

Attachment 5 - USFWS and NDDB Compliance Determination



USFWS & NDDB Compliance Determination

March 31, 2020

Eversource Energy
107 Selden Street
Berlin, Connecticut 06037

Re: Proposed Branford 11J Communications Facility
272-276 East Main Street, Branford, Connecticut
APT Project No. CT578100

On behalf of Eversource Energy ("Eversource"), All-Points Technology Corporation, P.C. ("APT") performed an evaluation with respect to possible federally- and state-listed, threatened, endangered or special concern species in order to determine if the proposed referenced communication facility ("Facility") would result in a potential adverse effect to listed species.

The Facility will be located within the existing Branford 11J substation located at 272-276 East Main Street, Branford, Connecticut ("Subject Property"). APT understands that Eversource proposes to install one new antenna on an existing wood pole within the substation compound. A propane fueled emergency backup power generator and 1,000-gallon propane tank will be installed adjacent to the southwestern side of the existing substation to provide for communications during power outages

USFWS

The federal consultation was completed in accordance with Federal Communications Commission ("FCC") rules implementing the National Environmental Policy Act ("NEPA") and Section 7 of the Endangered Species Act through the U.S. Fish and Wildlife Service's ("USFWS") Information, Planning, and Conservation System ("IPaC"). Based on the results of the IPaC review, two federally-listed¹ threatened species are known to occur in the vicinity of the Subject Property, documented as the northern long-eared bat ("NLEB"; *Myotis septentrionalis*) and Roseate Tern (*Sterna dougallii*). As a result of this preliminary finding, APT performed an evaluation to determine if the proposed referenced Facility would result in a likely adverse effect to NLEB and Roseate Tern.

The proposed Facility would be located within the cleared and developed limits of the substation and therefore would not require forest clearing or be located adjacent to a forested area that could potentially serve as habitat by NLEB. A review of the Connecticut Department of Energy & Environmental Protection ("DEEP") Wildlife Division Natural Diversity Data Base ("NDDB") NLEB habitat map² revealed that the proposed Facility is not within 150 feet of a known occupied NLEB maternity roost tree and is not within 0.25 mile of a known NLEB hibernaculum. The nearest NLEB habitat resource to the proposed Facility is located ± 4.5 miles to the north in North Branford.

¹ Listing under the federal Endangered Species Act

² *Northern long-eared bat areas of concern in Connecticut to assist with Federal Endangered Species Act Compliance* map. February 1, 2016.

Roseate Terns are exclusively marine and typically nest with Common Terns in various habitats on offshore islands or mainland beaches. Roseate Terns prefer sandy, gravelly, or rocky areas with shelter provided by vegetation, debris or rocks. The Subject Property does not contain nor is it located near any coastal sandy beaches or offshore islands and therefore does not support Roseate Tern habitat.

Therefore, the proposed Facility would have no effect on NLEB or Roseate Tern or their potential habitat. As a result, no consultation with USFWS is required.

NDDB

No known areas of state-listed species are depicted on the most recent DEEP NDDB Maps (December 2019) in the location of the proposed Facility or within a 0.25-mile radius of the proposed activity. A review of the NDDB Map for Branford reveals the nearest NDDB buffer is ±0.43-mile northwest of the Subject Property. Since the proposed Facility and Subject Property are not located within a NDDB buffer area, consultation with DEEP is not required in accordance with their review policy³. Also, since the NDDB buffer area is located more than 0.25-mile away, consultation with DEEP is not required in accordance with the Connecticut Siting Council's review policy.

Therefore, the proposed Facility is not anticipated to adversely impact any federal or state threatened or endangered species or species of special concern.

Sincerely,
All-Points Technology Corporation, P.C.

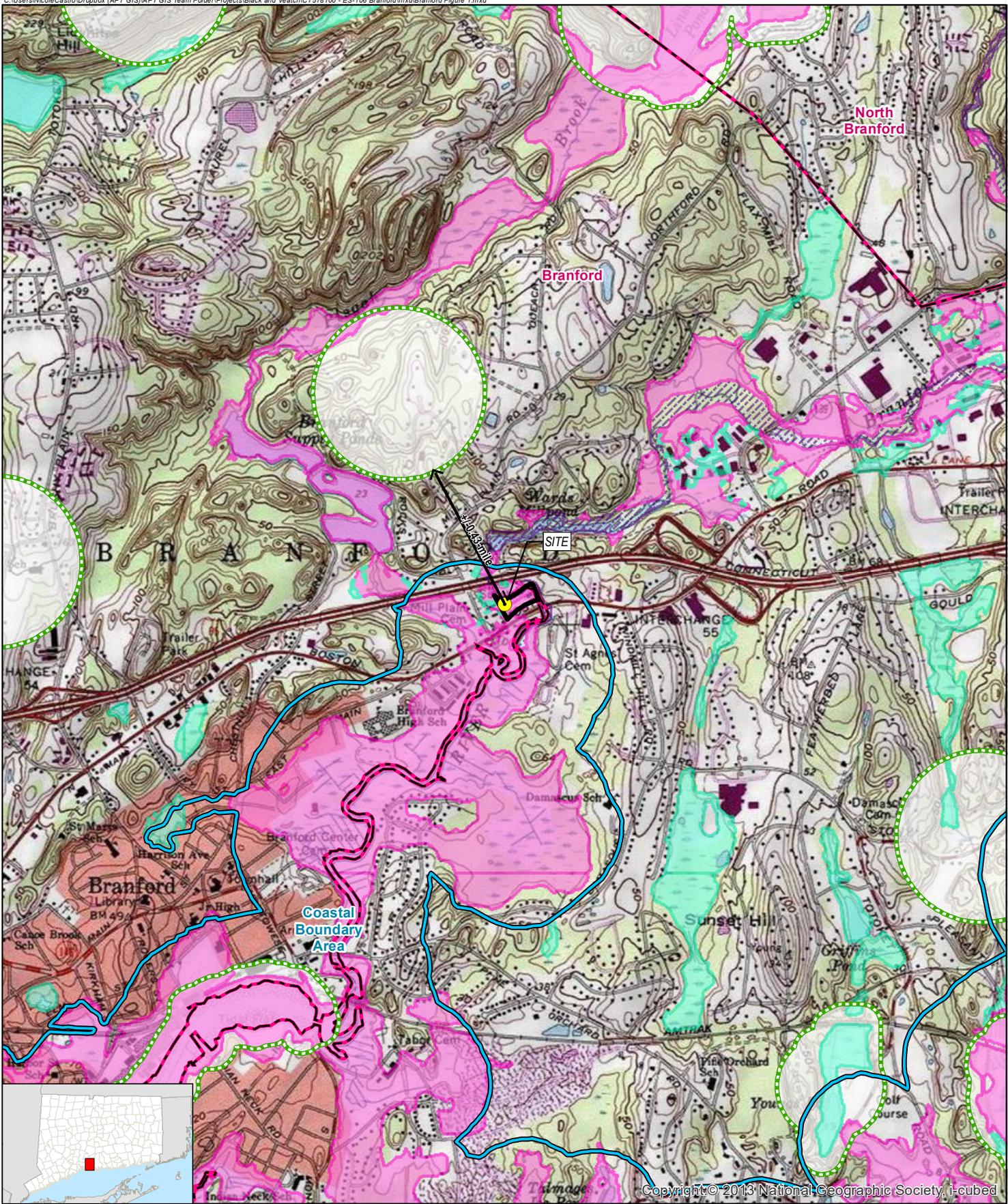


Dean Gustafson
Senior Biologist

Enclosure

³ DEEP Requests for NDDB State-listed Species Reviews. <https://portal.ct.gov/DEEP/Endangered-Species/Endangered-Species-ReviewData-Requests>

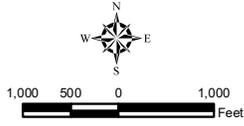
NDDDB Map



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- Legend**
- Site
 - Subject Property
 - Natural Diversity Database (updated 12/2019)
 - Municipal Boundary
 - FEMA 100-Year Flood Zone
 - FEMA 500-Year Flood Zone
 - Floodway
 - CT DEEP Coastal Boundary

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



**Figure 1
 Overview Map**

Proposed Communications Facility
 Branford 11J
 272 East Main Street
 Branford, Connecticut



Attachment 6 – Calculated Radio Frequency Emissions Report



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Calculated Radio Frequency Emissions Report



ES-106

272 East Main Street

Branford, CT 06405

May 26, 2020

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed Eversource installation to be located at 272 East Main Street in Bradford, CT.

Eversource is proposing to install one omnidirectional antenna as part of its 220 MHz communications system.

This report considers the planned antenna configuration as provided by Eversource along with the operating parameters of the existing Eversource antennas to calculate the power density and corresponding % 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:

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

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 proposed Eversource omnidirectional antenna has a narrow vertical beamwidth of 30° and the existing Eversource transmitting antenna has a vertical beamwidth of 9°; therefore, the majority of the RF power is focused out towards the horizon. 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. Please refer to Attachment C for the vertical pattern of the existing and proposed Eversource transmitting antennas. The calculated results in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below each antenna. For clarity, the proposed Eversource antenna is highlighted in blue in Table 1. 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 Energy	41	935.4	1	240	0.0070	0.6236	1.13%
Eversource Energy	53	217	4	124	0.0081	0.2000	4.04%
						Total	5.17%

Table 1: Proposed Facility % MPE ^{1 2 3}

¹ The operational parameters for the transmitting antennas were provided by Eversource or its agent(s). Please note that % MPE values listed are rounded to two decimal points and the total % MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not identically match the total value reflected in the table.

² The height listed for the existing Eversource antenna is in reference to the Black & Veatch Structural Analysis report dated 04/10/2020. In this case, there is no information to distinguish between transmit and receive antennas, so the lower center line was considered in the analysis as the worst-case scenario.

³ The transmit antenna height listed for the proposed Eversource antenna is in reference to Black & Veatch Construction Drawings dated 5/21/2020 (Rev. 0).

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 **5.17% 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.



Report Prepared By: Sokol Andoni
RF Engineer
C Squared Systems, LLC

February 18, 2020
Date



Reviewed/Approved By: Keith Vellante
Director of RF Services
C Squared Systems, LLC

May 26, 2020
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 Exposure⁴

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 Exposure⁵

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)

⁴ 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

⁵ 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

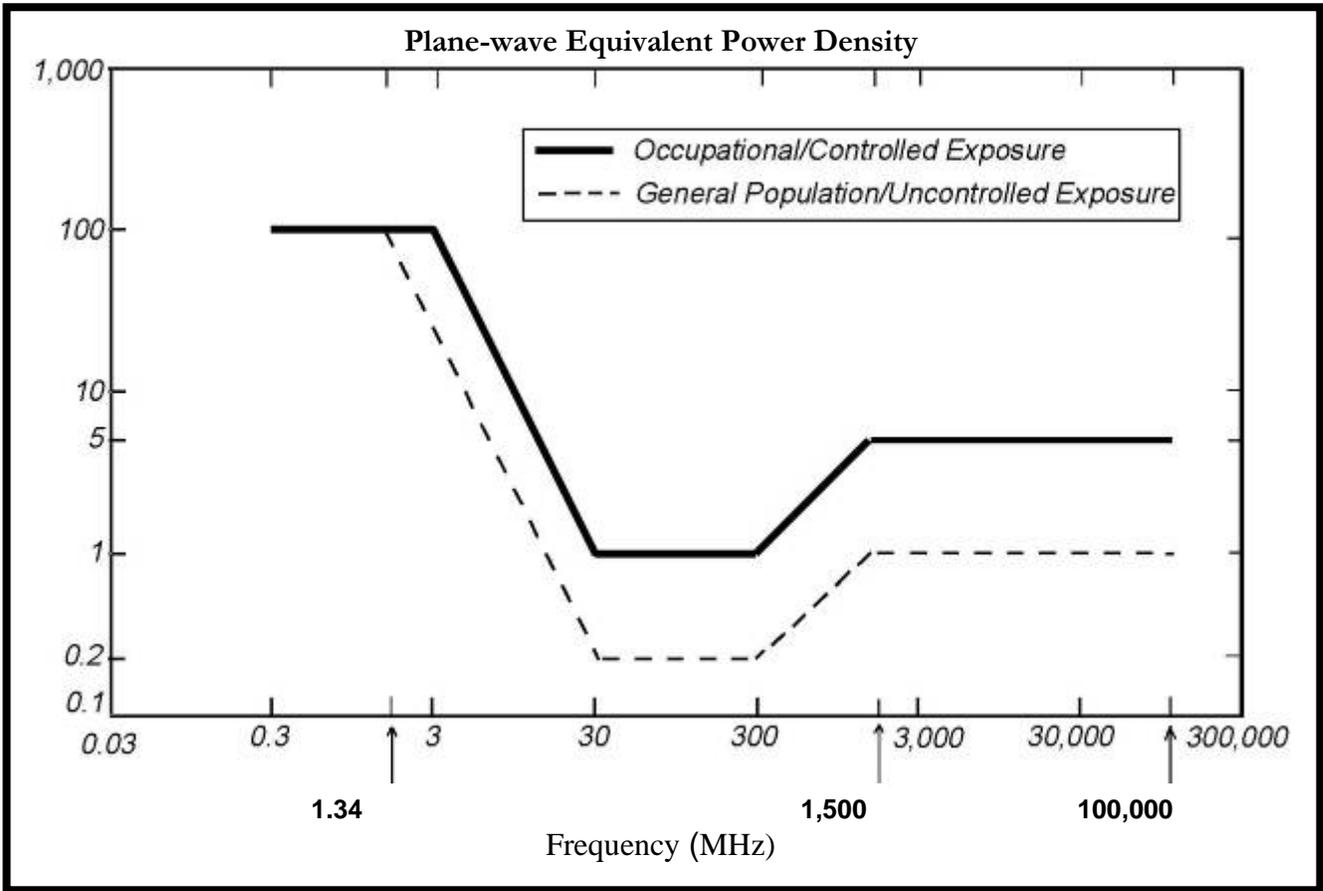
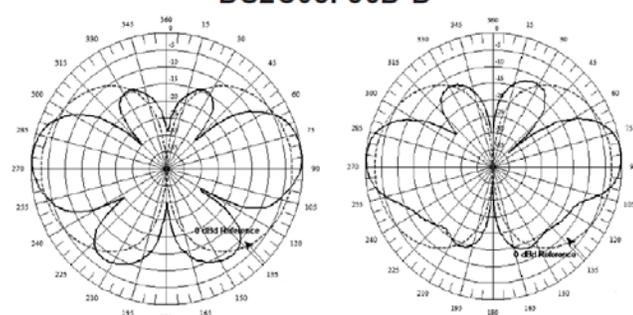
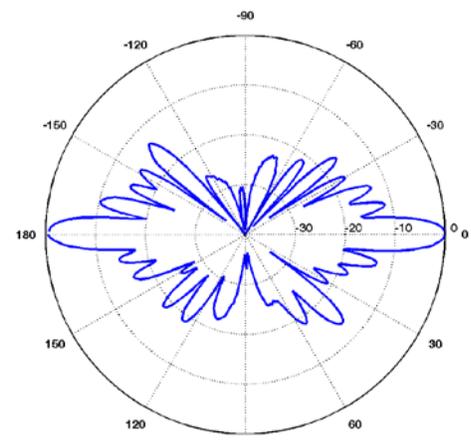


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: Eversource Antenna Data Sheets and Electrical Patterns

<p>217 MHz</p> <p>Manufacturer: dbSpectra Model #: DS2C03F36D Frequency Band: 217-222 MHz Gain: 3.0 dBd Vertical Beamwidth: 30° Horizontal Beamwidth: 360° Polarization: Vertical Length: 24.3'</p>	<p style="text-align: center;">DS2C03F36D-N DS2C03F36D-D</p>  <p style="text-align: center;">Top Bottom</p>
<p>950 MHz</p> <p>Manufacturer: Andrew Model #: DB589-Y Frequency Band: 890-960 MHz Gain: 9.0 dBd Vertical Beamwidth: 9° Horizontal Beamwidth: 360° Polarization: Vertical Length: 9.2'</p>	

Attachment 7 – Photographic Documentation and Simulations

Photographic Documentation & Simulations

BRANFORD 11J
272 EAST MAIN STREET
BRANFORD, CT 06405

Prepared in March 2020 by:
All-Points Technology Corporation, P.C.
567 Vauxhall Street Extension – Suite 311
Waterford, CT 06385

Prepared for Eversource Energy

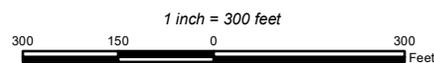




PHOTO LOG

Legend

- Site
- Year-Round
- Not Visible





EXISTING

PHOTO

1

LOCATION

EAST MAIN STREET

ORIENTATION

WEST

DISTANCE TO SITE

+/- 0.17 MILE

VISIBILITY

NOT VISIBLE



EXISTING

PHOTO

2

LOCATION

EAST MAIN STREET

ORIENTATION

NORTHWEST

DISTANCE TO SITE

+/-360 FEET

VISIBILITY

VISIBLE



PROPOSED

PHOTO

2

LOCATION

EAST MAIN STREET

ORIENTATION

NORTHWEST

DISTANCE TO SITE

+/-360 FEET

VISIBILITY

VISIBLE



EXISTING

PHOTO

3

LOCATION

HOST PROPERTY

ORIENTATION

NORTHWEST

DISTANCE TO SITE

+/-245 FEET

VISIBILITY

VISIBLE



PROPOSED

PHOTO

3

LOCATION

HOST PROPERTY

ORIENTATION

NORTHWEST

DISTANCE TO SITE

+/-245 FEET

VISIBILITY

VISIBLE



EXISTING

PHOTO

4

LOCATION

EAST MAIN STREET

ORIENTATION

NORTH

DISTANCE TO SITE

+/- 267 FEET

VISIBILITY

NOT VISIBLE



EXISTING

PHOTO

5

LOCATION

EAST MAIN STREET AT MILL PLAIN ROAD

ORIENTATION

NORTHEAST

DISTANCE TO SITE

+/- 0.11 MILE

VISIBILITY

NOT VISIBLE



EXISTING

PHOTO

6

LOCATION

EAST MAIN STREET AT NORTH MAIN STREET

ORIENTATION

NORTHEAST

DISTANCE TO SITE

+/- 0.38 MILE

VISIBILITY

NOT VISIBLE



EXISTING

PHOTO

7

LOCATION

MILL PLAIN ROAD

ORIENTATION

SOUTHEAST

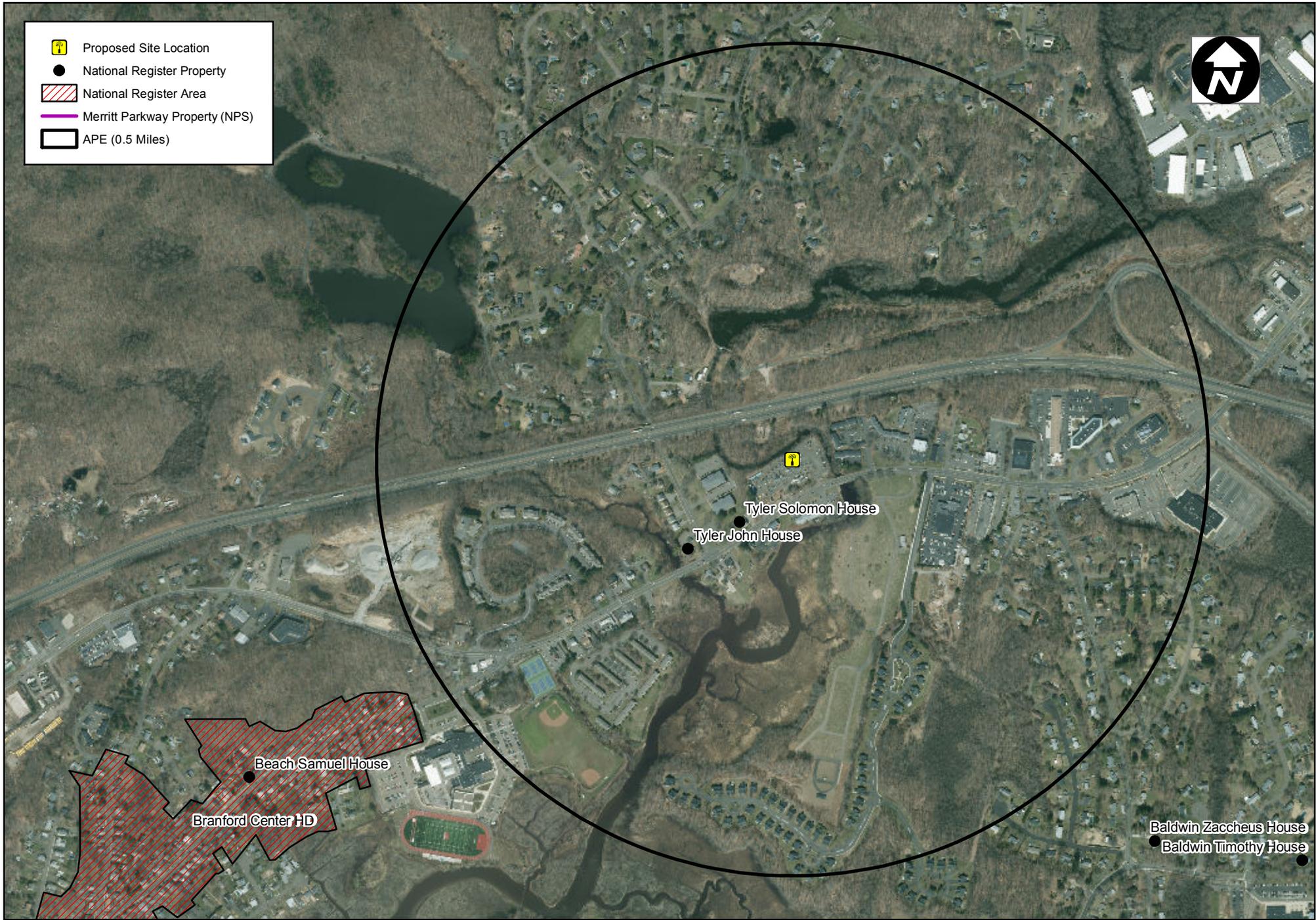
DISTANCE TO SITE

+/- 0.22 MILE

VISIBILITY

NOT VISIBLE

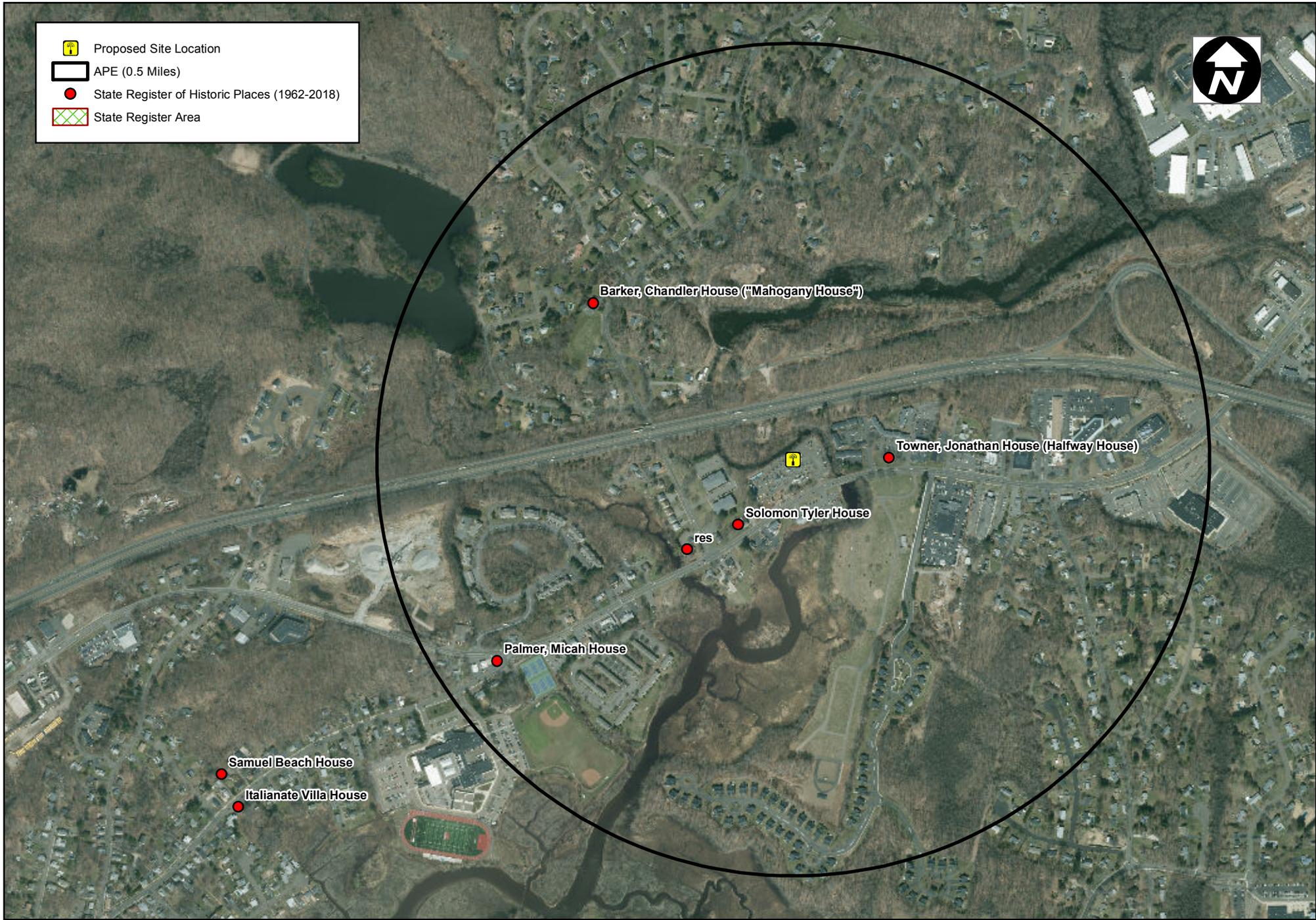
Attachment 8 – Cultural Resources Screen



Cultural Resources Screen

CT578100 ES-136 - 272 East Main St Branford CT

February 4, 2020 \ USGS QUAD: Branford



 Proposed Site Location
 APE (0.5 Miles)
 State Register of Historic Places (1962-2018)
 State Register Area



Cultural Resources Screen

CT578100 ES-136 - 272 East Main St Branford CT

February 4, 2020 \ USGS QUAD: Branford

