



**ELECTRIC VEHICLE
READINESS POLICY**
For new developments



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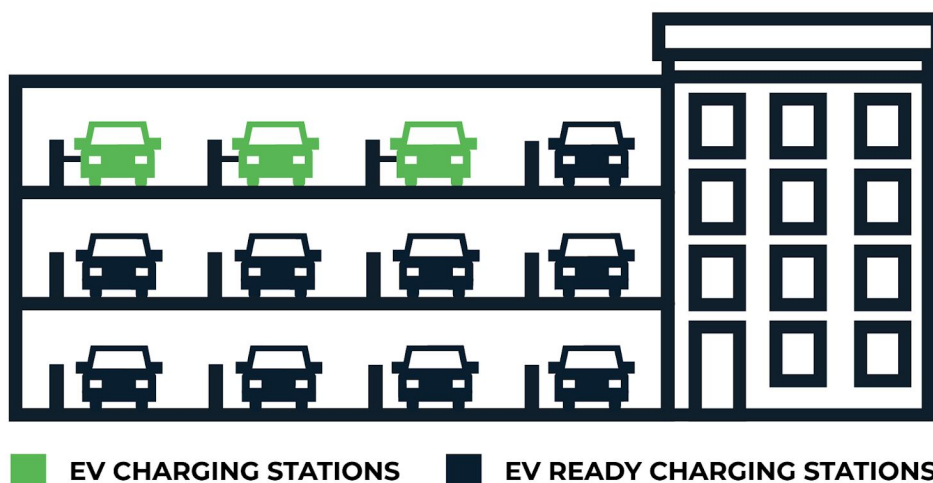
1. POLICY OVERVIEW

I. PURPOSE AND INTENT

Electric vehicle sales in Massachusetts have grown rapidly, nearly doubling between 2017 and 2018 alone. This growth is expected to continue as new makes and models come to market, offering increasingly affordable options to consumers. This growth is fueled by state and federal incentives as well as ongoing reductions in battery costs. As the number of electric vehicles on the road increases, the demand for electric vehicle charging infrastructure will grow.

The City of Boston has a goal of becoming carbon neutral by 2050. Transportation accounts for nearly a third of Boston's total GHG emissions, 65 percent of which comes from personal vehicles. The City of Boston's comprehensive transportation plan, Go Boston 2030, aims to address this by shifting travelers away from personal vehicle modes to public transit, walking and biking, and shared trips. To reach carbon neutrality, in addition to massive mode shift away from driving alone, any remaining vehicles on the road will need to be zero-emission vehicles.

This document provides guidance on the requirement that new developments that trigger the Transportation Access Plan Agreement (TAPA) process or that are located within a Parking Freeze zone, shall have 25% of parking spaces be EVSE-Installed; and the remaining 75% of parking spaces shall be EV-Ready for future installation, to the maximum extent



Large project review developments must equip 25% of their total parking spaces to be EVSE (electric vehicle supply equipment) installed and the remaining 75% of the total spaces to be EV (electric vehicle) ready.

practicable. This policy applies to any Article 80 development that receives Boston Planning and Development Agency Board approval after March 7, 2019 and to any development that submits a parking freeze permit application to the Air Pollution Control Commission after March 20, 2019.



II. DEFINITIONS

Electric Vehicle (EV): Any vehicle that is licensed and registered for operation on public and private highways, roads, and streets and that operates exclusively on electrical energy from an off-board source that is stored in the vehicle's batteries, producing zero tailpipe emissions or pollution when stationary or operating.

Plug-In Hybrid Electric Vehicle (PHEV): A hybrid electric vehicle whose battery can be recharged by plugging it into an external source of electric power, as well as by its on-board engine and generator.

Electric Vehicle Supply Equipment (EVSE): Equipment for the purpose of transferring electric energy to a battery or other energy storage device in an electric vehicle. There are 3 different standardized indicators of electrical power and voltage, at which an electric vehicle's battery is recharged. The terms Level 1, Level 2, and Direct Current Fast Charging are the most common charging levels. The charging levels include the following specifications:

1. Level 1 is considered slow charging and operates on a 15 to 20 amp breaker. The voltage is a single phase 120 volt AC branch circuit. Approved Level 1 connectors include standard 120V grounded outlets (NEMA 5-15, 5-20, or 5-30) and SAE J1772.
 - a. Should developers choose to install Level 1 Chargers to meet the EVSE-Installed requirements, the chargers must be assigned and have restricted access to specific persons, unless in Office Zoning.
 - b. Level 1 EVSE are only permitted in Residential and Office Zoning.
2. Level 2 is considered medium charging and operates on a 40 to 50 amp breaker on a single phase 208/240 volt AC circuit. Approved Level 2 connectors include SAE J1772 EV plug. However, the installation of other connector types in addition to the required 25% EVSE-Installed requirement is not restricted.
 - a. Parking spaces equipped with Level 2 chargers in order to meet the 25% EVSE-Installed requirement, or in excess to the requirement, do not have to be designated and restricted for EV Charging purposes.
 - b. Level 2 EVSE shall be equipped with cellular phone service, wired or wireless communications.
 - c. Level 2 EVSE are permitted in any zoning district.
 - d. Level 2 EVSE can have multiple connectors. It is permissible to serve up to two spaces with one Level 2 EVSE, but each associated connector must be able to reach the individual parking space.
3. DCFC is considered fast or rapid charging. DCFC operates on a 100 amp or higher breaker on a 480 volt three phase AC with special grounding equipment. DCFC stations are typically characterized by industrial grade electrical outlets that allow for faster recharging of electric vehicles. For fast charging, the CHAdeMO and SAE Combo (also called CCS for "Combo Charging System") are the approved connector types. Other DCFC connector types will not be considered for meeting the 25% EVSE-Installed requirement. However, the installation of



other connector types in addition to the required 25% EVSE-Installed requirement is not restricted.

- a. Where parking spaces are designated and equipped with DCFC, to meet the 25% EVSE-Installed requirements, such spaces should be for the exclusive purpose of electric vehicle charging. DCFC installed to meet the EVSE-Installed requirements must have a system in place to ensure turnover rates of one (1) hour.
- b. DCFC EVSE shall be equipped with cellular phone service, wired or wireless communications.
- c. DCFC EVSE can have multiple connectors. It is permissible to serve up to two parking spaces with one DCFC EVSE, but each associated connector must be able to reach the individual parking space.

EV Inlet: The EV inlet is located on the EV and consists of an electrical connection port that, when combined with the connector, can provide conductive charging and information exchange.

Connector: A connector is a device that, by insertion into an EV inlet, establishes an electrical connection to the EV for the purpose of information exchange and charging.

EV-Ready EV-Ready shall mean providing raceway to every parking space, adequate space in the electrical panel and space for additional transformer capacity to accommodate the future installation of the transformer, if necessary, and the associated Level 2 EVSE. The City approved EV Requirement Equivalent Calculator must be used if chargers other than Level 2 Chargers are planned to be installed in the future to meet with EV-Ready Requirements.

EVSE-Installed: "EVSE-Installed" shall mean an installed Level 2 EVSE. The City approved EV Requirement Equivalent Calculator must be used if chargers other than Level 2 Chargers are installed to meet the EVSE-Installed Requirement.

Non-Electric Vehicle: Any vehicle that does not meet the definition of a Plug-In Hybrid Vehicle, or Electric Vehicle.

III. ACRONYMS

ADA: Americans with Disabilities Act

CSO: Car Share Operator

CCS: Combo Charging System

DCFC: Direct Current Fast Charging

EV: Electric Vehicle

EVSE: Electric Vehicle Supply Equipment

FEMA: Federal Emergency Management Association

PHEV: Plug-In Hybrid Electric Vehicle

NEMA: National Electrical Manufacturers Association

NFPA: National Fire Protection Agency



SAE: Society of Automotive Engineers
TAPA: Transportation Access Plan Agreement
UL: Underwriters Laboratories

2. REQUIREMENTS

I. EV POLICY OVERVIEW

All new development projects that require the Boston Transportation Department's TAPA approval and/or the [Article 80](#) Large Project Review must equip 25% of their total parking spaces to be EVSE-Installed and the remaining 75% of the total spaces to be EV-Ready. Calculated spaces shall be rounded up to the nearest whole number. Parking spots required to meet this policy are those that are associated with the development, even if those spaces are in a common garage that shares parking spaces with an unassociated development. To meet these requirements a development project must be designed to meet the standards detailed below.

The City of Boston will release an electric vehicle adoption threshold by the end of 2020 that will determine when additional EVSE will be required beyond the 25% to utilize the EV-Ready spaces. The threshold will rely on industry standard local EV adoption data, and federal guidance on ratios of EV infrastructure to vehicles. If local data is not available, state data will be utilized. The City will release an annual update on the market threshold.

A detailed strategy plan must be submitted with the TAPA to explain how the developer will convert EV-Ready Spaces to be EVSE-Installed when notified by the City that adoption rates have passed the threshold. The strategy plan must detail the type, location, and electrical plan for EVSE that will be installed to meet future EVSE requirements, up to 100% EVSE-Installed.

II. EVSE-INSTALLED REQUIREMENTS & EQUIVALENCE

EVSE-Installed requirements are as detailed:

- (a) For all new developments requiring TAPA or Article 80 review, 25% of all parking spaces in parking areas shall be EVSE-Installed, meaning each parking space must be equipped with functioning Level 2 Chargers, or the equivalent thereof must be provided. The City approved EV Requirement Equivalent Calculator must be used if chargers other than Level 2 Chargers are installed.

All required chargers must have the approved connector types, as determined by Section 3. Chargers with unapproved connector types will not count towards the 25% EVSE-Installed requirement.



The policy allows for flexibility by allowing an EVSE-Installed Requirement Equivalence. Each parking spot is equal to one point and may be offset by Level 1 Chargers, Level 2 Chargers, DCFC - 50kw, DCFC - 125-150kw, EV Carshare, and Electric Bike Parking amenities. Level 2 EVSE is the baseline charger for this weighted ratio, and is equal to one point per connector, which is consistent with existing EV Ordinances in other jurisdictions. This policy and point system weights various charger types to ensure that the same number of EVs are served per unit of time as Level 2 EVSE. The points awarded to different levels of EVSE are based on nominal power delivery ratings. The EV Car Share and Electric Bike Parking weight is given based off of emissions reduced, and the reduced need for car ownership.

Level 2 EVSE and DCFC can have more than one connector. It is possible to serve more than one parking spaces with a Level 2 EVSE or DCFC EVSE that has more than one connector. For example, if a developer installs one Level 2 EVSE with two connectors, and so long as the connectors can adequately reach 1 parking space each, the number of points earned is 2.

If the development includes residential or office space, the equivalence for Level 1 Chargers must be applied for residential on a one-to-one ratio to the number of units in the development or by a ratio of square footage of office space that proportionally offsets the 25% requirement. For example, if a development is 100,000 square feet, and 50,000 square feet is dedicated to office space, the development may offset half of their 25% EVSE-Installed required points, or 12.5%.

The chart below details the equivalence options and their associated weighted points to support developers in determining the EVSE-Installed Requirement Equivalence. As technology changes additional equivalence options may be considered and potentially added to the options available.



EVSE-Installed Equivalence Chart

CATEGORY / NAME / OPTIONS	WEIGHTED POINTS (PER MITIGATION MEASURE)	RESTRICTION/RANGE
LEVEL 1 CHARGER	1	Only land uses classified as Residential and/or Office may offset with this option. Parking spaces must be assigned for residential.
LEVEL 2 CHARGER	1	
DCFC - 50KW	8	
DCFC - 125-150KW	24	
EV CARSHARE	19	
ELECTRIC BIKE PARKING	0.50	Maximum of 5 points.

A. Electric Bike Parking Requirements

If the developer chooses to install EV bike parking as an equivalence option, the developer must provide an easily accessible electrical outlet at a ratio of one (1) standard wall outlet for two (2) bike parking spaces.

To claim .50 equivalence points, two (2) bikes must be served by one (1) standard wall outlet and with secure bike parking amenities. This option is available to all permit types. Outlets in excess of the requirement are permitted.

All provided bike parking must comply with City of Boston Bike Parking Guidelines. Outlets must be sited no more than 4 feet from the center of the bike space the outlet is intended to serve. Approved outlet types include standard 120V grounded outlets NEMA 5-15, 5-20, or 5-30.



B. EV Car Share Requirements

Developers are permitted to install EV Car Share as an equivalence option.

The baseline requirements for both the TDM Point System and EV Car Share requirements are one (1) Car Share vehicle each. Baseline required EV Car Share installed to meet the EVSE-Installed requirements are independent of the baseline TDM Point System Car Share requirements and cannot be double counted. EV Car Share vehicles in excess of the baseline may support further TDM Point System requirements. Non-electric Car Share vehicles in excess of the baseline TDM Point System requirement do not fulfill EV Car Share requirements.

Car Share is defined by a vehicle that is only available to members by reservation on an hourly basis, or in smaller intervals, and at rates that vary by time or by time and distance. Car Share vehicles are available to members at an unstaffed self-service location and available for pick-up by members on a twenty-four hour, seven-days per week basis without assistance or key exchanges or hand-offs with owner, operator, lot, stations or garage or any other paid or contracted personnel. Car Share Operators (CSOs) shall be available by phone to the City to resolve inquiries from 8am-6pm Monday through Friday.

To claim nineteen (19) equivalence points, one parking spot must be designated with one (1) EV Car Share available for reservation. The parking space must be equipped with a Level 2 Charger or higher. Each additional EV Car Share space is worth 19 equivalence points.

A charger must be installed to support the EV Car Share vehicle. If the charger is a dual connector Level 2 unit, there are two points associated with the charger: one point is associated with the nineteen (19) points received for the car share and the other point may offset the total EVSE-Installed point requirements.

Personal vehicles, privately owned, or privately leased vehicles are acceptable for the EV Car Share fleet so long as they meet the definition of Car Share as detailed above.

The EV Car Share vehicle and service must be operational for at least 75% of the year. Third party reporting is required annually. EV Car Share that is not operational for at least 75% of the year shall be considered to have been removed from service and will not count towards the 25% EVSE-Installed requirement. The failure to maintain the required number of EV Car Share vehicles shall be cause for additional installation of EVSE or replacement of EV Car Share vehicles in order to meet the requirements.



III. EV-READY REQUIREMENTS

EV-Ready requirements are as detailed:

- (a) For all new developments requiring TAPA or Article 80 review 75% of their parking spaces must be EV-Ready for the installation of Level 2 Chargers or equivalent service. The City approved EV Requirement Equivalent Calculator must be used if chargers other than Level 2 Chargers are planned to be installed in the future.
- (b) EV-Ready requires raceways, adequate space in the electrical panel, and sufficient space within the electrical equipment room to accommodate future additional electrical capacity to install EVSE in 100% of parking spaces or equivalence thereof.
- (c) Raceways must be continuous from the branch circuit/feeder panel location and end at a point allowing convenient future installation of and access to EVSE. The raceway shall be sized and installed per the National Electrical Code; however, in no case shall the EVSE infrastructure be less than 1" (one inch) in size. The EVSE infrastructure raceway shall include a pull rope or line installed for future conductor installation, with the raceway sealed and labeled as "EV-Ready" for future use.
- (d) The electrical equipment room must have a dedicated space for the future installation of electrical equipment to serve the EVSE. This space shall be identified on all construction documents submitted for review, and must be in compliance with the National Electrical Code prescriptive requirements. The space shall not be used for any other permanent purpose, so as not to restrict future installation of electrical equipment.
- (e) Site design and plans must include the location(s) and type of raceway method(s), wiring schematics (if any), and electrical calculations to verify that the electrical system has sufficient capacity to simultaneously support all future EVSE.
- (f) Raceway shall be wired through the ceiling if the site is located within the flood zone. Evaluate flood risk using Boston Planning and Development Agency's "Climate Resilience Layer" in the [Zoning Viewer](#).



The following chart details the weighted points of each mitigation measure to support developers in determining the EV-Ready Requirement Equivalence.

EV-Ready Equivalence Chart

CATEGORY / NAME OPTIONS	WEIGHTED POINTS (PER MITIGATION MEASURE)	RESTRICTION/RANGE
LEVEL 1 CHARGER	1	Only residential and/or Office may offset with this option. Parking spaces must be assigned if Residential.
LEVEL 2 CHARGER	1	
DCFC - 50KW	8	
DCFC -125-150KW	24	

EV Car Share and Electric Bike Parking are not options for the EV Ready Requirement. However, planning for EV Car Share and/or Electric Bike Parking can be accomplished by indicating the associated charger type.

3. OPERATION AND DESIGN

I. OPERATION AND MAINTENANCE

Developers are not restricted from collecting a service fee for the use of an EVSE.

Any EVSE must be operational for at least 75% of the year. Annual reporting by a third party is required. Any EVSE that is non operational for at least 75% of the year shall be considered to have been removed from service. The failure to maintain the required number of EVSE shall be cause for additional installation or replacement of EVSE in order to meet the requirements.

II. REQUIRED NOTICES

The following information shall be posted at all EVSE:

1. Voltage and amperage levels;
2. Hour of operations if time limits or tow away provisions are to be enforced;
3. Usage fees;
4. Safety information;



5. Contact information for reporting when the equipment is not operating or other problems. Contact information must contain a service phone number.

III. SIGNAGE

Approved General Service Signs

General Service signs are intended to provide guidance to the location of the charging station and should be installed at a suitable distance in advance of the turn-off or intersecting roadway, and at the charging station.

Signage shall be placed at the parking entrance notifying the presence of EVSE. The City of Boston's Wayfinding Logo sign shall be used for General Service EVSE signage. A link to a high resolution graphic can be found at www.boston.gov/recharge-boston



Figure 1: City of Boston's Wayfinding Logo for General Service EVSE Signage.

Approved Regulatory Signs

Regulatory Signs help to enforce what vehicles park in EVSE parking spots, as well as the time duration that EVs are permitted to park and/or charge at charging stations. If time limits or vehicle removal provisions are to be applied, regulatory signage including parking restrictions, hours and days of operations, towing, and contact information may be installed immediately adjacent to, and visible from, the electric vehicle parking or charging station.

Regulatory signs should be no smaller than 12" x 18" and placed immediately adjacent to the EVSE at a height of 7 feet.



Figure 2: (Labeled Left to Right A-D) Example EVSE regulatory signs.

Sign A indicates the number of hours an EV is permitted to park if a dwelling restriction is in place and if the parking space is reserved exclusively for EVs.

Sign B indicates that the space is reserved exclusively for EV charging, though the EV does not need to be actively charging. This sign can be used when there is no dwell restriction, but if the space is restricted for EV parking.

Sign C shall be coupled with Sign A or B if the building requires that the EV must be actively charging.

Sign D shall be coupled with Sign A or B to indicate that the EV must be actively plugged in, and must vacate the parking space when charging is complete.

Parking Spot Stencils

Parking spot stencils are not required, but painting an EVSE symbol on the parking surface can help to identify EVSE spaces. Parking space stencils should not be substituted for EVSE signage requirements. For the City of Boston approved stencil, refer to Figure 1 on the previous page.

IV. DESIGN AND ACCESSIBILITY

All EVSE placed and proposed shall be compliant with the Americans with Disabilities Act. All EVSE placed must comply with the Massachusetts Architectural Access Board and the City of Boston Disabilities Commission rules and regulations.

EVSE may be installed in standard parking spaces or accessible parking spaces. The installation of a charging station should not reduce the size of the parking space to below minimum local zoning requirements for off-street parking spaces.

An EVSE should have all relevant parts located within accessible reach, and in a barrier-free access aisle for the user to move freely between the EVSE and the electric vehicle. Charging station outlets and connectors shall be no less than 36 inches and no higher than 48 inches from the surface of the floor. Level 1 outlets may be 12 inches and no higher than 48 inches from the surface of the floor.

Where EVSE is provided or proposed within an adjacent pedestrian circulation area, such as a sidewalk or accessible route to the building entrance, the charging equipment must be located so as to not interfere with accessibility requirements; it should not interfere with the minimum pedestrian clearance widths as defined in Chapter 11B of the American Disability Act Standard. Cords, cables, and connector equipment should not extend across the path of travel within the sidewalk or walkway. The National Electric Code states that cords can be no longer than 25 feet, unless equipped with a retraction or other control device. Retraction devices or a place to hang permanent cords and connectors should be provided even if the cord is shorter than 25 feet. Adequate EVSE protection, such as concrete-filled steel bollards, should be used where warranted.



The City of Boston requires at minimum 5% of the provided electric vehicle charging station parking spaces, but not less than one (1), shall be accessible and in compliance with the accessible parking space requirements per 521 CMR 23.

- (a) This requirement is per site.
- (b) The accessible parking spaces for charging stations shall be above and beyond the requirements for the number of accessible parking spaces required in 521 CMR 23.2. The accessible electric vehicle charging parking space shall not be reserved for persons with disabilities. The parking space may be reserved for electric vehicle charging.

V. REQUIRED CONNECTOR TYPES

Level 1 Connectors

Approved Level 1 connectors include standard 120V grounded outlets (NEMA 5-15, 5-20, or 5-30) and SAE J1772.

Level 2 Connectors

Approved Level 2 connectors include SAE J1772 EV plug. Other Level 2 connector types will not be considered for meeting the 25% EVSE-Installed requirement. However, the installation of other connector types in addition to the required 25% EVSE-Installed requirement is not restricted. It may be necessary to remove unapproved connector types in the future in order to install approved connector types to fulfill future EVSE-Installed Requirements.

DCFC Connectors

For fast charging, the CHAdeMO and/or SAE Combo (also called CCS for “Combo Charging System”) are the approved connector types. Other DCFC connector types will not be considered for meeting the 25% EVSE-Installed requirement. However, the installation of other connector types in addition to the required 25% EVSE-Installed requirement is not restricted.

VI. SAFE IMPLEMENTATION AND PERMITTING

Installation of a charging station associated with the new development project of a new residential or non-residential property shall be processed in association with the underlying permit(s).

Installation of selected charger models must be:

- I. UL certified.
- II. Installed by a Massachusetts licensed electrician.
- III. Installed in compliance with NFPA 70, National Electric Code article 625 and applicable Massachusetts electrical code adopted and enforced within the jurisdiction of installation.



