EV Charge Point Data Programme

Local Authority Research

December 2022

FRAZER-NASH CONSULTANCY
A KBR COMPANY

FNC 015415
129533V Issue: 1
Prepared for: Geospatial Commission

www.fnc.co.uk

SYSTEMS • ENGINEERING • TECHNOLOGY


2

Executive summary

The aim of the Geospatial Commission discovery project was to explore the geospatial requirements of local authorities with respect to EV Charging Infrastructure (EVCI). In particular, the Geospatial Commission was interested in any barriers or missing capabilities faced by local authorities and opportunities to improve EVCI roll-out through targeted intervention.

Our findings are based on a series of workshops undertaken with local authority staff involved in EVCI planning, implementation and operation. The programme was conducted over eight weeks, starting in March 2022. Nine local authorities in England participated in the research. They were selected to provide geographic spread as well variation in population density and tourism. Desktop research and supplementary discussions with other stakeholders were used to establish wider context.

Our research has confirmed the critical role geospatial data plays in formulating EVCI policy. Good data made available to the right people, at the right time is crucial in understanding EVCI demand for a given area, identifying potential locations and selecting which of these will best meet the needs of the community. In the future we believe it is likely to become more important still, as local authorities are challenged to ramp up their roll-out plans in a fast-moving environment. Nowhere is this more apparent than in addressing the challenge of on-street charging and filling gaps in commercial charge point provision.

Responding to this challenge will require sophisticated geospatial analysis to identify charge point locations in an increasingly complex environment.

> *“Our research has confirmed the critical role geospatial data plays in formulating EVCI policy.”*

EVCI planning requires multiple organisations to work together effectively, sharing data across various boundaries. As EV uptake accelerates, closer collaboration and data sharing will become increasingly important to ensure no-one is left behind.

Engagement with the local authorities showed that each could articulate a process it followed for deciding on EVCI planning and delivery. At a broad level, these were sufficiently similar across the Local authorities that it is possible to discern a generic process including key datasets, applications and outputs, as shown below:

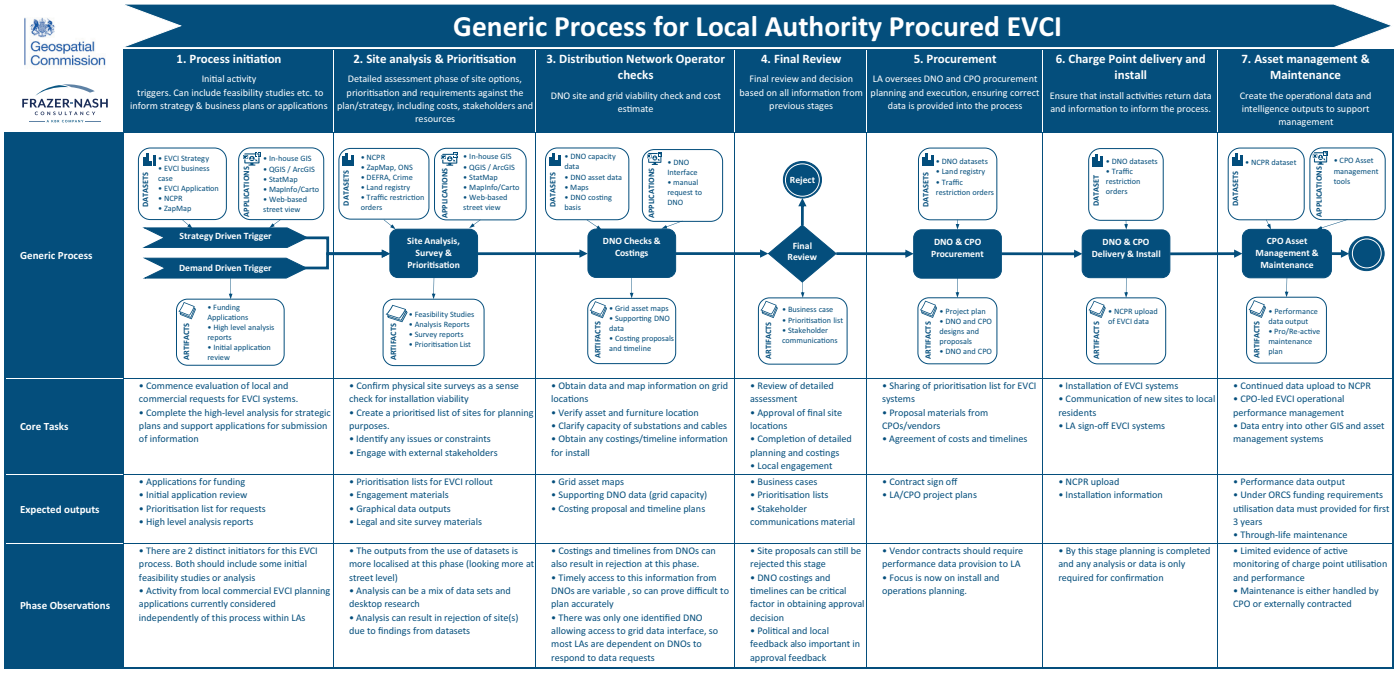
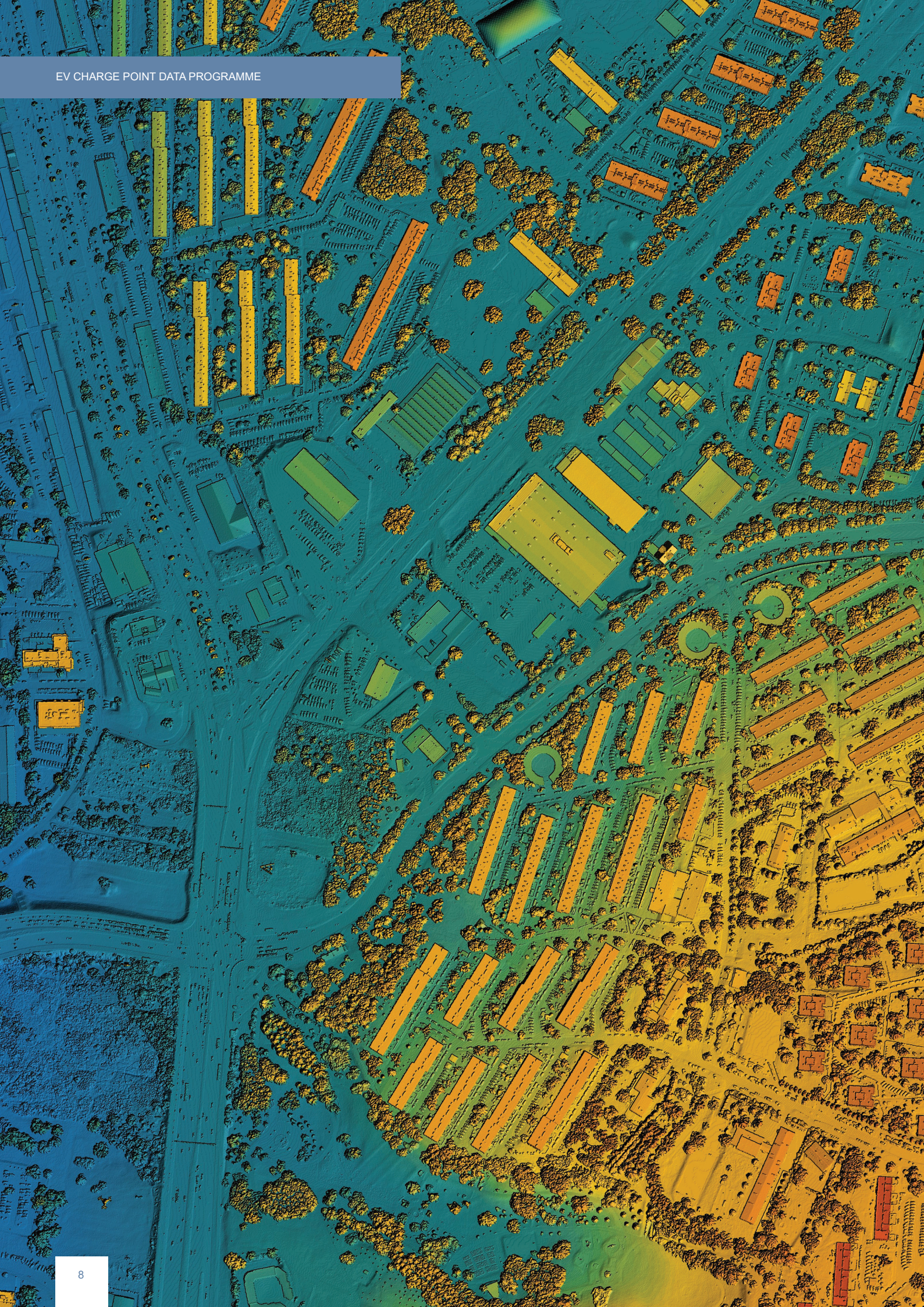


Figure 1– Generic Process Local Authority procured EVCI showing the processes, core tasks and expected outputs from seven identifiable stages.

Contents

Glossary

Term	Definition
AI	Artificial Intelligence
API	Application Programming Interface
BI	Business Intelligence
CMA	Competition and Markets Authority
CPO	Charge Point Operator
DEFRA	Department for Environment, Food & Rural Affairs
DfT	Department for Transport
DNO	Distribution Network Operator
EST	Energy Savings Trust
EV	Electric Vehicle
EVCI	Electric Vehicle Charging Infrastructure
GIS	Geographic Information System
IGIF	Integrated Geospatial Information Framework
LEVI	Local Electric Vehicle Infrastructure
LGA	Local Government Association
MSOA	Middle Layer Super Output Area
NCPR	National Charge Point Registry
NUAR	National Underground Asset Register
OGC	Open Geospatial Consortium
ORCS	On-street Residential Charge point Scheme
OZEV	Office for Zero Emission Vehicles
PSGA	Public Sector Geospatial Agreement
QFAIR	Quality, Findability, Accessibility, Interoperability, Reusability
REME	Rural Electric Mobility Enabler
STB	Sub National Transport Body
TOID	Topographic Identifier
TRO	Traffic Restriction Order
UPRN	Unique Property Reference Number



1

Introduction

The Geospatial Commission is part of the Cabinet Office and was established in 2018 as an independent, expert committee responsible for setting the UK's geospatial strategy and coordinating public sector geospatial activity. Its aim is to unlock the significant economic, social, and environmental opportunities offered by location data and to boost the UK's global geospatial expertise.

1.1 Background

In June 2020, the Commission published a five-year UK Geospatial Strategy, Unlocking the Power of Location: The UK's geospatial strategy 2020 to 2025, outlining 4 missions and 9 opportunity areas [1]. Addressing the EV charge point location problem aligns with Mission 2 - improving access to better location data, and transport is one of the nine opportunity areas. The GC's recent publication, Positioning the UK in the Fast Lane, outlined the significant location data opportunities for better UK transport, highlighting EV infrastructure as an important area for future focus [2].

The work presented here is also informed by wider research including research commissioned in April 2021 by the Local Government Association (LGA) looking at the role local authorities feel they should take in the delivery of EV charging infrastructure [3] and work by Ordnance Survey on the role of geospatial data in mapping electric vehicle charging points [4]. According to the LGA, many Local authorities are already involved in the procurement and deployment of public EVCI, with those not currently involved making plans to be so in the near future. The LGA found that the role for local government in the delivery of EVCI is unclear; however, many local authorities have begun developing EVCI delivery strategies as part of their transport planning activities [4].

1.2 Aims

The Geospatial Commission has launched a discovery project to explore how location data can be better utilised to support planning and delivery of electric vehicle charge points by local authorities.

The aim of the project was to explore the geospatial requirements of local authorities with respect to EV Charging Infrastructure (EVCI). In particular, the Geospatial Commission was interested in any barriers faced by local authorities (or missing capabilities) and opportunities to improve EVCI roll-out through targeted intervention.

A supplementary aim was to gain an understanding of the geospatial datasets utilised by local authorities in the planning of EVCI locations.

1.3 Approach

For this research, a conceptual framework was developed by the Geospatial Commission to look at local authority involvement in EV charging infrastructure from strategy to delivery. The framework covered local authority involvement in:

- strategy and policy formulation;
- understanding the demand for charge point infrastructure for a given area;
- identifying and selecting charge point site locations;
- engaging with commercial operators and supporting the installation of charge point infrastructure;
- charge point operation.

Our findings are based on a series of structured workshops undertaken with local authority staff involved in the process of planning, implementing and operating EV charge points.

Nine local authorities in England participated in the research. They were selected to provide geographic spread as well variation in population density and tourism. Supplementary desktop research and discussions with other stakeholders, including the Energy Saving Trust and Transport for the North, were used to establish wider context and helped set our insights from the workshops into that context.

The discovery project was conducted over eight weeks, starting in March 2022. We followed an iterative approach, breaking the work into weekly sprints and holding regular reviews and 'play backs' with Geospatial Commission stakeholders.

For each local authority we mapped the business processes used to plan and deploy EVCI infrastructure, identifying:

- key stakeholders and key decision points;
- the geospatial data used to support the processes;
- supporting applications and tools, and;
- existing challenges and opportunities for improvement.

As part of this work, we developed a Long Form Questionnaire which the Geospatial Commission will use separately to elicit further evidence from a wider pool of local authorities.

1.4 Geospatial Data

Geospatial data is data used to create information that supports location-informed decision making. It is often visualized through the medium of maps, charts, diagrams, or models. It has been widely used by local authorities to support a wide range of local public services and local/regional policy decisions. Key use cases include [5]:

- evidence-based decision-making;
- designing and managing services and infrastructures;
- achieving and enforcing regulatory compliance;
- describing and monitoring local conditions and change;
- understanding and meeting customer needs locally;
- communicating and presenting spatial information.

Local authorities have access to Ordnance Survey data, free at the point of use, through the Public Sector Geospatial Agreement (PSGA) and most have Geographic Information Systems (GIS) to analyse, visualise and share geospatial data. It is worth noting that the LGA is in the process of developing a policy framework to drive changes in local authority geospatial practice, and development as an enabler in providing better services .

1.5 Q-FAIR

Open data standards are recognised in UK policy as a cornerstone for improving use and sharing of data [6]. The GEO6, in collaboration with Geospatial Commission and others, is working to develop a UK Geospatial Standards set and catalogue [7].

Q-FAIR (Quality, Findability, Accessibility, Interoperability and Reusability) is a framework used to ensure that data (in this case, geospatial data) is of the necessary standard to be easily and widely used by both experts and non-experts alike. Q-FAIR is used by the Geospatial Commission to describe characteristics of datasets [8].

2

Findings

In this section we present the findings from the nine workshops categorised into four broad themes:

- Governance and Process;
- Data;
- Technology;
- People and Skills.

2.1 Governance and Process

2.1.1 EVCI Planning and Delivery Process

Engagement with the local authorities showed that each could articulate a process it followed for deciding on EVCI planning and delivery.

There is variation in the maturity of these processes but none of the local authorities we spoke to had yet established formal processes with clear gateways and governance. The priority was getting initial EVCI in place. Many local authorities are making decisions based on political factors (e.g., requests directly from council members), convenience factors (e.g. availability of council owned land and property) or linked to tactical ORCS funding applications. The use of geospatial data to drive these processes was varied, ranging from desktop analysis of Google Maps to the use of AI and modelling. For example, one council employed consultants who used AI and geospatial data to identify 5000 candidate sites for charge points as part of a feasibility study.

2.1.2 Generic Process for Local Authority Procured EVCI

We found that, at a broad level, the EVCI planning and delivery processes for Local authority procured EVCI were sufficiently similar across the local authorities that it is possible to discern a generic process, as shown in Figure 1.

> *"The EVCI planning and delivery processes for local authority procured EVCI were sufficiently similar across the local authorities that it is possible to discern a generic process."*

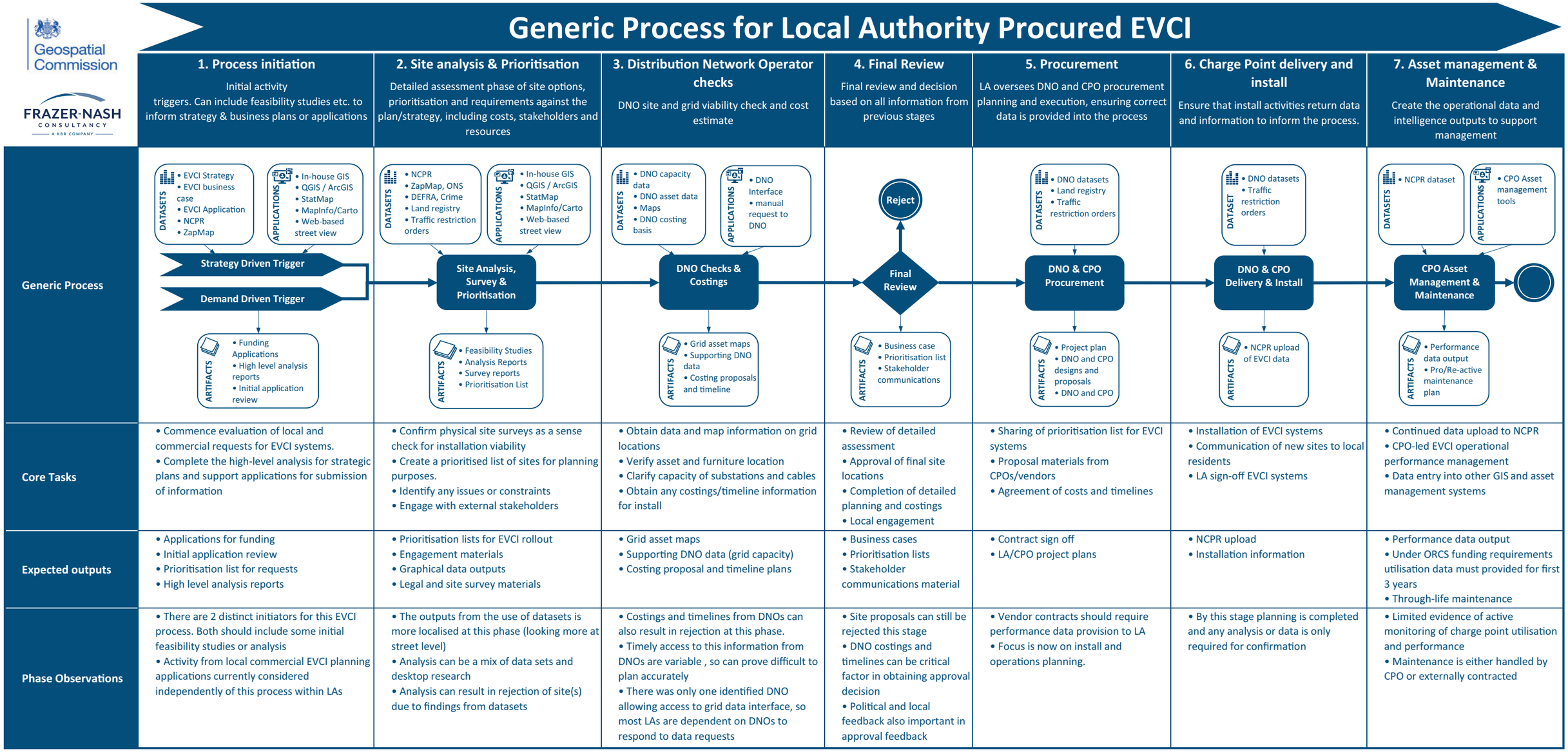
There are two initiators for this process: "strategy-driven" or "demand-driven".

- "Strategy-driven" is initiated by an internal decision or application to fund and progress EVCI systems. The common initiating point for this is either internally developed strategic plans (often in the form of Local Transport plans or as part of low-carbon initiatives), the development of business cases or direct applications for funding (such as Local Electric Vehicle Infrastructure (LEVI) and On-Street Residential Chargepoint Scheme (ORCS).

- "Demand-driven" is initiated by local demand triggers, such as requests from residents for local authority provided EVCI systems on streets or places of interest. The channel for raising these requests varies from informal approaches to formal consultation initiated by the local authority (such as a local newsletter issued by one of the councils).

The level of detail at this initiation phase varied depending on the level of complexity of the application or strategy as well as the resources and capability of the local authority. At the more complex end of the scale, this initiation phase can include business cases and feasibility studies which support the application or development of strategy, in terms of candidate EVCI sites, their prioritisation and possible cost and benefit impacts.

Figure 1– Generic Process Local Authority procured EVCI showing the processes, core tasks and expected outputs from seven identifiable stages.



Core Tasks	• Commence evaluation of local and commercial requests for EVCI systems. • Complete the high-level analysis for strategic plans and support applications for submission of information	• Confirm physical site surveys as a sense check for installation viability • Create a prioritised list of sites for planning purposes. • Identify any issues or constraints • Engage with external stakeholders	• Obtain data and map information on grid locations • Verify asset and furniture location • Clarify capacity of substations and cables • Obtain any costings/timeline information for install	• Review of detailed assessment • Approval of final site locations • Completion of detailed planning and costings • Local engagement	• Sharing of prioritisation list for EVCI systems • Proposal materials from CPOs/vendors • Agreement of costs and timelines	• Installation of EVCI systems • Communication of new sites to local residents • LA sign-off EVCI systems	• Continued data upload to NCPR • CPO-led EVCI operational performance management • Data entry into other GIS and asset management systems
Expected outputs	• Applications for funding • Initial application review • Prioritisation list for requests • High level analysis reports	• Prioritisation lists for EVCI rollout • Engagement materials • Graphical data outputs • Legal and site survey materials	• Grid asset maps • Supporting DNO data (grid capacity) • Costing proposal and timeline plans	• Business cases • Prioritisation lists • Stakeholder communications material	• Contract sign off • LA/CPO project plans	• NCPR upload • Installation information	• Performance data output • Under ORCS funding requirements utilisation data must provided for first 3 years • Through-life maintenance
Phase Observations	• There are 2 distinct initiators for this EVCI process. Both should include some initial feasibility studies or analysis • Activity from local commercial EVCI planning applications currently considered independently of this process within LAs	• The outputs from the use of datasets is more localised at this phase (looking more at street level) • Analysis can be a mix of data sets and desktop research • Analysis can result in rejection of site(s) due to findings from datasets	• Costings and timelines from DNOs can also result in rejection at this phase. • Timely access to this information from DNOs are variable , so can prove difficult to plan accurately • There was only one identified DNO allowing access to grid data interface, so most LAs are dependent on DNOs to respond to data requests	• Site proposals can still be rejected this stage • DNO costings and timelines can be critical factor in obtaining approval decision • Political and local feedback also important in approval feedback	• Vendor contracts should require performance data provision to LA • Focus is now on install and operations planning.	• By this stage planning is completed and any analysis or data is only required for confirmation	• Limited evidence of active monitoring of charge point utilisation and performance • Maintenance is either handled by CPO or externally contracted

The assessment phase assesses the application or requirement, again with an appropriate level of detail and scale. It typically includes more detailed site assessments, surveys and prioritisation or selection. It can also include engaging with external stakeholders and any legal considerations. Once the higher priority sites are identified a submission is made to the relevant DNO to check if the sites are viable and to provide cost estimates for connection to the electrical distribution network. This can happen in parallel with the rest of the ongoing assessment phase. Importantly this check not only considers the connection to the electrical distribution network but also the capacity of it, as a requirement for a new substation can substantially alter the cost of a site. The time to respond to these requests can vary from weeks to months (for example, one of the local authorities noted that their DNO have an unlimited time response window).

The final review phase considers all the gathered information and costings to make a decision on how and where to proceed. The procurement exercise is then initiated and overseen by the local authority to appoint a CPO to install and operate the EVCI and the DNO to make the required electrical distribution network connections.

Once an EV charger is installed, the local authorities did not identify developed processes around operations and monitoring of the charger's performance. The only consistent activity that was undertaken was the statutory reporting required by the ORCS funding scheme. This requires the provision of half-hourly utilisation data on a monthly basis for a period of three years. The data must be provided in .csv format, but nothing else was noted to be done with this data.

> *"The time to respond to these requests can vary from weeks to months."*

2.1.3 Generic Process for Privately Procured EVCI

Where the local authorities receive planning applications for EVCI installations from residents and private organisations (e.g. supermarkets) their process is aligned to their normal planning application procedures. It does not follow the process described above for local authority procured EVCI.

Following receipt of the application they will undertake an assessment of the application (e.g. against parking provision and highway safety requirements) and make a decision. It is then over to the private applicant to engage with the DNO and continue with the procurement and maintenance of the EVCI.

Whilst this is a straightforward process, it is notable that there was not consistent consideration of the planning application in light of the local authority's own EVCI strategy. This has led to the situation noted by two councils, where duplicate EVCIs are planned, leading to wasted effort.

2.1.4 Additional Insights

When combining each local authority's process into the generic process there were some activities undertaken by only one or two local authorities which were omitted. However, as these are all potentially valuable parts of a future ideal process or best practice, and may have data requirements, they have been captured here along with a brief description:

- Lessons learned sessions from rejected applications – it is generally good practise to review feedback so that future applications and assessments do not repeat the same mistakes, and so any required changes to local luthority practices can be identified.
- Review of applications against wider strategy – ensuring that all EVCI applications (public and private) align to the local authority's strategy and are cognisant of the surrounding existing and planned EVCI infrastructure.
- Engagement with parish and town councils, and information distribution to the wider population – wider stakeholder engagement can ease planning applications and reduce challenges to them. It also helps ensure the resulting EVCI meets users' requirements and improves communication between parties with related responsibilities.

> *"The focus of local authorities to date has been delivering the first phases of their EVCI roll out plans. These have tended to be localised, tactical initiatives funded through the ORCS programme."*

2.1.5 Collaboration

The focus of local authorities to date has been delivering the first phases of their EVCI roll out plans. These have tended to be localised, tactical initiatives funded through the ORCS programme. This 'start-up' period is now moving into a new phase as the market scales and use of electric vehicles expands beyond the early adopters. As the market scales, EVCI provision will need to evolve and mature, and the role of local authorities will need to adjust accordingly. For example, they will need:

- to consider charge point provision across geographic and administrative boundaries,
- demand modelling which considers visitor journey's from anywhere in the country,
- improved understanding of commercial and private EVCI provision and,
- better integration with EVCI provision on the strategic road network.

As a result, many local authorities spoke about the challenge of improving collaboration and data sharing between the private and public sector, with other local authorities, DNOs and Sub National Transport Bodies (STBs). For example:

- One local authority has found that the lack of data sharing with commercial providers can result in duplication of site locations with the effect that work is wasted, and further work is needed to find an alternative site (i.e. without collaboration there is duplication).
- Another reported a similar issue, where private projects tend to move faster than public, and time and effort can be wasted if a private supplier installs a charge point in an area under consideration. The associated time and effort spent on site identification could have been saved through better data collaboration.

Many local authorities saw an opportunity for improving collaboration with internal and external stakeholders to address many of the challenges outlined above

Whether it is better coordination between neighbouring authorities, districts and DNOs, sharing of demand models between local, sub national or national bodies, or sharing site location and utilisation data between the private and public sector, collaboration is the people and process key to improving data quality, accessibility, interoperability, and reuse. One council highlighted the role of residents as stakeholders and the opportunity to use a more interactive web portal to improve engagement which is currently done using a web-based but flat format newsletter. Other findings include:

- An opportunity for better engagement with transport authorities to improve the council's EVCI planning including the regional STB as well as Highways and City councils.
- On a practical level, the need identified by a council for a shared, prioritised list of geospatial and other data sets that are most likely to have the greatest impact on EVCI decision-making.
- Another council made a similar point to address their uncertainty over which datasets would be most useful for a data-driven planning approach. They also felt that discussion with Local authorities with a more mature EVCI strategy would be beneficial to their planning.
- One participant felt that if the DNO could be more actively involved in site selection, this would avoid last-minute plan changes and cancellations.
- Another made the point that good relationships with district authorities will make it easier for chargers to be installed in these areas.
- That improving the data sharing between commercial and public organisations will reduce replication of work, increase inter-working capabilities, and reduce the level of non-working chargers.
- A desire to build collaborations with commercial data providers, to encourage the sharing of non-sensitive geospatial (and other) data sets. This council also believe their relationship with the DNO and district councils will be key to the success of their EVCI roll out.

2.2 Data

2.2.1 Datasets

Except for one council who were not using geospatial data in any form, we found that the local authorities are using a common set of geospatial data to identify suitable locations for EVCI. We also identified several datasets used only by a single local authority. A full list of the datasets identified during the discovery can be found in Annex A2. For each dataset, we have made a high-level assessment against the Q-FAIR framework to help inform our discussion. The key datasets used by local authorities primarily support the first three phases of the generic EVCI process described in Section 2.1.1, namely: Process Initiation (strategy development), Site Analysis and Prioritisation and DNO Checks. These can be grouped as:

- Location and status of existing EVCI;
- Electricity network capacity and availability;
- On and off-street parking locations;
- Land Ownership.

> *"Local authorities are using a common set of geospatial data to identify suitable locations for EVCI."*

All the participating local authorities using these data stated that future decision-making could be made easier and quicker by making this data more Q-FAIR. For example, one council believes that standardised data sets will improve their ability to work across borders when planning, enhance funding applications and streamline reporting for local and central government purposes. They also observed that although there is a wealth of available datasets, there is no guidance on which are most important in terms of planning EVCI. Detailed findings for each of these datasets are presented in the following sections.

2.2.1.1 Existing EVCI

Understanding existing EVCI provision is necessary to allow local authorities to identify gaps in coverage and help select and prioritise new EVCI sites. Seven of the nine authorities interviewed utilise either the National Charge Point Registry (NCPR) or Zap Map's charge point location information to inform their EVCI planning.

The NCPR is freely available via a portal provided by the Department for Transport and Office for Zero Emission Vehicles. The portal allows CPOs and charge point controllers to upload data concerning the location of charge points and various attributes regarding the owner and status of the device. Location data can be provided in the form of a Lat / Long, Address and Postcode, UPRN and Location description.

All those local authorities who utilised the NCPR reported that it is:

- Incomplete (e.g. it does not include commercially operated charge points)
- Out of date because it is updated approximately every six months
- Poor quality as there is no validation of data quality or completeness at the point of entry.

Data from Zap-Map is used by four of the nine local authorities through a subscription service. The Zap-Map database of EV charging points is sourced directly from the CPOs along with some desk research and external public sources and contributors. This subscription is used by one council to inform their EVCI location planning. They noted that whilst an improvement on the NCPR, there are still gaps in the data. Received on a quarterly basis, authorities found it becomes quickly out of date. There were also concerns that there is no system to feedback gaps and errors.

Most of the local authorities interviewed see an opportunity to improve the NCPR through standardisation and better governance (e.g. enforcement of metadata). They also believe there is an opportunity to include commercial charge point location data in the NCPR to provide a more complete picture of EVCI in their areas. However, this is not necessarily straightforward. One local authority said it is "almost in competition" with the CPOs and that the CPO is sometimes reluctant to share where they are looking to put charging points because they were keen to secure high utilisation sites.

One participant said that a complete and openly available dataset of existing charge points locations would improve their ability to plan new chargers (requiring improvements to the NCPR and Zap-Map data). While another feels more accurate charge point information would allow them to understand the current state of EVCI without needing to engage with multiple individual entities (e.g., supermarkets etc): "… being able to understand the activities of private organisations and operators is really helpful and understanding the intensity and where to focus". However, the commercial challenges around achieving this are appreciated.

2.2.1.2 Electricity Network

Understanding the availability and capacity of the electricity network is essential for understanding where to install EVCI. All local authorities interviewed reported that it was difficult to obtain good data on the availability and cost of power at a given location. Specific challenges included:

- Insufficient spatial resolution of the data which is available on a self-service basis
- The need to request detailed assessments on a site-by-site basis. For example, the interrogation in an interface which can only be completed using a single request at a time, meaning that large numbers of enquiries become time consuming
- Local authorities serviced by more than one DNO reported that variation in the engagement process was problematic
- One council reported that information from the DNO often arrives late in the process. A site can be chosen for the charge point (after significant work), only for the DNO to advise that it would not be suitable which adds time and financial burden. Moreover, the lack of data hindered EVCI planning at a strategic level
- Another finds it difficult to know the availability of electricity at any given location which makes it difficult to determine the type and number of EV chargers that can be installed
- A council reported that only 85 to 90% of DNO data arrived in a form that can be used, meaning site surveys are required to cover the gap with design/installation rework being experienced as a result
- Another stated that the DNO had changed the response time for queries from 185 days to an unlimited time frame
- One participant noted that the cost of electricity connection was the most variable cost factor and determines whether a site is affordable but was a "big unknown" until they get to individual site assessment.

As a result of these experiences, local authorities see an opportunity to make the EVCI planning process more efficient by having more timely and more accurate electricity network data from DNOs. For example, one of the councils said that improving availability to DNO electrical distribution network capacity and cost data would remove existing friction in the site selection process and improve planning for future EVCI. Additionally, one local authority remarked on the need for data which was easily interpretable for non-specialists. This point is discussed further in Section 3.3.1.3.

2.2.1.3 Off-Street Parking

Whether or not they are following a 'hub' strategy or providing on-street charge points (or both), local authorities are often involved with providing EVCI to people without access to off-street parking. For example, two local authorities reported the need to identify those areas without off street parking as part of their site planning and selection process. There does not appear to be a dedicated or standardised geospatial dataset for identification of areas without off-street parking locations meaning some local authorities are using 'proxy' data to derive data they can use for planning purposes.

- One participant said that identification of off-street parking is not readily available meaning it is not possible to effectively plan for these locations.
- The Energy Saving Trust models off street parking using 'proxy' data such as areas with flats and/or terrace housing combined with data on existing infrastructure and one council reported using similar analysis.
- OS AddressBase is used by one council to identify residents with off-street parking but reported concerns regarding the accuracy and completeness of the data relating to property type. They found it can provide incorrect classifications (e.g., a terraced house is listed as semi-detached) which causes difficulty in obtaining accurate street level parking information.
- Another council made the point that off-street parking is not just a problem in towns but is also important in rural areas "Everybody forgets the villages have parking problems as well".

Two of the participants said they would like a geospatial dataset which provides a map of areas without off street parking. Indeed, one of them mentioned the potential to use satellite imagery and advanced image processing techniques for identifying areas without off street parking.

2.2.2 Data Sharing

Three of the nine councils mentioned the potential benefit of having a national data sharing portal dedicated to EVCI planning and operation. Ensuring the data was accessible in standardised (open) and ready for use formats was important for making such a portal valuable.

Such a repository would include data on current charge point locations, land ownership, electricity network, pavement widths, EV registration locations, etc., at whichever level of granularity they required.

- One council believes a central portal for the display and interrogation of EVCI planning data will help stakeholders have a better understanding of selection criteria and its impacts. They stated that this will be critical for evidence-based decision-making as early as possible in the process saying: “It's being able to provide some something that people can use and interact with”. They added that a centralised, standardised data repository would allow for easier and better cross-functional collaboration when working both within the authority and with other Local authorities.
- Another noted that their current method for sharing of geospatial data largely relies on PDFs sent via email. This method does not allow for interactive interrogation of the information and can only reveal data at the level of granularity shown in the document.

2.3 Technology

2.3.1 Tools and Methods

Many local authorities see both a need and an opportunity to undertake more complex data analysis and predictive demand modelling to inform decisions on EVCI in the future. The need is driven by an expectation that the commercial charge point provision will grow quickly over the next few years and that a key role of local authorities in the future will be to fill gaps in commercial EVCI provision and install chargers where commercial suppliers will not. This is going to require local authorities to anticipate and identify those gaps by using data analysis to better understand future EVCI demand and provision.

- One is working with a private sector technology company who have developed an EVCI planning tool which uses AI to ‘learn’ where the best locations are based on user defined criteria e.g. estimating the likelihood of a property having a driveway based on the distance from the front of the property to the kerb. They also made the point that their analysis of geospatial data to date has been focussed on identifying EVCI locations in towns, but in future will need to be used to identify EVCI locations in more rural areas using different data and methods.
- In the future one council want to undertake more sophisticated demand modelling to investigate visitor flows and cross boundary integration (site locations have so far have been “self-selecting” within a small geographic area and they have not needed detailed modelling or use of geospatial data for site identification).
- Another council is looking to incorporate tourist destination forecasting data into their demand planning models to include popularity and frequency of journeys. A key challenge for them will be coastal resorts and understanding the rural aspect of EVCI.
- One of the councils is considering utilising artificial intelligence / machine learning techniques or use of satellite imagery to identify off street parking.
- One council mentioned DfT’s digitalisation programme for Traffic Restriction Orders (TROs) which aims to provide a common standard and associated

high-quality, single source of road closure and restriction information which can be used to improve modelling and provide better information to EVCI users.

- Local authorities who have been operating charge points for several years have access to utilisation data and are already using this to help understand the viability of proposed new EVCI locations. In the future, a great deal more utilisation data will be available for use in analytical tools.

2.3.2 Applications

Throughout this discovery, local authorities have been asked to identify those applications they use to interrogate and manipulate geospatial data. The level of maturity in the use of technology and applications ranged from limited to well-developed. Some local authorities had access to advanced GIS mapping tools that allowed interrogation of various geospatial data (e.g. air quality, crime information) down to street level. One discussed the potential to use machine learning and artificial intelligence techniques to help automate identification of on-street parking locations using satellite imagery.

2.4 People and Skills

Six local authorities reported either a shortfall in geospatial expertise or resourcing constraints. This results either in the use of outside consultants, or in not using geospatial specialists to inform their EVCI work. Individual findings include:

- A team which is made up of an EV Infrastructure Project Engineer, a Digital Innovation Lead and a Sustainability Manager, and does not include a GIS specialist.

“Six local authorities reported either a shortfall in geospatial expertise or resourcing constraints.”

- A council with in-house GIS specialists, but they currently are not available for EVCI planning. As a result, they outsource to two private sector providers for GIS analytics and insights.
- A council which does not have access to in-house GIS specialists and outsource geospatial analysis.
- A EVCI delivery team which is made up of transport planners supplemented by external contractors who deliver their GIS capability.
- One council discussed how they wish to use the available data but do not have the specialist expertise to understand how to do this effectively and are looking for guidance from other local authorities.
- Another council where EVCI is planned by the transport team. They have access to a dedicated Business Intelligence (BI) team with geospatial expertise, but this team has not been engaged so far. In the future, they see the need to use the BI team as they turn to data-driven decision-making for future EVCI roll out (see Section 3.2.3).


Electric vehicle recharging point only
At any time
ABB Electric Highway
Electric Highway
Electric Highway

3

Discussion

This research has confirmed the critical role geospatial data plays in EVCI strategy and policy formulation, in understanding the demand for charge point infrastructure for a given area, and in the identification and selection of charge point locations.

3.1 Overview

In the future we believe it is likely to become even more important as local authorities are challenged to turn their focus to addressing gaps in commercial EVCI provision. This shift will mean there is a need to consider issues such as social inclusivity, identification of poorly served locations and provision across rural and urban communities – important also to the levelling up agenda.

Provision of on-street charging by local authorities will be particularly important to meet these gaps. The Competition and Markets Authority (CMA) has found that "there needs to be a step change in the role that local authorities are currently taking in on-street charging and the support available to them" [9]. Responding to this challenge will require sophisticated geospatial analysis such as that being developed by TfN and Mind Foundry to identify charge point locations in an increasingly complex environment. This will include the need to turn their attention to rural areas, which will become more important as local authorities move beyond their initial rollouts.

Geospatial data is not widely shared with CPOs, beyond the sharing of site plans and placing a requirement on the operators of authority owned EVCI to register with the NCPR. Similarly, most of the local authorities we spoke to are not currently using geospatial data within the context of charge point operation and performance management. However, one council provided an example of how that is likely to change in the future. They are using sensors on their charge points to identify, in real time, when the charger is being used. This information is being shared with the parking enforcement team to ensure parking regulations are being met. This type of system integration, where location is a common thread through multiple data sources, will be necessary to achieve the UK's wider ambition to create 'smart' cities, towns and communities.

> *"This research has confirmed the critical role geospatial data plays in EVCI strategy and policy formulation."*

3.2 Governance and Process

3.2.1 Process

Local authorities participants are generally working to roll out EVCI using processes which are still evolving and not well documented. We believe they may benefit from introducing more formal processes to help manage an increasing EVCI workload in the face of increased EV take-up and resultant demand. Every local authority has different project delivery and governance structures which are designed to address local conditions, and so it may be helpful to provide guidance which is focused on the generic process we identified in Section 2.1.1.

3.2.2 Collaboration

This work has highlighted that EVCI planning brings together people and data from across multiple organisations from local authority transport planners, car park managers and GIS specialists, through to DNO's, CPOs, STBs, the Energy Saving Trust, OZEV and many more. As EV uptake accelerates, collaboration will become increasingly important to ensure that EVCI is fit for purpose and leaves no-one behind. As such, there is an opportunity for closer collaboration between local, regional and national bodies and between the public and private sector with respect to the use of geospatial data and analysis for EVCI.

The Energy Saving Trust already runs a free 'local authority EV Forum', delivered as part of their Local Government Support Programme (in partnership with OZEV). The fourth and next meeting will include a briefing from OZEV and focus on three themes created from local authority feedback: (1) Exploring council EV strategies, (2) Electrification of council fleets and (3) public and private funding of EV infrastructure.

Similarly, the Open Geospatial Consortium's Domain Working Groups provide forums for geospatial professionals to share insight and expertise on specific industry areas; We believe there would be value in setting up an EV group within either the Energy & Utilities, or Smart Cities Domain Working Groups.

3.3 Data

3.3.1 Datasets

3.3.1.1 NCPR

Local authorities highlighted several limitations with the data (including incompleteness, timeliness, and consistency) but also a major opportunity by making it more Q-FAIR conformant. Zap-Map is filling part of the gap but comes with commercial constraints.

The success of a future NCPR is likely to depend on including charge points which are owned by the commercial sector, for example in supermarket car parks and hotels, as well as workplace charging infrastructure. Only then will local authorities have a full view of existing EVCI provision, improving future planning and supporting use of demand-led, predictive modelling. To achieve this may require intervention at a national level to overcome possible concerns of sharing data which may be commercially sensitive to the CPOs.

> *"Between now and 2030 there needs to be a significant scaling up of on-street charging to help the transition to EVs for those who cannot charge at home."*

OZEV and DfT are already running projects to look at improving the quality of charge point data and make it more open. For example, by ensuring the location attributes conform to UK geospatial and addressing standards, and by understanding the benefit of using the Unique Property Reference Number (UPRN) field within the NCPR. UPRNs are mandated by the UK Open Standards Board as the standard way of referencing and sharing information about properties and streets across government [10, 11]. It would also be worthwhile investigating the utility of using the OS Open TOID identifier [12] which is appropriate for unambiguously referencing the location of a wide range of landscape and built environment features. TOIDs are an integral part of OS MasterMap products which are available to local authorities through the PGSA.

3.3.1.2 Off-street Parking

Identifying areas without off-street parking is central to how local authorities identify EVCI locations and is set to become more important still over the next few years.

"Between now and 2030 there needs to be a significant scaling up of on-street charging to help the transition to EVs for those who cannot charge at home due to lack of off-street parking (over a quarter of UK drivers). So far there are only 5,700 on-street charge points, and of these only 1,000 are outside of London. Therefore, there needs to be a step change in the role that local authorities are currently taking in on-street charging and the support available to them" Competition and Markets Authority (CMA), 2021 [9].

Research commissioned by DfT exploring charging preferences of drivers without access to off-street parking provides useful insight into the critical role location will play in determining future charging solutions e.g. charging at workplaces, places of education and destinations such as supermarkets are appealing for most current EV drivers without off-street parking [23].

Currently data on off-street parking locations is derived from a combination of (imperfect) datasets. We spoke to the Energy Saving Trust who are helping some authorities identify off-street parking locations through development of a model which involves combining data on housing type (e.g. flats, terrace housing), existing infrastructure (NCPR), "resident request" data and parking restrictions. The private sector is also responding to this need through the development of tools and techniques such as those provided by Mind Foundry which is working with one of the councils involved in this research and the Energy Systems Catapult, combining geospatial AI with variety of different data sources to model and predict the changing requirements for EVCI (see also Section 3.3.3).

Our research suggests there is a good case for creating a national, standardised "off-street parking" dataset which is made freely available to local authorities (and other planners). This would be a significant technical challenge because it would first require agreement on a standard set of methods for deriving the data, a national programme to create a production dataset and on-going update and maintenance of the data. We believe a more pragmatic approach would be to develop best practice guidance on current analytical and modelling techniques (see Section 3.4.1) and to share across local authorities through specific forums (see Section 3.2.2).

> *"Our research suggests there is a good case for creating a national, standardised "off-street parking" dataset."*

We see potential to develop methods to identify where people actually park their cars for given periods of time, rather than simply identifying area without off-street parking or areas of on-street parking i.e. where they could park them.

Notwithstanding the commercial, privacy, security, licensing and legislative considerations, mobile location service operators such as Google and HERE possess high-precision data showing locations of halted and parked vehicles, including daily and seasonal variations. An opportunity exists to explore whether suitably anonymised data from these sources could be used to accelerate development of national dataset showing actual parking behaviours.

3.3.1.3 Electricity Electrical Distribution Network Data

Every local authority needs to work with their local DNO(s) to identify suitable EVCI locations and obtain cost estimates for connection of the charge point to the electrical distribution network (the most uncertain cost driver for EVCI site selection). Nearly all found timely access to the right data at the right spatial resolution a problem.

Our workshop findings are consistent with those identified by Regen who are supporting UK Power Networks to develop its open data offering in support of Net Zero planning. They identified a requirement for a single set of network planning data that is consistent across DNOs, granular demand data and network capacity data [13].

Outside of the workshops, a subnational transport body said their model would also benefit from access to better energy infrastructure data which they find is hard to obtain (specifically secondary substation data which provides the Low Voltage (LV) electricity capacity data needed for detailed EVCI site selection).

The evidence we have seen suggests that making DNO data Q-FAIR on a national basis has the potential to save local authorities significant time and effort by helping them plan their EVCI more quickly and with greater confidence.

The National Underground Asset Register (NUAR), which contains data on the electricity network, is an example of how a national dataset specific to the needs of EVCI could be developed [22] and the UKPN open data initiative demonstrates that some DNOs are already working to improve access to their data. We are also aware that Energy Networks Association (ENA) is working with Ordnance Survey (OS) and 1Spatial to build a proof-of-concept national energy system map which will provide information about energy network assets, where those assets are located as well as who owns them .

“Our workshop findings are consistent with those identified by Regen who are supporting UK Power Networks to develop its open data offering in support of Net Zero planning.”

3.3.1.4 Land Ownership

HM Land Registry is a Geospatial Commission partner body and holds data on land and property ownership on more than twenty-six million titles showing evidence of ownership for more than 87% of the land mass of England and Wales. While this data meets many Q-FAIR criteria, there are issues with accessibility for multiple searches and licensing concerns over reuse. This issue was not raised universally but easier access would address concerns raised by some local authorities. We believe there is an opportunity to make land ownership data more Q-FAIR for public sector users to remove existing constraints and friction in the EVCI planning process.

3.3.2 Data Sharing

3.3.2.1 National EVCI Data Sharing Platform

Several authorities believe that a national EVCI data sharing portal might be beneficial. By providing access to a national, standardised set of data required for EVCI planning (a "single source of the truth"), there is an opportunity to make the process more consistent and more efficient, as well as better enabling local authorities to address cross-boundary working, which is likely to become more prevalent in the future. As such, we can see two actions which can be taken at national level which will deliver timely, practical benefit to local authorities.

1. Making key EVCI geospatial data more Q-FAIR. Specifically, ensuring the NCPRs geospatial attributes comply with UK standards for addressing and geographic coordinates (see Section 4.2), and making NCPR data available 'live' and accessible through an API.

2. The creation of a catalogue of EVCI open geospatial datasets to help local authorities understand which data is useful and how to find it. We envisage this being similar to the dataset listing created for the housing and planning sector, which brings together a collection of housing, land and planning open datasets [21]. There is an opportunity to use best practice forums described previously to assist in the creation of the catalogue and its dissemination across local government. The catalogue could be made available through data.gov.uk and/or the EVCI Portal described below.

3.3.2.2 National EVCI Portal

Consideration should be given to extending the concept of a data sharing platform into that of an EVCI Portal which provides access not only to data but also to the best practice guidance, tools and methods described in Sections 3.3.3 and 3.4.1. A further opportunity exists in creation of a Portal registry service through which the EVCI community can share links to data and services, and to host a repository of useful artefacts such as example GIS project files, workflow definitions, data guides and schemas, best practice guides, etc. The idea of an EVCI portal (and data sharing platform) is consistent with the development of a national location data framework that is itself consistent with the UN Integrated Geospatial Information Framework (IGIF) which has been adopted by the UK [1].

3.3.2.3 Geospatial Standards

The use of existing geospatial standards or need for new standards was not raised during the workshops. However, local authority observations on Q-FAIR issues with key datasets highlights the importance of data providers maintaining and supplying high-quality standards-based metadata to enable stakeholders to assess the usefulness and suitability of data products.

We have also mentioned the role addressing geospatial standards should play in the future NCPR, but a wider point is worth raising. EVCI is an increasingly important part of our national infrastructure and as we seek to make our towns and communities 'smarter' we need to ensure that EVCI is consistently represented in geospatial digital models (e.g. Building Information Models (BIM)) and is interoperable.

> *Local authorities, industry, academia and STBs are all responding to the need for new tools to help plan EVCI.*

We contacted the Open Geospatial Consortium (OGC) to understand whether there were relevant international initiatives in play. There are two OGC Domain Working Groups (DWGs) related to electric vehicles (Energy and Utilities DWG and Smart Cities DWG) although neither are working directly on EV charge points. However, the CityGML standard is possibly relevant by offering an Application Domain Extension (ADE) for the Energy domain, though focused on Buildings. CityGML also includes modules for Transportation and CityFurniture (the Transportation module defines central elements of the traffic infrastructure).

We are also aware of other standards communities and organisations which are active in this space (e.g. for the development of standardised, digital TRO's, BIM standards etc.).

Although further assessment is outside of the scope of this research, we believe it would be worthwhile investigating how EVCI data is currently standardised and represented in geospatial models.

3.4 Technology

Local authorities, industry, academia and STBs are all responding to the need for new tools to help plan EVCI [15, 16, 17, 18]. These tools and techniques are only as good as the data they work from and any improvements to the underlying data (see Section 3.2.2) will help with their development and utility. There are also challenges associated with translating data into a meaningful commentary/analysis, particularly in relation to identifying off-street parking areas (see Section 3.3.1.2). Sharing best practice methods will help local authorities get the most from their data (see Section 3.4.1).

3.4.1 Transport for the North

TfN's work is particularly noteworthy. They are building an EVCI model which can be used to determine the number of charge points required in five-year increments for a given area projected down to Middle Layer Super Output Areas (MSOA). The model uses transport, land use, population data and takes into account the extent of existing 'en-route' rapid charging points.

We feel this is a tool with significant potential to address many of the challenges faced by local authorities in the future. As such, there may well be an opportunity to make the model available on a national basis and help inform requirements for further development, potentially through a national EVCI portal (see Section 3.3.2.1).

3.4.2 REME (Rural Electric Mobility Enabler)

We are also aware of the REME project which is studying solutions to improve public EV charging provision in rural regions. The project is funded by Innovate UK and led by EDF working closely with Field Dynamics, DG Cities, Bonnet, and Devon County Council. Outputs from the project include a mapping solution to enable local authority and other stakeholders to collate a series of datasets to help highlight different needs for rural communities around EV charging.

One of key challenges faced by the REME team was understanding seasonality and modelling the large fluctuations of holiday and visitor traffic into rural areas [19]. They found it was not possible to create a seasonal demand model due to a range of (unspecified) data availability issues.

3.5 People and Skills

3.5.1 Best Practice

All the local authorities we spoke to are operating to their own approach and guidelines. The process of EVCI planning and roll out is still relatively new and developing organically. We identified many examples of good practice but also a need to learn from the experiences of others and to share best practice. If developed, a best practice guide or "playbook" could:

- provide a prioritised list of geospatial data sources and their role in EVCI analysis and planning;
- outline the most effective geospatial data processing workflows and analysis techniques for EVCI planning (including identification of off-street and on-street parking areas);
- describe the "state of the art" predictive modelling for demand planning;
- provide examples of integrating EVCI systems into 'smart community' architectures;
- contain useful reference links to support and guidance (e.g. Energy Savings Trust).

One example (mentioned by a local authority) where guidance would be beneficial concerns the use of PDFs to share data. In this case, the open Geospatial PDF format could be used instead. This is a format supported by many GIS software tools, which embeds the underlying geospatial data in the PDF file, allowing it to be re-imported into GIS tools for further analysis, whilst still displaying in standard PDF viewers. This may provide a useful bridge between current workflows and future GIS-enabled workflows for those local authorities that have yet to adopt GIS technologies.

A relevant example of this type of guidance comes from the Department for Transport. In support of the Cycling and Walking Investment Strategy (CWIS), they have produced guidance on cycle infrastructure design which reflects current good practice, standards and legal requirements [14].


HP
taxi

4

References

All online references were accessed during April 2022.

1. Geospatial Commission, 2020. Unlocking the power of location: The UK's geospatial strategy 2020 to 2025. Available at: https://www.gov.uk/government/publications/unlocking-the-power-of-locationthe-uks-geospatial-strategy/unlocking-the-power-of-location-the-uks-geospatial-strategy-2020-to-2025).
2. Geospatial Commission, 2021. Positioning the UK in the fast lane- location data opportunities for better UK transport. Available at https://www.gov.uk/government/publications/positioning-the-uk-in-the-fast-lane-location-data-opportunities-for-better-uk-transport.
3. Local Government Association, 2021. Scoping the role of local authorities in the provision of electric vehicle charging infrastructure. https://www.local.gov.uk/publications/scoping-role-local-authorities-EV.
4. Ordnance Survey, Mapping electric vehicle charging points using geospatial data. Available at https://www.ordnancesurvey.co.uk/business-government/environmental-sustainability/geospatial-sustainability-trends/map-electric-vehicle-charging-points.
5. Local Government Group, 2010. The value of geospatial information to local public service delivery in England and Wales.
6. UK Government, 2020. Policy paper: National Data Strategy. Available at https://www.gov.uk/government/publications/uk-national-data-strategy/national-data-strategy.
7. Lewis, E., Parslow, P., 2021. Geospatial standards for UK authoritative data providers. UK. Ordnance Survey.
8. Geospatial Commission, 2022. How FAIR are the UK's national geospatial data assets? Available at: https://www.gov.uk/government/publications/how-fair-are-the-uks-geospatial-assets.
9. Competition and Markets Authority (CMA), 2021. Electric Vehicle Charging market study. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1012617/EVC_MS_final_report_--.pdf.
10. Geospatial Commission,2020. Press release: Geospatial Commission to release core identifiers under Open Government Licence. Available at: https://www.gov.uk/government/news/geospatial-commission-to-release-core-identifiers-under-open-government-licence.
11. Geoplace, UPRNs – essential in shaping policy for on-street Electric Vehicle chargers. Available at https://www.geoplace.co.uk/case-studies/uprns-essential-in-shaping-policy-for-on-street-electric-vehicle-chargers.
12. Ordnance Survey, OS Open TOID, Available at: https://www.ordnancesurvey.co.uk/business-government/products/open-toid.
13. UK Power Networks, 2022. Energy Data to Support Net Zero Planning, Online Consultation and Workshop Findings. Available at: https://www.regen.co.uk/project/uk-power-networks-open-data/.
14. Department for Transport, 2020. Cycle Infrastructure Design. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/951074/cycle-infrastructure-design-ltn-1-20.pdf.

15. Davies, A, 2022. How Can Adequate Rapid Charging Infrastructure in Hampshire be Achieved by 2030? Geography Single Dissertation, 1900 4172, Keele University.

16. Milan Strakaa et al., 2019. Predicting popularity of EV charging infrastructure from GIS data. Available at https://arxiv.org/pdf/1910.02498.pdf.

17. Mind Foundry, 2021, Optimising electric vehicle charging stations using Geospatial AI. Available at: https://www.techuk.org/resource/guest-blog-optimising-electric-vehicle-charging-stations-using-geospatial-ai.html.

18. ESRI, 2022. Using GIS Suitability Analysis for Electric Vehicle Charging Locations. Available at: https://www.esri.com/content/dam/esrisites/en-us/events/conferences/2022/user-conference/user-sessions/12954-using-gis-suitability-analysis-for-electric-vehicle-charging-locations.pdf

19. Field Dynamics, 2022. REME Ground Truthing Report. https://www.dgcities.com/reme.

20. Office for Zero Emission Vehicles, 2021, Open electric vehicle chargepoint data Discovery report. https://www.gov.uk/government/organisations/office-for-zero-emission-vehicles

21. Geospatial Commission, 2020. Guidance: Bringing together housing, land and planning geospatial datasets. Available at: https://www.gov.uk/government/publications/bringing-together-housing-land-and-planning-geospatial-datasets.

22. Geospatial Commission, 2022. Guidance: National Underground Asset Register (NUAR). Available at: https://www.gov.uk/guidance/national-underground-asset-register-nuar.

23. Department for Transport, 2022. Public Electric Vehicle Charging Infrastructure, Deliberative and quantitative research with drivers without access to off-street parking. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1061865/public-ev-charging-infrastructure-research-report.

Annex A - Appendices

A.1 Local authorities

The table below details each of the Local Authorities we engaged with during this work and covers some basic details to give an understanding of their size.

Council	Type
Norfolk County Council	Norfolk County Council is approximately 962km² and has a population of approximately 105,000. It is served by 84 councillors.
City of York Council	City of York Council is a unitary authority servicing approximately 200,000 people, covering an area of 169km². It is represented by 47 councillors.
Oxfordshire County Council	Oxfordshire County Council serves around 600,000 people across 2,605km² and consists of 63 councillors.
Greater Manchester Combined Authority	Greater Manchester Combined Authority covers an area of 805km² and serves 5.7 million people. It is represented by 96 councillors.
West Sussex County Council	West Sussex County Council represents 859,000 people across 1,991km². It is served by 71 councillors.
Cornwall Council	Cornwall Council has an area of 3,563km², serving 568,000 people. It is represented by 87 councillors.
Kent County Council	Kent County Council covers 3,736km² and serves 1.85 million people. It is represented by 81 councillors.
Wiltshire Council	Wiltshire Council represents 720,000 people across 3,485km². It is represented by 98 councillors.
Coventry City Council	Coventry City Council represents 652,000 people across 99km². It is represented by 54 councillors.

A.2 Data Catalogue

This table summarises the geospatial datasets identified during the local authority workshops and do not represent a full data audit. We have made a high-level Q-FAIR assessment for each dataset and address specific issues within the main body of the report and through our recommendations.

Theme	Dataset	Description	Use	Q-FAIR Assessment	Format
Existing EVCI	NCPR	Centralised dataset of national EV charging point locations.	Understanding current ECVI provision for planning and site selection.	Accessible, but report of poor quality due to incompleteness, inconsistency and errors in the data. Interoperability issues: format does not conform the UK geospatial standards.	CSV, XML, JSON
	Zap Map - free	App for finding EVCI locations – free version.	Understanding current ECVI provision for planning and site selection.	Gaps reported and data potentially out of date due to quarterly update cycle. Does not allow identification of new charge points. Data can be obtained and re-used under licence. Interoperability issues - does not provide standard Web Map Service interface.	Web/mobile map application
	Zap Map - paid	Zap-Map Plus and Zap-Map Premium.– paid version.	Understanding current ECVI provision for planning and site selection. Supports identification of new charge points and user ratings.	Gaps reported and data potentially out of date due to quarterly update cycle. See comments above. Requires subscription for access.	Mobile map application
Energy Infrastructure	Electricity capacity	Availability of electricity by location.	Understand whether the electricity capacity at a given location is sufficient for the demands of the proposed EVCI.	Data exists but Local Authorities find it challenging to access timely data at the right level of detail (quality). Data is not standardised and ability to reuse is not clear. Q-FAIR status will therefore vary between electricity suppliers, but generally low.	Various
Social and Demographic	ONS Census	Demographic data for every UK household.	EVCI demand and location planning	Quality concern as census data is now out of date pending 2021 data which will be made available in the summer of 2022. Easily accessible online in a standard format.	CSV
Road Use & Traffic	Traffic restriction & regulation orders	Existing parking places, and locations covered by enforceable parking regulations.	EVCI planning and operations.	Data types and accessibility varies between authorities - typically maintained internally and not publicly available. DfT TRO digitisation programme aims to make data more Q-FAIR.	ESRI Shapefiles
	Authority maintained roads & paths	Location (polylines) and boundaries (polygons) of authority maintained roads and footpaths.	Identifying where EVCI could be placed on the highway, and where sufficient footpath width exists without impinging on footpath access requirements.	Data formats and accessibility varies between authorities - typically maintained internally and not publicly available. Q-FAIR status therefore varies. (Alternative Q-FAIR source of roads/path maintenance information is available in Ordnance Survey Highways dataset.)	ESRI Shapefiles
Land and Property	Land Registry	Dataset of all title deeds for UK property.	Understanding land ownership of potential EVCI locations.	Challenges (cost and time) when wanting to make multiple title searches and uncertainty regarding rights of reuse and sharing therefore affect Q-FAIR accessibility and reuse status. Interoperability issues: Data is supplied in PDF rather than GIS data formats.	PDF
	OS Address Base	29 million Royal Mail postcodes matched to a Unique Property Reference Number.	Identification and mapping off-street parking areas.	Reportedly contains some categorisation errors affecting quality status, though otherwise Q-FAIR.	ESRI Shapefiles, CSV, Geopackage
	OS Master Map	OS MasterMap comprises multiple layers; freely available to Local Authorities under the PSGA. The Highways layer provides a topological network dataset covering the UK road network, including road names, classifications, asset management/maintenance information, road speed, turn restrictions, etc	Base mapping for GIS analysis for EVCI planning.	Data is Q-FAIR.	GML, Shapefiles, Geopackage
	Authority-owned asset data	Various - typically polygon datasets showing location of Authority land assets, including housing, car parks, roads and other surfaces.	Used to identify potential EVCI locations.	Status varies between Authorities, but data typically stored in standard formats, but not currently findable or accessible outside of authorities.	Typically ESRI Shapefiles and/or other standard GIS formats.
	Imagery	Aerial or satellite imagery provided though online providers such as ESRI. Many other free and commercial sources exist e.g. https://gisgeography.com/free-satellite-imagery-data-list/	Identifying where there is an abundance of on-street parking for further investigation, as well as an overview of available highway space	Findability and accessibility depend on authorities having access to appropriate imagery service. ESRI services are limited to paying subscribers. Freely available Very High-Resolution (VHR Q-FAIR alternative sources, such as Copernicus mosaics would support higher F/A assessments.	GeoTIFF, GeoJPEG
	Google Street View	Interactive panoramas from positions along streets provided in featured in Google Maps and Google Earth	Understanding of off-street parking patterns	Data is free to view but only representative of a single point in time and can be out of date. Creating/extracting data from Street View images prohibited both for academic research and commercial purposes.	Web application
Requests / Poll / Opinion	Social Media polls	Local Authority social media posts.	Understanding of public views with respect to proposed EVCI plans and locations.	Qualitative data. Q-FAIR status will vary depending on the specific technology and terms/conditions. Potential for re-use of social media data can be affected by privacy/GDPR considerations.	Web / mobile application
	Resident requests	Direct enquiries / requests from residents for EVCI.	Triggers the planning stage for the demand EVCI process.	Q-FAIR status varies depending on data type and source.	
Environmental	Air quality	Defra information on air quality by location.	Areas with poor air quality are used to inform EVCI plans and site selection.	Q-FAIR data; up-to-date and freely available for re-use, in standard format.	CSV
	Crime data	Rates of crime by location.	EVCI plans and site selection	Q-FAIR data; up-to-date and freely available for re-use, in standard format.	CSV

A.3 Geospatial / GIS Capability

This table summarises the geospatial applications and tools which the local authorities highlighted they used in their EVCI planning processes.

Capability	Type	Description	Local Authority
ESRI ArcGIS	Desktop / web application	ArcGIS comprises a comprehensive collection of GIS tools, including data editing, geoprocessing, analysis and visualisation tools, and interactive web/browser-based data creation, editing and visualisation features via ArcGIS Online (AGOL). It is commercial software, and widely regarded as *de facto* standard software.	West Sussex County Council, Coventry City Council, Wiltshire Council, Norfolk County Council
QGIS	Desktop application	QGIS is a widely used, free open source (GPL) desktop GIS application that implements many (OGC) geospatial data and service standards. It includes comprehensive editing, geoprocessing, analysis, visualisation tools, and web map server.	Kent County Council
StatMap Earthlight	Web application	Earthlight is a web/browser-based GIS product developed by UK-based StatMap. It offers basic spatial data creation and editing tools, and provides dedicated support for OS MasterMap data. Data is stored on the user's local network.	West Sussex County Council
MapInfo Pro	Desktop application	MapInfo is established COTS GIS software, providing desktop GIS tools for data editing, geoprocessing, analysis and visualisation.	Greater Manchester Combined Authority
Bespoke council-specific GIS	Application	Mapping tools created in-house by various councils.	City of York Council, Cornwall Council, Wiltshire Council
Carto	Web application	A cloud-native 'location intelligence platform', providing spatial data analysis, enrichment and visualisation tools, including solutions for urban planning, smart cities and IoT.	West Sussex County Council
Safe Software FME (Feature Manipulation Engine)	Desktop / cloud application	A commercial geospatial data integration, and ETL (extract, transform, load) platform for creation of reusable data workflows and pipelines. FME supports a wide range of geospatial and non-geospatial data types, and provides a comprehensive library of geospatial data transformers. It is the *de facto* standard geospatial ETL tool.	Greater Manchester Combined Authority
Mind Foundry AI	Services	An Oxford University company specialising in scalable and reliable Artificial Intelligence solutions, including geospatial applications for government, and specialist services of EV charging point location selection (Geospatial Solutions for EV Charge Point Infrastructure (mindfoundry.ai)).	Oxfordshire County Council
Energeo	Services and Application	UK GIS service company specialising in energy, smart grids and smart mobility. LOCATE is their 'minimum viable product' platform to help 'reduce the time and effort associated with assessing site suitability for EV chargepoint deployment'.	Oxfordshire County Council
Connected Kerb	Services	An EV infrastructure provider, specialising in EV data and long-dwell charging.	Kent County Council, West Sussex County Council, Coventry City Council
Google Maps and Google Earth	Web application	A simple web-based global mapping and spatial data visualisation service, including satellite imagery,3D visualisation and Street View imagery. Free for use for research purposes.	Norfolk County Council
MS Excel	Desktop application	Spreadsheet application with data analysis and visualisation capabilities.	Greater Manchester Combined Authority

FRAZER-NASH CONSULTANCY
A KBR COMPANY

FNC 015415
129533V Issue: 1
Prepared for: Geospatial Commission

www.fnc.co.uk