

April 2014
FM Translator W289CB
Milwaukee, WI Channel 289D
Allocation Study

The attached spacing study shows the spacing between the proposed translator site and the location of cochannel and adjacent channel stations and proposals. This study was made with the Commission's Class A spacing requirements, and individual situations were examined to determine the lack of prohibited contour overlap per the requirements of §74.1204 of the Rules. The attached allocation study map demonstrates compliance with the Commission's Rules for protection of FM broadcast stations and FM translators as outlined in §74.1204.

The proposed translator transmitter site is located within the 60 dBu protected contour of second-adjacent channel station WLVE 287A Mukwonago. The proposed site is 27.19 km from the WLVE transmitter site at a bearing of 58 degrees True. Given the WLVE antenna's 197 meter HAAT and 1.65 kW ERP along this radial, WLVE places a 60.9 dBu contour at the translator transmitter site. For the purposes of the following calculations, we assume that WLVE places a 60 dBu contour at the translator transmitter site. The corresponding interfering contour from the translator is $60 + 40 = 100$ dBu. Given that the transmitting antenna will be installed at a height of 290 meters above ground, and taking into consideration the vertical plane pattern of the Shively 6813-3-SS half-wave-spaced antenna, the attached calculations demonstrate that the interference area will not reach ground level. Therefore, the proposed facility is believed to satisfy the requirements of §74.1204(d) with respect to WLVE.

The proposed translator transmitter site is located within the 54 dBu protected contour of second-adjacent channel station WMIL-FM 291B Waukesha. The proposed site is 0.09 km from the WMIL-FM transmitter site at a bearing of 312 degrees True. Given the WMIL-FM antenna's 284 meter HAAT and 12 kW ERP along this radial, WMIL-FM places a 138.6 dBu contour at the translator transmitter site. The corresponding interfering contour from the translator is $138.6 + 40 = 178.6$ dBu. This contour would extend just 0.1 meters from the antenna per a Free Space calculation and would not reach ground level. There is no population within this contour. Therefore, the proposed facility is believed to satisfy the requirements of §74.1204(d) with respect to WMIL-FM.

The attached spacing study demonstrates compliance with §73.207 of the Commission's Rules regarding spacing restrictions to stations which are 53 or 54 channels removed from the proposed operation.

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SEARCH PARAMETERS

FM Database Date: 140421

Channel: 289A 105.7 MHz

Page 1

Latitude: 43 5 48

Longitude: 87 54 18

Safety Zone: 50 km

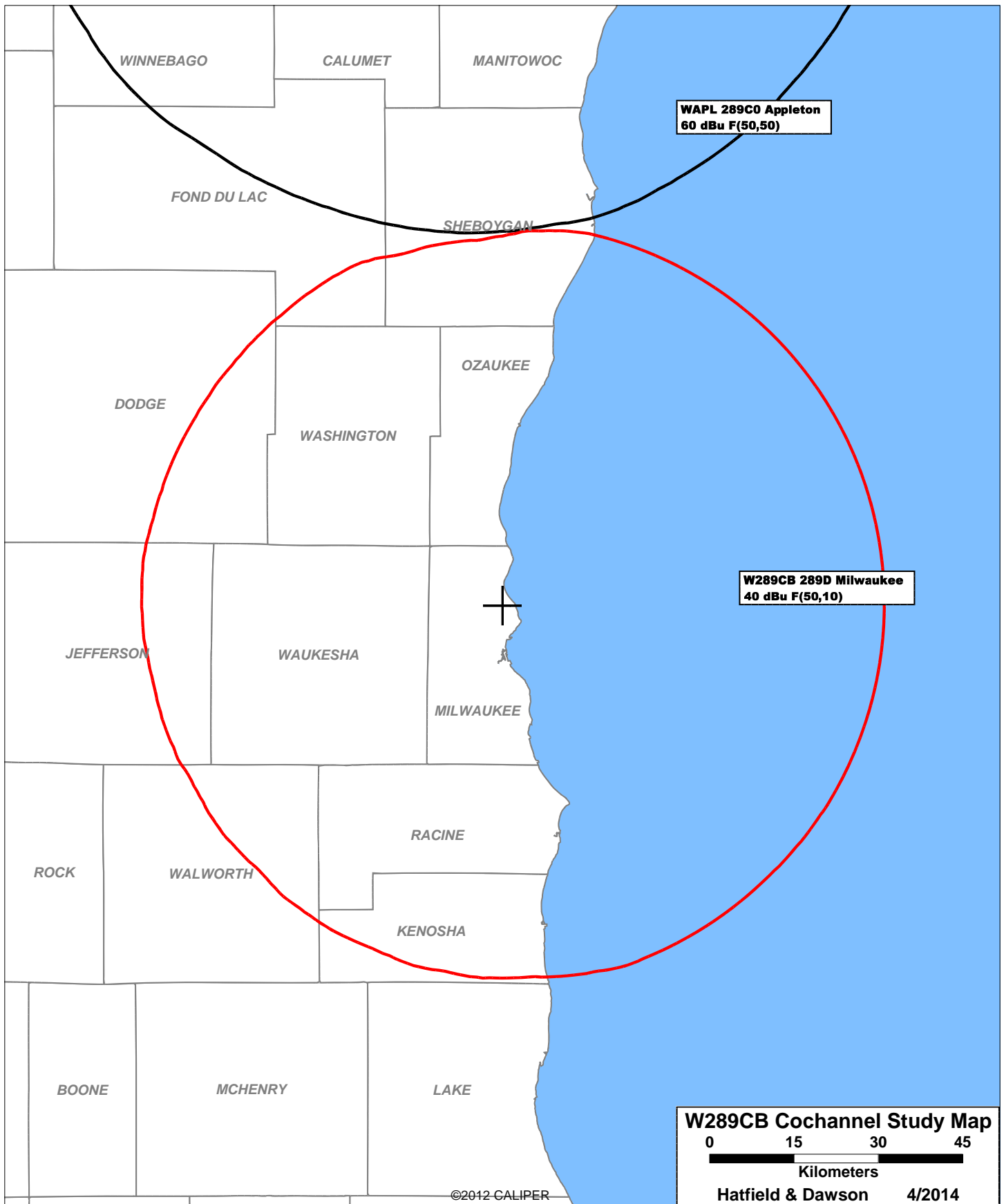
Job Title: W289CB ON ASR 1045308

Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
WIIL LIC	UNION GROVE WI	BLH-00402ACK	236B 95.1	50.000 117.0	42-33-10 087-53-38	179.1	60.43 45.43	15 CLEAR
W286CR CP	PLYMOUTH WI	BNPFT-30823AAN	286D 105.1	0.010 85.0	43-45-18 087-58-06	356.0	73.32 0.00	0 TRANS
W286CO CP	PORT WASHINGTON WI	BNPFT-30829AGR	286D 105.1	0.055 66.0	43-23-11 087-55-10	357.9	32.21 0.00	0 TRANS
WLVE LIC	MUKWONAGO WI	BMLD-80208AEO	287A 105.3	1.650 193.0	42-58-05 088-11-20	238.3	27.19 -3.81	31 SHORT
W287CI CP	SHEBOYGAN WI	BNPFT-30823ACL	287D 105.3	0.038 86.0	43-45-56 087-45-59	8.5	75.16 0.00	0 TRANS
WZSR LIC	WOODSTOCK IL	BLH-971117KC	288A 105.5	1.600 DA 173.0	42-15-34 088-21-45	202.0	100.28 28.28	72 CLEAR
WZSRaux LIC	WOODSTOCK IL	BXLH-30724ACR	288A 105.5	1.200 148.0	42-15-30 088-21-48	202.1	100.42 0.00	0 AUX
W288CZ CP	BEAVER DAM WI	BNPFT-30827AAL	288D 105.5	0.170 35.0	43-27-39 088-49-17	298.9	84.68 0.00	0 TRANS
W289AB LIC	ROCKFORD IL	BLFT-921007TC	289D 105.7	0.055 73.0	42-16-01 089-05-05	226.7	133.58 0.00	0 TRANS
WSRW-FM LIC	GRAND RAPIDS MI	BLH-71129AJD	289B 105.7	265.000 177.0	42-39-17 085-31-38	103.4	200.39 22.39	178 CLEAR
WSRWaux LIC	GRAND RAPIDS MI	BXLH-50303ADJ	289B 105.7	99.000 177.0	42-44-14 085-37-16	101.3	190.71 0.00	0 AUX
WAPL LIC	APPLETON WI	BMLH-50610AGX	289C0 105.7	100.000 358.0	44-21-32 087-59-07	357.4	140.39 -74.61	215 SHORT
WAPLaux LIC	APPLETON WI	BXLH-00930AKA	289C0 105.7	26.000 133.0	44-15-37 088-22-00	344.1	134.54 0.00	0 AUX
WAPLaux LIC	APPLETON WI	BLH-980130KA	289C0 105.7	29.000 126.0	44-15-37 088-22-00	344.1	134.54 0.00	0 AUX

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SEARCH PARAMETERS                               FM Database Date: 140421
Channel: 289A    105.7 MHz                      Page    2
Latitude:  43  5 48
Longitude:  87 54 18
Safety Zone:  50 km
Job Title: W289CB ON ASR 1045308
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Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
W289CB	MILWAUKEE		289D	0.200	43-05-46	132.4	0.09	0
CP MOD	WI	BMPFT-40221ACB	105.7	279.0	087-54-15		0.00	TRANS
WCFS-FM	ELMWOOD PARK		290B	4.100	41-52-44	170.6	137.07	113
LIC	IL	BMLH-11101AAC	105.9	482.0	087-38-08		24.07	CLEAR
WCFSaux	ELMWOOD PARK		290B	25.100 DA	41-56-17	174.4	129.32	0
LIC	IL	BXLH-50427AAI	105.9	147.6	087-45-04		0.00	AUX
WWHG	EVANSVILLE		290A	1.700	42-43-38	249.9	117.29	72
LIC	WI	BLH-00712AAF	105.9	147.0	089-15-02	SS	45.29	CLEAR
WMILaux	WAUKESHA		291B	15.000	43-05-24	228.4	1.12	0
LIC	WI	BXLH-01115DLM	106.1	100.0	087-54-55		0.00	AUX
WMILaux	WAUKESHA		291B	12.000	43-05-46	132.4	0.09	0
LIC	WI	BXLH-30530AKT	106.1	122.0	087-54-15		0.00	AUX
WMIL-FM	WAUKESHA		291B	12.000	43-05-46	132.4	0.09	69
LIC	WI	BLH-70606ABQ	106.1	304.0	087-54-15		-68.91	SHORT

===== END OF FM SPACING STUDY FOR CHANNEL 289 =====



WAPL 289C0 Appleton
60 dBu F(50,50)

W289CB 289D Milwaukee
40 dBu F(50,10)

W289CB Cochannel Study Map

0 15 30 45

Kilometers

Hatfield & Dawson 4/2014

W289CB Free Space Interference Area Calculator

Interference Area to WLVE

Antenna Height: 290 meters AGL
 Contour Level: 100 dBu equals 0.1 V/m
 ERP in Watts: 240 Watts

Maximum distance
 to interfering contour is: 3563.1 feet equals 1086.0 meters

Antenna: 6813-3-SS

Depression Angle (degrees)	Shively 6813-3-SS Relative Field	Adjusted ERP (Watts)	Free Space Distance To 100 dBu Contour Along the depression angle	Horizontal Distance (meters)	Contour AGL (meters)
-90	0.000	0.0	0.0 meters	0	290.0
-89	0.007	0.0	7.4	0.1	282.6
-88	0.013	0.0	14.4	0.5	275.6
-87	0.020	0.1	21.3	1.1	268.7
-86	0.026	0.2	28.1	2.0	262.0
-85	0.032	0.2	34.8	3.0	255.4
-84	0.038	0.3	41.4	4.3	248.8
-83	0.044	0.5	48.0	5.8	242.4
-82	0.050	0.6	54.5	7.6	236.1
-81	0.056	0.8	60.9	9.5	229.8
-80	0.062	0.9	67.3	11.7	223.8
-79	0.068	1.1	73.6	14.0	217.8
-78	0.073	1.3	79.8	16.6	212.0
-77	0.079	1.5	85.9	19.3	206.3
-76	0.085	1.7	91.9	22.2	200.8
-75	0.090	1.9	97.8	25.3	195.6
-74	0.095	2.2	103.5	28.5	190.5
-73	0.100	2.4	109.1	31.9	185.7
-72	0.105	2.7	114.5	35.4	181.1
-71	0.110	2.9	119.7	39.0	176.9
-70	0.115	3.2	124.6	42.6	172.9
-69	0.119	3.4	129.3	46.3	169.3
-68	0.123	3.6	133.7	50.1	166.1
-67	0.127	3.9	137.7	53.8	163.2

(Straight down)

-66	0.130	4.1	141.4	57.5	160.8
-65	0.133	4.3	144.7	61.2	158.9
-64	0.136	4.4	147.5	64.7	157.4
-63	0.138	4.6	149.9	68.0	156.5
-62	0.140	4.7	151.7	71.2	156.1
-61	0.141	4.8	152.9	74.1	156.2
-60	0.141	4.8	153.6	76.8	157.0
-59	0.141	4.8	153.5	79.1	158.4
-58	0.141	4.7	152.7	80.9	160.5
-57	0.139	4.6	151.1	82.3	163.2
-56	0.137	4.5	148.8	83.2	166.7
-55	0.134	4.3	145.5	83.5	170.8
-54	0.130	4.1	141.3	83.1	175.7
-53	0.125	3.8	136.2	82.0	181.2
-52	0.120	3.4	130.0	80.0	187.5
-51	0.113	3.1	122.8	77.3	194.6
-50	0.105	2.7	114.4	73.6	202.3
-49	0.097	2.2	104.9	68.9	210.8
-48	0.087	1.8	94.3	63.1	220.0
-47	0.076	1.4	82.3	56.2	229.8
-46	0.064	1.0	69.2	48.1	240.2
-45	0.050	0.6	54.7	38.7	251.3
-44	0.036	0.3	39.0	28.0	262.9
-43	0.020	0.1	21.9	16.0	275.1
-42	0.003	0.0	3.5	2.6	287.7
-41	0.015	0.1	16.3	12.3	279.3
-40	0.034	0.3	37.3	28.6	266.0
-39	0.055	0.7	59.7	46.4	252.4
-38	0.077	1.4	83.4	65.8	238.6
-37	0.100	2.4	108.4	86.6	224.7
-36	0.124	3.7	134.7	109.0	210.8
-35	0.149	5.3	162.1	132.8	197.0
-34	0.176	7.4	190.7	158.1	183.3
-33	0.203	9.9	220.4	184.9	169.9
-32	0.231	12.8	251.2	213.0	156.9
-31	0.260	16.3	282.9	242.5	144.3
-30	0.290	20.3	315.5	273.2	132.3
-29	0.321	24.8	348.8	305.1	120.9
-28	0.353	29.8	382.9	338.1	110.2
-27	0.384	35.5	417.5	372.0	100.4
-26	0.417	41.7	452.6	406.8	91.6
-25	0.449	48.5	488.1	442.4	83.7
-24	0.482	55.8	523.8	478.5	77.0
-23	0.515	63.7	559.5	515.0	71.4
-22	0.548	72.1	595.2	551.9	67.0
-21	0.581	80.9	630.7	588.8	64.0

-20	0.613	90.2	665.9	625.8	62.2
-19	0.645	99.9	700.6	662.4	61.9
-18	0.676	109.8	734.7	698.7	63.0
-17	0.707	120.0	767.9	734.4	65.5
-16	0.737	130.3	800.3	769.3	69.4
-15	0.766	140.7	831.5	803.2	74.8
-14	0.793	151.0	861.6	836.0	81.6
-13	0.820	161.3	890.2	867.4	89.7
-12	0.845	171.2	917.4	897.3	99.3
-11	0.868	180.9	942.9	925.6	110.1
-10	0.890	190.1	966.7	952.0	122.1
-9	0.910	198.8	988.6	976.4	135.4
-8	0.929	206.9	1008.4	998.6	149.7
-7	0.945	214.3	1026.2	1018.6	164.9
-6	0.959	220.9	1041.9	1036.2	181.1
-5	0.972	226.6	1055.2	1051.2	198.0
-4	0.982	231.3	1066.2	1063.6	215.6
-3	0.990	235.1	1074.9	1073.4	233.7
-2	0.995	237.8	1081.1	1080.4	252.3
-1	0.999	239.4	1084.8	1084.6	271.1
0	1.000	240.0	1086.0	1086.0	290.0

(Horizontal)

April 2014
FM Translator W289CB
Milwaukee, WI Channel 289D
RF Exposure Study

Facilities Proposed

The proposed operation will be on Channel 289D (105.7 MHz) with an effective radiated power of 240 watts. Operation is proposed with an antenna to be mounted on an existing tower with FCC Antenna Structure Registration Number 1045308.

RF Exposure Calculations

OET Bulletin 65 Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields (Edition 97-01) states in part that:

When performing an evaluation for compliance with the FCC's RF guidelines all significant contributors to the ambient RF environment should be considered. . . For purposes of such consideration, significance can be taken to mean any transmitter producing more than 5% of the applicable exposure limit (in terms of power density or the square of the electric or magnetic field strength) at accessible locations.

As will be demonstrated below, the proposed operation of W289CB will produce less than 5% of the applicable exposure limit for both controlled and uncontrolled environments. Thus, the proposed facility is categorically excluded from the requirement of further study. Therefore, pursuant to §1.1307(b)(3) of the Commission's Rules no calculations are required for the other FM and TV facilities in the vicinity, and precise calculations are made only with regard to the levels from this proposal.

The power density calculations shown below were made using the techniques outlined in OET Bulletin No. 65. "Ground level" calculations in this report have been made at a reference height of 2 meters above ground to provide a worst-case estimate of exposure for persons standing on the ground in the vicinity of the tower. The equation shown below was used to calculate the ground level power density figures from each antenna.

$$S(\mu W / cm^2) = \frac{33.40981 \times AdjERP(Watts)}{D^2}$$

Where: *AdjERP(Watts)* is the maximum lobe effective radiated power times the element pattern factor times the array pattern factor.

D is the distance in meters from the center of radiation to the calculation point.

Ground level power densities have been calculated for locations extending from the base of the tower to a distance of 1000 meters. Values past this point are increasingly negligible.

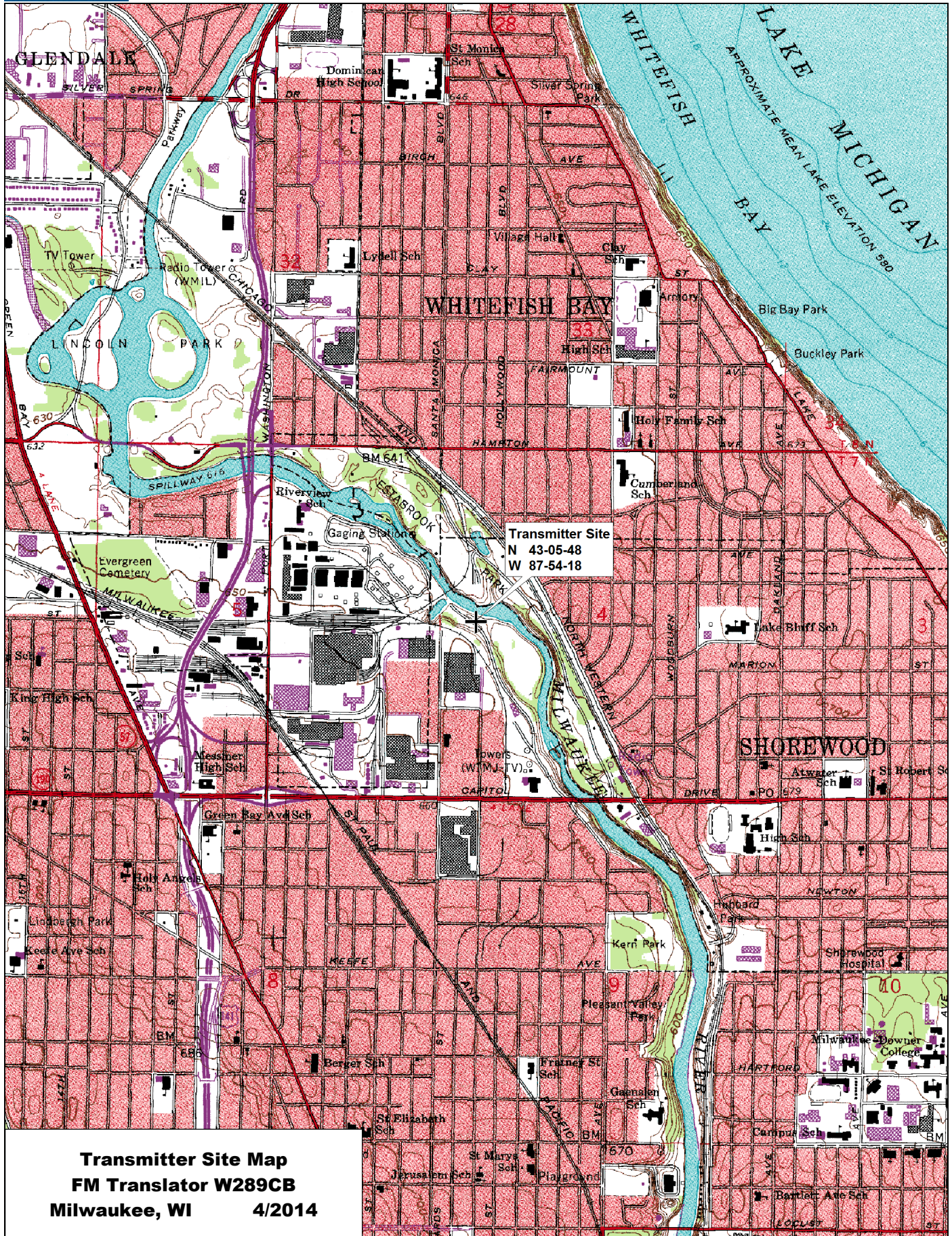
Calculations of the power density produced by the W289CB antenna system have been made assuming that the antenna will radiate 100% power straight down to a point 2 meters above ground

Hatfield & Dawson Consulting Engineers

at the base of the tower (288 meters below the antenna radiation center). Under this worst-case assumption, the highest calculated ground level power density from W289CB occurs at the base of the antenna support structure. At this point the power density is calculated to be $0.2 \mu\text{W}/\text{cm}^2$, which is $<0.1\%$ of $1000 \mu\text{W}/\text{cm}^2$ (the FCC standard for controlled environments) and $<0.1\%$ of $200 \mu\text{W}/\text{cm}^2$ (the FCC standard for uncontrolled environments).

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation of W289CB alone is less than 5% of the applicable FCC exposure limit at all locations between 1 and 1000 meters from the base of the antenna support structure. Section 1.1307(b)(3) of the Commission's Rules excludes applications for new facilities or modifications to existing facilities from the requirement of preparing an environmental assessment when the calculated emissions from the applicants proposed facility are predicted to be less than 5% of the applicable FCC exposure limit. Therefore, the proposed facility is in compliance with Section 1.1301 *et seq* and no further analysis of RF exposure at this site is required in this application.

The permittee/licensee in coordination with other users of the site must reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency radiation in excess of FCC guidelines.



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