W. David Seidel, AIA
Architect

Aspectus, Inc.

SOUNDPROOFING / ACOUSTICS CONSULTING
DESIGN /PLANNING / CONSTRUCTION MANAGEMENT
RESIDENTIAL / COMMERCIAL

March 1, 2020

To: City of San Rafael
Dept. of Public Works
111 Morphew Street
San Rafael, CA 94901

Re: Noise Assessment Report for Proposed Electronic Equipment
5 Sites located within San Rafael City Limits

This letter certifies that after carefully reviewing:

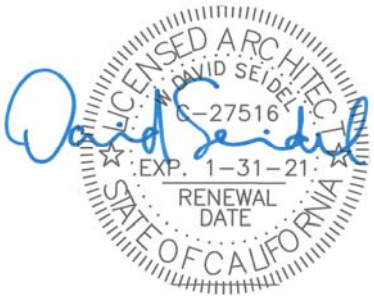
One of five technically and essentially identical sets of permit application documents (Node ID CROWN/SFB005m2 @ 44 Simms St., San Rafael, dated 8/22/19, prepared by SHIFT Engineering LLC., see Appendix) for the proposed scope of work at each node, the list and map of locations as well as the manufacturer's specifications of the proposed equipment, I have not discovered any equipment in the scope, that will produce audible noise during standby or regular operation.

The proposed scope covers installing small cell wireless antennas and supporting equipment on the existing utility structures in a public right-of-way. The proposed equipment consists of antennas, electrical panels and meters and antenna radiowave amplifiers to be mounted on existing utility and light poles. None of these units have any active cooling systems with motors, fans, pumps, compressors, etc. of any kind.

All cooling is achieved by unaided convection. The manufacturer certifies this equipment to operate silently, see specifications in appendix.

I hope this letter answers all your questions about the potential noise impact for this project, which I evaluate to be zero, please feel free to call or email me for more information.

Sincerely,



W. David Seidel, AIA
Architect
CA Lic. C 27516

Short Biography

David Seidel, AIA is the owner of "W. David Seidel, Architect"
His license no. CA C-27516 was issued by the State's Dept. of Consumer Affairs in 1998. David received his B.A. with honors in Architecture from the University of California at Berkeley in 1991.

His ongoing architecture projects are mostly of the commercial and the residential variety.
His office has been open for twelve years and has $150k in Annual Revenues.
David has 23 years of industry experience and possesses deep experience in design, bidding, permits and construction administration for projects large and small.

Before launching his office, David has worked at well-known S.F. architecture firms such as Gensler, Holey Associates, Flad and Associates and EHDD where he was responsible for leading teams of architects and consultants working on residential, commercial and institutional buildings.

Soundproofing & Acoustics Consulting

David has helped numerous architects, homeowners, renters, as well as seasoned engineers and facility managers, to achieve their acoustic or noise control goals.
David combines the following skills and experiences into in-depth expertise as an acoustics and soundproofing consultant:

- 20 years experience as a licensed architect.
- Two years course work in sound engineering, T.U. Berlin, Germany
- Experience with both residential and commercial project types.
- Track record of successfully completed facilities.

David is outfitted with all required equipment to perform field measurements and recordings of noise transmission and/or acoustical performance and character of spaces. The use of C.A.R.A. acoustic design software allows the modeling and fine-tuning of any type and size enclosed space.

David is registered as a LBE with the S.F. HRC, a copy of the certificate will be attached to the proposal.

More information and photographs of completed projects can be found at David's website:

http://www.wdavidseidel.com/Sound.htm

APPENDIX

Map of 5 Proposed Project Sites

List of 5 Proposed Project Sites

Radio Amplifier Specification, Airspan AH4400

Sample permit application documents
Node ID CROWN/SFB005m2 @ 44 Simms St., San Rafael,
dated 8/22/19,
prepared by SHIFT Engineering LLC.


SFB004m1
SFB001m3
SFB002m2
SFB003m1
SFB005m2
2nd St
Mission Ave
Embarcadero Way
Marina Blvd
Montecito Rd
Lincoln Ave
Lindaro St
Jordan St
Rice Dr
Bay St
Mooring Rd
Canal St
Sonoma St
Spinnaker Point Dr
Francisco Blvd W
Mill St
Front St
Medway Rd
Vivian St
Novato St
Fairfax St
Alto St
Lovell Ave
Bret Ave
La Loma Ct
Woodland Ave
Francisco Blvd E
Market St
Castro Ave
Kerner Blvd
Windward Way
Baypoint Dr
Du Bois St
Blossom Dr
Meadow Ave
Harte Ave
Bret Harte Rd
Gary Pl
Twin St
Auburn St
Orange St
Glenaire Dr
101
580
Google Earth
© 2020 Google

CROWN CASTLE

ansion_58 Nodes

Site Configuration Approval Form

Market Northern California
Cluster: SF Bay Exp Phase II

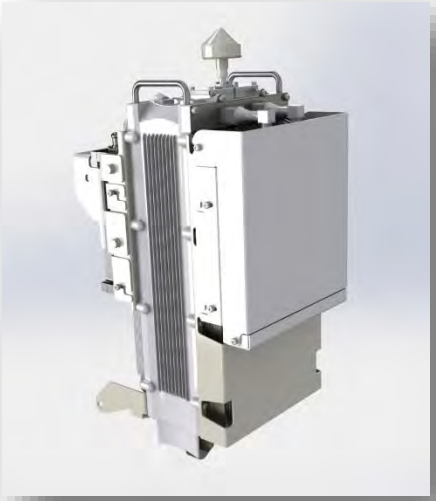
System Project ID: 49053467
Date: 1/10/2020

SCAF Version: 20191219

Crown Node ID	Pole Number	Pole Owner	Pole Type	Number of Amplifiers (Radios) to Deploy	Amplifier/ Radio Equip-ment Manu-facturer	Amplifier/ Radio Equipment Model	Antenna Type	Antenna Manufacturer	Antenna Model	Radio Location	Pole Height	Proposed Rad Center (AGL)	Number of Required Antennas at Site	Latitude	Longitude	Site Address	City	State	Zoning Jurisdiction
SFB001m3	120064926	Pacific Gas & Electric Company	Wood	1	Airspan	Airspan AH4400 B41 2x20W	External	CCI	SCA360V-E2AB-K	Pole-Mounted	32' 7"	19' 11"	1	37.969112	-122.505819	8 Loma Linda Rd	San Rafael	California	San Rafael City
SFB002m2	120051185	Pacific Gas & Electric Company	Wood	1	Airspan	Airspan AH4400 B41 2x20W	External	CCI	SCA360V-E2AB-K	Pole-Mounted	42' 3"	29' 0"	1	37.967602	-122.499832	3777 Kerner Blvd	San Rafael	California	San Rafael City
SFB003m1	3302	City of San Rafael	Metal Streetlight	1	Airspan	Airspan AH4400 B41 2x20W	External	Amphenol	2C4U3MT360X06F04s0	Pole-Mounted	30' 0"	31' 10"	1	37.963922	-122.499099	Across from 425 Bahia Way	San Rafael	California	San Rafael City
SFB004m1	120001512	Pacific Gas & Electric Company	Wood	1	Airspan	Airspan AH4400 B41 2x20W	External	Amphenol	2C4U3MT360X06F04s0	Pole-Mounted	30' 0"	38' 0"	1	37.972172	-122.515749	Across 304 Mission Ave	San Rafael	California	San Rafael City
SFB005m2	120051749	Pacific Gas & Electric Company	Wood	1	Airspan	Airspan AH4400 B41 2x20W	External	Amphenol	2C4U3MT360X06F06s0	Pole-Mounted	42' 10"	25' 6"	1	37.957890	-122.506809	44 Simms St	San Rafael	California	San Rafael City

Print Name.		**Signature:**		**Date:**	
Print Name.		**Signature:**		**Date:**	

High Capacity Outdoor LTE-Advanced eNodeB



AirHarmony 4400 is part of Airspan's carrier-class LTE Advanced small cell eNodeB family. AirHarmony 4400 is a Macro-class product that supports 3GPP's Long Term Evolution (LTE) eNodeB specifications, providing high-speed data, mobility, Voice over LTE, and broadcast/multicast services in order to meet the demands of the LTE Mobile Carriers.

AirHarmony 4400 is a compact, easy to install Macro-class eNodeB, allowing an operator to deploy LTE broadband services using existing infrastructure or Street Furniture. AirHarmony 4400 has two 20W (43dBm) transmit channels and four receive channels. AirHarmony 4400 supports single or dual carrier up to 2x 20MHz.

Release 10 LTE-Advanced

AirHarmony 4400 supports 3GPP LTE Broadband access technologies; Airspan's 3GPP LTE implementation is compliant with the 3GPP standards and has interoperable S1 and X2 interfaces and supports commercial GCF tested UE devices, including Smartphones, Dongles and Tablet computers.

The Power of HETNETS

As operators struggle to cope with growing customer demand for higher throughput, they are discovering that layering small base stations into a macro cell coverage area, enables a significant increase in network capacity by filling in coverage gaps and addressing actual traffic distribution where demand is highest. AirHarmony 4400 is ideal for these networks, delivering high data rates where needed most, whether at the macro cell edge or closer to the user base, maximizing coverage and customer satisfaction.

Broadband Access

AirHarmony-4400 supports 3GPP LTE Broadband access technologies; Airspan's 3GPP LTE implementation is compliant with the 3GPP standards and has interoperable S1 and X2 interfaces and supports commercial GCF tested UE devices, including Smartphones, Dongles and Tablet computers.

Integrated Backhaul

AirHarmony also supports tight integration with iBridge or iRelay, Airspan's small cell backhaul product. AirHarmony plus iRelay creates a single install process for LTE Access and Backhaul, and enables "Just add Power" plug and play deployment method saving deployment CAPEX and OPEX.

Physical

Dimensions

Variant	Dimensions[1] (H x W x D)
Main Unit w/o filters	509 x 262 x 210 mm / 20.0 x 10.3 x 8.3 inch
Main Unit with external filters	509 x 262 x 305 mm / 20.0 x 10.3 x 12.0 inch
Cavity Filter Set (4 filters in 2 sets of 2 filters each)	229 x 120 x 39.0 / 9.01 x 4.72 x 1.53 inch (2 units)

Weight

Variant	Weight
Main Unit w/o filters / duplexers	19 Kg / 41.89 Lbs.
Main Unit with filter set	24 Kg / 52.9 Lbs.
Universal mounting bracket	3 Kg / 6.6 Lbs.
Quadruple Filter Set (B41)	6 Kg / 13.2 Lbs.

Operational Tolerances

Type	Details	Standard Compliance
Operating temperature	-40°C to 55°C / -40°F to 131°F	ETSI 300 019 1-4
Operating humidity	5% - 100% non-condensing	ETSI 300 019 1-4
Storage temperature	-40°C to 70° C / -40°F to 158°F	N/A
Storage humidity	5% - 100% non-condensing	ETSI 300 019 1-4
Rain and dust ingress protection	IP66	N/A
Operational altitude	70-106 kPa as well as: From -60m to 1800m @ 40°C From 1800m to 4000m @ 30°C	ETSI 300 019 1-4
Solar radiation	1120 W/m^2	ETSI 300 019 1-4

[1] Dimensions excludes connectors height and protruding screws

Voltages and Amperage Draws

AirHarmony-4400 AC variants supports direct connection to AC power source

- Operational Voltage Range: 100VAC~240VAC, 47Hz~63Hz

AirHarmony-4400 DC variants supports direct connection to DC power source

- Operational Voltage Range: -40.5 to -57 VDC
- Transient Voltage: +150V (ETR283)

AC power feed is also available, using an AC/DC power converter offered by Airspan.

Duplex	Tx Power at RF Port (dBm)	Band	Power Source	Nominal Power Consumption (W)	Max Power Consumption with PoE (Instantaneous) (W)	Max Current with PoE (Instantaneous) (A)	PoE Maximum Power Consumption (W)	Power Supply Requirements (W)
TDD	2 x 43	B41	AC	290	405	4.50	60	N/A

Transmitter Radio Performance

Product Variants

Band	Variant	Downlink Freq. (MHz)	Uplink Freq. (MHz)	Dup. Mode	Max Channel BW (MHz)	Dual Carrier	Tx / Rx Conf.	Tx Power (dBm)	Power Source	External Duplexers / filters
41	HAR44-EF-U41-B06AP	2496-2690	2496-2690	TDD	20	Yes	2x4	43*	AC	Per Freq. Range

* Product can support either single carrier at 2x20W per carrier or dual carrier at 2x10W per carrier

Filters - AirHarmony 4000 (Manufacturers Specifications)

	Band 41 – Cavity Filters		
Product Code	**HAR44-FLTR-KIT-U41L**	**HAR44-FLTR-KIT-U41H**	**HAR44-FLTR-KIT-U41F**
Freq. range (MHz)	2496-2568	2618-2690	2496-2690
Bandwidth	72MHz	72MHz	194MHz
Insertion Loss	≤1.0dB (Over Temp.)	≤1.0dB (Over Temp.)	≤1.0dB (Over Temp.)
Passband Ripple	≤0.75dB	≤0.75dB	≤0.75dB
Return Loss	≥18dB	≥18dB	≥18dB
Rejection	≥20dB@1---2473MHz ≥100dB@1550---1600MHz ≥20dB@2710---12750MHz ≥74dB@824---2025MHz ≥54dB@2400---2473MHz ≥45dB@2618---2690MHz ≥38dB@4992---5380MHz ≥38dB@7488---8070MHz ≥38dB@9984---10760MHz ≥38dB@12480---13450MHz ≥38dB@14976---16140MHz ≥38dB@17472---18830MHz ≥38dB@19968---21520MHz	≥20dB@1---2473MHz ≥100dB@1550---1600MHz ≥20dB@2710---12750MHz ≥74dB@824---2025MHz ≥54dB@2400---2473MHz ≥45dB@2496---2568MHz ≥38dB@4992---5380MHz ≥38dB@7488---8070MHz ≥38dB@9984---10760MHz ≥38dB@12480---13450MHz ≥38dB@14976---16140MHz ≥38dB@17472---18830MHz ≥38dB@19968---21520MHz	≥20dB@1---2473MHz ≥100dB@1550---1600MHz ≥20dB@2710---12750MHz ≥74dB@824---2025MHz ≥54dB@2400---2473MHz ≥38dB@4992---5380MHz ≥38dB@7488---8070MHz ≥38dB@9984---10760MHz ≥38dB@12480---13450MHz ≥38dB@14976---16140MHz ≥38dB@17472---18830MHz ≥38dB@19968---21520MHz
Group Delay Variation In Passband	≤40ns	≤40ns	≤40ns

PIM	≤-146dBc@2*43dBm	≤-146dBc@2*43dBm	≤-146dBc@2*43dBm
Power	OFDM RMS power of 50W and peak power of 400W due to PAPR of 10dB	OFDM RMS power of 50W and peak power of 400W due to PAPR of 10dB	OFDM RMS power of 50W and peak power of 400W due to PAPR of 10dB
Input & Output Impedance	50Ω	50Ω	50Ω
Operating Temperature	-40 to +85°	-40 to +85°	-40 to +85°
Lightening Surge	Max 6kV Pulsed	Max 6kV Pulsed	Max 6kV Pulsed
Connectors	DIN 4.1/9.5 Female (4 holes)	DIN 4.1/9.5 Female (4 holes)	DIN 4.1/9.5 Female (4 holes)
Color	RAL9002	RAL9002	RAL9002

Channel Frequency Resolution

The center frequency is tunable with a 100 KHz resolution

Frequency Stability

The AirHarmony-4400 reference frequency accuracy is better than ±0.05ppm

Modulation & FEC

AirHarmony-4400 supports QPSK, 16QAM and 64QAM modulations on both Downlink and Uplink with all Modulation and Coding Schemes defined in 3GPP TS 36.211

Power

Maximum Configurable Tx Power (per RF port) Per carrier / Single Carrier	43 dBm (20W)
Maximum Configurable Tx Power (per RF port) Per carrier / Dual Carrier	40 dBm (10W)
Transmit Power Accuracy	±1dB in normal conditions
Control Step	1dB

Transmitter Dynamic Range

The transmitter supports a monotonic power control of 40dB with step size of 1dB

Transmitter Spurious Emissions

AirHarmony-4400 complies with the “Category B” transmitter spurious emissions, as they are defined in TS 36.104

Transmitter Error Vector Magnitude

The AirHarmony 4400 transmitter EVM/RCE[3] is no more than -28dB for all power levels

Receiver Radio Performance

Rx Noise Figure

AirHarmony-4000 receiver noise figure is 2.9 dB

Receiver Sensitivity Level[1]

The values in the table below are defined for QPSK ⅓ with allocation BW as indicated by TS 36.104

Channel Bandwidth (MHz)	Allocation Size (RB)	Reference Sensitivity Level (dBm)
5	25	-104.5
10	25	-104.5
15	25	-104.5
20	25	-104.5

In Channel Selectivity[2]

AirHarmony-4400 complies with ICS as defined by TS 36.104 for “Wide Area BS”

Adjacent Channel Selectivity[3]

AirHarmony-4400 ACS complies with ACS requirements as defined in TS 36.104 for “Wide Area BS”

Receive Dynamic Range

AirHarmony-4400’s receiver has a dynamic range of 54dB

Maximum Input Signal

The AirHarmony-4400 receiver can receive a maximum on-channel signal of –30dBm

Maximum Input Signal without Damage

The AirHarmony-4400 receiver can tolerate a maximum signal of -10dBm without damage

Receiver Spurious Emission[4]

AirHarmony-4400 complies with the receiver spurious emission as defined by TS 36.104 as well as ETSI EN 301 893

Mobility

AirHarmony-4400 can support Intra and Inter frequency handovers.

[1]The receiver sensitivity power level is the minimum mean power received at the antenna connector at which a throughput requirement is being met for a specified reference measurement channel. The AirHarmony 4400 meets the requirements defined for in TS 36.104 for Wide Area Base Stations

[2]In-channel selectivity (ICS) is a measure of the receiver ability to receive a wanted QPSK½ signal at its assigned resource block locations in the presence of an interfering signal received at a larger power spectral density.

[3]Adjacent Channel Selectivity (ACS) is defined as the measure of the receiver’s ability to receive a wanted signal at its assigned channel frequency in the presence of an adjacent channel signal with a specified center frequency offset of the interfering signal to the band edge of a victim system

[4]The spurious emissions are the power of emissions generated or amplified in a receiver that appear at the receiver antenna connector

Physical Interfaces

This following defines all external Network and Maintenance equipment interfaces as well as System LED. All interfaces are Weatherproof, supporting IP66 Ingress Protection Rating.

GPS Antenna Port

Connector Type	TNC Male
Characteristic Impedance	50 Ω
Quantity	1

RF Antenna Ports

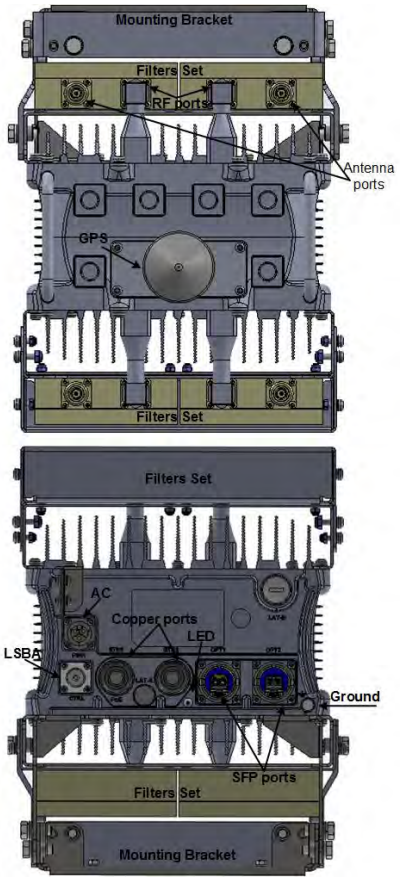
RF ports on B41:

- 4 ports located on the top panel and connected directly to the external filters.
- Filters are sold separately
- 4xRF ports to the antenna located on the top of the filters

Connector Type	4.1-9.5 DIN Female
Characteristic Impedance	50 Ω
Quantity	4

Antenna Connections – Ports labeled

Tx/Rx	Ant 1
Tx/Rx	Ant 2
Rx	Ant 3
Rx	Ant 4
Connector Type	SFP Socket with Full AXS sealing connector
Quantity	2



Copper Ethernet Port

Connector Type	RJ45
Standard	IEEE802.3
Cable Type	STP Category 5E
Interface Speed	100/1000 Base-T
Communication Mode	Full/Half Duplex with Auto Negotiation
PoE Output	2 ports supports PoE out
Quantity	2

PoE Port Specification[1]

Power available at powered device	25.5 W
Maximum power delivered	30 W[2]
Voltage range delivered	50.0–57.0 V
Voltage range (at powered device)	42.0–57.0 V
Maximum current	600 mA
Maximum cable resistance	12.5 Ω (Category 5 cable)
Power management	Four power class levels negotiated at initial connection or 0.1 W steps negotiated continuously
Supported cabling	Category 3 and Category 5

[2] Each port can supply up to 30W. Total power from the 2 ports can't exceed 45W

SBA Control

Connector Type	AISG
Standard	RS485

Controls the SBA direction when mounted remotely

Can also control specific RET antennas control by the AISG protocol. Contact Airspan sales for further details.

Power Connection AC Variants

Connector Type	Proprietary
Standard	100VAC~240VAC, 47Hz~63Hz
Cable Length	Various

Power Connection DC Variants

Connector Type	Proprietary
Standard	-48V DC
Cable Length	Various

LED Display

A single tri-color LED (Green/Red/Orange) appears at the bottom of the unit, providing unit status indication

Mounting

AirHarmony-4400 includes a pole mounting kit with the following attributes:

Attribute	Values
Mechanical tilting range	0°
Supported pole diameters	48.3 to 406.4 mm / 1.9 to 16 inch
Supported wind load	200 km/h / 125 mph

Standard Compliances

	Standard
EMC	EN 301 489-1 V1.9.2 (2011-09) Class B
	EN 301 489-4 V2.2.1 (2015-05)
	FCC 47 CFR Part 15:2014 Subpart B Class B
	ICES-003: 2012 issue 5 class B
Safety	IEC 60950-1:2005 + A1:2009 + A2:2013
	IEC 60950 22:2005 (1st Edition) + A11:2008
	EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013
	EN 60950-22:2006 + A11:2008
	UL 60950-1
	UL 60950-22
ROHS	EU ROHS directive - 2002/95/EC (ROHS) - ROHS6
WEEE	Per the requirements of European directive 2002/96/EC
FCC	Title 47, Part 90 - Band 26
	Title 47, Part 27 - Band 41
Environmental	IEC 60529
	IEC 60068
	ETSI EN 300-019-2-4 Operational (non-weather protected equipment)
	ETSI EN 300-019-2-1 Storage (weather protected, not temperature controlled locations)

	Standard
	ETSI EN 300-019-2-2 Transportation (Public Transportation)
	GR-63,Issue 4
IP Rating	IP66

Color – RAL9002

Export Control Classification Number – ECCN 5A002

CROWN CASTLE

PROJECT NAME: SAN FRANCISCO BAY EXPANSION - 58 SITES
PROJECT ADDRESS: 44 SIMMS ST., SAN RAFAEL, CA 94901
PROJECT TYPE: EXIST. PG&E-OWNED WOOD JPA POLE
CUSTOMER NODE ID#: SF90XS2H0
NODE #(s): **SFB005m2**
HUB AREA: SF36XC052
COORDINATES: LAT: 37.95789, LONG: -122.506809
CROWN CASTLE BILLING / SCU#: 479646

T1.1-Sheet Index

PROJECT TEAM

ARCHITECT

Company: SHIFT CONSULTING
Address: 3334 N. 20TH ST.
PHOENIX, AZ 85016
Phone Number: 480.264.0829
Fax Number: 480.264.0163
Contact: CHRIS MYERS

OWNER INFO

Company: CROWN CASTLE
Address: 695 RIVER OAKS PARKWAY
SAN JOSE, CA 95134
Phone Number: 707.756.2030
Fax Number:
Contact: JOHN GRIFFITHS

STRUCTURAL

Company: STRUKTUR STUDIO, LLC
Address: 1525 N. GRANITE REEF RD., STE. 9
SCOTTSDALE, AZ 85257
Phone Number: 480.425.2250
Fax Number: 480.425.2225
Contact: DAVID LUNENG

RF ENGINEER

Company: CROWN CASTLE
Address: 695 RIVER OAKS PARKWAY
SAN JOSE, CA 95134
Phone Number: 408.468.5546
Fax Number:
Contact: ERNESTO FIGUEROA

PROJECT SUMMARY

JURISDICTION:
SAN RAFAEL PUBLIC WORKS
111 MORPHEW ST.
SAN RAFAEL, CA 94901
PH: 415.485.3355

APPLICANT:
CROWN CASTLE
695 RIVER OAKS PARKWAY
SAN JOSE, CA 95134

HANDICAPPED REQUIREMENTS:
-FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.

-HANDICAPPED ACCESS REQUIREMENTS ARE NOT REQUIRED.

CODES:
GENERAL ORDER (GO) 95, RULE 94

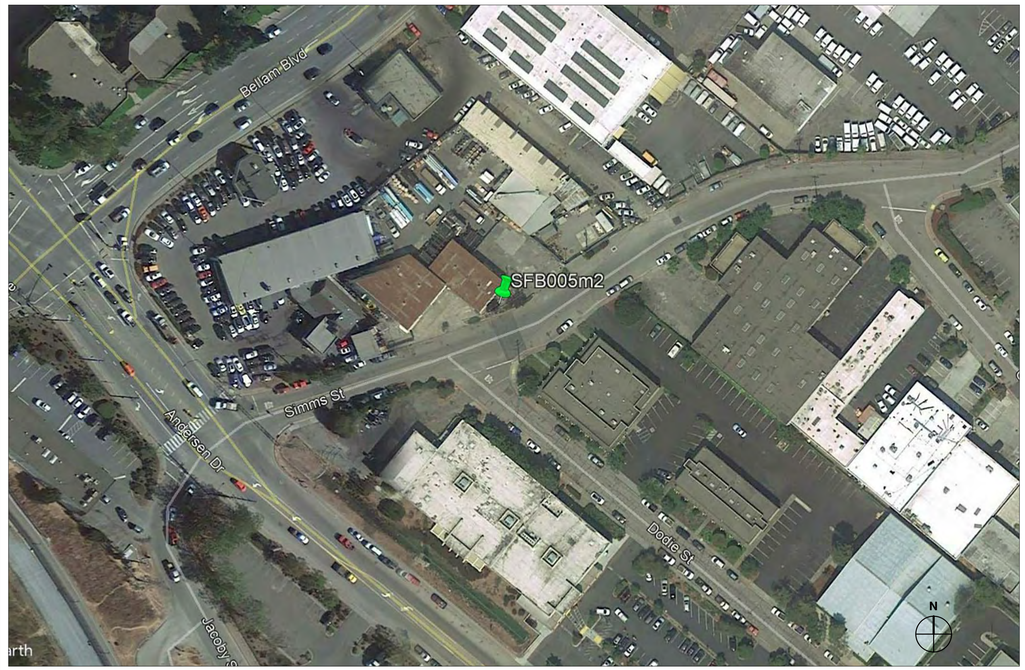
2012 INTERNATIONAL BUILDING CODE (IBC)

2014 NATIONAL ELECTRICAL CODE (NEC)

PLUMBING REQUIREMENTS:
FACILITY HAS NO PLUMBING

POWER COMPANY:
PACIFIC GAS AND ELECTRIC (PG&E)

OVERALL NODE LOCATION MAP



PROJECT DESCRIPTION

THIS PROJECT WILL CONSIST OF ADDING A NEW POLE-TOP CANISTER ANTENNA AND A SIDE-MOUNTED EQUIPMENT CHASSIS TO THE EXISTING POLE.
THE EQUIPMENT CHASSIS WILL CONTAIN THE FOLLOWING:
(1) NEW RADIO UNIT
(1) FIBER ENCLOSURE BOX
(1) ELECTRICAL LOAD CENTER / DISTRIBUTION PANEL
(1) ELECTRICAL POWER METER

CROWN CASTLE
CROWN CASTLE
695 RIVER OAKS PARKWAY
SAN JOSE, CA 95134

RECORD DRAWINGS ISSUE DATE: 08.22.19

SHIFT
Shift Companies, LLC
3334 N. 20TH ST.
PHOENIX, ARIZONA 85016
ph: 480.264.0829
fax: 480.264.0163

RELEASE

DATE	SUBMITTAL
08.22.19	1ST SUBMITTAL

REVISIONS

NO.	DATE	COMMENT

PROJECT NAME
SAN FRANCISCO BAY EXPANSION - 58 SITES

NODE NUMBER
SFB005m2

NODE ADDRESS
44 SIMMS ST., SAN RAFAEL, CA 94901

HUB AREA
SF36XC052

SHIFT JOB NUMBER
150601

IN HOUSE
DRAWN BY: MB
CHECKED BY: RA

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T1.1

PAGE
1 OF 9

PLOT SCALE: 1:1 @ 24"x36"; 1:2 @ 11"x17"

PLAN CHECK #

CASE #

1. RIGHT-OF-WAY USE PERMIT SHALL BE OBTAINED BY CONTRACTOR PRIOR TO COMMENCING WORK.
2. ALL WORK TO BE CONDUCTED IN CITY RIGHT OF WAY, U.N.O.
3. ALL DISTURBED LANDSCAPING SHALL BE REPLACED TO SIMILAR EXISTING CONDITION.
4. ANY SIDEWALK CLOSURE SHALL BE COORDINATED WITH THE CITY AND PROPER SIGNAGE WILL BE PLACED.
5. TEMPORARY LIGHTING WILL BE COORDINATED WITH CITY AND PROVIDED WHENEVER EXISTING LIGHTING IS REMOVED OR UNAVAILABLE AS REQUIRED.
6. NO MATERIALS OR EQUIPMENT SHALL BE STORED ON PRIVATE PROPERTY OR BLOCK ACCESS TO PRIVATE PROPERTY.
7. CLEANUP OF THE WORK AREA WILL BE COMPLETED EACH EVENING AND THE PROJECT AREA WILL BE RETURNED TO EXISTING CONDITION AT THE COMPLETION OF CONSTRUCTION AT EACH NODE LOCATION.
8. ALL WORK TO COMPLY WITH OSHA AND CITY GUIDELINES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE TO REMOVE AND REPLACE, AT THEIR COST, ANY AND ALL DAMAGED PAVEMENT, SIDEWALK, CURB AND GUTTER OUTSIDE THE PAY LIMIT, DAMAGE DUE TO THEIR ACTIVITIES ON THE PROJECT. THIS INCLUDES, BUT IS NOT LIMITED TO THE REMOVAL AND REPLACEMENT OF NEWLY CRACKED, THE REMOVAL AND REPLACEMENT OF EXISTING CRACKS WHERE THE CRACKS HAVE BEEN ENLARGED DUE TO THE CONTRACTORS OPERATIOINS, THE REMOVAL AND REPLACEMENT OF DEFORMED PAVEMENT, CURB AND GUTTTER, SIDEWALK, ETC.. ALL SAW CUTS USED FOR THE REMOVAL OF THESE ITEMS SHALL BE PERPENDICULAR AND PARALLEL TO THE CENTERLINE CONTROLLING THAT ITEM, OR AT THE DISCRETION OF THE CITY INSPECTOR.

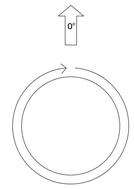
GENERAL PROJECT NOTES — SCALE: NTS — 1

- CENTER LINE
- PROPERTY LINE
- RIGHT-OF-WAY
- FIBER
- GAS
- POWER
- SANITARY SEWER
- STORM DRAIN
- WATER
- LIGHT CIRCUIT POWER
- OVERHEAD POWER LINE
- REVISION (3)
- KEY NOTE (A01)
- DETAIL REFERENCE (1 / A1)
- ELEVATION REFERENCE (8 / A-2)
- SECTION REFERENCE (17 / A-3)
- ELEVATION MARKER
- PHOTOSIM REFERENCE (A.5)
- ANTENNA AZIMUTH (##°)
- EXISTING TREE
- EXISTING BUSH / SHRUB

ABBREVIATIONS AND SYMBOLS — SCALE: NTS — 9

ANTENNA AZIMUTHS

OMNI: 360°



CALL TWO WORKING DAYS BEFORE YOU DIG.

SUBJECT POLE: **SFB005m2**

GPS COORDINATES:

LAT: **37.95789**

LONG: **-122.506809**

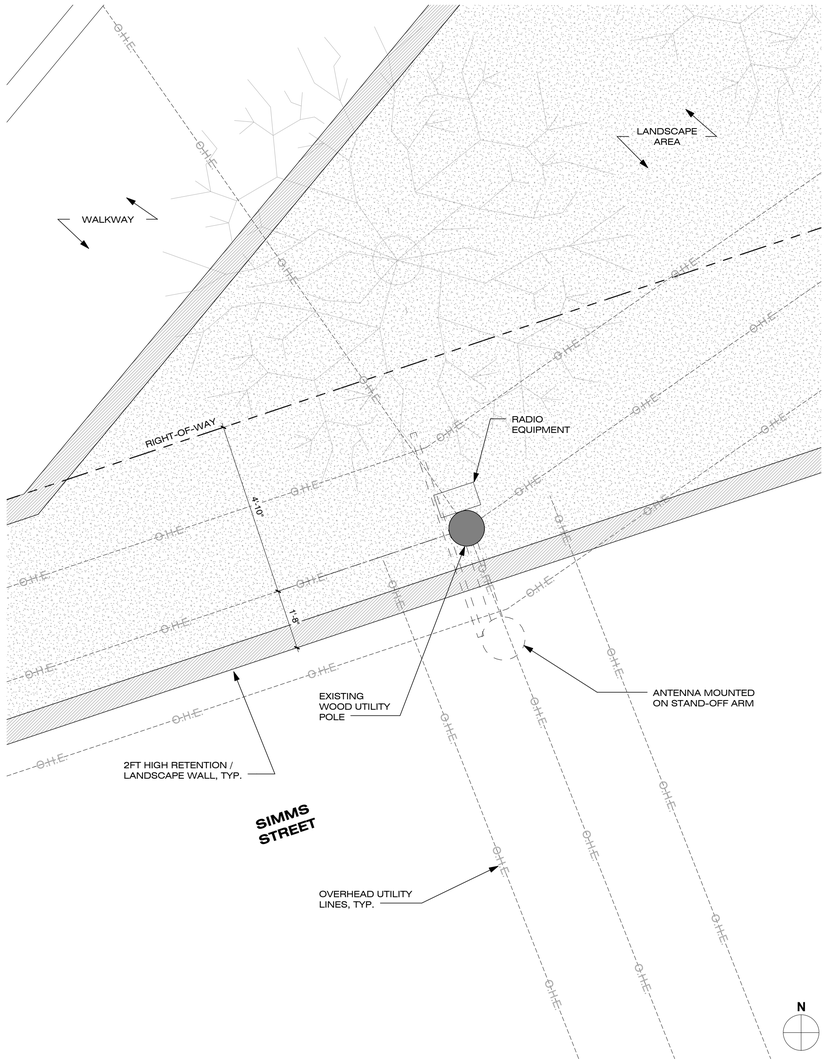
POLE TYPE: **EXIST. PG&E-OWNED WOOD JPA POLE**

POLE ID #:

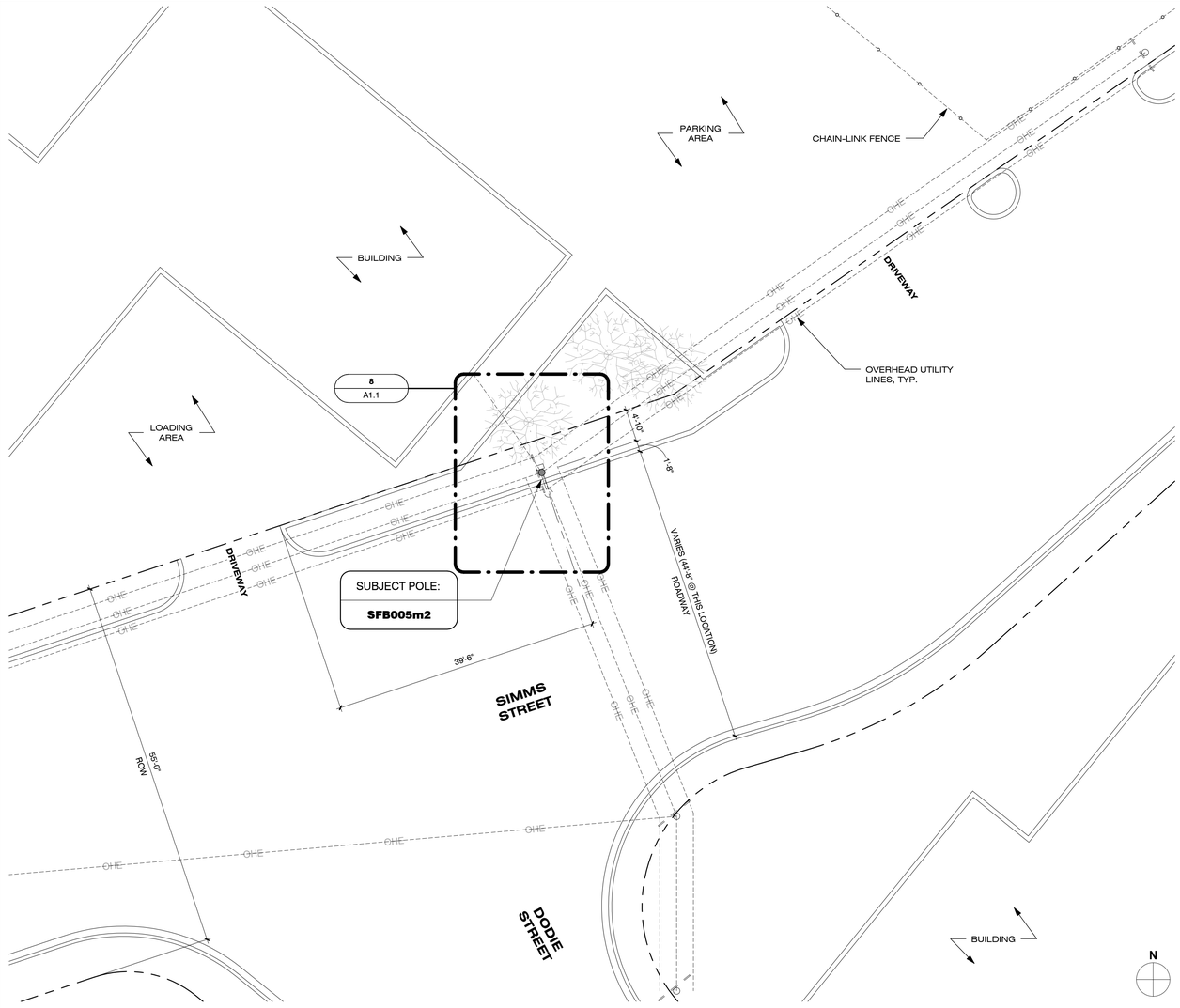
ANTENNA RAD CENTER: **26' - 9" A.F.G.**

SUBJECT POLE IS LOCATED IN:

CITY OF SAN RAFAEL R.O.W.



EQUIPMENT AND ANTENNA PLAN — 1/2" = 1'-0" — 8



OVERALL SITE PLAN — 1" = 10'-0" — 0 5 10 20 — 20

CROWN CASTLE
CROWN CASTLE
695 RIVER OAKS PARKWAY
SAN JOSE, CA 95134

RECORD DRAWINGS ISSUE DATE: 08.22.19

SHIFT
Shift Companies, LLC
3334 N. 20TH ST.
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fax: 480.264.0163

RELEASE

DATE	SUBMITTAL
08.22.19	1ST SUBMITTAL

REVISIONS

NO.	DATE	COMMENT

PROJECT NAME

SAN FRANCISCO BAY EXPANSION - 58 SITES

NODE NUMBER

SFB005m2

NODE ADDRESS

44 SIMMS ST., SAN RAFAEL, CA 94901

HUB AREA

SF36XC052

SHIFT JOB NUMBER: 150601

IN HOUSE: DRAWN BY: MB; CHECKED BY: RA

SHEET TITLE

SITE PLAN

SHEET NUMBER: A1.1

PAGE: 2 OF 9

PLOT SCALE: 1:1 @ 24"x36"; 1:2 @ 11"x17"

PLAN CHECK #

CASE #

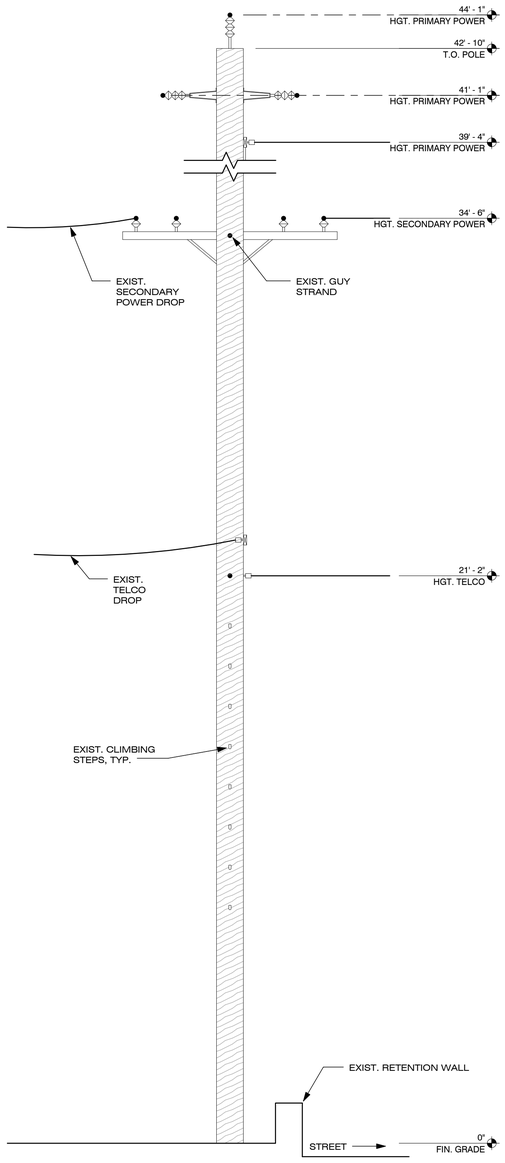
D:\AAA - Shift Companies\AAA - Crown Castle\AAA - California\San Francisco 58\Sites\SFB-005.rvt

8/27/2019 8:53:50 AM

EXISTING POLE TYPE =	EXIST. PG&E-OWNED WOOD JPA POLE
EXISTING POLE CLASS =	4
EXISTING POLE WIDTH =	TOP: 10" DIA., BOTTOM: 1' - 2" DIA.
EXISTING POLE HEIGHT =	42' - 10"
EXISTING POLE OWNER =	PG&E

POLE INFORMATION

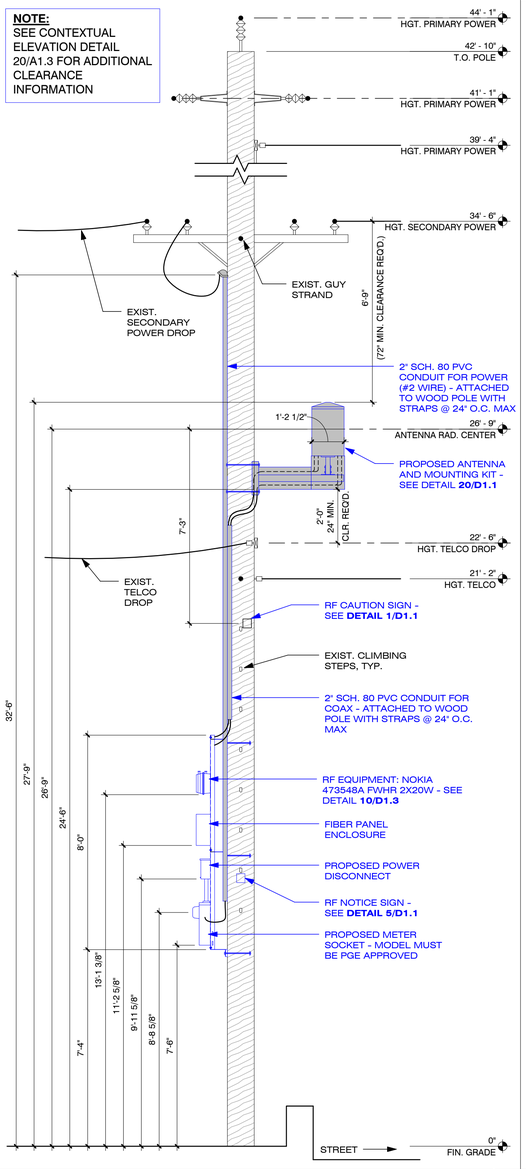
SCALE: N.T.S. | 1



POLE ELEVATION - EXISTING (LOOKING EAST)

SCALE: 3/8" = 1'-0" | 16

NOTE:
SEE CONTEXTUAL ELEVATION DETAIL 20/A1.3 FOR ADDITIONAL CLEARANCE INFORMATION

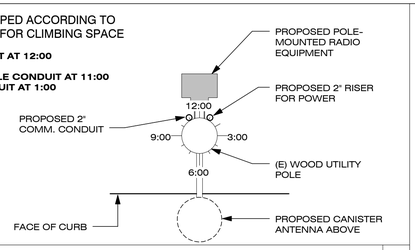


POLE ELEVATION - PROPOSED (LOOKING EAST)

SCALE: 3/8" = 1'-0" | 16

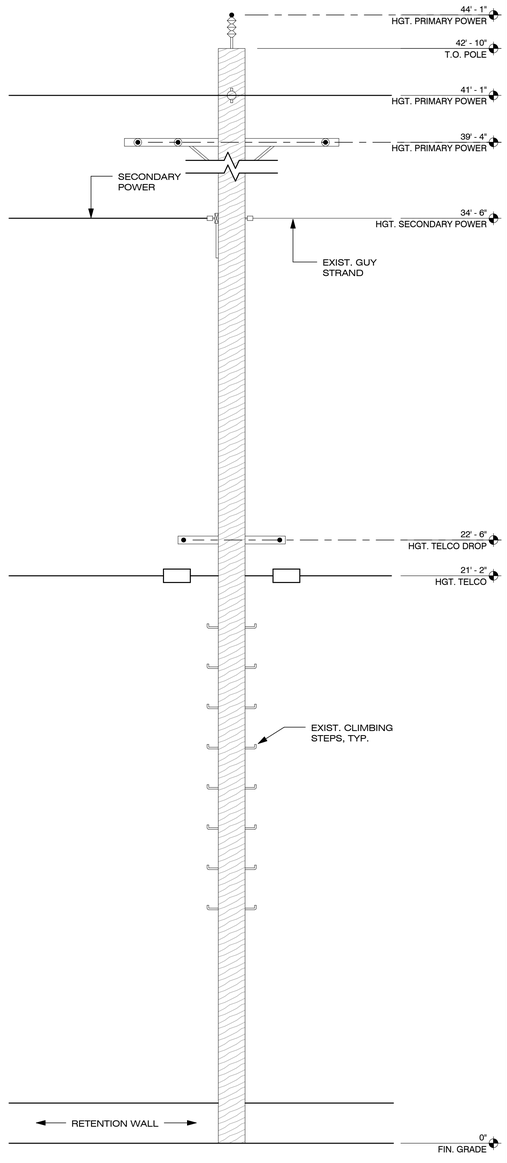
POLE WILL BE STEPPED ACCORDING TO GO 95 STANDARDS FOR CLIMBING SPACE

-REMOTE EQUIPMENT AT 12:00
-ANTENNA AT 6:00
-(1) 2" CROWN CASTLE CONDUIT AT 11:00
-(1) 2" POWER CONDUIT AT 1:00



POLE RISER PLAN

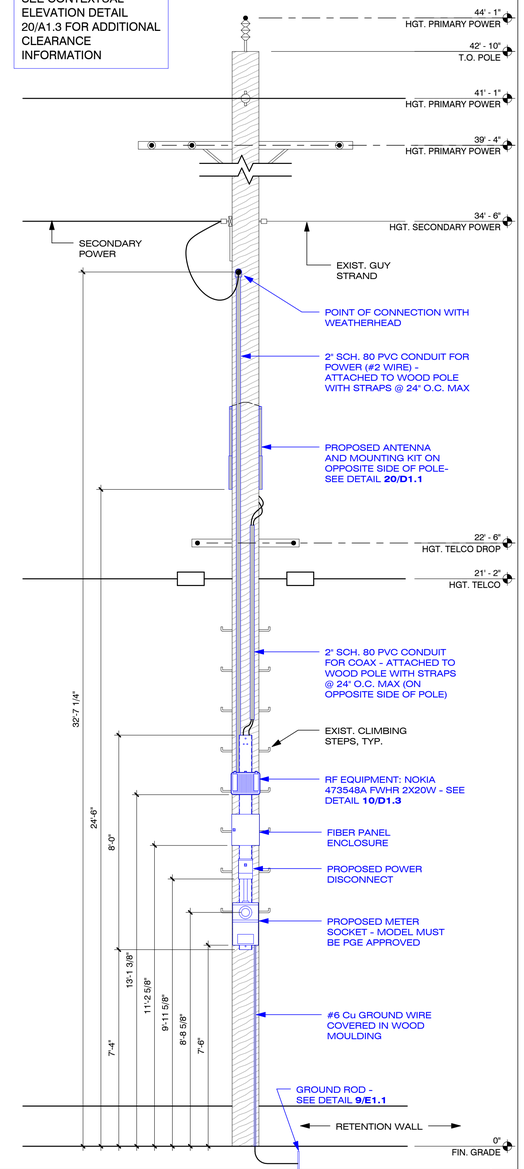
SCALE: N.T.S. | 5



POLE ELEVATION - EXISTING (LOOKING SOUTH)

SCALE: 3/8" = 1'-0" | 16

NOTE:
SEE CONTEXTUAL ELEVATION DETAIL 20/A1.3 FOR ADDITIONAL CLEARANCE INFORMATION



POLE ELEVATION - PROPOSED (LOOKING SOUTH)

SCALE: 3/8" = 1'-0" | 20

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NO.	DATE	COMMENT

PROJECT NAME

SAN FRANCISCO BAY EXPANSION - 58 SITES

NODE NUMBER

SFB005m2

NODE ADDRESS

44 SIMMS ST., SAN RAFAEL, CA 94901

HUB AREA

SF36XC052

SHIFT JOB NUMBER: 150601

IN HOUSE: DRAWN BY: MB; CHECKED BY: RA

SHEET TITLE

POLE ELEVATIONS / PHOTO SIMS, PROPOSED

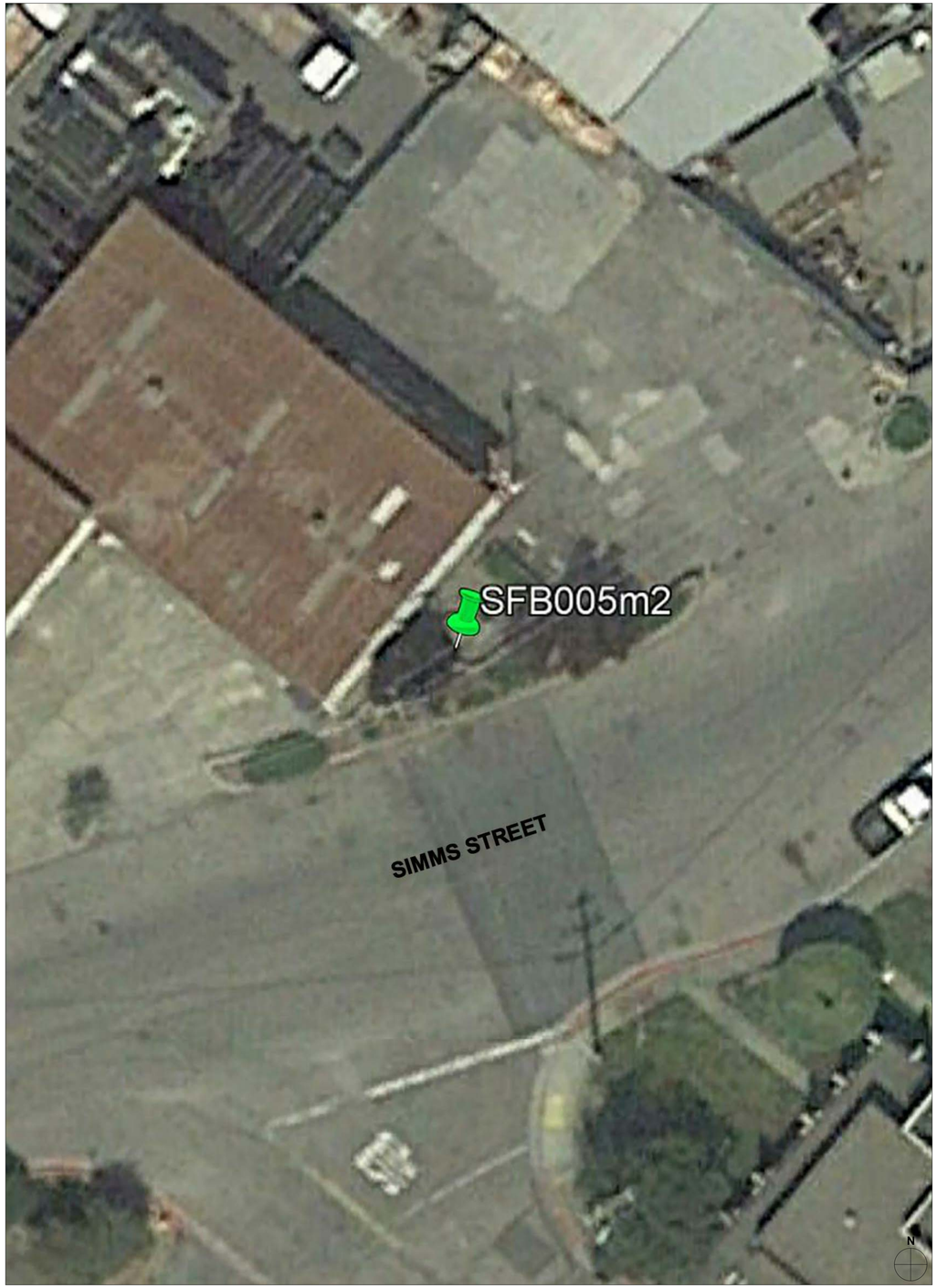
SHEET NUMBER: A1.2

PAGE: 3 OF 9

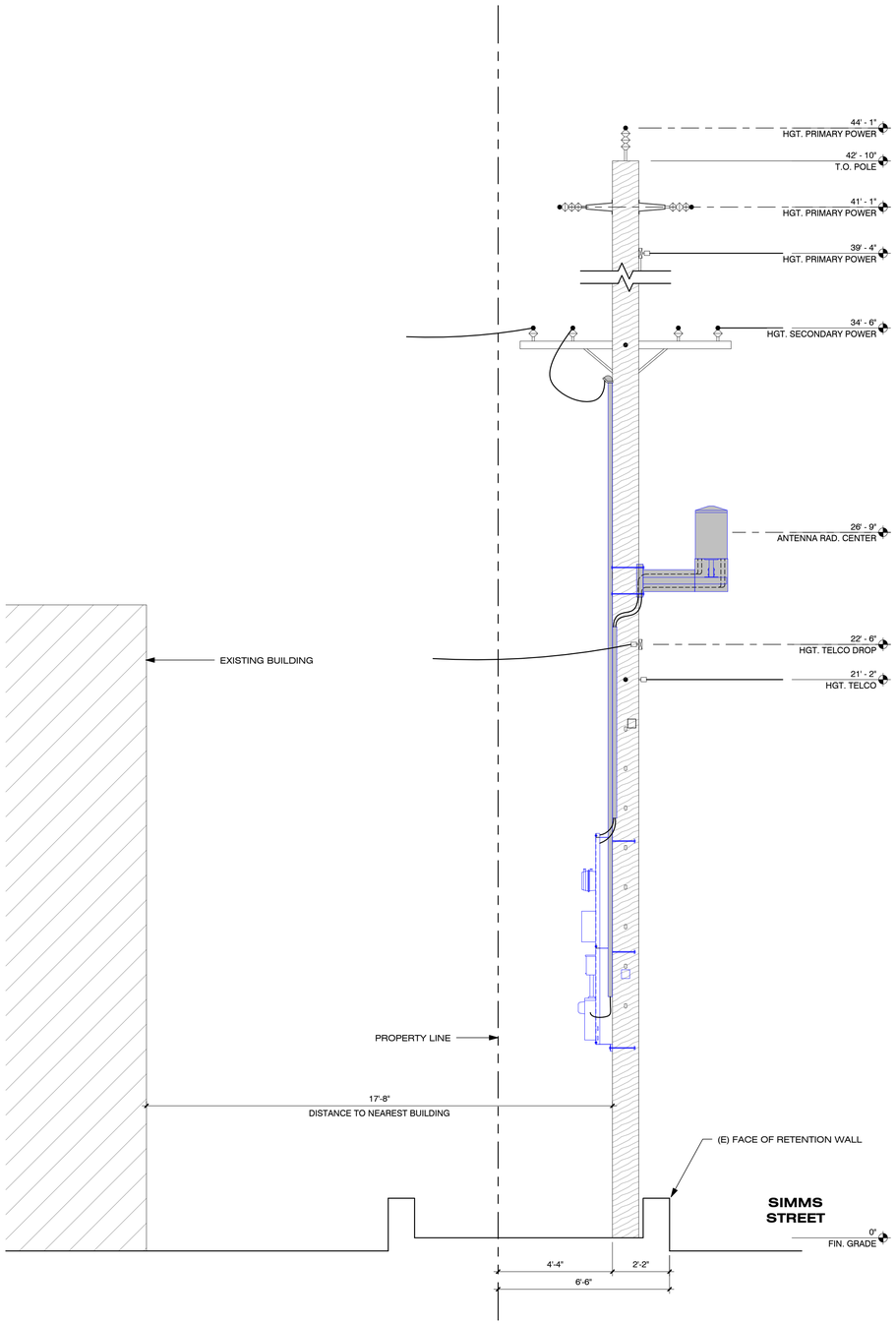
PLOT SCALE: 1:1 @ 24"x36"; 1:2 @ 11"x17"

PLAN CHECK #

CASE #



AERIAL VIEW — 1" = 10'-0" (0, 5, 10, 20) — 12



CONTEXTUAL ELEVATION OF EXISTING POLE WITH PROPOSED EQUIPMENT — 3/8" = 1'-0" (0, 1', 2', 4') — 20

CROWN CASTLE

CROWN CASTLE
CROWN CASTLE
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NODE ADDRESS

44 SIMMS ST., SAN RAFAEL, CA 94901

HUB AREA

SF36XC052

SHIFT JOB NUMBER

150601

IN HOUSE

DRAWN BY: MB
CHECKED BY: RA

SHEET TITLE

UTILITY POLE SITE SURVEY

SHEET NUMBER

A1.3

PAGE

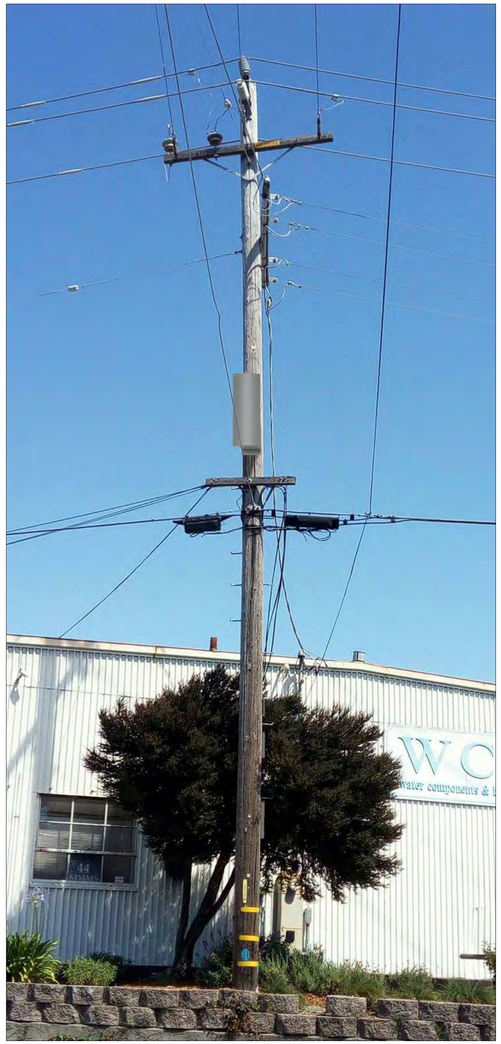
4 OF 9

PLOT SCALE: 1:1 @ 24"x36"; 1:2 @ 11"x17"

PLAN CHECK #

CASE #

POLE PHOTO - LOOKING NORTH(EXISTING) SCALE: N.T.S. 4



POLE PHOTO SIMULATION - LOOKING NORTH(PROPOSED) SCALE: N.T.S. 8

POLE PHOTO - LOOKING EAST(EXISTING) SCALE: N.T.S. 16

POLE PHOTO SIMULATION - LOOKING EAST(PROPOSED) SCALE: N.T.S. 20

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SAN JOSE, CA 95134

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SAN FRANCISCO BAY EXPANSION - 58 SITES

NODE NUMBER

SFB005m2

NODE ADDRESS

44 SIMMS ST., SAN RAFAEL, CA 94901

HUB AREA

SF36XC052

SHIFT JOB NUMBER

150601

IN HOUSE

DRAWN BY: MB
CHECKED BY: RA

SHEET TITLE

PHOTO SIMULATIONS

SHEET NUMBER

A1.4

PAGE

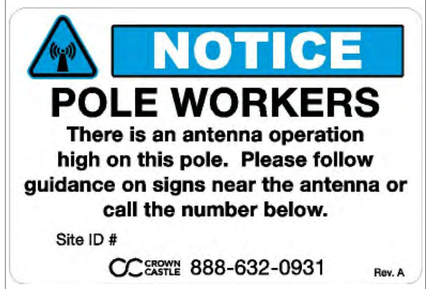
5 OF 9

PLOT SCALE: 1:1 @ 24"x36"; 1:2 @ 11"x17"

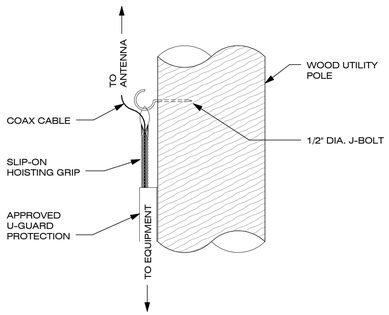
PLAN CHECK #

CASE #

RF WARNING SIGNAGE SCALE: N.T.S. **1**

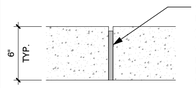


RF WARNING SIGNAGE SCALE: N.T.S. **5**



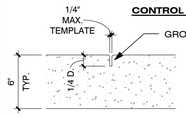
COAX HANGER DETAIL SCALE: N.T.S. **6**

EXPANSION JOINT



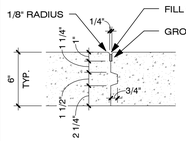
1/2" PREMOLDED NON-EXTRUDING EXPANSION JOINT MATERIAL TO MEET AASH TO SPEC. M-59.
*EXPANSION JOINTS SHALL BE INSTALLED WHEN ABUTTING EXISTING CONCRETE OR FIXED STRUCTURES SUCH AS INLETS AND DRIVEWAYS, AND EVERY 300' ON LONG STRAIGT CONCRETE STRETCHES

CONTROL JOINT



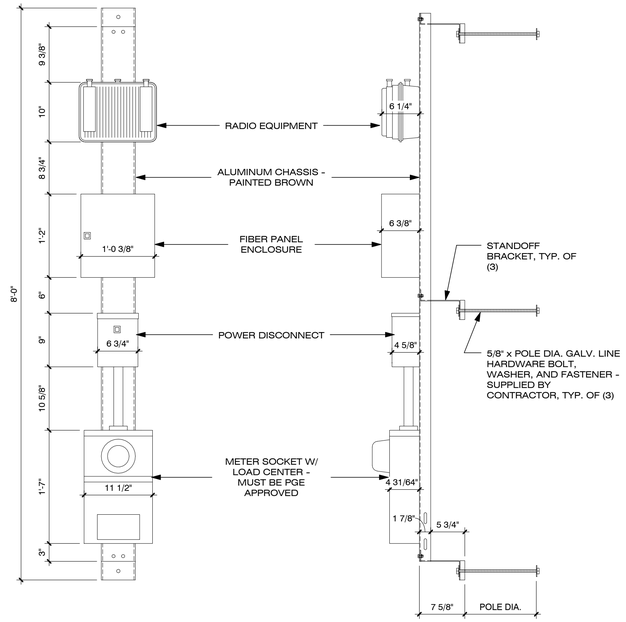
FORM W/ TEMPLATE OR SAWCUT JOINTS. SAWCUT JOINTS, IF USED, SHALL BEGIN AS SOON AS CONC. IS HARDENED SUFFICIENTLY TO PERMIT SAWING WITHOUT EXCESSIVE RAVELING AND BEFORE UNCONTROLLED CRACKING OCCURS. MAX DISTANCE BETWEEN JOINTS = 10'; MIN DISTANCE = 5'

KEYED JOINT

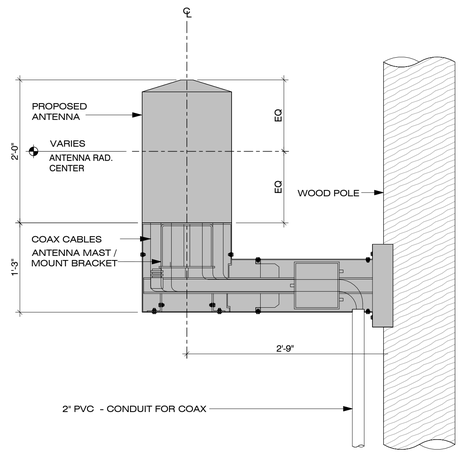


KEYWAY FORMED BY FASTENING METAL KEY TO FORM

CONCRETE JOINT DETAILS SCALE: N.T.S. **10**



EQUIPMENT MOUNTING CHASSIS DETAIL SCALE: 1"=1'-0" **12**



NOTES:
1. CONTRACTOR TO INSTALL WEATHERPROOF WRAP AT ALL CONNECTORS. WRAP TO BE APPROVED BY CROWN CASTLE.

2. COLOR CODE COAX CABLES PER CROWN CASTLE WIRING DIAGRAM.

POLE-TOP EXTENSION / ANTENNA DETAIL SCALE: 1"=1'-0" **20**

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695 RIVER OAKS PARKWAY
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PROJECT NAME

SAN FRANCISCO BAY EXPANSION - 58 SITES

NODE NUMBER

SFB005m2

NODE ADDRESS

44 SIMMS ST., SAN RAFAEL, CA 94901

HUB AREA

SF36XC052

SHIFT JOB NUMBER 150601

IN HOUSE DRAWN BY: MB CHECKED BY: RA

SHEET TITLE

CONSTRUCTION DETAILS

SHEET NUMBER D1.1

PAGE 6 OF 9

PLOT SCALE: 1:1 @ 24'x36"; 1:2 @ 11"x17"

PLAN CHECK #

CASE #

FOR ALL COAX WATERPROOFING INSTALLATIONS, SEE INSTALLATION INSTRUCTIONS FOR

JMA WIRELESS "JMA WEATHER PROTECTION SYSTEM"

1) FOR 1/2" CONNECTIONS TO ANTENNA OR DEVICE

2) FOR 1/2" CONNECTIONS TO ANTENNA OR DEVICE USING WPS-DF-CUTTER

3) FOR WPS-N, 1/2" NM CONNECTOR TO PORT

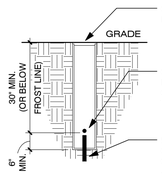
4) FOR WPS-DRA, MALE TO PORT

5) FOR 1/4" CONNECTIONS TO ANTENNA OR DEVICE

COAX WATERPROOFING - FUSION TAPE TYPE SCALE:N.T.S. 5

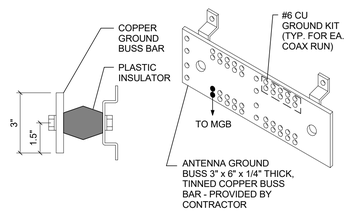
NOTES:

1. VERIFY LIGHT GROUNDING REQUIREMENTS FOR LIGHT ARMS WHEN APPLICABLE.
2. ALL GROUND BARS ASSOCIATED WITH POLE TO BE MOUNTED AT INTERIOR (SCREENED FROM VIEW).
3. MOUNT ANTENNA GROUND BUS VERTICALLY BEHIND LOWER ANTENNA ARRAY.
4. ALL CONNECTORS SHALL BE DOUBLE LUG.
5. GROUND BAR KITS TO INCLUDE:
   1/4" THICK TIN COPPER BUS BAR, SS BRACKET, INSULATOR OR EQUIVALENT, 3/8"DIA. BOLT AND LOCKWASHER.



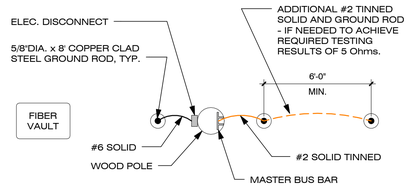
GROUND ROD DETAIL SCALE:N.T.S. 9

NOTES:
1. ALL CONNECTORS MUST BE DOUBLE LUG.
2. MOUNT ANTENNA GROUND BUSS VERTICALLY BEHIND LOWER ANTENNA ARRAY

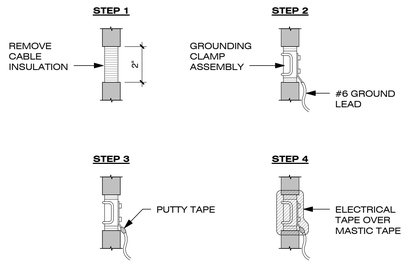


GROUND BUSS BAR DETAIL SCALE:N.T.S. 13

■ CADWELD - SEE DETAIL 1/E1.1
▲ MECHANICAL CONNECTION
GROUND BAR - COPPER - SIZE AS NEEDED
GROUND ROD - SEE DETAIL 9/E1.1



EQUIPMENT GROUNDING SCHEMATIC DTL. SCALE:N.T.S. 17



COAXIAL CABLE GROUNDING SCALE:N.T.S. 2

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE AND ALL OTHER APPLICABLE LOCAL CODES.
2. CONTRACTOR SHALL OBTAIN ALL PERMITS, PAY ALL PERMIT FEES, AND SCHEDULE ALL REQUIRED INSPECTIONS. CONTRACTOR SHALL OBTAIN LOCAL POWER COMPANY APPROVAL AND COORDINATE SERVICE ENTRANCE REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY SERVICE LOCATIONS AND CONTACT PROJECT MANAGER WITH DISCREPANCIES FROM PLAN.
4. CONTRACTOR SHALL PROVIDE ALL LABOR AND MATERIAL DESCRIBED ON THIS DRAWING, AND ALL ITEMS INCIDENTAL TO COMPLETING AND PRESENTING THIS PROJECT AS FULLY OPERATIONAL. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED.
5. CONDUCTORS SHALL BE INSTALLED IN SCHEDULE 40 CONDUIT (UNDERGROUND) AND IMC OR SCH 80 PVC CONDUIT ABOVE GROUND.
6. PROVIDE 2" OR 2 1/2" SCHEDULE 40 PVC UNDERGROUND CONDUIT WITH PULL WIRE BETWEEN ELECTRICAL UTILITY DEMARCATION POINT AND APS JUNCTION BOX. CONTRACTOR SHALL DETERMINE REQUIRED NUMBER AND LOCATION OF JUNCTION BOXES PER UTILITY STANDARDS.
7. USE 1" SCHEDULE 40 PVC CONDUIT AND APPROPRIATE FITTINGS TO ENTER NSR LOAD CENTER.
8. CONTRACTOR TO NOTIFY ALL APPROPRIATE PARTIES PRIOR TO CONSTRUCTION AND SHALL PROVIDE AND MAINTAIN A TRAFFIC CONTROL PLAN PER NDOT REQUIREMENTS.
10. CONTRACTOR TO LOCATE ALL UTILITIES IN PROJECT AREA PRIOR TO CONSTRUCTION THROUGH BLUE STAKE.
11. VERIFY DEPTH OF EXISTING UTILITY CROSSING POINTS VIA APPROVED POTHOLING METHODS AND NOTE ON PLAN SETS FOR AS-BUILT CLOSE OUT.
12. NOTE DEPTH AND LOCATIONS OF ALL INSTALLED UTILITIES ON AS-BUILT REDLINE DRAWINGS.
13. IF EXISTING IRRIGATION LINES ARE ENCOUNTERED, CONTRACTOR SHALL NOTIFY OWNER PRIOR TO DISTURBING OR MODIFYING.
14. CONTRACTOR SHALL NOT RELOCATE PROPOSED EQUIPMENT OR POLE LOCATIONS WITHOUT WRITTEN APPROVAL FROM CROWN CASTLE AND PROJECT ENGINEERS
15. MATERIAL SUBSTITUTIONS ARE SUBJECT TO CROWN CASTLE AND ENGINEERING REVIEW PRIOR TO CONSTRUCTION.

ELECTRICAL NOTES SCALE:NONE 6

PANEL A

FED FROM TRANSFORMER
NEMA 3R
VOLTS 240/120V 2P 3W
BUS AMPS 60
NUETRAL 100%
AIC (REFER TO FAULT CALC)
MAIN BKR 60
LUGS STANDARD

NO.	CB	CIRCUIT DESCRIPTION	KVA LOAD A	KVA LOAD B	NO.	CB	CIRCUIT DESCRIPTION	KVA LOAD A	KVA LOAD B
1	60/1	MAIN	0.00		2	20/1	RADIO EQUIPMENT	1.05	
3	60/1	MAIN		0.00	4	20/1	RADIO EQUIPMENT		1.05
5	-	SPACE	0.00		6	20/1	SPARE	0.00	
7	-	SPACE		0.00	8	-	SPACE		0.00
							TOTAL CONNECTED KVA BY PHASE	1.05	1.05
							TOTAL CONNECTED AMPS BY PHASE	11.8	11.8

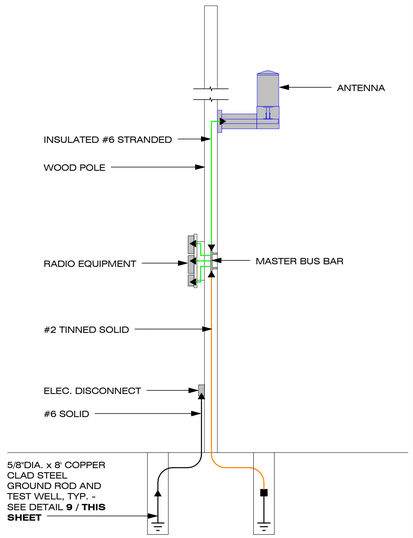
	CONN. KVA	CALC KVA	
LIGHTING	0	0	(125%)
LARGEST MOTOR	0	0	(125%)
OTHER MOTORS	0	0	(125%)
RECEPTACLES	0	0	

	CONN. KVA	CALC KVA	
CONTINUOUS	0	0	(125%)
HEATING	0	0	(100%)
NONCONTINUOUS	2.1	2.1	(100%)
TOTAL KVA	2.82	2.82	

PER NEC 210.4(B)
PROVIDE COMMON TRIP HANDLES FOR ALL MULTI-CIRCUIT CONDUIT RUNS.

ELECTRICAL PANEL SCHEDULES SCALE: NTS 14

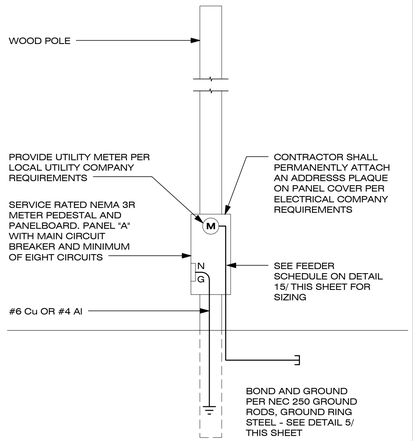
■ CADWELD - SEE DETAIL 1/E1.1
▲ MECHANICAL CONNECTION
GROUND BAR - COPPER - SIZE AS NEEDED
GROUND ROD - SEE DETAIL 9/E1.1



GROUNDING SCHEMATIC SCALE:N.T.S. 19

METER NOTES:

1. CONTRACTOR SUPPLIES METER BASE AND DISCONNECT
2. CONTRACTOR SUPPLIES (1) 20AMP BREAKER FOR EACH RADIO



NOTES:

1. EC TO FIELD VERIFY SITE CONDITION.
2. ALL EQUIPMENT IS NEW UNLESS NOTED OTHERWISE.
3. ALL EXTERIOR EQUIPMENT SHALL BE WEATHERPROOF.
4. PROVIDE ADEQUATE SERVICE CONDUCTOR LENGTH AT THE BASE OF THE RISER POLE FOR LOCAL UTILITY COMPANY TO INSTALL UP THE POLE AND CONNECT TO UTILITY COMPANY SECONDARY LINES WITH A 12" DRIP LOOP.
5. ALL TRENCHES SHALL BE MIN. 24" IN DEPTH.
6. ALL WIRE TO BE THHN OR THWN INSULATION OR EQUIVALENT EXCEPT WHERE NOTED OTHERWISE.
7. FUTURE BREAKERS IN PANEL B SHALL BE SERIES RATED WITH THEIR RESPECTIVE UPSTREAM REMOTE MAIN PROTECTIVE DEVICE. A TWO-TIER (22K/10KVA) SYSTEM IS SPECIFIED.
8. WHERE NECESSARY TO TERMINATE OVERSIZED CONDUCTORS, CONTRACTOR TO CONVERT CONDUCTORS TO PANEL LUG APPROVED SIZE USING AN NEC COMPLIANT CONNECTOR.

ONE-LINE DIAGRAM SCALE:N.T.S. 4

PART 2 - EXECUTION

2.1 **EXECUTION**

A. Provide (1) main ground from the antenna mounting bracket at the top of the pole, to the main ground bus bar (TMGB) (location defined below). Main vertical ground shall consist of a # 2 solid bare copper cable. Said ground shall be protected by a PVC U-Guard to the top of the pole and stapled every 24" with corrosion resistant (dipped galvanized) staples.

B. #2 solid bare copper cable is highly susceptible to theft and may be a bit excessive to run to top of pole. #2 tin coated is recommended by Ops. As it's cheaper and less likely to be stolen. Buss Bars may also be tin coated to make them less susceptible to theft.

C. Provide (1) main ground from the main ground bus bar (TMGB) (location defined below) to a ground rod at the pole base. Main ground vertical shall consist of a # 2 solid bare copper cable. Said ground shall be protected by a PVC U-Guard to the bottom of the pole and stapled every 24" with corrosion resistant (dipped galvanized) staples.

D. Ground rod shall be 8' in depth minimum and copper clad.

E. Ground rod shall be placed per NEC code with regards to depth and distance from wood pole.

F. Ground rod shall be buried minimum of 30" below grade.

G. # 2 ground shall be attached directly to the ground rod via Cad Weld.

H. Main ground vertical shall be attached directly to a ground bus bar (TMGB) mounted to the face of the utility pole. Method of contact shall be 2 hole slotted lug (Brown) to the main ground bus (TMGB) on the left or top slot depending on the orientation of the TMGB.

I. Main ground vertical to the Antenna mounting bracket shall be attached directly to the Antenna Bracket via a self-tapping bolt or screw. A washer must be added to the thru bolt or screw to avoid damage to the lug while maintaining a secure bond.

J. TMGB shall be mounted above the Charles' cabinet below the RRH standoff, directly to the wood pole structure.

K. All pole mounted devices, including but not limited to: (antenna mounts and antennas, mounting brackets, cabinets) shall be connected to the TMGB with a #6 copper stranded cable UV coated and green in color.

L. All pole mounted devices, including but not limited to: (antenna mounts and antennas, mounting brackets, cabinets) shall be connected to the TMGB using compression type, 2 hole connector lugs.
   1. Connector lugs must attach to the bus bar with two holes facing up and out with the bolt heads are on the back side of the bus bar.
   2. Stacking of connector lugs is prohibited.
   3. Placement of connector lugs on front and rear face of grounding bar is permitted.
   4. Any modifications to the connector lugs is prohibited, including but not limited to grinding, cutting or bending.
   5. Connector lugs must be placed with even spacing and must not come in contact with another connector lug.
   6. Slotted side of the connector lug should be placed on the slotted side of the bus bar.
   7. All connector lugs shall have two (2) compressions per lug.
   8. All connector lugs must have NO-OX applied to any sides which contact another metal to retard oxidation including and especially the conductor in the compression end.
   9. All connector lugs must be properly sealed from weather with heat shrink.
   10. All connector lugs must be attached using 3/8" hardware x 2 per each lug and in the following manner:
      a. Flat Washer on the backside of the lug
      b. Bolt thru the lug hole facing outward.
      c. Flat Washer on the front side of the lug.
      e. Lock Washer on the front side of the flat washer
      f. Nut on the bolt, turned to "three threads showing at maximum torque"
      g. All nuts on connector bolts must be tightened so that the lock washers are completely compressed.

M. No mechanical connections are acceptable except in the event of mechanical fittings being a integral part of the product from the factory. ie: Charles cabinet # 6 ground lugs on each side of the cabinet.

N. Excess welds on CadWelds must be ground off to a safe taper.

O. All cad welds must be coated with Zinc-it or like product to prevent oxidation.

P. All exposed metallic surfaces must be sprayed with a protective coating such as Zinc-It.

Q. All fittings exposed to environment must be sealed with shrink wrap.
   1. Exposed "shiners" conductors are prohibited if in excess of 1/16th of an inch.

PART 3 – TESTING AND DOCUMENTATION

3.1 **TESTING**

A. 5 Ohms to ground is required for acceptance. If 5 Ohms cannot be met with above requirements, additional ground rods will be added to the field until 5 Ohms is achieved.

3.2 **DOCUMENTATION**

A. Photos of the tests are required as well as test results in formal document format. Submit result of test to CC Construction Manager prior to final walkthrough. Submit all photos and tests with closeout package per Section 017700 – Closeout Procedures and Required Documents.

GROUNDING SPECIFICATIONS SCALE: NTS 12

POWER FEEDER SCHEDULE			
LENGTH	SIZE (AWG/KCMIL)	GROUND SIZE	CONDUIT SIZE
320'	2	6	2"
380'	1	4	2"
470'	1/0	2	2"
550'	2/0	2	2"
680'	3/0	2	2"
800'	4/0	1	2"
920'	250	1/0	2 - 1/4"
1050'	300	2/0	2-1/2"

FEEDER SCHEDULE SCALE: NTS 15

Fault Point	Panel Transformer	Source (Fault Point)	Source I (amps)	Conduit Type	Wire/Bus Size	'C' value	E (volts)	L (length)	f	M	Isc	AIC Rating
1	UTILITY XFMR/FRYS PEDESTAL		22000				240				22000	
2	Panel-A @ 20'	1	22000	NM	1 Set(s) of 2	3730	240	20	0.851	0.54	11884	22,000
3	Panel-A @ 100'	1	22000	NM	1 Set(s) of 2	3730	240	100	4.256	0.19	4185	10,000
3	Panel-A @ 150'	1	22000	NM	1 Set(s) of 2	3730	240	150	6.385	0.14	2979	10,000
4	Panel-A @ 200'	1	22000	NM	1 Set(s) of 2	3730	240	200	8.513	0.11	2313	10,000

FAULT CURRENT CALCULATION SCALE: NTS 20

CROWN CASTLE
CROWN CASTLE
695 RIVER OAKS PARKWAY
SAN JOSE, CA 95134

RECORD DRAWINGS ISSUE DATE: 08.22.19

SHIFT
Shift Companies, LLC
3334 N. 20TH ST.
PHOENIX, ARIZONA 85016
ph: 480.264.0829
fax: 480.264.0163

RELEASE	
DATE	SUBMITTAL
08.22.19	1ST SUBMITTAL

REVISIONS		
NO.	DATE	COMMENT

PROJECT NAME
SAN FRANCISCO BAY EXPANSION - 58 SITES

NODE NUMBER
SFB005m2

NODE ADDRESS
44 SIMMS ST., SAN RAFAEL, CA 94901

HUB AREA
SF36XC052

SHIFT JOB NUMBER
150601

IN HOUSE
DRAWN BY: MB
CHECKED BY: RA

SHEET TITLE
ELECTRICAL DETAILS

SHEET NUMBER
D1.2

PAGE
7 OF 9

PLOT SCALE: 1:1 @ 24"x36"; 1:2 @ 11"x17"

PLAN CHECK #

CASE #

High Capacity Outdoor LTE-Advanced eNodeB

AirHarmony 4400 is part of Airspan's carrier-class LTE Advanced small cell eNodeB family. AirHarmony 4400 is a Macro-class product that supports 3GPP's Long Term Evolution (LTE) eNodeB specifications, providing high-speed data, mobility, Voice over LTE, and broadcast/multicast services in order to meet the demands of the LTE Mobile Carriers.

AirHarmony 4400 is a compact, easy to install Macro-class eNodeB, allowing an operator to deploy LTE broadband services using existing infrastructure or Street Furniture. AirHarmony 4400 has two 20W (43dBm) transmit channels and four receive channels. AirHarmony 4400 supports single or dual carrier up to 2x 20MHz.

Release 10 LTE-Advanced

AirHarmony 4400 supports 3GPP LTE Broadband access technologies; Airspan's 3GPP LTE implementation is compliant with the 3GPP standards and has interoperable S1 and X2 interfaces and supports commercial GCF tested UE devices, including Smartphones, Dongles and Tablet computers.

The Power of HETNETS

As operators struggle to cope with growing customer demand for higher throughput, they are discovering that layering small base stations into a macro cell coverage area, enables a significant increase in network capacity by filling in coverage gaps and addressing actual traffic distribution where demand is highest. AirHarmony 4400 is ideal for these networks, delivering high data rates where needed most, whether at the macro cell edge or closer to the user base, maximizing coverage and customer satisfaction.

Broadband Access

AirHarmony-4400 supports 3GPP LTE Broadband access technologies; Airspan's 3GPP LTE implementation is compliant with the 3GPP standards and has interoperable S1 and X2 interfaces and supports commercial GCF tested UE devices, including Smartphones, Dongles and Tablet computers.

Integrated Backhaul

AirHarmony also supports tight integration with iBridge or iRelay, Airspan's small cell backhaul product. AirHarmony plus iRelay creates a single install process for LTE Access and Backhaul, and enables "Just add Power" plug and play deployment method saving deployment CAPEX and OPEX.

Physical

Dimensions

Variant	Dimensions[1] (H x W x D)
Main Unit w/o filters	509 x 262 x 210 mm / 20.0 x 10.3 x 8.3 inch
Main Unit with external filters	509 x 262 x 305 mm / 20.0 x 10.3 x 12.0 inch
Cavity Filter Set (4 filters in 2 sets of 2 filters each)	229 x 120 x 39.0 / 9.01 x 4.72 x 1.53 inch (2 units)

Weight

Variant	Weight
Main Unit w/o filters / duplexers	19 Kg / 41.89 Lbs.
Main Unit with filter set	24 Kg / 52.9 Lbs.
Universal mounting bracket	3 Kg / 6.6 Lbs.
Quadruple Filter Set (B41)	6 Kg / 13.2 Lbs.

Operational Tolerances

Type	Details	Standard Compliance
Operating temperature	-40°C to 55°C / -40°F to 131°F	ETSI 300 019 1-4
Operating humidity	5% - 100% non-condensing	ETSI 300 019 1-4
Storage temperature	-40°C to 70° C / -40°F to 158°F	N/A
Storage humidity	5% - 100% non-condensing	ETSI 300 019 1-4
Rain and dust ingress protection	IP66	N/A
Operational altitude	70-106 kPa as well as: From -60m to 1800m @ 40°C From 1800m to 4000m @ 30°C	ETSI 300 019 1-4
Solar radiation	1120 W/m²	ETSI 300 019 1-4

[1] Dimensions excludes connectors height and protruding screws

RADIO SPEC. SCALE: N.T.S. **10**

Charles Industries
CFTT-2424 Series Fiber Enclosure
General Description and Installation

1. GENERAL INTRODUCTION

1.1 Document Purpose

This document provides installation instructions for the Charles Industries' CFTT-2424 series fiber enclosures. Figure 1 shows the front view of the CFTT-2424.

1.2 Product Purpose

The CFTT-2424 provides a means of managing fiber optics service cable. The enclosure houses 24 fiber adapter ports. Feed and drop fibers enter the enclosure and are connected to these ports. The CFTT-2424 is designed for mounting on a pole or wall.

Figure 1 CFTT-2424 Front

2. INSTALLATION

2.1 Warnings and Precautions

- Follow all national safety codes, OSHA requirements, and local environmental, workplace and company codes, safety procedures and practices.
- Only authorized trained personnel shall install the unit.

2.2 Mounting the CFTT-2424 on a Pole

The CFTT-2424 ships with the enclosure attached to the pole mounting bracket. To mount the unit, first remove the enclosure from the bracket by removing the hardware from the four attachment points as shown in Figure 2. Save this hardware.

The bracket has two mounting options.

- Option 1: use the two holes in the center of the bracket to mount a pair of lag bolts into the pole.
- Option 2: use the four obround slots at the sides of the bracket to mount to the pole using straps.

See Figure 3 for locations of mounting holes and slots. Use local practice for mounting the bracket to the pole. All hardware for mounting to the pole is customer supplied.

Once the bracket is securely on the pole, re-attach the enclosure onto the PEM studs using the hardware removed previously.

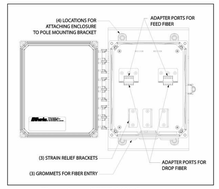


Figure 2 CFTT-2424 Components

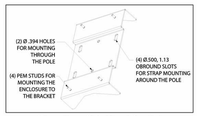


Figure 3 Pole Mount Bracket

2.3 Routing Cable into the Unit

Twenty-four adapter ports are provided inside the enclosure. These ports open to the top and bottom and are numbered (1 through 24).

Grommets on the bottom of the enclosure allow fiber routing (Figure 4).

An optional conduit kit is available that provides protection for fibers as they enter the enclosure (97-000012-A, sold separately). For kit mounting instructions, see the documentation that ships with the kit.

2.3.1 Feed Cable

1. Insert the connectorized feed cable into the CFTT-2424 through the center grommet.
2. Use local practice for securing cable. Three strain relief brackets are provided.
3. Connect the fibers to the adapter ports that face the top of the CFTT-2424.

2.3.2 Drop Cable

1. Insert the first 12 connectorized drop cables into the CFTT-2424 through the left-most grommet. Use the right-most grommet to route fibers to ports 13-24.
2. Use local practice for securing cable. Three strain relief brackets are provided.
3. Connect the fibers to the adapter ports that face the bottom of the CFTT-2424. Check the numbering to ensure that the fibers are connected to the correct ports.

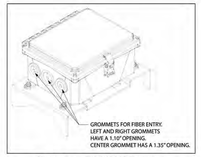


Figure 4 CFTT-2424 Grommets

3. TECHNICAL ASSISTANCE AND REPAIR SERVICE

For questions on product repair or if technical assistance is required, contact Charles Technical Support.

847-806-8500
techserv@charlesindustries.com (email)
http://www.charlesindustries.com/techserv.htm

4. WARRANTY & CUSTOMER SERVICE

Charles Industries, Ltd. offers a one-year warranty on the housing and a one-year warranty on the optical components. The Charles warranty is limited to the operation of the hardware as described in this documentation and does not cover equipment which may be integrated by a third party. The terms and conditions applicable to any specific sale of product shall be defined in the resulting sales contract. For questions on warranty or other customer service assistance, contact your Charles Customer Service Representative.

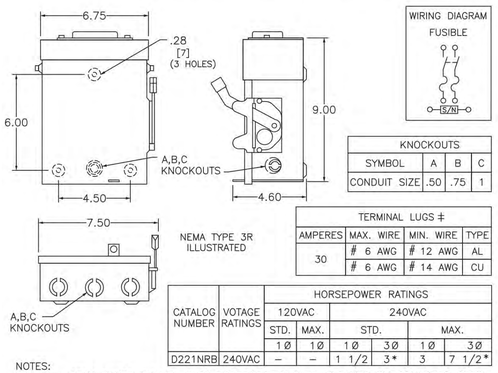
847-806-6300
mktserv@charlesindustries.com (email)
http://www.charlesindustries.com/main/telecom_sales_support.htm

5. SPECIFICATIONS

Physical	
Weight	Approx. 6.0 lbs. as shipped
Available Colors	CFTT-2424LCUXPB: Onyx Black CFTT-2424LCUXPG: Gray CFTT-2424LCUXP7: Beige
Kits and Replacement Parts	
Fiber Conduit Adapter Kit	97-000012-A

FIBER ENCLOSURE SPEC. SCALE: N.T.S. **18**

DISCONNECT SWITCH



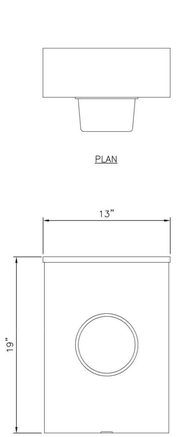
KNOCKOUTS			
SYMBOL	A	B	C
CONDUIT SIZE	.50	.75	1

TERMINAL LUGS ‡			
AMPERES	MAX. WIRE	MIN. WIRE	TYPE
30	# 6 AWG	# 12 AWG	AL
	# 6 AWG	# 14 AWG	CU

CATALOG NUMBER	VOTAGE RATINGS	HORSEPOWER RATINGS					
		120VAC		240VAC			
		STD.	MAX.	STD.		MAX.	
		1Ø	1Ø	1Ø	3Ø	1Ø	3Ø
D221NRB	240VAC	–	–	1 1/2	3*	3	7 1/2*

NOTES:
FINISH – GRAY BAKED ENAMEL ELECTRODEPOSITIED OVER CLEANED PHOSPHATIZED STEEL.
UL LISTED – FILE E–2875
ALL NEUTRALS – INSULATED GROUNDABLE
SUITABLE FOR USE AS SERVICE EQUIPMENT
TOP OF NEMA TYPE 3R SWITCHES HAVE PROVISIONS FOR MAXIMUM 2 1/2" BOLT–ON HUB.
SHORT CIRCUIT CURRENT RATINGS:
◆ 10,000 AMPERES.
10,000 AMPERES WHEN USED WITH OR PROTECTED BY CLASS H OR K FUSES.
100,000 AMPERES WITH CLASS R FUSES.
* FOR CORNER GROUNDED DELTA SYSTEMS.
■ PLUG FUSES
‡ LUGS SUITABLE FOR 60°C OR 75° CONDUCTORS.

LOAD CENTER SPEC. SCALE: N.T.S. **12**



METER SPEC. SCALE: N.T.S. **16**

Amphenol ANTENNA SOLUTIONS

(2x) 696-960 / (4x) 1695-2700 / (2x) 3550-3700 / (1x) 5150-5925 MHz

2C4U3MT360X06F04s0

MULTI BAND | OMNI | CANISTER ANTENNA | X-POL | FIXED TILT | 610 MM (24.0 IN)

Features

- Omni configuration with 18 connectors
- Ideal for Small Cell / DAS applications
- This antenna meets the requirements of the U-NII
- Available for order with a grey, brown or black radome

Connector Description

The antenna has 18 connectors located at the bottom.

Low Band #1	R1	696-960 MHz	(2x) 4.3-10 Female
Low Band #2	R2	696-960 MHz	(2x) 4.3-10 Female
Mid Band #1	Y1	1695-2700 MHz	(2x) 4.3-10 Female
Mid Band #2	Y2	1695-2700 MHz	(2x) 4.3-10 Female
Mid Band #3	Y3	1695-2700 MHz	(2x) 4.3-10 Female
Mid Band #4	Y4	1695-2700 MHz	(2x) 4.3-10 Female
High Band #1	P1	3550-3700 MHz	(2x) 4.3-10 Female
High Band #2	P2	3550-3700 MHz	(2x) 4.3-10 Female
High Band #3	O1	5150-5925 MHz	(2x) 4.3-10 Female

Electrical Characteristics		R1 R2		Y1 Y2 Y3 Y4				P1 P2	O1
Frequency Bands (MHz)		(2x) 696-960		(4x) 1695-2700				(2x) 3550-3700	5150-5925
		696-806	806-960	1695-1880	1850-1990	1920-2200	2300-2700		
Polarization		(2x) ±45°		(4x) ±45°				(2x) ±45°	±45°
Horizontal Beamwidth		360°	360°	360°	360°	360°	360°	360°	360°
Vertical Beamwidth		96.9° ± 26.7°	72° ± 21.7°	38.3° ± 7.8°	33.8° ± 8.2°	33.4° ± 6.2°	29.0° ± 5.1°	40.2° ± 4.6°	21.3° ± 5.9°
Gain (dBi)	BASTA	4.2 ± 0.9	3.9 ± 0.7	6.1 ± 0.7	6.2 ± 0.7	6.1 ± 0.9	6.8 ± 1.1	5.3 ± 0.6	4.8 ± 1.0
	Max	5.1	4.6	6.8	6.9	7.0	7.9	5.9	5.8
Electrical Downtilt (°)		(x) 0		(y) 2, 4, 6				0	0
Impedance		50Ω		50Ω				50Ω	50Ω
VSWR		≤ 1.5:1		≤ 1.5:1				≤ 1.5:1	≤ 1.5:1
Upper Sidelobe Suppression		N/A		N/A				N/A	N/A
Isolation	Intraband	25 dB		25 dB				25 dB	25 dB
	Interband	28 dB		28 dB				28 dB	28 dB
IM3 (2x20W carrier)		< -153 dBc		< -153 dBc				N/A	N/A
Input Power		(4x) 500 W		(8x) 300 W				(4x) 100 W	(2x) 50 W
U-NII Compliant		---		---				---	Yes
Diplexed		No							
Number of Sectors and/or Pattern Shape		Omni							
Lightning Protection		Direct Ground							

Mechanical Characteristics				
Antenna Dimensions (Height x Diameter)	610 x 371 mm		24.0 x 14.6	in
Weight without Mounting Bracket Kit	11.3 kg		25	lbs
Antenna Volume	0.07 m³		2.3	ft³
Survival Wind Speed	241 km/hr		150	mph
Wind Area	0.22 m²		2.4	ft²
Wind Load (160 km/hr or 100 mph)	191 N		43	lbf

Quoted performance parameters are provided to offer typical, peak or range values only and may vary as a result of normal testing, manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to products may be made without notice.

REV100918NA www.amphenol-antennas.com 1 of 5

ANTENNA SPEC. SCALE: N.T.S. **20**

CROWN CASTLE
CROWN CASTLE
695 RIVER OAKS PARKWAY
SAN JOSE, CA 95134

RECORD DRAWINGS ISSUE DATE: 08.22.19

SHIFT
Shift Companies, LLC
3334 N. 20TH ST.
PHOENIX, ARIZONA 85016
ph: 480.264.0829
fax: 480.264.0163

RELEASE

DATE	SUBMITTAL
08.22.19	1ST SUBMITTAL

REVISIONS

NO.	DATE	COMMENT

PROJECT NAME

SAN FRANCISCO BAY EXPANSION - 58 SITES

NODE NUMBER

SFB005m2

NODE ADDRESS

44 SIMMS ST., SAN RAFAEL, CA 94901

HUB AREA

SF36XC052

SHIFT JOB NUMBER 150601

IN HOUSE DRAWN BY: MB CHECKED BY: RA

SHEET TITLE

EQUIPMENT SPECIFICATIONS

SHEET NUMBER D1.3

PAGE 8 OF 9

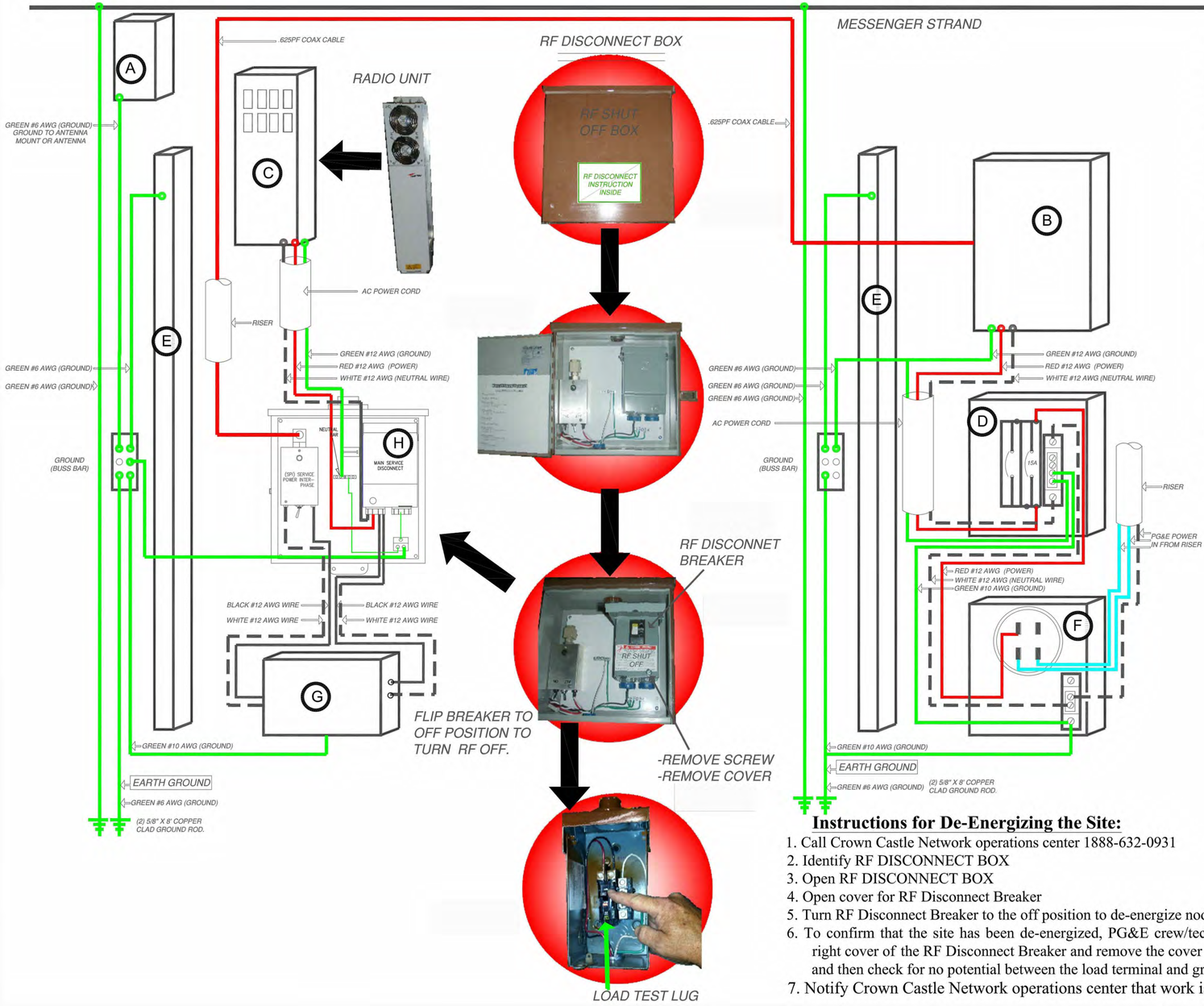
PLOT SCALE: 1:1 @ 24"x36"; 1:2 @ 11"x17"

PLAN CHECK #

CASE #

METERED SITE & BBU ON THE SAME POLE, NODE & ANTENNAS ADJACENT TO THE METER POLE

(DRAWING #3)



A) ANTENNA AND MOUNTING BRACKET
B) BATTERY BACKUP
C) NODE EQUIPMENT
D) SQUARE-D (DISCONNECT BREAKER)
E) POLE MOUNTING CHANNEL
F) B-LINE 114TB METER SOCKET
G) DONGAN TRANSFORMER
H) RF DISCONNECT BOX

COLOR KEY	
RED (POWER)	
GREEN (GROUND)	
BLUE (PG&E POWER)	
BLACK / DASHED (NEUTRAL)	

Instructions for De-Energizing the Site:

1. Call Crown Castle Network operations center 1888-632-0931
2. Identify RF DISCONNECT BOX
3. Open RF DISCONNECT BOX
4. Open cover for RF Disconnect Breaker
5. Turn RF Disconnect Breaker to the off position to de-energize node
6. To confirm that the site has been de-energized, PG&E crew/technician can remove the single screw on the bottom right cover of the RF Disconnect Breaker and remove the cover to expose the source and load terminals on the switch and then check for no potential between the load terminal and ground to verify that no RF signal can be generated.
7. Notify Crown Castle Network operations center that work is complete

CROWN CASTLE
CROWN CASTLE
695 RIVER OAKS PARKWAY
SAN JOSE, CA 95134

RECORD DRAWINGS ISSUE DATE: 08.22.19

SHIFT
Shift Companies, LLC
3334 N. 20TH ST.
PHOENIX, ARIZONA 85016
ph: 480.264.0829
fax: 480.264.0163

RELEASE	
DATE	SUBMITTAL
08.22.19	1ST SUBMITTAL

REVISIONS		
NO.	DATE	COMMENT

PROJECT NAME
SAN FRANCISCO BAY EXPANSION - 58 SITES

NODE NUMBER
SFB005m2

NODE ADDRESS
44 SIMMS ST., SAN RAFAEL, CA 94901

HUB AREA
SF36XC052

SHIFT JOB NUMBER: 150601
IN HOUSE: DRAWN BY: MB, CHECKED BY: RA

SHEET TITLE
PGE EQUIPMENT SHUT-DOWN PROCEDURE

SHEET NUMBER: D1.4
PAGE: 9 OF 9

PLOT SCALE: 1:1 @ 24"x36"; 1:2 @ 11"x17"

PLAN CHECK #

CASE #