

April 8, 2017

RE: Eco-Site / T-Mobile
Site: VA-0003 / 7FBU103
Plank Road
Fredericksburg, VA
SUP16-0011

Eco-Site's application in partnership with T-Mobile for SUP16-0011 to establish a new telecommunications facility at parcel 23-22-2 was considered by the Planning Commission on 3/1. This letter is in response to the questions and concerns raised by members of the Planning Commission and County staff, including the written comments of Ms. Jane Reeve and subsequent correspondence with Mr. Patrick White.

Does this site serve a coverage or capacity need?

Comments: Mr. Barnes stated at the Planning Commission meeting that there was a contradiction as to whether the site served a coverage or capacity need. Ms. Reeve's letter references improvements to coverage or capacity. Mr. White's comments by email of 3/21 requests clarification on the difference between coverage and capacity needs.

Response: T-Mobile's network currently has a need for both additional capacity and extended coverage in the area surrounding this site.

This site will expand the coverage of T-Mobile's LTE (mobile broadband) network along Route 3, and in the areas to the north and south of Route 3. These areas currently have outdoor voice coverage, but cannot reliably accommodate data uses. This site will establish indoor LTE coverage in these areas. It will also expand basic capabilities to some further outlying areas.

In addition, T-Mobile's surrounding towers, labeled 7FBU001A and 7FBU011A on the coverage maps, are experiencing voice and data demands that far exceed the amount of traffic they can accommodate. Any one given site has a theoretical maximum amount of traffic it can accommodate. If these maximums are exceeded, users will experience dropped calls and connections, inability to connect to calls or the internet, and unreliable service, even if they are in an area that is covered.

By using a technique known as "cell splitting", T-Mobile can address these capacity issues by placing a new site between the two existing, over-capacity sites. In order to effectively offload traffic from the affected towers, the new site must be placed in a very limited geographic boundary in between the existing sites.

The proposed site is located to address both the coverage and capacity goals outlined above. The proposed location was specifically chosen to ensure that both the coverage issues and the capacity issues were addressed with a single new site.

Comments: Ms. Reeve's letter stated that there was no documentation of a coverage and capacity need in the report. It also stated that the submitted propagation maps were not of a consistent resolution or scale, and that the County's consultant should have validated the data. Mr. Thompson questioned the validity of the submitted propagation maps. Mr. White requested that the concerns with the propagation maps be addressed.

Response: The propagation maps are being resubmitted to have a consistent scale and resolution.

T-Mobile's propagation maps show coverage at three levels: -114 dBm (light green), -97 dBm (mid green), and -88 dBm (dark green). White areas on the maps represent no measurable coverage.

The light green areas represent coverage with the minimum signal strength required to connect to the network, in order to place a phone call. However, reliable LTE data connections (mobile broadband for email, apps, navigation, internet use, etc.) are not possible at this signal level. The mid green areas have coverage at a signal strength where it is possible to establish data connections outdoors and in most residential buildings. The dark green areas have coverage at a signal strength where it is possible to establish data connections in both residential and commercial buildings.

The report submitted by the County's third party consultant, Atlantic Technologies Consulting, indicates that "an independent RF analysis has been performed by this Consultant" and concurs with T-Mobile's position that the current -114 dBm signal in the affected areas is insufficient for a mobile broadband connection. The consultant performed an RF analysis, including performing their own RF modeling, to support this position.

The service interruptions caused by insufficient capacity are not represented on a propagation map because they occur in areas that technically have coverage, but they are evident through customer complaints and evaluation of certain network metrics over time.

What sites were considered for modification, and why were they ruled out?

Members of the Planning Commission asked about modifying T-Mobile's existing sites at the Chancellor Convenience Center (T-Mobile site 7FBU011A) and Central Park / Carl D. Silver (T-Mobile site 7FBU001A). Ms. Reeve's letter stated that the County's tower at the Chancellor Convenience Center has spare structural capacity to accommodate additional antennas and equipment, and recommended that T-Mobile expand their equipment at this facility. Ms. Reeve stated that T-Mobile has not approached the county to evaluate any additional equipment load on this tower. Mr. White requested further information on T-Mobile's fully upgraded sites in the area, and whether further upgrades are possible.

Response: T-Mobile has the rights to broadcast LTE (mobile broadband) signal on spectrum blocks in the 700 MHz, 1900 MHz, and 2100 MHz bands in Spotsylvania County. Currently antennas capable of using all of these frequency bands are deployed at the Chancellor Convenience Center and Carl D. Silver towers.

Another T-Mobile vendor is in the process of finalizing a proposal to upgrade T-Mobile's antennas and equipment at the Chancellor Convenience Center with more modern, effective antennas. This proposal will be transmitted to Ms. Reeve presently, if it has not been already. The applicant mistakenly believed that this upgrade was already completed at the time of application because it was accounted for in T-Mobile's analysis of the bandwidth requirements in the area. The corresponding upgrades to the Carl D. Silver tower were completed in 2016.

With these new upgrades, the two sites 7FBU001A and 7FBU011A are "fully upgraded" with all of T-Mobile's most modernized capabilities. No more upgrades are possible at these sites, because adding additional antennas will not allow the deployment of additional spectrum or technologies. Even accounting for these most recent or currently proposed upgrades, there is still a significant capacity shortfall in the area. This capacity issue cannot be resolved with further upgrades to the existing sites because there are not additional technologies T-Mobile can deploy.

The original application did reference the structural capacity of both the Chancellor Convenience Center and Carl D. Silver towers. At the time the application was being prepared, the most recent structural analyses available to T-Mobile indicated that the towers were at 98.9% and 102% of their structural capacities, respectively. The reference to these figures was intended to indicate that, in the future, other carriers seeking to deploy their own technologies in the area may have difficulty using these towers, and may thus take advantage of the currently proposed Eco-Site tower. T-Mobile understands that the Chancellor Convenience Center tower is now at approximately 97.4%, which may allow for future upgrades by collocators. However, this increased structural capacity will not allow T-Mobile to deploy new technologies at the site because there are no additional technologies available that T-Mobile can deploy at this time. If, in the future, T-Mobile develops or acquires new technologies to improve its network capabilities, it will consider upgrading all existing sites (including all of the sites at issue in this matter) before considering establishing new sites.

It should be noted that T-Mobile intends to maintain its equipment on both the Chancellor and Carl D. Silver towers. It is vital that both of these towers remain on air, in addition to the new proposed location, to adequately serve the area.

What sites were considered for collocation, and why were they ruled out?

Comments: Members of the Planning Commission asked about possible collocations at the Cherry Road water tank and the approved (but not yet constructed) tower at Hazelwild Farm on Harrison Road. Ms. Reeve's letter stated that T-Mobile has not approached the County to request collocation on the Cherry Road water tank, and that T-Mobile may have relied on an engineering firm to evaluate the water tank structurally. Mr. White additionally asked about collocation at 3504 Plank Road.

Response: T-Mobile has not assessed the structural capacity of the Cherry Road water tank in connection with this matter.

Additions and expansions to mobile networks must be designed around the existing fixed network, limiting the placement of new locations. Enclosed with this letter is a visual depiction of T-Mobile's "search ring", or the limited geographic area in which the proposed site must be located to meet the

coverage and capacity goals outlined above. Only locations in this limited area between the existing sites 7FBU001A and 7FBU011A are able to meet these coverage and capacity goals. In effect, the new site must create significant overlap in its coverage area with the areas currently served by the existing towers, so that the new site may offload traffic from the existing ones.

A site that is not between the existing sites would not “split the cell” and thus would not be capable of reaching the target area without causing signal interference with the existing sites. Attempts to cover this target area from outside the area between the existing sites could actually cause poorer signal and capacity by causing interference.

The Cherry Road water tank is approximately 1.3 miles outside the search ring. The approved Verizon location is approximately 1 mile outside the search ring and at a significantly lower ground elevation. T-Mobile’s propagation maps show that collocation on these structures would provide almost no coverage benefit in the targeted area. The Chery Road water tank would not affect the area served by the Carl D. Silver tower at all, which is the area most urgently in need of capacity. The Hazelwild tower likewise would not serve the area in the vicinity of the Carl D. Silver tower . Both of these towers would have some minimal overlap area with the Chancellor Convenience Center tower, but neither would overlap in the critical area to the northeast of that site near Plank Road, where capacity issues are most significant.

The County’s third party consultant concurred with these findings in their report. The consultant performed an independent RF analysis, based on field visits, preexisting knowledge of the sites in question, and their own RF modeling. The consultant found that “no proximal sites affording co-location potential and meeting the stated coverage goals are available.” The consultant further stated that existing sites “are out of position and unable to work within the network architecture.”

The building Mr. White inquired about is approximately 45’ in height, well below the tree line in areas targeted by T-Mobile for this site, and the ground elevation at that location is approximately 20 feet lower than at the proposed location. As T-Mobile’s propagation maps show, leaves very large sections of the target area uncovered. It would not be possible to cover the target areas on such a low structure.

T-Mobile evaluated all of these existing structures before proposing a new tower at the chose location. In each case the structure was ruled out because it could not meet T-Mobile’s needs in this area.

What other parcels were considered, and why were they ruled out?

Comment: Mr. White inquired about Salem Elementary School at 4501 Jackson Road and the Chancellor Volunteer Fire Department at 5700 General Semmes Road, both County owned parcels.

Response: The two sites referenced above are approximately .4 miles outside the search ring. Their relative position is too close to the Chancellor Convenience Center location, relative to the Carl D. Silver location, to be able to effectively split the cell. Placement of the site at one of these locations (which are across Salem Church Road from each other) would either cause interference with site 7FBU011A or not be able to offload traffic from site 7FBU001A.

Additionally, the parcel on which the fire department is located is not large enough to accommodate a tower. Nowhere on the parcel could afford greater than approximately a 30-foot setback from all roads and structures and the parking lot of the fire department. Prior correspondence with County staff indicated that no other uses are permitted within the setback radius of a tower. Placement of a tower on an elementary school property would also be difficult, as ensuring that proper setbacks are met and that the tower is in an unused portion of the parcel present special challenges in a school environment.

Eco-Site also engaged owners of other properties within the search ring to determine whether development of a tower on those properties would be possible. Those properties included the Spotsylvania Towne Centre (220 Spotsylvania Mall Drive), BJ's Wholesale (3985 Plank Road), and Gander Mountain (3700 Plank Road). The owners of these sites were not amenable to leasing the required space to Eco-Site. Other potential sites could not afford enough space to accommodate the required setbacks, including Village Square (952 Bragg Road) and Dickenson Equipment (1200 Bragg Road).

How many carriers can the proposed monopole accommodate?

Comment: Mr. White requested clarification that the proposed monopole can accommodate three major carriers plus public safety equipment.

Response: The proposed monopole has been designed to accommodate three commercial carriers at predefined mount heights on the pole. Structural loading reserves for three commercial carriers are included in the calculations provided. The calculations indicate excess spare loading available for other uses, which could possibly accommodate public safety equipment at an unoccupied mount height. If necessary in the future to accommodate the County's needs, the tower could be modified to provide additional structural capacity or mount heights.

What is the size of the lightning rod?

Comment: Ms. Reeve's letter noted that the County's third party consulted listed a four foot lightning rod, while the application listed a ten foot lightning rod.

Response: At the time of initial application, the size of the lightning rod was not stated on the engineering drawings or on the application itself. This was discussed at the Technical Review Committee meeting, where one County representative suggested that a four foot rod might be typical for this type of tower. Following that meeting, the applicant revised the application materials to indicate a ten foot rod. However, the date of the consultant's report indicates that it was prepared in advance of the TRC meeting.

Will equipment be relocated from the Chancellor Convenience Center tower?

Comment: Ms. Reeve's letter questioned whether T-Mobile would relocate their equipment from the Chancellor Convenience Center tower to the new proposed location.

Response: This site is not intended to replace T-Mobile's site 7FBU011A. It is required in addition to that site, and T-Mobile intends to maintain its equipment at the Chancellor Convenience Center location with all possible upgrades. T-Mobile has no plans or intention to remove its equipment from the Chancellor Convenience Center tower, and in fact the proposed site is located to maximize the effectiveness of the surrounding towers, including the Chancellor location.

Can the proposal be replaced with taller or shorter towers?

Comment: Ms. Reeve's letter questioned whether coverage issues could be addressed with a smaller number of taller towers, or whether capacity issues could be addressed with shorter towers.

Response: Expansions and additions to a commercial wireless network must be designed around the existing fixed base stations in the network. T-Mobile currently has equipment on numerous existing structures in the area. This limits the geographical locations new sites can be placed in.

Installing several taller towers to meet coverage goals would not be feasible in this area without interfering with the existing sites already operating. Doing so could require taking existing T-Mobile sites offline or broadcasting from the new sites at significantly decreased power, negating the benefits of taller towers.

Installing shorter sites would, as Ms. Reeve's letter suggests, not significantly expand coverage in this area. Large areas of the coverage goal would remain unserved by LTE-capable mobile broadband signals. The County's third party consultant concurred with this conclusion, based on their own RF analysis and modeling, stating that lowering this site to even 80' would result in a 35-45% reduction in coverage achieved. As a result, it would not eliminate the need to install new towers at significant height to achieve the coverage goals targeted by this site.

If you have any questions or concerns about this matter, please feel free to contact me.

Regards,

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