



SAN FRANCISCO PLANNING DEPARTMENT

FAQs for Small Cells (wireless) on Steel Light and Transit Poles

This flyer is intended to provide answers to Frequently Asked Questions regarding the proposed addition of Personal Wireless Services Facilities (or Small Cells) to Steel Light and Transit Poles

- Wireless carriers propose to place a single ("Small Cell") antenna, shrouding, and equipment on 300+ steel light and transit poles primarily in SOMA, and the northeastern part of the City (east of Van Ness Avenue, and north of Market Street).
- These systems are referred to as "Small Cells" and are used to provide faster data coverage and capacity for mobile phone and device users.
- If a specific pole is tentatively approved, residents within 150 feet (as well as neighborhood groups within 300 feet) of a pole would receive a notice by mail; with a photo simulation and other information.
- The photo simulation below shows a proposed antenna on top of the pole; and two equipment enclosures midway down the pole (with signage affixed in front of one of the enclosures).
- Various City agencies, including Planning, Public Works, SFPUC, SFMTA (MUNI), and the Department of Technology have been working extensively on this proposed project, to ensure the design and siting is compatible with the surrounding neighborhoods.

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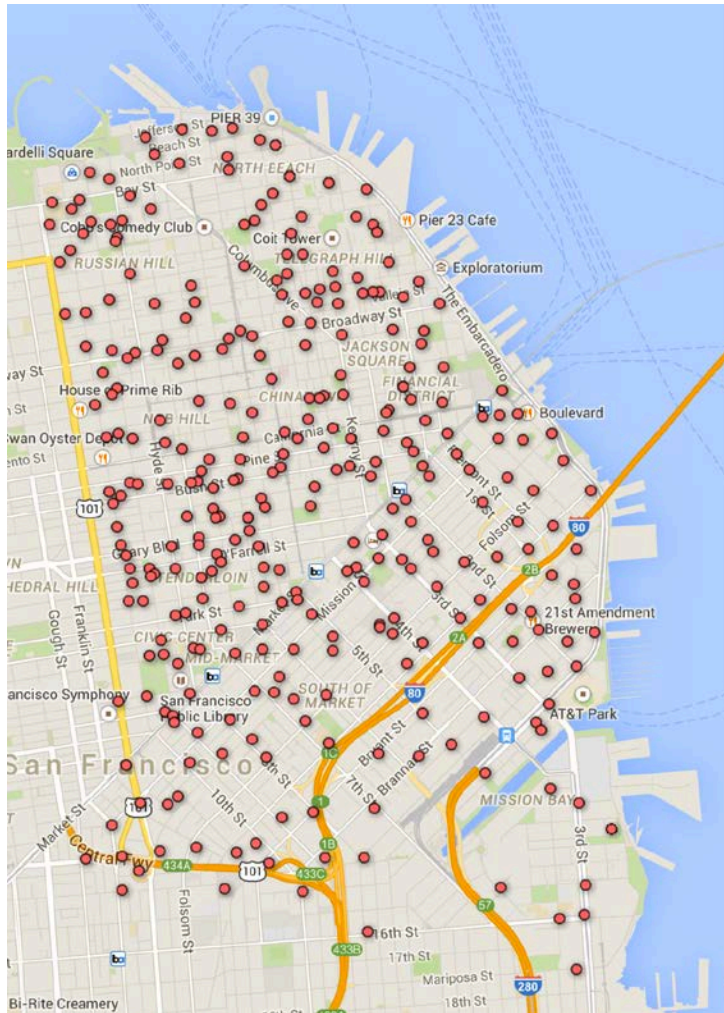
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415.558.6378

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What is being proposed at this time? Wireless carriers are proposing to add a single antenna & equipment to existing steel light and transit poles, with the first locations in the South of Market Area (SOMA), and the northeastern parts of the City (east of Van Ness Avenue and north of Market Street). An initial concept deployment map is provided further below. The initial proposal would serve the Verizon Wireless network. A separate proposal (discussed further below) would serve the T-Mobile network.



Initial Steel Pole “Concept” Deployment Map for Extinet Systems & Verizon Wireless

Who owns the poles? *Steel* poles along public streets that only feature a street light are generally owned by the San Francisco Public Utilities Commission (SFPUC)¹. Transit poles that support electric lines for buses and light rail vehicles (including those with a street light) are generally owned by the San Francisco Municipal Transportation Agency (SFMTA, or “MUNI”).

Wood poles are not typically owned by the City, but by either the Northern California Joint Pole Association (a consortium of utility providers), or Pacific Gas & Electric (typically wood poles only holding up a street light). [Link to FAQs about wireless facilities on wooden poles.](#)

Will the antennas & equipment be added to decorative or historic poles? No wireless facilities (antennas and equipment) are proposed on poles which are either historic (e.g. Path of Gold poles along Market Street in Downtown or historic poles along Mission Street & Columbus Avenue); or are decorative in nature (e.g. fluted poles in Jackson Square).

¹ Approximately 30 steel light poles, where Small Cells are proposed, in the northeastern part of the City, are owned by Pacific Gas & Electric (instead of SFPUC) An additional (small) shut off switch box may also be added to the pole and mounted between the two radio relay units.



Existing facility at Bay Street and North View Court in the Russian Hill neighborhood. Planning Department staff worked with the carrier to place the existing road signs in front of the two equipment enclosures.

Do these systems generate noise or light? No. The antennas themselves do not generate noise or vibration. Noise is typically created by cooling fans; however the proposed equipment enclosures use passive cooling, without cooling fans. There are no lights used by the equipment or antennas.

Are new cabinets proposed on sidewalks? No new above ground sidewalk cabinets (surface mounted facilities), and no major street trenching is proposed. Fiber-optic cables would connect from the antenna, through the pole, then to existing underground pathways (conduit), and onto centralized switch locations.

Did these proposals go through design, historic preservation or environmental review? Yes. The Planning Department went through extensive review and redesign (see photos on last two pages) of these Small Cells. Planning staff worked with City agencies such as SFPUC, and SFMTA, along with wireless carriers on improving the designs so as to ensure they are thoughtfully integrated into our City's streetscapes.

In addition, the Architectural Review Committee (ARC), a sub-committee of the Historic Preservation Commission, reviewed the designs with respect to their compatibility within historic conservation and preservation districts.

- [Link to presentation slides for the proposed Small Cell design, which was shown at the March 4, 2015 ARC hearing](#) (these slides also include examples of designs not supported by Planning, and two wooden pole sites within the Northeast Waterfront Landmark District)
- [Link to Architectural Review Committee \(ARC\) staff report, photo simulations, & sample project plans](#)
- [Link to audio recording of the March 4, 2015 ARC Hearing](#)

Lastly, the facilities underwent environmental review and were determined to be categorically exempt (sample [link](#)), per the California Environmental Quality Act (CEQA).



Existing transit pole on the left and a proposed Small Cell (on Columbus Avenue) on the right. The Italian flag tri-colors painted on the existing pole (below sign) would be retained.

Does the City receive revenue? Yes². the City receives a license fee of approximately \$4,000 per year, per pole. More information on the lease terms can be found at this [link](#), for SFPUC owned poles, and this [link](#), for SFMTA (MUNI) owned poles.

- SFGovTV videos of a hearing before San Francisco Board of Supervisors Budget & Finance Committee for SFPUC owned light poles ([link](#)); and video of an SFMTA Board hearing, for SFMTA owned poles ([link](#)).



Why do the conditions of approval

include a street tree? The Planning Department typically requests a street tree to be provided by the wireless carrier for each facility mounted on a pole within the public right-of-way; in order to screen the equipment. In the event a tree cannot be planted due to conflicts such as existing trees, driveways or utility infrastructure ([link to location requirements](#)), the wireless carrier would be required to pay an in-lieu fee to be used by the SF Bureau of Urban Forestry.

Which companies are proposing to add Small Cells? Various carriers are proposing facilities. The initial proposals would include a system operated by Verizon Wireless for those sites in SOMA, and another system operated by Extenet Systems, also for Verizon Wireless, for those sites in the northeastern part of the City (east of Van Ness Avenue).

Photo simulation of a proposed T-Mobile facility on a steel light pole.

² No license fee applies for the subset of steel light poles owned by Pacific Gas & Electric (PG&E).

T-Mobile has expressed an interest in a similar proposal. However their proposal (see photo simulation below) is different in that it would not include an external antenna above the pole.

Instead, two (2) radio relay units would be placed higher up on the pole (*near the top of the pole, but below the light arm, if present*). An antenna would be placed behind the face of each radio relay unit. Approximately 75 such systems are estimated in SOMA and the northeast of the City (north of Market Street and east of Van Ness Avenue).



Another carrier, Mobilitie (*not affiliated with AT&T Mobility*), has also signed agreements (with SFPUC & SFMTA) to potentially operate a network for other wireless carriers, but no specific design has been approved as of December 2015.

Background: While wireless carriers install and operate their own systems, some companies, such as Extenet Systems, Mobilitie, and Crown Castle (acquired NextG), will often run these small cell systems on behalf of the four primary wireless carriers licensed by the Federal Communications Commission (AT&T Mobility, T-Mobile, Sprint, and Verizon Wireless), to operate in the San Francisco Bay Area.

What is the review process for these sites? The pole-owning agency (SFMTA or SFPUC) would provide permission to the carrier, based on the license agreement and specific pole review.

The carrier would then apply for a Personal Wireless Services Facility Permit from the Department of Public Works (DPW). [These permits are subject to Article 25 of the Public Works Code](#)³.

Those permit requests would then be referred to the [Department of Public Health](#) and Planning Department for design and preservation (historic resources) review; as well as review by the Recreation and Parks Department for those sites near a public park or plaza.

If an approval recommendation is provided by each department, DPW would issue a tentative notice of approval. The carrier would then be required to send a mailed notice out to all residents and property owners within 150 feet of the pole, and all neighborhood groups (registered with the Planning Department) within 300 feet. A notice would also be attached to the pole.

If no protests (request for a DPW hearing) are filed within 20 days of mailing, DPW would issue the permit.

Would the actual pole be replaced? Not typically. In some limited instances a pole that is worn or damaged may need to be replaced.

In some locations, the pole would be replaced if an external antenna is proposed on a “Davit pole,” which is a pole that has a natural bend instead of a distinct lighting arm. The replacement pole would be a standard steel tapered light pole. Davit poles are common around the Gateway area which is tucked between Jackson Square and the Embarcadero in areas a few

³ Wireless facilities on poles situated on lands ([map viewer](#)) under the jurisdiction of the Port of San Francisco, would not be subject to Article 25 of the Public Works Code. Therefore they would not require permits from the Department of Public Works (and not typically be subject neighborhood notification).

blocks north of Market Street. No replacement would be needed for the T-Mobile proposal which does not include an external antenna (only antennas inside the radio relay units).

What exactly is proposed on the pole? The initial Extenet Systems and Verizon Wireless proposals would include an antenna at the top of the pole and two equipment enclosures mounted midway down the pole. In addition a small radio-frequency information and site identification sticker would be placed near the antenna. A detailed breakdown, for a (wider pole diameter) SFMTA-owned pole is provided further below. The T-Mobile proposal would differ as noted earlier.

What is the range of these systems? That depends on a number of factors (e.g. nearby buildings blocking signals and the presence of hills or trees), but on average, these systems have an approximate range of 150 to 500 feet, due to their low mounting height and low power output (either 66, 100, or 174 watts).

For comparison purposes, a typical rooftop-mounted “macro” facility, with higher power usage (e.g. 10,000+ watts), and a higher mounting location; can have a range of between a mile in a rural area, or down to a quarter mile in a more urban area.

Do these networks replace the use of wireless (panel) antennas on building rooftops? No. These systems are generally intended to complement the existing networks of (Micro or Macro) rooftop sites throughout the City. While most areas of San Francisco have good (mobile) voice coverage, wireless carriers are typically proposing these sites to complement the “macro” rooftop sites and offer improved high-speed data coverage for mobile users with smaller (comparatively lower power) facilities closer to sidewalk and street level. While each carrier has different goals and technologies, the use of Small Cells on steel light and transit poles may lessen the demand for the overall number (or specific size) of larger rooftop sites; allowing for more scale and context appropriate siting and design of wireless infrastructure in San Francisco.

Background: There are approximately 700 existing micro or macro (mostly rooftop-mounted) sites in San Francisco, each with between 1 to 16 panel antennas, with each antenna approximately the size of a parking meter. There are also approximately 383 existing wireless facilities mounted to wooden utility poles (which are not owned by the City).

Map of 1,000+ existing wireless facilities in San Francisco (map does not include all of the 383 existing facilities mounted on *wooden* utility poles):



New! Wireless Telecommunications Facilities

N/A

April 2015

Interactive map and Google Fusion Table displaying locations of wireless / cell tower telecommunications facilities (including cell phone masts) in San Francisco.

Can more than one wireless carrier be placed on a single pole? While it is possible for more than one wireless carrier to “share” a single antenna, wireless carriers typically seek separate equipment enclosures for each system. The cumulative effect of multiple equipment enclosures may result a cluttered design that would not be viable.



AdvanceSim
Photo Simulation Solutions
Contact (925) 202-8507

How long would construction take? Generally, the installation of the antennas and equipment on the pole, and painting (if needed to match equipment to the pole) can be accomplished in a few days. Additional work may be required at sidewalk level to connect power and fiber-optic cables (used to transmit signals) to the pole-mounted equipment and antennas.

What if the carrier wants to change the equipment in the future? Because the City owns the majority of steel poles, we can ensure that if any changes are proposed, that they are more closely reviewed to ensure compatibility.

Will these Small Cells interfere with my home electronics, or City Wi-Fi on Market Street or in parks and plazas? The City's license agreement with carriers requires the carrier to ensure they do not interfere with other City communication systems. This would include public Wi-Fi systems (such as those at many parks and on Market Street) that are operated by the Department of Technology. The Federal Communications Commission also requires carriers to take steps to eliminate or reduce potential interference with other electronics. To date, the City has generally not seen a pattern of interference created by similar commercial wireless facilities.

What is the technical term for these systems? The City refers to systems in the public right-of-way (e.g. on poles along streets) as "Personal Wireless Services Facilities."

Antennas and equipment on buildings, for example, are referred to as either "Micro" or "Macro" Wireless Telecommunications Services Facilities (WTS). Micro WTS facilities typically feature 1 or 2 small antennas (each about the size of a baseball bat). Macro WTS facilities are larger systems (3 to 16 panel antennas and equipment), mostly found on rooftops in San Francisco.

Wireless carriers will often refer to Personal Wireless Services facilities on poles as either: "Small Cells," or "Outdoor Distributed Antenna Systems," or the acronym "oDAS."

Are these facilities reviewed by the Planning Commission? No. While, many wireless facilities, such as those on building rooftops are typically reviewed by the Planning Commission; wireless facilities on wooden or steel poles in the public right-of-way are not reviewed by the Planning Commission.

The Planning Department (staff) reviews wireless facilities on wooden or steel poles, with the permits administered by the Department of Public Works.

How do these systems conform with the [City's General Plan or Master Plan](#) (Section 101.1 of the Planning Code)?

By providing robust communications that are well-designed, these systems can improve connectivity for residents, visitors, and businesses, including neighborhood-serving retail. In addition:

- The design of these facilities would not detract from streetscapes, historic districts or other areas that define individual neighborhoods and the City as a whole.
- These facilities would not impede MUNI transit service and would provide additional revenue to SFTMA (MUNI) and SFPUC.

- These facilities would enhance connectivity in the event of an emergency.
- The facilities would not affect the use of parks or open space, nor would they impair access to sunlight or detract from scenic vistas.

What about safety from radio-frequency emissions? All Personal Wireless Facilities proposed in San Francisco are reviewed by the [San Francisco Department of Public Health \(DPH\)](#). This review looks at both the radio-frequency (RF) emissions report created for each type of system; as well as field testing from the antenna during operations, if approved and installed.

Field testing is required each time a modification (change of equipment or antenna) is proposed that may change the RF emissions, and every time the permit is renewed.

A sample copy of the RF report and DPH approval for these systems can be found [at this link](#).

Residents near an operating system can request testing of their dwelling units, at no charge (free). The City has not seen a pattern of non-compliance with FCC-established standards, for these small cell systems.

Due to their low power output (either 66, 100, or 174 watts) the general public should remain between 4 to 8 feet (depending on wattage of the specific antenna) away from the face of the antenna at the top of the pole. This distance does **not** apply when underneath the antenna, because of the directional nature of these systems.

For comparison purposes, a typical large “macro” (10,000+ watts, and larger antennas) rooftop-mounted system may have a public stay-away distance of 30 to 65 feet from the face of the antennas.

The antennas are typically mounted no closer than 8 feet from the nearest window, deck, or other publicly-accessible area. In addition, while the antenna shape is akin to a rounded cone, these antennas are directional in nature with the signal primarily focused up and down streets, and not directly into the residence behind the pole.

The Radio-Frequency (RF) report indicates the maximum RF exposure level at ground level. Does the RF report take into account the RF exposure level on upper stories of residences closer to the antenna?

When an RF report is prepared it takes into account the location, orientation, and output of the antenna, relative to the nearest publicly-accessible areas, such as balconies, roof decks, and nearby dwellings (including upper stories). The RF emissions at any publicly-accessible area must also comply with the standards set by the Federal Communications Commission (FCC). Field testing can be arranged at no charge for residents from within their dwelling.

When the external antennas is placed in a location where it is both parallel and close to a

building, the antenna is typically setup in such a manner where the RF emissions are focused (“sectorized pattern”) up and down streets, and not directly toward the building behind the antenna. In other words, this means that while the antenna enclosure may be round in shape, the RF emissions are not necessarily sent in all directions for antennas next to a building. Further information can be obtained from the Department of Public Health.

How do the antenna energy levels from these systems compare to what is allowed both in the US and overseas? The limits set by the FCC for frequencies used for mobile phone operators are very similar to those limits used for mobile phone operators in most of the European Union. Furthermore, when antennas such as these are producing radio frequency exposures of around 1% of the FCC’s standards, that is also generally compliant with even the most restrictive standards found in a few countries, such as Switzerland.

When the City has conducted in-the-field testing, using our own calibrated radio-frequency meter, for similar pole-mounted antennas; we have typically seen “actual” RF exposure levels within adjacent upper level dwellings (or at ground level) at, or near 1% of the limits set by the FCC.

These systems generate an effective maximum radiated power (ERP) of between 66 to 174 watts (depending on antenna model at a given location). This is considered “low” when compared, for example to typical rooftop-mounted “macro” wireless facilities, with maximum ERPs of around 7,000 to 10,000+ watts (e.g. a site approved on the roof of a residential building at [2001 Sacramento Street](#), in Pacific Heights, or for an existing facility on the roof of [725 Greenwich Street](#) in North Beach).

The maximum ERP wattage assumes the antenna is operating at maximum capacity to generate a worst-case scenario in determining compliance with standards set by the Federal Communications Commission (FCC). That is not a typical operating condition. The City has not seen a pattern of non-compliance for pole-mounted facilities, with radio-frequency exposure standards.

How does the radio-frequency (RF) exposure from these antennas compare to the RF output from a mobile phone, baby monitor, or Wi-Fi router in a persons home? RF exposure is highly dependent on factors like distance and orientation from the antenna (so being below or behind these antennas generates significantly lower RF exposure). Generally, any person within their home (even if on an upper story dwelling unit at the same level as the antenna), or at ground level would be subject to higher RF exposure levels from a cell phone in their hand (if they own one) than the RF exposure typically seen from these antennas.

This is due to the distance between the antenna and any publicly accessible areas, as well as the orientation of the antennas. The antennas on steel poles are directional (meaning they have a specific beam pattern) so the RF exposure at a dwelling right behind the antenna is significantly lower than being directly in front of the antenna.

Are wireless facilities on poles banned in Europe or other California cities, including Berkeley? No. Wireless systems can be found on poles and buildings in Europe, and on other California cities, including [Berkeley](#).

Berkeley recently passed an ordinance to require that when people purchase cell phones that they are made aware that the mobile device itself generates radio-frequency (RF) emissions, and provide relevant information ([link](#)). The ordinance is currently subject to legal challenge.

Are these systems safe for birds? These systems have not been shown to affect birds or other wildlife.

How is this different from services such as Comcast, Sonic, or AT&T U-Verse/Lightspeed? Those services primarily deliver “wired” internet, cable television and landline phone service without antennas; though there are many cable strand (antenna) modems (providing Comcast Wi-Fi service) that can be found on overhead communication lines, strung between wooden utility poles.

These proposed Small Cells on City-owned poles would provide wireless mobile voice and data coverage.

Do other cities have these small cell systems? Yes. Wireless carriers have proposed similar networks in varying cities ranging from places like New York City to San Diego, and smaller communities throughout California. The City looked at various deployments from other cities while developing this project ([examples on slides 7 and 8](#)).

Can I protest the installation of a wireless facility on my block? Yes. If you have received notice that a wireless facility has been proposed to be installed on your block it means DPW has tentatively approved the application. It also means that the Planning Department, DPH, and possibly the Recreation and Park Department have recommended that DPW grant the permit. While you may protest the issuance of the permit, you must do so in the time set forth in the notice, which will be 20 days after the notice is postmarked. DPW will not consider an untimely protest. If your protest is timely, DPW will hold a hearing to determine whether to issue the permit. DPW will notify you of the date and time for the hearing. You will be given the opportunity during the hearing to explain the reasons for your protest. Contact information for protests can be found on the DPW web site ([link](#)).

Can I appeal DPW's issuance of a wireless permit? Yes. Whether or not you protested the permit you may appeal DPW's issuance of the permit to the Board of Appeals. As with protests, you must file your appeal in the time required by City law, which is generally 15 days after the permit is issued. More information about filing an appeal can be found on the Board of Appeals web site ([link](#)). Only the environmental determination may be appealed to the Board of Supervisors ([link](#)).

Who do I contact if I have additional questions? Please contact the Planning Department's Wireless Planner, Omar Masry, at (415) 575-9116, or Omar.Masry@sfgov.org

Common Terms:

DAS – Acronym for a Distributed Antenna System. A network of small antennas and equipment enclosures usually attached to steel or wooden poles in the public right-of-way.

“Macro” Wireless Telecommunication Services (WTS) Facility - Typically three to sixteen panel antennas mounted on the roof of a building, along with multiple equipment cabinets. Permits reviewed by the Planning Department, Fire Department, DPH, and Department of Building Inspection (DBI); subject to the [City’s Wireless Guidelines](#), and Planning Code. Macro WTS facilities typically require Planning Commission approval in most residential, neighborhood commercial, and mixed-use zoning districts. A photo simulation of a previously approved Macro WTS Facility can be found on Pages 37 and 38 of this [link](#).

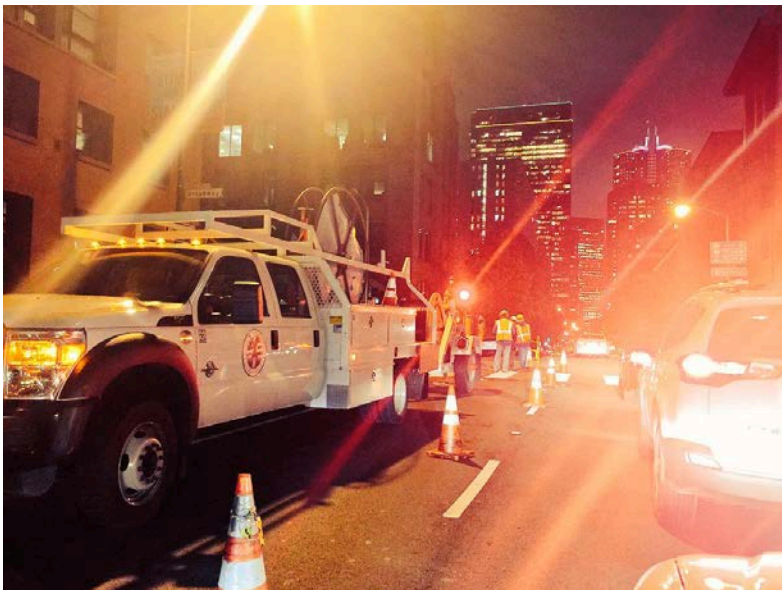
“Micro” Wireless Telecommunications Services (WTS) Facility - Typically one or two antennas mounted on the roof of a building. Permits reviewed by the Planning Department, Fire Department, DPH, and Department of Building Inspection (DBI); subject to the [City’s Wireless Guidelines](#), Planning Code, and review by the Zoning Administrator. [Example link](#).

Personal Wireless Services Facility Permit – Permit for wireless facilities mounted on poles in the public right-of-way. Permits administered by the [Department of Public Works](#).

Public Right of Way – Typically streets and sidewalks, where light and utility poles are placed.

Radio Relay Unit - Equipment enclosures which functions akin to a computer; and routes power and signal through wires (inside the pole) to the transmitting antenna.

Small Cells – Similar to DAS, though a different communications network architecture.



Crews laying fiber-optic (glass) cables under City streets. The signal from a mobile device, such as a cell phone, communicates with the antenna on the pole. The signal would then travel from the antenna down through cables inside the pole to the radio relay units below. From there the signal would then travel through fiber-optic cables which run inside the pole and then underneath sidewalks and streets, through Pacific Gas & Electric conduit to the carrier’s network hubs.



14 inch wide antenna enclosure* on wide transit poles

Small RF Warning Sticker

Cabling located inside pole

(2) Radio Relay Units
(computers for power and communications)
No fan noise, lights, logos or decals

No major street trenching required
In some instances a 2' x 3' sidewalk-flush
vault is required

** A 10.5 inch wide antenna enclosure would be used on slimmer light poles*

1 of 3
Pole Types

SFMTA Owned Pole | Wider pole featuring cobra head light used to support overhead electric lines for buses and light rail

Previous Site Design Examples



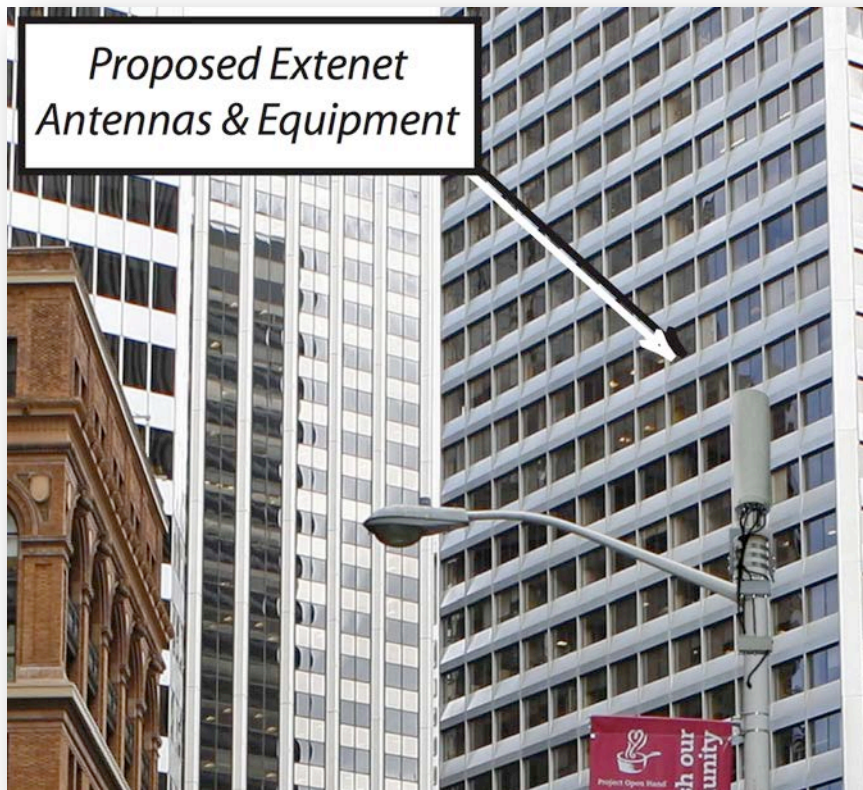
extenet
8/25/14

PUC9 / Steel Pole
San Francisco, CA

Applied Imaginations 510 914-0900

Example of a design that was **disapproved** by Planning, and is no longer proposed.

In this example the antenna is mounted on a side-arm.



Example of a design that was **disapproved** by Planning, and is no longer proposed. In this example equipment and cabling below the antenna is not shrouded



Example of an initial mockup **(not proposed)** before re-design.

This example featured unpainted antenna shrouding with an alternate design; extra stickers on the pole and wider cabling sweeps below the two unpainted computers midway down the pole.