

# ***APPLICATION FOR MODIFICATION OF CONSTRUCTION PERMIT***

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WCXP-LP - CHICAGO, ILLINOIS  
FACILITY ID: 192383  
FILE NO: BMPL-20150630ABC

CHICAGO INDEPENDENT RADIO PROJECT

MAY, 2017

## **APPLICATION FOR MODIFICATION OF CONSTRUCTION PERMIT**

The following engineering statement and attached exhibits have been prepared for **Chicago Independent Radio Project** ("CHIRP"), permittee of low-power FM station WCXP-LP at Chicago, Illinois, and are in support of their application for modification of construction permit.<sup>1</sup> This application seeks to relocate WCXP-LP from its current authorized site, to different site located approximately 2.5 kilometers from the currently authorized site. The proposed facility described in this application is the second modification to the original construction permit, and has become necessary due to restrictions on the construction of the facility imposed by the City of Chicago.

The proposed facility would be located at the Metropolitan Condominium building at 5320 N. Sheridan Road in Chicago, Illinois. The proposed relocation of WCXP-LP to this address would represent a minor change to both the current construction permit for the facility, and to the original construction permit for WCXP-LP.<sup>2</sup> Exhibit E-1 illustrates all three of the sites, and demonstrates that the site location proposed under this application is within 5.6 kilometers of both construction permit sites.

The site elevation at Metropolitan Condominium 178.9 meters (587 feet) above mean sea level. The proposed antenna center of radiation is 71.3 meters (234 feet) above ground level. The antenna center of radiation elevation is 10 feet above the highest point of the building, which is the mechanical penthouse. The average terrain for the site location is determined through the values in the following table.

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<sup>1</sup> The Facility ID for WCXP-LP at Chicago, Illinois is 192383.

<sup>2</sup> The current construction permit for WCXP-LP is under FCC File No. BMPL-20150630ABC. The original construction permit was under FCC File No. BNPL-20131112ALF.

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<b>Azimuth</b>	<b>Average Elevation</b>	<b>COR Above Average Terrain</b>
180	180.8	69.4
225	184.8	65.4
270	189.0	61.2
315	187.6	62.6
	Average:	64.7

Only azimuths between 180 and 315 degrees true are considered due to the procedures described in Sections 73.813 and 73.313(d)(2) of the Commission's Rules. Exhibit E-2 illustrates the site location, the eight cardinal radials, and demonstrates that the cardinal radials with azimuths of 0 degrees through 135 degrees true extend over Lake Michigan in the 3 to 16 kilometer segment. The proposed center of radiation is therefore located at 64.7 meters above average terrain. This elevation reduces the effective radiated power for the facility to 21 Watts to achieve a 60 dBu contour radius of 5.6 kilometers. The ERP of the facility is further reduced to 18 Watts due to second adjacent interference considerations.

Exhibit E-3 is a single channel spacing study for the proposed facility. This study demonstrates that the proposed facility would be in compliance with the spacing requirements of Section 73.807 of the Commission's Rules to all facilities with the exception of three. Under that section of the rules, the proposed facility would be short spaced to WGCI-FM at Chicago, Illinois, and WPPN(FM) at Des Plaines, Illinois.<sup>3</sup> Both of these facilities are authorized on channels second adjacent to WCXP-LP. A waiver of Section 73.807 with regard to these two facilities is respectfully requested. Additionally, this study also illustrates a short spacing to the construction

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<sup>3</sup> The Facility ID for WGCI-FM at Chicago, Illinois is 51165. The Facility ID for WPPN(FM) at Des Plaines, Illinois is 25053.

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permit for W295CG at Lake Bluff, Illinois.<sup>4</sup> The proposed relocation of WCXP-LP would reduce the short spacing to the W295CG construction permit as is demonstrated in Exhibit E-4.

Although the proposed facility would be short spaced to both of these second adjacent facilities, interference is not predicted to occur in any populated region. Exhibit E-5 illustrates the proposed WCXP-LP transmitter site along with the predicted 69.97 dBu service contour from WPPN and the 87.15 dBu service contour from WGCI-FM. Since the two full power facilities operate on second adjacent channels to WCXP-LP, interference to either would be predicted to occur when the WCXP-LP field strength is at least 40 dB above the field strength of either full-power facility. Specifically interference to WGCI-FM would potentially occur in regions where the WCXP-LP field strength is at least 127.15 dBu to WGCI-FM, and to WPPN when at least 109.97 dBu. The lower of the two interfering field strengths is 109.97 dBu to WPPN, thus demonstrating compliance to that facility will infer compliance to WGCI-FM.

The power density for the interfering field strength is given by the following equation:

$$S = \frac{E^2}{Z_0}$$

In this equation, S represents the calculated power density in Watts per square meter, E is the electric field intensity, and  $Z_0$  is the characteristic impedance of free space of 377 ohms.

The power density is also given by:

$$S = \frac{P}{4\pi R^2}$$

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<sup>4</sup> The Facility ID for W295CG at Lake Bluff, Illinois is 141545. The construction permit for W295CG is under FCC File No. BPFT-20160811AAO. A license application for W295CG has been filed under FCC File No. BLFT-20170414AAC. Subsequent to the submission of this license application, a petition to deny was filed.

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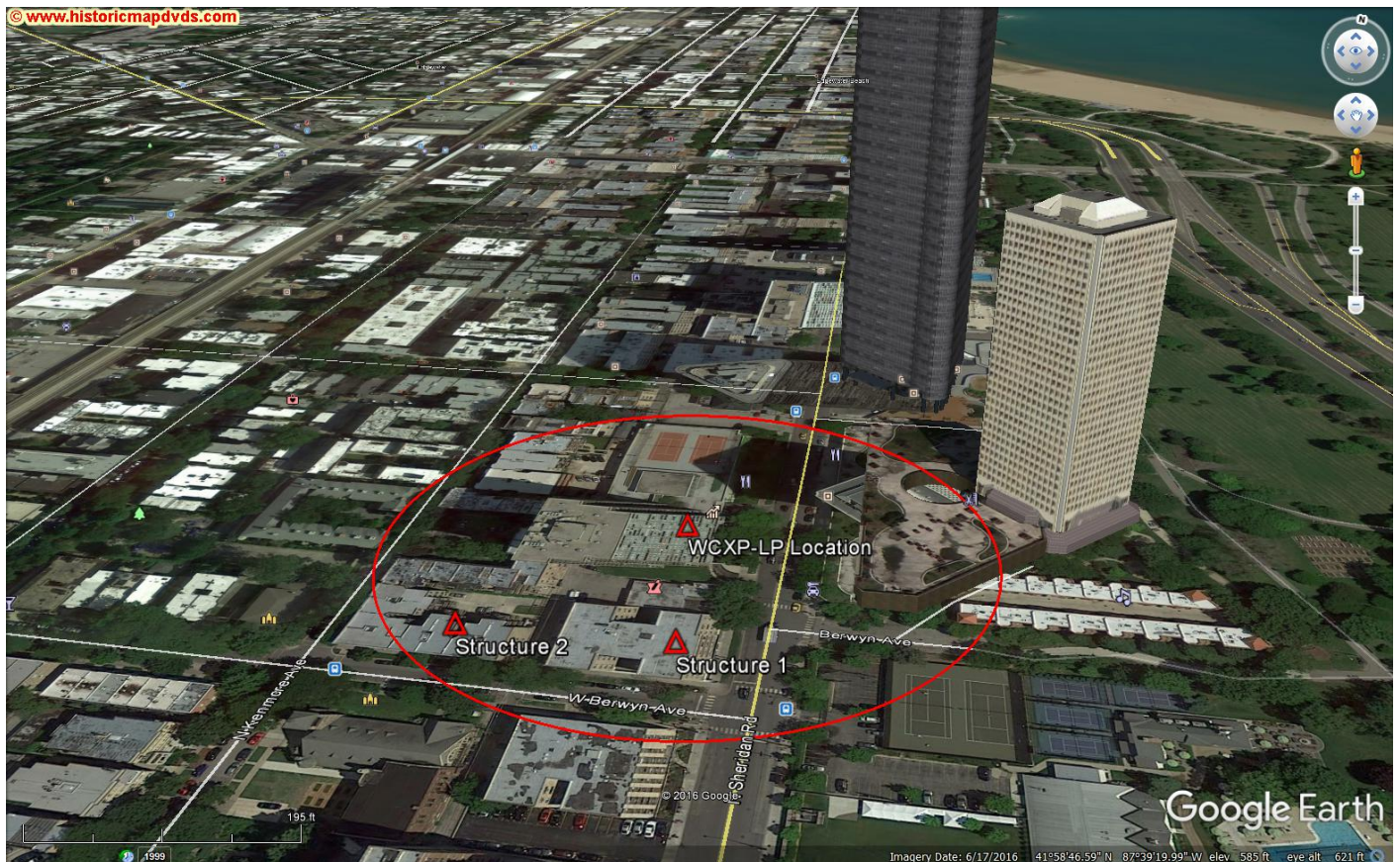
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Where S is the same units, P is the total power in Watts and R is the distance from the antenna. Rearranging the terms in the equation, it can be solved for the distance to the desired power density as follows:

$$R^2 = \frac{P}{4\pi S}$$

The results of these calculations for depression angles of 0 degrees to 90 degrees are tabulated in Exhibit E-6. The listed radii values indicate the region in which interference may potentially occur relative to the center of radiation of the antenna. The following satellite image, panned to an oblique angle, illustrates the vicinity of the WCXP-LP antenna location.



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It should be noted that the antenna for WCXP-LP is to be located on the penthouse of 5320 N. Sheridan, which is the building on the west side of Sheridan Road on which the WCXP marker is indicated. The location indicated by the triangle, however, compensates for the viewing angle at which the satellite image was obtained. Therefore, while the triangle appears to have a location other than at the building penthouse, it is in reality located there.

The red circle on the image represents the 94.43 meter radius from the antenna. This circle is utilized to demonstrate that the interference region does not intersect 5333 N. Sheridan or 5415 N. Sheridan, both of which are taller than 5320 N. Sheridan. All other buildings within the interference region are shorter than 5320 N. Sheridan on which the WCXP-LP antenna is located.

This image also illustrates two structures denoted "Structure 1" and "Structure 2". These are residential buildings within the interference region. The following image illustrates Structure 1 to the left of the street, with an additional structure at the corner of Berwyn and Sheridan on the right side of the street level image. Both of these structures are five stories, and 60 feet (18.3 meters) in height above ground level.<sup>5</sup>

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<sup>5</sup> Note that the interference radius can also be seen in this image.

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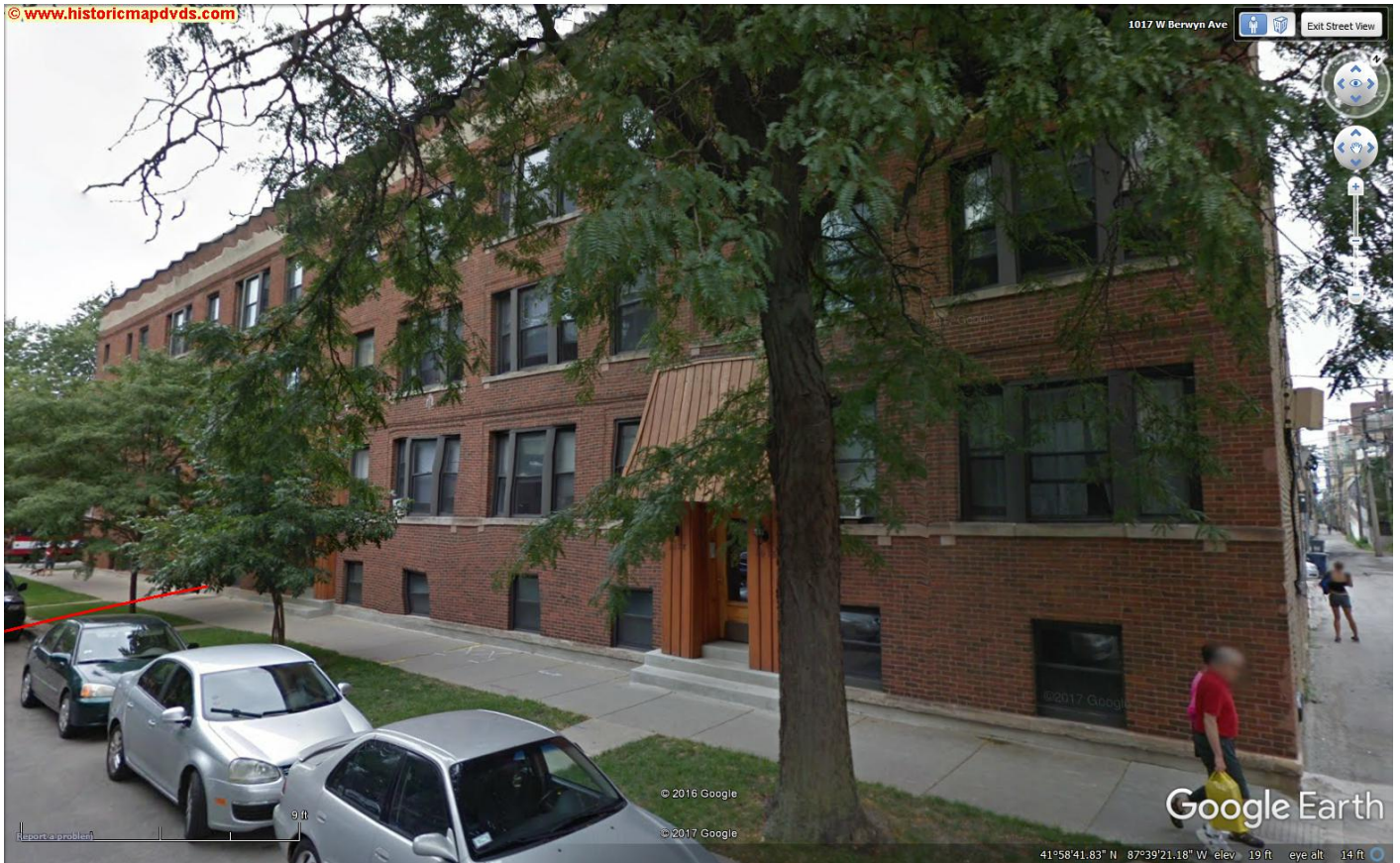
The following street level image depicts the building denoted as Structure 2 on the satellite image. The vantage point for this building is essentially the same as the above street level image. As this second street level image demonstrates, this residential building is four stories, or 48 feet in height (14.6 meters) above ground level.

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In Exhibit E-5, it can be seen that the closest approach to ground elevation of the potential interference region occurs at a depression angle of 48 degrees, where the interference region is 21.4 meters or 70.2 feet above ground level. The interference region therefore is no closer to ground level than 70.2 feet, which is *above* the highest point of any of the structures within the interference region. The interference region therefore is in an uninhabited region of free space, so no interference to populated areas is expected to occur.

The proposed facility complies with the relevant portions of Section 73.827 of the Commission's Rules. Three FM translator stations are authorized within 10 kilometers of the proposed site. Their information, including primary station and delivery method, is summarized in the following table.

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<b>Callsign</b>	<b>Facility ID</b>	<b>City of License</b>	<b>Primary</b>	<b>Primary Channel</b>	<b>Delivery</b>
W216CL	91647	Chicago, IL	WBEZ	218	Other
W268AY	145107	Seward Township, IL	WMBI	AM	Other
W280EM	140763	Chicago, IL	WTMX	270	Other

As this table demonstrates, none of the translators within 10 kilometers of the proposed facility is utilizing an input that is within three channels of the proposed operation.

The proposed facility would not constitute a significant environmental impact, and is exempt from environmental processing. The antenna would utilize a mast to be installed on the existing high-rise structure. The addition of this mast and antenna to the structure would not increase the existing environmental impact already present from the building.

Additionally, the facility will not result in human exposure to radiofrequency radiation in excess of the applicable safety standards. Using *FM* Model, the predicted power density at ground level is  $0.0557 \mu\text{W}/\text{cm}^2$ . At roof level, persons are not permitted to be closer than 2.45 meters from the antenna without the transmitter being powered down. This distance was calculated using the equations in *OET Bulletin 65* assuming the uncontrolled condition upper limit of  $200 \mu\text{W}/\text{cm}^2$ . This region will be appropriately marked and signed.

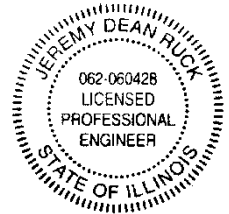
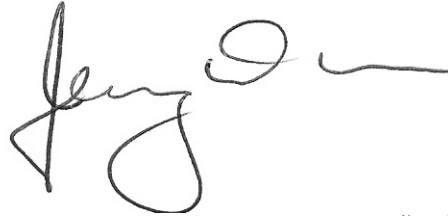
CHIRP certifies that it will coordinate with all other users of the site to ensure that workers and other personnel are not exposed to levels of radiofrequency radiation in excess of the applicable safety standards. Such coordination will include, but is not necessarily limited to, a reduction in transmitter power or cessation of operation.

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The preceding statement and attached exhibits have been prepared by me, or under my direction, and are true and accurate to the best of my belief and knowledge.



Above signature is digitized copy of actual signature  
License Expires November 30, 2015

Jeremy D. Ruck, PE  
May 10, 2017

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**1573557.C**

BNPL20131112ALF  
Latitude: 41-57-20 N  
Longitude: 087-41-34 W  
ERP: 0.10 kW  
Channel: 296  
Frequency: 107.1 MHz  
AMSL Height: 207.0 m  
Horiz. Pattern: Omni  
Vert. Pattern: No  
Prop Model: None

**WCXP-LP.C**

BMPL20150630ABC  
Latitude: 41-57-48 N  
Longitude: 087-40-40 W  
ERP: 0.0443 kW  
Channel: 296  
Frequency: 107.1 MHz  
AMSL Height: 227.0 m  
Horiz. Pattern: Omni  
Vert. Pattern: No  
Prop Model: None

**WCXP-LP.X**

BMPL20150630ABC  
Latitude: 41-58-44 N  
Longitude: 087-39-19.30 W  
ERP: 0.018 kW  
Channel: 296  
Frequency: 107.1 MHz  
AMSL Height: 250.2 m  
Horiz. Pattern: Omni  
Vert. Pattern: No  
Prop Model: None

Exhibit E-1  
Site Location Comparison  
WCXP-LP - Chicago, Illinois  
Chicago Independent Radio Project  
May, 2017

WCPX-LP Current CP  
Transmitter Site

Original CP 5.6 km  
Site Location Radius

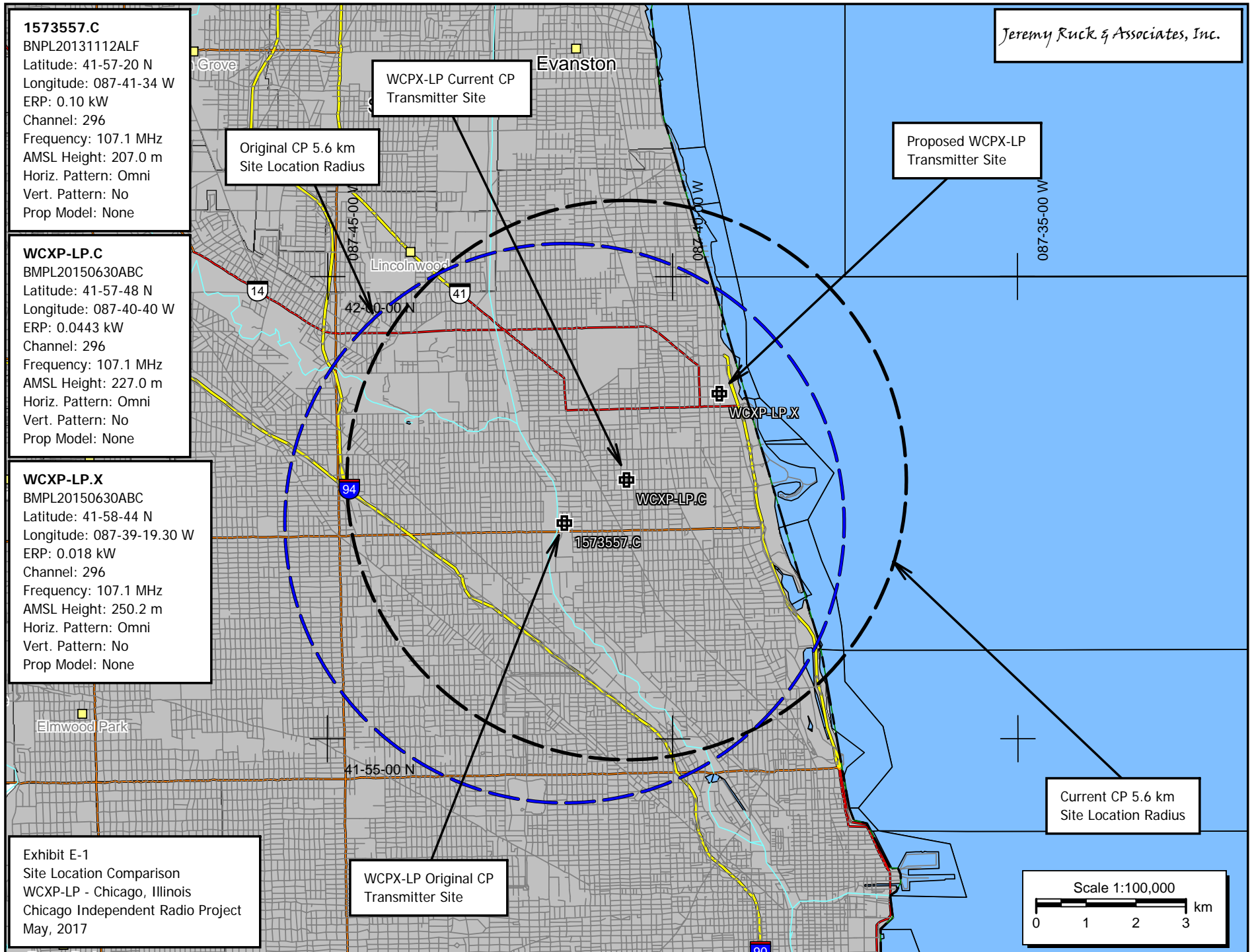
Proposed WCPX-LP  
Transmitter Site

*Jeremy Ruck & Associates, Inc.*

Current CP 5.6 km  
Site Location Radius

WCPX-LP Original CP  
Transmitter Site

Scale 1:100,000  
0 1 2 3 km



**WCXP-LP.X**

BMPL20150630ABC

Latitude: 41-58-44 N

Longitude: 087-39-19.30 W

ERP: 0.018 kW

Channel: 296

Frequency: 107.1 MHz

AMSL Height: 250.2 m

Horiz. Pattern: Omni

Vert. Pattern: No

Prop Model: None

WCXP-LP 3 km

Site Location Radius

*Jeremy Ruck & Associates, Inc.*

WCXP-LP 16 km

Site Location Radius

WCXP 34 dBu  
F(50,10) Contour**Exhibit E-2**

Illustration of HAAT Determination

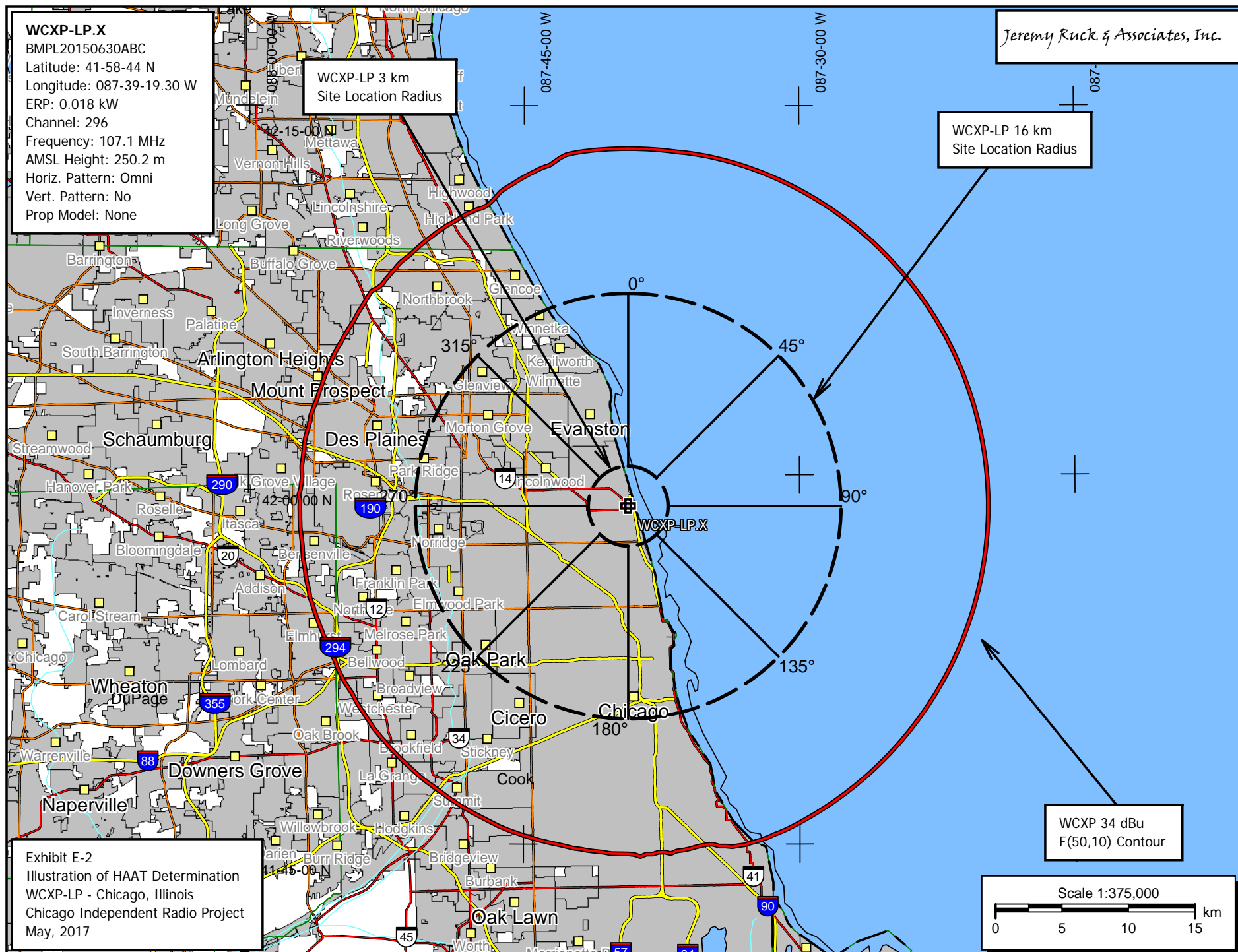
WCXP-LP - Chicago, Illinois

Chicago Independent Radio Project

May, 2017

Scale 1:375,000

0 5 10 15 km





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Consulting Engineers - Canton, Illinois  
Exhibit E-3 - Single Channel Spacing Study  
WCXP-LP - Chicago, Illinois

REFERENCE		DISPLAY DATES
41 58 44.0 N.	CLASS = L1	DATA 05-05-17
87 39 19.3 W.	Current Spacings to 2nd Adj.	SEARCH 05-05-17
----- Channel 296 - 107.1 MHz -----		

Call	Channel	Location	Azi	Dist	FCC	Margin
WGCI-FM	LIC 298B	Chicago	IL 171.6	11.22	66.5	-55.3
WPPN	LIC 294B	Des Plaines	IL 303.2	32.28	66.5	-34.2
WCXP-LP	CP 296L1	Chicago	IL 227.0	2.53	23.5	-21.0
W295CG	CP -D 296D	Lake Bluff	IL 303.2	32.28	38.5	-6.2
WZVN	LIC-N 296A	Lowell	IN 161.1	76.96	66.5	10.5
WSPY-FM	LIC 296A	Plano	IL 245.7	84.05	66.5	17.6
W295CG	LIC-D 295D	Lake Bluff	IL 303.2	32.28	14.5	17.8
W296DA	LIC 296D	Vernon Hills	IL 300.7	60.28	31.5	28.8
WIRX	LIC 296A	St. Joseph	MI 84.0	106.90	66.5	40.4

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All separation margins include rounding

**W295CG.C**

BPFT20160811AAO  
Latitude: 42-08-14 N  
Longitude: 087-58-57 W  
ERP: 0.25 kW  
Channel: 296  
Frequency: 107.1 MHz  
AMSL Height: 332.0 m  
Horiz. Pattern: Directional  
Vert. Pattern: No  
Prop Model: None

**WCXP-LP.C**

BMPL20150630ABC  
Latitude: 41-57-48 N  
Longitude: 087-40-40 W  
ERP: 0.0443 kW  
Channel: 296  
Frequency: 107.1 MHz  
AMSL Height: 227.0 m  
Horiz. Pattern: Omni  
Vert. Pattern: No  
Prop Model: None

**WCXP-LP.X**

BMPL20150630ABC  
Latitude: 41-58-44 N  
Longitude: 087-39-19.30 W  
ERP: 0.018 kW  
Channel: 296  
Frequency: 107.1 MHz  
AMSL Height: 250.2 m  
Horiz. Pattern: Omni  
Vert. Pattern: No  
Prop Model: None

**Exhibit E-4**

Site Location Comparison  
WCXP-LP - Chicago, Illinois  
Chicago Independent Radio Project  
May, 2017

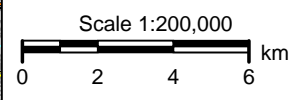
W295CG CP  
Transmitter Site

Jeremy Ruck & Associates, Inc.

WCXP-LP CP Site  
31.8 km Radius

WCXP-LP CP  
Transmitter Site

WCXP-LP Proposed  
Transmitter Site



**WCXP-LP.X**

BMPL20150630ABC  
Latitude: 41-58-44 N  
Longitude: 087-39-19.30 W  
ERP: 0.021 kW  
Channel: 296  
Frequency: 107.1 MHz  
AMSL Height: 250.2 m  
Horiz. Pattern: Omni  
Vert. Pattern: No  
Prop Model: None

*Jeremy Ruck & Associates, Inc.*

WPPN 69.97 dBu  
F(50,50) Contour

**FCC F(50-50) 69.97 dBu (FCC HAAT)**

Proposed WCXP-LP  
Transmitter Site

**FCC F(50-50) 87.15 dBu (FCC HAAT)**

WCXP-LP.X

WGCI-FM 87.15 dBu  
F(50,50) Contour

Exhibit E-5  
Interference Study  
WCXP-LP - Chicago, Illinois  
Chicago Independent Radio Project  
May, 2017

Scale 1:50,000

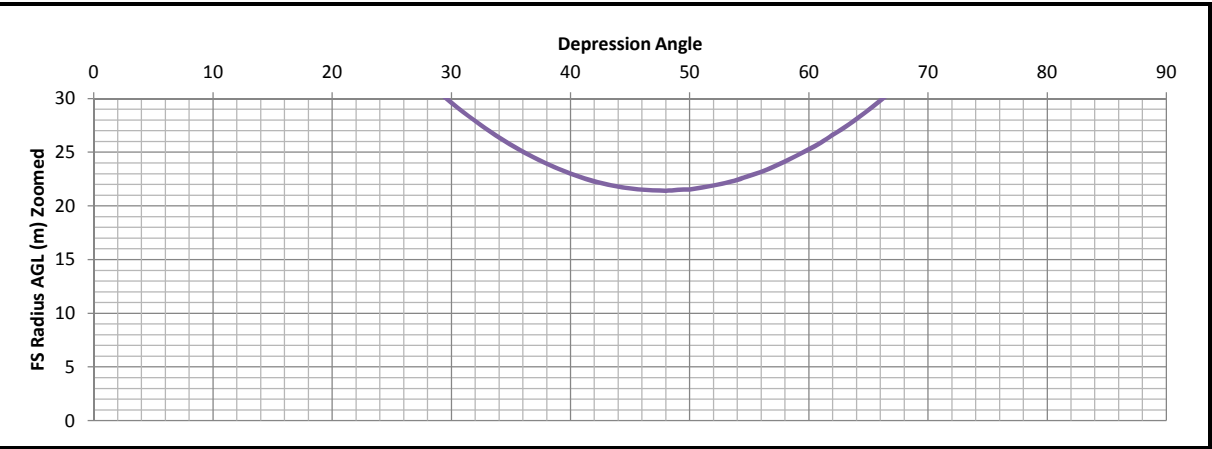
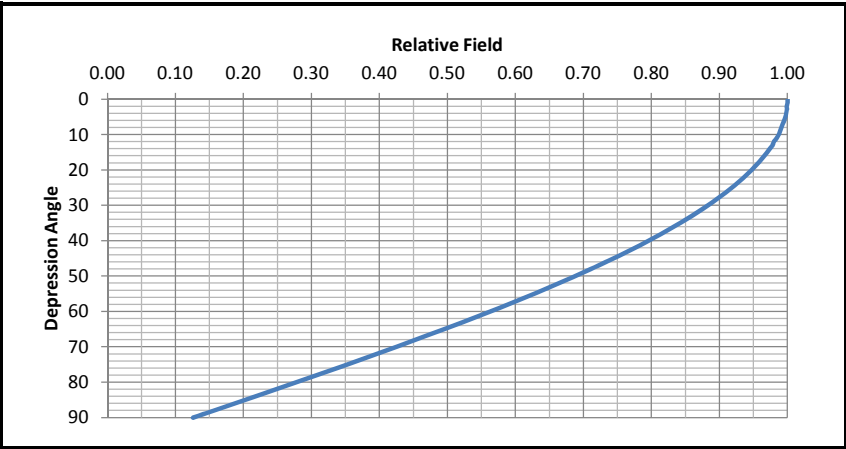


Exhibit E-5

Proximity Interference Analysis

WCXP-LP - Chicago, Illinois

Antenna No:	149	⬆	⬆	Center of Radiation:	71.3 m AGL
Manufacturer:	ERI	⬆	⬆	Effective Radiated Power:	18 Watts
Model:	LPX-1			FS Contour:	109.97 dBu
Number of Bays:	1			E Field Strength:	0.31514 V/m
Bay Spacing:	Lambda			Z0:	377 Ohms
				Power Density:	0.000263426 W/m^2



Depression Angle	Relative Field	Relative Power	ERP Watts	Radii in meters			
				Field Strength	Horizontal	Vertical	AGL
0	1.0000	1.0000	18.00	94.43	94.43	0.00	71.30
1	1.0000	1.0000	18.00	94.43	94.42	1.65	69.65
2	0.9990	0.9980	17.96	94.34	94.28	3.29	68.01
3	0.9990	0.9980	17.96	94.34	94.21	4.94	66.36
4	0.9980	0.9960	17.93	94.24	94.01	6.57	64.73
5	0.9970	0.9940	17.89	94.15	93.79	8.21	63.09
6	0.9950	0.9900	17.82	93.96	93.45	9.82	61.48
7	0.9930	0.9860	17.75	93.77	93.07	11.43	59.87
8	0.9910	0.9821	17.68	93.58	92.67	13.02	58.28
9	0.9890	0.9781	17.61	93.39	92.24	14.61	56.69
10	0.9870	0.9742	17.54	93.21	91.79	16.18	55.12
11	0.9840	0.9683	17.43	92.92	91.21	17.73	53.57
12	0.9800	0.9604	17.29	92.54	90.52	19.24	52.06
13	0.9780	0.9565	17.22	92.36	89.99	20.78	50.52
14	0.9740	0.9487	17.08	91.98	89.25	22.25	49.05
15	0.9700	0.9409	16.94	91.60	88.48	23.71	47.59
16	0.9660	0.9332	16.80	91.22	87.69	25.14	46.16
17	0.9620	0.9254	16.66	90.84	86.88	26.56	44.74
18	0.9570	0.9158	16.49	90.37	85.95	27.93	43.37
19	0.9520	0.9063	16.31	89.90	85.00	29.27	42.03
20	0.9470	0.8968	16.14	89.43	84.03	30.59	40.71
21	0.9420	0.8874	15.97	88.96	83.05	31.88	39.42
22	0.9360	0.8761	15.77	88.39	81.95	33.11	38.19
23	0.9310	0.8668	15.60	87.92	80.93	34.35	36.95
24	0.9240	0.8538	15.37	87.26	79.71	35.49	35.81
25	0.9180	0.8427	15.17	86.69	78.57	36.64	34.66
26	0.9120	0.8317	14.97	86.12	77.41	37.75	33.55
27	0.9050	0.8190	14.74	85.46	76.15	38.80	32.50
28	0.8980	0.8064	14.52	84.80	74.87	39.81	31.49
29	0.8900	0.7921	14.26	84.05	73.51	40.75	30.55
30	0.8830	0.7797	14.03	83.38	72.21	41.69	29.61
31	0.8750	0.7656	13.78	82.63	70.83	42.56	28.74
32	0.8670	0.7517	13.53	81.87	69.43	43.39	27.91
33	0.8590	0.7379	13.28	81.12	68.03	44.18	27.12
34	0.8510	0.7242	13.04	80.36	66.62	44.94	26.36
35	0.8420	0.7090	12.76	79.51	65.13	45.61	25.69
36	0.8330	0.6939	12.49	78.66	63.64	46.24	25.06
37	0.8240	0.6790	12.22	77.81	62.14	46.83	24.47
38	0.8150	0.6642	11.96	76.96	60.65	47.38	23.92
39	0.8050	0.6480	11.66	76.02	59.08	47.84	23.46
40	0.7960	0.6336	11.41	75.17	57.58	48.32	22.98
41	0.7860	0.6178	11.12	74.22	56.02	48.70	22.60
42	0.7760	0.6022	10.84	73.28	54.46	49.03	22.27
43	0.7650	0.5852	10.53	72.24	52.83	49.27	22.03
44	0.7550	0.5700	10.26	71.30	51.29	49.53	21.77
45	0.7440	0.5535	9.96	70.26	49.68	49.68	21.62

Depression Angle	Relative Field	Relative Power	ERP Watts	Radii in meters			
				Field Strength	Horizontal	Vertical	AGL
45	0.7440	0.5535	9.96	70.26	49.68	49.68	21.62
46	0.7330	0.5373	9.67	69.22	48.08	49.79	21.51
47	0.7220	0.5213	9.38	68.18	46.50	49.86	21.44
48	0.7110	0.5055	9.10	67.14	44.93	49.90	21.40
49	0.6990	0.4886	8.79	66.01	43.31	49.82	21.48
50	0.6880	0.4733	8.52	64.97	41.76	49.77	21.53
51	0.6760	0.4570	8.23	63.84	40.17	49.61	21.69
52	0.6640	0.4409	7.94	62.70	38.60	49.41	21.89
53	0.6520	0.4251	7.65	61.57	37.05	49.17	22.13
54	0.6400	0.4096	7.37	60.44	35.52	48.89	22.41
55	0.6270	0.3931	7.08	59.21	33.96	48.50	22.80
56	0.6150	0.3782	6.81	58.08	32.48	48.15	23.15
57	0.6020	0.3624	6.52	56.85	30.96	47.68	23.62
58	0.5890	0.3469	6.24	55.62	29.47	47.17	24.13
59	0.5760	0.3318	5.97	54.39	28.01	46.62	24.68
60	0.5630	0.3170	5.71	53.17	26.58	46.04	25.26
61	0.5500	0.3025	5.45	51.94	25.18	45.43	25.87
62	0.5360	0.2873	5.17	50.62	23.76	44.69	26.61
63	0.5230	0.2735	4.92	49.39	22.42	44.01	27.29
64	0.5090	0.2591	4.66	48.07	21.07	43.20	28.10
65	0.4950	0.2450	4.41	46.74	19.76	42.36	28.94
66	0.4810	0.2314	4.16	45.42	18.47	41.50	29.80
67	0.4670	0.2181	3.93	44.10	17.23	40.59	30.71
68	0.4530	0.2052	3.69	42.78	16.02	39.66	31.64
69	0.4390	0.1927	3.47	41.46	14.86	38.70	32.60
70	0.4250	0.1806	3.25	40.13	13.73	37.71	33.59
71	0.4110	0.1689	3.04	38.81	12.64	36.70	34.60
72	0.3960	0.1568	2.82	37.40	11.56	35.57	35.73
73	0.3820	0.1459	2.63	36.07	10.55	34.50	36.80
74	0.3670	0.1347	2.42	34.66	9.55	33.31	37.99
75	0.3520	0.1239	2.23	33.24	8.60	32.11	39.19
76	0.3370	0.1136	2.04	31.82	7.70	30.88	40.42
77	0.3230	0.1043	1.88	30.50	6.86	29.72	41.58
78	0.3080	0.0949	1.71	29.09	6.05	28.45	42.85
79	0.2930	0.0858	1.55	27.67	5.28	27.16	44.14
80	0.2780	0.0773	1.39	26.25	4.56	25.85	45.45
81	0.2630	0.0692	1.25	24.84	3.89	24.53	46.77
82	0.2480	0.0615	1.11	23.42	3.26	23.19	48.11
83	0.2330	0.0543	0.98	22.00	2.68	21.84	49.46
84	0.2170	0.0471	0.85	20.49	2.14	20.38	50.92
85	0.2020	0.0408	0.73	19.08	1.66	19.00	52.30
86	0.1870	0.0350	0.63	17.66	1.23	17.62	53.68
87	0.1720	0.0296	0.53	16.24	0.85	16.22	55.08
88	0.1570	0.0246	0.44	14.83	0.52	14.82	56.48
89	0.1410	0.0199	0.36	13.32	0.23	13.31	57.99
90	0.1260	0.0159	0.29	11.90	0.00	11.90	59.40

