

TECHNICAL EXHIBIT
AMENDMENT TO
APPLICATION FOR CONSTRUCTION PERMIT
GADSDEN STATE COMMUNITY COLLEGE
RADIO STATION WSGN(FM)
GADSDEN, ALABAMA

May 14, 1992

CH 218C3

6.3 KW (V, MAX-DA)

159 M

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Technical Narrative

The technical exhibit of which this narrative is part has been prepared on behalf of the Gadsden State Community College (herein "Gadsden"), licensee of non-commercial, educational broadcast station WSGN(FM), Gadsden, Alabama (FCC File No. BLED-1362), in support of an amendment to its application for modification of its licensed main facility (FCC File No. BPED-860307MK). The proposed station will operate on channel 218C3 (91.5 MHz) with maximum effective radiated power of 6.3 kilowatts using a directional antenna and antenna height above average terrain of 159 meters. Vertical-only polarization is proposed.

The purpose of this amendment is to eliminate prohibited contour overlap between the proposed WSGN(FM) facility and the proposed new FM station on channel 217A at Oxford, Alabama (FCC File No. BPED-860512MB). In order to eliminate this overlap, Gadsden is proposing the use of channel 218C3 instead of 217C2 and will use a directional antenna to avoid prohibited overlap with the proposed Oxford station and other pertinent FM facilities. The proposal for modified facilities, as amended herein, is considered a major change for FCC processing purposes

according to 47 CFR 73.3573 since the change in 60 dBu land area coverage is greater than 50 percent of the present licensed coverage area.

The proposal meets the allocation requirements with respect to all existing and proposed stations. The WSGN(FM) application (FCC File No. BPED-860307MK) will no longer be mutually exclusive with the Oxford, Alabama application as a result of this amendment.

The proposal does not appear to be subject to environmental processing in accordance with 47 CFR 1.1306. Since there will be no change in the height of the existing structure to be employed, it is not necessary to notify the Federal Aviation Administration. Specifications for the proposed operation are included herein as Figure 1.

Proposed Transmitter Location

The proposed 3-bay custom directional antenna will be mounted at the same height on the same existing structure as proposed in the original application. Thus, there are no changes proposed in antenna elevation data or transmitter location. Therefore, neither a site map nor antenna sketch are included as these are already on file with the Commission.

Directional Antenna

A directional antenna is proposed for use by WSGN(FM) in order to eliminate prohibited contour overlap between the WSGN(FM) proposal and the proposed, new

Oxford, Alabama facility (FCC File No. BPED-860512MB). Graphs of the proposed horizontal plane radiation pattern envelope are included herein as Figure 2, and tabulations of the pattern envelope relative field and effective radiated power are included herein as Figure 3.

The directional antenna ultimately constructed will be custom designed to maintain the radiation within the proposed pattern envelope. Details concerning the directional antenna will be supplied with the WSGN(FM) application for license. The proposed antenna will be side-mounted on the existing tower in accordance with specific instructions provided by the manufacturer. No other antennas will be mounted on the tower at the same level as the proposed antenna, nor will any antennas be mounted within the distance specified by the manufacturer for proper directional operation.

Allocation Considerations

The proposed facility complies with the requirements of 47 CFR 73.509 with respect to all stations and it complies with 47 CFR 73.207 with respect to all intermediate frequency (IF) related stations and stations on commercial FM channel 221. Figure 6 is an allocation study which contains a tabulation of all the stations considered in the allocation study. Sheet 3 of Figure 6 illustrates the protected and interfering contours along all azimuths for the proposed facility and the protected and interfering contours along required azimuths for other pertinent facilities.

It can be seen from Sheet 3 of Figure 6 that no prohibited overlap occurs with any other station except co-channel WUAL-FM, channel 218C1, Tuscaloosa, Alabama, with respect to which the proposed WSGN(FM) will have a small area of approximately 40 square kilometers of received interference. This area of received interference, however, is not in contravention of 47 CFR 73.509, since the licensed WSGN(FM) operation is also predicted to receive interference over a small area of approximately 50 square kilometers and the area of proposed overlap meets the four criteria of 47 CFR 73.509(d). Sheet 4 of Figure 6 shows both the proposed and present, predicted overlap areas.

Determination of Contours

The predicted coverage, protected and interfering contours for all stations studied were determined in accordance with the provisions of 47 CFR 73.313. In accordance with current FCC practice, no consideration was given to terrain roughness correction factors.

The average terrain elevations from 3 to 16 kilometers along pertinent radials from each site were determined by the method of 47 CFR 73.313 using data from the NGDC 30-second terrain database. The value of the antenna radiation center height above mean sea level for each station, as specified in the Commission's records, was employed in determining the antenna height above average terrain along each radial. For stations employing non-directional antennas, the contours are based on the standard eight radials. For stations employing

directional antennas, the contours are based on radials at 10-degree intervals over pertinent azimuthal arcs using the effective radiated power in each radial direction. Directional antenna patterns were obtained from the Commission's FM directional antenna information database. For the proposed WSGN(FM) operation, the antenna heights above average terrain along the standard eight radials were obtained from the original application and those along 32 supplemental radials were obtained using elevation data from the NGDC 30-second terrain database.

Figure 4 is a tabulation of average elevations and distances to the proposed predicted WSGN(FM) 60 dBu coverage contour. Figure 5 is a map showing this contour.

The "blanketing" contour of a 6.3-kilowatt FM station, as defined by 47 CFR 73.318, extends radially from the transmitter site to a distance of approximately 1 kilometer. The applicant recognizes its responsibility to remedy complaints of blanketing interference as required by 47 CFR 73.318.

Within 10 kilometers of the proposed transmitter site, there are no known TV stations and only one known full service FM station, WQSB(FM), channel 286C, Albertville, Alabama. No form of interference is anticipated with respect to any broadcast or non-broadcast facilities. However, the applicant recognizes its responsibility to protect existing facilities in accordance with applicable rules.

TV Channel 6 Protection

The Commission requires that non-commercial educational FM facilities provide interference protection to "affected" TV channel 6 facilities, as specified in 47 CFR 73.525(a)(1). The only TV channel 6 station within the 166 kilometer distance specified in this section of the rules is WBRC-TV, Birmingham, Alabama, which is located approximately 93 kilometers southwest of the proposed WSGN(FM) facility. Accordingly, a TV channel 6 protection study has been prepared with respect to WBRC-TV.

In accordance with 47 CFR 73.525(b)(2) and (e), the proposed predicted channel 6 interference area and the existing predicted channel 6 interference area were determined. These two areas are shown in Figure 7, in which the predicted area of new interference and the predicted area where interference will be eliminated are identified along with the area of interference common to both the proposed and existing WSGN(FM) facilities. The population predicted to receive new interference and the population within the area for which predicted existing interference is to be eliminated were determined by the method of 47 CFR 73.525(e)(2) using the appropriate County Subdivision Map and population information from the 1980 U.S. Census (1990 U.S. Census County Subdivision Maps are not yet available). Because the area of predicted new interference is in a less densely populated area than area of predicted existing interference, there are only 7,760 persons predicted to receive new interference whereas it is predicted that interference will be eliminated to an estimated 23,967 persons. Therefore, for every person

predicted to receive new interference, it is predicted that existing interference will be eliminated to slightly over 3 persons. Thus, the proposal complies with the requirement of 47 CFR 73.525(b)(2).

The effective radiated power along all azimuths for the proposed WSGN(FM) operation is 10 times that used in determining the proposed predicted TV channel 6 interference area in accordance with the adjustment for vertical polarization only which is allowed under the provisions of 47 CFR 73.525(e)(4)(i).

Population and Area

The population to be served within the predicted 60 dBu contour was determined by a computer program which sums the population of each 1990 census enumeration district having its centroid within the contour. The area within the 60 dBu contour was determined by a computer program using a root mean square algorithm. The proposed, predicted WSGN(FM) 60 dBu service contour encompasses an area of 2,359 square kilometers within which an estimated 131,235 persons reside.

Environmental Considerations

The proposed facility was evaluated in terms of potential radiofrequency radiation exposure at ground level in accordance with OST Bulletin No. 65, "Evaluating Compliance With FCC-Specified Guidelines for Human Exposure to Radiofrequency Radiation." Using Equation (4) on Page 8 of this Bulletin, the "worst-case" (assuming a downward relative field factor of 1) estimated power

density level at the tower base is approximately 7 percent of the ANSI guideline.

Gadsden verifies that access to the tower base will be restricted by a fence which will be kept locked and that appropriate warning signs will be posted. Should it become necessary for workers or other authorized personnel to enter the restricted area and climb the tower, Gadsden verifies that appropriate measures will be taken (including reduction in or shut down of power, as necessary) to assure that no exposure to radiofrequency radiation in excess of the ANSI guidelines will occur.

The proposal appears to be categorically excluded from environmental processing as it appears to qualify for such an exclusion under 47 CFR 1.1306. The proposal involves no new tower construction and the potential for human exposure to radiofrequency radiation is predicted to be within the standards specified in 47 CFR 1.1307(b).



David E. Dickmann

May 14, 1992

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CH 218C3 6.3 KW (V, MAX-DA) 159 M

Technical Specifications

Channel	218C3
Frequency	91.5 MHz
Site coordinates	34° 04' 29" North Latitude 86° 01' 11" West Longitude
Site elevation above mean sea level	329.2 m (1080 ft)
Average elevation above mean sea level of standard eight radials, 3-16 kilometers	225.4 m (739 ft)
Overall height of proposed antenna supporting structure with lighting	
Above ground	60.1 m (197 ft)
Above mean sea level	389.3 m (1277 ft)
Height of FM antenna radiation center	
Above ground	54.9 m (180 ft)
Above mean sea level	384.1 m (1260 ft)
Above average terrain	158.7 m (521 ft)
Transmitter	*Continental, type 814R-1
Rated power output	2.5 kW

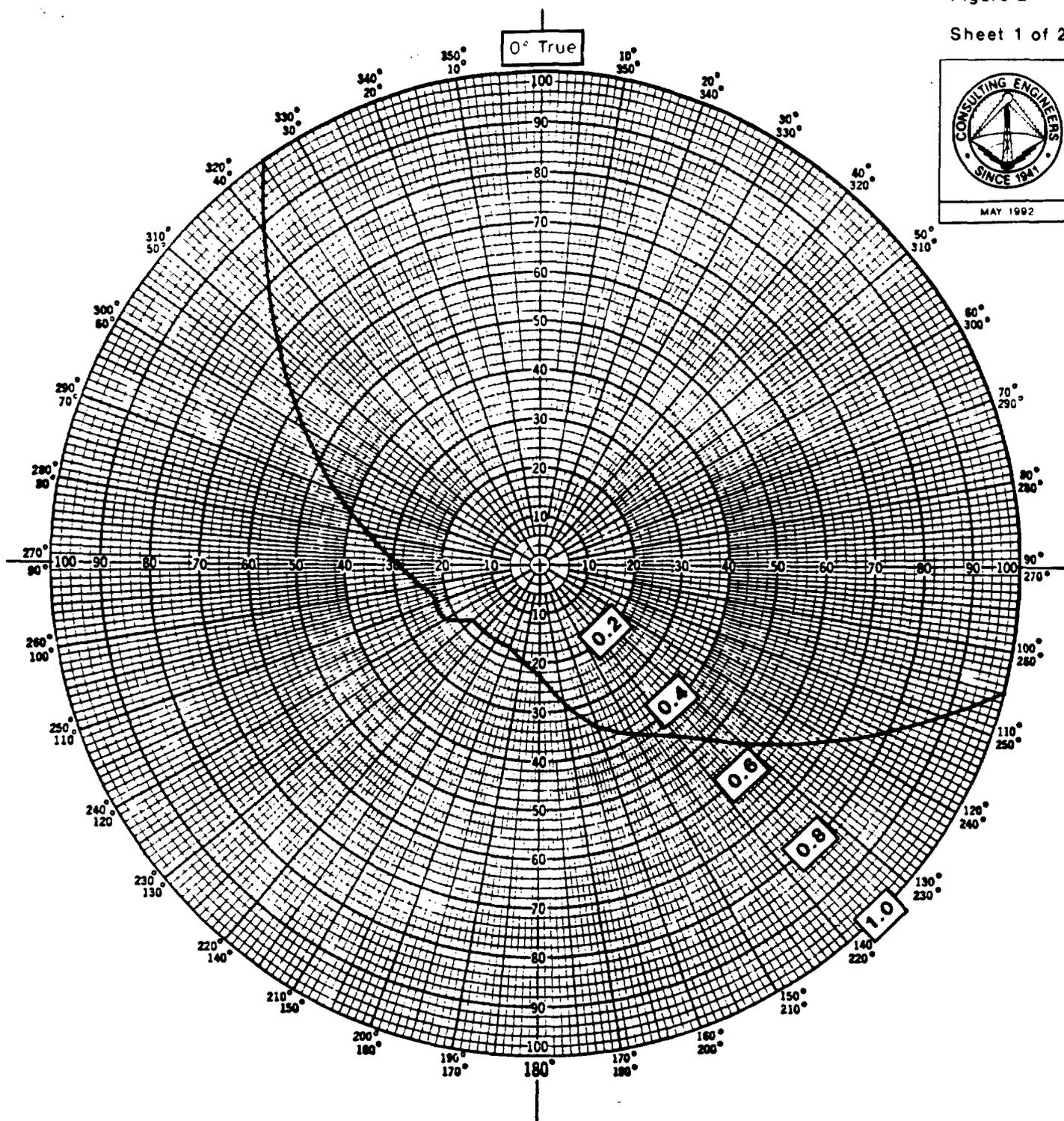
*Or equivalent

Transmission line	*Andrew, type LDF5-50A
Nominal diameter	2.2 cm (7/8 in)
Length	64 m (210 ft)
Efficiency (0.74 dB loss)	84.3%
Antenna	*Shively, Custom
Number of bays	3
Polarization	Vertical
Estimated power gain	6.0

Proposed Operation

Transmitter output power	1.25 kW
Transmission line loss	0.20 kW
Antenna input power	1.05 kW
Maximum effective radiated power	
Vertical polarization	6.3 kW

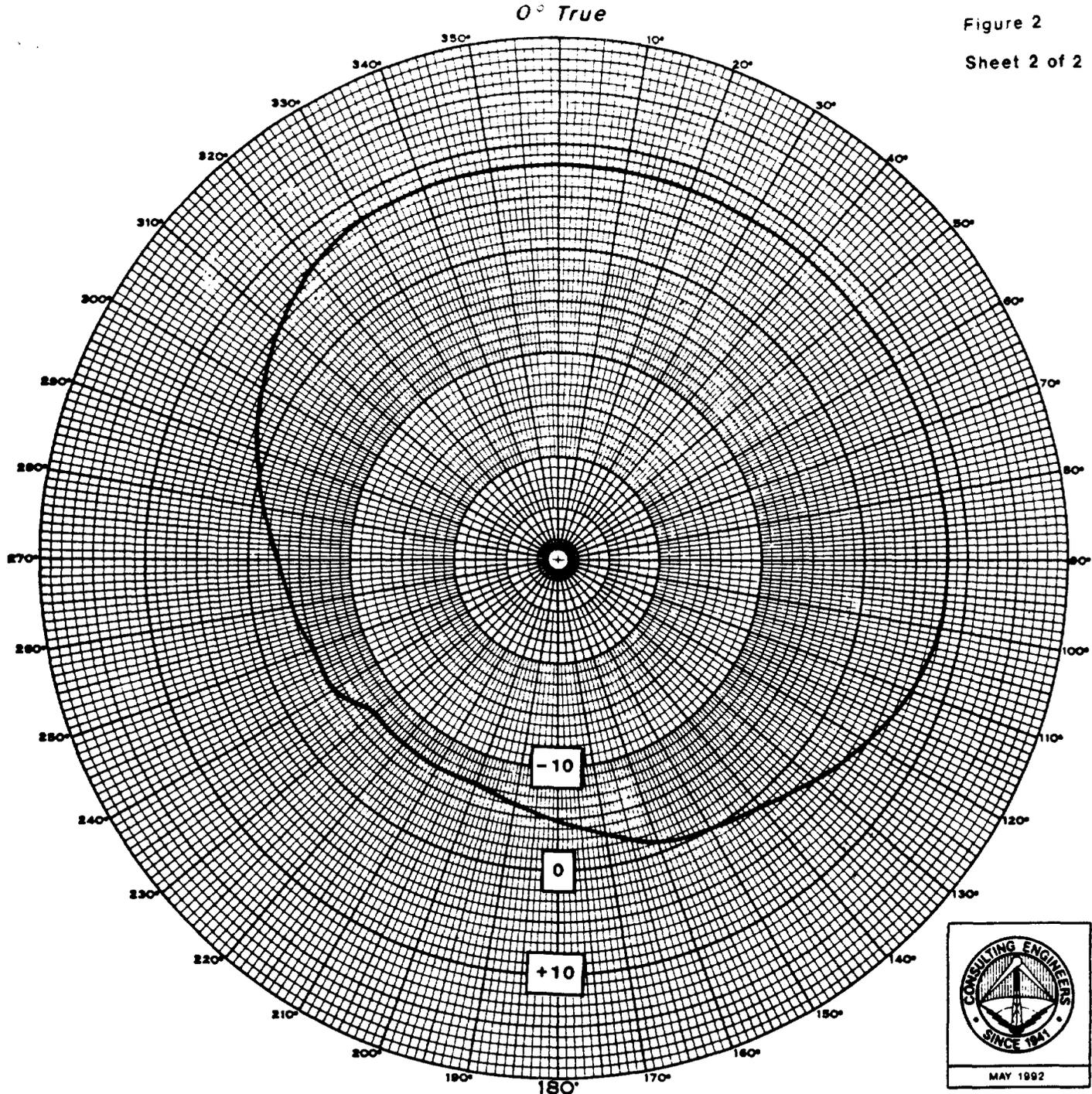
*Or equivalent



**PROPOSED HORIZONTAL PLANE RADIATION PATTERN ENVELOPE
(Relative Field)**

**GADSDEN STATE COMMUNITY COLLEGE
WSGN(FM) GADSDEN, ALABAMA
CH 218C3 6.3 KW(V.MAX-DA) 159 M**

du Treil, Lundin & Rackley, Inc. Washington, D.C.



**PROPOSED HORIZONTAL PLANE RADIATION PATTERN ENVELOPE
(Effective Radiated Power - dBk)**

**GADSDEN STATE COMMUNITY COLLEGE
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Tabulation of Proposed Horizontal
Plane Radiation Pattern Envelope

<u>Azimuth (Degrees True)</u>	<u>Relative Field</u>
0	1.000
10	1.000
20	1.000
30	1.000
40	1.000
50	1.000
60	1.000
70	1.000
80	1.000
90	1.000
100	1.000
110	0.891
120	0.708
130	0.562
140	0.447
150	0.398
160	0.355
170	0.282
180	0.224
190	0.200
200	0.178
210	0.178
220	0.178
230	0.178
240	0.224
250	0.224
260	0.251
270	0.282
280	0.355
290	0.447
300	0.562
310	0.708
320	0.891
330	1.000
340	1.000
350	1.000

Note: Maxima occur over the range from 325° True to 105° True.
Minima occur over the range from 200° True to 230° True.

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Tabulation of Proposed Horizontal
Plane Radiation Pattern Envelope

<u>Azimuth (Degrees True)</u>	<u>Effective Radiated Power (dBk)</u>
0	8.00
10	8.00
20	8.00
30	8.00
40	8.00
50	8.00
60	8.00
70	8.00
80	8.00
90	8.00
100	8.00
110	7.00
120	5.00
130	3.00
140	1.00
150	0.00
160	-1.00
170	-3.00
180	-5.00
190	-6.00
200	-7.00
210	-7.00
220	-7.00
230	-7.00
240	-5.00
250	-5.00
260	-4.00
270	-3.00
280	-1.00
290	1.00
300	3.00
310	5.00
320	7.00
330	8.00
340	8.00
350	8.00

Note: Maxima occur over the range from 325° True to 105° True.
Minima occur over the range from 200° True to 230° True.

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Tabulation of Average Elevations
and Distances to Coverage Contour

<u>Radial Bearing (deg. T.)</u>	<u>3-16 Kilometer Average Terrain Elevation* (meters AMSL)</u>	<u>Antenna Height Above Average Terrain (meters)</u>	<u>Effective Radiated Power (kW)</u>	<u>Distance to 60 dBu Contour (kilometers)</u>
0	256.8	127.3	6.30	31.9
10	233.0	151.1	6.30	34.6
20	220.5	163.6	6.30	36.0
30	250.7	133.4	6.30	32.6
40	304.4	79.7	6.30	25.7
45	275.1	109.0	6.30	29.8
50	251.7	132.4	6.30	32.5
60	268.0	116.1	6.30	30.7
70	248.8	135.3	6.30	32.8
80	223.3	160.8	6.30	35.7
90	207.2	176.9	6.30	37.3
100	194.4	189.7	6.30	38.4
110	188.6	195.5	5.01	37.0
120	184.5	199.6	3.16	33.6
130	172.5	211.6	2.00	30.9
135	177.1	207.0	1.58	29.0
140	180.0	204.1	1.26	27.3
150	187.6	196.5	1.00	25.5

*Values for standard eight radials obtained from application
BPED-860307MK, others from NGDC 30-second terrain database.

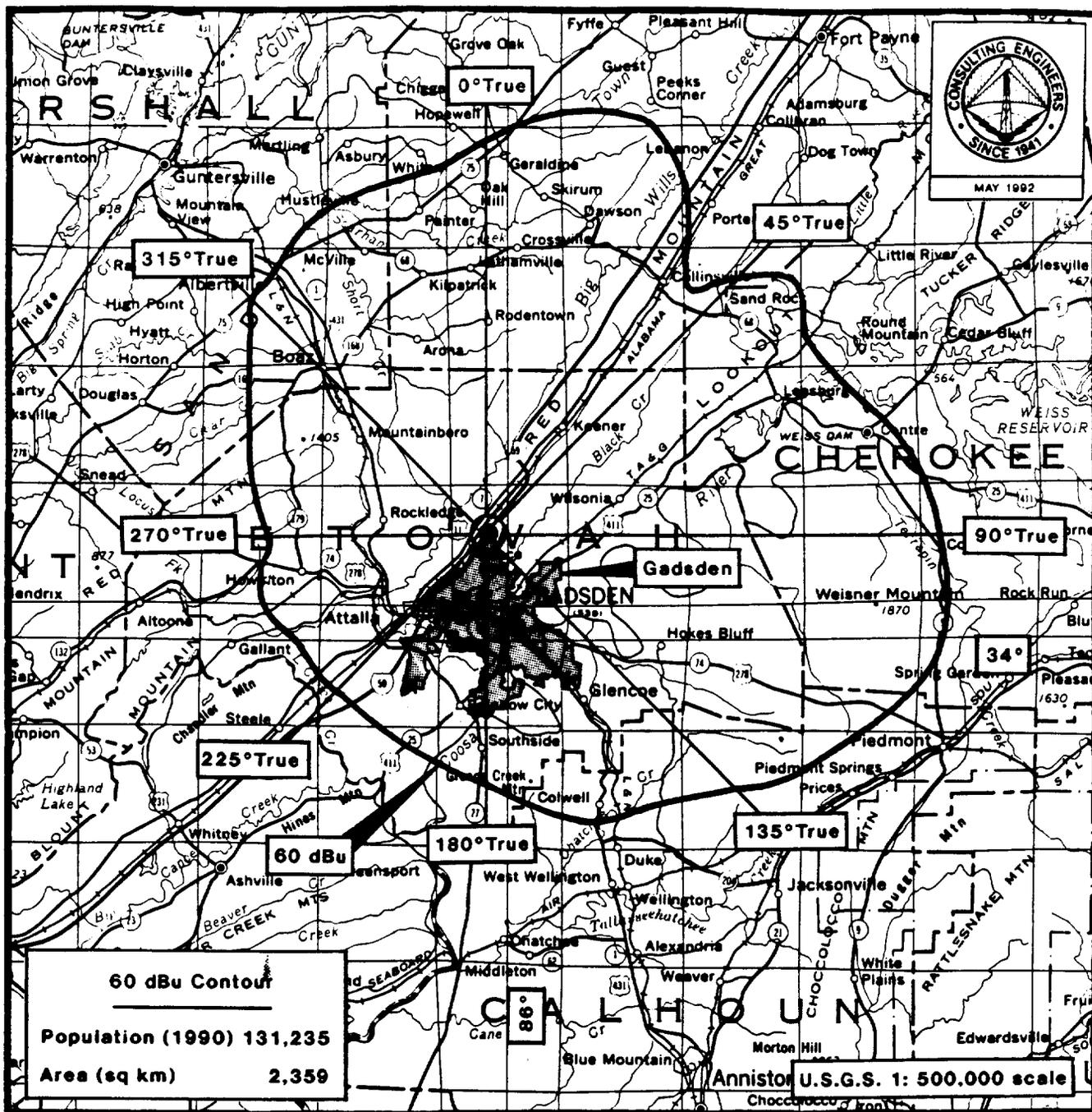
Tabulation of Average Elevations and
Distances to Coverage Contour
Gadsden, Alabama

Figure 4
Sheet 2 of 2

<u>Radial Bearing (deg. T.)</u>	<u>3-16 Kilometer Average Terrain Elevation* (meters AMSL)</u>	<u>Antenna Height Above Average Terrain (meters)</u>	<u>Effective Radiated Power (kW)</u>	<u>Distance to 60 dBu Contour (kilometers)</u>
160	182.6	201.5	0.79	24.5
170	178.1	206.0	0.50	22.2
180	176.7	207.4	0.32	20.0
190	170.9	213.2	0.25	19.1
200	167.9	216.2	0.20	18.2
210	175.8	208.3	0.20	17.8
220	184.8	199.3	0.20	17.4
225	181.8	202.3	0.20	17.6
230	181.8	202.3	0.20	17.6
240	224.7	159.4	0.32	17.6
250	203.3	180.8	0.32	18.8
260	224.6	159.5	0.40	18.7
270	254.7	129.4	0.50	17.7
280	265.4	118.7	0.79	19.2
290	275.7	108.4	1.26	20.6
300	282.6	101.5	2.00	22.2
310	278.4	105.7	3.16	25.2
315	273.8	110.3	3.98	27.0
320	283.1	101.0	5.01	27.3
330	280.5	103.6	6.30	29.1
340	277.6	106.5	6.30	29.5
350	<u>275.9</u>	<u>108.2</u>	6.30	29.7
Average**	225.4	158.7		

*Values for standard eight radials obtained from application
BPED-860307MK, others from NGDC 30-second terrain database.

**Average values based on standard eight radials only.



PREDICTED 60 dBu COVERAGE CONTOUR

GADSDEN STATE COMMUNITY COLLEGE

WSGN(FM) GADSDEN, ALABAMA

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duTreil, Lundin & Rackley, Inc. Washington, D.C.

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Allocation Study

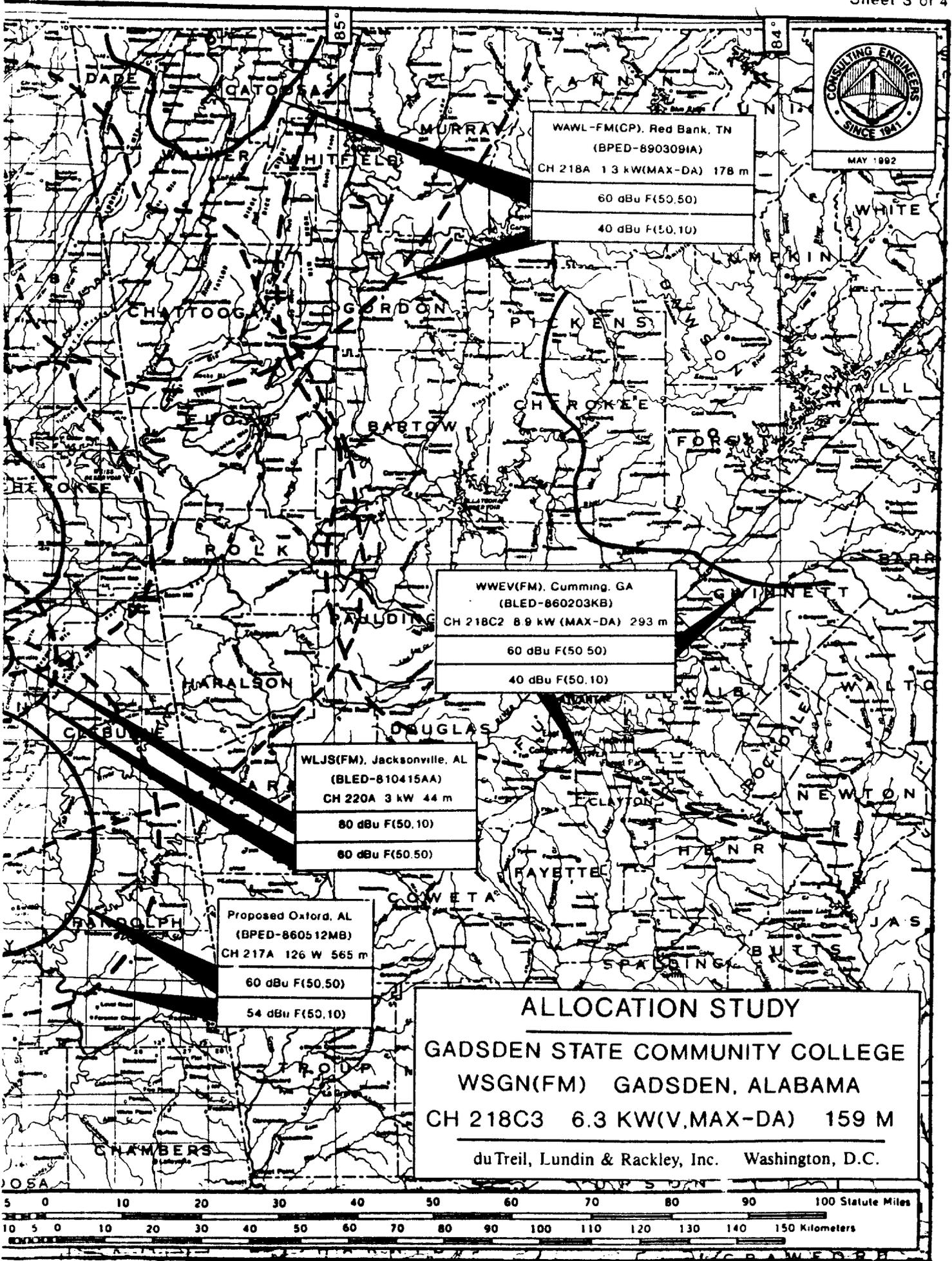
Proposed Transmitter Site: 34° 04' 29" North Latitude
86° 01' 11" West Longitude

<u>Station Considered</u>	<u>Maximum Distance to 60 dBu Contour (km)</u>	<u>Interfering Contour/ Maximum Distance to Interfering Contour (dBu)/(km)</u>	<u>Distance From Proposed WSGN(FM) Required* Actual (km) (km)</u>	
Proposed 217A, Oxford, AL		See Sheet 3		
WAWL(FM), Signal Mountain, TN CH 218A, 0.2 kW (Max-DA), 290 m 35° 09' 42" N/85° 19' 06" W	26.7	40/80.2	127.0	136.7
WAWL(FM) (CP), Red Bank, TN		See Sheet 3		118.5
WUAL-FM, Tuscaloosa, AL		See Sheets 3 and 4		169.0
WWEV(FM), Cumming, GA		See Sheet 3		
WYFD(FM), Decatur, AL CH 219A, 3.0 kW, 115 m 34° 33' 05" N/87° 03' 56" W	25.9	54/38.9	82.8	109.8
Proposed WYFD(FM), Decatur, AL		See Sheet 3		105.7
WLJS(FM), Jacksonville, AL		See Sheet 3		36.5
WKUL(FM), Cullman, AL CH 221A, 3.0 kW, 47 m 34° 10' 34" N/86° 50' 30" W	---	---	42/1	76.7

No intermediate frequency related stations within required separations of 47 CFR 73.207.

1Required separation per 47 CFR 73.207.

*The required distance is the sum of the maximum distance to the protected contour of the desired station and the maximum distance to the interfering contour of the undesired station or the sum of the maximum distance to the interfering contour of the desired station and the maximum distance to the protected contour of the undesired station, whichever figure is greater. Distances employed for WSGN(FM) proposed interfering contours [F(50,10)] are as follows: 80 dBu = 12.7 km, 54 dBu = 56.9 km, 40 dBu = 100.3 km. The distance employed for the WSGN(FM) proposed 60 dBu contour [F(50,50)] is 38.4 km.



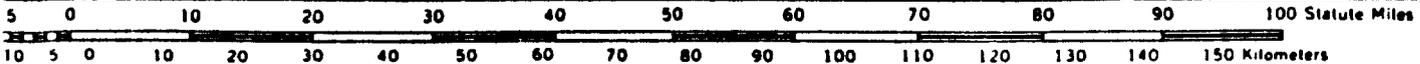
WAWL-FM(CP), Red Bank, TN
(BPED-890309IA)
CH 218A 1.3 kW(MAX-DA) 178 m
60 dBu F(50,50)
40 dBu F(50,10)

WWEV(FM), Cumming, GA
(BLED-860203KB)
CH 218C2 8.9 kW (MAX-DA) 293 m
60 dBu F(50,50)
40 dBu F(50,10)

WLJS(FM), Jacksonville, AL
(BLED-810415AA)
CH 220A 3 kW 44 m
80 dBu F(50,10)
60 dBu F(50,50)

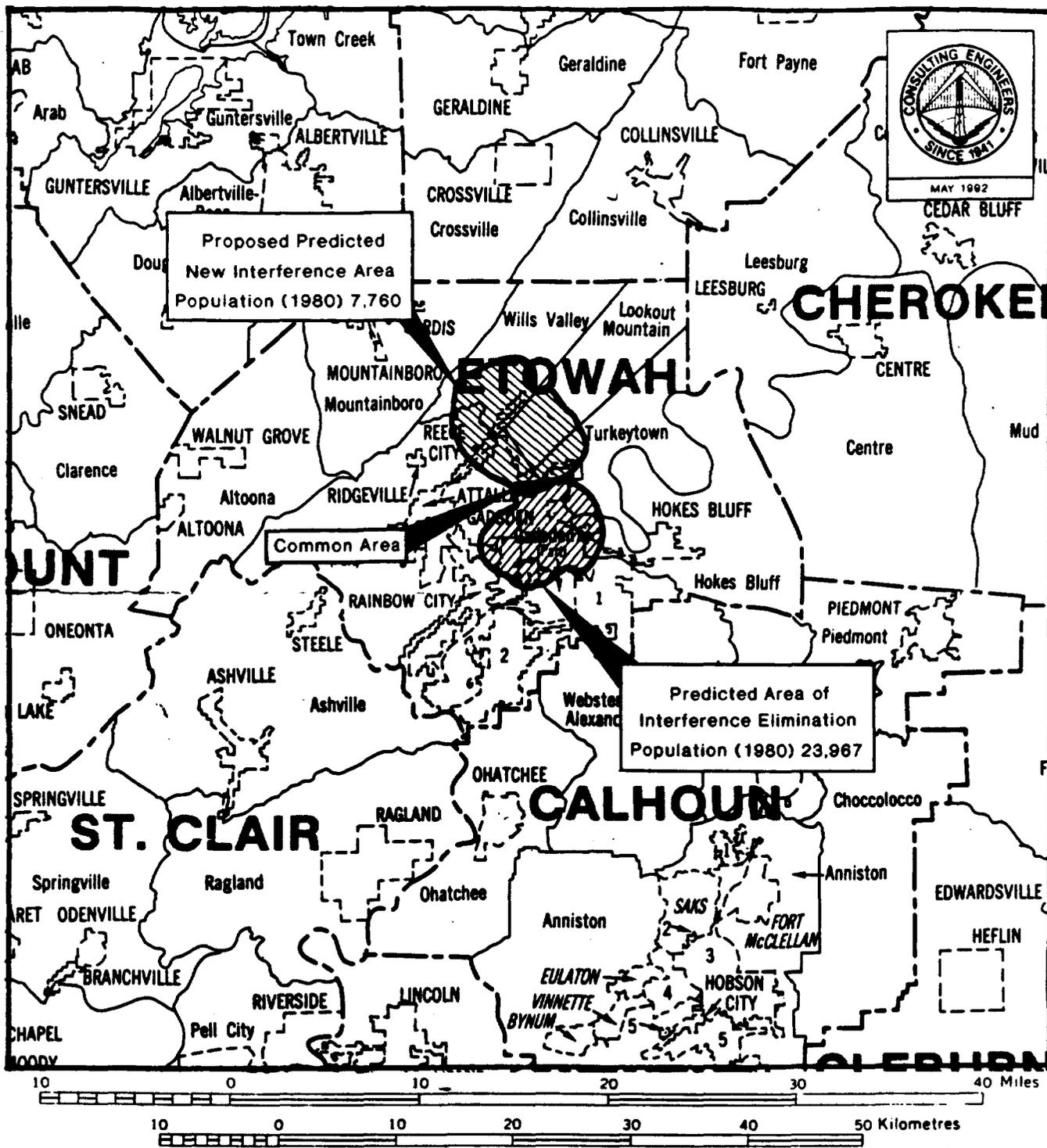
Proposed Oxford, AL
(BPED-860512MB)
CH 217A 126 W 565 m
60 dBu F(50,50)
54 dBu F(50,10)

ALLOCATION STUDY
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 du Treil, Lundin & Rackley, Inc. Washington, D.C.



TV CHANNEL 6 PROTECTION STUDY
GADSDEN STATE COMMUNITY COLLEGE
WSGN(FM) GADSDEN, ALABAMA
CH 218C3 6.3 KW(V,MAX-DA) 159 M
 du Treil, Lundin & Rackley, Inc. Washington, D.C.