

Hendersonville, North Carolina
Application for Minor Modification of FM Translator W257DH
On Channel 257
by
Western North Carolina Public Radio, Inc.

Exhibit 13
Interference Analysis

February 2015

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Declaration

I declare, under penalty of perjury, that I am a technical consultant to broadcasting and other communications systems, that I have over twenty-five years of experience in the engineering of broadcast and other communications systems, that I am familiar with the Federal Communications Commission's Rules found in the Code of Federal Regulations Title 47, that I am a Professional Engineer registered in North Carolina, that I have prepared or supervised the preparation of the attached Exhibit 13, Interference Analysis, for Western North Carolina Public Radio, Inc., and that all of the facts therein, except for facts of which the Federal Communications Commission may take official notice, are true to the best of my knowledge and belief.



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3 February 2015

Narrative

This Exhibit supports a minor modification application to modify a construction permit for FM translator W257DH (new call sign W225CD), on Channel 257 in Hendersonville, North Carolina. Allocation details are provided in this exhibit. This proposal complies fully with the requirements of 47 C.F.R. §74.1204(a), with the exception of facilities protected under 47 C.F.R. §74.1204(d) by the Undesired to Desired (U/D) method described below. The proposed modified facilities create no mutual exclusivities with any licensed facilities, construction permits, or applications as shown in the allocation table in this exhibit.

This application proposes a new site, an increase in height, and a decrease in power.

Figure 1 shows the authorized 60 dBu F(50,50) coverage area, the proposed 60 dBu F(50,50) coverage area, and the 60 dBu F(50,50) contour of the primary station, WCQS, Asheville, North Carolina. As shown on Figure 1, the proposed modification is a minor modification of the licensed facilities. Figure 2 is a detailed confirmation that the proposed facilities are a fill-in for WCQS.

Allocations

This application proposes service to Hendersonville, North Carolina, on channel 257. An updated Table 1: Allocations is included in this exhibit with a list of the stations, construction permits, allocations, and applications studied. All are protected under §74.1204(a) contour protection by this application, with the exception of facilities protected by the Undesired to Desired (U/D) method. Facilities protected by the U/D method are listed in

Table 2. The allocations table was prepared using the NED 03 arcsecond terrain database which is described below.

Television Channel 6 Protection

There are no television channel 6 stations requiring protection. This application proposes a channel which is not subject to television channel 6 separation requirements.

Table 1: Allocations

Allocation Study												
Western North Carolina Public Radio, Inc.												
REFERENCE	CH# 257D - 99.3 MHz, Pwr= 0.028 kW DA, HAAT= 83.0 M, COR= 775 M										DISPLAY DATES	
35 20 18.0 N. 82 29 02.0 W.	Average Protected F(50-50)= 7.0 km Standard Directional										DATA 02-03-15 SEARCH 02-03-15	
CH CITY	CALL	TYPE	ANT STATE	AZI. <--	DIST FILE #	LAT. LNG.	Pwr(kw) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap)	*OUT* (in km)	
260C Old Fort	WKSF	LIC	C NC	291.5 111.3	26.63 BLH20140717ABM	35 25 32.0 82 45 25.0	53.000 786	12.7 1784	95.6 Capstar Tx Llc	6.0	-69.3*	
255C Spartanburg One Step Application	WSPA-FM	CP	CX SC	136.9 317.0	25.64 BPH20130415ABG	35 10 11.0 82 17 28.0	100.000 581	11.2 1016	77.7 Entercom License, Llc	4.7	-52.4*	
255C Spartanburg	WSPA-FM	LIC	C SC	136.9 317.0	25.64 BLH19991026ACQ	35 10 11.0 82 17 28.0	100.000 580	11.2 1016	77.7 Entercom License, Llc	4.7	-52.4*	
257D Hendersonville	w257DH!	CP	C NC	292.1 112.1	0.08 BNPFT20130830AME	35 20 19.0 82 29 05.0	0.030 80	29.1 768	8.7 Western North Carolina Pub	-36.2	-32.5	
Facility being modified.												
257C1 Cornelia One Step Application	WCON-FM	CP	NCX GA	230.6 49.9	141.79 BPH20140723AEB	34 31 24.0 83 40 46.0	100.000 246	166.0 662	67.2 Habersham Broadcasting Co.	-31.4*	54.4	
258D West Asheville	w258CA	CP	C NC	332.5 152.4	32.90 BNPFT20130827ADD	35 36 04.0 82 39 07.0	0.010 340	16.9 1048	11.5 Radio Training Network, Inc	7.3	9.1	
257C2 Cornelia	WCON-FM	LIC	CN GA	230.6 49.9	141.79 BLH19891201KA	34 31 24.0 83 40 46.0	19.000 246	127.0 662	51.6 Habersham Broadcasting Co.	7.7	72.5	
257C3 Chester	WBT-FM	LIC	CX SC	118.4 299.1	126.38 BLH20031201APJ	34 47 30.0 81 16 06.0	7.700 182	104.1 350	40.5 Greater Media Charlotte In	12.0	51.8	
257C3 Elizabethton	WTZR	LIC	NCX TN	12.0 192.1	120.70 BLH20130715ADX	36 24 07.0 82 12 12.0	4.400 244	100.2 802	39.1 Bristol Broadcasting Company	12.6	54.3	
258D Greenville	w249CB	CP	DC SC	170.8 350.9	45.35 BPFT20130220ACI	34 56 05.0 82 24 16.0	0.250 333	14.5 632	10.1 Tower Above Media Llc	23.8	22.1	
257A Jefferson City	WNRX	LIC	ZCX TN	309.9 129.2	128.64 BLH20121219ACI	36 04 28.0 83 34 56.0	0.200 199	53.0 533	16.3 Lakeway Broadcasting, Llc	68.0	86.2	
257A Jefferson City	WNRX	CP	ZCX TN	316.2 135.6	132.18 BPH20140723AEC	36 11 29.1 83 30 15.2	0.950 84	51.3 455	14.6 Lakeway Broadcasting, Llc	72.8	89.4	
255D Franklin	w255CR	CP	C NC	260.3 79.8	81.73 BNPFT20130828ADC	35 12 39.7 83 22 07.4	0.040 -138	0.4 679	4.4 Charisma Radio Corp.	73.9	76.9	
258L1 Belton	WQAT-LP	LIC	SC	183.6 3.5	91.54 BLL20150128AAA	34 30 53.0 82 32 47.0	0.100 19	255		77.1	79.8	
254D Bryson City	w254CH	CP	C NC	275.4 94.9	92.75 BNPFT20130830ALX	35 24 47.0 83 30 02.0	0.009 268	0.2 1055	10.4 western North Carolina Pub	85.2	81.0	
257L1 Hickory	WLRZ-LP	LIC	NC	66.3 247.0	113.47 BLL20050103ACW	35 44 33.0 81 20 04.0	0.018 70	386		92.2	82.2	
256D Bryson City	w256CQ	CP	C NC	270.3 89.6	103.48 BNPFT20130830ALW	35 20 16.0 83 37 20.0	0.055 -133	6.9 681	4.8 western North Carolina Pub	89.2	87.0	
255D Newport	w255BK	CP	C TN	318.0 137.6	99.00 BPFT20140129AIY	35 59 52.0 83 13 14.0	0.050	0.5 429	4.7 Bristol Broadcasting Compa	90.0	92.6	

Terrain database is NED 03 SEC, R= 73.215 qualifying spacings or FCC minimum spacings in KM, M= Margin in KM
 In & Out distances between contours are shown at closest points. Reference Zone= East Zone, Co to 3rd adj.
 All separation margins (if shown) include rounding. Call signs with exclamation marks need not be protected.
 Ant Column: (D= DA Standard, Z= DA 73.215, N= Not DA 73.215, _= Omni), Polarization (C,H,V,E), Beamtilt(Y,N,X)
 "*"affixed to 'IN' or 'OUT' values = site inside restricted contour.

Table 2: Facilities Protected by U/D Method

Facility	WKSF Old Fort, North Carolina	WSPA-FM Spartanburg, South Carolina
Relationship	260C, third adjacent	255C, second adjacent
Distance (km)	26.63	25.65
Bearing (degrees)	291.5	136.9
ERP (kW, on azimuth)	53.0	100.0
HAAT (m, on azimuth)	896.1	384.3
Ratio	40	40
Signal Strength (dBu)	90.1	85.8
Translator Signal Strength	130.1	125.8
Translator distance (km)	.012	.019

Undesired to Desired Method under §74.1204(d)

Protection to some facilities is provided through the use of Undesired to Desired Signal Strength Ratio (U/D) calculations. Table 2 lists the parameters studied. The proposed antenna is a Shively 6736 SLV-1 “Versa2une” single level antenna. The elevation pattern is shown in Figure 3.

The WKSF field strength calculated at ground level at the proposed W257DH site is 90.1 dBu, using the FM Curves calculator on the FCC web site. For the translator interference contour, free space calculations are used. The corresponding 130.1 dBu field strength distance is .012 kilometers in the horizontal plane. The proposed antenna location is 80 meters above ground. Therefore the worst case predicted interfering signal will not reach ground level. When the elevation pattern of the antenna is considered, the distance to the interference contour in the vertical plane is even less. The 130.1 dBu signal level does not reach ground level. A vertical plot of the predicted interference contour is shown in Figure 4.

The WSPA-FM field strength calculated at ground level at the proposed W257DH site is 85.8 dBu, using the FM Curves calculator on the FCC web site. For the translator

interference contour, free space calculations are used. The corresponding 125.8 dBu field strength distance is .019 kilometers in the horizontal plane. The proposed antenna location is 80 meters above ground. Therefore the worst case predicted interfering signal will not reach ground level. When the elevation pattern of the antenna is considered, the distance to the interference contour in the vertical plane is even less. The 125.8 dBu signal level does not reach ground level. A vertical plot of the predicted interference contour is shown in Figure 5.

Figure 6 is a topographic map of the transmitter site. Figure 7 is an aerial photograph of the site, showing the absence of any structures in the area of interest. There is no population within the predicted interference area and therefore this facility is permitted under §74.1204(d).

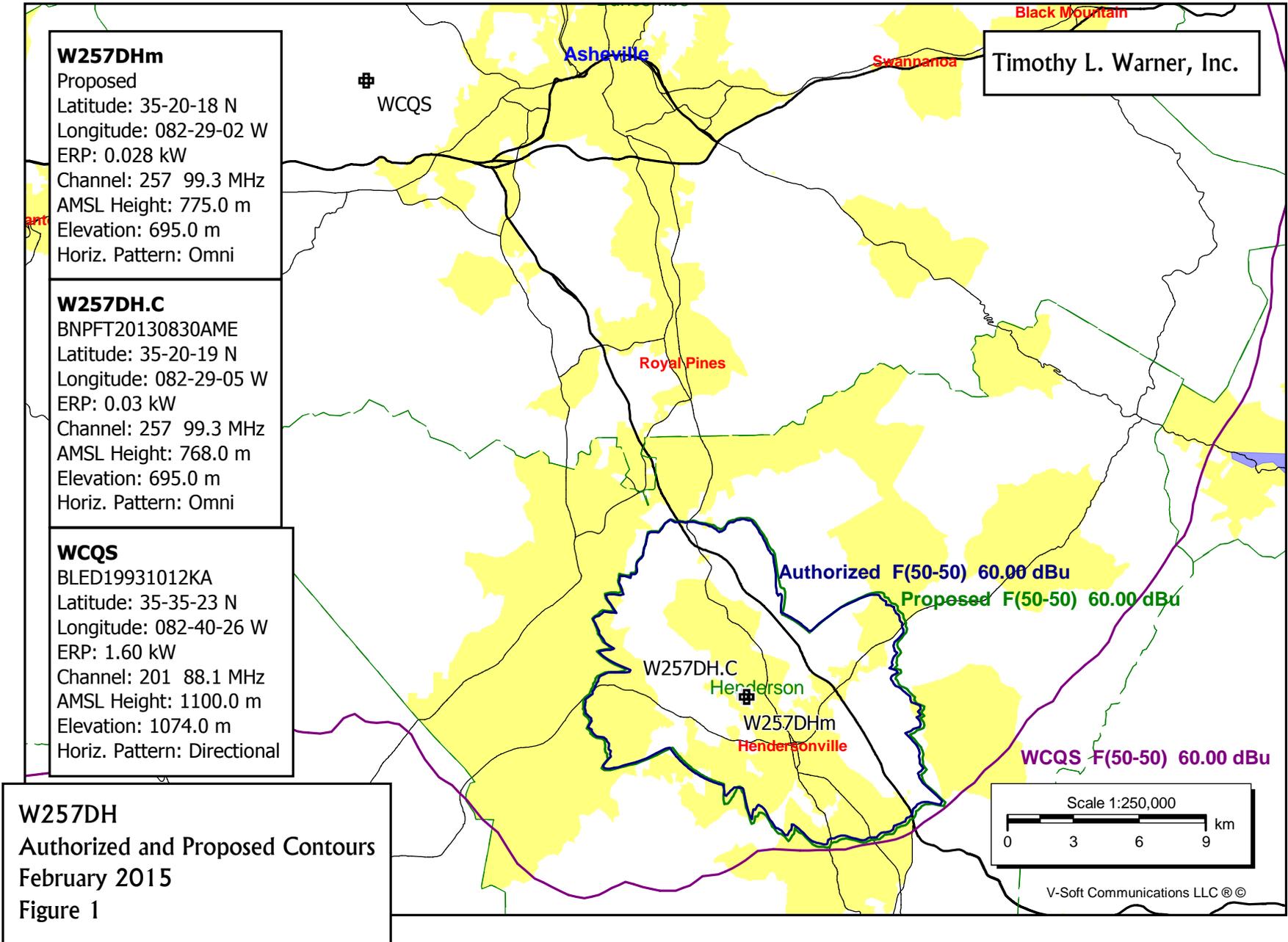
The applicant recognizes that the U/D method is only a tool for predicting likely interference. Should any actual interference be experienced, the applicant will cooperate fully in correcting the interference. Corrective steps may require changes in the transmitting antenna or other steps which would require Commission authorization, may require that the translator cease operation except for brief equipment tests, or may require filtering at the receivers which report interference.

Source of Data

Transmitter location, effective radiated power, directional antenna pattern, and elevation data are extracted from the Commission's CDDBS. All contours for existing and proposed facilities are calculated using height above average terrain calculated at one degree horizontal increments.

V-Soft studies use the NED 03 database with a resolution of three arcseconds. The NED 03 database is derived from the USGS National Elevation Data 30 meter terrain database. The USGS National Elevation Dataset has been developed by merging the highest-resolution, best-quality elevation data available across the United States into a seamless raster format. NED is the result of the maturation of the USGS effort to provide 1:24,000-scale Digital Elevation Model (DEM) data for the conterminous US and 1:63,360-scale DEM data for Alaska.

All population data is from 2010 U.S. Census PL data files. Population is counted by considering the location of the centroid of each census block. The data for each block is counted if it falls within the area being counted.



Timothy L. Warner, Inc.

Asheville

WCQS

Swannanoa

Black Mountain

Royal Pines

Authorized F(50-50) 60.00 dBu

Proposed F(50-50) 60.00 dBu

W257DH.C

Henderson

W257DHm

Hendersonville

WCQS F(50-50) 60.00 dBu

W257DHm

Proposed
Latitude: 35-20-18 N
Longitude: 082-29-02 W
ERP: 0.028 kW
Channel: 257 99.3 MHz
AMSL Height: 775.0 m
Elevation: 695.0 m
Horiz. Pattern: Omni

WCQS

BLED19931012KA
Latitude: 35-35-23 N
Longitude: 082-40-26 W
ERP: 1.60 kW
Channel: 201 88.1 MHz
AMSL Height: 1100.0 m
Elevation: 1074.0 m
Horiz. Pattern: Directional

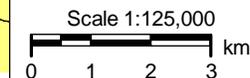
W257DH

Fill-In Demonstration
February 2015
Figure 2

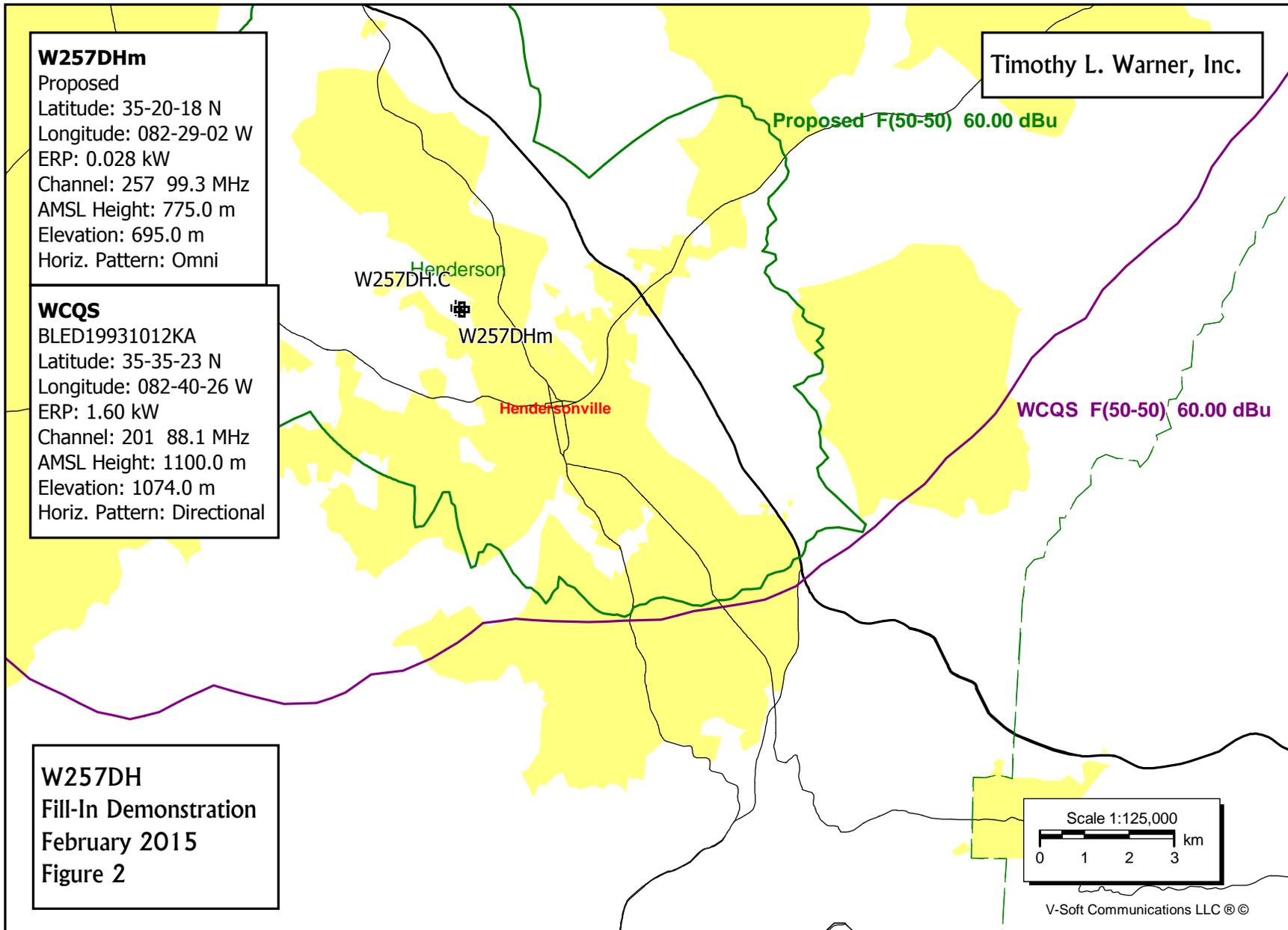
Timothy L. Warner, Inc.

Proposed F(50-50) 60.00 dBu

WCQS F(50-50) 60.00 dBu



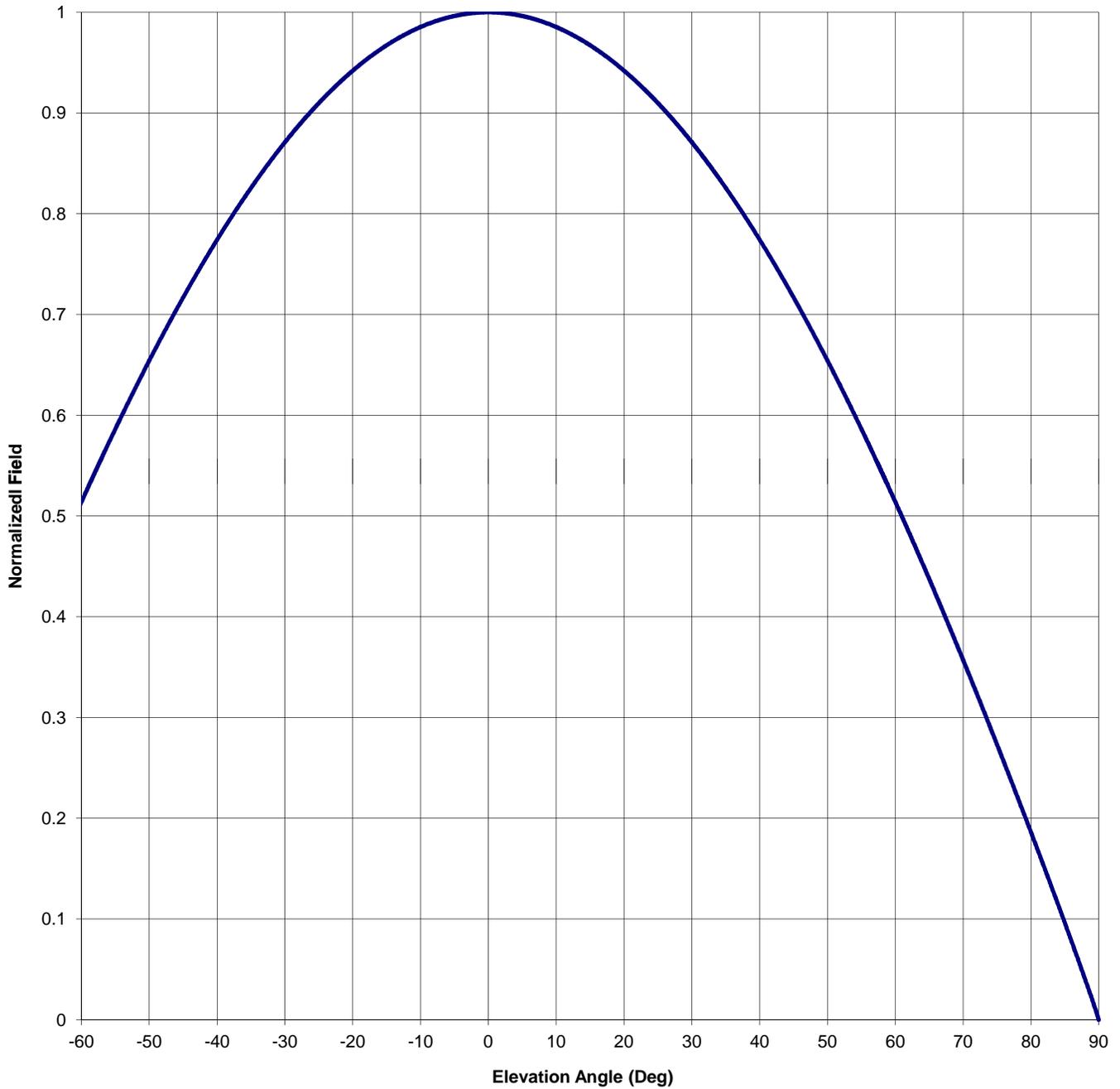
V-Soft Communications LLC ©

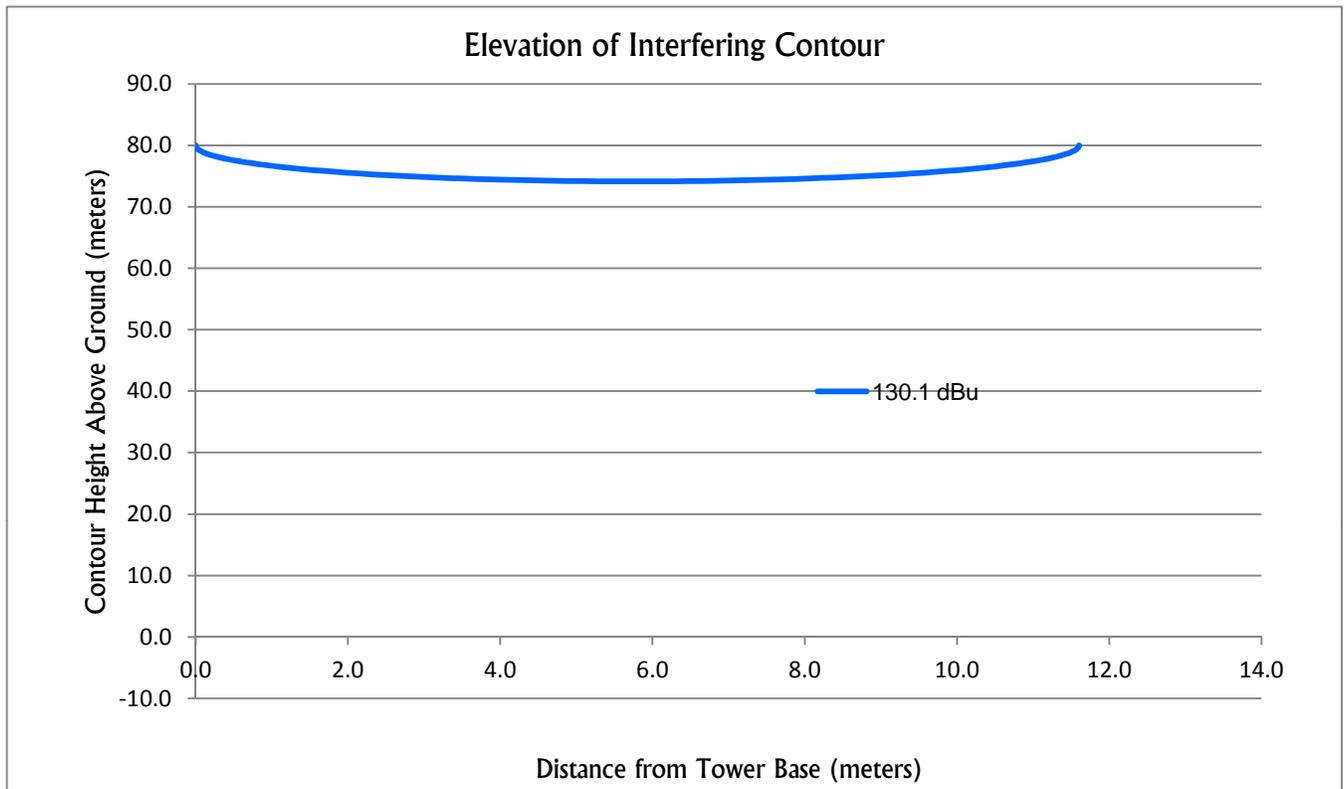


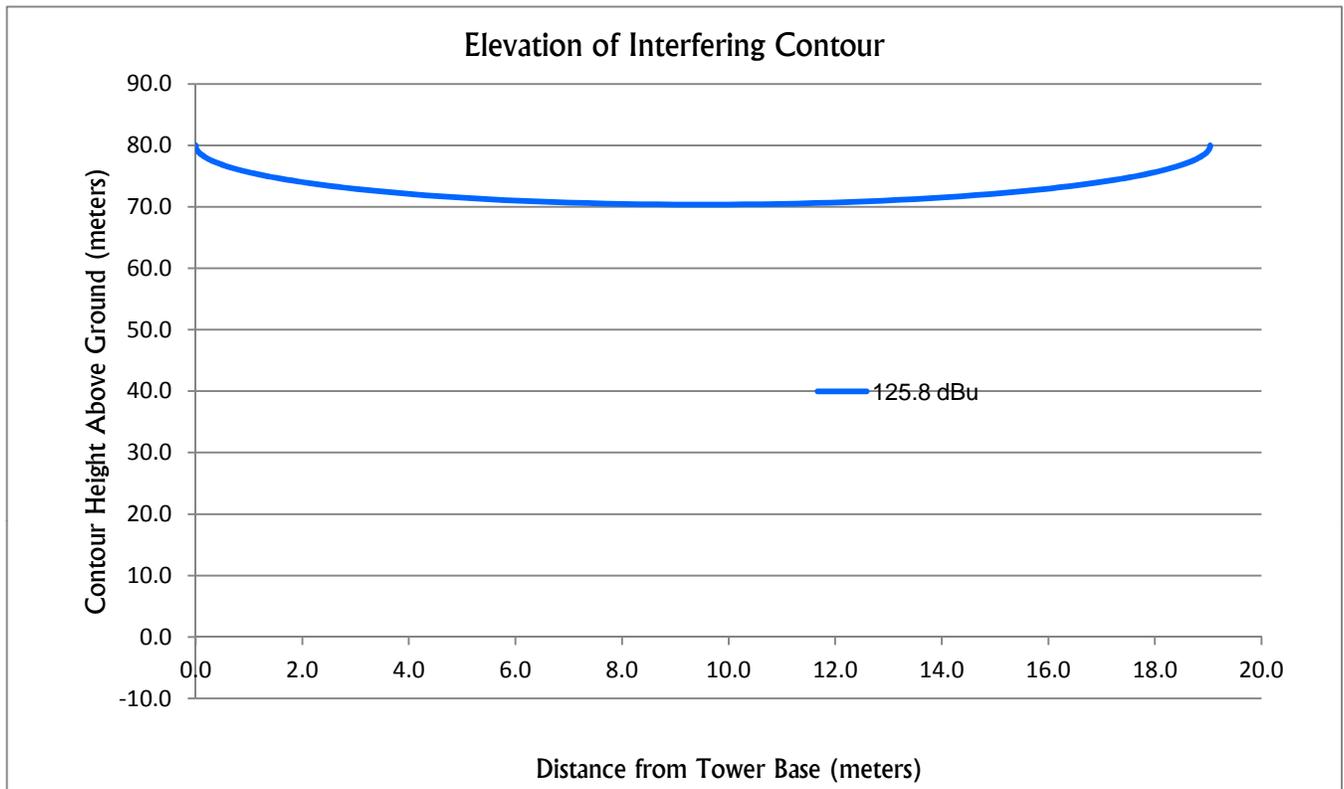
Antenna Mfg.: Shively
Antenna Type: 6736-1
Station: W257DH
Frequency: 99.3
Channel #: 257
Figure: 3

Date: 2/3/2015

Beam Tilt	0	
Gain (Max)	0.454	-3.426 dB
Gain (Horizon)	0.454	-3.426 dB







82°29'45" 82°29'30" 82°29'15" 82°29' 82°28'45" 82°28'30"

35°21'

35°21'

35°20'45"

35°20'45"

35°20'30"

35°20'30"

35°20'15"

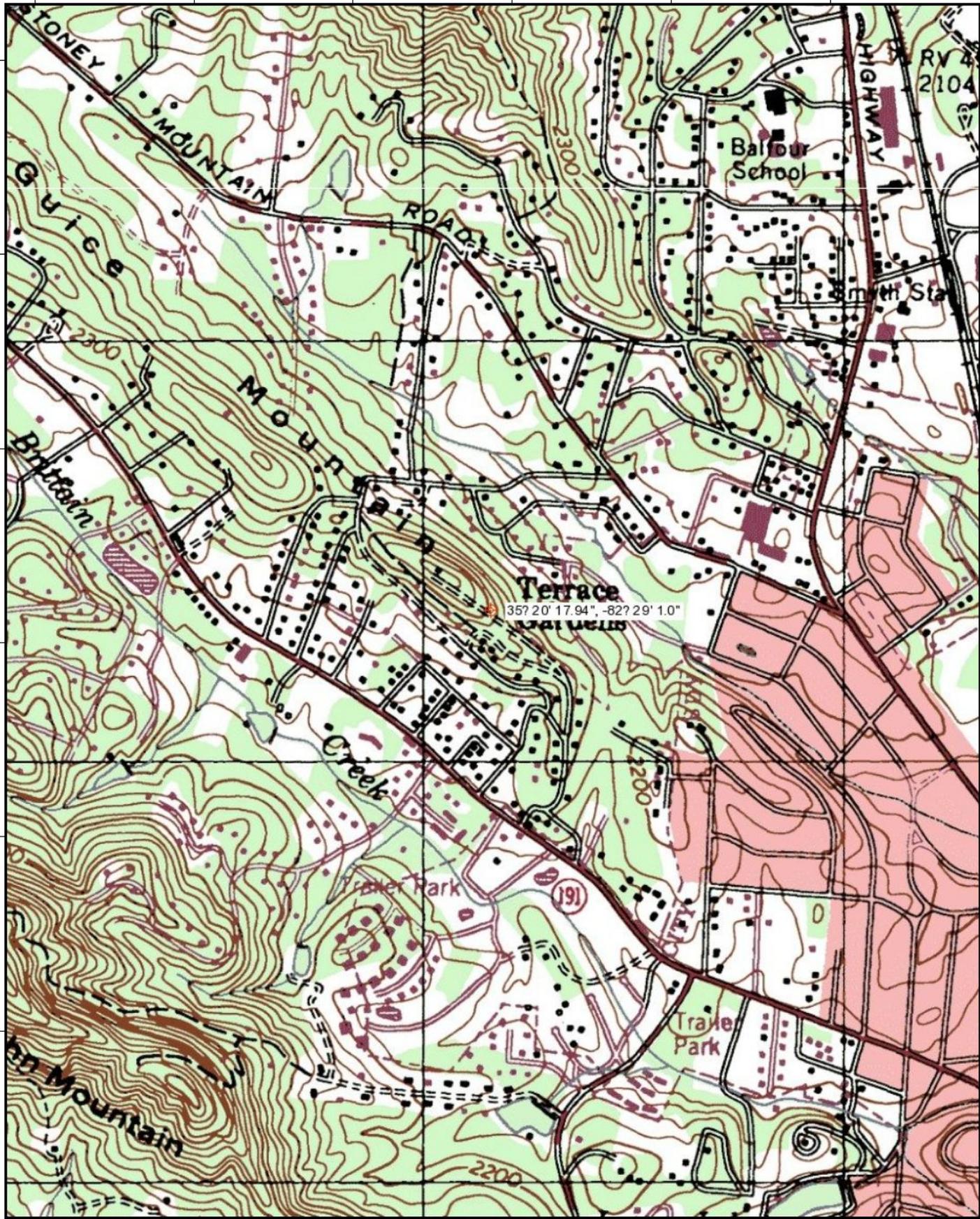
35°20'15"

35°20'

35°20'

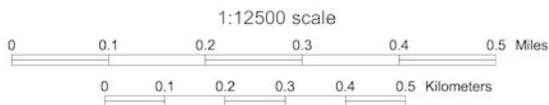
35°19'45"

35°19'45"



82°29'45" 82°29'30" 82°29'15" 82°29' 82°28'45" 82°28'30" 82°28'15"

Universal Transverse Mercator (UTM) Projection Zone 17
North American Datum of 1983



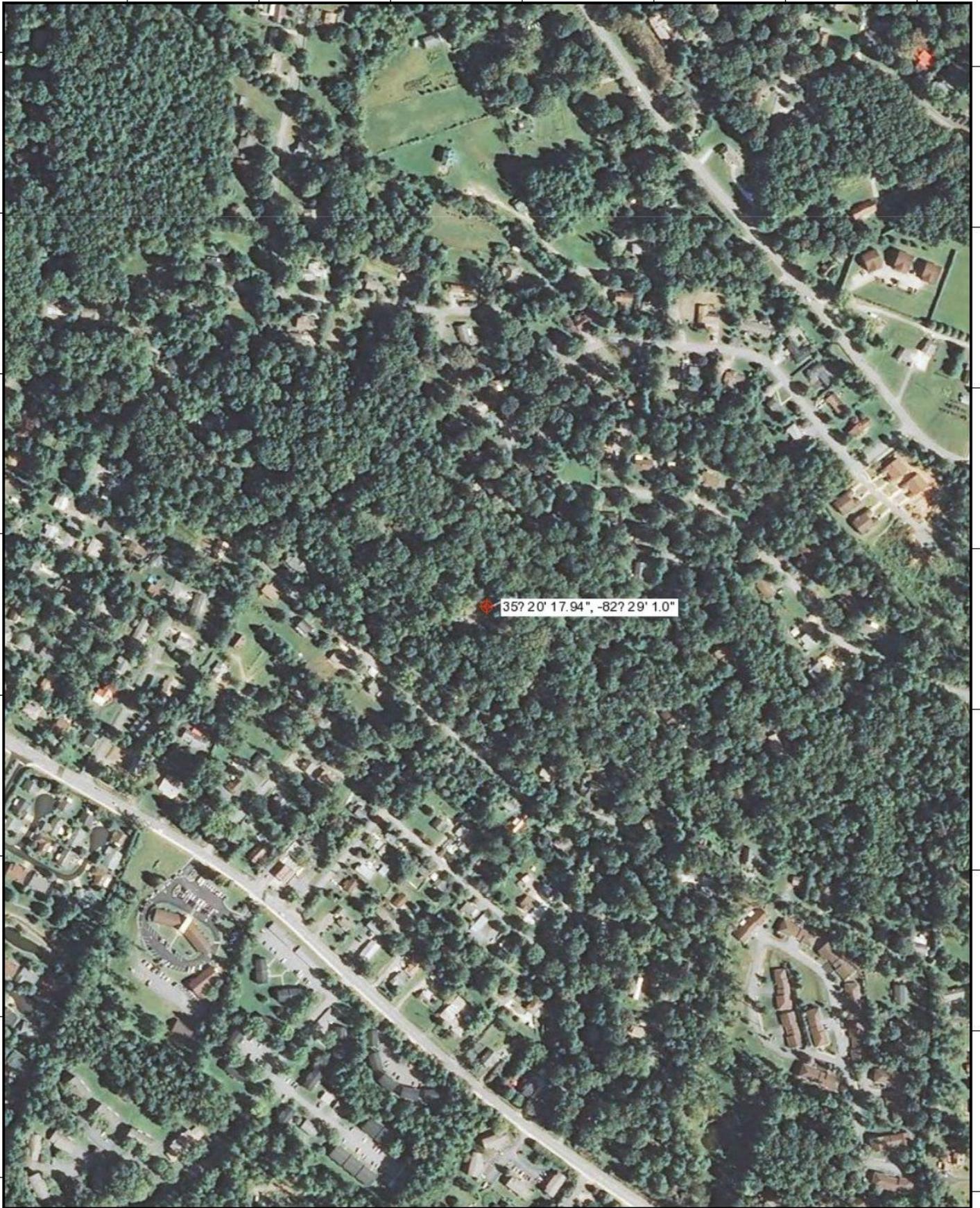
Magnetic declination of 7W at center of map
on March 17, 2011

Figure 6

82°29'15" 82°29'10" 82°29'05" 82°29' 82°28'55" 82°28'50" 82°28'45"

35°20'35"
35°20'30"
35°20'25"
35°20'20"
35°20'15"
35°20'10"
35°20'05"
35°20'

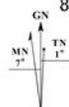
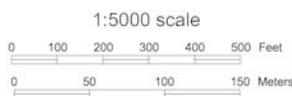
35°20'35"
35°20'30"
35°20'25"
35°20'20"
35°20'15"
35°20'10"
35°20'05"
35°20'



357 20' 17.94", -827 29' 1.0"

82°29'15" 82°29'10" 82°29'05" 82°29' 82°28'55" 82°28'50" 82°28'45"

Universal Transverse Mercator (UTM) Projection Zone 17
North American Datum of 1983



Magnetic declination of 7W at center of map
on March 17, 2011

Figure 7