

Streetlight Standards and Requirements

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Re: Streetlights Design Standards and Requirements

This document is provided as a general guide summarizing what the San Francisco Public Utilities Commission, Power Enterprise, Streetlights Section (“SFPUC”) expects regarding any streetlights located in the franchise area within the Geographical boundaries of the City and County of San Francisco. If this document contradicts any other document, this document will prevail. The document is not intended to be inclusive of all comments made by the streetlight engineer reviewing your application.

1. Under the City Administrative Code, the Department of Public Works (DPW) shall require that underground street lighting facilities, including standards, all associated wires, cables, conduits, junction boxes, services, and all connections therewith satisfactory to the Public Utilities Commission, be included in all plans, maps and specifications, for the opening of new streets, tracts, districts or subdivisions, except when arrangements have been made by the Public Utilities Commission for installation of adequate overhead street lighting facilities on utility poles.
2. The below will aid the engineers to determine whether streetlight work will need to be performed by the project owner. The below list is not inclusive.
 - a. Street improvements
 - i. Can include but are not limited to the following:
 1. adding/upgrading a bike lane
 2. improvements to the area that would change pedestrian conflict or road classification
 3. redoing/adding curb ramps,
 4. adding trees/sidewalk furniture
 5. adding/redoing islands.
 - b. Trenching within 3ft of the SL foundation
 - c. Relocation or other modification of existing streetlight infrastructure
3. SFPUC will own and maintain streetlights on DPW accepted streets. SFPUC will not own and maintain streetlights on Private Road and Streets not accepted, owned, and maintained by DPW. If there are unaccepted streets, the project owner will be required to apply for a major encroachment permit and install streetlights to meet the needs of the road.
4. Call 811 to mark and locate before you dig
5. For emergency situations, call 911
6. For outages, call 311
7. Streetlights will be owned and maintained by SFPUC on sidewalks in SFPUC accepted streets for maintenance. If there is a major encroachment permit for the sidewalk, privately owned streetlights will be required if any of the following are true:
 - a. If DPW does not own and maintain the area
 - b. If the area is no longer part of the franchise map
 - c. If the area is not an accepted street

- d. If the area is closed off to vehicular traffic
- e. If the streetlights in the area are not maintainable by SFPUC streetlight maintenance staff
- f. If Streetlight Engineer determines that streetlights should be private

At the time the major encroachment permit expires, the owner of the streetlights must bring streetlights to SFPUC standards before SFPUC will accept, own, and maintain the lights.

8. Streetlights will be owned and maintained by SFPUC on stairways if the stairway is part of the DPW right of way map and going from one right of way to another. Streetlights on the stairways can only be certain lights on the catalog, please contact streetlight engineer to verify which one should be used. DPW will be responsible for maintaining the foundation, conduit, and staircase and SFPUC will be responsible for conductors, pole, and luminaire.
9. Streetlights will be owned and maintained by SFPUC on walkways if:
 - a. The walkway is for pedestrians only
 - b. The streetlights are part of the DPW right of way map and going from one right of way to another.
 - c. Width for walkway is less than 10ft wide
 - d. Streetlights on the walkways can only be certain lights on the catalog, please contact streetlight engineer to verify which one should be used.
 - e. Walkway/stairway is owned and maintained by DPW
 - f. If the material for walkway is not regular sidewalk, DPW will replace walkway when SFPUC needs to work on streetlight infrastructure.
10. Streetlights will be owned and maintained by SFPUC on bike paths if the bike path is part of the DPW accepted and maintained road.
11. DPW does not claim jurisdiction on Private Roads. SFPUC recommends the private road owners to light the streets using RP 8 and using Caltrans maps to aid in determining street classification.
12. For intersections between private and public roads, SFPUC will require the intersection to meet this standard's lighting requirements.
13. The street and pedestrian light poles and luminaires shall be selected to comply with SFPUC streetlight catalogue. All new street and pedestrian light fixtures shall be designed to use Light Emitting Diodes (LEDs). LED color temperature is 3000K Kelvin only. The final fixtures selected in the design must be approved by the SFPUC.
14. The SFPUC shall review the plans for streetlight spacing, illumination levels and uniformity. Project owner is responsible for providing photometric and streetlight plans for Streetlight engineer. This should include landscape plans that show streetlight spacing from other street furniture such as trees, planters, other utility pole, fire hydrants, gutters, and bike racks.
15. The streetlight review process will look at the following:
 - a. Photometrics- evaluate the average fc and uniformity to ensure the needs of the street/sidewalk/intersection are met.
 - b. Streetlight plan- general review of plan. It is assumed that the project owner will apply for a new unmetered service for the streetlights they are installing unless otherwise specified.

- c. The Project owner is responsible to ensure that all streetlight guidelines are met. If a variance is needed, the project owner is responsible to request a variance in writing. The Project owner needs to fill out the Variance Request Form and send it to the Streetlight Engineer for review and approval.
16. SFPUC requires 10% spare of catalogue fixtures (poles, arms, luminaire assemblies) and 20% for non-standard fixtures upon completion of a project for projects that are installing more than 5 streetlights. The calculation of spares should round to the closest number (i.e. if the project is installing 14 streetlights 1 spare is needed). Please note if the optics of an approved fixture is not on the catalog, it is considered a non-catalog item.
 17. There shall be a minimum of one service point per side of a street per block. A request must be made to use existing streetlight services. See below commonly asked questions for more information about using existing streetlight power. In the interim:
 - a. For project owners, apply for new PG&E LS-2 retail unmetered service at [Sign In \(yourprojects-pge.com\)](https://yourprojects-pge.com)
 - b. For interagency projects, apply for new unmetered service at [Sign In \(yourprojects-pge.com\)](https://yourprojects-pge.com)
 - c. If there is available redevelopment power, request new unmetered services with redevelopment engineer.

Project owner should contact SFPUC for service order process in which SFPUC will inform project owner of the steps needed for SFPUC to take ownership of the streetlight. Please see below commonly asked questions for more information.

18. After project completion, as-built drawings shall be provided to SFPUC. Send an electronic copy of the as-built drawings to PEMA@sfgwater.org and SLinspections@sfgwater.org, and a hard copy to Power Enterprise, 525 Golden Gate 7th Floor, CA 94102. Electronic As-built should include the AGI file, if possible.
19. For design purposes, streetlights must be designed to use SFPUC standard poles and be mounted at either 25 ft, or 30 ft. Pedestrian scale lights installed on 16 ft tall poles can only be used to light the sidewalk and not the roadway.

For small alley ways and certain residential areas, pedestrian scale lights may be an option to light the roadway; however, a variance request will need to be reviewed and approved by streetlight engineering. The variance design must include lighting the roadway.

If the Project owner would like to add pedestrian scale lights, the pedestrian lights must be on both sides of the block and for at least one block.

If the road is more than 60ft wide and the project owner would like to have pedestrian scale lights on the street, there must be cobra head lights at the end of the block (one on each end) Streetlights along the block should match, they should have the same pole type, luminaire, and color.

Pedestrian scaled backlights are nonstandard and will need to have a variance request approved and reviewed case by case.

20. All streetlights need to be adequately protected. If the streetlight is not located on the sidewalk with a 6 in curb at least 24 in from the center of the streetlight pole to face of the curb, a variance needs to be requested and approved. The proposed protection needs to be equivalent to the standard. There must be at least a 3 ft working clearance around the streetlight pole and box.
21. Design and installation must meet NEC, NESC, and other applicable code requirements. Streetlight plan and photometrics should be stamped by a Professional engineer, calculated by lighting manufacturer, or certified by qualified lighting designer.
22. Go to <https://sfpuc.org/streetlights> for standard installation drawings, streetlight guidelines, useful documents, and catalog.
23. Streetlight photometric and streetlight plan approvals are valid for 3 years; streetlight photometric and plan review is necessary. For example, If construction does not begin within 3 years or if there is a gap of construction for more than 2 years, streetlight plan and photometric re-review is necessary. In addition, anything approved before 1/2019 will need to be reviewed. Approvals without permits will only be valid for 1 year. The standard that the review will be based on is the standard the first review was performed unless there is more than 1 year between revisions. If the revisions are more than 1 year apart, then the project will need to follow current standards.
24. If the project team is redoing curb ramps and there is streetlight infrastructure in the curb ramp area, the project team must relocate streetlight infrastructure outside of the curb ramp area.
25. When working on sidewalk with existing streetlight infrastructure
 - a. If there are grade changes on the sidewalk, the existing infrastructure will need to be moved to the correct grade and clearances.
 - b. If the height of sidewalk at the pole base has a change of more than +2 inches or if the hand hole is covered, a new foundation and pole will need to be installed.
 - c. If the height of the sidewalk at the pole base has a change of more than -1 inch, then a new foundation and pole will need to be installed or a structural review by a licensed professional engineer will be required.
 - d. If work is being performed within 3ft of a 3X3X3 unreinforced rough pour streetlight foundation, streetlight foundation and pole will need to be replaced or a structural review by a licensed professional engineer will be required.
 - e. If work is being performed around concrete streetlight poles, sidewalk work cannot touch foundation with vibratory or power-driven equipment or entire foundation and pole will need to be replaced.
 - f. If bulb out are added, streetlights will need to move 24" from face of curb. If the pole is shared with MTA the pole can be between 24" - 6' from the face of the curb but must be outside of any atypical areas (planters, bio retainers, the curb ramp, wing of the curb, or warning bands).
26. In areas with islands not in the middle of the street, make sure there is 10ft wide area for a truck to perform maintenance on the streetlight.

27. All streetlights and pedestrian lights need to face the road unless the pedestrian scaled light is mounted on a streetlight scaled pole.
28. If the project owner fails to complete streetlight work, the property owner/HOA is liable to pay the costs for SFPUC to complete the work. SFPUC reserves the right to assess fees necessary to complete work to the owners of record.

Streetlight Review Process:

1. Project owner submits drawings online at <https://sfpuc.org/streetlights>
2. A streetlight engineer is assigned to the application. The streetlight engineer reviews the application and provides comments concerning the photometrics. The streetlight engineer will also include an application number with the initial comments. Include this application number when sending emails or submitting documents.
3. Project owner incorporates comments and resubmits drawings online at <https://sfpuc.org/streetlights>.
4. The streetlight engineer reviews the drawings and approves the photometrics or provides additional comments.
5. Project owner will incorporate comments and resubmit for review until photometrics are approved.
6. Project owner applies for new unmetered service(s), one service point per block per side of the street.
7. Once Project owner receives the service point information, submit plan drawing to streetlight engineer for review.
8. Streetlight engineer will review and provide comments or approve.
9. Project owner will incorporate comments and resubmit for review until streetlight plan is approved.
10. The streetlight engineer will provide custom work letter which includes pole numbers. Estimates will eventually move towards a fee-based system and will collect funds through CSB.
11. SFPUC-streetlights will collect inspection fees, if necessary.
12. Project owner may begin the construction process and request inspections when ready.

Construction Process:

1. When Project owner is ready to construct, send a request for a pre-construction meeting by filling out request at streetlight website or <https://www.tfaforms.com/5012630>. Payment must be processed before any inspection is scheduled.
2. Project owner will construct streetlight foundation, lay conduit, and install streetlight box.
3. Prior to pouring concrete, project owner will request an inspection by filling out request at streetlight website or <https://www.tfaforms.com/5012630>.
4. Project owner can pour if the inspection passes. If the inspection does not pass, Project owner will correct the issue(s) and request another inspection.
5. Inspection is required for first foundation and conduit before the concrete is poured. Witnessing mandrel test is needed for fist conduit layout. It is up to the SFPUC inspector's discretion to require inspection on all substructures prior to pouring concrete or to perform spot checks. It is

the project team's responsibility to provide a construction pouring schedule to SFPUC inspector. SFPUC will contact the person indicated in the inspection form for site access. It is recommended to not schedule the concrete pour the same day of inspection to allow for time for correction.

6. Project owner will install the streetlight and service infrastructure then request punch list inspection once all the lights are ready to be operational. Project Owner is responsible to take pictures with tape measurer of all streetlight infrastructure before concrete is poured. Pictures should have a date and time the picture was taken. Naming convention of each photo should include the type of infrastructure and Asset ID number. For example, Foundation F03P001. For conduit it would be from Asset number to asset number. For example, Conduit from F03P001 to F03P002.
 - a. To request punch list inspection, the project owner should provide the following
 - i. Picture of pre-pour infrastructure
 1. Foundation
 - a. Show the depth and width of the foundation
 - b. the UFER like grounding
 - c. the conduit depth going into the foundation
 - d. where the bolt circle is in relation to the foundation edges
 - e. the size of the bolt circles







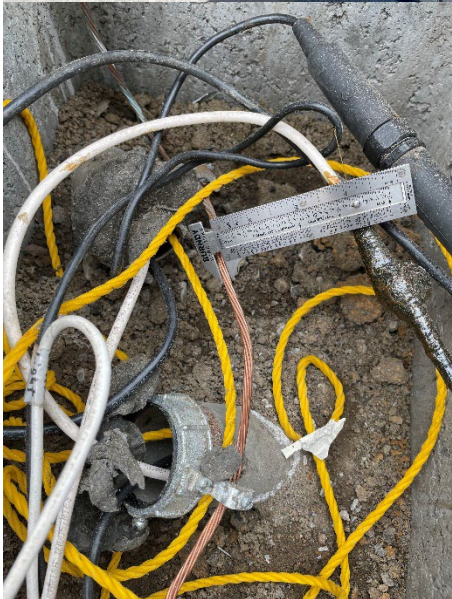
2. Conduit

- a. Conduit depth measured from top of conduit to finished grade



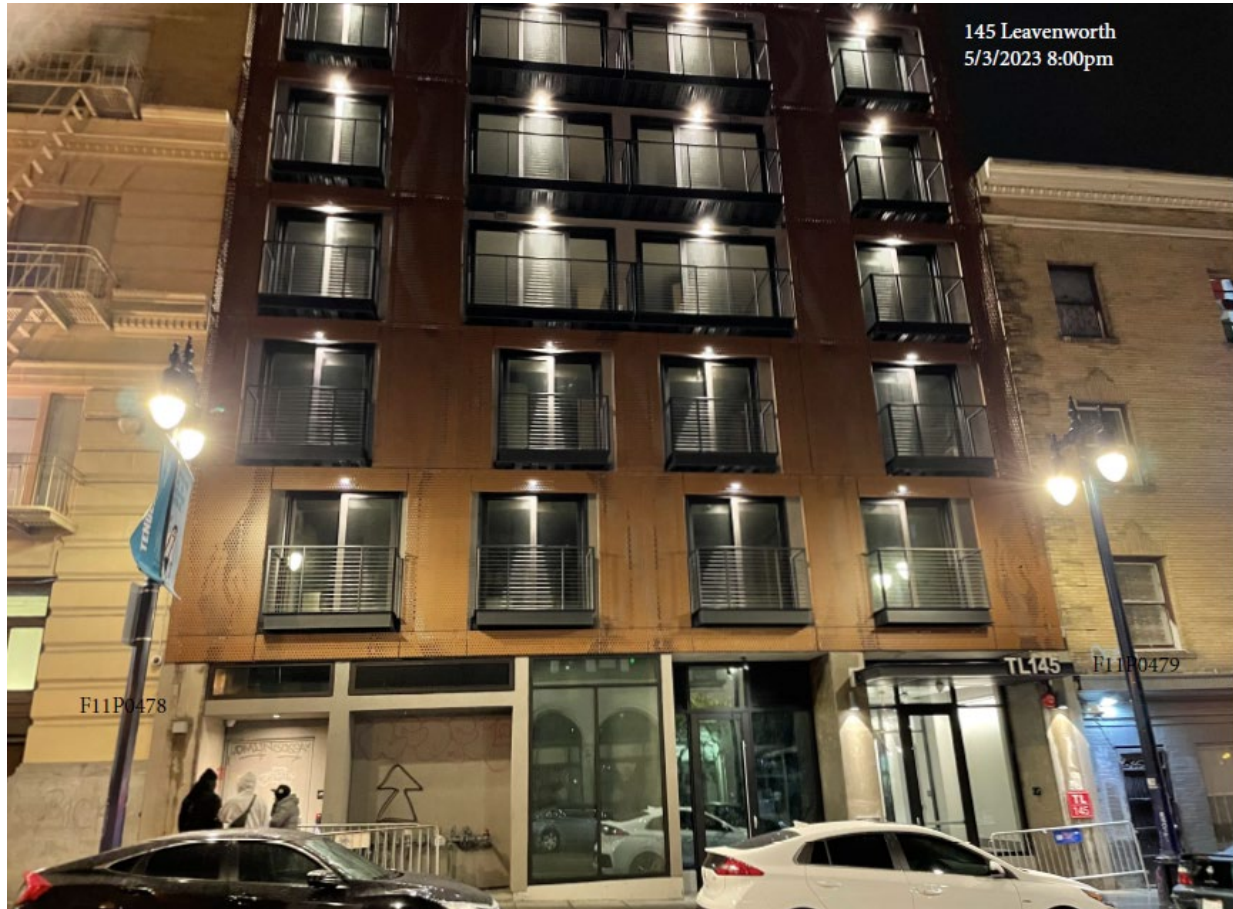
3. Box

- a. Conduit depth coming in and out of box
- b. depth the conduit is in relation to the top of the box
- c. Grounding
- d. Angle of conduit coming in and out



- 7. Punch list items will be sent to Project owner to complete. Once punch list items are completed, Project owner will send pictures of the completed items. Depending on the punch list items, final inspection may be needed.
- 8. Once all punch list items are completed, project owner can connect the power to the streetlights and send pictures of the lights operational. Pictures should have
 - b. Streetlight number

- c. Location
- d. Date and time picture was taken
- e. Show the whole pole, arm, and luminaire
- f. Point of reference



- 9. Red-lined drawings are sent to PEMA@sfgwater.org and SLinspections@sfgwater.org.
- 10. Once final inspection is completed the streetlights will be accepted. Project owner will receive an acceptance document by email from the streetlight engineer stating the lights on the project have been accepted.
- 11. Streetlights will not be accepted until all punch list items are completed from the final inspection.
- 12. After all punch list items have been completed SFPUC will send an notification of streetlight acceptance to the Project Owner.
- 13. Red-lined drawings and submittal drawings should be emailed to PEMA@sfgwater.org and SLinspections@sfgwater.org

Final submittals and spec sheets that reflects what was purchased and installed should be emailed to PEMA@sfgwater.org and SLinspections@sfgwater.org.

Temporary Streetlights:

Temporary streetlights are required when the existing permanent lights need to be removed before the new permanent lights are installed. The temporary lights need to be like in kind and must be operational from dusk to dawn. The temporary lights must be operational before the existing permanent lights are removed. If they are not like in kind, a photometric plan will need to be submitted for review. Power for the temporary lights is the project owner's responsibility.

1. If Project owner has not submitted temporary streetlight information with the streetlight review from, submit a removal form (SFPUC, PG&E, or both) and photometrics if needed to streetlight engineer. If a streetlight engineer has not been assigned to the project, apply for streetlight removal at <https://sfpuc.org/streetlights>.
2. The streetlight engineer will review the temporary streetlight information. If acceptable, the streetlight engineer will provide approval. If not, the streetlight engineer will send comments and Project owner will revise and submit for review until acceptable.
3. Project owner will install temporary streetlights and send pictures to the streetlight engineer to show they are operational.
 - a. Pictures should have streetlight number
 - b. Location
 - c. Date and time picture was taken
 - d. Show the whole pole, arm, and luminaire
4. The streetlight engineer will submit request to PG&E and/or give permission to remove the streetlights. Do not demo the streetlight service. Project owner is responsible for cost that PG&E will charge to remove PG&E owned light(s).
5. Project owner is responsible to contact the various agencies to relocate infrastructure installed on the streetlight pole.
 - a. DAS: das@sfwater.org.
 - b. AAA Flag: 415-431-2950
 - c. Traffic/Parking signs: 415-550-2736
 - d. Other: SLEngineering@sfwater.org
6. The temporary streetlight(s) may be removed after the new permanent streetlights have been energized and proved to be operational. See Removal of Streetlight section.

Relocation of Streetlight Infrastructure:

The following procedure shall be adhered by Project owner when unplanned streetlight relocation is needed: Note that existing infrastructure cannot be reused.

1. Project owner submits online application at <https://sfpuc.org/streetlights>. If a streetlight that provides light to the intersection or crosswalk needs to be moved or if a streetlight is moved more than 10 ft, a photometric study needs to be performed and submitted for review.
2. A streetlight engineer is assigned to the application. The streetlight engineer reviews the application and provides comments. The streetlight engineer will also include an application number with the initial comments. When sending emails or submitting documents, include this application number. If the streetlight engineer has no further comments, the streetlight engineer

will provide a Custom Work letter to collect money for inspections. Estimates will eventually move towards a fee-based system and will collect funds through CSB.

3. If project owner is relocating a streetlight, project owner is responsible to contact the various agencies to relocate infrastructure installed on the streetlight pole.
 - a. DAS: das@sfgwater.org.
 - b. AAA Flag: 415-431-2950
 - c. Traffic/Parking signs: 415-550-2736
 - d. Other: SLEngineering@sfgwater.org
4. Project owner will send payment to SFPUC. Include signed custom work letter with payment.
5. Project owner will send a request for a pre-construction meeting by filling out request at streetlight website or <https://www.tfaforms.com/5012630>.
6. If temporary streetlights are needed, project owner will install temporary streetlights and send pictures to the streetlight engineer to show they are operational (see above requirements).
7. The streetlight engineer will give permission to start relocation work.
8. Project owner will perform work and request inspections when ready (see Inspections section for instructions on how and when to request inspections).
9. Once all work is completed and acceptable, the project owner will receive an acceptance document by email from the streetlight engineer stating the lights on the project have been accepted.

Removal of Streetlights:

After a project has installed permanent lights, there may be a need to remove existing streetlights.

1. When permanent streetlights are operational, project owner submits removal form (SFPUC, PG&E, or both) to streetlight engineer.
2. Streetlight Engineer will review the form. If acceptable, Streetlight Engineer will submit request to PG&E and/or give permission to remove the SFPUC streetlights.
3. Project owner is responsible to contact the various agencies to relocate infrastructure installed on the streetlight pole.
 - a. DAS: das@sfgwater.org.
 - b. AAA Flag: 415-431-2950
 - c. Traffic/Parking signs: 415-550-2736
 - d. Other: SLEngineering@sfgwater.org

Temporary Removal of Streetlights:

A project owner may have the need to temporarily remove streetlights to perform construction on the site. Note that existing infrastructure cannot be reused.

1. Follow steps in Temporary Streetlighting and indicate in the notes that the removal is temporary.
2. If the light that was removed is a PG&E LS-1 light, Project owner will contact the streetlight engineer to apply to PG&E to re-install the light. Project owner will be responsible for any costs that PG&E may charge to re-install the light.

3. If the light removed is an SFPUC owned light, project owner will install new pole and luminaire and will request inspection once completed. During the preconstruction meeting, SFPUC will determine whether a new foundation is needed.
4. Project owner is responsible to contact the various agencies to relocate infrastructure installed on the streetlight pole.
 - a. DAS: das@sfwater.org.
 - b. AAA Flag: 415-431-2950
 - c. Traffic/Parking signs: 415-550-2736
 - d. Other: SLEngineering@sfwater.org
5. Once all work is completed and acceptable, the project owner will receive an acceptance document by email from the streetlight engineer stating the lights on the project have been accepted.

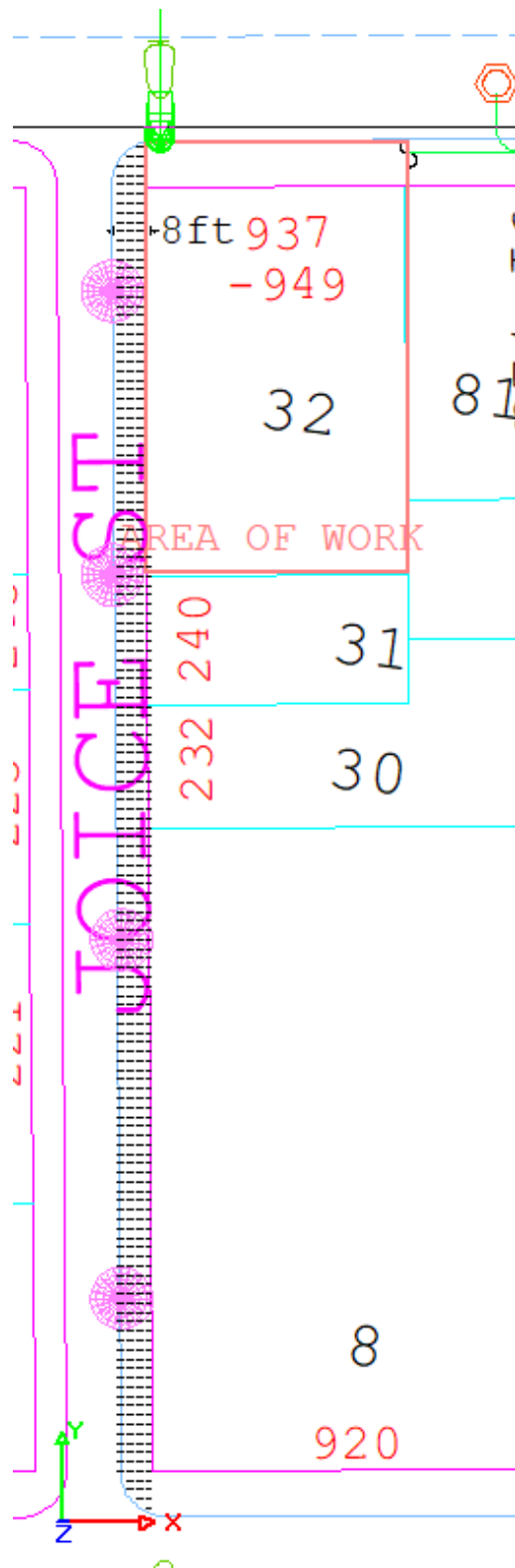
Streetlight Photometrics:

Photometric Study:

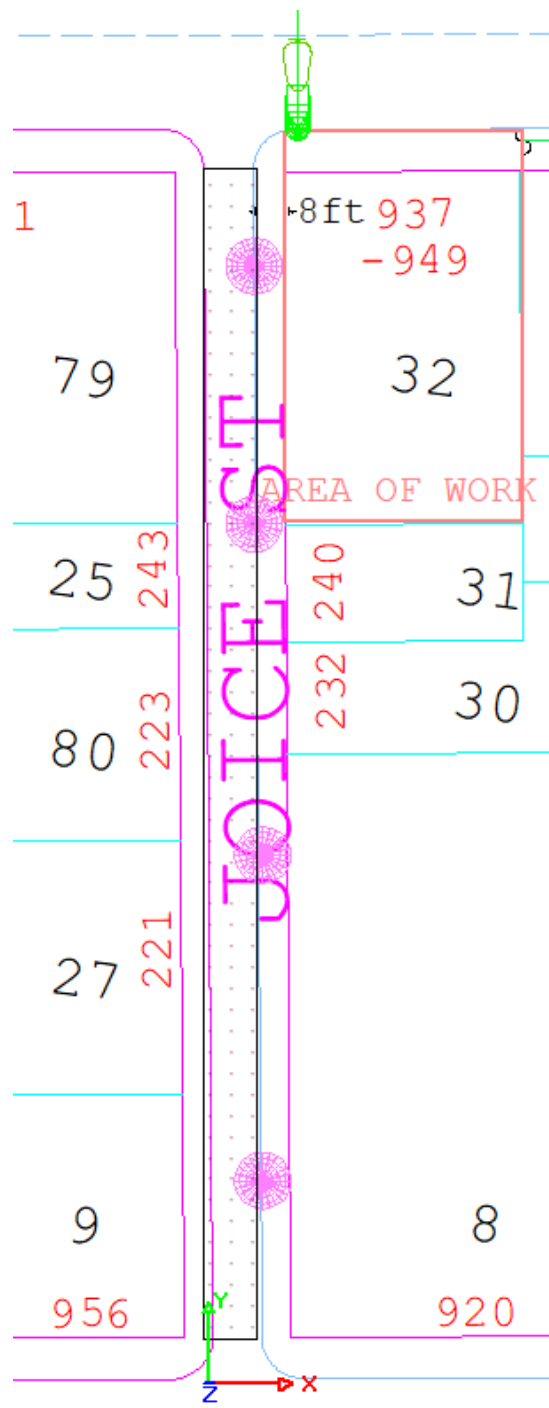
Streetlight work will only be required in the areas where the project owner is performing street improvements. Street improvements can include but are not limited to the following: adding/upgrading a bike lane, improvements to the area that would change pedestrian conflict or road classification, redoing/adding curb ramps, adding trees/sidewalk furniture and adding/redoing islands. Unless otherwise stated (i.e., if the project owner would like to use post top pedestrian lights, the lights will need to be on both sides of the block for at least 1 block) Perform the photometric study as follows:

1. Use interactive map found at <https://sfpuc.org/streetlights> to find existing light information and/or Project owner in field investigation. PG&E owned and maintained lights on behalf of SFPUC will need to be field verified. If the interactive map does not provide the information needed, request existing streetlight information from PEMA@sfwater.org.
 - a. If year of installation is unknown, please use older generation models.
2. Perform the streetlight study providing results per block to meet the needs of the street.
 - a. Street, Sidewalk, Intersection, and midblock calculations may be required. Mid-block crosswalks should be approximately 1.5X the road requirement.
 - b. Add new streetlights only in the area where the project owner is making street improvements. If a streetlight is within 5 ft of a residential window, a house side shield is required.
 - c. Study areas should include the whole road, intersection, or sidewalk by block. Project should model lights on both sides of the street to show the whole picture. If the project is less than a block, the project should provide the calculation for the whole block and the area in front of their property.
 - d. Sidewalk and street results should be separated unless it is a local residential only road. Local residential sidewalks will be incidentally lit by the streetlights.
 - e. Intersection results should be provided if the development is working within 50ft of the intersection.

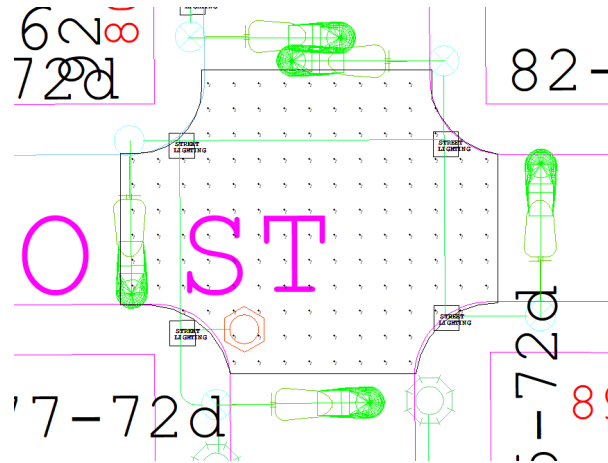
Sidewalk calculation points should be about 2 ft apart. If the sidewalk is less than 4ft, only one line of calculations will be needed in the middle of the sidewalk.



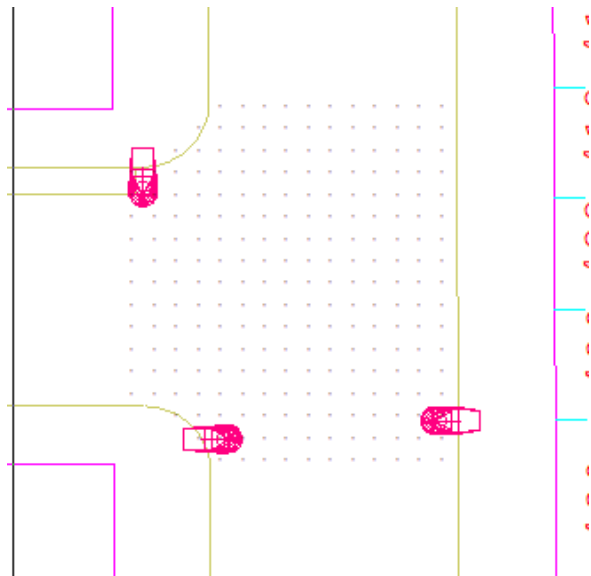
- f. Roadway calculation points should be about 5 ft apart the length of the road and 5 ft apart the width of the road. The photometric study should be for the whole width of the road. The calculations points should start from the middle of the road and move 5ft from the middle of the road. If the road is not fully vertical or horizontal, please make sure that the points in the road area are accounted for, even if the calculation point is slightly inside the sidewalk.



- g. Intersection calculation points should be about 5 ft apart.



- h. Locate at least one streetlight at mid-block crossing. It is best to locate the streetlight about 15ft before the crosswalk
- i. T-intersection



- j. It is preferred that streetlights are placed about 5ft in front of the crosswalk. All utility and city clearance requirements must be met with this placement.
- k. To aid in the review, highlight the area where sidewalk work is to be done.
- l. The requirements, light schedule, study parameters, and results should be on the drawing in chart form.
- m. Indicate what lights are existing and which ones are new.
- n. Make sure the light is visible in the drawing.
- o. Include legend on the photometric sheets- lights, SL Box, SL service point, SL conduit, trees, planters, and bio retainers.
- p. Photometric plan drawing should be scaled, scale should be noted on the plan.
- q. Photometric plan should be in PDF format and reviewed by the EOR or performed by a lighting representative.

Photometric Requirements:

1. The design for street and pedestrian lighting shall comply with the Recommended Practices of Roadway Lighting (RP-8), published by the Illuminating Engineering Society of Northern California (“IESNA”), and roadway functional classifications specified by Caltrans California Road System (CRS) Maps.

To determine recommended illuminance values:

- a) Identify the roadway functional classification by using Caltrans CRS Maps (5M and 5L for San Francisco), which can be located at <http://www.dot.ca.gov>.

Notes:

- i. Caltrans Principal/Minor Arterial roadways are equivalent to IESNA Major roadways.
 - ii. Caltrans Major/Minor Collector roadways are equivalent to IESNA Collector roadways.
 - iii. Caltrans Local roadways are equivalent to IESNA Local roadways.
- b) Identify Pedestrian Conflict Areas by using IESNA definitions per Section 3.5 Pedestrian and Bikeway Design Criteria and zoning map (<https://sfgov.org/sfplanningarchive/sites/default/files/FileCenter/Documents/9016-BIGmap.pdf>).

Pedestrian Conflict	Definition
High	commercial areas in urban environments with high night pedestrian activities.
Medium	intermediate areas with moderate night pedestrian activities. These areas are typically near community facilities, such as libraries and recreational centers or multifamily homes.
Low	Non-High-Rise residential only areas.

- c) Determine recommended illuminance values for roadways using results from steps a) and b) and Figure 1.
- d) Determine recommended illuminance values for intersections using results from steps a) and b) and Figure 2.
- e) Determine recommended illuminance values for pedestrian walkways and bikeways from step a) and Figure 3.

When in doubt regarding the pedestrian conflict, LED lighting can be designed within the two average values provided in Figures 1 and 2. For example, if pedestrian conflict is between high and medium, roadway average-maintained illuminance levels can be between 1.3fc and 1.7fc. Consult with the SFPUC Streetlight division for any additional questions.

Road & Pedestrian Conflict Area		Average Value	Uniformity Ratio
IESNA Road Classification	Pedestrian Conflict Area	R2 & R3 Pavement Classification Type (fc)	Eavg/Emin
Major	High	1.7	3.0
	Medium	1.3	3.0
Collector	High	1.2	3.0
	Medium	0.9	3.5
Local	High	0.9	6.0
	Medium	0.7	6.0
	Low	0.4	6.0

Figure 1: Recommended illuminance values for roadways (IESNA Section 3.0)

IESNA Road Classification	Average Illuminance at Pavement by Pedestrian Conflict Classification (fc)			Uniformity Ratio
	High	Medium	Low	Eavg/Emin
Major/Major	3.4	2.6	-	3.0
Major/Collector	2.9	2.2	-	3.0
Major/Local	2.6	2.0	1.3	3.0
Collector/Collector	2.4	1.8	-	4.0
Collector/Local	2.1	1.6	1.0	4.0
Local/Local	1.8	1.4	0.8	6.0

Figure 2: Recommended Illuminance values for intersections (IESNA Section 4.0)

Pedestrian Conflict Area	Average Illuminance (fc)	Uniformity Ratio, Eavg/Emin
Medium*	0.5-1.0	4.0

Figure 3: Recommended illuminance values for pedestrian walkways and bikeways (IESNA Section 3.0)

*Recommended values for civic, downtown and commercial areas, and do not apply to residential areas. For Local roadways that are residential only, with low vehicular traffic, pedestrian walkways may be illuminated incidentally by roadway lighting.

For photometric calculations use LLF=0.81 for LED lights.

Streetlight Plan:

Plan Drawing requirements:

1. Streetlight plan should be scaled, and scale noted on the plan.
2. Streetlight plan should include part numbers.
3. Streetlight plan should show service point box and conduit path.
4. Include all trees in the area and label them small, medium, and large. Include all planters and bio retainers. Indicate where the curb is.
5. Include legend on the streetlight plan sheets- lights, SL Box, SL service point, SL conduit, trees, planters, and bio retainers.
6. Indicate what lights are existing and which ones are new.
7. Stamped by a professional engineer.
8. Streetlight plan should be in PDF Format. If the project owner has AutoCAD files, send with red-lined drawings to PEMA@sfgov.org and SLinspections@sfgov.org.

Streetlight requirements:

1. Streetlight design should follow standard drawings unless otherwise noted by SFPUC . If there are conflicting direction on specifications from [Standards Specifications and Plans | Public Works \(sfpuc.org\)](https://www.sfpuc.org/standards-specifications-and-plans-public-works) and the streetlight website, contact the streetlight engineer for clarification.
2. Streetlights must be installed at grade.
3. All lighting at major intersections and /or same block of street, shall be consistent and shall use the same fixture technology (i.e., all LEDs). For intersection lighting, design the lighting such that the number of streetlight poles is no more than the number of crossing at that intersection (typically four poles at a crossing of two roads). Streets with center islands count as two crossing.
4. Each streetlight pole shall have an individual pull box installed within 5 ft at the base of all streetlight poles. A separate main service pull box in the sidewalk with appropriate fuse shall be provided to serve a single light or multiple streetlights.
5. Changes to an area surrounding existing streetlight infrastructure may require modifications to the streetlight infrastructure for it to remain in compliance with DPW's standard plans. For example:
 - a. If the grade is lowered by two feet; instead of lowering the streetlight pullbox cover by two feet, the pullbox may have to be dug and reset so the wires can continue to meet DPW's minimum separation requirements between the wires and the bottom of the pullbox lid. Conduits may need to be lowered to meet minimum cover requirements.
 - b. Similarly, if the grade is raised, the streetlight pole and foundation may have to be redone.
 - c. If the height of sidewalk at the pole base has a change of more than +2 inches or if the hand hole is covered , a new foundation and pole will need to be installed.

- d. If the height of the sidewalk at the pole base has a change of more than -1 inch, then a new foundation and pole will need to be installed or a structural review by a licensed professional engineer will be required
6. Typical streetlight spacing of pole is approximately 80 ft from one another. This is approximately three times the mounting height for Type II and Type III LED lights.

Streetlight Service:

Streetlight should have an input voltage of 120 V and use wattages of less than 150 W. Service connection and wiring should follow standard drawing.

Overhead Service:

If PUC approves an overhead service to streetlights, each streetlight will require a streetlight box and conduit run from the pole to the streetlight box for future undergrounding.

Underground Service:

Underground service is the standard service for streetlights. The project owner should apply for one service point per block per side of the street. When there is no available service point on the same side of the street, a variance will need to be requested and a spare conduit will need to be installed whenever there is conduit in the street. Each streetlight service needs a dedicated streetlight box with a 40A fuse. See circuit drawing for single phase 3 wire service on standard drawing, each streetlight box will have a 10A fuse.

Grounding:

1. Follow standard drawings for grounding.
2. Ufer like ground should be installed at each streetlight foundation. Use at least 20ft of #6 bare Cu and bond grounding conductor to reinforcing steel in at least 4 locations, to anchor bolts, and streetlight pole.
3. Ground rod should be installed at each service point streetlight box

Streetlight Clearances and Separation:

1. If not otherwise indicated, clearance requirement measurements should be made from the edge of the infrastructure
2. Contact DPW Bureau of Urban Forestry (BUF) for the classifications of trees. Trees such as the Chinese Elm or Brisbane box are considered large trees, thereby necessitating a 21 ft clearance between those trees and streetlights. Streetlights must clear the crown of the tree.
 - a. Small (less than 20 ft crown diameter at maturity)-9 Ft
 - b. Medium (20 ft to 35 ft crown diameter at maturity)-15 Ft
 - c. Large (more than 35 ft crown diameter at maturity)-21 Ft.
 - d. If the tree has a crown larger than 42ft please consult with BUF for clearance requirement.

- e. If a variance is provided and the streetlights are in line with the tree, the streetlight needs to clear the crown of the tree by at least 2ft.
- f. Measurement should be made from center of tree to center of pole along the road.
3. Poles should be 24 in from center of pole to face of the curb. Measurement should be made from center of the pole.
4. Poles should be 5ft from curb returns unless pole is shared with MTA.
5. Poles should be at least 3 ft from low pressure hydrant and 5 ft from high pressure.
6. For dry utilities, keep a distance of at least 12 in from streetlight infrastructure.
7. For wet utilities, keep a distance of at least 3.5 ft from streetlight infrastructure.
8. Catch basins should be offset by 3.5ft from edge of foundation to edge of catch basin
9. Make sure that there is a working clearance of at least 3 ft, including overhead wires.
10. Streetlight poles shall be a minimum of 3 ft from a permanent private structure (i.e., buildings)
11. Streetlight boxes and conduit should be 12 in from private structures.
12. Conduits need to be a minimum of 6 in from the edge of the curb. The closest conduits can be located within the first flag away from the road.
13. Streetlights need to be at least 3ft away from planters.
14. Streetlights need to be at least 10 ft away from the bioretention areas.
15. There should be 20in between the edge of the foundation to the edge of the wing of curb ramp.
16. In areas with islands close to the sidewalk, there needs to be at least 10ft clearance for a truck to service the streetlights
17. Streetlights must be 3ft from edge of foundation to edge of driveway.

Infrastructure Requirements:

1. All streetlight infrastructure must be in standard DPW sidewalk inside a trench designed for that purpose.
2. The streetlight pole foundations, conduits, and boxes shall not be located within a curb ramp, or wing of a curb ramp, and warning bands.
3. All streetlight infrastructure cannot be in planters, dirt, permeable pavers, bio retention areas, or other atypical materials that can settle or cause the streetlight facility to be hidden in the future. This includes but not limited to conduits, streetlight boxes, poles, and foundations.
4. At the SFPUC Service Box, install a 40A fuse as specified in the catalog.
5. At the streetlight box, install a 10A fuse as specified in the catalog.
6. If streetlights are in an area with pavers, a 3 ft X 3 ft flag around each light pole and SL box is required. The flag needs to be at grade with the sidewalk.
7. If there is an MTA Signal on PUC streetlight pole, the signal power and the streetlight power must be in separate conduits. Power for both streetlight and traffic signal must be from the same unmetered service point with two different fuses.

8. Ground rod in the streetlight service box shall be ground by code and the standard streetlight plans. Attachments to this grounding (other than the metal streetlight conduit) shall use stranded copper wires (such as for streetlight pole foundations).
9. There should be no more than four conduits coming in/out of the N16 streetlight box.
10. There should be no more than nine conduits coming in/out of the N36 streetlight box.
11. Follow DPW standards for compaction.
12. Streetlight poles and boxes should be in the center of the sidewalk flag

Lights:

1. Streetlights should be chosen from the streetlight catalog. Use the wattages and distribution type provided on the catalog. If photometrics cannot be met with those wattages and distribution types, state that when submitting for review.
2. Design and installation should follow standard drawings.
3. Top mounted, 7-pin, twist lock photo-eye should be oriented to the North

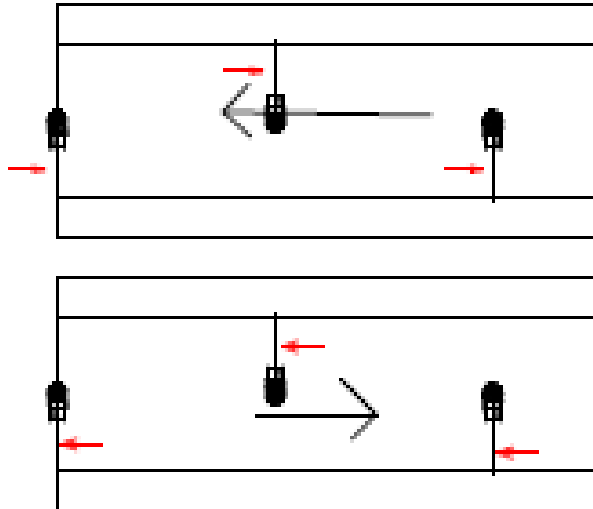
Boxes:

1. Must be N16 or N36 concrete box. If the sidewalk will have a lot of vehicle traffic, use a B1017 box.
2. Streetlight box must be lockable, for the streetlight box cover use tamper proof penta-head machine bolts.
3. Design and installation should follow standard drawings.
4. Streetlight box cover should say "SFPUC STREET LIGHTING" according to standard drawing.
5. Splicing can be only done inside the box and not in conduits.
6. Streetlight box should be visible from the streetlight
7. For splicing details see standard drawing
8. Streetlight box material should be reinforced concrete body with lockable reinforced concrete lid. Boxes must be located inside the sidewalk.
9. Minimum of 3 in gravel underneath the boxes is required.
10. In areas with sidewalk basements, the streetlight box can be up to 10ft away from the streetlight to avoid being installed inside the basement. The streetlight box should be visible from the streetlight

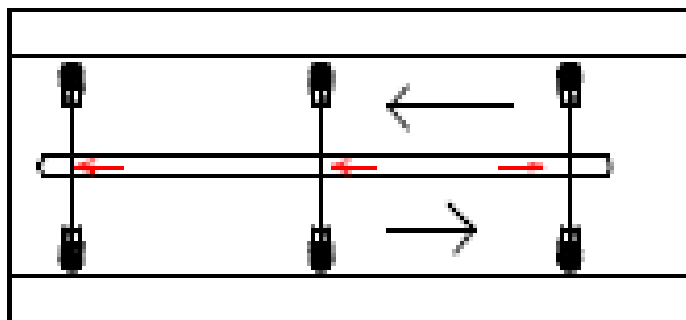
Poles:

1. Pedestrian light poles should be 16 ft tall.
2. Streetlight poles should be 25 ft, or 30 ft (28.5 ft) tall.
3. Poles should be at least 11 gauge
4. Round tapered poles are preferred.
5. Design and installation should follow standard drawings.
6. Numbering should be added according to standard drawings. The numbers will be provided after the photometric plan is approved.

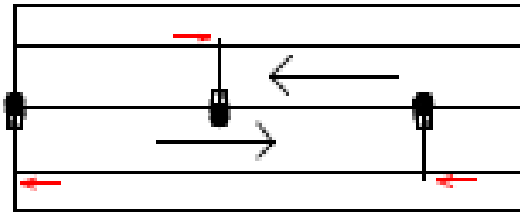
7. Hand holes should be placed such that crew can work in the hand hole on the sidewalk while being able to view oncoming traffic. See below examples. The red arrows show the location of the hand hole and the black arrows show the flow of traffic.
- a. One-way street



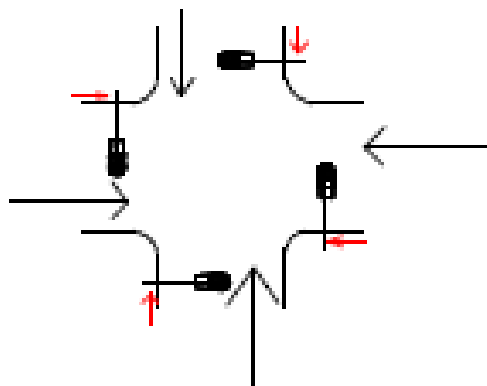
- b. Streetlights in island. The mid-block streetlight can have the hand hole in either location shown below.



c. Two-way street



d. Intersection



8. Each pole can only have conductors from one service
9. All steel poles go above finish sidewalk. The grout should be no less than 1 inch and no more than 1 ¾ inch. If it is a concrete pole the pole should be below grade with bolts covered with a minimum of 1 inch.
10. Streetlight poles should be in front of all overhead power/communication lines and have a 3ft clearance from all lines.
11. Standard streetlight poles should not have any color, it should be hot dipped galvanized.

Conduits:

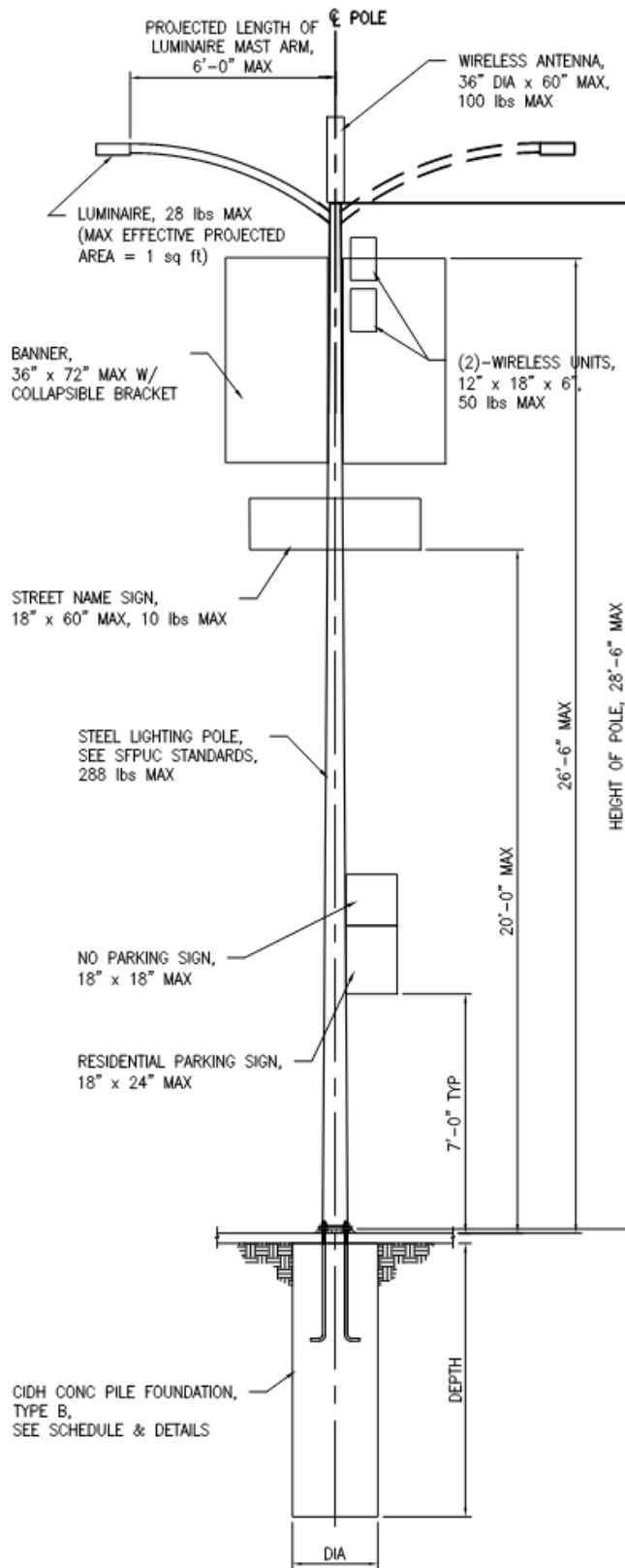
1. Avoid routing streetlight conduits under a roadway. Street crossing should be rare, and a variance request must be approved by SFPUC. Design the project such that streetlight conduits are located under the sidewalk when running parallel to the curb.
2. Streetlight conduits are typically located 18 in below topping slab in dirt finished grade under the sidewalk and 30 in below finished grade under roadway. When part of a dry utility joint trench, design the streetlight conduit such that it is located 18 in under the topping slab.
3. Conduits cannot be run underneath planters.
4. Conduits: Use 2 in PVC schedule 80 conduit from streetlight box to streetlight box.
5. Conduits: Use 1.5 in RGS conduit between pull box to streetlights. Conduit in the foundation should be taped with Corrosion Protection Pipe wrap tape.

6. Use #8 AWG wire between pullboxes, use #10 AWG from pullbox to light with a 10A fuse. Use #6 AWG for ground. Maximum distance between pullboxes shall be 250 ft. Wires shall be stranded copper with THWN insulation. All streetlight conduits shall run underneath the sidewalk; with the sole exception of service conduit road crossings when there are no other available options.
7. Use Ideal Duct Seal Non-Hardening Sealing Compound #31-601 or equivalent duct seal for all conduits at each SL box.
8. As stated previously, upon a granted variance - street crossings can only occur at the end of the block and between 3 ft – 5 ft from the crosswalks and curb ramp. Conduit should not be in the intersection. A spare conduit shall be provided for this type of crossing. The spare conduit should be capped at both ends with a pull string inside.
9. The conduit bends will be less than 270 degrees from pullbox to pullbox.
10. Splicing can only happen in the streetlight boxes.
11. T-connections are not allowed.
12. Conduits must enter and leave through the bottom of the SL box (as per the standard plans).
13. Refer to standard drawings for more information.
14. When existing conduits/conductors are no longer being used, pull conductors out and pull in mule tape and cap.
15. In areas with sidewalk basements, conduit should be routed inside the parking strip unless there is streetlight infrastructure already in the sidewalk basement.
16. No Jetting in trenches

Foundation:

1. Bolt circles and Anchors
 - a. Pole anchors will be minimum of 42-in-long, 1-in diameter.
 - b. Bolt circle will be 11 in for all metal Streetlight Poles.
 - c. Must have slotted bolt circle of at least 0.5 in.
2. Please use new DPW standard S-101 Streetlight Pole Foundation.
3. If the foundation is less than 24 in from a basement or vault, then the standard streetlight foundation is no longer acceptable. Have a structural engineer design an equivalent streetlight foundation. Submit a stamped drawing and calculations for Streetlight review and approval.
4. Digging within 3ft of the foundation will require new foundation and streetlights.
5. Project owner's structural engineer to stamp drawing/calculations that the proposed foundation can handle the load, both seismic and wind (AASHTO).
 - a. Attachments should be
 - i. 2- 6ft arms with cobra head lights
 - ii. 1 -100lbs weight perpendicular to the pole at the top of the pole (sheer force)
 - iii. 2- 12"X18"X6" 50lbs max boxes at a height of 26'-6"
 - iv. Street signs
 1. 1- 18"X60" maximum 10lbs at 20'
 2. 1-18"X18" at 9'

3. 1-18"X24" at 7'



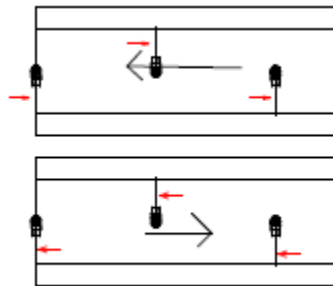
Red-lined Drawing Requirements:

1. Red-lined drawing should be scaled, and scale noted on the plan
2. Red-lined drawing should include part numbers and streetlight numbers
3. Red-lined drawing should show service point box and conduit path
4. Include all trees in the area and label them small, medium, and large. Include all planters and bio retainers. Indicate where the curb is.
5. Include legend on the streetlight plan sheets- lights, SL Box, SL service point, SL conduit, trees, planters, and bio retainers
6. The redlined drawings should be made on the approved streetlight plan drawing and in PDF Format
7. Include final submittals of poles and luminaries and include any warranty information.

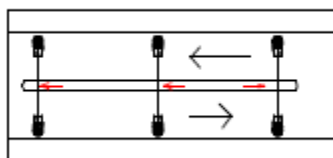
Purchasing:

All streetlights purchased should include the following:

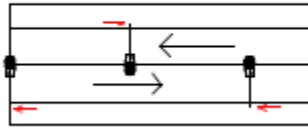
1. See catalog for specific add-ons used by SFPUC.
2. Ask manufacturer/sales rep if there are any special SFPUC modifications to the light/pole.
3. Input voltage should be universal; able to handle 120V-277V.
4. Hand holes should be placed such that crew can work in the hand hole on the sidewalk while being able to view oncoming traffic. See below examples. The red arrows show the location of the hand hole, and the black arrows show the flow of traffic
 - a. One-way street



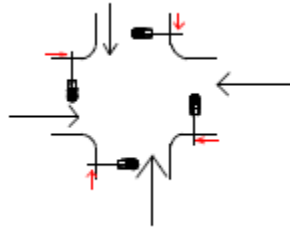
- b. Streetlights in island



- c. Two-way street



- d. Intersection



5. 7-Pin receptacle- Use top mounted, 7-pin, twist lock photo-eye.
6. Slotted bolt circle.
7. Spare poles should be ordered with the anchor bolts
8. For cobra head lights, the ANSI wattage label to be installed on the fixture per the 2011 ANSI standard giving the exact wattage of the fixture.
9. Invoice needs to be submitted and reviewed before attic stock is received at the warehouse. The below information should be provided with the invoice:
 - a. Manufacturer
 - b. Make
 - c. Part Number
 - d. RAL color
 - e. Job name/number
10. If attic stock is being purchased, include an identification label on the box, which includes the wattage and distribution type, similar to the ANSI label (ex. 54W R2M).
 - a. Attic stock should be sent to
Pier 23
The Embarcadero
San Francisco, 94111
 - b. Contact PEMA@sfwater.org and bmurphy@sfwater.org to deliver attic stock. Invoice should be included with delivery.
11. All lights are 3000k.
12. Submittals and Request for Information: PUC will provide standards and design guidelines to the design engineers and they will design, review and comment on submittals and RFIs. If the design or material are different from PUC standards, the design engineer should contact PUC Streetlights to discuss possible exceptions.
13. Streetlight finish color should match the area.

Maintenance Agreement:

1. In areas with pavers or atypical materials, if the conduit path needs to be repaired SFPUC streetlights will backfill up to subsurface. Finish surface will be done by property owner / Home Owners Association (HOA) or else it will be standard concrete by SFPUC streetlights. This will need to be written into the Covenant, Conditions, and Restrictions (CC&R).
2. If there is a need for streetlight or pedestrian light protection the property owner/HOA would be responsible to own and maintain the protection. This will need to be written into the CC&R.
3. If the new streetlights are on a new street, the streetlights will not be accepted until the street is accepted by the City.

Commonly asked questions:

Is replacing poles and foundation required for grade change?

When work around the streetlight poles, chips or damages the foundation in any way, new foundation will be required. Having the poles foundation exposed above the finished grade (above the base plate) is unacceptable, unless the project owner provides a report from a CA registered structural engineer asking for exception. This variance will need to be reviewed and approved.

If the grade changes more than +2inches/- 1inch, a new foundation and streetlight will be required.

The grade change cannot cover the hand hole for both concrete poles and steel poles and cannot cover base plate for steel poles.

Extension lugs for anchor bolts are not allowed.

Digging within 3ft of the foundation will require new foundation and streetlights.

Can existing poles be reused?

New, similar poles will be installed unless project requests to reuse the pole. Upon PUC inspection of the pole, PUC may grant permission for re-using of the existing pole. Concrete poles may not be reused.

Can I connect the new streetlights to PUC service points?

Yes, if you have written approval from PUC engineer. Follow this process:

Note that PUC service point is the box which is owned by PUC and connected directly to PG&E infrastructure.

1. Use interactive map found at <https://sfpuc.org/streetlights> to find existing light information and/or Project owner in field investigation.
2. If the interactive map does not provide the information needed, request existing streetlight information from PEMA@sfgwater.org.
3. Mark up provided drawing indicating which service point you are requesting to use and where the new lights will be located. Also include the additional load information. Note that the service

point needs to be on the same block and side of the block as the lights to be installed. Send information to the Streetlight Engineer reviewing your application.

4. The engineer will respond with a decision.

How can I request a streetlight foundation variance?

Fill out a variance form with the following information to the streetlight engineer for review:

1. Description of why project owner cannot install the standard foundation:
2. Will moving the light < 10 feet while still being ~ 24 in from the face of the curb allow the project owner to install the standard foundation?
3. Provide a stamped drawing of the proposed foundation stating it is equivalent to the standard foundation and state that it is able to handle the attachments shown in the foundation section.

What are some of the emergency temporary light requirements?

When an unexpected outage occurs due to project owner construction, project owner is responsible to install like-in-kind temporary lighting until the permanent light is repaired by the project owner. The temporary light must be installed within 3 days from when the permanent light was nonoperational.

- Must be operational from dusk to dawn every day
- Light must face the road
- If it is a cobra head, orient it to the road and tilt should be 0
- Light should be mounted at the same height as the streetlights in the area
- Light must have equivalent lumens of light it is replacing

Do I need to perform a photometric study if I need to move an existing streetlight?

If the project needs to move an existing light to accommodate the project's needs, a photometrics study is needed if the streetlight is moving more than 10ft or if the light being moved lights up the intersection or crosswalk.

How do we know if the streetlight is approved?

Even when a streetlight is on the catalog, the streetlight engineer must approve it. When the streetlight engineer approves the photometrics, the streetlight is approved. Prior to the photometrics being approved, the project owner cannot assume that the streetlight is approved for the project.

What is a like for like change?

A like for like change for lights in an intersection is:

- Equivalent wattage
 - I.e. 150W HPS is equivalent to 72W LED
- Same distribution, mounting height, tilt, and orientation

- In a location that adequately lights up the intersection
- 24 in away from the face of the curb

A like for like change for lights mid-block is:

- Equivalent wattage
 - i.e. 150W HPS equivalent is 72WLED
- Same distribution
- Same mounting height, tilt, and orientation
- Within 10ft from the location of the pole being removed
- 24 in from face of the curb

How do I fill out the PG&E LS-2 Retail application?

Please see below notes to aid in filling out the LS-2 retail application. The project owner is responsible for the energy usage until SFPUC accepts the streetlights for ownership and maintenance.



Application for Service Streetlight

Please complete this form and submit to PG&E New Construction Services at P.O. Box 24047 Fresno CA 93779-0447 or Call 1-877-PGE-SRVIC to apply over the phone. This form should be used for Streetlight requests which are not associated with another application. *Indicates optional fields.

Project Information

Residential Single Family
 Residential Subdivision
 Commercial/Industrial
 Agricultural
 Agency (City, County, Cal Trans)
 Mix Use

Service Request Date: _____ (mm/dd/yyyy)

Project Address or Lot Number: _____ Nearest Cross Street: _____

City: _____ County: _____ Zip: _____

Applicant / Company Name: _____

Individual
 Partnership
 Corporation
 Limited Liability Corporation
 Governmental Agency
 Sole Proprietor
 Other _____

Day Phone: _____ *Cell Phone: _____ *Fax: _____

*Email address: _____ (Correspondence will be sent via e-mail)

Applicant Address: _____, City: _____ State: _____ Zip: _____

*Representative Name: _____ (if different from applicant)

Day Phone: _____ *Cell Phone: _____ *Fax: _____

*Email address: _____

*Representative Address: _____ *City: _____ *State: _____ Zip: _____

Contract Information

Legal name to appear on contract: _____

Individual
 Partnership
 Corporation
 Limited Liability Corporation
 Governmental Agency
 Sole Proprietor
 Other _____

Name of person authorized to sign contracts: _____ *Title: _____
First Name, Middle Initial, Last Name

Mailing address for contracts: _____ City: _____ State: _____ Zip: _____

Credit Information (Party responsible for energy use after the streetlight is installed)

Name/Company to appear on bill: _____
(First Name, Middle Initial, Last Name)

Individual
 Partnership
 Corporation
 Limited Liability Corporation
 Governmental Agency
 Sole Proprietor
 Other _____

*State of incorporation or LLC: _____

Mailing address for bill: _____, City: _____, State: _____, Zip: _____

Choose what your development falls under

At least 6 months from the time of application

Pick what applicant's company falls under

Information of who will be responsible for the lights until the City takes ownership of the lights and service

Contact SEngineering@swater.org for with any additional questions concerning design/engineering.
Contact SLinspections@swater.org for streetlight inspection requests.
Contact PEMA@swater.org for streetlight asset questions

Revision History:

Revision	Date	Standards Engineer	Approved by	Description
0	07/01/2020	R. Huang Associate Engineer	M. Ho Senior Engineer	
1	11/03/2020	R. Huang Associate Engineer	M. Ho Senior Engineer	Added process information and clarification to existing sections
2	01/25/2021	R. Huang Associate Engineer	M. Ho Senior Engineer	Clarification to clearances and determining street ownership
3	07/01/2021	R. Huang Engineer	M. Ho Senior Engineer	Changed Website information Updated photometric study Updated clearance requirements Updated ownership requirements Updated structural study requirements Other Miscellaneous changes
4	7/1/2023	R. Huang Engineer	M. Ho Senior Engineer	Changed Website information Updated structural study/foundation requirements Formalize Curb ramp relocation requirement Inspection process changes Other Miscellaneous changes

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