

# Willoughby City Council

## Electric Vehicle Charging Controls

### Report of Recommendations

*Prepared by ChargeWorks Pty Ltd*



# 1 Overview

ChargeWorks has been engaged by Willoughby City Council to provide a report of recommendations for appropriate development controls applicable to Electric Vehicle (EV) charging in buildings.

A workshop meeting was held at Council on the 1<sup>st</sup> of February 2023 to discuss these controls.

This report provides recommendations that includes:

<b>Building Type</b>	<b>Controls</b>
Free-standing dwellings	<p>Should be applicable to new constructions, or significant alternations and additions requiring electrical works (noting some exceptions).</p> <p>Requires that the development provide future provision for Level 2 EV charging (circuitry only), such that the resident can readily install charging when required.</p>
Multi-dwelling housing (including residential flat buildings)	<p>Should be applicable to only new constructions.</p> <p>Requires that the development provide future provision for Level 2 EV charging (circuitry and / or dedicated switchboards), such that residents can readily install charging when required.</p>
Commercial and industrial buildings.	<p>Should be applicable to new constructions and major developments.</p> <p>Requires that the development provide future provision for EV charging (generally) by requiring dedicated and sufficient switchboards in parking areas such that EV charging can be readily installed when required.</p>

## 2 Free Standing Dwellings

Demand for EV charging is set to increase, and the most convenient and beneficial mode of charging is charging at home. Best practice is for homes with dedicated off-street parking to have appropriate charging infrastructure.

To facilitate appropriate charging, it is this report's recommendation that all new, and substantially altered homes or dual occupancies, make provision for at least a 40A (single phase) dedicated circuit to each garage.

Whilst the actual EV charger needn't be installed at the time of the development, the provision of such a circuit will substantially reduce the burden for installing EV charging later. The expected additional cost of this control is estimated to be no more than \$5,000 and should save substantial cost in doing this work later.

This report recommends that:

- New or significant alterations and additions that require electrical works should include a requirement for installing an EV charging circuit as part of the works.
- Since also adding an EV circuit is straightforward for any licensed electrician who is already working on a free-standing dwelling's switchboard, it is a sensible to add this requirement and place little additional burden on the owner.
- However, works not requiring a licensed electrician should be exempt because this opportunity to avoid additional burden is not present.
- Similarly, works taking place outside the main residence (e.g. pools, secondary dwellings, boatsheds, outbuildings) don't make sense for an electrician to modify the main switchboard.
- On the other hand, any works involving garages or carports should automatically require provision for EV charging, even if an electrician is not explicitly required, because the opportunity to install sensible infrastructure during the build is significant and will substantially reduce the cost of adding charging later.

As a minimum, new dwellings, new dual occupancies, and any significant alterations to existing dwellings or dual occupancies must make provision for at least a 40A (single phase) dedicated circuit to each garage. The EV charging circuit must be dedicated as per AS/NZS 3000.

For clarity, a 16A three phase circuit is not a suitable alternative, because most vehicles in Australia only charge with single-phase power. 40A is the recommended amperage (in both single and three phase configurations) to ensure that 32A circuits are not de-rated or overloaded.

# 3 Multi-Dwelling Housing

As above, the most convenient and beneficial mode of charging is charging at home. This similarly applies to residents of flats and multi-dwelling housing. However, the burden to retro-fit EV charging in multi-dwelling housing can be substantial and complicated due to the arrangement of parking and electrical infrastructure.

For this reason, this report recommends that EV charging controls only apply to **new** residential flat buildings, multi dwelling housing, shop top housing and mixed use developments where it is relatively straightforward for the developer to plan and accommodate sensible EV charging infrastructure.

The burden to the developer at this stage is very low since electrical works, concrete pours and cable paths can be considered in advance, but is enormously beneficial to any EV drivers later. The estimated cost of this control is approximately \$30,000-\$50,000 per level, but could save between 3 and 10 times higher as a retrofit.

There are a number of different ways that these types of dwellings can arrange and manage EV charging, but the backbone infrastructure generally remains the same.

No matter the configuration, the building should make provision for Level 2 charging :

- The [NSW Electric and Hybrid Vehicle Plan](#) defines Level 2 charging as single or 3-phase electric vehicle supply equipment with a power range of 7kW-22kW.
- Level 2 differs from Level 1 in that it is dedicated equipment. Level 1 is most typically just a normal power outlet (GPO or “power-point”).
- Level 2 is critical in a multi-dwelling setting because it enables intelligent load management, which in the future will be necessary to avoid dozens of vehicles accidentally overloading the build’s power supply. It also enables billing and cost recovery which is important for stratas that facilitate charging via the common area power.

This report recommends that:

- New buildings make provision for Level 2 charging in every space.
- This should include:
  - A dedicated EV charging switchboard on each parking level.
  - Cabling to every space, or if it is impractical or prohibitive to do so, provide cable tray such that residents can easily connect EV charging infrastructure later.

EV charging switchboards should have sufficient capacity for a future when all residents are charging. There is some electrical diversity in how EV charging will occur, but at a minimum, the electrical capacity should allow for 5A per phase per space e.g:

- If there are 1-9 spaces per level, provide one dedicated 63A three-phase EV charging switchboard per level.
- If there are 10-19spaces per level, provide one dedicated 100A three-phase EV charging switchboard per level.
- If there are 20-39 spaces per level, provide one dedicated 200A three-phase EV charging switchboard per level.
- If there are 40-80 spaces per level, provide one dedicated 400A three-phase EV charging switchboard per level.

# 4 Commercial and Industrial

New and major developments of commercial and industrial buildings should also make future consideration for EV charging. The justification of requiring a control for EV charging is that the cost of retrofitting EV charging is far greater than integrating the infrastructure in plans for other electrical upgrades and carpark constructions.

The trigger point for this control should be alterations and additions which result in more than a 10% increase in the 'gross floor area'. Relatively speaking, the cost of adding switchboards and cable paths to parking levels is immaterial to the cost of a major development of this size, but adding this infrastructure later is often prohibitive. The estimated cost is \$30,000-\$50,000 per level but could save between 3 and 10 times higher than this as a retrofit.

Similar to above, provision for EV charging begins with a sensibly sized switchboard on each parking level. This could culminate as slow charging in each space, or fast charging in a few dedicated EV charging spaces (such as dedicated public fast charging).

At a minimum, the electrical capacity should allow for 5A per phase per space e.g:

- If there are 1-9 spaces per level, provide one dedicated 63A three-phase EV charging switchboard per level.
- If there are 10-19 spaces per level, provide one dedicated 100A three-phase EV charging switchboard per level.
- If there are 20-39 spaces per level, provide one dedicated 200A three-phase EV charging switchboard per level.
- If there are 40-80 spaces per level, provide one dedicated 400A three-phase EV charging switchboard per level.

This should be sufficient to cover a wide range of use case and future possibilities for EV charging, including EV charging in individual commercial tenancies and also a range of public fast-charging infrastructure options.

# 5 Summary

In summary this report recommends:

Building Type	Controls
Free-standing dwellings	<p>Should be applicable to new constructions, or significant alternations and additions requiring electrical works (noting some exceptions).</p> <p>Requires that the development provide future provision for Level 2 EV charging (circuitry only), such that the resident can readily install charging when required.</p>
Multi-dwelling housing (including residential flat buildings)	<p>Should be applicable to only new constructions.</p> <p>Requires that the development provide future provision for Level 2 EV charging (circuitry and / or dedicated switchboards), such that residents can readily install charging when required.</p>
Commercial and industrial buildings.	<p>Should be applicable to new constructions and major developments.</p> <p>Requires that the development provide future provision for EV charging (generally) by requiring dedicated and sufficient switchboards in parking areas such that EV charging can be readily installed when required.</p>

