

Installation and connection of other highway electrical equipment

Items of highway electrical equipment such as bus shelters and market trader electrical supplies, should be installed and connected generally in accordance with this Code of Practice and the IET *Guide to Highway Electrical Street Furniture*, which deals specifically with these types of equipment. Electric vehicle (EV) charging points should be installed in accordance with the IET *CoP for Electric Vehicle Charging Equipment Installation*.

It should be noted that many of these types of equipment would be supplied using a TT or TN system, and therefore suitable earth electrodes would need to be specified, installed, tested, connected and maintained. It is recommended that two earth electrodes are installed, to allow periodic condition reporting testing of each earth path by swapping from one to the other whilst maintaining an earth path at all times to the installation (see Section 11.3).

In respect of EV charging points, consideration needs to be given to whether the use of a TN system is appropriate, due to the risks associated with broken protective earth and neutral (PEN) conductors in TN-C portions of the supply. In addition, the existing supply may have insufficient demand, and an alternative source of supply may be necessary. Hence, the EV charging equipment may not form part of the same electrical earthing system as nearby lighting and street furniture.

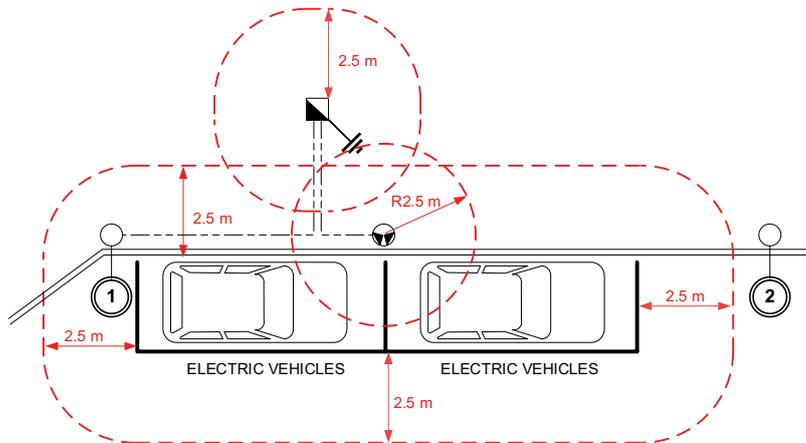
It is therefore necessary to assess whether there is any other electrical equipment (including EVs on charge supplied by other installations) in the area of the EV charging equipment and the vehicle(s) on charge.

BS 7671 requires any exposed-conductive-parts that are simultaneously accessible (within arm's reach or 2.5 m) to be connected to the same electrical earthing system. It is usually the case that lighting columns are on unmetered PME supplies; as such, if there is a proposal to install, say, a charge point within 2.5 m of the column, or if a column already sits within 2.5 m of the advised area in which a vehicle will be charged, then either:

- the lighting column supply should be changed to a TT supply, and connected to the TT supply used for the EV charging equipment: or
- if the DNO/IDNO permits, and there is spare capacity, the EV charging equipment should be connected to the same PME supply as the lighting column, and open PEN protection equipment provided to disconnect the live conductors and protective conductor to the vehicle in the event of a broken supply neutral conductor.

For example, in Figure 12.1, lighting column 1 lies within the 2.5 m zone for simultaneous contact and should be connected to the same earthing system as the EV charging equipment, whereas column 2 does not. In this case, column 1 and the EV charging equipment are both connected to the same TT earthing arrangement.

▼ **Figure 12.1** Example EV charging equipment layout showing 2.5 m zone for simultaneous contact assessment



Where TT earthing arrangements are used for EV charging equipment, suitable separation below ground is required between earth electrodes and other buried conductive parts connected to the TT earthing system, and buried conductive parts connected to the PME earthing system (such as earth electrodes, paper insulated lead sheathed cables, metal street furniture, metal lighting columns, and extraneous-conductive-parts). Annex H of the *IET CoP for Electric Vehicle Charging Equipment Installations* recommends at least 2.0 m separation below ground for on-street installations, although the DNO/IDNO may require separation in excess of this.

Where renewable energy technologies are used, either for these types of equipment or for more traditional uses, such as traffic signs, the appropriate guidance should be sought. For solar photovoltaic cells, BS 7671 would apply, together with the *IET CoP for Grid Connected Solar Photovoltaic Systems*. An isolator should be installed on the output terminals of the battery and routine maintenance should include a check on the battery as well as array cleaning. At the end of life, batteries should be recycled and/or disposed of in accordance with the Batteries Directive.