

TECHNICAL EXHIBIT
APPLICATION FOR CONSTRUCTION PERMIT
FM STATION WKRH
FAIR HAVEN, NEW YORK
CH 293A 5.4 KW 100 M

Technical Narrative

The technical exhibit of which this narrative is a part was prepared in support an application for a construction permit for FM station WKRH at Minetto, New York. Station WKRH is currently licensed (BLH-19961106KD) to operate on channel 293A (106.5 MHz) at Minetto with an effective radiated power (ERP) of 5 kilowatts (kW) and an antenna height above average terrain (HAAT) of 100 meters.

The purpose of the instant application is to specify a change in the city of license of WKRH from Minetto, New York to Fair Haven, New York on channel 293A. It is proposed to operate on channel 293A at Fair Haven, New York from an existing tower (ASRN 1006959) with a nondirectional antenna maximum ERP of 5.4 kW and an HAAT of 100 meters. The proposed reallocation to Fair Haven will comply with the Commission's *Rural Radio* policies.¹ The instant application is being filed under the contingent application rule (Section 73.3517(e)], as grant of this application is contingent on the grant of an application for construction permit for WTKV on channel 288A (105.5 MHz) at Oswego, New York to change its city of license to Minetto, New York. The WTKV contingent application is being filed concurrently with this application. The instant application is considered to be a "minor" change in facilities in accordance with Section 73.3573(a)(1)(i) and 73.3573(g). Processing under Section 73.215 is requested with respect to a short-spacing with WBDR on channel 294C3 at Copenhagen, New York.

Response to Paragraph 13 - Allotment

Figure 1 is a separation study for channel 293A operation from the proposed allotment reference site. As

¹ See *Policies to Promote Rural Radio Service to Streamline Allotment and Assignment Procedures*, Second Report and Order, First Order on Reconsideration, and Second Further Notice of Proposed Rule Making, MB Docket No. 09-52 (RM-11528, FCC 11-28, adopted March 3, 2011), and Second Order on Reconsideration, MB Docket 09-52 (RM-11528, FCC 12-127, adopted October 11, 2012) ("Second Order").

shown, the proposed allotment reference site complies with the minimum distance separation requirements of Section 73.207 for Class A operation on channel 293 towards all existing, authorized and proposed stations with the exception of the licensed operation of WKRH. This short-spacing establishes mutual exclusivity pursuant to Section 73.3573(g).

Figure 2 is a map which demonstrates that the proposed allotment reference point complies with the FCC's city coverage requirements (Section 73.315) based on maximum Class A facilities (ERP 6 kW/HAAT 100 m).

Response to Paragraph 16 - Interference

Figure 3 is a separation study for channel 293A operation from the proposed site (ASRN 1006959). As shown, the proposed site complies with the minimum distance separation requirements of Section 73.207 for Class A operation on channel 293 towards all existing, authorized and proposed stations with the exceptions of the licensed operation of WBDR on channel 294C3 at Copenhagen, New York and two (2) vacant Canadian allotments, namely, channel 293C1 at Foymount, Ontario and channel 293A at Brockville, Ontario. It is proposed to utilize the contour protection provisions of Section 73.215 with respect to the WBDR short-spacing. Figure 4 demonstrates that the proposed operation on channel 293A at Fair Haven complies with the contour protection provisions of Section 73.215 with respect to WBDR.² All contour locations were based on the use of the U.S. Geological Survey (U.S.G.S.) 30-second terrain database.

With respect to the short-spacings with the Canadian vacant allotments at Foymount (channel 293C1) and Brockville (channel 293A), it is noted that the current WKRH operation is also short-spaced to these allotments. Figure 5 demonstrates that the proposed operation complies with the provisions of the US-Canadian FM agreement towards the Foymount and Brockville allotments. Specifically, there is no overlap between the proposed 34 dBu, F(50,10) interfering contour and the Foymount 54 dBu, F(50,50) protected contour (86 km circle).

² The distance between the proposed transmitter site and the KATT-FM and KLAU transmitter sites complies with the minimum distance separation requirements of Section 73.215(e).

In addition, there will not be an increase in the existing overlap between WKRH's licensed 34 dBu, F(50,10) interfering contour and the Brockville 54 dBu, F(50,50) protected contour (38 km circle). If necessary, it is requested that instant proposal be specially coordinated with Canada as a short-spaced, limited allotment with respect to the Brockville allotment.

Response to Paragraph 14 - Community Coverage

Compliance with the community coverage requirements of Section 73.315 has been demonstrated by a supplemental showing using an alternative contour prediction method contained in an Attachment (see Exhibit 28).

Response to Paragraph 17 - RFR Hazard Statement

The proposed facilities were evaluated in terms of potential radiofrequency radiation exposure at 2 meters above ground level in accordance with the OST Bulletin No. 65, "Evaluating Compliance With FCC-Specified Guidelines for Human Exposure to Radiofrequency Radiation". This Bulletin provides assistance in determining whether FCC-regulated transmitting facilities, operations or devices comply with limits for human exposure to radiofrequency (RF) electromagnetic fields.

The calculated power density at 2 meters above ground level at the base of the tower was calculated using the appropriate equation contained in the Bulletin. Using a greater than expected vertical relative field value of 0.52 (for angles below 60 degrees downward,) for the proposed 2-bay, 1-wavelength spaced non-directional antenna (see Figure 12), the total ERP of 10.8 kW (H+V) and an antenna center of radiation height above ground level of 79 meters, the calculated power density at two meters above ground level at the base of the tower is 19.3 microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$), or 9.7 percent of the Commission's recommended limit applicable to general population/uncontrolled exposure areas ($200 \mu\text{W}/\text{cm}^2$ for FM channel 293).

However, as this is a multiple-user site shared with FM station WRVO on channel 210B at Oswego, New York, both facilities must be considered in the RFR evaluation. For the WRVO power

density calculation, a greater than expected vertical relative field value of 0.5 (for angles below 60 degrees downward) was used for their directional antenna (Shively 4-bay, 1-wavelength spaced) along with the total ERP of 99.01 kW (H+V) and an antenna center of radiation height above ground level of 110 meters. On this basis, the calculated WRVO power density at two meters above ground level at the base of the tower is 70.9 microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$), or 35.4 percent of the Commission's recommended limit applicable to general population/uncontrolled exposure areas ($200 \mu\text{W}/\text{cm}^2$ for FM channel 210). The summation of the percentages of the ANSI limit for each of the above stations is 45.1%. Since this is less than 100%, the combined power density at 2 meters above ground level will be less than the ANSI recommended limit applicable to general population/uncontrolled exposure areas. Thus, it is believed that the proposed WKRH facility is in full compliance with the FCC's requirements with regard to radio frequency radiation exposure.

Access to the transmitting site will be restricted and appropriately marked with warning signs. Furthermore, as this is a multi-user site, procedures will be in effect in the event that workers or other authorized personnel enter the restricted area to ensure worker safety with respect to radio frequency radiation exposure. Such measures include reducing the average exposure by spreading out the work over a longer period of time, wearing "accepted" RFR protective clothing and/or RFR exposure monitors or scheduling work when the stations are at reduced power or shut down.

Finally, it is noted that this technical exhibit only addresses the potential for radiofrequency electromagnetic field exposure.

Response to Paragraph 18 - Community of License Change -
Section 307(b)

1. Proposal

It is proposed to specify a change in the city of license of WKRH from Minetto, New York to Fair Haven, New York as permitted by the Commission's rules allowing community of license changes by application.

2. City Populations and Local Service

Minetto is a census designated place (CDP) and has a 2010 U.S. Census population of 1,069 persons. Minetto has no other local FM or AM service. However, Minetto will not be deprived of its only aural service as licensed FM station WTKV on channel 288A at Oswego, New York will be reallocated from Oswego to Minetto. Furthermore, Oswego, which has a 2010 U.S. Census population of 18,142 persons, has 4 other FM and AM services.³

Fair Haven is a village which has a 2010 U.S. Census population of 745 persons and has no other FM or AM service. Fair Haven is not located within an urbanized area (see below). Therefore, the instant proposal will result in a first local aural transmission service to the community of Fair Haven under FM priority 3.⁴

3. 60 dBu Loss Area and Available Aural Services

Figure 6 is a map showing the FM 60 dBu (1 mV/m) primary service contour for WKRH's licensed operation on channel 293A at Minetto and WKRH's proposed channel 293A operation at Fair Haven. The 60 dBu contours were calculated using actual facilities, actual terrain, the NGDC 30-second terrain database and the FCC's standard prediction method as set forth in the *Second Order*. The 60 dBu loss area is also indicated and contains 15,344 persons within a land area of 335 square kilometers.

Figure 6 also shows the other aural services available to the 60 dBu loss area. The determination of available full-time reception services was also based on the criteria set forth in the *Second Order*. Specifically, for FM service (commercial and noncommercial educational) the Class service contour was used based on the authorized (licensed or permitted) facilities using actual terrain, the NGDC 30-second terrain database and the FCC's standard prediction method. For

³ FM stations WWLF-FM, channel 244A, WNYO, channel 205A and WRVO, channel 210B and AM station WSGO, 1440 kHz, are currently assigned to Oswego.

⁴ The FM allotment priorities are (1) first fulltime aural service; (2) second fulltime aural service; (3) first local service; and (4) other public interest matters.

AM fulltime service, the common area within the daytime 2 mV/m contour and nighttime interference-free (NIF) contour was used.

Figure 7 tabulates the AM and FM stations whose contours are shown on Figure 6. The numerals within the 60 dBu loss area indicate the number of available services. As indicated on Figure 6, there are no white or gray areas located within the 60 dBu loss area.

4. Protected FM and AM Services Available to Fair Haven

It has been determined that there are 11 protected FM and AM services available to Fair Haven as shown on Figure 8.⁵ Figure 9 tabulates the FM and AM stations whose contours are shown on Figure 8.

5. 70 dBu and 60 dBu Coverage

The following tabulates the land area and 2010 Census population within the 70 dBu and 60 dBu contours for the proposed channel 293A operation at Fair Haven which are depicted on Figure 10.

| Contour | Population (2010 Census) | Area (sq. km) |
|---------|-----------------------------|------------------|
| 70 dBu | 42,016 | 393 |
| 60 dBu | 76,682 | 1,060 |

Contour locations calculated in accordance with the provisions of Section 73.313. Population calculated using a computer program that utilizes the 2010 U.S. Census database of population centroids. Area calculated using a root mean square algorithm.

6. Urbanized Area Considerations

Figure 11 is a map which depicts the Fair Haven city limits and the Syracuse, New York Urbanized Area (UA). Also shown is the 70 dBu contour for the proposed channel 293A operation at Fair Haven. As indicated, no portion of Fair

⁵ For FM stations, the pertinent primary service contour has been used. For AM stations, the daytime 2 mV/m contour has been used.

Haven is located within the Syracuse UA. In addition, the proposed 70 dBu contour does not encompass any portion of the Syracuse UA.

Studies were conducted to determine if any rule-compliant minor modifications could be made on the proposed channel which would provide 70 dBu coverage over 50 percent or more of the Syracuse UA. The studies considered all existing registered towers in the Commission's Antenna Structure Registration database along with unregistered towers currently used by licensed radio stations. In addition, consideration was also given to use of short-spaced sites and directional antenna systems. On this basis, it was determined that only 3 alternate registered towers could potentially be used for the proposed Fair Haven channel 293A allotment, namely ASRN's 1205682, 1203765 and 1222485. However, operation from each of these towers with maximum nondirectional Class A facilities (i.e. best case presumption) would not result in any 70 dBu coverage of the Syracuse UA. Therefore, it is apparent that a minor change modification could not be made which would provide 70 dBu coverage over 50 percent of the Syracuse UA.

If there are any questions, or additional information is required, please contact the office of the undersigned.



W. Jeffrey Reynolds

du Treil, Lundin & Rackley, Inc.
201 Fletcher Avenue
Sarasota, FL 34237-6019
(941) 329-6000
JEFF@DLR.COM

June 25, 2013

CDBS FM SEPARATION STUDY - WKRH, CH 239A, FAIR HAVEN, NY, ALLOTMENT COORDINATES

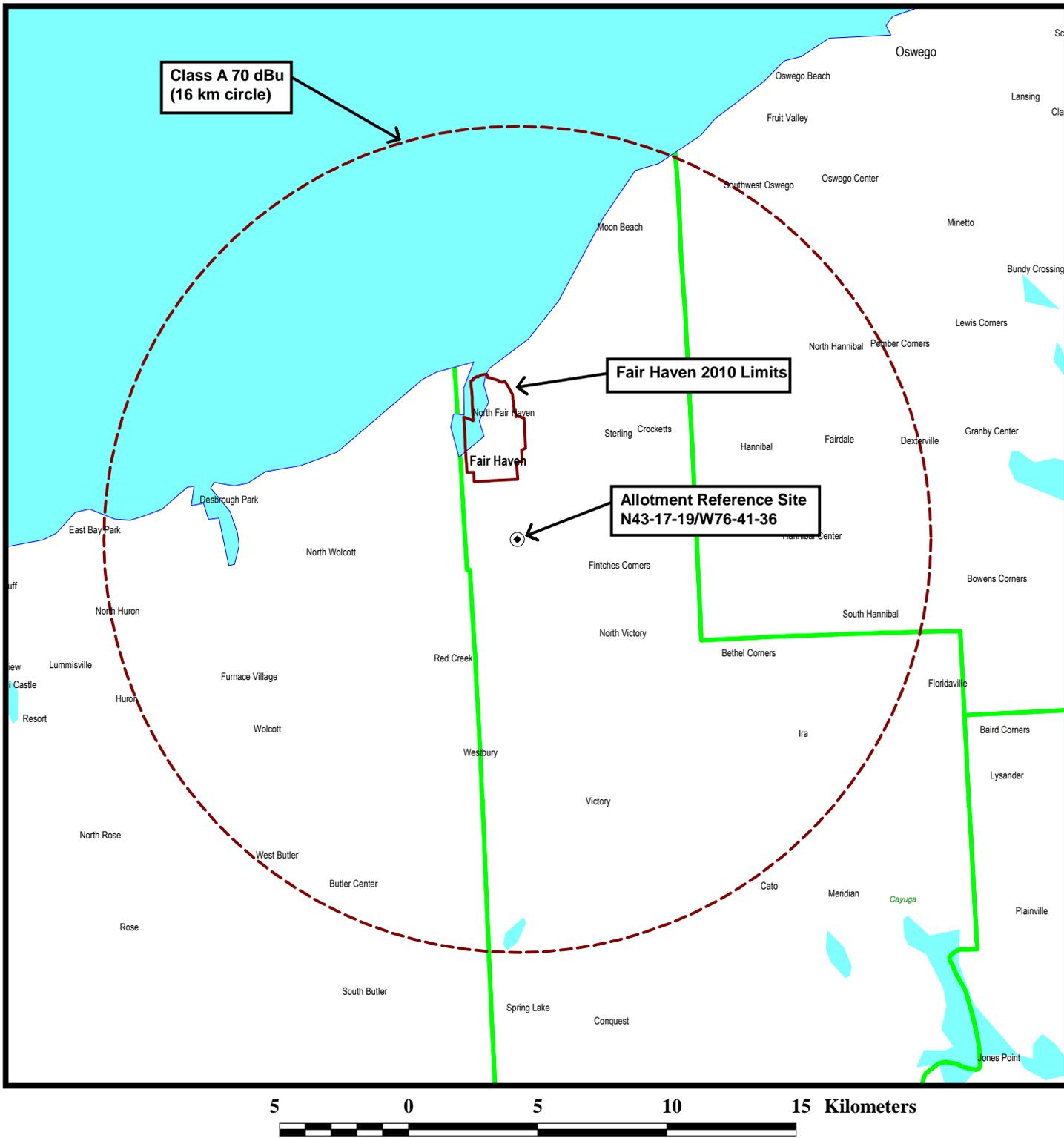
Channel: 293 Coordinates: 043-17-19 076-41-36 (NAD 27)
 Class: A Buffer Distance: 5 km

Date: 06/26/2013
 Page: 1 of 1

| Callsign | Status | Chan. | Serv. | Freq. | City | State | Latitude | Dist.(km) | Sep.(km) | Spacing(km) | | |
|----------------|-----------------|-------|-------|-------|-------------|---------|-----------|-----------|-----------|-------------|-------------|--------------------------|
| Fac. ID | ARN | | | Class | DA | Ant. ID | ERP(kW) | HAAT(m) | Longitude | Bear.(deg) | 73.215 | Comment |
| WKRH | LIC | 293 | FM | 106.5 | MINETTO | NY | 043-25-04 | 23.42 | 115 | -91.58 | | |
| 56996 | BLH 19961106KD | | | A | N | | 5 | 100 | 076-27-54 | 52.04 | 92 Y | SHORT¹ |
| | | 293 | FR | 106.5 | FOYMOUNT | ON | 045-25-44 | 242.73 | 243 | -0.27 | | |
| | | | | C1 | | | | | 077-18-20 | 348.65 | | CLOSE |
| WKGS | LIC | 294 | FM | 106.7 | IRONDEQUOIT | NY | 043-08-05 | 74.47 | 72 | 2.47 | | |
| 3205 | BLH 20120906AAY | | | A | D | 98719 | 4.6 | 114 | 077-35-07 | 256.99 | 49 Y | CLOSE |
| WSYR-FM | LIC | 295 | FM | 106.9 | SOLVAY | NY | 043-00-10 | 51.21 | 48 | 3.21 | | |
| 25018 | BLH 20090825BEP | | | B1 | D | 89253 | 9 | 124 | 076-11-58 | 128.25 | 42 Y | CLOSE |

¹ Short-spacing which establishes mutual exclusivity pursuant to Section 73.3573(g).

Figure 2



COMPLIANCE WITH SECTION 73.315

FM STATION WKRH
FAIR HAVEN, NEW YORK
CH 293A 5.4 KW 100 M

du Treil, Lundin & Rackley, Inc. Sarasota, Florida

CDBS FM SEPARATION STUDY - WKRH, CH 239A, FAIR HAVEN, NY, PROPOSED SITE

Channel: 293 Coordinates: 043-25-14 076-32-39 (NAD 27)
 Class: A Buffer Distance: 5 km

Date: 06/26/2013
 Page: 1 of 1

| Callsign | Status | Chan. | Serv. | Freq. | City | State | Latitude | Dist.(km) | Sep.(km) | Spacing(km) | |
|----------------|----------------|-------|-------|-------|------------|---------|-----------|-----------|------------|--------------------------|--------------------------|
| Fac. ID | ARN | | | Class | DA Ant. ID | ERP(kW) | HAAT(m) | Longitude | Bear.(deg) | 73.215 | Comment |
| WKRH | LIC | 293 | FM | 106.5 | MINETTO | NY | 043-25-04 | 6.42 | 115 | -108.58 | |
| 56996 | BLH 19961106KD | | | A | N | 5 | 100 | 076-27-54 | 92.74 | 92 Y | SHORT¹ |
| | | 293 | FR | 106.5 | FOYMOUNT | ON | 045-25-44 | 231.21 | 243 | -11.79 | |
| | | | | C1 | | | | 077-18-20 | 345.12 | SHORT² | |
| | | 293 | FA | 106.5 | BROCKVILLE | ON | 044-36-00 | 148.09 | 151 | -2.91 | |
| 95443 | | | | A | | | | 075-41-00 | 27.4 | SHORT² | |
| CBOB-FM | | 293 | FM | 106.5 | BROCKVILLE | ON | 044-38-25 | 154.48 | 151 | 3.48 | |
| 177916 | 20080228CAN | | | A | | 3 | 100.5 | 075-37-07 | 28.3 | CLOSE | |
| WBDR | LIC | 294 | FM | 106.7 | COPENHAGEN | NY | 043-52-47 | 83.83 | 89 | -5.17 | |
| 43748 | BLH 19940627KB | | | C3 | D 14472 | 1.8 | 363 | 075-43-11 | 52.13 | 72 Y | SHORT³ |

¹ Short-spacing which establishes mutual exclusivity pursuant to Section 73.3573(g).

² Proposal complies with the provisions of the US-Canadian FM Agreement with respect to this short-spacing. See Technical Narrative and Figure 5.

³ Section 73.215 processing requested with this short-spacing. The proposal complies with the minimum distance separation requirements of Section 73.213(e). See Figure 4.

Figure 5

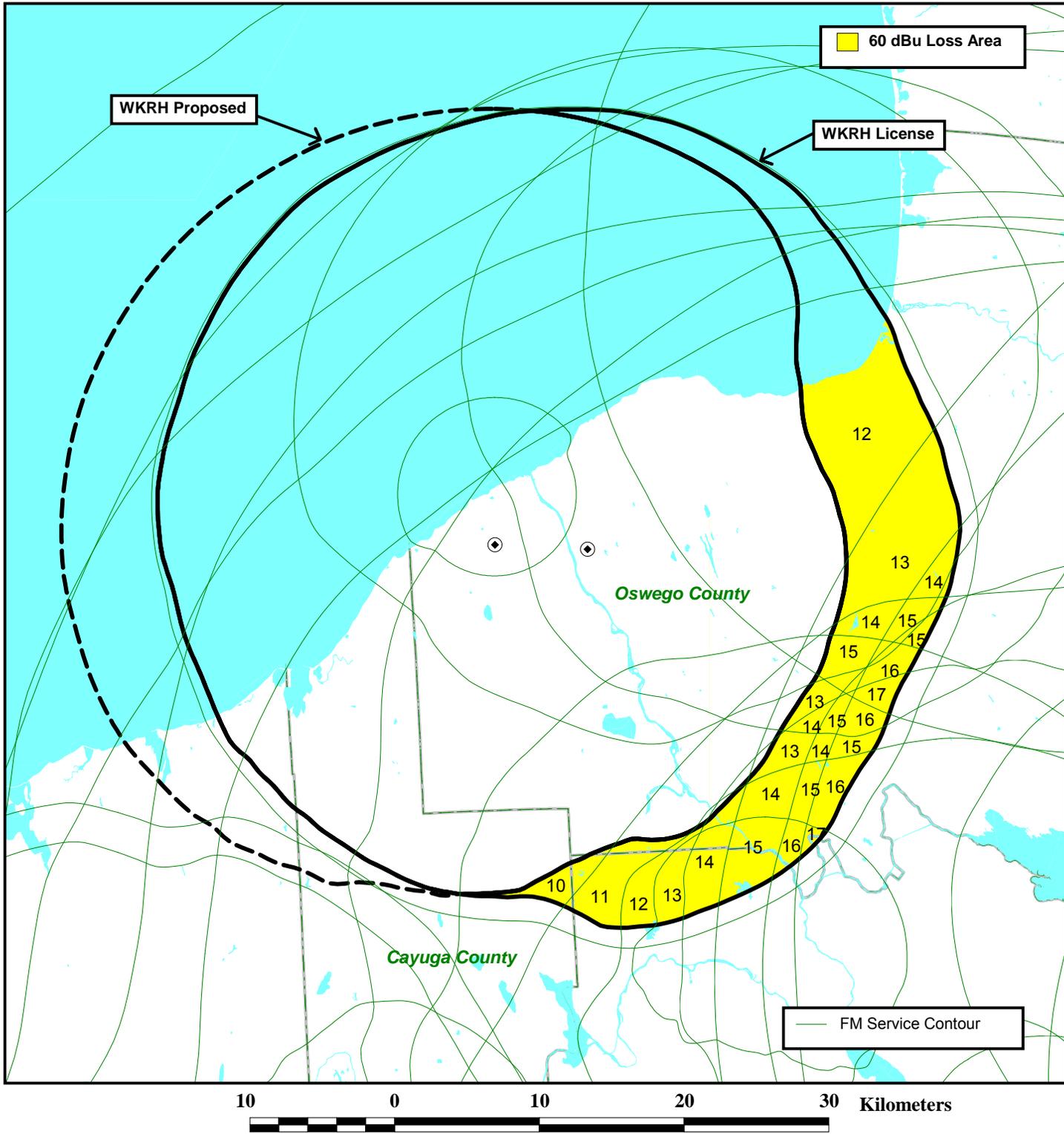


CANADIAN ALLOCATION STUDY

FM STATION WKRH
FAIR HAVEN, NEW YORK
CH 293A 5.4 KW 100 M

du Treil, Lundin & Rackley, Inc. Sarasota, Florida

Figure 6



60 DBU LOSS AREA MAP

FM STATION WKRH
FAIR HAVEN, NEW YORK
CH 293A 5.4 KW 100 M

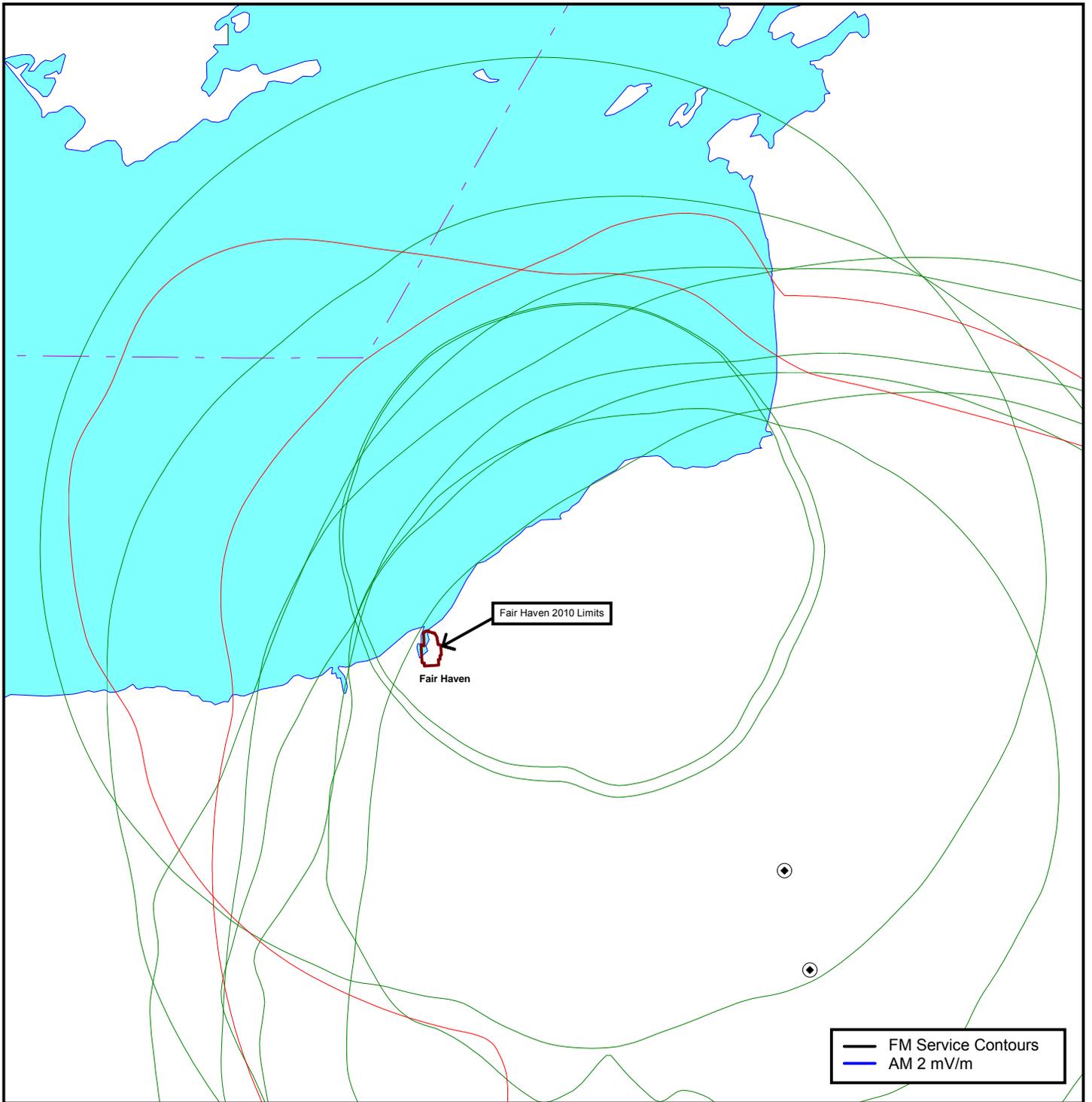
du Treil, Lundin & Rackley, Inc. Sarasota, Florida

TECHNICAL EXHIBIT
STATION WKRH
FAIR HAVEN, NEW YORK
CH 293A 5.4 KW 100 M

Tabulation of Other FM Full-Time Services
Available to 60 dBu Loss Area

| <u>Call Sign</u> | <u>Community of License</u> | <u>State</u> | <u>Channel</u> |
|------------------|-----------------------------|--------------|----------------|
| WOLF-FM | DERUYTER | NY | 286B |
| WMHR | SYRACUSE | NY | 275B |
| WYYY | SYRACUSE | NY | 233B |
| WBBS | FULTON | NY | 284B |
| WFRG-FM | UTICA | NY | 282B |
| WNTQ | SYRACUSE | NY | 226B |
| WUMX | ROME | NY | 273B |
| WWHT | SYRACUSE | NY | 300B |
| WRVO | OSWEGO | NY | 210B |
| WAER | SYRACUSE | NY | 202B |
| WCNY-FM | SYRACUSE | NY | 217B |
| WGKV | PULASKI | NY | 269A |
| WBXL | BALDWINVILLE | NY | 213A |
| WWLF-FM | OSWEGO | NY | 244A |
| WLLW | SENECA FALLS | NY | 257A |
| WDWN | AUBURN | NY | 206A |
| WITC | CAZENOVIA | NY | 205A |
| WRCU-FM | HAMILTON | NY | 211A |
| WXHC | HOMER | NY | 286A |
| WTKW | BRIDGEPORT | NY | 258A |
| WTKV | OSWEGO | NY | 288A |
| WCOV-FM | CLYDE | NY | 229A |
| WSKS | WHITESBORO | NY | 250A |
| WKRL-FM | NORTH SYRACUSE | NY | 265A |
| WKRH | MINETTO | NY | 293A |
| WMCR-FM | ONEIDA | NY | 292A |
| WXTL | SYRACUSE | NY | 290A |
| WZUN | PHOENIX | NY | 271A |
| WSUC-FM | CORTLAND | NY | 213A |
| WNYO | OSWEGO | NY | 205A |
| WRVD | SYRACUSE | NY | 212A |
| WVOA-FM | MEXICO | NY | 280A |
| WHCL-FM | CLINTON | NY | 204A |
| WJPZ-FM | SYRACUSE | NY | 206A |
| WMLN | SYLVAN BEACH | NY | 262A |
| WXXE | FENNER | NY | 213A |
| WTMI | FLEMING | NY | 204A |

Figure 8



**OTHER FM AND AM PROTECTED SERVICES
AVAILABLE TO FAIR HAVEN, NEW YORK**

FM STATION WKRH
FAIR HAVEN, NEW YORK
CH 293A 5.4 KW 100 M

du Treil, Lundin & Rackley, Inc. Sarasota, Florida

TECHNICAL EXHIBIT
 STATION WKRH
 FAIR HAVEN, NEW YORK
 CH 293A 5.4 KW 100 M

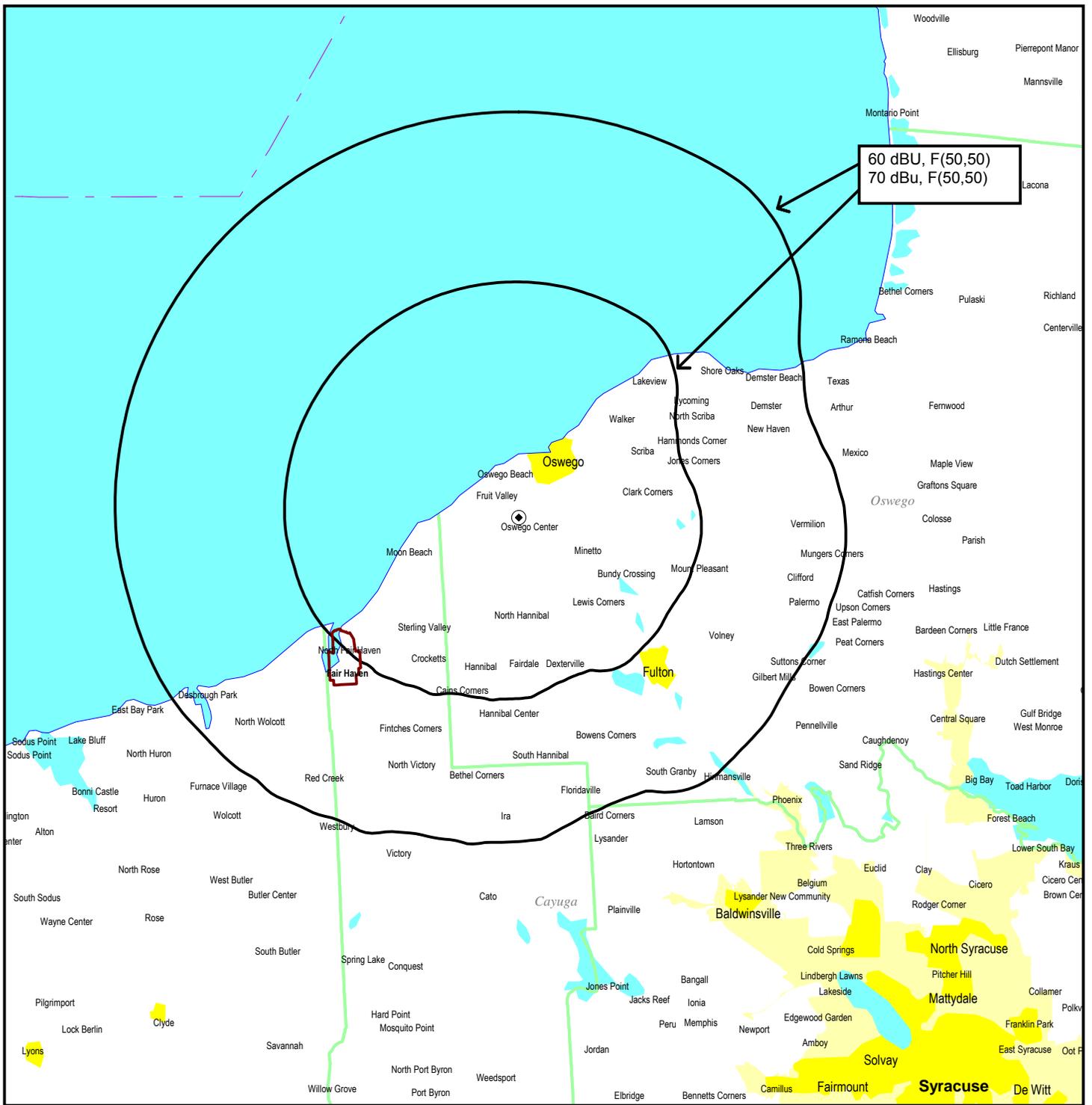
Tabulation of AM/FM Protected Services
Available to Fair Haven, New York

FM CONTOURS

| <u>Call Sign</u> | <u>Community of License</u> | <u>State</u> | <u>Channel</u> |
|-------------------------|------------------------------------|---------------------|-----------------------|
| WMHR | SYRACUSE | NY | 275B |
| WTKV | OSWEGO | NY | 288A |
| WSEN-FM | BALDWINSVILLE | NY | 221B1 |
| WCNY-FM | SYRACUSE | NY | 217B |
| WBBS | FULTON | NY | 284B |
| WRVO | OSWEGO | NY | 210B |
| WNTQ | SYRACUSE | NY | 226B |
| WWHT | SYRACUSE | NY | 300B |
| WYYY | SYRACUSE | NY | 233B |

AM CONTOURS

| <u>Call Sign</u> | <u>Community of License</u> | <u>State</u> | <u>Frequency (kHz)</u> |
|-------------------------|------------------------------------|---------------------|-------------------------------|
| WSYR | Syracuse | NY | 570 |
| WHEN | Syracuse | NY | 620 |

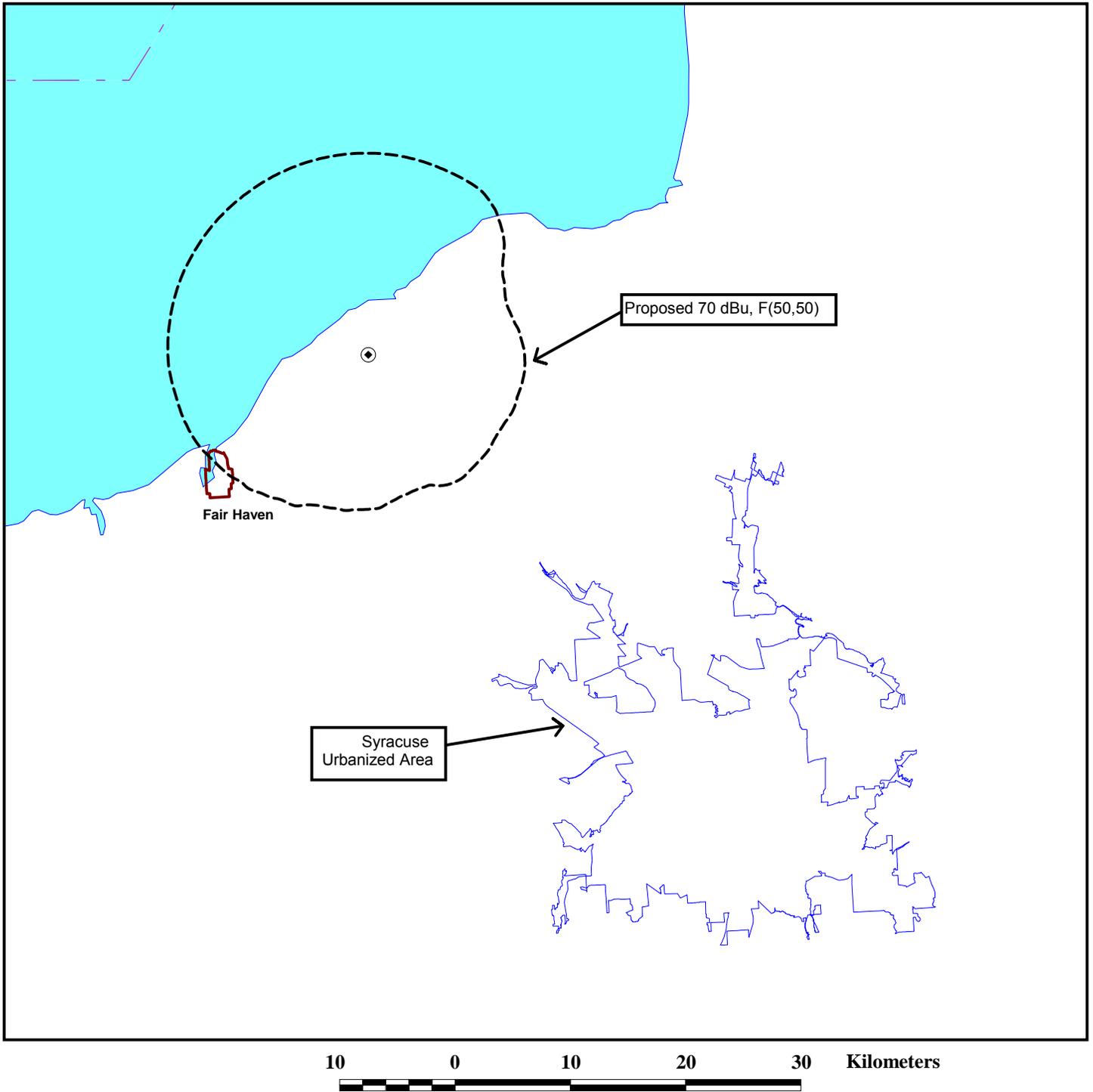


60 dBu, F(50,50)
70 dBu, F(50,50)

10 0 10 20 30 Kilometers

FCC PREDICTED COVERAGE CONTOURS

FM STATION WKRH
FAIR HAVEN, NEW YORK
CH 293A 5.4 KW 100 M

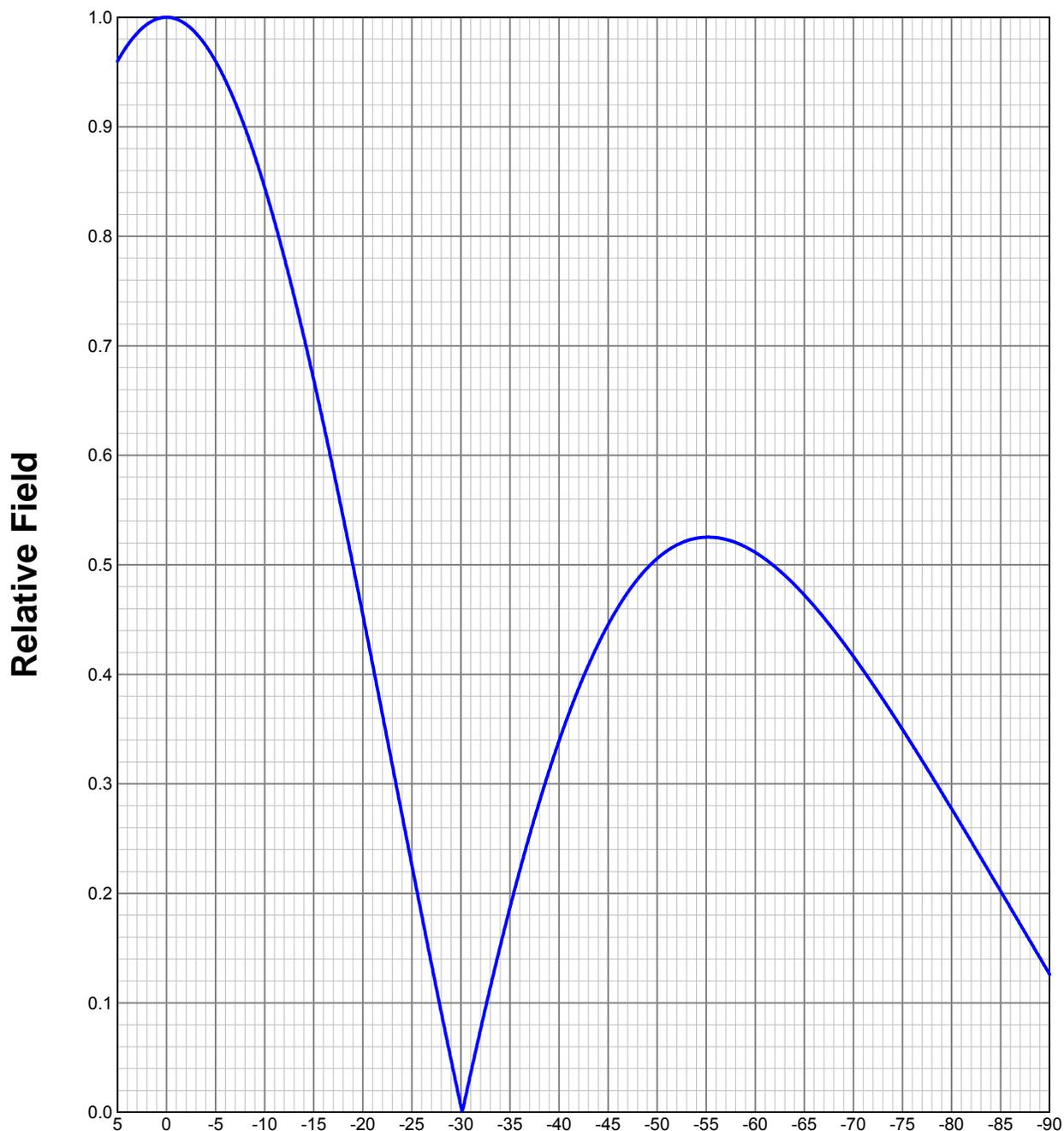


URBANIZED AREA COVERAGE

FM STATION WKRH
FAIR HAVEN, NEW YORK
CH 293A 5.4 KW 100 M

ELEVATION PATTERN

| | | | | |
|--------------|---------|-------|---------------|----------|
| Type: | LPX2F | | Channel: | 293 |
| Directivity: | Numeric | dBd | Location: | |
| Main Lobe: | 1.00 | -0.01 | Beam Tilt: | 0.00 |
| Horizontal: | 1.00 | -0.01 | Polarization: | Circular |



Preliminary, subject to final design and review.

TABULATED DATA FOR ELEVATION PATTERN

Type: LPX2F

Polarization: Circular

| ANGLE FIELD | dB | ANGLE FIELD | dB | ANGLE FIELD | dB | ANGLE FIELD | dB | ANGLE FIELD | dB | | | | | |
|-------------|-------|-------------|--------|-------------|--------|-------------|-------|-------------|--------|-------|-------|--------|-------|--------|
| 5.00 | 0.960 | -0.36 | -6.75 | 0.927 | -0.65 | -27.00 | 0.135 | -17.37 | -50.50 | 0.509 | -5.86 | -74.00 | 0.364 | -8.79 |
| 4.75 | 0.964 | -0.32 | -7.00 | 0.922 | -0.70 | -27.50 | 0.113 | -18.92 | -51.00 | 0.513 | -5.80 | -74.50 | 0.357 | -8.95 |
| 4.50 | 0.967 | -0.29 | -7.25 | 0.917 | -0.76 | -28.00 | 0.091 | -20.80 | -51.50 | 0.516 | -5.75 | -75.00 | 0.350 | -9.13 |
| 4.25 | 0.971 | -0.26 | -7.50 | 0.911 | -0.81 | -28.50 | 0.069 | -23.17 | -52.00 | 0.518 | -5.71 | -75.50 | 0.343 | -9.30 |
| 4.00 | 0.974 | -0.23 | -7.75 | 0.905 | -0.87 | -29.00 | 0.048 | -26.39 | -52.50 | 0.520 | -5.68 | -76.00 | 0.336 | -9.48 |
| 3.75 | 0.977 | -0.20 | -8.00 | 0.899 | -0.93 | -29.50 | 0.027 | -31.51 | -53.00 | 0.522 | -5.65 | -76.50 | 0.328 | -9.67 |
| 3.50 | 0.980 | -0.17 | -8.25 | 0.893 | -0.99 | -30.00 | 0.006 | -45.12 | -53.50 | 0.523 | -5.63 | -77.00 | 0.321 | -9.86 |
| 3.25 | 0.983 | -0.15 | -8.50 | 0.886 | -1.05 | -30.50 | 0.015 | -36.36 | -54.00 | 0.524 | -5.61 | -77.50 | 0.314 | -10.06 |
| 3.00 | 0.985 | -0.13 | -8.75 | 0.880 | -1.11 | -31.00 | 0.036 | -28.95 | -54.50 | 0.525 | -5.60 | -78.00 | 0.307 | -10.27 |
| 2.75 | 0.988 | -0.11 | -9.00 | 0.873 | -1.18 | -31.50 | 0.056 | -25.06 | -55.00 | 0.525 | -5.59 | -78.50 | 0.299 | -10.48 |
| 2.50 | 0.990 | -0.09 | -9.25 | 0.866 | -1.25 | -32.00 | 0.076 | -22.42 | -55.50 | 0.525 | -5.59 | -79.00 | 0.292 | -10.69 |
| 2.25 | 0.992 | -0.07 | -9.50 | 0.859 | -1.32 | -32.50 | 0.095 | -20.43 | -56.00 | 0.525 | -5.60 | -79.50 | 0.285 | -10.91 |
| 2.00 | 0.994 | -0.06 | -9.75 | 0.852 | -1.39 | -33.00 | 0.114 | -18.84 | -56.50 | 0.524 | -5.61 | -80.00 | 0.277 | -11.14 |
| 1.75 | 0.995 | -0.04 | -10.00 | 0.845 | -1.47 | -33.50 | 0.133 | -17.52 | -57.00 | 0.523 | -5.63 | -80.50 | 0.270 | -11.38 |
| 1.50 | 0.996 | -0.03 | -10.50 | 0.829 | -1.62 | -34.00 | 0.151 | -16.40 | -57.50 | 0.522 | -5.65 | -81.00 | 0.262 | -11.62 |
| 1.25 | 0.997 | -0.02 | -11.00 | 0.814 | -1.79 | -34.50 | 0.169 | -15.42 | -58.00 | 0.520 | -5.67 | -81.50 | 0.255 | -11.87 |
| 1.00 | 0.998 | -0.01 | -11.50 | 0.797 | -1.97 | -35.00 | 0.187 | -14.56 | -58.50 | 0.519 | -5.70 | -82.00 | 0.247 | -12.13 |
| 0.75 | 0.999 | -0.01 | -12.00 | 0.781 | -2.15 | -35.50 | 0.204 | -13.80 | -59.00 | 0.516 | -5.74 | -82.50 | 0.240 | -12.40 |
| 0.50 | 1.000 | 0.00 | -12.50 | 0.763 | -2.35 | -36.00 | 0.221 | -13.12 | -59.50 | 0.514 | -5.78 | -83.00 | 0.232 | -12.68 |
| 0.25 | 1.000 | 0.00 | -13.00 | 0.745 | -2.55 | -36.50 | 0.237 | -12.50 | -60.00 | 0.511 | -5.83 | -83.50 | 0.225 | -12.96 |
| 0.00 | 1.000 | 0.00 | -13.50 | 0.727 | -2.77 | -37.00 | 0.253 | -11.93 | -60.50 | 0.508 | -5.88 | -84.00 | 0.217 | -13.26 |
| -0.25 | 1.000 | 0.00 | -14.00 | 0.708 | -3.00 | -37.50 | 0.269 | -11.42 | -61.00 | 0.505 | -5.93 | -84.50 | 0.210 | -13.57 |
| -0.50 | 1.000 | 0.00 | -14.50 | 0.689 | -3.24 | -38.00 | 0.284 | -10.94 | -61.50 | 0.502 | -5.99 | -85.00 | 0.202 | -13.89 |
| -0.75 | 0.999 | -0.01 | -15.00 | 0.669 | -3.49 | -38.50 | 0.298 | -10.51 | -62.00 | 0.498 | -6.05 | -85.50 | 0.195 | -14.22 |
| -1.00 | 0.998 | -0.01 | -15.50 | 0.649 | -3.76 | -39.00 | 0.312 | -10.11 | -62.50 | 0.494 | -6.12 | -86.00 | 0.187 | -14.57 |
| -1.25 | 0.997 | -0.02 | -16.00 | 0.629 | -4.03 | -39.50 | 0.326 | -9.74 | -63.00 | 0.490 | -6.19 | -86.50 | 0.179 | -14.93 |
| -1.50 | 0.996 | -0.03 | -16.50 | 0.608 | -4.33 | -40.00 | 0.339 | -9.39 | -63.50 | 0.486 | -6.26 | -87.00 | 0.172 | -15.30 |
| -1.75 | 0.995 | -0.04 | -17.00 | 0.587 | -4.63 | -40.50 | 0.352 | -9.07 | -64.00 | 0.482 | -6.34 | -87.50 | 0.164 | -15.70 |
| -2.00 | 0.994 | -0.06 | -17.50 | 0.565 | -4.96 | -41.00 | 0.364 | -8.77 | -64.50 | 0.477 | -6.43 | -88.00 | 0.156 | -16.11 |
| -2.25 | 0.992 | -0.07 | -18.00 | 0.544 | -5.30 | -41.50 | 0.376 | -8.50 | -65.00 | 0.472 | -6.51 | -88.50 | 0.149 | -16.54 |
| -2.50 | 0.990 | -0.09 | -18.50 | 0.522 | -5.65 | -42.00 | 0.387 | -8.24 | -65.50 | 0.467 | -6.61 | -89.00 | 0.141 | -17.00 |
| -2.75 | 0.988 | -0.11 | -19.00 | 0.499 | -6.03 | -42.50 | 0.398 | -8.00 | -66.00 | 0.462 | -6.70 | -89.50 | 0.134 | -17.48 |
| -3.00 | 0.985 | -0.13 | -19.50 | 0.477 | -6.43 | -43.00 | 0.409 | -7.78 | -66.50 | 0.457 | -6.80 | -90.00 | 0.126 | -17.99 |
| -3.25 | 0.983 | -0.15 | -20.00 | 0.455 | -6.85 | -43.50 | 0.418 | -7.57 | -67.00 | 0.452 | -6.90 | | | |
| -3.50 | 0.980 | -0.17 | -20.50 | 0.432 | -7.29 | -44.00 | 0.428 | -7.37 | -67.50 | 0.446 | -7.01 | | | |
| -3.75 | 0.977 | -0.20 | -21.00 | 0.409 | -7.76 | -44.50 | 0.437 | -7.19 | -68.00 | 0.440 | -7.12 | | | |
| -4.00 | 0.974 | -0.23 | -21.50 | 0.386 | -8.26 | -45.00 | 0.445 | -7.03 | -68.50 | 0.435 | -7.24 | | | |
| -4.25 | 0.971 | -0.26 | -22.00 | 0.363 | -8.79 | -45.50 | 0.453 | -6.87 | -69.00 | 0.429 | -7.36 | | | |
| -4.50 | 0.967 | -0.29 | -22.50 | 0.340 | -9.36 | -46.00 | 0.461 | -6.73 | -69.50 | 0.423 | -7.48 | | | |
| -4.75 | 0.964 | -0.32 | -23.00 | 0.317 | -9.97 | -46.50 | 0.468 | -6.59 | -70.00 | 0.416 | -7.61 | | | |
| -5.00 | 0.960 | -0.36 | -23.50 | 0.294 | -10.62 | -47.00 | 0.475 | -6.47 | -70.50 | 0.410 | -7.74 | | | |
| -5.25 | 0.956 | -0.39 | -24.00 | 0.272 | -11.32 | -47.50 | 0.481 | -6.36 | -71.00 | 0.404 | -7.88 | | | |
| -5.50 | 0.952 | -0.43 | -24.50 | 0.249 | -12.09 | -48.00 | 0.487 | -6.25 | -71.50 | 0.397 | -8.02 | | | |
| -5.75 | 0.947 | -0.47 | -25.00 | 0.226 | -12.93 | -48.50 | 0.492 | -6.16 | -72.00 | 0.391 | -8.16 | | | |
| -6.00 | 0.942 | -0.51 | -25.50 | 0.203 | -13.85 | -49.00 | 0.497 | -6.07 | -72.50 | 0.384 | -8.31 | | | |
| -6.25 | 0.938 | -0.56 | -26.00 | 0.180 | -14.88 | -49.50 | 0.502 | -5.99 | -73.00 | 0.377 | -8.47 | | | |
| -6.50 | 0.933 | -0.61 | -26.50 | 0.158 | -16.04 | -50.00 | 0.506 | -5.92 | -73.50 | 0.370 | -8.62 | | | |

Preliminary, subject to final design and review.