

Design Guidelines for Small Cells, Wireless Support Structures, & Associated Infrastructure

First Edition

July 2018

Revised October 2018

1. Introduction

1.1 Background

Ohio House Bill 478 (“HB 478”), effective August 1, 2018, modifies the Ohio Revised Code concerning the regulation of wireless service deployed as small cell facilities within the municipal right-of-way.

The law’s intent is to promote the rapid deployment of small cell facilities within the right-of-way as part of the next generation of wireless service known as “5G”. Municipalities are obligated to grant or deny consent in a timely manner, with the recognition that a municipality may adopt design guidelines for the purpose of reviewing proposed small cell facilities. Although exempt from HB 478, small cell facilities proposed for poles owned by the Department of Public Utilities should follow the design guidelines to follow.

1.2 Purpose

The purpose of this document is to provide application procedures and design guidance for a number of potential buildout scenarios related to the deployment of small cell wireless facilities. The document will be used to:

- Provide uniformly applied criteria in a non-discriminatory fashion to all applicants;
- Support wireless service providers in the efficient deployment of small cell technology, to the benefit of residents, businesses, and visitors in the city of Columbus;
- Preserve and enhance the character of the city’s neighborhoods and commercial corridors by ensuring that small cell deployments are appropriate for their given context;
- Inform the siting, design, landscaping, screening, camouflaging, public art opportunities, and other pertinent factors in the installation of small cell facilities;
- Promote small cell deployment that is of a high quality of design;
- Provide flexibility to allow for future technological advancements in small cells to be taken into account; and
- Comply with, rather than conflict with or preempt, all applicable state and federal laws, including relevant FCC rulings.

1.3 Applicability

Placement or modification of a small cell facility and/or wireless support structure shall comply with these design guidelines at the time the permit for installation or modification is approved and as amended from time to time. These design guidelines are in addition to other rules and regulations promulgated pursuant to Title 9 and the Department of Public Service's ROW regulations. Wireless support structures owned by the Department of Public Utilities are exempt from the provisions of HB 478. Nonetheless, small cell facilities proposed on wireless support structures owned by the Department of Public Utilities should follow the design guidelines to follow, unless otherwise agreed to by written agreement with the Department of Public Utilities.

2. Application Types

Existing Wireless Support Structure Applications

2.1 Type 1: New Small Cell Facility

This type of application involves the installation of a new small cell facility on an existing structure within the right-of-way. This type of installation is referred to as collocation. This can occur on an existing utility pole, streetlight, traffic signal, or other existing pole. Attachments to poles owned by the Department of Public Utilities will require a separate agreement.

Standard Review Timeframe = 90 Days (Review timelines for attachment to poles owned by the Department of Public Utilities will comply with the pole attachment agreement.)

2.2 Type 2: Substantial Modification of Small Cell Facility

This type of application involves the modification of a small cell facility on an existing structure within the right-of-way that is considered “substantial” under federal law, defined as:

- (1) *It increases the height of the structure by more than 10% or more than ten feet, whichever is greater;*
 - (a) *Changes in height should be measured from the original support structure in cases where deployments are or will be separated horizontally, such as on buildings’ rooftops; in other circumstances, changes in height should be measured from the dimensions of the wireless support structure, inclusive of originally approved appurtenances and any modifications that were approved prior to the passage of the Spectrum Act.*
- (2) *It involves adding an appurtenance to the body of the wireless support structure that would protrude from the edge of the structure by more than six feet;*
- (3) *It involves installation of more than the standard number of new equipment cabinets for the technology involved, but not to exceed four cabinets; or, for wireless support structures in the public rights-of-way, it involves installation of any new equipment cabinets on the ground if there are no pre-existing ground cabinets associated with the structure, or else involves installation of ground cabinets that are more than 10% larger in height or overall volume than any other ground cabinets associated with the structure; and/or*
- (4) *It entails any excavation or deployment outside the current site.*

Standard Review Timeframe = 90 Days

2.3 Type 3: Non-Substantial Modification of Small Cell Facility

This type of application involves the modification of a new small cell facility on an existing structure within the right-of-way that is not considered “substantial” under federal law (see above definition of “substantial”). This type of install is referred to as an “eligible facility request”.

Standard Review Timeframe = 60 Days

New Wireless Support Structure Application

2.4 Type 4: New Small Cell Facility

This type of application involves the installation of a new small cell facility on a new wireless support structure within the right-of-way.

For Type 4 applications, the City of Columbus may request dedication of the new wireless support structure to the City of Columbus.

Standard Review Timeframe = 120 Days

Replacement Wireless Support Structure Application

2.5 Type 5: New Small Cell Facility

This type of application involves the installation of a new small cell facility on a new wireless support structure within the right-of-way that is replacing an existing wireless support structure at the same location. This may occur when the existing pole does not meet the needs of the applicant or a proposed small cell facility would not meet the design guidelines as provided by the City of Columbus.

For Type 5 applications, the City of Columbus may request dedication of the new wireless support structure to the City of Columbus.

Standard Review Timeframe = 120 Days

3. Application Requirements

3.1 Pre-Application Meeting

The City strongly recommends a pre-submittal meeting to meet with potential applicants and discuss projects on a conceptual level. The meeting is intended to identify the correct application type and content requirements for any given project, and also to create an informal forum in which applicants and the City can discuss any concerns that should be addressed as soon as possible to avoid any unnecessary delays in the processing of an application and deployment of wireless facilities in the City.

An appointment is required for all pre-submittal meetings. City staff may establish regular hours in which appointments are available. City staff will endeavor to provide applicants with an appointment within approximately five (5) business days after receipt of a written or email request. Each meeting is generally limited to discussion of up to five potential projects, but applicants may request to discuss additional projects provided that the additional time required does not impact other applicants' ability to obtain an appointment.

3.2 Tolling of Applications

The City will toll the timeline for review:

- (a) By mutual agreement between the applicant and the City,
- (b) In cases where the City determines the application is incomplete, or
- (c) When the number of applications is likely to result in difficulty processing them within the time limits noted under Application Types (Section 2) due to staff limitations. This would occur if the City received more than 90 applications within a consecutive 30 day period. For applications beyond the first 90, tolling shall be done as shown in Table 1 below.

Population threshold	Application threshold	Applications for 1st tolling period (21 days)	Applications for 2nd tolling period (15 days)	Applications for 3rd tolling period (15 days)
100,001 or more	90	91-120	121-150	151-180

Table 1 –
Schedule of tolling of applications for small cell facility applications

3.3 Required Submittal Materials

Prior to submitting an application, the applicant is strongly recommended to complete a pre-application meeting. Once completed, an official application may be submitted, to include:

1. A permit application per the Department of Public Service's requirements, to include, at a minimum:
 - a. Name of company seeking permit
 - b. Point of contact
 - i. Mailing address
 - ii. Email address
 - iii. Phone number
 - c. Written documentation of agent designation
2. Application Type (see Section 2).
 - a. For Type 1 and Type 2 applications, the City of Columbus, in order to encourage collocation of small cell facilities by different carriers, may request an access agreement allowing other carriers to use the same wireless support structure where technically feasible. Demonstrative proof must be provided as to why collocation is not feasible.
 - b. For Type 4 and Type 5 applications, the City of Columbus may request dedication of the new wireless support structure to the City of Columbus.
3. Permit Fee of \$250 (2018).
 - a. Future permit fees are as follow: \$275 (August 2023), \$300 (August 2028)
 - b. Fees for attachment to poles owned by the Department of Public Utilities will comply with the pole attachment agreement.
4. Fully dimensioned site plan (prepared, sealed, stamped, and signed by a Professional Engineer licensed and registered by the State of Ohio).
 - a. Must depict any existing nearby wireless facilities (including from other carriers), with all existing transmission equipment identified; other improvements; the proposed facility, with all proposed transmission equipment and other improvements; and the boundaries of the area surrounding the proposed facility and any associated access or utility easements and setbacks.
5. Fully dimensioned elevation drawings (prepared, sealed, stamped, and signed by a Professional Engineer licensed and registered by the State of Ohio).
6. Structural Calculations (prepared, sealed, stamped, and signed by a Professional Engineer licensed and registered by the State of Ohio).
7. Color sample of existing pole (if applicable) with proposed paint color for the small cell facility.
8. Photo simulations from a least three reasonable line-of-site locations near the proposed project site.
 - a. The photo sims must be taken from the viewpoints of the greatest pedestrian or vehicular traffic. Angle of photo sim separation must be at 90 degrees or greater and provide a full profile depiction.
 - b. Photo sims should include all cabling, conduit, RF stickers, and identification stickers.
 - c. For existing poles that are leaning and slated for replacement, the photo sim should show the proposed upright pole.

- d. Photo sims should accurately reflect any proposed equipment offset from the pole
 - e. Include date of photo simulation
 - f. Photo sims should include all equipment proposed, including electric meter (if required), disconnect, and ground mounted equipment.
9. Equipment specifications:
- a. Manufacturer name and model number
 - b. Physical dimensions including, without limitation, height, width, depth, volume and weight with mounts and other necessary hardware;
 - c. Technical rendering of all external components, including enclosures and all attachment hardware; and
 - d. The ambient noise level generated from the equipment, if any at 3 feet away and 10 feet away.
10. Landscape plans (for sites with ground-mounted equipment or cabinets)
- a. Planting details
 - b. Plant species
 - c. Plant quantities
 - d. Spacing
 - e. Height/size at installation
 - f. Projected height/size at maturity
11. RF Compliance Affidavit
- a. Applicants must submit a sworn affidavit prepared and signed by an RF engineer with knowledge about the proposed project that affirms the proposed project will be compliant with all applicable governmental regulations in connection with human exposure to radiofrequency emissions. The affidavit must include:
 - i. All frequencies on which the equipment will operate;
 - ii. How many channels will be used on each frequency;
 - iii. The effective radiated power ("ERP") output level in measured watts; and
 - iv. The height above ground for the lowest point on the lowest transmitter. The required disclosures above must be included for all transmitters on the support structure, which includes without limitation existing collocated antennas and antennas used for wireless backhaul (such as microwave dish antenna or U/E relay).
12. A webmap with publicly downloadable GIS data displaying a current accounting of active small cell facility locations within the City of Columbus as of the application date (maintained in an ongoing fashion).

3.4 Incomplete Applications

If the City determines during its review that the application is incomplete, the City will notify the applicant and suspend further review until the missing items are provided. Consistent with state and federal requirements, the City will toll the review timeline for incomplete applications. If the City determines the application is still incomplete after receipt of additional application materials, the City will toll the timeline again until the application is deemed complete

4. Siting

4.1 Existing Utility Pole Siting Preferences

The City of Columbus recognizes that every location is unique, however, the following list represents the City's preferences when siting small cells on existing City and non-City owned utility poles. The list is provided in order of preference, with number 1 being the most preferred.

1. Poles that have an existing small cell facility.
2. Guy stubs - Poles that do not have any electrical or communications; they simply provide a structural tie point for a guy wire for a neighboring pole
3. Poles with overhead secondary power conductors only (600 volts or less)
4. Primary electric poles with no attached equipment (with specific City approval for facilities owned by the Department of Public Utilities) Equipment includes transformers, reclosers, switches, capacitors, etc.)

4.2 General Restrictions on New Wood Poles

Collocation of small cell facilities on existing poles is a priority. Where a new pole is proposed at any location, the City reserves the right to require a metal pole rather than a wood pole based on the character of the proposed site location. In particular, new wood poles are strongly discouraged within the following areas:

1. Downtown District
2. East Franklinton District
3. University District
4. Historic Districts
 - a. Brewery District
 - b. German Village
 - c. Italian Village
 - d. Victorian Village
 - e. Other Historic Districts under the purview of the Historic Resources Commission
 - f. Other Historic Districts on the National Register of Historic Places
5. Areas with underground utilities

4.3 New Pole Siting Preferences

In all locations, the City reserves the right to require a metal pole rather than a wood pole based on the character of the proposed site location. New freestanding poles acting as wireless support structures for small cells should be located:

1. At the intersecting property line (parcel line) of two adjoining parcels wherever possible.
2. A minimum of 15 feet away from existing or planned street trees to avoid disturbing the root zone,
3. Spaced an equal distance between trees.
4. So as to not obstruct access to fire hydrants.
5. A minimum of 5 feet from driveways, entrances, or walkways.
6. Outside of the perpendicular extension of the primary street-facing wall plane for single unit and two unit residential buildings (see Figure 1 below)
7. At least 250 feet from other wireless support structures (proposed or existing), not including existing streetlights or utility poles.
8. Aligned within the same plane as existing trees, streetlights, utility poles, and other street furniture located in the amenity zone.
9. So as to not impede, obstruct, or hinder pedestrian, bicyclist, or vehicular travel
10. At least 2 feet from the travel way, edge line, face of curb, sidewalk, bike lane, or shared use path.
11. So as to adhere to existing neighborhood or district based streetscape improvement guidelines.
12. So as to not violate the Americans with Disabilities Act (ADA).
13. Outside of the clear vision triangle as determined by the Department of Public Service.
14. Away from storefront windows, when in a commercial areas, so as to not negatively impact said commercial establishment.
15. So as to not be positioned in front of an individually listed historic building, property or landmark (does not apply to buildings deemed historic as part of a historic district).

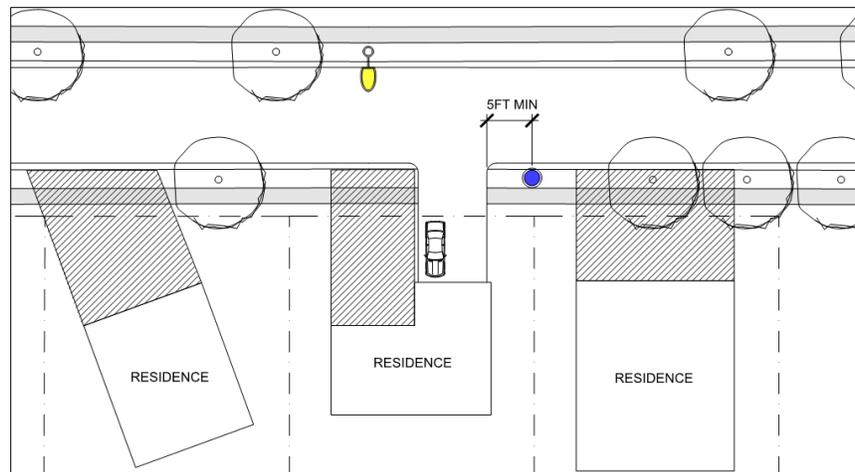


Figure 1 -

Proposed Small Cell Facility located on a new freestanding pole shown in blue. Hatched area shown is the perpendicular extension of the primary street-facing wall where new freestanding poles are discouraged.

4.4 Collocation on Existing Poles:

In order to reduce visual clutter, the City encourages the collocation of small cell facilities on existing poles where feasible. If the applicant chooses not to collocate when options appear available, a statement must be provided as to why collocation is not feasible.

4.5 Collocation with other Wireless Carriers:

As noted previously, the City of Columbus seeks to support wireless service providers in the efficient deployment of small cell technology, to the benefit of residents, businesses, and visitors in the city of Columbus. To that end, the City supports the collocation of small cell facilities by different carriers on the same wireless support structure wherever possible. If the applicant chooses to not collocate when options appear available, a statement must be provided as to why collocation is not feasible.

4.6 Existing Small Cell Facility Designs:

Type 2 and Type 3 applications (i.e. modifications to existing small cell facilities) are to be reviewed for consistency with the Design Guidelines. At the time of the application for modifications, the City may request reasonable, technically achievable modifications that are consistent with the Design Guidelines. Additionally, the City encourages the modification of existing non-compliant small cell facilities that would result in facilities that are more consistent with the Design Guidelines.

5. Design Guidelines

5.1 General Design Guidance:

1. **Concealment:** The design of any small cell facility should include concealment elements, including camouflaging and shrouding.
2. **Cabling:**
 - a. All cabling shall be hidden within conduit, shrouds, or by other concealment techniques.
 - b. For non-wood poles, underground cable or wires should transition directly into the pole base without any external junction box.
 - c. Excess cable shall not be spooled, coiled, or stored on the pole except within the approved shroud or cabinet
3. **Paint:** Antennas, brackets (mounting), equipment boxes (excluding ground mounted equipment), shrouds, meters, disconnects, conduits, and all other components of the small cell facility should be painted to match the color of the pole.
4. **Equipment Lighting:** Unless otherwise required for compliance with FAA or FCC regulations, the facility shall not include any permanently installed lights. Any lights associated with the electronic equipment shall be appropriately shielded from public view. This guideline is not meant to prohibit installations on streetlights or the installation of luminaires or additional street lighting on new poles when required by the City.
5. **Advertisement:** All manufacture equipment labels shall be removed, covered (i.e. by shrouding), or painted to match the pole and other equipment. Visibly depressed or indented manufacturer logos or names should be avoided, or filled in to match the equipment.
6. **Vaulting:** Installation in Underground Area: Where existing equipment and utilities are located underground, the City may at its discretion, require the installation of pad-mounted or vault-mounted equipment. Undergrounding of utilities is generally encouraged throughout the City.
7. **Height:**
 - a. The height of new wireless support structures, including the small cell facility itself, should not exceed 40 feet, except in areas where the predominant character is industrial in nature, in which case the height should not exceed 50 feet.
 - b. For an existing wireless support structure, the antenna and any associated shroud may be located at the top of the existing structure, but may not increase the height be more than 5 feet.
8. **Stickers:** Excessive stickers are discouraged. Where stickers are required by FCC regulation or for identification, the background of the sticker should match the color of the equipment, with black lettering, unless otherwise required by law.
 - a. **RF Warning Labels:** Utilize the smallest and lowest visibility RF warning stickers required by law, with the sticker placed as close to the antenna as possible.
 - i. For areas with nearby residential, place the sticker facing the street.
 - ii. Otherwise, place the sticker facing away from the street.
 - b. **Identification Label:** Identification of the small cell facility owner should be limited to a single sticker no larger than 4 inches by 6 inches. The background of the sticker should be the same color as the equipment, and should be placed on the bottom of

the equipment shroud if possible. Alternatively, the label may be placed on the equipment opposite the direction of vehicular travel on the adjacent roadway. The label should include:

- i. Carrier name
- ii. Location identification information
- iii. Emergency telephone number

5.2 Antenna Design Guidance:

1. Antennas:

- a. The antenna(s) associated with the first installation should be top-mounted and concealed within a radome that also conceals the cable connections, antenna mount and other hardware.
- b. Top-mounted antennas should be directly mounted to the pole or utilize a short extension that is full shrouded. Very tall extensions are generally not supported.
- c. Top-mounted antennas should be centered on the pole, not offset.
- d. Top-mounted antennas should be the same diameter of the pole at the point of attachment, and should appear as a seamless vertical extension of the pole.
- e. When a larger diameter antenna is required, the diameter should be no larger than 14 inches in diameter and include a smooth tapered shroud from the pole to the antenna.
- f. Top-mounted antennas should be no larger than 5 feet tall, including the antenna itself, radio head, mounting bracket, and all other hardware necessary for a complete installation.
- g. The antennas should be non-reflective and painted to match the pole (wireless support structure).
- h. Top-mounted antennas should not be installed on poles with primary electric wires. All antennas on primary electric poles shall be installed in the pole's communication space.
- i. The City may approve one side-mounted antenna per pole with the initial installation, in lieu of a top-mounted antenna, if, in the City's discretion, the side-mounted antenna would be more appropriate given the built environment, neighborhood character, and overall site appearance.
- j. Side-mounted antennas should conceal all cabling within the antenna arm extension.
- k. Side-mounted antennas should be installed parallel to the roadway.
- l. Antenna may not exceed 6 cubic feet in volume

2. **Wireless Backhaul:** The City generally discourages the use of microwave or other wireless backhaul that requires additional or separate antennas, with wired backhaul being preferred.

3. **GPS Antennas:** Where necessary for the operations of the small cell facility, GPS antennas should be built into the proposed primary antenna rather than added after the fact.

5.3 Electric Meter Design Guidance:

1. **Flat Rate:** Generally, utility-grade metering is preferred. However, flat rate electric service may be negotiated for installations where a “glass bubble” meter is impractical.
2. **Glass Bubble Meter:** If a glass bubble meter is proposed, the applicant should use a meter with a slim profile cabinet as shown in Figure 2,
3. **One Meter:** For poles with multiple wireless carriers, one electric meter (if present, or required) should serve all carriers, if feasible.



Figure 2 –

Slim profile electric meter on an existing wood pole. Note, however that it is not painted to match the pole per City of Columbus guidance.

4. **Disconnect Switches:** Place disconnect switches above or below the meter (when present) rather than to the side of the meter.

5.4 General Equipment Design Guidance:

1. **Number of Shrouds:** Generally, only one equipment shroud, containing all required small cell equipment, should be installed per pole. In cases where there are multiple wireless carriers using a pole, equipment shrouds should be the same width and color and stacked to present a unified design aesthetic.
2. **Sound:** Passive cooling (no noise generation) is preferred. If active cooling is required, the following guidelines apply for sound limits.
 - a. Goal of less than 30 decibels within 3 feet of any property line.
 - b. Maximum of 45 decibels within 3 feet of any residential property line or park
 - c. Maximum of 55 decibels within 10 feet of all other property lines
3. **Equipment, Cabling, & Conduit Attachments:**
 - a. For existing and proposed wood poles, all equipment, cabling, & conduit attachments should be flush with the pole.

- b. All wires, cables, and connections shall be located within the smallest diameter channel, conduit, u-guard, or shroud feasible, with a maximum diameter of 4", painted to match the pole.
- c. If existing pole limitations restrict this, pole replacement should be considered.
- d. If an offset from the pole is necessary for equipment, the shroud should include wings that fully conceal the offset.

5.5 Pole Mounted Equipment:

1. When pole-mounted equipment is either permitted or required, all equipment other than the antenna(s), electric meter and disconnect switch must be concealed within an equipment shroud.
2. The equipment should be installed no lower than 15 feet above ground level.
3. The equipment shroud must be non-reflective and painted to match the existing pole.
4. It is preferred that equipment shrouds be mounted flush to the pole, subject to the pole owner's approval.
5. Standoff mounts are permitted for the equipment shroud, but may not exceed six (6") inches and must include metal flaps (or "wings") to conceal the space between the shroud and the pole.
5. Pole mounted equipment, including shrouds, should be long and narrow, with a target width equal to that of the pole.
6. Pole mounted equipment, including shrouds, should face away from nearby residential windows, where present.
7. The equipment shroud, electric meter, and disconnect should be placed on the same side of the pole and stacked as closely as possible along a common centerline.
8. Equipment may not exceed 28 cubic feet in volume

5.6 Ground Mounted Equipment Design Guidance:

1. Where ground mounted equipment or boxes are proposed the following apply:
 - a. **Suburban Commercial Areas** –
 - i. Ground mounted equipment should be 100% screened using evergreen plant material and shown on the landscape plan.
 - ii. The ground mounted equipment should be painted to blend in with the landscaped screening to the greatest extent possible.
 - b. **Urban Commercial Areas** –
 - i. Ground mounted equipment is discouraged, with vaulting encouraged for areas where utilities are located underground.
 - ii. Ground mounted equipment may be supportable if located in a box with a public art wrap (Columbus Art Commission review may be necessary) or camouflaged as part of a street furniture option or bus shelter. See Figure 3 for an example of each.

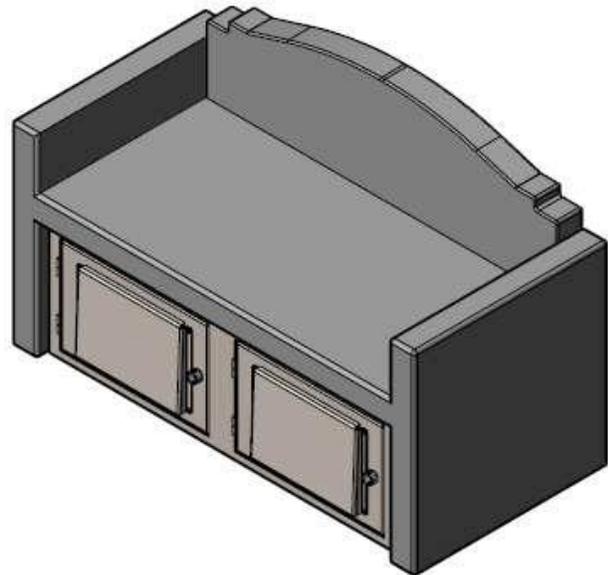


Figure 3 –

Example of a public art wrap on ground mounted equipment in an urban commercial area, and a bench with equipment cabinet below.

5.7 New Pole Design Guidance:

1. **New Poles with Blank Connections:** The City may require that for Type 4 and Type 5 applications, that the new pole include blank connections for City use such as cameras, food truck connections, wi-fi, wayfinding signage, or banners.
 - a. A minimum of 15% of the pole design structural capacity shall be reserved for future City installations.
2. **New Integrated & Standalone Metal Poles:**
 - a. Base equipment cabinet should be round to match diameter below.
 - b. Base equipment cabinet preferred diameter is 16 inches, with a maximum of 20 inches.
 - c. A decorative transition or base cover should be installed as a transition to the pole
 - d. Base equipment cabinet should be no taller than 5 feet in height.
 - e. Base equipment cabinet shall not have a continuous horizontal surface greater than 1.5 inches, to avoid accumulation of debris and litter,
 - f. Pole should create a cohesive architectural aesthetic

IFICATIONS

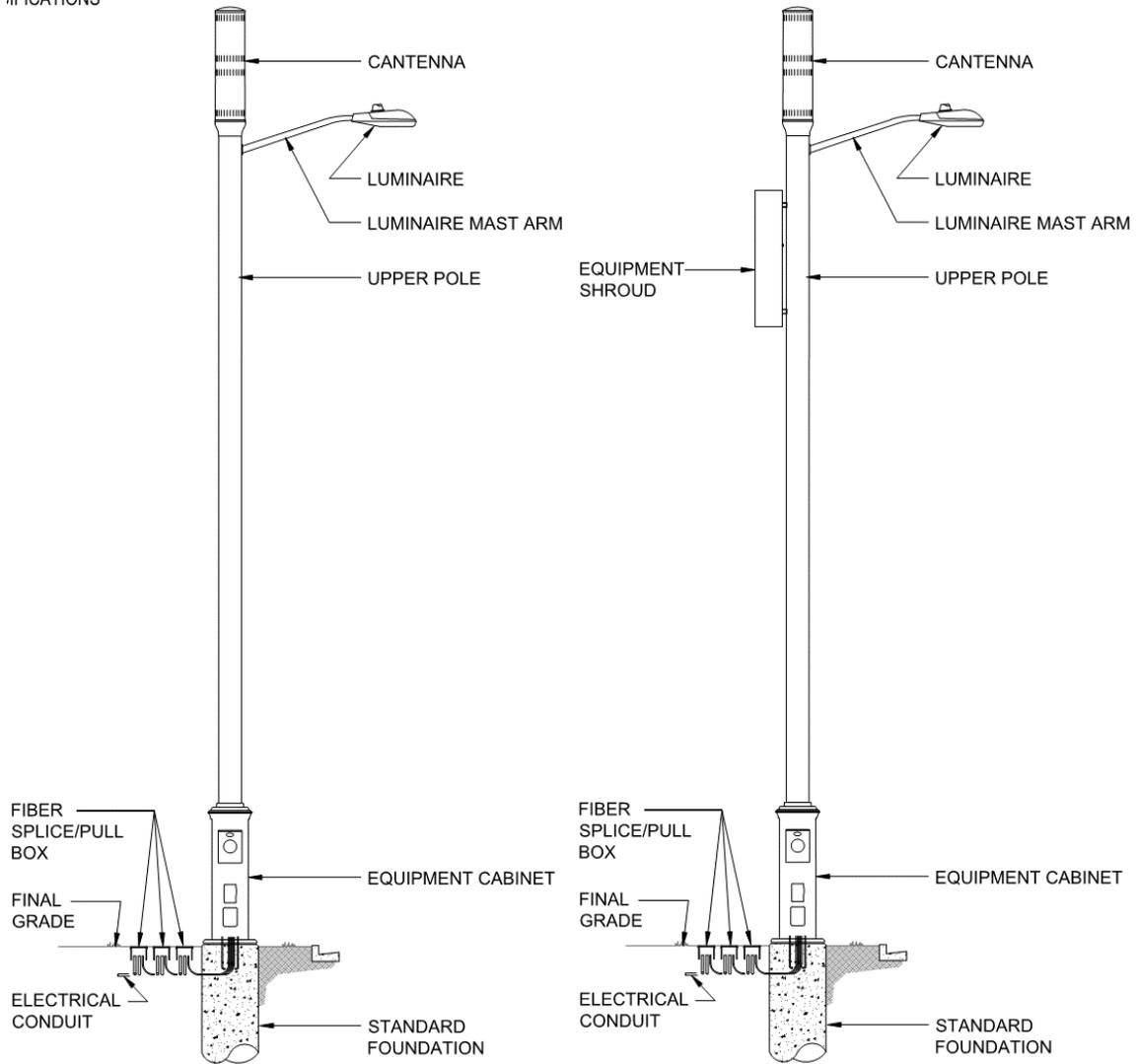


Figure 4 -

Examples of integrated street light with small cell facility

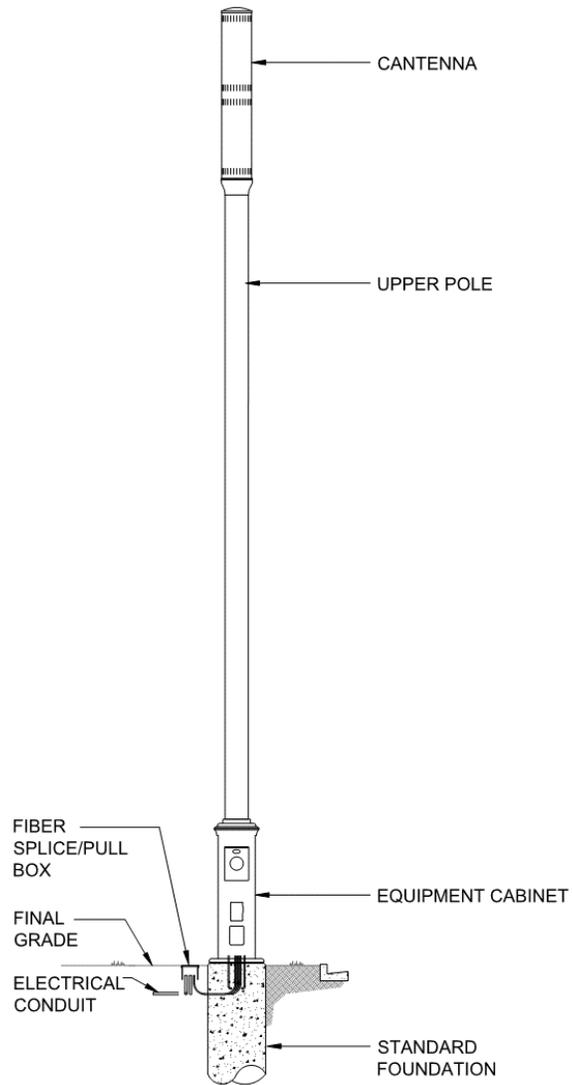


Figure 5 -

Example of standalone small cell facility