Wireless Communications Facilities Development Standards

City of Loveland

Loveland Water and Power

Public Works

Current Planning

Building Department

April 9, 2019

Table of Contents

CITY OF LOVELAND WIRELESS COMMUNICATION FACILITIES DEVELOPMENT STANDARDS

The *Wireless Communications Facilities Development Standards* apply to all new installations and additions to or modifications of existing installations of small cell wireless facilities in the City of Loveland Right of Way (ROW). Go to http://www.cityofloveland.org/ to access this document electronically.

Intent

Small cell wireless facilities must demonstrate compliance with all applicable provisions within these *Wireless Communications Facilities Development Standards* before receiving approval from the City of Loveland for an attachment to a facility within the City ROW, unless exempted in writing by the Director of the Department of Water & Power or his or her designee. Existing installations that fail to meet requirements for clearance and/or access to City equipment may be subject to additional fees and/or disconnection of electric service. Note that the requirements contained herein are for reference and guideline purposes and are not intended to cover all installation practices. Please contact the appropriate City of Loveland representative for any questions regarding installations or modification.

Revisions and Updated Standards

Revisions to these Standards shall be pursuant to Larimer County Urban Area Street Standards 1.6.2. The Department will maintain these Standards and any amendments hereto. The Department will post these Standards and amendments on the City's Internet website, under the Department's specific website location. The Department does not keep a database of holders of these Standards; consequently, it shall be the responsibility of each holder to verify the most current Standards are being used for any Project Area.

This edition of Wireless Communications Facilities Development Standards is effective April 14, 2019. This book replaces all previous editions of the Wireless Communications Facilities Development Standards. All previous editions should be destroyed.

Important Contacts

Before doing any digging or excavation call for an underground cable location:

811

City of Loveland Department Contacts

• Water and Power	970-962-3000	PowerDevelopment@cityofloveland.org
o Electric Design		
o Electric Metering		
o Municipal Fiber		
• Public Works	970-962-2524	engineering@cityofloveland.org
o ROW Permitting		
o Traffic Engineering		
• Current Planning	970-962-2523	eplan-planning@cityofloveland.org
• Building Department	970-962-2505	Eplan-buildingFastTrack@cityofloveland.org

Important Documents

The documents below are separate from these Wireless Communications Facilities Development Standards; however, there are references made to these throughout this document. Please check the City of Loveland website for electronic copies or contact us at 970-962-3000 to obtain a copy.

City of Loveland Document

- Contractor License Application
- Exemption/Revision Form
- Municipal Code Title 13 Utilities Chapter 13.12 Electricity
- Municipal Code Title 18 Wireless Telecommunications Standards 18.02.411
- Right-of-Way (ROW) Permit application
- Electric Service Worksheet Form
- Schedule of Rates, Charges and Fees
- Pole Attachment Agreement
- Master License Agreement for For the Use of the City's Public Right-of-Way Property in Connection with With the Operation of a Wireless Network (MLA)
- Non-Residential building permit

Other Documents Referenced

- American Concrete Institute (ACI American Concrete Institute (ACI)
- American Association of State Highway and Transportation Officials (AASHTO)
- American National Standards Institute (ANSI)
- American Society for Testing and Materials Specifications (ASTM)
- American Public Works Association (APWA)
- Colorado Department of Transportation Specifications (C-DOT)
- Institute of Electrical & Electronics Standards (IEEE)
- Larimer County Urban Area Street Standards (LCUASS)
- National Electric Code (NEC)
- National Electric Safety Code (NESC)
- Occupational Safety and Health Administration Regulations (OSHA)

Definitions and Acronyms

AASHTO - American Association of State Highway and Transportation Officials

Antenna - Communications equipment transmitting or receiving electromagnetic radio frequency signals used in providing Wireless Service

ANSI - American National Standards Institute See www.ansi.org

Applicable Code - uniform building, fire, electrical, plumbing, or mechanical codes adopted by a recognized national code organization; and City of Loveland's amendments to those codes

APWA - American Public Works Association (APWA)

ACI - American Concrete Institute (ACI, formerly National Association of Cement Users or NACU)

ASTM - American Society for Testing and Materials is an international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services.

Cantenna - A waveguide antenna, directional in nature, used to better detect or broaden a wireless network's range generally in the shape of a can.

Carrier –a Wireless Service Provider; or an entity who does not provide Wireless Service and is not an electric utility but builds or installs on behalf of a Wireless Service provider network equipment; or poles or any other structure supporting or capable of supporting network equipment.

Carrier Space – Space either on or within the pole designated for network and Carrier-owned equipment.

CDOT - Colorado Department of Transportation Specifications

City of Loveland – City of Loveland, Colorado or COL

COL-owned Utility Pole - A Utility Pole owned or operated by a COL department and located in Public ROW

Disconnect Switch - A visible open disconnect device that the Carrier is required to install and maintain in accordance with the requirements set forth in this document. It will completely isolate the Carrier's Facility from the City's electric power system, including the Utility metering equipment located at the service entrance. It will also allow for disconnect of radio frequency emitting equipment.

Freestanding Pole - a Pole installed by a Carrier for the primary purpose of supporting a network equipment

IEEE - The Institute of Electrical and Electronic Engineers. See http://www.ieee.org/index.html.

LCUASS - Larimer County Urban Area Street Standards

Metering - The function related to measuring the transfer of electric power and energy.

NEC - National Electric Code. See www.necdirect.org

NFPA - – National Fire Protection Association. See http://www.nfpa.org.

NEMA - National Electrical Manufacturers Association. See http://www.nema.org.

NESC - National Electric Safety Code

OSHA – Occupational Safety and Health Administration. See http://www.osha.gov.

Permit - Written authorization to use Public ROW or collocation on a Service Pole required from COL before a Carrier may perform an action or initiate, continue, or complete a project over which COL has police power authority.

Pole - A Service Pole, COL-owned Utility Pole, Freestanding Pole or Utility Pole.

ROW – Public Right of Way. The area on, below, or above a public roadway, highway, street, public sidewalk, alley, waterway, or utility easement in which COL has an interest. The term does not include:

- a private easement; or
- the airwaves above a public right-of-way with regard to wireless telecommunications.

Small cell facility or small cell – has the meaning set forth in Section 29-27-402(4) of the Colorado Revised Statutes.

UDC – City of Loveland Unified Development Code

UL – Underwriters Laboratories Inc. See http://www.ul.com

Background and Purpose

Pursuant to Colorado House Bill 17-1193, effective July 1, 2017, wireless service providers and wireless infrastructure providers are permitted to locate small wireless facilities in the public right-of-way.

A small cell wireless network consists of small micro antennas that provide cellular and data coverage in smaller geographic areas. These small cells are intended to supplement the Carrier's existing network of macro cellular infrastructure. Small cell infrastructure requires three key components: a fiber connection, a power source, and an elevated mounting location such a streetlight or pole.

These design standards provide design and aesthetic requirements and specifications that all small wireless facilities installed within the ROW must meet prior to installation within City of Loveland municipal boundaries or on City-owned facilities outside of the municipal boundary. All small cells installed within the City's ROW, including installations on equipment or poles owned by other entities, must follow these design standards and all referenced standards and requirements.

Section 1 – General Information

1-1 General

This document provides information to small cell wireless Carriers and small cell infrastructure providers concerning the design standards, materials, construction, and other requirements for installation of small cell infrastructure within the City of Loveland.

These design standards are not exhaustive and the City, as the owner, keeper, and manager of the ROW retains the right to modify or adjust the requirements on a case-by-case basis.

1-2 Aesthetics

Carriers shall consider the aesthetics of existing street lights, street furniture, and other development aesthetics in the neighborhood of the proposed small cell locations. Installations on private property must meet all aesthetics and design requirements in accordance with the City of Loveland's Unified Development Code (UDC).

The City of Loveland requires that all new wire, cable, and fiber infrastructure be installed underground.

1-3 Poles

The pole design must match the aesthetics of existing streetlights installed in the vicinity of the pole. The small cell components must be sized to be visually pleasing. For a pole to be considered visually pleasing, the transition between the equipment cabinet and upper pole should be considered. A decorative transition must be installed over the equipment cabinet upper bolts, or decorative base cover must be installed to match the equipment cabinet size. The upper pole must be scaled to 0.5 to 0.75 the size of the equipment cabinet, with a 10-inch minimum outer diameter. All hardware connections must be hidden from view. No horizontal flat spaces greater than 1.5 inches may exist on the equipment cabinet to prevent cups, trash, and other objects from being placed on the equipment cabinet. Each pole component must be architecturally compatible to create a cohesive aesthetic.

All poles must be round, straight and made of galvanized steel. The pole must be painted to match existing streetlights in the area, which are typically a dark bronze color.

1-4 Existing Buildings

Installations on existing buildings or infrastructure on private property must be architecturally compatible with the surrounding buildings and land uses in the area or otherwise incorporated to blend in with the existing characteristics of the property. Refer to the City of Loveland UDC for design and camouflage requirements.

1-5 Other Structures

Structures designed to disguise or camouflage small cell infrastructure other than approved freestanding poles, streetlights, traffic poles, and utility infrastructure may not be installed in the ROW. These types of structures are allowed on private property and must meet all requirements and standards in the UDC.

1-6 Electrical Service and Metering

All small cell infrastructure, regardless of attachment type, must be individually metered by the City of Loveland Water and Power Department. The metering must be either mounted within the pole base or within an approved ground mounted equipment enclosure. The electric service installation and all metering requirements must be completed in accordance with the City's Requirements for Electric Service in effect at the time of installation.

1-7 Equipment and Hardware

All small cell Carrier equipment must be housed internal to the equipment cabinet or hidden behind the antenna. Carrier equipment may not be strapped to the outside of the pole or otherwise visible external to the pole. Dual-carrier poles are generally required, and all the network provider equipment must be located internal to the pole and cantenna. The exception to these requirements are utility pole applications, which are discussed in a separate section.

1-8 Wind Loading

All poles and other structures installed in the ROW must be designed to the current version of the AASHTO for wind and load calculations.

1-9 Antenna

The antenna must be located within a cantenna located on top of the pole. The outer diameter must be 14" maximum and the cantenna may be no more than 5 feet tall, including antenna, radio head, mounting bracket, and all other hardware necessary for a complete installation.

1-10 Electromagnetic Radiation

A non-ionizing radiation electromagnetic radiation report (NIER) must be submitted to the City and retained on file with the Carrier for equipment type and model. The NIER report must be endorsed by an RF PE licensed in the State of Colorado. It must specify minimum approach distances to the general public as well as electrical and communication workers that are not trained for working in an RF environment (uncontrolled) when accessing the pole by climbing or bucket.

1-11 Warning and Labels

Radio frequency warning labels must be mounted exterior to Carrier's equipment, and clearly marked on both sides of the enclosure and be visible from the ground, roadside, and field side. A 4-inch by 6-inch (maximum) plate with the Carrier's name, location identifying information, and emergency telephone number must be permanently fixed to the shroud.

1-12 Warning Tape

All electric services for the small cell wireless infrastructure must be marked with warning tape. Detectable electrical warning tape must consist of pre-manufactured non- adhesive polyethylene material that is unaffected by acids, alkalines, and other soil components. The tape must be red in color and must be, at a minimum, 3.5 mils thick and 6 inches wide. Its tensile strength must be 2,500 psi lengthwise. The electrical tape must include the following identification printed in black letters continuously along the length of the tape: "CAUTION BURIED ELECTRIC LINE BELOW".

The identification note and color of tape must conform to the requirements of the "American Public Works Association (APWA) Uniform Color Codes (Red) – Electrical Power Lines, Cables, Conduit and Lighting Cables."

1-13 Tracer Wire

All conduit, wire, cable, fiber or other below grade infrastructure must include tracer wire or locate disks or other electronically locatable technology to allow for field location in compliance with Colorado 811 One-Call requirements.

1-14 Equipment Cabinet

All equipment must be located internal to the equipment cabinet or recessed as much as possible in the equipment cabinet and meet City of Loveland power utility requirements. All equipment must be mounted per the Carrier's requirements. Pole bases must be sized to handle the listed equipment and all other equipment attached to the pole. The equipment compartment or cabinet must have a lockable access door sized to install, maintain, and remove all small cell equipment as needed to meet Carrier's requirements.

1-15 Wiring and Cabling

Wiring and cabling for city utility and traffic infrastructure will be physically separate from wiring and cabling for small cell wireless infrastructure. The pole must be designed with a physical interior divider to allow for separation of city wiring and cabling from small cell infrastructure.

1-16 Conduit

All wiring and cabling to the pole, handhole, pull boxes, or other ground mounted equipment must be installed in conduit. Conduit installation must be installed per the Requirements for Electric Services book. Conduit must also be included internal to the foundation. Eight (8) 2" PVC conduit sweeps must be installed on streetlight applications. Conduit shall accommodate City electrical, City fiber, and Small cell Carrier electrical and fiber with up to four (4) spare sweeps for future service.

1-17 Shrouding

The antenna and associated equipment shall be installed in a cantenna shroud to disguise or camouflage the small cell infrastructure as much as possible.

1-18 Handholds and Pull Boxes

All fiber and power infrastructure shall be installed in a handhole adjacent to the pole. All handholes and pull boxes shall be flush mounted.

1-19 Foundations

While the City accepts cast-in-place foundations, precast concrete foundations are preferred and should be installed whenever possible. Concrete bases and equipment pads shall be pre-cast or cast-in-place concrete per the City standard to meet ACI 318. A complete foundation includes the concrete, reinforcing steel, anchor bolts, leveling nuts, conduit stubs, ground rod and wire, excavation and backfill, restoration, and accessories as required to provide a complete unit. Banner arm (if required) wind loading shall be incorporated into light standard structural design.

1-20 Bolt Patterns

The bolt circle for the poles shall be:

- 19.5-inch bolt circle when installing a 16-inch pole.
- 23.5-inch bolt circle when installing a 20-inch pole.

1-21 Disconnect

For all small cell wireless infrastructure mounted on non-carrier owned infrastructure (i.e. streetlights, utility poles, traffic signals) the Carrier shall include in the design the ability to easily shut off radio signals and power while City staff and contractors are working on the pole. The disconnect switch shall be clearly labeled in the construction drawings and shall be clearly identified on the pole. The City reserves the right to turn off or disconnect the equipment at any time for necessary operations and maintenance activities.

1-22 Collocation

Small cell wireless infrastructure shall be required to be designed and constructed to accommodate equipment from at least two (2) wireless service providers on the same support structure

To the extent reasonably feasible, the small cell wireless infrastructure must be collocated with other small cell wireless infrastructure on the same pole or structure to limit the number of poles within the Public Right-of-Way

1-23 Location Preferences

1. Third-party poles under the terms of a fully executed pole attachment agreement with the Owner of such poles,
2. City-owned poles, including street lighting poles and utility poles, in the ROW,
3. New street lighting poles approved by the City for street lighting purposes that are purchased by the Licensee and ownership conveyed by the Licensee to the City (via bill of sale), or
4. Licensee's proprietary poles to the extent permitted by, and in conformance with, City regulations and ordinances.
5. City's traffic signal poles.

1-24 Placement Requirements

Any ground-mounted equipment must be located in a manner that does not interfere with public safety and aesthetic concerns. The City may, where reasonably feasible based on construction, engineering, and design standards, require ground-mounted equipment for a small cell wireless infrastructure to be installed in a flush-to-grade underground equipment vault. Due to the frequency with which median mounted poles are hit by traffic, streetlights located within raised medians shall not be eligible for small cell installation to ensure public safety.

1-25 Separation

Unless the small cell infrastructure is deployed on an existing structure in the Public Right-of-Way, a small cell infrastructure placed on a new pole within the Public Right-of-Way shall be separated from any other pole, accessory equipment, or small cell infrastructure in the Right-of-Way by a distance of at least 250 feet.

1-26 Height

The pole or structure height (as measured from the ground to the top of the pole or structure) may not exceed the lesser of forty five (45) feet or ten (10) feet taller than any existing utility or traffic signal pole within a six-hundred (600) foot radius of the pole or structure.

1-27 ADA

All equipment located within the public ROW shall be located such that it meets ADA requirements and does not obstruct, impede, or hinder usual pedestrian or vehicular travel or interferes with the operation and maintenance of signal lights, signage, street lights, street furniture, fire hydrants, or business district maintenance.

No small cell infrastructure or Alternative Tower Structure may be located or maintained in a manner that causes unreasonable interference to the Public Right of Way. Unreasonable interference means any use of the Right-of-Way that disrupts or interferes with use of the Public Right of Way by the City, the general public, or other person authorized to use or be present upon the Public Right-of-Way, when there exists an alternative that would result in less disruption or interference. Unreasonable interference also includes any use of the Public Right-of-Way that disrupts vehicular or pedestrian traffic, any interference with public utilities, and any other activity that will present a hazard to public health, safety, or welfare.

1-28 Noise

Noise from fans and other motorized equipment must be limited to not greater than 30dBA measured at one meter from the equipment and must not be greater than 5dBA above ambient sound.

1-29 Construction and Make Ready

City of Loveland infrastructure (streetlights, utility poles, traffic poles, etc.) located in the ROW was not originally designed to accommodate additional attachments such as small cell wireless infrastructure. The Carrier should assume that existing infrastructure will need to be upgraded to accommodate the additional equipment and loading on the poles.

At the sole cost of the carrier, the City of Loveland shall perform all make ready work to replace and upgrade all poles and any associated infrastructure as required to accommodate the carrier's small cell infrastructure. The Carrier will be responsible for installing their equipment once make ready work is completed.

For freestanding poles in the ROW and infrastructure installed on private property, the Carrier is required to meet all standards in this document and all other relevant standards and requirements. The Carrier shall only install freestanding poles listed in Section 7. Substitution shall only be allowed with express prior consent from the City and must meet or exceed all City standards for safety, performance and aesthetics.

1-30 Historic and Architecturally Unique Areas

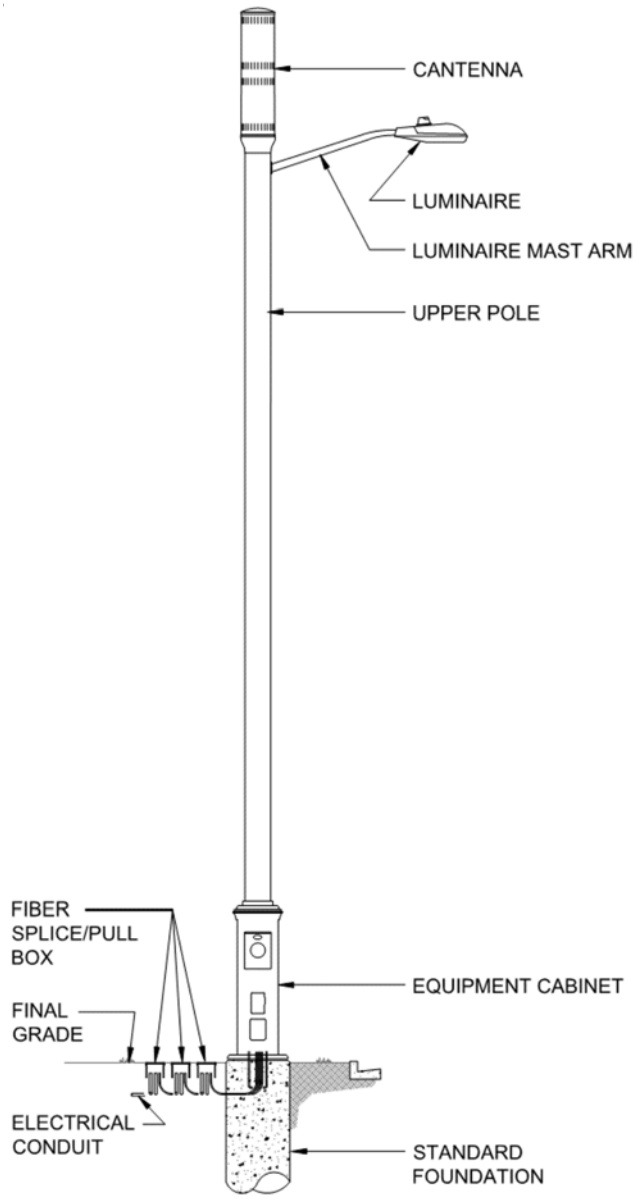
The City of Loveland may require deviations from these standards in areas that are considered historic or have unique architectural design requirements. The deviations will be required in order to match existing infrastructure and designs standards. These deviations may include, but are not limited to, color of the pole, height, and the inclusion of pole base shrouds. Please contact the City for more information.

Section 2 – Streetlight Attachments

2-1 General

This section describes the standards and requirements for placement of small cell infrastructure at the location of an existing streetlight poles in ROW. Combination streetlight and small cell poles shall only be placed in locations where it has been identified that a streetlight is necessary. Existing streetlights are typically owned and maintained by the City of Loveland's Water and Power Department (COL W&P). Streetlight poles shall meet all COL W&P standards for placement, spacing and design.

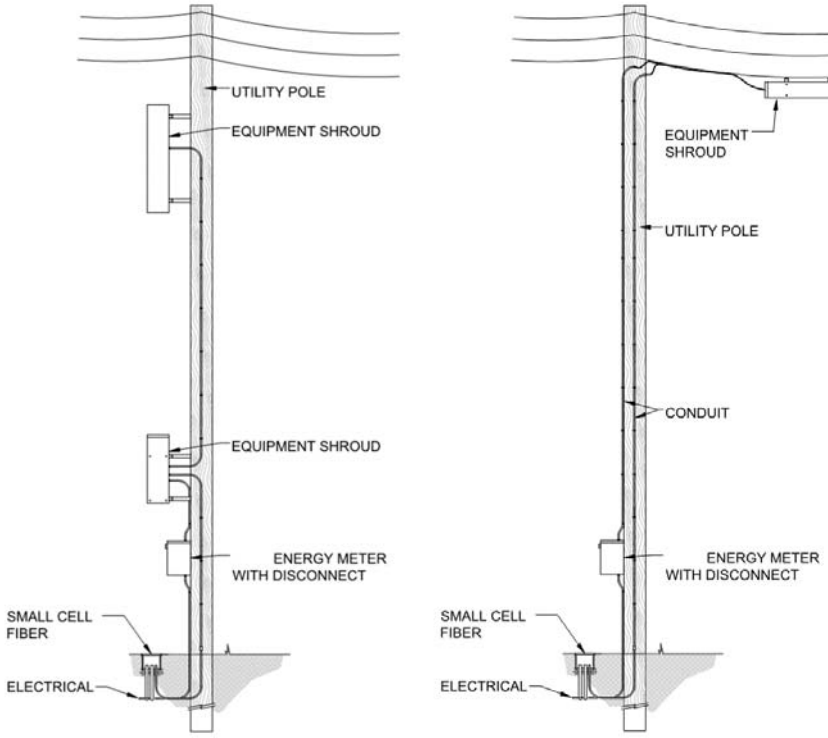
Figure 1



Section 3 – Utility Pole Attachments

This section describes the standards and requirements for placement of small cell infrastructure on existing utility poles in the ROW. All attachments to utility poles must be approved by the owner utility prior to application. All equipment must meet the owner utility's requirements.

Figure 2



3-1 Pole Loading

Prior to submitting an application for a utility pole attachment, the Carrier must ensure the supporting poles and appurtenances are appropriately sized and have sufficient strength to accommodate the additional equipment loads. This information, along with confirmation from the utility pole owner, must be included in the application.

3-2 Color

All visible equipment, attachments and hardware must be nonspecular and light gray in color. All painted surfaces shall be painted in light gray, ANSI No. 70, Munsell Notation 5.0 BG 7.0/0.4

3-3 Clearances

All fiber and electric service conduits must be separate on the pole. All installations must meet or exceed all applicable structural standards, clearance standards, and provisions of the latest National Electrical Safety Code (NESC), or the owner utility's clearance requirements. In case of conflict, the most stringent requirements apply. All necessary permits must be obtained by the wireless Carrier owner and provided to the pole owner in addition to the City with the permit application.

3-4 Grounding

All equipment on the utility pole must be grounded in accordance with the NESC, the utility owner's requirements, and City's Requirements for Electric Service. In case of conflict, the most stringent requirements apply.

3-5 Future Undergrounding

All Carrier equipment must be removed and relocated at no cost to the City when the City decides to underground the utility lines in the future. The equipment must be removed within a reasonable time frame determined by the City Water and Power Department. A reasonable time frame refers to a period of time that does not delay the removal of the utility poles and lines.

3-6 Equipment Mounting

The Carrier must comply with mounting requirements of the owner utility for each pole. Equipment may either be mounted on the utility pole or strand mounted at the discretion of the pole owner.

For City of Loveland-owned utility poles, no equipment may be mounted above energized equipment. All communications equipment, including small cell infrastructure, must be mounted in the communications space on the pole and must maintain all clearances in accordance with the NESC and City standards.

3-7 Pole Mounted

Only one utility pole mount shroud installation is allowed per site. The shroud must contain all required small cell equipment. The shroud must measure no more than 38"H x 16"W x 12"D in size.

3-8 Strand Mounted

Only one strand mount shroud installation is allowed per site. No strand-mounted small cell devices may be installed on poles with mounted streetlights. The equipment shroud may not exceed 5.5 cubic feet in size.

Aerial fiber and power strand installations may be allowed in areas with existing aerial fiber infrastructure only with express approval from the City.

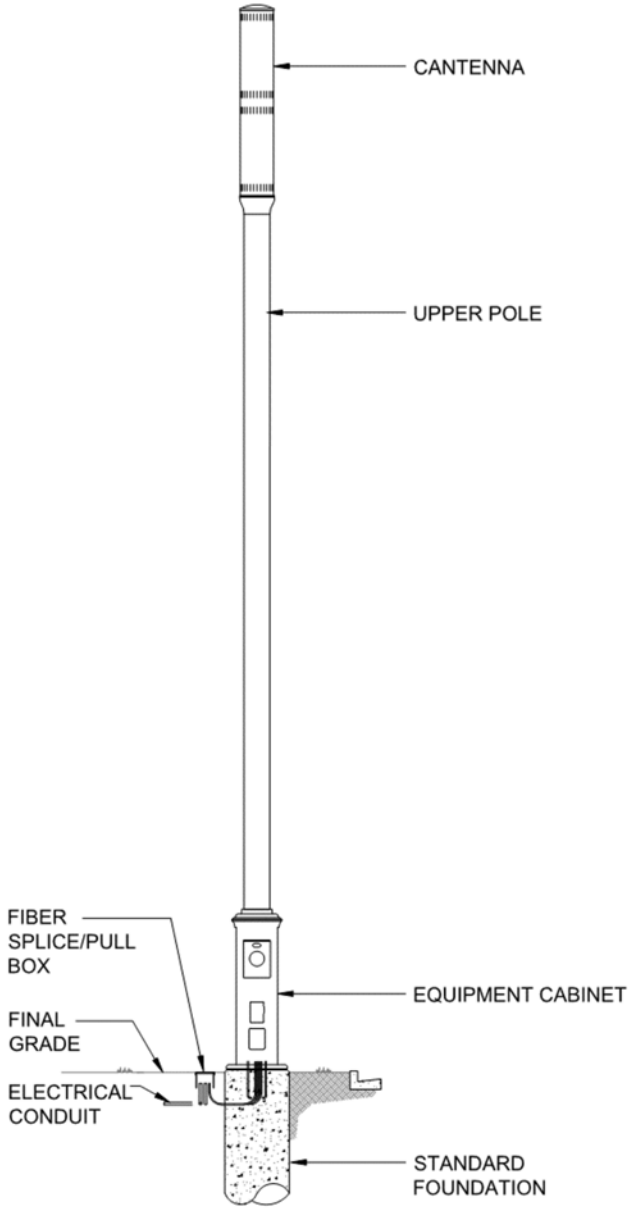
Section 4 – Freestanding Infrastructure in ROW

4-1 General

This section describes the standards and requirements for placement of small cell infrastructure at a location with no existing infrastructure available for attachment (such as a streetlight, utility pole, or other structure in the ROW). All freestanding pole permit applications must be approved by City of Loveland prior to installation and must comply with all requirements in Section 1 – General of this document as well as all other applicable standards, codes, and requirements.

Freestanding small cell pole components include the foundation, equipment cabinet, upper pole, cantenna, and all hardware and electrical equipment necessary for a complete assembly.

Figure 3



4-2 Placement Requirements

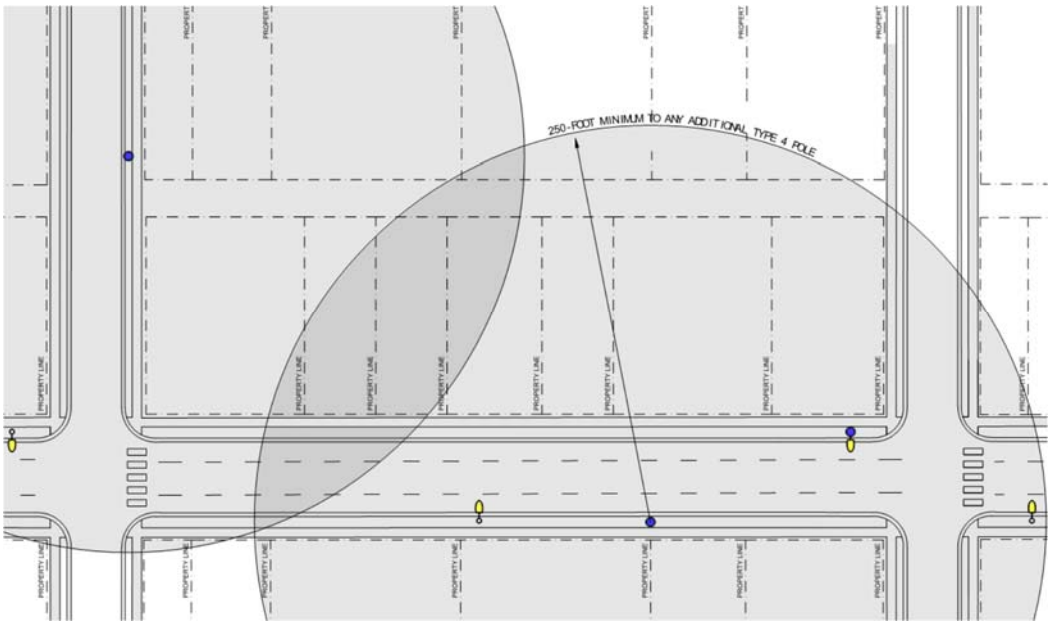
Freestanding poles must be placed:

a. In a manner that does not impede, obstruct, or hinder pedestrian or vehicular travel.
b. So as not to be located along the frontage of a historical building deemed historical on a federal, state, or local level.
c. So as not to significantly create a new obstruction to property sight lines.
d. At the intersection of property lines, or along secondary property street facing.
e. Within the street amenity zone whenever possible.
f. In alignment with existing trees, utility poles, and streetlights.
g. Equal distance between trees when possible, with a minimum of 15 feet separation such that no disturbance will occur within the critical root zone or dripline of any tree.
h. With appropriate clearance from existing utilities.
i. Outside of the 20-foot equipment clear zone (for base cabinets less than 18-inches in diameter) or 30-foot clear sight triangle (for base cabinets equal to or greater than 18-inches in diameter) at intersection corners as shown in **Figure 6**.
j. 10 feet away from the triangle extension of an alley way flare.
k. No closer than 100 feet of the apron of a fire station or other adjacent emergency service facility.
l. No closer than 250 feet, radially, from another privately-owned freestanding small cell pole.
m. In a manner that avoids, to the maximum extent feasible, new installations in residential areas, near schools, and parks.

4-3 Spacing

Poles must be spaced a minimum of 250 feet apart, measured radially. This includes around corners and in alleyways. To the extent possible, the poles must be in line with trees, existing streetlights, utility poles, and other street furniture as shown in **Figure 4** below.

Figure 4



4-4 Setback within ROW

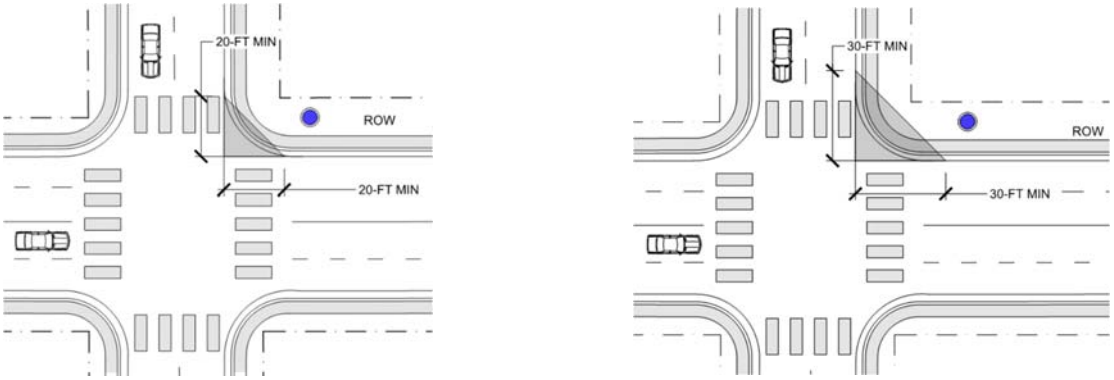
Freestanding poles must be located such that they do not impede, obstruct, or hinder normal pedestrian and vehicular travel. They must not be placed in a way that affects public safety or obstructs the legal access or use of the public ROW. The placement must not violate or conflict with any public ROW design standards, specifications, or other special district requirements. The placement of a pole must not violate the Americans with Disabilities Act, or in any way create a risk to public health, safety, or welfare. **Figure 5** shows the setback location of WCF within ROW.

Figure 5

4-5 Intersections

Freestanding small cell poles must not be located in such a way that the pole hinders, blocks or otherwise obstructs the line of site at intersections or the approaches to intersections. Freestanding small cell infrastructure may be never be placed in the line of sight triangle, as shown in **Figure 6** below.

Figure 6



4-6 Property Lines

Freestanding small cell infrastructure may not be located within 15 feet of trees to prevent disturbance within the critical root zone or dripline of the tree, as shown in **Figure 7**. The freestanding small cell infrastructure may not be installed between the perpendicular extension of the primary street-facing wall plane of any single or two-family residence as shown in **Figure 8**.

Figure 7

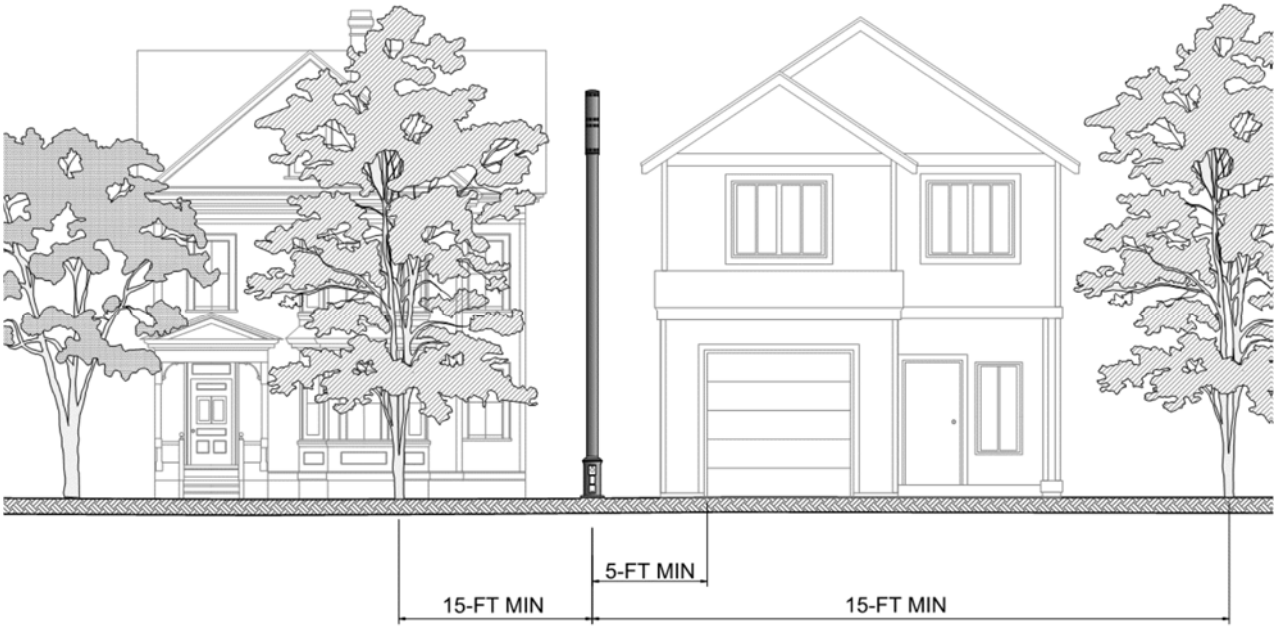
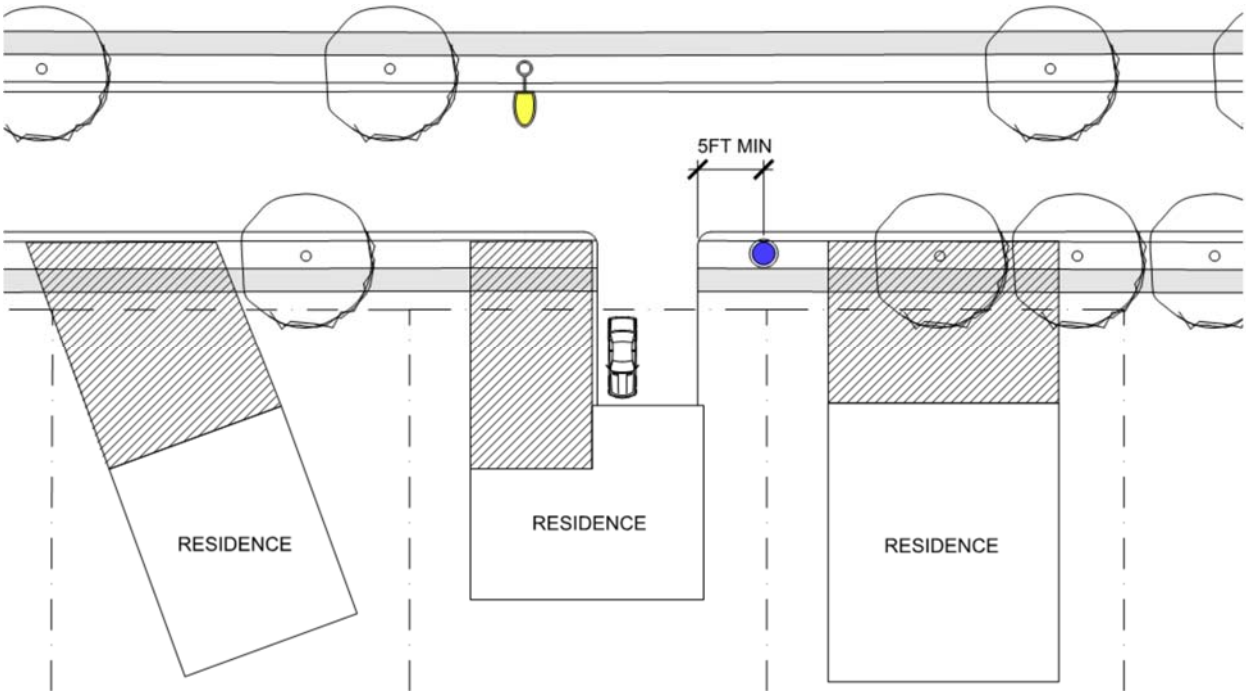


Figure 8



4-7 Commercial Areas

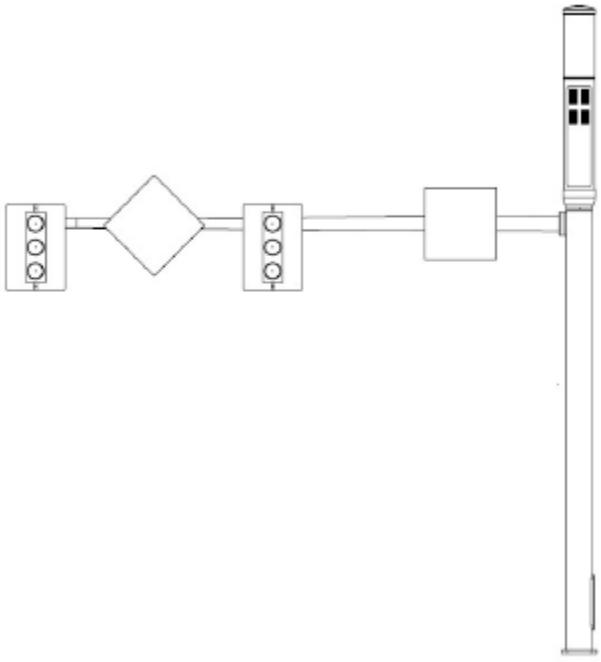
When located adjacent to a commercial establishment, such as a shop or restaurant, care should be taken to locate the freestanding small cell infrastructure such that it does not negatively impact the business. Small cells must not be located in front of store front windows, primary walkways, primary entrances or exits, or in such a way that it would impede a delivery to the building. Small cells must be located between properties as much as possible, as shown in **Figure 9**.

Figure 9

Section 5 – Traffic Pole Attachments

All Carrier equipment other than the antenna must be housed inside a ground-mounted utility box or hidden within a cantenna. The utility box must be located in vicinity of the pole such that it does not impede line of sight or otherwise impact public safety. The antenna may only be attached to the top of the upright pole. No provider equipment shall be strapped to the outside of the signal pole or on a side arm extension. Poles housing existing radio antennae, CCTV cameras, weather stations, and Wi-Fi sniffers are not eligible for small cell installation. Pursuant to Section 38-5.5-104.5, no small cell facility or small cell network may be located or mounted on any apparatus, pole, or signal with tolling collection or enforcement equipment attached.

Figure 10



5-1 Radio Interference

The Carrier must provide an analysis that the proposed small cell equipment to be installed on a traffic signal will not cause any interference with City public safety radio systems, traffic signal, emergency signal control devices, radio-read water meters, radar detection, Wi-Fi sniffers, “smart” street lights, future “smart city” applications, other city communications components, or any other unforeseen interferences. The survey and analysis must be certified by an RF PE licensed in the State of Colorado.

Section 6 – Private Property

Small cell infrastructure is allowed on private property with the express consent of the property owner. These installation may include attachment to existing building or other infrastructure, as a freestanding pole or disguised to blend into the property.

All small cell infrastructure installed on private property must be approved through the City of Loveland's Development Review process and must meet all standards and requirements set forth in the City's Unified Development Code (UDC) for Wireless Telecommunications Standards 18.02.411 and applicable standards contained within this document.

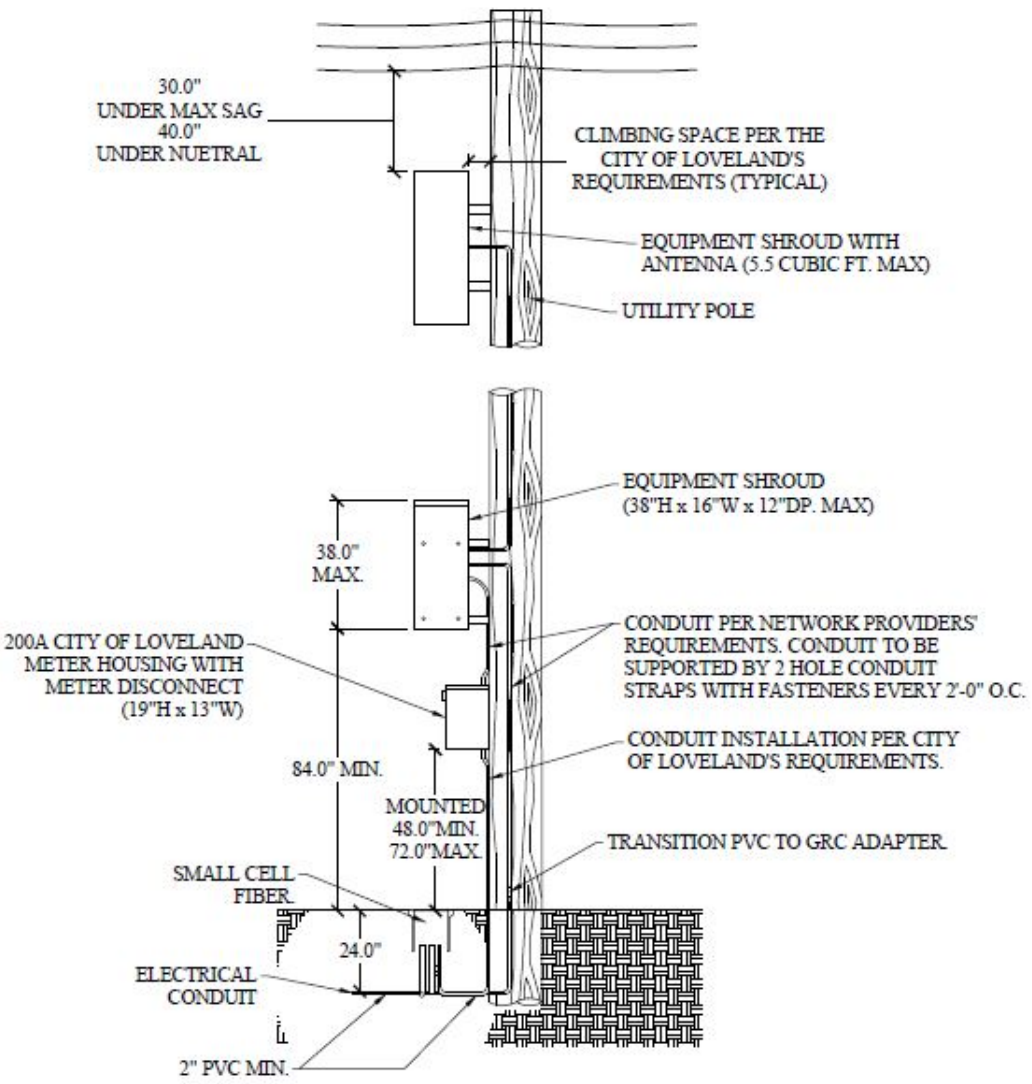
Section 7 – Material Specifications and Details

This section contains the approved manufacturers and catalog number for poles that have been approved by the City of Loveland as meeting the City's required specifications. Other poles and manufacturers that meet or exceed these requirements will be considered with prior approval. At its sole discretion, the City reserves the right to specify and select qualified manufacturers and materials.

Approved Materials:

Place holder for:

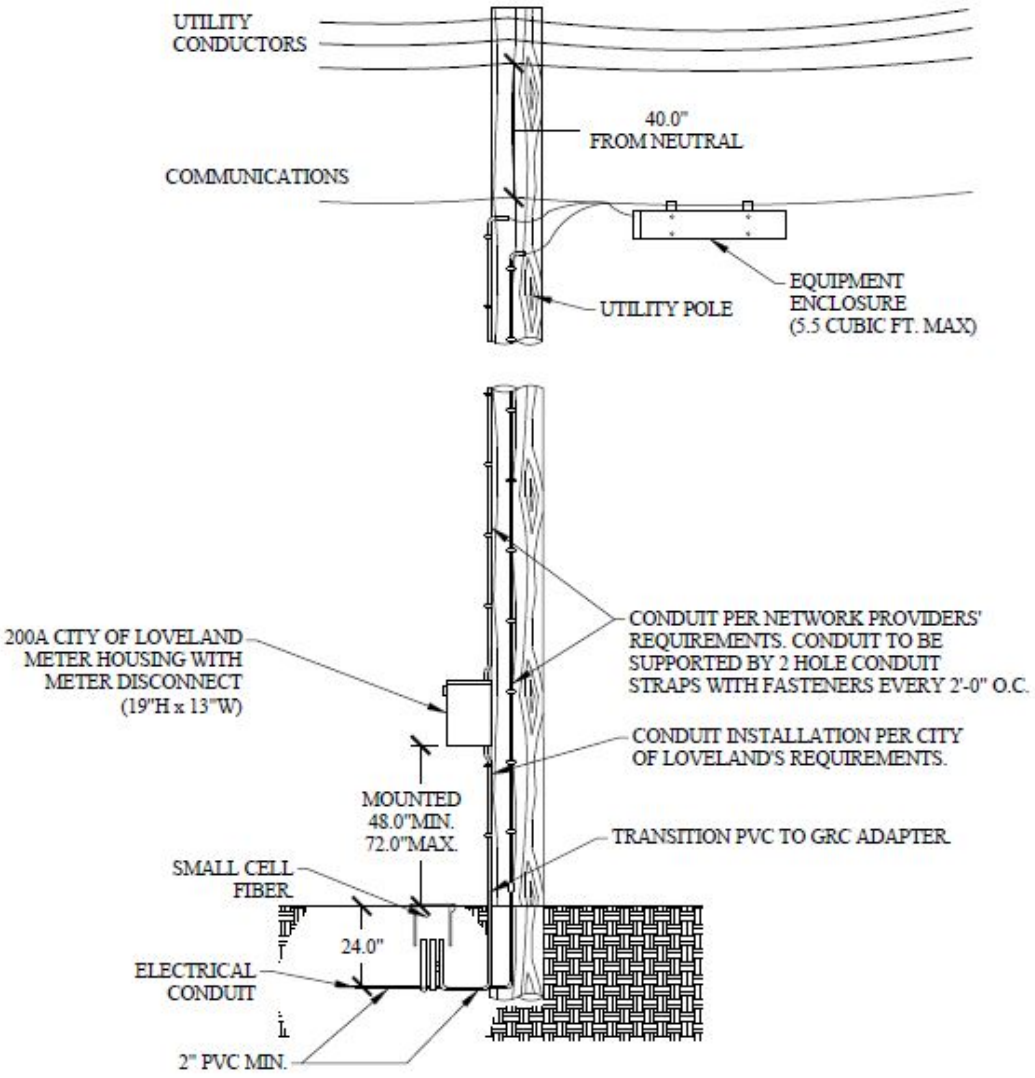
1. Streetlight
2. Standalone pole
3. Traffic Pole
4. Precast bases



NOTES:

1. SEE CITY OF LOVELAND SPECIFICATION FOR POLE DEPTH.

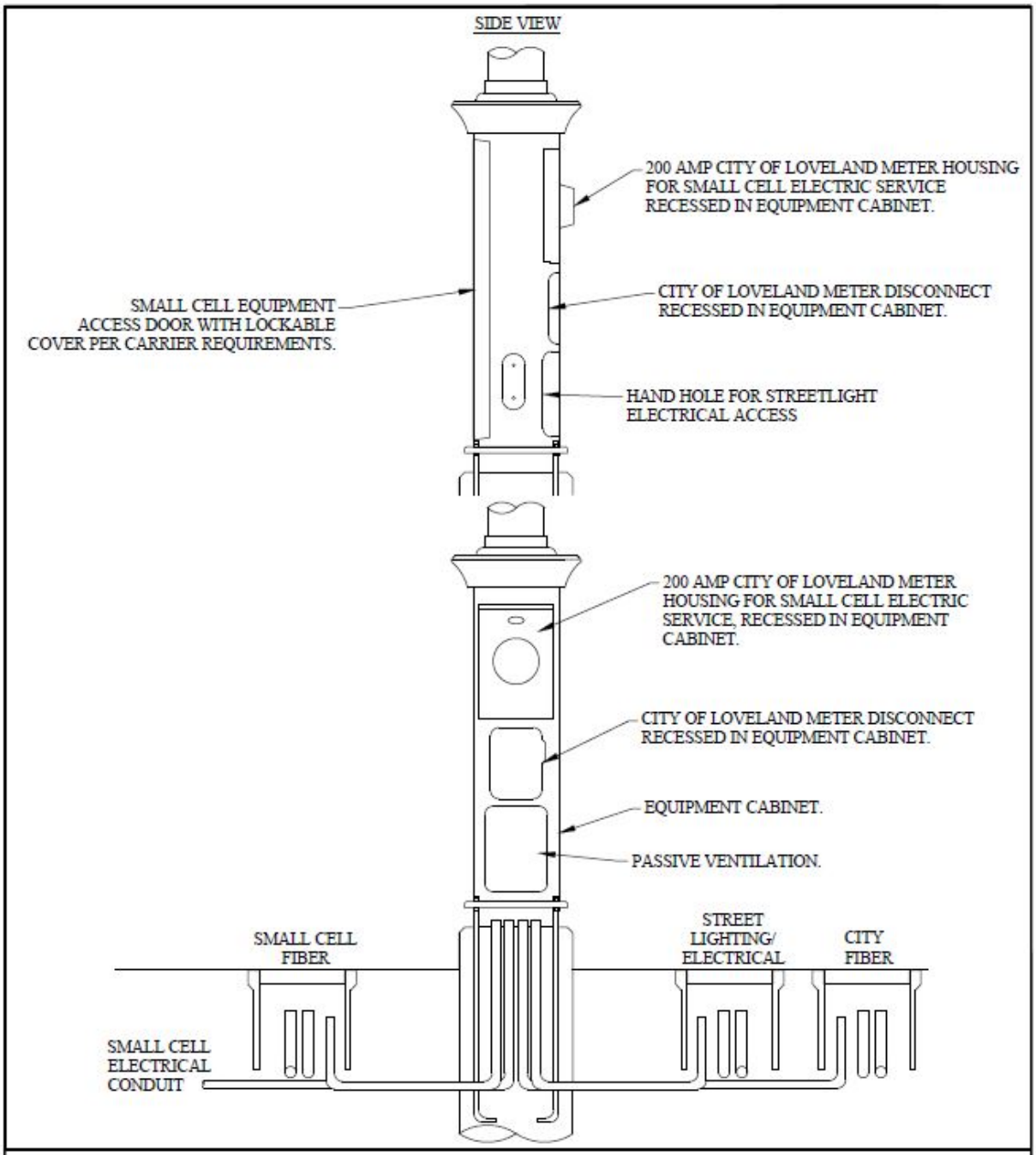
WIRELESS SMALL CELL	TYPICAL UTILITY POLE MOUNTED DETAIL	APPROVED BY:	NONE
POLE EQUIPMENT		DATE:	mm/dd/yyyy
CITY OF LOVELAND WATER & POWER		DRAWING NO.	SC-01



NOTES:

1. SEE CITY OF LOVELAND SPECIFICATIONS FOR POLE DEPTH.

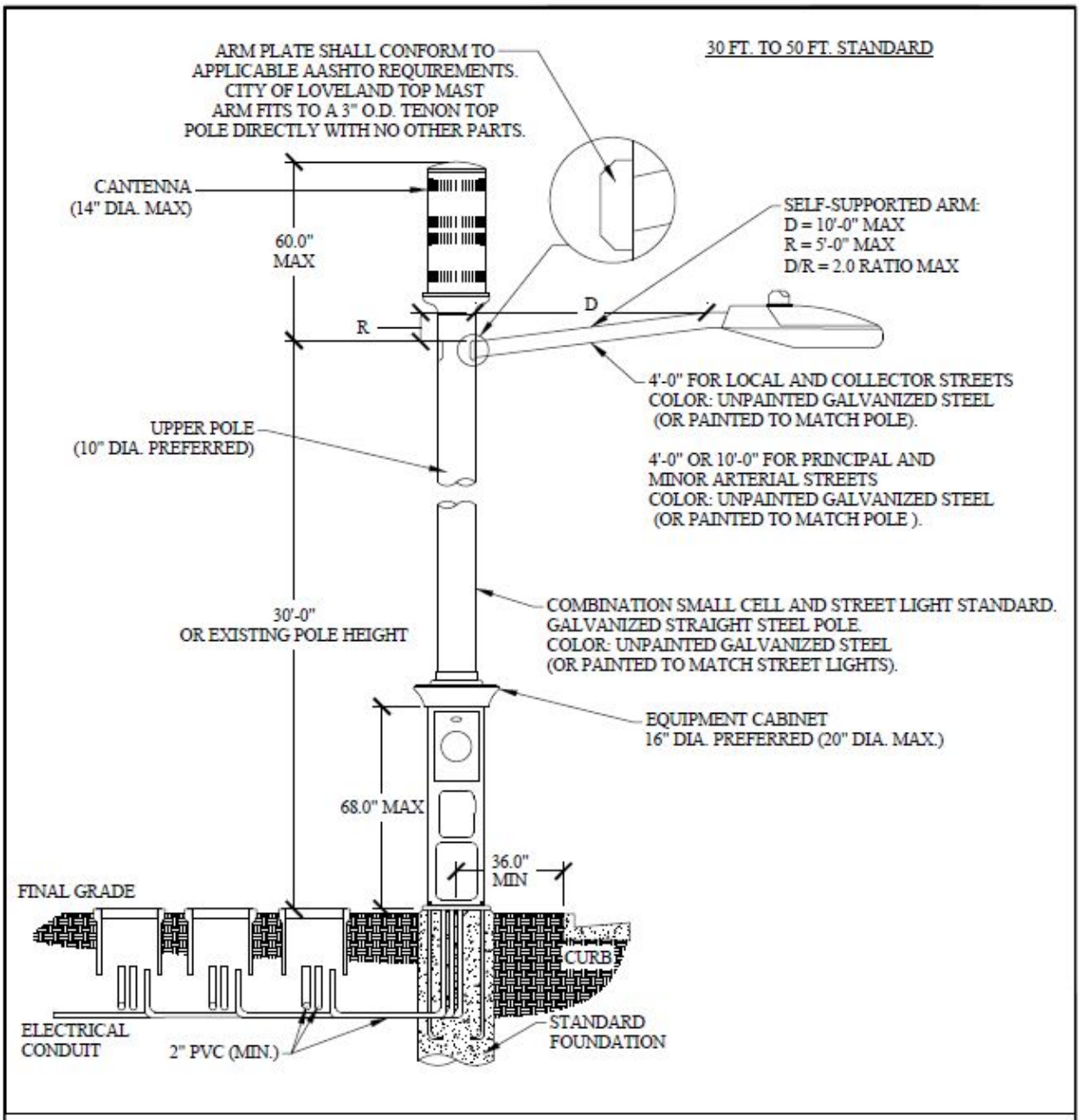
WIRELESS SMALL CELL	TYPICAL UTILITY POLE STRAND MOUNTED DETAIL	APPROVED BY:	NONE
POLE EQUIPMENT		DATE:	mm/dd/yyyy
CITY OF LOVELAND WATER & POWER		DRAWING NO.	SC-02



NOTES:

1. THE CITY OF LOVELAND MAY REQUIRE 2 METERS FOR A SINGLE POLE.

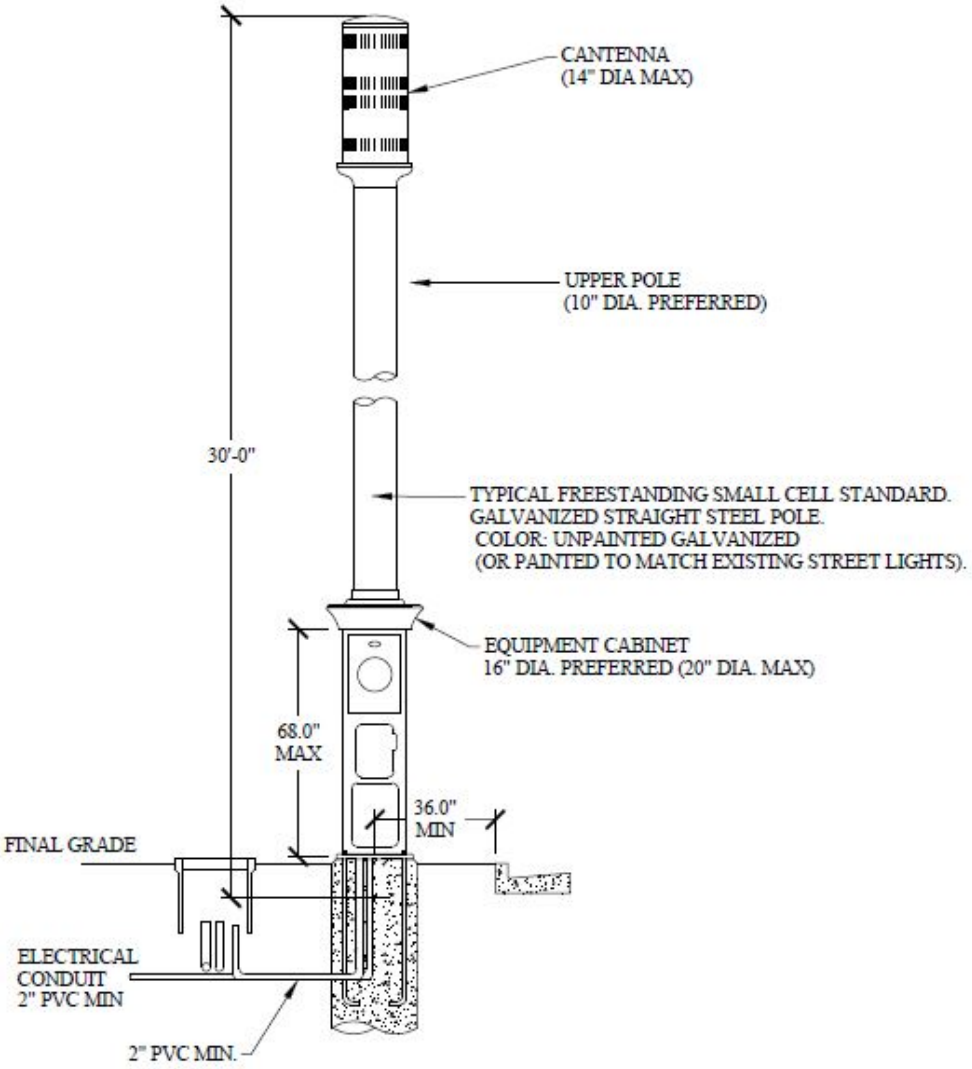
WIRELESS SMALL CELL	TYPICAL COMBINATION POLE EQUIPMENT CABINET DETAIL	APPROVED BY:	NONE
POLE EQUIPMENT		DATE:	mm/dd/yyyy
CITY OF LOVELAND WATER & POWER		DRAWING NO.	SC-03



NOTES:

1. LUMINAIRE SHALL BE MOUNTED AT THE SAME HEIGHT AS SURROUNDING STREETLIGHTS.
2. ALL ANCHOR BOLT HARDWARE SHALL BE CONCEALED.
3. ALL ELECTRICAL WIRING AND FIBER IN UPPER POLE SHALL BE SEPARATED BY OWNER.
4. ALL SMALL CELL EQUIPMENT SHALL BE HOUSED INTERNAL TO THE EQUIPMENT CABINET OR HIDDEN BEHIND THE CANTENNA.

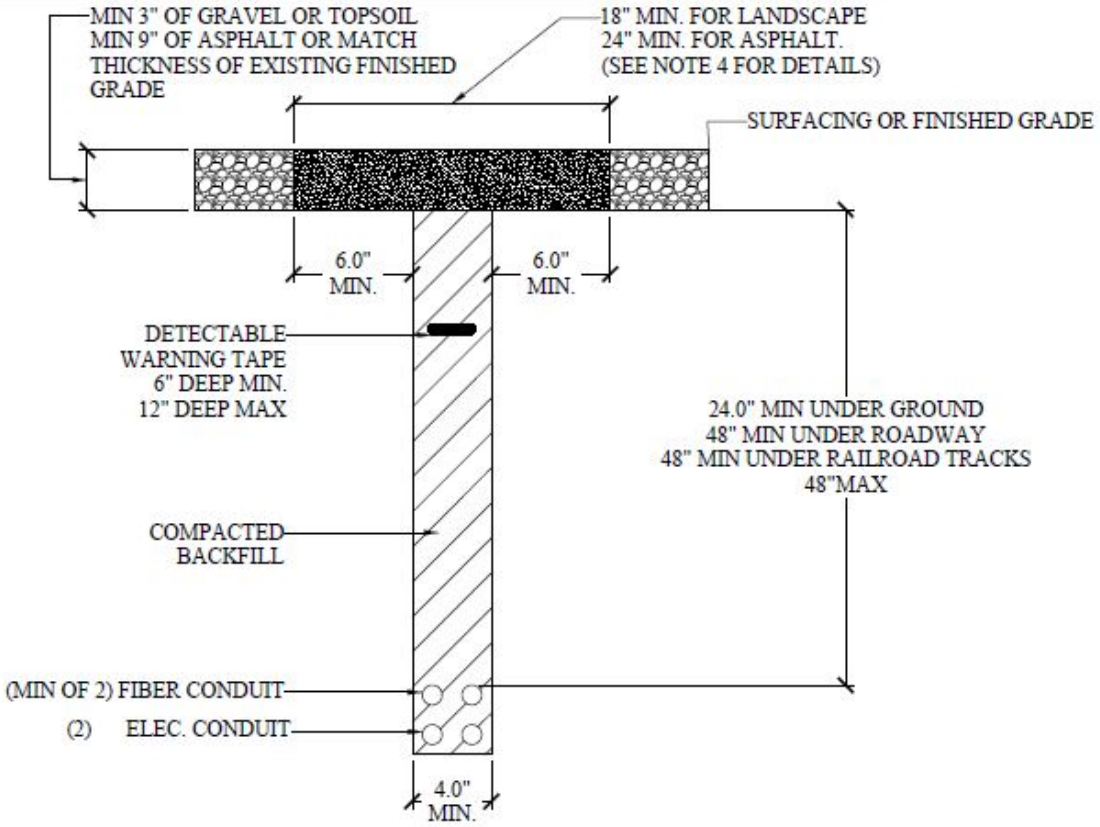
WIRELESS SMALL CELL	TYPICAL COMBINATION POLE DETAIL	APPROVED BY:	NONE
POLE EQUIPMENT		DATE:	mm/dd/yyyy
CITY OF LOVELAND WATER & POWER		DRAWING NO.	SC-04



NOTES:

1. ALL ANCHOR BOLT HARDWARE SHALL BE CONCEALED.
2. ALL ELECTRICAL WIRING AND FIBER IN UPPER POLE SHALL BE SEPARATED BY OWNER.
3. ALL SMALL CELL EQUIPMENT SHALL BE HOUSED INTERNAL TO THE EQUIPMENT CABINET OR HIDDEN BEHIND THE CANTENNA

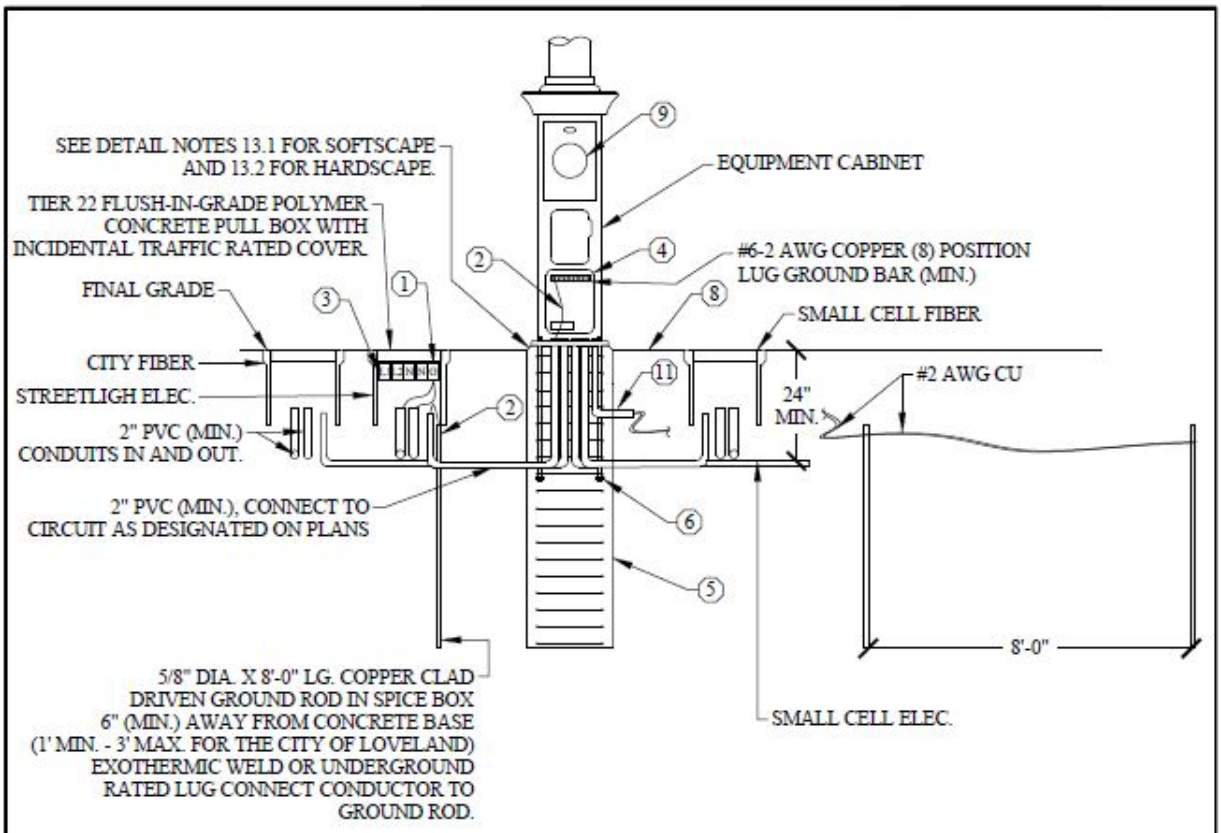
WIRELESS SMALL CELL	TYPICAL FREESTANDING SMALL CELL POLE DETAIL	APPROVED BY:	NONE
POLE EQUIPMENT		DATE:	mm/dd/yyyy
CITY OF LOVELAND WATER & POWER		DRAWING NO.	SC-05



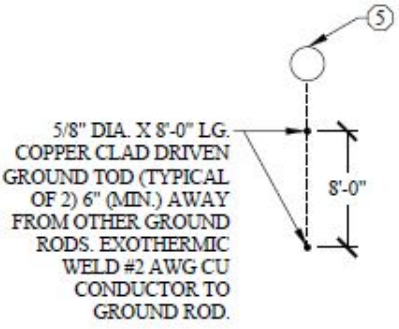
NOTES:

1. CONTRACTOR SHALL COORDINATE BORING, DRIVING, OR TRENCHING WITH OTHER UNDERGROUND UTILITIES. CONTRACTOR SHALL USE COMMON TRENCHES WHEREVER POSSIBLE.
2. WHENEVER POSSIBLE, CONDUIT OR CABLE SHALL BE INSTALLED BY BORING, DRIVING OR ANY OTHER ACCEPTABLE MEANS UNDER CONCRETE UNITS. OPEN CUTTING SHALL BE USED ONLY UNDER SPECIAL CIRCUMSTANCES AND ONLY WITH APPROVAL OF PUBLIC WORKS.
3. MINIMUM WIDTH AND TYPE OF RESTORATION TO BE DETERMINED BY PW INSPECTOR, BASED ON CONTRACTOR'S PRE-ACTIVITY PHOTOS, TO MATCH PRE-EXISTING CONDITIONS.
4. SOD REPLACEMENT SHALL BE A MINIMUM OF 18" IN WIDTH. ASPHALT REPLACEMENT SHALL BE A MINIMUM OF 24" IN WIDTH. CONCRETE REPLACEMENT SHALL BE PER THE DEPARTMENT OF PUBLIC WORKS TRANSPORTATION STANDARD DETAILS 12.3.
5. ANY HARDSCAPE (CONCRETE OR PAVERS) SHALL BE REPLACED IN FULL PANELS OR PAVERS OF THE SAME TYPE, COLOR, AND SIZE AS BEFORE.
6. 1-#12 AWG LOCATE WIRE AND A NYLON OR POLYESTER PULL TAPE WITH 1250 LBS TEST STRENGTH AND FOOTAGE MARKINGS IN ALL EMPTY CONDUITS.
7. ALL CONDUIT, LANDSCAPE RESTORATION, ASPHALT RESTORATION, AND CONCRETE RESTORATION MUST BE INSTALLED IN ACCORDANCE WITH THE DEPARTMENT OF PUBLIC WORKS TRANSPORTATION STANDARD DETAILS.
8. SEPARATE CONDUIT SHALL BE PROVIDED FOR STREETLIGHT ELECTRICAL CONDUIT, CITY FIBER, SMALL CELL ELECTRIC CONDUIT AND SMALL CELL CARRIER FIBER.

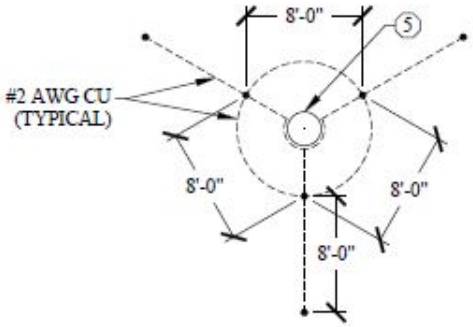
WIRELESS SMALL CELL	TYPICAL COMBINATION POLE CONDUIT BURIAL DETAIL	APPROVED BY:	NONE
UNDERGROUND EQUIPMENT		DATE:	mm/dd/yyyy
CITY OF LOVELAND WATER & POWER		DRAWING NO.	SC-06



ELEVATION SECTION VIEW

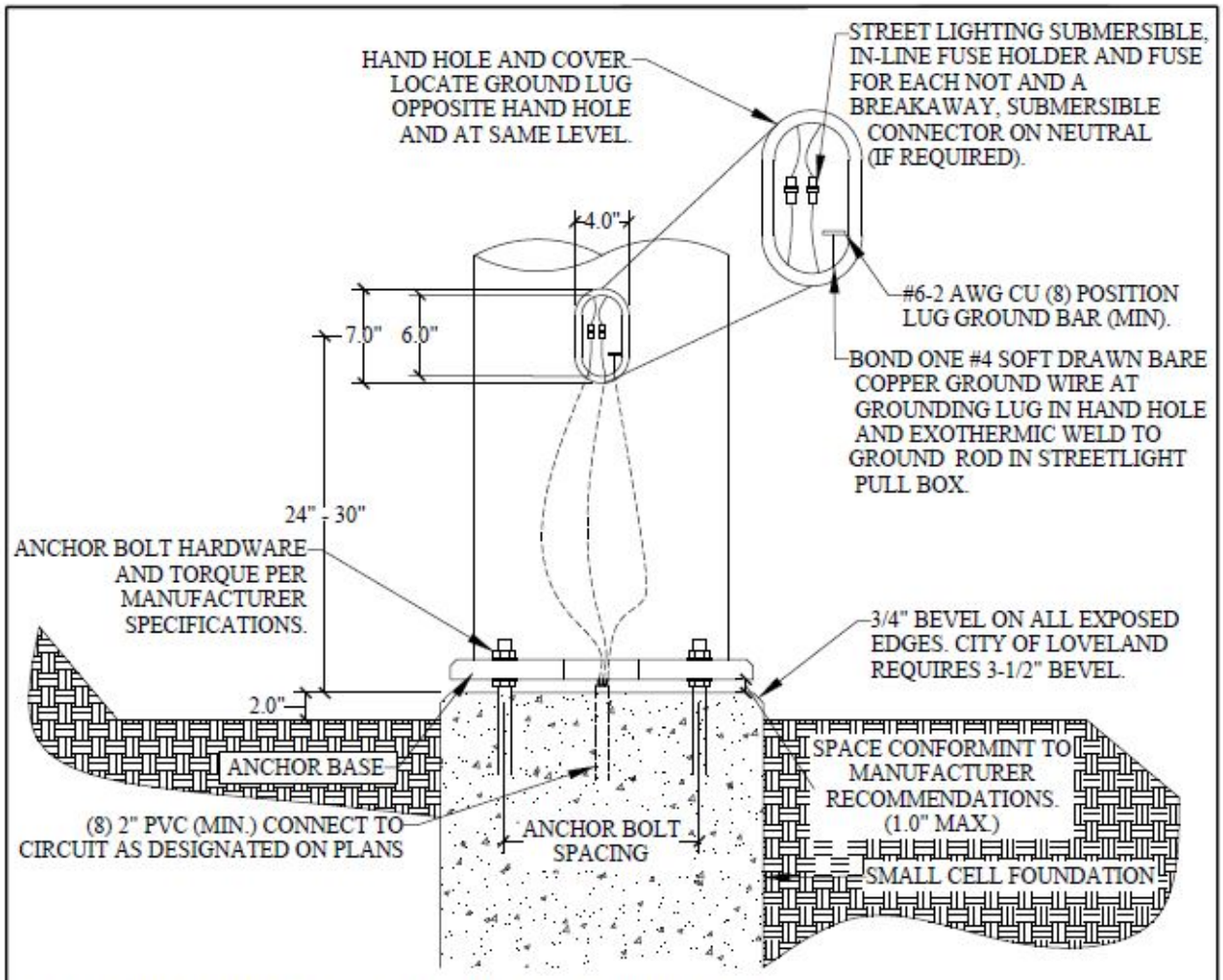


11 GROUNDING OPTION 1
LINEAR GROUNDING
PLAN VIEW



10 GROUNDING OPTION 2
RADIAL GROUNDING WITH INNER RING
PLAN VIEW

WIRELESS SMALL CELL	TYPICAL SMALL CELL ELECTRICAL DETAIL FOR SOFTSCAPE AND HARDSCAPE	APPROVED BY:	NONE
FOUNDATION DETAIL		DATE:	mm/dd/yyyy
CITY OF LOVELAND WATER & POWER		DRAWING NO.	SC-07



NOTES: FOR USE ONLY OUTSIDE CLEAR ZONE OR IN PROTECTED INSTALLATIONS

1. SMALL CELL STANDARD FOUNDATIONS SHALL BE PRECAST CONCRETE.
2. ALL CONDUCTORS SHALL BE SIZED IN CONFORMANCE WITH NEC REQUIREMENTS 3/C COPPER #12 AWG CABLE MINIMUM.
3. THE CITY OF LOVELAND REQUIRES SIZE BASED ON THE ODL MANUAL "MAXIMUM DISTANCE AND LUMINAIRES PER STREET LIGHT CONDUCTOR RUN-UG FED" USING ALUMINUM CONDUCTORS.
4. THE CITY OF LOVELAND IS GOVERNED BY THE NESC INSTEAD OF NEC.
5. ALL EQUIPMENT SHALL BE LOCATED INTERNAL TO THE EQUIPMENT CABINET OR RECESSED IN THE EQUIPMENT CABINET TO MEET UTILITY REQUIREMENTS.
6. EQUIPMENT CABINET SHALL BE SIZED TO HANDLE THE EQUIPMENT REQUIRED BY THE OWNER.
7. EQUIPMENT SHALL BE INSTALLED IN SEPARATED COMPARTMENTS WITH LOCKABLE ACCESS COVER PER OWNER REQUIREMENTS.
8. ANCHOR BOLT CIRCLE SHALL BE 19.5" FOR 16" EQUIPMENT CABINET (OR 23.5" FOR 20" EQUIPMENT CABINET) AND CENTERED ON FOUNDATION. USE ANCHOR BOLT TEMPLATE.

WIRELESS SMALL CELL	TYPICAL NON-BREAKAWAY POLE BASE STANDARD DETAIL	APPROVED BY:	NONE
FOUNDATION STRUCTURE		DATE:	mm/dd/yyyy
CITY OF LOVELAND WATER & POWER		DRAWING NO.	SC-08