TRM
TOWER RESOURCE MANAGEMENT

EM-METROPCS-072-090728

ORIGINAL

July 27, 2009

Via Hand Delivery

S. Derek Phelps
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification**
12 Orchard Drive Ledyard, CT

Dear Mr. Phelps:

MetroPCS Massachusetts, LLC d/b/a MetroPCS ("MetroPCS") intends to install antennas on the existing 150-foot self-supporting monopole owned by SBA at 12 Orchard Drive Ledyard, Connecticut. 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 Fred B. Allyn, Mayor, Town of Ledyard. Mr. Richard and Diane Holmberg is the owner of the property on which the tower is located.

The facility consists of a 150-foot self-supporting monopole tower capable of supporting multiple carriers within a fenced compound at 12 Orchard Drive Ledyard, CT. The tower is currently occupied by T-Mobile with antennas located at the 147-foot level on the tower. MetroPCS intends to install six (6) 742-351 Kathrein antennas and six (6) 860-10025 Kathrein Remote Control Units at the 137-foot level on the tower. Associated equipment will be located on a 10' x 16' concrete equipment pad on the ground near the base of the tower, within the fenced compound. Attached behind Exhibit A are Project Plans for the proposed MetroPCS facility.

30 Lyman Street, Suite 12
Westborough, MA 01581
Fax: 508-389-1749

TRM
TOWER RESOURCE MANAGEMENT

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

1. The proposed modification will not increase the overall height of the existing tower. MetroPCS antennas will be mounted with their centerline at the 137-foot level on the 150-foot tower.

2. The proposed installation of associated equipment will not require an extension of the fenced compound.

3. The proposed installation will not increase the noise levels at the facility by six decibels or more.

4. The operation of the antennas will not increase radio frequency (RF) power density levels at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. The RF power density calculations for existing and MetroPCS antennas would be 5.27% of the FCC standard. A cumulative power density calculations table is included behind Exhibit B.

Included behind Exhibit C is a Structural Analysis Report confirming that the tower can support the existing and MetroPCS antennas, and associated equipment.

For the foregoing reasons, MetroPCS respectfully submits that the proposed antenna installation at the facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Douglas L. Culp

Real Estate Consultant for MetroPCS

860-463-5511

30 Lyman Street, Suite 12
Westborough, MA 01581
Fax: 508-389-1749

Exhibit A

Design Drawings

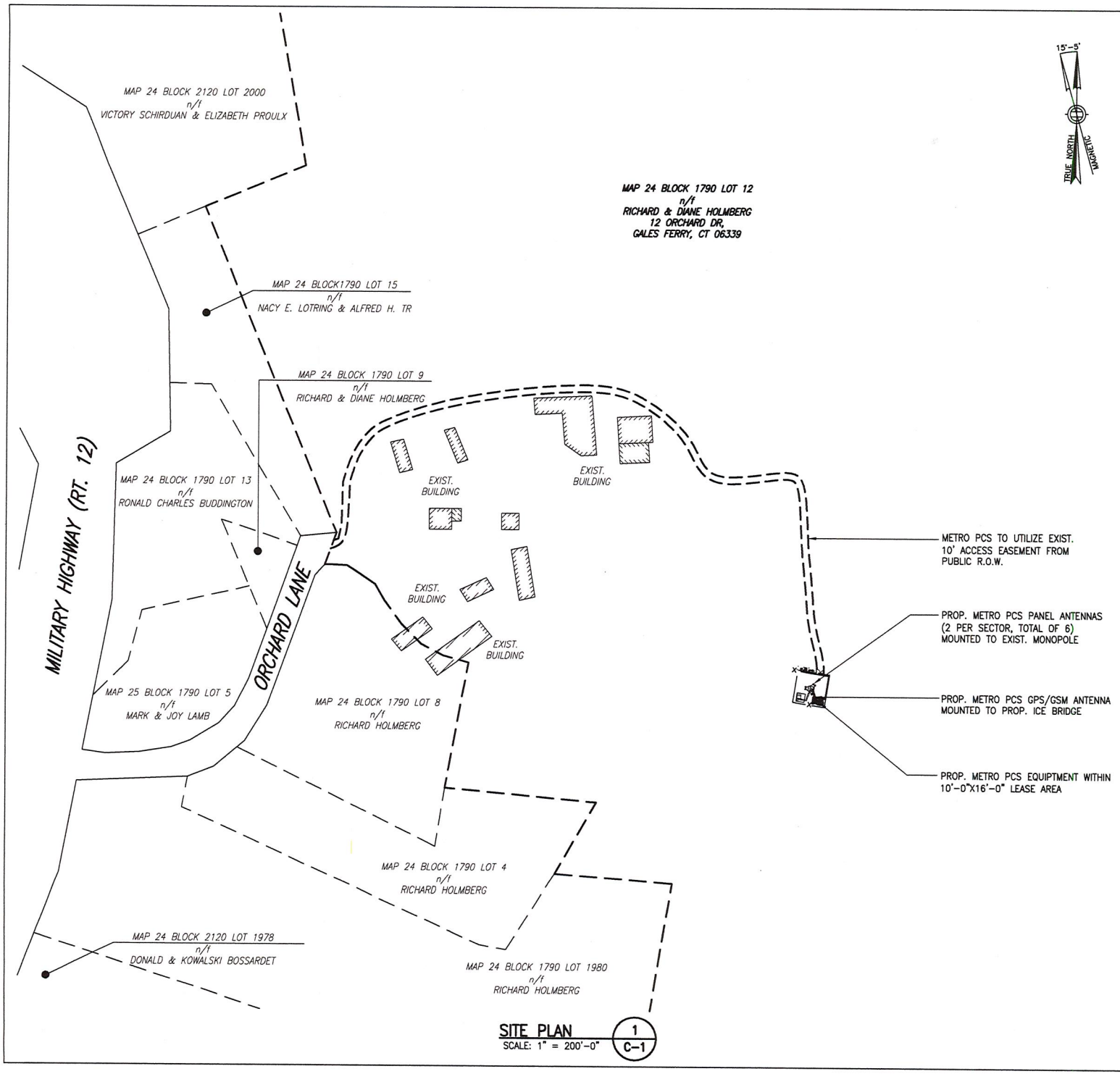
And

Antenna Cut Sheets

MetroPCS Site NLD0067A

12 Orchard Drive

Ledyard, Connecticut



SITE PLAN (1 / C-1)
SCALE: 1" = 200'-0"

metroPCS
Unlimit Yourself.

285 BILLERICA ROAD
THIRD FLOOR
CHELMSFORD, MA 01824
TEL (978) 244-7200
FAX (978) 244-7240

CHAPPELL ENGINEERING ASSOCIATES, LLC
Civil · Structural · Land Surveying

201 BOSTON POST ROAD WEST
SUITE 301
MARLBOROUGH, MA 01752
(508) 481-7400
www.chappellengineering.com

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	07/01/09	CONN. SITING COUNCIL PLAN	NWC	JMT	JMT

NOT TO SCALE | DESIGNED BY: JMT | DRAWN BY: ACG

APPROVALS

SITE OWNER — DATE

CONSTRUCTION MANAGER — DATE

RF ENGINEER — DATE

SITE ACQUISITION — DATE

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

SITE ID
NLD0067A

SITE NAME
SBA ORCHARD LANE
LEDYARD

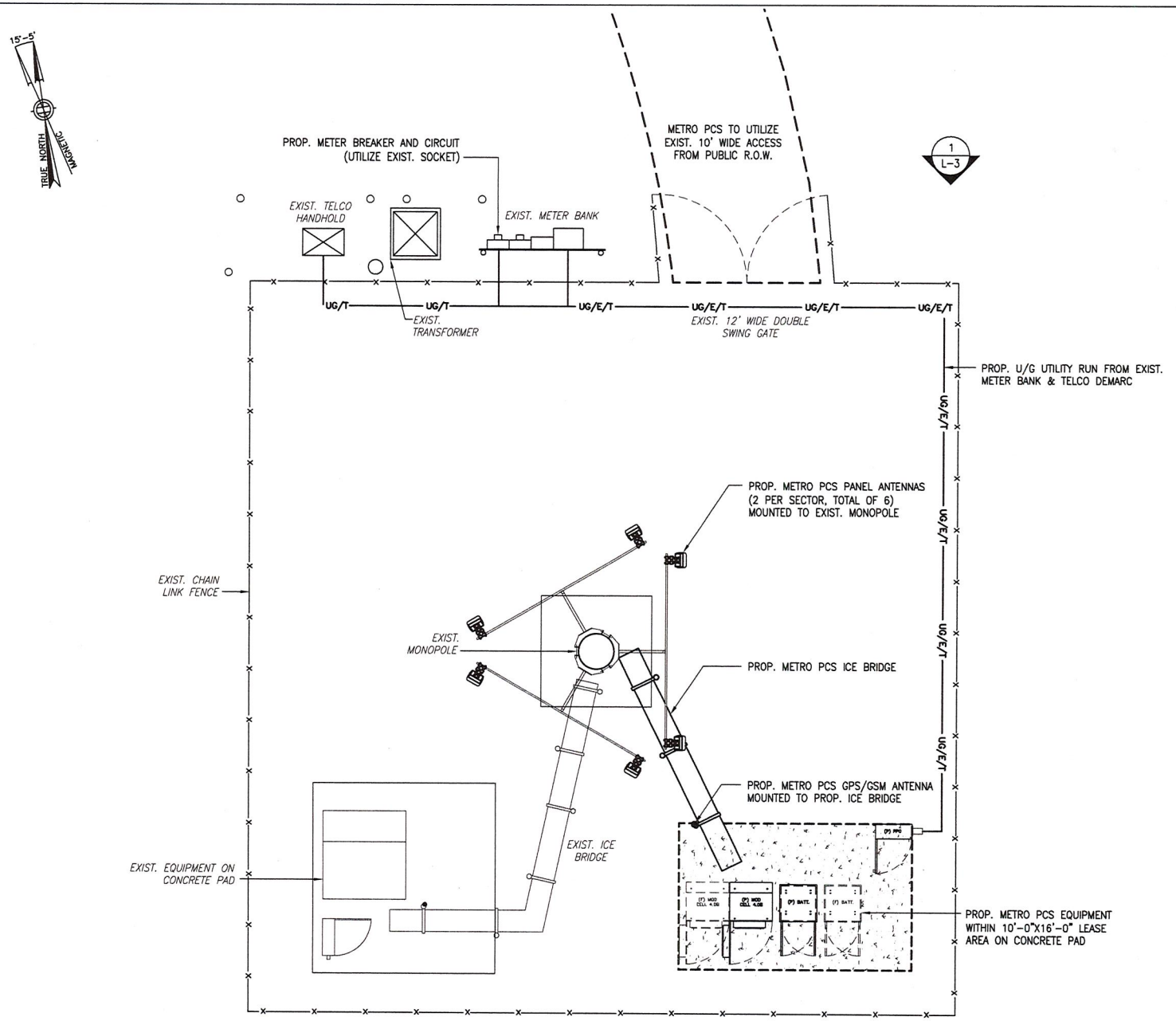
SITE ADDRESS
12 ORCHARD LANE,
LEDYARD, CT 06335

METRO PCS LEASE AREA

EQUIPMENT: 10'-0"x16'-0"=160.0 S.F.

TOTAL: = 160.0 S.F.

PROJECT NO.	DRAWING NAME	DATE	SHEET NO.	REV
736.265	C-1	07/01/09	1 OF 4	0



COMPOUND PLAN 1/C-2
SCALE: 1" = 10'-0"

metroPCS
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CHELMSFORD, MA 01824
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FAX (978) 244-7240

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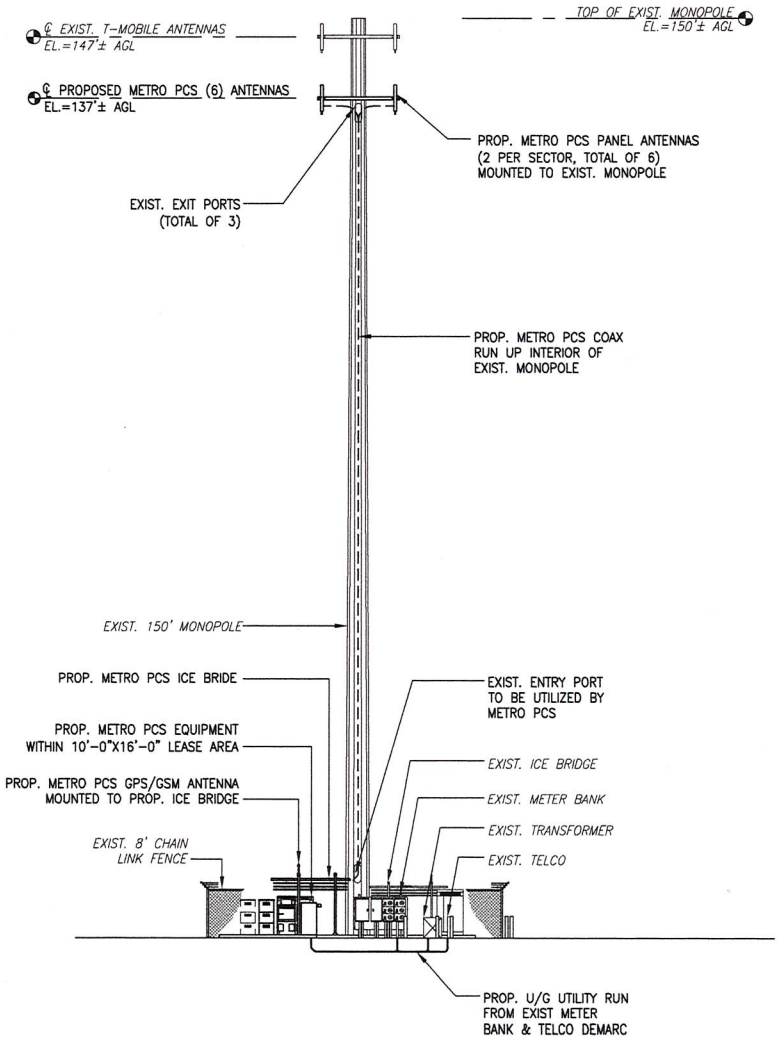
PROJECT NO.	DRAWING NAME	DATE	SHEET NO.	REV
736.265	C-2	07/01/09	2 OF 4	0



SOUTH TOWER ELEVATION

SCALE: 1" = 20'-0"

1
C-3

metroPCS
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NOT TO SCALE | DESIGNED BY: JMT | DRAWN BY: ACG

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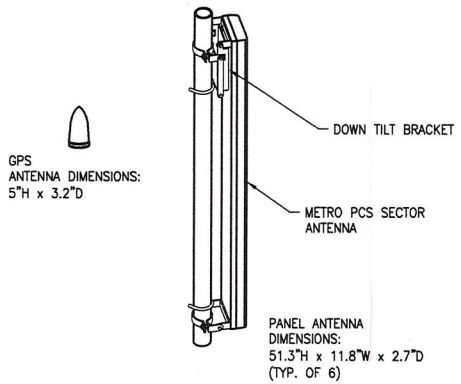
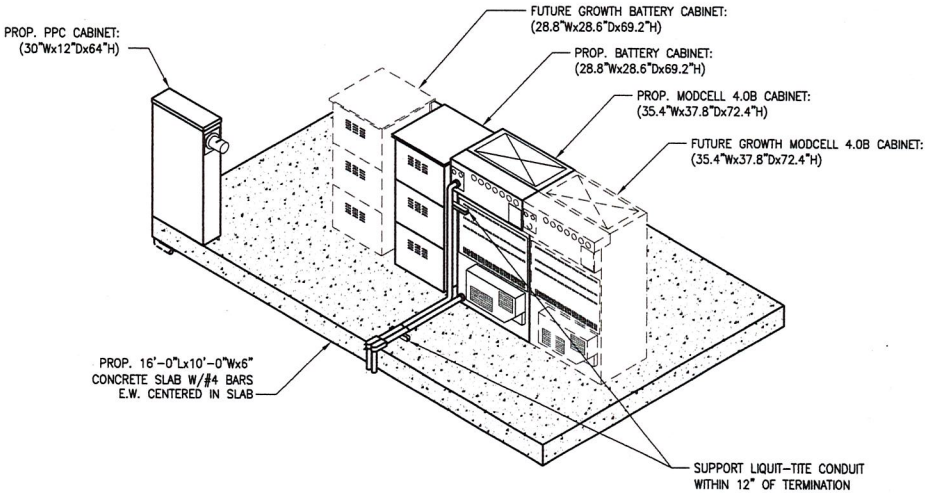


GPS & PANEL ANTENNA DETAIL (1 / C-4)

SCALE: NOT TO SCALE



EQUIPMENT LAYOUT DETAIL (2 / C-4)

SCALE: NOT TO SCALE

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NOT TO SCALE | DESIGNED BY: JMT | DRAWN BY: ACG

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PROJECT NO.	DRAWING NAME	DATE	SHEET NO.	REV
736.265	C-4	07/01/09	4 OF 4	0

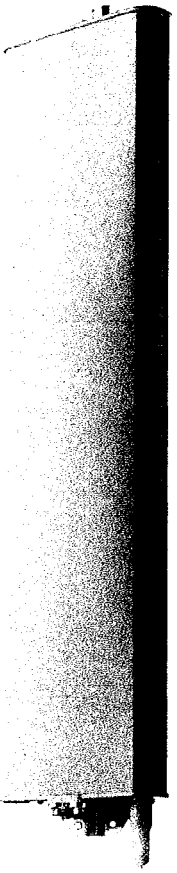
KATHREIN
SCALA DIVISION

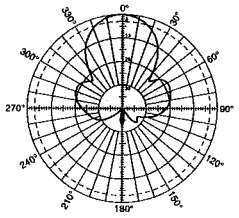
742 351

35° Panel Antenna

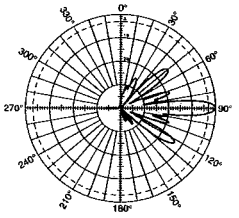
Kathrein's X-polarized adjustable electrical downtilt antennas offer the wireless carrier the ability to tailor polarization diversity sites for optimum performance. Using variable downtilt, only a few models need be procured to accommodate the needs of widely varying conditions. Remotely controlled downtilt is available as a retrofitable option.

- 0-8° downtilt range.
- UV resistant pulltruded fiberglass radome.
- DC Grounded metallic parts for impulse suppression.
- No moving electrical connections.
- Wideband vector dipole technology.
- Optional remote downtilt control.
- Will accomodate future 3G / UMTS applications.





Horizontal pattern
±45°- polarization



Vertical pattern
±45°- polarization

General specifications:

Frequency range	1710–2170 MHz
VSWR	<1.5:1
Impedance	50 ohms
Intermodulation (2x20w)	IM3: <-150 dBc
Polarization	+45° and -45°
Front-to-back ratio	>30 dB (co-polar)
Connector	2 x 7/16 DIN female
Isolation	>30 dB
Maximum input power	300 watts (at 50°C) per input
Weight	29.8 lb (13.5 kg)
Dimensions	51.3 x 11.8 x 2.7 inches (1304 x 299 x 69 mm)
Equivalent flat plate area	5.48 ft² (0.509 m²)
Wind survival rating*	120 mph (200 kph)
Shipping dimensions	62.6 x 12.7 x 4.3 inches (1589 x 322 x 108 mm)
Shipping weight	32 lb (14.5 kg)
Mounting	Fixed and tilt mount options are available for 2 to 4.6 inch (50 to 115 mm) OD masts.

See reverse for order information.

Specifications:	**1710–1880 MHz**	**1850–1990 MHz**	**1920–2170 MHz**
Gain	20.2 dBi	20.5 dBi	20.7 dBi
Horizontal beamwidth	36° (half-power)	35° (half-power)	33° (half-power)
Vertical beamwidth	7.4° (half-power)	7° (half-power)	6.7° (half-power)
Electrical downtilt continuously adjustable	0°–8° (manual or optional remote control)	0°–8°	0°–8°
Sidelobe suppression for: First sidelobe above main beam Horizontal pattern	0° 4° 8° T 18 17 16 dB >14 dB	0° 4° 8° T 18 18 17 dB >14 dB	0° 4° 8° T 18 17 16 dB >14 dB
Cross polar ratio Main direction 0° Sector ±30°	20 dB (typical) >10 dB	20 dB (typical) >10 dB	20 dB (typical) >10 dB

*Mechanical design is based on environmental conditions as stipulated in EIA-222-F (June 1996) and/or ETS 300 019-1-4 which include the static mechanical load imposed on an antenna by wind at maximum velocity. See the Engineering Section of the catalog for further details.

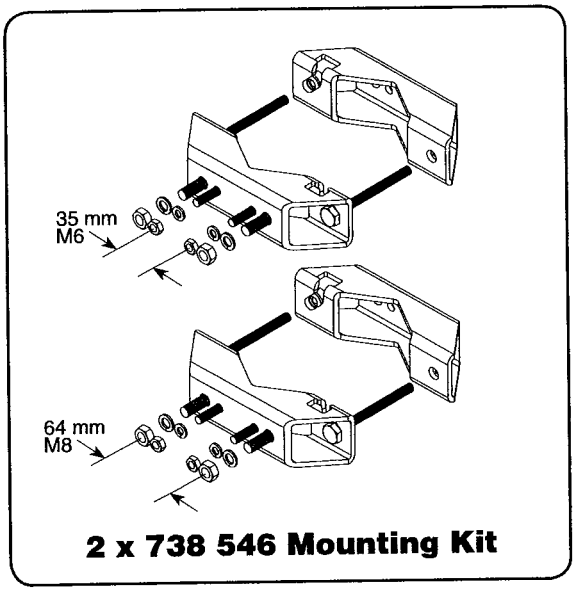
10708-E
936.2209/g

Kathrein Inc., Scala Division Post Office Box 4580 Medford, OR 97501 (USA) Phone: (541) 779-6500 Fax: (541) 779-3991
Email: communications@kathrein.com Internet: www.kathrein-scala.com

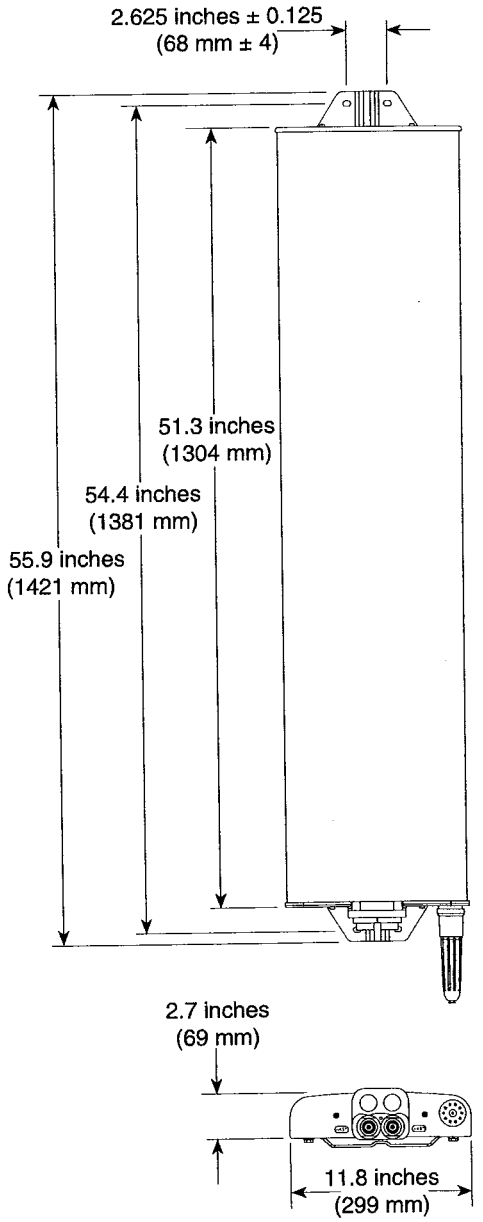
KATHREIN
SCALA DIVISION

742 351

35° Panel Antenna

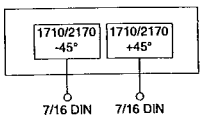


2 x 738 546 Mounting Kit



Mounting Options:

Model	Description
2 x 736 548	Mounting Kit for 2 to 4.6 inch (50 to 115 mm) OD mast.
737 978	Tilt Mount Kit 0–16 degrees downtilt angle.



Order Information:

Model	Description
742 351	Antenna with 7/16 DIN connectors 0°–8° adjustable electrical downtilt

All specifications are subject to change without notice. The latest specifications are available at www.kathrein-scala.com.

Kathrein Inc., Scala Division Post Office Box 4580 Medford, OR 97501 (USA) Phone: (541) 779-6500 Fax: (541) 779-3991
Email: communications@kathrein.com Internet: www.kathrein-scala.com

KATHREIN
SCALA DIVISION

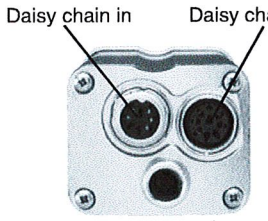
860 10025

Remote Control Unit

Kathrein's 860 10025 Remote Control Unit allows operators to control the electrical tilt of compatible antennas without direct access to the antenna.

- Automatically calibrates to the antenna. There is no need to preset the antenna's electrical tilt or the 860 10025 when installing the unit.
- Allows control of the antenna either locally through a laptop computer, on site desktop computer, the optional central control unit; remotely via an ethernet network or over the internet.
- May be retrofitted to compatible antennas without dismantling or removing the antenna.
- Suitable for daisy chain and splitter solutions.
- Suitable for outdoor use.

860 10025
Remote Control Unit



Bottom of RCU

Daisy chain termination

Specifications:

Input voltage range	10–30 V (pin 1 and pin 6)
Power Consumption	<1 W (standby); <8.5 W (motor activated)
Connectors [1]	2 x 8 pin connector according to IEC 60130-9 conforming with AISG Daisy chain in: male; Daisy chain out: female
Hardware interfaces	RS485A/B (pin 5, pin 3) power supply (pin 1, pin 6); DC return (pin 7) conforming with AISG
Logical interface [2]	Command set conforming to 3GPP/AISG 2.0 or AISG 1.1
Logical interface ex factory [3]	Conforming to AISG 1.1
Adjustment time (full range)	40 seconds (typical, depending on antenna type)
Adjustment cycles	>50,000
Temperature range	-40°C to +60°C
Protection class	IP 24
Housing material	Profile: Aluminum, coated Cover: Zinc diecast, coated varnished housing (RAL 7035, light gray)
Weight	1.16 lb (525 g) (without daisy chain termination)
Dimensions	7.6 x 2.4 x 2 inches (194 x 60 x 50 mm) (with daisy chain termination)
Shipping dimensions	9.6 x 4 x 3.7 inches (245 x 102 x 93 mm)
Standards	EN 60950-1 (Safety) EN 55022 (Emission) EN 55024 (Immunity) ETS 300019-1-4 (Environmental) UL 60950-1; 1st edition
Certifications	CE, UL FCC 15.107 Class B

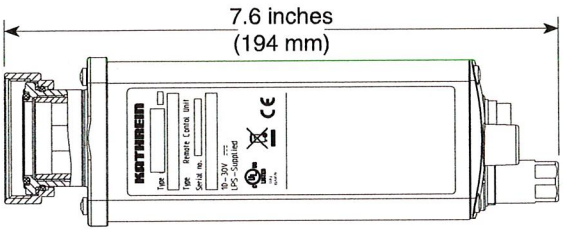
[1] The tightening torque for attaching the connector must be 0.5–1.0 Nm (hand tightened).

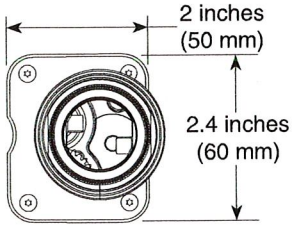
[2] The protocol of the logical interface can be switched from AISG 1.1 to 3GPP/AISG 2.0 and vice versa with a vendor specific command. Please contact Kathrein for further information.

[3] **Please note:** Ex factory, the communication protocol of the RCU (type-no. 860 10025) is **preset to AISG 1.1**. Therefore, start-up operation is only possible in an RET system supporting AISG 1.1. If the RET system supports 3GPP/AISG 2.0, the RCU must be set to 3GPP/AISG 2.0 before installation (i.e. with Kathrein PCA 860 10046) Please contact Kathrein for further information.

Order Information:

Model	Description
860-10025	Remote control unit with daisy chain termination





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The latest specifications are available at www.kathrein-scala.com.

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Email: communications@kathrein.com Internet: www.kathrein-scala.com

Exhibit B

Power Density Calculations

MetroPCS Site NLD0067A

12 Orchard Drive

Ledyard, Connecticut

Site Name: T-MOBILE ORCHARD ROAD LEDYARD
Antenna Height: MetroPCS @ Ft.

Control Number	Site
Docket 322	Ledyard - 12 Orchard Drive
	Ledyard - 12 Orchard Drive

Carrier	# Channels	ERP/Ch	Ant Ht	Power Density (mW/cm2	MHz	S	% MPE	Site Total
T-Mobile	8	204	147	0.0272	1945	1.0000	2.72%	2.72%
MetroPCS	3	443.61	137	0.0255	2140	1.0000	2.55%	5.27%

* Source: Siting Council

Exhibit C

Structural Analysis

MetroPCS Site NLD0067A

12 Orchard Drive

Ledyard, Connecticut

Structural Analysis for
SBA Network Services, Inc.

150' Monopole

Site Name: Ledyard
Site ID: CT13076-A

FDH Project Number 09-07106E S1

Prepared By:

Trent T. Snarr, EI
Project Engineer

Reviewed By:

Christopher M. Murphy, PE
Vice President
CT PE License No. 25842

FDH Engineering, Inc.
2730 Rowland Road
Raleigh, NC 27615
(919)-755-1012
info@fdh-inc.com

July 24, 2009

Prepared pursuant to ANSI/TIA-222-G Structural Standard for Antenna Supporting Structures and Antennas

TABLE OF CONTENTS

2730 Rowland Rd., Raleigh, NC 27615 Ph: (919) 755-1012 Fax: (919) 755-1031 info@fdh-inc.com

EXECUTIVE SUMMARY

At the request of SBA Network Services, Inc., FDH Engineering, Inc. performed a structural analysis of the monopole located in Ledyard, CT to determine whether the tower is structurally adequate to support both the existing and proposed loads, pursuant to the *Structural Standards for Antenna Supporting Structures and Antennas, ANSI/TIA-222-G.* Information pertaining to the existing/proposed antenna loading, current tower geometry, and member sizes was obtained from Radian Communication Services (File No. 060-3664) original design drawings dated March 27, 2007, FDH, Inc. (Job No. 08-07141T) TIA Inspection Report dated September 8, 2008, and SBA Network Services, Inc.

The *basic design wind speed* per *ANSI/TIA-222-G* standards is 120 MPH without ice and 50 MPH with 3/4" radial ice. Ice is considered to increase in thickness with height.

Conclusions

With the existing and proposed antennas from MetroPCS in place at 137 ft, the tower meets the requirements of the *ANSI/TIA-222-G* standards provided the **Recommendations** listed below are satisfied. Furthermore, provided the foundation was designed and constructed to support the original design reactions (see Radian File No. 060-3664), the foundation should have the necessary capacity to support the existing and proposed loading. For a more detailed description of the analysis of the tower, see the **Results** section of this report.

Our structural analysis has been performed assuming all information provided to FDH Engineering, Inc. is accurate (i.e., the steel data, tower layout, current antenna loading, and proposed antenna loading) and that the tower has been properly erected and maintained per the original design drawings.

Recommendations

To ensure the requirements of the *ANSI/TIA-222-G* standards are met with the existing and proposed loading in place, we have the following recommendations:

1. The proposed coax should be installed inside the pole's shaft.

2730 Rowland Rd., Raleigh, NC 27615 Ph: (919) 755-1012 Fax: (919) 755-1031 info@fdh-inc.com

APPURTENANCE LISTING

The proposed and existing antennas with their corresponding cables/coax lines are shown in **Table 1**. *If the actual layout determined in the field deviates from this layout, FDH Engineering, Inc. should be contacted to perform a revised analysis.*

Table 1 – Appurtenance Loading

Existing Loading:

No.	Centerline Elevation (ft)	Coax and Lines[1]	Carrier	Mounts	Description
1-9	147[2]	(12) 1-5/8" (1) 1/4"	T-Mobile	(1) 13.5' LP Platform	(9) RFS APX16DWV-16DWVS (6) Remec S20057A1 TMAs

1 Coax installed inside the pole's shaft unless otherwise noted.
2 Currently T-Mobile has (3) antennas, (6) TMAs, (12) 1-5/8" coax, and (1) 1/4" coax installed at 147'. According to information provided by SBA, T-Mobile may install up to (9) antennas, (6) TMAs, (12) 1-5/8" coax, and (1) 1/4" coax at 147'. Analysis performed with the total leased loading in place.

Proposed Loading:

No.	Centerline Elevation (ft)	Coax and Lines	Carrier	Mounts	Description
1-6	137	(12) 1-5/8" (1) 3/8"	MetroPCS	(3) 12' T-Arms	(6) Kathrein 742-351

2730 Rowland Rd., Raleigh, NC 27615 Ph: (919) 755-1012 Fax: (919) 755-1031 info@fdh-inc.com

RESULTS

Based on information obtained from the original design drawings, the yield strength of steel for individual members was as follows:

Table 2 - Material Strength

Member Type	Yield Strength
Tower Shaft Sections	65 ksi
Base Plate	50 ksi
Anchor Bolts	105 ksi

Table 3 displays the ratio (as a percentage) of force in the member to their capacities. Values greater than 100% indicate locations where the maximum force in the member exceeds its capacity. **Table 4** displays the maximum foundation reactions.

If the assumptions outlined in this report differ from actual field conditions, FDH Engineering, Inc. should be contacted to perform a revised analysis. Furthermore, as no information pertaining to the allowable twist and sway requirements for the existing or proposed appurtenances was provided, deflection and rotation were not taken into consideration when performing this analysis.

See the **Pole Profile** for detailed modeling information.

Table 3 – Summary of Working Percentage of Structural Components

Section No.	Elevation ft	Component Type	Size	% Capacity	Pass Fail
L1	150 - 120.67	Pole	TP36.33x30x0.1875	22.8	Pass
L2	120.67 - 84.17	Pole	TP43.67x34.9838x0.3125	32.2	Pass
L3	84.17 - 41.587	Pole	TP52.07x41.8974x0.4375	37.2	Pass
L4	41.587 - 0	Pole	TP60x49.835x0.5	44.2	Pass
		Anchor Bolts	(34) 1.5" diam. on 65" BC	47.5	Pass
		Base Plate	1.75" thk. x 69.5" round	48.4	Pass

Table 4 – Maximum Base Reactions

Base Reactions	Current Analysis *(ANSI/TIA-222-G)*	Original Design *(ANSI/TIA-222-G)*
Axial	46 k	95 k
Shear	33 k	55 k
Moment	2,929 k-ft	6,054 k-ft

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GENERAL COMMENTS

This engineering analysis is based upon the theoretical capacity of the structure. It is not a condition assessment of the tower and its foundation. It is the responsibility of SBA Network Services, Inc. to verify that the tower modeled and analyzed is the correct structure (with accurate antenna loading information) modeled. If there are substantial modifications to be made or the assumptions made in this analysis are not accurate, FDH Engineering, Inc. should be notified immediately to perform a revised analysis.

LIMITATIONS

All opinions and conclusions are considered accurate to a reasonable degree of engineering certainty based upon the evidence available at the time of this report. All opinions and conclusions are subject to revision based upon receipt of new or additional/updated information. All services are provided exercising a level of care and diligence equivalent to the standard and care of our profession. No other warranty or guarantee, expressed or implied, is offered. Our services are confidential in nature and we will not release this report to any other party without the client's consent. The use of this engineering work is limited to the express purpose for which it was commissioned and it may not be reused, copied, or distributed for any other purpose without the written consent of FDH Engineering, Inc.

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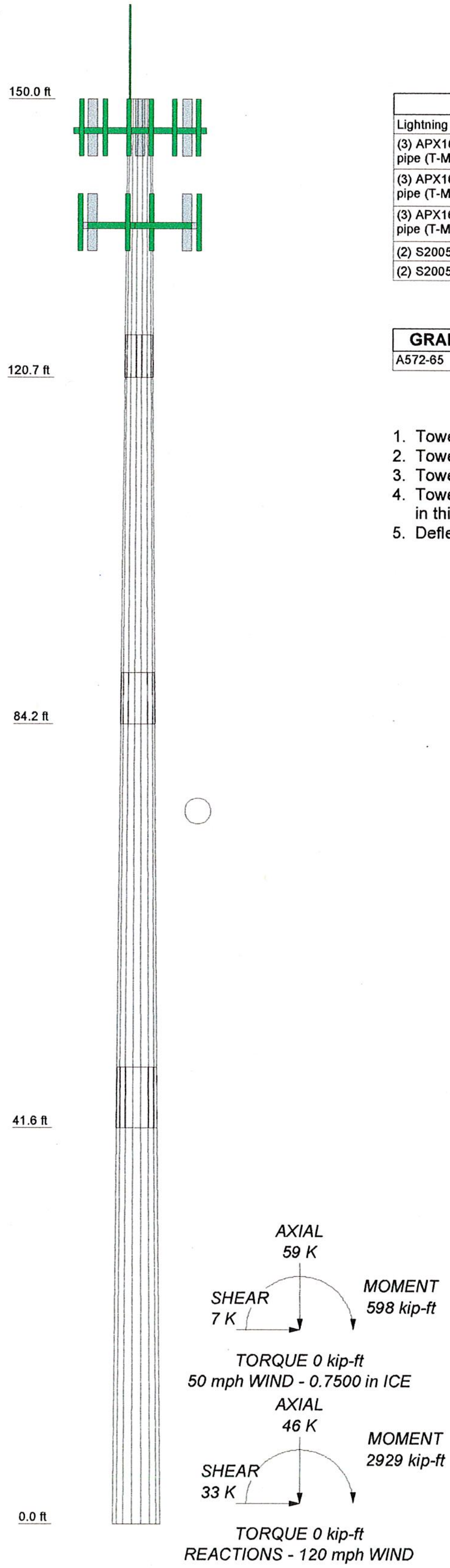
Section	1	2	3	4	
Length (ft)	29.33	41.00	48.00	48.00	
Number of Sides	18	18	18	18	
Thickness (in)	0.1875	0.3125	0.4375	0.5000	
Lap Splice (ft)	4.50	5.42	6.42		
Top Dia (in)	30.0000	34.9838	41.8974	49.8350	
Bot Dia (in)	36.3300	43.6700	52.0700	60.0000	
Grade	A572-65				
Weight (K)	2.0	5.4	10.6	14.1	32.0



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	150	(2) S20057A1 TMA (T-Mobile)	147
(3) APX16DWV-16DWVS w/ mount pipe (T-Mobile)	147	13.5' Low Profile Platform (T-Mobile)	147
		(2) 742 351 w/ mount pipe (MetroPCS)	137
(3) APX16DWV-16DWVS w/ mount pipe (T-Mobile)	147	(2) 742 351 w/ mount pipe (MetroPCS)	137
		(2) 742 351 w/ mount pipe (MetroPCS)	137
(3) APX16DWV-16DWVS w/ mount pipe (T-Mobile)	147	12' T-Arm Mount (MetroPCS)	137
		12' T-Arm Mount (MetroPCS)	137
(2) S20057A1 TMA (T-Mobile)	147	12' T-Arm Mount (MetroPCS)	137
(2) S20057A1 TMA (T-Mobile)	147		

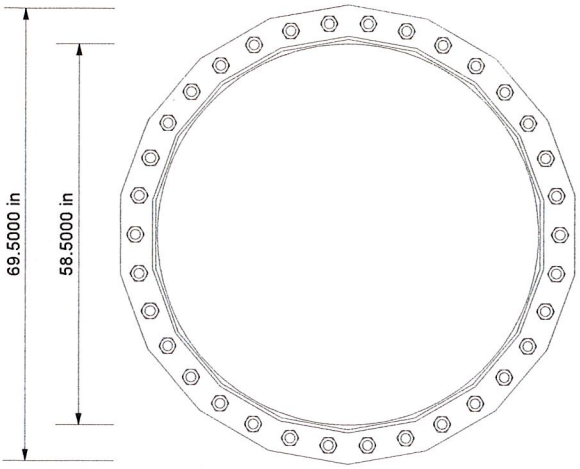
MATERIAL STRENGTH

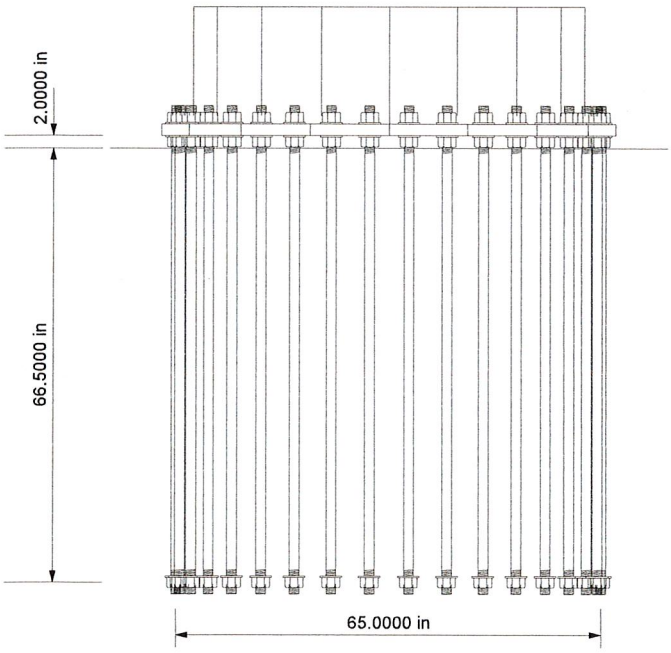
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.

FDH ENGINEERING	**FDH Engineering, Inc.**	Job: **Ledyard, CT13076-A**			
	2730 Rowland Road	Project: **09-07106E S1**			
	Raleigh, NC 27615	Client: SBA	Drawn by: TTS	App'd:	
Tower Analysis	Phone: 919-755-1012	Code: TIA-222-G	Date: 07/27/09	Scale: NTS	
	FAX: 919-755-1031	Path:		Dwg No. E-1	





FOUNDATION NOTES

1. Plate thickness is 1.7500 in.
2. Plate grade is A572-50.
3. Anchor bolt grade is F1554-105.
4. f'c is 4 ksi.

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Raleigh, NC 27615
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Tower Analysis

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