

New Canaan Wireless Infrastructure
Planning for Improved Services
March 3rd, 2014

Overview

Cellular service in New Canaan is of uneven quality. Radio signal coverage gaps are not uncommon in some parts of town and residents report experiencing dropped calls or fading signal strength in certain locations.

In part, the cellular service quality problem reflects the challenge of local topography. The northern side of town, in particular, features hills, valleys and ridgelines. Coverage, while not comprehensive, is arguably better in the southern part of town, where the topography is more forgiving and thus better suited for the propagation of radio signals, which travel “line of sight” between the user and the nearest cell site.

How Bad is Cellular Coverage in Town?

Although it has been widely reported that New Canaan suffers from “only 25% cellular coverage,” even a cursory glance at AT&T and Verizon coverage plots reveals this assertion to be inaccurate.

The problem lies in how one defines “coverage.” Typically, radio engineers define radio signal strength according to a yardstick called “dbms,” which describes the radio power output as a ratio of decibels to one milliwatt of power. An excellent cellular network signal strength level is -75 dbm. “Good coverage,” which offers clear conversation without dropped calls or fade-outs, may take place anywhere within a signal strength range of -75 dbm to -95 dbm. Beyond -100 dbms, signal strength weakens and may fade out or attenuate.

When the Silver Hill cell site is completed, AT&T’s coverage plots show that at least 60% of New Canaan will receive a signal strength on their network in the range of -75 dbm to -92 dbm. The rest of the town will receive a signal strength of at least -105 dbm. The point is, when a carrier or their advocates intend to rush town officials toward a rapid decision to approve a cell site, they may choose to define coverage in a way that suggests the problem is much worse than anyone thought, thereby increasing the pressure on town officials.

Improving Cellular Coverage: The Carriers’ Approach

The carriers' preferred solution to filling in network coverage gaps is to build tall towers (150 feet or taller) mounting various external antenna arrays. Why this bias in favor of tall towers? They offer the carrier a number of technical and commercial advantages:

- Tall towers maximize the reach of radio signals over a given geographic area at minimum cost *for the carrier*.

- Tall towers allow *the carrier* to recover a significant part of their capital investment by leasing space on the same tower to other carriers.
- Tall towers offer a fast solution to resolving coverage issues and thus *improve the carrier's competitive posture* in the local market.

The problem is that none of these benefits take into account the costs that tall towers impose on the local communities surrounding them.

1. Esthetic impact. Understandably, no one wants to see a tall tower thrusting up in the middle of their neighborhoods. These towers are ugly, obtrusive and have a negative impact on the local scenery.
2. Real estate value impact. Carriers and their advocates routinely argue that there is no proof that tall towers negatively impact real estate values. But this is a fatuous claim. Common sense dictates that given a choice between a house with a cell tower looming over it and one without, no one would choose to purchase a house near a tall cell tower.

For New Canaan, with its beautiful New England character and high real estate values, the problem of the esthetic impact of tall towers is amplified. With the drop in home values since 2008, residents are proving to be highly sensitive to this issue as we have seen in the case of the proposed AT&T transfer station site.

In summary, although both carriers and town may wish to see improved coverage, their interests can quickly diverge when it comes to finding acceptable solutions. The question is: are there alternatives for improving coverage without relying exclusively on tall towers and what role can the town play a role in guiding carriers towards these more acceptable solutions?

The answer to the first question is a qualified “yes.” When cellular was first introduced, tall towers were the only “game in town.” Since then, network equipment manufacturers have developed a wide range of technologies that provide carriers with a series of less obtrusive options, including distributed antenna systems, repeaters, pico cells, femto cells and stealth, camouflaged towers. Some of these alternatives are currently installed in downtown New Canaan. Local topography can help determine whether such options are feasible or not, but the bottom line is that there *are* options.

Why Not Do Nothing?

Given the difficult choices facing the town, it may be tempting to delay decisions indefinitely and avoid controversial choices. To do so, however, would leave these choices in the hands of the CT State Siting Council which has the full legal authority to override local zoning and land use laws and permit the placement of cell towers on private land regardless of local objections. Based on their history, it can be said that the Siting Council has never met a tall and obtrusive cell tower they did not like. The list of

CT towns where the Siting Council authorized tall cell towers over local objections is long and depressing.

Why don't carriers simply bypass town governments and go straight to the Siting Council for the necessary approvals? In part because there is a lack of private property available for the placement of cell towers of any kind in New Canaan. This gives the town government, which has access to multiple parcels of municipal property, additional leverage over the carriers or tower developers when it comes to the design and placement of new wireless facilities.

In addition, the Siting Council does not have the authority to force the installation of cell sites on municipal property. By contrast, with regard to placing cell sites on private property, the Siting Council has exercised its authority in the past to increase the height and obtrusiveness of proposed cell towers. This would argue in favor of the town offering access to municipal property if only to be able to exercise maximum influence over the exact design and placement of new cell sites. Under this approach, both sides can win. Carriers will have an opportunity to deploy multiple cell sites on municipal land or in municipal rights of way. The town will win by resolving a major public safety issue in a way which ensures that esthetic concerns are respected throughout the design and placement process.

Planning for Improved Coverage

When a carrier approaches the town to propose leasing municipal property for the purpose of installing a tall tower, the application typically includes a raft of coverage maps and other data indicating why the tower is needed and where it should be placed.

The problem is, town officials have very little capacity to independently evaluate and judge the technical documentation provided by the carrier. This leaves town officials at a disadvantage when it comes to negotiating the terms of the land use by the carrier. It's hard to second-guess someone who holds all the cards.

This lack of knowledge also makes it difficult for the town to develop a comprehensive solution to the local coverage problem. As a result, each proposal to install a new tower must be dealt with on a one-off basis. Over time, the town will have to respond to a series of unique cell site proposals without the capacity to judge how all of the pieces will fit together.

In order to find a comprehensive solution and avoid being subjected to this "salami slicing tactic", it may make sense to commission an independent study of actual cellular coverage conditions within town. Such a study would have to be carried out by a qualified radio engineer-consulting firm. It would consist of two elements. The first is known as a "drive test." The drive test examines both the geographic extent and quality of the radio signals generated by each of the licensed cellular carriers present in New Canaan. Police, Fire and EMS bands can also be included in this survey.

The second part of the study consists of the “site survey” where each existing cell site serving the town is audited and evaluated so as to determine the actual level of coverage currently available from these sites.

The resulting report would show, at a glance, where coverage gaps exist and where additional cellular network infrastructure might be required. As a next step, the consulting firm would be able to recommend locations for new sites and site configurations that are consistent with the town’s preference to avoid tall, obtrusive towers.

Once the town has reliable radio signal propagation plots in hand, it will also have the capacity to independently evaluate tower sites proposed by the carriers both in terms of the location and tower height. This could be the start of a real dialogue with the carriers.

A Partnership with Carriers

More importantly, with access to independently generated empirical data, town officials will be able to grasp the true nature of cellular coverage in New Canaan. As a next step, it may be possible to work with carriers to arrive at a comprehensive solution to the coverage problem rather than repeatedly struggling over one cell site at a time.

To be successful, such an approach would require finding locations for cell sites that are situated and designed to meet the needs of both carriers and town. What are those needs?

- Carriers want to extend their coverage and improve network capacity and they want to do so as quickly and cost-efficiently as possible.
- New Canaan wants to improve coverage and do so in a way that minimizes the visual impact of new cell sites. The town would also like to improve coverage of police, fire and EMS radio signals.

One approach the town might follow would be to use its coverage maps to identify municipal properties, rights of way and other appropriate parcels where future cell sites might be located so that a multiple number of sites might be negotiated as part of a “package” deal for interested carriers.

- For the carrier, the benefit is rapid deployment and a comprehensive solution. This saves them time and money.
- For the town, the ability to deliver a package of multiple sites on town property may provide sufficient leverage to influence the type and dimensions of each cell site to be installed. Coverage is improved in a way that minimizes the impact on the community. As a bonus, the town can also stipulate that each new site should include antennas which will extend the signals of police, fire and EMS bands

Note that town ownership of the actual cell sites is also an option. Cell towers can generate significant amounts of recurring annual revenue for the town, and represent a potentially valuable asset that may fetch at attractive price from tower aggregators at some point in the future.

Some Key Assumptions

The approach described above rests on a number of assumptions that have not yet been tested:

1. That the town will have access to either property or rights of way where cell sites required for additional coverage may be built. Carriers must sign off on potential locations too.
2. That residents will accept the implied tradeoff of more, smaller and less intrusive cell sites instead of three or more 150ft tall, obtrusive cell towers.
3. That carriers will choose to accept this trade off of less costly tall towers in return for a speedy and a comprehensive solution to addressing the coverage problem built around smaller towers, micro cell sites and/or distributed antenna systems.

Summary

By commissioning an independent study of cellular coverage in town and working with the resulting findings, New Canaan can engage carriers in an open discussion that may permit a win/win solution to the problem. The alternative is to continue dealing with a series of one-off proposals from carriers to build tall towers in town without having any basis for independently judging and modifying these proposals.

The carriers are not our adversaries. But it would be a mistake to assume that the information and data they offer us in justification of their business goals is objective and unbiased.

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