

Elkin, North Carolina
Application for Minor Modification of FM Translator W278CZ
On Channel 278
by
Foothills Media, Inc.

Exhibit 13
Interference Analysis

April 2019

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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 Foothills Media, 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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24 April 2019

Narrative

This Exhibit supports a minor modification application for FM translator construction permit W278CZ, on Channel 278 in Elkin, North Carolina. Allocation details are provided in this exhibit. This proposal complies fully with the requirements of 74 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.

The changes are a new site, an increase in height, and a new omnidirectional antenna, with three quarter wavelength spacing.

Figure 1 shows the authorized and protected contours, and fill-in compliance.

Allocations

This application proposes service to Elkin, North Carolina, on channel 278. 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. Where the outgoing protection is provided by interference contours with a separation of less than 3.2 kilometers (2 miles), the lack of overlap is plotted in figures in this

exhibit, and the output of the FM Over program is provided. For this application, there is one (1) facility for which additional detail is provided.

Table and Figure	Call Sign	Location	Channel, class and relationship
3	W276CN	Elkin, North Carolina	276D, second adjacent

Table 1: Allocations

Allocation Study Foothills Media, Inc.											
REFERENCE		CH# 278D - 103.5 MHz, Pwr= 0.25 kw, HAAT= 44.3 M, COR= 406 M							DISPLAY DATES		
36 15 07.0 N.		Average Protected F(50-50)= 8.7 km							DATA 04-24-19		
80 56 08.0 W.		Omni-directional							SEARCH 04-24-19		
CH CITY	CALL	TYPE STATE	ANT STATE	AZI. <--	DIST FILE #	LAT. LNG.	Pwr(kw) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap)	*OUT* (in km)
281C Winston-salem	WTQR	LIC NC	NC	74.5 254.9	52.61 BLH20110809ABB	36 22 36.4 80 22 08.6	100.000 528	12.8 850	88.2 Clear Chan.	27.0	-36.7*
Protected by Undesired to Desired Signal Ratio Study, see text and figures.											
278D Elkin	w278CZ!	CP C	NC	190.2 10.2	2.38 BNPFT20180507ACO	36 13 51.0 80 56 25.0	0.250	405	---Reference--- Foothills Media, Inc.		
279C0 Charlotte	WSOC-FM	LIC CN	NC	168.5 348.7	113.45 BMLH20140821ABX	35 15 06.0 80 41 12.0	100.000 411	119.2 613	80.2 Beasley Media Group Licens	-16.9*	17.8
276D Elkin	w276CN	LIC V	NC	97.1 277.1	7.50 BLFT20160420ADF	36 14 37.0 80 51 09.0	0.120	0.8 289	5.9 Triad Family Network, Inc	-6.5*	0.5
278A Marion	WZVA	LIC C	VA	331.3 151.0	82.62 BLH20030930BCX	36 54 10.0 81 22 56.0	3.700 129	76.0 951	22.1 Bristol Broadcasting Compa	0.2	31.9
277L1 Yadkinville	WXTZ-LP	LIC	NC	129.0 309.1	23.84 BLL20150727AAO	36 07 00.9 80 43 44.6	0.033 51	335	6.9 Yadkinville Media Inc		5.0
277A Lenoir	WKVS	LIC NCX	NC	241.1 60.7	63.34 BLH20061003ABC	35 58 30.0 81 33 07.0	0.910 257	44.6 710	28.9 Foothills Radio Group, Llc	7.9	16.3
278D Winston-salem	w278BM	LIC DC	NC	107.8 288.2	64.21 BLFT20180801AAR	36 04 26.0 80 15 18.0	0.250	34.7 321	10.3 Truth Broadcasting Corpora	16.7	12.5
275C1 Hickory	WLKO	LIC C	NC	190.6 10.5	95.53 BMLH20120608AAZ	35 24 26.0 81 07 47.0	31.000 468	8.5 706	70.8 Capstar Tx, Llc, As Debtor	76.8	23.6
276D Fancy Gap	w276BA	LIC C	VA	27.5 207.6	49.45 BLFT20031215AAL	36 38 47.0 80 40 48.0	0.010 314	0.2 979	13.2 Triad Family Network, Inc.	40.2	35.1
277C1 Danville	WAKG	LIC CN	VA	68.1 249.0	148.89 BLH19900904KB	36 44 28.0 79 23 05.0	100.000 199	91.1 410	61.1 Piedmont Broadcasting Corp	45.0	68.7
278C Knoxville	WIMZ-FM	LIC CY	TN	267.9 86.2	250.58 BMLH19890601KB	36 08 06.0 83 43 29.0	100.000 525	194.6 875	90.0 Midwest Communications, In	45.5	134.3
277D Salisbury	w277DD	LIC C	NC	148.7 328.9	74.45 BLFT20161202AAL	35 40 45.0 80 30 25.0	0.250	13.5 279	9.7 2b Productions, Llc	49.0	47.2
276D Winston-salem	w276DS	CP C	NC	91.1 271.5	66.61 BNPFT20180508AAS	36 14 19.0 80 11 34.0	0.250	1.1 317	7.9 Crescent Media Group Llc	52.0	56.5
278D Sedalia	w278AM	LIC CN	NC	107.2 287.8	104.61 BLFT19980127TC	35 58 09.0 79 49 29.0	0.010 168	28.6 466	8.6 Triad Family Network, Inc.	62.9	54.2
Translator for WBFJFM, Winston Salem, N.C.											
279D Newland	w279DR	CP DC	NC	257.9 77.3	90.14 BNPFT20180322AAK	36 04 39.0 81 54 59.0	0.250	20.9 1246	7.1 High Country Adventures, L	59.9	54.5
280D Boone	w280ES	LIC DC	NC	268.4 88.0	68.43 BLFT20161220AAH	36 13 58.0 81 41 54.0	0.009	0.2 1437	11.8 Positive Alternative Radio	57.9	55.0
278D Blacksburg	w278AJ	LIC C	VA	21.1 201.4	111.50 BLFT20160805ABM	37 11 11.6 80 28 53.8	0.200	47.8 745	14.5 Monticello Media Llc	55.7	72.8

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	WTQR Winston-Salem, North Carolina
Relationship	281C, third adjacent
Distance (km)	52.61
Bearing (degrees)	74.5
ERP (kW, on azimuth)	100.0
HAAT (m, on azimuth)	524.4
Ratio	40
Signal Strength (dBu)	74.85
Translator Signal Strength	114.85
Translator distance (km)	.201

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 an SWR FMEC/2-75 two level directional antenna array with bay spacing of 0.75 wavelength, as designed by the manufacturer. The elevation pattern is shown in Figure 4. The elevation of the 114.85 dBu contour is shown in Figure 5.

The WTQR field strength calculated at ground level at the proposed W278CZ site is 74.85 dBu, using the FM Curves calculator on the FCC web site. For the translator interference contour, free space calculations are used. The corresponding 114.85 dBu field strength distance is .201 kilometers in the horizontal plane. The proposed antenna location is 49 meters above ground. As Figure 6 shows, the 114.85 dBu signal level does not reach ground level. The lowest elevation is 4 meters (13 feet) above ground.

Figure 6 is a topographic map of the transmitter site, showing that the site is on a minor ridge in gently rolling terrain. Figure 7 is a Google Earth aerial photograph with a 114.85 dBu field strength line plotted. There are a few structures within the contour, but

mostly on lower terrain and well below the interference contour elevation as shown in Figure 5. Two unoccupied storage sheds are located on the same elevation as the base of the tower. The distances to those sheds and their roof levels are plotted on Figure 5. The only area with a higher elevation than the base of the structure is a portion of a field South Southeast of the structure. 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 CDBS. All contours for existing and proposed facilities are calculated using height above average terrain calculated at one degree horizontal increments.

The contours were evaluated using terrain extracted from the National Elevation Dataset (NED) 03 terrain database. The NED 03 database is derived from the USGS National Elevation Dataset 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.

Table 3: FM Over Output for Protection of W276CN

04-24-2019 Terrain Data: NED 03 SEC FMOVer Analysis

W276CN BLFT20160420ADF

W278CZ.C

Channel = 276D
 Max ERP = 0.12 kW
 RCAMSL = 289 m
 N. Lat. 36 14 37.0
 W. Lng. 80 51 09.0
 Protected
 60 dBu

Channel = 278D
 Max ERP = 0.25 kW
 RCAMSL = 406 m
 N. Lat. 36 15 07.0
 W. Lng. 80 56 08.0
 Interfering
 100 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
217.0	000.1200	-0065.0	005.9	145.3	000.2500	0076.0	006.9	68.56	
218.0	000.1200	-0067.6	005.9	145.6	000.2500	0078.0	006.8	69.06	
219.0	000.1200	-0068.5	005.9	145.8	000.2500	0079.6	006.7	69.51	
220.0	000.1200	-0067.0	005.9	146.1	000.2500	0081.0	006.6	69.94	
221.0	000.1200	-0067.0	005.9	146.3	000.2500	0081.5	006.5	70.27	
222.0	000.1200	-0068.4	005.9	146.6	000.2500	0082.2	006.4	70.63	
223.0	000.1200	-0065.0	005.9	146.8	000.2500	0083.5	006.3	71.05	
224.0	000.1200	-0054.4	005.9	147.0	000.2500	0084.3	006.2	71.44	
225.0	000.1200	-0047.4	005.9	147.2	000.2500	0084.8	006.1	71.79	
226.0	000.1200	-0045.7	005.9	147.4	000.2500	0085.1	006.0	72.12	
227.0	000.1200	-0043.7	005.9	147.6	000.2500	0085.1	005.9	72.44	
228.0	000.1200	-0040.2	005.9	147.8	000.2500	0085.1	005.8	72.75	
229.0	000.1200	-0035.7	005.9	148.0	000.2500	0085.1	005.7	73.07	
230.0	000.1200	-0033.4	005.9	148.1	000.2500	0084.9	005.6	73.37	
231.0	000.1200	-0033.0	005.9	148.3	000.2500	0084.8	005.5	73.69	
232.0	000.1200	-0031.4	005.9	148.4	000.2500	0084.8	005.4	74.02	
233.0	000.1200	-0027.6	005.9	148.5	000.2500	0084.8	005.2	74.35	
234.0	000.1200	-0022.5	005.9	148.6	000.2500	0084.7	005.1	74.68	
235.0	000.1200	-0023.1	005.9	148.7	000.2500	0084.5	005.0	75.00	
236.0	000.1200	-0022.7	005.9	148.8	000.2500	0084.4	004.9	75.33	
237.0	000.1200	-0021.7	005.9	148.8	000.2500	0084.3	004.8	75.66	
238.0	000.1200	-0017.3	005.9	148.9	000.2500	0084.3	004.7	76.01	
239.0	000.1200	-0014.5	005.9	148.9	000.2500	0084.2	004.6	76.37	
240.0	000.1200	-0011.2	005.9	148.9	000.2500	0084.3	004.5	76.74	
241.0	000.1200	-0010.9	005.9	148.8	000.2500	0084.3	004.4	77.13	
242.0	000.1200	-0012.0	005.9	148.8	000.2500	0084.4	004.3	77.53	
243.0	000.1200	-0011.7	005.9	148.7	000.2500	0084.6	004.2	77.95	
244.0	000.1200	-0007.2	005.9	148.6	000.2500	0084.8	004.1	78.37	
245.0	000.1200	-0004.3	005.9	148.4	000.2500	0084.8	004.0	78.79	
246.0	000.1200	-0000.4	005.9	148.2	000.2500	0084.9	003.9	79.23	
247.0	000.1200	-0002.9	005.9	148.0	000.2500	0085.1	003.8	79.68	
248.0	000.1200	-0004.6	005.9	147.7	000.2500	0085.1	003.7	80.13	
249.0	000.1200	-0006.6	005.9	147.4	000.2500	0085.1	003.6	80.57	
250.0	000.1200	-0005.9	005.9	147.1	000.2500	0084.5	003.5	80.97	
251.0	000.1200	-0007.0	005.9	146.7	000.2500	0082.8	003.4	81.28	
252.0	000.1200	-0005.7	005.9	146.2	000.2500	0081.4	003.3	81.62	
253.0	000.1200	-0008.4	005.9	145.7	000.2500	0078.8	003.2	81.84	
254.0	000.1200	-0014.7	005.9	145.1	000.2500	0075.2	003.1	81.98	
255.0	000.1200	-0020.0	005.9	144.5	000.2500	0074.0	003.0	82.39	
256.0	000.1200	-0025.7	005.9	143.8	000.2500	0073.8	002.9	82.93	
257.0	000.1200	-0031.0	005.9	143.0	000.2500	0071.9	002.8	83.31	
258.0	000.1200	-0034.7	005.9	142.1	000.2500	0069.3	002.7	83.66	
259.0	000.1200	-0036.6	005.9	141.1	000.2500	0065.7	002.6	83.92	
260.0	000.1200	-0039.2	005.9	140.0	000.2500	0064.6	002.5	84.45	
261.0	000.1200	-0040.8	005.9	138.8	000.2500	0061.1	002.5	84.76	
262.0	000.1200	-0040.0	005.9	137.4	000.2500	0059.6	002.4	85.27	
263.0	000.1200	-0040.7	005.9	135.9	000.2500	0054.4	002.3	85.28	
264.0	000.1200	-0043.2	005.9	134.3	000.2500	0048.7	002.2	84.97	
265.0	000.1200	-0042.7	005.9	132.5	000.2500	0047.4	002.1	85.38	
266.0	000.1200	-0044.9	005.9	130.6	000.2500	0053.8	002.1	87.15	
267.0	000.1200	-0048.8	005.9	128.5	000.2500	0063.3	002.0	88.78	
268.0	000.1200	-0051.8	005.9	126.1	000.2500	0065.8	001.9	89.54	
269.0	000.1200	-0053.9	005.9	123.6	000.2500	0061.6	001.9	89.76	
270.0	000.1200	-0056.5	005.9	120.9	000.2500	0067.0	001.8	90.63	
271.0	000.1200	-0059.5	005.9	118.0	000.2500	0076.0	001.8	91.64	
272.0	000.1200	-0060.5	005.9	115.0	000.2500	0074.3	001.7	91.91	
273.0	000.1200	-0061.7	005.9	111.7	000.2500	0075.5	001.7	92.29	
274.0	000.1200	-0061.8	005.9	108.3	000.2500	0080.4	001.6	92.82	

275.0	000.1200	-0062.2	005.9	104.8	000.2500	0093.1	001.6	93.61
276.0	000.1200	-0064.1	005.9	101.2	000.2500	0098.5	001.6	93.93
277.0	000.1200	-0066.8	005.9	097.5	000.2500	0105.0	001.6	94.19
278.0	000.1200	-0065.9	005.9	093.8	000.2500	0109.8	001.6	94.31
279.0	000.1200	-0067.2	005.9	090.2	000.2500	0107.6	001.6	94.16
280.0	000.1200	-0068.1	005.9	086.7	000.2500	0101.2	001.6	93.80
281.0	000.1200	-0069.4	005.9	083.2	000.2500	0093.6	001.7	93.28
282.0	000.1200	-0072.0	005.9	079.9	000.2500	0089.0	001.7	92.79
283.0	000.1200	-0074.0	005.9	076.8	000.2500	0078.8	001.7	91.90
284.0	000.1200	-0075.9	005.9	073.9	000.2500	0079.3	001.8	91.53
285.0	000.1200	-0079.0	005.9	071.1	000.2500	0086.1	001.8	91.49
286.0	000.1200	-0082.5	005.9	068.6	000.2500	0092.1	001.9	91.36
287.0	000.1200	-0085.2	005.9	066.2	000.2500	0082.0	002.0	90.25
288.0	000.1200	-0085.6	005.9	064.0	000.2500	0077.2	002.0	89.38
289.0	000.1200	-0088.1	005.9	062.0	000.2500	0081.3	002.1	89.10
290.0	000.1200	-0088.0	005.9	060.2	000.2500	0071.6	002.2	87.77
291.0	000.1200	-0086.8	005.9	058.6	000.2500	0064.9	002.3	86.58
292.0	000.1200	-0084.9	005.9	057.1	000.2500	0056.8	002.4	85.11
293.0	000.1200	-0087.3	005.9	055.7	000.2500	0050.4	002.4	83.41
294.0	000.1200	-0090.4	005.9	054.4	000.2500	0049.6	002.5	82.60
295.0	000.1200	-0092.7	005.9	053.3	000.2500	0049.9	002.6	81.99
296.0	000.1200	-0093.1	005.9	052.3	000.2500	0051.9	002.7	81.67
297.0	000.1200	-0092.1	005.9	051.4	000.2500	0048.7	002.8	80.44
298.0	000.1200	-0094.6	005.9	050.6	000.2500	0046.3	002.9	79.33
299.0	000.1200	-0095.2	005.9	049.8	000.2500	0043.4	003.0	78.13
300.0	000.1200	-0095.5	005.9	049.1	000.2500	0040.7	003.1	76.93
301.0	000.1200	-0098.0	005.9	048.6	000.2500	0038.9	003.2	75.97
302.0	000.1200	-0099.4	005.9	048.0	000.2500	0037.0	003.3	74.99
303.0	000.1200	-0099.5	005.9	047.6	000.2500	0036.4	003.4	74.33
304.0	000.1200	-0099.8	005.9	047.1	000.2500	0034.7	003.5	73.39
305.0	000.1200	-0101.8	005.9	046.8	000.2500	0033.0	003.6	72.48
306.0	000.1200	-0104.4	005.9	046.5	000.2500	0032.5	003.7	71.84
307.0	000.1200	-0105.0	005.9	046.2	000.2500	0032.3	003.8	71.33
308.0	000.1200	-0106.4	005.9	046.0	000.2500	0031.1	003.9	70.53
309.0	000.1200	-0108.3	005.9	045.8	000.2500	0030.0	004.0	69.80
310.0	000.1200	-0107.5	005.9	045.6	000.2500	0029.7	004.1	69.34
311.0	000.1200	-0108.1	005.9	045.5	000.2500	0029.8	004.2	68.91
312.0	000.1200	-0108.1	005.9	045.4	000.2500	0030.0	004.3	68.49
313.0	000.1200	-0107.1	005.9	045.3	000.2500	0030.2	004.4	68.12
314.0	000.1200	-0104.9	005.9	045.3	000.2500	0030.3	004.5	67.76
315.0	000.1200	-0101.2	005.9	045.3	000.2500	0030.3	004.6	67.39
316.0	000.1200	-0099.5	005.9	045.3	000.2500	0030.3	004.7	67.03
317.0	000.1200	-0098.9	005.9	045.3	000.2500	0030.2	004.8	66.67
318.0	000.1200	-0100.1	005.9	045.3	000.2500	0030.1	004.9	66.30
319.0	000.1200	-0101.0	005.9	045.4	000.2500	0030.0	005.0	65.93
320.0	000.1200	-0101.8	005.9	045.5	000.2500	0029.8	005.1	65.60
321.0	000.1200	-0097.7	005.9	045.6	000.2500	0029.6	005.2	65.27
322.0	000.1200	-0092.9	005.9	045.7	000.2500	0029.8	005.3	64.94
323.0	000.1200	-0089.1	005.9	045.8	000.2500	0030.3	005.4	64.68
324.0	000.1200	-0087.2	005.9	046.0	000.2500	0031.0	005.5	64.56
325.0	000.1200	-0082.8	005.9	046.1	000.2500	0032.0	005.6	64.48
326.0	000.1200	-0077.2	005.9	046.3	000.2500	0032.5	005.7	64.28
327.0	000.1200	-0077.0	005.9	046.5	000.2500	0032.5	005.8	63.97
328.0	000.1200	-0078.7	005.9	046.7	000.2500	0032.7	005.9	63.72
329.0	000.1200	-0076.6	005.9	046.9	000.2500	0033.2	006.0	63.55
330.0	000.1200	-0075.5	005.9	047.1	000.2500	0034.1	006.1	63.47
331.0	000.1200	-0079.3	005.9	047.3	000.2500	0035.5	006.2	63.53
332.0	000.1200	-0085.6	005.9	047.5	000.2500	0036.3	006.3	63.42
333.0	000.1200	-0088.5	005.9	047.7	000.2500	0036.6	006.4	63.23
334.0	000.1200	-0091.2	005.9	048.0	000.2500	0036.9	006.5	63.05
335.0	000.1200	-0093.3	005.9	048.2	000.2500	0037.4	006.6	62.90
336.0	000.1200	-0094.9	005.9	048.5	000.2500	0038.7	006.7	62.93

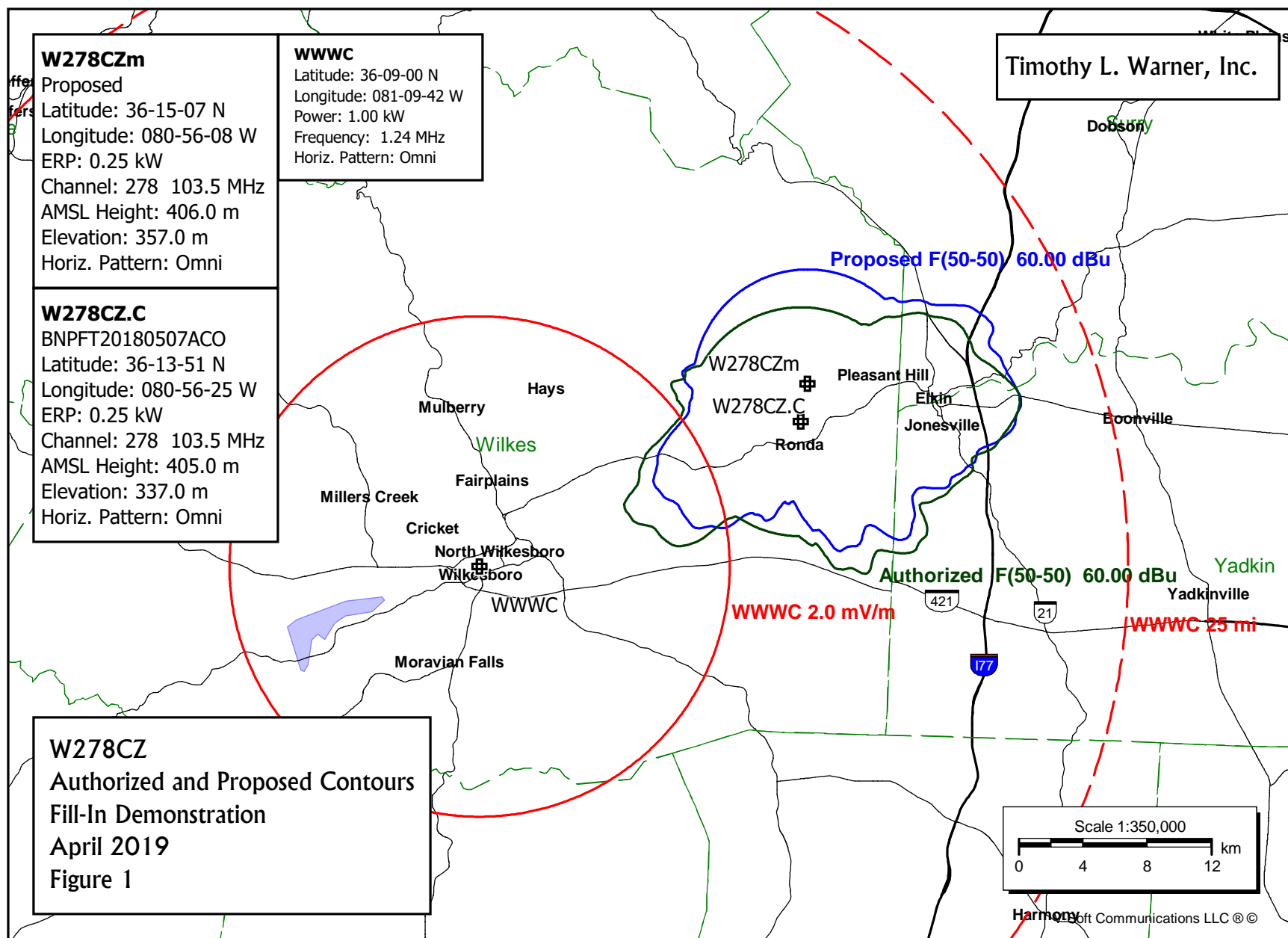
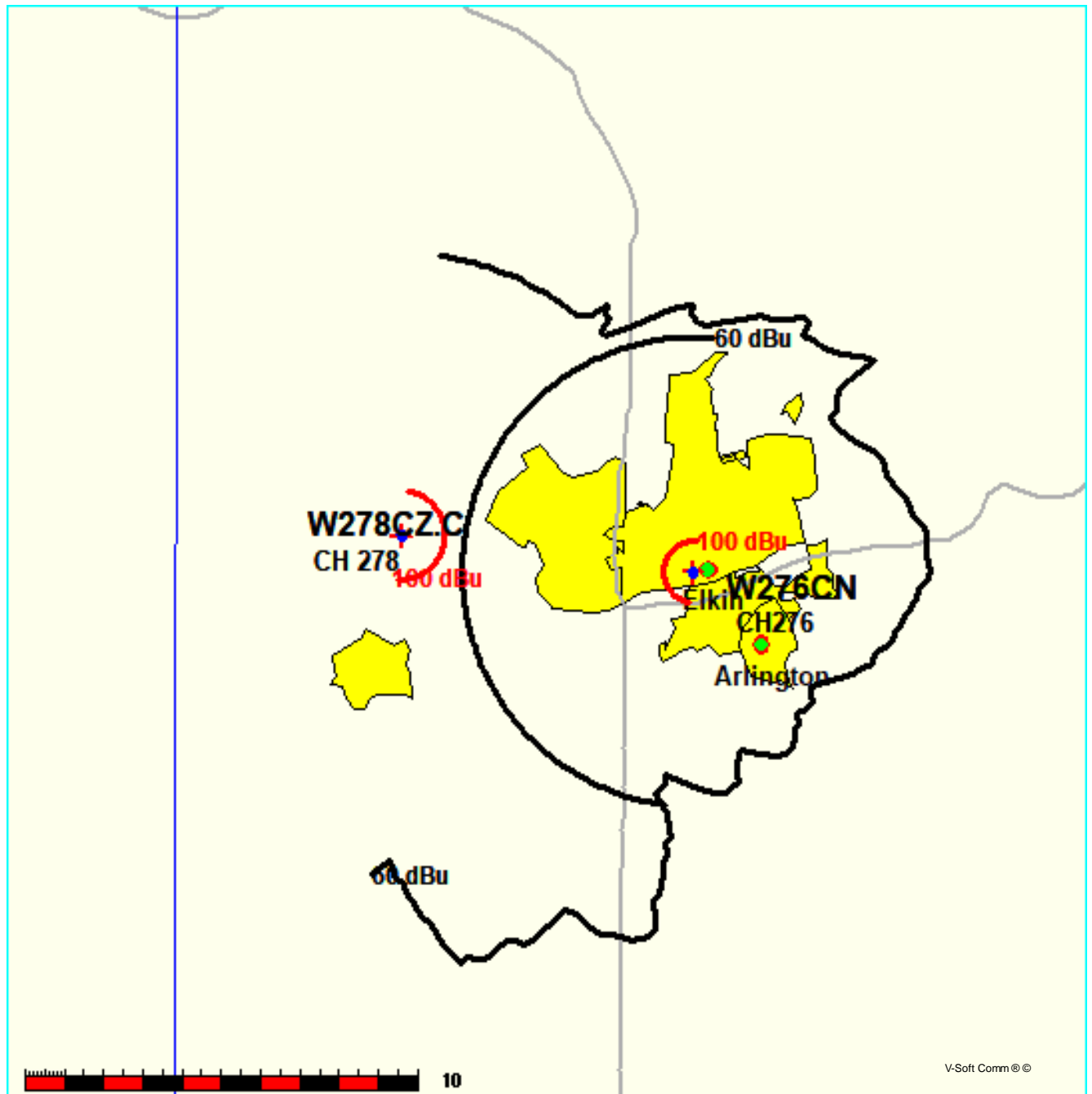


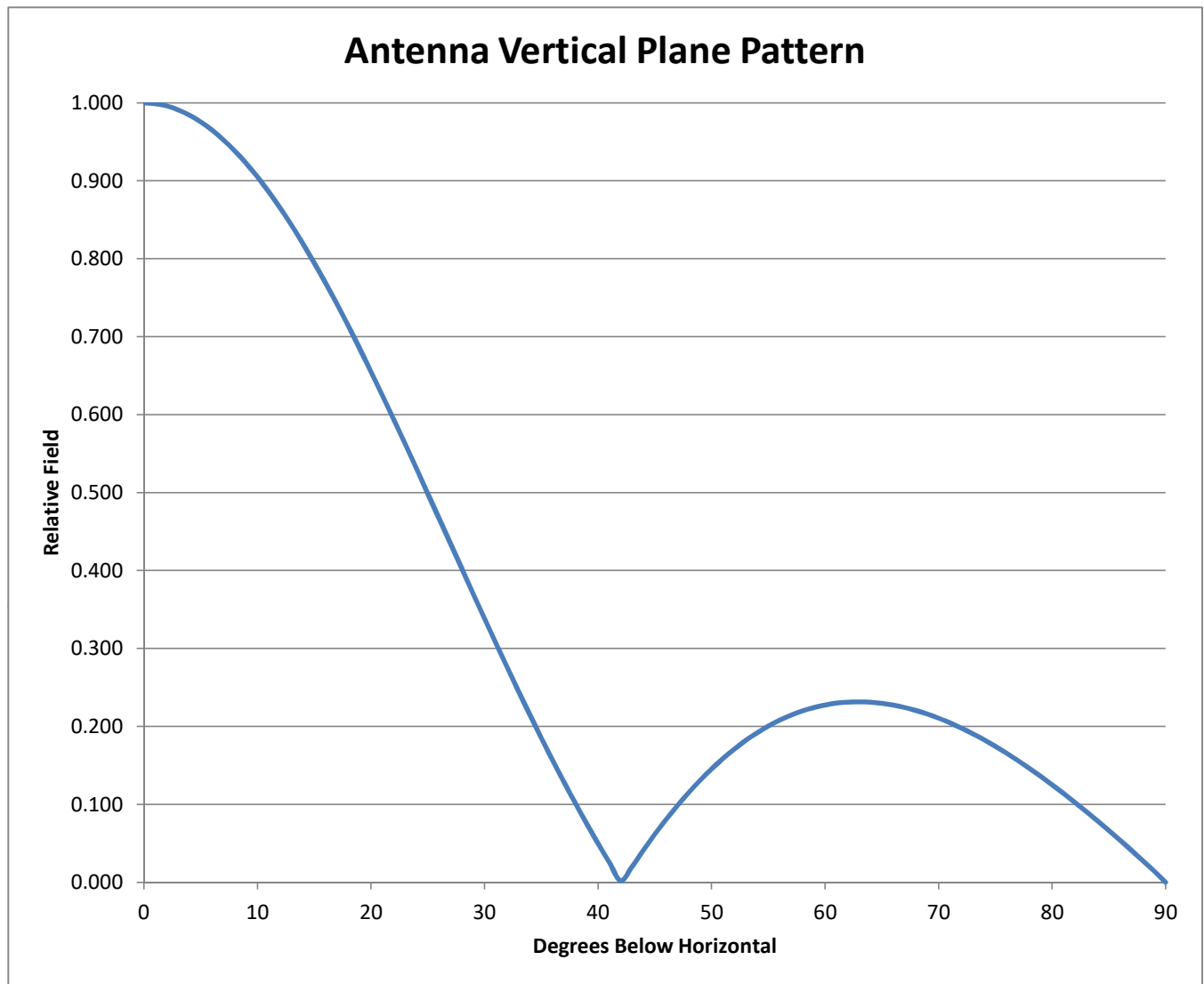
Figure 3: Allocation Study: W276CN
Foothills Media, Inc.

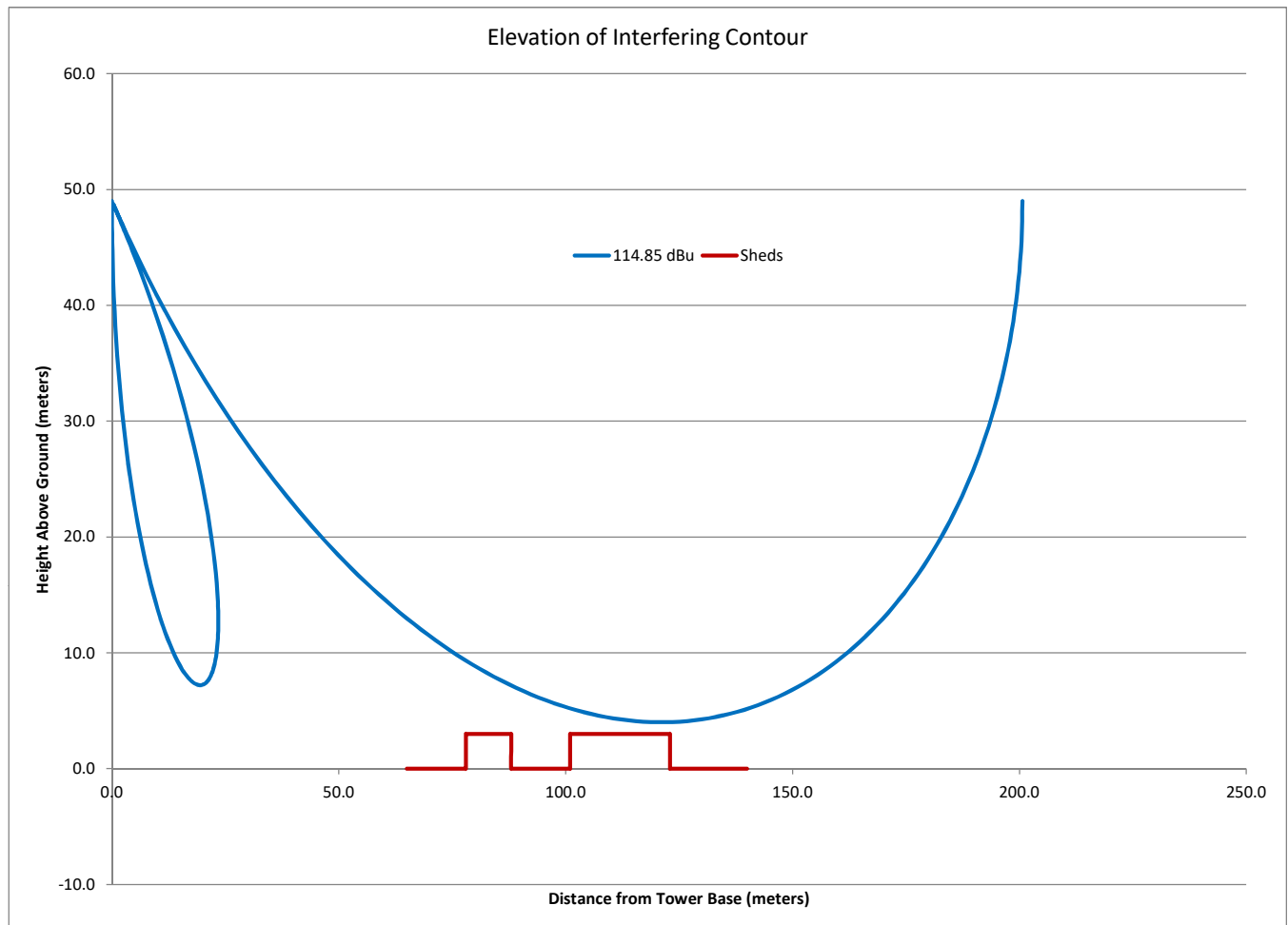
FMCommander Single Allocation Study - 04-24-2019 - NED 03 SEC
W278CZ.C's Overlaps (In= -6.46 km, Out= 0.5 km)

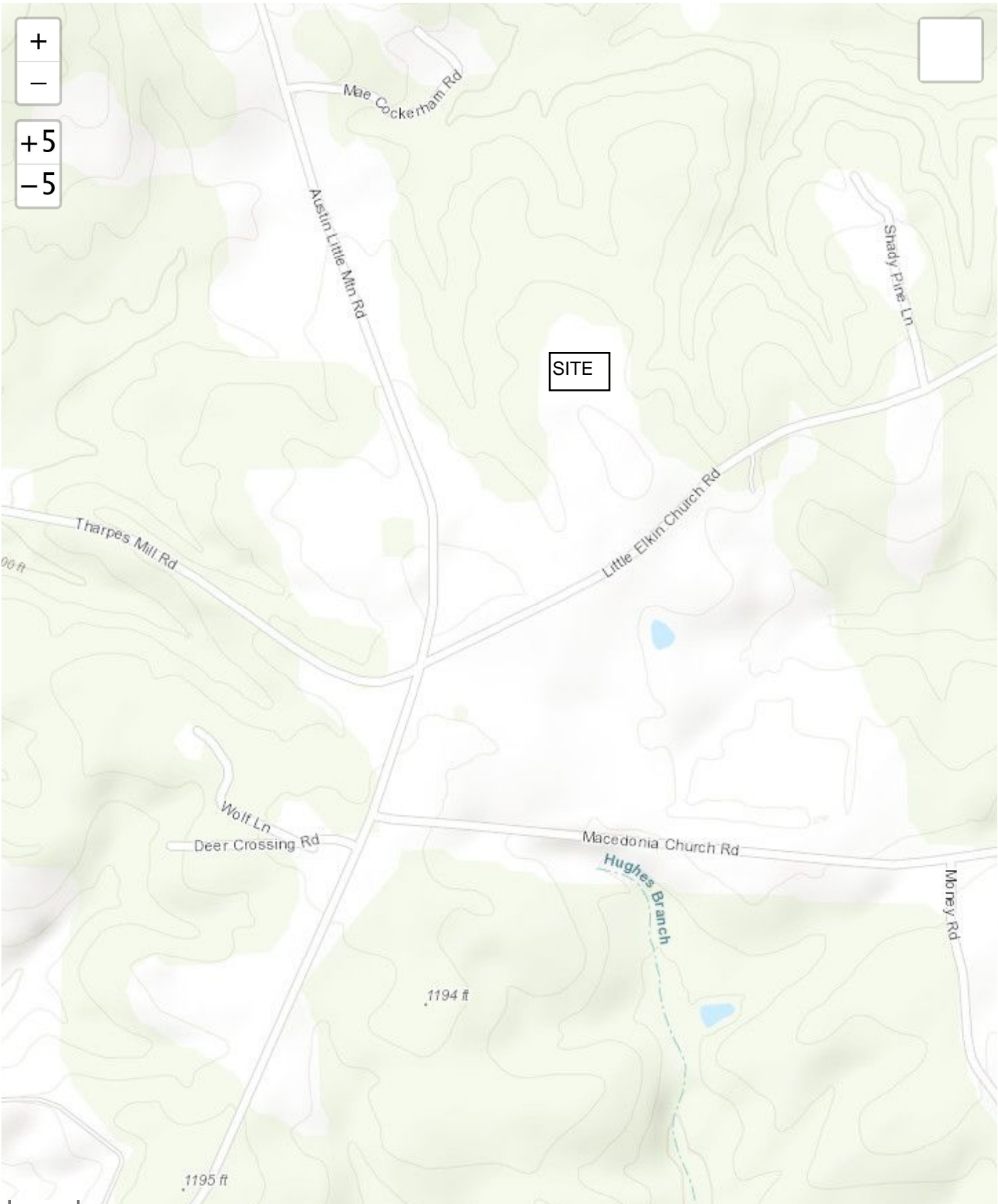
W278CZ.C CH 278 D
Lat= 36 15 07.0, Lng= 80 56 08.0
0.25 kW 44.3 m HAAT, 406 m COR
Prot.= 60 dBu, Intef.= 100 dBu

W276CN CH 276 D BLFT20160420ADF
Lat= 36 14 37.0, Lng= 80 51 09.0
0.12 kW 0 m HAAT, 289 m COR
Prot.= 60 dBu, Intef.= 100 dBu











Leaflet | Tiles © Esri — Esri, DeLorme, NAVTEQ, TomTom, Intermap, iPC, USGS, FAO, NPS, NRCAN, GeoBase, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

W278CZm

Aerial Photograph
With Interference Contour
April 2019
Figure 7

Legend

-  W278CZm (278)
-  W278CZm (278) - 50 10 Field Strength: 114.85 dBu FCC [NED 03 US]

