APCO 2024

August 4-7 | Orlando, FL

Are My Facilities "Public Safety Grade?"

Presented by: Brad Barber, V.P., LMR/Wireless Practice

Travis LePage, Director, LMR/Wireless Practice

Introductions

- Brad Barber:
  - 38 years of public safety experience, including public safety system management and support, & emergency communications consulting
  - 18 years as a public safety consultant
- Travis LePage:
  - 24 years of public safety communications experience, including public safety system site development, system implementation, and interoperable communications plan development
  - 20 years as a public safety consultant
- Federal Engineering Inc:
  - Four decades of experience with emergency communications systems
  - Over 2,500 successful projects

Federal Engineering®

APCO 2024
August 4-7 | Orlando, FL

Agenda

- What does "Public Safety Grade” mean?
- Why “Public Safety Grade” must become the “New Norm”
- What does the “Public Safety Grade” scope cover?
- What are the risk factors?
- Key requirements for public safety grade facilities
- Assessing sites for public safety grade characteristics
- Mitigation approaches to address gaps identified in site assessments
- Q&A

Federal Engineering®

APCO 2024
August 4-7 | Orlando, FL

What Does "Public Safety Grade" Mean?

- "The term ***"Public Safety Grade"*** is a .... term that refers to the expectation of emergency response providers and practitioners that their equipment and systems will remain operational during and immediately following a major natural or manmade disaster on a local, regional, and nationwide basis."
  - NPSTC "*Defining Public Safety Grade Systems and Facilities*" Final Report 5/22/2014
- "…public safety requirements regarding various characteristics to make mission critical communications network sites sufficiently robust to meet the service availability requirements of public safety. In other words, what it takes to make network sites "public safety grade" or the extent to which they are "hardened."
  - ANSI/APCO "*Public Safety Grade Site Hardening Requirements*" APCO ANS 2.106.1-2019

What Does "Public Safety Grade" Mean?

- ***"Public Safety Grade"*** in plain language is the ability of infrastructure to support **Public Safety's Mission** to protect life and property during and following natural and manmade events without the degradation or loss of continuity of operations.

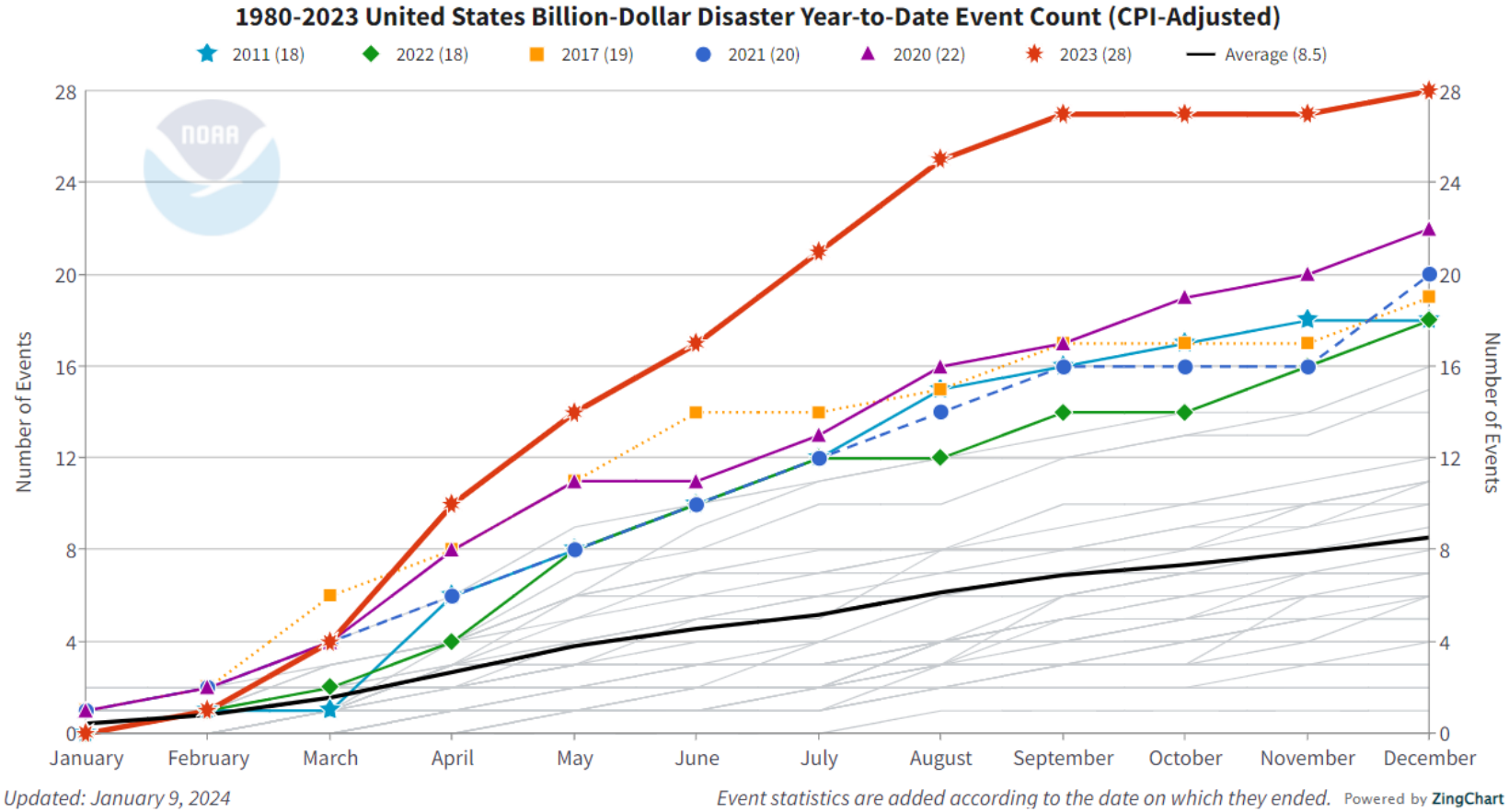
- Achieving **"Public Safety Grade"** requires implementing **physical**, **electronic**, and **cybersecurity** resources to Identify, Protect, Detect, Respond, and Recover from events that impede the **Public Safety Mission**.

APCO 2024
August 4-7 | Orlando, FL

Federal Engineering®

Why “Public Safety Grade” Has to Become the “New Norm”

- 2023 marks the fourth consecutive year where the frequency and impact of events have increased



“Public Safety Grade” Service Delivery Impact – Calls for Service

- As of 2021, there are over 5,700 primary and secondary Emergency Communications Centers (ECCs) in the U.S.
- Over 3,000 counties have ECCs
- “Public Safety Grade” systems needed to protect:
  - Over 600,000 9-1-1 calls for help made per day
  - Over 25,000 9-1-1 calls for help made per hour

Source: https://www.nena.org/page/911Statistics

Federal Engineering®

APCO 2024
August 4-7 | Orlando, FL

Resiliency Enables Continuity Across the Public Safety Ecosystem

- *"The ability to maintain voice and data communications at all times is critical for public safety agencies to perform their life-saving missions. By establishing resiliency measures, public safety communications can better withstand potential disruptions to service."*

[Communications and Cyber Resiliency Toolkit | CISA]

APCO 2024
August 4-7 | Orlando, FL

What's Covered by the "Public Safety Grade" Scope?

- Wireless network equipment – transceivers and supporting equipment
- System interconnection, alternate routing, backhaul network equipment
- Network supporting devices, including routers, switches, servers
- Equipment enclosures including budlings, shelters, cabinets
- Environmental and security support systems
- Commercial, emergency standby power systems
- Antenna support structures, including towers, rooftops, and poles
- Physical security, including roads, gates, fences, and cameras
- All capability elements within the agency's toolkit

What are the Risk Factors?

- Environmental
  - Wind, flood, fire, seismic, ice, nuclear
- Power
  - Grid failures, emergency power fuel supply, standby capacity
- Security
  - Physical, cyber, site access, and access control
- Resiliency
  - Tower structures & risk category, transport network(s), grounding and lightning protection

APCO 2024
August 4-7 | Orlando, FL

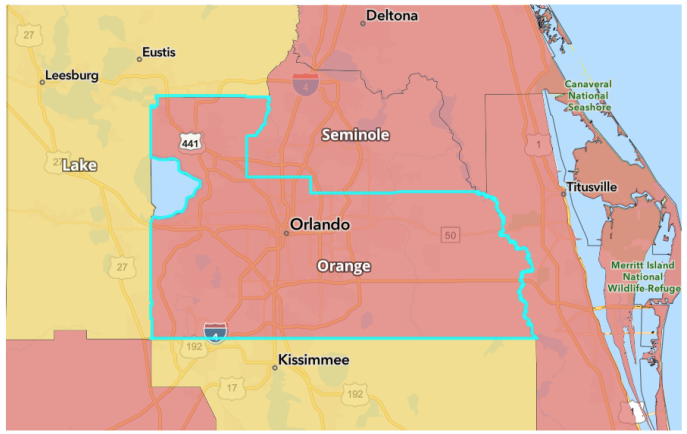
Federal Engineering®

FEMA National Risk Index Map

[Map | National Risk Index (fema.gov)]

Risk Index

The Risk Index rating is **Relatively High** for **Orange County, FL** when compared to the rest of the U.S.



Score **98.57**

National Percentile
98.57

Percentile Within Florida
86.60

0 100

99% of U.S. counties have a lower Risk Index

87% of counties in Florida have a lower Risk Index

Risk Index Legend

Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low

No Rating | Not Applicable | Insufficient Data

Risk Factor Breakdown

Hazard Type	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
Hurricane	$172,391,267	Very High	Relatively Moderate	1.21	$211,501,591	99.1
Tornado	$40,542,202	Very High	Relatively Moderate	1.21	$50,366,217	99.3
Wildfire	$22,936,932	Very High	Relatively Moderate	1.21	$23,639,438	99.5
Lightning	$5,937,536	Very High	Relatively Moderate	1.21	$7,453,327	99.7
Strong Wind	$2,598,155	Very High	Relatively Moderate	1.21	$3,168,925	96.2
Riverine Flooding	$1,989,076	Very High	Relatively Moderate	1.21	$2,573,293	85.5
Cold Wave	$1,867,398	Very High	Relatively Moderate	1.21	$2,257,170	97.5
Drought	$2,031,830	Very High	Relatively Moderate	1.21	$1,940,602	97.6
Earthquake	$1,274,938	Very High	Relatively Moderate	1.21	$1,588,538	84
Landslide	$122,400	Very High	Relatively Moderate	1.21	$157,098	88.4
Hail	$23,240	Very High	Relatively Moderate	1.21	$28,684	22.9

Federal Engineering®

APCO 2024
August 4-7 | Orlando, FL

Identifying Gaps in “Public Safety Grade” Facilities

- The Cybersecurity and Infrastructure Security Agency’s (CISA) Infrastructure Resilience Planning Framework (IRPF) provides a five-step method to identify and manage “Public Safety Grade Facilities”

“Public Safety Grade” Communications Site Assessments – **Prepare for Assessment**

1) “Right-size” site assessment based on baseline standards, budget, resource availability, and site criticality
2) Establish standards baseline according to national, state, local codes and regulations
3) Add to baseline from the ***ANSI/APCO Public Safety Grade Site Hardening Requirements (APCO ANS 2.106.1-2019)***
4) Consider dependencies (reference CISA toolkits)
5) Finalize assessment checklist and execute plan

Federal Engineering®

APCO 2024
August 4-7 | Orlando, FL

“Public Safety Grade” Communications Site Assessments – **Dependencies**

- As the threat environment widens and deepens, assessments also review resource dependencies for a site to continue functioning

Federal Engineering®

“Public Safety Grade” Site Assessments – **Finalize Checklist and Execute Plan**

#1 – Perform 360˚ Review

Involve peers, field personnel, administrators, and executives: final buy-in

#2 – Publish Site Assessment Checklist

Hard copy, electronic/tablet, web form

#3 – Perform Assessments

Inspect against standards/best-practices and dependencies

#4 – Analyze Findings and Assess Risks

Threat scenarios

Threat assessments

Threat controls and asset protection

#5 – Develop Action Plan

Short, mid, long-term

Resiliency solutions

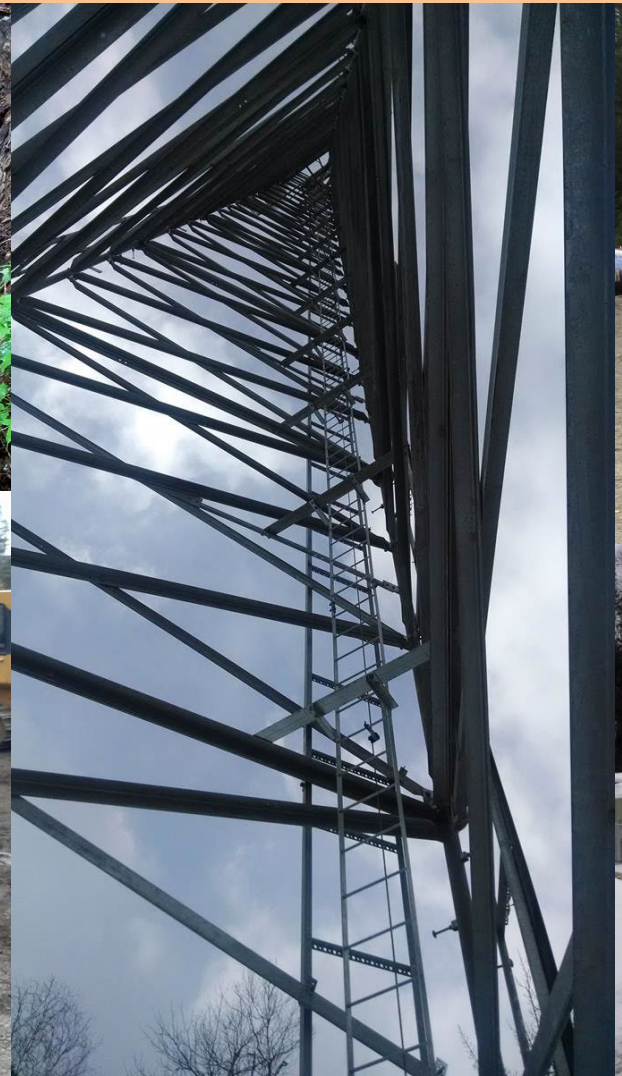
Implementation strategies

#6 – Continual Review and Improvement Plan

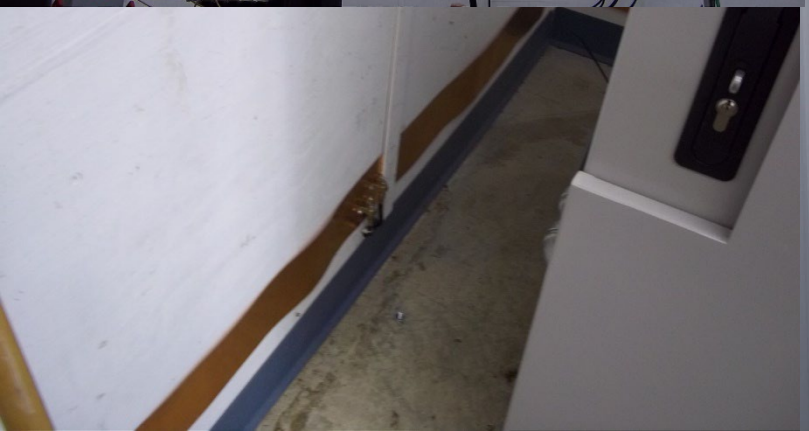
Inspection and adaption to meet/exceed objectives

Modernization roadmap

Greenfield or New Site Builds



Existing Site Assessments



Third-Party Collocation Sites

Mitigation Approaches to “Public Safety Grade” Facilities

- Performance Evaluation Method for Identifying Risk

- The Community Resilience Planning Guide (CRPG) approach can be used to evaluate the operational capabilities of facilities against goals under threat/hazard scenarios.

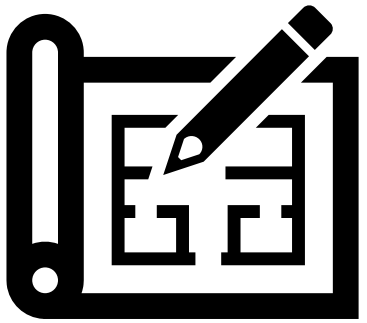
- The CRPG emphasizes characterizes how long a community can continue to operate if various services and systems are compromised.

Mitigation Approaches to “Public Safety Grade” Facilities

Priority Infrastructure	Support Needed	Phase 1 Short Term (Hours)			Phase 2 Intermediate (Weeks)			Phase 3 Long Term (Months)		
		0 -24	24-48	48-72	1-4	4-8	8-12	3+	4-24	24+
Infrastructure System/Asset 1	R, S, MS C	90%								
Infrastructure System/Asset 2	R	30%	90%							
Infrastructure System/Asset 3	MS			30%	60%		90%			
Infrastructure System/Asset 4	C		30%			60%		90%		
Infrastructure System/Asset 5		60%	90%							

(R) Regional: Neighboring communities, county government
(S) State: State authorities
(MS) Multi-State: Council of governments/governors, interstate support
(C) Corporate/Community Organizations: e.g. Red Cross, major industries in community or region

A Few Examples…



APCO 2024
August 4-7 | Orlando, FL

CISA RESILIENT POWER BEST PRACTICES

Level 1 Resilience - Least-cost best practices to provide a commercially reasonable chance of maintaining power for at least **three days** under all hazards

Level 2 Resilience - Best-efforts approach to maintain power for at least **seven days** under all hazards

Level 3 Resilience – Covers the most critical infrastructure where power should be sustained under all hazards for at least 30 days

How long does it take to respond, restore power, add fuel, etc.? How long does site need to run on batteries, UPS, emergency generator?

Federal Engineering®

APCO 2024
August 4-7 | Orlando, FL

Site Designs and Modifications

Most commercial towers built and analyzed at a Class II risk category (TIA 222)

Structures used primarily for redundant services that may be provided by other means) such as commercial wireless communications….**non-hardened sites** that support antennas or equipment that may be used for redundant communications by police and fire departments, first responders, etc., during emergencies

Critical public safety sites should be built and analyzed at a Class III risk category (TIA 222), particularly in areas subject to frequent hurricanes, tornadoes, etc.

Structures in this category are used for communications across nonredundant and **hardened networks** such as civil or national defense, rescue or disaster operations, military and navigation facilities.

Flood risk for all site structures

All structures in a flood-prone area must be elevated above the expected flood level. This includes tower bases, shelters, generators, fuel tanks, and other structures that may all require elevated platforms.

Network Resiliency

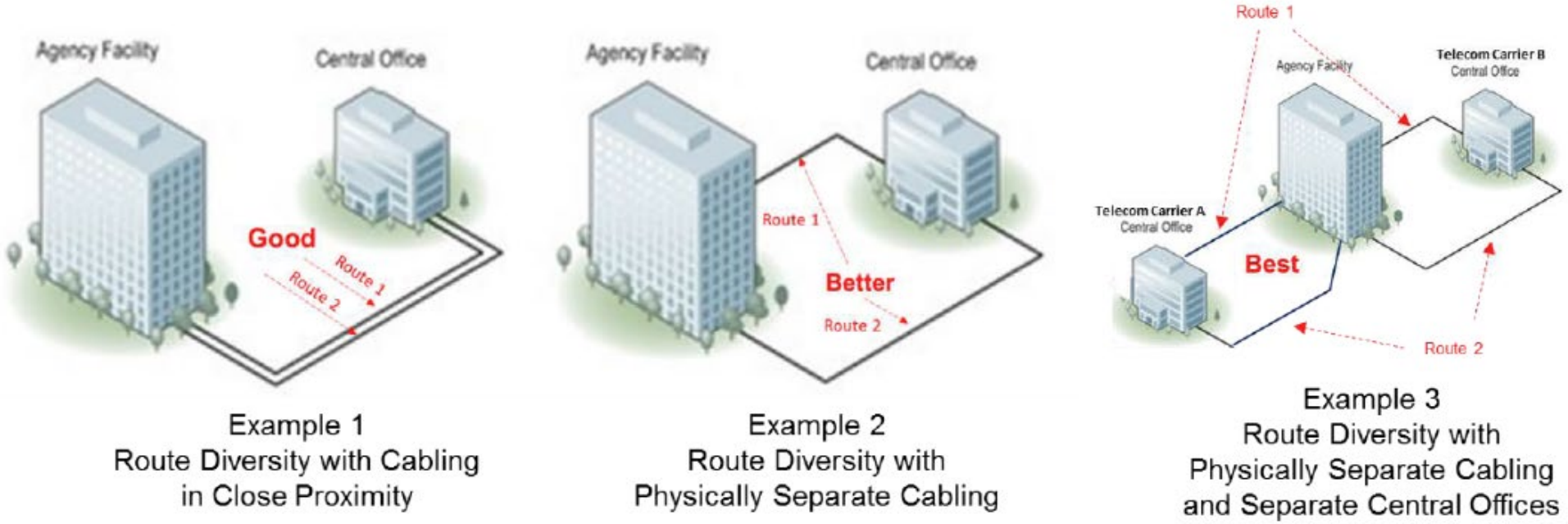


Figure 1: Route Diversity Examples[2]

Public Safety Communications Resiliency
Ten Keys to Obtaining a Resilient Local Access Network
CISA

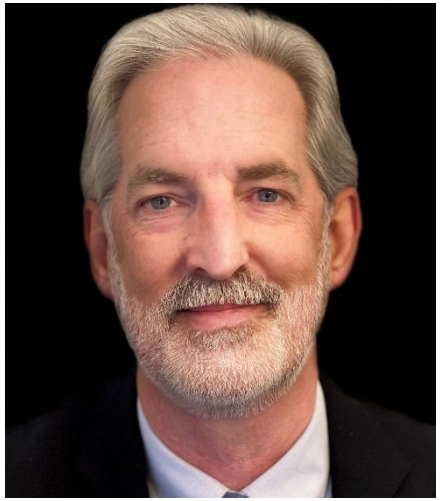
Federal Engineering®

APCO 2024
August 4-7 | Orlando, FL

Developing Priorities

- Risk Analysis
  - Probability, impact, cost to mitigate, cost of NOT mitigating
- Site criticality
  - Type of site, its age, location, and condition
  - Role in the continued operation of communications systems
  - Examples:
    - Core: Required for all system operations, a network control site
    - Critical: Critical to system operations, e.g., a primary microwave backhaul site
    - High-Criticality: Impact to system coverage or capacity; a radio site that serves a high population area
    - Medium-Criticality: Example – Site that serves a suburban area or a spur microwave site
    - Low-Criticality: A site in a low-population area or the last site in a microwave spur.
- Other factors such as the needs of the agencies, **calls for service**, coverage gaps, redundancy, resiliency, population density, and population migration trends

Contact Info



Brad Barber

Vice President, LMR/Wireless Practice

Mobile: 850-377-7707

Email: bbarber@fedeng.com

Travis LePage

Director, LMR/Wireless Practice

MBA, PMP, PMI-ACP, CSM

Mobile: 585-507-9731

Email: tlepage@fedeng.com

APCO 2024

August 4-7 | Orlando, FL

Federal Engineering®

Questions and Answers

Thank You!

APCO 2024
August 4-7 | Orlando, FL

Federal Engineering®

“Public Safety Grade” Communications Site Assessments – Additional Standards

Short Name	Author	Adoption Date	Document Title
ANSI/TIA-1019A	American National Standards Institute / Telecommunications Industry Assoc.	2012	Standard for Installation, Alteration and Maintenance of Antenna Supporting Structures and Antennas
ANSI T1.313-2003	American National Standards Institute	2003	Electrical Protection of Communications Towers and Associated Structures (Superseded ATIS 0600313, 12/2013)
ANSI T1.334-2002	American National Standards Institute	2002	Electrical Protection For Telecommunications Central Offices

“Public Safety Grade” Communications Site Assessments – Additional Standards

ANSI/TIA-222-G	American National Standards Institute / Telecommunications Industry Assoc.	2009	Structural Standard for Antenna Supporting Structures and Antennas
ASCE-7	American Society of Civil Engineers	2013	Minimum Design Loads for Buildings and Other Structures
CLF-SFR0111	Chain Link Fence Manufacturers Assoc.	Not Provided[29]	Chain Link Fence Manufacturers Institute Security Fencing Recommendations
OET- Bulletin 65	Federal Communications Commission	1997	Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields, Office of Engineering and Technology Bulletin 65

“Public Safety Grade” Communications Site Assessments – Additional Standards

IEC 61024-1-2	International Electrotechnical Commission		Protection of structures against lightning – Part 1-2: General principles – Guide B – Design, installation, maintenance and inspection of lightning protection systems
IEC 61643-1	International Electro technical Commission	2011	Low Voltage Surge Protective Devices, Testing
IEEE C62.45	Institute of Electrical and Electronics Engineers	2002	Surge Protection Device Testing
IEEE STD 1100	Institute of Electrical and Electronics Engineers	1999	Recommended Practice for Powering and Grounding [Revised 2005]
IEEE STD 1159	Institute of Electrical and Electronics Engineers	2001	Recommended Practice for Monitoring Electric Power Quality [Revised 2009]

“Public Safety Grade” Communications Site Assessments – Additional Standards

NEMA 250	National Electrical Manufacturers Assoc.	2008	Enclosures for Electrical Equipment, 1000V Maximum
NFPA 70 (also the NEC)	National Fire Protection Association	2014[30]	National Electric Code
NFPA 780	National Fire Protection Association	2011	Standard for the Installation of Lightning Protection Systems [Revised for 2014]
NFPA 1144	National Fire Protection Association	2008	Standard for Reducing Structure Ignition Hazards from Wild land Fire
Motorola R56	Motorola Solutions, Inc.	2005	Standards and Guidelines for Communication Sites

“Public Safety Grade” Communications Site Assessments – Additional Standards

UL-1449	Underwriters Laboratory	2006	Surge Protective Devices
UL-72	Underwriters Laboratory	2001	Tests for Fire Resistance of Record Protection Equipment
UL-752	Underwriters Laboratory	2005	Standard of Safety for Bullet-Resisting Equipment
UL-96A	Underwriters Laboratory	2013	Lightning Protection Components
UL-1449	Underwriters Laboratory	2009	Standard for Safety for Surge Protective Devices, 3rd Edition