

Foreword

Document History

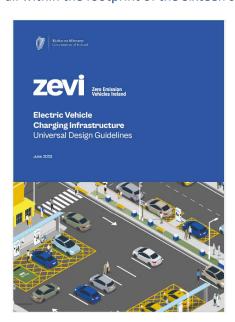
Revision	Date	Prepared By	Checked By	Approved By	Comments
01	01/11/2024	John Shaughnessy	J Freeman		

Engagement was initially between Roscommon County Council and Zero Emission Vehicles Ireland (ZEVI) for the potential an EV Charging Hub Pilot scheme at Aras an Chontae Ros Comáin complex car park. A block of Sixteen standard carparking spaces was selected as being at the optimal location for this charging hub. The Roads & Transportation Department of Roscommon County Council then commenced an extensive review of the options available in the EV charging market while availing of direction from ZEVI.

Numerous designs and charger configurations including the potential for battery support to the hub square were considered and evaluated, with the most advantageous model selected by RCC for approval.

This 'Use Case / Business Case' is a full analysis of user needs, justification for the modification of existing car park spaces and the appraisal of capital expenditure against earnings and projected payback on investment. It also incorporates learning from the review on the optimal operation and maintenance factors and costings.

The re-purposing of a block of sixteen number perpendicular car parking spaces in the Aras An Chontae car park to meet Zero Emission Vehicle Ireland – Electric Vehicle Charging Infrastructure- 'Universal Design Guidelines'. The guidelines provide Access-for-All to the EV charging network even those who are in wheelchairs or have some varying degrees of mobility issues. The proposed EV Charging Hub has Five number fully 'Universal Design' perpendicular spaces, with Three number not to full universal design parallel spaces, space for chargers and ancillary equipment and all within the footprint of the Sixteen standard spaces.

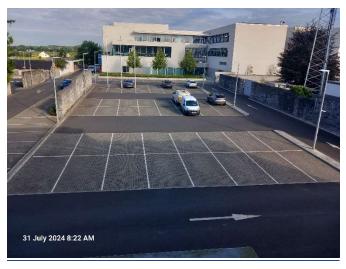


The scope for the business case has identified multiple user needs

- Install a hub using universal design for 5 perpendicular spaces to universal design standards and 2/3 parallel spaces not to full universal design.
- The right capacity chargers mix of dual 150KW and 3-4no 22KW along with a mega-pillar
- Chargers at the right location
- · That meets the multiple user needs including
 - DC Fast Charging option
 - a) workplace charging
 - b) Off-peak charging for neighbourhoods to use the hub as a "base" charger option
 - c) En-route charging for those travelling along the N63 etc..
- AC Slow Charging
 - a) workplace charging over 6-8 hours of working day potential for RCC staff particularly
 - b) Off-peak charging for residents / visitors to area with reduced rates during day and extra incentives for night-time.
- This site offers additionality and will be designed as such to allow expansion (subject to agreement with owners of adjacent folio

JUSTIFICATION FOR CHANGE OF USE





The existing Sixteen number perpendicular car parking spaces are permeable paving off macadam aisles and are the nearest RCC spaces to the Courthouse end of the car park. The Twelve perpendicular spaces adjacent to courthouse are owned by court services.

The re-purposing of these Sixteen standard spaces into an area for a EV Charging Hub, or block as sometimes referred to, to serve not just the general public but for town residents without the physical space for a base charger at their home, for council employees and for all professionals working in the community and educational zone around Aras An Chontae. The loss of Sixteen spaces to create a hub to offer EV Charging to meet all needs from access, convenient location from businesses, from national routes, secure with lighting and close to Roscommon Garda station. This strategic location was the preferred over a number of others considered but it's prime central location to meet all needs meant it was by far the best option.

The move to de-carbonisation our society and same for Roscommon County Council operations means that this EV Charging Hub aligns with RCC climate action policy and plans as this hub would also facilitate charging RCC's ever expanding electric vehicle fleet with an overnight charging base available, working off cheaper night time tariffs.

The hub is also designed to allow additional car park areas of the Aras car park in the future to be converted for eV Charging and the plans show possible addition of hybrid spaces where day time parking turning into night time charging could be a way of meeting another user need.

UTILISATION OR USE CASE

The charging hub is proposed to have

Dual DC Fast charger will meet user needs but will not be at as attractive a rate compared to long AC charge. There is a premium for the convenience being offered.

- Destination top-up charging option for travellers to use fast charging service at hub to enable continuance of their car journey. The fast charge takes less than one hour increases their range by minimum 200km. This would be a long range fast charge.
- Employees of RCC or other facilities nearby such as Garda station, schools or Primary Care Centres can dropin and get a very quick-charge for short range to satisfy a need to attend a meeting or conduct patient call-out in locality where their battery is close to being depleted.

Dual AC Long / slow chargers will meet user needs and this charging option will be offered at a reduced rate compared to fast DC charge. The reduced rate can further be incentivised for night-time charging at the hub. RCC employees, workers in town, visitors and residents in town without on-street parking could avail of this charging service.

- The long slow charging is an ideal offering to employees of RCC and neighbouring facilities to park-up in the morning- charge and go as most facilities such as Garda station, schools, Government building, Primary care centre and GRETB etc. are only walking distance from proposed RCC EV Charging Hub.
- Neighbourhood charging for residents in Roscommon town that cannot, due to logistics, have a home 'Base-charger' and this would meet their needs. Again these residents could pick from day or night-time charging, whichever suits their needs to suit e.g. shift work. As car park site is full illuminated in darker hours, is monitored by CCTV and is in close proximity to Garda station and town is fully illuminated along all footways leading to and away from Aras then users should feel safe using the night-time option.

The need to expand the EV charging network in a zone of Roscommon where there are numerous buildings town (all within a 0.8km diameter) with various services and functions all with staff, students and visitors requiring car parking and therefore potential charging of electric vehicles.

- Sacred Heart Church
- Two National schools
- Three Secondary schools
- o Roscommon County Council headquarters
- o Garda Station
- Courthouse
- Teagasc Offices
- o Swimming Pool & Gymnasium complex
- o St. Coman's handball Club building
- County Library
- o Government Buildings at Convent of mercy grounds
- Galway Roscommon Educational Training Board (GRETB)
- o Roscommon Primary Care Centre
- o Roscommon Hospital



The above list does not include residences in locality that cannot and most likely will never be able to avail of home charging but these residences could also avail of this charging hub considering its central and easily accessible location within Roscommon Town.

Expand the zone out further then there are numerous sports pitches and sporting facilities, retail and commercial businesses with carparking with even more potential to offer charging facilities.

Car Ownership

1 This

Car ownership in Roscommon Town is very high and there are only a small number of non-car households. Figure 2.11 shows that the non-car households are clustered in the town centre and the train station, due to the proximity of these locations to local jobs, services and public transport. It is notable that the locations which hold the non-car households are the denser, mixed use parts of the town. In contrast with this, the suburbs and periphery of Roscommon town predominantly feature households who own a car, which is partly due to their greater distance to local jobs and services, but it also reflects the importance of the private car in rural Ireland due to the lack of viable alternatives.



The Place of Work School and College, Census of Anonymized Records (POWSCAR (2016) dataset was used to assess the origin and destinations of trips to and from Roscommon Town.

Table 2.3 shows the top destinations for work trips by residents living within the Roscommon CSO Settlement boundary. This shows that most work travel is internal within the town (56.7%) or to areas in the rest of the county (15.5%). Nearby urban centres such as Athlone (5.7%) and Longford (2.1%) only attract a modest number of work trips1.

Name	Trips	% Total
Roscommon	983	56.7%
Roscommon Rural	269	15.5%
Athlone	99	5.7%
Dublin city and suburbs	40	2.3%
Longford	36	2.1%
Castlerea	27	1.6%
Longford Rural	26	1.5%
Boyle	21	1.2%
Galway city and suburbs	20	1.2%
Ballaghaderreen	15	0.9%
Strokestown	13	0.8%
Galway Rural	12	0.7%
Athleague	11	0.6%
Ballinasloe	11	0.6%
Tullamore	10	0.6%
	Roscommon Roscommon Rural Athlone Dublin city and suburbs Longford Castlerea Longford Rural Boyle Galway city and suburbs Ballaghaderreen Strokestown Galway Rural Athleague Ballinasloe	Roscommon 983 Roscommon Rural 269 Athlone 99 Dublin city and 40 suburbs Longford 36 Castlerea 27 Longford Rural 26 Boyle 21 Galway city and 20 suburbs Ballaghaderreen 15 Strokestown 13 Galway Rural 12 Athleague 11 Ballinasloe 11

Figure 2.15 shows that most internal trips are to Roscommon Town centre or to employment clusters in the outskirts such as the IDA industrial estate in the north-west on Racecourse Road or in the east at Roscommon General Hospital or Sacred Heart Hospital.

2.3.4 Road Network

Figure 2.23 shows the road hierarchy of Roscommon Town and County. Roscommon Town is served by three National Roads; the N60, N61 and N63 and the R366 Regional Road to the west. The closest motorway access is via the N61 to the M6 in the south which connects Galway and Dublin.



Figure 2.23 Roscommon County Road Infrastructure (From RCDP)



Aras carpark and EV charge-points easily accessible for destination travellers off N60, N61 & N63



No street side charging available along Abbey Street is an example of the appeal of a charging hub nearby at Aras an Chontae Roscommon.



No street side charging available along Church Street Roscommon is another example of the appeal of a charging hub nearby at Aras an Chontae Roscommon



Another example of no street side charging available along Goff Street Roscommon

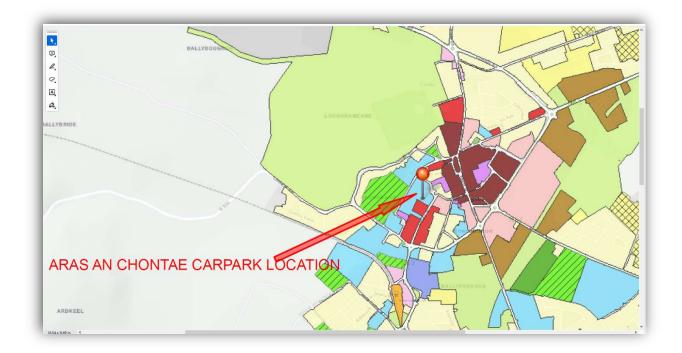
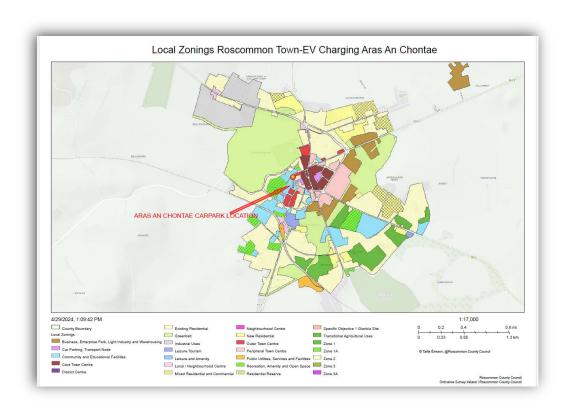
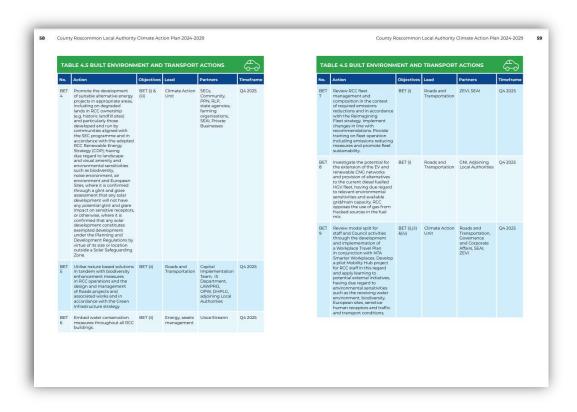


Image below for Roscommon Town- Local Zonings





The Roscommon Town Decarbonisation Zone (DZ) as shown above extracted from RCC Climate Action Plan 2024-2029. Below is TABLE 4.5 BUILT ENVIRONMENT AND TRANSPORT ACTIONS (BET 8) from Climate Action Plan with Actions as part of the BUILT ENVIRONMENT AND TRANSPORT OBJECTIVES.



BUSINESS CASE / DESIGN BRIEF

Roscommon can potentially energise this EV charging hub in a number of ways while not affecting the daily operation of the Aras building. There is a nearby ESB substation which energises the Aras building / complex and it has sufficient spare capacity to increase the Maximum Import Capacity (MIC) head for the building to power the EV Charging Hub or to allow a new stand-alone connection for the hub. There are advantages and disadvantages to both depending on which charger or charger /battery configuration option is preferred.

One way to energise EV hub is to Increase MIC of Aras building /complex from 140kVA to 250kVA MIC to avail of reduced demand at night time in Aras building / complex by using existing connection to ESB MV/LV substation CO***4201. This would be for Options 1 & 3 below.

Another way to energise EV hub is for a new 200kVA or 49kVA connection to existing ESB MV/LV substation $CO^{***}4201$ Option 1, 2 & 3 below could be connected this way.

The existing connection for Aras an Chontae Ros Comáin to ESB MV/LV substation CO***4201 https://maps.app.goo.gl/QbwMGAS2RRWWaVyz8 53.629574 N, -8.194966 W

Parent Station: Roscommon: T42 Demand Capacity: 630kVA

Demand Capacity Available: 500kVA

Aras MIC 140kVA

Aras spare head = 30kVA approx..

Charger and ancillary battery configurations, all options

1 Nr - dual 150KW DC fast charger OR 1 Nr dual 150KW DC fast charger/200kVA battery combi unit

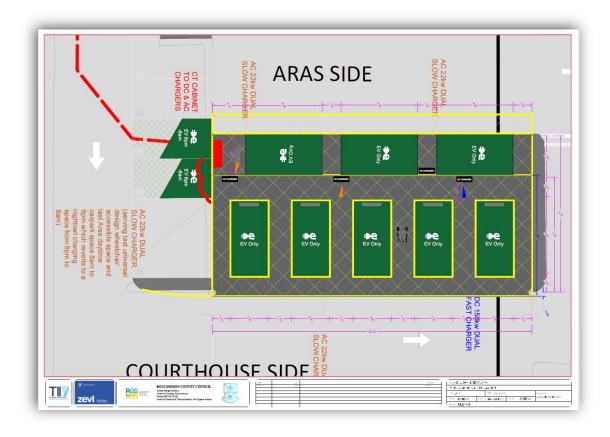
3 Nr - Dual 22KW AC regular charger

1 Nr- 200kVA independent battery charged from new 200kVA connection only!

Option of 1 Nr additional - Dual 22KW AC regular charger - for 2 Nr hybrid spaces

Plus all associated equipment including large CT / mega pillar for future connections for additional EV chargers.

OPTION 1



- Chargers: 1 dual DC 150kw | 3 dual AC 22kw | + civils + install + setup

TOTAL CIVILS =
TOTAL EQUIPMENT =

€00.00 €00.00

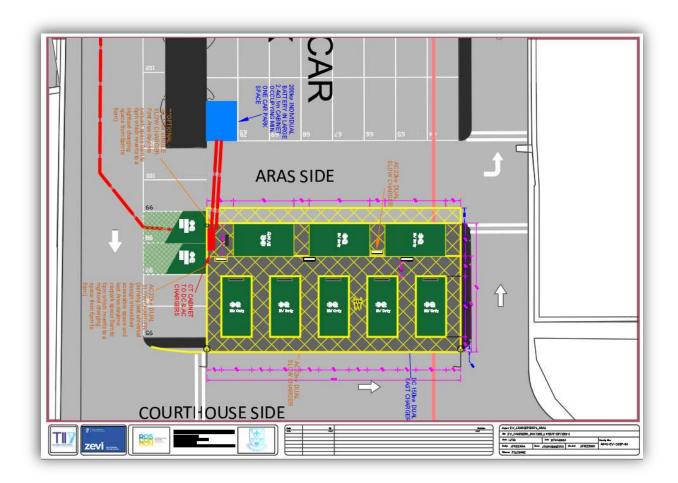
TOTAL COSTINGS=

€000.00

****Above inclusive of €0000 new connection fee to ESB Network for 200kva MIC



OPTION 2



- Chargers: 1 dual DC 150kw | 3 dual AC 22kw | + 200kVA Independent Battery + civils + install + setup

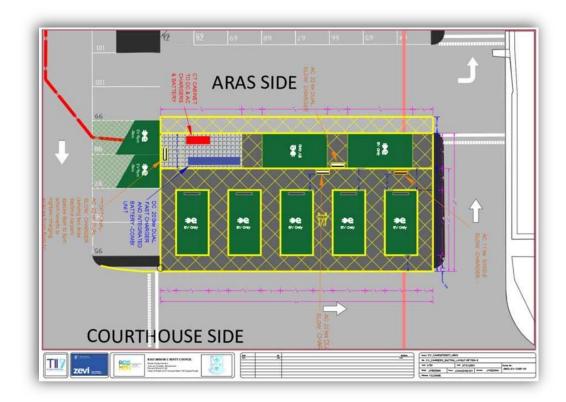
TOTAL CIVILS = €00.00TOTAL EV EQUIPMENT = €00.00TOTAL INDEPENDENT 200Kva BATTERY = €00.00

TOTAL COSTINGS=

€00.00

****Above inclusive of €000 new connection fee to ESB Network for 200kva MIC

OPTION 3



- Chargers: 3 dual AC 22kw | + 200kVA Battery / DC 150kw Charger combi unit + civils + install + setup

TOTAL CIVILS = €00.00

TOTAL EV EQUIPMENT +
COMBI BATTERY EV DC CHARGER =

€00.00

TOTAL COSTINGS=

€00.00

****Above inclusive of €0,000 new connection fee to ESB Network for 49kva MIC



Option 3- CPO visualisation of option 3 with Battery/ EV charger combi unit visible and located in one of the original parallel spaces as in options 1 and 2.

Roscommon County Council's preferred option for EV Charging Pilot scheme at Aras an Chontae

Option 1 is considered the best with option 3 next and Option 2 not recommended, it's viewed as being least value for capital expenditure allied to giving least profitability in O&M.

Option 1-

Connect to Aras Building Complex with a proposed increase in MIC from 140kVA to 250kVA

OR

Completely new 200 kva connection off 630kva substation giving 200kw MIC for EV chargers (load managed for fast chargers)

Connect to Aras Building Complex with a proposed increase in MIC or a new connection fully independent of Aras an Chontae complex which can be separately metered, with a separate energy bill. Either connection option gives the flexibility for a rates share arrangement with a 90% to 10% or 93% to 7% split in favour of Roscommon County Council as the CPO is not investing in the CAPEX and OPEX is 100% with CPO with costs and profitability from the percentage of charging revenues . Roscommon County Council would then be able to tailor rates so as to offer avail of preferential tariffs for employees. This preferential tariff or charging rate could also be sought for Roscommon town residents especially those without street-parking or logistical issues for getting a home charger. Premium rates would be charged to day-time fast charging and a modest reduction for night-time fast charging. Day-time AC slow charging could have a reduced rate and an even better rate for night-time AC slow charging and again especially to residents. No batteries to charge so extra incentives could be offered as stated for nigh-time DC or especially AC charging. The 200kVA MIC is costly in terms of connection fee and ongoing DUoS standing charges. By increasing MIC and availing on spare night time head of Aras building then the costly new connection charge is removed for CAPEX.

Option 2-Completely new 200 kva connection off 630kva substation giving 200kw MIC for EV chargers (load managed for fast chargers) with 200 kVA Battery with option to charge battery at cheaper night-time tariff and charge EVs during day.

A new connection fully independent with all same as option 1 but with a large increase in CAPEX for 200kVA battery. Battery can charge at night-time but if depleted during day then only economical way is to replenish battery at night rate. This option seems to have less potential to allow for flexible demand tariffs. Again the 200kVA MIC is costly in terms of connection fee and ongoing DUoS standing charges. No space for the large cabinet to house the battery, would involve sacrificing another parking space in nearby bank of 16 spaces up tight to protected stone wall.

Option 3-Completely new 49 kva connection off 630kva substation giving 49kw MIC for EV chargers (load managed for fast chargers) with 199 kVA Battery/ EV dual DC 150KW fast charger combi unit with option to charge battery at cheaper night-time tariff and charge EVs during day.

A new connection fully independent with all same as option 1 but with a large increase in CAPEX for 199 kVA Battery/EV dual DC 150KW fast charger combi unit. Battery can charge at night-time but if depleted during day then only economical way is to replenish battery at night rate. The big plus with this is the 49 kVA MIC is considerably less costly in terms of connection fee and ongoing DUoS standing charges than options 1 and 2. The combi unit can run the slow AC chargers and will really only be depleted quickly if all DC chargers and possibly all ACs are charging simultaneously or 2-3 DCs charge at once. The Combi unit is only economical if charged at night rate energy tariff. This could give this option an advantage over the rest as it also is less of a draw on the network. But if its depleted by charging during day then it's cost effectiveness reduces drastically so becomes less viable as hub should be have maximum usage therefore battery would be depleted quickly.

Summary of options

	Total Cost	Capex Battery	% increas e Opt 1	DUoS MIC / annum	New connection charge	Charging options	
OPTION 1**	€00.00	n/a	0%	€00**	€0000	-Day Premium rate fast -Day Reduced rate slow -Over-Night extra reduced rate	Best option for return for investment if used frequently for night time charging -if it's a standard timed connection with day and night time rates for usage.
OPTION 2	€00.00	€000.00	+66%	€4,000**	€0000	-Day Premium rate fast -Day Reduced rate slow ** slower drain off battery -Over-Night extra reduced rate	Worst option for CAPEX i.e. large cost for 200kVA independent battery and poor OPEX option. Worst option for return on investment if ran solely off grid. Needs solar trickle feed to replenish battery(s) even then huge area of solar panels required.
OPTION 3	€000.00	€000.00 ****	+82%	€00 **	€0000	-Day Premium rate fast -Day Reduced rate slow ** slower drain off battery -Over-Night extra reduced rate	Potential option if in a flexible demand tariff with energy provider and has option to add more batteries in sequence to combi unit. Could be energised from solar panels but it's an larger increase in CAPEX over option 2

^{****}Option 3 –DC chargers and Battery combi unit- cost of battery in combi unit less cost of options 1 & 2 DC EV 150kw charger

REVIEW AND RECOMMENDATION

RCC recommend OPTION 1 as offering the best potential return on investment. The configuration of EV chargers only, with no ancillary or combi unit batteries, is the best overall with – Chargers: 1 dual DC 150kw | 3 dual AC 22kw | + civils + install + setup and option to add 1 nr dual AC charger for hybrid spaces. There is less interruption in service as battery options, not recommended, present greater potential for maintenance issues than chargers alone.

TOTAL CIVILS = €00.00 TOTAL EQUIPMENT = €00.00

TOTAL COSTINGS=

€00.00

Also the preferred option to energise EV hub is to increase MIC of Aras building /complex from 140kVA to 250kVA MIC to avail of reduced demand at night time in Aras building / complex by using existing connection to ESB MV/LV substation CO***4201. Aras building uses 110kVA day time and 30-35 kVA at night so 250 kVA would give over 215kVA at night.

The preferred configuration of option 1 allied to energising off the increased Aras MIC meaning that the Aras complex is guaranteed 110kVA daytime power every weekday with adjustments at weekends. The chargers would be load managed to approx.. 130kVA daytime to ensure Aras has minimum required power demand and should the customer demand dictate the need to increase the MIC for the chargers then this option is available.

RCC has a Climate Action Plan and more solar panels is in this strategic plan. These panels will energise the building and could load shed to EV hub plus relieve stress on network to energise complex and EV hub.

^{**} Option 1 has 2 different connection options- Increased Aras MIC or New Connection to Substation

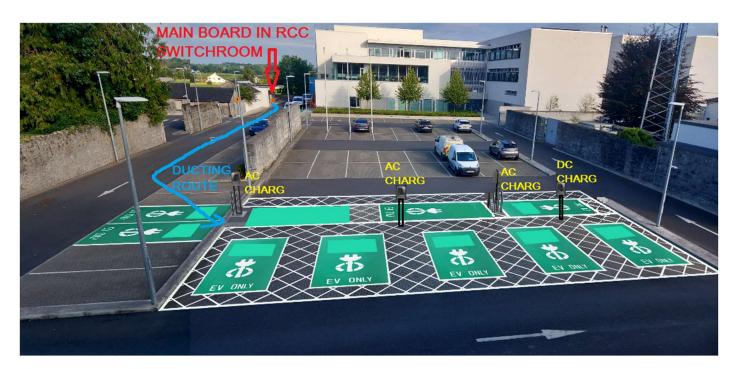
^{****}Above inclusive of €000 new connection fee to ESB Network for 200kva MIC

RRC also view this hub as an integral part of the transition for staff with diesel fleet vehicles operating out of the Aras. The hub would provide options for night or day long slow AC charging or DC fast day or early morning (night rate) charging. The EV hub would facilitate this transition and RCC staff with their own private EV's would be able to get reduced charging rates. Residents of the town could do the same.

The EV charging hub pilot has the potential for expansion within the complex. Learnings from the operations, maintenance and usage frequency would enable RCC to efficiently add more EV hubs to other RCC buildings and complexes.

End user benefits of the preferred option

- Increasing MIC of current power supply is the most economical connection option and allows us to avail of existing rates this offers the best value for money when compared to other options
- Potential revenue source for RCC that can be targeted towards transition to EVs
- Potential for profit share arrangement with service provider
- All back end support provided by service provider as part of contract over an agreed period
- RCC will have control and input into preferential rates for staff and local residents
- Facility may encourage staff to transition to an EV
- Will enable RCC to phase out some of our diesel fleet that are based at the Aras onsite charging available
- Will be ideal for utilisation of excess power generated by solar once installed



Visualisation of 5 number perpendicular universal design ev charging spaces with 3 parallel spaces not universal design and the 2 hybrid spaces not in this phase but are part of strategic plan for future consideration.





Examples of some of the DC rapid fast chargers available on market, the Autel and the Smappee with dynamic load managing and all with user friendliness in mind.



The RCC main LV board with spare capacity to energise the EV Charging hub by installing a new 400 amp ACC/MCCB residual circuit breaker and connect to Busbar and a new mini/ mega pillar with 400 amp breaker closer to chargers in hub area.

Please refer to design drawings for greater detail of layout.

ARAS-EV-CHGP-01 A1 drawing

ARAS-EV-CHGP-02 A1 drawing

ARAS-EV-CHGP-04 A1 drawing

Overall conclusion

The re-purposing and layout of new EV Charging Hub would not affect circulation and operation of car park as a whole. The option for staff to put their EV on slow charge during the working day means that vehicles or vehicles are effectively parked for day or most of it freeing up space or otherwise using spaces as they were. Reduced rates for night time charging should be attractive. Also the convenience offered to residents, RCC employees and other institutions close-by for fast or slow charging will have a positive impact on community. Offering one number dual fast DC charger along with 3 number dual AC slow chargers means destination charging is catered for along with slow trickle charging and should generate revenue towards capital expenditure, operation & maintenance costs and energy costs. This EV Charge Hub is also to be used as a model for the essential and inevitable rollout of EV charging infrastructure countywide allied to stimulating residents / RCC staff to transition to EVs.

The options for battery back-up with chargers was not deemed to deliver the best return on investment and stand alone dual chargers connected to the Aras An Chontae existing supply with favourable charging rates for residents, local professionals and RCC staff was deemed the best option. The expectation is for this hub to have medium to high usage at the beginning and with more and more transitioning to EVs then usage to ramp up considerably inside of 12-18 months.

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