V3R		DSH2V3R		DSH3V3N		DSH3V3R		DSH3V3N	
DIMENSIONS	**Length**, ft(m)	12.7 (3.9)		21.9 (6.7)		22.3 (6.8)		7.7 (2.3)		9.9 (3)		18.1 (5.5)		13.6 (4.1)		24.3 (7.4)	
DIMENSIONS	**Radome O.D.**, in(cm)	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)	
DIMENSIONS	**Net Weight** w/o bracket, lb(kg)	37 (16.8)		60 (27.2)		63 (28.6)		19 (8.6)		26 (11.8)		47 (21.3)		40 (18.1)		70 (31.8)	
DIMENSIONS	**Shipping Weight**, lb(kg)	67 (30.4)		90 (40.8)		93 (42.2)		39 (17.7)		56 (25.4)		77 (34.9)		70 (31.8)		100 (45.4)	

DS2C03F36D-D

VERTICAL PATTERNS

DS1G03F36U-N
DS1G03F36U-D



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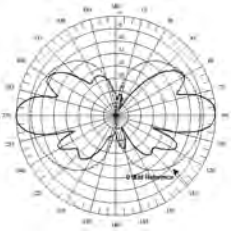
DS1G06F36U-D



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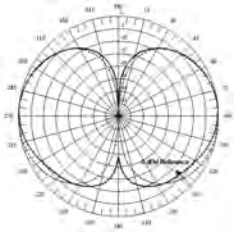

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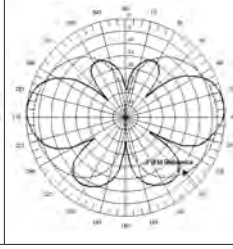

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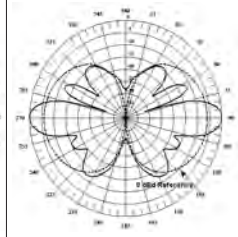

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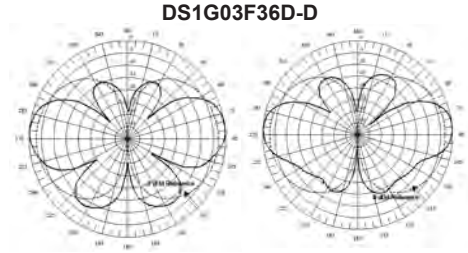

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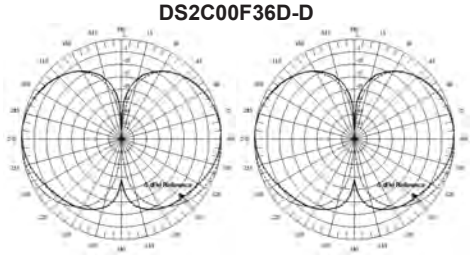

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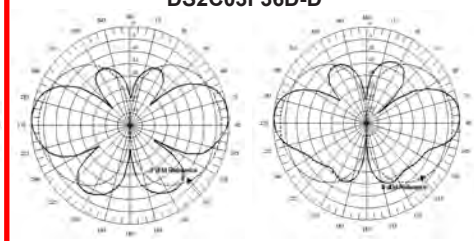
DS2C03F36D-D



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Attachment 3 – Structural Analysis Report

Date: **July 15, 2020**

Black & Veatch Corp.
6800 W. 115th St., Suite 2292
Overland Park, KS 66211
(913) 458-2522

Subject:	**Structural Analysis Report**	
Eversource Designation:	**Site Number:**	ES-136
	Site Name:	Canton5R
Engineering Firm Designation:	**Black & Veatch Corp. Project Number:**	403093
Site Data:	**13 Morgan Rd, Canton, Hartford County, CT** **Latitude *41° 50' 18.88"*, Longitude *-72° 55' 34.26"*** **45 Foot – Proposed Monopole Tower**	

Black & Veatch Corp. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC1: Proposed Equipment Configuration **Sufficient Capacity – 52.6%**

This analysis utilizes an ultimate 3-second gust wind speed of 130 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Chris Giannotti

Respectfully submitted by:

Joshua J Riley, P.E.
Professional Engineer

07/15/2020

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a proposed 45 ft Monopole tower manufactured by Sabre-FWT.

2) ANALYSIS CRITERIA

TIA-222 Revision: TIA-222-H
Risk Category: III
Wind Speed: 130 mph ultimate
Exposure Category: C
Topographic Factor: 1
Ice Thickness: 2 in
Wind Speed with Ice: 50 mph
Seismic Ss: 0.180
Seismic S_1: 0.065
Service Wind Speed: 60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
42.0	55.0	1	DBSPECTRA	DS2C03F36D-D	2	7/8	-
	42.0	1	Generic	Mount Pipe 4" Sch 40 (4.5 OD) x 6'-0"			
		1	Site Pro 1	Chain Mount (P/N TCHM1)			

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
TOWER MANUFACTURER DRAWINGS	Sabre-FWT Erection Drawing 55' H1-LD2 WPE's	-	Eversource
GEOTECHNICAL REPORT	Substation Foundation Design Dated 8/31/2015	-	Eversource

3.1) Analysis Method

tnxTower (version 8.0.5.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures to be installed and maintained in accordance with the manufacturer's specifications.
2) Tower is in plumb condition.
3) All coax cables routed as specified in Appendix B of this report.
4) All members are assumed to be as specified in the original tower design documents.
5) All member protective coatings are in good condition.
6) All tower members were properly design, fabricated, installed and have been properly maintained since erection.

7) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
8) Soil parameters provided by Eversource. Black & Veatch does not assume any responsibility for its accuracy.

This analysis may be affected if any assumptions are not valid or have been made in error. Black & Veatch Corp. should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	45 - 0	Pole	TP13.8807x8x0.1875	1	-1.46	483.63	36.7	Pass
							Summary	
						Pole (L1)	36.7	Pass
						RATING =	36.7	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Base Foundation Soil Interaction	0	52.6	Pass
	Base Foundation		36.9	Pass

Structure Rating (max from all components) =	52.6%

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

The proposed tower must conform to the following specifications:

- Pole Type: Sabre-FWT 55’ H1
- Embedment Depth: 10 ft
- Foundation: Concrete Encased with 4.5 ft Diameter (design meets SUB 090 8.A.2 requirements)

After proper installation, the tower and its foundation will have sufficient capacity to carry the proposed load configuration.

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °	Check*
L1	45 - 0	3.22	41	0.5728	0.0197	OK

*Limit State Deformation (TIA-222-H Section 2.8.2)
1) Maximum Rotation = 4 Degrees
2) Maximum Deflection = 0.03 * Tower Height = 16 in.

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °	Combined Max	Check*
L1	45 - 0	8.559	42	1.524	0.0559	1.525	OK**

*Up to 0.5 degree is considered acceptable per SUB090 Section 7

** Deflection approved by Eversource Energy

APPENDIX A

TNXTOWER OUTPUT

DESIGNED APPURTENANCE LOADING

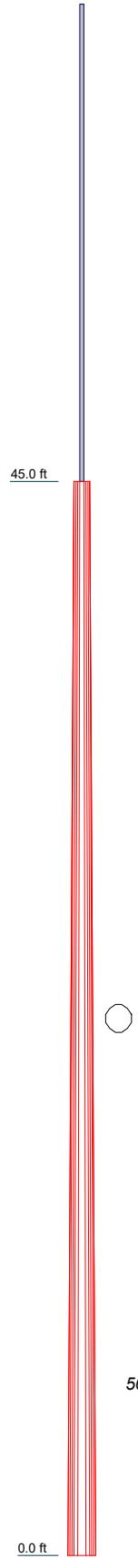
TYPE	ELEVATION	TYPE	ELEVATION
Side Arm Mount [SO 202-1]	42	DS2C03F36D-D	42

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

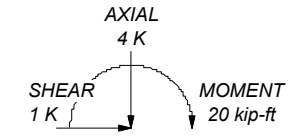
TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 130 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 2.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category III.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 36.7%

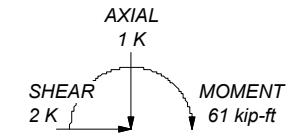


Section	Length (ft)	Number of Sides	Thickness (in)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	45.00	12	0.1875	8.0000	13.8807	A572-65	1.0
							1.0

ALL REACTIONS ARE FACTORED



TORQUE 0 kip-ft
50 mph WIND - 2.0000 in ICE



TORQUE 1 kip-ft
REACTIONS - 130 mph WIND

BLACK & VEATCH
Building a world of difference.

Black & Veatch Corp.
6800 W. 115th St., Suite 2292
Overland Park, KS 66211
Phone: (913) 458-9650
FAX:

Job: ***ES-136 Canton5R***			
Project: ***403093***			
Client: Eversource	Drawn by: CG		App'd:
Code: TIA-222-H	Date: 06/24/20		Scale: NTS
Path:			Dwg No. E-1

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

1) Tower is located in Hartford County, Connecticut.
2) Tower base elevation above sea level: 435.00 ft.
3) Basic wind speed of 130 mph.
4) Risk Category III.
5) Exposure Category C.
6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
7) Topographic Category: 1.
8) Crest Height: 0.00 ft.
9) Nominal ice thickness of 2.0000 in.
10) Ice thickness is considered to increase with height.
11) Ice density of 56 pcf.
12) A wind speed of 50 mph is used in combination with ice.
13) Temperature drop of 50 °F.
14) Deflections calculated using a wind speed of 60 mph.
15) A non-linear (P-delta) analysis was used.
16) Pressures are calculated at each section.
17) Stress ratio used in pole design is 1.
18) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-H Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	45.00-0.00	45.00		12	8.0000	13.8807	0.1875	0.7500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	8.2161	4.7168	36.7463	2.7969	4.1440	8.8673	74.4579	2.3215	1.6415	8.755
	14.3042	8.2673	197.8600	4.9022	7.1902	27.5180	400.9180	4.0689	3.2175	17.16

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 45.00-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
7/8	C	No	Surface Ar (CaAa)	42.00 - 0.00	2	2	0.000 0.030	1.1100		0.54

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	45.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	9.324	0.000	0.05

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	45.00-0.00	A	2.202	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	34.780	0.000	0.50

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	45.00-0.00	-0.0363	1.1543	-0.0498	1.5858

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	1	7/8	0.00 - 42.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment ° °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Side Arm Mount [SO 202-1]	A	From Leg	0.50 0.00 0.00	0.0000	42.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.78 2.24 2.75 3.89	2.97 3.57 4.19 5.55	0.11 0.13 0.16 0.25
DS2C03F36D-D	A	From Leg	1.00 0.00 13.00	0.0000	42.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.29 9.75 12.23 17.24	7.29 9.75 12.23 17.24	0.07 0.12 0.19 0.37

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	45 - 0	Pole	Max Tension	27	0.00	0.00	-0.00
			Max. Compression	26	-4.16	0.00	0.75
			Max. Mx	8	-1.46	-61.49	0.20
			Max. My	2	-1.46	0.00	59.32
			Max. Vy	8	2.14	-61.49	0.20
			Max. Vx	2	-2.08	0.00	59.32
			Max. Torque	9			0.60

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	28	4.16	-0.31	0.52
	Max. H_x	21	1.10	2.14	0.00
	Max. H_z	3	1.10	0.00	2.08
	Max. M_x	2	59.32	0.00	2.08
	Max. M_z	8	61.49	-2.14	0.00
	Max. Torsion	9	0.60	-2.14	0.00
	Min. Vert	5	1.10	-1.07	1.80
	Min. H_x	9	1.10	-2.14	0.00
	Min. H_z	15	1.10	0.00	-2.08
	Min. M_x	14	-58.91	0.00	-2.08
	Min. M_z	20	-61.49	2.14	0.00
	Min. Torsion	21	-0.60	2.14	0.00

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	1.22	0.00	0.00	-0.17	0.00	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	1.46	0.00	-2.08	-59.32	0.00	0.00

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.0 Wind 0 deg - No Ice	1.10	0.00	-2.08	-59.08	0.00	0.00
1.2 Dead+1.0 Wind 30 deg - No Ice	1.46	1.07	-1.80	-51.40	-30.75	-0.30
0.9 Dead+1.0 Wind 30 deg - No Ice	1.10	1.07	-1.80	-51.19	-30.65	-0.30
1.2 Dead+1.0 Wind 60 deg - No Ice	1.46	1.85	-1.04	-29.76	-53.25	-0.52
0.9 Dead+1.0 Wind 60 deg - No Ice	1.10	1.85	-1.04	-29.61	-53.09	-0.52
1.2 Dead+1.0 Wind 90 deg - No Ice	1.46	2.14	0.00	-0.20	-61.49	-0.60
0.9 Dead+1.0 Wind 90 deg - No Ice	1.10	2.14	0.00	-0.15	-61.30	-0.60
1.2 Dead+1.0 Wind 120 deg - No Ice	1.46	1.85	1.04	29.36	-53.25	-0.52
0.9 Dead+1.0 Wind 120 deg - No Ice	1.10	1.85	1.04	29.31	-53.09	-0.52
1.2 Dead+1.0 Wind 150 deg - No Ice	1.46	1.07	1.80	50.99	-30.75	-0.30
0.9 Dead+1.0 Wind 150 deg - No Ice	1.10	1.07	1.80	50.89	-30.65	-0.30
1.2 Dead+1.0 Wind 180 deg - No Ice	1.46	0.00	2.08	58.91	0.00	0.00
0.9 Dead+1.0 Wind 180 deg - No Ice	1.10	0.00	2.08	58.78	0.00	0.00
1.2 Dead+1.0 Wind 210 deg - No Ice	1.46	-1.07	1.80	50.99	30.75	0.30
0.9 Dead+1.0 Wind 210 deg - No Ice	1.10	-1.07	1.80	50.89	30.65	0.30
1.2 Dead+1.0 Wind 240 deg - No Ice	1.46	-1.85	1.04	29.36	53.25	0.52
0.9 Dead+1.0 Wind 240 deg - No Ice	1.10	-1.85	1.04	29.31	53.09	0.52
1.2 Dead+1.0 Wind 270 deg - No Ice	1.46	-2.14	0.00	-0.20	61.49	0.60
0.9 Dead+1.0 Wind 270 deg - No Ice	1.10	-2.14	0.00	-0.15	61.30	0.60
1.2 Dead+1.0 Wind 300 deg - No Ice	1.46	-1.85	-1.04	-29.76	53.25	0.52
0.9 Dead+1.0 Wind 300 deg - No Ice	1.10	-1.85	-1.04	-29.61	53.09	0.52
1.2 Dead+1.0 Wind 330 deg - No Ice	1.46	-1.07	-1.80	-51.40	30.75	0.30
0.9 Dead+1.0 Wind 330 deg - No Ice	1.10	-1.07	-1.80	-51.19	30.65	0.30
1.2 Dead+1.0 Ice+1.0 Temp	4.16	0.00	-0.00	-0.75	0.00	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	4.16	0.00	-0.60	-19.75	0.00	0.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	4.16	0.31	-0.52	-17.20	-9.76	-0.11
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	4.16	0.53	-0.30	-10.25	-16.91	-0.19
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	4.16	0.61	-0.00	-0.75	-19.52	-0.22
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	4.16	0.53	0.30	8.75	-16.91	-0.19
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	4.16	0.31	0.52	15.71	-9.76	-0.11
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	4.16	0.00	0.60	18.25	0.00	0.00
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	4.16	-0.31	0.52	15.71	9.76	0.11
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	4.16	-0.53	0.30	8.75	16.91	0.19
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	4.16	-0.61	-0.00	-0.75	19.52	0.22
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	4.16	-0.53	-0.30	-10.25	16.91	0.19

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	4.16	-0.31	-0.52	-17.20	9.76	0.11
Dead+Wind 0 deg - Service	1.22	0.00	-0.44	-12.32	0.00	0.00
Dead+Wind 30 deg - Service	1.22	0.22	-0.38	-10.69	-6.30	-0.06
Dead+Wind 60 deg - Service	1.22	0.39	-0.22	-6.25	-10.92	-0.10
Dead+Wind 90 deg - Service	1.22	0.45	0.00	-0.17	-12.61	-0.12
Dead+Wind 120 deg - Service	1.22	0.39	0.22	5.91	-10.92	-0.10
Dead+Wind 150 deg - Service	1.22	0.22	0.38	10.36	-6.30	-0.06
Dead+Wind 180 deg - Service	1.22	0.00	0.44	11.99	0.00	0.00
Dead+Wind 210 deg - Service	1.22	-0.22	0.38	10.36	6.30	0.06
Dead+Wind 240 deg - Service	1.22	-0.39	0.22	5.91	10.92	0.10
Dead+Wind 270 deg - Service	1.22	-0.45	0.00	-0.17	12.61	0.12
Dead+Wind 300 deg - Service	1.22	-0.39	-0.22	-6.25	10.92	0.10
Dead+Wind 330 deg - Service	1.22	-0.22	-0.38	-10.69	6.30	0.06

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-1.22	0.00	0.00	1.22	0.00	0.000%
2	0.00	-1.46	-2.08	0.00	1.46	2.08	0.000%
3	0.00	-1.10	-2.08	0.00	1.10	2.08	0.000%
4	1.07	-1.46	-1.80	-1.07	1.46	1.80	0.000%
5	1.07	-1.10	-1.80	-1.07	1.10	1.80	0.000%
6	1.85	-1.46	-1.04	-1.85	1.46	1.04	0.000%
7	1.85	-1.10	-1.04	-1.85	1.10	1.04	0.000%
8	2.14	-1.46	0.00	-2.14	1.46	0.00	0.000%
9	2.14	-1.10	0.00	-2.14	1.10	0.00	0.000%
10	1.85	-1.46	1.04	-1.85	1.46	-1.04	0.000%
11	1.85	-1.10	1.04	-1.85	1.10	-1.04	0.000%
12	1.07	-1.46	1.80	-1.07	1.46	-1.80	0.000%
13	1.07	-1.10	1.80	-1.07	1.10	-1.80	0.000%
14	0.00	-1.46	2.08	0.00	1.46	-2.08	0.000%
15	0.00	-1.10	2.08	0.00	1.10	-2.08	0.000%
16	-1.07	-1.46	1.80	1.07	1.46	-1.80	0.000%
17	-1.07	-1.10	1.80	1.07	1.10	-1.80	0.000%
18	-1.85	-1.46	1.04	1.85	1.46	-1.04	0.000%
19	-1.85	-1.10	1.04	1.85	1.10	-1.04	0.000%
20	-2.14	-1.46	0.00	2.14	1.46	0.00	0.000%
21	-2.14	-1.10	0.00	2.14	1.10	0.00	0.000%
22	-1.85	-1.46	-1.04	1.85	1.46	1.04	0.000%
23	-1.85	-1.10	-1.04	1.85	1.10	1.04	0.000%
24	-1.07	-1.46	-1.80	1.07	1.46	1.80	0.000%
25	-1.07	-1.10	-1.80	1.07	1.10	1.80	0.000%
26	0.00	-4.16	0.00	0.00	4.16	0.00	0.000%
27	0.00	-4.16	-0.60	0.00	4.16	0.60	0.000%
28	0.31	-4.16	-0.52	-0.31	4.16	0.52	0.000%
29	0.53	-4.16	-0.30	-0.53	4.16	0.30	0.000%
30	0.61	-4.16	0.00	-0.61	4.16	0.00	0.000%
31	0.53	-4.16	0.30	-0.53	4.16	-0.30	0.000%
32	0.31	-4.16	0.52	-0.31	4.16	-0.52	0.000%
33	0.00	-4.16	0.60	0.00	4.16	-0.60	0.000%
34	-0.31	-4.16	0.52	0.31	4.16	-0.52	0.000%
35	-0.53	-4.16	0.30	0.53	4.16	-0.30	0.000%
36	-0.61	-4.16	0.00	0.61	4.16	0.00	0.000%
37	-0.53	-4.16	-0.30	0.53	4.16	0.30	0.000%
38	-0.31	-4.16	-0.52	0.31	4.16	0.52	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
39	0.00	-1.22	-0.44	0.00	1.22	0.44	0.000%
40	0.22	-1.22	-0.38	-0.22	1.22	0.38	0.000%
41	0.39	-1.22	-0.22	-0.39	1.22	0.22	0.000%
42	0.45	-1.22	0.00	-0.45	1.22	0.00	0.000%
43	0.39	-1.22	0.22	-0.39	1.22	-0.22	0.000%
44	0.22	-1.22	0.38	-0.22	1.22	-0.38	0.000%
45	0.00	-1.22	0.44	0.00	1.22	-0.44	0.000%
46	-0.22	-1.22	0.38	0.22	1.22	-0.38	0.000%
47	-0.39	-1.22	0.22	0.39	1.22	-0.22	0.000%
48	-0.45	-1.22	0.00	0.45	1.22	0.00	0.000%
49	-0.39	-1.22	-0.22	0.39	1.22	0.22	0.000%
50	-0.22	-1.22	-0.38	0.22	1.22	0.38	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00018557
7	Yes	4	0.00000001	0.00010788
8	Yes	4	0.00000001	0.00014043
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00010986
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00013127
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00013127
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00010986
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00014043
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00018557
23	Yes	4	0.00000001	0.00010788
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00010376
28	Yes	4	0.00000001	0.00013153
29	Yes	4	0.00000001	0.00017080
30	Yes	4	0.00000001	0.00015853
31	Yes	4	0.00000001	0.00013713
32	Yes	4	0.00000001	0.00012112
33	Yes	4	0.00000001	0.00008756
34	Yes	4	0.00000001	0.00012112
35	Yes	4	0.00000001	0.00013713
36	Yes	4	0.00000001	0.00015853
37	Yes	4	0.00000001	0.00017080
38	Yes	4	0.00000001	0.00013153
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	45 - 0	3.220	41	0.5728	0.0197

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
42.00	Side Arm Mount [SO 202-1]	41	3.005	0.5347	0.0184	Inf

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	45 - 0	15.877	8	2.8270	0.1033

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
42.00	Side Arm Mount [SO 202-1]	8	14.818	2.6385	0.0964	Inf

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	45 - 0 (1)	TP13.8807x8x0.1875	45.00	0.00	0.0	8.2673	-1.46	483.63	0.003

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	45 - 0 (1)	TP13.8807x8x0.1875	61.49	169.03	0.364	0.00	169.03	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	45 - 0 (1)	TP13.8807x8x0.1875	2.14	145.09	0.015	0.60	174.76	0.003

Pole Interaction Design Data

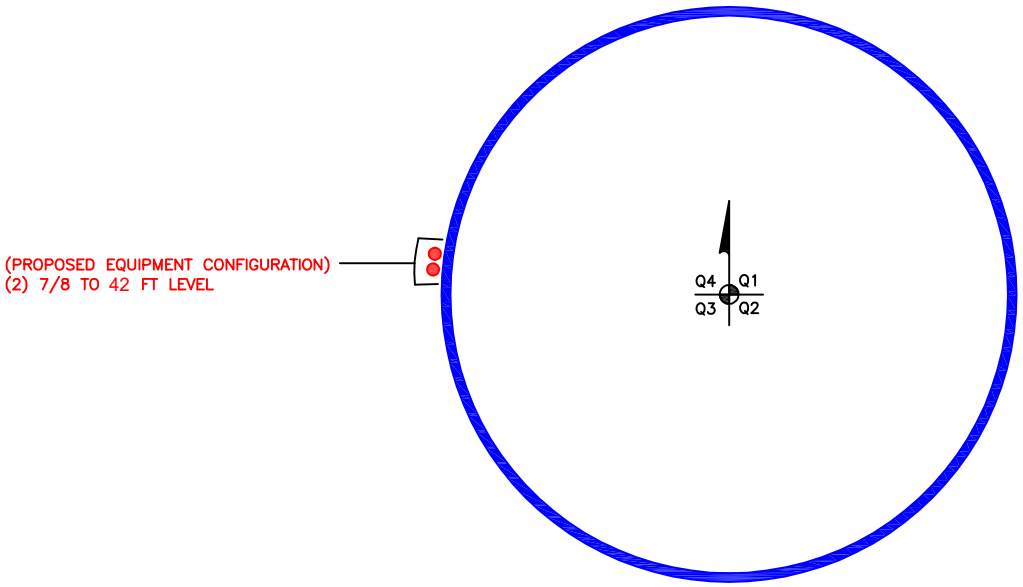
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	45 - 0 (1)	0.003	0.364	0.000	0.015	0.003	0.367	1.000	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	45 - 0	Pole	TP13.8807x8x0.1875	1	-1.46	483.63	36.7	Pass
							Summary	
						Pole (L1)	36.7	Pass
						RATING =	**36.7**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(PROPOSED EQUIPMENT CONFIGURATION)
(2) 7/8 TO 42 FT LEVEL
Q4
Q1
Q3
Q2

APPENDIX C

ADDITIONAL CALCULATIONS

```
*********************************************************************************************
*                                                                                           *
* CAISSON - Pier Foundations Analysis and Design -  Copyright Power Line Systems, Inc. 1993-2016 *
*                                                                                           *
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```

Project Title: ES-136 Canton5R
Project Notes: Eversource

Calculation Method: Full 8CD

******* I N P U T D A T A

Pier Properties

Diameter (ft)	Distance of Top of Pier above Ground (ft)	Concrete Strength (ksi)	Steel Yield Strength (ksi)
4.50	0.00		

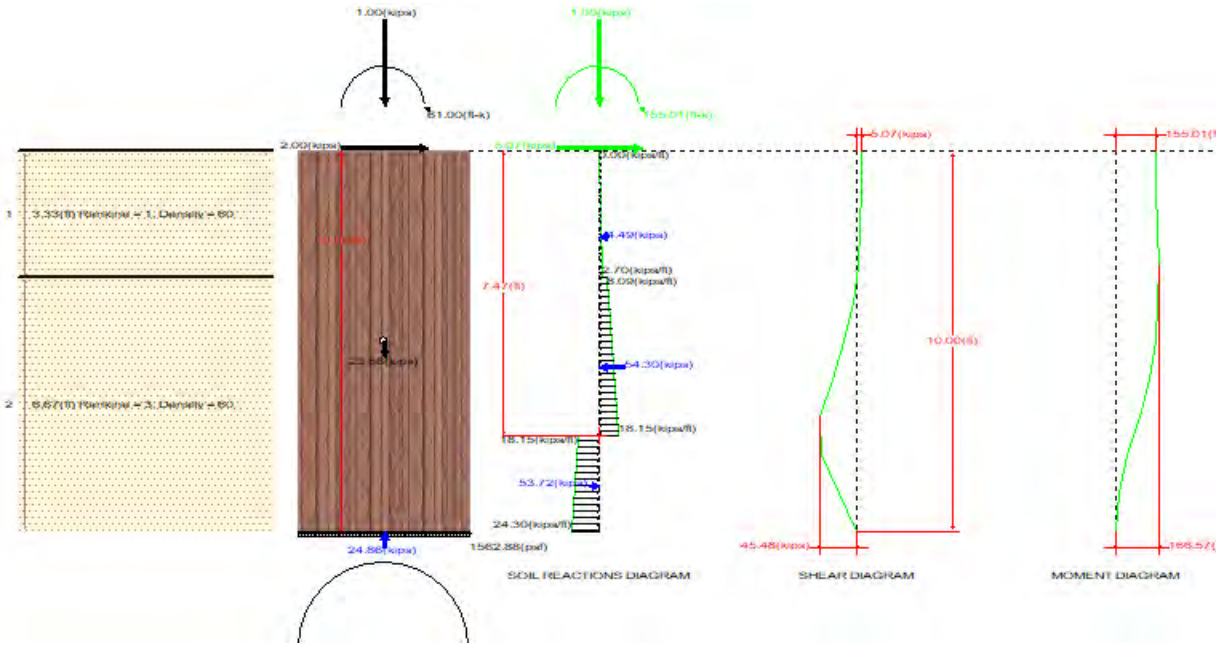
Soil Properties

Layer	Type	Thickness (ft)	Depth at Top of Layer (ft)	Density (lbs/ft^3)	CU (psf)	KP	PHI (deg)
1	Sand	3.33	0.00	60.0	1.000		
2	Sand	6.67	3.33	60.0	3.000		30.00

Design (Factored) Loads at Top of Pier

Moment (ft-k)	Axial Load (kips)	Shear Load (kips)	Additional Safety Factor Against Soil Failure
61.0	1.0	2.00	2.53

******* R E S U L T S



Calculated Pier Properties

Length (ft)	Weight (kips)	Pressure Due To Axial Load (psf)	Pressure Due To Weight (psf)	Total End-Bearing Pressure (psf)
10.000	23.856	62.9	1500.0	1562.9

Ultimate Resisting Forces Along Pier

Type	Distance of Top of Layer to Top of Pier (ft)	Thickness (ft)	Density (lbs/ft^3)	CU (psf)	KP	Force (kips)	Arm (ft)
Sand	0.00	3.33	60.0		1.000	4.49	2.22
Sand	3.33	4.14	60.0		3.000	54.30	5.66
Sand	7.47	2.53	60.0		3.000	-53.72	8.80

Shear and Moments Along Pier

Distance below Top of Pier (ft)	Shear (with Safety Factor) (kips)	Moment (with Safety Factor) (ft-k)	Shear (without Safety Factor) (kips)	Moment (without Safety Factor) (ft-k)
0.00	5.1	155.0	2.0	61.3
1.00	4.7	159.9	1.8	63.2
2.00	3.4	164.1	1.4	64.8
3.00	1.4	166.6	0.6	65.8
4.00	-5.4	165.4	-2.1	65.4
5.00	-16.3	154.7	-6.5	61.1
6.00	-29.7	131.9	-11.7	52.1
7.00	-45.5	94.5	-18.0	37.4
8.00	-43.7	45.4	-17.3	17.9
9.00	-23.1	11.7	-9.1	4.6
10.00	0.0	0.0	0.0	0.0

Embedded Pole

This sheet calculates the capacity of an embedded pole according to either EIA/TIA-222-F, TIA-222-G, or TIA-222-H.

ES-136 Canton5R
Eversource

TIA Revision: H

Reactions:		
Tower Weight, **P_u:**	1	kip
Moment, **M_u:**	61.0	kip-ft

Embedded Shaft Properties:		
Shaft Filled & Encased with Concrete?	Y	Y/N
Yield Stress, **Fy:**	65	ksi
# of Sides:	12	"0" if round
Thickness of Pole, **t:**	0.1875	in
Dia. at Top of Pole Section:	8	in
Dia. at Bot. of Pole Section:	15.1875	in
Length of Pole Section:	55	ft
Diameter at Max Moment, **D:**	14.30	in

Pier Properties		
Diameter of Pier, **Dp:**	4.5	ft
Depth of Foundation, **L:**	10	ft
Concrete Density, **δc:**	88	pcf

Soil Properties		
Soil Unit Weight, **γ**:	60	pcf
Ultimate Gross Bearing, ***Bc*** *:*	4	ksf

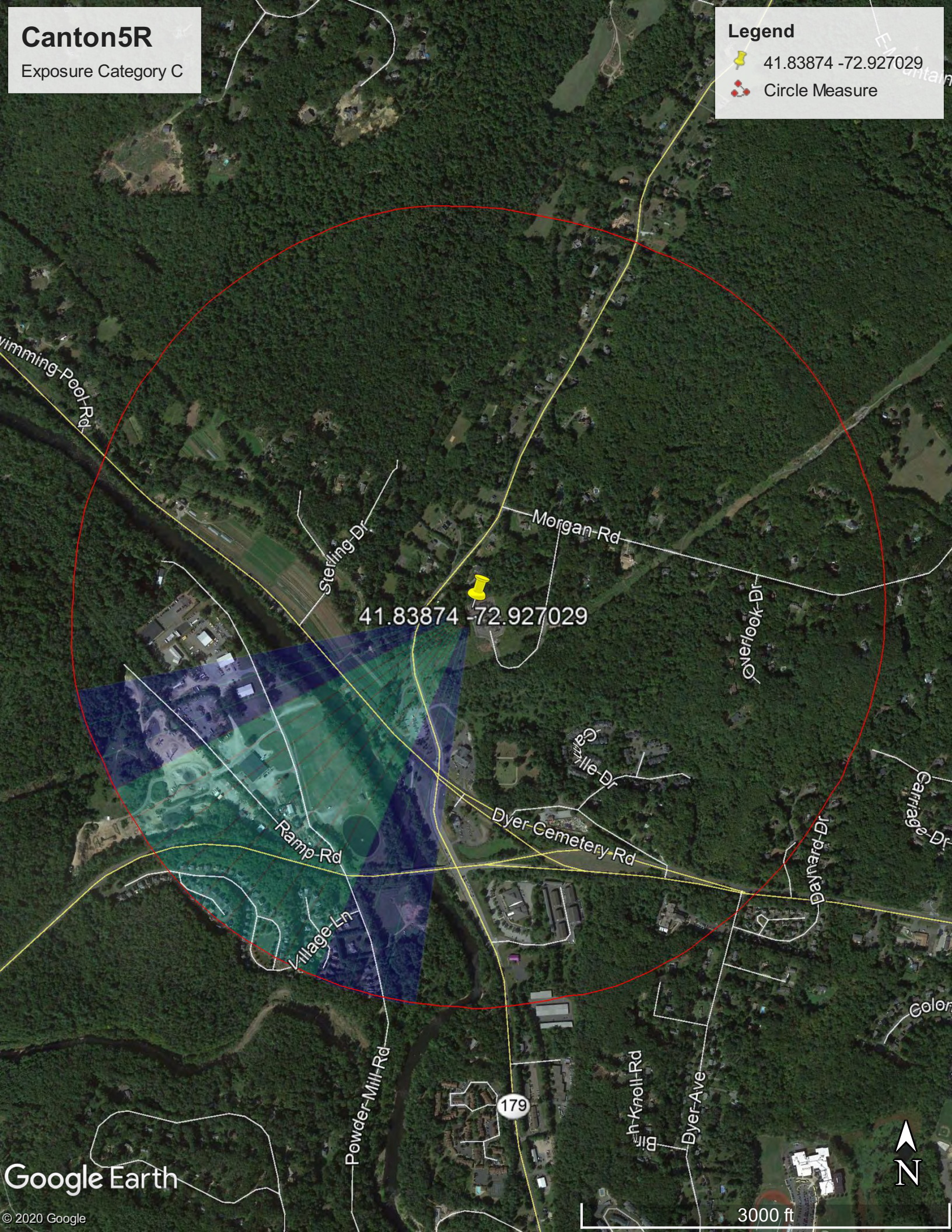
Design Checks				
	Capacity/ Availability	**Demand/ Limits**	**Rating**	**Check**
Steel Axial Capacity (k):	628.12	1.00	**0.16%**	**Pass**
Steel Moment Capacity (k-ft):	179.66	66.02	**36.75%**	**Pass**
Combined Ratio:	1.00	0.369	**36.91%**	**Pass**
Soil Moment Capacity (FOS):	2.53	1.33	**52.57%**	**Pass**
Bearing Pressure (ksf):	3.00	0.94	**31.30%**	**Pass**

Soil Rating:	**52.6%**
Structural Rating:	**36.9%**

Caisson Analysis		
Depth to Zero Shear	3.22	ft
Max Moment	66.02	kip-ft
Overturning FOS:	2.53	

Depth		Shear		Moment	
2	ft	1.4	kips	64.8	kip-ft
3	ft	0.6	kips	65.8	kip-ft
4	ft	-2.1	kips	65.4	kip-ft

REFERENCES


Canton5R
Exposure Category C
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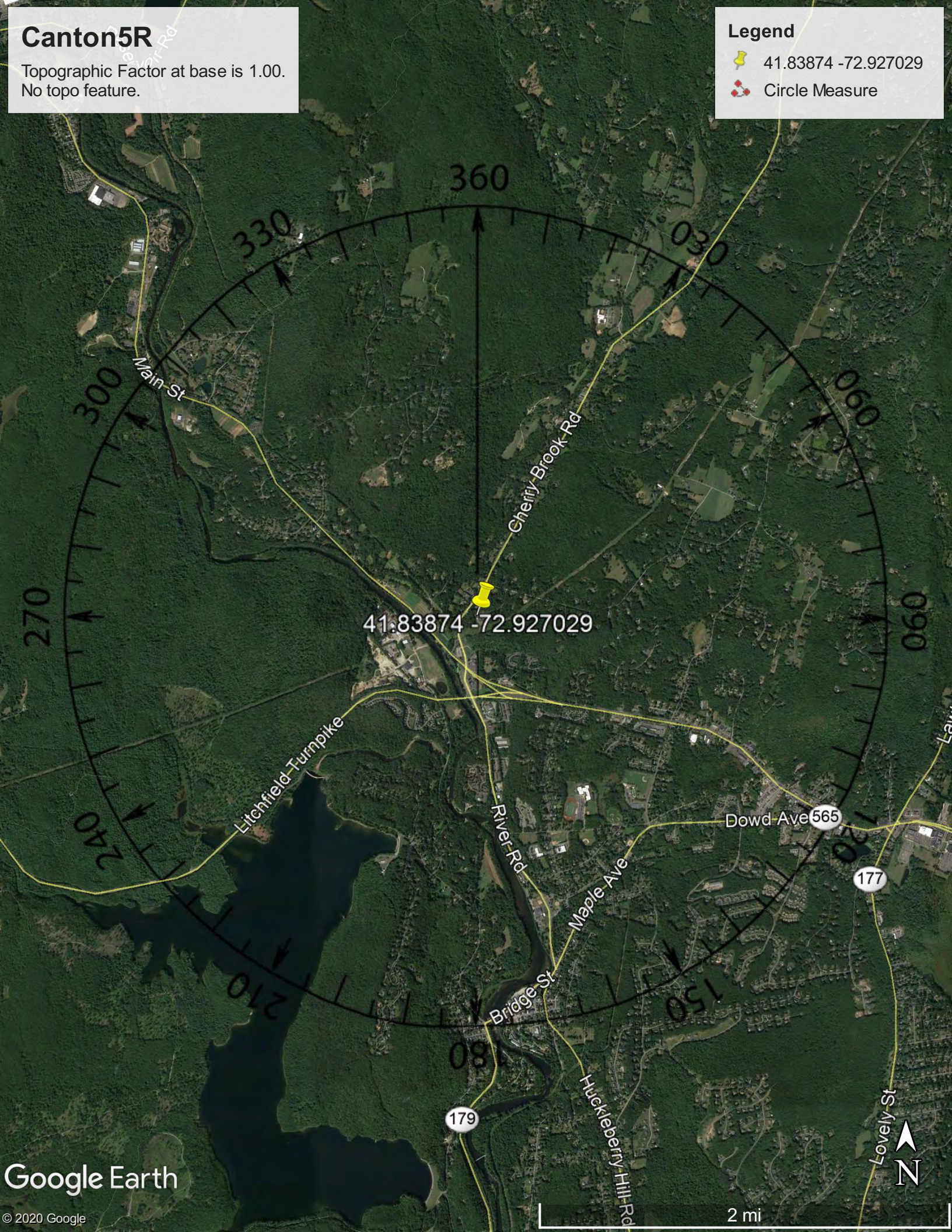
Circle Measure
41.83874 -72.927029
Morgan-Rd
Sterling-Dr
Overlook-Dr
Ramp-Rd
Dyer-Cemetery-Rd
Village-Ln
Powder-Mill-Rd
Dyer-Ave
Carriage-Dr
179
Google Earth
© 2020 Google
3000 ft
N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Topographic Factor at base is 1.00.
No topo feature.
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090
120
150
180
210
240
270
300
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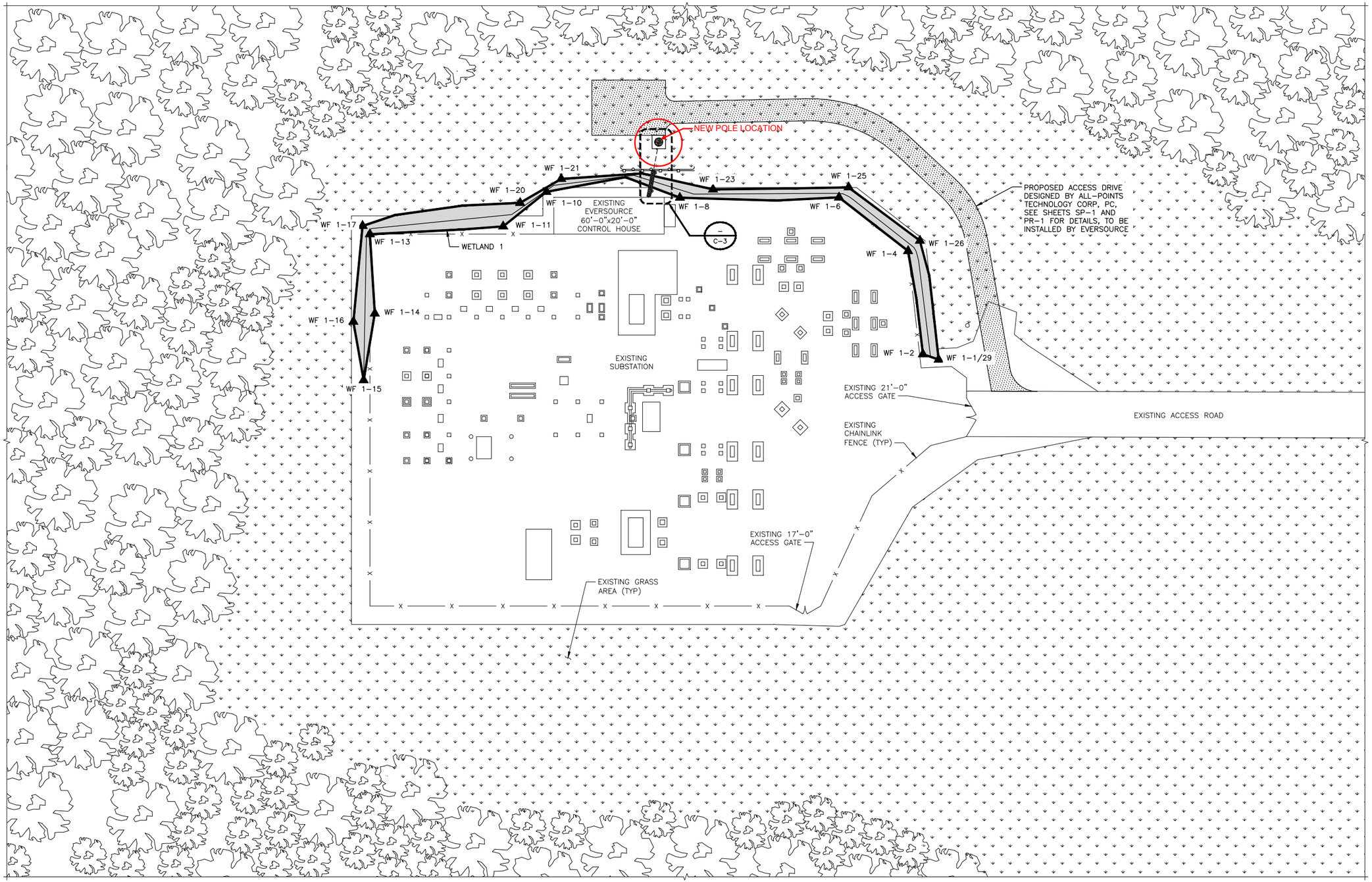
Main St
Cherry Brook Rd
Litchfield Turnpike
River Rd
Maple Ave
Bridge St
Huckleberry Hill Rd
Dowd Ave
565
177
179
Lovely St
N
2 mi
Google Earth
© 2020 Google



PARTIAL SITE PLAN

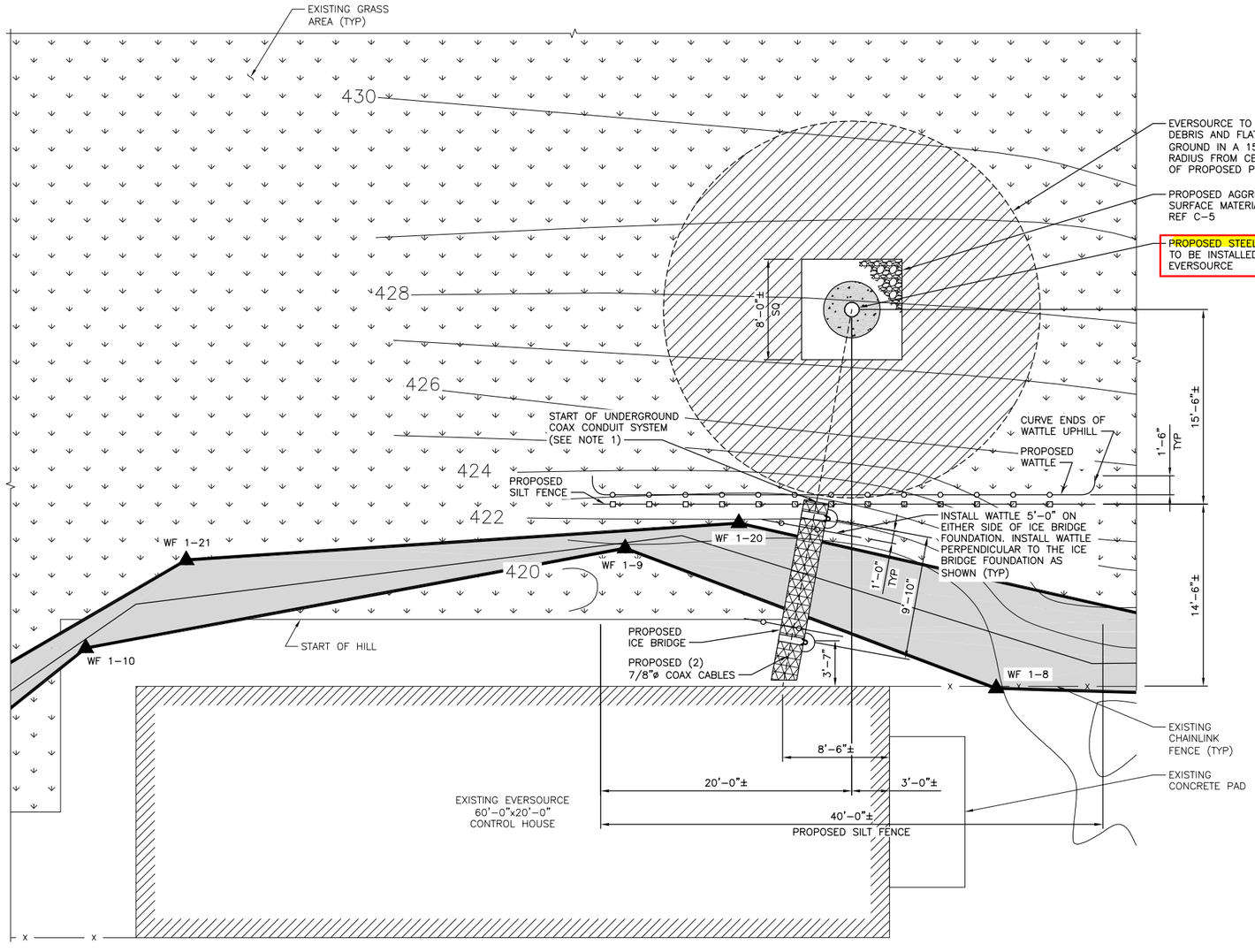
NO SCALE

SHEET NUMBER

C-2

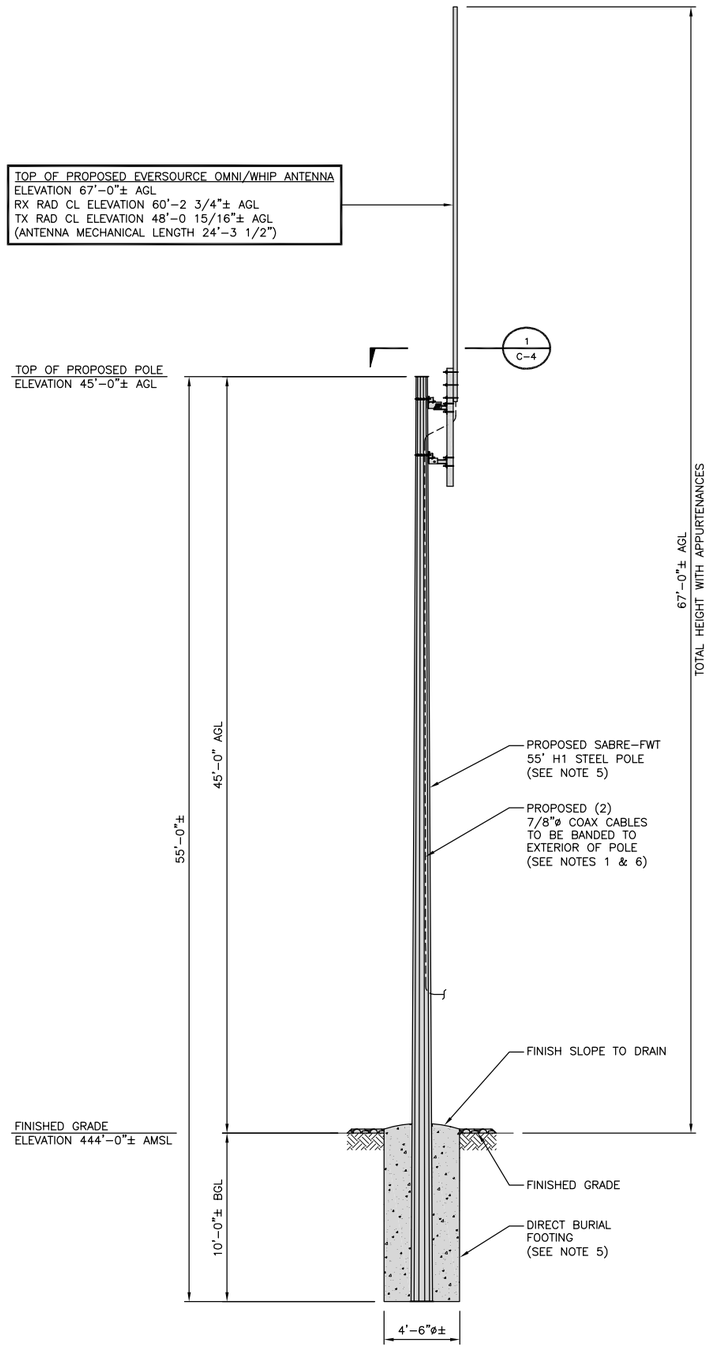
NOTES

1. UNDERGROUND CONDUIT SYSTEM TO BE DESIGNED AND INSTALLED BY EVERSOURCE. BLACK & VEATCH RECOMMENDS (4) 6" CONDUITS TO ALLOW FOR FUTURE EXPANSION. CONDUIT STUB-UP BEND RADIUS SHALL BE A MINIMUM OF 12".
2. SILT FENCE TO BE INSTALLED BY EVERSOUCE.
3. CONTOUR LINES WERE PROVIDED BY EVERSOURCE ENERGY. BLACK & VEATCH DOES NOT ASSUME RESPONSIBILITY FOR ITS ACCURACY.
4. PROPOSED ACCESS DRIVE NOT SHOWN FOR CLARITY.



SITE PLAN
NO SCALE

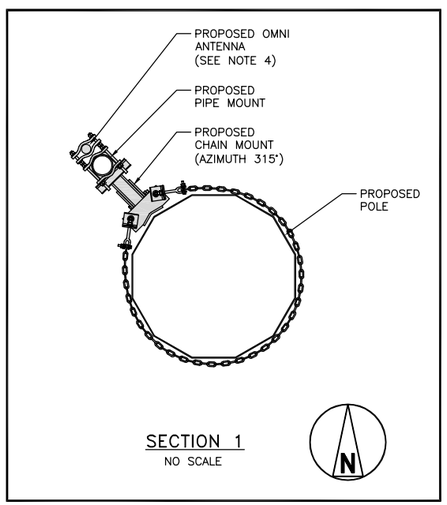
SHEET NUMBER
C-3



TOWER ELEVATION
NO SCALE

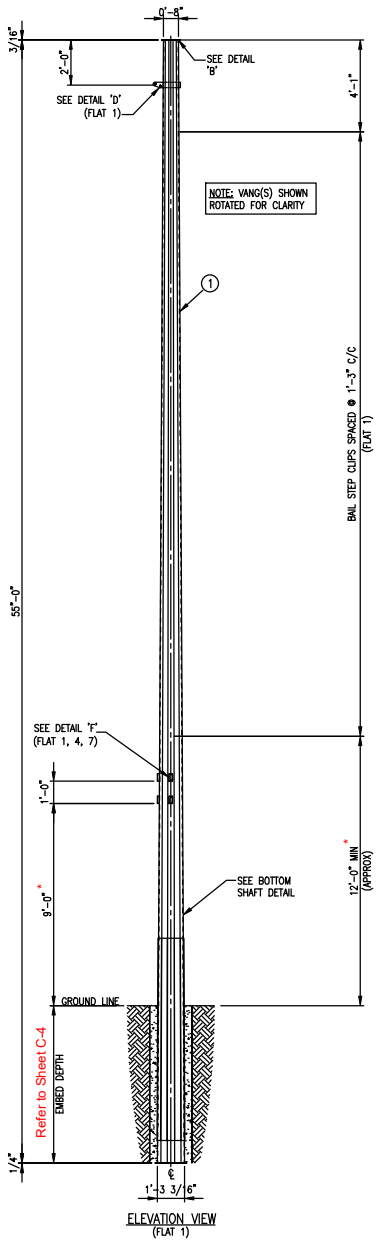
NOTES

1. ALL COAXIAL CABLE TO BE SECURED TO THE SUPPORT STRUCTURE AT DISTANCES NOT TO EXCEED 4'-0" OC.
2. CONTRACTOR MUST FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING THE INSTALLATION OF COAXIAL CABLES, CONNECTORS AND ANTENNAS.
3. DESIGN OF THE FOUNDATION WAS BASED ON SUB012 EVERSOURCE SUBSTATION STANDARDS, SECTION 6.D., FOUNDATION STABILITY AND SOIL BEARING CAPACITY. NO SUBGRADE SOIL CONDITIONS WERE AVAILABLE OR ARE KNOWN.
4. PROPOSED OMNI/WHIP ANTENNA SHALL BE INSTALLED USING PROPOSED CLAMP SET SITE PRO 1 P/N: DCP12K. SPACE CLAMPS PER ANTENNA MANUFACTURER'S RECOMMENDATIONS, (3) ATTACHMENTS POINTS (CLAMPS) REQUIRED (TOTAL OF 2 CLAMP SETS).
5. INSTALL POLE PER MANUFACTURER'S RECOMMENDATIONS EXCEPT FOR POLE EMBEDMENT. REFER TO SABRE-FWT ERECTION DRAWINGS – 55' H1-LD2 WPE'S.
6. PROPOSED COAX CABLES TO BE STACKED IN ONE ROW.
7. THE ENGINEER OF RECORD SHALL BE NOTIFIED IMMEDIATELY IF BEDROCK IS ENCOUNTERED, A HIGH GROUND WATER TABLE IS ENCOUNTERED OR THE BOREHOLE (SOIL) IS COLLAPSING INTO ITSELF.

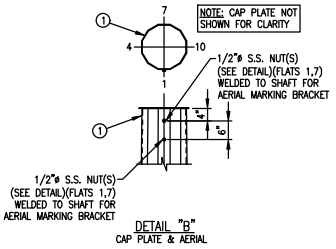


SECTION 1
NO SCALE

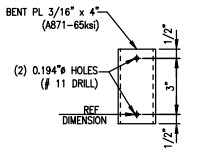
SHEET NUMBER
C-4



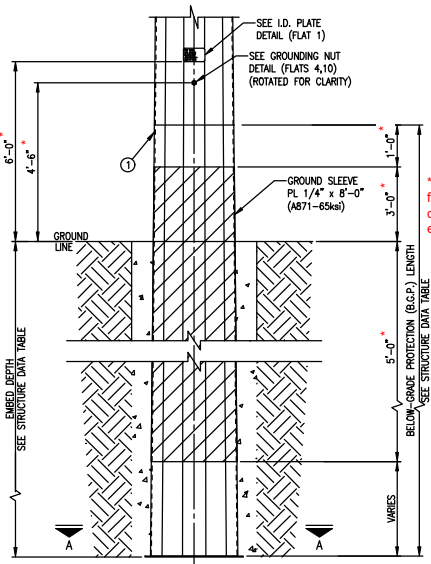
ELEVATION VIEW
(FLAT 1)



DETAIL "B"
CAP PLATE & AERIAL

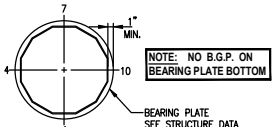


DETAIL 'F'
ATTACHMENT FOR SIGN BRACKET
BAIL STEP CLIPS w/HOLE(S)

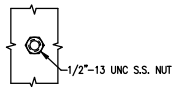


*Dimension will differ from this drawing due differing embedment depth.

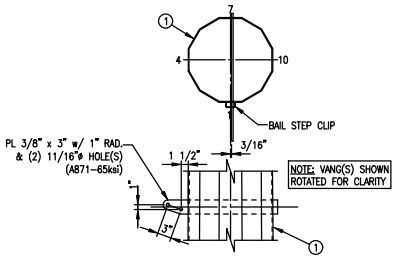
BOTTOM SHAFT DETAIL



SECTION 'A-A'



1/2" SS NUT DETAIL



DETAIL "D"
FALL PROECTION VANG

WEATHERING STEEL

SSPC-SP6 SAND BLASTING IS REQUIRED

* STRUCTURE NO.: SEE CHART

Sabre·FWT
5750 EAST I-20 FORT WORTH, TEXAS 76119 USA
(817) 255-3060

DATE:	BY:	ISSUE: RELEASED FOR FABRICATION	REV: 0
DWN:	CHK'D:	DWG FILE:	SCALE: NTS
CLIENT: Eversource Energy			DATE:
PROJ: PO – Release WPEs			SHEET NO.: 1 of 2
TITLE: ERECTION DRAWING – 55' H1-LD2 WPE's			JOB NO.:
			DRAWING NO.: E04

Structure Data Table										
QT #	STR. #	STR LINE & RELEASE (*)	O.A.L.	CLASS	CENTER OF GRAVITY (WELD BEADS ON FLATS 1,4,7,10)	EMBEDMENT				
					DISTANCE FROM TOP OF SHAFT	EMBEDMENT DEPTH (FEET)	BGP DEPTH (FEET)	BEARING PLATE (THICK)	BEARING PLATE (DIAM)
004			55'-0"	H1-LD2	34'-0"	7'-6"	11'-6"	1/4"	17"ø

LINE ITEM: * — BILL OF MATERIAL — STR #: SEE STR. DATA TABLE

ITEM	ASSY#	QTY.	DESCRIPTION	"Fy"	WEIGHT/lbs
1	3004-1	1	PL 3/16" x 8.00" x 15.20" x 55'-0" (12 SIDED)	65 ksi	1636
			TOTAL BLACK WEIGHT/lbs		1636

QUANTITIES IN BILL OF MATERIAL FOR (1) ASSEMBLY ONLY, ( ) REQUIRED.

SHIP LOOSE ITEMS			
ITEM	PART NO	QTY	DESCRIPTION
1	PT99970		POLY-COTE PC 110 TOUCH UP "BLACK" PINT KIT

PROJECT NOTES:

1.) POLE SECTIONS SHALL BE FABRICATED FROM WEATHERING STEEL.
2.) THE TOP OF MID AND/OR BOTTOM SHAFTS TO BE SEALED WITH A 3/16" THICK A871 (65 ksi) PLATE.

ERECTION NOTES:

1.) AS A MINIMUM, ALL NUTS SHOULD BE INSTALLED SNUG TIGHT. "SNUG TIGHT" IS DEFINED AS THE TIGHTNESS ATTAINED BY A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF A MAN USING AN ORDINARY SPUD WRENCH.
2.) ALL POLE SECTIONS WILL HAVE ORIENTATION AND SECTION IDENTIFICATION MARKS TO BE USED FOR PROPER ORIENTATION OF POLE SECTIONS PRIOR TO ENGAGING SPLICES.
3.) PLEASE REFER TO DRAWING "FWT002" SUPPLIED WITH FINAL DRAWING PACKET FOR FWT RECOMMENDATIONS.

MATERIAL NOTES:

1.) STEEL SPECIFICATIONS: ALL STEEL PER ASTM A871, GR 65 (UNLESS NOTED OTHERWISE)

PLATE (ie POLE SHAFT): 65 ksi A871 GRADE 65
PLATE (ie BASE PLATE/BEARING PLATE): 65 ksi A871 GRADE 65

2.) HIGH STRENGTH PLATES TO HAVE A CHARPY V-NOTCH IMPACT VALUE OF 15FT-LBS. MINIMUM AT -20' F PER HEAT LOT TEST. (UNLESS NOTED OTHERWISE)

WELDING NOTES:

1.) ALL WELDS SHALL MEET THE REQUIREMENTS OF LATEST REVISION OF AWS D1.1.
2.) LONGITUDINAL WELDS SHALL BE 80% MINIMUM PENETRATION WITH 100% FUSION TO THAT DEPTH (TYPICAL), UNLESS NOTED. 100% FULL PENETRATION LONGITUDINAL SEAM WELDS WILL BE +6" LONG AT SHAFT ENDS AND SPLICE LENGTH +24" LONG AT FEMALE LAP SPLICE.
3.) FILLET WELDS SHALL BE 100% FUSION THROUGH THEIR ENTIRE CROSS SECTION FIELD WELDING WILL NOT BE PERMITTED WITHOUT WRITTEN APPROVAL OF BUYER

GENERAL NOTES:

1.) EACH STRUCTURE WILL BE MARKED WITH AN IDENTIFICATION PLATE (3/4" HIGH NUMBERS STAMPED IN 1/4" A871-65ksi PLATE MATERIAL) WELDED TO THE BASE SECTION. SEE BELOW:

STS
CLASS#: H1-LD2
HT: 55'-0"
PO:
STR.#: H1-55-*
ASSY# 3004-1
* SEQ#

ID PLATE DETAIL
BASE TAG

2.) ALL OTHER PARTS AND WELDMENTS SHIPPED WITH STRUCTURE WILL BE MARKED WITH THEIR RESPECTIVE MARK NUMBER.

"STRUCTURES SHALL BE WEATHERING STEEL"
"STRUCTURES SHALL HAVE BELOW GRADE PROTECTION"
"BGP" AT TOP SHALL BE "FEATHERED"
(NO "HARD LIP" IS ALLOWED)
(BGP COATING MINIMUM DRY THICKNESS OF 16 MILS)

TOLERANCE NOTES:

1.) POLE SECTION LENGTH: ±1"
2.) ALL OTHERS PER AISC

SHIPPING NOTES:

1.) HARDWARE IN BOM(S) EXACT QTY TO ASSEMBLE STRUCTURE(S). 5% EXTRA TO BE SHIPPED PER PROJECT

JOB REQUIRES "GO & NO-GO GAGE" TO BE USED

"BUY AMERICA"
DOMESTIC STEEL ONLY

WEATHERING STEEL

SSPC-SP6 SAND BLASTING IS REQUIRED

* STRUCTURE NO.: SEE CHART

Sabre · FWT
5750 EAST I-20 FORT WORTH, TEXAS 76119 USA
(817) 255-3060

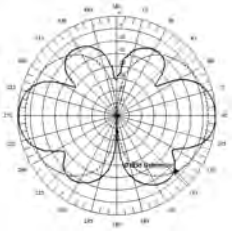
DATE:	BY:	DESC.: RELEASED FOR FABRICATION		REV.: 0
DWN BY:	CHK'D:	ENG.:	CAD FILE: -	SCALE: NTS
CLIENT: Eversource Energy SITE: PO - Release WPEs			DATE:	SHEET NO.: 2 of 2
TITLE: ERECTION DRAWING - 55' H1-LD2 WPE's			JOB NO.:	DRAWING NO.: E04

VHF Omni Antennas (160-222 MHz)

		160-174 MHz						217-222 MHz									
	Model Number	**DS1G03F36U-N**	**DS1G03F36U-D**	**DS1G06F36U-N**	**DS1G06F36U-D**	**DS1G03F36D-N**	**DS1G03F36D-D**	**DS2C00F36U-N**	**DS2C00F36U-D**	**DS2C03F36U-N**	**DS2C03F36U-D**	**DS2C06F36U-N**	**DS2C06F36U-D**	**DS2C00F36D-N**	**DS2C00F36D-D**	**DS2C03F36D-N**	**DS2C03F36D-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
	Type	Single		Single		Dual		Single		Single		Single		Dual		Dual	
ELECTRICAL	**Bandwidth**, MHz	14		14		14		5		5		5		5		5	
	Power, Watts	500		500		350		500		500		500		350		350	
	Gain, dBd	3		6		3		0		3		6		0		3	
	Horizontal Beamwidth, degrees	360		360		360		360		360		360		360		360	
	Vertical Beamwidth, degrees	30		16		30		60		30		16		60		30	
	Beam Tilt, degrees	0		0		0		0		0		0		0		0	
	Isolation (minimum), dB	N/A		N/A		30		N/A		N/A		N/A		30		30	
MECHANICAL	**Number of Connectors**	1		1		2		1		1		1		2		2	
	Flat Plate Area, ft²(m²)	2.53 (0.24)		4.38 (0.41)		4.5 (0.42)		1.9 (0.18)		1.9 (0.18)		2.58 (0.24)		2.4 (0.22)		4.1 (0.38)	
	Lateral Windload Thrust, lbf(N)	95 (423)		164 (730)		169 (752)		53 (236)		69 (307)		108 (480)		90 (400)		169 (752)	
	Survival Wind Speed **without ice**, mph(kph) **with 0.5" radial ice**, mph(kph)	 110 (177) 93 (150)		 75 (121) 60 (97)		 75 (121) 65 (105)		 222 (357) 193 (311)		 172 (277) 150 (241)		 110 (177) 96 (154)		 130 (209) 115 (185)		 75 (121) 65 (105)	
	Mounting Hardware included	DSH3V3R		DSH3V3N		DSH3V3N		DSH2V3R		DSH2V3R		DSH3V3N		DSH3V3R		DSH3V3N	
DIMENSIONS	**Length**, ft(m)	12.7 (3.9)		21.9 (6.7)		22.3 (6.8)		7.7 (2.3)		9.9 (3)		18.1 (5.5)		13.6 (4.1)		24.3 (7.4)	
	Radome O.D., in(cm)	3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		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)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)	
	Net Weight w/o bracket, lb(kg)	37 (16.8)		60 (27.2)		63 (28.6)		19 (8.6)		26 (11.8)		47 (21.3)		40 (18.1)		70 (31.8)	
	Shipping Weight, lb(kg)	67 (30.4)		90 (40.8)		93 (42.2)		39 (17.7)		56 (25.4)		77 (34.9)		70 (31.8)		100 (45.4)	

VERTICAL PATTERNS

DS1G03F36U-N
DS1G03F36U-D



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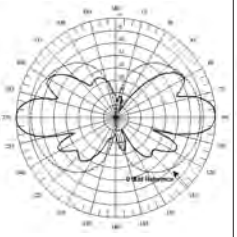

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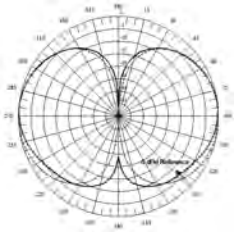

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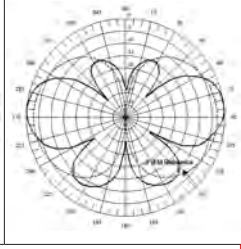

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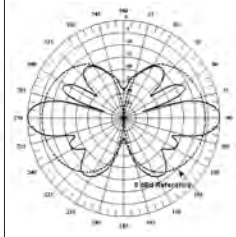

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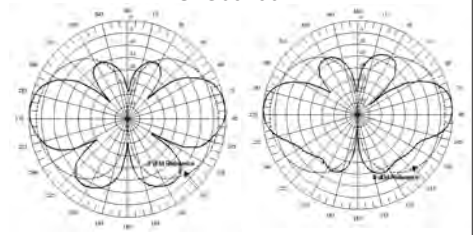

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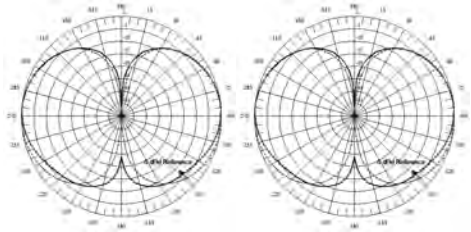

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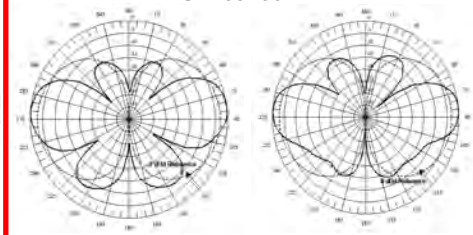

Top Bottom

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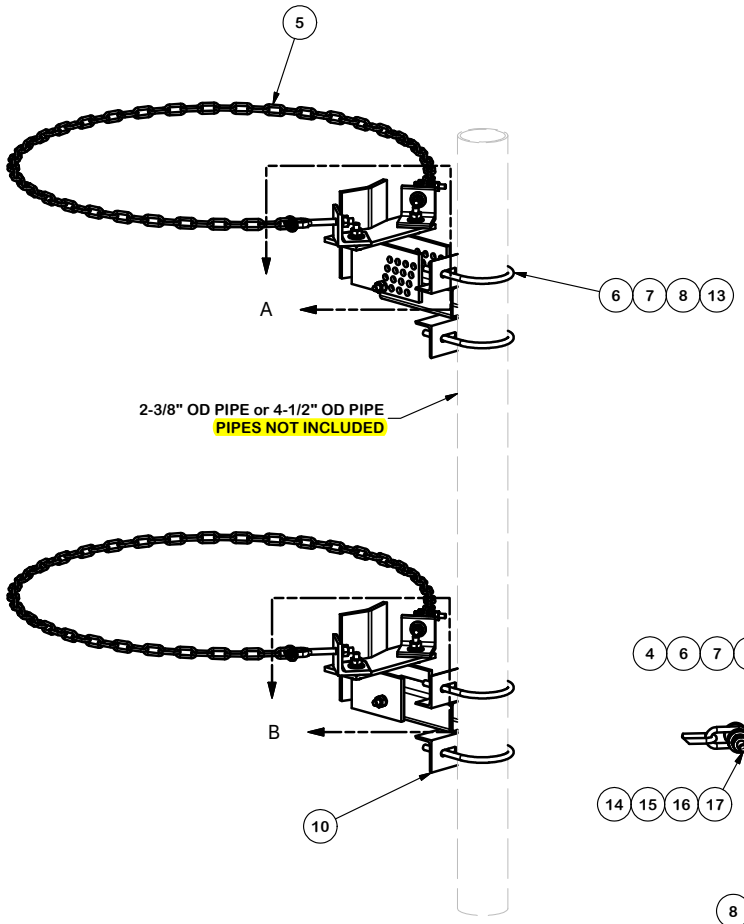
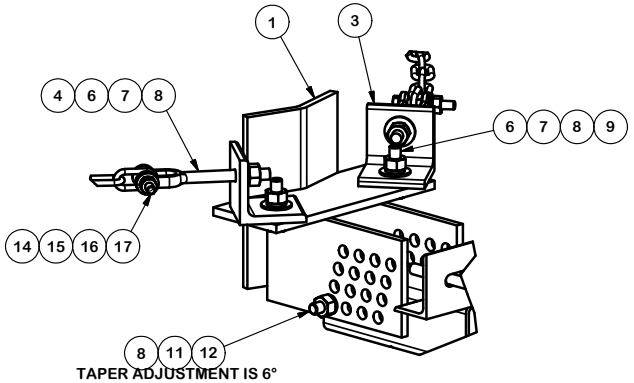
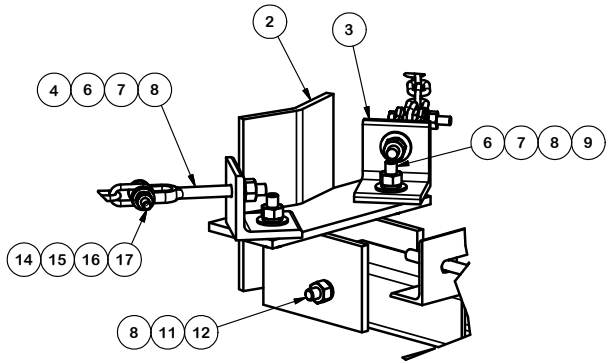
TOWER/MAST SIZE AT PROPOSED ANTENNA ATTACHMENT = 8 1/2" ± DIAMETER.
PROPOSED CHAIN MOUNT FITS POLYGON OR ROUND POLES 5"-36" IN DIAMETER.
NOTE: (1) 4" (4.5" OD) SCH 40 x 6'-0" MOUNT PIPE IS REQUIRED.

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	X-UCMMH	TOP CHAIN MOUNT BRACKET		16.17	16.17
2	1	X-UCMSH	LOWER CHAIN MOUNT BRACKET		14.14	14.14
3	4	SHCM-T	CHAIN MOUNT TIGHTENER BRACKET	3.000 in	1.84	7.36
4	4	JB4	JAW BOLT GALV. 1/2" x 6"		0.51	2.04
5	2	GC4095	1/4" x GR40 GALV. CHAIN 9.5'		4.07	8.14
6	16	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	1.15
7	16	G12FW	1/2" HDG USS FLATWASHER		0.03	0.55
8	18	G12LW	1/2" HDG LOCKWASHER		0.01	0.25
9	4	G1202	1/2" x 2" HDG HEX BOLT GR5	2	0.18	0.70
10	2	X-UAPM	UNIVERSAL ANGLE TUBE 9"		9.31	18.62
11	2	A12NUT	1/2" HDG A325 HEX NUT		0.07	0.14
12	2	A1205	1/2" x 5" A325 HDG BOLT	5 in.	0.34	0.69
13	4	X-UB1458	1/2" X 4-5/8" X 7" X 3" GALV U-BOLT		0.97	3.89
13	4	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" GALV. U-BOLT		0.66	2.63
14	4	G38FW	3/8" HDG USS FLATWASHER		0.01	0.05
15	4	G38LW	3/8" HDG LOCKWASHER		0.01	0.03
16	4	G38NUT	3/8" HDG HEAVY 2H HEX NUT		0.03	0.14
17	4	G38212	3/8" x 2-1/2" HDG HEX BOLT GR5		0.10	0.41
					TOTAL WT. #	80.15





DETAIL A
UPPER MOUNTING BRACKET



DETAIL B
LOWER MOUNTING BRACKET

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION
1'-0" STANDOFF, SINGLE SECTOR,
TAPER ADJUSTMENT CHAIN MOUNT,
SITE PRO 1

SITE PRO 1
A valmont COMPANY

Engineering Support Team:
1-888-753-7446

Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

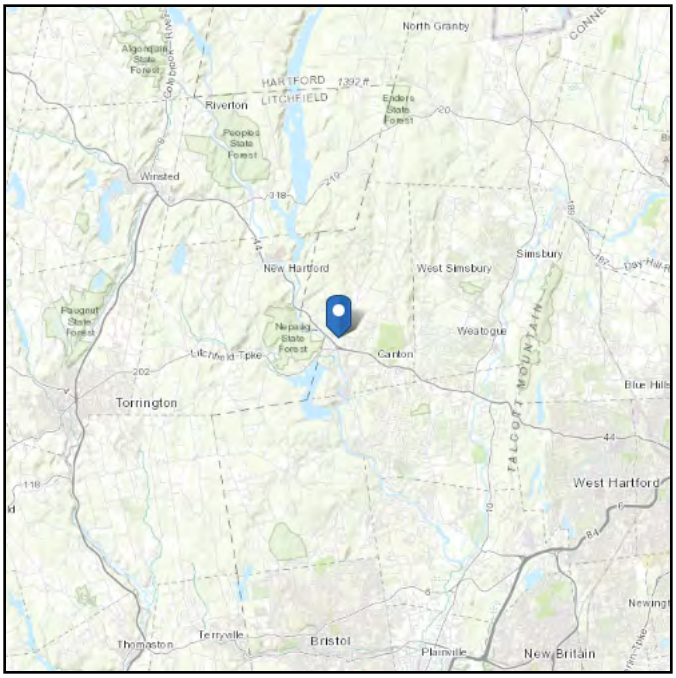
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
	RH18 3/12/2010		TCHM1

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 3/15/2010	TCHM1

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-10	**Elevation:**	404.52 ft (NAVD 88)
Risk Category:	III	**Latitude:**	41.83874
Soil Class:	D - Stiff Soil	**Longitude:**	-72.927029



Data Source: ASCE/SEI 7-10, Fig. 26.5-1B and Figs. CC-1–CC-4, incorporating errata of March 12, 2014

Date Accessed: Mon Feb 24 2020

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (annual exceedance probability = 0.000588, MRI = 1,700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

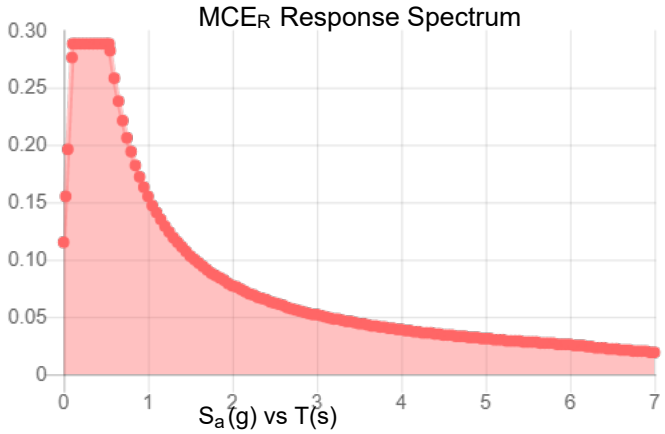
Seismic

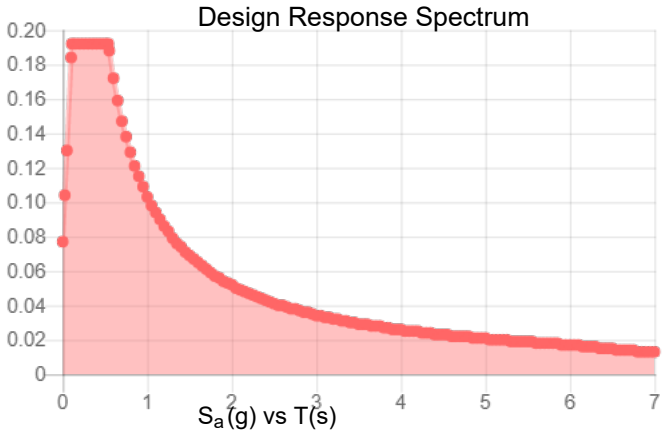
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.18	S_{DS} :	0.192
S_1 :	0.065	S_{D1} :	0.103
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.09
S_{MS} :	0.288	PGA_M :	0.144
S_{M1} :	0.155	F_{PGA} :	1.6
		I_e :	1.25

Seismic Design Category B





Data Accessed: Mon Feb 24 2020

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Mon Feb 24 2020

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Attachment 4 – Wetlands Inspection Report

WETLAND INSPECTION

June 26, 2020 **APT Project No. CT578100**

Prepared For: Eversource Energy
107 Selden Street
Berlin, Connecticut 06037

Site Name: Canton 5R

Site Address: 13 Morgan Road, Canton, Connecticut

Date(s) of Investigation: 2/20/2020

Field Conditions: **Weather:** sunny**,** low 30's
Soil Moisture: moist

Wetland/Watercourse Delineation Methodology[1][2]**:**
☒Connecticut Inland Wetlands and Watercourses
☐U.S. Army Corps of Engineers

Municipal Upland Review Areas: **Wetlands:** 100 feet **Watercourses:** 100 feet

The wetlands inspection was performed by:

Matthew Gustafson, Registered Soil Scientist

Enclosures: Wetland Delineation Field Form & Wetland Inspection Map

This report is provided as a brief summary of findings from APT's wetland investigation of the referenced Study Area that consists of proposed development activities and areas generally within 200 feet.[3] *If applicable, APT is available to provide a more comprehensive wetland impact analysis upon receipt of site plans depicting the proposed development activities and surveyed location of identified wetland and watercourse resources.*

---

[1] *Wetlands and watercourses were delineated in accordance with applicable local, state and federal statutes, regulations and guidance.*

[2] *All established wetlands boundary lines are subject to change until officially adopted by local, state, or federal regulatory agencies.*

[3] *APT has relied upon the accuracy of information provided by Eversource Energy and its contractors regarding the proposed Study Area for the purposes of identifying wetlands and watercourses.*

Attachments

- Wetland Delineation Field Form
- Wetland Inspection Map

Wetland Delineation Field Form

Wetland I.D.:	Wetland 1	
Flag #'s:	WF 1-01 to 1-29 (Loop)	
Flag Location Method:	Site Sketch ☒	GPS (sub-meter) located ☒

WETLAND HYDROLOGY:

NONTIDAL ☒

Intermittently Flooded ☐	Artificially Flooded ☒	Permanently Flooded ☐
Semipermanently Flooded ☒	Seasonally Flooded ☐	Temporarily Flooded ☐
Permanently Saturated ☐	Seasonally Saturated/seepage ☐	Seasonally Saturated/perched ☐
Comments: Wetland 1 consists of an artificially flooded curtain drain/drainage swale.		

TIDAL ☐

Subtidal ☐	Regularly Flooded ☐	Irregularly Flooded ☐
Irregularly Flooded ☐		
Comments: None		

WETLAND TYPE:

SYSTEM:

Estuarine ☐	Riverine ☐	Palustrine ☒
Lacustrine ☐	Marine ☐	
Comments: None		

CLASS:

Emergent ☒	Scrub-shrub ☐	Forested ☐
Open Water ☒	Disturbed ☒	Wet Meadow ☐
Comments: As this feature was constructed to function as a curtain drain to convey surface water and seasonal high groundwater around the eastern side of the substation. Limited emergent wetland vegetation is supported by this man-made feature.		

WATERCOURSE TYPE:

Perennial ☐	Intermittent ☒	Tidal ☐
Watercourse Name: None		
Comments: This constructed curtain drain/drainage swale intercepts surface water and seasonal high groundwater discharge resulting in its classification as an intermittent watercourse. The channel is approximately 1 to 3 feet wide with a stone armored bottom/bank and 2-3 inches of inundation throughout. A deeper southern segment of the swale contains deeper (±2 feet) of inundation).		

Wetland Delineation Field Form (Cont.)

SPECIAL AQUATIC HABITAT:

Vernal Pool Yes ☐ No ☒ Potential ☐	Other ☐
Vernal Pool Habitat Type: None	
Comments: None	

SOILS:

Are field identified soils consistent with NRCS mapped soils?	Yes ☒	No ☐

DOMINANT PLANTS:

Sphagnum moss (Sphagnum spp.)	Silky Dogwood (Cornus amomum)
Sedge sp. (Carex sp.)	Narrow-Leaf Cattail (Typha augustifolia)

* denotes Connecticut Invasive Species Council invasive plant species

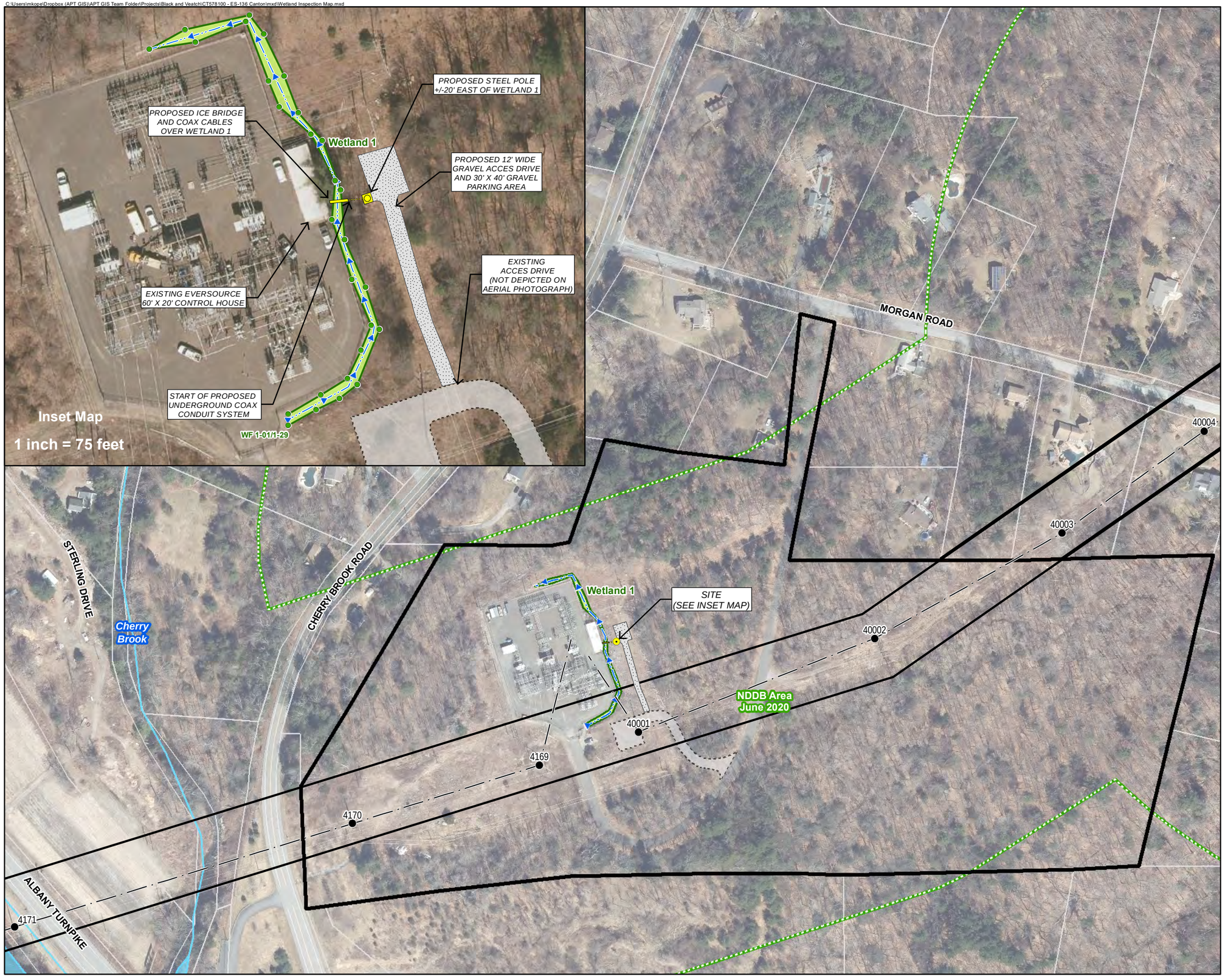
GENERAL COMMENTS:

All-Points Technology Corp., P.C. ("APT") understands that Eversource proposes to construct a communications tower located along the eastern side of the Canton Substation adjacent to the control house building. The location of the proposed communication facility consists of an upland area with maintained vegetation associated with the substation and electrical transmission/distribution lines.

One wetland (Wetland 1) was identified near the proposed communications tower site, consisting of an isolated man-made curtain drain/drainage swale (with stone armoring) that was constructed around the eastern side of the substation to convey flows away from the substation. This feature which appears to have been constructed in uplands sustains inundation and flows from surface water and seasonal high groundwater inputs for a sufficient period to be classified as an intermittent watercourse feature.

The proposed communication facility development activities avoid any direct impact to Wetland 1, but are located in close proximity. However, due to this feature's isolated nature, anthropogenic (man-made) origin, and lack of supporting function and values (its principal functions is conveyance of surface and groundwater, which will not be impacted by the proposed communications tower project), no likely adverse impact to Wetland 1 would result. In addition, provided appropriate erosion controls are installed and maintained in accordance with the *2002 Connecticut Guidelines For Soil Erosion and Sediment Control*, no temporary impact to Wetland 1 would occur during construction of this facility.

C:\Users\mkopel\Dropbox (APT GIS)\APT GIS Team Folder\Projects\Black and Veatch\CT578100 - ES-136 Canton\mxd\Wetland Inspection Map.mxd



Wetland Inspection Map
Proposed Communications Facility
Canton 5R
13 Morgan Road, Canton, CT

EVERSOURCE ENERGY

Legend

- Site
- Proposed Gravel Access Drive
- Existing Access Drive
- Proposed Equipment (Inset Map)
- Proposed Coax Conduit (Inset Map)
- Subject Property
- Wetland Flag
- Delineated Wetland Boundary Outline
- Field Delineated Wetland
- Intermittent Watercourse
- 5-foot Contour Line
- Natural Diversity Database Area (June 2020)
- Approximate Parcel Boundary
- Existing Eversource Structure
- Overhead Eversource Line
- Existing Eversource Right-of-Way (ROW)
- Watercourse (not delineated; CTDEEP)
- Open Water (not delineated; CTDEEP)

N W E S

200 100 0 200 Feet

ALL-POINTS TECHNOLOGY CORPORATION

Map Sources:

Wetlands field delineated by Matthew Gustafson, Registered Soil Scientist, APT, on 2/20/2020

Ortho Base Map: State of Connecticut 2019 aerial imagery CTECO

Elevation contours derived from 2016 LiDAR data provided by CTECO

NWI+ wetland data provided by CTECO

Flood Zones obtained from FEMA National Flood Hazard Layer(NFHL) dataset.

CTDEEP's data library (http://www.ct.gov/deep)
Data layers are maintained and updated by CTDEEP and represent the most recent publications.

Map Date: November 2020

Attachment 5 – 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

ES-136 – Canton 5R

13 Morgan Road

Canton, CT 06019

November 13, 2020

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 Eversource installation to be located at 13 Morgan Road in Canton, CT. Eversource is proposing to install a wood-pole with one omnidirectional antenna as part of its 220 MHz communications system.

This report considers the antenna configuration as detailed by Eversource to calculate the % MPE (Maximum Permissible Exposure) of the proposed facility at ground level.

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. Power Density Calculation Methods

The power density calculation results were generated using the following formula as outlined in FCC bulletin OET 65, and Connecticut Siting Council recommendations:

$$\text{Power Density} = \left(\frac{1.6^2 \times 1.64 \times \text{ERP}}{4\pi \times R^2}\right) \text{X Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power = 1.64 x ERP

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

H = Horizontal Distance from antenna

V = Vertical Distance from radiation center of antenna

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 full power, and that all antenna 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 consider actual terrain elevations which could attenuate the signal. As a result, the calculated power density and corresponding % MPE levels reported below are much higher than the actual levels will be from the final installation.

4. Calculated % MPE Results

Table 1 below outlines the power density information for the site. The Eversource omnidirectional antenna has a narrow vertical beamwidth of 30°; therefore, the majority of the RF power is focused out towards the horizon. Please refer to Attachment C, for the vertical pattern of the proposed Eversource antenna. Therefore, 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. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the facility. Any inactive or receive-only antennas are not included in the table, as they are irrelevant in terms of the % MPE calculations.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mW/cm^2)	Limit	% MPE
Eversource	48	217	4	124	0.0101	0.2000	5.06%
						Total	**5.06%**

Table 1: Proposed Facility % MPE [1]

[1] Transmit antenna height listed for the proposed antenna is as detailed in the Black & Veatch site plans dated 11/10/2020 (Rev. 0). The proposed antenna consists of two internally stacked atnennas – upper is for receive, lower is for transmit.

5. Conclusion

The above analysis concludes that RF exposure at ground level with the proposed antenna installation will be below the maximum power density limits as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Using the conservative calculation methods discussed herein, the highest expected percent of Maximum Permissible Exposure at ground level with the proposed installation is **5.06% of the FCC General Population/Uncontrolled limit**.

As noted previously, the calculated % MPE levels are more conservative (higher) than the actual levels will be from the finished installation.

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 FCC OET Bulletin 65 Edition 97-01, IEEE Std. C95.1, and IEEE Std. C95.3.

Keith Vellante

November 13, 2020

Report Prepared By: Keith Vellante
Director of RF Services
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[2]

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[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)
0.3-1.34	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)

[2] 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

[3] 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

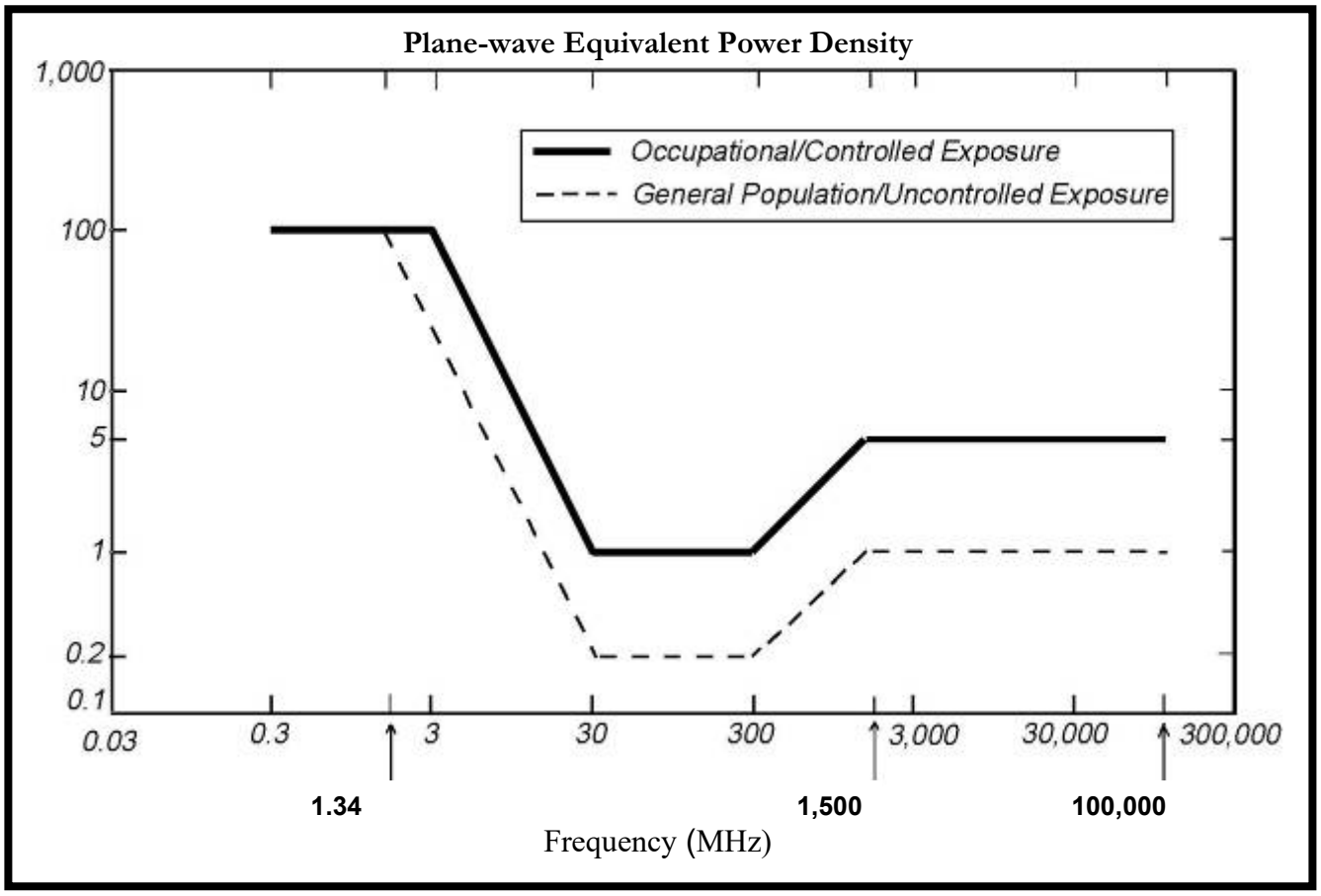
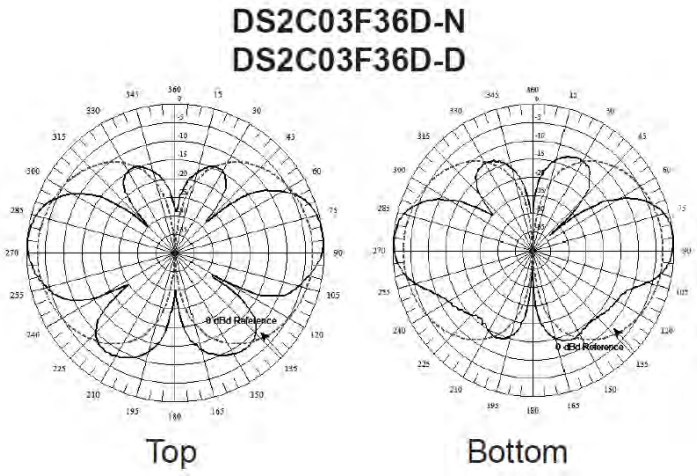


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: Eversource Antenna Data Sheets and Electrical Patterns

217 MHz

Manufacturer:	dbSpectra
Model #:	DS2C03F36D
Frequency Band:	217-222 MHz
Gain:	3.0 dBd
Vertical Beamwidth:	30°
Horizontal Beamwidth:	360°
Polarization:	Vertical
Length:	24.3’



Attachment 6 – Photographic Simulations

EXISTING

PHOTO	LOCATION	ORIENTATION
1	**HOST PROPERTY CANTON, CT**	**NORTH**

ALL-POINTS TECHNOLOGY CORPORATION

EVERSOURCE ENERGY

PROPOSED

PHOTO	LOCATION	ORIENTATION
1	**HOST PROPERTY CANTON, CT**	**NORTH**

ALL-POINTS TECHNOLOGY CORPORATION

EVERSOURCE ENERGY

EXISTING

PHOTO	LOCATION	ORIENTATION
2	**HOST PROPERTY CANTON, CT**	**NORTHEAST**

ALL-POINTS TECHNOLOGY CORPORATION

EVERSOURCE ENERGY

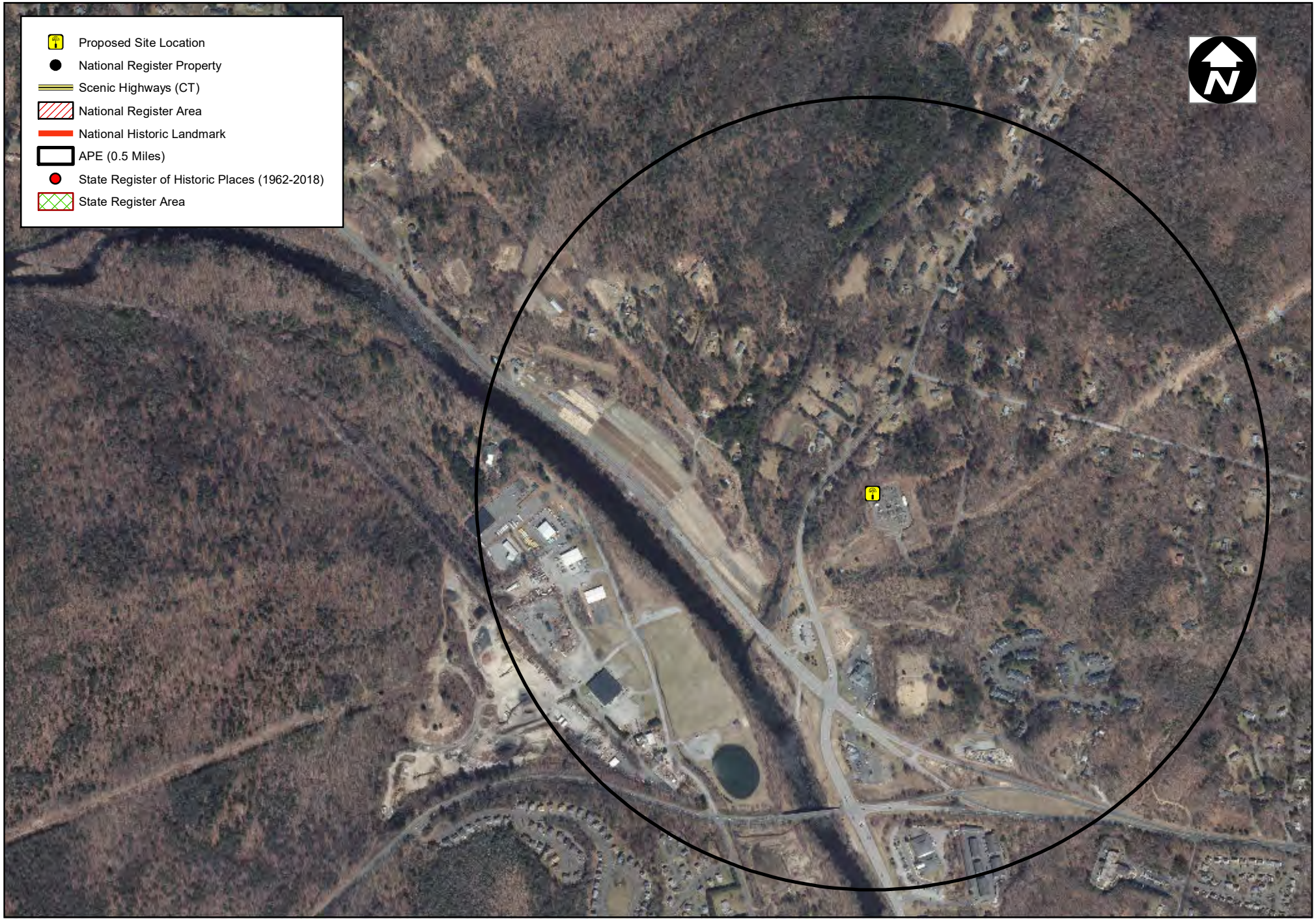
PROPOSED

PHOTO	LOCATION	ORIENTATION
2	**HOST PROPERTY CANTON, CT**	**NORTHEAST**

ALL-POINTS TECHNOLOGY CORPORATION

EVERSOURCE ENERGY

Attachment 7 – Cultural Resources Screen



Cultural Resources Screen

CT578100 ES-136 - 13 Morgan St Canton CT

February 6, 2020 \ USGS QUAD: Avon

0 500 1,000 2,000 Feet

Prepared for All-Points Technology Corp. by Heritage Consultants, 2020

Attachment 8 – TOWAIR Determination Results

TOWAIR Determination Results

*** NOTICE ***

TOWAIR's findings are not definitive or binding, and we cannot guarantee that the data in TOWAIR are fully current and accurate. In some instances, TOWAIR may yield results that differ from application of the criteria set out in 47 C.F.R. Section 17.7 and 14 C.F.R. Section 77.13. A positive finding by TOWAIR recommending notification should be given considerable weight. On the other hand, a finding by TOWAIR recommending either for or against notification is not conclusive. It is the responsibility of each ASR participant to exercise due diligence to determine if it must coordinate its structure with the FAA. TOWAIR is only one tool designed to assist ASR participants in exercising this due diligence, and further investigation may be necessary to determine if FAA coordination is appropriate.

DETERMINATION Results

Structure does not require registration. There are no airports within 8 kilometers (5 miles) of the coordinates you provided.

Your Specifications

NAD83 Coordinates	
Latitude	41-50-18.9 north
Longitude	072-55-34.2 west
Measurements (Meters)	
Overall Structure Height (AGL)	20.4
Support Structure Height (AGL)	13.7
Site Elevation (AMSL)	135.3
Structure Type	
POLE - Any type of Pole	

Tower Construction Notifications
Notify Tribes and Historic Preservation Officers of your plans to build a tower.

CLOSE WINDOW

Attachment 9 – Certification of Notice

EVERSOURCE ENERGY

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

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

December 22, 2020

VIA COURIER

RE: Eversource Energy ("Eversource")
Installation of Wireless Communications Facility
13 Morgan Road, Canton, Connecticut

Dear First Selectman Robert Bessel:

We are writing to you with respect to the above referenced matter and our intent to file a Petition for a declaratory ruling with the State of Connecticut Siting Council (the "Siting Council") for approval of the installation of a wireless communications facility at our existing Canton Morgan Road Substation (the "Facility") at the above referenced property.

Included with this letter please find a copy of the Petition for your review. In accordance with Siting Council requirements, abutting landowners were also sent notice of this filing.

If you have any questions concerning this Petition, please contact the Siting Council or the Kathleen M. Shanley after December 23, 2020, the date that the Petition is expected to be on file.

Sincerely,

Kathleen M. Shanley
Manager – Transmission Siting

Enclosure

EVERSOURCE ENERGY

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

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

December 22, 2020

VIA COURIER

RE: Eversource Energy ("Eversource")
Installation of Wireless Communications Facility
13 Morgan Road, Canton, Connecticut

Dear Neil Pade, AICP:

We are writing to you with respect to the above referenced matter and our intent to file a Petition for a declaratory ruling with the State of Connecticut Siting Council (the "Siting Council") for approval of the installation of a wireless communications facility at our existing Canton Morgan Road Substation (the "Facility") at the above referenced property.

Included with this letter please find a copy of the Petition for your review. In accordance with Siting Council requirements, abutting landowners were also sent notice of this filing.

If you have any questions concerning this Petition, please contact the Siting Council or the Kathleen M. Shanley after December 23, 2020, the date that the Petition is expected to be on file.

Sincerely,

Kathleen M. Shanley
Manager – Transmission Siting

Enclosure

EVERSOURCE

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

December 23, 2020

At Eversource, we're always working to serve you better. We are submitting a petition to the Connecticut Siting Council (CSC) to install a new communication system at our existing Canton Substation facility located at 13 Morgan Road, Canton, Connecticut.

Proposed Project Information
The project, called the Connecticut Voice Radio Project, is in the process of reconfiguring its communication system throughout Connecticut. In Canton, this reconfiguration involves the installation of a new communications system at the Canton Substation property located at 13 Morgan Rd., Canton, Connecticut. The proposed upgrades would enhance the communication system and would provide critical radio communications for Eversource field crews that operate in Canton and the surrounding towns, thereby increasing the reliability of the electrical distribution system. The proposed improvements include:

- Installation of a new steel pole, extending approximately 45 feet above ground level.
- Installation of one ± 24-foot new antenna that would extend to a height of approximately 67 feet above ground level.
- Installation of an ice bridge and associated cabling. The associated cable will run underground from the steel pole and transition above ground to the ice bridge and into control house which will house the radio equipment.

If approved, the work is scheduled to begin and expected to be complete early-spring 2021. This schedule is subject to change due to weather delays or unexpected circumstances.

The safety of our employees, our customers, and the public is our top priority during the ongoing coronavirus public health crisis. Our commitment to safety, first and always, is continuous.

At the same time, Eversource must fulfill its foundational mission to deliver safe, reliable services to our customers. We continue to call on our employees and contractors to perform essential work, such as this proposed project, that maintains and improves the reliability of our networks, while also adapting our work practices to incorporate social distancing, heightened hygiene, and other best practices to protect their, and the public's, health.

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 Fitterman at (860) 657-6613 or send an email to ryan.fitterman@eversource.com

If you would like to send comments regarding Eversource's petition to the CSC, please send them via email to siting.council@ct.gov or send a letter to the following address: Melanie Bachman, Executive Director, Connecticut Siting Council, Ten Franklin Square, New Britain, CT 06051

Thank you.

Sincerely,

Ryan Fitterman

Ryan Fitterman
Eversource Telecommunication Engineering

NOTICE

Notice is hereby given, pursuant to Section 16-50j-40(a) of the Regulations of Connecticut State Agencies, of a Petition being filed with the Connecticut Siting Council ("Siting Council") on or after December 23, 2020 by Eversource Energy ("Eversource"). Eversource seeks a declaratory ruling 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 install a new communications pole at its Canton Morgan Road substation.

The communications facility is located adjacent to an existing Substation owned by Eversource at 13 Morgan Road in the town of Canton (the "Property"). Eversource's proposed modifications would consist of installing one (1) new 45-foot-tall steel pole with one (1) 24 foot-3-inch-tall omnidirectional antenna to be mounted at the top of the pole. Coaxial cables would be installed in underground conduit from the pole and transition to an ice bridge to an existing control house within the substation. The site would be accessed by an extension of an existing gravel-based access drive. The proposed modifications are designed to modernize Eversource's communication services to enable the highest level of voice communications under all operating conditions, including during critical emergency and storm restoration activities.

The Petition provides a detailed description of the proposed activities and explains why the proposed modification presents no significant adverse environmental effects. The location, height and other features of the proposal are subject to review and potential change under the provisions of Connecticut General Statutes Sections 16-50g et. seq.

Copies of the Petition will be available for review during normal business hours on or after September 30, 2020 at the following:

Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Town Clerk of Canton
Linda Smith, Town Clerk
Town Clerk's Office
4 Market Street
Collinsville, CT 06022

A copy of the Petition will also be available on the Connecticut Siting Council website: https://www.ct.gov/csc/site/default.asp under Pending Matters. All inquiries should be addressed to the Connecticut Siting Council or to the undersigned.

Ryan Fitterman
Eversource Energy
56 Prospect Street
Hartford, CT 06103
(860) –657-6613
Ryan.fitterman@eversource.com

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3.	Hon. Chris Murphy Senator 120 Huyshope Ave., Suite 401 Hartford, CT 06106				
4.	Lyle Wray Capitol Region Council of Governments 241 Main St. Hartford, CT 06106-5310				
5.	State Historic Preservation Office Dept. of Economic and Community Development 450 Columbus Blvd., 5th Floor Hartford, CT 06103				
6.	Federal Communications Commission 445 12th St SW Washington, DC 20554				

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3.	Hon. Leslee B. Hill Representative, District 17 Legislative Office Building, Room 4200 300 Capitol Ave. Hartford, CT 06106				
4.	Hon. Robert Bessel, First Selectman Canton Town Hall PO Box 168, 4 Market St. Collinsville, CT 06022				
5.	Linda Smith, Town Clerk 4 Market St., PO Box 168 Collinsville, CT 06022				
6.	Neil Pade, AICP Director of Planning and Community Development PO Box 168, 4 Market St. Collinsville, CT 06022				

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2.	Joseph Giulietti, Commissioner Department of Transportation 2800 Berlin Turnpike Newington, CT 06111				
3.	David Lehman, Commissioner Department of Economic and Community Development 450 Columbus Blvd. Hartford, CT 06103				
4.	James C. Rovella, Commissioner Dept. of Emergency Services and Public Protection Div. of Emergency Mgmt and Homeland Security 1111 Country Club Rd. Middletown, CT 06457				
5.	Michelle H. Seagull, Commissioner Department of Consumer Protection 450 Columbus Blvd., Suite 901 Hartford, CT 06103				
6.	Hon. Denise Merrill Secretary of the State 165 Capitol Ave. Hartford, CT 06106				

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1.	Hon. William Tong Attorney General 55 Elm St. Hartford, CT 06106				
2.	Katie Dykes, Commissioner Department of Energy and Environmental Protection 79 Elm St. Hartford, CT 06106-5127				
3.	Marissa Paslick Gillett, Chairman Public Utilities Regulatory Authority 10 Franklin Square New Britain, CT 06051				
4.	Deidre S. Gifford, MD, MPH Acting Commissioner Department of Public Health 410 Capitol Ave. Hartford, CT 06134				
5.	Peter B Hearn, Executive Director Council on Environmental Quality 79 Elm St., 6th Floor Hartford, CT 06106				
6.	Bryan P. Hurlburt, Commissioner Department of Agriculture 450 Columbus Blvd., Suite 701 Hartford, CT 06103				

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2.	Emily Kyle, CZEO Assistant Town Planner, ZEO and Inland Wetlands & Watercourses Agent PO Box 168, 4 Market St. Collinsville, CT 06022				
3.	David Shepard, Chairman Inland Wetlands and Watercourses Agency PO Box 168, 4 Market St. Collinsville, CT 06022				
4.	Jonathan Thiesse, Chairman Planning & Zoning Commission PO Box 168, 4 Market St. Collinsville, CT 06022				
5.	Lucien Rucci, Chairman Zoning Board of Appeals PO Box 168, 4 Market St. Collinsville, CT 06022				
6.					