

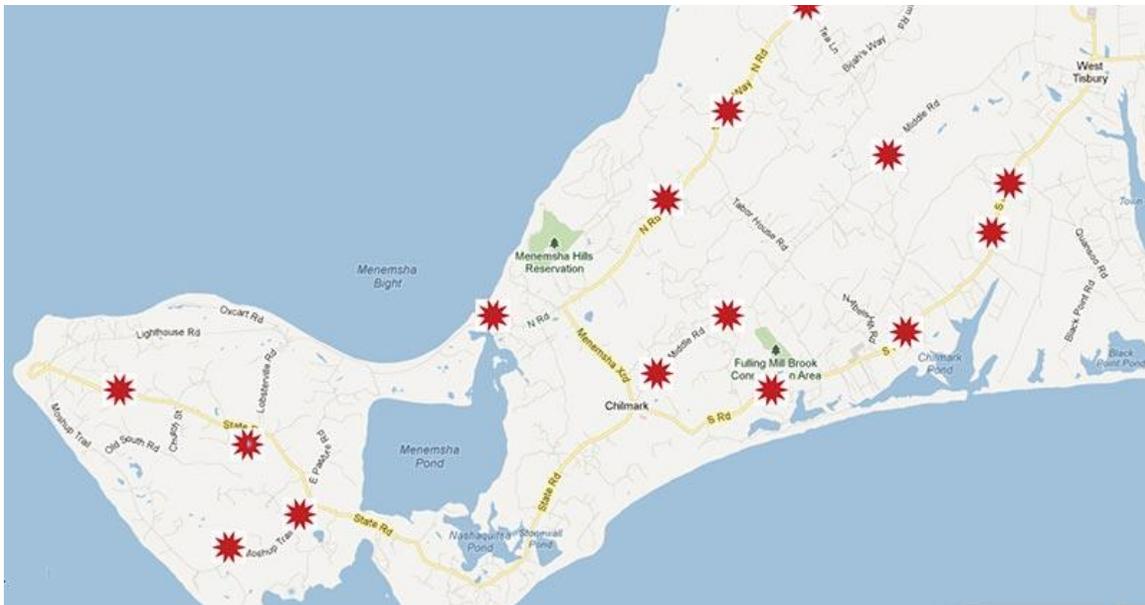
## Memorandum on Connecticut Siting Council questions Regarding Docket 488, Kent, CT

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In response to the Council's inquires, I provide the following information:

### Chilmark DAS

Regarding the Distributed Antenna System in Chilmark, Massachusetts, I spoke with the Town Administrator, Tim Carroll. Mr. Carroll is also the director of emergency management for the Town. He reports that there are 52 approved DAS node locations in Chilmark and abutting Aquinnah. The DAS is owned and operated by American Tower Corporation. He does not know how many of the approved nodes have been built to date. There have been three rounds of buildout over the years. First with Verizon, then AT&T and finally an expansion by Verizon. Below is a map from the Marthas Vineyard Times showing the initial DAS node locations in the two towns as of the 2012 construction date.



No new cell towers have been placed in the area since the DAS went on line (8 years). In his capacity with town emergency management, Mr. Carroll reports the DAS nodes have 4-hour battery backup and a socket connected to a transfer switch for connecting a generator. The town was supplied with small portable generators to initiate backup power for long-duration outages. A contractor now handles the responsibility for American Tower.



Mr. Carroll reports that AT&T includes its FirstNet frequencies on the DAS. A planned outage of 6 hours for utility upgrades was conducted in early August. Backup generators were placed at key locations in anticipation of the outage. Occasional heavy storms take power out for more than 4 hours, and the generators are used to operate DAS nodes.

Chilmark's small-cell solution proves that broad areas can be provided coverage by small cell arrays as a way to address both the coverage need and scenic impacts.

## About Hills

There is no distinction that should be made about the hilliness of Chilmark versus Kent. With antennas approximately 40-50 feet above ground, the terrain does not have to be very hilly to obstruct signals. The key point about hilliness that I made in my testimony relates to the fact that the lower frequencies do better "bending" (diffracting) over terrain undulations than the higher frequencies. This is one of the factors that is included in my mentioning the better propagation at 700 MHz and the Communications Research Center comparison of propagation of 2 GHz and 700 MHz signals. Both the reduced affect of foliage and the increased diffraction over terrain edges provide a substantial increase in coverage (decrease in path loss) for the lower frequencies.

## Innovation to Answer Regulation

With the discussion of my modeling of a notional small cell network in Kent, it is important to keep some perspective. It is not the job of local regulators to tell wireless companies how to engineer their solutions. Rather, regulators have the opportunity to press carriers to innovate to solve siting issues. Chilmark and Aquinnah prevailed with their preference for a DAS by staying the course against having a massive towers on a scenic hilltops. Aquinnah had even faced a lawsuit for denying a permit for a macrocell site.

In my experience, when cell towers were a new thing, there were no manufacturers with stock designs of monopoles. I recall hearing from applicants at the time (late 1990s) the argument that really tall monopoles were impossible, because they were not available. With steady pressure from land-use regulators, a monopole industry was born. Now monopoles are a commonly preferred cell tower design. At about the same time, carriers were pressured to conceal their installations, particularly on things like rooftops, building facades, and faux structures (like the faux trackside water tower approved and built in Branford). I witnessed applicants arguing that putting antennas behind plastic concealment would unduly mess up radio propagation. With continued pressure over time from land-use regulators, the nascent antenna concealment industry innovated with radio-friendly plastics with non-fading colors and designs to produce myriad custom concealments. In the case of the monopole and the concealment, applicants originally claimed it couldn't be done.



Carriers attest to how DAS (and now small cells of other kinds) are used in stadium and high-density neighborhoods, implying they are not used for other purposes. They are, but sometimes with strong reluctance by the carriers.

Even industry responded with innovation in the DAS realm. Original DAS designs were a brute-force method of distributing signals. The base station would produce the radio signal at a base station hotel and the signal would be converted to light on a fiber, sent across a dedicated fiber to the DAS node and converted back to a radio signal.

With 4G technology, the design of base stations became more adaptable. The switching functions of a base station can now reside in “the cloud” and a readily available commercial data link can be ordered at the location of the small-cell node to connect the node to the cloud. No longer is a base station hotel necessary or any dedicated fiber to be run from the hotel to the node. Innovation abounds, when it suits the industry.

Based on my experience, I do not see carriers and tower speculators slowing down on their inexorable placement of massive cell towers on every major hilltop in rural Connecticut. To prevent what amounts to “death by a thousand cuts” the public convenience and necessity of preserving pristine scenery (that can never be recovered once lost) must be given high priority against ill-situated cell towers. Innovation to protect the scenery does not come unless there is pressure to foster it. It is not the role of the regulator to design the solution, but only to be aware that carriers have demonstrated the ability to innovate in response to local concerns. How the applicant innovates a better way to inject signals into Kent is up to them. It should be sufficient that we have shown one approach to finding an alternative.

David Maxson, WCP  
August 27, 2020