Comprehensive Engineering Statement

prepared for

Pacifica Foundation, Inc.

WPFW(FM) Washington, DC

Facility ID 51255

Ch. 207B 34 kW 156 m

Pacifica Foundation, Inc. ("Pacifica") is the licensee of WPFW(FM), Channel 207B, Washington, DC, (FCC Facility ID 51255, FCC File Number BLED-1662). *Pacifica* herein proposes to utilize a common antenna system for WPFW(FM) and several other stations on the same registered supporting structure (ASR number 1045309). The tower coordinates are 38º 56' 10" N Latitude, and 77º 05' 33" W Longitude (NAD 27). A coordinate correction and Height Above Average Terrain ("HAAT") of 156 meters is being specified herein.

Allocation Considerations

As a Channel 207 NCE facility, the proposal continues to comply with the NCE protection rules as described below. WPFW has been authorized to operate at 50 kW Effective Radiated Power ("ERP") with an antenna height of 125 m HAAT at its current location since July 11, 1977. The new antenna height of 225.9 meters AMSL is 156 meters HAAT.

Figure 1 compares the licensed and proposed 60 dBµ coverage contour. As shown, the proposed contour replicates the licensed contour. As required by Section 73.515 of the Rules, more than 50 percent of Washington, DC is covered by the 60 dBµ contour.[1] **Table I** provides a listing of the nearest co-channel and adjacent channel full service facilities based on standard spacing. The nearest co-channel stations are WVTU(FM) (Channel 207B1, Charlottesville, VA), WRTJ(FM) (Channel 207A, Coatesville, VA), WNJB-FM (Channel 207A, Bridgeton, NJ) and WJYA(FM) (CP - Channel 207C2, Emporia, VA). As demonstrated in **Figure 2**, the 60 dBµ contour of each co-channel station is protected from overlap by the proposed 40 dBµ F(50,10) interfering contour. Likewise, none of the other co-channel station's 40 dBµ interfering contour has prohibited overlap with the proposal.

The nearest first adjacent facilities include WLJV(FM) (Channel 208B1, Spotsylvania, VA), WGMS(FM) (Channel 206B1, Hagerstown, VA), WSCL(FM) (Channel 208B, Salisbury, MD), WITF-FM (Channel 208B, Harrisburg, PA) and WRLP(FM) (Channel 206A, Orange, VA).

[1] Contours for this study were calculated with HAAT determined for every degree along radials. Terrain was determined using a 3 arc-second database derived from USGS topographic maps.

As shown in **Figure 3**, no first adjacent incoming prohibited contour overlap is being proposed for the proposed facility. Also shown, there is no prohibited outgoing first adjacent contour overlap to first adjacent facilities with the exception of WLJV(FM). **Figure 3a** depicts a detailed view of the Licensed and proposed contour overlap, with a comparison of the previous WLJV(FM) authorization.[2] As demonstrated, there is existing overlap between the Licensed WPFW(FM) 54 dBμ interfering contour and the Licensed WLJV(FM) 60 dBμ contour. Since the existing overlap is being reduced as a result of the proposal, it is believed that the instant proposal complies with FCC policy regarding overlap.

Nearby second adjacent facilities include WEAA(FM) (Ch205B1, Baltimore, MD), WTMD(FM) (Channel 209B1, Towson, MD) and WXMD(FM) (Channel 209B1, California, MD). **Figure 4** demonstrates that no prohibited overlap will occur to second or third adjacent facilities as a result of the proposal. There are no IF relationship (53 or 54 Channels separated) facilities within 20 km of the proposal. The nearest IF station is WDCH-FM (Channel 256B, Bowie, MD) at a distance of 32.23 km.

TV Channel 6 Considerations

Under §73.525(a)(1), an affected TV Channel 6 station must be considered with a proposed non-commercial educational facility on Channel 207 if the distance between the respective transmitter sites is 246 km or less. Within a 246 km radius of the proposed facility, there are no full service NTSC TV Channel 6 facilities. The proposed facility is not moving to a new transmitter site, and any predicted interfering contours are actually being decreased as a result of the antenna height increase. It is therefore believed that no television Channel 6 facilities will experience a change in interference as a result of the instant proposal.

Green Bank, Monitoring Station, International Considerations

The proposed facility is located outside the Green Bank coordinates identified in §73.1030(a)(1). The site is located 457.4 km from Canada and 2,371.1 km from the Mexican border, well beyond the 320 km coordination distance for both countries. The nearest FCC

[2] The existing contour overlap in our studies appears to have been introduced in the most recent authorization for WLJV(FM) (file number BLED-20180529AAP). See **Figure 3a** for comparison between the previous and the current WJLV(FM) licenses. We have not been able to reproduce the lack of contour overlap which was presented in the WLJV(FM) CP (file number BPED- 20180112AAE) using the same software and terrain databases identified.

monitoring station is 34.6 km distant at Laurel, Maryland. This distance is within the threshold distance specified in Section 73.1030(c)(3)(iv) that would suggest consideration of the monitoring station. However, the instant proposal is not requesting an increase in ERP or proposing to increase the field strength over the monitoring station in excess of that previously authorized. Therefore, notification of the monitoring station is not required. With respect to AM stations, according to information extracted from the Commission's Media Bureau database, there are no facilities within 3.2 km of the proposed site.

It is therefore believed that the proposed facility satisfies all of the pertinent Commission Rules and Policies now in effect regarding allocation matters.

Environmental Considerations

Pacifica proposes to move WPFW(FM) to a new antenna on the same registered tower (ASR number 1045309) as its current authorization. The proposed antenna will be a new Master FM Antenna to be used by WPFW(FM) (Channel 207B, Washington, DC), WAMU(FM) (Channel 203B, Washington, DC), WETA(FM) (Channel 215B, Washington, DC), and WTOP-FM (Channel 278B, Washington, DC). The antenna will be mounted with the center of radiation at 114.6 meters above ground level. The overall height of the structure will continue to be 130.5 meters above ground level. The use of existing transmitting locations has been characterized as being environmentally preferable by the Commission, according to Note 1 of §1.1306 of the FCC Rules. Because no change in structure height is proposed, no change in current structure marking and lighting requirements is anticipated. Therefore, it is believed that this application may be categorically excluded from environmental processing pursuant to §1.1306 of the Commission's rules.

Human Exposure to Radiofrequency Radiation

In keeping with §1.1307(b) of the Commission's Rules, the proposed operation has been evaluated for human exposure to radiofrequency energy using the procedures outlined by the Federal Communications Commission in FCC OET Bulletin 65 ("OET-65"). OET-65 describes a means of determining whether a proposed facility exceeds the radiofrequency exposure guidelines specified in §1.1310 of the Commission's Rules. Under present Commission policy, a facility may be presumed to comply with the limits in §1.1310 of the Commission's Rules if it satisfies

the exposure criteria set forth in OET-65. Based upon that methodology, and as demonstrated in the following, the proposed transmitting system will comply with the cited adopted guidelines.

An effective radiated power ("ERP") of 34 kW, circularly polarized, will be employed, utilizing an ERI model number 1183-4CP-DA-SP 4-bay antenna with a bay spacing of 100 inches, or 0.76 wavelengths at 89.3 MHz. **Figure 5** depicts the vertical (elevation) pattern specific to WPFW(FM)'s frequency.[3] The "uncontrolled/general population" limit specified in §1.1310 for FM Channel 203 (89.3 MHz) is 200 μW/cm².

OET-65's formula for FM signal density in this analysis is essentially the same as equation (10) in OET-65:

$$S = (33.4098)\,(F^2)\,(ERP) / D^2$$

Where:

S	=	power density in microwatts/cm^2
ERP	=	total (average) ERP in Watts
F	=	relative field factor
D	=	distance in meters

Using this formula, the antenna's elevation pattern, and the above assumptions, the proposed facility would contribute a maximum power density of 6.39 μW/cm² at two meters above ground, or 3.195 percent of the general population/uncontrolled MPE limit. **Figure 6** is a graphical depiction of the calculated RF exposure attributable to the instant proposal along radials extending 1,000 meters from the proposed support structure at two meters above ground level. At ground level locations away from the base of the tower, the calculated RF power density is lower, due to the increasing distance from the transmitting antenna. Thus, the proposed facility complies with §1.1307(b) of the Commission's Rules regarding exposure to radiofrequency radiation.

§1.1307(b)(3) states that facilities at locations with multiple transmitters (such as the case at hand) are categorically excluded from responsibility for taking any corrective action in the

[3] The FCC prefers the use of FM Model to predict the FR exposure of a proposal. In this case, FM Model does not have a choice that includes the type of antenna being proposed. As a worst-case prediction, the default "ring-stub" style antenna exaggerates the downward radiation compared to the data provided by the manufacturer. All other FM Model choices predict lower downward radiation than provided by the manufacturer. The elevation pattern tabulation of the antenna can be made available to FCC staff upon request.

areas where their contribution is less than five percent. Since the instant situation meets the five percent exclusion test at all ground level areas, the impact of any other facilities using this site may be considered independently from this proposal. Accordingly, it is believed that the impact of the proposed operation should not be considered to be a factor at or near ground level as defined under §1.1307(b).

As demonstrated herein, excessive levels of RF energy attributable to the proposal will not be caused at publicly accessible areas at ground level near the antenna supporting structure. Consequently, members of the general public will not be exposed to RF levels in excess of the Commission's guidelines. Nevertheless, tower site access will continue to be restricted and controlled through the use of a locked fence. Additionally, appropriate RF exposure warning signs will continue to be posted.

Safety of Tower Workers and the General Public

With respect to worker safety, it is believed that based on the preceding analysis, excessive exposure would not occur in areas at ground level. A site exposure policy will continue to be employed protecting maintenance workers from excessive exposure when work must be performed on the tower in areas where high RF levels may be present. Such protective measures may include, but will not be limited to, restriction of access to areas where levels in excess of the guidelines may be expected, power reduction, or the complete shutdown of facilities when work or inspections must be performed in areas where the exposure guidelines will be exceeded. On-site RF exposure measurements may also be undertaken to establish the bounds of safe working areas. The applicant will coordinate exposure procedures with all pertinent stations.

Based on the preceding, it is believed that the instant proposal may be categorically excluded from environmental processing under Section 1.1306 of the Rules; hence preparation of an Environmental Assessment is not required.

Conclusion

It is therefore believed that the proposed facility satisfies all of the pertinent Commission Rules and Policies now in effect.

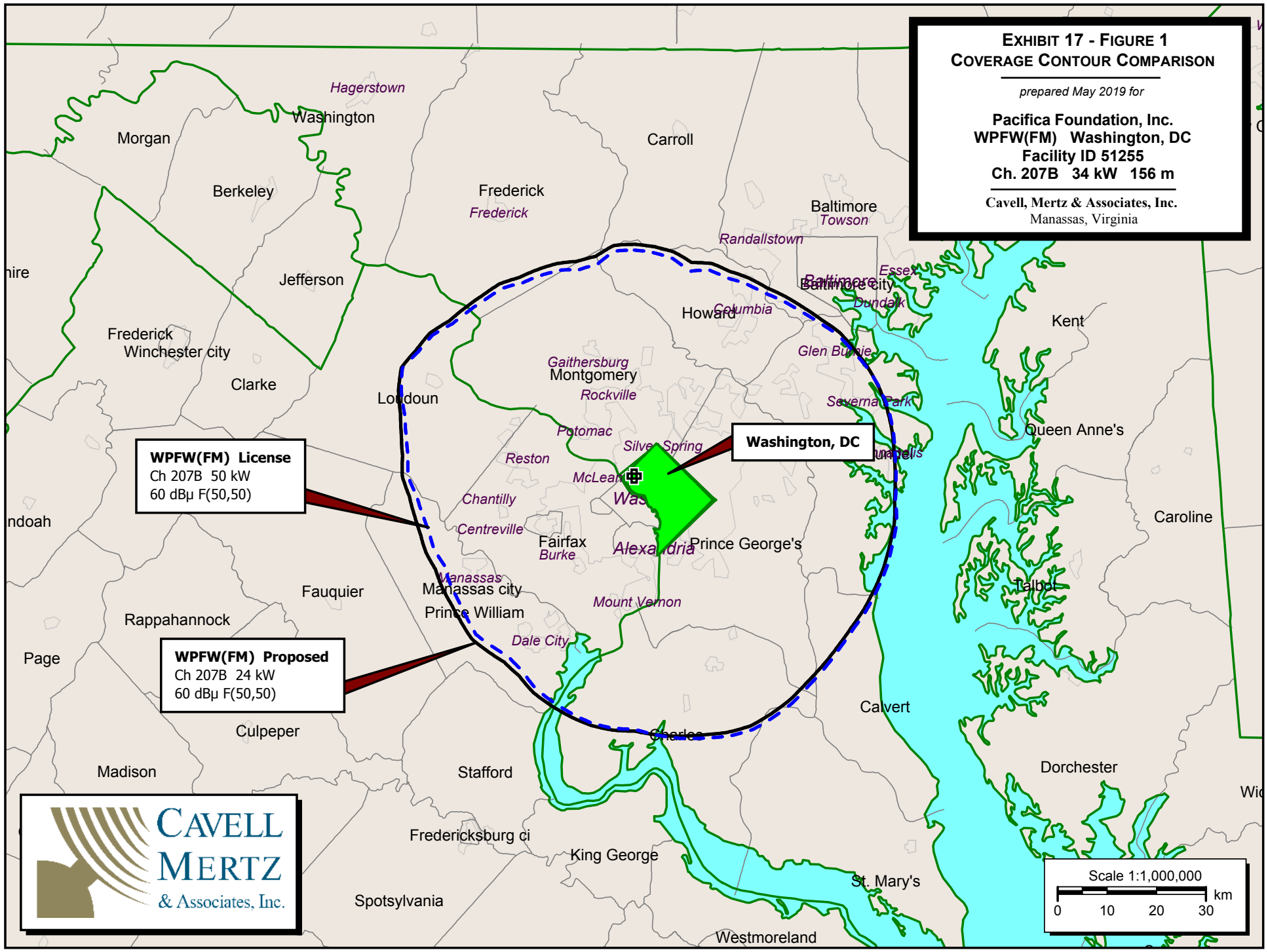


EXHIBIT 17 - FIGURE 1
COVERAGE CONTOUR COMPARISON
prepared May 2019 for
Pacifica Foundation, Inc.
WPFW(FM) Washington, DC
Facility ID 51255
Ch. 207B 34 kW 156 m
Cavell, Mertz & Associates, Inc.
Manassas, Virginia
WPFW(FM) License
Ch 207B 50 kW
60 dBµ F(50,50)
WPFW(FM) Proposed
Ch 207B 24 kW
60 dBµ F(50,50)
Washington, DC
CAVELL MERTZ & Associates, Inc.
Scale 1:1,000,000
km
0 10 20 30
Hagerstown
Washington
Morgan
Berkeley
Frederick
Carroll
Baltimore
Towson
Randallstown
Jefferson
Howard
Columbia
Baltimore city
Dundalk
Essex
Kent
Frederick
Winchester city
Clarke
Loudoun
Gaithersburg
Montgomery
Rockville
Glen Burnie
Severna Park
Queen Anne's
Potomac
Silver Spring
Reston
McLean
Chantilly
Centreville
Fairfax
Burke
Alexandria
Prince George's
Caroline
Fauquier
Manassas
Manassas city
Prince William
Mount Vernon
Talbot
Rappahannock
Dale City
Page
Calvert
Culpeper
Madison
Stafford
Dorchester
Fredericksburg ci
King George
St. Mary's
Spotsylvania
Westmoreland

Exhibit 17 - Table I

SPACING SUMMARY FOR WPFW(FM)

prepared for

Pacifica Foundation, Inc.

WPFW(FM) Washington, DC

Facility ID 51255

Ch. 207B 34 kW 156 m

REFERENCE
38 56 09.0 N.
77 05 33.0 W.

CLASS = B Int = B
Current Spacings to 3rd Adj.
Channel 207 - 89.3 MHz

DISPLAY DATES
DATA 03-19-19
SEARCH 03-19-19

Call	Channel		Location		Azi	Dist	FCC	Margin
~~WPFW~~	~~LIC~~	~~207B~~	~~Washington~~	~~DC~~	~~0.0~~	~~0.00~~	~~241.0~~	~~-241.0~~[1]
WLJV	LIC-D	208B1	Spotsylvania	VA	206.6	91.70	145.0	-53.3
WGMS	LIC-D	206B1	Hagerstown	MD	336.9	91.92	145.0	-53.1
WSCL	LIC	208B	Salisbury	MD	103.3	132.39	169.0	-36.6
WVTU	LIC-D	207B1	Charlottesville	VA	237.4	177.38	211.0	-33.6
WRTJ	LIC	207A	Coatesville	PA	41.8	163.41	178.0	-14.6
WITF-FM	LIC	208B	Harrisburg	PA	6.9	157.69	169.0	-11.3
WEAA	LIC	205B1	Baltimore	MD	43.8	62.79	71.0	-8.2
WPIR	LIC-D	210B	Culpeper	VA	244.8	66.86	74.0	-7.1
WTMD	LIC-D	209B1	Towson	MD	38.9	66.89	71.0	-4.1
WNJB-FM	LIC	207A	Bridgeton	NJ	70.1	176.96	178.0	-1.0
WJYA	CP	207C2	Emporia	VA	197.2	240.12	241.0	-0.9
WRLP	LIC	206A	Orange	VA	229.6	117.38	113.0	4.4
WXMD	LIC-D	209B1	California	MD	148.0	76.75	71.0	5.8

[1] This is the current license for the proposed facility.

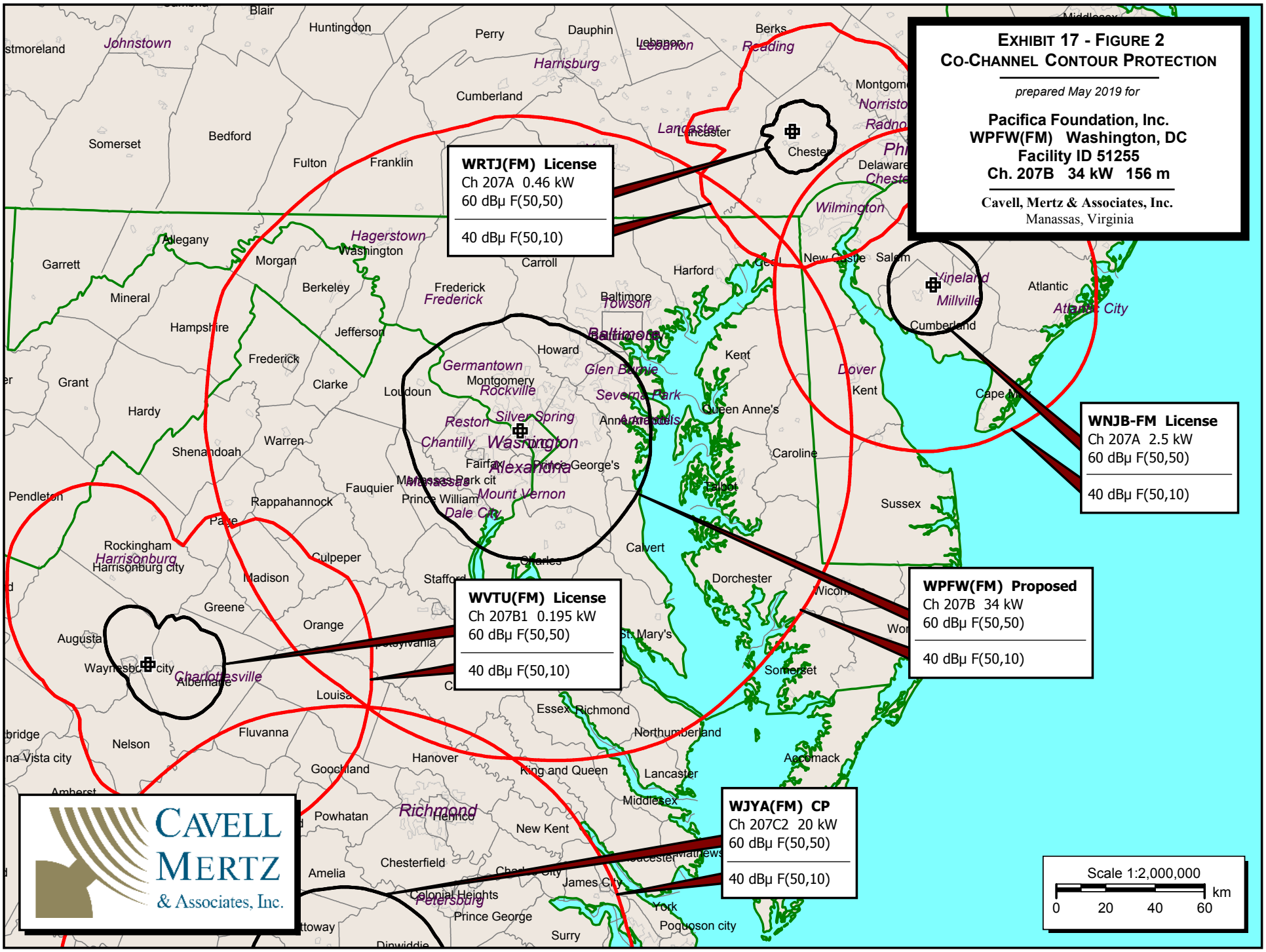


EXHIBIT 17 - FIGURE 2
CO-CHANNEL CONTOUR PROTECTION
prepared May 2019 for
Pacifica Foundation, Inc.
WPFW(FM) Washington, DC
Facility ID 51255
Ch. 207B 34 kW 156 m
Cavell, Mertz & Associates, Inc.
Manassas, Virginia
WRTJ(FM) License
Ch 207A 0.46 kW
60 dBµ F(50,50)
40 dBµ F(50,10)
WNJB-FM License
Ch 207A 2.5 kW
60 dBµ F(50,50)
40 dBµ F(50,10)
WPFW(FM) Proposed
Ch 207B 34 kW
60 dBµ F(50,50)
40 dBµ F(50,10)
WVTU(FM) License
Ch 207B1 0.195 kW
60 dBµ F(50,50)
40 dBµ F(50,10)
WJYA(FM) CP
Ch 207C2 20 kW
60 dBµ F(50,50)
40 dBµ F(50,10)
CAVELL MERTZ & Associates, Inc.
Scale 1:2,000,000
km
0 20 40 60
Johnstown
Harrisburg
Reading
Lancaster
Chester
Wilmington
Hagerstown
Frederick
Baltimore
Towson
Germantown
Rockville
Glen Burnie
Severna Park
Reston
Silver Spring
Chantilly
Washington
Alexandria
Mount Vernon
Dale City
Manassas
Harrisonburg
Charlottesville
Richmond
Petersburg
Vineland
Millville
Atlantic City
Dover
Blair
Huntingdon
Perry
Dauphin
Lebanon
Berks
Cumberland
Somerset
Bedford
Fulton
Franklin
Allegany
Garrett
Morgan
Washington
Carroll
Harford
Mineral
Berkeley
Frederick
Hampshire
Jefferson
Howard
Montgomery
Loudoun
Kent
Grant
Hardy
Clarke
Warren
Shenandoah
Fauquier
Prince William
Rappahannock
Pendleton
Page
Rockingham
Harrisonburg city
Culpeper
Madison
Greene
Orange
Augusta
Waynesboro city
Albemarle
Louisa
Fluvanna
Nelson
Amherst
Goochland
Hanover
Powhatan
Chesterfield
Amelia
Colonial Heights
Prince George
Dinwiddie
Surry
Essex
King and Queen
New Kent
Northumberland
Lancaster
Middlesex
Accomack
Caroline
Queen Anne's
Talbot
Sussex
Calvert
Charles
Dorchester
St. Mary's
Somerset
James City
York
Poquoson city
Cumberland
Atlantic
Delaware
New Castle
Salem

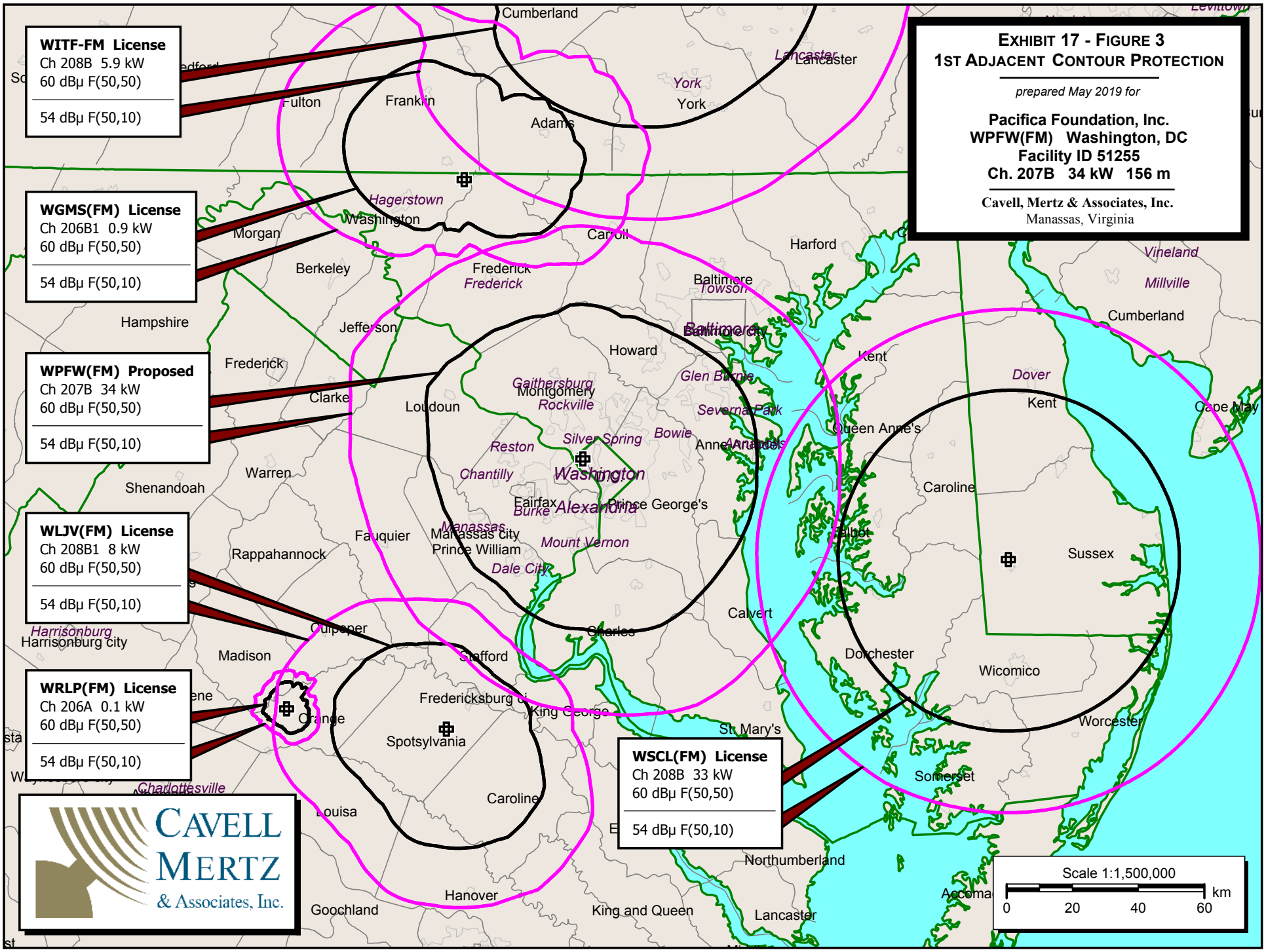


EXHIBIT 17 - FIGURE 3
1ST ADJACENT CONTOUR PROTECTION
prepared May 2019 for
Pacifica Foundation, Inc.
WPFW(FM) Washington, DC
Facility ID 51255
Ch. 207B 34 kW 156 m
Cavell, Mertz & Associates, Inc.
Manassas, Virginia
WITF-FM License
Ch 208B 5.9 kW
60 dBµ F(50,50)
54 dBµ F(50,10)
WGMS(FM) License
Ch 206B1 0.9 kW
60 dBµ F(50,50)
54 dBµ F(50,10)
WPFW(FM) Proposed
Ch 207B 34 kW
60 dBµ F(50,50)
54 dBµ F(50,10)
WLJV(FM) License
Ch 208B1 8 kW
60 dBµ F(50,50)
54 dBµ F(50,10)
WRLP(FM) License
Ch 206A 0.1 kW
60 dBµ F(50,50)
54 dBµ F(50,10)
WSCL(FM) License
Ch 208B 33 kW
60 dBµ F(50,50)
54 dBµ F(50,10)
CAVELL MERTZ & Associates, Inc.
Scale 1:1,500,000
0 20 40 60 km
Cumberland
Lancaster
York
Fulton
Franklin
Adams
Hagerstown
Washington
Morgan
Berkeley
Frederick
Carroll
Harford
Baltimore
Towson
Baltimore City
Howard
Montgomery
Gaithersburg
Rockville
Glen Burnie
Severna Park
Anne Arundel
Queen Anne's
Kent
Dover
Cape May
Vineland
Millville
Hampshire
Jefferson
Clarke
Loudoun
Reston
Silver Spring
Bowie
Chantilly
Washington
Fairfax
Alexandria
Prince George's
Warren
Shenandoah
Fauquier
Manassas
Manassas city
Prince William
Mount Vernon
Dale City
Rappahannock
Caroline
Talbot
Sussex
Harrisonburg
Harrisonburg city
Culpeper
Madison
Stafford
Charles
Calvert
Dorchester
Wicomico
Worcester
Somerset
St Mary's
Fredericksburg
King George
Orange
Spotsylvania
Charlottesville
Louisa
Caroline
Hanover
Goochland
King and Queen
Lancaster
Northumberland
Accoma

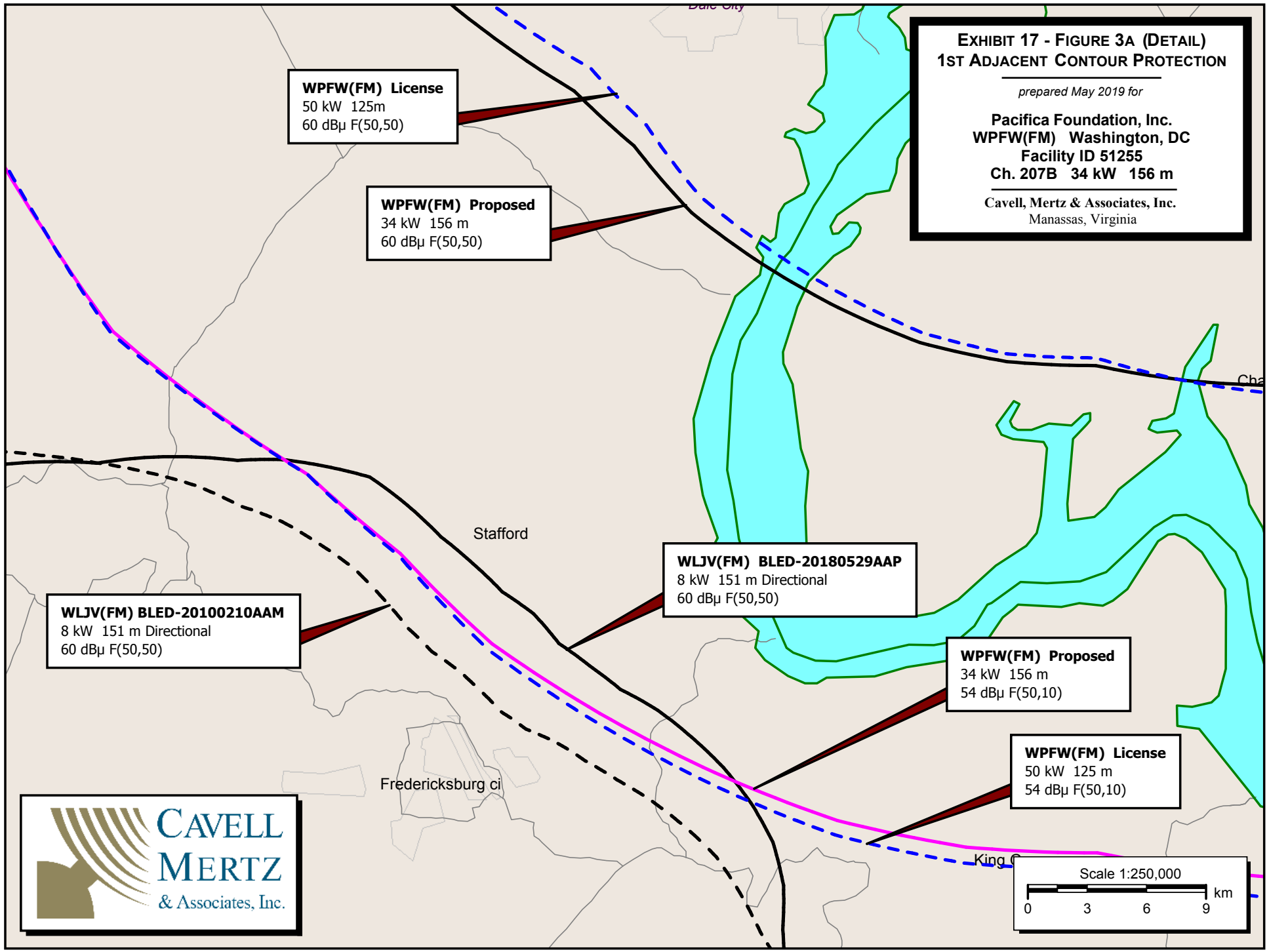


EXHIBIT 17 - FIGURE 3A (DETAIL)
1ST ADJACENT CONTOUR PROTECTION
prepared May 2019 for
Pacifica Foundation, Inc.
WPFW(FM) Washington, DC
Facility ID 51255
Ch. 207B 34 kW 156 m
Cavell, Mertz & Associates, Inc.
Manassas, Virginia
WPFW(FM) License
50 kW 125m
60 dBµ F(50,50)
WPFW(FM) Proposed
34 kW 156 m
60 dBµ F(50,50)
WLJV(FM) BLED-20180529AAP
8 kW 151 m Directional
60 dBµ F(50,50)
WLJV(FM) BLED-20100210AAM
8 kW 151 m Directional
60 dBµ F(50,50)
WPFW(FM) Proposed
34 kW 156 m
54 dBµ F(50,10)
WPFW(FM) License
50 kW 125 m
54 dBµ F(50,10)
Stafford
Fredericksburg ci
Scale 1:250,000
km
0 3 6 9
CAVELL MERTZ & Associates, Inc.

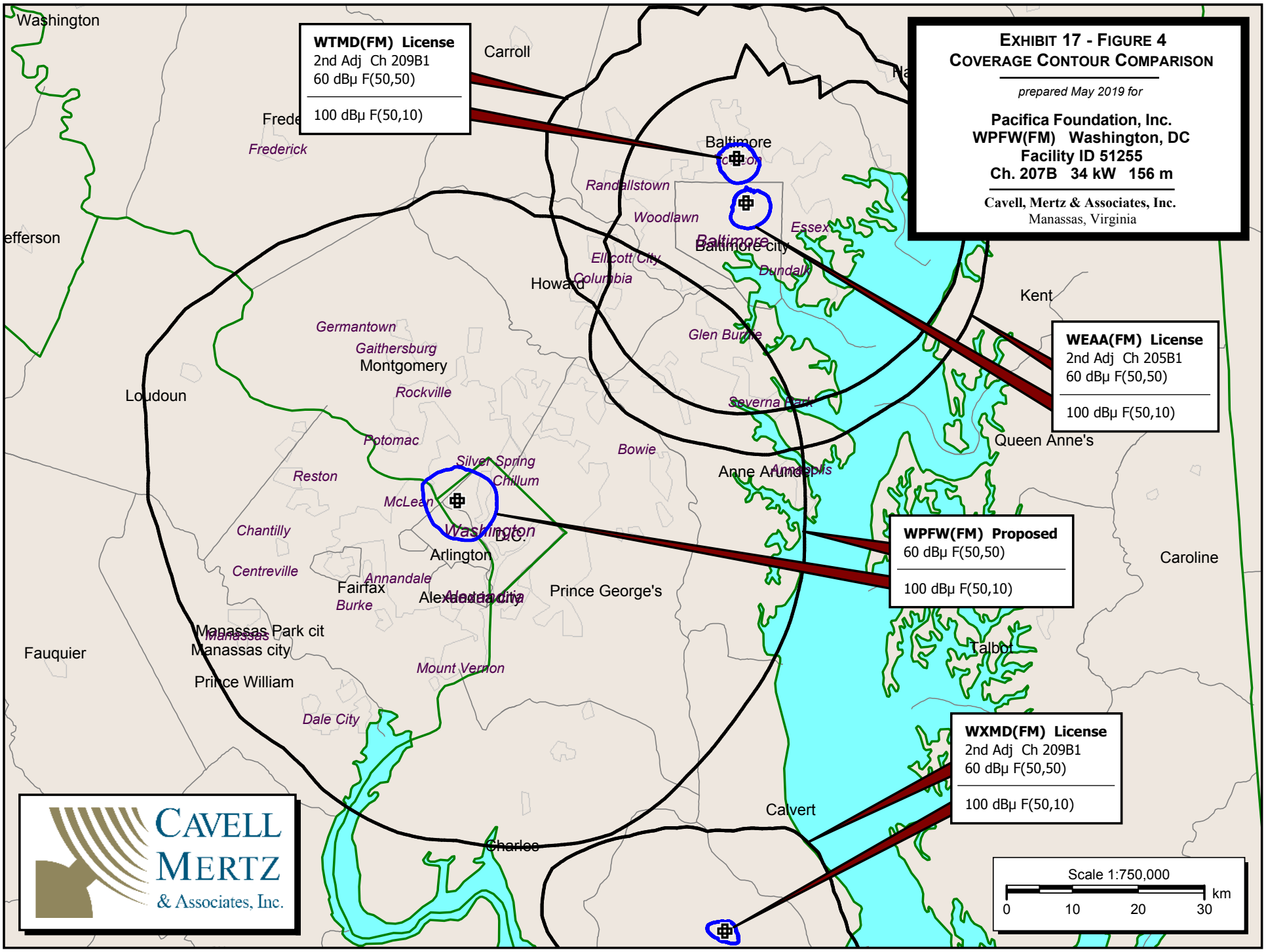


EXHIBIT 17 - FIGURE 4
COVERAGE CONTOUR COMPARISON
prepared May 2019 for
Pacifica Foundation, Inc.
WPFW(FM) Washington, DC
Facility ID 51255
Ch. 207B 34 kW 156 m
Cavell, Mertz & Associates, Inc.
Manassas, Virginia
WTMD(FM) License
2nd Adj Ch 209B1
60 dBµ F(50,50)
100 dBµ F(50,10)
WEAA(FM) License
2nd Adj Ch 205B1
60 dBµ F(50,50)
100 dBµ F(50,10)
WPFW(FM) Proposed
60 dBµ F(50,50)
100 dBµ F(50,10)
WXMD(FM) License
2nd Adj Ch 209B1
60 dBµ F(50,50)
100 dBµ F(50,10)
Washington
Carroll
Frederick
Baltimore
Randallstown
Woodlawn
Essex
Baltimore city
Ellicott City
Columbia
Howard
Dundalk
Kent
Germantown
Gaithersburg
Montgomery
Glen Burnie
Loudoun
Rockville
Severna Park
Queen Anne's
Potomac
Bowie
Silver Spring
Chillum
Reston
Anne Arundel
Annapolis
McLean
Washington
D.C.
Chantilly
Arlington
Centreville
Annandale
Fairfax
Alexandria
Prince George's
Caroline
Burke
Manassas Park cit
Manassas city
Fauquier
Talbot
Mount Vernon
Prince William
Dale City
Calvert
Charles
CAVELL MERTZ & Associates, Inc.
Scale 1:750,000
km
0
10
20
30

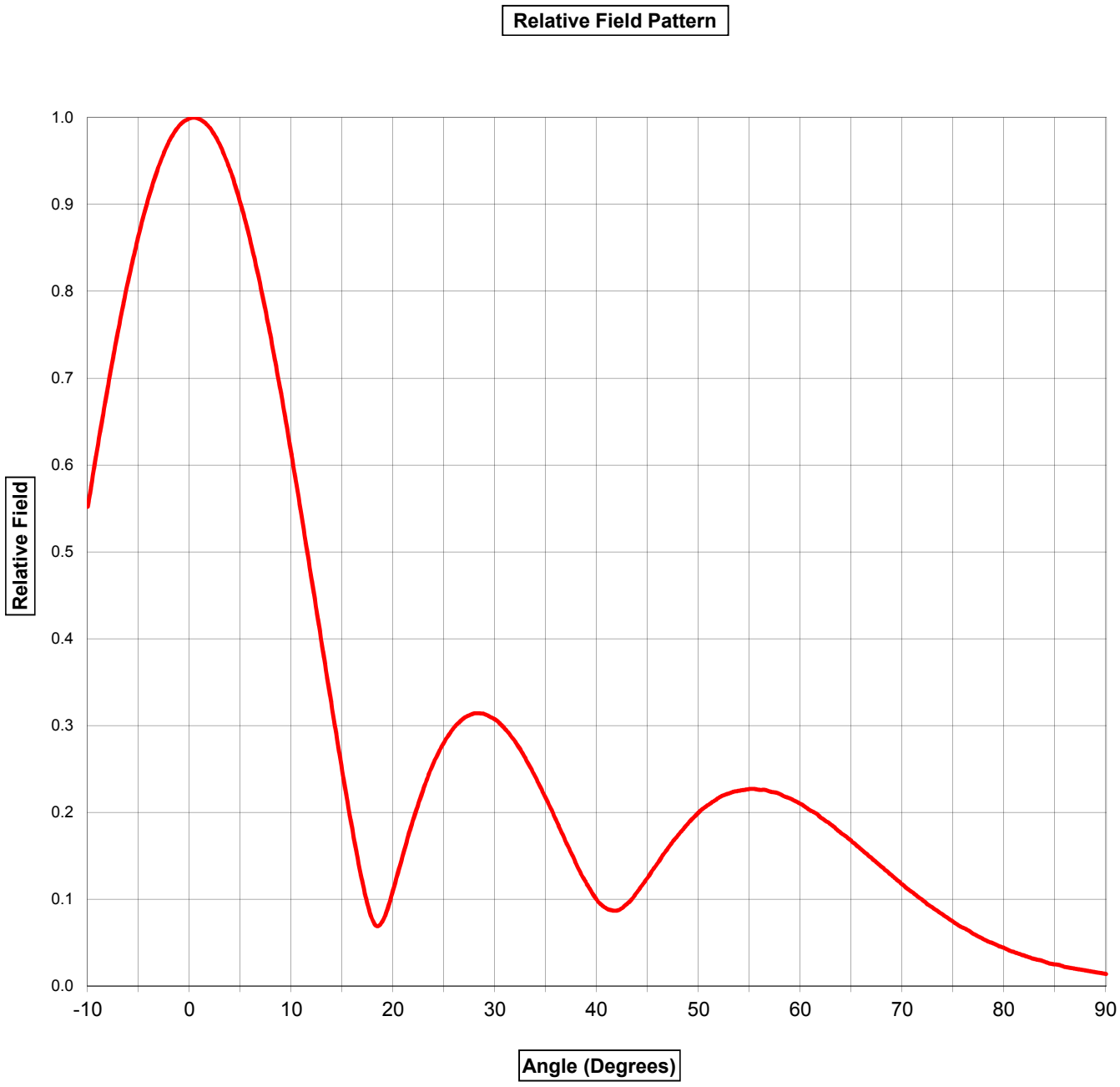


EXHIBIT 17 - FIGURE 5

ANTENNA VERTICAL (ELEVATION) PLANE RADIATION PATTERN

prepared May 2019 for

Pacifica Foundation, Inc.
WPFW(FM) Washington, DC
Facility Id 51255
Ch. 207B 34.6 kW 156 m

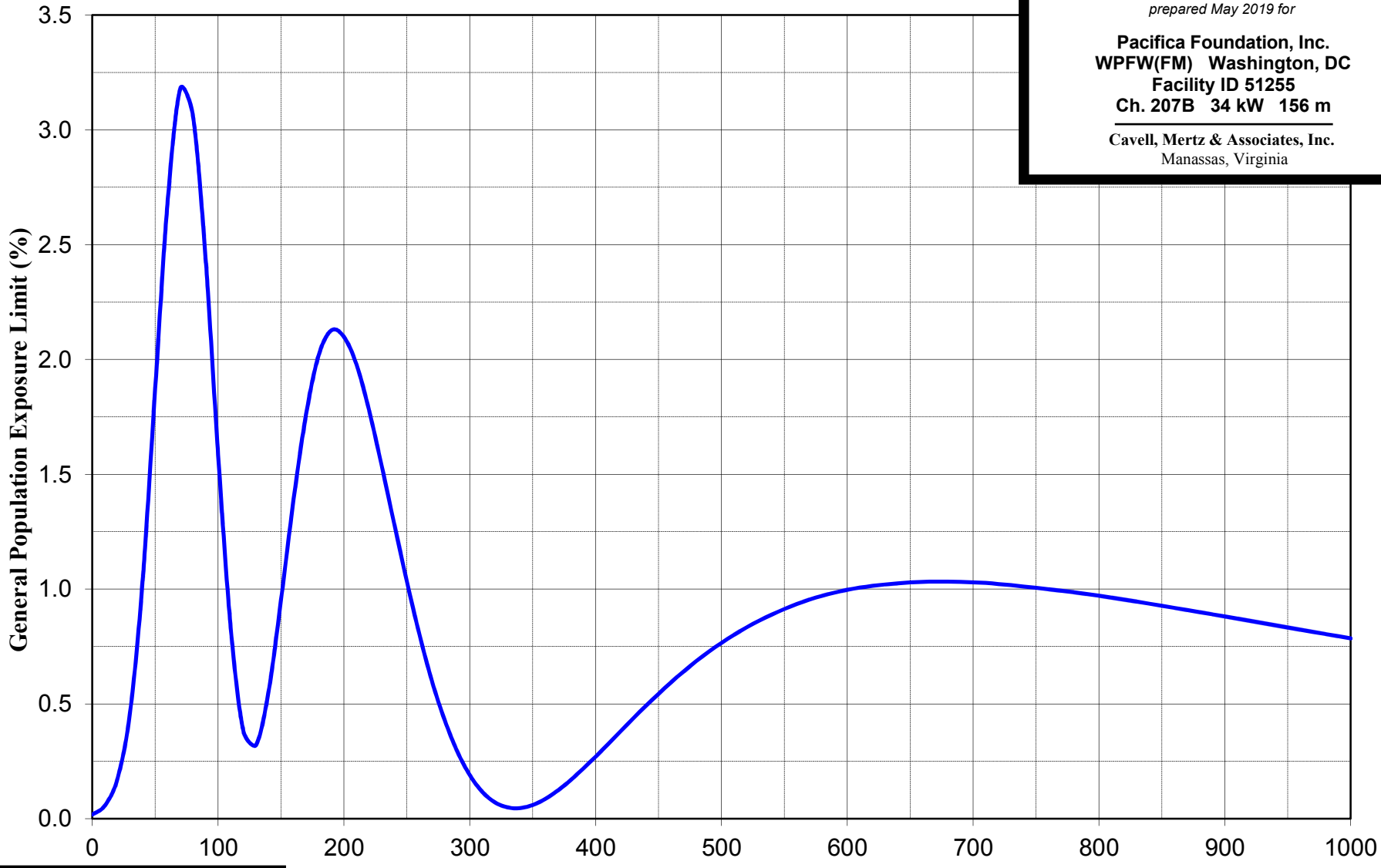
Cavell, Mertz & Associates, Inc.
Manassas, Virginia

EXHIBIT 17 - FIGURE 6
RF EXPOSURE AT GROUND LEVEL

prepared May 2019 for

Pacifica Foundation, Inc.
WPFW(FM) Washington, DC
Facility ID 51255
Ch. 207B 34 kW 156 m

Cavell, Mertz & Associates, Inc.
Manassas, Virginia



CAVELL MERTZ & Associates, Inc.