

# Small Wireless Facilities: Siting and Deployment

Illinois Association of  
Regional Councils

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### **Stuart G. Chapman, M.PA President/Technologist**



- **Telecommunications advisor to municipalities and counties since 1991**
- **Advised more than 250 cities and counties in 10 states on wired and wireless telecommunications**
- **30 years in cable TV, cellular phone, wireless Internet, facilities siting, and ordinance development**
- **Author: Public Safety and Wireless Communications Frequencies - Issues of Interference for National Association of Telecommunications Officers and Advisers (NATOA)**
- **Education:  
B.A., Political Science, The Ohio State University.  
  
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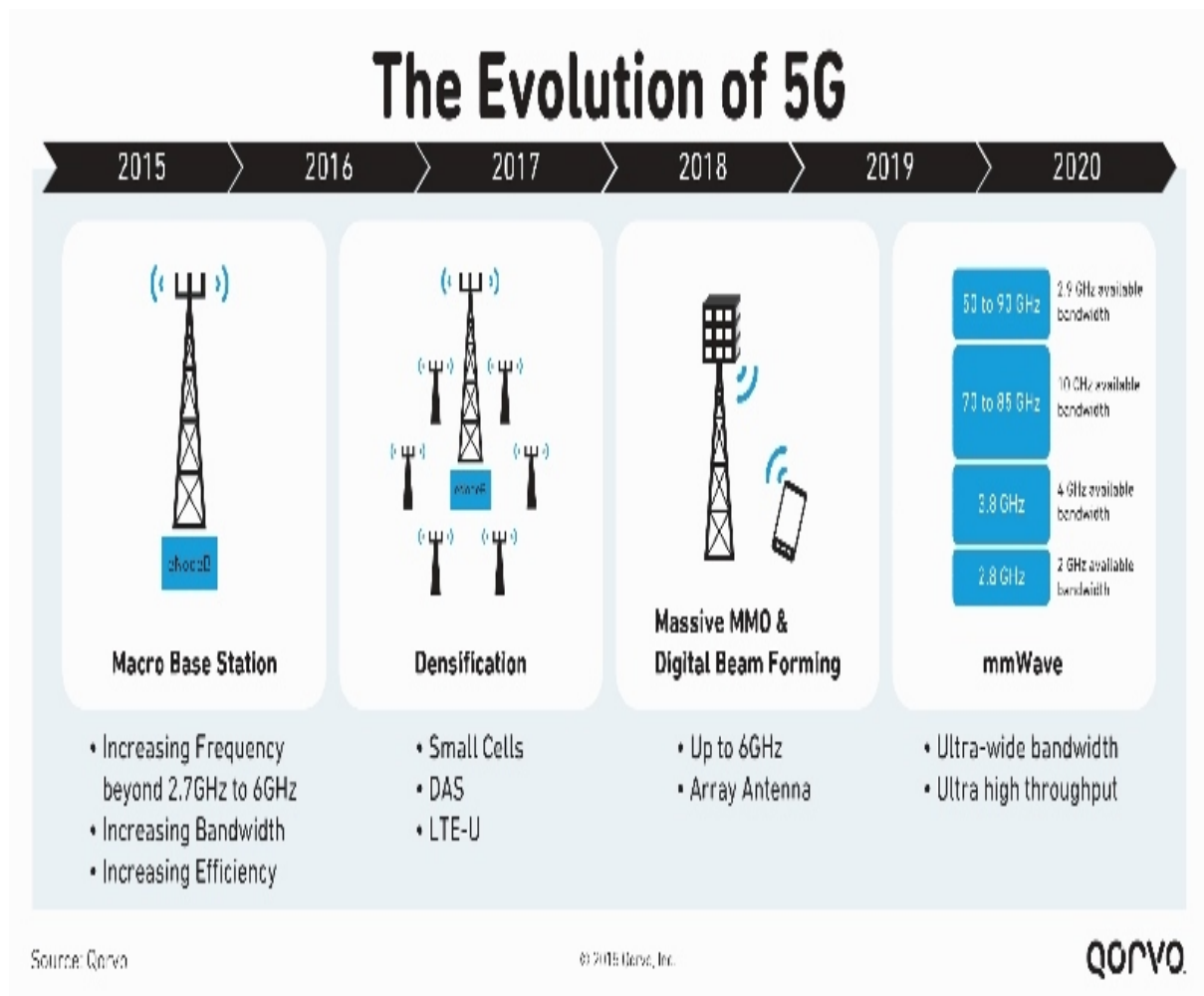
## Cellular Technology – The Basics

### Some Terms You May Have Heard:

- 3G -** A set of standards for wireless service established by the Third Generation Partnership Project (3GPP) for wireless speed and data frequency, transmission and reception applications.
- 4G -** Fourth Generation wireless - Extension of the 3G standards to allow for faster transmission speeds and improved voice and video quality.
- 5G -** Fifth Generation wireless - New standards expanding frequency ranges to allow for substantially faster data speeds and improved coverage.
- LTE -** Long-term Evolution - A design method for cell sites that allows for periodic upgrades through antenna, radio, and signal delivery modifications.

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### Cellular Technology – The Basics



## So What Exactly Is 5G?

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## Cellular Technology – The Basics

### Macrocells:

- Cell sites mounted on towers, buildings, or concealed in other structures. Cell site usually mounted at heights of 50' to 250' with a separate base station shelter or platform.

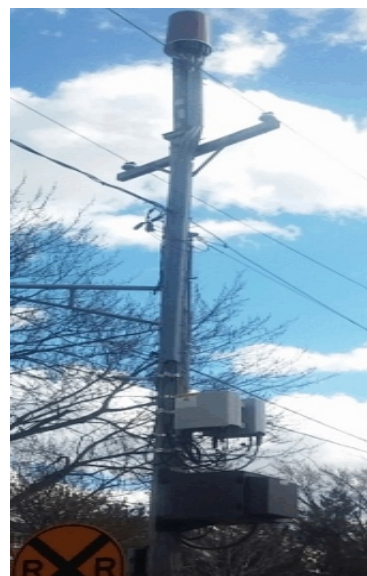


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## Cellular Technology – The Basics

### Small Cells (a/k/a Microcells):

- The only thing small about a Small Cell is its coverage zone – 250' to 1000'.
- A small cell is usually mounted on a utility pole, street light, or other similar structure at a height of 50 feet or less.
- A small cell has a base station, on the pole or in a nearby vault. Signals travel from radio-computer units on the pole or in the vault, then by fiber underground or aurally to a data center.

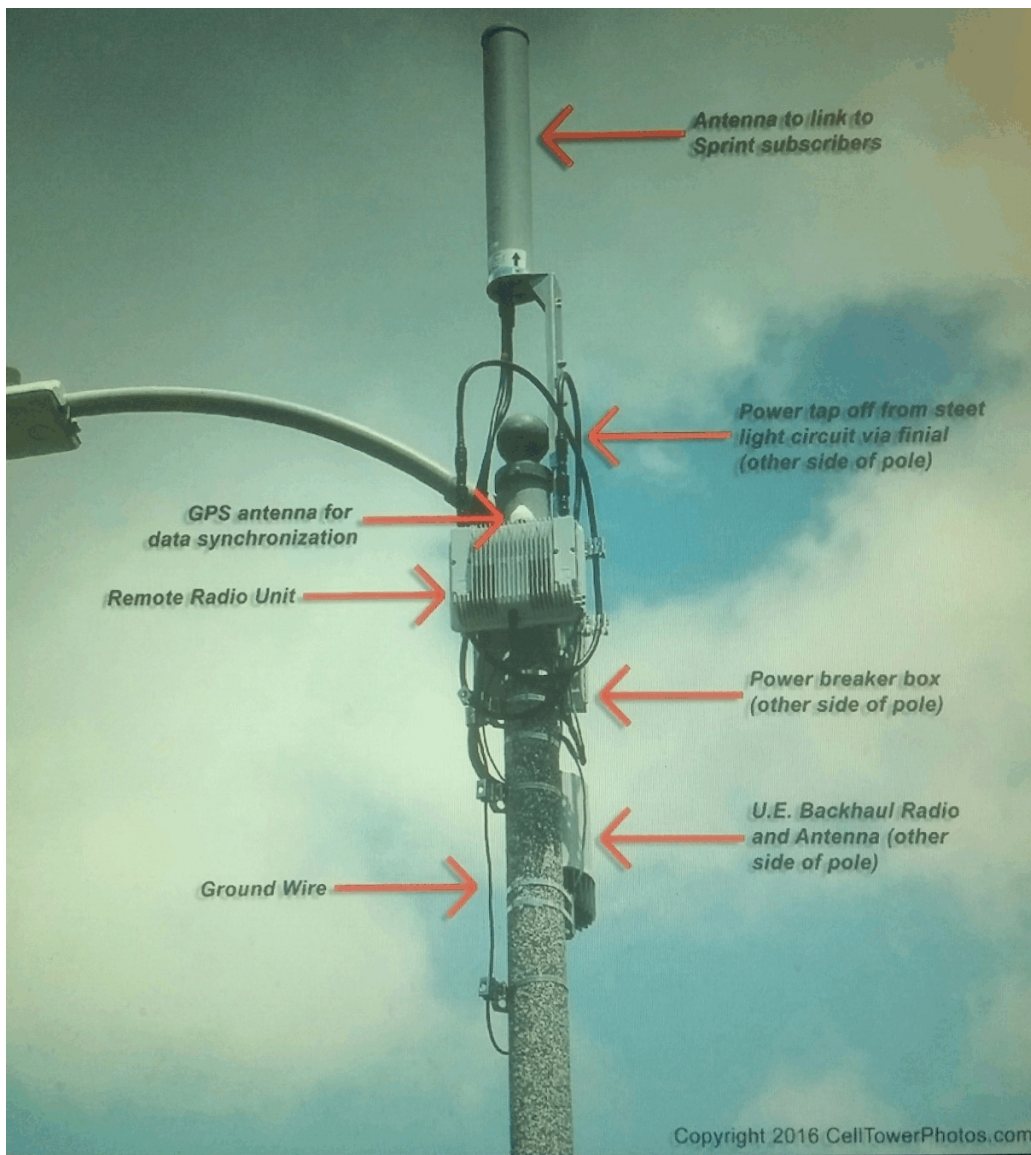




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## Cellular Technology – The Basics

### Anatomy of a Small Cell



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### Why Do Carriers Need Small Cells?

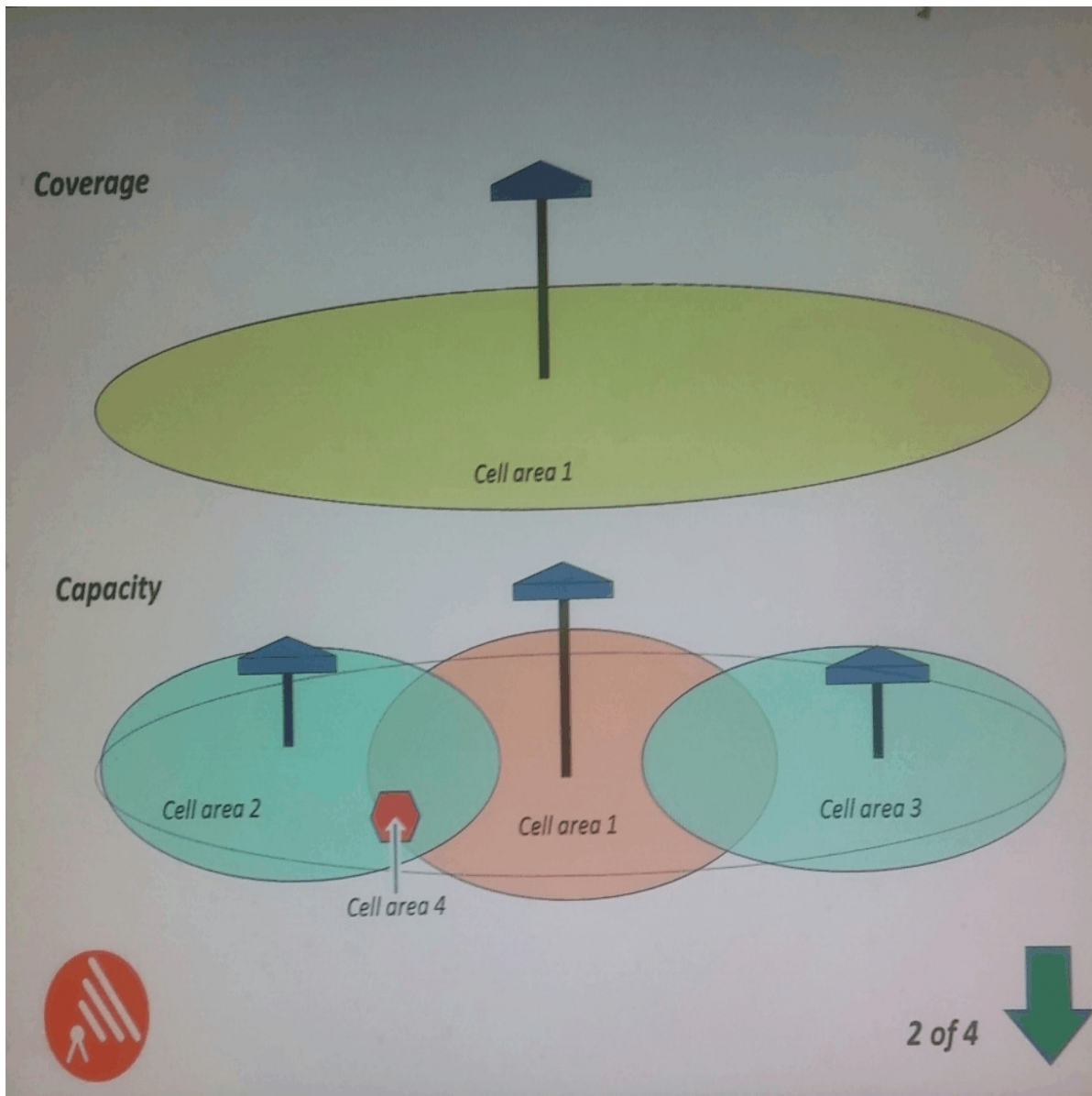
- Rapid demand for wireless services.
  - Smartphones and tablets.
  - Video streaming.
  - Landline phase-out.
- Not enough capacity.
  - Frequency shortage slow demand response.
  - More devices, more strain on the system.
- Not enough density.
  - Macrocells stretched too thin.
  - Mobile traffic exceeds ability of macrocells to handle it.
  - Growth is occurring in areas with few wireless resources (rural areas, exurbia).
- Preparing for Internet-of-Things (IoT).
  - Inter-Device communications will drive demand exponentially.
  - IoT well underway at consumer level. Will spread to Life-Saving (LS-IoT), Education (Ed-IoT), and Transportation.



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### Why Do Carriers Need Small Cells?

The problem is inadequate demand support –

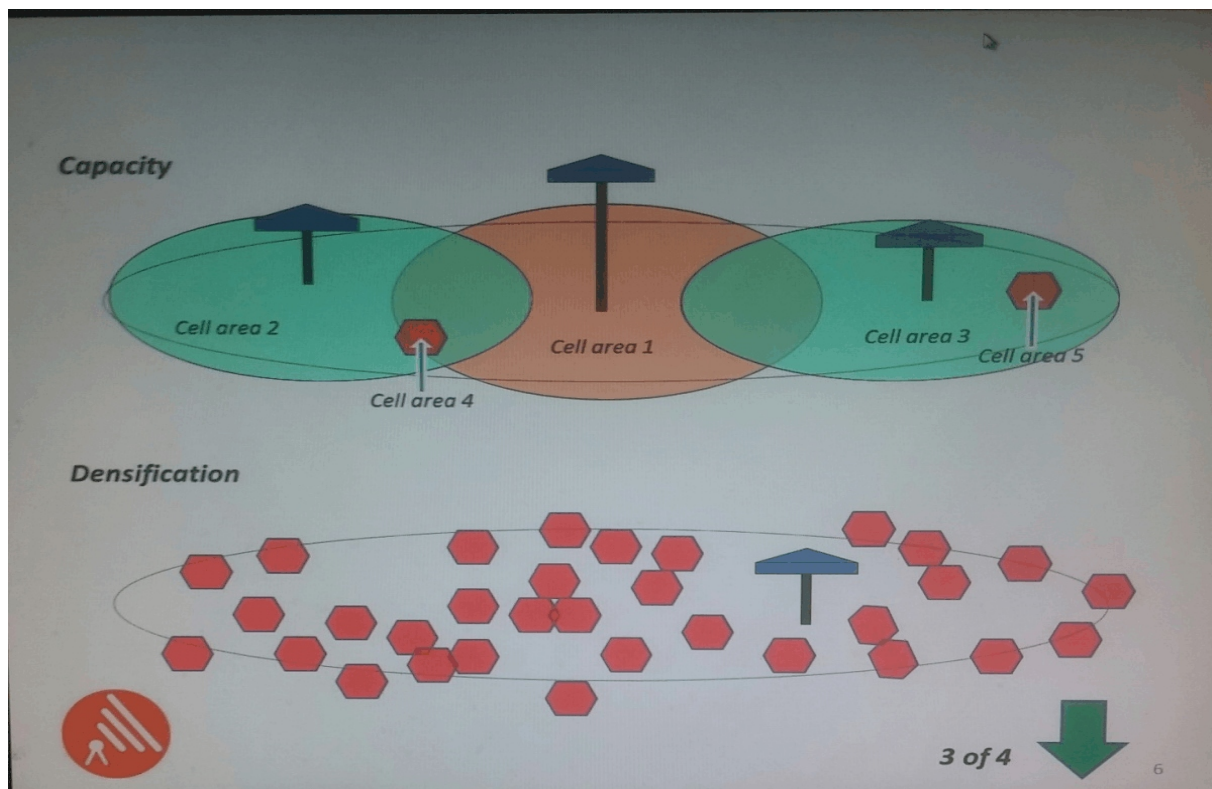


Small cells provide spot capacity.

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### Why Do Carriers Need Small Cells?

If within an area that is two square miles, you had 100 customers when the cell tower was built 10 years ago, and now you have 2000, you have a density problem. Small cells solve the problem of low signal capacity and high wireless demand.



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### **Location and Small Cells**

- Location is critical for small cells - Their purpose is to increase capacity and density.
- Small cells are currently used as gap fillers, but eventually they will provide seamless wireless coverage.
- How many small cells will a community need?

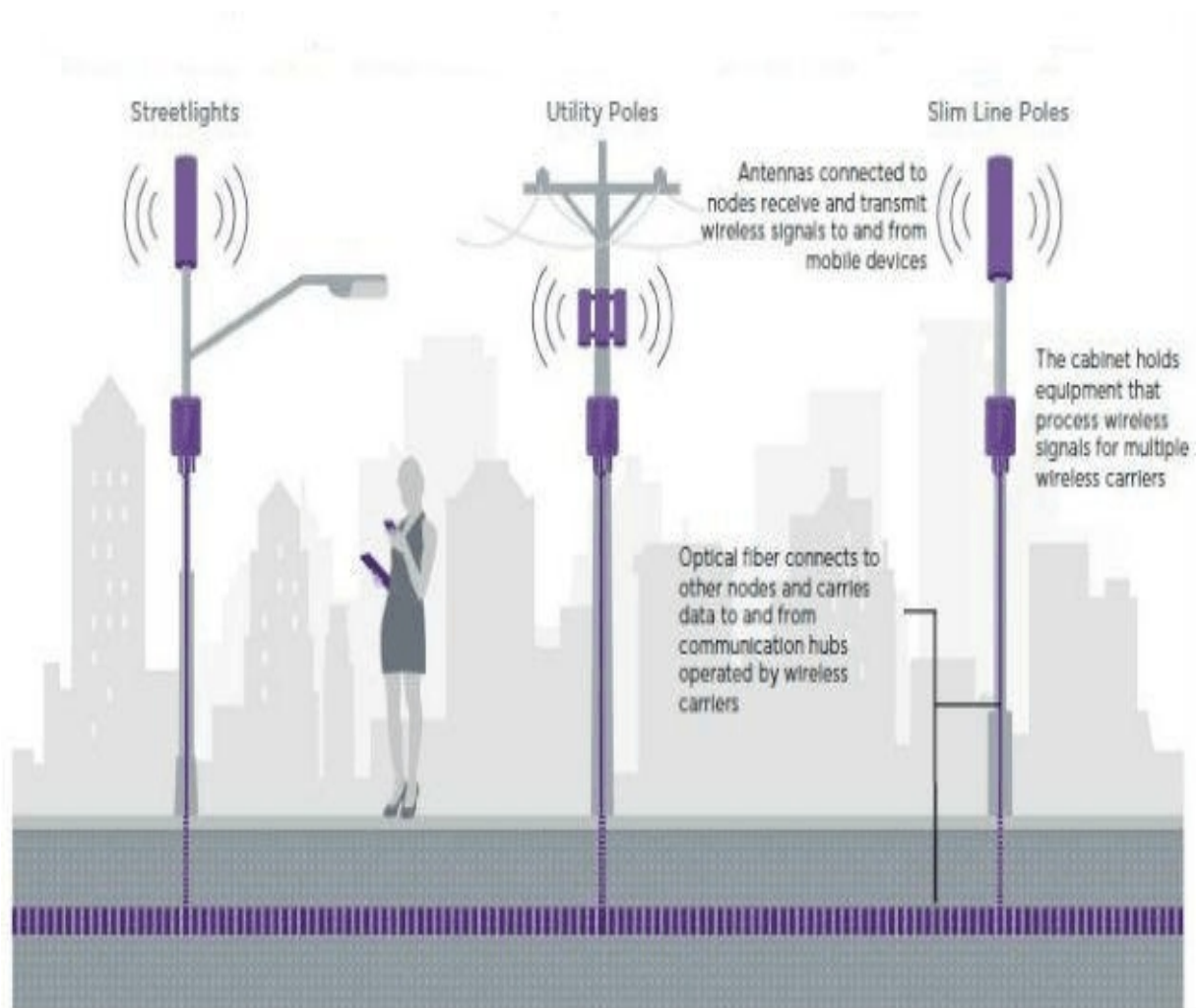
### **Example:**

- Industry estimates **10** small cell sites per square mile per carrier.
- **4** major carriers x **10** small cells per square mile x city size of **5** square miles = **200** small cells. If there is a carrier merger (Sprint/T-Mobile) reducing the number to 3 carriers, then **150** small cells – if demand requires numerous small cells.

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## **Location and Small Cells**

### **Where Will All The Small Cells Be Located?**



### **Two BIG Issues:**

- **Aesthetics**
- **Concealment**

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## **Location and Small Cells**

### **Aesthetic Issues:**

- Integration of small cell facilities with surrounding environment.
- Location of small cells in Historic Districts or Buildings, or near architecturally important sites.
- Placement of small cells in Right-of-Way – Do they create visual impediments to motorists?
- Some poles designed to hold small cells may be as tall as 90' - 120'.





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## **Location and Small Cells**

### **Aesthetic Issues:**

- Location of small cells in Historic Districts or buildings, or near architecturally important sites.



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## **Location and Small Cells**

### **Aesthetic Issues:**

- Placement of small cells in Right-of-Way – Do they create visual impediments to motorists?





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## **Location and Small Cells**

### **Noise Issues:**

- Small cells do not require generators, however, some require cooling fans which can make noise.
- Cooling fans may be pole-mounted or installed at ground level along with power and battery cabinets.
- These cabinets combined together may be sizeable – SB 1451 allows for up to 34 cubic feet.



- What can your city or county do? Require burial in a vault if necessary, or require a smaller, thinner structure that is self-containing.

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## **Zoning and Right-of Way Issues**

### Key Questions to Ask Before Reviewing Small Cell Apps:

- Does your city or county have a Right-of-Way Ordinance?
- Is the Right-of-Way outside of the zoning district or within the zoning district?
- Does the city or county have well-defined policies regarding the use of the ROW if it does not have an ordinance?
- Do you know your city or county's timeline for review of cell site applications? There are **three** federally-mandated shot clocks.
- If the ROW is located within your zoning districts, are there prohibitions of antennas (other than Ham Radio) in residential districts?
- Has a carrier approached the city or county about installing small cells on its property?

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### **Zoning and Right-of Way Issues**

- Federal law is changing and State law may also be changing – Your city or county's ROW ordinance, zoning ordinance, or ROW use policies need to reflect these changes.

### **How Can the City or County Address These Questions?**

- If the City or County has a ROW ordinance based on the IML model ordinance, consider adding modifications to the ordinance that address:
  - Maximum height for small cells.
  - Location on permitted structures (e.g., utility poles, traffic signals, street lights).
  - Concealment if small cell blends in with the structure.
  - No increase in height of structure by more than 10' without approval.
  - Projects that defeat the elements of the support structure that allow for concealment require approval.
  - Require antennas and cabling to be painted to match support structure.
  - No construction of small cell sites in wetlands.

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## **Zoning and Right-of Way Issues**

### **How Can the City or County Address These Questions?**

- If the ROW is within the zoning district, how does the city or county seek to treat small cells? It cannot deny the placement of a small cell in the ROW if the applicant is a utility, however it can regulate the placement and location.
- ROW policies and ordinances should reflect the shot clocks found in the Spectrum Act (47 USC ¶1.40001) or 2009 rulings based on the wording of Section 332 (c)(7) of the 1996 Telecom Act.
- **The Shot Clocks:**
  - 150 days for initial deployment.
  - 90 days for sites involving “Substantial Change.”
  - 60 days for Spectrum Act modification involving no “Substantial Change.”

**NOTE:** A city or county can toll the shot clock if the application is incomplete **and** the city or county notifies the applicant in writing within **30 days** to provide additional information. If the information is still incomplete, the shot clock can remain tolled if notice is given within **10 days**. The shot clock can be paused the carrier and the local government agree.

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### **Zoning and Right-of Way Issues**

#### **How Can the City or County Address These Questions?**

- Some cities and counties don't have a ROW ordinance and rely on policies instead. These policies should set up mechanisms for handling small cells that include various requirements applicable to other ROW users. The IML model Small Cell Ordinance can be used as a guide.
- Whether ROW policies or ROW ordinance, develop a specific application for macrocell and small cell sites based on Spectrum Act and '96 Telecom Act requirements as part of permitting.
- Small cells in ROWs pose a problem if the ROW is part of the zoning district.
  - Small cells can't be banned and Special Use status will be resisted by carriers.
    - SB 1451 would disallow treatment of ROW-based small cells as a Special Use.
    - Encourage concealment, equipment vaults, if possible, and direct power instead of large battery boxes.

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## **Zoning and Right-of Way Issues**

### **How Can the City or County Address These Questions?**

- When a carrier or their representative submit a small cell request, what then?
  - Know ahead – If in ROW, Public Works issue or Planning Department issue based on ROW status.
  - Get as much information as possible - structural evaluation is a **MUST!** Also needed is information on height, location of equipment, source of power, photo simulations.
  - Identify a plan reviewer who can carefully examine the plan. If your city or county doesn't have one, get assistance.
  - Sit down with the carrier or representative to discuss design ideas, safety issues, and timetable.
  - **Critical Point:** If the small cell is on municipal property, **negotiate a property use agreement that covers current and future small cells.**

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Key Points About Spectrum Act and Section 332( c)(7):

### **Spectrum Act (a/k/a Sec. 6409(a) of Middle Class Tax Relief and Job Creation Act of 2012):**

- Mandates approval of collocated cell sites, including tower, antenna structure and base station, that don't require "Substantial Change." Includes collocation, removal, and equipment replacement.
- Establishes criteria for "Substantial Change"
  - Tower height increase **outside Public ROW** by 10% or more than 20', whichever is greater.
  - Structure height **outside PROW** increase by 10% or more than 20', whichever is greater.
  - Adding appurtenance to tower or other structure that would protrude more than 20' or the width of the tower, whichever is greater.
  - Defeats existing concealment elements of support structure.
  - Involves excavation or deployment outside of current cell site.
  - Involves installing more than the standard number of new cabinets, up to 4 cabinets.
  - Does not comply with conditions of approval for eligible structure, provided that this limit does not apply if modification is consistent with above limits.



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Key Points About Spectrum Act and Section 332( c)(7):

### **Spectrum Act (a/k/a Sec. 6409(a) of Middle Class Tax Relief and Job Creation Act of 2012):**

- Permit applications still allowed, but limited to documentation reasonably related to determining whether the Eligible Facilities Request meets the requirements of the Spectrum Act.

### **Four Critical Points to Take Away From Spectrum Act:**

- If the Eligible Facilities Request (e.g., small cell application) does not involve a “Substantial Change” the city or county “. . . May not deny and shall approve any eligible facilities request for modification of an eligible support structure that does not substantially change the physical dimensions of such structure.”
- The Spectrum Act does **NOT** apply to a city or county when it is acting in a proprietary capacity (i.e., as a landlord).
- If a proposed collocation or modification requires a “Substantial Change” it does **NOT** fall under the regulatory regime of the Spectrum Act.
- An Eligible Facilities Request shall be **DEEMED GRANTED** if the city or county fails to take final action within 60 days, accounting for any tolling.

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Key Points About Spectrum Act and Section 332( c)(7):

### **Section 332( c)(7) - 1996 Telecommunications Act**

- Preserves state and local authority over zoning and land use decisions for “Personal wireless service facilities” but allows for limits, which include ruling on applications in a “Reasonable period” of time, which include “Shot clocks” for review and decisions on wireless applications. No “Deemed Granted” rule for 150-day initial deployment review periods.
- Requires that cities and counties may not unreasonably discriminate among providers of wireless services that are functionally equivalent.
- Preempts cities and counties from making decisions on wireless facilities applications based on “Environmental effects of radio frequency emissions” (RF). Providers are assumed to be in compliance with FCC RF regulations. Allows cities and counties to determine if a carrier’s application meets FCC RF requirements.
- Allows for a city or county to deny a wireless facilities application, but denial must be in writing and be supported by substantial evidence.

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## **Federal Regulatory Actions Underway**

- **Federal Communications Commission**
  - Mobilitie Petition for Declaratory Relief - 11/2016
    - Petition asks FCC to compel local governments to allow wireless facilities into Right-of-Way and at no cost.
    - Gives more weight to Section 253 of 1996 Telecom Act over Section 332 of 1996 Telecom Act (Federal guidelines over local zoning authority).
    - Comments and Reply Comments already filed. No expected action.
  - Wireless Deregulation Rulemaking - 4/2017
    - FCC Notice of Proposed Rulemaking makes all shot clock misses deemed granted and non-appealable to federal courts.
    - Gives more weight to Section 253 of 1996 Telecom Act over Section 332 of 1996 Telecom Act? What constitutes a prohibition of service?
    - Should the FCC ease procedures to comply with the National Environmental Policy Act?
    - Comments and Reply Comments already filed. Action in late 2017/early 2018?

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## **Federal Regulatory Actions Underway**

- Federal Communications Commission
  - Wireline Deregulation Rulemaking - 4/2017
    - FCC Notice of Proposed Rulemaking regarding pole attachments; access to conduits; retiring copper facilities; ROW access costs.
    - Reduce processing times, burdens for telco requests to discontinue wireline services to customers.
    - Gives more weight to Section 253 to set aside local laws as a prohibition of service.
    - Should the FCC ease procedures to comply with the National Environmental Policy Act?
    - Comments and Reply Comments already filed. Action in late 2017 or early 2018?

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### State - Local Regulatory Framework

- **Illinois State Law**

Public Utilities Act – 220 ILCS 5/13-401

Telephone Company Act – 220 ILCS 65/1, *et. al*

Infrastructure Maintenance Fee Act – 35 ILCS 635/10

**AT&T v. Village of Arlington Heights (1993)**

183 Ill.Dec. 720 – “Municipalities do not possess proprietary powers over the public streets. They only possess regulatory powers. The public streets are held in trust for the use of the public . . . As such, any payment to which defendants would be entitled should only cover actual costs, including inspection, regulatory, administrative and repair costs associated with the tunneling under public streets.”

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### State - Local Regulatory Framework

- **Local Ordinance**
  - Wireless siting rules
  - Right-of-Way management rules and policies
  - Applications
  - Standard permit conditions
  - Fees

If approved, SB 1451 will substantially change the ways that cities and counties regulate small wireless facilities.

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### **State Regulatory Action Underway**

- Senate Bill 1451 sponsored by Sen. Link (D-Waukegan) and Reps. Burke (D-Oak Lawn) and Breen (R-Downers Grove)

### **NUMEROUS CHANGES TO THE WAY LOCAL GOVERNMENTS REGULATE WIRELESS FACILITIES WOULD BE MADE BY THIS LEGISLATION:**

#### **SB 1451 Would:**

- Exempt City of Chicago, Park, Forest Preserve and Conservation Districts.
- Allow carriers to access the ROW. Permit and application fees of up to \$350 would be allowed. There are questions about what the fees may exclude and if staff time or outside review can be charged.
- Require small cells and micro wireless facilities to be a Permitted Use in all ROWs and in all areas outside of the ROW not primarily zoned for residential use.
- Prevent municipalities from limiting placement of pole-mounted facilities by minimum horizontal separation.



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### **SB 1451 Effects:**

- Allow for the attachment of small wireless facilities to municipal light, sign and traffic control poles without paying the full cost of the modifications needed to support the equipment. Defines “Utility Pole” to include street lights, traffic signals, or other signage.
- Pay much less than current agreements for rent of that pole space and would expose municipalities to risks caused by the installation without fully protecting local residents from the costs of those risks. Limits rent to \$200/pole/year.
- The proposed 90-day time limit for permitting, including bulk permits of up to 25 locations, will likely overwhelm municipal staffs and result in many permits being automatically ‘deemed approved’ without adequate review.
- Cities and counties would also be required to approve or deny the siting of the small cell within 90 days of receipt of a permit application. The wireless provider would have up to 180 days to install the small cell.
- Cities and counties would have little leeway to provide alternate locations for industry’s chosen sites.

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### **SB 1451 Effects:**

- Would require a permit duration of 10 years, even though SB 1451 sunsets in 2020 and federal law may change before then.
- Prohibit cities and counties from requiring applications or permits or charge fees for routine maintenance, replacement of wireless facilities with facilities of the same size or less, or for installation, placement, maintenance or replacement of micro-wireless facilities strung by Communications Service Providers between utility poles.
- Would allow cities and counties to require Right-of-Way permits for traffic related activities.

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## **SB 1451 Effects:**

- Define Micro Wireless Facilities as no larger than 24" in length, 15" in width, and 12" in height with an antenna of up to 11" in height. Allows for a small cell to have up to 34 cubic feet of space.



- The amendment exempts privately owned utility poles belonging to Local Exchange Carriers (e.g., AT&T).

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### **SB 1451 Effects:**

- Would not authorize any Person to offer communications service or install, place, maintain or operate communications facilities in the Right-of-Way. Grandfathers existing agreements between municipalities and communications service providers.
- Prohibits municipalities from 1) adopting or enforcing any regulations on the placement or operation of communications facilities in the Right-of-Way by any provider other than those granted under SB 1451 to operate in the Right-of-Way, or 2) regulate any communications service or impose or collect any taxes or fees or charges not specifically authorized by federal or state law.
- Prohibits exclusive agreements between municipalities and Persons to make communications service attachments to authority utility poles.
- Requires non-discriminatory rates and fees, but limits annual fees imposed by municipalities to either the lesser of those adopted by the FCC (under 47 USC 224(d), currently \$7/pole/year) or \$10 per year per municipally-owned utility pole.

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### Municipal Concerns With SB 1451:

- Impacts deployment of future public safety technology.
- Prevents cities and counties from reserving their own facilities for future usage or requiring relocation of equipment if other public use of a facility is needed.
- Requires approval of locations that are not in accordance with local standards or are in locations where significant capital resources have been invested to bury utilities.
- Allows commercial interests to take control of public property without just compensation.
- Places city and county officials at a disadvantage when conducting plan review processes.
- Limits the ability of cities and counties to manage Right-of-Way congestion.
- Provides inadequate time to fully vet each facility prior to required approval.
- Proposed “Sunset” clause conflicts with required 10-year agreement terms.

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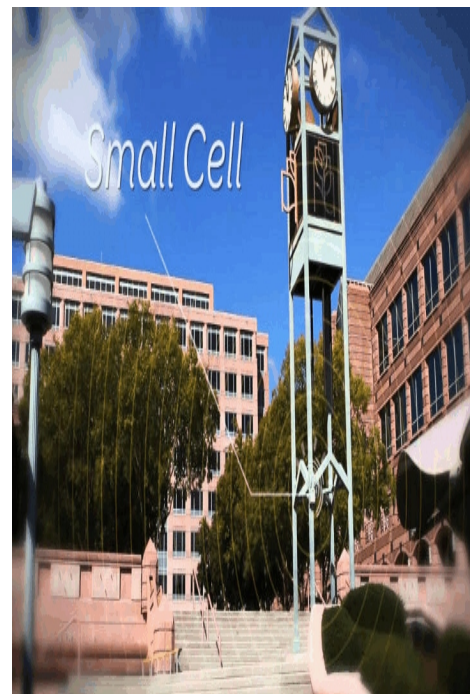
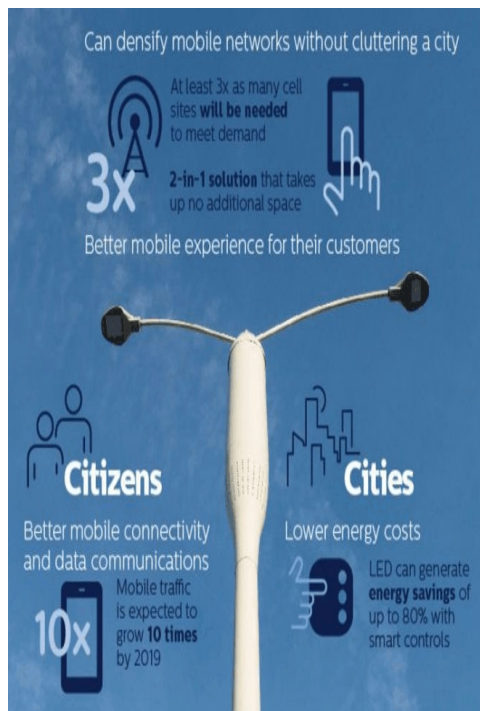
### **To Conclude:**

- SB 1451 has been moved from the House Rules Committee to the House floor while discussions between the Wireless Industry, Cities, and Counties continue.
- Progress has been made on this bill since it was introduced. The local government viewpoint is making headway, but much remains to be done.
- Cities and counties need to continue to work with Councils of Government, and local government organizations to make sure their voice is heard.
- Small cells and 5G facilities are coming. Cities and counties will play a critical role in their deployment and citizens are anxiously awaiting the arrival of faster and more reliable wireless services. Cities and counties need to work with carriers to make better broadband happen.

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## To Conclude:

- Cities and counties should work with carriers toward innovative and creative solutions for wireless facilities —





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Work closely with the wireless carriers proposing a facility, because the last thing your city or county needs is:



QUESTIONS?

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