

APPLICATION FOR MODIFICATION OF CONSTRUCTION PERMIT

WXCP-LP - CHICAGO, ILLINOIS
FACILITY ID: 192383
FILE NO: BNPL-20131112ALF

CHICAGO INDEPENDENT RADIO PROJECT

JUNE, 2015

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.¹ This application seeks to relocate WCXP-LP from its current authorized site, to a different site approximately 1.5 kilometers from the current site.

The antenna for the proposed facility would be located atop the high-rise structure at 4500 N. Winchester in Chicago, Illinois. The proposed relocation would constitute a minor change to the existing construction permit. Exhibit E-1 illustrates the authorized and proposed antenna locations, and demonstrates that the spacing between these two locations is less than 5.6 kilometers.

The site elevation at this structure is 183 meters above mean sea level. The proposed antenna center of radiation is 44 meters above ground, or 227 meters above mean sea level. Average terrain for the site is determined through the values in the following table.

Azimuth	Average Elevation	COR Above Average Terrain
0	181.8	45.4
45	176.0	50.7
90	176.2	50.5
135	176.6	50.1
182	181.4	45.3
225	186.5	40.2
270	190.4	36.3
315	188.5	38.2
	Average:	44.6

¹ The Facility ID for WCXP-LP at Chicago, Illinois is 192383.

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The proposed center of radiation is therefore located at 44.6 meters above average terrain. This elevation above average terrain reduces the maximum effective radiated power of the facility to 44 Watts.

Exhibit E-2 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 two. 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.² 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.

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-3 illustrates the proposed WCXP-LP transmitter site along with the predicted 70.39 dBu service contour from WPPN and the 88.70 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 128.7 dBu, and to WPPN when at least 110.39 dBu. The lower

² 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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of the two interfering field strengths is 110.39 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:

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

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:

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

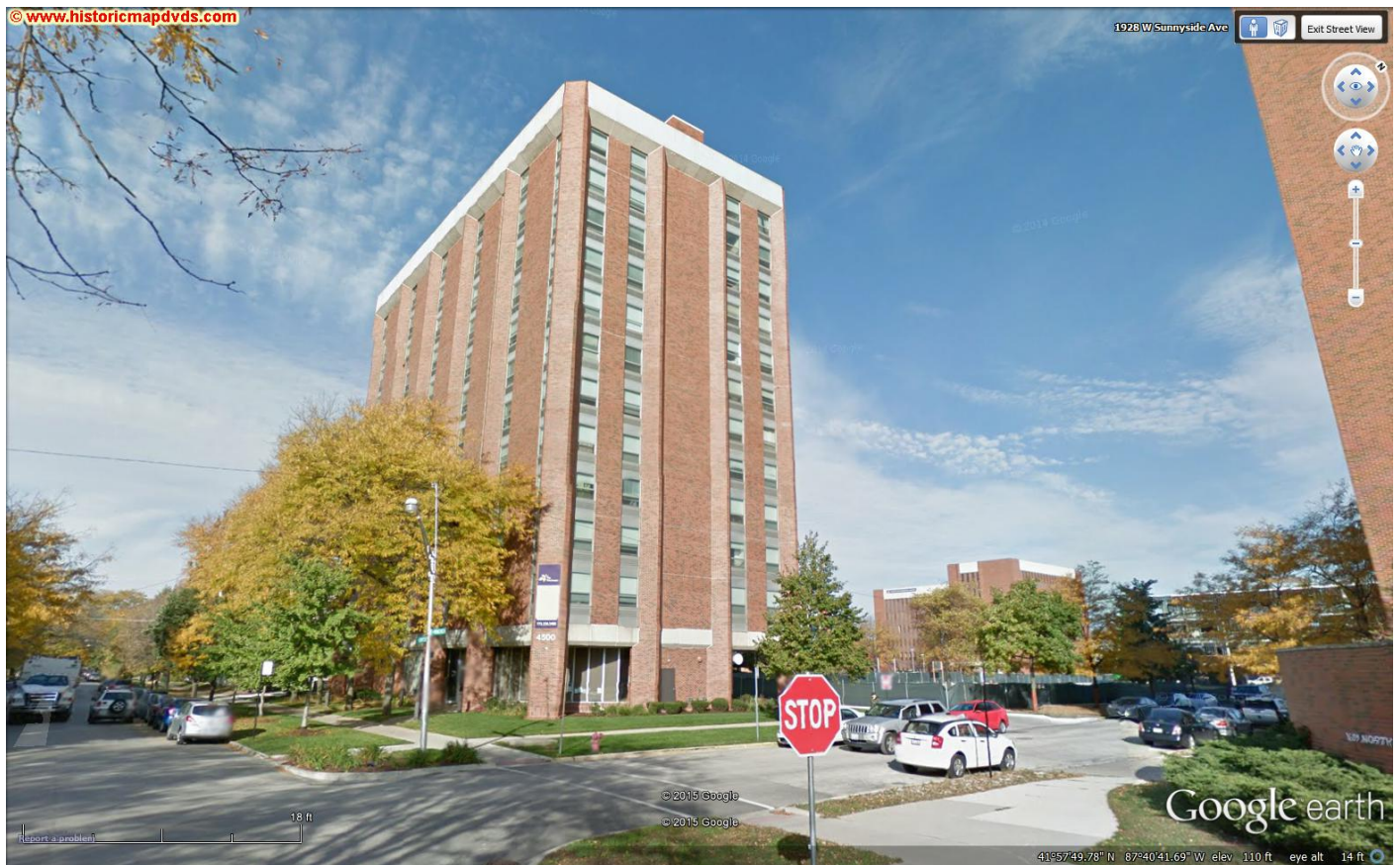
The results of these calculations for depression angles of 0 degrees to 90 degrees are tabulated in Exhibit E-4. The listed radii values indicate the region in which interference may potentially occur relative to the center of radiation of the antenna. As the values and tables indicate, this region is confined to a volume with an elevation of at least 26 meters above ground level. Calculations are based on the use of a specific antenna as indicated in Exhibit E-4. The

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following image street level image illustrates the building on which the WCXP-LP antenna would be mounted.



This building is located at 4500 N. Winchester in Chicago, and is part of the campus of the former Ravenswood Hospital. The main roof level is at 116 feet (35.4 meters) above ground, with a second roof level at 126 feet (38.4 meters), and the final penthouse roof level at 136 feet (41.5 meters) above ground level. The proposed antenna would be secured to a mast tied to this penthouse structure.

In Exhibit E-4, the tabulation demonstrates that the maximum horizontal distance for the potential interference region from the CHIRP antenna is 140.67 meters. This radius is illustrated in the following satellite photograph, along with the indicated location of the CHIRP antenna.

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Due to the height of the building on which the antenna would be located, the only two structures of particular interest are the one directly across Winchester to the east of the CHIRP location, and the structure North-Northwest of the CHIRP location at the red circle. All other structures within the region are of four or fewer stories in height. At four stories in height, their overall heights would be approximately 50 feet (15.2 meters) or less in height. As Exhibit E-4 demonstrates, the predicted interference region exists at an elevation well above that value.

The structure near the north-northwest interference zone radius is a medical office building. It is illustrated in the following street level image. Also visible in this street level image is the 4500 N. Winchester structure where the antenna is to be located to the left of the Ravenswood Professional Building, and a school under construction further to the east. Note that the school is

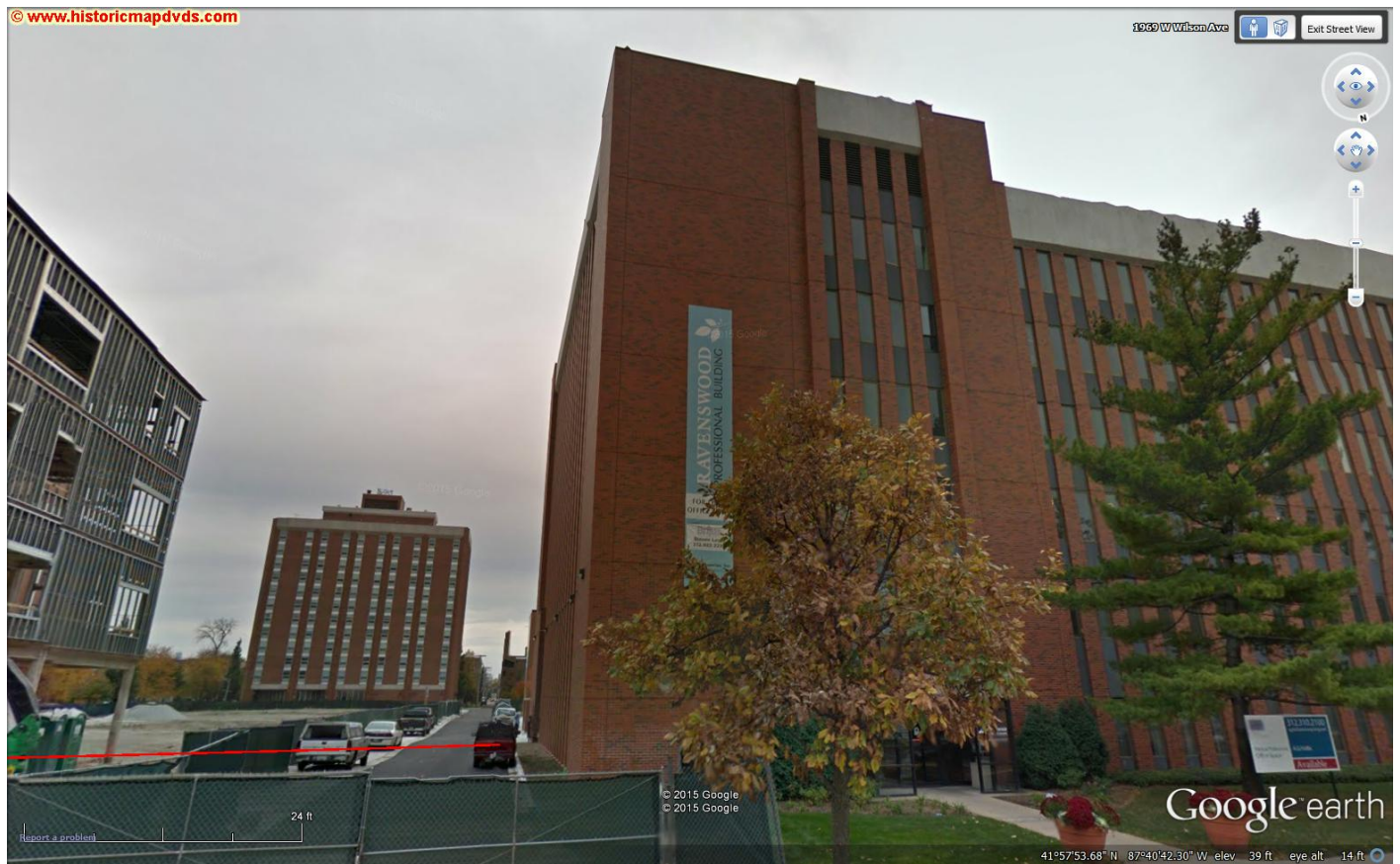
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four stories in height, and the interference region is tangential to its structure, thus it is not impacted.



The Ravenswood Professional Building in the foreground is six stories in height with architectural extensions above the occupied space. The overall height of this structure is therefore 70 feet (21.3 meters) above ground level. As Exhibit E-4 demonstrates, the predicted interference region exists no closer to ground than 26 meters. As a result, any interference that would potentially occur would exist above this structure.

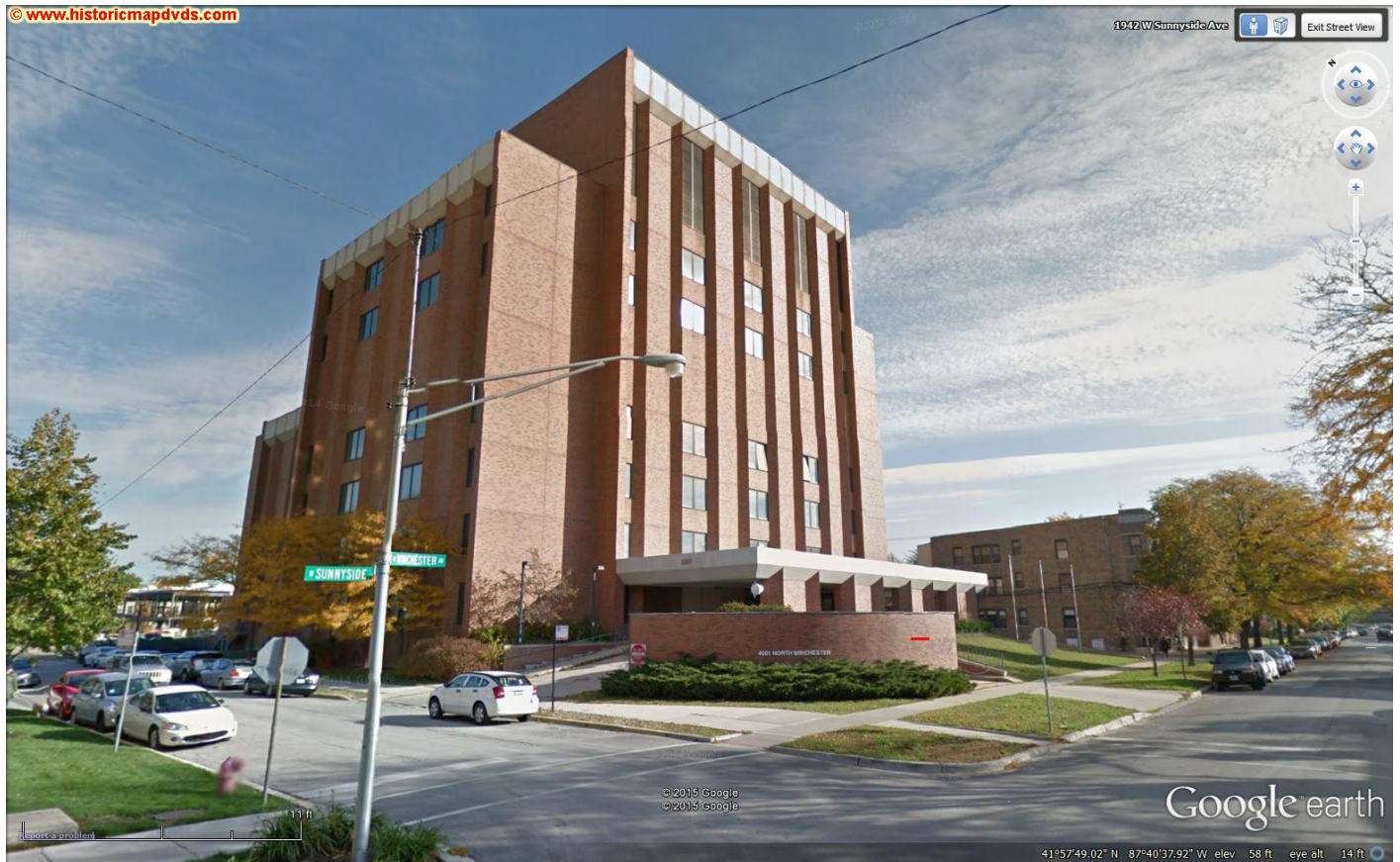
The other structure of consideration is located at 4501 North Winchester, and is directly across the street to the east of the building on which the antenna is to be located. This structure is depicted in the following street level photograph.

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This structure consists of seven and one-half stories of occupied space, with a large mechanical level above the occupied space. This structure was originally part of the now defunct Ravenswood hospital complex, which explains its somewhat odd construction. The upper reaches of the occupied portion of this building exists at approximately 80 feet above ground level. This elevation is 24.4 meters above ground level. Exhibit E-4 previously demonstrated that the interference region would not exist below approximately 26 meters above ground. As a result, none of the residential portions of this structure will be impacted by interference from the proposed CHIRP facility.

The proposed facility complies with the relevant portions of Section 73.827 of the Commission's Rules. Four FM translator stations are authorized within 10 kilometers of the

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proposed site. Their information, including primary station and delivery method, is summarized in the following table.

Callsign	Facility ID	City of License	Primary Station	Primary Channel	Delivery
W217BM	91647	Chicago, IL	WBEZ	218	Other
W244BQ	145323	Park Ridge, IL	KVRT	214	Off-Air ³
W248BB	144731	Hillside, IL	WEBG	238	Off-Air
W246BF	140680	Englewood, IL	WHLP	210	Off-Air

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. Under a worst-case scenario, using the equations in Appendix A of *OET Bulletin 65*, the calculated power density at ground level is no greater than $1.52 \mu\text{W}/\text{cm}^2$. At the roof level, which functions as a controlled environment due to the presence of a wireless telephone site there, approach to the WCXP-LP within 1.7 meters will be restricted due to the calculated power density. This region will be marked as necessary to prevent inadvertent access.

³ Data for W244BQ indicates off-air reception of the primary station, however, KVRT(FM) is licensed to Victoria, Texas, thus it seems somewhat unlikely that KVRT is being received in Chicago with a usable signal. It is respectfully submitted that W244BQ is most likely receiving their programming via satellite delivery.

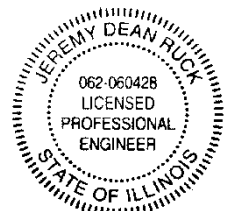
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CHIRP certifies that it will coordinate with all other users of the site to ensure that workers and other personnel are not exposed to levels of radiofrequency radiation in excess of the applicable safety standards. Such coordination will include,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

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
June 25, 2015

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WCXP-LP.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.X
BNPL20131112ALF
Latitude: 41-57-48.40 N
Longitude: 087-40-40 W
ERP: 0.044 kW
Channel: 296
Frequency: 107.1 MHz
AMSL Height: 226.7 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

Exhibit E-1
Site Location Comparison
WCXP-LP - Chicago, Illinois
Chicago Independent Radio Project
June, 2015

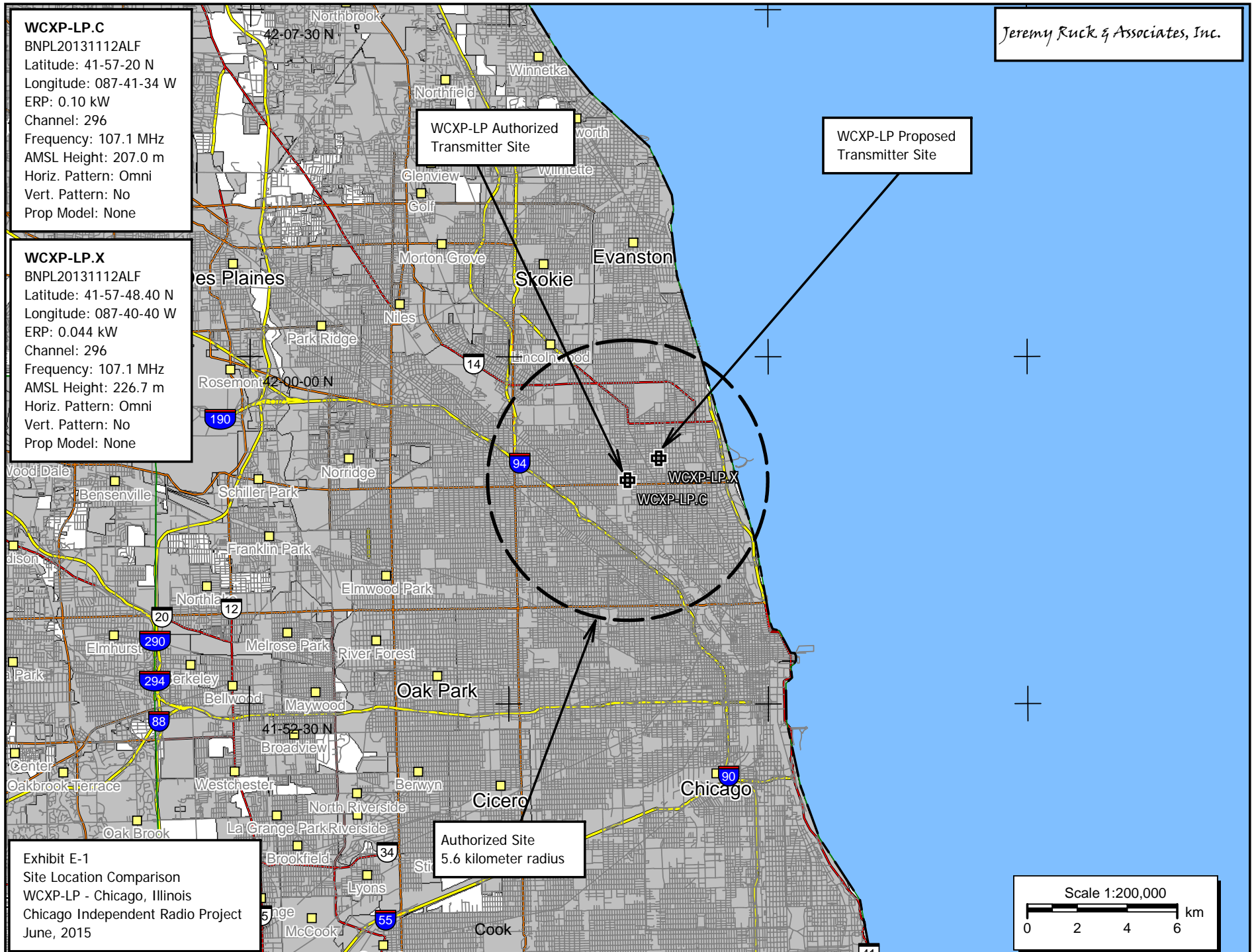
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WCXP-LP Authorized
Transmitter Site

WCXP-LP Proposed
Transmitter Site

Authorized Site
5.6 kilometer radius

Scale 1:200,000
0 2 4 6 km



Jeremy Ruck & Associates, Inc.
Consulting Engineers - Canton, Illinois
Exhibit E-2 - Single Channel Spacing Study
WCXP-LP - Chicago, Illinois

REFERENCE		DISPLAY DATES
41 57 48.4 N.	CLASS = L1	DATA 06-25-15
87 40 40.0 W.	Current Spacings to 2nd Adj.	SEARCH 06-25-15
----- Channel 296 - 107.1 MHz -----		

Call	Channel	Location	Azi	Dist	FCC	Margin
WGCI-FM	LIC 298B	Chicago	IL 159.6	10.02	66.5	-56.5
WPPN	LIC 294B	Des Plaines	IL 307.6	31.76	66.5	-34.7
WCXP-LP	CP 296L1	Chicago	IL 234.7	1.52	23.5	-22.0
WZVN	LIC-N 296A	Lowell	IN 159.3	75.98	66.5	9.5
WSPY-FM	LIC 296A	Plano	IL 246.3	81.66	66.5	15.2
WIRX	LIC 296A	St. Joseph	MI 83.2	108.94	66.5	42.4

All separation margins include rounding

BNPL20131112ALF
Latitude: 41-57-48.40 N
Longitude: 087-40-40 W
ERP: 0.044 kW
Channel: 296
Frequency: 107.1 MHz
AMSL Height: 226.7 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

BLH20010413AAL
Latitude: 41-52-44 N
Longitude: 087-38-08 W
ERP: 3.70 kW
Channel: 298
Frequency: 107.5 MHz
AMSL Height: 653.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

BLH19990818KA
Latitude: 42-08-14 N
Longitude: 087-58-57 W
ERP: 50.00 kW
Channel: 294
Frequency: 106.7 MHz
AMSL Height: 347.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

Exhibit E-3
Interference Study
WCXP-LP - Chicago, Illinois
Chicago Independent Radio Project
June, 2015

WPPN 70.39 dBu
Service Contour

FCC F(50-50) 70.39 dBu (FCC HAAT)

FCC F(50-50) 88.70 dBu (FCC HAAT)

WGCI-FM 88.7 dBu
Service Contour

Scale 1:200,000

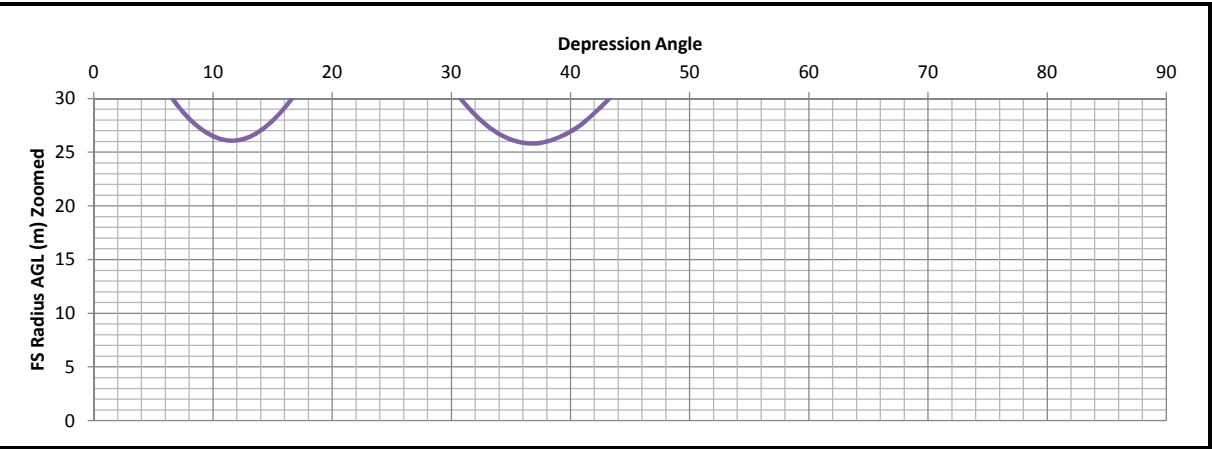
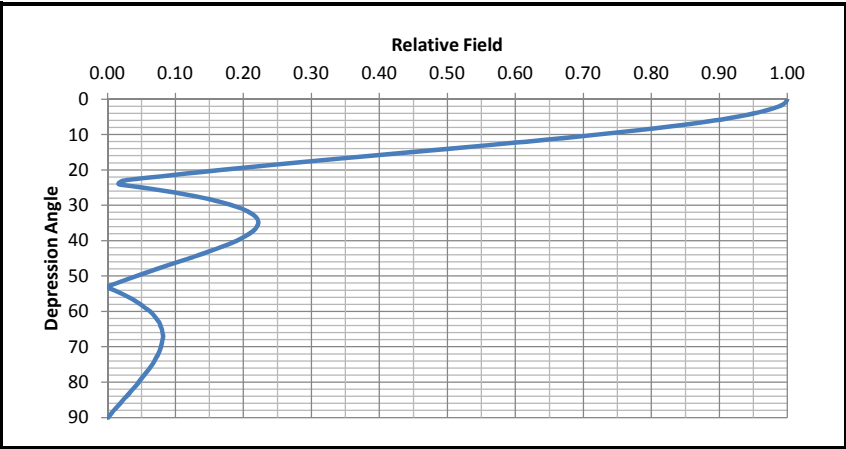
0 2 4 6 km

Exhibit E-4

Proximity Interference Analysis

WCXP-LP - Chicago, Illinois

Antenna No:	63	<div><div></div><div></div><div></div></div>	Center of Radiation:	44.1 m AGL
Manufacturer:	PSI	<div><div></div><div></div><div></div></div>	Effective Radiated Power:	44 Watts
Model:	PSIFML-4/0.625		FS Contour:	110.39 dBu
Number of Bays:	4		E Field Strength:	0.33075 V/m
Bay Spacing:	0.625		Z0 (Ohms):	377 Ohms
			Power Density:	0.000290174 W/m^2



Depression Angle	Relative Field	Relative Power	ERP Watts	Radii in meters			
				Field Strength	Horizontal	Vertical	AGL
0	1.0000	1.0000	44.00	140.67	140.67	0.00	44.10
1	0.9970	0.9940	43.74	140.25	140.23	2.45	41.65
2	0.9880	0.9761	42.95	138.99	138.90	4.85	39.25
3	0.9720	0.9448	41.57	136.74	136.55	7.16	36.94
4	0.9510	0.9044	39.79	133.78	133.46	9.33	34.77
5	0.9250	0.8556	37.65	130.12	129.63	11.34	32.76
6	0.8930	0.7974	35.09	125.62	124.93	13.13	30.97
7	0.8560	0.7327	32.24	120.42	119.52	14.68	29.42
8	0.8150	0.6642	29.23	114.65	113.53	15.96	28.14
9	0.7690	0.5914	26.02	108.18	106.85	16.92	27.18
10	0.7200	0.5184	22.81	101.29	99.75	17.59	26.51
11	0.6690	0.4476	19.69	94.11	92.38	17.96	26.14
12	0.6150	0.3782	16.64	86.51	84.62	17.99	26.11
13	0.5590	0.3125	13.75	78.64	76.62	17.69	26.41
14	0.5020	0.2520	11.09	70.62	68.52	17.08	27.02
15	0.4440	0.1971	8.67	62.46	60.33	16.17	27.93
16	0.3860	0.1490	6.56	54.30	52.20	14.97	29.13
17	0.3290	0.1082	4.76	46.28	44.26	13.53	30.57
18	0.2730	0.0745	3.28	38.40	36.52	11.87	32.23
19	0.2180	0.0475	2.09	30.67	29.00	9.98	34.12
20	0.1660	0.0276	1.21	23.35	21.94	7.99	36.11
21	0.1160	0.0135	0.59	16.32	15.23	5.85	38.25
22	0.0680	0.0046	0.20	9.57	8.87	3.58	40.52
23	0.0240	0.0006	0.03	3.38	3.11	1.32	42.78
24	0.0170	0.0003	0.01	2.39	2.18	0.97	43.13
25	0.0540	0.0029	0.13	7.60	6.88	3.21	40.89
26	0.0880	0.0077	0.34	12.38	11.13	5.43	38.67
27	0.1180	0.0139	0.61	16.60	14.79	7.54	36.56
28	0.1440	0.0207	0.91	20.26	17.89	9.51	34.59
29	0.1660	0.0276	1.21	23.35	20.42	11.32	32.78
30	0.1840	0.0339	1.49	25.88	22.42	12.94	31.16
31	0.1990	0.0396	1.74	27.99	24.00	14.42	29.68
32	0.2090	0.0437	1.92	29.40	24.93	15.58	28.52
33	0.2170	0.0471	2.07	30.53	25.60	16.63	27.47
34	0.2210	0.0488	2.15	31.09	25.77	17.38	26.72
35	0.2220	0.0493	2.17	31.23	25.58	17.91	26.19
36	0.2200	0.0484	2.13	30.95	25.04	18.19	25.91
37	0.2160	0.0467	2.05	30.39	24.27	18.29	25.81
38	0.2090	0.0437	1.92	29.40	23.17	18.10	26.00
39	0.2000	0.0400	1.76	28.13	21.86	17.71	26.39
40	0.1900	0.0361	1.59	26.73	20.47	17.18	26.92
41	0.1780	0.0317	1.39	25.04	18.90	16.43	27.67
42	0.1640	0.0269	1.18	23.07	17.14	15.44	28.66
43	0.1500	0.0225	0.99	21.10	15.43	14.39	29.71
44	0.1350	0.0182	0.80	18.99	13.66	13.19	30.91
45	0.1200	0.0144	0.63	16.88	11.94	11.94	32.16

Depression Angle	Relative Field	Relative Power	ERP Watts	Radii in meters			
				Field Strength	Horizontal	Vertical	AGL
45	0.1200	0.0144	0.63	16.88	11.94	11.94	32.16
46	0.1040	0.0108	0.48	14.63	10.16	10.52	33.58
47	0.0880	0.0077	0.34	12.38	8.44	9.05	35.05
48	0.0720	0.0052	0.23	10.13	6.78	7.53	36.57
49	0.0570	0.0032	0.14	8.02	5.26	6.05	38.05
50	0.0420	0.0018	0.08	5.91	3.80	4.53	39.57
51	0.0280	0.0008	0.03	3.94	2.48	3.06	41.04
52	0.0140	0.0002	0.01	1.97	1.21	1.55	42.55
53	0.0010	0.0000	0.00	0.14	0.08	0.11	43.99
54	0.0100	0.0001	0.00	1.41	0.83	1.14	42.96
55	0.0220	0.0005	0.02	3.09	1.78	2.54	41.56
56	0.0320	0.0010	0.05	4.50	2.52	3.73	40.37
57	0.0410	0.0017	0.07	5.77	3.14	4.84	39.26
58	0.0490	0.0024	0.11	6.89	3.65	5.85	38.25
59	0.0560	0.0031	0.14	7.88	4.06	6.75	37.35
60	0.0630	0.0040	0.17	8.86	4.43	7.68	36.42
61	0.0680	0.0046	0.20	9.57	4.64	8.37	35.73
62	0.0720	0.0052	0.23	10.13	4.76	8.94	35.16
63	0.0760	0.0058	0.25	10.69	4.85	9.53	34.57
64	0.0780	0.0061	0.27	10.97	4.81	9.86	34.24
65	0.0800	0.0064	0.28	11.25	4.76	10.20	33.90
66	0.0810	0.0066	0.29	11.39	4.63	10.41	33.69
67	0.0820	0.0067	0.30	11.54	4.51	10.62	33.48
68	0.0810	0.0066	0.29	11.39	4.27	10.56	33.54
69	0.0800	0.0064	0.28	11.25	4.03	10.51	33.59
70	0.0790	0.0062	0.27	11.11	3.80	10.44	33.66
71	0.0770	0.0059	0.26	10.83	3.53	10.24	33.86
72	0.0750	0.0056	0.25	10.55	3.26	10.03	34.07
73	0.0720	0.0052	0.23	10.13	2.96	9.69	34.41
74	0.0690	0.0048	0.21	9.71	2.68	9.33	34.77
75	0.0660	0.0044	0.19	9.28	2.40	8.97	35.13
76	0.0620	0.0038	0.17	8.72	2.11	8.46	35.64
77	0.0580	0.0034	0.15	8.16	1.84	7.95	36.15
78	0.0540	0.0029	0.13	7.60	1.58	7.43	36.67
79	0.0500	0.0025	0.11	7.03	1.34	6.90	37.20
80	0.0460	0.0021	0.09	6.47	1.12	6.37	37.73
81	0.0420	0.0018	0.08	5.91	0.92	5.84	38.26
82	0.0370	0.0014	0.06	5.20	0.72	5.15	38.95
83	0.0330	0.0011	0.05	4.64	0.57	4.61	39.49
84	0.0280	0.0008	0.03	3.94	0.41	3.92	40.18
85	0.0230	0.0005	0.02	3.24	0.28	3.22	40.88
86	0.0190	0.0004	0.02	2.67	0.19	2.67	41.43
87	0.0140	0.0002	0.01	1.97	0.10	1.97	42.13
88	0.0090	0.0001	0.00	1.27	0.04	1.27	42.83
89	0.0050	0.0000	0.00	0.70	0.01	0.70	43.40
90	0.0010	0.0000	0.00	0.14	0.00	0.14	43.96

