3.5 BUILDING AND ELECTRICAL CODE GUIDANCE

3.5.1 GUIDANCE FOR EVALUATING PARKING FACILITIES FOR EVSE INSTALLATIONS

Before deciding to install EVSE, property owners and/or parking lot operators should first determine if the parking facility is a good candidate site. To assist in this assessment, this section of the guidelines addresses key planning factors in three specific areas: site location, user base, and parking lot features. To assess the suitability of a privately-owned site, four key questions should guide the decision-making process.

- Does my community have a Charging Station Siting Plan that has been developed as part of a regional effort --or is one being created?
- Does my property meet the long term needs of a particular user base?
- Is there sufficient electrical supply to provide charging services, and if not how feasible will it be to expand the supply?
- At my location, what is the average length of time that PEVs needs to charge? (potentially allows for use of less costly AC Level 1 versus AC Level 2 charger)

Site Location
Appropriate planning is essential for successful charger siting and installation. A community-wide master plan for chargers, now underway in most metropolitan regions, will assist site owners to better understand supply, demand, and the potential aggregate user base. Additional key siting considerations include:

- Ability to economically obtain sufficient electrical energy
- Visibility and ease of driving and walking access to the parking facility
- Distance and relationship to other parking facilities and land uses
- Occurrences of flooding or ponding of water on the parking lot
- Availability of wired or wireless communications at the site

User Base
Parking lots often target multiple categories of users. For instance, a shopping mall would generally target convenient customer parking and long term employee parking. A downtown surface lot owner will often provide short-term hourly parking for shoppers and monthly parking for employees of nearby businesses.

When considering the addition of EVSE in a parking lot, the owner/operator has an opportunity to attract new customers. The operator should look at all possible users, types of equipment, and classes of electrified vehicles, including electric bicycles and scooters. Since electrical rates are lower at night than during daytime peak demand periods, operators may want to explore offering nighttime charging services for nearby residents that do not have charging opportunities at their residence or multi-unit dwelling (MUD).

Key user base considerations are:

- Hours and days of parking facility operations
- Customers' typical driving distances and frequency of use
- Expected PEV product mix and resulting needs
- Likely peak use days/times and duration of stay
- Day and night walking conditions and distances to nearby attractions
- Perceptions of site safety
- Method of assessing and collecting charging fees
- Opportunities for valet parking/charging service

Parking Lot Features
The third important planning consideration is the features of the parking facility and its operations. Having a clean, safe and secure lot, that provides convenient access to charging equipment, pedestrian exits and building entrances, is much likelier to be used than one that is remote, dimly lit and is prone to vandalism. Having assurance the charging equipment will be available for use upon arrival, or that a valet service will move and charge the car for a certain period of time is a convenience that will attract regular users. If the parking lot is provided primarily for nighttime parking, for instance hotel guest parking, having the guarantee of a fully or partially charged vehicle the next morning is critical to the success of any overnight charging service. Many on-site factors listed below need exploring when considering charger installations.

- Will clustering chargers in one area be better than dispersing them?
- Where is the source of electricity and electrical panel/circuits?
- Is there enough electrical power capacity beyond the existing electrical loads?
- Location of existing accessible parking spaces and determining location of accessible battery charging stations
- Ensuring cables will not infringe upon walkways and high pedestrian traffic areas
- How will charging electric vehicles change the nature of the existing operations?
- Should lighting, shelter, signage or pedestrian improvements be installed with new charging stations?

3.5.2 AMERICANS WITH DISABILITIES ACT (ADA) AND REASONABLE ACCOMMODATIONS

The ADA became federal law in 1990 with the intent to prohibit discrimination of individuals on the basis of disabilities. Title I of the ADA prohibits private employers, state and local governments, employment agencies and labor unions from discriminating against qualified individuals with disabilities in job application procedures, hiring, firing, advancement, compensation, job training, and other terms, conditions, and privileges of employment. The ADA covers employers with 15 or more employees, including state and local governments.

An employer is required to make a reasonable accommodation to the known disability of a qualified applicant or employee if it would not impose an "undue hardship" on the operation of the employer's business. Reasonable accommodations are adjustments or modifications provided by an employer to enable people with disabilities to enjoy equal employment opportunities. The Equal Employment Opportunity Commission (EEOC) is the enforcing agency for Title I.

Title II of the ADA addresses State and local government services, and Title III addresses places of public accommodation and commercial facilities. Under titles II and III of the ADA, the Access Board develops and maintains accessibility guidelines for buildings, facilities, and transit vehicles and provides technical assistance and training on these guidelines. The Department of Justice (DOJ) is the enforcing agency for Title II, and the Department of Transportation, along with the DOJ are the enforcing agencies for Title III.

3.5.2.1 ACCESSIBLE ELECTRIC VEHICLE CHARGING STATIONS

Since public charging stations offer a service to the general public, the ADA prohibits discrimination of individuals on the basis of disabilities. Accessibility standards specific to public chargers do not currently exist in California except in some fashion through Chapter 11C of the California Building Code—*Standards for Card Readers at Gasoline Fuel-Dispensing Facilities*.[40] The interpretation of the 11C Standard is that it applies to card readers not only on liquid fuel pumps, but also on charging stations, because it lists electricity as a motor fuel.

There also exists a State of California Internal Policy 97-03[41]—Interim Disabled Access Guidelines for Electrical Vehicle Charging

	New Construction[1]	Existing Parking Facility
1st EVCS	The first EVCS shall be accessible, and be installed in an existing van-accessible parking space or in a new 17-foot wide EVCS meeting all requirements of a van-accessible parking space. If in a new space it does not have to be designated with D9-6/R7-8b signs (disabled parking symbol/VAN-accessible) or contain a striped access aisle.	The first EVCS should be accessible, and may be installed in the existing van-accessible space, in an existing accessible parking space, in a standard parking space (9-feet wide minimum) adjacent to an "access aisle", or in a standard parking space with a 3-foot wide (minimum) unstriped path of travel between the battery charging station and the vehicle inlet.
2nd EVCS	The second EVCS should be accessible and be installed in an existing accessible parking space or in a new 14-foot wide charger meeting all requirements of an accessible parking space. If in a new space it does not have to be designated with a D9-6 (disabled parking sign) or contain a striped access aisle[2]. The first two accessible chargers may share the same access aisle.	The second EVCS should be accessible, and may be installed in a standard parking space (9-feet wide minimum) with a 3-foot wide (minimum) un-striped path of travel2. The first two accessible EVCS may share the same path of travel.
3rd EVCS	The third EVCS and beyond may be installed in a standard parking space no less than 9-feet wide.	The third EVCS and beyond may be installed in a standard parking space no less than 9-feet wide.

Table D - Installation Options for Accessible EVCS

[1] Includes existing facilities increased in size by 50% or greater or by 30 parking spaces or greater (percentage size increase or number of parking spaces to be determined by local agency)
[2] If the first battery charging station can simultaneously charge two PEVs, the card-reading device would qualify as accessible for each vehicle

Stations that was developed in 1997 (last revised 2-10-2005) by the State Department of General Services. The Policy was developed to provide guidance for the installation of charging equipment on state-owned parking lots, including public schools. It states that local agencies are granted latitude to adopt similar methods of administering code requirements. While the Policy references the California Building Standards Code, it does not reference the California Electrical Code, Fire Code, Vehicle Code, or Manual on Uniform Traffic Control Devices; all of which must be considered when providing safe, accessible and enforceable public charging infrastructure.

The inconsistencies and incompleteness of both the standard for card-reading devices on fuel dispensers and the State's internal policy on accessible chargers has resulted in local agencies developing broad interpretations of the documents. The result has been widespread confusion and inconsistent applications of policy across the State, as well as across the nation. Until such time that a federal or State standard is developed that takes into consideration all necessary codes and modern equipment with varying charging levels, the guidelines below are being made available as a resource for local jurisdictions to consider using when designing, reviewing, installing and operating electric vehicle supply equipment. They should not be interpreted to dictate the manner in which a public agency chooses to administer the installation of public and restricted charging infrastructure.

An important objective of these guidelines is to ensure that accessibility provisions are met whenever possible and feasible. The guidelines take into consideration that planning EVI in new construction allows architects and engineers to match up the source and level of power supply, building use(s), and parking lot design with desired EVCS locations and charging levels. The guidelines also take into consideration the installation challenges in existing parking facilities such as uneven topography, use of existing electrical service, location of power supply, or space limitations. Because there are no definitive standards for the design and installation of EVCS, careful planning and consultation with local building officials is highly recommended before proceeding in both new and existing developments. In all cases the agency having jurisdictional authority will make the ultimate determination on permitted installations.

These guidelines identify the "battery charging station" as the accessible element, or as the point of service (see Appendix 8.1). It is recognized that in conforming existing public parking facilities at least one van-accessible space already exists. By locating the first battery charging station within a van-accessible parking space, the requirement that the first battery charging station be accessible would likely be met. In doing so however, it would likely result in the van-accessible space closest to the building entrance having a very low turnover rate and less overall availability to disabled users that depend upon lift equipment, because of the long periods of time needed to charge electric vehicles. It may also result in unexpected "cable management" and tripping concerns as van-accessible parking is often on the shortest pedestrian route to the main building entrance.

Provisions for accessible card-reading equipment in the Chapter 11C standard apply to battery charging station installations as they do to liquid fuel pumps, because the standard defines electricity as a motor fuel. Chapter 11C requires that the card-reading controls of the first two dispensers of any type of motor fuel need to be accessible in new or existing facilities.

For the next several years it is expected the vast majority of public EVCS will be installed in existing private surface lots. Therefore, EVCS will likely take the place of existing standard parking spaces (assumed 9'-0" wide). The first EVCS should have accessible equipment, thus a path of travel (see Appendix 8.1) is required on either side of the space leading to the battery charging station. It is here where some agencies may require a path of travel as wide as an 8'0" access aisle so as to accommodate an electric van with lift equipment. However, lack of definitive standards for the installation of accessible battery charging equipment is resulting in some agencies authorizing the minimum 3'-0" path of travel between the equipment and vehicle inlet.

Figure 5 - Example of an accessible liquid fuel dispenser

Until such time as Accessible EVCS installation standards are developed and adopted by the State, two courses of action may be considered by local agencies; one for new construction and one for existing parking facilities (see Table D). As local agencies eventually adopt ordinances, codes, private & public development standards and regulations, every effort should be made to update these guidelines to reflect current laws and regulations.

3.5.2.2 EQUIPMENT REACH AND APPROACHABILITY

Key challenges facing property owners, engineers, architects, contractors and others are how to place charging equipment near a convenient and sufficient power source, protect the equipment from possible vehicle damage, and still ensure that the equipment is accessible for persons with disabilities. These guidelines identify the battery charging station as the accessible element. Below is a summary of the primary design requirements in Chapter 11C[42] for accessible fuel-dispensing equipment as revised to coordinate with Title 24 and ADA Standards and other recommendations in the document:

- At each parking site, card readers serving the first two EVCS must be accessible (a battery charging station that can simultaneously charge two or more PEVs from one card reader would qualify to meet this requirement)
- A level accessible area (see definitions) measuring no less than 30-inches by 48-inches (with the long dimension being parallel to and centered in front of the equipment, plus or minus 9-inches on either side) must exist.
- If on a raised surface, the face of the card-reading controls must be within 10 inches in plan view from the face of curb and be no higher than 54-inches from the level accessible area in front of the controls. The 2010 ADA Standard lowers height reach ranges to 48 inches maximum, except that the operable parts of fuel dispensers shall be permitted to be 54 inches maximum measured from the surface of the vehicular way where fuel dispensers are installed on existing curbs.
- Where protective posts or other guard devices are provided they shall not obstruct accessible EVCS paths of travel or other accessible routes and shall not be located within 3-feet of the battery charging station controls and connector handle(s).
- In new construction a path of travel (see Appendix 8.1) no less than 3-feet in width must exist between the level accessible area in front of the charging station and an exterior accessible route of travel to the main building entrance.
- The electric cable and connector may cross over the level accessible area when inserted in the vehicle charging inlet.

Figure 5, a gasoline dispenser with two hoses, protected by guard posts provides an illustration of the front of the controls where the gas handle and card-reader are situated, with a recessed curb centered beneath the card-reading device.

Figures 6, 7, and 8 and accompanying comments that follow provide guidance for accessible electric vehicle charging stations in various parking lot configurations. The examples are based upon conventional parking lot designs, review of ADA design standards, Chapter 11C of the CBC and the State's internal Policy 97-03. If a local jurisdiction in California finds that compliance with accessibility and building standards would make the specific work of the project affected by the building standard unfeasible due to one or more factors cited under "unreasonable hardships" section of the State Building Code, the details of the hardship should be recorded and entered in the files of the enforcing agency.

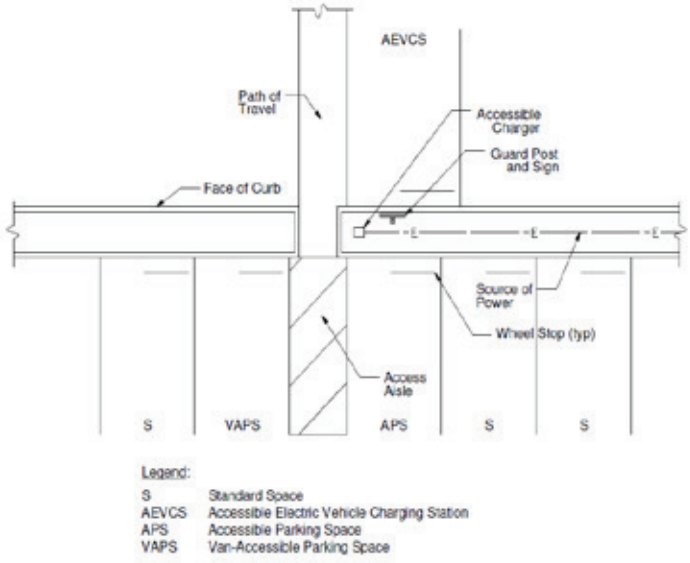

Figure 6 - Example of first EVCS in Existing Parking Facility

Dual Port Charging Station on Extended Island Configuration: This example illustrates how placement of dual port charging station in an existing parking facility can accommodate an accessible EVCS on one side of an island, as well an accessible parking space on the opposite side. Any vehicle displaying a Disabled Person (DP) placard or DP license plates may occupy the Dual Port Charging Station on Extended Island Configuration: This example illustrates how placement of dual port charging station in an existing parking facility can accommodate an accessible EVCS on one side of an island, as well an accessible parking space on the opposite side. Any vehicle displaying a Disabled Person (DP) placard or DP license plates may occupy the accessible parking space including a PEV that could utilize the accessible battery charging station. Signs identifying the accessible parking space as an "Electric Vehicle Charging Station" would be added to the existing ADA signage. The accessible EVCS must meet the reach, height, clearance and slope requirements of accessible fuel-dispensing equipment (Chapter 11C, CBC) and ADA standards. This figure is patterned after Sonoma County EVCS Program and Installation Guidelines.[43]

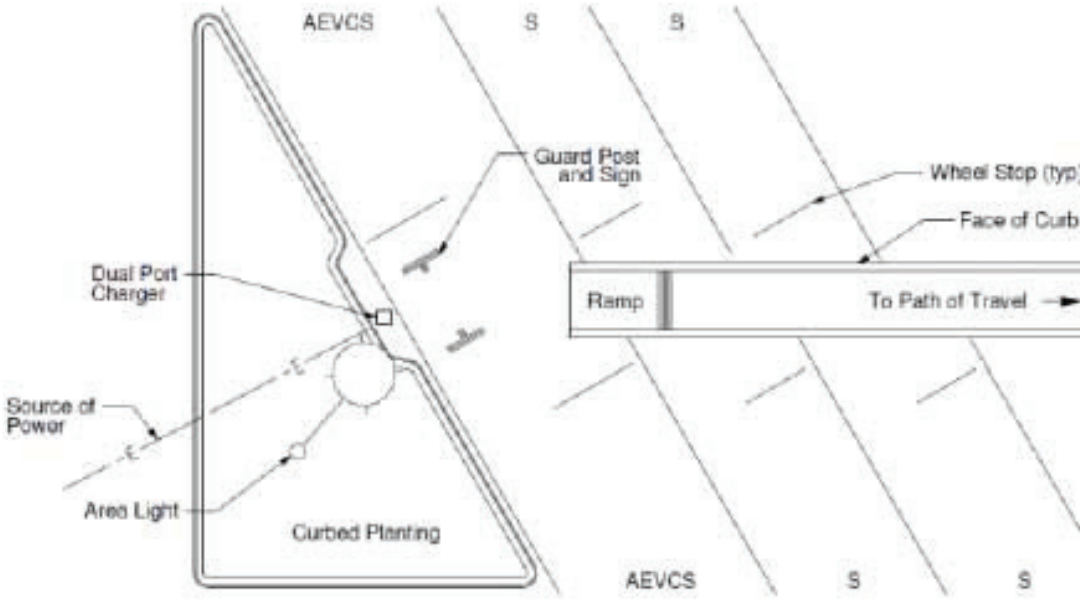

Figure 7 - Example of First Two EVCS in Existing Parking Facility

Dual Port Charging Station on Planted Island Configuration: This example in an existing parking facility takes advantage of a planted island at the end of a parking bay, where a dual port charging station is installed in a recessed section behind the curb line. The two accessible EVCS are a minimum of 12 feet wide (9' for parking and 3' for maneuverability), and have an unobstructed route from any side of the vehicle to the charger and to the ramp leading to the path of travel. Because the charging station is installed at the same elevation as the parking lot surface, guard posts containing signage are installed to protect the equipment and keep the ramp clear. This figure is patterned after Sonoma County EVCS Program and Installation Guidelines.[45]

Charging Stations on Paved Area Configuration: Figure 8 illustrates an accessible EVCS adjacent to a wide level paved area between the EVCS and sidewalk, where the sidewalk serves as the path of travel. Two EVCS are also shown. This figure is patterned after Sonoma County EVCS Program and Installation Guidelines.[44]

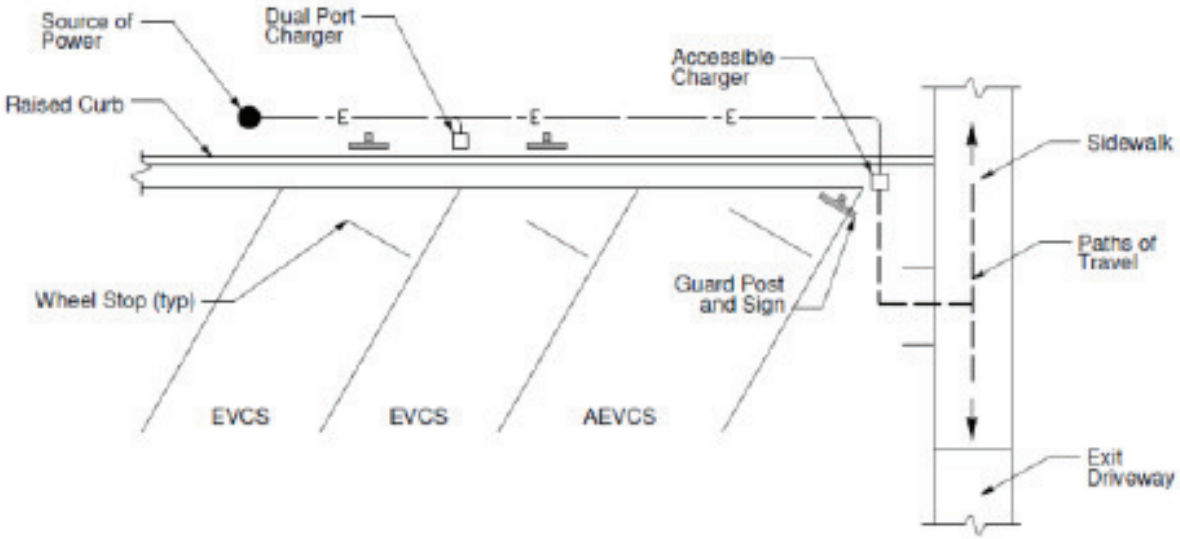

Figure 8 - Example of Accessible EVCS and Two EVCS

Legend:
EVCS Electric Vehicle Charging Station
AEVCS Accessible Electric Vehicle Charging Station