

Design and Construction Standards

390. Small Wireless Facilities Design & Construction Standards

390.1. Permitting Process

- A. A Network Provider shall comply with the following permitting process when seeking to install Wireless Facilities in the public right-of-way (ROW):
 1. Obtain a City of Hillsboro franchise and/or ROW license;
 2. File a Type II land use application, where applicable; and
 3. Obtain a Public Improvement Permit (PIP)

390.2. General Provisions

- A. Wireless Facilities, for the purposes of these standards, includes any pole, conduit/cabling, cabinets, equipment or other materials used in the installation of a wireless network.
- B. A Network Provider shall construct and maintain Wireless Facilities in a manner that does not:
 1. Obstruct, impede or hinder the usual travel or public safety on the Public Right-of-Way;
 2. Obstruct the legal use of the Public Right-of-Way by other providers;
 3. Violate or conflict with any Laws, including but not limited to the City of Hillsboro ordinances or standards;
 4. Obstruct, impede, or hinder any operations of the City's infrastructure or systems (existing or future), including but not limited to Smart City equipment, street light equipment, traffic signal equipment, etc.
 5. Any items installed after the initial application will require an additional approval process with the City. All new and existing equipment will be required to comply with any currently adopted standards at the time of installation.
- C. In locations where a new pole is installed, the City requires the pole be designed to internally conceal and hold all Wireless Facilities equipment. In instances where an existing pole is located in the desired location, and the existing pole is deemed structurally sound to support the proposed network equipment, the Wireless Facilities may attach to the existing pole so long as every effort is made to conceal the equipment inside the pole. In the event the proposed equipment cannot reasonably fit within the existing pole itself, and with the approval of the City, the Wireless Facilities shall be concealed or enclosed in one (1) equipment box, cabinet or other unit that may include ventilation openings.
 1. Poles and associated wireless facilities equipment shall be prepared and powder coated consistent with 00593 of the *Oregon Standard Specifications for Construction*.
- D. Any newly installed street light poles shall be PGE Option C.

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- E. There shall be no surface mounted conduit or exposed wiring on any exterior surface of the supporting pole.
- F. There shall be no more than one (1) Network Node on any one (1) Pole.
- G. A Network Node installed on a street light pole must connect to the same power source supplying power for the street light.
- H. Aerial cable spans and/or aerial span power connections are not permitted.
- I. Network Provider installations are limited within the public right-of-way to installation on:
 - 1. Street light poles (City of Hillsboro Owned)
 - 2. Existing public utility poles
 - 3. Network Provider installed poles, which will require a separate land use approval process. See City of Hillsboro Municipal Code for additional information.
- J. Complete Construction plans for the proposed infrastructure must be submitted through a PFI permit application and bundled into a single PDF file, formatted to 11"x 17" sheets, sealed by a Professional Engineer licensed in the State of Oregon, and including:
 - 1. Each pole represented by a set of plans within the overall file, designed so that if any single pole is removed from the application, the remaining plan set remains valid. Overall sheets including details & notes are encouraged.
 - 2. Structural analysis for each identified pole sealed by a Professional Engineer in the State of Oregon indicating the pole and foundation can handle the proposed equipment load, and where and existing pole is utilized, any existing loading. Foundations must also be approved by pole owner.
 - 3. Electrical load analysis showing that the existing transformer, circuit and any associated wiring can handle the additional power load from the proposed equipment, or any proposed upgrades as needed. Wiring shall be sized to limit voltage drops to a maximum of 2 percent between the utility service connection and the control panel, and a maximum of 3 percent from the control panel to the most distant fixture served. Submit an electronic file of the voltage drop/line loss calculations for City approval.
 - 4. Each plan set shall include the following:
 - a) A cover sheet containing a scaled City map including all pole locations included in the subject application, a list of each pole location including GPS coordinate, PGE or City pole ID (where applicable), and a legend of all sheets.

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- b) A page for each specific pole location referenced with pole title, name, location information, PGE pole ID (where applicable), and photograph of the proposed location of the pole.
 - c) "Required Notes for Each set of Pole Plans" only if unique to the location and as such cannot be part of Overall sheet notes.
 - d) Labeled and dimensioned site plan and elevation plan, including the following as applicable:
 - i. Key symbols, ROW lines, property lines, etc.
 - ii. Street information including names, curb-lines, sidewalk, street amenities, vegetation, existing and proposed utilities
 - iii. Identification of immediately adjacent property owner(s) and/ or easements
 - iv. Structural Plans for pole and associated foundations that reference structural calculations and include depth, diameter, grounding, reinforcing, and foundation information as necessary
 - v. Labeled construction materials, color, finish, etc.
 - vi. Pole dimensions and total max height from adjacent grade
 - vii. Size and dimension of any projection(s) from pole
 - viii. Proposed voltage, maximum transmission wattage and radio frequency for all equipment associated with each Network Node, as allowed under FCC regulations
 - ix. Detail of proposed communication conduit and electrical connection location
 - x. Typical conduit / duct bank installation section detail
 - xi. All existing utilities, including but not limited to:
 - A. Storm & Sanitary Sewer pipes and appurtenances
 - B. Any utilities 24" and greater depicted as double-lines
 - C. Gas line (indicate size, High Pressure, services, etc).
 - D. Electric lines (indicate power pole number, anchor pole, overhead line, and duct bank in actual dimensions)
 - E. Water infrastructure including valves, fire hydrants, etc.
 - F. Adjacent private service line locations where known
 - e) Certification for each proposed site showing the wireless facility operates within radio frequency exposure guidelines as established by the FCC.
- K. Once installation is completed, the applicant is required to provide the City with a complete set of as-built drawings meeting the same information and requirements as the application set outlined in item K of this section, but updated for any approved changes that occurred in the field.
- 390.3. Location
- A. All Wireless Facilities shall be located to avoid any physical or visual obstruction to pedestrian or vehicle traffic, or in any manner create safety hazards to pedestrians, bicyclists or motorists.

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- B. All Wireless Facilities shall be positioned to not encroach or effectively narrow the clear path of any pedestrian, bicycle, or roadway facility.
- C. Wireless facilities proposed to be sited in the ROW shall be sited according to the following priorities, in descending order of preference. If the priority is not followed, the owner must demonstrate why a higher priority is not available for use. For purposes of this subsection, streets shall have the classification set forth in the Hillsboro Transportation System Plan.
 - 1. First priority: freeways;
 - 2. Second priority: arterials;
 - 3. Third priority: collectors;
 - 4. Fourth priority: neighborhood routes;
 - 5. Fifth priority: local streets.

390.4. Separation

- A. The separation between Network Provider (i.e. those not owned by the City of Hillsboro or its agency partners) installed Wireless Facilities shall be a minimum of two-hundred fifty (250) feet.
- B. The separation between Wireless Facilities and City of Hillsboro or its agency partners owned/operated Smart City technology shall be a minimum of two-hundred fifty (250) feet.
- C. In residential areas, the Wireless Facilities shall be located where the shared property line between two residential parcels intersects the Public Right-of-Way.
- D. In no instance shall a Wireless Facility be located in front of a building entrance or exit.

390.5. Wireless Facilities

- A. Cabinets and Equipment
 - 1. Where Wireless Facilities are installed in the location of an existing street light, and the additional structural load cannot be accommodated by the existing street light pole and foundation, a new street light pole and foundation shall be installed and all equipment shall be concealed and located inside the pole, except for the antenna.
 - 2. Where Wireless Facilities are installed and the additional structural load can be accommodated by the existing street light pole and foundation, every effort must be made to conceal the equipment inside the pole. In instances where the proposed equipment cannot reasonably be accommodated within the existing pole, the Wireless Facilities shall be concealed or enclosed in an equipment box, cabinet or other unit that may include ventilation openings as follows:
 - a. The Network Provider is limited to one (1) equipment box or cabinet per pole per installation. All other equipment must be located either within the pole itself, or in a below ground vault.

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- b. The Network Provider shall not install ground mounted cabinets or other equipment without written City approval.
 - c. The base of all cabinets and equipment attached to poles shall be installed at least eight (8) feet above the ground, and if a Network Node attachment is projecting toward the street and/or bicycle facilities, for the safety and protection of the public and vehicular traffic, the base of the attachment shall be installed no less than seventeen (17) feet above the bicycle facility and/or street.
 - d. Protrusions from the outer circumference of the pole shall be no more than eighteen (18) inches and twenty four (24) inches in height.
 - e. The color of all cabinets and equipment shall match pole color.
 - f. The total volume of all installed equipment external to the pole (including, but not limited to cabinets, vaults, boxes, antennas) shall not exceed twenty-one (21) cubic feet. This maximum applies to all equipment installed at the time of original application, and including any equipment to be installed at a future date. If a Network Provider wishes to install equipment that exceeds this maximum, the installation will be redefined as a Macro site installation and all the associated standards and rates for Macro installations will be applied.
 - g. Equipment shall be orientated away from nearby residential windows, doorways and entrances.
 - h. Where permitted, equipment located on poles must be attached with stainless steel banding, powder coated to match pole, and sized to support the required equipment load.
- B. Antennas
- 1. Network Antennas shall be built into any newly installed poles.
 - 2. Where the Network Provider has demonstrated an existing pole can be used, the antenna must be painted to match the existing pole.
 - 3. Antennas shall not exceed:
 - a. Maximum five (5) feet in height or 10% of the pole height, whichever is less; and
 - b. Maximum diameter/width of nine (9) inches or pole diameter at mounting location, whichever is less
 - c. If a network provider wishes to install an antenna that exceeds these limitations, the installation will be redefined as a Macro site installation and all the associated standards and rates for Macro installations will be applied.
 - 4. Network Antenna placement shall not impair light, air or views from adjacent windows.
 - 5. For Equipment that include a GPS antenna, integrate the GPS antenna into the same cylindrical shape on top of the main antenna in order to form the appearance of a single unit.

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6. Antennas shall use electronic tilt mechanisms.
 7. Use single element side-arm or top-mount cylindrical antennas.
 8. Panel antennas are not permitted.
 9. Side-mounted antennas shall use flange or channel mounting arm to conceal all cabling and passive radio frequency equipment.
 10. For top-mounted antennas, use a shroud around the base of the antenna, especially for antennas models with four or more cabling ports. If a shroud cannot be used, utilize cable ties (or similar) to neatly arrange cabling and note such on the site completion checklist on the cover sheet of the plans.
 11. Pole top antenna mounts shall not be offset from pole.
 12. Only one (1) antenna shall be allowed per pole. If a Network Provider wishes to upgrade or replace their antenna at any point during their permitted use of the right-of-way, they must remove any existing antenna so the maximum number of antennas at any time does not exceed one (1).
- 390.6. Network Provider Installed Poles
- A. A Network Provider installed pole is defined as any pole installed by the Network Provider. This can be either to replace an existing pole in its current location that cannot structurally support the Wireless Facilities, or a pole installed in a new location where it can be shown that no existing location can be utilized.
 1. Structural calculations shall take into account anticipated sign loading of 10.3 square feet, with centroid of sign located at 9.8 feet from base of pole.
 - B. New Network Provider installed poles must be designed to be consistent in size, color, and character with the existing street lighting within the project area and/or block face. This includes tapering the poles so they have the appearance of street lighting poles.
 - C. Network Provider poles that are installed to replace or supplement existing street lighting must be submitted with an accompanying photometric analysis that meets Subsection 350 of the latest version of the *City of Hillsboro Design and Construction Standards*. The photometric analysis must be sealed by a Professional Engineer in the State of Oregon.
 - D. The maximum diameter of any Network Provider installed pole shall not exceed three feet (3').
 - E. Network Provider installed pole set back from curbs, offset from driveways and offset from street trees shall be directed by City.
 - F. Network Provider installed poles and accessory equipment shall not be located within 10 feet of any energized line. Installation shall conform to OAR 437-002-0047 and 437-002-2316.
 - G. New Network Provider installed poles shall be designed so they do not interfere or conflict with existing building overhangs and awnings.

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- H. Network Provider installed poles shall use breakaway technology.

390.7. Electrical Service

- A. The Network Provider shall be responsible for coordinating with the City of Hillsboro for electrical service connection to the Wireless Facility.
- B. Provide separate disconnect for Wireless Facility in junction box adjacent to pole.
- C. All electrical service conduit and wiring shall be located underground, and inside pole.
- D. A Network Provider shall not allow or install generators or backup generators.

390.8. Logo, Decals, Flashing Lights, and RF Warning Sticker

- A. The Network Provider shall post its name, identifying information, permit number and 24 - hour emergency telephone number in an area of the Wireless Facility that is visible to the public. Signage required under this section shall not exceed two (2) inches by four (4) inches, unless otherwise required by law (e.g. RF ground notification signs).
 1. Place the identifying information on the side of the enclosure facing on-coming vehicle traffic for the side of the road where the equipment is installed. Consider combining with disconnect information.
 2. Use sticker colors that are muted (e.g. tan), complementary or the same color as the equipment but with white colored lettering.
 3. Utilize the smallest and lowest visibility (e.g. yellow instead of blue) radio-frequency (RF) warning sticker required by government or electric utility regulations. Place the RF sticker as close to the antenna as possible, facing directly out toward the street, or directly away from the street if there is no window or doorway within twenty-five (25) feet of the pole (preferred).
- B. All equipment manufacturer decals shall be removed. Except as required by Law or by the Utility Pole owner, Network Provider shall not post any signage or advertising on the Wireless Facilities.
- C. Equipment shall not have static or flashing light that are visible when the enclosures are closed.
- D. Equipment related features (e.g. cooling system fans) shall not exceed a 50 decibels during the day and 40 decibels at night.

390.9 Conduit and Cabling

- A. Electrical systems for Wireless Facilities located within the City and/or PGE owned street light poles shall be contained in a dedicated conduit labeled to identify its dedicated use for Wireless Facilities.

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- B. All underground conduit runs must be marked with an underground marking tape per 00960.42(e) of the *Oregon Standard Specifications for Construction* and contain locate wires.
- C. All conduits shall be Schedule 40 PVC or HDPE depending on installation method. All elbows shall be fiberglass.
- D. Install bushings on all conduit ends and seal the ends with an approved conduit plug.
- E. All underground conduit must be located in the public utility easement (PUE) where available.