CENTRAL NSW
JOINT ORGANISATION

Electric Vehicle Charging Infrastructure

Assessment of Suitable Charging Sites
December 2021

Prepared by ChargeWorks Pty Ltd

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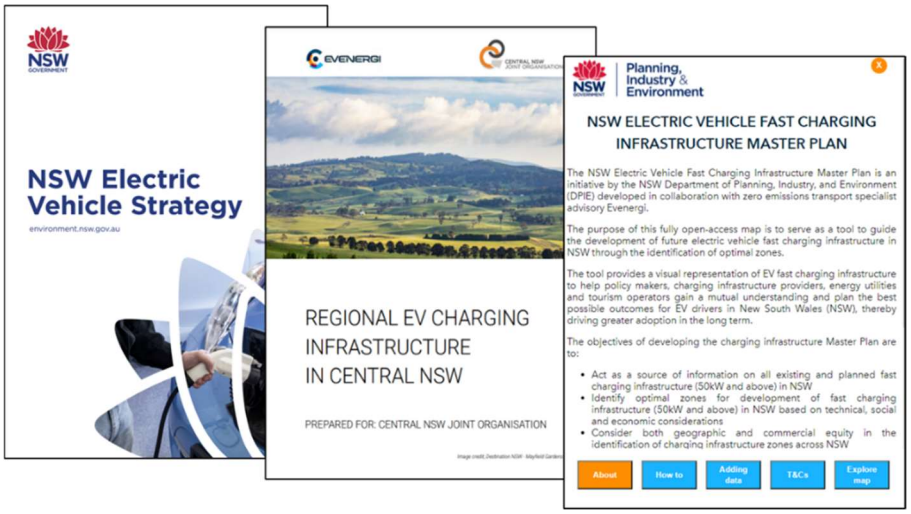
Introduction

In June 2021 the NSW Government published its NSW Electric Vehicle Strategy detailing a commitment to accelerate the uptake of EVs in NSW. This strategy identifies a $171 million investment over the next 4 years to develop a world-class charging network across the state.



Of the total investment:

- $131 million is for **ultra-fast** charging infrastructure in areas with limited off-street parking, as well as to build EV Commuter Corridors and Super Highways
- $20 million is for charging infrastructure in or near commuter carparks and other popular Transport for NSW sites
- $20 million is for **destination** charging infrastructure at **regional tourist locations**, such as motels, restaurants and wineries.

EV Strategy Masterplan

In September 2021, the NSW Government published an electric vehicle fast charging Masterplan prepared by EVENERGI to support industry and planners in selecting ideal locations for public fast charging stations.

This plan includes an interactive tool which identified optimal zones for fast charging throughout NSW over the next decade. The table below summarises the target number of **fast charging** plugs within each region of central NSW.

	Existing (NRMA + Tesla)	**Target Number of Plugs**		
Council	2021	2023	2026	2031
Bathurst	7	4	13	59
Blayney	0	N/A	N/A	N/A
Cabonne	0	4	4	7
Cowra	1	4	4	19
Forbes	0	4	4	12
Lachlan	0	4	4	4
Oberon	0	N/A	N/A	N/A
Orange	1	4	9	43
Parkes	1	4	4	17
Weddin	0	N/A	N/A	N/A

Masterplan Optimal Zones– CNSWJO Councils

CNSWJO Regional Charging Infrastructure Report

In 2020, prior to the NSW Government's EV Strategy, the Central NSW Joint Organisation contracted EVENERGI to prepare a Regional EV Charging Infrastructure Report which shortlisted potential charging sites in each of the member Council areas and provided recommendations around successful implementation.

This report was focused on supporting tourism to the regions. EVENERGI conducted a desktop assessment of the suitability of both Council owned and privately owned locations in each Council. It also provided an overview of the existing electrical capacity within the network at each location.

Key takeaways and recommendations from this report are:

- CNSWJO supports private EV charging operators to develop sites that can be monetised, but it will consider becoming the lead proponent for providing "blackspot" charging infrastructure in the region.
    - Whilst some sites can be monetised, Councils should look to facilitate external benefits to the region in blackspot locations.
    - Councils should own the assets but outsource installation and operation to a single provider.
    - Councils will be most effective in stimulating private investment if they provide high-quality and transparent information, streamline planning processes, and offer site leases at nominal or no cost where appropriate.
- Focus efforts on being grant ready.
    - Identify final sites, determine clearer costing, and develop a resourceful team within the CNSWJO to advocate on behalf of the region.
- Collaboration on infrastructure projects in the region is more efficient than alone.
    - A regional approach towards a charging network will provide a better charging experience, avoid blackspots, and optimise efforts for securing funding.

Following the recommendations of this report, the CNSWJO has facilitated buy-in from Council stakeholders and engaged ChargeWorks to conduct a site assessment of those short-listed sites.

This Document

ChargeWorks has continued the work done by EVENERGI by conducting a site assessment of up to 8 potential destination and fast charging locations in each of the member Councils.

The aim of this report is to provide clear recommendations around the suitability of shortlisted locations and inform Council decision making to assist in becoming grant ready.

The recommendations made within this report are aligned with the goals of the NSW Electric Vehicle Strategy and Masterplan with the aim of accessing some of the applicable funding streams.

ChargeWorks travelled to each of the 60 proposed locations in an electric vehicle using existing charging infrastructure.

The recommendations in this report are based on suitability of locations in terms of:

1. Use case
2. Physical constraints
3. Electrical constraints, and
4. Long-term regional strategy integration.

The sites selected for assessment were identified by each Council with consideration of the recommendations within the EVENERGI report. Each Council nominated between 1-3 fast charging sites and 2-5 destination/tourism sites.

ChargeWorks visited each of these locations as well as other potential sites that weren't identified by Council.

At each location ChargeWorks determined:

- Future use case for both local and visiting EV drivers including impact on Council and nearby residents and businesses.
- Suitable equipment size to satisfy use case requirements.
- Electrical considerations including required upgrades to service required capacity.
- Considerations for future expansion.
- Impact on existing carparking i.e. space availability.
- Considerations for potential EV charging providers.
- Consideration of Council's energy strategies.
- Indicative price for implementation.

This report recommends that each Council will achieve the best outcome by focusing their resources on **proper execution of suitable sites** over trying to deliver charging across lots of sites.

Many of the shortlisted locations **served no use case** meaning they are unsuitable and/or inconvenient for any local or visiting EV driver.

Common limitations across the shortlisted locations include:

- Use Case
    - Just because a site has EV charging doesn't mean EV drivers will use it – there needs to be some specific use-case present.
    - EV tourists and visitors will not use a charging location unless it has suitable appeal, i.e:
        - Is in close proximity to a desirable destination.
        - Has suitable amenities.
        - Has suitable lighting and safety.
        - Is not geographically isolated.
    - Unlike major metropolitan areas, the vast majority of locals have access to home charging and will not use slow-speed EV charging unless it is extremely convenient.

- Electrical Constraints
    - Many of the sites did not have sufficiently sized electrical infrastructure to accommodate EV charging without upgrades.
    - Whilst strong use cases at some sites do warrant upgrades, the high cost of electrical upgrades prohibits charging at other sites with lesser use cases.

- Physical constraints
    - The availability of front or rear to kerb parking was considered.
    - The necessary space for charging infrastructure was considered.
    - The impact to the existing parking layout was considered including the high utility of existing spaces – i.e. EV charging shouldn't take up busy spots

- Better charging elsewhere
    - Within towns, superior charging locations will eclipse others that are lesser powered or less convenient.
    - Councils are better off doing one location really well rather than multiple locations in the same town.

EV Charging in a Regional Setting

Electric Vehicle charging requirements in a regional setting differ greatly from urban environments. This is primarily due to the greater distances travelled, smaller town size, lower population density and the increased availability of home charging.

The table below details the different use cases for EV charging in a regional setting:

Use Case	**Behaviour**
Legitimate Destination or Tourism Charging	Drivers **<u>without</u>** home charging, including tourists, who specifically seek to visit charging stations when it is convenient to do so whilst completing other tasks. Visiting drivers will select their destinations based on availability of charging infrastructure. EVSEs* will be visible on car GPS, phone apps or online such that installing an EVSE in a small town may serve to "Put it on the map". Suitable destinations may include a lunch stop in a small town or overnight accommodation. Local drivers will visit locations such as workplaces, restaurant precincts or shopping centres regularly and will plan their weekly charging habits around these visits. This type of user typically spends between 1-3 hours charging - usually enough time to recharge a vehicle close to 100% state of charge when charging a few times per week.
Fast Charging	Drivers that **<u>do not</u>** have access to home or convenient destination charging may require the use of fast chargers. This use case is similar to the conventional petrol station model where drivers specifically go to recharge for between 5 and 30 minutes. This is not the norm for EV drivers except for very long journeys and very occasionally when EVs are accidentally left without charge. Fast charging sites should be close to major roads and be quickly and easily accessed.
Opportunity Charging	Drivers may choose to take advantage of public charging when they happen to be visiting a location for other reasons. This opportunistic charging is performed not because it is essential, but because it is free (or at least cheaper than charging at home). In a regional setting, most residents live in a free-standing home with access to overnight charging.

**EVSE - Whilst more commonly referred to as a 'charger', Electric vehicle supply equipment (EVSEs) can be understood simply as devices that supply electricity to EVs. The battery charger is in fact located on-board an electric vehicle and it is the vehicle that controls the charging process.*

Fast Charging

The CNSWJO's regional approach to electric vehicle infrastructure facilitates a more wholistic view of the future fast-charging network. That is, the infrastructure within each Council is closely related to the network available in neighbouring Councils. It is sub-optimal to install expensive ultra-fast chargers in every major town as many of these will go under-utilised, particularly in the short-medium term.

According to the NSW Government's EV strategy:

"NSW EV drivers already have access to the largest regional network of EV fast chargers in Australia, with 59 EV fast charging sites featuring 153 charging stations available across New South Wales as of July 2020, and another 35 underway.

The NSW Government will build on this progress by co-investing in more ultra-fast chargers at 100 km intervals across all major highways in New South Wales – creating 'EV Super Highways' across the State. This will help regional residents and businesses share in the benefits of EVs by improving their access to charging infrastructure and encouraging more city-based EV drivers to travel to regional areas, boosting local tourism."

Figure 3 Indicative map of NSW EV Super Highways.

The recommendations for ultra-fast (350kW) chargers are limited to towns which form part of this Super-Highway network.

However, there is a strong case for more affordable fast chargers of between 25-125kW which are optimised to suit the use case of other locations and fill in the "black spots" between these Super Highways.

The NSW Government Masterplan identified "Optimal Zones" for regional fast charging based on:

- Projected electric vehicle adoption in the area
- Traffic movements
- Tourism data
- Vehicle ownership
- Local points of interest
- Location of major cabling across NSW
- Available substation capacities

ChargeWorks has identified at least one suitable location for fast charging **within each Council** to align with the optimal zones identified in the Masterplan.

For Blayney, Oberon and Weddin, ChargeWorks has identified suitable locations for one or more 50kW fast chargers similar to the existing NRMA network. 50kW EVSEs will act more as highly capable destination chargers by providing a fast-charging assurance to EV drivers who might have range anxiety when travelling outside the major highways.

Parkes - NRMA 50kW EVSE

Destination/Tourism Charging

The NSW Government has committed $20 million to destination charging infrastructure at regional tourist locations, such as motels, restaurants and wineries.

Council destinations assessed in this document are primarily:

- The main street of a small town
- Public parks and amenities in the centre of town
- Visitor Information Centres

A well-placed charger at these locations, whilst not an EV driver's primary destination, will facilitate access to nearby shops, restaurants, and other local businesses.

It is critical to **match the charging infrastructure to the use case** at each of these locations.

For example, where a winery may see drivers stay for 1-3 hours or even overnight, public parks and Visitor Information Centres usually serve more of an extended pit stop of less than hour before a driver travels onwards to their primary destinations.

For this reason, "fast destination chargers" of between 25 and 75kW will provide great utility to tourists and provide benefits to all surrounding businesses.

Opportunity Charging

Many of the identified locations will allow EV drivers, both locals and visitors, to also perform opportunity charging.

As above, this opportunistic charging is performed not because it is essential, but because it convenient (and usually free).

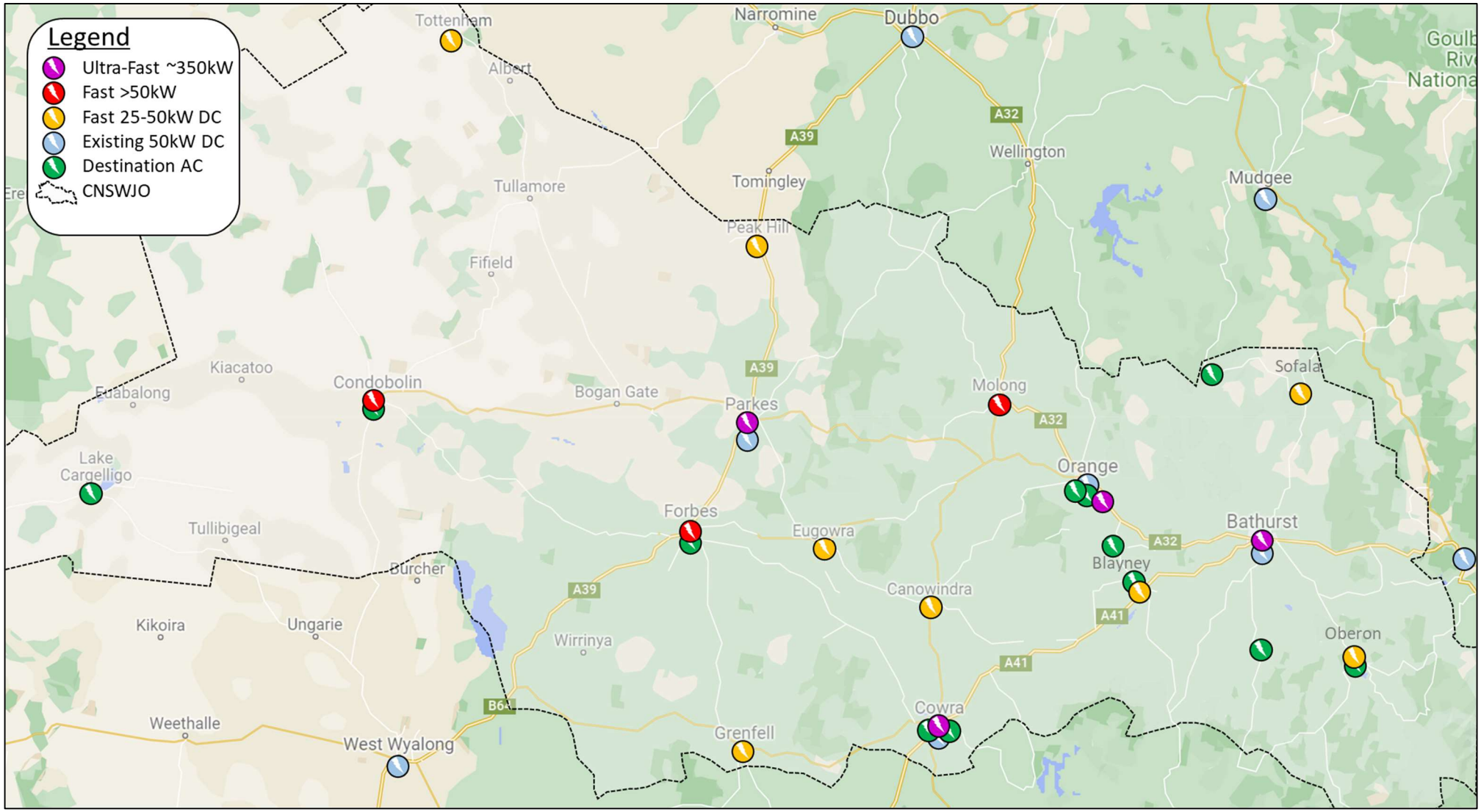
Whilst most locals won't drive to a Visitor Information Centre to charge, they may plug in at a charger located in the main street or public amenity if their activities happen to see them parking there anyway.

Introduction to Council Based Assessments

Below is the Council-by-Council assessment of each of the nominated charging locations and any others identified in ChargeWorks' assessment.

It is important to identify the use case and imagine yourself 'in the driver's seat' as to how this charging location will be used. As above, just because a site has EV charging doesn't mean EV drivers will use it – there needs to be some specific use case present.

Proposed CNSWJO Regional EV Charging Network




Bathurst Regional Council
Hill End

Bathurst Regional Council

Fast Charging

Located 200km from Sydney, in context of the EV Masterplan, Bathurst is an ideal location for fast charging.

Bathurst already has 6 x 120kW Tesla brand "Superchargers" and an NRMA 50kW DC fast charger located at the Visitor Information Centre. Whilst this location serves its purpose, there is little in the way of amenities, especially after hours.

Moving forwards, Bathurst is expected to experience a significant increase in demand for fast charging and has been identified for **59 fast chargers by 2031**, the highest number amongst any of the Joint Organisation members. Whilst Council can begin this implementation, many of the future plugs will be stem from private investment such as at conventional petrol stations.

	Existing (NRMA + Tesla)	Target Number of Plugs		
Council	2021	2023	2026	2031
Bathurst	7	4	13	59

Elizabeth St Carpark – Ultra Fast Charging

Elizabeth St Carpark is an excellent candidate for 4 x 350kW Ultra-Fast chargers in line with the NSW EV Masterplan. This location is very close to the Great Western Highway, is well lit, has nearby restaurants, shopping centre and amenities. There are suitable spaces at the North-West corner of the carpark adjacent to the grass bordering Elizabeth St.

A new 700kVA (minimum) substation will be required to service the high-power demand. We note there are high voltage mains running underneath Elizabeth St, and the charging provider (either Council or private company) will need to work with Essential Energy to verify the power availability at this site.

Art Gallery – Ultra Fast Charging

Bathurst Regional Art Gallery is a centrally located carpark with space available for ultra-fast chargers. Located 3 blocks from the highway, with a range of nearby cafes and restaurants, this site provides a suitable alternative option to the Elizabeth St Carpark. This location is not easily visible from the main roads and would need to be sign-posted.

A new 700kVA(minimum) substation will be required to service the high-power demand. There are high voltage aerial mains running along Seymour St. A 60m trench would be required to service charging in the carpark.

Destination/Tourism Charging

Sofala

Sofala is a candidate for a 20kW DC destination charger. The location is on the main road between Bathurst and Mudgee and is a gateway from the Central NSW region.

Drivers will likely **not need** to charge here, however, it is an attractive place to stop. This destination becomes busy on weekends so a designated EV only parking space will be required. There is an existing switchboard that can be connected to.

Hill End

Hill End is a unique historic tourist destination with visitors likely to spend a few hours here. Drivers will likely not need to charge however a 22kW AC EVSE could be an attractive, relatively low-cost option that puts Hill End on the EV map.

Council will need to liaise with the National Parks and Wildlife Office to negotiate an electrical connection to their switchboard. A short trench to the fence will provide a great location for tourists in the middle of town.

Rockley

Rockley is a candidate for 2 x 7kW EVSEs connected to the existing public toilet block electrical infrastructure.

Located next to the park and across the road from the pub this location would be great place for drivers to stop for a meal whilst topping up their car.

A short trench will be required for the cable run.

Other Sites

The following sites do not address any particular use case for EV drivers. Whilst EVs may visit these sites, there is either:

a) No compelling need to charge at this location (because there are superior locations nearby), or
b) The site is inconvenient as a charging location.

Trunkey Creek – Fast Charging

EV drivers travelling through Trunkey Creek will be serviced by fast chargers in the major towns to the north and south.

Whilst there are public toilets at this location, there is little in the way of restaurants or shops. This site would require significant civil works (new carpark) and substantial upgrade to electrical infrastructure. There is currently insufficient capacity in the network to supply fast charging in Trunkey Creek.

Chifley Dam – Tourism

An EV driver's decision to visit Chifley Dam will be made regardless of whether charging is available. There are amenities and outdoor attractions to occupy drivers however no restaurants or shops to benefit from EV tourism.

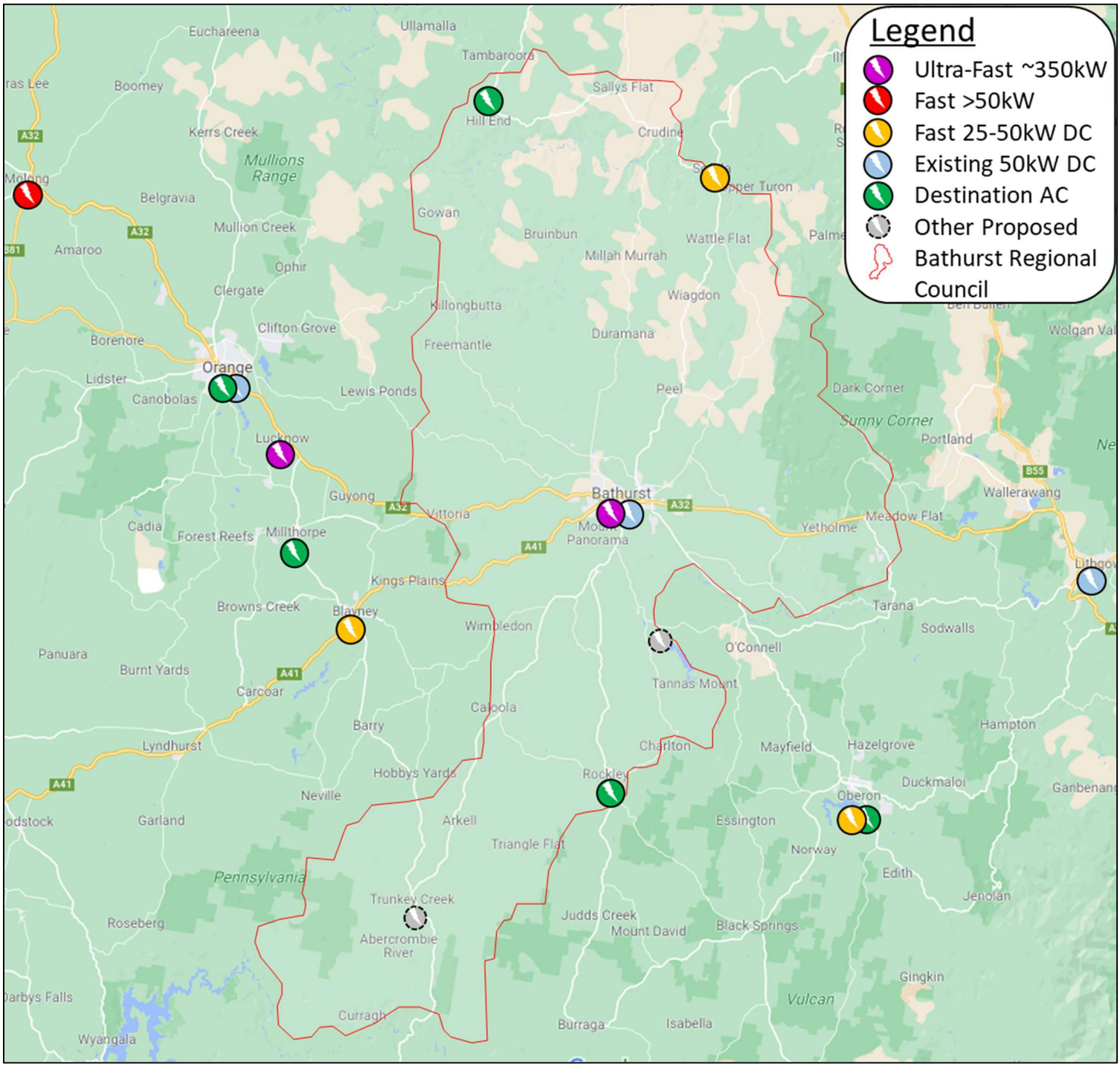
Chifley Dam is also close enough to Bathurst that charging at this location will never be a necessity.

Bathurst Regional Council – EV Charging Map

The proposed charging locations offer an excellent balance of fast and destination charging throughout the LGA to service both locals and tourists.

The ultra-fast charging in Bathurst will experience high utility, particularly from Sydney based tourists travelling out west.

The destination chargers are spread out in the more isolated areas to service blackspots and incentivise EV tourism in places which may otherwise be passed by.



Site	Recommended EVSE	Electrical Considerations	Other Considerations	Estimated Cost
		Fast Charging		
Elizabeth St Carpark	4 x 350kW DC	• New substation required minimum 700kVA • Existing underground HV under Elizabeth St. May need to trench HV underneath road.	• Substation can be mounted either in one of the car spots or on the grass along Elizabeth St. • EVSE will require mechanical protection on road side. • 24hr McDonalds close by.	$1.9M
Bathurst Regional Art Gallery	4 x 350 kW DC (As an alternative to Elizabeth St)	• Aerial HV available on Seymour St. New Substation required for fast charging	• Low utility carpark, low visibility. • Close to shops and restaurants • Daytime amenities available.	$1.8M
Trunkey Creek	Nil	• HV aerial across the street however capacity unknown.	• Civil works required to create parking area. • Adjacent to amenities. • Poor lighting and no nearby destinations.	-
		Destination Charging		
Sofala	1 x 25kW DC	• Connect to existing Council switchboard on side of toilet block.	• Narrow street with no designated spaces. New "EV Only" space adjacent to park required.	$30,000
Rockley	2 x 7kW	• Connect to existing Council switchboard on side of toilet block	• Trenching required.	$12,000
Hill End	1 x 22kW AC	• Connect to National Parks and Wildlife office. Short trench to front fence required. Consult with National Parks and Wildlife		$9,000
Chifley Dam	Nil	• HV and LV aerials available. New meter connection required	• No use case or external benefit • Potential to make campground a powered site however this will be used by Caravans and not EVs.	-


Blayney Shire Council
Millthorpe

Blayney Shire Council

Fast Charging

The NSW EV Masterplan did not identify Blayney Shire as an optimal zone for ultra-fast charging, however, it is a great candidate for two 50kW DC fast chargers similar to the existing NRMA chargers in Bathurst, Orange, Cowra and Parkes.

Although considered "fast chargers", these 50kW units can act as a destination charger for the town of Blayney. These EVSEs will typically be in use for 30-90 minutes and offer visitors the opportunity to stop and see Blayney whilst they recharge their vehicle.

An EV driver may elect to stop in Blayney rather than use the ultra-fast chargers in Bathurst, Orange or Cowra, especially to save $20-$30 in charging costs if they have the time. Ultra-fast charging costs a lot more to use and so more modest charging in Blayney could be a great opportunity for attracting EV tourists to the town.

The Community Centre carpark is centrally located within town and close to the highway. It also doubles as providing charging to Council vehicles and locals looking for a quick charge whilst they are in town. Low utility car spaces at the back of the carpark near the laneway should be selected to avoid disruption to locals and patrons.

A new 100kVA pole top transformer will be required to service the new EVSEs. Whilst it may be possible to use Council's existing switchboards it is best to install a new small switchboard straight off the existing pole.

Destination/Tourism Charging

Millthorpe

Millthorpe is an excellent candidate for destination charging with a range of restaurants, cafes, and boutique shops for visitors to see. Visitors to Millthorpe will **not need** to charge, however, 1 x 22kW dual port AC charger may put Millthorpe on the charging map and entice EV drivers to stop.

The proposed location near the train station is close to the town centre whilst not occupying high utility parking spots in front of Millthorpe's local businesses.

A new meter connection will be required to service this site. ChargeWorks recommends Council dig a trench approximately 15m from the nearby power pole and install a pad or pole mounted switchboard to service the EVSEs.

This location appears to be susceptible to pooling water. Council may elect to move further up the hill or install a gutter to direct water flow away from the car spaces.

Blayney Train Station

Blayney train station is not considered a destination charging site, however, offers a unique, low-cost opportunity for Council to install lockable power points immediately adjacent to the existing parking spaces.

Drivers parking at the train station are likely to be parked for many hours and do not require significant power to top up their vehicles.

A standard 10A power point will be sufficient to recharge. EV drivers would be required to bring their own lead (common practice) and plug in to the lockable power point. The lock is required to prevent vandals from unplugging cars when unattended.

ChargeWorks does not recommend that these spaces be specifically reserved for EVs but rather offer an opportunity for charging if desired.

Due to the low power demand, the 10A power points may be supplied by the existing lighting circuit that services the poles in the carpark.

Other Sites

The following sites do not address any particular use case for EV drivers. Whilst EVs may visit these sites, there is either:

a) No compelling need to charge at this location (because there are superior locations nearby), or
b) The site is inconvenient as a charging location.

Kurt Fearnley Park – Carcoar

Carcoar's proximity to Blayney and Cowra means visitors will not need to charge when they visit the town.

Installing an EVSE will not influence a driver's decision to visit Carcoar and would only provide a low-value opportunity charge.

Should Council elect to install charging at this location anyway, it would be straightforward to connect 2 x pole mounted 7kW EVSEs to the switchboard that services the park BBQ.

Heritage Park

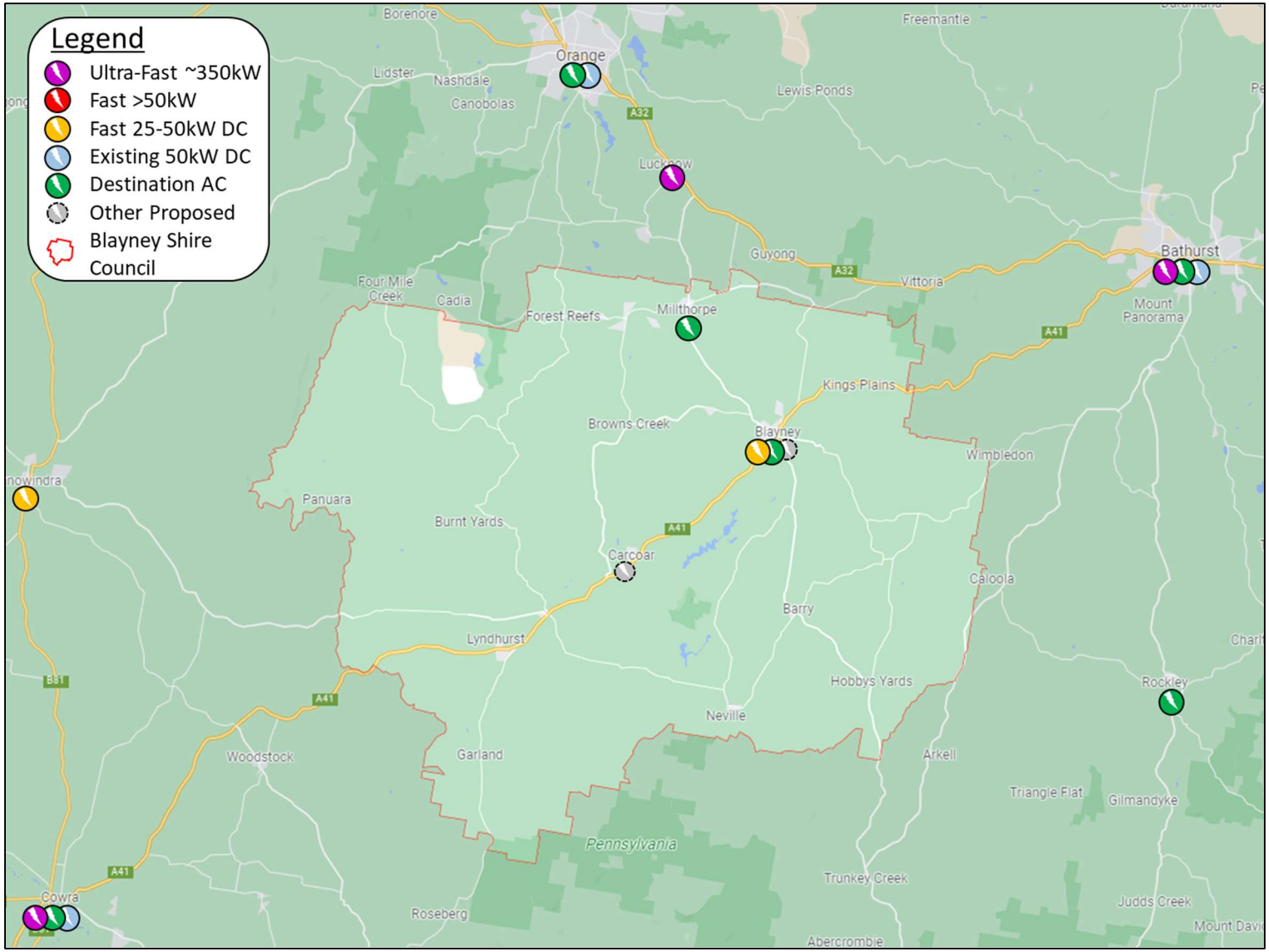
Heritage Park, located in Blayney, has few available car spaces and is generally inferior to the alternative Community Centre location.

Connecting an EVSE at this location would be electrically difficult and require new aerial power lines to cross the highway.

Aside from the park and toilet block, there is nothing for drivers to do whilst they wait for their vehicle to charge, and the town centre is too far away to conveniently walk.

Blayney Shire Council – EV Charging Map

Whilst Blayney Shire is not considered an optimal zone for fast charging, the proposed network will encourage EV tourism within the LGA and service what might otherwise be left as a blackspot by commercial charging providers. As seen in the map below, Blayney is surrounded by ultra-fast charging on the major highways. The 50kW EVSEs at the Community Centre will provide a cheaper alternative for savvy tourists looking to explore Blayney.



Site	Recommended EVSE	Electrical Considerations	Other Considerations	Estimated Cost
Fast Charging				
Blayney Community Centre	2 x 50kW DC	• Switchboard and meter to be located on the grass at the corner of the site.	• Select low utility spots in the back of the carpark near the laneway. • EVSE and equipment shall not block the accessway to adjacent properties.	$200,000
Destination Charging				
Millthorpe	1 x Dual Port 22kW AC	• New meter and switchboard to be connected to power pole located on the street corner.	• Pooling water at proposed site may be addressed with a gutter or moving the location up the hill.	$20,000
Blayney Train Station	2 x 10A lockable power points.	• Connect power to the existing carpark lighting circuit. 2 x 10A GPOs	• Car spaces should not be reserved for EVs however signage required to advertise availability.	$5,000
Carcoar – Kurt Fearnley Park	Nil	• Available point of connection at the BBQ area in the park. Would require 10m trench to roadside.	• Low use case for destination charging.	-
Blayney – Heritage Park	Nil	• Mains on the opposite side of the road. New aerials would be required.	• Very few parking spaces.	-


Cabonne Council
Molong

Cabonne Council

Fast Charging

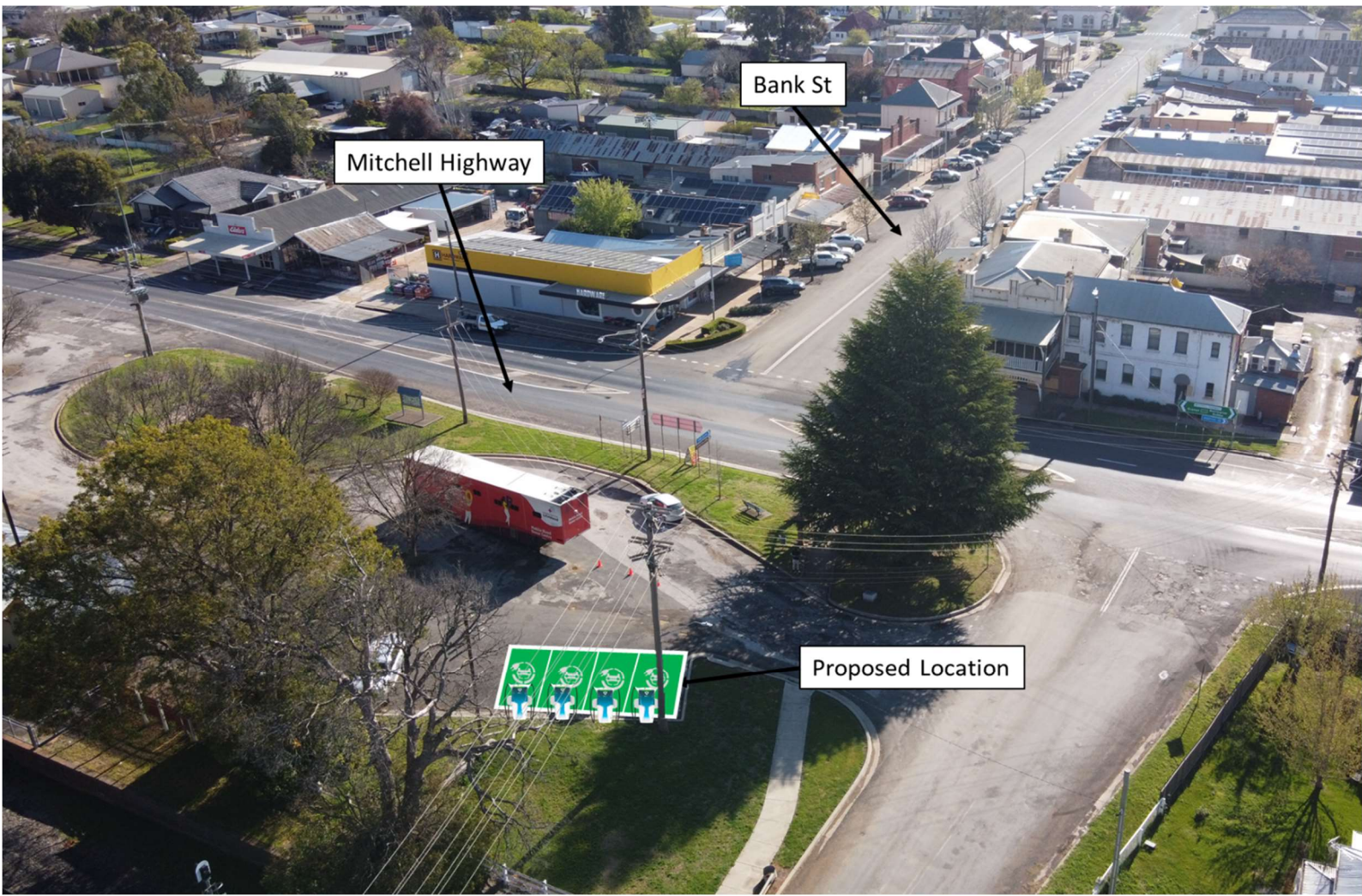
Molong railway station carpark is situated on the Mitchell Highway and is a prime candidate for 4 x 125kW DC Fast Chargers. This charging station would service EV drivers travelling north towards Dubbo from the Central West, Sydney and the Riverina areas including Canberra.

The Mitchell Highway **has been identified in the NSW Government EV Masterplan** as a Super Highway with the vision to install ultra-fast chargers at 100km intervals. According to EVENERGIs infrastructure report, Molong has limited available capacity in the electricity network, thereby restricting the power available for ultra-fast charging. Council should work with Essential Energy to establish the expected future network constraints.

Furthermore, Molong's proximity to larger regional centres of Orange and Bathurst abates the need for expensive ultra-fast chargers, particularly for drivers travelling from Sydney.

Pending approval from Essential Energy, ChargeWorks recommends Council look to install 4 x 125kW fast chargers at the railway station. Whilst not ultra-fast, these will be a very attractive option for drivers looking for a quick 10–30-minute stop.

The proposed location is in close walking distance to the centre of town with nearby shops and restaurants likely to benefit from EV tourism. The proposed location is immediately below high voltage aerial power lines and could be supplied by a 250kVA pole-top transformer.



Destination/Tourism Charging

Eugowra

Grevilia Ave Park in Eugowra is an attractive location for a short rest stop close to the park, amenities, and town centre. Visitors to Eugowra will likely not need to stop and recharge, however, a 25kW DC EVSE will be a great addition to the regions charging network for when drivers need a little top up to reach their destination.

There is an existing Council switchboard and meter located on the electrical pole in the parking area with sufficient rating for up to 25kW. This location may be susceptible to flooding so this should be considered in the design of the system. Installing a smaller AC system, whilst more affordable, will yield low utility as most driver's won't wait for a slow charge.

Canowindra – Age of Fishes Museum

The Age of Fishes Museum and Visitor Information Centre is a suitable location for a 25kW DC charger.

Like Eugowra, visitors will **not need** to recharge, however, a moderately fast charger such as this will attract visitors to stop in Canowindra instead of the major centres. This location is also a short walk from the centre of town.

There is a suitable location for an EVSE in the parking area to the north of the VIC near the disabled spot.

The VIC is currently supplied by a 100A main switchboard located near the road at the south of the building. Council will need to dig a trench approximately 70m along the front of the building to supply the EVSE.

Other Sites

The following sites do not address any particular use case for EV drivers. Whilst EVs may visit these sites, there is either:

a) No compelling need to charge at this location (because there are superior locations nearby), or
b) The site is inconvenient as a charging location.

Canowindra – Memorial Park

Memorial Park, whilst close to the centre of town, has no suitable parking spaces and insufficient power supply on the park side of the street.

Canowindra – Morris Park

Morris Park does not provide a convenient location for EV drivers to charge. Whilst there is a nearby toilet block, this location has no lighting, challenging electrical infrastructure set up and is too far from town to conveniently walk.

Cudal – Cabonne Food and Wine Cultural Centre

Cudal, located between Cabonne's two main centres of Canowindra and Molong, has a poor use case for destination charging as drivers will not require a charge when visiting Cudal. EV charging will also detract from the heritage appeal of the cultural centre.

Molong Village Green

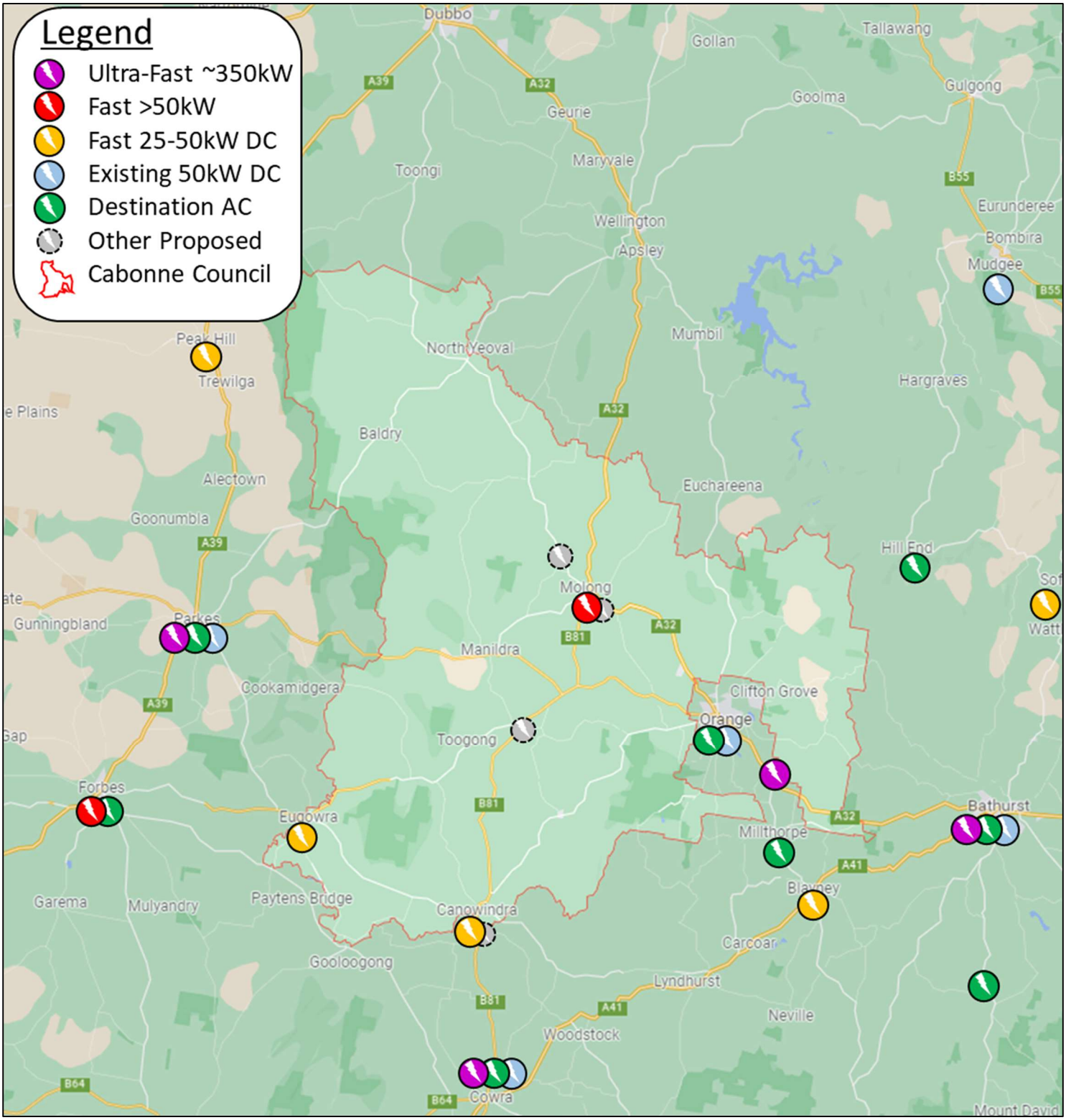
As identified above, Molong is an ideal location for a fast charger. Molong Village Green is a very attractive location, however, the infrastructure will detract significantly from the park aesthetic. It is much more practical to locate the fast chargers at the train station.

Cumnock Park

There is no destination charging use case for Cumnock. It is very close to Molong and is a detour for travellers using the Mitchell Highway.

Cabonne Council – EV Charging Map

Cabonne is one of the larger LGAs within the Joint Organisation and spans a large area within the centre of the region. Surrounded by ultra-fast charging on three sides, Cabonne is well suited to medium level fast chargers throughout the region. These chargers will aid in spanning the gap for EV drivers and provide relief to those running low on range. Molong, located on a super-highway will provide convenient fast charging to North and South bound travellers whilst incentivising drivers to explore the town of Molong.



Site	Recommended EVSE	Electrical Considerations	Other Considerations	Estimated Cost
		Fast Charging		
Molong Railway Station	4 x 125kW DC	• Available grid capacity to be verified with Essential Energy • High Voltage power lines immediately above proposed location • New 250kVA pole-top transformer required.	• Signage and space marking required.	$750,000
Molong Village Green	Nil	• Available high voltage power. • New substation required	• 45-degree parking is sub-optimal. • Electrical infrastructure will ruin park aesthetic.	-
		Destination/Tourism Charging		
Canowindra – VIC	1 x 25kW DC	• Connect to existing 100A VIC switchboard. • Active load management required to prevent overload.	• 70m trench required for cable run • Parking spaces next to disabled spot to be reserved for EVs	$33,000
Eugowra – Grevillia Ave Park	1 x 25kW DC	• Existing 40A switchboard available. • Active load management required.	• Flooding concerns. High mounting may be required. • Parallel parking will require longer cable to service all types of vehicles	$30,000
Canowindra – Memorial Park	Nil	• No suitable electrical infrastructure available on park side of the street.	• No available parking area	-
Canowindra – Morris Park	Nil	• No suitable electrical infrastructure available on park side of the street.	• Inconvenient location • No lighting	-
Cudal – Cabonne Food and Wine Cultural Centre	Nil	• Long trench required to back of building. Possibly connect to Council depot.	• Heritage aesthetic concerns • No use case due to close proximity to major towns. Drivers won't stop for slow charger.	-
Cumnock park	Nil	• Available switchboard	• No use case due to proximity to Molong. Detour from highway. • Requires carpark modification	-


Cowra Council
Cowra Japanese Gardens

Cowra Council

Fast Charging

Edgell Park, located beside the Mid-Western Highway and across the road from the Cowra Visitor Information Centre is an excellent candidate for 4 x 350kW ultra-fast chargers.

This location could form part of the EV Super Highway in line with the NSW Government EV Masterplan.

With nearby amenities and restaurants this is a very convenient location for EV drivers to stop on their way through Cowra. The Edgell Park parking area currently has 2 x 22kW Tesla chargers and designated EV parking spaces.

ChargeWorks recommends that Council upgrade the Edgell Park parking area to ultra-fast chargers. A new 700kVA (minimum) transformer should be installed on the garden island to service the increased power demand. This location is ideal from an electrical point of view because of the high voltage powerlines located immediately above the island which can service this substation. There is a pad mounted obsolete pump in this location that can be removed to make space for the new transformer.

The parking area layout will need to be modified to accommodate front or rear to kerb parking at the island as shown below. This may affect one of the long vehicle bays.

Destination Charging

Japanese Gardens

The Japanese gardens are a suitable location for 2 x 7kW EVSEs.

This carpark experiences high demand on weekends and holidays such that Council should select low utility spaces away from the entrance for EV charging.

This site presents some electrical challenges with no convenient way of sourcing power from the park entrance.

It may be more suitable to connect the EVSEs to a supply within the gardens area.

Aquatic Centre

Cowra Aquatic Centre provides a low-cost option for 2 x 7kW EVSEs. These EVSEs can be easily connect to the switchboard located next to the basketball court

This destination charger is really targeted towards **locals** visiting the aquatic centre, basketball court or the park.

For locals to use it, it must be free-of-charge or more affordable than charging at home.

An EVSE at this location would encourage patronage at the pool and potentially earlier EV adoption if marketed as free charging.

Other Sites

The following sites do not address any particular use case for EV drivers. Whilst EVs may visit these sites, there is either:

a) No compelling need to charge at this location (because there are superior locations nearby), or
b) The site is inconvenient as a charging location.

Visitor Information Centre

The Visitor Information Centre is a suitable geographic location for fast charging however lacks the electrical infrastructure and space to provide ultra-fast charging.

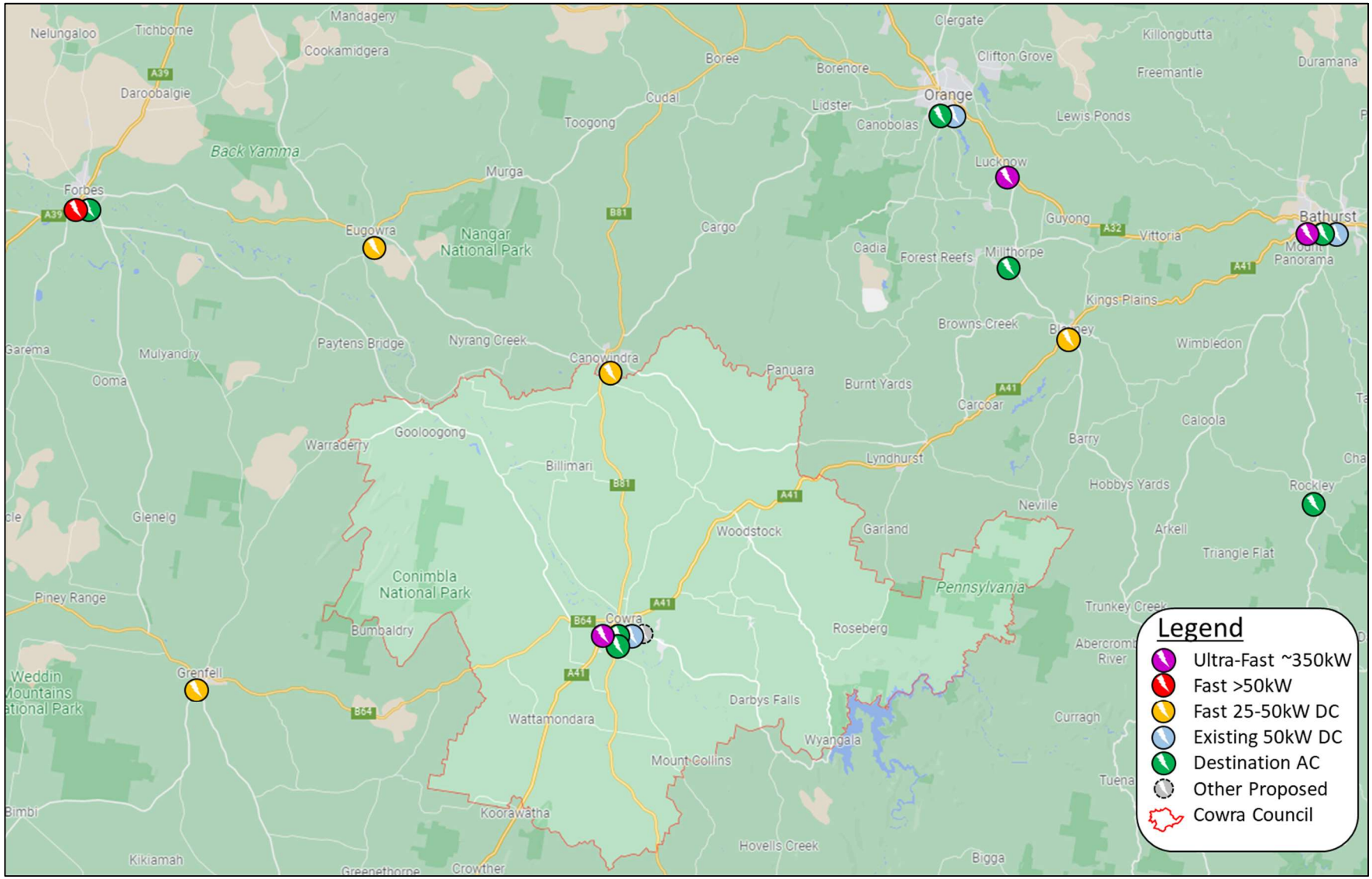
The nearby Edgell Park site identified above is a more suitable location, is highly visible and will be more cost effective to set up fast charging without impacting operations at the VIC.

CBD Carpark

Council has recently upgraded the CBD carpark with new surfacing and solar lighting. Whilst centrally located and of high utility to locals, there is no electrical supply accessible in the parking area, preventing the possibility of EV charging.

Cowra Council – EV Charging Map

In line with the NSW Government EV Masterplan, Cowra is an ideal location for ultra-fast charging at the intersection of the Mid-Western and Olympic Highways. At the southern border of Central NSW, Cowra will act as a gateway from Canberra and the Riverina and allow EV drivers to quickly recharge before proceeding to all areas of Central NSW. Cowra will service both North-South and East-West traffic and has suitable electrical infrastructure for ultra-fast charging.



Site	Recommended EVSE	Electrical Considerations	Other Considerations	Estimated Cost
		Fast Charging		
Edgell Park	4 x 350kW DC	• Available high voltage power lines immediately above location. • New 700kVA (minimum) substation required.	• Some civil works required to remodel parking area. May lose one long vehicle bay. • Close proximity to VIC, restaurants and amenities.	$1.8M
Visitor Information Centre	Nil	• No available high voltage power.	• Relatively small parking area.	-
		Destination/Tourism Charging		
Japanese Gardens	2 x 7kW AC	• Suitable power supply required from within the gardens. Trenching required.	• To be located in low utility spots away from the entrance. • Excellent destination use case	$12,000
Aquatic Centre	2 x 7kW AC	• Council switchboard immediately adjacent to parking area. Capacity to be verified by Council	• 45-degree parking sub-optimal. Recommend changing to front or rear to kerb for this section. • Suited to local use case. Should be free of charge (or cheaper than home)	$10,000
CBD Carpark	Nil	• No electrical infrastructure available		-


Forbes Shire Council
New VIC Precinct

Forbes Shire Council

Fast Charging

New Visitor Information Centre Precinct

Forbes Shire Council is in the process of developing a new Visitor Information Centre on the Newell Highway on the south side of Forbes.

The **Newell Highway has been identified in the NSW Government EV Masterplan as a Super Highway** with the vision to install ultra-fast chargers at 100km intervals. We note that the Masterplan does not specifically identify Forbes for ultra-fast charging, but Parkes is highlighted.

As Forbes is located only 37km from Parkes, it is sub-optimal to install ultra-fast chargers at both Parkes and Forbes.

For this reason, ChargeWorks recommends that Forbes look to install a much more affordable 4 x 125kW charging station at the new Visitor Information Centre. This is primarily due to the power available to the area. Forbes Shire Council is already making provision for a high voltage supply to the site within their trenching works as part of the precinct upgrade.

Destination/Tourism Charging

Victoria Park

Victoria Park is centrally located within Forbes and will serve as an excellent destination location for drivers looking to stop in Forbes for a longer duration rather than fast-charging on the highway. This location is suitable for 2 x dual Port 22kW EVSEs (4 ports total).

Opposite the iconic Town Hall, this infrastructure will be useful for tourists and locals, as well as Council's future electric fleet. There is an existing point of connection available in the park close to the road which will facilitate a straightforward and low-cost installation.

This site will likely not be suitable for monetisation however Council should expect to receive external benefits in the form of:

- Tourism benefits to nearby shops and restaurants
- Council fleet charging (short term)
- Incentivised local adoption of EVs
- High value of marketing and publicity in front of town hall

Other Sites

The following sites do not address any particular use case for EV drivers. Whilst EVs may visit these sites, there is either:

a) No compelling need to charge at this location (because there are superior locations nearby), or
b) The site is inconvenient as a charging location.

Lawler St

Lawler St is a convenient parking location with easy access to Woolworths and other nearby shops. This location would be utilised by locals as an opportunity charge **but is unlikely to attract tourists** who would otherwise charge at the highway fast-charging location. As this location is not a blackspot, there would be little external benefit to Council. Lawler St is also susceptible to flooding.

Spring St

Spring St, whilst centrally located, presents both electrical and physical challenges. Parking on Spring St is in the centre of the road and would require significant electrical and civil works to establish a charging location. Spring St has low visibility and is generally inferior to the proposed Victoria Park location.

Camping Grounds

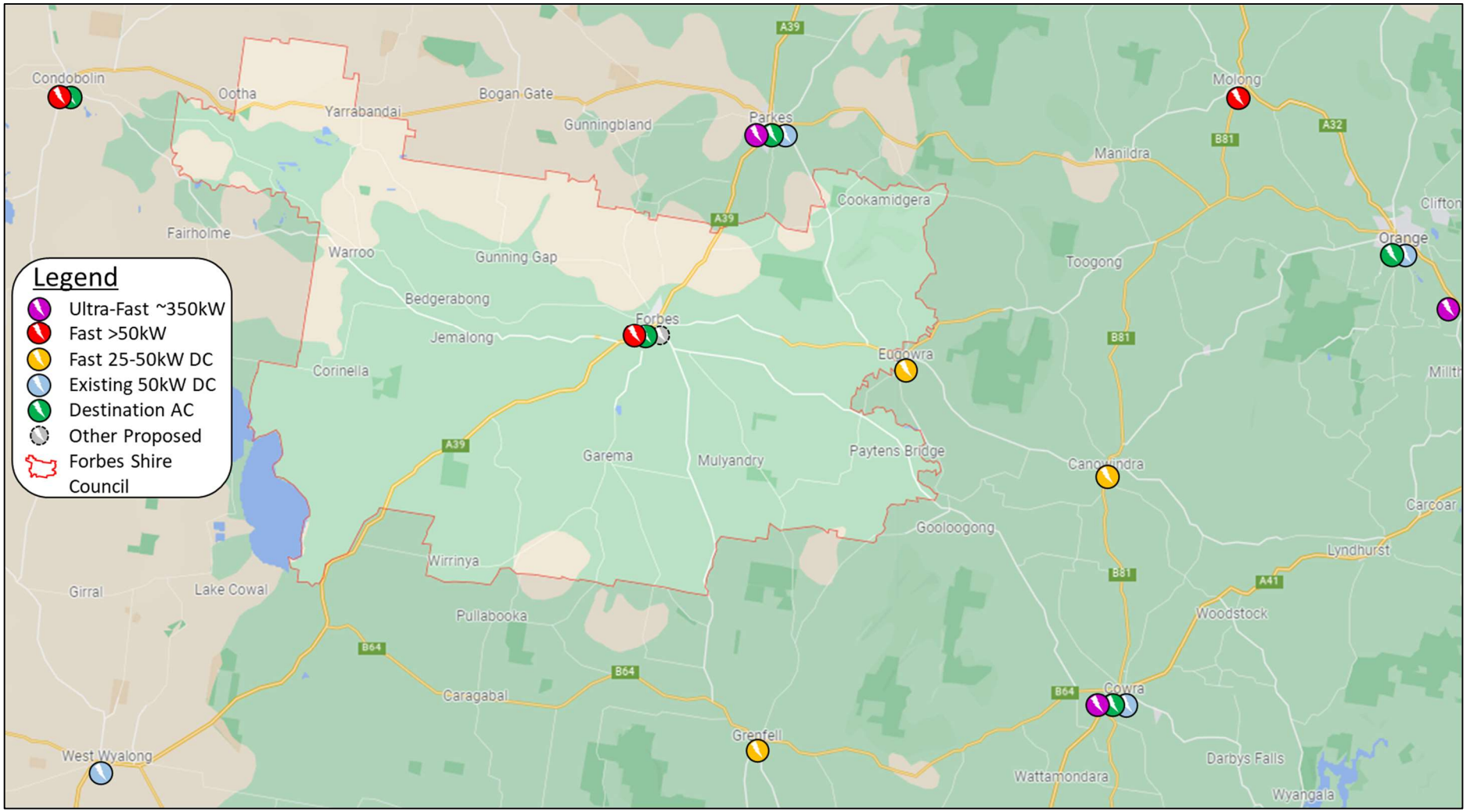
There is no use case for charging at the riverside campgrounds. There is also no conveniently available low voltage power supply on the riverside. Charging at this location would have no external benefit to Forbes.

Lions Park

The newly developed Lions Park carpark on the river is an attractive location for drivers to charge. This area is popular amongst locals for picnics and tourists to pop off the highway and have a rest stop. Power could be sourced from the toilet block if desired. There is little external benefit to Council by installing charging at this location with no nearby shops or restaurants.

Forbes Shire Council – EV Charging Map

Forbes is located on an EV super highway and is an ideal candidate for fast charging. Due to the available electrical infrastructure and proximity to Parkes, Forbes is well suited to a more affordable medium level fast charger at the new Visitor Information Centre precinct. This, along with the destination chargers in town, will remove what is currently a charging blackspot and encourage EV tourism within the LGA



Site	Recommended EVSE	Electrical Considerations	Other Considerations	Estimated Cost
		Fast Charging		
Visitor Information Centre	4 x 125kW DC	• This site is to be fed from high voltage power lines approximately 400m to the SW of the site. Council is making provisions for high voltage supply in upcoming trenching works. • Dedicated 500kVA substation required at parking location.	• Council to allocate EV charging spaces in newly developed carpark. • Toilets and amenities required at this location.	$850,000
		Destination/Tourism Charging		
Victoria Park	2 x Dual Port 22kW AC	• Existing point of connection available in the park. • Some trenching works required underneath footpath.	• High utility parking area including dedicated spot for mobile breast-screen van. Council to determine most suitable spots. • Will service Council fleet charging in the short term.	$24,000
Lawler St	Nil	• New aerial power line required across carpark. • New meter and switchboard required	• Flood zone. • Suited to local opportunity charging rather than tourists. • 45-degree parking sub-optimal	-
Spring St	Nil	• New meter and switchboard required with trenching works.	• Centre of street parking presents mechanical, electrical and practical challenges. • Poor use case	-
Campgrounds	Nil	• No immediately available electrical infrastructure.	• No use case or external benefit	-
Lions Park	Nil	• Can be connected to existing switchboard in toilet block.	• No external benefit to Council or local businesses.	-

Lachlan Shire Council

Lake Cargelligo

Lachlan Shire Council

Fast Charging

Utes in the Paddock - Condobolin

Lachlan Shire Council is in the process of redeveloping the 'Utes in the Paddock' rest area with the construction of a new Visitor Information Centre. Conveniently located close to town on Lachlan Valley Way, the 'Utes in the Paddock' is an ideal candidate for 4 x 125kW DC fast chargers. Whilst Condobolin does not lie on the EV Super Highway, the NSW EV Masterplan has identified Lachlan as an optimal zone for 4 fast chargers.

Fast charging in Condobolin will have a great impact on expanding the range of EV drivers looking to explore the heart of NSW. Under existing infrastructure, drivers must plan carefully when traveling to Lachlan Shire with the nearest charging locations in Parkes and West Wyalong, each over 100kms away.

The 200kVA transformer located at the site will need to be upgraded (to 500kVA) to service the increase in power demand. Condobolin is currently operating close to the maximum available electrical capacity on the network. Council will need to work with Essential Energy to determine the future capacity available for fast charging at this location.

Destination/Tourism Charging

Condobolin – Bathurst St

Bathurst St is an ideal candidate for a dual port 22kW EVSE in front of the public toilet block. This site is centrally located, has an existing point of connection available (100A main switch) and will provide free charging to locals and tourists looking to spend longer durations in Condobolin.

Lake Cargelligo – Visitor Information Centre

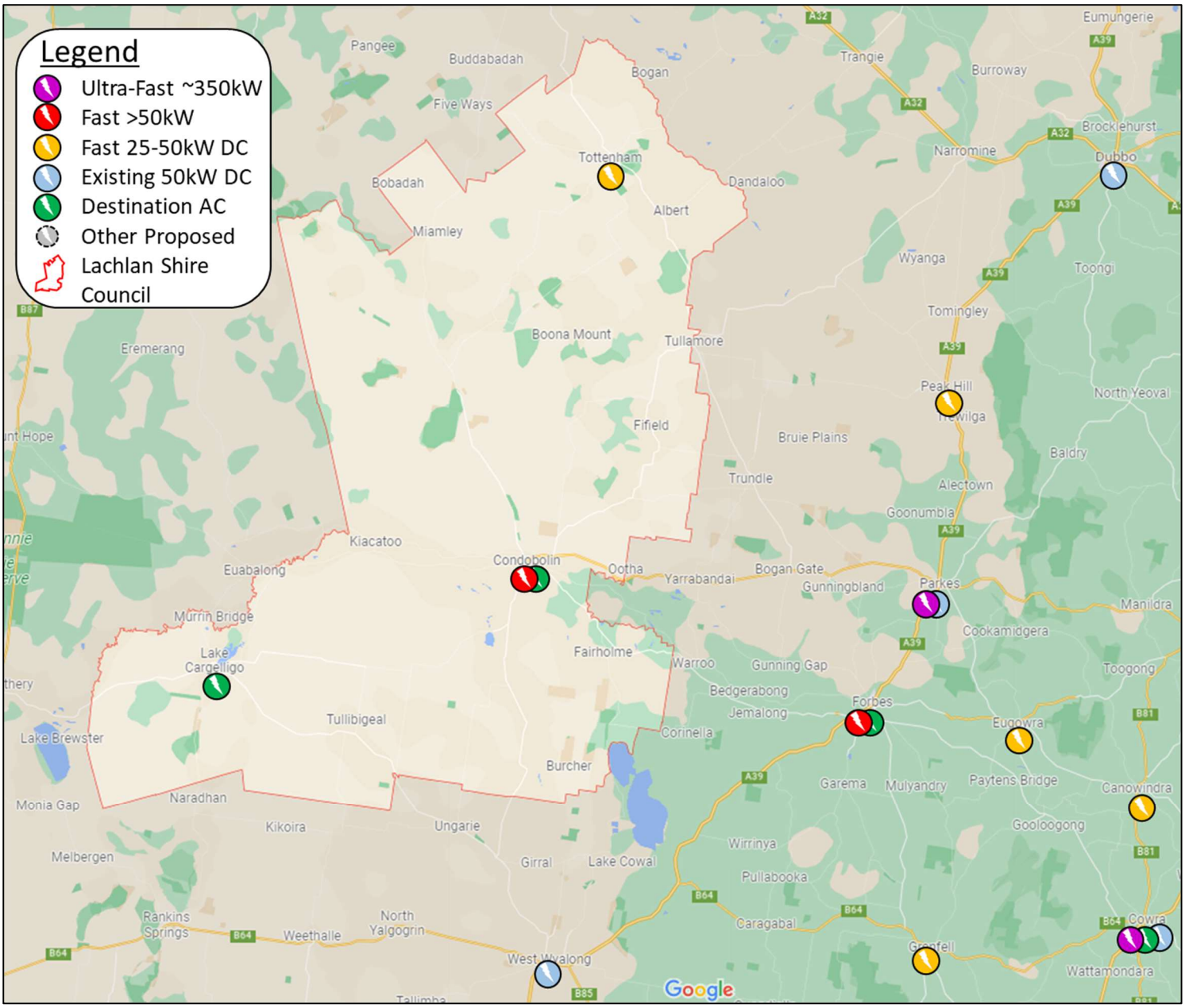
Marking the western boundary of the CNSWJO region, Lake Cargelligo provides an excellent location for a destination charger at the Visitor Information Centre. 1 x Dual port 22kW EVSE may be connected to the switchboard located on the outside of the building. The 80A main switch is sufficiently sized for these chargers however load monitoring and control should be incorporated into the design to avoid circuits tripping.

Tottenham Memorial Park

Tottenham is an excellent location for a 25kW DC fast charger. Located at the geographic centre of NSW, **this site has great marketing value** and opens central NSW to EV tourism. Memorial park is in the centre of town, has an amenities block and has a point of connection available nearby.

Lachlan Shire Council – EV Charging Map

Located in the geographic centre of NSW, EV charging in Lachlan Shire will open the region to EV tourism and service what is currently a very significant charging blackspot. The combination of medium level fast charging in Condobolin and destination chargers in Tottenham and Lake Cargelligo will provide an EV gateway to the central west.



Site	Recommended EVSE	Electrical Considerations	Other Considerations	Estimated Cost
		Fast Charging		
Utes in the paddock Condobolin	4 x 125kW DC	• Existing (new) 200kVA pole top transformer will need upgrading to 500kVA. • Consultation with Essential Energy required for available network capacity.	• New Visitor Information Centre development in progress. • Suitable amenities required to services EV drivers whilst they charge.	$800,000
		Destination/Tourism Charging		
Bathurst St - Condobolin	1 x Dual port 22kW	• Existing 100A switchboard available in toilet block	• Trenching under footpath required. Pavers can be easily removed.	$15,000
Lake Cargelligo Visitor Information Centre	1 x Dual port 22kW	• Existing 80A switchboard available at back of Visitor Information Centre. • Active load management required.	• Short trench in garden bed required.	$15,000
Tottenham	1 x 25kW DC	• Existing point of connection available adjacent to park in community centre.		$32,000

Oberon Council

Oberon Council

Fast Charging

Oberon Council was not identified in the NSW Government EV Masterplan for ultra-fast charging. However, there is opportunity to install two 50kW DC fast chargers to complement the charging infrastructure in the major centres of Bathurst, Blue Mountains and Goulburn.

Although considered "fast chargers", these 50kW units can act as highly capable destination chargers for the town of Oberon. These EVSEs will typically be in use for 30-90 minutes and offer visitors the opportunity to stop and see Oberon whilst they recharge their vehicle.

These chargers will also give comfort to drivers with less range or who are planning on exploring further into the Oberon region.

Oberon St

Oberon St was not identified as a potential location within the EVENERGI report, however, has been selected because of the available electrical infrastructure and premium use case.

Oberon St is an ideal location for 2 x 50kW DC EVSEs. There is low voltage power running underground on either side of Oberon St. Council may choose any location along the street but must verify the available capacity on the network with Essential Energy.

The proposed location pictured here is immediately outside the toilet block. This site has been selected as it does not immediately block any shops or restaurants but offers a very convenient location for drivers and is highly visible. EVs will typically be parked here for 30 to 90 minutes. Some modification may be required to facilitate front or rear to kerb parking rather than 45-degree parking.

Oberon Commons

Oberon Commons is an attractive location to visit, however, is somewhat inconvenient for drivers looking to visit shops or restaurants in town whilst their vehicle charges.

There is a switchboard located at the entrance to the park with sufficient capacity for slow speed AC destination charging (similar to the Tesla ones at the VIC). Slow speed destination charging will not encourage drivers to visit this location.

This location is a fair alternative to the Oberon St location presented above. A new pole top transformer and switchboard would be required to install 50kW fast chargers at this location. Drivers parked here will be inconvenienced by the walk to town.

Destination/Tourism Charging

Tallys Lane

The community centre/library carpark located on the corner of Fleming St and Tallys Lane has potential for a low-cost dual port 22kW AC charger.

There is currently a switchboard located on the back of the Community Centre with two x dedicated three phase outlets. This circuit could be continued to the carpark area to facilitate charging. Load management would be required to control the charging load if the 3-phase outlets are in use.

Other Sites

The following sites do not address any particular use case for EV drivers. Whilst EVs may visit these sites, there is either:

a) No compelling need to charge at this location (because there are superior locations nearby)
b) The site is inconvenient to use as a charging location.

Oberon VIC

Oberon Visitor Information Centre has existing 22kW Tesla destination charging. This location, 600m from the town centre, has poor visibility and is an inconvenient location for drivers to park if visiting the town centre.

The relatively slow charging speeds will not warrant drivers stopping here. A new pole top transformer would be required to service a faster charger in this area.

Oberon Dam

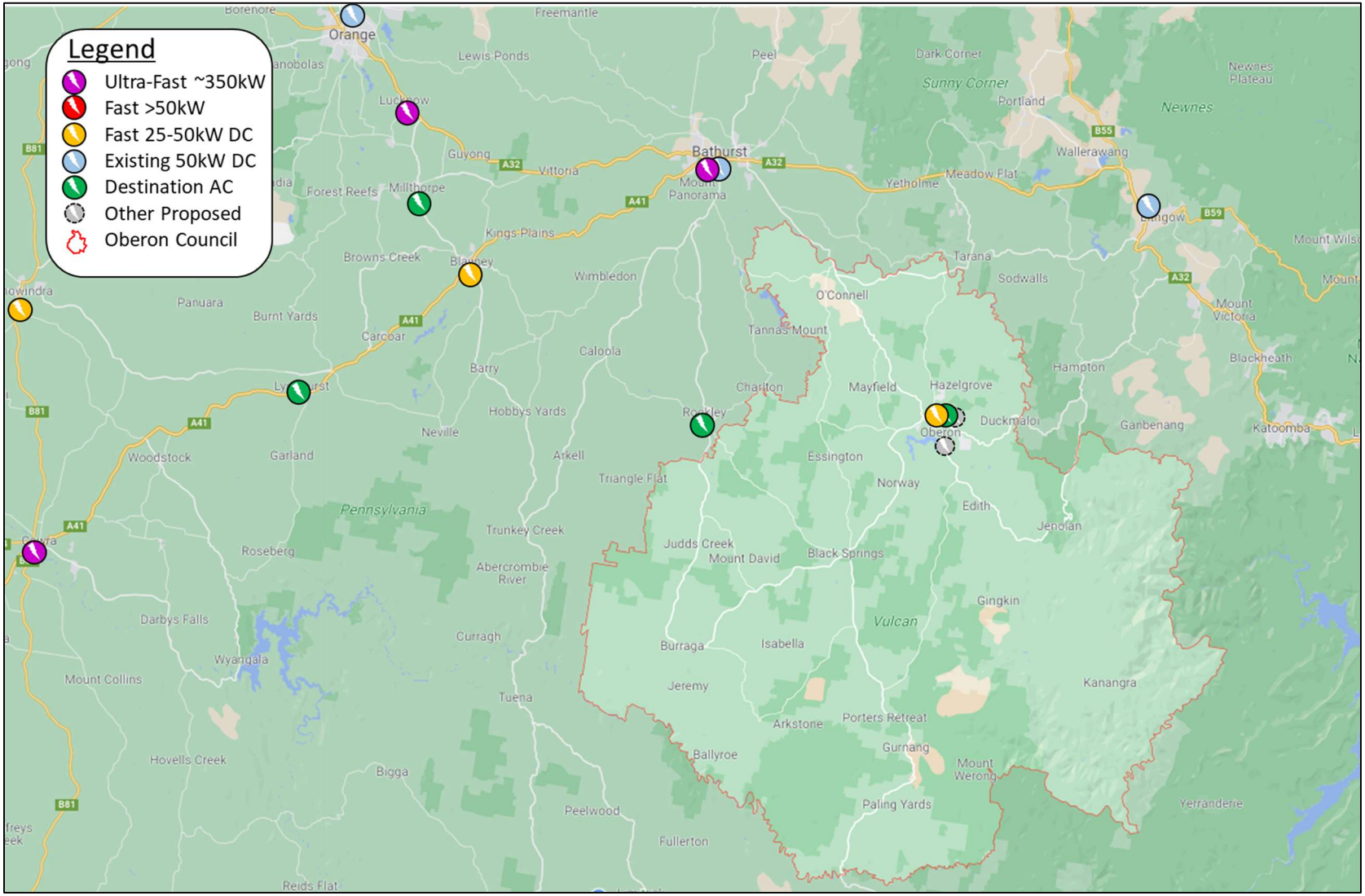
An EV driver's decision to visit Oberon Dam will be made regardless of whether charging is available. There are no attractions, or restaurants to occupy drivers whilst their vehicle charges and no external benefits to Council or businesses.

Apex Park

There is no use case for charging at Apex Park. There is no suitable parking area or infrastructure, and it is an inconvenient place for drivers to park.

Oberon Council – EV Charging Map

The proposed locations in Oberon are entirely within the town of Oberon. These chargers will serve to ensure that the LGA is no longer a blackspot for EVs. Visitors wishing to explore the region in more depth will have enough range to travel top their destination and then back to Oberon or onwards to another major centre.



Site	Recommended EVSE	Electrical Considerations	Other Considerations	Estimated Cost
		Fast Charging		
Oberon St	2 x 50kW DC	• Low voltage power running underground on either side of street. • Upgraded transformer may be required. Council needs to verify with Essential Energy. • New meter and point of connection required.	• Trenching works under footpath. • 90 Degree parking will facilitate easer of use for drivers. • Some fan noise will be present when vehicles charging.	$190,000
Oberon Commons	2 x 50kW DC (as an alternative to Oberon St)	• New pole top transformer required (existing 200kVA will become overloaded) • Upgraded mains to switchboard at park entrance. • Upgraded main switchboard.	• Trenching works from power pole to existing switchboard. • Dedicated parking spaces required. • Inconvenient charging location.	$190,000
		Destination/Tourism Charging		
Tallys Lane	1 x Dual Port 22kW AC	• Existing dedicated circuit on back of community centre building. • Active load management required if 3-phase outlets to remain in use.	• Short trench through community centre backyard required. • Dedicated parking spots for EVs. • Recommend installing sign on Oberon St to advertise charging location.	$12,000
Visitor Information Centre	Nil	• Existing Tesla 22kW chargers connected to Visitor Information Centre.	• Poor visibility from street • VIC is an inconvenient charging location if visiting the town centre	-
Oberon Dam	Nil		• No use case	-
Apex Park	Nil	• No conveniently available infrastructure	• No use case. Inconvenient location.	-


Orange City Council
Orange

Orange City Council

Fast Charging

Orange is forecast to experience **significant demand for EV charging by 2031**. Located on an EV super-highway, ultra-fast charging will facilitate EV tourism within Orange and Central NSW. Whilst Council can begin this implementation, many of the future charging stations will stem from private investment such as at conventional petrol stations.

Fast charging in Orange is best suited to the highways and distributor roads rather than the centre of town. Orange locals are likely to charge using home or destination charging and will not require fast charging on a regular basis.

	Existing (NRMA + Tesla)	Target Number of Plugs		
	2021	2023	2026	2031
Orange	1	4	9	43

Lucknow – Mitchell Highway

Lucknow is an excellent candidate for 4 x 350kW Ultra-Fast chargers. Located on the Mitchell Highway, this location has enormous potential for charging as well as revamping the town and surrounding businesses. The proposed carpark location is privately owned and will require a mutually beneficial agreement between Council and owners to facilitate charging.

Located 250km from Sydney, this location is perfectly situated for EVs heading west which are starting to get to low charge. As the **first location** a driver will pass before heading into Orange this site will experience high utility.

There is currently high voltage power on the opposite side of the highway. A new aerial will be required to service a substation next to the carpark. We recommend that Council look to upgrade the carpark and construct an amenities block to service parked drivers. This location has potential to inject money into the town of Lucknow, in particular the shops and restaurants that may be located near the chargers.

This location will also service Orange residents and other drivers travelling East who need to top up their vehicle in order to reach their destination in Sydney or elsewhere.

Destination/Tourism Charging

Orange City Council is unique within the Joint Organisation as a high-density population with relatively low km for residents. Well placed destination chargers at the Civic Centre and Woolworths carpark will encourage EV adoption for locals and experience high utility.

Civic Centre Carpark

The Civic Centre Carpark is a high-utility location next to the Library, Art Gallery and Visitor Information Centre as well as many nearby businesses in central Orange.

Visitors to this location are typically here for 1-3 hours with some people parking here all day whilst they are working nearby.

This location is suitable for a bank of 6 x 7kW EVSEs. Charging here will more than replenish a local driver's daily needs.

These chargers will also service locals or visitors without access to home charging.

These EVSEs can be connected to the main switchboard that supplies the Library and Art Gallery. These facilities have been identified by Council for a large solar PV array once the library roof is replaced. Future provision should be made in the cable run for expansion for up to 12 x EVSEs.

Woolworths Carpark – Anson St

The Woolworths carpark off Anson St services many shops and businesses within Central Orange. This carpark has a 2hr time limit.

This location is ideal for 2 x dual port 22kW chargers connected to the public toilet in the centre of the carpark.

Council will need to verify the capacity of the main switchboard at this site and whether active load control is required.

These chargers will service visitors and locals who do not have access to overnight charging. EV drivers will plan their shopping visits around their charging needs.

Other Sites

The following sites do not address any particular use case for EV drivers. Whilst EVs may visit these sites, there is either:

a) No compelling need to charge at this location (because there are superior locations nearby), or
b) The site is inconvenient as a charging location

Peisley St Carpark

Peisley St Carpark is a newly developed site in Central Orange. This site currently has low appeal as a place to charge with no nearby amenities, shops or restaurants.

This site does however have potential as a future fast charging location in Central Orange.

Fast charging at this location would service Orange residents looking to top up their vehicle before beginning of a long journey.

Northern Distributor – Caltex/BP

Service stations will implement EV charging infrastructure over the next decade through private investment with or without Council's assistance.

Council investment in these locations will provide minimal benefits to Orange.

Northern Distributor - Botanic Gardens

Located on the Northern Distributor road, the Botanic Gardens are in a suitable location for through traffic.

However this site lacks the infrastructure, amenities and other attractions for fast charging.

This site would be particularly poor location at night time with minimal lighting and nothing to occupy drivers whilst they wait.

Southern Feeder Road Jack Brabham Carpark

This location does not lie on a super-highway as identified in the EV Masterplan.

Charging at this location would require new high voltage aerial powerlines across the road. There are also no amenities to service drivers whilst they charge.

McNamara Lane

McNamara Lane is a high utility carpark located in the centre of Orange.

The all-day car spots are under high demand with the remaining available spots restricted to 1 hour parking. This location has underground power but would require a new meter box and point of connection. This location is more suited to **opportunistic locals** rather than visiting drivers.

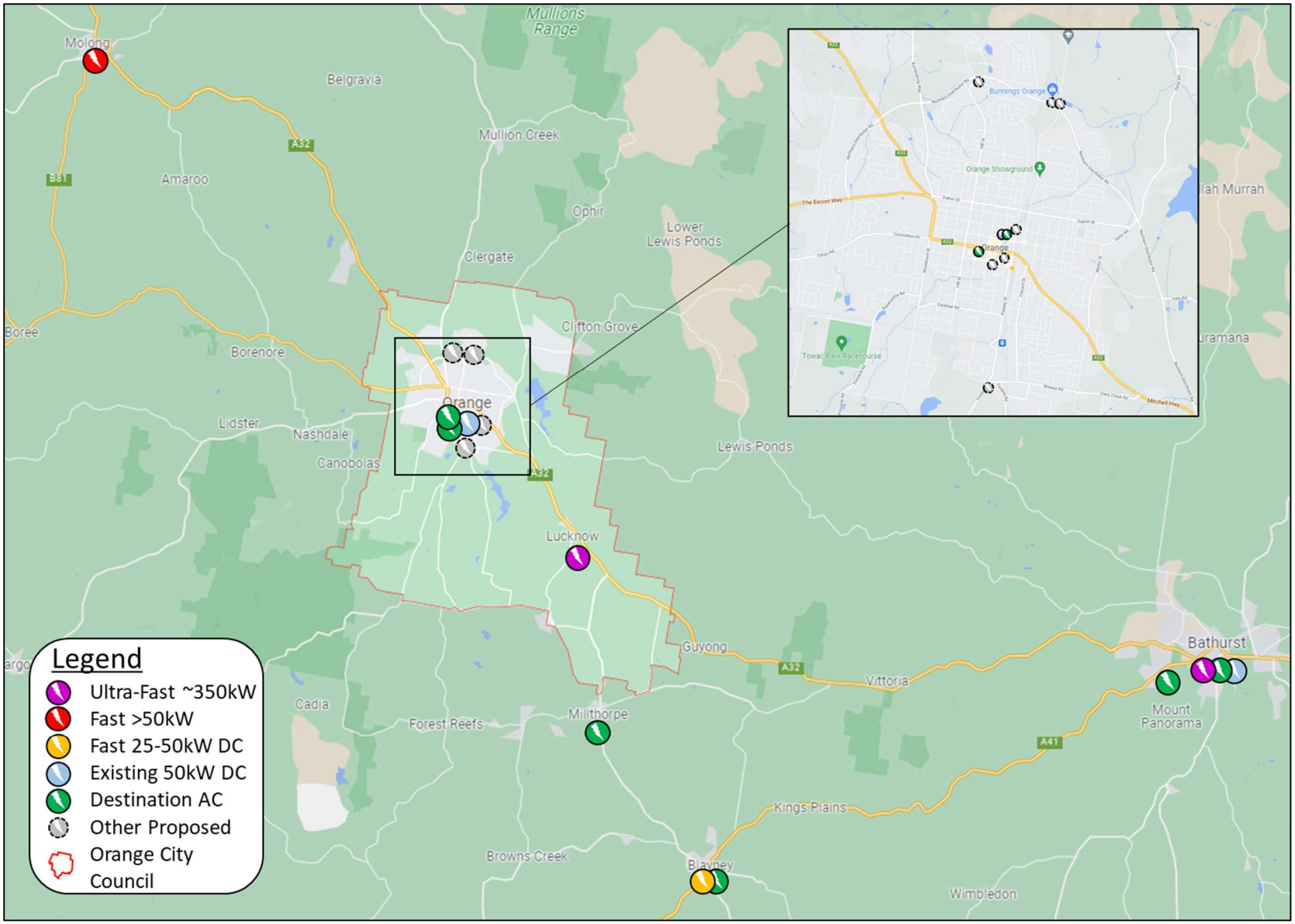
Kite St – Commuter Carpark

Kite St Council carpark has high utility as an all-day carpark for drivers working nearby.

The use case is more suited to commuter charging rather than destination charging. A bank of several slow speed chargers (3.6kW) would be possible to supply from an existing switchboard located on Lords Place. Charging at this location would provide little external benefit to Council and surrounding businesses however may encourage local EV adoption.

Orange City Council – EV Charging Map

Lucknow is an excellent location for fast-charging and will experience high utility, particularly from drivers travelling to or from Sydney. Destination charging within Orange will service both locals and tourists and will encourage EV adoption within Orange.



Site	Recommended EVSE	Electrical Considerations	Other Considerations	Estimated Cost
Fast Charging				
Lucknow	4 x 350kW DC (potential future expansion)	• New high voltage aerial power line required to cross the highway. • New substation to be installed next to carpark.	• Recommend Council construct a toilet block and other amenities to rejuvenate the area. • Potential for Lucknow businesses to benefit from EV drivers. I.e. cafes/shops.	$1.9M
Peisley St	Future Fast Charging Central Orange	• New 11KV aerial required to cross the street. Space for substation on grass near carpark.	• Requires amenities to service drivers. • No nearby shops or restaurants to occupy drivers whilst they wait.	-
Northern Distributor – Caltex/BP	Nil	• New Substation Required. Existing substation services petrol stations.	• Private investment from service stations will facilitate EV charging. • No external benefit to Council here.	-
Northern Distributor – Botanic Gardens	Nil	• No nearby suitable electrical infrastructure.	• Poor lighting, toilet block available but nothing to do at night time.	-
Southern Feeder Road – Jack Brabham Carpark	Nil	• Requires new HV aerial to cross the street.	• No use case at this time.	-
Destination/Tourism Charging				
Civic Centre	6 x 7kW AC (or 3 x dual port)	• To be supplied by Library/Art Gallery switchboard. • Recommend running a cable through the ceiling space during upcoming roof replacement	• Trenching required between library and parking spaces. • Recommend provisioning for expansion.	$40,000
Woolworths Carpark	2 X 22kW Dual Port	• Council to verify capacity of toilet block switchboard. • Active load management may be required.	• 4 parking spaces to be reserved for EVs. • Trenching can run in garden bed.	$26,000
McNamara Lane	Nil	• Underground power available. New meter and switchboard required	• High utility carpark. Would require modification to the 1hr spots.	-
Kite St	Nil	• Point of connection available on Lords Place	• Commuter carpark. Minimal external benefit to Council.	-


Parkes Shire Council
Parkes

Parkes Shire Council

Fast Charging

Parkes has been identified within the NSW Government EV Masterplan as **an optimal location for ultra-fast charging**. With the Newell Highway passing through town, a well placed ultra-fast charger provides will encourage EV tourism in Parkes and beyond.

Library/Post Office Carpark

The Library/Post Office carpark located on Welcome St is a suitable candidate for 4 x 350kW ultra-fast chargers.

This location has underground high voltage power available and is conveniently located close to both the highway and the centre of town. This location will encourage EV drivers to visit local shops and restaurants.

There is an existing high voltage substation immediately adjacent to this location, but a new 700kVA substation will be required to service the chargers. There is space available in the adjacent garden bed. The front/rear to kerb parking in this location is ideal for charging and will accommodate all EVs.

Destination Charging

Peak Hill

Peak Hill is a suitable candidate for a 25-50kW DC fast charger. EV drivers passing through will likely **not** require charging due to the proximity to both Dubbo and Parkes. However Peak Hill may be a convenient place to stop and visit while using a highly capable destination charger.

The proposed location is close to a public toilet as well as local shops and restaurants. This infrastructure should be offered **for free or at lower cost than the ultra-fast chargers** in Parkes and Dubbo. This will incentivise savvy EV drivers to stop and spend time and money in Peak Hill rather than the major towns.

A new meter and switchboard will be required to connect the EVSE. There is an existing 315kVA pole top transformer immediately above the proposed location. Council will need to consult with Essential Energy regarding the available capacity on this transformer. It may be more suitable to reduce the charging power rather than install a new transformer at this location.

Other Sites

The following sites do not address any particular use case for EV drivers. Whilst EVs may visit these sites, there is either:

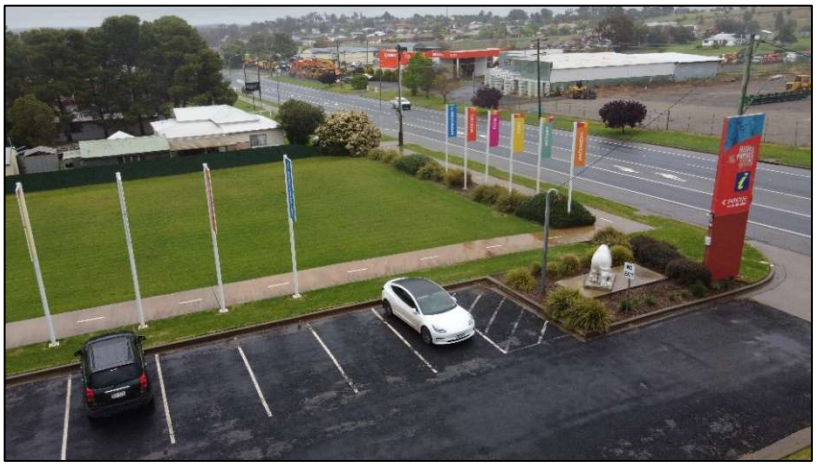
a) No compelling need to charge at this location (because there are superior locations nearby)
b) The site is inconvenient to use as a charging location.

Henry Parkes Centre

The Henry Parkes Centre will be a suitable location for future fast charging as demand increases over the next decade.

Whilst located on the highway, this location is less convenient to drivers wishing to visit the town centre and will have less external benefit to local shops and restaurants.

A new high voltage aerial will be required to cross the highway and a substation installed adjacent to the parking spaces.



Church St CBD Carpark

The physical layout of this carpark is not conducive to EV charging. This carpark is also highly utilised and would require significant trenching works to facilitate a power supply.

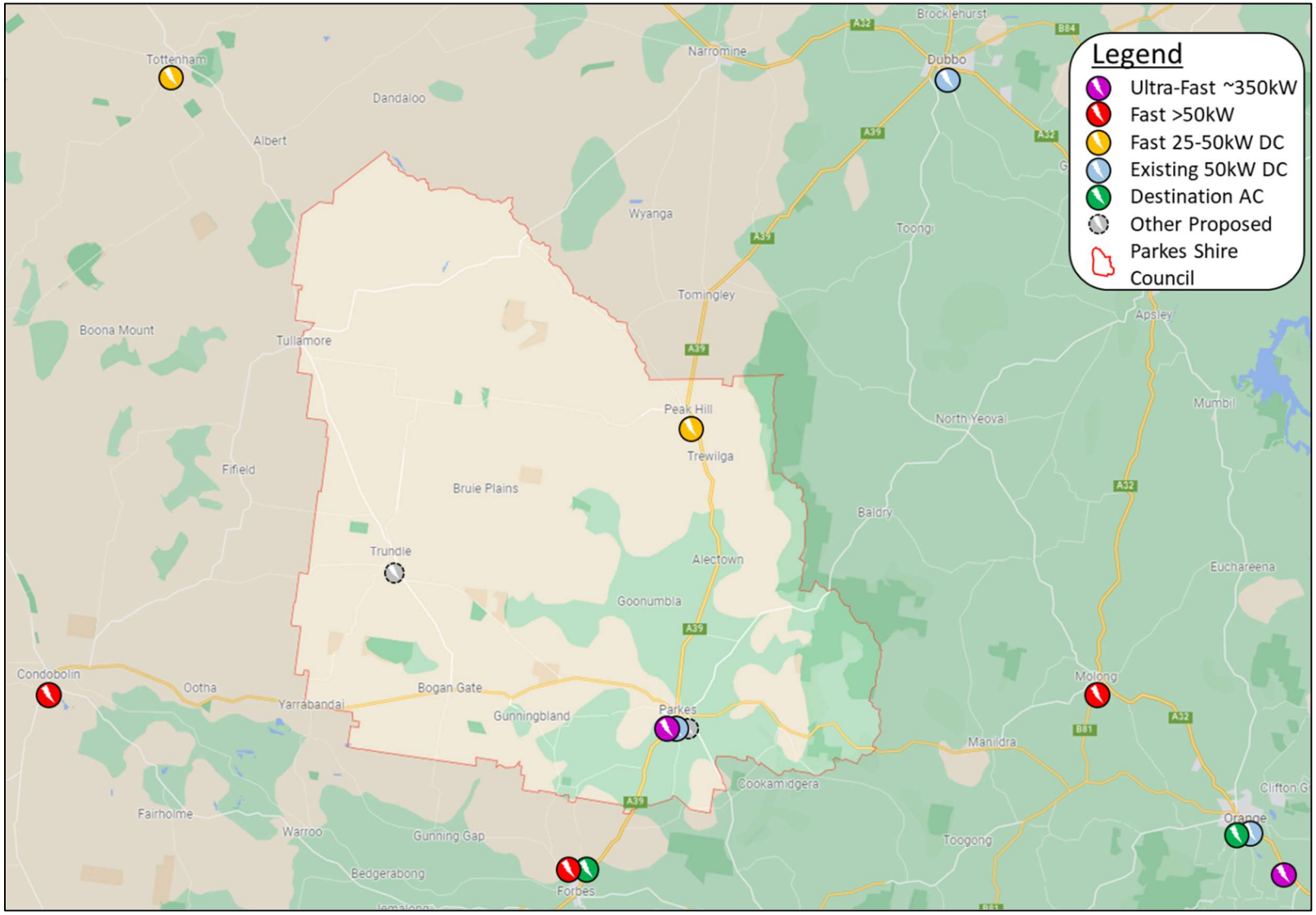
Trundle

There is no use case for destination charging in Trundle.

Drivers passing through Trundle will not require charging and will not wait for slow charging. Local residents will have access to home charging.

Parkes Shire Council – EV Charging Map

Parkes Shire will form a key component of the central NSW charging network. The ultra -fast charger is critical for drivers travelling both North-South on the super-highway as well as East-West throughout the region. Council installing an ultra-fast charger within the town centre will promote tourism and encourage visitors to visit local shops and restaurants. The Peak Hill 50kW charger will be a bonus addition to the network which will provide increased convenience to drivers looking to explore the region.



Site	Recommended EVSE	Electrical Considerations	Other Considerations	Estimated Cost
		Fast Charging		
Library/Post Office Carpark	4 x 350kW DC	• High voltage power under the carpark. Some trenching required. • New dedicated 700kVA substation required in garden bed.	• Front/Rear to kerb parking spots are ideal. • Very convenient place for EV drivers.	$1.8M
Henry Parkes Centre	Future Ultra-Fast Charging	• New high-voltage aerials required to cross the highway. • New substation and point of connection required.	• No nearby shops/restaurants to occupy drivers. Subject to centre opening hours.	-
Church St CBD	Nil	• Significant trenching or aerials required to service EVSEs	• Carpark layout not conducive to EV charging.	-
		Destination/Tourism Charging		
Peak Hill	25-50kW DC	• Existing 350kVA pole top transformer. Available capacity to be verified with Essential Energy and EVSE power to be designed accordingly.	• Parallel parking. Extra-long spot required to service different types of EVs.	$50,000
Trundle	Nil	• Existing 415V power available immediately above carparking locations. New meter and switchboard required.	• No use case for destination charging.	-


Weddin Shire Council
Grenfell

Weddin Shire Council

Destination Charging

Weddin Shire has **not** been identified by the NSW Government as an optimal zone for ultra-fast charging. Drivers passing through Weddin will likely not require charging and can be serviced by the infrastructure in Cowra and West Wyalong.

Grenfell, however, is suitable for a highly capable 25-50kW destination charger to encourage drivers to visit the region.

Forbes St Carparking

The proposed location on Forbes St in Grenfell is located immediately around the corner from Main St and the town centre. This location has been selected as it is relatively low utility and won't block any shop fronts or affect the aesthetics of Main St.

Council is in the process of resurfacing the roads through the town centre and has made provision for conduit to the proposed location. A new meter and switchboard will be required to service the EVSE and can be connected to the nearby power lines.

The proposed location will have two dedicated parallel parking spots. The EVSE leads should be sufficiently long to reach around the back of a car to the roadside. This site should be free of charge to incentivise people to charge here instead of at the ultra-fast chargers in neighbouring towns.

Other Sites

The following sites do not address any particular use case for EV drivers. Whilst EVs may visit these sites, there is either:

a) No compelling need to charge at this location (because there are superior locations nearby), or
b) The site is inconvenient as a charging location.

Aquatic Centre

Grenfell Aquatic Centre, also located on Forbes St, has the potential to be a future destination charger for local residents looking to charge when they visit the pool.

A dual port 22kW EVSE could be connected to the pool switchboard immediately next to the road. A short trench across the footpath would be required to facilitate a cable run.

This site could be linked to Council's plan to install a solar PV system on the pool amenities building which could service the energy requirements of the chargers.

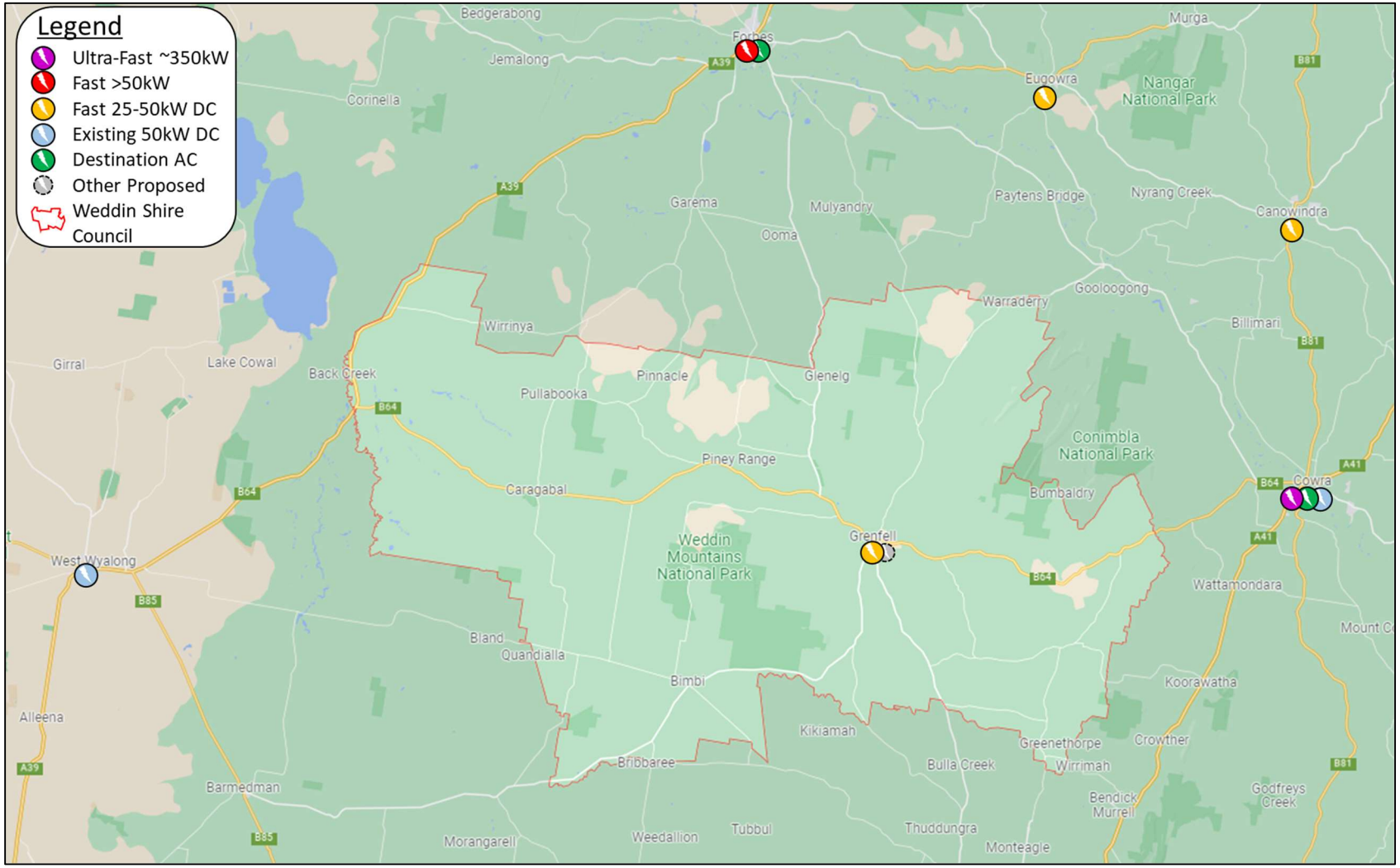
Grenfell Community Hub – Main St

The Visitor Information Centre is **not** suitable for EV charging because of the limited suitable electrical infrastructure and the high utility of parking spaces.

This location is inferior to the alternative proposed Forbes St location.

Weddin Shire Council – EV Charging Map

Weddin Shire, located between the major towns of Cowra, Forbes, West Wyalong and Young is not an optimal zone for fast charging. Whilst EV drivers will likely not require a charge, a medium level DC fast charger in Grenfell will be a welcome addition to the network. This highly capable destination charger will encourage EV tourism in the area and EV drivers to visit Grenfell's local shops and restaurants.



Site	Recommended EVSE	Electrical Considerations	Other Considerations	Estimated Cost
Destination/Tourism Charging				
Forbes St	1 x Dual Port 25-50kW EVSE	• Council has made provision for cable run as part of road resurfacing project	• Two parallel parking spots to be reserved for EVs. • Long Cable required to reach round the back of vehicles.	$50,000
Grenfell Aquatic Centre	Potential future destination charger	• Conveniently located main switchboard could supply an EVSE with solar power.	• No use case unless free and faster Forbes St EVSE costs money.	$10,000
Community Hub	Nil	• No suitable infrastructure available	• High utility spot not suitable for EV charging.	-

Summary of Recommended EV Charging Infrastructure

Below is a summary of all CNSWJO Councils and the recommended charging infrastructure for each.

	Site	Charging Type	Recommended Equipment Size	Estimated Cost EVSE + Install	Estimated Cost Infrastructure
Bathurst	Elizabeth St	Fast	4 x 350kW DC	$1,400,000	$500,000
	Sofala	Destination	1 x 25kW DC	$30,000	$0
	Hill End	Destination	1 x 22kW AC	$9,000	$0
	Rockley	Destination	2 x 7kW	$12,000	$0
Blayney	Community Centre	Fast	2 x 50kW DC	$100,000	$100,000
	Train Station	Destination	2 x Lockable Power Point	$5,000	$0
	Milthorpe	Destination	1 x 22kW Dual Port	$20,000	$0
Cabonne	Molong - Railway Station	Fast	4 x 125kW DC	$600,000	$150,000
	Eugowra - Grevilia Ave Park	Destination	1 x 25kW DC	$30,000	$0
	Canowindra - Age of Fishes - VIC	Destination	1 x 25kW DC	$33,000	$0
Cowra	Edgell Park	Fast	4 x 350kW DC	$1,400,000	$400,000
	Japanese Gardens	Destination	2 x 7kW	$12,000	$0
	Aquatic Centre	Destination	2 x 7kW	$10,000	$0
Forbes	New VIC Precinct	Fast	4 x 125kW DC	$600,000	$250,000
	Victoria Park	Destination	2 x dual port 22kW	$24,000	$0
Lachlan	Utes in the Paddock - Condobolin	Fast	4 x 125kW	$600,000	$200,000
	Bathurst St - Condobolin	Destination	1 x dual port 22kW	$15,000	$0
	VIC - Lake Cargelligo	Destination	1 x dual port 22kW	$15,000	$0
	Tottenham Memorial Park	Destination	1 x 25kW DC	$32,000	$0
Oberon	Main St	Fast	2 x 50kW DC	$90,000	$100,000
	Tallys Lane	Destination	1 x dual port 22kW	$18,000	$0
Orange	Lucknow	Fast	4 or more 350kW	$1,400,000	$500,000
	Civic Centre Carpark	Destination	6 x 7kW	$30,000	$10,000
	Woolworths Carpark	Destination	2 x dual port 22kW	$26,000	$0
Parkes	Library/Post Office Carpark	Fast	4 x 350kW DC	$1,400,000	$400,000
	Peak Hill	Destination	1 x 25-50kW DC	$45,000	$5,000
Weddin	Forbes St	Destination	1x 25-50kW Dual port DC	$45,000	$5,000
			TOTAL	$8,001,000	$2,620,000

Appendix 1 - Overview of Electric Vehicle Supply Equipment

Electric Vehicle supply equipment (EVSEs) can be understood simply as devices that supply electricity to EVs.

An EVSE is not a 'charger', or at least no more of a charger than a standard power point is. The battery charger is located on-board an electric vehicle and it is the vehicle that controls the charging process.

The rate at which an EV can charge depends on both the vehicle and the electrical infrastructure of the supply equipment. The charging power of the equipment is broadly categorised into three levels:

Level	**Format**	**Description**	**Charging Power**	**Charging Speed** (extra range / hour)
Level 1	Single Phase	AC power supplied via standard power point socket	2.0kW – 2.4kW	Up to 15 km / hour
Level 2	Single Phase	AC power supplied using dedicated EVSE, single phase	3.6kW – 9.6kW	Up to 55 km / hour
	Three Phase	AC power supplied using dedicated EVSE, three-phase	3.6kW – 22kW	Up to 130 km / hour
Level 3	DC	DC fast charging power dedicated EVSE and electrical infrastructure	25kW – 350kW	Up to 2,000km / hour

The type of EVSE at each location must suit the use case of a particular location as well as the expected demand as the amount of EVs increases over the next decade.

EVSE Plugs and Cables

Plugs: Type 2 and CHAdeMO

Most EVs in Australia use a Type 2 plug. Type-2 plugs have 7 pins and provide the ability to charge with either three-phase or single-phase. This covers all types of vehicles and all charging speeds.

CCS Type 2 plugs are used exclusively for DC fast charging. They are the same form-factor as regular type-2 plugs with the addition of two dedicated DC pins below.

Nissan brand cars use type-2 plugs for level 2 AC charging but use a CHAdeMO plug for DC fast charging.

A comparison of each can be seen below.

Most DC fast-charging systems in Australia simultaneously offer both CCS 2 and CHAdeMO.

For all AC charging, Type-2 has become all but ubiquitous (all new vehicles now use this standard plug). Council, in considering EVSEs, should similarly choose AC EVSEs with type-2 plugs and DC chargers with both CCS 2 and CHAdeMO plugs.

Cables

EVSEs feature either a **tethered plug-and-lead** or **socket**.

A tethered plug and lead is designed to plug directly into the charging port of a vehicle.

- The advantage of tethered plugs is the user experience - it is easy for drivers to simply park and plug-in.
- The disadvantage is that these cords get damaged over time, particularly in high use public carparks. If the cord of a tethered EVSE is destroyed then the whole device must be replaced at high cost.
- Tethered plug-and-lead is the norm for fast charging. Larger fast charging units have built in cable management systems.

A socketed (also known as 'universal') EVSE requires drivers to Bring Your Own Cable (BYOC).

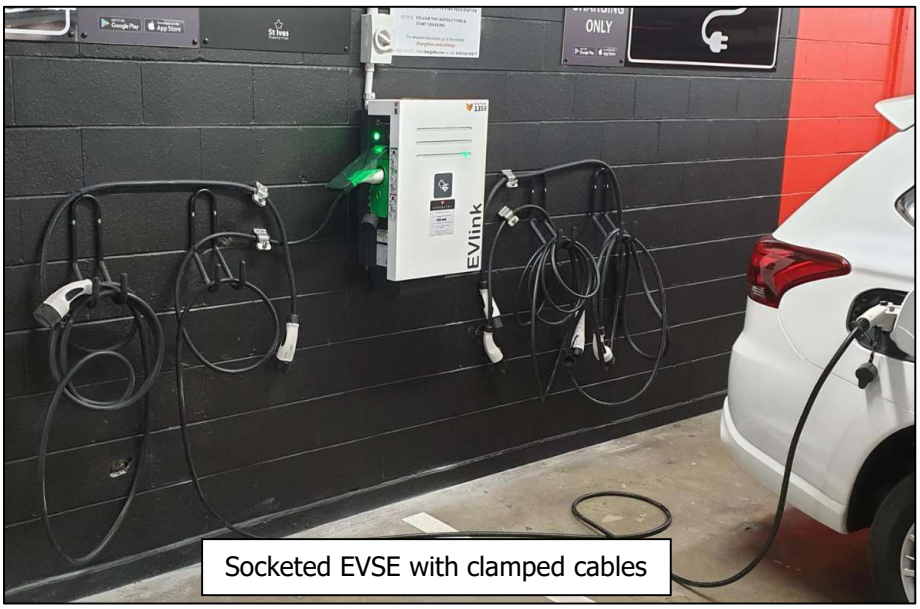
- The advantage of BYOC is that between charging sessions there are no cables lying around, mitigating the risk of tripping and reducing the risk of vandalism or theft.
- The disadvantage of BYOC is the user experience of needing to retrieve a stored, furled cable from the vehicle and then plugging it into both the EVSE and the vehicle.

Tethered leads are better suited to fast charging and home charging, whilst more exposed locations such as public carparks and workplaces are often better suited to a socketed EVSE. Councils should assess sites on a case-by-case basis to determine the most suitable plug arrangement.

Tethered plug and lead EVSE

Socketed EVSE

A hybrid option which has recently become popular is the use of a socketed EVSE with a portable lead that has been semi-permanently attached.



Socketed EVSE with clamped cables

This solution allows the same ease-of-use of a tethered system but means that the cable can be detached and cheaply replaced in case of damage.

Councils may considerer EVSEs be fitted with a **semi-permanent portable leads** for use cases with high use or potential for vandalism.

The one downside of this approach is that the cable management can be messy:

Cable take-up systems are still in development, but solutions do exist. These can feature a retractable mechanism which keep longer cords from being left on the ground.

Appendix 2 – EVENERGI – Available Zone Substation Capacity

AREMI-sourced details of Zone Substations in Central NSW		
Zone Substation name	Total capacity (MVA)	Available capacity (MVA)
Bathurst	66	47.6
Blayney	22	12.8
Condobolin	4.4	0.1
Cowra	33	11.6
Forbes	33	18
Grenfell	5.5	0.1
Molong	4.4	0.1
Oberon	49.5	22.1
Orange Industrial	11	0
Orange North	0	0
Orange South	33	14.1
Orange West	33	17.7
Parkes	33	11.9