



# Electric and Magnetic Fields Summary

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*Seacoast Reliability Project  
Amended Calculations*

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## Summary

*This section provides electric and magnetic fields (EMF) information for the Project, presenting projections for future EMF levels associated with the proposed transmission line in each segment where the design is being amended.*

*Section 1 provides general background information about amended project and Section 2 discusses the calculated electric and magnetic fields associated with this project.*

*The company prepared calculations of magnetic field levels in the vicinity of the proposed transmission lines under average annual loads and annual peak loads. Under all of these conditions, the calculated electric and magnetic fields are well below the exposure levels corresponding to ICNIRP and ICES Basic Restriction limits summarized in the table below.*

	EF (kV/m)	MF (mG)
ICES	26.8	9,150
ICNIRP	36.4	12,400

**Table 1 - Summary of EMF levels corresponding to Basic Restrictions on public exposure from international scientific agencies**

*In addition, Attachment A contains tabulated results of the calculated electric and magnetic fields for the Project.*

# **1 Description of Project Design Changes**

As described in the initial filing, PSNH has continued to work closely with abutters, host communities and its citizens to avoid, minimize, and mitigate potential impacts of the construction and operation of the Project. To respond directly to the feedback received from these stakeholders, PSNH has made significant design changes, including, siting approximately 2,680 additional feet of the Project underground through the Newington Center Historic District and Hannah Lane residential neighborhood, altering the route for the underground design in Newington through Gundalow Landing, relocating the site of a transition structure in Newington, and modifying the overhead design in both of the Towns of Durham and Newington. The Applicant comes before the Committee to submit this Amendment to its Application that reflects the aforementioned changes in the Project.

This submission describes in detail those sections of the April 12, 2016 Application that must be modified as a result of the design changes. PSNH also submits updated appendices and amended pre-filed testimony for each of its supporting witnesses.

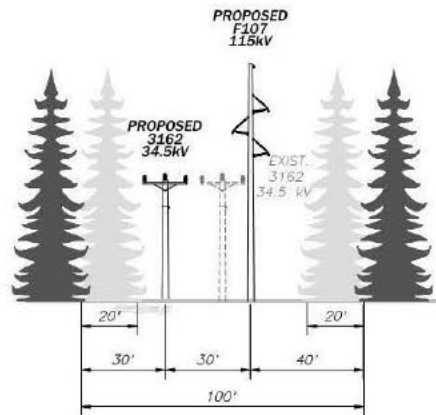
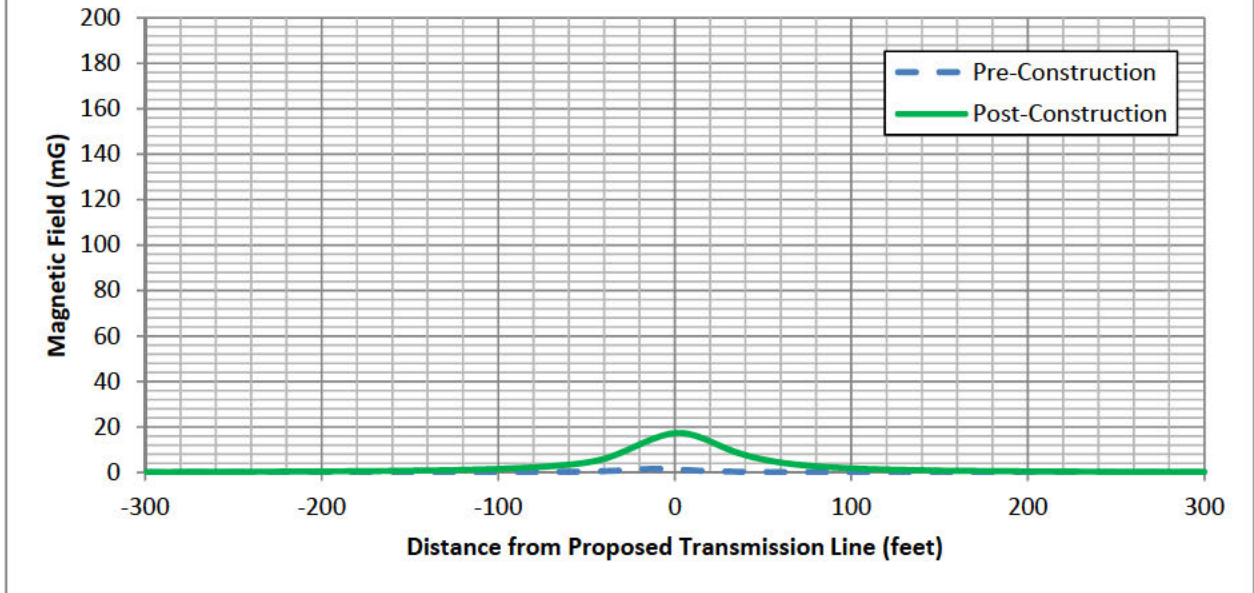
## **2 Calculated Electric and Magnetic Fields from Proposed Changes**

As with other effects associated with the proposed changes, calculations were prepared to summarize the effect of the proposed modifications to the design and siting of section of certain line sections on electric and magnetic fields. These calculations were prepared using the same techniques and line loadings as were used to prepare the electric and magnetic field information from the Application.

### **2.1 Calculated Magnetic Fields During Assumed Average Annual Loads**

Calculated magnetic fields are presented here as a profile looking along the right-of-way (“ROW”) from Madbury Substation (in the Town of Madbury) towards Portsmouth Substation (in the Town of Portsmouth). The calculations are prepared for a distance of 300 feet on either side of the proposed 115-kV transmission line. Fields are plotted for both the existing distribution lines and the proposed transmission lines on the same figure. Below each graph is a depiction of the ROW showing both the existing and proposed facilities.

## Calculated Magnetic Fields Route 108 to Timber Brook Lane

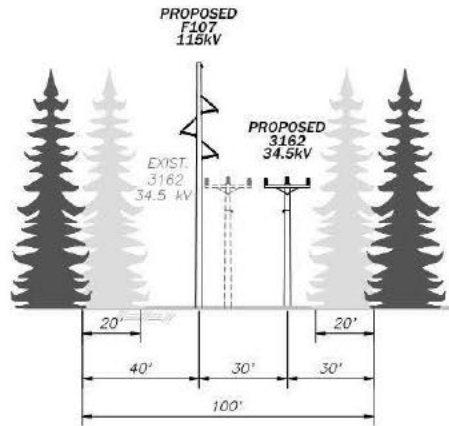
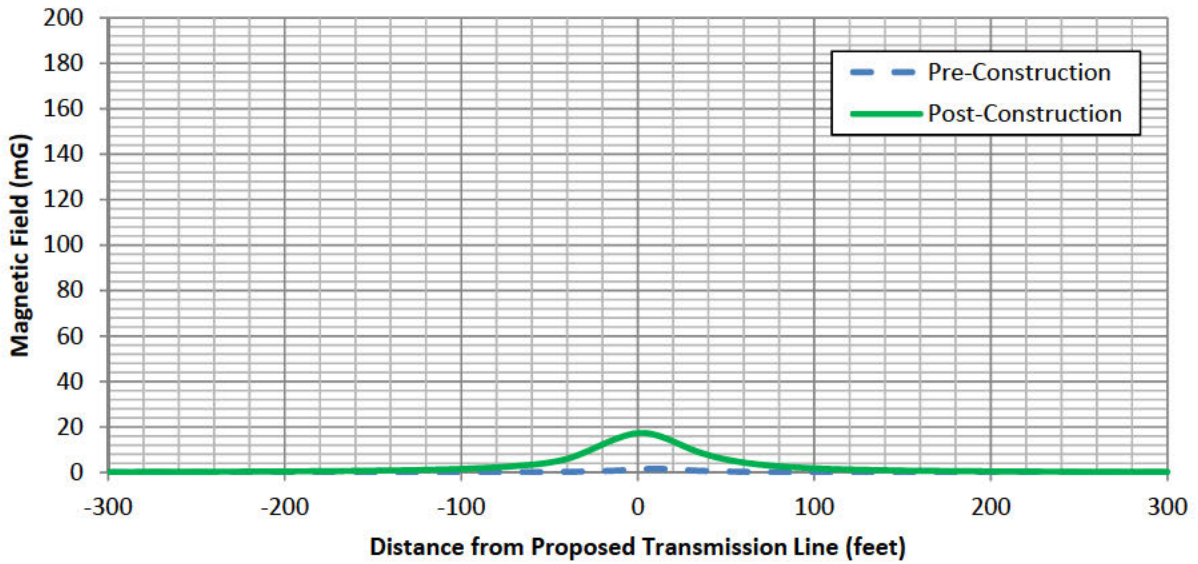


### SECTION 13

PROPOSED F107 SINGLE CIRCUIT &  
 PROPOSED 3162 SINGLE CIRCUIT  
 ROUTE 108 TO TIMBER BROOK LANE  
 STR. 62 – STR. 63  
 (1100' ±)

Figure 1 - Magnetic Field Calculations for Route 108 to Timber Brook Lane

## Calculated Magnetic Fields Section West of Durham Point Rd (~1900 feet)

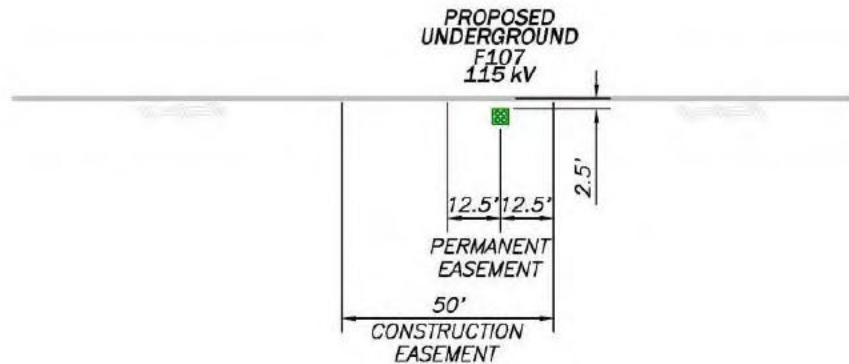
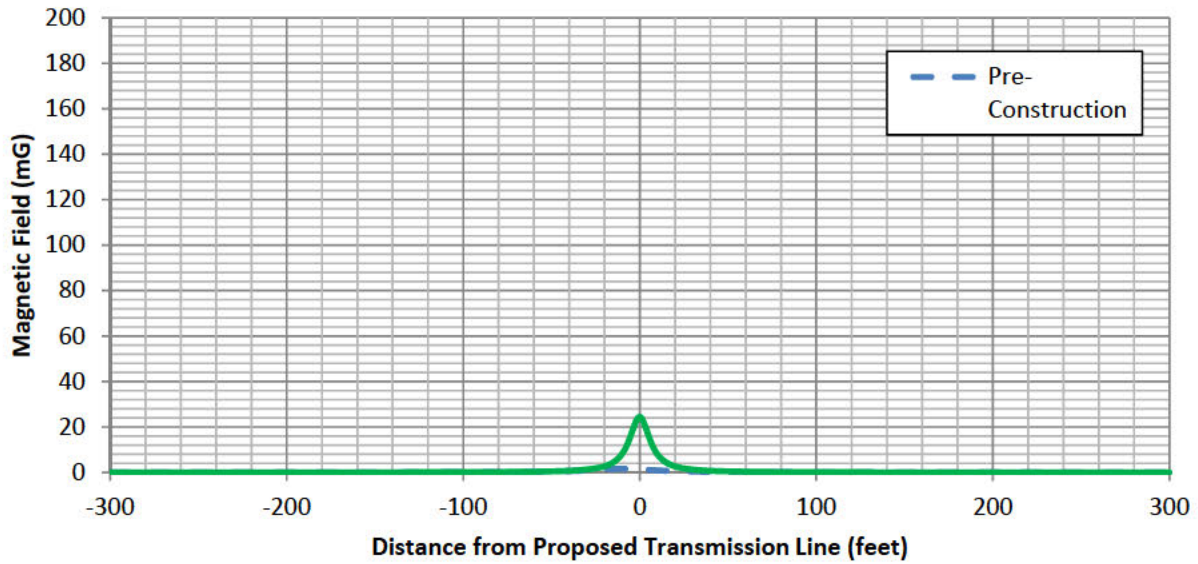


### SECTION 15

PROPOSED F107 SINGLE CIRCUIT &  
 PROPOSED 3162 SINGLE CIRCUIT  
 F107/3162 CIRCUIT SPLIT TO DURHAM POINT ROAD  
 STR. 93 – STR. 96  
 (1900' ±)

Figure 2 - Magnetic Field Calculations for Section of ROW West of Durham Point Road

## Calculated Magnetic Fields Underground from Little Bay to Structure 102



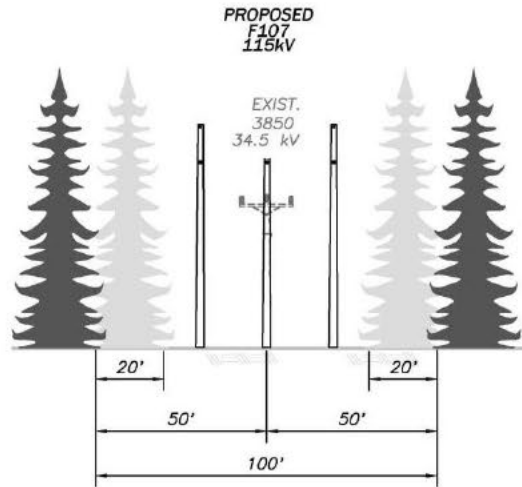
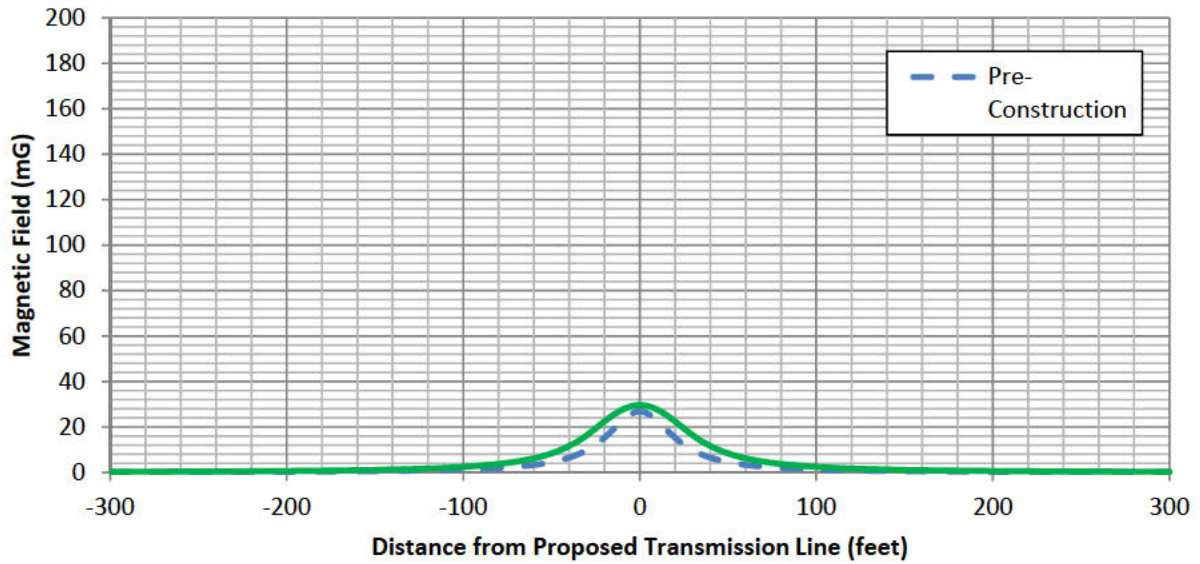
### SECTION 22

PROPOSED LINE F107 UNDERGROUND  
LITTLE BAY ROAD TO STR. 102  
(430' ±)

Figure 3 - Magnetic Field Calculations for the Underground Transmission Line from Little Bay Rd to Structure 102



## Calculated Magnetic Fields Structure 102 to Frink Farm

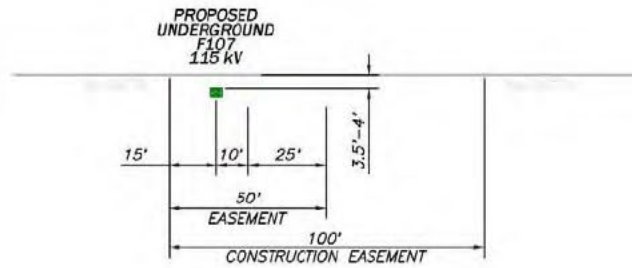
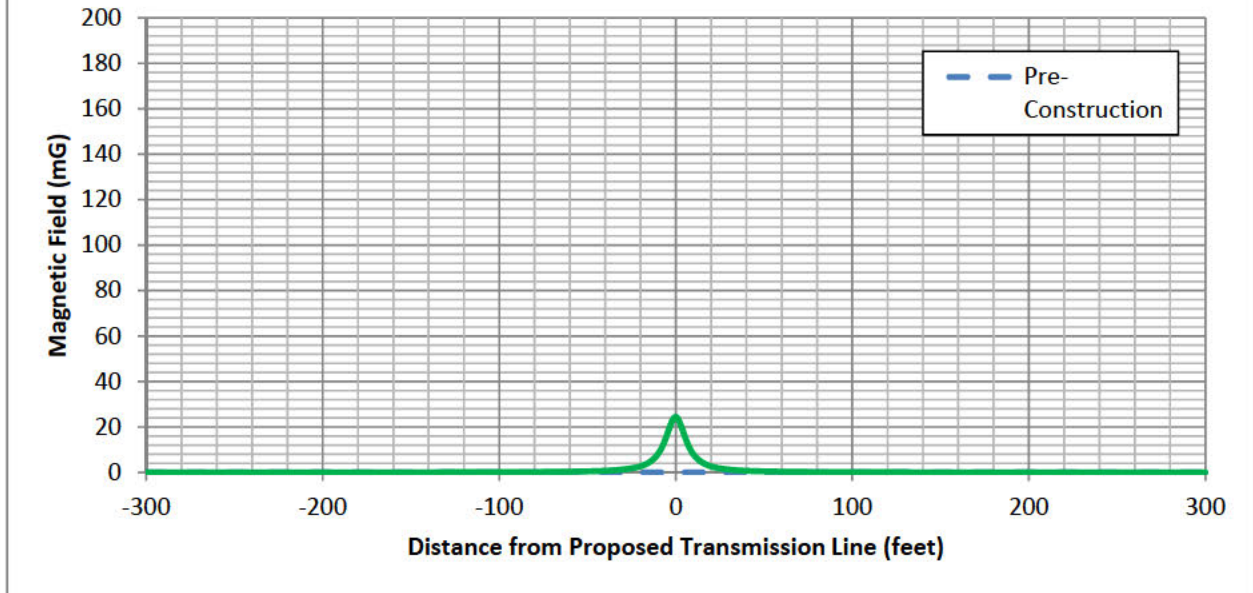


### SECTION 23

PROPOSED F107 SINGLE CIRCUIT  
 STR. 102 TO FRINK FARM  
 STR. 102 - STR. 109  
 (2820' ±)

Figure 4 - Magnetic Field Calculations for Structure 102 to Frink Farm

## Calculated Magnetic Fields Underground Through Frink Farm

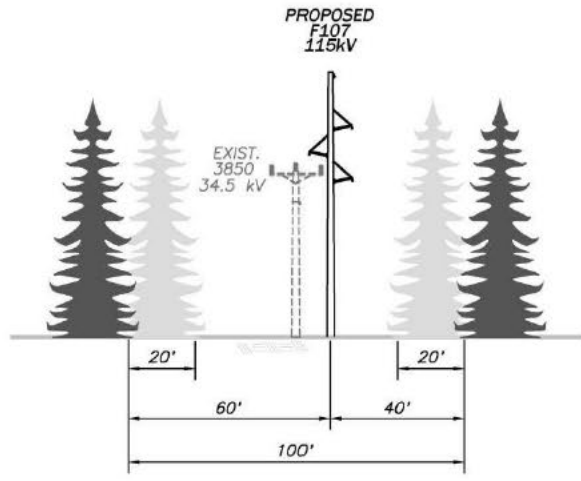
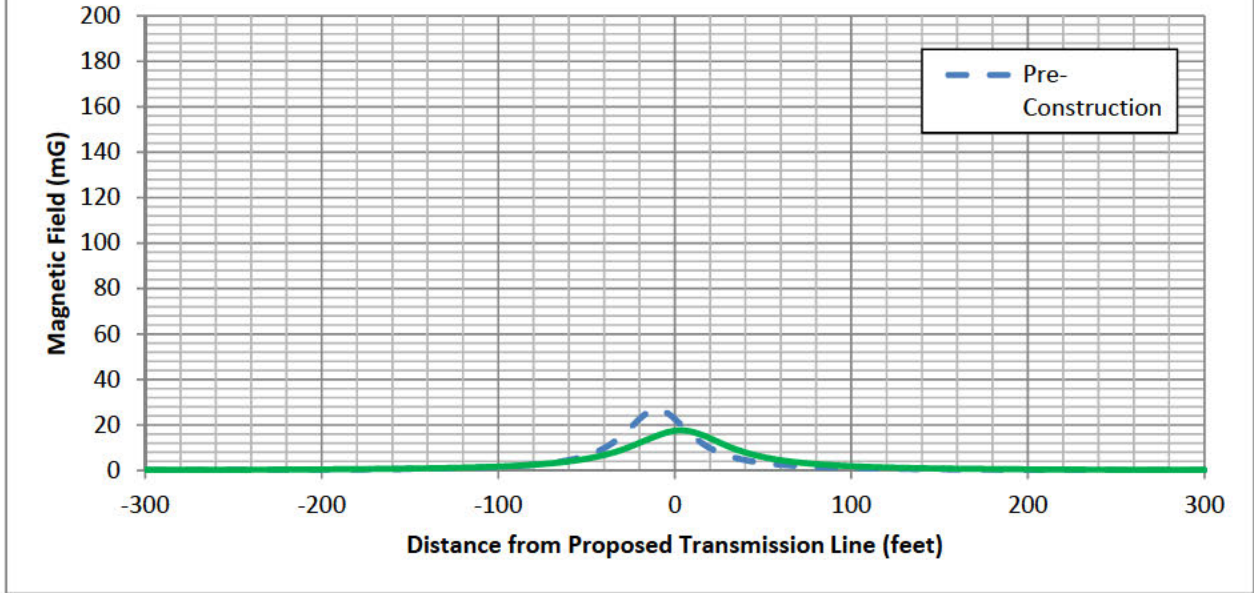


### SECTION 24

PROPOSED LINE F107 UNDERGROUND  
FRINK FARM  
STR. 109 - HANNAH LANE  
(2420' ±)

Figure 5 - Magnetic Field Calculations for Underground Transmission Line Through Frink Farm

## Calculated Magnetic Fields Frink Farm to Fox Point Road

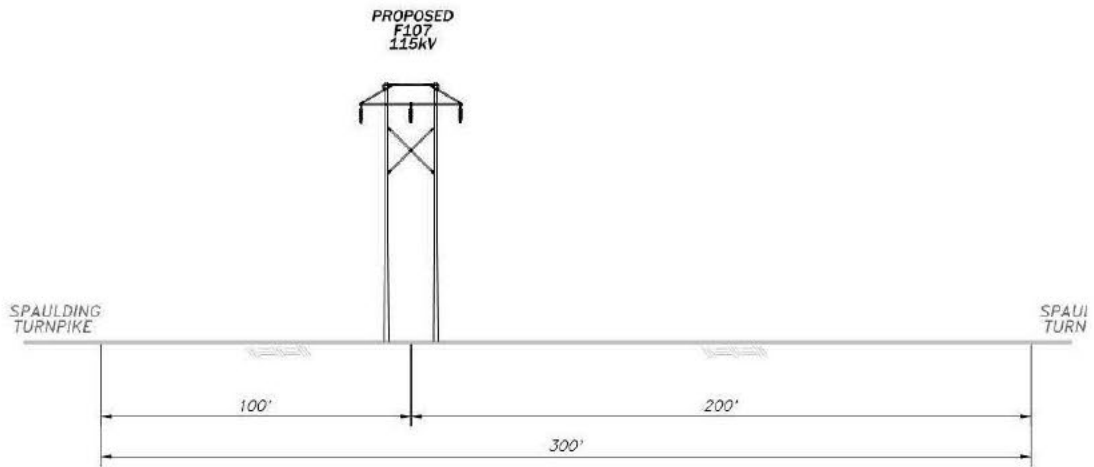
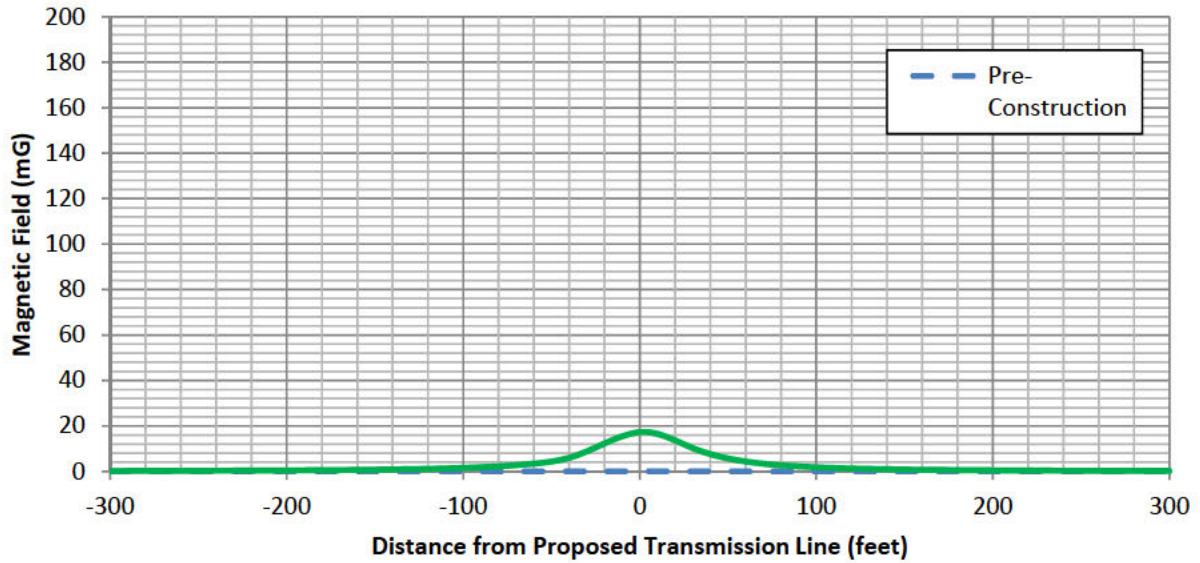


### SECTION 25

PROPOSED F107 SINGLE CIRCUIT  
FRINK FARM TO FOX POINT ROAD  
STR. 113 – STR. 114  
(720' ±)

Figure 6 - Magnetic Field Calculations for Frink Farm to Fox Point Road

## Calculated Magnetic Fields Spaulding Turnpike Crossing



### SECTION 30

PROPOSED F107 SINGLE CIRCUIT SPAULDING  
TURNPIKE CROSSING TO LINE E194 CROSSING  
STR. 138 - STR. 140  
(1500' ±)

**Figure 7 - Magnetic Field Calculation for Spaulding Turnpike Crossing**

## 2.2 Calculation of EF from Transmission Lines

Below are plots of calculated electric fields for the updated design sections. Because there is no external electric field caused by the underground transmission lines, those plots have been omitted.

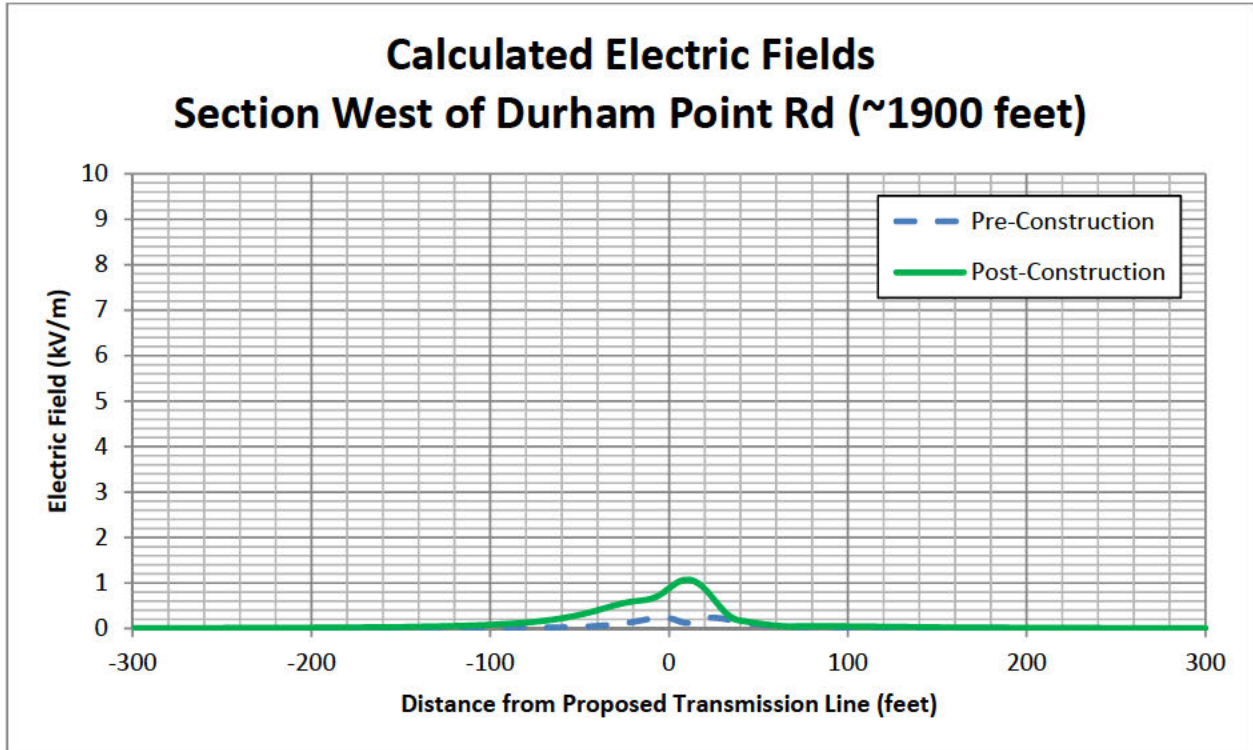


Figure 8 - Electric Field Calculations for Section of ROW West of Durham Point Road

### Calculated Electric Fields Riser Structure (102) to Frink Farm

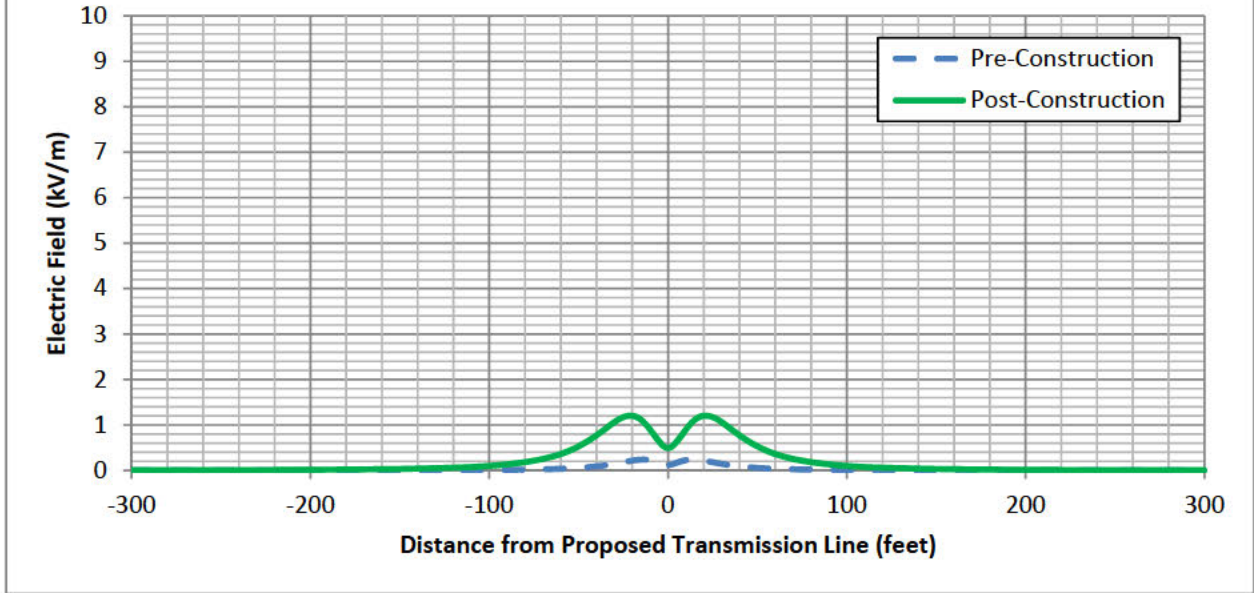


Figure 9 - Electric Field Calculations for Structure 102 to Frink Farm

### Calculated Electric Fields Frink Farm to Fox Point Rd

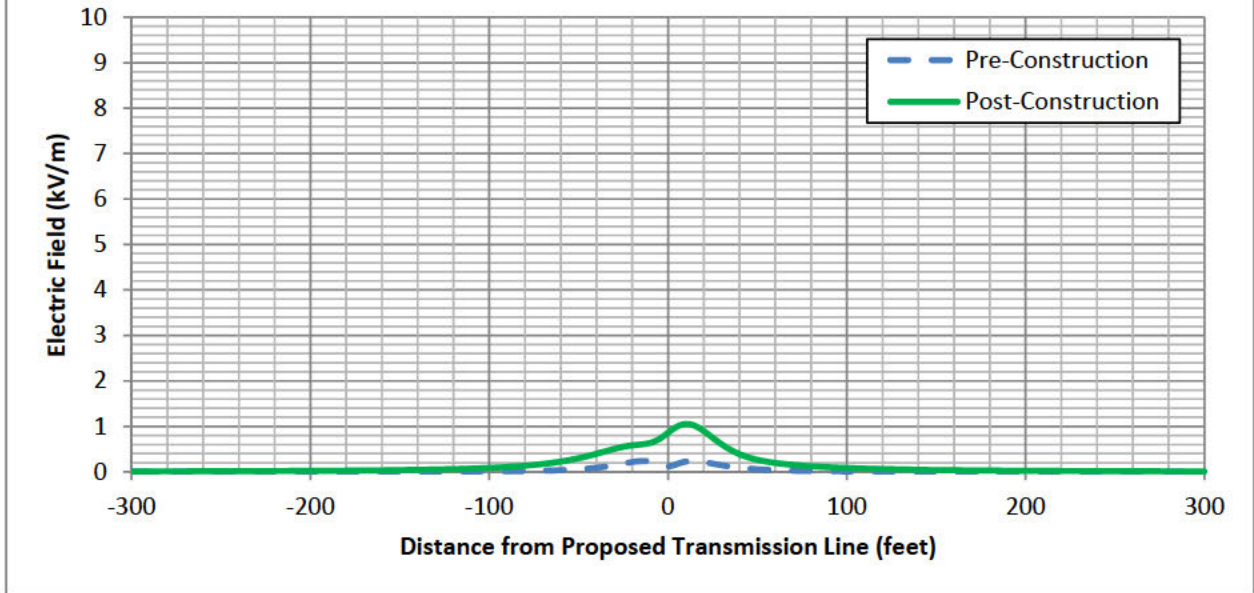


Figure 10 - Electric Field Calculations for Frink Farm to Fox Point Road

## Calculated Electric Fields Spaulding Turnpike Crossing

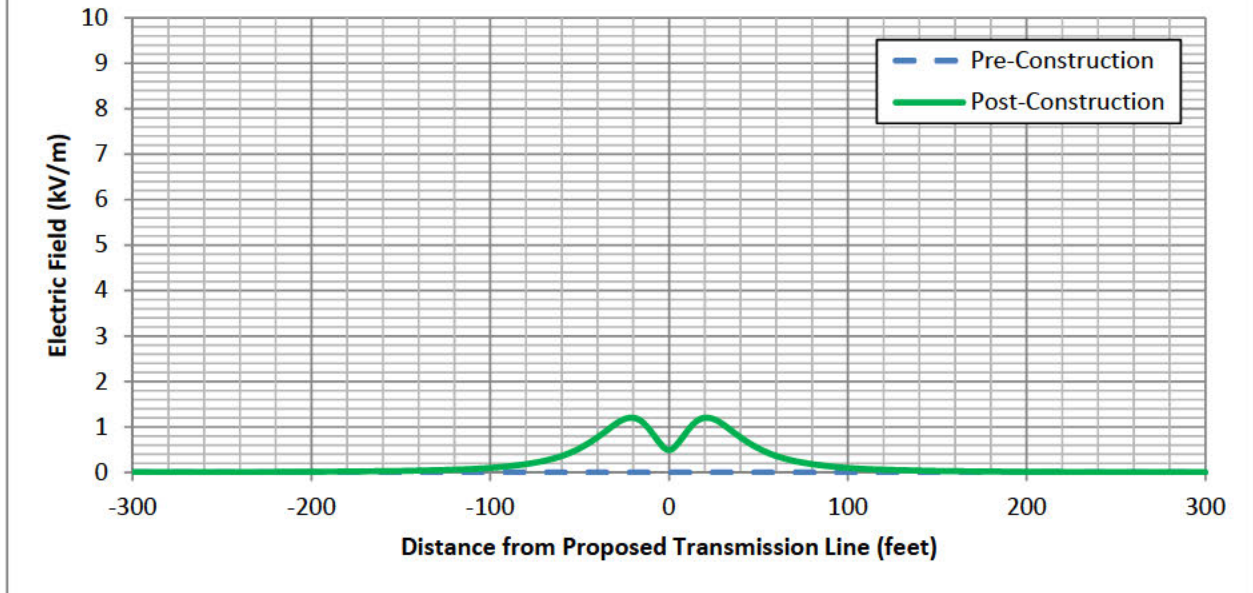


Figure 11 - Electric Field Calculations for Spaulding Turnpike Crossing

**Attachment A Tabulated Summaries of EMF Calculations**



### Tabulated Magnetic Field Calculations – Average Annual Loads

Line Section		Magnetic Field Calculations (mG; Average Annual Loads)					
From	To	Pre-Project			Post-Project		
		- ROW Edge	Maximum	+ ROW Edge	- ROW Edge	Maximum	+ ROW Edge
Route 108	Timber Brook Lane	0.27	1.60	0.27	4.35	17.36	7.62
Section West of Durham Point Rd (±1900 feet)		0.27	1.60	0.27	6.71	17.89	4.13
Underground from Little Bay to Structure 102		±0.00	0.00	±0.00	±0.48	24.43	±0.47
Structure 102	Frink Farm	4.54	26.77	4.54	8.37	29.60	8.37
Underground Through Frink Farm		±0.00	0.00	±0.00	±0.48	24.43	±0.47
Frink Farm	Fox Point Rd	4.54	26.77	4.54	3.97	17.63	7.92
Spaulding Turnpike Crossing		0.00	0.00	0.00	8.37	29.60	0.64

† For sections of Underground Cable which are not within existing Eversource ROWs, Calculations are at 50 feet from the transmission line.

### Tabulated Electric Field Calculations

Electric Field Calculations (kV/m)							
Line Section		Pre-Project			Post-Project		
From	To	- ROW Edge	Maximum	+ ROW Edge	- ROW Edge	Maximum	+ ROW Edge
Route 108	Timber Brook Lane	0.06	0.24	0.06	0.05	1.09	0.40
Section West of Durham Point Rd (±1900 feet)		0.06	0.24	0.06	0.40	1.07	0.06
Underground from Little Bay to Structure 102							
Structure 102	Frink Farm	0.06	0.24	0.06	0.53	1.20	0.53
Underground Through Frink Farm							
Frink Farm	Fox Point Rd	0.06	0.24	0.06	0.30	1.05	0.26
Spaulding Turnpike Crossing		0.00	0.00	0.00	0.10	1.20	0.01

† For sections of Underground Cable which are not within existing Eversource ROWs, Calculations are at 50 feet from the transmission line.