

**ATLANTIC COAST PIPELINE, LLC
ATLANTIC COAST PIPELINE**

and

**DOMINION ENERGY TRANSMISSION, INC.
SUPPLY HEADER PROJECT**

**Supplemental Filing
November 3, 2017**

APPENDIX A

Light Pollution Study and Lighting Mitigation Plan



1160 Johnson Avenue
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Phone (304) 848-6730

Light Pollution Study & Lighting Mitigation Plan

Prepared For:

Atlantic Coast Pipeline

Rev 0
October 31, 2017

SCOPE

On August 30, 2017, Atlantic Coast Pipeline requested that I3 Engineering and Consulting, LLC prepare a Light Pollution Study and Lighting Mitigation Plan to address concerns associated with the installation of temporary work zone lighting for the horizontal directional drill entry point for the Blue Ridge Parkway HDD.

Concerns center around possible light pollution that could be experienced at the Fenton Inn located approximately 285' from the identified temporary work zone.

PURPOSE

The purpose of this study is to determine what level of light pollution, if any, will exist at the Fenton Inn location due to temporary work zone lighting. Furthermore, this study will also determine what design changes are necessary, if any, to mitigate or possibly eliminate light pollution at the Fenton Inn.

PROCEDURE

Evaluation of the proposed temporary work zone lighting installation was conducted using AGI32 lighting design software (version 18.3.2). The horizontal directional drilling contractor supplied the information as listed:

- They plan to utilize (6) light plant/generators
- Each light plant has (4) light fixtures
- Each fixture has a light output of 50,000 lumens
- Total lumens of 1,200,000 of light output
- Lights to be aimed toward the center of the temporary workspace
- Low lumen task lighting for specific equipment was provided but not considered due to the negligible impact

Study Input Parameters

IES Photometric File – RAB Lighting file IES LM-63-2002 was used. This fixture is a 50,000 lumens wide patterned floodlight.

Light Fixture Arrangements – A total of (6) lighting locations are to be installed at the temporary Work Zone area (See Appendix 1).

Light Fixture Mounting Height – 28'

Light Fixture Locations/Aiming Points – See Appendix 1.

Lighting Design Values – Expressed in foot-candle units.

Site Drawing Showing Proximity of Work Zone & Fenton Inn – See Appendix 2.

Study Results

At the temporary construction work zone, a total of twenty-four (24) 50,000 lumen floodlights were installed in an area covering approximately 55,000 square feet. These floodlights have the ability to be “aimed” and have adjustable mounting heights.

The study indicates a light level of 0.0 foot-candles on the Fenton Inn building structure. The foot-candle distribution can be noted on the Lighting Distribution drawing (see Appendix 3).

Study Summary

The study indicates that the temporary work zone lighting can be installed without any light pollution levels at the Fenton Inn building structure, provided that the study input parameters are maintained. The study indicates that adjustments to the fixture aiming points and mounting heights as noted in the Appendix 1 will successfully eliminate any light pollution at the Fenton Inn building structure.

Therefore, the site lighting mitigation parameters that the contractor shall adhere to include the following:

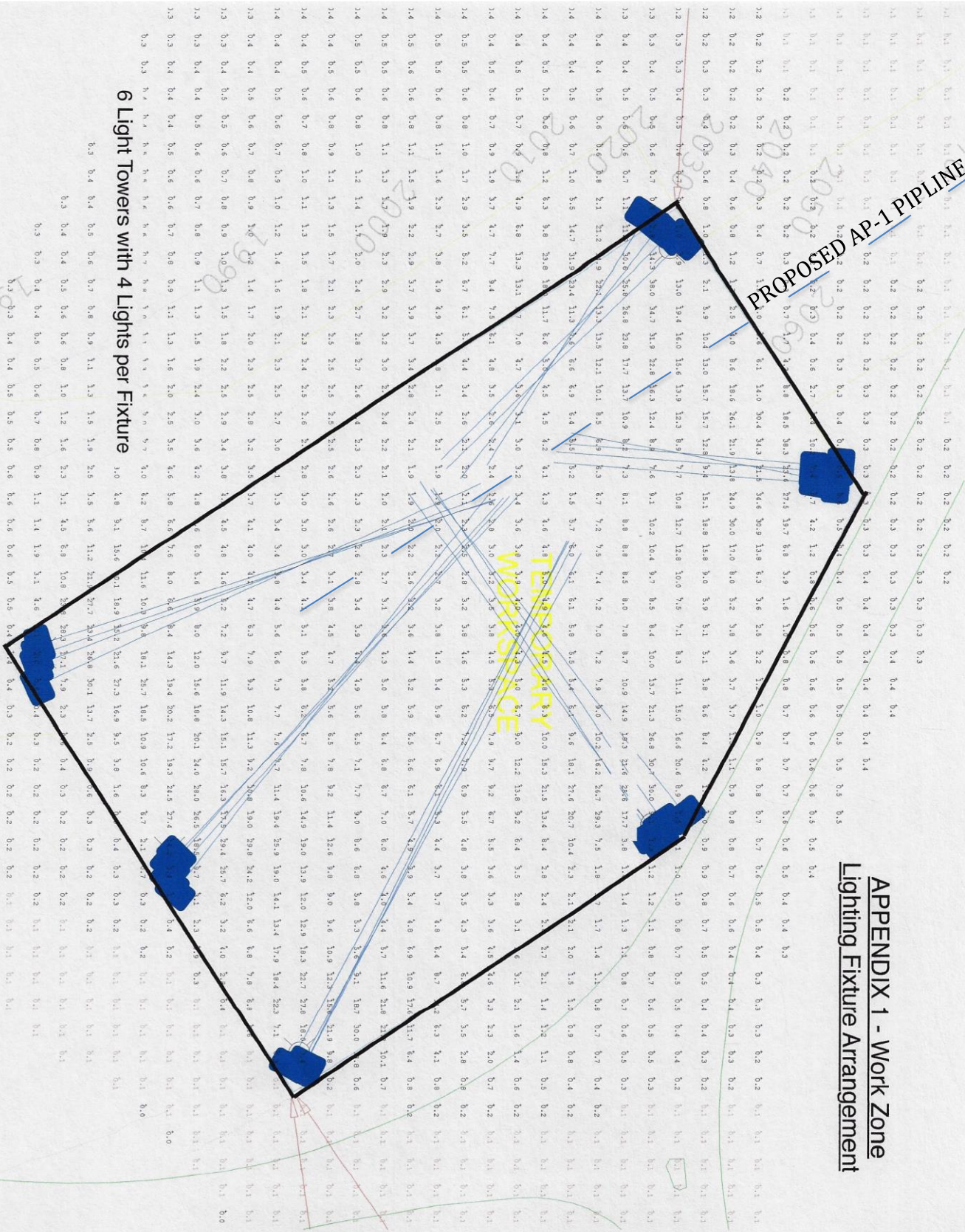
1. Mounting heights shall be a maximum of 28 feet from the ground surface
2. Light plant fixtures shall be 50,000 lumens each or less
3. Light plants shall have a maximum of four fixtures per plant
4. A maximum of six light plants shall be utilized
5. The light plants shall be aimed toward the center of the workspace as shown in the Appendix 1 diagram

Study Prepared By:

Terry Carpenter, P.E.
Project Engineer
I3 Engineering & Consulting, LLC

PROPOSED AP-1 PIPLINE

APPENDIX 1 - Work Zone
Lighting Fixture Arrangement



6 Light Towers with 4 Lights per Fixture

1980



Fenton Inn
Building
Structure

235'

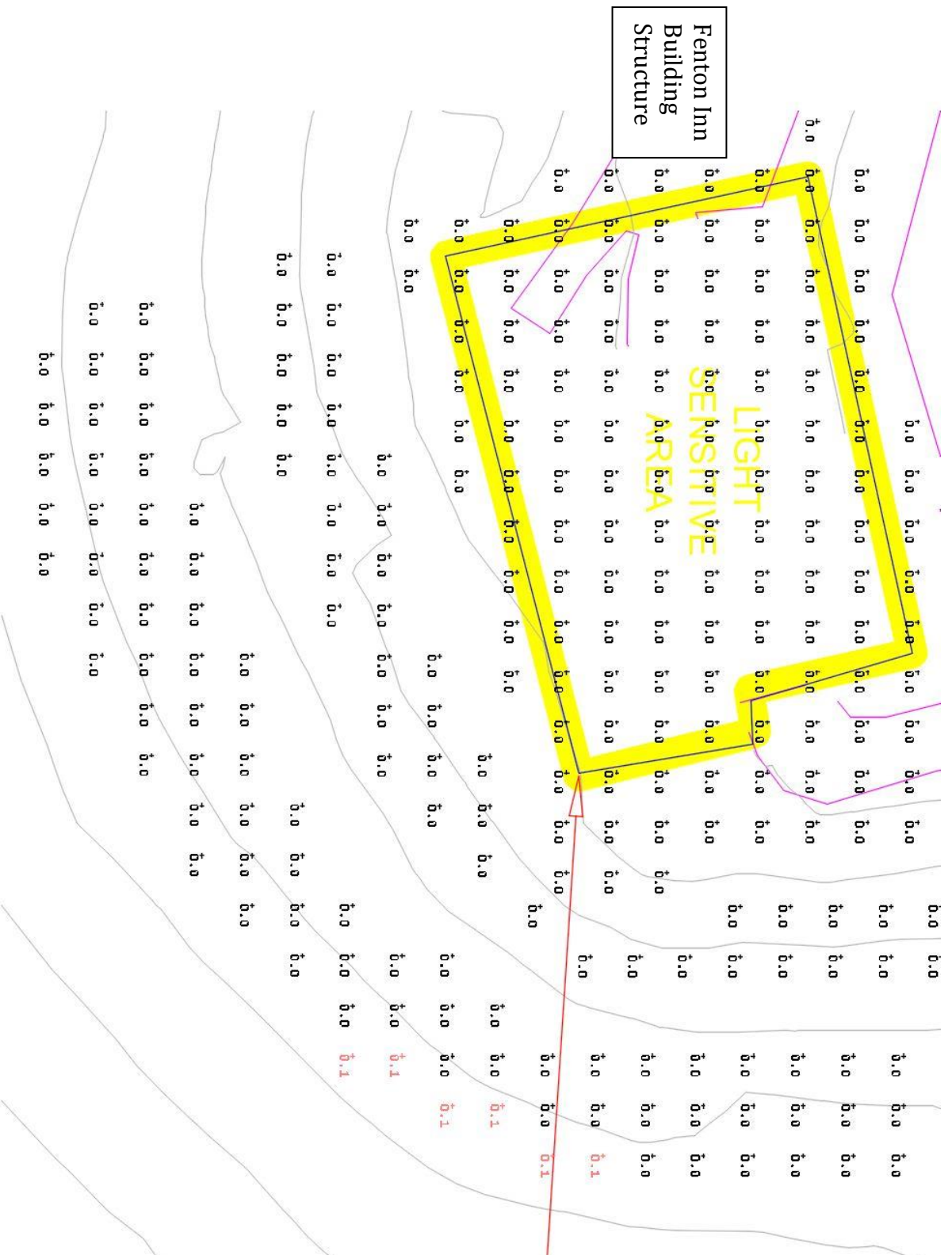
PROPOSED AP-1 PIPELINE

Work
Zone

MAINT RW

APPENDIX 2 - Site
Layout

APPENDIX 3 – Lighting Distribution



Lighting Levels Shown in Foot-Candles