October 2020
KUGS(FM) Channel 207A
Bellingham, WA
Allocation Study

Background

The instant application proposes modification of the KUGS construction permit BPED-20180502AAZ in order to change the antenna height on the tower, along with a corresponding change in ERP, to facilitate installation of the antenna on the tower.

Allocation Study

The attached spacing study shows the co-channel and adjacent channel spacing between stations and demonstrates that the proposed operation meets the IF channel spacing requirements as prescribed in §73.207 of the Commission's Rules.

Individual stations were examined to confirm the lack of prohibited contour overlap as prescribed in §73.509 of the Commission's Rules. The attached allocation study exhibits demonstrate requisite contour protection for the following domestic stations:

Cochannel:	KVIX	207A	Port Angeles
First-adjacent:	KNHC	208C1	Seattle
Second-adjacent:	KPLK	205A	Sedro-Woolley
	KMWS	209A	Mount Vernon

Canada Protection Study

The proposed facility is located within the US-Canada Border Zone, and is therefore subject to the requirements of the *Working Arrangement for the Allotment and Assignment of FM Broadcasting Channels Under the Agreement Between the Government of Canada and the Government of the United States of America Relating to the FM Broadcasting Service*, as amended in 1997 ("*Working Arrangement*"). The following items address the cross-border short-spacings which are identified in the spacing study.

New 207A Surrey: The spacing study indicates a 96 kilometer short-spacing to Channel 207A at Surrey. This is an abandoned proposal which no longer appears in the Canadian FM database. In Broadcasting Decision CRTC 2016-464 (Ottawa, 28 November 2016), the

CRTC considered several applications for the use of either 89.1 MHz or 89.3 MHz at Surrey. Ultimately, the CRTC approved the use of 89.1 MHz (Channel 206A) by South Asian Broadcasting for use at Surrey. That use is now licensed as CKYE-FM-1 (see below). Since first-adjacent channels 206A and 207A could not both be used at Surrey, the Channel 207A entry in the Commission's database can be considered moot.

CKYE-FM-1 206A Surrey: The spacing study indicates a 43 kilometer short-spacing to Channel 206A at Surrey. CKYE-FM-1 was, however, approved as a specially-negotiated short-spaced allotment which is limited to its "proposed parameters including the antenna pattern towards channel 207A in Bellingham, WA".

The attached "Canada Protection Study Map" demonstrates that the 48 dBu F(50,10) contour from the proposed KUGS facility will result in a slight decrease in the existing overlap which is voluntarily received by the CKYE-FM-1 facility. Since CKYE-FM-1 operates as a specially-negotiated short-spaced station with limitations towards KUGS, it has been shown on this map using the 54 dBu F(50,50) contour as calculated from its licensed parameters.

CHWK-FM 208A Chilliwack: The spacing study indicates a 55 kilometer short-spacing to Channel 208A at Chilliwack. The attached "Canada Protection Study Map" demonstrates that the 48 dBu F(50,10) contour from the proposed KUGS facility will result in a slight decrease in the existing overlap which is caused to the CHWK-FM 38 kilometer protected service radius over Canadian land areas.

CBUX-FM-1 205C1 Victoria: The spacing study indicates a 19 kilometer short-spacing to Channel 205C1 at Victoria. The attached "Canada Protection Study Map" demonstrates that the 74 dBu F(50,10) contour from the proposed KUGS facility will not overlap any Canadian land areas.

Based on the preceding analysis, the proposed facility can operate in compliance with the interference protection requirements of the *Working Arrangement*.

The proposed KUGS 60 dBu contour would (like the licensed KUGS 60 dBu contour) receive overlap from the Chilliwack allotment. However, because the received overlap in this case is not from a domestic station or allotment, the received overlap prohibitions of §73.509 are not strictly applicable to the overlap received by KUGS 207A from Chilliwack 208A. Application of §73.509 is limited to "overlap of signal strength contours with any other station *licensed by the Commission* and operating in the reserved band..." (emphasis added). Therefore, waiver of the received overlap prohibitions of §73.509 is not believed to be an absolute requirement. However, if the staff determines that a waiver of the applicable portions of §73.509 is required, it is explicitly requested for the contour overlap which would be received by the proposed KUGS 207A facility.

TV Channel 6

Section 73.525 of the Commission's Rules specifies a threshold distance of 211 kilometers for FM stations operating on Channel 214. There is no domestic TV Channel 6 station located within this threshold distance.

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SEARCH PARAMETERS FM Database Date: 20200928

Channel: 207A 89.3 MHz

Latitude: 48 44 8.5 (NAD83)

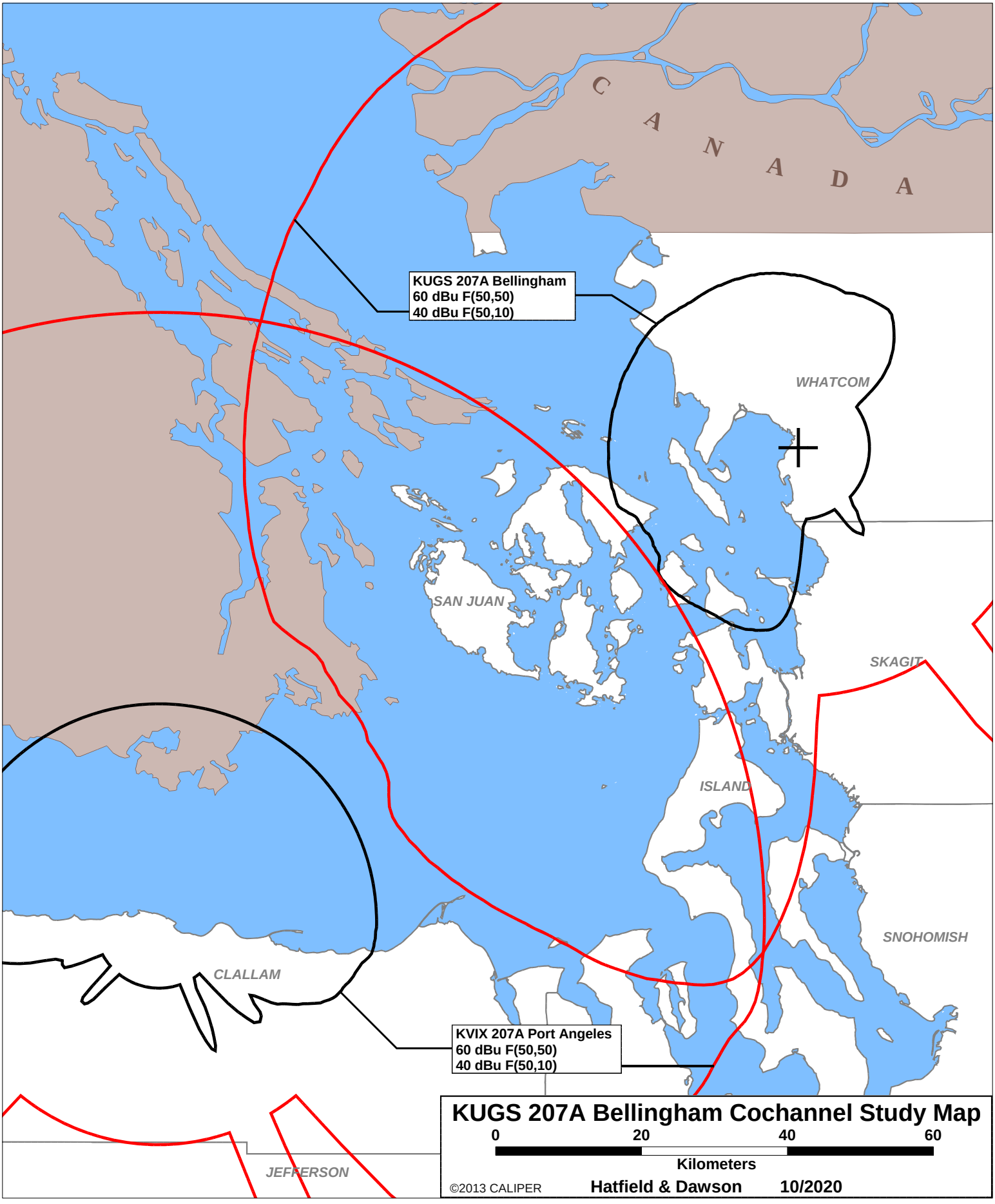
Longitude: 122 28 53.5

Safety Zone: 32 km

Job Title: KUGS 207A BELLINGHAM

Call Status	City St FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
K204BI	BELLINGHAM	204D	0.030	DA 48 48 3.4	10.9	7.39	0
LIC	WA BLFT-20100219AAT	88.7	0.0	122 27 44.6		0.00	TRANS
NEW	VICTORIA	205C1	0.000	48 35 40.3	259.0	79.89	99
ALC	BC	88.9	0.0	123 32 41.7		-19.11	SHORT
KPLK	SEDRO-WOOLLEY	205A	4.200	DA 48 32 29.4	147.7	25.54	31
LIC	WA BLED-20131017CGN	88.9	47.0	122 17 47.6		-5.46	SHORT
	SQUAMISH	206A	0.000	49 46 23.4	338.0	124.67	98
ALC	BC	89.1	0.0	123 7 48.7		26.67	CLEAR
K206DL	GRANITE FALLS/EVERET	206D	0.005	DA 48 3 5.3	148.7	88.87	0
LIC	WA BLFT-20050314AAS	89.1	0.0	121 51 41.4		0.00	TRANS
	PORT ALBERNI	207A	0.000	49 16 29.3	290.9	175.61	151
ALC	BC	89.3	0.0	124 44 14.9		24.61	CLEAR
KVIX	PORT ANGELES	207A	0.600	48 9 2.3	233.9	109.41	115
LIC	WA BLED-20050401BGM	89.3	149.0	123 40 13.7		-5.59	SHORT
KUGS	BELLINGHAM	207A	0.950	48 44 10.4	33.4	0.07	115
LIC	WA BLED-20130114ACZ	89.3	101.4	122 28 51.6		-114.93	SHORT
KUGS	BELLINGHAM	207A	0.850	48 44 8.3	198.3	0.01	115
CP	WA BPED-20180502AAZ	89.3	132.0	122 28 53.6		-114.99	SHORT
KNHC	SEATTLE	208C1	8.500	DA 47 32 34.4	168.1	135.51	133
LIC	WA BLED-20020402AAC	89.5	372.0	122 6 29.4		2.51	CLOSE
	DUNCAN	209B	0.000	48 51 37.3	278.9	94.72	78
ALC	BC	89.7	0.0	123 45 24.7		16.72	CLEAR
KMWS	MOUNT VERNON	209A	1.500	DA 48 32 29.4	147.7	25.54	31
LIC	WA BLED-20070919AAE	89.7	36.0	122 17 47.6		-5.46	SHORT
K210CN	BELLINGHAM	210D	0.007	DA 48 46 56.4	57.7	9.74	0
LIC	WA BLFT-20060906ABO	89.9	0.0	122 22 9.6		0.00	TRANS

==== END OF FM SPACING STUDY FOR CHANNEL 207 ====


C A N A D A
KUGS 207A Bellingham
60 dBu F(50,50)
40 dBu F(50,10)
WHATCOM
SAN JUAN
SKAGIT
ISLAND
SNOHOMISH
CLALLAM
KVIX 207A Port Angeles
60 dBu F(50,50)
40 dBu F(50,10)
JEFFERSON
KUGS 207A Bellingham Cochannel Study Map
0
20
40
60
Kilometers
©2013 CALIPER
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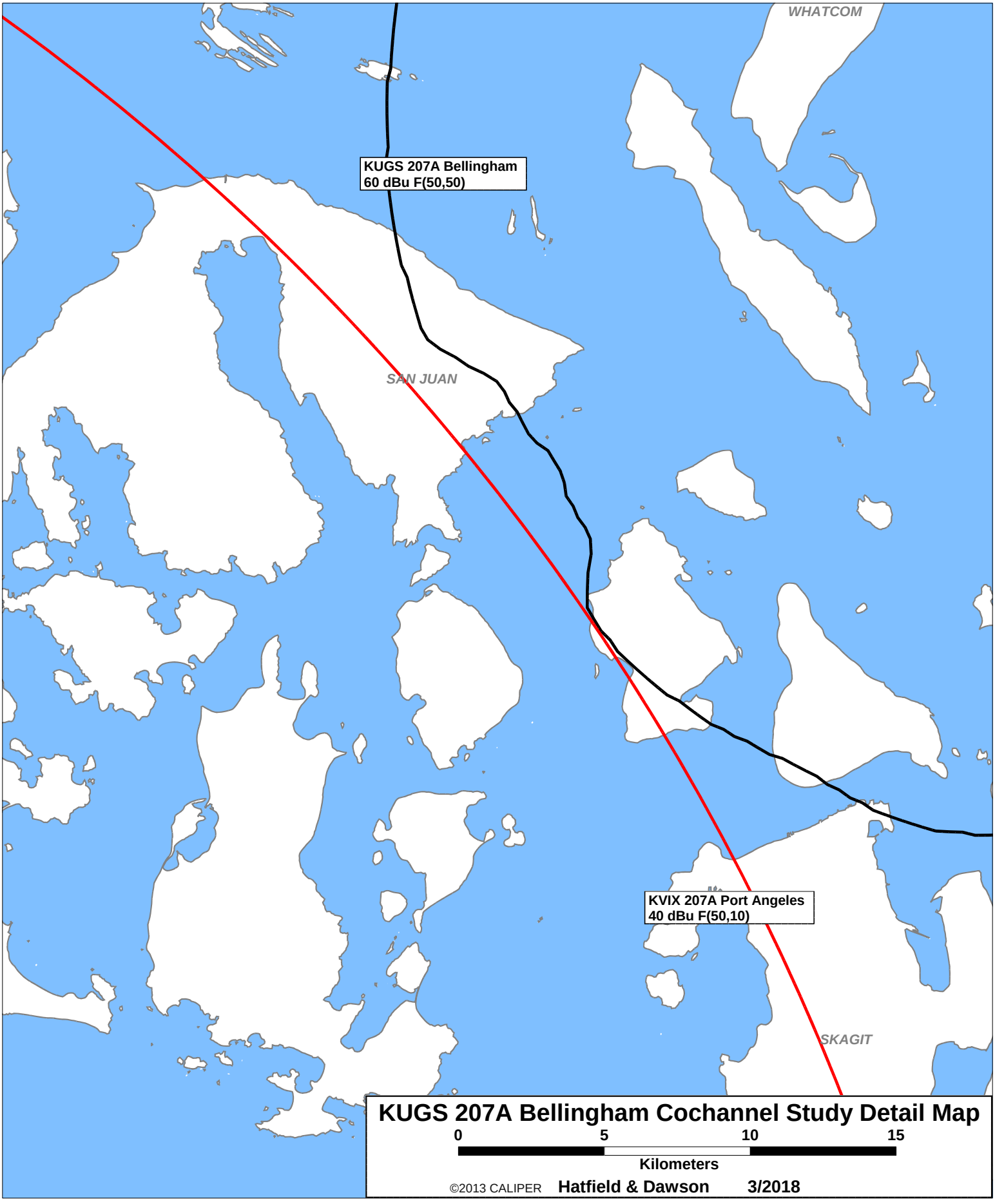
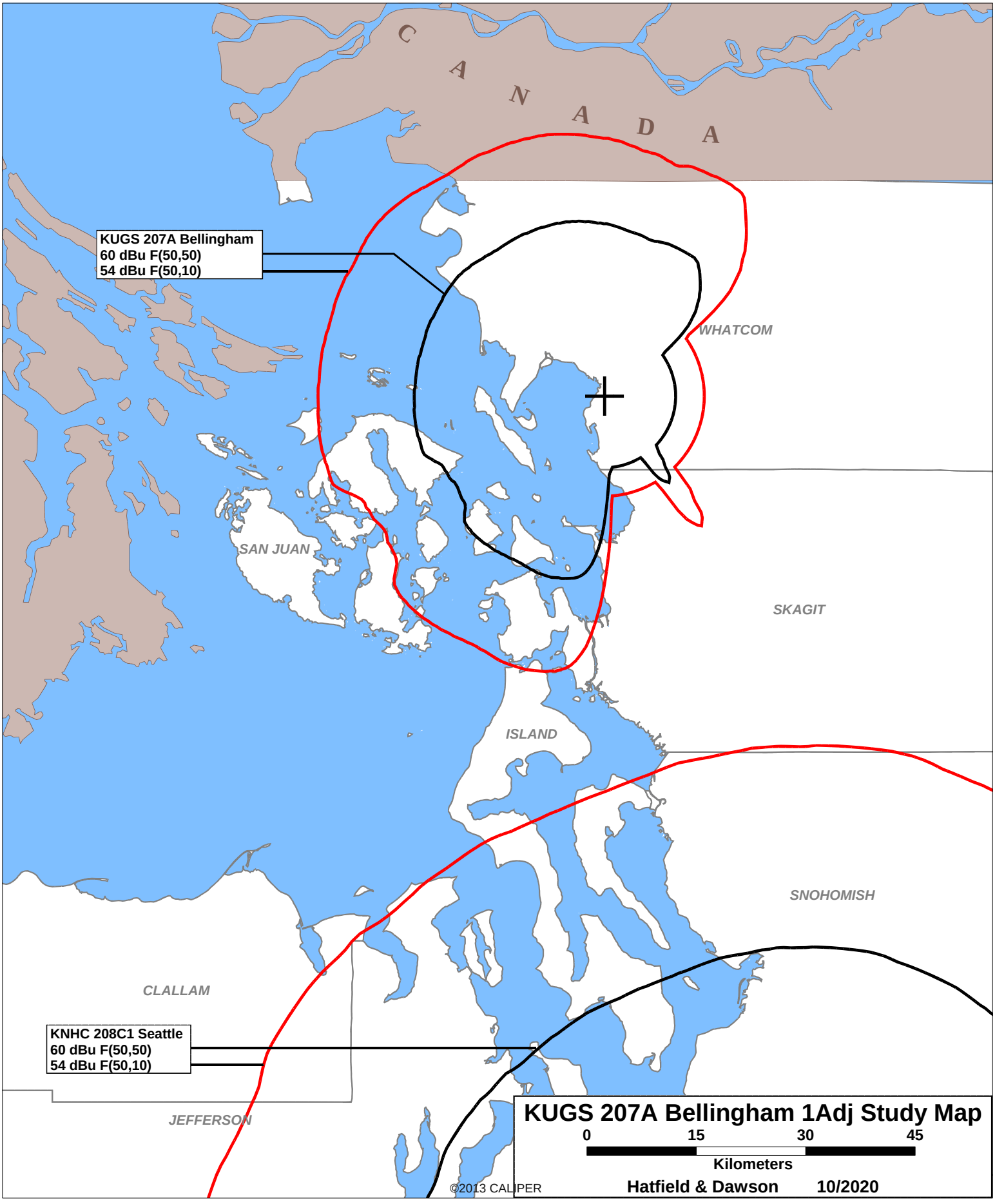


KUGS 207A Bellingham Cochannel Study Detail Map

0 5 10 15

Kilometers

 Hatfield & Dawson 3/2018


C A N A D A
KUGS 207A Bellingham
60 dBu F(50,50)
54 dBu F(50,10)
WHATCOM
SAN JUAN
SKAGIT
ISLAND
SNOHOMISH
CLALLAM
KNHC 208C1 Seattle
60 dBu F(50,50)
54 dBu F(50,10)
JEFFERSON
KUGS 207A Bellingham 1Adj Study Map
0 15 30 45
Kilometers
©2013 CALPER
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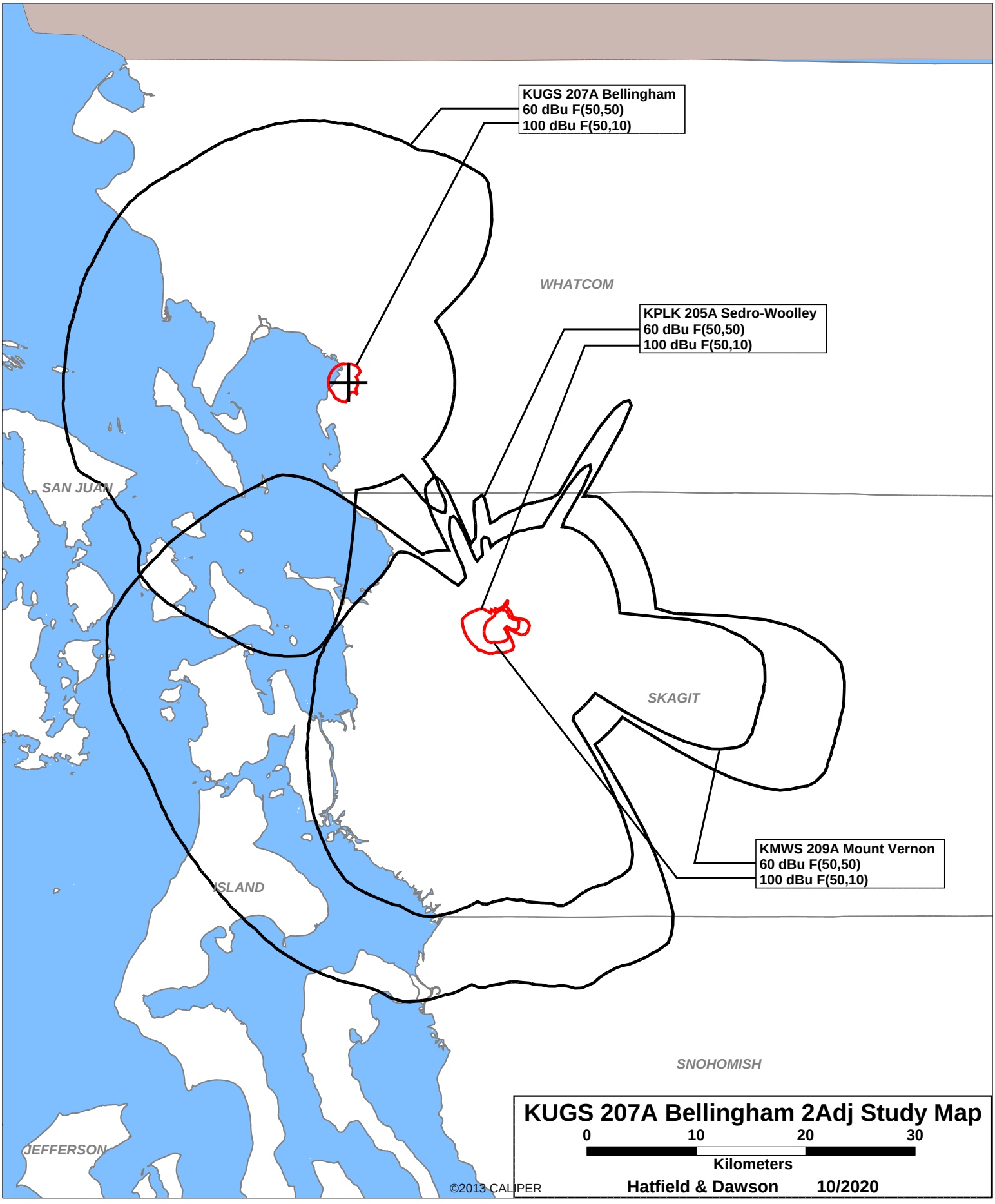
KUGS 207A Bellingham
60 dBu F(50,50)
100 dBu F(50,10)
KPLK 205A Sedro-Woolley
60 dBu F(50,50)
100 dBu F(50,10)
KMWS 209A Mount Vernon
60 dBu F(50,50)
100 dBu F(50,10)
WHATCOM
SAN JUAN
SKAGIT
ISLAND
SNOHOMISH
JEFFERSON
KUGS 207A Bellingham 2Adj Study Map
0
10
20
30
Kilometers
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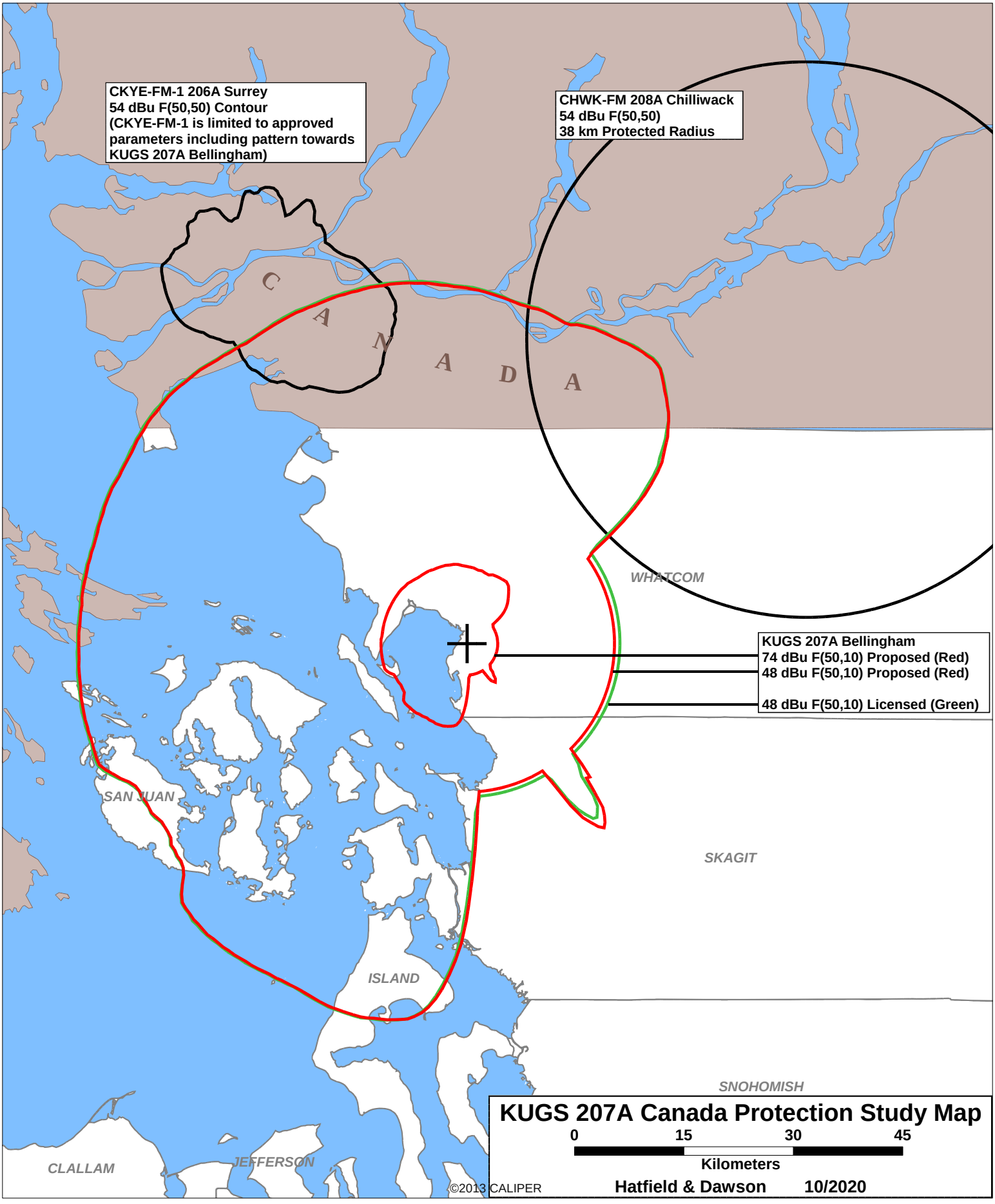
CKYE-FM-1 206A Surrey
54 dBu F(50,50) Contour
(CKYE-FM-1 is limited to approved parameters including pattern towards KUGS 207A Bellingham)
CHWK-FM 208A Chilliwack
54 dBu F(50,50)
38 km Protected Radius
C A N A D A
WHATCOM
KUGS 207A Bellingham
74 dBu F(50,10) Proposed (Red)
48 dBu F(50,10) Proposed (Red)
48 dBu F(50,10) Licensed (Green)
SAN JUAN
SKAGIT
ISLAND
SNOHOMISH
CLALLAM
JEFFERSON
KUGS 207A Canada Protection Study Map
0 15 30 45
Kilometers
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October 2020
KUGS(FM) Channel 207A
Bellingham, WA
RF Exposure Study

Facilities Proposed

The proposed operation will be on Channel 207A (89.3 MHz) with an effective radiated power of 0.810 kilowatts. Operation is proposed with a 4-element circularly-polarized omni-directional antenna which will be side-mounted on a tower atop Sehome Hill in Bellingham.

The proposed antenna support structure does not exceed 60.96 meters (200 feet) above ground and does not require notification to the Federal Aviation Administration. Therefore, this structure does not require an Antenna Structure Registration Number.

DETERMINATION Results

PASS SLOPE(100:1): NO FAA REQ-RWY MORE THAN 10499 MTRS & 6707.73 MTRS (6.7077 KM) AWAY

Type	C/R	Latitude	Longitude	Name	Address	Lowest Elevation (m)	Runway Length (m)
AIRP	R	48-47-0.00N	122-32-15.00W	BELLINGHAM INTL	WHATCOM BELLINGHAM, WA	49.8	2042.2

Your Specifications	
NAD83 Coordinates	
Latitude	48-44-08.5 north
Longitude	122-28-53.5 west
Measurements (Meters)	
Overall Structure Height (AGL)	60.4
Support Structure Height (AGL)	60.4
Site Elevation (AMSL)	190.0
Structure Type	
LTOWER - Lattice Tower	

RF Exposure 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.

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

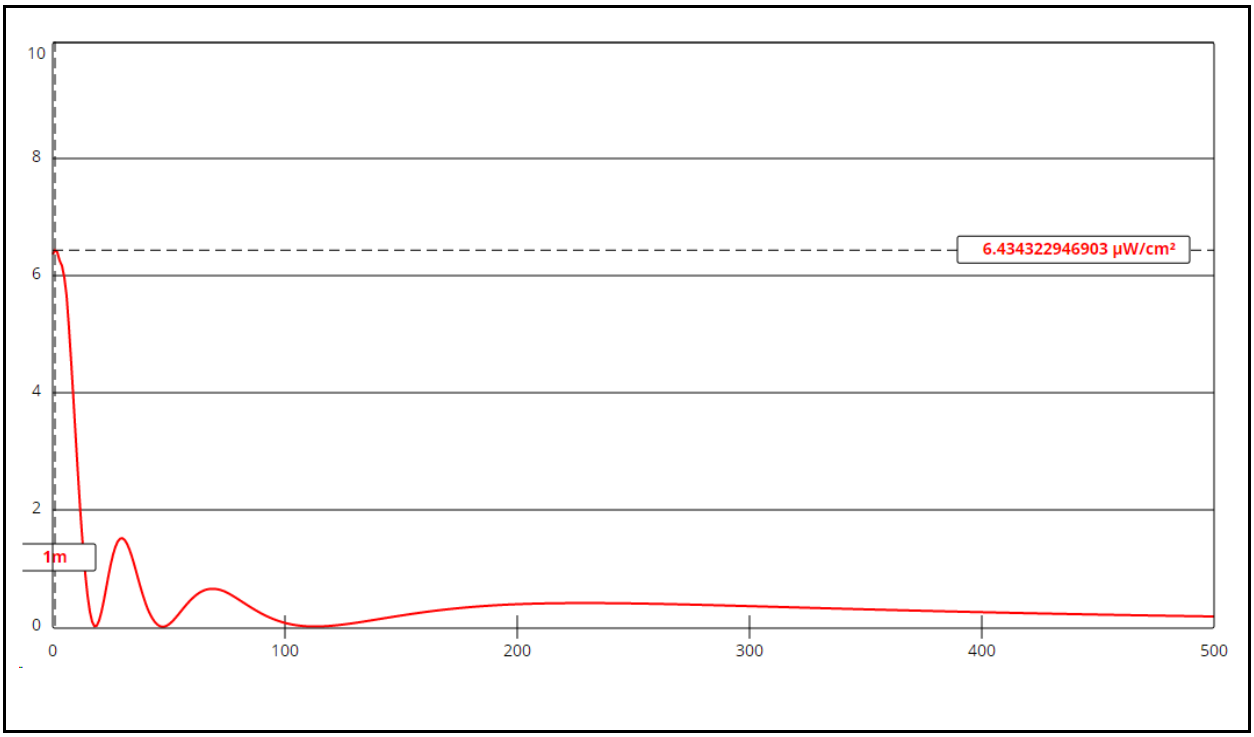
Where: *AdjERP(Watts)* is the maximum lobe effective radiated power times the element pattern factor times the array pattern factor.

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

Ground level power densities have been calculated for locations extending from the base of the tower to a distance of 500 meters. Values past this point are increasingly negligible.

Calculations of the power density produced by the proposed antenna system assume a Type 1 element pattern, which is the FMModel element pattern for the Shively 6812B-4 antenna proposed for use. The highest calculated ground level power density occurs at a distance of 1 meters from the base of the antenna support structure. At this point the power density is calculated to be 6.4 $\mu W/cm^2$, which is 3.2% of 200 $\mu W/cm^2$ (the FCC standard for uncontrolled environments).

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.

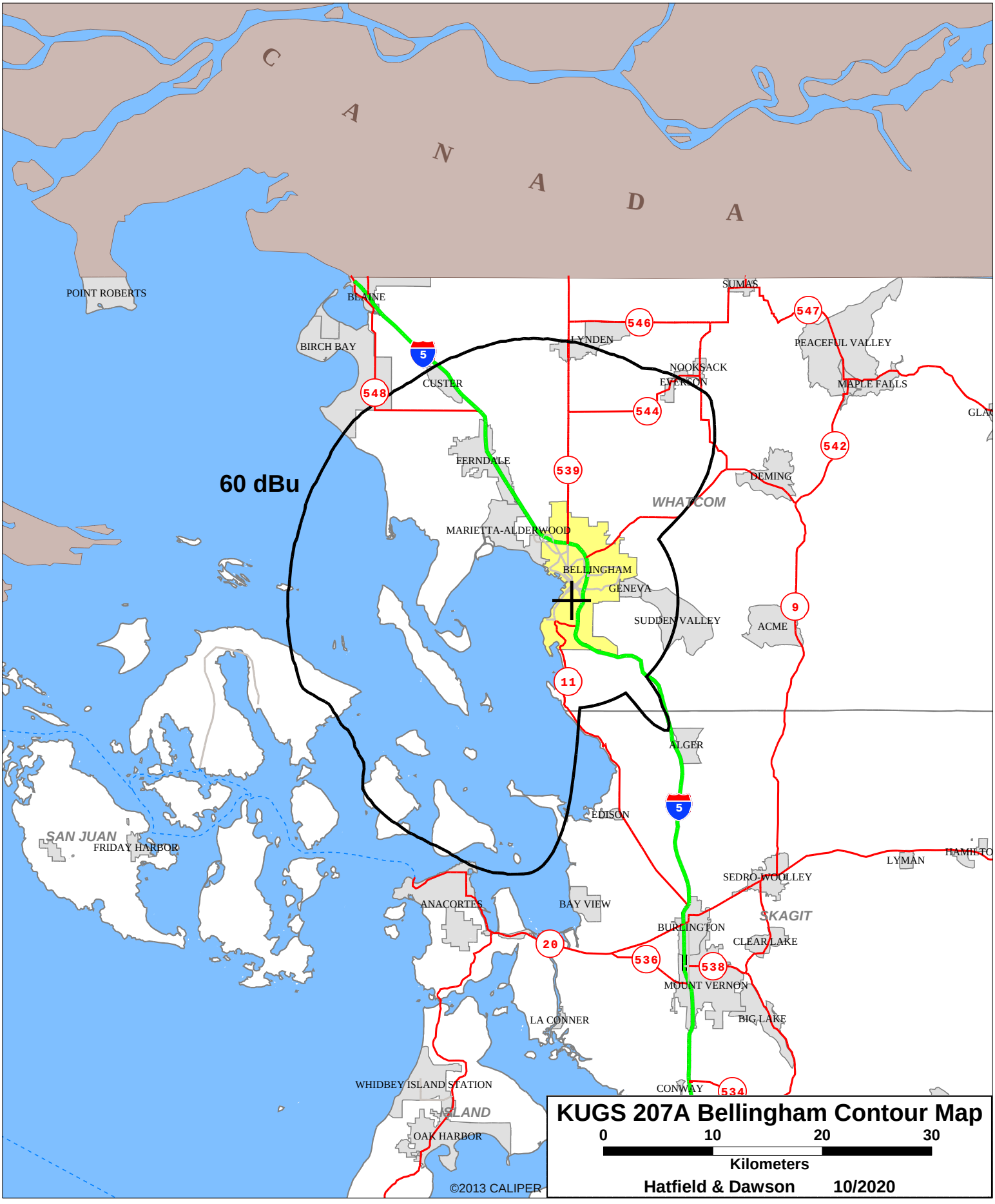


Ground-Level RF Exposure **OET FMModel**

KUGS 207A Bellingham

Antenna Type:	Shively 6812B-4 (Type 1)
No. of Elements:	4
Element Spacing:	0.85 wavelength
Distance:	500 meters
Horizontal ERP:	810 W
Vertical ERP:	810 W
Antenna Height:	36.6 meters AGL

Maximum Calculated Power Density is 6.4 µW/cm^2 at 1 meters from the antenna structure.


C A N A D A
POINT ROBERTS
BLAINE
BIRCH BAY
CUSTER
LYNDEN
SUMAS
NOOKSACK
EVERSON
PEACEFUL VALLEY
MAPLE FALLS
FERNDALE
DEMING
60 dBu
WHATCOM
MARIETTA-ALDERWOOD
BELLINGHAM
GENEVA
SUDDEN VALLEY
ACME
ALGER
EDISON
SAN JUAN
FRIDAY HARBOR
ANACORTES
BAY VIEW
SEDRO-WOOLLEY
LYMAN
SKAGIT
BURLINGTON
CLEAR LAKE
MOUNT VERNON
BIG LAKE
LA CONNER
WHIDBEY ISLAND STATION
CONWAY
OAK HARBOR
546
547
548
544
542
539
9
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538
534
KUGS 207A Bellingham Contour Map
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Kilometers
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