



**Observations on the SBA Application for a Special Permit
to Install a Wireless Facility and Tower
at 5 Craig Road, Acton, Massachusetts**

The Acton Planning Board is hearing an application by SBA Towers II, LLC to install a 170 foot tower and accompanying wireless facilities at 5 Craig Road. Following is a bulleted listing of our observations:

3.10.6.3- The tower height is proposed to be 170 feet. The bylaw specification is for a 175 foot maximum, based on the greater (“higher”) of two measurements. One is from the point of the base of the proposed tower and the other is from the average elevation of the land within 500 feet of the tower. The proposed 170-foot height is based on the former measurement (elevation at the point of the tower base). No average elevation is presented. It is reassuring that the terrain is relatively flat around the proposed tower site and the proposed tower height is 5 feet less than the maximum, indicating a likelihood that the proposed tower is either compliant with or is not significantly outside the bounds of the 175-foot cap.

3.10.6.4- The proposed tower is not a CAM and will require a Board determination that the “aesthetic considerations are less important” for the proposed facility. A 170-foot tower is likely to be able to support 6 or 7 wireless antenna systems at 10-foot intervals on the tower, if it is not a CAM. It is structurally challenging to accommodate so many antenna systems within the skin of a CAM. If the appearance of the proposed tower’s mounting frames/platforms is objectionable and if the CAM design is not practicable, a compromise method would be to use the Flush Mount design. Below is a photo of a 140-foot tower in Westwood with a Flush Mount design. (note that tower and antennas are painted brown rather than light gray; some installations may appear in their viewshed contexts to be more rural and less industrial when brown.)

The Flush Mount approach reduces the number of antennas that can be accommodated at each level, and some carriers demand additional vertical space to compensate. Specific engineering should be provided to demonstrate why an applicant cannot use a typical 10-foot aperture to accommodate antennas in the Flush Mount method. Larger apertures reduce the co-location potential of the tower. Wayland negotiated a 15-foot aperture for Flush Mounting a carrier at the top of the tower at its water tank site. Some successfully retain the 10-foot spacing.

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Westwood, Massachusetts Flush Mount Monopole by Route 128 and Route 109

3.10.6.5 – The proposed height does maximize co-location potential by approaching the permissible height limit. It would be instructive to see how the applicants' coverage would perform at lesser heights on the proposed tower. It may not be necessary to have the tower at full height at this time, so long as it can be extended in the future when demonstrated that an extension is necessary. In Medfield, a 150-foot tower was constructed with the capacity to be extended to as high as 190 feet, if sufficient demonstration of need was provided by a later co-applicant. Several years later, the tower was extended to 170 feet. To date (more than a decade has passed) the tower has not been extended above 170 feet. It is possible that the applicant's proposed tenants (T-Mobile and Clearwire) would be satisfied by lesser antenna heights. Coverage from 100 feet and 135 feet should be provided to illustrate the effects of changing the heights of the facilities.

3.10.6.9 a) – See discussion above about minimizing vertical space if a Flush Mount is considered.

b) c) & f) – Applicant is a tower company in whose interest it is to maximize co-location (to the extent a client is not fatally offended) and to make efficient use of its equipment compound. The 100x100 compound is large compared to typical such spaces and should be adequate to address the needs of the many carriers who might utilize the tower.

d) – because the proposed facility can truly maximize co-location potential (structurally), this clause seems not to be applicable (Board requirement to relocate to another site to maximize co-location).¹

3.10.6.14 – Regarding conditioning permits on Carrier provision of reports on request, the applicant is not a Carrier of personal wireless services, so interpretation of this clause may be necessary. Although it has rarely, if ever, been necessary to confirm a wireless tower’s compliance, years after construction, with noise, radio frequency or aeronautical criteria, it would not be harmful to impose a criterion based on reasonable concerns of an issue. We do not support automatic scheduled reporting, the administrative burden of which outweighs the benefits in this case.

3.10.6.15 – Regarding the potential for multiple towers at a site, we have suggested above that the applicant’s two carrier tenants provide information on the effectiveness of coverage at lesser heights. It may (or may not) provide a significant reduction in visual impact if the tower were capped at a lesser height (e.g. 100 or 135 feet) and if there continues to be demand for additional facilities after the first tower is full, a second or even a third tower were to be permitted at the lesser height at some later time.

3.10.6.17 – Several Mandatory Findings: Minimizing adverse impacts, most community compatible method, evidence of significant gap, no existing wireless facilities can help, no less objectionable sites. We rely on local knowledge to suggest alternative locations that are in the vicinity of the targeted area that might be more compatible. The facility is described by Clearwire as targeting the area around “Massachusetts Ave (State Hwy 111)” including surrounding residential and commercial areas and roads. T-Mobile describes its gap in terms of

¹ Lacking any other place to bring this up, we note here that Clearwire has been sharing the antenna apertures of Sprint antennas at some existing Sprint towers in Massachusetts. It is worth inquiring whether the possibility of Sprint joining Clearwire on Clearwire’s aperture on the proposed tower is contractually, structurally and electronically practicable. This would preserve one additional co-location space on the tower for other purposes because Sprint and Clearwire would share a common tower space. Ground space would still have to be separate.

“in-building coverage” north and south of Route 2 and “travelers along Route 2 and 2A in Acton.”

Note that the two carriers have provided coverage plots marked “...Coverage...” with no numerical values. Section 3.10.3.4 presumes a received signal power of -90 dBm indicates coverage unless the applicant demonstrates that a different value or metric is applicable. Neither carrier has made a demonstration of what signal levels are depicted and why the Board should accept those signal levels as indicating coverage. Typically, one rationalizes a signal level threshold with a link budget analysis.

Assuming the thresholds depicted by the carriers are deemed by the Board to be applicable, T-Mobile shows very little “white space” in Acton, north and south of Route 2. This white space represents the gap as T-Mobile presents it. Secondly, the lighter green spaces on the T-Mobile plots are said to represent in-vehicle coverage, and are therefore not considered by T-Mobile to be suitable for reliable in-building service. The darker green areas are said to be served with in-building service. Thus, a strict interpretation of T-Mobile’s claims would indicate that only where the dark green covers buildings will there be in-building service. If this were strictly true, then even with the proposed facility, Acton would be left with gaps in in-building service everywhere there remains light green in-vehicle service. Ergo, T-Mobile would need numerous additional facilities to serve all buildings shown on the Acton plot; in other words, T-Mobile would need additional facilities to make all neighborhoods in Acton dark green instead of light green.

The reality, then, is slightly different than T-Mobile’s stated ideal. T-Mobile has an objective of serving as many buildings as possible with the dark green level of service. T-Mobile will tolerate a percentage of those buildings receiving less than the ideal in-building level. Further, the proposed facility provides substantial overlap into Concord with coverage from existing facilities, as well as substantial overlap with existing served areas in Acton. There is a plot of existing and a plot of existing plus proposed coverage, but there is no plot of the proposed coverage alone. Without the latter, it is less than obvious that there is substantial overlap between the proposed and the existing coverage.

The placement of the proposed facility set back from but near Route 2, and adjacent to a substantial amount of undeveloped open space, forces the facility to deliver a substantial amount of in-building service to areas where it is of no use. It is typically more effective to have wireless

facilities that are intended to provide in-building service to be placed where the in-building coverage does the most good. This has to be balanced with the zoning objectives of avoiding objectionable consequences of facilities inaptly placed in residential or commercial areas.

We note that to the west of Hosmer Road and south of Route 2, there is some commercial/industrial development and a more substantial presence of tree growth surrounding the area. While this location is northwest of the proposed site, it might satisfy the coverage objectives while potentially being more in keeping with the objectives of the bylaw. It also appears that it could provide T-Mobile's valued in-building coverage to more buildings than from the proposed site.

The Clearwire coverage analysis does not have two tiers the way the T-Mobile plots do. Since Clearwire is a new entrant to the market, they are likely seeking the minimum level of service necessary to at least get service to the area. It would be helpful to see the coverage from the proposed facility alone, and to see existing coverage plus anticipated coverage from any facility Clearwire targets or could target nearby in Concord (e.g. Baker Ave or the rotary area). This will help provide a bound to the east of the proposed facility (which T-Mobile provides in their analysis). Similarly, coverage emanating from a more southerly potential location in Acton would illuminate the bounds of what could be served from other than the proposed facility.

3.10.6.7 j) – The proposed facility has been demonstrated to be compliant with FAA and MAC aeronautical criteria without requiring tower lighting and marking. It is implicitly compliant with FCC requirements regarding radio emissions of wireless facilities (47 CFR 1.1307 Table 1). Noise is unlikely to be an issue because the site is industrial in nature and remote from residences; these facilities also generate noise primarily with cooling fans and air conditioning, not unlike that which is found service other commercial/industrial facilities. The applicant could be questioned about present or future plans for a generator, although the noise from a generator is also not likely to be an issue.

- A question was raised about the FCC licenses of the carriers associated with the applicant. As noted above, the applicant is a tower company. The bylaw does not require a carrier to be a co-applicant to any facility proposal. However, the bylaw does require proof of a gap in service and therefore there must be a carrier involved in the application process. There are two carriers that have presented information on coverage. Copies of FCC web page printouts

indicating the call sign and owner of each of two licenses were provided with the application. The Clearwire document is a printout of the FCC license search results page for the applicable Clearwire license. The Call Sign and the Licensee Federal Reference Number (FRN) uniquely identify the licensed spectrum in the region and the entity holding the license. The T-Mobile document is the result of the preparer pressing the “Reference Copy” link of the FCC website (see the Clearwire printout and identify the Reference Copy link in the top row of links). This reference copy is more descriptive of certain requirements of the license than is the web search printout. In the case of T-Mobile, it holds more than one license in the region. If the purpose of showing a license is to demonstrate that the carriers supporting the application are licensed personal wireless service carriers, we consider the documentation to be sufficient. If there is another purpose for asking the carriers to provide a facsimile of the original printed licenses we can address it when so informed.

In summary, we have identified the following questions and discrepancies:

- Missing 500-ft radius documentation of average elevation.
- Further information on the structural, visual, and antenna/cable space impacts of CAM vs. Flush Mount, vs. proposed design is necessary to answer questions about design appropriate for the site.
- Documentation of coverage available at lesser heights needed – try 100 and 135 feet.
- Documentation confirming of rejecting the possibility of using a shorter tower that could be increased in height in the future if proven necessary to the Board.
- Consider allowing one or more shorter towers on the site, if and when necessary, if the resulting lesser tower heights provide a substantial reduction in objectionable visual impact.
- Documentation of any technical reasons (including RF engineering calculations or other data if applicable) for requiring changes to the 10-foot spacing or to the number of carriers able to use the tower is Flush Mount or CAM is required instead of the proposed platform arrays.
- Applicant should explain what changes are necessary to achieve 6-7-carrier capacity on the tower.
- Clearwire could explain the possibility of sharing its proposed space on the tower with Sprint if Sprint were to join the site in the future.
- Coverage analysis needs additional information: proposed-only coverage plots (both carriers); Clearwire prospective coverage south and east of the proposed facility; published signal level

thresholds and detailed rationalization for these thresholds instead of the -90 dBm presumption.

- Evaluate (coverage, availability, visual impact, zoning compliance) potential of alternative facility at the industrial area west of Hosmer Rd and south of Rt 2 (also, is the wooded area east of Hosmer Rd and south of Rt 2 available?). Provide applicant and consultant with suggestions for other sites (could be more than one site to jointly substitute for proposed) that might be more desirable for the community.

We look forward to discussing the Board's questions and issues at the upcoming hearing.

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