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PLANNING BOARD
GRAFTON, MA

Review of T-Mobile Application for Special Permit for Wireless Facility at 29 Leland Hill Rd, Grafton March 30, 2018

Introduction

The Town of Grafton Planning Board is hearing an application by T-Mobile to install a wireless communications facility ("WCF") at 29 Leland Hill Road. The installation will consist of antennas mounted to an existing water tank with support equipment mounted beside the tank. This report summarizes key points in the zoning bylaw's WCF section 5.8 in relation to the application. Other general special permit requirements are left to staff or other civil engineering resources to review.

Summary

In this report, Isotrope comments on the application with respect to the clauses in the wireless zoning bylaw (Sec. 5.8). The Board is faced with the usual issues of interpreting the Grafton zoning bylaw when a new wireless facility is proposed without requiring a new cell tower. The bylaw language is at times ambiguous and/or very restrictive when a wireless project uses existing structures, requiring the Board's interpretation of bylaw language and an applicant's submission of waiver requests.

The applicant's coverage analysis is reviewed, indicating adequate in-vehicle service throughout southern Grafton, and a substantial lack of in-building quality service in the area of the proposed facility. The applicant provided a short-list of alternatives considered, which the Board may consider in its analysis of alternatives for TCA purposes. A more rigorous alternatives analysis can be performed by Isotrope for the record, if the Board determines it is necessary under the circumstances.

The width of the antenna shroud seemed mildly understated (by ~15%) in the photosimulations. Separately, if the height of the proposed shroud were increased several feet, it would be more likely that a co-locator could install antennas in the proposed shroud below the T-Mobile antennas. The facility is designed to be compliant with FCC safety requirements, and a two-carrier facility could also be compliant.

Several waivers have been requested. If Section 5.8.6.1 (property line setback) is determined to be applicable, a waiver is requested.



Section 5.8.6.2 (residence setback) mirrors 5.8.6.1 and would be applicable if 5.8.6.1 is. The applicant has not formally requested a waiver of 5.8.6.2.

Section 5.8.6.10 (panel antenna size) might not be applicable because the shroud hides the antennas. If it is applicable, a waiver has been requested.

Section 5.8.6.13 (landscaping) allows for landscape design alternatives to be proposed. If the applicant's landscape plan is a qualifying alternative, no waiver is needed. The applicant has applied for a waiver if necessary.

Section 5.8.4.e calls for a balloon test. These are usually applicable to new tower projects. If this clause is applicable to this project, the applicant seeks a waiver of the balloon test.

The Board should determine how much more evidence is needed, if any, relating to the TCA substantial evidence requirement. Any favorable decision should be written in anticipation of the rights to modify that Section 6409 (discussed below) grants to wireless carriers.

5.8.1.1 Purpose and Intent

The introductory language of the WCF bylaw includes, among other things, this list of objectives:

- *Maximize use of existing and approved towers and other structures to accommodate new antennas and transmitters in order to reduce the number of wireless communications facilities needed to serve the community.*
- *Encourage providers to co-locate their facilities on a single structure or site*
- *Minimize the location of facilities in visually sensitive areas*
- *Site facilities below visually prominent ridge lines*
- *Protect historic and residential areas from potential adverse impacts of such facilities*
- *Avoid potential damage to adjacent properties from facility failure through engineering and careful siting of facilities*

The proposal utilizes an existing structure to support the WCF's antennas and related equipment, eliminating the need for a new tower. Visual and historic sensitivity issues are left to the Board to obtain evidence and decide. Generally, water tanks are massive structures, the addition of antennas to which typically does not materially increase visual conspicuousness. The proposal includes a shroud to conceal the antennas in an architectural enclosure that reduces the visual clutter of exposed antenna arrays. The shroud would increase the overall height of the structure by about 30%. Photo simulations and neighbor input can provide the evidence needed to decide. The impact of the proposed shroud on visually sensitive areas, ridge lines and historic and residential areas can be assessed based on this evidence.



With respect to engineering failures, the Massachusetts Building Code applies, and is enforced by the Grafton Code Enforcement Officer. Also, the structural integrity of water supply structures is regulated. Typically, the addition of antennas to a water tank, using appropriate structural methods, bears negligible risk of engineering failures of any consequence.

5.8.3 Site Selection Preferences

The highest priority sites are: "On existing structures such as buildings, communications towers, smokestacks, utility structures, etc.;" The proposed WCF is the highest priority solution in Grafton.

5.8.4 Additional Submittal Requirements

The submittal requirements include:

5.8.4.a

- The number and type of antenna(e) proposed;
- A description of the proposed antenna(e) and all related fixtures, structures, appurtenances and apparatus, including height, materials, color and lighting;

Yes

- A description of the proposed antenna(e) function and purpose;

Yes

- The frequency, modulation and class or service;

Yes

- Direction of maximum lobes;

Yes

- An evaluation of the potential to utilize existing facilities for the proposed facility

Yes. Existing T-Mobile wireless facilities are shown to be insufficient.

- An evaluation of the feasibility of attaching the proposed facility to existing buildings;

Yes. The proposal is an existing structure.

- Copies of all applicable permits, including but not limited to all State and Federal permits required for this project and a certification of compliance with the terms and provisions of the license issued for this purpose by the Federal Communications Commission (FCC).

Yes, T-Mobile is licensed to provide personal wireless services in Grafton. Under its licenses, T-Mobile is obliged to honor the FCC emissions limits for protecting the public from harmful radio emissions. The information provided by the applicant confirms the facility is designed to be compliant.

5.8.4.b Site justification and narrowing process

Verify

5.8.4.c FAA compliance



No information is provided on FAA analysis. The applicant should confirm that this addition to an existing structure does not require FAA notification.

5.8.4.d Similar structures within ½ mile

Application contains an alternative site analysis. The Board can determine whether this information is sufficiently responsive to this requirement.

5.8.4.e Balloon test

Balloon tests are generally conducted for new tower proposals. Determine if it is applicable here. A waiver has been requested.

5.8.4.f Section 1 Justification

Yes. Review the evidence.

- **Abutter mailing**

Verify

- **Funds for peer review**

Verify

5.8.5 Conditions for Granting

Required findings:

a) How well proposal satisfies bylaw.

Review evidence on record.

b) *"...if the proposed facility is to be located in a residential zoning district, or within a distance equal to twice the height of the tower (from the ground to its highest point) but not less than 200 feet of a residential zoning district, whether the applicant has provided substantial evidence that the facility cannot, by technical necessity, feasibly be located in a non-residential zone."*

Wireless bylaws often mix terminology, such as using "facility" to describe either a tower or an installation of wireless equipment on a tower or other structure. The context here suggests that this criterion applies to new towers, as the dimensions are keyed to tower height. Since it is increasingly important to have cell sites serving areas where people live, keeping WCFs out of residential districts when existing structures in residential districts are available may be counter to the primary objectives of the bylaw.

If this clause is more broadly interpreted to include the proposed WCF, additional evidence would be required to assess the viability of a location in a non-residential zone. Nearby is a 300-foot wide Neighborhood Business district along Main Street that is about 80 feet lower in elevation than the proposed site. Bear in mind that this proposal employs the highest-priority structure, and alternatives might require a lower-priority structure. The question, then, would be which takes precedence, the priority schema or the requirement to locate outside



residential areas if possible? Based on a discussion of these priorities, the Board can decide whether it is necessary to explore locations outside the residential district.

- c) *"...whether the proposal would sufficiently screen the facility from view, both through landscaping, placement and design, in order to minimize the visual appearance of the entire facility from areas within a one-thousand three hundred twenty foot (1,320') radius of the proposed facility location."*

The term "facility" reappears in this clause. If interpreted as a tower, consistent with the previous suggested interpretation, this clause would not be applicable. The radius of interest, which is ¼ mile, is the sort of distance that would be relevant to new tower construction, which suggests this is intended to apply to new towers.

In the alternative, the applicant proposes to screen the antennas behind a shroud and the ground equipment behind vegetation. If this clause is applicable, a review of the evidence would enable the Board to decide whether it is satisfied.

- d) *"...whether the proposed facility will be housed within or upon a special structure, which will be architecturally compatible with the surrounding residential area (including, for example, bell tower or church steeple), or whether, by virtue of its design, no such special structure is required in order to minimize the visual impact within a one-quarter-mile (1,320') radius. This provision applies to facilities in a residential (A, R40, R20, or RMF) zoning district, or within a distance equal to twice the height of the facility (from the ground to its highest point) but not less than three hundred feet (300'), from such zoning district." (emphasis added)*

This section uses the term "facility" in a way that might be tower-specific, except for specific mention of a church steeple which might have contemplated a new or replacement steeple, in the context of a new tower, or it might indicate an intent to expand this clause beyond new towers. (A bell tower, in contrast, is a common way to disguise a new cell tower.) The proposed antenna shroud is an architectural feature intended to improve the appearance of the finished product.

If this clause is applicable, the Board is at liberty to determine whether a) the shrouded antenna array on a water tank is architecturally compatible or b) the design inherently requires nothing additional to minimize its visual impact, or none of the above.



5.8.6 General Requirements

5.8.6.1 *Any principal part of the facility (excluding guy cables) shall be setback from the nearest property line by a distance of twice the height of the facility (as measured to its highest point, including antennae, etc.), or a distance of three hundred feet (300'), whichever is greater.*

This section implies it is applicable to new towers because of the mention of guy cables. The 300-foot setback is difficult enough when trying to locate a new tower on just the right size parcel in just the right location. If this clause were to apply to every proposed WCF, it is unlikely that no existing structure would comply. Applying this to existing structure proposals would essentially defeat the highest-priority category.

If this clause is determined to be applicable to the proposed facility, a waiver would be necessary. While the applicant suggests this is not applicable, the applicant has prudently included this clause in its waiver request.

5.8.6.2 This clause mirrors 5.8.6.1, but for residential structures instead of property lines. Make the same determination whether this is applicable as for 5.8.6.1. In the event this clause is applicable, the applicant has neglected to include this in its waiver request.

5.8.6.3 The applicant expresses intent to comply with the lighting criteria. Based on preliminary information, Isotrope finds no FAA lighting is expected to be required. The site plans show a proposed light at one corner of the T-Mobile compound wired to a 60-minute timer switch.

5.8.6.4 Tower design requirement (monopole). Not applicable.

5.8.6.5 Site-sharing with future tenants is required if feasible. The applicant suggests this requirement applies to new towers. There is no language that hints at this interpretation, only "the proposed facility." A water tower wireless facility can be "...designed and constructed so it is reasonably capable of accommodating other users, including other wireless communications companies and local police, fire and ambulance companies unless it is determined to be technically infeasible based on the Board's evaluation of information submitted."

The proposed height of the shroud is 70 ft above ground level. The height of the center of the tank is 55 ft AGL, and slopes to 50 ft AGL at its rim. The shroud is 15 ft diameter, while the tank appears to be 30 ft diameter (scaling off the drawings and off orthophotography).¹ The base of

¹ Note that while the drawings show the diameter of the shroud to be half the width of the tank, the photosimulations appear to show a slightly narrower shroud (photosimulation Location #1). The photosimulation error is a shroud that should be about 15% wider, unless the width of the tank is misreported on the drawings.



the shroud will be at an elevation between 50 and 55 ft AGL. The height of the shroud and its mounting structure is 16 ft 11 in (call it 17 ft). Subtracting 17 ft from 70 ft AGL, the base of the shroud is 53 ft AGL.

Conventional spacing for multiple carriers is 10 feet on-center vertically. If the useable space on the tank were 20 feet high, a second carrier might find the tank a suitable space to co-locate. The following caveats apply:

- 1) The second carrier will have antennas closer to the top of the tank, so having the second carrier's antennas as high as the ten-foot mark as possible is valuable to minimize reflections and refraction of the radio signals off the tank top. Adding about ten feet for the first carrier (T-Mobile), the shroud should extend about 20 feet above the tank, or to a 73 ft AGL overall height. This is a 3-foot height increase.²
- 2) To accommodate a second carrier, the additional several feet of shroud height must be designed into the system now. The applicant provided structural engineering information based on the proposed height.
- 3) Once designed to be several feet taller, the shroud provides the same wind-loading regardless how many antenna arrays are behind it, so once the design is in place, the wind resistance of the assembly would not increase with a second carrier.
- 4) The weight of a second carrier's additional antennas and related apparatus on the water tank would have to be incorporated in the initial design.
- 5) Typically, the emissions of a second carrier at these heights, summing with the emissions of the first carrier, will remain well within the FCC safety guidelines.
- 6) The site layout of utilities would be required not to interfere with a reasonably sized compound for a second carrier.

5.8.6.6 The applicant certifies it will not interfere with other uses of the radio spectrum. Under FCC jurisdiction, interference regulation is preempted by the FCC. The applicant is required not to interfere under the terms of its FCC licenses.

5.8.6.7 Color of tower facilities. This is not a tower facility. Applicant proposes to paint shroud to match. Surface-painting of fiber-reinforced panels may require more maintenance than using panels manufactured to the appropriate color. Even if the shroud is, say, white material instead of a painted light-blue match, it may be preferable to have an integral color instead of a painted surface. The Board might be interested in obtaining more detail on the coloration method and its ability to weather well.

² This is a "back-of-the-napkin" estimation. The exact shroud height necessary to co-locate a second carrier should be determined with a proper engineering process.



5.8.6.8 Ground equipment capped at 12 ft height. No ancillary use of the site by the applicant. The design complies.

5.8.6.9 Underground utilities are proposed as required.

5.8.6.10 Panel antennas are limited to 5 ft length. Applicant seeks a waiver. Wireless panel antennas today are often about 8 ft tall, for a variety of reasons. There are two ways to consider this. First, the antennas are concealed from view, and this clause might be considered not applicable. Alternatively, the applicant should show that technically it cannot comply with the 5 ft requirement by producing evidence there are no alternative antenna configurations that would work.

5.8.6.11 Applicant agrees to comply with the no advertising and signage requirement. It will be necessary to post certain workplace safety signage and notification information on the gate of the compound.

5.8.6.12 Construction of a "facility" must be more than 400 feet from a municipal wellhead area. Applicant suggests this is for new towers and therefore not applicable, but still states the site complies with this criterion.

5.8.6.13 The bylaw calls for a rigorous landscape plan. It also allows, "Applicants may substitute alternative landscape plans that meet the purposes of this subsection to limit the visual impact of the lower portion of the tower and adjoining accessory facilities for the Board's consideration." See application materials. The Board could consider whether the alternative landscaping proposed meets the alternative terms of this clause, or whether a waiver is necessary. The applicant has included this in its waiver request.

5.8.7 Board is to consider the functioning of the lot with this second use (technically not accessory but permitted under this bylaw). This kind of installation at hilltop water tanks is very common. The compound is to the rear of the water tank. It is reasonable to assume that, as landlord to the applicant, the water tower owner finds this use will not encumber its use as public water supply infrastructure.

5.8.8 Alteration or expansion of the use requires modification of the special permit. Applicant acknowledges, but "to the extent not preempted or otherwise inapplicable." In terms of preemption, the 2012 Middle Class Tax Relief and Jobs Creation Act Section 6409, and subsequent interpretations by the FCC create a class of "eligible facilities requests" for increasing the dimensions of an existing wireless facility, either for the current occupants or for other wireless carriers to attach. Designated "eligible facilities requests" may not be denied and shall be approved by the local jurisdiction. The current interpretation is that a facility can be extended 20 feet in height (or breadth) to accommodate additional equipment, provided the increase does not



“defeat” a camouflage design. It would be prudent to word any approval in a way that has the best chance of preserving the Board’s rights to control at least some future modifications in light of this law. Advice of counsel is recommended.

5.8.9 The applicant agrees to comply with the abandonment clause.

5.8.10 The Planning Board is given authority to waive requirements in Section 5.8. The applicant submits a waiver request in conjunction with this.

Telecommunications Act

The zoning bylaw exists under the umbrella of federal regulation of local zoning of personal wireless service facilities. Generally, land use boards in Massachusetts endeavor to obtain information relating to their need to be in compliance with the Telecommunications Act of 1996 (“TCA”) by:

- 1) Basing their written decisions on substantial evidence in the written record
- 2) Evaluating whether there is a significant gap in the provision of the applicant’s personal wireless services that the proposal addresses
- 3) Evaluating whether there are alternatives that could provide coverage to the gap and have a likelihood they would receive approval
- 4) In the event the proposal is not approved, or will not be approved, by the Board, the Board might make a determination that the presence of a gap and the lack of reasonable alternatives require the Board to grant approval under the TCA.

This process has complex legal implications and advice of counsel is recommended. In some instances, if a land use board is favorably disposed to an application, it might obtain a consensus to limit further collecting and reviewing of TCA related information. Normally, however, boards find it to be prudent to collect the TCA evidence concurrently with the zoning review.

In the present case, the applicant has provided information on the existing T-Mobile coverage in southern Grafton. On page 11 of the Supporting Statement (Tab 3 of the application), the applicant says, “T-Mobile has a significant gap in wireless capacity and coverage in the town of Grafton.”³ It also says, “A gap in coverage is evidenced by the inability to adequately transmit or to receive a wireless signal, or by the interruption or disconnection of a wireless signal.”⁴

³ The evidence the applicant has chosen to place on the record is entirely with respect to coverage. There is no evidence offered to show whether the T-Mobile network is experiencing a capacity restriction in Grafton.

⁴ This is the applicant’s presentation of what it means to have a significant gap in the provision of personal wireless services. It is left to the Board, with advice of counsel, to decide how the concept of a significant



The applicant's radio frequency engineer states (Tab 5) the objective of the proposed facility is to address "inadequate network service" in the vicinity of Main St, Pleasant Street and Leland Hill Road (including surrounding neighborhoods). The applicant's coverage maps (Tab 6) show that it already provides what it defines as reliable in-vehicle service throughout southern Grafton. The coverage maps indicate that the degree of in-building service in this locus is very limited with its 700 MHz license and absent with its 2100 MHz license. To obtain a reliable in-building service, the signal levels on the coverage maps must be higher than for vehicles because buildings attenuate incoming signals more than vehicles do (on the average).

With the continuing nationwide demand for wireless services from indoors (in excess of 70% of wireless data traffic comes from indoors according to the FCC and to Cisco) the wireless companies are competing to serve their customers and to win the business of their competitors' customers. The TCA has generally been interpreted as protecting each carrier's need to provide service, regardless how well another carrier might be providing service in the same locale. This is why the analysis focuses solely on T-Mobile coverage.

The applicant provided an alternative site analysis prepared by its site acquisition consultant. The consultant indicated that because of the bylaw-expressed preference for the use of existing structures, the primary focus of the site search was initially the water tank and a church steeple. The consultant reported the church did not respond to repeated inquiries. If there comes information on the record from the church that it would be interested, the Board could decide whether the steeple would qualify as an alternative for TCA purposes. In addition, the consultant indicated the Town was interested in using the solar field site on Follette Street for a cell tower, but that the alternative of using the water tank was more compelling as an existing structure under the bylaw. If there is a reason a new tower at the solar field site would be at least as or more consistent with the intent of the bylaw, the Board might determine if the solar site is a reasonable alternative.

If the Board has the appetite to pursue alternatives more vigorously for the record, there are additional steps that Isotrope can take to obtain suggestions from the Board and to perform a peer review of the alternatives search to see if more alternatives are likely.

gap is interpreted legally with the present facts of the case. Using the applicant's definition, the evidence the applicant wants the Board to see is in the form of coverage maps and a brief RF Engineer's explanation.