



Thinking outside the sphere

Fourth Commentary on the T-Mobile Application for a Wireless Facility at 22 Griffin Road

Broadcast Signal Lab was engaged by the Town of Westford to assist with the review of the T-Mobile application for variances for a Wireless Communications Facility (WCF) including a new tower, at 22 Griffin Road (Site). Isotrope, LLC has acquired the wireless division of Broadcast Signal Lab and is assigned the underlying contract in this matter. The applicant seeks a use variance as well as a variance from the 900-foot dwelling setback in the WCF bylaw (6.2.3) and from the 35 foot height limitation in the Table of Dimensional and Density Regulations (Appendix C). Applicant also seeks a variance to the limitation of not more than one principal structure on a lot (4.1.2).

In our Initial Commentary dated May 14, 2010, we summarized topics of inquiry. In our Further Commentary July 16, 2010, we remarked in depth on various issues. We also provided a separate document confirming the proposed facility's design is compliant with FCC regulations concerning the facility's radio frequency emissions to the environment. We provided a separate coverage analysis report showing our assessment of the projected coverage from the proposed facility and from alternatives on the Walsh park site owned by the Town, and from a location on the hill that is south of the proposed tower site. We provided an addendum to the coverage report in response to the suggestion of a location on the hill that would be in the Walsh parcel. In our second Further Commentary September 24, 2010, we summarized the facts that were submitted to the record on outstanding questions regarding alternatives to the proposed facility. We provided a report on potential alternative locations on the parcel of the proposed facility, dated November 3, 2010.

There remain only a few outstanding questions. The Zoning Board of Appeals ("ZBA") sought additional information on the viability of the 4H site at 55 South Chelmsford Road. Continuing



discussion with 4H left open the possibility that 4H would allow a tower to be constructed on the 4H site. Discussions were fruitful, and T-Mobile performed a “CW”¹ drive test to evaluate potential coverage from the 4H site. T-Mobile submitted maps of the drive test results with the test antenna at various heights above ground. The greatest height, nominally 147 feet above ground level (“AGL”), would provide the most coverage. Isotrope prepared a coverage map that includes prospective coverage from the 4H site. Further discussion appears below.

The ZBA also sought further facts on the potential of a new tower at Lyberty Way to provide coverage to a portion of the subject area reached by the proposed 22 Griffin Road facility. There is reportedly at least one willing landowner in the Lyberty Way industrial park. T-Mobile conducted a CW test at various heights from Lyberty Way and submitted maps of the results. Isotrope prepared a coverage map that includes prospective coverage from the Lyberty Way site.

The T-Mobile drive test maps and the Isotrope coverage maps are consistent. Isotrope map Figure 1 shows the predicted coverage from 150-foot towers at both the 4H site and the Lyberty Way site. These are shown in green. Visualizing the green coverage plots as overlays on the map, any areas that are not green are transparent to the layers below it. Isotrope modeled coverage from the 22 Griffin Road site at two heights – 147 and 97 feet AGL. This coverage is shown in a reddish color. On the Isotrope maps the Griffin Road coverage (orange) is a layer below the green 4H and Lyberty Way coverage (green). With the layers stacked in this order, the areas that are not reached by 4H and Lyberty Way, but are reached from Griffin Road are visible orange. It is evident that the alternatives at 4H and Lyberty Way do not reach Griffin

¹ There are several types of drive test. The CW test is conducted to evaluate prospective sites for their coverage potential. CW stands for Continuous Wave, a technical term that indicates the test signal is a simple informationless radio signal emitted from the test site – usually on a crane temporarily erected for the purpose. In contrast, a “Scan” test is performed to measure signal levels and other characteristics of the coverage provided by a number of existing wireless facilities to more precisely describe the strengths and weaknesses of existing coverage.

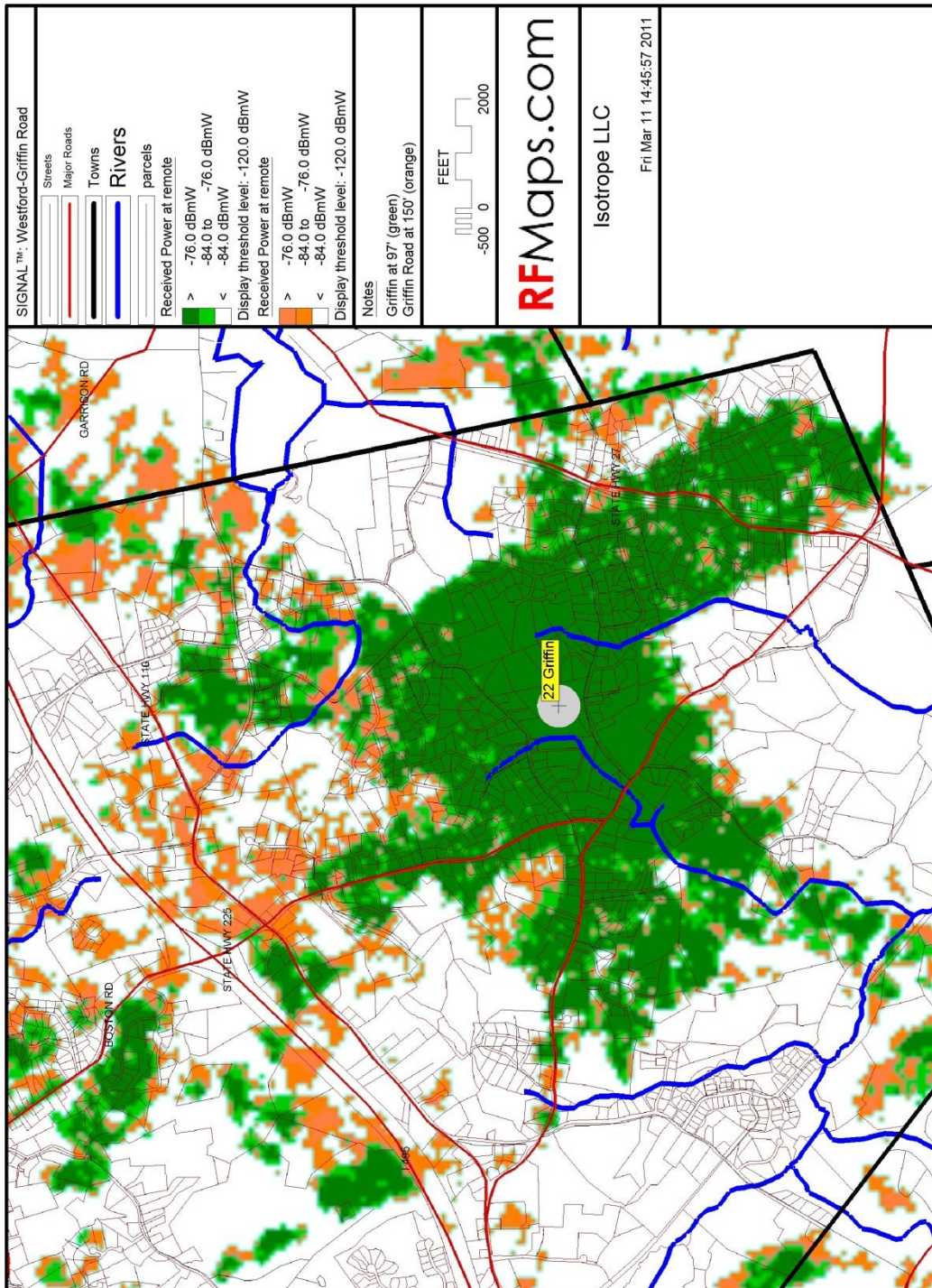


Figure 2 - Griffin at 100 feet (green) over Griffin at 150 feet (orange)

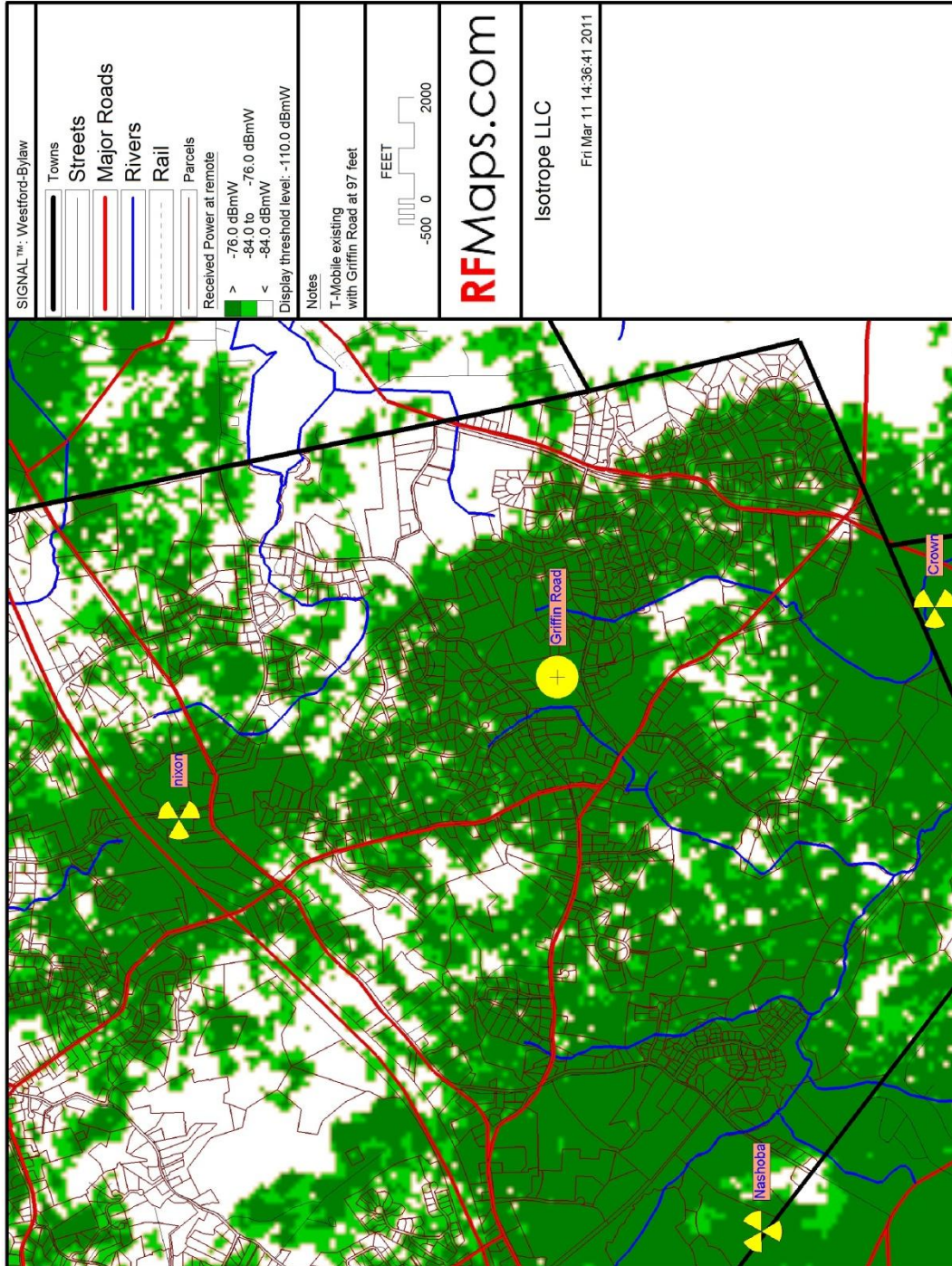


Figure 3 - Existing Coverage plus 22 Griffin Road at 100 feet



Isotrope map Figure 2 shows the difference between coverage from 147 feet (nominally 150) and 97 feet (nominally 100). The top layer (green) is the projected coverage from 100 feet. The exposed parts of the orange layer show where the 150 foot height would provide coverage and the 100 foot height would not. Coverage is shown using the applicant's signal level thresholds.

Finally, Figure 3 shows the existing coverage plus coverage from 22 Griffin Road at 100 feet. Figure 3 suggests a 100 foot height would be sufficient for providing the coverage T-Mobile is seeking to provide. The height ultimately selected, if the facility is approved, will be based on a weighing of the relative benefits of collocation versus the relative adverse impacts of greater heights (if any).

For considering the visual characteristics of tower height and location on the parcel, we repeat the figure we prepared from the applicant's visual impact study (Figure 4) and presented in our analysis of alternative locations on the subject parcel.

Finally, a word about the accuracy of the Isotrope coverage maps. Isotrope requested the raw drive test data of the existing coverage scan test and the alternatives at two sites at various heights. In the time available, the applicant supplied the existing coverage scan test data. Isotrope input the scan test data into our mapping system. We compared the measured signal levels of existing coverage (summer) with our computer model of the same coverage. Without any attempts at tuning the model to the measured data, the Isotrope computer model was shown to be extremely accurate. There was a mean offset (error) of 1 decibel. This is an excellent figure. Isotrope's coverage maps of the T-Mobile coverage in the Griffin Road area are highly reliable.



Isotrope, LLC



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Figure 4 - Applicant's photosimulation with Isotrope additional photosimulation of tower at 150 feet height at alternative location on the parcel.

David Maxson, WCP®
Isotrope, LLC
505 Main Street
Medfield, MA 02052

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