

ENGINEERING EXHIBITS  
IN SUPPORT OF COMMENTS OF  
THE AM RADIO PRESERVATION ALLIANCE  
IN MB DOCKET NO. 13-249

WBAL(AM), Baltimore, Maryland

JANUARY 2019

The attached engineering exhibits have been prepared on behalf of the AM Radio Preservation Alliance (AMRPA) to document the impact on AM radio service during nighttime, critical hours and daytime operations, respectively, if certain changes to the AM protection rules currently enforced by the Federal Communication Commission (FCC), under consideration in MB Docket No. 13-249, were adopted.<sup>1</sup> These exhibits clearly validate that there would be minimal theoretical gains in radio service provided by other AM stations at the expense of new interference to vastly more populations currently reached by established Class A AM radio service.

In this set of engineering exhibits, interference and coverage studies were conducted analyzing Class A AM Station WBAL, Baltimore, Maryland, FCC Facility ID No. 65679, in regard to its nighttime (Figures 1-N through 13-N), critical hours (Figures 1.1-C through 2.3-C) and daytime operations (Figures 1-D through 5-D), applying the FCC's reduced protection requirements to Class A AM stations as proposed in the *SFNPRM*.<sup>2</sup>

As detailed further below, Figure 1-N documents the negative impact on the studied Class A AM station's nighttime signal from nearby non-Class A AM stations adding nighttime coverage assuming the *SFNPRM*'s Alternative 1 for nighttime hours protection to Class A AM stations (protection of 0.5 mV/m groundwave contour) was adopted, while Figures 2-N through 13-N show the theoretical additional service if neighboring non-Class A AM stations were to add nighttime coverage under Nighttime

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<sup>1</sup> See *Revitalization of the AM Radio Service*, Second Further Notice of Proposed Rulemaking, FCC 18-139, MB Docket No. 13-249 (rel. Oct. 5, 2018) ("*SFNPRM*").

<sup>2</sup> These interference studies were conducted using computer software V-Soft AMpro2's incoming interference study program, combining interfering signal strength using the RSS methodology with a 50% minimum level for inclusion and a buffer grid size of 500x500.

Alternative 1.<sup>3</sup> Following these figures are contour maps (prepared by iHeartMedia's engineering staff) mapping these non-Class A AM station's theoretical nighttime AM gain areas in comparison with such station's licensed or permitted FM translator service area (60 dBu contour), where applicable,<sup>4</sup> along with a chart summarizing the actual FM translator population served in contrast to the theoretical nighttime AM gains coming at the expense of more interference on the AM band.

Figures 1.1-C, 1.2-C and 1.3-C address the studied Class A AM station during critical hours periods under Alternative 1 (Class A AM stations afforded no protection from other AM stations during critical hours). Figures 2.1-C, 2.2-C and 2.3-C document the studied Class A AM station during critical hours periods under Alternative 2 of the *SFNPRM* (protection of a Class A AM station during critical hours only to its 0.5 mV/m groundwave contour by amending 47 C.F.R. Section 73.190 critical hours figures to reference the distance from the Class A AM station's 0.5 mV/m contour in lieu of its 0.1 mV/m contour). These Critical Hours Alternative 1 and Alternative 2 studies reflect increasing interference (shaded red) to currently served populations by the studied Class A AM station at the intervals of one-hour, one-half hour, and one-quarter hour before sunset.

Daytime operations under the *SFNPRM* proposal are addressed in Figures 1-D through 5-D. Figure 1-D documents the daytime operations of the studied Class A AM station as currently protected (to its 0.1 mV/m daytime groundwave contour), as well

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<sup>3</sup> Based on a sampling analysis, *SFNPRM* Nighttime Alternative 2 generally is expected to authorize even more interference to the listeners of Class A AM stations than pursuant to *SFNPRM* Nighttime Alternative 1.

<sup>4</sup> In situations where the non-Class A AM station has more than one FM translator authorization, only the FM translator facility closest to the theoretical nighttime AM gain area has been mapped.

as the predicted interference within that contour that would result if nearby AM stations operated with the maximum powers permitted in the direction of the studied Class A AM station as proposed in the *SFNPRM* (protecting only the 0.5 mV/m daytime groundwave contour of the Class A AM station). Figures 2-D through 5-D document the potential daytime population gain – solely in the direction of the studied Class A AM station as other stations may limit power gains in other directions – for the individual interfering stations, assuming the daytime protection to only the 0.5 mV/m groundwave contour was adopted as proposed in the *SFNPRM*.

Following the Figures are charts tabulating the results of these nighttime, critical hours and daytime studies.

In addition, the summary pages of the “Grid Based Incoming Interference Population Report(s)” conducted for the nighttime, critical hours and daytime analysis of the studied Class A AM station are also attached. Due to their length, only the summaries, and not the entire Grid Based Incoming Interference Population Report(s) are attached; the entire Report(s) are available upon the request of the FCC or any interested party.

Below is a summary of the methodology of the conducted coverage and interference studies in regard to the studied Class A AM station as documented in the attached figures and charts:

#### Nighttime

Figure 1-N maps the studied Class A AM station’s nighttime 0.5 mV/m 50% skywave contour (red line), which is currently protected, along with the Class A AM station’s nighttime 0.5 mV/m groundwave contour (blue line) which is proposed to be protected under Nighttime Alternative 1 of the *SFNPRM*. The resulting zone subject to new interference from co-channel Class D stations adding nighttime operations is shown in

red shading, and the currently-served population and population subject to such new interference are detailed in red on Figure 1-N. In determining the interference to the studied Class A AM station, the nighttime operation for each impinging Class D AM station is based on protecting the 0.5 mV/m groundwave contour of the studied Class A AM station pursuant to Nighttime Alternative 1 of the *SFNPRM*. Generally, the impinging Class D AM stations are non-directional. In those few instances where the Class D AM station employs a directional pattern, the presumed Class D AM station power has been limited in the direction of the studied Class A AM station's 0.5 mV/m groundwave contour and has not been verified for protection limits in other directions.

Figures 2-N through 13-N show the nighttime interference-free contour for each co-channel Class D interfering AM station assuming nighttime operations with maximum permissible power, while protecting only the nighttime 0.5 mV/m groundwave contour of the studied Class A AM station pursuant to Nighttime Alternative 1 of the *SFNPRM*. The potential nighttime population and area gains resulting from such co-channel Class D stations operating with maximum allowed power in the direction of the studied Class A AM station's protected 0.5 mV/m groundwave contour is also detailed in red on each figure. A tabulation of the nighttime study results is provided following all the figures.

### Critical Hours

Figures 1.1-C through 1.3-C and Figures 2.1-C through 2.3-C each show the daytime 0.1 mV/m groundwave contour (blue line) and the 0.5 mV/m groundwave contour (red line) of the studied Class A AM station. There are three studies in each set, employing skywave diurnal factors (FCC Section 73.190 Figure 13) for the time frames of (i) one hour prior to sunset (SS-1), (ii) ½ hour prior to sunset (SS-0.5), and (iii) ¼ hour prior to sunset (SS-0.25). Predicted interference within the respective contours is shown in red shading.

Under Critical Hours Alternative 1 of the *SFNPRM*, neighboring stations to a Class A AM station (which in this instance are Class D stations) could continue to operate at full daytime power during critical hours. The interference to the studied Class A AM station from such unrestricted power operations of its neighbors during critical hours per Alternative 1 of the *SFNPRM* is documented in red shading on Figures 1.1-C, 1.2-C and 1.3-C, for each respective time period (one hour, ½ hour and ¼ hour prior to sunset).

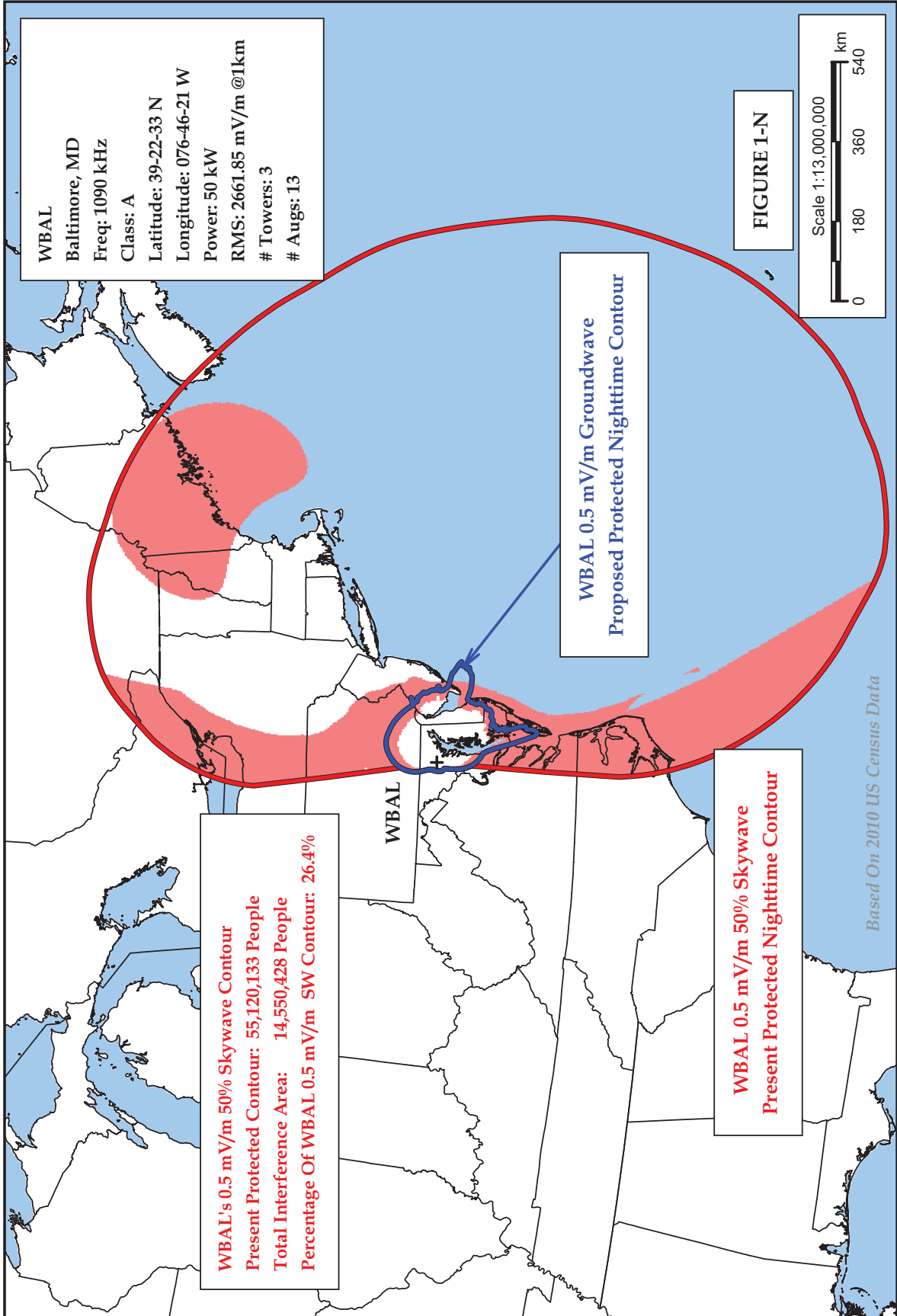
Pursuant to Critical Hours Alternative 2 of the *SFNPRM*, the Commission would change the vertical axis reference for application of Figures 9, 10 and 11 of 47 C.F.R. Section 73.190 from "Distance from 0.1 mV/m Contour in Miles" to "Distance from 0.5 mV/m Contour in Miles." The interference to the studied Class A AM station from such revised permissible power calculations for its neighbors during critical hours per Alternative 2 of the *SFNPRM* is documented in red shading on Figures 2.1-C, 2.2-C and 2.3-C, for each respective time period (one hour, ½ hour and ¼ hour prior to sunset).

The box on the upper left-hand corner of each Critical Hours figure sets forth the data for the population, area and percentage impact of the resulting interference under the reviewed Critical Hours Alternative on the studied Class A AM station's 0.1 mV/m contour; the box on the upper right-hand corner, on the studied Class A AM station's 0.5 mV/m contour. A tabulation of the critical hours study results is provided following all the figures.

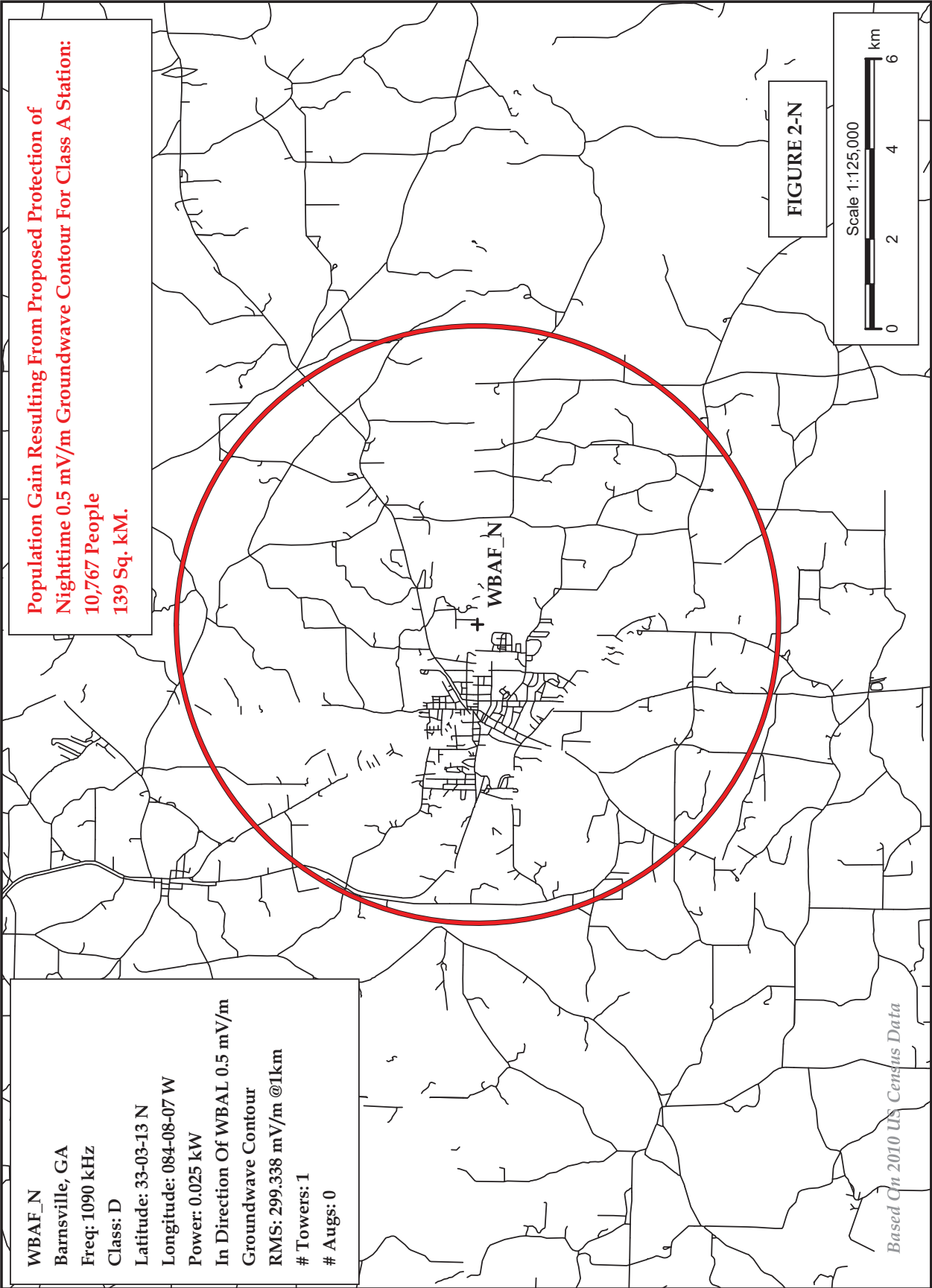
### Daytime

For the studied Class A AM station, Figure 1-D maps the present daytime protected 0.1 mV/m groundwave contour (blue line) as well as the less-encompassing daytime 0.5 mV/m groundwave contour (red line) proposed to be protected from co-channel interference in the *SFNPRM*. The interference area resulting from nearby co-channel stations (typically Class D AM stations) operating with maximum potential power (up to 50 kW) in the direction of the studied Class A AM daytime 0.5 mV/m groundwave contour is shown in red shading. The box at the upper right-hand corner of Figure 1-D details the currently protected population within the studied Class A AM station's daytime 0.1 mV/m groundwave contour, the population within that contour that would be subject to interference if only the daytime 0.5 mV/m groundwave contour is protected as proposed in the *SFNPRM*, and the percentage of the current population now served that such interference zone encompasses.

Figures 2-D through 5-D document the potential daytime population gain for the individual interfering stations in the direction of the studied Class A AM station with daytime protection to the Class A AM station's 0.5 mV/m groundwave contour, as proposed in the *SFNPRM*. The boundaries for the gain areas are the difference between the licensed and potential 0.5 mV/m groundwave contours of the interfering station through the arc of the Class A AM station's protected 0.5 mV/m groundwave contour, as detailed on each of Figures 2-D through 5-D. Individually and collectively, the potential daytime population gains by the interfering stations in the direction of the now-limiting Class A AM station under the *SFNPRM* daytime proposal constitutes a tiny percentage of the population that would be subject to new interference to their daytime reception of the studied Class A AM station. A tabulation of the daytime study results is provided following all the figures.

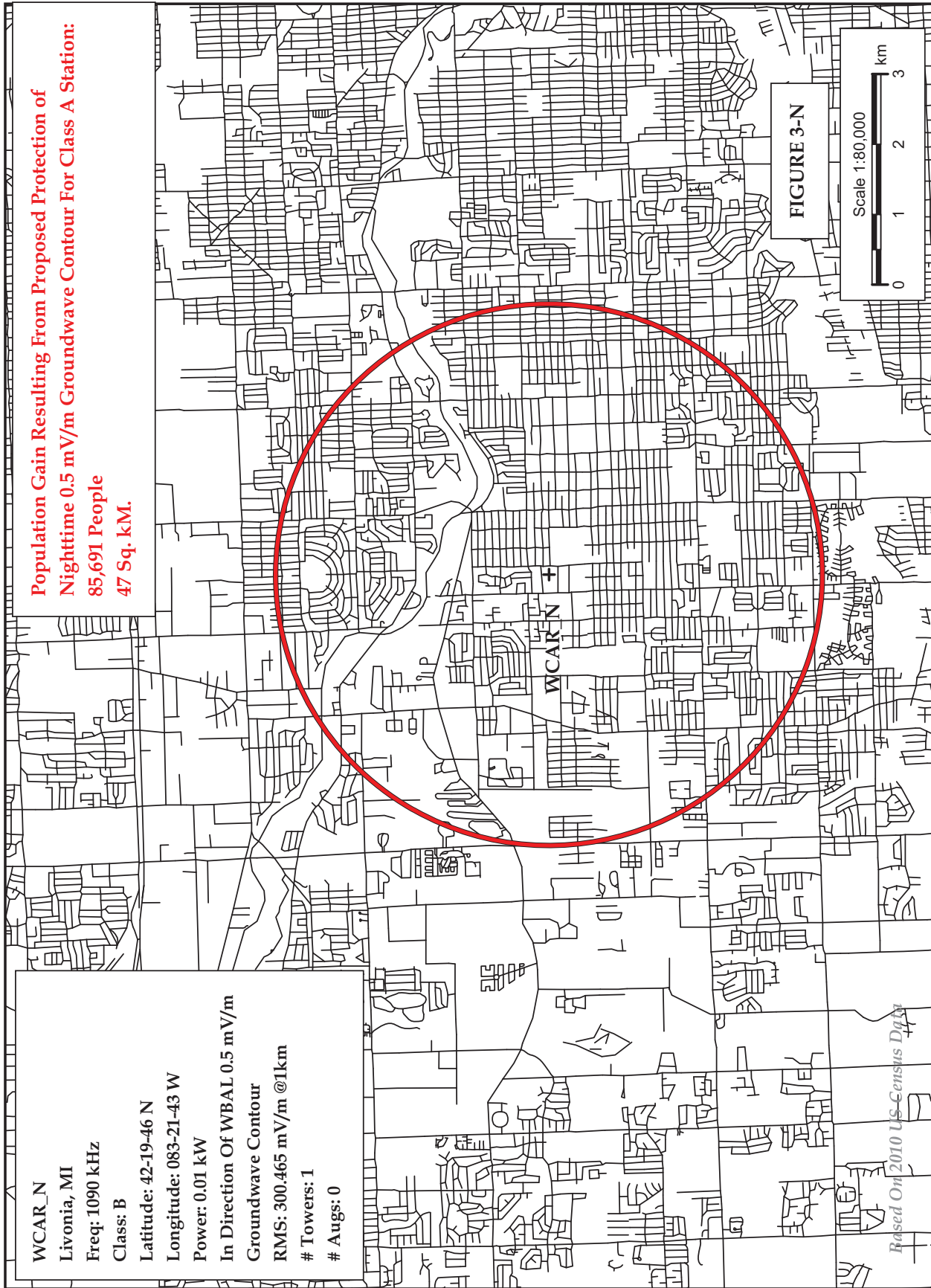


Predicted Nighttime Interference Area To The Present Protected WBAL 0.5 mV/m 50% Skywave Nighttime Contour From Class D Stations WBAF, WCAR, WKTE, WKFI, WCZZ, WENR, WHGG, WKBZ, WFCV, WTNK, WTSB and WILD Operating With Maximum Allowed Power In The Direction Of WBAL's 0.5 mV/m Groundwave Contour

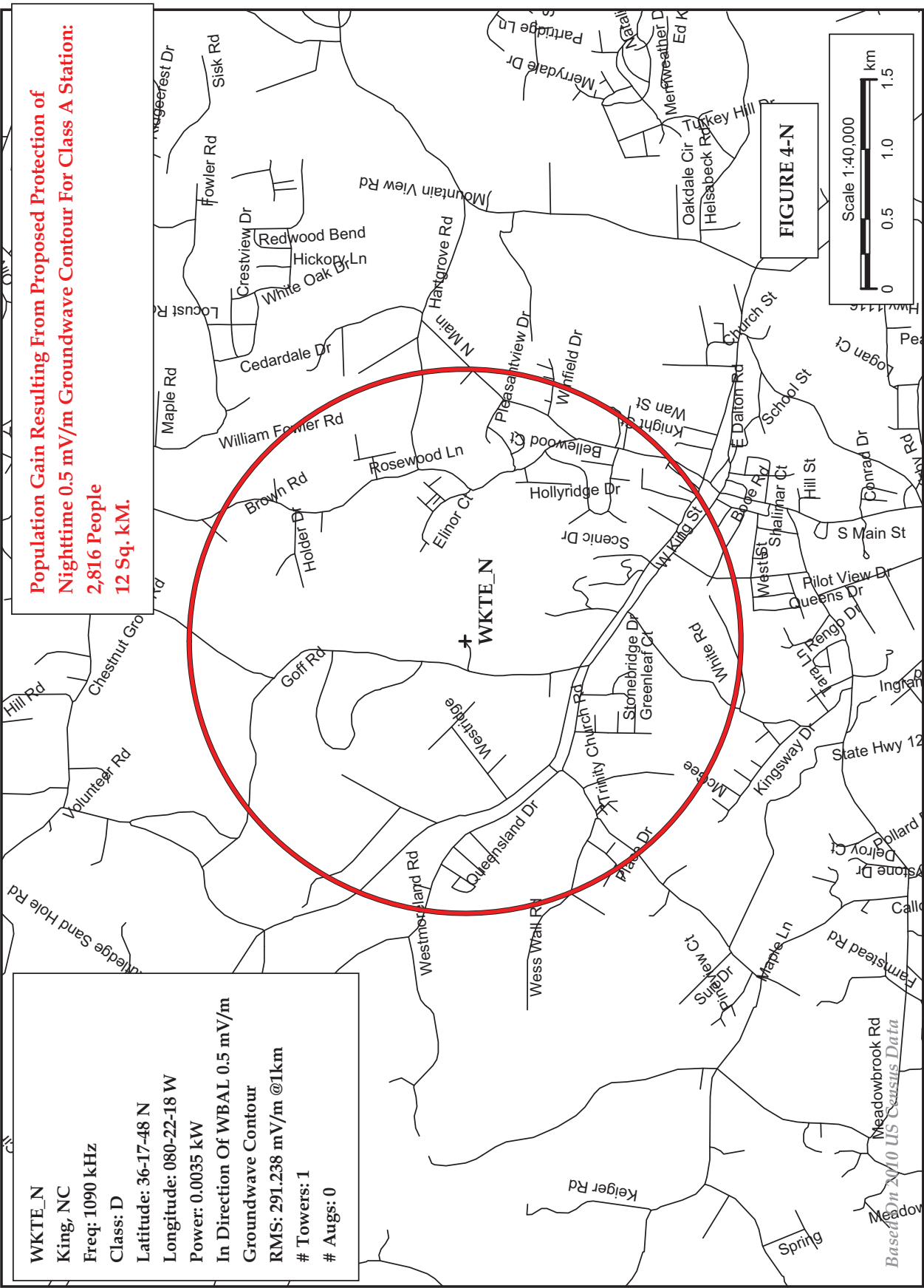


WBAF NIF 3.8 mV/m Groundwave Contour With Protection To Class A Station WBAF's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour

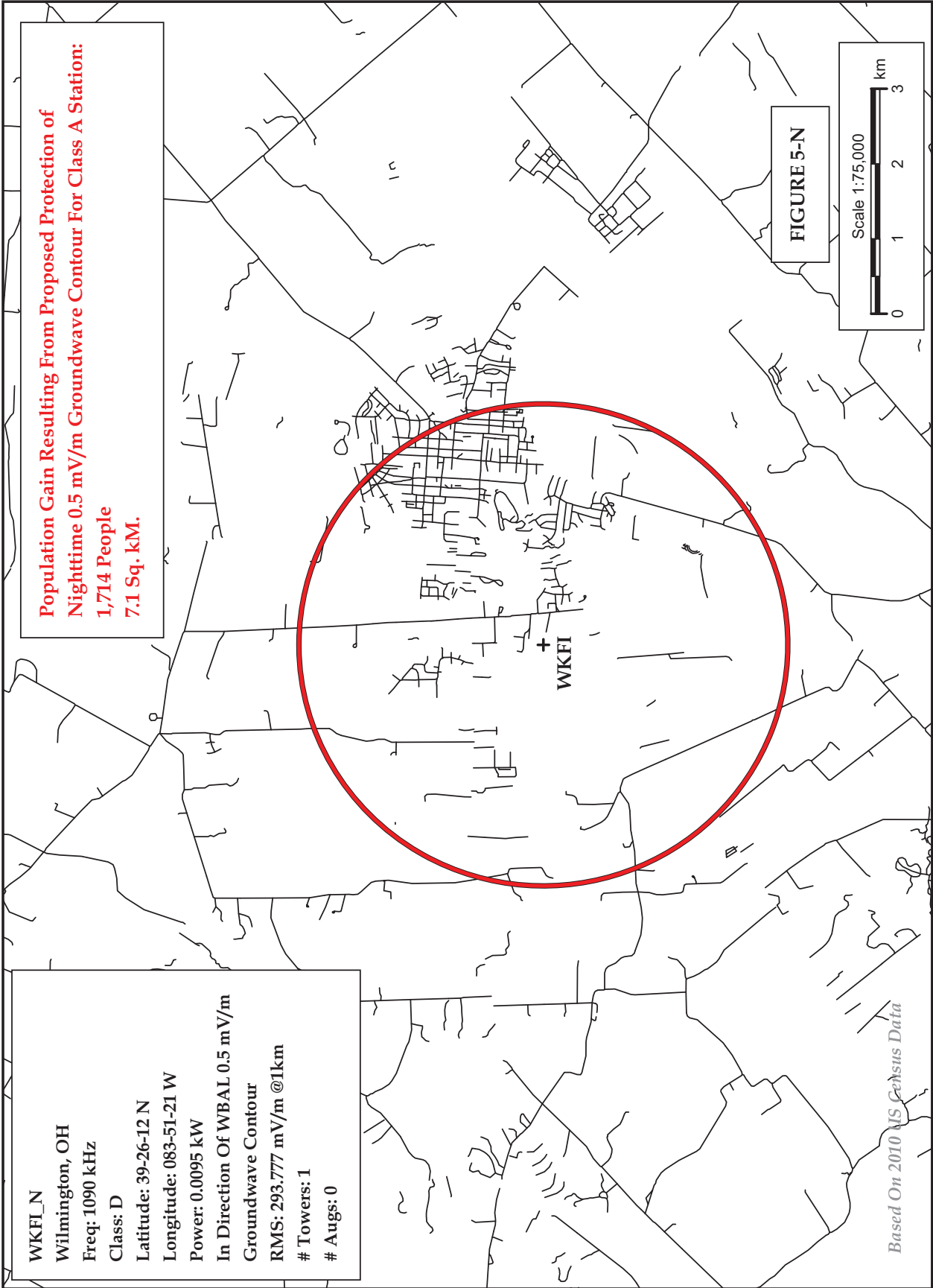




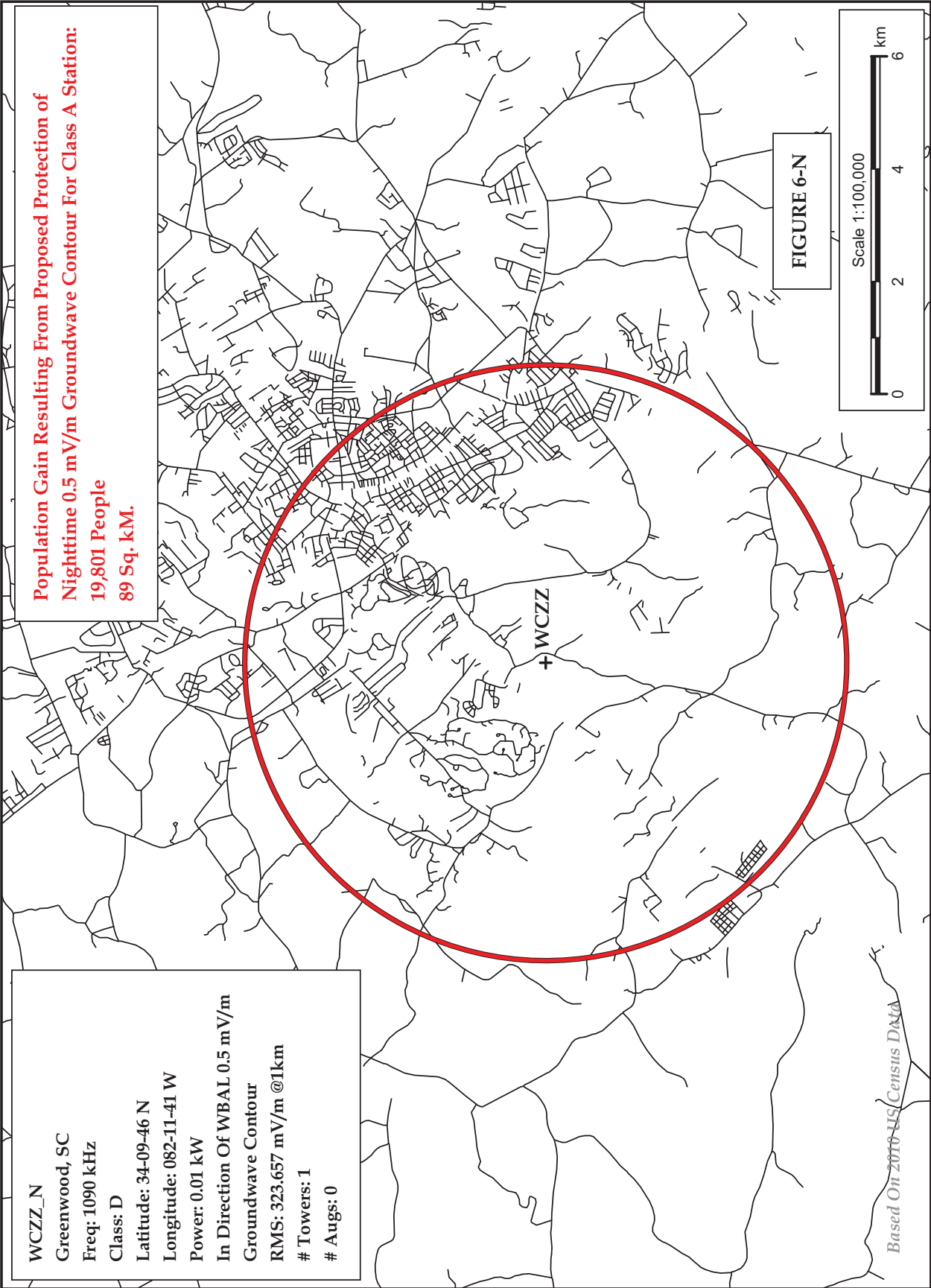
WCAR NIF 6.4 mV/m Groundwave Contour With Protection To Class A Station WBAL's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour



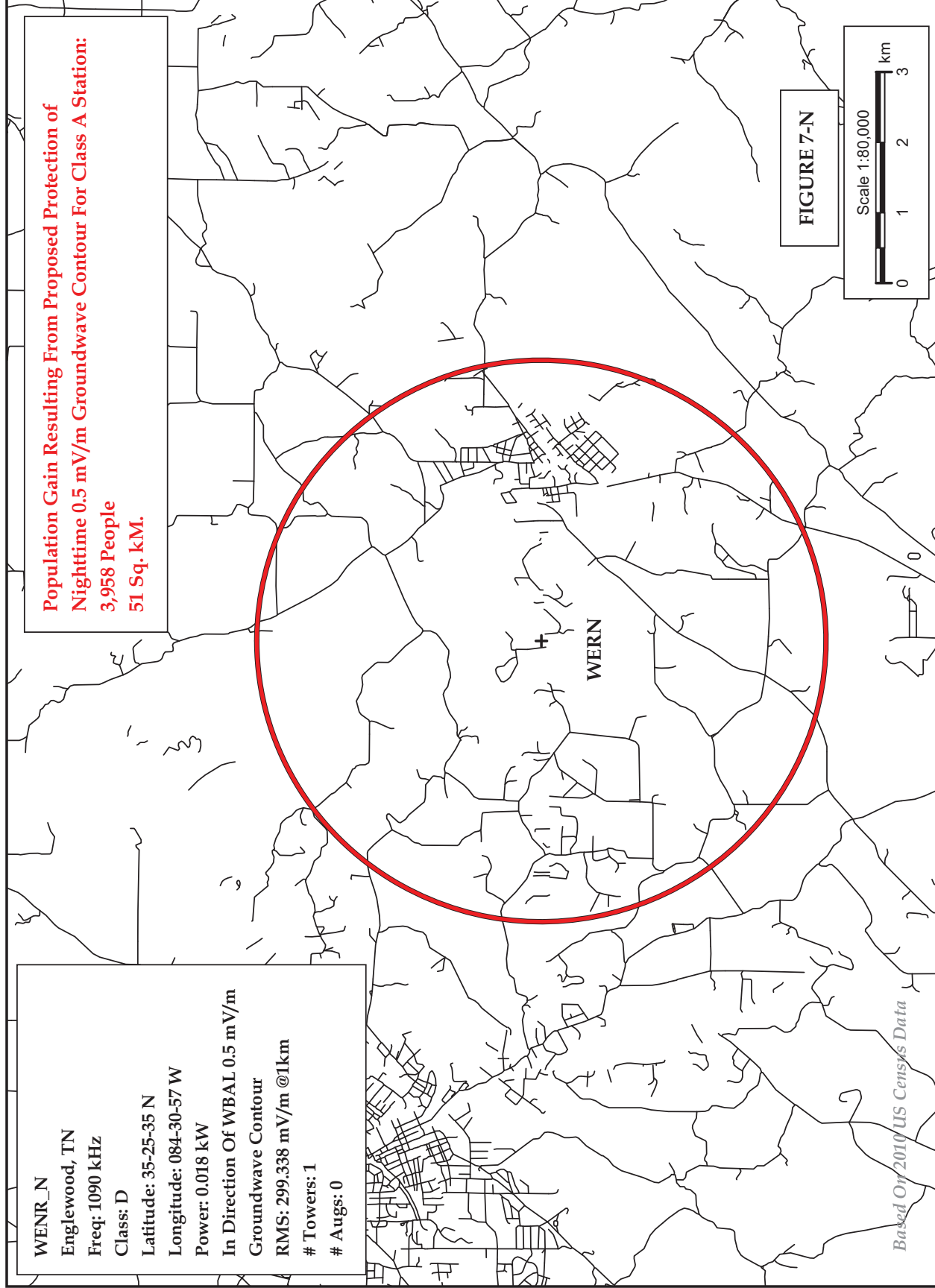
WKTE NIF 5.3 mV/m Groundwave Contour With Protection To Class A Station WBAL's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour



WKFI NIF 7.5 mV/m Groundwave Contour With Protection To Class A Station WBAL's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour

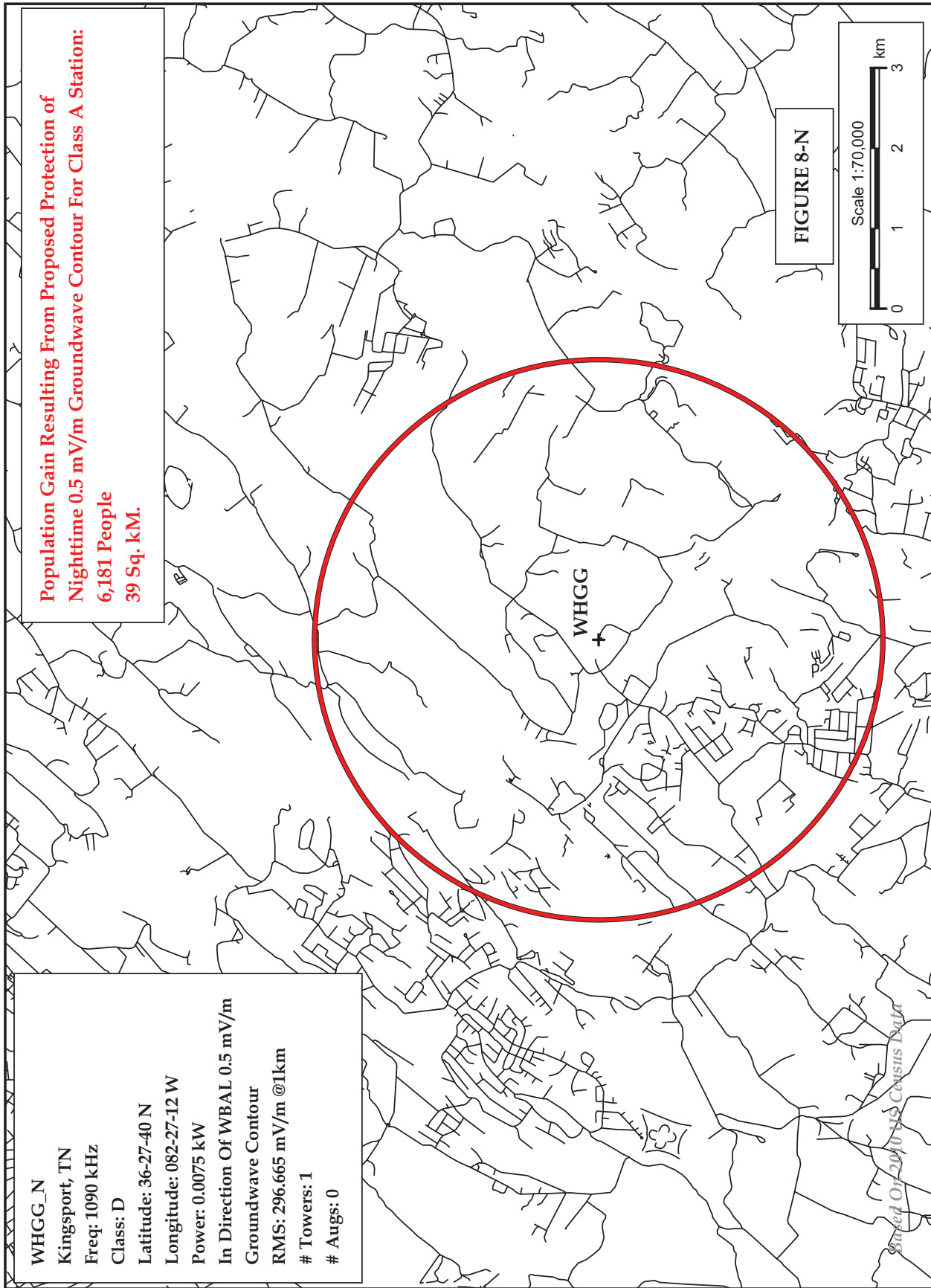


WCZZ NIF 3.6 m V/m Groundwave Contour With Protection To Class A Station WBAL's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour

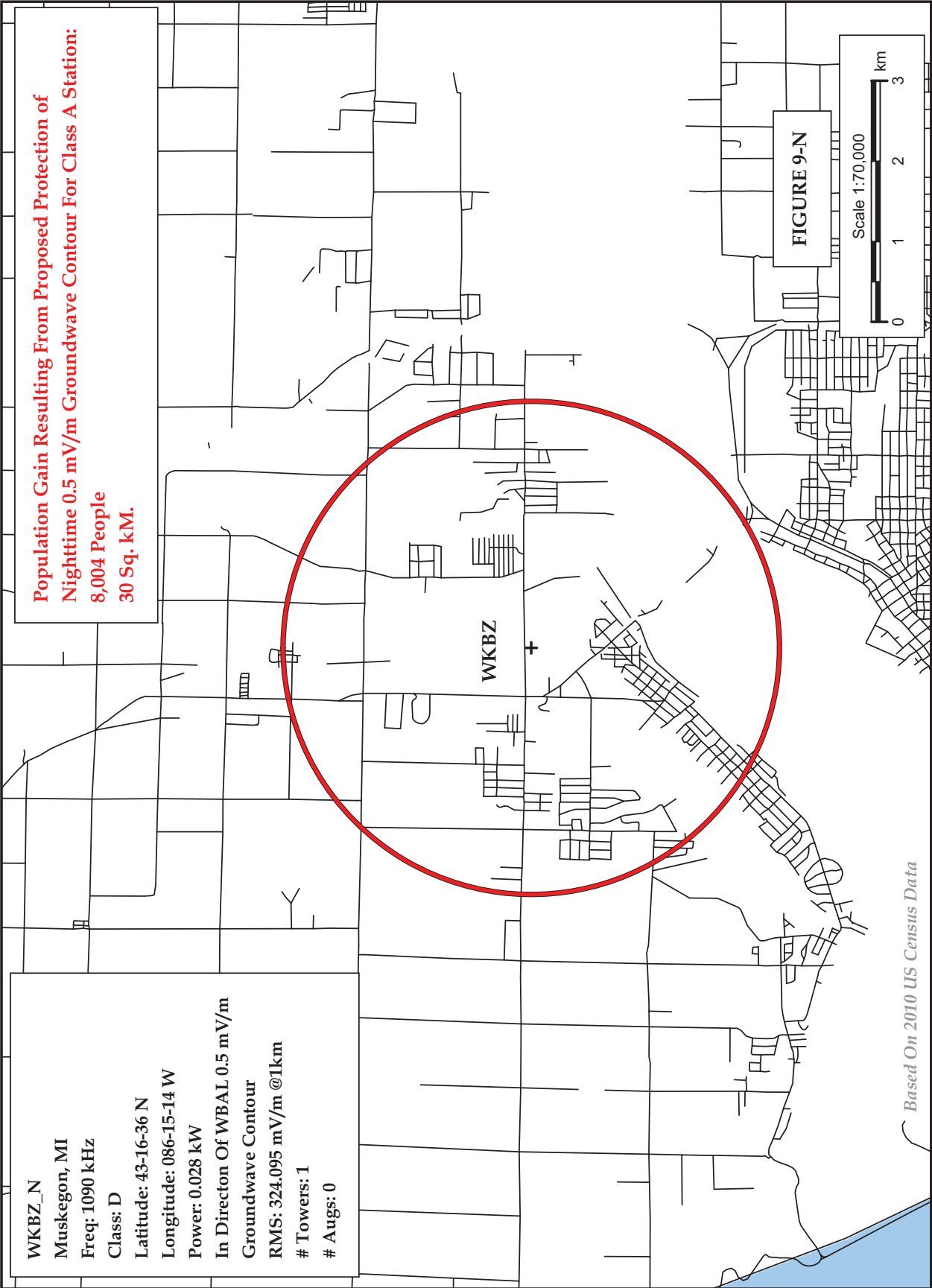


WENR NIF 4.4 mV/m Groundwave Contour With Protection To Class A Station WBAL's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour

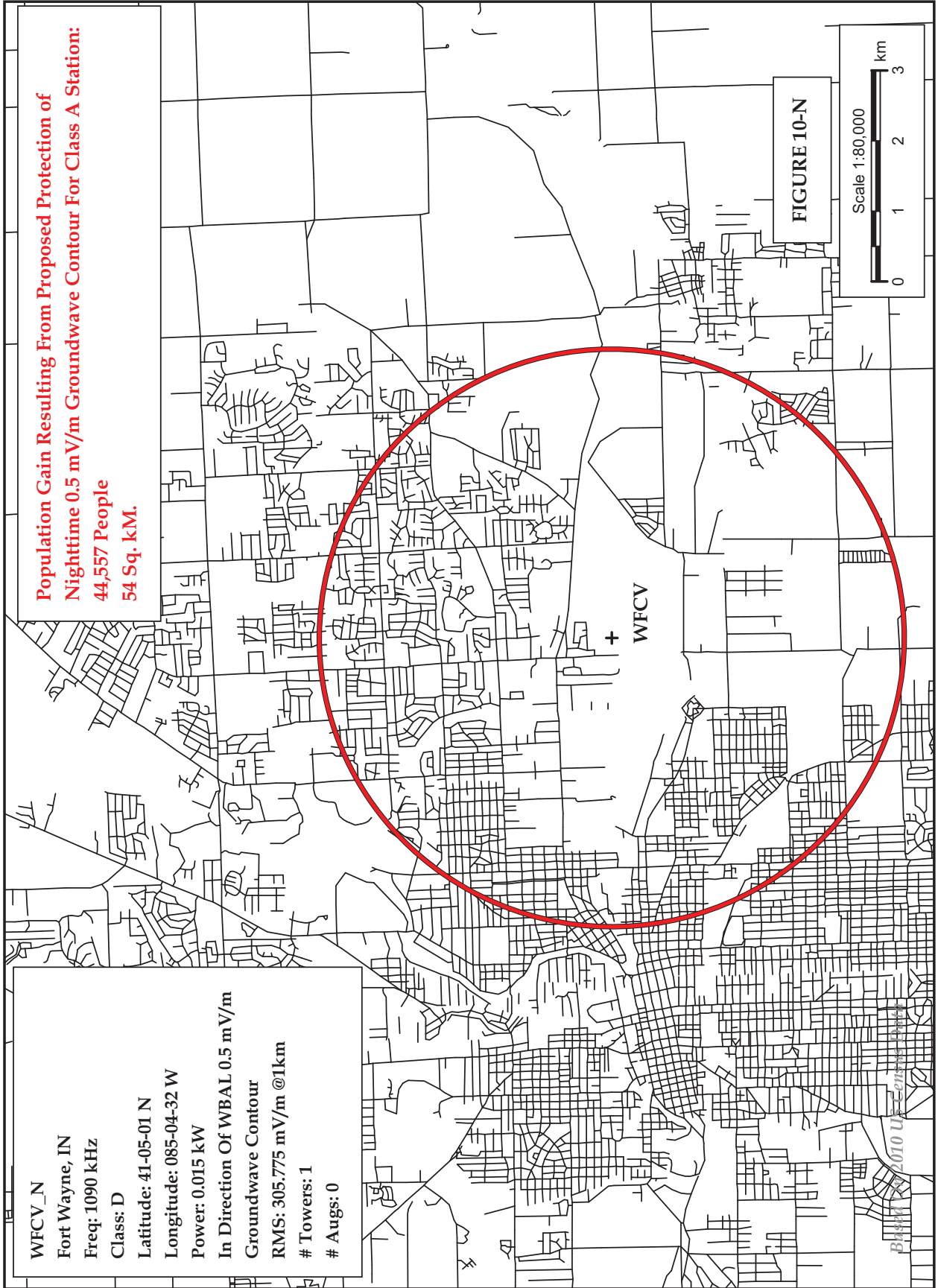




WHGG NIF 5 mV/m Groundwave Contour With Protection To Class A Station WBAL's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour

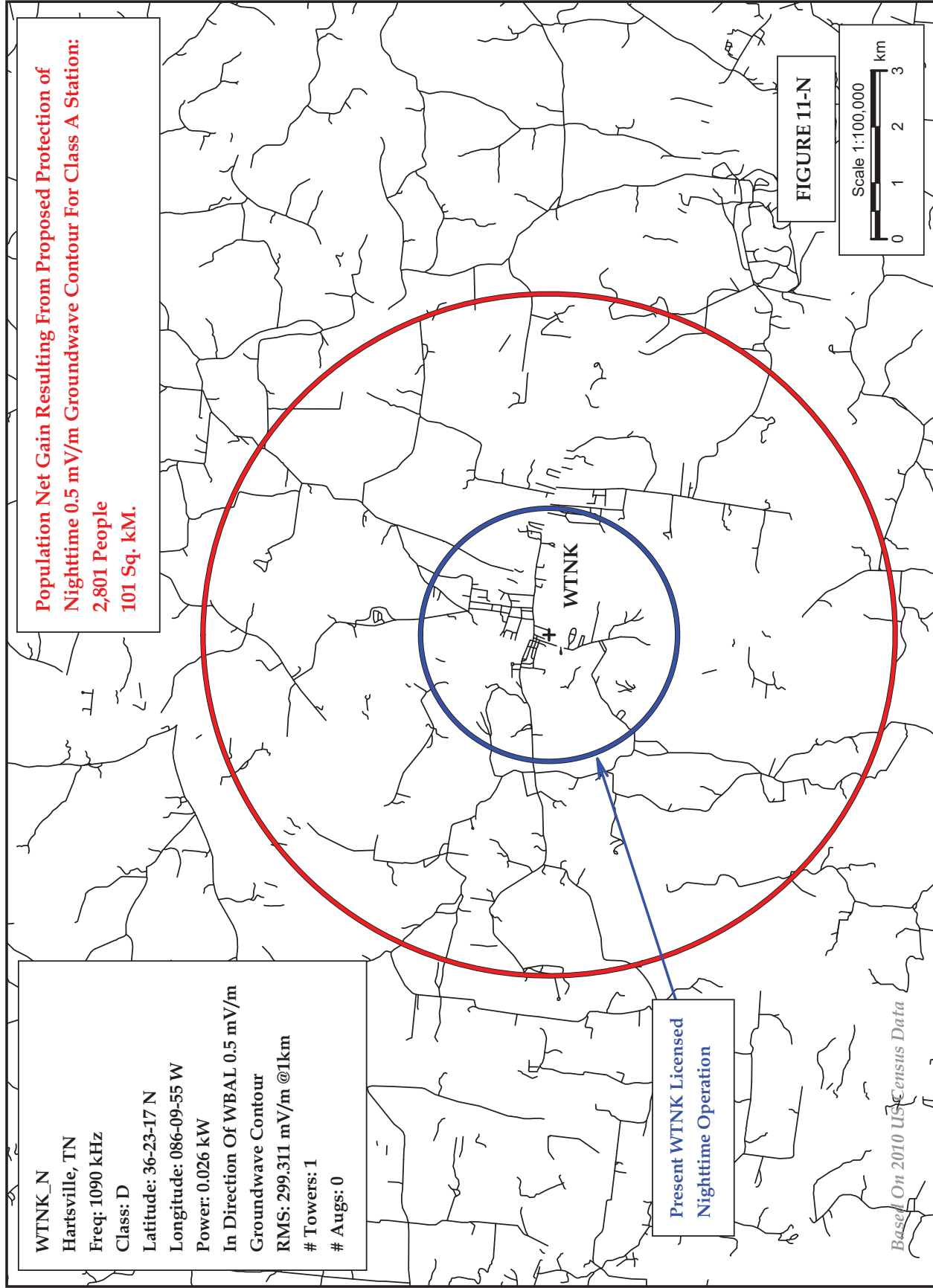


WKBZ NIF 8.9 mV/m Groundwave Contour With Protection To Class A Station WBAL's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour

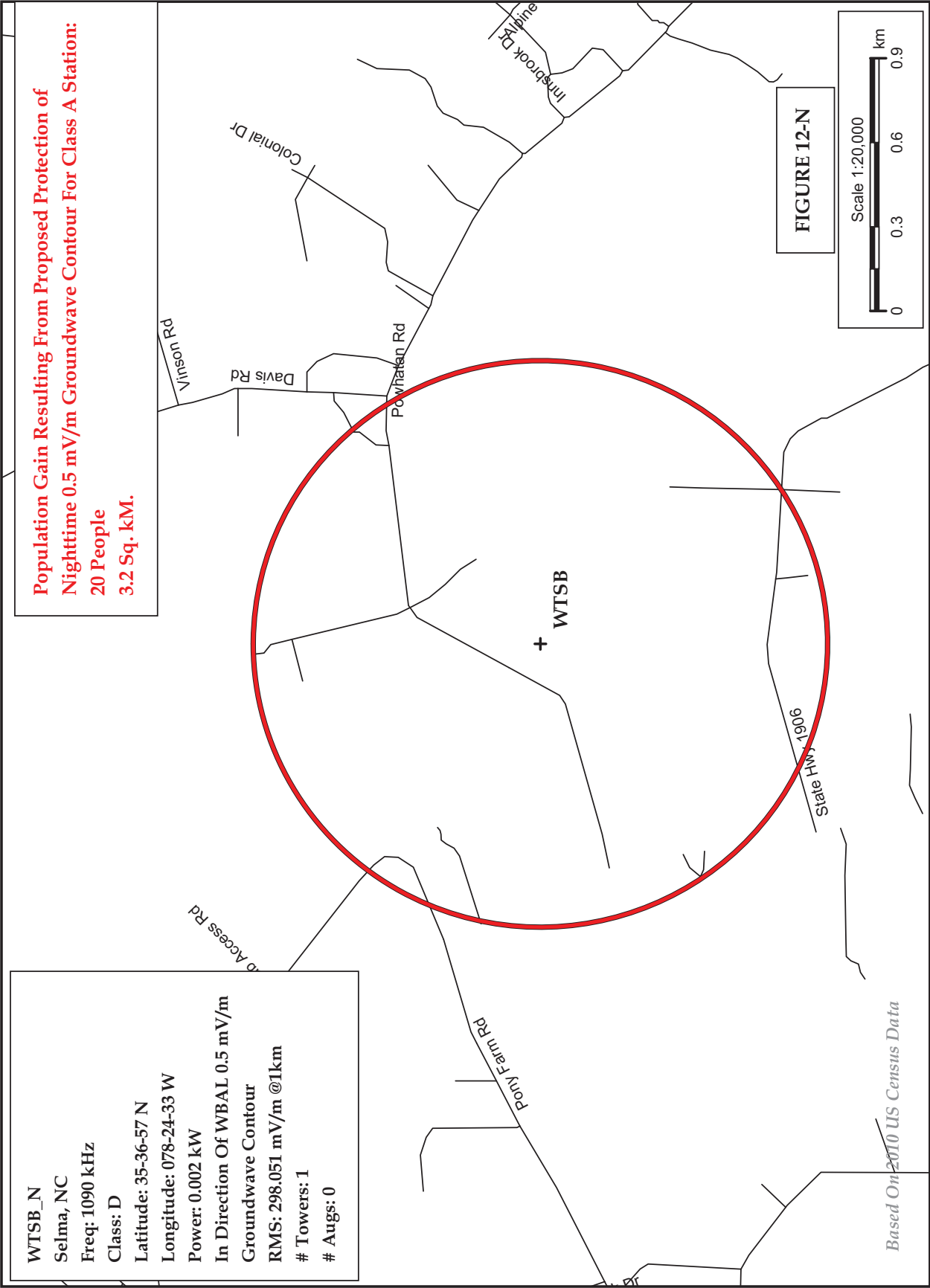


WFCV NIF 7.4 mV/m Groundwave Contour With Protection To Class A Station WBAL's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour

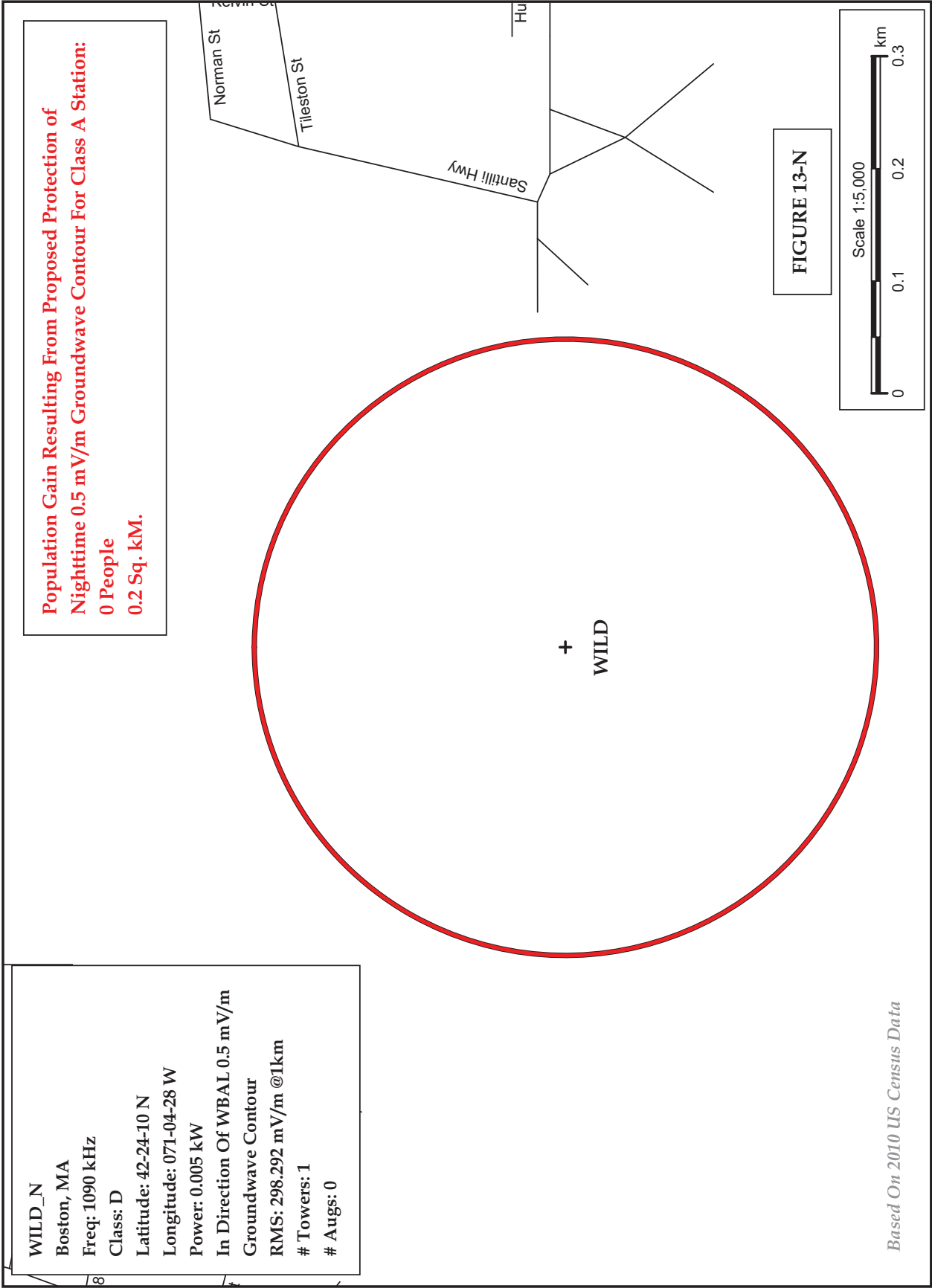




WTNK NIF 4.4 mV/m Groundwave Contour With Protection To Class A Station WBAL's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour

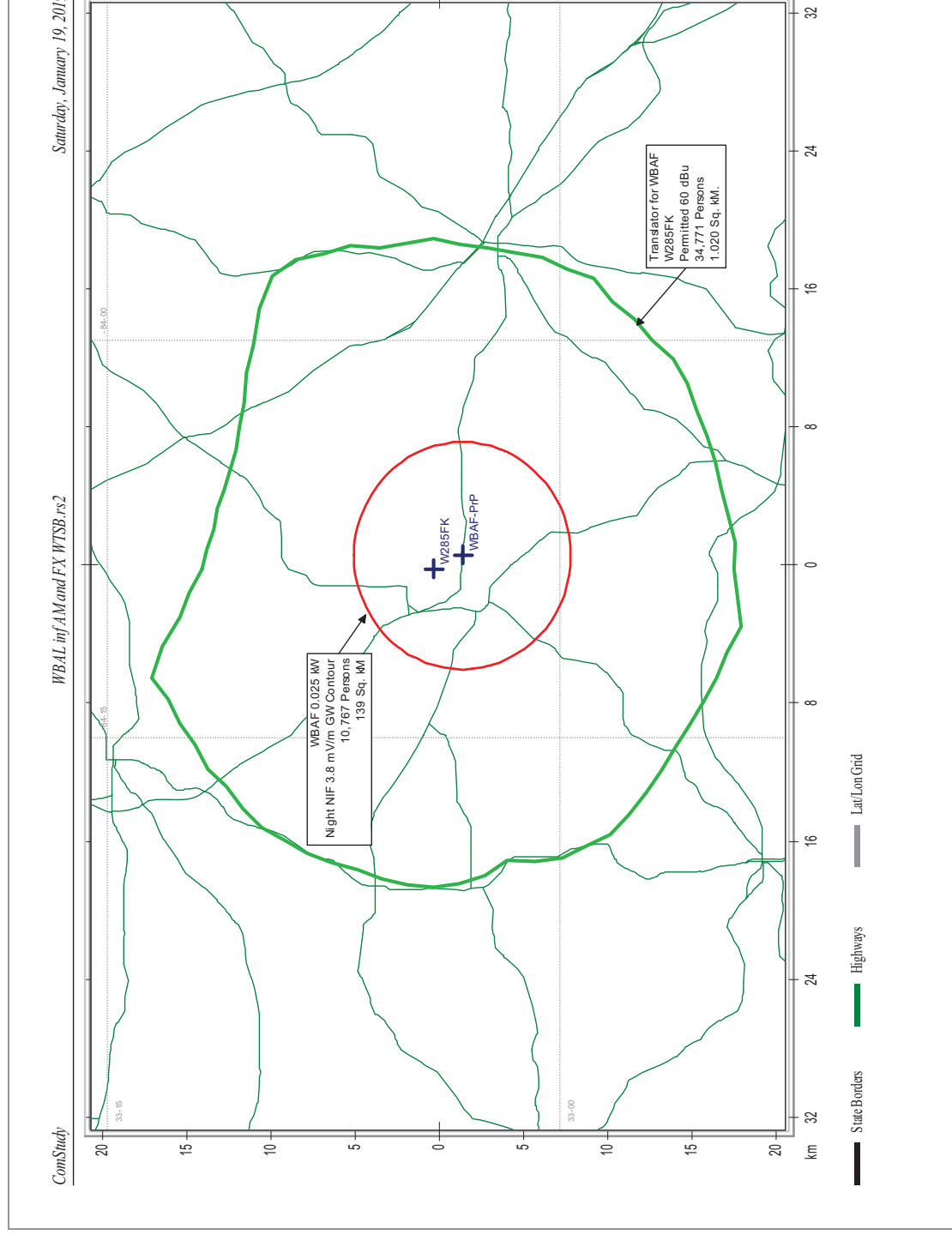


WTSB NIF 11.3 mV/m Groundwave Contour With Protection To Class A Station WBAL's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour



WILD NIF 66.5 mV/m Groundwave Contour With Protection To Class A Station WBAL's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour

# WBAF



No FM Translators:

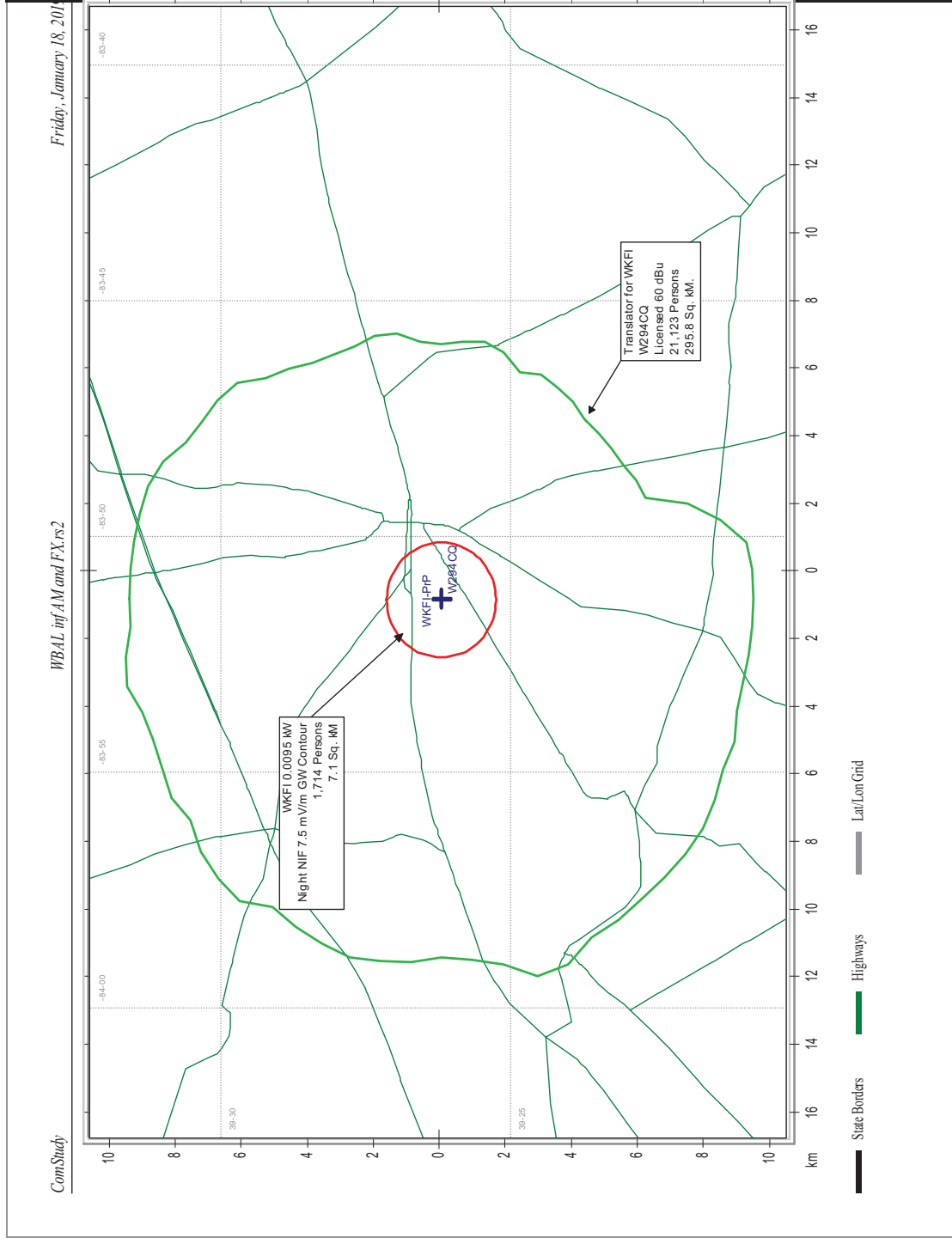
WCAR

WKTE

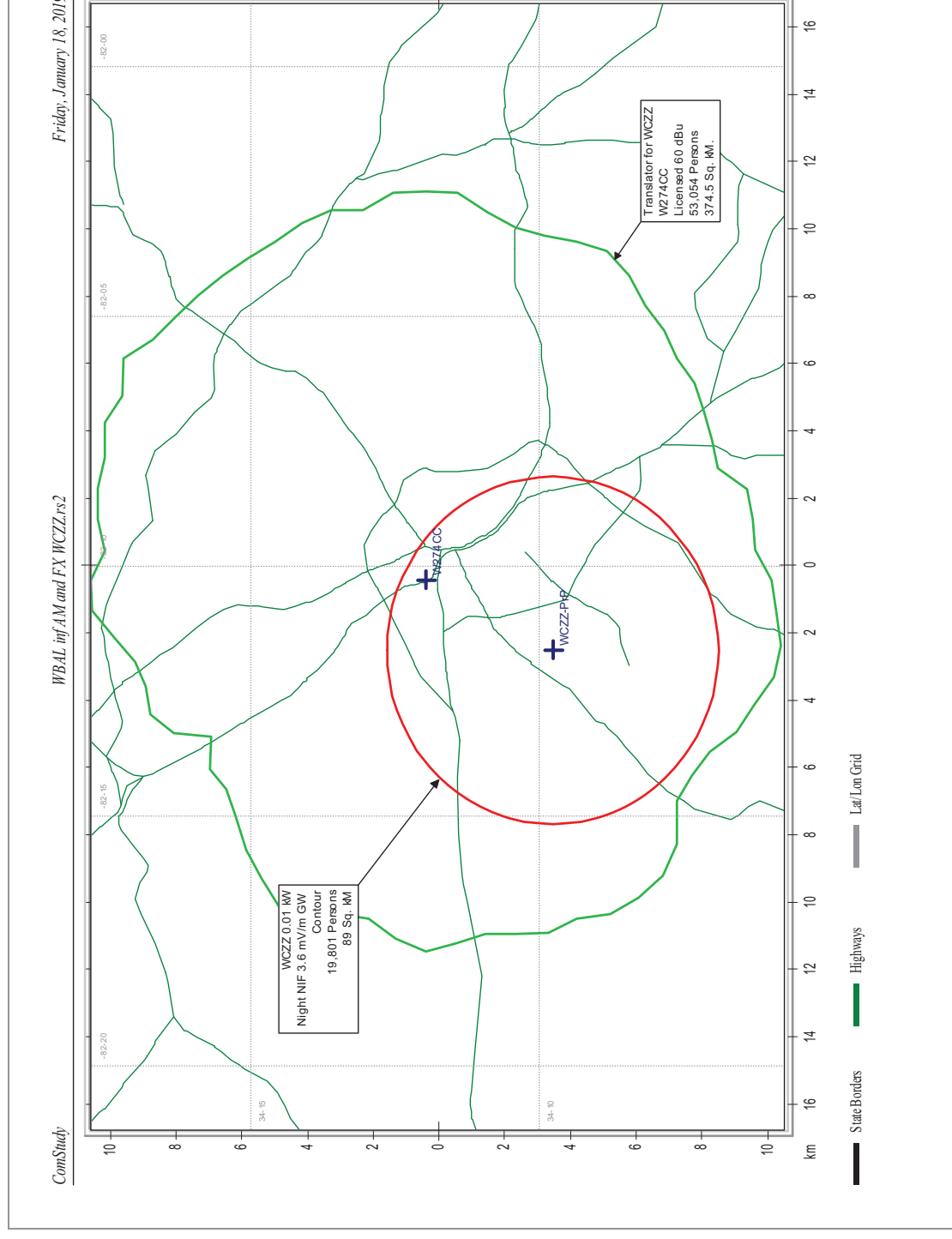
WKBZ

WILD

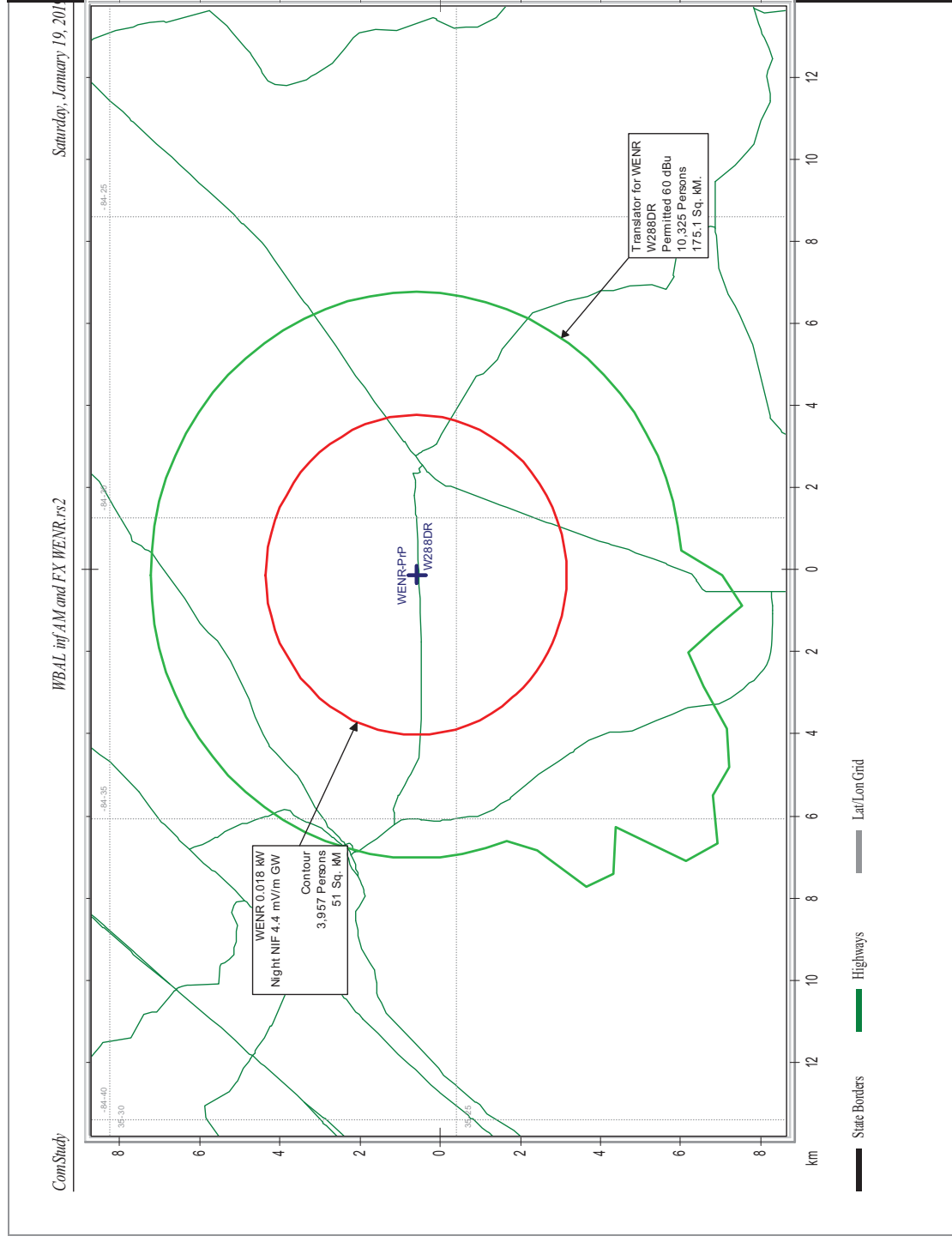
WKFI



# WCZZ

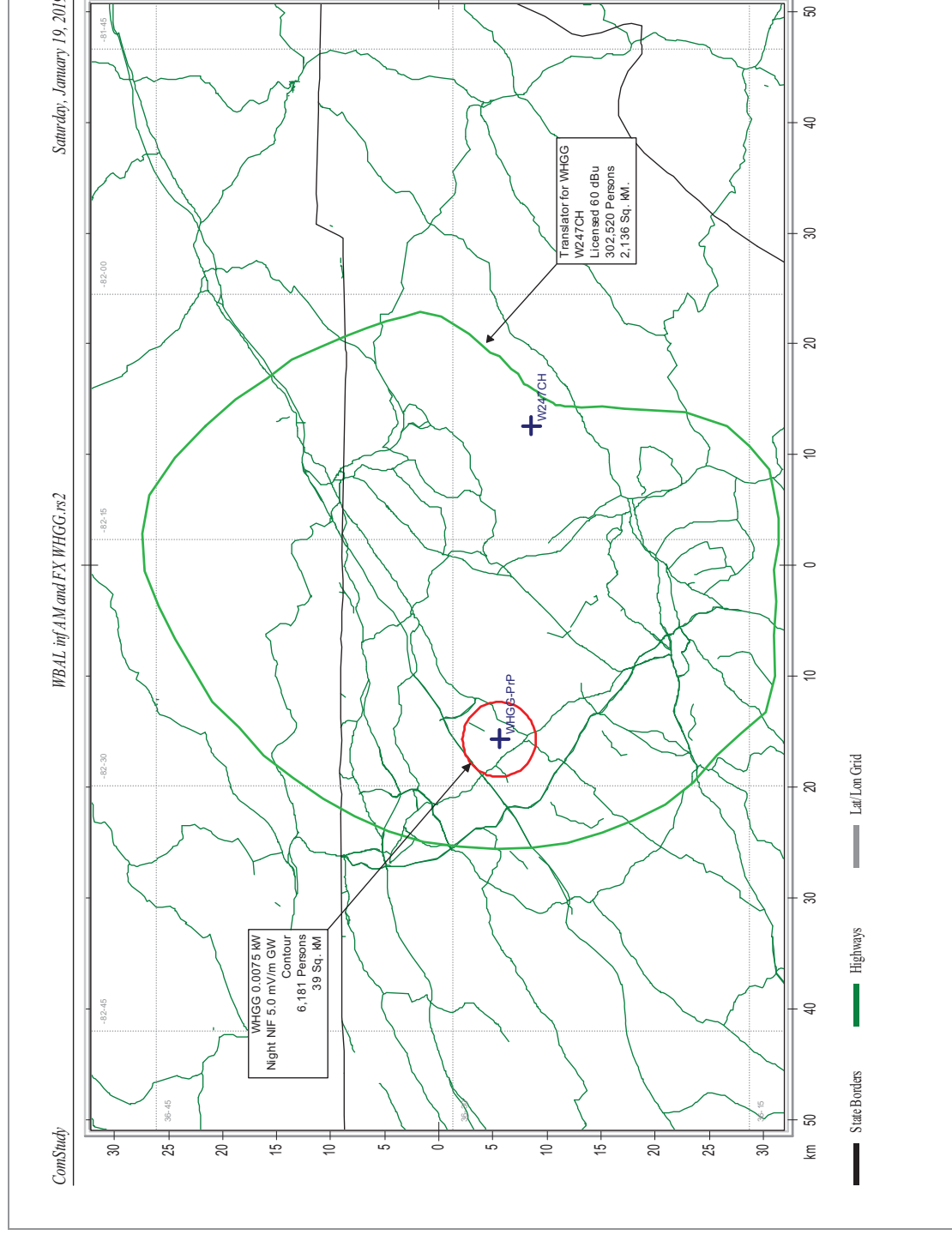


# WENR

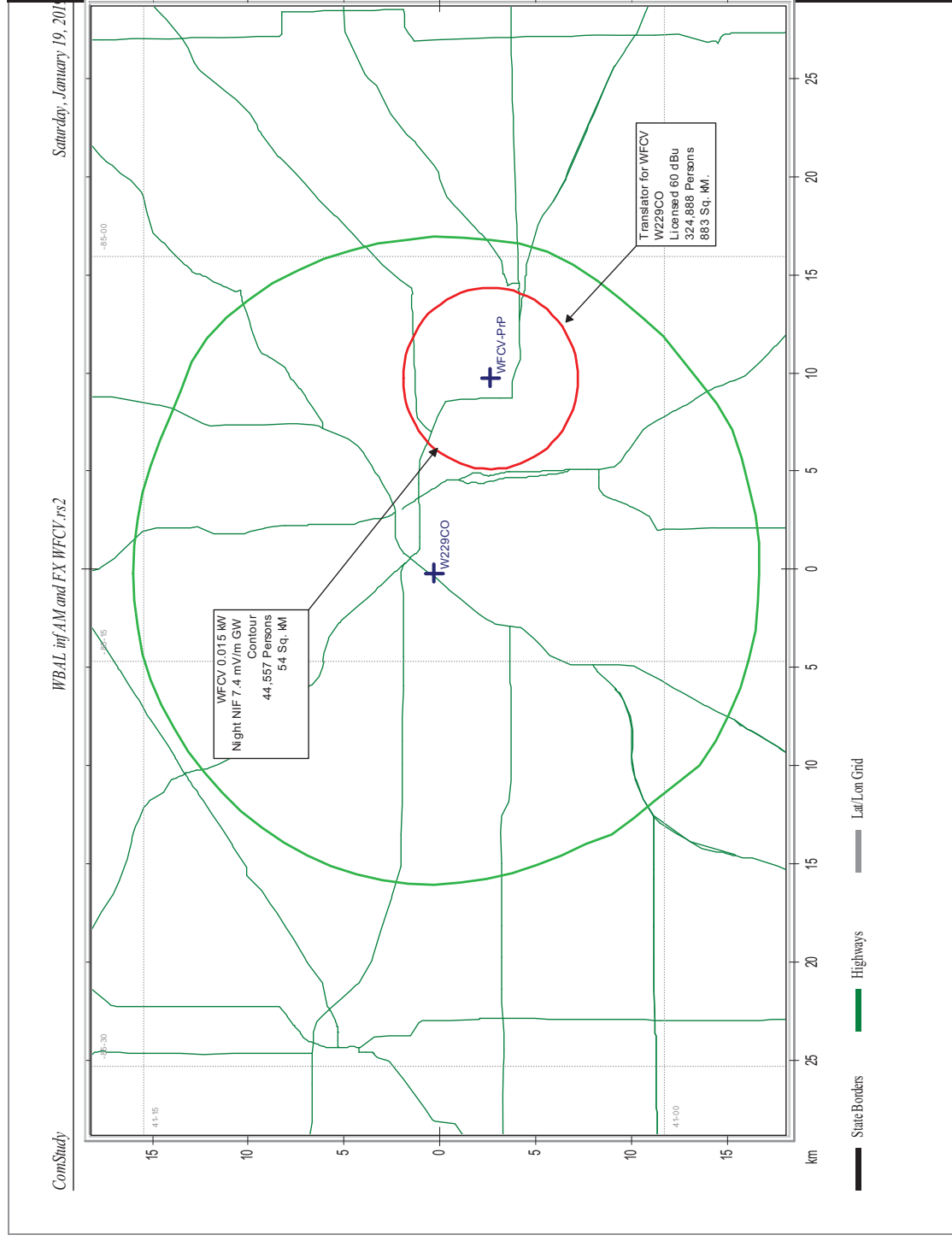




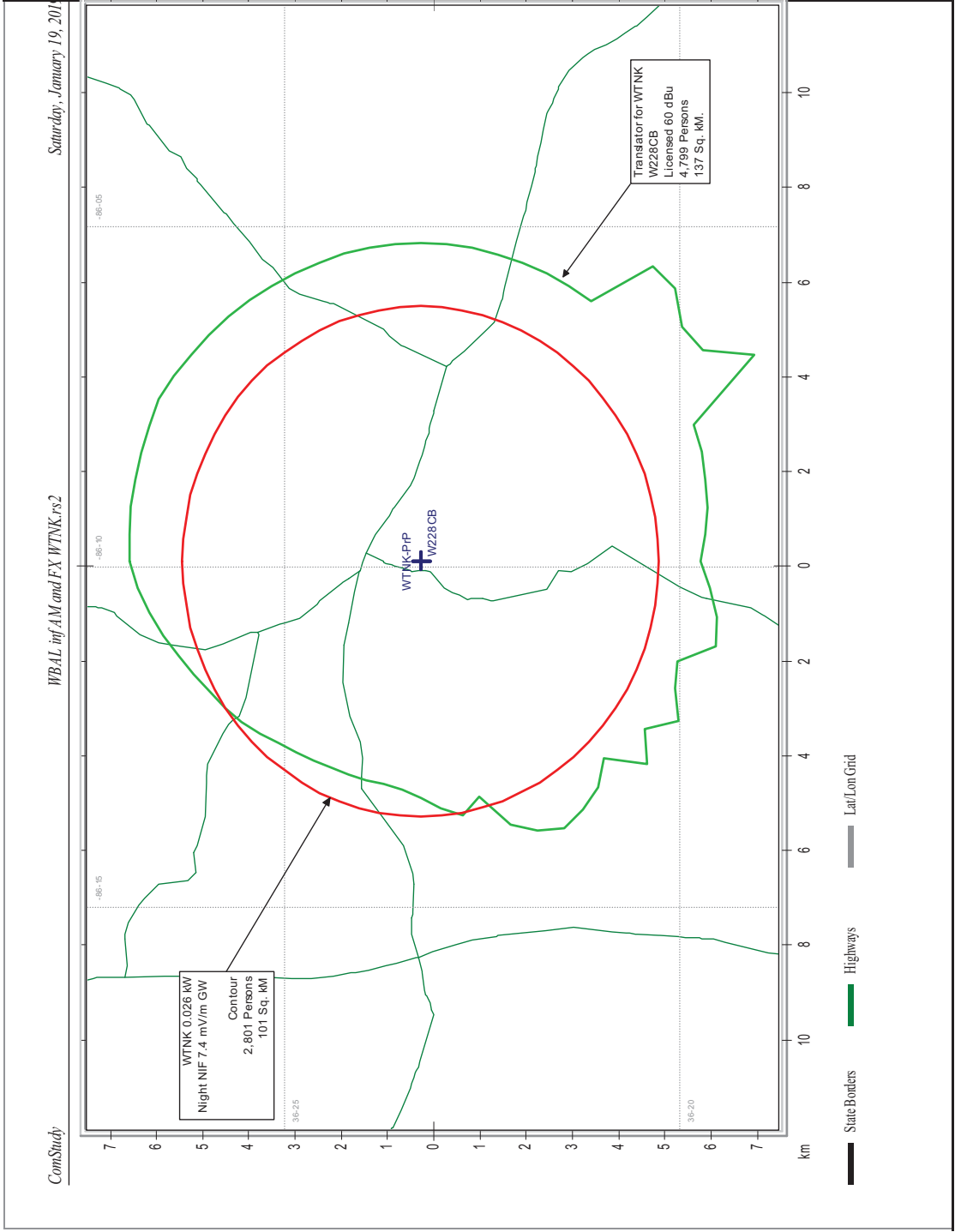
# WHGG



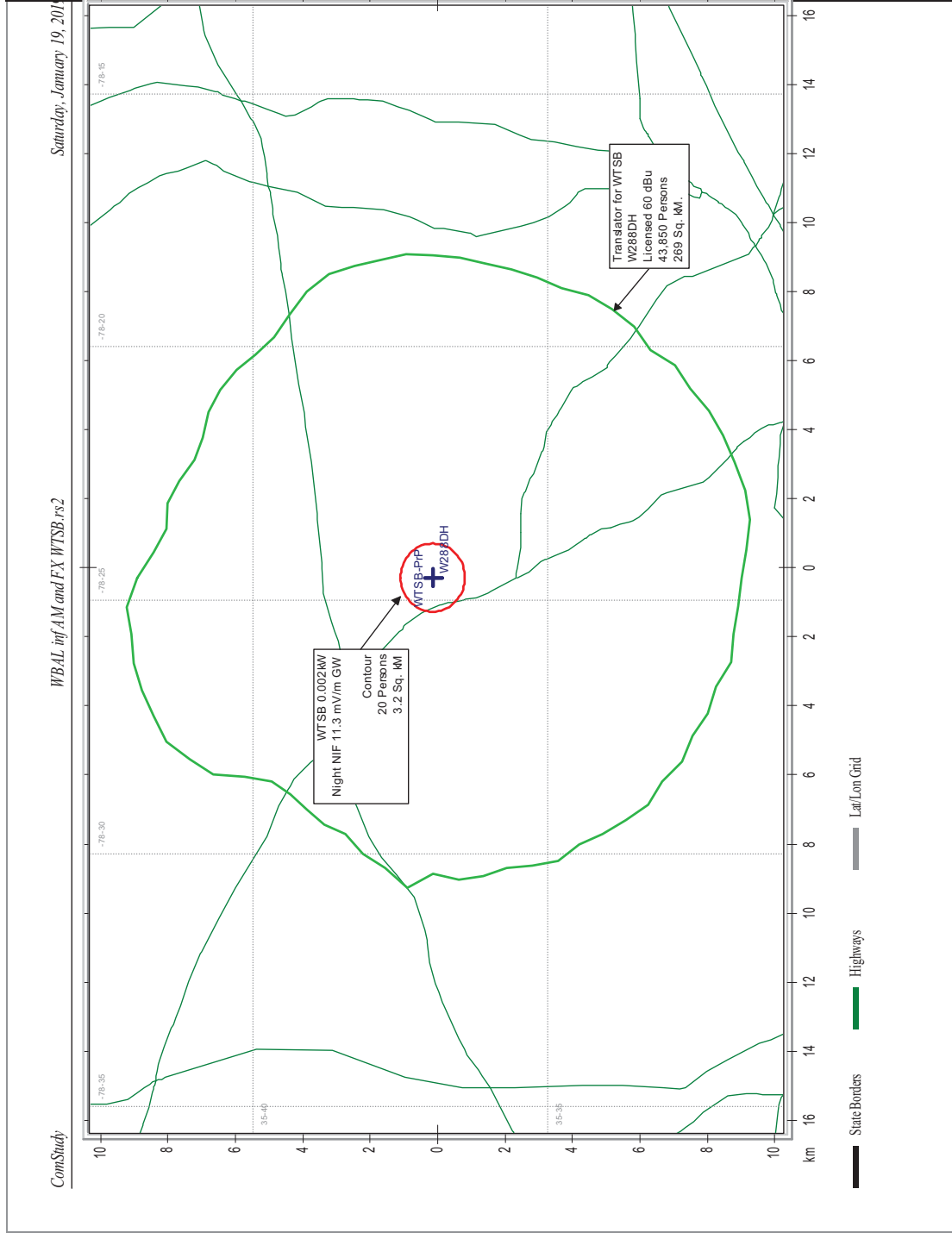
# WFCV



WTNK

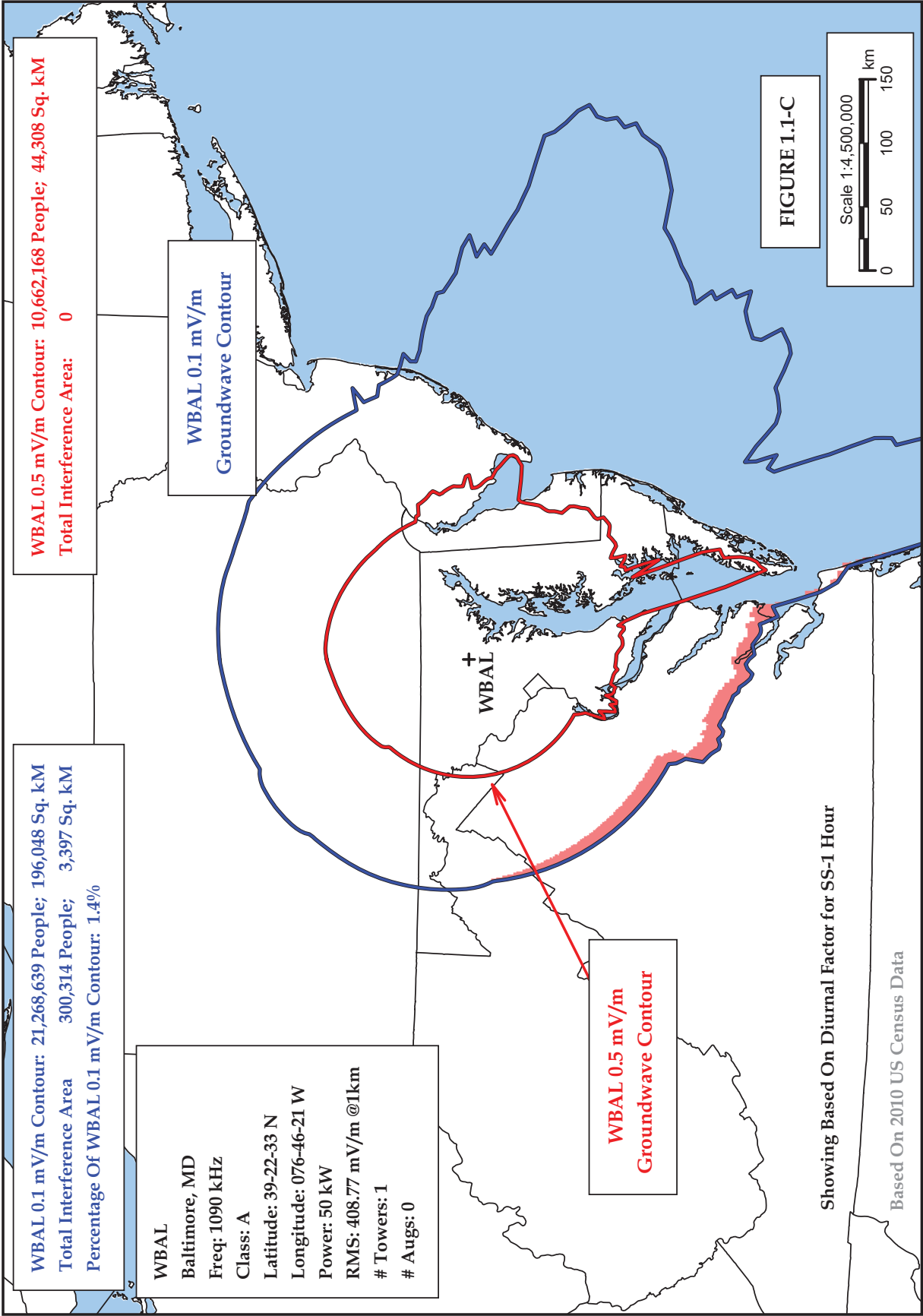


# WTSB

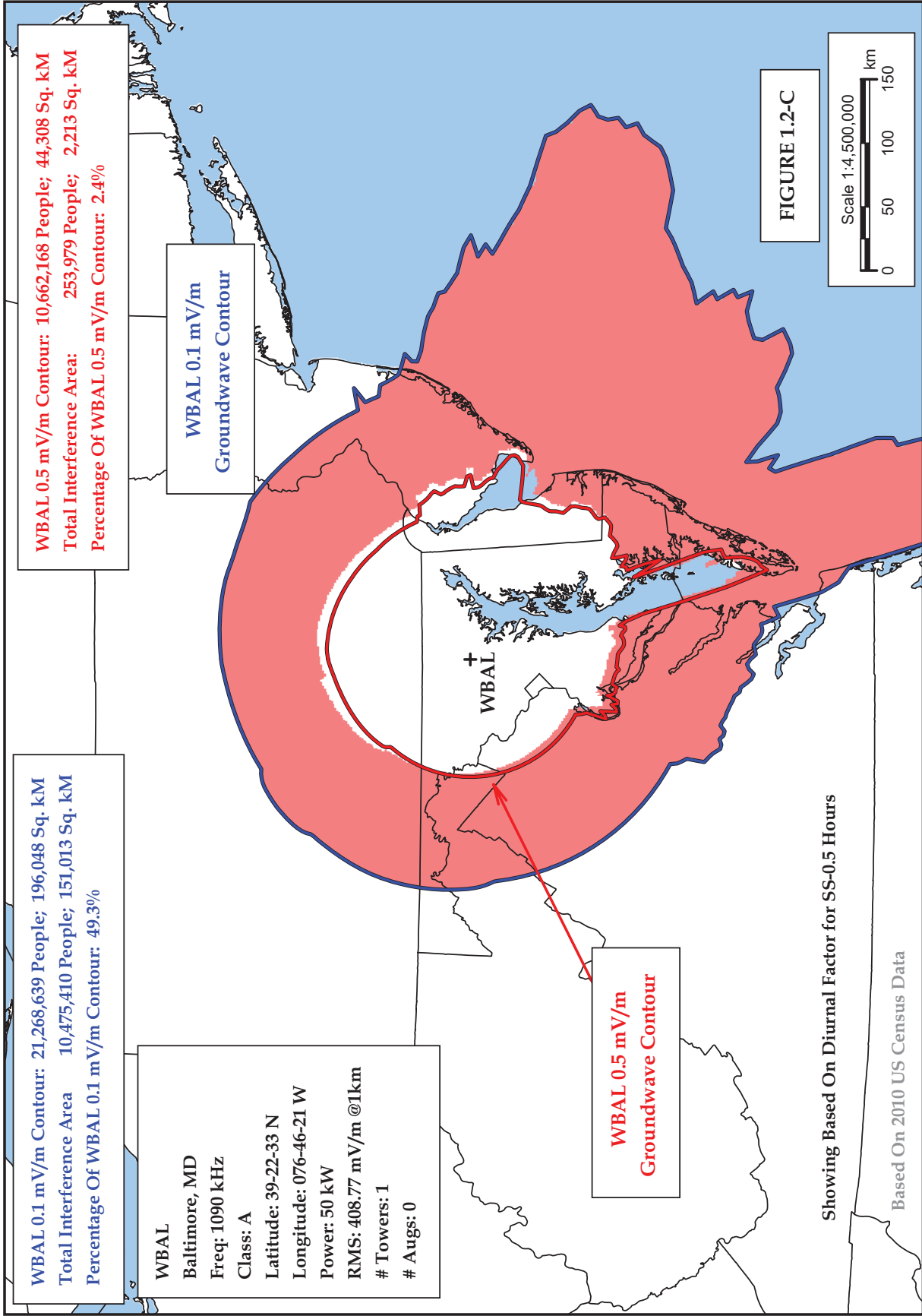


Summary of FM Translator Studies/WBAL

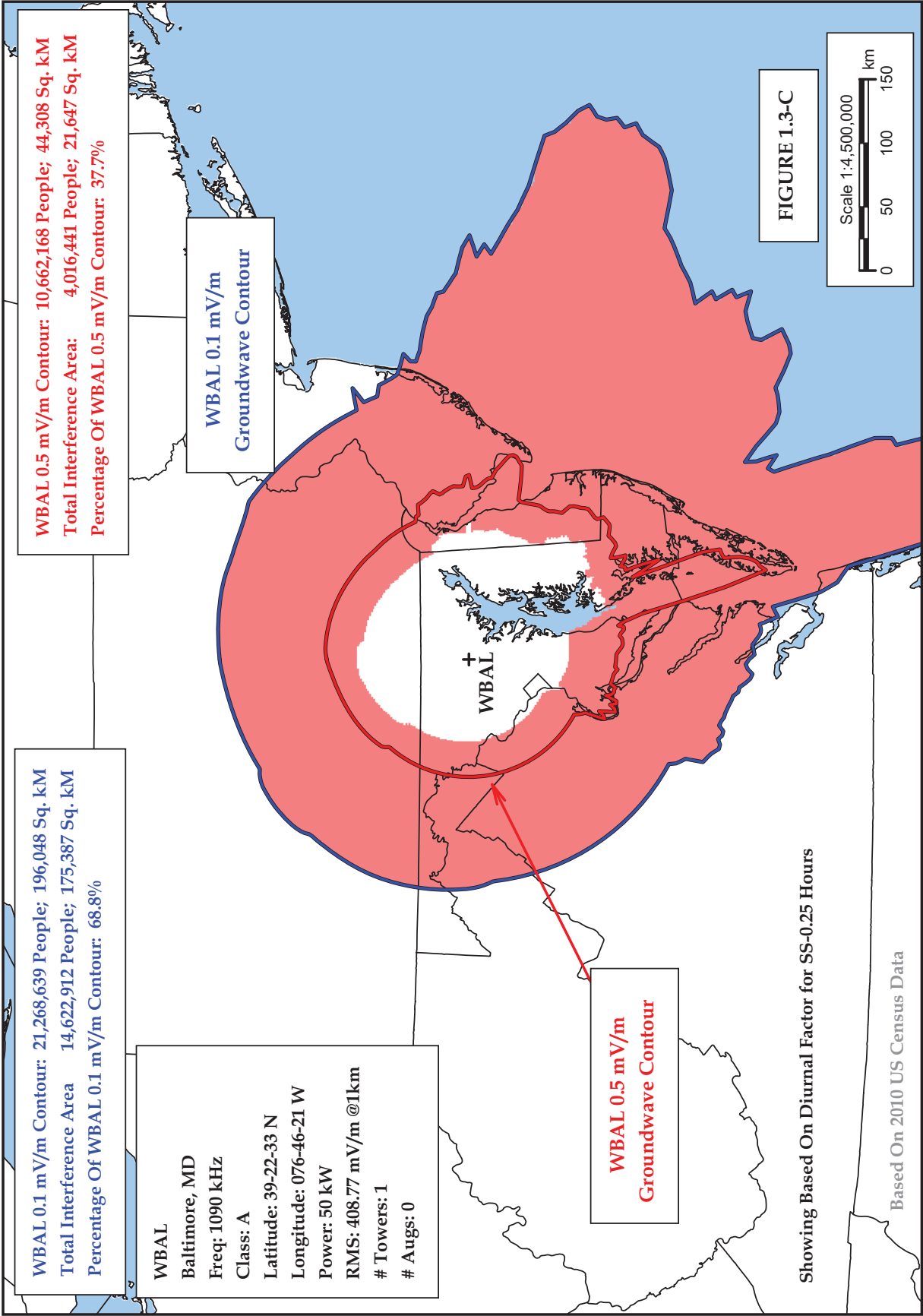
Class D AM Station Causing Interference to Class A Station WBAL if Class D Operates with Maximum Power Per Nighttime Alternative 1	FM Translator (License or Permit) Associated with Class D Station	Population Within FM Translator's 60 dBu Contour	Population Within Class D Station's Potential Nighttime Interference Free Contour Under Nighttime Alternative 1
WBAF	W285FK	N/A	10767
WCAR	N/A	34771	85691
WKTE	N/A	N/A	2816
WKFI	W294CQ	21123	1714
WCZZ	W274CC	53054	19801
WENR	W288DR	10325	3957
WHGG	W247CH	302520	6181
WKBZ	N/A	N/A	8004
WFCV	W229CO	324888	44557
WTNK	W228CB	4799	2801
WTSB	W288DH	48850	20
WILD	N/A	N/A	0
Cumulative Sum:		800,330	186,309



Alternative 1 - Proposed Critical Hours Interference Area to WBAL From The Licensed Daytime Hours Operation Of Stations KEXS, WCZZ, WFCV, WHGG, WILD And WTSB To Class A Station WBAL, Baltimore, MD for One Hour Before Sunset

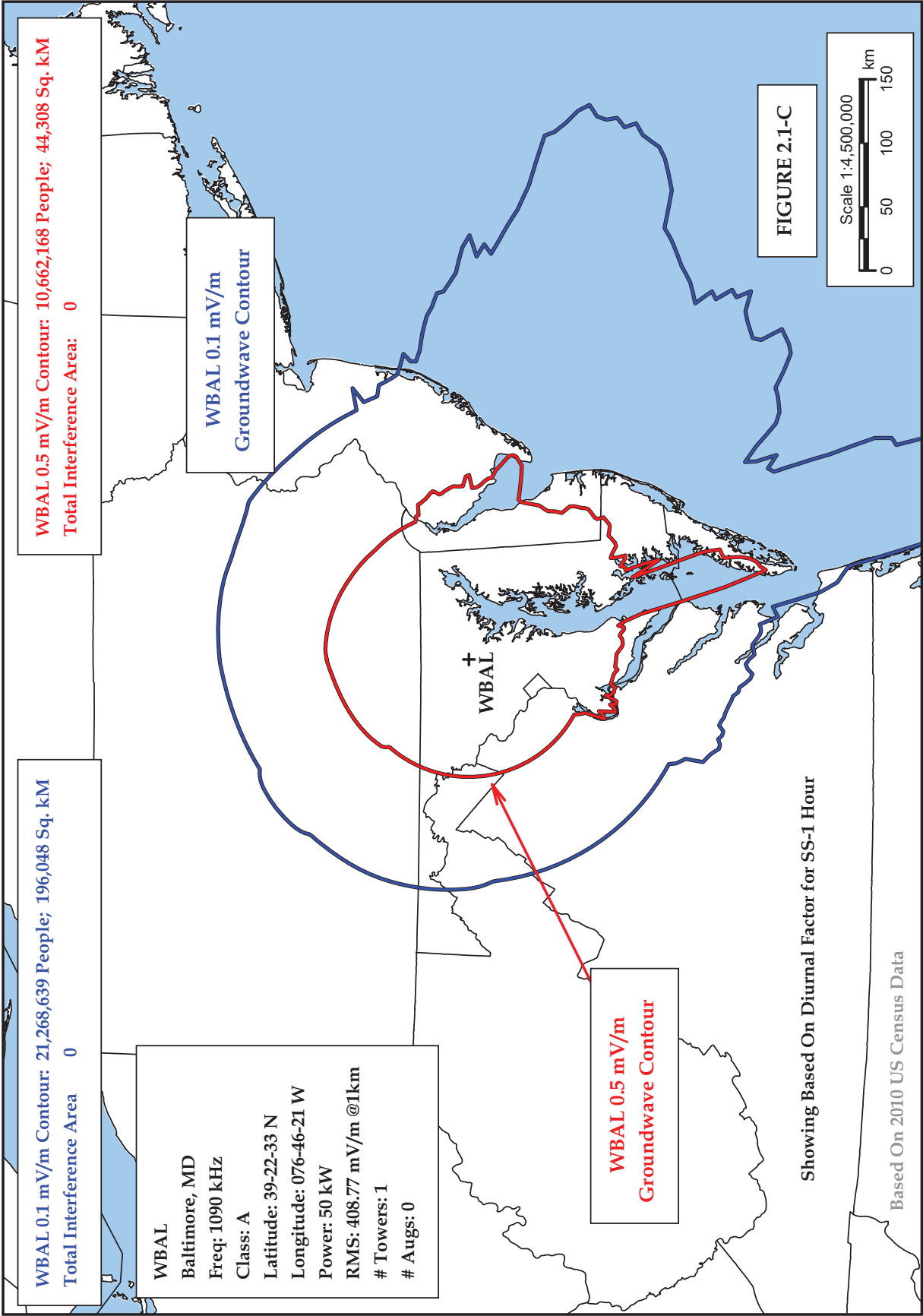


Alternative 1 - Proposed Critical Hours Interference Area to WBAL From The Licensed Daytime Hours Operation Of Stations KEXS, WCZZ, WFCV, WHGG, WILD And WTSB To Class A Station WBAL, Baltimore, MD for One-Half Hour Before Sunset

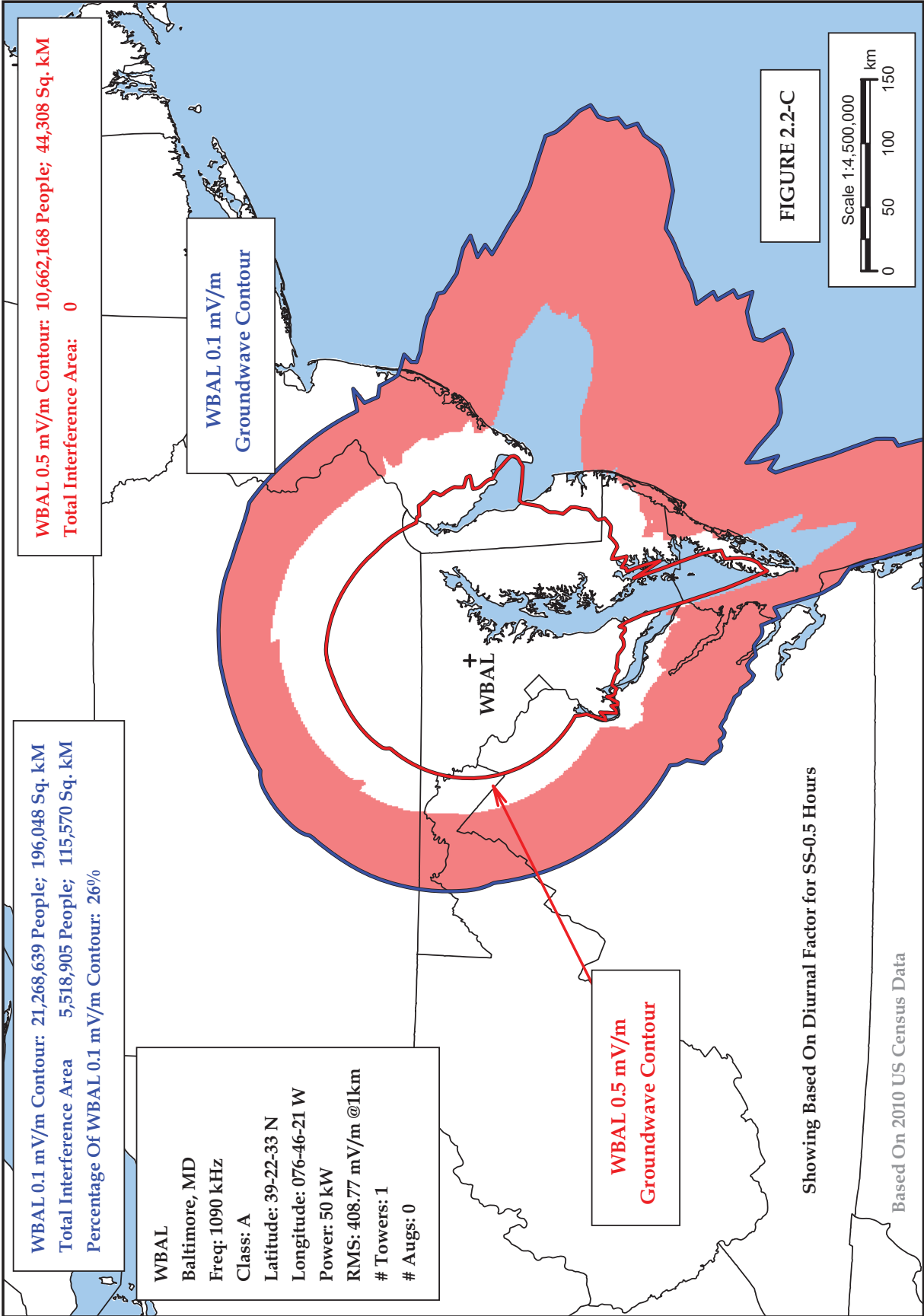


Alternative 1 - Proposed Critical Hours Interference Area to WBAL From The Licensed Daytime Hours Operation Of Stations KEXS, WCZZ, WFCV, WHGG, WILD And WTSB To Class A Station WBAL, Baltimore, MD for One-Quarter Hour Before Sunset

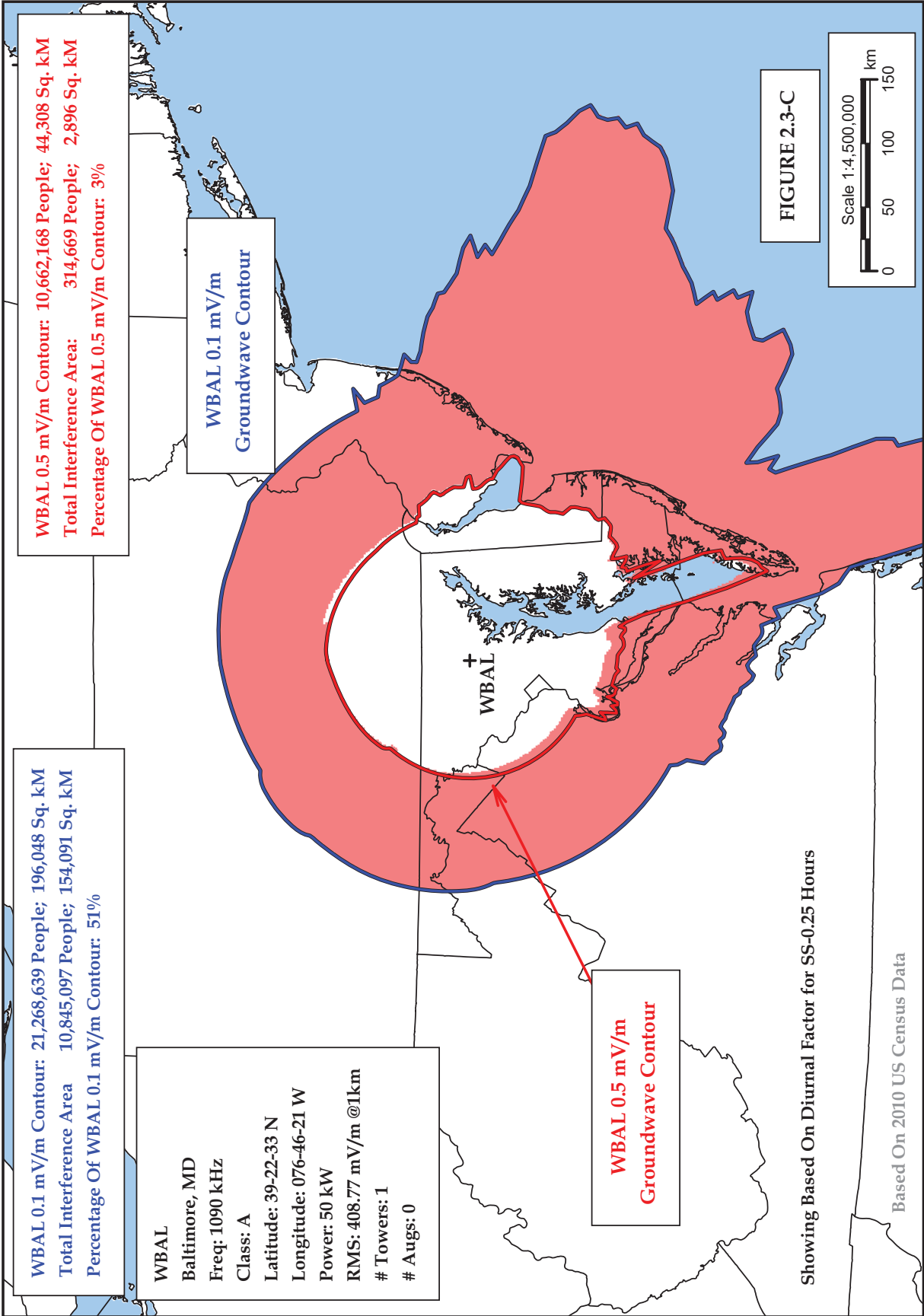




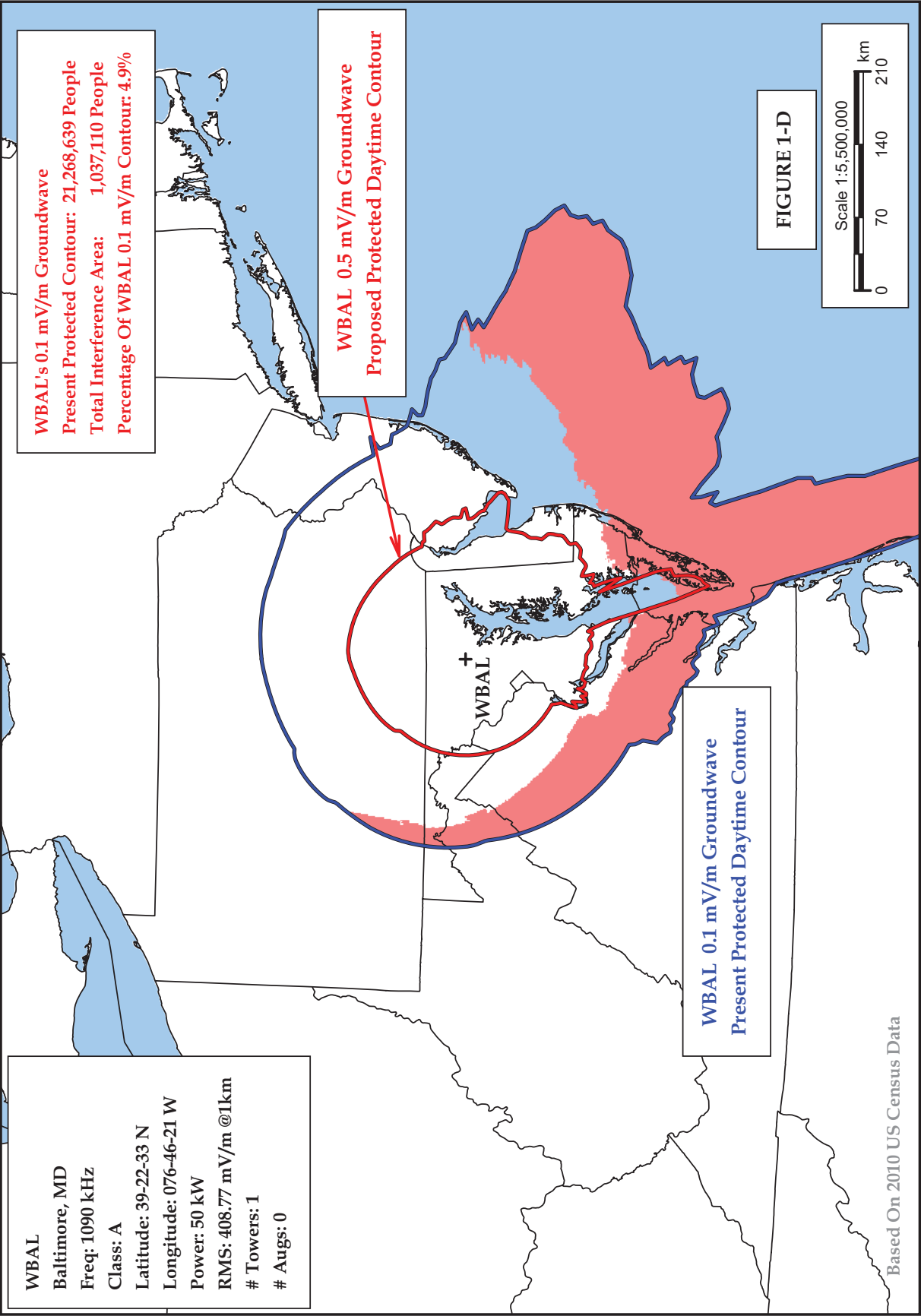
Alternative 2 - Proposed Critical Hours Interference Area to WBAL From Potential Critical Hours Operation Of Stations KEXS, WCZZ, WFCV, WHGG, WILD And WTSB To Class A Station WBAL, Baltimore, MD for One Hour Before Sunset



Alternative 2 - Proposed Critical Hours Interference Area to WBAL From Potential Critical Hours Operation Of Stations KEXS, WCZZ, WFCV, WHGG, WILD And WTSB To Class A Station WBAL, Baltimore, MD for One-Half Hour Before Sunset



Alternative 2 - Proposed Critical Hours Interference Area to WBAL From Potential Critical Hours Operation Of Stations KEXS, WCZZ, WFCV, WHGG, WILD And WTSB To Class A Station WBAL, Baltimore, MD for One-Quarter Hour Before Sunset



Red Shaded Area is Predicted Daytime Interference Area Within WBAL's 0.1 mV/m Groundwave Daytime Contour From Nearby Class D Stations WTSB, WKTE, WKFI and WWDR Operating With Maximum Allowed Power In The Direction of WBAL

WTSB\_D  
Selma, NC  
Freq: 1090 kHz  
Class: D  
Latitude: 35-36-57 N  
Longitude: 078-24-33 W  
Power: 50 kW  
In The Direction Of WBAL  
0.5 mV/m Groundwave Contour  
RMS: 297.7 mV/m @1km  
# Towers: 1  
# Augs: 0

Potential WTSB Population Gain in the Direction of WBAL Resulting From Protecting the Daytime 0.5 mV/m Contour of Class A Station WBAL; 42,608 People; 1,348 Sq. km.

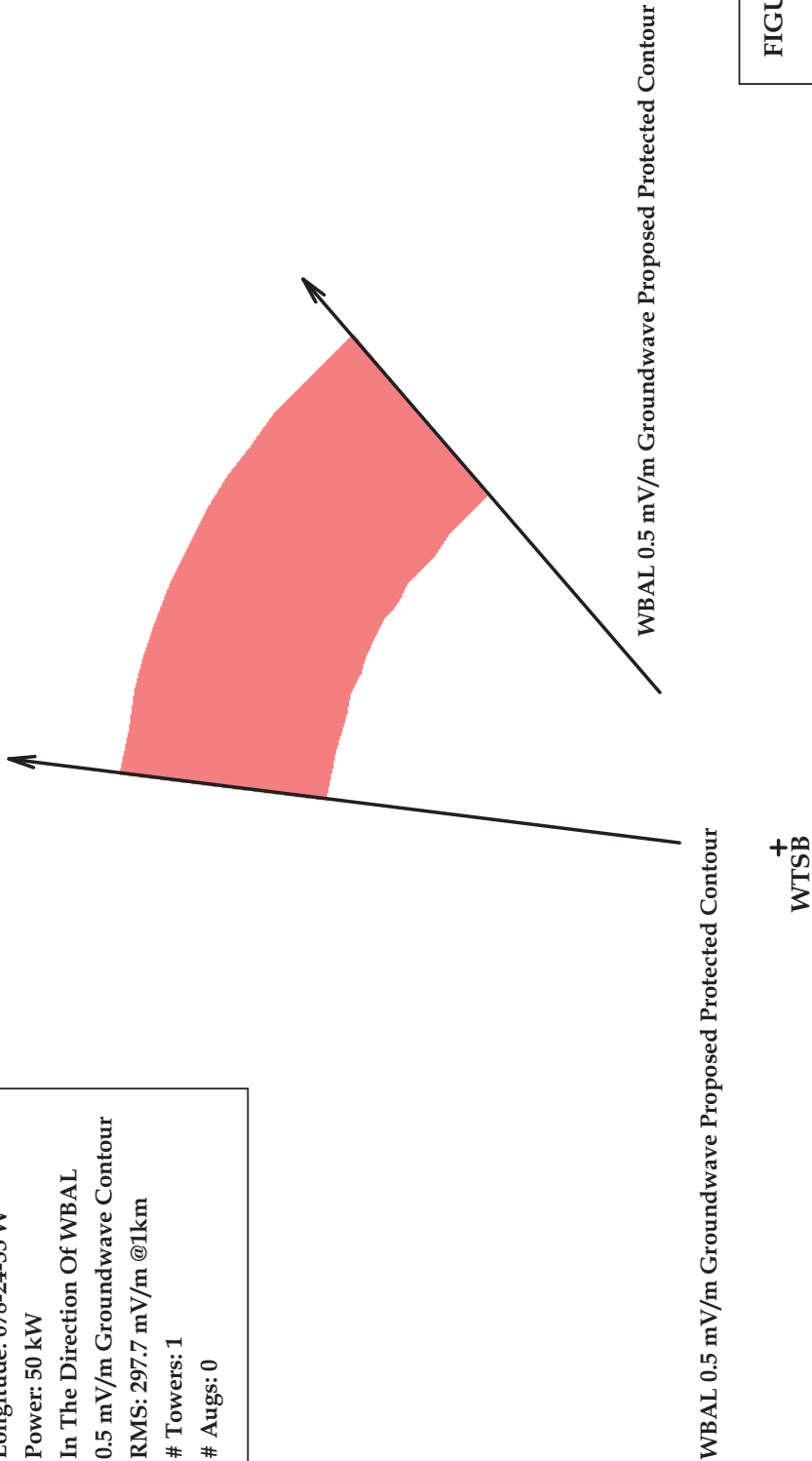
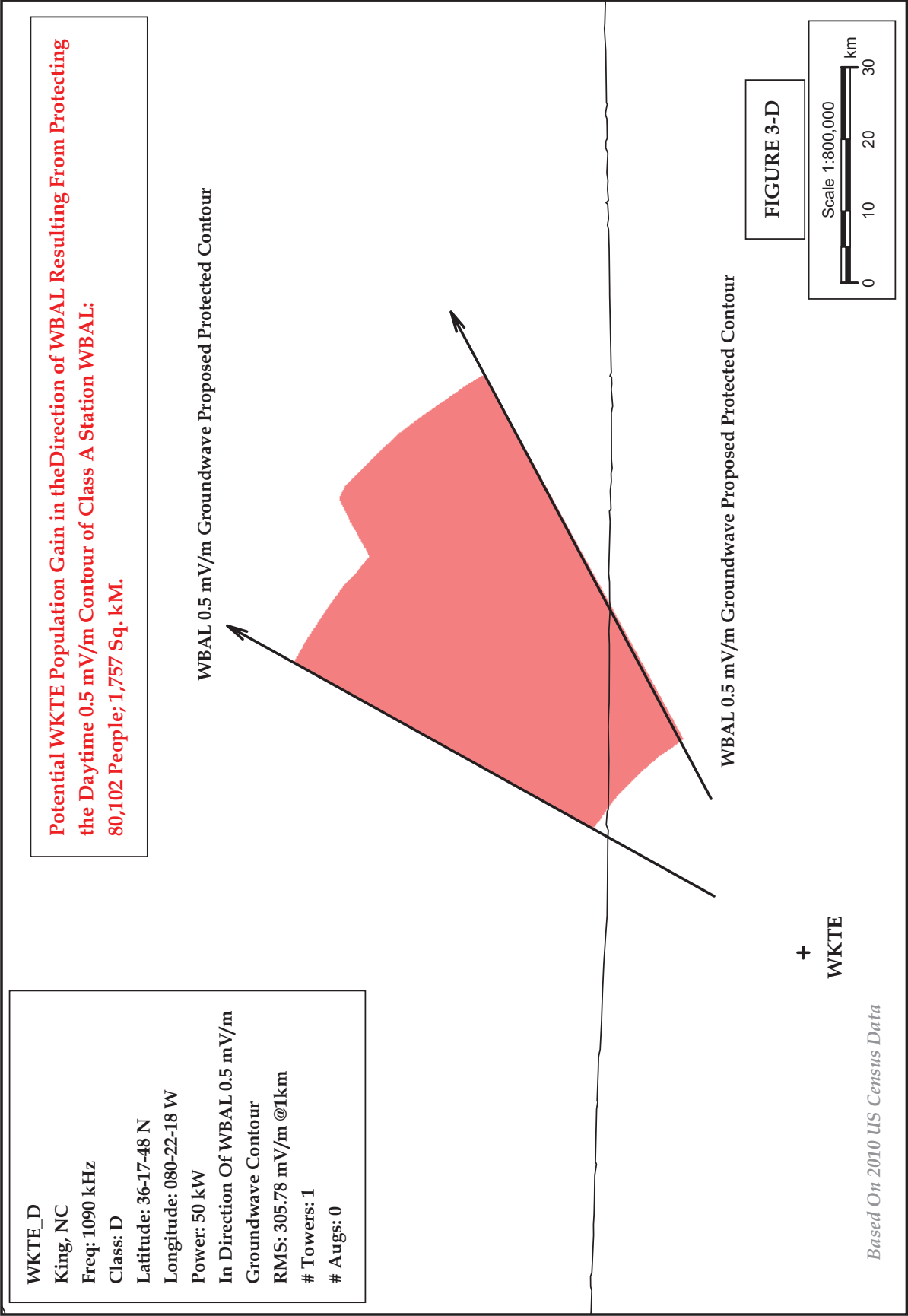


FIGURE 2-D



Based On 2010 US Census Data

Potential WTSB 0.5 mV/m Gain Area in the Direction of WBAL Resulting From Class A Station WBAL Being Protected to Its 0.5 mV/m Groundwave Daytime Contour



Potential WKTE 0.5 mV/m Gain Area in the Direction of WBAL Resulting From Class A Station WBAL Being Protected to Its 0.5 mV/m Groundwave Daytime Contour

WKFI\_D

Wilmington, OH

Freq: 1090 kHz

Class: D

Latitude: 39-26-12 N

Longitude: 083-51-21 W

Power: 50 kW

In Direction Of WBAL 0.5 mV/m

Groundwave Contour

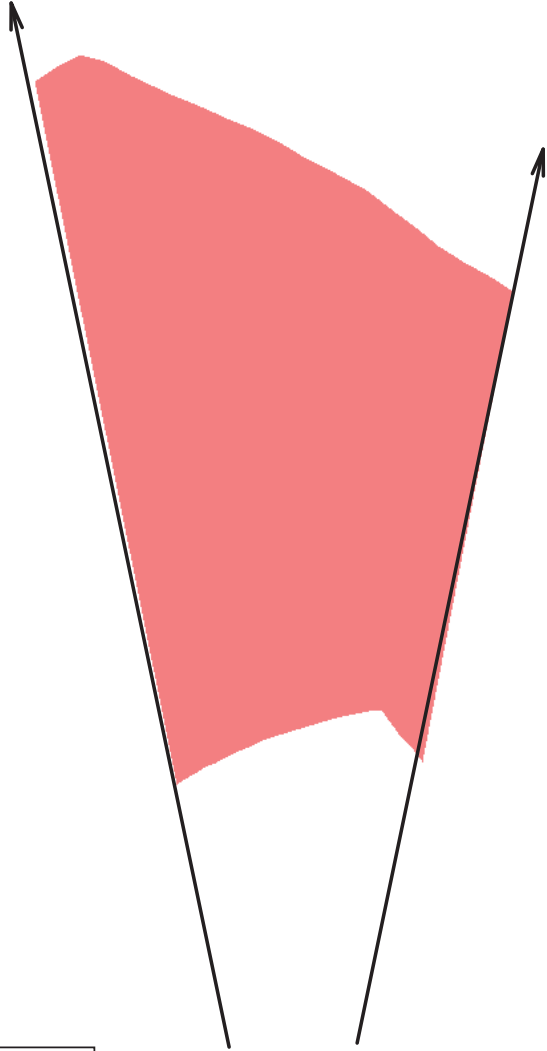
RMS: 2145.954 mV/m @1km

# Towers: 2

# Augs: 11

Potential WKFI Population Gain in the Direction of WBAL Resulting From Protecting the Daytime 0.5 mV/m Contour of Class A Station WBAL: 86,595 People; 2,440 Sq. km.

WBAL 0.5 mV/m Groundwave Proposed Protected Contour



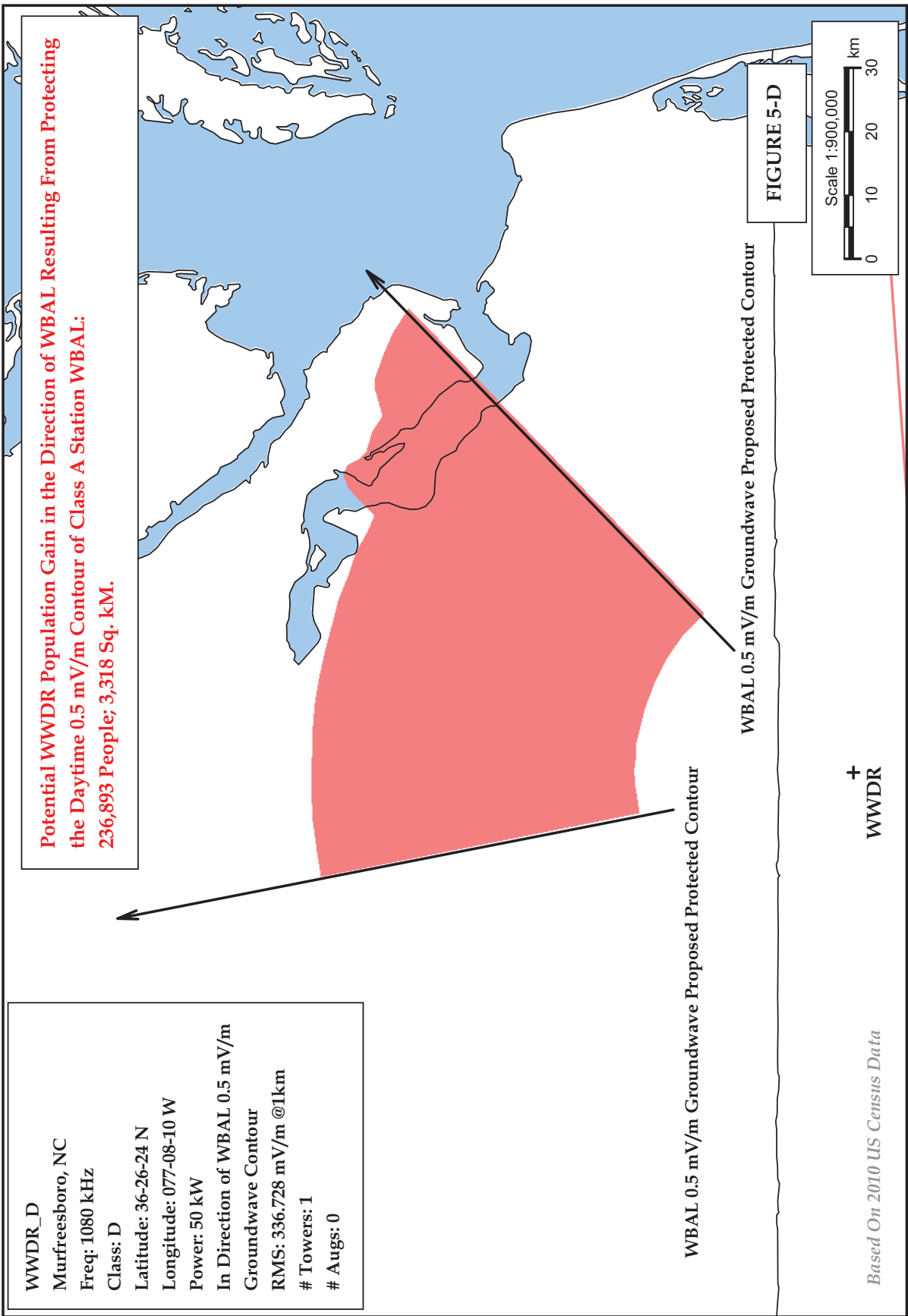
+ WKFI

FIGURE 4-D



Based On 2010 US Census Data

Potential WKFI 0.5 mV/m Gain Area in the Direction of WBAL Resulting From Class A Station WBAL Being Protected to Its 0.5 mV/m Groundwave Daytime Contour



Potential WWDR 0.5 mV/m Gain Area in the Direction of WBAL Resulting From Class A Station WBAL Being Protected to Its 0.5 mV/m Groundwave Daytime Contour



WBAL, BALTIMORE, MARYLAND

1090 kHz 50 kW DA-N

JANUARY 2019

WBAL NIGHTTIME OPERATION

0.5 mV/m 50% Skywave  
(Presently Protected  
Contour)  
Current Population

Interference Caused to 0.5 mV/m 50% Skywave by  
Maximized Class D Nighttime Operations Per *SFNPRM*  
Nighttime Alternative 1  
(Figure 1-N)

	Population:	Percentage of Interference to Population Within 0.5 mV/m 50% Skywave:
55,120,123	14,550,428	26.4%

GAIN IN CLASS D STATION'S NIGHTTIME INTERFERENCE FREE CONTOUR SERVICE  
WITH MAXIMUM POWER IN THE DIRECTION OF WBAL (Figures 2-N through 13-N)

Maximizing Class D Station	Gain by Population (Persons) and Area (square kilometers)	Figure
WBAF	10,767/139	2-N
WCAR	85,691/47	3-N
WKTE	2,816/12	4-N
WKFI	1,714/7.1	5-N
WCZZ	19,801/80	6-N
WERN	3,958/51	7-N
WHGG	6,181/39	8-N
WKBZ	8,004/30	9-N
WFCV	44,557/54	10-N
WTNK	2,801/101	11-N
WTSB	20/3.2	12-N
WILD	0/0.2	13-N
COLLECTIVE GAIN:	186,310/563.5	

NET LOSS IN SERVICE FROM *SFNPRM* NIGHTTIME ALTERNATIVE 1 (CLASS A  
AM STATION LOSS MINUS COLLECTIVE GAIN IN CLASS D SERVICE):

14,550,428 (Loss of Class A AM Service) – 186,310 (Collective Class D Gain) = 14,364,118 persons Net  
Loss

WBAL, BALTIMORE, MARYLAND

1090 kHz 50 kW DA-N

JANUARY 2019

WBAL CRITICAL HOURS OPERATION

SFNPRM Alternative 1: No Critical Hours Protections To Class A AM Stations

Critical Hours Time Period	Interference Caused Within Class A 0.1 mV/m Groundwave Contour By Class D Operations With Full Daytime Power		Interference Caused Within Class A 0.5 mV/m Groundwave Contour By Class D Operations With Full Daytime Power		Contour:
	Population:	Area (square kilometers):	Percentage of Interference to Population Within 0.1 mV/m Groundwave Contour:	Population:  Area (square kilometers):	Percentage of Interference to Population Within 0.5 mV/m Groundwave Contour:
One Hour Before Sunset (Figure 1.1-C)	300,314	3,397	1.4%	0	0%
One-Half Hour Before Sunset (Figure 1.2-C)	10,475,410	151,013	49.3%	253,979	2.4%
One-Quarter Hour Before Sunset (Figure 1.3-C)	14,622,912	175,387	68.8%	4,016,441	37.7%

## WBAL CRITICAL HOURS OPERATION

### *SFNPRM* Alternative 2: Section 73.190 Critical Hours Figures Revised to Reference Distance From 0.5 mV/m Contour (in Lieu of 0.1 mV/m Contour) of Class A AM Stations

Critical Hours Time Period	Interference Caused Within Class A 0.1 mV/m Groundwave Contour By Class D Operations Per Alternative 2	Interference Caused Within Class A 0.5 mV/m Groundwave Contour By Class D Operations Per Alternative 2		
	Population:	Area (square kilometers):	Percentage of Interference to Population Within 0.1 mV/m Groundwave Contour:	Population: Area (square kilometers): Percentage of Interference to Population Within 0.5 mV/m Groundwave Contour:
One Hour Before Sunset (Figure 2.1-C)	0	0	0%	0 0 0%
One-Half Hour Before Sunset (Figure 2.2-C)	5,518,905	115,570	26.0%	0 0 0%
One-Quarter Hour Before Sunset (Figure 2.3-C)	10,845,097	154,091	51.0%	314,669 2,896 3.0%

**WBAL, BALTIMORE, MARYLAND**

**1090 kHz 50 kW DA-N**

**JANUARY 2019**

**WBAL DAYTIME OPERATION**

<b>0.1 mV/m Groundwave (Presently Protected Contour)</b>	<b>Interference Caused to Class A 0.1 mV/m Groundwave Contour By Maximized Class D Daytime Operations Per <i>SFNPRM</i> Daytime Proposal (Figure 1-D)</b>
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<b>Population:</b>	<b>Population:</b>	<b>Percentage of Interference to Population Within 0.1 mV/m Groundwave Contour:</b>
21,268,639	1,037,110	4.9%

**GAIN IN CLASS D STATION'S DAYTIME OPERATION IN THE DIRECTION OF WBAL  
WITH MAXIMUM POWER IN THE DIRECTION OF WBAL (Figures 2-D through 5-D)**

<b>Maximizing Class D Station</b>	<b>Gain by Population (Persons) and Area (square kilometers)</b>	<b>Figure</b>
WTSB	42,608/1,348	2-D
WKTE	80,102/1,757	3-D
WKFI	86,595/2,440	4-D
WWDR	236,893/3,318	5-D
<b>COLLECTIVE GAIN:</b>	<b>446,198/8863</b>	

**NET LOSS IN SERVICE FROM *SFNPRM* DAYTIME PROPOSAL (CLASS A AM STATION  
LOSS MINUS COLLECTIVE GAIN IN CLASS D SERVICE):**

**1,037,110 (Loss of Class A AM Service) – 446,198 (Collective Class D Gain) = 590,912 persons Net  
Loss<sup>1</sup>**

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<sup>1</sup> This figure represents the net loss assuming upgrades by the listed neighboring Class D stations. Potentially different populations within the studied Class A AM station could be subject to interference depending upon future neighboring upgrades, with up to 10,606,471 persons subject to loss of service (WBAL's 0.1 mV/m daytime contour population of 21,268,639 minus WBAL's 0.5 mV/m daytime contour population of 10,662,168 = 10,606,471).

# Grid Based Incoming Interference Population Report

## Station Information:

Call: WBAL  
 Freq: 1090 kHz  
 BALTIMORE, MD, US  
 Hours: N  
 Lat: 39-22-33 N  
 Lng: 076-46-21 W  
 Power: 50.0 kW - Custom Q Value Used: 24.784  
 Theo RMS: 2661.85 mV/m @ 1km @ 50.0 kW  
 # of Augmentations: 13

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Switch	TL Switch	A (deg)	B (deg)	C (deg)	D (deg)
1	0.509	102.2	0.0	0.0	200.0	0	0	0.0	0.0	0.0	0.0
2	1.000	0.0	93.0	85.0	200.0	1	0	0.0	0.0	0.0	0.0
3	0.509	-102.2	93.0	85.0	200.0	1	0	0.0	0.0	0.0	0.0

#	Azimuth (deg)	Radiation (mV/m@1km)	Span (deg)
1	15.00	3200.82	20.0
2	25.00	3723.54	20.0
3	71.50	4655.19	27.0
4	85.00	4857.48	27.0
5	100.00	4861.18	30.0
6	115.00	4653.90	30.0
7	130.00	4295.18	30.0
8	145.00	3696.18	15.0
9	152.50	3332.95	15.0
10	222.00	119.09	52.0
11	248.00	112.65	52.0
12	282.00	90.12	58.0
13	311.00	119.09	30.0

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 Theoretical RMS: 2661.85 mV/m@1km Erss = 2691.85 mV/m@1km  
 Standard RMS: 2795.06 mV/m@1km Q = 24.78 mV/m@1km  
 Augmented RMS: 2869.44 mV/m@1km

## Study Information:

Calculation Area: SkyWave 500.0 uV/m  
 Grid Size: 500 x 500  
 Reference Propagation Model: Groundwave + Skywave  
 Interference Propagation Model: Skywave [10% Time]  
 Ratios:  
     Co-channel: 20.0  
     First Adjacent: 1.0

Second Adjacent: 0.033  
 Third Adjacent: 0.033  
 Ix signals combined using RSS methodology: Yes  
 RSS Cutoff Percentage: 50.0  
 Threshold for reception: 0.1 mV/m  
 Population Database: 2010 US Census (PL)

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Summary:

Total Station Coverage: 55,120,133 ( 1815937.1 sq. km )  
 Total Interference: 14,550,428 ( 357693.3 sq. km )  
 Interference Free Coverage: 40,569,705 ( 1458248.9 sq. km )

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Stations Causing Interference:

Call Letters	Area (sq. km)	Housing Units	Population
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WKBZ_N	90,933	4,303,745	10,214,219
WILD_N	198,216	4,532,661	10,184,990
WFCV_N	45,674	2,828,799	6,699,709
WCAR_N	84,047	2,366,824	5,507,740
WTNK_N	18,515	1,334,152	3,040,801
WBAF_N	132,854	1,113,039	2,297,009
WCZZ_N	132,832	1,022,711	2,252,447
WKTE_N	30,588	888,382	2,129,979
WTSB_N	70,637	868,407	1,991,237
WKFI_N	6,547	486,248	1,179,459
WENR_N	83,348	617,410	1,178,957
WHGG_N	7,876	277,331	692,227
1090CKKW	(Not Considered In Report)		
CBON-12	(Not Considered In Report)		
WUFO	(Not Considered In Report)		
WKGX	(Not Considered In Report)		
WKBY	(Not Considered In Report)		
WWNL	(Not Considered In Report)		
WWDR	(Not Considered In Report)		
WOKT	(Not Considered In Report)		
WALD	(Not Considered In Report)		
WTIC	(Not Considered In Report)		
WUFO	(Not Considered In Report)		
WHLI	(Not Considered In Report)		
WTAM	(Not Considered In Report)		
WGPA	(Not Considered In Report)		
WTWN	(Not Considered In Report)		

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Interference Free Breakdown:

# Grid Based Incoming Interference Population Report

## Station Information:

Call: WBAL  
Freq: 1090 kHz  
BALTIMORE, MD, US  
Hours: D  
Lat: 39-22-33 N  
Lng: 076-46-21 W  
Power: 50.0 kW  
Theo RMS: 408.77 mV/m @ 1km @ 1kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	200.0	0	0	0.0	0.0	0.0	0.0

## Study Information:

Calculation Area: GW 0.1 mV/m  
Grid Size: 500 x 500  
Reference Propagation Model: Groundwave  
Interference Propagation Model: Groundwave  
Ratios:  
    Co-channel: 20.0  
    First Adjacent: 2.0  
    Second Adjacent: 0.033  
    Third Adjacent: 0.033  
Ix signals combined using RSS methodology: Yes  
    RSS Cutoff Percentage: 50.0  
Threshold for reception: 0.1 mV/m  
Population Database: 2010 US Census (PL)

## Summary:

Total Station Coverage: 21,268,639 ( 196048.5 sq. km )  
Total Interference: 1,037,110 ( 82169.8 sq. km )  
Interference Free Coverage: 20,231,529 ( 113880.7 sq. km )

## Stations Causing Interference:

Call Letters	Area (sq. km)	Housing Units	Population
WTSB_D	77,381	426,693	953,358
WKTE_D	10,941	246,551	595,082
WWDR_D	68,814	213,998	432,506
WKFI	2,505	41,562	88,652

WTSB (Not Considered In Report)  
WUFO\_O (Not Considered In Report)  
WWNL (Not Considered In Report)  
WWNL\_D (Not Considered In Report)

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Interference Free Breakdown:

White:	12,961,343	[ 64.1% ]
Black:	3,837,744	[ 19.0% ]
Hispanic:	1,886,392	[ 9.3% ]
Native American:	39,048	[ 0.2% ]
Asian:	1,070,938	[ 5.3% ]
Pacific Islander:	7,257	[ 0.0% ]
Mixed Race:	390,869	[ 1.9% ]
Other:	37,938	[ 0.2% ]

Total: 20,231,529

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	Housing Units	Population	%
Delaware			
Kent County			
Total	65,338	162,310	
WBAL Coverage	65,338	162,310	
Ix Free Cov	65,338	162,310	100.00
New Castle County			
Total	217,511	538,479	
WBAL Coverage	217,511	538,479	
Ix Free Cov	217,511	538,479	100.00
Sussex County			
Total	123,036	197,145	
WBAL Coverage	123,036	197,145	
Ix Free Cov	123,036	197,145	100.00
District of Columbia			
District of Columbia			
Total	296,719	601,723	
WBAL Coverage	296,719	601,723	
Ix Free Cov	296,719	601,723	100.00
Maryland			
Allegany County			
Total	33,311	75,087	
WBAL Coverage	22,961	51,338	
Ix Free Cov	2,259	4,271	8.32
WKTE_D	20,702	47,067	91.68
WKFI	20,702	47,067	91.68
Anne Arundel County			
Total	212,562	537,656	
WBAL Coverage	212,562	537,656	
Ix Free Cov	212,562	537,656	100.00
Baltimore County			
Total	335,622	805,029	