

**November 2016
New LPFM Channel 289L1
Kennewick, Washington
Allocation Study**

Facilities Proposed

The instant application proposes a minor modification of the original construction permit for New LPFM on Channel 289L1 at Kennewick, Washington. Operation is proposed from a tower which is 3 kilometers south of the authorized coordinates. This existing tower has FCC Antenna Structure Registration Number 1201787.

Spacing Study

The attached spacing study shows that the proposed LPFM operation meets the co-channel and adjacent channel spacing requirements for Class L1 stations as prescribed in §73.807 of the Commission's Rules, with the exception of short-spacings to KONA-FM Kennewick and K291BS Richland. A second-adjacent channel waiver is requested with respect to these stations.

KONA-FM 287C Kennewick

The proposed LPFM transmitter site is located within the 60 dBu protected contour of second-adjacent channel station KONA-FM 287C Kennewick. The following calculation, performed using the *Living Way* methodology, addresses interference protection to that station.

<i>Protected Station</i>	<i>Distance & Bearing to Proposal</i>	<i>Station ERP and HAAT on that azimuth</i>	<i>Station Field Strength at Proposal</i>	<i>Corresponding Translator Interfering Contour</i>	<i>Distance to Translator Interfering Contour</i>
KONA-FM 287C	10.26 km 14 deg True	100 kW 486 meters	102.9 dBu F(50,50)	142.9 dBu	5 meters Free Space

The 142.9 dBu interfering contour from the proposed facility would extend only 5 meters¹ from the antenna and would not reach ground level (which is 20 meters below the antenna). There is no population within this contour. Therefore, the proposed facility is believed to satisfy the requirements of §73.807(e)(1) with respect to KONA-FM.

¹ This study assumes a maximum ERP of 100 watts, for a worst-case analysis.

K291BS Richland

The proposed LPFM transmitter site is located within the 60 dBu protected contour of second-adjacent channel station K291BS Richland. The following calculation, performed using the *Living Way* methodology, addresses interference protection to that station.

Protected Station	Distance & Bearing to Proposal	Station ERP and HAAT on that azimuth	Station Field Strength at Proposal	Corresponding Translator Interfering Contour	Distance to Translator Interfering Contour
K291BS	13.58 km 114 deg True	0.218 kW 328 meters	69.0 dBu F(50,50)	109.0 dBu	See following text

The authorized Kennewick 289L1 facility is located 12.66 km from the K291BS transmitter site, while the proposed facility is located 13.58 km from K291BS. In both cases, there is a short-spacing compared to the required 21 kilometer spacing. While the proposed facility improves the spacing between the two stations, and while §73.807(d) would appear to allow this modification simply that the provided that the spacing is improved, it is presumed that the LPFM CP facility was approved under a second-adjacent channel waiver to K291BS although this was not explicitly addressed in the original Form 318 application.

The authorized LPFM facility is located 12.66 km from K291BS. Given the translator's power, pattern, and HAAT in the direction of the LPFM permit, the translator places a 71.8 dBu contour at the LPFM permit site. The corresponding interfering contour from the LPFM permit would be the 111.8 dBu contour. Given a typical Nicom BKG77-1 antenna,² and taking that antenna's vertical plane pattern into account, a Free Space analysis shows that the interference area would extend 170 meters from the CP site. Review of recent aerial photography indicates that within this radius there are 39 homes, two auto dealer buildings, a small office building, a drug store, and a fast-food restaurant.

As shown above, K291BS places a 109.0 dBu contour at the proposed LPFM site. The corresponding interfering contour from the LPFM would be the 109.0 dBu contour. Given the proposed Nicom BKG77-1 antenna, and taking that antenna's vertical plane pattern into account,

² While the original LPFM application utilized a 1-bay-antenna's vertical plane pattern in its second-adjacent channel waiver request, the model of the antenna was not specified.

a Free Space analysis would show that the interference area for 100 watt operation would extend 248 meters from the proposed site. However, if ERP is reduced to 65 watts, the interference area would extend just 200 meters from the proposed site. Review of recent aerial photography indicates that within this radius are 33 homes, two outbuildings at a Buddhist temple, and part of a garden nursery. Therefore there would be a reduction of interference impact, compared to that which would result from the authorized LPFM facility.

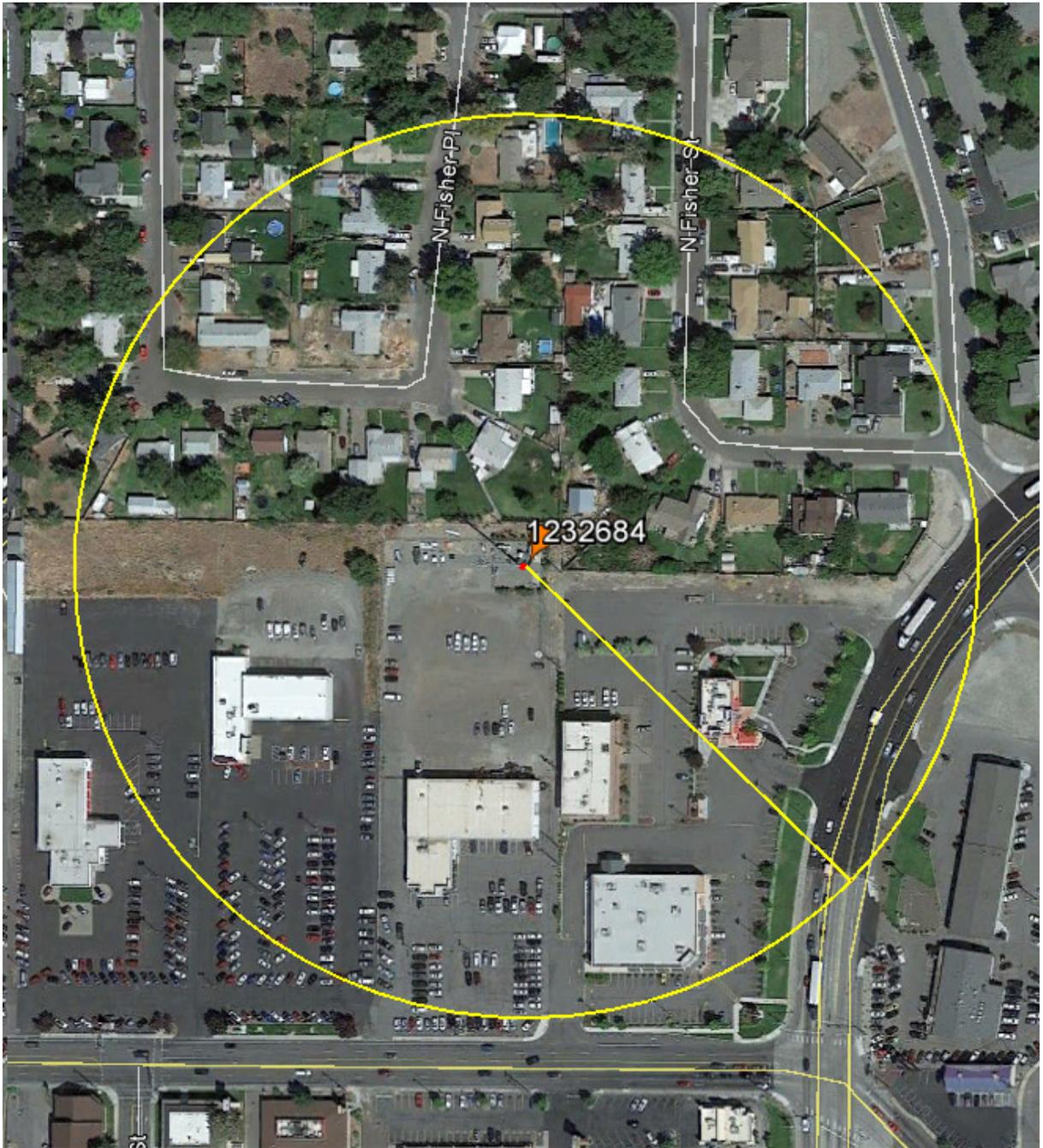
If the Commission is unable to approve full 100 watt operation of the LPFM station based on the improvement of spacing to the FM translator station (per §73.807(d)), then the applicant is willing to accept operation with 65 watts ERP, based on a reduction of interference impact.

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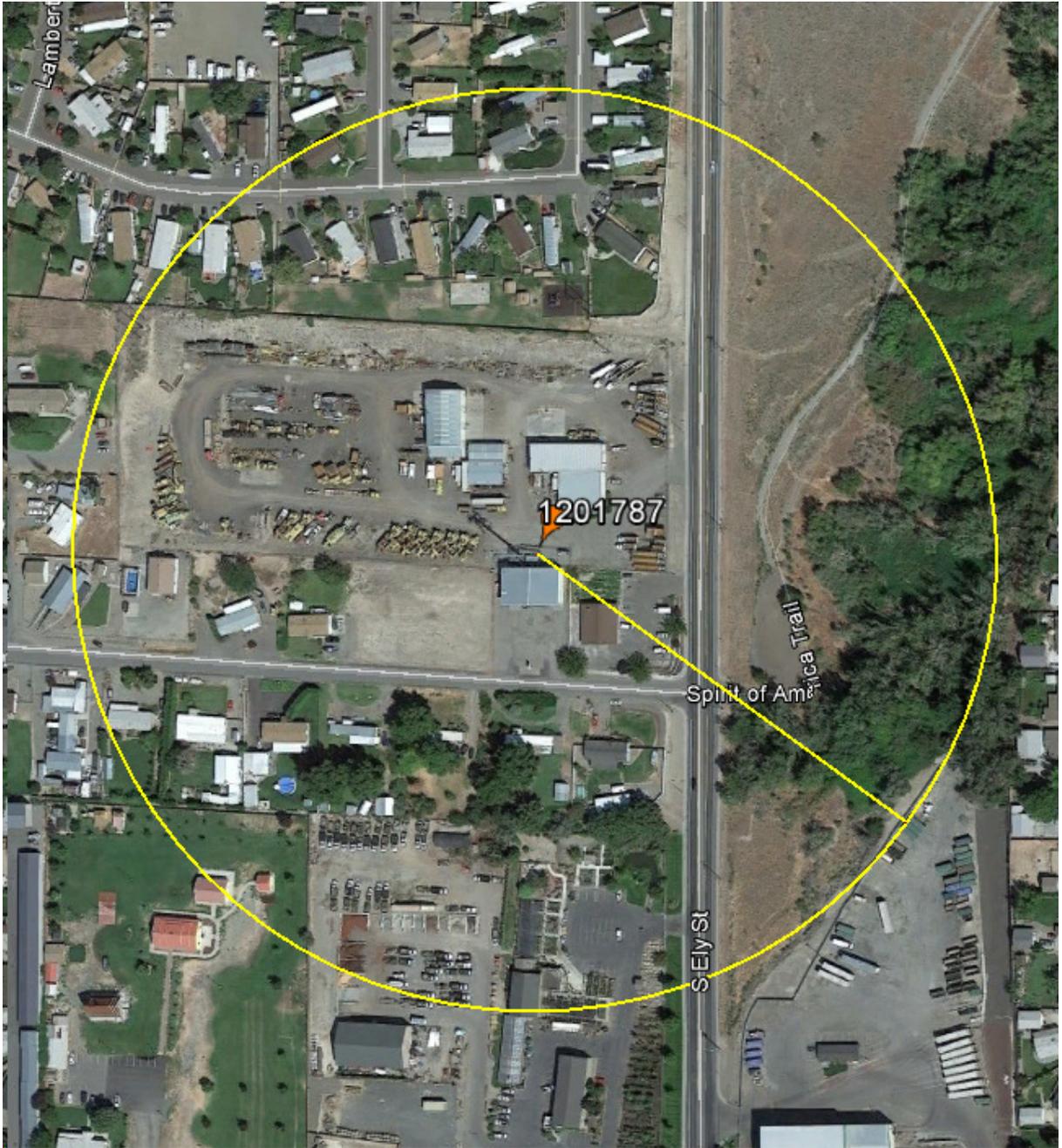
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SEARCH PARAMETERS                               FM Database Date: 161115
Channel: 289L1 105.7 MHz                        Page 1
Latitude: 46 11 13
Longitude: 119 9 32
Safety Zone: 32 km
Job Title: KENNEWICK LPFM MOD
    
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Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
KONA-FM LIC	KENNEWICK WA	BLH-940525KA	287C 105.3	100.000 347.0	46-05-51 119-11-30	194.3	10.26 -82.74	93 SHORT
K289BJ LIC	ARLINGTON OR	BLFT-71001ACR	289D 105.7	0.115 153.0	45-42-27 120-13-27	237.5	98.30 59.30	39 CLEAR
NEW CP	KENNEWICK WA	BNPL-31115ABU	289L1 105.7	0.100 13.1	46-12-51 119-09-33	359.6	3.03 -20.97	24 SHORT
KRSE LIC	YAKIMA WA	BMLH-30327AIS	289C1 105.7	100.000 172.3	46-42-42 120-37-22	298.0	126.70 15.70	111 CLEAR
KOLH-LP LIC	HERMISTON OR	BLL-50701AFI	290L1 105.9	0.100 23.3	45-50-07 119-15-02	190.3	39.73 25.73	14 CLEAR
K291BS LIC	RICHLAND WA	BLFT-60422AAE	291D 106.1	0.250 DA 0.0	46-14-08 119-19-13	293.6	13.58 -7.42	21 SHORT

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



170 meter radius from CP site



200 meter radius from proposed site

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RF Exposure Study

Power Density Calculations

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.

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

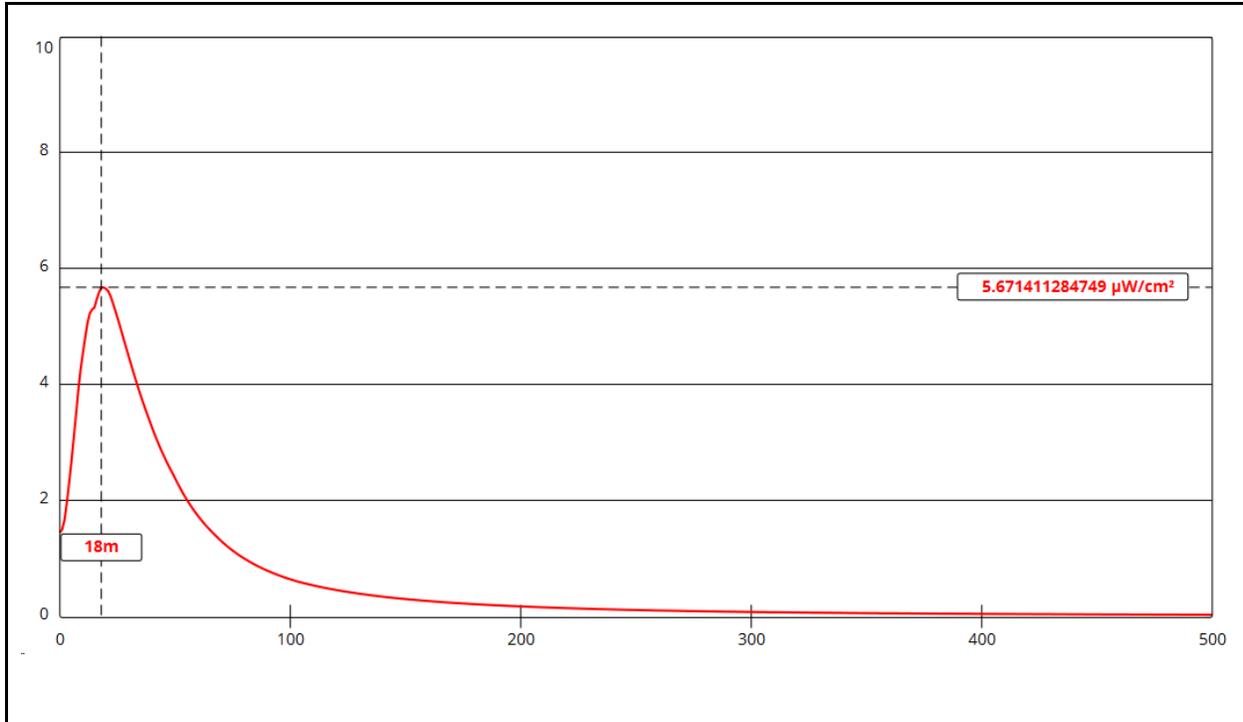
Where: *AdjERP(Watts)* is the maximum lobe effective radiated power times the element pattern factor times the array pattern factor.

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

Calculations of the power density produced by the proposed antenna system have been made using the appropriate element pattern for the Nicom BKG77-1 antenna to be used. The highest calculated ground level power density from the proposed LPFM station occurs at a distance of 18 meters from the base of the antenna support structure. At this point the power density is calculated to be 5.7 $\mu W/cm^2$, which is 2.9% of 200 $\mu W/cm^2$ (the FCC standard for uncontrolled environments).³

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 exposure in excess of FCC guidelines.

³ This study assumes a maximum ERP of 100 watts, for a worst-case analysis.



Ground-Level RF Exposure

OET FMModel

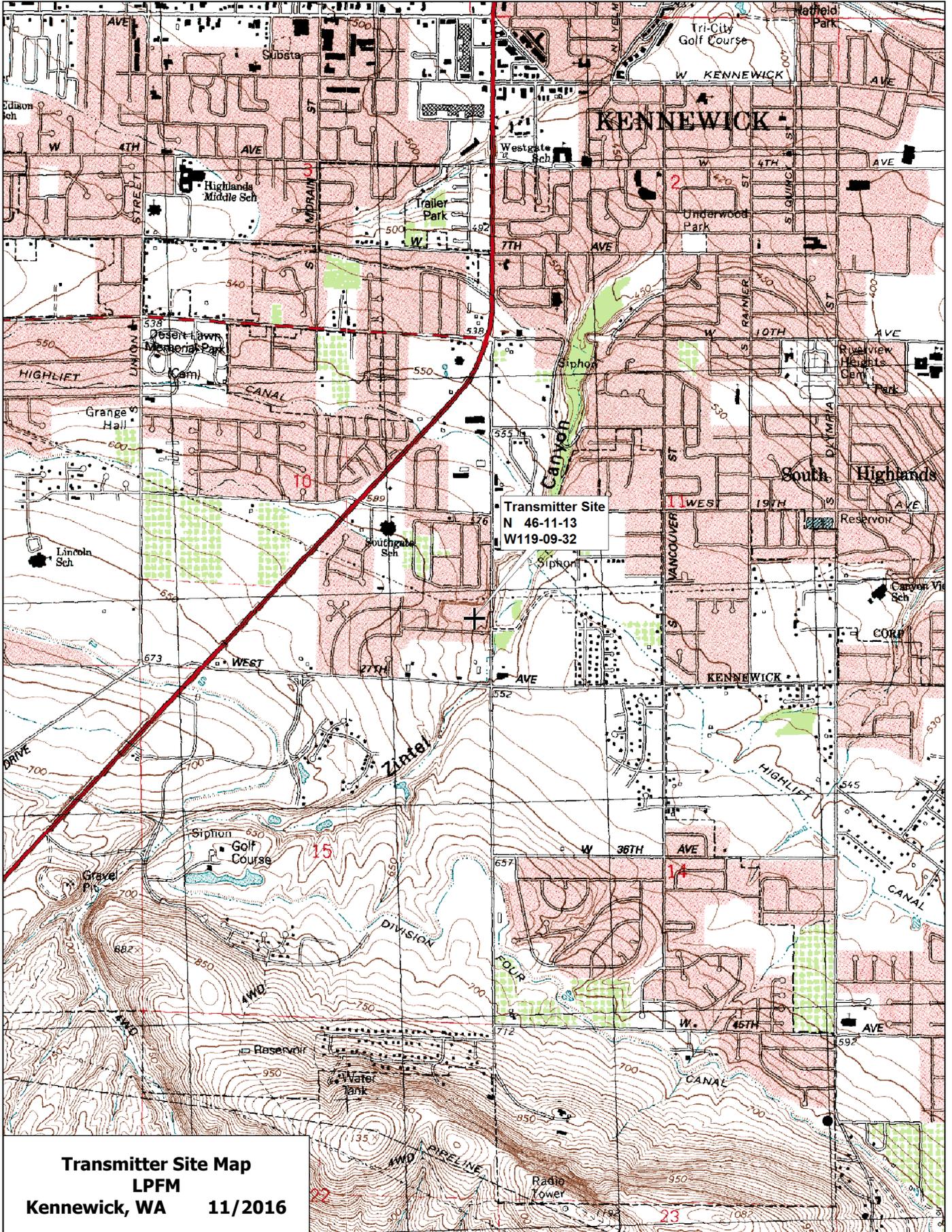
Kennewick 289L1

Antenna Type: Nicom BKG77-1 (Type 2)
 No. of Elements: 1
 Element Spacing: 1.0 wavelength

Distance: 100 meters
 Horizontal ERP: 100 W assumed
 Vertical ERP: 100 W assumed

Antenna Height: 20 meters AGL

Maximum Calculated Power Density is 5.7 μW/cm² at 18 meters from the antenna structure.



Transmitter Site
 N 46-11-13
 W 119-09-32

Transmitter Site Map
LPFM
Kennewick, WA 11/2016

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