

March 31, 2020

Via Electronic Mail

Melanie A. Bachman, Esq.
Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Facility Modification
11 Filbert Road, Norwalk, Connecticut**

Dear Attorney Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) antennas (six (6) at the 106-foot level and six (6) at the 114-foot level) on the existing 130-foot tall water tank at 11 Filbert Road in Norwalk, Connecticut (the “Property”). The Property and the water tank are owned by the First Taxing District Water Department. The Siting Council approved Cellco’s shared use of the water tank in 1993 in Petition No. 305 and has maintained jurisdiction over this structure since that time. A copy of the Council’s staff report is included in Attachment 1.

Cellco now intends to modify its existing facility by replacing six (6) of its existing antennas with six (6) new panel antennas; replace three (3) additional panel antennas with three (3) new CBRH integrated (antenna and RRH) units; and remove nine (9) RRHs, replacing them with six (6) new dual band RRHs. A set of project plans showing the proposed facility modifications and specifications for Cellco’s new antennas, CBRH units and RRHs are included in Attachment 2.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Norwalk’s Mayor, Harry Rilling; Steve Kleppin, Norwalk’s Director of Planning and Zoning; and the First Taxing District Water Department, the owner of the water tank and the Property.

20555949-v1

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The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing water tank. Cellco's replacement antennas will be installed at the same 106 and 114-foot levels on the 130-foot tall water tank. (See Attachment 2).
2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The installation of new antennas and RRHs will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table for the modified facility is included in Attachment 3.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The water tank, its foundation and new reinforced antenna mounts can support Cellco's proposed facility modifications. (See Structural Analysis Report included in Attachment 4).

A copy of the parcel map and Property owner information is included in Attachment 5. A Certificate of Mailing verifying that this filing was sent to municipal officials and the owner of the Property is included in Attachment 6.

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

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Melanie A. Bachman, Esq.
March 31, 2020
Page 3

Sincerely,

A handwritten signature in black ink, appearing to read "Kenneth C. Baldwin". The signature is fluid and cursive, with a long horizontal stroke at the end.

Kenneth C. Baldwin

Enclosures

Copy to:

Harry Rilling, Norwalk Mayor
Steve Kleppin, Director of Planning and Zoning
First Taxing District Water Department
Tim Parks

ATTACHMENT 1



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051-4225
Phone: 827-7682

Petition No. 305

Metro Mobile of Fairfield County, Inc.
Installation of cellular telecommunications
antennas and equipment building at a water tank
located in the Town of Norwalk, Connecticut.
Staff Report
May 6, 1993

Metro Mobile of Fairfield County, Inc. (Metro Mobile), is petitioning the Council under the regulations of State Agencies 16-50j-38 through 40 for a declaratory ruling that the installation of certain cellular telecommunications antennas on the sides of an existing water tank and construction of an equipment building adjacent to the base of the water tank will not have a substantial adverse environmental effect and, therefore, does not require a Certificate of environmental compatibility and public need from the Council. On April 30, 1993, Chairman Mortimer A. Gelston of the Connecticut Siting Council (Council), and Fred Cunliffe of the Council's staff reviewed this petition.

Metro Mobile proposes to install six panel antennas with reflectors, approximately three and one-half by one and one-half feet, around the sides of a water tank located at the end of Filbert Road in Norwalk, Connecticut. This existing water tank site is fenced, surrounded by vegetation, and is in a residential area. The existing water tank stands approximately 130 feet to which the antennas would be attached directly to the tank's support legs reaching an approximate total height of 119 feet above ground level. Metro Mobile also proposes to construct a 500 square foot equipment building directly beneath the water tank. Exact dimensions would be governed by the confined space under the tower and final approval by the property owner. No clearing or landscaping would be necessary. Metro Mobile states that a building permit would be pursued following a Council ruling.

Metro Mobile contends that this project will have no effect on the ecology of the site, non-ionizing radio frequency will be below the DEP State standard, the proposed installation will not increase noise levels at the site boundary by six decibels or more, and the site boundaries will not be expanded by the project.

In conclusion, Metro Mobile requests that the Council issue a determination that the proposed project will not have a substantial adverse environmental effect and, therefore, does not require a Certificate from the Council. Staff is in agreement with the contentions of Metro Mobile and recommends approval of this petition.

Fred Cunliffe
Siting Analyst

6914E-3

ATTACHMENT 2



WIRELESS COMMUNICATIONS FACILITY
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

On Air Engineering, LLC
88 Pounding Road Road
Crest Springs, NY 10916
201-455-4024
onair@onairllc.com



NO.	DATE	DESCRIPTION
1	02/19/19	REVISED FOR OWNER
2	03/25/19	REVISED FOR OWNER
3	04/15/19	REVISED FOR OWNER
4	05/01/19	REVISED FOR OWNER
5	05/15/19	REVISED FOR OWNER
6	06/01/19	REVISED FOR OWNER
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16	11/01/19	REVISED FOR OWNER
17	11/15/19	REVISED FOR OWNER
18	12/01/19	REVISED FOR OWNER
19	12/15/19	REVISED FOR OWNER
20	01/01/20	REVISED FOR OWNER

PROJECT NAME:
**CBRS/850-LTE
CARRIER ADD
DESIGN EXHIBITS**

SHEET NAME:
E NORWALK CT

SITE ADDRESS:
**FIRST DIST. WATER DEPT.
FILBERT RD.
NORWALK, CT 06851**

SHEET TITLE:
COMPOUND PLAN

SHEET NUMBER:
DE-1

NOTE: CONTRACTOR SHALL BRACE ALL VERIZON WIRELESS MASTS (6 TOTAL) BACK TO TANK STRUCTURE; REFER TO DE-4 FOR DETAILS

EXISTING ANTENNA (TYP. OF 2); UPPER ANTENNA TO BE REPLACED AND LOWER ANTENNA TO REMAIN; REFER TO DE-3 FOR PROPOSED MODIFICATIONS

EXISTING ANTENNA (TYP. OF 2) TO BE REPLACED WITH NEW; REFER TO DE-3 FOR PROPOSED MODIFICATIONS

EXISTING ANTENNA (TYP. OF 2) TO BE REPLACED WITH NEW; REFER TO DE-3 FOR PROPOSED MODIFICATIONS

APPROX. LOCATION OF EXISTING VERIZON WIRELESS EQUIPMENT SHELTER AT GRADE (BENEATH TANK)

PROPOSED (6) 2x4 HYBRID CABLES TO REPLACE EXIST. (6) HYBRID CABLES ON BRIDGE; REMOVE (6) EXISTING UNUSED COAXIAL CABLES

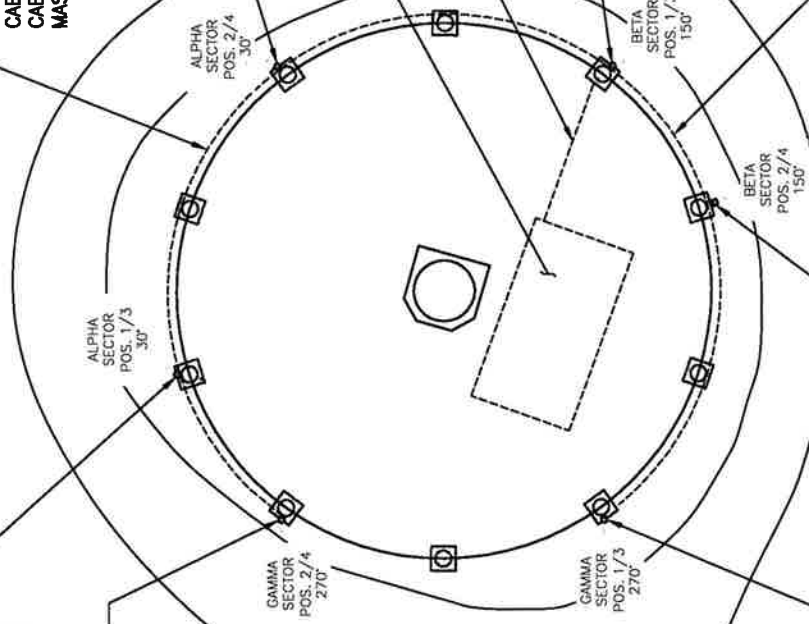
EXISTING ANTENNA (TYP. OF 2); UPPER ANTENNA TO BE REPLACED AND LOWER ANTENNA TO REMAIN; REFER TO DE-3 FOR PROPOSED MODIFICATIONS

PROPOSED 2x4 HYBRID CABLE (TYP.) TO REPLACE EXISTING 2x4 HYBRID CABLES ROUTED ON TANK ("SOUTH" CABLES ROUTED TO BOTH BETA MASTS AND GAMMA POS. 1/3 MAST)

EXISTING ANTENNA (TYP. OF 2) TO BE REPLACED WITH NEW; REFER TO DE-3 FOR PROPOSED MODIFICATIONS

EXISTING ANTENNA (TYP. OF 2); UPPER ANTENNA TO BE REPLACED AND LOWER ANTENNA TO REMAIN; REFER TO DE-3 FOR PROPOSED MODIFICATIONS

PROPOSED 2x4 HYBRID CABLE (TYP.) TO REPLACE EXISTING 2x4 HYBRID CABLES ROUTED ON TANK ("NORTH" CABLES ROUTED TO BOTH ALPHA MASTS AND GAMMA POS. 2/4 MAST)



1 DE-1
1 DE-2
1 COMPOUND PLAN
Scale: 1" = 20'

NOTES:
1. COMPOUND PLAN IS BASED EXISTING DRAWINGS PROVIDED BY VERIZON WIRELESS AND A LIMITED DESIGN VISIT ON 5-1-19 FOR A PROPOSED ANTENNA MODIFICATION.
2. PLANS ARE DIAGRAMMATIC ONLY AND NOT TO BE SCALED.
3. REFER TO STRUCTURAL EVALUATION UNDER SEPARATE COVER.

verizon
WIRELESS COMMUNICATIONS FACILITY

20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

On Air Engineering, LLC
88 Pounding Road, Road
Coral Gables, NY 10616
201-456-4624
oae@onair.com



NO.	DATE	DESCRIPTION
1	03/21/18	REVISED FOR CHG
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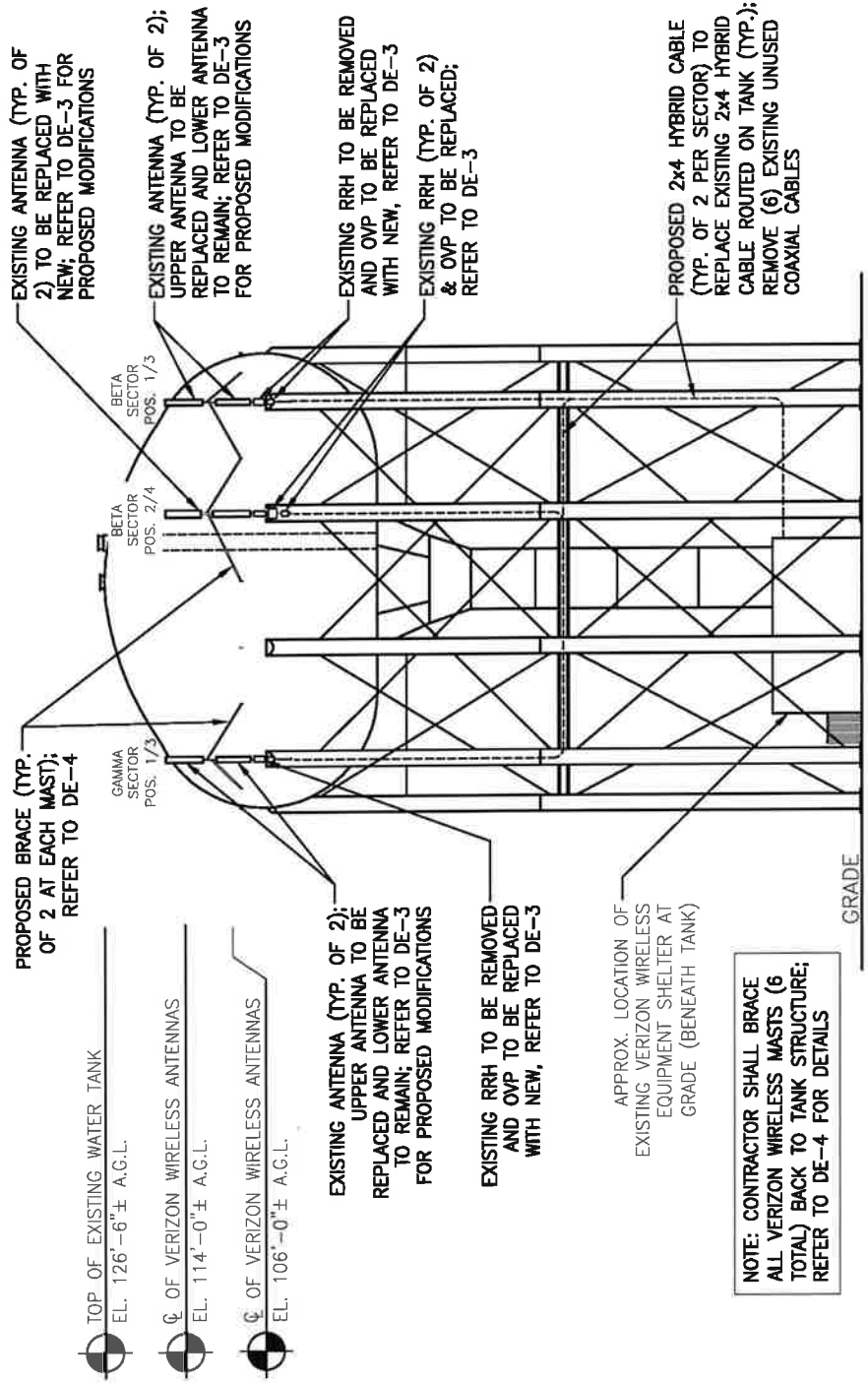
PROJECT NAME:
**CBRS/850-LTE
CARRIER ADD
DESIGN EXHIBITS**

SITE NAME:
E NORWALK CT

SITE ADDRESS:
**FIRST DIST. WATER DEPT.
FILBERT RD.
NORWALK, CT 06851**

PROJECT TITLE:
SOUTH ELEVATION

PROJECT NUMBER:
DE-2



NOTE: CONTRACTOR SHALL BRACE ALL VERIZON WIRELESS MASTS (6 TOTAL) BACK TO TANK STRUCTURE; REFER TO DE-4 FOR DETAILS

1 SOUTH ELEVATION
Scale: 1" = 20'

- NOTES:
1. ALL HEIGHTS ARE BASED ON EXISTING DRAWINGS PROVIDED BY VERIZON WIRELESS.
 2. PLANS ARE DIAGRAMMATIC ONLY AND NOT TO BE SCALED.
 3. REFER TO STRUCTURAL EVALUATION UNDER SEPARATE COVER.



NO.	DATE	DESCRIPTION
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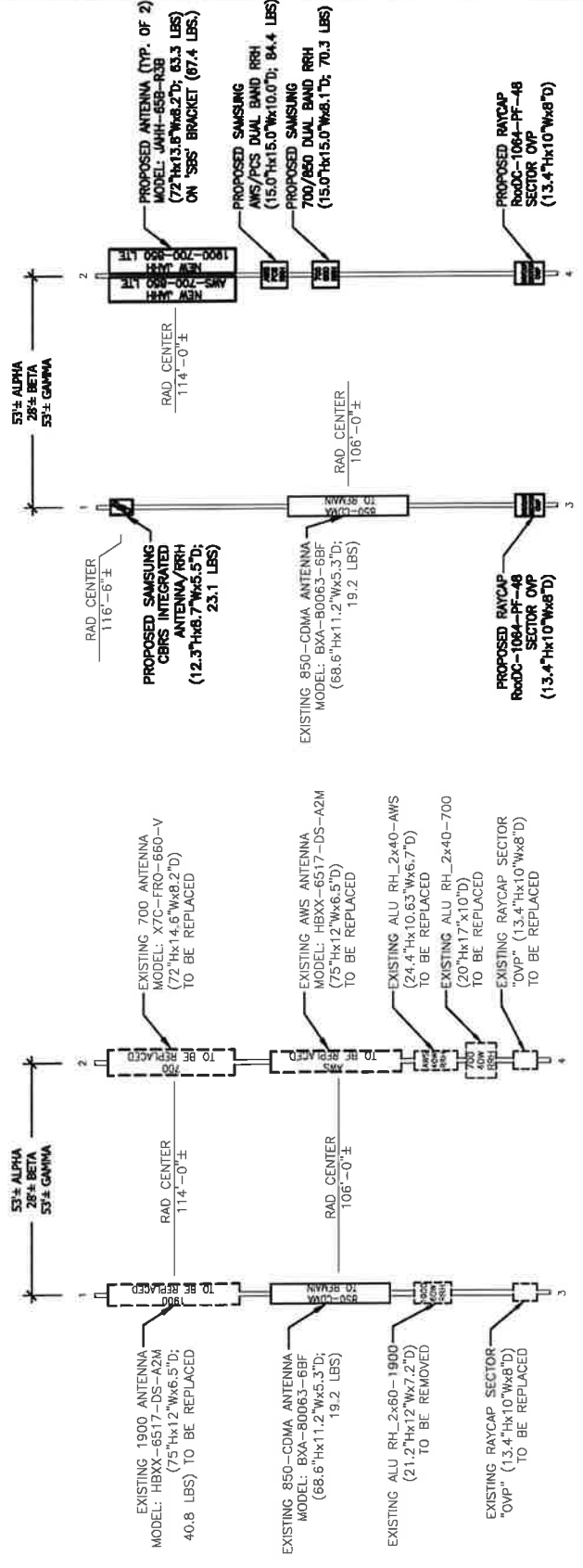
PROJECT NAME:
**CBRS/850-LTE
CARRIER ADD
DESIGN EXHIBITS**

SITE NAME:
E NORWALK CT

SITE ADDRESS:
**FIRST DIST. WATER DEPT.
FILBERT RD.
NORWALK, CT 06851**

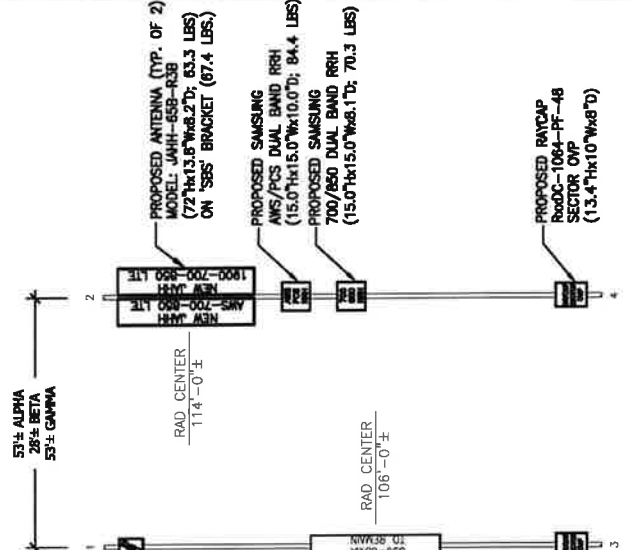
SHEET TITLE:
**ANTENNA
CONFIGURATION
ALL SECTORS**

SHEET NUMBER:
DE-3



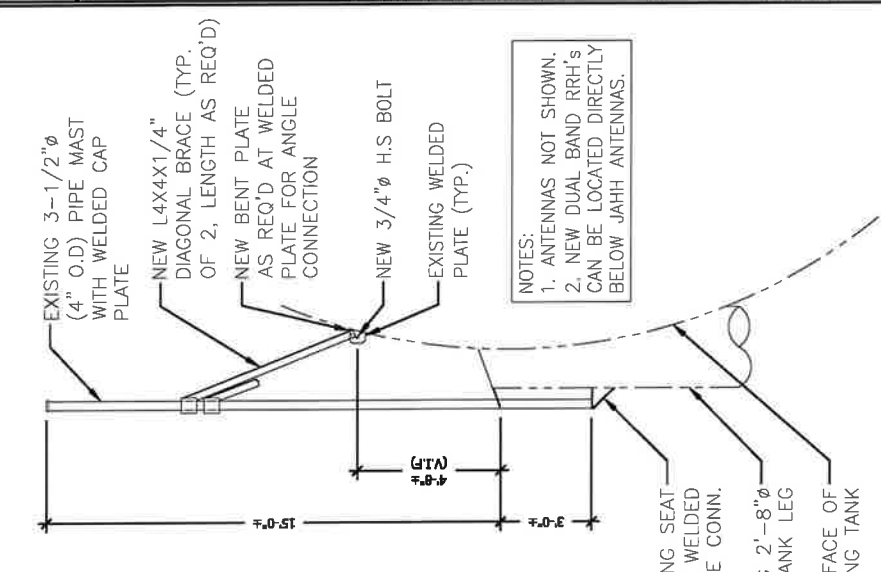
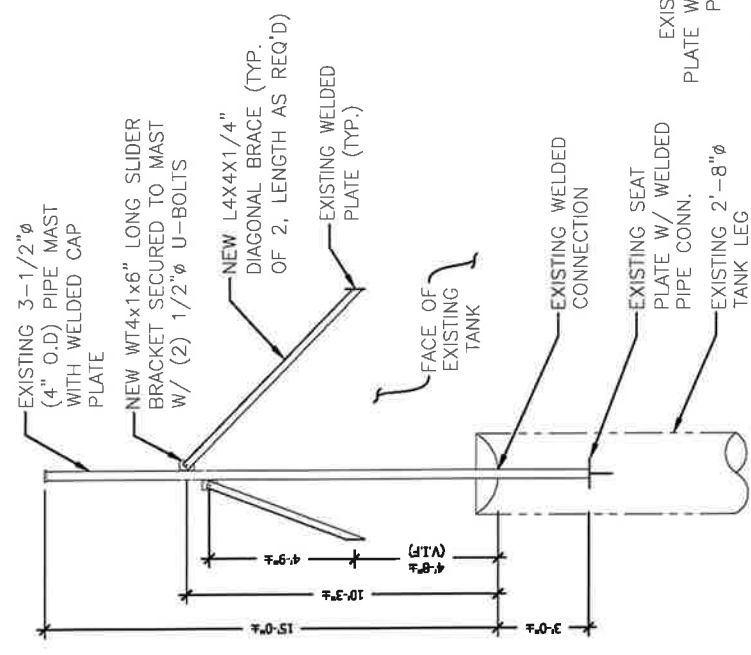
2 ANTENNA CONFIGURATION - PROPOSED (ALL SECTORS)
Scale: 3/16" = 1'-0"

ANTENNAS VIEWED FROM THE REAR



STRUCTURAL NOTES

- DESIGN REQUIREMENTS ARE PER STATE BUILDING CODE AND APPLICABLE SUPPLEMENTS; AWS/AISC7, 11A-222-G STRUCTURAL STANDARDS FOR STEEL ANTENNA SUPPORTING STRUCTURES.
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. ANY UNUSUAL CONDITIONS SHALL BE REPORTED TO THE ATTENTION OF THE CONSTRUCTION MANAGER.
- DESIGN AND CONSTRUCTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
- WIDE FLANGE STRUCTURAL STEEL SHALL CONFORM TO ASTM A992. MISCELLANEOUS STEEL SHALL CONFORM TO ASTM A36.
- STEEL PIPE SHALL CONFORM TO ASTM A500 "COLD-FORMED WELDED & SEAMLESS CARBON STEEL STRUCTURAL TUBING" GRADE A, OR ASTM S53 PIPE STEEL. BLACK AND HOT-DIPPED ZINC-COATED WELDED AND SEAMLESS TYPE E OR S, GRADE B. PIPE SIZES INDICATED ARE NOMINAL. ACTUAL OUTSIDE DIAMETER IS LARGER.
- STRUCTURAL CONNECTION BOLTS SHALL BE HIGH STRENGTH BOLTS (BEARING TYPE) AND CONFORM TO ASTM A325 "HIGH STRENGTH BOLTS FOR STRUCTURAL JOINTS, INCLUDING SUITABLE NUTS AND PLAN HARDENED WASHERS." ALL BOLTS SHALL BE 3/4" (U.O.N.)
- ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS OTHERWISE NOTED.
- ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS OTHERWISE NOTED.
- FIELD WELDS, DRILL HOLES, SAW CUTS AND ALL DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED WITH AN ORGANIC ZINC REPAIR PAINT COMPLYING WITH REQUIREMENTS OF ASTM A780. GALVANIZING REPAIR PAINT SHALL HAVE 65 PERCENT ZINC BY WEIGHT, ZIRP BY DUNCAN GALVANIZING, GALVA BRIGHT PREMIUM BY CROWN OR EQUAL. THICKNESS OF APPLIED GALVANIZING REPAIR PAINT SHALL BE NOT LESS THAN 4 COATS (ALLOW TIME TO DRY BETWEEN COATS) WITH A RESULTING COATING THICKNESS REQUIRED BY ASTM A123 OF A153 AS APPLICABLE.
- CONTRACTOR SHALL COMPLY WITH AWS CODE PROCEDURES, APPEARANCE AND QUALITY OF WELDS AND FOR METHODS USED IN CORRECTING WELDING. ALL WELDERS AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D.I.I. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE D2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION", 9TH EDITION.
- INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE CONSTRUCTION MANAGER PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE CONSTRUCTION MANAGER APPROVAL.



NOTES:
 1. ANTENNAS NOT SHOWN.
 2. NEW DUAL BAND RRH'S CAN BE LOCATED DIRECTLY BELOW JAHH ANTENNAS.

1 ANTENNA MOUNT DETAIL-FRONT
 Scale: 1/4" = 1'-0"

2 ANTENNA MOUNT DETAIL-SIDE
 Scale: 1/4" = 1'-0"

Verizon
 WIRELESS COMMUNICATIONS FACILITY

On Air Engineering, LLC
 88 Foundry Road, 2nd Floor
 East Granby, NY 10816
 201-456-4024
 onair@onair-engineering.com



SUBMITTALS	
NO.	DESCRIPTION
1	AS SHOWN
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50	AS SHOWN

DAVID WERNKE, P.E.
 CT LIC. NO. 22144

PROJECT NAME:
CBR8/850-LTE CARRIER ADD DESIGN EXHIBITS

SHEET NAME:
E NORWALK CT

SITE ADDRESS:
FIRST DIST. WATER DEPT. FILBERT RD. NORWALK, CT 06851

SHEET TITLE:
ANTENNA MOUNT REINFORCEMENT DETAILS

SHEET NUMBER:
DE-4

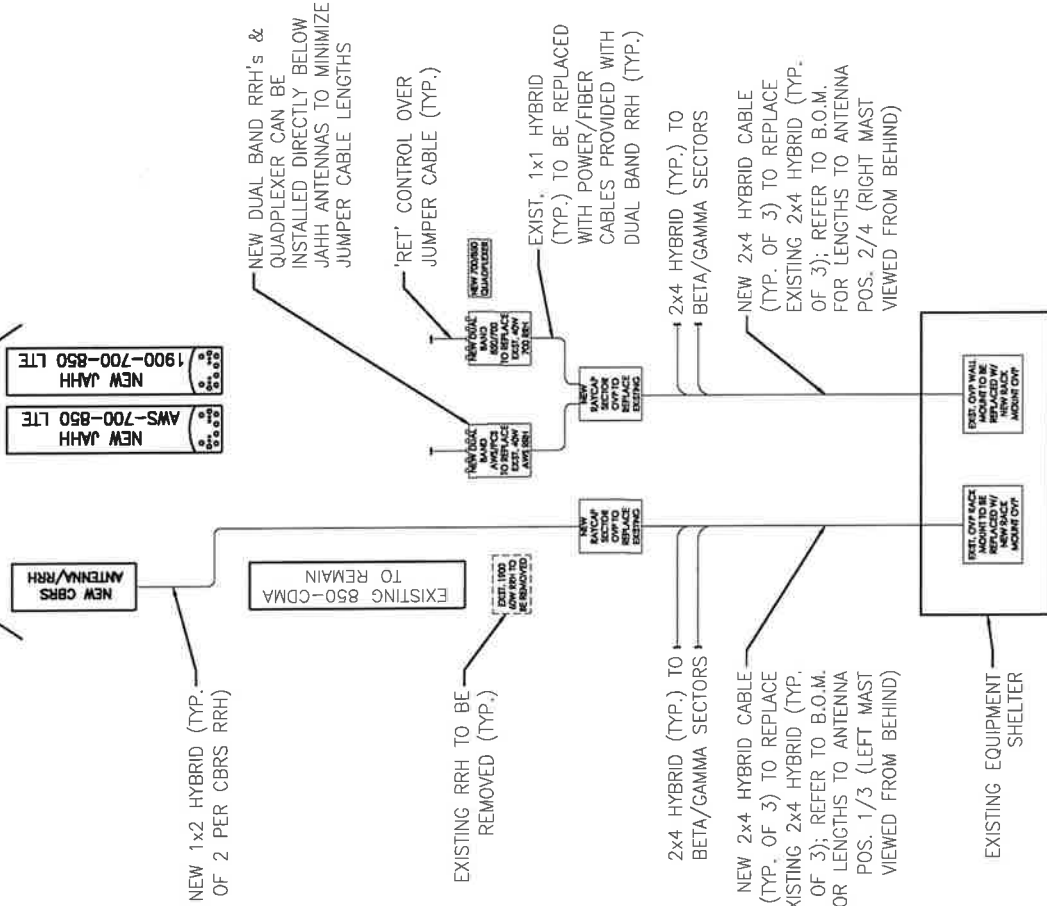
GENERAL NOTES:

- CONTRACTOR SHALL REFER TO THE LATEST VERIZON WIRELESS RF DATA SHEET WHICH MAY INCLUDE ANTENNA SECTOR AZIMUTHS/ANTENNA CHANGES, ETC. THAT ARE REQUIRED AS PART OF THE PROJECT.
- CONTRACTOR SHALL SECURE ALL CONTROL CABLES IN ACCORDANCE WITH INDUSTRY STANDARDS AND MANUFACTURERS' INSTRUCTIONS. EXTERIOR CONTROL CABLES MAY BE TAPED OR TIE-WRAPPED TO EXISTING COAXIAL CABLES EVERY 4 FT. MAX. FOR HORIZONTAL RUNS. CONTRACTOR MAY USE HOISTING GRIPS AT TOP OF VERTICAL CABLE RUNS IN CERTAIN APPLICATIONS. CABLES SHALL BE ROUTED AND SECURED ON STRUCTURAL MEMBERS ONLY - DO NOT "LOOP" THE CABLES IN MID-AIR BETWEEN ANTENNAS
- EXISTING COAX AND JUMPER CABLES NOT SHOWN.

BILL OF MATERIALS				EMBEDDED BASE
DESCRIPTION	QTY	LENGTH	COMMENTS	
LOWER/UP SECTOR CYP	2	-	REPLACE EXIST. WALL & BACK MOUNT W/ NEW RACK MOUNTS	
2x4 HYBRID - ALPHA 1/3 - LEFT MAST	1	250 FT.	NEW (1) LOW-INDUCTANCE HYBRID TO REPLACE EXISTING	
2x4 HYBRID - ALPHA 2/4 - RIGHT MAST	1	250 FT.	NEW (1) LOW-INDUCTANCE HYBRID TO REPLACE EXISTING	
2x4 HYBRID - BETA 1/3 - LEFT MAST	1	190 FT.	NEW (1) LOW-INDUCTANCE HYBRID TO REPLACE EXISTING	
2x4 HYBRID - BETA 2/4 - RIGHT MAST	1	220 FT.	NEW (1) LOW-INDUCTANCE HYBRID TO REPLACE EXISTING	
2x4 HYBRID - GAMMA 1/3 - LEFT MAST	1	270 FT.	NEW (1) LOW-INDUCTANCE HYBRID TO REPLACE EXISTING	
2x4 HYBRID - GAMMA 2/4 - RIGHT MAST	1	270 FT.	NEW (1) LOW-INDUCTANCE HYBRID TO REPLACE EXISTING	
1/2" HYBRID CABLE	6	20 FT.	2 PER SECTOR FOR CBRS RRH	
RET CONTROL CABLE	-	-	HOT TIEED FOR JARRH ANTENNAS; REMOVE EXISTING	
1/2" JUMPER	60	15 FT.	(20) PER SECTOR; SEE NOTE 2	
DUAL BAND AWS/PCS RRH	3	-	MOUNT DIRECTLY BELOW JARRH ANTENNAS	
DUAL BAND 700/650 RRH	3	-	MOUNT DIRECTLY BELOW JARRH ANTENNAS	
QUADPLEXER 700/650	3	-	COMMSCOPE CSCRFT-D9-43-2X	
CBRS ANTENNA/RRH	3	-	SAMBUNG RRH ANTENNA INTEGRATED	
AWS ANTENNA	3	-	NEW. JARRH TO REPLACE EXIST. AWS. ADD 860-LTE/700	
700 ANTENNA	3	-	NEW. JARRH TO REPLACE EXIST. 700. ADD 860-LTE/1900	
1900 ANTENNA	3	-	SHARED WITH 700. 860-LTE JARRH ANTENNAS	
860-CDMA ANTENNA	3	-	EXISTING TO REMAIN - 1 PER SECTOR	
860-LTE ANTENNA	3	-	SHARED WITH AWS, 1900, 700 JARRH ANTENNAS	
SIDE-BY-SIDE MTO BRACKET	3	-	COMMSCOPE BSAMMT-5805-2-3	

- NOTES:
- ITEMS SHOWN ARE FOR MAJOR DESIGN ELEMENTS ONLY. REFER TO VERIZON WIRELESS B.O.M. FOR ALL MANUFACTURER PART NUMBERS AND ACCESSORY ITEMS REQUIRED FOR A COMPLETE INSTALLATION.
 - EXISTING AWS, 700 & 1900 JUMPERS TO BE REPLACED; PROVIDE TERMINATION CAPS ON ALL UN-USED ANTENNA PORTS.

ALPHA SECTOR - VIEWED FROM REAR (TYP.) LAYOUT FOR ALL SECTORS



1 RF PLUMBING DIAGRAM Scale: N.T.S.

verizon
WIRELESS COMMUNICATIONS FACILITY

20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

On Air Engineering LLC
88 Forestry Road Blvd
Cold Spring, NY 10516
201-956-4004
oae@onair-engineering.com



DAVID W. NORWALK, P.E.
CT LICENSE NO. 22144

NO.	DATE	DESCRIPTION
1	10/23/19	ISSUED FOR PERMITS
2	11/15/19	ISSUED FOR PERMITS
3	11/15/19	ISSUED FOR PERMITS
4	11/15/19	ISSUED FOR PERMITS
5	11/15/19	ISSUED FOR PERMITS
6	11/15/19	ISSUED FOR PERMITS
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9	11/15/19	ISSUED FOR PERMITS
10	11/15/19	ISSUED FOR PERMITS

PROJECT NAME:
CBRS/850-LTE CARRIER ADD DESIGN EXHIBITS

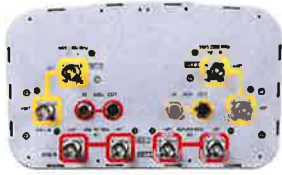
SITE NAME:
E NORWALK CT

SITE ADDRESS:
FIRST DIST. WATER DEPT. FILBERT RD. NORWALK, CT 06851

SHEET TITLE:
RF PLUMBING DIAGRAM & B.O.M.

SHEET NUMBER:
DE-5

JAHH-65B-R3B



8-port sector antenna, 2x 698–787, 2x 824–894 and 4x 1695–2360 MHz, 65° HPBW, 3x RET and low bands have diplexers. Internal SBT's on first LB(Port 1) and first HB(Port 5).

- Internal SBT on low and high band allow remote RET control from the radio over the RF jumper cable
- One RET for 700MHz, one RET for 850MHz, and one RET for both high bands to ensure same tilt level for 4x Rx or 4x MIMO
- Internal filter on low band and interleaved dipole technology providing for attractive, low wind load mechanical package
- Separate RS-485 RET input/output for low and high band

General Specifications

Antenna Type	Sector
Band	Multiband
Color	Light gray
Effective Projective Area (EPA), frontal	0.28 m ² 3.014 ft ²
Effective Projective Area (EPA), lateral	0.24 m ² 2.583 ft ²
Grounding Type	RF connector body grounded to reflector and mounting bracket
Performance Note	Outdoor usage Wind loading figures are validated by wind tunnel measurements described in white paper WP-112534-EN
RF Connector Interface	4.3-10 Female
RF Connector Location	Bottom
RF Connector Quantity, high band	4
RF Connector Quantity, low band	4
RF Connector Quantity, total	8

Remote Electrical Tilt (RET) Information, General

RET Interface	8-pin DIN Female 8-pin DIN Male
RET Interface, quantity	2 female 2 male

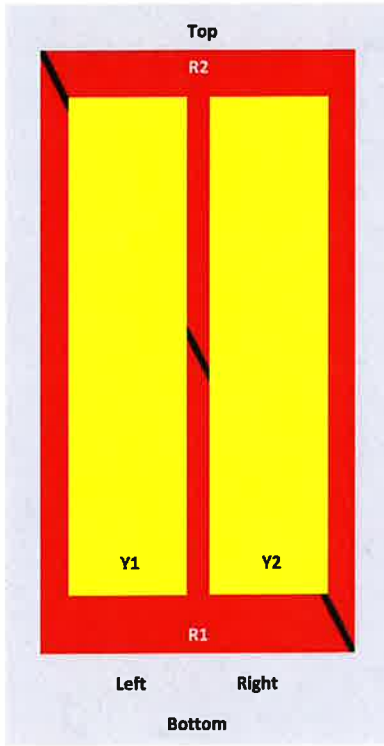
Dimensions

Width	350 mm 13.78 in
Length	1828 mm 71.969 in
Depth	208 mm 8.189 in

JAHH-65B-R3B

Array Layout

JAHH-65A-R3B JAHH-65B-R3B JAHH-65C-R3B



Array	Freq (MHz)	Comms	RET (SRET)	AISG RET UID
R1	698-787	1-2	1	ANXXXXXXXXXXXXXXX1
R2	824-894	3-4	2	ANXXXXXXXXXXXXXXX2
Y1	1695-2360	5-6	3	ANXXXXXXXXXXXXXXX3
Y2	1695-2360	7-8		

View from the front of the antenna
(Sizes of colored boxes are not true depictions of array sizes)

Electrical Specifications

Operating Frequency Band 1695 – 2360 MHz | 698 – 787 MHz | 824 – 894 MHz

Remote Electrical Tilt (RET) Information, Electrical

Protocol 3GPP/AISG 2.0 (Single RET)

Power Consumption, idle state, maximum 2 W

Power Consumption, normal conditions, maximum 13 W

Input Voltage 10–30 Vdc

Internal Bias Tee Port 1 | Port 5

Internal RET High band (1) | Low band (2)

JAHH-65B-R3B

Electrical Specifications

Frequency Band, MHz	698–787	824–894	1695–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	14.5	15.8	18	18.4	18.5	18.8
Beamwidth, Horizontal, degrees	67	65	63	63	65	68
Beamwidth, Vertical, degrees	12.4	10.5	5.7	5.2	4.9	4.4
Beam Tilt, degrees	2–14	2–14	0–10	0–10	0–10	0–10
USLS (First Lobe), dB	18	18	20	20	21	23
Front-to-Back Ratio at 180°, dB	32	34	31	35	36	38
Isolation, Cross Polarization, dB	25	25	25	25	25	25
Isolation, Inter-band, dB	30	30	30	30	30	30
VSWR Return loss, dB	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port at 50° C, maximum, watts	200	200	300	300	300	250

Electrical Specifications, BASTA

Frequency Band, MHz	698–787	824–894	1695–1880	1850–1990	1920–2200	2300–2360
Gain by all Beam Tilts, average, dBi	14.3	14.9	17.6	18.1	18.2	18.5
Gain by all Beam Tilts Tolerance, dB	±0.3	±0.5	±0.6	±0.4	±0.5	±0.6
Gain by Beam Tilt, average, dBi	2° 14.3 8° 14.3 14° 14.3	2° 15.0 8° 14.9 14° 15.4	0° 17.2 5° 17.6 10° 17.6	0° 17.6 5° 18.2 10° 18.2	0° 17.7 5° 18.3 10° 18.3	0° 17.9 5° 18.7 10° 18.7
Beamwidth, Horizontal Tolerance, degrees	±1.2	±1.4	±4	±2.4	±2.9	±2.7
Beamwidth, Vertical Tolerance, degrees	±0.9	±0.5	±0.3	±0.2	±0.3	±0.1
USLS, beampeak to 20° above beampeak, dB	18	17	17	18	19	18
Front-to-Back Total Power at 180° ± 30°, dB	25	24	26	29	27	29
CPR at Boresight, dB	22	23	20	21	21	24
CPR at Sector, dB	11	12	11	11	11	8

Material Specifications

Radiator Material

Aluminum | Low loss circuit board

Radome Material

Fiberglass, UV resistant

JAHH-65B-R3B

Reflector Material Aluminum

Mechanical Specifications

Wind Loading at Velocity, frontal	301.0 N @ 150 km/h 67.7 lbf @ 150 km/h
Wind Loading at Velocity, lateral	254.0 N @ 150 km/h 57.1 lbf @ 150 km/h
Wind Loading at Velocity, maximum	143.4 lbf @ 150 km/h 638.0 N @ 150 km/h
Wind Speed, maximum	241 km/h 149.75 mph

Packaging and Weights

Width, packed	456 mm 17.953 in
Depth, packed	357 mm 14.055 in
Length, packed	1975 mm 77.756 in
Net Weight, without mounting kit	29.2 kg 64.375 lb
Weight, gross	42.5 kg 93.696 lb

Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Above maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
ROHS	Compliant/Exempted



Included Products

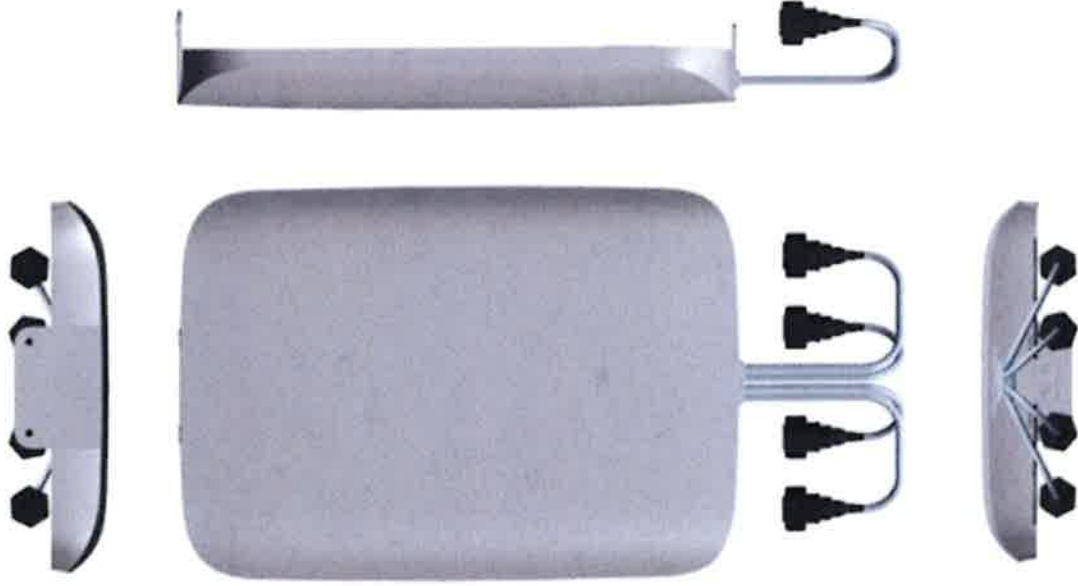
BSAMNT-3 — Wide Profile Antenna Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

* Footnotes

Performance Note Severe environmental conditions may degrade optimum performance

[CBRS] Clip-on Antenna Specifications

VZW accepted IP45 in FLD, but IP55 is Samsung Spec.

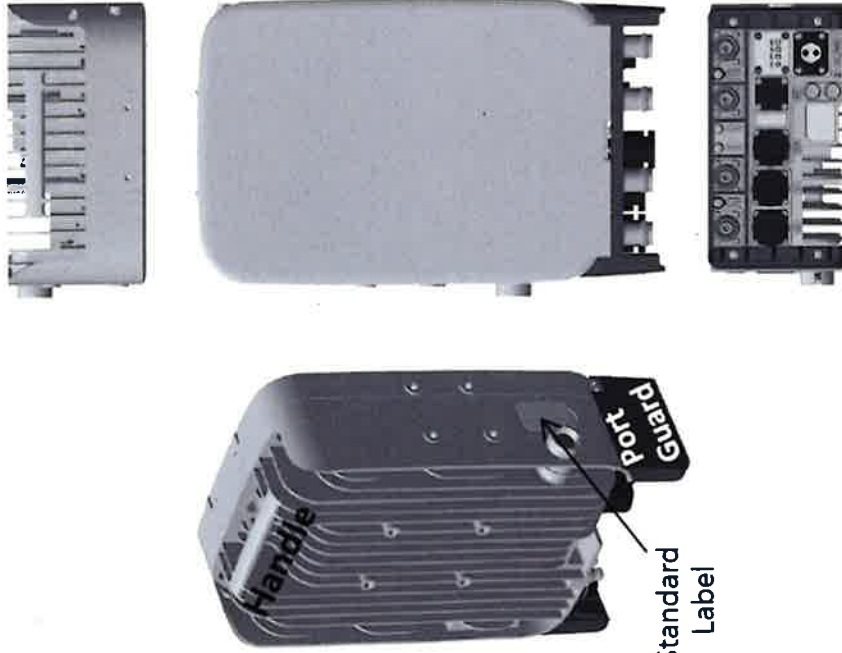


Items	Clip-on Antenna, BASTA**
Antenna Gain	12.5 ± 0.5 dBi (Max 13 dBi)
Horizontal BW (-3dB)	65° ± 5°
Vertical BW (-3dB)	17° ± 3°
Electrical Tilt	8° (fixed) ± 2°
Front-to-Back Ratio	> 25 dB
Port-to-Port Tracking	< 3 dB
VSWR	< 1.5
Isolation	> 25 dB
Ingress Protection	IP55
Size	220(W) × 313(H) × 34.3(D) mm (*) (8.7 × 12.3 × 1.4 inch.)
Weight	< 2.0 kg [Typ. 1.3 kg]
It is required that the radio should be weatherproofed properly with JMA WPS Boot with external antenna or with Weatherproof Boot for clip-on antennas.	

Antenna includes integrated cable with connector
 * Design is subject to minor change

** Ant. spec. follows NGMN recommendations on Base Station Antenna Standards (BASTA). For example, 'mean ± tolerance of 86.6%' is applied to double-sided specification of statistical RF parameters.

[CBRS RRH] Spec.



Current Size: 216 x 307 x 105.5 mm (6.99L)
 (8.5 x 12.1 x 4.1 inch., excluding Port Guard)

Design is subject to minor change

Item	Specification
Band	Band 48 (3.5 GHz)
Frequency	3550~3700 MHz
IBW	150 MHz
OBW	80 MHz
# of Carriers	5/10/15/20 MHz x 4 carriers
RF Chain	4TX / 4RX
RF Output Power & EIRP	4 path x 5 W (Total: 20 W = 43 dBm) (EIRP: 47 dBm / 10 MHz)
RX Sensitivity	Typical : -101.5 dBm @ 1 Rx (3GPP 36.104, Wide Area)
Modulation	256-QAM support (1024-QAM with 1~2dB power back-off) -48 VDC (-38 to -57 VDC, 1 SKU), with clip-on AC-DC converter (Option)
Input Power	About 160 Watt @ 100% RF load, typical conditions
Power Consumption	Under 7L (w/o Antenna), Under 9.6L (with antenna)
Volume	Under 8.0 kg (18.64 lb) (w/o Antenna), Under 10.5 Kg (with ant.)
Weight	-40°C (-40°F) ~ 55°C (131°F) (W/o solar load)
Operating Temperature	Natural convection
Cooling	3GPP 36.104 Category A [B48] : FCC 47 CFR 96.41 e)
Unwanted Emission	20km, 2 ports (9.8Gbps x 2), SFP, single mode, duplex or Bi-Di
Optic Interface	Not supported
CPRI Cascade	4
# of Antenna Port	4
External Alarm (UDA)	AISG 2.2
RET	Not supported
TMA & built-in Bias-T I//F and PIM cancellation	Pole, wall, tower, back to back, side by side (for external ant), 3 RRH with Clip-on Antenna on the pole
Mounting Options	Integrated (Clip-on) antenna (Option), External antenna (Option)
Antenna Type	Not Supported (HW Resource reserved for 1 Guard Band NB-IoT per LTE carrier)
NB-IoT	TX/RX Support
Spectrum Analyzer	4
External Alarm (UDA)	Support with S/W upgrade
5G NR	Support with S/W upgrade
XRAN	

SAMSUNG

Dual-Band Radio Unit 700/850MHz (B13/B5)

RFV01U-D2A

Samsung's RFV01U-D2A is a compact remote Radio Unit (RU) designed for deployments that require flexibility in installation and rapid onlining, without compromising on coverage, capacity or operational expenses.



The RFV01U-D2A RU targets dual-band support across Band 13 (700MHz) and Band 5 (850MHz), making it an ideal product for broad coverage footprints across multiple common low-end, long-range frequencies.

The RU handles all Radio Frequency (RF) processing in a single, compact unit, and is designed to interface via CPRI with Samsung's CDU baseband offerings, in both distributed- and central-RAN configurations.

In addition to its minimal footprint and ease of installation, the RU is also designed to reduce cost of ownership through its integrated spectrum analyzer, which allows for remote RF monitoring, greatly reducing the need for on-site maintenance visits.

Features and Benefits

- Dual-band support for broad frequency coverage
- Minimal footprint reduces site costs
- Rapid, easy installation
- Flexibly deployable in any location
- Remote RF monitoring capability
- Convection cooled, silent operation

Key Technical Specifications

Duplex Type: FDD

Operating Frequencies:

B13: DL(746-756MHz)/UL(777-787MHz)

B5: DL(869-894MHz)/UL(824-849MHz)

Instantaneous Bandwidth: 10MHz(B13) + 25MHz(B5)

RF Chain: 4T4R/2T4R/2T2R

Output Power: Total 320W

DU-RU Interface: CPRI (10Gbps)

Dimensions: 380 x 380 x 207mm (29.9L)

Weight: 31.9kg

Input Power: -48V DC

Operating Temp.: -40 - 55°(w/o solar load)

Cooling: Natural convection

SAMSUNG

Dual-Band Radio Unit

AWS/PCS (B66/B2)

RFV01U-D1A

Samsung's RFV01U-D1A is a compact remote Radio Unit (RU) designed for deployments that require flexibility in installation and rapid onlining, without compromising on coverage, capacity or operational expenses.



The RFV01U-D1A RU targets dual-band support across Band 66 (AWS) and Band 2 (PCS), making it an ideal product for broad coverage footprints across multiple common mid-range frequencies.

The RU handles all Radio Frequency (RF) processing in a single, compact unit, and is designed to interface via CPRI with Samsung's CDU baseband offerings, in both distributed- and central-RAN configurations.

In addition to its minimal footprint and ease of installation, the RU is also designed to reduce cost of ownership through its integrated spectrum analyzer, which allows for remote RF monitoring, greatly reducing the need for on-site maintenance visits.

Features and Benefits

- Dual-band support for broad frequency coverage
- Minimal footprint reduces site costs
- Rapid, easy installation
- Flexibly deployable in any location
- Remote RF monitoring capability
- Convection cooled, silent operation
- Built-in Broadcast Auxiliary Services (BAS) filter ensures compliant AWS operation without impacting footprint

Key Technical Specifications

Duplex Type: FDD

Operating Frequencies:

B66: DL(2,110-2,180MHz)/UL(1,710-1,780MHz)

B2: DL(1,930-1,990MHz)/UL(1,850-1,910MHz)

Instantaneous Bandwidth:

70MHz(B66) + 60MHz(B2)

RF Chain: 4T4R/2T4R/2T2R

Output Power: Total 320W

DU-RU Interface: CPRI (10Gbps)

Dimensions: 380 x 380 x 255mm (36.8L)

Weight: 38.3kg

Input Power: -48V DC

Operating Temp.: -40 - 55°(w/o solar load)

Cooling: Natural convection

ATTACHMENT 3

Site Name: E NORWALK CT
 Cumulative Power Density

Operator	Operating Frequency (MHz)	Number of Trans.	ERP Per Trans. (watts)	Total ERP (watts)	Distance to Target (feet)	Calculated Power Density (mW/cm ²)	Maximum Permissible Exposure* (mW/cm ²)	Fraction of MPE (%)
VZW PCS	1970	1	1593	1592.94	117	0.0418	1.0	4.18%
VZW Cellular CDMA	869	1	500	500	117	0.0131	0.5793333333	2.27%
VZW Cellular LTE	880	1	500	500	117	0.0131	0.5866666667	2.24%
VZW AWS	2145	1	1633	1633.42	117	0.0429	1.0	4.29%
VZW 700	746	1	613	613.19	117	0.0161	0.4973333333	3.24%
VZW CBRS	3550	1	50	50	117	0.0013	2.3666666667	0.06%

Total Percentage of Maximum Permissible Exposure

16.28%

*Guidelines adopted by the FCC on August 1, 1996, 47 CFR Section 1.13101 based on NCRP Report 86, 1986 and generally on ANSI/IEEE C95.1-1992

MHz = Megahertz

mW/cm² = milliwatts per square centimeter

ERP = Effective Radiated Power

Absolute worst case maximum values used, including the following assumptions:

1. closest accessible point is distance from antenna to base of pole;
2. continuous transmission from all available channels at full power for indefinite time period; and,
3. all RF energy is assumed to be directed solely to the base of the pole.

ATTACHMENT 4

STRUCTURAL ANALYSIS REPORT

FOR

E NORWALK CT
FIRST DIST. WATER DEPT.
FILBERT RD
NORWALK, CT 06851



PREPARED FOR:

verizon^v

WIRELESS COMMUNICATIONS FACILITY
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

On Air Engineering, LLC

88 FOUNDRY POND ROAD
COLD SPRING, NY 10516
ONAIR@OPTONLINE.NET
201-456-4624



PBA ENGINEERING, PC
Structural Engineers

12 KULICK ROAD
FAIRFIELD, NEW JERSEY 07004-3363
PHONE: (973) 276-1700
FAX: (973) 276-9766

PROJECT NO. N-528
DATE: 3/20/2020

CONTENTS

1. – PURPOSE
2. – REFERENCES
3. – BUILDING CODES
4. – EXISTING STRUCTURE & FIELD OBSERVATIONS
5. – PROPOSED VERIZON ANTENNA/EQUIPMENT CONFIGURATION
6. – RESULTS
7. – CONCLUSION
8. – APPENDIX A (CALCULATIONS)

1. PURPOSE

The purpose of this analysis is to determine whether the existing water tank structure located at Filbert Rd, Norwalk, Connecticut, is adequate to support the proposed modifications to Verizon's antennas and equipment.

2. REFERENCES

1. Construction drawings prepared by On Air Engineering, LLC, dated October 25, 2019.
2. Existing tank elevation drawing prepared by Pittsburgh-Des Moines Steel Co., dated September 14, 1962. This document was provided by Verizon.

3. BUILDING CODES

1. 2018 Connecticut State Building Code
2. 2015 International Building Code
3. ASCE/SEI 7-10 (Minimum Design Loads for Buildings and Other Structures)
4. ANSI/AWWA D100-11 (Welded Carbon Steel Tanks for Water Storage)

4. EXISTING STRUCTURE & FIELD OBSERVATIONS

The existing water tank structure is 126.5 feet in height with a diameter of 77 feet. The cross-braced column supported elevated tank consists of welded steel plates that form the standpipe and reservoir. The reservoir is supported by 10 steel column legs braced with steel rods. The antennas and equipment are currently supported by steel pipe posts welded directly to the tank support legs. See construction documents referenced above for more detail on the existing support members.

On Air Engineering, LLC, performed an onsite visual review of the existing condition on May 1, 2019. The tank appeared to be in good condition. The tank was observed to be supporting only Verizon equipment. Verizon's antennas are vertically stacked with (2) antennas per mast and (2) masts per sector for a total of (4) antennas per sector. Verizon has existing RRH's and Raycap OVP's located at the base of each antenna mast.

5. PROPOSED VERIZON ANTENNA/EQUIPMENT CONFIGURATION

- Replace (6) existing panel antennas with (6) new antennas utilizing "side-by-side" (SBS) mounting brackets (2 antennas per bracket located at each sector, using an existing pipe mast)
- Replace (9) existing remote radio heads (RRH's) (3 per sector) with (6) new "dual band" RRH's (2 per sector)
- Replace (3) existing panel antennas with (3) new integrated antennas on existing masts (1 per sector).
- Existing (3) panel antennas to remain (1 per sector)
- Existing (6) Raycap 'Sector' OVP's (2 per sector) to be replaced with (6) new Sector OVP's (2 per sector)

6. RESULTS

1. Water Tank

The existing water tank weight without water is approximately 445,800 pounds. The Verizon equipment weight is approximately 6,156 pounds which is inclusive of all sectors with proposed changes. Thus, the gravity load is increased by 1.38 percent. If the tank were full then the gravity load percentage increase would be lower. The lateral forces applied from the tank and its contents are detailed in the attached calculations which indicate that seismic force controls rather than wind forces. The percentage increase in seismic lateral force applied from the proposed Verizon changes is 0.07 percent.

2. Antenna/Equipment Mounts

Based on our analysis, all of the existing pipe posts supporting the antennas and equipment require bracing, as the existing pipe posts (worst case) are overstressed by 65.1 percent for the proposed modification. The bracing is detailed in the construction documents referenced previously. The existing pipe posts with the braces installed will be stressed to 26.7 percent of their capacity with the proposed modifications. The new braces will be stressed to 39.6 percent of their capacity with the proposed modifications.

7. CONCLUSION

According to the 2015 IBC/IEBC, which is referenced in the 2018 Connecticut Building Code, a 5% or less increase in gravity loads and 10% or less increase in lateral loads does not require an analysis of the existing water tank as stated in sections 707.2 and 807.5. Since the increase

in each of those forces are less than 5 and 10 percent respectively, the existing water tank is found to be adequate to support the modifications to the Verizon equipment as stated in this report. The members supporting the telecommunications equipment were all found to be adequate to support the modifications as seen in the calculations once the new braces are installed.

This analysis is based on the information provided to our office and is assumed to correctly depict the existing condition. The existing water tank structure and foundation are assumed to be installed properly and in a professional manner per the original design documents. From the time the tank was initially constructed, it is assumed that the tank has undergone regular maintenance and will continue in the same manner.

Should you have any questions concerning the items contained within this report, please do not hesitate to contact our office.

Sincerely,
PBA ENGINEERING, P.C.



Paul C. Beck, P.E.
Connecticut Professional Engineer
License No: 12949

PCB/mf

L:\WP61\ULTRICELLULAR JOBSW-528 Structural Analysis Report, Verizon, E Norwalk CT, First Dist. Water Dept., Filbert Rd, Norwalk, CT (Rev 3-20-20).docx

APPENDIX

(APPENDIX N) MUNICIPALITY - SPECIFIC STRUCTURAL DESIGN PARAMETERS

Municipality	Ground Snow Load (psf)	Wind Design Parameters											Hurricane-Prone Regions
		MCE Spectral Acceleration s (%g)		Ultimate Design Wind Speeds, V_{ult} (mph)			Nominal Design Wind Speeds, V_{asd} (mph)			Wind-Borne Debris Regions ¹			
		S_s	S_1	Risk Cat. I	Risk Cat. II	Risk Cat III-IV	Risk Cat. I	Risk Cat. II	Risk Cat. III-IV	Risk Cat. II & III except Occup I-2	Risk Cat III Occup I-2 & Risk Cat. IV		
Montville	30	0.165	0.059	125	135	145	97	105	112		Type A	Yes	
Morris	35	0.187	0.065	110	120	125	85	93	97			Yes	
Naugatuck	30	0.190	0.064	110	125	135	85	97	105			Yes	
New Britain	30	0.183	0.064	115	125	135	89	97	105			Yes	
New Canaan	30	0.240	0.068	110	120	130	85	93	101			Yes	
New Fairfield	35	0.212	0.067	105	115	125	81	89	97				
New Hartford	40	0.180	0.065	110	120	130	85	93	101			Yes	
New Haven	30	0.186	0.062	115	125	135	89	97	105		Type C	Yes	
Newington	30	0.182	0.064	115	125	135	89	97	105			Yes	
New London	30	0.161	0.058	125	135	145	97	105	112	Type B	Type A	Yes	
New Milford	35	0.198	0.066	105	115	125	81	89	97				
Newtown	30	0.208	0.066	110	120	130	85	93	101			Yes	
Norfolk	40	0.175	0.065	105	115	125	81	89	97				
North Branford	30	0.179	0.061	120	130	140	93	101	108			Yes	
North Canaan	40	0.173	0.065	105	115	120	81	89	93				
North Haven	30	0.184	0.062	115	125	135	89	97	105			Yes	
North Stonington	30	0.163	0.059	125	135	145	97	105	112		Type A	Yes	
Norwalk	30	0.232	0.067	110	120	130	85	93	101			Yes	
Norwich	30	0.168	0.060	125	135	145	97	105	112		Type A	Yes	
Old Lyme	30	0.164	0.059	125	135	145	97	105	112	Type B	Type A	Yes	
Old Saybrook	30	0.164	0.059	125	135	145	97	105	112	Type B	Type A	Yes	
Orange	30	0.192	0.063	115	125	135	89	97	105			Yes	
Oxford	30	0.196	0.064	110	125	130	85	97	101			Yes	
Plainfield	35	0.170	0.061	125	135	145	97	105	112		Type A	Yes	
Plainville	35	0.184	0.064	115	125	135	89	97	105			Yes	
Plymouth	35	0.186	0.064	110	120	130	85	93	101			Yes	
Pomfret	40	0.172	0.063	120	130	140	93	101	108			Yes	
Portland	30	0.180	0.063	115	130	135	89	101	105			Yes	
Preston	30	0.167	0.060	125	135	145	97	105	112		Type A	Yes	
Prospect	30	0.188	0.064	115	125	135	89	97	105			Yes	
Putnam	40	0.172	0.063	120	130	140	93	101	108			Yes	
Redding	30	0.220	0.067	110	120	130	85	93	101			Yes	
Ridgefield	30	0.230	0.068	110	120	125	85	93	97			Yes	
Rocky Hill	30	0.181	0.063	115	125	135	89	97	105			Yes	
Roxbury	35	0.197	0.065	110	120	125	85	93	97			Yes	
Salem	30	0.170	0.060	120	135	140	93	105	108		Type A	Yes	
Salisbury	40	0.173	0.065	105	115	120	81	89	93				
Scotland	30	0.172	0.061	120	130	140	93	101	108			Yes	
Seymour	30	0.194	0.064	115	125	135	89	97	105			Yes	
Sharon	40	0.179	0.065	105	115	120	81	89	93				
Shelton	30	0.199	0.064	115	125	135	89	97	105			Yes	
Sherman	35	0.202	0.066	105	115	120	81	89	93				

WIND LOAD ON TELECOM EQUIPMENT

MecaWind Pro v2.2.8.2 per ASCE 7-10

Developed by MECA Enterprises, Inc. Copyright www.mecaenterprises.com

Date : 5/31/2019	Project No. : N-528
Company Name : PBA Engineering	Designed By : WJZ
Address : 12 Kulick Rd	Description : Antenna Mounts
City : Fairfield	Customer Name : OAE
State : NJ	Proj Location : East Norwalk, CT
File Location: C:\Users\BillZ\AppData\Roaming\MecaWind\Default.wnd	

Input Parameters: Other Structures & Building Appurtances MWFRS (Ch 29)

Basic Wind Speed(V) = 120.00 mph	Exposure Category = C
Structural Category = II	Flexible Structure = No
Natural Frequency = N/A	Kd Directional Factor = 0.85
Importance Factor = 1.00	Zg = 900.00 ft
Alpha = 9.50	Bt = 1.00
At = 0.11	Bm = 0.65
Am = 0.15	l = 500.00 ft
Cc = 0.20	Zmin = 15.00 ft
Epsilon = 0.20	Ht- Grade to Top of Sign= 117.00 ft
B - Horizontal Dim. = 1.15 ft	S - Vertical Sign Dim. = 6.00 ft
W - Sign Depth = 0.68 ft	Sh- Ratio of S / Ht = 0.05
Bs- Ratio of B / S = 0.19	Elb - Base Elevation = .00 ft
E - Solidity Ratio = 100.00 %	

Gust Factor Calculations

Gust Factor Category I Rigid Structures - Simplified Method
 Gust1: For Rigid Structures (Nat. Freq.>1 Hz) use 0.85 = 0.85

Gust Factor Category II Rigid Structures - Complete Analysis

Zm: 0.6*Ht	= 70.20 ft
lzm: Cc*(33/Zm)^0.167	= 0.18
Lzm: 1*(Zm/33)^Epsilon	= 581.48 ft
Q: (1/(1+0.63*((B+Ht)/Lzm)^0.63))^0.5	= 0.90
Gust2: 0.925*((1+1.7*lzm*3.4*Q)/(1+1.7*3.4*lzm))	= 0.88

Gust Factor Summary
 Not a Flexible Structure use the Lessor of Gust1 or Gust2 = 0.85

Design Wind Pressure - Other Structures

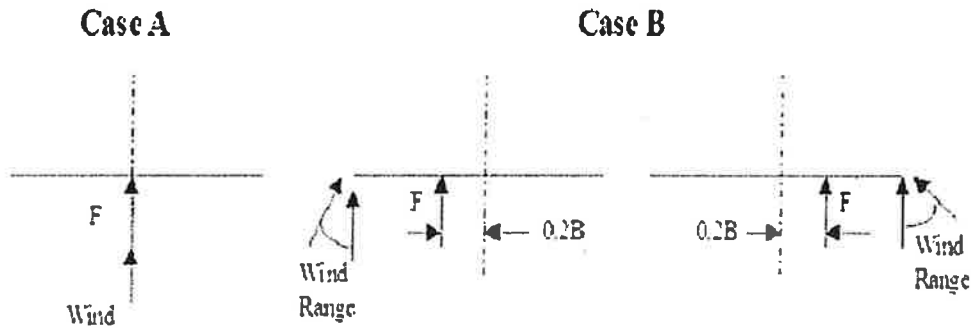
Elev ft	Kz	Kzt	qz psf	W_Pres_Cf (1.85) psf
117.00	1.31	1.00	40.990	64.46
116.00	1.31	1.00	40.916	64.34
115.00	1.30	1.00	40.842	64.22
114.00	1.30	1.00	40.767	64.11
113.00	1.30	1.00	40.691	63.99
112.00	1.30	1.00	40.615	63.87
111.00	1.29	1.00	40.538	63.75
110.00	1.29	1.00	40.461	63.63
109.00	1.29	1.00	40.383	63.50
108.00	1.29	1.00	40.305	63.38
107.00	1.28	1.00	40.226	63.26
106.00	1.28	1.00	40.147	63.13
105.00	1.28	1.00	40.067	63.01
104.00	1.28	1.00	39.986	62.88
103.00	1.27	1.00	39.905	62.75
102.00	1.27	1.00	39.823	62.62
101.00	1.27	1.00	39.741	62.49
100.00	1.27	1.00	39.657	62.36
99.00	1.26	1.00	39.574	62.23
98.00	1.26	1.00	39.489	62.10
97.00	1.26	1.00	39.404	61.96
96.00	1.25	1.00	39.318	61.83
95.00	1.25	1.00	39.231	61.69
94.00	1.25	1.00	39.144	61.55
93.00	1.25	1.00	39.056	61.42
92.00	1.24	1.00	38.967	61.28
91.00	1.24	1.00	38.878	61.14
90.00	1.24	1.00	38.787	60.99
89.00	1.23	1.00	38.696	60.85
88.00	1.23	1.00	38.604	60.71
87.00	1.23	1.00	38.512	60.56
86.00	1.23	1.00	38.418	60.41
85.00	1.22	1.00	38.323	60.26

84.00	1.22	1.00	38.228	60.11
83.00	1.22	1.00	38.132	59.96
82.00	1.21	1.00	38.035	59.81
81.00	1.21	1.00	37.937	59.66
80.00	1.21	1.00	37.837	59.50
79.00	1.20	1.00	37.737	59.34
78.00	1.20	1.00	37.636	59.18
77.00	1.20	1.00	37.534	59.02
76.00	1.19	1.00	37.431	58.86
75.00	1.19	1.00	37.327	58.70
74.00	1.19	1.00	37.222	58.53
73.00	1.18	1.00	37.115	58.36
72.00	1.18	1.00	37.007	58.19
71.00	1.18	1.00	36.899	58.02
70.00	1.17	1.00	36.789	57.85
69.00	1.17	1.00	36.677	57.68
68.00	1.17	1.00	36.565	57.50
67.00	1.16	1.00	36.451	57.32
66.00	1.16	1.00	36.336	57.14
65.00	1.16	1.00	36.219	56.95
64.00	1.15	1.00	36.101	56.77
63.00	1.15	1.00	35.982	56.58
62.00	1.14	1.00	35.861	56.39
61.00	1.14	1.00	35.738	56.20
60.00	1.14	1.00	35.614	56.00
59.00	1.13	1.00	35.488	55.81
58.00	1.13	1.00	35.361	55.60
57.00	1.12	1.00	35.231	55.40
56.00	1.12	1.00	35.100	55.20
55.00	1.12	1.00	34.967	54.99
54.00	1.11	1.00	34.833	54.77
53.00	1.11	1.00	34.696	54.56
52.00	1.10	1.00	34.557	54.34
51.00	1.10	1.00	34.416	54.12
50.00	1.09	1.00	34.273	53.89
49.00	1.09	1.00	34.127	53.67
48.00	1.08	1.00	33.980	53.43
47.00	1.08	1.00	33.829	53.20
46.00	1.07	1.00	33.676	52.96
45.00	1.07	1.00	33.521	52.71
44.00	1.06	1.00	33.363	52.46
43.00	1.06	1.00	33.202	52.21
42.00	1.05	1.00	33.038	51.95
41.00	1.05	1.00	32.870	51.69
40.00	1.04	1.00	32.700	51.42
39.00	1.04	1.00	32.526	51.15
38.00	1.03	1.00	32.349	50.87
37.00	1.03	1.00	32.168	50.58
36.00	1.02	1.00	31.983	50.29
35.00	1.01	1.00	31.794	50.00
34.00	1.01	1.00	31.600	49.69
33.00	1.00	1.00	31.402	49.38
32.00	1.00	1.00	31.199	49.06
31.00	0.99	1.00	30.992	48.73
30.00	0.98	1.00	30.778	48.40
29.00	0.98	1.00	30.559	48.05
28.00	0.97	1.00	30.334	47.70
27.00	0.96	1.00	30.103	47.34
26.00	0.95	1.00	29.865	46.96
25.00	0.95	1.00	29.619	46.58
24.00	0.94	1.00	29.366	46.18
23.00	0.93	1.00	29.104	45.77
22.00	0.92	1.00	28.833	45.34
21.00	0.91	1.00	28.552	44.90
20.00	0.90	1.00	28.260	44.44
19.00	0.89	1.00	27.957	43.96
18.00	0.88	1.00	27.640	43.46
17.00	0.87	1.00	27.309	42.94
16.00	0.86	1.00	26.963	42.40
15.00	0.85	1.00	26.599	41.83
14.00	0.85	1.00	26.599	41.83
13.00	0.85	1.00	26.599	41.83
12.00	0.85	1.00	26.599	41.83
11.00	0.85	1.00	26.599	41.83
10.00	0.85	1.00	26.599	41.83
9.00	0.85	1.00	26.599	41.83
8.00	0.85	1.00	26.599	41.83
7.00	0.85	1.00	26.599	41.83
6.00	0.85	1.00	26.599	41.83

5.00	0.85	1.00	26.599	41.83
4.00	0.85	1.00	26.599	41.83
3.00	0.85	1.00	26.599	41.83
2.00	0.85	1.00	26.599	41.83
1.00	0.85	1.00	26.599	41.83

Note: W_{Pres_Cf} is Wind Pressure based on C_f (Force Coefficient)

Figure 29.4-1: Wind Loads for Solid Signs & Freestanding Walls



C_f - Force Coefficient	=	1.85
R_d - Reduction Factor $(1 - (1 - E)^{1.5})$	=	1.00
K_z	=	1.31
K_{zt}	=	1.00
Q_z	=	40.99 psf
Wind Pressure at Elevation 117 ft	=	64.46 psf ←

- Notes: 1) Signs with openings comprising < 30% of gross area are considered solid signs
 2) Force Coefficients for solid signs with openings shall be multiplied by R_d
 3) Case C only applies when $B_s \geq 2$

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Title Block Line 6

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Fig. #: KW-06000304

PBA ENGINEERING, P.C.

DESCRIPTION: Exist Pipe Post Supporting New Equipment

Load Combination Segment Length	Span #	Max Stress Ratios		Summary of Moment Values						Summary of Shear Values			
		M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
Dsgn. L = 3.00 ft	1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 10.25 ft	2		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 4.75 ft	3		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
+D+Lr+H													
Dsgn. L = 3.00 ft	1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 10.25 ft	2		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 4.75 ft	3		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
+D+S+H													
Dsgn. L = 3.00 ft	1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 10.25 ft	2		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 4.75 ft	3		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
+D+0.750Lr+0.750L+H													
Dsgn. L = 3.00 ft	1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 10.25 ft	2		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 4.75 ft	3		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
+D+0.750L+0.750S+H													
Dsgn. L = 3.00 ft	1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 10.25 ft	2		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 4.75 ft	3		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
+D+0.60W+H													
Dsgn. L = 3.00 ft	1	0.029	0.007	0.15		0.15	8.84	5.29	1.27	1.00	0.11	26.25	15.72
Dsgn. L = 10.25 ft	2	0.267	0.034	0.15	-1.41	1.41	8.84	5.29	3.00	1.00	0.54	26.25	15.72
Dsgn. L = 4.75 ft	3	0.267	0.021		-1.41	1.41	8.84	5.29	1.00	1.00	0.33	26.25	15.72
+D+0.70E+H													
Dsgn. L = 3.00 ft	1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 10.25 ft	2		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 4.75 ft	3		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
+D+0.750Lr+0.750L+0.450W+H													
Dsgn. L = 3.00 ft	1	0.022	0.005	0.12		0.12	8.84	5.29	1.27	1.00	0.08	26.25	15.72
Dsgn. L = 10.25 ft	2	0.200	0.026	0.12	-1.06	1.06	8.84	5.29	3.00	1.00	0.40	26.25	15.72
Dsgn. L = 4.75 ft	3	0.200	0.016		-1.06	1.06	8.84	5.29	1.00	1.00	0.25	26.25	15.72
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 3.00 ft	1	0.022	0.005	0.12		0.12	8.84	5.29	1.27	1.00	0.08	26.25	15.72
Dsgn. L = 10.25 ft	2	0.200	0.026	0.12	-1.06	1.06	8.84	5.29	3.00	1.00	0.40	26.25	15.72
Dsgn. L = 4.75 ft	3	0.200	0.016		-1.06	1.06	8.84	5.29	1.00	1.00	0.25	26.25	15.72
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 3.00 ft	1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 10.25 ft	2		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 4.75 ft	3		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
+0.60D+0.60W+0.60H													
Dsgn. L = 3.00 ft	1	0.029	0.007	0.15		0.15	8.84	5.29	1.27	1.00	0.11	26.25	15.72
Dsgn. L = 10.25 ft	2	0.267	0.034	0.15	-1.41	1.41	8.84	5.29	3.00	1.00	0.54	26.25	15.72
Dsgn. L = 4.75 ft	3	0.267	0.021		-1.41	1.41	8.84	5.29	1.00	1.00	0.33	26.25	15.72
+0.60D+0.70E+0.60H													
Dsgn. L = 3.00 ft	1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 10.25 ft	2		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 4.75 ft	3		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
W Only	1	0.0028	1.640	W Only	0.0000	0.000
	2	0.0000	1.640		-0.0605	7.243
W Only	3	0.4689	4.750		0.0000	7.243

Vertical Reactions

Load Combination	Support notation : Far left is #1				Values in KIPS
	Support 1	Support 2	Support 3	Support 4	
Overall MAXimum	0.180	-0.053	1.446		
Overall MINimum	0.081	-0.024	0.651		
+D+H					
+D+L+H					
+D+Lr+H					
+D+S+H					
+D+0.750Lr+0.750L+H					
+D+0.750L+0.750S+H					
+D+0.60W+H	0.108	-0.032	0.867		
+D+0.70E+H					
+D+0.750Lr+0.750L+0.450W+H	0.081	-0.024	0.651		
+D+0.750L+0.750S+0.450W+H	0.081	-0.024	0.651		

Project Title:
 Engineer:
 Project ID:
 Project Descr:

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Fig. #: KW-06000304

PBA ENGINEERING, P.C.

DESCRIPTION: Exist Pipe Post Supporting New Equipment

Load Combination	Support notation : Far left is #1				Values in KIPS
	Support 1	Support 2	Support 3	Support 4	
+D+0.750L+0.750S+0.5250E+H					
+0.60D+0.60W+0.60H	0.108	-0.032	0.867		
+0.60D+0.70E+0.60H					
D Only					
Lr Only					
L Only					
S Only					
W Only	0.180	-0.053	1.446		
E Only					
H Only					

Project Title:
 Engineer:
 Project ID:
 Project Descr:

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PBA ENGINEERING, P.C.

DESCRIPTION: Exist. Pipe Post Supporting Exist. Antenna w/ New RRH and OVP

CODE REFERENCES

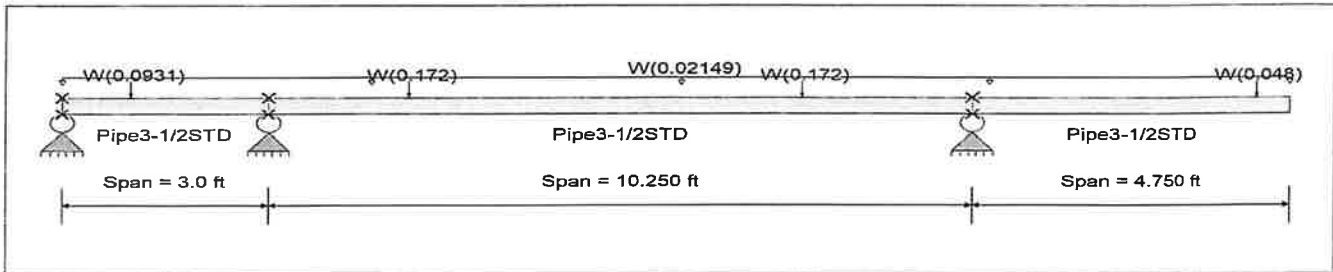
Calculations per AISC 360-10, IBC 2015, CBC 2016, ASCE 7-10

Load Combination Set : ASCE 7-10

Material Properties

Analysis Method : Allowable Strength Design
 Beam Bracing : Completely Unbraced
 Bending Axis : Major Axis Bending

Fy : Steel Yield : 35.0 ksi
 E : Modulus : 29,000.0 ksi



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
 Loads on all spans...
 Uniform Load on ALL spans : W = 0.06446 ksf, Tributary Width = 0.3333 ft

Load(s) for Span Number 1
 Point Load : W = 0.09310 k @ 1.0 ft, (New Raycap "OVP")

Load(s) for Span Number 2
 Point Load : W = 0.1720 k @ 7.750 ft, (Exist. 850 Antenna)
 Point Load : W = 0.1720 k @ 2.033 ft, (Exist. 850 Antenna)

Load(s) for Span Number 3
 Point Load : W = 0.0480 k @ 4.250 ft, (New CBRS/RRH)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.051 : 1	Maximum Shear Stress Ratio =	0.011 : 1
Section used for this span	Pipe3-1/2STD	Section used for this span	Pipe3-1/2STD
Ma : Applied	0.268 k-ft	Va : Applied	0.1720 k
Mn / Omega : Allow able	5.292 k-ft	Vn/Omega : Allow able	15.719 k
Load Combination	+D+0.60W+H	Load Combination	+D+0.60W+H
Location of maximum on span	10.250ft	Location of maximum on span	3.000 ft
Span # where maximum occurs	Span # 2	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.029 in	Ratio =	4,170 >=180
Max Upward Transient Deflection	-0.002 in	Ratio =	15,454 >=180
Max Downward Total Deflection	0.018 in	Ratio =	6951 >=180
Max Upward Total Deflection	-0.001 in	Ratio =	25758 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values					Summary of Shear Values			
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx
+D+H													
Dsgn. L =	3.00 ft	1		0.000			8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L =	10.25 ft	2		0.000			8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L =	4.75 ft	3		0.000			8.84	5.29	1.00	1.00	-0.00	26.25	15.72
+D+L+H													
Dsgn. L =	3.00 ft	1		0.000			8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L =	10.25 ft	2		0.000			8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L =	4.75 ft	3		0.000			8.84	5.29	1.00	1.00	-0.00	26.25	15.72

Project Title:
 Engineer:
 Project ID:
 Project Descr:

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PBA ENGINEERING, P.C.

DESCRIPTION: Exist Pipe Post Supporting Exist. Antenna w/ New RRH and OVP

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values						Summary of Shear Values			
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+Lr+H	Dsgn. L = 3.00 ft	1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
	Dsgn. L = 10.25 ft	2		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
	Dsgn. L = 4.75 ft	3		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
+D+S+H	Dsgn. L = 3.00 ft	1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
	Dsgn. L = 10.25 ft	2		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
	Dsgn. L = 4.75 ft	3		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
+D+0.750Lr+0.750L+H	Dsgn. L = 3.00 ft	1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
	Dsgn. L = 10.25 ft	2		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
	Dsgn. L = 4.75 ft	3		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
+D+0.750L+0.750S+H	Dsgn. L = 3.00 ft	1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
	Dsgn. L = 10.25 ft	2		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
	Dsgn. L = 4.75 ft	3		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
+D+0.60W+H	Dsgn. L = 3.00 ft	1	0.047	0.011		-0.25	0.25	8.84	5.29	2.07	1.00	0.17	26.25	15.72
	Dsgn. L = 10.25 ft	2	0.051	0.011	0.15	-0.27	0.27	8.84	5.29	1.80	1.00	0.17	26.25	15.72
	Dsgn. L = 4.75 ft	3	0.051	0.006		-0.27	0.27	8.84	5.29	1.00	1.00	0.09	26.25	15.72
+D+0.70E+H	Dsgn. L = 3.00 ft	1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
	Dsgn. L = 10.25 ft	2		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
	Dsgn. L = 4.75 ft	3		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
+D+0.750Lr+0.750L+0.450W+H	Dsgn. L = 3.00 ft	1	0.035	0.008		-0.19	0.19	8.84	5.29	2.07	1.00	0.13	26.25	15.72
	Dsgn. L = 10.25 ft	2	0.038	0.008	0.11	-0.20	0.20	8.84	5.29	1.80	1.00	0.13	26.25	15.72
	Dsgn. L = 4.75 ft	3	0.038	0.004		-0.20	0.20	8.84	5.29	1.00	1.00	0.07	26.25	15.72
+D+0.750L+0.750S+0.450W+H	Dsgn. L = 3.00 ft	1	0.035	0.008		-0.19	0.19	8.84	5.29	2.07	1.00	0.13	26.25	15.72
	Dsgn. L = 10.25 ft	2	0.038	0.008	0.11	-0.20	0.20	8.84	5.29	1.80	1.00	0.13	26.25	15.72
	Dsgn. L = 4.75 ft	3	0.038	0.004		-0.20	0.20	8.84	5.29	1.00	1.00	0.07	26.25	15.72
+D+0.750L+0.750S+0.5250E+H	Dsgn. L = 3.00 ft	1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
	Dsgn. L = 10.25 ft	2		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
	Dsgn. L = 4.75 ft	3		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
+0.60D+0.60W+0.60H	Dsgn. L = 3.00 ft	1	0.047	0.011		-0.25	0.25	8.84	5.29	2.07	1.00	0.17	26.25	15.72
	Dsgn. L = 10.25 ft	2	0.051	0.011	0.15	-0.27	0.27	8.84	5.29	1.80	1.00	0.17	26.25	15.72
	Dsgn. L = 4.75 ft	3	0.051	0.006		-0.27	0.27	8.84	5.29	1.00	1.00	0.09	26.25	15.72
+0.60D+0.70E+0.60H	Dsgn. L = 3.00 ft	1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
	Dsgn. L = 10.25 ft	2		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
	Dsgn. L = 4.75 ft	3		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
W Only	1	0.0000	0.000	W Only	-0.0023	1.860
W Only	2	0.0295	5.125	W Only	0.0000	1.860
W Only	3	0.0191	4.750	W Only	-0.0013	0.728

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	-0.043	0.487	0.428	
Overall MINimum	-0.019	0.219	0.192	
+D+H				
+D+L+H				
+D+Lr+H				
+D+S+H				
+D+0.750Lr+0.750L+H				
+D+0.750L+0.750S+H				
+D+0.60W+H	-0.026	0.292	0.257	
+D+0.70E+H				
+D+0.750Lr+0.750L+0.450W+H	-0.019	0.219	0.192	
+D+0.750L+0.750S+0.450W+H	-0.019	0.219	0.192	
+D+0.750L+0.750S+0.5250E+H				
+0.60D+0.60W+0.60H	-0.026	0.292	0.257	

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Title Block Line 6

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Steel Beam

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PBA ENGINEERING, P.C.

DESCRIPTION: Exist. Pipe Post Supporting Exist. Antenna w/ New RRH and OVP

Vertical Reactions	Support notation : Far left is #1				Values in KIPS
	Support 1	Support 2	Support 3	Support 4	
Load Combination					
+0.60D+0.70E+0.60H					
D Only					
Lr Only					
L Only					
S Only					
W Only	-0.043	0.487	0.428		
E Only					
H Only					

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Title Block Line 6

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Steel Beam

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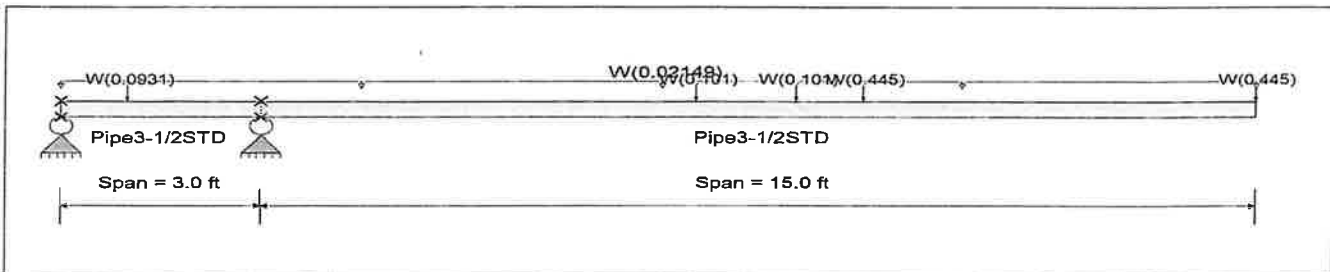
DESCRIPTION: Exist. Pipe Post Supporting New Equipment Unbraced

CODE REFERENCES

Calculations per AISC 360-10, IBC 2015, CBC 2016, ASCE 7-10
 Load Combination Set : ASCE 7-10

Material Properties

Analysis Method : Allowable Strength Design
 Beam Bracing : Completely Unbraced
 Bending Axis : Major Axis Bending
 Fy : Steel Yield : 35.0 ksi
 E: Modulus : 29,000.0 ksi



Applied Loads

Service loads entered. Load Factors w will be applied for calculations.

Beam self weight NOT internally calculated and added
 Loads on all spans...
 Uniform Load on ALL spans : W = 0.06446 ksf, Tributary Width = 0.3333 ft

Load(s) for Span Number 1
 Point Load : W = 0.09310 k @ 1.0 ft, (New Raycap "OVP")

Load(s) for Span Number 2
 Point Load : W = 0.4450 k @ 9.0 ft, (New 700 Antennas)

Point Load : W = 0.1010 k @ 8.0 ft, (New RRH)

Point Load : W = 0.4450 k @ 15.0 ft, (New 700 Antennas)

Point Load : W = 0.1010 k @ 6.50 ft, (New RRH)

DESIGN SUMMARY

Design N.G.

Maximum Bending Stress Ratio =	1.651 : 1	Maximum Shear Stress Ratio =	0.188 : 1
Section used for this span	Pipe3-1/2STD	Section used for this span	Pipe3-1/2STD
Ma : Applied	8.737 k-ft	Va : Applied	2.950 k
Mn / Omega : Allow able	5.292 k-ft	Vn/Omega : Allow able	15.719 k
Load Combination	+D+0.60W+H	Load Combination	+D+0.60W+H
Location of maximum on span	3.000ft	Location of maximum on span	3.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	14.408 in	Ratio =	24 < 180
Max Upward Transient Deflection	-0.110 in	Ratio =	325 >= 180
Max Downward Total Deflection	8.977 in	Ratio =	40 < 180
Max Upward Total Deflection	-0.066 in	Ratio =	543 >= 180

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values						Summary of Shear Values			
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H														
Dsgn. L =	3.00 ft	1		0.000			8.84	5.29	1.00	1.00	-0.00	26.25	15.72	
Dsgn. L =	15.00 ft	2		0.000			8.84	5.29	1.00	1.00	-0.00	26.25	15.72	
+D+L+H														
Dsgn. L =	3.00 ft	1		0.000			8.84	5.29	1.00	1.00	-0.00	26.25	15.72	
Dsgn. L =	15.00 ft	2		0.000			8.84	5.29	1.00	1.00	-0.00	26.25	15.72	

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Title Block Line 6

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Steel Beam

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Lic. #: KW-06000304

PBAENGINEERING, P.C.

DESCRIPTION: Exist Pipe Post Supporting New Equipment Unbraced

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values						Summary of Shear Values			
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+Lr+H														
Dsgn. L = 3.00 ft		1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 15.00 ft		2		0.000			8.84	5.29	1.00	1.00	-0.00	26.25	15.72	
+D+S+H														
Dsgn. L = 3.00 ft		1		0.000			8.84	5.29	1.00	1.00	-0.00	26.25	15.72	
Dsgn. L = 15.00 ft		2		0.000			8.84	5.29	1.00	1.00	-0.00	26.25	15.72	
+D+0.750Lr+0.750L+H														
Dsgn. L = 3.00 ft		1		0.000			8.84	5.29	1.00	1.00	-0.00	26.25	15.72	
Dsgn. L = 15.00 ft		2		0.000			8.84	5.29	1.00	1.00	-0.00	26.25	15.72	
+D+0.750L+0.750S+H														
Dsgn. L = 3.00 ft		1		0.000			8.84	5.29	1.00	1.00	-0.00	26.25	15.72	
Dsgn. L = 15.00 ft		2		0.000			8.84	5.29	1.00	1.00	-0.00	26.25	15.72	
+D+0.60W+H														
Dsgn. L = 3.00 ft		1	1.651	0.188		-8.74	8.74	8.84	5.29	1.68	1.00	2.95	26.25	15.72
Dsgn. L = 15.00 ft		2	1.651	0.054		-8.74	8.74	8.84	5.29	1.00	1.00	0.85	26.25	15.72
+D+0.70E+H														
Dsgn. L = 3.00 ft		1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 15.00 ft		2		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
+D+0.750Lr+0.750L+0.450W+H														
Dsgn. L = 3.00 ft		1	1.238	0.141		-6.55	6.55	8.84	5.29	1.68	1.00	2.21	26.25	15.72
Dsgn. L = 15.00 ft		2	1.238	0.040		-6.55	6.55	8.84	5.29	1.00	1.00	0.64	26.25	15.72
+D+0.750L+0.750S+0.450W+H														
Dsgn. L = 3.00 ft		1	1.238	0.141		-6.55	6.55	8.84	5.29	1.68	1.00	2.21	26.25	15.72
Dsgn. L = 15.00 ft		2	1.238	0.040		-6.55	6.55	8.84	5.29	1.00	1.00	0.64	26.25	15.72
+D+0.750L+0.750S+0.5250E+H														
Dsgn. L = 3.00 ft		1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 15.00 ft		2		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
+0.60D+0.60W+0.60H														
Dsgn. L = 3.00 ft		1	1.651	0.188		-8.74	8.74	8.84	5.29	1.68	1.00	2.95	26.25	15.72
Dsgn. L = 15.00 ft		2	1.651	0.054		-8.74	8.74	8.84	5.29	1.00	1.00	0.85	26.25	15.72
+0.60D+0.70E+0.60H														
Dsgn. L = 3.00 ft		1		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72
Dsgn. L = 15.00 ft		2		0.000				8.84	5.29	1.00	1.00	-0.00	26.25	15.72

Overall Maximum Deflections

Load Combination	Span	Max. " Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	W Only	-0.1106	1.740
W Only	2	14.9620	15.000		0.0000	1.740

Vertical Reactions

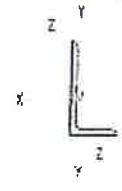
Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-4.760	6.331	
Overall MINimum	-2.142	2.849	
+D+H			
+D+L+H			
+D+Lr+H			
+D+S+H			
+D+0.750Lr+0.750L+H			
+D+0.750L+0.750S+H			
+D+0.60W+H	-2.856	3.799	
+D+0.70E+H			
+D+0.750Lr+0.750L+0.450W+H	-2.142	2.849	
+D+0.750L+0.750S+0.450W+H	-2.142	2.849	
+D+0.750L+0.750S+0.5250E+H			
+0.60D+0.60W+0.60H	-2.856	3.799	
+0.60D+0.70E+0.60H			
D Only			
Lr Only			
L Only			
S Only			
W Only	-4.760	6.331	
E Only			
H Only			

Table 4-11 (continued)
Available Strength in Axial Compression, kips
Centrically Loaded Single Angles

$F_y = 36$ ksi



L4

Shape	L4x4x		L4x3 1/2x						L4x3x				
	1/2"		1/2	3/8	5/16	1/4"	5/8						
lb/ft	6.60		11.9	9.10		7.70		6.20		13.6			
Design	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	
	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	37.9	57.0	75.4	113	57.0	88.8	40.4	72.7	35.8	53.8	36.0	129
	1	37.5	56.4	74.3	112	56.9	85.6	47.7	71.6	35.3	53.1	34.4	127
	2	36.3	54.5	71.1	107	54.5	81.9	45.6	68.6	32.9	51.0	29.7	120
	3	34.3	51.5	66.0	99.3	50.6	76.1	42.4	63.8	31.0	47.7	27.5	109
	4	31.7	47.6	59.6	89.5	45.7	68.7	38.3	57.6	29.0	43.5	23.4	95.3
	5	28.6	43.0	52.1	78.4	40.0	60.2	33.6	50.5	25.7	38.6	19.4	80.3
	6	25.3	38.0	44.3	66.6	34.1	51.2	28.7	43.1	22.2	33.4	16.3	66.1
	7	21.8	32.6	36.6	54.9	28.2	42.3	23.7	35.6	18.7	28.1	13.6	50.9
	8	18.4	27.7	29.3	44.0	22.6	34.9	19.1	29.7	15.3	23.1	10.9	38.9
	9	15.2	22.9	23.1	34.8	17.9	26.8	15.1	22.7	12.0	18.2	8.2	30.8
	10	12.4	18.6	19.7	28.1	14.5	21.7	12.2	18.3	9.93	14.3	6.6	24.9
	11	10.2	15.3	15.5	23.3	12.0	18.0	10.1	15.2	8.21	12.0		
	12	8.58	12.9					8.48	12.7	6.90	10.4		
13	7.31	11.0											
Properties													
A_g , in. ²	1.93		3.50		2.66		2.25		1.82		3.99		
r_z , in.	0.783		0.716		0.719		0.721		0.723		0.631		
ASD	LRFD		* Shape is slender for compression with $F_y = 36$ ksi.										
$\Omega_c = 1.67$	$\phi_c = 0.90$		Note: Heavy line indicates KL/r_z equal to or greater than λ_{c1} .										

∴ MAX LOAD @ BRACE = 2.892 KIPS < 7.31 KIPS OK

WIND LOAD ON WATER TANK

MecaWind Pro v2.2.8.2 per ASCE 7-10

Developed by MECA Enterprises, Inc. Copyright www.mecaenterprises.com

Date : 5/22/2019 Project No. : N-528
 Company Name : PBA Engineering Designed By : WJZ
 Address : 12 Kulick Rd Description : Water Tank
 City : Fairfield Customer Name : OAE
 State : NJ Proj Location : East Norwalk, CT
 File Location: U:\Bill\N-528 East Norwalk Water Tank\N-528.wnd

Input Parameters: Other Structures & Building Appurtances MWFRS (Ch 29)

Basic Wind Speed(V)	=	130.00 mph	Exposure Category	=	C
Structural Category	=	IV	Flexible Structure	=	No
Natural Frequency	=	N/A	Kd Directional Factor	=	See Below
Importance Factor	=	1.00	Zg	=	900.00 ft
Alpha	=	9.50	Bt	=	1.00
At	=	0.11	Bm	=	0.65
Am	=	0.15	l	=	500.00 ft
Cc	=	0.20	Zmin	=	15.00 ft
Epsilon	=	0.20			

Gust Factor Calculations

Gust Factor Category I Rigid Structures - Simplified Method
 Gust1: For Rigid Structures (Nat. Freq.>1 Hz) use 0.85 = 0.85

Gust Factor Category II Rigid Structures - Complete Analysis
 Zm: 0.6*Ht = 55.32 ft
 lzm: Cc*(33/Zm)^0.167 = 0.18
 Lzm: 1*(Zm/33)^Epsilon = 554.43 ft
 Q: (1/(1+0.63*(B+Ht)/Lzm)^0.63)^0.5 = 0.91
 Gust2: 0.925*((1+1.7*lzm*3.4*Q)/(1+1.7*3.4*lzm)) = 0.88

Gust Factor Summary
 Not a Flexible Structure use the Lessor of Gust1 or Gust2 = 0.85

Design Wind Pressure - Other Structures

Wind On Chimneys, Tanks, Rooftop Equip. & Similar Structures per Figure 29.5-2:

Elev ft	Kz	Kzt	Kd	qz psf	Fres psf			
126.50	1.33	1.00	0.95	54.657	46.458 ←			
Top El ft	Btm El ft	Width ft	Type	Cf psf	Addl ft	Tot Wid ft	Shear Kip	Moment K-ft
126.50	.00	77.004		0.511	.00039	3.325	231.114	617.9

Notes:

- Top El = Top elevation of element under consideration relative to grade.
- Btm El = Top elevation of element under consideration relative to grade.
- Width = Dia of circular cross-section & least horizontal dim of square, hexagonal or octagonal cross section.
- Type = (1)Square-Wind on Face, (2)Square-Wind Along Diagonal, (3)Hexag. or Octag. (4)Round-Moderately Smooth, (5)Round-Rough, (6)Round-Very Rough
- Cf = Shape factor per Figure 6-21 based upon H/D ratio and Type selected.
- Addl = Additional Area (Piping, Ladders, platforms, etc.), Cf=1.0 is assumed.
- Tot Wid = Total Wind Width: Cf * Width + Addl
- Shear @ Btm: Press * Tot Wid + Shear(top)
- Moment = Mom @ Btm: Mom(Top)+Shear(Top)*(Top El-Btm El)+Shear(Btm)*(Top El-Btm El)/2



PBA ENGINEERING, P.C.

Structural Engineers

12 Kulick Road • Fairfield, New Jersey 07004
973-276-1700

JOB N-528

Filbert Rd

East Norwalk, CT

SHEET NO. _____

OF _____

CALCULATED BY WJZ

DATE 5/31/19

SEISMIC LOAD CALCULATION (PER AWWA D100-11)

- SEISMIC USE GROUP = III (TABLE 24)
- IMPORTANCE FACTOR $I_E = 1.5$ (TABLE 24)
- SITE CLASS = D (TABLE 25)
- $S_S = 0.231$ (FIGURE 5)
- $S_1 = 0.067$ (FIGURE 6)
- $F_a = 1.6$ (TABLE 26)
- $F_v = 2.4$ (TABLE 27)
- RESPONSE MODIFICATION FACTOR: (TABLE 28)
 R_i (IMPULSIVE) = 3.0
- $S_{ms} = F_a S_S = (1.6)(0.231) = 0.370$ (FIGURE 13-5)
- $S_{m1} = F_v S_1 = (2.4)(0.067) = 0.161$ (FIGURE 13-6)
- $S_{DS} = \left(\frac{2}{3}\right) S_{ms} = \left(\frac{2}{3}\right)(0.370) = 0.246$ (EQ 13-7)
- $S_{D1} = \left(\frac{2}{3}\right) S_{m1} = \left(\frac{2}{3}\right)(0.161) = 0.107$ (EQ 13-8)
- $T_L = 6.0$ SECONDS (FIGURE 19)
- $T_i = 4.0$ SECONDS (SECTION 13.2.9.1)
- $T_S = \frac{S_{D1}}{S_{DS}} = \frac{0.107}{0.246} = 0.435$ SECONDS (SECTION 13.2.7.3.1)



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SHEET NO. _____ OF _____
CALCULATED BY WJZ DATE 5/31/19

- FOR $0 \leq T_i \leq T_s$: $S_{ai} = S_{DS} = 0.246$ (controls) (EQ 13-9)

FOR $T_s < T_i \leq T_L$: $S_{ai} = \frac{S_{D1}}{T_i} = \frac{0.107}{4} = 0.027$ (EQ 13-10)

$\therefore S_{ai} = 0.246$

- $A_i = \frac{S_{ai} I_E}{1.4 R_i} \geq \frac{0.36 S_i I_E}{R_i}$ (EQ 13-16)

$$= \frac{(0.246)(1.5)}{1.4(3.0)} \geq \frac{0.36(0.067)(1.5)}{3.0}$$

$$= 0.088 \geq 0.012 \quad \checkmark$$

- W_T (WEIGHT OF WATER TANK) :

LEGS	= 147,620 #	} *
STAND PIPE	= 50,270 #	
INNER DRAIN PIPE	= 13,280 #	
STAND PIPE FRUSTRUM CONE	= 30,280 #	
TANK RESERVIOR	= 204,350 #	
<u>TOTAL = 445,800 #</u>		

* = WEIGHTS BASED ON PREVIOUS CALCULATIONS PERFORMED ON 9/21/11

- W_C (WEIGHT OF CONTENTS)

$$= (\text{TANK CAPACITY}) \times (\text{WATER DENSITY})$$

$$= (1,000,000 \text{ GALLONS}) \times (8.34 \text{ lb./GALLON})$$

$$= 8,340,000 \text{ #}$$

- V_s (SEISMIC LATERAL FORCE) (EQ 13-20)

$$= A_i W_{\text{TOTAL}} = (0.088)(8,340,000 + 445,800)$$

$$= \underline{773,150 \text{ #}}$$



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SHEET NO. _____ OF _____
CALCULATED BY WJZ DATE 5/31/19

- PROJECTED WIND AREA OF TANK STRUCTURE:

TANK RESERVIOR	= 2827 SF	} *
TOTAL LEG AREA	= 2670 SF	
STANDPIPE	= 1700 SF	

TOTAL = 7197 SF

* = WEIGHTS BASED ON PREVIOUS CALCULATIONS PERFORMED ON 9/21/11

- V_w (WIND LATERAL FORCE)

$$\begin{aligned}
 &= (\text{WIND PRESSURE}) \times (\text{PROJECTED WIND AREA}) \\
 &= (46.458 \text{ PSF}) \times (7197 \text{ SF}) \\
 &= 334,358 \#
 \end{aligned}$$

- GOVERNING LOAD:

$$\begin{aligned}
 &= \left(\frac{0.7 V_{SEISMIC}}{0.6 V_{WIND}} \right) \\
 &= \left(\frac{0.7 \times 773,150}{0.6 \times 334,358} \right) = 2.7 \therefore \text{SEISMIC LOAD GOVERNS}
 \end{aligned}$$



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Filbert Rd
East Norwalk, CT

SHEET NO. _____ OF _____
CALCULATED BY WJZ DATE 3/20/20

- WEIGHT OF VERIZON EQUIPMENT (PER SECTOR):

EXIST. ANTENNAS	= 1 @ 19.2 #	= 19.2 #
NEW ANTENNAS	= (2 @ 63.3 #) + 67.4 #	
	+ (1 @ 23.1 #)	= 217.1 #
NEW RRH'S	= (1 @ 84.4 #) + (1 @ 70.3 #)	= 154.7 #
NEW OVP	= 2 @ 32 #	= 64 #
EXIST. PIPE POSTS	= 2 @ 165 #	= 330 #
NEW BRACES	= 4 @ 66 #	= 264 #
CABLE	= 1000 # PER SECTOR	= 1000 #

TOTAL WEIGHT = 2052 #
(PER SECTOR)

(3 SECTORS @ 2052 #/SECTOR) = 6156 # (ALL SECTORS)

- V_{ADD} (ADDITIONAL LATERAL FORCE FROM TELECOM EQUIP.)

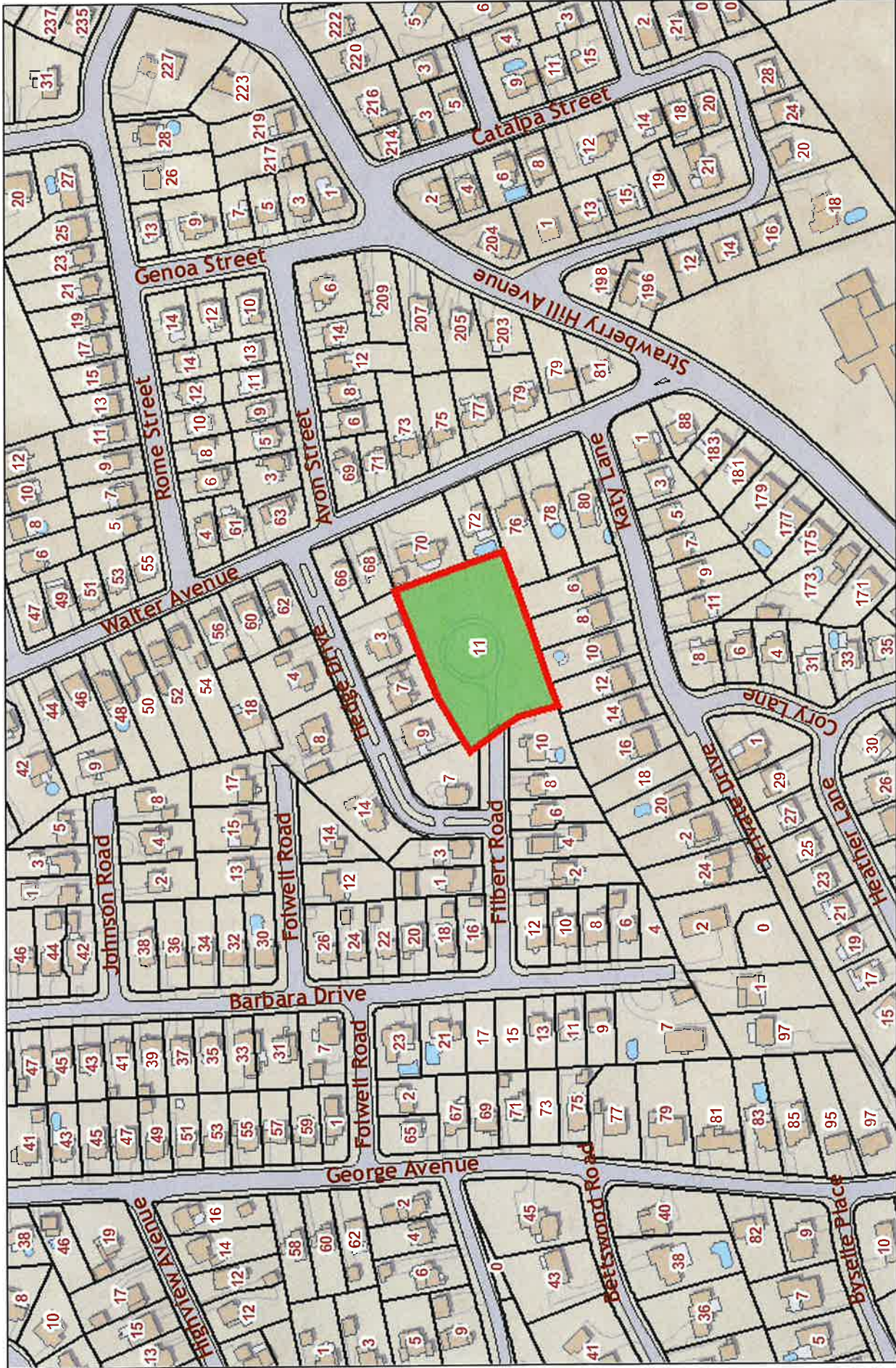
$$\begin{aligned}
 &= A_i W_{EQUIP.} \\
 &= (0.088)(6156 \#) \\
 &= 0.542 \text{ KIPS}
 \end{aligned}$$

- SEISMIC FORCE COMPARISON

$$\frac{V_{ADD}}{V_S \text{ (EXIST)}} = \frac{0.542 \text{ KIPS}}{773.15 \text{ KIPS}} = 0.07\% < 10\% \quad \text{OK}$$

∴ TANK IS ADEQUATE
TO SUPPORT EQUIPMENT

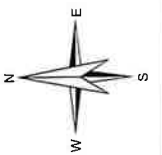
ATTACHMENT 5



CSC Exhibit



1 inch = 290 feet



11 FILBERT RD

Location 11 FILBERT RD

Mblu 5/ 4/ 199/ 0/

Acct# 16358

Owner FIRST TAXING DISTRICT

Assessment \$1,141,550

Appraisal \$1,630,780

PID 16358

Building Count 1

Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2018	\$527,720	\$1,103,060	\$1,630,780
Assessment			
Valuation Year	Improvements	Land	Total
2018	\$369,410	\$772,140	\$1,141,550

Owner of Record

Owner FIRST TAXING DISTRICT
Co-Owner (WATER DEPT - WATER TANK)
Address 3 BELDEN AVE
 NORWALK, CT 06850-3303

Sale Price \$0
Certificate
Book & Page 532/361
Sale Date 04/01/1960

Ownership History

Ownership History				
Owner	Sale Price	Certificate	Book & Page	Sale Date
FIRST TAXING DISTRICT	\$0		532/361	04/01/1960

Building Information

Building 1 : Section 1

Year Built: 1993
Living Area: 450
Replacement Cost: \$22,100
Building Percent Good: 87
Replacement Cost
Less Depreciation: \$19,230

Building Attributes

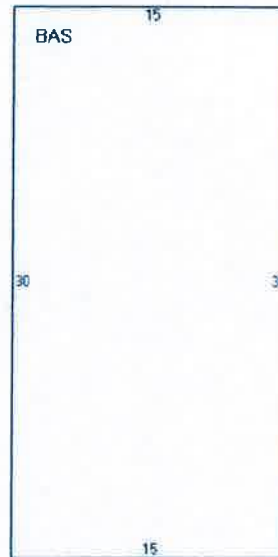
Field	Description
STYLE	Warehouse
MODEL	Industrial
Grade	C
Stories:	1.00
Occupancy	1.00
Exterior Wall 1	Aluminum Sidng
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt Shingl
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Minimum/Plywd
Interior Floor 2	
Heating Fuel	Electric
Heating Type	Forced Air
AC Percent	100
Heat Percent	100
Bldg Use	Wtr Treatmnt
Total Rooms	0
Bedrooms	0
Full Baths	0
Half Baths	0
Extra Fixtures	0
FBM Area	
Heat/AC	Heat/AC Split
Frame	Wood
Plumbing	Average
Foundation	Poured Conc
Partitions	Average
Wall Height	
% Sprinkler	0.00

Building Photo



(<http://images.vgsi.com/photos/NorwalkCTPhotos/default.jpg>)

Building Layout



(ParcelSketch.ashx?pid=16358&bid=16358)

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	450	450
		450	450

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code 924
Description Wtr Treatmnt
Zone B
Neighborhood C330

Land Line Valuation

Size (Acres) 1.06
Frontage
Depth
Assessed Value \$772,140
Appraised Value \$1,103,060

Outbuildings

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
SHD1	Shed	CB	CindBk/Frame	450.00 S.F.	\$3,940	1
TNK3	Tank >10K			1000000.00 GALS	\$500,000	1
FN6	Fence 6'			500.00 L.F.	\$4,550	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2018	\$527,720	\$1,103,060	\$1,630,780
2017	\$399,800	\$770,040	\$1,169,840
2016	\$399,800	\$770,040	\$1,169,840

Assessment			
Valuation Year	Improvements	Land	Total
2018	\$369,410	\$772,140	\$1,141,550
2017	\$279,870	\$539,030	\$818,900
2016	\$279,870	\$539,030	\$818,900

ATTACHMENT 6



Certificate of Mailing — Firm

Name and Address of Sender

Kenneth C. Baldwin, Esq.
 Robinson & Cole LLP
 280 Trumbull Street
 Hartford, CT 06103

TOTAL NO.
of Pieces Listed by Sender

3

TOTAL NO.
of Pieces Received at Post Office™

3

Affix Stamp Here
Postmark with Date of Receipt.

neopostSM
 03/31/2020
US POSTAGE \$002.90⁰⁰

 ZIP 06103
 041L12203937

Postmaster, per (name of receiving employee)

[Handwritten Signature]

USPS® Tracking Number
Firm-specific Identifier

Address
(Name, Street, City, State, and ZIP Code™)

Postage

Fee

Special Handling

Parcel Airlift

1.

Harry Rilling, Mayor
 City of Norwalk
 125 East Avenue
 P.O. Box 5125
 Norwalk, CT 06856-5125

2.

Steve Kleppin, Director of Planning and Zoning
 City of Norwalk
 125 East Avenue
 P.O. Box 5125
 Norwalk, CT 06856-5125

3.

First Taxing District Water Department
 3 Beldin Avenue
 Norwalk, CT 06850-3303

4.

5.

6.

