

WIRELESS COMMUNICATION FACILITIES

DESIGN GUIDELINES

Planning, Building, and Transportation Department
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Hours: 7:30 a.m.–3:30 p.m., M–Th

- A. Purpose and Applicability.** The purpose of these Wireless Communication Facilities (WCF) Design Guidelines are to assist applicants with preparing design plans for the deployment of WCF in the City of Alameda. The guidelines govern all WCF deployment on private property and in the public right-of-way. These guidelines will be used to evaluate permit applications for all WCF, and these guidelines may be updated periodically by the Planning, Building, and Transportation Department to address the needs with fast-evolving technology.
- B. Goals.** The City of Alameda seeks to balance the importance of providing good and reliable wireless coverage and capacity with installations that do not significantly impact neighborhood character or detract from Alameda's unique and historic streetscapes. The design guidelines support the following goals:
1. Facilitate the buildout of a wireless telecommunications network that provides high speed telecommunications service to the entire Alameda community.
 2. Ensure wireless facilities be aesthetically compatible with its immediate surroundings by concealing all components in existing structures, or otherwise apply stealth, camouflage, and screening techniques to hide or blend them into the environment.
 3. Avoid wireless facility installations that would materially impair the character of historic/architecturally significant buildings or otherwise would substantially obstruct significant views (e.g., locations that have clear views of local landmarks or the San Francisco Bay.)
- C. Location Preferences.** The City of Alameda has established the following location preferences for WCF site selection in order to mitigate against adverse visual, noise and aesthetic impacts. These parameters are listed in the order of preference:
1. Co-location on existing towers, facilities and sites.
 2. Property owned by the City of Alameda.
 3. Public right-of-way.
 4. Non-residential areas.
 5. Residential areas - Siting within residential zones is discouraged unless supported by a wireless coverage analysis documenting that no alternate site can feasibly close a significant gap in wireless coverage of the project applicant using any less intrusive means to close that gap from any other location. New macro tower facilities are strongly discouraged in residential areas.
- D. Design Guidelines.**
- 1. Universal Guidelines for All WCF:**
- a. Least Intrusive Means. WCF shall utilize the smallest, least visually intrusive antennas, components, and other necessary equipment.
 - b. Minimize all Visual Impacts: Design all wireless facilities with the goal of minimizing its visual impact to the surrounding environment. At the earliest stages of site selection and equipment planning, think about the most appropriate design that would allow for the optimal integration of the new installation with existing environment, with specific attention to possible visual synergies with architecture and landscape nearby. All wireless communications facilities shall be designed, screened and/or camouflaged to the greatest extent possible so as not to create substantial visual, noise, or aesthetic impacts.
 - c. Use of Landscaping. When facilities are located in areas with substantial existing vegetation, place the installation where it can maximize usage of the existing landscape for visual screening. Use landscaping to

screen, buffer, and blend wireless facilities into the surrounding environment. When new landscaping is incorporated into the design, the landscaping must appear as natural features found in the immediate area so as to be unnoticeable (camouflaged facilities). Any new landscaping, including irrigation, shall be installed and maintained by the applicant, as long as the permit is in effect.

- d. Paint and Finish. All equipment, antennas, poles, cables, hardware, and towers shall have a non-reflective finish and shall be painted or otherwise treated to minimize visual and aesthetic impacts.
- e. Security. All wireless communications facilities shall provide sufficient security measures and anti-climbing measures in the design of the facility to reduce the potential for damage, theft, trespass, and injury.
- f. Interference. All WCF shall be designed, located and operated to avoid interference with the quiet enjoyment of the surrounding area or neighborhood, including interference from adverse visual, noise and aesthetic impacts, and at a minimum shall be subject to the City-adopted noise standards contained in AMC Section 4-10. *Noise Regulations*.
- g. Signage and Decals. No advertising or signs, other than necessary provider identification signs and warning signs, shall be allowed on or at the location of a wireless communications facility. Radio-frequency (RF) warning labels, Node ID stickers, and other required identification labels should be the smallest possible and lowest visibility. Consider placing these labels on the underside of the equipment enclosure, for example, so it is only visible to the person standing up close. Remove or paint over colored equipment manufacturer decals and logos not required by government regulation.
- h. Noise from Ventilation. In areas close to residences or windows use a passive cooling system. In the event that a fan is needed, consider using enclosures with sufficient space to allow for additional airflow and a different cooling fan with a lower noise profile. In some instances, a larger fan often may have a lower noise profile, due to fewer revolutions per minute.
- i. Detailed Plans. Ensure plans and photo simulations submitted for City plan review accurately show smaller equipment items such as duplexers, ground buss bars, PBX or J-Boxes. Hide these elements in locations such as behind equipment enclosures, or in mounting arms which feature recessed areas.

2. **Additional Guidelines for Building-Mounted Equipment**. In addition to the Universal Guidelines above, WCF mounted on or attached to existing or proposed buildings should adhere to the following:

- a. Plan and design building-mounted antennas and any ancillary equipment to be in scale and architecturally integrated with the building design in such a manner as to be visually unobtrusive and to mitigate adverse aesthetic impacts. Screening may include designs such as locating the facility within attics, steeples, towers, behind and below parapets, or concealed within a new architectural addition to a building or structure which is architecturally compatible with the building. When new architectural additions are proposed, they must adhere to the City's Design Review Manual and are subject to the Design Review process under AMC Section 30-37.
- b. Avoid placing equipment on the primary or public-facing façade of the building.
- c. New architectural features such as columns, pilasters, corbels, or other ornamentation that conceal antennas may be used only if such features are native to the architectural style of the existing building.
- d. Façade mounted antennas attached to existing structures must consider the scale, symmetry, and design of the structure and minimize the addition of bulk and clutter to a building. Do not interrupt the architectural lines or decorative patterns of the building.
- e. Paint or otherwise treat/texture antennas or other equipment that are mounted directly against a building wall to match the adjacent building surfaces.
- f. Place all roof-mounted equipment and antennas a minimum of five-feet (5') from the edge of the building.

- g. Do not allow exposed cabling or exposed mounting apparatus on a building façade without the associated antennas.

3. Additional Guidelines for Vertical Installations. In addition to the Universal Guidelines above, this section addresses vertical installations including streetlights, utility poles, and other pole-mounted facilities such as faux trees and athletic field lights.

- a. Consider the use of equipment enclosures that are nearly the same width as the pole, even if they need to be slightly longer as a result. Narrow enclosures are less likely to impair views of buildings and scenic resources or to detract from streetscapes. Utilize equipment mounting base plates that are no wider than the pole.
- b. Typically, the wide variation in enclosure surface materials and sizes on a single pole can draw more attention (clutter compared to mass) to the facility than a system of enclosures that is comparatively larger, but more uniform in profile and longer instead of wider or deeper.
- c. Design vertical structures and poles to the minimum height necessary.
- d. Antennas mounted on such structures as light standards should be placed on the structure in a way to minimize visibility, and be painted to blend into the structure.
- e. For new poles, incorporate any cabling and conduits into the pole itself. On existing poles, use shrouds, risers or conduit, to reduce the appearance of cluttered or tangled cabling. In some instances, installation practices such as using equipment enclosures with specific port locations, or crossing wires below a down-facing port on an equipment enclosure, can reduce the likelihood that cabling will appear cluttered or bend outward from the pole and further away from the enclosure.
- f. **Distributed Antenna Systems (DAS) or Small Cells:**
 - 1) Limit installation to one radome antenna at the top of the light standard with one equipment cabinet mounted directly on the pole. All antennas shall be concealed inside the radome with a diameter similar to the pole itself, but in no case should the radome be more than eighteen (18") inches in diameter.
 - 2) When mounted on street lights, the antennas/radome enclosures should be mounted above the light source, but the antenna/radome should extend no higher than four (4) feet above the height of the existing pole.
 - 3) Design all equipment to be internally enclosed within the pole or caisson to minimize external pole-mounted equipment. If this is not feasible, equipment should be minimally visible through the use of an underground vault (evaluated on a case by case basis). Above-ground cabinets not attached to a pole are prohibited.
 - 4) Mount equipment cabinets directly behind any road signs located on a pole, if possible.
 - 5) Minimum height clearance regulations shall be observed by all components of the installation.
 - 6) All cables shall be concealed within a sleeve between the bottom of the antenna and the mounting bracket. All cables and conduit to and from the light standard is expected to be routed from underneath the caisson.
 - 7) Stack equipment close together and on the same side of the pole. If a long rectangular disconnect switch is used, rotate the enclosure so the elements can be stacked closer together on the pole. Utilize brackets that allow antennas to be mounted no more than 4" from the pole except for utility poles which must comply with California Public Utilities General Order 95 (2' from pole).

- 8) All replacement or new poles must comply with all applicable City regulations and policies. The new or replacement poles must match design, height, color and material of the original or adjacent poles.
- 9) Decorative/historic-themed light poles in Alameda have historical significance and must be avoided.
- 10) All disturbed landscape shall be replaced in-kind and areas of bare or disturbed soil must be revegetated in accordance with City landscape requirements.
- 11) All Attachments on utility poles must meet requirements in California Public Utilities General Order 95.
- 12) On jointly owned public utility poles, the installation must occur below the section of pole supporting Alameda Municipal Power overhead electric lines.
- 13) Electrical power must be arranged through a service agreement with the City's electric utility service provider Alameda Municipal Power. Service through AMP will be non-metered service.

g. Athletic Field Lights (AFL):

- 1) Mount antennas as close as possible to the pole without obstructing the light source and within a radome no more than thirty-six (36") inches in diameter. Provide covers on the underside of the radome enclosure.
- 2) For existing AFL with exposed antennas, route all cables directly into port holes no more than 12 inches of exposed conduit (evaluated on a case by case basis).
- 3) Apply chin covers to conceal any excess cables that hang above or below the antennas. Chin covers shall match the exact antennas dimensions and profile, and be painted and textured to match the antenna's exterior finish.
- 4) Paint antennas and mounting apparatus the same color as the pole.
- 5) All cables and conduit to and from the light standard are expected to be routed from underneath the caisson up into the pole. Where that is not feasible on an existing pole, cable coverings may be allowed on the exterior where they are painted to match and minimally visible (evaluated on a case-by-case basis).

h. Faux Trees:

- 1) Only use faux trees in an existing landscape setting with trees of a similar height and species.
- 2) If the site is void of tall trees or landscape, create a landscape setting that integrates the faux tree with additional live planting of a similar tree species and varying heights.
- 3) Faux trees in non-urban settings should be species regionally appropriate to the San Francisco Bay Area that blends with established plant communities.
- 4) Utilize faux trees that replicate the shape, structure, and color of live trees. Provide detailed specifications of the branch and leaf design on plans submitted for plan review.
- 5) Ensure that the top of the faux tree does not exceed allowed height on approved plans.
- 6) All cables must be routed directly from the ground up through the pole. Avoid the use of exterior cable coverings that may defeat the tree design.
- 7) Faux tree structures shall include three dimensional bark cladding from the base to the top of the 'trunk' and along all portions of each branch.

- 8) Design faux trees with a minimum of 3-branches per foot for full density coverage with limited spacing between the branches so that the structure appears as natural as possible. The majority of branches should be 8-foot or longer. Branches should extend beyond the length of the antenna by a minimum of 24-inches. Trees should be designed to mimic the natural appearance of their species. Branch coverage shall be dense and natural, and no portion of any antennas shall protrude beyond the branches. There should be no gaps in branch coverage.
- 9) Socks are mandatory for all antennas and associated components located on a faux tree. Sock design shall replicate the same visual appearance as the rest of the tree.

DRAFT

Small Cell Example 1 – Concrete Light Pole

Existing



Proposed



Specifications

Pole

- 29'6" existing pole

Antenna

- 36" pipe antenna

Lighting

- 2 6' aluminum elliptical luminaire arm

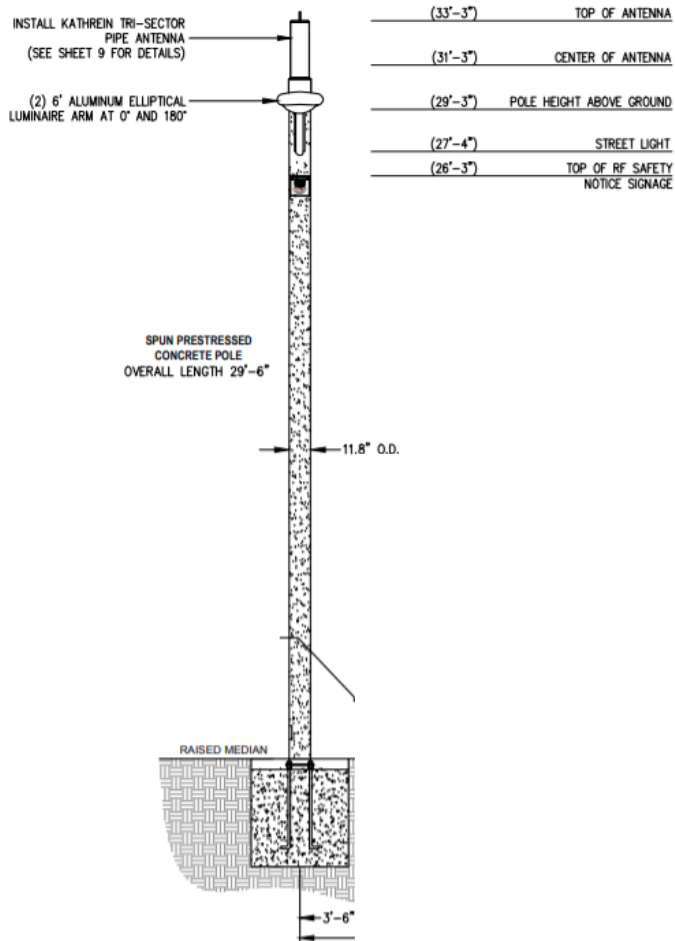
Equipment Enclosure

- (1) – 24"L x 21"W x 8" H concealed pad

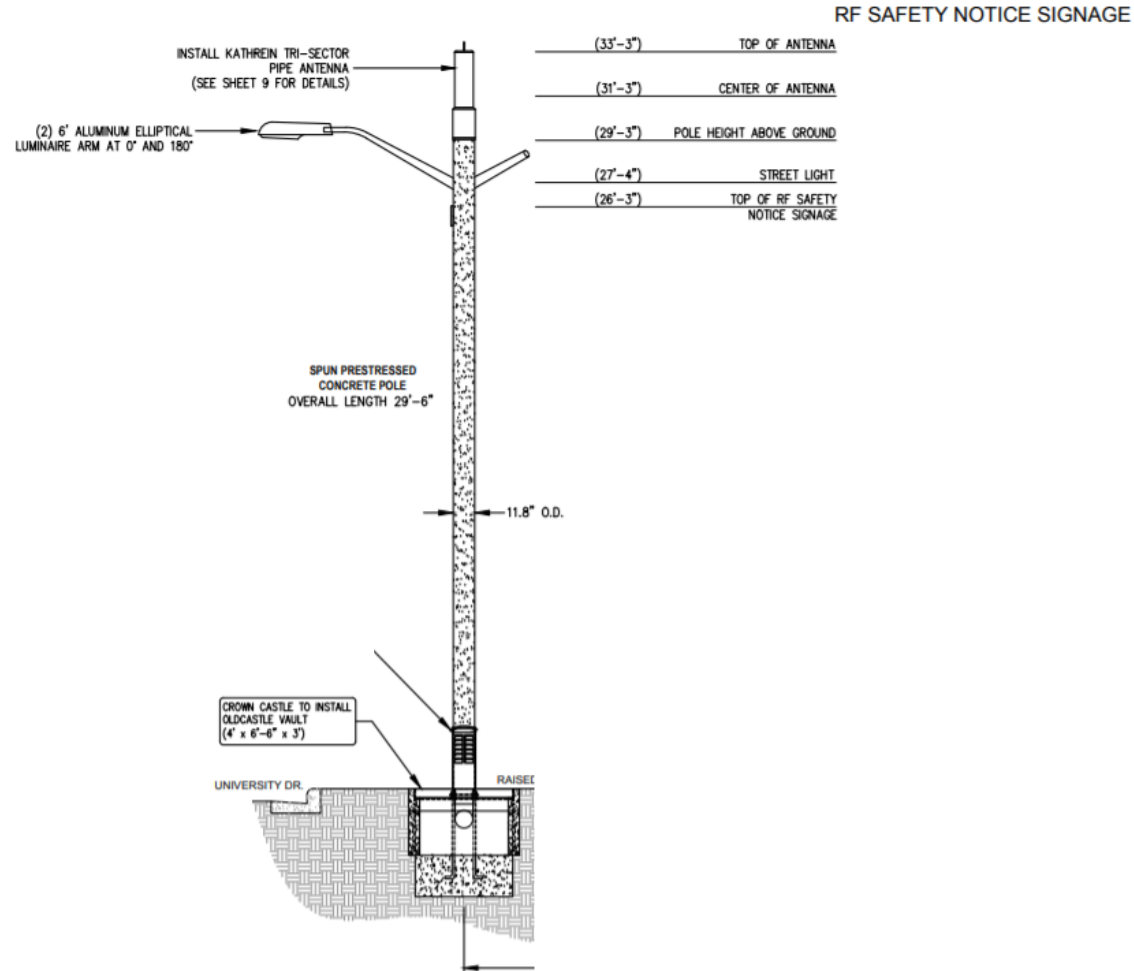
Utilities Router

- Power and fiber utilities routed underground

Small Cell Example 1 – Concrete Light Pole



FRONT VIEW
LOOKING NORTH
SCALE: NTS



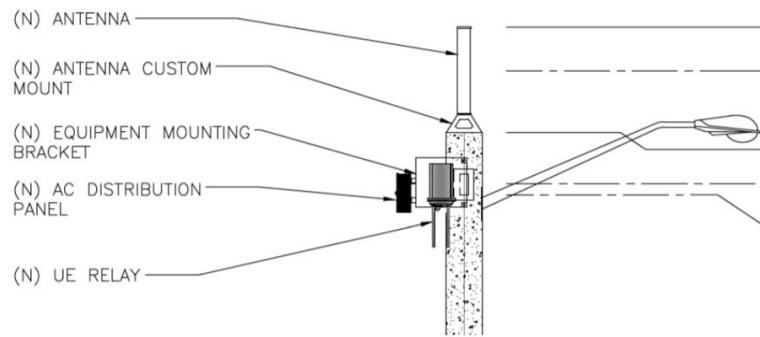
SIDE VIEW
LOOKING WEST
SCALE: NTS

Small Cell Example 2

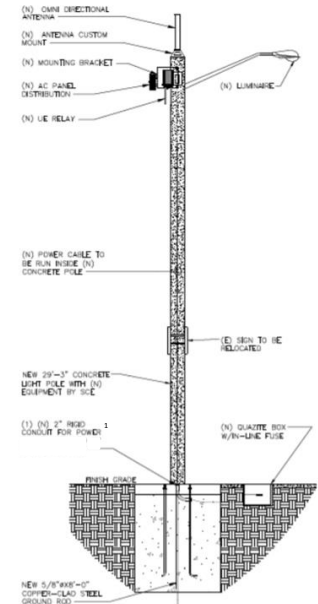
Proposed



- Height: **35 IN (above pole top)**
- Antenna Height: **29.5 IN**
- Antenna Diameter: **4.5 IN**
- *no official approval yet



mobilitie
intelligent infrastructure



1. Applicant will be responsible for providing power cable from AMP designated splice box to the pole & equipment

Specifications

Pole	Antenna	Lighting	Equipment Enclosure	Utilities Router
<ul style="list-style-type: none"> Existing pole height + 3'4" with installation 	<ul style="list-style-type: none"> Antenna – 29.6"H X 4.5" Ø unshrouded – custom shroud optional 	<ul style="list-style-type: none"> Existing luminaire 	<ul style="list-style-type: none"> 35"H X 15.5"W X 9"D 	<ul style="list-style-type: none"> Power and fiber utilities routed underground

Small Cell Example 3 – Metal Street Light Pole with Street Sign

Existing



Proposed



Specifications

Pole

- Existing pole height 31'7" +3'4"

Antenna

- Antenna shroud – 24.7"H X 10.75" Ø

Lighting

- Existing luminaire

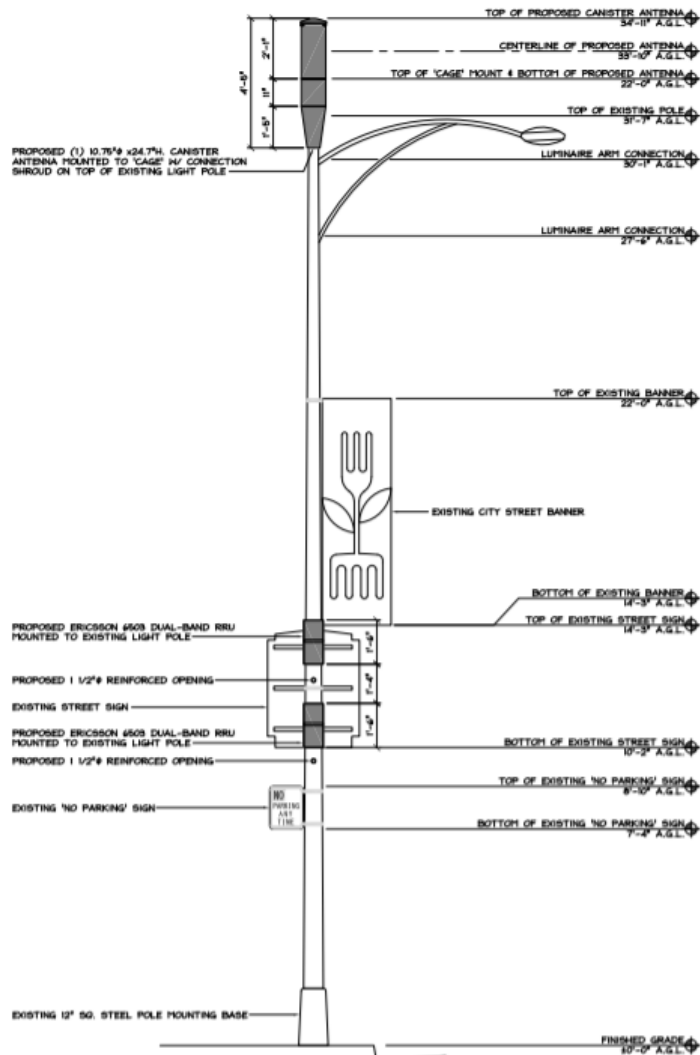
Equipment Enclosure

- No equipment enclosure
- (2) Dual-Band RRH mounted to existing light pole behind existing street sign

Utilities Router

- Power and fiber utilities routed underground

Small Cell Example 3 – Metal Street Light Pole with Street Sign

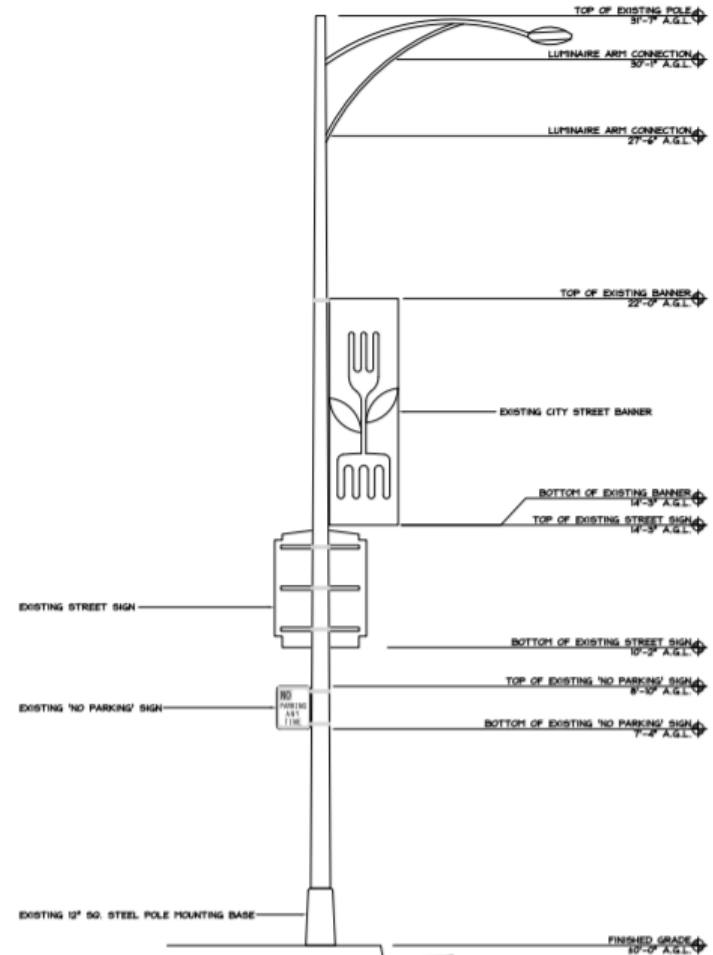


PROPOSED WEST ELEVATION

24"x36" SCALE: 1/2" = 1'-0"
 18"x12" SCALE: 1/4" = 1'-0"



2



EXISTING WEST ELEVATION

24"x36" SCALE: 1/2" = 1'-0"
 18"x12" SCALE: 1/4" = 1'-0"



1

Small Cell Example 4 - RRU 32 Micro Design

Existing



Proposed



Specifications

Pole

- Existing pole height 28'6"+2'
- Pole cap to be removed

Antenna

- Antenna shroud – ~4'9.25"H X 1'2.75" Ø

Lighting

- Existing luminaire with light sensor (Top height of 30'0")

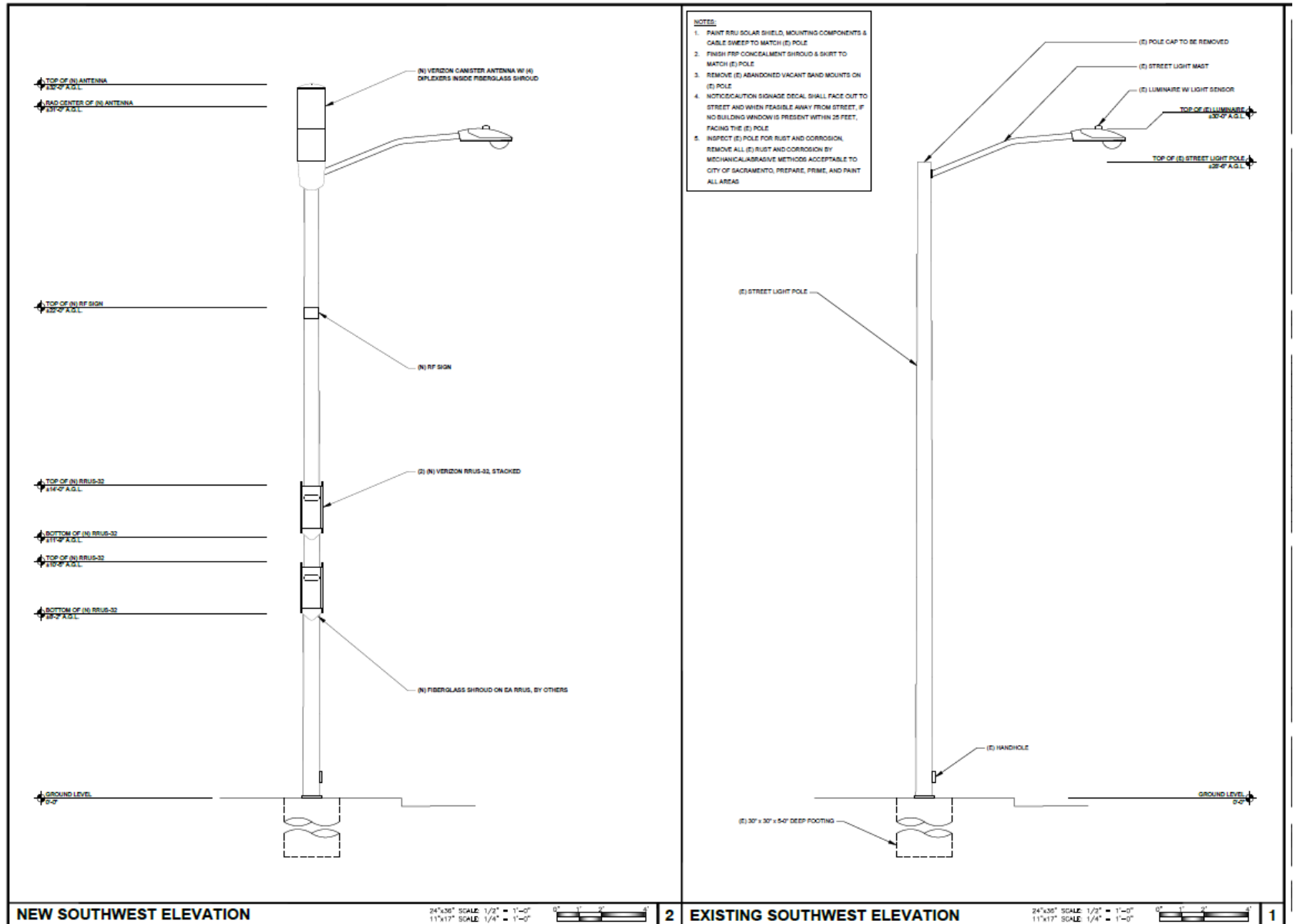
Equipment Enclosure

- (2) Ericsson RRUS-32 mounted on pole – 27"H x 12"W x 7" D

Utilities Router

- Power and fiber utilities routed underground

Small Cell Example 4 - RRU 32 Micro Design



Small Cell Example 5

