Small Cell Design Guidelines and Standards

For Small Cell Facilities in the Public Right-of-Way

PURPOSE & BACKGROUND

Research shows that mobile data traffic in North America has grown significantly, and is projected to continue increasing at a rapid rate with the proliferation of mobile devices. Wireless companies have indicated that existing infrastructure is becoming congested and cannot continue to meet the demands of their customers. According to wireless carriers, existing cell sites are already becoming congested, and installing more cell towers covering large areas will not keep up with projected demand for high-speed wireless data. To meet demands for wireless data, carriers have begun using new lower-powered small cell antenna technology to "offload" data traffic from larger cell towers.

These Small Cell Design Guidelines provide aesthetic requirements and specifications that all small cell facilities installed in the City of Boulder are expected to meet. In addition to the compatibility standards set forth in Section 8-6-6.5, "Small Cell Facilities in the Public Right-of-Way," B.R.C. 1981, these guidelines are intended to ensure wireless carriers minimize the visual impact of all proposed small call equipment. There is a preference for utilizing or replacing existing permitted facilities (including without limitation, traffic signs, traffic signals, light poles or light standards) to limit the amount of new vertical infrastructure installed within the city's right-of-way.

TYPES OF SMALL CELL FACILITIES

There are three major types of small cell infrastructure installations permitted within the rightof- way. An overview of each type, specific standards of acceptable installations are provided below.

Replacement Street Lights.

- ☐ Shall not exceed the height limitations for principal buildings and uses in Chapter 9-7, "Form and Bulk Standards," B.R.C. 1981.
- ☐ Each antenna and all of its exposed elements shall fit within an imaginary enclosure of no more than three cubic feet.
- ☐ The new street light arm shall match the arm length, luminaire fixture, and luminaire mounting height of the existing pole. The applicant may request a modification to these standards through the procedures set forth in Section 1.05, "Alterations, Modifications, and Waivers," of the City of Boulder Design and Construction Standards.

Attached to Existing Vertical Infrastructure.

To the extent possible, small cell equipment should only be attached to existing metal infrastructure. If attachments to a wooden pole are proposed, applicants must demonstrate that no other feasible options occur within the proximity of the needed signal area.

- ☐ Shall not exceed the height of the existing infrastructure on which it is mounted by more than ten feet or the height limitations for principal buildings and uses in Chapter 9-7, "Form and Bulk Standards," B.R.C. 1981, whichever results in a lesser height.

- ☐ Shall be placed in a manner so that the size, appearance, and function of the traffic signal, street light or other utility pole will not be considerably altered.
- ☐ Each antenna and all of its exposed elements shall fit within an imaginary enclosure of no more than three cubic feet.
- ☐ All wireless equipment shall be enclosed within the pole or below grade and fully concealed from view.
  - Panel/prismatic antennas whose proper function prevents them from being fully enclosed within an enclosure shall be considered enclosed if their installation is substantially within a maximum diameter of 20 inches.
- ☐ Applicant shall provide analysis and documentation that the existing infrastructure is structurally capable of supporting the new wireless communication equipment.

New Freestanding Facilities.

To the extent possible, new freestanding facilities should only be proposed if there are no feasible options for replacement street lights and/ or attaching to existing vertical infrastructure (metal or wooden) within the proximity of the needed signal area.

- ☐ The maximum facility height, including both vertical infrastructure and antenna, is not more than:
  - Thirty feet when the facility is within three hundred feet of a property of the P, RR-1, RR-2, RE, RL-1, RL-2, RM-1, RM-2, RM-3, RH-6 and MH zoning districts.
  - For all other zoning districts, the facility height does not exceed the height limitations for principal buildings and uses in Chapter 9-7, "Form and Bulk," B.R.C. 1981.
- ☐ Each antenna and all of its exposed elements could fit within an imaginary enclosure of no more than three cubic feet.
- ☐ All wireless equipment shall be enclosed within the pole or below grade and fully concealed from view.
  - Panel/prismatic antennas whose proper function prevents them from being fully enclosed within an enclosure shall be considered enclosed if their installation is substantially within a maximum diameter of 20 inches.

COMPATIBILITY REQUIREMENTS

Compatibility techniques shall be used in the design and siting of small cell facilities. The compatibility techniques will minimize or eliminate the visual impact of such facilities to surrounding uses. A small cell facility shall utilize compatibility techniques by:

- ☐ Utilizing or replacing existing permitted facilities (including without limitation, traffic signs, traffic signals, light poles, or light standards) so that the presence of the small cell facility is not readily apparent;
- ☐ Integrating the equipment in an architectural feature of an existing structure;
- ☐ Integrating or attaching equipment to an outdoor fixture such as a traffic signal, light standard, utility pole, or flagpole;
- ☐ Utilizing a design which mimics or is consistent with the nearby natural or architectural features; and

☐ Maintain consistency with the size and shape of the pole-mounted equipment installed by communications companies on utility poles within three hundred feet of the facility.

All small cell equipment shall also meet the requirements listed below:

☐ Visible exterior surfaces shall be constructed out of or finished with non-reflective material and shall be painted to match as closely as possible the color and texture of the vertical infrastructure on which it is mounted.

- The standard pole color is RAL 9017 (Traffic Black).

☐ Except for the equipment that is expressly permitted above grade for a small cell facility, equipment vaults, and other transmission equipment associated with the pole and antenna, shall be placed below grade when located within the public right-ofway. Such equipment may be placed above grade outside of the public right-of-way if compatibility techniques of this section are otherwise met.

☐ To the extent practical, all small cell facilities shall be designed and constructed to permit such facility to accommodate at least two wireless service providers on the same facility.

☐ No exterior lighting may be installed for the benefit of small cell facilities, unless required by the FAA or other applicable governmental authority or the small cell facility is mounted on a light pole or other similar structure primarily used for lighting purposes.

PLACEMENT & SEPARATION REQUIREMENTS

☐ The facility shall be separated from all other wireless communication facilities and small cell facilities within the right-of-way by a distance of at least 600 feet, unless the facility replaces an existing traffic signal, street light pole, or similar vertical infrastructure. In determining compliance with this separation requirement, the city manager may consider approved and pending applications for wireless communications facilities.

Utilities.

☐ All new small cell equipment shall be horizontally separated from existing utilities in accordance Design and Construction Standards Section 4.06. This includes 10 feet of separation from sewer lines and 5 feet of separation from water and stormwater lines. The minimum separation from dry utility lines such as electric, gas or telecommunications shall be per the utility owner or 18 inches, whichever is greater. All measurements for separation are from the nearest outside edge of pipe. No small cell equipment will be allowed on top of or over any city utilities, including mains, pipes, service laterals, meter pits or stormwater inlets.

☐ All utilities located within a 20 foot radius of the proposed new small cell equipment shall be located and depicted on submitted plans to a Quality Level B per ASCE 38-02 "Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data" and city drafting standards as stated in the DCS. The city may require Qualify Level A depictions for any utilities within a 5 foot radius of the proposed location of the small cell equipment. If utility locates disagree with city mapping, additional located and survey data maybe required of the applicant to resolve the discrepancy.

Transportation.

☐ If the proposed facility replaces an existing utility pole with city signage or staff determines a nearby freestanding city sign should be mounted to a new freestanding facility the following note must be included on plans: "Contact Traffic Signs and Markers Maintenance Supervisor with the City of Boulder Sign Shop at

(303) 413-7122 or (303) 829-2172 (cell) prior to installing the guide signs to verify signs are installed on pole consistent with city standards."

- ☐ All new small cell equipment shall be located 18 inches from an existing sidewalk and 36 inches from the face of the curb to the center of the pole. The city may use its discretion in varying these standards for small cell facilities that replace an existing utility pole.
- ☐ Any encroachment on a sidewalk shall maintain a minimum clearance of eight feet vertically and horizontally of unobstructed pedestrian way. The requirements of this paragraph may be modified by the city manager if reasonable passage is provided on the sidewalk and the safety of pedestrians, bicyclists, and motorists is not impaired.
- ☐ All small cell facilities to be installed in the Colorado Department of Transportation (CDOT) right-of-way must obtain an approved permit from CDOT prior to submitting a right-of-way permit application with the City.
- ☐ Small cell facilities shall not alter vehicular circulation or parking within the right-of-way or impede vehicular, bicycle, or pedestrian access or visibility along the right-of-way. All equipment installations shall comply with the Americans With Disabilities Act and all local, state and federal law and regulations. No small cell may be located or maintained in a manner that causes unreasonable interference. Unreasonable interference means any use of the right-of-way that disrupts or interferes with its use by the city, the general public, or other persons authorized to use or be present upon the right-of-way, when there exists an alternative that would result in less disruption or interference. Unreasonable interference includes any use of the 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.

Landscaping.

- ☐ All potentially impacted public street trees must be protected during construction at a minimum in accordance with Chapter 6-6 B.R.C. 1981 and Chapter 3 of the Design and Construction Standards. Sufficient notes and tree protection details (specifically Detail 3.12) shall be included on all plans with existing public street trees proximal to any proposed small cell equipment.
- ☐ All new small equipment shall be located a minimum of 15 feet from any existing public tree measured from the center of the pole to the center of the tree.
- ☐ If no existing public trees exist in the vicinity of a proposed location, the facility shall be located so that it does not prevent the City Forester from planting street trees or prevent the adjacent property from meeting street tree requirements if and when required (see Sections 9-9-12 and 9-9-13, B.R.C. 1981). Potential locations for future street trees shall follow the standards below:
  - A minimum of 15 feet from any utility or light pole.
  - A minimum of 10 feet from any water or sewer line.
  - A minimum of 4 feet from any pavement, driveways, curb ramps, etc.
  - Spaced approximately 30-40 feet on center.

Commercial and Industrial Areas.

Any small cell equipment installed in commercial and industrial areas must be located so as not to impede the operation and enjoyment of adjacent uses. New freestanding facilities shall not be located in

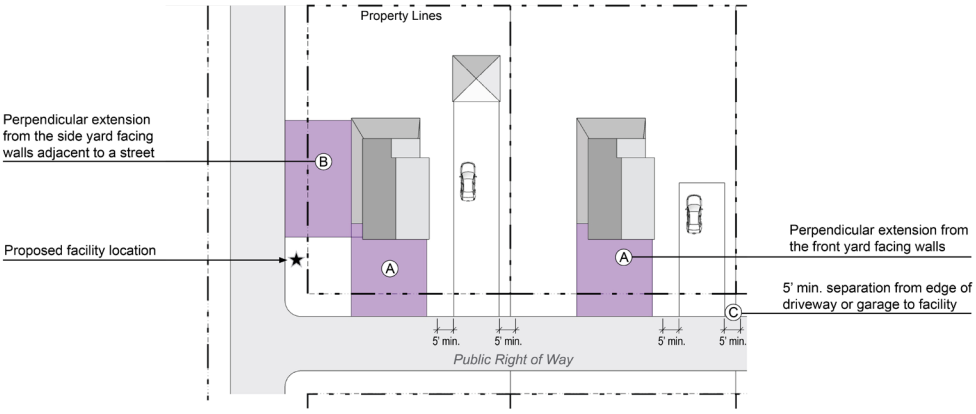
front of primary egress and access points, primary window displays, accessible patios or balconies, and other building elements clearly intended to serve the establishment. Both new freestanding facilities and replacement street or traffic light poles should be placed in a manner that does not unnecessarily block the path of travel nor negatively impact the pedestrian experience.

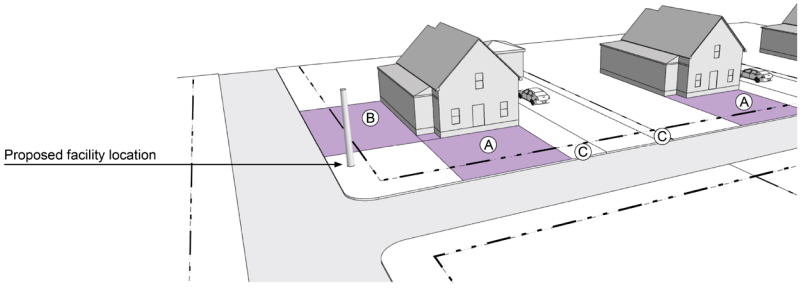
Residential Areas.

Generally, new freestanding facilities should be avoided in low-density residential neighborhoods. Applicants must demonstrate there are no replacement or attachment options available within one radial block of the proposed location or provide a letter from a radio frequency engineer stating there are no other feasible options.

☐ When placed adjacent to a residential zoned property, or a property with a residential use, a new freestanding facility:

- Shall not be installed within the perpendicular extension of the front yard facing walls of the principal structure on the property or within the perpendicular extension of any walls of said structure facing a side yard that is adjacent to a street. Front yard and side yard shall have the meanings defined in Section 9-16-1, "Definitions," B.R.C. 1981.
- Shall be located at least five feet from the nearest edge of the garage or driveway, whichever is closer.
- In the case of a corner lot, where practical, the facility shall be placed on the corner formed by two intersecting streets.
- When placed in a zone that is not classified as a residential zone, to the extent practical, the facility shall not be installed along a property with a residential use.





Historic Preservation.

☐ Any small cell facility that is constructed in a historic district shall be required to obtain an alteration certificate pursuant to Chapter 9-11, B.R.C. 1981 prior to all other applications.

Floodplain and Wetlands.

☐ The limits of the 500- and 100-year floodplains must be clearly shown on plans. All small cell facilities proposed within the 100-year floodplain must submit and receive a floodplain development permit.

☐ The weland boundaries as depicted in city-adopted wetland mapping (Section 9-3-9, B.R.C. 1981) including high functioning wetland/stream area, inner buffer and outer buffer, must be clearly shown on plans. All small cell facilities located within the wetland buffer must submit and receive a wetland permit.

BUILDING & ELECTRICAL REQUIREMENTS

☐ Both the foundation and pole must be designed for a 175 mph vult wind load (risk category III structure) and 30 psf snow load.

☐ All small cell equipment must comply with the 2018 IBC, TIA-222, and NEC 2020.

SUPPLEMENTAL INFORMATION:

- Section 8-6-6.5, "Small Cell Facilities in the Public Right-of-Way Permits" B.R.C. 1981
- City of Boulder Design and Construction Standards
- City of Boulder eMaplink
- City of Boulder Public Tree Inventory