Electric Vehicle Charging Station

Design Standard

Revision: A
Date: 25 February 2025
Document number: DOC25/9679

Yarning Circle TAFE NSW Eora

TAFE NSW would like to pay our respect and acknowledge Aboriginal and Torres Strait Islander Peoples as the Traditional Custodians of the Land, Rivers and Sea. We acknowledge and pay our respect to the Elders; past, present and emerging of all Nations.

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This document is a design standard only. The project team retains responsibility for the coordination, design, procurement and delivery of any design project. This includes taking all reasonable steps to ensure that designs comply with all applicable Australian Standards required by the NCC, WHS Legislation, Statutory planning approval processes, TAFE NSW Procedures & Policies, and all other relevant statutory requirements.

Rev	Issue date	Issue	Amendments since previous issue
A	25 Feb 2025	1	N/A

Contents

Introduction

1 Introduction

1.1 Overview

This design standard provides specific guidelines for the planning, design and construction of electric vehicle charging stations (EVCS) across TAFE NSW campuses. The standard applies to projects installing electric vehicle charging infrastructure.

1.2 Policy and Standards Compliance

All works shall be designed and certified by an appropriately accredited person in accordance with relevant Government legislation, Australian Standards, National Construction Code (NCC) and TAFE NSW design standards.

Escalate any conflicting requirements identified to the TAFE Infrastructure NSW representative for resolution.

1.2.1 Specific electric vehicle policy and standards

In conjunction with this Standard, consultants and contractors should pay particular attention to the following NSW Government policies and schemes when undertaking electric vehicle related projects for TAFE NSW.

- SCM13381 Electric Vehicle Fleet Charging Infrastructure Scheme
- NSW Electric Vehicle Strategy
- Net Zero Government Operations Policy

Technical Requirements

2 Technical Requirements

2.1 Summary

Infrastructure to support Electric Vehicle (EV) charging must be considered at all TAFE NSW sites where:

- There are any works that include new car parking spaces
- There are any works that include new or modified fleet vehicle parking spaces
- Projects where EV charging can help achieve a required environmental standard certification (e.g. projects targeting Greenstar certification)

At project commencement seek direction from TAFE Infrastructure NSW and confirm whether EV charging stations or provision for future infrastructure only is required to be provided as part of the project.

2.2 Design

The EV charging strategy must be developed in conjunction with the nominated TAFE Infrastructure NSW project lead.

To accurately scope project requirements, all required site investigations and due diligence must be provided to confirm the following:

- The number, size and type of fleet and general chargers required.
- If the desired EV chargers can be incorporated and used without load and timing restrictions and/or
- Significant upgrades to the existing campus electrical infrastructure and supply being triggered.
- If electrical infrastructure and/or supply upgrades are required, estimate expected costs and impacts associated.
- The location of chargers, conduits and infrastructure and any provisions for future charger installations.
- If renewable energy technology installation (solar, battery storage) is planned to support the EV charging stations, identify suitable locations and any opportunities, risks or constraints for the installation of these technologies.

2.3 Capacity to be provided

2.3.1 Fleet vehicles

Confirm with the TAFE Infrastructure NSW project lead:

- The quantity of passenger fleet vehicles to be parked at the site.
- Any planned future fleet expansion.
- Any changes to the EV charging requirements or whole of government approach.

2.3.2 General vehicles

Confirm with the TAFE Infrastructure NSW project lead the number of general EV chargers required for the project. Inclusion of EV charging stations can be triggered by:

- Development Application (DA) conditions of consent (especially state significant DAs).
- New buildings classified as carparks under the National Construction Code.
- Projects seeking certain environmental certification (i.e. Greenstar).

2 Technical Requirements

2.3 Capacity to be provided

- Specific TAFE NSW-led initiatives.
- NSW Government-led initiatives.

Where general vehicle EV chargers are required for a project, provide access to a charger to a minimum of 1 x accessible parking space.

When assessing capacity to be provided at a site, consider potential future EV charging requirements and where applicable/feasible, future proof the site to accommodate additional charging infrastructure at a later stage.

2.4 Types of chargers

Characteristics	Fleet Vehicle Use	General Vehicle Use
Charger type	Dual port - 2 x 22kW	Dual Port - 2 x 22kW
Electrical supply	3 phase fast chargers	3 phase fast chargers
Mounting	Ground or wall mounted to suit location and carpark configuration	Ground or wall mounted to suit location and carpark configuration
Access	RFID programmable access pass, and Chargefox platform connectivity	Pay As You Go payments enabled, and Chargefox platform connectivity
Compatibility	OCPP version 1.6j & 2.0 compliant and ISO15118 compliant	OCPP version 1.6j & 2.0 compliant and ISO15118 compliant
User interface	Easy to use colour LCD touchscreen. Display to have colour contrast between text and background, and accessible size of text.	Easy to use colour LCD touchscreen. Display to have colour contrast between text and background, and accessible size of text.
Network connectivity	Yes	Yes
Communications access	Supports wired ethernet and 4G cellular connections as a minimum.	Supports wired ethernet and 4G cellular connections as a minimum
Energy management	Yes	Yes
Data output	Require charger energy use and cost data	Require charger energy use and cost data
Impact resistance	Minimum IK09	Minimum IK09
Weather protection	Under cover: minimum IP54 Outdoor exposed: minimum IP55	Under cover: minimum IP54 Outdoor exposed: minimum IP55
Standard	IEC 62196-2 type 2 connection	IEC 62196-2, type 2 connection
Warranty	Minimum 5 years for materials and workmanship. Rated for min. 10,000 use cycles	Minimum 5 years for materials and workmanship. Rate for min. 10,000 use cycles

2 Technical Requirements

2.5 Location

Coordinate EV charging station locations with the TAFE Infrastructure NSW project lead. Consider the following when selecting locations:

- Proximity to available electrical infrastructure to reduce cable runs and minimise cost and disruption of required work.
- Impact on existing in-ground services in the proposed locations.
- Impact on existing footpaths, paths of travel, and disabled access and egress requirements.
- Such that one charger is provided between two parking bays (where possible).
- So as not to impact operation, access to, servicing and compliance of any existing infrastructure.
- Where evening or out of hours use is permitted, in locations with suitable access and lighting for user safety.
- In locations that minimise the potential for vandalism.

2.6 Charging Station Layout

2.6.1 Spatial considerations

EV charger spatial considerations:

Requirement	Ground-Mounted Chargers	Wall-Mounted Chargers
Location	Locate charger at the end of a car parking space and aligned centrally between two adjacent parking spaces	Locate the charger on an adjacent building. Maximum allowed distance from wall to back of wheel stop is 2000mm
Protection	Required	Required
Wheel stops	Required	Required
Proprietary signage	Required	Required
Accessible car spaces	Ensure charging bay has unimpeded level access and paths of sufficient width to support access to the charger	N/A

2.6.2 Lighting

Where new or additional lighting is determined to be required for the project, lighting must be provided to the EV charger locations in accordance with the TAFE NSW Lighting Design Standard.

2.6.3 Signage and linemarking

All EV charging spaces must be identified by dedicated signage and linemarking.

Unless otherwise specified in this design standard, signage and linemarking should comply with the design and performance requirements of *TS 00106:1.0 Electric Vehicle Charging Stations - Signposting and Pavement Marking* as issued by Transport for NSW.

2 Technical Requirements

2.6 Charging Station Layout

Pole/wall mounted sign

Fleet vehicle: Refer to the TAFE NSW Signage & Wayfinding Design Standard, exterior sign type E17P. Sign text to state "Fleet EV Charging" below a white EV charging icon on a green background.

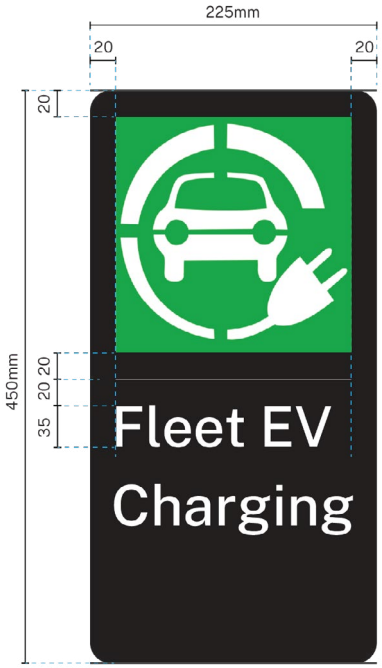


Diagram 1 - Fleet EV charging sign

General vehicle: Sign type R5-40-1n to be installed at all general use EV charging bays.

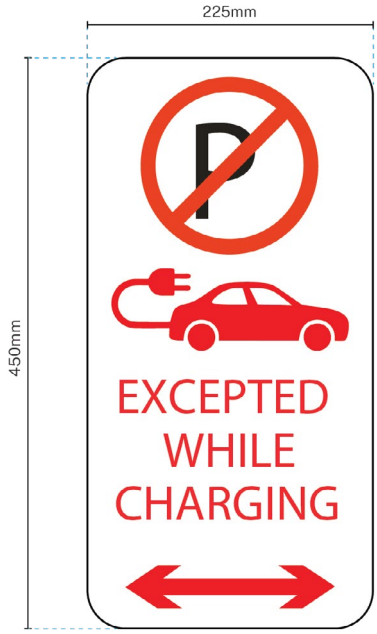


Diagram 2 - Sign type R5-40-1n

2 Technical Requirements

2.6 Charging Station Layout

Signs to be positioned as follows:

- Wall mounted - Located on the wall directly behind the carpark and 1850mm (H) to base of sign from carpark FFL, and centrally within the width of the car space.
- Pole mounted - Placed 500mm back from the front face of the kerb (to centre of post) and aligned to the centre of the width of the car space.

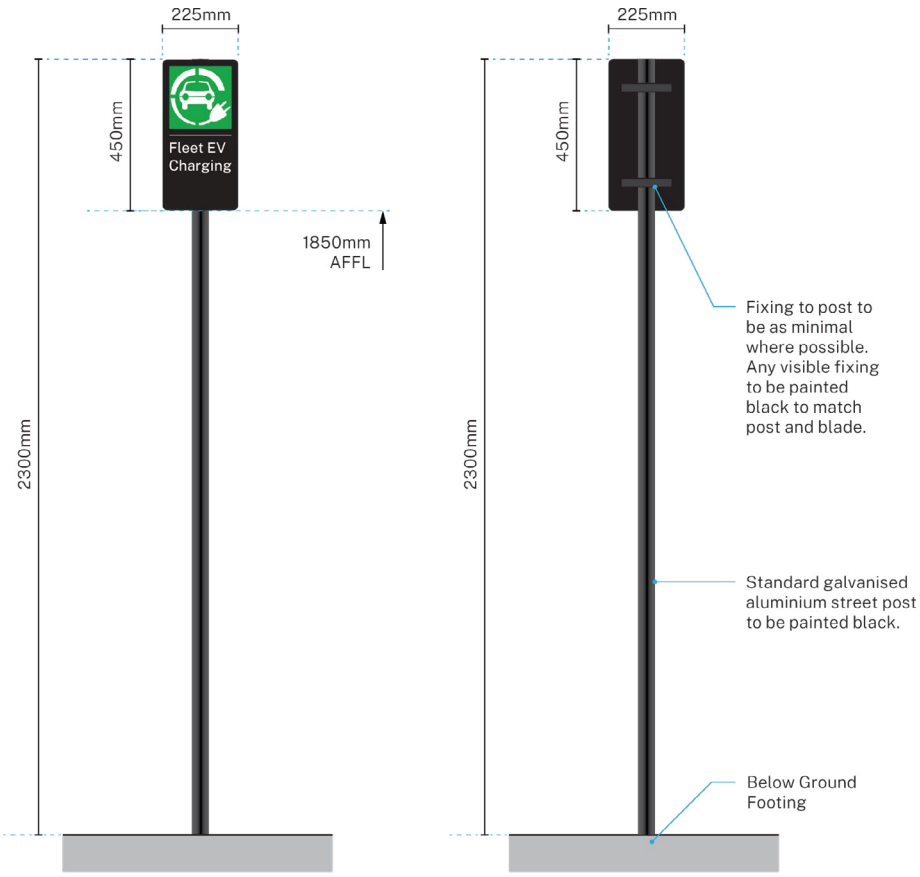


Diagram 3 - Pole mounted sign, front and rear elevations

Linemarking

Line marking must include a painted pictogram to the following requirements:

Fleet vehicle parking bays:

- A white symbol located on a green background 1100mm(L) x 1100mm (W).
- The green background should be equivalent to AS2700 G13 Emerald.
- Located between 500-600mm from the car park entry point, and centrally within the width of the car space.

2 Technical Requirements

2.6 Charging Station Layout

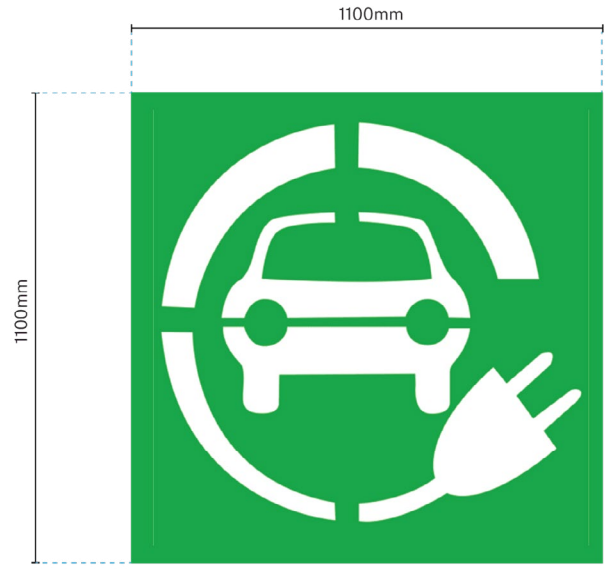


Diagram 4 - EV fleet carpark linemarking icon

General EV charging bays:

- Green pavement marking icon with charging restriction wording as per TS 00106:1.0

Diagram 5 - EV charging linemarking icon with restriction wording

2 Technical Requirements

2.7 Components

2.7.1 Lead in infrastructure

Where project requirements necessitate upgrades to the lead in infrastructure, ensure that the capacity is sized to suit potential future EV charging installations, inclusive of load management strategy. This includes:

- Site electrical capacity.
- Consumer mains capacity.
- Sub-main capacity.
- MSB capacity
- Capacity of EVDBs, or space for additional future EVDBs/DBs.
- Conduits and trenches

Where infrastructure upgrades are required, provide options for load management or alternate power sources that maintain existing lead in infrastructure and seek direction from TAFE Infrastructure NSW.

Where the current NCC requires an increase in the capacity of lead in infrastructure above these standards, size lead in infrastructure to meet NCC requirements.

2.7.2 Distribution boards

EV chargers are required to be provided with dedicated EV boards or circuits as per the following requirements:

Requirements	Sites with more than two EV chargers	Sites with two or fewer EV chargers
Distribution board type	Provide a dedicated EV distribution board (EVDB) from the main switchboard	EV chargers may connect into general distribution boards
Distribution board size	EV charging board to be selected from standard sizes up to a maximum of 250A chassis, provide additional EV charging boards if 250A is exceeded	As per requirements for general distribution boards
Sub-meters	Provide an electrical sub-meter per charger capable of connecting to a BMCS/EMS	Provide an electrical sub-meter per charger capable of connecting to a BMCS/EMS
Electrical supply	All EV chargers and load management system shall be fed off the EVDB	All EV chargers and load management system shall be fed off the general DB
RCBOs	All RCBOs supplying EV chargers shall be type B RCBOs	All RCBOs supplying EV chargers shall be type B RCBOs
Spare capacity	Allow for a 48-pole spare capacity to enable future provisions for additional EV chargers.	As per requirements for general distribution boards.

Distribution boards must be located in compliance with the NCC, AS 3000, and as per the TAFE NSW Electrical Services Design Standard - Section 4.3 Switchboards.

2 Technical Requirements

2.7 Components

2.7.3 Conduits

Provide separate conduits for power and data and size for future possible expansion.

Conduit pathways should be optimised for each site to reduce length, minimise cabling, conduits and infrastructure runs. Preferred conduit locations are below ground but may be subject to site-specific requirements (i.e. building mounted). The locations of EV chargers and conduits must be protected from mechanical damage and vandalism.

2.7.4 Cabling

All communication cabling must be provided in accordance with the TAFE NSW Structured Cabling Specification.

All communications cabling must be CAT6A (or equivalent) between the load management system, EV chargers, and multifunction meters.

The EVCH shall be provided with a single CAT6A data outlet for potential Wireless Access Point provisions.

2.7.5 Load Management

Load management if required and agreed by TAFE Infrastructure NSW for existing and new sites to be provided in accordance with the following:

New Site	Existing Site
Peak load management with dynamic energy allocation via dynamic set point	Dynamic load monitoring via static set point at the EV switchboard/general switchboard

The load management system shall be fully functional and compatible with all connected multifunction meters and EV chargers. The system will be capable of reading, viewing and storing current and power readings from all meters using a standard communications protocol.

When implemented the trickle charge method will limit the charging speed of the EV chargers during peak usage time. During this time the speed of charge will be limited as a ratio of available power to a minimum of 20%. When the site uses less power, more power will be allocated to the EV chargers through load management software monitoring the sites overall usage.

2.7.6 Billing

Billing for TAFE NSW electric vehicle charging stations is managed via the Chargefox platform. All EV chargers installed on TAFE NSW campuses must be able to support Chargefox.

2.7.7 Metering

All EV chargers must be provided with a private meter, the private meter must support connection to an EMS and BMCS as per TAFE NSW Electrical Services and Smart Campus Design Standards.

2 Technical Requirements

2.8 System Connectivity BMCS / Non-BMCS on Site

Provide system connectivity as follows:

Connectivity Type	Connectivity Requirement
Chargefox Platform	Provide to all sites where EV chargers are installed
TAFE NSW Cloud Access	Provide to all sites when providing EV chargers. Connect software and load management to TAFE NSW cloud software to allow remote access to monitor system
BMCS	If compatible BMCS is on site, provide connectivity as required to interface to the usage data and load management data for all EV chargers
Energy Management System	If compatible EMS is on site connect all charging meters to the EMS

Connections to be as per the TAFE NSW Smart Campus Design Standard. Connection type may include physical cabling, 4G, 5G and wireless depending on site requirements and to provide the best solution for the specific installation considering distance and reliability.

In addition, the load management platform and monitoring software shall consider future expansion for each car space to be connected to the load management system.

2.9 Deliverables

2.9.1 Designer submissions

Submit detailed design drawings and specifications which indicate the following:

- EV charging unit details including product brochure (containing product images, general features, size and standard finishes) and associated technical specifications, installation guide and maintenance manual.
- Location plan showing charger location on site and including all relevant dimensions.
- Spatial requirements for each EV charger adjacent the car space, with manufacturer's advised clearances around EV charger and car space, walls and columns shown. Show charging cord distances reaching the car spaces on either side of the charger.
- Linemarking and signage layouts and detailed drawings.
- Electrical layout plan showing proposed locations, conduit pathways and reticulation pathways for power and communications.
- Determine spare capacity from existing electrical infrastructure for provision of EV chargers and highlight implications on existing infrastructure if the nominated required amount of EV chargers are provided.
- Single line diagrams showing proposed connections to infrastructure.
- Details of the proposed load management system (if required) and expected limitations to charging. If load management is not used, provide permission to connect approval from relevant supply authority for additional load.
- Metering proposed, and interface connection details to EMS and BMCS. For campuses without EMS/BMCS ensure the metering can connect to such systems in the future. Incorporate any requirements of the TAFE NSW Smart Campus Design Standard/
- List of any interpretations, assumptions or judgement made in the design.

2 Technical Requirements

2.9 Deliverables

2.9.2 Installer submissions

Installer to submit all as-built drawings, shop drawings, operations and maintenance manuals, and required certification upon completion of the project. All documentation to be submitted in both hardcopy and digital formats.

Amendments

3 Amendments

3.1 Amendments to Electrical Services Design Standard

Two amendments to the TAFE NSW Electrical Services Design Standard are triggered when applying the Electric Vehicle Charging Station Design Standard on a project.

Clause	Page	Change
4.3 Switchboards > 4.3.2 Design > Distribution board > item 2. lighting section	47	This section is not required for electric vehicle distribution boards
4.5 Energy Management Systems > 4.5.2 Design > Functional Requirements > item 10. Dashboards	55	Include additional point *"- EV Charging load management status"*

Definitions

4 Definitions

BMCS - Building Management & Control System

Chargefox - The current NSW Government nominated provider of charger and electric vehicle management solutions

EMS - Energy management system

EV - Electric vehicle

EVDB - Electric vehicle distribution board

Dual Port - Charging station with two charging outlets, typically positioned between 2 carparks to service both carparks

Fleet vehicles - Electric vehicles that are part of the TAFE NSW fleet of vehicles

General vehicles - Electric vehicles owned by the public and other businesses outside of TAFE NSW

OCPP - Open Charge Point Protocol, a standard widely accepted data protocol enabling any charging station to connect with any charging system regardless of the vendor

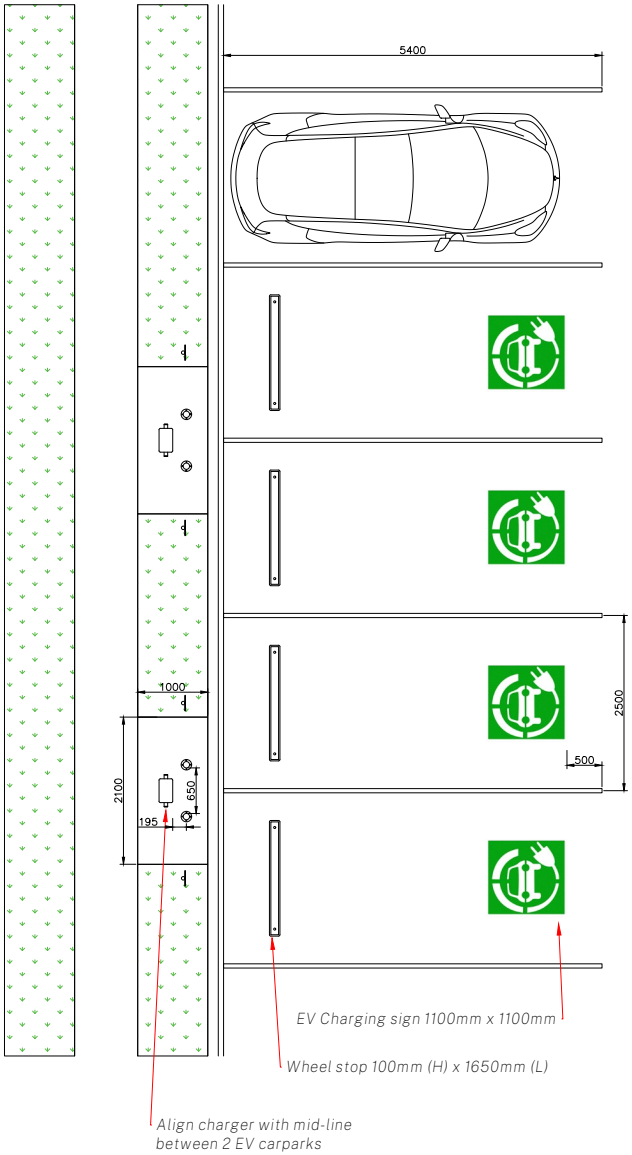
RFID - Radio frequency identification

Appendices

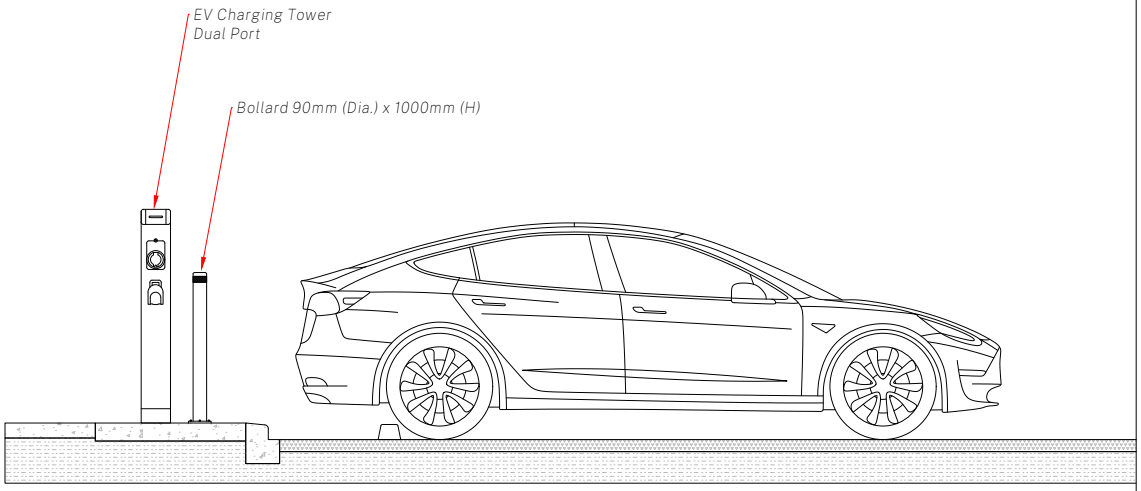
5 Appendices

5.1 Appendix A: Fleet Vehicle Charging Bay Layouts

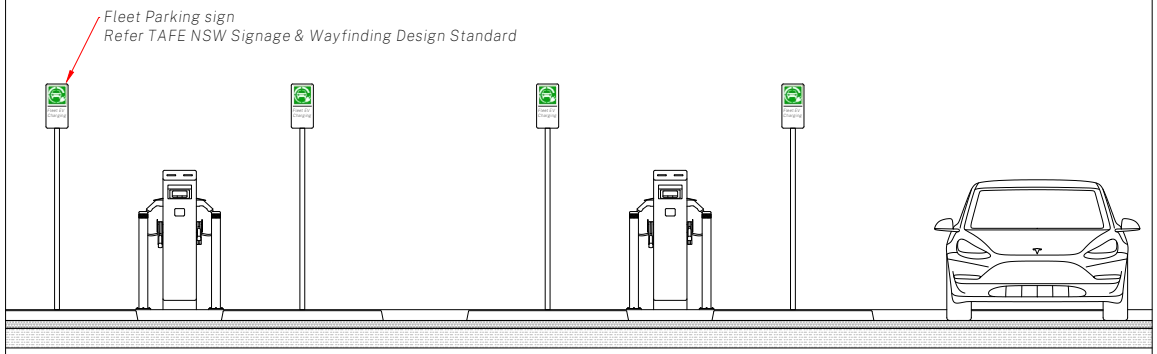
The layouts shown in the following pages are general in nature and for information only. It is the consultant and contractor's responsibility to develop the charging bay design for the project, accounting for the business/user requirements and site constraints unique to the project.



Floor plan



Elevation - side



Elevation - front

General Notes

Not for construction.
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No.	Revision/Issue	Date

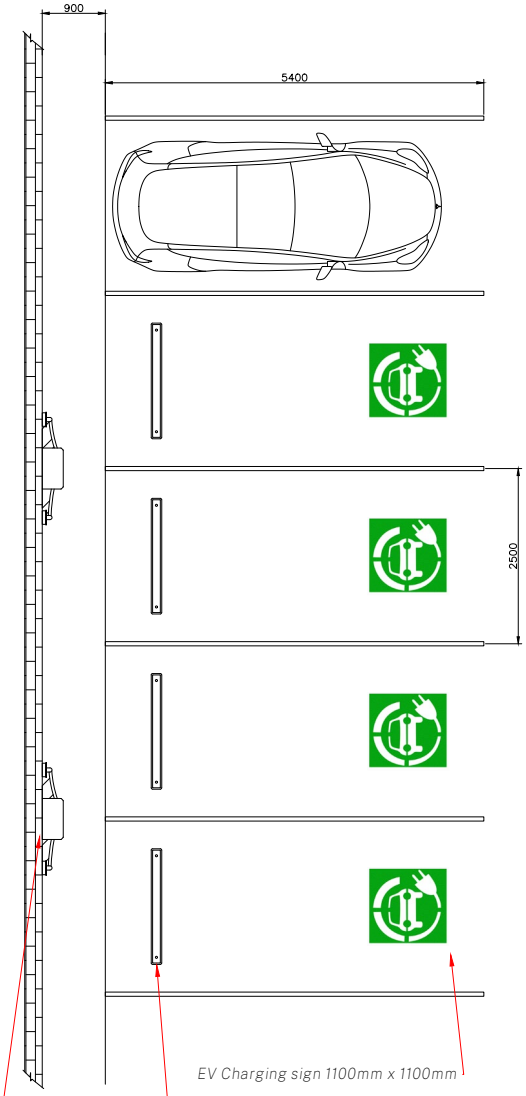
Firm Name and Address

TAFE NSW

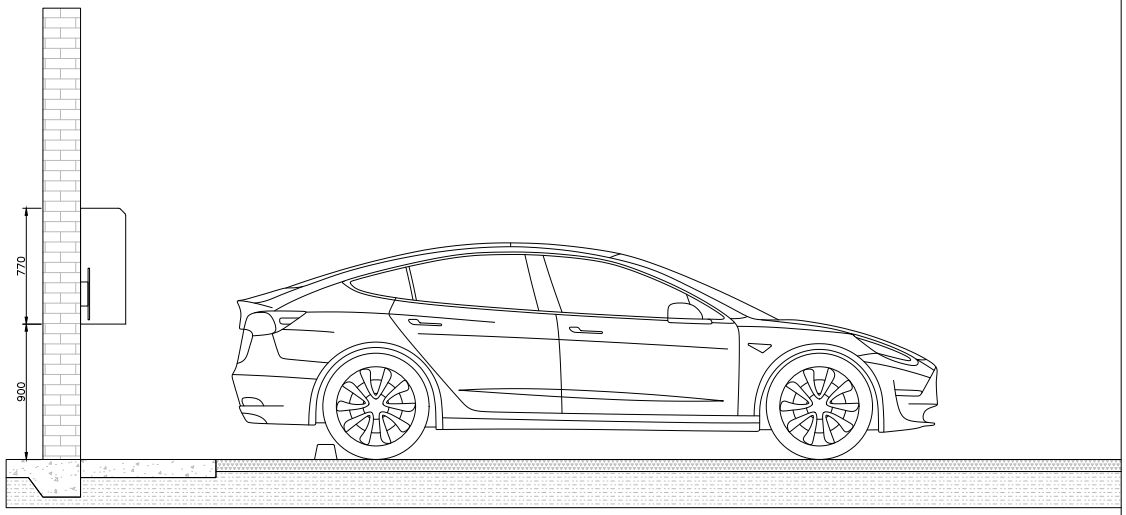
Project Name and Address

EV Charging Stations
Fleet Vehicle Ground–Mounted Charger
Plan & Elevations

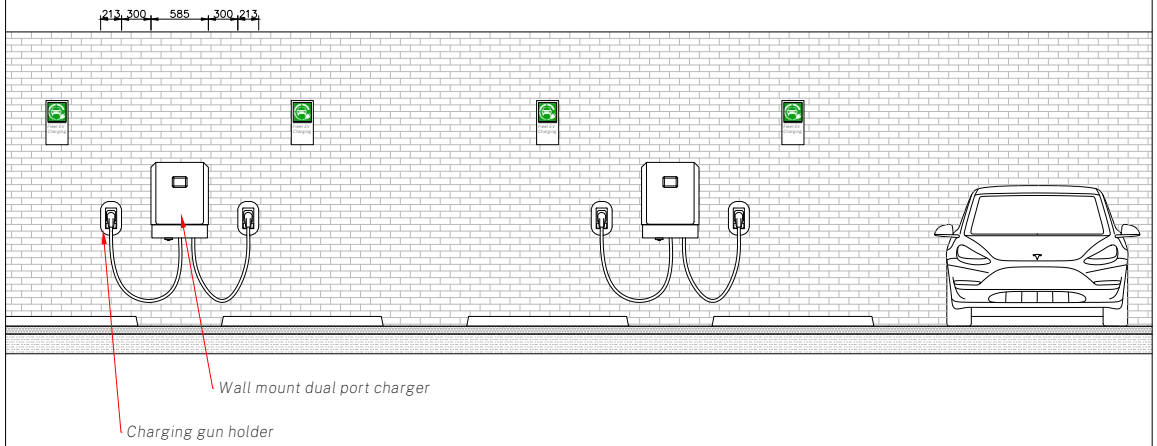
Project: EV Charging	Sheet: 02
Date: 06.12.2024	
Scale: NTS	



Floor plan



Elevation - side



Elevation - front

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No.	Revision/Issue	Date

Firm Name and Address

TAFE NSW

Project Name and Address

EV Charging Stations
Fleet Vehicle Wall Charger
Plan & Elevations

Project: EV Charging	Sheet: 01
Date: 06.12.2024	
Scale: NTS	

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