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Daniel M. Laub
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September 28, 2018

VIA EMAIL & OVERNIGHT DELIVERY

Hon. Robin Stein, Chairman and
Members of the Connecticut Siting Council
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

Re: Tower Sharing Request by New Cingular Wireless PCS, LLC
Facility as Approved in Siting Council Docket 473
Premises: 515 Morehouse Road, Easton, Connecticut

Dear Chairman and Members of the Siting Council:

Pursuant to Connecticut General Statutes (C.G.S.) § 16-50aa, New Cingular Wireless PCS, LLC ("AT&T") hereby requests an order from the Connecticut Siting Council (the "Council") to approve the proposed shared use of a communications tower and associated compound at the town-owned parcel identified as 515 Morehouse Road in the Town of Easton (the "Morehouse Road Facility"). The Certificate Holder and tower owner is Homeland Towers ("Homeland"). AT&T and Homeland have agreed to share the use of the Morehouse Road Facility as detailed below.

The Morehouse Road Facility

The Morehouse Road Facility consists of an approximately one hundred and fifty-foot (150') monopole (the "Tower") and associated equipment for wireless communications use by Verizon and others. The tower and compound are located on an approximately 104-acre parcel owned by the Town of Easton.



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AT&T Installation

As depicted on the enclosed plans prepared by Hudson Design Group LLC dated September 6, 2018 and last revised September 18, 2018, including a site plan, compound and equipment layout and tower elevation, AT&T proposes shared use of Facility to provide FCC licensed services. Please see **Attachment 1**. AT&T will install 9 antennas, 12 remote radio head units (RRUs), and 6 surge arrestors on an antenna mount at the 135-foot level of the Tower.¹ As also depicted on the drawings, within the existing compound AT&T will install a 6' x 6' walk in equipment cabinet on a 102" x 102" (8'6" x 8'6") concrete pad within the existing compound. A 15kw backup generator on a 51" x 46" (4'3" x 3'10") concrete pad will also be installed within the existing compound.

Connecticut General Statutes § 16-50aa provides that, upon written request for shared use approval, an order approving such use shall be issued, "if the Council finds that the proposed shared use of the facility is technically, legally, environmentally and economically feasible and meets public safety concerns." (C.G.S. § 16-50aa(c)(1).) Further, upon approval of such shared use, it is exclusive, and no local zoning or land use approvals are required C.G.S. § 16-50x. Shared use of the Morehouse Road Facility satisfies the approval criteria set forth in C.G.S. § 16-50aa as follows:

- A. Technical Feasibility: As evidenced in the structural report prepared by Hudson Design Group LLC and dated August 15, 2018 annexed hereto as **Attachment 2**, AT&T confirmed that the tower is designed built to support the addition of AT&T's antennas and tower mounted equipment in addition to the existing loading. The proposed shared use of this tower is therefore technically feasible.
- B. Legal Feasibility: Pursuant to C.G.S. § 16-50aa, the Council is authorized to issue an order approving shared use of the existing Morehouse Road Facility. (C.G.S. § 16-50aa(c)(1)). Under the authority vested in the Council by C.G.S. § 16-50aa, an order by the Council approving the shared use of a tower would permit the Applicant to obtain a building permit for the proposed installation. Notably, the tower is subject to the approval granted in Docket 473. In addition, Condition 5 of the Decision and Order in Docket 473 mandated that the tower be available for shared use where feasible and such is the case with this proposal.

¹ Please note that for planning purposes AT&T has included "future" installations on the drawings which are also included in the analysis of the attached structural report. AT&T will not install those items noted as "future" initially and will return to the Siting Council for approval once this noted equipment is available and ready for installation.

- C. Environmental Feasibility: The proposed shared use would have a minimal environmental effect, for the following reasons:
1. The proposed installation would have a *de minimis* visual impact and would not cause any significant change or alteration in the physical or environmental characteristics of the approved facility. Indeed, the Applicants' Ex. 1. Tab 9 (Visibility Analysis) already simulated the appearance of the facility with additional carriers and confirm the appearance would be minimally changed from existing conditions.
 2. The installation by AT&T will not increase the height of the approved Tower nor extend the site boundaries;
 3. The proposed installation will not increase the noise levels at the facility boundaries by six decibels or more;
 4. Operation of AT&T's antennas at this site will not exceed the total radio frequency electromagnetic radiation power density level adopted by the FCC and Connecticut Department of Health. AT&T's proposed antenna installation along with other carriers is calculated to be within
 5. 7.03% of FCC Standard for General Public/Uncontrolled Maximum Permissible Exposure (MPE). Please see the assessment of RF power density dated September 19, 2018, prepared by Sanket Joshi, RF Engineer, SAI, annexed hereto as **Attachment 3**; and
 6. The proposed shared use of the Morehouse Road Facility would not require any water or sanitary facilities or discharges into any waterbodies. The only air emissions would be from weekly testing of the generator and its use during a power outage. Please see **Attachment 4**. Further, the installation will not generate any traffic other than for periodic maintenance visits.
- D. Economic Feasibility: The Applicant and the Certificate Holder entered into an agreement to share use of the Morehouse Road Facility on terms agreeable to both parties. The proposed tower sharing is therefore economically feasible.
- E. Public Safety: As stated above and evidenced in attachments hereto the tower is structurally capable of supporting AT&T's installation and emissions are well within the maximum permitted by the FCC and the Connecticut Department of



September 28, 2018

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Health. Further, the addition of AT&T Wireless' telecommunications service in the Easton area through shared use of the Morehouse Road Facility is expected to enhance the safety and welfare of local residents and travelers through the area resulting in an improvement to public safety in this area of the state.

Conclusion

In furtherance of this notice please find enclosed SAI check number 63606 payable to the Connecticut Siting Council representing the submission fee.

As explained above, the proposed shared use of the Morehouse Road Facility satisfies the criteria set forth in C.G.S. §16-50aa and advances the General Assembly's and the Siting Council's goal of preventing the proliferation of towers in the State of Connecticut. AT&T therefore requests the Siting Council issue an order approving the proposed shared use of the Morehouse Road Facility.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read "D. Laub", written over a horizontal line.

Daniel M. Laub
On behalf of AT&T

Attachments

cc: Hon. Adam Dunsby, First Selectman, Easton
Mr. John Hayes, Land Use Director, Easton
Homeland Towers
AT&T
SAI

PROJECT INFORMATION	
SCOPE OF WORK:	TELECOMMUNICATIONS FACILITY (NSB):
SITE ADDRESS:	515 MOREHOUSE ROAD EASTON, CT 06612
LATITUDE:	41.23558 N, 41° 14' 08.10" N
LONGITUDE:	73.28537 W, 73° 17' 07.34" W
TYPE OF SITE:	MONOPOLE / OUTDOOR EQUIPMENT
STRUCTURE HEIGHT:	150'±
RAD CENTER:	135'±
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY



SITE NUMBER: CT1323
SITE NAME: MOREHOUSE ROAD
FA CODE: 10128143
PACE ID: MRCTB028433
PROJECT: NSB

ISSUED FOR ZONING

DRAWING INDEX		
SHEET NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	1
C-1	ABUTTERS PLAN	1
A-1	COMPOUND & EQUIPMENT PLAN	1
A-2	ANTENNA LAYOUT & ELEVATION	1
A-3	DETAILS	1

VICINITY MAP

DIRECTIONS TO SITE:

DEPART ENTERPRISE DR TOWARD CAPITOL BLVD. 0.3 MI. TURN LEFT ONTO CAPITOL BLVD. 0.3 MI. TURN LEFT ONTO WEST ST. 0.3 MI. TAKE RAMP LEFT FOR I-91 S. 9.6 MI. AT EXIT 17, TAKE RAMP RIGHT FOR CT-15 SOUTH TOWARD E. MAIN ST / W. CROSS PKWY. 36.3 MI. AT EXIT 46, TAKE RAMP RIGHT TOWARD EASTON / FAIRFIELD. 246 FT. TURN RIGHT ONTO CONGRESS ST. 486 FT. TURN LEFT ONTO CT-59 / EASTON TPKE. 1.6 MI. TURN LEFT ONTO BEERS RD. 0.8 MI. TURN RIGHT ONTO MOREHOUSE RD. 0.7 MI. ARRIVE AT ENTRANCE TO SITE ON THE LEFT



GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T MOBILITY REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.
4. CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED SUBMITTAL DATE LISTED HEREIN.

45 BEECHWOOD DRIVE
NORTH ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

12 INDUSTRIAL WAY
SALEM, NH 03079

SITE NUMBER: CT1323
SITE NAME: MOREHOUSE ROAD

515 MOREHOUSE ROAD
EASTON, CT 06612
FAIRFIELD COUNTY

500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

1	09/18/18	ISSUED FOR ZONING	SB	AT	DJC
A	09/06/18	ISSUED FOR REVIEW	ET	AT	DJC
NO.	DATE	REVISIONS	BY	CHK	APP'D
SCALE: AS SHOWN			DESIGNED BY: AT		DRAWN BY: ET

AT&T

TITLE SHEET
(NSB)

SITE NUMBER	DRAWING NUMBER	REV
CT1323	T-1	1

NOTE:

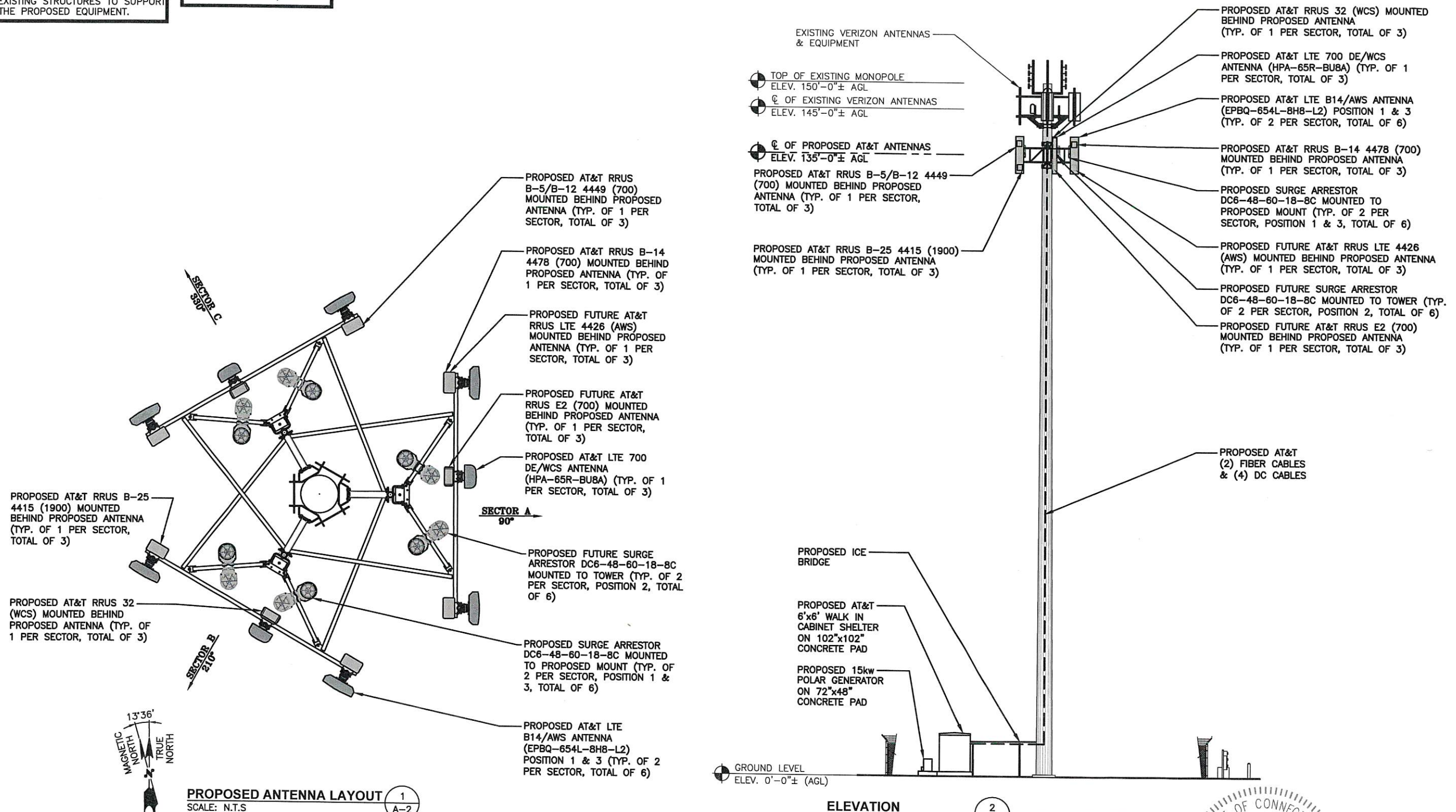
REFER TO STRUCTURAL ANALYSIS BY: HUDSON DESIGN GROUP, LLC, DATED: AUGUST 15, 2018, FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.

NOTE:

PROPOSED POWER, TELCO, & GROUNDING TO COME FROM EXISTING SOURCES (ROUTING TO BE DETERMINED)

NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.



HUDSON
Design Group LLC

45 BEECHWOOD DRIVE
NORTH ANDOVER, MA 01845
TEL: (978) 557-5553
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SAI

12 INDUSTRIAL WAY
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515 MOREHOUSE ROAD
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at&t

500 ENTERPRISE DRIVE, SUITE 3A
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REVISIONS				AT&T			
NO.	DATE	REVISIONS	BY	CHK	APP'D	SITE NUMBER	DRAWING NUMBER
1	09/18/18	ISSUED FOR ZONING	SB	AT	DJC	CT1323	A-2
A	09/08/18	ISSUED FOR REVIEW	ET	AT	DJC		
SCALE: AS SHOWN				DESIGNED BY: AT			
				DRAWN BY: ET			
				ANTENNA LAYOUT & ELEVATION (NSB)			
				REV			

NOTE:

REFER TO STRUCTURAL ANALYSIS BY: HUDSON DESIGN GROUP, LLC, DATED: AUGUST 15, 2018, FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.

NOTE:

PROPOSED POWER, TELCO, & GROUNDING TO COME FROM EXISTING SOURCES (ROUTING TO BE DETERMINED)

NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

PROPOSED AT&T ANTENNAS
(TYP. OF 3 PER SECTOR,
TOTAL OF 9)

PROPOSED 2.5" STD.
(2.88" O.D.) MOUNTING
PIPE (8'-0" LONG PIPE)
(TYP. OF 3 PER SECTOR,
TOTAL OF 9)

PROPOSED/FUTURE AT&T RRU
MOUNTED BEHIND PROPOSED
ANTENNA (TYP.)

PROPOSED/FUTURE
SURGE ARRESTOR
(TYP.)

PROPOSED TIE BACK
ARM (TYP. OF 2 PER
SECTOR, TOTAL OF 6)

PROPOSED V-BOOM
ANTENNA MOUNT (TYP. OF 1
PER SECTOR, TOTAL OF 3)

NOTE:

SEE RFDS FOR RRH
FREQUENCY AND
MODEL NUMBER

PROPOSED SECTOR FRAME,
ANTENNA, SURGE SUPPRESSOR
& RRH'S MOUNTING DETAIL

SCALE: N.T.S.

☉ OF PROPOSED
AT&T ANTENNAS
ELEV. = 135'± A.G.L.

8" MIN

ANTENNA SCHEDULE

SECTOR	EXISTING/ PROPOSED	BAND	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA CL. HEIGHT	AZIMUTH	TMA/ DIPLEXER	RRU	SIZE (INCHES) (L x W x D)	FEEDER	RAYCAP
A1	PROPOSED	LTE 700 B14/AWS	EPBQ-654L8H8-L2	96x21x8.3	135±	90°	-	(P)(1) 4478 B14 (700) (P)(F)(1) 4426 (AWS)	15x13.2x7.4 15X13.2X7.4	-	(P)(F)(2) RAYCAP DC6-48-60-18-8C
A2	PROPOSED	LTE 700 DE/WCS	HPA65R-BU8A	96X11.7X7.6	135±	90°	-	(E)(F)(1) RRUS-E2 (700) (E)(1) RRUS-32 (WCS)	20x20.4x9.5 27.2x12.1x7.0	-	(P)(2) RAYCAP DC6-48-60-0-8C
A3	PROPOSED	LTE 700 BC/850/PCS	EPBQ-654L8H8-L2	96x21x8.3	135±	90°	-	(P)(1) 4449 (850) (P)(1) 4415 (PCS)	15x13.2x7.4 15X13.2X5.4	-	(P)(F)(2) RAYCAP DC6-48-60-18-8C
A4	-	-	-	-	-	-	-	-	-	-	-
B1	PROPOSED	LTE 700 B14/AWS	EPBQ-654L8H8-L2	96x21x8.3	135±	210°	-	(P)(1) 4478 B14 (700) (P)(F)(1) 4426 (AWS)	15x13.2x7.4 15X13.2X7.4	-	(P)(F)(2) RAYCAP DC6-48-60-18-8C
B2	PROPOSED	LTE 700 DE/WCS	HPA65R-BU8A	96X11.7X7.6	135±	210°	-	(E)(F)(1) RRUS-E2 (700) (E)(1) RRUS-32 (WCS)	20x20.4x9.5 27.2x12.1x7.0	-	(P)(2) RAYCAP DC6-48-60-0-8C
B3	PROPOSED	LTE 700 BC/850/PCS	EPBQ-654L8H8-L2	96x21x8.3	135±	210°	-	(P)(1) 4449 (850) (P)(1) 4415 (PCS)	15x13.2x7.4 15X13.2X5.4	-	(P)(F)(2) RAYCAP DC6-48-60-18-8C
B4	-	-	-	-	-	-	-	-	-	-	-
C1	PROPOSED	LTE 700 B14/AWS	EPBQ-654L8H8-L2	96x21x8.3	135±	330°	-	(P)(1) 4478 B14 (700) (P)(F)(1) 4426 (AWS)	15x13.2x7.4 15X13.2X7.4	-	(P)(F)(2) RAYCAP DC6-48-60-18-8C
C2	PROPOSED	LTE 700 DE/WCS	HPA65R-BU8A	96X11.7X7.6	135±	330°	-	(E)(F)(1) RRUS-E2 (700) (E)(1) RRUS-32 (WCS)	20x20.4x9.5 27.2x12.1x7.0	-	(P)(2) RAYCAP DC6-48-60-0-8C
C3	PROPOSED	LTE 700 BC/850/PCS	EPBQ-654L8H8-L2	96x21x8.3	135±	330°	-	(P)(1) 4449 (850) (P)(1) 4415 (PCS)	15x13.2x7.4 15X13.2X5.4	-	(P)(F)(2) RAYCAP DC6-48-60-18-8C
C4	-	-	-	-	-	-	-	-	-	-	-

FINAL ANTENNA SCHEDULE

SCALE: N.T.S.

1
A-3

RRU CHART

QUANTITY	MODEL	L	W	D
3(P)	RRUS-32	27.2"	12.1"	7.0"
3(P)	4415	15.0"	13.2"	5.4"
3(P)	4426	15.0"	13.2"	7.4"
3(P)	4449	15.0"	13.2"	7.4"
3(P)	4478	15.0"	13.2"	7.4"

NOTE:
MOUNT PER MANUFACTURER'S
SPECIFICATIONS

NOTE:

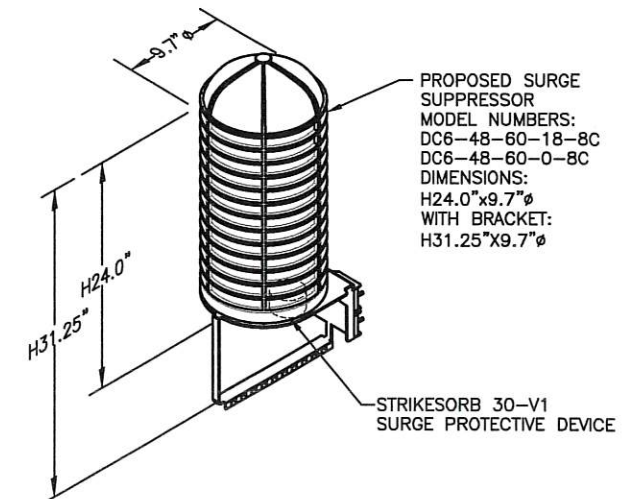
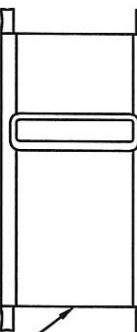
SEE RFDS FOR RRH
FREQUENCY AND
MODEL NUMBER

PROPOSED RRU REFER TO THE
FINAL RFDS AND CHART FOR
QUANTITY, MODEL AND DIMENSIONS

NOTE:
MOUNT PER MANUFACTURER'S
SPECIFICATIONS.

PROPOSED RRUS DETAIL

SCALE: N.T.S.



NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

DC SURGE SUPPRESSOR DETAIL

SCALE: N.T.S.

4
A-3

HDG HUDSON
Design Group LLC

45 BEECHWOOD DRIVE
NORTH ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

SAI

12 INDUSTRIAL WAY
SALEM, NH 03079

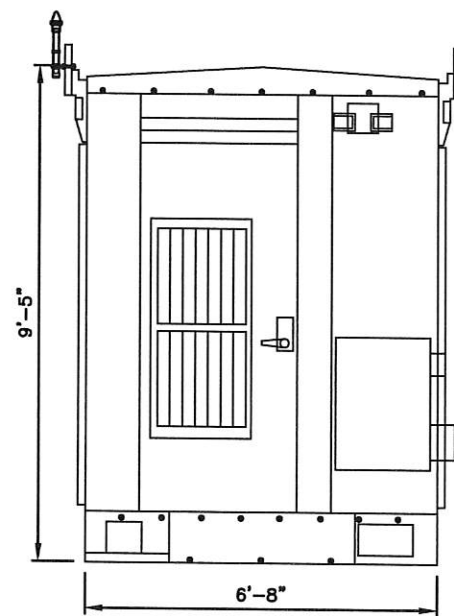
SITE NUMBER: CT1323
SITE NAME: MOREHOUSE ROAD

515 MOREHOUSE ROAD
EASTON, CT 06612
FAIRFIELD COUNTY

at&t

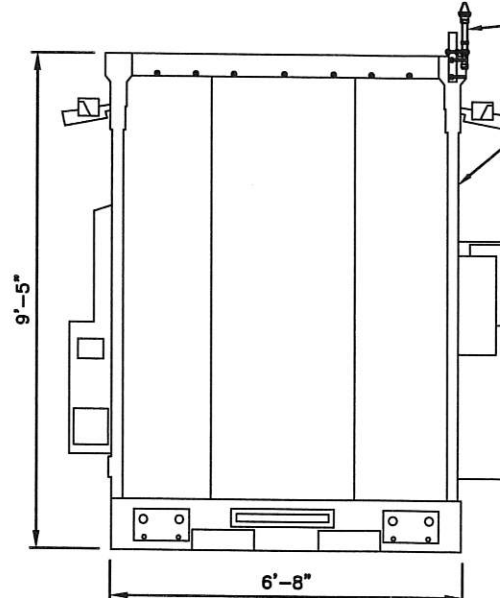
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

1	09/18/18	ISSUED FOR ZONING	SB	AT	DJC	AT&T
A	09/06/18	ISSUED FOR REVIEW	ET	AT	DJC	DETAILS (NSB)
NO.	DATE	REVISIONS	BY	CHK	APP'D	
SCALE:	AS SHOWN	DESIGNED BY: AT	DRAWN BY: ET			
SITE NUMBER	CT1323	DRAWING NUMBER	A-3			
REV						1

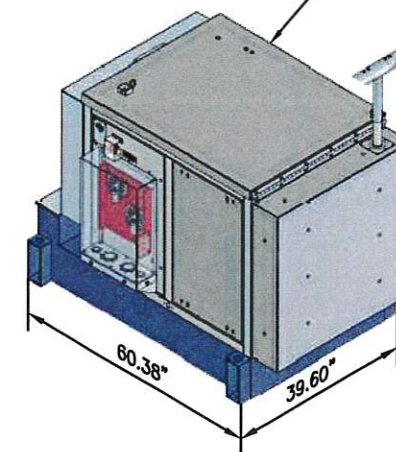


TYPICAL SHELTER DETAIL
SCALE: N.T.S

1
A-4



PROPOSED (1) LTE GPS
ANTENNA MOUNTED TO
PROPOSED SHELTER
PROPOSED AT&T 80"x80"
SMARTMOD WALK-IN CABINET



PROPOSED POLAR 15KW GENERATOR
MODEL#: 8220-100-D-15-03

GENERATOR DETAIL
SCALE: N.T.S

2
A-4

Attachment 1

Attachment 2

STRUCTURAL ANALYSIS REPORT

For

CT1323

MOREHOUSE ROAD

515 MOREHOUSE ROAD
EASTON, CT 06612

Antennas Mounted to the Monopole



Prepared for:



Dated: August 15, 2018

Prepared by:



45 Beechwood Drive
North Andover, MA 01845
(P) 978.557.5553 (F) 978.336.5586
www.hudsondesigngroupllc.com





HUDSON
Design Group LLC

SCOPE OF WORK:

Hudson Design Group LLC (HDG) has been authorized by AT&T to conduct a structural evaluation of the 149' monopole supporting the proposed AT&T's antennas located at elevation 135' above the ground level.

This report represents this office's findings, conclusions and recommendations pertaining to the support of AT&T's proposed antennas listed below.

Record drawings of the existing tower were not available for our use. The structural design report prepared by Sabre Industries, dated October 19, 2017, was available and obtained for our use.

CONCLUSION SUMMARY:

Based on our evaluation, we have determined that the existing monopole and foundation are in conformance with the ANSI/TIA-222-G Standard for the loading considered under the criteria listed in this report. The monopole structure is rated at **69.8%** - (Anchor Bolts at EL.0' Controlling).



APPURTENANCES CONFIGURATION:

Tenant	Appurtenances	Elev.	Mount
	(3) ANT150D3	150.5'	Side Mount Standoff
	(2) 2' Dish	148'	Side Mount Standoff
	(12) 8' Panel Antennas	145'	Low Profile Platform
	(24) RRUS-11	145'	Low Profile Platform
	(6) FD9R6004	145'	Low Profile Platform
	(3) DC6-48-60-18-8F	145'	Low Profile Platform
	(1) SC412-HF2LDF	145'	Low Profile Platform
AT&T	(6) EPBQ-654L8H8-L2 Antennas	135'	T - Frame
AT&T	(3) HPA65R-BU8A Antennas	135'	T - Frame
AT&T	(3) B14 4478	135'	T - Frame
AT&T	(3) RRUS-32	135'	T - Frame
AT&T	(3) Radio 4449	135'	T - Frame
AT&T	(3) B25 4415	135'	T - Frame
AT&T	(6) DC6-48-60-18-8C	135'	T - Frame
AT&T (Future)	(3) RRH 4426	135'	T - Frame
AT&T (Future)	(3) RRUS-E2	135'	T - Frame
AT&T (Future)	(6) DC6-48-60-18-8C	135'	T - Frame
	(12) 8' Panel Antennas	125'	Low Profile Platform
	(24) RRUS-11	125'	Low Profile Platform
	(6) FD9R6004	125'	Low Profile Platform
	(3) DC6-48-60-18-8F	125'	Low Profile Platform
	(1) SC412-HF2LDF	125'	Low Profile Platform
	(2) 2' Dish	95'	Side Mount Standoff
	(1) DB201-L	80'	Side Mount Standoff
	(1) ANT150D3	75.5'	Side Mount Standoff

* Proposed AT&T Appurtenances shown in Bold.

AT&T EXISTING/PROPOSED COAX CABLES:

Tenant	Coax Cables	Elev.	Mount
AT&T	(4) DC Power Cables	135'	Inside Monopole
AT&T	(2) Fiber Cables	135'	Inside Monopole

*Proposed AT&T Coax Cables shown in Bold.



HUDSON
Design Group LLC

ANALYSIS RESULTS SUMMARY:

Component	Max. Stress Ratio	Elev. of Component (ft)	Pass/Fail	Comments
Pole Section-L1	5.8 %	139 – 149	PASS	
Pole Section-L2	58.0 %	92.5 – 139	PASS	
Pole Section-L3	67.2 %	45 – 92.5	PASS	
Pole Section-L4	65.8 %	0 – 45	PASS	
Base Plate & Anchor Bolts	69.8 %	0	PASS	Controlling



HUDSON
Design Group LLC

DESIGN CRITERIA:

1. EIA/TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures
County: Fairfield
City/Town: Easton
Wind Load: 101 mph (3 second gust)
Structural Class: II
Exposure Category: C
Topographic Category: 2
Crest Height: 115 ft.
Ice Thickness: 0.75 inch
2. Approximate height above grade to proposed antennas: 135'

Calculations and referenced documents are attached

ASSUMPTIONS:

1. The monopole dimensions, member sizes and material strength are as indicated in the structural design report prepared by Sabre Industries, dated October 19, 2017.
1. The appurtenances configuration is as stated in the structural design report prepared by Sabre Industries, dated October 19, 2017. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer's requirements.
2. The monopole and foundation are properly constructed and maintained. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
3. The support mounts and platforms are not analyzed and are considered adequate to support the loading. The analysis is limited to the primary support structure itself.
4. All prior structural modification, if any, are assumed to be as per the data supplied (if available), and installed properly.

SUPPORT RECOMMENDATIONS:

HDG recommends that the proposed antennas, RRHs and surge arrestors be mounted on the proposed T-frame supported by the monopole.



HUDSON
Design Group LLC

CALCULATIONS

Section	1	2	3	4
Length (ft)	10.00	50.50	53.50	53.25
Number of Slides	18	18	18	18
Thickness (in)	0.2500	0.4375	0.5000	0.5625
Socket Length (ft)	4.00	6.00	8.25	55.5064
Top Dia (in)	24.0600	25.6840	40.5259	74.3200
Bot Dia (in)	27.6000	43.5200	59.4200	20817.9
Grade			A572-65	
Weight (lb)	690.7	8152.4	14293.3	43954.4

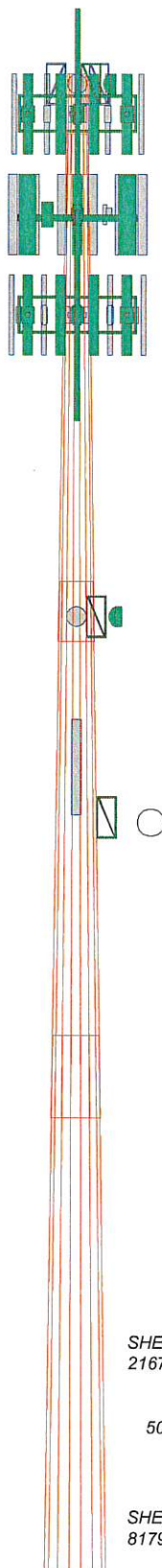
149.0 ft

139.0 ft

92.5 ft

45.0 ft

0.0 ft



DESIGNED APPURTENANCE LOADING

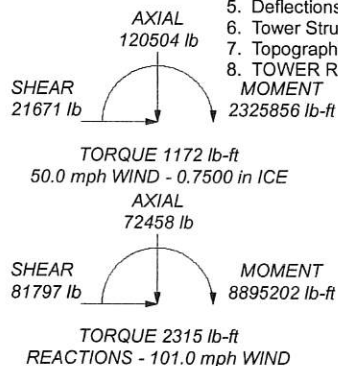
TYPE	ELEVATION	TYPE	ELEVATION
ANT150D3	150.5	B25 4415	135
ANT150D3	150.5	B25 4415	135
ANT150D3	150.5	B25 4415	135
3' Side Mount Standoff	148	(2) DC6-48-60-18-8C	135
3' Side Mount Standoff	148	(2) DC6-48-60-18-8C	135
3' Side Mount Standoff	148	(2) DC6-48-60-18-8C	135
1' Side Mount Standoff	148	RRH 4426 (ATI - future)	135
1' Side Mount Standoff	148	RRH 4426	135
HP2-102	148	RRH 4426	135
HP2-102	148	Ericsson RRUS-E2	135
(4) Panel Antenna 96"x12"x9" w/mount pipe	145	Ericsson RRUS-E2	135
(4) Panel Antenna 96"x12"x9" w/mount pipe	145	(2) DC6-48-60-18-8C	135
(8) RRUS 11	145	(2) DC6-48-60-18-8C	135
(8) RRUS 11	145	(2) DC6-48-60-18-8C	135
(8) RRUS 11	145	PIROD 12' T-Frame (ATI - proposed)	135
(2) FD9R6004 Diplexer	145	PIROD 12' T-Frame	135
(2) FD9R6004 Diplexer	145	(4) Panel Antenna 96"x12"x9" w/mount pipe	125
(2) FD9R6004 Diplexer	145	(4) Panel Antenna 96"x12"x9" w/mount pipe	125
DC6-48-60-18-8F	145	(8) RRUS 11	125
DC6-48-60-18-8F	145	(8) RRUS 11	125
DC6-48-60-18-8F	145	(8) RRUS 11	125
SC412-HF2LDF	145	(2) FD9R6004 Diplexer	125
PIROD 12' Platform w / handrails	145	(2) FD9R6004 Diplexer	125
(4) Panel Antenna 96"x12"x9" w/mount pipe	145	(2) FD9R6004 Diplexer	125
PIROD 12' T-Frame	135	DC6-48-60-18-8F	125
(2) EPBQ-654L8H8-L2 w/mount pipe	135	DC6-48-60-18-8F	125
(2) EPBQ-654L8H8-L2 w/mount pipe	135	DC6-48-60-18-8F	125
(2) EPBQ-654L8H8-L2 w/mount pipe	135	SC412-HF2LDF	125
HPA65R-BU8A w/mount pipe	135	PIROD 12' Platform w / handrails	125
HPA65R-BU8A w/mount pipe	135	(4) Panel Antenna 96"x12"x9" w/mount pipe	125
HPA65R-BU8A w/mount pipe	135	1' Side Mount Standoff	95
B14 4478	135	1' Side Mount Standoff	95
B14 4478	135	HP2-102	95
B14 4478	135	HP2-102	95
Ericsson RRUS-32	135	DB201-L	80
Ericsson RRUS-32	135	ANT150D3	75.5
Radio 4449	135	3' Side Mount Standoff	75
Radio 4449	135	3' Side Mount Standoff	75
Radio 4449	135		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 101.0 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.0 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.0 mph wind.
6. Tower Structure Class II.
7. Topographic Category 2 with Crest Height of 115.00 ft
8. TOWER RATING: 67.2%



Hudson Design Group LLC

45 Beechwood Drive
North Andover, MA 01845
Phone: (978) 557-5553
FAX: (978) 336-5586

Job: **CT1323**

Project: **150 ft Monopole**

Client: **AT&T**

Code: **TIA-222-G**

Path:

Drawn by: **kw**

Date: **08/15/18**

App'd:

Scale: **NTS**

Dwg No. **E-1**

tnxTower Hudson Design Group LLC 45 Beechwood Drive North Andover, MA 01845 Phone: (978) 557-5553 FAX: (978) 336-5586	Job	CT1323	Page	1 of 10
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	Client	AT&T	Designed by	kw

Tower Input Data

There is a pole section.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

Tower is located in Fairfield County, Connecticut.

Basic wind speed of 101.0 mph.

Structure Class II.

Exposure Category C.

Topographic Category 2.

Crest Height 115.00 ft.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56.0 pcf.

A wind speed of 50.0 mph is used in combination with ice.

Temperature drop of 50.0 °F.

Deflections calculated using a wind speed of 60.0 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Slides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	149.00-139.00	10.00	4.00	18	24.0600	27.6000	0.2500	1.0000	A572-65
L2	139.00-92.50	50.50	6.00	18	25.6840	43.5200	0.4375	1.7500	(65 ksi) A572-65
L3	92.50-45.00	53.50	8.25	18	40.5259	59.4200	0.5000	2.0000	(65 ksi) A572-65
L4	45.00-0.00	53.25		18	55.5064	74.3200	0.5625	2.2500	(65 ksi) A572-65

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight plf
1/2	B	No	Inside Pole	149.00 - 6.00	3	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1/2	B	No	Inside Pole	148.00 - 6.00	2	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1/2	B	No	Inside Pole	145.00 - 6.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1 5/8	B	No	Inside Pole	145.00 - 6.00	12	No Ice	0.00	1.04

tnxTower Hudson Design Group LLC 45 Beechwood Drive North Andover, MA 01845 Phone: (978) 557-5553 FAX: (978) 336-5586	Job	CT1323	Page	2 of 10
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	Client	AT&T	Designed by	kw

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _{AA} ft ² /ft	Weight plf
1 5/8	B	No	Inside Pole	125.00 - 6.00	12	1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
						No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1/2	B	No	Inside Pole	125.00 - 6.00	1	1" Ice	0.00	1.04
						No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1/2	B	No	Inside Pole	95.00 - 6.00	2	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
						No Ice	0.00	0.25
1/2	B	No	Inside Pole	80.00 - 6.00	1	1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
						No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
1/2	B	No	Inside Pole	76.00 - 6.00	1	1" Ice	0.00	0.25
						No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25

WR-VG122ST-BRDA (AT&T - proposed)	B	No	Inside Pole	135.00 - 6.00	4	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
FB-L98B-002	B	No	Inside Pole	135.00 - 6.00	2	1" Ice	0.00	0.25
						No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight lb
3' Side Mount Standoff	A	From Face	1.50	0.0000	148.00	No Ice	1.50	1.50	45.00
			0.00			1/2" Ice	2.20	2.20	70.00
			0.00			1" Ice	2.90	2.90	95.00
3' Side Mount Standoff	B	From Face	1.50	0.0000	148.00	No Ice	1.50	1.50	45.00
			0.00			1/2" Ice	2.20	2.20	70.00
			0.00			1" Ice	2.90	2.90	95.00
3' Side Mount Standoff	C	From Face	1.50	0.0000	148.00	No Ice	1.50	1.50	45.00
			0.00			1/2" Ice	2.20	2.20	70.00
			0.00			1" Ice	2.90	2.90	95.00
ANT150D3	A	From Face	3.00	0.0000	150.50	No Ice	1.60	1.60	18.00
			0.00			1/2" Ice	2.88	2.88	23.40
			0.00			1" Ice	4.16	4.16	28.80
ANT150D3	B	From Face	3.00	0.0000	150.50	No Ice	1.60	1.60	18.00
			0.00			1/2" Ice	2.88	2.88	23.40
			0.00			1" Ice	4.16	4.16	28.80
ANT150D3	C	From Face	3.00	0.0000	150.50	No Ice	1.60	1.60	18.00
			0.00			1/2" Ice	2.88	2.88	23.40
			0.00			1" Ice	4.16	4.16	28.80
1' Side Mount Standoff	A	From Leg	0.50	0.0000	148.00	No Ice	1.00	1.00	30.00
			0.00			1/2" Ice	1.50	1.50	50.00
			0.00			1" Ice	2.00	2.00	70.00
1' Side Mount Standoff	B	From Leg	0.50	0.0000	148.00	No Ice	1.00	1.00	30.00
			0.00			1/2" Ice	1.50	1.50	50.00

tnxTower Hudson Design Group LLC 45 Beechwood Drive North Andover, MA 01845 Phone: (978) 557-5553 FAX: (978) 336-5586	Job	CT1323	Page	3 of 10
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	Client	AT&T	Designed by	kw

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight lb
*****			0.00			1" Ice	2.00	2.00	70.00
PIROD 12' Platform w / handrails	A	None		0.0000	145.00	No Ice	26.30	26.30	1920.00
						1/2" Ice	35.60	35.60	2340.00
						1" Ice	44.90	44.90	2760.00
(4) Panel Antenna 96"x12"x9" w/mount pipe	A	From Face	3.50 0.00 0.00	0.0000	145.00	No Ice	11.75	11.72	82.11
						1/2" Ice	12.47	13.25	182.71
						1" Ice	13.18	14.61	294.51
(4) Panel Antenna 96"x12"x9" w/mount pipe	B	From Face	3.50 0.00 0.00	0.0000	145.00	No Ice	11.75	11.72	82.11
						1/2" Ice	12.47	13.25	182.71
						1" Ice	13.18	14.61	294.51
(4) Panel Antenna 96"x12"x9" w/mount pipe	C	From Face	3.50 0.00 0.00	0.0000	145.00	No Ice	11.75	11.72	82.11
						1/2" Ice	12.47	13.25	182.71
						1" Ice	13.18	14.61	294.51
(8) RRUS 11	A	From Face	2.50 0.00 0.00	0.0000	145.00	No Ice	2.78	1.19	50.70
						1/2" Ice	2.99	1.33	71.50
						1" Ice	3.21	1.49	95.33
(8) RRUS 11	B	From Face	2.50 0.00 0.00	0.0000	145.00	No Ice	2.78	1.19	50.70
						1/2" Ice	2.99	1.33	71.50
						1" Ice	3.21	1.49	95.33
(8) RRUS 11	C	From Face	2.50 0.00 0.00	0.0000	145.00	No Ice	2.78	1.19	50.70
						1/2" Ice	2.99	1.33	71.50
						1" Ice	3.21	1.49	95.33
(2) FD9R6004 Diplexer	A	From Face	2.50 0.00 0.00	0.0000	145.00	No Ice	0.31	0.08	2.60
						1/2" Ice	0.39	0.12	4.90
						1" Ice	0.47	0.17	8.29
(2) FD9R6004 Diplexer	B	From Face	2.50 0.00 0.00	0.0000	145.00	No Ice	0.31	0.08	2.60
						1/2" Ice	0.39	0.12	4.90
						1" Ice	0.47	0.17	8.29
(2) FD9R6004 Diplexer	C	From Face	2.50 0.00 0.00	0.0000	145.00	No Ice	0.31	0.08	2.60
						1/2" Ice	0.39	0.12	4.90
						1" Ice	0.47	0.17	8.29
DC6-48-60-18-8F	A	From Face	2.50 0.00 0.00	0.0000	145.00	No Ice	0.79	0.79	20.00
						1/2" Ice	1.27	1.27	35.12
						1" Ice	1.45	1.45	52.57
DC6-48-60-18-8F	B	From Face	2.50 0.00 0.00	0.0000	145.00	No Ice	0.79	0.79	20.00
						1/2" Ice	1.27	1.27	35.12
						1" Ice	1.45	1.45	52.57
DC6-48-60-18-8F	C	From Face	2.50 0.00 0.00	0.0000	145.00	No Ice	0.79	0.79	20.00
						1/2" Ice	1.27	1.27	35.12
						1" Ice	1.45	1.45	52.57
SC412-HF2LDF	C	From Face	2.50 0.00 0.00	0.0000	145.00	No Ice	6.26	6.26	79.00
						1/2" Ice	12.63	12.63	150.33
						1" Ice	14.79	14.79	235.13

PIROD 12' T-Frame (AT&T - proposed)	A	From Face	2.00 0.00 0.00	0.0000	135.00	No Ice	12.20	12.20	360.00
						1/2" Ice	17.60	17.60	490.00
						1" Ice	23.00	23.00	620.00
PIROD 12' T-Frame	B	From Face	2.00 0.00 0.00	0.0000	135.00	No Ice	12.20	12.20	360.00
						1/2" Ice	17.60	17.60	490.00
						1" Ice	23.00	23.00	620.00
PIROD 12' T-Frame	C	From Face	2.00 0.00 0.00	0.0000	135.00	No Ice	12.20	12.20	360.00
						1/2" Ice	17.60	17.60	490.00
						1" Ice	23.00	23.00	620.00
(2) EPBQ-654L8H8-L2 w/mount pipe	A	From Face	3.50 0.00 0.00	0.0000	135.00	No Ice	18.33	9.17	118.85
						1/2" Ice	19.06	10.68	235.80
						1" Ice	19.81	12.22	363.23

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	Project	150 ft Monopole	Date	09:36:21 08/15/18
	Client	AT&T	Designed by	kw

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight lb
(2) EPBQ-654L8H8-L2 w/mount pipe	B	From Face	3.50 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	18.33 19.06 19.81	9.17 10.68 12.22	118.85 235.80 363.23
(2) EPBQ-654L8H8-L2 w/mount pipe	C	From Face	3.50 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	18.33 19.06 19.81	9.17 10.68 12.22	118.85 235.80 363.23
HPA65R-BU8A w/mount pipe	A	From Face	3.50 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	11.52 12.24 12.94	10.63 12.16 13.50	109.41 204.04 309.78
HPA65R-BU8A w/mount pipe	B	From Face	3.50 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	11.52 12.24 12.94	10.63 12.16 13.50	109.41 204.04 309.78
HPA65R-BU8A w/mount pipe	C	From Face	3.50 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	11.52 12.24 12.94	10.63 12.16 13.50	109.41 204.04 309.78
B14 4478	A	From Face	2.50 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	0.93 1.05 1.19	60.00 74.37 91.23
B14 4478	B	From Face	2.50 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	0.93 1.05 1.19	60.00 74.37 91.23
B14 4478	C	From Face	2.50 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	0.93 1.05 1.19	60.00 74.37 91.23
Ericsson RRUS-32	A	From Face	2.50 3.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	3.31 3.56 3.81	2.42 2.64 2.86	77.00 104.93 136.47
Ericsson RRUS-32	B	From Face	2.50 3.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	3.31 3.56 3.81	2.42 2.64 2.86	77.00 104.93 136.47
Ericsson RRUS-32	C	From Face	2.50 3.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	3.31 3.56 3.81	2.42 2.64 2.86	77.00 104.93 136.47
Radio 4449	A	From Face	2.50 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.16 1.30 1.45	74.00 90.16 108.95
Radio 4449	B	From Face	2.50 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.16 1.30 1.45	74.00 90.16 108.95
Radio 4449	C	From Face	2.50 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.16 1.30 1.45	74.00 90.16 108.95
B25 4415	A	From Face	2.50 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	0.93 1.05 1.19	60.00 74.37 91.23
B25 4415	B	From Face	2.50 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	0.93 1.05 1.19	60.00 74.37 91.23
B25 4415	C	From Face	2.50 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	0.93 1.05 1.19	60.00 74.37 91.23
(2) DC6-48-60-18-8C	A	From Face	2.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	0.79 1.27 1.45	0.79 1.27 1.45	20.00 35.12 52.57
(2) DC6-48-60-18-8C	B	From Face	2.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	0.79 1.27 1.45	0.79 1.27 1.45	20.00 35.12 52.57

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	Client	AT&T	Designed by	kw

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
(2) DC6-48-60-18-8C	C	From Face	2.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	0.79 1.27 1.45	0.79 1.27 1.45	20.00 35.12 52.57

RRH 4426 (AT&T - future)	A	From Face	2.50 3.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	2.66 2.88 3.10	1.59 1.77 1.96	64.00 84.35 107.85
RRH 4426	B	From Face	2.50 3.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	2.66 2.88 3.10	1.59 1.77 1.96	64.00 84.35 107.85
RRH 4426	C	From Face	2.50 3.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	2.66 2.88 3.10	1.59 1.77 1.96	64.00 84.35 107.85
Ericsson RRUS-E2	A	From Face	2.50 3.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	3.31 3.56 3.81	2.42 2.64 2.86	77.00 104.93 136.47
Ericsson RRUS-E2	B	From Face	2.50 3.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	3.31 3.56 3.81	2.42 2.64 2.86	77.00 104.93 136.47
Ericsson RRUS-E2	C	From Face	2.50 3.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	3.31 3.56 3.81	2.42 2.64 2.86	77.00 104.93 136.47
(2) DC6-48-60-18-8C	A	From Face	2.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	0.79 1.27 1.45	0.79 1.27 1.45	20.00 35.12 52.57
(2) DC6-48-60-18-8C	B	From Face	2.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	0.79 1.27 1.45	0.79 1.27 1.45	20.00 35.12 52.57
(2) DC6-48-60-18-8C	C	From Face	2.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	0.79 1.27 1.45	0.79 1.27 1.45	20.00 35.12 52.57

PiROD 12' Platform w/ handrails	A	None		0.0000	125.00	No Ice 1/2" Ice 1" Ice	26.30 35.60 44.90	26.30 35.60 44.90	1920.00 2340.00 2760.00
(4) Panel Antenna 96"x12"x9" w/mount pipe	A	From Face	3.50 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	11.75 12.47 13.18	11.72 13.25 14.61	82.11 182.71 294.51
(4) Panel Antenna 96"x12"x9" w/mount pipe	B	From Face	3.50 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	11.75 12.47 13.18	11.72 13.25 14.61	82.11 182.71 294.51
(4) Panel Antenna 96"x12"x9" w/mount pipe	C	From Face	3.50 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	11.75 12.47 13.18	11.72 13.25 14.61	82.11 182.71 294.51
(8) RRUS 11	A	From Face	2.50 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	50.70 71.50 95.33
(8) RRUS 11	B	From Face	2.50 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	50.70 71.50 95.33
(8) RRUS 11	C	From Face	2.50 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	50.70 71.50 95.33
(2) FD9R6004 Diplexer	A	From Face	2.50 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	0.31 0.39 0.47	0.08 0.12 0.17	2.60 4.90 8.29
(2) FD9R6004 Diplexer	B	From Face	2.50	0.0000	125.00	No Ice	0.31	0.08	2.60

tnxTower Hudson Design Group LLC 45 Beechwood Drive North Andover, MA 01845 Phone: (978) 557-5553 FAX: (978) 336-5586	Job	CT1323	Page	6 of 10
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	Client	AT&T	Designed by	kw

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
(2) FD9R6004 Diplexer	C	From Face	0.00	0.0000	125.00	1/2" Ice	0.39	0.12	4.90
			0.00			1" Ice	0.47	0.17	8.29
			2.50			No Ice	0.31	0.08	2.60
			0.00			1/2" Ice	0.39	0.12	4.90
DC6-48-60-18-8F	A	From Face	0.00	0.0000	125.00	1" Ice	0.47	0.17	8.29
			2.50			No Ice	0.79	0.79	20.00
			0.00			1/2" Ice	1.27	1.27	35.12
			0.00			1" Ice	1.45	1.45	52.57
DC6-48-60-18-8F	B	From Face	2.50	0.0000	125.00	No Ice	0.79	0.79	20.00
			0.00			1/2" Ice	1.27	1.27	35.12
			0.00			1" Ice	1.45	1.45	52.57
			2.50			No Ice	0.79	0.79	20.00
DC6-48-60-18-8F	C	From Face	0.00	0.0000	125.00	1/2" Ice	1.27	1.27	35.12
			0.00			1" Ice	1.45	1.45	52.57
			2.50			No Ice	0.79	0.79	20.00
			0.00			1/2" Ice	1.27	1.27	35.12
SC412-HF2LDF	C	From Face	0.00	0.0000	125.00	1" Ice	1.45	1.45	52.57
			2.50			No Ice	6.23	6.23	79.00
			0.00			1/2" Ice	12.63	12.63	150.33
			0.00			1" Ice	14.79	14.79	235.13

1' Side Mount Standoff	A	From Leg	0.50	0.0000	95.00	No Ice	1.00	1.00	30.00
			0.00			1/2" Ice	1.50	1.50	50.00
			0.00			1" Ice	2.00	2.00	70.00
1' Side Mount Standoff	B	From Leg	0.50	0.0000	95.00	No Ice	1.00	1.00	30.00
			0.00			1/2" Ice	1.50	1.50	50.00
			0.00			1" Ice	2.00	2.00	70.00
3' Side Mount Standoff	A	From Leg	1.50	0.0000	75.00	No Ice	1.50	1.50	45.00
			0.00			1/2" Ice	2.20	2.20	70.00
			0.00			1" Ice	2.90	2.90	95.00
3' Side Mount Standoff	B	From Leg	1.50	0.0000	75.00	No Ice	1.50	1.50	45.00
			0.00			1/2" Ice	2.20	2.20	70.00
			0.00			1" Ice	2.90	2.90	95.00
DB201-L	A	From Leg	3.00	0.0000	80.00	No Ice	6.03	6.03	22.90
			0.00			1/2" Ice	9.09	9.09	104.28
			0.00			1" Ice	9.71	9.71	192.91
ANT150D3	B	From Leg	3.00	0.0000	75.50	No Ice	1.60	1.60	18.00
			0.00			1/2" Ice	2.88	2.88	23.40
			0.00			1" Ice	4.16	4.16	28.80

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight lb
HP2-102	A	Paraboloid w/Shroud (HP)	From Leg	2.00	0.0000		148.00	2.00	No Ice	3.14
				0.00					1/2" Ice	3.41
				0.00					1" Ice	3.67
HP2-102	B	Paraboloid w/Shroud (HP)	From Leg	2.00	0.0000		148.00	2.00	No Ice	3.14
				0.00					1/2" Ice	3.41
				0.00					1" Ice	3.67
HP2-102	A	Paraboloid w/Shroud (HP)	From Leg	2.00	0.0000		95.00	2.00	No Ice	3.14
				0.00					1/2" Ice	3.41
				0.00					1" Ice	3.67

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Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight lb	
HP2-102	B	Paraboloid w/Shroud (HP)	From Leg	2.00	0.0000		95.00	2.00	No Ice	3.14	25.00
				0.00					1/2" Ice	3.41	42.49
				0.00					1" Ice	3.67	59.98

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service

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Comb. No.	Description
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	33	120504.27	-37.72	-21662.38
	Max. H _x	20	72457.99	81658.56	242.14
	Max. H _z	2	72457.99	300.42	81665.84
	Max. M _x	2	8878143.40	300.42	81665.84
	Max. M _z	8	8863674.53	-81540.68	-102.61
	Max. Torsion	16	2314.72	40619.58	-70839.46
	Min. Vert	11	54343.49	-70574.48	-41093.09
	Min. H _x	8	72457.99	-81540.68	-102.61
	Min. H _z	14	72457.99	-187.78	-81755.62
	Min. M _x	14	-8889927.47	-187.78	-81755.62
	Min. M _z	20	-8877047.25	81658.56	242.14
	Min. Torsion	4	-2299.66	-40681.48	70667.60

Tower Mast Reaction Summary

Load Combination	Vertical lb	Shear _x lb	Shear _z lb	Overturning Moment, M _x lb-ft	Overturning Moment, M _z lb-ft	Torque lb-ft
Dead Only	60381.66	0.00	0.00	294.62	-461.76	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	72457.99	-300.42	-81665.84	-8878143.40	36483.85	1725.76
0.9 Dead+1.6 Wind 0 deg - No Ice	54343.49	-300.42	-81665.84	-8836757.14	36453.23	1722.83
1.2 Dead+1.6 Wind 30 deg - No Ice	72457.99	40681.48	-70667.60	-7681640.07	-4421157.98	2299.66
0.9 Dead+1.6 Wind 30 deg - No Ice	54343.49	40681.48	-70667.60	-7645842.19	-4400361.10	2294.51
1.2 Dead+1.6 Wind 60 deg - No Ice	72457.99	70586.40	-40753.07	-4429066.80	-7672561.65	1532.89
0.9 Dead+1.6 Wind 60 deg - No Ice	54343.49	70586.39	-40753.07	-4408465.45	-7636572.53	1526.86
1.2 Dead+1.6 Wind 90 deg - No Ice	72457.99	81540.68	102.61	13018.02	-8863674.53	355.37
0.9 Dead+1.6 Wind 90 deg - No Ice	54343.49	81540.68	102.61	12864.22	-8822120.68	350.07
1.2 Dead+1.6 Wind 120 deg - No Ice	72457.99	70574.48	41093.09	4471705.83	-7671061.13	-193.08
0.9 Dead+1.6 Wind 120 deg - No Ice	54343.49	70574.48	41093.09	4450719.04	-7635078.72	-196.15
1.2 Dead+1.6 Wind 150 deg - No Ice	72457.99	40867.05	70855.92	7705538.74	-4444016.83	-1106.06
0.9 Dead+1.6 Wind 150 deg - No Ice	54343.49	40867.05	70855.92	7669443.50	-4423111.39	-1106.12
1.2 Dead+1.6 Wind 180 deg - No Ice	72457.99	187.78	81755.62	8889927.47	-23720.86	-1946.63

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Load Combination	Vertical lb	Shear _x lb	Shear _y lb	Overturning Moment, M _x lb-ft	Overturning Moment, M _y lb-ft	Torque lb-ft
0.9 Dead+1.6 Wind 180 deg - No Ice	54343.49	187.78	81755.62	8848299.69	-23467.61	-1943.69
1.2 Dead+1.6 Wind 210 deg - No Ice	72457.99	-40619.58	70839.46	7703535.92	4412384.87	-2314.72
0.9 Dead+1.6 Wind 210 deg - No Ice	54343.49	-40619.58	70839.46	7667450.33	4391911.41	-2309.58
1.2 Dead+1.6 Wind 240 deg - No Ice	72457.99	-70632.52	40779.70	4433069.49	7677108.66	-1532.89
0.9 Dead+1.6 Wind 240 deg - No Ice	54343.49	-70632.52	40779.70	4412265.31	7641381.31	-1526.85
1.2 Dead+1.6 Wind 270 deg - No Ice	72457.99	-81658.56	-242.14	-29497.50	8877047.25	-340.18
0.9 Dead+1.6 Wind 270 deg - No Ice	54343.49	-81658.56	-242.14	-29450.71	8835715.12	-334.89
1.2 Dead+1.6 Wind 300 deg - No Ice	72457.99	-70708.56	-41040.43	-4464469.89	7686439.80	413.90
0.9 Dead+1.6 Wind 300 deg - No Ice	54343.49	-70708.56	-41040.43	-4443702.75	7650670.03	416.97
1.2 Dead+1.6 Wind 330 deg - No Ice	72457.99	-40929.50	-70819.87	-7700359.02	4450582.40	1106.02
0.9 Dead+1.6 Wind 330 deg - No Ice	54343.49	-40929.50	-70819.87	-7664474.48	4429930.29	1106.09
1.2 Dead+1.0 Ice+1.0 Temp	120504.27	0.00	0.00	668.94	-1543.34	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	120504.27	-60.36	-21644.34	-2320226.40	5980.44	710.03
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	120504.27	10791.75	-18733.08	-2007820.84	-1158311.89	1169.06
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	120504.27	18716.77	-10806.13	-1157689.71	-2008200.81	1168.42
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	120504.27	21619.20	20.61	3401.24	-2319493.72	854.70
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	120504.27	18714.37	10874.44	1167912.67	-2007899.82	458.27
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	120504.27	10829.03	18770.91	2014196.40	-1163021.82	-144.71
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	120504.27	37.72	21662.38	2324103.88	-6405.70	-754.26
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	120504.27	-10779.31	18767.61	2013778.61	1153459.70	-1171.78
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	120504.27	-18726.03	10811.48	1159961.27	2006088.45	-1168.42
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	120504.27	-21642.88	-48.65	-5345.58	2319199.35	-851.95
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	120504.27	-18741.31	-10863.86	-1164979.19	2008015.13	-414.10
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	120504.27	-10841.57	-18763.67	-2011682.46	1161320.44	144.70
Dead+Wind 0 deg - Service	60381.66	-59.29	-16116.68	-1748059.03	6823.04	342.27
Dead+Wind 30 deg - Service	60381.66	8028.45	-13946.19	-1512436.60	-870977.44	456.96
Dead+Wind 60 deg - Service	60381.66	13930.16	-8042.58	-871937.86	-1511242.99	305.36
Dead+Wind 90 deg - Service	60381.66	16091.98	20.25	2797.75	-1745798.56	71.94
Dead+Wind 120 deg - Service	60381.66	13927.81	8109.68	880806.62	-1510953.42	-36.93
Dead+Wind 150 deg - Service	60381.66	8065.08	13983.35	1517621.15	-875483.93	-218.29
Dead+Wind 180 deg - Service	60381.66	37.06	16134.40	1750851.31	-5032.39	-385.71
Dead+Wind 210 deg - Service	60381.66	-8016.24	13980.10	1517221.59	868529.38	-459.65
Dead+Wind 240 deg - Service	60381.66	-13939.26	8047.84	873196.33	1511418.08	-305.36
Dead+Wind 270 deg - Service	60381.66	-16115.24	-47.79	-5574.25	1747715.80	-69.25
Dead+Wind 300 deg - Service	60381.66	-13954.27	-8099.29	-878915.65	1513264.11	80.36
Dead+Wind 330 deg - Service	60381.66	-8077.40	-13976.24	-1516133.58	876055.18	218.28

Stiffened or Unstiffened, UngROUTed, Circular Base Plate - Any Rod Material

TIA Rev G

Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#:	CT1323
Site Name:	0
App #:	0
Pole Manufacturer:	Other

Anchor Rod Data

Qty:	30
Diam:	2.25 in
Rod Material:	A615-J
Strength (Fu):	100 ksi
Yield (Fy):	75 ksi
Bolt Circle:	82 in

Plate Data

Diam:	87.75 in
Thick:	2.75 in
Grade:	50 ksi
Single-Rod B-eff:	7.86 in

Stiffener Data (Welding at both sides)

Config:	0	*
Weld Type:		
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data

Diam:	74.32 in
Thick:	0.5625 in
Grade:	65 ksi
# of Sides:	18 "0" IF Round
Fu	80 ksi
Reinf. Fillet Weld	0 "0" if None

Reactions

Mu:	8895	ft-kips
Axial, Pu:	72	kips
Shear, Vu:	82	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

If No stiffeners, Criteria: AISC LRFD <-Only Applicable to Unstiffened Cases

Anchor Rod Results

Max Rod (Cu+ Vu/η): 181.4 Kips
 Allowable Axial, Φ^*Fu^*Anet : 260.0 Kips
 Anchor Rod Stress Ratio: 69.8% **Pass**

Rigid
AISC LRFD
Φ^*Tn

Base Plate Results

Base Plate Stress: 28.7 ksi
 Allowable Plate Stress: 45.0 ksi
 Base Plate Stress Ratio: 63.8% **Pass**

Flexural Check

Rigid
AISC LRFD
Φ^*Fy
Y.L. Length: 34.65

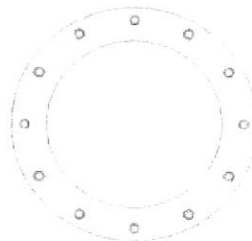
n/a

Stiffener Results

Horizontal Weld : n/a
 Vertical Weld: n/a
 Plate Flex+Shear, $fb/Fb+(fv/Fv)^2$: n/a
 Plate Tension+Shear, $ft/Ft+(fv/Fv)^2$: n/a
 Plate Comp. (AISC Bracket): n/a

Pole Results

Pole Punching Shear Check: n/a



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Monopole Pier and Pad Foundation

BU # : CT1323

Site Name:

App. Number:

TIA-222 Revision: **G**

Design Reactions		
Shear, S:	82	kips
Moment, M:	8895	ft-kips
Tower Height, H:	149	ft
Tower Weight, Wt:	73	kips
Base Diameter, BD:	6.19	ft

Foundation Dimensions		
Depth, D:	6	ft
Pad Width, W:	33.5	ft
Neglected Depth, N:	0	ft
Thickness, T:	2.25	ft
Pier Diameter, Pd:	9.00	ft
Ext. Above Grade, E:	0.50	ft
BP Dist. Above Pier:	3	in.
Clear Cover, Cc:	3.0	in

Soil Properties		
Soil Unit Weight, y:	0.100	kcf
Ult. Bearing Capacity, Bc:	12.0	ksf
Angle of Friction, Φ:	30	deg
Cohesion, Co:	0.000	ksf
Passive Pressure, Pp:	0.000	ksf
Base Friction, μ:	0.45	

Material Properties		
Rebar Yield Strength, Fy:	60000	psi
Concrete Strength, F'c:	4500	psi
Concrete Unit Weight, δc:	0.150	kcf
Seismic Zone, z:	2	

Rebar Properties		
Pier Rebar Size, Sp:	9	
Pier Rebar Quantity, mp:	60	46
Pad Rebar Size, Spad:	9	
Pad Rebar Quantity, mpad:	79	32
Pier Tie Size, St:	5	3
Tie Quantity, mt:	7	8

Design Checks			
	Capacity/ Availability	Demand/ Limits	Check
Req'd Pier Diam.(ft)	9	8.19	OK
Overturning (ft-kips)	12471.86	8895.00	71.3%
Shear Capacity (kips)	319.29	82.00	25.7%
Bearing (ksf)	9.00	2.40	26.7%
Pad Shear - 1-way (kips)	948.00	715.10	75.4%
Pad Shear - 2-way (kips)	1947.49	135.03	6.9%
Pad Moment Capacity (k-ft)	7766.96	3620.41	46.6%
Pier Moment Capacity (k-ft)	9815.92	9243.50	94.2%

Attachment 3



Sanket Joshi
SAI Communications
12 Industrial Way
Salem, NH 03079
Sanket.Joshi@sai-comm.com

September 19, 2018

Connecticut Siting Council

Subject: AT&T Wireless, S2032 – Easton, CT

Dear Connecticut Siting Council:

At the request of AT&T Wireless, SAI Communications has performed an assessment of the RF Power Density at the proposed site located at 515 Morehouse Road, Easton, CT. Calculations were done in compliance with FCC OET Bulletin 65 and incorporating an additional 10 dB Off-Beam Pattern Adjustment which results in a number that is 10 percent of the standard "Worst-Case" calculation. This report provides an FCC compliance assessment based on an analysis that all transmitters are simultaneously operating at full power and pointing directly at the ground.

Power Density formula:

$$S = \frac{2.56 * 1.64 * ERP * 0.1}{4 * \pi * R^2}$$

Transmission Mode	Antenna Centerline AGL (ft)	Frequency (MHz)	Number of Channels	Effective Radiated Power per Channel (Watts)	Power Density (mW/cm ²)	Standard Limits (mW/cm ²)	% MPE (Uncontrolled/General Public)
AT&T LTE	135	722	2	3,459	0.0137	0.4813	2.84%
AT&T LTE	135	851	1	3,972	0.0078	0.5673	1.38%
AT&T LTE	135	1930	2	2,723	0.0107	1	1.07%
AT&T LTE	135	2310	1	3,126	0.0062	1	0.62%
Others							1.12%
Total							7.03%

Conclusion: AT&T's proposed antenna installation along with other carriers is calculated to be within 7.03% of FCC Standard for General Public/Uncontrolled Maximum Permissible Exposure (MPE).

Sincerely,

Sanket Y Joshi
SAI Communications

Attachment 4

8220-100 series

RUGGED POWER



8220-100 series
1 of 5

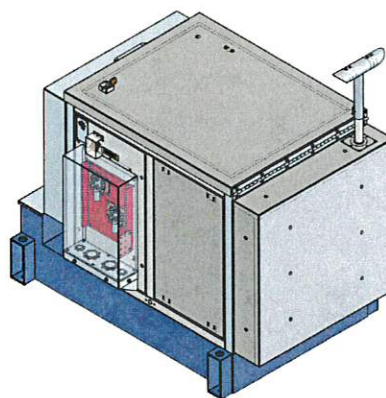
Founded in 1979 Polar Power specialized in solar photovoltaic systems, solar air conditioning and refrigeration. We developed and provided photovoltaic charging controls for telecommunications in the 1980s along with DC generators for the military. In 1994 we were first to provide DC generators with remote control and monitoring to the telecommunications industry.

Polar's success is based on engineering generators to meet the very specific needs of each application. Telecom site optimization is best met with the DC generator technology as the loads and batteries are DC. It makes no sense to install an AC generator and convert the output to DC. The AC generators are designed for a wide range of applications and they are not specifically produced for telecom applications so there are issues with reliability, space, and fuel efficiency.

Polar can save you considerable time and cost in permitting, installing, purchasing, and maintaining a backup generator. We reduce CAPEX and OPEX costs while improving backup reliability.

Model Number:

8220-100-D-15-03 - Diesel 15 kW -48 VDC



Intertek 4003706

Conforms to UL STD 2200

Certified to CSA STD C22.2 No. 100

Meets EPA Emission Regulations

CA/MA Emissions Compliant

2 year standard warranty



The concepts and features behind Polar's Hybrid application generator for telecommunications include:

SMALL FOOTPRINT. Polar's DC generator is considerably smaller in size than an AC generator. You can now backup sites that could not accommodate an AC generator. Smaller also means less cost for space leasing.

LOW MAINTENANCE. Due to oversized oil sump, and oil/fuel filtration system.

LOW ACOUSTIC NOISE. <62 dBA @ 7 meters for diesel, and low vibration so as not to disturb the local residents or building landlords.

LIGHTWEIGHT. Up to 1/3 the weight of a comparable AC generator.

CORROSION RESISTANT. All-aluminum enclosure with stainless hardware for low maintenance, and long service life.

FUEL EFFICIENT. Up to 85% fuel savings due to smaller engine displacement, high efficiency alternator, and variable speed operation.

RODENT RESISTANT. Small animals can quickly destroy a generator set by gnawing on wires, fuel lines, radiator hoses, etc. Cooling air inlets and outlets have perforated aluminum screens to keep small rodents and large insects out. Stainless steel wire braid is placed over fuel and radiator lines to prevent damage.

SUPERCAPACITOR STARTER. Failure to start is the number one problem plaguing generator reliability and typically this is caused by a bad starting battery. Polar unique design has replaced the starting battery with a Super Capacitor. Capacitors are more reliable and last longer than batteries (10-15 year life).

LONG LIFE. Controls and wire harnesses are designed to exceed a 20 year life. Higher grade, longer life electrical wire (UL 3173), weather tight connectors, gold plated connector pins on signal circuits. No transfer switches are required.

ADVANCED MONITORING. Remote diagnostics, control, and monitoring. Ethernet and RS232 standard, with optional SNMP.

COMPARING THE COST OF AC vs DC

	AC	DC
Transfer switch required	Yes	No
Rectifier	Yes	No
Permitting costs	\$\$	\$
Shipping to site and installation cost	\$\$	\$
Site preparation/reinforcing structures	\$\$\$	\$
Ethernet/RS232 remote control and monitoring	Extra	Standard

PERMITTING IS FACILITATED

- Small engine horsepower
- DC generator is fully isolated from the utility grid
- Low acoustic noise
- Incorporates all requirements made by local Fire Marshals

8220 ALTERNATOR FEATURES

- No mechanical adjustments
- Very lightweight
- High quality electrical output
- Voltage and current regulation
- Up to 94% efficiency
- -40° to 70° C operational range
- Class 220 C insulation
- Anodized type III process for aluminum parts
- Nickel plating for steel parts
- Stator is varnished

8220 ALTERNATOR SPECIFICATIONS

Type	Permanent Magnets, NdFeB
Weight (lb/kg)	46.5/21
Regulation Type	Variable engine speed operation over 500 RPM range
Stator	3 phase/32 poles
Overcurrent Protection (A)	15 kW - 350
Disconnect Means	Fused Disconnect, sized for each generator size.
Voltage Range (VDC)	44 to 62
Alternator Exhaust Flow (cfm/cmm)	130 to 180 or 3.68 to 5.1
MTBF (hr)	100,000+

ENCLOSURE

Model	88-25-0100
Type	Weather Protective
Materials	Marine Grade Aluminum
Door Hardware	Pad Locked with Removable Side Panels
Mounting	Secure Mounting Tabs

STARTER SUPERCAPACITOR SPECIFICATIONS

Model	20-16-0001
Storage Rating (Farads)	500
Voltage (VDC)	13-14.4
Weight (lb/kg)	12.1/5.5
Operating Temperature (°C/°F)	-40 to 65 or -40 to 149
Service Life (year)	10 to 15

CHARGER SPECIFICATIONS

Model	00-10-0015
Input Voltage (VDC)	28.8 to 60
Output Voltage (VDC)	14 to 14.4
Recharge time from 0 VDC (min)	10
Recharge time from 8 VDC (min)	2
Weight (lb/kg)	2.2/1

FUEL TANK SPECIFICATIONS

UL Rated Capacity (gal/L)	54/204
Tank Alarms	Yes
Visual Gages	Yes
Catch Basin (gal/L)	5/19
Listings	UL 142 (double wall)



APPLICATION AND ENGINEERING DATA

8220-100 series
3 of 5

ENGINE SPECIFICATIONS

Engine Model	Yanmar 3TNV88
Cylinders	3 In-line
Displacement (L)	1.642
Bore (in./mm)	3.4/88
Stroke (in./mm)	3.5/90
Intake Air System	Naturally Aspirated
Engine HP	24
Emissions Compliance	EPA and CARB Certified
Variable RPM	1500 to 1850

ENVIRONMENTAL

Operating Temperature (°C/°F)	-40 to 72 or -40 to 162
Operating Humidity %	100
Cold Start Aids	Glow Plugs

FUEL SYSTEM

Type	Diesel
Fuel Pump Type	Electrical
Injector Type	Mechanical
Fuel Filtering	Paper element

SOUND EMISSIONS

Contact us for current sound data.

POWER ADJUSTMENT FOR AMBIENT CONDITIONS

Temperature Deration	1% derate for every 5.6 °C (10 °F) above 25 °C (77 °F)
Altitude Deration	3% derate for every 300 m (1000 ft) above 91 m (300 ft)

WEIGHTS AND DIMENSIONS

Dry Weight (lb/kg)	1242 / 564
Dimensions (LxWxH) (in/cm)	61 x 40 x 45/155 x 102 x 115

ENGINE LUBRICATION SYSTEM

Oil Filter Type	Full flow spin-on canister
Oil Capacity	6.7 L
Oil Pressure Switch	Yes
Oil Pressure Transducer	Optional

ENGINE COOLING SYSTEM

Type	Pressurized Aluminum Radiator
Water Pump	Belt-driven, Pre-lubed, self-sealing
Fan Type	12 V Electric Fans
Fan Quantity	6
CFM	1300
M³/hr.	2200
Fan Mode	Pusher
Temperature Switch	Yes

FUEL CONSUMPTION

	Output (kW)	gal/hr	L/hr
3TNV88	15	1.02	3.86

ENGINE COOLING

System coolant capacity (gal/L)	2.2/8.3
Maximum operation air temperature on radiator (°C/°F)	57/135
Maximum ambient temperature (°C/°F)	60/140

COMBUSTION REQUIREMENTS

Flow at rated power (cfm/cmm)	68/1.92
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EXHAUST

Exhaust flow at rated output (cfm/cmm)	135/3.82
Exhaust temperature at rated output (°C/°F)	480/900

CONTROLLER FEATURES

Controller Type.....	Supra Model 250
4-Line Plain Text LCD Display.....	Simple user interface for ease of operation
Engine Run Hours Indication.....	Standard
Programmable Start Delay.....	Standard
Run/Alarm/Maintenance Logs.....	Standard
Engine Start Sequence.....	Cyclic cranking: 5 sec on, 45 sec rest (3 attempts maximum)
Starter Supercapacitor Charger.....	Standard
Automatic Voltage Regulation with Over and Under Voltage Protection.....	Standard
Automatic Low Oil Pressure/High Oil Temperature Shutdown.....	Standard
Overcrank/Overspeed.....	Standard
Automatic High Engine Temperature Shutdown.....	Standard
Field Upgradeable Firmware.....	Standard
Glow Plug Delay	Automatic With Temperature
Engine Start Delay.....	Adjustable, Set at 60 sec
Return to Utility Delay.....	Adjustable, Set at 60 sec
Engine Cooldown.....	Adjustable, Set at 60 sec
Exerciser.....	Programmable, weekly/bi-weekly

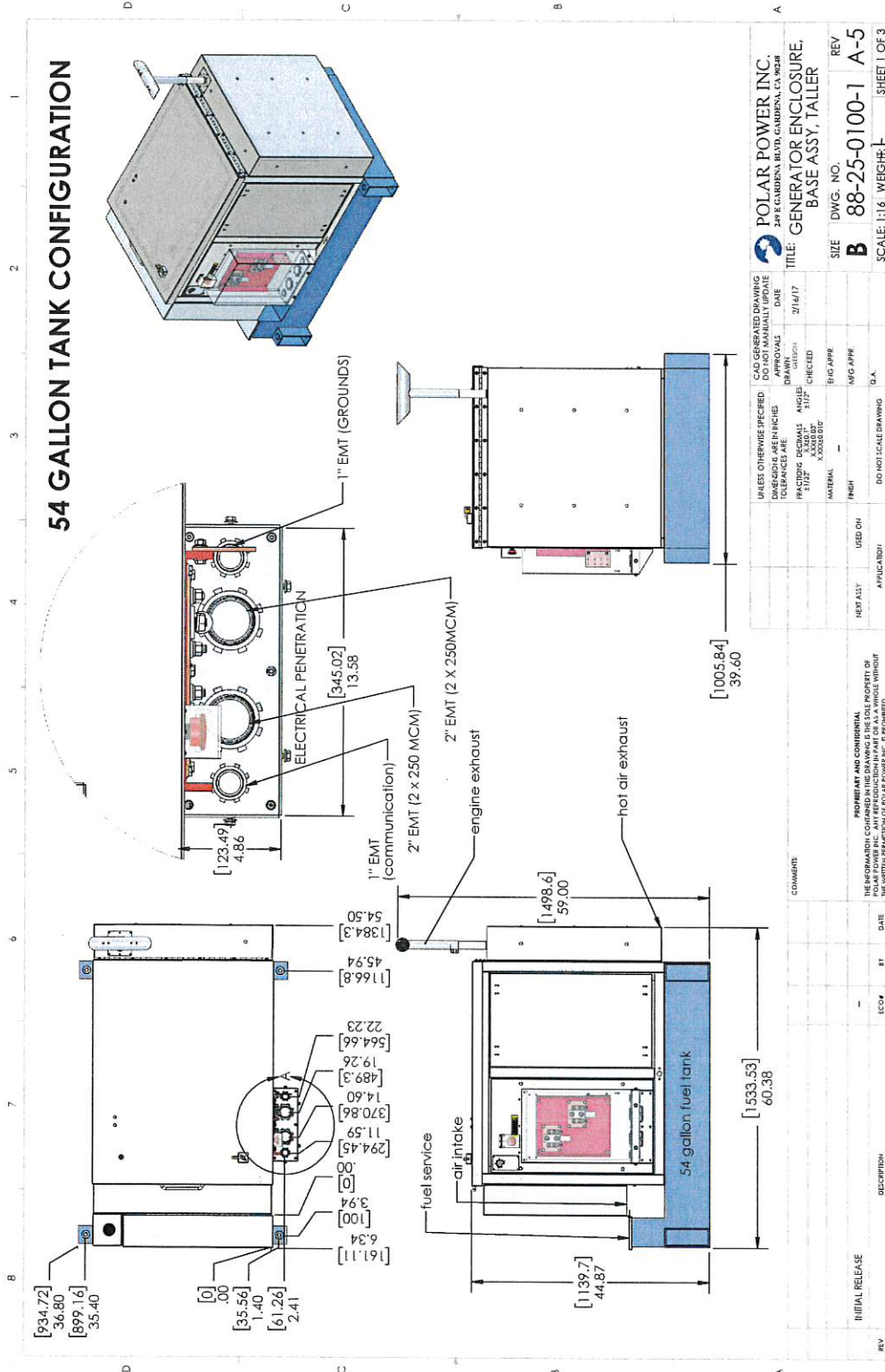
WARNING ALARMS

Low Diesel Fuel Level.....	Standard
Diesel Fuel Tank Rapture Basin.....	Standard
Low/High Supercapacitor Voltage.....	Standard
High Water Temperature.....	Standard
Low Oil Pressure.....	Standard

CONTACT CLOSURE FOR REMOTE INDICATION

Shutdown Alarm.....	Standard
Warning Alarm.....	Standard
Engine Run.....	Standard
Low Diesel Fuel Level.....	Standard
Diesel Fuel Leak.....	Standard
E-Stop Depressed.....	Standard
Fuel Level Over 90%.....	Standard

54 GALLON TANK CONFIGURATION



POLAR POWER INC. 249 E. GARDENA BLVD, GARDENA, CA 90248		DATE	2/16/17
TITLE: GENERATOR ENCLOSURE, BASE ASSY. TALLER		APPROVALS	
SIZE	DWG. NO.	REV	
B	88-25-0100-1	A-5	
SCALE: 1:16		WEIGHT	
SHEET 1 OF 3			

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. TOLERANCES: FRACTIONS: 1/32, 1/16, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/2, 2, 3, 4, 6, 8, 12, 16, 24, 36, 48, 60, 72, 96, 120, 144, 180, 240, 300, 360, 480, 600, 720, 960, 1200, 1440, 1800, 2400, 3000, 3600, 4800, 6000, 7200, 9600, 12000, 14400, 18000, 24000, 30000, 36000, 48000, 60000, 72000, 96000, 120000, 144000, 180000, 240000, 300000, 360000, 480000, 600000, 720000, 960000, 1200000, 1440000, 1800000, 2400000, 3000000, 3600000, 4800000, 6000000, 7200000, 9600000, 12000000, 14400000, 18000000, 24000000, 30000000, 36000000, 48000000, 60000000, 72000000, 96000000, 120000000, 144000000, 180000000, 240000000, 300000000, 360000000, 480000000, 600000000, 720000000, 960000000, 1200000000, 1440000000, 1800000000, 2400000000, 3000000000, 3600000000, 4800000000, 6000000000, 7200000000, 9600000000, 12000000000, 14400000000, 18000000000, 24000000000, 30000000000, 36000000000, 48000000000, 60000000000, 72000000000, 96000000000, 120000000000, 144000000000, 180000000000, 240000000000, 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