

BOARD of SUPERVISORS



City Hall
1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco 94102-4689
Tel. No. 554-5184
Fax No. 554-5163
TDD/TTY No. 554-5227

MEMORANDUM

TO: Tom Hui, Director, Department of Building Inspection
Sonya Harris, Secretary, Building Inspection Commission

FROM: *al for* Alisa Somera, Legislative Deputy Director
Land Use and Transportation Committee

DATE: March 7, 2017

SUBJECT: LEGISLATION INTRODUCED

The Board of Supervisors' Land Use and Transportation Committee has received the following legislation, introduced by Mayor Lee on February 28, 2017:

File No. 170202

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.

The proposed ordinance is being transmitted pursuant to Charter, Section D3.750-5, for public hearing and recommendation. It is pending before the Land Use and Transportation Committee and will be scheduled for hearing upon receipt of your response.

Please forward me the Commission's recommendation and reports at the Board of Supervisors, City Hall, Room 244, 1 Dr. Carlton B. Goodlett Place, San Francisco, CA 94102 or by email at: alisa.somera@sfgov.org.

c: William Strawn, Department of Building Inspection
Carolyn Jayin, Department of Building Inspection

[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.

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

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

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

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

16 (2) San Francisco is already experiencing the repercussions of excessive CO₂
17 emissions as rising sea levels threaten the City's shoreline and infrastructure, have caused
18 significant erosion, have increased impacts to infrastructure during extreme tides, and have
19 caused the City to expend funds to modify the sewer system.

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

22 (4) Increasing the adoption and use of electric vehicles will help San Francisco
23 meet its goals under Ordinance No. 81-08, to reduce greenhouse gas emissions citywide to
24 40% below 1990 levels by 2025 and 80% by 2050.

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

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

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

11
12 Section 3. The Green Building Code is hereby amended by revising Section 202, to
13 read as follows:

14 *[Add and amend the following definitions:]*

15 **SEC. 202. DEFINITIONS.**

16 * * * *

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

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

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

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

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

9 * * * *

10
11 Section 4. The Green Building Code is hereby amended by revising Section 302.1, to
12 read as follows:

13 *[Revise this section as follows:]*

14 **SEC. 302.1. MIXED OCCUPANCY BUILDINGS.**

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

21
22 Section 5. The Green Building Code is hereby amended by adding Section 4.103.3.3,
23 to read as follows:

24 *[Add the following section:]*

25 **SEC. 4.103.3.3. ELECTRIC VEHICLE CHARGING.**

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

6
7
8 Section 6. The Green Building Code is hereby amended by revising Section 4.106.4,
9 to read as follows:

10 *[Revise this section as follows:]*

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

13 New construction and major alterations shall comply with Sections 4.106.4.1 and
14 4.106.4.2 to provide electrical capacity and infrastructure to facilitate future installation and use of
15 EV Chargers, such that the project will be capable of providing electric vehicle charging services at
16 100% of parking spaces. Electric Vehicle Supply Equipment (EVSE) shall be installed in accor-
17 dance with the ~~California Electrical Code~~ California Electrical Code Article 625, and the California
18 Energy Code, Subchapter 4, Section 130.5, and as follows.

19 Exceptions:

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

- 23 1. Where there is no commercial power supply.
- 24 2. Where there is evidence substantiating that meeting the requirements will
25 alter the local utility infrastructure design requirements on the utility side of the meter so

1 as to increase the utility side cost to the homeowner or the developer by more than
2 \$400.00 per dwelling unit parking space. In such cases, buildings subject to Section 4.106.4
3 shall maximize the number of EV Spaces, up to a utility side cost of a maximum of \$400 per
4 space. Cost shall be determined by dividing the increase in local utility infrastructure cost
5 attributable to compliance with this section by the sum of parking spaces and Electric Vehicle
6 Charging Spaces.

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

10
11 Section 7. The Green Building Code is hereby amended by revising
12 Sections 4.106.4.1 and 4.106.4.1.1, to read as follows:

13 *[Revise this section as follows:]*

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

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

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

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

3 **SEC. 4.106.4.1.1. IDENTIFICATION.**

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

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

11 *[Revise this section as follows:]*

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

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

23 **Note:** Electrical engineering design and cConstruction documents are intended to
24 demonstrate the project's capability and capacity for facilitating future EV charging.
25 ~~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

1 Building Code, Chapter 2, to the building.

2
3 Section 10. The Green Building Code is hereby amended by revising
4 Section 4.106.4.2.2, to read as follows:

5 *[Revise this section as follows:]*

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

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

- 9 1. The minimum length of each EV space shall be 18 feet (5486 mm).
10 2. The minimum width of each EV space shall be 9 feet (2743 mm).
11 3. One in every 25 EV spaces, but not less than one, shall also have an 8-foot (2438
12 mm) wide minimum aisle. A 5-foot (1524 mm) wide minimum aisle shall be permitted
13 provided the minimum width of the EV space is 12 feet (3658 mm).

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

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

22 *4. Accessible spaces must meet the dimensions specified above, whichever would result in a*
23 *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

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

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

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

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

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

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

24 Construction documents shall indicate the raceway termination point and proposed location of
25 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

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

7
8 Section 14. The Green Building Code is hereby amended by revising
9 Section 4.106.4.2.5, to read as follows:

10 *[Revise this section as follows:]*

11 **SEC. 4.106.4.2.5. IDENTIFICATION.**

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

17 **Notes:**

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

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

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

5
6 Section 15. The Green Building Code is hereby amended by adding Section 5.103.3.3,
7 to read as follows:

8 *[Add the following section:]*

9 **SEC. 5.103.3.3. ELECTRIC VEHICLE CHARGING.**

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

15
16 Section 16. The Green Building Code is hereby amended by revising
17 Section 5.106.5.3, to read as follows:

18 *[Revise this section as follows:]*

19 **SEC. 5.106.5.3. ELECTRIC VEHICLE (EV) CHARGING. ~~EV~~**

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

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

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

3
4 Section 17. The Green Building Code is hereby amended by revising
5 Section 5.106.5.3.1, to read as follows:

6 *[Revise this section as follows:]*

7 **SEC. 5.106.5.3.1. SINGLE CHARGING SPACE REQUIREMENTS. ~~AN~~**

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

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

- 19 ~~1. The type and location of the EVSE.~~
20 ~~2. A listed raceway capable of accommodating a 208 or 240-volt dedicated branch circuit.~~
21 ~~3. The raceway shall not be less than trade size 1."~~
22 ~~4. The raceway shall originate at a service panel or a subpanel serving the area, and shall~~
23 ~~terminate in close proximity to the proposed location of the charging equipment and into a listed~~
24 ~~suitable cabinet, box, enclosure or equivalent.~~
25 ~~5. The service panel or subpanel shall have sufficient capacity to accommodate a minimum~~

1 ~~40-ampere dedicated branch circuit for the future installation of the EVSE.~~

2
3 Section 18. The Green Building Code is hereby amended by revising
4 Section 5.106.5.3.2, to read as follows:

5 *[Revise this section as follows:]*

6 **SEC. 5.106.5.3.2. MULTIPLE CHARGING SPACE REQUIREMENTS. ~~AN~~**

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

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

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

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

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

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

7
8 Exceptions.

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

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

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

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

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

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

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

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

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

18
19 Section 19. The Green Building Code is hereby amended by adding
20 Section 5.106.5.3.2.1, to read as follows:

21 [Add the following section:]

22 **SEC. 5.106.5.3.2.1. ELECTRIC VEHICLE FAST CHARGING SPACES.**

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

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

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

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

19
20 Section 20. The Green Building Code is hereby amended by revising
21 Section 5.106.5.3.3, to read as follows:

22 *[Revise this section as follows:]*

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

25 Electrical engineering design and construction documents shall indicate how many accessible

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

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

11 **Note:** Section 5.106.5.3.3, above, requires that the project be prepared to comply with
12 accessibility requirements applicable at the time of EVSE installation. Section 11B-812 of the
13 2016 California Building Code requires that a facility providing EVCS for public and common
14 use also provide one or more accessibility EVCS as specified in Table 11B-228.3.2.1.
15 Chapter 11B applies to certain facilities including but not limited to public accommodations
16 and publicly funded housing (see section 1.9 of Part 2 of the California Building Code).
17 Section 11B-812.4 requires that "Parking spaces, access aisles and vehicular routes serving
18 them shall provide a vertical clearance of 98 inches (2489 mm) minimum." Section 11B-812.3
19 requires that parking spaces and access aisles meet maximum slope requirements of 1 unit
20 vertical in 48 units horizontal (2.083% slope) in any direction at the time of new building
21 construction or renovation. Section 11B-812.5 contains accessible route requirements.
22 Table 5.106.5.3.3 shall be used to determine if single or multiple charging space requirements
23 apply for the future installation of EVSE.

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

1 ~~conditions:~~

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

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

6
7 Section 21. The Green Building Code is hereby amended by revising
8 Section 5.106.5.3.4, to read as follows:

9 *[Revise this section as follows:]*

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

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

16
17 Section 22. The Green Building Code is hereby amended by revising
18 Section 5.106.5.3.5, to read as follows:

19 *[Revise this section as follows:]*

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

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

23 **Notes:**

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

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

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

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

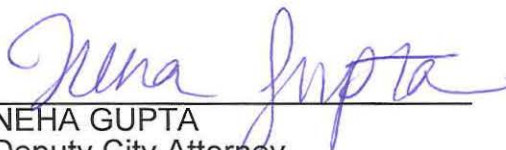
9
10 Section 23. Effective and Operative Dates. This ordinance shall become effective 30
11 days after enactment. Enactment occurs when the Mayor signs the ordinance, the Mayor
12 returns the ordinance unsigned or does not sign the ordinance within ten days of receiving it,
13 or the Board of Supervisors overrides the Mayor's veto of the ordinance. The provisions of
14 this ordinance shall become operative on May 1, 2017.

15
16 Section 24. Scope of Ordinance. In enacting this ordinance, the Board of Supervisors
17 intends to amend only those words, phrases, paragraphs, subsections, sections, articles,
18 numbers, punctuation marks, charts, diagrams, or any other constituent parts of the Municipal
19 Code that are explicitly shown in this ordinance as additions, deletions, Board amendment
20 additions, and Board amendment deletions in accordance with the "Note" that appears under
21 the official title of the ordinance.

1 Section 25. Directions to Clerk. The Clerk of the Board of Supervisors is hereby
2 directed to forward a copy of this ordinance to the California Building Standards Commission
3 upon final passage.
4

5
6 APPROVED AS TO FORM:
7 DENNIS J. HERRERA, City Attorney

8
9 By:


NEHA GUPTA
Deputy City Attorney

10
11
12
13 n:\legana\as2017\1700264\01174336.docx
14
15
16
17
18
19
20
21
22
23
24
25

LEGISLATIVE DIGEST

[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.

Existing Law

The relevant provisions of the Green Building Code set forth requirements for installation of electric vehicle ("EV") charging infrastructure in new construction.

Amendments to Current Law

This proposal adds and amends certain definitions as follows. It defines "Electric Vehicle Charging Space" as a space intended for installation of EV charging equipment and charging of electric vehicles, and adds that this chapter does not require an EV Space to be reserved exclusively for EV charging.

It also amends the definition of "Electric Vehicle Charging Station," currently provided as one or more electric vehicle charging spaces served by electric vehicle charger(s) or other charging equipment allowing charging of electric vehicles, to comply with accessibility requirements. The proposed addition to the definition specifies that when the permitted length of time a vehicle may occupy an EV charging station differs from the permitted duration of stay in publicly accessible parking spaces in the same parking area, EV charging stations are not considered parking spaces. When the permitted duration of stay in a space served by EV charger(s) is the same as other publicly accessible parking spaces in the same parking area, EV charging stations may be considered parking spaces.

The proposal adds a definition for "Electric Vehicle Fast Charger," defining this as 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.

It also adds a definition for "Electric Vehicle Load Management System," defining this as an electronic system designed to allocate charging capacity among EV chargers.

Existing law requires new construction to include electrical capacity to support future installation of EV chargers. This proposal requires new construction as well as those Group R occupancies undergoing major alterations that involve electrical service upgrades to include electrical capacity and infrastructure, to facilitate future installation and use of EV Chargers

such that the building will be capable of providing electric vehicle charging services at 100% of parking spaces. This requirement is subject to certain exceptions. Existing exceptions include where there is no commercial power supply, and where the requirements would impose costs higher than \$400 per dwelling unit on the owner or developer. This proposal modifies this cost-based exception to apply for instances where the requirements would impose costs higher than \$400 per parking space. It would also add an exception for instances where a sponsor to a major alterations project can demonstrate that the requirements impose unreasonable hardship.

Existing law applicable to one and two-family dwellings and town-houses with attached private garages specifies that for each dwelling unit, there must be installed a listed raceway to accommodate a dedicated 208/240-volt branch circuit. This proposal requires one and two-family dwellings and town-houses with attached or adjacent private garages to install for each parking space a 40-Amp 208 or 240-volt branch circuit, including raceway, electrical panel capacity, overprotection devices, wire and termination point such as a receptacle.

For new multifamily dwellings, existing law requires that where 17 or more multifamily dwelling units are built on a site, 3% of spaces (and at least 1 space) must be capable of supporting future EV charging. This proposal requires that where 3 or more multifamily dwelling units are constructed on a building site or undergo major alterations, 100% of parking spaces must be capable of supporting future EV charging. The proposal further specifies the type of electrical infrastructure that must be installed to meet this requirement, and clarifies that this provision does not require that EV chargers be installed; rather, it provides the option to use Electric Vehicle Load Management Systems to provide Level 2 EV charging (40 amperes at 208 or 240 volts) at 100% percent of parking spaces.

Existing law requires that EV charging space locations be designated on construction documents, and that at least one EV space be located in common use areas available for use by all residents. It further requires that the EV space be located either adjacent to an accessible parking space, or on an accessible route. This proposal modifies this requirement for a common use EV space to apply only where parking spaces are provided for public use or common use by residents.

Existing law specifies that EV charging space dimensions must be at least 18 feet long and 9 feet wide, and that at least 1 of every 25 (and at least 1) should have a minimum 8-foot wide aisle. Such an aisle can be minimum 5 feet wide if the EV space width is 12 feet. Existing law also specifies that this EV space and aisle must have no greater than a 2.083% slope in any direction.

This proposal adds to this provision that notwithstanding any other 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.

Where a single EV charging space is required at residential building sites, existing law requires that a raceway be installed at the time of construction and comply with certain listed specifications. This proposal modifies these specifications to require installation of 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.

Where multiple EV spaces are required at residential building sites, existing law provides that construction documents should indicate the raceway termination point and proposed location of future EV spaces and chargers; provide information on amperage of future EV supply equipment, raceway method(s), wiring schematics, anticipated EV load management system design(s), and electrical load calculations; and base plan design on a 40-ampere minimum branch circuit.

This proposal would add to the requirements for instances where multiple EV spaces are required at residential building sites to specify that for a minimum of 10% percent of EV spaces, and in no case less than 2 spaces when the total number of EV spaces is 2 or more, there must be installed 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. For an additional 10% of EV spaces, there must be installed either a full circuit with minimum of 40-Amp 208 or 240 Volt capacity, or 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 proposal specifies that this section does not require EV chargers or EV load management systems to be installed.

This proposal adds a new provision regarding EV fast charging spaces at residential building sites. It provides that installation of an EV fast charger may reduce the number of EV spaces required under other provisions by up to 5 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. The electrical panel board(s) provided at each parking level served by EV fast chargers shall have sufficient capacity to supply each EV 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.

For nonresidential building sites, this proposal requires that 100% of parking spaces provided for all types of parking facilities shall be EV spaces capable of supporting future EV charging equipment.

Where a single EV charging space is required at nonresidential building sites, existing law requires that a raceway be installed at the time of construction and comply with certain listed specifications. This proposal modifies these specifications to require installation of 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.

Where multiple EV spaces are required at nonresidential building sites, existing law provides that raceway installation take place at the time of construction, and construction documents should contain listed specifications.

Under this proposal, where multiple EV spaces are required at nonresidential building sites, a minimum of 10% of spaces, and no less than 2 when there are 2 or more, must include 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. For an additional 10% of spaces, there must be installed either 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 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. This proposal specifies that 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, along with several other requirements. This proposal provides for several exceptions to these requirements, including where there is no commercial power supply; where implementation would generate for the developer a utility side cost of more than \$400 per parking space; and where the project sponsor demonstrates unreasonable hardship in a major alteration.

This proposal adds a provision regarding EV fast charging spaces for nonresidential building sites. It states that installation of 1 EV fast charger may reduce the number of otherwise required EV spaces by up to 10, 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.

Existing law provides that whether single or multiple EV charging space requirements apply is determined according to Table 5.106.5.3.3, subject to certain exceptions. This proposal deletes this provision, inserts requirements that construction documents indicate how many accessible EV charging stations are required according to Title 24 Chapter 11B Table 11B-228.3.2.1, and sets forth additional accessibility requirements.

n:\legana\as2017\1700264\01174351.docx