DC Share

Site Selection Report

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1. Executive Summary

This report details the procedures used to determine which Local Authorities and geographical locations may be considered most suited to receiving the DC Share trial project.

The procedures used followed those specified within the Final Submission Proposal (FSP) and as dictated by Ofgem with the Project Direction Letter.

The DC Share project shall demonstrate that load equalisation can be achieved amongst the connected substations. It shall also assess the ability to provide rapid charging for Electric Vehicle (EV) owners within a constrained urban environment in a safe, efficient and controlled manner. To achieve this second objective we require a location that can provide a significant quantity of EV users who are able to connect and charge at different times of the day.

The site selection process has yielded four possible locations for the DC Share trial project, with the first ranked location, Taunton, Option #1, residing under Somerset West and Taunton Local Authorities control.

The second ranked location, Plymouth, Option #3, resides under Plymouth Local Authorities control.

Given the above criteria described above, Taunton Option #1 was ranked first for the following reasons:

- Commitment for the Local Authority to make space available for the EV rapid chargers in suitable locations, procure a fleet of EV's and assist with the planning application procedures (Ref: Appendix A.1 containing two letters of support received from Somerset West and Taunton Local Authority for the DC Share project)
- The council offices are close to one of the proposed EV charging hub locations, which will enable the council drivers to benefit from a conveniently located array of rapid charging points. This EV charging hub location is also next to a brownfield site undergoing development into a commercial and retail park
- The second EV charging hub location is close to the county cricket ground plus the shopping area
- There are no other rapid EV chargers in the immediate area
- Private EV car ownership in the local area is considered to be "average" (around 250 – 300) when compared to the other LA's within WPD's license area (Appendix 2 refers)
- There are a selection of substations in the central town area which have the required spare capacity to power the DC ring and which also have differing load profiles, which shall permit load equalisation to be trialled. Cable routes between them are possible (noting a river crossing is required, but which will either be accomplished via directional digging directly under the river or utilising above-ground duct via a pedestrian bridge crossing). There will be no main road crossings required.

The ongoing impact of COVID-19 which has manifested itself at the same time site selection was occurring has meant that, apart from an initial visit to both Taunton and Plymouth during February 2020, further travel to sites for detailed inspections and Local Authority discussions have not been possible. However, the majority of investigations and discussions between all concerned Parties have, to the best of our combined abilities, been undertaken remotely and hence this report is concluded with the findings and resolutions made accordingly.

Upon approval by Ofgem of the report we shall endeavour to re-visit Taunton and conclude final site inspections to verify suitability of the substation sites.

Should any issues arise at Taunton, with Option #1, then we shall proceed to investigate the next ranked option and so on until all issues are resolved and an option can be entirely agreed.

Upon conclusion of the above, planning application process shall commence with intend to conclude no later than 30th September 2020.

2. Abbreviations

Full Wording	Abbreviation
Alternating Current	AC
Business as Usual	BaU
Charge Point Operator	CPO
Direct Current	DC
Distribution Network Operator	DNO
Electric Vehicle	EV
Grid Tied Inverter	GTI
Local Authority	LA
Low Voltage	LV
National Innovation Competition	NIC
Western Power Distribution	WPD

3. Introduction

DC Share is an innovation project funded by Ofgem's Network Innovation Competition (NIC), led by Ricardo Energy & Environment on behalf of Western Power Distribution (WPD). Electricity North West Turbo Power Systems and Vectos are project partners.

The aim of DC Share is to demonstrate an alternative method to traditional AC reinforcement for the provision of significant amounts of power to EV rapid charging hubs in urban locations. A DC ring will be installed between four AC secondary substations to which two EV rapid charging hubs will be connected. The DC ring will allow the distribution of power between different AC substations and from AC substations to the DC rapid chargers. By sharing the rapid charging demand between AC substations with different load profiles, rapid charging hubs can be delivered without traditional reinforcement of the network. This will allow for rapid EV charging facilities to be developed in urban areas in a cost effective manner and where there may be space constraints for additional AC substations. Additionally, this will provide equalisation between the existing AC substations leading to better utilisation of the capacity of existing assets leading to reduced costs (calculated to be 1,800MVA of capacity released up to 2050) and carbon emissions (calculated to be 26,000 tCO2e of direct savings up to 2050).

DC Share will develop and trial a DC network to give a versatile and flexible solution for rapid EV charging using network equalisation. The system comprises four principal components:

1. Bi-directional power electronic converters connected between the 415 V AC network and ±800-900V DC distribution cable network;
2. A DC cable network with remote control sectionalising switches and connection hubs at strategic points;
3. A monitoring and control system to operate the charging and equalisation system, prioritising charge speeds and equalising the local distribution network;
4. Rapid EV charging equipment comprising DC hubs with smart chargers to enable managed utilisation of each DC hub whilst the cars are connected.

As part of the DC Share project, Ricardo and WPD have contacted a number of Local Authorities to identify the most suitable location for a trial site for two DC rapid charging hubs. The development of rapid charging hubs will create a "petrol station" -like infrastructure and have a positive impact on the transition to greener transport. Discussions have been held with a number of Local Authorities and investigations undertaken when suitable trial sites were identified leading to the selection of Taunton for the trial location. This report details the site selection process and the rationale behind the choice of trial location.

3.1 Trial Considerations

The selected trial location should enable the objectives of the trial to be achieved, whilst also meeting logistical and practical considerations.

The site selection process for the trial site includes a number of criteria that are important in this context only and will be substantially different in a Business as Usual (BaU) equivalent process. Most pertinently is the need to demonstrate all of the technical capabilities of the system, including

- the ability to draw power from sites with capacity and support sites with limited capacity available; and
- the rapid charging of reasonable numbers of EVs.

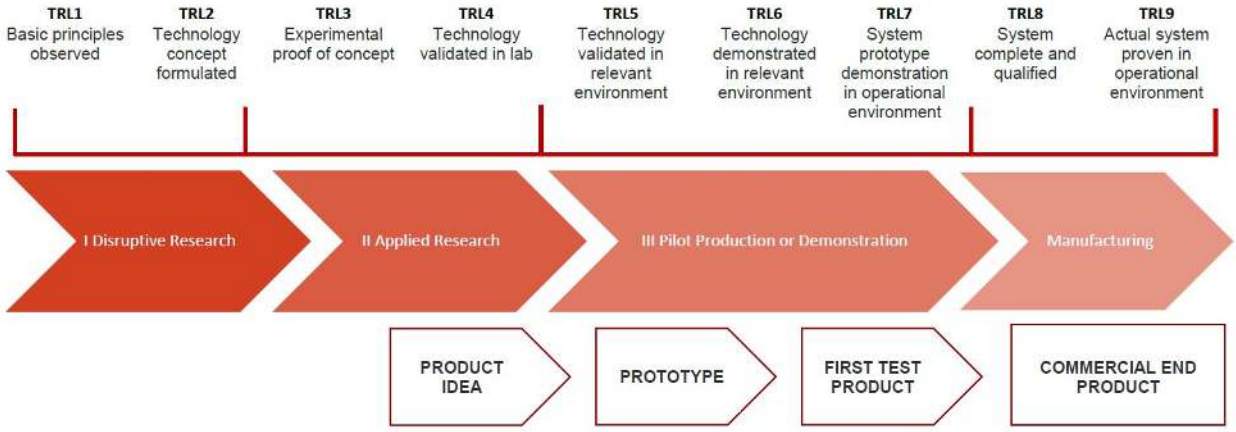
These factors drive a number of criteria that are important in determining the trial location.

In the BaU process selection of charging hub locations would be determined by third parties on a commercial basis, based on where they believe there is need for a rapid charging solution. Selection of the DC Share system would then be determined where it offers a more cost effective design than a conventional connection for the selected location.

3.2 The Objectives of the Trial

It is important to install a working solution to increase the Technical Readiness Level from level 6 to level 8.

Figure 1. Technical Readiness Level



The Objectives of the trial are:

- Proof of the systems technical capability, including:
  - Development of the hardware and software systems to allow a working system to be installed (including consideration of all Safety, protection etc. requirements),
  - Test the interfaces, both within the DC share solution, and to the external DNO equipment and control system
  - Examine how the trial will fit into the Distribution Network Operator (DNO) systems and processes, for example the connection application process.

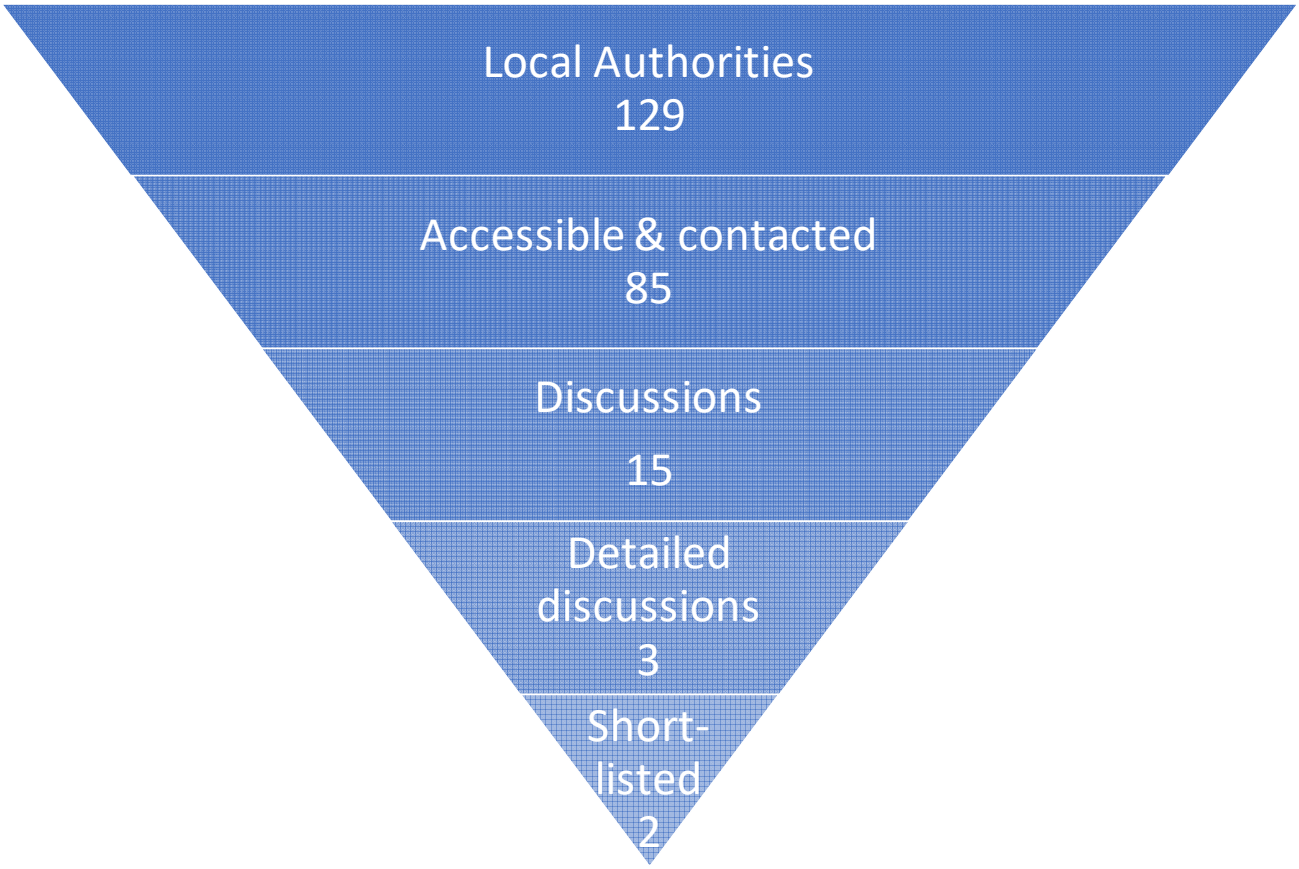
- Understand the key considerations for selection of both trial and BaU locations;
- Determine the costs required for installation, what factors influence them, and how these may change if the solution is installed at scale;
- Investigate potential operating modes and prioritisation methods for the system; and
- Gather some information on customer usage patterns and their priorities when selecting a rapid charging facility.

4. Site Selection Process

This section describes the site selection process used to filter down all of the potential locations that the trial could be held in, to a short list of preferred sites.

There are 129 local authorities in the four WPD license areas, and many more possible trial locations within each of these. It is therefore important that the DC Share team follow a fair and coherent trial site selection process to ensure that the relevant factors are evaluated and the objectives can be achieved.

Figure 2. Overview of Site Selection Process



4.1 Stage 1 - Initial Criteria for Selection

An initial set of criteria were developed during the project submission stage in 2019 and these were refined for the site selection process:

1. **Locations Within the WPD Area**

   The trial is being undertaken with WPD as the lead DNO and hence the trial site will be within one of their four license network areas (South West, South Wales, East and West Midlands).

Figure 3. WPD License Areas

At the end of this stage it has been determined that there are 129 Local Authority areas within WPD's license area and, initially, none are eliminated from consideration. Each Local Authority area could have many potential trial site locations within its operating area so all have been assessed.

2. Locations Which the Project Team can Efficiently Access

Some of the local authorities in the WPD license areas are remote and would be difficult and expensive (both in time and money) for the project team to access for surveys, installation and monitoring purposes. It is anticipated that many visits to the trial location will be required over the course of the project. The most extreme example within the WPD license area is the Isles of Scilly 40km from the Cornish peninsula, but other locations in South Wales and the South West are also remote.

Consideration was therefore given to remoteness and by analysing the accessibility by mainline train services which resulted in 41 local authorities being discounted, leaving 88 in contention.

3. Conurbations Where the Uptake of EVs is Being Encouraged

A significant factor in the demonstration of the success of the equalisation method will be the demonstration of rapid charging of multiple EVs at one time. The trial does not involve the provision of EVs hence it is very important to find a location where the uptake of EVs is being actively encouraged to ensure many different users engage with the trial. Local fleet operators or businesses who are adopting EVs in the vicinity of the trial this will help to guarantee users.

Some local authorities have existing EVs in their fleets and are actively purchasing EVs as they replace vehicles. This would help the trial by providing some guaranteed charging requirements and the possibility of determining trial periods where a number of fleet users are all requested to charge during a short period of time.

Additionally, some local authorities are encouraging taxi fleets to convert to EVs. Rapid charging hubs would help with this as taxis are likely to require a top up of power during their

shift. It is noted that taxi ranks are only available to taxi's so any EV chargers placed specifically in taxi ranks cannot be used by the public.

This metric was initially found to be difficult to apply, as the majority of Local Authorities investigated suggested that they are encouraging EV uptake although many were unable to provide significant evidence of their plans to achieve this. It was therefore transferred into Stage 2 of the site selection process, for discussion with Local Authorities as to specifics of how a good degree of utilisation could be assured, via the use of a commercial fleet or similar that would want to use the DC Share solution during the project timescales.

4. Locations Where Rapid Chargers will be Convenient for Users and in Demand

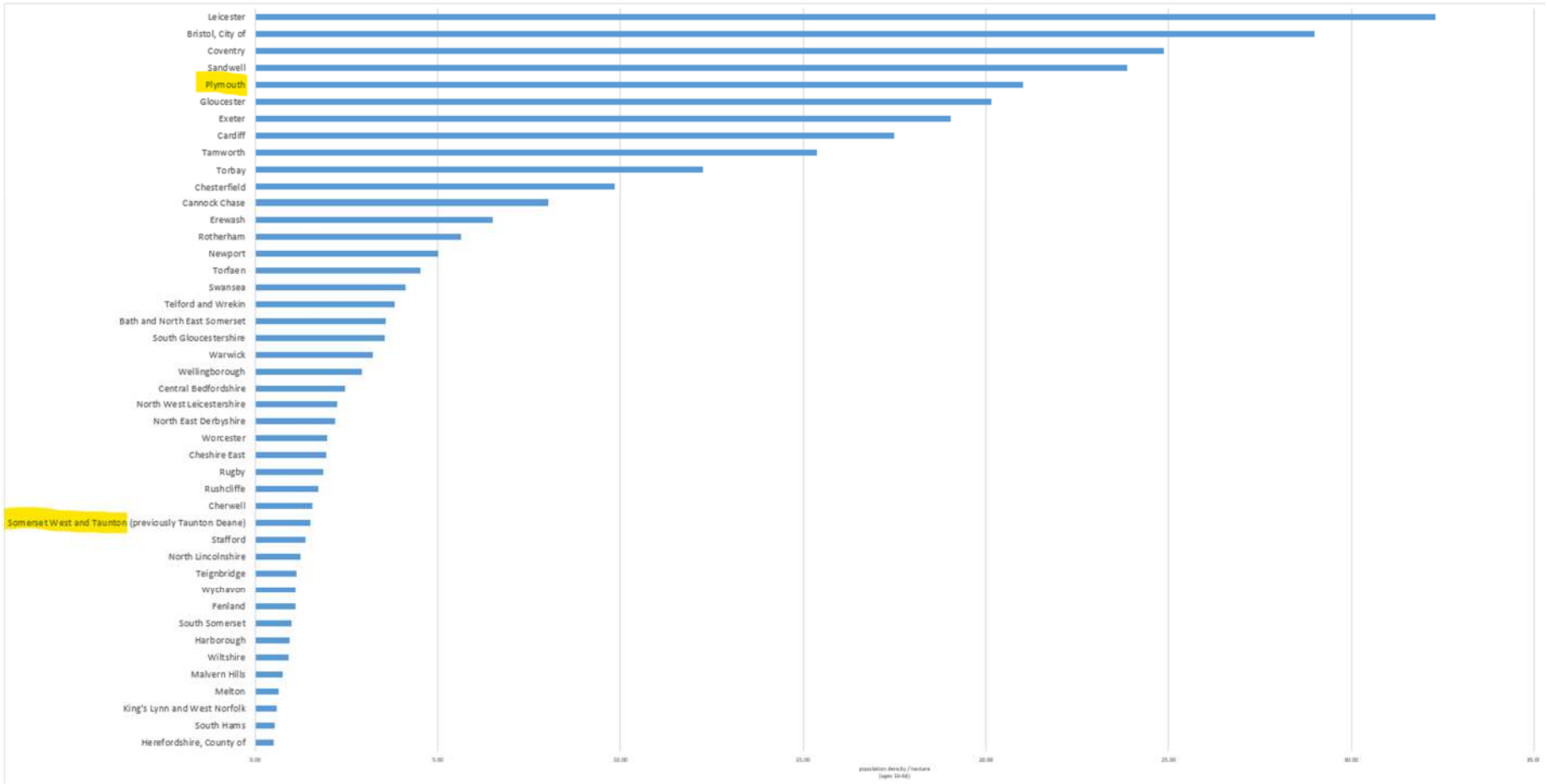
The location should be somewhere where vehicle fleets, taxis and private vehicles will stop to charge frequently and regularly. We envisage rapid charging users stopping for approximately half an hour to charge their EVs and hence it is important that other local facilities are in easy reach; for example, shops, cafes and public parks.

The rapid charging hubs could include a mix of private and public charging facilities as appropriate for the trial site.

The population density by local authority area of people aged between 16-64 was then used to determine the most likely driving population in each local authority area. This results in a range of population density (age 16-64) from 0.5 people$_{(16\text{-}64)}$ / hectare in rural local authorities such as West Lindsey and Mid Devon to over 30 people$_{(16\text{-}64)}$ / hectare in the most urban local authorities such as Nottingham and Leicester. This range, for a selection of Local Authorities within WPD's license area, is illustrated in Figure 4.

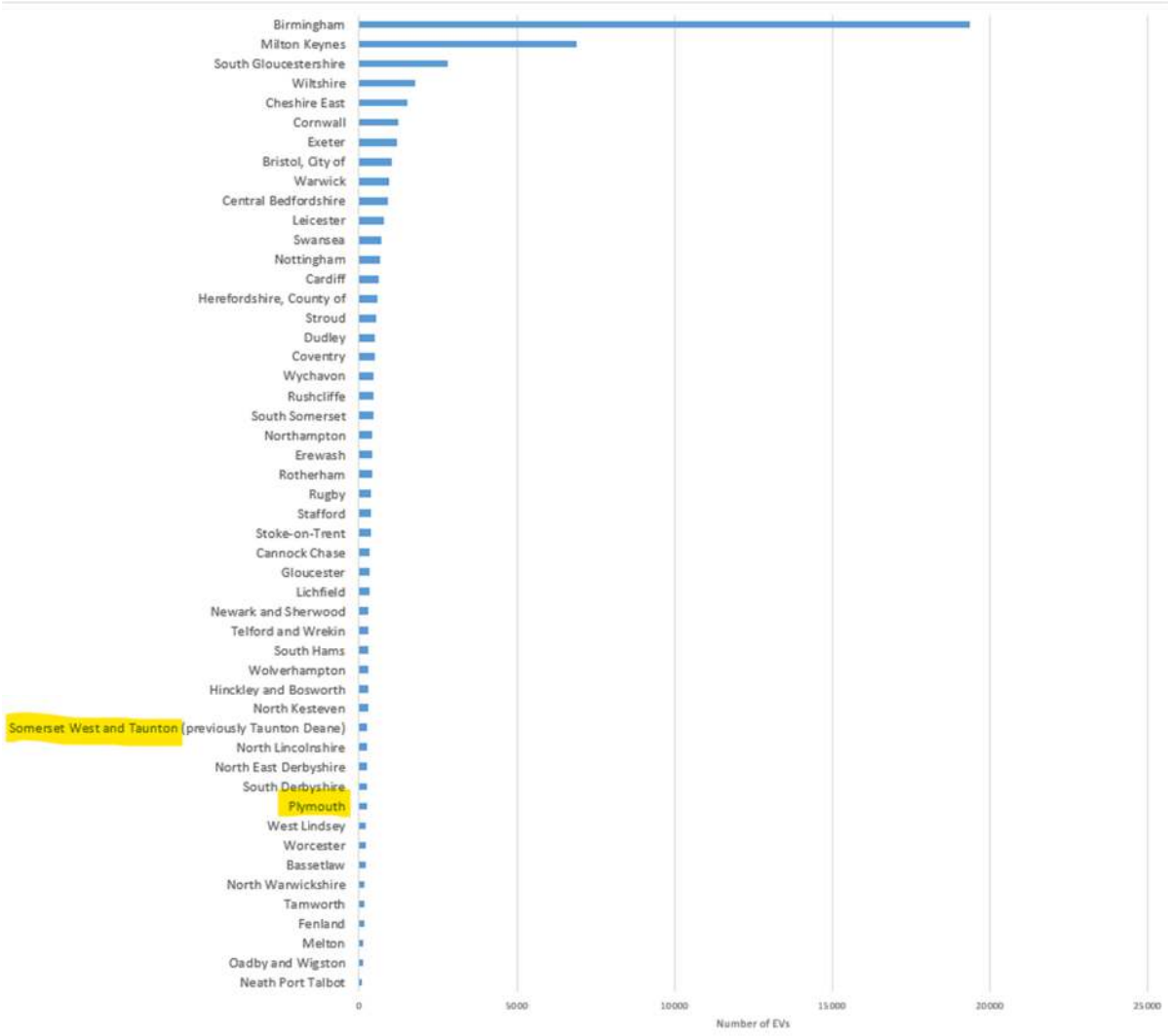
Figure 4. Range of Population Density / Hectare by Local Authority (population aged 16 - 64)

Note: The figure below details a selection of all the Local Authorities within WPD's license area, with Taunton and Plymouth highlighted. Please refer to Appendix 2 for full Local Authority data.



The take up of EVs is also variable by local authority, with Birmingham having over 19,000 EVs and Torfaen and Neath Port Talbot each having less than 100. This variability, for a selection of Local Authorities within WPD's license area, is illustrated in Figure 5. Appendix 2 provides full data for each Local Authority.

Figure 5. Range of Number of EVs by Local Authority[1]



Local Authorities with both high population densities and a high number of EVs were preferred, but it was felt that this metric should not be used to categorically rule in or out any Local Authority. Instead a holistic assessment against these criteria of locations identified in stage 2 should be adopted.

5. Limited Number of Existing Rapid Chargers

In order to assist with the requirement to achieve high utilisation of the rapid chargers, it was considered prudent to seek a local authority and location that did not already have a large number of rapid chargers installed and where local demand was expected to be reasonably significant.

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/853463/veh0132.ods

The rationale for this was that locations having a very low (or zero) quantity of existing rapid charger provision would help guarantee usage and the risk of competition from existing rapid charging points could be mitigated.

On this basis, locations such as Milton Keynes, which already has over 40 rapid chargers including a rapid charging hub of 8 chargers at the Milton Keynes Coachway, along with other cities such as Bristol, Nottingham and Coventry, which all have between 8 and 11 rapid charges in central locations, were not favoured.

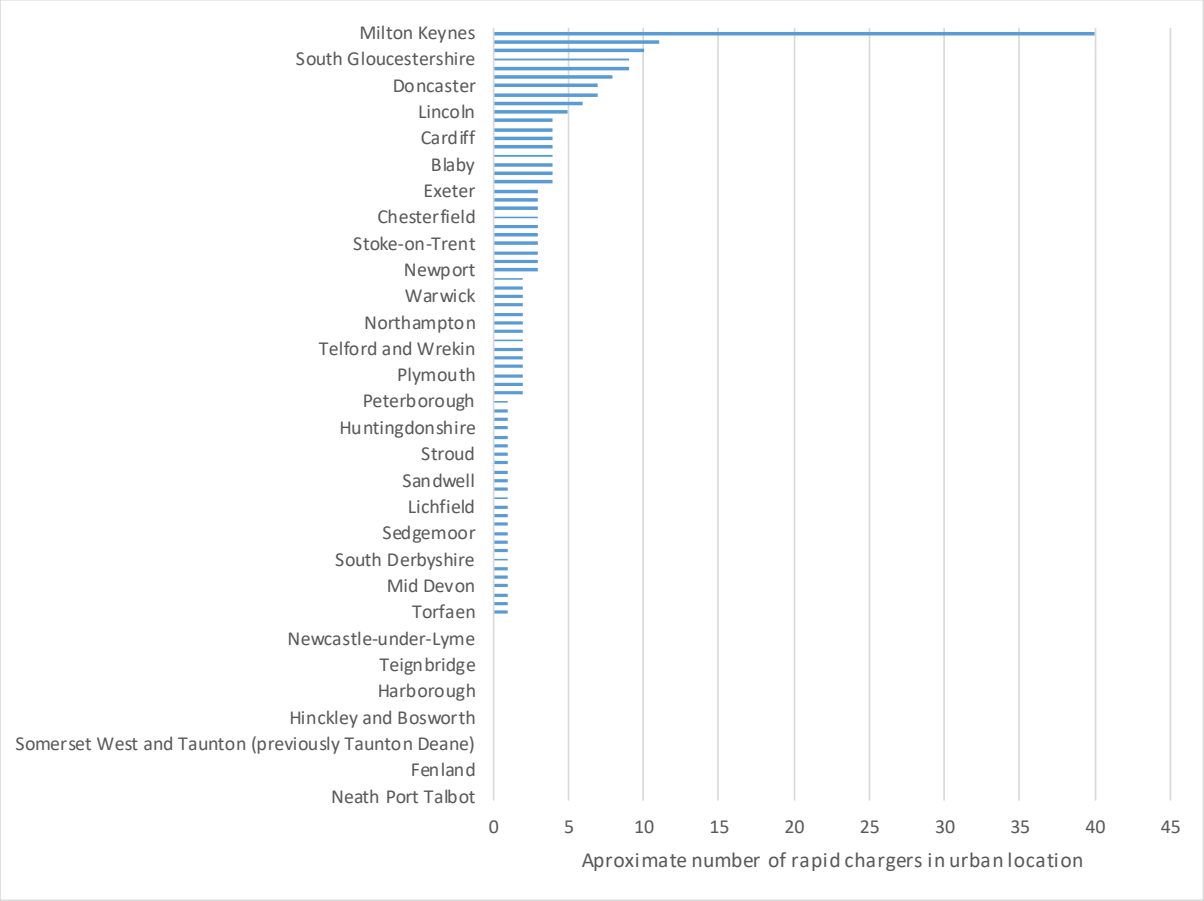
Likewise, locations deemed to be “stop-over points” for longer car journeys (eg motorway service stations) and “out-of-town park and ride areas” were not considered.

Publicly available information from Zap Map (www.zap-map.com) was used to review and concur with the publicly available data as detailed above.

The range of rapid charger provision by local authority is illustrated in Figure 6.

Consideration was also given to the fact that certain Local Authorities already had agreements in place with Charge Point Operators (CPO’s) to manage/operate the EV charging points with their own infrastructures, which meant that should that CPO not choose to integrate the new DC Share EV chargers then the LA may not be able to proceed with the scheme. Given the perceived risk of this, these Local Authorities were discounted.

Figure 6. Approximate Number of Rapid Chargers by Local Authority in Urban Areas



4.1.1 Summary of Findings from Stage 1 Criteria

An ideal location would therefore be one with a high population density, a large number of existing electric vehicles, no existing rapid charging facilities. However, these criteria are somewhat mutually exclusive as areas with significant numbers of EVs are generally supported by existing rapid charging provision. Whilst the DC Share solution could be used in conjunction with existing chargers, and indeed this would be the case for roll out, the project learning will be maximised if the trial rapid charging hubs are exclusive in the area.

Stage 1 has therefore consisted of a desktop review of the most fundamental aspects of the site selection with the above considerations in mind.

This has narrowed the possible trial locations down from the initial pool of 129 local authority areas, to 88 which are accessible to the project team. Other criteria have been reviewed but have not been used to rule in or out locations, instead being used in combination with discussions with Local Authority's to inform the decision-making process.

In addition to the above, a further consideration is that the selected site must facilitate our ability to progress the project within the project timescale and also minimised installation risks.

Stage 2 of the site selection will reduce this number further based on LA engagement and will also identify specific locations within the candidate LAs for detailed evaluation in stage 3 of the process.

Figure 7. Results of First Stage of Site Selection Process

Local Authorities in WPD area	Local authorities reached out to (emailed)	Interest from Local Authorities	Number of local authorities engaged with	Percentage of existing EVs (Office for National Statistics 2019)	Number of existing rapid chargers
129 in total 41 discounted due to difficulty in access by public transport for the project team	88 Local authorities emailed with project proposal	15 Local authorities expressed interest in the DC Share project	Stratford upon Avon	0.02%	1
			South Hams	0.81%	0
			Somerset West and Taunton	0.56%	0
			East Devon	0.72%	1
			South West Devon	0.63%	1
			Newcastle-Under-Lyme	0.89%	0
			Warwick	1.61%	2
			Sheffield	0.6%	2
			Plymouth	0.21%	2
			Worcester	0.51%	3
			Bristol	0.56%	11
			Milton Keynes	7%	40+
			Coventry	0.39%	9
			Derby City Council	1.31%	2
			Gloucester	0.66%	4

4.2 Stage 2 - Engagement with Local Authorities

Following the initial review in stage 1, the project team attempted to engage with the remaining 88 potential Local Authority's. This was required to:

- Understand the level of interest,
- Identify specific sites within their areas,
- Identify potential "fleet" users, and
- Ascertain any issues that might preclude the trial being undertaken in that locality in the project timescales.

Of the 88 local authorities that were accessible to the project team within the WPD license areas, 3 were unable to be reached out to via email, leaving 85 for further consideration. The email thus issued to each (example of which is contained within Appendix 3), outlined the project and asked them if they were interested in finding out more about participation. We approached all of them to ensure that all possible specific locations within an LA were considered against the selection criteria.

Further detailed discussions were held with those that we received responses back from, namely:

- Devon (South Hams District Council, West Devon Borough Council and Devon County Council are working together in respect of EV Charging);
- Newcastle-Under-Lyme;
- Rotherham;
- South Staffordshire;
- Coventry City Council;
- Derby;
- Somerset West and Taunton Council;
- Stratford-on-Avon;
- Warwick;
- Plymouth;
- Worcester;
- Gloucester;
- Cornwall;
- Bristol;
- Milton Keynes

4.2.1 Summary of Detailed Engagement

Direct discussions with the remaining 15 LA's concentrated on the precise details of the charging hub locations, and in particular the following criteria:

1. Charging Hubs Located on Local Authority Land

The trial has a fixed programme and hence it is important that once the site is selected it is relatively straightforward to obtain the necessary planning permission for the location of the rapid charging hubs. Locating the charge points on public land in collaboration with a local authority should aid the project in respect of obtaining the necessary planning permission and enable the project timescales to be met.

2. Locations Where Cars and Vans can Safely Stop to Park

For all EV charging facilities it is important that the charge points, in this case a set of two charging hubs, are placed in a location where:

- the vehicles can safely access the parking spaces,
- the users can safely plug in their vehicles,
- the leads will not pose a trip hazard to the general public, and;
- the users can safely leave their vehicles for the duration of the charge.

This could be a location where there is space on the pavement or the side of the road for the chargers and vehicles or where there is space for a charging hub arrangement.

3. Locations with an EV "Fleet" User Identified

In order to ensure that the trial can be assured of a base EV charging demand, locations where an identified group of EVs will be attracted to use the chargers were discussed. For example those having, or soon to be having a population of electric taxis, council vehicles, a commercial EV fleet user, an EV Car club etc. were preferred.

4. Locations Within 1km and Surrounded by Mixed Use Property

The equalisation benefits arise due to the variation in load profiles of the AC substations. Hence the trial should connect substations supplying a mixture of commercial / industrial and residential areas, as these have peak demands at differing times of day and the DC Share system can vary both where charging demand is obtained from, and provide support to the heavily loaded sites at times when it is required.

Ideally the project locations would be within a 1 km square area, in order to limit the length of DC cabling required.

4.2.2 Discounted Locations

Using the site selection criteria there are several reasons why we have discounted sites as being unsuitable for the trial location. These are summarised below:

Milton Keynes are ahead with the provision of charging points and already having a rapid charging hub. Working in conjunction with Chargemaster they have plans for EV charging expansion as well as other transport polices. We investigated possibility of second site near the Mercedes Benz factory with Chargemaster but nothing positive was identified. From the project perspective Milton Keynes is ahead in provision of rapid charging and our chargers would compete with existing provision, potentially limiting their usage.

Derby sent a statement that they were unable to support the project.

Coventry are the City of Culture in 2021, hence it is not possible to dig up roads in the centre of the City during our project timescales. The Ricoh arena, or Council depots were identified as possibilities but the Ricoh arena is also likely to be involved with the City of Culture activities.

Warwick / Leamington Spa currently have 6 EVs as part of the council fleet, however Leamington Spa are hosting the bowling for the Commonwealth Games in 2022 so locations would have to be

considered carefully to minimise disruption. This location was discounted as being high risk to the project due to the possibility of installation works coinciding with preparation for the Games.

Birmingham and Solihull have been discounted for the same reason as above in respect of providing locations for the Commonwealth Games.

Bristol have many charging infrastructure plans under the Go Ultra Low programme, and whilst there are over 100 EVs in the area there are no specific commitments to EV taxi or fleet provision. Furthermore, the existing EV infrastructure would require the project communications to link up with Siemens systems which would add an unnecessary complication and risk to the project.

Worcester have plans for a number of rapid chargers with Chargemaster and there was Interest in exploring this further especially with taxi charging at a potential site near Shrub Hill Train station. However, a second charging hub site could not be found within a short distance.

Newcastle-Under-Lyme are progressing their EV strategy but were unable to work with the project timescales.

Honiton was identified by East Devon Council as being a location they favoured for charge point provision mainly due to its proximity to the A30 traffic. However, the conurbation and associated carparks were considered too small for the project, the current level of local EV take-up was small and there was no guarantee that EV owners taking long car journeys to the West Country via the A30, would stop to recharge.

4.2.3 Short Listed Sites

Following discussions three locations were identified as being possible trial sites. Interestingly, all three have very different characteristics as discussed below.

Somerset West and Taunton

Population Density/Hectare: 1.52

Number of EVs registered within the LA: 263

Number of Rapid Chargers: 0

Discussions were held with the Somerset West and Taunton Locality Manager in respect of suitable sites for the trial and the commitment the council are making to electrification of transport. Taunton is currently undergoing significant regeneration and redevelopment and there are two council owned pieces of land which are suitable locations for the rapid charging hubs. One is in a carpark at Coal Orchard which currently being redeveloped and is just behind the main shopping street. The other is at Firepool, an area which has recently been cleared for redevelopment. Firepool is near the council offices, the station and the county cricket ground and there are plans for development of a mix of office, hotel and residential accommodation together with supporting waterfront leisure and retail outlets. The areas around both locations include a mix of property types. The distance between the two sites is in the order of 1km.

A letter of support has been received from Somerset West and Taunton Local Authority for the DC Share project, please refer to Appendix A.1.

The council are planning to replace their car fleet with EVs in the project timescales and as the Firepool site is adjacent to the council offices the project could engage with the users during the trial to set up specific charging trials. This is confirmed in the letter of intent in which the council state that they anticipate the replacement vehicles to begin in the later part of 2020 if they are selected as the host authority. The Firepool site is very close to the train station and hence the rapid charging hub would be expected to attract any taxis that transition to EV. The council could help the project engage with the taxis within the existing taxi forum.

A site visit was made to Taunton on February 13th 2020 during which the council representative showed the project team the proposed rapid charging sites and the locations of the substations and suitable cable routes were discussed. A further potential charging hub location was discussed during the visit, Canon St, which is geographically closer to Coal Orchard, reducing the required circuit lengths and negating the need for cables to cross the river Tone, but without the assurance of council EVs favouring the site.

Both of these options are considered in section 4.3, the electrical infrastructure review.

Plymouth

Population Density/Hectare: 21.01

Number of EVs registered within the LA: 234

Number of Rapid Chargers: 2

We had discussions with the Low Carbon City Officer for Plymouth. Central Plymouth is a frequented urban area with a potential variety of EV charging from the local council fleet, taxis, shopping, night-time entertainment. Sites around the city were discussed with central Plymouth being preferred from a usage perspective. Rapid charging hub locations such as the city council office at Ballard House near Millbay Park, a taxi rank at Raleigh Street and carparks in Bath Street and at the Civic Centre were considered. All these sites are within a few hundred meters of each other in a mixed commercial and residential area.

Plymouth council currently have six EVs in their fleet and have plans for a large number of their cars and vans to be EV in the next replacement period. Plymouth has received £250,000 from the Transforming Cities fund to expand it's electric vehicle charging facilities with 22 kW charge points being installed and it is part of the E-flex V2G demonstration project. There are also plans to install charging points for electric boats.

A site visit was undertaken to Plymouth on 25th of February 2020 and three options for charging locations were considered:

- Option 1 - St Andrews Street and Guildhall Square short stay carparks, St Andrews Street is being redeveloped to include a taxi rank.
- Option 2 - Plymouth Pavilions an events venue and ice rink and Ballard house, Plymouth Council
- Option 3 – Market Square and Mayflower West short stay carparks.

The appropriateness of these is considered in section 4.3, the stage 3 infrastructure review.

Exeter

Population Density: 19.03

Number of EVs registered within the LA: 1,194

Number of Rapid Chargers: 3

Discussions were held with the South West Energy Partnership Regional Programme Manager. Several councils are working in collaboration to support the transition to EVs. Exeter was identified as being the most suitable location, however ownership of sites in central Exeter is complicated.

Discussions progressed about the possibility of using two park and ride carparks (Sowton & Honiton) on the outskirts of Exeter, both close to junctions 29 and 30 of the M5 motorway about 1.2 km apart.

Whilst rapid charging is not directly applicable to long stay users of the park and ride, the proximity to the motorway and other facilities such as Exeter Chiefs rugby club, Digby & Sowton train station, IKEA, hotels, and a prospective retail park mean this would be a good location for the DC Share solution.

However, as the locations did not have a guaranteed EV charging user and would be dependent on public users only. On this basis, Exeter was discounted at this stage.

Conclusions from Short Listed sites

The project continued to explore the Taunton and Plymouth options as they both have suitable locations for the rapid charging hubs and the councils are converting their fleets to EV meaning the project would have a guarantee of vehicles to participate in the trial of the charging hubs.

The Exeter park and rides were not pursued further as the rapid chargers would only be dependent on general (public) EV users plus the proposed site for the charger locations (forming part of a long-stay car-park) was not considered ideal. It is however suggested that such sites could be, suitable for a DC Share solution in the future when EVs are more widespread.

Figure 8. Results of the Stage 2 Process

Criteria	Taunton	Plymouth	Exeter
1. Location within the WPD area	South West license area	South West license area.	South West license area
2. Location which the project team can access	Taunton is close to the M5, and near to the A303. The railway is served by Great Western Railway and Cross country services	Plymouth is 45 miles south of Exeter. The railway is served by Great Western Railway and Cross country services.	Exeter is close to the M5. The railway is served by Great Western Railway and Cross country services
3. Conurbation where the uptake of EVs is being encouraged	Somerset West and Taunton Council is pursuing a range of different options including providing funding for charging points in isolated rural areas within its district. They planning to roll out charging points in carparks.	A number of 22 kW charge points are being installed.	South West Devon, East Devon and South Hams are pursuing a range of different options to encourage the uptake of EVs. The councils are transitioning to EVs in their fleets.
4. Located on public land	The two sites identified are owned by the Council	The sites identified are owned by the Council.	The two park and ride sites are owned by the Council
6. Location where cars and vans can safely stop to park	Both sites are carparks and the rapid charging hubs can be designed appropriately.	The sites considered are carparks hence the rapid charging hubs can be designed appropriately.	Both sites are carparks and the rapid charging hubs can be designed appropriately.

Criteria	Taunton	Plymouth	Exeter
7. Surrounded by mixed use property	The sites are in a mixed commercial and residential area and there are several substations with different load profiles in the vicinity.	The sites are in a mixed commercial and residential area and there are several substations with different load profiles in the vicinity.	The sites are in a mixed commercial and residential area and there are several substations with different load profiles in the vicinity.
8. Location where a number of rapid chargers will be well utilised	The sites are close to the town centre, the council offices for fleet charging, the railway station for taxis. Both sites are in a redevelopment area with mixed facilities in close proximity. There are not a large number of privately owned EVs in the area, but the commitment from the council in respect of their fleet conversion and the close proximity to the station for taxis is significant.	Plymouth has over 200 EVs in the area, and the council are switching a number of their fleet vehicles to electric.	The sites are close to the M5 and other local facilities. Like the Milton Keynes hub it is imagined that the hubs would be used by vehicles on the M5. The Exeter area has a good take up of EVs at over 1000. However, no “fleet” user could be identified in close proximity to the charging sites.
9. Number of existing rapid chargers	None. No commitment to an existing charge point provider	One in a carpark, one in a hotel. The existing charge point provider is Pod Point	There are 3 rapid chargers in the nearby M5 service station which can also be accessed from Exeter without the need to use the M5.
10 Other	One of the options would require the DC cable to cross the river Tone. However there are several road and footbridges which could accommodate this crossing.	Plymouth is 1.5 hours further south than Taunton so would extend the project travelling time significantly and make single day visits to site less viable.	The proposed location for the EV chargers was within a long-stay car-park
Outcome:	Progress options to Stage 3	Progress options to Stage 3	Discounted due to lack of “Fleet” user plus long stay car park issues

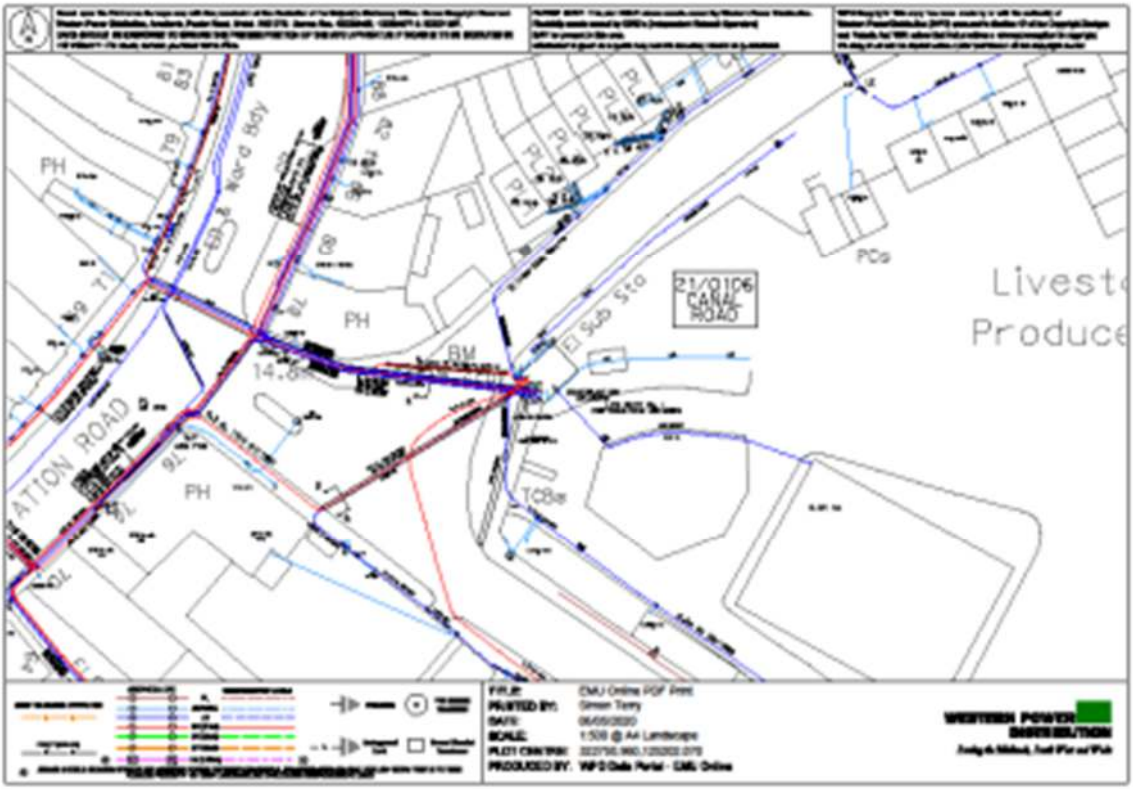
4.3 Stage 3 - Electrical Infrastructure Review

Following identification of the charging hub location options for both Taunton and Plymouth, an initial review of the electrical infrastructure was undertaken, an example for which is detailed below.

This comprised the following steps:

1. Identification of the secondary substations in the area that could be used as the DC Share supply points. This was achieved using the WPD online mapping tool to locate the charging hub locations, the secondary substations and cable routes in the immediate vicinity.

Figure 9. Example of WPD Mapping Information



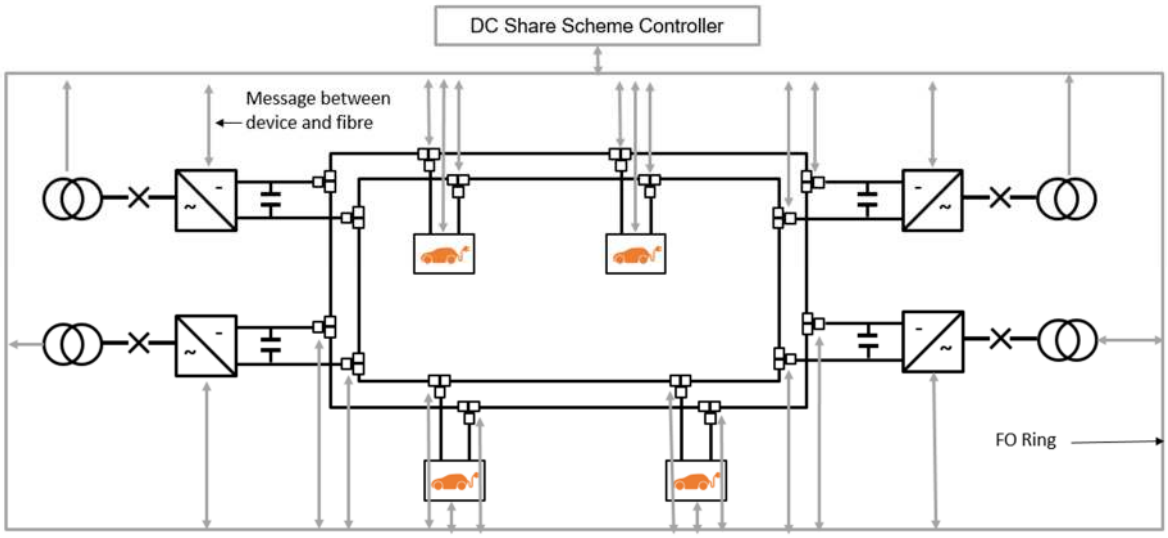
2. Due to the project timescales it is important that there are no existing major network investment plans in the vicinity that would adversely impact installation. Locations were reviewed for currently planned work that could delay or disrupt the trial.
3. Collection of information on the transformer capacity and Maximum Demand Indications (MDIs) at each of the identified connection substations. WPD were able to provide MDIs giving daytime and night information. These provide an indication of when the substation is predominantly loaded,
    - Day: implying a commercial/industrial profile, or
    - Night, implying a residential profile.

    The DC Share Grid Tied Inverters (GTI) are 250 kVA, so only substations with 250kVA spare capacity during day or night, as determined by their MDI readings, were considered. Sites that have a history of being heavily loaded at all times would be of limited use to provide charging capacity.

More detailed information on the demand profiles this will be collected from the preferred sites in order to model scenarios of the power flows under possible charging scenarios.

4. Any of the potential sites that were found to supply a customer directly at HV were discounted, as the required access to the LV distribution board would not be possible at these sites.
5. An initial selection of 4 substations to supply the 2 charging locations was then made, using those with available capacity and a mixture of those with day and night peaks. Potential alternative locations were also noted, should one of the preferred sites not be suitable for any reason (limited space etc.).
6. All sites were reviewed to ensure that they are all “Cold Sites” to avoid difficulties with step and touch potentials under fault conditions.
7. A preliminary design of the DC cable routes that would connect the 4 substation sites and pass through the charging locations was produced, as shown below in Figure 11. In order to have charging demand on each of the 4 DC circuit legs of the installation, it is necessary for each of the 2 charging hub locations to have 2 of the circuits pass through it.

Figure 8. Schematic Representation of the DC Share Solution

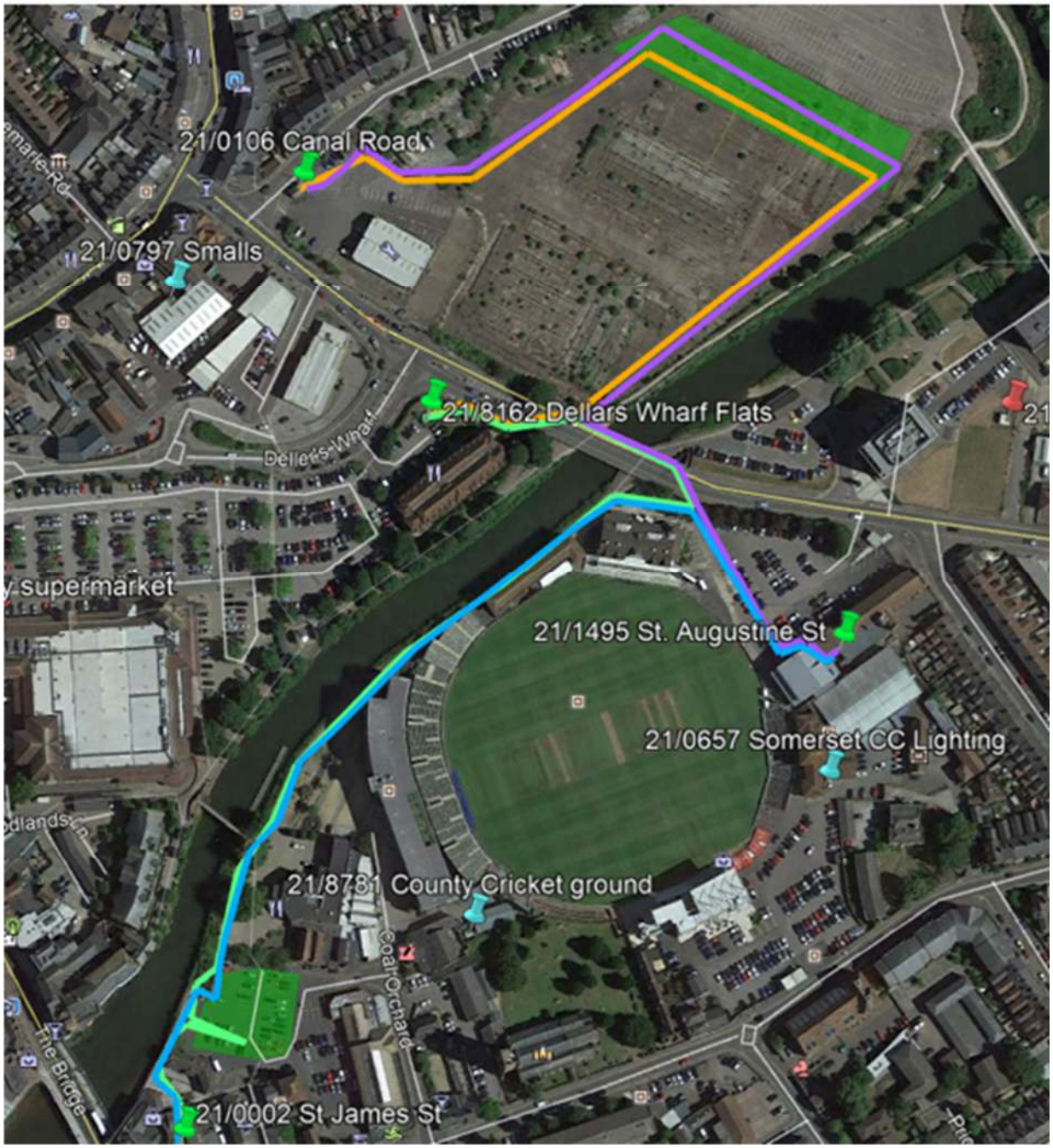


Ideally the trial location will be one where it will be relatively easy to install the DC cable without being unduly disruptive. The indicative cable routes were completed aiming to minimise cost and disruption, so the following factors were considered:

- Use of existing cable routes and ducts,
- Minimisation of disruption to roads and pavements,
- If possible, avoid obstacles such as river and/or major road crossings, unless the perceived benefits of proceeding to link substations and hence facilitating the best locations for EV charging points, out-weighed these considerations
- Laying multiple cables together in order to reduce the trench length.

An example preliminary design for Taunton Option 1 is shown in 11, and further information on the other options considered is provided in Section 2.4.

Figure 9. Preliminary Layout for Taunton Option 1



Key

EV Charging Location

DC Cable Circuits

Substation (connected)

4.3.1 Summary of the Options Considered Following Preliminary Design

The tables below summarise the options considered for both Taunton and Plymouth sites.

Table 1. Taunton Options

Option	Description
1. **Firepool and Coal Orchard**	• The locations are in central Taunton, close to several notable features, such as the railway station, the cricket ground, a supermarket and town centre shopping and leisure locations. • Installation in both locations can be completed concurrently with planned redevelopment work. • There is the possibility that secondary substations may be added or redeveloped as part of the redevelopment of the Firepool site. Details of this would require monitoring. • Firepool Charging hub will be used by Local Authority EVs, so should benefit from good utilisation. • The two sites are either side of the river tone, so a crossing point is required. • The substations are all 500kVA, and include a mixture of those with daytime and night peaks. Some are heavily loaded and some lightly loaded. • There are a number of possible alternative sites in close proximity should one of those selected be unsuitable. • Approximate Cable length = 1770m
2. **Coal Orchard and Canon Street**	• The locations are in central Taunton, close to several notable features, such as the railway station, the cricket ground, a supermarket and town centre shopping and leisure locations. • Both charging hubs will be dependent on public charging only, so there is no guaranteed charging demand. • Installation in Canon St Car park would cause disruption. • No river crossing is required. • The substations include a mixture of those with daytime and night peaks. Some are heavily loaded and some lightly loaded. One site (21/1469 – Works) appears to experience relatively constant loading of around 70%, and being 500kVA does not have 250kVA of spare capacity. • There are limited alternative substations within close proximity to those selected. • Approximate Cable length = 1300m

Table 2. Plymouth Options

Option	Description
1. St Andrews St and Guildhall Square	• The locations are in central Plymouth, close to several notable features, such as the theatre, and town centre shopping and leisure locations. • Both charging hubs will be dependent on public charging only, so there is no guaranteed charging demand. • St Andrews St car park has planned redevelopment work which could be completed concurrently. Installation in guildhall car park would cause disruption. • No major obstacles are obvious in the route.

	• The substations currently all have daytime peaks. Some are heavily loaded and some lightly loaded. Two of the sites have multiple transformers, requiring investigation to determine the most appropriate connection arrangements. Bretonside leisure complex has recently opened, so it is possible that peak demands will rise as public footfall increases. • There are limited alternative substations within close proximity to those selected. • Approximate Cable length = 1630m
2. The Pavilions and Ballard House	• The locations are on the outskirts of central Plymouth, close to the Pavilions leisure centre, hotels, the council offices and housing. • Ballard House could be used for charging of council EVs, but this is not confirmed. • Installation in both locations would cause disruption. • Crossing of the busy Millbay Road would be required. • The substations all have daytime peaks. Some are heavily loaded and some lightly loaded. • There are limited alternative substations within close proximity to those selected. • Approximate Cable length = 1350m
3. Market Square and Mayflower West	• The locations are in central Plymouth, town centre shopping and leisure locations. • Both charging hubs will be dependent on public charging only, so there is no guaranteed charging demand. Mayflower West is a popular rest location for taxi drivers so could be a good location for electric taxi charging, if drivers can be encouraged to take these up. • Installation in both car parks would cause disruption. • No major obstacles are obvious in the route. • The substations all have daytime peaks. Some are heavily loaded (including one that has been overloaded) and some lightly loaded (including one that is extremely lightly loaded. • There are alternative substations within close proximity to those selected. • Approximate Cable length = 800m

4.4 Cost Comparisons (Dig & Lay)

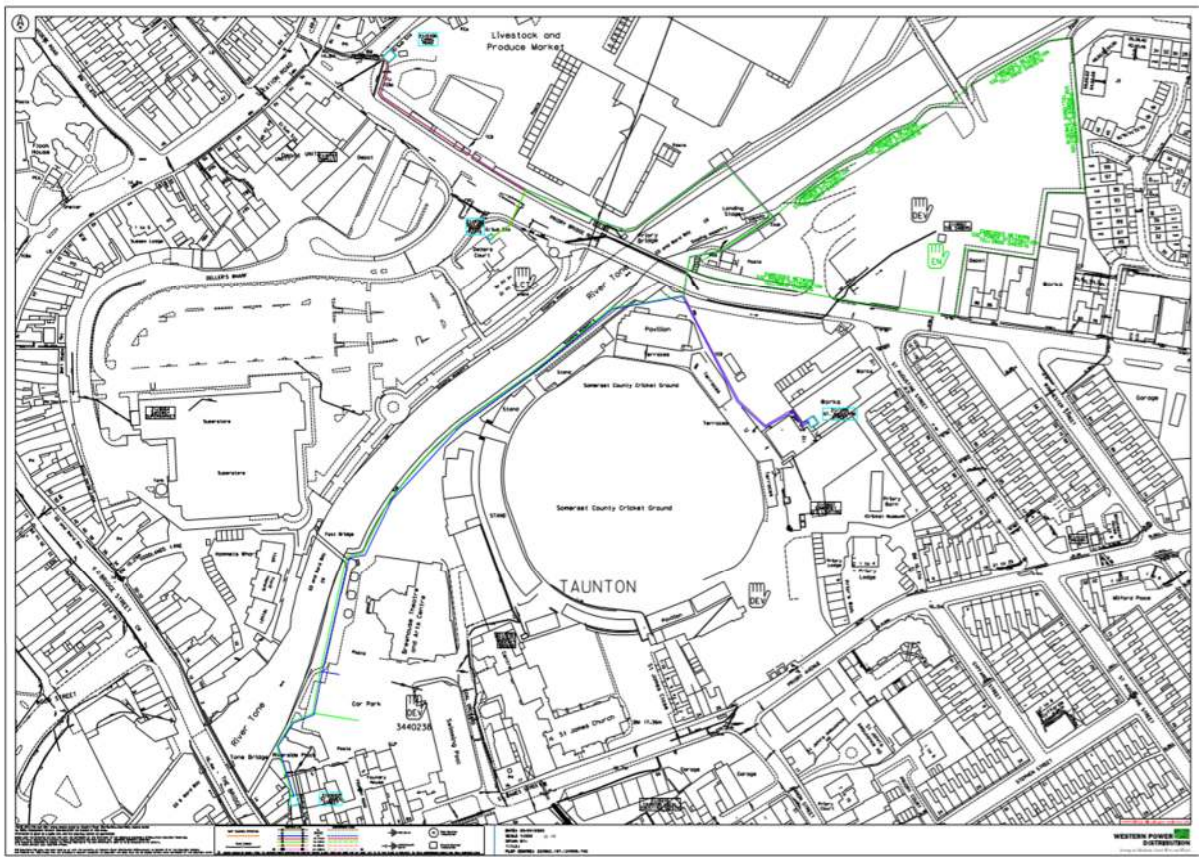
The preliminary layouts were used to produce an initial cost estimate of the various options at both Taunton and Plymouth.

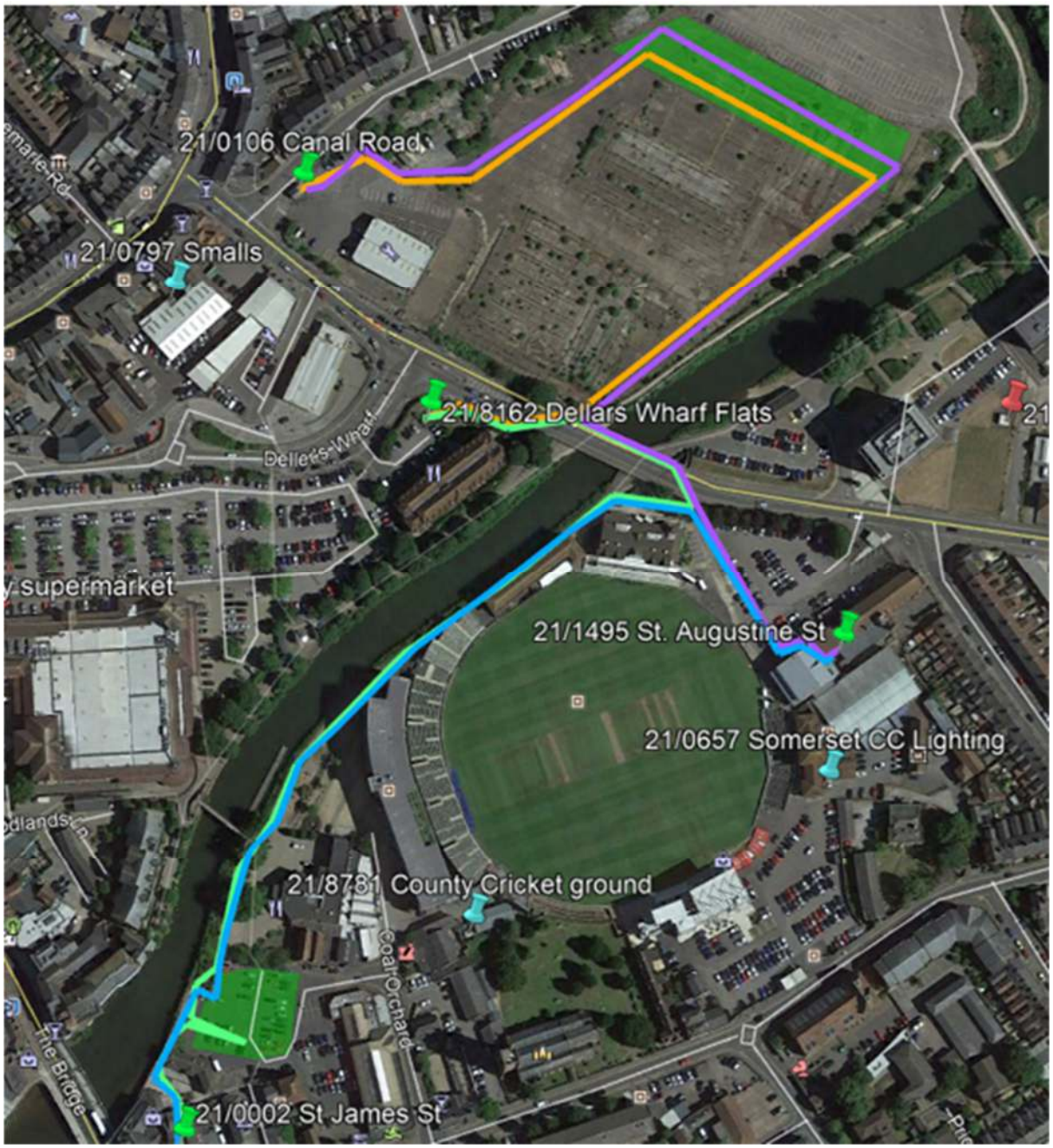
Description of the findings of the initial costings are provided below.

The costings concentrate, for comparison purposes, only on the costs for dig and lay of the DC cable as all other cost elements for all remaining equipment and materials are essentially the same regardless of what location/option is chosen.

In addition to the costings detailed here, it is anticipated that each substation will require modifications to the existing LVAC distribution board, plus some minor civil works. A cost of £12,000 per substation is budgeted for this work.

4.4.1 Taunton Option #1





Key

- EV Charging Location
- DC Cable Circuits
- Substation (connected)

Taunton Option 1

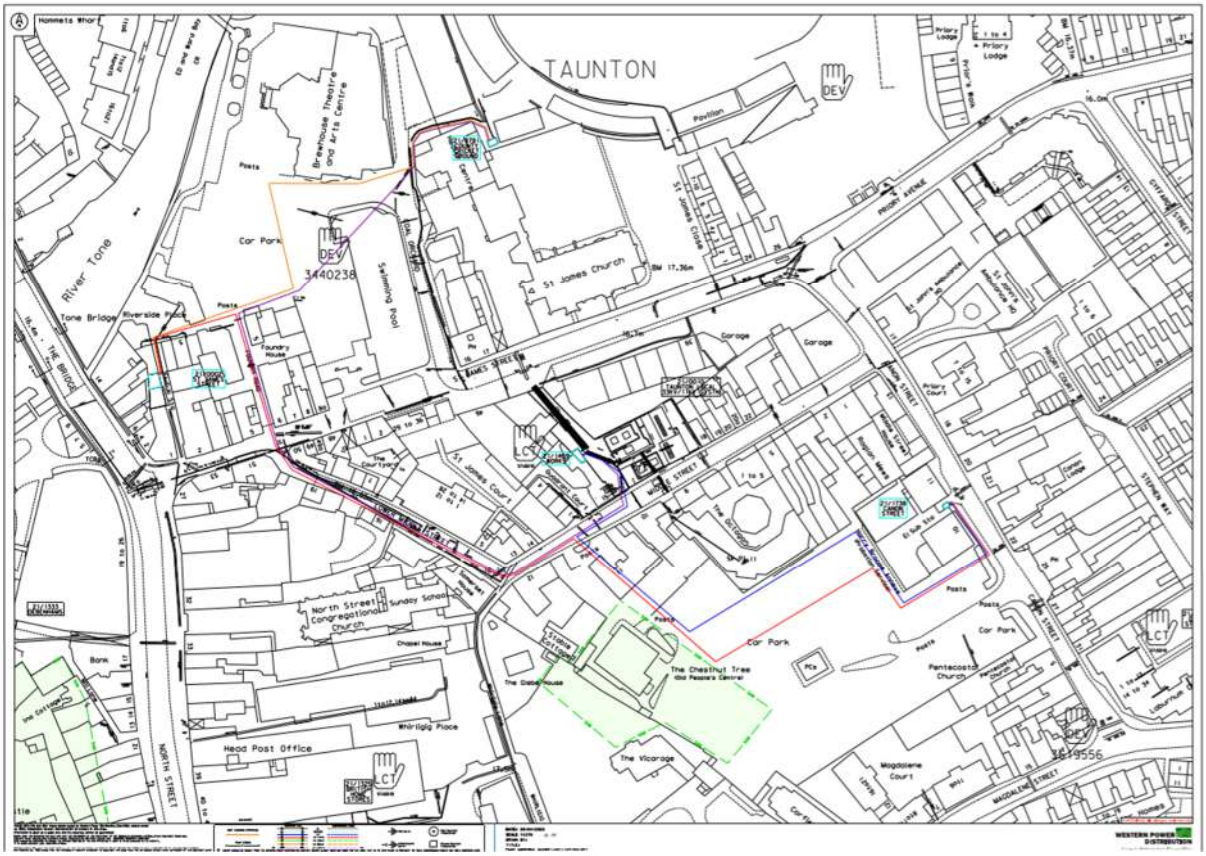
Total Bridge:	£97,237.19
Total Footpath:	£94,068.75

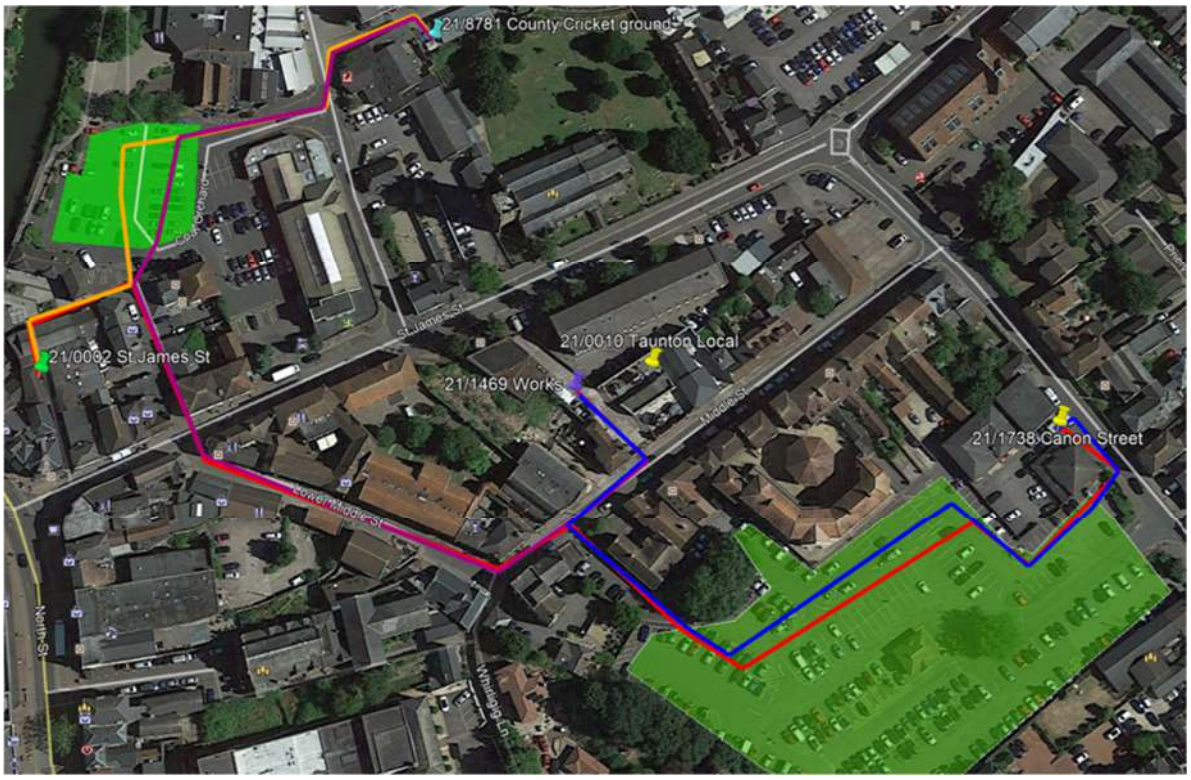
Dig and Lay	Length (m)	Dig and Lay Cost

A3038 (Canal Road to St Augustine St. - 320m)	320	£53,363.20
A3038 (Canal Road to Bridge)	187	£31,184.12
A3038 (Bridge to St Augustine St)	114	£19,010.64
St Augustine St (A3038 to Lane - 25m)	25	£1,678.25
Bridge over River Tone from Youngman Pl.	£28,000 (average of quotations)	
St James St (Coal Orchard to Lane before North Street - 103m)	103	£13,085.12
Coal Orchard (to St James St. 124m)	124	£8,324.12
Footpath Youngmans Pl.	236	£14,016.04
Footpath Around Cricket Ground	114	£6,770.46

As an alternative to the Option #1 route detailed herein, it may be preferable to route the DC cable across the river above ground using a pedestrian bridge located further upstream. Whilst the length of DC cable required would be marginally longer, the cost of installation (ducting versus directional drilling) would more than compensate. At the time of report preparation, WPD are considering this option and will need to start a dialogue with the relevant Authorities (eg Environment Agency. Highways Agency) to determine best route to take.

4.4.2 Taunton Option #2





Key

EV Charging Location

DC Cable Circuits

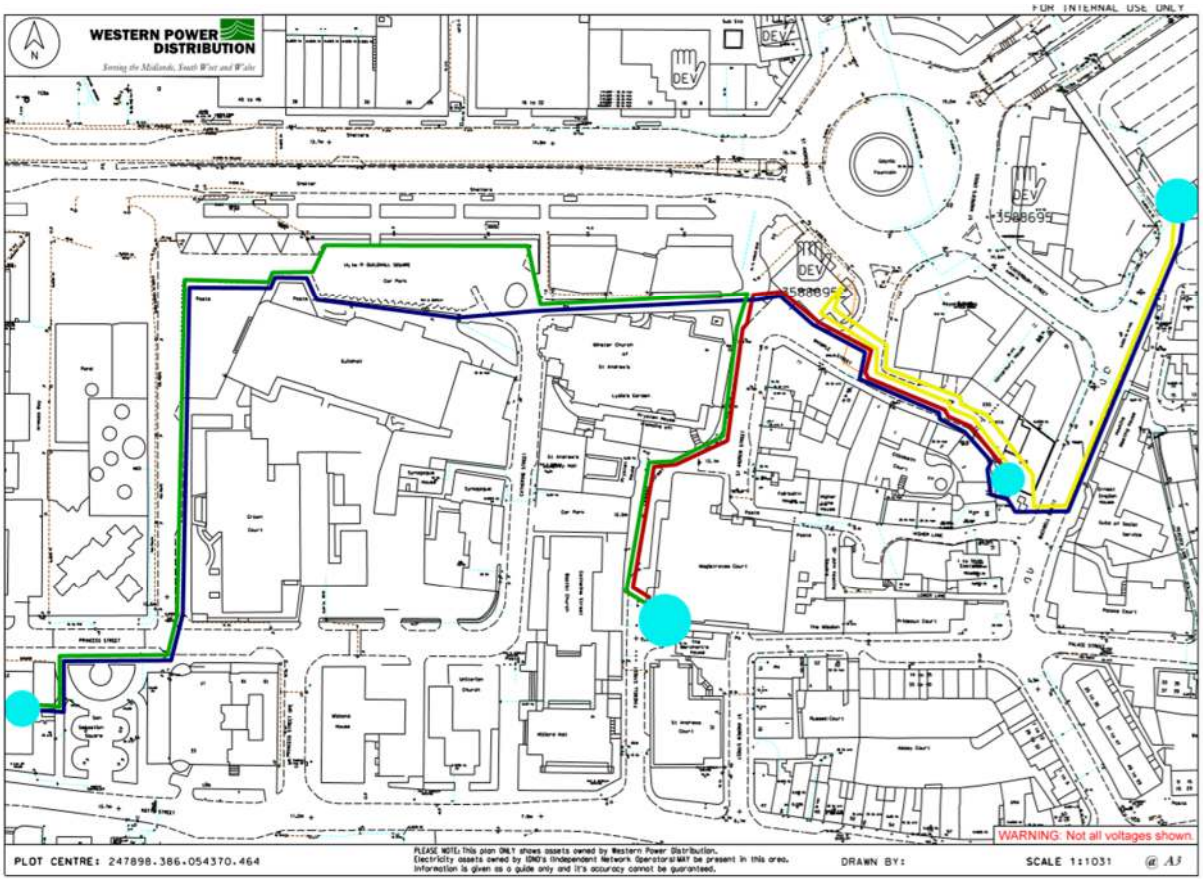
Substation (connected)

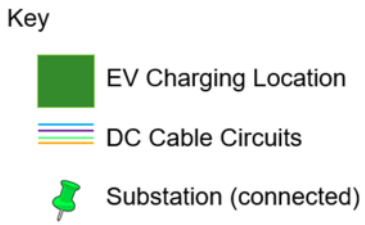
Taunton Option 2

Total:	£52,898.44

Dig and Lay	Length (m)	Dig and Lay Cost
Cricket Ground Sub to St James Street Sub	200	£13,426
St James Street Sub to Canon Street Sub	435	£29,202
Extra leg for Canon Street Sub to Works Sub	100	£6,713
Extra leg for Canon Street Sub to Works Sub (2)	53	£3,558

4.4.3 Plymouth Option #1





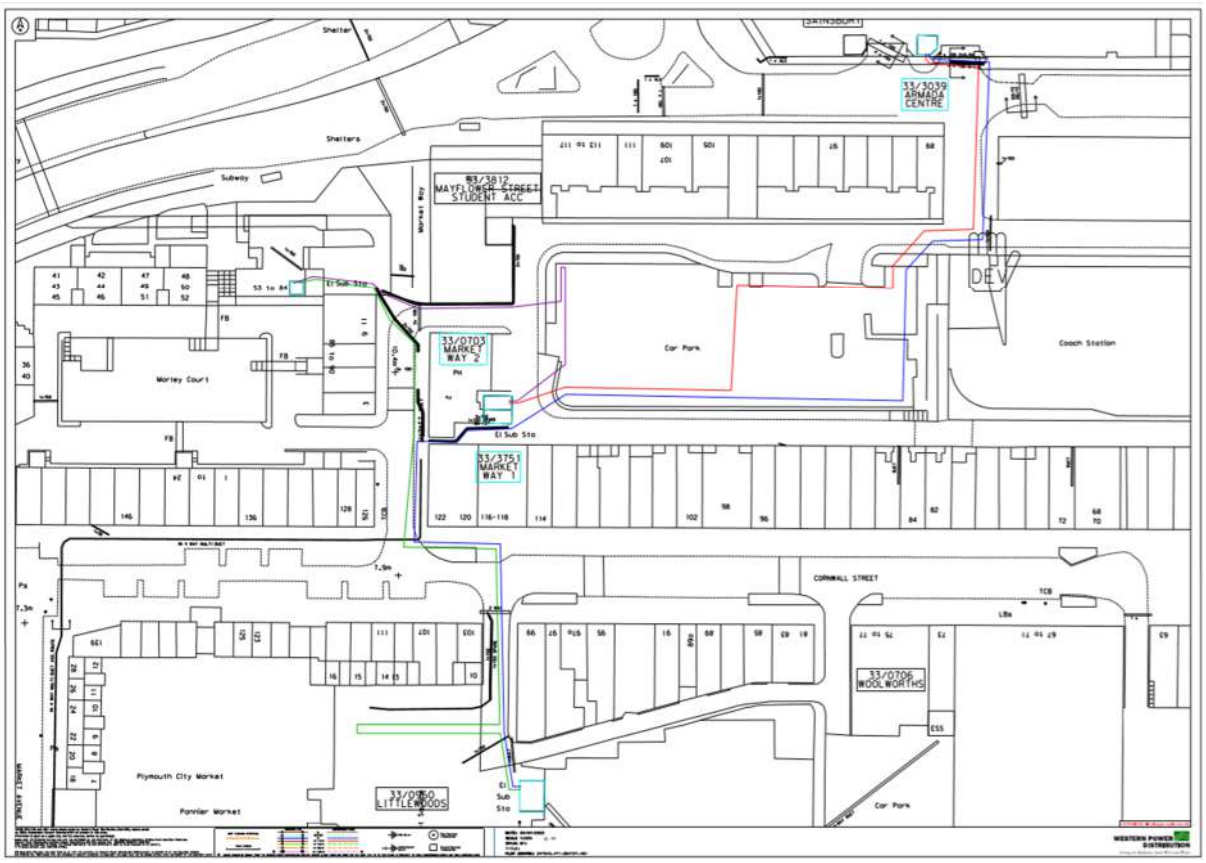
Plymouth Option 1	Total:	£104,152.74

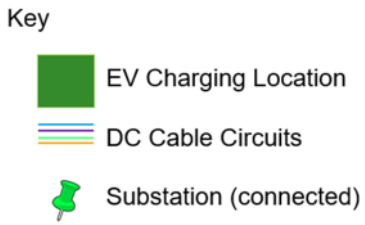
Dig and Lay	Length (m)	Dig and Lay Cost
Bretonside St. to Buckwell St. to Whimple St Sub	121	£20,177.96
Whimple St. to St Andrew's Car Park	110	£7,384.30
St. Andrew's Car Park to Magistrates	152	£19,253.84
Princess St. to St Andrew's Car Park, through Guildhall Car Park	397	£50,287.99
Extra Leg in Guildhall Car Park	105	£7,048.65

4.4.4 Plymouth Option #2

After extended site survey and assessment it was observed that the substations required had 11kV feeders so were considered unusable, hence this Option was dismissed at this stage. There was also the added complexity of a major road crossing involved.

4.4.5 Plymouth Option #3





Plymouth Option 3

Total:	**£35,914.55**

Dig and Lay	Length (m)	Dig and Lay Cost
Armada Centre Sub to Littlewoods Sub	300	£20,139
Extra leg for Littlewoods Sub to Morley Court	55	£3,692
Extra leg for Market Way to Armada Centre	100	£6,713
Extra Leg for Market Way to Morley Court	80	£5,370

4.5 Selection of Preferred Options

A ranked summary of the options considered in detail is presented in Table 3.

Table 3. Summary of Location Options

Rank	City	Option	Technical considerations	Cost Considerations	Logistical Considerations	Other Considerations
1	Taunton	1	• Appropriate Substations and alternatives identified. • 1770m DC Cable Route.		• River Crossing required. • Both charging locations are being redeveloped.	Good charger utilisation expected from Council vehicles
2	Plymouth	3	• All substations appear to have daytime peaks, but a good mix of heavily and lightly loaded. Some alternatives available. • 800m DC Cable Route		• No major obstacles in route. • Disruption to both charging locations.	Reliant on public EV users for charging demand, though Taxi Charging demand is possible.
3	Taunton	2	• One substation appears to be constantly loaded with only 150kVA of spare capacity. Limited alternatives available • 1330m DC Cable Route		• No major obstacles in route. • One charging location is being redeveloped.	Reliant on public EV users for charging demand
4	Plymouth	1	• All substations appear to have daytime peaks, but a good mix of heavily and lightly loaded. Limited alternatives available • 1630m DC Cable Route		• No major obstacles in route. • One charging location is being redeveloped.	Reliant on public EV users for charging demand
Discounted due to lack of suitable substations	Plymouth	2	• There are not 4 suitable substations available for use. • 1350m DC Cable Route		• Major road crossing • Disruption to both charging locations	Charging Hub is at the council offices, so there is potential for good charging demand

4.6 Site Surveys

Having ranked each of the options the site surveys will be completed to confirm that the sites are suitable. The impact of COVID 19 working restrictions has meant site visits of the potential substation sites has not been possible at the time of writing.

Site surveys are required in order to determine:

- Requirements to connect to the LV distribution board – Are there spare ways on the LV board or a generator connection point that could be used, or is a replacement required?
- Access routes into, and the space available within the substations to locate the GTIs – It is intended to locate the power electronic converters in existing substations requiring a space in the order of 2.5m^3. The space available will be used to inform the design of the GTIs.
- Installation of demand monitors and subsequent review of the recorded data to confirm that the load profiles are suitable for use in the trial.
- Review of utility maps for the locations and cable routes to understand any underground obstacles that will need consideration.

These will be completed on the substations in preferential order, with alternative substations investigated should any insurmountable problems be encountered.

The substations associated at least with the first ranked site were all constructed many years ago and are of the traditional, brick-built substation design, so expectation is that there will be sufficient room to house the new equipment (GTI's and associated cubicles etc).

In the unlikely event that issues are encountered at multiple substations and the alternatives such that a location is no longer viable, substations at the next option will be surveyed.

5. Next steps

Following the site surveys the project will complete final selection of the location and the substations that will be used for the trial.

Following final selection, the following activities will be completed such that the solution is installed and commissioned in readiness for the start of the trial period:

- Detailed design of cable routes (including final assessment of the best engineered solution for the river crossing, taking due regards to cost, risk and cable run lengths) and substation equipment layouts;
- Design of the charging hubs including layouts and any architectural considerations;
- Detailed costing of equipment and installation;
- The planning applications for the charging hubs;
- Work planning and procurement of the required equipment;
- Site installation works;
- Testing and commissioning.

5.1 Lessons Learnt

The site selection process has produced the following insights on the process in selecting the trial location, and also learning for how site selection will be completed in Business as Usual.

- It can be difficult to determine the correct contact for engagement with at Local Authorities and other third parties. This was felt to be important in order to ensure that as many potential sites as possible were considered and was found to be more time consuming that had been anticipated. This point is directly relevant to the trial site selection, as the BaU process would include consideration of the commercial needs case for a location and include private land purchase or rental.
- Some metrics to exclude locations were investigated, but it was difficult to apply them directly, without risking discounting of a possible location. In practice a holistic approach was used, following discussion with interested LA's so that the merits of each option could be considered. This point is directly relevant to the trial site selection, as commercial needs case will drive site selection in a BaU process.
- Assessing the Electrical infrastructure and requirements is a more complex process than a conventional connection application due to:
    - The requirement to use spare capacity at 4 existing substations;
    - Uncertainties of the form factor of the system equipment;
    - The novelty of the DC solution, and the requirement to avoid potential installation risks in order to meet the project timescales and budget.

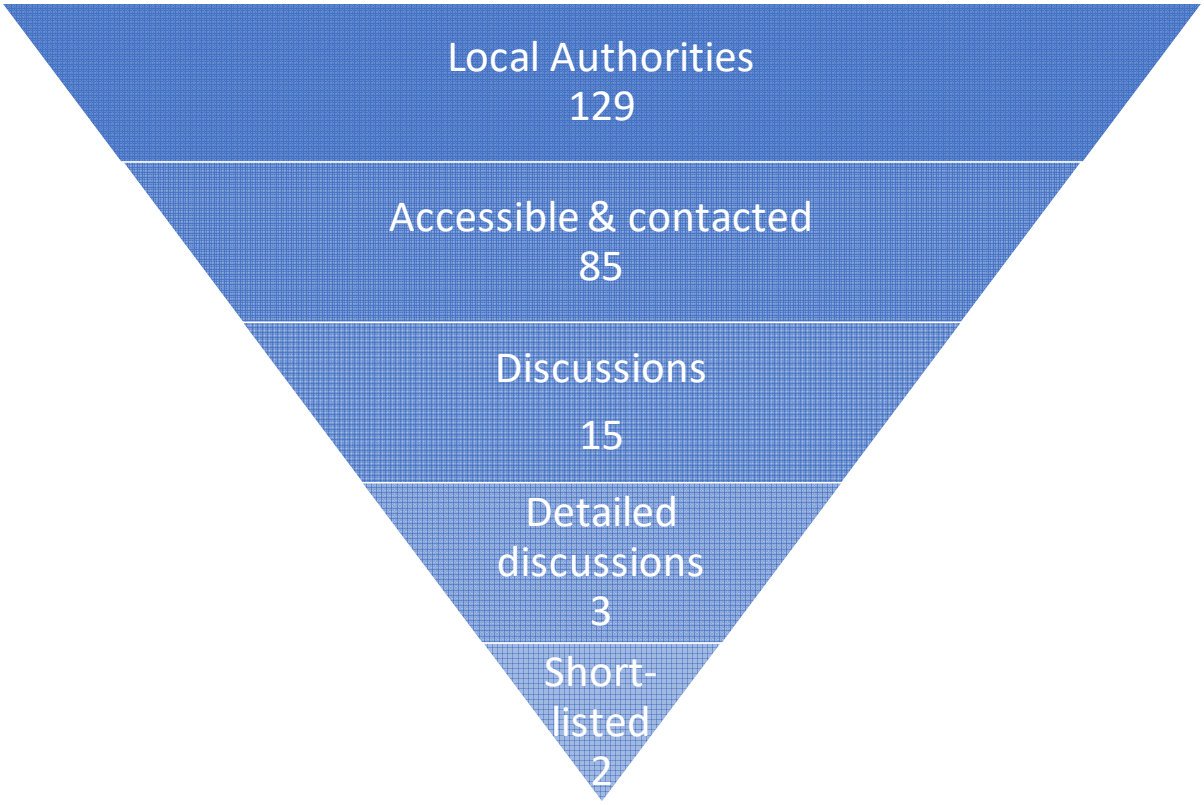
6. Conclusion

This document has outlined the site selection process that has been developed in order to determine the location for the DC Share projects trial location.

The process has paid particular attention to the need to ensure that the system is demonstrated with significant charging demand, as this is crucial to the viability of the solution and there are currently a relatively limited number of EVs in GB.

Selection has been completed as a filtering process starting with all of the possible locations within the WPD license areas and reducing the number of potential locations through a mixture of desktop review, engagement with Local Authorities and site visits.

Figure 12. DC Share Trial Site Selection Process



The process has produced a ranked short list of 4 location options, that will be reviewed to ensure that the logistics for installation are appropriate, via site surveys.

Table 4. Short Listed Options

Rank	City	Option
1	Taunton	1. Firepool and Coal Orchard

2	Plymouth	2. Market Square and Mayflower West
3	Taunton	3. Firepool and Canon St.
4	Plymouth	1. St Andrews St and Guildhall Square

This process is anticipated to form the basis of the process that would be used in BaU application, particularly with regards to the selection of charging hub locations, and the review of the electrical infrastructure that would be used to provide the solution.

Selection of geographic area would be determined by third parties on a commercial basis, based on where they believe there is need for a rapid charging solution, and where the DC Share system would offer a more cost-effective design than a conventional connection.

Appendices

A.1 Local Authority Support Letter

Somerset West and Taunton Local Authority have provided two formal letters (dated 20th Jan 2020 and 20th May 2020) to WPD to confirm their interest and commitment to working with the DC Share project team to secure suitable EV rapid charging sites, progress the planning process and migrate their fleet of vehicles to EV's for use during the project trials.

Somerset West and Taunton

Mr R. Duke
Innovation and Low Carbon Engineer
Western Power Distribution
Feeder Road
Avonmouth
BS2 0TB

Our Ref:
Your Ref:
Date: 20 January 2020

Dear Ricky,

Further to your conversation with our representative I wanted to put in writing our congratulations for being awarded the scheme funding by government, and to express our continued support of the project.

We are aware of the need to secure sites that are suitable and we have put forward Firepool and Coal Orchard as options in Taunton. These sites are both owned and are being developed by the Council for the benefit and regeneration of the Town.

We, therefore, have the overall control of the schemes and would be able to make amendments to them to suit the DC share project and ensure permanency of the installations. You will be aware that the DC share project will require planning permission and we would seek to support you through this process. We consider that any permissions needed for this project would be in keeping with the site uses.

In order to ensure a supply of electric vehicles are using the charging facilities, we commit to converting our pool car fleet to EV and utilising the DC Share charge points as the primary charging location for these vehicles.

We will send forward the proposed pool car replacement programme by separate letter but we anticipate the replacements to begin in the latter part of 2020 if we are selected as the Host Authority.

Somerset West and Taunton, PO Box 866, Taunton TA1 9GS
www.somersetwestandtaunton.gov.uk

We recognise that the infrastructure installation will be disruptive but, again, we will work alongside you to promote the benefits of the scheme and reassure the community that impacts will be minimised.

We look forward to your decision on Host Authority status and to discussing this project in more detail with you.

Yours sincerely

James Hassett
Chief Executive

Cllr F. Smith-Roberts
Leader of the Council

Cc Cllr P. Pilkington – Lead Member, Climate Change

Somerset West and Taunton

Mr R. Duke
Innovation and Low Carbon Engineer
Western Power Distribution
Feeder Road
Avonmouth
BS2 0TB

Our Ref:
Your Ref:
Date: 20 May 2020

Dear Ricky,

Somerset West and Taunton Council continue to recognise the opportunity that the DC Share infrastructure scheme represents and see it as a significant step in decarbonising transport to enable net zero carbon emissions by 2050 and our Council's target of 2030.

Our Liberal Democrat Administration have set a clear direction and shown leadership within their manifesto on the importance of these issues for the local community, both in terms of future direction and air quality.

Our challenges to date have been the ability to lead this in isolation and we pledge our support as a Host Authority bringing together the distribution network, the Council, with our provision of possible charging sites within the public car parks, and the technical innovators that will make this enhancement available for our residents and visitors.

Whilst charging points could be installed by the Council we have concerns that the EV market is moving at such speed we risk being behind the curve without the links identified above. This scheme allows us to be part of a partnership at the forefront of technology and sustainable network supply.

The benefits of our involvement are that we have control of the Council owned and operated car parks in addition to the redevelopment areas that have been offered to the DC Share project. We are able to work with the project team to ensure space is made available in a format that works for them and the public. We also hold a recently approved Garden Town Status and feel that this project fits well with our ambitions.

We have a desire to move our own fleet to EV and are exploring the options to do this alongside the charging point needs and network capacity. We see this project as a catalyst for this progression. We have previously stated our intention to change our pool car fleet to EV and will work with the project team to time this for the benefit

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of the trial. This will give an assurance of the volume of vehicles that are available to routinely use the charge points and test the system.

We support the DC Share infrastructure project which is looking at an alternative, flexible solution to provide the network capacity and believe the learning will inform the provision of the next generation rapid charging solutions. The learning in terms of the benefits of the equalisation solution, the future flexibility and the user requirements and experience will be valuable to enable us with our decarbonisation planning.

Yours sincerely

Cllr Federica Smith-Roberts
Leader

A.2 Full Local Authority Data

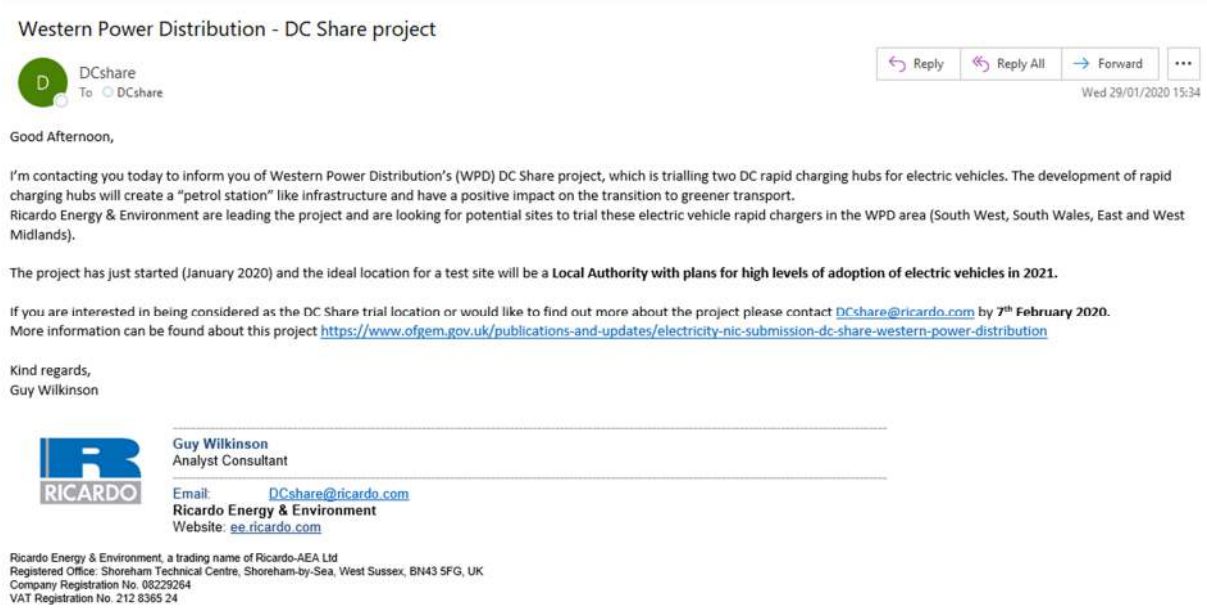
Local Authority	Pop density (ha)	Car numbers	Numbers of EVs	EVs / Cars	Rapid chargers
West Lindsey	0.48	38,385	226	0.59%	1
Herefordshire, County of	0.52	78,319	598	0.76%	3
Mid Devon	0.52	32,758	207	0.63%	1
South Hams	0.55	36,858	297	0.81%	0
Shropshire	0.59	129,674	972	0.75%	3
King's Lynn and West Norfolk	0.60	62,977	275	0.44%	2
Rutland	0.61	15,002	150	1.00%	0
Melton	0.63	21,490	140	0.65%	1
North Kesteven	0.74	45,972	275	0.60%	0
Malvern Hills	0.76	32,212	297	0.92%	1
South Northamptonshire	0.88	34,717	571	1.64%	0
Wiltshire	0.91	194,194	1791	0.92%	1
Cornwall	0.93	230,389	1223	0.53%	6
Harborough	0.93	34,898	353	1.01%	0
East Devon	0.96	59,071	425	0.72%	1
South Somerset	1.00	69,501	441	0.63%	0
Staffordshire Moorlands	1.01	41,772	222	0.53%	1
Fenland	1.10	40,620	160	0.39%	0
Bassetlaw	1.11	47,667	214	0.45%	4
Wychavon	1.12	49,466	474	0.96%	2
Newark and Sherwood	1.13	48,773	310	0.64%	2
Teignbridge	1.13	54,003	390	0.72%	0
Huntingdonshire	1.21	69,333	856	1.23%	1

North Lincolnshire	1.23	70,684	262	0.37%	1
Sedgemoor	1.27	48,801	259	0.53%	1
Stafford	1.38	55,703	361	0.65%	1
North Warwickshire	1.39	25,812	180	0.70%	0
Somerset West and Taunton (previously Taunton Deane)	1.52	46,907	263	0.56%	0
Stroud	1.54	47,794	556	1.16%	1
Cherwell	1.57	56,728	1043	1.84%	1
South Staffordshire	1.65	44,458	238	0.54%	2
Rushcliffe	1.74	45,835	450	0.98%	0
Lichfield	1.86	41,224	323	0.78%	1
Rugby	1.86	41,875	377	0.90%	0
East Staffordshire	1.88	47,251	275	0.58%	0
Cheshire East	1.94	159,441	1550	0.97%	4
South Derbyshire	1.94	38,992	245	0.63%	1
Worcester	1.98	42,042	216	0.51%	3
Neath Port Talbot	2.00	60,393	99	0.16%	0
North East Derbyshire	2.18	43,070	256	0.59%	1
Bedford	2.21	63,812	516	0.81%	7
North West Leicestershire	2.26	39,128	280	0.72%	0
Hinckley and Bosworth	2.28	45,377	276	0.61%	0
Central Bedfordshire	2.47	104,399	912	0.87%	0
Kettering	2.65	39,701	901	2.27%	3
Wellingborough	2.93	32,057	161	0.50%	1
Bolsover	3.09	32,801	114	0.35%	2
Warwick	3.23	58,679	943	1.61%	2
Doncaster	3.38	126,487	1664	1.32%	7
South Gloucestershire	3.56	107,538	2810	2.61%	9
Bridgend	3.57	58,515	360	0.62%	0

Bath and North East Somerset	3.58	73,515	721	0.98%	2
Peterborough	3.64	74,023	11075	14.96%	1
Telford and Wrekin	3.82	66,608	297	0.45%	2
Newcastle-under-Lyme	3.89	52,574	470	0.89%	0
Swansea	4.12	103,497	689	0.67%	1
Charnwood	4.25	66,516	449	0.68%	4
Torfaen	4.52	38,524	95	0.25%	1
Blaby	4.68	38,686	322	0.83%	4
Newport	5.01	61,172	215	0.35%	3
Milton Keynes	5.49	98,584	6896	7.00%	40+
Rotherham	5.64	108,293	400	0.37%	2
Gedling	6.01	49,349	299	0.61%	3
Erewash	6.50	48,692	414	0.85%	3
Solihull	7.16	86,056	2296	2.67%	2
Cannock Chase	8.01	40,664	354	0.87%	1
Broxtowe	8.74	46,820	254	0.54%	1
Chesterfield	9.83	46,796	682	1.46%	3
Nuneaton and Bedworth	10.01	52,711	178	0.34%	4
Torbay	12.26	59,010	228	0.39%	2
Oadby and Wigston	14.62	21,339	115	0.54%	0
Tamworth	15.37	31,617	167	0.53%	0
Stoke-on-Trent	17.13	107,575	357	0.33%	3
Cardiff	17.49	142,557	627	0.44%	4
Northampton	17.58	88,731	436	0.49%	2
Exeter	19.03	49,242	1194	2.42%	3
Dudley	19.74	129,867	517	0.40%	1
Gloucester	20.15	50,363	333	0.66%	4
Derby	20.67	102,271	1341	1.31%	2

Plymouth	21.01	109,307	234	0.21%	2
Wolverhampton	23.49	102,177	294	0.29%	10
Sandwell	23.85	121,498	412	0.34%	1
Lincoln	24.55	42,368	136	0.32%	5
Coventry	24.86	128,592	500	0.39%	9
Birmingham	27.39	410,736	19383	4.72%	4
Bristol, City of	28.99	182,747	1028	0.56%	11
Nottingham	30.92	126,131	649	0.51%	8
Leicester	32.31	123,125	778	0.63%	1

A.3 Example of Email Sent to Local Authorities



Western Power Distribution - DC Share project

DCshare
To DCshare

Reply | Reply All | Forward | ...
Wed 29/01/2020 15:34

Good Afternoon,

I'm contacting you today to inform you of Western Power Distribution's (WPD) DC Share project, which is trialling two DC rapid charging hubs for electric vehicles. The development of rapid charging hubs will create a "petrol station" like infrastructure and have a positive impact on the transition to greener transport.
Ricardo Energy & Environment are leading the project and are looking for potential sites to trial these electric vehicle rapid chargers in the WPD area (South West, South Wales, East and West Midlands).

The project has just started (January 2020) and the ideal location for a test site will be a **Local Authority with plans for high levels of adoption of electric vehicles in 2021.**

If you are interested in being considered as the DC Share trial location or would like to find out more about the project please contact DCshare@ricardo.com by **7th February 2020.**
More information can be found about this project https://www.ofgem.gov.uk/publications-and-updates/electricity-nic-submission-dc-share-western-power-distribution

Kind regards,
Guy Wilkinson

RICARDO

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