BIC Regular Meeting of March 15, 2017

Agenda Items 10

City and County of San Francisco
Department of Building Inspection

Edwin M. Lee, Mayor
Tom C. Hui, S.E., C.B.O., Director

March 10, 2017

Building Inspection Commission
1660 Mission Street
San Francisco, CA 94103

RE: Proposed Ordinance-Requirements for Installation of Electric Vehicle Chargers

Honorable Members of the Commission:

At the regular meeting of March 8, 2017, the full Code Advisory Committee (CAC) deliberated on a proposed new ordinance amending the Green Building Code to establish requirements for installation of electric vehicle charger infrastructure in new buildings or buildings undergoing major alterations.

The CAC forwards a unanimous recommendation for support of the legislation as written including the suggested modifications with the recommendation that the costs be revisited to the Building Inspection Commission for consideration.

Respectfully submitted,

Kirk Means
DBI Technical Services Division
Secretary to the Code Advisory Committee

cc: Tom C. Hui, S.E., C.B.O., Director
Dan Lowrey, Deputy Director
David Leung, Manager
Stephen Harris, S.E., Chair, Code Advisory Committee
William Strawn, Legislative Affairs

Attach: Proposed Ord.
Additional suggested modifications

CAC 3/8/2017
Approved Mods

EV Ready – Necessary changes to introduced draft

Sec. 302 – Definitions:

MAJOR ALTERATIONS. Alterations *and additions* where interior finishes are removed and significant upgrades to structural and mechanical, electrical and/or plumbing systems are proposed where areas of such construction are 25,000 gross square feet or more in Group B, M or R occupancies of existing buildings.

- What about I and ~~M~~ 4 occupancies?

4.106.4.2.2. ..... DIMENSIONS

...

4. Accessible spaces must meet the dimensions specified above, *Planning Code Section 154, or other applicable accessibility requirements*, whichever would result in a larger EV Space size.

4.106.4.2.4. *AND* 5.106.5.3.2. MULTIPLE EV SPACES:

In (a), add "*per EV Space*", consistent with (b).

Reasons for Not Proposing Requiring Installation of Chargers

- Technology change
  - Chargers
  - Charging management systems
  - Bi-directional inverters
  - Utility tariffs and programs
- Cost
- Design flexibility
- Split incentive in the case of some for-sale development
- Accessibility – Different requirements for public (CBC 11B) vs. private (CBC 11A and ADA) parking spaces
- Reservation of space exclusively for EVs – a function of program and occupants
- Variation in timing of EV ownership – both at the time a building is delivered, and over the future life of the building

Content for EV Ready Ordinance Administrative Bulletin

- Overview - Electrical Utility Service Sizing, 20%, and 80% - in plain English
  - Diversity, Service vs. Load,
  - Installed circuits vs. installed appliances
  - Tradeoffs (installed fast chargers vs. L2 charger-ready)
- Labeling
- Permits
- Accessibility requirements based on situation, case studies/examples
- Variation in parking
  - High density parking, including stackers & valet
- How to calculate marginal cost of Utility Service attributable to EV Ready requirement
- Best Practices
  - Locational equity of electrical infrastructure
  - Adaptability/reconfigurability
  - Assigned parking spaces vs. unassigned, public vs. private
  - Fast charging
- Charging management systems

CAC 3/8/2017
Approved w/mods as attached. Costs s/b revisited

FILE NO. ORDINANCE NO.
EV Ready Ordinance as Introduced February 28, 2017

[Green Building Code - Requirements for Installation of Electric Vehicle Chargers]

Ordinance amending the Green Building Code to establish requirements for installation of electric vehicle charger infrastructure in new buildings or buildings undergoing major alterations; affirming the Planning Department's determination under the California Environmental Quality Act; making findings under the California Health and Safety Code; and directing the Clerk of the Board of Supervisors to forward this ordinance to the California Building Standards Commission upon final passage.

NOTE: **Unchanged Code text and uncodified text** are in plain Arial font.
Additions to Codes are in *single-underline italics Times New Roman font*.
Deletions to Codes are in ~~*strikethrough italics Times New Roman font*~~.
Board amendment additions are in double-underlined Arial font.
Board amendment deletions are in ~~strikethrough Arial font~~.
Asterisks (* * * *) indicate the omission of unchanged Code subsections or parts of tables.

Be it ordained by the People of the City and County of San Francisco:

Section 1. Findings.

(a) The Planning Department has determined that the actions contemplated in this ordinance comply with the California Environmental Quality Act (California Public Resources Code Sections 21000 et seq.). Said determination is on file with the Clerk of the Board of Supervisors in File No. ___ and is incorporated herein by reference. The Board affirms this determination.

(b) The Building Inspection Commission considered this ordinance on _____, 2017 at a duly noticed public hearing, pursuant to Charter Section D3.750-5.

Section 2. Findings Regarding Local Conditions Required by the California Health and Safety Code.

(a) California Health & Safety Code Section 17958.7 provides that before making any changes or modifications to the California Green Building Standards Code and any other applicable provisions published by the State Building Standards Commission, the governing body must make an express finding that each such change or modification is reasonably necessary because of specified local conditions, and the findings must be filed with the State Building Standards Commission before the local changes or modifications go into effect.

(b) The Board of Supervisors expressly declares that the following amendments to the San Francisco Green Building Code are reasonably necessary because of local climatic, topological, and geological conditions as listed below.

(1) As a coastal city located on the tip of a peninsula, San Francisco is vulnerable to sea level rise, and human activities releasing greenhouse gases into the atmosphere cause increases in worldwide average temperature, which contribute to melting of glaciers and thermal expansion of ocean water – resulting in rising sea levels.

(2) San Francisco is already experiencing the repercussions of excessive CO_2 emissions as rising sea levels threaten the City's shoreline and infrastructure, have caused significant erosion, have increased impacts to infrastructure during extreme tides, and have caused the City to expend funds to modify the sewer system.

(3) Some subpopulations of San Francisco residents are vulnerable to heat events.

(4) Increasing the adoption and use of electric vehicles will help San Francisco meet its goals under Ordinance No. 81-08, to reduce greenhouse gas emissions citywide to 40% below 1990 levels by 2025 and 80% by 2050.

(5) Use of electric vehicles benefits the health, welfare, and resiliency of San Francisco and its residents.

(6) Electric vehicles depend upon convenient access to charging, and the ability to serve electric vehicles in existing buildings is commonly limited by the electrical system capacity of the building.

(c) The most cost-effective time to prepare building electrical infrastructure for electric vehicle charging is when electric service is installed or upgraded due to construction, because workers are already on-site, utility service upgrade costs are lower, permitting and administrative costs are lower, and it is more cost-effective to include such systems in existing construction financing.

Section 3. The Green Building Code is hereby amended by revising Section 202, to read as follows:

[Add and amend the following definitions:]

SEC. 202. DEFINITIONS.

* * * *

ELECTRIC VEHICLE CHARGING SPACE (EV Space). A space intended for ~~*future*~~ installation of EV charging equipment and charging of electric vehicles. *The EV Space need not be reserved exclusively for electric vehicle charging.*

ELECTRIC VEHICLE CHARGING STATION (EVCS). One or more electric vehicle charging spaces served by electric vehicle charger(s) or other charging equipment allowing charging of electric vehicles. *For purposes of determining compliance with accessibility requirements, when the permitted length of time a vehicle may occupy an electric vehicle charging station differs from the permitted duration of stay in publicly accessible parking spaces in the same parking area, electric* ~~*Electric*~~ vehicle charging stations are not considered parking spaces.

When the permitted duration of stay in a space served by electric vehicle charger(s) is the same as other publicly accessible parking spaces in the same parking area, EVCS may be considered parking spaces. The EVCS need not be reserved exclusively for electric vehicle charging.

ELECTRIC VEHICLE (EV) FAST CHARGER. *Off-board charging equipment with a minimum direct current or alternating current power output of 24 kW, for the purpose of providing an electric vehicle charge in significantly less time than a standard Electric Vehicle Charger.*

ELECTRIC VEHICLE LOAD MANAGEMENT SYSTEM. *An electronic system designed to allocate charging capacity among EV chargers.*

* * * *

Section 4. The Green Building Code is hereby amended by revising Section 302.1, to read as follows:

[Revise this section as follows:]

SEC. 302.1. MIXED OCCUPANCY BUILDINGS.

In mixed occupancy buildings, each portion of a building shall comply with the specific ~~*California Title 24 Part 11 required*~~ measures applicable to each specific occupancy *as required by California Code of Regulations Title 24 Part 11 and the San Francisco Green Building Code.* However, to fulfill any ~~*additional local green building*~~ requirements *of San Francisco Green Building Code Sections 4.103 through 4.105 and 5.103 through 5.105, as applicable*, the project sponsor may apply a single required green building standard to the entire building.

Section 5. The Green Building Code is hereby amended by adding Section 4.103.3.3, to read as follows:

[Add the following section:]

SEC. 4.103.3.3. ELECTRIC VEHICLE CHARGING.

Sections 4.106.4 through 4.106.4.2.6 of this Chapter shall apply to all newly-constructed buildings, and to major alterations to existing Group R occupancy buildings where electrical service to the building will be upgraded. In major alterations where existing electrical service will not be upgraded, the requirements of Sections 4.106.4 through 4.106.4.2.6 shall apply to the maximum extent that does not require upgrade to existing electrical service.

Section 6. The Green Building Code is hereby amended by revising Section 4.106.4, to read as follows:

[Revise this section as follows:]

SEC. 4.106.4. ELECTRIC VEHICLE (EV) CHARGING FOR NEW CONSTRUCTION *AND MAJOR ALTERATIONS.*

New construction *and major alterations* shall comply with Sections 4.106.4.1 and 4.106.4.2 to *provide electrical capacity and infrastructure to* facilitate future installation and use of EV Chargers, *such that the project will be capable of providing electric vehicle charging services at 100% of parking spaces.* Electric Vehicle Supply Equipment (EVSE) shall be installed in accordance with the ~~*California Electrical Code*~~ *California Electrical Code Article 625, and the California Energy Code, Subchapter 4, Section 130.5, and as follows.*

Exceptions:

On a case-by-case basis, where the ~~*local enforcing agency*~~ *Director* has determined EV charging and infrastructure are not feasible based upon one or more of the following conditions:

1. Where there is no commercial power supply.

2. Where there is evidence substantiating that meeting the requirements will alter the local utility infrastructure design requirements on the utility side of the meter so

as to increase the utility side cost to the homeowner or the developer by more than $400.~~00~~ per ~~*dwelling unit*~~ *parking space. In such cases, buildings subject to Section 4.106.4 shall maximize the number of EV Spaces, up to a utility side cost of a maximum of $400 per space. Cost shall be determined by dividing the increase in local utility infrastructure cost attributable to compliance with this section by the sum of parking spaces and Electric Vehicle Charging Spaces.*

3. In major alterations, where there is evidence substantiating that meeting the requirements of this section presents an unreasonable hardship, the Director may consider an appeal from the project sponsor to reduce the number of EV Spaces required.

Section 7. The Green Building Code is hereby amended by revising Sections 4.106.4.1 and 4.106.4.1.1, to read as follows:

[Revise this section as follows:]

SEC. 4.106.4.1. NEW ONE-AND-TWO-FAMILY DWELLINGS AND TOWN-HOUSES WITH ATTACHED *OR ADJACENT* PRIVATE GARAGES.

For each parking space, install a 40-Amp 208 or 240-volt branch circuit, including raceway, electrical panel capacity, overprotection devices, wire and termination point such as a receptacle. The termination point shall be in close proximity to the proposed EV charger location. Raceways are required to be continuous at enclosed, inaccessible, or concealed areas and spaces. Raceway for each circuit shall not be less than trade size 1 (nominal 1-inch inside diameter).

~~*For each dwelling unit, install a listed raceway to accommodate a dedicated 208/240-volt branch circuit. The raceway shall not be less than trade size 1 (nominal 1-inch inside diameter). The raceway shall originate at the main service or unit subpanel and shall terminate into a listed cabinet, box or other enclosure in close proximity to the proposed location of an EV charger. Raceways are required to be continuous at enclosed, inaccessible or concealed areas and spaces. The service panel*~~

~~*and/or subpanel shall provide capacity to install a 40-ampere minimum dedicated branch circuit and space(s) reserved to permit installation of a branch circuit overcurrent protective device.*~~

SEC. 4.106.4.1.1. IDENTIFICATION.

The service panel or subpanel circuit directory shall identify the overcurrent protective device space(s) reserved for future EV charging as *"EV READY" for full circuits and otherwise* "EV CAPABLE". The raceway termination location shall be permanently and visibly marked as *"EV READY" for full circuits and otherwise* "EV CAPABLE".

Section 8. The Green Building Code is hereby amended by revising Section 4.106.4.2, to read as follows:

[Revise this section as follows:]

SEC. 4.106.4.2. NEW MULTIFAMILY DWELLINGS *AND MAJOR ALTERATIONS.*

Where *three* ~~*17*~~ or more multifamily dwelling units are constructed on a building site, *or undergo major alteration, 100%* ~~*3 percent*~~ of the total number of parking spaces provided for all types of parking facilities~~*, but in no case less than one,*~~ shall be electric vehicle charging spaces (EV Spaces) capable of supporting future EVSE. ~~*Calculations for the number of EVCS shall be rounded up to the nearest whole number.*~~ *A branch circuit panelboard shall be provided at each parking level, and the panelboard shall have capacity to deliver a minimum 8 amperes at 208 or 240 volts multiplied by the total number of EV Spaces and shall provide sufficient space in the panelboard to install one 40-ampere minimum dedicated branch circuit and overcurrent protective device for each EV Space. The circuits and overcurrent protective devices shall remain reserved for exclusive use by electric vehicle charging.*

Note: *Electrical engineering design and c*~~C~~onstruction documents are intended to demonstrate the project's capability and capacity for facilitating future EV charging. ~~*There is no requirement for EV spaces to be constructed or available until EV Chargers are*~~

~~installed for use.~~ *There is no requirement for EV Chargers to be installed. The intention of sizing the panel to deliver 8 amperes per EV Space is to provide the option to utilize Electric Vehicle Load Management Systems to provide Level 2 EV charging (40 amperes at 208 or 240 volts) at 100% of parking spaces. Eight (8) amperes of capacity per EV Space is sufficient for a listed EV Load Management system to manage the available capacity in a safe manner. For example, such a system may allocate up to 36 amperes at 208 or 240 volts to vehicles in 20% of the total number of EV Charging Stations simultaneously. The same system may allocate 8 amperes to vehicles in 100% of parking spaces.*

EV load management systems are not required, but may be necessary if EVSE are installed serving greater than 20% of parking spaces simultaneously.

Section 9. The Green Building Code is hereby amended by revising Section 4.106.4.2.1, to read as follows:

[Revise this section as follows:]

SEC. 4.106.4.2.1. ELECTRIC VEHICLE CHARGING SPACE LOCATIONS.

Electrical engineering design and construction documents shall indicate the location of proposed EV spaces. *Where parking spaces are provided for public use or for common use by residents, at* ~~At~~ least one EV space shall be located in common use areas and available for use by all residents.

When EV chargers are installed, accessible EV spaces required by Section 4.106.2.2, Item 3, shall comply with at least one of the following options:

1. The EV space shall be located adjacent to an accessible parking space meeting the requirements of the California Building Code, Chapter 11A, to allow use of the EV charger from the accessible parking space.

2. The EV space shall be located on an accessible route, as defined in the California

Building Code, Chapter 2, to the building.

Section 10. The Green Building Code is hereby amended by revising Section 4.106.4.2.2, to read as follows:

[Revise this section as follows:]

SEC. 4.106.4.2.2. ELECTRIC VEHICLE CHARGING SPACE (EV SPACES) DIMENSIONS.

Unless otherwise specified by Planning Code Section 154, ~~The~~ EV Spaces shall be designed to comply with the following:

1. The minimum length of each EV space shall be 18 feet (5486 mm).

2. The minimum width of each EV space shall be 9 feet (2743 mm).

3. One in every 25 EV spaces, but not less than one, shall also have an 8-foot (2438 mm) wide minimum aisle. A 5-foot (1524 mm) wide minimum aisle shall be permitted provided the minimum width of the EV space is 12 feet (3658 mm).

a. Surface slope for this EV space and the aisle shall not exceed 1 unit vertical in 48 units horizontal (2.083*% ~~percent~~* slope) in any direction.

b. Notwithstanding any other applicable requirements, when an EV charger is installed serving an accessible parking space, the space may be considered a parking space if the duration of stay is not subject to any limitations different from those generally applied to other publicly accessible parking spaces in the same parking area. If the duration of stay in an accessible space equipped with an EV charger is subject to limitations different from those generally applied to other publicly accessible parking spaces in the same parking area, the space is not a parking space.

4. Accessible spaces must meet the dimensions specified above, whichever would result in a larger space size.

Section 11. The Green Building Code is hereby amended by revising Section 4.106.4.2.3, to read as follows:

[Revise this section as follows:]

SEC. 4.106.4.2.3. SINGLE EV SPACE REQUIRED.

Where a single EV space is required, install a full circuit with a minimum of 40-Amp 208 or 240 Volt capacity, including listed raceway, sufficient electrical panel capacity, overcurrent protection devices, wire, and termination point such as a receptacle. The termination point shall be in close proximity to the proposed EV charger location. The raceway shall not be less than trade size 1 (nominal 1-inch inside diameter).

~~*Install a listed raceway capable of accommodating a 208/240 volt dedicated branch circuit. The raceway shall not be less than trade size 1 (nominal 1-inch inside diameter). The raceway shall originate at the main service or subpanel and shall terminate into a listed cabinet, box or enclosure in close proximity to the proposed location of the EV spaces. Construction documents shall identify the raceway termination point. The service panel and/or subpanel shall provide capacity to install a 40 ampere minimum dedicated branch circuit and space(s) reserved to permit installation of a branch circuit overcurrent protective device.*~~

Section 12. The Green Building Code is hereby amended by revising Section 4.106.4.2.4, to read as follows:

[Revise this section as follows:]

SEC. 4.106.4.2.4. MULTIPLE EV SPACES REQUIRED.

(a) For a minimum of 10% of EV Spaces and in no case less than two EV Spaces when the total number of EV Spaces is two or more, install a full circuit with minimum of 40-Amp 208 or 240 Volt capacity, including listed raceway, sufficient electrical panel capacity, overcurrent protection devices, wire, and suitable listed termination point such as a receptacle. The termination point shall be

in close proximity to the proposed EV charger location. Calculations for the number of EV Spaces shall be rounded up to the nearest whole number.

(b) For an additional 10% of EV Spaces (totaling not less than 20% when combined with (a)), install either:

(1) A full circuit with minimum of 40-Amp 208 or 240 Volt capacity, including listed raceway, sufficient electrical panel capacity, overcurrent protection devices, wire, and suitable listed termination point such as a receptacle. OR

(2) A full listed raceway with pull string and sufficient electrical panel capacity for a minimum of 40-Amp 208 or 240 Volt capacity per circuit per EV Space. The raceway shall extend for the complete run from the branch circuit panelboard to a termination point in close proximity to the proposed EV charger location.

(c) For all remaining EV Spaces, electrical engineering design and construction documents shall indicate the raceway termination point to supply an EV charger with a 40-ampere minimum branch circuit. Electrical engineering design and construction documents shall provide information on amperage of future EVSE, raceway method(s), wiring schematics, anticipated EV load management system design(s), and electrical load calculations to verify that the electrical panel service capacity and electrical system, including any on-site distribution transformer(s), can charge all EV Space and EVSEs required by sections (a) and (b) simultaneously at the full rated amperage of the EVSE. An EV load management system may be necessary in order to provide EV charging at EV Spaces required by section (c). Raceways and related components that are planned to be installed underground, enclosed, inaccessible or in concealed areas and spaces shall be installed at the time of original construction.

Note: This section does not require EV chargers or EV load management systems to be installed.

~~*Construction documents shall indicate the raceway termination point and proposed location of future EV Spaces and EV chargers. Construction documents shall also provide information on*~~

~~*amperage of future EVSE, raceway method(s), wiring schematics and electrical load calculations to verify that the electrical panel service capacity and electrical system, including any on-site distribution transformer(s), have sufficient capacity to simultaneously charge all EVs at all required EV spaces at the full rated amperage of the EVSE. Plan design shall be based upon a 40-ampere minimum branch circuit. Raceways and related components that are planned to be installed underground, enclosed, inaccessible or in concealed areas and spaces shall be installed at the time of original construction.*~~

Section 13. The Green Building Code is hereby amended by adding Section 4.106.4.2.4.1, to read as follows:

[Add the following section:]

SEC. 4.106.4.2.4.1. ELECTRIC VEHICLE FAST CHARGING SPACES.

(a) Installation of one Electric Vehicle Fast Charger may reduce the number of EV Spaces required under Section 4.106.4.2.4 (a) and (b) by up to five EV Spaces, provided that the project includes at least one EV Space equipped with a full circuit able to deliver 40-Amp 208 or 240 Volt capacity to the EV Space, including listed raceway, sufficient electrical panel capacity, overcurrent protection devices, wire, and suitable listed termination point such as a receptacle.

The electrical panel board(s) provided at each parking level served by EV Fast Chargers shall have sufficient capacity to supply each Electric Vehicle fast charger with a minimum of 30 kW AC in addition to the capacity to serve any remaining EV Spaces with a minimum of 8-amperes at 208 or 240-volts per EV Space, with a minimum of 40 amperes per circuit.

(b) After the requirements of 4.106.4.2.4(a) and (b) are met, each planned Electric Vehicle Fast Charger may reduce the number of planned EV Spaces required under 4.106.4.2.4(c) by up to five spaces. Electrical engineering design and construction documents shall indicate the raceway termination point and proposed location of future EV fast charger spaces and EV fast chargers. Electrical engineering design and construction documents shall also provide information on amperage.

of EV fast chargers, raceway method(s), wiring schematics, and electrical load calculations to verify that the electrical panel service capacity and electrical system has sufficient capacity to simultaneously operate all installed EV fast chargers at the full rated amperage of the EV fast charger(s) and simultaneously serve any remaining spaces required by 4.106.4.2.4(a) and (b). Raceways and related components that are planned to be installed underground, enclosed, inaccessible, or in concealed areas and spaces shall be installed at the time of original construction.

Section 14. The Green Building Code is hereby amended by revising Section 4.106.4.2.5, to read as follows:

[Revise this section as follows:]

SEC. 4.106.4.2.5. IDENTIFICATION.

The service panel or subpanel circuit directory shall identify the overcurrent protective device space(s) reserved for future EV charging purposes as *"EVSE READY" for full circuits and otherwise* "EV*SE* CAPABLE" in accordance with the California Electrical Code. *The raceway termination location or receptacle shall be permanently and visibly marked as "EVSE READY" for full circuits and otherwise "EVSE CAPABLE," until such time as EVSE are installed.*

Notes:

1. The California Department of Transportation adopts and publishes the "California Manual on Uniform Traffic Control Devices (California MUTCD)" to provide uniform standards and specifications for all official traffic control devices in California. Zero Emission Vehicle Signs and Pavement Markings can be found in the New Policies & Directives Number 13-01. Website: http://www.dot.ca.gov/hq/traffops/policy/13-01.pdf.

2. See Vehicle Code Section 22511 for EV charging space signage in off-street parking facilities and for use of EV charging spaces.

3. The Governor's Office of Planning and Research (OPR) published a "Zero-Emission Vehicle Community Readiness Guidebook" which provides helpful information for local governments, residents and businesses. Website: http://opr.ca.gov/docs/ZEV_Guidebook.pdf.

Section 15. The Green Building Code is hereby amended by adding Section 5.103.3.3, to read as follows:

[Add the following section:]

SEC. 5.103.3.3. ELECTRIC VEHICLE CHARGING.

Section 5.106.5.3 of this chapter shall apply to all newly constructed buildings, and to major alterations to existing Group A, B, I, and M occupancy buildings where electrical service to the building will be upgraded. In major alterations where existing electrical service will not be upgraded, the requirements of Section 5.106.5 (all sections) shall apply to the maximum extent that does not require upgrade to existing service.

Section 16. The Green Building Code is hereby amended by revising Section 5.106.5.3, to read as follows:

[Revise this section as follows:]

SEC. 5.106.5.3. ELECTRIC VEHICLE (EV) CHARGING. ~~*[N]*~~

In new construction and major alterations, 100% of parking spaces provided for all types of parking facilities shall be electric vehicle charging spaces (EV Spaces) capable of supporting future EVSE. Electrical engineering design and construction documents shall indicate the location of all proposed EV spaces. When EVSE is installed, it shall be in accordance with the San Francisco Building Code and the San Francisco Electrical Code.

~~*Construction shall comply with Section 5.106.5.3.1 or Section 5.106.5.3.2 to facilitate future*~~

~~*installation of electric vehicle supply equipment (EVSE). When EVSE(S) is/are installed, it shall be in accordance with the California Building Code, the California Electrical Code, and as follows:*~~

Section 17. The Green Building Code is hereby amended by revising Section 5.106.5.3.1, to read as follows:

[Revise this section as follows:]

SEC. 5.106.5.3.1. SINGLE CHARGING SPACE REQUIREMENTS. ~~*[N]*~~

When a single EV space is required per Section 5.106.5.3.3, install a full circuit with a minimum of 40-Amp 208 or 240 Volt capacity, including listed raceway, sufficient electrical panel capacity, overcurrent protection devices, wire, and suitable listed termination point such as a receptacle. The termination point shall be in close proximity to the proposed EV charger location. The raceway shall not be less than trade size 1 (nominal 1-inch inside diameter). The circuit shall be installed in accordance with the California Electrical Code San Francisco Electrical Code and the San Francisco Building Code.

~~*When only a single charging space is required per Table 5.106.5.3.3, a raceway is required to be installed at the time of construction and shall be installed in accordance with the California Electrical Code. Construction plans and specifications shall include, but are not limited to, the following:*~~

~~*1. The type and location of the EVSE.*~~

~~*2. A listed raceway capable of accommodating a 208 or 240 volt dedicated branch circuit.*~~

~~*3. The raceway shall not be less than trade size 1."*~~

~~*4. The raceway shall originate at a service panel or a subpanel serving the area, and shall terminate in close proximity to the proposed location of the charging equipment and into a listed suitable cabinet, box, enclosure or equivalent.*~~

~~*5. The service panel or subpanel shall have sufficient capacity to accommodate a minimum*~~

~~*40-ampere dedicated branch circuit for the future installation of the EVSE.*~~

Section 18. The Green Building Code is hereby amended by revising Section 5.106.5.3.2, to read as follows:

[Revise this section as follows:]

SEC. 5.106.5.3.2. MULTIPLE CHARGING SPACE REQUIREMENTS. ~~*[N]*~~

(a) For a minimum of 10% of EV Spaces, and in no case less than two EV spaces when the total number of EV Spaces is two or more, install a full circuit with minimum of 40-Amp 208 or 240 Volt capacity, including listed raceway, sufficient electrical panel capacity, overcurrent protection devices, wire, and suitable listed termination point such as a receptacle. The termination point shall be in close proximity to the proposed EV charger location.

(b) For an additional 10% of EV Spaces (total of not less than 20% when combined with (a)), install either:

(1) A full circuit with minimum of 40-Amp 208 or 240 Volt capacity, including listed raceway, sufficient electrical panel capacity, overcurrent protection devices, wire, and suitable listed termination point such as a receptacle; or

(2) A full listed raceway with pull string and sufficient electrical panel capacity for a minimum of 40-Amp 208 or 240 Volt capacity per circuit per EV Space. The raceway shall extend for the complete run from the branch circuit panelboard to a termination point in close proximity to the proposed EV charger location.

(c) For all remaining EV Spaces, electrical engineering design and construction documents shall indicate the raceway termination point to supply an EV charger with a 40-ampere minimum branch circuit. Electrical engineering design and construction documents shall provide information on amperage of future EVSE, raceway method(s), wiring schematics, anticipated EV load management system design(s), and electrical load calculations to verify that the electrical panel service capacity and

electrical system, including any on-site distribution transformer(s), can charge all EV Space and EVSEs required by subsections (a) and (b) simultaneously at the full rated amperage of the EVSE. Installation of an EV load management system is not required, but may be necessary in order to provide EV charging at EV Spaces required by subsection (c). Raceways and related components that are planned to be installed underground, enclosed, inaccessible, or in concealed areas and spaces shall be installed at the time of original construction.

Exceptions.

1. *Where there is no commercial power supply.*
2. *Where there is evidence substantiating that meeting the requirements will alter the local utility infrastructure design requirements directly related to the implementation of this Section may increase the utility side cost to the developer by more than $400 per parking space. In such cases, buildings subject to Section 5.106.5.3.2 shall maximize the number of EV Spaces, up to a maximum utility side cost of $400 per space. Cost shall be determined by dividing the increase in local utility infrastructure cost attributable to compliance with this section by the sum of parking spaces and Electric Vehicle Charging Spaces.*
3. *In major alterations, where there is evidence substantiating that meeting the requirements of this section present an unreasonable hardship, the Director may upon request from the project sponsor consider an appeal to reduce the number of EV Spaces required.*

***Note:** The intent of sizing the panel with a minimum of 8 amperes per EV Space and EVSE is to provide the option to utilize Electric Vehicle Load Management Systems to provide Level 2 EV charging (40 amperes at 208 or 240-volts) at 100% of parking spaces. Eight (8) amperes of capacity per EV Space is sufficient for a listed EV Load Management system to manage the available capacity in a safe manner, such as allocating 36 amperes at 208 or 240 volts to vehicles in 20% of the total number of EV Charging Stations simultaneously, or allocating 8*

amperes to vehicles in 100% of parking spaces, or similar. Given the capacity required by this Section, individual EV chargers may be installed in up to 20% of parking spaces before an EV load management system is necessary.

~~*When multiple charging spaces are required per Table 5.106.5.3.3, raceway(s) is/are required to be installed at the time of construction and shall be installed in accordance with California Electrical Code. Construction plans and specifications shall include, but are not limited to, the following:*~~

~~*1. The type and location of the EVSE.*~~

~~*2. The raceway(s) shall originate at a service panel or a subpanel(s) serving the area, and shall terminate in close proximity to the proposed location of the charging equipment and into listed suitable cabinet(s), box(es), enclosure(s) or equivalent.*~~

~~*3. Plan design shall be based upon 40-ampere minimum branch circuits.*~~

~~*4. Electrical calculations shall substantiate the design of the electrical system, to include the rating of equipment and any on-site distribution transformers and have sufficient capacity to simultaneously charge all required EVs at its full rated amperage.*~~

~~*5. The service panel or subpanel(s) shall have sufficient capacity to accommodate the required number of dedicated branch circuit(s) for circuits for the future installation of the EVSE.*~~

Section 19. The Green Building Code is hereby amended by adding Section 5.106.5.3.2.1, to read as follows:

[Add the following section:]

SEC. 5.106.5.3.2.1. ELECTRIC VEHICLE FAST CHARGING SPACES.

(a) Installation of one Electric Vehicle Fast Charger may reduce the number of EV Spaces required under Section 5.106.5.3.2(a) and (b) by up to 10 EV Spaces, provided that the project includes at least one EV Space equipped with a full circuit able to deliver 40 Amps at 208 or 240 volts to the EV

Space, including listed raceway, sufficient electrical panel capacity, overcurrent protection devices, wire, and suitable listed termination point such as a receptacle.

The electrical panel board(s) provided at each parking level served by EV Fast Chargers shall have sufficient capacity to supply each Electric Vehicle fast charger with a minimum of 30 kW AC in addition to the capacity to serve any remaining EV spaces with a minimum of 8-amperes at 208 or 240 volts per EV Space simultaneously, with a minimum of 40 amperes per circuit.

(b) After the requirements of 5.106.5.3.2(a) and (b) are met, each planned Electric Vehicle Fast Charger may reduce the number of planned EV Spaces required under 5.106.5.3.2(c) by up to 10 spaces. Electrical engineering design and construction documents shall indicate the raceway termination point and proposed location of future EV fast charger spaces and EV fast chargers. Electrical engineering design and construction documents shall also provide information on amperage of EV fast chargers, raceway method(s), wiring schematics. Electrical engineering design and construction documents shall also provide electrical load calculations to verify that the electrical panel service capacity and electrical system has sufficient capacity to simultaneously operate all installed EV fast chargers with the full rated amperage of the EV fast charger(s), and simultaneously serve any remaining EV spaces required by Sections 4.106.4.2.4 (a) and (b). Raceways and related components that are planned to be installed underground, enclosed, inaccessible, or in concealed areas and spaces shall be installed at the time of original construction.

Section 20. The Green Building Code is hereby amended by revising Section 5.106.5.3.3, to read as follows:

[Revise this section as follows:]

SEC. 5.106.5.3.3. EV SPACE SLOPE, DIMENSIONS, AND LOCATION. ~~***EV CHARGING SPACE CALCULATION. [N]***~~

Electrical engineering design and construction documents shall indicate how many accessible

EVCS would be required under Title 24 Chapter 11B Table 11B-228.3.2.1, if applicable, in order to convert all EV spaces required under 5.106.5.3.2 to EVCS. Electrical engineering design and construction documents shall also demonstrate that the facility is designed so that compliance with accessibility standards will be feasible for accessible EV Spaces at the time of EVCS installation. Surface slope for any area designated for accessible EV Spaces shall meet slope requirements in section 11B-812.3 at the time of original building construction and vertical clearance requirements in Section 11B-812-4, if applicable.

***Exception:** Accessibility requirements of Section 5.106.5.3.3 shall not apply to buildings which are not covered under Title 24 Part 2 Chapter 11B. In addition, all applicable exceptions to Chapter 11B shall continue to apply to this section.*

***Note:** Section 5.106.5.3.3, above, requires that the project be prepared to comply with accessibility requirements applicable at the time of EVSE installation. Section 11B-812 of the 2016 California Building Code requires that a facility providing EVCS for public and common use also provide one or more accessibility EVCS as specified in Table 11B-228.3.2.1. Chapter 11B applies to certain facilities including but not limited to public accommodations and publicly funded housing (see section 1.9 of Part 2 of the California Building Code). Section 11B-812.4 requires that "Parking spaces, access aisles and vehicular routes serving them shall provide a vertical clearance of 98 inches (2489 mm) minimum." Section 11B-812.3 requires that parking spaces and access aisles meet maximum slope requirements of 1 unit vertical in 48 units horizontal (2.083% slope) in any direction at the time of new building construction or renovation. Section 11B-812.5 contains accessible route requirements.*

~~*Table 5.106.5.3.3 shall be used to determine if single or multiple charging space requirements apply for the future installation of EVSE.*~~

~~***Exceptions:** On a case-by-case basis where the local enforcing agency has determined EV charging and infrastructure is not feasible based upon one or more of the following*~~

~~*conditions:*~~

~~*1. Where there is insufficient electrical supply.*~~

~~*2. Where there is evidence suitable to the local enforcing agency substantiating that additional local utility infrastructure design requirements, directly related to the implementation of Section 5.106.5.3, may adversely impact the construction cost of the project.*~~

Section 21. The Green Building Code is hereby amended by revising Section 5.106.5.3.4, to read as follows:

[Revise this section as follows:]

SEC. 5.106.5.3.4. IDENTIFICATION. ~~*[N]*~~

The service panel or subpanel(s) circuit directory shall identify the reserved overcurrent protective device space(s) for future EV charging as *"EVSE READY" for full circuits and otherwise* "EV*SE* CAPABLE." The raceway termination location *or receptacle* shall be permanently and visibly marked as *"EVSE READY" for full circuits and otherwise* "EV*SE* CAPABLE" *until such time as EVSE are installed.*

Section 22. The Green Building Code is hereby amended by revising Section 5.106.5.3.5, to read as follows:

[Revise this section as follows:]

SEC. 5.106.5.3.5. ~~*[N]*~~

Future charging spaces qualify as designated parking as described in Section 5.106.5.2, Designated parking for clean air vehicles.

Notes:

1. The California Department of Transportation adopts and publishes the California Manual on Uniform Traffic Control Devices (California MUTCD) to provide

uniform standards and specifications for all official traffic control devices in California. Zero Emission Vehicle Signs and Pavement Markings can be found in the New Policies & Directives number 13-01. www.dot.ca.gov/hq/traffops/policy/13-01.pdf.

2. See Vehicle Code Section 22511 for EV charging spaces signage in off-street parking facilities and for use of EV charging spaces.

3. The Governor's Office of Planning and Research published a Zero-Emission Vehicle Community Readiness Guidebook which provides helpful information for local governments, residents and businesses. www.opr.ca.gov/docs/ZEV_Guidebook.pdf.

Section 23. Effective and Operative Dates. This ordinance shall become effective 30 days after enactment. Enactment occurs when the Mayor signs the ordinance, the Mayor returns the ordinance unsigned or does not sign the ordinance within ten days of receiving it, or the Board of Supervisors overrides the Mayor's veto of the ordinance. The provisions of this ordinance shall become operative on May 1, 2017.

Section 24. Scope of Ordinance. In enacting this ordinance, the Board of Supervisors intends to amend only those words, phrases, paragraphs, subsections, sections, articles, numbers, punctuation marks, charts, diagrams, or any other constituent parts of the Municipal Code that are explicitly shown in this ordinance as additions, deletions, Board amendment additions, and Board amendment deletions in accordance with the "Note" that appears under the official title of the ordinance.

Section 25. Directions to Clerk. The Clerk of the Board of Supervisors is hereby directed to forward a copy of this ordinance to the California Building Standards Commission upon final passage.

APPROVED AS TO FORM:
DENNIS J. HERRERA, City Attorney

By: _____
NEHA GUPTA
Deputy City Attorney

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