



Thinking outside the sphere

Report of David Maxson, WCP In the Matter of Docket No. 445 Before the Connecticut Siting Council

April 17, 2014



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Executive Summary

This report outlines key shortcomings and inconsistencies of the Applicant's presentation to the Connecticut Siting Council in Docket 445. In short, the following conclusions arise in this report:

- The proposed tower is not the result of careful network planning and instead is an opportunistic site that went looking for a carrier.
- The proposed tower's opportunism is evidenced in part by the choice of a prominent ridge location with an utter lack of integration into the existing AT&T network.
- The proposed tower height is arbitrary, as there is no network design reason for selecting any one height over another. Underscoring the absurdity of the only apparent rationale for the proposed height, essentially that more height gets more people, then a 250 foot tower would be even better, but has not been proposed.
- A much shorter tower that integrates more harmoniously with the ridgeline would still provide substantial coverage.
- The proposed facility leaves substantial gaps in the Titicus valley area and the Ridgebury area; therefore, multiple towers/cell sites will be necessary to fulfill the stated coverage objectives of the applicant even with the proposed facility.
- Other placements on, in particular, large parcels that are heavily wooded, remote from residences and/or are developed for non-residential use, can provide equal, or collectively, better coverage than the proposed facility.
- Town Meeting, when it had opportunity to speak against a tower at this general locus, said "no."
- Evidence on the purported benefits to emergency communications consists of vague unsubstantiated statements that shows local public safety has no plan and had done no technical due diligence on the proposal, such that the Council has insufficient evidence to determine whether the need or the purported solution is genuine.



Introduction and Qualifications

This report was prepared by David P. Maxson, WCP. I am an IEEE Wireless Communications Engineering Technology Professional®, which is the only independent certification that specifically addresses knowledge and experience in the field of wireless communications engineering technology. I have been involved professionally with radio communications engineering since 1976, and in the field of personal wireless communications technology since 1988. My *curriculum vitae* is appended to this report (Exhibit G). I have testified from time to time on behalf of municipalities and on behalf of intervenors (both private and commercial) before the Connecticut Siting Council (the “Council”) since my first engagement here in 1995.

I am familiar with the area of the proposed facility described in Docket 455 for two reasons. First, as a child, I was raised on Kiah’s Brook Lane in Ridgefield, which is located at the base of the hill on which the proposed wireless tower would be situated. I graduated from the then-new Ridgefield High School at North Salem Road the year it opened. I am familiar with the topography and land use in the area.

Second, as a wireless consultant, I responded to a Request for Proposals by the Town of Ridgefield (“Town”) in 2012, when the town was seeking proposals to place wireless facilities near where the proposed facility is now located, on land that would prospectively be purchased by the Town. At that time I contacted several wireless carriers and no carrier had an active search ring in the locus. Nevertheless, I assumed the townspeople were in support of the concept, and I recommended an ownership model that would be more beneficial to the town. Rather than acting as a middleman tower owner/developer, my proposal was to act as a project manager to develop the site for the town. The Town would own and realize 100% of the revenue from the proposed facility, rather than sharing revenue with a tenant (tower owner) who would subcontract space to wireless service providers. Also, my proposal included a low-profile design involving one or more utility-style poles peeking above the tree canopy with antennas mounted on them. I demonstrated there would be substantial coverage from such lower antenna heights because of the prominence of the ridge on which the poles would be placed. There were no adjacent cell sites with which such a facility would be able to provide call



handoffs to, regardless of the tower height. I saw it as an opportunity to minimize visual impact while providing substantial new coverage.

The Town selected another proponent, but because execution of the project in the 2012 request for proposals was dependent on Town Meeting approvals that were not forthcoming, a contract for the project was never consummated. The winning proponent was the same company that is now an applicant in this proceeding. The private property that Town Meeting rejected the acquisition of and development of a cell tower on was subdivided. Town Meeting approved the purchase of the major portion, with a cell tower restriction. Instead, the subdivided portion was privately sold to a tower developer. This maneuver prevented Town Meeting from explicitly voting on the new cell tower proposal on the ridge, on which the previous tower proposal was defeated.

In the present matter, I have no development interest in any facility location and I present facts in the matter for the Council's consideration.

Applicant's Site Selection Process

The Applicant's description of its site search is vague and non-specific, belying the actual nature of the site selection process. The first three paragraphs of the Applicant's Attachment 2 Site Search Summary describe "in general" how "the wireless industry develops" site searches. It describes, without foundation, that "once a site search area is identified" certain things typically happen. No indication is given that a site search area was identified, by whom, or when. No specific description is given of the process by which the proposed Site was identified.

Only in the final paragraph of the Site Search Summary is there mention that the tower developer and AT&T "independently investigated" parcels. No time line is presented. No evidence is given whether the search area for the present facility was initiated by AT&T in the current disposition of AT&T. Recall that AT&T, like other carriers, has been through mergers, technology upgrades and financing ebbs and flows – each of which readily takes search areas off the table and renders them moot. It would be misleading to imply that an AT&T search "several



years ago” (Many years ago? What year?) was still ripe during the current phase of planning, without accurate documentation.

Based on the information available to me, it appears that the proposed Site is a cart-before-horse proposition that has been advocated actively by the tower developer applicant even when no wireless carriers had active search areas in the vicinity.

Coverage

In response to the Council’s question Q5 [4_1_14 Docket No. 445 Responses to CSC Pre-hearing Questions Set I.PDF] regarding adjacent sites that would be involved in handoffs with the proposed facility, the Applicant’s answer simply used the term “interact with the proposed facility.” The question is important, because the Applicant’s coverage mapping suggests that even after the proposed facility were on line, there would be a wide perimeter of substandard service between existing facilities and the proposed facility. Handoffs at these “substandard or nonexistent” signal levels will be unreliable, if they are possible at all. There is no evidence that even suggests the proposed facility is sited to complement the existing AT&T network. To the contrary, this further underscores the appearance of the proposed Site as a site of opportunity rather than one being the result of a rational network plan.

Coverage at Lesser Heights

If it is determined to be necessary to place a facility at the Site, the fact that even at the proposed height it fails to connect with coverage from all existing sites indicates that there is no mandate for the height proposed. Certainly more coverage is generally conceived as better, if ignoring all other constraints such as visual impact and land use compatibility. In this instance, there is an opportunity to reduce the height of antennas on the ridge to just above the treetops. At such lower elevations, faux tree camouflage then becomes realistic, instead of surreal at greater heights. Even using painted exposed antennas (brown or green), as an alternative to the faux tree approach, would still significantly diminish the visual impact if positioned at near-



treetop heights, as opposed to a tall tower for which no color will substantially reduce its visual impact.

When queried about the lowest feasible height that “could fulfill the coverage objectives from the facility?” (ibid. Q11) the Applicant’s response was a statement that a greater height had been sought, and that reduction to 150 feet AGL would not pose a “material” burden. Applicant then avers that 150 ft is the “lowest feasible height”. As requested, a propagation map at ten feet below the stated lowest feasible height was submitted by the Applicant. That new map at 140 feet (Attachment 1 of the Responses) indeed shows very little change in the coverage footprint from 150 to 140 feet. More useful would be coverage modeling from progressively lower heights, particularly heights at which the tower would be substantially less objectionable.

As discussed above, the proposed facility is not placed to provide connecting coverage to the coverage of any existing AT&T or other cell sites. Consequently, the “coverage objectives from the facility” are circularly derived. The proposed facility satisfies the coverage objective 100% because the proposed facility’s coverage is defined as the objective. Because there are no handoff objectives requiring coverage to any existing service boundary, the proposed facility fails to complement the AT&T network, other than to provide gross coverage as an island unto itself. The implications of this approach include the unintended consequences of creating narrow gaps that are either unserviceable (allowing dropped calls for every passerby and creating a zone of “substandard or nonexistent service” that will never be addressed due to its size) or require redundant facilities (as numerous towers are proposed to inefficiently fill in smaller gaps around the proposed facility).

To illustrate the effect of having antennas modestly above the tree canopy, I prepared coverage plots at two antenna heights at the Site: 146 ft and 80 ft above ground. Note, when considering my analysis in light of that submitted by AT&T, it is the nature of computer modeling that two plots reasonably executed by experienced individuals will not necessarily agree 100%. Any minor differences between my coverage modeling at 146 ft and the map provided by AT&T are not material to the purpose of this submission. It is reassuring to note that my baseline analysis



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is indeed similar to that produced by the applicant. More importantly, it is the purpose of my analysis to provide a comparison between two heights.

My Exhibit A interprets coverage from 146 feet at the Site. My Exhibit B interprets coverage from 80 feet. Note that at 80 feet there is diminution of coverage to the north side of the ridge, compared to 146 feet. Also note the pink polygon laid on the map for reference. This polygon essentially marks out the Titicus valley area south of the Site and the Ridgebury area to the north – all within Ridgefield. The polygon was placed to follow natural terrain breaks and where practicable, undeveloped land. This polygon shows that even with the facility at 146 feet, the coverage to Ridgebury is limited. In order to eliminate a tall tower from looming over the neighborhood, and to minimize the visual intrusion of a tall tower on a scenic ridge, it may be reasonable to not provide the proposed coverage to Ridgebury, and focus on serving the Titicus valley area by adopting an above-treetop height of about 80 feet (or such other height as is determined to be compatible with the surroundings).

For comparison, a population count table is presented below.

Location	Height	Pops -82 dBm
Titicus & Ridgebury Outline	N/A	Total pops: 7330
Proposed Site	146 ft	2703
Proposed Site	80 ft	2116
RHS	170 ft	1488
Barlow Mtn School	140 ft	2927

As the Proposed Site lines of the table show, a significant majority of the population served by the proposed facility is south of the ridge, in the Titicus valley area. For illustration of the terrain breaks in the area, Exhibit E is a terrain map of the area. The Titicus valley area to the south can be illuminated from the proposed site, or from sites within the valley area. The Ridgebury area is not well illuminated from the Site, even at 146 feet. The lay of the terrain shows how the proposed Site is not well situated to adequately serve the Ridgebury side of the ridge.

A Ridgebury facility will be necessary in the future no matter what. It is reasonable to expect that another facility can be designed to serve Ridgebury in concert with surrounding facilities



and in concert with the proposed facility at a much lower height, or with no proposed facility at all.

Alternate Site Examples

To illustrate how alternative sites, using land already developed for non-residential use, can provide substantial coverage to the Titicus valley area, Exhibits C and D provide two examples. Exhibit C depicts a 140 foot tower at the Scotland and Barlow Mountain Schools site. This location is immediately surrounded by wooded open space, ensuring that a tower would not loom over nearby residential use. Exhibit D depicts a 170 foot tower at the Ridgefield High School grounds. A location was chosen 250 feet from the nearest building (in observation of the statutory preference), which places it at modestly lower elevation than North Salem Road. Consequently, a 170 foot tower is modeled to ensure that there is no handicap caused by the lower ground elevation. The tower at RHS would be over 1000 feet from the nearest residence, ensuring a neighborhood-compatible result. At Barlow Mountain/Scotland Schools, the distance to the nearest residence may be more on the order of 800 feet, but with fully wooded separation likely.

The table above includes population counts for the coverage obtained by either of these facilities. Either location would provide substantial coverage for AT&T and other carriers, in lieu of the proposed facility's coverage.

Public Safety

Much is made of the potential for the proposed facility to serve public safety communications needs. Section 8.2 of the Ridgefield Zoning Regulations enables public safety communications towers by Special Permit. Ridgefield is not an impoverished community. Were there impetus to provide more comprehensive coverage for public safety, it would not seem to require a cell tower to accomplish the objective. The Town can readily develop the network it needs to ensure public safety. Public safety communications employ spectrum and technologies whose criteria differ from those of personal wireless communications.

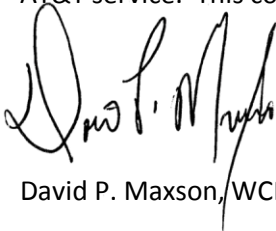


Representations regarding the public safety radio benefits of the proposed tower provide no substantive information. There are no coverage maps (which would be required in a Special Permit hearing for the same; to wit, “Each application shall include a map showing the extent of planned coverage within the Town of Ridgefield and the location and service area of the proposed facilities”). There is apparently no concerted public safety communications plan within which the proposed tower either fits or does not fit. The prospect of the proposed tower to improve public safety communications is purely opportunistic.

Public safety communications planning also may include considering the critical nature of providing in-building commercial wireless coverage at key municipal buildings, such as schools. Wireless facilities on or near school grounds have the ability to better penetrate the commercial/industrial construction of such buildings than would a tower a mile away. As the public becomes more inured to the presence and effectiveness of wireless communications, it is increasingly being accepted that good wireless service in school buildings is valuable. Locating wireless facilities at the High School and/or at Barlow Mountain/Scotland Schools not only provides substantial wireless coverage to major thoroughfares and numerous residences, but also provides signal strength and capacity in these critical municipal environments.

Conclusion

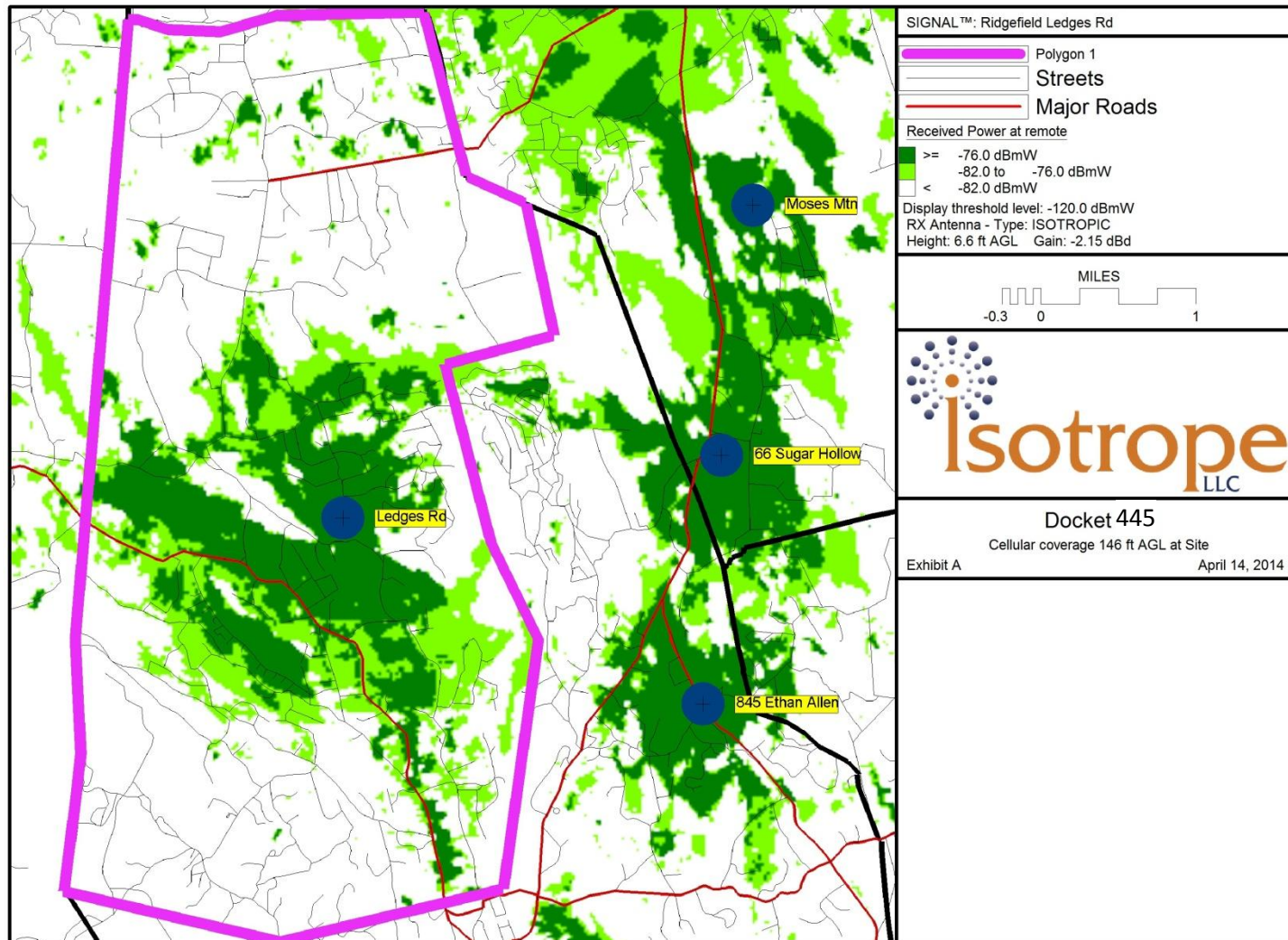
In the Executive Summary, above, I have distilled my findings regarding the proposed tower and AT&T service. This concludes my report on the matter.



David P. Maxson, WCP

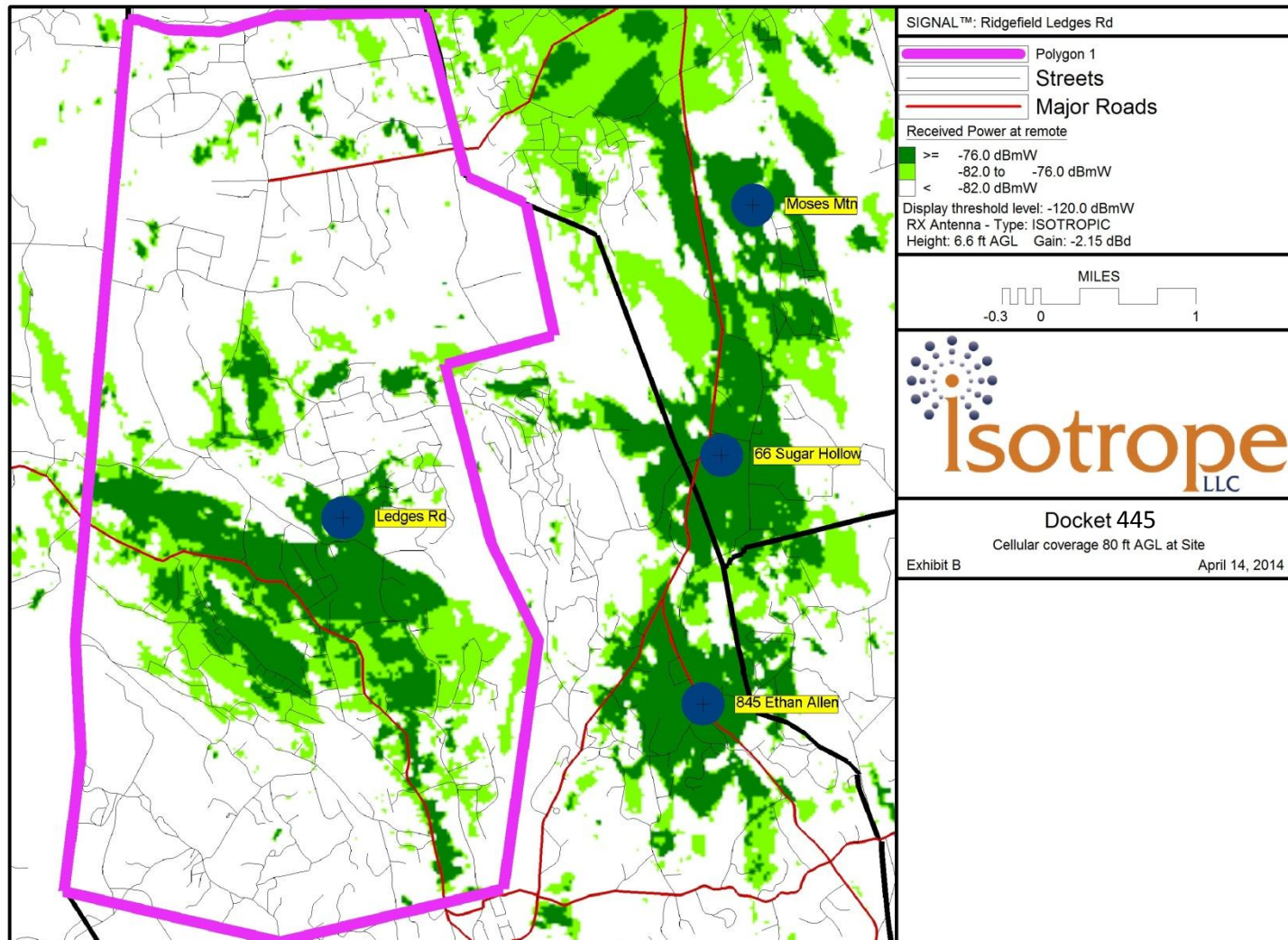


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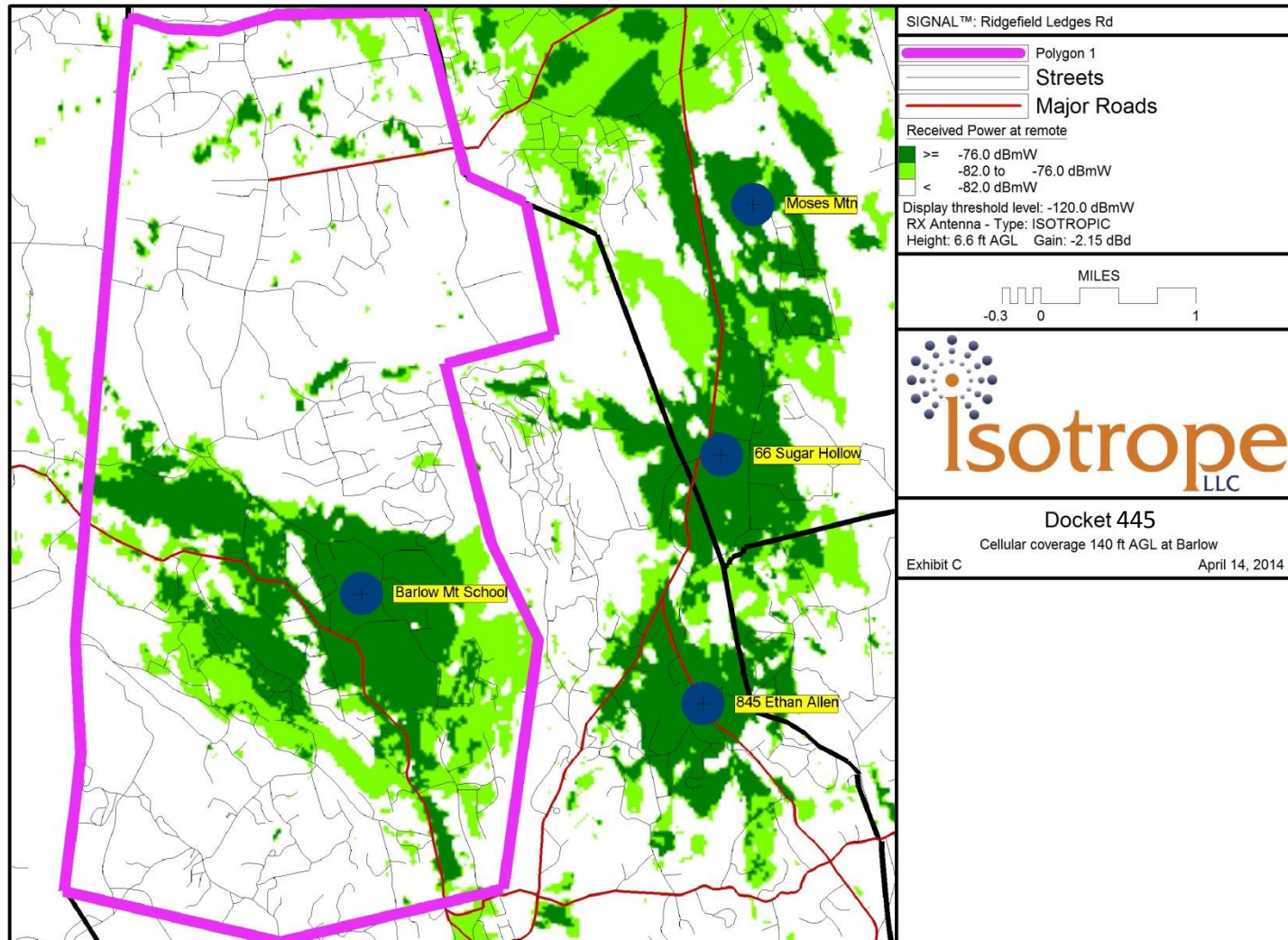


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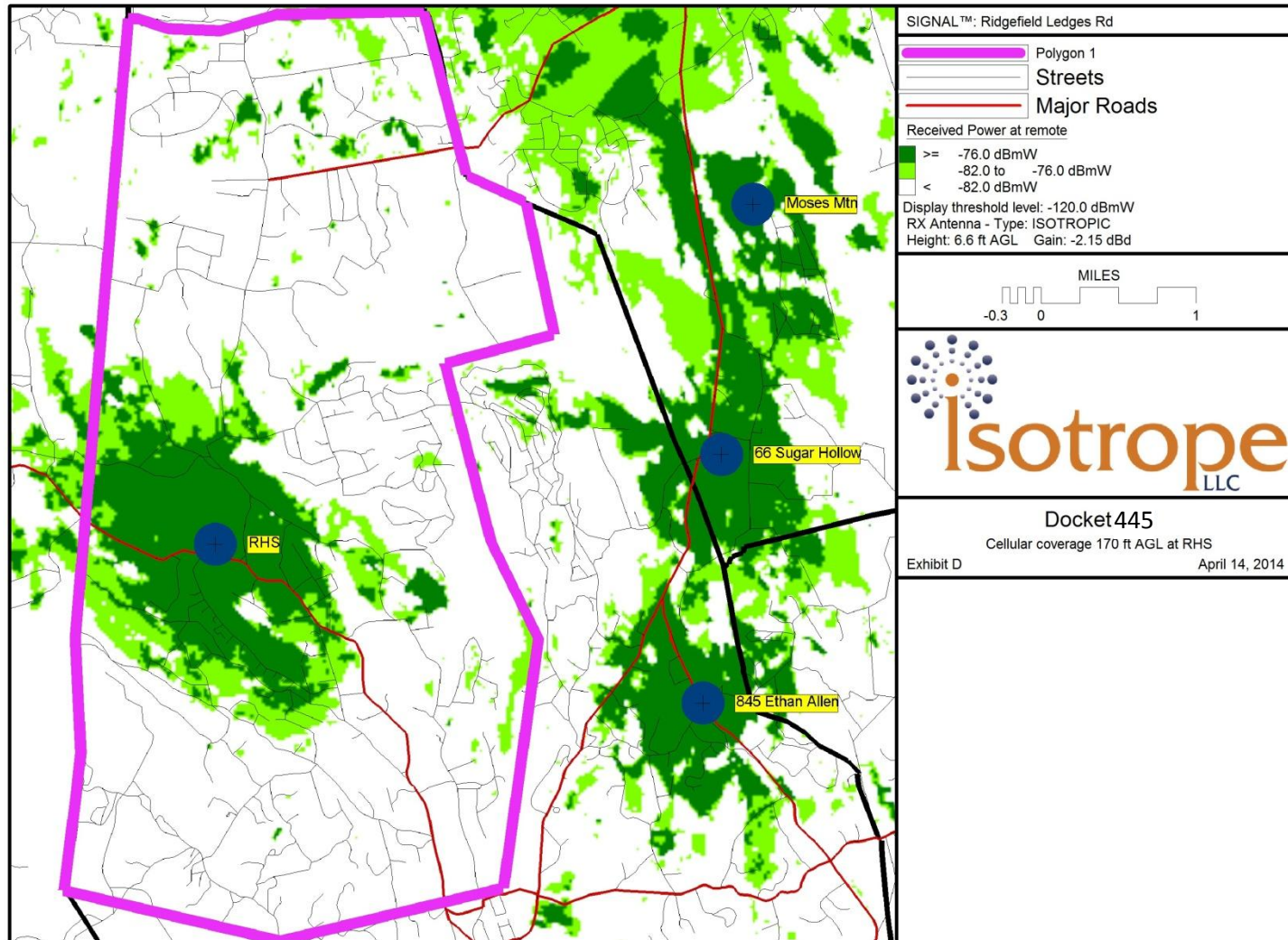


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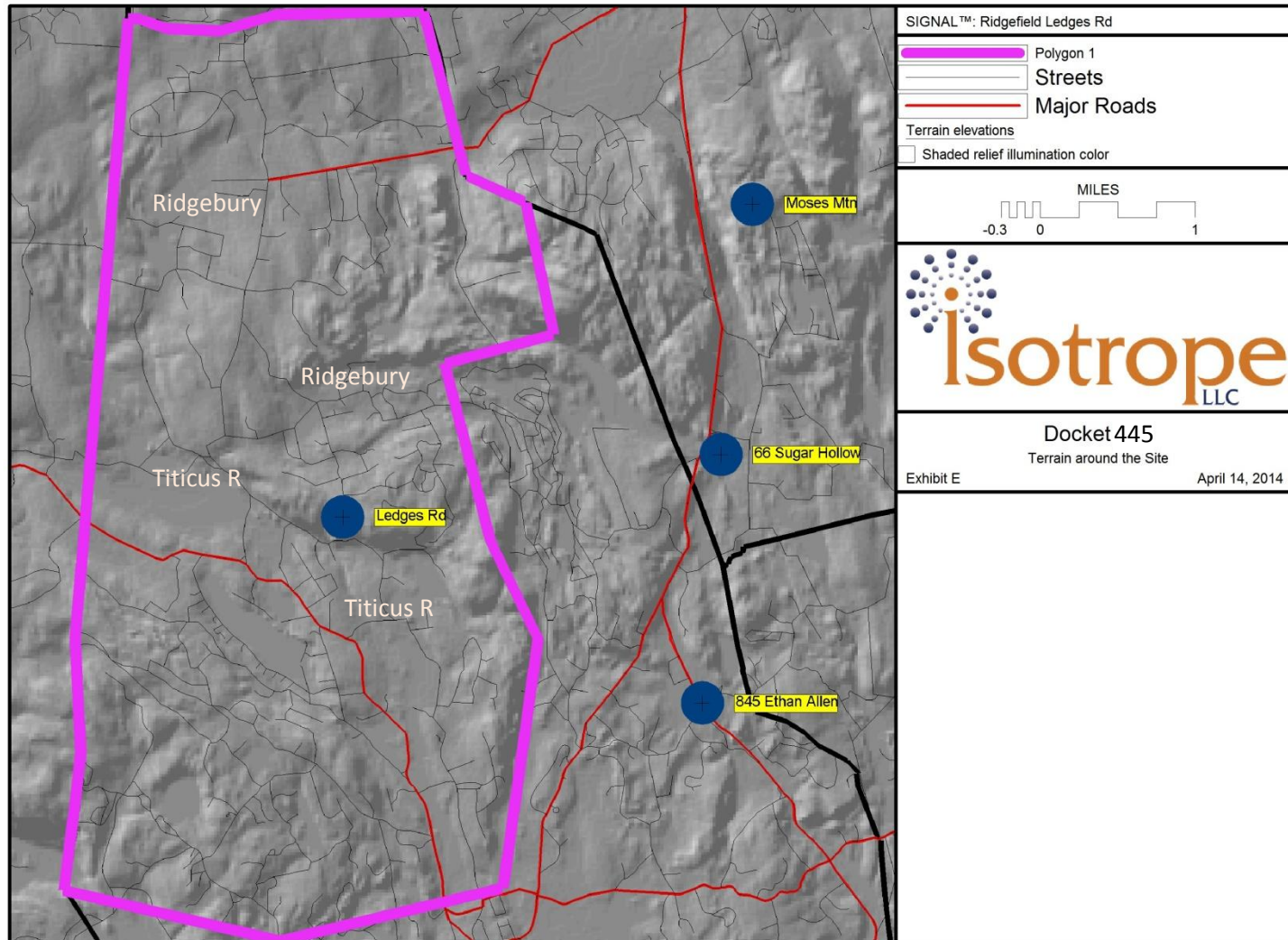


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Exhibit F
Curriculum Vitae
David P. Maxson

David P. Maxson, WCP®

Curriculum Vitae

Isotrope, LLC, Medfield, Massachusetts, 1982*-present

Founder, CEO

- | | |
|---|--|
| a) Municipal guidance in wireless planning and regulation | b) Evaluation of radio frequency facilities for compliance with technical and regulatory standards |
| c) Research and development on digital media initiatives | d) Safety planning and evaluation of communications facilities, safety protocol development |
| e) Communications facility design and construction | f) Radio frequency interference remediation |

*Note – The wireless consulting business of the former Broadcast Signal Lab, LLP is now Isotrope, LLC.

David has been an owner of the business since co-founding it in 1982. Isotrope was incorporated in 2009.

Charles River Broadcasting Company, Waltham, Massachusetts, 1978-1998.

Vice President, Director of Engineering and Technical Operations

Affiliations and Accomplishments

- Certified IEEE Wireless Communications Professional®, demonstrating “a thorough understanding of different key technologies in the wireless arena.” (ieee-wcet.org)
- Member of the PCIA’s DAS Forum (the wireless infrastructure association’s distributed antenna system group)
- Project Reviewer - NTIA Broadband Technology Opportunities Program and USDA Rural Utilities Service Broadband Initiatives Program – American Recovery and Reinvestment Act, 2009.
- Delegate to the National Radio Systems Committee, Digital Audio Broadcasting Subcommittee, 1998-present.
- Qualified expert on wireless communications matters before federal and state courts.
- Testimony, US House of Representatives Commerce Committee Telecommunications Subcommittee in the matter of Low Power FM Broadcasting, February 2000.
- Wireless facility evaluation and planning consultant to the Cape Cod Commission as well as to over a hundred municipalities in New England and beyond, 1999 to present.
- Appointed member of Massachusetts Department of Public Health ad hoc committee on revisions to electromagnetic energy safety regulations 105 CMR §122, 1997.
- Senior Member, IEEE; Certified Broadcast Radio Engineer, Society of Broadcast Engineers; FCC General Class Radiotelephone License with Radar Endorsement
- Massachusetts Licensed Construction Supervisor #CS073481.
- Bachelor of Science, Boston University, 1977

Selected Publications

- Author, *Your Mileage May Be Different – Reflections on Megabits per Second and Miles per Day [on a statewide drive test of broadband data connectivity in Utah]*, Above Ground Level Magazine, December 2011.
- Author, *The IBOC Handbook— Understanding HD Radio Technology*, 2007, Focal Press.
- Author, Chapter 2.5, *Managing Workplace and Environmental Hazards*, NAB Engineering Handbook, 10th Edition, 2007.
- Article, *Evaluating Emissions of Your New IBOC Transmitter*, Radio World Engineering Extra, June 2005.
- Article, *Posting Hazard Communications Signs at Your Radio Transmission Plant*, Radio Guide, April 2005.
- Published Paper: *Interference Potential of Hybrid Digital Transmission: An IBOC Occupied Bandwidth Case Study*, Proceedings of the National Association of Broadcasters Broadcast Engineering Conference (“NAB-BEC”), 2004.
- Published Paper: *Integrating ANSI-Compliant RF Signs Into Corporate RF Safety Programs*, NAB-BEC 2004.
- Published Paper, co-author: *Applying the Principles of Data Communications to the Development of an Open and Universal IBOC Data Protocol*, NAB-BEC 2003.