Buckland tower application FAQs

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Q. Are there any health effects that may be caused by the tower and the transmitters mounted on it?

A. The FCC has standards for radio frequency radiation safety. By law, local governments may not substitute their own judgments for these federal rules. If the proposed Buckland tower were fully occupied by four carriers, which is of course far from certain, and if each carrier operated on two separate bands, which is also uncertain, then the total radiation from the tower at any point near the ground would still be well under 1% of that safety threshold. The antennas, after all, direct the signal outward in a "pancake" pattern, slightly downtilted, so that the power is not wasted on the ground near the tower. And the tower is not very close to anyone – urban antennas can be much closer to the exposure limit. Taller towers reduce the concentration of signal power near the ground.

Cellular base station transmitters rarely generate more than 100 watts, often much lower; "effective" power is greater in the desired direction and lower elsewhere because antennas focus it where needed. In contrast, some radio and TV broadcast transmitters can operate at the 50,000 watt level. The height of the tower keeps FM and TV radiation away from nearby homes and passers-by. All must still follow safety standards.

The major radio-frequency exposure from cell phones comes, in fact, from the handset itself. Radio waves follow the inverse-square law: The effective signal strength is quartered when the distance is doubled. A radio next to your head talking to a tower a mile or two away is probably giving you a much bigger exposure than the tower, even though the tower starts with more power (30 to 100 watts, vs. 1/5 of a watt from a handset). And, critically, the power of a cellular handset's transmitter is always under control of the network and kept to the bare minimum needed. That optimizes battery life and network capacity. The stronger the signal from the tower, then, the less power is needed from the handset. A "four bars" signal thus exposes the user to much less than talking when there are only one or two bars, as the handset then cranks down its power to a much smaller fraction of a watt.

"Studies" of the danger of radio waves, if based on anything, mostly focus on very strong fields. This does not translate down to even a minor risk in the presence of weak fields. The sun itself generates radio waves as well as light. They are not "ionizing" radiation like radioactivity; they are just absorbed into heat.

Q. What about 5G? We hear so much about it from both sides.

A. "5G" (fifth generation) is frankly a nothingburger. Both the fearmongering and the advertising exaggerate its risks and capabilities.

Most cellular today is "4G", LTE, and the older 2G and 3G networks are mostly gone or in process of being phased out. "5G" is a set of extensions to LTE. These include operating on

more frequencies, operating on wider channels in order to have higher speed, and additional options for various technical details. Mostly these are aimed at extending carrier capacity in dense urban areas, where the existing spectrum bands are nearing capacity.

Some "5G" (like Verizon Ultra Wide) operates on millimeter wave bands, above 24 GHz (Gigahertz), compared to LTE which is almost always below 4 GHz. But millimeter wave LTE does not penetrate buildings, trees, or cars, and has a range of only a couple of hundred yards. It is harmless, but also not useful except in limited settings like football stadiums and very busy urban streets. It would make no sense in Buckland. In contrast, T-Mobile's "5G" operates on a *lower* frequency than its LTE, and doesn't offer much higher speeds. Its differences from 4G are trivial and largely internal to their network.

None of this is hazardous to people when installed according to the safety rules, and the FCC enforces those rules.

Q. How tall does the tower need to be?

A. A tower needs to keep all of the antennas well above the treetops. Beyond that, its coverage in rough terrain such as the hill country is based on getting past obstacles, such as hills. Radio waves travel "line of sight", though below the millimeter wave range that is not quite literally true.

Vertex applied for a tower that would support four carriers, the lowest centered at the 115' level. Carriers are spaced 10 feet apart. There are only three carriers currently operating in the state (AT&T, Verizon, and T-Mobile), though some day a fourth (most likely Boost, owned by Dish) may build out. Coverage a bit below the 115' level is not ideal but probably adequate. As the tower gets lower, the gap in coverage near the corner of Upper St. and Rt. 112, where the very steep hillside would block line of sight to the nearby tower, gets larger.

Q. Were alternative sites studied?

A. Vertex reported on six alternatives they considered. Their advantages and disadvantages are covered in the report. Other sites have been suggested by the public, some on Lone Tree Hill west of Rt. 112 (Vertex' Alternative C is also on that hill). A major issue for some sites is access. Other sites do not provide coverage along as much of the critical Rt. 112 corridor. More than one suggested site on Lone Tree Hill did not reach a significant portion of Rt. 112 south of Depot St.

Q. How many homes will receive service from the new tower?

A. While the primary purpose of the tower is to complete mobile coverage along Rt. 112 between Ashfield, where a new tower is planned, and Rt. 2, where coverage already exists, many homes will also receive coverage too. Based on coverage estimates, the new tower will reach 153 locations with a good signal, of which only 29 currently have service, so 124 will get their first wireless service. An additional 24 locations may receive service but with a weak signal.

A few homes in Buckland will get coverage from the new Ashfield tower, especially on Shepard Road, Clesson Brook Road southeast of Shepard Road, and parts of Apple Valley Road, Norman Road, S. Cemetery Road, Orcutt Hill Road, and Howes Road.

Q. Why will other areas remain unserved?

A. Due to the rough terrain, and the fact that many streets wind between hills, coverage gaps will remain in some areas. There are some "small cell" approaches that could fill in such smaller areas using relatively inexpensive cells mounted atop utility poles, but the big carriers won't do that without a subsidy or other incentive, and there are technical challenges to operating them. A number of poles in Hawley provide fixed wireless service to homes and most only reach 6-12 homes or so before a hill gets in the way.