

Exhibit J - Appeal

**Statement on  
Proposed Verizon 'POR Stringer' Cell Phone Tower**

October 16, 2020

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**BACKGROUND.** I am a physicist, with a Bachelors, Masters and Doctorate in Physics from the University of Chicago, Laboratory for Astrophysics and Space Research. Over my 50+ year career, I have addressed many significant problems for clients interested in challenging the conventional wisdom on topics from astrophysics to many types of radio wave propagation, including cell systems.

My first notable success was to challenge the concept of a small heliosphere filled by the solar wind. I argued in 1975 that it had to be huge to explain the eight-month lag of a galactic cosmic ray index behind a solar index. It took a quarter of a century for NASA spacecraft to finally reach the boundary at 100+ AU, twenty times further than conventional wisdom said. (One AU is the distance from the Earth to the Sun.)

For the Defense Nuclear Agency, I developed a computerized Ground Wave propagation model (based on the work of Bremmer) that was able to solve the very involved equations for transmission over a smooth spherical earth. This was an exact solution, not a simulated approximation. I also worked on various projects to improve military communications in the event of a nuclear war, from a better understanding sky-wave propagation and D-layer absorption, to utilizing the structured plasma that a high altitude nuclear weapon produces, to using communications off of tiny meteor trails, to ground wave propagation from buried antennas in a Minuteman missile field.

I worked on hardening military systems against nuclear weapon produced Electromagnetic Pulses that can destroy sensitive solid-state electronics on the ground or in satellites and destroy electric utility systems with long overhead lines, even very far from the actual blast.

I also worked on the opposite but completely analogous problem of keeping adversaries from acquiring electronic intelligence from our activities. One of my projects involved onsite assistance at the US Embassy in Moscow, just before President Ronald Reagan came to Moscow to negotiate the collapse of the Soviet Union with Premier Mikhail Gorbachev. I pointed out to the State Department that their "experts" had little idea what they were doing, after picking up a Russian television station signal inside what was supposed to be a very secure facility.

In other work, we were able to show that the well-known astrophysicist, Carl Sagan, was largely wrong about a so-called 'Nuclear Winter.' He had chosen parameters that were unlikely, in order to get the scary Nuclear Winter result that assisted his political perspective.

Recently, I have been working with other scientists to demonstrate that human emissions of carbon dioxide are far less consequential to our climate than many believe and unable to cause anything close to a catastrophe. As one of the unpaid Directors of the CO2 Coalition, I work with Princeton University Professor of Physics Will Happer and MIT Professor of Meteorology Richard Lindzen (both members of the National Academy of Sciences) to educate people about the overwhelming benefits of

atmospheric carbon dioxide, including being able to feed the seven billion people who call this planet home.

**SUMMARY.** Based on my evaluation of the engineering documents that Verizon has provided, I believe that Verizon has not undertaken a good-faith evaluation of possible sites for a new cell phone facility along the lines required by Multnomah County. And from their own perspective, I do not believe that their proposed 'Stinger' location on Woodard Road addresses their stated needs as well as other locations would.

Even though they seem to think that the Woodard location would improve their service along the Historic Columbia River Scenic Highway from I-84 into Springdale, it will clearly not do so in the Sandy River Gorge where steep cliffs will create a substantial shadow along the highway. The proposed tower will improve service on the 'Troutdale Plateau' and in the rural area around the tower continuing toward Corbett, as they maintain. But so would other locations that have less of an impact on the rural area, like the Corbett Water District water tank on Cabbage Hill and a site south of the Sandy river where it makes a big bend to the east, roughly midway between Verizon's existing Greenbriar and Bruines sites. That I call the 'Riverview' site, because it would have a clear view of the Sandy River, Historic Columbia River Highway, and residences nearby.

A site, on the plateau, in that vicinity would not only have a clear view of the Troutdale Plateau but would illuminate the Historic Columbia River Highway into Springdale and allow seamless service into Corbett where Verizon's existing tree tower already provides service. It would also provide good coverage into most of the rural area east of the Sandy River, but short of Corbett.

**ANALYSIS.** The primary engineering issue for any Verizon cell phone tower installation is coverage area, namely how large an area will a particular node serve and how well will it be served? These are signal strength questions that involve both the expected signal strength at the customer location and the signal strength expected back at the node from the customer's low wattage cell phone. The greater the signal strength, the greater the possible data rate and the greater tolerance for less than ideal transmission conditions, namely inside a vehicle or inside a building. Reciprocity says that a good node location for transmission will be a good location for reception as well.

Verizon provides a very detailed signal strength map for its present system in the Troutdale area, shown in Figure 1. One might hope that this is based on actual signal strength measurements, *but it is likely just a computer simulation.* These exercises in imagination have largely replaced real measurements.

Simulations contain a large amount of make-believe designed to impress those easily fooled by impressive graphics. My home is within the area Verizon believes is problematical. Yet we get a good signal inside our house. Verizon thinks that is not possible. We should have to stand outside in the rain!

This highlights a common problem today. With the advent of fast computers, people rely more and more on simulations that are not solidly tied to reality. They look impressive, but more in the sense of a Hollywood production than in the sense of reality. When you watch a TV weather presenter showing elaborate computer predictions of rain arriving tomorrow, you probably want to stop the animation to see when the rain will arrive at your house. But it is 95% imagination. The computer forecast is lucky to get the rain on the correct day, not the correct hour or minute.

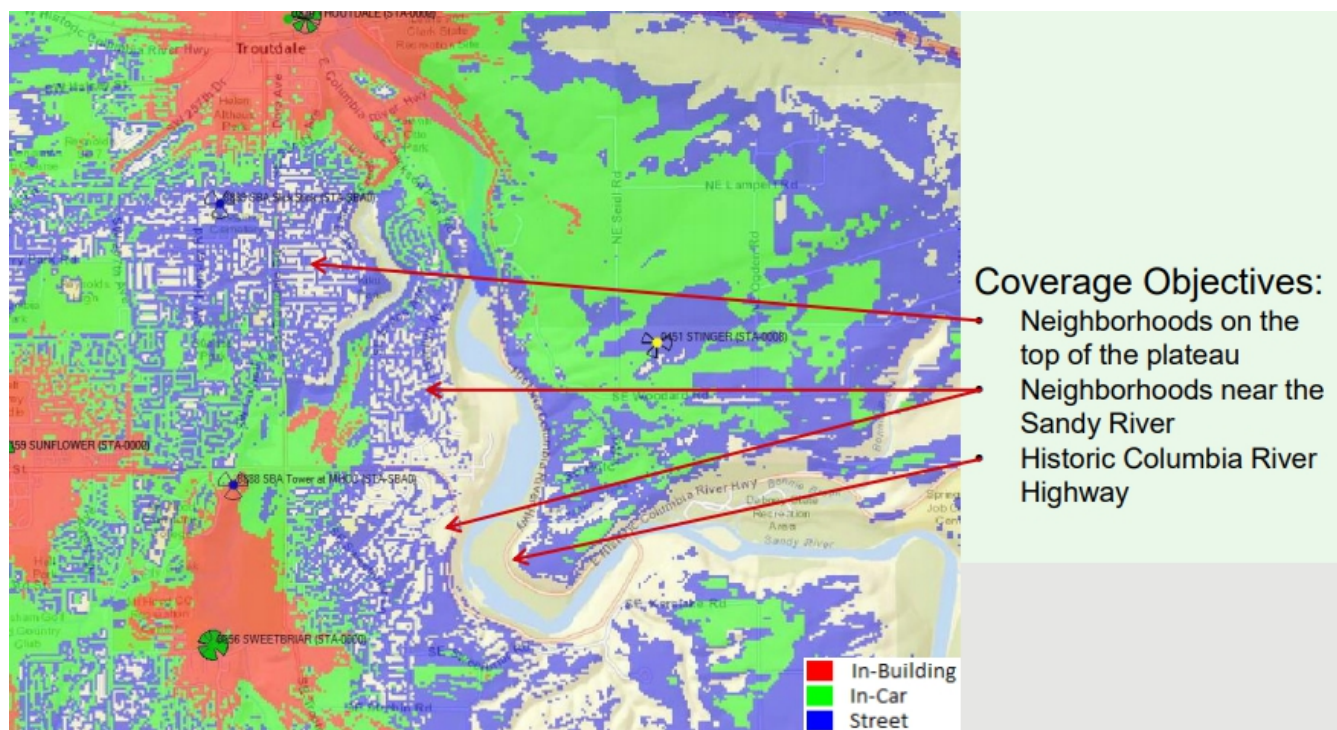


Figure 1a. Computer-generated graphic from Verizon showing existing cell phone coverage, including claims of poor signal strength on the Troutdale plateau, along the Sandy River, and along the Historic Columbia River Highway.

And computers require those who use them to input the proper information, lest you end up with a 'Garbage in – Garbage out' problem. With the dramatic Labor Day fires that we had recently in Oregon, the National Weather Service was twenty degrees Fahrenheit wrong in predicting high temperatures. They kept calling for highs near 90, when they were actually near 70. When I asked why, I was told that Weather Service employees have been instructed to follow computer projections, and the models took no account of the dense smoke! That was dumb.

**Hence, I would take all of Verizon's coverage maps with considerable skepticism.** Their knowledge is far from that detailed. If they touted how they had checked the projections against actual field measurements, that would be a different situation. That is how scientists and engineers really operate. We use computers. But we also check up on what they tell us. I am afraid that, in this case, they only intend to impress people with their ability to produce fancy graphics.

As to Verizon's general claims of spotty coverage in certain areas and sometimes overloaded existing nodes, I have no reason to doubt that. I presume they are telling the truth and relying on actual reports, not simulations. They do not want to spend a great deal of money to install another node, if there is no need.

On the other hand, the transition from 4G to 5G systems is about to occur, with large tall towers soon to be supplemented by numerous and much smaller low power transmitter/receivers on telephone poles. Verizon's large towers would presumably be converted to “low-band” UHF, if that is the way they intend to roll out fifth generation systems. Low-band offers little improvement in data rate, because it operates at the same frequencies as the present 4G. Hence, some 5G systems will abandon “low-band” altogether and go to “medium-band” microwave frequencies that promise three times the data rate of

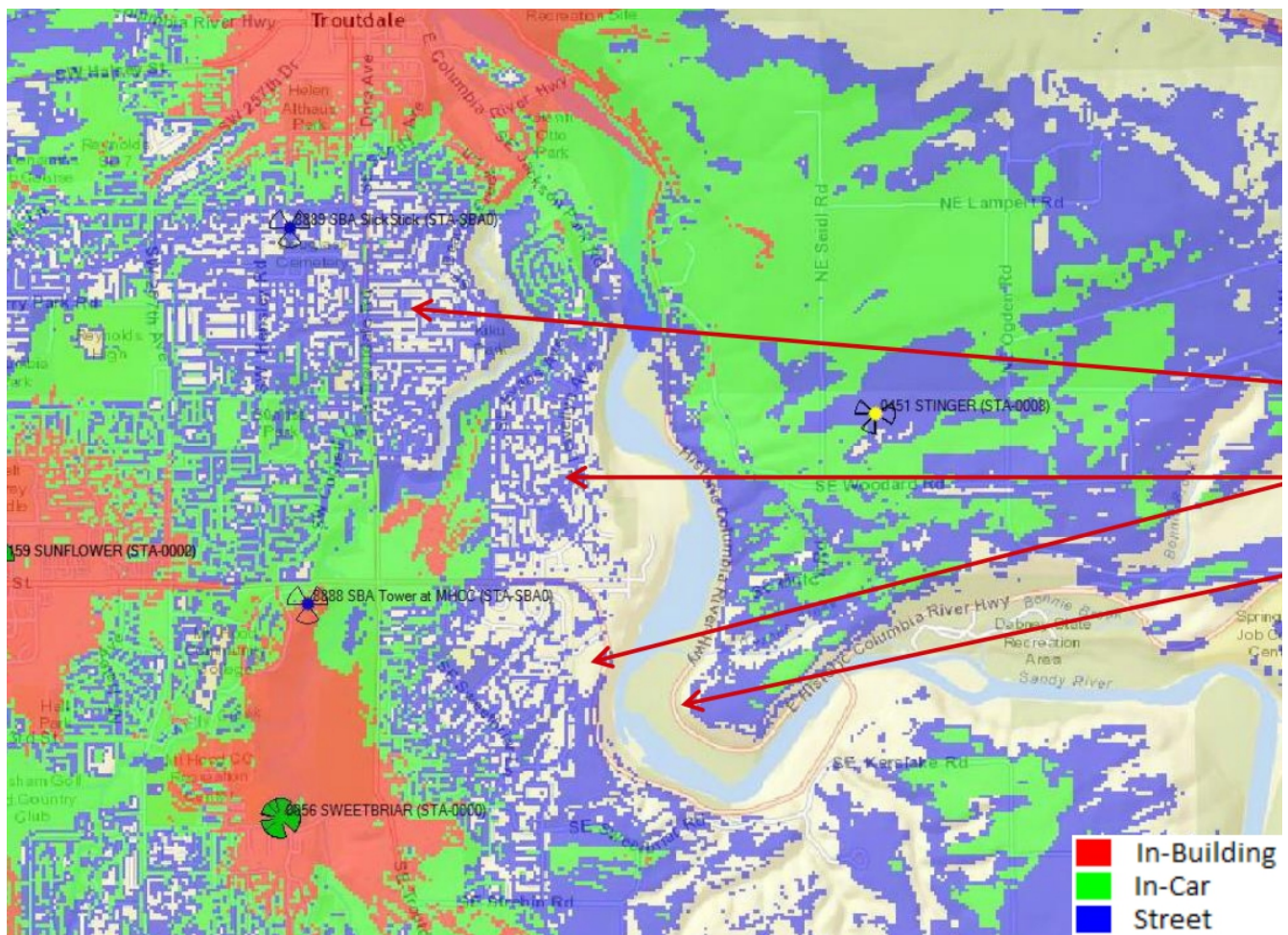


Figure 1b. Detail of Figure 1a.

4G. The high-band 5G systems, operating at millimeter wavelengths, will provide data rates of one to ten gigabits per second and increase the number of devices served from 100,000 to a million per square kilometer. This makes such communication comparable to Cable Internet and hence practical for desktop computers as well as cell phones.

Advancing technology may soon render the Stinger site less important or even obsolete, as many nodes replace just a few. Should Verizon continue to operate their 4G towers or convert them to a 5G site, they might only serve a few nearby residences, the very neighbors who are objecting to the tower today!

What then is the solution to Verizon's need for better interim coverage and more capacity, before 5G systems take over? The proposed Stinger tower is one possibility. Figure 2 shows that it would miraculously solve all their problems, apparently more so than other nodes in their system. **That stretches believability**, because there are no miracles in this business. Any customer within line-of-sight or with minimal absorbers (trees, walls, etc) in the line-of-sight should see a strong signal. But customers driving along the Historic Columbia River Highway should not see the improvement that Verizon claims, because that highway is too close to high cliffs that will block Verizon signals coming from the east. Homes on the east side of the Sandy River will see minimal benefit for the same reason.

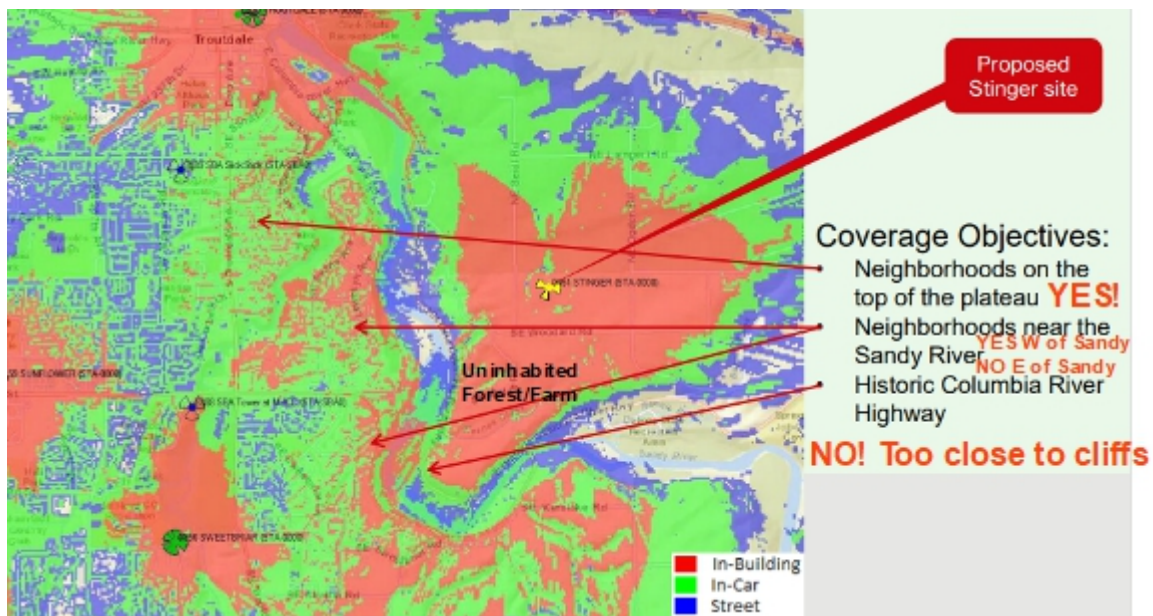


Figure 2a. Computer-generated graphic from Verizon claims dramatic improvement in coverage with their proposed 150 foot Stinger tower. However, much of the area shown in red immediately southwest of the proposed Stinger tower is uninhabited farmland. Only cabbages and corn live along Mutch Road. My comments point out that Verizon does **not** meet half of their stated objectives with Stinger.

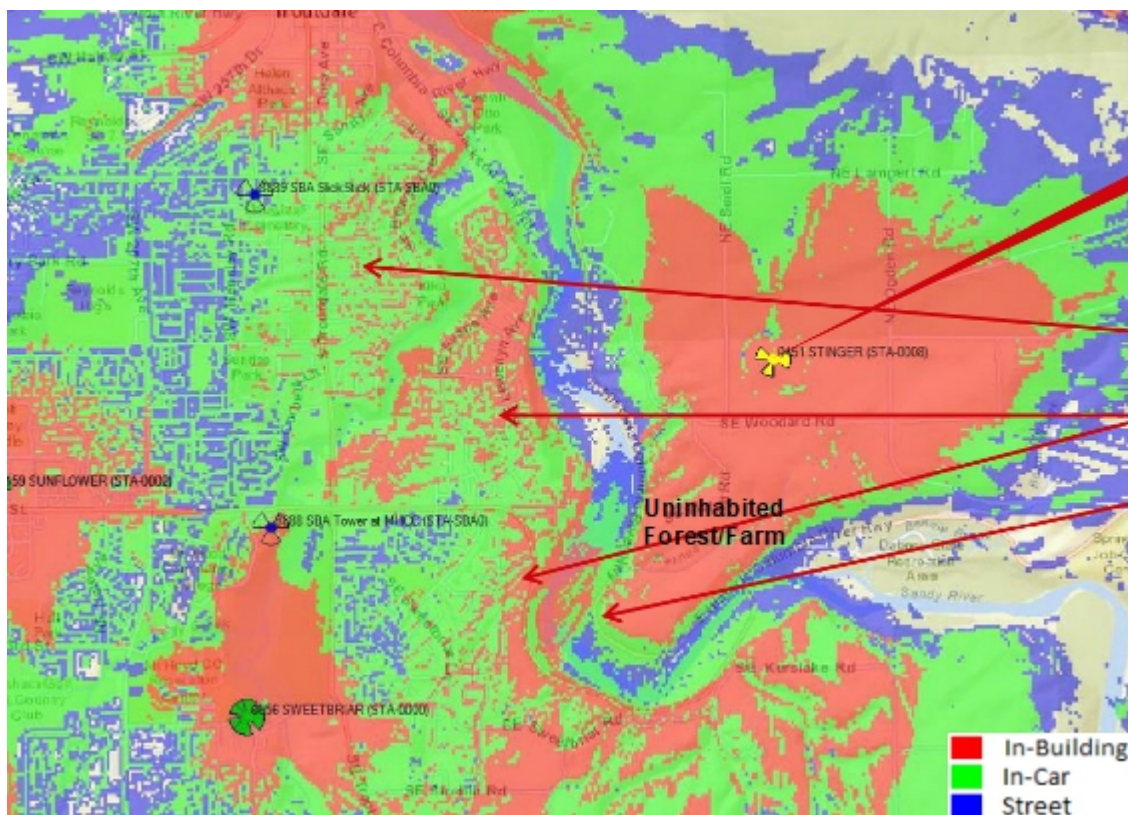


Figure 2b. Detail of Figure 2a.

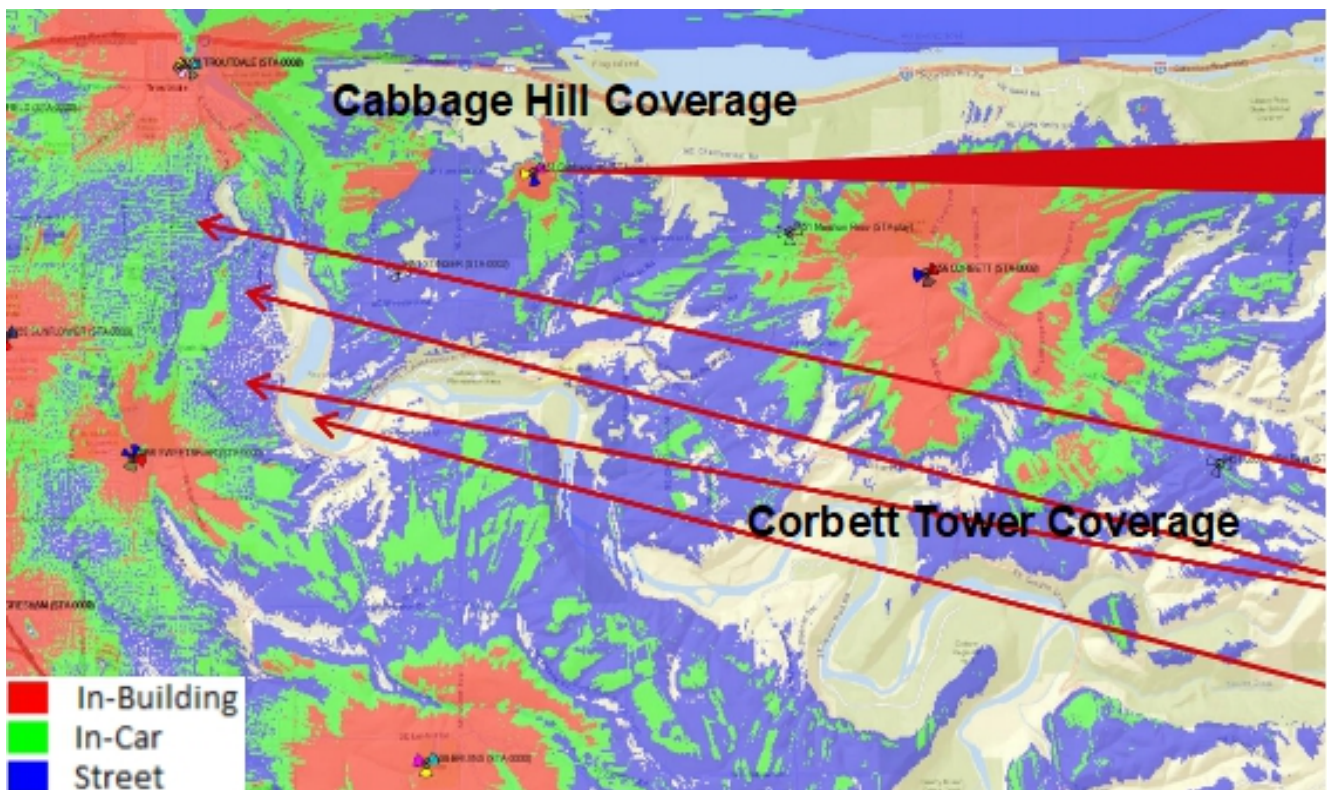


Figure 3. Computer-generated graphic from Verizon showing essentially no improvement in Verizon's coverage from an antenna installation on the Corbett Water District tank near the top of Cabbage Hill (elevation 908 ft), even though it has a commanding view of the surrounding area. Note that Verizon shows dramatic coverage (in red) from their existing tower in Corbett. Cabbage Hill should show something similar, if properly engineered.

**This means that Verizon will NOT meet half of their stated “Coverage Objectives” with the Stinger tower. That is something they should admit, but do not.** They obviously need to seriously look at alternatives and not merely try to bluff their way through Multnomah County's Administrative Decision process.

I understand and agree that alternative existing towers in Troutdale may be too close to existing Verizon nodes to be usable. They do not want one node interfering with another. And I agree that the Corbett Water District tanks (such as the Mershon tank) far to the east are not viable alternatives for meeting Verizon's objectives.

However, I am concerned that Verizon has not done a reasonable job evaluating the Corbett Water District tank that sits very near the top of Cabbage Hill (Chamberlain Hill) at 908 feet. Figure 3 shows the tiny coverage that their computer imagines for that location. **It is nonsense.**

A high location, about three hundred feet higher than the top of the proposed Stinger tower, has a commanding view of all the surrounding area and hence a large coverage area. Because it is located further back from Verizon's target areas, there will be about 6db more signal attenuation (inverse square law loss). But ground wave losses will be minimal because the signal will be high above the ground for most of its propagation to customers.

The Cabbage Hill location should have an enormous coverage area, similar to their Corbett tower, and that coverage area will address Verizon's stated needs on the Troutdale Plateau, as well as their unstated needs in the rural community. **In other words, Figure 3 is not a credible evaluation of an alternative site, as Verizon is required to provide.**

I suspect that Verizon did not elevate a hypothetical node at that location above low surrounding obstacles. The water tank there is partially buried. Did Verizon bury their hypothetical antenna too? That would be like shortening their proposed Stinger tower so that their antennas had no easy line-of-sight communications. The Cabbage Hill site would clearly need a short tower to function. Verizon's engineers should not play games with Multnomah County.

The Cabbage Hill (CWD) site would have the same downside that the Stinger site has, namely no improvement in coverage along the Historic Columbia River Highway until past Dabney State Park, going east.

If Verizon really wants to improve coverage all the way into Corbett, along that highway and still meet their other objectives, I suggest that they consider a tower south of the Sandy, roughly midway between their existing Sweetbriar and Bruines sites. This would be near where the Sandy River makes a big bend to the east. I call this site 'Riverview,' because it would have a commanding view of the Sandy River gorge. See Figure 4.

A tower site, on the plateau, in that vicinity would not only have a clear view of Troutdale but would illuminate the Historic Columbia River Highway from I-84 in Troutdale into Springdale and allow seamless service into Corbett where Verizon's existing Corbett tree tower already provides service. It would also provide good coverage into most of the rural area east of the Sandy River, short of Corbett.

Figure 4. shows most of the area under consideration here, including the steep cliffs that block cell phone signals from the proposed Stinger and Cabbage Hill (CWD) nodes reaching cars along the Historic Columbia River Highway. The Riverview site would cover all of the areas where Verizon wants improved coverage, including the immediate east side of the Sandy River where the Historic Columbia River Highway is located and far east into the rural area, as well.

**CONCLUSIONS.** There are many alternatives to the proposed Stinger tower that are more viable for meeting Verizon's stated needs than their proposed Stinger site. I discuss two alternatives, one on a Corbett Water District tank (called CWD) and the other on farm land near the big bend in the Sandy River (called Riverview). Multnomah County should insist that Verizon seriously consider them. They would not have the environmental impacts on the rural community that the Stinger tower would.

Moreover, Verizon needs to base their application on much more than computer-generated graphics that seem to be science-based, because they are so detailed. But they are more imagination than science. Verizon needs to explain their methodology for these coverage maps and show actual measurements that will help us to evaluate their engineering value.

**I recommend that Multnomah County deny approval of the Stinger cell tower.** At the very least, the County should add conditions of approval requiring Verizon to come back with real scientific evidence that the Stinger site meets their needs better than alternatives, will not be immediately obsolete as they transition to 5G, and does not violate 'Dark Sky' requirements.

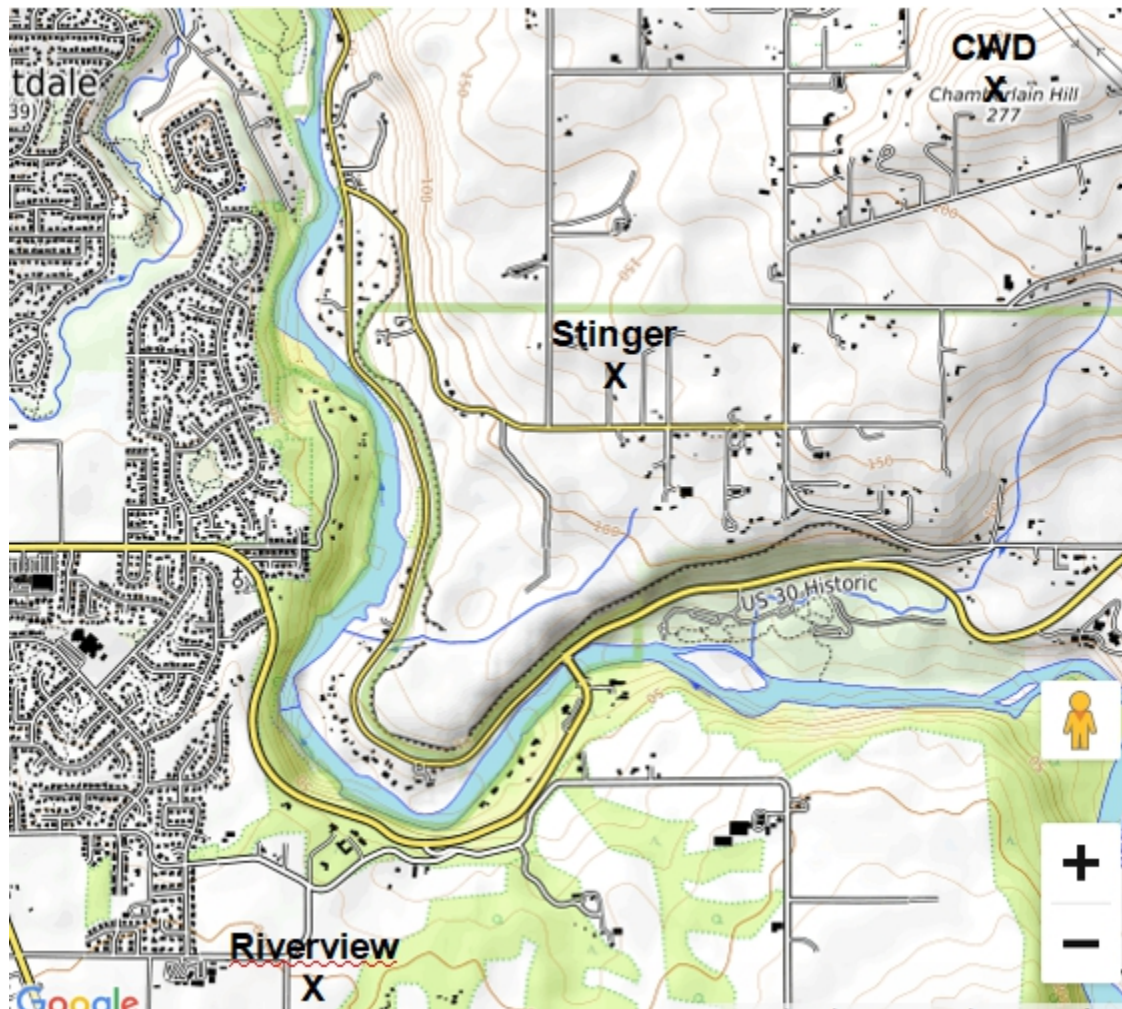


Figure 4. Topographic map of the area showing possible sites for Verizon, including their proposed Stinger site, with the Corbett Water District (CWD) site on Cabbage Hill and the Riverview site as better alternatives. Note the steep cliffs along the Sandy River that keep the proposed Stinger site from illuminating the Historic Columbia River Highway (Old US 30). Note also that the proposed tower would illuminate a large area above the cliffs that is *uninhabited* farm and forest land. The many wild animals there (from deer to bear to cougar to the largest surviving North American woodpeckers) have no need for cell service.