

Appendix G:
Post-Construction Electric and Magnetic Field Monitoring Plan

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APPENDIX D

**POST-CONSTRUCTION ELECTRIC &
MAGNETIC FIELD MEASUREMENT PLAN**

GREENWICH SUBSTATION AND LINE PROJECT

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I. Introduction and Purpose

In accordance with the November 9, 2017 Decision and Order of the Connecticut Siting Council (the “Council”) in Docket 461A, the Connecticut Light & Power Company dba Eversource Energy (the “Company”) proposes the following post-construction electric and magnetic field measurement plan for the Greenwich Substation and Line Project (the “Project”). The Project includes the construction and operation of a new approximately 2.3-mile underground, double-circuit, 115-kilovolt (“kV”) transmission line, consisting of cross-linked polyethylene (“XLPE”) cable, as well as modifications to the existing Eversource Cos Cob Substation and the construction of a new Greenwich Substation Located at 290 Railroad Ave in Greenwich, CT.

A primary purpose for electric and magnetic field (“E & MF”) measurements near transmission lines and substations is to make comparisons to levels predicted by calculations. This purpose is best served for an underground transmission line by selecting post-construction measurement locations where conductor configurations and depths are typical and representative, and where few if any confounding field sources and objects exist. Because there are no external electric fields associated with underground cables, the Company proposes to measure electric fields only at Cos Cob Substation.

A secondary purpose for such measurements can be to make comparisons between levels measured at points of interest before and after new line construction. However, those points of interest may not be at locations which best serve the primary purpose. Also, measurements of magnetic fields should not be so compared to predicted levels because power-flow circumstances can be significantly different at the times of these before and after measurements.

II. Measurement Locations

The Company’s proposed measurement locations for electric and magnetic fields along the Project are listed in Table 1, below, and are illustrated on the aerial-photography based maps in Attachment G.1. The identified measurement locations were selected to provide representative data regarding the underground portions of the transmission line, including near Cos Cob and Greenwich substations. The table also identifies locations which measurements will be performed at each location.

Table 1
Project Post-Construction E&MF Measurement Locations

Site	Municipality	EF	MF	Location
1	Greenwich	X	X	Cos Cob Substation
2	Greenwich		X	Wood Road
3	Greenwich		X	Arch Street
4	Greenwich		X	Greenwich Substation (290 Railroad Ave)

Additional considerations in the selection of the measurement locations are as follows:

Measurement Location Characteristics and Criteria

The Company chose at least one readily accessible measurement location on transmission line route and around both substations.

At each of the two-line measurement locations listed in Table 1, measurements will be made on public roadways, and not on nearby private property outside of the public way, absent landowner approval.

To the extent possible, the Company chose measurement locations where: (1) cable configurations and depths are typical and representative; and (2) where possible, few if any confounding sources, such as local distribution lines, and objects exist, other than the existing substations and parallel distribution lines.

For the locations selected to meet the criteria identified previously, the Company will measure magnetic fields along a transect (i.e., profile) passing perpendicularly above the underground transmission line of the new 115-kV line. At each listed location, the measurement path will extend to a minimum of 25 feet from either side of the new transmission line.

The Company will take a post-construction measurement of magnetic fields twice at each of the listed locations within 10 months of commencement of new 115-kV line operation. In addition, the Company will take electric field measurements along around the perimeter of Cos Cob Substation at least once within 10 months of commencement of 115-kV line operation.

III. Measurement Instrumentation and Recording

The Company will record all electric and magnetic field measurements at a height of one meter (3.28 feet) above ground in accordance with the industry standard protocol for taking measurements near power lines (IEEE Std. 644-1994 [R2008], "*IEEE Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields From AC Power Lines*").

The resultant magnetic field will be measured with a 3-axis, recording digital meter (EMDEX II). Electric fields will be measured with an E-Probe attachment accessory to the EMDEX II meter. This accessory enables the EMDEX II to make single-axis measurements of the electric field. Both the EMDEX II magnetic field meter and the E-probe accessory meet the IEEE instrumentation standard for obtaining valid and accurate field measurements at power line frequencies (IEEE Std. 1308-1994, "*IEEE Recommended Practice for Instrumentation: Specifications for Magnetic Flux Density and Electric Field Strength — 10 Hz to 3 kHz.*") With this instrumentation, magnetic fields can be recorded continuously while walking and then plotted, whereas electric fields can be measured at spots and then recorded by hand in a data table and then plotted.

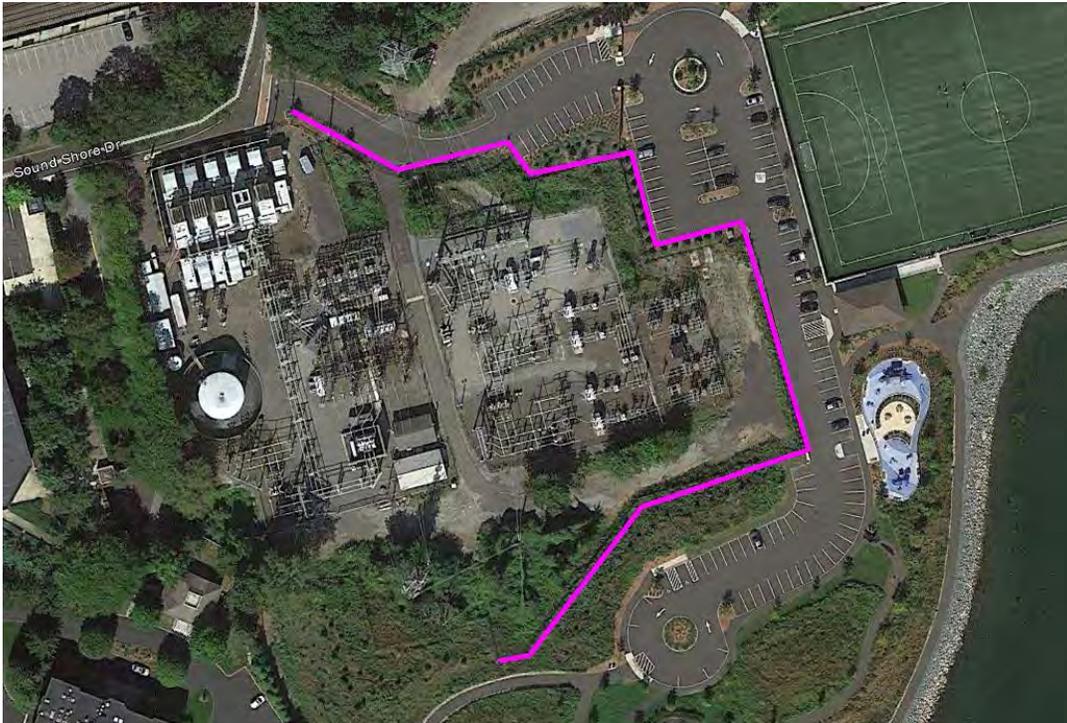
IV. Reporting

Within twelve months of the in-service date of the new 115-kV line, the Company will provide to the Council a report on these measurements with “true-up” comparisons to predicted values.

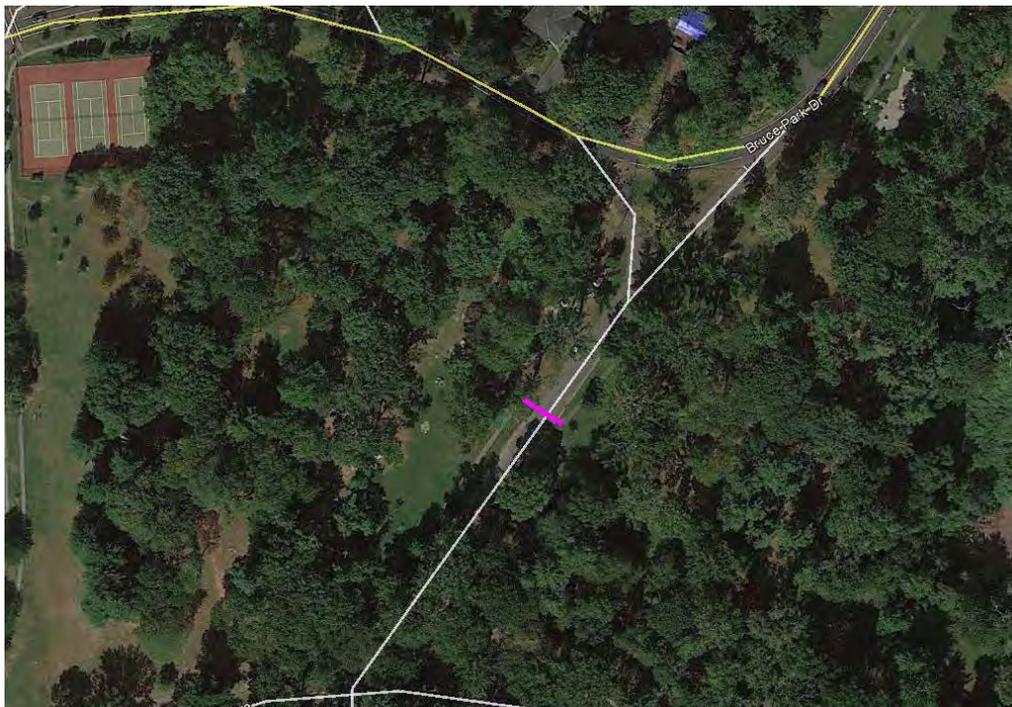
“True-ups” are electric and magnetic field calculations that are based on site-specific conditions, including the actual conductor heights and depths at a location at the time the measurement is made, current flows on the lines at the time the measurement is made, and the terrain. These calculations are then compared with the measurements taken at the location. True-up comparisons of measurements with calculations will be performed and reported for some locations to demonstrate model accuracy

The report will also include aerial photographs from Google Earth to mark each measurement location. For each magnetic field measurement, the coincident transmission line currents, as recorded by the CONVEX SCADA system, will be noted and reported. Additionally, for each measurement location, the size of transmission line conductor types will be reported.

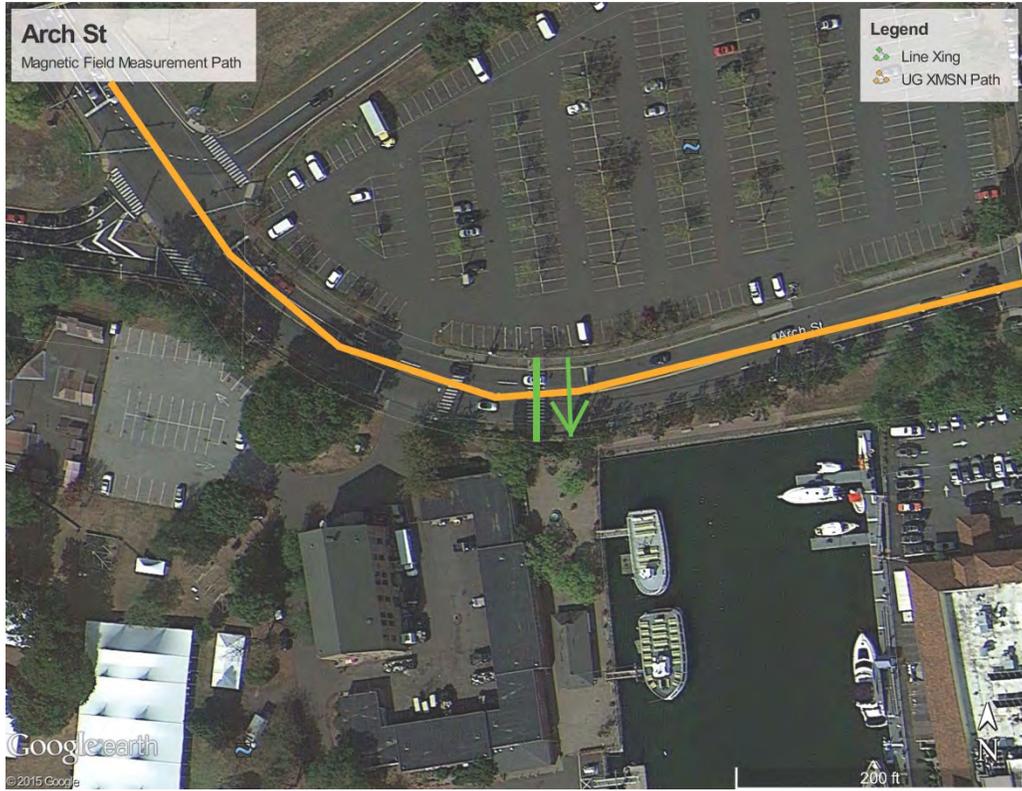
**ATTACHMENT G.1
GOOGLE EARTH AERIAL IMAGES
OF PROPOSED POST-CONSTRUCTION E&MF MEASUREMENT LOCATIONS**



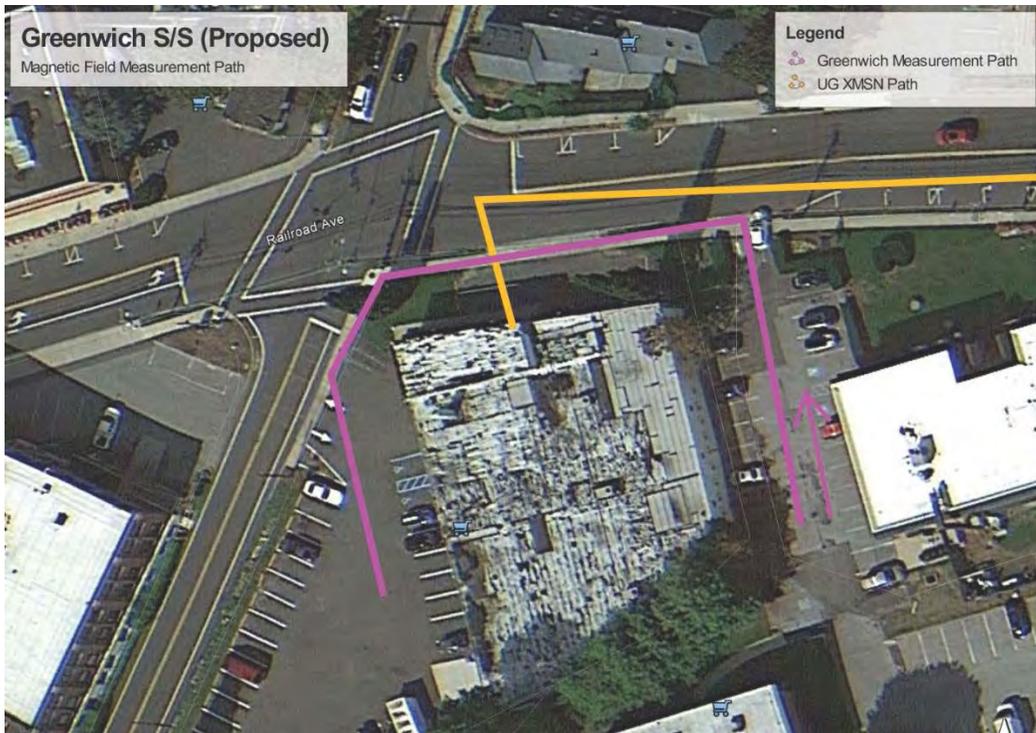
Cos Cob Substation (Greenwich, CT)



Wood Road (Greenwich, CT)



Arch St (Greenwich, CT)



Greenwich Substation (Greenwich, CT)

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