



VIA US AND ELECTRONIC MAIL

6/12/2017

Robert Stein  
Chairman  
The Connecticut Siting Council  
Ten Franklin Square  
New Britain, CT 06051

Re: The United Illuminating Company's Notice of Exempt Modification Pursuant to R.C.S.A. § 16-50j-58 to the Following Existing Energy Facility: **1100 Quinnipiac Avenue, New Haven CT** ("Notice of Exempt Modification")

Dear Chairman Stein:

Pursuant to Regulations of Connecticut State Agencies ("R.C.S.A.") §16-50j-58, The United Illuminating Company ("UI" or "Company") hereby notifies the Connecticut Siting Council (the "Council") of its intent to make exempt modifications to the following substations: 1100 Quinnipiac Avenue, New Haven CT ("Facility" or "Quinnipiac Substation").

As discussed in detail below, after a review of certain UI substations, the Company has determined that increased lighting protection is required at Quinnipiac Substation. The results of UI's study are included in Attachment 1.

The \$625 filing fee along with 2 copies of this Notice of Exempt Modification are enclosed herewith.

**100 Quinnipiac Avenue – Quinnipiac Substation**

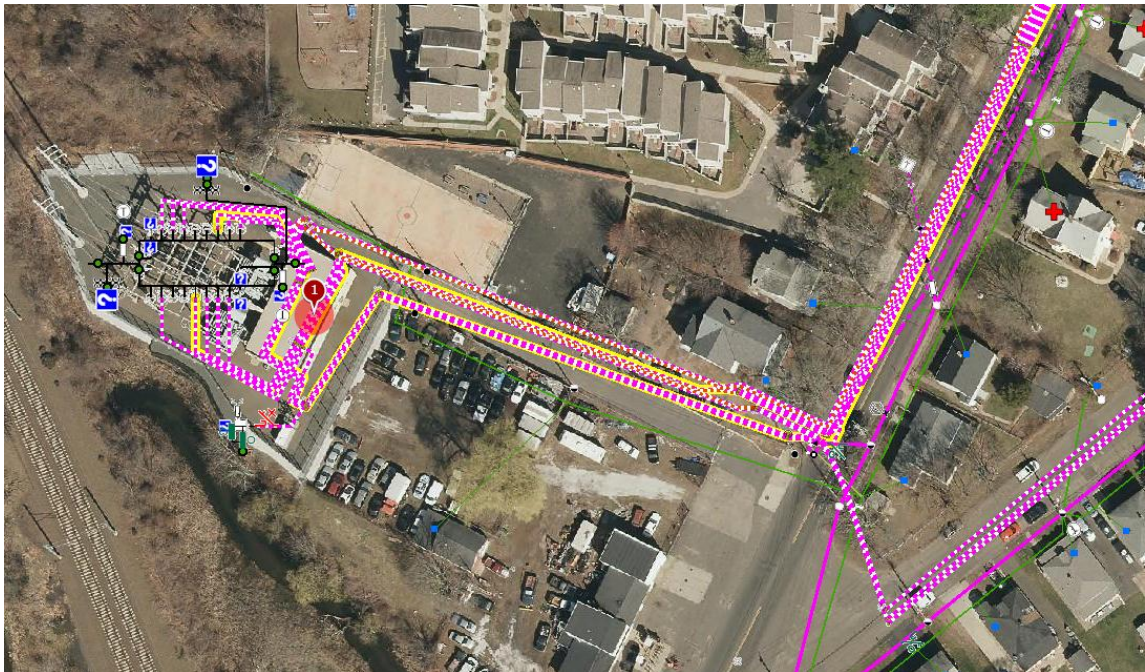
The 1100 Quinnipiac Avenue Facility is located in the City of New Haven, CT at 41°19'04" and Λ 72°52'38" and is more particularly described in Attachment A.

**Aerial Photos of the Facility**



Quinnipiac Substation. 1100 Quinnipiac Ave, New Haven CT 06513  
Source: Google Maps 2017

**GIS Photos of the Facility**



Quinnipiac Substation. 1100 Quinnipiac Ave, New Haven CT 06513 (Current)  
Source: GIS Lite 4/12/17

Proposed Modifications

The Company proposes the addition of a lightning mast to provide 100% lightning protection to the site and its equipment. As the proposed modifications relate solely to improving system maintenance, the changes will not impact the existing Facility's structural capability or impact electric and magnetic fields. Engineering drawings depicting the proposed lightning mast are included as Attachment 3 and a Visibility Analysis, prepared by All-Points Technology Corporation is included as Attachment 2.

Current and proposed photos of Quinnipiac Substation. *Please note the proposed lightning mast.*



DOCUMENTATION

Quinnipiac Substation, Current Site.  
All-Points Technology Corporation 4/12/17



SIMULATION

Quinnipiac Substation, Proposed Site.  
All-Points Technology Corporation 4/12/17

Compliance with R.C.S.A. § 16-50j-57(b)

Pursuant to R.C.S.A. § 16-50j-57(b), the proposed changes do not constitute a modification to an existing facility that may have a substantial adverse environmental effect and are exempt from the requirement to obtain a certificate pursuant to Section 16-50k of the Connecticut General Statutes. Specifically, consistent with R.C.S.A. § 16-50j-57(b), the proposed changes to the existing site do not:

- (A) Extend the boundaries of the site beyond the existing fenced compound;
- (B) Increase the height of existing associated equipment;
- (C) Increase noise levels at the site boundary by 6 decibels or more, or to levels that exceed state and local criteria;
- (D) Impact electric and magnetic field levels at the site boundary in a manner that is inconsistent with the Council's Best Management practices for Electric and Magnetic Fields;
- (E) Cause a significant adverse change or alteration in the physical or environmental characteristics of the site; or
- (F) Impair the structural integrity of the facility, as determined in a certification provided by a professional engineer licensed in Connecticut, where applicable.

The project would not have a substantial adverse environmental effect or cause a significant adverse change or alteration in the physical or environmental characteristics because:

- (A) The proposed changes would be located within the Substation's existing fence line; the Substation's fenced area would not be expanded.
- (B) The equipment would be no taller than existing equipment within the Substation.
- (C) There would be no change to the existing television or radio interference resulting from the modifications of the Substation.
- (D) Sound-pressure levels at all points along properties lines would continue to meet state regulations set out in R.C.S.A. §§ 22a-69-1 et seq.
- (E) The project work would not affect water resource areas.
- (F) UI's review of the Connecticut Department of Energy and Environmental Protection's ("CT DEEP") Natural Diversity Data Base did not identify any state-listed endangered, threatened, or special concern species in the vicinity of the Project.
- (G) Electric and Magnetic field levels at the Substation boundary would not change as a result of the modifications.

UI intends to initiate the project, Design Adequacy Group 1, on or after the Council's acknowledgement that the proposed activities are exempt.

Chairman Stein  
Exempt Modification  
Quinnipiac Substation  
Page 5 of 5

Please do not hesitate to contact me at 203-499-2586 should you have any questions regarding this notice.

Very truly yours,



Amy Hicks  
Analyst, Permitting & Public Outreach  
The United Illuminating Company

cc: The Honorable Mayor Toni Harp, City of New Haven  
James Morrissey, Attorney, UIL Holdings Corporation  
Nathan Hartford, The United Illuminating Company  
Jonathan Wolff, The United Illuminating Company

Attachments: Attachment A: 1100 Quinnipiac Avenue Property Description  
Attachment 1: Scope of Work  
Attachment 2: Quinnipiac Visual Analysis Report  
Attachment 3: Design Adequacy – 90 Drawing Set

## ATTACHMENTS

Attachment A

1100 Quinnipiac Avenue, New Haven, Connecticut

Acquired via 3 deeds:

Parcel One: Volume 2421 Page 636

Parcel Two: Volume 2372 Page 233

Parcel Three: Volume 2412 Page 155

Bounded as follows:

Beginning at a point where the westerly line of land herein described meets the Northwesterly line of Quinnipiac Avenue, distant 94 feet Eastwardly and radially from the monumented centerline of the railroad now or formerly of Penn Central Transportation Company leading from New Haven to New London, Connecticut at station 182+27.73 therein;

Extending from said beginning point along the following three courses by the remaining land of said Transportation Company: Northwestwardly, at right angles to said Northwesterly line of Quinnipiac Avenue, 60.51 feet to a point distant 49 feet measured Eastwardly and radially from said monumented centerline at station 181+88.18 therein;

Northwardly, parallel with said monumented centerline, on a curve to the left having a radius of 3206.04 feet, the arc distance of 614.05 feet to a point opposite station 175+83.51 in said monumented centerline; and

Southeastwardly, 49.75 feet to a point in said Westerly line of land of Illuminating Company distant 94 feet measured Eastwardly and radially from said monumented centerline at station 176+04.30 therein, said last mentioned point being at the distance of 20.9 feet +/- measured Southwardly, along said line of the land of Illuminating Company, from a corner of land now or formerly of Augur;

Thence running Northwardly 20.9 feet along remaining land of said Transportation Company;

Thence turning Eastwardly, running 66.8 feet along land now or formerly of Augur;

Thence turning Southwardly, running 27.2 feet along the width of so-called Russell's Crossing;

Thence turning Eastwardly, running a distance of 20.24 feet along the southerly boundary of Russell's Crossing;

Thence running Southeastwardly a distance of 391.34 feet along land now or formerly of Clementel;

Attachment A

Thence running Southwesterly 25 feet along the Northwesterly line of Quinnipiac Avenue to a point intersecting property now or formerly of Kilmartin;

Thence running Northwesterly in a straight line making a right angle with the said Northwesterly line of Quinnipiac Avenue, a distance of 257 feet;

Thence running Southwesterly in a straight line making a right angle with the last described line, a distance of 123 feet, more or less;

Thence turning and running Southeasterly 60.5 feet,

Thence running Southeasterly along land now or formerly of Kilmartin 136.6 feet;

Thence Easterly 91.0 feet again along land now or formerly of Kilmartin to a point in the Northwesterly line of Quinnipiac Avenue;

Thence Southwesterly a distance of 262 feet along said streetline back to the place of beginning.

Parcel contains 2.9 acres.



Date: June 24, 2016  
Project Name: Fault Current Design Adequacy Project – Group 1  
Project Number: 801979  
Project Manager: Charles Wallis

### **Summary**

Fault current withstand capability is a design consideration for any green-field substation. The withstand design value at any given sub is based upon the size of conductors chosen for the electric bus and equipment within the yard. The actual fault current value is largely dependent on generation at the transmission levels, and fault current values can increase over the lifetime of the station as additional lines/interconnections are established. Several UI Substations are 40 or more years in age and have not been assessed for fault current design since conception.

### **Program Need Statement:**

The design adequacy of the existing fault current withstand at UI's 115kV Substations were evaluated by NPE Consultants, LLC in 2012. The assessment evaluated the following key areas:

- Short-circuit adequacy of transmission equipment, electric bus, and bus structures
- Protection level from direct stroke lightning
- National Electric Safety Code (NESC) and UI standard conformance regarding phase-to-phase, phase-to-ground clearance requirements and worker approach distances.

NPE provided reports to UI that recommended, on a per station basis, upgrades to the electric bus infrastructure that would ensure fault current withstand and lightning protection levels were at an acceptable level per UI standards. This program will evaluate and implement the recommendations for each station over the next several years and as transmission line outages are available.

There are a total of nine (9) substations that will be completed under this program. UI plans to engineer, procure, and construct Group 1 Substations comprised of Ansonia, June Street, Quinnipiac, and Trap Falls.

### **Engineering Project Scope:**

The results and recommendations of this assessment are to be vetted and executed in this project with engineering by Black & Veatch and procurement and construction completed by UI for Group 1, comprised of Ansonia, June Street, Quinnipiac, and Trap Falls Substations.

Based on UI's current and predicted future maximum short circuit values, Black & Veatch will provide engineering services relative to foundations evaluations and upgrades, steel bus structures evaluations and upgrades, lightning protection assessments and recommendations, and bus calculations with recommended upgrades. Black and Veatch will also convert any Raster or

Vellum drawings to CAD that may not contribute in providing a complete design. Existing fault current information for the substation's 115kV system including complex X/R values were provided by the UI Protection & Control department in support of this assessment. The rigid bus conductor within the substation was evaluated for fault current forces in order to determine its structural adequacy. The substation components and structures were evaluated per the applicable UI design standards and structural design codes/standards.



2016

The United Illuminating Company



Project 801979

# **[DESIGN ADEQUACY SUMMARY]**

Group 1 – Ansonia, June Street, Trap Falls, Quinnipiac

# Design Adequacy Summary | 2016

**Ansonia** (report [here](#))

**The NPE results are to be used as a jumping off point for evaluation, the results they give are to be accepted/rejected on a case by case basis.**

<b>Task</b>	<b>Responsible</b>
Determine UI's current and predicted future Maximum Short Circuit/Fault Current Values as-well-as X/R ratios.	UI P&C engineer Tony Napikoski to provide guidance.
Review lightning protection assessment provided by B&V to UI	B&V has these reports (SS Component Assessment Project, Project No.: 173441).  B&V shall review and assess provide a summary of needs along with recommend solutions with conceptual level cost estimates.
Complete fault current withstand calculations for Existing Buswork and Bus Structures	B&V will provide calculations to UI.  If deficiencies are found, B&V will provide recommended solutions to a 50kA rated level as well as conceptual level cost estimates.

# Design Adequacy Summary | 2016

## June Street (report [here](#))

**The NPE results are to be used as a jumping off point for evaluation, the results they give are to be accepted/rejected on a case by case basis.**

<b>Task</b>	<b>Responsible</b>
Determine UI's current and predicted future Maximum Short Circuit/Fault Current Values as-well-as X/R ratios.	UI P&C engineer Tony Napikoski to provide guidance.
Review lightning protection assessment provided by B&V to UI	No action required (Lightning protection was addressed during the breaker replacement in 2015)
Complete fault current withstand calculations for Existing Buswork and Bus Structures	B&V will provide calculations to UI.  If deficiencies are found, B&V will provide recommended solutions to a 50kA rated level as well as conceptual level cost estimates.
Evaluation of "Type 3" foundations	B&V will investigate the deficiencies of the foundations and provide recommended solutions with conceptual level cost estimates.

# Design Adequacy Summary | 2016

## Quinnipiac (report [here](#))

**The NPE results are to be used as a jumping off point for evaluation, the results they give are to be accepted/rejected on a case by case basis.**

<b>Task</b>	<b>Responsible</b>
Determine UI's current and predicted future Maximum Short Circuit/Fault Current Values as-well-as X/R ratios.	UI P&C engineer Tony Napikoski to provide guidance.
Review lightning protection assessment provided by B&V to UI	B&V has these reports (SS Component Assessment Project, Project No.: 173441)  B&V shall review and assess provide a summary of needs along with recommend solutions with conceptual level cost estimates.
Complete fault current withstand calculations for Existing Buswork and Bus Structures	B&V will provide calculations to UI.  If deficiencies are found, B&V will provide recommended solutions to a 50kA rated level as well as conceptual level cost estimates.
Evaluation of "Type C" foundations	B&V will investigate the deficiencies of the foundations and provide recommended solutions with conceptual level cost estimates.

# Design Adequacy Summary | 2016

## **Trap Falls** (report [here](#))

**The NPE results are to be used as a jumping off point for evaluation, the results they give are to be accepted/rejected on a case by case basis.**

<b>Task</b>	<b>Responsible</b>
Determine UI's current and predicted future Maximum Short Circuit/Fault Current Values as-well-as X/R ratios.	UI P&C engineer Tony Napikoski to provide guidance.
Review lightning protection assessment provided by B&V to UI	B&V has these reports (SS Component Assessment Project, Project No.: 173441)  B&V shall review and assess provide a summary of needs along with recommend solutions with conceptual level cost estimates.
Complete fault current withstand calculations for Existing Buswork and Bus Structures	B&V will provide calculations to UI.  If deficiencies are found, B&V will provide recommended solutions to a 50kA rated level as well as conceptual level cost estimates.
Engineering weld expert to evaluate A440 welds on Structures 1 and 1A	B&V will investigate the welds and provide recommended solutions with conceptual level cost estimates.

# **VISIBILITY ANALYSIS**

## **QUINNIPIAC SUBSTATION 55 FOOT LIGHTNING MAST STRUCTURE NEW HAVEN, CONNECTICUT**



**Prepared for:**

**The United Illuminating Company  
180 Marsh Hill Road  
Orange, CT 06108**

**Prepared by:**

**All-Points Technology Corporation, P.C.  
3 Saddlebrook Drive  
Killingworth, CT 06419**

**MAY 2017**

## **Project Introduction**

The United Illuminating Company (“UIC”) proposes to modify its existing Quinnipiac Substation located west of Quinnipiac Avenue in New Haven, Connecticut (the “Site”). The proposed modifications include the addition of one (1) new lightning mast. At the request of UIC, All-Points Technology Corporation, P.C. (“APT”) prepared this Visibility Analysis to evaluate potential views associated with the proposed modification.

## **Site Description and Setting**

The Site is currently developed with the Quinnipiac Substation. The project includes the addition of a single, 55-foot tall lightning mast in the eastern portion of the existing Substation.

The Site is located east of the Quinnipiac River flood plain and active railroad tracks and south of State Highway 80 (Foxon Boulevard), surrounded by commercial and industrial land uses on three sides. Residential development occurs to the east of the Site.

## **Methodology**

On January 27, 2017, APT personnel conducted a field reconnaissance to determine where the existing Substation is visible today and to photo-document existing conditions. The geographic coordinates of the camera’s position at each photo location were logged via GPS. Photographs were taken with a Canon EOS 6D digital camera body and Canon EF 24 to 105 millimeter (“mm”) zoom lens, with the lens set to 50 mm, to provide a consistent field of view.

Three-dimensional computer models were developed for the existing Substation and components of the proposed installation from AutoCAD information. Photographic simulations were then generated to portray scaled renderings of the proposed installation from representative locations where it would be visible. Using field data, site plan information and image editing software, the proposed Facility was scaled to the correct location and height, relative to the existing Substation and surrounding area. For presentation purposes in this report, all of the photographs were produced in an approximate 7-inch by 10.5-inch format. A photolog map and copies of the existing conditions and photo-simulations are attached.



## Attachment 2

The table below summarizes the photographs and simulations presented in the attachment to this report including a description of each location, the view orientation, the distance from where the photo was taken relative to the existing Substation and the general characteristics of that view.

View	Location	Orientation	Dist. To Project	View Characteristics
1	Quinnipiac Avenue	Northeast	±0.17 Mile	Not Visible
2	Quinnipiac Avenue	Northeast	±0.10 Mile	Visible
3	Quinnipiac Avenue	Northwest	± 394 Feet	Visible
4	Quinnipiac Avenue	West	± 327 Feet	Visible
5	Foxon Street at Quinnipiac Avenue	Southwest	±0.17 Mile	Not Visible

The existing conditions photographs and corresponding simulations are provided in the Attachment to this report. A photolog map depicting the locations of the selected views is also included.

Three (3) of the five (5) locations presented herein were simulated to provide a representation of the proposed modification under similar settings as those encountered during the field reconnaissance. Views of the Facility can change throughout the seasons as well as the time of day, and are dependent on weather and other atmospheric conditions including but not necessarily limited to haze, fog, and clouds; the location, angle and intensity of the sun; light conditions, and the specific viewer location.

## Conclusions

In general, views of the new lightning mast would be limited to areas within approximately 500 feet of the Substation, primarily to the east, where existing views of the facility occur today along portions of Quinnipiac Avenue. The height of the proposed 55-foot tall lightning mast is substantially shorter than several surrounding transmission line support structures which rise to heights of 90+ feet above grade (see View 3 as an example). Portions of the new lightning mast would be visible from some residential locations, including an abutting apartment complex to the north, and to a lesser degree, homes immediately to the east/northeast along Quinnipiac Avenue and Essex Street. These residences currently have views of the existing Substation and transmission infrastructure. The majority of views to the south and west would be over undeveloped marsh and the railroad. Based on the results of this analysis, the proposed addition of the new lightning mast at the Quinnipiac Substation would not significantly alter existing views. It is our opinion that the proposed installation will not have an adverse visual impact on existing views of the Substation or the surrounding environment.

## **ATTACHMENTS**



# PHOTO LOG

Legend

- Site
- Year-Round Visibility
- Not Visible



5 of 13 1 inch = 300 feet  
 200 100 0 200  
 Feet



**NOT VISIBLE FROM THIS LOCATION**

**DOCUMENTATION**

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
1	QUINNIPIAC AVENUE	NORTHEAST	+/- 0.17 MILE



**DOCUMENTATION**

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
2	QUINNIPIAC AVENUE	NORTHEAST	+/- 0.10 MILE



**SIMULATION**

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
2	QUINNIPIAC AVENUE	NORTHEAST	+/- 0.10 MILE



**DOCUMENTATION**

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
3	QUINNIPIAC AVENUE	NORTHWEST	+/- 394 FEET



**SIMULATION**

PHOTO

3

LOCATION

QUINNIPIAC AVENUE

ORIENTATION

NORTHWEST

DISTANCE TO SITE

+/- 394 FEET





**DOCUMENTATION**

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
4	QUINNIPIAC AVENUE	WEST	+/- 327 FEET



**SIMULATION**

PHOTO

4

LOCATION

**QUINNIPIAC AVENUE**

ORIENTATION

**WEST**

DISTANCE TO SITE

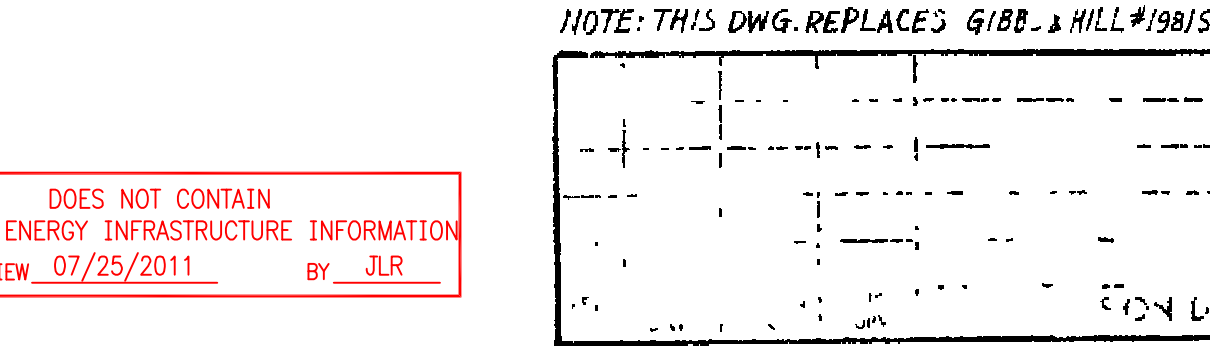
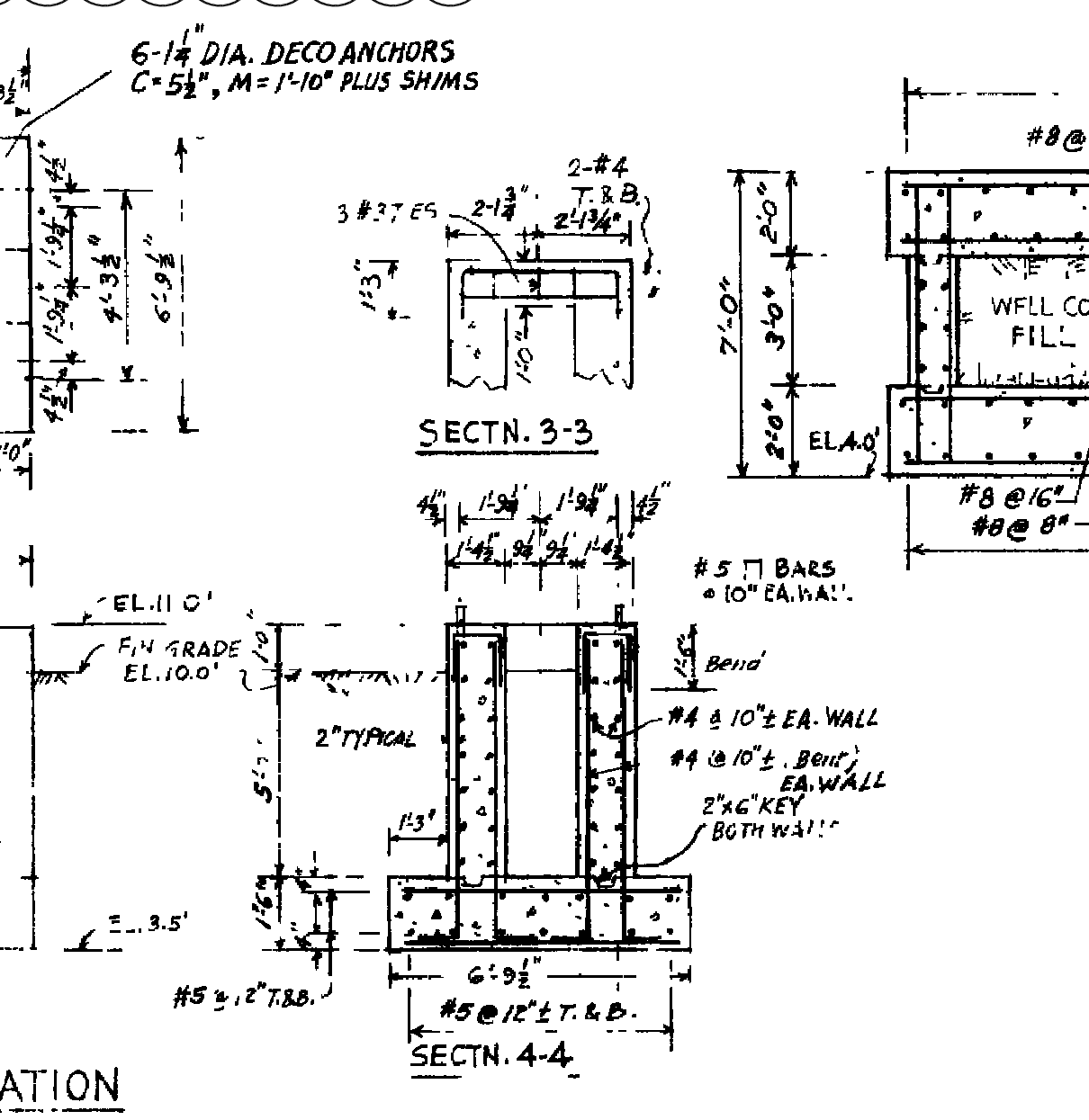
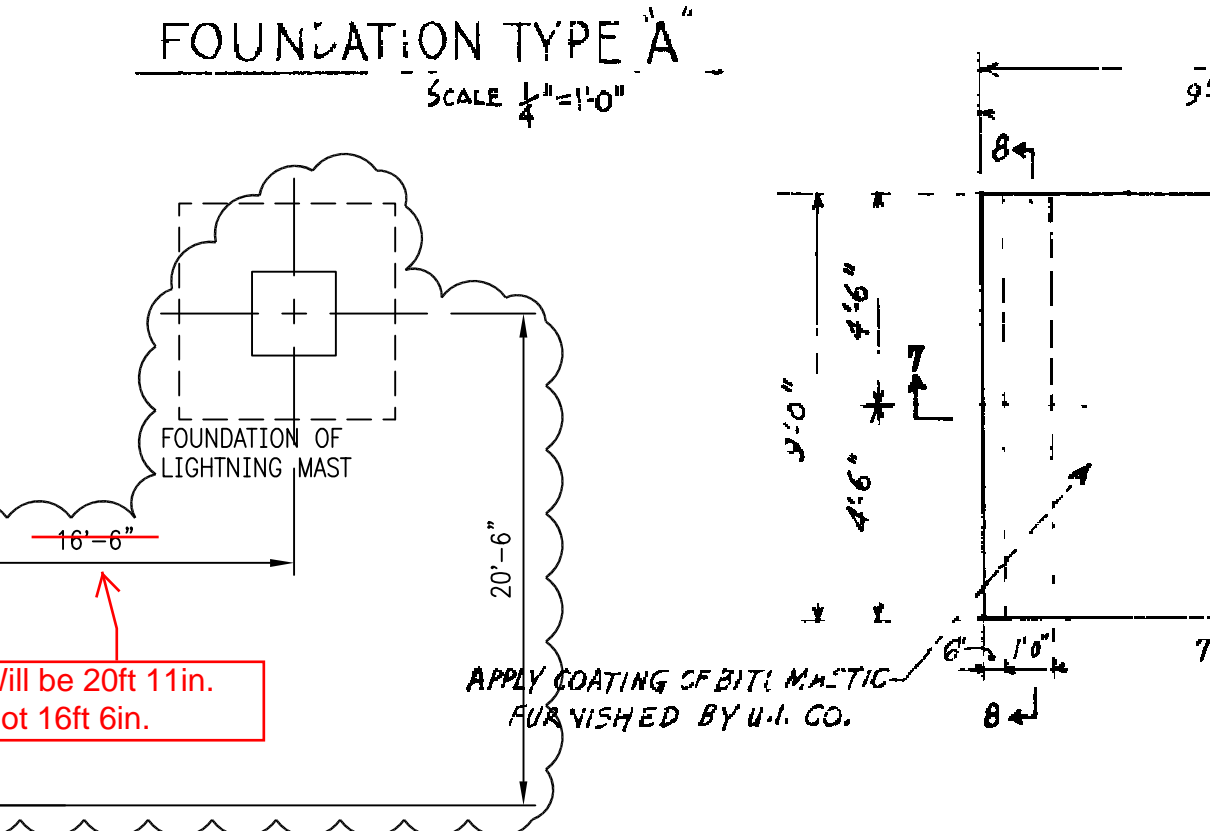
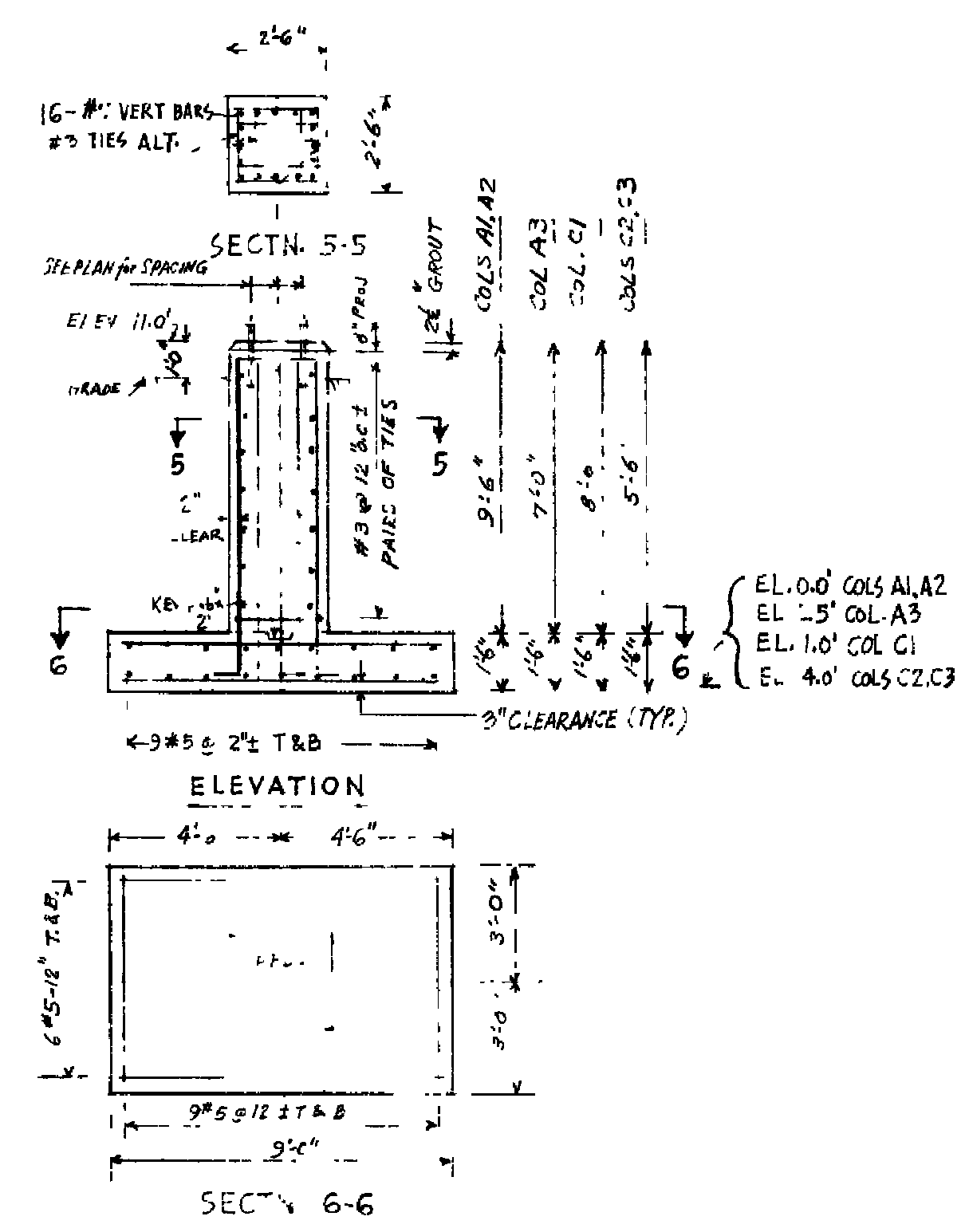
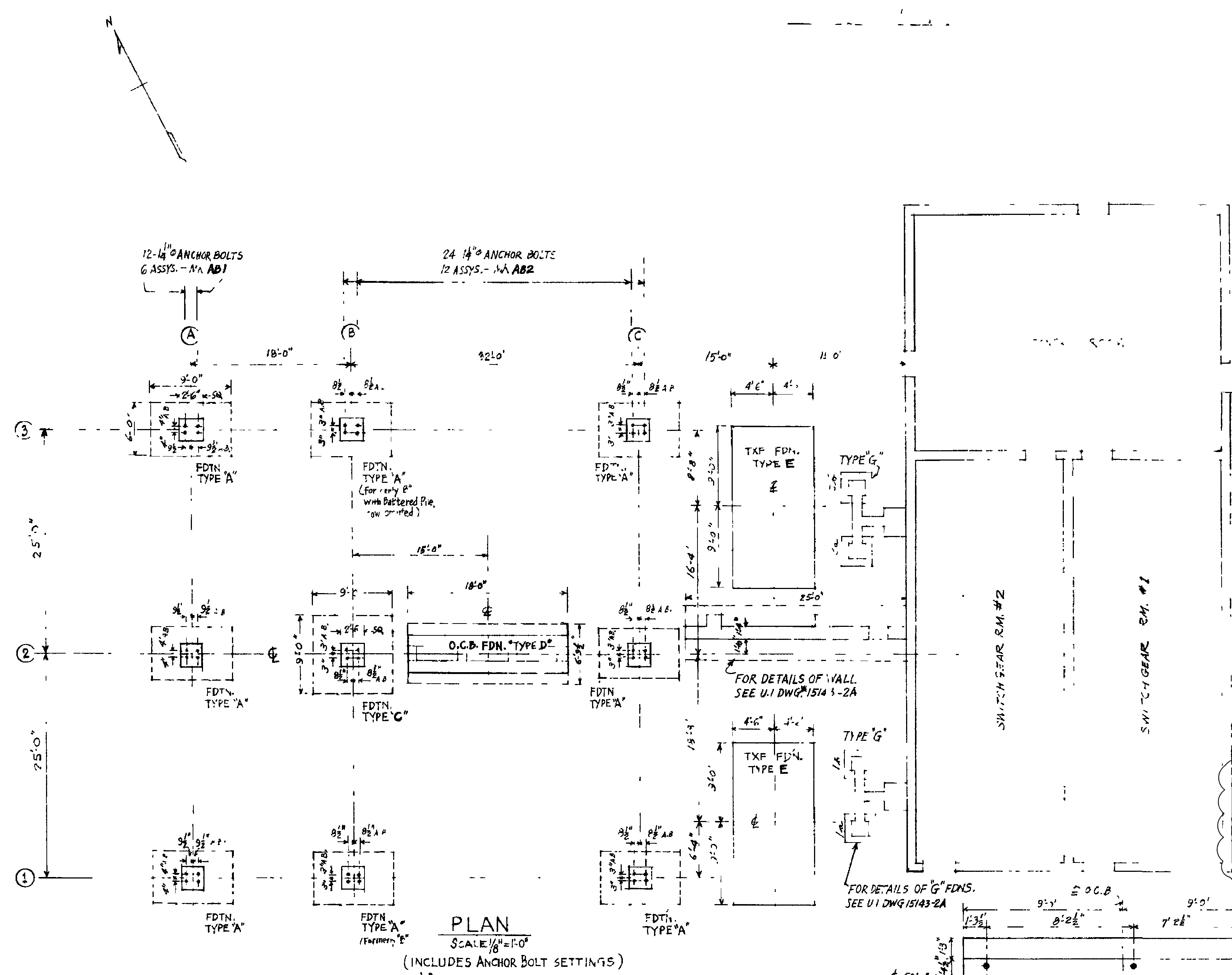
**+/- 327 FEET**



**NOT VISIBLE FROM THIS LOCATION**

**DOCUMENTATION**

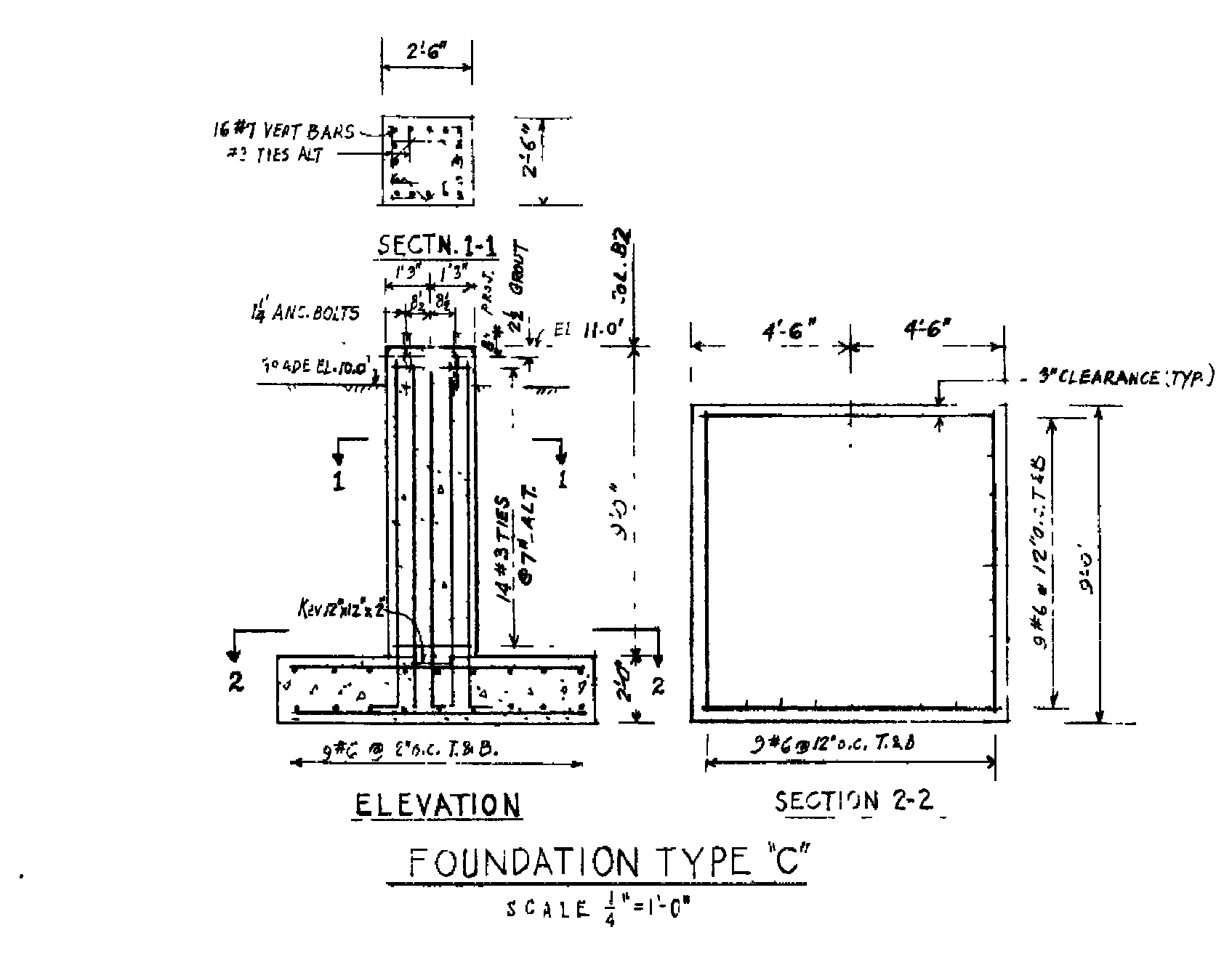
PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE
5	FOXON STREET AT QUINNIPIAC AVENUE	SOUTHWEST	+/- 0.19 MILE



- GENERAL NOTES:**
1. THE SOILS AND FOUNDATION INVESTIGATION CONDUCTED BY "ENVIRONMENT ENGINEERING" HAS BEEN USED AS THE BASIS OF ALLOWABLE SOIL PRESSURE THEIR RECOMMENDATIONS SHALL BE FOLLOWED FOR CONSTRUCTION PROCEDURE.
  2. ALL EXCAVATIONS TO BE PUMPED DRY BEFORE PLACING CONCRETE.
  3. SOIL UNDER FOOTINGS SHALL BE FIRM AND COMPACTED AS DIRECTED & APPROVED BY U.I. CO. CONSTRUCTION SUPERVISOR, PRIOR TO POURING CONCRETE.
  4. CONCRETE TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 P.S.I. AT 28 DAYS.
  5. ALL CONSTRUCTION JOINTS SHALL BE CLEANED, ROUGHENED, AND THOROUGHLY BRUSHED WITH MORTAR BEFORE PLACING CONCRETE.
  6. CONCRETE IS NOT TO BE POURED UNTIL ALL REQUIRED EQUIPMENT, ANCHOR BOLTS, PIPE SLEEVES, MISCELLANEOUS STEEL, ETC. WHICH ARE TO BE SET IN CONCRETE ARE IN PLACE.
  7. THE EXPOSED HORIZONTAL EDGES & VERTICAL CORNERS OF PIERS SHALL BE CHAMFERED TO A DEPTH OF 3/4", AND THE TOPS OF THE PIERS SHALL BE SLIGHTLY SLOPED AWAY FROM THE BASE PLATES FOR DRAINAGE.
  8. TOP SURFACES OF ALL EQUIPMENT FOUNDATIONS ARE TO BE TROWELLED, SMOOTH & LEVEL.
  9. CONCRETE WORKMANSHIP TO CONFORM TO THE LATEST A.C.I. SPECIFICATIONS.
  10. TOP OF FOUNDATIONS TO BE ELEVATION 11.00', FINISHED GRADE ELEV. 10.00' ± ALL ELEVATIONS REFER TO U.S.C.G.S. DATUM.
  11. REINFORCING TO BE DEFORMED BARS IN ACCORDANCE WITH ASTM. SPECS. A15 & A-305 (LATEST REVISIONS). THE ALLOWABLE TENSILE UNIT STRESS FOR REINFORCING STEEL SHALL BE 20,000 P.S.I. MINIMUM CONCRETE PROTECTION TO BE 3" UNLESS NOTED.
  12. ALL BACKFILL OF EARTH MATERIAL SHALL BE PLACED IN LAYERS, WITH 95% COMPACTION BY SUITABLE EQUIPMENT. NO WATER SHALL BE ADDED UNLESS THE MOISTURE CONTENT IS LESS THAN APPROXIMATELY 15% OF THE DRY SAMPLE.

AREAS BACKCIRCLED ON THIS DRAWING INDICATE WORK ASSOCIATE WITH DESIGN ADEQUACY PROJECT #191369

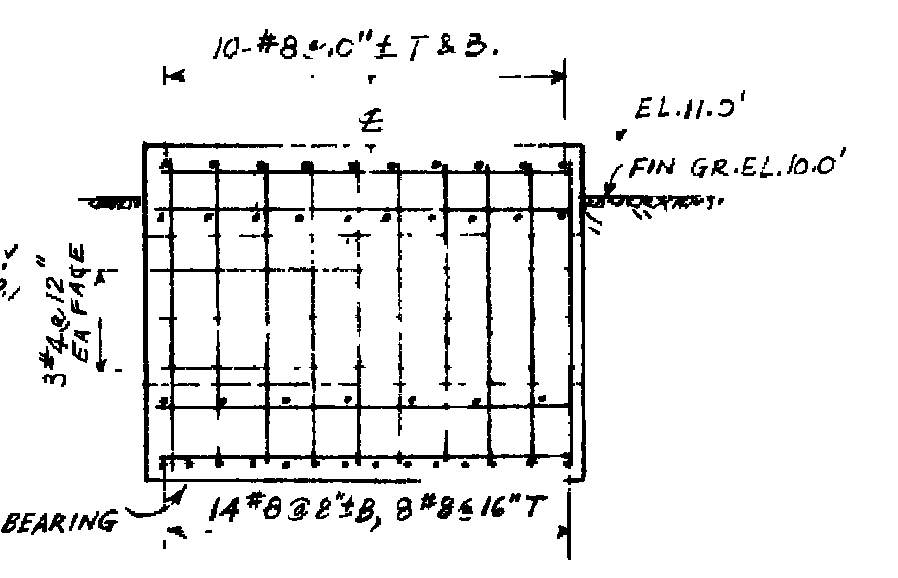
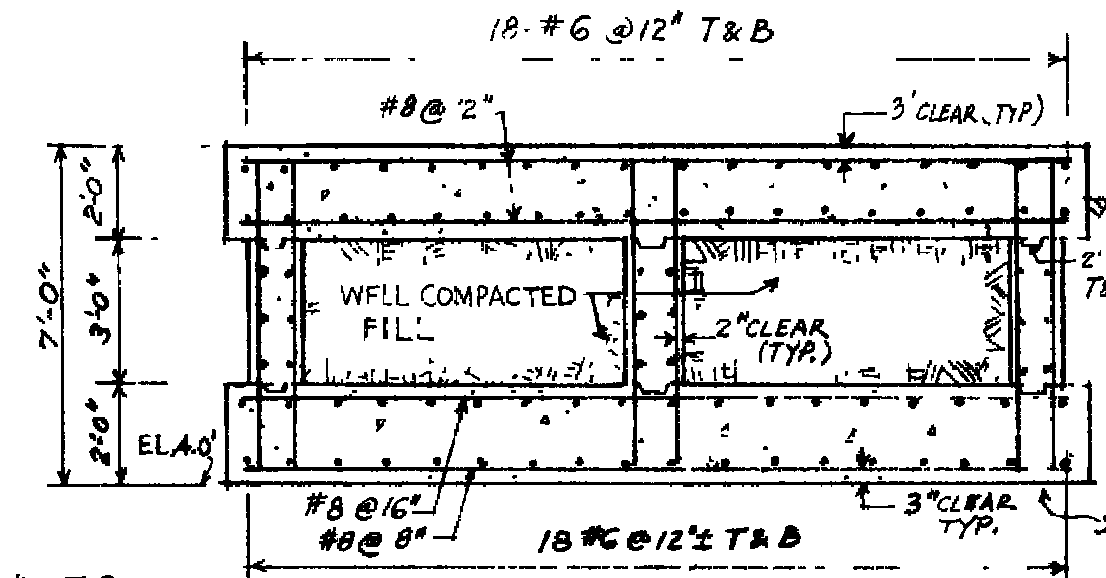
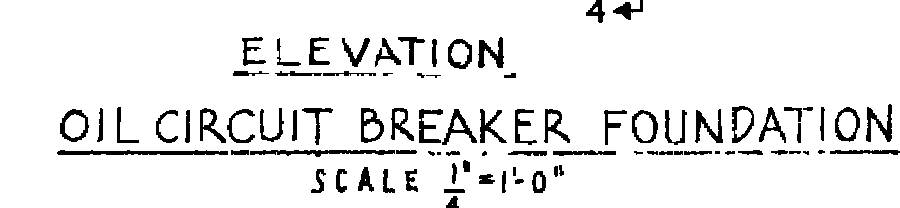
**REFERENCE DRAWINGS**  
SECTIONS AND DETAILS  
14209-XXX



**PRELIMINARY**

NOT TO BE USED FOR CONSTRUCTION

DOES NOT CONTAIN CRITICAL ENERGY INFRASTRUCTURE INFORMATION  
DATE OF REVIEW 07/25/2011 BY JLR



<b>BLACK &amp; VEATCH</b> Building a world of difference®		PROJECT NO. 191369			
B 11/23/2016	ISSUED FOR UI 90% REVIEW-PROJECT #191369-DESIGN ADEQUACY	CRE	MAR	MI	WB
A 09/09/2016	ISSUED FOR UI 30% REVIEW-PROJECT #191369-DESIGN ADEQUACY	SLC	TD	MI	WB
No.	Date	Revision	By	Chkd.	Engr. Supr.

THE UNITED ILLUMINATING COMPANY  
YARD FOUNDATIONS  
QUINNIPIAC SUBSTATION  
NEW HAVEN, CONN.

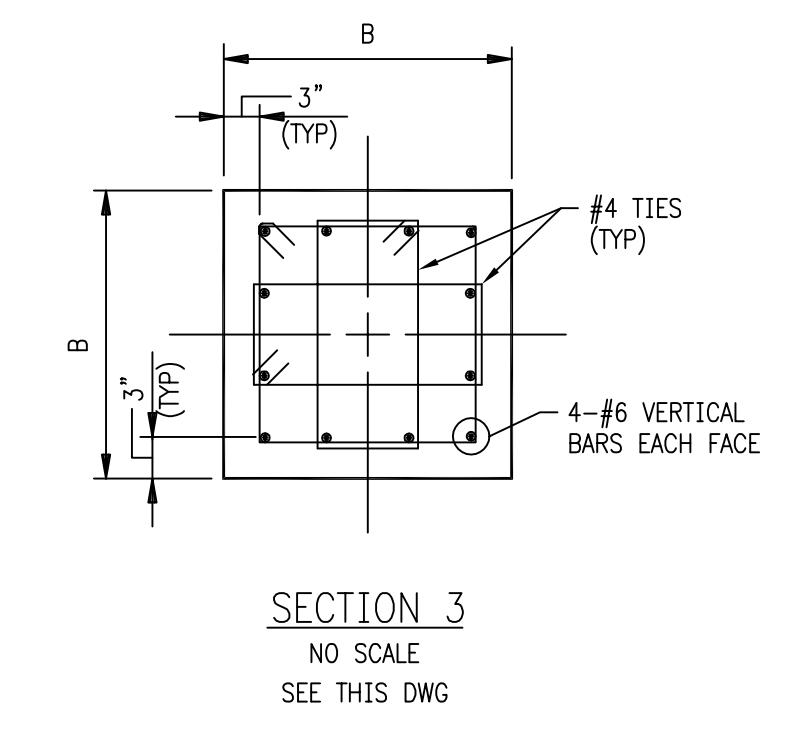
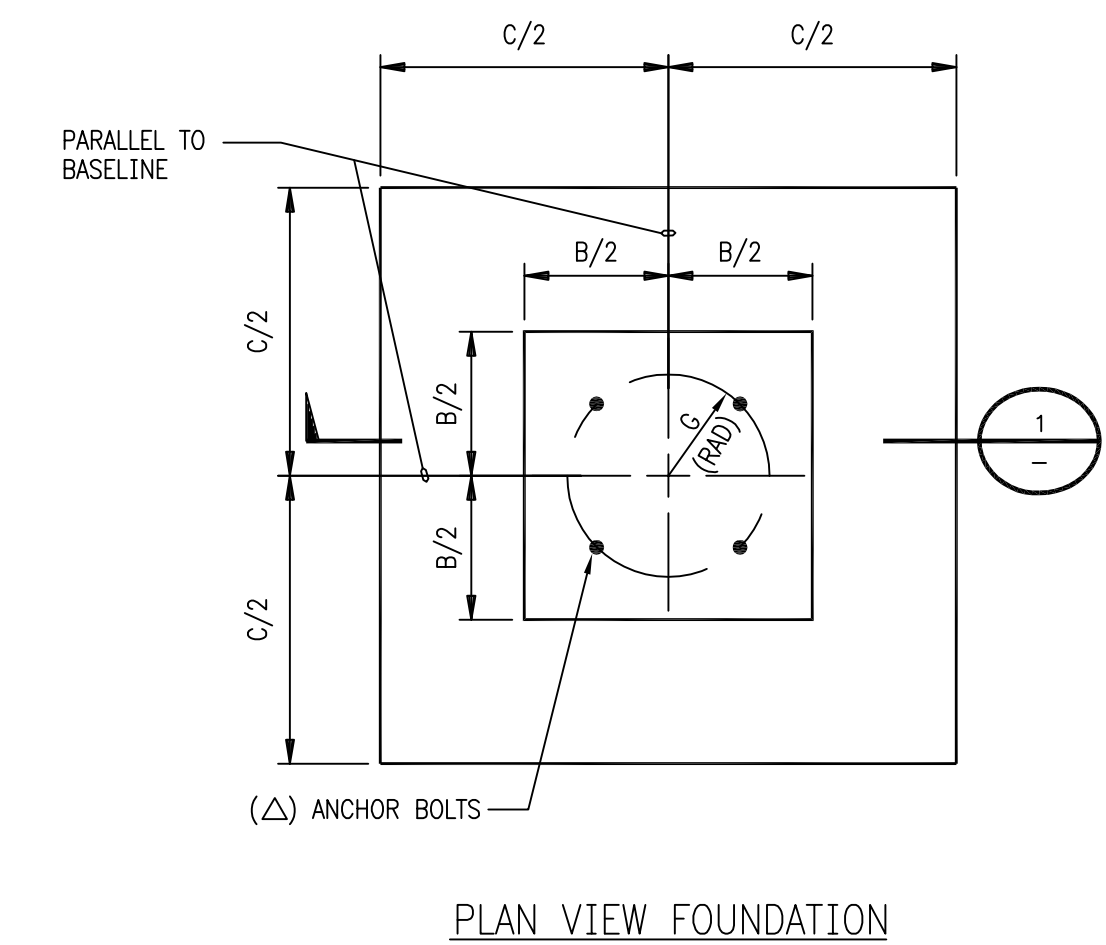
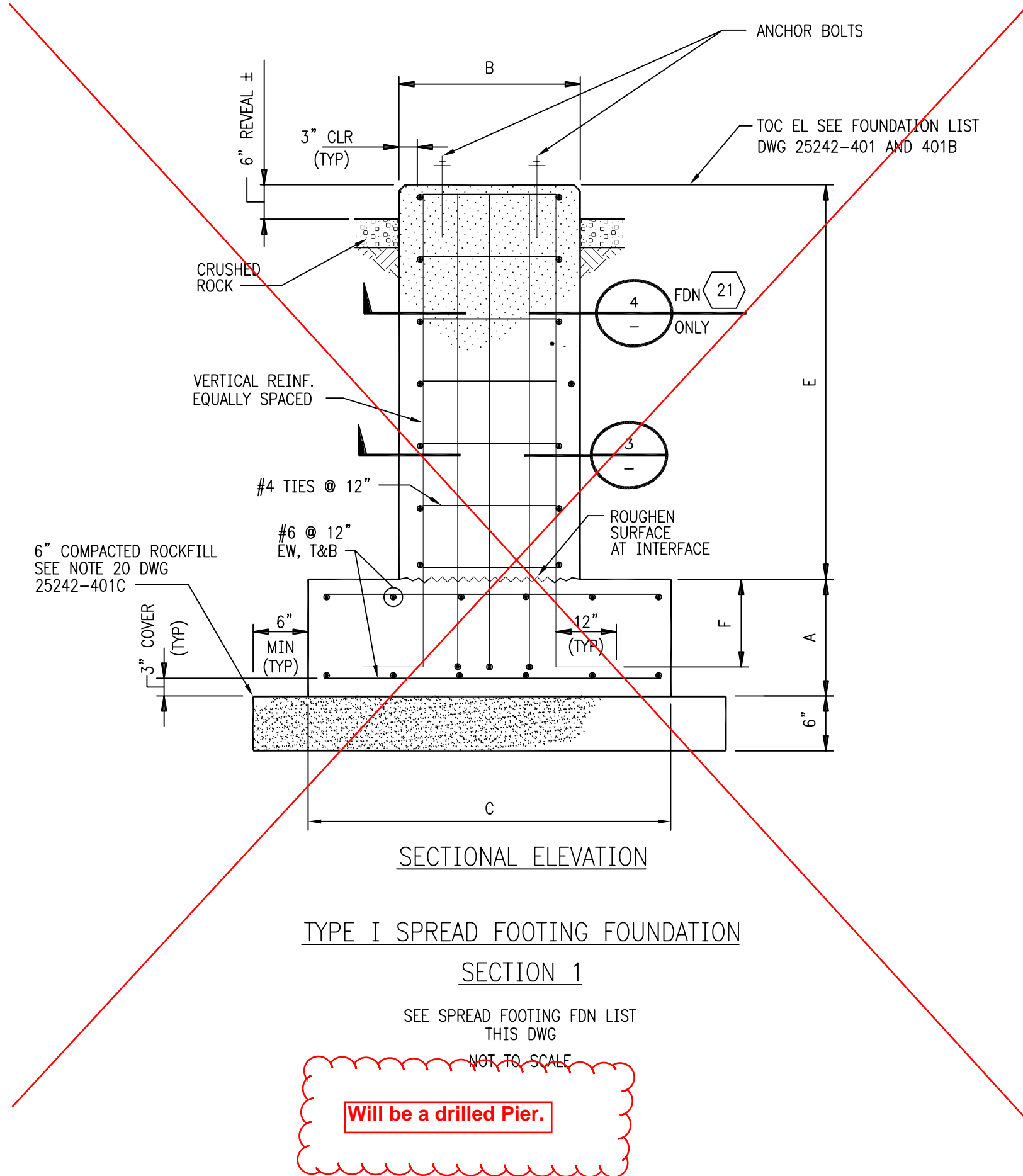
DESIGNED BY: R.W. DE GROOT  
APR. 23, 1971  
AS NOTED

DRAWING NUMBER  
15143-3A

SEQ# 10694

SPREAD FOOTING FOUNDATION LIST

FDN NUMBER	QTY OF FDN	DIM "A"	DIM "B"	DIM "C"	DIM "D"	DIM "E"	DIM "F"	DIM "G"	VERTICAL REINF.	ANCHOR BOLT		STRUCTURAL BOM ITEM NUMBER	FOUNDATION DESCRIPTION
										MK NO (SEE NOTES 3)	BY FAB		
21	1	2'-0"	3'-6"	8'-0"	-	4'-6"	1'-7"	9"	16-#7	BY FAB	YS21	55' LIGHTNING MAST	



NOTES

- SEE DRAWING 15143-9A FOR GENERAL NOTES.
- ALL WORK SHOWN ON THIS DRAWING SHALL BE FURNISHED AND INSTALLED BY GENERAL CONTRACTOR UNLESS NOTED OTHERWISE.
- FOUNDATION ANCHOR BOLTS SHALL BE PROVIDED BY THE CONTRACTOR UNLESS NOTED OTHERWISE.

REFERENCE DRAWINGS

FOUNDATION PLAN AND LIST 15143-9A

**PRELIMINARY**

NOT TO BE USED FOR CONSTRUCTION

<b>BLACK &amp; VEATCH</b> Building a world of difference®									
DESIGNER	MI	DRAWN	CRE						
CHECKED	-	DATE	-						
PROJECT #	191369								
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NO	DATE	REVISION			DRN	CHKD	DESN	SUPR.	

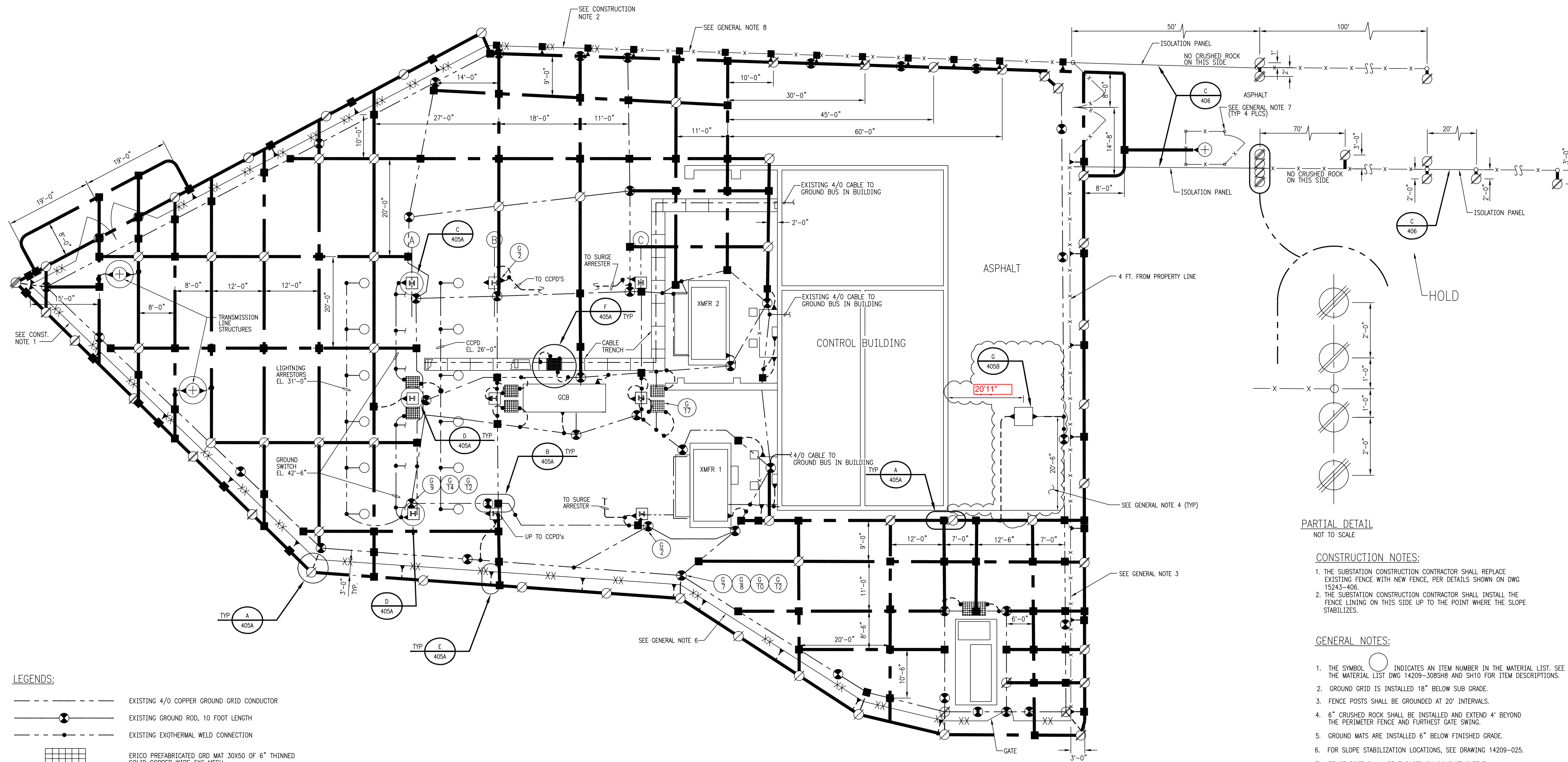
**NEW DRAWING**

DOES NOT CONTAIN  
CRITICAL ENERGY INFRASTRUCTURE INFORMATION  
DATE OF REVIEW 07/01/2016 BY MPC

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No	Date	Revision	By	Chkd.	Engr.	Supv.	Chkd.	Design Engr.	Design Supv.



FOUNDATION PLANS SECTIONS AND DETAILS		
QUINNIPIAC SUBSTATION		
CAD FILE NAME	SEQUENCE No.	DRAWING NUMBER
	098771	15143-010



- LEGENDS:**
- EXISTING 4/0 COPPER GROUND GRID CONDUCTOR
  - EXISTING GROUND ROD, 10 FOOT LENGTH
  - EXISTING EXOTHERMAL WELD CONNECTION
  - ERICO PREFABRICATED GRD MAT 30X50 OF 6" THINNED SOLID COPPER WIRE 6X6 MESH
  - NEW 4/0 COPPER GROUND GRID CONDUCTOR AT 1.5" (SEE GENERAL NOTE 10).
  - NEW 10" X 3/4" GROUND ROD (SEE GENERAL NOTE 10).
  - NEW 20" X 3/4" GROUND ROD (SEE GENERAL NOTE 10).
  - NEW 30" X 3/4" GROUND ROD (SEE GENERAL NOTE 10).
  - NEW 40" X 3/4" GROUND ROD (SEE GENERAL NOTE 10).
  - 4/0 COPPER GROUND STINGER (SEE GENERAL NOTE 10).
  - COMPRESSION CONNECTION (SEE GENERAL NOTE 10).
  - THIS SYMBOL INDICATES AN EXISTING ITEM NUMBER IN THE GROUNDING MATERIAL LIST. SEE GIBBS & HILL 1981A G1, G2 & G3 (14209-30SH8, SH9, & SH10)
  - X --- X --- NEW FENCE (SEE GENERAL NOTE 10).
  - XX --- XX --- NEW FENCE WITH FENCE LINING (SEE GENERAL NOTE 10).

- CONSTRUCTION NOTES:**
- THE SUBSTATION CONSTRUCTION CONTRACTOR SHALL REPLACE EXISTING FENCE WITH NEW FENCE, PER DETAILS SHOWN ON DWG 15243-406.
  - THE SUBSTATION CONSTRUCTION CONTRACTOR SHALL INSTALL THE FENCE LINING ON THIS SIDE UP TO THE POINT WHERE THE SLOPE STABILIZES.
- GENERAL NOTES:**
- THE SYMBOL ○ INDICATES AN ITEM NUMBER IN THE MATERIAL LIST. SEE THE MATERIAL LIST DWG 14209-30SH8 AND SH10 FOR ITEM DESCRIPTIONS.
  - GROUND GRID IS INSTALLED 18" BELOW SUB GRADE.
  - FENCE POSTS SHALL BE GROUNDED AT 20' INTERVALS.
  - 6" CRUSHED ROCK SHALL BE INSTALLED AND EXTEND 4' BEYOND THE PERIMETER FENCE AND FURTHEST GATE SWING.
  - GROUND MATS ARE INSTALLED 6" BELOW FINISHED GRADE.
  - FOR SLOPE STABILIZATION LOCATIONS, SEE DRAWING 14209-025.
  - FENCE POST SHALL BE ENCASED IN CONDUIT SLEEVE.
  - FENCE POSTS SHALL BE GROUNDED AT 10'-0" INTERVALS ON THIS SIDE ONLY.
  - EXISTING GROUND GRID WAS MOVED FROM DWG 14209-025.
  - NEW ADDITIONS SHOWN ON THIS DRAWING ARE ASSOCIATED WITH GROUNDING ENHANCEMENT PROJECT - 184625.
- REFERENCE DRAWINGS**
- | DRAWING TITLE                         | DRAWING NUMBER    |
|---------------------------------------|-------------------|
| GROUNDING DETAILS                     | 15243-405A & 405B |
| SUBSTATION FENCE SECTIONS AND DETAILS | 15243-406         |
| BILL OF MATERIALS - GROUNDING         | 15243-499         |

**PRELIMINARY**  
NOT TO BE USED FOR CONSTRUCTION

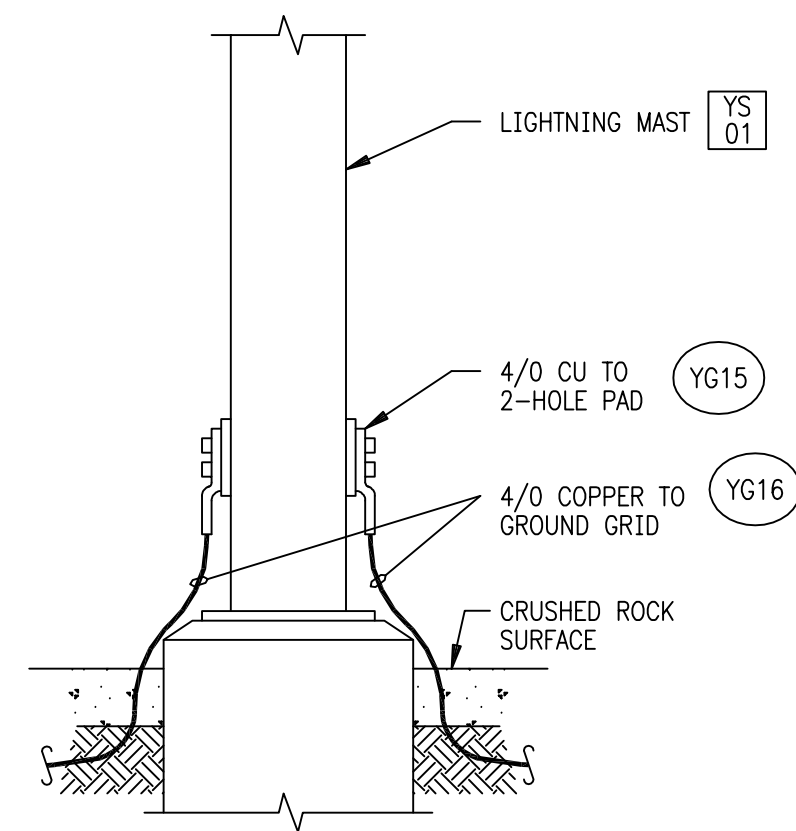
<b>BLACK &amp; VEATCH</b> Building a world of difference®		PROJECT NO. 191369			
No	Date	Revision	By	Chkd.	Engr. Supr.
A	11/23/2016	ISSUED FOR UI 90% REVIEW-PROJECT #191369-DESIGN ADEQUACY	CRE	TD	CDS WB

No	Date	Revision	By	Chkd.	Engr. Supr.
7	6/2/2016	QUINNIPIAC DESIGN ADEQUACY	CRE	-	CDS WB
6	6/2/2016	184625-GROUNDING ENHANCEMENT	TJD	TKD	ASV MAV
5	2/21/2013	CCVT REPLACEMENT	VJP	MPC	MPC GWB
4	03/14/2012	AS-BUILT DRAWINGS FOR CYBER SECURITY PROJECT	AGF	LST/CS	CS AVR
3	11/27/90	ADD CAP BANK AND REVISE FENCE		JR	
2	10/13/90	REDRAWN ON MYLAR WITH ACTUAL LOC. OF FENCE	ACG		
1	3/16/90	ADDED CAP. EDNT-GRD & CONDUITS	ACG		

**ui**  
The United Illuminating Company

Drawn \_\_\_\_\_ Date \_\_\_\_\_ Scale: 3/32"=1'-0"  
 Chkd. \_\_\_\_\_ Design Engr. \_\_\_\_\_ Design Supv. \_\_\_\_\_

GROUNDING PLAN		
QUINNIPIAC SUBSTATION		
CAD FILE NAME	SEQUENCE No.	DRAWING NUMBER
	067717	15243-405



DETAIL G  
LIGHTNING MAST GROUNDING  
NOT TO SCALE

REFERENCE DRAWINGS

GROUNDING PLAN	15243-405
BILL OF MATERIALS	15243-499

**PRELIMINARY**

NOT TO BE USED FOR CONSTRUCTION

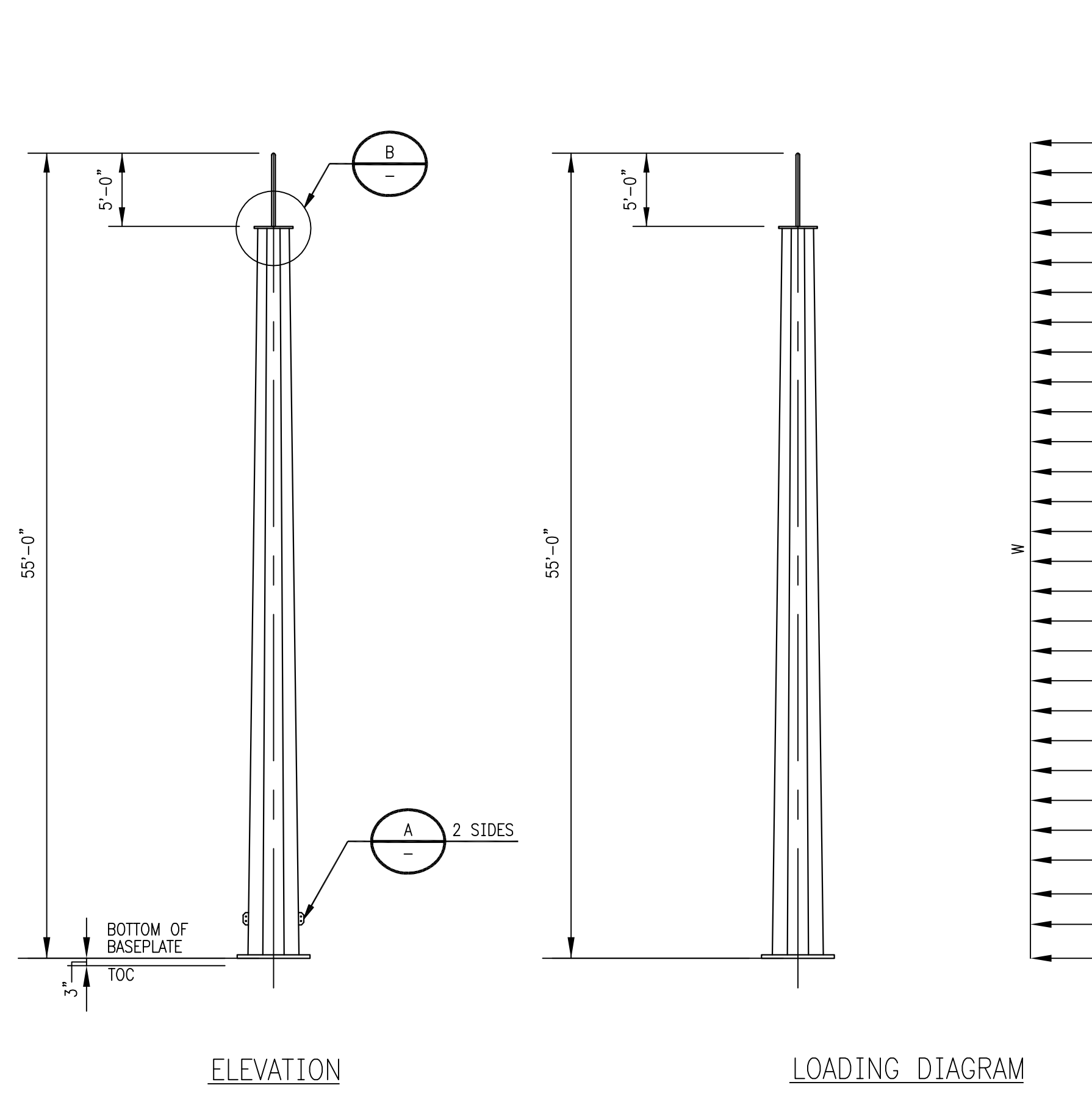
**NEW DRAWING**

<b>BLACK &amp; VEATCH</b> Building a world of difference®									
DESIGNER	CDS	DRAWN	CRE						
CHECKED	-	DATE	-						
PROJECT # 191369									
A	11/23/2016	ISSUED FOR UI 90% REVIEW-PROJECT #191369-DESIGN ADEQUACY				CRE	TD	CDS	WB
NO	DATE	REVISION				DRN	CHKD	DESN	SUPR.

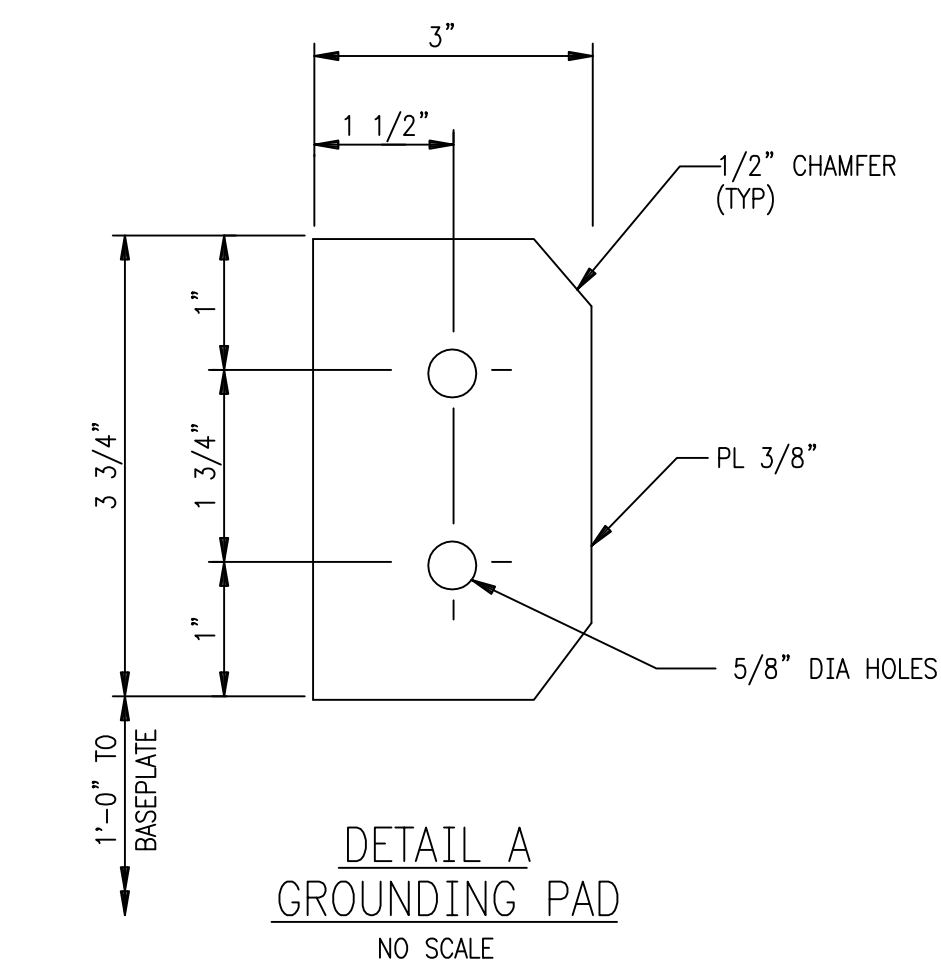
1	10/2016	QUINNIPIAC DESIGN ADEQUACY			CRE	-	CDS	WB
No	Date	Revision			By	Chkd.	Engr.	Supv.



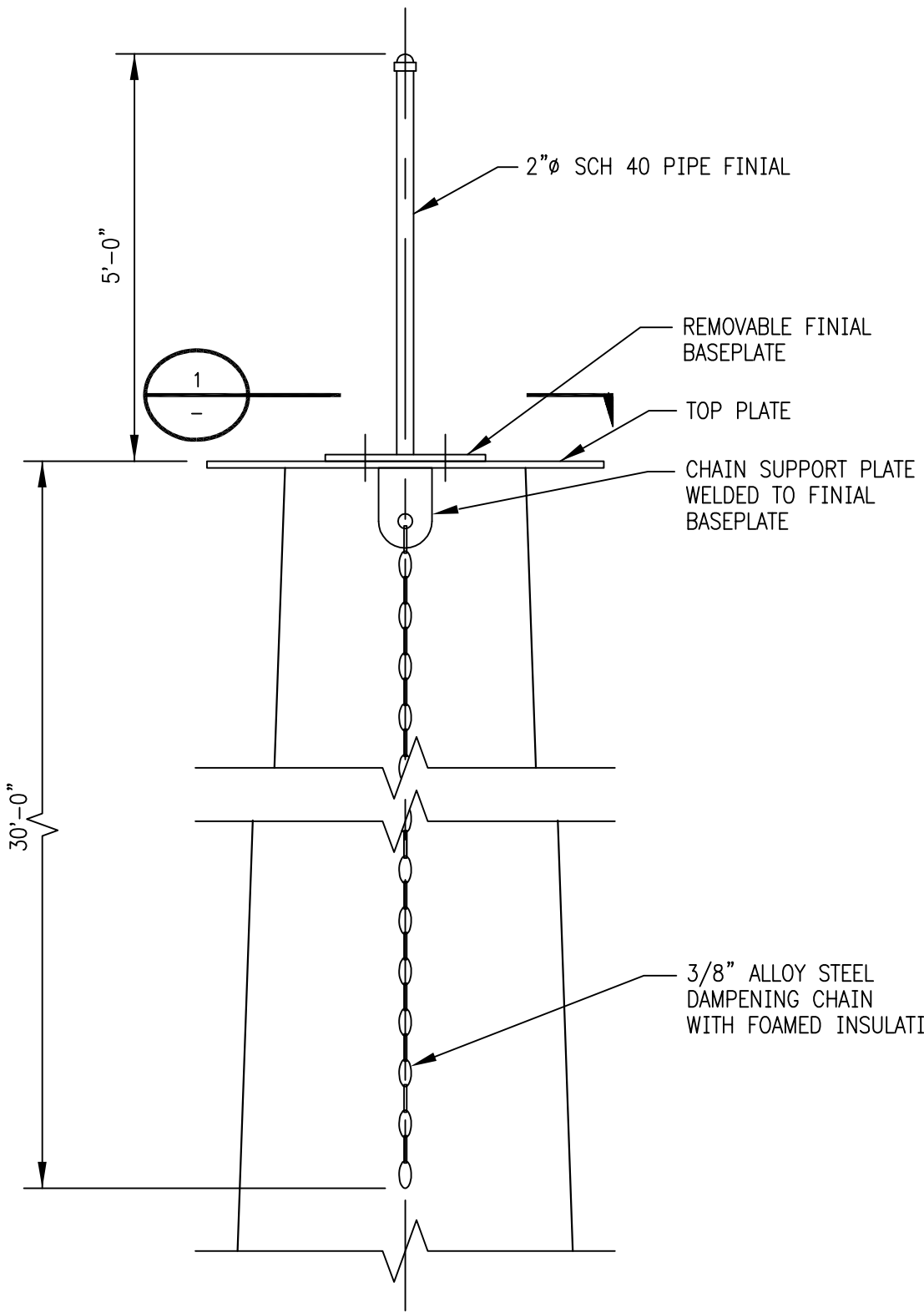
GROUNDING DETAILS		
QUINNIPIAC SUBSTATION		
CAD FILE NAME	SEQUENCE No.	DRAWING NUMBER
	-	15243-405B



**LIGHTNING MAST  
STRUCTURE [YS01]**  
NO SCALE  
( 1 REQUIRED )



**DETAIL A  
GROUNDING PAD**  
NO SCALE



**DETAIL B**  
NO SCALE  
SEE THIS DWG

LOADING TABLE 1 (WITH OVERLOAD FACTORS)		
STRUCTURE	LOAD	LOAD CASE 1
LIGHTNING MAST	W	0.045

**LOADING TABLE 1 NOTES:**

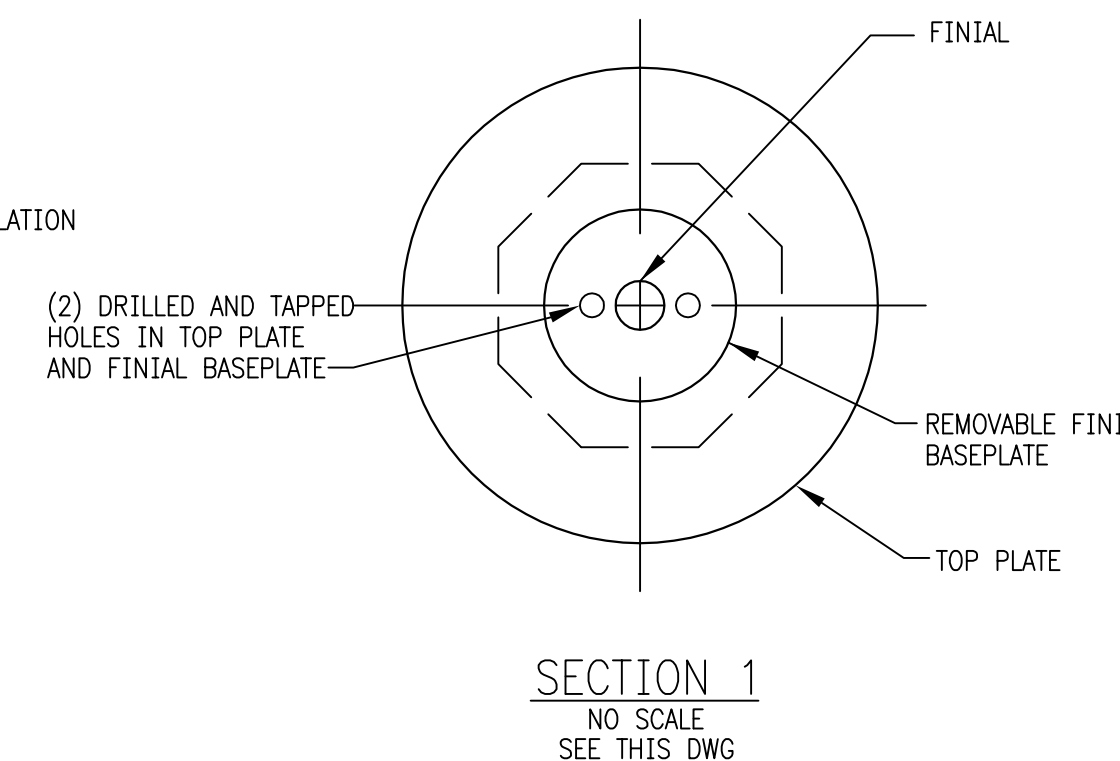
- THE LOADS SHOWN IN LOADING TABLE 1 INCLUDE OVERLOAD FACTORS (OLF).
- LOAD ABBREVIATIONS AND UNITS IN THE TABLE:  
"W" = WIND PRESSURE ON STRUCTURE AND EQUIPMENT (KIPS PER SQUARE FOOT)
- LOAD CASES:  
LOAD CASE 1: EXTREME WIND  
LIGHTNING MAST WIND: 36 PSF  
WIND AND VERTICAL OLF: 1.25
- THE WIND PRESSURE LOADS "W" SHALL BE APPLIED BY THE SUPPLIER TO THE STRUCTURE. THE PRESSURE DOES NOT INCLUDE A SHAPE FACTOR. THE SUPPLIER SHALL MULTIPLY THE WIND PRESSURE ON THE STRUCTURE BY THE APPROPRIATE SHAPE FACTORS SHOWN IN THE TABLE BELOW.
- THE SUPPLIER SHALL INCLUDE THE STRUCTURE WEIGHT AND MULTIPLY THESE LOADS BY THE APPROPRIATE VERTICAL OVERLOAD FACTOR (OLF).
- THE STRUCTURES SHALL MEET THE DEFLECTION CRITERIA UNDER "WORKING LOADS" AS DESCRIBED IN THE NOTES FOR LOADING TABLE 2.

LOADING TABLE 2 (WORKING LOADS)		
STRUCTURE	LOAD	LOAD CASE 11
LIGHTNING MAST	W	0.036

**LOADING TABLE 2 NOTES:**

- THE LOADS SHOWN IN LOADING TABLE 2 ARE WORKING LOADS WITHOUT OVERLOAD FACTORS.
- THE SUPPLIER SHALL PROVIDE GROUNDLINE REACTIONS FOR THE LOADING CONDITION SHOWN IN TABLE 2.
- LOAD ABBREVIATIONS AND UNITS IN THE TABLE:  
"W" = WIND PRESSURE ON STRUCTURE AND EQUIPMENT (KIPS PER SQUARE FOOT)
- LOAD CASES:  
LOAD CASE 2: EXTREME WIND  
LIGHTNING MAST WIND: 36 PSF
- THE WIND PRESSURE LOADS "W" SHALL BE APPLIED BY THE SUPPLIER TO THE STRUCTURE. THE PRESSURE DOES NOT INCLUDE A SHAPE FACTOR. THE SUPPLIER SHALL MULTIPLY THE WIND PRESSURE ON THE STRUCTURE BY THE APPROPRIATE SHAPE FACTORS SHOWN IN THE TABLE BELOW.
- THE SUPPLIER SHALL INCLUDE THE STRUCTURE WEIGHT.
- THE STRUCTURE SHALL MEET THE FOLLOWING DEFLECTION CRITERIA UNDER WORKING LOADS AS DEFINED BY NEMA SG 6 FOR LOAD CASE 2:  
VERTICAL MEMBERS:  
HORIZONTAL DEFLECTION: HEIGHT/50

STRUCTURE AND EQUIPMENT SHAPE FACTOR TABLE					
SHAPE					
SHAPE FACTOR	1.6	1.6	1.4	1.0	1.4



**SECTION 1**  
NO SCALE  
SEE THIS DWG

**GENERAL DESIGN NOTES**

- THE TAPERED TUBULAR MEMBERS SHOWN ARE FOR REPRESENTATION PURPOSES ONLY. IF PREFERRED, THE SUPPLIER MAY DESIGN THIS STRUCTURE UTILIZING STRUCTURAL TUBES.
- ANCHOR BOLTS SHALL BE DESIGNED AND SUPPLIED BY THE CONTRACTOR UNLESS NOTED OTHERWISE.
- MAXIMUM ANCHOR BOLT CIRCLE SHALL NOT EXCEED 30 INCHES.
- ALL STEEL SHALL BE HOT-DIP GALVANIZED.
- WELDING ELECTRODE GRADE 70.
- ALL WORK SHOWN ON THIS DRAWING SHALL BE FURNISHED BY STRUCTURES AND EQUIPMENT SUPPLIER AND ERECTED BY GENERAL CONTRACTOR, UNLESS NOTED OTHERWISE.

**REFERENCE DRAWINGS**

YARD FOUNDATIONS  
FOUNDATION PLAN, SECTION AND DETAILS

15143-9A  
14209-XXX

**PRELIMINARY**

NOT TO BE USED FOR CONSTRUCTION

<b>BLACK &amp; VEATCH</b> Building a world of difference®							
DESIGNER	MI	DRAWN	CRE				
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PROJECT # 191369							
A	11/23/2016	ISSUED FOR UI 90% REVIEW-PROJECT 191369-DESIGN ADEQUACY	CRE	MAR	MI	WB	
NO	DATE	REVISION	DRN	CHKD	DESN	SUPR.	

**NEW DRAWING**

DOES NOT CONTAIN  
CRITICAL ENERGY INFRASTRUCTURE INFORMATION  
DATE OF REVIEW 10/15/2015 BY MPC

1	10/2016	QUINNIPIAC DESIGN ADEQUACY	CRE	-	MI	WB	
No	Date	Revision	By	Chkd.	Engr.	Supv.	



55 FOOT LIGHTNING MAST  
SUPPORT STRUCTURE [YS01]

QUINNIPIAC SUBSTATION

Drawn	Date 10/06/2016	Scale: NONE	CAD FILE NAME	SEQUENCE No.	DRAWING NUMBER
Chkd.	Design Engr.	Design Supv.		098790	15243-409A