



CITY OF CAMBRIDGE
MASSACHUSETTS
BOARD OF ZONING APPEAL
831 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02139
617 349-6100

BZA APPLICATION FORM

Plan No: BZA-017112-2019

GENERAL INFORMATION

The undersigned hereby petitions the Board of Zoning Appeal for the following:

Special Permit : ✓ Variance : _____ Appeal : _____

PETITIONER : Sprint Spectrum Realty Company, LLC - C/O Simon J. Brighenti, Centerline Com

PETITIONER'S ADDRESS : 750 W. Center Street W. Bridgewater, MA 02379

LOCATION OF PROPERTY : 284-286 Norfolk St Cambridge, MA 02139

TYPE OF OCCUPANCY : Telecom ZONING DISTRICT : Residence C-1 Zone

REASON FOR PETITION :

Other: Replace existing antennas with new

DESCRIPTION OF PETITIONER'S PROPOSAL :

Remove existing previously-permitted rooftop telecommunication equipment and replace with upgraded equipment. This is an eligible facilities request pursuant to 47 USC 1455 (a)

SECTIONS OF ZONING ORDINANCE CITED :

Article 4.000	Section 4.32.G.1 (Telecommunications Facility).
Article 4.000	Section 4.40 (Footnote 49) (Telecommunications Facility).
Article 6409	Section 47 USC 1455 (a) (Middle Class Tax Relief Act).
Article 10.000	Section 10.40 (Special Permit).

Original Signature(s) :

Simon Brighenti
(Petitioner(s) / Owner)

Simon Brighenti
(Print Name)

Address :

750 W. Center St.
W. Bridgewater MA 02379

Tel. No. :

413-237-1550

E-Mail Address :

S.Brighenti@clinellc.com

Date :

5/6/19

BZA APPLICATION FORM - OWNERSHIP INFORMATION

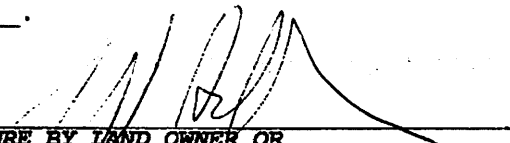
To be completed by OWNER, signed before a notary and returned to The Secretary of the Board of Zoning Appeals.

I/We Norshire LLC
(OWNER)
Address: 288 Norfolk St, Cambridge, MA 02139

State that I/We own the property located at 284 Norfolk Street,
which is the subject of this zoning application.

The record title of this property is in the name of Norshire LLC

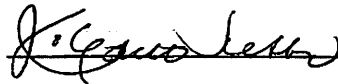
*Pursuant to a deed of duly recorded in the date 11/17/08, Middlesex South
County Registry of Deeds at Book 51897, Page 321; or
Middlesex Registry District of Land Court, Certificate No. _____
Book _____ Page _____.


**SIGNATURE BY LAND OWNER OR
AUTHORIZED TRUSTEE, OFFICER OR AGENT***

***Written evidence of Agent's standing to represent petitioner may be requested.**

Commonwealth of Massachusetts, County of Middlesex

The above-name Neari Hefron personally appeared before me,
this 25th of MARCH, 2019, and made oath that the above statement is true.

 Notary

My commission expires June 24, 2022 (Notary Seal).

- If ownership is not shown in recorded deed, e.g. if by court order, recent deed, or inheritance, please include documentation.

CONFIDENTIAL - SECURITY INFORMATION

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE

DATE 10-10-76 BY SP-6 JWS

10-10-76 10-10-76 10-10-76 10-10-76

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BZA APPLICATION FORM

SUPPORTING STATEMENT FOR A SPECIAL PERMIT

Please describe in complete detail how you meet each of the following criteria referring to the property and proposed changes or uses which are requested in your application. Attach sheets with additional information for special permits which have additional criteria, e.g.; fast food permits, comprehensive permits, etc., which must be met.

Granting the Special Permit requested for 288 Norfolk St Cambridge, MA 02139 (location) would not be a detriment to the public interest because:

- A)** Requirements of the Ordinance can or will be met for the following reasons:
- The existing base station is an eligible support structure pursuant to Section 6409 of the Middle-Class Tax Relief and Job Creation Act of 2012. 47 USC 1455 Section 6409 (a). There will little to no change to the existing conditions.
- B)** Traffic generated or patterns of access or egress would not cause congestion hazard, or substantial change in established neighborhood character for the following reasons:
- There will be no additional traffic or congestion created subsequent to the minimal disruption concomitant with the removal and replacement of the subject equipment.
- C)** The continued operation of or the development of adjacent uses as permitted in the Zoning Ordinance would not be adversely affected by the nature of the proposed use for the following reasons:
- There will be no impact upon the existing cited conditions.
- D)** Nuisance or hazard would not be created to the detriment of the health, safety and/or welfare of the occupant of the proposed use or the citizens of the City for the following reasons:
- There will be no detriment to the health, safety, and/or welfare of the residents and visitors to the area. To the contrary, enhanced and more robust telecommunications service will supplement the ability to communicate in both emergency and non-emergency situations.
- E)** For other reasons, the proposed use would not impair the integrity of the district or adjoining district or otherwise derogate from the intent or purpose of this ordinance for the following reasons:
- See attached supplemental information

BZA APPLICATION FORM**DIMENSIONAL INFORMATION**

APPLICANT: Centerline Communications, LLC **PRESENT USE/OCCUPANCY:** Commercial/Telecom
LOCATION: 288 Norfolk St Cambridge, MA 02139 **ZONE:** Residence C-1 Zone
PHONE: _____ **REQUESTED USE/OCCUPANCY:** Commercial/Telecom

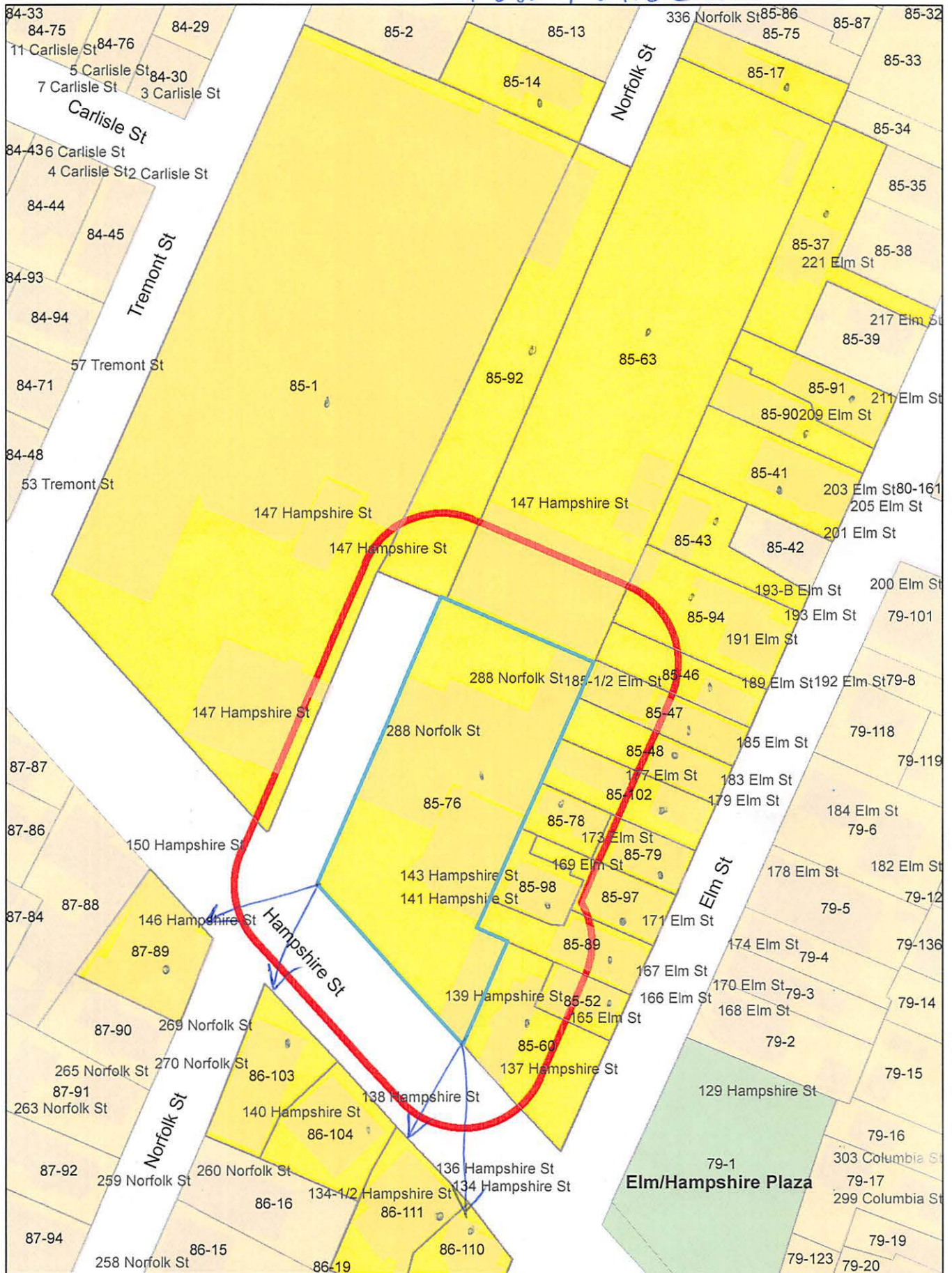
		<u>EXISTING</u> <u>CONDITIONS</u>	<u>REQUESTED</u> <u>CONDITIONS</u>	<u>ORDINANCE</u> <u>REQUIREMENTS</u> ¹	
<u>TOTAL GROSS FLOOR AREA:</u>		NA	NA	NA	(max.)
<u>LOT AREA:</u>		NA	NA	NA	(min.)
<u>RATIO OF GROSS FLOOR AREA</u> <u>TO LOT AREA:</u> ²		NA	NA	NA	(max.)
<u>LOT AREA FOR EACH DWELLING UNIT:</u>		NA	NA	NA	(min.)
<u>SIZE OF LOT:</u>	WIDTH	NA	NA	NA	(min.)
	DEPTH	NA	NA	NA	
<u>SETBACKS IN FEET:</u>	FRONT	NA	NA	NA	(min.)
	REAR	NA	NA	NA	(min.)
	LEFT SIDE	NA	NA	NA	(min.)
	RIGHT SIDE	NA	NA	NA	(min.)
<u>SIZE OF BLDG.:</u>	HEIGHT	60 ft	60 ft	NA	(max.)
	LENGTH	NA	NA	NA	
	WIDTH	NA	NA	NA	
<u>RATIO OF USABLE OPEN SPACE</u> <u>TO LOT AREA:</u>		NA	NA	NA	(min.)
<u>NO. OF DWELLING UNITS:</u>		NA	NA	NA	(max.)
<u>NO. OF PARKING SPACES:</u>		NA	NA	NA	(min./max)
<u>NO. OF LOADING AREAS:</u>		NA	NA	NA	(min.)
<u>DISTANCE TO NEAREST BLDG.</u> <u>ON SAME LOT:</u>		NA	NA	NA	(min.)

Describe where applicable, other occupancies on same lot, the size of adjacent buildings on same lot, and type of construction proposed, e.g.; wood frame, concrete, brick, steel, etc.

No change to existing referenced conditions

1. SEE CAMBRIDGE ZONING ORDINANCE ARTICLE 5.000, SECTION 5.30 (DISTRICT OF DIMENSIONAL REGULATIONS).
2. TOTAL GROSS FLOOR AREA (INCLUDING BASEMENT 7'-0" IN HEIGHT AND ATTIC AREAS GREATER THAN 5') DIVIDED BY LOT AREA.
3. OPEN SPACE SHALL NOT INCLUDE PARKING AREAS, WALKWAYS OR DRIVEWAYS AND SHALL HAVE A MINIMUM DIMENSION OF 15'.

284-288 Norfolk St.



284-288 Northek St.

Rehtimer

85-17
DEWART, CHRISTOPHER B. & SARAH B. DEWART
336 NORFOLK STREET
CAMBRIDGE, MA 02139

85-14
TINKJIAN, KEVORK & ANNA M. ROSENBLATT
50 PROSPECT ST
CAMBRIDGE, MA 02139

CENTERLINE COMMUNICATIONS
C/O SIMON BRIGHENTI
750 W. CENTER STREET
W. BRIDGEWATER, MA 02379

85-37
219-221 ELM STREET LLC
38-40 GRANVILLE ROAD
CAMBRIDGE, MA 02138

85-43
PEREZ, FELIX & CARMEN PEREZ
197 ELM ST.
CAMBRIDGE, MA 02139

85-46
CHERNEY, CHARLES & CANDACE BOTT
189 ELM ST
CAMBRIDGE, MA 02139

85-47
CAZEAU, ANDRE & MATANIE CAZEAU,
TRS. THE CAZEAU REALTY TRUST
P.O. BOX 400844
CAMBRIDGE, MA 02140

85-52
ELMSHIRE LLC
288 NORFOLK ST
CAMBRIDGE, MA 02139

85-60-76
NORSHIRE LLC,
288 NORFOLK ST
CAMBRIDGE, MA 02139

85-1-63-92
CITY OF CAMBRIDGE
C/O LOUIS DEPASQUALE
CITY MANAGER

85-1-63-92
CITY OF CAMBRIDGE
C/O NANCY GLOWA
CITY SOLICITOR

85-78
SYTCHOV, MIKHAIL
173R ELM ST
CAMBRIDGE, MA 02139

85-90
MALAMUD, NORBERT S. & LINDA NGUYEN
209 ELM ST
CAMBRIDGE, MA 02139

85-91
LACOURT FOUNDATION, LLC
30 COLLEGE AVE
SOMERVILLE, MA 02144

85-1-63-92
CAMBRIDGE CITY OF PUBLIC WORKS DEPT
147 HAMPSHIRE ST
CAMBRIDGE, MA 02139

85-94
PIRES, FRANCISCA
193 ELM ST
CAMBRIDGE, MA 02139

85-98
THAMES, JAMES NATHAN &
ELIZABETH WILLARD THAMES
169R ELM ST.
CAMBRIDGE, MA 02139

86-103-104
ROWLEY, JAMES J. & JOANNE K. ROWLEY,
TRS THE ROWLEY FAMILY REALTY TRUST
29 RUSKIN ST.
WEST ROXBURY, MA 02132

85-102
DASILVA, NAZIDIR RODRIGUES
179 ELM STREET
CAMBRIDGE, MA 02139

86-110
HENRY, SHAWN R. & LAETITIA M. HENRY
145 ELM ST
CAMBRIDGE, MA 02139

86-111
JEFFRIES, BENJAMIN E.,
TR OF HAMPSHIRE STREET REALTY TRUST
P.O. BOX 534
N. SEABREEZE AVE
STONINGTON, ME 04681

87-89
MASS AVE BAPTIST CHURCH INC
146 HAMPSHIRE
CAMBRIDGE, MA 02139

85-41
DE, ALOK M. & MAYA DEE
TRUSTEES THE DE FAMILY TRUST
203-205 ELM ST., #1
CAMBRIDGE, MA 02139

85-41
HOSS, JENNIFER L. & ANDREW GUZIOR HOSS
TRUSTEES OF THE HOSS FAMILY TRST
203-205 ELM ST #3
CAMBRIDGE, MA 02139

85-41
SELIGER, VERENA INGEBORG
203-205 ELM ST., #2
CAMBRIDGE, MA 02139

85-79
SEWELL, ELI A. & JILL W. SEWELL
175 ELM ST., #175/1
CAMBRIDGE, MA 02139

85-79
YIP, ARTHUR HONG CHUN
175 ELM ST., #175/3
CAMBRIDGE, MA 02139

85-79
WONG, ON YI
394 NORFOLK ST.
CAMBRIDGE, MA 02139

85-97
PEDRELLI, PAOLA
171 ELM ST., UNIT #1
CAMBRIDGE, MA 02139

85-97
KHANGURA, NAVTEJ
651 FRANKLIN ST., #4112
MOUNTAIN VIEW, CA 94041

284-288 Norfolk St.

85-97
MARTYN, RAJEEVE & MELISSA DUGGAN
171 ELM ST., #2
CAMBRIDGE, MA 02139

85-48
SUZUKI, YUJI , KEIKO SUZUKI & SARA SUZUKI
183 ELM ST., #1
CAMBRIDGE, MA 02139

85-48
LEE, BRITTANY L.
183 ELM ST., #2
CAMBRIDGE, MA 02140

85-89
PETERSON, HILLARY FITZPATRICK &
BENJAMIN J. PETERSON
167 ELM ST., #1
CAMBRIDGE, MA 02139

85-89
SCOTT, LEONARD GREGORY & PAMELA KAY OTSTOT
TRUSTEES OF THE LG & PK SCOTT 2013 TRUST
2434 JACKSON ST.
SAN FRANCISCO, CA 94118

85-89
YANG, YU-SANG
167 ELM ST., #2
CAMBRIDGE, MA 02139

85-102
BERRY, JESSICA C.
177 ELM ST.
CAMBRIDGE, MA 02141



CAMBRIDGE HISTORICAL COMMISSION

831 Massachusetts Avenue, 2nd Floor, Cambridge, Massachusetts 02139

Telephone: 617 349 4683 TTY: 617 349 6112

E-mail: histcomm@cambridgema.gov URL: <http://www.cambridgema.gov/Historic>

Bruce A. Irving, *Chair*; Susannah Barton Tobin, *Vice Chair*; Charles M. Sullivan, *Executive Director*
William G. Barry, Jr., Robert G. Crocker, Joseph V. Ferrara, Chandra Harrington, Jo M. Solet, *Members*
Gavin W. Kleespies, Paula A. Paris, Kyle Sheffield, *Alternates*

Jurisdiction Advice

To the Owner of Property at 284-288 Norfolk Street

The above-referenced property is subject to the jurisdiction of the Cambridge Historical Commission (CHC) by reason of the status referenced below:

- ☐ Old Cambridge Historic District
- ☐ Fort Washington Historic District
(M.G.L. Ch. 40C, City Code §2.78.050)
- ☐ Avon Hill Neighborhood Conservation District
- ☐ Half Crown – Marsh Neighborhood Conservation District
- ☐ Harvard Square Conservation District
- ☐ Mid Cambridge Neighborhood Conservation District
- ☐ Designated Landmark
- ☐ Property is being studied for designation: _____
(City Code, Ch. 2.78., Article III, and various City Council Orders)
- ☐ Preservation Restriction or Easement (as recorded)
- ☒ **X** Structure is fifty years or more old and therefore subject to CHC review of any application for a demolition permit, if one is required by ISD. (City Code, Ch. 2.78, Article II). See the back of this page for definition of demolition.
No demolition permit application is anticipated.
- ☐ No jurisdiction: not a designated historic property and the structure is less than fifty years old.
- ☐ No local jurisdiction, but the property is listed on the National Register of Historic Places;
CHC staff is available for consultation, upon request.
Staff comments: _____

The Board of Zoning Appeal advises applicants to complete Historical Commission or Neighborhood Conservation District Commission reviews before appearing before the Board.

If a line indicating possible jurisdiction is checked, the owner needs to consult with the staff of the Historical Commission to determine whether a hearing will be required.

CHC staff initials SLB

Date May 20, 2019

Received by Uploaded to Energov

Date May 20, 2019

Relationship to project BZA 017112-2019

cc: Applicant
Inspectional Services Commissioner

Demolition Delay Ordinance and Application Information

The Demolition Delay Ordinance (Chapter 2.78, Article II of the Cambridge Municipal Code) was adopted by the City Council in 1979 to afford public review of demolition permit applications for potentially significant buildings. When the Historical Commission determines that a building is significant and should be preserved, demolition will be delayed for up to six months so that solutions can be sought to preserve the building indefinitely. The Ordinance covers all buildings over 50 years old, city-wide. The Historical Commission archives provide dates of construction for all properties in the City.

Demolition is defined in the ordinance as "the act of pulling down, destroying, removing or razing a building or commencing the work of total or substantial destruction with the intent of completing the same." The Inspectional Services Commissioner has provided further guidelines to outline what actions require a demolition permit. **In addition to complete demolition of a building, the following actions may require a demolition permit,**

- **removal of a roof,**
- **removal of one side of a building,**
- **gutting of a building's interior to the point where exterior features (windows, etc.) are impacted, and**
- **removal of more than 25% of a structure.**

Please contact the building inspector or a staff member of the Historical Commission if you have questions about whether a demolition permit is required for a particular project.

Demolition permit applications can be obtained from the Inspectional Services Department. The completed application should be submitted to the Historical Commission, where the staff will review the application. If the Executive Director of the Historical Commission makes an initial determination that the building is significant, a public hearing will be scheduled with Historical Commission. If the staff makes an initial determination that the building is not significant, the application is released for further review by the Building Commissioner.

More information about the demolition permit application procedures is available on the Historical Commission's web site or by calling or dropping by the Historical Commission office.

July 2003

Cambridge Historical Commission
831 Massachusetts Ave., 2nd Fl.
Cambridge, MA 02139
Ph: 617/349-4683 or TTY: 617/349-6112
<http://www.cambridgema.gov/Historic>



CITY OF CAMBRIDGE
MASSACHUSETTS
BOARD OF ZONING APPEAL
831 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02139
617 349-6100

2019 MAY -8 PM 3:28
OFFICE OF THE CITY CLERK
CAMBRIDGE, MASSACHUSETTS

BZA APPLICATION FORM

Plan No: BZA-017112-2019

GENERAL INFORMATION

The undersigned hereby petitions the Board of Zoning Appeal for the following:

Special Permit : ✓ Variance : _____ Appeal : _____

PETITIONER : Sprint Spectrum Realty Company, LLC - C/O Simon J. Brighenti, Centerline Com

PETITIONER'S ADDRESS : 750 W. Center Street W. Bridgewater, MA 02379

LOCATION OF PROPERTY : 284-288 Norfolk St Cambridge, MA 02139

TYPE OF OCCUPANCY : Telecom ZONING DISTRICT : Residence C-1 Zone

REASON FOR PETITION :

Other: Replace existing antennas with new

DESCRIPTION OF PETITIONER'S PROPOSAL :

Remove existing previously-permitted rooftop telecommunication equipment and replace with upgraded equipment. This is an eligible facilities request pursuant to 47 USC 1455 (a)

SECTIONS OF ZONING ORDINANCE CITED :

Article 4.000 Section 4.32.G.1 (Telecommunications Facility).

Article 4.000 Section 4.40 (Footnote 49) (Telecommunications Facility).

Article 6409 Section 47 USC 1455 (a) (Middle Class Tax Relief Act).

Article 10.000 Section 10.40 (Special Permit).

Original Signature(s) :

Simon Brighenti
(Petitioner(s) / Owner)

Simon Brighenti
(Print Name)

Address : 750 W. Center St.
W. Bridgewater MA 02379

Tel. No. : 413-237-1550

E-Mail Address : SBrighenti @ Clinell.com

Date :

5/6/19

Photographic Simulation Package

Proposed Upgrade to Existing Wireless Telecommunications Facility:

BS60XC003 ELI
284 Norfolk Street
Cambridge, MA 02139

- Site Photographs Taken 4/11/19



Package prepared by:

Virtual Site Simulations, LLC
28 Caswell Street
Suite 100
Narragansett, Rhode Island 02882

www.VirtualSiteSimulations.com
www.ThinkVSSFirst.com

Photo Simulations are for demonstration purposes only. It should not be used in any other fashion or with any other intent. The accuracy of the resulting data is not guaranteed and is not for redistribution



Photolog



Wireless Telecommunications Facility:

BS60XC003 ELI
284 Norfolk Street
Cambridge, MA 02139

Legend:

- ★ Facility Location
- 750 Ft Radius
- ⓧ Photo location - Year Round Visibility
- ⓧ Photo location - Obscured Visibility
- ⓧ Photo location - NOT visible

Photo Simulations are for demonstration purposes only. It should not be used in any other fashion or with any other intent. The accuracy of the resulting data is not guaranteed and is not for redistribution



Existing



Photo #	Location	Gps Coordinates		Distance to site	Orientation	Bearing to site	Visibility
1	162 Hampshire St	42.37163	-71.09835	340.7 Feet	West	110	Year Round

Site: BS60XC003 ELI

Photo Simulations are for demonstration purposes only. It should not be used in any other fashion or with any other intent. The accuracy of the resulting data is not guaranteed and is not for redistribution



Simulation



Photo #	Location	Gps Coordinates		Distance to site	Orientation	Bearing to site	Visibility
1	162 Hampshire St	42.37163	-71.09835	340.7 Feet	West	110	Year Round

Site: BS60XC003 ELI

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Existing



Photo #	Location	Gps Coordinates		Distance to site	Orientation	Bearing to site	Visibility
2	3 Carlisle St	42.37233	-71.09771	403.43 Feet	North	159	Year Round

Site: BS60XC003 ELI

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Simulation



Photo #	Location	Gps Coordinates		Distance to site	Orientation	Bearing to site	Visibility
2	3 Carlisle St	42.37233	-71.09771	403.43 Feet	North	159	Year Round

Site: BS60XC003 ELI

Photo Simulations are for demonstration purposes only. It should not be used in any other fashion or with any other intent. The accuracy of the resulting data is not guaranteed and is not for redistribution



Existing



Photo #	Location	Gps Coordinates		Distance to site	Orientation	Bearing to site	Visibility
3	140 Elm St	42.37023	-71.09666	416.39 Feet	South	341	Year Round

Site: BS60XC003 ELI

Photo Simulations are for demonstration purposes only. It should not be used in any other fashion or with any other intent. The accuracy of the resulting data is not guaranteed and is not for redistribution



Simulation



Photo #	Location	Gps Coordinates		Distance to site	Orientation	Bearing to site	Visibility
3	140 Elm St	42.37023	-71.09666	416.39 Feet	South	341	Year Round

Site: BS60XC003 ELI

Photo Simulations are for demonstration purposes only. It should not be used in any other fashion or with any other intent. The accuracy of the resulting data is not guaranteed and is not for redistribution



Existing



Photo #	Location	Gps Coordinates		Distance to site	Orientation	Bearing to site	Visibility
4	342 Norfolk St	42.37268	-71.09643	0.1 Miles	North	202	Year Round

Site: BS60XC003 ELI

Photo Simulations are for demonstration purposes only. It should not be used in any other fashion or with any other intent. The accuracy of the resulting data is not guaranteed and is not for redistribution



Simulation



Photo #	Location	Gps Coordinates		Distance to site	Orientation	Bearing to site	Visibility
4	342 Norfolk St	42.37268	-71.09643	0.1 Miles	North	202	Year Round

Site: BS60XC003 ELI

Photo Simulations are for demonstration purposes only. It should not be used in any other fashion or with any other intent. The accuracy of the resulting data is not guaranteed and is not for redistribution



July 3, 2018

Sprint
1 International Blvd
Suite 800
Mahwah, NJ 07495

Structural Evaluation of Antenna Loads

RE:

Candidate Number	BS60XC003
Candidate Name	ELI
Candidate Address	294 Norfolk Street, Cambridge, MA 02139

To whom it may concern:

Chappell Engineering Associates, LLC has reviewed the existing antenna installation at the above referenced location. Based upon the site audit, the existing antenna mounts consist of antennas mounted to the façade of the existing building's wall/penthouse.

The current Sprint antenna configuration consists of:

<u>Antenna(s)</u>	<u>Remote Radio Unit</u>	<u>Antenna Support</u>
(12) Panel Antennas	(3)800MHz + (3)1900MHz*	Façade Pipe mount on exist. wall

* RRU's are mounted to the existing ballast mount (to be relocated)

Sprint currently proposes to reconfigure the existing site to include the additional antennas and final configuration listed below:

<u>Antenna(s)</u>	<u>Remote Radio Unit</u>	<u>Antenna Support</u>
(3) APXVSP18-C-A20 Antennas	(3)800MHz + (3)1900MHz*	Façade Pipe mount on exist. wall
(3) APXVTSM18-C-I20 Antennas	(3)2500MHz*	Façade Pipe mount on exist. wall

* RRU's will be mounted to the proposed ballast mount

The proposed antennas will supplement the existing in-service antennas and RRU's currently installed at the site.

Sprint also proposes to run (3) new 1-1/4" Hybriflex cables along the existing cable path. The (3) new cables will be run alongside the existing 1-5/8" Hybriflex cables up the tray on the existing structure. Based on a review of the previous analysis, the existing facility is capable of supporting the increased load of the proposed (3) Hybriflex cables with no modification.

Based upon our review of the existing antenna mounts and our review of the proposed aggregate antenna and associated hardware loads, Chappell Engineering Associates, LLC has determined that the existing structure and the proposed antenna and RRU mounting configuration are adequate. Additionally, as stated above, the existing tray is structurally sufficient to install the additional (3) cables. Photos of the existing installation as well as the appropriate antenna and RRU mounting details have been included in our construction drawings which are enclosed for your convenience.

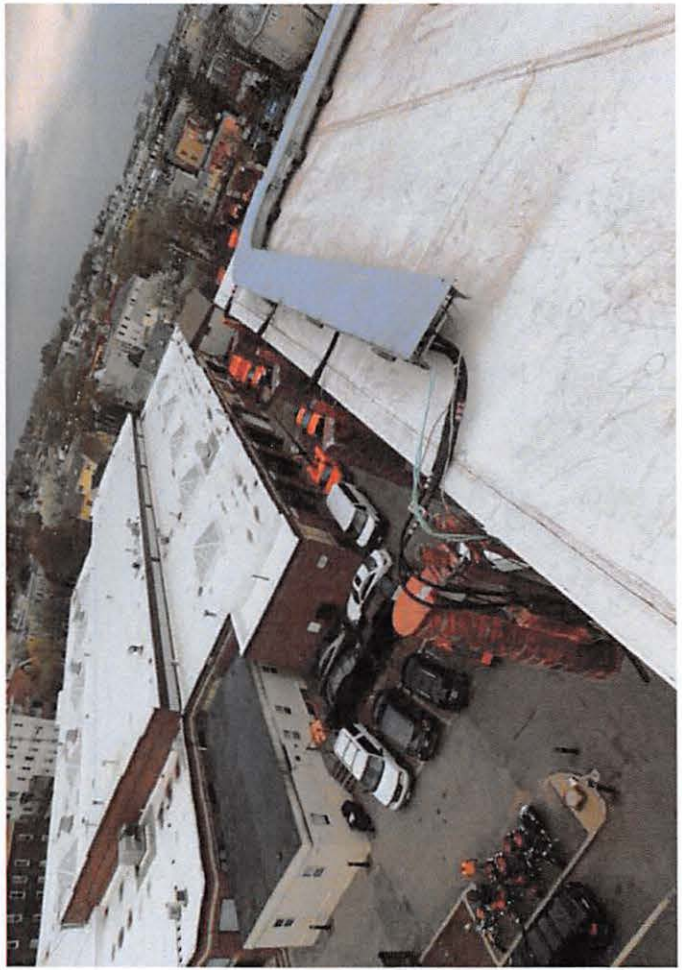
If you have any questions regarding this matter, please do not hesitate to call.

Very truly yours,

CHAPPELL ENGINEERING ASSOCIATES, LLC


Clement J Salek, P.E.
CJS/cjs





April 24, 2019

City of Cambridge
Board of Zoning Appeals
831 Massachusetts Avenue
Cambridge, MA 02139

RE: Sprint Spectrum Realty Company, LLC
Special Permit Application
284 Norfolk Street, Cambridge, MA
Supporting Statement

Dear Chair and Members:

I am a network development consultant to Sprint Spectrum Realty Company, LLC successor in interest to Sprint Spectrum LP ("Sprint"). Sprint is an FCC-licensed provider of wireless telecommunications services to the general public in the City of Cambridge and throughout the Commonwealth of Massachusetts. The purpose of this supplement is to provide support to the within application seeking approval to modify the existing *base station*¹ or *eligible support structure* previously installed at the building at 284 Norfolk Street. The building is located in a non-residential use and structure in a residential district and has hosted at least one wireless facility for several years. The existing Sprint *base station* consists of antennas secured by mounts to the roof of the building and camouflaged behind screening. The within application seeks to replace existing antennas with a new generation of antennas which will provide more robust service to the students and visitors to the hospital and surrounding properties and roads.

Applicant submits that this application constitutes an *eligible facilities request* in that the request for modification does not substantially change the physical dimensions of the *base station*. There is no increase in height of the *support structure*, nor does the proposed modification defeat the *concealment elements* of the *support structure*²

Approval of the within Application will result in no visible change to the existing facility. There will be no increase in vehicular or pedestrian traffic subsequent to installation, no increased impact on municipal resources, and Sprint will continue to monitor and maintain the facility pursuant to current practice.

¹ Certain italicized terms in context shall be defined as set forth in Section 6409 of the Middle-Class Tax Relief and Job Creation Act of 2012, 47 U.S.C. 1455 Section 6409.

² Note that one sector does not currently incorporate a *concealment element*. However, in that case, there will be no addition to the number of antennas; in fact, there will be a reduction in number.

*284 Norfolk Street
Cambridge, MA 02138
Application for Special Permit
July 12, 2018
Page 2 of 2*

The Applicant submits that the accompanying application materials meet the requirements of the City of Cambridge Zoning Ordinance and respectfully request that the requested relief be granted by the Board of Zoning Appeal.

Simon J. Brighenti, Jr. JD
Site Acquisition Consultant
750 W. Center Street – Floor 3
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April 24, 2019

City of Cambridge
Board of Zoning Appeals
831 Massachusetts Avenue
Cambridge, MA 02139

RE: Sprint Spectrum Realty Company, LLC Special Permit Application -
284 Norfolk Street, Cambridge, MA

Dear Chair and Members:

Please accept the accompanying material in application for a Special Permit to remove existing telecommunications equipment on the rooftop of the property known locally as 284 Norfolk Street and to replace it with upgraded equipment. This structure has hosted telecommunications equipment for several years. As disclosed in the accompanying plans and the photographic simulations, this proposed removal and replacement will have a very minimal aesthetic or visual impact as there will be very minor noticeable change to the current conditions should this requested zoning relief be granted and the new equipment installed. There will be, however, an enhanced service available to individuals both inside and outside of the surrounding buildings as well as the vehicles passing through the general area, in both emergency and non-emergency situations.

The Applicant submits that the accompanying application materials meet the requirements of the City of Cambridge Zoning Ordinance and respectfully requests that the requested relief be granted by the Board of Zoning Appeal.

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SPECIAL CONSTRUCTION NOTE:
SPRINT SITE WORK IS CONTINGENT ON THE FOLLOWING:
* COMPLETION OF A GLOBAL STRUCTURAL STABILITY ANALYSIS (PROVIDED BY STRUCTURE OWNER OR A&E VENDOR).
* COMPLETION OF AN ANTENNA/RRH MOUNT STRUCTURAL ASSESSMENT (PROVIDED BY A&E VENDOR).
* GC SHALL FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS AS INDICATED IN BEFORE-MENTIONED ANALYSIS AND ASSESSMENT.



NOTE:
OWNER AND TENANT MAY, FROM TIME TO TIME AT TENANT'S OPTION, REPLACE THIS EXHIBIT WITH AN EXHIBIT SETTING FORTH THE LEGAL DESCRIPTION OF THE SITE, OR WITH ENGINEERED OR AS-BUILT DRAWING DEPICTING THE SITE OR ILLUSTRATING STRUCTURAL MODIFICATIONS OR CONSTRUCTION PLANS OF THE SITE. ANY VISUAL OR TEXTUAL REPRESENTATION OF THE EQUIPMENT LOCATED WITHIN THE SITE CONTAINED IN THESE OTHER DOCUMENTS IS ILLUSTRATIVE ONLY, AND DOES NOT LIMIT THE RIGHTS OF SPRINT AS PROVIDED FOR IN THE AGREEMENT. THE LOCATIONS OF ANY ACCESS AND UTILITY EASEMENTS ARE ILLUSTRATIVE ONLY. ACTUAL LOCATIONS MAY BE DETERMINED BY TENANT AND/OR THE SERVICING UTILITY COMPANY IN COMPLIANCE WITH LOCAL LAWS AND REGULATIONS.

PROJECT: DO MACRO UPGRADE

SITE NAME: ELI

SITE CASCADE: BS60XC003

SITE ADDRESS: 284 NORFOLK STREET
CAMBRIDGE, MA 02139

SITE TYPE: ROOFTOP

SprintVISION

1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
(800) 357-7641

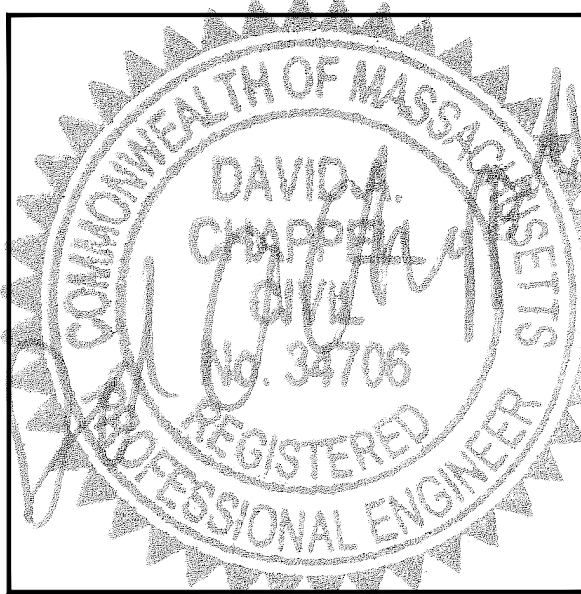
CENTERLINECOMMUNICATIONS

95 RYAN DRIVE, SUITE 1
RAYNHAM, MA 02767
(844) 748-8878
www.centerlinecommunications.com

CHAPPELLENGINEERINGASSOCIATES, LLC

Civil · Structural · Land Surveying

R.K. EXECUTIVE CENTRE
201 BOSTON POST ROAD WEST, SUITE 101
MARLBOROUGH, MA 01752
(508) 481-7400
www.chappellengineering.com



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CONFIDENTIAL AND ARE THE SOLE
PROPERTY OF SPRINT AND MAY
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DISSEMINATED OR REDISTRIBUTED
WITHOUT THE EXPRESS WRITTEN
CONSENT OF SPRINT.

CHECKED BY: JMT

APPROVED BY: JMT

SUBMITTALS			
REV.	DATE	DESCRIPTION	BY
5	03/06/19	CONSTRUCTION REVISED	CMC
4	02/19/19	CONSTRUCTION REVISED	CMC
3	11/13/18	CONSTRUCTION REVISED	JRV
2	10/19/18	CONSTRUCTION REVISED	CMC
1	07/11/18	ISSUED FOR CONSTRUCTION	CAW
0	06/22/18	ISSUED FOR REVIEW	CAW

SITE NUMBER:
BS60XC003

SITE NAME:
ELI

SITE ADDRESS:
284 NORFOLK STREET
CAMBRIDGE, MA 02139

SHEET TITLE

TITLE SHEET

SHEET NUMBER

T-1

1725.075

SITE INFORMATION	AREA MAP	PROJECT DESCRIPTION	DRAWING INDEX																																																																																									
<p>PROPERTY OWNER:</p> <p>NORSHIRE LLC. 288 NORFOLK STREET CAMBRIDGE, MA 02139</p> <p>LATITUDE (NAD83): GOOGLE EARTH 2-C CONFIRMATION</p> <p>N 42° 22' 16.70" 42.371306°</p> <p>LONGITUDE (NAD83): GOOGLE EARTH 2-C CONFIRMATION</p> <p>W 71° 05' 49.80" 71.097167°</p> <p>COUNTY:</p> <p>MIDDLESEX</p> <p>ZONING JURISDICTION:</p> <p>CITY OF CAMBRIDGE</p> <p>ZONING DISTRICT:</p> <p>RESIDENCE C-1 (C-1)</p> <p>POWER COMPANY:</p> <p>EVERSOURCE ELECTRIC PHONE: 1-800-592-2000</p> <p>AAV PROVIDER:</p> <p>COMCAST PHONE: 1-800-COMCAST</p> <p>SPRINT CM:</p> <p>RON FARIUS PHONE: (401) 297-7043 RONALD.FARIUS@SPRINT.COM</p> <p>EQUIPMENT SUPPLIER:</p> <p>ALCATEL-LUCENT 600 MOUNTAIN AVENUE MURRAY HILL, NJ 07974 (908) 508-8080</p>		<p>SCOPE OF WORK:</p> <p>GROUND-LEVEL RAN EQUIPMENT, CONSISTING OF:</p> <ul style="list-style-type: none">(1) NEW LTE BBU 2.5GHz RETROFIT KIT WITHIN EXISTING MM-BTS EQUIPMENT CABINET(3) NEW RECTIFIERS WITHIN EXISTING MM-BTS EQUIPMENT CABINET (IF REQ'D)(1) ADDITIONAL BATTERY STRING(S) INSIDE EXISTING BATTERY BACKUP (BBU) CABINET (IF REQ'D) <p>ROOF-TOP EQUIPMENT, INCLUDING INSTALLATION/REMOVAL OF:</p> <ul style="list-style-type: none">(11) EXISTING ANTENNAS TO BE REMOVED(4) EXISTING ANTENNAS TO BE REPLACED WITH (4) NEW ANTENNAS(6) REMOTE RADIO HEADS (RRH)(8) DIPLEXERS(1) HYBRID (FIBER & POWER) CABLE (AND ASSOCIATED FIBER, DC POWER, COAXIAL CABLE JUMPERS AND ANTENNA REMOTE ELECTRICAL-TILT (RET) CABLE) TO REPLACE EXISTING SPRINT & CLEARWIRE COAX CABLES, HYBRID CABLES & INNERDUCTS <div><p>SPECIAL ZONING NOTE: BASED ON INFORMATION PROVIDED BY SPRINT REGULATORY COMPLIANCE PROFESSIONALS AND LEGAL COUNSEL, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS CONSIDERED AN ELIGIBLE FACILITY UNDER THE MIDDLE CLASS TAX RELIEF AND JOB CREATION ACT OF 2012, 47 USC 1455(A), SECTION 6409(A), AND IS SUBJECT TO AN ELIGIBLE FACILITY REQUEST, EXPEDITED REVIEW, AND LIMITED/PARTIAL ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW, OR ADMINISTRATIVE REVIEW).</p></div>	<table><tr><th>SHEET NO.</th><th>SHEET TITLE</th><th>REV.</th><th>CHK.</th><th>BY.</th></tr><tr><td>T-1</td><td>TITLE SHEET</td><td>5</td><td>JMT</td><td>CMC</td></tr><tr><td>SP-1</td><td>OUTLINE SPECIFICATIONS</td><td>5</td><td>JMT</td><td>CMC</td></tr><tr><td>SP-2</td><td>OUTLINE SPECIFICATIONS</td><td>5</td><td>JMT</td><td>CMC</td></tr><tr><td>SP-3</td><td>OUTLINE SPECIFICATIONS</td><td>5</td><td>JMT</td><td>CMC</td></tr><tr><td>A-1</td><td>ROOF & EQUIPMENT PLANS</td><td>5</td><td>JMT</td><td>CMC</td></tr><tr><td>A-2</td><td>ELEVATION</td><td>5</td><td>JMT</td><td>CMC</td></tr><tr><td>A-3</td><td>ANTENNA PLANS</td><td>5</td><td>JMT</td><td>CMC</td></tr><tr><td>A-4</td><td>RF DATA SHEET</td><td>5</td><td>JMT</td><td>CMC</td></tr><tr><td>A-5</td><td>RAN WIRING DIAGRAMS</td><td>5</td><td>JMT</td><td>CMC</td></tr><tr><td>A-6</td><td>EQUIPMENT DETAILS</td><td>5</td><td>JMT</td><td>CMC</td></tr><tr><td>A-7</td><td>EQUIPMENT DETAILS</td><td>5</td><td>JMT</td><td>CMC</td></tr><tr><td>S-1</td><td>STRUCTURAL DETAILS - FACADE MOUNT</td><td>5</td><td>JMT</td><td>CMC</td></tr><tr><td>S-2</td><td>STRUCTURAL DETAILS - FAUX CHIMNEY</td><td>5</td><td>JMT</td><td>CMC</td></tr><tr><td>S-3</td><td>STRUCTURAL DETAILS - CHIMNEY PANELS</td><td>5</td><td>JMT</td><td>CMC</td></tr><tr><td>E-1</td><td>ONE-LINE DIAGRAM & PPC DETAILS</td><td>5</td><td>JMT</td><td>CMC</td></tr><tr><td>E-2</td><td>GROUNDING DETAILS & NOTES</td><td>5</td><td>JMT</td><td>CMC</td></tr></table>					SHEET NO.	SHEET TITLE	REV.	CHK.	BY.	T-1	TITLE SHEET	5	JMT	CMC	SP-1	OUTLINE SPECIFICATIONS	5	JMT	CMC	SP-2	OUTLINE SPECIFICATIONS	5	JMT	CMC	SP-3	OUTLINE SPECIFICATIONS	5	JMT	CMC	A-1	ROOF & EQUIPMENT PLANS	5	JMT	CMC	A-2	ELEVATION	5	JMT	CMC	A-3	ANTENNA PLANS	5	JMT	CMC	A-4	RF DATA SHEET	5	JMT	CMC	A-5	RAN WIRING DIAGRAMS	5	JMT	CMC	A-6	EQUIPMENT DETAILS	5	JMT	CMC	A-7	EQUIPMENT DETAILS	5	JMT	CMC	S-1	STRUCTURAL DETAILS - FACADE MOUNT	5	JMT	CMC	S-2	STRUCTURAL DETAILS - FAUX CHIMNEY	5	JMT	CMC	S-3	STRUCTURAL DETAILS - CHIMNEY PANELS	5	JMT	CMC	E-1	ONE-LINE DIAGRAM & PPC DETAILS	5	JMT	CMC	E-2	GROUNDING DETAILS & NOTES	5	JMT	CMC
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<p>LOCATION MAP - GOOGLE EARTH 2-C CONFIRMATION</p>	<p>GENERAL NOTES</p> <ol style="list-style-type: none">THIS IS AN UNMANNED AND RESTRICTED ACCESS TELECOMMUNICATION FACILITY, AND IS NOT FOR HUMAN HABITATION. IT WILL BE USED FOR THE TRANSMISSION OF RADIO SIGNAL FOR THE PURPOSE OF PROVIDING PUBLIC CELLULAR SERVICE.<ul style="list-style-type: none">ADA COMPLIANCE NOT REQUIRED.PORTABLE WATER OR SANITARY SERVICE IS NOT REQUIRED.NO OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES REQUIRED.CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON JOB SITE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. FAILURE TO NOTIFY THE ARCHITECT/ENGINEER PLACE THE RESPONSIBILITY ON THE CONTRACTOR TO CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.NEW CONSTRUCTION WILL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES.<ul style="list-style-type: none">BUILDING CODE: MASSACHUSETTS STATE BUILDING CODE 780 CMR (9TH EDITION)ELECTRICAL CODE: 2017 NATIONAL ELECTRICAL CODESTRUCTURAL CODE: TIA/EIA-222-H STRUCTURAL STANDARDS FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS. <div><p>AT LEAST 72 HOURS PRIOR TO DIGGING, THE CONTRACTOR IS REQUIRED TO CALL DIG SAFE AT 811</p></div> <div></div>	<p>THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.</p> <table><tr><td>SPRINT:</td><td></td><td>DATE:</td><td></td></tr><tr><td>CONSTRUCTION MANAGER:</td><td></td><td>DATE:</td><td></td></tr><tr><td>LEASING/ SITE ACQUISITION:</td><td></td><td>DATE:</td><td></td></tr><tr><td>RF ENGINEER:</td><td></td><td>DATE:</td><td></td></tr><tr><td>LANDLORD/ TOWER OWNER:</td><td></td><td>DATE:</td><td></td></tr></table>					SPRINT:		DATE:		CONSTRUCTION MANAGER:		DATE:		LEASING/ SITE ACQUISITION:		DATE:		RF ENGINEER:		DATE:		LANDLORD/ TOWER OWNER:		DATE:																																																																			
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THESE OUTLINE SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT STANDARD CONSTRUCTION SPECIFICATIONS, INCLUDING CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

SECTION 01 100 - SCOPE OF WORK

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT CONSTRUCTION STANDARDS FOR WIRELESS SITES, CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

- A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.
- B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HERewith.

1.3 PRECEDENCE: SHOULD CONFLICTS OCCUR BETWEEN THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES INCLUDING THE STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES AND THE CONSTRUCTION DRAWINGS, INFORMATION ON THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE. NOTIFY SPRINT CONSTRUCTION MANAGER IF THIS OCCURS.

1.4 NATIONALLY RECOGNIZED CODES AND STANDARDS:

- A. THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL AND LOCAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
- GR–78–CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
 - GR–1089 CORE, ELECTROMAGNETIC COMPATIBILITY AND ELECTRICAL SAFETY –GENERIC CRITERIA FOR NETWORK TELECOMMUNICATIONS EQUIPMENT.
 - NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPa) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE – "NEC") AND NFPA 101 (LIFE SAFETY CODE).
 - AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM)
 - INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE)
 - AMERICAN CONCRETE INSTITUTE (ACI)
 - AMERICAN WIRE PRODUCERS ASSOCIATION (AWPA)
 - CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
 - AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
 - PORTLAND CEMENT ASSOCIATION (PCA)
 - NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
 - BRICK INDUSTRY ASSOCIATION (BIA)
 - AMERICAN WELDING SOCIETY (AWS)
 - NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
 - SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
 - DOOR AND HARDWARE INSTITUTE (DHI)
 - OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
 - APPLICABLE BUILDING CODES INCLUDING UNIFORM BUILDING CODE, SOUTHERN BUILDING CODE, BOCA, AND THE INTERNATIONAL BUILDING CODE.

1.5 DEFINITIONS:

- A. WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
- B. COMPANY: SPRINT CORPORATION
- C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
- D. CONTRACTOR: CONSTRUCTION CONTRACTOR; CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.
- E. THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.
- F. OFCI: OWNER FURNISHED, CONTRACTOR INSTALLED EQUIPMENT.
- G. CONSTRUCTION MANAGER – ALL PROJECTS RELATED COMMUNICATION TO FLOW THROUGH SPRINT REPRESENTATIVE IN CHARGE OF PROJECT...

1.6 SITE FAMILIARITY: CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE SPRINT CONSTRUCTION MANAGER PRIOR TO THE COMMENCEMENT OF WORK. NO COMPENSATION WILL BE AWARDED BASED ON CLAIM OF LACK OF KNOWLEDGE OR FIELD CONDITIONS.

1.7 POINT OF CONTACT: COMMUNICATION BETWEEN SPRINT AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE SPRINT CONSTRUCTION MANAGER APPOINTED TO MANAGE THE PROJECT FOR SPRINT.

1.8 ON–SITE SUPERVISION: THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.

1.9 DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE: THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS, STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.

- A. THE JOBSITE DRAWINGS, SPECIFICATIONS AND DETAILS SHALL BE CLEARLY MARKED DAILY IN RED PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS–BUILT" DRAWINGS. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK. CONTRACTOR SHALL NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY VARIATIONS PRIOR TO PROCEEDING WITH THE WORK.
- C. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. SPACING BETWEEN EQUIPMENT IS THE REQUIRED CLEARANCE. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, EXISTING CONDITIONS AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE SPRINT CONSTRUCTION MANAGER PRIOR TO PROCEEDING WITH THE WORK.

1.10 USE OF JOB SITE: THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION AND RELATED OPERATIONS INCLUDING STAGING AND STORAGE OF MATERIALS AND EQUIPMENT, PARKING, TEMPORARY FACILITIES, AND WASTE STORAGE TO THE LEASE PARCEL UNLESS OTHERWISE PERMITTED BY THE CONTRACT DOCUMENTS.

1.11 UTILITIES SERVICES: WHERE NECESSARY TO CUT EXISTING PIPES, ELECTRICAL WIRES, CONDUITS, CABLES, ETC., OF UTILITY SERVICES, OR OF FIRE PROTECTION OR COMMUNICATIONS SYSTEMS, THEY SHALL BE CUT AND CAPPED AT SUITABLE PLACES OR WHERE SHOWN. ALL SUCH ACTIONS SHALL BE COORDINATED WITH THE UTILITY COMPANY INVOLVED:

1.12 PERMITS / FEES: WHEN REQUIRED THAT A PERMIT OR CONNECTION FEE BE PAID TO A PUBLIC UTILITY PROVIDER FOR NEW SERVICE TO THE CONSTRUCTION PROJECT, PAYMENT OF SUCH FEE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

1.13 CONTRACTOR SHALL TAKE ALL MEASURES AND PROVIDE ALL MATERIAL NECESSARY FOR PROTECTING EXISTING EQUIPMENT AND PROPERTY.

- 1.14 METHODS OF PROCEDURE (MOPS) FOR CONSTRUCTION: CONTRACTOR SHALL PERFORM WORK AS DESCRIBED IN THE FOLLOWING INSTALLATION AND COMMISSIONING MOPS.
- TOP HAT
 - HOW TO INSTALL A NEW CABINET
 - BASE BAND UNIT IN EXISTING UNIT
 - INSTALLATION OF BATTERIES
 - INSTALLATION OF HYBRID CABLE
 - INSTALLATION OF RRH'S
 - CABLING
 - TS–0200 REV 4 – ANTENNA LINE ACCEPTANCE STANDARDS
 - SPRINT CELL SITE ENGINEERING NOTICE – EN 2012–001, REV 1.
 - COMMISSIONING MOPS
 - SPRINT CELL SITE ENGINEERING NOTICE – EN–2013–002
 - SPRINT ENGINEERING LETTER – EL–0504
 - SPRINT ENGINEERING LETTER – EL–0568
 - SPRINT TECHNICAL SPECIFICATION – TS–0193

1.15 USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:

- A. CONTRACTOR WILL UTILIZE ITS BEST EFFORTS TO WORK WITH SPRINT ELECTRONIC PROJECT MANAGEMENT SYSTEMS. CONTRACTOR UNDERSTANDS THAT SUFFICIENT INTERNET ACCESS, EQUIVALENT TO "BROADBAND" OR BETTER, IS REQUIRED TO TIMELY AND EFFECTIVELY UTILIZE SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS AND AGREES TO MAINTAIN APPROPRIATE CONNECTIONS FOR CONTRACTOR'S STAFF AND OFFICES THAT ARE COMPATIBLE WITH SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 TEMPORARY UTILITIES AND FACILITIES: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEPT AS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES AND FACILITIES INCLUDE POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILITIES, WASTE DISPOSAL FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PROVIDE TEMPORARY UTILITIES AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTHORITY HAVING JURISDICTION. CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVICE IN THE COMPLETION OF THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LESSORS OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

3.2 ACCESS TO WORK: THE CONTRACTOR SHALL PROVIDE ACCESS TO THE JOB SITE FOR AUTHORIZED COMPANY PERSONNEL AND AUTHORIZED REPRESENTATIVES OF THE ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

3.3 TESTING: REQUIREMENTS FOR TESTING BY THIS CONTRACTOR SHALL BE AS INDICATED HEREWITH, ON THE CONSTRUCTION DRAWINGS, AND IN THE INDIVIDUAL SECTIONS OF THESE SPECIFICATIONS. SHOULD COMPANY CHOOSE TO ENGAGE ANY THIRD–PARTY TO CONDUCT ADDITIONAL TESTING, THE CONTRACTOR SHALL COOPERATE WITH AND PROVIDE A WORK AREA FOR COMPANY'S TEST AGENCY.

3.4 DIMENSIONS: VERIFY DIMENSIONS INDICATED ON DRAWINGS WITH FIELD DIMENSIONS BEFORE FABRICATION OR ORDERING OF MATERIALS. DO NOT SCALE DRAWINGS.

3.5 EXISTING CONDITIONS: NOTIFY THE SPRINT CONSTRUCTION MANAGER OF EXISTING CONDITIONS DIFFERING FROM THOSE INDICATED ON THE DRAWINGS. DO NOT REMOVE OR ALTER STRUCTURAL COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ARCHITECT AND ENGINEER.

SECTION 01 200 - COMPANY FURNISHED MATERIAL AND EQUIPMENT

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

- A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.
- B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HERewith.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 RECEIPT OF MATERIAL AND EQUIPMENT:

- A. COMPANY FURNISHED MATERIAL AND EQUIPMENT IS IDENTIFIED ON THE RF DATA SHEET IN THE CONSTRUCTION DOCUMENTS.
- B. THE CONTRACTOR IS RESPONSIBLE FOR SPRINT PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:
- ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.
 - VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.
 - TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.
 - RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY–FOUR HOURS AFTER RECEIPT, REPORT TO SPRINT OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.
 - PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.
 - COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF–LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

3.2 DELIVERABLES:

- A. COMPLETE SHIPPING AND RECEIPT DOCUMENTATION IN ACCORDANCE WITH COMPANY PRACTICE.
- B. IF APPLICABLE, COMPLETE LOST/STOLEN/DAMAGED DOCUMENTATION REPORT AS NECESSARY IN ACCORDANCE WITH COMPANY PRACTICE, AND AS DIRECTED BY COMPANY.
- C. UPLOAD DOCUMENTATION INTO SPRINT SITE MANAGEMENT SYSTEM (SMS) AND/OR PROVIDE HARD COPY DOCUMENTATION AS REQUESTED.

SECTION 01 300 - CELL SITE CONSTRUCTION

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

- A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.
- B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HERewith.

1.3 NOTICE TO PROCEED:

- A. NO WORK SHALL COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF THE WORK ORDER.
- B. TOWER OWNER NOTIFICATION: ONCE THE CONTRACTOR HAS RECEIVED AND ACCEPTED THE NOTICE TO PROCEED, THE CONTRACTOR WILL CONTACT THE CONSTRUCTION MANAGER OF RECORD (NOTED ON THE FIRST PAGE ON THIS CONSTRUCTION DRAWING) A MINIMUM OF 48 HOURS PRIOR TO WORK START. UPON ARRIVAL TO THE JOB SITE, CONTRACTOR CREW IS REQUIRED TO NOTIFY THE CARRIER NOC WORK HAS BEGUN.
- C. PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 FUNCTIONAL REQUIREMENTS:

- A. THE ACTIVITIES DESCRIBED IN THIS PARAGRAPH REPRESENT MINIMUM ACTIONS AND PROCESSES REQUIRED TO SUCCESSFULLY COMPLETE THE WORK. THE ACTIVITIES DESCRIBED ARE NOT EXHAUSTIVE, AND CONTRACTOR SHALL TAKE ANY AND ALL ACTIONS AS NECESSARY TO SUCCESSFULLY COMPLETE THE CONSTRUCTION OF A FULLY FUNCTIONING WIRELESS FACILITY AT THE SITE IN ACCORDANCE WITH COMPANY PROCESSES.
- B. SUBMIT SPECIFIC DOCUMENTATION AS INDICATED HEREIN, AND OBTAIN REQUIRED APPROVALS WHILE THE WORK IS BEING PERFORMED.
- C. MANAGE AND CONDUCT ALL FIELD CONSTRUCTION SERVICE RELATED ACTIVITIES
- D. PROVIDE CONSTRUCTION ACTIVITIES TO THE EXTENT REQUIRED BY THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
- PERFORM ANY REQUIRED SITE ENVIRONMENTAL MITIGATION.
 - PREPARE GROUND SITES; PROVIDE DE–GRUBBING; AND ROUGH AND FINAL GRADING, AND COMPOUND SURFACE TREATMENTS.
 - MANAGE AND CONDUCT ALL ACTIVITIES FOR INSTALLATION OF UTILITIES INCLUDING ELECTRICAL AND TELCO BACKHAUL.
 - INSTALL UNDERGROUND FACILITIES INCLUDING UNDERGROUND POWER AND COMMUNICATIONS CONDUITS, AND UNDERGROUND GROUNDING SYSTEM.
 - INSTALL ABOVE GROUND GROUNDING SYSTEMS.
 - PROVIDE NEW HVAC INSTALLATIONS AND MODIFICATIONS.
 - INSTALL "H–FRAMES", CABINETS AND SHELTERS AS INDICATED.
 - INSTALL ROADS, ACCESS WAYS, CURBS AND DRAINS AS INDICATED.
 - ACCOMPLISH REQUIRED MODIFICATION OF EXISTING FACILITIES.
 - PROVIDE ANTENNA SUPPORT STRUCTURE FOUNDATIONS.
 - PROVIDE SLABS AND EQUIPMENT PLATFORMS.
 - INSTALL COMPOUND FENCING, SIGHT SHIELDING, LANDSCAPING AND ACCESS BARRIERS.
 - PERFORM INSPECTION AND MATERIAL TESTING AS REQUIRED HEREINAFTER.
 - CONDUCT SITE RESISTANCE TO EARTH TESTING AS REQUIRED HEREINAFTER
 - INSTALL FIXED GENERATOR SETS AND OTHER STANDBY POWER SOLUTIONS.
 - INSTALL TOWERS, ANTENNA SUPPORT STRUCTURES AND PLATFORMS ON EXISTING TOWERS AS REQUIRED.
 - INSTALL CELL SITE RADIOS, MICROWAVE, GPS, COAXIAL MAINLINE, ANTENNAS, CROSS BAND COUPLERS, TOWER TOP AMPLIFIERS, LOW NOISE AMPLIFIERS AND RELATED EQUIPMENT.
 - PERFORM, DOCUMENT, AND CLOSE OUT ANY CONSTRUCTION CONTROL DOCUMENTS THAT MAY BE REQUIRED BY GOVERNMENT AGENCIES AND LANDLORDS.
 - PERFORM ANTENNAL AND COAX SWEEP TESTING AND MAKE ANY AND ALL NECESSARY CORRECTIONS.
 - REMAIN ON SITE MOBILIZED THROUGHOUT HAND–OFF AND INTEGRATION TO ASSIST AS NEEDED UNTIL SITE IS DEEMED SUBSTANTIALLY COMPLETE AND PLACED "ON AIR."

3.2 GENERAL REQUIREMENTS FOR CIVIL CONSTRUCTION:

- A. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.
- B. EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.
- C. CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.
- IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
 - CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.

D. CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION

E. CONDUCT TESTING AS REQUIRED HEREIN.

3.3 DELIVERABLES:

- A. CONTRACTOR SHALL REVIEW, APPROVE, AND SUBMIT TO SPRINT SHOP DRAWINGS, PRODUCT DATA, SAMPLES, AND SIMILAR SUBMITTALS AS REQUIRED HEREINAFTER
- B. PROVIDE DOCUMENTATION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING. DOCUMENTATION SHALL BE FORWARDED IN ORIGINAL FORMAT AND/OR UPLOADED INTO SMS.
- ALL CORRESPONDENCE AND PRELIMINARY CONSTRUCTION REPORTS.
 - PROJECT PROGRESS REPORTS.
 - CIVIL CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
 - ELECTRICAL SERVICE COMPLETION DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
 - LINES AND ANTENNA INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
 - POWER INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
 - TELCO READY DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
 - PPC (OR SHELTER) INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
 - TOWER CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
 - TOWER CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
 - BTS AND RADIO EQUIPMENT DELIVERED AT SITE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).

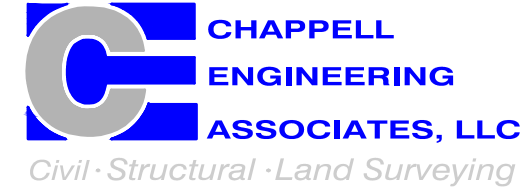
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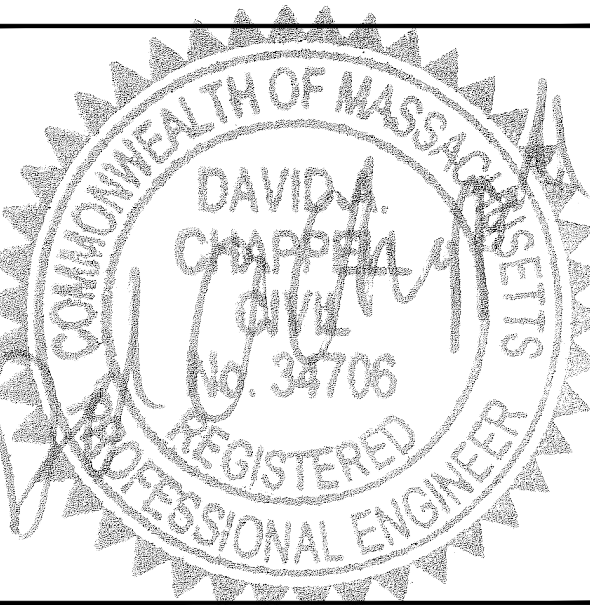
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CHECKED BY: JMT

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SUBMITTALS			
REV.	DATE	DESCRIPTION	BY
5	03/06/19	CONSTRUCTION REVISED	CMC
4	02/19/19	CONSTRUCTION REVISED	CMC
3	11/13/18	CONSTRUCTION REVISED	JRV
2	10/19/18	CONSTRUCTION REVISED	CMC
1	07/11/18	ISSUED FOR CONSTRUCTION	CAW
0	06/22/18	ISSUED FOR REVIEW	CAW

SITE NUMBER:
BS60XC003

SITE NAME:
ELI

SITE ADDRESS:
284 NORFOLK STREET
CAMBRIDGE, MA 02139

SHEET TITLE

OUTLINE SPECIFICATIONS

SHEET NUMBER

SP-1

1725.075

CONTINUED FROM SP-1:

12. NETWORK OPERATIONS HANDOFF CHECKLIST (HOC WALK) COMPLETE (UPLOAD FORM IN SMS)
13. CIVIL CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
14. SITE CONSTRUCTION PROGRESS PHOTOS UNLOADED INTO SMS.

SECTION 01 400 - SUBMITTALS, TESTS, AND INSPECTIONS

PART 1 – GENERAL

1.1 **THE WORK:** THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 **RELATED DOCUMENTS:**

- A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.
- B. SPRINT “STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES” ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 **SUBMITTALS:**

- A. THE WORK IN ALL ASPECTS SHALL COMPLY WITH THE CONSTRUCTION DRAWINGS AND THESE SPECIFICATIONS.
- B. SUBMIT THE FOLLOWING TO COMPANY REPRESENTATIVE FOR APPROVAL.
 1. CONCRETE MIX–DESIGNS FOR TOWER FOUNDATIONS, ANCHORS PIERS, AND CONCRETE PAVING.
 2. CONCRETE BREAK TESTS AS SPECIFIED HEREIN.
 3. SPECIAL FINISHES FOR INTERIOR SPACES, IF ANY.
 4. ALL EQUIPMENT AND MATERIALS SO IDENTIFIED ON THE CONSTRUCTION DRAWINGS.
 5. CHEMICAL GROUNDING DESIGN.
- C. ALTERNATES: AT THE COMPANY’S REQUEST, ANY ALTERNATIVES TO THE MATERIALS OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRINT’S CONSTRUCTION MANAGER FOR APPROVAL PRIOR TO BEING SHIPPED TO SITE. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED. SUBMITTAL FOR APPROVAL SHALL INCLUDE A STATEMENT OF COST REDUCTION PROPOSED FOR USE OF ALTERNATE PRODUCT.

1.4 **TESTS AND INSPECTIONS:**

- A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.
- B. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
 1. COAX SWEEPS AND FIBER TESTS PER SPRINT TS–0200 CURRENT VERSION ANTENNA LINE ACCEPTANCE STANDARDS.
 2. AGL, AZIMUTH AND DOWNTILT USING ELECTRONIC COMMERCIAL MADE–FOR–THE–PURPOSE ANTENNA ALIGNMENT TOOL.
 3. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.
- C. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING;
 1. AZIMUTH, DOWNTILT, AGL – UPLOAD REPORT FROM ANTENNA ALIGNMENT TOOL TO SITERRA TASK 465. INSTALLED AZIMUTH, DOWNTILT, AND AGL MUST CONFORM TO THE RF DATA SHEETS. SWEEP AND FIBER TESTS
 2. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT
 3. ALL AVAILABLE JURISDICTIONAL INFORMATION
 4. PDF SCAN OF REDLINES PRODUCED IN FIELD
 5. ELECTRONIC AS–BUILT DRAWINGS IN AUTOCAD AND PDF FORMATS. ANY FIELD CHANGE MUST BE REFLECTED BY MODIFYING THE PLANS, ELEVATIONS, AND DETAILS IN THE DRAWING SETS. GENERAL NOTES INDICATING MODIFICATIONS WILL NOT BE ACCEPTED. CHANGES SHALL BE HIGHLIGHTED AS “CLOUDS” IDENTIFIED AS THE “AS–BUILT” CONDITION.
 6. LIEN WAIVERS
 7. FINAL PAYMENT APPLICATION
 8. REQUIRED FINAL CONSTRUCTION PHOTOS
 9. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS
 10. ALL POST NTP TASKS INCLUDING DOCUMENT UPLOADS COMPLETED IN SITERRA (SPRINTS DOCUMENT REPOSITORY OF RECORD).

1.5 **COMMISSIONING:** PERFORM ALL COMMISSIONING AS REQUIRED BY APPLICABLE MOPS

1.6 **INTEGRATION:** PERFORM ALL INTEGRATION ACTIVITIES AS REQUIRED BY APPLICABLE MOPS

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 **REQUIREMENTS FOR TESTING:**

- A. THIRD PARTY TESTING AGENCY: WHEN THE USE OF A THIRD PARTY INDEPENDENT TESTING AGENCY IS REQUIRED, THE AGENCY THAT IS SELECTED MUST PERFORM SUCH WORK ON A REGULAR BASIS IN THE STATE WHERE THE PROJECT IS LOCATED AND HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
 1. THE THIRD PARTY TESTING AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
 2. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.
 3. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.

3.2 **REQUIRED TESTS:**

- A. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
 1. CONCRETE CYLINDER BREAK TESTS FOR THE TOWER AND ANCHOR FOUNDATIONS AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
 2. ASPHALT ROADWAY COMPACTED THICKNESS, SURFACE SMOOTHNESS, AND COMPACTED DENSITY TESTING AS SPECIFIED IN SECTION: HOT MIX ASPHALT PAVING.
 3. FIELD QUALITY CONTROL TESTING AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
 4. TESTING REQUIRED UNDER SECTION: AGGREGATE BASE FOR ACCESS ROADS, PADS AND ANCHOR LOCATIONS
 5. STRUCTURAL BACKFILL COMPACTION TESTS FOR THE TOWER FOUNDATION.

6. SITE RESISTANCE TO EARTH TESTING PER EXHIBIT: CELL SITE GROUNDING SYSTEM DESIGN.
7. ANTENNA AND COAX SWEEP TESTS PER EXHIBIT: ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS.
8. GROUNDING AT ANTENNA MASTS FOR GPS AND ANTENNAS
9. ALL OTHER TESTS REQUIRED BY COMPANY OR JURISDICTION.

3.3 **REQUIRED INSPECTIONS:**

- A. SCHEDULE INSPECTIONS WITH COMPANY REPRESENTATIVE.
- B. CONDUCT INSPECTIONS INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
 1. GROUNDING SYSTEM INSTALLATION PRIOR TO EARTH CONCEALMENT DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
 2. FORMING FOR CONCRETE AND REBAR PLACEMENT PRIOR TO POUR DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
 3. COMPACTION OF BACKFILL MATERIALS; AGGREGATE BASE FOR ROADS, PADS, AND ANCHORS; ASPHALT PAVING; AND SHAFT BACKFILL FOR CONCRETE AND WOOD POLES, BY INDEPENDENT THIRD PARTY AGENCY.
 4. PRE– AND POST–CONSTRUCTION ROOFTOP AND STRUCTURAL INSPECTIONS ON EXISTING FACILITIES.
 5. TOWER ERECTION SECTION STACKING AND PLATFORM ATTACHMENT DOCUMENTED BY DIGITAL PHOTOGRAPHS BY THIRD PARTY AGENCY.
 6. ANTENNA AZIMUTH , DOWN TILT AND PER SUNLIGHT TOOL SUNSIGHT INSTRUMENTS – ANTENNALIGN ALIGNMENT TOOL (AAT)
 7. VERIFICATION DOCUMENTED WITH THE ANTENNA CHECKLIST REPORT, BY A&E, SITE DEVELOPMENT REP, OR RF REP.
 8. FINAL INSPECTION CHECKLIST AND HANDOFF WALK (HOC.). SIGNED FORM SHOWING ACCEPTANCE BY FIELD OPS IS TO BE UPLOADED INTO SMS.
 9. COAX SWEEP AND FIBER TESTING DOCUMENTS SUBMITTED VIA SMS FOR RF APPROVAL.
 10. SCAN–ABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT
 11. ALL AVAILABLE JURISDICTIONAL INFORMATION
 12. PDF SCAN OF REDLINES PRODUCED IN FIELD
- E. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.
- F. CONSTRUCTION INSPECTIONS AND CORRECTIVE MEASURES SHALL BE DOCUMENTED BY THE CONTRACTOR WITH WRITTEN REPORTS AND PHOTOGRAPHS. PHOTOGRAPHS MUST BE DIGITAL AND OF SUFFICIENT QUALITY TO CLEARLY SHOW THE SITE CONSTRUCTION. PHOTOGRAPHS MUST CLEARLY IDENTIFY THE PHOTOGRAPHED ITEM AND BE LABELED WITH THE SITE CASCADE NUMBER, SITE NAME, DESCRIPTION, AND DATE.

3.4 **DELIVERABLES:** TEST AND INSPECTION REPORTS AND CLOSEOUT DOCUMENTATION SHALL BE UPLOADED TO THE SMS AND/OR FORWARDED TO SPRINT FOR INCLUSION INTO THE PERMANENT SITE FILES.

- A. THE FOLLOWING TEST AND INSPECTION REPORTS SHALL BE PROVIDED AS APPLICABLE.
 1. CONCRETE MIX AND CYLINDER BREAK REPORTS.
 2. STRUCTURAL BACKFILL COMPACTION REPORTS.
 3. SITE RESISTANCE TO EARTH TEST.
 4. ANTENNA AZIMUTH AND DOWN TILT VERIFICATION
 5. TOWER ERECTION INSPECTIONS AND MEASUREMENTS DOCUMENTING TOWER INSTALLED PER SUPPLIER’S REQUIREMENTS AND THE APPLICABLE SECTIONS HEREIN.
 6. COAX CABLE SWEEP TESTS PER COMPANY’S “ANTENNA LINE ACCEPTANCE STANDARDS”.
- B. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES THE FOLLOWING;
 1. TEST WELLS AND TRENCHES: PHOTOGRAPHS OF ALL TEST WELLS; PHOTOGRAPHS SHOWING ALL OPEN EXCAVATIONS AND TRENCHING PRIOR TO BACKFILLING SHOWING A TAPE MEASURE VISIBLE IN THE EXCAVATIONS INDICATING DEPTH.
 2. CONDUITS, CONDUCTORS AND GROUNDING: PHOTOGRAPHS SHOWING TYPICAL INSTALLATION OF CONDUCTORS AND CONNECTORS; PHOTOGRAPHS SHOWING TYPICAL BEND RADIUS OF INSTALLED GROUND WIRES AND GROUND ROD SPACING;
 3. CONCRETE FORMS AND REINFORCING: CONCRETE FORMING AT TOWER AND EQUIPMENT/SHELTER PAD/FOUNDATIONS – PHOTOGRAPHS SHOWING ALL REINFORCING STEEL, UTILITY AND CONDUIT STUB OUTS; PHOTOGRAPHS SHOWING CONCRETE POUR OF SHELTER SLAB/FOUNDATION, TOWER FOUNDATION AND GUY ANCHORS WITH VIBRATOR IN USE; PHOTOGRAPHS SHOWING EACH ANCHOR ON GUYED TOWERS, BEFORE CONCRETE POUR.
 4. TOWER, ANTENNAS AND MAINLINE: INSPECTION AND PHOTOGRAPHS OF SECTION STACKING; INSPECTION AND PHOTOGRAPHS OF PLATFORM COMPONENT ATTACHMENT POINTS; PHOTOGRAPHS OF TOWER TOP GROUNDING; PHOTOS OF TOWER COAX LINE COLOR CODING AT THE TOP AND AT GROUND LEVEL; INSPECTION AND PHOTOGRAPHS OF OPERATIONAL OF TOWER LIGHTING, AND PLACEMENT OF FAA REGISTRATION SIGN; PHOTOGRAPHS SHOWING ADDITIONAL GROUNDING POINTS FOR TOWERS GREATER THAN 200 FEET.; PHOTOS OF ANTENNA GROUND BAR, EQUIPMENT GROUND BAR, AND MASTER GROUND BAR; PHOTOS OF GPS ANTENNA(S); PHOTOS OF EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA; PHOTOS OF COAX WEATHERPROOFING – TOP AND BOTTOM; PHOTOS OF COAX GROUNDING––TOP AND BOTTOM; PHOTOS OF ANTENNA AND MAST GROUNDING; PHOTOS OF COAX CABLE ENTRY INTO SHELTER; PHOTOS OF PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
 5. ROOF TOPS: PRE–CONSTRUCTION AND POST–CONSTRUCTION VISUAL INSPECTION AND PHOTOGRAPHS OF THE ROOF AND INTERIOR TO DETERMINE AND DOCUMENT CONDITIONS; ROOF TOP CONSTRUCTION INSPECTIONS AS REQUIRED BY THE JURISDICTION; PHOTOGRAPHS OF CABLE TRAY AND/OR ICE BRIDGE; PHOTOGRAPHS OF DOGHOUSE/CABLE EXIT FROM ROOF;
 6. SITE LAYOUT – PHOTOGRAPHS OF THE OVERALL COMPOUND, INCLUDING EQUIPMENT PLATFORM FROM ALL FOUR CORNERS.
 7. FINISHED UTILITIES: CLOSE–UP PHOTOGRAPHS OF THE PPC BREAKER PANEL; CLOSE–UP PHOTOGRAPH OF THE INSIDE OF THE TELCO PANEL AND NIU; CLOSE–UP PHOTOGRAPH OF THE POWER METER AND DISCONNECT; PHOTOS OF POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE; PHOTOGRAPHS AT METER BOX AND/OR FACILITY DISTRIBUTION PANEL.
 8. REQUIRED MATERIALS CERTIFICATIONS: CONCRETE MIX DESIGNS; MILL CERTIFICATION FOR ALL REINFORCING AND STRUCTURAL STEEL; AND ASPHALT PAVING MIX DESIGN.
 9. ANY AND ALL SUBMITTALS BY THE JURISDICTION OR COMPANY.

SECTION 01 500 - PROJECT REPORTING

PART 1 – GENERAL

1.1 **THE WORK:** THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 **RELATED DOCUMENTS:**

- A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.
- B. SPRINT “STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES” ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 **WEEKLY REPORTS:**

- A. CONTRACTOR SHALL PROVIDE SPRINT WITH WEEKLY REPORTS SHOWING PROJECT STATUS. THIS STATUS REPORT FORMAT WILL BE PROVIDED TO THE CONTRACTOR BY SPRINT. THE REPORT WILL CONTAIN SITE ID NUMBER, THE MILESTONES FOR EACH SITE, INCLUDING THE BASELINE DATE, ESTIMATED COMPLETION DATE AND ACTUAL COMPLETION DATE.
- B. REPORT INFORMATION WILL BE TRANSMITTED TO SPRINT VIA ELECTRONIC MEANS AS REQUIRED. THIS INFORMATION WILL PROVIDE A BASIS FOR PROGRESS MONITORING AND PAYMENT.

3.2 **PROJECT CONFERENCE CALLS:**

- A. SPRINT MAY HOLD WEEKLY PROJECT CONFERENCE CALLS. CONTRACTOR WILL BE REQUIRED TO COMMUNICATE SITE STATUS, MILESTONE COMPLETIONS AND UPCOMING MILESTONE PROJECTIONS, AND ANSWER ANY OTHER SITE STATUS QUESTIONS AS NECESSARY.

3.3 **PROJECT TRACKING IN SMS:**

- A. CONTRACTOR SHALL PROVIDE SCHEDULE UPDATES AND PROJECTIONS IN THE SMS SYSTEM ON A WEEKLY BASIS.

3.4 **ADDITIONAL REPORTING:**

- A. ADDITIONAL OR ALTERNATE REPORTING REQUIREMENTS MAY BE ADDED TO THE REPORT AS DETERMINED TO BE REASONABLY NECESSARY BY COMPANY.

3.5 **PROJECT PHOTOGRAPHS:**

- A. FILE DIGITAL PHOTOGRAPHS OF COMPLETED SITE IN JPEG FORMAT IN THE SMS PHOTO LIBRARY FOR THE RESPECTIVE SITE. PHOTOGRAPHS SHALL BE CLEARLY LABELED WITH SITE NUMBER, NAME AND DESCRIPTION, AND SHALL INCLUDE AT A MINIMUM THE FOLLOWING AS APPLICABLE:
 1. SHELTER AND TOWER OVERVIEW.
 2. TOWER FOUNDATION(S) – FORMS AND STEEL BEFORE POUR (EACH ANCHOR ON GUYED TOWERS).
 3. TOWER FOUNDATION(S) POUR WITH VIBRATOR IN USE (EACH ANCHOR ON GUYED TOWERS).
 4. TOWER STEEL AS BEING INSTALLED INTO HOLE (SHOW ANCHOR STEEL ON GUYED TOWERS).
 5. PHOTOS OF TOWER SECTION STACKING.
 6. CONCRETE TESTING / SAMPLES.
 7. PLACING OF ANCHOR BOLTS IN TOWER FOUNDATION.
 8. BUILDING/WATER TANK FROM ROAD FOR TENANT IMPROVEMENTS OR COMMENTS.
 9. SHELTER FOUNDATION––FORMS AND STEEL BEFORE POURING.
 10. SHELTER FOUNDATION POUR WITH VIBRATOR IN USE.
 11. COAX CABLE ENTRY INTO SHELTER.
 12. PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
 13. ROOFTOP PRE AND POST CONSTRUCTION PHOTOS TO INCLUDE PENETRATIONS AND INTERIOR CEILING.
 14. PHOTOS OF TOWER TOP COAX LINE COLOR CODING AND COLOR CODING AT GROUND LEVEL.
 15. PHOTOS OF ALL APPROPRIATE COMPANY OR REGULATORY SIGNAGE.
 16. PHOTOS OF EQUIPMENT BOLT DOWN INSIDE SHELTER.
 17. POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE AND POWER AND TELCO SUPPLY LOCATIONS INCLUDING METER/DISCONNECT.
 18. ELECTRICAL TRENCH(S) WITH ELECTRICAL / CONDUIT BEFORE BACKFILL.
 19. ELECTRICAL TRENCH(S) WITH FOIL–BACKED TAPE BEFORE FURTHER BACKFILL.
 20. TELCO TRENCH WITH TELEPHONE / CONDUIT BEFORE BACKFILL.
 21. TELCO TRENCH WITH FOIL–BACKED TAPE BEFORE FURTHER BACKFILL.
 22. SHELTER GROUND–RING TRENCH WITH GROUND–WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
 23. TOWER GROUND–RING TRENCH WITH GROUND–WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
 24. FENCE GROUND–RING TRENCH WITH GROUND–WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
 25. ALL BTS GROUND CONNECTIONS.
 26. ALL GROUND TEST WELLS.
 27. ANTENNA GROUND BAR AND EQUIPMENT GROUND BAR.
 28. ADDITIONAL GROUNDING POINTS ON TOWERS ABOVE 200’.
 29. HVAC UNITS INCLUDING CONDENSERS ON SPLIT SYSTEMS.
 30. GPS ANTENNAS.
 31. CABLE TRAY AND/OR WAVEGUIDE BRIDGE.
 32. DOGHOUSE/CABLE EXIT FROM ROOF.
 33. EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA.
 34. MASTER BUS BAR.
 35. TELCO BOARD AND NIU.
 36. ELECTRICAL DISTRIBUTION WALL.
 37. CABLE ENTRY WITH SURGE SUPPRESSION.
 38. ENTRANCE TO EQUIPMENT ROOM.
 39. COAX WEATHERPROOFING–TOP AND BOTTOM OF TOWER.
 40. COAX GROUNDING –TOP AND BOTTOM OF TOWER.
 41. ANTENNA AND MAST GROUNDING.
 42. LANDSCAPING – WHERE APPLICABLE.

3.6 **FINAL PROJECT ACCEPTANCE:** COMPLETE ALL REQUIRED REPORTING TASKS PER CONTRACT, CONTRACT DOCUMENTS OR THE SPRINT INTEGRATED CONSTRUCTION STANDARDS FOR WIRELESS SITES AND UPLOAD INTO SITERRA.

SECTION 07 500 - ROOF CUTTING, PATCHING AND REPAIR

SUMMARY:

THIS SECTION SPECIFIES CUTTING AND PATCHING EXISTING ROOFING SYSTEMS WHERE CONDUIT OR CABLES EXIT THE BUILDING ONTO THE ROOF OR BUILDING–MOUNTED ANTENNAS, AND AS REQUIRED FOR WATERTIGHT PERFORMANCE. ROOFTOP ENTRY OPENINGS IN MEMBRANE ROOFTOPS SHALL BE CONSTRUCTED TO COMPLY WITH LANDLORD, ANY EXISTING WARRANTY, AND LOCAL JURISDICTIONAL STANDARDS.

1.4 **SUBMITTALS:**

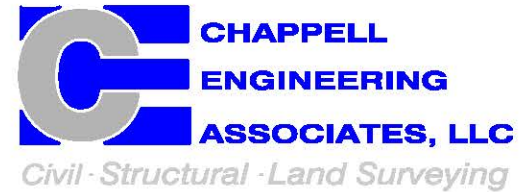
- A. **PRE–CONSTRUCTION ROOF PHOTOS:** COMPLETE A ROOF INSPECTION PRIOR TO THE INSTALLATION OF SPRINT EQUIPMENT ON ANY ROOFTOP BUILD. AT A MINIMUM INSPECT AND PHOTOGRAPH (MINIMUM 3 EA.) ALL AREAS IMPACTED BY THE ADDITION OF THE SPRINT EQUIPMENT.
- B. PROVIDE SIMILAR PHOTOGRAPHS SHOWING ROOF CONDITIONS AFTER CONSTRUCTION (MINIMUM 3 EA.)
- C. ROOF INSPECTION PHOTOGRAPHS SHOULD BE UPLOADED WITH CLOSEOUT PHOTOGRAPHS.



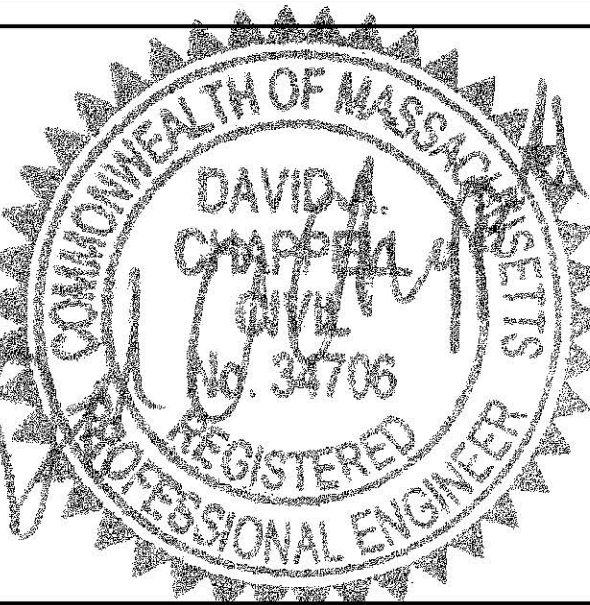
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SUBMITTALS			
REV.	DATE	DESCRIPTION	BY
5	03/06/19	CONSTRUCTION REVISED	CNC
4	02/19/19	CONSTRUCTION REVISED	CNC
3	11/13/18	CONSTRUCTION REVISED	JRY
2	10/19/18	CONSTRUCTION REVISED	CNC
1	07/11/18	ISSUED FOR CONSTRUCTION	CNC
0	06/22/18	ISSUED FOR REVIEW	CNC

SITE NUMBER:
BS60XC003

SITE NAME:
ELI

SITE ADDRESS:
284 NORFOLK STREET
CAMBRIDGE, MA 02139

SHEET TITLE

OUTLINE SPECIFICATIONS

SHEET NUMBER

SP-2

CONTINUED FROM SP-2:

SECTION 09 900 - PAINTING

QUALITY ASSURANCE:

- A. COMPLY WITH GOVERNING CODES AND REGULATIONS. PROVIDE PRODUCTS OF ACCEPTABLE MANUFACTURERS WHICH HAVE BEEN IN SATISFACTORY USE IN SIMILAR SERVICE FOR THREE YEARS. USE EXPERIENCED INSTALLERS. DELIVER, HANDLE, AND STORE MATERIALS IN ACCORDANCE WITH MANUFACTURER’S INSTRUCTIONS.
- B. COMPLY WITH ALL ENVIRONMENTAL REGULATIONS FOR VOLATILE ORGANIC COMPOUNDS.

MATERIALS:

- A. MANUFACTURERS: BENJAMIN MOORE, ICI DEVOE COATINGS, PPG, SHERWIN WILLIAMS OR APPROVED EQUAL. PROVIDE PREMIUM GRADE, PROFESSIONAL–QUALITY PRODUCTS FOR COATING SYSTEMS.

PAINT SCHEDULE:

- A. EXTERIOR ANTENNAE AND ANTENNA MOUNTING HARDWARE: ONE COAT OF PRIMER AND TWO FINISH COATS. PAINT FOR ANTENNAE SHALL BE NON–METALLIC BASED AND CONTAIN NO METALLIC PARTICLES. PROVIDE COLORS AND PATTERNS AS REQUIRED TO MASK APPEARANCE OF ANTENNAE ON ADJACENT BUILDING SURFACES AND AS ACCEPTABLE TO THE OWNER. REFER TO ANTENNA MANUFACTURER’S INSTRUCTIONS WHENEVER POSSIBLE.
- B. ROOF TOP CONSTRUCTION: TOUCH UP – PREPARE SURFACES TO BE REPAIRED. FOLLOW INDUSTRY STANDARDS AND REQUIREMENTS OF OWNER TO MATCH EXISTING COATING AND FINISH.

PAINTING APPLICATION:

1. INSPECT SURFACES, REPORT UNSATISFACTORY CONDITIONS IN WRITING; BEGINNING WORK MEANS ACCEPTANCE OF SUBSTRATE.
2. COMPLY WITH MANUFACTURER’S INSTRUCTIONS AND RECOMMENDATIONS FOR PREPARATION, PRIMING AND COATING WORK. COORDINATE WITH WORK OF OTHER SECTIONS.
3. MATCH APPROVED MOCK–UPS FOR COLOR, TEXTURE, AND PATTERN. RE–COAT OR REMOVE AND REPLACE WORK WHICH DOES NOT MATCH OR SHOWS LOSS OF ADHESION.
4. CLEAN UP, TOUCH UP AND PROTECT WORK.

TOUCHUP PAINTING:

1. GALVANIZING DAMAGE AND ALL BOLTS AND NUTS SHALL BE TOUCHED UP AFTER TOWER ERECTION WITH “GALVANOX,” “DRY GALV,” OR “ZINC–IT.”
2. FIELD TOUCHUP PAINT SHALL BE DONE IN ACCORDANCE WITH THE MANUFACTURER’S WRITTEN INSTRUCTIONS.
3. ALL METAL COMPONENTS SHALL BE HANDLED WITH CARE TO PREVENT DAMAGE TO THE COMPONENTS, THEIR PRESERVATIVE TREATMENT, OR THEIR PROTECTIVE COATINGS.

SECTION 11 700 - ANTENNA ASSEMBLY, REMOTE RADIO HEADS AND CABLE INSTALLATION

SUMMARY:

THIS SECTION SPECIFIES INSTALLATION OF ANTENNAS, RRH’S, AND CABLE EQUIPMENT, INSTALLATION, AND TESTING OF COAXIAL FIBER CABLE.

ANTENNAS AND RRH’S:

THE NUMBER AND TYPE OF ANTENNAS AND RRH’S TO BE INSTALLED IS DETAILED ON THE CONSTRUCTION DRAWINGS.

HYBRID CABLE:

HYBRID CABLE WILL BE DC/FIBER AND FURNISHED FOR INSTALLATION AT EACH SITE. CABLE SHALL BE INSTALLED PER THE CONSTRUCTION DRAWINGS AND THE APPLICABLE MANUFACTURER’S REQUIREMENTS.

JUMPERS AND CONNECTORS:

FURNISH AND INSTALL 1/2” COAX JUMPER CABLES BETWEEN THE RRH’S AND ANTENNAS. JUMPERS SHALL BE TYPE LDF 4, FLC 12–50, CR 540, OR FXL 540. SUPER–FLEX CABLES ARE NOT ACCEPTABLE. JUMPERS BETWEEN THE RRH’S AND ANTENNAS OR TOWER TOP AMPLIFIERS SHALL CONSIST OF 1/2 INCH FOAM DIELECTRIC, OUTDOOR RATED COAXIAL CABLE. DO NOT USE SUPERFLEX OUTDOORS. JUMPERS SHALL BE FACTORY FABRICATED IN APPROPRIATE LENGTHS WITH A MAXIMUM OF 4 FEET EXCESS PER JUMPER AND HAVE CONNECTORS AT EACH END, MANUFACTURED BY SUPPLIER. IF JUMPERS ARE FIELD FABRICATED, FOLLOW MANUFACTURER’S REQUIREMENTS FOR INSTALLATION OF CONNECTORS

REMOTE ELECTRICAL TILT (RET) CABLES:

MISCELLANEOUS:

INSTALL SPLITTERS, COMBINERS, FILTERS PER RF DATA SHEET, FURNISHED BY SPRINT.

ANTENNA INSTALLATION:

THE CONTRACTOR SHALL ASSEMBLE ALL ANTENNAS ONSITE IN ACCORDANCE WITH THE INSTRUCTIONS SUPPLIED BY THE MANUFACTURER. ANTENNA HEIGHT, AZIMUTH, AND FEED ORIENTATION INFORMATION SHALL BE A DESIGNATED ON THE CONSTRUCTION DRAWINGS.

- A. THE CONTRACTOR SHALL POSITION THE ANTENNA ON TOWER PIPE MOUNTS SO THAT THE BOTTOM STRUT IS LEVEL. THE PIPE MOUNTS SHALL BE PLUMB TO WITHIN 1 DEGREE.
- B. ANTENNA MOUNTING REQUIREMENTS: PROVIDE ANTENNA MOUNTING HARDWARE AS INDICATED ON THE DRAWINGS.

HYBRID CABLES INSTALLATION:

- A. THE CONTRACTOR SHALL ROUTE, TEST, AND INSTALL ALL CABLES AS INDICATED ON THE CONSTRUCTION DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER’S RECOMMENDATIONS.
- B. THE INSTALLED RADIUS OF THE CABLES SHALL NOT BE LESS THAN THE MANUFACTURER’S SPECIFICATIONS FOR BENDING RADII.
- C. EXTREME CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE CABLES DURING HANDLING AND INSTALLATION.
1. FASTENING MAIN HYBRID CABLES: ALL CABLES SHALL BE PERMANENTLY FASTENED TO THE COAX LADDER AT 4’–0” OC USING NON–MAGNETIC STAINLESS STEEL CLIPS.
2. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA), WITHIN THE MMBTS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES:
- a. FIBER: SUPPORT FIBER BUNDLES USING ½” VELCRO STRAPS OF THE REQUIRED LENGTH @ 18” OC. STRAPS SHALL BE UV, OIL AND WATER RESISTANT AND SUITABLE FOR INDUSTRIAL INSTALLATIONS AS MANUFACTURED BY TEXTOL OR APPROVED EQUAL.
- b. DC: SUPPORT DC BUNDLES WITH ZIP TIES OF THE ADEQUATE LENGTH. ZIP TIES TO BE UV STABILIZED, BLACK NYLON, WITH TENSILE STRENGTH AT 12,000 PSI AS MANUFACTURED BY NELCO PRODUCTS OR EQUAL.

3. FASTENING JUMPERS: SECURE JUMPERS TO THE SIDE ARMS OR HEAD FRAMES USING STAINLESS STEEL TIE WRAPS OR STAINLESS STEEL BUTTERFLY CLIPS.
4. CABLE INSTALLATION:
- a. INSPECT CABLE PRIOR TO USE FOR SHIPPING DAMAGE, NOTIFY THE CONSTRUCTION MANAGER.
- b. CABLE ROUTING: CABLE INSTALLATION SHALL BE PLANNED TO ENSURE THAT THE LINES WILL BE PROPERLY ROUTED IN THE CABLE ENVELOP AS INDICATED ON THE DRAWINGS. AVOID TWISTING AND CROSSOVERS.
- c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURES RECOMMENDED MAXIMUM BEND RADIUS.
5. GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.
6. HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED PER SPRINT TS–0200 CURRENT VERSION.
7. HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA–NUMERICALLY ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE – EN 2012–001, REV1

WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:

- A. ALL FIBER & COAX CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED.
- B. WEATHERPROOFED USING ONE OF THE FOLLOWING METHODS. ALL INSTALLATIONS MUST BE DONE IN ACCORDANCE WITH THE MANUFACTURER’S RECOMMENDATIONS AND INDUSTRY BEST PRACTICES.
1. COLD SHRINK: ENCOMPASS CONNECTOR IN COLD SHRINK TUBING AND PROVIDE A DOUBLE WRAP OF 2” ELECTRICAL TAPE EXTENDING 2” BEYOND TUBING. PROVIDE 3M COLD SHRINK CXS SERIES OR EQUAL.
2. SELF–AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF–AMALGAMATING TAPE 2” BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF–AMALGAMATING TAPE IN OPPOSITE DIRECTION. APPLY DOUBLE WRAP OF 2” WIDE ELECTRICAL TAPE EXTENDING 2” BEYOND THE SELF–AMALGAMATING TAPE.
3. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.
4. OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE

SECTION 11 800 - INSTALLATION OF MULTIMODAL BASE STATIONS (MMBTS) AND RELATED EQUIPMENT

SUMMARY:

- A. THIS SECTION SPECIFIES MMBTS CABINETS, POWER CABINETS, AND INTERNAL EQUIPMENT INCLUDING BY NOT LIMITED TO RECTIFIERS, POWER DISTRIBUTION UNITS, BASE BAND UNITS, SURGE ARRESTORS, BATTERIES, AND SIMILAR EQUIPMENT FURNISHED BY THE COMPANY FOR INSTALLATION BY THE CONTRACTOR (OFCI).
- B. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS MATERIALS AND PROVIDE ALL LABOR REQUIRED FOR INSTALLATION EQUIPMENT IN EXISTING CABINET OR NEW CABINET AS SHOWN ON DRAWINGS AND AS REQUIRE BY THE APPLICABLE INSTALLATION MOPS.
- C. COMPLY WITH MANUFACTURERS INSTALLATION AND START–UP REQUIREMENTS

DC CIRCUIT BREAKER LABELING

- A. LABEL CIRCUIT BREAKERS ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE – EN 2012–001, REV 1.

SECTION 11 800 - INSTALLATION OF MULTIMODAL BASE TRANSCEIVER STATIONS (MMBTS) AND RELATED EQUIPMENT

SUMMARY:

- A. THIS SECTION SPECIFIES MMBTS CABINETS, POWER CABINETS, AND INTERNAL EQUIPMENT INCLUDING BY NOT LIMITED TO RECTIFIERS, POWER DISTRIBUTION UNITS, BASE BAND UNITS, SURGE ARRESTORS, BATTERIES, AND SIMILAR EQUIPMENT FURNISHED BY THE COMPANY FOR INSTALLATION BY THE CONTRACTOR (OFCI).
- B. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS MATERIALS AND PROVIDE ALL LABOR REQUIRED FOR INSTALLATION EQUIPMENT IN EXISTING CABINET OR NEW CABINET AS SHOWN ON DRAWINGS AND AS REQUIRE BY THE APPLICABLE INSTALLATION MOPS.
- C. COMPLY WITH MANUFACTURERS INSTALLATION AND START–UP REQUIREMENTS

SUPPORTING DEVICES:

- A. MANUFACTURED STRUCTURAL SUPPORT MATERIALS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY THE FOLLOWING:
1. ALLIED TUBE AND CONDUIT
2. B–LINE SYSTEM
3. UNISTRUT DIVERSIFIED PRODUCTS
4. THOMAS & BETTS
- B. FASTENERS: TYPES, MATERIALS, AND CONSTRUCTION FEATURES AS FOLLOWS:
1. EXPANSION ANCHORS: CARBON STEEL WEDGE OR SLEEVE TYPE.
2. POWER–DRIVEN THREADED STUDS: HEAT–TREATED STEEL, DESIGNED SPECIFICALLY FOR THE INTENDED SERVICE.
3. FASTEN BY MEANS OF WOOD SCREWS ON WOOD.
4. TOGGLE BOLTS ON HOLLOW MASONRY UNITS.
5. CONCRETE INSERTS OR EXPANSION BOLTS ON CONCRETE OR SOLID MASONRY.
6. MACHINE SCREWS, WELDED THREADED STUDS, OR SPRING–TENSION CLAMPS ON STEEL.
7. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE SHALL NOT BE PERMITTED.
8. DO NOT WELD CONDUIT, PIPE STRAPS, OR ITEMS OTHER THAN THREADED STUDS TO STEEL STRUCTURES.
9. IN PARTITIONS OF LIGHT STEEL CONSTRUCTION, USE SHEET METAL SCREWS.

SUPPORTING DEVICES:

- A. INSTALL SUPPORTING DEVICES TO FASTEN ELECTRICAL COMPONENTS SECURELY AND PERMANENTLY IN ACCORDANCE WITH NEC.
- B. COORDINATE WITH THE BUILDING STRUCTURAL SYSTEM AND WITH OTHER TRADES.
- C. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTING HARDWARE SECURELY TO THE STRUCTURE IN ACCORDANCE WITH THE FOLLOWING:
- D. ENSURE THAT THE LOAD APPLIED BY ANY FASTENER DOES NOT EXCEED 25 PERCENT OF THE PROOF TEST LOAD.
- E. USE VIBRATION AND SHOCK–RESISTANT FASTENERS FOR ATTACHMENTS TO CONCRETE SLABS.

ELECTRICAL IDENTIFICATION:

- A. UPDATE AND PROVIDE TYPED CIRCUIT BREAKER SCHEDULES IN THE MOUNTING BRACKET, INSIDE DOORS OF AC PANEL BOARDS WITH ANY CHANGES MADE TO THE AC SYSTEM.
- B. BRANCH CIRCUITS FEEDING AVIATION OBSTRUCTION LIGHTING EQUIPMENT SHALL BE CLEARLY IDENTIFIED AS SUCH AT THE BRANCH CIRCUIT PANELBOARD.

SECTION 26 200 - ELECTRICAL MATERIALS AND EQUIPMENT

CONDUIT:

- A. RIGID GALVANIZED STEEL (RGS) CONDUIT SHALL BE USED FOR EXTERIOR LOCATIONS ABOVE GROUND AND IN UNFINISHED INTERIOR LOCATIONS AND FOR ENCASED RUNS IN CONCRETE. RIGID CONDUIT AND FITTINGS SHALL BE STEEL, COATED WITH ZINC EXTERIOR AND INTERIOR BY THE HOT DIP GALVANIZING PROCESS. CONDUIT SHALL BE PRODUCED TO ANSI SPECIFICATIONS C80.1, FEDERAL SPECIFICATION WW–C–581 AND SHALL BE LISTED WITH THE UNDERWRITERS’ LABORATORIES. FITTINGS SHALL BE THREADED – SET SCREW OR COMPRESSION FITTINGS WILL NOT BE ACCEPTABLE. RGS CONDUITS SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND.
- B. UNDERGROUND CONDUIT IN CONCRETE SHALL BE POLYVINYLCHLORIDE (PVC) SUITABLE FOR DIRECT BURIAL AS APPLICABLE. JOINTS SHALL BE BELLED, AND FLUSH SOLVENT WELDED IN ACCORDANCE WITH MANUFACTURER’S INSTRUCTIONS. CONDUIT SHALL BE CARLON ELECTRICAL PRODUCTS OR APPROVED EQUAL.
- C. TRANSITIONS BETWEEN PVC AND RIGID (RGS) SHALL BE MADE WITH PVC COATED METALLIC LONG SWEEP RADIUS ELBOWS.
- D. EMT OR RIGID GALVANIZED STEEL CONDUIT MAY BE USED IN FINISHED SPACES CONCEALED IN WALLS AND CEILINGS. EMT SHALL BE MILD STEEL, ELECTRICALLY WELDED, ELECTRO–GALVANIZED OR HOT–DIPPED GALVANIZED AND PRODUCED TO ANSI SPECIFICATION C80.3, FEDERAL SPECIFICATION WW–C–563, AND SHALL BE UL LISTED. EMT SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND, OR APPROVED EQUAL. FITTINGS SHALL BE METALLIC COMPRESSION. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE.
- E. LIQUID TIGHT FLEXIBLE METALLIC CONDUIT SHALL BE USED FOR FINAL CONNECTION TO EQUIPMENT. FITTINGS SHALL BE METALLIC GLAND TYPE COMPRESSION FITTINGS, MAINTAINING THE INTEGRITY OF CONDUIT SYSTEM. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE. MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL NOT EXCEED 6–FEET. LFMC SHALL BE PROTECTED AND SUPPORTED AS REQUIRE BY NEC. MANUFACTURERS OF FLEXIBLE CONDUITS SHALL BE CAROL, ANACONDA METAL HOSE OR UNIVERSAL METAL HOSE, OR APPROVED EQUAL.
- F. MINIMUM SIZE CONDUIT SHALL BE 3/4 INCH (21MM).

HUBS AND BOXES:

- A. AT ENTRANCES TO CABINETS OR OTHER EQUIPMENT NOT HAVING INTEGRAL THREADED HUBS PROVIDE METALLIC THREADED HUBS OF THE SIZE AND CONFIGURATION REQUIRED. HUB SHALL INCLUDE LOCKNUT AND NEOPRENE O–RING SEAL. PROVIDE IMPACT RESISTANT 105 DEGREE C PLASTIC BUSHINGS TO PROTECT CABLE INSULATION.
- B. CABLE TERMINATION FITTINGS FOR CONDUIT
1. CABLE TERMINATORS FOR RGS CONDUITS SHALL BE TYPE CRC BY O–Z/GEDNEY OR EQUAL.
2. CABLE TERMINATORS FOR LFMC SHALL BE ETCO – CL2075; OR MADE FOR THE PURPOSE PRODUCTS BY ROXTEC.
- C. EXTERIOR PULL BOXES AND PULL BOXES IN INTERIOR INDUSTRIAL AREAS SHALL BE PLATED CAST ALLOY, HEAVY DUTY, WEATHERPROOF, DUST PROOF, WITH GASKET, PLATED IRON ALLOY COVER AND STAINLESS STEEL COVER SCREWS, CROUSE–HINDS WAB SERIES OR EQUAL.
- D. CONDUIT OUTLET BODIES SHALL BE PLATED CAST ALLOY WITH SIMILAR GASKETED COVERS. OUTLET BODIES SHALL BE OF THE CONFIGURATION AND SIZE SUITABLE FOR THE APPLICATION. PROVIDE CROUSE–HINDS FORM 8 OR EQUAL.
- E. MANUFACTURER FOR BOXES AND COVERS SHALL BE HOFFMAN, SQUARE “D”, CROUSE–HINDS, COOPER, ADALET, APPLETON, O–Z GEDNEY, RACO, OR APPROVED EQUAL.

SUPPLEMENTAL GROUNDING SYSTEM

- A. FURNISH AND INSTALL A SUPPLEMENTAL GROUNDING SYSTEM AS INDICATED ON THE DRAWINGS. SUPPORT SYSTEM WITH NON–MAGNETIC STAINLESS STEEL CLIPS WITH RUBBER GROMMETS. GROUNDING CONNECTORS SHALL BE TINNED COPPER WIRE, SIZES AS INDICATED ON THE DRAWINGS. PROVIDE STRANDED OR SOLID BARE OR INSULATED CONDUCTORS AS INDICATED.
- B. SUPPLEMENTAL GROUNDING SYSTEM: ALL CONNECTIONS TO BE MADE WITH CAD WELDS, EXCEPT AT EQUIPMENT USE LUGS OR OTHER AVAILABLE GROUNDING MEANS AS REQUIRED BY MANUFACTURER; AT GROUND BARS USE TWO HOLE SPADES WITH NO OX.
- C. STOLEN GROUND–BARS: IN THE EVENT OF STOLEN GROUND BARS, CONTACT SPRINT CM FOR REPLACEMENT INSTRUCTION USING THREADED ROD KITS.

EXISTING STRUCTURE:

- A. EXISTING EXPOSED WIRING AND ALL EXPOSED OUTLETS, RECEPTACLES, SWITCHES, DEVICES, BOXES, AND OTHER EQUIPMENT THAT ARE NOT TO BE UTILIZED IN THE COMPLETED PROJECT SHALL BE REMOVED OR DE–ENERGIZED AND CAPPED IN THE WALL, CEILING, OR FLOOR SO THAT THEY ARE CONCEALED AND SAFE. WALL, CEILING, OR FLOOR SHALL BE PATCHED TO MATCH THE ADJACENT CONSTRUCTION.

CONDUIT AND CONDUCTOR INSTALLATION:

- A. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON–PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
- B. CONDUCTORS SHALL BE PULLED IN ACCORDANCE WITH ACCEPTED GOOD PRACTICE.



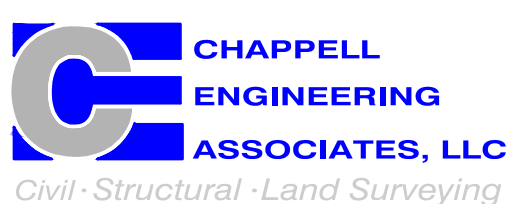
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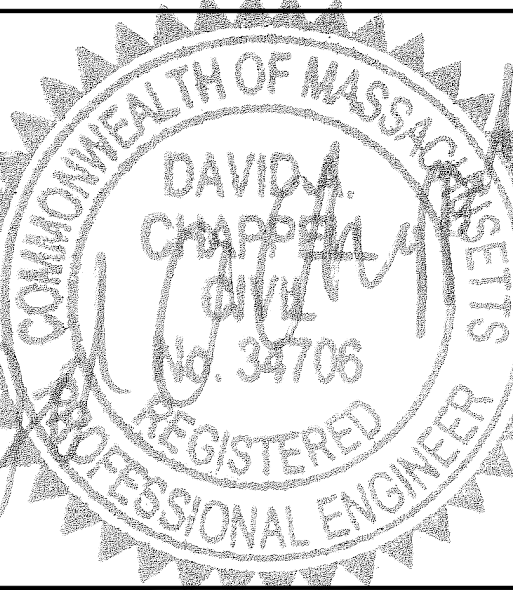
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5	03/06/19	CONSTRUCTION REVISED	CMC
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3	11/13/18	CONSTRUCTION REVISED	JRV
2	10/19/18	CONSTRUCTION REVISED	CMC
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SITE NUMBER:
BS60XC003

SITE NAME:
ELI

SITE ADDRESS:
284 NORFOLK STREET
CAMBRIDGE, MA 02139

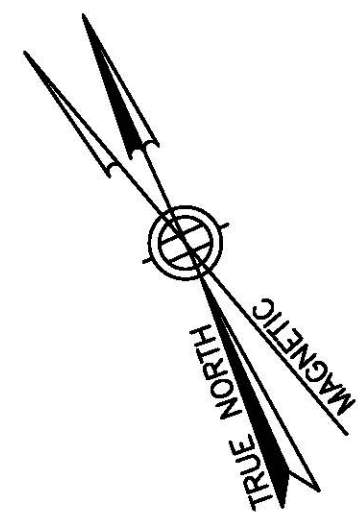
SHEET TITLE

OUTLINE SPECIFICATIONS

SHEET NUMBER

SP-3

1725.075



ALPHA SECTOR
INSTALL SPRINT 2500MHz ANTENNA
TO EXIST. PIPE MOUNT ON EXIST.
BUILDING FACADE TO REPLACE
EXIST. PANEL ANTENNA (PAINT TO
MATCH EXIST. BUILDING FACADE)

2 3
A-3 A-6

ALPHA SECTOR
INSTALL SPRINT 800/1900MHz
ANTENNA TO EXIST. PIPE MOUNT ON
EXIST. BUILDING FACADE (PAINT TO
MATCH EXIST. BUILDING FACADE)

2 3
A-3 A-6

EXIST. CLEARWIRE DISH ANTENNA
FACADE MOUNTED TO EXIST. PENTHOUSE ON
EXIST. MOUNTS (TOTAL OF 2) (TO REMAIN)

EXIST. NEXTEL CABLE
TRAYS TO BE REMOVED

EXIST. AT&T ANTENNAS FACADE
MOUNTED TO EXIST. PENTHOUSE
BELOW SPRINT ANTENNAS

EXIST. LOWER
ROOF

EXIST. SPRINT GPS ANTENNA MOUNTED
TO EXIST. PENTHOUSE (TO REMAIN)

ALPHA SECTOR
EXIST. SPRINT 800MHz & 1900MHz
RRH'S FACADE MOUNTED TO EXIST.
PENTHOUSE (1 EACH, TOTAL OF 2)

EXIST. SPRINT (3) HYBRID TRUNK CABLES & (2)
1/2" COAX CABLES FOR DISH ANTENNAS ROUTED
WITHIN EXIST. CABLE TRAYS (TO REMAIN)

1
A-6
INSTALL (1) HYBRID TRUNK CABLE
WITHIN EXIST. CABLE TRAYS

3
A-1
INSTALL NEW EQUIPMENT
WITHIN EXIST. EQUIPMENT
AREA IN EXIST. BASEMENT.

2 4
A-3 A-6
BETA & GAMMA SECTORS
INSTALL SPRINT PCS/AWS DIPLEXERS
WITHIN NEW FAUX CHIMNEY
(4 PER SECTOR, TOTAL OF 8)

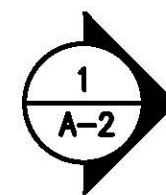
EXIST. AT&T ANTENNAS WITHIN EXIST.
CHIMNEY ON EXIST. STEEL FRAME

BETA & GAMMA SECTORS
EXIST. SPRINT 800MHz & 1900MHz RRH'S
RELOCATED TO PROP. BALLAST FRAMES
(1 EACH PER SECTOR, TOTAL OF 4)

2
A-3

ALL SECTORS
INSTALL SPRINT 800MHz & 2500MHz
RRH'S ON PROP. BALLAST FRAME
(1 EACH PER SECTOR, TOTAL OF 6)

2 2
A-3 A-6



ALL SECTORS
INSTALL RRH BALLAST FRAMES ON EXIST.
ROOF (1 PER SECTOR, TOTAL OF 3)

2
S-1

BETA & GAMMA SECTORS
FUTURE PANEL ANTENNAS WITHIN FAUX
CHIMNEY (1 PER SECTOR, TOTAL OF 2)

2
S-1

BETA & GAMMA SECTORS
INSTALL SPRINT 800/1900/2500MHz
ANTENNAS WITHIN NEW FAUX CHIMNEY
TO REPLACE EXIST. PANEL ANTENNAS
(1 PER SECTOR, TOTAL OF 2)

2 3
A-3 A-6

BETA & GAMMA SECTORS
INSTALL SPRINT 4'-6"x4'-6"x10'-0" H
FAUX CHIMNEYS ON EXIST. ROOF TO
REPLACE EXIST. BALLAST MOUNTED
FLUES (1 PER SECTOR, TOTAL OF 2)
(PAINT/TEXTURE TO MATCH EXIST.
BUILDING, CHIMNEYS AND/OR OTHER
ROOFTOP EQUIPMENT)

1 1
S-2 S-3

ALL SECTORS
EXIST. NEXTEL PANEL ANTENNAS
FACADE MOUNTED TO EXIST.
BUILDING TO BE REMOVED

NOTE:
ALL EXISTING SPRINT, NEXTEL &
CLEARWIRE ANTENNAS, RRH'S, MOUNTS
& BALLAST MOUNTED FLUES TO BE
REMOVED PRIOR TO CONSTRUCTION.

ROOF PLAN

SCALE: 1" = 10'-0"

0 5' 10' 20' 30'

1
A-1

EXIST. SPRINT (3) HYBRID TRUNK CABLES &
(2) 1/2" COAX CABLES FOR DISH ANTENNAS
ROUTED WITHIN EXIST. BUILDING (TO REMAIN)

EXIST. SPRINT FIBER DISTRIBUTION

EXIST. MMBS 9928
(TO BE REMOVED)

EXIST. STEEL PLATFORM

EXIST. PPC

POWER TELCO

EXIST. BATTERY CABINET

15'-0"

14'-0"

EXISTING EQUIPMENT PLAN

SCALE: 1/4" = 1'-0"

0 2' 4' 8' 12'

2
A-1

EXIST. FAUX CHIMNEYS
BY OTHERS

BETA
180°

EXIST. HVAC UNIT (TYP.)

EXIST. AT&T ANTENNAS WITHIN EXIST.
CHIMNEY ON EXIST. CHANNEL FRAME

EXIST. LOWER
ROOF

EXIST. SPRINT (3) HYBRID TRUNK CABLES &
(2) 1/2" COAX CABLES FOR DISH ANTENNAS
ROUTED WITHIN EXIST. BUILDING (TO REMAIN)

EXIST. SPRINT FIBER DISTRIBUTION

INSTALL (1) NEW BATTERY
STRING WITHIN EXIST. BATTERY
CABINET (IF REQUIRED)

2
A-7

INSTALL NEW LTE BBU 2.5GHz
RETROFIT KIT & RECTIFIERS
(IF REQUIRED) WITHIN PROP.
MM-BTS EQUIPMENT CABINET

1
A-7

INSTALL (1) MMBS 9927
(TO REPLACE MMBS 9928)

EXIST. STEEL PLATFORM

EXIST. 4' CHAIN-LINK GATE

EXIST. PPC

POWER TELCO

EXIST. BATTERY CABINET

15'-0"

14'-0"

PROPOSED EQUIPMENT PLAN

SCALE: 1/4" = 1'-0"

0 2' 4' 8' 12'

3
A-1

NOTE:
COORDINATE CABINET UPGRADE WITH
SPRINT CM. REPLACE EXIST. CABINET
WITH MMBS 9927 (IF REQ'D)

Sprint
VISION

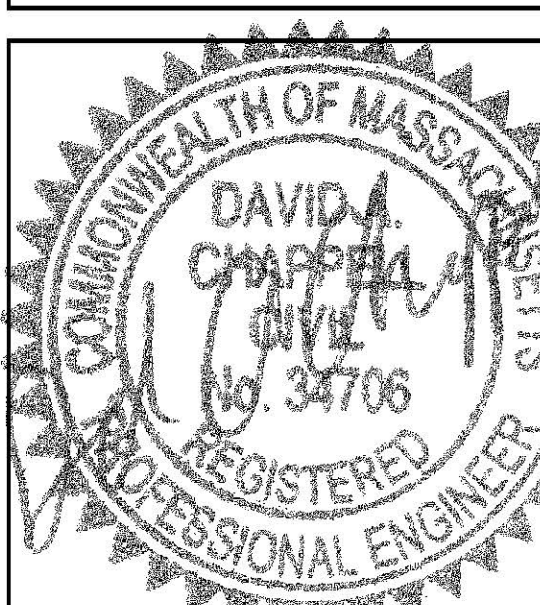
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REV.	DATE	DESCRIPTION	BY
5	03/06/19	CONSTRUCTION REVISED	CMC
4	02/19/19	CONSTRUCTION REVISED	CMC
3	11/13/18	CONSTRUCTION REVISED	JRV
2	10/19/18	CONSTRUCTION REVISED	CMC
1	07/11/18	ISSUED FOR CONSTRUCTION	CAW
0	06/22/18	ISSUED FOR REVIEW	CAW

SITE NUMBER:
BS60XC003

SITE NAME:
ELI

SITE ADDRESS:
284 NORFOLK STREET
CAMBRIDGE, MA 02139

SHEET TITLE

ROOF &
EQUIPMENT PLANS

SHEET NUMBER

A-1

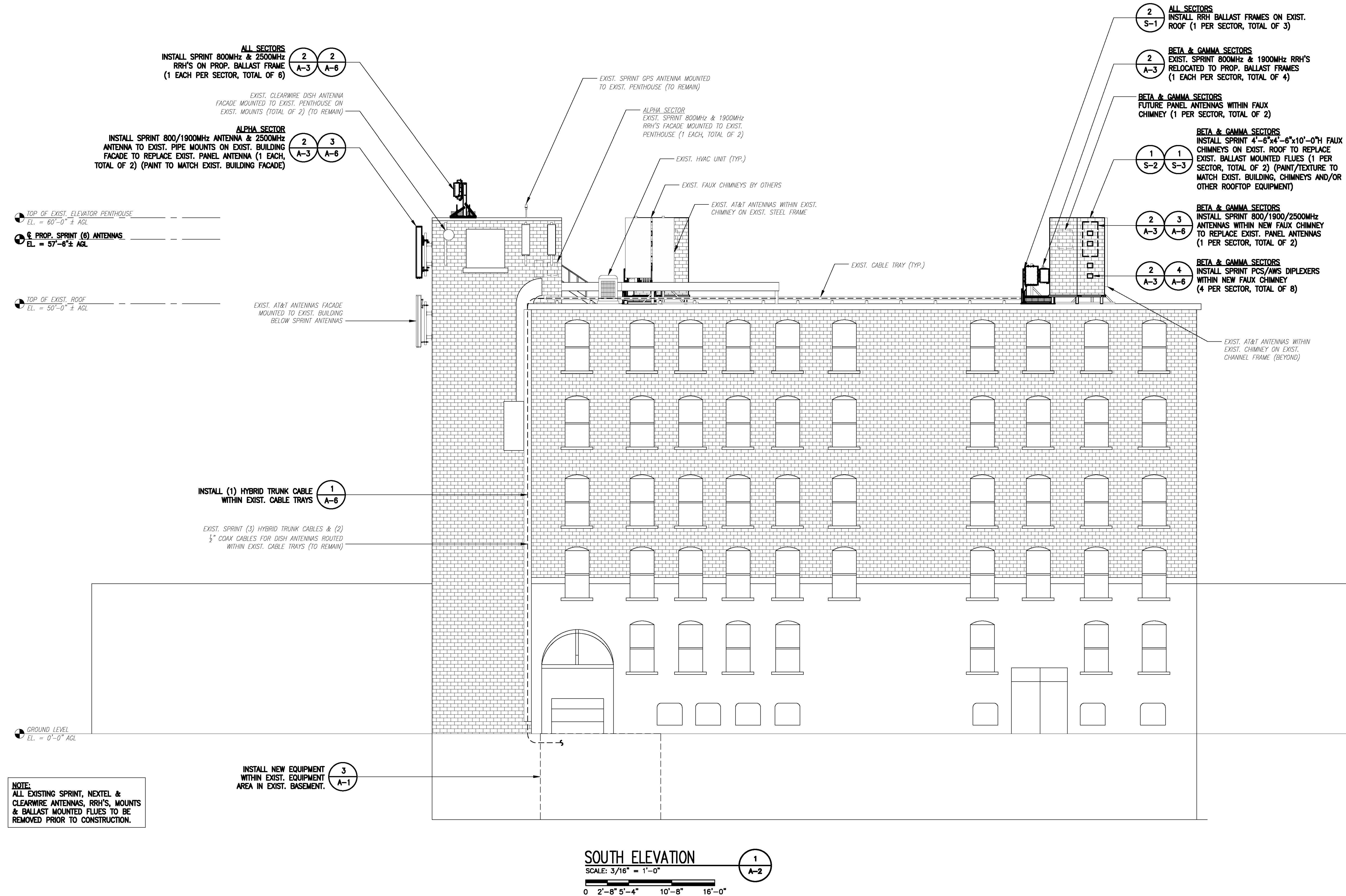
SPECIAL CONSTRUCTION NOTE:

SPRINT SITE WORK IS CONTINGENT ON THE FOLLOWING:

- * COMPLETION OF A GLOBAL STRUCTURAL STABILITY ANALYSIS (PROVIDED BY STRUCTURE OWNER OR A&E VENDOR).
- * COMPLETION OF AN ANTENNA/RRH MOUNT STRUCTURAL ASSESSMENT (PROVIDED BY A&E VENDOR).
- * GC SHALL FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS AS INDICATED IN BEFORE-MENTIONED ANALYSIS AND ASSESSMENT.

STRUCTURAL NOTE:

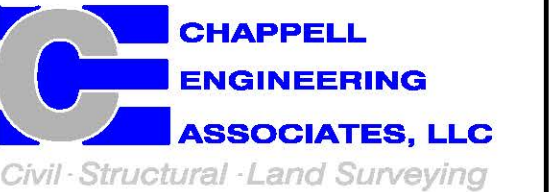
ADDITIONAL MAPPING AND STRUCTURAL ANALYSIS ARE REQUIRED PRIOR TO CONSTRUCTION. DRAWINGS ARE SUBJECT TO CHANGE PENDING OUTCOME OF STRUCTURAL ANALYSIS.



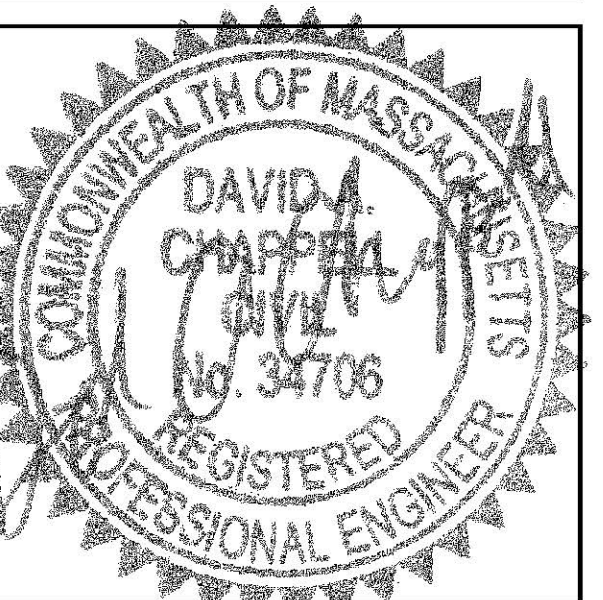
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(800) 357-7641



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SITE NAME:
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SITE ADDRESS:
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CAMBRIDGE, MA 02139

SHEET TITLE

ELEVATION

SHEET NUMBER

A-2

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* COMPLETION OF AN ANTENNA/RRH MOUNT STRUCTURAL ASSESSMENT (PROVIDED BY A&E VENDOR).
* GC SHALL FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS AS INDICATED IN BEFORE-MENTIONED ANALYSIS AND ASSESSMENT.

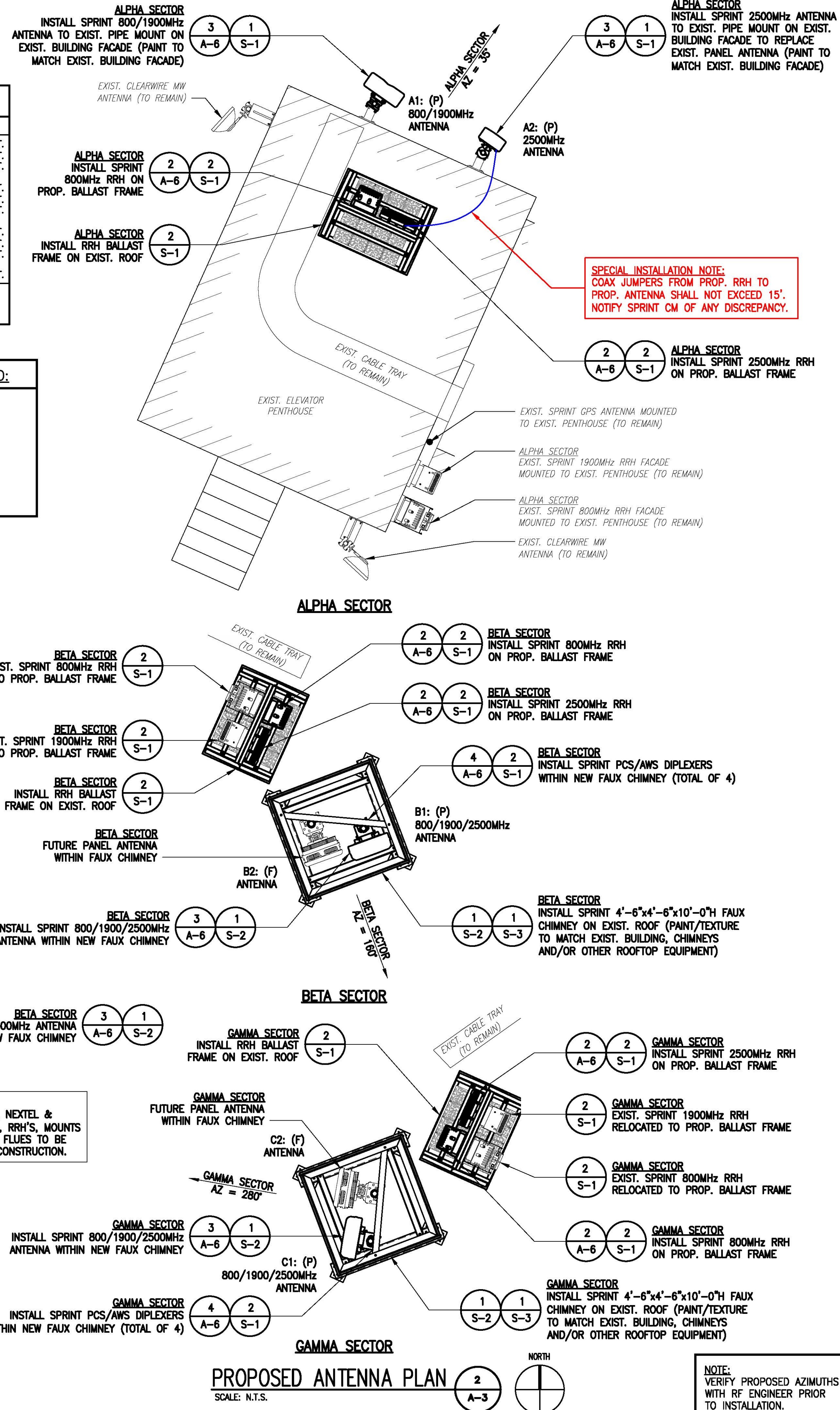
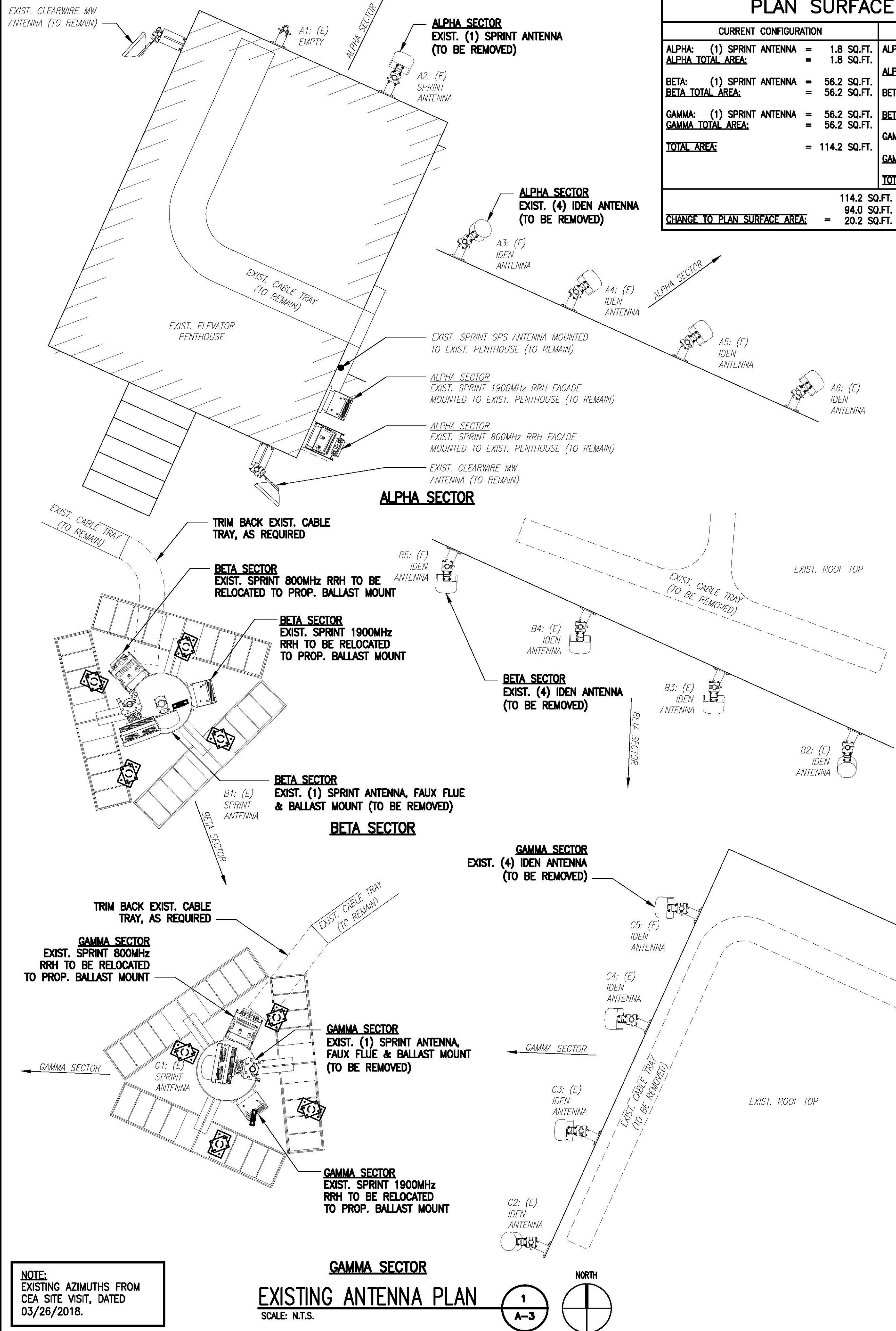
STRUCTURAL NOTE:
ADDITIONAL TOWER MAPPING AND STRUCTURAL ANALYSIS ARE REQUIRED PRIOR TO CONSTRUCTION. DRAWINGS ARE SUBJECT TO CHANGE PENDING OUTCOME OF STRUCTURAL ANALYSIS.

PLAN SURFACE AREA CHART

CURRENT CONFIGURATION	PROPOSED CONFIGURATION
ALPHA: (1) SPRINT ANTENNA = 1.8 SQ.FT. ALPHA TOTAL AREA: = 1.8 SQ.FT.	ALPHA: (2) SPRINT ANTENNAS = 14.0 SQ.FT. ALPHA: (1) RRU BALLAST FRAME = 12.0 SQ.FT. ALPHA TOTAL AREA: = 26.0 SQ.FT.
BETA: (1) SPRINT ANTENNA = 56.2 SQ.FT. BETA TOTAL AREA: = 56.2 SQ.FT.	BETA: (2) SPRINT ANTENNAS = 22.0 SQ.FT. BETA: (1) RRU BALLAST FRAME = 12.0 SQ.FT. BETA TOTAL AREA: = 34.0 SQ.FT.
GAMMA: (1) SPRINT ANTENNA = 56.2 SQ.FT. GAMMA TOTAL AREA: = 56.2 SQ.FT.	GAMMA: (2) SPRINT ANTENNAS = 22.0 SQ.FT. GAMMA: (1) RRU BALLAST FRAME = 12.0 SQ.FT. GAMMA TOTAL AREA: = 34.0 SQ.FT.
TOTAL AREA: = 114.2 SQ.FT.	TOTAL AREA: = 94.0 SQ.FT.
CHANGE TO PLAN SURFACE AREA: = 20.2 SQ.FT.	

ANTENNA STATUS LEGEND:

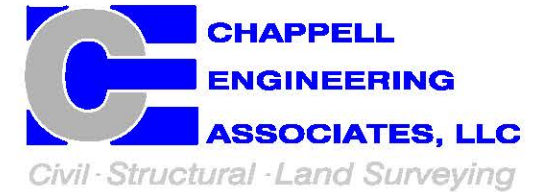
EMPTY - EMPTY PIPE
(E) - EXISTING
(P) - INSTALL
NV - SPRINT ANTENNA
2.5 - SPRINT ANTENNA



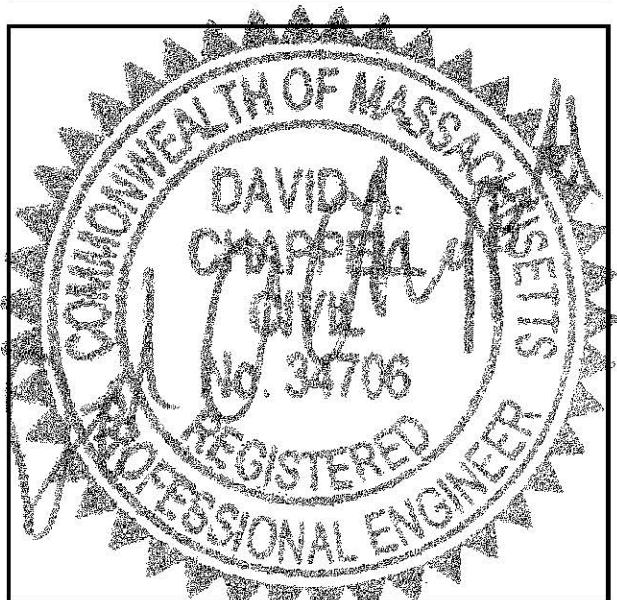
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SITE NUMBER:
BS60XC003

SITE NAME:
ELI

SITE ADDRESS:
284 NORFOLK STREET
CAMBRIDGE, MA 02139

SHEET TITLE

ANTENNA PLANS

SHEET NUMBER

A-3

Site Data	Region: Northeast	Market	Boston	Revision 3.0	Rev Date: 4-Mar-2019
	Cascade ID		BS60XC003	BTS OEM: ALU	RFDS Type: Preliminary
1900	Augment Import Code: SPDOMU01_DO_Macro_Upgrade		Augment: DO Macro Upgrade	Structure Type:	Rooftop
	Address: 284 Norfolk Street, Cambridge, MA, 02139		Sprint Eng. Name: Bill Hastings	Eng. Phone: 978-590-9700	
	Latitude: 42.37130601 Longitude: -71.09716716		Manager Name: Jonathan Hull	Manager Phone: 617-233-2920	
	Detailed RFDS Description:		RFE: Praveen Meesarapu	Praveen.Meesarapu@sprint.com	RFE Phone: 301-728-0006
	NV existing add 800/2.5 dual band, add 2nd 800 RRH, 2.5 RRH, 1 Hybrid; remove IDEN, CW leave CW MW (and associated cable)		Filter Analysis Complete: NO	Border Analysis Complete: YES	Channel Plan Complete: YES
		Alpha	Beta	Gamma	
	1900MHz_Azimuth	35	160	280	
	1900MHz_No_of_Antennas	1	1	1	
	1900MHz_RADCenter(ft)	60	57	57	
	1900MHz_Antenna Make	Commscope	CCI	CCI	
	1900MHz_Antenna Model	NNV-65B-R4	TPA65R-KE4DA-K	TPA65R-KE4DA-K	
	1900MHz_Horizontal_Beamwidth	60	0	0	
	1900MHz_Vertical_Beamwidth	6.4	0	0	
	1900MHz_Antenna Dimensions (in) & Weight (lbs)	72 x 19.6 x 7.8 77.4 (lbs)	48 x 21 x 7.8 52 (lbs)	48 x 21 x 7.8 52 (lbs)	
	1900MHz_AntennaGain(dBi)	17.7	0	0	
	1900MHz_M_Tilt	0	0	0	
	1900MHz_E_Tilt	3	3	3	
	1900_Effective_Tilt	3	3	3	
	1900MHz_Carrier_Forecast_Year_2018				
	1900MHz_RRH Manufacturer	ALU	ALU	ALU	
	1900MHz_RRH Model	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz	
	1900MHz_RRH Count	1	1	1	
	1900MHz_RRH Specs	25 x 11.1 x 11.4 (60 lbs)	25 x 11.1 x 11.4 (60 lbs)	25 x 11.1 x 11.4 (60 lbs)	
	1900MHz_RRH Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower	
	1900MHz Combiner Model	No Combiner Required	No Combiner Required	No Combiner Required	
	1900MHz_Power_Split_Ratio (Main/Split)				
	1900MHz_Splitter Manufacturer				
	1900MHz_Splitter Model	No Splitter Required	No Splitter Required	No Splitter Required	
	1900MHz Number of Splitters	0	0	0	
	1900MHz_Top_Jumper #1_Length (RRH or Combiner-to-Antenna for TT or Main Coax to Antenna for Ground Mount, ft)	8	8	8	
	1900MHz_Top_Jumper #1_Cable_Model (RRH or Combiner-to-Antenna for TT or Main Coax to Antenna for Ground Mount)	LCF12-50J	LCF12-50J	LCF12-50J	
	1900MHz_Top_Jumper #2_Length (RRH to Combiner for TT if applicable, ft)				
	1900MHz_Top_Jumper #2_Cable_Model (RRH to Combiner for TT if applicable)				
	1900MHz_Main_Cable_Length (ft)	85	81	81	
	1900MHz_Main_Cable_Model	HB114-1-08U4-M5F	HB114-1-08U4-M5F	HB114-1-08U4-M5F	
	1900MHz_Bottom_Jumper #1_Length (Ground based RRH to Combiner-OR-Main Coax, ft)				
	1900MHz_Bottom_Jumper #1_Cable_Model (Ground based RRH to Combiner-OR-Main Coax)				
	1900MHz_Bottom_Jumper #2_Length (Ground based-Combiner to Main Coax, ft)				
	1900MHz_Bottom_Jumper #2_Cable_Model (Ground based-Combiner to Main Coax)				

NOTES:
1. COMMENTS IN RED TEXT PROVIDED BY A&E VENDOR.
2. ANTENNA RAD CENTER BASED ON EQUIPMENT DATABASE AND STRUCTURAL ANALYSIS.
3. SPRINT CM SHALL CONFIRM HYBRID CABLE LENGTH, COAX JUMPER LENGTH AND AISG CABLE LENGTH BEFORE PREPARING BOM. A&E RECOMMENDED HYBRID CABLE LENGTH BASED ON NV 2.5 EQUIPMENT AUDIT PLUS 20 FEET FOR (2) 10-FOOT COILS AT EACH END OF THE FIBER TRUNK.

NOTE:
GENERAL CONTRACTOR/TOWER CREW SHALL VERIFY THAT THE LATEST RF DATA SHEET IS USED FOR EQUIPMENT INSTALLATION.

SPECIAL WORK NOTE:
JUMPERS (COAX/AISG) FROM THE 2.5 RRH TO THE 2.5 ANTENNA CANNOT EXCEED 15'. NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY DISCREPANCY.

800	800MHz_Azimuth	35	160	280
	800MHz_No_of_Antennas	1	1	1
	800MHz_RADCenter(ft)	60	56	56
	800MHz_AntennaMake	NA	NA	NA
	800MHz_AntennaModel	Antenna assigned on a different band	Antenna assigned on a different band	Antenna assigned on a different band
	800MHz_Horizontal_Beamwidth	NA	NA	NA
	800MHz_Vertical_Beamwidth	NA	NA	NA
	800MHz_Antenna Dimensions (in) & Weight (lbs)	NA NA	NA NA	NA NA
	800MHz_AntennaGain(dBi)	NA	NA	NA
	800MHz_M_Tilt	0	0	0
	800MHz_E_Tilt	5	5	5
	800 MHz_Effective Tilt (degrees)	5	5	5
	800MHz_RRH Manufacturer	ALU	ALU	ALU
	800_Combiner_Model	No Combiner Required	No Combiner Required	No Combiner Required
	800MHz_RRH Model	RRH 800 MHz 2x50W	RRH 800 MHz 2x50W	RRH 800 MHz 2x50W
	800MHz_RRH Specs	15.8 x 13.0 x 14.0 (64 lbs)	15.8 x 13.0 x 14.0 (64 lbs)	15.8 x 13.0 x 14.0 (64 lbs)
	800MHz_RRH Count	2	2	2
	800MHz_RRH Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower
	800MHz_BILT Border Filter	na	na	na
	800MHz_Splitter Manufacturer			
	800MHz_Splitter Model			
	800MHz Number of Splitters	0	0	0
	800_Top_Jumper #1_Length (RRH to Antenna for TT or Main Coax to Antenna for GM)	8	8	8
	800_Top_Jumper_Cable_Model (RRH to Antenna for TT or Main Coax to Antenna for GM)	LCF12-50J	LCF12-50J	LCF12-50J
	800MHz_Main_Coax_Cable_Length (ft)	NA	NA	NA
	800MHz_Main_Coax_Cable_Model	NA	NA	NA
	800_Bottom_Jumper #1_Length (Ground based RRH to Main Coax)			
	800_Bottom_Jumper #1_Cable_Model (Ground based RRH to Main Coax)			
2500	2500MHz_Azimuth	35	160	280
	2500MHz_No_of_Antennas	1	1	1
	2500MHz_RADCenter(ft)	60	56	56
	2500MHz_AntennaMake	RFS	NA	NA
	2500MHz_AntennaModel	APXVTM14-ALU-I20	Antenna assigned on a different band	Antenna assigned on a different band
	2500MHz_Horizontal_Beamwidth	68	NA	NA
	2500MHz_Vertical_Beamwidth	5	NA	NA
	2500MHz_AntennaHeight (in)	61 x 17.3 x 11.8 56 (lbs)	NA NA	NA NA
	2500MHz_AntennaGain (dBi)	18	NA	NA
	2500MHz_M_Tilt	0	0	0
	2500MHz_E_Tilt	2	2	0
	2500 MHz_Effective Tilt (degrees)	2	2	0
	2500MHz_RRH Manufacturer	ALU	ALU	ALU
	2500_Combiner_Model	No Combiner Required	No Combiner Required	No Combiner Required
	2500MHz_RRH Model	TD-RRH8x20-25	TD-RRH8x20-25	TD-RRH8x20-25
	2500MHz_RRH Count	1	1	1
	2500MHz_RRH Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower
	2500MHz_Power_Split_Ratio (Main/Split)			
	2500MHz_Splitter Manufacturer			
	2500MHz_Splitter Model			
	2500MHz Number of Splitters	0	0	0
	2500_Top_Jumper #1_Length (RRH to Antenna for TT or Main Coax to Antenna for GM)	8	8	8
	2500_Top_Jumper_Cable_Model (RRH to Antenna for TT or Main Coax to Antenna for GM)	LCF12-50J	LCF12-50J	LCF12-50J
	2500MHz_Main_Cable_Length (ft)	85		85
	2500MHz_Main_Cable_Model	HB114-08U3M12-xxxF	HB114-08U3M12-xxxF	HB114-08U3M12-xxxF
	2500_Bottom_Jumper #1_Length (Ground based RRH to Main Coax)			
	2500_Bottom_Jumper #1_Cable_Model (Ground based RRH to Main Coax)			

Sprint
VISION

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MAHWAH, NJ 07495
(800) 357-7641

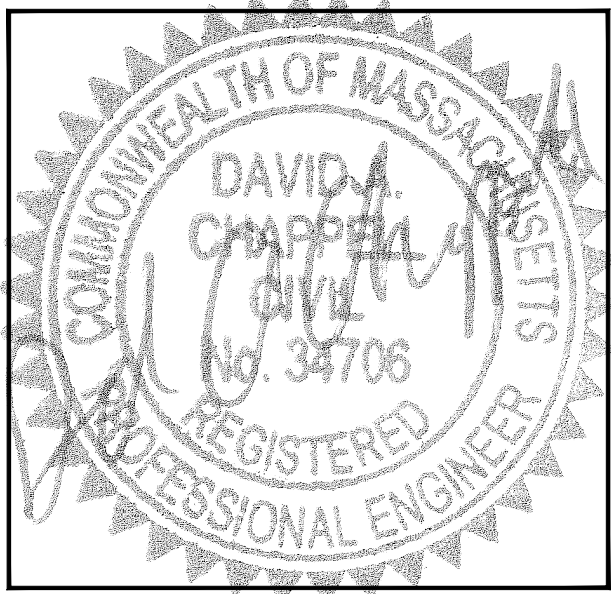
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BS60XC003

SITE NAME:
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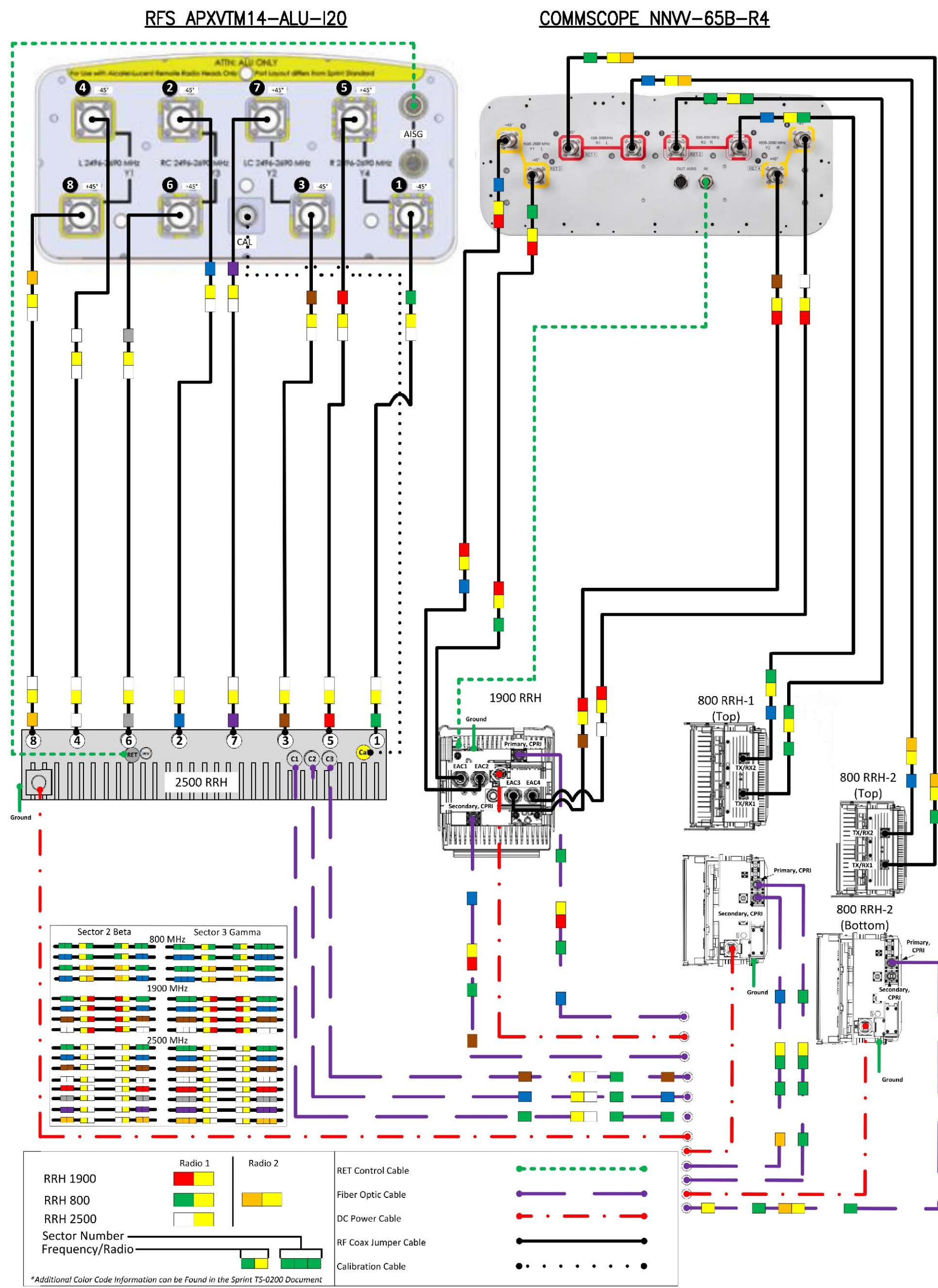
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284 NORFOLK STREET
CAMBRIDGE, MA 02139

SHEET TITLE

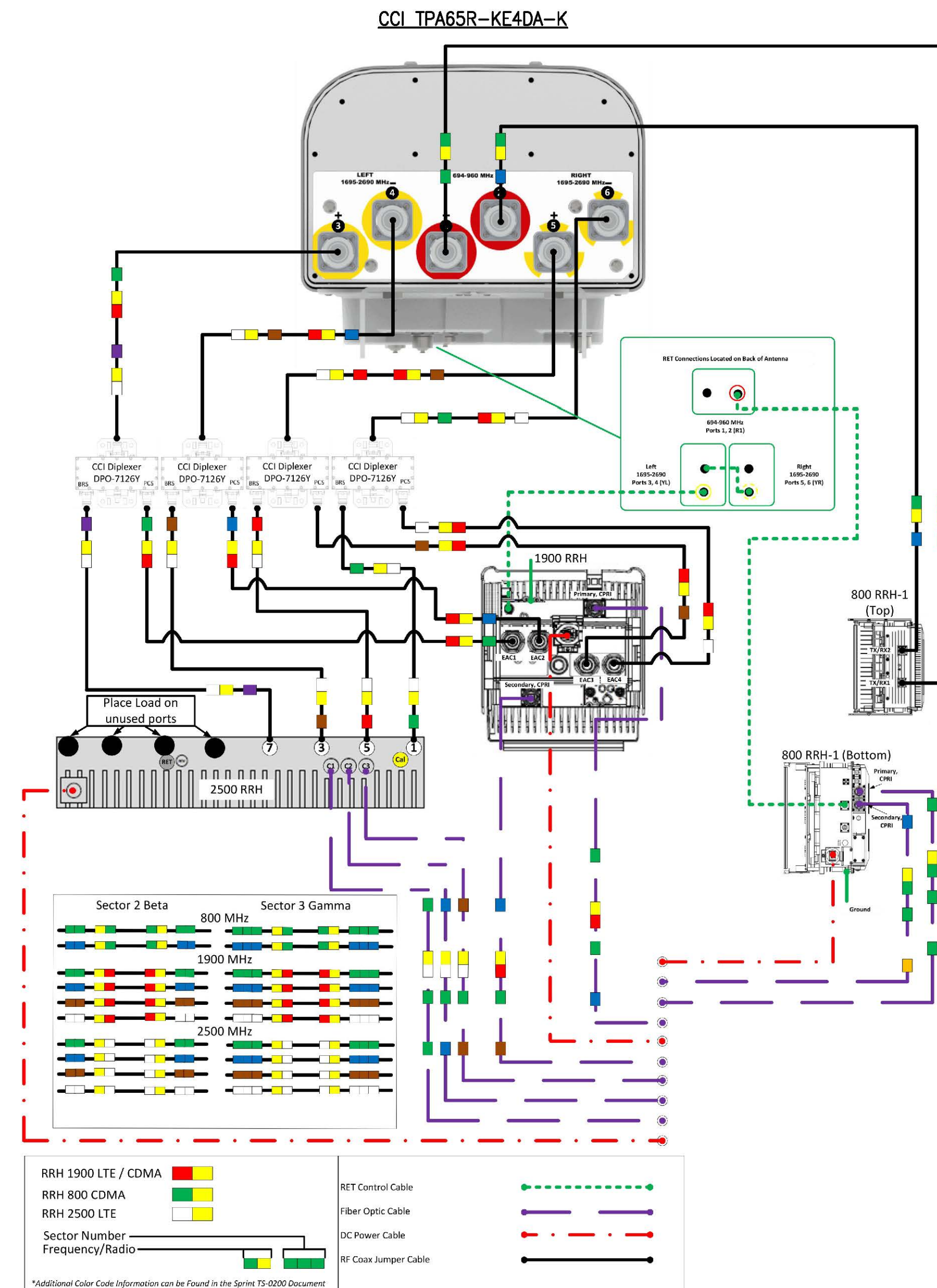
RF DATA SHEET

SHEET NUMBER

A-4



ALPHA SECTOR



BETA & GAMMA SECTORS

PLUMBING DIAGRAM

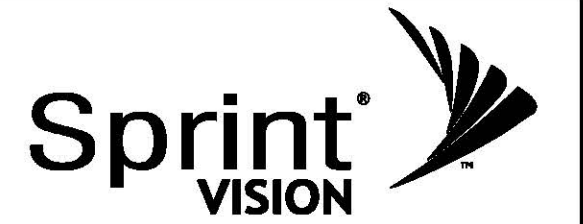
SCALE: N.T.S.

1
A-5

SPRINT CONSTRUCTION STANDARDS:

GENERAL CONTRACTOR SHALL ADHERE TO THE FOLLOWING SPRINT CONSTRUCTION STANDARDS.

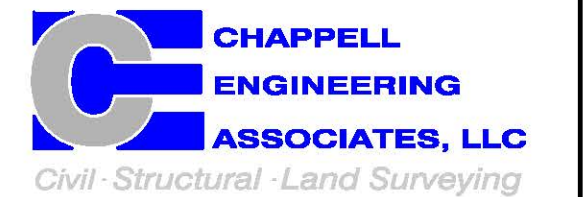
- CONSTRUCTION STANDARDS: INTEGRATED CONSTRUCTION STANDARDS FOR WIRELESS SITES - (CURRENT VERSION), INCLUDING EXHIBITS A-M.
- CONSTRUCTION SPECIFICATIONS: CONSTRUCTION STANDARDS EXHIBIT A - STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES (CURRENT VERSION).
- GROUNDING STANDARDS: EXTERIOR GROUNDING SYSTEM DESIGN.
- WEATHER PROOFING STANDARDS: EXCERPT FROM CONSTRUCTION STANDARDS EXHIBIT A, SECTION 3.6 WEATHERPROOFING CONNECTORS AND GROUND KITS.
- COLOR CODING: SPRINT NEXTEL ANT AND LINE COLOR CODING PER SPRINT TS-0200 CURRENT VERSION.
- GENERAL CONTRACTOR TO FIELD VERIFY AZIMUTH AND CL HEIGHT AND MECHANICAL DOWNTILT. IF DIFFERENT THAN CALLED OUT IN RFDS, HALT ANTENNA WORK FOR WORK FOR ONE HOUR, CALL SPRINT RF ENGINEER (OR MANAGER IF RF ENGINEER DOES NOT ANSWER, BUT STILL LEAVE A MESSAGE TO RF ENGINEER) USING SPRINT-PROVIDED CONTACT INFORMATION FOR FURTHER INSTRUCTIONS. IF SPRINT DOES NOT RESPOND WITHIN ONE HOUR, PLACE 2.5GHz ANTENNA AT SAME CL AS 1.9GHz ANTENNA AND EMAIL CORRECT CL HEIGHT AND AZIMUTH TO SPRINT RF ENGINEER. UPDATE AS-BUILT DRAWING WITH CORRECT CL HEIGHT. ALSO EMAIL CORRECT 1900MHz AND 800MHz ANTENNA CL HEIGHT, AZIMUTH AND MECHANICAL DOWNTILT TO RF ENGINEER.
- AISG TESTS TO VERIFY OPERATION IS TO BE PERFORMED AFTER FINAL INSTALLATION OF ANTENNAS AND AISG CABLES HAVE BEEN CONNECTED. VERIFY OPERATION OF ALL EXISTING SPRINT AISG EQUIPMENT INCLUDING 800MHz, 1.9GHz, AND 2.5GHz. TEST INCLUDE COMPLETE DOWNTILT, AZIMUTH (IF APPLICABLE) AND BEAMWIDTH SWINGS (IF APPLICABLE). DOCUMENT AISG TEST RESULTS IN COAX SWEEP TEST SPREADSHEET.
- GENERAL CONTRACTOR MUST INSURE THAT NO OBJECT IS LOCATED IN FRONT OF ANTENNA. THIS MEANS NO OBJECT IS TO BE LOCATED 45 DEGREES LEFT AND RIGHT OF FRONT OF ANTENNA OR 7 DEGREES UP AND DOWN FROM CENTER OF ANTENNA. IF THIS IS NOT POSSIBLE, CONTACT RF ENGINEER FOR FURTHER INSTRUCTION. IN ADDITION, 2.5GHz ANTENNA IS NOT TO BE PLACED IN FRONT OF ANY OTHER ANTENNA USING THE SAME 45 DEGREE RULE. THIS INCLUDES SPRINT AND NON-SPRINT ANTENNAS.
- GENERAL CONTRACTOR IS REQUIRED TO USE A DIGITAL ALIGNMENT TOOL TO SET AZIMUTH, ROLL AND DOWNTILT. AZIMUTH ACCURACY IS TO BE WITHIN 1 DEGREES. DOWNTILT AND ROLL (LEFT TO RIGHT TILT) IS TO BE WITHIN 0.1 DEGREES. IF FOR SOME REASON THIS ACCURACY CANNOT BE ACHIEVED, UPDATE AS-BUILT DRAWINGS AND EMAIL SPRINT RF ENGINEER WITH AS-BUILTS SETTINGS. USE 3Z RF ALIGNMENT TOOL OR EQUIVALENT TOOL. [HTTP://WWW.3ZTECOM.COM/ANTENNA-ALIGNMENT-TOOL/](http://www.3ztecom.com/antenna-alignment-tool/).



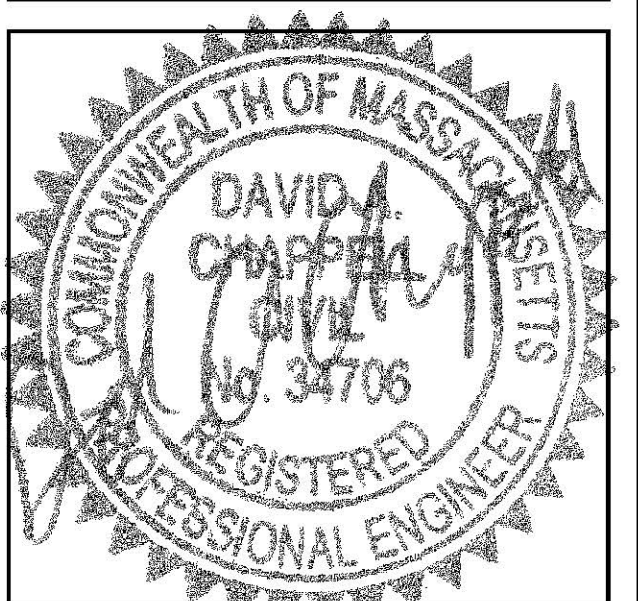
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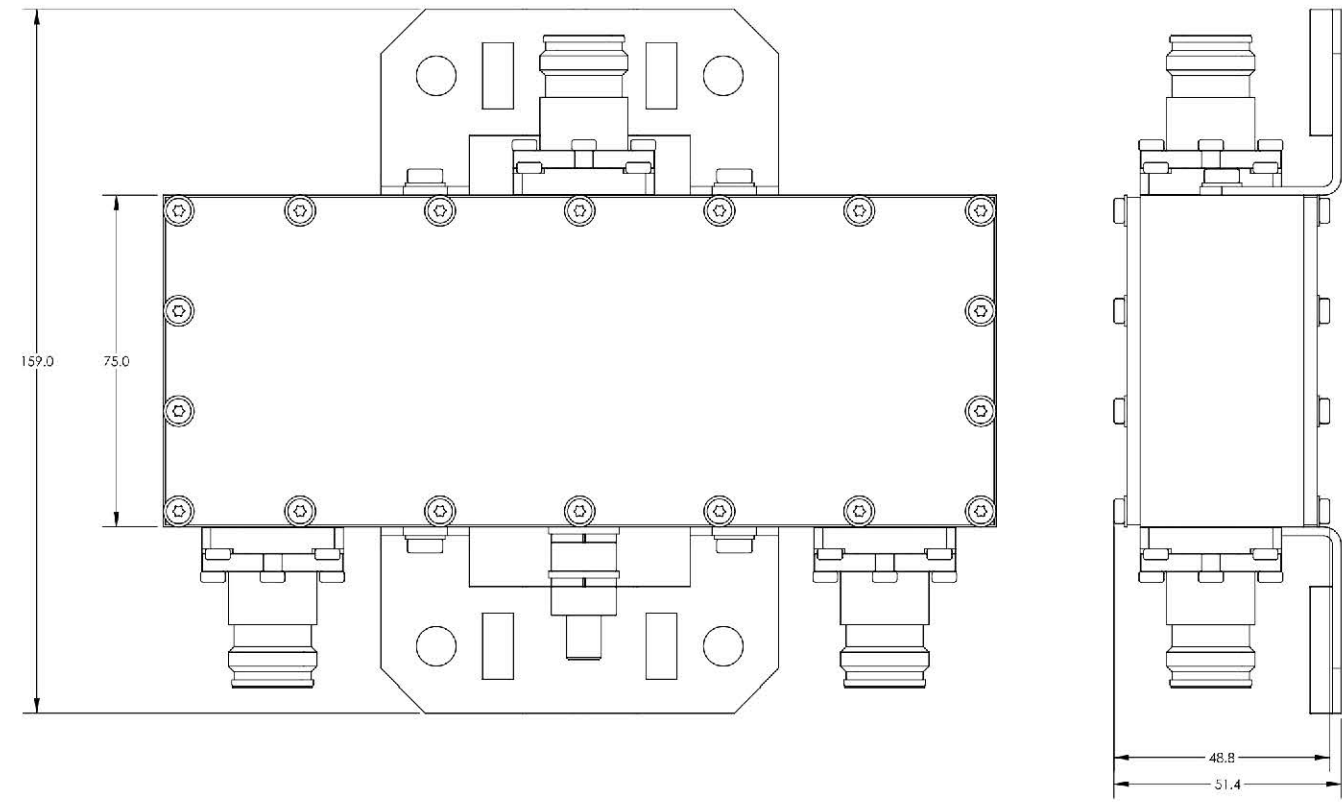
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CAMBRIDGE, MA 02139

SHEET TITLE

RAN WIRING
DIAGRAMS

SHEET NUMBER

A-5



CCI DPO-7126Y-0x1 PCS/AWS DIPLEXER
DIMENSIONS: 6.26"x7.42"x2.02"
WEIGHT: 3.7 LBS W/ HARDWARE

DIPLEXER DETAIL
SCALE: N.T.S.

8
A-2

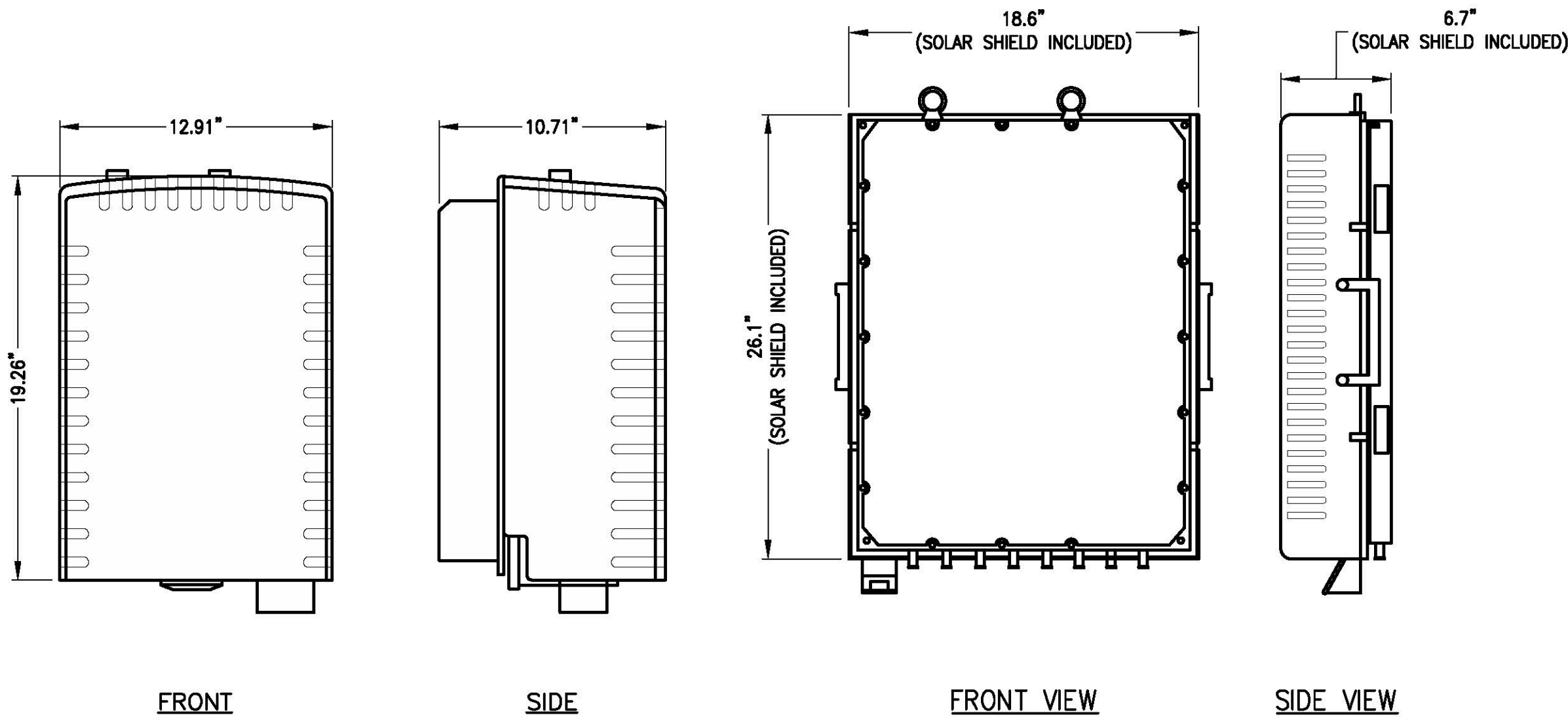
NOKIA-A SCENARIOS	CABLE DESCRIPTION	CABLE LENGTH (FT)	DIAMETER (IN)	WEIGHT (LBS/FT)
(*) 1 CABLE PER SECTOR (1) 1900 (2) 800 (1)mMIMO OR 8T8R	4 PAIRS OF 6AWG DC CONDUCTORS WITH 24 MULTI-MODE FIBER PAIRS	0-120	1.376	1.354
1 CABLE PER SECTOR (1) 1900 (2) 800 (1)mMIMO OR 8T8R	4 PAIRS OF 4AWG DC CONDUCTORS WITH 24 MULTI-MODE FIBER PAIRS	121-200	1.545	1.875
1 CABLE PER SECTOR (1) 1900 (2) 800 (1)mMIMO (WITH BI-WIRE) OR 8T8R	5 PAIRS OF 4AWG DC CONDUCTORS WITH 24 MULTI-MODE FIBER PAIRS	201-375	1.619	2.161

* ALL FIBER PAIRS TERMINATE IN SENKO IP-LC AT TOWER TOP.

* NOTE: SPRINT CM TO CONFIRM HYBRID RISER CABLE AND HYBRID JUMPER CABLE MODEL NUMBERS BEFORE PREPARING BOM.

HYBRID CABLE CHART
SCALE: NTS

1
A-6



DIMENSIONS: 12.91"x10.71"x19.26"
WEIGHT: 53 LBS

800MHz RRH

DIMENSIONS: 26.1"x18.6"x6.7"
WEIGHT: 70.0 LBS

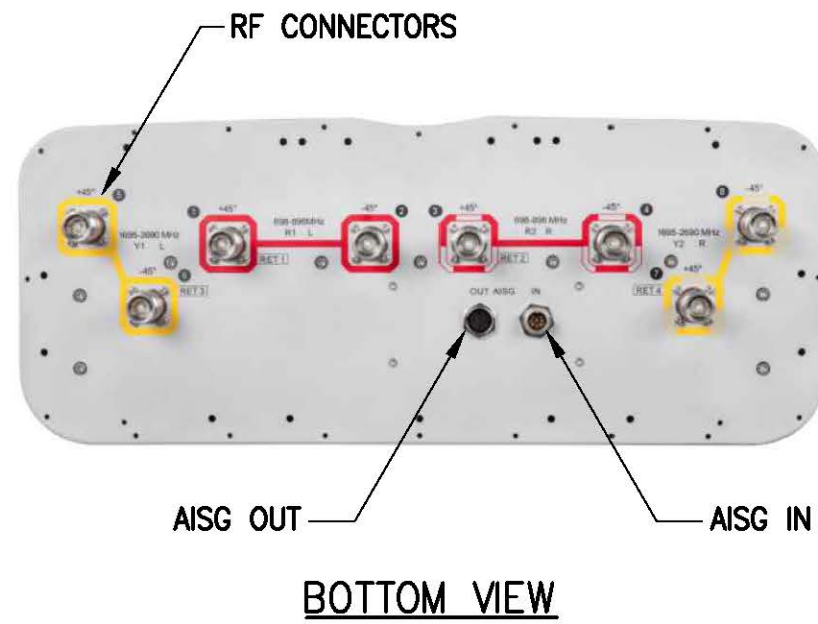
2500MHz RRH

RRH DETAILS
N.T.S.

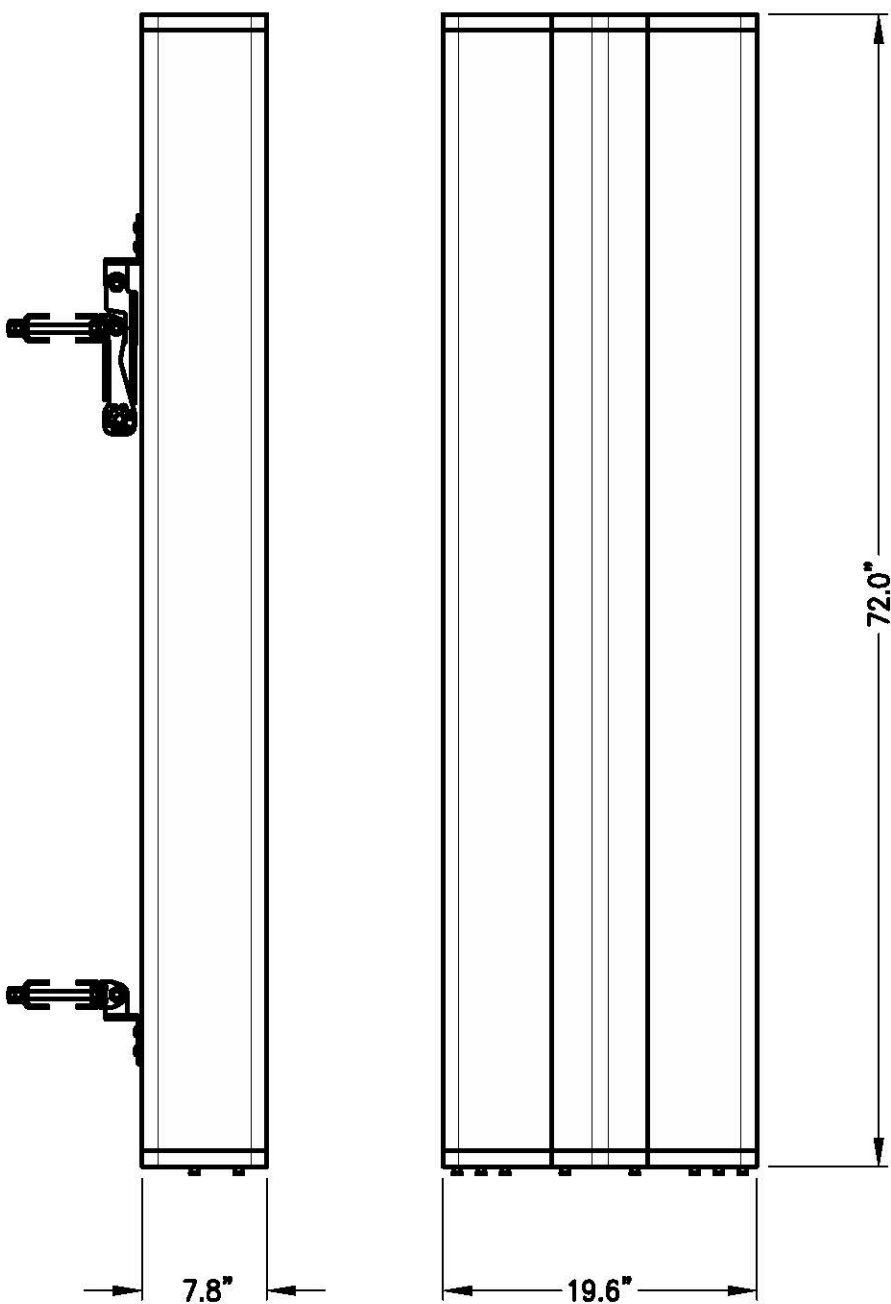
2
A-6

FINAL ANTENNA CONFIGURATION

SECTOR	POS	STATUS	ANTENNA MFR	ANTENNA MODEL	RAD CENTER	AZIMUTH (TRUE NORTH)	DOWNTILT		RRH/DIPLEXER QTY & MODEL	JUMPER QTY & LENGTH	CABLE LENGTH & SIZE	CABLE QTY & MODEL
							MECH	ELEC				
ALPHA	1	PROPOSED	COMMScope	NWV-65B-R4	56.0'± AGL	35°	0°	3°	(2) FD-RHH-2X50-800 (1) FD-RHH-4X45-1900	(4) 10'-0" (4) 10'-0"	UTILIZE EXISTING	UTILIZE EXISTING
	2	PROPOSED	RFS	APXVTM14-ALU-I20	56.0'± AGL	35°	0°	0°	(1) TD-RRH-8x20-25	(8) 10'-0"	115'± (1½"Ø)	(1) HB114-08U3M12-XXXF
BETA	1	PROPOSED	CCI	TPA65R-KE4DA-K	56.0'± AGL	160°	0°	4°	(2) FD-RHH-2X50-800 (1) FD-RHH-4X45-1900 (1) TD-RRH-8x20-25 (4) DPO-7126Y-0x1	(4) 10'-0" (4) 10'-0" (4) 10'-0" (4) 10'-0"	UTILIZE EXISTING	UTILIZE EXISTING
	2	FUTURE	TBD	TBD	-	-	-	-	-	-	-	-
GAMMA	1	PROPOSED	CCI	TPA65R-KE4DA-K	56.0'± AGL	380°	0°	4°	(2) FD-RHH-2X50-800 (1) FD-RHH-4X45-1900 (1) TD-RRH-8x20-25 (4) DPO-7126Y-0x1	(4) 10'-0" (4) 10'-0" (4) 10'-0" (4) 10'-0"	UTILIZE EXISTING	UTILIZE EXISTING
	2	FUTURE	TBD	TBD	-	-	-	-	-	-	-	-



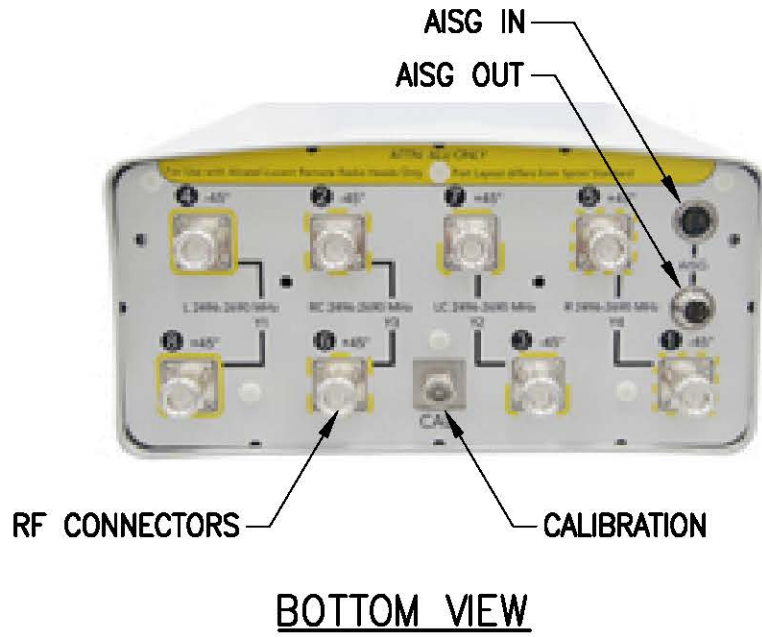
BOTTOM VIEW



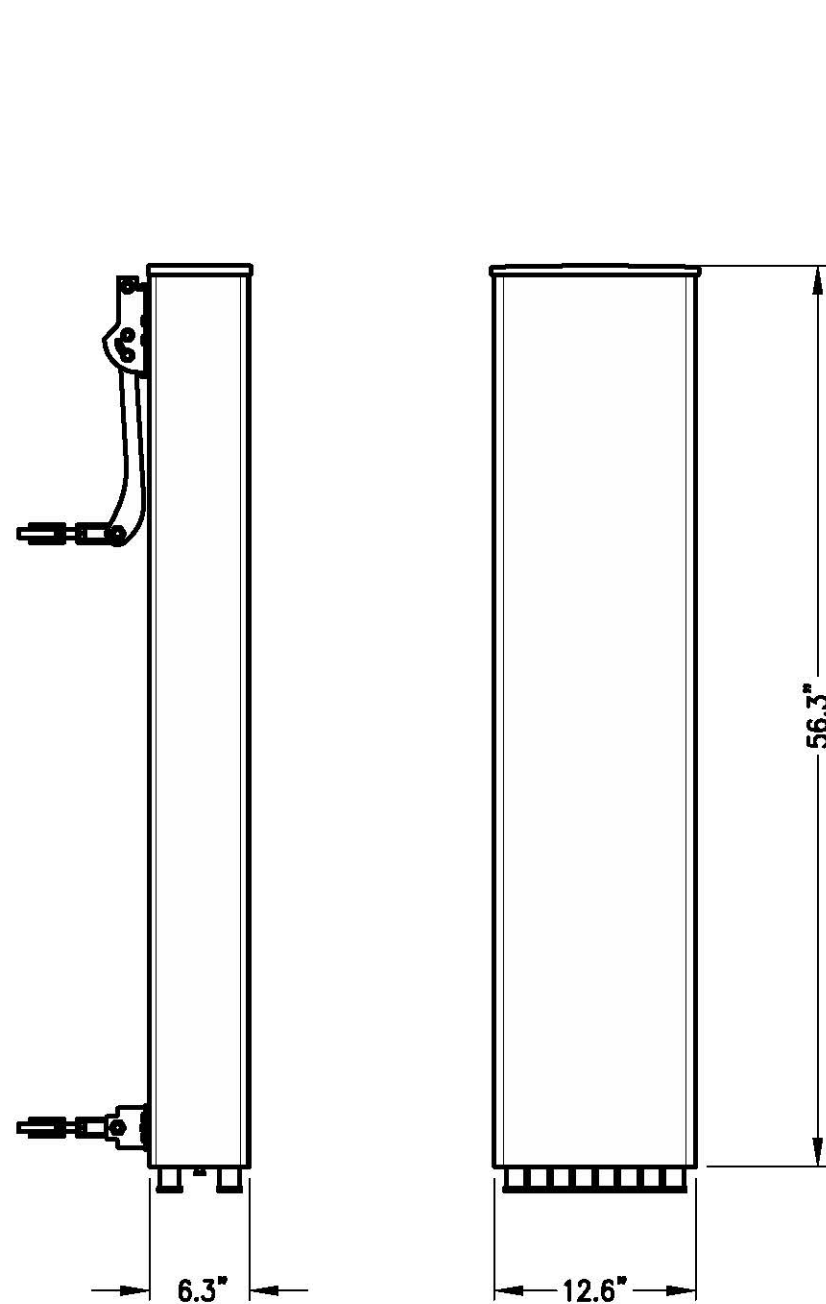
SIDE VIEW FRONT VIEW
800/1900MHz ANTENNA (ALPHA)

COMMScope NWV-65B-R4 PANEL ANTENNA

DIMENSIONS: 72.0"x19.6"x7.8"
WEIGHT: 77.4 LBS W/ HARDWARE



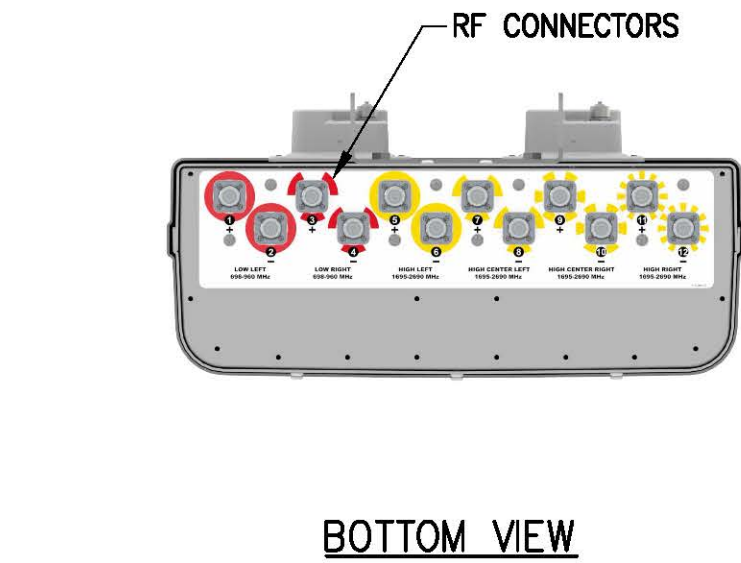
BOTTOM VIEW



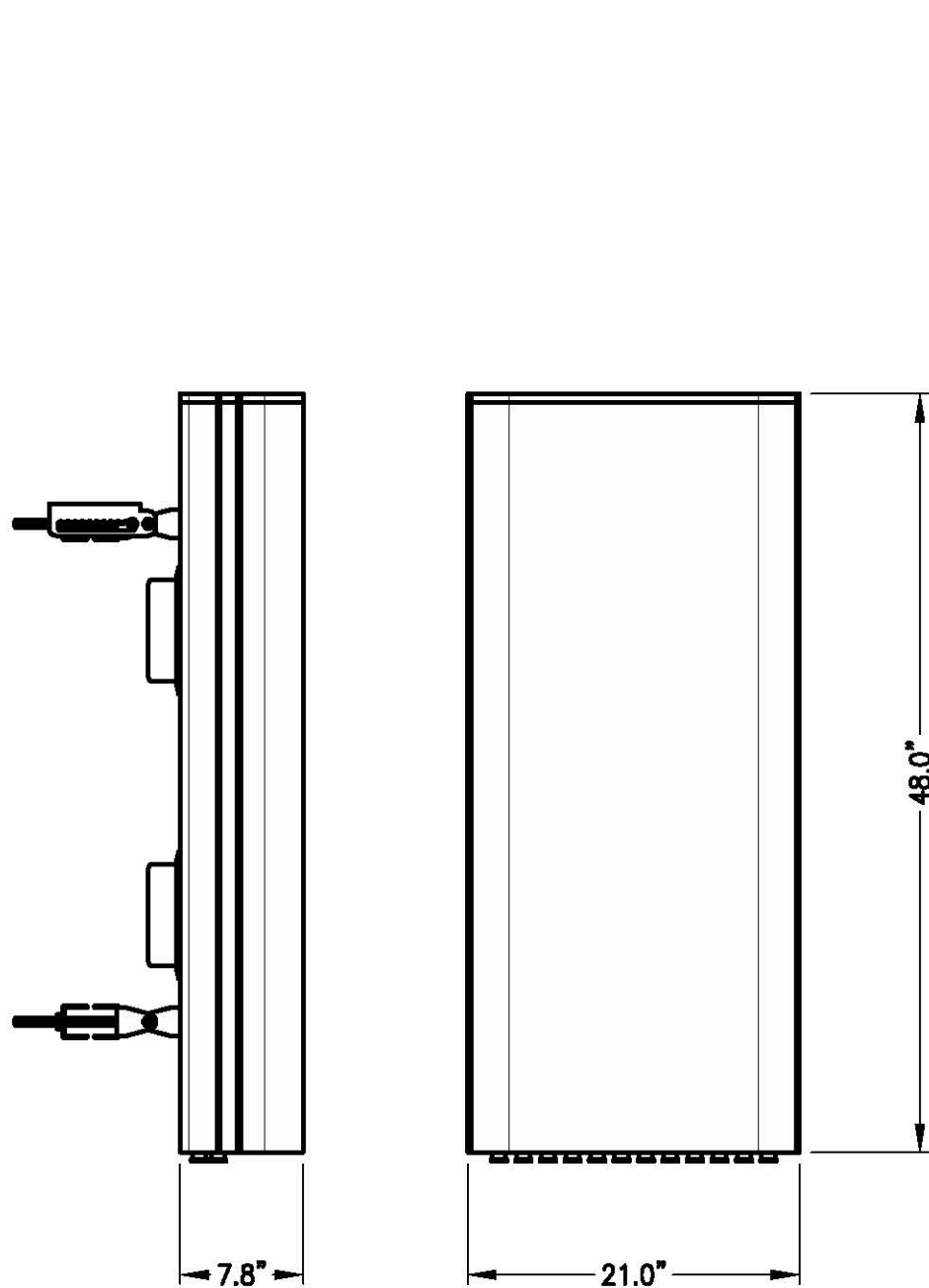
SIDE VIEW FRONT VIEW
2500MHz ANTENNA (ALPHA)

RFS APXVTM14-ALU-I20 PANEL ANTENNA

DIMENSIONS: 56.3"x12.6"x6.3"
WEIGHT: 67.7 LBS W/ HARDWARE



BOTTOM VIEW



SIDE VIEW FRONT VIEW
800/1900/2500MHz ANTENNA (BETA & GAMMA)

CCI TPA65R-KE4D PANEL ANTENNA

DIMENSIONS: 48.0"x21.0"x7.8"
WEIGHT: 52.9 LBS W/ HARDWARE

Sprint VISION

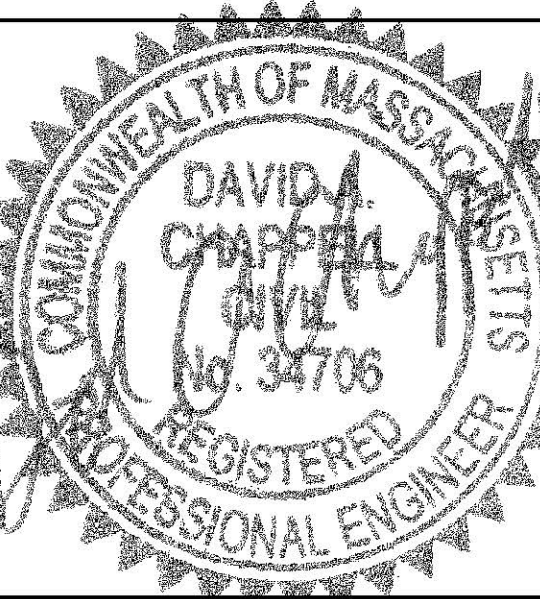
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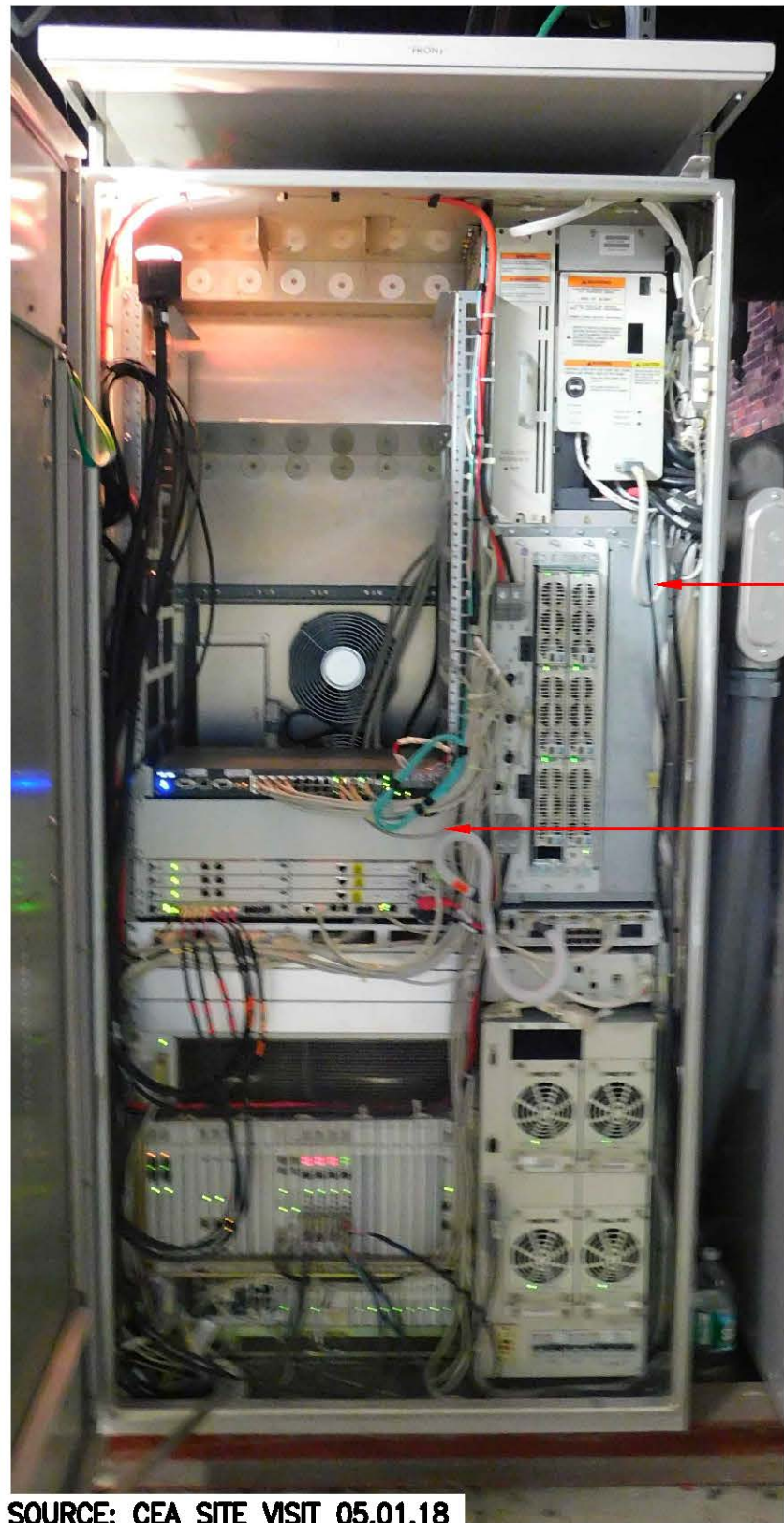
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SITE ADDRESS:
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CAMBRIDGE, MA 02139

SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-6



SOURCE: CEA SITE VISIT 05.01.18

FRONT VIEW
EXISTING MMBTS CABINET
SCALE: NTS

INSTALL NEW RECTIFIER SHELF & (3)
RECTIFIERS WITHIN EXIST. MM-BTS
EQUIPMENT CABINET (IF REQUIRED)

INSTALL NEW LTE BBU 2.5GHz
RETROFIT KIT WITHIN EXIST.
MM-BTS EQUIPMENT CABINET

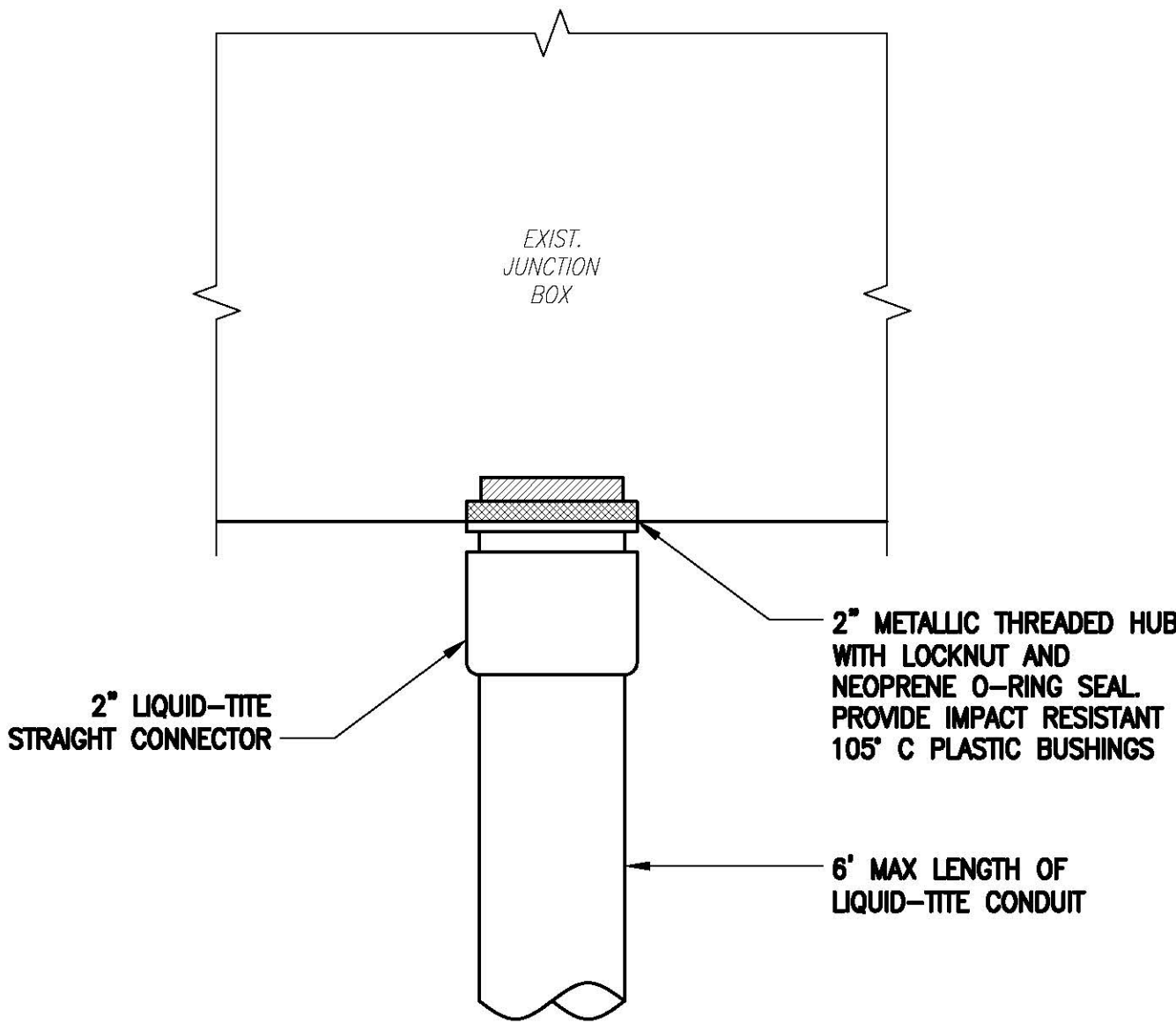
NOTE:
COORDINATE CABINET UPGRADE WITH
SPRINT CM. REPLACE EXIST. CABINET
WITH MMBTS 9927 (IF REQ'D)



SOURCE: CEA SITE VISIT 05.01.18

FRONT VIEW
EXISTING 2.5 POWER BBU CABINET
SCALE: NTS

INSTALL (1) NEW BATTERY
STRING WITHIN EXIST. BBU
CABINET SPLIT BETWEEN (2)
EMPTY BAYS (IF REQUIRED)

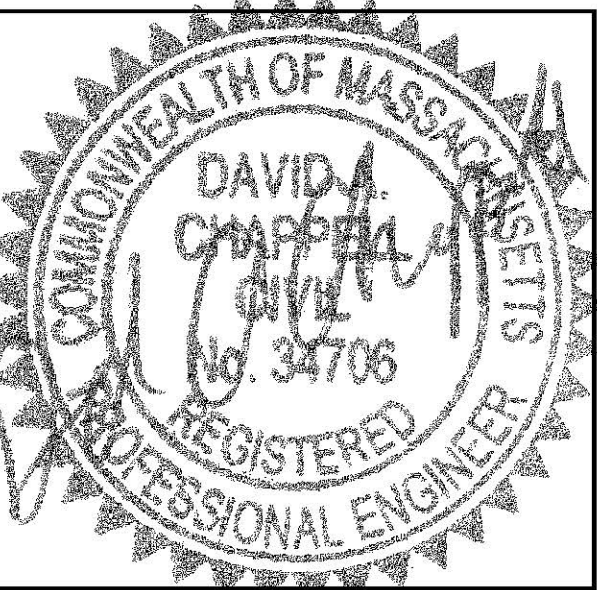


FIBER JUNCTION BOX PENETRATION
SCALE: NTS

1 INTERNATIONAL BLVD, SUITE 800
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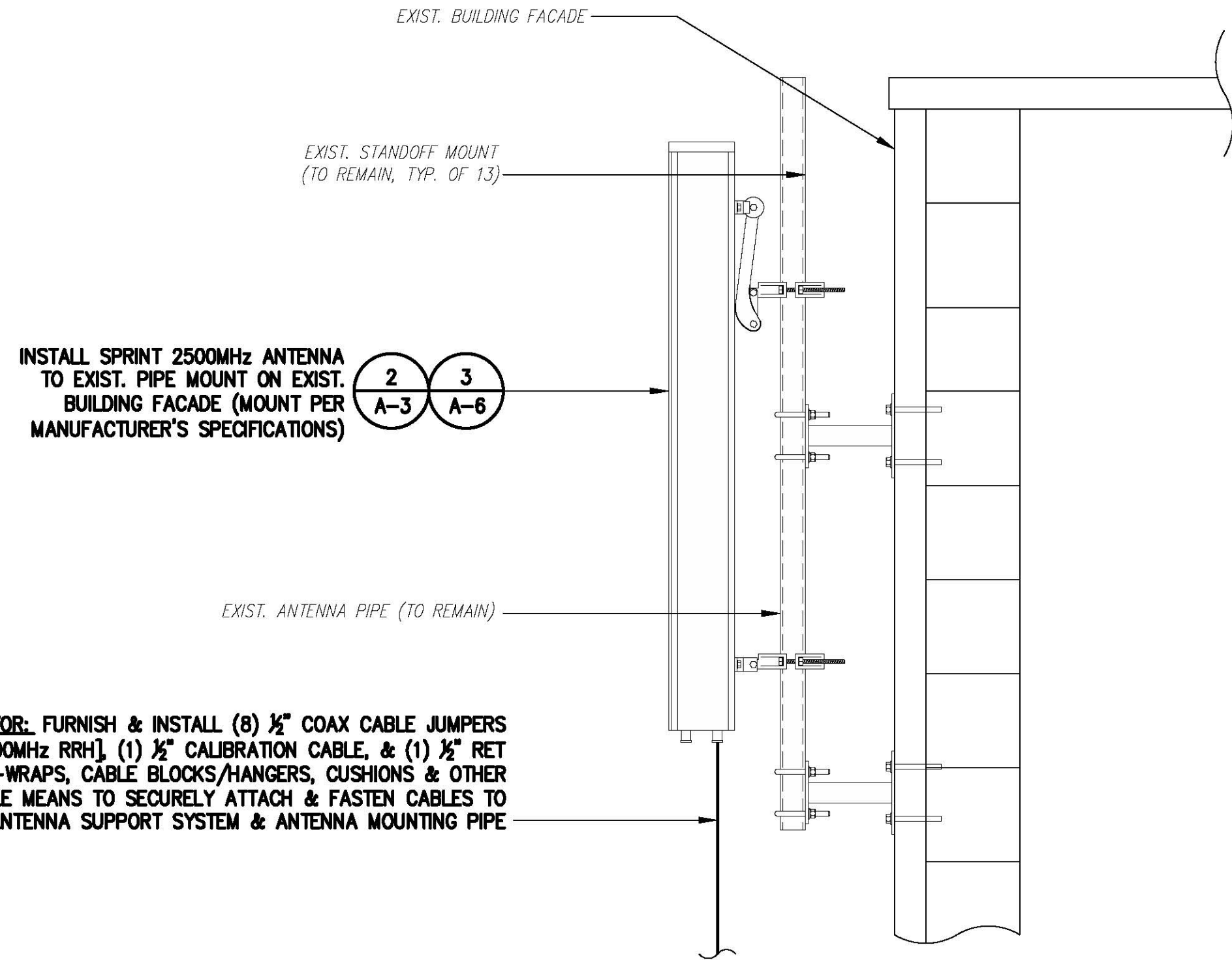
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SHEET TITLE

EQUIPMENT
DETAILS

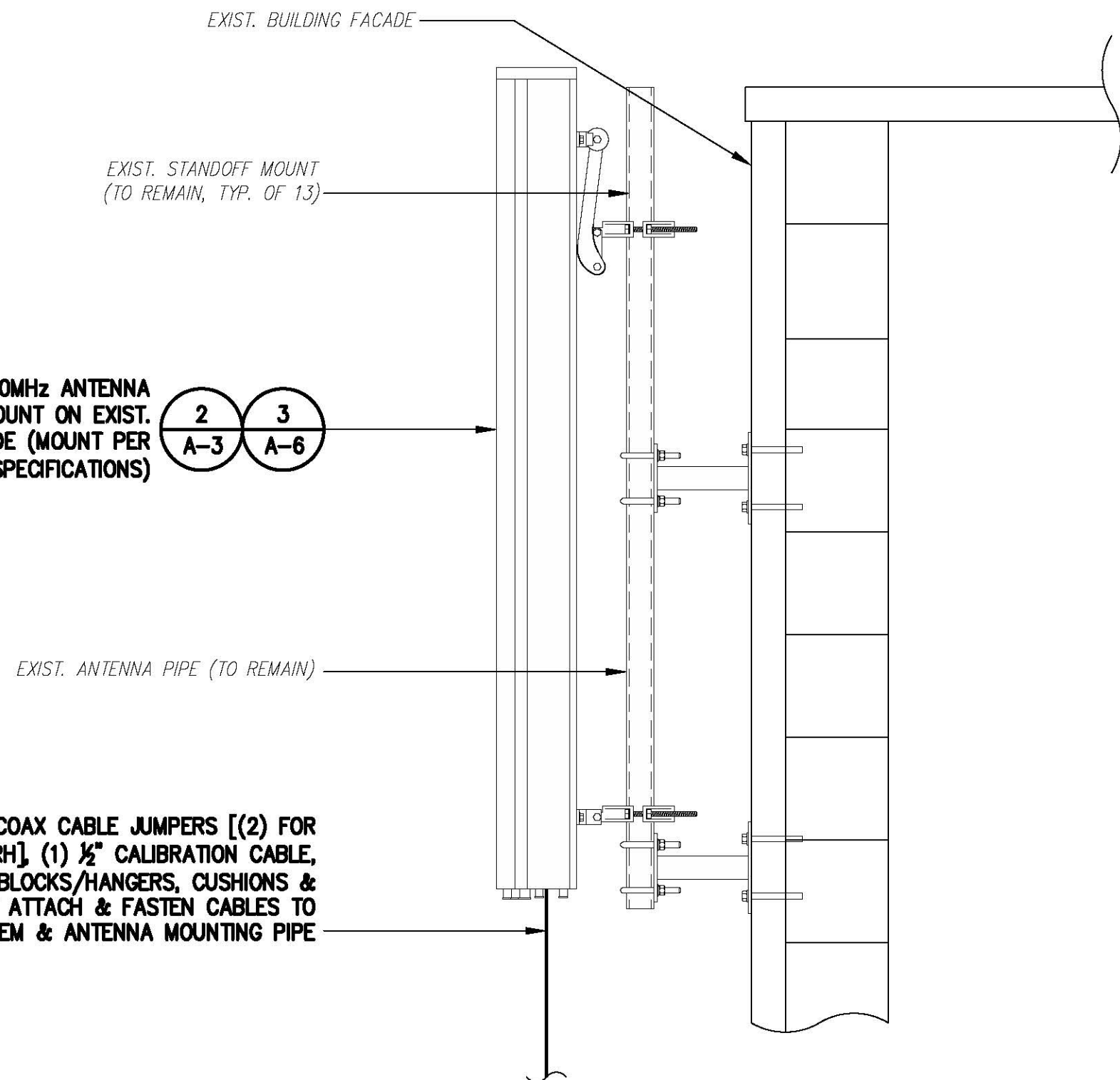
SHEET NUMBER

A-7



PAINT TO MATCH NOTE
ALL PROPOSED & EXISTING ANTENNAS, MOUNTS, & HARDWARE SHALL BE PAINTED TO MATCH EXISTING BUILDING.

(P) 800/2500MHZ ANTENNA



(P) 800/1900MHZ ANTENNA

TYPICAL ANTENNA AND RRH MOUNTING DETAILS
SCALE: N.T.S.

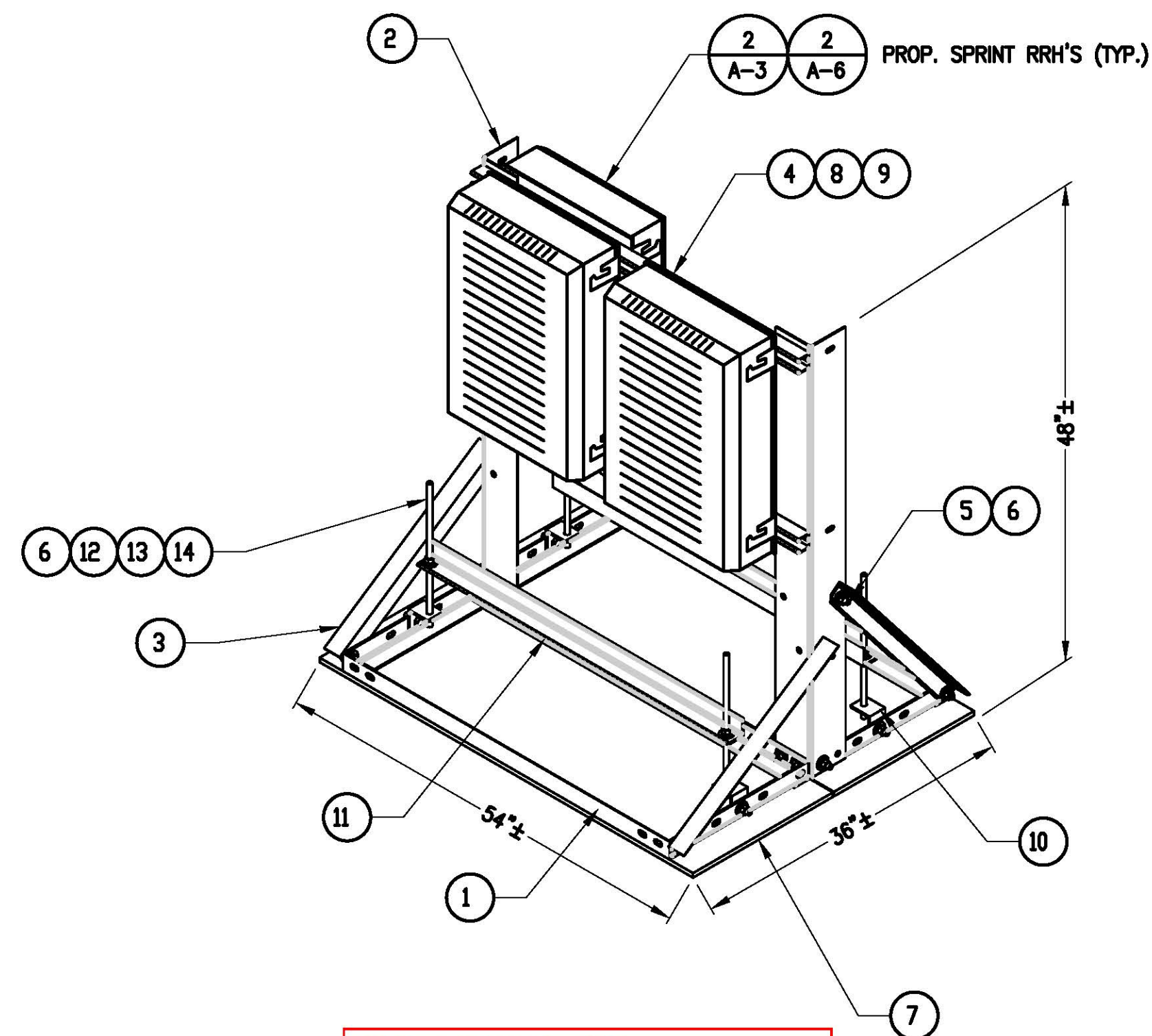
1
S-1

SPECIAL INSTALLATION NOTE:
COAX JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15'. NOTIFY SPRINT CM OF ANY DISCREPANCY.

- INSTALLATION NOTES:**
1. CONTRACTOR TO VERIFY, IN FIELD, SIZE OF EXISTING MOUNTING PIPE TO BE 2½" STD (2.88 O.D.) PIPE MAST (6'-0" LONG).
 2. VERIFY EXACT RRH AND ANTENNA MODEL & AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION.
 3. RRH PLACEMENT FOR REFERENCE ONLY. CONTRACTOR SHALL PLACE RRH IN CORRECT ORDER MATCHING INSTALL ANTENNA PLACEMENT.
 4. INSTALL EQUIPMENT TO BE MOUNTED PER MANUFACTURERS SPECIFICATIONS.

- SPECIAL CONSTRUCTION NOTE:**
SPRINT TOWER TOP WORK IS CONTINGENT ON THE FOLLOWING:
- * COMPLETION OF A GLOBAL STRUCTURAL STABILITY ANALYSIS (PROVIDED BY STRUCTURE OWNER OR A&E VENDOR).
 - * COMPLETION OF AN ANTENNA/RRH MOUNT STRUCTURAL ASSESSMENT (PROVIDED BY A&E VENDOR).
 - * GC SHALL FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS AS INDICATED IN BEFORE-MENTIONED ANALYSIS AND ASSESSMENT.

ITEM	PART NO.	DESCRIPTION	QTY.	WEIGHT
1	MT416.10	WELDMNT BALLAST SLED FRAME	2	22.40 LBS
2	MTC329420	VERTICAL ANGLE	2	13.93 LBS
3	MTC329421	BRACE ANGLE	4	4.71 LBS
4	MTC329414	1 5/8" UNISTRUT	2	6.25 LBS
5	GB-04145	1/2" X 1-1/2" GALV BOLT KIT	18	0.13 LBS
6	GW-04	1/2" GALV FLAT WASHER	28	0.06 LBS
7	MT-F1637	RUBBER MAT .5" X 18" X 48"	2	15.61 LBS
8	GW-03	3/8" GALV FLAT WASHER	8	0.01 LBS
9	GB-03145	3/8" X 1-1/2" GALV BOLT KIT	4	0.07 LBS
10	MTC8326.01	CLIP ANGLE	4	0.478 LBS
11	MTC329422	BRACE ANGLE	2	7.92 LBS
12	GW-04	1/2" GALV LOCK WASHER	8	0.09 LBS
13	GN-04	1/2" GALV HEX NUT	8	0.04 LBS
14	MT-379-16	1/2" X 16" GALV THREADED ROD	4	0.88 LBS



SPECIAL INSTALLATION NOTE:
INSTALL (2) 4"x8"x16" SOLID BLOCKS PER TRAY

TYPICAL RRH MOUNTING DETAIL
SCALE: N.T.S.

2
S-1

Sprint VISION

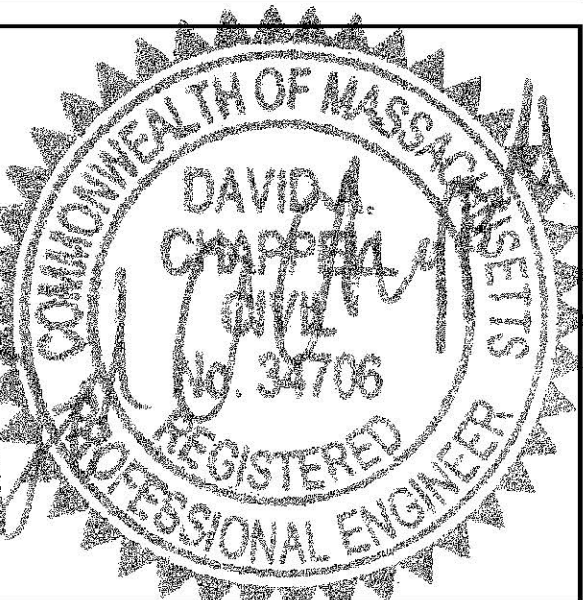
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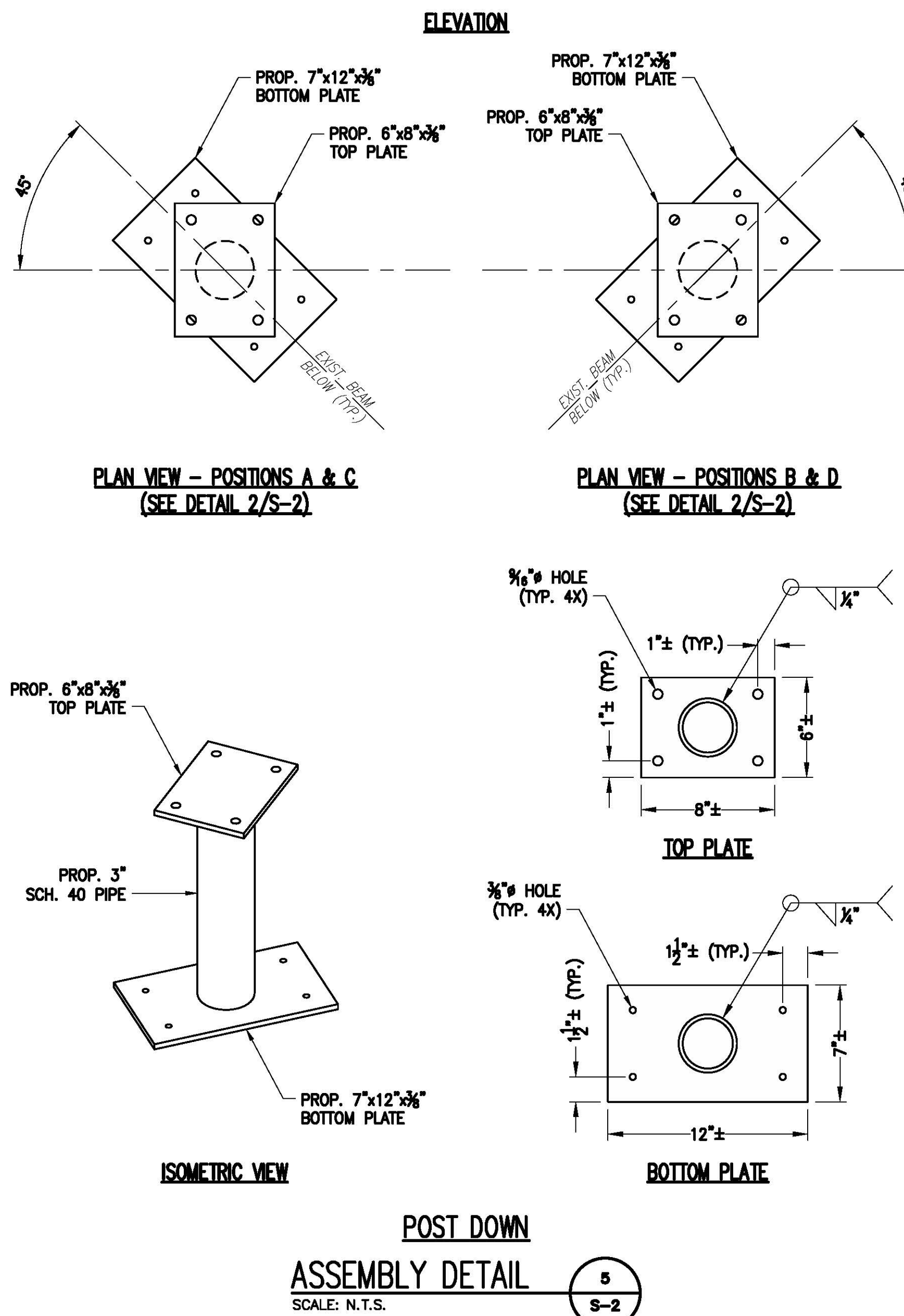
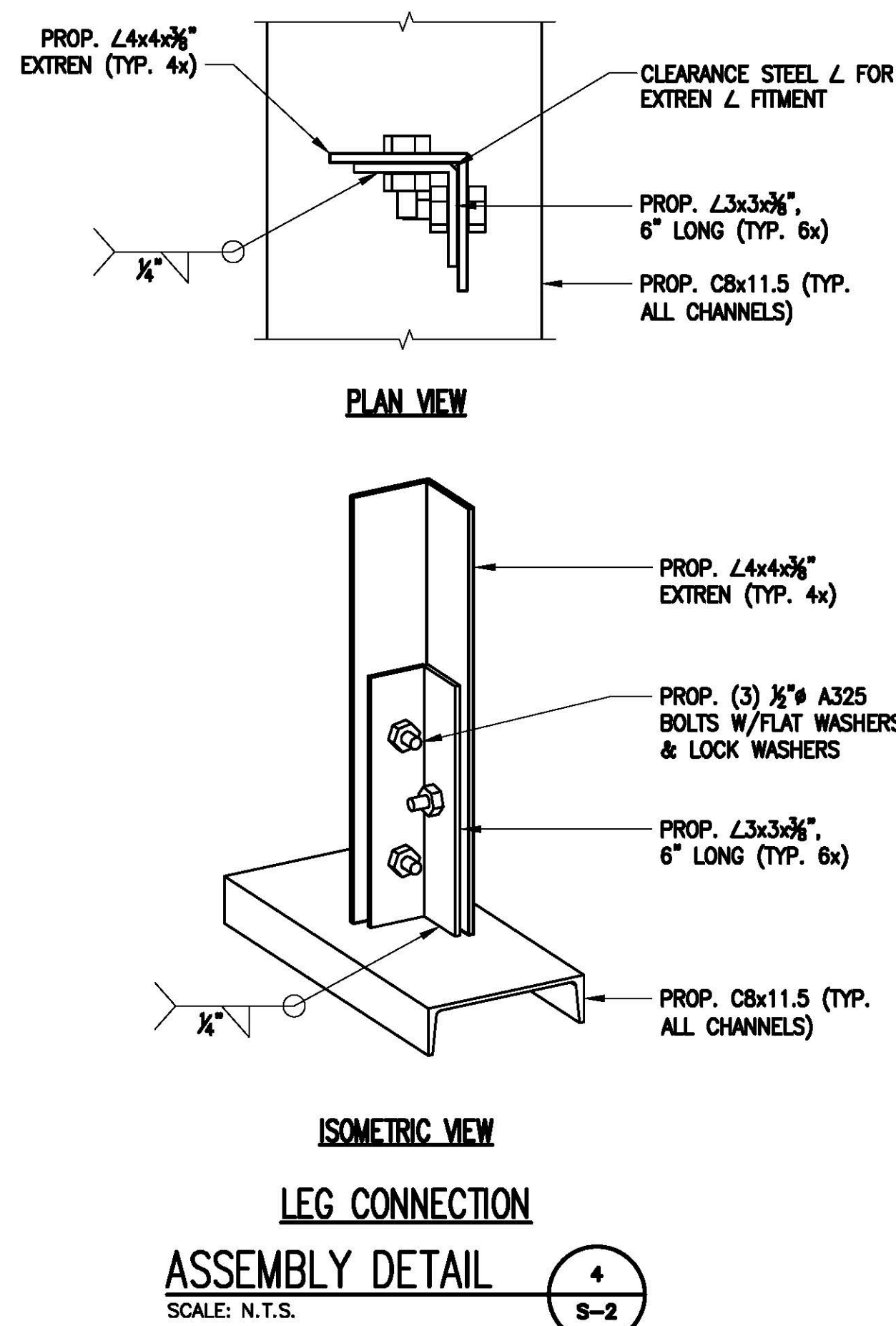
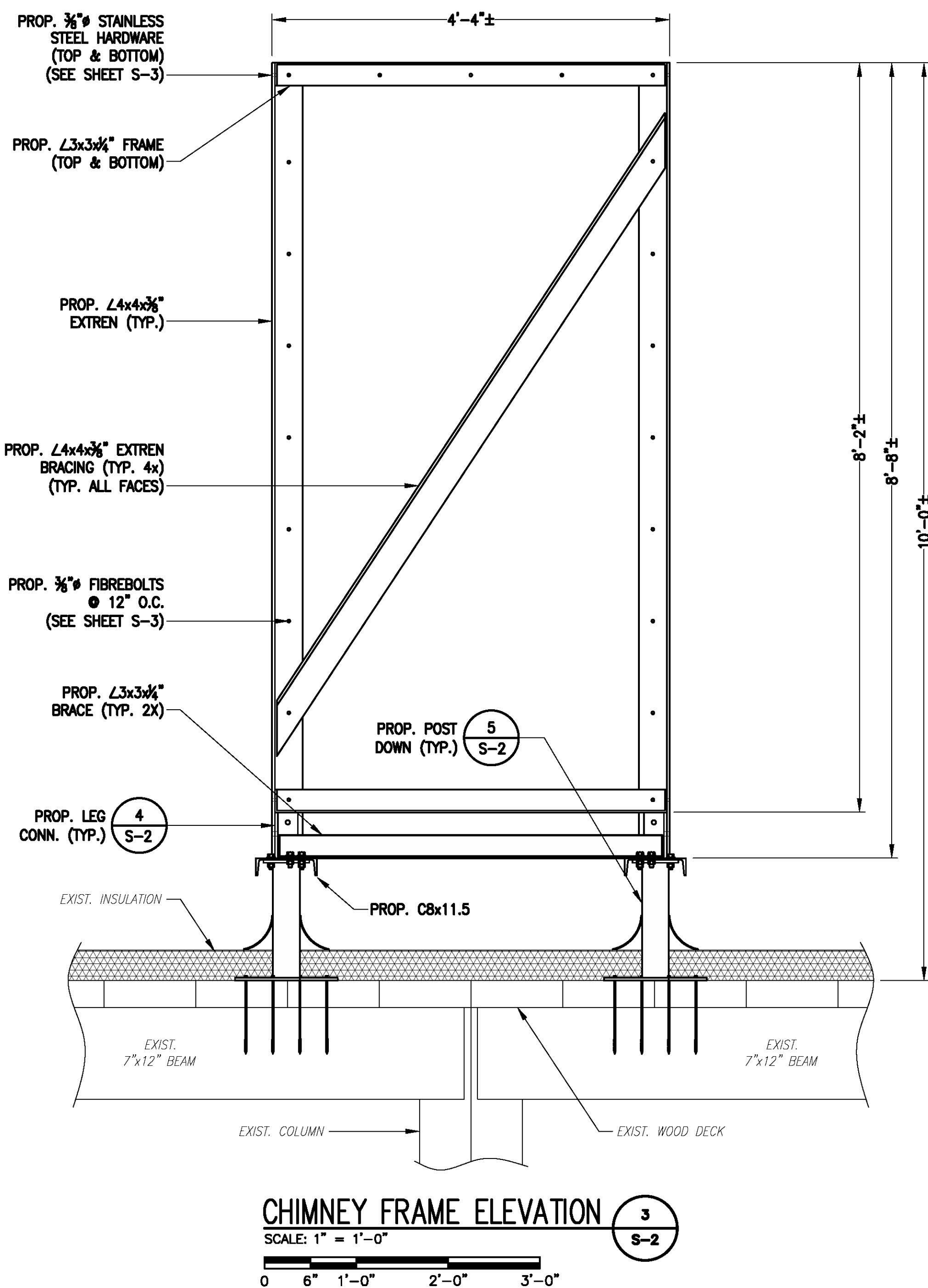
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SHEET TITLE
STRUCTURAL DETAILS
FACADE MOUNT

SHEET NUMBER
S-1

1. ALL STRUCTURAL FIBERGLASS (FRP) SHAPES, PLATE & SHEET ARE TO BE EXTREME BY STRONGWELL, SERIES 525 (OR APPROVED EQUAL).
2. HAND LAID DUAL CORE PANELS ARE TO BE MIN. 1" THICK, NOT INCLUDING DECORATIVE TEXTURE ON EXTERIOR.
3. FRP PANELS SHALL BE PAINTED/TEXTURED TO MATCH EXISTING BUILDING, CHIMNEYS, AND/OR OTHER ROOFTOP EQUIPMENT.



SHEET NUMBER

S-2

HARDWARE INSTALLATION NOTES

1. ALL HARDWARE IN DIRECT PATH OF ANTENNAS SHALL BE $\frac{3}{8}$ "-16 40% GLASS FILLED ISOPLAST GRAY FLANGE HEX HEAD CAP SCREWS AND 40% GLASS FILLED ISOPLAST FLANGE NUTS, EXCEPT AT REMOVABLE PANEL LOCATIONS. NO SUBSTITUTIONS PERMITTED WITHOUT PRIOR APPROVAL.

SUPPLIER INFORMATION:
E&T FASTENERS
41 ODELL SCHOOL ROAD, UNIT A
CONCORD, NC 28027
TEL: 704-933-5774
WWW.FASTENERCOMPONENTS.COM

2. ALL HARDWARE ON REMOVABLE PANELS SHALL BE $\frac{3}{8}$ " FIBREBOLT ASSEMBLY AS SHOWN IN DETAIL 3/S-3. SEE FIBREBOLT INSTALLATION NOTES.

3. ALL REMAINING HARDWARE SECURING SCREENING MATERIAL ON UPPER AND LOWER STEEL HALO FRAMES SHALL BE $\frac{3}{8}$ " GALVANIZED OR STAINLESS STEEL HARDWARE. UTILIZE FLAT AND LOCK WASHERS TO PREVENT CRUSHING OF EXTREN L'S WHEN TIGHTENING BOLTS. LOCATE FLAT WASHERS AGAINST EACH FACE OF EXTREN L'S AS REQUIRED TO PREVENT CRUSHING AND FRACTURING OF EXTREN MEMBER WHEN TIGHTENING FASTENERS.

4. POLYURETHANE ADHESIVE SHALL BE USED ON ALL NON-METALLIC HARDWARE, EXCEPT ON REMOVABLE PANEL LOCATIONS.

FIBREBOLT INSTALLATION PROCEDURE

FIBREBOLT STUDS AND NUTS HAVE PROPERTIES AND CHARACTERISTICS DIFFERENT FROM STEEL. FAILURE TO FOLLOW THE PROCEDURE BELOW CAN RESULT IN DAMAGE AND/OR PREMATURE FAILURE OF FIBREBOLT.

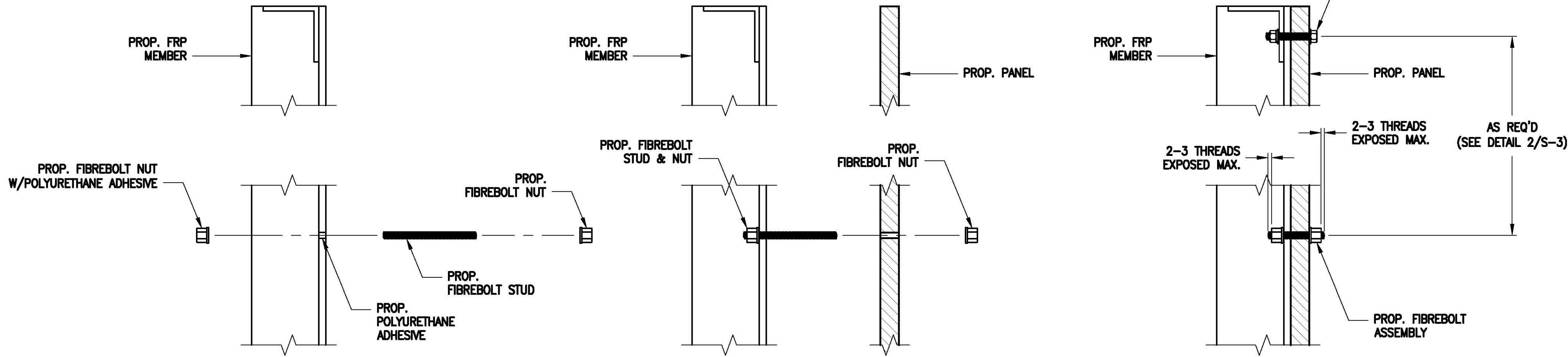
1. BEARING SURFACES OF NUTS MUST BE PARALLEL TO THE SURFACES BEING FASTENED.

2. A TORQUE WRENCH MUST BE USED. SEE THE TABLE BELOW:

SIZE	ULTIMATE TORQUE STRENGTH	RECOMMENDED MAXIMUM INSTALLATION TORQUE
$\frac{3}{8}$ - 16 UNC	8 FT. - LBS.	4 FT. - LBS.
$\frac{1}{2}$ - 13 UNC	18 FT. - LBS.	8 FT. - LBS.
$\frac{3}{4}$ - 11 UNC	35 FT. - LBS.	16 FT. - LBS.
$\frac{1}{2}$ - 10 UNC	50 FT. - LBS.	24 FT. - LBS.
$\frac{1}{2}$ - 8 UNC	110 FT. - LBS.	50 FT. - LBS.

3. WRENCHES MUST MAKE FULL CONTACT WITH ALL NUT EDGES. PARTIAL CONTACT WILL CAUSE THE CORNERS TO FRACTURE, AFFECTING THE PERFORMANCE OF THE STUD/NUT ASSEMBLY. A STANDARD SIX POINT SOCKET IS RECOMMENDED FOR THE HEX NUTS.

4. THE REMOVABLE PANEL IS BEING INSTALLED FOR ACCESS TO THE EQUIPMENT WITHIN THE FAUX CHIMNEY. ADHESIVE SHALL NOT BE INSTALLED ON THE FIBREBOLTS TO ALLOW FOR THE PANEL TO BE REMOVED. INSTALL FIBREBOLT NUTS USING THE RECOMMENDED MAXIMUM INSTALLATION TORQUE.



FIBREBOLT INSTALLATION NOTES

1. DRILL UNDERSIZED HOLE IN FRP MEMBER.

2. TAP FRP MEMBER FOR $\frac{3}{8}$ "-16 THREAD.

3. INSTALL FIBREBOLT $\frac{3}{8}$ "-16 (6" LONG) STUD INTO TAPPED FRP WITH POLYURETHANE ADHESIVE.

4. INSTALL FIBREBOLT NUT WITH POLYURETHANE ADHESIVE ON REAR SIDE OF FRP.

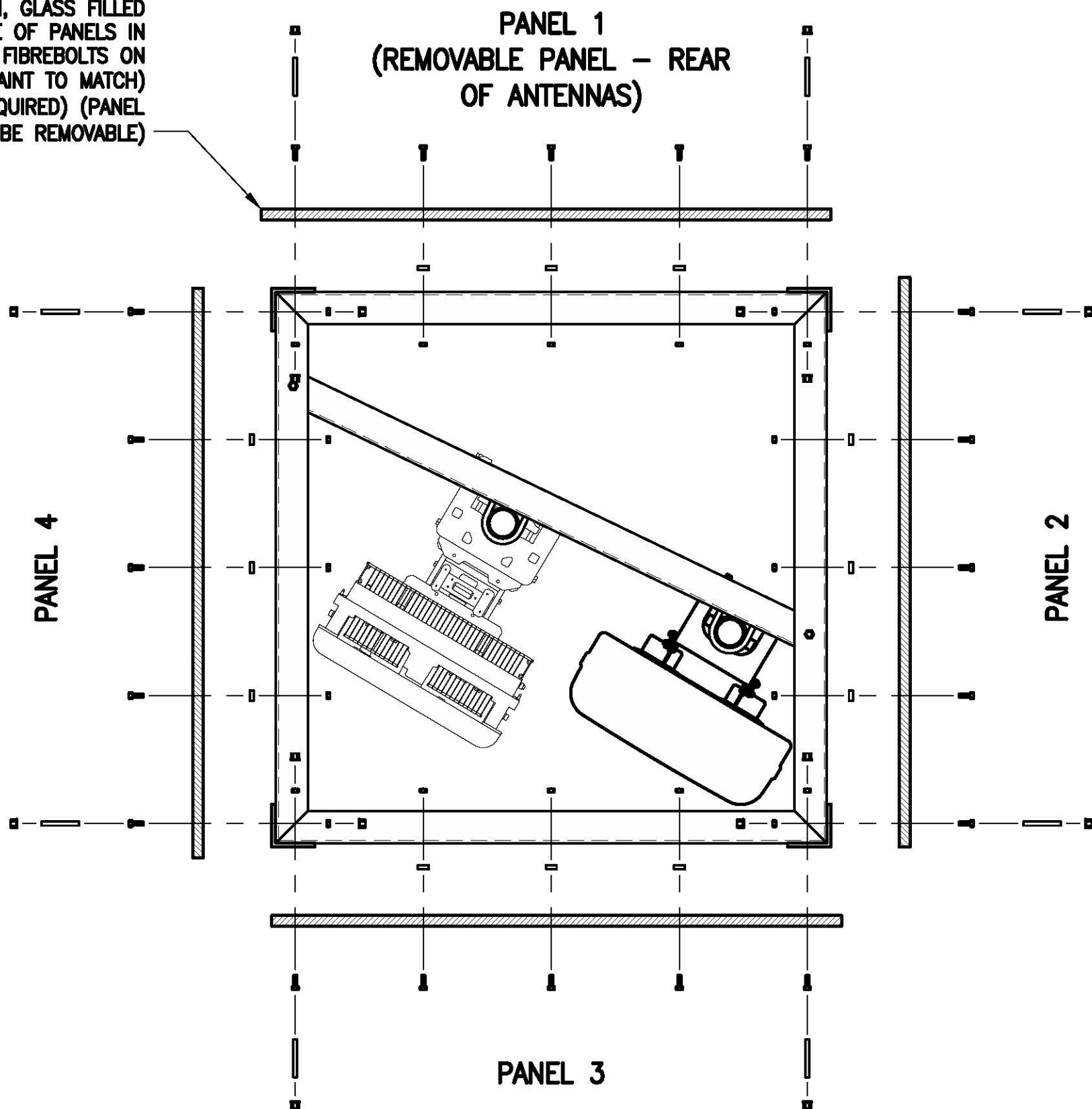
5. INSTALL PANEL AND EXTERIOR FIBREBOLT NUT. EXCESS THREADED STUD SHALL BE TRIMMED TO 2-3 THREADS UPON COMPLETION.

FIBREBOLT INSTALLATION DETAILS

SCALE: N.T.S.

3
S-3

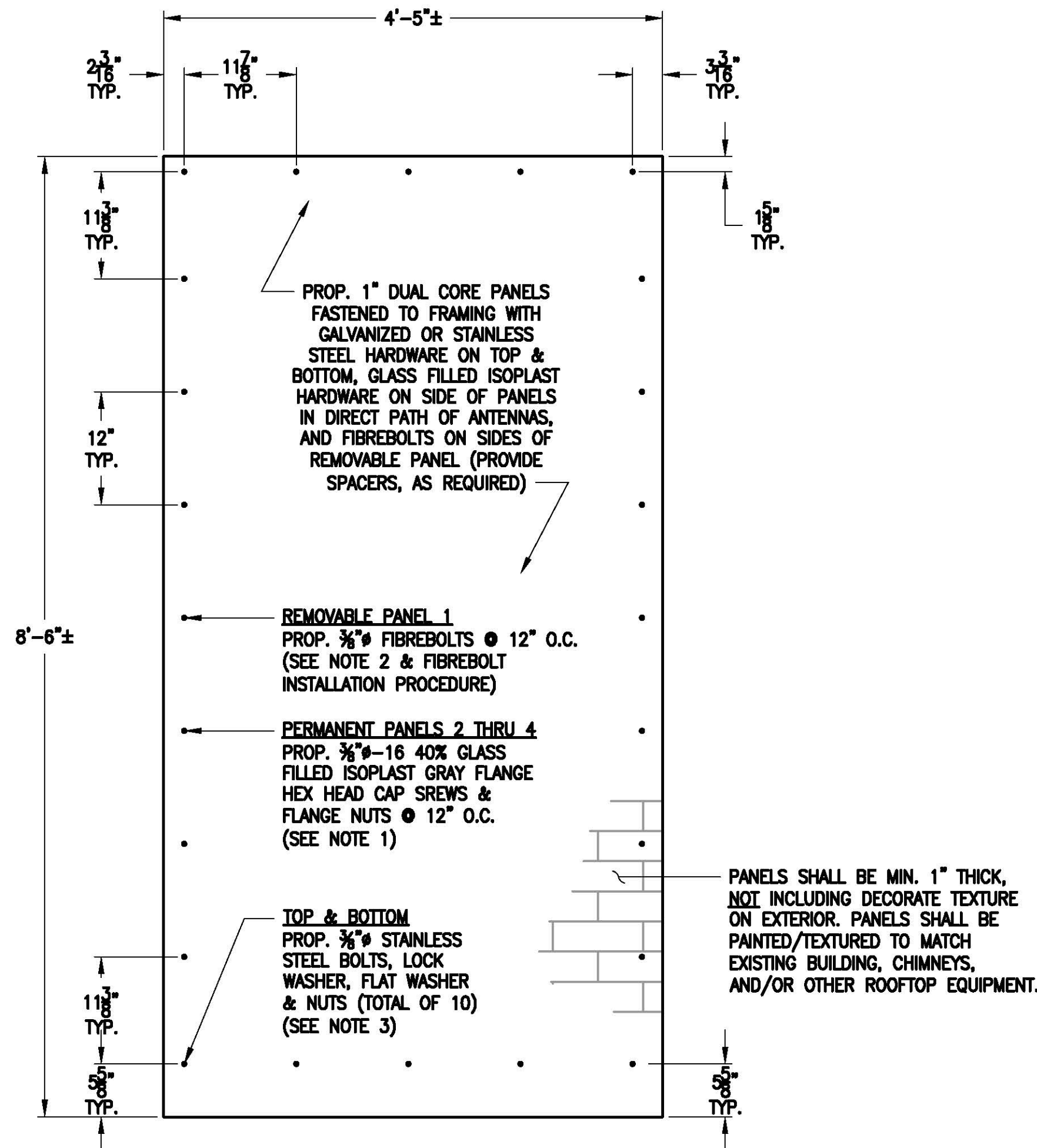
PROP. 1" DUAL CORE PANELS FASTENED TO FRAMING WITH GALVANIZED OR STAINLESS STEEL HARDWARE ON TOP & BOTTOM, GLASS FILLED ISOPLAST HARDWARE ON SIDE OF PANELS IN DIRECT PATH OF ANTENNAS, AND FIBREBOLTS ON SIDES OF REMOVABLE PANEL (PAINT TO MATCH) (PROVIDE SPACERS, AS REQUIRED) (PANEL BEHIND PROP. ANTENNAS SHALL BE REMOVABLE)



CHIMNEY PLAN

SCALE: 1" = 1'-0"

1
S-3



ALL PANELS

CHIMNEY PANELS

SCALE: 1/2" = 1'-0"

2
S-3

FRP NOTES

1. ALL STRUCTURAL FIBERGLASS (FRP) SHAPES, PLATE & SHEET ARE TO BE EXTREN BY STRONGWELL, SERIES S25 (OR APPROVED EQUAL).

2. HAND LAID DUAL CORE PANELS ARE TO BE MIN. 1" THICK, NOT INCLUDING DECORATIVE TEXTURE ON EXTERIOR.

3. FRP PANELS SHALL BE PAINTED/TEXTURED TO MATCH EXISTING BUILDING, CHIMNEYS, AND/OR OTHER ROOFTOP EQUIPMENT.



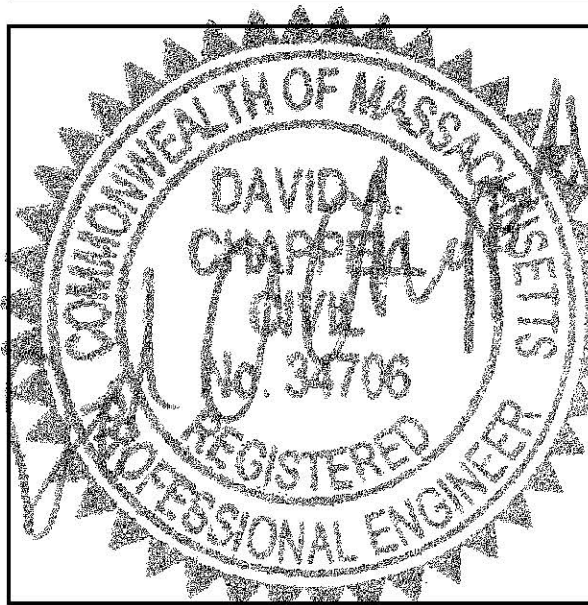
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3	11/13/18	CONSTRUCTION REVISED	JRV
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1	07/11/18	ISSUED FOR CONSTRUCTION	CMC
0	06/22/18	ISSUED FOR REVIEW	CMC

SITE NUMBER:
BS60XC003

SITE NAME:
ELI

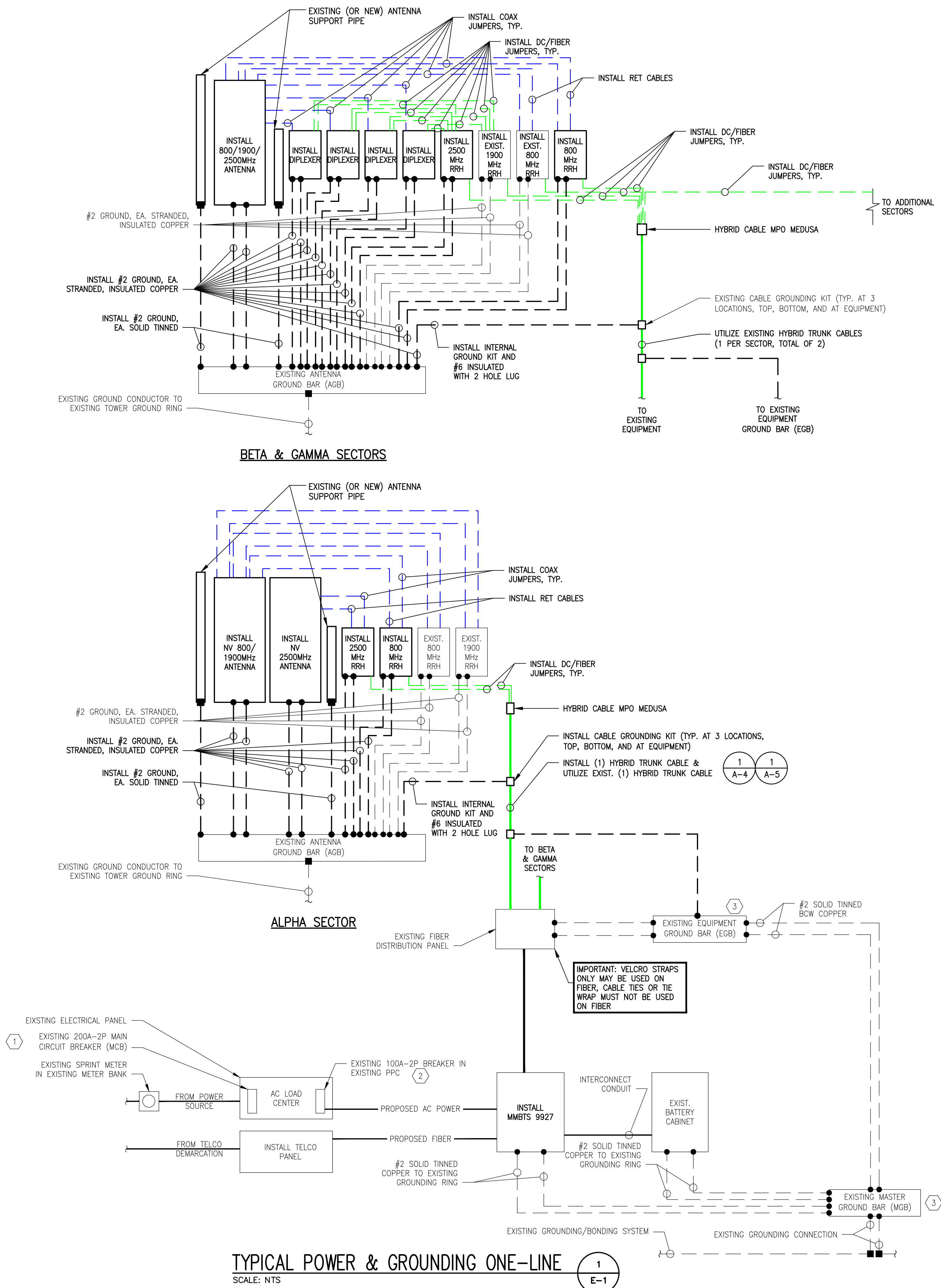
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CAMBRIDGE, MA 02139

SHEET TITLE

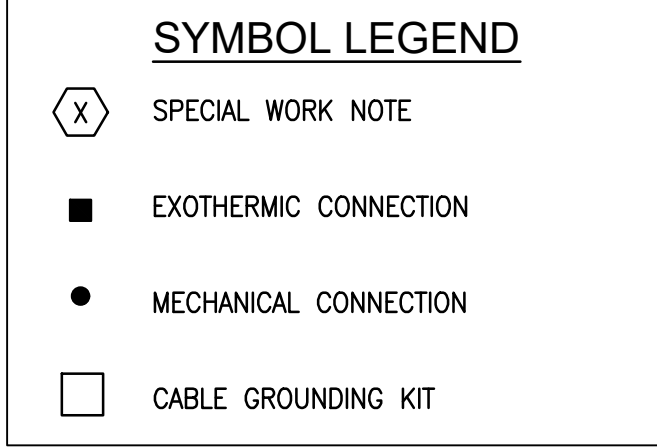
STRUCTURAL DETAILS
CHIMNEY PANELS

SHEET NUMBER

S-3

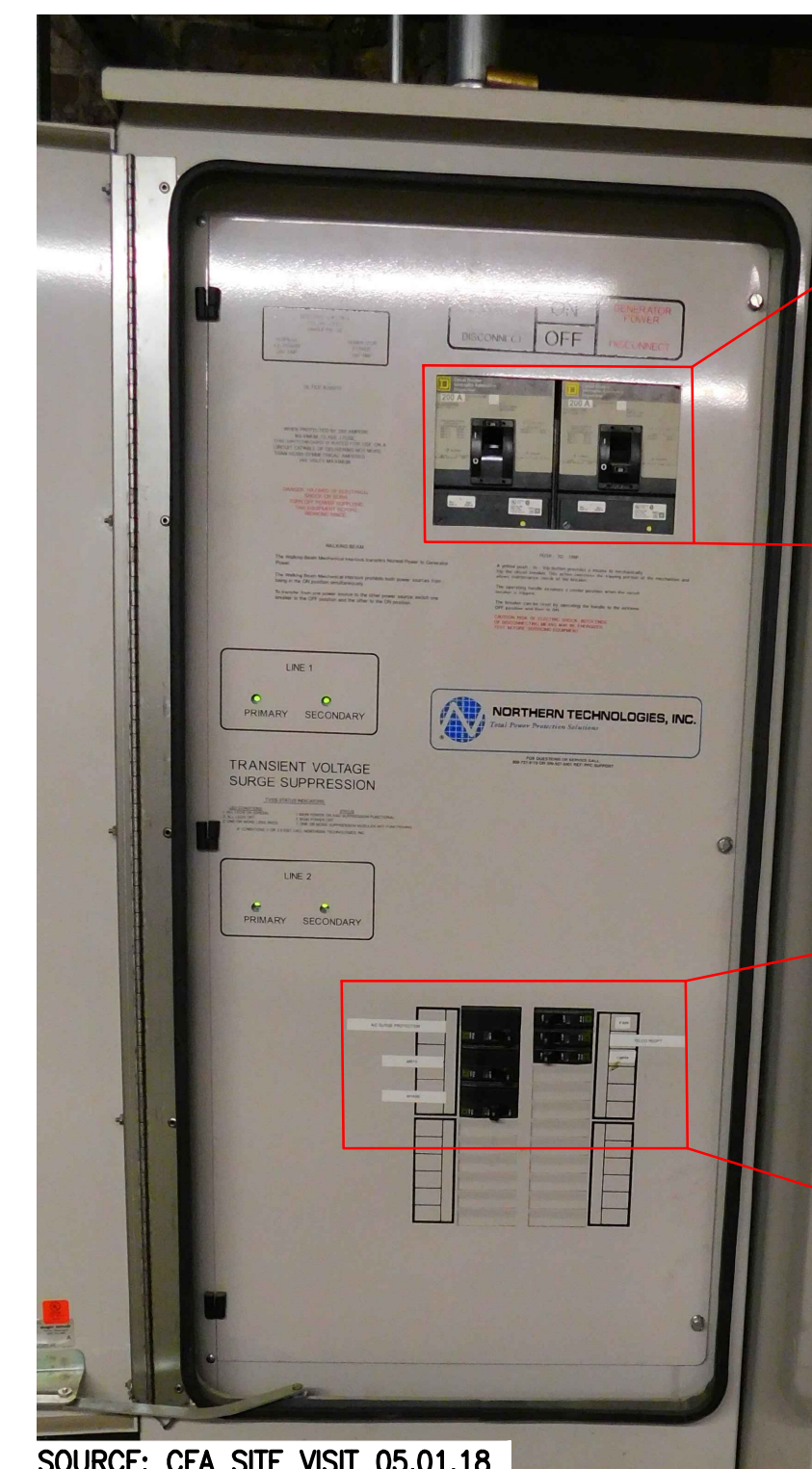


- SPECIAL WORK NOTE:**
- G.C. TO FURNISH AND INSTALL ALL COMPONENTS TO UPGRADE EXISTING ELECTRICAL SERVICE, CONDUIT, CONDUCTOR, PPC AND MCB IN ACCORDANCE WITH SPRINT CONSTRUCTION STANDARDS NV 2.5 ADDENDUM "ENGINEERING NOTICE 2013-002 (POWER UPGRADES) REV.0" (OR CURRENT VERSION)
 - G.C. TO FURNISH AND INSTALL UPGRADE THE EXISTING MMBTS BREAKER, CONDUCTOR, AND CONDUIT TO A MINIMUM NEC RATING FOR A 100-AMP, 240V CIRCUIT.
 - FOR NEW OR REPAIRED GROUNDING EQUIPMENT, REFER TO SPRINT GROUNDING STANDARDS AND FOLLOWING (SUPPLEMENTS):
-ANTI-THEFT UPDATE TO SPRINT GROUNDING DATED 08-24-12 (OR CURRENT VERSION)
-SPRINT ENGINEERING LETTER EL-0504 DATED 04-20-12 (OR CURRENT VERSION)



ELECTRICAL NOTES

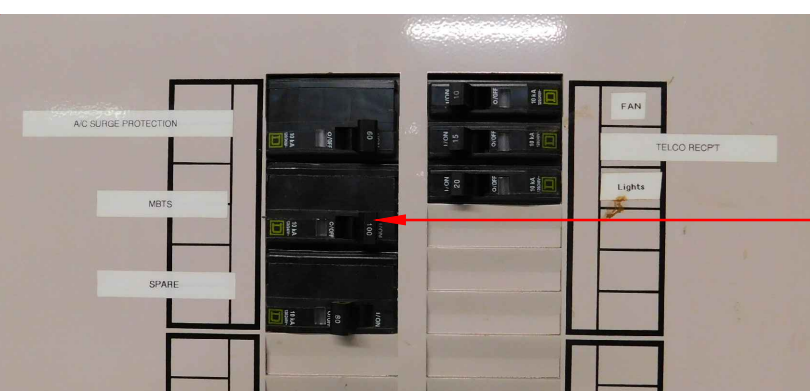
- ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
- THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL CONDUIT ROUTING WITH LOCAL UTILITY COMPANIES AND SPRINT CONSTRUCTION MANAGER.
- ALL CONDUITS ROUTED BELOW GRADE SHALL TRANSITION TO RIGID GALVANIZED ELBOWS WITH RIGID GALVANIZED STEEL CONDUIT ABOVE GRADE.
- ALL METAL CONDUITS SHALL BE PROVIDED WITH GROUNDING BUSHINGS.
- GENERAL CONTRACTOR SHALL PROVIDE ALL DIRECT BURIED CONDUITS WITH PLASTIC WARNING TAPE IDENTIFYING CONTENTS. TAPE COLORS SHALL BE ORANGE FOR TELEPHONE AND RED FOR ELECTRIC.
- ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
- THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIALS DESCRIBED BY DRAWINGS AND SPECIFICATIONS INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
- GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
- ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
- BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.
- ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THIN INSULATION.
- RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE PPC AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
- RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON THIS DRAWING PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
- FIBER OPTIC CIRCUITS SHALL BE IN ACCORDANCE WITH NEC ARTICLE 770-OPTICAL FIBER CABLES AND RACEWAYS.
- COMMUNICATIONS CIRCUITS SHALL BE IN ACCORDANCE WITH NEC ARTICLE 800-COMMUNICATIONS SYSTEMS.



SOURCE: CEA SITE VISIT 05.01.18



EXIST. 200A-2P MAIN CIRCUIT BREAKER (MCB)

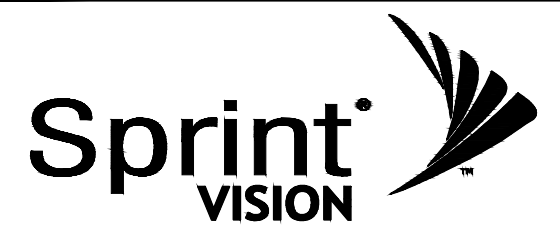


EXIST. 100A-2P MMBTS CIRCUIT BREAKER

EXIST. PPC BREAKER PANEL

SCALE: NTS

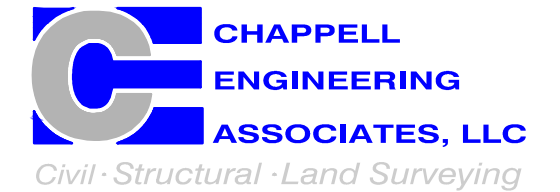
2
E-1



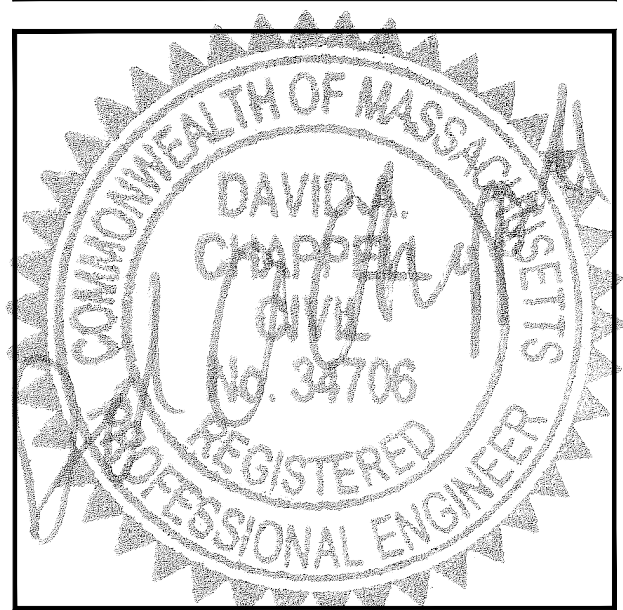
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1	07/11/18	ISSUED FOR CONSTRUCTION	CAW
0	06/22/18	ISSUED FOR REVIEW	CAW

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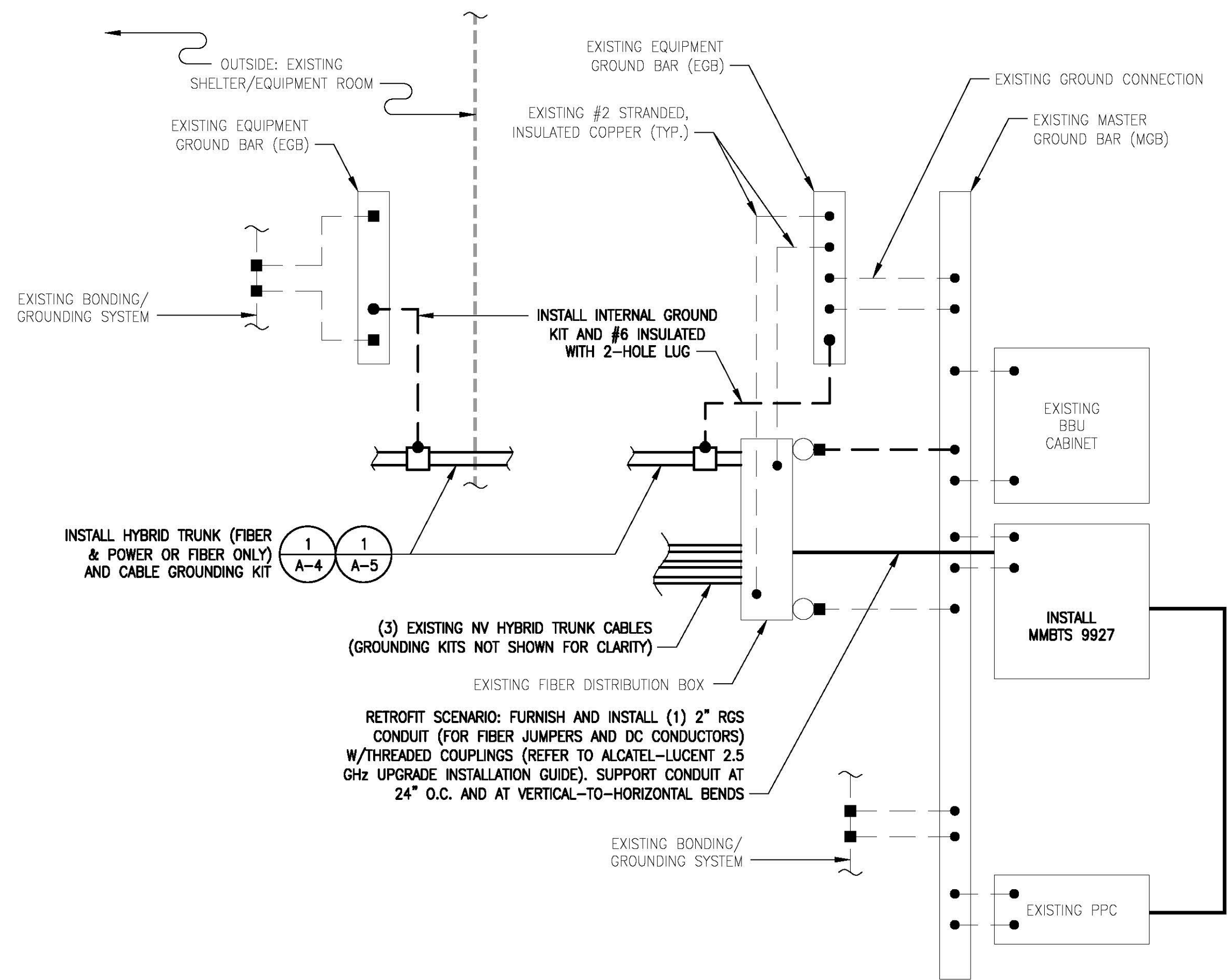
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CAMBRIDGE, MA 02139

SHEET TITLE

ONE-LINE DIAGRAM
& PPC DETAILS

SHEET NUMBER

E-1

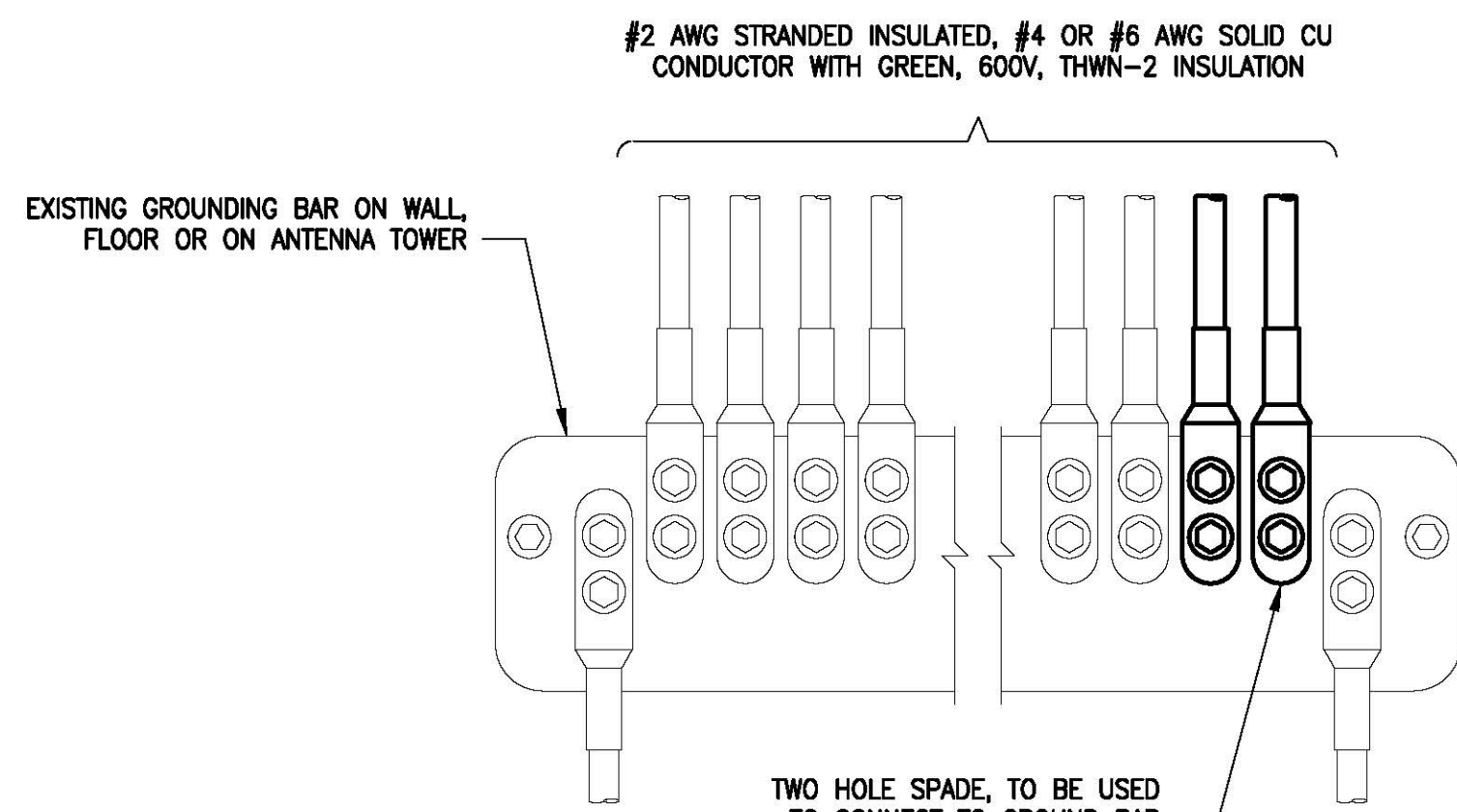


NOTE: HYBRIFLEX (FIBER & POWER) AND HYBRIFLEX (FIBER-ONLY) SHOWN. REFER TO RAN EQUIPMENT RFDS FOR SITE-SPECIFIC SCENARIO.

EQUIPMENT GROUNDING SCHEMATIC

SCALE: N.T.S.

1
E-2



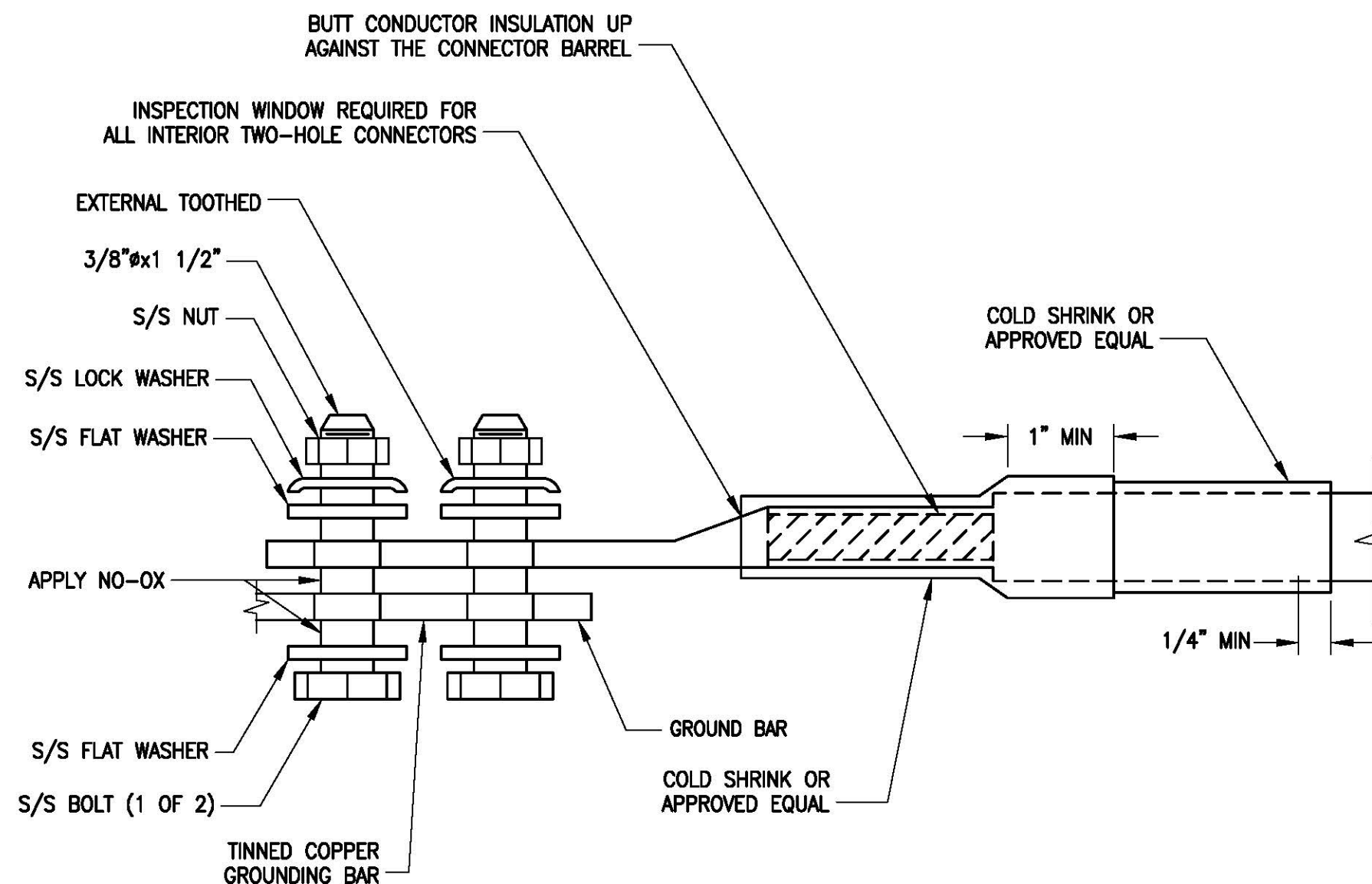
NOTES

1. APPLY NO-OX TO LUG AND BAR CONTACT SURFACE. DO NOT COAT INLINE LUG.
2. IF STOLEN GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT CM FOR REPLACEMENT THREADED ROD KIT.

INSTALLATION OF GROUNDING CONDUCTOR TO GROUNDING BAR

SCALE: N.T.S.

2
E-2



TWO HOLE LUG

SCALE: N.T.S.

3
E-2

SYMBOL LEGEND

- EXOTHERMIC CONNECTION
- MECHANICAL CONNECTION
- CABLE GROUNDING KIT
- GROUNDING/BONDING
- CONDUIT

UNLESS NOTED OTHERWISE, ALL BONDING CONDUCTORS ARE 2# SOLID TINNED BCW.

NOTE: EXISTING NV EQUIPMENT CONDUITS NOT SHOWN FOR CLARITY. REFER TO RECORD AS-BUILT NV PHOTOS AND NV AS-BUILT DRAWINGS.

PROTECTIVE GROUNDING SYSTEMS GENERAL NOTES:

1. GROUNDING SHALL BE IN ACCORDANCE WITH NEC ARTICLE 250—GROUNDING AND BONDING.
2. GROUNDING SHALL BE IN ACCORDANCE WITH SPRINT SSEO DOCUMENTS 3.018.02.004 "BONDING, GROUNDING AND TRANSIENT PROTECTION FOR CELL SITES" AND 3.018.10.002 "SITE RESISTANCE TO EARTH TESTING".
3. PROVIDE GROUND CONNECTIONS FOR ALL METALLIC STRUCTURES, ENCLOSURES, RACEWAYS AND OTHER CONDUCTIVE ITEMS ASSOCIATED WITH THE INSTALLATION OF CARRIER'S EQUIPMENT.
4. GROUND CONNECTIONS: CLEAN SURFACES THOROUGHLY BEFORE APPLYING GROUND LUGS OR CLAMPS. IF SURFACE IS COATED, REMOVE THE COATING, APPLY A NON-CORROSIVE APPROVED COMPOUND TO CLEAN SURFACE AND INSTALL LUGS OR CLAMPS. WHERE GALVANIZING IS REMOVED FROM METAL, IT SHALL BE PAINTED OR TOUCHED UP WITH "GALVAMOX" OR EQUAL.
5. ALL GROUNDING WIRES SHALL PROVIDE A STRAIGHT, DOWNWARD PATH TO GROUND WITH GRADUAL BENDS AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
6. ALL CLAMPS AND SUPPORTS USED TO SUPPORT THE GROUNDING SYSTEM CONDUCTORS AND PVC CONDUITS SHALL BE PVC TYPE (NON CONDUCTIVE). DO NOT USE METAL BRACKETS OR SUPPORTS WHICH WOULD FORM A COMPLETE RING AROUND ANY GROUNDING CONDUCTOR.
7. ALL GROUND WIRES SHALL BE #2 SOLID TINNED BCW UNLESS NOTED OTHERWISE.
8. PROVIDE DEDICATED #2 AWG COPPER GROUND WIRE FROM EACH ANTENNA MOUNTING PIPE TO ASSOCIATED CIGBE.
9. GROUND ANTENNA BASES, FRAMES, CABLE RACKS, AND OTHER METALLIC COMPONENTS WITH #2 INSULATED TINNED STRANDED COPPER GROUNDING CONDUCTORS AND CONNECT TO INSULATED SURFACE MOUNTED GROUND BARS. CONNECTION DETAILS SHALL FOLLOW MANUFACTURER'S SPECIFICATIONS FOR GROUNDING.
10. EACH EQUIPMENT CABINET SHALL BE CONNECTED TO THE MASTER ISOLATION GROUND BAR (MGB) WITH #2 SOLID TINNED BCW EQUIPMENT CABINETS WILL HAVE (2) CONNECTIONS.
11. GROUND HYBRIFLEX SHIELD AT TOP, BOTTOM AND AT TRANSITION TO HYBRIFLEX JUMPER CABLES AT EQUIPMENT CABINET ENTRANCE USING MANUFACTURER'S GUIDELINES. WHEN HYBRIFLEX CABLE EXCEEDS 200', GROUND AT INTERVALS NOT EXCEEDING 100'.
12. THE CONTRACTOR SHALL VERIFY THAT THE EXISTING GROUND BARS HAVE ENOUGH SPACE/HOLES FOR ADDITIONAL TWO HOLE LUGS.
13. EXOTHERMIC WELDING IS RECOMMENDED FOR GROUNDING CONNECTION WHERE PRACTICAL OTHERWISE. THE CONNECTION SHALL BE MADE USING COMPRESSION TYPE-2 HOLES, LONG BARREL LUGS OR DOUBLE CRIMP "C" CLAMP. THE COPPER CABLES SHALL BE COATED WITH AN ANTI-OXIDANT (THOMAS BETTS KOPR-SHIELD) BEFORE MAKING THE CRIMP CONNECTIONS THE CONTRACTOR SHALL FOLLOW MANUFACTURER'S RECOMMENDED TORQUES ON THE BOLT ASSEMBLY TO SECURE CONNECTIONS.
14. AT ALL TERMINATIONS AT EQUIPMENT ENCLOSURES, PANEL, AND FRAMES OF EQUIPMENT AND WHERE EXPOSED FOR GROUNDING. CONDUCTOR TERMINATION SHALL BE PERFORMED UTILIZING TWO HOLE BOLTED TONGUE COMPRESSION TYPE LUGS WITH STAINLESS STEEL SELF-TAPPING SCREWS.
15. THE MASTER GROUND BAR (MGB) SHALL BE MADE OF BARE 1/4"x2" COPPER (FOR OUTDOOR APPLICATIONS IT SHALL BE TINNED COPPER) AND LARGE ENOUGH TO ACCOMMODATE THE REQUIRED NUMBER OF GROUND CONNECTIONS. THE HARDWARE SECURING THE MGB SHALL ELECTRICAL INSULATE THE MGB FROM ANY STRUCTURE TO WHICH IT IS FASTENED.
16. ALL BOLTS, WASHERS, AND NUTS USED ON GROUNDING CONNECTIONS SHALL BE STAINLESS STEEL.
17. ALL GROUNDING CONNECTIONS SHALL BE COATED WITH A COPPER SHIELD ANTI-CORROSIVE AGENT SUCH AS T&B KOPR SHIELD. VERIFY PRODUCT WITH SPRINT CONSTRUCTION MANAGER.
18. FOR NEW OR REPAIRED GROUNDING EQUIPMENT. REFER TO SPRINT GROUNDING STANDARDS AND FOLLOWING (SUPPLEMENTS):
 - ANTI-THEFT UPDATE TO SPRINT GROUNDING DATED 08-24-12 (OR CURRENT VERSION)
 - SPRINT ENGINEERING LETTER EL-0504 DATED 04-20-12 (OR CURRENT VERSION)



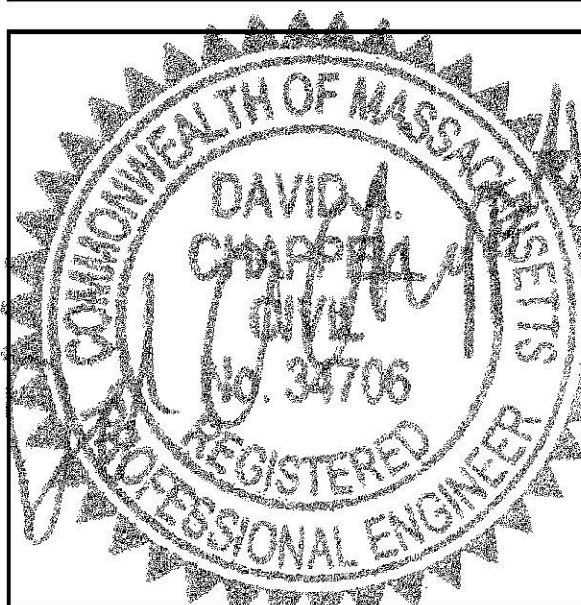
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SITE NUMBER:
BS60XC003

SITE NAME:
ELI

SITE ADDRESS:
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CAMBRIDGE, MA 02139

SHEET TITLE

GROUNDING DETAILS
& NOTES

SHEET NUMBER

E-2



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STRUCTURAL ANALYSIS
BS60XC003 – ELI



Address:
284 NORFOLK STREET
CAMBRIDGE, MA 02139

Date:
MARCH 27, 2019



March 27, 2019

Sprint

1 International Blvd
Suite 800
Mahwah, NJ 07495

RE:

Site Number BS60XC003B
Site Name Eli
Site Address 284 Norfolk Street, Cambridge, MA 02139

To whom it may concern:

Chappell Engineering Associates, LLC has performed a structural analysis of the proposed installation of the Sprint telecommunications facility at the above-referenced location. The existing building is a 5-story brick masonry commercial building with wood framed floor and roof structure. Sprint proposes to re-configure the existing telecommunications facility by locating one (1) additional panel antenna at each of the three antenna sectors. Additionally, (2) remote radio units (RRU's) will be located adjacent to the proposed antenna sectors on RRU ballast frames.

The existing Sprint *alpha* antenna is located on the face of the existing elevator penthouse. The proposed *alpha* antenna will be secured to the face of the existing elevator penthouse, adjacent to the existing in-service antenna. The proposed RRU units will be secured to a single RRU ballast frame located on the roof of the elevator penthouse roof.

The existing Sprint *beta* and *gamma* sector antennas are located on the main roof structure housed within two (2) triangular ballast-mounted RF radome assemblies. The ballast-mounted structures are located above the existing wood column locations. Because the existing radome assemblies are not large enough to accommodate the additional antenna being proposed, a new anchored 52in x 52in x 10ft tall false brick RF chimney is being proposed at each of the *beta* and *gamma* sectors (one false chimney at each location). An elevated steel base frame will be constructed at the the *beta* and *gamma* sectors in place of the existing triangular ballast mounts. The locations of the proposed RF antenna enclosures are Shown within our design drawings, which are enclosed for reference.

Based upon our analysis of the proposed Sprint installation, the information obtained during our site walk on 10-10-2018, and the magnitude of the anticipated loads, we consider the existing structure adequate to support the proposed Sprint installation as shown on our drawings. The results of our analysis are enclosed within this report.

If you have any questions regarding this matter, please do not hesitate to call.

Very truly yours,

CHAPPELL ENGINEERING ASSOCIATES, LLC



Clement J Salek, P.E.
CJS/cjs









SPECIAL CONSTRUCTION NOTE:
SPRINT SITE WORK IS CONTINGENT ON THE FOLLOWING:
• COMPLETION OF A GLOBAL STRUCTURAL STABILITY ANALYSIS (PROVIDED BY STRUCTURE OWNER OR A&E VENDOR).
• COMPLETION OF AN ANTENNA/RRH MOUNT STRUCTURAL ASSESSMENT (PROVIDED BY A&E VENDOR).
• GC SHALL FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS AS INDICATED IN BEFORE-MENTIONED ANALYSIS AND ASSESSMENT.

Sprint
VISION



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PROJECT: DO MACRO UPGRADE

SITE NAME: ELI

SITE CASCADE: BS60XC003

SITE ADDRESS: 284 NORFOLK STREET
CAMBRIDGE, MA 02139

SITE TYPE: ROOFTOP

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SITE NAME:
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SITE ADDRESS:
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CAMBRIDGE, MA 02139

SHEET TITLE
TITLE SHEET
SHEET NUMBER
T-1

SITE INFORMATION

PROPERTY OWNER:

NORSHIRE LLC,
288 NORFOLK STREET
CAMBRIDGE, MA 02139

LATITUDE (NAD83):

GOOGLE EARTH 2-C CONFIRMATION
N 42° 22' 16.70"
42.371306°

LONGITUDE (NAD83):

GOOGLE EARTH 2-C CONFIRMATION
W 71° 05' 49.80"
71.097167°

COUNTY:

MIDDLESEX

ZONING JURISDICTION:

CITY OF CAMBRIDGE

ZONING DISTRICT:

RESIDENCE C-1 (C-1)

POWER COMPANY:

EVERSOURCE ELECTRIC
PHONE: 1-800-592-2000

AAV PROVIDER:

COMCAST
PHONE: 1-800-COMCAST

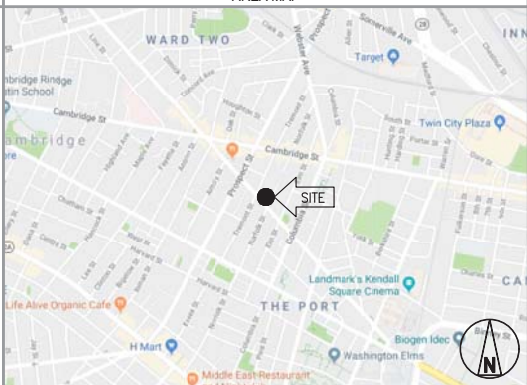
SPRINT CM:

RON FARIUS
PHONE: (401) 297-7043
RONALD.FARIUS@SPRINT.COM

EQUIPMENT SUPPLIER:

ALCATEL-LUCENT
600 MOUNTAIN AVENUE
MURRAY HILL, NJ 07974
(908) 508-8080

AREA MAP



LOCATION MAP - GOOGLE EARTH 2-C CONFIRMATION



PROJECT DESCRIPTION

SCOPE OF WORK:

GROUND-LEVEL RAN EQUIPMENT, CONSISTING OF:

- (1) NEW LTE BBU 2.5GHz RETROFIT KIT WITHIN EXISTING MM-BTS EQUIPMENT CABINET
- (3) NEW RECTIFIERS WITHIN EXISTING MM-BTS EQUIPMENT CABINET (IF REQ'D)
- (1) ADDITIONAL BATTERY STRING(S) INSIDE EXISTING BATTERY BACKUP (BBU) CABINET (IF REQ'D)

ROOF-TOP EQUIPMENT, INCLUDING INSTALLATION/REMOVAL OF:

- (11) EXISTING ANTENNAS TO BE REMOVED
- (4) EXISTING ANTENNAS TO BE REPLACED WITH (4) NEW ANTENNAS
- (6) REMOTE RADIO HEADS (RRH)
- (8) DIPLEXERS
- (1) HYBRID (FIBER & POWER) CABLE (AND ASSOCIATED FIBER, DC POWER, COAXIAL, CABLE JUMPERS AND ANTENNA REMOTE ELECTRICAL-TILT (RET) CABLE) TO REPLACE EXISTING SPRINT & CLEARWIRE COAX CABLES, HYBRID CABLES & INNERDUCTS

SPECIAL ZONING NOTE:

BASED ON INFORMATION PROVIDED BY SPRINT REGULATORY COMPLIANCE PROFESSIONALS AND LEGAL COUNSEL, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS CONSIDERED AN ELIGIBLE FACILITY UNDER THE MIDDLE CLASS TAX RELIEF AND JOB CREATION ACT OF 2012, 47 USC 1455(A), SECTION 6409(A), AND IS SUBJECT TO AN ELIGIBLE FACILITY REQUEST, EXPEDITED REVIEW, AND LIMITED/PARTIAL ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW, OR ADMINISTRATIVE REVIEW).

GENERAL NOTES

1. THIS IS AN UNMANNED AND RESTRICTED ACCESS TELECOMMUNICATION FACILITY, AND IS NOT FOR HUMAN HABITATION. IT WILL BE USED FOR THE TRANSMISSION OF RADIO SIGNAL FOR THE PURPOSE OF PROVIDING PUBLIC CELLULAR SERVICE.
 - ADA COMPLIANCE NOT REQUIRED.
 - PORTABLE WATER OR SANITARY SERVICE IS NOT REQUIRED.
 - NO OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES REQUIRED.
2. CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON JOB SITE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. FAILURE TO NOTIFY THE ARCHITECT/ENGINEER PLACE THE RESPONSIBILITY ON THE CONTRACTOR TO CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.
3. NEW CONSTRUCTION WILL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES.
 - BUILDING CODE: MASSACHUSETTS STATE BUILDING CODE 780 CMR (9TH EDITION)
 - ELECTRICAL CODE: 2017 NATIONAL ELECTRICAL CODE
 - STRUCTURAL CODE: TIA/EIA-222-H STRUCTURAL STANDARDS FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.

AT LEAST 72 HOURS PRIOR TO
DIGGING, THE CONTRACTOR IS
REQUIRED TO CALL DIG SAFE AT 811



DRAWING INDEX

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A-4	RF DATA SHEET	5	JMT	CMC
A-5	RAN WIRING DIAGRAMS	5	JMT	CMC
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S-1	STRUCTURAL DETAILS - FACADE MOUNT	5	JMT	CMC
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APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.

SPRINT: _____ DATE: _____

CONSTRUCTION MANAGER: _____ DATE: _____

LEASING/ SITE ACQUISITION: _____ DATE: _____

RF ENGINEER: _____ DATE: _____

LANDLORD/ TOWER OWNER: _____ DATE: _____

THESE OUTLINE SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT STANDARD CONSTRUCTION SPECIFICATIONS, INCLUDING CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

SECTION 01 100 - SCOPE OF WORK

PART 1 - GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT CONSTRUCTION STANDARDS FOR WIRELESS SITES, CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

- THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.
- SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HERewith.

1.3 PRECEDENCE: SHOULD CONFLICTS OCCUR BETWEEN THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES INCLUDING THE STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES AND THE CONSTRUCTION DRAWINGS, INFORMATION ON THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE. NOTIFY SPRINT CONSTRUCTION MANAGER IF THIS OCCURS.

1.4 NATIONALLY RECOGNIZED CODES AND STANDARDS:

- THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL AND LOCAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
 - GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT
 - GR-1089 CORE, ELECTROMAGNETIC COMPATIBILITY AND ELECTRICAL SAFETY -GENERIC CRITERIA FOR NETWORK TELECOMMUNICATIONS EQUIPMENT.
 - NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE - "NEC") AND NFPA 101 (LIFE SAFETY CODE).
 - AMERICAN SOCIETY OF TESTING OF MATERIALS (ASTM)
 - INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE)
 - AMERICAN CONCRETE INSTITUTE (ACI)
 - AMERICAN WIRE PRODUCERS ASSOCIATION (AWPA)
 - CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
 - AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
 - PORTLAND CEMENT ASSOCIATION (PCA)
 - NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
 - BRICK INDUSTRY ASSOCIATION (BIA)
 - AMERICAN WELDING SOCIETY (AWS)
 - NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
 - SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
 - DOOR AND HARDWARE INSTITUTE (DHI)
 - OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
 - APPLICABLE BUILDING CODES INCLUDING UNIFORM BUILDING CODE, SOUTHERN BUILDING CODE, BOCA, AND THE INTERNATIONAL BUILDING CODE.

1.5 DEFINITIONS:

- WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
- COMPANY: SPRINT CORPORATION
- ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
- CONTRACTOR: CONSTRUCTION CONTRACTOR; CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.
- THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.
- OFFICE: OWNER FURNISHED, CONTRACTOR INSTALLED EQUIPMENT.
- CONSTRUCTION MANAGER - ALL PROJECTS RELATED COMMUNICATION TO FLOW THROUGH SPRINT REPRESENTATIVE IN CHARGE OF PROJECT...
- SITE FAMILIARITY: CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE SPRINT CONSTRUCTION MANAGER PRIOR TO THE COMMENCEMENT OF WORK. NO COMPENSATION WILL BE AWARDED BASED ON CLAIM OF LACK OF KNOWLEDGE OR FIELD CONDITIONS.
- POINT OF CONTACT: COMMUNICATION BETWEEN SPRINT AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE SPRINT CONSTRUCTION MANAGER APPOINTED TO MANAGE THE PROJECT FOR SPRINT.
- ON-SITE SUPERVISION: THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.
- DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE: THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS, STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.
 - THE JOBSITE DRAWINGS, SPECIFICATIONS AND DETAILS SHALL BE CLEARLY MARKED DAILY IN RED PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS-BUILT" DRAWINGS.
 - DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK. CONTRACTOR SHALL NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY VARIATIONS PRIOR TO PROCEEDING WITH THE WORK.
 - DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. SPACING BETWEEN EQUIPMENT IS THE REQUIRED CLEARANCE. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, EXISTING CONDITIONS AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE SPRINT CONSTRUCTION MANAGER PRIOR TO PROCEEDING WITH THE WORK.
- USE OF JOB SITE: THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION AND RELATED OPERATIONS INCLUDING STAGING AND STORAGE OF MATERIALS AND EQUIPMENT, PARKING, TEMPORARY FACILITIES, AND WASTE STORAGE TO THE LEASE PARCEL UNLESS OTHERWISE PERMITTED BY THE CONTRACT DOCUMENTS.

1.11 UTILITIES SERVICES: WHERE NECESSARY TO CUT EXISTING PIPES, ELECTRICAL WIRES, CONDUITS, CABLES, ETC., OF UTILITY SERVICES, OR OF FIRE PROTECTION OR COMMUNICATIONS SYSTEMS, THEY SHALL BE CUT AND CAPPED AT SUITABLE PLACES OR WHERE SHOWN. ALL SUCH ACTIONS SHALL BE COORDINATED WITH THE UTILITY COMPANY INVOLVED:

1.12 PERMITS / FEES: WHEN REQUIRED THAT A PERMIT OR CONNECTION FEE BE PAID TO A PUBLIC UTILITY PROVIDER FOR NEW SERVICE TO THE CONSTRUCTION PROJECT, PAYMENT OF SUCH FEE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

1.13 CONTRACTOR SHALL TAKE ALL MEASURES AND PROVIDE ALL MATERIAL NECESSARY FOR PROTECTING EXISTING EQUIPMENT AND PROPERTY.

1.14 METHODS OF PROCEDURE (MOPS) FOR CONSTRUCTION: CONTRACTOR SHALL PERFORM WORK AS DESCRIBED IN THE FOLLOWING INSTALLATION AND COMMISSIONING MOPS.

- TOP HAT
- HOW TO INSTALL A NEW CABINET
- BASE BAND UNIT IN EXISTING UNIT
- INSTALLATION OF BATTERIES
- INSTALLATION OF HYBRID CABLE
- INSTALLATION OF RRH'S
- CABLING
- TS-0200 REV 4 - ANTENNA LINE ACCEPTANCE STANDARDS
- SPRINT CELL SITE ENGINEERING NOTICE - EN 2012-001, REV 1.
- COMMISSIONING MOPS
- SPRINT CELL SITE ENGINEERING NOTICE - EN-2013-002
- SPRINT ENGINEERING LETTER - EL-0504
- SPRINT ENGINEERING LETTER - EL-0508
- SPRINT TECHNICAL SPECIFICATION - TS-0193

1.15 USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:

- CONTRACTOR WILL UTILIZE ITS BEST EFFORTS TO WORK WITH SPRINT ELECTRONIC PROJECT MANAGEMENT SYSTEMS. CONTRACTOR UNDERSTANDS THAT SUFFICIENT INTERNET ACCESS, EQUIVALENT TO "BROADBAND" OR BETTER, IS REQUIRED TO TIMELY AND EFFECTIVELY UTILIZE SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS AND AGREES TO MAINTAIN APPROPRIATE CONNECTIONS FOR CONTRACTOR'S STAFF AND OFFICES THAT ARE COMPATIBLE WITH SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 TEMPORARY UTILITIES AND FACILITIES: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEPT AS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES AND FACILITIES INCLUDE POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILITIES, WASTE DISPOSAL FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PROVIDE TEMPORARY UTILITIES AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTHORITY HAVING JURISDICTION. CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVICE IN THE COMPLETION OF THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LESSORS OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

3.2 ACCESS TO WORK: THE CONTRACTOR SHALL PROVIDE ACCESS TO THE JOB SITE FOR AUTHORIZED COMPANY PERSONNEL AND AUTHORIZED REPRESENTATIVES OF THE ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

3.3 TESTING: REQUIREMENTS FOR TESTING BY THIS CONTRACTOR SHALL BE AS INDICATED HERewith ON THE CONSTRUCTION DRAWINGS, AND IN THE INDIVIDUAL SECTIONS OF THESE SPECIFICATIONS. SHOULD COMPANY CHOOSE TO ENGAGE ANY THIRD-PARTY TO CONDUCT ADDITIONAL TESTING, THE CONTRACTOR SHALL COOPERATE WITH AND PROVIDE A WORK AREA FOR COMPANY'S TEST AGENCY.

3.4 DIMENSIONS: VERIFY DIMENSIONS INDICATED ON DRAWINGS WITH FIELD DIMENSIONS BEFORE FABRICATION OR ORDERING OF MATERIALS. DO NOT SCALE DRAWINGS.

3.5 EXISTING CONDITIONS: NOTIFY THE SPRINT CONSTRUCTION MANAGER OF EXISTING CONDITIONS DIFFERING FROM THOSE INDICATED ON THE DRAWINGS. DO NOT REMOVE OR ALTER STRUCTURAL COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ARCHITECT AND ENGINEER.

SECTION 01 200 - COMPANY FURNISHED MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

- THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.
- SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HERewith.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 RECEIPT OF MATERIAL AND EQUIPMENT:

- COMPANY FURNISHED MATERIAL AND EQUIPMENT IS IDENTIFIED ON THE RF DATA SHEET IN THE CONSTRUCTION DOCUMENTS.
- THE CONTRACTOR IS RESPONSIBLE FOR SPRINT PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:
 - ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.
 - VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.
 - TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.
 - RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY-FOUR HOURS AFTER RECEIPT, REPORT TO SPRINT OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.
 - PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.
 - COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF-LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

3.2 DELIVERABLES:

- COMPLETE SHIPPING AND RECEIPT DOCUMENTATION IN ACCORDANCE WITH COMPANY PRACTICE.
- IF APPLICABLE, COMPLETE LOST/STOLEN/DAMAGED DOCUMENTATION REPORT AS NECESSARY IN ACCORDANCE WITH COMPANY PRACTICE, AND AS DIRECTED BY COMPANY.
- UPLOAD DOCUMENTATION INTO SPRINT SITE MANAGEMENT SYSTEM (SMS) AND/OR PROVIDE HARD COPY DOCUMENTATION AS REQUESTED.

SECTION 01 300 - CELL SITE CONSTRUCTION

PART 1 - GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

- THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.
- SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HERewith.

1.3 NOTICE TO PROCEED:

- NO WORK SHALL COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF THE WORK ORDER.
- TOWER OWNER NOTIFICATION: ONCE THE CONTRACTOR HAS RECEIVED AND ACCEPTED THE NOTICE TO PROCEED, THE CONTRACTOR WILL CONTACT THE CONSTRUCTION MANAGER OF RECORD (NOTED ON THE FIRST PAGE ON THIS CONSTRUCTION DRAWING) A MINIMUM OF 48 HOURS PRIOR TO WORK START. UPON ARRIVAL TO THE JOB SITE, CONTRACTOR CREW IS REQUIRED TO NOTIFY THE CARRIER NOC WORK HAS BEGUN.
- PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 FUNCTIONAL REQUIREMENTS:

- THE ACTIVITIES DESCRIBED IN THIS PARAGRAPH REPRESENT MINIMUM ACTIONS AND PROCESSES REQUIRED TO SUCCESSFULLY COMPLETE THE WORK. THE ACTIVITIES DESCRIBED ARE NOT EXHAUSTIVE, AND CONTRACTOR SHALL TAKE ANY AND ALL ACTIONS AS NECESSARY TO SUCCESSFULLY COMPLETE THE CONSTRUCTION OF A FULLY FUNCTIONING WIRELESS FACILITY AT THE SITE IN ACCORDANCE WITH COMPANY PROCEDURES.
- SUBMIT SPECIFIC DOCUMENTATION AS INDICATED HEREIN, AND OBTAIN REQUIRED APPROVALS WHILE THE WORK IS BEING PERFORMED.
- MANAGE AND CONDUCT ALL FIELD CONSTRUCTION SERVICE RELATED ACTIVITIES
- PROVIDE CONSTRUCTION ACTIVITIES TO THE EXTENT REQUIRED BY THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
 - PERFORM ANY REQUIRED SITE ENVIRONMENTAL MITIGATION.
 - PREPARE GROUND SITES; PROVIDE DE-GRUBBING; AND ROUGH AND FINAL GRADING, AND COMPOUND SURFACE TREATMENTS.
 - MANAGE AND CONDUCT ALL ACTIVITIES FOR INSTALLATION OF UTILITIES INCLUDING ELECTRICAL AND TELCO BACKHAUL.
 - INSTALL UNDERGROUND FACILITIES INCLUDING UNDERGROUND POWER AND COMMUNICATIONS CONDUITS, AND UNDERGROUND GROUNDING SYSTEM.
 - INSTALL ABOVE GROUND GROUNDING SYSTEMS.
 - PROVIDE NEW HVAC INSTALLATIONS AND MODIFICATIONS.
 - INSTALL "H-FRAMES", CABINETS AND SHELTERS AS INDICATED.
 - INSTALL ROADS, ACCESS WAYS, CURBS AND DRAINS AS INDICATED.
 - ACCOMPLISH REQUIRED MODIFICATION OF EXISTING FACILITIES.
 - PROVIDE ANTENNA SUPPORT STRUCTURE FOUNDATIONS.
 - PROVIDE SLABS AND EQUIPMENT PLATFORMS.
 - INSTALL COMPOUND FENCING, SIGHT SHIELDING, LANDSCAPING AND ACCESS BARRIERS.
 - PERFORM INSPECTION AND MATERIAL TESTING AS REQUIRED HEREINAFTER.
 - CONDUCT SITE RESISTANCE TO EARTH TESTING AS REQUIRED HEREINAFTER.
 - INSTALL FIXED GENERATOR SETS AND OTHER STANDBY POWER SOLUTIONS.
 - INSTALL TOWERS, ANTENNA SUPPORT STRUCTURES AND PLATFORMS ON EXISTING TOWERS AS REQUIRED.
 - INSTALL CELL SITE RADIOS, MICROWAVE, GPS, COAXIAL MAINLINE, ANTENNAS, CROSS BAND COUPLERS, TOWER TOP AMPLIFIERS, LOW NOISE AMPLIFIERS AND RELATED EQUIPMENT.
 - PERFORM, DOCUMENT, AND CLOSE OUT ANY CONSTRUCTION CONTROL DOCUMENTS THAT MAY BE REQUIRED BY GOVERNMENT AGENCIES AND LANDLORDS.
 - PERFORM ANTENNA AND COAX SWEEP TESTING AND MAKE ANY AND ALL NECESSARY CORRECTIONS.
 - REMAIN ON SITE MOBILIZED THROUGHOUT HAND-OFF AND INTEGRATION TO ASSIST AS NEEDED UNTIL SITE IS DEEMED SUBSTANTIALLY COMPLETE AND PLACED "ON AIR."

3.2 GENERAL REQUIREMENTS FOR CIVIL CONSTRUCTION:

- CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.
- EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.
- CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.
 - IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
 - CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.
- CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION
- CONDUCT TESTING AS REQUIRED HEREIN.

3.3 DELIVERABLES:

- CONTRACTOR SHALL REVIEW, APPROVE, AND SUBMIT TO SPRINT SHOP DRAWINGS, PRODUCT DATA, SAMPLES, AND SIMILAR SUBMITTALS AS REQUIRED HEREINAFTER
- PROVIDE DOCUMENTATION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING. DOCUMENTATION SHALL BE FORWARDED IN ORIGINAL FORMAT AND/OR UPLOADED INTO SMS.
 - ALL CORRESPONDENCE AND PRELIMINARY CONSTRUCTION REPORTS.
 - PROJECT PROGRESS REPORTS.
 - CIVIL CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
 - ELECTRICAL SERVICE COMPLETION DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
 - LINE AND ANTENNA INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
 - POWER INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
 - TELCO READY DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
 - PPC (OR SHELTER) INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
 - TOWER CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
 - TOWER CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
 - BTS AND RADIO EQUIPMENT DELIVERED AT SITE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).

CONTINUE SHEET SP-2



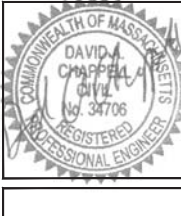
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CHECKED BY: JMT

APPROVED BY: JMT

SUBMITTALS			
REV.	DATE	DESCRIPTION	BY
5	03/06/19	CONSTRUCTION REVISED	CNC
4	02/16/19	CONSTRUCTION REVISED	CNC
3	11/13/18	CONSTRUCTION REVISED	JAV
2	10/19/18	CONSTRUCTION REVISED	CNC
1	07/11/18	ISSUED FOR CONSTRUCTION	CNC
0	06/22/18	ISSUED FOR REVIEW	CNC

SITE NUMBER:
BS60XC003
SITE NAME:
ELI
SITE ADDRESS:
284 NORFOLK STREET
CAMBRIDGE, MA 02139

SHEET TITLE
OUTLINE SPECIFICATIONS
SHEET NUMBER

SP-1

CONTINUED FROM SP-1:

12. NETWORK OPERATIONS HANDOFF CHECKLIST (HOC WALK) COMPLETE (UPLOAD FORM IN SMS)
13. CIVIL CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
14. SITE CONSTRUCTION PROGRESS PHOTOS UNLOADED INTO SMS.

SECTION 01 400 - SUBMITTALS, TESTS, AND INSPECTIONS

PART 1 - GENERAL

1.1 **THE WORK:** THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

- A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.
- B. SPRINT 'STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES' ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HERewith.

1.3 SUBMITTALS:

- A. THE WORK IN ALL ASPECTS SHALL COMPLY WITH THE CONSTRUCTION DRAWINGS AND THESE SPECIFICATIONS.
- B. SUBMIT THE FOLLOWING TO COMPANY REPRESENTATIVE FOR APPROVAL.
 1. CONCRETE MIX-DESIGNS FOR TOWER FOUNDATIONS, ANCHORS PIERS, AND CONCRETE PAVING.
 2. CONCRETE BREAK TESTS AS SPECIFIED HEREIN.
 3. SPECIAL FINISHES FOR INTERIOR SPACES, IF ANY.
 4. ALL EQUIPMENT AND MATERIALS SO IDENTIFIED ON THE CONSTRUCTION DRAWINGS.
 5. CHEMICAL GROUNDING DESIGN.
- C. ALTERNATES: AT THE COMPANY'S REQUEST, ANY ALTERNATIVES TO THE MATERIALS OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRINT'S CONSTRUCTION MANAGER FOR APPROVAL PRIOR TO BEING SHIPPED TO SITE. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED. SUBMITTAL FOR APPROVAL SHALL INCLUDE A STATEMENT OF COST REDUCTION PROPOSED FOR USE OF ALTERNATE PRODUCT.

1.4 TESTS AND INSPECTIONS:

- A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.
- B. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
 1. COAX SWEEPS AND FIBER TESTS PER SPRINT TS-0200 CURRENT VERSION ANTENNA LINE ACCEPTANCE STANDARDS.
 2. AZIMUTH AND DOWNTILT USING ELECTRONIC COMMERCIAL MADE-FOR-THE-PURPOSE ANTENNA ALIGNMENT TOOL.
 3. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.
- C. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:
 1. AZIMUTH, DOWNTILT, AZL - UPLOAD REPORT FROM ANTENNA ALIGNMENT TOOL TO SITERA TASK 465. INSTALLED AZIMUTH, DOWNTILT, AND AZL MUST CONFORM TO THE RF DATA SHEETS. SWEEP AND FIBER TESTS
 2. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT
 3. ALL AVAILABLE JURISDICTIONAL INFORMATION
 4. PDF SCAN OF REDLINES PRODUCED IN FIELD
 5. ELECTRONIC AS-BUILT DRAWINGS IN AUTOCAD AND PDF FORMATS. ANY FIELD CHANGE MUST BE REFLECTED BY MODIFYING THE PLANS, ELEVATIONS, AND DETAILS IN THE DRAWING SETS. GENERAL NOTES INDICATING MODIFICATIONS WILL NOT BE ACCEPTED. CHANGES SHALL BE HIGHLIGHTED AS 'CLOUDS' IDENTIFIED AS THE 'AS-BUILT' CONDITION.
 6. LIEN WAIVERS
 7. FINAL PAYMENT APPLICATION
 8. REQUIRED FINAL CONSTRUCTION PHOTOS
 9. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS
 10. ALL POST NTP TASKS INCLUDING DOCUMENT UPLOADS COMPLETED IN SITERA (SPRINTS DOCUMENT REPOSITORY OF RECORD).

1.5 **COMMISSIONING:** PERFORM ALL COMMISSIONING AS REQUIRED BY APPLICABLE MOPS

1.6 **INTEGRATION:** PERFORM ALL INTEGRATION ACTIVITIES AS REQUIRED BY APPLICABLE MOPS

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 REQUIREMENTS FOR TESTING:

A. THIRD PARTY TESTING AGENCY: WHEN THE USE OF A THIRD PARTY INDEPENDENT TESTING AGENCY IS REQUIRED, THE AGENCY THAT IS SELECTED MUST PERFORM SUCH WORK ON A REGULAR BASIS IN THE STATE WHERE THE PROJECT IS LOCATED AND HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.

1. THE THIRD PARTY TESTING AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
2. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASHTO, AND OTHER METHODS IS NEEDED.
3. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASHTO, AND OTHER METHODS IS NEEDED.

3.2 REQUIRED TESTS:

- A. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
 1. CONCRETE CYLINDER BREAK TESTS FOR THE TOWER AND ANCHOR FOUNDATIONS AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
 2. ASPHALT ROADWAY COMPACTED THICKNESS, SURFACE SMOOTHNESS, AND COMPACTED DENSITY TESTING AS SPECIFIED IN SECTION: HOT MIX ASPHALT PAVING.
 3. FIELD QUALITY CONTROL TESTING AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
 4. TESTING REQUIRED UNDER SECTION: AGGREGATE BASE FOR ACCESS ROADS, PADS AND ANCHOR LOCATIONS
 5. STRUCTURAL BACKFILL COMPACTION TESTS FOR THE TOWER FOUNDATION.

6. SITE RESISTANCE TO EARTH TESTING PER EXHIBIT: CELL SITE GROUNDING SYSTEM DESIGN.
7. ANTENNA AND COAX SWEEP TESTS PER EXHIBIT: ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS.
8. GROUNDING AT ANTENNA MASTS FOR GPS AND ANTENNAS
9. ALL OTHER TESTS REQUIRED BY COMPANY OR JURISDICTION.

3.3 REQUIRED INSPECTIONS:

- A. SCHEDULE INSPECTIONS WITH COMPANY REPRESENTATIVE.
- B. CONDUCT INSPECTIONS INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
 1. GROUNDING SYSTEM INSTALLATION PRIOR TO EARTH CONCEALMENT DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
 2. FORMING FOR CONCRETE AND REBAR PLACEMENT PRIOR TO POUR DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
 3. COMPACTION OF BACKFILL MATERIALS; AGGREGATE BASE FOR ROADS, PADS, AND ANCHORS; ASPHALT PAVING; AND SHAFT BACKFILL FOR CONCRETE AND WOOD POLES, BY INDEPENDENT THIRD PARTY AGENCY.
 4. PRE- AND POST-CONSTRUCTION ROOFTOP AND STRUCTURAL INSPECTIONS ON EXISTING FACILITIES.
 5. TOWER ERECTION SECTION STACKING AND PLATFORM ATTACHMENT DOCUMENTED BY DIGITAL PHOTOGRAPHS BY THIRD PARTY AGENCY.
 6. ANTENNA AZIMUTH , DOWN TILT AND PER SUNLIGHT TOOL SUNSIGHT INSTRUMENTS - ANTENNA ALIGNMENT TOOL (AAT)
 7. VERIFICATION DOCUMENTED WITH THE ANTENNA CHECKLIST REPORT, BY A&E, SITE DEVELOPMENT REP, OR RF REP.
 8. FINAL INSPECTION CHECKLIST AND HANDOFF WALK (HOC.). SIGNED FORM SHOWING ACCEPTANCE BY FIELD OPS IS TO BE UPLOADED INTO SMS.
 9. COAX SWEEP AND FIBER TESTING DOCUMENTS SUBMITTED VIA SMS FOR RF APPROVAL.
 10. SCAN-ABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT
 11. ALL AVAILABLE JURISDICTIONAL INFORMATION.
 12. PDF SCAN OF REDLINES PRODUCED IN FIELD
- E. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.
- F. CONSTRUCTION INSPECTIONS AND CORRECTIVE MEASURES SHALL BE DOCUMENTED BY THE CONTRACTOR WITH WRITTEN REPORTS AND PHOTOGRAPHS. PHOTOGRAPHS MUST BE DIGITAL AND OF SUFFICIENT QUALITY TO CLEARLY SHOW THE SITE CONSTRUCTION. PHOTOGRAPHS MUST CLEARLY IDENTIFY THE PHOTOGRAPHED ITEM AND BE LABELED WITH THE SITE CASCADE NUMBER, SITE NAME, DESCRIPTION, AND DATE.

3.4 **DELIVERABLES:** TEST AND INSPECTION REPORTS AND CLOSEOUT DOCUMENTATION SHALL BE UPLOADED TO THE SMS AND/OR FORWARDED TO SPRINT FOR INCLUSION INTO THE PERMANENT SITE FILES.

A. THE FOLLOWING TEST AND INSPECTION REPORTS SHALL BE PROVIDED AS APPLICABLE.

1. CONCRETE MIX AND CYLINDER BREAK REPORTS.
2. STRUCTURAL BACKFILL COMPACTION REPORTS.
3. SITE RESISTANCE TO EARTH TEST.
4. ANTENNA AZIMUTH AND DOWN TILT VERIFICATION.
5. TOWER ERECTION INSPECTIONS AND MEASUREMENTS DOCUMENTING TOWER INSTALLED PER SUPPLIER'S REQUIREMENTS AND THE APPLICABLE SECTIONS HEREIN.
6. COAX CABLE SWEEP TESTS PER COMPANY'S 'ANTENNA LINE ACCEPTANCE STANDARDS'.

B. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES THE FOLLOWING:

1. TEST WELLS AND TRENCHES: PHOTOGRAPHS OF ALL TEST WELLS; PHOTOGRAPHS SHOWING ALL OPEN EXCAVATIONS AND TRENCHING PRIOR TO BACKFILLING SHOWING A TAPE MEASURE VISIBLE IN THE EXCAVATIONS INDICATING DEPTH.
2. CONDUITS, CONDUCTORS AND GROUNDING: PHOTOGRAPHS SHOWING TYPICAL INSTALLATION OF CONDUCTORS AND CONNECTORS; PHOTOGRAPHS SHOWING TYPICAL BEND RADIUS OF INSTALLED GROUND WIRES AND GROUND ROD SPACING;
3. CONCRETE FORMS AND REINFORCING: CONCRETE FORMING AT TOWER AND EQUIPMENT/SHELTER PAD/FOUNDATIONS - PHOTOGRAPHS SHOWING ALL REINFORCING STEEL, UTILITY AND CONDUIT STUB OUTS; PHOTOGRAPHS SHOWING CONCRETE POUR OF SHELTER SLAB/FOUNDATION, TOWER FOUNDATION AND GUY ANCHORS WITH VIBRATOR IN USE; PHOTOGRAPHS SHOWING EACH ANCHOR ON GUYED TOWERS, BEFORE CONCRETE POUR.
4. TOWER, ANTENNAS AND MAINLINE: INSPECTION AND PHOTOGRAPHS OF SECTION STACKING; INSPECTION AND PHOTOGRAPHS OF PLATFORM COMPONENT ATTACHMENT POINTS; PHOTOGRAPHS OF TOWER TOP GROUNDING; PHOTOS OF TOWER COAX LINE COLOR CODING AT THE TOP AND AT GROUND LEVEL; INSPECTION AND PHOTOGRAPHS OF OPERATIONAL OF TOWER LIGHTING, AND PLACEMENT OF FAA REGISTRATION SIGN; PHOTOGRAPHS SHOWING ADDITIONAL GROUNDING POINTS FOR TOWERS GREATER THAN 200 FEET; PHOTOS OF ANTENNA GROUND BAR, EQUIPMENT GROUND BAR, AND MASTER GROUND BAR; PHOTOS OF GPS ANTENNA(S); PHOTOS OF EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA; PHOTOS OF COAX WEATHERPROOFING - TOP AND BOTTOM; PHOTOS OF COAX GROUNDING--TOP AND BOTTOM; PHOTOS OF ANTENNA AND MAST GROUNDING; PHOTOS OF COAX CABLE ENTRY INTO SHELTER; PHOTOS OF PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
5. ROOF TOPS: PRE-CONSTRUCTION AND POST-CONSTRUCTION VISUAL INSPECTION AND PHOTOGRAPHS OF THE ROOF AND INTERIOR TO DETERMINE AND DOCUMENT CONDITIONS; ROOF TOP CONSTRUCTION INSPECTIONS AS REQUIRED BY THE JURISDICTION; PHOTOGRAPHS OF CABLE TRAY AND/OR ICE BRIDGE; PHOTOGRAPHS OF DOGHOUSE/CABLE EXIT FROM ROOF.
6. SITE LAYOUT - PHOTOGRAPHS OF THE OVERALL COMPOUND, INCLUDING EQUIPMENT PLATFORM FROM ALL FOUR CORNERS.
7. FINISHED UTILITIES: CLOSE-UP PHOTOGRAPHS OF THE PPC BREAKER PANEL; CLOSE-UP PHOTOGRAPH OF THE INSIDE OF THE TELCO PANEL AND NIU; CLOSE-UP PHOTOGRAPH OF THE POWER METER AND DISCONNECT; PHOTOS OF POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE; PHOTOGRAPHS AT METER BOX AND/OR FACILITY DISTRIBUTION PANEL.
8. REQUIRED MATERIALS CERTIFICATIONS: CONCRETE MIX DESIGNS, MILL CERTIFICATION FOR ALL REINFORCING AND STRUCTURAL STEEL, AND ASPHALT PAVING MIX DESIGN.
9. ANY AND ALL SUBMITTALS BY THE JURISDICTION OR COMPANY.

SECTION 01 500 - PROJECT REPORTING

PART 1 - GENERAL

1.1 **THE WORK:** THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

- A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.
- B. SPRINT 'STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES' ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HERewith.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 WEEKLY REPORTS:

- A. CONTRACTOR SHALL PROVIDE SPRINT WITH WEEKLY REPORTS SHOWING PROJECT STATUS. THIS STATUS REPORT FORMAT WILL BE PROVIDED TO THE CONTRACTOR BY SPRINT. THE REPORT WILL CONTAIN SITE ID NUMBER, THE MILESTONES FOR EACH SITE, INCLUDING THE BASELINE DATE, ESTIMATED COMPLETION DATE AND ACTUAL COMPLETION DATE.
- B. REPORT INFORMATION WILL BE TRANSMITTED TO SPRINT VIA ELECTRONIC MEANS AS REQUIRED. THIS INFORMATION WILL PROVIDE A BASIS FOR PROGRESS MONITORING AND PAYMENT.

3.2 PROJECT CONFERENCE CALLS:

- A. SPRINT MAY HOLD WEEKLY PROJECT CONFERENCE CALLS. CONTRACTOR WILL BE REQUIRED TO COMMUNICATE SITE STATUS, MILESTONE COMPLETIONS AND UPCOMING MILESTONE PROJECTIONS, AND ANSWER ANY OTHER SITE STATUS QUESTIONS AS NECESSARY.

3.3 PROJECT TRACKING IN SMS:

- A. CONTRACTOR SHALL PROVIDE SCHEDULE UPDATES AND PROJECTIONS IN THE SMS SYSTEM ON A WEEKLY BASIS.

3.4 ADDITIONAL REPORTING:

- A. ADDITIONAL OR ALTERNATE REPORTING REQUIREMENTS MAY BE ADDED TO THE REPORT AS DETERMINED TO BE REASONABLY NECESSARY BY COMPANY.

3.5 PROJECT PHOTOGRAPHS:

- A. FILE DIGITAL PHOTOGRAPHS OF COMPLETED SITE IN .JPEG FORMAT IN THE SMS PHOTO LIBRARY FOR THE RESPECTIVE SITE. PHOTOGRAPHS SHALL BE CLEARLY LABELED WITH SITE NUMBER, NAME AND DESCRIPTION, AND SHALL INCLUDE AT A MINIMUM THE FOLLOWING AS APPLICABLE:
 1. SHELTER AND TOWER OVERVIEW.
 2. TOWER FOUNDATION(S) - FORMS AND STEEL BEFORE POUR (EACH ANCHOR ON GUYED TOWERS).
 3. TOWER FOUNDATION(S) POUR WITH VIBRATOR IN USE (EACH ANCHOR ON GUYED TOWERS).
 4. TOWER STEEL AS BEING INSTALLED INTO HOLE (SHOW ANCHOR STEEL ON GUYED TOWERS).
 5. PHOTOS OF TOWER SECTION STACKING.
 6. CONCRETE TESTING / SAMPLES.
 7. PLACING OF ANCHOR BOLTS IN TOWER FOUNDATION.
 8. BUILDING/WATER TANK FROM ROAD FOR TENANT IMPROVEMENTS OR COMMENTS.
 9. SHELTER FOUNDATION--FORMS AND STEEL BEFORE POURING.
 10. SHELTER FOUNDATION POUR WITH VIBRATOR IN USE.
 11. COAX CABLE ENTRY INTO SHELTER.
 12. PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
 13. ROOFTOP PRE AND POST CONSTRUCTION PHOTOS TO INCLUDE PENETRATIONS AND INTERIOR CEILING.
 14. PHOTOS OF TOWER TOP COAX LINE COLOR CODING AND COLOR CODING AT GROUND LEVEL.
 15. PHOTOS OF ALL APPROPRIATE COMPANY OR REGULATORY SIGNAGE.
 16. PHOTOS OF EQUIPMENT BOLT DOWN INSIDE SHELTER.
 17. POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE AND POWER AND TELCO SUPPLY LOCATIONS INCLUDING METER/DISCONNECT.
 18. ELECTRICAL TRENCH(S) WITH ELECTRICAL / CONDUIT BEFORE BACKFILL.
 19. ELECTRICAL TRENCH(S) WITH FOIL-BACKED TAPE BEFORE FURTHER BACKFILL.
 20. TELCO TRENCH WITH TELEPHONE / CONDUIT BEFORE BACKFILL.
 21. TELCO TRENCH WITH FOIL-BACKED TAPE BEFORE FURTHER BACKFILL.
 22. SHELTER GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADIUS).
 23. TOWER GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADIUS).
 24. FENCE GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADIUS).
 25. ALL BTS GROUND CONNECTIONS.
 26. ALL GROUND TEST WELLS.
 27. ANTENNA GROUND BAR AND EQUIPMENT GROUND BAR.
 28. ADDITIONAL GROUNDING POINTS ON TOWERS ABOVE 200'.
 29. HVAC UNITS INCLUDING CONDENSERS ON SPLIT SYSTEMS.
 30. GPS ANTENNAS.
 31. CABLE TRAY AND/OR WAVEGUIDE BRIDGE.
 32. DOGHOUSE/CABLE EXIT FROM ROOF.
 33. EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA.
 34. MASTER BUS BAR.
 35. TELCO BOARD AND NIU.
 36. ELECTRICAL DISTRIBUTION WALL.
 37. CABLE ENTRY WITH SURGE SUPPRESSION.
 38. ENTRANCE TO EQUIPMENT ROOM.
 39. COAX WEATHERPROOFING--TOP AND BOTTOM OF TOWER.
 40. COAX GROUNDING --TOP AND BOTTOM OF TOWER.
 41. ANTENNA AND MAST GROUNDING.
 42. LANDSCAPING - WHERE APPLICABLE.

3.6 **FINAL PROJECT ACCEPTANCE:** COMPLETE ALL REQUIRED REPORTING TASKS PER CONTRACT, CONTRACT DOCUMENTS OR THE SPRINT INTEGRATED CONSTRUCTION STANDARDS FOR WIRELESS SITES AND UPLOAD INTO SITERA.

SECTION 07 500 - ROOF CUTTING, PATCHING AND REPAIR

SUMMARY:

THIS SECTION SPECIFIES CUTTING AND PATCHING EXISTING ROOFING SYSTEMS WHERE CONDUIT OR CABLES EXIT THE BUILDING ONTO THE ROOF OR BUILDING-MOUNTED ANTENNAS, AND AS REQUIRED FOR WATERTIGHT PERFORMANCE. ROOFTOP ENTRY OPENINGS IN MEMBRANE ROOFTOPS SHALL BE CONSTRUCTED TO COMPLY WITH LANDLORD, ANY EXISTING WARRANTY, AND LOCAL JURISDICTIONAL STANDARDS.

1.4 SUBMITTALS:

- A. PRE-CONSTRUCTION ROOF PHOTOS: COMPLETE A ROOF INSPECTION PRIOR TO THE INSTALLATION OF SPRINT EQUIPMENT ON ANY ROOFTOP BUILD. AT A MINIMUM INSPECT AND PHOTOGRAPH (MINIMUM 3 EA.) ALL AREAS IMPACTED BY THE ADDITION OF THE SPRINT EQUIPMENT.
- B. PROVIDE SIMILAR PHOTOGRAPHS SHOWING ROOF CONDITIONS AFTER CONSTRUCTION (MINIMUM 3 EA.)
- C. ROOF INSPECTION PHOTOGRAPHS SHOULD BE UPLOADED WITH CLOSEOUT PHOTOGRAPHS.



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CHECKED BY: JMT

APPROVED BY: JMT

SUBMITTALS			
REV.	DATE	DESCRIPTION	BY
5	03/08/19	CONSTRUCTION REVISED	CNC
4	02/19/19	CONSTRUCTION REVISED	CNC
3	11/13/18	CONSTRUCTION REVISED	JAV
2	10/19/18	CONSTRUCTION REVISED	CNC
1	07/11/18	ISSUED FOR CONSTRUCTION	CNC
0	06/22/18	ISSUED FOR REVIEW	CNC

SITE NUMBER:
BS60XC003

SITE NAME:
ELI

SITE ADDRESS:
284 NORFOLK STREET
CAMBRIDGE, MA 02139

SHEET TITLE

OUTLINE SPECIFICATIONS

SHEET NUMBER

SP-2

CONTINUE SHEET SP-3

CONTINUED FROM SP-2:
SECTION 09 900 - PAINTING

QUALITY ASSURANCE:

- A. COMPLY WITH GOVERNING CODES AND REGULATIONS. PROVIDE PRODUCTS OF ACCEPTABLE MANUFACTURERS WHICH HAVE BEEN IN SATISFACTORY USE IN SIMILAR SERVICE FOR THREE YEARS. USE EXPERIENCED INSTALLERS. DELIVER, HANDLE, AND STORE MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- B. COMPLY WITH ALL ENVIRONMENTAL REGULATIONS FOR VOLATILE ORGANIC COMPOUNDS.

MATERIALS:

- A. MANUFACTURERS: BENJAMIN MOORE, ICI DEVOE COATINGS, PPG, SHERWIN WILLIAMS OR APPROVED EQUAL. PROVIDE PREMIUM GRADE, PROFESSIONAL-QUALITY PRODUCTS FOR COATING SYSTEMS.

PAINT SCHEDULE:

- A. EXTERIOR ANTENNAE AND ANTENNA MOUNTING HARDWARE: ONE COAT OF PRIMER AND TWO FINISH COATS. PAINT FOR ANTENNAE SHALL BE NON-METALLIC BASED AND CONTAIN NO METALLIC PARTICLES. PROVIDE COLORS AND PATTERNS AS REQUIRED TO MASK APPEARANCE OF ANTENNAE ON ADJACENT BUILDING SURFACES AND AS ACCEPTABLE TO THE OWNER. REFER TO ANTENNA MANUFACTURER'S INSTRUCTIONS WHENEVER POSSIBLE.

- B. ROOF TOP CONSTRUCTION: TOUCH UP - PREPARE SURFACES TO BE REPAIRED. FOLLOW INDUSTRY STANDARDS AND REQUIREMENTS OF OWNER TO MATCH EXISTING COATING AND FINISH.

PAINTING APPLICATION:

1. INSPECT SURFACES; REPORT UNSATISFACTORY CONDITIONS IN WRITING; BEGINNING WORK MEANS ACCEPTANCE OF SUBSTRATE.
2. COMPLY WITH MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS FOR PREPARATION, PRIMING AND COATING WORK. COORDINATE WITH WORK OF OTHER SECTIONS.
3. MATCH APPROVED MOCK-UPS FOR COLOR, TEXTURE, AND PATTERN. RE-COAT OR REMOVE AND REPLACE WORK WHICH DOES NOT MATCH OR SHOWS LOSS OF ADHESION.
4. CLEAN UP, TOUCH UP AND PROTECT WORK.

TOUCHUP PAINTING:

1. GALVANIZING DAMAGE AND ALL BOLTS AND NUTS SHALL BE TOUCHED UP AFTER TOWER ERECTION WITH "GALVANOK", "DRY GALV." OR "ZINC-IT".
2. FIELD TOUCHUP PAINT SHALL BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.
3. ALL METAL COMPONENTS SHALL BE HANDLED WITH CARE TO PREVENT DAMAGE TO THE COMPONENTS, THEIR PRESERVATIVE TREATMENT, OR THEIR PROTECTIVE COATINGS.

SECTION 11 700 - ANTENNA ASSEMBLY, REMOTE RADIO HEADS AND CABLE INSTALLATION

SUMMARY:

THIS SECTION SPECIFIES INSTALLATION OF ANTENNAS, RRH'S, AND CABLE EQUIPMENT, INSTALLATION, AND TESTING OF COAXIAL FIBER CABLE.

ANTENNAS AND RRH'S:

THE NUMBER AND TYPE OF ANTENNAS AND RRH'S TO BE INSTALLED IS DETAILED ON THE CONSTRUCTION DRAWINGS.

HYBRID CABLE:

HYBRID CABLE WILL BE DC/FIBER AND FURNISHED FOR INSTALLATION AT EACH SITE. CABLE SHALL BE INSTALLED PER THE CONSTRUCTION DRAWINGS AND THE APPLICABLE MANUFACTURER'S REQUIREMENTS.

JUMPERS AND CONNECTORS:

FURNISH AND INSTALL 1/2" COAX JUMPER CABLES BETWEEN THE RRH'S AND ANTENNAS. JUMPERS SHALL BE TYPE LDF 4, FLC 12-50, CR 540, OR FXL 540. SUPER-FLEX CABLES ARE NOT ACCEPTABLE. JUMPERS BETWEEN THE RRH'S AND ANTENNAS OR TOWER TOP AMPLIFIERS SHALL CONSIST OF 1/2 INCH FOAM DIELECTRIC, OUTDOOR RATED COAXIAL CABLE. DO NOT USE SUPERFLEX OUTDOORS. JUMPERS SHALL BE FACTORY FABRICATED IN APPROPRIATE LENGTHS WITH A MAXIMUM OF 4 FEET EXCESS PER JUMPER AND HAVE CONNECTORS AT EACH END, MANUFACTURED BY SUPPLIER. IF JUMPERS ARE FIELD FABRICATED, FOLLOW MANUFACTURER'S REQUIREMENTS FOR INSTALLATION OF CONNECTORS

REMOTE ELECTRICAL TILT (RET) CABLES:

MISCELLANEOUS:

INSTALL SPLITTERS, COMBINERS, FILTERS PER RF DATA SHEET, FURNISHED BY SPRINT.

ANTENNA INSTALLATION:

THE CONTRACTOR SHALL ASSEMBLE ALL ANTENNAS ONSITE IN ACCORDANCE WITH THE INSTRUCTIONS SUPPLIED BY THE MANUFACTURER. ANTENNA HEIGHT, AZIMUTH, AND FEED ORIENTATION INFORMATION SHALL BE A DESIGNATED ON THE CONSTRUCTION DRAWINGS.

- A. THE CONTRACTOR SHALL POSITION THE ANTENNA ON TOWER PIPE MOUNTS SO THAT THE BOTTOM STRUT IS LEVEL. THE PIPE MOUNTS SHALL BE PLUMB TO WITHIN 1 DEGREE.
- B. ANTENNA MOUNTING REQUIREMENTS: PROVIDE ANTENNA MOUNTING HARDWARE AS INDICATED ON THE DRAWINGS.

HYBRID CABLES INSTALLATION:

- A. THE CONTRACTOR SHALL ROUTE, TEST, AND INSTALL ALL CABLES AS INDICATED ON THE CONSTRUCTION DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
- B. THE INSTALLED RADIUS OF THE CABLES SHALL NOT BE LESS THAN THE MANUFACTURER'S SPECIFICATIONS FOR BENDING RADI.
- C. EXTREME CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE CABLES DURING HANDLING AND INSTALLATION.
1. FASTENING MAIN HYBRID CABLES: ALL CABLES SHALL BE PERMANENTLY FASTENED TO THE COAX LADDER AT 4'-0" OC USING NON-MAGNETIC STAINLESS STEEL CLIPS.
 2. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA), WITHIN THE MMBTS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES:
 - a. FIBER: SUPPORT FIBER BUNDLES USING 3/4" VELCRO STRAPS OF THE REQUIRED LENGTH @ 18" OC. STRAPS SHALL BE UV, OIL AND WATER RESISTANT AND SUITABLE FOR INDUSTRIAL INSTALLATIONS AS MANUFACTURED BY TEXTOL OR APPROVED EQUAL.
 - b. DC: SUPPORT DC BUNDLES WITH ZIP TIES OF THE ADEQUATE LENGTH. ZIP TIES TO BE UV STABILIZED, BLACK NYLON, WITH TENSILE STRENGTH AT 12,000 PSI AS MANUFACTURED BY NELCO PRODUCTS OR EQUAL.

3. FASTENING JUMPERS: SECURE JUMPERS TO THE SIDE ARMS OR HEAD FRAMES USING STAINLESS STEEL THE WRAPS OR STAINLESS STEEL BUTTERFLY CLIPS.
4. CABLE INSTALLATION:
 - a. INSPECT CABLE PRIOR TO USE FOR SHIPPING DAMAGE, NOTIFY THE CONSTRUCTION MANAGER.
 - b. CABLE ROUTING: CABLE INSTALLATION SHALL BE PLANNED TO ENSURE THAT THE LINES WILL BE PROPERLY ROUTED IN THE CABLE ENVELOP AS INDICATED ON THE DRAWINGS. AVOID TWISTING AND CROSSEOVERS.
 - c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURES RECOMMENDED MAXIMUM BEND RADIUS.
5. GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.
6. HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED PER SPRINT TS-0200 CURRENT VERSION.
7. HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA-NUMERICALLY ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE - EN 2012-001, REV1

WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:

- A. ALL FIBER & COAX CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED.
- B. WEATHERPROOFED USING ONE OF THE FOLLOWING METHODS. ALL INSTALLATIONS MUST BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY BEST PRACTICES.
1. COLD SHRINK: ENCOMPASS CONNECTOR IN COLD SHRINK TUBING AND PROVIDE A DOUBLE WRAP OF 2" ELECTRICAL TAPE EXTENDING 2" BEYOND TUBING. PROVIDE 3M COLD SHRINK CXS SERIES OR EQUAL.
 2. SELF-AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF-AMALGAMATING TAPE 2" BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF-AMALGAMATING TAPE IN OPPOSITE DIRECTION. APPLY DOUBLE WRAP OF 2" WIDE ELECTRICAL TAPE EXTENDING 2" BEYOND THE SELF-AMALGAMATING TAPE.
 3. 3M SLUM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.
 4. OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE.

SECTION 11 800 - INSTALLATION OF MULTIMODAL BASE STATIONS (MMBTS) AND RELATED EQUIPMENT

SUMMARY:

- A. THIS SECTION SPECIFIES MMBTS CABINETS, POWER CABINETS, AND INTERNAL EQUIPMENT INCLUDING BY NOT LIMITED TO RECTIFIERS, POWER DISTRIBUTION UNITS, BASE BAND UNITS, SURGE ARRESTORS, BATTERIES, AND SIMILAR EQUIPMENT FURNISHED BY THE COMPANY FOR INSTALLATION BY THE CONTRACTOR (OFCI).
- B. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS MATERIALS AND PROVIDE ALL LABOR REQUIRED FOR INSTALLATION EQUIPMENT IN EXISTING CABINET OR NEW CABINET AS SHOWN ON DRAWINGS AND AS REQUIRE BY THE APPLICABLE INSTALLATION MOPS.
- C. COMPLY WITH MANUFACTURERS INSTALLATION AND START-UP REQUIREMENTS

DC CIRCUIT BREAKER LABELING

- A. LABEL CIRCUIT BREAKERS ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE - EN 2012-001, REV 1.

SECTION 11 800 - INSTALLATION OF MULTIMODAL BASE TRANSCIEVER STATIONS (MMBTS) AND RELATED EQUIPMENT

SUMMARY:

- A. THIS SECTION SPECIFIES MMBTS CABINETS, POWER CABINETS, AND INTERNAL EQUIPMENT INCLUDING BY NOT LIMITED TO RECTIFIERS, POWER DISTRIBUTION UNITS, BASE BAND UNITS, SURGE ARRESTORS, BATTERIES, AND SIMILAR EQUIPMENT FURNISHED BY THE COMPANY FOR INSTALLATION BY THE CONTRACTOR (OFCI).
- B. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS MATERIALS AND PROVIDE ALL LABOR REQUIRED FOR INSTALLATION EQUIPMENT IN EXISTING CABINET OR NEW CABINET AS SHOWN ON DRAWINGS AND AS REQUIRE BY THE APPLICABLE INSTALLATION MOPS.
- C. COMPLY WITH MANUFACTURERS INSTALLATION AND START-UP REQUIREMENTS

SUPPORTING DEVICES:

- A. MANUFACTURED STRUCTURAL SUPPORT MATERIALS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY THE FOLLOWING:
1. ALLIED TUBE AND CONDUIT
 2. 8-LINE SYSTEM
 3. UNISTRUT DIVERSIFIED PRODUCTS
 4. THOMAS & BETTS
- B. FASTENERS: TYPES, MATERIALS, AND CONSTRUCTION FEATURES AS FOLLOWS:
1. EXPANSION ANCHORS: CARBON STEEL WEDGE OR SLEEVE TYPE.
 2. POWER-DRIVEN THREADED STUDS: HEAT-TREATED STEEL, DESIGNED SPECIFICALLY FOR THE INTENDED SERVICE.
 3. FASTEN BY MEANS OF WOOD SCREWS ON WOOD.
 4. TOGGLE BOLTS ON HOLLOW MASONRY UNITS.
 5. CONCRETE INSERTS OR EXPANSION BOLTS ON CONCRETE OR SOLID MASONRY.
 6. MACHINE SCREWS, WELDED THREADED STUDS, OR SPRING-TENSION CLASPS ON STEEL.
 7. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE SHALL NOT BE PERMITTED.
 8. DO NOT WELD CONDUIT, PIPE STRAPS, OR ITEMS OTHER THAN THREADED STUDS TO STEEL STRUCTURES.
 9. IN PARTITIONS OF LIGHT STEEL CONSTRUCTION, USE SHEET METAL SCREWS.

SUPPORTING DEVICES:

- A. INSTALL SUPPORTING DEVICES TO FASTEN ELECTRICAL COMPONENTS SECURELY AND PERMANENTLY IN ACCORDANCE WITH NEC.
- B. COORDINATE WITH THE BUILDING STRUCTURAL SYSTEM AND WITH OTHER TRADES.
- C. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTING HARDWARE SECURELY TO THE STRUCTURE IN ACCORDANCE WITH THE FOLLOWING:
- D. ENSURE THAT THE LOAD APPLIED BY ANY FASTENER DOES NOT EXCEED 25 PERCENT OF THE PROOF TEST LOAD.
- E. USE VIBRATION AND SHOCK-RESISTANT FASTENERS FOR ATTACHMENTS TO CONCRETE SLABS.

ELECTRICAL IDENTIFICATION:

- A. UPDATE AND PROVIDE TYPED CIRCUIT BREAKER SCHEDULES IN THE MOUNTING BRACKET, INSIDE DOORS OF AC PANEL BOARDS WITH ANY CHANGES MADE TO THE AC SYSTEM.
- B. BRANCH CIRCUITS FEEDING AVIATION OBSTRUCTION LIGHTING EQUIPMENT SHALL BE CLEARLY IDENTIFIED AS SUCH AT THE BRANCH CIRCUIT PANELBOARD.

SECTION 26 200 - ELECTRICAL MATERIALS AND EQUIPMENT

CONDUIT:

- A. RIGID GALVANIZED STEEL (RGS) CONDUIT SHALL BE USED FOR EXTERIOR LOCATIONS ABOVE GROUND AND IN UNFINISHED INTERIOR LOCATIONS AND FOR ENCASED RUNS IN CONCRETE. RIGID CONDUIT AND FITTINGS SHALL BE STEEL, COATED WITH ZINC. EXTERIOR AND INTERIOR BY THE HOT DIP GALVANIZING PROCESS. CONDUIT SHALL BE PRODUCED TO ANSI SPECIFICATIONS C80.1, FEDERAL SPECIFICATION WW-C-581 AND SHALL BE LISTED WITH THE UNDERWRITERS' LABORATORIES. FITTINGS SHALL BE THREADED - SET SCREW OR COMPRESSION FITTINGS WILL NOT BE ACCEPTABLE. RGS CONDUITS SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND.
- B. UNDERGROUND CONDUIT IN CONCRETE SHALL BE POLYVINYLCHLORIDE (PVC) SUITABLE FOR DIRECT BURIAL AS APPLICABLE. JOINTS SHALL BE BELLED, AND FLUSH SOLVENT WELDED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. CONDUIT SHALL BE CARLON ELECTRICAL PRODUCTS OR APPROVED EQUAL.
- C. TRANSITIONS BETWEEN PVC AND RIGID (RGS) SHALL BE MADE WITH PVC COATED METALLIC LONG SWEEP RADIUS ELBOWS.
- D. EMT OR RIGID GALVANIZED STEEL CONDUIT MAY BE USED IN FINISHED SPACES CONCEALED IN WALLS AND CEILINGS. EMT SHALL BE MILD STEEL, ELECTRICALLY WELDED, ELECTRO-GALVANIZED OR HOT-DIPPED GALVANIZED AND PRODUCED TO ANSI SPECIFICATION C80.3, FEDERAL SPECIFICATION WW-C-563, AND SHALL BE UL LISTED. EMT SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND, OR APPROVED EQUAL. EMT SHALL BE METALLIC COMPRESSION. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE.
- E. LIQUID TIGHT FLEXIBLE METALLIC CONDUIT SHALL BE USED FOR FINAL CONNECTION TO EQUIPMENT. FITTINGS SHALL BE METALLIC GLAND TYPE COMPRESSION FITTINGS, MAINTAINING THE INTEGRITY OF CONDUIT SYSTEM. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE. MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL NOT EXCEED 6-FEET. LFMC SHALL BE PROTECTED AND SUPPORTED AS REQUIRE BY NEC. MANUFACTURERS OF FLEXIBLE CONDUITS SHALL BE CAROL, ANACONDA METAL HOSE OR UNIVERSAL METAL HOSE, OR APPROVED EQUAL.
- F. MINIMUM SIZE CONDUIT SHALL BE 3/4 INCH (21MM).

HUBS AND BOXES:

- A. AT ENTRANCES TO CABINETS OR OTHER EQUIPMENT NOT HAVING INTEGRAL THREADED HUBS PROVIDE METALLIC THREADED HUBS OF THE SIZE AND CONFIGURATION REQUIRED. HUB SHALL INCLUDE LOCKNUT AND NEOPRENE O-RING SEAL. PROVIDE IMPACT RESISTANT 105 DEGREE C PLASTIC BUSHINGS TO PROTECT CABLE INSULATION.
- B. CABLE TERMINATION FITTINGS FOR CONDUIT
1. CABLE TERMINATORS FOR RGS CONDUITS SHALL BE TYPE CRC BY O-2/GEDNEY OR EQUAL.
 2. CABLE TERMINATORS FOR LFMC SHALL BE ETCO - CL2075; OR MADE FOR THE PURPOSE PRODUCTS BY ROXTEC.
- C. EXTERIOR PULL BOXES AND PULL BOXES IN INTERIOR INDUSTRIAL AREAS SHALL BE PLATED CAST ALLOY, HEAVY DUTY, WEATHERPROOF, DUST PROOF, WITH GASKET, PLATED IRON ALLOY COVER AND STAINLESS STEEL COVER SCREWS, CROUSE-HINDS WAB SERIES OR EQUAL.
- D. CONDUIT OUTLET BODIES SHALL BE PLATED CAST ALLOY WITH SIMILAR GASKETED COVERS. OUTLET BODIES SHALL BE OF THE CONFIGURATION AND SIZE SUITABLE FOR THE APPLICATION. PROVIDE CROUSE-HINDS FORM 8 OR EQUAL.
- E. MANUFACTURER FOR BOXES AND COVERS SHALL BE HOFFMAN, SQUARE "D", CROUSE-HINDS, COOPER, ADALET, APPLETON, O-2 GEDNEY, RACO, OR APPROVED EQUAL.

SUPPLEMENTAL GROUNDING SYSTEM

- A. FURNISH AND INSTALL A SUPPLEMENTAL GROUNDING SYSTEM AS INDICATED ON THE DRAWINGS. SUPPORT SYSTEM WITH NON-MAGNETIC STAINLESS STEEL CLIPS WITH RUBBER GROMMETS. GROUNDING CONNECTORS SHALL BE TINNED COPPER WIRE, SIZES AS INDICATED ON THE DRAWINGS. PROVIDE STRANDED OR SOLID BARE OR INSULATED CONDUCTORS AS INDICATED.
- B. SUPPLEMENTAL GROUNDING SYSTEM: ALL CONNECTIONS TO BE MADE WITH CAD WELDS, EXCEPT AT EQUIPMENT USE LUGS OR OTHER AVAILABLE GROUNDING MEANS AS REQUIRED BY MANUFACTURER; AT GROUND BARS USE TWO HOLE SPADES WITH NO OX.
- C. STOLEN GROUND-BARS: IN THE EVENT OF STOLEN GROUND BARS, CONTACT SPRINT CM FOR REPLACEMENT INSTRUCTION USING THREADED ROD KITS.

EXISTING STRUCTURE:

- A. EXISTING EXPOSED WIRING AND ALL EXPOSED OUTLETS, RECEPTACLES, SWITCHES, DEVICES, BOXES, AND OTHER EQUIPMENT THAT ARE NOT TO BE UTILIZED IN THE COMPLETED PROJECT SHALL BE REMOVED OR DE-ENERGIZED AND CAPPED IN THE WALL, CEILING, OR FLOOR SO THAT THEY ARE CONCEALED AND SAFE. WALL, CEILING, OR FLOOR SHALL BE PATCHED TO MATCH THE ADJACENT CONSTRUCTION.

CONDUIT AND CONDUCTOR INSTALLATION:

- A. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BOXES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
- B. CONDUCTORS SHALL BE PULLED IN ACCORDANCE WITH ACCEPTED GOOD PRACTICE.



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SUBMITTALS			
REV.	DATE	DESCRIPTION	BY
5	03/06/19	CONSTRUCTION REVISED	CNC
4	02/19/19	CONSTRUCTION REVISED	CNC
3	11/13/18	CONSTRUCTION REVISED	JAV
2	10/19/18	CONSTRUCTION REVISED	CNC
1	07/11/18	ISSUED FOR CONSTRUCTION	CW
0	06/22/18	ISSUED FOR REVIEW	CW

SITE NUMBER:
BS60XC003

SITE NAME:
ELI

SITE ADDRESS:
284 NORFOLK STREET
CAMBRIDGE, MA 02139

SHEET TITLE
OUTLINE SPECIFICATIONS

SHEET NUMBER
SP-3



ALPHA SECTOR
INSTALL SPRINT 2500MHz ANTENNA TO EXIST. PIPE MOUNT ON EXIST. BUILDING FACADE TO REPLACE EXIST. PANEL ANTENNA (PAINT TO MATCH EXIST. BUILDING FACADE)

ALPHA SECTOR
INSTALL SPRINT 800/1900MHz ANTENNA TO EXIST. PIPE MOUNT ON EXIST. BUILDING FACADE (PAINT TO MATCH EXIST. BUILDING FACADE)

EXIST. CLEARWAVE LBY ANTENNA FACADE MOUNTED TO EXIST. PERIMETER ON EXIST. MOUNTS (TOTAL OF 2) (TO REMAIN)

EXIST. NEXTEL CABLE TRAYS TO BE REMOVED

EXIST. JURY ANTENNA WITHIN EXIST. CHIMNEY ON EXIST. STEEL FRAME

BETA & GAMMA SECTORS
EXIST. SPRINT 800MHz & 1900MHz RPT'S RELOCATED TO PROP. BALLAST FRAMES (1 EACH PER SECTOR, TOTAL OF 4)

ALL SECTORS
INSTALL SPRINT 800MHz & 1900MHz RPT'S ON PROP. BALLAST FRAME (1 EACH PER SECTOR, TOTAL OF 6)

ALL SECTORS
INSTALL RPH BALLAST FRAMES ON EXIST. ROOF (1 PER SECTOR, TOTAL OF 3)

BETA & GAMMA SECTORS
FUTURE PANEL ANTENNAS WITHIN FAUX CHIMNEY (1 PER SECTOR, TOTAL OF 2)

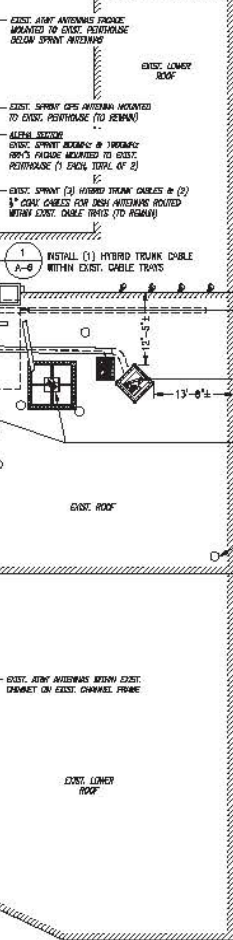
BETA & GAMMA SECTORS
INSTALL SPRINT 800/1900/2500MHz ANTENNAS WITHIN NEW FAUX CHIMNEY TO REPLACE EXIST. PANEL ANTENNAS (1 PER SECTOR, TOTAL OF 2)

BETA & GAMMA SECTORS
INSTALL SPRINT 4-6V4-6V10-6V11 FAUX CHIMNEYS ON EXIST. ROOF TO REPLACE EXIST. BALLAST MOUNTED FLUES (1 PER SECTOR, TOTAL OF 3) (PAINT/TEXTURE TO MATCH EXIST. BUILDING, CHIMNEYS AND/OR OTHER ROOF-TOP EQUIPMENT)

ALL SECTORS
EXIST. NEXTEL PANEL ANTENNAS FACADE MOUNTED TO EXIST. BUILDING TO BE REMOVED

NOTE:
ALL EXISTING SPRINT, NEXTEL & CLEARWAVE ANTENNAS, RPH'S, MOUNTS & BALLAST MOUNTED FLUES TO BE REMOVED PRIOR TO CONSTRUCTION.

ROOF PLAN
SCALE 1" = 10'-0"
1 A-1



EXIST. SPRINT (3) HYBRID TRUNK CABLES & (2) 5' COAX CABLES FOR DSH ANTENNAS ROUTED WITHIN EXIST. BUILDING (TO REMAIN)

EXIST. SPRINT FIBER DISTRIBUTION

EXIST. MWTS BBOX (TO BE REMOVED)

EXIST. STEEL PLATFORM

EXISTING EQUIPMENT PLAN
SCALE 1/4" = 1'-0"
2 A-1

EXIST. SPRINT (3) HYBRID TRUNK CABLES & (2) 5' COAX CABLES FOR DSH ANTENNAS ROUTED WITHIN EXIST. BUILDING (TO REMAIN)

EXIST. SPRINT FIBER DISTRIBUTION

INSTALL (1) NEW BATTERY STRING WITHIN EXIST. BATTERY CABINET (IF REQUIRED)

INSTALL NEW LITE BBU 2.5GHz RETROFIT KIT & RECTIFIERS (IF REQUIRED) WITHIN PROP. MW-BTS EQUIPMENT CABINET

INSTALL (1) MWTS BBOX (TO REPLACE MWTS BBOX)

EXIST. STEEL PLATFORM

EXIST. 4" DOWN-LINK GUTTER

PROPOSED EQUIPMENT PLAN
SCALE 1/4" = 1'-0"
3 A-1

NOTE:
COORDINATE CABINET UPGRADE WITH SPRINT CW. REPLACE EXIST. CABINET WITH MWTS BBOX (IF REQ'D)

Sprint VISION
1 INTERNATIONAL BLVD, SUITE 900
WATSON, MA 02460
(800) 367-7641

CENTERLINE
communications
85 RYAN DRIVE, SUITE 1
RAYMOND, MA 02267
(949) 748-8878
www.centerlinecommunications.com

CHAPPELL ENGINEERING ASSOCIATES, LLC
Civil Structural Land Surveying
R.V. EXECUTIVE CENTRE
201 BOSTON POST ROAD WEST, SUITE 101
MILFORD, MA 01752
(508) 481-7400
www.chapplingengineering.com

COMMONWEALTH OF MASSACHUSETTS
DAVID A. CHAPPELL
CIVIL
No. 34706
REGISTERED PROFESSIONAL ENGINEER

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SUBMITTALS			
REV.	DATE	DESCRIPTION	BY
5	03/08/18	CONSTRUCTION REVISED	CWC
4	02/19/18	CONSTRUCTION REVISED	CWC
3	11/13/16	CONSTRUCTION REVISED	JMT
2	10/14/16	CONSTRUCTION REVISED	CWC
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SITE NUMBER:
BS60XC003
SITE NAME:
ELI
SITE ADDRESS:
284 NORFOLK STREET
CAMBRIDGE, MA 02139

SHEET TITLE
ROOF & EQUIPMENT PLANS

SHEET NUMBER
A-1

* GC SHALL FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS AS INDICATED IN BEFORE-MENTIONED ANALYSIS AND ASSESSMENT.

CULTURE OF STRUCTURAL ANALYSIS



NOTE:
ALL EXISTING SPRINT, NEXTEL &
CLEARWIRE ANTENNAS, RRH'S, MOUNTS
& BALLAST MOUNTED FLUES TO BE
REMOVED PRIOR TO CONSTRUCTION.

0 2'-6" 5'-4" 10'-8" 16'-0"

A-2

SPRINT SITE WORK IS CONTINGENT ON THE FOLLOWING:

- * COMPLETION OF A GLOBAL STRUCTURAL STABILITY ANALYSIS (PROVIDED BY STRUCTURE OWNER OR AGE VENDOR).
- * COMPLETION OF AN ANTENNA/RRH MOUNT STRUCTURAL ASSESSMENT (PROVIDED BY AGE VENDOR).
- * GC SHALL FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS AS INDICATED IN BEFORE-MENTIONED ANALYSIS AND ASSESSMENT.

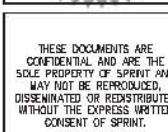
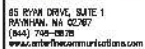
ADDITIONAL TOWER MAPPING AND STRUCTURAL ANALYSIS ARE REQUIRED PRIOR TO CONSTRUCTION. DRAWINGS ARE SUBJECT TO CHANGE PENDING OUTCOME OF STRUCTURAL ANALYSIS.

SUPPORT CONFIGURATION		PROPOSED CONFIGURATION	
ALPHA: (1) SPINNET ANTENNAS =	1.8 SQ.FT.	ALPHA: (2) SPINNET ANTENNAS =	14.0 SQ.FT.
BETA: (1) REU BALLAST FRAME =	1.8 SQ.FT.	BETA: (1) REU BALLAST FRAME =	12.0 SQ.FT.
BETA: (1) SPINNET ANTENNAS =	0.82 SQ.FT.	BETA: (2) SPINNET ANTENNAS =	29.0 SQ.FT.
BETA: (1) REU BALLAST FRAME =	0.82 SQ.FT.	BETA: (1) REU BALLAST FRAME =	12.0 SQ.FT.
DELTA: (1) SPINNET ANTENNAS =	0.82 SQ.FT.	DELTA: (2) SPINNET ANTENNAS =	22.0 SQ.FT.
DELTA: (1) REU BALLAST FRAME =	0.82 SQ.FT.	DELTA: (1) REU BALLAST FRAME =	13.0 SQ.FT.
TOTAL AREA =	114.2 SQ.FT.	TOTAL AREA =	94.0 SQ.FT.
	114.2 SQ.FT.		94.0 SQ.FT.
ADDING TO PLANT SURFACE AREA =	20.0 SQ.FT.		
	134.2 SQ.FT.		

EMPTY - EMPTY PIPE
(E) - EXISTING
(P) - INSTALL
NV - SPRINT ANTENNA
2.5 - SPRINT ANTENNA

SPECIAL INSTALLATION NOTE-
COAX JUMPERS FROM PROP. RRH TO
PROP. ANTENNA SHALL NOT EXCEED 15'.
NOTIFY SPRINT CM OF ANY DISCREPANCY.

1 INTERNATIONAL BLVD, SUITE 800
 MANASSA, NJ 07490
 (800) 357-7641



APPROVED BY: _____

REV	DATE	DESCRIPTION
3	03/08/18	CONSTRUCTION REVISED
4	02/19/19	CONSTRUCTION REVISED
3	11/13/18	CONSTRUCTION REVISED
2	10/19/18	CONSTRUCTION REVISED
1	07/11/18	ISSUED FOR CONSTRUCTION
0	06/22/18	ISSUED FOR REVIEW

SITE ADDRESS:
284 NORFOLK STREET
CAMBRIDGE, MA 02138

ANTENNA PLANS

SWEET MARIJUANA

A-3

PLAN SURFACE

CURRENT CONFIGURATION

ALPHA: (1) SPRINT ANTENNA	= 1.0 SQ.FT.
ALPHA TOTAL AREA	= 1.0 SQ.FT.
BETA: (1) SPRINT ANTENNA	= 0.3 SQ.FT.
BETA TOTAL AREA	= 0.3 SQ.FT.
GAMMA: (1) SPRINT ANTENNA	= 0.3 SQ.FT.
GAMMA TOTAL AREA	= 0.3 SQ.FT.
TOTAL AREA	= 114.2 SQ.FT.
	114.2 SQ.FT.
	910 SQ.FT.
	20.5 SQ.FT.

EXISTING ANTENNA PLAN

NOTE: EXISTING ADMITS FROM USE SITE VISIT, DATED 03/24/2016.

NOTE:
ALL EXISTING SPRINT, NEXTEL &
CLEARWIRE ANTENNAS, RHYS, MOUNTS
& BALLAST MOUNTED FLIES TO BE
REMOVED PRIOR TO CONSTRUCTION.

NOTE:
VERIFY PROPOSED AZIMUTHS
WITH RF ENGINEER PRIOR
TO INSTALLATION.

ALPHA SECTOR

INSTALL SPRINT 800/1800MHz ANTENNA TO EXIST. PIPE MOUNT ON EXIST. BUILDING FACADE (PAINT TO MATCH EXIST. BUILDING FACADE)

EXIST. CLEANLINE AIR ANTENNA (TO REMAIN)

ALPHA SECTOR
INSTALL SPRINT 800MHz RPH ON PROP. BALLAST FRAME

ALPHA SECTOR
INSTALL RPH BALLAST FRAME ON EXIST. ROOF

EXIST. OVERLAP PENETRANCE

EXIST. OVERLAP PENETRANCE

EXIST. SPRINT 800MHz RPH ANTENNA MOUNTED TO EXIST. PENETRANCE (TO REMAIN)

ALPHA SECTOR
EXIST. SPRINT 1800MHz RPH FACADE MOUNTED TO EXIST. PENETRANCE (TO REMAIN)

ALPHA SECTOR
EXIST. SPRINT 800MHz RPH FACADE MOUNTED TO EXIST. PENETRANCE (TO REMAIN)

EXIST. CLEANLINE AIR ANTENNA (TO REMAIN)

BETA SECTOR

INSTALL SPRINT 2000MHz ANTENNA TO EXIST. PIPE MOUNT ON EXIST. BUILDING FACADE (PAINT TO MATCH EXIST. BUILDING FACADE)

ALPHA SECTOR
INSTALL SPRINT 2000MHz RPH ON PROP. BALLAST FRAME

INSTALL SPRINT 800MHz RPH ON PROP. BALLAST FRAME

BETA SECTOR
INSTALL SPRINT 2000MHz RPH ON PROP. BALLAST FRAME

BETA SECTOR
INSTALL SPRINT PCS/WMS SPLITTERS WITHIN NEW FAUX CHIMNEY (TOTAL OF 4)

B1: (P)
800/1800/2000MHz ANTENNA

B2: (P)
ANTENNA

BETA SECTOR
INSTALL SPRINT 4"-6"x4"-6"x10"-0" FAUX CHIMNEY ON EXIST. ROOF (PAINT/TEXTURE TO MATCH EXIST. BUILDING CHIMNEYS AND/OR OTHER ROOFTOP EQUIPMENT)

BETA SECTOR
INSTALL SPRINT 800/1800/2000MHz ANTENNA WITHIN NEW FAUX CHIMNEY

BETA SECTOR
INSTALL SPRINT 800/1800/2000MHz ANTENNA WITHIN NEW FAUX CHIMNEY

BETA SECTOR
INSTALL SPRINT PCS/WMS SPLITTERS WITHIN NEW FAUX CHIMNEY (TOTAL OF 4)

GAMMA SECTOR

INSTALL SPRINT 2000MHz ANTENNA TO EXIST. PIPE MOUNT ON EXIST. BUILDING FACADE (PAINT TO MATCH EXIST. BUILDING FACADE)

INSTALL SPRINT 800/1800/2000MHz ANTENNA WITHIN NEW FAUX CHIMNEY

INSTALL SPRINT PCS/WMS SPLITTERS WITHIN NEW FAUX CHIMNEY (TOTAL OF 4)

INSTALL SPRINT 2000MHz RPH ON PROP. BALLAST FRAME

INSTALL SPRINT 1800MHz RPH RELOCATED TO PROP. BALLAST FRAME

INSTALL SPRINT 800MHz RPH RELOCATED TO PROP. BALLAST FRAME

INSTALL SPRINT 800MHz RPH ON PROP. BALLAST FRAME

INSTALL SPRINT 4"-6"x4"-6"x10"-0" FAUX CHIMNEY ON EXIST. ROOF (PAINT/TEXTURE TO MATCH EXIST. BUILDING CHIMNEYS AND/OR OTHER ROOFTOP EQUIPMENT)

PROPOSED ANTENNA PLAN

SCALE: 1/8" = 1'-0"

NOTE: VERIFY PROPOSED ANTENNA WITH RF ENGINEER PRIOR TO INSTALLATION.

Site Data	Region: Northeast	Market	Boston	Revision 3.0	Rev Date: 4-Mar-2019
	Cascade ID		BS60XC003	BTS DEM: ALU	RFDS Type: Preliminary
RFDS Description	Augment Import Code: SP00MU03_DO_Macro_Upgrade	Augment: DO Macro Upgrade	Structure Type: RoofTop	Eng. Phone: 978-560-9700	RF Phone: 901-728-0006
	Address: 284 Norfolk Street, Cambridge, MA, 02139	Sprint Eng. Name: Bill Hastings	Bill.Hastings@sprint.com	Manager Phone: 617-233-2900	RF Phone: 901-728-0006
RFDS Description	Latitude: 42.37130601 Longitude: -71.09716714	Manager Name: Jonathan Hall	Jonathan.Hall@sprint.com	Manager Phone: 617-233-2900	RF Phone: 901-728-0006
	RF: Praveen Meerasapu	RF: Praveen Meerasapu	Praveen.Meerasapu@sprint.com	Manager Phone: 617-233-2900	RF Phone: 901-728-0006
RFDS Description	NV existing add 800/2.5 dual band, add 2nd 800 RRH, 2.5 RRH, 1 Hybrid; remove IDEN, CW leave CW MW (and associated cable)	Filter Analysis Complete: NO	Order Analysis Complete: YES	Channel Plan Complete: YES	
1900	1900MHz_Azimuth	35	160	280	
	1900MHz_No_of_Antennas	1	1	1	
1900MHz_RADCenter(R)	1900MHz_RADCenter(R)	60	56	56	
	1900MHz_AntennaMale	NA	NA	NA	
1900MHz_AntennaModel	1900MHz_AntennaModel	NA	NA	NA	
	1900MHz_Horizontal_Beamwidth	NA	NA	NA	
1900MHz_Vertical_Beamwidth	1900MHz_Vertical_Beamwidth	NA	NA	NA	
	1900MHz_Antenna_Dimensions (in) & Weight (lbs)	NA NA	NA NA	NA NA	
1900MHz_AntennaGain (dB)	1900MHz_AntennaGain (dB)	NA	NA	NA	
	1900MHz_M_Tilt	0	0	0	
1900MHz_E_Tilt	1900MHz_E_Tilt	5	5	5	
	1900MHz_Effective_Tilt (degrees)	5	5	5	
1900MHz_RRH Manufacturer	1900MHz_RRH Manufacturer	ALU	ALU	ALU	
	1900MHz_RRH Model	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz	
1900MHz_RRH Count	1900MHz_RRH Count	1	1	1	
	1900MHz_RRH Specs	25 x 11.1 x 11.4 (60 lbs)	25 x 11.1 x 11.4 (60 lbs)	25 x 11.1 x 11.4 (60 lbs)	
1900MHz_RRH Location	1900MHz_RRH Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower	
	1900MHz_Combiner Model	No Combiner Required	No Combiner Required	No Combiner Required	
1900MHz_Power Split Ratio (Main/Split)	1900MHz_Power Split Ratio (Main/Split)	No Splitter Required	No Splitter Required	No Splitter Required	
	1900MHz_Splitter Manufacturer	No Splitter Required	No Splitter Required	No Splitter Required	
1900MHz_Top_Jumper #1_Length (RRH or Combiner-to-Antenna for TT or Main Coax to Antenna for Ground Mount, ft)	1900MHz_Top_Jumper #1_Length (RRH or Combiner-to-Antenna for TT or Main Coax to Antenna for Ground Mount, ft)	0	0	0	
	1900MHz_Top_Jumper #2_Length (RRH or Combiner-to-Antenna for TT or Main Coax to Antenna for Ground Mount, ft)	LCF12-50i	LCF12-50i	LCF12-50i	
1900MHz_Main_Cable_Length (ft)	1900MHz_Main_Cable_Length (ft)	85	81	81	
	1900MHz_Main_Cable_Model	HB114-1-08U4-M5F	HB114-1-08U4-M5F	HB114-1-08U4-M5F	
1900MHz_Bottom_Jumper #1_Length (Ground based RRH to Combiner-OR Main Coax, ft)	1900MHz_Bottom_Jumper #1_Length (Ground based RRH to Combiner-OR Main Coax, ft)				
	1900MHz_Bottom_Jumper #1_Cable_Model (Ground based RRH to Combiner-OR Main Coax)				
1900MHz_Bottom_Jumper #2_Length (Ground based Combiner to Main Coax, ft)	1900MHz_Bottom_Jumper #2_Length (Ground based Combiner to Main Coax, ft)				
	1900MHz_Bottom_Jumper #2_Cable_Model (Ground based Combiner to Main Coax)				

NOTES:

- COMMENTS IN RED TEXT PROVIDED BY A&E VENDOR.
- ANTENNA RAD CENTER BASED ON EQUIPMENT DATABASE AND STRUCTURAL ANALYSIS.
- SPRINT CM SHALL CONFIRM HYBRID CABLE LENGTH, COAX JUMPER LENGTH AND AISG CABLE LENGTH BEFORE PREPARING BOM. A&E RECOMMENDED HYBRID CABLE LENGTH BASED ON NV 2.5 EQUIPMENT AUDIT PLUS 20 FEET FOR (2) 10-FOOT COILS AT EACH END OF THE FIBER TRUNK.

NOTE:

GENERAL CONTRACTOR/TOWER CREW SHALL VERIFY THAT THE LATEST RF DATA SHEET IS USED FOR EQUIPMENT INSTALLATION.

SPECIAL WORK NOTE:

JUMPERS (COAX/AISG) FROM THE 2.5 RRH TO THE 2.5 ANTENNA CANNOT EXCEED 15'. NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY DISCREPANCY.

800	800MHz_Azimuth	35	160	280	
	800MHz_No_of_Antennas	1	1	1	
800MHz_RADCenter(R)	800MHz_RADCenter(R)	60	56	56	
	800MHz_AntennaMale	NA	NA	NA	
800MHz_AntennaModel	800MHz_AntennaModel	NA	NA	NA	
	800MHz_Horizontal_Beamwidth	NA	NA	NA	
800MHz_Vertical_Beamwidth	800MHz_Vertical_Beamwidth	NA	NA	NA	
	800MHz_Antenna_Dimensions (in) & Weight (lbs)	NA NA	NA NA	NA NA	
800MHz_AntennaGain (dB)	800MHz_AntennaGain (dB)	NA	NA	NA	
	800MHz_M_Tilt	0	0	0	
800MHz_E_Tilt	800MHz_E_Tilt	5	5	5	
	800 MHz Effective Tilt (degrees)	5	5	5	
800MHz_RRH Manufacturer	800MHz_RRH Manufacturer	ALU	ALU	ALU	
	800MHz_RRH Model	RRH 800 MHz 2x50W	RRH 800 MHz 2x50W	RRH 800 MHz 2x50W	
800MHz_RRH Count	800MHz_RRH Count	2	2	2	
	800MHz_RRH Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower	
800MHz_Splitter Manufacturer	800MHz_Splitter Manufacturer	na	na	na	
	800MHz_Splitter Model				
800MHz_Top_Jumper #1_Length (RRH to Antenna for TT or Main Coax to Antenna for GM)	800MHz_Top_Jumper #1_Length (RRH to Antenna for TT or Main Coax to Antenna for GM)	0	0	0	
	800MHz_Top_Jumper #2_Length (RRH to Antenna for TT or Main Coax to Antenna for GM)	LCF12-50i	LCF12-50i	LCF12-50i	
800MHz_Main_Cable_Length (ft)	800MHz_Main_Cable_Length (ft)	NA	NA	NA	
	800MHz_Main_Cable_Model	NA	NA	NA	
800MHz_Bottom_Jumper #1_Length (Ground based RRH to Main Coax)	800MHz_Bottom_Jumper #1_Length (Ground based RRH to Main Coax)				
	800MHz_Bottom_Jumper #1_Cable_Model (Ground based RRH to Main Coax)				
2500	2500MHz_Azimuth	35	160	280	
	2500MHz_No_of_Antennas	1	1	1	
2500MHz_RADCenter(R)	2500MHz_RADCenter(R)	60	56	56	
	2500MHz_AntennaMale	RFS	NA	NA	
2500MHz_AntennaModel	2500MHz_AntennaModel	FFRVTM14-ALU-120	Antenna assigned on a different band	Antenna assigned on a different band	
	2500MHz_Horizontal_Beamwidth	68	NA	NA	
2500MHz_Vertical_Beamwidth	2500MHz_Vertical_Beamwidth	5	NA	NA	
	2500MHz_AntennaHeight (in)	61 x 17.3 x 11.8 56 (lbs)	NA NA	NA NA	
2500MHz_AntennaGain (dB)	2500MHz_AntennaGain (dB)	18	NA	NA	
	2500MHz_M_Tilt	0	0	0	
2500MHz_E_Tilt	2500MHz_E_Tilt	2	2	2	
	2500 MHz Effective Tilt (degrees)	2	2	2	
2500MHz_RRH Manufacturer	2500MHz_RRH Manufacturer	ALU	ALU	ALU	
	2500MHz_RRH Model	TD-88H8x20-25	TD-88H8x20-25	TD-88H8x20-25	
2500MHz_RRH Count	2500MHz_RRH Count	1	1	1	
	2500MHz_RRH Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower	
2500MHz_Power Split Ratio (Main/Split)	2500MHz_Power Split Ratio (Main/Split)				
	2500MHz_Splitter Manufacturer				
2500MHz_Splitter Model	2500MHz_Splitter Model				
	2500MHz_Top_Jumper #1_Length (RRH to Antenna for TT or Main Coax to Antenna for GM)	0	0	0	
	2500MHz_Top_Jumper #2_Length (RRH to Antenna for TT or Main Coax to Antenna for GM)	LCF12-50i	LCF12-50i	LCF12-50i	
2500MHz_Main_Cable_Length (ft)	2500MHz_Main_Cable_Length (ft)	85	81	81	
	2500MHz_Main_Cable_Model	HB114-08U3M11-xxxf	HB114-08U3M12-xxxf	HB114-08U3M12-xxxf	
2500MHz_Bottom_Jumper #1_Length (Ground based RRH to Main Coax)	2500MHz_Bottom_Jumper #1_Length (Ground based RRH to Main Coax)				
	2500MHz_Bottom_Jumper #1_Cable_Model (Ground based RRH to Main Coax)				



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5	03/06/19	CONSTRUCTION REVISED	CWC
4	02/19/19	CONSTRUCTION REVISED	CWC
3	11/13/18	CONSTRUCTION REVISED	JRY
2	10/19/18	CONSTRUCTION REVISED	CWC
1	07/11/18	ISSUED FOR CONSTRUCTION	CWC
0	06/22/18	ISSUED FOR REVIEW	CWC

SITE NUMBER:
BS60XC003
SITE NAME:
ELI

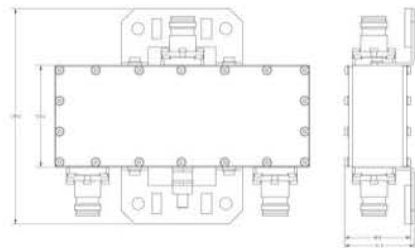
SITE ADDRESS:
284 NORFOLK STREET
CAMBRIDGE, MA 02139

SHEET TITLE
RF DATA SHEET

SHEET NUMBER
A-4

RF DATA SHEET
N.T.S.

1
A-4



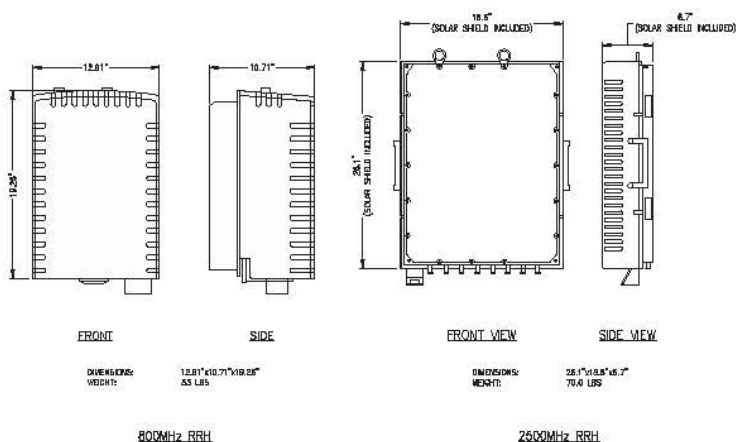
CG-DPX-71287-0x1 PGM/ANAL DIPLEXER
DIMENSIONS: 9.20"x7.42"x2.02"
WEIGHT: 3.7 LBS W/ HARDWARE
DIPLEXER DETAIL
SCALE: N.T.S.

NOKIA-A SCENARIOS	CABLE DESCRIPTION	CABLE LENGTH (FT)	DIAMETER (IN)	WEIGHT (LBS/FT)
1 CABLE PER SECTOR (1) 1900 (2) 800 (1) MMIMO OR 8T8R	4 PAIRS OF 6AWG DC CONDUCTORS WITH 24 MULTI-MODE FIBER PAIRS	0-120	1.376	1.354
1 CABLE PER SECTOR (1) 1900 (2) 800 (1) MMIMO OR 8T8R	4 PAIRS OF 6AWG DC CONDUCTORS WITH 24 MULTI-MODE FIBER PAIRS	121-200	1.545	1.875
1 CABLE PER SECTOR (1) 1900 (2) 800 (1) MMIMO (WITH 6I-WIRE) OR 8T8R	5 PAIRS OF 6AWG DC CONDUCTORS WITH 24 MULTI-MODE FIBER PAIRS	201-375	1.819	2.161

* ALL FIBER PAIRS TERMINATE IN SENKO P-LC AT TOWER TOP.

* NOTE: SPRINT ON TO DOWNLINK HYBRID RIBER CABLE AND HYBRID JUMPER CABLE MODEL NUMBERS BEFORE PREPARING BOX.

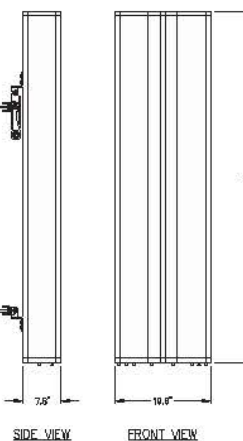
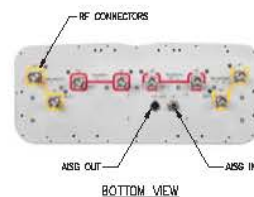
HYBRID CABLE CHART
SCALE: N.T.S.



RRH DETAILS
N.T.S.

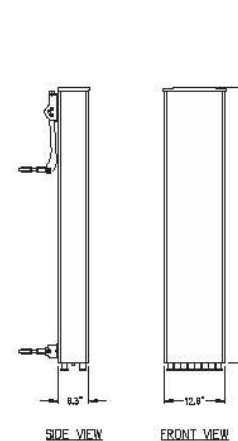
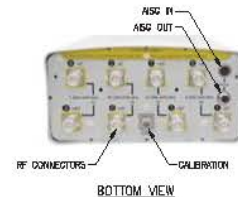
FINAL ANTENNA CONFIGURATION

SECTOR	POS	STATUS	ANTENNA MFR	ANTENNA MODEL	RAD CENTER	AZIMUTH (TRUE NORTH)	DOWNTILT		RRH/DIPLEXER QTY & MODEL	JUMPER QTY & LENGTH	CABLE LENGTH & SIZE	CABLE QTY & MODEL
							MECH	ELEC				
ALPHA	1	PROPOSED	COMMSCOPE	NNVA-BB-24	56.0'± AQL	35°	0°	3°	(2) FD-RRH-2550-800 (1) FD-RRH-4245-1900	(4) 10'-0" (4) 10'-0"	UTILIZE EXISTING	UTILIZE EXISTING
	2	PROPOSED	RFS	APX/TW14-ALL-120	56.0'± AQL	35°	0°	0°	(1) TD-RRH-B-20-25	(8) 10'-0"	110'± (115'N)	HBT14-DBLW12-333F
BETA	1	PROPOSED	CDI	TPW6R-KE40A-K	56.0'± AQL	160°	0°	4°	(2) FD-RRH-2550-800 (1) FD-RRH-4245-1900 (1) TD-RRH-B-20-25 (4) DPG-71287-0x1	(4) 10'-0" (4) 10'-0" (4) 10'-0" (4) 10'-0"	UTILIZE EXISTING	UTILIZE EXISTING
	2	FUTURE	TBD	TBD	-	-	-	-	-	-	-	-
GAMMA	1	PROPOSED	CDI	TPW6R-KE40A-K	56.0'± AQL	380°	0°	4°	(2) FD-RRH-2550-800 (1) FD-RRH-4245-1900 (1) TD-RRH-B-20-25 (4) DPG-71287-0x1	(4) 10'-0" (4) 10'-0" (4) 10'-0" (4) 10'-0"	UTILIZE EXISTING	UTILIZE EXISTING
	2	FUTURE	TBD	TBD	-	-	-	-	-	-	-	-



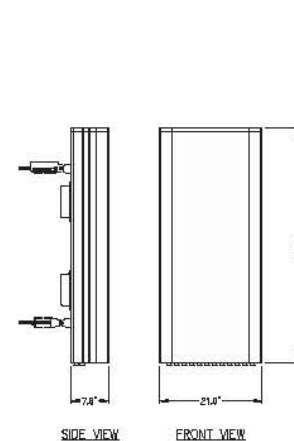
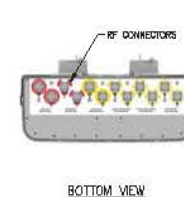
SIDE VIEW FRONT VIEW
800/1900MHz ANTENNA (ALPHA)

COMMSCOPE NNVA-BB-24 PANEL ANTENNA
DIMENSIONS: 72.0"x19.8"x5.7"
WEIGHT: 77.4 LBS W/ HARDWARE



SIDE VIEW FRONT VIEW
2500MHz ANTENNA (BETA & GAMMA)

RFS APX/TW14-ALL-120 PANEL ANTENNA
DIMENSIONS: 56.3"x12.4"x5.7"
WEIGHT: 67.7 LBS W/ HARDWARE



SIDE VIEW FRONT VIEW
800/1900/2500MHz ANTENNA (BETA & GAMMA)

CG-TPW6R-KE50 PANEL ANTENNA
DIMENSIONS: 48.0"x21.0"x7.0"
WEIGHT: 33.9 LBS W/ HARDWARE



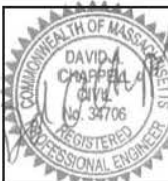
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5	05/06/18	CONSTRUCTION REVIEW	CNC
4	02/16/18	CONSTRUCTION REVIEW	CNC
3	11/13/18	CONSTRUCTION REVIEW	JAY
2	10/19/18	CONSTRUCTION REVIEW	CNC
1	07/11/18	ISSUED FOR CONSTRUCTION	CNC
0	06/22/18	ISSUED FOR REVIEW	CNC

SITE NUMBER:
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SITE NAME:
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SITE ADDRESS:
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CAMBRIDGE, MA 02139

SHEET TITLE
EQUIPMENT
DETAILS

SHEET NUMBER
A-6



SOURCE: DEA SITE VISIT 06.01.18

FRONT VIEW

EXISTING MMBTS CABINET

SCALE: NTS

1
A-7

NOTE:
COORDINATE CABINET UPGRADE WITH
SPRINT CM. REPLACE EXIST. CABINET
WITH MMBTS 9927 (IF REQ'D)

INSTALL NEW RECEIVER SHELF & (2)
RECEPTS WITHIN EXIST. WM-BTS
EQUIPMENT CABINET (F REQUIRED)

INSTALL NEW LTE BBU 2.5GHz
RETROFIT KIT WITHIN EXIST.
WM-BTS EQUIPMENT CABINET



SOURCE: DEA SITE VISIT 06.01.18

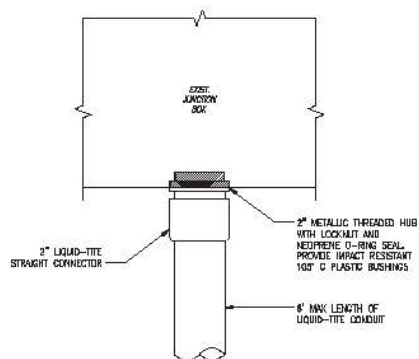
FRONT VIEW

EXISTING 2.5 POWER BBU CABINET

SCALE: NTS

2
A-7

INSTALL (1) NEW BATTERY
STRING WITHIN EXIST. BBU
CABINET SPLIT BETWEEN (2)
EMPTY BAYS (IF REQUIRED)



FIBER JUNCTION BOX PENETRATION

SCALE: NTS

3
A-7

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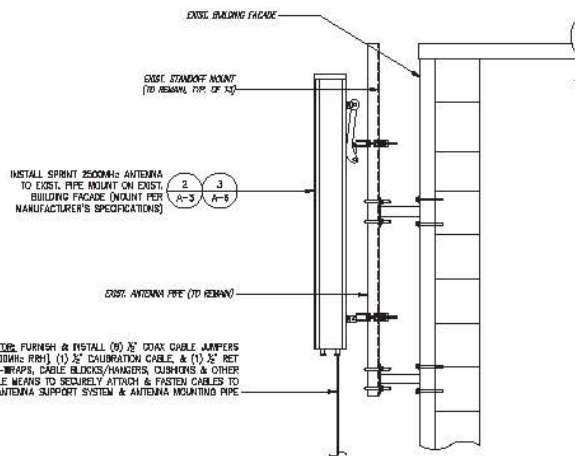
SUBMITTALS			
REV.	DATE	DESCRIPTION	BY
5	02/06/19	CONSTRUCTION REVISED	CM
4	02/16/19	CONSTRUCTION REVISED	CM
3	11/13/18	CONSTRUCTION REVISED	JMT
2	10/16/18	CONSTRUCTION REVISED	CM
1	02/11/18	ISSUED FOR CONSTRUCTION	CM
0	06/22/18	ISSUED FOR REVIEW	CM

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SHEET TITLE
**EQUIPMENT
DETAILS**

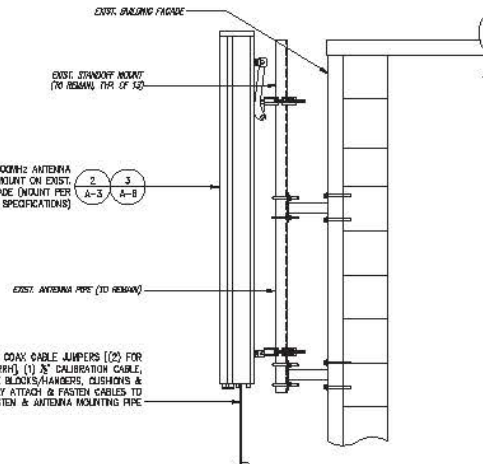
SHEET NUMBER
A-7

175254



(P) 800/2500MHz ANTENNA

PAINT TO MATCH NOTE
ALL PROPOSED & EXISTING ANTENNAS, MOUNTS, & HARDWARE SHALL BE PAINTED TO MATCH EXISTING BUILDING.



(P) 800/1900MHz ANTENNA

TYPICAL ANTENNA AND RRH MOUNTING DETAILS
SCALE: N.T.S.

1
S-1

SPECIAL INSTALLATION NOTE:
INSTALL (5) 4"x6"x18" SOLID BLOCKS PER TOWER.
DOWN JUMPERS FROM 2.5 TOWER TO 2.5 ANTENNA SHALL NOT EXCEED 15'. NOTIFY SPRINT CM OF ANY DISCREPANCY.

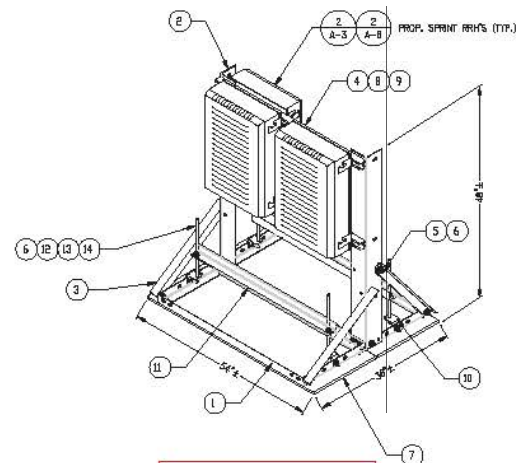
INSTALLATION NOTES:

- CONTRACTOR TO VERIFY IN FIELD SIZE OF EXISTING MOUNTING PIPE TO BE 3/4" STD (2.66 O.D.) PIPE (AST 10-0" LONG).
- VERIFY EXACT RRH AND ANTENNA MODEL & AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION.
- RRH PLACEMENT FOR REFERENCE ONLY. CONTRACTOR SHALL PLACE RRH IN CORRECT ORDER MATCHING INSTALL ANTENNA PLACEMENT.
- INSTALL EQUIPMENT TO BE MOUNTED PER MANUFACTURER'S SPECIFICATIONS.

SPECIAL CONSTRUCTION NOTE:

- SPRINT TOWER TOP WORK IS CONTINGENT ON THE FOLLOWING:
- COMPLETION OF A GLOBAL STRUCTURAL STABILITY ANALYSIS (PROVIDED BY STRUCTURE OWNER OR A/E VENDOR).
 - COMPLETION OF AN ANTENNA/RRH MOUNT STRUCTURAL ASSESSMENT (PROVIDED BY A/E VENDOR).
 - GC SHALL FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS AS INDICATED IN BEFORE-MENTIONED ANALYSIS AND ASSESSMENT.

ITEM	PART NO.	DESCRIPTION	QTY.	WEIGHT
1	NTC25420	VERTICAL ANGLE	2	22.40 LBS
2	NTC25420	BRACE ANGLE	4	4.71 LBS
3	NTC25420	BRACE ANGLE	4	4.71 LBS
4	NTC25420	BRACE ANGLE	4	4.71 LBS
5	GI-0045	1/2" X 1-1/2" GALV. BOLT KIT	16	0.19 LBS
6	GI-0045	1/2" GALV. FLAT WASHER	28	0.05 LBS
7	MT-11637	RUBBER MAT 9" X 16" X .08"	2	1.56 LBS
8	GI-0045	3/8" GALV. FLAT WASHER	8	0.01 LBS
9	GI-0045	3/8" X 1-1/2" GALV. BOLT KIT	4	0.02 LBS
10	NTC25420	BRACE ANGLE	4	0.478 LBS
11	NTC25420	BRACE ANGLE	2	7.50 LBS
12	GI-0045	1/2" GALV. FLAT WASHER	8	0.05 LBS
13	GI-0045	1/2" GALV. HEX MAT	8	0.04 LBS
14	MT-279-16	1/2" X 16" GALV. THREADED ROD	4	0.00 LBS



SPECIAL INSTALLATION NOTE:
INSTALL (5) 4"x6"x18" SOLID BLOCKS PER TOWER.

TYPICAL RRH MOUNTING DETAIL
SCALE: N.T.S.

2
S-1

Sprint
VISION

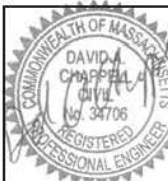
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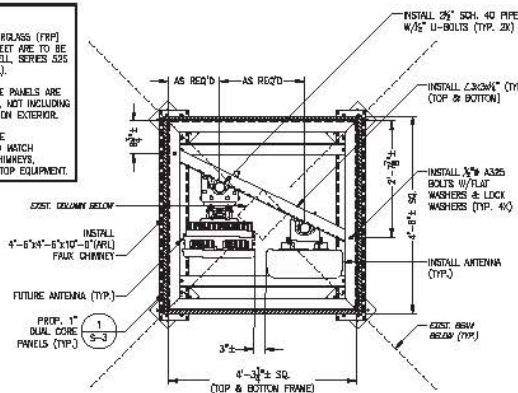
REV.	DATE	DESCRIPTION	BY
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4	02/16/10	CONSTRUCTION REVISED	CM
3	11/13/10	CONSTRUCTION REVISED	JMT
2	10/16/10	CONSTRUCTION REVISED	CM
1	02/11/10	ISSUED FOR CONSTRUCTION	CM
0	06/22/10	ISSUED FOR REVIEW	CM

SITE NUMBER:
BS60XC003
SITE NAME:
ELI
SITE ADDRESS:
284 NORFOLK STREET
CAMBRIDGE, MA 02139

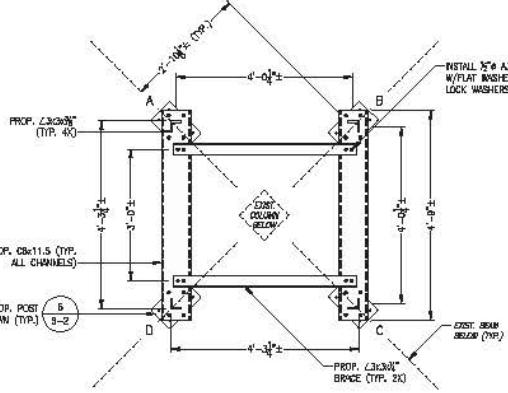
SHEET TITLE
**STRUCTURAL DETAILS
FACADE MOUNT**

SHEET NUMBER
S-1

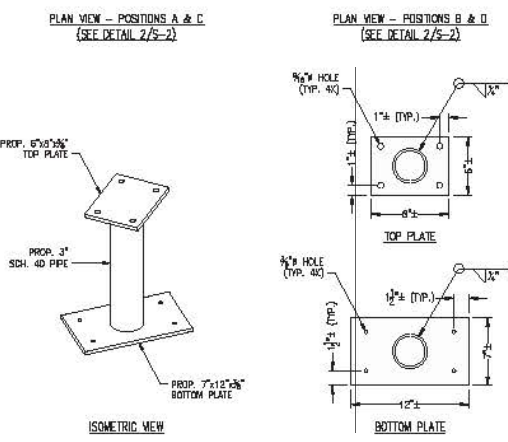
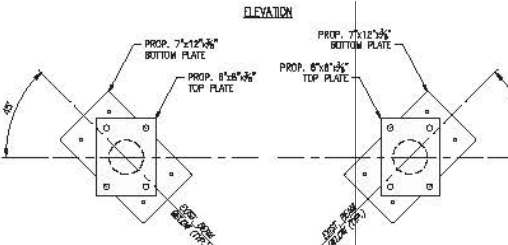
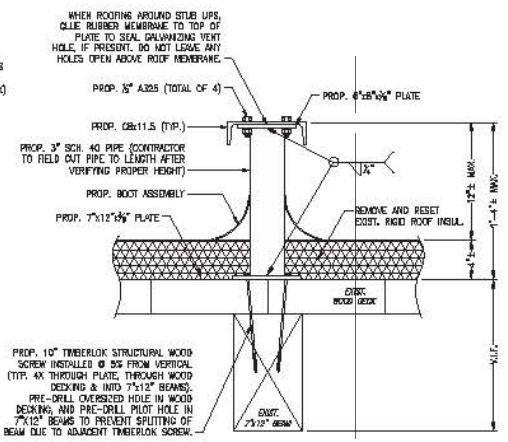
- FRP NOTES**
1. ALL STRUCTURAL FIBERGLASS (FRP) SHAPES, PLATE & SHEET ARE TO BE ORDERED BY STOCKWELL, SERIES S25 (OR APPROVED EQUAL).
 2. HAND Laid DUAL CORE PANELS ARE TO BE MIN. 1" THICK, NOT INCLUDING DECORATIVE TEXTURE ON EXTERIOR.
 3. FRP PANELS SHALL BE PAINTED/TEXTURED TO MATCH EXISTING BUILDING, CHIMNEYS, AND/OR OTHER ROOFTOP EQUIPMENT.



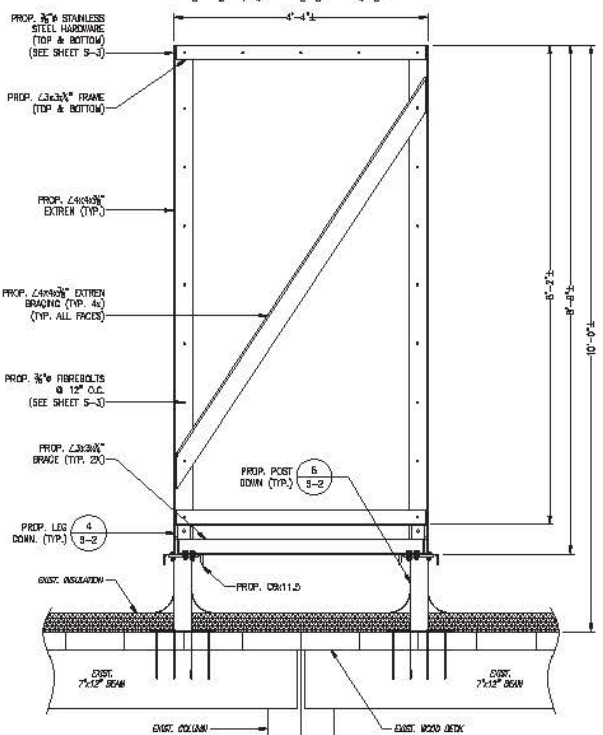
ANTENNA & CHIMNEY PLAN (1)
SCALE: 3/4" = 1'-0"



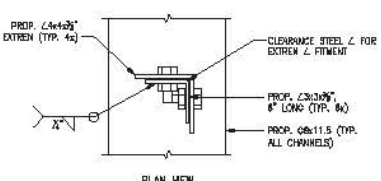
CHIMNEY BASE FRAME PLAN (2)
SCALE: 3/4" = 1'-0"



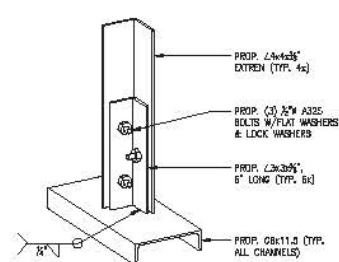
POST DOWN ASSEMBLY DETAIL (3)
SCALE: N.T.S.



CHIMNEY FRAME ELEVATION (3)
SCALE: 1" = 1'-0"



PLAN VIEW



ISOMETRIC VIEW

LEG CONNECTION ASSEMBLY DETAIL (4)
SCALE: N.T.S.

Sprint VISION

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(508) 357-7841

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DAVID A. CHAPPELL & ASSOCIATES, LLC
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4	02/18/10	CONSTRUCTION REVISION	DMC	
3	11/13/10	CONSTRUCTION REVISION	JAY	
2	10/16/10	CONSTRUCTION REVISION	DMC	
1	02/11/10	ISSUED FOR CONSTRUCTION	DMC	
0	06/22/10	ISSUED FOR REVIEW	DMC	

SITE NUMBER:
BS60XC003

SITE NAME:
ELI

SITE ADDRESS:
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CAMBRIDGE, MA 02139

SHEET TITLE
STRUCTURAL DETAILS FAUX CHIMNEY

SHEET NUMBER
S-2

HARDWARE INSTALLATION NOTES

- ALL HARDWARE IN DIRECT PATH OF ANTENNAS SHALL BE $\frac{3}{8}$ "-16 40% GLASS FILLED ISOPLAST GRAY FLANGE HEX HEAD CAP SCREWS AND 40% GLASS FILLED ISOPLAST FLANGE NUTS, EXCEPT AT REMOVABLE PANEL LOCATIONS. NO SUBSTITUTIONS PERMITTED WITHOUT PRIOR APPROVAL.

SUPPLIER INFORMATION:
EAT FASTENERS
41 ODELL SCHOOL ROAD, UNIT A
CONCORD, NC 28027
TEL: 704-933-5774
WWW.FASTENERCOMPONENTS.COM

- ALL HARDWARE ON REMOVABLE PANELS SHALL BE $\frac{3}{8}$ " FIBREBOLT ASSEMBLY AS SHOWN IN DETAIL 3/S-3. SEE FIBREBOLT INSTALLATION NOTES.
- ALL REMAINING HARDWARE SECURING SCREENING MATERIAL ON UPPER AND LOWER STEEL HALO FRAMES SHALL BE $\frac{3}{8}$ " GALVANIZED OR STAINLESS STEEL HARDWARE. UTILIZE FLAT AND LOCK WASHERS TO PREVENT CRUSHING OF EXTREN L'S WHEN TIGHTENING BOLTS. LOCATE FLAT WASHERS AGAINST EACH FACE OF EXTREN L'S AS REQUIRED TO PREVENT CRUSHING AND FRACTURING OF EXTREN MEMBER WHEN TIGHTENING FASTENERS.
- POLYURETHANE ADHESIVE SHALL BE USED ON ALL NON-METALLIC HARDWARE, EXCEPT ON REMOVABLE PANEL LOCATIONS.

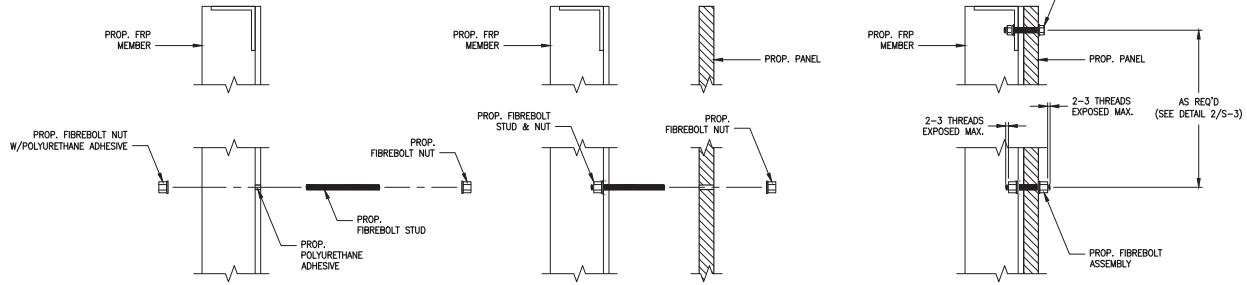
FIBREBOLT INSTALLATION PROCEDURE

FIBREBOLT STUDS AND NUTS HAVE PROPERTIES AND CHARACTERISTICS DIFFERENT FROM STEEL. FAILURE TO FOLLOW THE PROCEDURE BELOW CAN RESULT IN DAMAGE AND/OR PREMATURE FAILURE OF FIBREBOLT.

- BEARING SURFACES OF NUTS MUST BE PARALLEL TO THE SURFACES BEING FASTENED.
- A TORQUE WRENCH MUST BE USED. SEE THE TABLE BELOW:

SIZE	ULTIMATE TORQUE STRENGTH	RECOMMENDED MAXIMUM INSTALLATION TORQUE
$\frac{3}{8}$ " - 16 UNC	8 FT. - LBS.	4 FT. - LBS.
$\frac{1}{2}$ " - 13 UNC	18 FT. - LBS.	8 FT. - LBS.
$\frac{5}{8}$ " - 11 UNC	35 FT. - LBS.	16 FT. - LBS.
$\frac{3}{4}$ " - 10 UNC	50 FT. - LBS.	24 FT. - LBS.
$\frac{7}{8}$ " - 8 UNC	110 FT. - LBS.	50 FT. - LBS.

- WRENCHES MUST MAKE FULL CONTACT WITH ALL NUT EDGES. PARTIAL CONTACT WILL CAUSE THE CORNERS TO FRACTURE, AFFECTING THE PERFORMANCE OF THE STUD/NUT ASSEMBLY. A STANDARD SIX POINT SOCKET IS RECOMMENDED FOR THE HEX NUTS.
- THE REMOVABLE PANEL IS BEING INSTALLED FOR ACCESS TO THE EQUIPMENT WITHIN THE FAUX CHIMNEY. ADHESIVE SHALL NOT BE INSTALLED ON THE FIBREBOLTS TO ALLOW FOR THE PANEL TO BE REMOVED. INSTALL FIBREBOLT NUTS USING THE RECOMMENDED MAXIMUM INSTALLATION TORQUE.



FIBREBOLT INSTALLATION NOTES

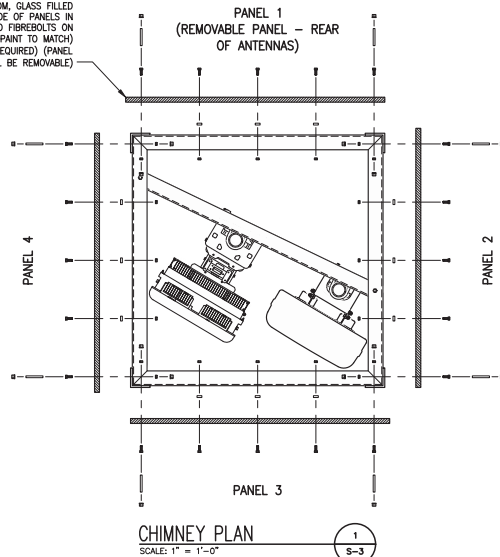
- DRILL UNDERSIZED HOLE IN FRP MEMBER.
- TAP FRP MEMBER FOR $\frac{3}{8}$ "-16 THREAD.
- INSTALL FIBREBOLT $\frac{3}{8}$ "-16 (6" LONG) STUD INTO TAPPED FRP WITH POLYURETHANE ADHESIVE.
- INSTALL FIBREBOLT NUT WITH POLYURETHANE ADHESIVE ON REAR SIDE OF FRP.
- INSTALL PANEL AND EXTERIOR FIBREBOLT NUT. EXCESS THREADED STUD SHALL BE TRIMMED TO 2-3 THREADS UPON COMPLETION.

FIBREBOLT INSTALLATION DETAILS

SCALE: N.T.S.

3
S-3

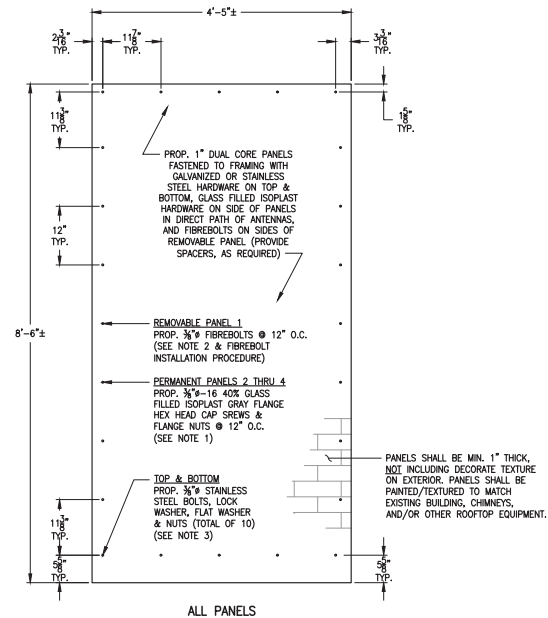
PROP. 1" DUAL CORE PANELS FASTENED TO FRAMING WITH GALVANIZED OR STAINLESS STEEL HARDWARE ON TOP & BOTTOM. GLASS FILLED ISOPLAST HARDWARE ON SIDE OF PANELS IN DIRECT PATH OF ANTENNAS, AND FIBREBOLTS ON SIDES OF REMOVABLE PANEL (PAINT TO MATCH) (PROVIDE SPACERS, AS REQUIRED) (PANEL BEHIND PROP. ANTENNAS SHALL BE REMOVABLE)



CHIMNEY PLAN

SCALE: 1" = 1'-0"

1
S-3



CHIMNEY PANELS

SCALE: 1/2" = 1'-0"

2
S-3

FRP NOTES

- ALL STRUCTURAL FIBERGLASS (FRP) SHAPES, PLATE & SHEET ARE TO BE EXTREN BY STRONGWELL, SERIES 525 (OR APPROVED EQUAL).
- HAND LAID DUAL CORE PANELS ARE TO BE MIN. 1" THICK, NOT INCLUDING DECORATIVE TEXTURE ON EXTERIOR.
- FRP PANELS SHALL BE PAINTED/TEXTURED TO MATCH EXISTING BUILDING, CHIMNEYS, AND/OR OTHER ROOFTOP EQUIPMENT.

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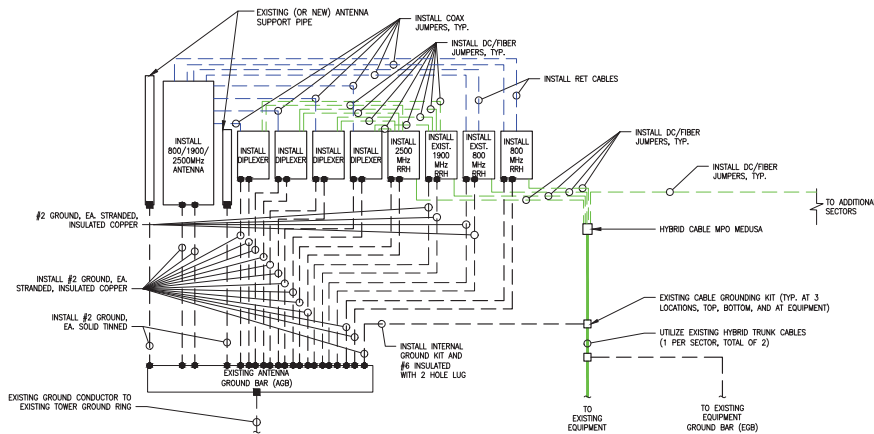
284 NORFOLK STREET
CAMBRIDGE, MA 02139

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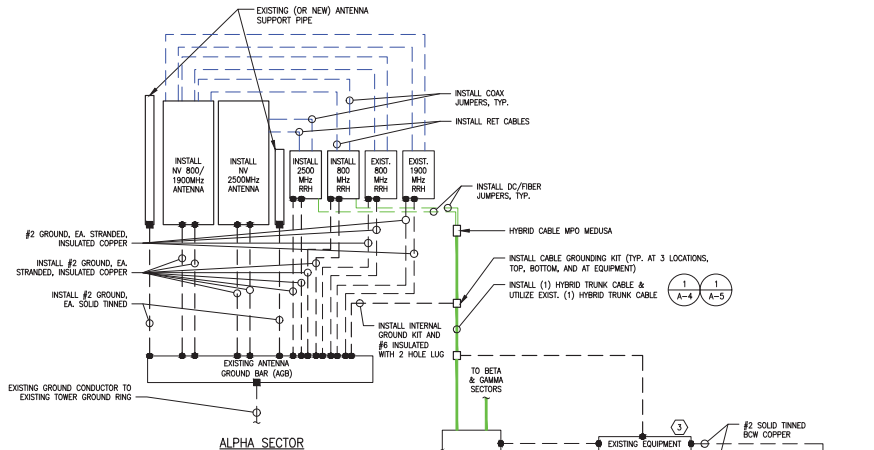
STRUCTURAL DETAILS
CHIMNEY PANELS

SHEET NUMBER

S-3



BETA & GAMMA SECTORS



ALPHA SECTOR

SPECIAL WORK NOTE:

- 1) S.C. TO FURNISH AND INSTALL ALL COMPONENTS TO UPGRADE EXISTING ELECTRICAL SERVICE, CONDUIT, CONDUCTOR, PPC AND MCB IN ACCORDANCE WITH SPRINT CONSTRUCTION STANDARDS NV 2.5 ADDENDUM "ENGINEERING NOTICE 2013-002 (POWER UPGRADES) REV.0" (OR CURRENT VERSION).
- 2) S.C. TO FURNISH AND INSTALL UPGRADE THE EXISTING MMBS BREAKER, CONDUCTOR, AND CONDUIT TO A MINIMUM NEC RATING FOR A 100-AMP, 240V CIRCUIT.
- 3) FOR NEW OR REPAIRED GROUNDING EQUIPMENT, REFER TO SPRINT GROUNDING STANDARDS AND FOLLOWING (SUPPLEMENTS):
-ANTI-THEFT UPDATE TO SPRINT GROUNDING DATED 08-24-12 (OR CURRENT VERSION)
-SPRINT ENGINEERING LETTER EL-0504 DATED 04-20-12 (OR CURRENT VERSION)

SYMBOL LEGEND

- (X) SPECIAL WORK NOTE
- EXOTHERMIC CONNECTION
- MECHANICAL CONNECTION
- CABLE GROUNDING KIT

ELECTRICAL NOTES

- 1) ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
- 2) THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL CONDUIT ROUTING WITH LOCAL UTILITY COMPANIES AND SPRINT CONSTRUCTION MANAGER.
- 3) ALL CONDUITS ROUTED BELOW GRADE SHALL TRANSITION TO RIGID GALVANIZED ELBOWS WITH RIGID GALVANIZED STEEL CONDUIT ABOVE GRADE.
- 4) ALL METAL CONDUITS SHALL BE PROVIDED WITH GROUNDING BUSHINGS.
- 5) GENERAL CONTRACTOR SHALL PROVIDE ALL DIRECT BURIED CONDUITS WITH PLASTIC WARNING TAPE IDENTIFYING CONTENTS. TAPE COLORS SHALL BE ORANGE FOR TELEPHONE AND RED FOR ELECTRIC.
- 6) ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
- 7) THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIALS DESCRIBED BY DRAWINGS AND SPECIFICATIONS INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
- 8) GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
- 9) ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
- 10) BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.
- 11) ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THHN INSULATION.
- 12) RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE PPC AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
- 13) RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE TELCO CABINET AND STS CABINET AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
- 14) FIBER OPTIC CIRCUITS SHALL BE IN ACCORDANCE WITH NEC ARTICLE 770-OPTICAL FIBER CABLES AND RACEWAYS.
- 15) COMMUNICATIONS CIRCUITS SHALL BE IN ACCORDANCE WITH NEC ARTICLE 800-COMMUNICATIONS SYSTEMS.



SOURCE: CEA SITE VISIT 05.01.18



EXIST. 200A-2P MAIN CIRCUIT BREAKER (MCB)



EXIST. 100A-2P MMBS CIRCUIT BREAKER

TYPICAL POWER & GROUNDING ONE-LINE

SCALE: NTS

1
E-1

EXIST. PPC BREAKER PANEL

SCALE: NTS

2
E-1



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3	11/13/18	CONSTRUCTION REVISED	JRY
2	10/19/18	CONSTRUCTION REVISED	CNC
1	07/19/18	ISSUED FOR CONSTRUCTION	CW
0	06/22/18	ISSUED FOR REVIEW	CW

SITE NUMBER:

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SITE NAME:

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SITE ADDRESS:

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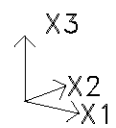
SHEET TITLE

ONE-LINE DIAGRAM

& PPC DETAILS

SHEET NUMBER

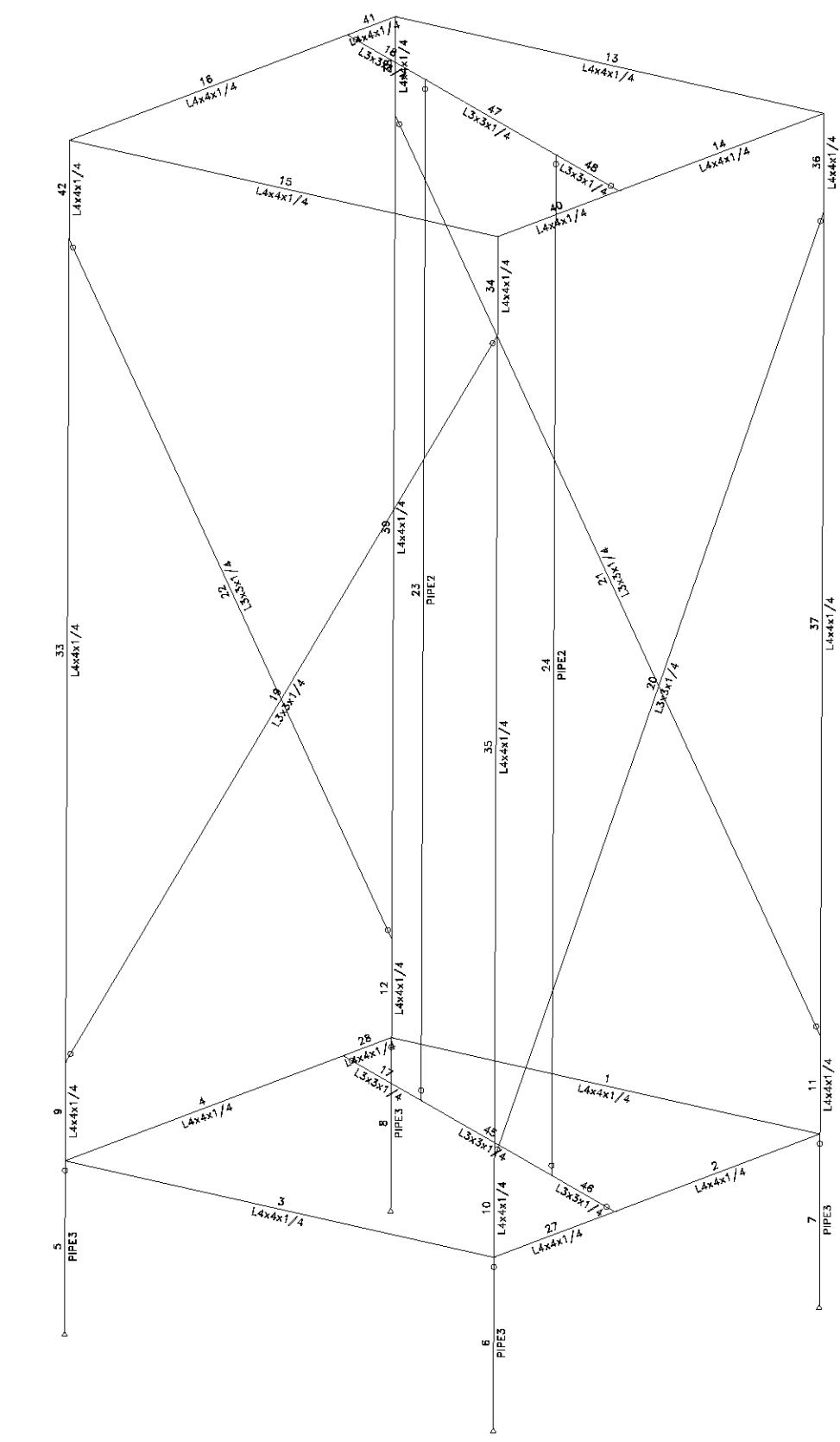
E-1



SCALE = 1:16

UNITS: kip ft

DATE: 3/27/19



GEOMETRY

Norfolk St Cambridge MA BS60XC003

Prepared by:**Page:** 3
Date: 3/27/19**Load no. 1: Selfweight (units - kips ft.)**

/ BEAM LOADS
SELF X3 -1. B 1 TO 48
/ END

FORCE SUMMATION

FX1=0. kip
FX2=0. kip
FX3=-1.8776 kip

Load no. 2: RF Panels (units - kips ft.)

/ GLOBAL LOADS
/ GLOBAL LOADS
DIST FX3 -0.005 PLANE 2.167 -2.167 1.437 2.167 -2.167 9.999 2.167
2.167 9.999 PT 0. 4.334 BEAMS
DIST FX3 -0.005 PLANE -2.167 -2.167 1.437 -2.167 -2.167 9.999 2.167
-2.167 9.999 PT 0. 4.334 BEAMS
DIST FX3 -0.005 PLANE -2.167 2.167 1.437 -2.167 2.167 9.999 2.167
2.167 9.999 PT 0. 4.334 BEAMS
DIST FX3 -0.005 PLANE -2.167 -2.167 1.437 -2.167 -2.167 9.999 -2.167
2.167 9.999 PT 0. 4.334 BEAMS
/ END

FORCE SUMMATION

FX1=0. kip
FX2=0. kip
FX3=-0.7421 kip

Load no. 3: Antenna DL (units - kips ft.)

/ JOINT LOADS
FX3 -0.07 N 26 28 27 25
/ END

FORCE SUMMATION

FX1=0. kip
FX2=0. kip
FX3=-0.28 kip

Norfolk St Cambridge MA BS60XC003

Prepared by:**Page:** 4**Date:** 3/27/19**Load no. 4: X2 Wind Load (units - kips ft.)**

/ GLOBAL LOADS

/ GLOBAL LOADS

/ GLOBAL LOADS

/ GLOBAL LOADS

DIST FX2 0.024 PLANE -2.167 -2.167 1.437 -2.167 -2.167 9.999 2.167

-2.167 9.999 PT 0. 4.334 BEAMS

/ END

FORCE SUMMATION

FX1=0. kip

FX2=0.8906 kip

FX3=0. kip

Load no. 5: X1 Wind Load (units - kips ft.)

/ GLOBAL LOADS

/ GLOBAL LOADS

/ GLOBAL LOADS

/ GLOBAL LOADS

DIST FX1 0.024 PLANE -2.167 -2.167 1.437 -2.167 -2.167 9.999 -2.167

2.167 9.999 PT 0. 4.334 BEAMS

/ END STATIC

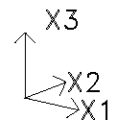
FORCE SUMMATION

FX1=0.8905 kip

FX2=0. kip

FX3=0. kip

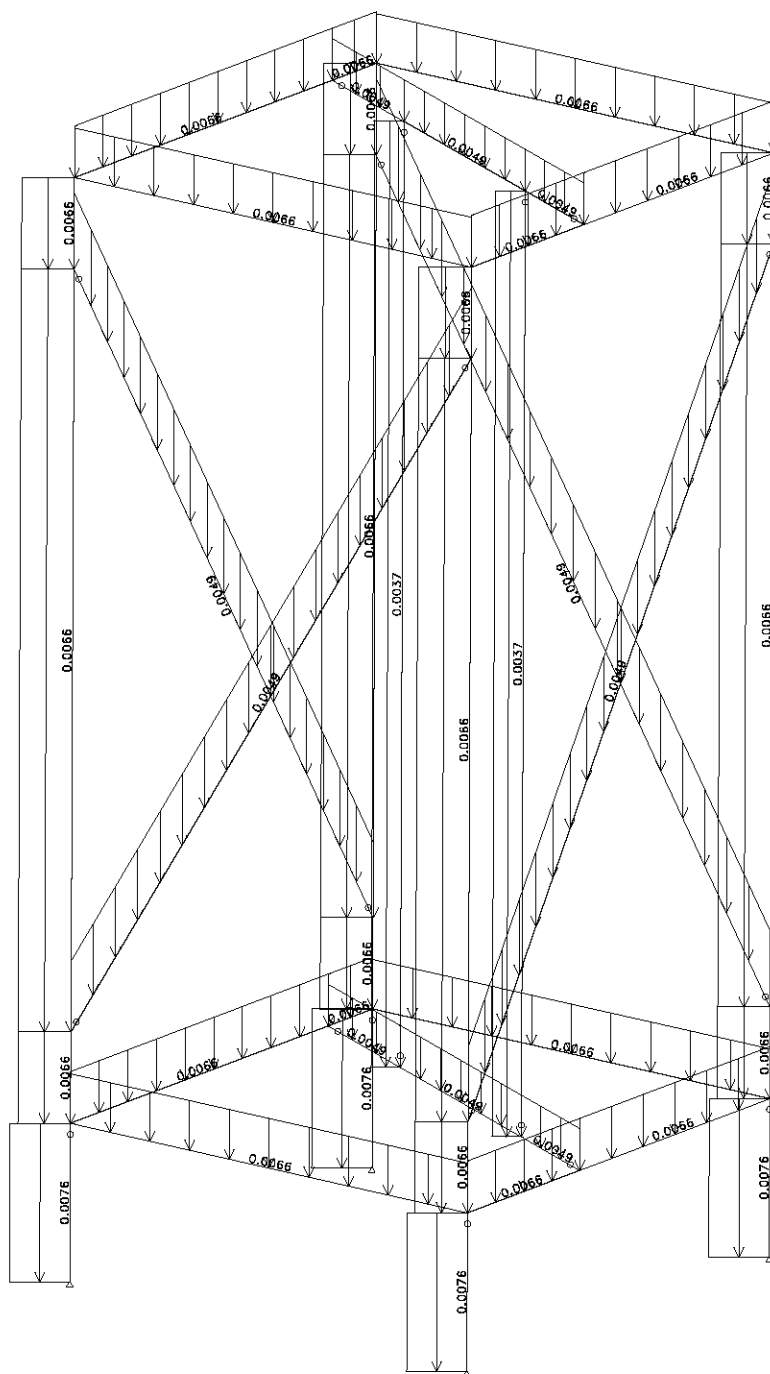
Load 1: Selfweight



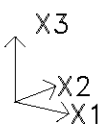
SCALE = 1:20

UNITS: kip ft

DATE: 3/27/19



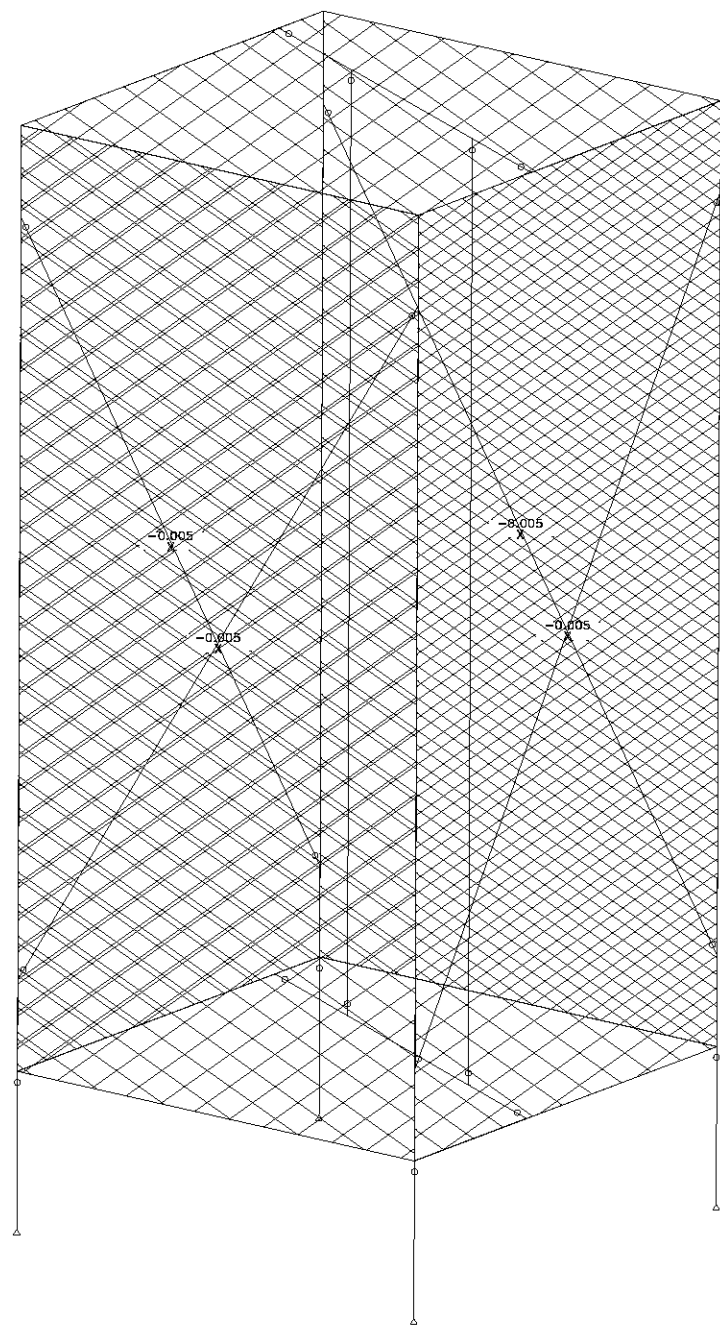
Load 2: RF Panels



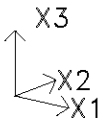
SCALE = 1:20

UNITS: kip ft

DATE: 3/27/19



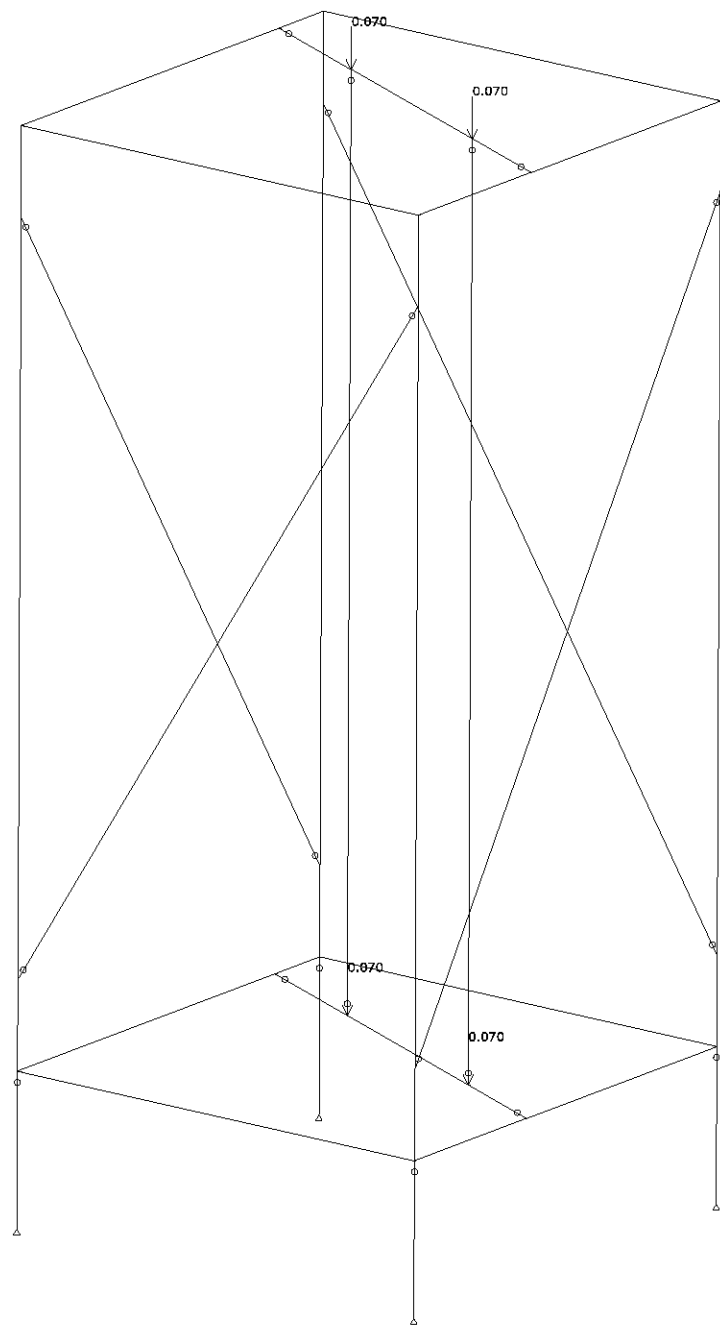
Load 3: Antenna DL



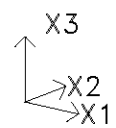
SCALE = 1:20

UNITS: kip ft

DATE: 3/27/19



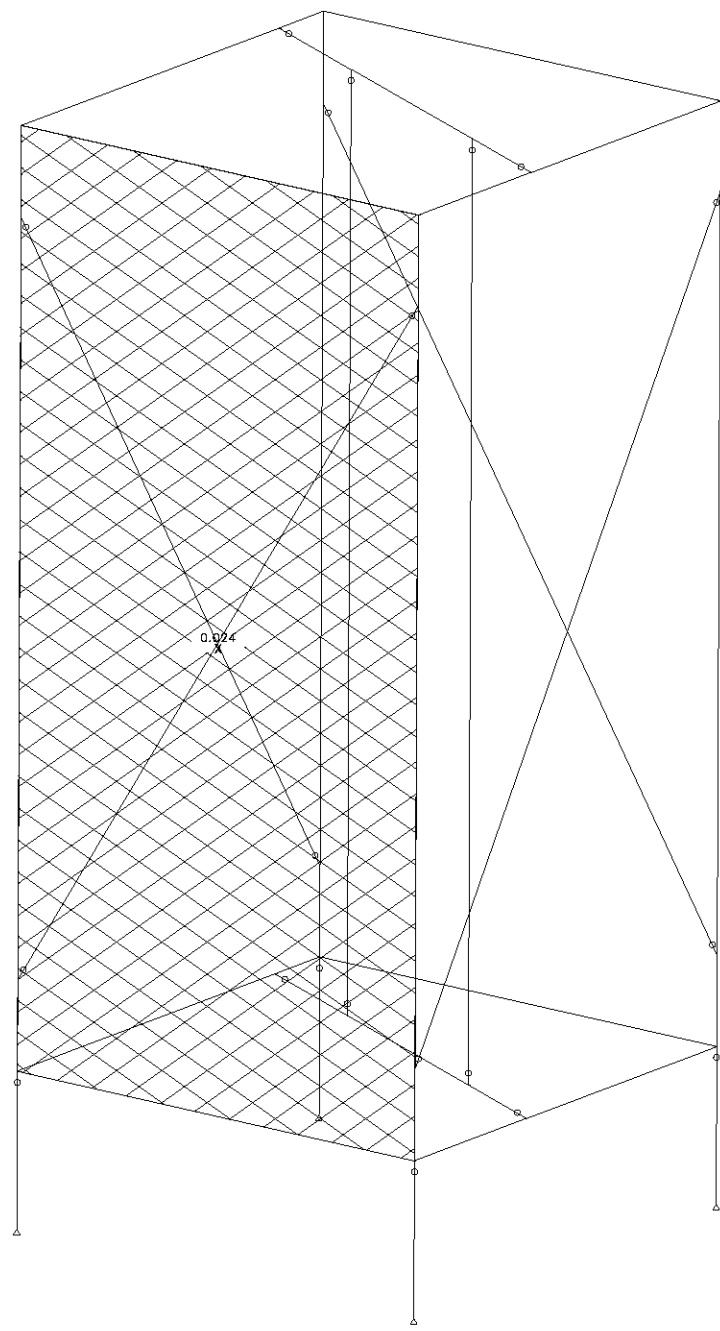
Load 4: X2 Wind Load
View: isometric view



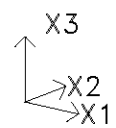
SCALE = 1:20

UNITS: kip ft

DATE: 3/27/19



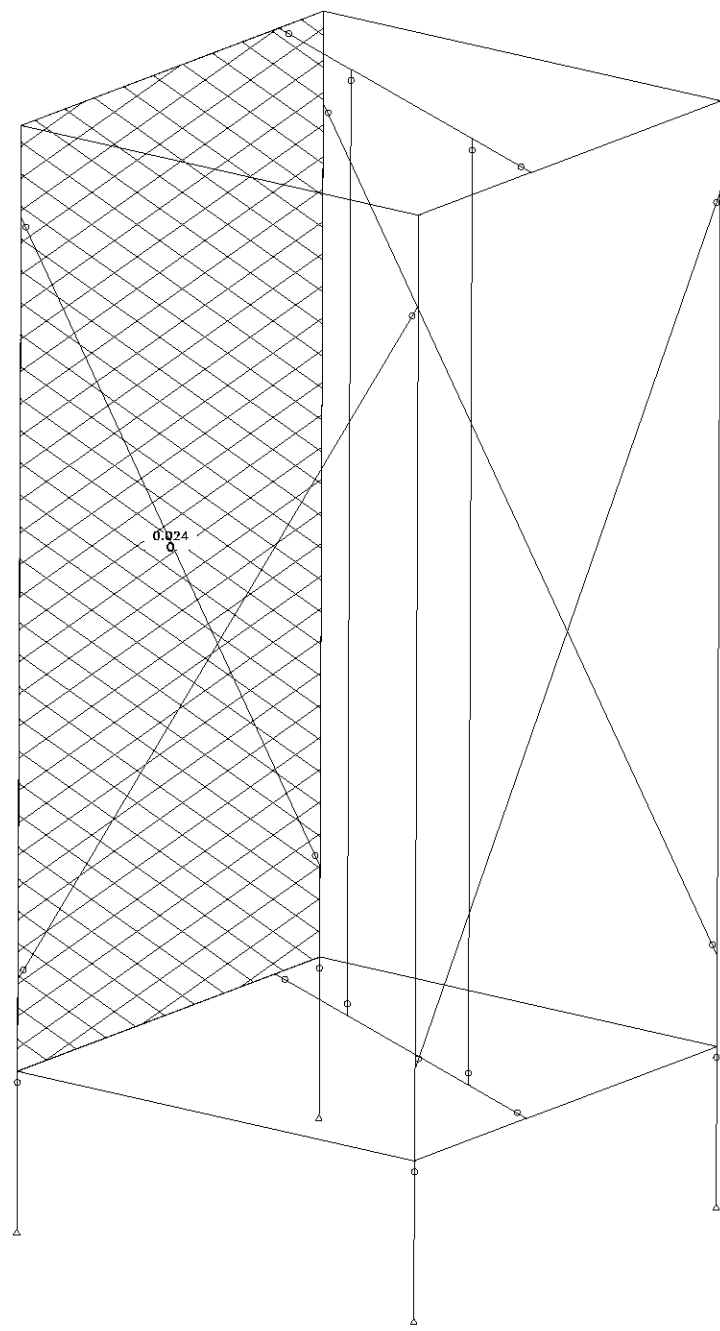
Load 5: X1 Wind Load
View: isometric view



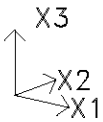
SCALE = 1:20

UNITS: kip ft

DATE: 3/27/19



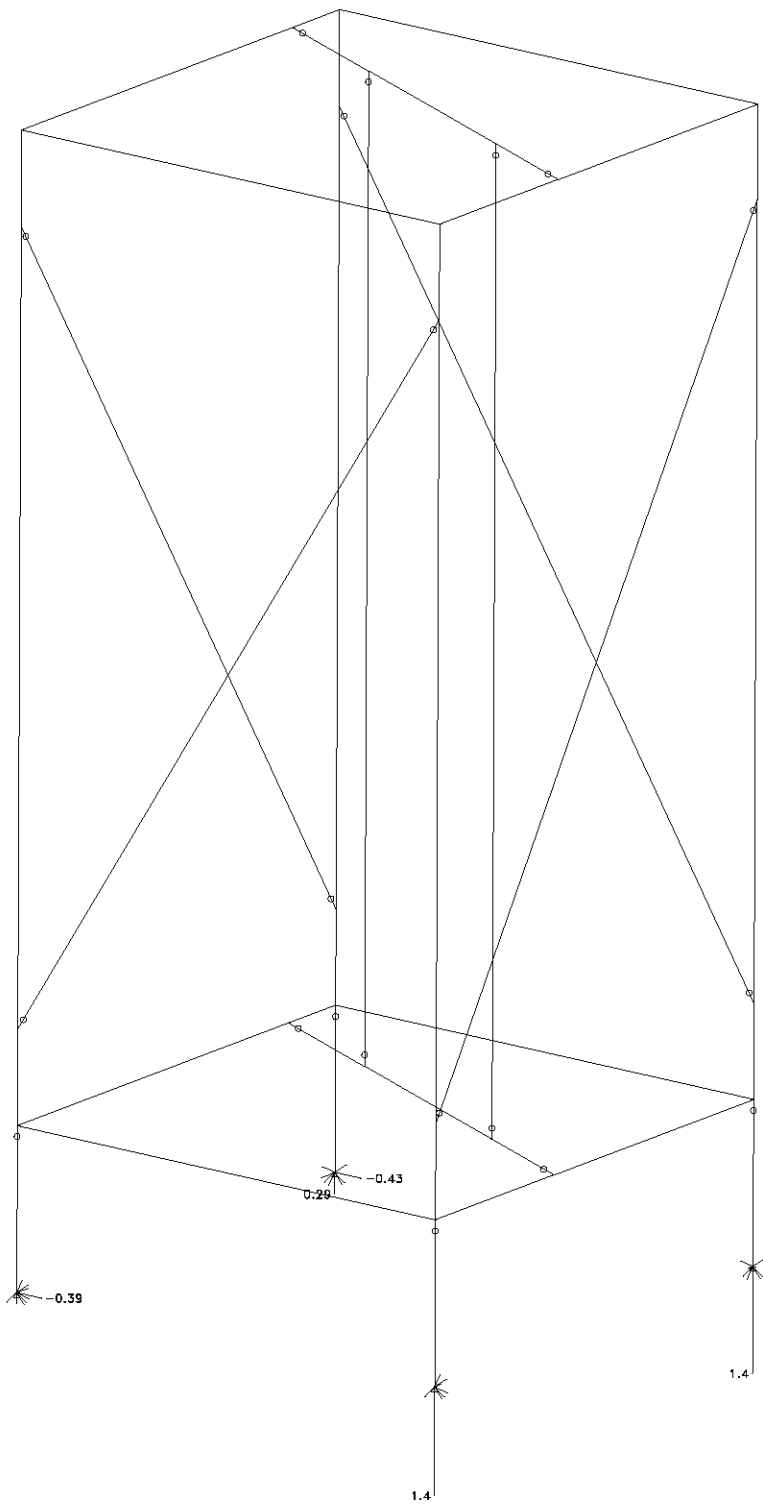
View: isometric view



SCALE = 1:19

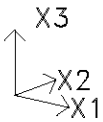
UNITS: kip

DATE: 3/27/19



REACTIONS COMB. NO. 1 X1 Wind

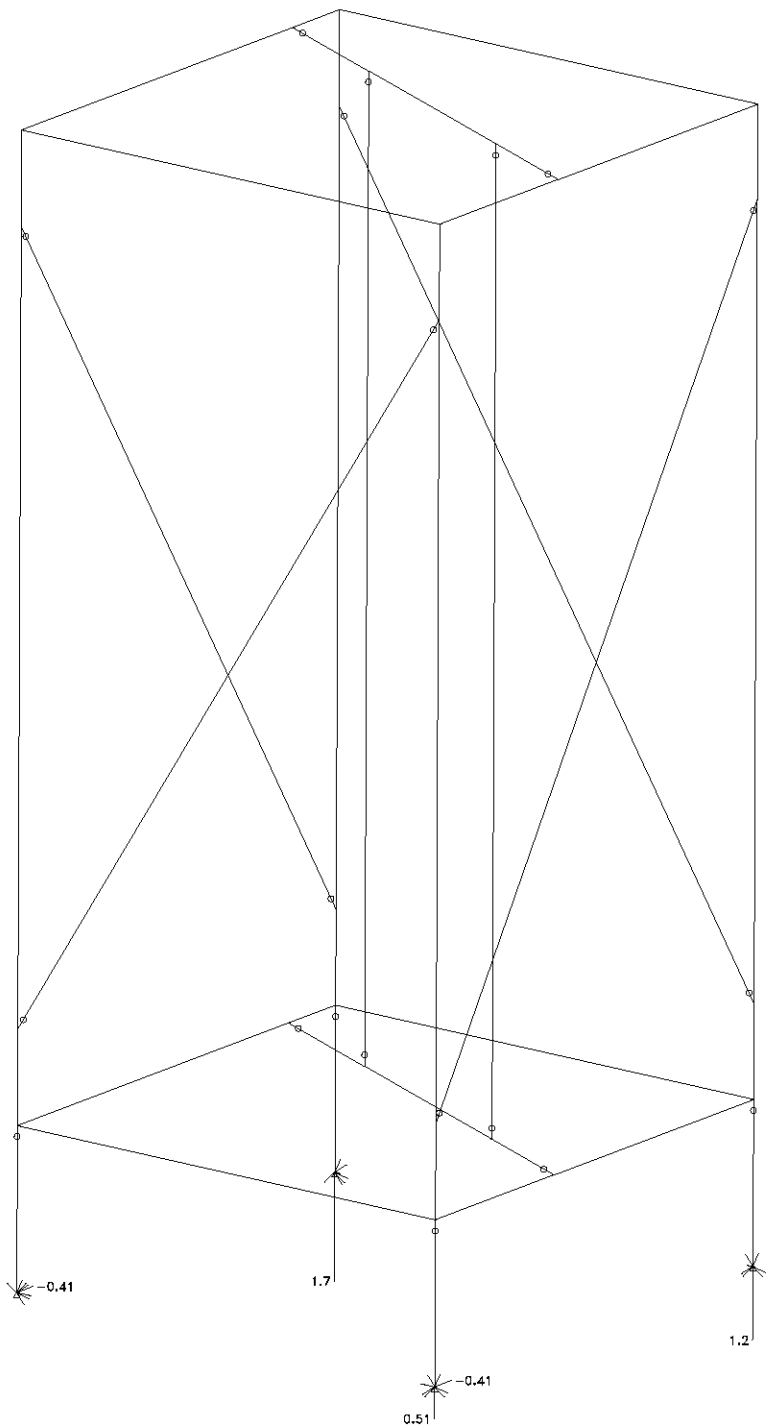
View: isometric view

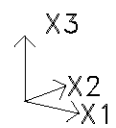


SCALE = 1:19

UNITS: kip

DATE: 3/27/19

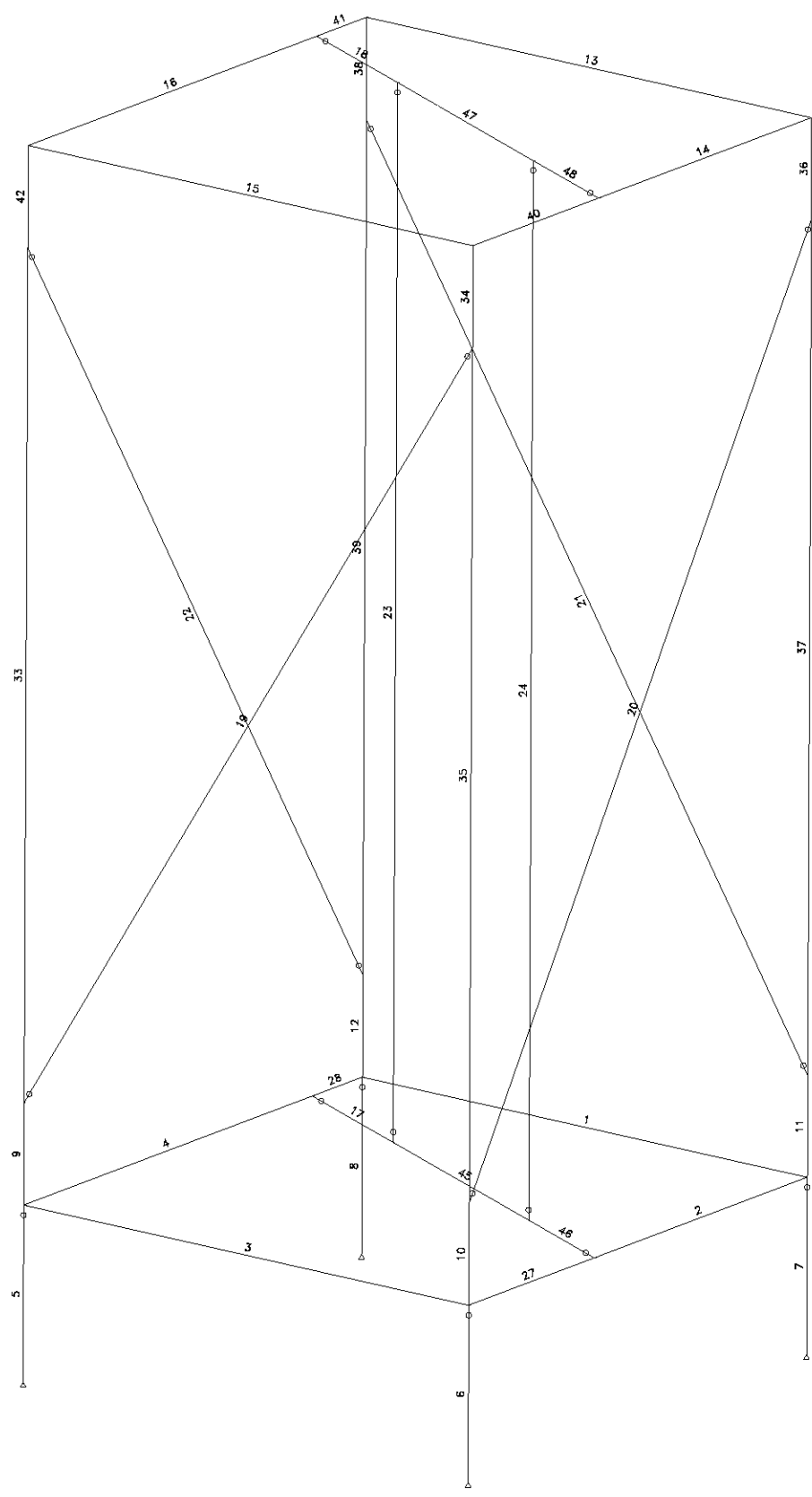




SCALE = 1:16

UNITS: kip ft

DATE: 3/27/19



GEOMETRY

Norfolk St Cambridge MA BS60XC003

Code: AASHTO-L

Page: 1

Date: 3/27/19

Prepared by:

Results Summary Table

Beam	Section	Com	Defl L/	Slen	CAPACITY					Combined Axial+Mom	
					Axial	Dir Shear	Mom	LTB			
1	L 4x4x1/4	1	9999	65	0.00	MJ	0.01	0.04	0.04	0.05	
3	L 4x4x1/4	1	8363	65	0.00	MJ	0.01	0.08	0.08	0.08	
						MI	0.00	0.02	0.00		
4	L 4x4x1/4	2	9999	65	0.00	MJ	0.01	0.05	0.05	0.05	
						MI	0.00	0.01	0.00		
5	PIPE 3	2	9999	15	0.00	MJ	0.01	0.08	0.08	0.14	
						MI	0.02	0.09	0.00		
6	PIPE 3	2	9999	15	-0.01	MJ	0.01	0.05	0.05	0.14	
						MI	0.02	0.09	0.00		
7	PIPE 3	1	9999	15	-0.01	MJ	0.00	0.02	0.02	0.04	
						MI	0.00	0.02	0.00		
8	PIPE 3	1	9848	15	-0.02	MJ	0.02	0.09	0.09	0.15	
						MI	0.01	0.06	0.00		
9	L 4x4x1/4	1	4462	118	-0.01	MJ	0.02	0.08	0.08	0.10	
						MI	0.01	0.04	0.00		
10	L 4x4x1/4	2	4811	123	-0.02	MJ	0.01	0.04	0.07	0.09	
						MI	0.02	0.07	0.00		
11	L 4x4x1/4	1	9999	123	-0.02	MJ	0.01	0.04	0.05	0.08	
						MI	0.01	0.05	0.00		
12	L 4x4x1/4	2	9999	82	-0.02	MJ	0.01	0.04	0.05	0.07	
						MI	0.01	0.05	0.00		
13	L 4x4x1/4	1	9999	65	0.00	MJ	0.00	0.01	0.02	0.03	
						MI	0.00	0.02	0.00		
15	L 4x4x1/4	1	9601	65	-0.01	MJ	0.00	0.04	0.04	0.06	
						MI	0.00	0.02	0.00		
16	L 4x4x1/4	1	9999	65	0.00	MJ	0.01	0.02	0.02	0.04	
						MI	0.01	0.02	0.00		
17	L 3x3x1/4	2	3880	97	0.00	MJ	0.01	0.06	0.07	0.07	
18	L 3x3x1/4	2	3236	97	0.00	MJ	0.01	0.08	0.09	0.09	
19	L 3x3x1/4	2	676	165	0.01	MJ	0.00	0.03	0.19	0.22	
						MI	0.01	0.19	0.00		
20	L 3x3x1/4	1	4251	165	0.01	MJ	0.00	0.03	0.04	0.04	
21	L 3x3x1/4	1	4251	165	-0.04	MJ	0.00	0.03	0.04	0.06	
22	L 3x3x1/4	1	676	165	-0.04	MJ	0.00	0.03	0.19	0.22	
						MI	0.01	0.19	0.00		
23	PIPE 2	2	9999	113	0.00	MI	0.00	0.00	0.00	0.00	
24	PIPE 2	2	9999	131	0.00	MI	0.00	0.00	0.00	0.00	
27	L 4x4x1/4	2	7681	65	0.00	MJ	0.01	0.07	0.07	0.09	
						MI	0.00	0.02	0.00		
40	L 4x4x1/4	2	9999	63	-0.01	MJ	0.01	0.06	0.06	0.07	
						MI	0.00	0.01	0.00		

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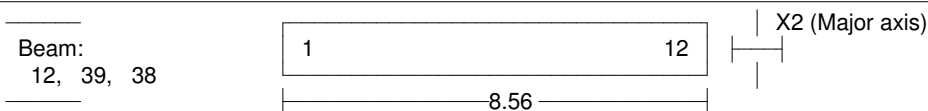
Prepared by:

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Detailed Results Table for Beam 38

Moments: kips*foot , Forces: kips , Stresses: ksi , Section prop.: inch

**CONSTRAINTS**

- Sections : Check
- Steel Grade: A36

DESIGN DATA

- $K_x = 1.00$ - $K_y = 1.00$
- Allow. Slend. : 200 (compr.) 300 (tens.)
- Allowable Deflection : 1/240
- Tension Area Reduction Factor : 1.00
- Building type : Unbraced

Section: L 4x4x1/4

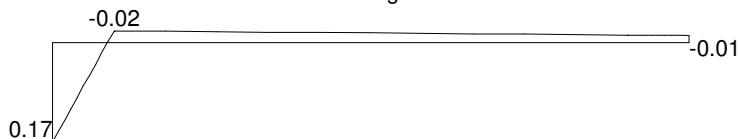
$I_x = 3.04$ $I_y = 3.04$ $S_x = 1.05$ $S_y = 1.05$ $\text{Area} = 1.94$
 $h = 4.00$ $b = 4.00$ $t = 0.25$ $e_y = 2.90$ $e_x = 2.90$
 $J = 0.04$ $C_w = 0.00$ $I_v = 1.23$ in^4

DESIGN COMBINATION = 2

M2 Moment Diagram



Max. AXIAL Force = -0.85 (compr.) Max. SHEAR Force = 0.06
M3 Moment Diagram



Max. AXIAL Force = -0.85 (compr.) Max. SHEAR Force = 0.23

SECTION CLASSIFICATION: *** NON-COMPACT / SLENDER ***

Limiting Ratios:	Compact	Non-Compact	Slender -axial
$d/t = 16.13$	< 12.8	25.8	12.8 ($F_y = 36.0$)
$b/t = 16.13$	< 15.3	25.8	12.8

DESIGN	EQUATION	FACTORS	VALUES	RESULT
V2 Shear 6.10.9.2-1 6.10.9.3.2-4	$V_u/V_n < 1.00$ $V_n = C V_p$ $C = 1.0$	$A_v = 0.89$ $V_p = 0.58 * F_y * A_v$	$V_u = 0.23$ $V_n = 18.67$	0.01
M3 Moment AISC F10-7 FLB	$\frac{M}{1. M_n} < 1.00$	$\lambda = 16.13$ $\lambda_p = 18.55$ $\lambda_r = 25.83$	$M = 0.17$ $M_n = 3.57$ $M_p = 4.73$ $M_r = 2.73$	0.05

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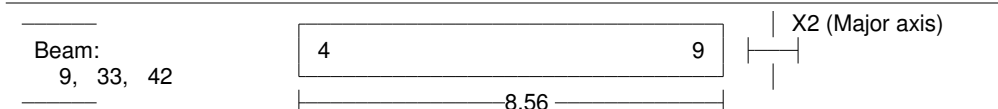
Detailed Results Table for Beam 38

Moments: kips*foot , Forces: kips , Stresses: ksi , Section prop.: inch

DESIGN	EQUATION	FACTORS	VALUES	RESULT
M2 Moment AISC F10-7 FLB	$\frac{M}{1. Mn} < 1.00$	$\lambda = 16.13$ $\lambda_p = 18.55$ $\lambda_r = 25.83$	$M = 0.05$ $Mn = 3.57$ $Mp = 4.73$ $Mr = 2.73$	0.01
Axial Force 6.9.2.1-1	$\frac{Pu}{0.9 Pn} < 1.00$ Slender. reduct.	$(kL/r)_x = 52$ $(kL/r)_y = 82$ $P0/Pe = 0.77$ $x = 0.64$ $Q = 0.91$	$Pu = 0.85$ $As = 1.94$ $Pn = 46.11$ $y = 0.64$	0.02
Lateral Torsional Buckling (10-2,3)	$\frac{M}{1. Mn} < 1.00$ Critical Segment from 0.00 to 8.56 on +z flange Segment End Moments: -0.17 and 0.01	$Lb = 8.56$ $Cb = 2.23$	$M = 0.17$ $Mn = 3.57$ $Me = -1.00$	0.05
Combined Forces (compress.) 6.9.2.2-1	$\frac{Pu}{2Pr} + \frac{Mux}{Mrx} + \frac{Muy}{Mry} < 1.00$	$Cmx = 1.00$ $Cmy = 1.00$ $Pex = 206.34$ $Pey = 82.98$	$Mux = 0.05$ $Muy = 0.17$ $\delta bx = 1.00$ $\delta by = 1.01$	0.07

Detailed Results Table for Beam 9 - 42

Moments: kips*foot , Forces: kips , Stresses: ksi , Section prop.: inch

**CONSTRAINTS**

- Sections : Check
- Steel Grade: A36

DESIGN DATA

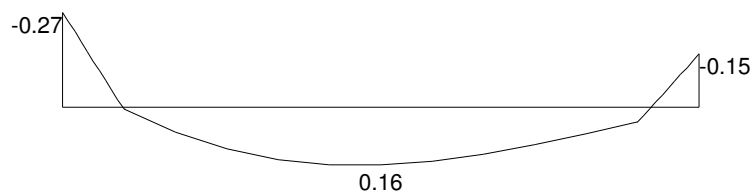
- $Kx = 1.00$ - $Ky = 1.00$
- Allow. Slend. : 200 (compr.) 300 (tens.)
- Allowable Deflection : 1/240
- Tension Area Reduction Factor : 1.00
- Building type : Unbraced

Section: L 4x4x1/4

$I_x = 3.04$ $I_y = 3.04$ I_n^4 $S_x = 1.05$ $S_y = 1.05$ I_n^3 Area = 1.94
 $h = 4.00$ $b = 4.00$ $t = 0.25$ $e_y = 2.90$ $e_x = 2.90$
 $J = 0.04$ $C_w = 0.00$ I_n^6 $I_v = 1.23$ I_n^4

DESIGN COMBINATION = 1

M2 Moment Diagram



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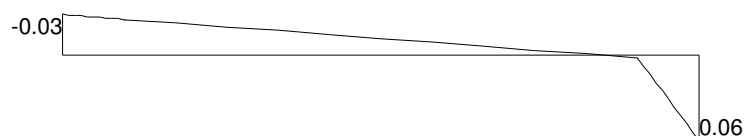
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Detailed Results Table for Beam 9 - 42

Moments: kips*foot , Forces: kips , Stresses: ksi , Section prop.: inch

Max. AXIAL Force = -0.37 (compr.) Max. SHEAR Force = 0.34
M3 Moment Diagram

Max. AXIAL Force = -0.37 (compr.) Max. SHEAR Force = 0.07

SECTION CLASSIFICATION: *** NON-COMPACT / SLENDER ***

Limiting Ratios:	Compact	Non-Compact	Slender -axial	
d/t= 16.13	<	12.8	25.8	12.8 (Fy= 36.0)
b/t= 16.13	<	15.3	25.8	12.8

DESIGN	EQUATION	FACTORS	VALUES	RESULT
M3 Moment AISC F10-7 FLB	$\frac{M}{1. Mn} < 1.00$	$\lambda = 16.13$ $\lambda_p = 18.55$ $\lambda_r = 25.83$	$M = 0.06$ $M_n = 3.57$ $M_p = 4.73$ $M_r = 2.73$	0.02
V3 Shear 6.10.9.2-1 6.10.9.3.2-4	$\frac{V_u}{V_n} < 1.00$ $V_n = C V_p$ $C = 1.0$	$A_v = 0.89$ $V_p = 0.58 F_y A_v$	$V_u = 0.34$ $V_n = 18.67$	0.02
M2 Moment AISC F10-7 FLB	$\frac{M}{1. Mn} < 1.00$	$\lambda = 16.13$ $\lambda_p = 18.55$ $\lambda_r = 25.83$	$M = 0.27$ $M_n = 3.57$ $M_p = 4.73$ $M_r = 2.73$	0.08
Deflection	$\frac{\text{defl.}}{L / 240} < 1.00$		$\text{defl} = 0.02303$	0.05
Axial Force 6.9.2.1-1	$\frac{P_u}{0.9 P_n} < 1.00$ Slender. reduct.	$(kL/r)_x = 75$ $(kL/r)_y = 118$ $P_0/P_e = 1.59$ $x = 0.91$ $Q = 0.91$	$P_u = 0.37$ $A_s = 1.94$ $P_n = 32.72$ $y = 0.91$	0.01
Lateral Torsional Buckling (10-2,3)	$\frac{M}{1. Mn} < 1.00$ Critical Segment from 0.00 to 8.56 on +z flange Segment End Moments: -0.27 and -0.15	$L_b = 8.56$ $C_b = 1.25$	$M = 0.27$ $M_n = 3.57$ $M_e = 12.62$	0.08
Combined Forces (compress.) 6.9.2.2-1	$\frac{P_u}{2 Pr} + \frac{M_{ux}}{M_{rx}} + \frac{M_{uy}}{M_{ry}} < 1.00$	$C_{mx} = 1.00$ $C_{my} = 1.00$ $P_{ex} = 99.19$ $P_{ey} = 40.07$	$M_{ux} = 0.27$ $M_{uy} = 0.06$ $\delta_{bx} = 1.00$ $\delta_{by} = 1.01$	0.10

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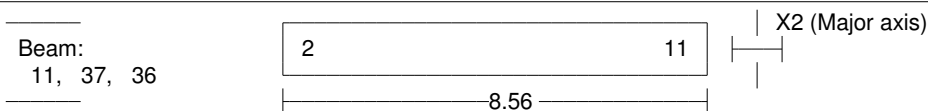
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Detailed Results Table for Beam 11 - 36

Moments: kips*foot , Forces: kips , Stresses: ksi , Section prop.: inch

**CONSTRAINTS**

- Sections : Check
 - Steel Grade: A36

DESIGN DATA

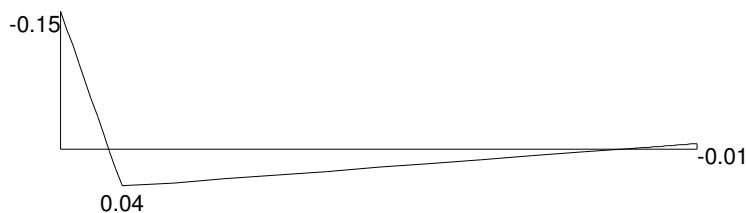
- $K_x = 1.00$ - $K_y = 1.00$
 - Allow. Slend. : 200 (compr.) 300 (tens.)
 - Allowable Deflection : 1/240
 - Tension Area Reduction Factor : 1.00
 - Building type : Unbraced

Section: L 4x4x1/4

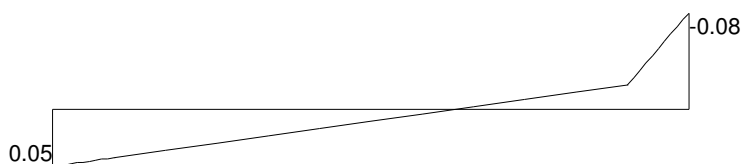
$I_x = 3.04$ $I_y = 3.04$ $S_x = 1.05$ $S_y = 1.05$ $\text{Area} = 1.94$
 $h = 4.00$ $b = 4.00$ $t = 0.25$ $e_y = 2.90$ $e_x = 2.90$
 $J = 0.04$ $C_w = 0.00$ $I_v = 1.23$ in^4

DESIGN COMBINATION = 1

M2 Moment Diagram



Max. AXIAL Force = -0.84 (compr.) Max. SHEAR Force = 0.24
 M3 Moment Diagram



Max. AXIAL Force = -0.84 (compr.) Max. SHEAR Force = 0.07

SECTION CLASSIFICATION: *** NON-COMPACT / SLENDER ***

Limiting Ratios:	Compact	Non-Compact	Slender -axial
$d/t = 16.13$	< 12.8	25.8	12.8 (Fy= 36.0)
$b/t = 16.13$	< 15.3	25.8	12.8

DESIGN	EQUATION	FACTORS	VALUES	RESULT
M3 Moment AISC F10-7	M	$\lambda = 16.13$	$M = 0.08$	0.02
	< 1.00		$M_n = 3.57$	
		$\lambda_p = 18.55$	$M_p = 4.73$	
		$\lambda_r = 25.83$	$M_r = 2.73$	
FLB				
V3 Shear 6.10.9.2-1 6.10.9.3.2-4	$V_u/V_n < 1.00$ $V_n = C V_p$ $C = 1.0$	$A_v = 0.89$ $V_p = 0.58 \cdot F_y \cdot A_v$	$V_u = 0.24$ $V_n = 18.67$	0.01

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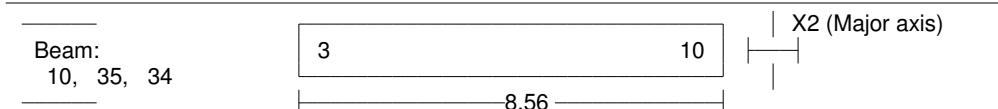
Detailed Results Table for Beam 11 - 36

Moments: kips*foot , Forces: kips , Stresses: ksi , Section prop.: inch

DESIGN	EQUATION	FACTORS	VALUES	RESULT
M2 Moment AISC F10-7 FLB	$\frac{M}{1. Mn} < 1.00$	$\lambda = 16.13$ $\lambda_p = 18.55$ $\lambda_r = 25.83$	$M = 0.15$ $Mn = 3.57$ $Mp = 4.73$ $Mr = 2.73$	0.04
Axial Force 6.9.2.1-1	$\frac{Pu}{0.9 Pn} < 1.00$ Slender. reduct.	$(kL/r)_x = 51$ $(kL/r)_y = 80$ $P0/Pe = 0.73$ $x = 0.62$ $Q = 0.91$	$Pu = 0.84$ $As = 1.94$ $Pn = 46.82$ $y = 0.62$	0.02
Lateral Torsional Buckling (10-2,3)	$\frac{M}{1. Mn} < 1.00$ Critical Segment from 0.00 to 8.56 on +z flange Segment End Moments: -0.15 and -0.01	$Lb = 8.56$ $Cb = 1.71$	$M = 0.15$ $Mn = 3.57$ $Me = 17.19$	0.04
Combined Forces (compress.) 6.9.2.2-1	$\frac{Pu}{2Pr} + \frac{Mux}{Mrx} + \frac{Muy}{Mry} < 1.00$	$Cmx = 1.00$ $Cmy = 1.00$ $Pex = 214.51$ $Pey = 87.18$	$Mux = 0.16$ $Muy = 0.08$ $\delta bx = 1.00$ $\delta by = 1.01$	0.08

Detailed Results Table for Beam 10 - 34

Moments: kips*foot , Forces: kips , Stresses: ksi , Section prop.: inch

**CONSTRAINTS**

- Sections : Check
- Steel Grade: A36

DESIGN DATA

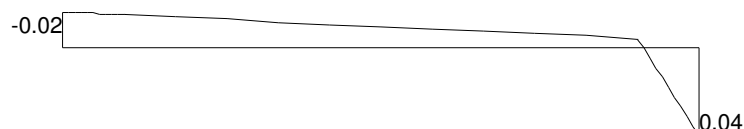
- $Kx = 1.00$ - $Ky = 1.00$
- Allow. Slend. : 200 (compr.) 300 (tens.)
- Allowable Deflection : 1/240
- Tension Area Reduction Factor : 1.00
- Building type : Unbraced

Section: L 4x4x1/4

$Ix = 3.04$ $Iy = 3.04$ $Sx = 1.05$ $Sy = 1.05$ $Area = 1.94$
 $h = 4.00$ $b = 4.00$ $t = 0.25$ $ey = 2.90$ $ex = 2.90$
 $J = 0.04$ $Cw = 0.00$ $Iv = 1.23$

DESIGN COMBINATION = 2

M2 Moment Diagram



Max. AXIAL Force = -0.45 (compr.) Max. SHEAR Force = 0.06

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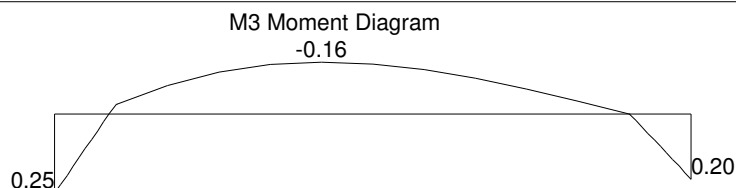
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Detailed Results Table for Beam 10 - 34

Moments: kips*foot , Forces: kips , Stresses: ksi , Section prop.: inch



Max. AXIAL Force = -0.45 (compr.) Max. SHEAR Force = 0.34

SECTION CLASSIFICATION: *** NON-COMPACT / SLENDER ***

Limiting Ratios:	Compact	Non-Compact	Slender -axial	
d/t= 16.13	< 12.8	25.8	12.8	(Fy= 36.0)
b/t= 16.13	< 15.3	25.8	12.8	

DESIGN	EQUATION	FACTORS	VALUES	RESULT
V2 Shear 6.10.9.2-1 6.10.9.3.2-4	$\frac{V_u}{V_n} < 1.00$ $V_n = C V_p$ C = 1.0	$A_v = 0.89$ $V_p = 0.58 F_y A_v$	$V_u = 0.34$ $V_n = 18.67$	0.02
M3 Moment AISC F10-7 FLB	$\frac{M}{1. M_n} < 1.00$	$\lambda = 16.13$ $\lambda_p = 18.55$ $\lambda_r = 25.83$	$M = 0.25$ $M_n = 3.57$ $M_p = 4.73$ $M_r = 2.73$	0.07
M2 Moment AISC F10-7 FLB	$\frac{M}{1. M_n} < 1.00$	$\lambda = 16.13$ $\lambda_p = 18.55$ $\lambda_r = 25.83$	$M = 0.04$ $M_n = 3.57$ $M_p = 4.73$ $M_r = 2.73$	0.01
Deflection	$\frac{\text{defl.}}{L / 240} < 1.00$		defl = 0.02136	0.05
Axial Force 6.9.2.1-1	$\frac{P_u}{0.9 P_n} < 1.00$ Slender. reduct.	$(kL/r)_x = 76$ $(kL/r)_y = 120$ $P_0/P_e = 1.64$ $x = 0.93$ $Q = 0.91$	$P_u = 0.45$ $A_s = 1.94$ $P_n = 31.98$ $y = 0.93$	0.02
Lateral Torsional Buckling (10-2.3)	$\frac{M}{1. M_n} < 1.00$ Critical Segment from 0.00 to 8.56 on +z flange Segment End Moments: -0.25 and -0.20	$L_b = 8.56$ $C_b = 2.23$	$M = 0.25$ $M_n = 3.57$ $M_e = -1.00$	0.07
Combined Forces (compress.) 6.9.2.2-1	$\frac{P_u}{2 P_r} + \frac{M_{ux}}{M_{rx}} + \frac{M_{uy}}{M_{ry}} < 1.00$	$C_{mx} = 1.00$ $C_{my} = 1.00$ $P_{ex} = 96.60$ $P_{ey} = 38.75$	$M_{ux} = 0.04$ $M_{uy} = 0.25$ $\delta_{bx} = 1.00$ $\delta_{by} = 1.01$	0.09

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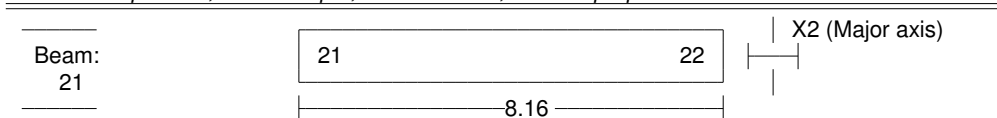
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Prepared by:

Detailed Results Table for Beam 21

Moments: kips*foot , Forces: kips , Stresses: ksi , Section prop.: inch

**CONSTRAINTS**

- Sections : Check
- Steel Grade: A36

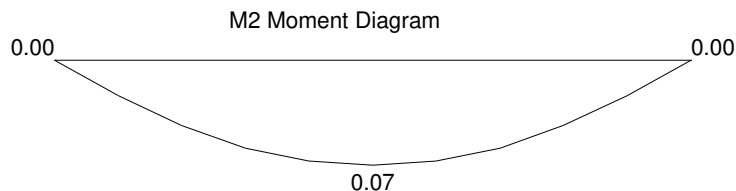
DESIGN DATA

- $K_x = 1.00$ - $K_y = 1.00$
- Allow. Slend. : 200 (compr.) 300 (tens.)
- Allowable Deflection : 1/240
- Tension Area Reduction Factor : 1.00
- Building type : Unbraced

Section: L 3x3x1/4

$I_x = 1.24$ $I_y = 1.24$ $S_x = 0.58$ $S_y = 0.58$ $I_n = 3$ Area = 1.44
 $h = 3.00$ $b = 3.00$ $t = 0.25$ $e_y = 2.15$ $e_x = 2.15$
 $J = 0.03$ $C_w = 0.00$ $I_v = 0.50$ $I_n = 4$

DESIGN COMBINATION = 1



Max. AXIAL Force = -0.51 (compr.) Max. SHEAR Force = 0.03

SECTION CLASSIFICATION: *** COMPACT ***

Limiting Ratios:	Compact	Non-Compact	Slender -axial
$d/t = 12.10$	< 12.8	25.8	12.8 ($F_y = 36.0$)
$b/t = 12.10$	< 15.3	25.8	12.8

DESIGN	EQUATION	FACTORS	VALUES	RESULT
M2 Moment AISC F10-1 without LTB	$\frac{M}{1. Mn} < 1.00$	$Z = 0.58$	$M = 0.07$ $Mn = 2.34$	0.03
Deflection	$\frac{\text{defl.}}{L / 240} < 1.00$		$\text{defl} = 0.02302$	0.06
Axial Force 6.9.2.1-1	$\frac{Pu}{0.9 Pn} < 1.00$ Slender. reduct.	$(kL/r)_x = 155$ $(kL/r)_y = 156$ $P0/Pe = 3.05$ $x = 0.94$	$Pu = 0.51$ $As = 1.44$ $Pn = 14.92$ $y = 0.94$	0.04
Lateral Torsional Buckling (10-2,3)	$\frac{M}{1. Mn} < 1.00$ Critical Segment from 0.00 to 8.16 on +z flange Segment End Moments: 0.00 and 0.00	$Lb = 8.16$ $Cb = 1.00$	$M = 0.07$ $Mn = 1.95$ $Me = 5.84$	0.04

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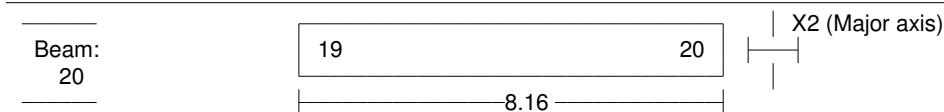
Detailed Results Table for Beam 21

Moments: kips*foot , Forces: kips , Stresses: ksi , Section prop.: inch

DESIGN	EQUATION			FACTORS	VALUES	RESULT
Combined Forces (compress.) 6.9.2.2-1	$\frac{P_u}{2Pr}$	$\frac{M_{ux}}{Mrx}$	$\frac{M_{uy}}{Mry}$	Cmx = 1.00 Cmy = 1.00 Pex = 17.23 Pey = 17.01	Mux = 0.08 Muy = 0.00 $\delta_{bx} = 1.03$ $\delta_{by} = 1.03$	0.06
			< 1.00			

Detailed Results Table for Beam 20

Moments: kips*foot , Forces: kips , Stresses: ksi , Section prop.: inch



CONSTRAINTS

- Sections : Check
- Steel Grade: A36

DESIGN DATA

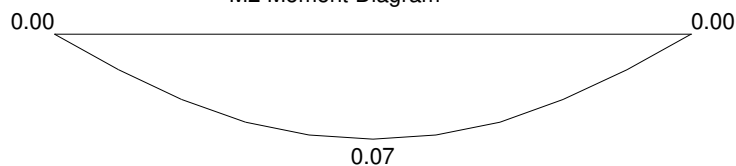
- Kx = 1.00 - Ky = 1.00
- Allow. Slend. : 200 (compr.) 300 (tens.)
- Allowable Deflection : 1/240
- Tension Area Reduction Factor : 1.00
- Building type : Unbraced

Section: L 3x3x1/4

Ix = 1.24 Iy = 1.24in⁴ Sx = 0.58 Sy = 0.58in³ Area = 1.44
h = 3.00 b = 3.00in t = 0.25 ey = 2.15in ex = 2.15in
J = 0.03 Cw = 0.00in⁶ Iv = 0.50 in⁴

DESIGN COMBINATION = 1

M2 Moment Diagram



Max. AXIAL Force = 0.17 (tens.) Max. SHEAR Force = 0.03

SECTION CLASSIFICATION: *** COMPACT ***

Limiting Ratios: Compact Non-Compact Slender -axial
d/t= 12.10 < 12.8 25.8 12.8 (Fy= 36.0)
b/t= 12.10 < 15.3 25.8 12.8

DESIGN	EQUATION		FACTORS	VALUES	RESULT
M2 Moment AISC F10-1 without LTB	$\frac{M}{1. Mn}$	< 1.00	Z = 0.58	M = 0.07 Mn = 2.34	0.03

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Prepared by:

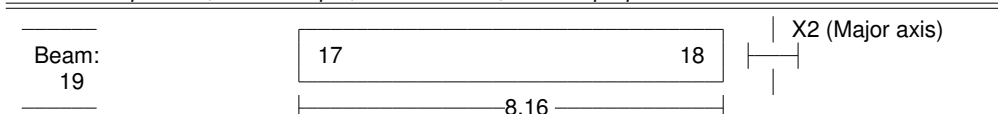
Detailed Results Table for Beam 20

Moments: kips*foot , Forces: kips , Stresses: ksi , Section prop.: inch

DESIGN	EQUATION	FACTORS	VALUES	RESULT
Deflection	$\frac{\text{defl.}}{L / 240} < 1.00$		defl = 0.02302	0.06
Axial Force 6.8.2.1-1	$\frac{P_u}{0.95A_g F_y} < 1.00$	(kL/r) _x = 164 (kL/r) _y = 165	P _u = 0.17 A _s = 1.44 F _y = 36.00	0.00
Lateral Torsional Buckling (10-2,3)	$\frac{M}{1. M_n} < 1.00$ Critical Segment from 0.00 to 8.16 on +z flange Segment End Moments: 0.00 and 0.00	L _b = 8.16 C _b = 1.00	M = 0.07 M _n = 1.95 M _e = 5.84	0.04
Combined Forces (compress.) 6.9.2.2-1	$\frac{P_u}{2P_r} + \frac{M_{ux}}{M_{rx}} + \frac{M_{uy}}{M_{ry}} < 1.00$	C _{mx} = 1.00 C _{my} = 1.00 P _{ex} = 15.39 P _{ey} = 15.21	M _{ux} = 0.07 M _{uy} = 0.00 δ _{bx} = 1.00 δ _{by} = 1.00	0.04

Detailed Results Table for Beam 19

Moments: kips*foot , Forces: kips , Stresses: ksi , Section prop.: inch



CONSTRAINTS

- Sections : Check
- Steel Grade: A36

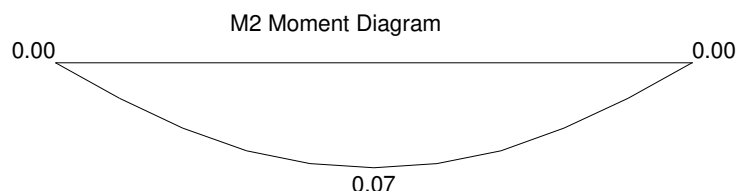
DESIGN DATA

- K_x = 1.00 - K_y = 1.00
- Allow. Slend. : 200 (compr.) 300 (tens.)
- Allowable Deflection : 1/240
- Tension Area Reduction Factor : 1.00
- Building type : Unbraced

Section: L 3x3x1/4

I_x = 1.24 I_y = 1.24in⁴ S_x = 0.58 S_y = 0.58in³ Area = 1.44
h = 3.00 b = 3.00in t = 0.25 e_y = 2.15in e_x = 2.15in
J = 0.03 C_w = 0.00in⁶ I_v = 0.50 in⁴

DESIGN COMBINATION = 2



Max. AXIAL Force = 0.16 (tens.) Max. SHEAR Force = 0.03

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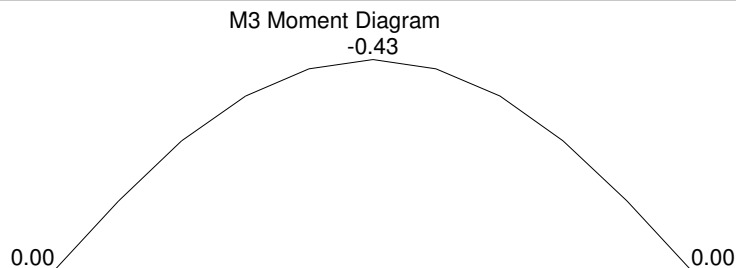
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Prepared by:

Detailed Results Table for Beam 19

Moments: kips*foot , Forces: kips , Stresses: ksi , Section prop.: inch



Max. AXIAL Force = 0.16 (tens.) Max. SHEAR Force = 0.18

SECTION CLASSIFICATION: *** COMPACT ***

Limiting Ratios:	Compact	Non-Compact	Slender -axial	
d/t= 12.10	<	12.8	25.8	12.8 (Fy= 36.0)
b/t= 12.10	<	15.3	25.8	12.8

DESIGN	EQUATION	FACTORS	VALUES	RESULT
V2 Shear 6.10.9.2-1 6.10.9.3.2-4	$\frac{V_u}{V_n} < 1.00$ $V_n = C V_p$ $C = 1.0$	$A_v = 0.67$ $V_p = 0.58 * F_y * A_v$	$V_u = 0.18$ $V_n = 14.00$	0.01
M3 Moment AISC F10-1 without LTB	$\frac{M}{1. M_n} < 1.00$	$Z = 0.58$	$M = 0.43$ $M_n = 2.34$	0.19
M2 Moment AISC F10-1 without LTB	$\frac{M}{1. M_n} < 1.00$	$Z = 0.58$	$M = 0.07$ $M_n = 2.34$	0.03
Deflection	$\frac{\text{defl.}}{L / 240} < 1.00$		$\text{defl} = 0.14470$	0.35
Axial Force 6.8.2.1-1	$\frac{P_u}{0.95 A_g F_y} < 1.00$	$(kL/r)_x = 164$ $(kL/r)_y = 165$	$P_u = 0.16$ $A_s = 1.44$ $F_y = 36.00$	0.00
Lateral Torsional Buckling (10-2,3)	$\frac{M}{1. M_n} < 1.00$ Critical Segment from 0.00 to 8.16 on -z flange Segment End Moments: 0.00 and 0.00	$L_b = 8.16$ $C_b = 1.00$	$M = 0.43$ $M_n = 2.34$ $M_e = -1.00$	0.19
Combined Forces (compress.) 6.9.2.2-1	$\frac{P_u}{2 P_r} + \frac{M_{ux}}{M_{rx}} + \frac{M_{uy}}{M_{ry}} < 1.00$	$C_{mx} = 1.00$ $C_{my} = 1.00$ $P_{ex} = 15.39$ $P_{ey} = 15.21$	$M_{ux} = 0.07$ $M_{uy} = 0.43$ $\delta_{bx} = 1.00$ $\delta_{by} = 1.00$	0.22

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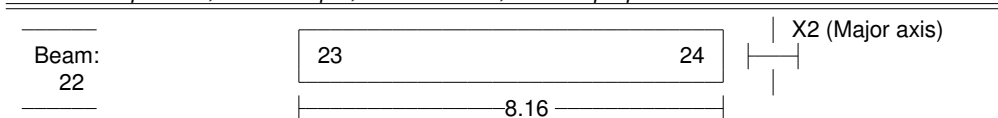
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Prepared by:

Detailed Results Table for Beam 22

Moments: kips*foot , Forces: kips , Stresses: ksi , Section prop.: inch

**CONSTRAINTS**

- Sections : Check
 - Steel Grade: A36

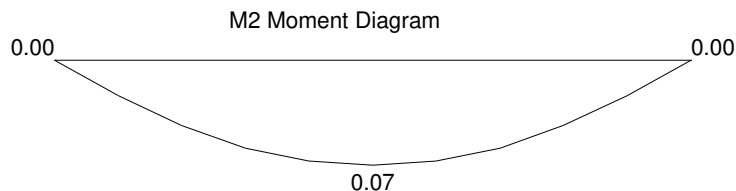
DESIGN DATA

- Kx = 1.00 - Ky = 1.00
 - Allow. Slend. : 200 (compr.) 300 (tens.)
 - Allowable Deflection : 1/240
 - Tension Area Reduction Factor : 1.00
 - Building type : Unbraced

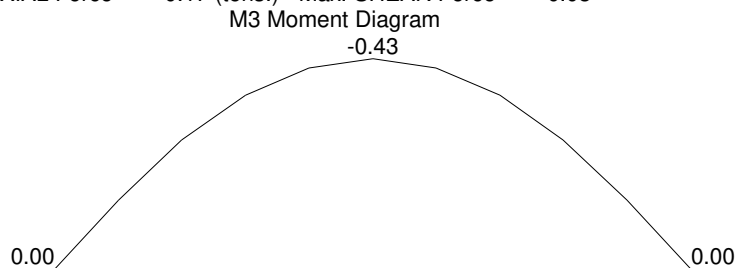
Section: L 3x3x1/4

Ix = 1.24 Iy = 1.24in⁴ Sx = 0.58 Sy = 0.58in³ Area = 1.44
 h = 3.00 b = 3.00in t = 0.25 ey = 2.15in ex = 2.15in
 J = 0.03 Cw = 0.00in⁶ Iv = 0.50 in⁴

DESIGN COMBINATION = 1



Max. AXIAL Force = 0.17 (tens.) Max. SHEAR Force = 0.03



Max. AXIAL Force = 0.17 (tens.) Max. SHEAR Force = 0.18

SECTION CLASSIFICATION: * COMPACT *****

Limiting Ratios: Compact Non-Compact Slender -axial
 d/t= 12.10 < 12.8 25.8 12.8 (Fy= 36.0)
 b/t= 12.10 < 15.3 25.8 12.8

DESIGN	EQUATION	FACTORS	VALUES	RESULT
V2 Shear 6.10.9.2-1 6.10.9.3.2-4	$V_u/V_n < 1.00$ $V_n = C V_p$ $C = 1.0$	$A_v = 0.67$ $V_p = 0.58 * F_y * A_v$	$V_u = 0.18$ $V_n = 14.00$	0.01
M3 Moment AISC F10-1 without LTB	$\frac{M}{1. M_n} < 1.00$	$Z = 0.58$	$M = 0.43$ $M_n = 2.34$	0.19

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Code: AASHTO-L**Page:** 12**Date:** 3/27/19**Prepared by:****Detailed Results Table for Beam 22***Moments: kips*foot , Forces: kips , Stresses: ksi , Section prop.: inch*

DESIGN	EQUATION	FACTORS	VALUES	RESULT
M2 Moment AISC F10-1 without LTB	$\frac{M}{1. Mn} < 1.00$	$Z = 0.58$	$M = 0.07$ $Mn = 2.34$	0.03
Deflection	$\frac{\text{defl.}}{L / 240} < 1.00$		$\text{defl} = 0.14470$	0.35
Axial Force 6.8.2.1-1	$\frac{Pu}{0.95 Ag Fy} < 1.00$	$(kL/r)_x = 164$ $(kL/r)_y = 165$	$Pu = 0.17$ $As = 1.44$ $Fy = 36.00$	0.00
Lateral Torsional Buckling (10-2,3)	$\frac{M}{1. Mn} < 1.00$ Critical Segment from 0.00 to 8.16 on -z flange Segment End Moments: 0.00 and 0.00	$Lb = 8.16$ $Cb = 1.00$	$M = 0.43$ $Mn = 2.34$ $Me = -1.00$	0.19
Combined Forces (compress.) 6.9.2.2-1	$\frac{Pu}{2Pr} + \frac{Mux}{Mrx} + \frac{Muy}{Mry} < 1.00$	$Cmx = 1.00$ $Cmy = 1.00$ $Pex = 15.39$ $Pey = 15.21$	$Mux = 0.07$ $Muy = 0.43$ $\delta bx = 1.00$ $\delta by = 1.00$	0.22

