August 26, 2016

VIA EMAIL AND HAND DELIVERY

Ms. Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: T-Mobile Northeast LLC – CTNL814C
Tower Share Application
401 Chapel Hill Road, Oakdale (Montville), CT 06370
LAT: 41.468797 N
LNG: -72.203344 W

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of T-Mobile Northeast LLC ("T-Mobile"). T-Mobile plans to install antennas and related equipment at the Subcarrier Communications, Inc., site located at 401 Chapel Hill Road in Oakdale (Montville), CT.

T-Mobile will install nine (6) 700/1900/2100 MHz antennas and nine (9) RRH's at the 180' level of the existing 300' lattice tower. One (1) hybrid cable will also be installed on the face of the tower. T-Mobile's equipment and utility cabinets will be placed on a 10' x 20' concrete pad inside the existing fenced compound. Included are plans prepared by All-Points Technology Corporation dated May 18, 2016, depicting the planned changes and attached as **Exhibit A**. Also included is a structural analysis prepared by Communication Structures Engineering, Inc., dated August 18, 2016 confirming that the existing tower is structurally capable of supporting T-Mobile's equipment subject to tower modifications. The structural analysis and tower modification design is attached as **Exhibit B**.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies 16-50aa, of T-Mobile's intent to share a telecommunications facility pursuant to R.C.S.A. 16-50j-88. In accordance with R.C.S.A., a copy of this letter is being sent to Mayor Ronald K. McDaniel, Town of Montville, and the property/tower owner, Subcarrier Communications, Inc. Also, please see the attached letter from Subcarrier Communications authorizing the proposed shared use of the facility attached as **Exhibit C.**

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. 16-50j-89.

1. The proposed equipment will not result in an increase in the height of the existing structure. The top of the lattice tower is approximately 300' AGL; T-Mobile's

proposed antennas will be located at a centerline height of 180' AGL.

2. The proposed modifications will not require the extension of the site boundary as depicted on the attached site plan. T-Mobile's equipment pad will be located within the existing fenced compound.

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. The incremental effect of the proposed changes will be negligible.

4. The operation of the proposed antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard. As indicated in the attached power density calculations, T-Mobile's operations at the site will result in a power density of 2.40%; the combined site operations will result in a total power density of 2.40% as evidenced by the power density calculations attached as **Exhibit D**.

5. The proposed equipment will not cause a change or alteration in the physical or environmental characteristics of the site.

Connecticut General Statutes 16-50aa indicates that the Council must approve the shared use of a telecommunications facility provided it finds the shared use is technically, legally, environmentally and economically feasible and meets the public safety concerns. As demonstrated in this letter, T-Mobile respectfully submits that the shared use of this facility satisfies these criteria:

A. Technical Feasibility. The existing lattice tower has been deemed to be structural capable of supporting T-Mobile's proposed loading subject to tower reinforcement. The structural analysis and tower modification design is included as **Exhibit B**.
B. Legal Feasibility. As referenced above, C.G.S. 16-50aa has been authorized to issue orders approving the shared use of an existing tower such as this lattice tower in Oakdale. Under the authority granted to the Council, an order of the Council approving the requested shared use would permit T-Mobile to obtain a building permit for the proposed installation. Further, a letter of authorization from the tower owner, Subcarrier Communications, Inc., is included as **Exhibit C** authorizing T-Mobile to file this application for shared use.
C. Environmental Feasibility. The proposed shared use of this facility would have a minimal environmental effect. The installation of T-Mobile's equipment at 180' AGL on the existing 300' lattice tower would have an insignificant visual impact on the area around the tower. T-Mobile's ground equipment will be installed within the existing fenced compound. Therefore, T-Mobile's shared use would not cause any significant alteration in the physical or environmental characteristics of the existing site. Additionally, as evidenced by **Exhibit D**, the proposed antennas will not increase radio frequency emissions to a level at or above the Federal Communications Commission safety standard.

D. Economic Feasibility. T-Mobile will be entering into an agreement with the owner of this facility under mutually agreeable terms.

E. Public Safety Concerns. As discussed above, the lattice tower is structurally capable of supporting T-Mobile's proposed loading subject to tower reinforcement. T-Mobile is not aware of any public safety concerns relative to the proposed sharing of the existing lattice tower. T-Mobile's intent to provide new and improved wireless service through the shared use of this facility is expected to enhance the safety and welfare of residents and individuals traveling through the Town of Montville.

Respectfully submitted,

By: _____

Eric Dahl, Agent for T-Mobile
edahl@comcast.net
860-227-1975

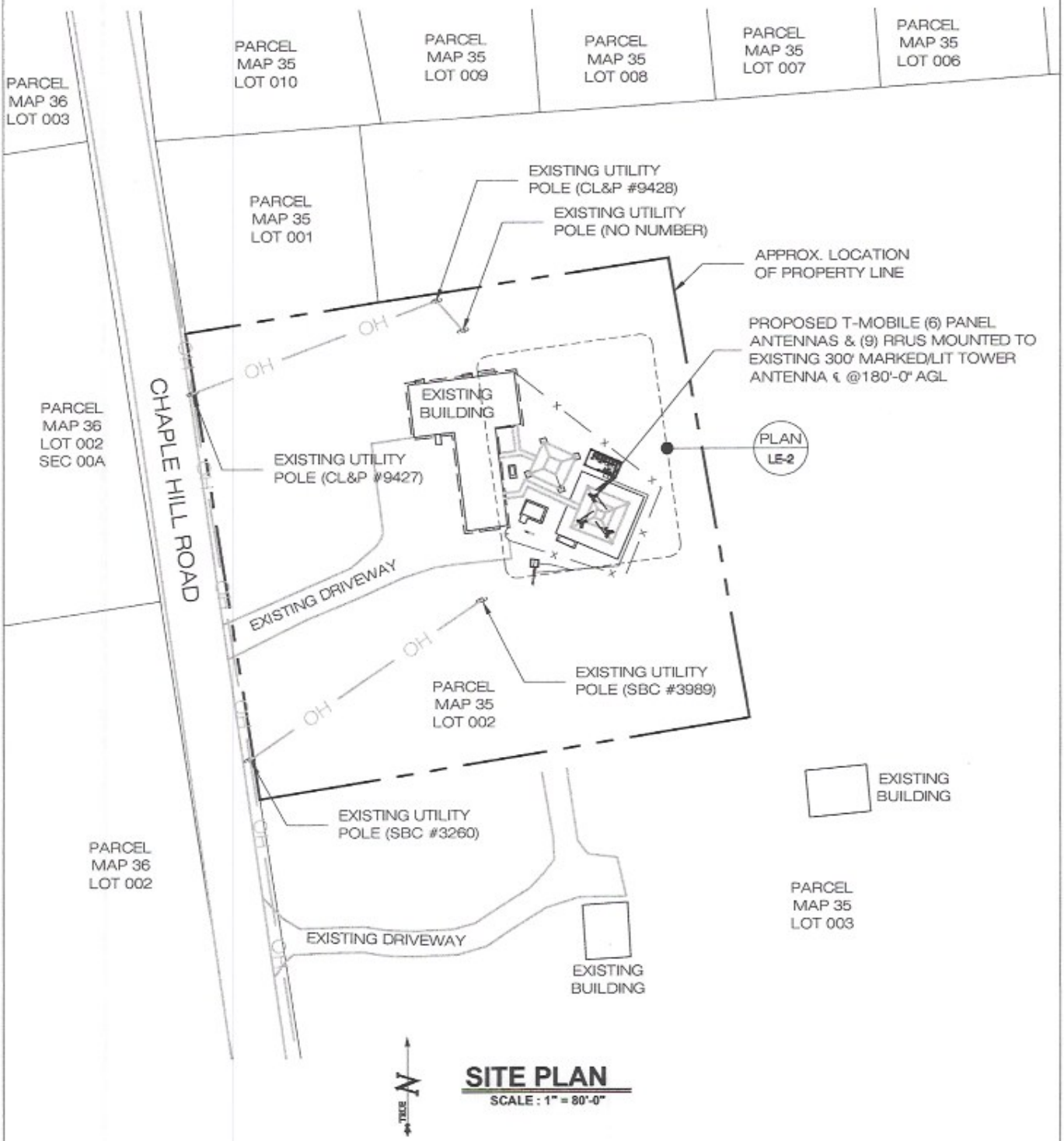
Attachments

cc: Ronald K. McDaniel, Mayor, Town of Montville
Subcarrier Communications, Inc. - as tower and property owner

EXHIBIT A

ALL-POINTS
TECHNOLOGY CORPORATION
3 SADDLEBROOK DRIVE
KILLINGWORTH, CT 06419
WWW.ALLPOINTSTECH.COM
PHONE: (860)-663-1697
FAX: (860)-663-0935

APT FILING NUMBER: CT409160		T-MOBILE: CTNL814C
LE-1		
SCALE: AS NOTED	DRAWN BY: BJP	35 GRIFFIN ROAD BLOOMFIELD, CT 06002 OFFICE: (860)-692-7100
DATE: 05/18/16	CHECKED BY: SMC	OAKDALE SUBCARRIER COMMUNICATIONS 401 CHAPEL HILL ROAD OAKDALE, CT 06370

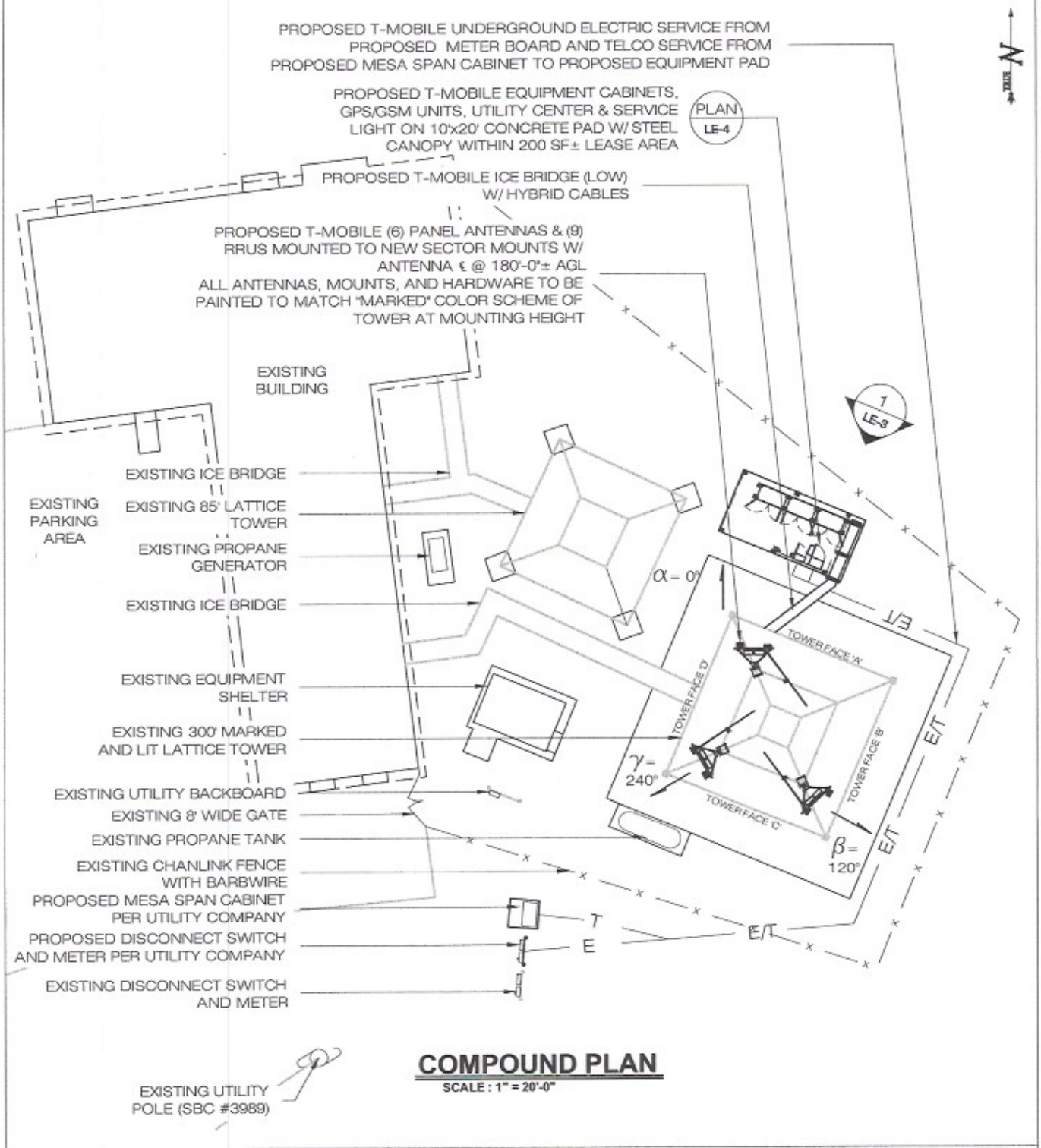


SITE PLAN

SCALE : 1" = 80'-0"

NOTE: EXACT LOCATION AND ORIENTATION OF PROPOSED LEASE AREA PENDING SITE SURVEY & FURTHER ENGINEERING REVIEW AND ANALYSIS. PROPOSED UTILITY ROUTING AND R.O.W. EXTENTS TO BE DETERMINED BY LOCAL UTILITY PROVIDERS.

ALL-POINTS TECHNOLOGY CORPORATION	APT FILING NUMBER: CT409160		T-Mobile	T-MOBILE: CTNL814C
3 SADDLEBROOK DRIVE KILLINGWORTH, CT 06419 WWW.ALLPOINTSTECH.COM PHONE: (860)-663-1697 FAX: (860)-663-0935	LE-2		35 GRIFFIN ROAD BLOOMFIELD, CT 06002 OFFICE: (860)-692-7100	OAKDALE SUBCARRIER COMMUNICATIONS 401 CHAPEL HILL ROAD OAKDALE, CT 06370
	SCALE: AS NOTED	DRAWN BY: BJP		
	DATE: 05/18/16	CHECKED BY: SMC		



COMPOUND PLAN

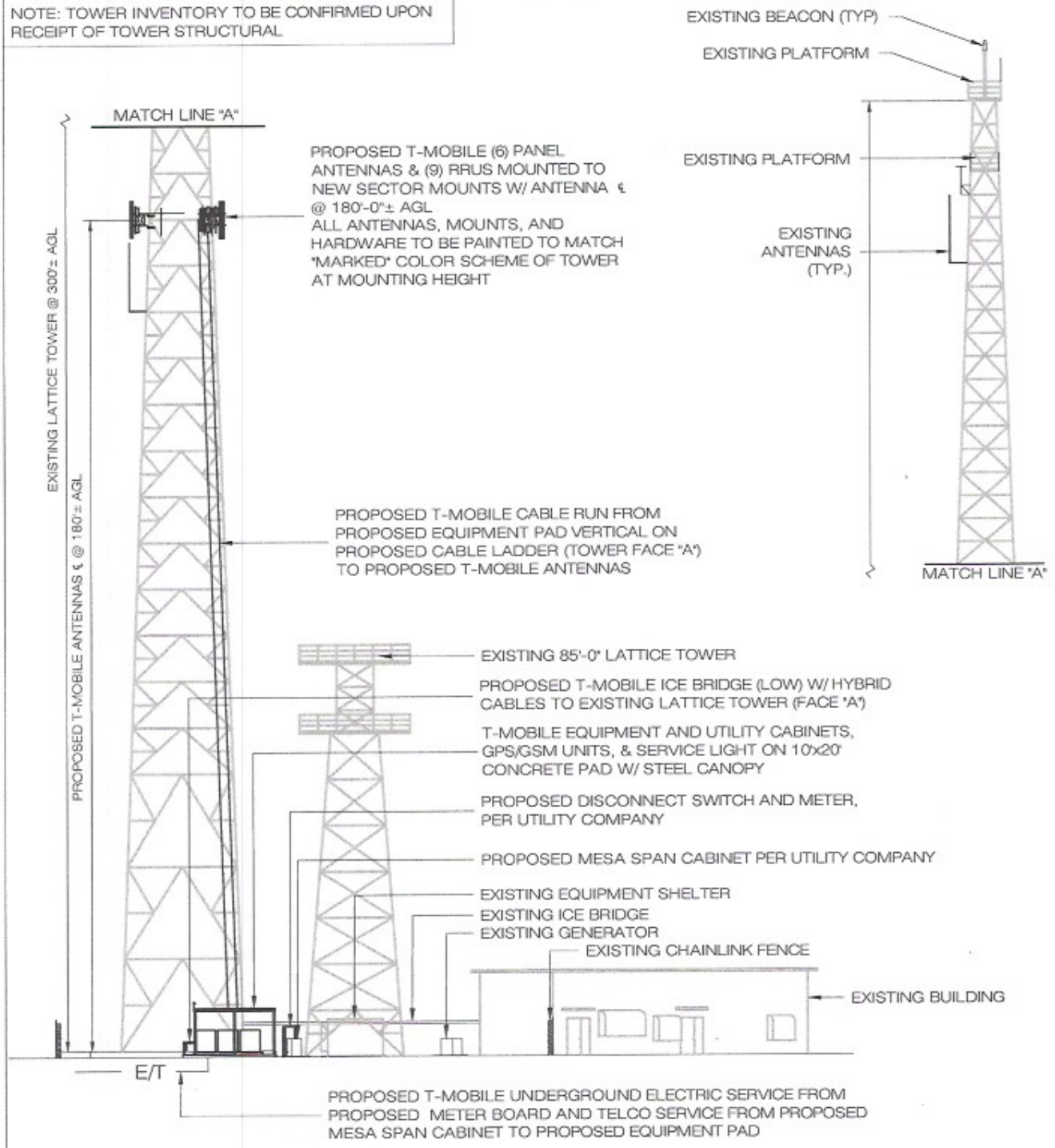
SCALE : 1" = 20'-0"

NOTE: EXACT LOCATION AND ORIENTATION OF PROPOSED LEASE AREA PENDING SITE SURVEY & FURTHER ENGINEERING REVIEW AND ANALYSIS. PROPOSED UTILITY ROUTING AND R.O.W. EXTENTS TO BE DETERMINED BY LOCAL UTILITY PROVIDERS.

ALL-POINTS TECHNOLOGY CORPORATION
3 SADDLEBROOK DRIVE
KILLINGWORTH, CT 06419
PHONE: (860)-663-1697
FAX: (860)-663-0935
WWW.ALLPOINTSTECH.COM

APT FILING NUMBER: CT409160		T-Mobile	T-MOBILE: CTNL814C
LE-3			
SCALE: AS NOTED	DRAWN BY: BJP	35 GRIFFIN ROAD BLOOMFIELD, CT 06002 OFFICE: (860)-692-7100	OAKDALE SUBCARRIER COMMUNICATIONS 401 CHAPEL HILL ROAD OAKDALE, CT 06370
DATE: 05/18/16	CHECKED BY: SMC		

NOTE: TOWER INVENTORY TO BE CONFIRMED UPON RECEIPT OF TOWER STRUCTURAL



1 LE-3 NORTHERN ELEVATION

SCALE : 1" = 30'-0"

NOTE: EXACT LOCATION AND ORIENTATION OF PROPOSED LEASE AREA PENDING SITE SURVEY & FURTHER ENGINEERING REVIEW AND ANALYSIS. PROPOSED UTILITY ROUTING AND R.O.W. EXTENTS TO BE DETERMINED BY LOCAL UTILITY PROVIDERS.

EXHIBIT B

Communication Structures Engineering, Inc.

Ms Marwa El-Gamal
Subcarrier Communications
139 White Oak Lane; Old Bridge, NJ 08857

August 18, 2016

Re: Structural Review of an Existing 300-ft Self Supporting Lattice Steel Tower
SubCarrier Communications Site: Oakdale (Montville) I.D. #4048
Location: 401 Chapel Hill Road, Village of Oakdale, CT 06370; New London County, CT

Dear Marwa,

Communication Structures Engineering, Inc. (CSEI) has completed a structural review of the existing 300-ft Self Supporting Tower located at this Subcarrier Communications Inc. site known as Oakdale, CT. In accordance with your request, we have performed a structural analysis of this tower to check its capability to support the existing tower & equipment loads as well as the loads from the proposed T-Mobile additions. A description of the existing tower, the loads considered, and the results of our review follow.

EXISTING TOWER INFORMATION & HISTORY

The 300-ft Self Supporting tower at this site was built in 1969 by Flint Steel Corp. for AT&T Long Lines Eastern Region. This tower, was built to provide an AT&T Microwave Radio Path to Greenhill R.I. The tower is a four-sided, lattice braced steel structure with a top grated antenna platform that measures 10'-0" X 23'-3", and a tower base plan dimension of 26'-4" X 26'-4". The tower was originally designed to support two Western Electric KS15676 Horn Reflector Antennas on the top platform. This structure is supported on a concrete spread footing foundation that was designed in 1968 by Rose Chulkoff & Rose Engineering (RCR of NYC). The tower foundation was strengthened in 2006. Both of the original KS15676 Horn Antennas were removed from the top grated antenna platform in 2006.

CSEI utilized the following documents from our archives to conduct our structural review of this tower: 1.) The 1968 AT&T Tower Design Drawings; 2.) The 1969 Flint Steel Tower Shop & Erection Drawings; 3.) The 1968 RCR Tower Foundation Design Drawings & Calculations; and 4.) The 1966 Geotechnical Report & Soil Borings. The T-Mobile RFDS sheet dated 3/16/16 which you provided to us was utilized to determine the T-Mobile antenna & cable requirements. A site visit or condition survey of this tower was not a part of CSEI's scope of work for this tower. We have assumed that the tower has been maintained in good physical condition.

DESIGN CRITERIA

The specific loading criteria that we utilized were those prescribed by "ANSI/TIA-222-G-2,", *"Structural Standards for Antenna Supporting Structures"*. In accordance with the this document the wind speed that we utilized for the analysis of this structure was the "3 second Gust Wind Speed" of 114-mph applicable to this location in New London County, CT . The tower was analyzed as a Class II Structure. Based on our review of the topography & local features, we have considered this location to be an Exposure Category 'B' & Topographic Category '1' site. Please see the next page titled, "DESIGN CRITERIA", for a complete listing of all customer mounted equipment items that were used to determine the loadings for our current structural analysis of this tower.

STRUCTURAL ANALYSIS PROCEDURE

The referenced design criteria combined with wind tunnel test data from tests conducted on AT&T tower framing and tower platforms, were utilized to determine the applicable loads for this structure. A frame analysis was then performed utilizing the stated wind loads and a computer model of the tower framing modeled on Power Line Systems Inc. "*PLS Tower*" Program. The load carrying frame members of this structure were reviewed to check their compliance with *ANSI/TIA-222-G-2*.

RESULTS OF STRUCTURAL ANALYSIS

Existing Steel Tower : As a result of this structural analysis, we determined that tower strengthening will be required to enable this steel structure to support the current antennas & lines in compliance with the referenced design criteria. The specific tower members that will require strengthening work are depicted on the attached Drawing TS-1. All other tower structural members were found to have maximum stress levels that were less than the allowable stresses permitted by referenced specifications. **Consequently, after the tower members designated on Drawing TS-1 are properly strengthened, this existing steel tower will be capable of supporting the itemized antennas & lines in compliance with compliance with *ANSI/TIA-222-G-2*.**

Existing Tower Foundation: The existing tower foundation was found to be adequate to support the existing and proposed tower & equipment loads. No strengthening of the foundation will be necessary.

If any co-location customers add any future additional antennas or equipment to this tower, this structure should be re-analyzed at that time. CSEI would be happy to respond to any questions regarding this analysis.

Sincerely,

James E. Boltz

James E. Boltz, P.E.

Attachments: 1.) Design Criteria 300-ft tower at Oakdale CT
2.) CSEI Drawing TS-1, Tower Strengthening at Oakdale CT
3.) Structural Calculations: 300-ft tower at Oakdale CT

August 18, 2016

DESIGN CRITERIA

SubCarrier Communications Site: Oakdale Site #4048

Location: 401 Chapel Hill Road, Village of Oakdale, CT 06370
Latitude N 41° 28' 07"/ Longitude W 72° 12' 12"
New London County, CT

DESIGN STANDARDS

ANSI/TIA/EIA-222-G-2,
114 MPH (3-Second Gust) Wind Speed for New London County, CT
Structure Class II Exposure 'B' ; Topographic Category 1

In addition to the loads from the existing tower framing and platforms the loads from the following antennas and their associated transmission lines were considered in the analysis.

ANTENNA CONFIGURATION (Used for Structural Analysis)

(Note: A.T.B.P. = Above Tower Base Plate)

Existing Customer Antennas - To Remain on Tower

- **Calvary Chapel** One (1) SWR-FM1 Low Power FM Antenna (ERP 250W) mounted on antenna platform at 300-ft A.T.B.P. with one (1) run of 0.5-inch dia. coaxial cable from the antenna down to grade.
- **Tactical Communications** Two (2) RFS Model # DB-408 UHF omni antennas mounted at 100-ft A.T.B.P with total of two (2) runs of 0.875-inch dia. coax cable from the antennas down to grade.

Existing United States Coast Guard Antennas - *To Remain on Tower*

1.) One (1) ADD090S Direction Finder Antenna mounted at 280-ft above tower base plate with two associated runs of 0.875 inch diameter coaxial cable and one run of AWG24 control cable.
2.) One (1) SRL235-2 VHF antenna mounted at 255-ft A.T.B.P. with one run of 0.875-inch dia. coax cable.
3.) One (1) SRL335-2 UHF antenna mounted at 255-ft A.T.B.P. with one run of 0.875-inch dia. coax cable.
4.) One (1) SRL235-2 VHF antenna mounted at 220-ft A.T.B.P with two runs of 0.875-inch dia. coax cable.

(All SRL antennas to be mounted on 6-ft side-arms)

NOTE: To reduce tower loading, the wind loads due to cable ladder were not included in our analysis. The proposed USCG vertical cables were to be installed using leg-mounted brackets instead of a cable ladder.

New (Proposed) T-Mobile Equipment at 180-ft A.T.B.P. - *To Be Added on Tower*

Three (3) panel antennas APX16DWV-16DWV-S-E-A20 (55" x 13.3" x 3.15") with mounts
Three (3) panel antennas LNX-6515DS-A1M (96.6" x 11.9" x 7.1") with mounts
Nine (9) RRUS11's (17 x17.8 x 7.2) at least (6) of these (9) will be mounted behind antennas
One (1) Commscope hybrid trunk fiber line (9x18)(1.6" dia.) from grade to break-out hub at 180-ft.

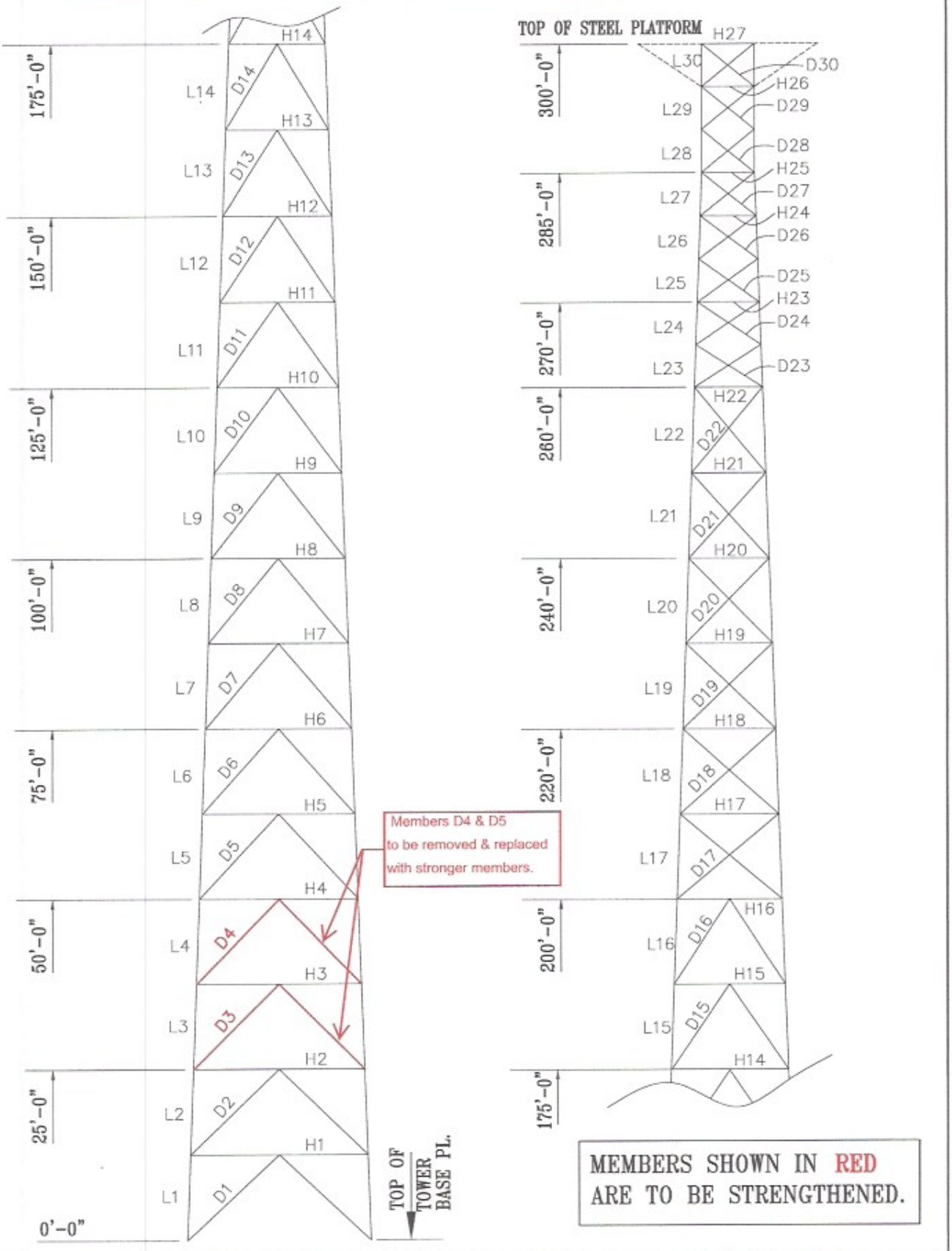
Customer Antenna & Cable Mounts and Their Connections to Tower

The loads stated above include the applicable overall tower dead and wind loads from the listed customer antennas and transmission lines that were provided to CSEI. CSEI's structural analysis applies these loads at the tower truss panel points (joints where tower braces connect) that are closest to the customer equipment location. CSEI's structural analysis of this overall tower structure does not include tower stresses that could occur from improper customer equipment attachments that may locally stress individual tower braces. The attachment of the individual customer's equipment is not a part of CSEI's scope of work. CSEI assumes that these attachments, in accordance with good engineering practice, will be designed and installed to properly connect close to the tower panel points in such a manner as to not introduce significant local stresses to the existing tower bracing members. Improperly connected customer equipment can significantly stress individual tower members and consequently reduce the overall load capacity of the entire tower structure.

The design & installation of all customers' antenna & cable mounts and their proper connections to this tower are the responsibility of the individual customers and their engineers, suppliers & contractors.

Communication Structures Engineering, Inc.

5579-B Chamblee Dunwoody Road /Suite 517/ Dunwoody, GA 30338 / (770) 951-8080



⚠ ORIGINAL ISSUE 6/22/16	Communication Structures Engineering, Inc. 5570-B Chamblee Dunwoody Rd. / Suite 517 Dunwoody, Georgia 30338 (770) 951-8060	Designed by: A. K. PADMAN Drawn by: A. K. PADMAN Checked by: J. R. BOLTZ	OAKDALE, CT EXISTING 300'-0" TOWER TOWER STRENGTHENING	Date: JUNE 2016 Project No: 16-212 Scale: NO SCALE SHEET No: TS-1	

COMMUNICATION STRUCTURES ENGINEERING, INC.
5579-B Chamblee Dunwoody Rd. /Suite 517
Dunwoody, GA 30338 (770) 951-8080

STRUCTURAL CALCULATIONS

SubCarrier Communications: Oakdale Site #4048
Existing 300-ft Self Supporting Tower
Village of Oakdale, CT

Issue Date: August 18, 2016

TABLE OF CONTENTS

DESIGN CRITERIA

SubCarrier Communications Site: Oakdale Site #4048

Location: 401 Chapel Hill Road, Village of Oakdale, CT 06370
Latitude N 41° 28' 07"/ Longitude W 72° 12' 12"
New London County, CT

DESIGN STANDARDS

ANSI/TIA/EIA-222-G-2,
114 MPH (3-Second Gust) Wind Speed for New London County, CT
Structure Class II Exposure 'B' ; Topographic Category 1

In addition to the loads from the existing tower framing and platforms the loads from the following antennas and their associated transmission lines were considered in the analysis.

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(All SRL antennas to be mounted on 6-ft side-arms)

NOTE: To reduce tower loading, the wind loads due to cable ladder were not included in our analysis. The proposed USCG vertical cables were to be installed using leg-mounted brackets instead of a cable ladder.

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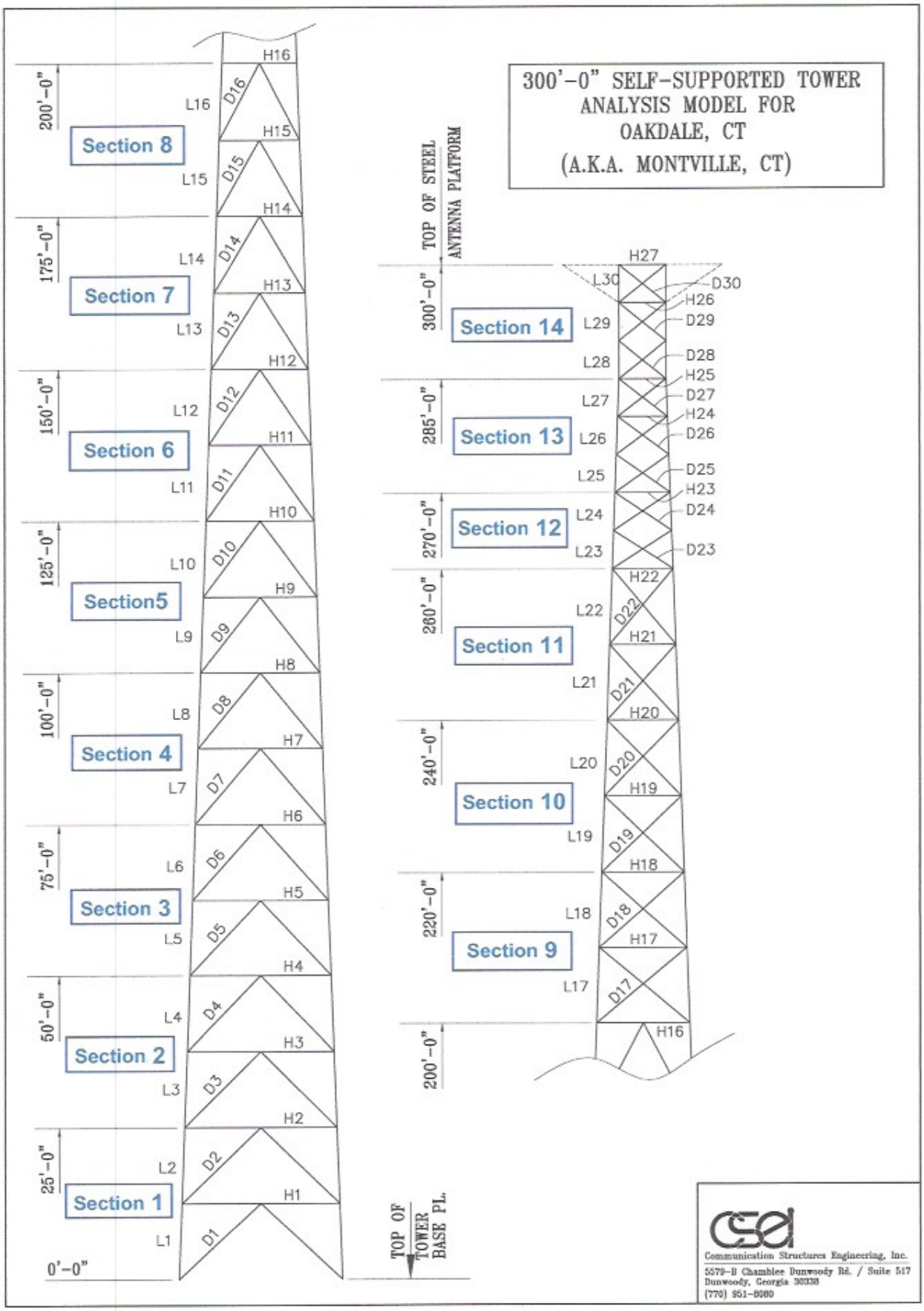

Communication Structures Engineering, Inc.
5579-B Chamblee Dunwoody Rd. / Suite 517
Dunwoody, Georgia 30338
(770) 951-0980

Tower Diagonal Members D3 & D4 are to be replaced with stronger members that will reduce this stress to less than 80%

ANALYSIS RESULTS SUMMARY

Tower Component Stresses vs. Capacity

Section No. *(see Analysis Model for section locations)*	Elevation (ft)	Percent Capacity Used		
		Leg	Diagonal	Horizontal
1	0'-0" to 25'-0"	83.9%	88.27%	97.8%
2	25-0" to 50'-0"'	87.6%	104.63%	88.2%
3	50'-0" to 75'-0"	78.5%	97.9%	73.8%
4	75"-0" to 100'-0"	94.3%	97.3%	60.5%
5	100'-0" to 125'-0"	91.3%	89.7%	47.2%
6	125-0" to 150'-0"	87.5%	83.7%	37.2%
7	150'-0" to 175'-0"	82.6%	78.6%	28.9%
8	175"-0" to 200'-0"	83.6%	68.6%	20.7%
9	200'-0" to 220'-0"	70.5%	78.1%	55.2%
10	220-0" to 240'-0"	62.6%	62.8%	40.9%
11	240'-0" to 260'-0"	46.9%	51.7%	27.6%
12	260-0" to 270'-0"	45.1%	32.6%	10.0%
13	270'-0" to 285'-0"	31.0.%	30.1%	10.0%
14	285'-0" to 300'-0"	19.9.%	16.8%	10.0%

TOWER FOUNDATION

Foundation Loads (with Load factor) from Current Analysis = **581.2 kips uplift / 656.9 kips downward**

Foundation Capacity (per calculations) = **585.3 kips uplift / 1000+ kips downward**

Actual Loads / Foundation Capacity

Uplift 581K/585K = 99% capacity
Downward 656K/1000K = 65% capacity

Foundation is adequate for the proposed loading

Results above indicate:

- **The tower foundation is sufficient to support the proposed loading.**
- **The tower will require some strengthening to support the proposed loads.**

Communication Structures Engineering, Inc.
5579-B Chamblee Dunwoody Rd. /Suite 517/ Dunwoody GA (770) 951-8080

EXHIBIT C

SUBCARRIER COMMUNICATIONS

PRECISION - RELIABILITY - EFFICIENCY

August 18, 2016

Via Email

Vertical Development, LLC.
20 Commercial St.
Branford, CT 06405
Attn: Matthew Bandle

RE: Zoning for T-Mobile site CTNL814C Oakdale, CT

Dear Mr. Bandle,

Subcarrier Communications, Inc. here by gives permission to Vertical Development, LLC. to file for zoning at 401 Chapel Hill Road, Oakdale (Montville), CT 06370. Please feel free to contact me with any questions. We appreciate your business and are here to serve you.

Sincerely,

CJ Manolescu
Senior Vice President
SUBcarrier COMmunications, Inc.

EXHIBIT D

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CTNL814C

CTNL814C
401 Chapel Hill Road
Oakdale, CT 06370

August 25, 2016

EBI Project Number: 6216003757

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	2.40 %

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

August 25, 2016

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CTNL814C – CTNL814C**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **401 Chapel Hill Road, Oakdale, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is approximately 467 $\mu W/cm^2$, and the general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **401 Chapel Hill Road, Oakdale, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel

3) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

4) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

5) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

6) The antennas used in this modeling are the **RFS APX16DWV-16DWVS-E-A20** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **RFS APX16DWV-16DWVS-E-A20** has a maximum gain of **16.3 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe at 700 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

7) The antenna mounting height centerline of the proposed antennas is **180 feet** above ground level (AGL).

8) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves. There were no additional carriers listed for this facility in the Connecticut Siting Council active database

9) All calculations were done with respect to uncontrolled / general public threshold limits.

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	180	Height (AGL):	180	Height (AGL):	180
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	7,678.43	ERP (W):	7,678.43	ERP (W):	7,678.43
Antenna A1 MPE%	0.91	Antenna B1 MPE%	0.91	Antenna C1 MPE%	0.91
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	180	Height (AGL):	180	Height (AGL):	180
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power(W):	30	Total TX Power(W):	30	Total TX Power(W):	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A2 MPE%	0.22	Antenna B2 MPE%	0.22	Antenna C2 MPE%	0.22

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**1.13 %**
No Additional Carriers	NA
Site Total MPE %:	**2.40 %**

T-Mobile Sector A Total:	1.13 %
T-Mobile Sector B Total:	1.13 %
T-Mobile Sector C Total:	1.13 %
Site Total:	2.40 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile PCS - 1950 MHz UMTS	2	1,279.74	180	3.04	PCS - 1950 MHz	1000	0.30%
T-Mobile AWS - 2100 MHz LTE	2	2,559.48	180	6.08	AWS - 2100 MHz	1000	0.61%
T-Mobile 700 MHz LTE	1	865.21	180	1.03	700 MHz	467	0.22%
						Total*:	**1.13%**

*NOTE: Totals may vary by .01% due to summing of remainders

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Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	1.13 %
Sector B:	1.13 %
Sector C:	1.13 %
T-Mobile Per Sector Maximum:	1.13 %
Site Total:	2.40 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **2.40%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.