

Report of the Technical Consulting Team to the Pinelands Commission

regarding
"Comprehensive Plan for
Wireless Communications Facilities in the Pinelands"

August 17, 1998

1. Since February 1996, the consulting team (CT: Bruce Eisenstein, Ph.D. P.E.; Moshe Kam, Ph.D.; P. M. Shankar, Ph.D.) provided the members and the staff of the Pinelands commission (PC) with technical assistance in the area of mobile radio and telecommunications.
2. The CT reviewed technical and administrative information supplied by the CT and by the prospective Cellular Providers (CPs), namely *Bell Atlantic Mobile, Comcast*
~~*Metrophone/Cellular-One, and Nextel Communications Inc.*~~ In the opinion of the CT, this group of CPs is the only group required by present regulations to prepare a plan for cellular telephony services in the Pinelands (*i.e., they constitute the industry.*)
3. The CT acquired or otherwise obtained background, technical, administrative and other standard information pertinent to the technical questions posed by the proposed plans of the CPs. The CT participated in formal and informal meetings with members of the PC's staff, members of the PC, representatives of the CPs, and members of the public. The CT communicated extensively with representatives of the CPs and the PC staff, in face-to-face meeting, by phone, fax, and electronic mail. The CT has reviewed several drafts of the document entitled "Comprehensive Plan for Wireless Communications Facilities in the Pinelands" submitted by *Bell Atlantic Mobile,*

Comcast Metrophone/Cellular-One, and *Nextel Communications Inc.*, as well as the final version of that document (referred to in the sequel as “the *plan*.”) The CT reviewed all written comments sent to the PC by the public about the plan.

Representatives of the CT were present during the public hearings about the plan.

4. The CT requested and obtained extensive technical and administrative information about the emerging plan for wireless communication facilities in the Pinelands, including geographical and topographical maps; detailed lists of planned locations; heights of proposed and existing towers; and equipment that the CPs have installed or wished to install in the Pinelands; aerial photographs; radiation-level maps (ANET plots); output of computer models and design algorithms for microwave radiation and cellular telephony design; and lists of existing towers, installations, and apparatus available within and without the Pinelands.
5. The CT has conducted independent experiments aimed to establish and maintain cellular-telephone connection from various locations within the Pinelands. These experiments were conducted in order to assess the realism of theoretical calculations made by the CPs, and in order to establish a base line for existing quality of service within the Pinelands. While not exhaustive, these tests served the CT to calibrate the information received from the CPs and to assess the advisability of tower erection in sensitive areas or in areas where the PC staff or the public expressed the need for extra caution.
6. The CT has conducted independent sample calculations to ascertain accuracy of the information supplied by the CPs.

7. The CT recognizes that design of a cellular-telephony grid presents a *coupled* tower-location problem. Towers are not erected in isolation, but depend on the location, height, and region-of-coverage of neighboring towers. Consequently, some providers are capable of covering a specific region in the Pinelands that other providers do not.
8. The CT recognizes that several different modulation and coding techniques are in use, and that different radio-frequency hardware designs are employed by the providers in their standard equipment. In particular, there are differences in the power levels transmitted and received by users of the different services; the same quality of service may require different signal-to-noise ratios in different systems. Some providers are thus capable of using antenna towers that other providers would find unsatisfactory; and some providers are capable of using existing structures that are not appropriate for others.

Determination of the needs of each provider depends the technical parameters of its service. The CT took the pertinent technical parameters of each provider into account when reviewing the various tower-location alternatives.

9. The CT received anecdotal evidence provided by the public regarding present quality of service in the Pinelands. This anecdotal evidence was extrapolated by some who attempted to assess the needs of one provider through the performance of another. As we have explained in sections 7 and 8, evidence of this sort cannot be used in most cases, due to the differences between providers in antenna-tower grid designs and in hardware designs.
10. For every proposed facility that could potentially be served from other existing or proposed locations, the CT requested and obtained ANET plots. These plots detailed

and analyzed the various options regarding this facility, per the CT's specifications. The information requested by the CT included ANET plots *with and without* the proposed facility. In addition to the ANET plots, the potential for "using other existing or proposed locations" was assessed through field trips by members of the PC's staff and the CT, examination of geographical maps and aerial photographs, and tower information supplied by the CPs and others.

11. The CT obtained all the ANET plots and all combinations of ANET plots that it requested from the CPs, and has secured, in all cases, the information that the CT needed in order to make an informed recommendation.
12. NUMBER AND LOCATION OF TOWERS The CT is of the opinion that, within the known technical parameters and the best estimates of present and expected need for cellular telephony services within the Pinelands, the present *plan* satisfies the "least number necessary" requirement per NJAC 7:50-5.4 (c) 6.
13. Specifically, The CT is of the opinion that, within the known technical parameters and the best estimates of present and expected need for cellular telephony services within the Pinelands, the present *plan* satisfies the "least number necessary" requirement in the areas designated as "least number" regions.
14. In rendering the opinions expressed in sections 12 And 13, the CT makes five related observations.
 - 14.1 The location and number of towers within the Pinelands are affected by the location and number of towers for cellular telephony and other services outside the Pinelands; the CT has examined the availability of facilities inside and outside the Pinelands in making its inquiries and recommendations.

14.2 The “least number necessary” solution is near-optimal but not necessarily unique (there may be other technically equivalent solutions); however, any solution that provides for a similar level of service using the same technology is likely to be essentially similar to the solution proposed by the CPs in the present *plan* - in terms of the number and general placement of antenna towers.

14.3 The CT has used the criteria for “quality of service” outlined in sections 15-16 below in order to assess the need for new facilities.

14.4 The CT assumed and required that co-location opportunities be exploited to the maximum extent possible (see sections 17-20.)

14.5 The CT has examined the need for all facilities proposed by the *plan*, one-by-one and in combination, and has concluded that all facilities as proposed in the *plan* are needed, one-by-one and in combination, to satisfy the required quality of service furnished by the PCs to regular customers within the Pinelands (see also sections 15-16.)

15. QUALITY OF SERVICE. The CT agrees that the parameters outlined in the *plan*'s Code Compliance Section, Exhibit C (“Level of service upon which this plan is based”) are the primary means to define quality of service at the present time.

15.1 The CT recommends that if future needs which were not foreseen by this *plan* are presented to the PC, the CPs be requested present the PC and its technical consultants with the values of *Signal to Interference Ratio at Audio*, *Dropped Call Rate* and *Blocked Call Rate*, as measured in areas that suffer from substandard

quality of service and in comparable areas where an acceptable quality of service level has been established.

15.2 The CT further recommends that in that case the PC and its technical consultants assess the quality of service with respect to these parameters (and additional quality of service parameters that may emerge in time as mobile radio services expand.) Values of these parameters would then be assessed in comparison with their values in similar regions inside and outside the Pinelands, and in comparison with the industry's norms and the prevailing technical standards.

16. As a basic yardstick for assessing future requests, the CT recommends at present that

16.1 *Signal to Interference Ratio at Audio* be deemed satisfactory if it is larger than or equal to 30dB in the 30-3400 Hz band;

16.2 *Dropped Call Rate* be deemed satisfactory if it is less than 1% over a period of 10 minutes; and

16.3 *Blocked Call Rate* be deemed satisfactory if it is less than 1% over a period of 10 minutes.

17. CO-LOCATION. The CT agrees with the principles and methodology detailed in the *plan's* Code Compliance Section, Exhibit B ("Co-location opportunities for Wireless Providers in the Pinelands.")

18. The CT specifically agrees with the use of the term *service affecting interference* in section 2 of the Exhibit. The CT recognizes that some level of interference is inevitable as a result of co-location, but once all other requirements for co-location have been met, *only service affecting interference could be a reason to reject a co-location request.*

19. The CT recommends that interference would be deemed *service affecting*, if and only if it causes at least one of the following: (i) a measurable reduction in the *Signal to Interference ratio*, but no less than 0.1dB; (ii) a measurable increase in the *Dropped Call Rate*, but no less than 0.05%; (iii) a measurable increase in the *Blocked Call Rate*, but no less than 0.05%.

20. The CT recognizes that understandably the present co-location policy does not provide a complete step-by-step blueprint for the co-location procedure at each site. A detailed contract that follows the co-location policy would be needed at each site.

21. SPECIFIC FACILITIES. The CT made the following recommendations and observations regarding sites which presented special problems or challenges. In all cases, the recommendations of the CT were accepted to the CT's satisfaction.

21.1 Can sites 1 and 3 be combined?

In the CT's opinion the answer is *no*. Due to the topology of the region where sites 1 and 3 are located, combining the sites will cause a coverage deficiency along Rt. 530/539 (possibly less than -95dBm receipt level.)

21.2 Site 2 - (old site number 583) The CT recommended the use of a single tower (rather than the originally proposed two) at this site.

21.3 Site 5 - The CT is aware of the great sensitivity surrounding the location of site 5. In the CT's opinion elimination of site 5 would cause a serious coverage deficiency and a service gaps along Rt. 530/539 (less than -95dBm receipt level along several miles).

21.4 Site 7 - (old site number 18)

21.4.1 The CT made measurements of signal levels and operated telephony equipment along a road segment of about 10 miles along route 70. The CT found that a segment of 5 miles along route 70 suffers from poor quality of service (high dropped call rate), in which 2 ½ miles receive no service at all (blocked calls.) The CT is of the opinion that these measurements established the need for Site 7. Furthermore, the CT believes that additional service would be needed from a tower on the intersection of routes 70 and 206.

21.4.2 At the request of the PC, the CT has supplied additional clarifications to its recommendations on site 7. These are attached to this report as *Appendix A*.

21.4.3 The CT notes that some members of the public have provided the PC with the results of anecdotal measurements around site 7. These measurements were made on a non-BAMS system. In the opinion of the CT, these measurements do not assist the CT or the PC in their assessment of BAMS' needs for site 7.

21.5 **Site 9** Using ANET plots, the CT formed the opinion that a tower in the general location of site 9 is necessary. The need is in the southeastern portion of Evesham, which at present is not properly covered by BAMS (receipt level of less than -85dBm). Sites mentioned in the public hearing and described in the public's written comments, which are west of Rt. 73 or further to the South (*i.e.*, in Berlin) will not cover this portion of Evesham.

21.6 Site 12 (old site number 582) The CT suggested relocation of a tower to the boundary of the "blue" area and the "green" area, so that the site not enter the most sensitive area in the Pinelands. The CT recommended against the erection of site 12 inside the Wharton State Forest.

21.7 Site 14 The CT examined suggestions to use reported existing facilities which are north of the proposed search area (close to Rt. 322) and concluded that these reported existing facilities will not provide the required coverage in the region that site 14 is designed to cover.

21.8 Site 18 (Old number 584) The CT concurs with the recommendation that this site be located on a planned Department of Transportation tower.

21.9 Site 20 (old site number 48)

The CT reviewed carefully the industry's comments and ANET plots for that site.

Specifically, the CT reviewed ANET plots supplied by COMCAST showing RF coverage levels with and without site 20.

21.9.1 Site 20 adds coverage at a level of -85dBm to a road segment of 1.5 miles along Rt. 557. Previously this segment was covered at a level between -85dBm and -95dBm.

21.9.2 However, site 20 does not completely solve a problem of coverage along Rt. 557, as there would still be a segment of more than four (4) miles covered at a level between -85dBm and -95dBm (rather than at a minimum level of -85dBm.) The site therefore solves about "1/3 of the problem" along this road.

21.9.3 Site 20 also adds a significant area of -85dBm level coverage on a segment that lies northwest of site 20. The south-north roads in this region portion are already covered by other sites.

21.9.4 The CT has concluded that the case for site 20 in its proposed location is good but not compelling; moreover, future needs along Rt. 557 might require additional facilities.

21.10 Sites 21 and 22 (old 576 and 47) The CT has examined several options regarding these sites. It concluded that the only acceptable options are:

- (a) to leave sites 21 and 22 at their present planned locations; and
- (b) to leave site 21 at its present planned location AND move site 22 southeast to the location of a fire tower.

The CT concluded that option (b) is 'border line' since it would leave a segment of low receipt levels (between -85dBm and -95dBm) along a major road.

However since siting constraints make option (a) infeasible, in the CT's opinion option (b) is the preferred solution.

21.11 Site 23 (old 45)

21.11.1 After an extensive examination of options, the CT has endorsed the *plan's* final location for site 23. The CT possesses a detailed ANET plot for site 23, for the nearby 170 ft. water tower, and for the State Police tower in Woodbine. The two latter locations do not allow for adequate coverage of Rt. 47.

21.11.2 The CT recognizes that even after the erection of a tower in site 23, some portions of Rt. 47 may still need additional service. However, in the

CT's opinion this additional service need not be supplied from within the Pinelands.

21.11.3 Reportedly NEXTEL would be able to use the water tower in Woodbine due to higher power-radiation level used by its equipment. As we explained in sections 7-9 this reported ability of NEXTEL does not reflect on the needs of BAMS or COMCAST.

Respectfully submitted



August 17, 1998

Moshe Kam, Ph.D.,

for the Consulting Team

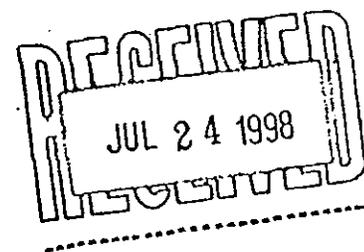
**“Comprehensive Plan for
Wireless Communications Facilities in the Pinelands”**

Appendix A

A Special Report to the Pinelands Commission

Regarding Site number 7

Dr. Bruce A. Eisenstein
7804 Pine Road
Wyndmoor, PA 19038



Consultant Team Special Report – Site #7

1. Introduction

- 1.1 This special report is prepared by the Consultant Team (CT – Drs. Bruce Eisenstein, Moshe Kam, P.M. Shankar) at the request of the staff of the New Jersey Pinelands Commission, and subsequent to correspondence between Valerie W. Haynes (Deputy Attorney General, New Jersey) and Bruce Eisenstein.
- 1.2 The purpose of this report is to provide back-up data to support the proposed tower #7 (Woodland, LAT: 39-52-41N; LON: 74-38-22W).

2. History

- 2.1 In June – July 1997, the CT made a preliminary assessment of the need for tower #7 (previously known as tower #18). This preliminary assessment was done without the benefit of ANET plots or field measurements. At the conclusion of the preliminary assessment, the CT made an alternative suggestion for the location of the tower (ref [1], page 5), namely “in our opinion, Site 18 can be located on a new tower at the intersection of Rts. 206 and 70.” (September 18, 1997)
- 2.2 In the period October – December, 1997, the CT re-examined this issue in light of new information not available until that time.
 - 2.2.1 The CT requested and received ANET plots from the cellular provider (BAMS).
 - 2.2.2 The CT conducted a *field test* using standard mobile-radio equipment.

2.3 As a result of the new information, the CT has changed its recommendation (ref. [2], [3]) to say:

“The CT made measurements of signal levels and operated telephony equipment along a road stretch of about 10 miles along Rt. 70. The CT found that a stretch of 5 miles along Rt. 70 suffers from poor quality of service (high dropped call rate), in which 2½ miles receive no service at all (blocked calls). The CT is of the opinion that these measurements established the need for Site 7. Furthermore, the CT believes that additional service would be needed from a tower on the intersection of routes 70 and 206.” (June 30, 1998)

3. Discussion of the need for tower #7

3.1 Reference is made to Appendix A which includes four ANET plots supplied to the CT at its request by BAMS.

3.2 Plot 7-A shows the current relevant RF radiation levels. There is a “low power” section of about six miles along Rt. 70, east of the intersection between Rts. 70 & 206. Along this section, low received power (between -85 dBm and -95 dBm) is predicted, under the usual assumptions regarding radio equipment in standard vehicles.

3.3 Plot 7-B shows what the situation would be if the CT’s Sept, ‘97 recommendation were implemented. The stretch of low power is reduced by 2 miles. The reduction is in the *western* part of the present low-power section, immediately to the east of the 70/206 intersection.

3.4 Plot 7-C shows BAMS recommendation – the stretch of low power is reduced by 5.5 miles in the *eastern* part of the present section of low power.

3.5 Plot 7-D shows the BAMS plan enhanced by the CT suggestion that an antenna be used at the 70/206 intersection. Under this configuration, the whole low-power section along Rt. 70 is brought to acceptable levels of service (greater than -85 dBm).

3.6 Conclusions from plots 7-A, 7-B, 7-C, 7-D

It is clear from plots 7-A, 7-B, 7-C, and 7-D that there are regions along Rt. 70 which are not covered properly at the present time, and will not be covered properly unless Site 7 is approved. The issue is signal levels (not caller-handling capacity).

3.7 Field test

3.7.1 In order to test the validity of the ANET plots supplied by BAMS, the CT travelled to the region in question. Using a commercial cellular phone produced by Nokia and the BAMS service, the CT travelled along Rt. 70 approximately from the *Whiting* area to *Medford*. During its travel, the CT established cellular-phone connection to several Philadelphia-area static phones, and repeatedly called numbers of Philadelphia-area static phones known to be un-engaged by other callers at the time.

3.7.2 The CT made repeated measurements of the alleged "low-power" section (see 3.2).

3.7.3 The CT found that along a section of an approximate length of 5 miles (starting 1 mile east of intersection 70/206 to the east) there was a high rate (>0.5) dropped calls. The power meter on the cellular phone showed low levels of received power, in conformity with the theoretical predictions.

3.7.4 The CT found that along a stretch of an approximate length of 2½ miles, within the 5-mile section described in 3.7.3, it could not establish phone connection with *any* party (blocked calls).

3.7.5 The CT found that in the 1-1½ mile section immediately to the east of the 70/206 intersection it was able to establish reliable and uninterrupted connections.

3.8 Conclusions

- 3.8.1 In the opinion of the CT, the measured field performance and the theoretical performance predicted by the BAMS ANET plot are in agreement.
- 3.8.2 In the opinion of the CT, the need for tower #7 was established.
- 3.8.3 In the opinion of the CT, the need for a tower at the intersection of Rt. 70 and Rt. 206 was established.

Respectfully submitted,



Moshe Kam, Ph.D.

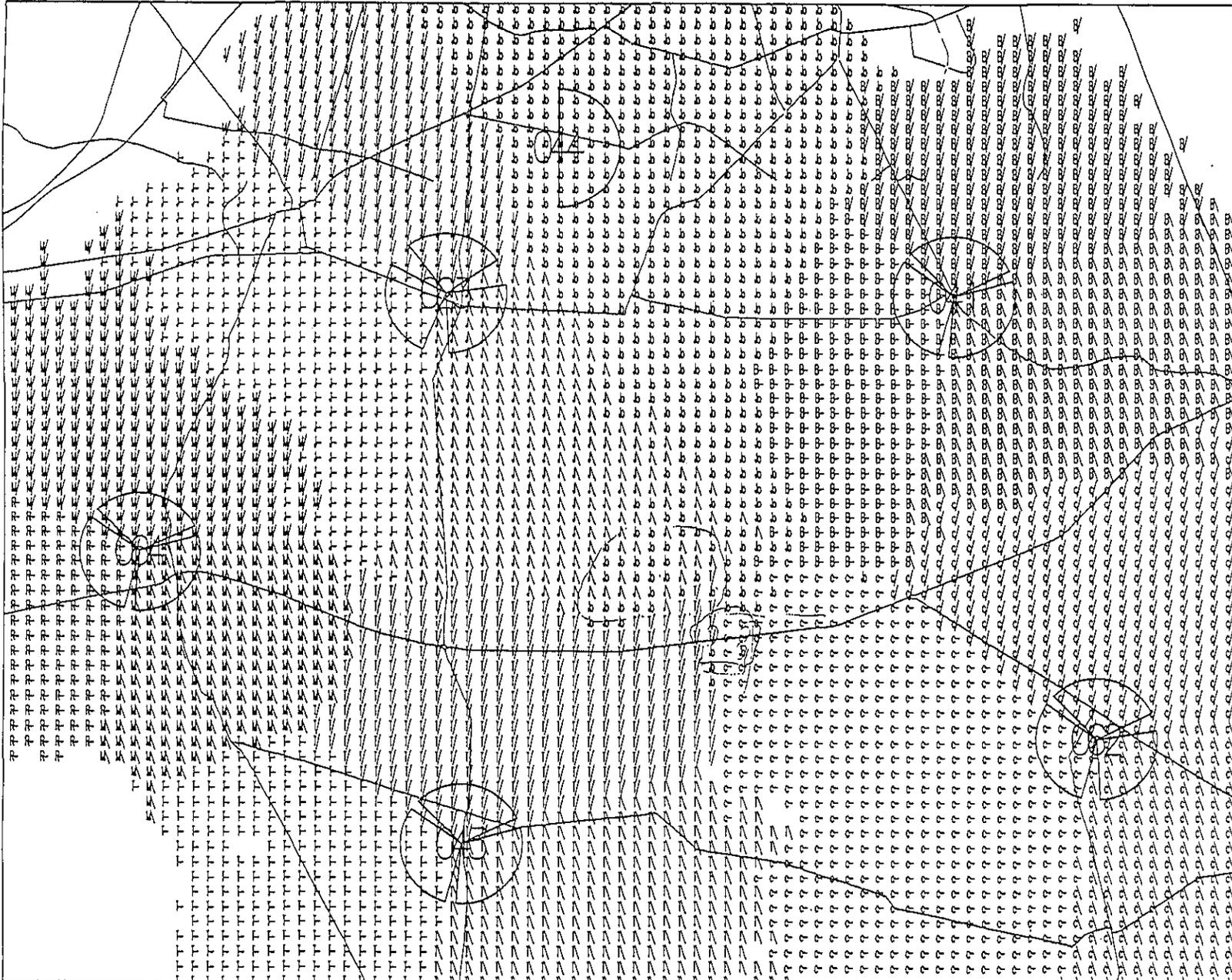
for the Consultant Team July 24, 98

- [1] B. Eisenstein, M. Kam, P.M. Shankar: Report on the Siting of Cellular Antennas in the Pinelands, September 18, 1997.
- [2] B. Eisenstein, M. Kam, P.M. Shankar: Consulting Team Recommendation Regarding Cellular Phone Tower Siting, January 12, 1998.
- [3] B. Eisenstein, M. Kam, P.M. Shankar: Report of the Consulting Team to the Pinelands Commission, Draft, June 30, 1998.

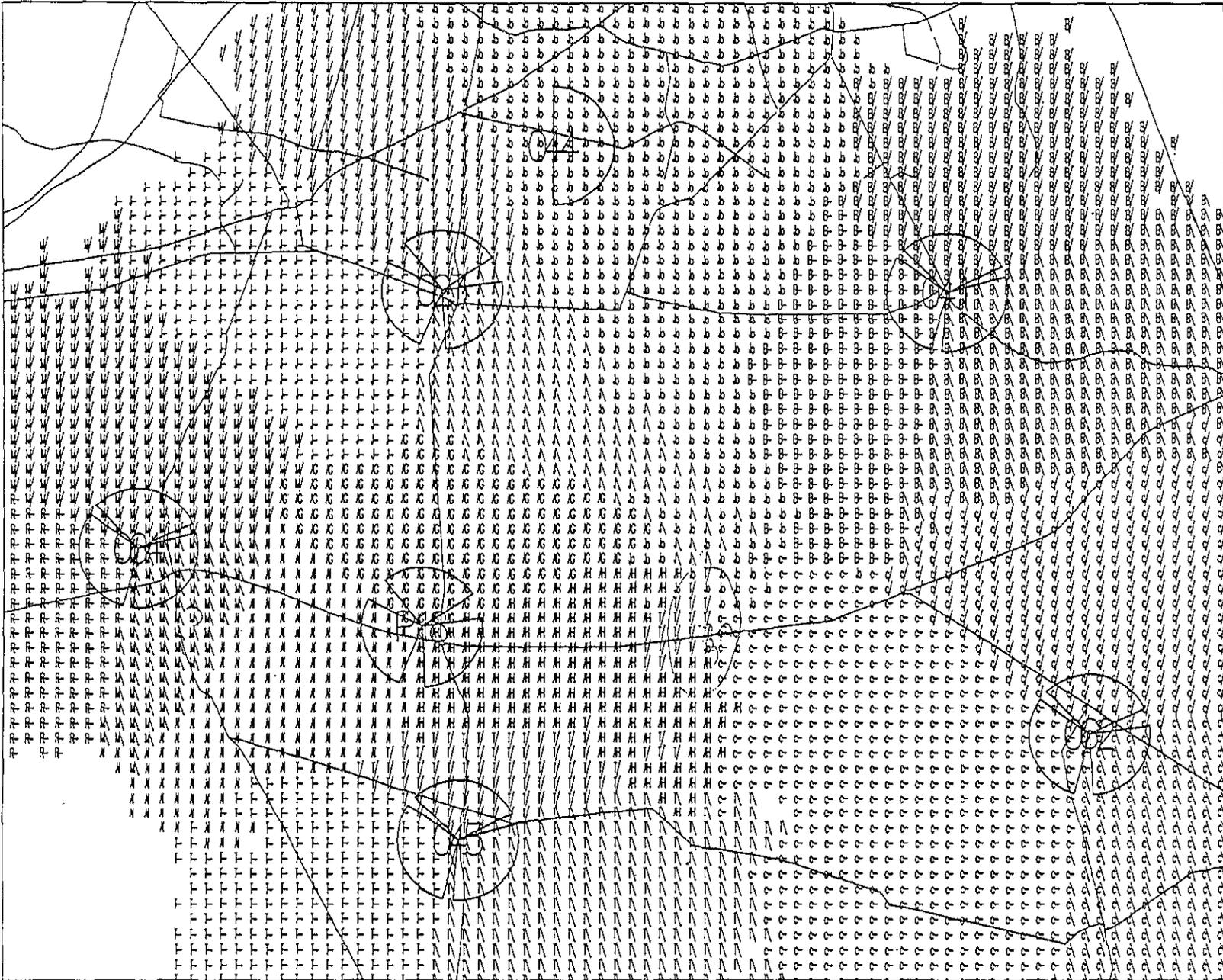
APPENDIX A

ANET Plots

(supplied by BAMS)



BAMS Plymouth Meeting BAMS CC-Philly Best Server CELICAD II v4.2 WOODLAND CURRENT	
EASTHAMPTON LAT:39-58-22N LON:74-44-27W GE: 6911 STN:V1 ORTN:10 *TN TXHT:188 ft ERP:100.00 W ANT:ALP9212-N DT:0M HW:0 LD:100	
STN:V2 ORTN:130 *TN TXHT:188 ft ERP:100.00 W ANT:ALP9212-N DT:0M HW:0 LD:100	
STN:V3 ORTN:250 *TN TXHT:188 ft ERP:100.00 W ANT:ALP9212-N DT:3M HW:0 LD:100	
BROWNS MILLS LAT:39-58-18N LON:74-35-00W GE: 8511 STN:V1 ORTN:10 *TN TXHT:150 ft ERP:100.00 W ANT:ALP11011-N DT:0E HW:0 LD:100	
STN:V2 ORTN:130 *TN TXHT:150 ft ERP:100.00 W ANT:ALP11011-N DT:0E HW:0 LD:100	
STN:V3 ORTN:250 *TN TXHT:150 ft ERP:100.00 W ANT:ALP11011-N DT:0E HW:0 LD:100	
TABERNACLE LAT:39-50-22N LON:74-44-12W GE: 10211 STN:V1 ORTN:10 *TN TXHT:180 ft ERP:100.00 W ANT:ALP11011-N DT:0E HW:0 LD:100 *** Legend incomplete. See report ***	
THRESHOLDS (>= dBm) >= -85 - >= -95 - -	OVERLAYS Interstate Hi State Highway County Boundaries Tertiary Highways MSA/RSA Boundaries MTA Boundaries BTA Boundaries Miles
0 1.00 2.00 3.00	
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BAMS Plymouth Meeting
 BAMS CC-Philly
 Best Server
 CellCAD II v4.2
 WOODLAND

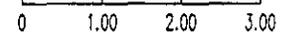
PINELAND
 PROPOSED

WOODLAND
 LAT:39-53-28N LON:74-44-52W
 GE: 49ft
 STN:V1 ORTN:10 'TN TXHT:180 ft
 ERP:100.00 W ANT:ALP9212-N
 DT:0E HW:0 LD:100
 STN:V2 ORTN:130 'TN TXHT:180 ft
 ERP:100.00 W ANT:ALP9212-N
 DT:0E HW:0 LD:100
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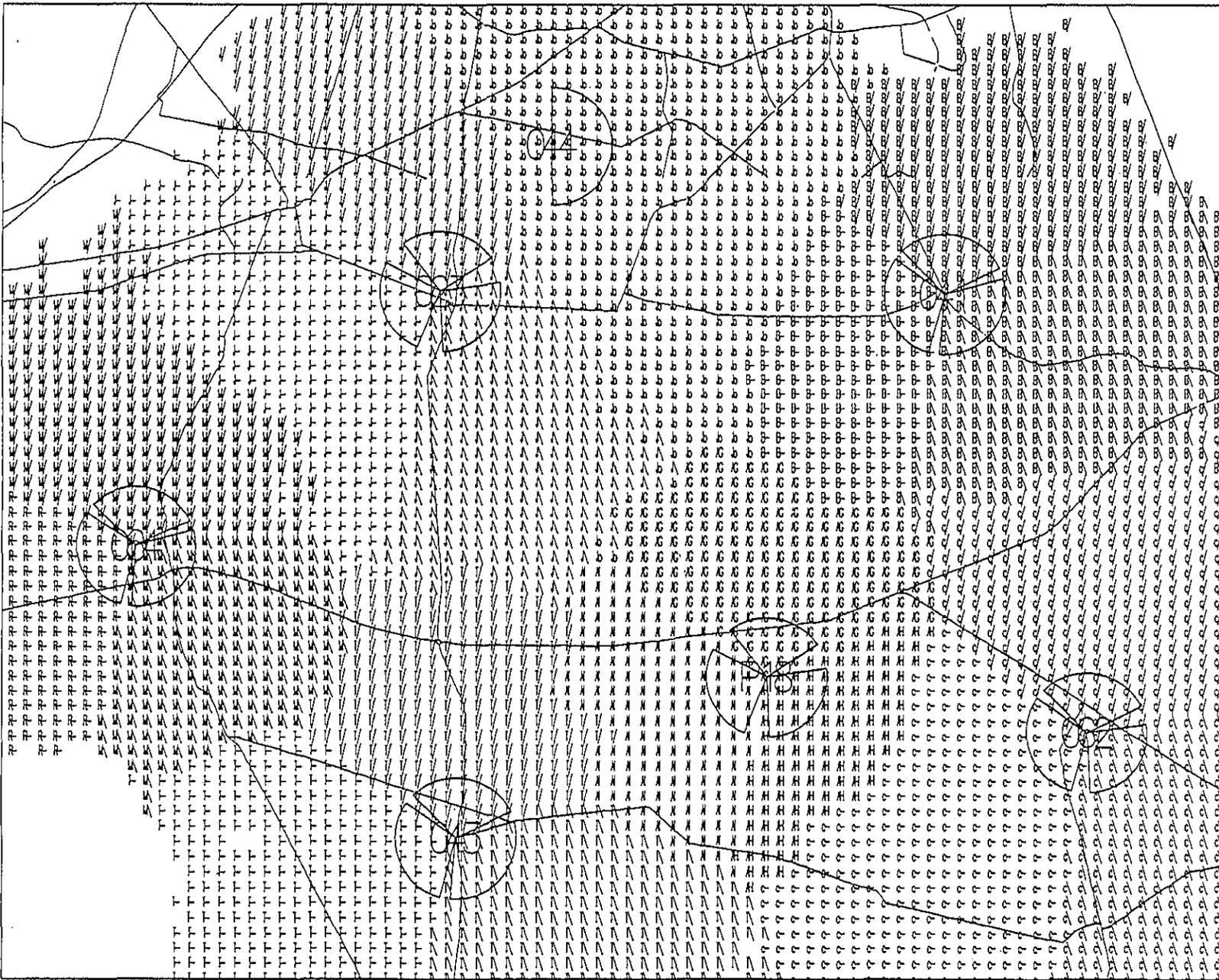
EASTHAMPTON
 LAT:39-58-22N LON:74-44-27W
 GE: 69ft
 STN:V1 ORTN:10 'TN TXHT:188 ft
 ERP:100.00 W ANT:ALP9212-N
 DT:0M HW:0 LD:100
 STN:V2 ORTN:130 'TN TXHT:188 ft
 ERP:100.00 W ANT:ALP9212-N
 DT:0M HW:0 LD:100
 STN:V3 ORTN:250 'TN TXHT:188 ft
 ERP:100.00 W ANT:ALP9212-N
 DT:3M HW:0 LD:100

BROWNS MILLS
 LAT:39-58-18N LON:74-35-00W
 GE: 85ft
 STN:V1 ORTN:10 'TN TXHT:150 ft
 ERP:100.00 W ANT:ALP11011-N
 DT:0E HW:0 LD:100
 *** Legend Incomplete. See report **

THRESHOLDS	OVERLAYS
(>= dBm)	
>=-85	Interstate Hi
>=-95	State Highway
	County Boundaries
	Tertiary Highways
	MSA/RSA Boundaries
	MTA Boundaries
	BTA Boundaries
	Miles



SCALE: 1:100,000 12/16/97 09:27



BAMS Plymouth Meeting
 BAMS OC-Philly
 Best Server
 CellCAD II v4.2 *BELL*
 WOODLAND *1RoPos2D*

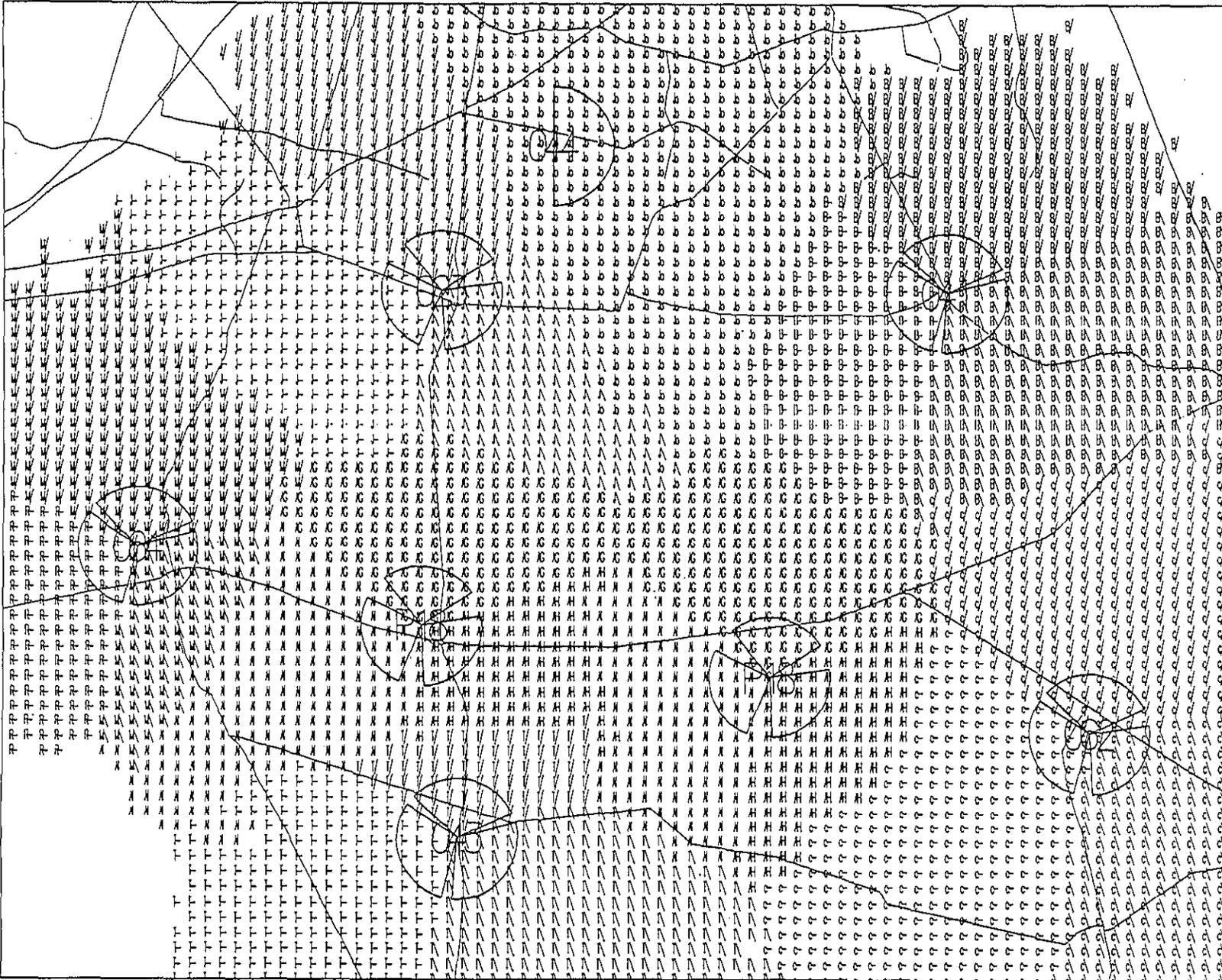
WOODLAND
 LAT:39-52-41N LON:74-38-22W
 GE: 8911
 STN:V1 ORTN:10 'TN TXHT:180 ft
 ERP:100.00 W ANT:ALP9212-N
 DT:0E HW:0 LD:100
 STN:V2 ORTN:130 'TN TXHT:180 ft
 ERP:100.00 W ANT:ALP9212-N
 DT:0E HW:0 LD:100
 STN:V3 ORTN:250 'TN TXHT:180 ft
 ERP:100.00 W ANT:ALP9212-N
 DT:0E HW:0 LD:100

EASTHAMPTON
 LAT:39-58-22N LON:74-44-27W
 GE: 6911
 STN:V1 ORTN:10 'TN TXHT:188 ft
 ERP:100.00 W ANT:ALP9212-N
 DT:0M HW:0 LD:100
 STN:V2 ORTN:130 'TN TXHT:188 ft
 ERP:100.00 W ANT:ALP9212-N
 LD:0M HW:0 LD:100
 STN:V3 ORTN:250 'TN TXHT:188 ft
 ERP:100.00 W ANT:ALP9212-N
 DT:3M HW:0 LD:100

BROWNS MILLS
 LAT:39-58-18N LON:74-35-00W
 GE: 8511
 STN:V1 ORTN:10 'TN TXHT:150 ft
 ERP:100.00 W ANT:ALP11011-N
 DT:0E HW:0 LD:100
 *** Legend incomplete. See report ***

THRESHOLDS	OVERLAYS
(>= dBm)	
>=-85	Interstate Hi
>=-95	State Highway
	County Boundaries
	Tertiary Highways
	MSA/RSA Boundaries
	MTA Boundaries
	BTA Boundaries
	Miles

0 1.00 2.00 3.00
 SCALE: 1:100,000 12/16/97 09:22



BAMS Plymouth Meeting BAMS CC-Philly Best Server CellCAD II v4.2 WOODLAND		FUTURE PLAN
WOODLAND LAT:39-53-28N LON:74-44-52W GE: 4911 STN:V1 ORTN:10 'TN TXHT:180 ft ERP:100.00 W ANT:ALP9212-N DT:0E HW:0 LD:100 STN:V2 ORTN:130 'TN TXHT:180 ft ERP:100.00 W ANT:ALP9212-N DT:0E HW:0 LD:100 STN:V3 ORTN:250 'TN TXHT:180 ft ERP:100.00 W ANT:ALP9212-N DT:0E HW:0 LD:100		
WOODLAND LAT:39-52-41N LON:74-38-22W GE: 8911 STN:V1 ORTN:10 'TN TXHT:180 ft ERP:100.00 W ANT:ALP9212-N DT:0E HW:0 LD:100 STN:V2 ORTN:130 'TN TXHT:180 ft ERP:100.00 W ANT:ALP9212-N DT:0E HW:0 LD:100 STN:V3 ORTN:250 'TN TXHT:180 ft ERP:100.00 W ANT:ALP9212-N DT:0E HW:0 LD:100		
EASTHAMPTON LAT:39-58-22N LON:74-44-27W GE: 6911 STN:V1 ORTN:10 'TN TXHT:188 ft ERP:100.00 W ANT:ALP9212-N DT:0M HW:0 LD:100 *** Legend incomplete. See report ***		
THRESHOLDS (>= dBm) >=-85 >=-95	OVERLAYS Interstate Hi State Highway	
	County Boundaries Tertiary Highways MSA/RSA Boundaries MTA Boundaries BTA Boundaries Miles	
0 1.00 2.00 3.00 SCALE: 1:100,000 12/16/97 09:28		