

ENGINEERING EXHIBIT
IN SUPPORT OF AN
AMENDMENT TO AN
APPLICATION FOR CONSTRUCTION PERMIT
FCC FILE NO. BP-20110223ACB
WWRC - WASHINGTON, DISTRICT OF COLUMBIA
1260 kHz - 25.0 kW DAY/5.0 kW NIGHT - DA-2
Facility ID: 8681

Applicant: Salem Media of Virginia, Inc.

April, 2011



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FCC Form 301 - Section III

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Applicant: Salem Media of Virginia, Inc.

I am a Radio Engineer, an employee in the firm of Carl T. Jones Corporation, with offices located in Springfield, Virginia.

My education and experience are a matter of record with the Federal Communications Commission. I am a Registered Professional Engineer in the Commonwealth of Virginia, Registration No. 027914.

GENERAL

This office has been authorized by Salem Media of Virginia, Inc. ("Salem"), licensee of Standard Broadcast Station WWRC, Washington, District of Columbia, to prepare this statement, FCC Form 301 (Section III), and the attached engineering exhibits in support of an Amendment to an Application for Construction Permit, FCC File No. BP-20110223ACB, to use the existing two end towers for the day array in lieu of the current three towers, modify the daytime electrical antenna parameters and increase the daytime

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power level to 25.0 kW. No other changes are proposed. The proposal is considered to be a minor change under Section 73.3571 of the FCC Rules. WWRC is licensed to operate on 1260 kHz with a power of 5.0 kW daytime and nighttime, employing a three-tower directional antenna array (DA-2).

Pursuant to Section 73.3517(c) of the Rules, this application is considered as filed simultaneously with the contingent Application for Construction Permit of WKDL, 1250 kHz, Warrenton, Virginia and the deletion of the WNWK, 1260 kHz, Newark, Delaware facility under an Interference Reduction Agreement ("IRA").

Station WKDL is licensed¹ to operate on 1250 kHz with a daytime power of 7.9 kW and a nighttime power of 0.125 kW employing a directional antenna system.

Radio Station WNWK, Newark, Delaware, is licensed to operate on 1260 kHz. The licensed authority provides for operation at 1 kW utilizing a directional antenna system during daytime hours. WNWK is also authorized for a low-power nighttime operation at 0.042 kW utilizing the same directional antenna system as employed during daytime hours. In June 2001², the station ceased operation with its licensed three tower directional antenna system, which was removed by the antenna site owner. Since then, when the station has operated it has operated pursuant to STA's from sites other than the licensed site.

¹A license application was filed (FCC File No. BMML-20091209AEO) to cover the outstanding construction permit BMP-20091021ACN.

²Per letter dated December 5, 2001, filed by WNWK requesting special temporary authority.

To increase the daytime power of WWRC, it is necessary to modify the daytime antenna parameters and reduce the daytime power of WKDL to 3.0 kW³. WNWK has agreed to relinquish the license rights for operation on 1260 kHz.

As detailed elsewhere in this application, a grant of the proposed simultaneous modification of WWRC and WKDL, and the relinquishment of the WNWK license would result in an overall reduction of interference in the AM band and an increase in the area of interference-free service in accordance with the provisions of Section 73.3517(c) of the Rules.

ANTENNA SYSTEM AND GROUND SYSTEM

The existing antenna system consists of three towers. The existing center tower is a skirted, guyed tower with the top portion detuned to achieve a 90 electrical degree tall tower. The north and south towers are tapered self-supporting towers, 90 electrical degrees in overall height.

It is proposed to no longer incorporate the center tower for use in the daytime mode. Only the end towers (north and south) will be employed during the day for a two tower array. The existing tall tower will be detuned during day operation. All three towers will still be used for the authorized night pattern. The nighttime parameters have been modified in the attached FCC Form 301 to specify the center tower (Tower #1) as the reference point

³FCC File No. BP-20110223ABY.

for the array rather than the current point in space. This change has no effect on the calculated directional nighttime antenna field pattern.

The existing ground system consists of 120 evenly spaced, buried, copper wire radials per tower. The radials are 59.7 meters long, except where bonded to the transverse copper strap between towers.

Figure 1 is a polar plot of the proposed daytime standard radiation pattern in the horizontal plane. Figure 2 is a tabulation of the horizontal inverse distance fields (mV/m at 1 kilometer).

SITE AND SURROUNDING TERRAIN

The WWRC antenna/transmitter location and surrounding terrain characteristics and the site elevation remain unchanged. Detailed information describing the site is on file with the FCC and FAA. Site photographs are on file with the FCC.

FAA NOTIFICATION AND TOWER REGISTRATION

WWRC is proposing to utilize two of the existing towers without any physical alteration; therefore, it is believed notification to the Federal Aviation Administration (FAA) is not necessary.

The proposed transmitting antennas are existing, registered tower structures. The registration numbers from north to south are: 1042695, 1042694, and 1042696. ASR #1042694 will not be used for the daytime operation.

BLANKETING AND STATION INTERACTION

The present and proposed 1000 mV/m contours are depicted in Figure 3. The population within the proposed daytime 1000 mV/m contour is greater than 300 persons and greater than 1.0 percent of the population within the proposed 25 mV/m contour. The population within the proposed day 1000 mV/m is 1.15% of the population within the 25 mV/m. The population within the proposed 1000 mV/m contour is 4,279 persons and 373,282 persons within the proposed 25 mV/m contour.

Though the proposed facilities of WWRC result in a population within the 1000 mV/m contour that exceeds 1% of the population within the 25 mV/m contour, it is believed that the public interest would be served by a waiver of the rule. WWRC respectfully requests a waiver of 73.24(g) of the FCC Rules.

There are two AM stations located within 3.2 kilometers of the WWRC facility. There are numerous FM stations and TV stations located within 10 kilometers. WWRC presently operates from this site, thus with a change in the directional antenna pattern and power level, it is believed that the effects should be minimal.

As required by Section 73.88 of the Rules, the applicant will satisfy all reasonable complaints of blanketing interference. In the event that blanketing or cross-modulation interference occurs to properly operating receivers, remedial measures will be taken.

JUSTIFICATION FOR A WAIVER OF 73.24(g)

- WWRC presently operates from this site, thus with the power increase, it is believed the blanketing effects will be minimal.
- Section 73.24(g) was established to encourage the location of transmitters in uncongested areas. No site relocation has taken place for WWRC. WWRC has been in operation since 1924 and has operated from the current site for no less than sixty years. The extent and location of blanketing cross-modulation interference is difficult to predict. As required by Section 73.88 of the Rules, **the applicant will satisfy all reasonable complaints of blanketing interference. In the event that blanketing or cross-modulation interference occurs to properly operating receivers, remedial measures will be taken.**
- WWRC's present authorization is for 5.0 kW daytime, and 5.0 kW nighttime with a directional array for both modes. The proposed daytime facility will operate with 25.0 kW employing two of the three existing towers. The current nighttime facility operates at 5.0 kW employing all three towers. Substantial areas and populations would receive new daytime service from WWRC. The following tabulation quantifies the population gains:

2000 Census Population (persons)				
Day Contour	Present	Proposed	Loss	Gain
5.0 mV/m	858,571	1,412,238	0	553,667
0.5 mV/m	3,304,624	4,394,316	0	1,089,692

- The proposal of WWRC will result in a gain of 553,667 persons within the 5.0 mV/m contour and 1,089,692 persons within the 0.5 mV/m contour receiving daytime service from WWRC without creating new objectionable interference to any existing station or receiving objectionable interference from any existing station. The gain in population is larger than the increased population served in the previous decisions in which a waiver of 73.24(g) was requested by the applicant and subsequently granted by the FCC⁴.
- Any site selected further from the District of Columbia would reduce the ability of WWRC to provide the requisite service to the community of license.

From all the facts stated above, it can be concluded that the public interest would be served by a waiver of Section 73.24(g) and grant of the WWRC application.

COVERAGE CONTOURS

The present and proposed 5.0 mV/m and 2.0 mV/m daytime contours are shown in Figures 4 and 5. The proposed 5.0 mV/m daytime service contour will encompass 74.31% of the city of license, Washington, D.C. The coverage is greater than the presently authorized 42.86%.

The present and proposed 0.5 mV/m daytime contours are shown in Figure 6.

⁴See O.K. Broadcasting Corp. (WEEL), 2 RR 2d 311 and WHOO Radio, Inc., 8 RR 2d 83.

DAYTIME ALLOCATION STUDY

The results of the daytime study are shown in Figure 7. Eleven stations were considered in detail regarding the daytime allocation. These stations are:

WJEJ	1240 kHz	Hagerstown, Maryland;
WCEM	1240 kHz	Cambridge, Maryland;
WKDL	1250 kHz	Warrenton, Virginia;
WYYC	1250 kHz	York, Pennsylvania;
WFJS	1260 kHz	Trenton, New Jersey;
WCHV	1260 kHz	Charlottesville, Virginia;
WZBO	1260 kHz	Edenton, North Carolina;
WPHB	1260 kHz	Philipsburg, Pennsylvania;
WTJZ	1270 kHz	Newport News, Virginia;
WCBC	1270 kHz	Cumberland, Maryland; and
WHVR	1280 kHz	Hanover, Pennsylvania.

The distances to all groundwave contours were calculated using the equivalent distance method. Contours were calculated at 5 degree intervals using ground conductivity values shown on the M-3 soil map with the exception of WWRC, WCHV, WPHB, and WKDL⁵, where measurement data was employed. A tabulation of the measured ground

⁵The measurement data utilized for WKDL was taken from recently conducted measurements on co-located station WKCW, 1420 kHz, Warrenton, Virginia and is contained in Appendix B.

conductivities employed are contained in Appendix A. Additional measurement data, not on file with the FCC, can be found in Appendix B.

The field measurements contained in Appendix B were made by station personnel and/or contract engineers under the direct supervision of the undersigned. Each individual is experienced in performing field strength measurements on directional antenna systems.

Tabulations of distances to groundwave contours and conductivity profiles are not included herein but can be provided upon request.

Figure 7 depicts the daytime allocation study. Figures 8-10 depict a breakdown of each channel relationship.

Co-channel Protection

As depicted in Figure 8, no overlap of the 0.025 mV/m and the 0.5 mV/m contours will occur between proposed WWRC and the co-channel stations WCHV, WZBO, WFJS, and WPHB.

First-adjacent Channel Protection

Figure 9 shows that the proposed operation of WWRC will not have prohibited overlap with WYYC, WCBC, WTJZ, and WKDL.

Second Adjacent Channel Protection

Figure 10 depicts that no prohibited overlap of the 5.0 mV/m contours presently exists, nor will any occur between WWRC and WJEJ, WHVR, and WCEM.

ENVIRONMENTAL IMPACT

The proposal described herein does not involve high intensity lighting as specified in Section 1.1307(a)(8) of the Rules, nor will it result in human exposure to radiofrequency radiation in excess of the standards specified in Section 1.1307(b). The applicant has determined that under the provisions of Section 1.1306, the proposal is excluded from environmental processing. No new tower construction is necessary.

RADIO-FREQUENCY IMPACT

On January 1, 1986, the FCC amended its Rules to implement the National Environmental Policy Act of 1969 (NEPA). This amendment established RF radiation protection guidelines to be used to determine if potentially harmful RF exposure is possible from an FCC-regulated transmission facility. Effective October 15, 1997, the FCC adopted revised guidelines and procedures for evaluating the environmental effects of RF emissions. These revised guidelines incorporate two tiers of exposure limits based on whether exposure occurs in a "controlled" (occupational) situation or an "uncontrolled" (general population) situation. The FCC has also revised OET Bulletin No. 65 entitled, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields", to aid in the radiation exposure analysis. This bulletin, as well as other current literature, provides detailed information for conducting an analysis including mathematical equations that can be used to determine compliance with the Commission's guidelines.

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The WWRC facility is co-located with one full-service FM station and five auxiliary FM stations. Thus, the proposed site is considered a multiple-use site. For a worst-case scenario, it will be assumed that the worst case power is the daytime power level of 25.0 kilowatts. The 25.0 kW will be assumed to be operating in any of the three towers and will be considered to be co-located with the full service FM and auxiliary FM operations.

CALCULATION METHODS

The following stations are authorized to operate from the tall center tower at the WWRC site:

CALL	Facility	Channel	ERP	CL AGL Meters	Antenna Model	Bays/ Element Spacing
WASH-FM	Auxiliary	246	15.5 kW	170	ERI SHPX-6AC-HW	6/ ½ λ
WMZQ-FM	Auxiliary	254	4.2 kW	170	ERI SHPX-6AC-HW	6/ ½ λ
WIHT	Auxiliary	258	15.5 kW	170	ERI SHPX-6AC-HW	6/ ½ λ
WBIG-FM	Auxiliary	262	4.1 kW	170	ERI SHPX-6AC-HW	6/ ½ λ
WWDC	Auxiliary	266	4.0 kW	211	ERI rototiller	1
WWDC	Main	266	22.5 kW	223	ERI rototiller	4/ 1 λ

The ERI SHPX-6AC-HW, 6 bay half-wave spaced “rototiller”, at 170 meters can only be operated in a single station mode or a combined operation of WMZQ-FM and WBIG-FM.

Therefore, the worst-case operation scenario will be with either WASH-FM or WIHT employing the single-station auxiliary operation at 15.5 kW. (The combined operation of WMZQ-FM and WBIG-FM is 8.3 kW.) At 2 meters, the height of an average person, and 944 -1004 meters from the base of the tower, the WASH-FM or WIHT will contribute worst-case, 0.0004 mW/cm² or 0.04 percent of the ANSI limit for controlled exposure and 0.21 percent of the ANSI limit for uncontrolled exposure.

The tall center tower also supports the main and auxiliary antennas for WWDC(FM). With the main facility as the worst-case, the ERI 4 bay full-wave spaced rototiller at a radiation centerline of 223 meters operates with an ERP of 22.5 kW (H & V). At 2 meters, the height of an average person, and 86-95 meters from the base of the tower, the worst-case contribution will be 0.0027 mW/cm² or 0.27 percent of the limit for controlled exposure and 1.33 percent for uncontrolled exposure.

The proposal described herein is for WWRC to increase the daytime operating power from 5.0 kW to 25.0 kW. The nighttime will remain as licensed with a power level of 5.0 kW. While the nighttime operation of WWRC utilizes all three existing towers on the property, the proposed daytime will only use the two end towers. For a worst-case scenario, it is assumed that 25.0 kilowatts will operate in any of the three towers.

Verification of compliance with FCC-specified guidelines for human exposure to RF radiation for WWRC was obtained from OET Bulletin No. 65. To obtain distance to compliance with the guidelines, Table 2 Section 1 of Supplement A was used. With a power of 25.0 kilowatts, a fence no less than 2.8 meters from the base of the tower is

required. The minimum distance from any of the three existing towers to the closest point of a fence is 5.3 meters. Figure 2 of Supplement A results in an E field of 12.7 V/m and an H field of 0.15 A/m. At a power of 25.0 kilowatts, this equates to an E field of 63.5 V/m or 1.07% of the plane wave equivalent power density and a H-field of 0.75 A/m or 21.21% of the plane wave equivalent power density of the controlled/uncontrolled limits.

The FM facilities will contribute a total of 0.31% of the controlled exposure limits and 1.54% of the uncontrolled exposure limits. Combining these contributions along with that of WWRC's worst case equivalent power density arising from the H-field, the total controlled exposure is 21.52% and the uncontrolled exposure is 22.75%. Thus, the WWRC proposal will not result in exposures greater than those established by FCC guidelines.

Thus the existing fencing of 5.3 meters will meet the requirements. This fencing requirement satisfies both the occupational/controlled and the general population/uncontrolled MPE limits. The fences will be locked to preclude public access to the towers and appropriate warning signs will also be posted.

OCCUPATIONAL SAFETY

Access to the antenna supporting tower bases will be restricted to authorized maintenance personnel only. The licensees, in a cooperative effort, will institute joint procedures to ensure protection of station personnel or tower contractors working in the vicinity of the towers, the station will reduce power and/or cease operation during times of

service or maintenance of the transmission systems when necessary to avoid potentially harmful exposure to personnel.

In light of the above, the proposed facility should be categorically excluded from RF environmental processing under Section 1.1307(b) of the Commission's Rules.

CONCLUSION

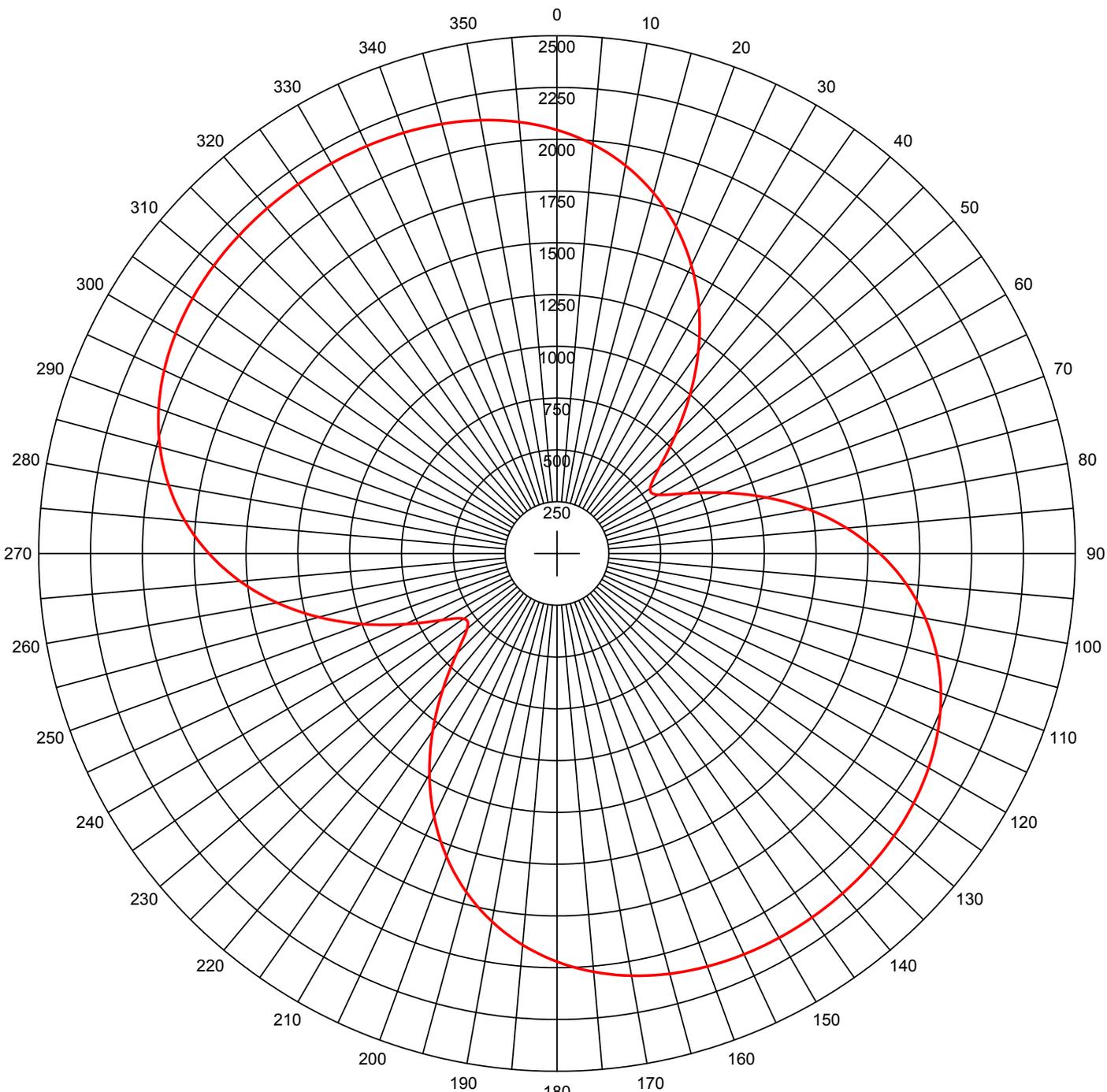
This statement and Section III of FCC Form 301 and the attached exhibits were prepared by me or under my direct supervision and are believed to be true and correct.

It is submitted that the proposed operation described herein complies with the technical standards of the Rules and Regulations of the Commission.

DATED: April 29, 2011



AM Directional Pattern



Theo RMS: 1639.106 mV/m@1km
 Std RMS: 1721.397 mV/m@1km
 Q: 32.4 mV/m@1km

Standard Horizontal Plane Pattern

— Pattern (mV/m @ 1km)
 — Pattern X10

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swtch	TL Swtch	A (deg)	B (deg)	C (deg)	D (deg)
2 (N)	1.000	0.0	0.0	0.0	90.0	0	0	0.0	0.0	0.0	0.0
3 (S)	0.605	-185.0	160.0	145.0	90.0	0	0	0.0	0.0	0.0	0.0

Call: WWRC
 Freq: 1260 kHz
 WASHINGTON, DC, US
 Hours: D
 Lat: 38-59-59 N
 Lng: 077-03-27 W
 Power: 25.0 kW
 Theo RMS: 1639.11 mV/m@1km
 @ 25.0 kW

**PROPOSED DAYTIME HORIZONTAL
 STANDARD RADIATION PATTERN
 APRIL, 2011**

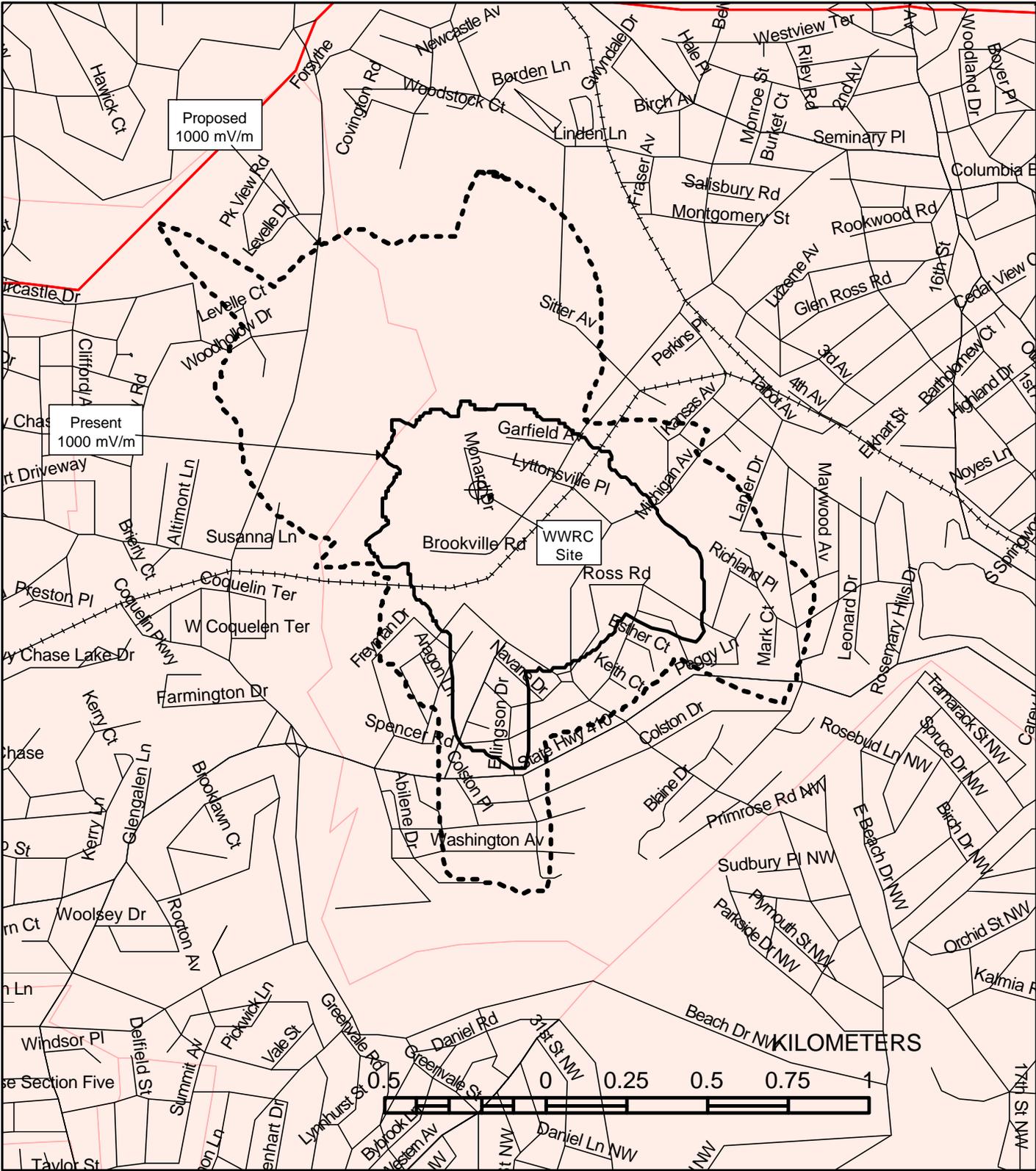
DAYTIME HORIZONTAL FIELDS

WWRC - WASHINGTON, DC
 1260 KHZ - 25.0 KW DAY/5.0 KW NIGHT - DA-2

AZIMUTH (DEGREES)	E THEO. (mV/m)	E STD. (mV/m)	AZIMUTH (DEGREES)	E THEO. (mV/m)	E STD. (mV/m)
0	1947.2	2045.2	180	1876.7	1971.3
5	1888.2	1983.3	185	1806.6	1897.7
10	1811.6	1902.9	190	1718.5	1805.2
15	1715.6	1802.2	195	1610.9	1692.2
20	1599.0	1679.8	200	1483.1	1558.1
25	1461.6	1535.6	205	1335.8	1403.5
30	1304.8	1371.0	210	1171.3	1231.0
35	1131.9	1189.6	215	994.6	1045.7
40	949.3	998.1	220	815.3	857.7
45	768.8	808.9	225	651.5	686.1
50	612.8	645.5	230	537.9	567.2
55	521.7	550.3	235	521.7	550.3
60	537.9	567.2	240	612.8	645.5
65	651.5	686.1	245	768.8	808.9
70	815.3	857.7	250	949.3	998.1
75	994.6	1045.7	255	1131.9	1189.6
80	1171.3	1231.0	260	1304.8	1371.0
85	1335.8	1403.5	265	1461.6	1535.6
90	1483.1	1558.1	270	1599.0	1679.8
95	1610.9	1692.2	275	1715.6	1802.2
100	1718.5	1805.2	280	1811.6	1902.9
105	1806.6	1897.7	285	1888.2	1983.3
110	1876.7	1971.3	290	1947.2	2045.2
115	1930.8	2028.1	295	1991.2	2091.4
120	1971.3	2070.5	300	2022.6	2124.4
125	2000.5	2101.1	305	2044.2	2147.0
130	2020.6	2122.2	310	2058.2	2161.8
135	2033.5	2135.8	315	2066.7	2170.7
140	2040.6	2143.3	320	2071.2	2175.4
145	2042.9	2145.7	325	2072.6	2176.9
150	2040.6	2143.3	330	2071.2	2175.4
155	2033.5	2135.8	335	2066.7	2170.7
160	2020.6	2122.2	340	2058.2	2161.8
165	2000.5	2101.1	345	2044.2	2147.0
170	1971.3	2070.5	350	2022.6	2124.4
175	1930.8	2028.1	355	1991.2	2091.4

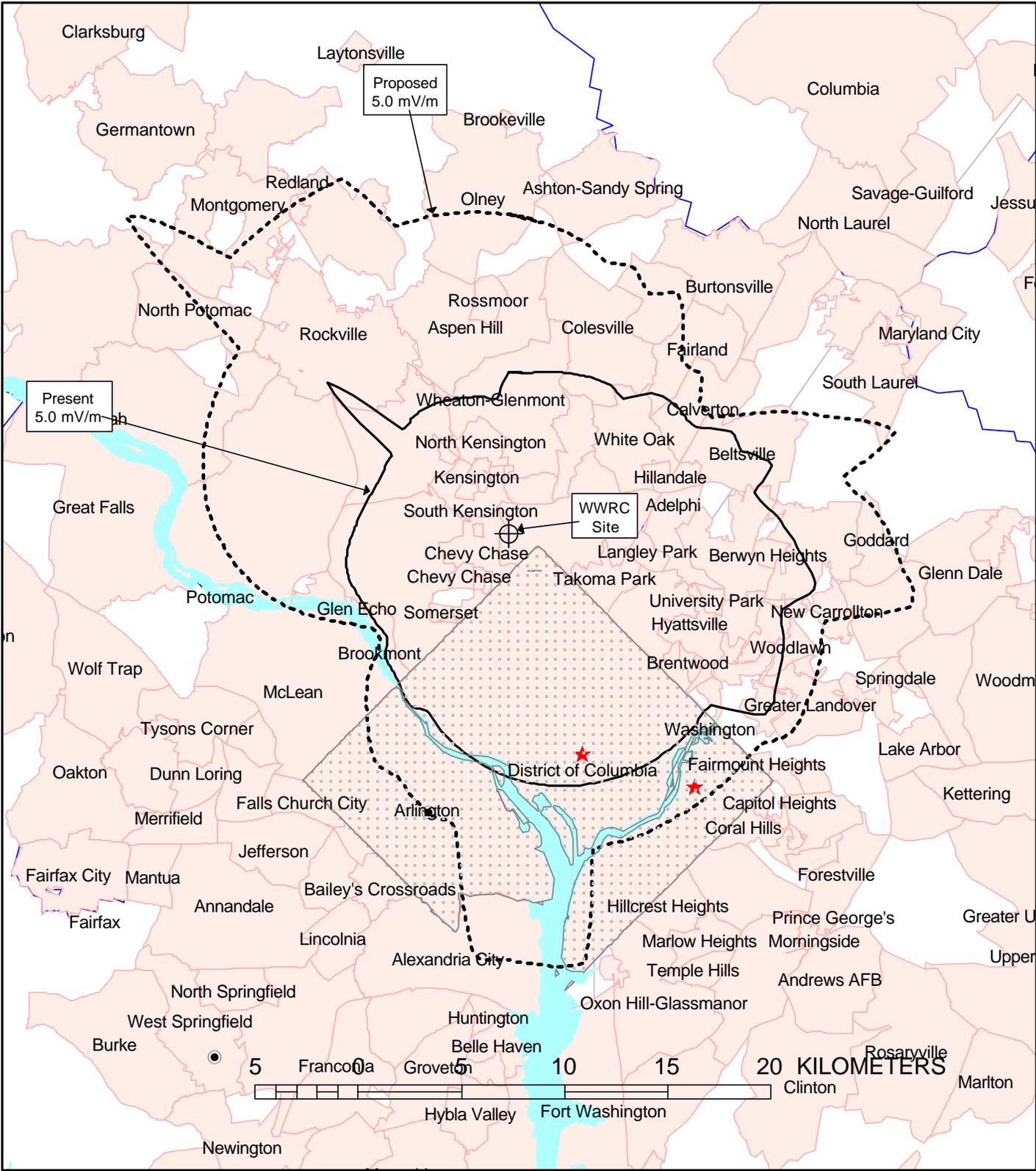
Fields in mV/m @ 1 Kilometer

FIGURE 3



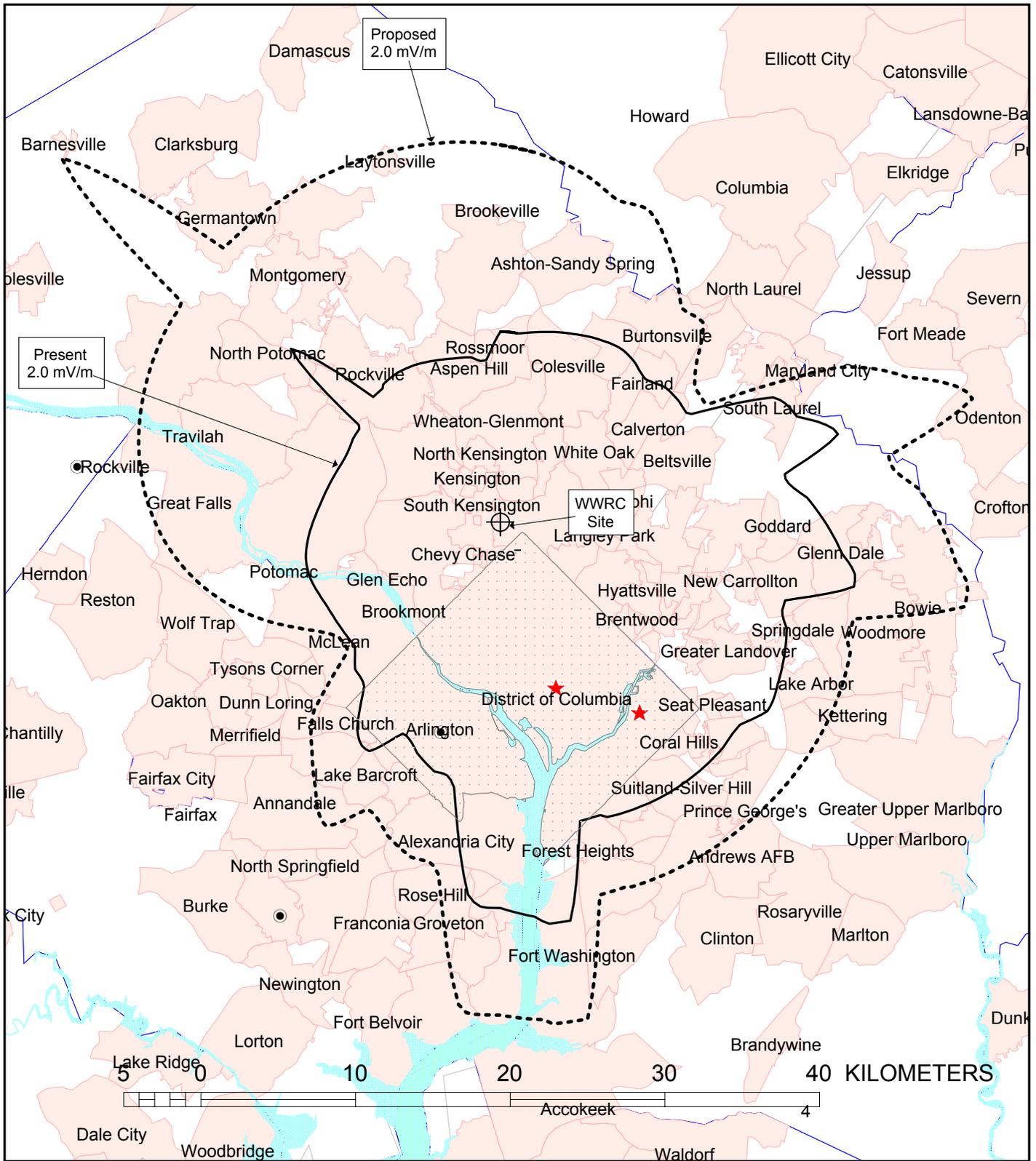
PRESENT & PROPOSED 1000 MV/M DAYTIME CONTOURS
WWRC(AM) - 1260 KHZ - WASHINGTON, DISTRICT OF COLUMBIA
PRESENT: 5.0 KW DAY/5.0 KW NIGHT - DA-2
PROPOSED: 25.0 KW DAY/5.0 KW NIGHT - DA-2
APRIL, 2011

FIGURE 4



PRESENT & PROPOSED 5.0 MV/M DAYTIME CONTOURS
WWRC(AM) - 1260 KHZ - WASHINGTON, DISTRICT OF COLUMBIA
PRESENT: 5.0 KW DAY/5.0 KW NIGHT - DA-2
PROPOSED: 25.0 KW DAY/5.0 KW NIGHT - DA-2
APRIL, 2011

FIGURE 5



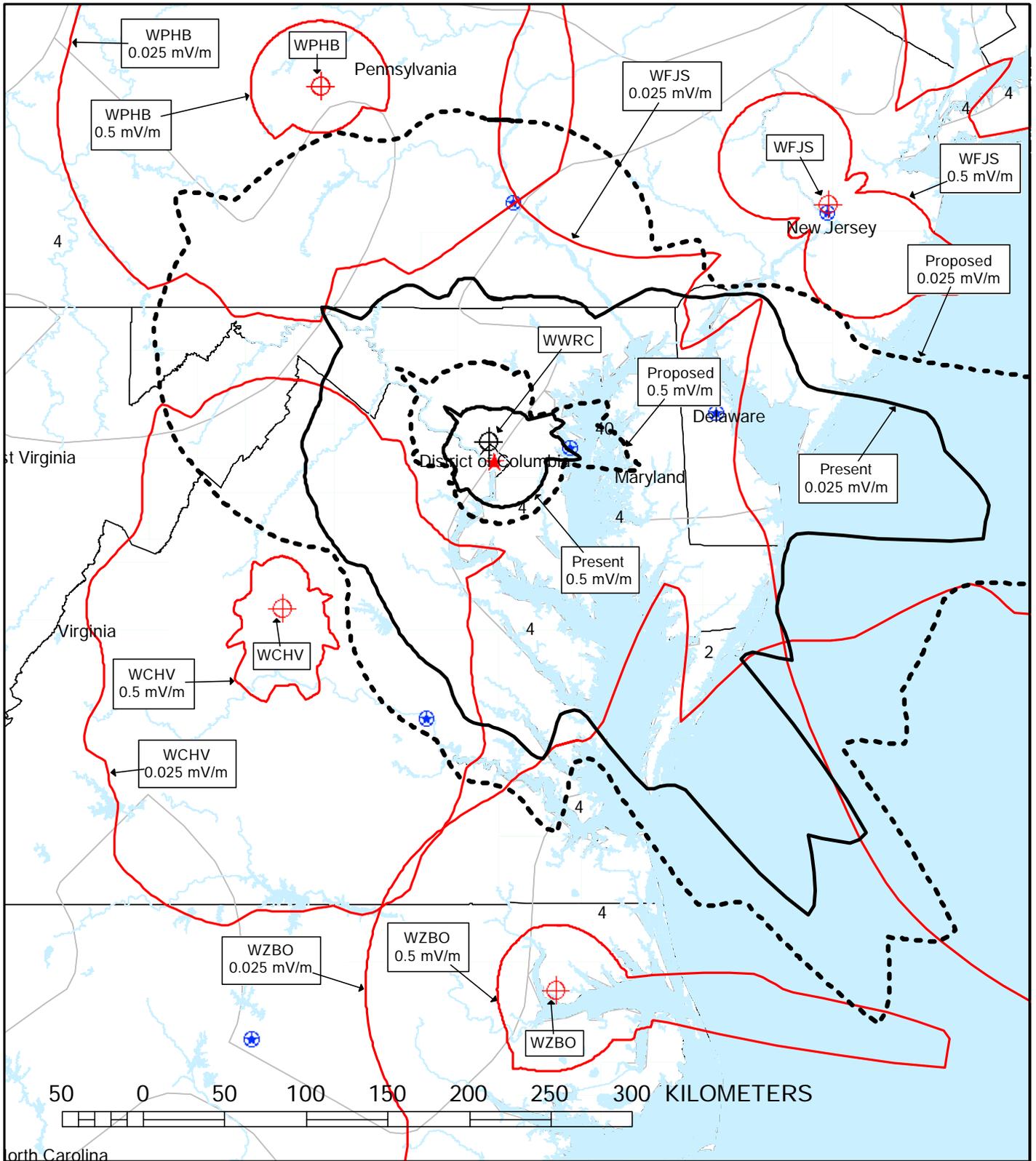
**PRESENT & PROPOSED 2.0 MV/M DAYTIME CONTOURS
WWRC(AM) - 1260 KHZ - WASHINGTON, DISTRICT OF COLUMBIA
PRESENT: 5.0 KW DAY/5.0 KW NIGHT - DA-2
PROPOSED: 25.0 KW DAY/5.0 KW NIGHT - DA-2
APRIL, 2011**

FIGURE 6



PRESENT & PROPOSED 0.5 MV/M DAYTIME CONTOURS
WWRC(AM) - 1260 KHZ - WASHINGTON, DISTRICT OF COLUMBIA
PRESENT: 5.0 KW DAY/5.0 KW NIGHT - DA-2
PROPOSED: 25.0 KW DAY/5.0 KW NIGHT - DA-2
APRIL, 2011

FIGURE 8



DAYTIME ALLOCATION STUDY
CO-CHANNEL STATIONS

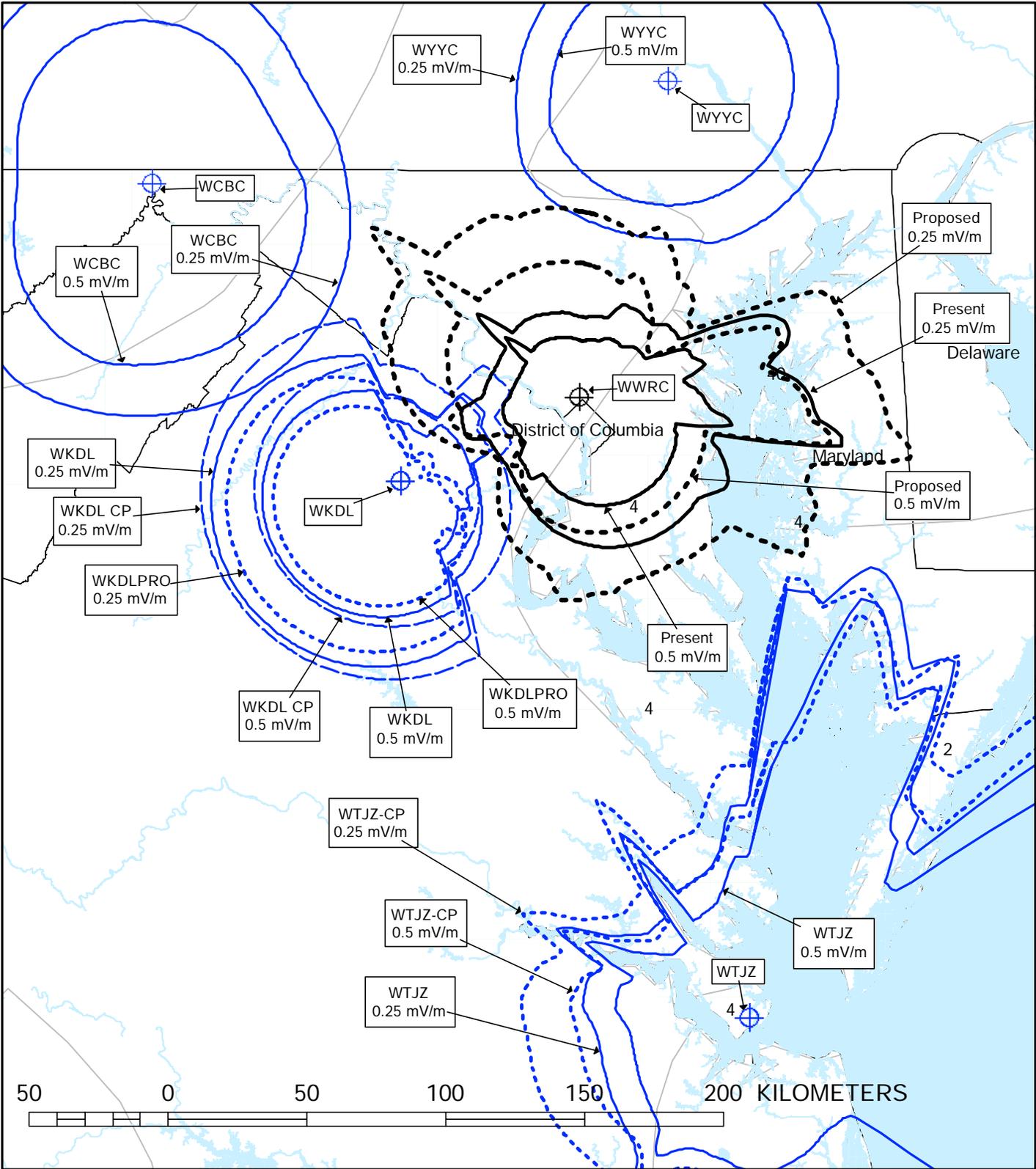
WWRC(AM) - 1260 KHZ - WASHINGTON, DISTRICT OF COLUMBIA

PRESENT: 5.0 KW DAY/5.0 KW NIGHT - DA-2

PROPOSED: 25.0 KW DAY/5.0 KW NIGHT - DA-2

APRIL, 2011

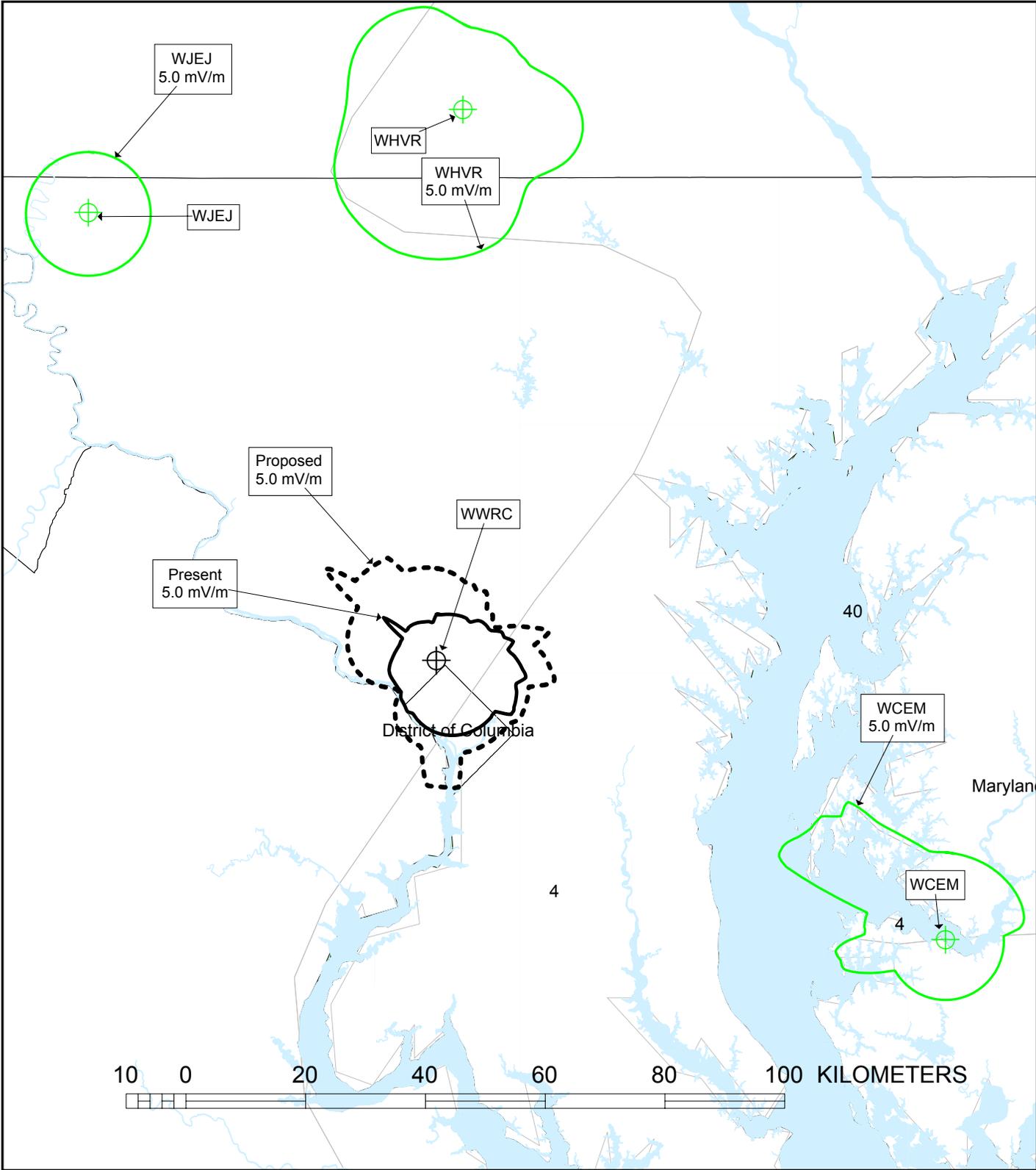
FIGURE 9



DAYTIME ALLOCATION STUDY
FIRST ADJACENT STATIONS

WWRC(AM) - 1260 KHZ - WASHINGTON, DISTRICT OF COLUMBIA
PRESENT: 5.0 KW DAY/5.0 KW NIGHT - DA-2
PROPOSED: 25.0 KW DAY/5.0 KW NIGHT - DA-2
APRIL, 2011

FIGURE 10



DAYTIME ALLOCATION STUDY
SECOND ADJACENT STATIONS

WWRC(AM) - 1260 KHZ - WASHINGTON, DISTRICT OF COLUMBIA
PRESENT: 5.0 KW DAY/5.0 KW NIGHT - DA-2
PROPOSED: 25.0 KW DAY/5.0 KW NIGHT - DA-2
APRIL, 2011