



# **ELECTRIC VEHICLE (EV) CHARGER INSTALLATION GUIDELINES**

**CITY OF HIGHLAND BUILDING DIVISION  
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Be aware that there are different types of Electric Vehicle (EV) Chargers. There are 2 basic types of EV chargers for home use (Level 1 and Level 2). Level 1 Chargers are smaller units that plug directly into a standard 120 volt receptacle outlet. These types of chargers typically require a longer period of time to recharge the vehicle. As long as the receptacle outlet being used to plug-in the Level 1 Charger is existing, there are no requirements to secure a permit from the Building and Safety division. On the other hand, if you will be installing a new 120 volt receptacle outlet for the charger, you will need to obtain a permit, but you will not need to provide any plans or electrical load calculations as would be required of the more powerful Level 2 type charging systems.

A Level 2 EV Charger installation requires permits from the City. In order to obtain the permit you will need to provide the City with some basic load calculations to show that your existing electrical service can handle the added load.

## **What information do I need to provide to the City in order to obtain the permit?**

The City of Highland has developed this EV Charger Installation Guideline in order to streamline the permit and installation process. In most cases, you or your contractor merely need to fill-in the blanks on this document, attach the manufacturer's installation instructions and charger specifications then submit it to the Building and Safety Division for an over the counter review and permit issuance. If all of the information is provided and the proposal complies with the applicable codes, the review and approval process will only take a few minutes. Once the permit is issued, the installation may begin. When the installation is complete, an inspection of the work will be scheduled with the Building Inspector upon request. Inspections are typically performed on the work day following your request for inspection. Keep in mind that someone will need to be present during the inspection so that the Building Inspector can access the location of the EV Charger (typically in the garage).

Installing a Level 2 EV Charging system often requires changes to the building wiring and utility electric services. Before installing the charging equipment and associated infrastructure, talk to your EV manufacturer for information about what you need to charge your vehicle.

When installing your EV Charger, be sure to use a licensed Electrical contractor whose license is current for electrical work (California license type C-10). The contractor should also follow the guidelines of the manufacturer and the requirements of the City.

## **Why is the Electric Utility concerned about your EV Charger installation?**

Though an individual Level 2 EV charger may have a negligible impact on the utility electric system, the combined effect of several chargers in the same area could result in overloads on the utility secondary wires and transformers. It is crucial that the local electrical service provider be notified of any Level 2 Charging Station installations to ensure that utility electrical system components are adequately sized to maintain a high-level of service reliability. For more information, please contact Southern California Edison at 800-684-8123.

## LEVEL 2 ELECTRIC VEHICLE CHARGER- SERVICE LOAD CALCULATIONS

**INSTRUCTIONS:** Review the list of electrical loads in the table below and check all that exist in the home (don't forget to include the proposed Level 2 EV charger). For each item checked, fill in the corresponding "Watts used" (refer to the "Typical Usage" column for wattage information). Add up all of the numbers that are written in the "Watts Used" column. Write that number in the "Total Watts Used" box at the bottom of the table and proceed to the next page.

(Loads shown are rough estimates; actual loads may vary- for a more precise analysis, use the nameplate ratings for appliances and other loads and consult with a trained electrical professional).

| ✓ Check all<br>Applicable<br>Loads                     | Description of Load  | Typical usage      | Watts used |
|--|--|--------------------|------------|
| <b>GENERAL LIGHTING AND RECEPTACLE OUTLET CIRCUITS</b> |  |                    |            |
| ✓  | Multiply the Square footage of the house X 3                                       | 3 watts/sq. ft.    |            |
| <b>KITCHEN CIRCUITS</b>                                |  |                    |            |
| ✓  | <b>Kitchen Circuits</b>  | <b>3,000 watts</b> |            |
|  | Electric oven  | 2,000 watts        |            |
|  | Electric stove top   | 5,000 watts        |            |
|  | Microwave  | 1,500 watts        |            |
|  | Garbage disposal   | 1,500 watts        |            |
|  | Automatic dish washer  | 3,500 watts        |            |
|  | Garbage compactor  | 1,000 watts        |            |
|  | Instantaneous hot water at sink  | 1,500 watts        |            |
| <b>LAUNDRY CIRCUIT</b>                                 |  |                    |            |
| ✓  | <b>Laundry Circuit</b>   | <b>1,500 watts</b> |            |
|  | Electric Clothes Dryer   | 4,500 watts        |            |
| <b>HEATING AND AIR CONDITIONING CIRCUITS</b>           |  |                    |            |
|  | Central Heating (gas) and Air Conditioning   | 6,000 watts        |            |
|  | Window mounted AC  | 1,000 watts        |            |
|  | Whole-house or attic fan   | 500 watts          |            |
|  | Central Electric Furnace   | 8,000 watts        |            |
|  | Evaporative Cooler   | 500 Watts          |            |
| <b>OTHER ELECTRICAL LOADS</b>                          |  |                    |            |
|  | Electric Water Heater (Storage type)   | 4,000 watts        |            |
|  | Electric tank-less Water Heater  | 15,000 watts       |            |
|  | Swimming Pool or Spa   | 3,500 watts        |            |
|  | Other:   |                    |            |
|  | Other:   |                    |            |
|  | Other:   |                    |            |
| <b>ELECTRIC VEHICLE CHARGER CIRCUIT</b>                |  |                    |            |
|  | Level 2 Electric Vehicle Charger rating*   |                    |            |
| ✓  | (Add-up all of watts for the loads you have checked )<br><b>TOTAL WATTS USED =</b> |                    |            |

\*Use name plate rating in watts or calculate as: (Ampere rating of circuit X 240 volts = Watts)

**INSTRUCTIONS:** Apply the **Total Watts Used** number from the previous page to the Table below to identify if the Existing Electrical Service panel is large enough to handle the added electrical load from the proposed Level 2 EV Charger. If your electrical service is **NOT** large enough, then you will need to install a new upgraded electrical service panel.

**Table based on NEC 220.83(A)**

| ✓ Check the appropriate line | Total Watts Used   | Minimum Required Size of Existing 240 Volt Electrical Service Panel (Main Service Breaker Size) | Identify the Size of Your Existing Main Service Breaker (Amps)** |
|------------------------------|--------------------|---|--|
|                              | Up to 24,000       | 60 amp  |  |
|                              | 24,001 to 48,000   | 100 amps  |  |
|                              | 48,001 to 63,000   | 125 amps  |  |
|                              | 63,001 to 78,000   | 150 amps  |  |
|                              | 78,001 to 108,000  | 200 amps  |  |
|                              | 108,001 to 123,000 | 225 amps  |  |

\*\*Please note that the size of your existing service **MUST** be equal to or larger than the Minimum Required Size identified in the table above or a New Upgraded electrical service panel will need to be installed (a separate permit is required for new or upgraded services).

CAUTION: This table is **NOT** to be used to determine the size of a **NEW** or **UPGRADED** service panel, if your existing panel is too small or overloaded according to the table above. In order to determine the size of the **NEW** or **UPGRADED** service panel, there is a completely different load calculation methodology that applies. Sizing of a **NEW** or **UPGRADED** electrical service panel should only be done by a qualified electrical contractor or electrical engineer.

**STATEMENT OF COMPLIANCE**

**By my signature, I attest that the information provided is true and accurate.**

**Job Address:** \_\_\_\_\_  
 (Print job address)

**Signature:** \_\_\_\_\_  
 (Signature of applicant) (Date)

In addition to this document, you will also need to provide a copy of the manufacturer’s instruction literature and specifications for the Level 2 Charger you are installing.

Please note that this is a voluntary compliance alternative and that you may wish to hire a qualified individual or company to perform a thorough evaluation of your electrical service capacity in lieu of this alternative methodology. Use of this electrical load calculation estimate methodology and forms is at the user’s risk and carries no implied guarantee of accuracy. Users of this methodology and these forms are advised to seek professional assistance in determining the electrical capacity of a service panel.