

TECHNICAL EXHIBIT  
APPLICATION FOR CONSTRUCTION PERMIT  
WGUL-FM, INC.  
RADIO STATION WLSS  
SARASOTA, FLORIDA

October 9, 2003

930 KHZ 5.0 KW-D, 3.0 KW-N U DA-2

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Technical Narrative

The technical exhibit of which this narrative is part has been prepared on behalf of WGUL-FM, Inc., licensee of AM broadcast station WLSS at Sarasota, Florida. WLSS is licensed as a Class B station for operation on 930 kilohertz with daytime power of 5.0 kilowatts and nighttime power of 2.5 kilowatts, operating with the different directional antenna patterns during daytime and nighttime hours. By means of this present application, the licensee proposes to change daytime parameters at the same power level and increase nighttime power to 3 kilowatts, also with new parameters. Both patterns will utilize the existing towers. The proposal is classified as a minor change according to 47 CFR 73.3571(a)(2). As a Class B station operating on one of the channels listed in 73.26(a), the proposal satisfies 47 CFR 73.21(a)(2) which permits operation with a nominal power of not less than 0.25 kilowatt nor more than 50 kilowatts at any time. The proposal is acceptable for filing under the criteria set forth in 47 CFR 73.37.

The proposed facility will not have a significant environmental impact with regard to potential radio frequency electromagnetic field exposure to humans as defined by 47 CFR 1.1307(b). The Federal Aviation

Administration has not been notified of the proposal as new tower construction is not proposed.

#### Directional Antenna Systems

Four existing towers will be employed for both the daytime and nighttime directional antenna patterns. The radiating elements for all towers are 78.4 meters (257 feet) in height and have an overall height of 80.3 meters (263 feet) above ground level. A summary of specifications for each of the directional antenna arrays is included herein as Figure 1.

The daytime and nighttime directional antenna patterns have been calculated in accordance with 47 CFR 73.150 assuming a one-ohm lumped loss resistance at the current loop of each tower in the array. The daytime standard radiation pattern is shown herein as Figure 2 and is tabulated in Figure 3. The nighttime standard radiation pattern is shown herein as Figure 4 and is tabulated in Figure 5.

#### Section 73.24(g)

The provisions of 47 CFR 73.24(g) require that the population within the 1,000 mV/m contour not exceed 300 persons. At the proposed location, during daytime or nighttime hours, the respective proposed 1,000 mV/m contours encompass 0 persons thus the proposal complies with Section 73.24(g).

#### Daytime Coverage

The proposed WLSS daytime field strength contours are depicted on Figure 6 and the existing daytime

field strength contours are shown on Figure 7. As indicated on Figure 6, the proposed daytime 5 mV/m contour will completely encompass the city limits of Sarasota. The Sarasota city limits depicted were obtained from a map contained in the TIGER 2000 U.S. census files.

#### Daytime Allocation Study

A daytime allocation study was made utilizing FCC Figure M-3 as shown on Figure 8. Daytime field strength contours were calculated in accordance with 47 CFR 73.183. Figure 9 is a tabulation of the data employed in the calculation of daytime contours. Measurement data taken on stations relevant to this study appear in Figure 10. Based on this analysis, the proposed WLSS facility will comply with all relevant allocation criteria.

#### Nighttime Coverage

The proposed WLSS nighttime field strength contours are depicted on Figure 11 and the existing daytime field strength contours are shown on Figure 12. As can be seen from Figure 11 and Figure 12, the proposed nighttime interference-free contour level of 23.9 mV/m will provide increased coverage of the area within the city limits of Sarasota.

#### Nighttime Allocation Study

The proposed WLSS facility will afford nighttime protection to all stations and international allotments operating on 920 kHz, 930 kHz, and 940 kHz. Figure 13 contains pertinent calculation data to support a conclusion that this proposal comports with all nighttime interference protection requirements.

Environmental Considerations

The proposed WLSS operation, both daytime and nighttime, was evaluated in terms of both the electric and magnetic field components which will be present at the base of each tower. Using Figures 1 through 4 of Supplement A to OET Bulletin 65, the worst case interpolated distance at which the electric and magnetic fields would fall below ANSI guidelines is 2 meters. Presently, the areas surrounding the base of each tower are appropriately restricted with a fence having a minimum radius of 2 meters (6 feet). Unless data obtained after construction has been completed indicates otherwise, the fence should assure that persons on the property outside the fenced area will not be exposed to radiofrequency field levels in excess of those recommended by the ANSI. Appropriate measures will be taken if post-construction measurements shown field levels above the ANSI standards; however, the proposed operation is predicted to be within the standards specified in 47 CFR 1.1307(b) for human exposure to radiofrequency radiation.

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October 9, 2003

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Specifications for Daytime and Nighttime  
Directional Antenna Systems

Frequency: 930 kHz

Hours of Operation: Unlimited

Power: 5.0 kW (Day)  
3.0 kW (Night)

Number of Towers: 4 (Day & Night)

Type of Tower: Guyed, Uniform Cross-section,  
base-insulated

All Towers - height above  
base insulator 78.4 m (257 ft)

All Towers - overall height 80.3 m (263 ft)

Tower Registration:

Tower No.	Registration Number
1	1029598
2	1029599
3	1029600
4	1029601

Daytime and Nighttime Tower Arrangement:

Tower No.	Spacing (deg.) / (m)	Orientation (deg. True)
1	0.0	0.0
2	90.0/80.6	44.0
3	180.0/161.3	164.0
4	155.9/139.7	134.0



Daytime Element Field Parameters:

<u>Tower</u> <u>No.</u>	<u>Field</u> <u>Ratio</u>	<u>Phase</u> <u>(degrees)</u>
1	1.000	0.0
2	0.926	+105.5
3	1.082	+13.5
4	1.283	+103.5

Nighttime Element Field Parameters:

<u>Tower</u> <u>No.</u>	<u>Field</u> <u>Ratio</u>	<u>Phase</u> <u>(degrees)</u>
1	1.000	0.0
2	0.985	+87.1
3	0.888	-2.2
4	0.607	+91.3

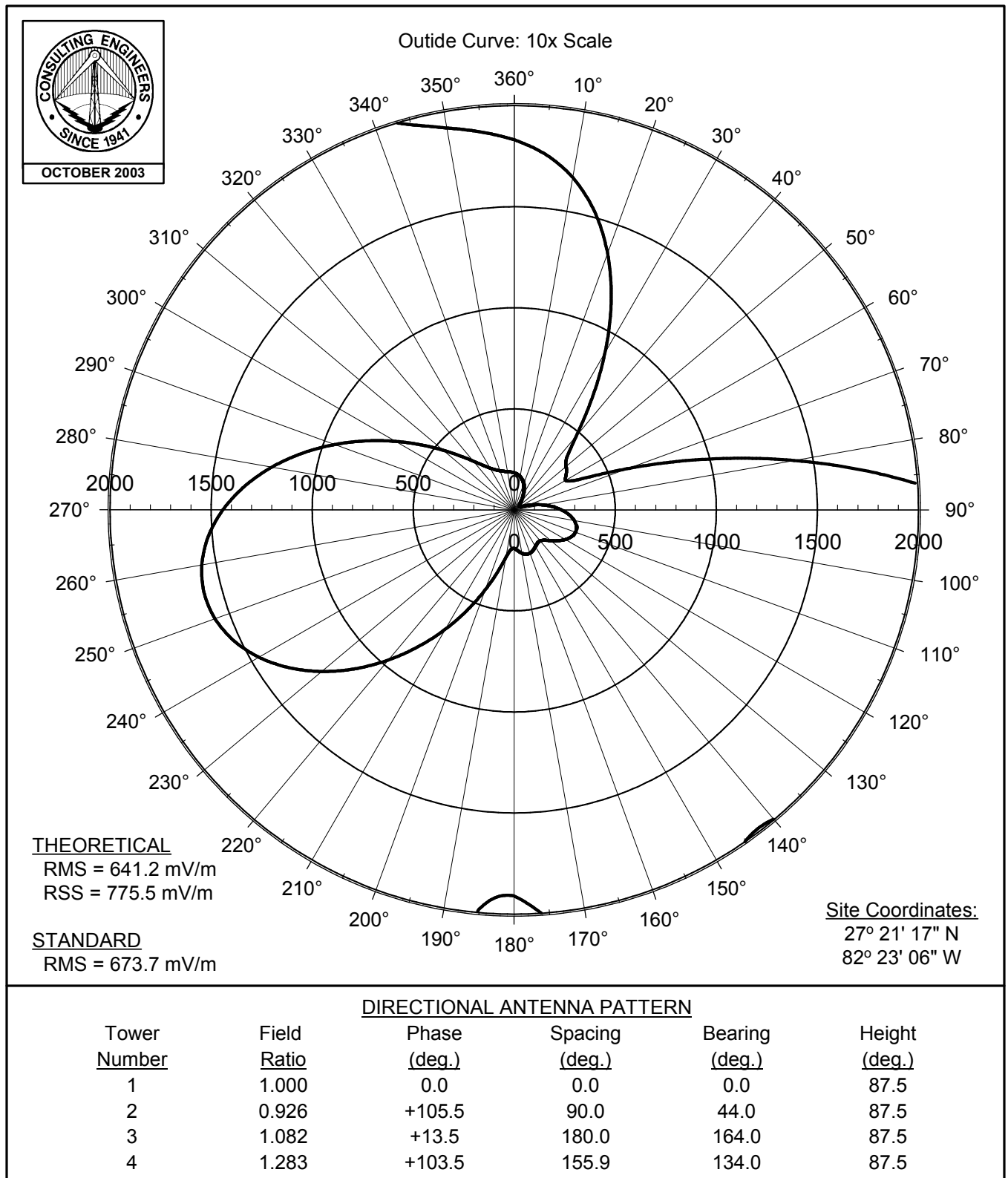
Daytime and Nighttime Ground System:

Installed about the base of each tower are 120 evenly spaced, buried copper wire radials (#10 AWG), extending 80.6 meters (265 ft) from all towers except where shortened and bonded to transverse copper strap between towers. In addition, copper strap runs from the transmitter and down the line of towers and is bonded to ground at the base of each tower.

Geographic Coordinates of  
Center of Antenna Array:

27° 21' 17" North Latitude  
82° 23' 06" West Longitude

Figure 2



## PROPOSED DAYTIME HORIZONTAL PLANE STANDARD RADIATION PATTERN

RADIO STATION WLSS  
SARASOTA, FLORIDA  
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du Treil, Lundin & Rackley, Inc. Sarasota, Florida

Figure 3

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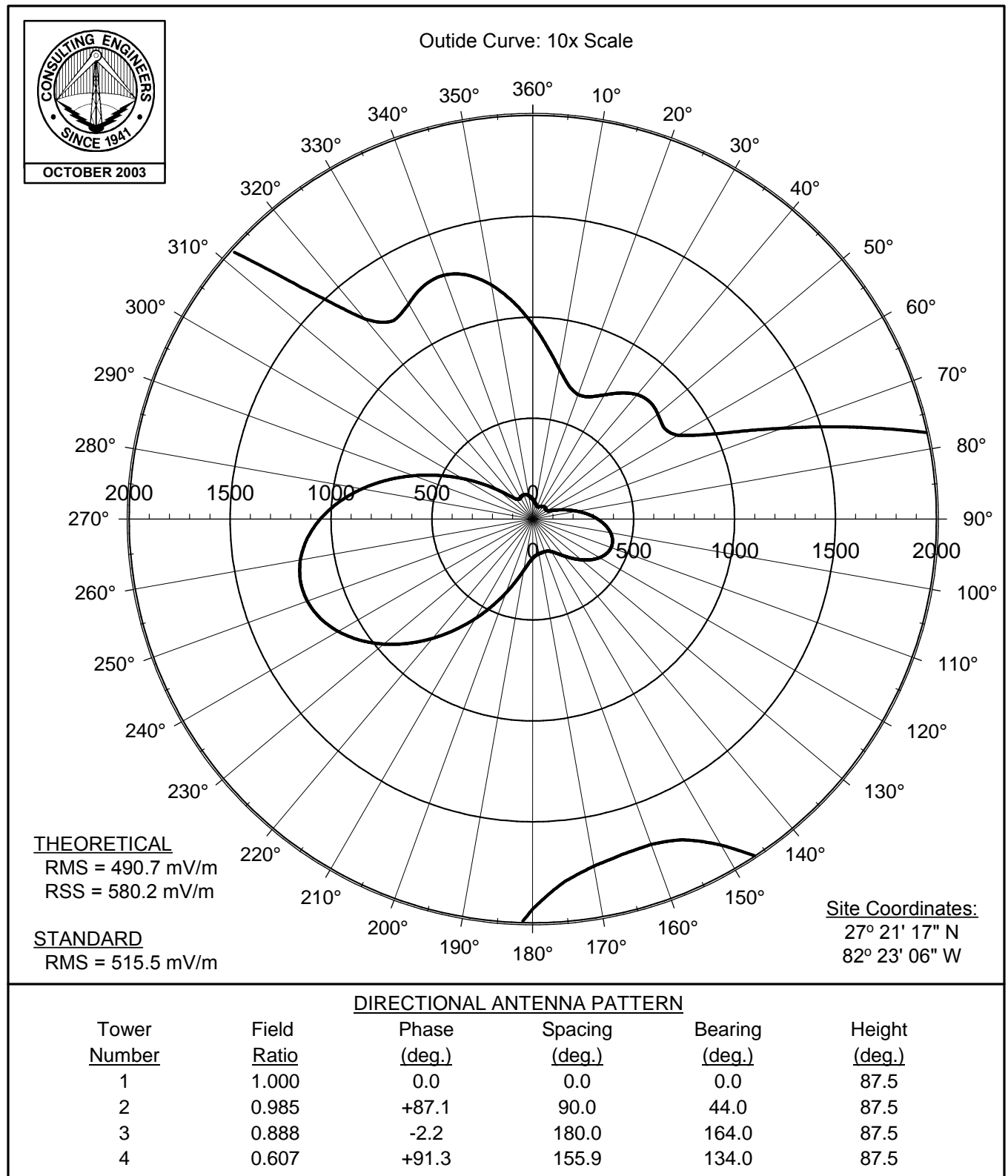
DAYTIME RADIATION PATTERN  
(Radiation Values at One Kilometer)

<u>Tower Number</u>	<u>Field Ratio</u>	<u>Phase (deg.)</u>	<u>Spacing (deg.)</u>	<u>Bearing (deg.)</u>	<u>Height (deg.)</u>
1	1.000	0.0	0.0	0.0	87.5
2	0.926	+105.5	90.0	44.0	87.5
3	1.082	+13.5	180.0	164.0	87.5
4	1.283	+103.5	155.9	134.0	87.5

<u>Input Power (kW)</u>	<u>Loop Loss (ohms)</u>	<u>Theo. RMS (mV/m)</u>	<u>Theo. RSS (mV/m)</u>	<u>Q Factor (mV/m)</u>	<u>Standard RMS (mV/m)</u>
5.0	1.0	641.2	775.5	22.4	673.7

<u>Azimuth (mV/m)</u>	<u>Field (mV/m)</u>	<u>Azimuth (mV/m)</u>	<u>Field (mV/m)</u>	<u>Azimuth (mV/m)</u>	<u>Field (mV/m)</u>	<u>Azimuth (mV/m)</u>	<u>Field (mV/m)</u>
0	183	90	233	180	191	270	1441
5	177	95	272	185	198	275	1338
10	167	100	302	190	240	280	1217
15	153	105	319	195	318	285	1083
20	135	110	323	200	422	290	944
25	113	115	314	205	546	295	807
30	89.7	120	293	210	682	300	677
35	66.7	125	266	215	825	305	559
40	47.8	130	237	220	971	310	458
45	36.7	135	213	225	1112	315	376
50	33.2	140	200	230	1244	320	314
55	31.4	145	200	235	1361	325	269
60	29.3	150	209	240	1458	330	238
65	35.8	155	220	245	1531	335	218
70	59.6	160	228	250	1575	340	205
75	96.4	165	227	255	1588	345	197
80	141	170	218	260	1569	350	192
85	188	175	203	265	1519	355	188

Figure 4



## PROPOSED NIGHTTIME HORIZONTAL PLANE STANDARD RADIATION PATTERN

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NIGHTTIME RADIATION PATTERN  
(Radiation Values at One Kilometer)

Tower <u>Number</u>	Field <u>Ratio</u>	Phase <u>(deg.)</u>	Spacing <u>(deg.)</u>	Bearing <u>(deg.)</u>	Height <u>(deg.)</u>
1	1.000	0.0	0.0	0.0	87.5
2	0.985	+87.1	90.0	44.0	87.5
3	0.888	-2.2	180.0	164.0	87.5
4	0.607	+91.3	155.9	134.0	87.5

Input Power <u>(kW)</u>	Loop Loss <u>(ohms)</u>	Theo. RMS <u>(mV/m)</u>	Theo. RSS <u>(mV/m)</u>	Q Factor <u>(mV/m)</u>	Standard RMS <u>(mV/m)</u>
3.0	1.0	490.7	580.3	17.3	515.6

Standard Radiation Pattern  
(at One Kilometer)

Azimuth Angle (deg)	Elevation Angle in Degrees						
	0 (mV/m)	5 (mV/m)	10 (mV/m)	15 (mV/m)	20 (mV/m)	25 (mV/m)	30 (mV/m)
0	96.4	94.4	88.4	78.8	66.2	53.0	45.3
5	85.2	83.4	77.9	69.0	57.1	44.5	37.3
10	75.5	73.8	68.6	60.0	48.4	35.8	29.5
15	68.6	66.9	61.7	53.0	41.1	27.8	22.5
20	65.7	63.9	58.4	49.2	36.5	22.0	18.0
25	66.9	64.9	58.9	49.0	35.4	20.4	18.6
30	71.1	69.0	62.4	51.7	37.7	23.6	24.3
35	76.4	74.0	67.0	55.7	41.7	29.9	33.2
40	80.7	78.1	70.7	59.3	46.3	37.9	44.3
45	82.3	79.8	72.5	61.9	51.4	48.0	57.8
50	81.2	78.9	72.6	64.4	58.6	61.2	74.5
55	79.5	77.9	74.0	70.3	70.9	79.2	95.1
60	83.2	82.9	82.5	84.4	90.9	103	120
65	100	101	103	109	119	133	149
70	131	133	137	145	155	168	183
75	174	176	180	187	196	207	218
80	223	224	228	233	240	248	255
85	274	275	277	280	284	288	291
90	321	322	322	324	325	325	325
95	362	362	361	361	360	357	353
100	392	392	391	389	386	382	376
105	409	409	408	406	402	397	390
110	413	413	412	411	408	404	397
115	404	404	404	404	403	401	396
120	382	383	384	386	388	389	388
125	351	352	355	360	365	370	374
130	314	316	320	328	337	347	355
135	275	277	283	293	306	320	334
140	238	240	248	260	276	294	312
145	207	210	217	230	248	269	292
150	186	189	195	208	226	249	275
155	175	177	182	193	210	235	263
160	172	172	176	185	202	226	256
165	172	172	175	183	200	225	255
170	175	175	178	187	204	230	262
175	180	182	186	197	216	243	275

Standard Radiation Pattern  
(at One Kilometer)

Azimuth Angle (deg)	Elevation Angle in Degrees						
	35 (mV/m)	40 (mV/m)	45 (mV/m)	50 (mV/m)	55 (mV/m)	60 (mV/m)	65 (mV/m)
0	51.7	71.2	96.1	121	142	156	161
5	45.3	65.9	91.3	117	138	153	158
10	40.2	62.5	88.5	114	135	150	156
15	37.0	61.1	87.6	113	135	149	155
20	36.4	61.8	88.7	114	135	150	155
25	38.8	64.9	91.8	117	138	151	156
30	44.4	70.3	96.9	121	141	154	158
35	52.8	78.3	104	128	147	158	160
40	63.9	88.8	114	136	154	163	164
45	77.9	102	126	147	162	170	168
50	95.0	118	140	159	172	177	173
55	115	137	157	173	183	185	179
60	139	159	176	189	195	195	185
65	167	183	197	206	209	204	192
70	197	210	219	224	223	214	199
75	229	237	242	242	237	225	206
80	261	265	265	261	251	235	213
85	293	292	287	278	265	245	220
90	322	317	308	295	278	255	227
95	347	338	326	310	289	264	233
100	367	356	341	323	300	272	239
105	381	369	353	333	308	279	245
110	389	376	361	340	315	285	250
115	389	379	365	345	320	290	254
120	384	377	365	348	324	294	258
125	375	371	363	348	326	297	261
130	361	362	358	347	327	300	264
135	345	352	352	344	328	302	267
140	329	340	345	341	328	304	270
145	313	330	339	339	328	306	272
150	300	321	334	337	329	308	275
155	291	315	331	337	331	311	278
160	286	313	332	339	334	315	282
165	287	315	335	344	339	319	286
170	294	322	343	351	345	325	291
175	307	335	354	361	354	332	296

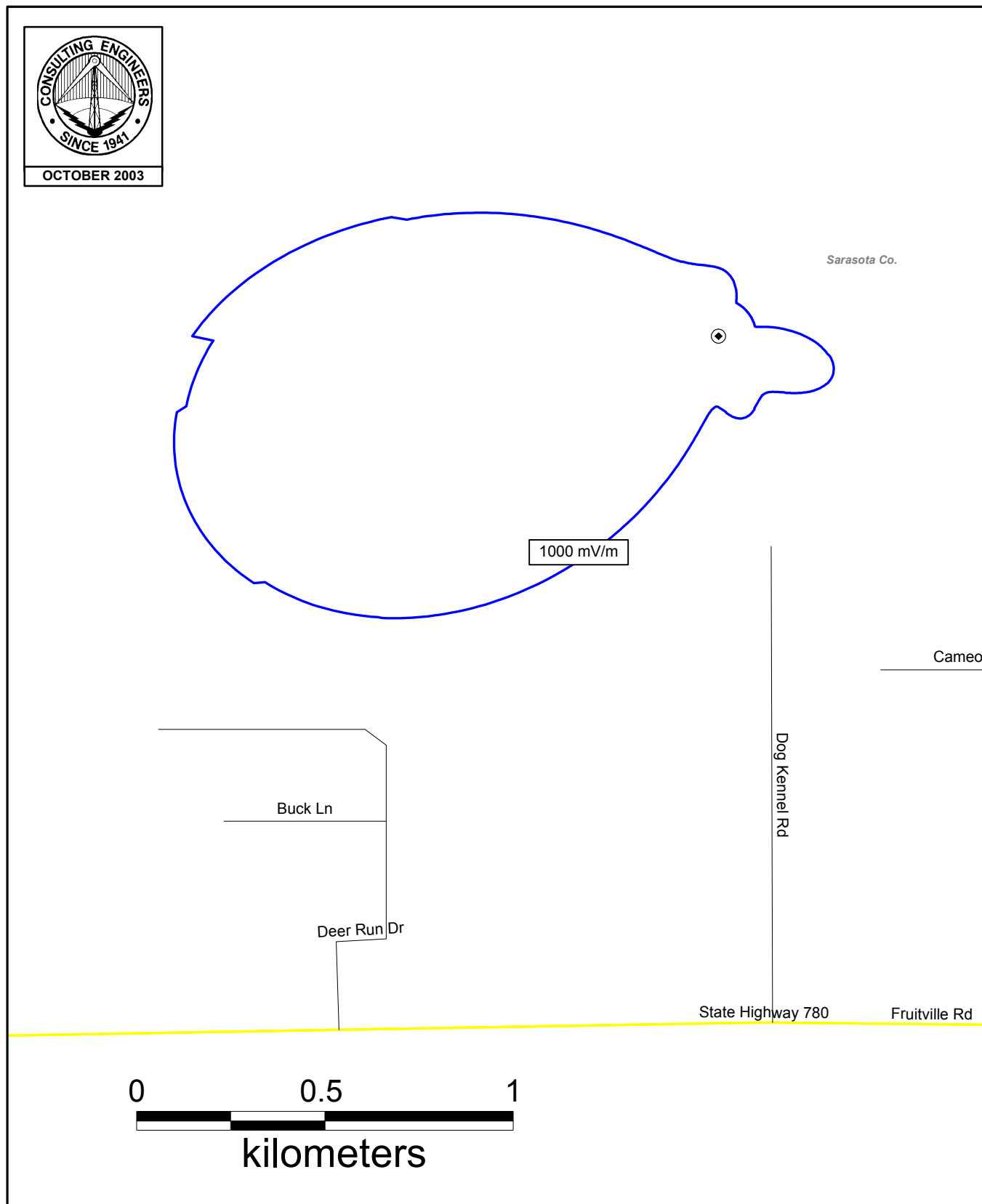
Standard Radiation Pattern  
(at One Kilometer)

Azimuth Angle (deg)	Elevation Angle in Degrees						
	0 (mV/m)	5 (mV/m)	10 (mV/m)	15 (mV/m)	20 (mV/m)	25 (mV/m)	30 (mV/m)
180	193	195	202	216	237	265	297
185	218	221	230	246	269	297	327
190	259	263	273	290	312	338	365
195	317	320	330	346	367	389	411
200	390	393	402	415	431	449	465
205	475	478	484	493	505	516	524
210	570	571	574	579	584	587	587
215	670	670	670	670	668	662	652
220	771	770	767	761	752	737	717
225	871	869	862	850	833	810	779
230	964	960	950	933	908	876	836
235	1046	1042	1028	1006	974	934	886
240	1113	1108	1092	1065	1028	981	925
245	1162	1156	1137	1107	1065	1013	952
250	1188	1182	1162	1129	1085	1030	965
255	1191	1184	1164	1130	1085	1028	962
260	1169	1162	1142	1109	1065	1009	944
265	1122	1116	1097	1066	1024	972	911
270	1052	1047	1030	1003	966	919	864
275	963	959	945	923	891	852	805
280	860	856	846	828	804	773	736
285	746	743	737	725	709	687	660
290	628	627	623	618	609	597	580
295	511	511	511	511	510	507	500
300	401	402	405	410	415	420	422
305	303	305	310	318	328	339	349
310	222	224	230	240	253	268	283
315	162	164	169	178	191	208	226
320	129	130	131	136	145	160	179
325	120	119	116	113	115	125	142
330	123	121	114	106	100	102	114
335	127	125	117	105	94.2	88.6	94.0
340	129	126	117	105	91.0	80.5	80.0
345	125	122	114	102	87.4	74.3	69.7
350	118	115	108	96.4	82.0	68.1	61.2
355	108	105	98.8	88.3	74.8	61.0	53.3



Standard Radiation Pattern  
(at One Kilometer)

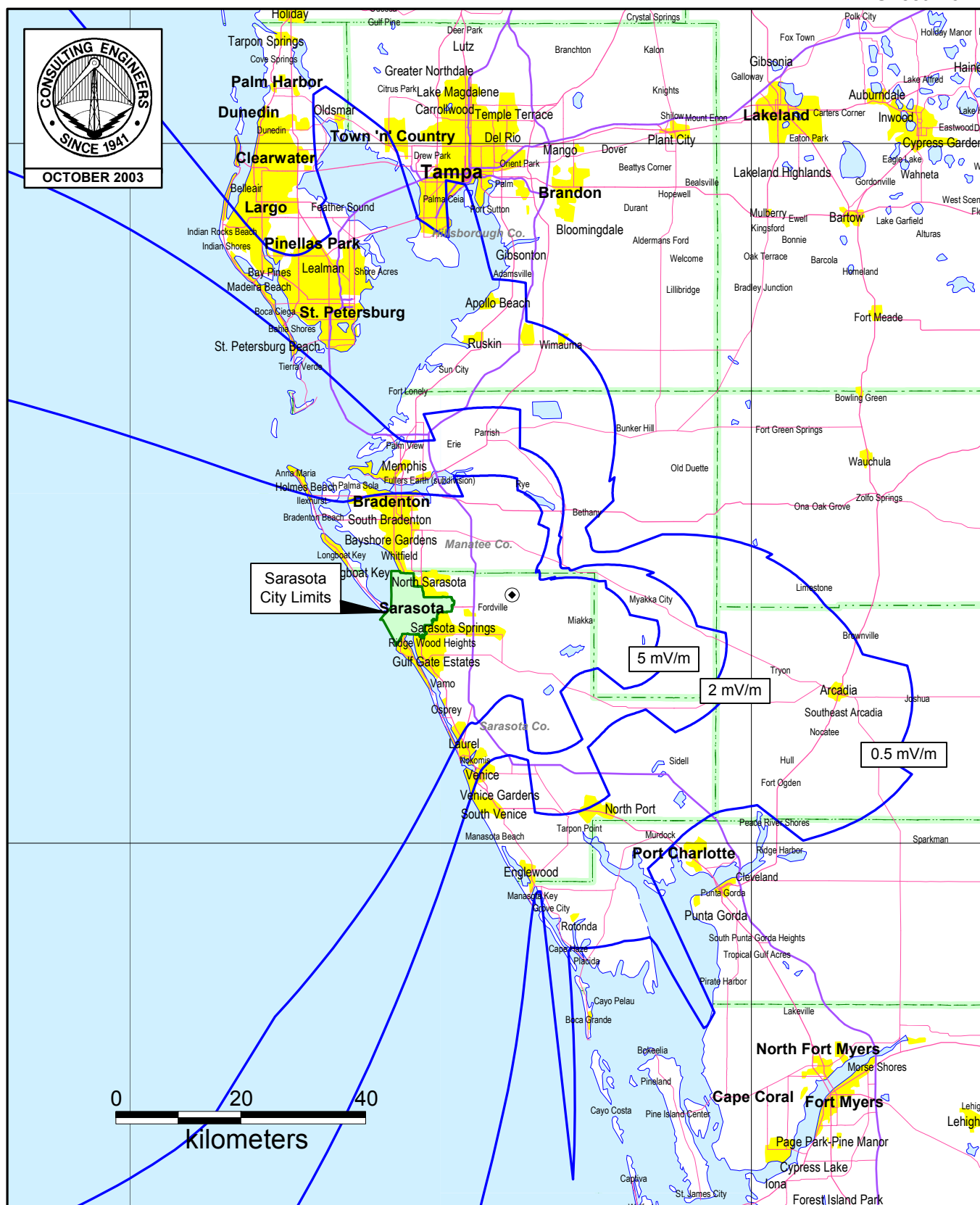
Azimuth Angle (deg)	Elevation Angle in Degrees						
	35 (mV/m)	40 (mV/m)	45 (mV/m)	50 (mV/m)	55 (mV/m)	60 (mV/m)	65 (mV/m)
180	328	353	370	375	365	341	302
185	355	377	390	391	378	350	309
190	389	407	415	410	392	360	316
195	430	441	442	432	408	372	323
200	476	480	473	456	426	384	331
205	526	521	507	481	444	396	338
210	580	565	542	507	463	408	346
215	635	610	577	533	481	420	353
220	690	654	611	558	498	431	359
225	742	696	643	582	514	441	365
230	789	733	671	602	528	450	369
235	829	765	695	619	539	456	373
240	861	790	713	631	546	460	375
245	882	806	724	638	550	462	375
250	892	812	727	639	550	461	373
255	888	808	723	635	546	457	370
260	872	793	710	624	537	450	365
265	843	768	689	607	524	440	358
270	802	734	661	585	507	428	350
275	751	691	627	558	487	414	340
280	692	642	587	527	463	397	329
285	626	587	543	492	438	379	317
290	558	530	496	456	410	359	304
295	488	471	448	419	382	339	290
300	420	414	401	381	354	319	277
305	356	359	355	345	326	298	263
310	297	308	312	310	299	279	250
315	245	261	273	277	273	260	237
320	201	221	238	248	250	242	224
325	163	186	207	221	229	226	213
330	134	157	180	198	209	211	202
335	111	134	158	178	193	198	193
340	92.8	115	139	162	178	187	184
345	79.1	99.5	124	148	166	177	177
350	68.3	87.6	112	137	156	168	170
355	59.3	78.3	103	128	148	162	165

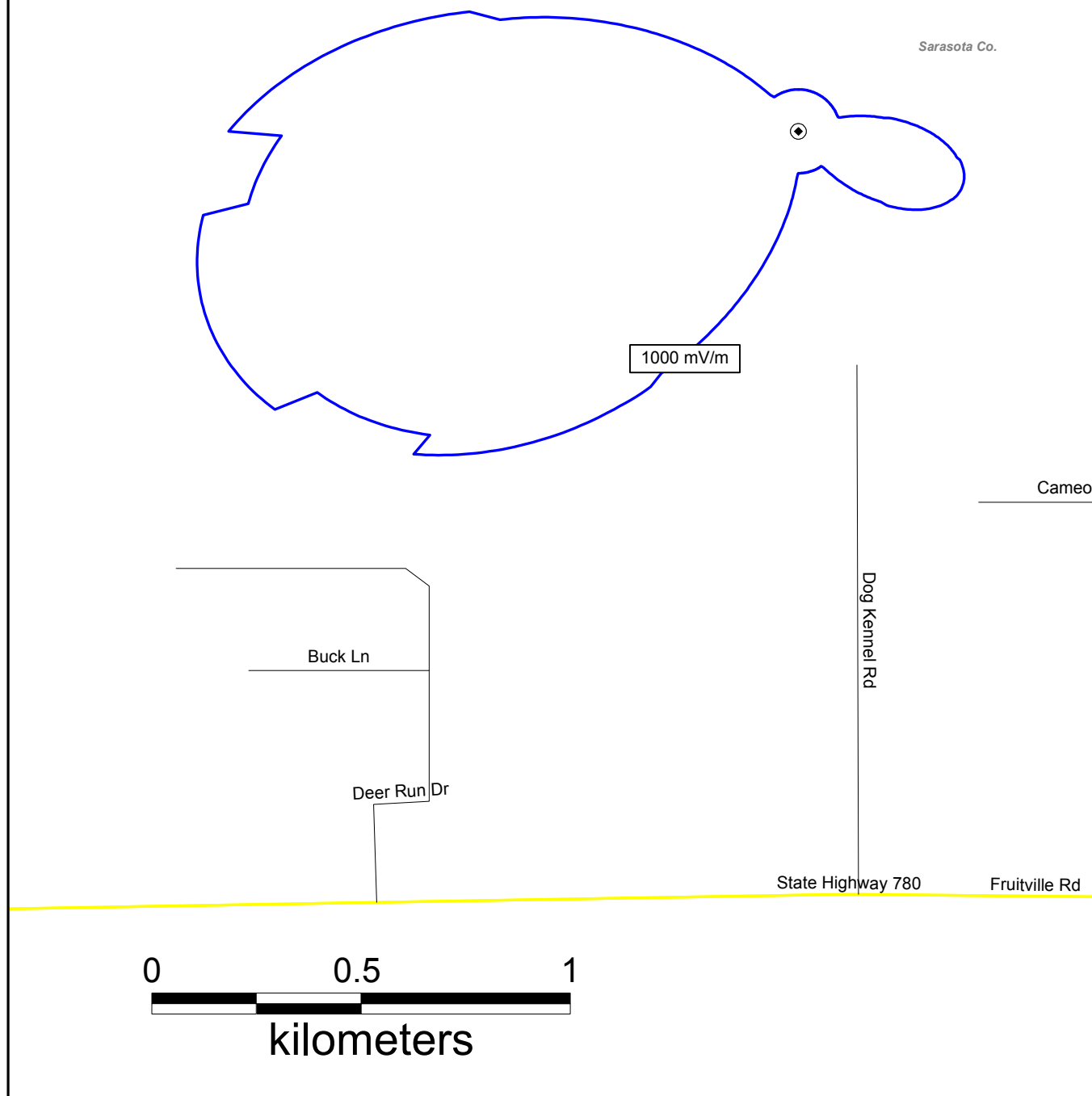
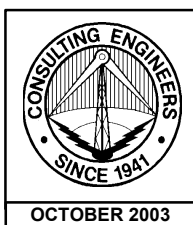


## PROPOSED DAYTIME FIELD STRENGTH CONTOURS

RADIO STATION WLSS  
SARASOTA, FLORIDA  
930 KHZ 5.0 KW-D, 3.0 KW-N U DA-2

du Treil, Lundin & Rackley, Inc. Sarasota, Florida

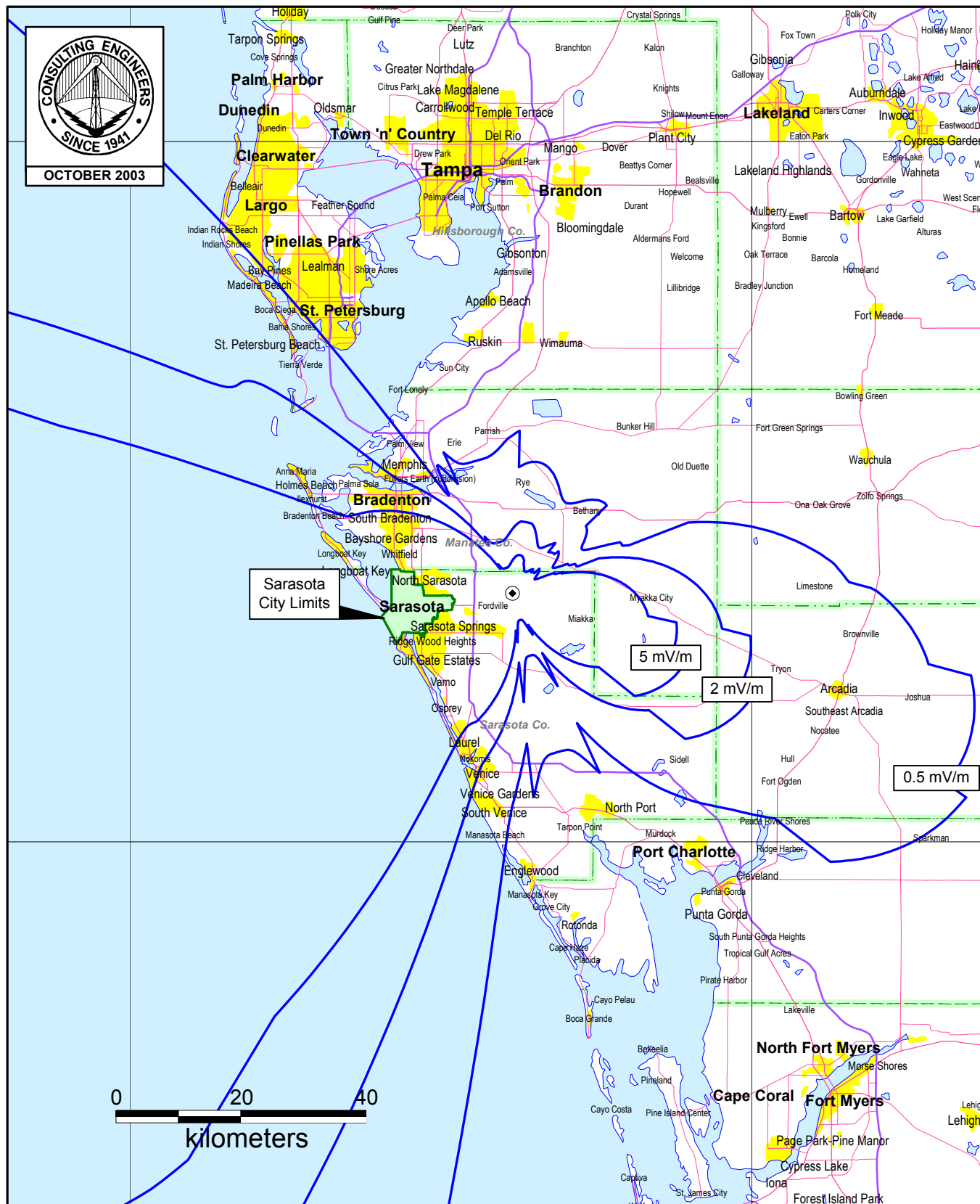




## EXISTING DAYTIME FIELD STRENGTH CONTOURS

RADIO STATION WLSS  
SARASOTA, FLORIDA  
930 KHZ 5.0 KW-D, 3.0 KW-N U DA-2

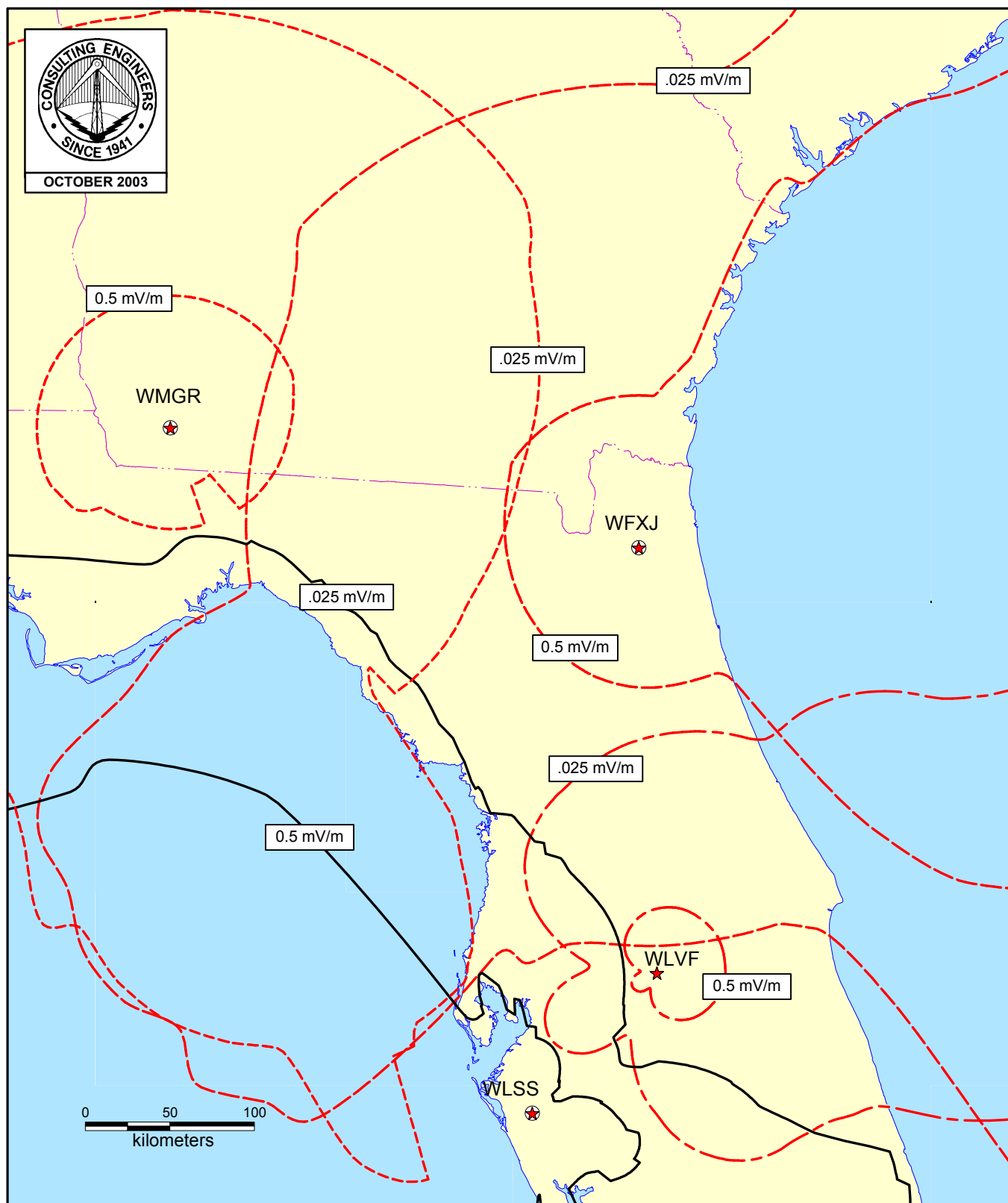
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## EXISTING DAYTIME FIELD STRENGTH CONTOURS

RADIO STATION WLSS  
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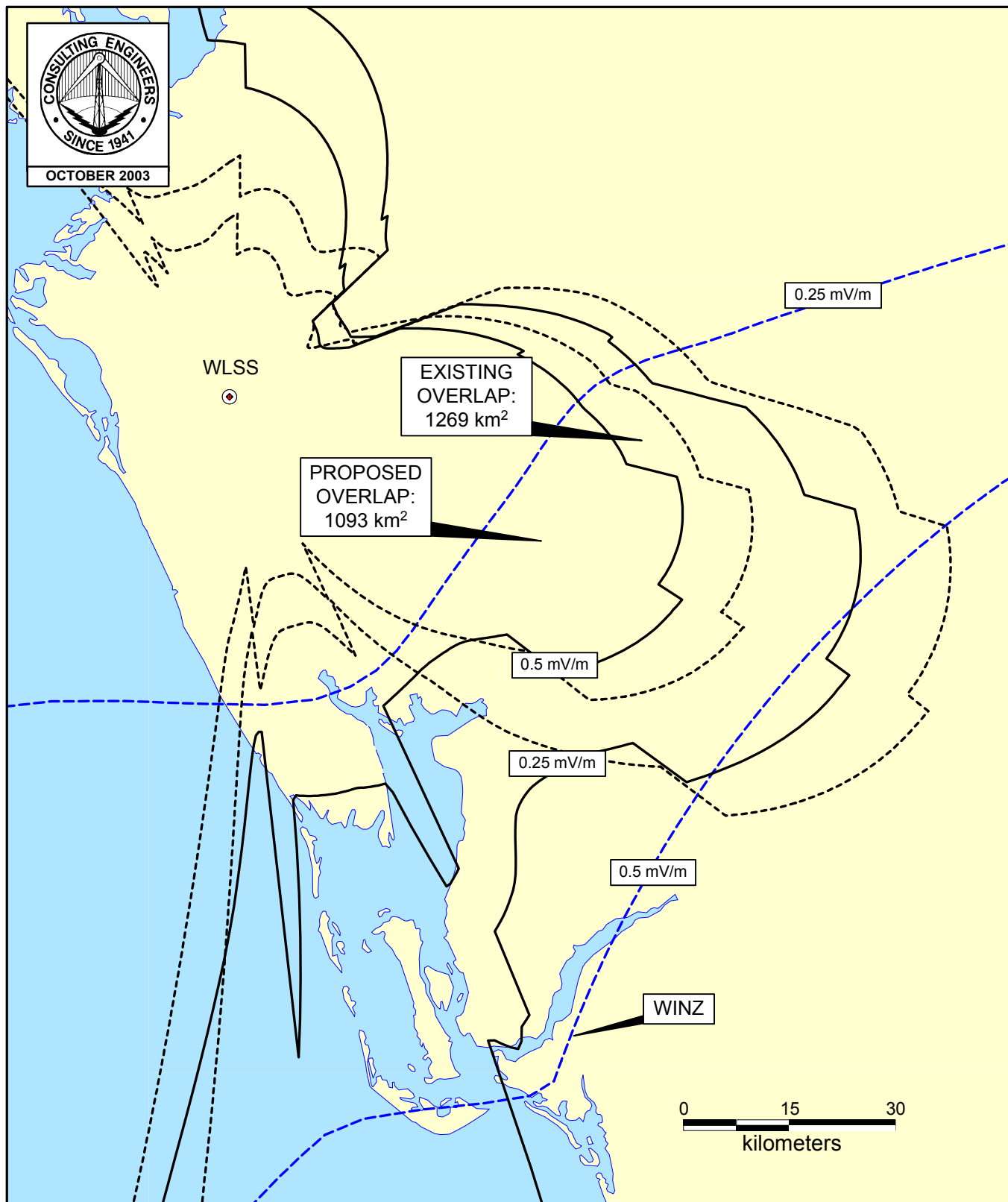
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## **DAYTIME ALLOCATION STUDY**

RADIO STATION WLSS  
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## DAYTIME ALLOCATION STUDY

RADIO STATION WLSS  
SARASOTA, FLORIDA  
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Tabulation of Data Employed in  
Calculation of Groundwave Contours



Call: WLSS - Licensed and Proposed

Sarasota, FL

Coordinates: 27-21-17 North 82-23-06 West

Frequency: 930 kHz

Azimuth	Region 1	Dist 1	Region 2	Dist 2	Region 3	Dist 3	Region 4	Dist 4	Region 5	Dist 5
(deg)	(mS/m)	(km)	(mS/m)	(km)	(mS/m)	(km)	(mS/m)	(km)	(mS/m)	(km)
3-20	10	6.5	7	11.5	5.5	17	4	26.1		
21-40	15	4	7	12	4	24.4				
48-67	10	7.4	5	10	3.5	11	2.5	19	2	24.2
82-99	10	3	15	12	6	15	4	24.6		
100-113	20	11	12	16	8	22	6	24.1		
114-130	15	13	8	25						
154-174	20	18	12	25.3						
210-230	7	20.3								
242-262	8	19.1								
270-290	15	3.3	10	11	7	26.3				
334-350	15	3.3	10	6.7	7	24.6				
351-2	10	6.3	7	24.5						

Measured data from Application BMP-860519AB

FCC M3 conductivity employed along all other azimuths

Call: WMGR - License

Jacksonville, FL

Coordinates: 30-54-25 North 84-33-02 West

Frequency: 930 kHz

Azimuth	Region 1	Dist 1	Region 2	Dist 2	Region 3	Dist 3
(deg)	(mS/m)	(km)	(mS/m)	(km)	(mS/m)	(km)
140-160	1	24	0.5	56.2	1.5	93.7

FCC M3 conductivity employed along all other azimuths

Call: WFXJ - License

Jacksonville, FL

Coordinates: 30-17-09 North 81-44-52 West

Frequency: 930 kHz

FCC M3 conductivity employed along all azimuths

Call: WLVF - License  
Haines City, FL  
Coordinates: 28-04-52 North 81-38-22 West  
Frequency: 930 kHz

FCC M3 conductivity employed along all azimuths

Call: WRFX - License  
Miami, FL  
Coordinates: 25-57-36 North 80-16-13 West  
Frequency: 940 kHz

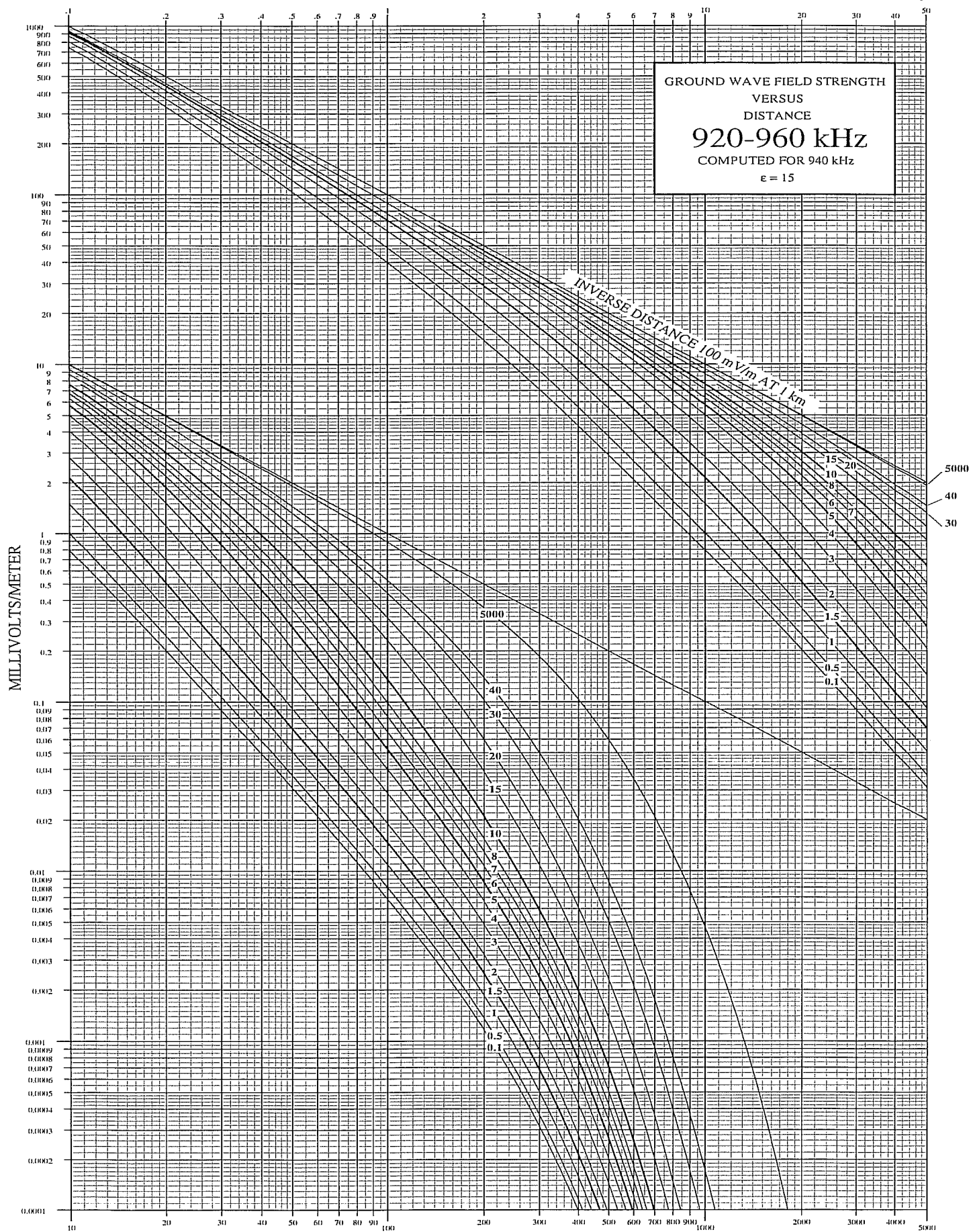
FCC M3 conductivity employed along all azimuths

TECHNICAL EXHIBIT  
APPLICATION FOR CONSTRUCTION PERMIT  
RADIO STATION WLSS  
SARASOTA, FLORIDA

930 KHZ 5.0 KW-D, 3.0 KW-N U DA-2

Field Strength Measurements

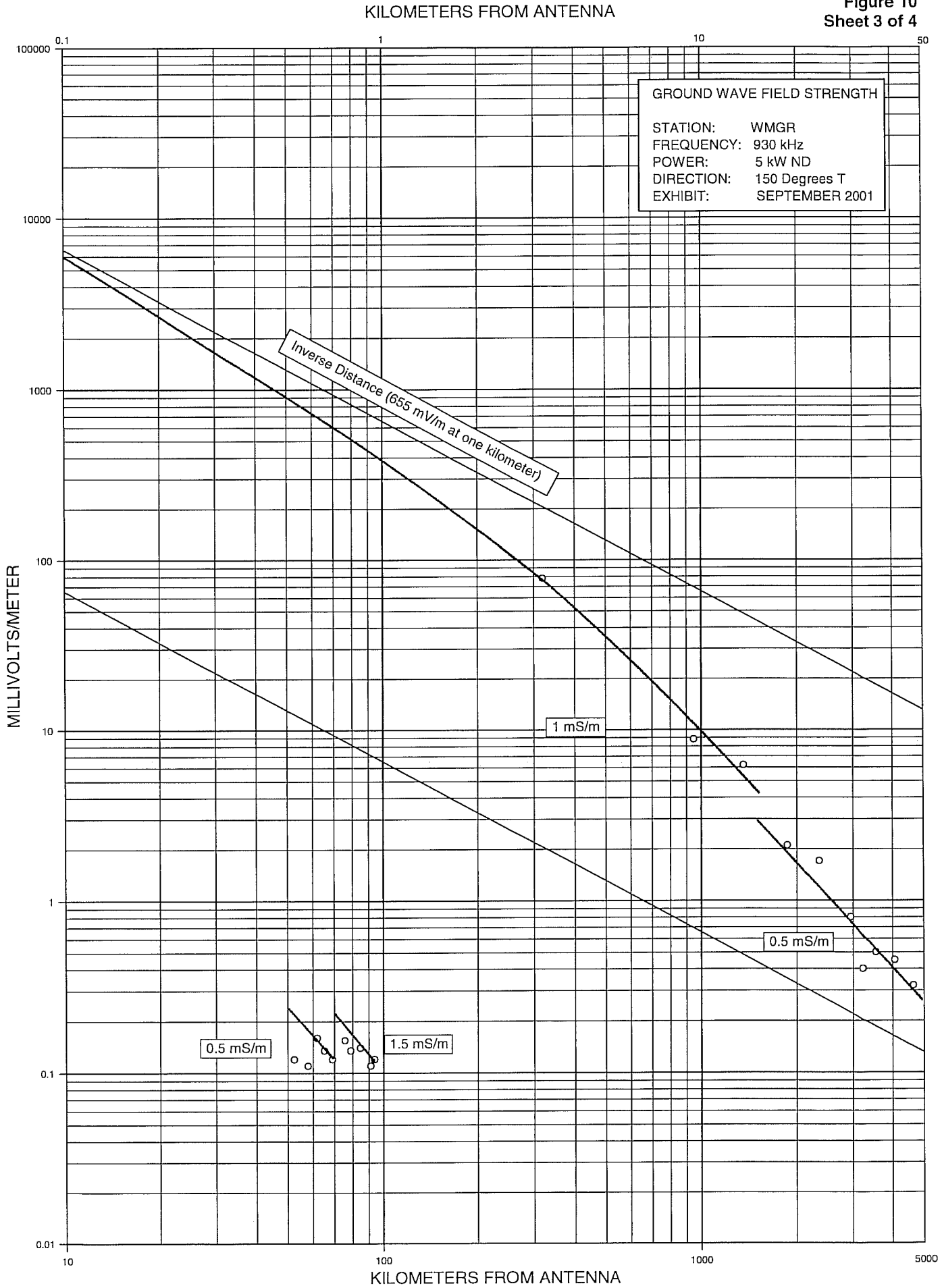
KILOMETERS FROM ANTENNA



KILOMETERS FROM ANTENNA

GRAPH 11

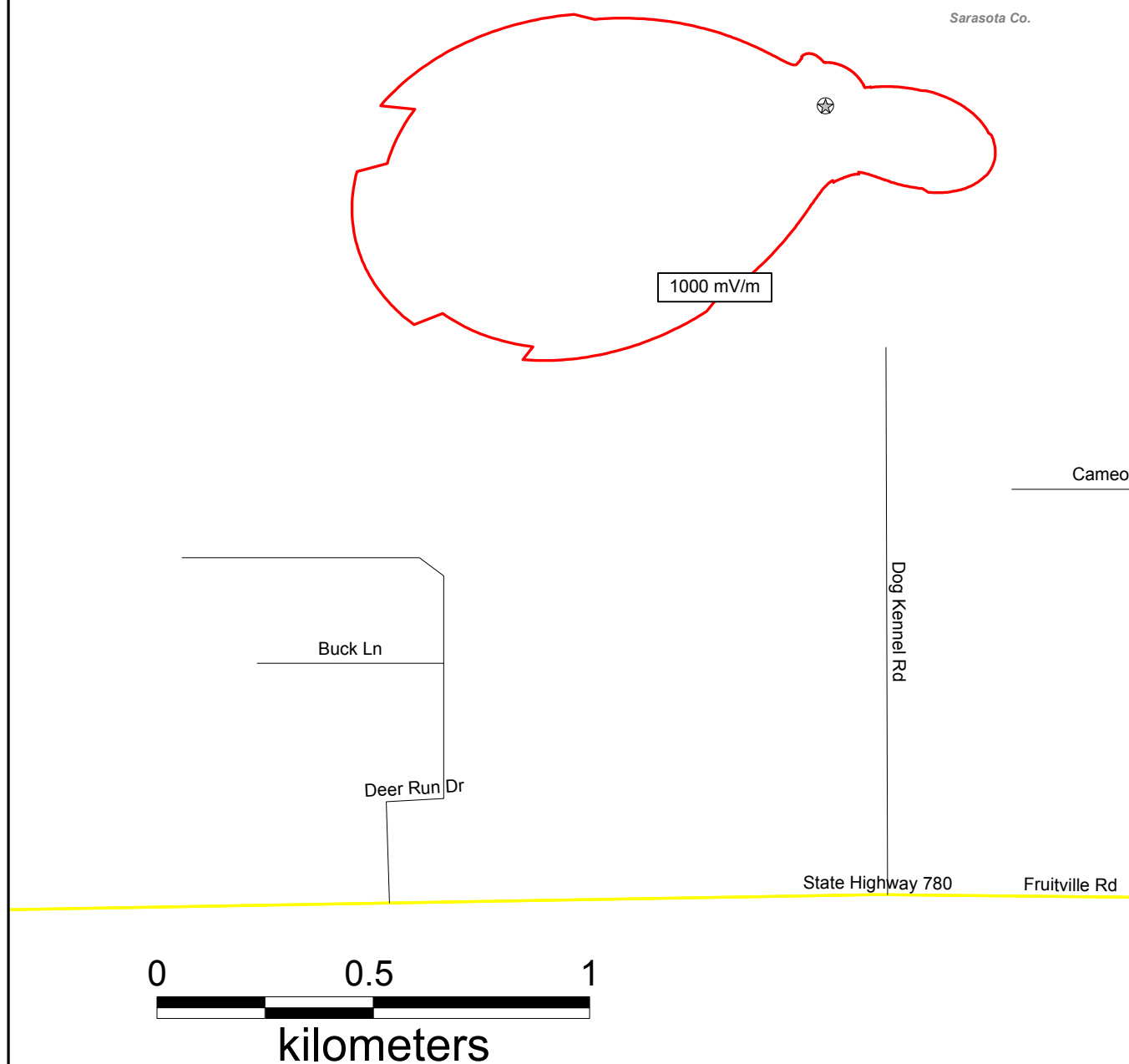
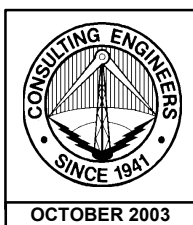
Figure 10  
Sheet 3 of 4



**Radio Station: WMGR**

150 Degree Radial - Day

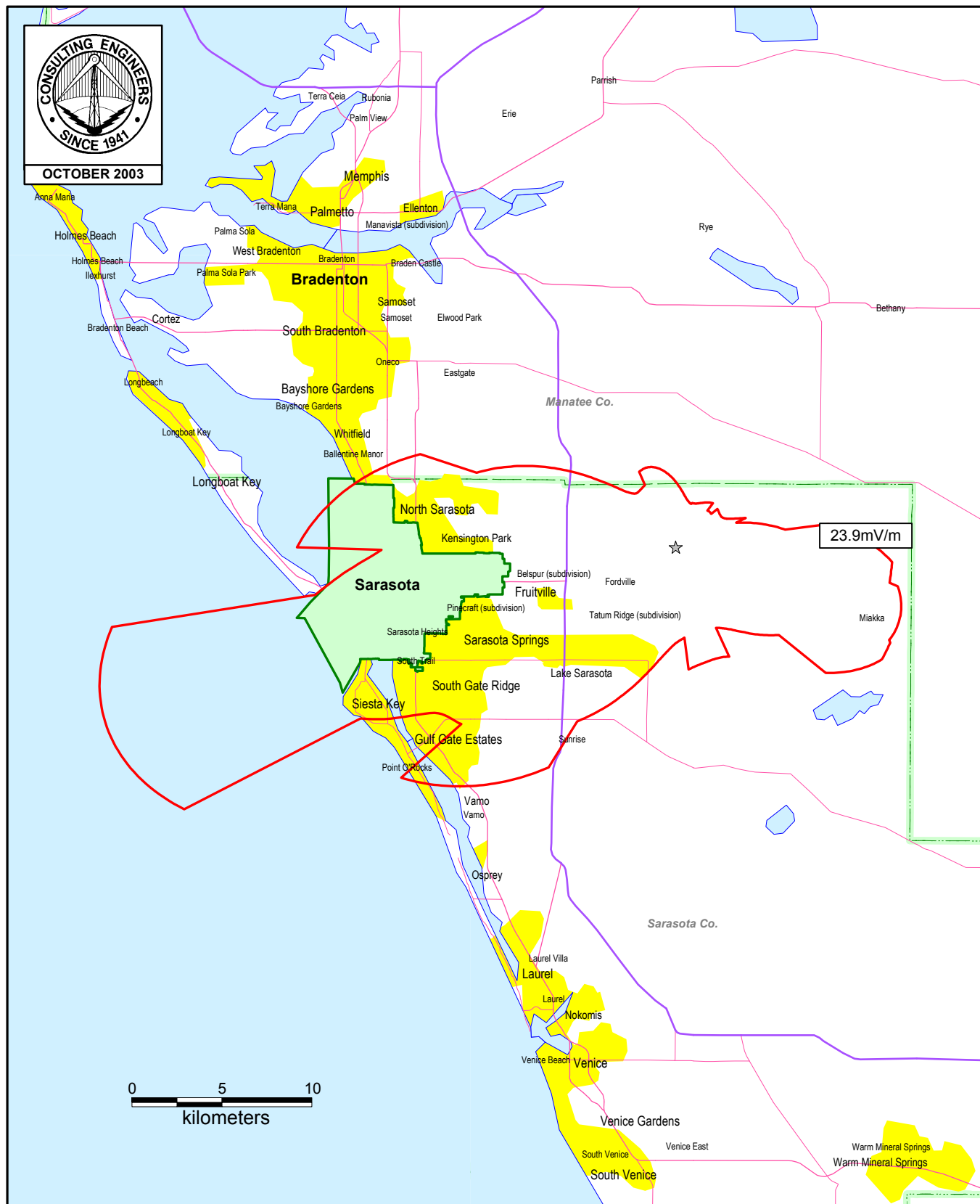
Point Desig.	Distance (km)	Date	Time (local)	Field Strength (mV/m)
1	3.19	9/28/01	815	78.0
2	9.48	9/28/01	842	8.80
3	13.58	9/28/01	905	6.20
4	18.67	9/28/01	925	2.10
5	23.43	9/28/01	940	1.70
6	29.45	9/28/01	1005	0.800
7	32.35	9/28/01	1022	0.400
8	35.41	9/28/01	1048	0.500
9	40.56	9/28/01	1105	0.450
10	46.35	9/28/01	1140	0.320
11	52.30	9/28/01	1205	0.120
12	57.78	9/28/01	1240	0.110
13	61.80	9/28/01	1310	0.160
14	65.02	9/28/01	1340	0.135
15	68.88	9/28/01	1435	0.120
16	75.48	9/28/01	1510	0.155
17	78.70	9/28/01	1550	0.135
18	84.49	9/28/01	1630	0.140
19	91.25	9/28/01	1705	0.110
20	93.66	9/28/01	1740	0.120



## PROPOSED NIGHTTIME FIELD STRENGTH CONTOURS

RADIO STATION WLSS  
SARASOTA, FLORIDA  
930 KHZ 5.0 KW-D, 3.0 KW-N U DA-2

du Treil, Lundin & Rackley, Inc. Sarasota, Florida

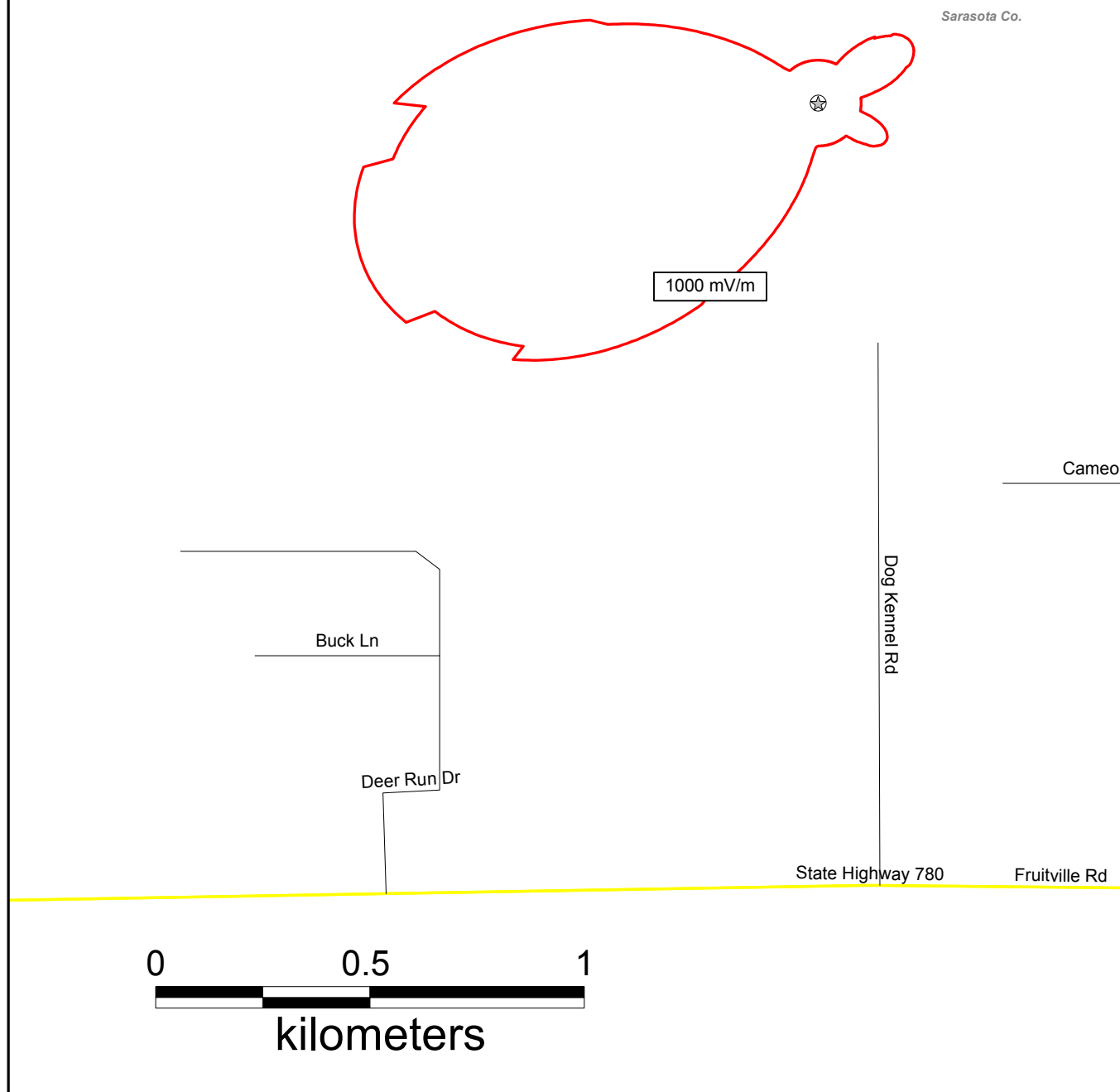
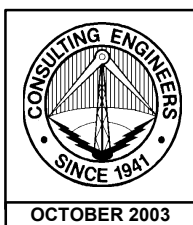


## PROPOSED NIGHTTIME FIELD STRENGTH CONTOURS

RADIO STATION WLSS  
SARASOTA, FLORIDA  
930 KHZ 5.0 KW-D, 3.0 KW-N U DA-2

du Treil, Lundin & Rackley, Inc. Sarasota, Florida

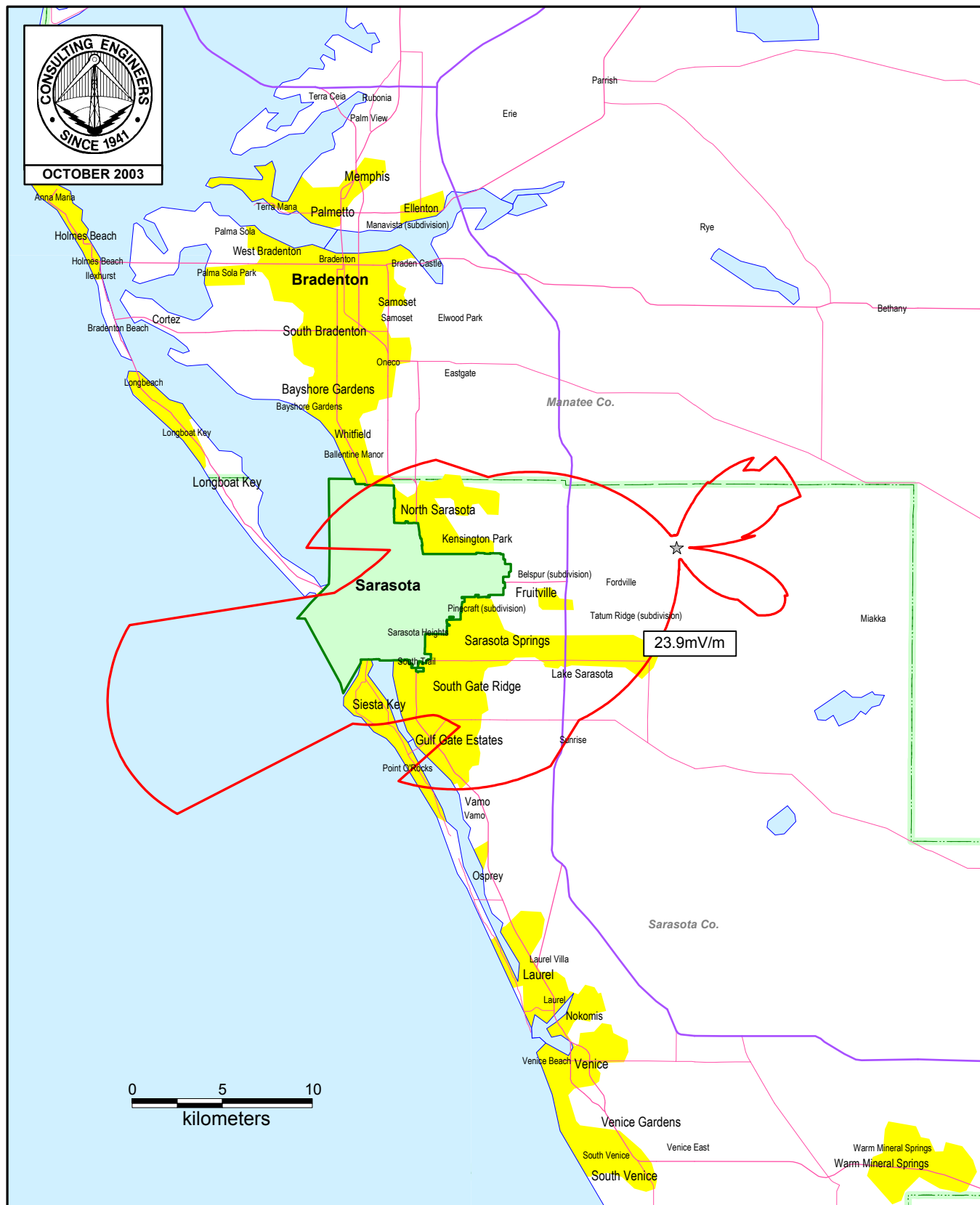




## EXISTING NIGHTTIME FIELD STRENGTH CONTOURS

RADIO STATION WLSS  
SARASOTA, FLORIDA  
930 KHZ 5.0 KW-D, 3.0 KW-N U DA-2

du Treil, Lundin & Rackley, Inc. Sarasota, Florida



## EXISTING NIGHTTIME FIELD STRENGTH CONTOURS

RADIO STATION WLSS  
SARASOTA, FLORIDA  
930 KHZ 5.0 KW-D, 3.0 KW-N U DA-2

du Treil, Lundin & Rackley, Inc. Sarasota, Florida

TECHNICAL EXHIBIT  
APPLICATION FOR CONSTRUCTION PERMIT  
RADIO STATION WLSS  
SARASOTA, FLORIDA

930 KHZ 5.0 KW-D, 3.0 KW-N U DA-2

Nighttime Allocation Study

RSS Night Limit

To Station (Call) WLSS	27-21-17		082-23-06				
From Station(Call)	WFXJ	WMGR	WSLI	COROZ	WJBY	YSTG	WEKO
Frequency(kHz)	930.000	930.000	930.000	930.000	930.000	930.000	930.000
G.C. Distance(km)	331.700	447.400	935.100	1172.600	815.600	1672.300	1867.500
Slant Distance (km)	387.364	490.081	956.232	1189.529	839.758	1684.237	1878.138
Bearing degrees	190.941	151.429	124.733	30.667	153.696	23.899	306.156
Mid-Pt Latitude(deg)	28.820	29.140	29.930	22.900	30.680	20.570	22.910
Geo. M.P. Lat.	39.980	40.220	40.840	33.880	41.720	31.520	34.350
Min-Angle(deg)	22.700	16.820	6.640	4.350	8.170	1.150	0.200
Max-Angle(deg)	35.010	27.090	12.220	8.870	14.490	4.360	3.080
Horiz. Rad (mV/m)	705.350	225.890	444.520	309.500	221.180	489.300	502.490
Max Vert. Rad. (mV/m)	621.614	209.423	432.022	308.554	209.702	489.155	502.481
Skywave Mult.	191.888	139.025	51.855	43.180	63.075	26.307	20.526
Night Limit (mV/m)	23.856	5.823	4.480	2.665	2.645	2.574	2.063
From Station(Call)	YSTG	YSTG	WKY	YSTG	KLUP	XEU	WMAC
Frequency(kHz)	930.000	930.000	930.000	930.000	930.000	930.000	940.000
G.C. Distance(km)	1662.800	1682.000	1696.700	1695.500	1583.400	1673.500	628.300
Slant Distance (km)	1674.781	1693.812	1708.449	1707.258	1596.015	1685.411	659.370
Bearing degrees	25.357	22.531	118.320	25.587	94.839	54.354	167.772
Mid-Pt Latitude(deg)	20.700	20.450	31.680	20.580	28.670	23.390	30.120
Geo. M.P. Lat.	31.640	31.410	42.330	31.520	39.280	34.090	41.230
Min-Angle(deg)	1.200	1.100	1.020	1.030	1.620	1.140	11.480
Max-Angle(deg)	4.420	4.290	4.190	4.190	5.010	4.350	19.400
Horiz. Rad (mV/m)	309.500	309.500	417.920	309.500	337.040	310.720	894.940
Max Vert. Rad. (mV/m)	309.401	309.416	417.630	309.427	336.854	310.621	823.626
Skywave Mult.	26.477	26.131	19.349	25.738	23.222	24.732	90.933
Night Limit (mV/m)	1.638	1.617	1.616	1.593	1.564	1.536	1.498

RSS Night Limit to station

50 % Exclusion = 23.856 mV/m from WFXJ  
 25 % Exclusion = 23.856 mV/m from WFXJ  
 0 % Exclusion = 26.213

du Treil, Lundin, and Rackley  
Sarasota, FL

Night Permissible Vertical Radiation From Station: WLSS  
Coordinates: 27-21-17 North 082-23-06 West

Toward Station	Freq. (kHz)	GC Dist. (km)	Bear (degT)	Angles Min (deg) Max (deg)		Skywav Mult. (mV/m)	50% Ex-RSS (mV/m)	25% Ex-RSS (mV/m)	Req. Prot. (mV/m)	Perm. Vert-Rad mV/m@1km
KSRM	920	6234.9	326.4	0.0	0.0	.18	.95	1.11	.28	78416.9
KARN	920	1248.5	313.8	3.8	8.0	32.67	5.21	6.67	1.67	2551.3
KVIN	920	3745.5	297.6	0.0	0.0	3.94	15.06	17.16	4.29	54523.6
KPSI	920	3327.	291.	0.0	0.0	5.5	11.73	13.9	3.47	31615.9
KVEC	920	3717.6	293.4	0.0	0.0	4.22	7.49	9.16	2.29	27153.6
KLMR	920	2231.2	307.5	0.0	1.1	11.34	10.43	12.99	3.25	14313.1
WMEL	920	188.2	62.1	37.0	51.4	306.89	8.98	9.66	2.42	393.6
WAFS	920	742.	345.8	9.3	16.2	72.24	3.32	4.5	1.12	778.5
KYFR	920	1888.	324.7	0.1	3.0	14.93	3.18	4.8	1.20	4015.8
WGNU	920	1453.9	332.6	2.4	6.1	24.43	10.42	12.36	3.09	6324.7
WBAA	920	1501.8	345.2	2.1	5.7	22.62	6.88	8.65	2.16	4780.3
KDHL	920	2116.4	335.5	0.0	1.7	11.2	7.94	9.61	2.40	10723.5
KWAD	920	2392.9	335.4	0.0	0.3	8.31	5.25	6.92	1.73	10412.2
WPHY	920	1592.2	23.8	1.6	4.9	20.24	8.37	9.67	2.42	5972.7
KSVA	920	2452.9	296.6	0.0	0.0	9.89	9.95	12.29	3.07	15524.9
KBAD	920	3233.6	295.9	0.0	0.0	5.58	8.56	10.53	2.63	23564.9
KIHM	920	3685.9	301.2	0.0	0.0	3.89	9.69	11.08	2.77	35586.4
WKRT	920	1781.6	16.8	0.6	3.6	15.9	14.8	15.48	3.87	12171.8
WMNI	920	1395.3	357.7	2.7	6.6	25.81	5.35	8.22	2.05	3979.2
KSHO	920	4063.7	309.	0.0	0.0	2.64	13.84	14.63	3.66	69347.6
WKVA	920	1535.1	15.5	1.9	5.4	21.56	4.62	6.29	1.57	3646.8
WHJJ	920	1892.7	29.2	0.1	2.9	14.29	4.89	5.68	1.42	4963.3
WYMB	920	732.8	15.5	9.5	16.4	73.51	8.6	9.38	2.35	1595.5
KBNA	920	2365.6	287.7	0.0	0.4	11.06	12.78	15.79	3.95	17844.5
KFLB	920	1997.1	289.2	0.0	2.3	15.04	11.39	15.9	3.97	13212.1
KYST	920	1248.3	283.5	3.8	8.0	34.18	19.84	19.84	4.96	7257.1
KVEL	920	2881.3	307.5	0.0	0.0	6.5	7.16	9.1	2.28	17496.1
KXLY	920	3769.8	316.1	0.0	0.0	2.85	2.12	2.89	.72	12697.
KXLY	920	3769.8	316.1	0.0	0.0	2.85	2.12	2.89	.72	12697.
WOKY	920	1810.7	345.	0.5	3.4	15.47	17.09	18.72	4.68	15121.5
* COROZ	930	1172.6	213.	6.6	6.6	19.17	5.85	7.85	2.93	763.3
CJCA	930	3854.2	327.2	0.0	0.0	2.03	3.07	3.92	1.53	3779.6
CFBC	930	2455.3	31.7	0.0	0.0	5.99	14.64	16.02	7.32	6106.3
CJYQ	930	3409.3	40.8	0.0	0.0	2.67	2.77	3.06	1.39	2594.1
CJYQ	930	3409.3	40.8	0.0	0.0	2.67	2.77	3.06	1.39	2594.1
CKNS	930	2100.5	1.3	0.5	0.5	9.06	23.05	28.58	11.53	6360.4
HJCS	930	2679.1	159.3	0.0	0.0	1.89	.96	1.05	.48	1275.
TIJJ	930	1944.9	185.5	1.2	1.2	4.53	4.46	5.63	2.23	2462.
CMDD	930	489.	170.3	20.3	20.3	50.34	4.18	5.41	2.09	207.8
CMLD	930	902.8	141.1	9.9	9.9	29.76	4.18	4.43	2.09	351.2

du Treil, Lundin, and Rackley  
Sarasota, FL

Night Permissible Vertical Radiation From Station: WLSS  
Coordinates: 27-21-17 North 082-23-06 West

Toward Station	Freq. (kHz)	GC Dist. (km)	Bear (degT)	Angles Min (deg) Max (deg)		Skywav Mult. (mV/m)	50% Ex-RSS (mV/m)	25% Ex-RSS (mV/m)	Req. Prot. (mV/m)	Perm. Vert-Rad mV/m@1km
HICK	930	1481.1	123.9	4.0	4.0	10.89	4.89	5.37	2.44	1122.2
YSTG	930	1682.	204.8	2.7	2.7	7.24	3.46	4.06	1.73	1194.
YSTG	930	1655.6	202.5	2.9	2.9	7.63	7.79	9.12	3.90	2551.5
YSTG	930	1672.3	206.3	2.8	2.8	7.38	3.56	4.22	1.78	1205.
YSTG	930	1662.8	207.9	2.8	2.8	7.52	3.66	4.4	1.83	1215.2
YSTG	930	1695.5	208.2	2.6	2.6	7.04	3.61	4.36	1.80	1280.1
TGJL	930	1553.2	213.4	3.5	3.5	9.47	7.79	9.47	3.89	2056.8
HRRC	930	1640.5	200.	3.0	3.0	7.88	8.07	9.23	4.04	2562.3
MONT	930	2390.2	115.5	0.0	0.0	2.57	4.32	4.64	2.16	4197.4
XERLA	930	2946.	276.9	0.0	0.0	3.75	16.45	16.45	8.23	10962.2
XEVSD1	930	2922.5	272.9	0.0	0.0	3.82	12.35	12.8	6.18	8078.7
XE	930	2300.1	274.3	0.0	0.0	7.01	13.02	15.89	6.51	4644.2
XENVA2	930	2162.7	281.7	0.2	0.2	8.38	17.6	18.68	8.80	5254.9
XEDS	930	2353.2	252.1	0.0	0.0	6.68	12.25	15.61	6.12	4583.
XEMK	930	1712.9	219.6	2.5	2.5	17.1	16.97	21.77	8.48	2480.2
XEMK1	930	1712.9	219.6	2.5	2.5	17.1	16.97	21.77	8.48	2480.2
XERE1	930	2029.6	251.3	0.8	0.8	9.99	15.16	17.35	7.58	3795.8
XELCM	930	2280.7	246.9	0.0	0.0	7.19	13.74	15.07	6.87	4778.7
XETLA	930	1931.5	237.6	1.3	1.3	11.64	13.22	16.94	6.61	2840.1
XENVA2	930	3160.2	288.3	0.0	0.0	3.19	26.26	27.24	13.13	20599.3
XEMZQ	930	2651.1	281.5	0.0	0.0	4.86	14.16	16.89	7.08	7281.5
XEU	930	1673.5	239.8	2.8	2.8	18.5	12.88	18.26	6.44	1741.4
*XEU	930	1015.3	227.9	8.4	8.4	62.59	18.14	22.47	11.67	932.2
XEQS1	930	2106.2	261.7	0.5	0.5	9.	15.79	18.45	7.89	4387.3
YNR8	930	1820.6	188.3	1.9	1.9	5.6	5.68	6.49	2.84	2535.7
HOU 80	930	2134.8	174.4	0.3	0.3	3.45	2.45	3.05	1.22	1771.3
KTKN	930	4998.1	322.4	0.0	0.0	.82	1.94	2.32	.58	3546.8
KNSA	930	6730.7	330.3	0.0	0.0	.06	.85	.89	.22	17354.6
WJBY	930	815.6	335.6	8.2	14.5	63.08	15.27	16.17	4.04	320.5
KHJ	930	3501.	291.2	0.0	0.0	4.92	3.85	4.25	1.06	1078.5
KHJ	930	3500.8	291.2	0.0	0.0	4.92	3.84	4.24	1.06	1077.6
WFXJ	930	331.7	10.6	22.7	35.0	191.89	5.41	6.25	1.56	40.7
WMGR	930	447.4	332.5	16.8	27.1	139.03	16.91	18.21	4.55	163.7
KSEI	930	3213.8	310.6	0.0	0.0	4.83	3.76	4.45	1.11	1150.7
WTAD	930	1623.6	331.4	1.4	4.7	19.85	5.77	7.62	1.90	479.7
WAUR	930	1678.2	342.3	1.1	4.3	18.22	12.77	14.61	3.65	1002.3
WKCT	930	1141.1	341.5	4.6	9.3	37.14	12.38	15.66	3.91	527.
WFMD	930	1416.	17.5	2.6	6.4	25.21	13.37	16.15	4.04	800.7

**Figure 13**  
**Sheet 5 of 5**

du Treil, Lundin, and Rackley  
Sarasota, FL

Night Permissible Vertical Radiation From Station: WLSS  
Coordinates: 27-21-17 North 082-23-06 West

Toward Station	Freq. (kHz)	GC Dist. (km)	Bear (degT)	Angles Min (deg) Max (deg)		Skywav Mult. (mV/m)	50% Ex-RSS (mV/m)	25% Ex-RSS (mV/m)	Req. Prot. (mV/m)	Perm. Vert-Rad mV/m@1km
WBCK	930	1680.2	352.	1.1	4.3	17.96	15.04	18.06	4.52	1257.3
KKIN	930	2350.8	338.1	0.0	0.5	8.58	17.92	19.25	4.81	2806.
KWOC	930	1283.5	326.2	3.5	7.7	30.76	10.49	13.26	3.32	539.
WSLI	930	934.9	308.7	6.6	12.2	51.87	7.42	10.53	2.63	253.9
WSLI	930	935.1	308.6	6.6	12.2	51.86	7.42	10.55	2.64	254.3
KLCY	930	3510.	316.7	0.0	0.0	3.49	11.82	11.82	2.95	4234.4
WYFQ	930	890.8	8.7	7.2	13.0	55.06	9.57	12.88	3.22	292.5
WDLX	930	1038.4	27.7	5.6	10.6	43.43	24.79	28.77	7.19	828.1
KOGA	930	2336.4	316.	0.0	0.6	9.83	15.07	15.77	3.94	2005.
WGIN	930	2048.2	27.2	0.0	2.0	11.91	19.06	19.06	4.76	1999.3
WPAT	930	1677.7	24.5	1.1	4.3	18.24	26.48	26.48	6.62	1815.1
WBEN	930	1764.3	9.2	0.7	3.7	16.13	3.05	4.14	1.03	320.6
WEOL	930	1547.4	1.2	1.8	5.3	21.12	5.34	7.18	1.80	425.2
WKY	930	1696.7	306.3	1.0	4.2	19.35	3.31	4.4	1.10	283.9
WEKO	930	1867.5	120.2	0.2	3.1	20.53	5.94	6.73	1.68	410.1
KSDN	930	2463.8	328.9	0.0	0.0	8.02	8.61	11.64	2.91	1814.3
KLUP	930	1583.4	282.5	1.6	5.0	23.22	28.98	30.17	7.54	1623.9
KBAI	930	4169.1	315.8	0.0	0.0	2.08	11.5	12.4	3.10	7450.9
WRVC	930	1228.4	359.6	3.9	8.2	32.5	7.3	10.58	2.65	406.9
YVLJ	930	2463.4	137.7	0.0	0.0	2.36	3.03	3.33	1.52	3211.3
CMID	930	715.3	148.3	13.4	13.4	38.68	4.57	5.68	2.28	295.1
* CMAD	930	568.	193.6	17.4	17.4	45.89	6.22	7.77	3.11	338.9
CMDD	930	489.	170.3	20.3	20.3	50.34	4.18	5.41	2.09	207.8
CMKD	930	952.8	138.1	9.2	9.2	27.51	4.34	4.54	2.17	394.
CMFD	930	611.3	160.8	16.0	16.0	43.8	4.75	5.95	2.38	271.3
CMDD	930	489.	170.3	20.3	20.3	50.34	4.18	5.41	2.09	207.8
CMLD	930	902.8	141.1	9.9	9.9	29.76	4.18	4.43	2.09	351.2
WRFX	940	261.1	125.9	28.3	41.9	246.57	18.2	20.64	5.16	1046.5
WMAC	940	628.3	348.4	11.5	19.4	90.93	8.35	11.13	2.78	1530.2
KHCM	940	7574.8	283.6	0.0	0.0	1.15	3.46	3.68	.92	40145.4
KPSZ	940	1862.1	330.3	0.2	3.1	15.1	6.58	8.11	2.03	6712.9
WMIX	940	1369.4	334.9	2.9	6.8	27.17	9.42	11.47	2.87	5278.1
WYLD	940	795.4	292.6	8.5	14.9	66.56	13.71	14.95	3.74	2807.4
WCPC	940	967.2	320.7	6.3	11.7	49.	10.18	11.53	2.88	2940.9
WKYK	940	953.	.6	6.4	11.9	49.57	9.8	10.99	2.75	2770.8
WIPR	940	1934.4	117.4	0.0	2.7	19.25	7.98	8.84	2.21	5743.3
KIXZ	940	2030.4	300.1	0.0	2.1	14.09	9.72	10.06	2.52	8927.3
WKGM	940	1208.5	24.9	4.1	8.5	33.67	9.	10.31	2.58	3825.9
WFAW	940	1822.	343.3	0.4	3.4	15.32	8.24	9.47	2.37	7724.5