Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Effects on Broadband Communications Networks	)	PS Docket No. 10-92
Of Damage to or Failure of Network Equipment	)	
Or Severe Overload	)	
	)	

COMMENTS OF PCIA—THE WIRELESS INFRASTRUCTURE ASSOCIATION

I. INTRODUCTION

PCIA—The Wireless Infrastructure Association ("PCIA") hereby submits these comments in response to the above captioned Federal Communications Commission ("FCC" or "Commission") *Notice of Inquiry* regarding broadband network survivability.[1] In this proceeding the Commission generally seeks "comment on the survivability features and risks presented by the physical architecture of current broadband communications networks."[2] PCIA, as the national trade association representing the wireless infrastructure industry,[3] provides these comments in response to the Commission's inquiry into whether a "cell site," among other components of broadband networks, constitutes a single point of failure in broadband networks.[4]

[1] *In re* Effects on Broadband Communications Networks of Damage to or Failure of Network Equipment or Severe Overload, *Notice of Inquiry*, FCC 10-62, PS Docket No. 10-92 (rel. Apr. 21, 2010) ("*NOI*").
[2] *Id.* at ¶ 10.
[3] PCIA is a non-profit national trade association representing the wireless infrastructure industry. PCIA's members develop, own, manage, and operate over 125,000 towers, rooftop wireless sites, and other facilities for the provision of all types of wireless services.
[4] *NOI* at ¶ 10.

As these comments describe, an individual cell site is not likely to be a single point of failure in a broadband network.

Wireless communication is vital to citizens, businesses, and first responders during emergencies. Indeed, in 2009, over 290,000 E-911 calls were made with wireless devices every day.[5] As consumers increasingly rely on wireless devices as their primary means of communication,[6] it is essential that they have robust access to wireless service in times of emergency, especially in residential areas. Wireless networks by design are highly survivable, and the physical structure supporting many cell sites[7]—the tower—is designed and constructed in compliance with international building standards, which provide a high level of fidelity even against extreme physical threats. Indeed, we believe the biggest issue with respect to end-user access to wireless services during emergencies is simply the availability of robust service, especially near residential areas, which is consistently burdened by local and state regulations.

III. WIRELESS NETWORK ARCHITECTURE AND TOWER CONSTRUCTION AND DESIGN STANDARDS MINIMIZE THE IMPACT OF THE FAILURE OF ANY ONE CELL SITE

The design of a wireless network is too complex and overlapping to identify an individual cell site as a single point of failure. Wireless networks are complex systems comprised of

[5] CTIA, US Wireless Quick Facts, http://www.ctia.org/advocacy/research/index.cfm/AID/10323 (last visited June 23, 2010).

[6] According to a recent report by the Centers for Disease Control: "One of every four American homes (24.5%) had only wireless telephones (also known as cellular telephones, cell phones, or mobile phones) during the last half of 2009—an increase of 1.8 percentage points since the first half of 2009." Stephen J. Blumberg & Julian V. Luke, Division of Health Interview Statistics, National Center for Health Statistics, Centers for Disease Control, Wireless Substitution: Early Release of Estimates From the National Health Interview Survey, July–December 2009 1 (2010), *available at* http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless201005.pdf.

[7] Cell sites comprise a variety of network elements from the physical tower, antennas, the physical link between antennas and the network, and accessory electronic equipment supporting the antennas. The largest single element is the tower, which is where these comments are focused.

hundreds of thousands of cell sites, which in turn support hundreds of thousands of antennas.[8] Wireless network design relies on overlap between the footprints of cell sites to ensure that calls are handed-off smoothly and service is not interrupted when users travel between cell sites. And, not all cell sites serve the same purpose. While some cell sites are designed to ensure service at the edge of a service area, the primary purpose of other cell sites may be to increase capacity in a dense urban area. Therefore, the impact on a wireless network of the failure of any single cell site is highly variable. Further, the primary support structure for many cell sites—a tower—is designed and constructed to ensure a high level of survivability against physical force. These factors ensure that any individual cell site will not necessarily constitute a single point of failure within a wireless network.

Cell site design varies based on topography, engineering requirements, the purpose of the site, and local rules and regulations governing wireless facility siting. These variations require cell sites to utilize a variety of support structures including towers of various designs and heights, buildings, and tall existing structures such as water towers and electric distribution towers, among other things. In practice, a cell site may be comprised of a monopole with various antennas located at different heights, the roof of a commercial building where a variety of antennas are located, or an electric distribution pole—it is impossible to generalize how a single cell site may be deployed.

A wireless service provider's purpose for a particular site is also highly variable. Some sites improve a wireless service provider's coverage in a given area, and serve to push wireless services further into unserved areas. Increasingly, other sites are deployed to provide increased

[8] As of year-end 2008, there were over 240,000 cell sites in the United States. *In re* Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions with Respect to Mobile Wireless, Including Commercial Mobile Services, *Fourteenth Report*, FCC 10-81, WT Docket No. 09-66(terminated) tbl. C-1 (rel. May 20, 2010) ("*Fourteenth CMRS Report*").

capacity to meet heightened demand to an area that is otherwise "covered" or to provide for specialized uses. A site located near (or even in) a sports venue, for example, may be designed for use primarily during sporting events. An antenna located on the side of a building in an urban area may provide increased capacity for data intensive users. The relative impact of the failure of any one of these sites on the overall network is not only variable, but also uncertain.

At a minimum, the unlikely failure of one cell site is not likely to result in the inability of users to access wireless service. Wireless networks rely on overlap between the footprints of each cell site in order to provide uninterrupted service to users who are moving between sites. To be sure, there are edges to every network, but the majority of cell sites do not service the edge. Further, the most common wireless support structure—towers—are highly survivable against physical attacks.

Wireless communication towers are designed and constructed in compliance with state and local building codes, which almost universally incorporate the International Building Code with certain amendments. With respect to the steel tower structure, the International Building Code incorporates by reference the TIA-222 standard, *Structural Standard for Antenna Supporting Structures and Antennas*,[9] and ACI-318, *Building Code Requirements for Structural Concrete*.[10] The steel tower structure is generally engineered, designed, manufactured, and erected in compliance with TIA-222. TIA-222 establishes engineering and design criteria with respect to wind and ice loadings that are based upon ASCE 7-02, *Minimum Design Loads for Buildings and Other Structures*.[11] The foundation is constructed in compliance with ACI-318.[12]

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[9] Telecommunications Industry Association, TIA-222-G, *Structural Standard for Antenna Supporting Structures and Antennas* (2005).
[10] American Concrete Institute, *Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary (ACI 318R-08)* (2008).
[11] American Society of Civil Engineers, *Minimum Design Loads for Buildings and Other Structures* (2002).
[12] American Concrete Institute, *Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary (ACI 318R-08)* (2008).

ACI-318 provides requirements for, among other things, materials; durability; concrete quality, mixing, and placing; strength and serviceability; and shear and torsion.[13] These standards provide a level of survivability equal to other similar commercial structures, such as high-rise buildings.[14]

Generally, due to the high level of survivability of towers, there is no need to take measures to increase the survivability of the tower for the public safety user. Public safety networks generally utilize both commercial cell sites and private cell sites. Even in the devastation caused by Hurricane Katrina in 2005, the Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks ("Katrina Panel") reported that "[i]n general, public safety's antenna towers remained standing after the storm."[15] Further, in the rare event of the failure of a commercial cell site relied upon by a public safety user, "[m]ost public safety radio systems by design are able to handle and manage a single or isolated subsystem failure or loss."[16]

The level of survivability provided by the standards governing wireless communications towers was clearly demonstrated following the devastation of Hurricane Katrina. PCIA members reported that less than 1% of the towers in geographies affected by Hurricane Katrina suffered structural damage.[17] As the Katrina Panel reported, the vast majority of cell site failures were

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[13] *See id.* at 318-2–6.

[14] Due to the high level of survivability of towers, there is little increased risk to wireless network survivability due to the collocation of multiple antennas on the same structure. The Commission has recognized the benefits of collocation: "[T]he ability of wireless service providers to lease space for new cell sites on established towers can ease and speed their entry into new geographic areas by eliminating the need to build a new tower." *Fourteenth CMRS Report* ¶ 291.

[15] *In re* Recommendations of the Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks, *Notice of Proposed Rulemaking,* FCC 06-83, EB Docket no. 06-119, App. B at 7 (rel. June 19, 2006) ("*Katrina Report*"). Note that public safety networks will utilize both commercial towers and private towers.

[16] *Id*.

[17] Letter from PCIA CEO Michael T. N. Fitch to Lisa M. Fowlkes, Enforcement Bureau, FCC, May 15, 2006; *Katrina Report* at 6.

caused by a loss of power and the inability to provide additional fuel to backup power systems.[18] The Katrina Panel noted that "the areas impacted by Katrina fared fairly well through the storm's wind and rain, in most cases sustaining only minor damage or damage that should have been promptly repairable."[19]

Both the high level of survivability of cell sites due to wireless tower design and construction standards, and the inherent survivability of wireless network architecture, ensure that individual cell cites are likely not single points of failure within a wireless network. Ultimately, however, the survivability of a wireless network is irrelevant if the reason for a lack of end-user access, especially in residential areas, is due solely to the inability to deploy any type of wireless infrastructure.

IV. INCREASED WIRELESS INFRASTRUCTURE DEPLOYMENT RESULTS IN INCREASED WIRELESS NETWORK SURVIVABILITY IN THE FACE OF PHYSICAL DAMAGE AND SEVERE OVERLOADS

The survivability of wireless networks against physical attacks and severe overloads improves as the number of cell sites increases. Additionally, as the number of cell sites increases in or near residential areas, wireless broadband will become a competitive alternative to wireline broadband, thereby increasing all broadband networks' ability to handle severe network overloads. These realities, however, are constrained by significant burdens to wireless infrastructure deployment at the state and local level.

Wireless users increasingly rely on wireless devices as their sole means of accessing public safety services, and are projected to use wireless devices as their primary means of

[18] *Katrina Report* at 9. In the Commission's proposed Broadband Plan Action Agenda Items, backup power will be addressed in a Notice of Inquiry in the fourth quarter of 2010; we will reserve our comments on this issue until that time.
[19] *Katrina Report* at 6.

accessing the Internet by 2020.[20] At the heart of this *Notice of Inquiry* is ensuring the ability of broadband users to access broadband services in times of emergency. Setting aside whether the network itself physically survives an emergency situation, just as important is whether the infrastructure necessary to ensure service has been deployed to enable service. Wireless service and infrastructure providers are investing billions of dollars to further their network coverage and capacity, but they are met by significant burdens at the state and local level.

The FCC's action in November 2009 to establish time limits for local government review of applications to site wireless facilities[21] was just a first step; as Chairman Genachowski has noted: "With [the Commission's] tower-siting shot-clock order in November, the Commission has already begun taking action to cut red tape, lower the costs of investment, and accelerate network deployments—but more needs to be done."[22]

Ultimately, a set time frame for action is ineffective if a state or locality imposes such burdens and limitations on wireless facility siting that deployment is infeasible. It is increasingly difficult to site wireless facilities in zoning districts in or near residential areas, and localities are generally becoming increasingly hostile toward efforts to site any wireless infrastructure. To truly ensure end-user access to wireless broadband in times of emergency, the Commission must take additional steps to ensure that the infrastructure necessary to enable wireless broadband is deployed. We look forward to working with the Commission to ensure that it takes this crucial step to ensure network survivability.

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[20] JANNA QUITNEY ANDERSON & LEE RAINE, PEW INTERNET & AMERICAN LIFE PROJECT, THE FUTURE OF THE INTERNET III 2 (2008), http://pewinternet.org/~/media//Files/Reports/2008/PIP_FutureInternet3.pdf.pdf.

[21] *See In re* Petition for Declaratory Ruling to Clarify Provisions of Section 332(c)(7)(B) to Ensure Timely Siting Review and to Preempt Under Section 253 State and Local Ordinances that Classify all Wireless Siting Proposals as Requiring a Variance, *Declaratory Ruling*, FCC 09-99, WT Docket No. 08-165 (rel. Nov. 18, 2009).

[22] Statement of Julius Genachowski, Chairman, Federal Communications Commission, "Mobile Broadband: A 21st Century Plan for U.S. Competitiveness, Innovation and Job Creation," at 5, Feb. 24, 2010, *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-296490A1.pdf.

V. CONCLUSION

For the foregoing reasons, we submit that individual cell sites are highly survivable and not likely single points of failure within wireless networks, and we urge the Commission to take additional steps to remove barriers to the deployment of wireless infrastructure

Respectfully submitted,

PCIA—The Wireless Infrastructure Association

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