How to Proactively Manage Small Cell Technology in Your Community

One City's Experience, A Technical Overview, & Lessons Learned,

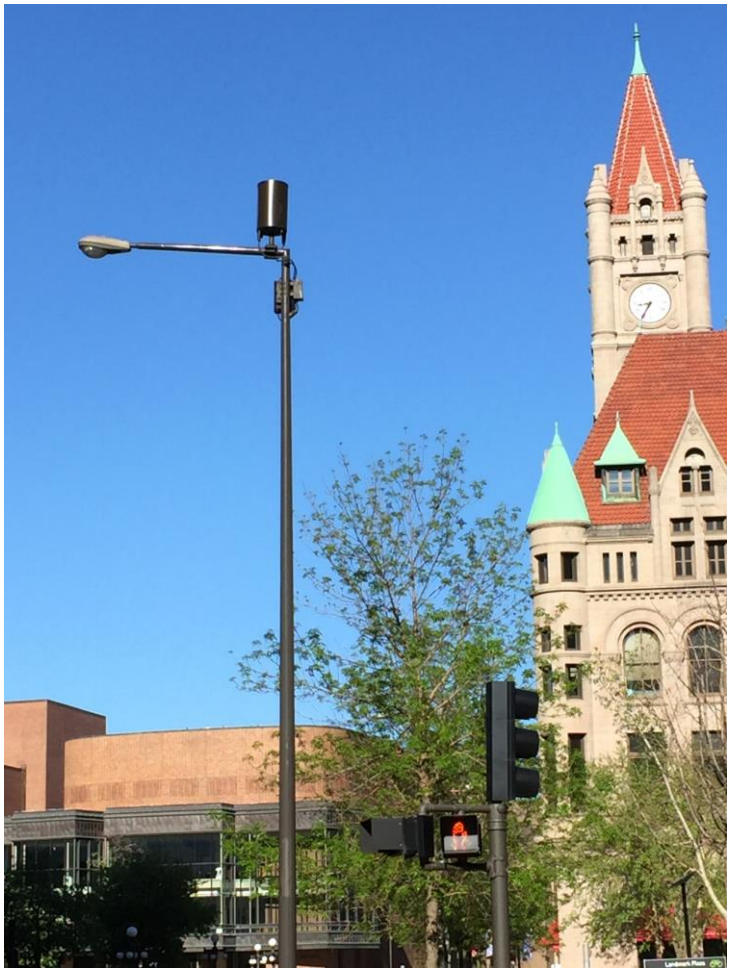
APWA MN Chapter Fall Conference
November 21, 2019

Presenters

- Eriks Ludins, City of Saint Paul Public Works Department
- Dale Romsos, SEH

Overview

- Saint Paul's Small Cells Overview
- Technical Overview of Small Cell Technology – 5G and More
  - Telecom 101
  - State and Federal law
  - Industry components
- Lessons Learned by Saint Paul in Small Cell Management
- Q and A

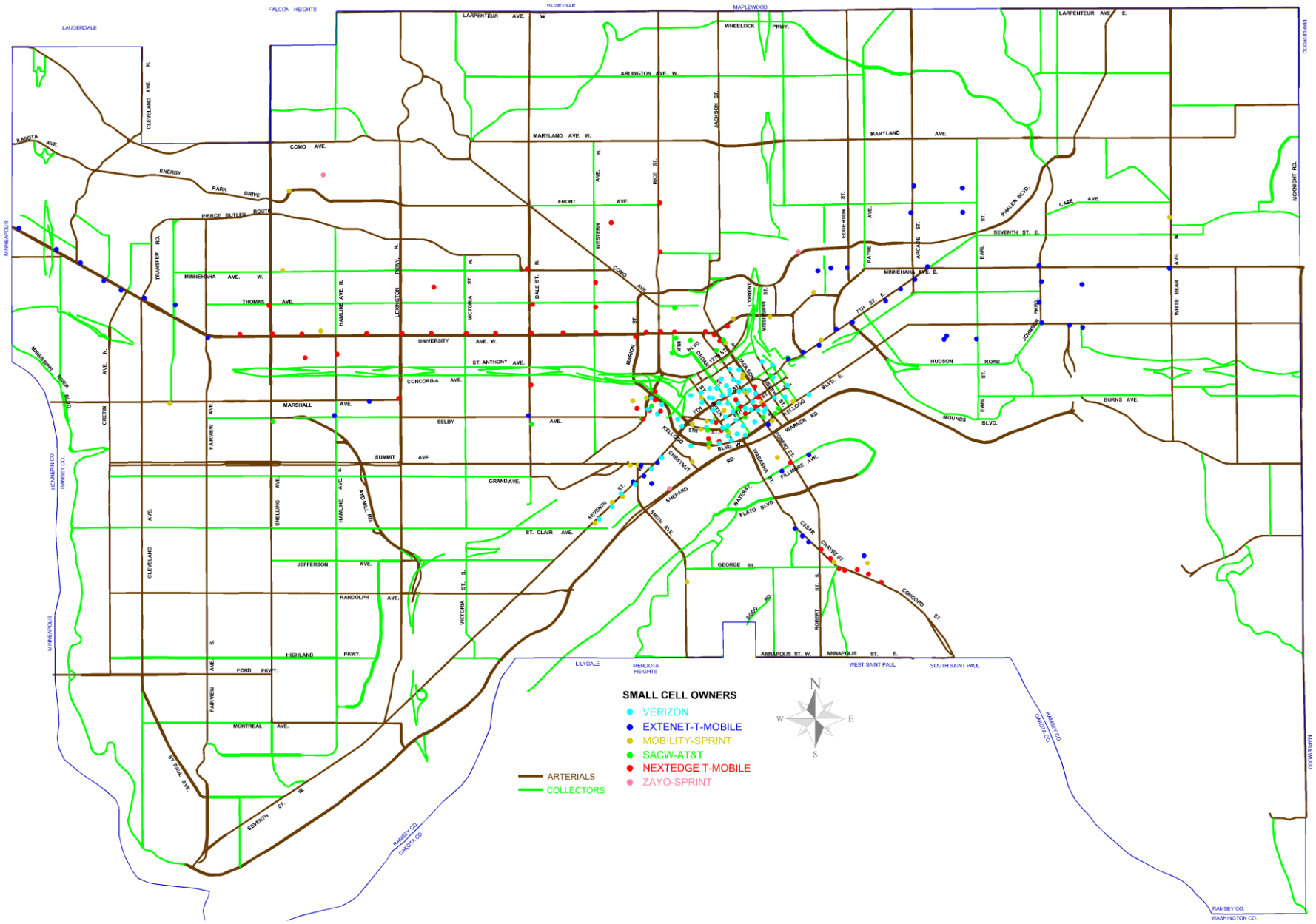


Sample Small Cell Installation in Saint Paul

St Paul Small Cell Quick Facts

- St. Paul Population: 313,500 2019 EST
- 212 small cells currently in place
- Six Providers – 4 Carriers
  2 Third Party
- Approximately 24 hours of staff time to review each potential location
- City Attorney spent months negotiating each Master License Agreement
- St. Paul owns and maintains overwhelming majority of street lights

St Paul Small Cell Map



Sample Small Cell Installation in Saint Paul

Saint Paul's Goals for Small Cell Management

- Comply with State and Federal Law
- Manage Assets
- Recover Costs
- Retain Aesthetics
- Clear Professional Relationship with Service Providers
- Provide Citizens with a Much Desired Service

How Does Saint Paul Pursue these Goals?

- St. Paul has Master License Agreements (MLAs) with six service providers:
    - Verizon
    - Mobilitie (Sprint)
    - T-Mobile
    - AT&T
    - ExteNet (3rd Party)
    - Zayo (3rd Party)

- Each individual antenna location is authorized by a Supplemental License Agreement (SLA) which specifies the location, pole type, power source etc.
- To date we have 212 signed SLAs.
- Big push prior to Super Bowl (Feb. 2018) and Final 4 (April 2019)

What Does Saint Paul Recommend for Managing Small Cell Technologies?

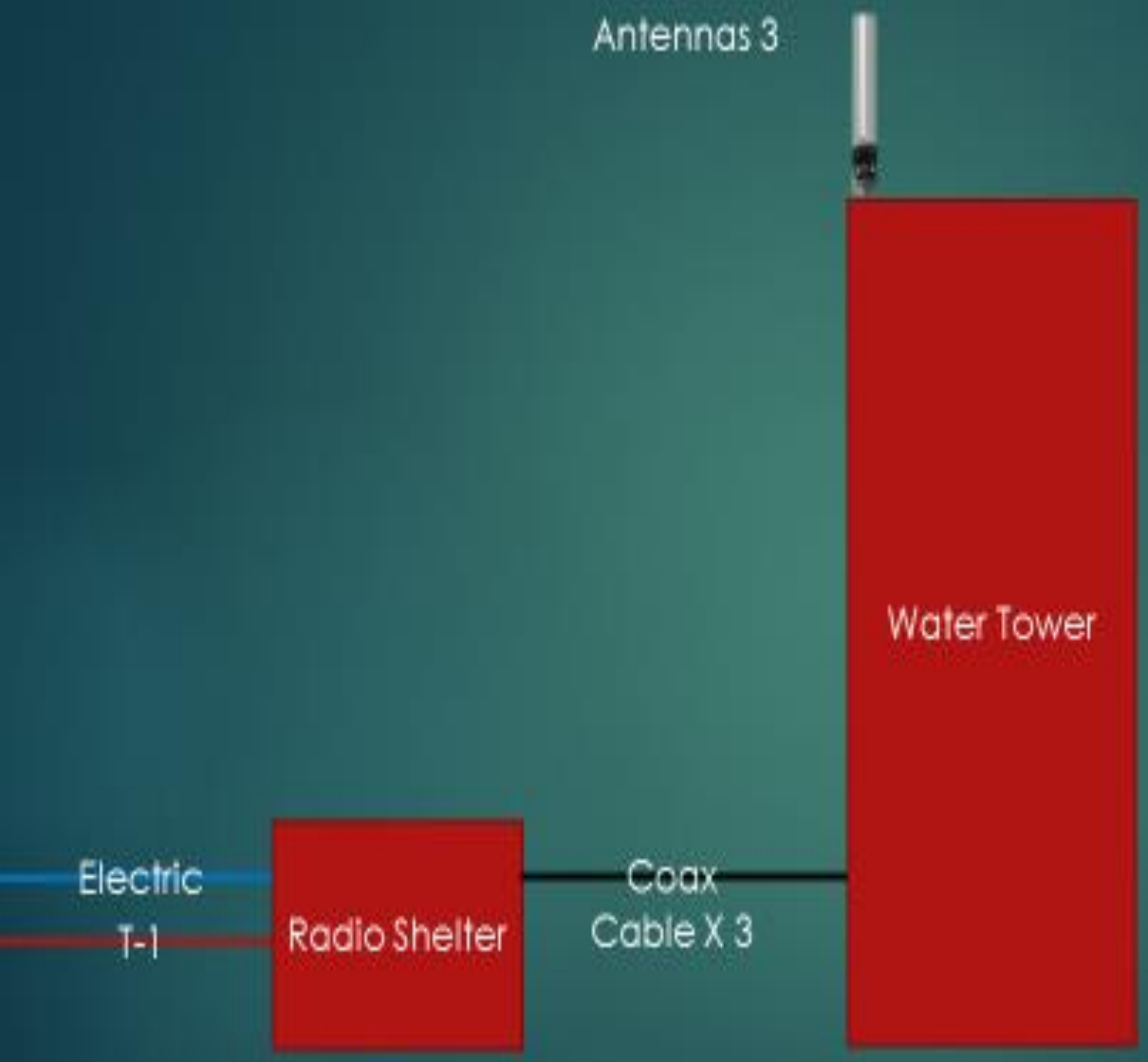
- Learn the law – connections with your legal staff
- Learn the technology – connections with your electricians +
- Establish standards for structures, analyses, application contents and level of detail, construction staging/TPAR, etc.
- Establish processes for review, approval, cost tracking, asset management, etc.
  - Ensure as necessary involvement from traffic engineer, planning/zoning, building inspection, public works permitting, maintenance staff, etc.
  - Keep in mind staffing needs to comply with shot clock
- Use available resources (League of MN Cities, etc.)
- Keep apprised of political activity on the part of service providers
- Meet with service providers and endeavor to have a professional relationship

Now that you have some context for how a city has experienced small cells…

On to the technical overview so you can engage well with small cell companies…

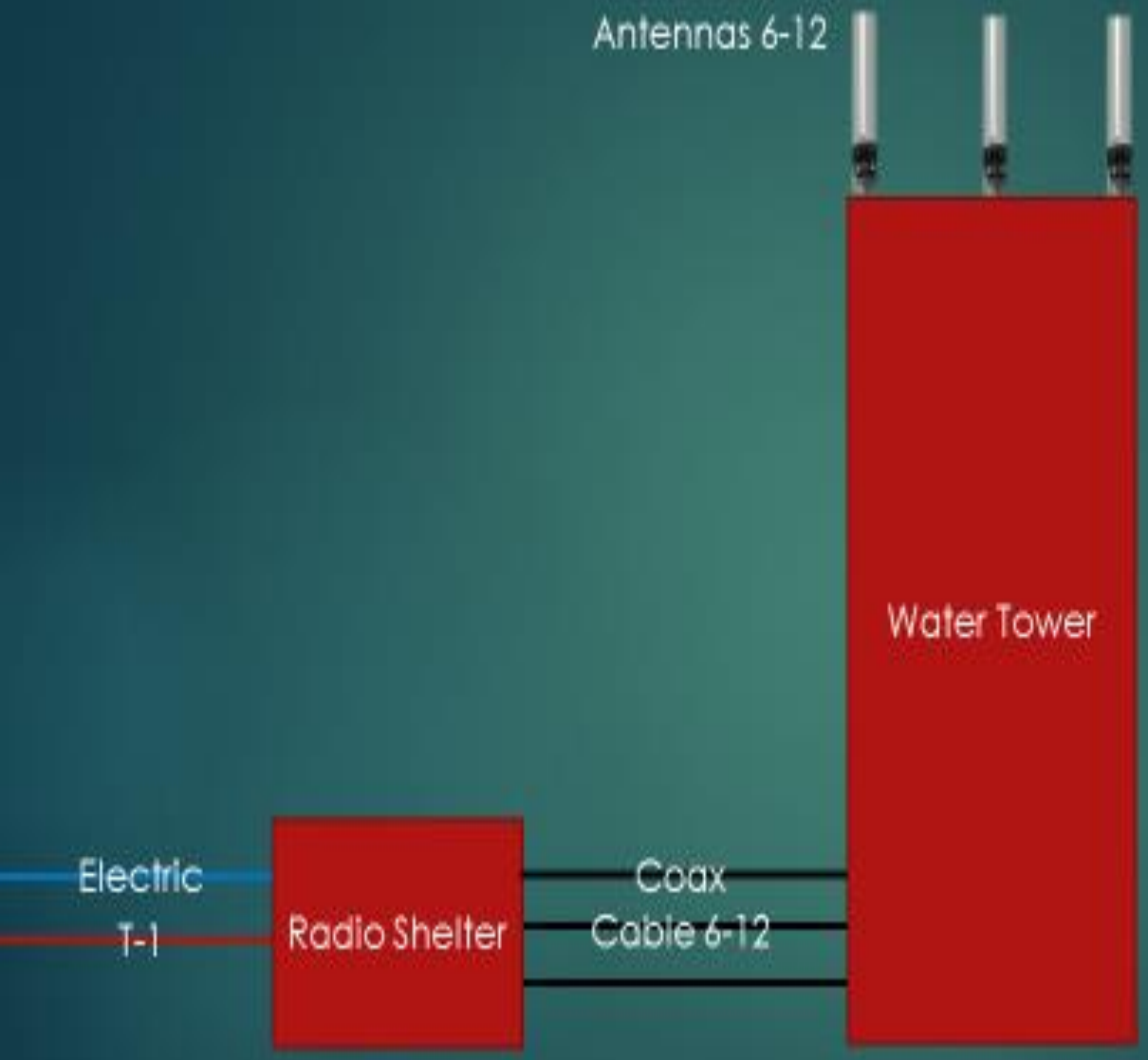
5G AND THE DEVELOPMENT OF SMALL CELL TECHNOLOGY

- Telecom 101
- Omni’s
- Sectorized
- 3G
- 4G
- Small Cell development


Antennas 3
Water Tower
Electric
T-1
Radio Shelter
Coax
Cable X 3

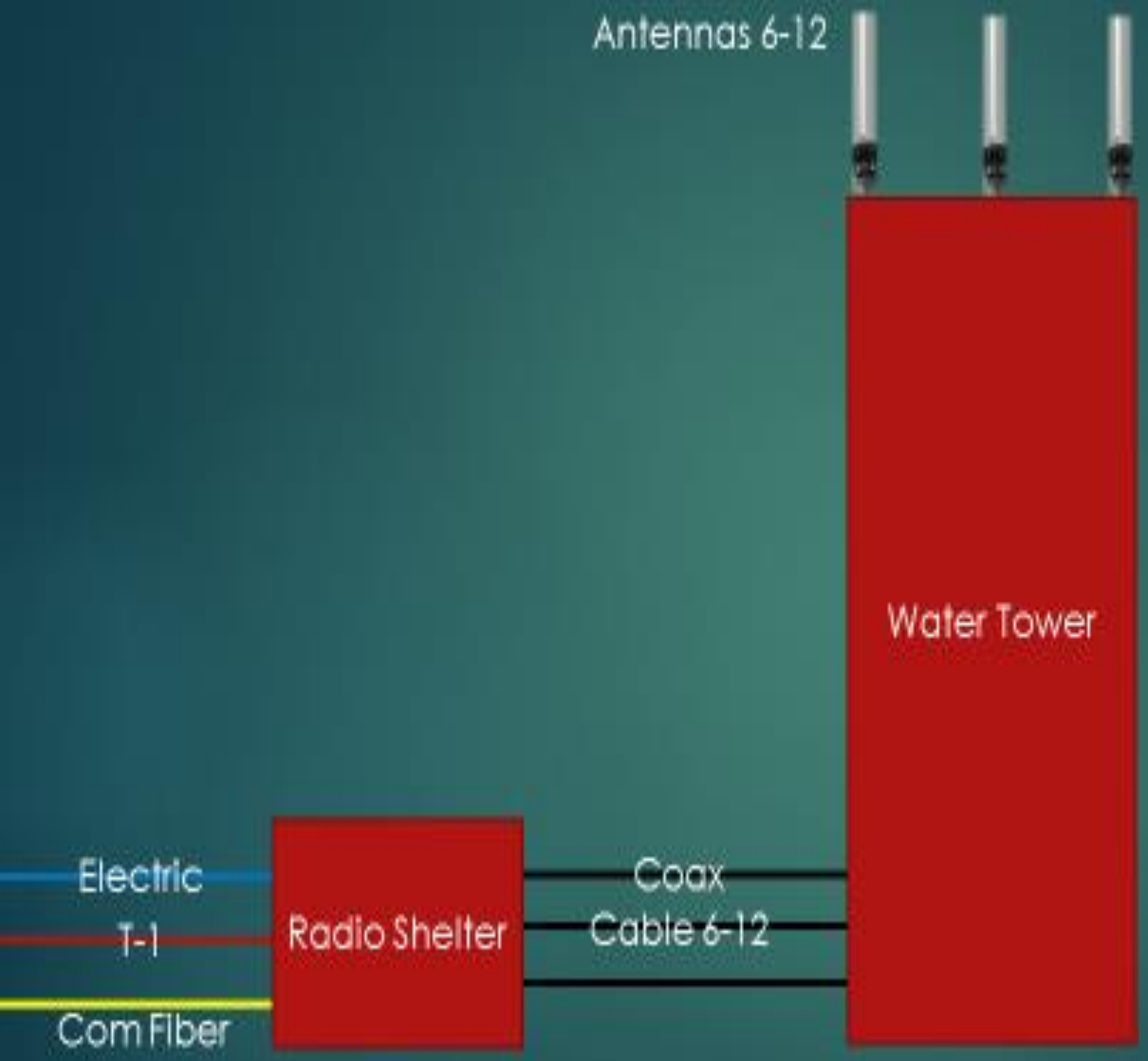
Omni

Omni


Antennas 6-12
Water Tower
Electric
T-1
Radio Shelter
Coax
Cable 6-12

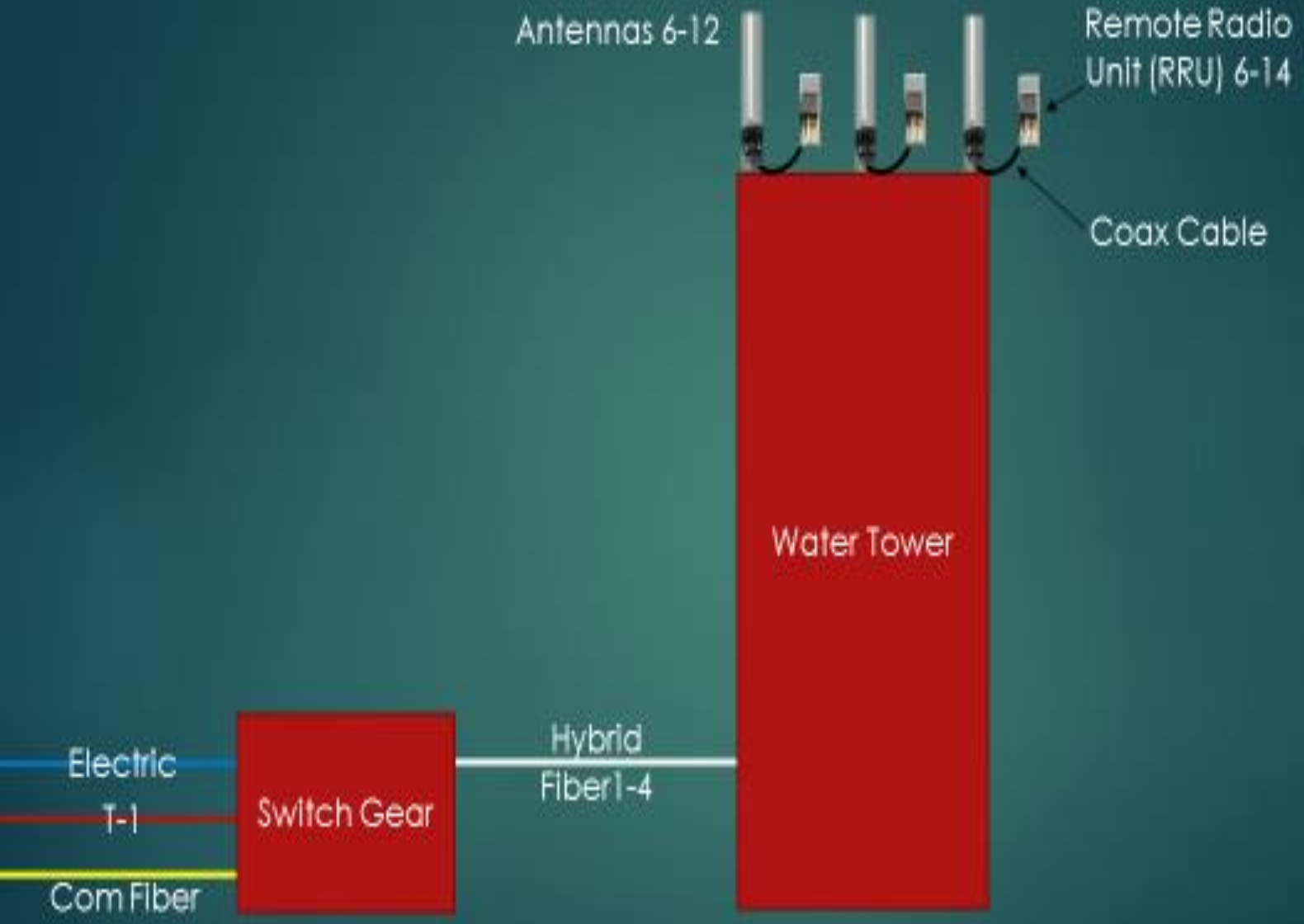
Sectorized

Sectorized



Sectorized 3G

Sectorized 3G



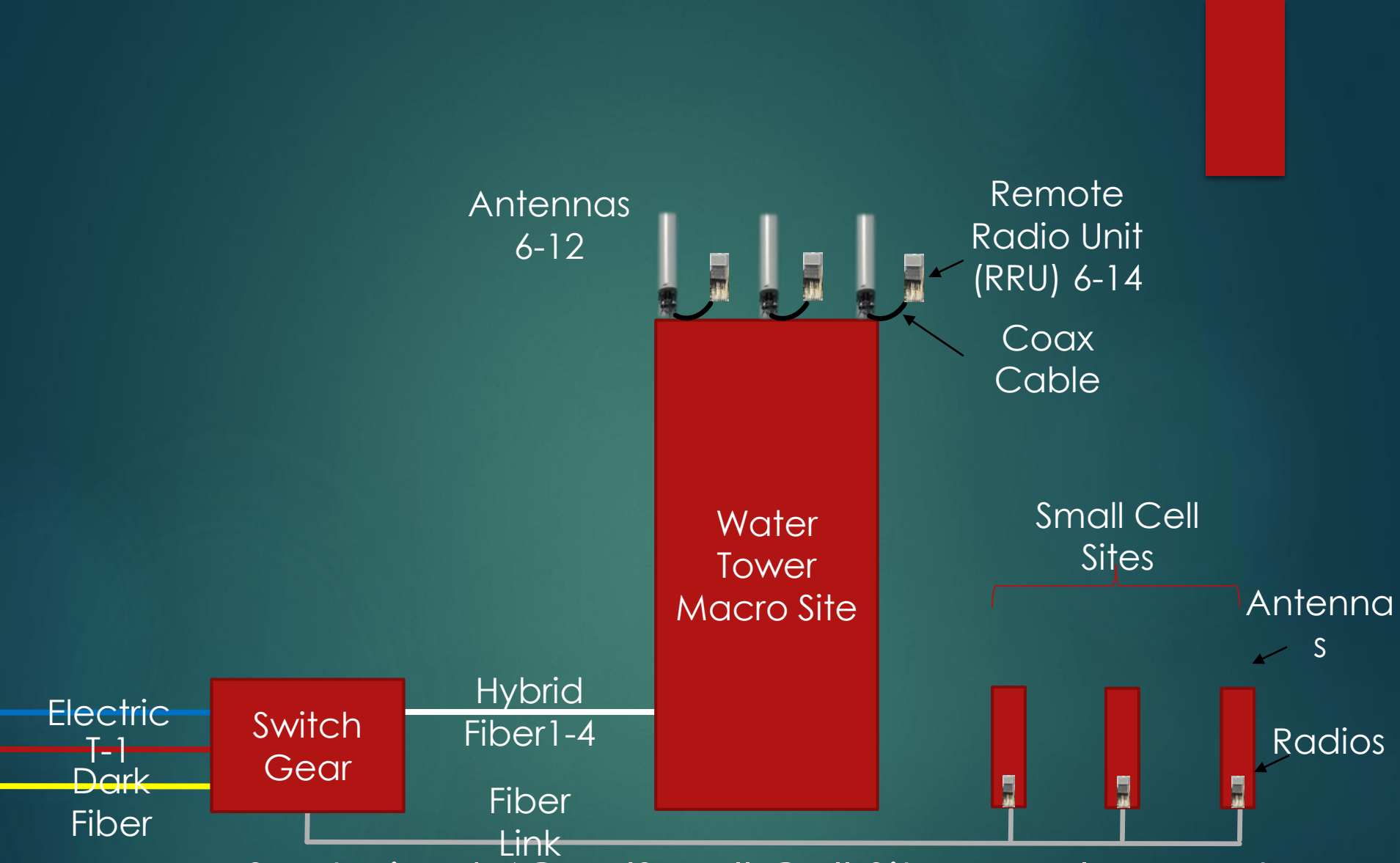
Sectorized 4G

Sectorized 4G

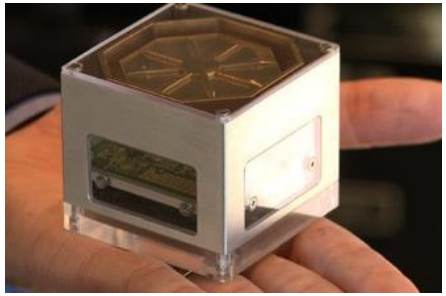
5G AND THE DEVELOPMENT OF SMALL CELL TECHNOLOGY

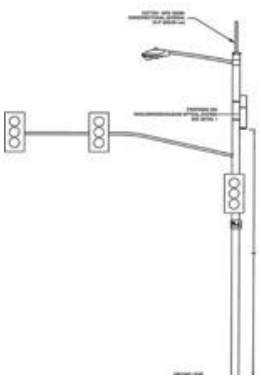
What are Small Cells

- Carrier - Technology Upgrade
- Purpose – To enhance Macro Site Capacity
- Location Specific
- Equipment Make up



Sectorized 4G w/Small Cell Site Development





Canister antenna
4 feet
Panel antennas
2 feet
Vents
4 feet

4 ft
35 ft
4 ft
4 ft

5G AND THE DEVELOPMENT OF SMALL CELL TECHNOLOGY

Why the Concern

- Lack of Carrier Presented Information
  - Mobilitie
- Access to the Right of Way
  - Location
  - Who Determines
  - Co-location
- Aesthetics

extenet systems

PUC1 / Steel Pole Typical

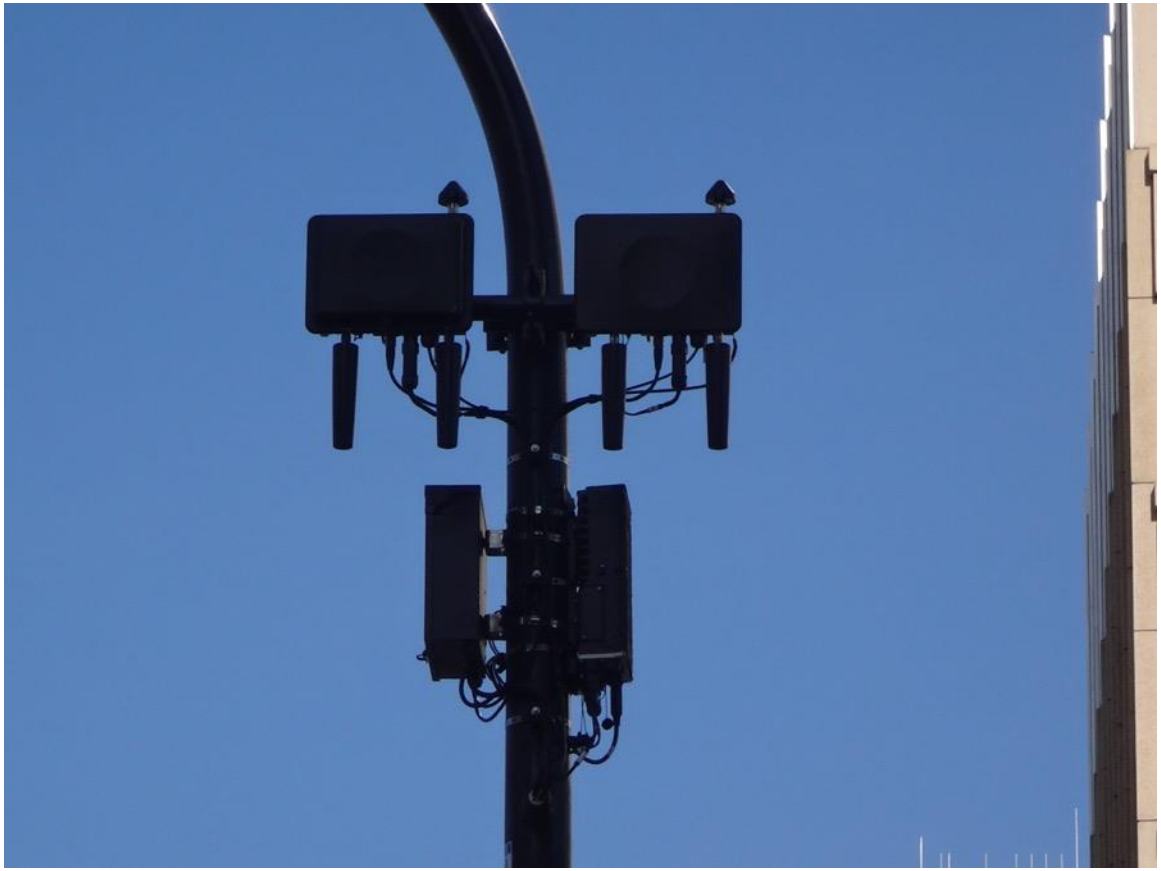
San Francisco, CA

12/8/14

Applied Imagination 510 914-0500

Sectorized 4G w/Small Cell Site Development

5G AND THE DEVELOPMENT OF SMALL CELL TECHNOLOGY



Small Cell Site?

Small Cell Site?

State & Federal Law

Governing Documents

- Article 9 Telecommunications - Minnesota Statutes 2016 section 237.162 as amended
- Federal Communications Commission (FCC) – CIRC1809-02

STATE & FEDERAL LAW

State & Federal Law

- Need for Jurisdiction over R/W
- Need for Policy/Process Implementation

5G AND THE DEVELOPMENT OF SMALL CELL TECHNOLOGY

State & Federal Law

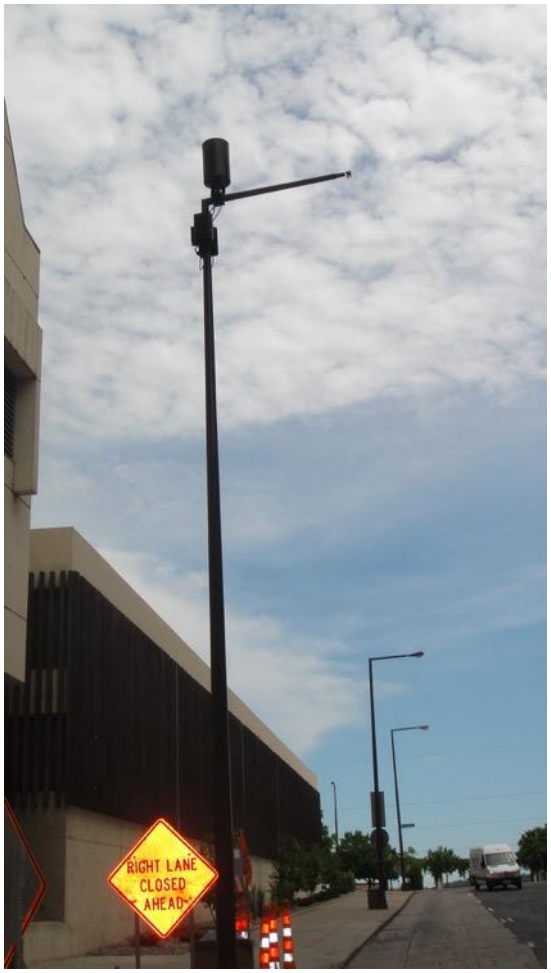
Justification

- Identification of Responsibilities

The Shot Clock

- Development of Standards

Aesthetics



5G AND THE DEVELOPMENT OF SMALL CELL TECHNOLOGY

State & Federal Law

- Due to variations in state law, local authority, and existing ordinances (among other things), there is no “one-size-fits-all” solution for complying with the FCC order, which took effect on Jan. 14.
- Localities were given until April 15 to finalize aesthetic standards.

SEH

State & Federal Law

Commission Note:

Aesthetic requirements are not preempted "if they are (1) reasonable, (2) no more burdensome than those applied to other types of infrastructure deployments, and (3) objective and published in advance." To be objective, aesthetic requirements, "must incorporate clearly defined and ascertainable standards, applied in a principled manner."

SEH

State & Federal Law

Templates are Available

- Ordinances
- Permit Applications
- Agreements

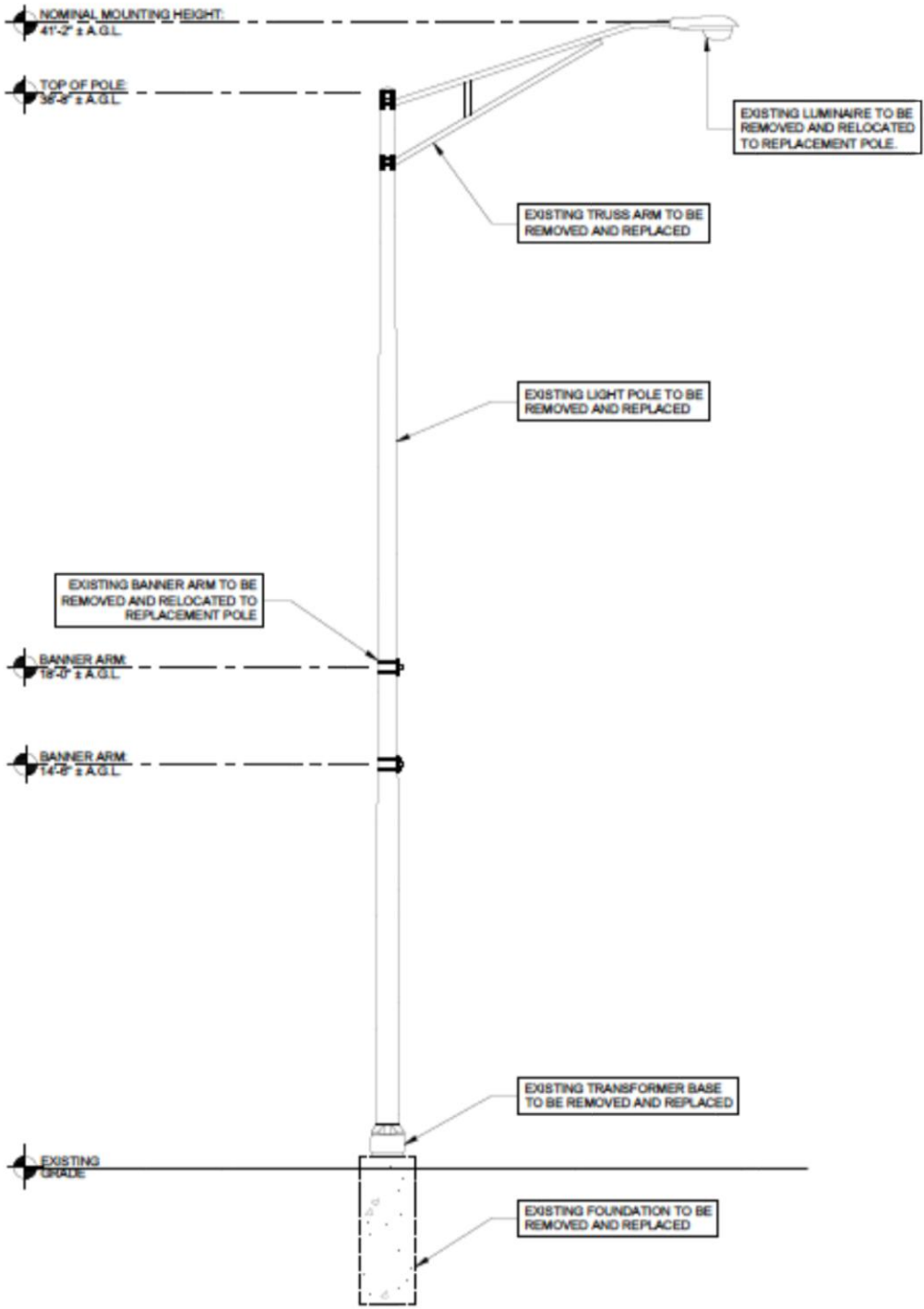
As developed by the National League of Cities and League of Minnesota Cities.

SEH

Industry Components

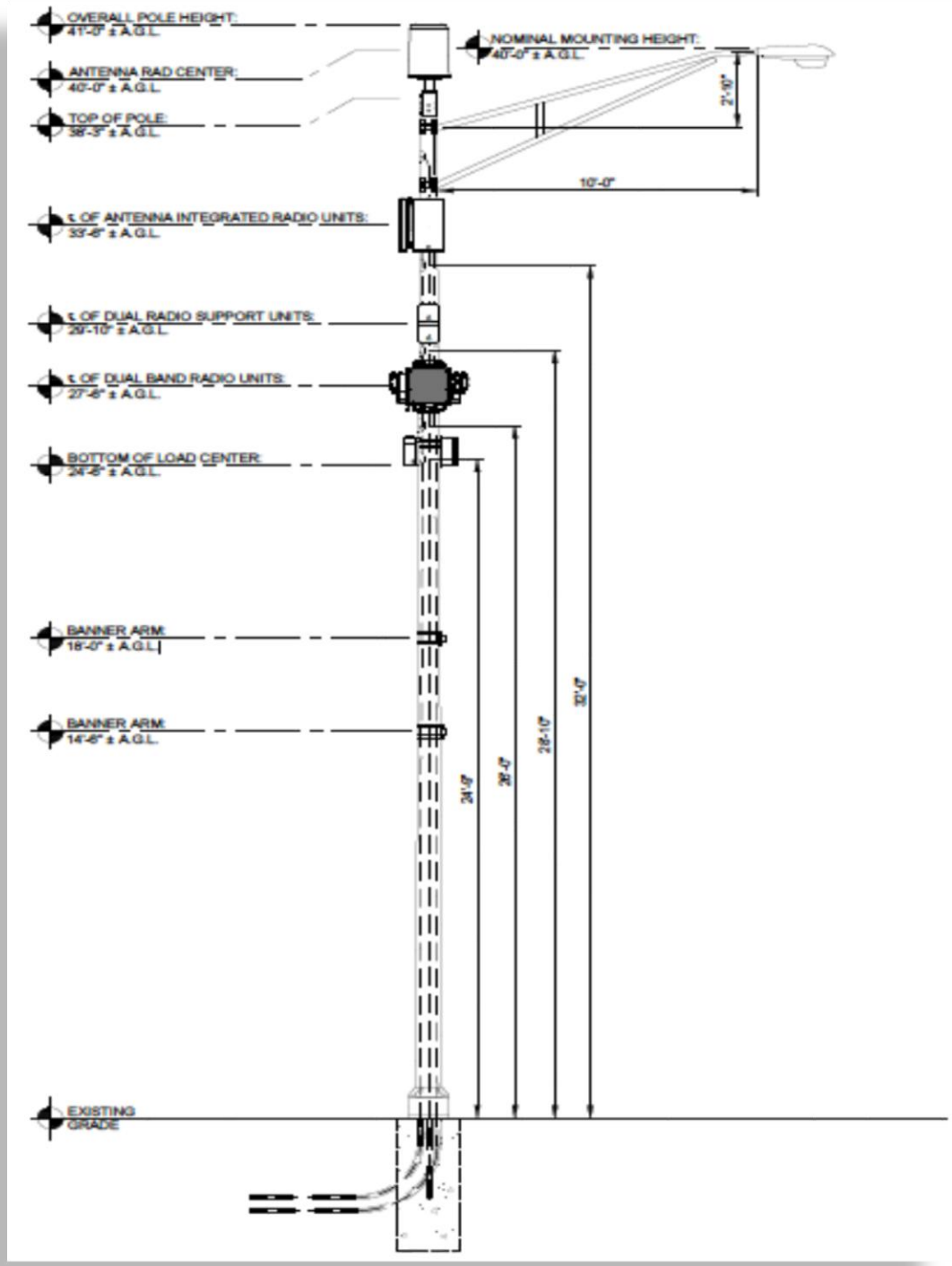
EMS

Existing Street Light Pole



New Small Cell Pole

- ✓ Foundation replaced
- ✓ Overall Pole Height Increased 9”
- ✓ Luminaire Mounting Height stays the same
- ✓ Outside Diameter likely increases to 8” – 10”
- ✓ Wall Thickness of Pole Increased
- ✓ Small Cell Equipment Added
  - 4G Cantenna
  - Pole Top Cantenna Mount
  - 5G Antennas (Qty 3)
  - Midpoint Equipment Mount
  - Dual Radio Support Units (Qty 2)
  - Twin Triplexers (Qty 2)
  - AC/DC Power Converters (Qty 2)
  - Load Center
- ✓ Qty 5 Additional Handholes



Example Small Cell Equipment Specs

- ✓ 4G Cantenna = **40 lbs** and EPA of 3 Sq. Ft
- ✓ Pole Top Mount = **28 lbs** and 2.24 Sq. Ft.
- ✓ 5G Antennas (Qty 3) = **135 lbs** total and EPA of 7.05 Sq. Ft.
- ✓ Dual Radio Support Units (Qty 2) = **44 lbs** and EPA of 2.2 Sq. Ft.
- ✓ Midpoint Mount, Twin Triplexers (Qty 2) & Power Converters = **276 lbs** and EPA of 10.86 Sq. Ft.
- ✓ Load Center = **10 lbs** and EPA of .94 Sq. Ft.

Total Additional Equipment Weight = 533 lbs

5G Antennas

Or

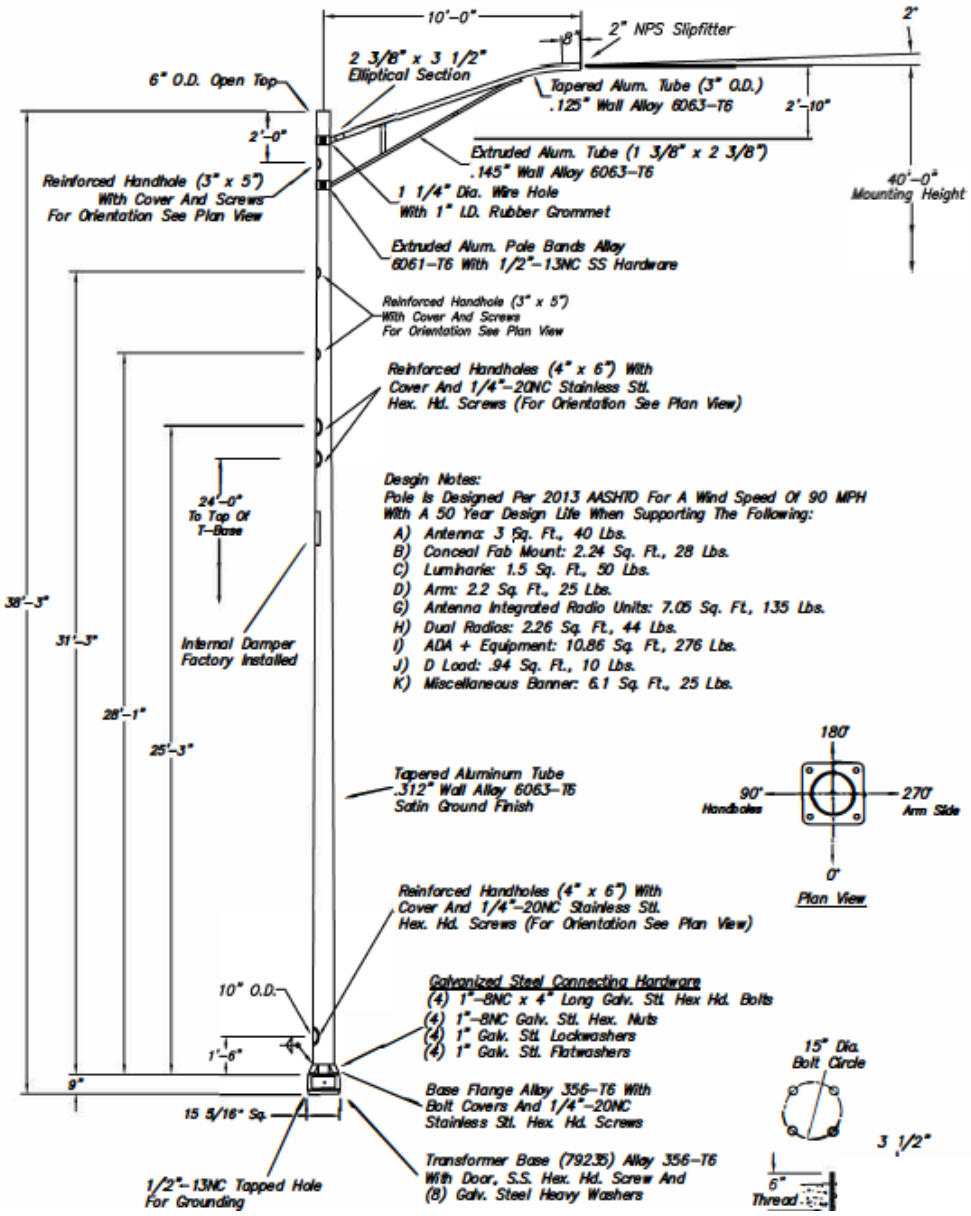
4G Cantennas

Or

AC/DC Power Converter

*Equipment specs and images are for examples and illustration purposes only. Actual equipment may vary slightly.

Small Cell Pole Design



How can you be proactive?

Begin asking questions of your pole provider….

- ✓ What is your pole provider's experience with small cell?
- ✓ Does your pole provider offer fully engineered small cell designs?
- ✓ 90% solution – Begin working with your pole provider on a pole design that meets your needs.

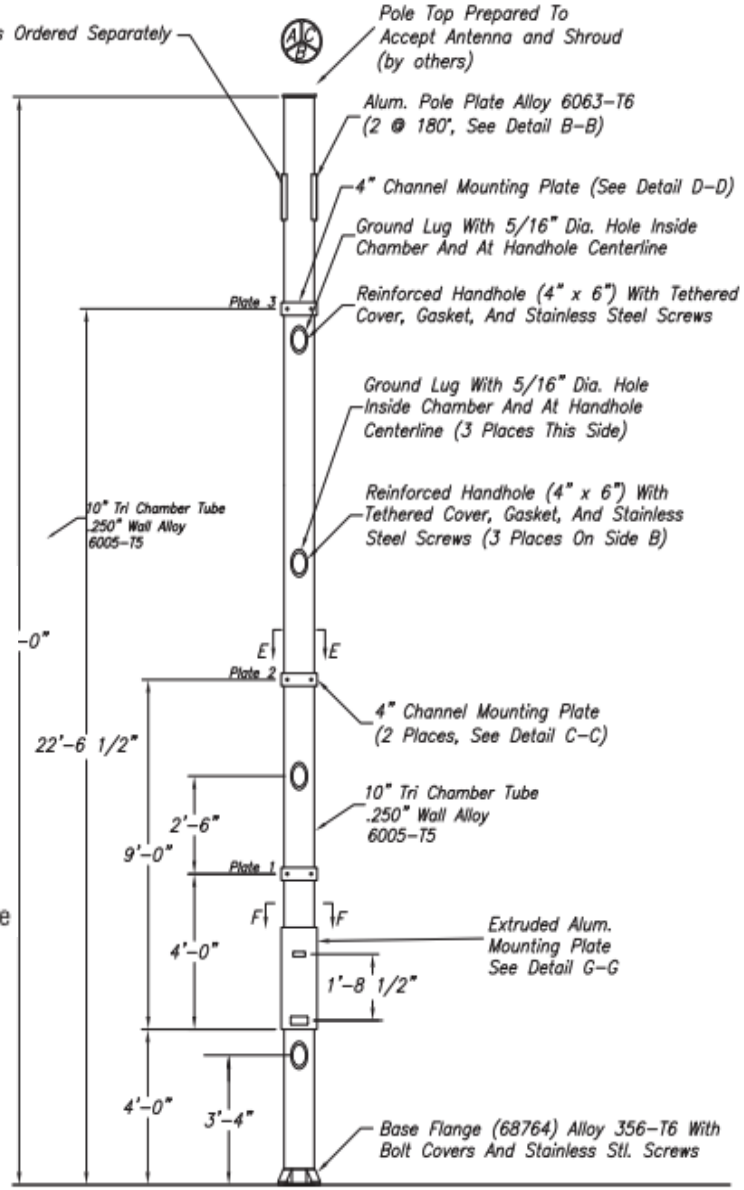
Unique Solutions – Multi-Chamber Design

Dual-Chamber

Tri-Chamber

Tri-Chamber Fluted

Dual-Chamber Square



Unique Solutions – Smart Trac Design

Smart Trac poles allow a customer to future-proof their pole with the ability to connect accessories to the pole via a track system at anytime during the life of the pole.

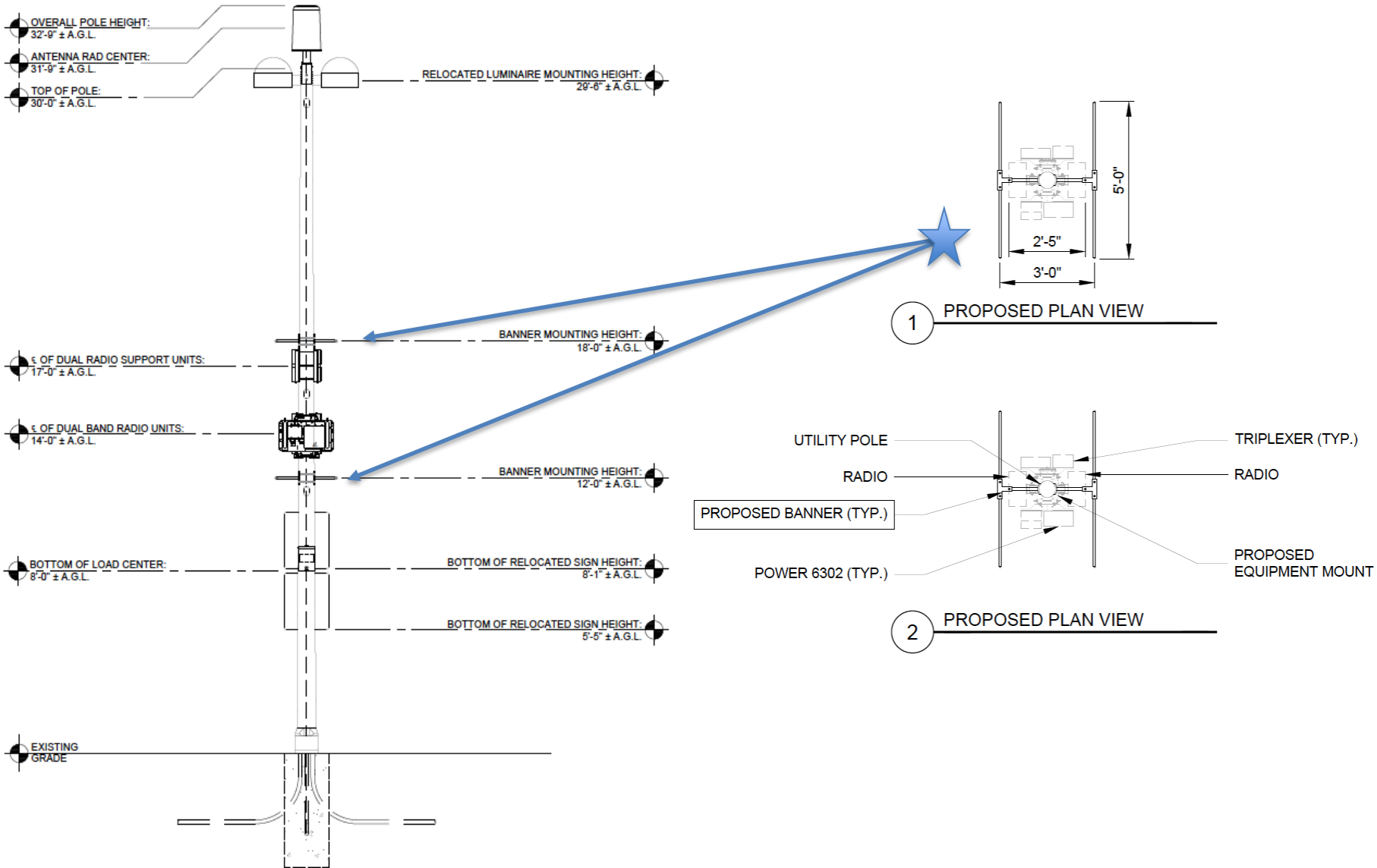
SMART TRAC, Quad-Chamber Round

Unique Solutions – Smart Base "Stealth Pole"

- ✓ Smart Bases provide a cabinet at the base of the pole to house all of the small cell support equipment except the antenna at the top of the pole.
- ✓ ~18" diameter and 8-10' tall

Equipment Concealment Options

Utilize banner arms to hide radios, AC/DC power converters and other equipment



Lessons Learned in St. Paul

- Companies may misrepresent timelines, and other factual aspects to try to influence processing
- Be cognizant of what is approved and what is then installed
- State and Federal laws refer specifically to cell service providers. Third party providers are not covered by the same regulations
- Negotiate a thorough Master License Agreement

What Does the Future Hold for a City like Saint Paul?

- Current MLAs have 10-year term with possible extensions of three 5-year terms. First MLA comes to term in 2024.
- New technologies? New laws?
- 5-G requires larger/heavier antenna systems. Many existing poles would not be able to support. City is preparing standards for permitted stand-alone poles to support only small cell equipment in the right of way but many issues exist for spacing, utility conflicts, historic districts, etc.
- First inquiries about 5-G placements are coming in – but what comes after 5-G?
- Autonomous vehicle systems technology – competition for space?

Q and A

Thank You!

Eriks Ludins, eriks.Ludins@ci.stpaul.mn.us

651-266-9810

Dale Romsos, dromsos@sehinc.com

651-414-5186