

TELEVATE

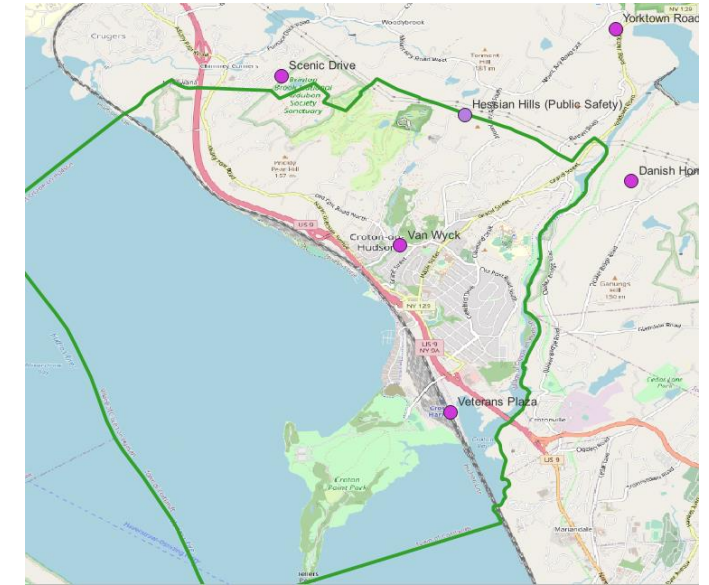
September 18, 2023

VILLAGE OF CROTON-ON- HUDSON, NEW YORK INFRASTRUCTURE AND COVERAGE ANALYSIS

Known Cell Sites

- Known Cell Sites in/around Village (% Area Served by Site)

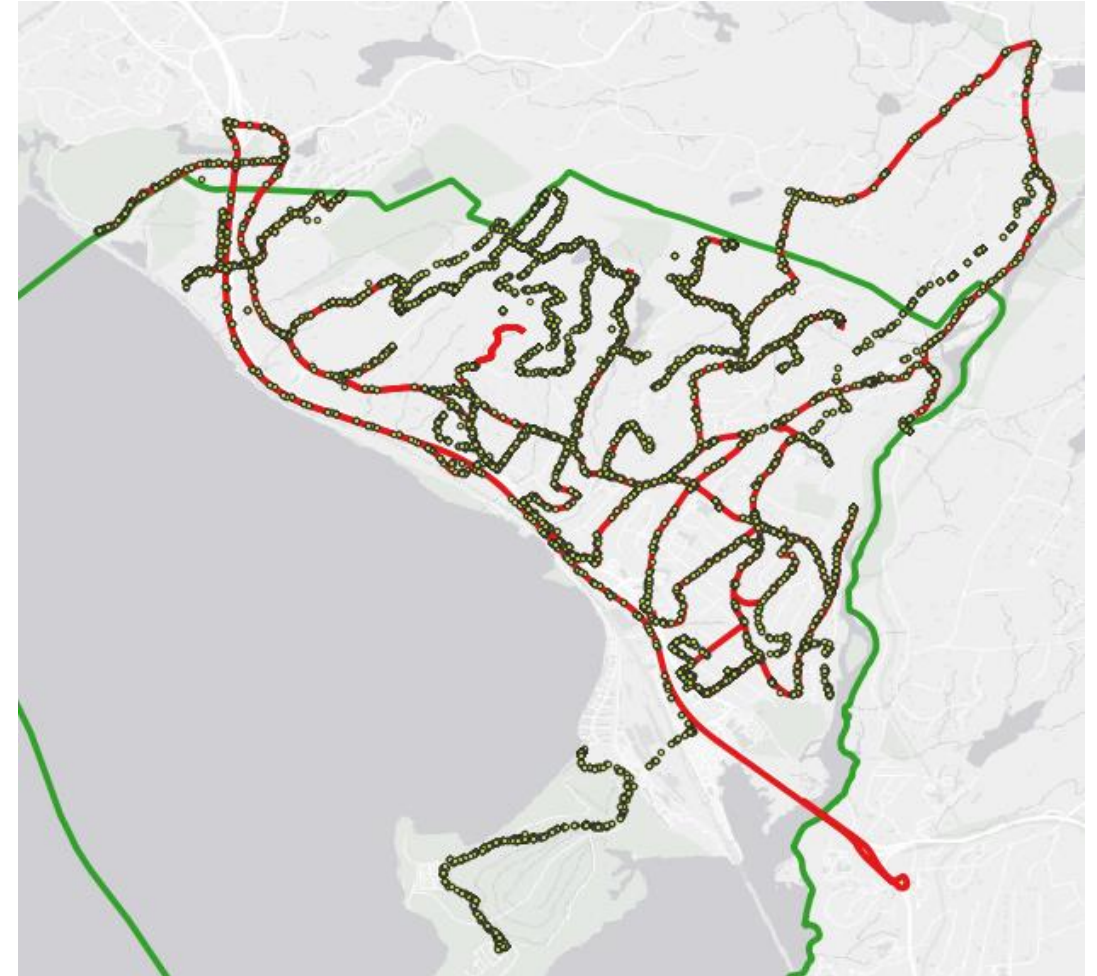
Site (Height in ft.)	Verizon	AT&T	T-Mobile
Van Wyck (81)	8.3%	Not Used	13.9%
Veterans Plaza (140)	29.6%	55.6%	25.9%
Scenic Drive* (150)	9.3%	11.1%	5.6%
Yorktown Road* (~50)	0.0%	0.0%	Not Used
Danish Home* (~80)	23.1%	Not Used	Not Used
Coverage from Above 5	70.4%	66.7%	45.4%
Coverage from outside*	62.1%	44.4%	60.2%



- Most of the coverage in the Village comes from towers outside of Village* for Verizon and T-Mobile, including from unknown sites
- Veterans Plaza provides plurality of coverage in the Village
- Hessian Hills site includes only public safety wireless service

Drive Test Summary

- Conducted on 8/29/23
- Three Samsung S22 phones, one each from AT&T, T-Mobile, and Verizon
- Includes 2+ hours of driving, plus a tour of Hudson National Golf Course
- Data processed into grids for localized summarization
- Used Televate's Pinpoint™ software to collect and analyze the data



Drive Test Routes (Red) and Points (Green)

Cell Service Summary

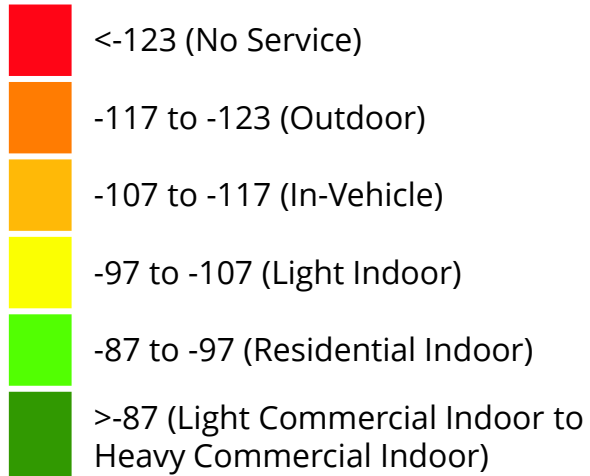
	AT&T	T-Mobile	Verizon
Service Availability	97.8%	85.3%	100%
Ping Loss (Overall)	9.6%	25%	1.6%
Signal Level 25 th , 50 th , and 75 th percentile (dBm)	-110/-105/-101	-116.8/-112/-107	-109/-105/-100
Median Throughput (DL/UL in Mbps)	6.4/1.7	5.7/4.6	13.4/7.2
Percent Area at: 768/256 kbps*	78.8%	82.7%	97.9%
5/1 Mbps**	54.1%	55.6%	83.5%

* The former FCC threshold for mobile broadband

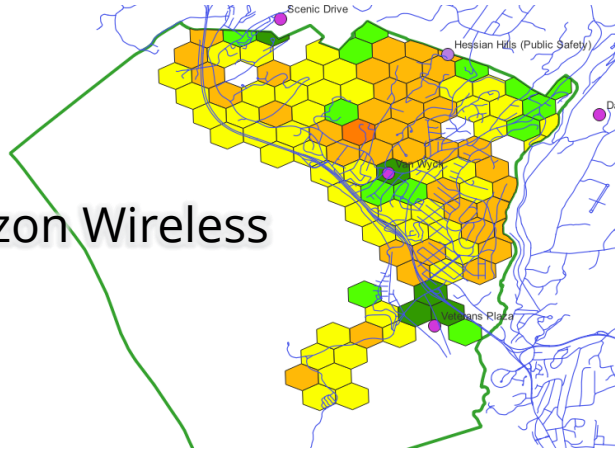
** The current FCC threshold for LTE mobile broadband service

Carrier Signal Strength

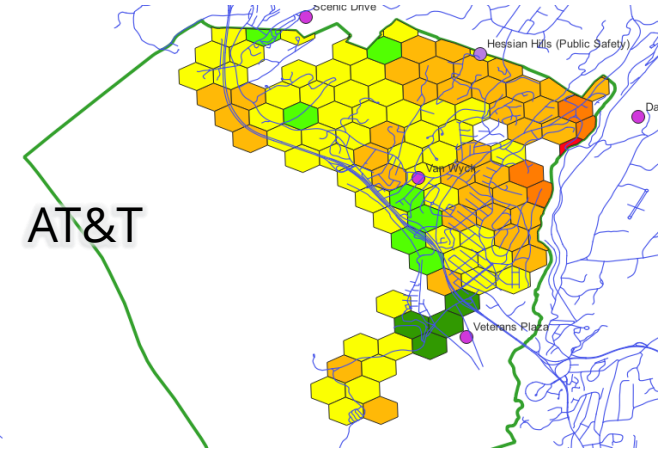
Signal Strength (dBm)



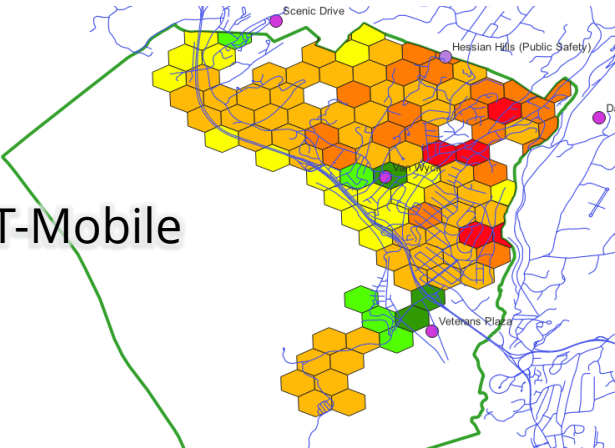
Verizon Wireless



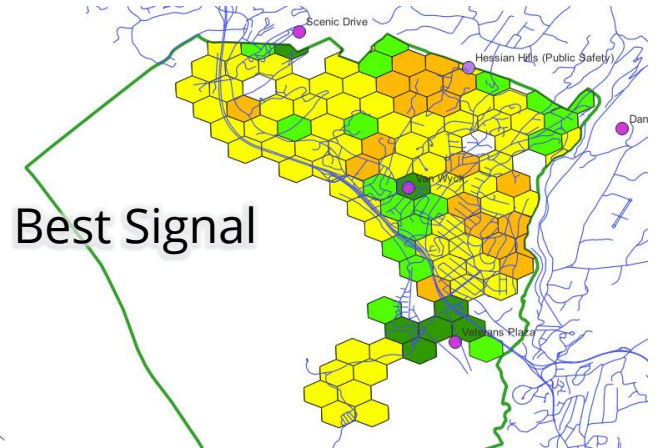
AT&T



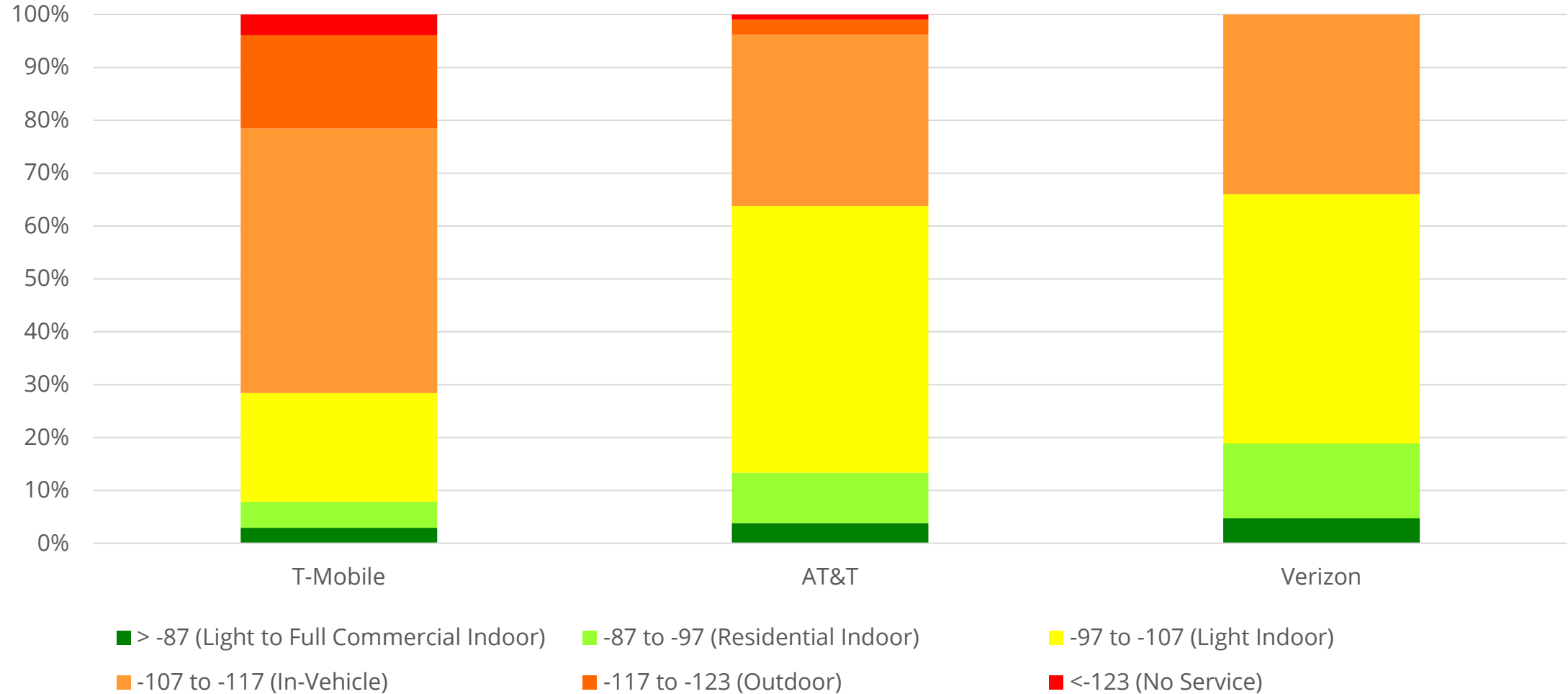
T-Mobile



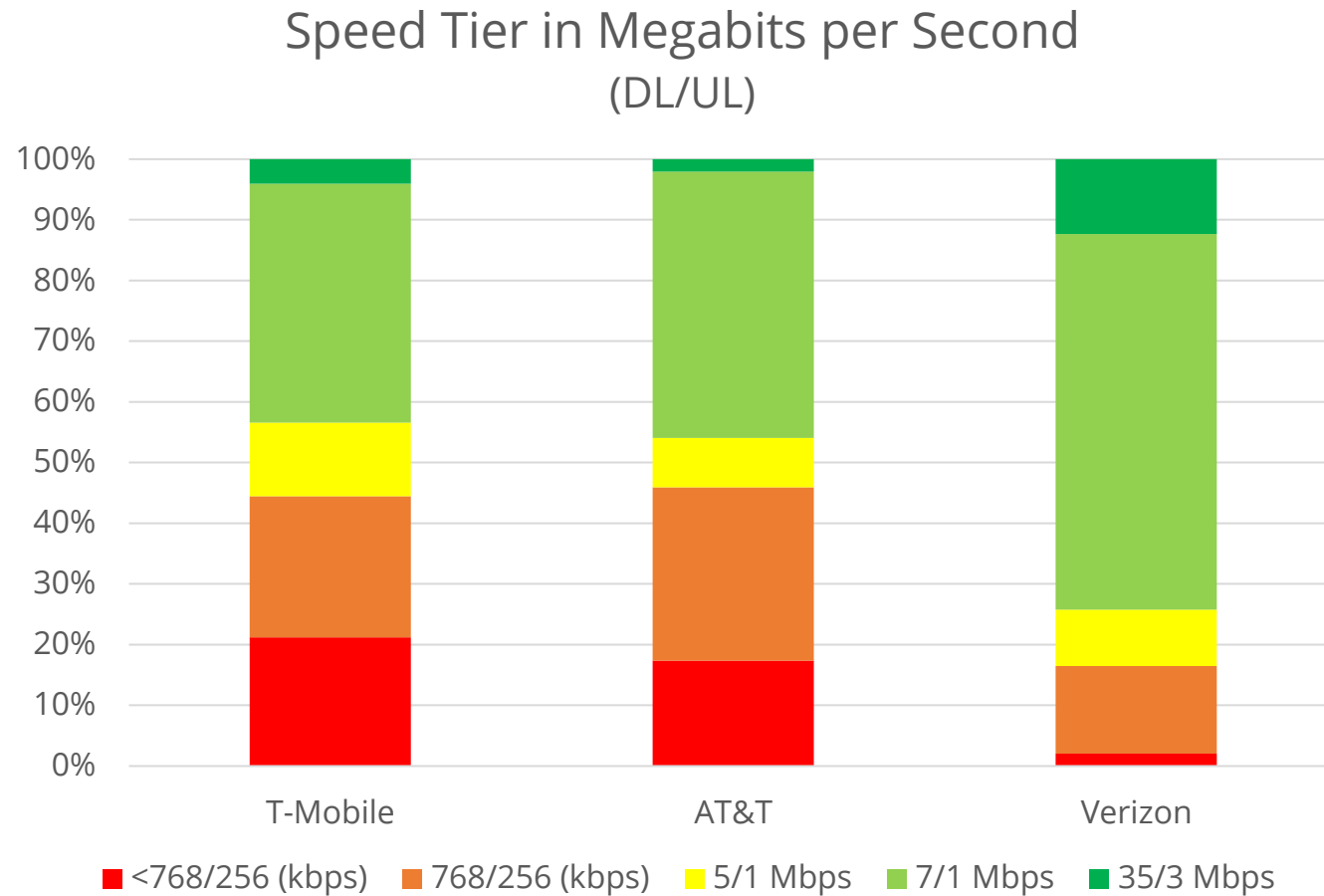
Best Signal



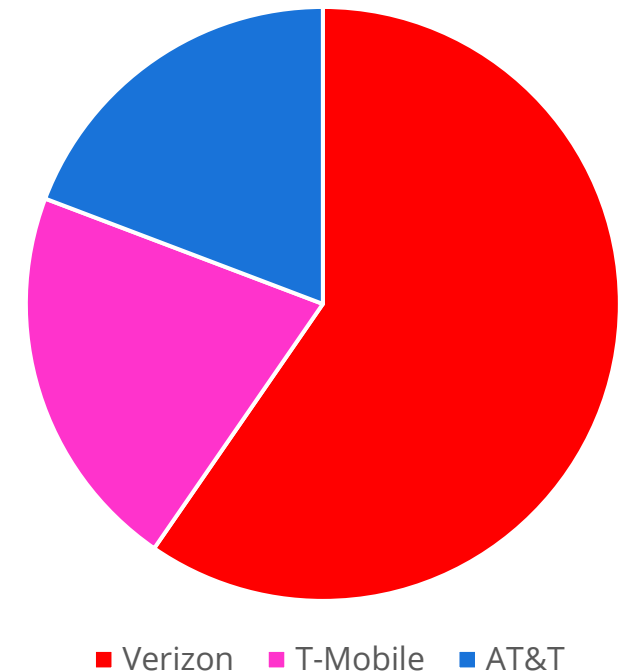
Carrier Signal Strength Summary



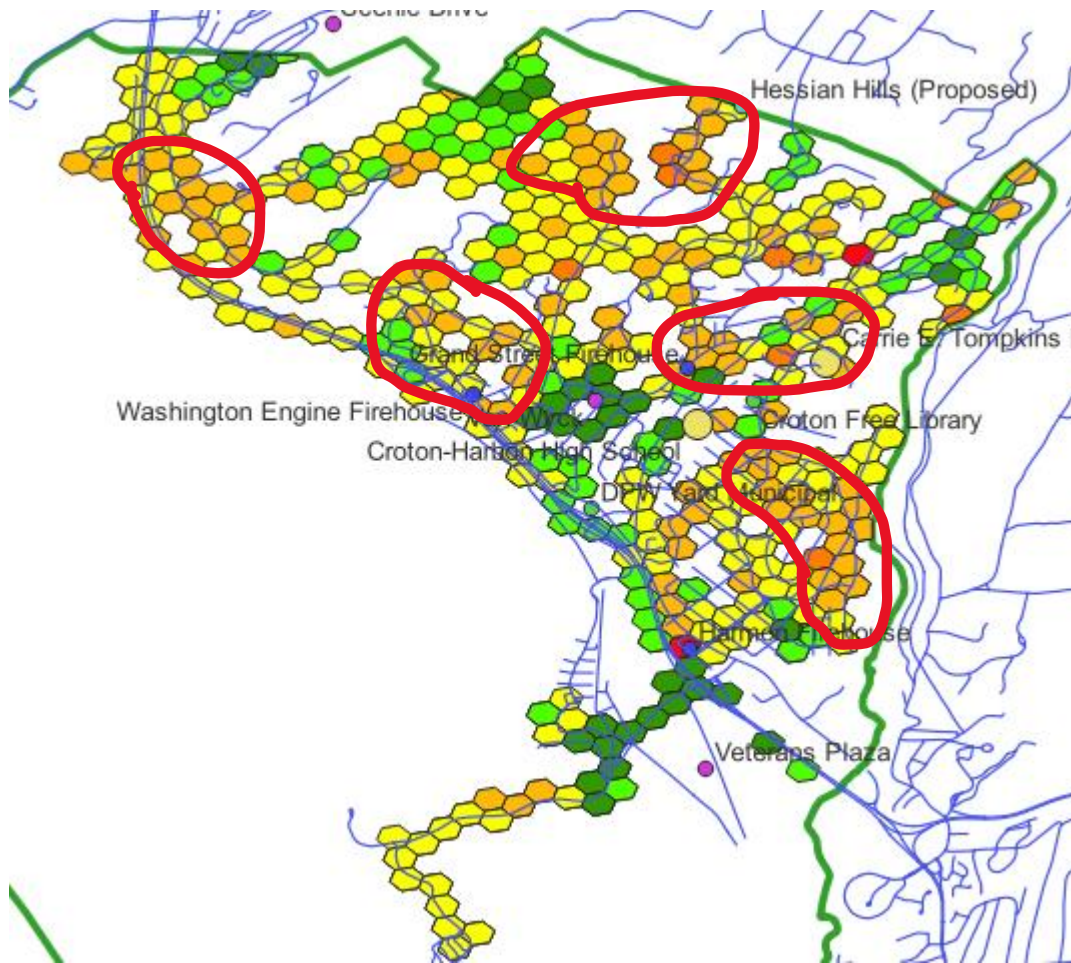
Speed Tier Attained / Best Speeds



Best Aggregate Speed
UL+DL



Possible Sites To Fix Low Signal Areas



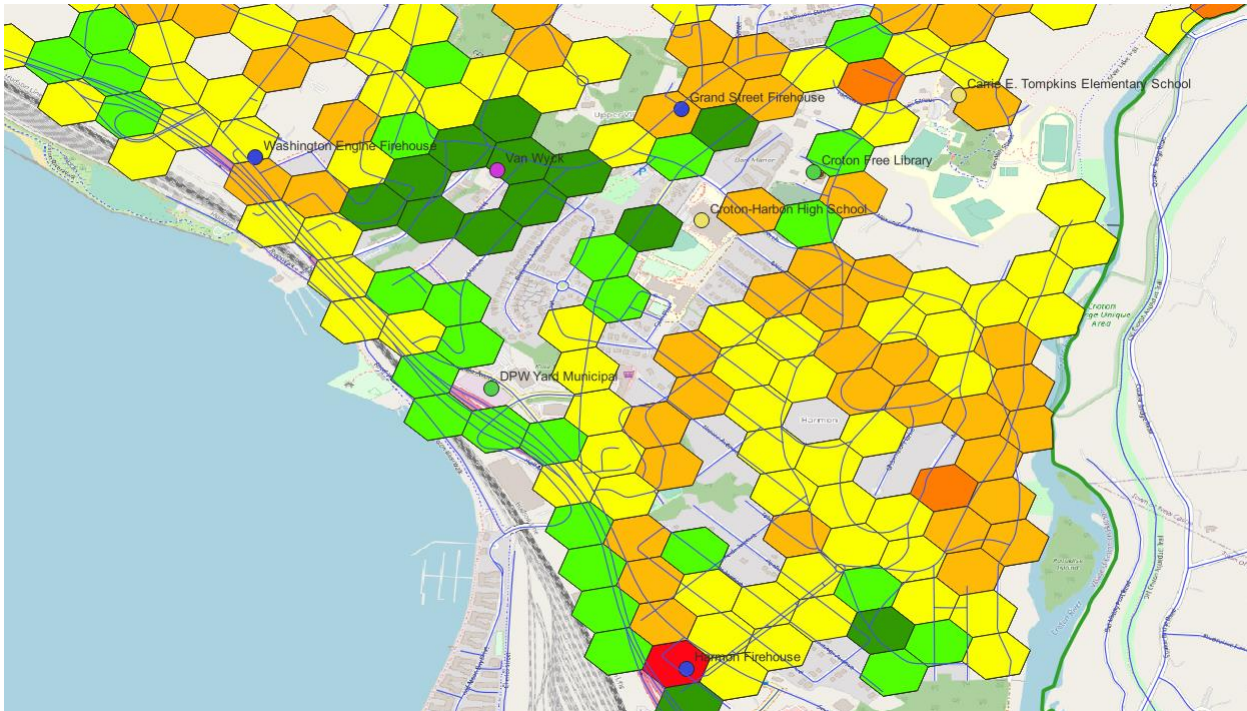
Best Signal Level From All Carriers

Problem Area	Potential Site(s)*
Hessian Hills	Hessian Hills PS Site
Southeast Village**	Croton Free Library Tompkins ES Croton High School
Grand Street**	Tompkins ES Grand Street FH
Prospect Place**	Washington FH
Albany Post Road	N/A
<u>For AT&T & T-Mobile:</u> NW Corner	Existing Danish Home Site

*Directional, not an engineering analysis, each carrier should conduct their own engineering. Requires propagation studies.

**May benefit from taller Van Wyck site

Southeast Village View



- DPW Yard may* provide some help to Bungalow, Radnor, and Riverside Road
- Highly variable signals due to terrain (requires propagation analysis for each site)
- Nordica / Truesdale Drive likely difficult to cover from existing sites (potentially small cell or from adjacent jurisdiction)

* Requires a propagation study. Is not expected to help given proximity of Veterans Plaza and the geometry

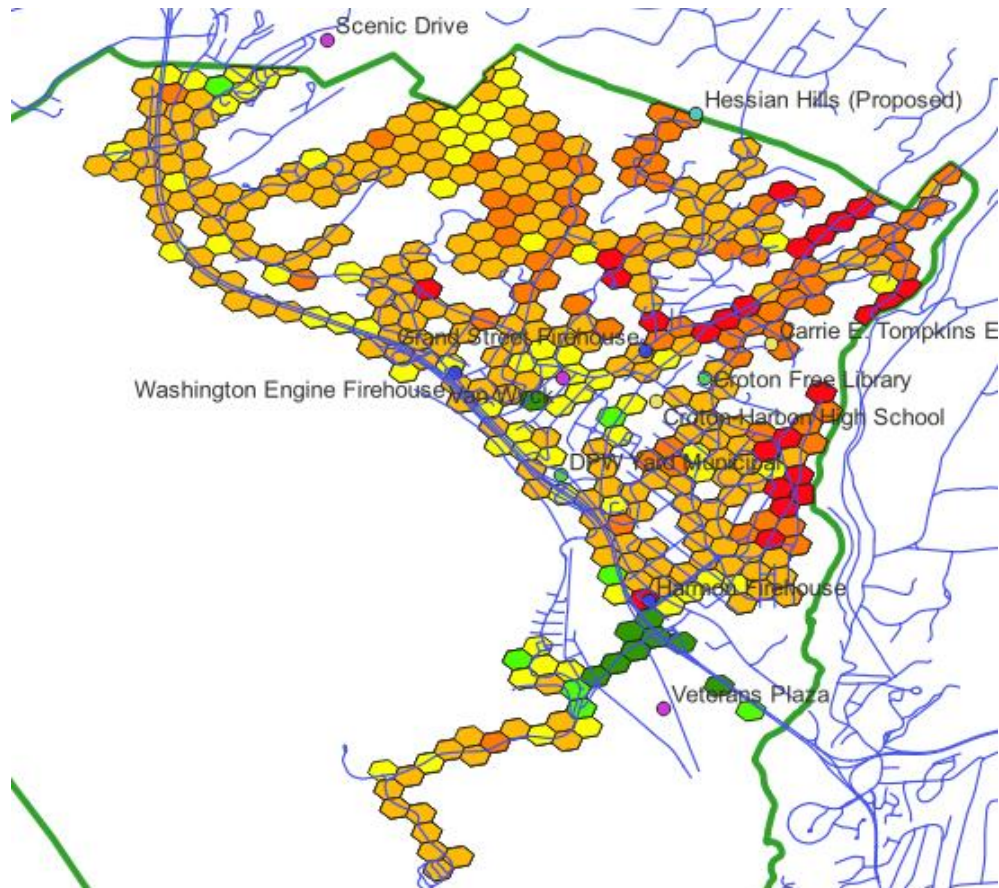
Other Thoughts/Recommendations

- Public safety service could be enhanced using some of these sites as well (unknown, did not measure or analyze). May represent a Village liability because police and fire can't communicate* at some locations
 - Recommend Village immediately conducts a public safety coverage study to better understand what potential sites could play a dual public safety/cellular role
- There are many weak coverage areas in the Village – will require many sites to serve, the few macro sites included in this analysis are insufficient to address all issues uncovered and may require small cells
- AT&T and T-Mobile could use the Danish Home site to improve service in NE
- Sites in this rough terrain are serving a very limited distance, and therefore, you should be cautious about applying generalized requirements about distance to alternative sites. E.G.,
 - No service in Village from Yorktown Road site (1 mile outside of Village)
 - Poor service levels within 0.25 miles of Van Wyck

*Per EMS statement at kickoff meeting

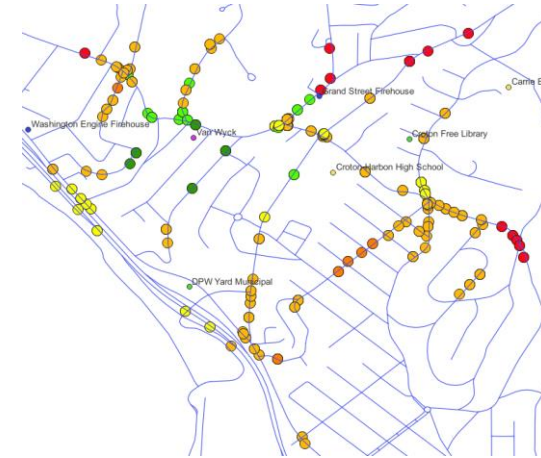
Additional Map Views

Worst Signal Level



Municipal Site Service

T-Mobile (30' AGL?)



VzW (80' AGL)

