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July 21, 2022

Melanie A. Bachman, Esq.
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Docket No. 3B - The United Illuminating Company Amended Certificate of Environmental Compatibility and Public Need for Replacement of a Portion of the Existing Derby – Shelton 115-kV Electric Transmission Line Facility

Dear Ms. Bachman:

Enclosed for filing with the Connecticut Siting Council ("Council") is a memorandum from Exponent regarding Magnetic Field Evaluation of Structure 4 Re-design prepared for The United Illuminating Company. The memorandum is Attachment F to Exhibit CSC 1-15-1 that was filed earlier today with the Council. UI apologizes for not including the memorandum as part of the prior filing.

An original and fifteen (15) copies of this filing will be hand delivered to the Council.

Should you have any questions regarding this letter, please do not hesitate to contact me.

Very truly yours,

Bruce L. McDermott

Enclosures

cc: Service List

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Exponent®

MEMORANDUM

TO:	Mr. Kevin McMahon
FROM:	Benjamin Cotts, Ph.D.
DATE:	July 20, 2022
PROJECT:	UI Derby to Ansonia Transmission Line – 2005859.000
SUBJECT:	Magnetic Field Evaluation of Structure 4 Re-design

At the request of the United Illuminating Company (UI), Exponent, Inc. (Exponent) modeled the 60-Hertz (Hz) magnetic-field levels associated with the revised design for Structure #4 of the Derby Junction to Ansonia Substation 115-kilovolt (kV) Transmission Line Rebuild Project (Project).

Consistent with the approach described in Exponent's April 22, 2022 report entitled "Electric- and Magnetic-Field Assessment Derby Junction to Ansonia 115-kV Transmission Line Rebuild Project (Appendix E to UI's Exhibit (Overview in Support of the Petition to Reopen and Modify Docket No. 3) (Exhibit E), Exponent modeled magnetic-field levels associated with the existing and proposed configurations of the transmission lines using the software program SUBCALC, which was developed by the Electric Power Research Institute, and is licensed as part of the Enertech EMF Workbench Suite. The software models the 3-dimensional arrangement of transmission line conductors (including sag) and calculates the magnetic fields for operating voltage and current flow conditions. Calculations were performed for both peak daily average load and peak loading in 2022 (for the existing configuration) and projected peak daily average load and peak loading within 5 years after the line is placed in service (i.e., in 2029) for the proposed configurations.[1]

Figure 1 shows a comparison between the originally proposed Structure 4 design with the two proposed monopoles (a) and revised Structure 4 design (b) with both the 1560-3 and 1594 Lines supported on the same monopole structure. Figure 1 also shows that the revised monopole structure has slightly wider spacing (20'-3" compared to 18') between conductors and is proposed to be offset by approximately 10 feet to the west from the centerline of the original

[1] Previous calculations in Exhibit E showed that magnetic fields at peak loading were higher than at peak daily average loading by approximately 1.5 mG or less in all 2D calculations. 3D analysis showed similar results and so only results of peak loading are reported below. Changes in electric-field due to the revised structure would be very localized and *de minimus*.

structure.[2] This change will slightly increase magnetic-field levels at ground level and also shift the location of the maximum magnetic-field level slightly to the west compared to the original Structure 4 design. Magnetic-field calculations made for the 3-dimensional models of the transmission line structures are shown in Figure 2.

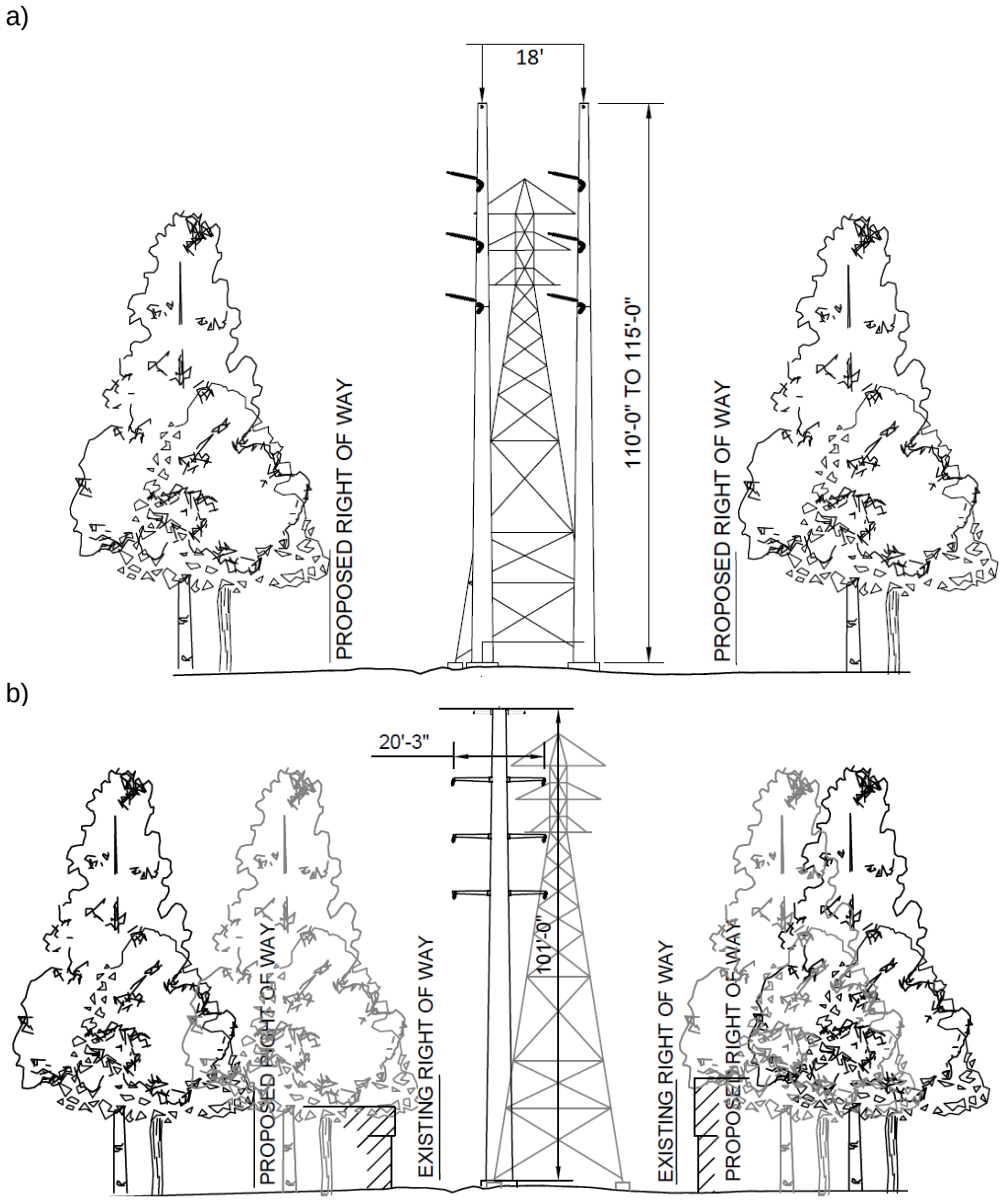

Figure 1. a) Originally proposed Structure 4 design with separate monopoles supporting the 1560-3 and 1594 Lines. b) Revised Structure 4 design with a single monopole supporting the 1560-3 and 1594 Lines

[2] This is contrast to the originally proposed Structure 4 design, for which the two monopole structures are generally centered around the existing structure.

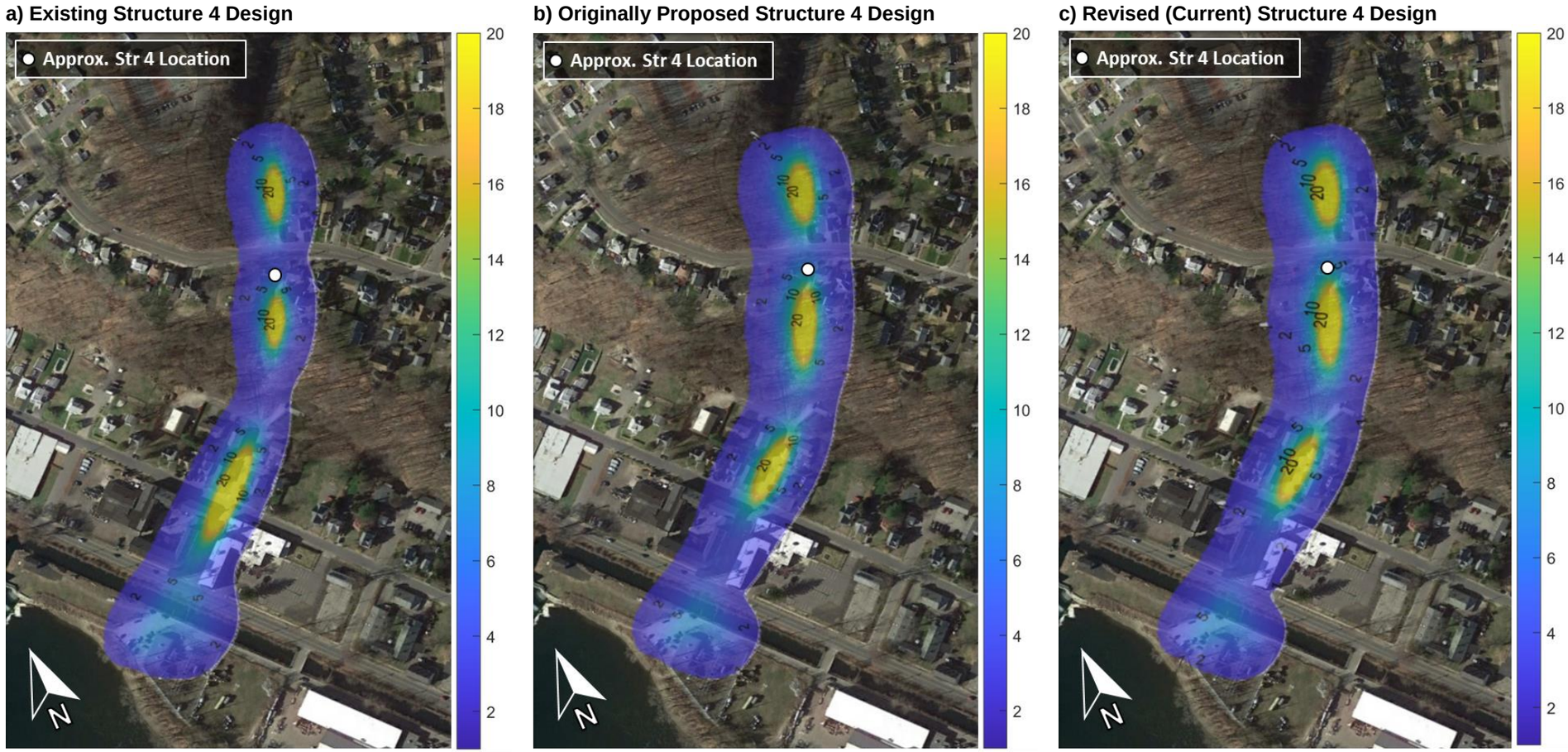

Figure 2. Comparison of the calculated magnitude and spatial extent of the magnetic field (mG) for existing (a), originally proposed (b), and revised (c) configurations for route segments around Structure 4, which is located between Indian Well Substation and Structure 5 (between Indian Well and Ansonia substations). Field levels decrease below 1 mG outside colored areas.

Calculated magnetic-field levels at a height of 3.3 feet (1 meter) above ground are shown for three configurations; the existing configuration in Figure 2a), the originally-proposed Structure 4 design in Figure 2b) and the revised (current) Structure 4 design are shown in Figure 2c).

Consistent with Exhibit E, these calculations show that the magnetic-field levels near ground decrease dramatically near where conductors are higher above ground as they approach suspension points on supporting structures compared to the midspan (where conductors are closer to ground). These results also show that the differences between the magnetic-field levels for the originally proposed Structure 4 design and the revised (current) Structure 4 design are quite small. The highest field for either configuration is near the midspan and is approximately 32 mG for either proposed structure design. Additional analysis shows that, as expected, the maximum magnetic-field level shifts slightly to the west for the revised Structure 4 design compared to the original Structure 4 design. However, at approximately 50 feet from the original structure centerline the difference between the magnetic-field level for the original and revised Structure 4 designs is less than 1.5 mG. These results also show that the distance at which magnetic-field levels from the transmission lines fall to 1 mG or less is quite similar for the existing and the originally proposed or revised Structure 4 configurations.

All calculated magnetic-field levels were a very small fraction (approximately 2% or less) of the limits set by two international scientific organizations—the International Committee on Electromagnetic Safety (ICES) and the International Commission on Non-Ionizing Radiation Protection (ICNIRP)—which have developed magnetic-field limits designed to protect public health and safety. These organizations based their standards on weight-of-evidence reviews and evaluations of relevant health research. The limits set forth by these organizations are 2,000 mG (ICNIRP) and 9,040 mG (ICES).[3]

[3] ICES; IEEE Std C95.1™ IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz. Piscataway, NJ: IEEE, 2019;

ICNIRP. Limiting exposure to time-varying electric and magnetic fields. Health Phys 99:818-836, 2010.