

STEPHEN S. LOCKWOOD, PE, PMP

THOMAS M. ECKELS, PE
THOMAS S. GORTON, PE

JAMES B. HATFIELD, PE
BENJAMIN F. DAWSON III, PE
ERIK C. SWANSON, PE, PMP
DAVID J. PINION, PE
STEPHEN PUMPLE, M.Eng, MBA, PMP
CONSULTANTS

HATFIELD & DAWSON
CONSULTING ELECTRICAL ENGINEERS
9500 GREENWOOD AVE. N.
SEATTLE, WASHINGTON 98103

TELEPHONE (206) 783-9151
FACSIMILE (206) 789-9834
E-MAIL hatdaw@hatdaw.com

MAURY L. HATFIELD, PE
(1942-2009)
PAUL W. LEONARD, PE
(1925-2011)

ENGINEERING REPORT

APPLICATION for CONSTRUCTION PERMIT to RELOCATE ANTENNA

KFLD(AM)

870 kHz

Pasco, Washington

Facility ID 16725

10 kW Day, 250 Watts Night ND-U

Townsquare License, LLC

December 2023

Purpose of Application

This Engineering Report has been prepared in support of an application by Townsquare License, LLC ("Townsquare") to relocate the antenna of KFLD(AM), 870 kHz, Pasco, Washington. Diplexed operation with co-owned KONA(AM) is proposed, using the center tower of the KONA array.

Allocation Considerations

Daytime

The proposed 10 kW omni-directional operation of KFLD will not result in prohibited contour overlap with any known facility with the exception of first-adjacent channel KPAM, Troutdale, Oregon. Existing contour overlap is reduced by this proposal, as demonstrated by the daytime allocation study maps included in this report. No maps for second or third adjacent channels are included, as there are no such facilities close enough to KFLD to require study. All allocation studies in this report are based on the December 18, 2023 edition of the Commission's LMS database, and M3 ground conductivity data.

Nighttime

The proposed 250 Watt nighttime operation of KFLD will not enter the 25% RSS of any domestic facility or the 50% of any Canadian facility identified in the current version of the LMS, as demonstrated by the Site to Site RSS Calculation exhibit included in this report. This report includes calculations for all stations to which KFLD will exceed the 10% RSS threshold. Skywave protection of Class A station WWL New Orleans is demonstrated by the skywave map included in this report.

Facilities Proposed

Townsquare proposes continued operation of KFLD on 870 kHz with a power of 10 kW daytime and 250 Watts nighttime, using the center tower of the three tower KONA array. This tower is 95.6 degrees in height at 870 kHz, with a calculated efficiency of 309.441 mV/m/km at 1 kW. This tower is identified by ASR# 1032348.

The ground system consists of 120 buried copper radials, 91.4 meters in length around the base of each tower, in addition to a 9.8 meter square ground screen about the base of the towers¹.

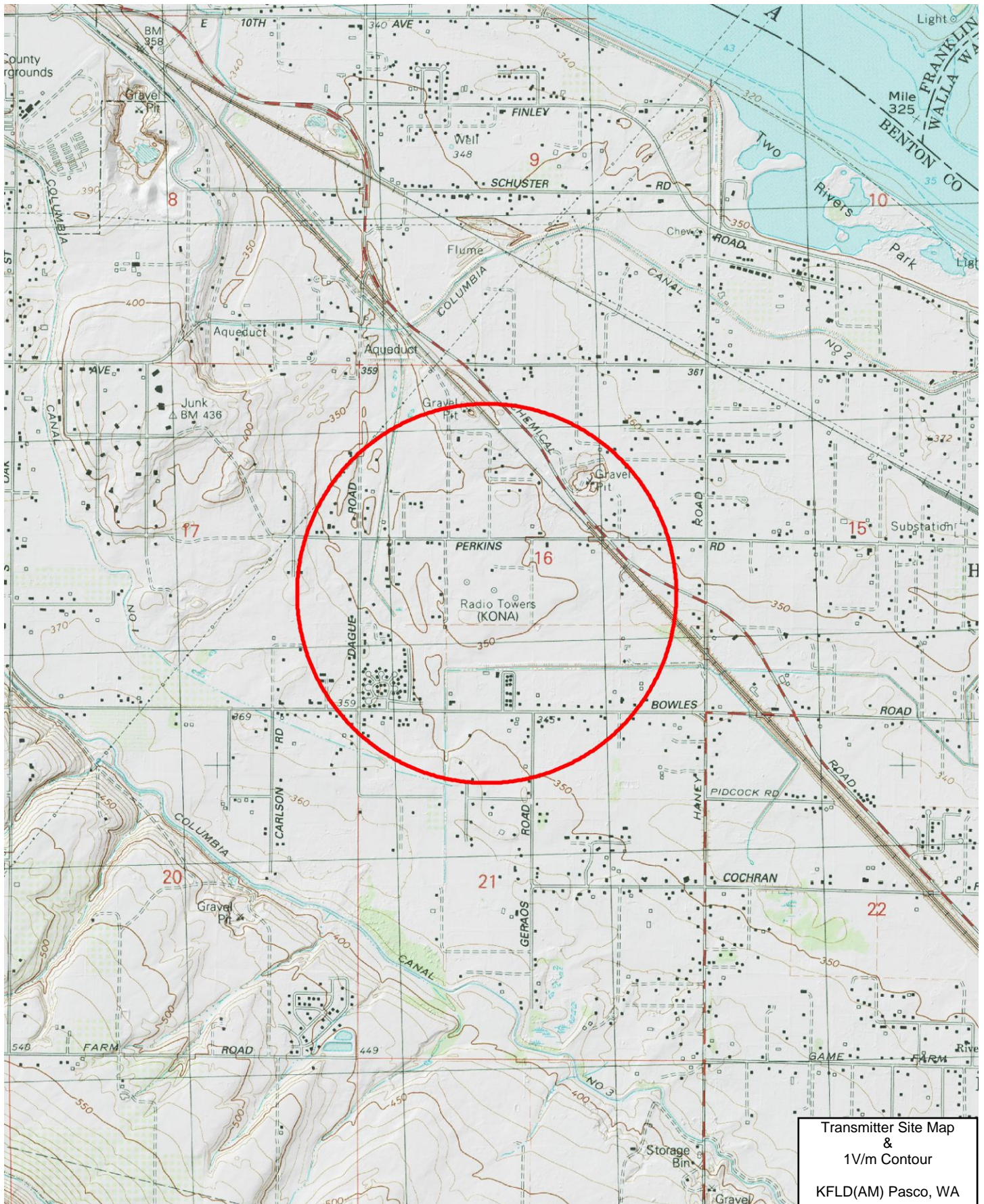
The population within the 1V/m blanketing contour of the proposed KFLD operation is 483 persons, which is 0.26% of the 183,488 persons within the 25 mV/m contour.

Antenna tower access is restricted by a fence with a locked gate that is at least 3 meters from the tower base, as required by OET-65. The required distance was calculated using Mininec Broadcast Professional using a power of 15 kW, the “worst case” combined powers of KFLD and KONA. The antenna tower is posted with warning signs, and all station personnel and contractors will be required to follow appropriate safety procedures before any work is commenced on the antenna tower, including reduction in power or discontinuance of operation before any maintenance work is undertaken.

¹BZ-841227AC



KFLD-KONA Transmitter Site Photograph

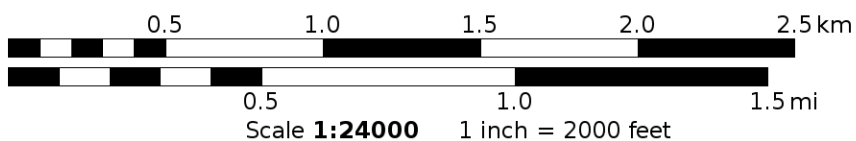


Transmitter Site Map
&
1V/m Contour
KFLD(AM) Pasco, WA

Mercator Projection

WGS84

UTM Zone 11T



MN
14.2°





KFLD

Freq: 870 kHz

Class: B

Latitude: 46-10-26.20 N

Longitude: 119-04-04.20 W

Power: 10 kW

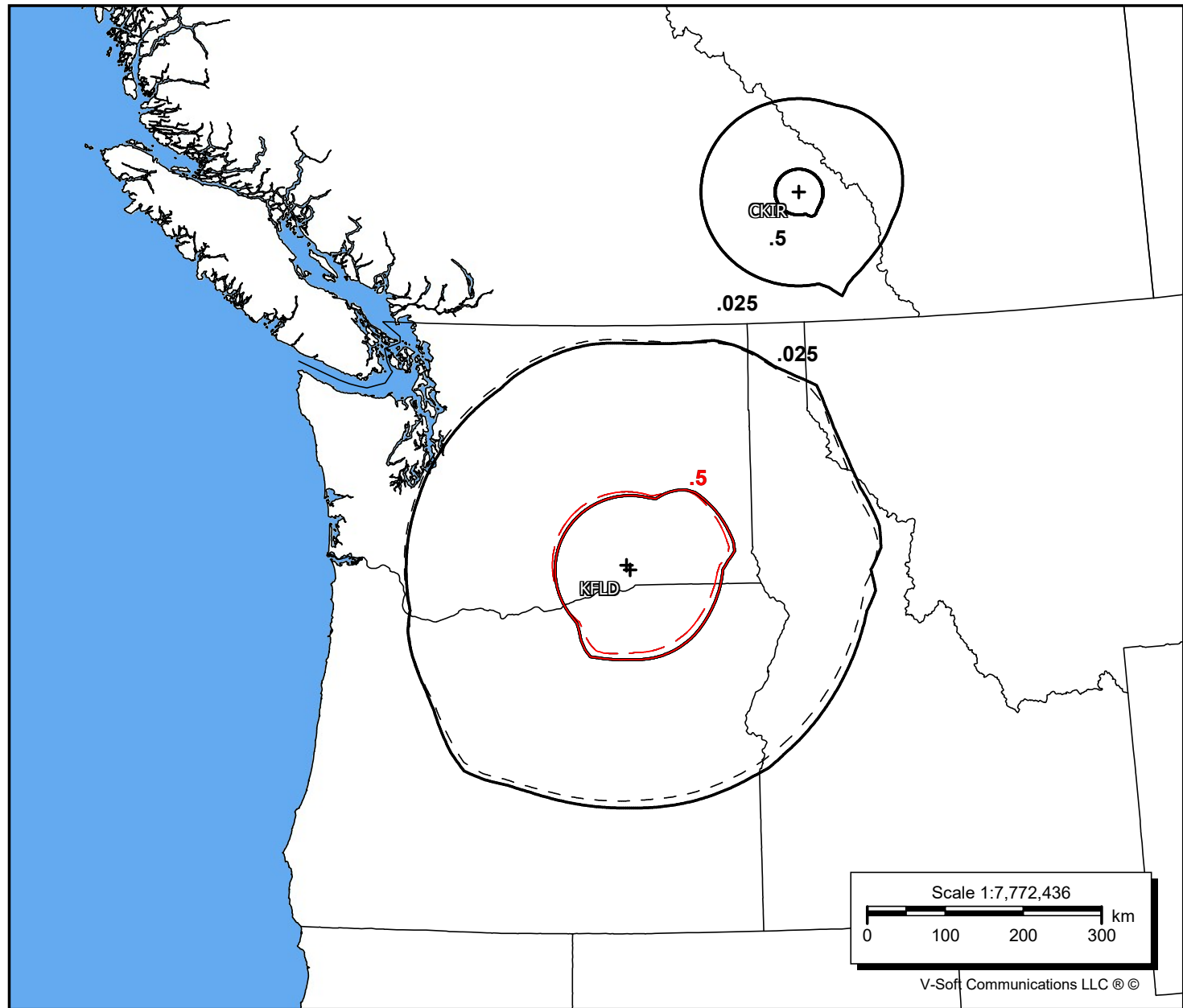
RMS: 309.441 mV/m @1km

Towers: 1

Augs: 0

Daytime Co-Channel
Allocation Study

Dashed Lines are
Licensed Contours



KFLD

Freq: 870 kHz

Class: B

Latitude: 46-10-26.20 N

Longitude: 119-04-04.20 W

Power: 10 kW

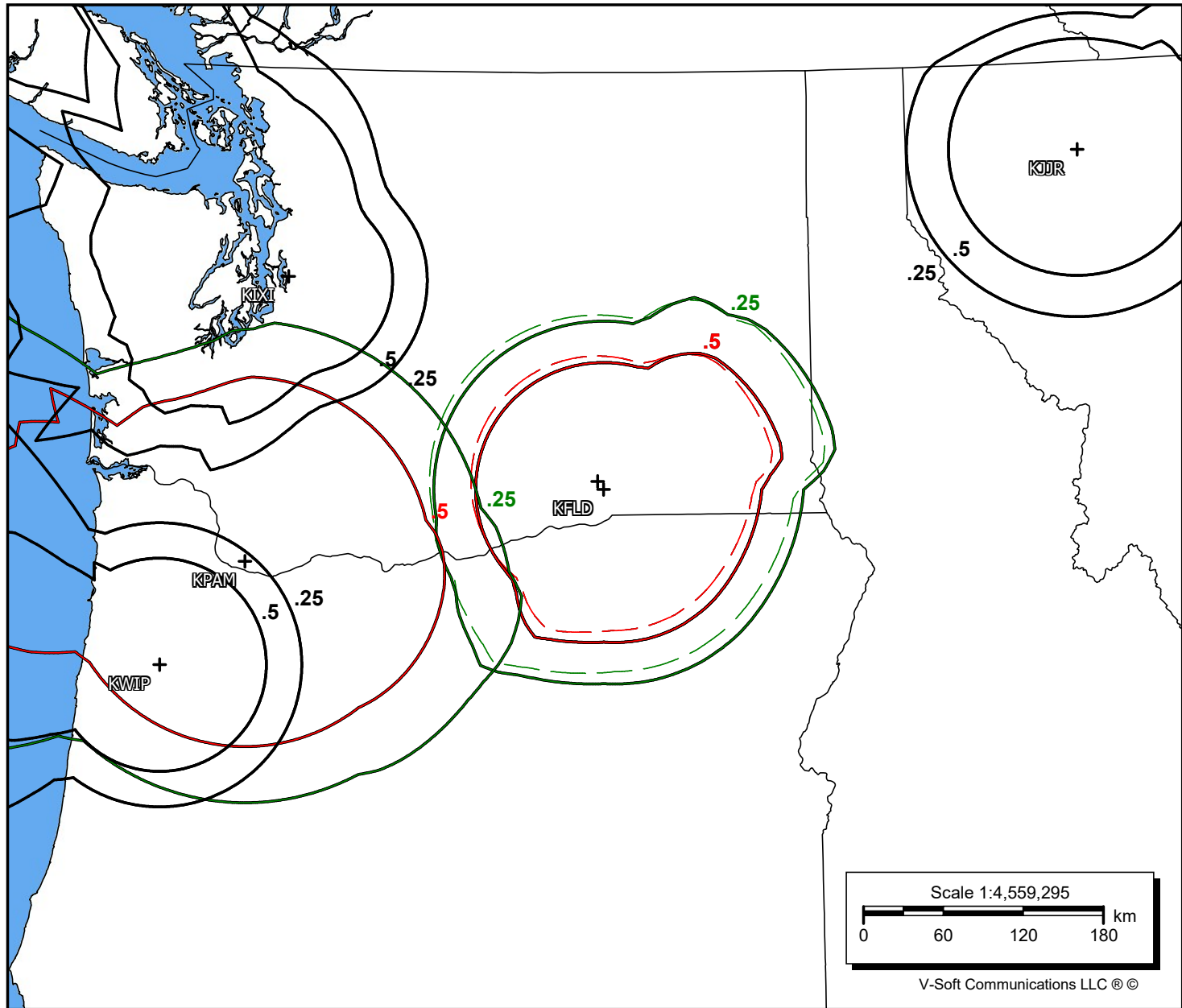
RMS: 309.441 mV/m @1km

Towers: 1

Aucs: 0

Daytime 1st-adj-Channel
Allocation Study

Dashed Lines are
Licensed Contours



Scale 1:4,559,295

0 60 120 180 km

V-Soft Communications LLC ©

KFLD

Freq: 870 kHz

Class: B

Latitude: 46-10-26.20 N

Longitude: 119-04-04.20 W

Power: 10 kW

RMS: 309.441 mV/m @1km

Towers: 1

Aucs: 0

Daytime 1st-adj-Channel
Allocation Study

Dashed Lines are
Licensed Contours

KPAM
0.5 mV/m

KFLD
0.5 mV/m

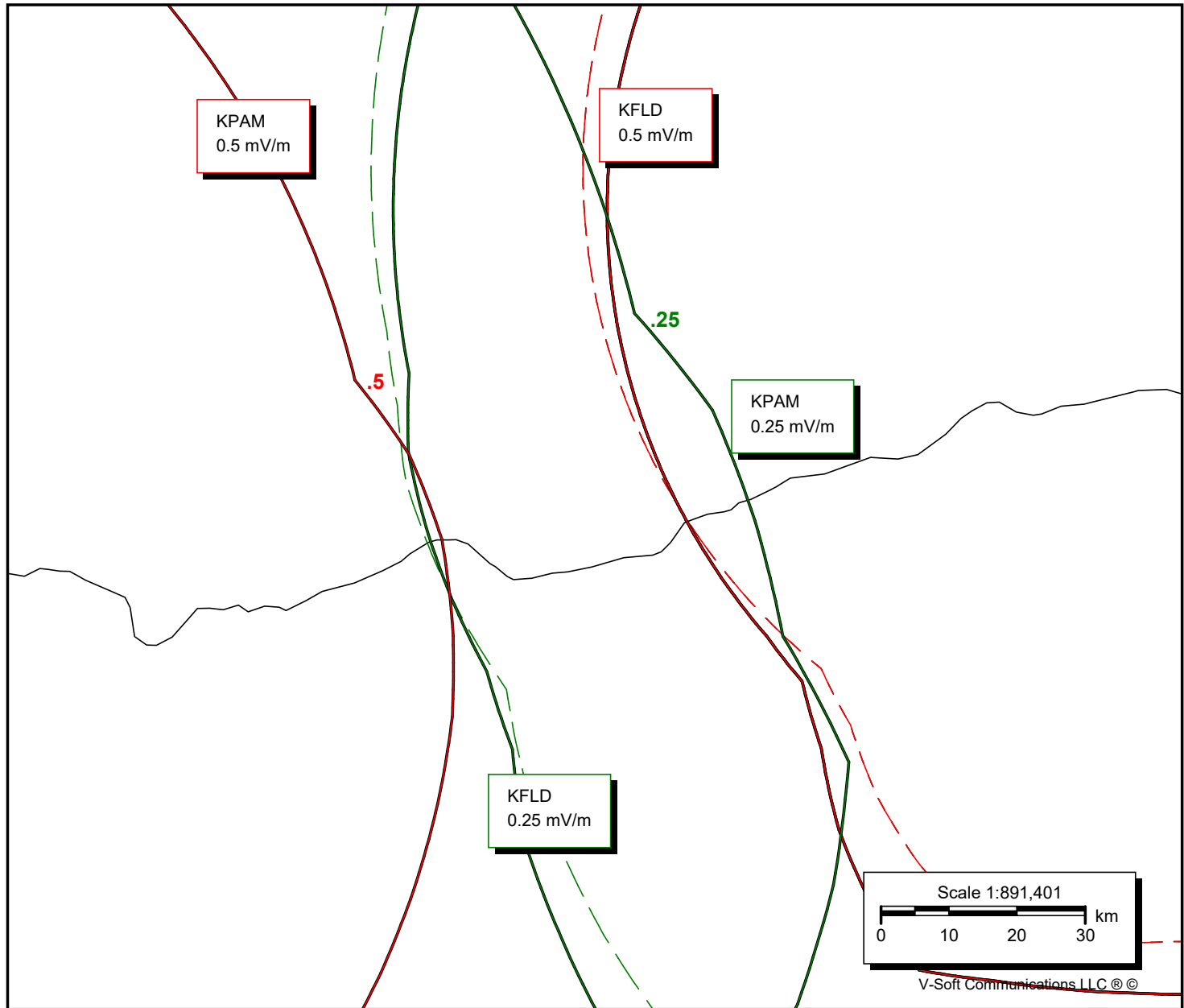
KPAM
0.25 mV/m

KFLD
0.25 mV/m

Scale 1:891,401

0 10 20 30 km

V-Soft Communications LLC ©



Critical Hours Radiation Report

Call: KFLD
 Freq: 870 kHz
 KENNEWICK-RICHLAND-P, WA, US
 Hours: D
 Lat: 46-10-26.20 N [NAD83]
 Lng: 119-04-04.20 W
 Power: 10.0 kW
 Theo RMS: 309.44 mV/m @ 1km @ 1kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	95.6	0	0	0.0	0.0	0.0	0.0

Interpolation factors for 870 kHz:

K(500) = 0.260
 K(1000) = 0.740
 K(1600) = 0.000

 Call: WWL
 Freq: 870 kHz
 NEW ORLEANS, LA, US
 Hours: D
 Lat: 29-50-14.75 N [NAD83]
 Lng: 090-07-55.27 W
 Power: 50.0 kW
 Theo RMS: 2798.70 mV/m @ 1km @ 50.0 kW
 # of Augmentations: 16

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swch	TL Swch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	182.1	0	0	0.0	0.0	0.0	0.0
2	1.250	67.0	138.0	180.0	182.1	0	0	0.0	0.0	0.0	0.0

Permissible radiation calculated using FCC 73.190 curves.
 Calculations performed using distance to the class A station's 0.1 mV/m contour.

Class A Azimuth (deg)	Reference Azimuth (deg)	Distance to 0.1 mV (km) / (mi)	Max Vert Angle (deg)	Max Rad Below Ang (mV/m@1km)	Permiss Radiation (mV/m@1km)	Margin (mV/m@1km)	
90.82	107.00	3692.4 / 2294.4	0.0	978.54	11207.3	10228.8	**
78.91	108.00	3422.0 / 2126.3	0.0	978.54	10264.7	9286.2	**
78.10	109.00	3364.3 / 2090.5	0.0	978.54	10091.3	9112.8	**
19.23	110.00	2974.4 / 1848.2	0.0	978.54	8837.0	7858.4	**
358.93	111.00	2873.1 / 1785.3	0.0	978.54	8523.7	7545.1	**
343.79	112.00	2792.5 / 1735.2	0.0	978.54	8273.3	7294.7	**
334.38	113.00	2755.8 / 1712.4	0.0	978.54	7878.5	6900.0	
326.43	114.00	2734.9 / 1699.4	0.0	978.54	7667.4	6688.9	
319.17	115.00	2729.9 / 1696.3	0.0	978.54	7671.6	6693.1	
311.96	116.00	2720.3 / 1690.3	0.0	978.54	7642.4	6663.9	
305.46	117.00	2701.1 / 1678.4	0.0	978.54	7554.0	6575.4	
299.15	118.00	2700.1 / 1677.8	0.0	978.54	7637.3	6658.8	
292.72	119.00	2709.5 / 1683.6	0.0	978.54	7819.6	6841.0	
285.00	120.00	2741.1 / 1703.2	0.0	978.54	8253.7	7275.2	
279.03	121.00	2751.6 / 1709.7	0.0	978.54	8464.5	7486.0	**
275.67	122.00	2738.6 / 1701.7	0.0	978.54	8458.6	7480.1	**
273.06	123.00	2725.2 / 1693.3	0.0	978.54	8451.2	7472.7	**
269.29	124.00	2731.2 / 1697.1	0.0	978.54	8519.5	7540.9	**
267.32	125.00	2721.5 / 1691.1	0.0	978.54	8528.3	7549.7	**

265.38	126.00	2715.5 /	1687.3	0.0	978.54	8552.5	7573.9	**
261.99	127.00	2732.8 /	1698.1	0.0	978.54	8671.0	7692.4	**
260.30	128.00	2732.1 /	1697.6	0.0	978.54	8720.2	7741.6	**
258.52	129.00	2735.9 /	1700.0	0.0	978.54	8789.9	7811.4	**
255.78	130.00	2757.1 /	1713.2	0.0	978.54	8932.1	7953.6	**
251.64	131.00	2802.9 /	1741.6	0.0	978.54	9173.5	8195.0	**

Class A Azimuth (deg)	Reference Azimuth (deg)	Distance to 0.1 mV (km) / (mi)	K(500) Value (mV/m@1km)	K(1000) Value (mV/m@1km)	Permiss Radiation (mV/m@1km)	
90.82	107.00	3692.4 / 2294.4	16093.44	9490.61	11207.3	**
78.91	108.00	3422.0 / 2126.3	16093.44	8216.80	10264.7	**
78.10	109.00	3364.3 / 2090.5	16093.44	7982.50	10091.3	**
19.23	110.00	2974.4 / 1848.2	16093.44	6287.40	8837.0	**
358.93	111.00	2873.1 / 1785.3	16093.44	5864.03	8523.7	**
343.79	112.00	2792.5 / 1735.2	16093.44	5525.62	8273.3	**
334.38	113.00	2755.8 / 1712.4	14951.23	5393.53	7878.5	
326.43	114.00	2734.9 / 1699.4	14297.11	5338.09	7667.4	
319.17	115.00	2729.9 / 1696.3	14249.44	5360.46	7671.6	
311.96	116.00	2720.3 / 1690.3	14133.21	5361.84	7642.4	
305.46	117.00	2701.1 / 1678.4	13920.67	5317.01	7554.0	
299.15	118.00	2700.1 / 1677.8	14111.82	5362.50	7637.3	
292.72	119.00	2709.5 / 1683.6	14531.23	5461.42	7819.6	
285.00	120.00	2741.1 / 1703.2	15594.83	5674.43	8253.7	
279.03	121.00	2751.6 / 1709.7	16093.44	5784.12	8464.5	**
275.67	122.00	2738.6 / 1701.7	16093.44	5776.15	8458.6	**
273.06	123.00	2725.2 / 1693.3	16093.44	5766.14	8451.2	**
269.29	124.00	2731.2 / 1697.1	16093.44	5858.32	8519.5	**
267.32	125.00	2721.5 / 1691.1	16093.44	5870.22	8528.3	**
265.38	126.00	2715.5 / 1687.3	16093.44	5902.94	8552.5	**
261.99	127.00	2732.8 / 1698.1	16093.44	6063.05	8671.0	**
260.30	128.00	2732.1 / 1697.6	16093.44	6129.55	8720.2	**
258.52	129.00	2735.9 / 1700.0	16093.44	6223.85	8789.9	**
255.78	130.00	2757.1 / 1713.2	16093.44	6415.98	8932.1	**
251.64	131.00	2802.9 / 1741.6	16093.44	6742.16	9173.5	**

** Indicates that the distance and/or azimuth was out of the range of the 73.190 permissible radiation graphs. The calculated permissible radiation is invalid.

Site to Site RSS Calculations

Protected Station: CKIR/ , 870 kHz - Invermere, BC, CA
 Coordinates: 50-31-08 N, 116-03-04 W
 Standard: Canadian (Figure 4) [10%]

Current:

Call	Freq (kHz)	Limit (mV/m)	(%)
870PRIGEO/	0870	5.097	100.0
870THOMPS/	0870	4.676	91.7
-----	50%	-----	-----
*KFLD	0870	3.368	48.6
KPRM	0870	3.207	41.6
CFBV/	0870	2.901	34.8
WWL	0870	2.679	30.3
-----	25%	-----	-----
870THUBAY/	0870	2.143	23.2
KLSQ	0870	1.574	16.6
KJMP	0870	1.524	15.8

Proposed:

Call	Freq (kHz)	Limit (mV/m)	(%)
870PRIGEO/	0870	5.097	100.0
870THOMPS/	0870	4.676	91.7
-----	50%	-----	-----
*KFLD-PRO	0870	3.426	49.5
KPRM	0870	3.207	41.5
CFBV/	0870	2.901	34.7
WWL	0870	2.679	30.2
-----	25%	-----	-----
870THUBAY/	0870	2.143	23.1
KLSQ	0870	1.574	16.5
KJMP	0870	1.524	15.8

Protected Station: CFBV/ , 870 kHz - Smithers, BC, CA
 Coordinates: 54-47-46 N, 127-11-55 W
 Standard: Canadian (Figure 4) [10%]

Current:

Call	Freq (kHz)	Limit (mV/m)	(%)
870PRIGEO/	0870	3.601	100.0
870THOMPS/	0870	2.330	64.7
CKIR/	0870	2.178	50.7
-----	50%	-----	-----
*KFLD	0870	1.606	33.3
WWL	0870	1.540	30.3
-----	25%	-----	-----
KPRM	0870	1.001	18.8
870THUBAY/	0870	0.917	16.9
KLSQ	0870	0.579	10.5

Proposed:

Call	Freq (kHz)	Limit (mV/m)	(%)
870PRIGEO/	0870	3.601	100.0
870THOMPS/	0870	2.330	64.7
CKIR/	0870	2.178	50.7
-----	50%	-----	-----
*KFLD-PRO	0870	1.627	33.8
WWL	0870	1.540	30.3
-----	25%	-----	-----
KPRM	0870	1.001	18.8
870THUBAY/	0870	0.917	16.9
KLSQ	0870	0.579	10.5

Protected Station: 870PRIGEO/ , 870 kHz - Prince George, BC, CA
 Coordinates: 53-52-00 N, 122-38-05 W
 Standard: Canadian (Figure 4) [10%]

Current:

Call	Freq (kHz)	Limit (mV/m)	(%)
CFBV/	0870	5.483	100.0
870THOMPS/	0870	3.621	66.0
-----	50%	-----	
CKIR/	0870	3.129	47.6
*KFLD	0870	2.261	31.0
-----	25%	-----	
WWL	0870	1.805	23.6
KPRM	0870	1.427	18.2
870THUBAY/	0870	1.261	15.8

Proposed:

Call	Freq (kHz)	Limit (mV/m)	(%)
CFBV/	0870	5.483	100.0
870THOMPS/	0870	3.621	66.0
-----	50%	-----	
CKIR/	0870	3.129	47.6
*KFLD-PRO	0870	2.296	31.5
-----	25%	-----	
WWL	0870	1.805	23.6
KPRM	0870	1.427	18.1
870THUBAY/	0870	1.261	15.8

KFLD

Freq: 870 kHz
Class: B
Latitude: 46-10-26.20 N
Longitude: 119-04-04.20 W
Power: 0.25 kW
RMS: 309.441 mV/m @1km
Towers: 1
AUs: 0

Skywave Protection of
Class A Station
WWL

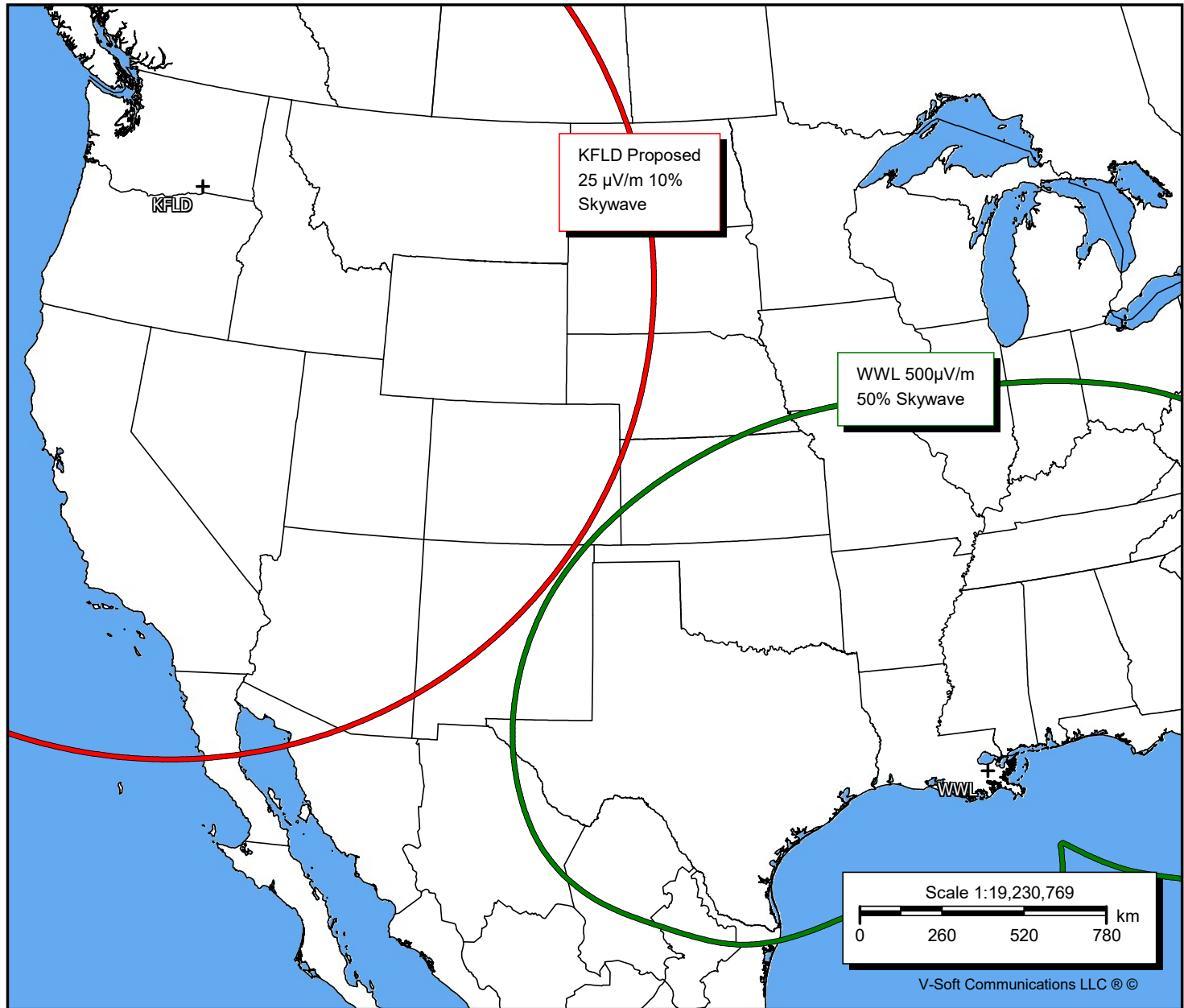
KFLD Proposed
25 μ V/m 10%
Skywave

WWL 500 μ V/m
50% Skywave

Scale 1:19,230,769

0 260 520 780 km

V-Soft Communications LLC ©



Statement of Engineer

This Engineering Report, relative to a change in facilities for KFLD(AM) has been prepared by the undersigned. All representations contained herein are true to the best of my knowledge. I am an experienced radio engineer whose qualifications are a matter of record with the Federal Communications Commission. I am an engineer in the firm of Hatfield and Dawson Consulting Engineers and am Registered as a Professional Engineer in the States of Washington and Oregon.

Signed this 20th day of December, 2023



Thomas S. Gorton, P.E.