

# Staffordshire County Council Public Electric Vehicle Charging Infrastructure Strategy

Staffordshire County Council EV Charging Strategy

18/01/2023

amey consulting

## Foreword

Climate Change is a huge issue that affects us all. Staffordshire County Council (SCC) declared a climate change emergency in 2019 and made a firm commitment to achieve net zero carbon emissions by 2050.

Since 2019 we have reduced our own carbon emissions by 43%, but SCC and the entire public sector only account for 2% of all emissions in Staffordshire. Transport accounts for around 40% of the county's total annual carbon emissions, and as well as contributing to climate change, has a major impact on public health.

We have a role to play in inspiring and facilitating more people to switch to greener and active travel, such as walking and cycling, or the use of electric vehicles (EVs). Indeed, the Government has banned the sale of all new petrol and diesel cars beyond 2030.

However, it is essential that Staffordshire has a convenient and accessible network of EV charging points. While it is not the county council's role or responsibility to install the charging points, we know our communities, and we want to work with and partner local authorities and the private sector

This strategy sets the scene for why we need to act, explains where we are and outlines the role that Staffordshire County Council will play.

### **Cllr David Williams**

Cabinet Member for Highways and Transport

## Executive Summary

In 2019, Staffordshire County Council (SCC) declared a climate emergency and committed to becoming net carbon neutral by 2050. To achieve this, the Council reviewed its operations and activities as well as putting in place a monitoring and evaluation programme to track progress.

Transport is a major contributor to the climate, health and ecological challenges being faced. In June 2019, the UK Government acknowledged this and announced ambitions for the transport network to be net zero by 2050. This was followed in November 2020 by an announcement of the ban on new petrol and diesel car sales by 2030. These are amongst the early steps in transitioning to sustainable modes of transport and the increased use of Electric Vehicles (EVs) will support the push to net zero. Further steps will be needed to encourage the removal of all petrol and diesel cars, including the growth of a viable second-hand EV market to reduce vehicle costs.

To support the move to EVs and other electric modes of transport, an EV charging network is essential. While it is not SCC's role to install and maintain the charging network, as the highways authority, a major land and asset owner, and our commitment to achieving net zero, we do have an important coordinating and facilitating role. SCC therefore commenced a concerted effort in 2019-20 to kick-start EV charging for the public but then COVID-19 struck, and this early work was stalled. SCC re-invigorated this work in late 2021 through commissioning Amey Consulting to work alongside them. This support facilitated the gathering of knowledge, developing a strategy and action plans whilst supporting all the Staffordshire district, town, and borough councils by bringing everyone together to increase understanding, provide a framework, and assist in the decision-making process.

EV car ownership sits at about 1% of the total UK car fleet in late 2021 and this is expected to increase to around 10% over the next three years. As battery technology improves, traveller range anxiety has lessened and price parity between combustion engine cars and EV cars is on the horizon (expected around 2026). Access to a usable and convenient charging network will therefore encourage further uptake of EVs and help to reduce inequalities in accessing this essential technology.

New government guidance now mandates EV charging in some car parks and most new homes. The newly published 'UK EV Charging Strategy' [1] along with this 'SCC Public EV Charging Strategy' will be crucial components in outlining how a charging network should be developed, where chargepoint

installation should be considered, and how SCC will provide coordination to local councils towards their successful installation of chargepoints.

This SCC Public EV Charging Infrastructure Strategy analyses various areas including policy, funding, and technology. The strategy identifies five types of charging solutions: EV charging hubs, EV forecourts, on-street charging, residential off-street parking, and off-street charging. The strategy also delves into the current and forecasted demand for each of the districts and boroughs and for the whole of Staffordshire, to inform strategic decision making. This document recommends broad locations across the county that should be considered for charging infrastructure and the optimal solutions that are most appropriate to match current and anticipated demand.

This document will be updated following receipt of additional guidance on EV strategies issued by the DfT in connection with Local Transport Plans.

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## 1. Glossary of Terms

**BEV** – Battery Electric Vehicle

**Chargepoints** – The physical devices that deliver electricity to EV's

**DNO** – Distribution Network Operator (electricity companies!)

**EV** – Electric Vehicle

**EV Forecourt** – Fuel stations that include chargepoints

**EV Charging Hub** – Fast, rapid, or ultra-rapid chargepoints at a specifically designed location

**Hybrid** – A vehicle that combines an electric motor supporting an Internal Combustion Engine

**ICE** – Internal Combustion Engine (usually petrol or diesel)

**kW / kWh** – Kilowatt / kilowatt hour – measure of power

**Off-street Charging** – Chargepoints in car parks

**On-Street Charging** – Chargepoints located on streets

**PHEVs** – Plug-in hybrid electric vehicle

**Residential Off-street Charging** – Private chargepoints installed by users at their residence

**Smart Charging** – This refers to electric vehicles and chargepoints sharing a data connection

**'the area'** – Refers to any locations or facilities within Staffordshire County Council boundaries

**'the borough'** - Refers to any borough council within Staffordshire

**'the district'** – Refers to any district council within Staffordshire

**'the council'** – Typically refers to Staffordshire County Council

**SCC** – Staffordshire County Council

**ULEV** – Ultra low emission vehicle

**User** – Electric vehicle owner or user and chargepoint user

## 2. Introduction

Staffordshire County Council (SCC) has commissioned Amey Consulting to create a Public Electric Vehicle (EV) Charging Infrastructure Strategy. This will explore how the council can facilitate the growth of charging infrastructure across the county working with the 2nd tier districts and boroughs. This strategy will be created to coordinate the development of accessible chargepoints across the county and support local authorities, residents, businesses, or others looking to install chargepoints through providing information and guidance. Though it is recognised that commercial companies will provide charging, the role of the authority is to coordinate and therefore facilitate the development of a charging network that meets the needs of the people of Staffordshire. Within this role, issues including distribution, reducing risks of poorly located and/or insufficiently maintained infrastructure and accessibility will be overcome.

The strategy will cover public EV charging infrastructure and key policies and regulations at both a local and UK level that impacts charging requirements. Amey Consulting will also explore existing and future technologies, funding procurement and delivery methods at a local level, as well as commercial models which might be appropriate for the council and included districts.

The second aspect of the strategy is to establish the likely current and future demand for EV charging infrastructure across Staffordshire, aligning to the Council's wider net zero policies. From this demonstrable demand, the propensity to use EVs will be mapped, forming the basis of the location selection for EV charging infrastructure and feeding into the final output of an Implementation and Action Plan.

The strategy will support all modes of sustainable transport and ensuring improvements enhance the full transport offering within Staffordshire. To achieve this, consideration was also given to the potential modal shift that new EV charging infrastructure could bring.

This strategy supports SCC's environmental objectives towards achieving net zero emissions by 2050, across every aspect of SCC's service provision and estate:

- Organisational Carbon Reduction (reduce the carbon impact of council services)
- Improve Air Quality (improve the health of individuals through improved air quality)
- Supporting Behavioural Change

To support the delivery of the strategy, SCC and Amey have held meetings and review workshops with the individual district and borough Councils in Staffordshire as well as internal SCC stakeholders. These helped ensure that the councils and the user needs were embedded into the long-term strategy and implementation plans. Review sessions and other meetings have been held to ensure that iterative feedback has been incorporated into this report.

### 3. EV Charging Context

SCC recognise that climate change is the biggest environmental challenge facing the world today and has reflected this by identifying climate change as one of the five key principles in the Council's Strategic Plan. SCC recognises that actions are needed to minimise the Council's net carbon emissions. These actions are to either stop carbon emissions, develop ways to remove carbon that is already in the atmosphere (sequestration) or help communities and business prepare for the impact of changing climate (adaptation).

EV adoption forms a crucial part of tackling climate change, along with the decarbonisation of transport in Staffordshire, which forms a key objective of Staffordshire's 2021-2025 Climate Change Action Plan.

Reference	Description	Action	Proposed timeline
CN-08-21	Increase the number of Electric Vehicle (EV) charging points.	Work with district and borough councils to agree a consistent approach to EV infrastructure across Staffordshire.	Mar 2023
		Investigate the potential to upgrade electricity supply in SCC building stock to facilitate EV charging in retained property portfolio.	Mar 2022
		Develop an EV Infrastructure Strategy and Low Emissions Vehicle Infrastructure Action Plan	Mar 2024
		Maximise opportunities to bid for Department for Transport funding, including workplace charging fund (at SCC buildings) and on street residential charging fund.	From Nov 2021
		Work with Amey to roll out EV charging across all highway's depots.	From Nov 2021

Table A: Carbon Reduction - CCAP - Chargepoints

The 2011-2026 Local Transport Plan highlights the need to reduce the reliance on private vehicles and support active travel and other modes, it acknowledges that cars will still play a role in the transport choices for many.

The availability of charging infrastructure across Staffordshire county can provide an important focus on encouraging the growth in use of EVs, whilst also supporting the rural community. Midlands Connect, who research and develop transport projects, also acknowledge the significance of EVs and EV infrastructure in the movement to decarbonisation.

At the end of May 2022 there were 32,312 charging points across the UK, at 19,945 charging locations, with a steep increase in growth from 2019 onwards. This represents a 32% increase in the number of charging devices since May 2021 [5].

This is driven by an increased demand for EVs, with more than 300,000 BEVs and 600,000 PHEVs on UK roads in 2021. As the number of EVs grow, retailers, supermarkets and other public facing organisations with car parks look to partner with chargepoint suppliers and provide their customers and

#### Staffordshire Local Transport Plan (2011-2026)

Reducing Road Transport Emissions and their Effects on the Highway:

- We will promote alternatives to private motor vehicles
- We will promote the use of low-emitting vehicles and vehicle efficiency
- We will lead by example and reduce our own road transport emissions
- We will improve the resilience of the transport network to changing climatic conditions

visitors with the required charging. Demand for EV charging could well be at around 300,000 chargepoints by 2030 [6].

Location	Total public charging devices	Total public rapid charging devices (25kW+)	Public rapid chargers as a % of total public charging devices	Charging devices per 100,000 population
UK	28,375	5,156	17%	42.3
West Midlands	1,969	495	25%	31
Staffordshire	239	105	46%	26

Table B: EV charging stats Jan 22 DfT EVCD\_01a/b

In Staffordshire there are approximately 450,000 petrol and diesel cars, and approximately 4,500 EVs registered across the respective districts and boroughs. There has been steady growth, but this is expected to increase dramatically in both the number of EVs registered and the number of chargers; all of which will contribute to the councils across Staffordshire reaching their respective net zero ambitions.

Location	ULEVs (all)*	BEV**	PHEV**	Motorcycles**	LGV's (all)**
United Kingdom	621,564	314,966	271,930	8,132	24,697
England	554,656	281,219	242,794	7,260	22,050
West Midlands	42,391	21,721	18,753	560	1,703
Staffordshire	4,558	2,315	1,999	60	182

Table C: ULEV's Q3 2021

\*Data from DfT VEH0131, Q3 2021

\*\*Data from VEH0133, Q3,2021

Data in italics extrapolated from VEH0131/VEH0133

Research conducted by Ordnance Survey, Zap-Map and Field Dynamics has identified that across Staffordshire, on average 75% of households have access to off-street parking and of those households that do not have off-street parking, on average of 3% of households are within a 5-minute walk from a public chargepoint. The 97% of households that do not have access to off-street parking and are not within a 5-minute walk of a public chargepoint equates to approximately 92,000 households. A public chargepoint infrastructure network should prioritise solutions that enable an equitable and accessible network for these 92,000 households.

Council	Percentage of households with access to off-street parking	Percentage of households within a 5-minute walk of a public charger
Cannock Chase	79%	1.8%
East Staffordshire	67%	5.2%
Lichfield	76%	11%
Newcastle Under Lyme	76%	0.5%
South Staffordshire	77%	2.5%
Stafford	75%	5.6%
Staffordshire Moorlands	80%	0.9%
Tamworth	71%	0.1%

Table D: Source: National Ranking of EV Charge Point Coverage, ZapMap & Field Dynamics

At present, any Staffordshire resident wishing to install an electric charging point can currently do so on their own private property (private on-street charging points are currently not available). There is a government grant available where a maximum of £350 is available to assist some residents with the initial upfront cost of installing an EV charging point [2]. However, there is a proportion of residents in Staffordshire who do not have off-street access, and for these residents most of the on-street parking is currently outside of the catchment area for public EV charge points (greater than a 5-minute walk).

Within the Midlands Connect EV Strategy, the identification of optimum locations for charging infrastructure has been recognised as a critical component of the deployment of a charging network, where locations have a variety of needs. Ensuring that those residents who don't have off-street parking options are still able to access chargepoints.

#### Supermarket Charge Point Operator Partnerships in Staffordshire

Tesco - Podpoint

ASDA – BP Pulse

Aldi – NewMotion

Lidl - Podpoint

Morrisons – GeniePoint

Co-op - ZeroNet

For greatest impact in meeting requirements for supporting those who wish to switch to EVs, the local authorities should coordinate the installation of chargepoints at workplaces or retail parks, improving EV catchment of off-street parking, and especially installing chargepoints in council owned and managed car parks. This could help the local councils to ensure the futureproofing of their infrastructure, providing chargepoints as the demand continues to increase.

It has been indicated by the UK Government that further policies will be released that will focus on Electric Vehicles and EV charging infrastructure in the next 12-24 months, along with funding to continue support for local authorities in their journey to decarbonisation. Midlands Connect is also planning continued support through establishing an EV forum, engagement with Distribution Network Operators (DNOs) and planning tools. In addition to the Government's on-going developments, the private sector has also continued the growth of charging networks across the UK, such as in petrol stations, supermarket car parks and retail parks. However, within Staffordshire this number remains low.

### 3.1. Midlands Connect

The Midlands Connect (MC) report 'Supercharging the Midlands' [3] summarises the key findings and analysis from their study of the MC region; providing guidance and principles to support the accelerated uptake and provision of EV charging infrastructure in the region. The report presents the baseline and forecasts for 2025 and 2030. MC also published their Rural Mobility Hub report [8] to help local authorities identify and establish commercially viable rural mobility hubs. This will generate new ideas during 2022 for an era of greater digital connectivity, and in the context of rural community needs [7].

EV's registered	Baseline 2020	2025	2030
Scenario 1 – slow uptake	44,909	344,951	1,304,156
% EV	0.74%	5.6%	20.9%
Scenario 3 – accelerated uptake	44,909	642,762	2,527,845
% EV	0.74%	10.5%	40.6%
Chargepoints forecast	2,174 (Jan 2021)	9,915 – 25,703	21,988 – 77,533

Table E: Midlands Connect MC region forecasts

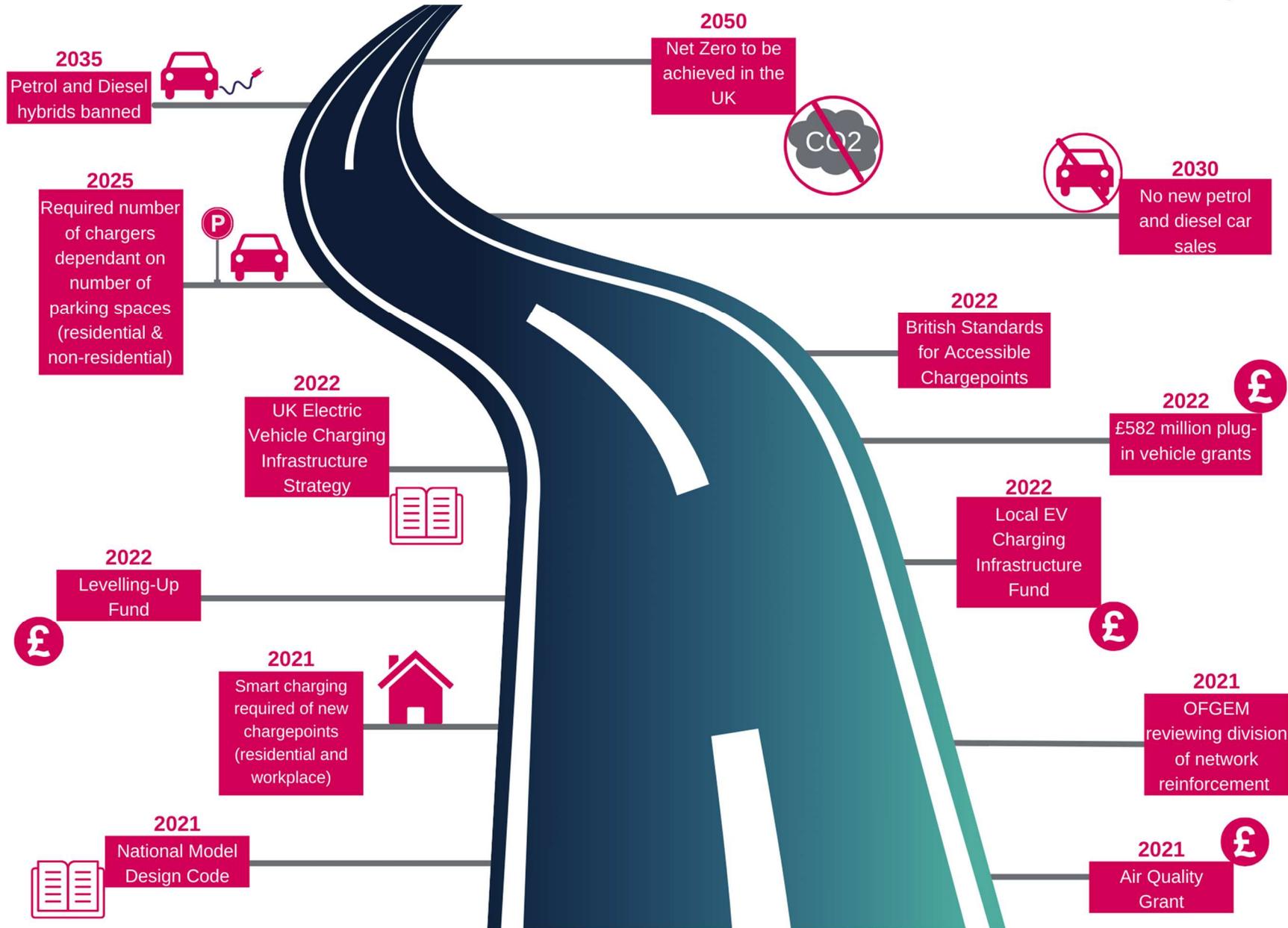


Figure 1: EV landscape roadmap

## 4. Policy and Funding Review

Over the last five years there has been continued growth in investment in charging infrastructure and policies that acknowledge the critical role that charging infrastructure has in the continued uptake in EVs. The announcement of the Rapid Charging Fund as part of the March 2020 budget saw £500 million committed to supporting the growth of a high-powered charging network across the UK. At the same time as announcing the funding, clear charging infrastructure aims and objectives for the UK were published. These aims included having 6 high-powered open access chargepoints at each motorway service area in the UK by 2023. It is understood that the demand for charging infrastructure will continue to increase, and the introduction of these policies aims to ensure this demand will be met. The policies and funding available for charging can be leveraged to help Staffordshire to meet their net zero ambitions.

Coordinating a wider EV charging network in Staffordshire will not only support the private use of EVs but can also be beneficial to businesses and workplaces who will need to move to electric fleets. The new legislation that bans new petrol and diesel cars being sold in the UK from 2030 will further drive movement away from petrol and diesel vehicles and towards low carbon alternatives.

This section of the strategy outlines the policies and funding that are and will continue to be most impactful for Staffordshire's short and long-term EV network plans. The policy and funding review focusses on five key areas of impact:

- **Chargepoint technology** – specifications for the charge point technology or where the policy supports the development of new technology
- **Chargepoint installation** – specifications on installation either on the number of charge-points available or the locations
- **Commercial requirements** – specifications for the operators or support for operators
- **Building regulations** – guidance on how charge-points should be incorporated into planning and planning decisions
- **Consumer protections** – specifications as to what operators and charge-points must provide to consumers

In addition to these five key areas, we have highlighted the chargepoint infrastructure solutions the policies are relevant to; whether responsibility for meeting the requirements falls to the public or private sectors; and have examined any available funding which supports meeting the policy aims. A summary of the information contained within the policies reviewed can be found in the local policies table below.

This information has been distilled into the roadmap presented above to demonstrate the key policies and funding milestones until 2050. Continued funding will enable SCC to adhere to both UK-wide and internal policies; the Council should seek to support government consultations to ensure the Staffordshire voice is heard.

Current national policies are displayed in Appendix D, whereas the local policies are set out in the table below.

Policy Title	Summary	Date of publication	Charge-point impact	Key Considerations	Chargepoint solution	Funding Opportunities	Timeframe
<b>Local Policies</b>							
<b>Staffordshire Local Transport plan 2011-2026</b>	The plan sets out the County Council's proposals for transport provision in the county, including walking, cycling, public transport, car-based travel and freight, together with the management and maintenance of local roads and footways.	2011	<ul style="list-style-type: none"> <li>Investigating measures that will encourage the use of low-emitting vehicles such as the development of EV charging points.</li> <li>Replacing SCC vehicles (when required) with ones that are less polluting and more fuel efficient, wherever possible.</li> <li>Reviewing SCC staff car parking facilities</li> <li>Encouraging public transport operators that when replacing vehicles, they consider purchasing lower emitting vehicles.</li> </ul>	<ul style="list-style-type: none"> <li>Promoting (and running) schemes that encourage the take up or smarter travel modes</li> <li>Introducing Traffic Regulation Orders (such as clear zones, low-emission zones and no stopping/parking zones)</li> <li>Encouraging all owners of the transport network to manage, maintain and develop with climate change in mind.</li> </ul>	<ul style="list-style-type: none"> <li>Off-street</li> <li>On-street</li> <li>EV Forecourts</li> <li>EV Charging Hubs</li> </ul>	<ul style="list-style-type: none"> <li>On-Street Residential Chargepoint Scheme</li> </ul>	Medium – 2 - 5 years +
<b>Staffordshire Climate Change Action Plan 2021-2025</b>	<p>SCC recognises that a range of actions are needed to stop or reduce the Council's carbon emissions. These actions are to either stop carbon emissions, develop ways to remove carbon emissions, or help communities and businesses prepare for the impact of a changing climate.</p> <p>The Council will monitor its carbon emissions each year, to track the success of these actions. This plan will be reviewed annually to ensure that it continues to deliver the Councils commitment to the climate change agenda.</p>	2021	<ul style="list-style-type: none"> <li>Increase the number of EV charging points</li> <li>Investigate the transitions of Council fleet to alternative fuels or more carbon efficient options where appropriate by 2025.</li> </ul>	<ul style="list-style-type: none"> <li>Work with district and borough councils to agree a consistent approach to EV infrastructure across Staffordshire.</li> <li>Investigate the potential to upgrade electricity supply in SCC building stock to facilitate EV charging in retained property portfolio.</li> <li>Develop an EV Infrastructure Strategy and Low Emissions Vehicle Infrastructure Action Plan</li> <li>Maximise opportunities to bid for Department for Transport funding, including workplace charging fund (at SCC buildings) and on street residential charging fund.</li> <li>Work with Amey to roll out EV charging across all highways depots.</li> <li>Ensure sufficient resources are available to support business areas in identifying opportunities and understanding carbon impacts.</li> <li>Continued liaison with district and borough councils to discuss how planning considerations can include climate change mitigation and adaptation.</li> </ul>		<ul style="list-style-type: none"> <li>On-Street Residential Chargepoint Scheme</li> </ul>	Medium – 2 - 5 years +
<b>Staffordshire Climate Change Strategic Development Framework</b>	SCC committed itself to the climate change agenda by declaring a climate change emergency in 2019 and to also achieve net zero carbon emissions by 2050. The Strategic Development Framework sets out how the authority will work towards achieving its carbon emissions target.	February 2021	<ul style="list-style-type: none"> <li>reduce vehicle emissions</li> <li>reduce our overall carbon impact</li> </ul>	<ul style="list-style-type: none"> <li>Ensure all council services understand the need to reduce our carbon emissions and are committed to doing so.</li> <li>Be innovative, aspirational and positive leading by example.</li> <li>Be positive in our approach, embrace opportunities and build on our successes.</li> <li>Empower our staff and members to suggest solutions and commit to delivering the net zero target.</li> <li>Have transparent processes and make the best use of the resources we have.</li> </ul>	<ul style="list-style-type: none"> <li>Off-street</li> <li>On-street</li> <li>EV Forecourts</li> <li>EV Charging Hubs</li> </ul>	<ul style="list-style-type: none"> <li>On-Street Residential Chargepoint Scheme</li> </ul>	Long - 5 years +

Table F: Policies review - Local Policies

## 5. Demand Analysis

### 5.1. Methodology

The focus of the demand analysis is to use data to create unique insight into the propensity to use EVs. The propensity to use EVs is directly linked to the requirements for charging infrastructure. Through specific analysis of data related to Staffordshire and its' districts and boroughs, a charging network is proposed to meet anticipated demand, local strategic objectives and existing and upcoming UK policies.

The analysis focuses on collating and mapping relevant data onto a GIS (geographical information system). GIS offers a unique ability to combine data that would not usually have been analysed together. For example, combining points of interest with the number of households with more than one car allows us to suggest the types of journeys being made. The use of GIS allows for the best use of the available data and ensures the analysis is tailored for the Staffordshire districts and boroughs.

The first step is to create a high-level demographic profile of those most likely to use EVs, using specific Staffordshire data. A matrix is created to assess all types of demographic data and identify areas where there is a highest likelihood of potential EV users. The output from the analysis is a propensity map of Staffordshire showing the areas of high and low propensity to use EVs

Further analysis is then undertaken to consider the infrastructure and journey data across the Council.

This level of assessment has provided unique insight across the county and allows for a charging network to be recommended to that considers the county wide perspective and the individual district and borough requirements towards a transition to EVs.

#### Demographic Assessment

The demographic assessment uses 2011 census data (This document will be revised when the 2021 census data becomes during late 2022) and additional local data available to the Council. The table below outlines the key datasets, the target population demographic and the rationale for including this sector within the intended audience.

Data	Target	Reason
<b>Age</b>	25-54 being the most ideal ranges	Those between these ages are the most likely to adopt new technology.
<b>Household income</b>	Minimum of £25k	The current cost of an EV can be prohibitive to lower incomes, but the funding available to support purchases of EVs supports this - as a minimum.
<b>Household access to a car</b>	Minimum one car	SCC is looking to support the transition to EV but are also looking to support modal shift away from car use.
<b>Household employment status</b>	Employed or a third level student	Those in employment are more likely to be commuting by car in the districts and boroughs, whilst students are likely to generate charging demand in the future.

Table G: Key demographic datasets

These data sets are chosen as the most impactful for those likely to adopt an EV in the future. This is expected to change as the expense of owning a private EV lowers and with the development of charging networks. These areas are scored based on the level of target demographics in the areas. These scores

are combined in a weighted overall score to create a demographic relative propensity map across Staffordshire for EV uptake.

### Journeys Assessment

Journey information assessment uses the Propensity to Cycle Tool (PTC), open street map, and SCC provided data. This data is used to map commuter journeys, school journeys and journey purpose (or driver), such as to supermarkets, workplaces and tourist destinations. The current commutes, school routes and the number of these journeys taken by car to establish the number of switchable trips to EV. Where journeys were not able to be mapped, journey drivers were analysed and trips that would most likely be made by car were inferred.

### Infrastructure Assessment

Infrastructure data is taken from Western Power Distribution (WPD), open street map, Zap-Map and SCC data. The table below outlines the key data sets and the reason for their inclusion within the analysis.

Data	Reason
<b>WPD capacity map</b>	Establish the location of existing sub-stations
<b>Car parks</b>	Establish demand for short-term charging and the car-parks ability to deliver this
<b>Land ownership</b>	Establish whether installation would be within SCC control
<b>Planning applications</b>	Establish growth in the area and opportunity for growth of off-street and off-street residential charging in line with new policy requirements for chargepoint installation in new developments
<b>Fuel Stations</b>	Establish existing network of fuel stations and infer transition of those fuel stations to EV forecourts as EV demand increases during phase out of petrol and diesel cars. Establish capacity to add to charging network at these locations.
<b>Existing chargers</b>	Establish locations and types of existing chargepoints

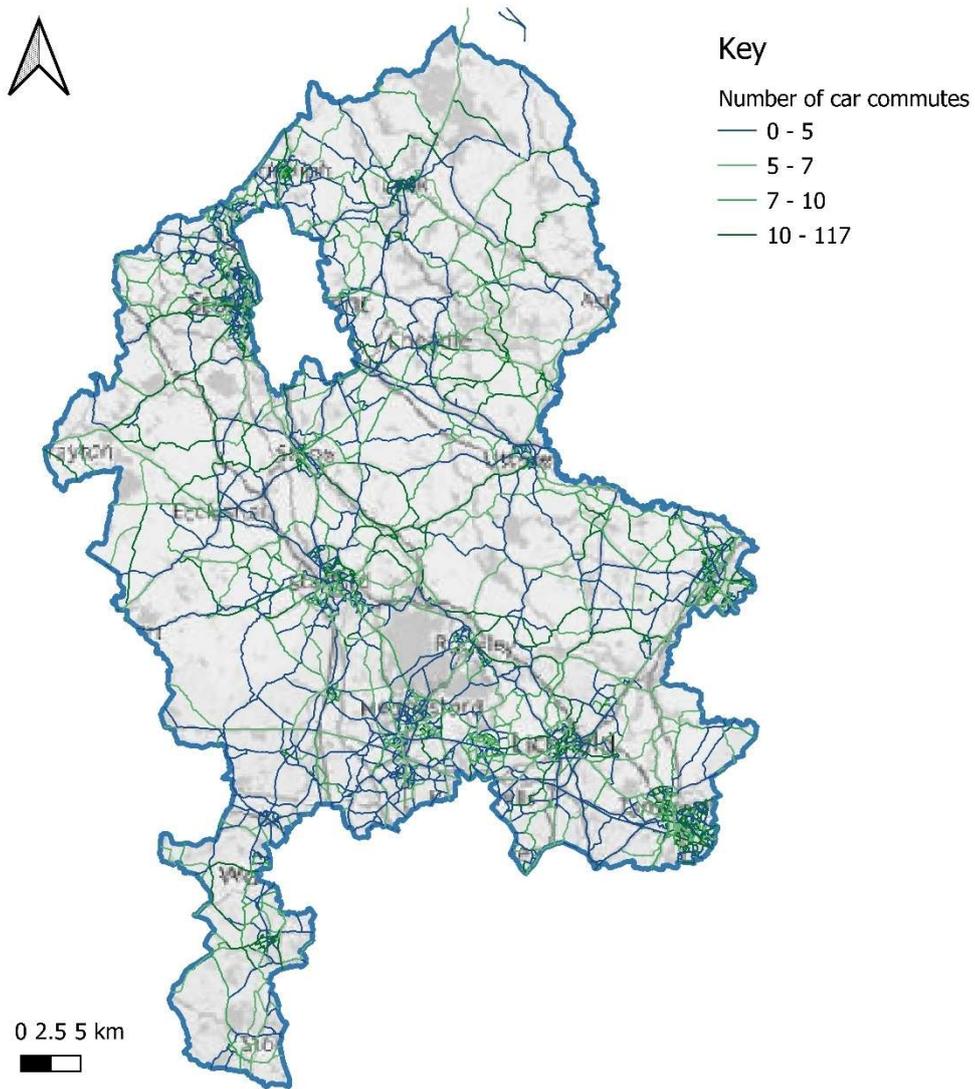
Table H: Key infrastructure datasets

These data sets have the highest impact on the development of the charging network both in terms of capacity and available space.

### Combined Assessment

The propensity map serves as the base for the combined assessment and, from this, facilitates a focus on the high propensity areas that enables individual assessments. At this individual assessment point, the infrastructure is examined to ensure available space and no overlap with existing chargepoints.

**Commuting**



*Figure 2: Staffordshire car commuting*

The map shows the number of car commutes across Staffordshire. The data is sourced from the propensity to cycle map and shows general start and end points rather than door to door travel. This data is used to show both the number of commutes and the percentage of the commutes made by car. The areas with high car commutes are given the highest score as these areas would have the highest impact if switched to EV and would therefore require the largest number of chargepoints.

## Points of Interest

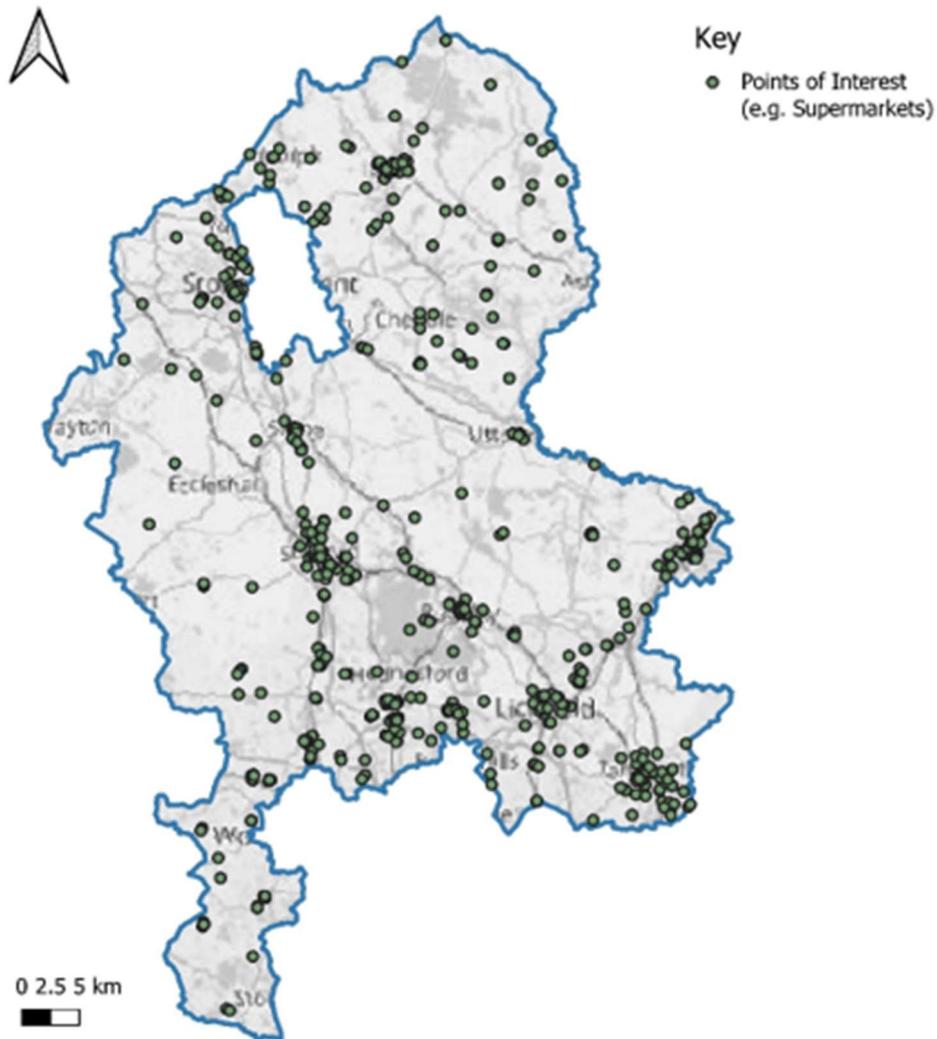


Figure 3: Staffordshire POI

The map shows a sample of points of interest that were mapped. The reason for mapping points of interest is to infer trip generators for example supermarkets, workplaces, tourists attractions. This has been undertaken due to the unavailability of live people movement data that would have shown the mode and destination of those points of interest that were most likely to have a high number of car journeys and were therefore given a higher score.

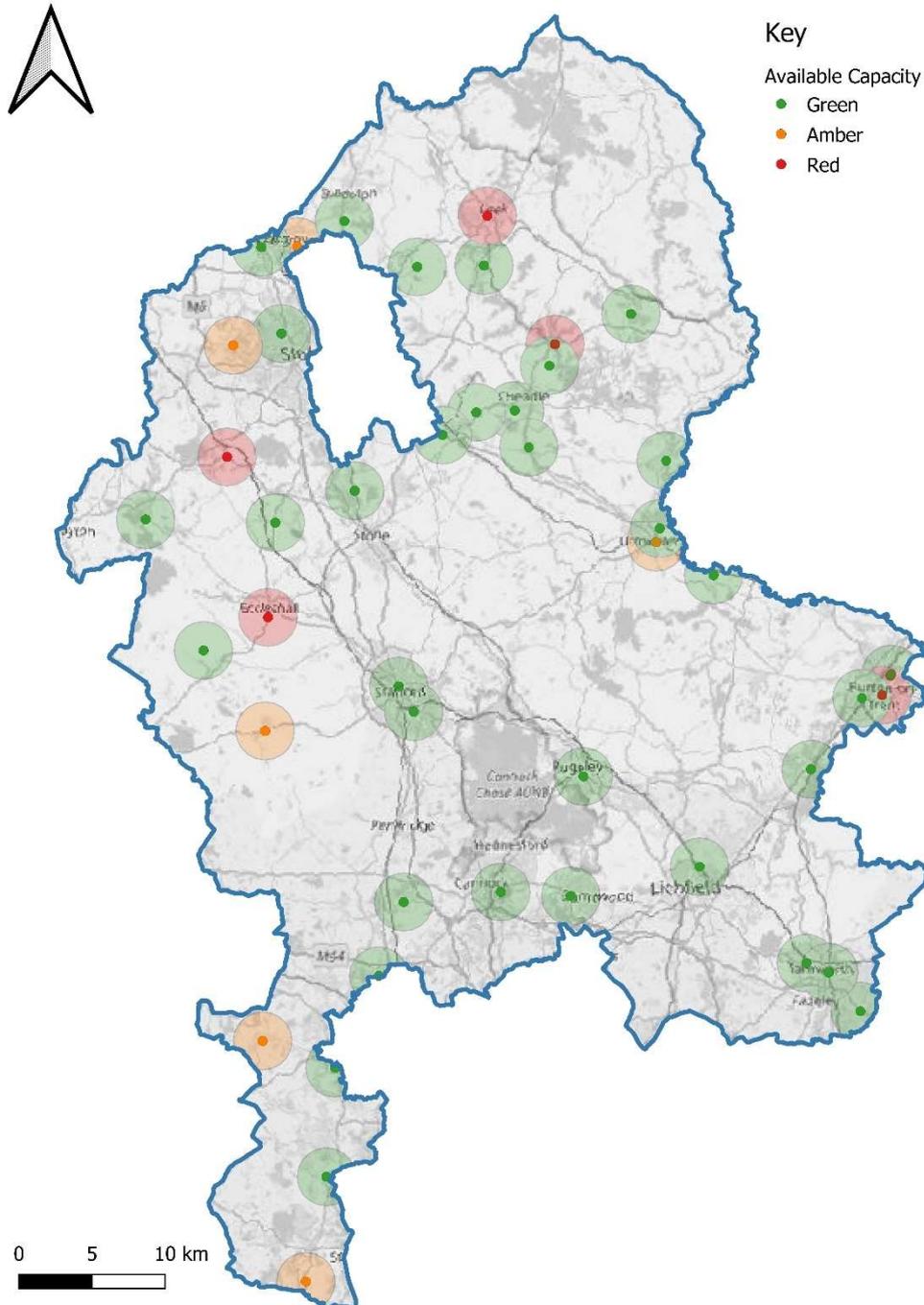


Figure 4: Sub-Station power capacity

The map shows all the Western Power sub-stations across Staffordshire; this gives some indication of where power is available across the power grid and where capacity may be more limited. This may be especially impactful when considering the location of rapid charging sites and hubs.

## 5.2. Demand Analysis – County Overview (2021/22)

### Propensity map

The maps are divided up by districts or boroughs along the Lower Layer Super Output Areas (LSOA), these are government geographical areas also used for the Census, each LSOA area has an average of 1,500 people or 650 households.

It should be noted that the strongest likelihood of converting to EVs at this time is often in more affluent and rural areas, rather than in the more urban centres. Campaign targeting is guided by propensity; whilst EV charging infrastructure locations are more related to current and expected demand.

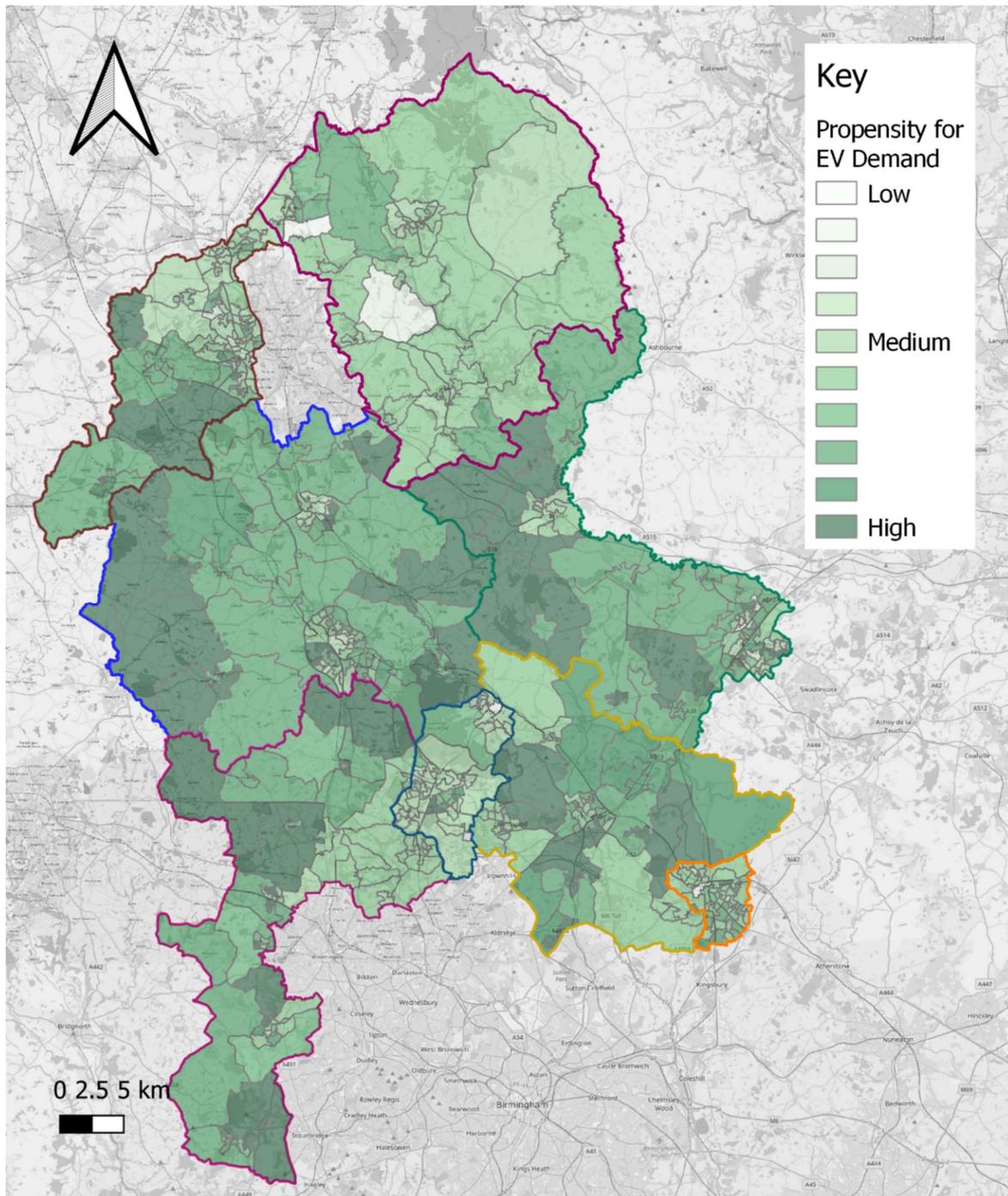


Figure 5: Staffordshire EV charging propensity

## Suggested EV charging locations

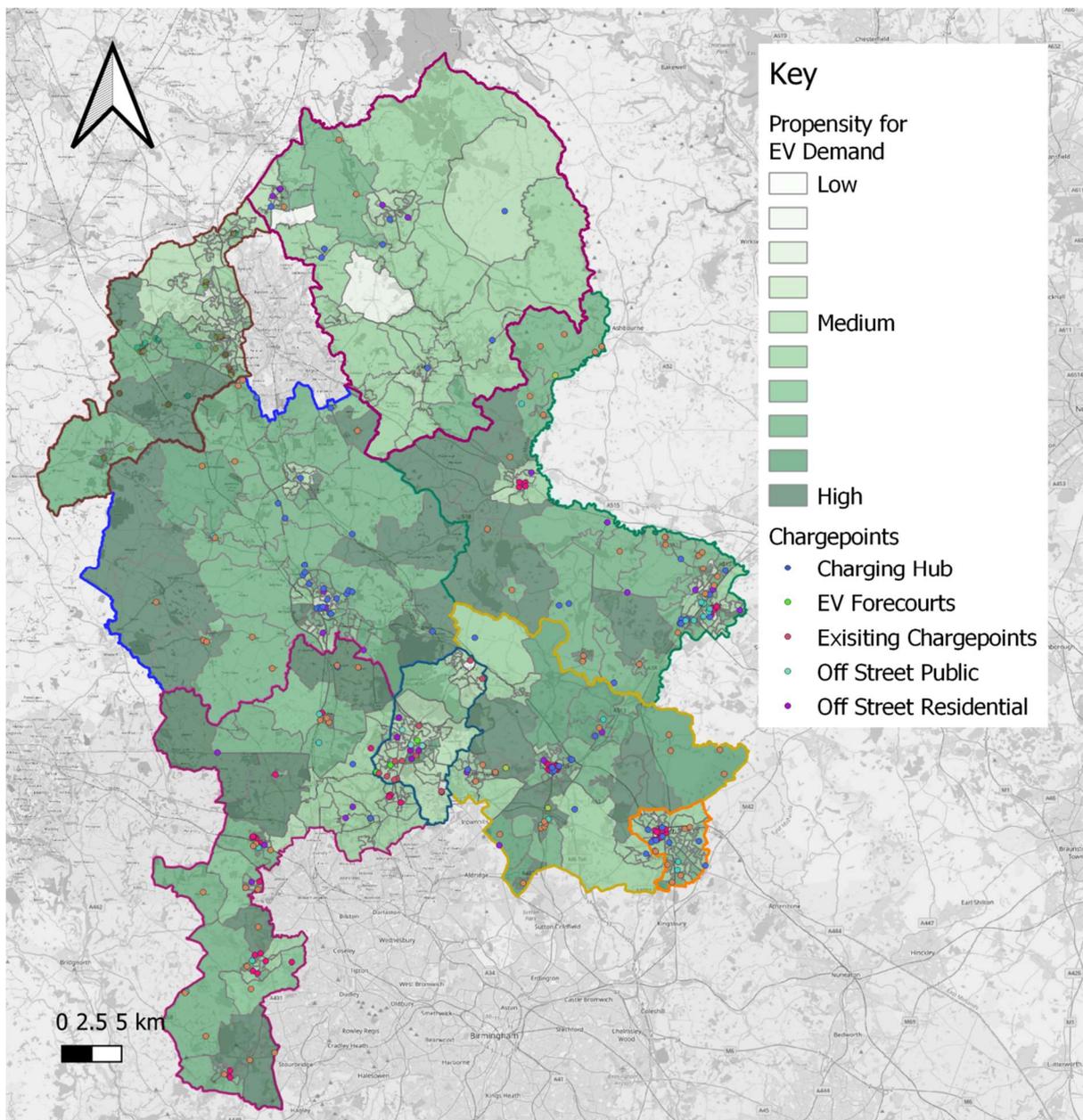


Figure 6: Staffordshire EV charging locations

### Chargepoint Definitions:

- EV Charging Hub - Suggested multiple fast, rapid, or ultra-rapid at specifically designed locations
- EV Forecourt – Existing fuel stations (highly likely to be converted to EV over the coming years)
- Off-street public – Suggested chargepoints at car parks
- Off-street residential – Suggested key council support areas for private chargepoints being installed at residences

For suggested chargepoints of off-street residential, EV charging hubs, and off-street residential the suggestions are locations within a 1km area

### 5.3. Demand Analysis – the District and Boroughs

#### Cannock Chase Propensity and Points of Interest

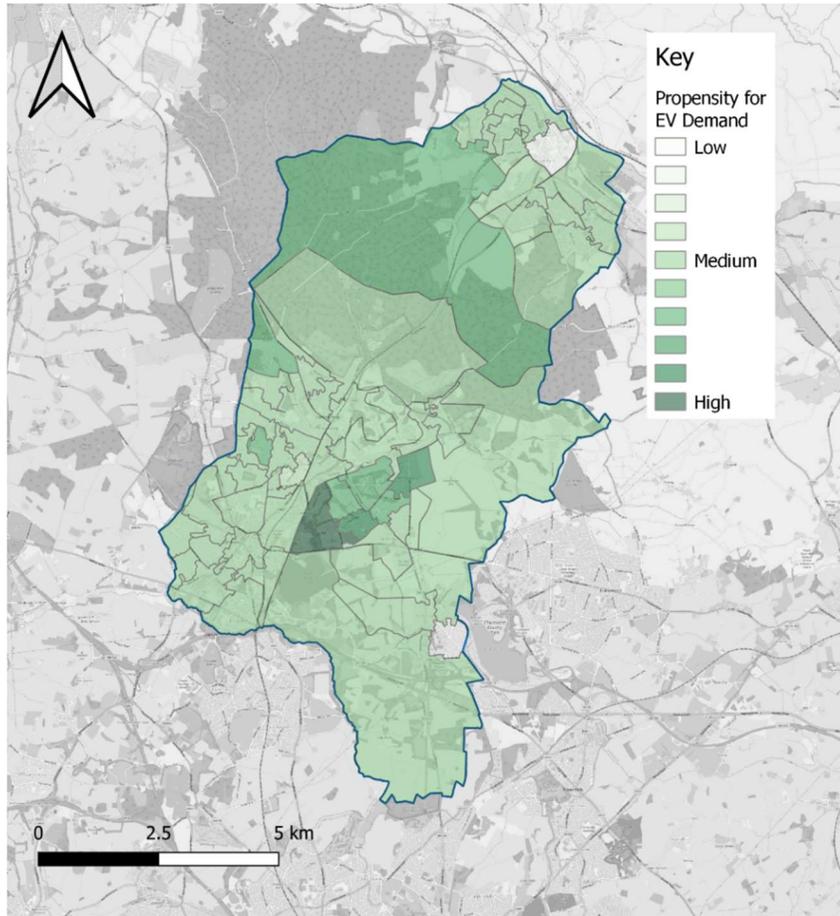


Figure 7: Cannock Chase Propensity

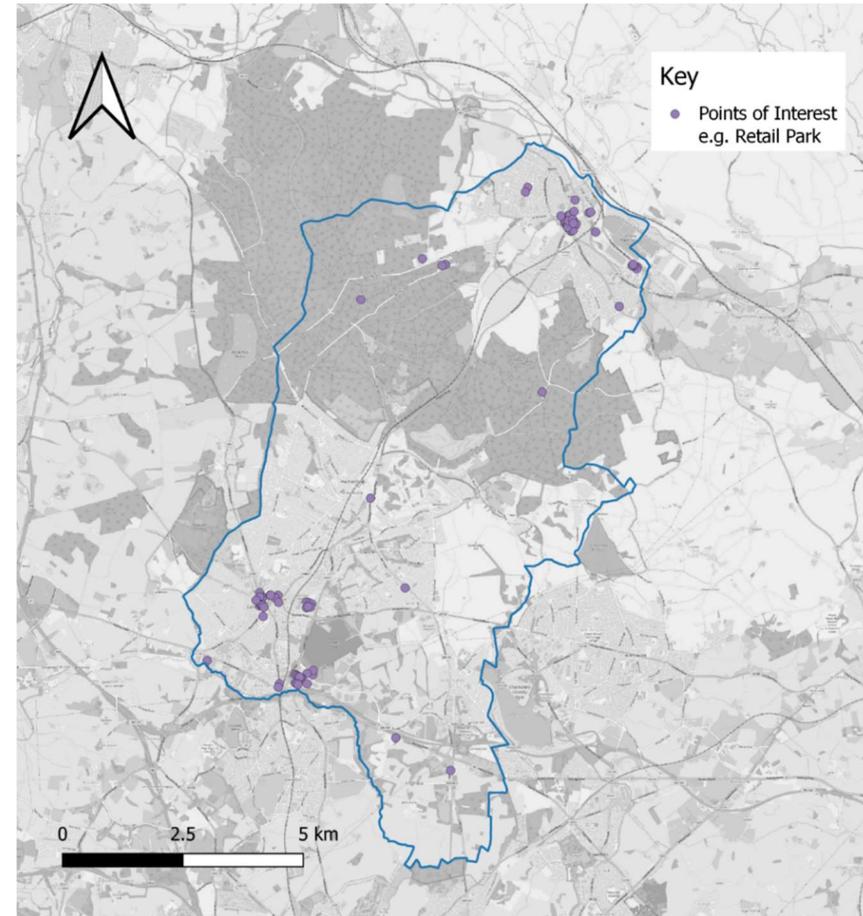
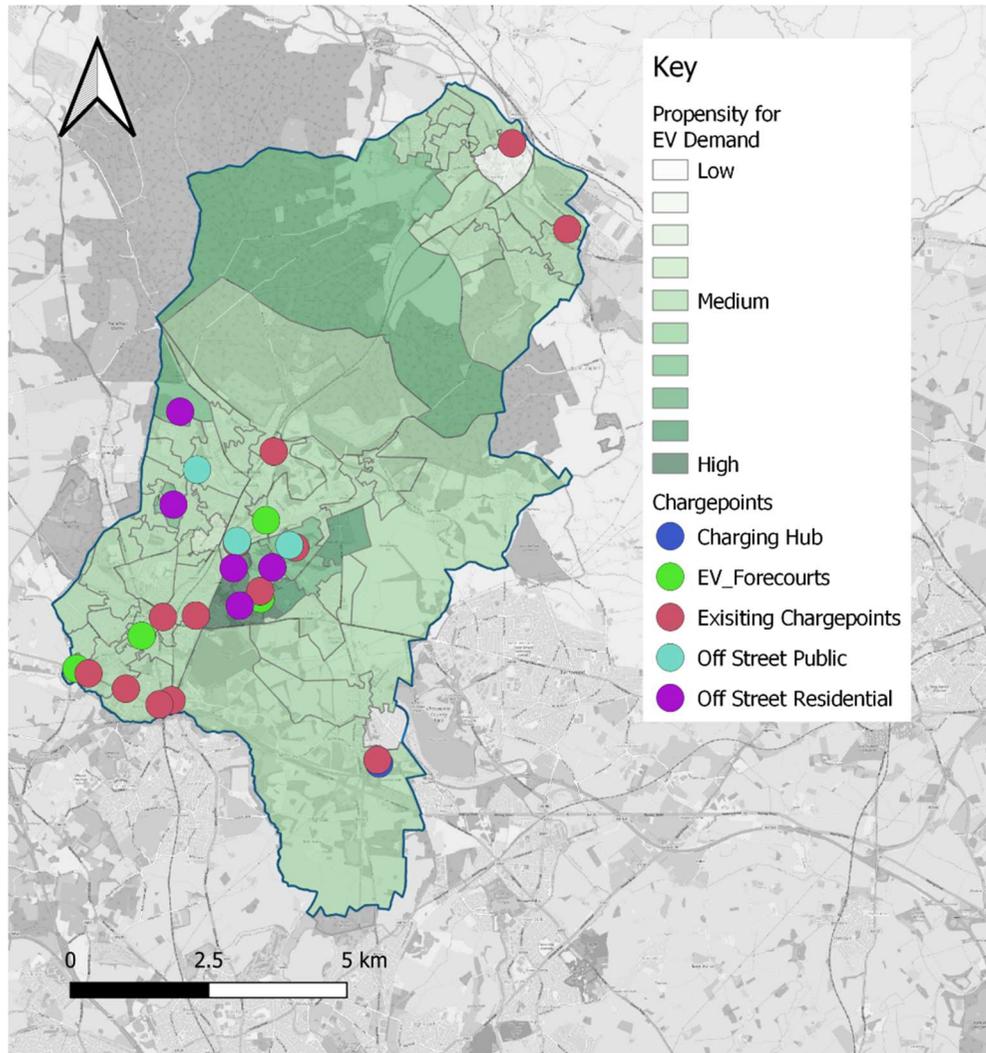


Figure 8: Cannock Chase Points of Interest

**Cannock Chase – Proposed Locations**



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EV Charging Hub	EV Forecourt	Off-street public	Off-street residential
Suggested multiple fast, rapid, or ultra-rapid at specifically designed locations	Existing fuel stations (highly likely to be converted to EV over the coming years)	Suggested chargepoints at car parks	Main areas where private chargepoints should be encouraged at residences (e.g. on driveways)
<b>Action:</b> Investigate private operators to build and run an EV charging location / hub	<b>Action:</b> Engage with fuel stations to confirm their plans; avoid coordinating EV charging in close proximity	<b>Action:</b> Engage with the district council to ensure ownership and facilitate EV charging installation	<b>Action:</b> The district council should engage residents and support where possible
For suggested chargepoints: EV charging hubs, off-street public and off-street residential the suggestions are locations within a 1km area.			

Figure 9: Cannock Chase - Proposed locations

East Staffordshire Propensity and Points of Interest

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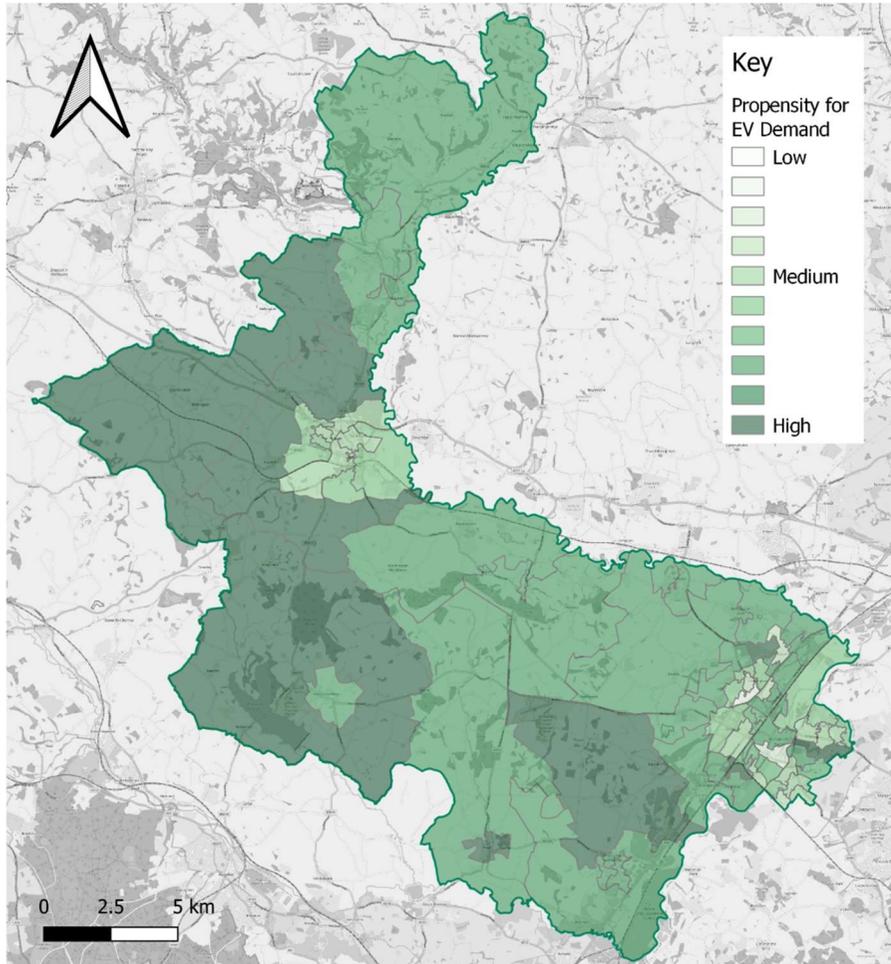


Figure 10: East Staffordshire propensity

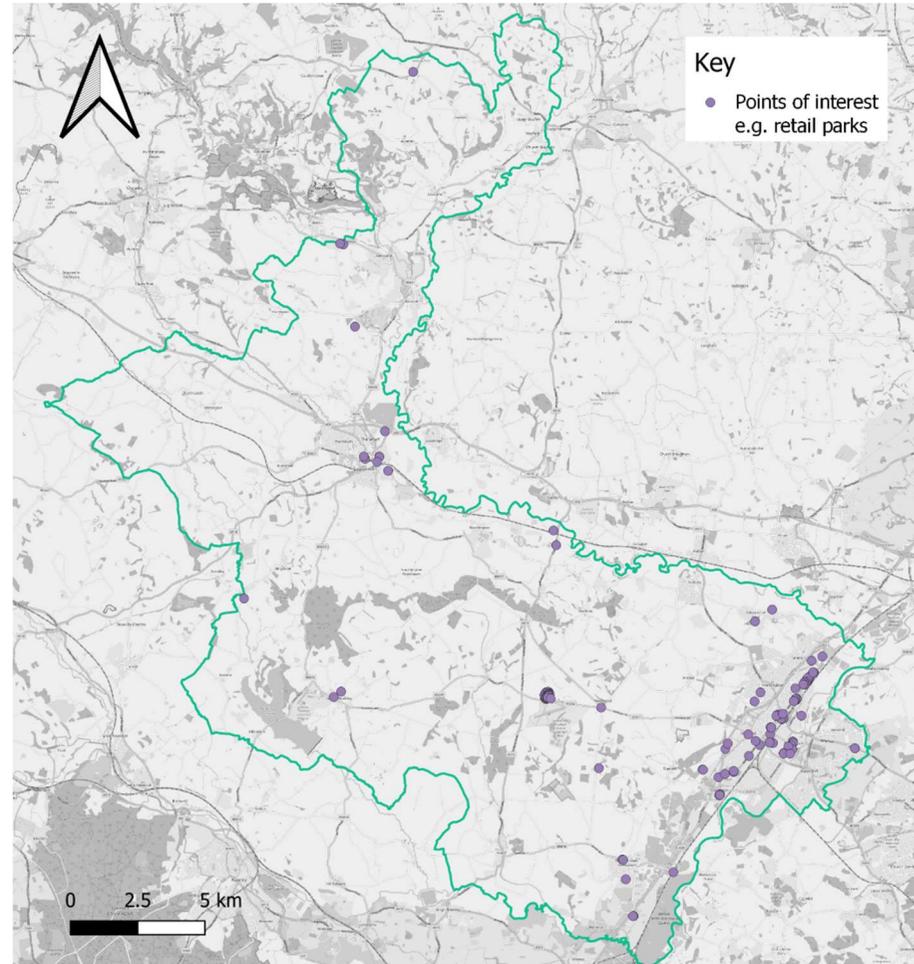


Figure 11: East Staffordshire Points of Interest

### East Staffordshire – Proposed Locations

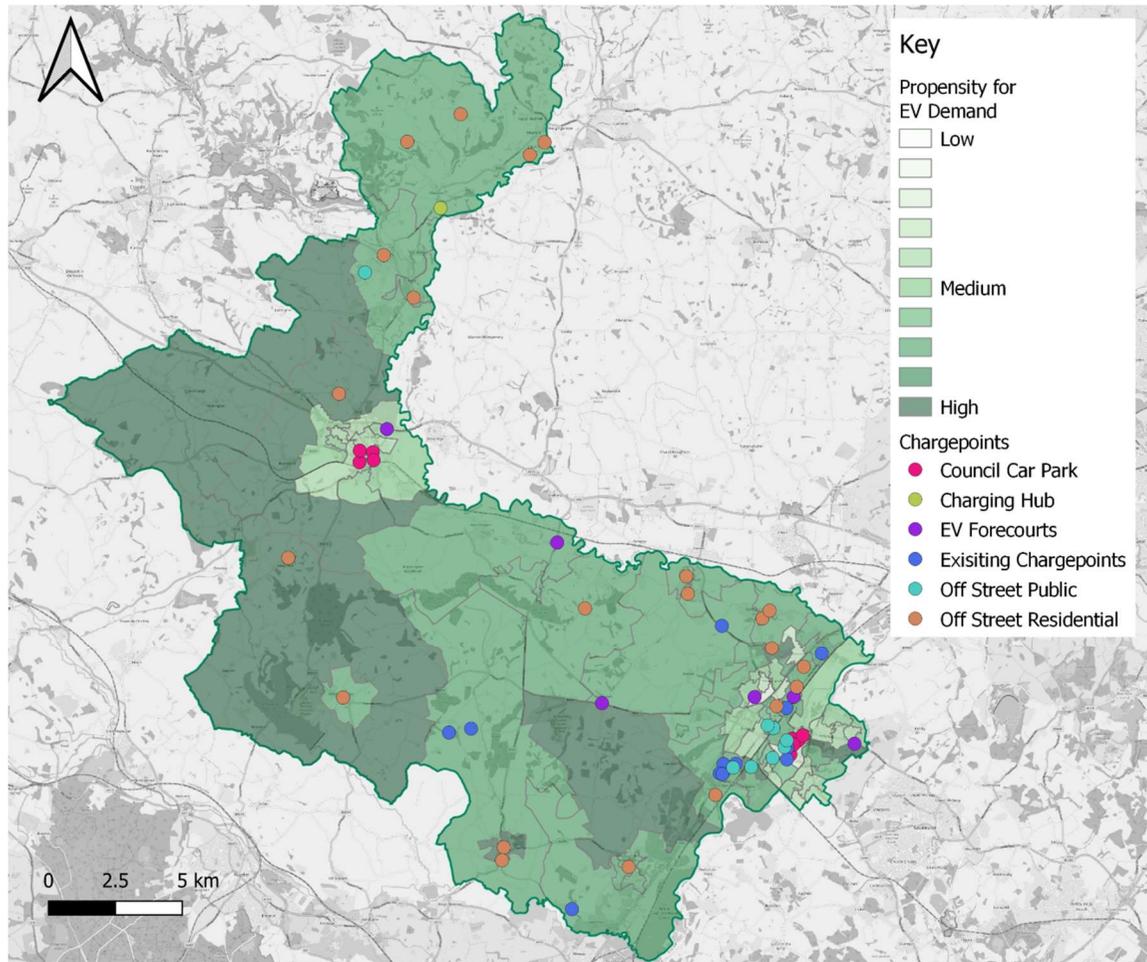


Figure 12: East Staffordshire Proposed locations

EV Charging Hub	EV Forecourt	Off-street public	Off-street residential
Suggested multiple fast, rapid, or ultra-rapid at specifically designed locations	Existing fuel stations (highly likely to be converted to EV over the coming years)	Suggested chargepoints at car parks	Main areas where private chargepoints should be encouraged at residences (e.g. on driveways)
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<b>Council Car Park</b> - Action: Engage with the borough council to ensure ownership and provide support to facilitate EV charging installation.			
For suggested chargepoints: EV charging hubs, off-street public and off-street residential the suggestions are locations within a 1km area.			

**Lichfield Propensity and Points of Interest**

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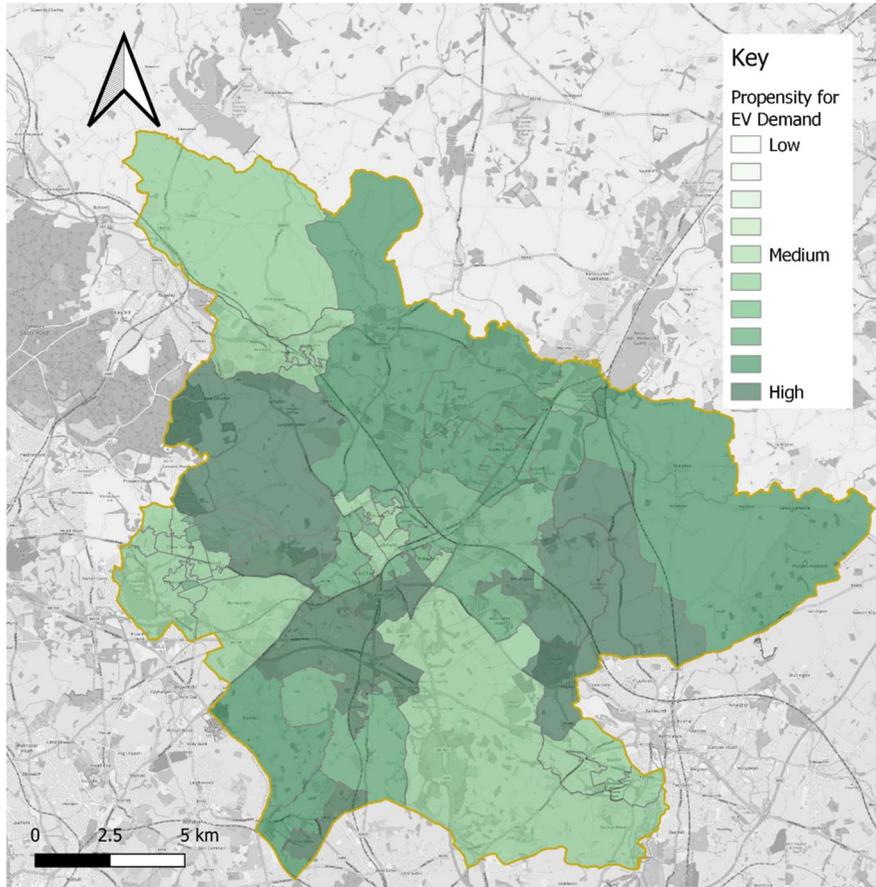


Figure 13: Lichfield Propensity

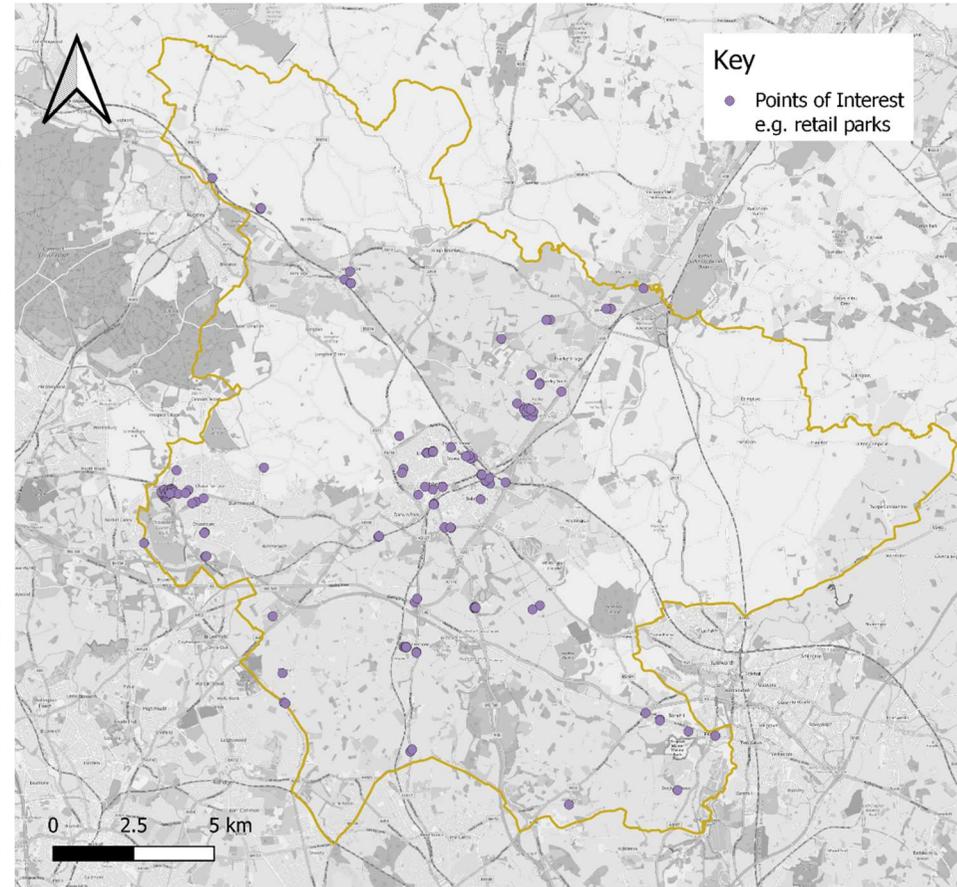


Figure 14: Lichfield Points of Interest

Lichfield – Proposed Locations

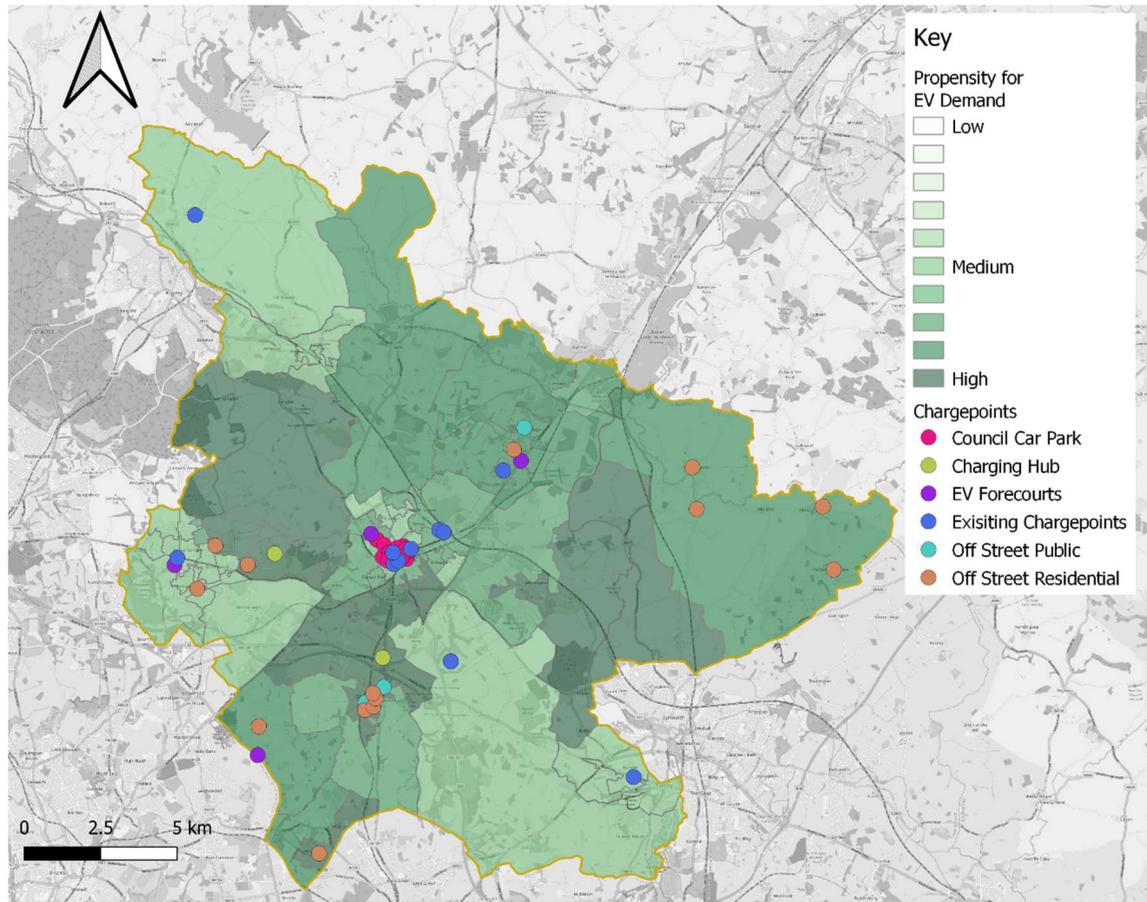


Figure 15: Lichfield - Proposed locations

EV Charging Hub	EV Forecourt	Off-street public	Off-street residential
Suggested multiple fast, rapid, or ultra-rapid at specifically designed locations	Existing fuel stations (highly likely to be converted to EV over the coming years)	Suggested chargepoints at car parks	Main areas where private chargepoints should be encouraged at residences (e.g. on driveways)
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For suggested chargepoints: EV charging hubs, off-street public and off-street residential the suggestions are locations within a 1km area.			

Newcastle under Lyme Propensity and Points of Interest

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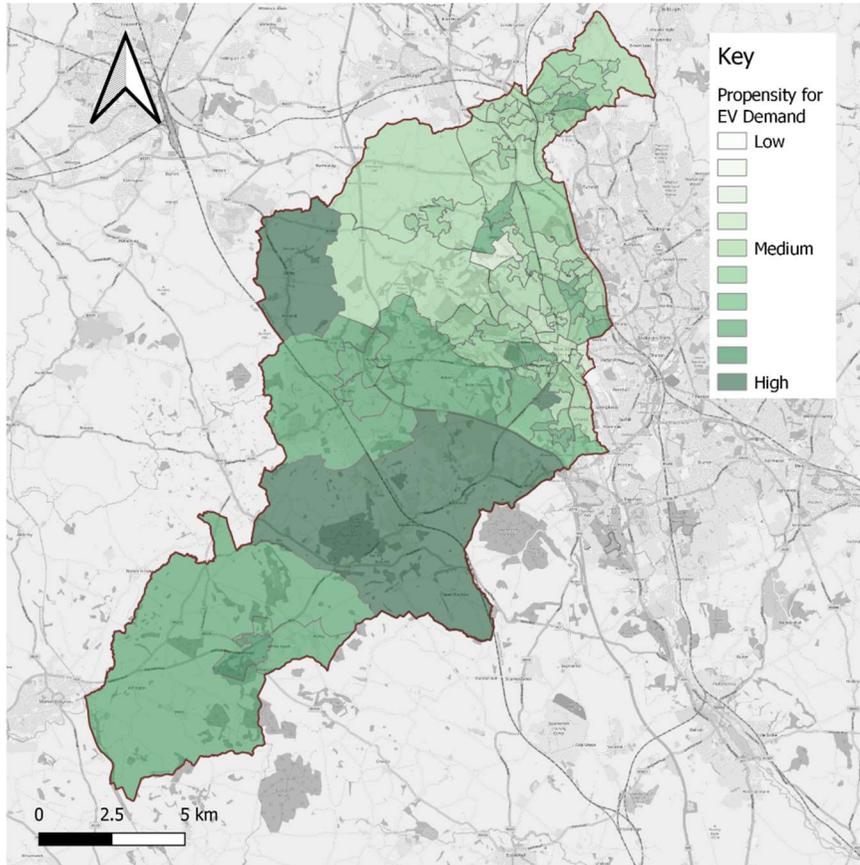


Figure 16: Newcastle under Lyme Propensity

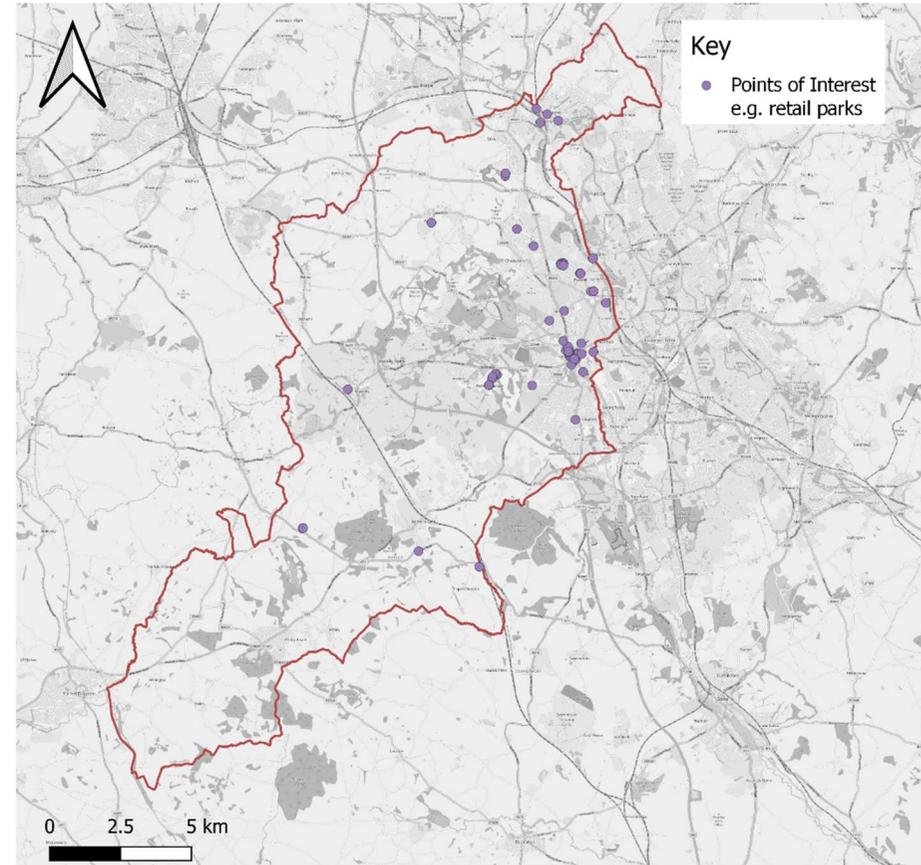
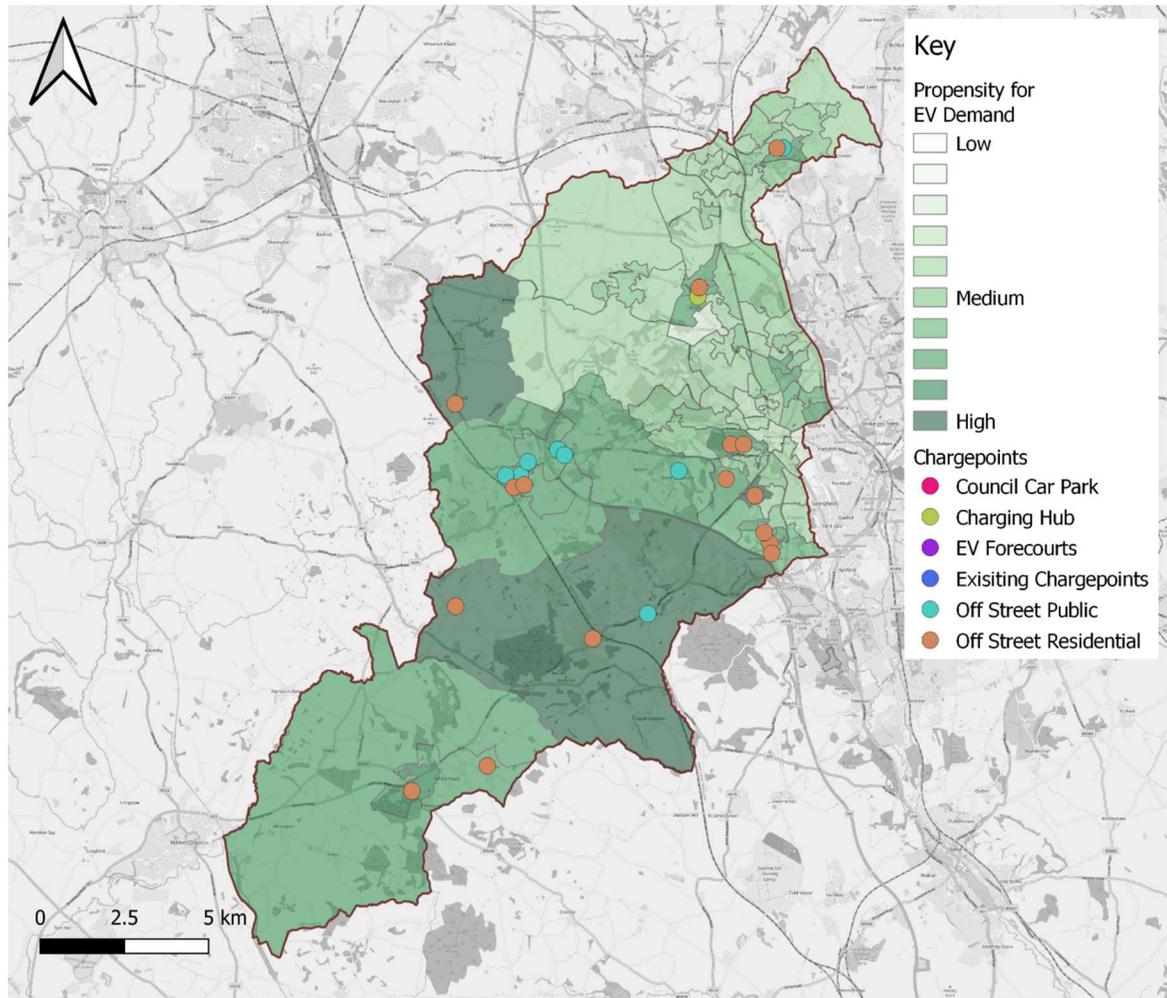


Figure 17: Newcastle under Lyme Points of Interest

### Newcastle under Lyme – Proposed Locations



EV Charging Hub	EV Forecourt	Off-street public	Off-street residential
Suggested multiple fast, rapid, or ultra-rapid at specifically designed locations	Existing fuel stations (highly likely to be converted to EV over the coming years)	Suggested chargepoints at car parks	Main areas where private chargepoints should be encouraged at residences (e.g. on driveways)
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<b>Council Car Park</b> - Action: Engage with the borough council to ensure ownership and provide support to facilitate EV charging installation.			
For suggested chargepoints: EV charging hubs, off-street public and off-street residential the suggestions are locations within a 1km area.			

Figure 18: Newcastle under Lyme Proposed locations

### South Staffordshire Propensity and Points of Interest

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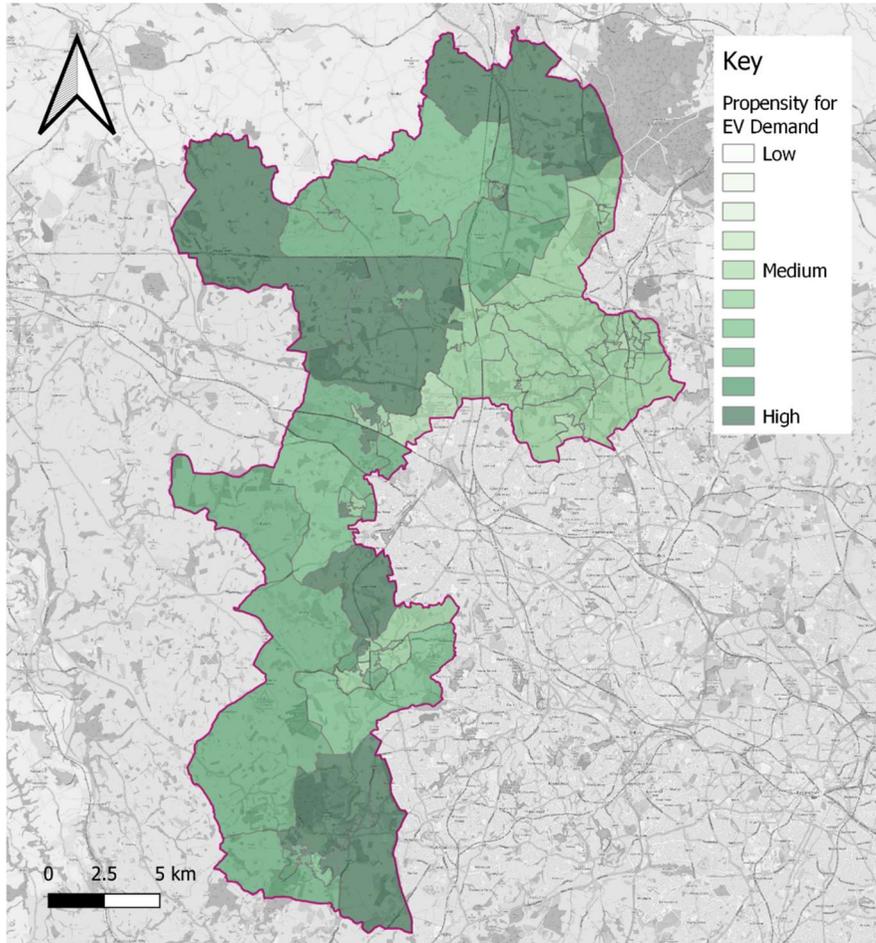


Figure 19: South Staffordshire Propensity

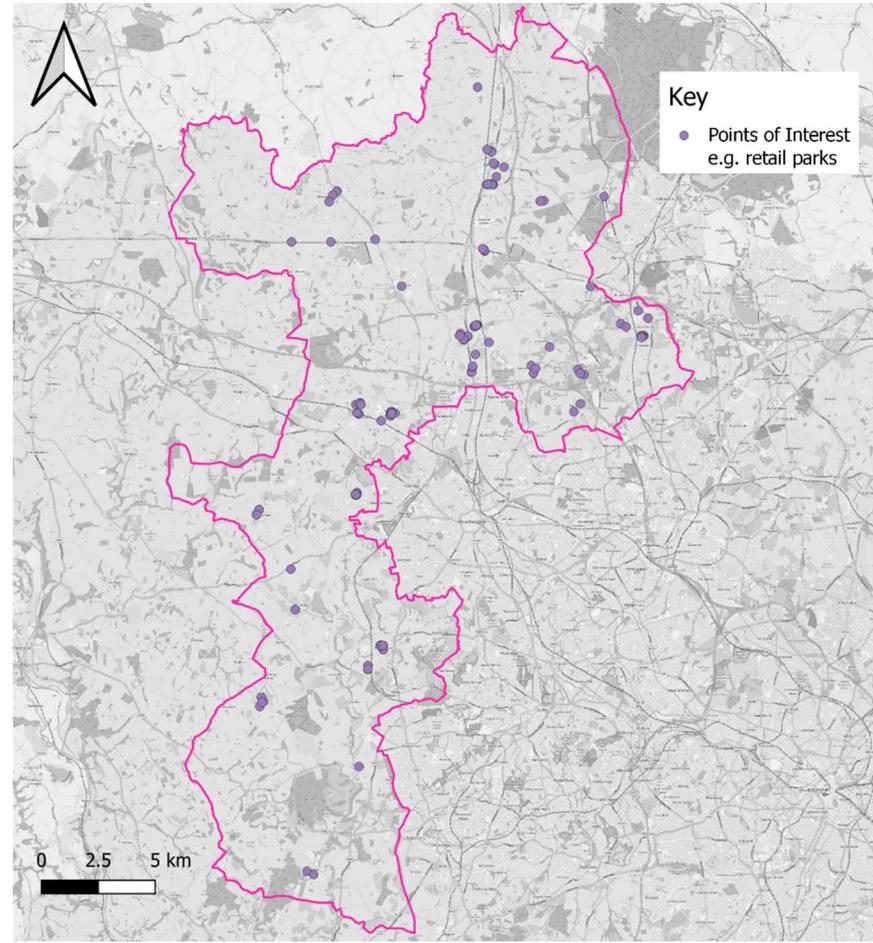


Figure 20: South Staffordshire Points of Interest

South Staffordshire – Proposed Locations

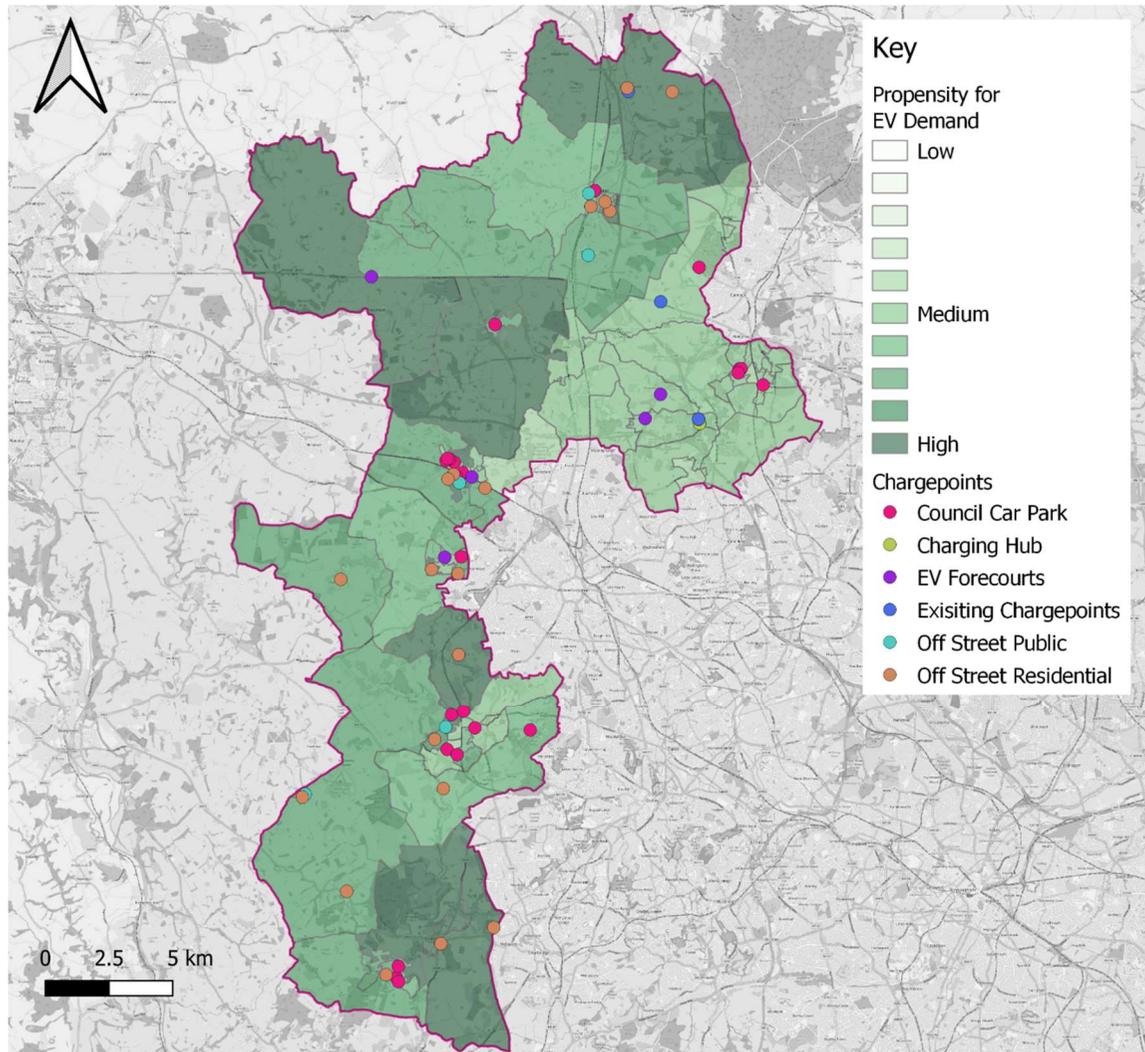


Figure 21: South Staffordshire Proposed locations

EV Charging Hub	EV Forecourt	Off-street public	Off-street residential
Suggested multiple fast, rapid, or ultra-rapid at specifically designed locations	Existing fuel stations (highly likely to be converted to EV over the coming years)	Suggested chargepoints at car parks	Main areas where private chargepoints should be encouraged at residences (e.g. on driveways)
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<b>Council Car Park</b> - Action: Engage with the district council to ensure ownership and provide support to facilitate EV charging installation.			
For suggested chargepoints: EV charging hubs, off-street public and off-street residential the suggestions are locations within a 1km area.			

### Stafford Propensity and Points of Interest

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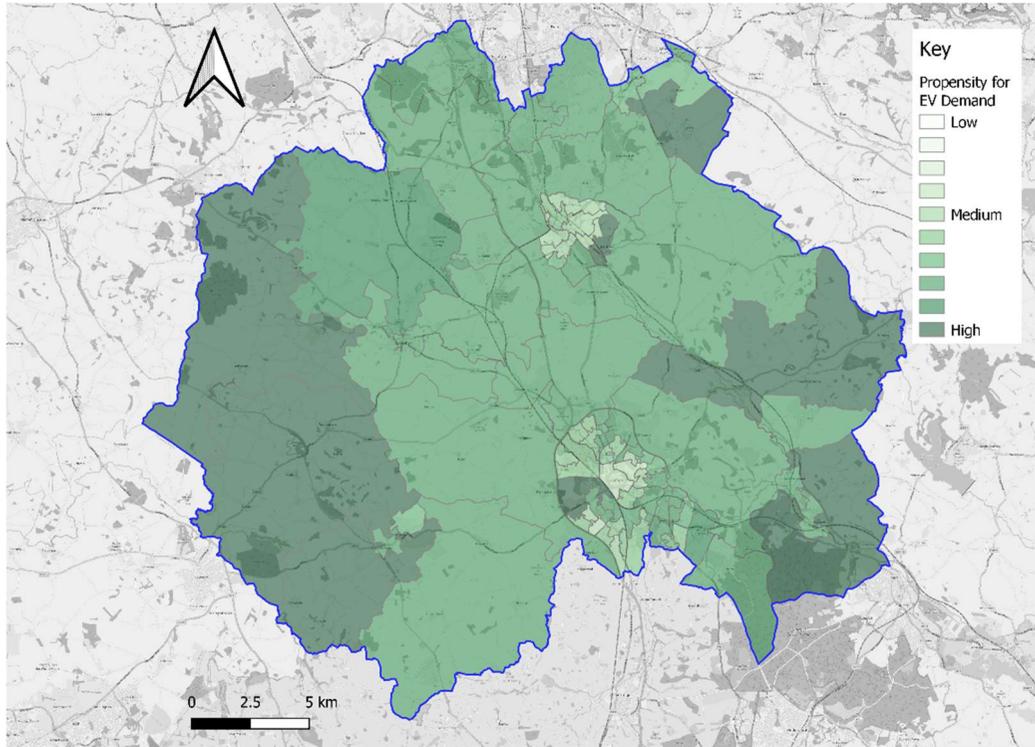


Figure 22: Stafford Propensity



Figure 23: Stafford Points of Interest

**Stafford – Proposed Locations**

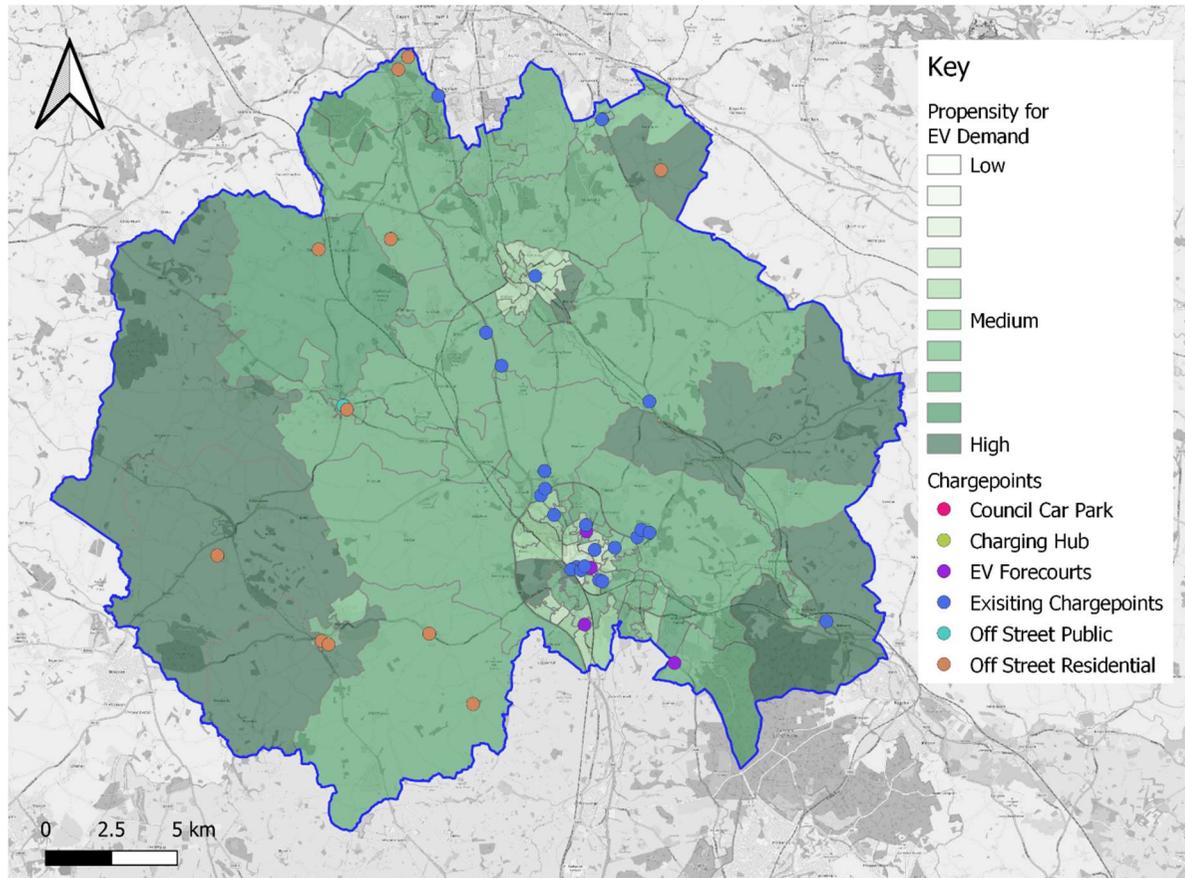


Figure 24: Stafford Proposed locations

EV Charging Hub	EV Forecourt	Off-street public	Off-street residential
Suggested multiple fast, rapid, or ultra-rapid at specifically designed locations	Existing fuel stations (highly likely to be converted to EV over the coming years)	Suggested chargepoints at car parks	Main areas where private chargepoints should be encouraged at residences (e.g. on driveways)
<b>Action:</b> Investigate private operators to build and run an EV charging location / hub	<b>Action:</b> Engage with fuel stations to confirm their plans; avoid coordinating EV charging in close proximity	<b>Action:</b> Engage with the borough council to ensure ownership and facilitate EV charging installation	<b>Action:</b> the borough council should engage residents and support where possible
<b>Council Car Park</b> - Action: Engage with the borough council to ensure ownership and provide support to facilitate EV charging installation.			
For suggested chargepoints: EV charging hubs, off-street public and off-street residential the suggestions are locations within a 1km area.			

**Staffordshire Moorlands Propensity and Points of Interest**

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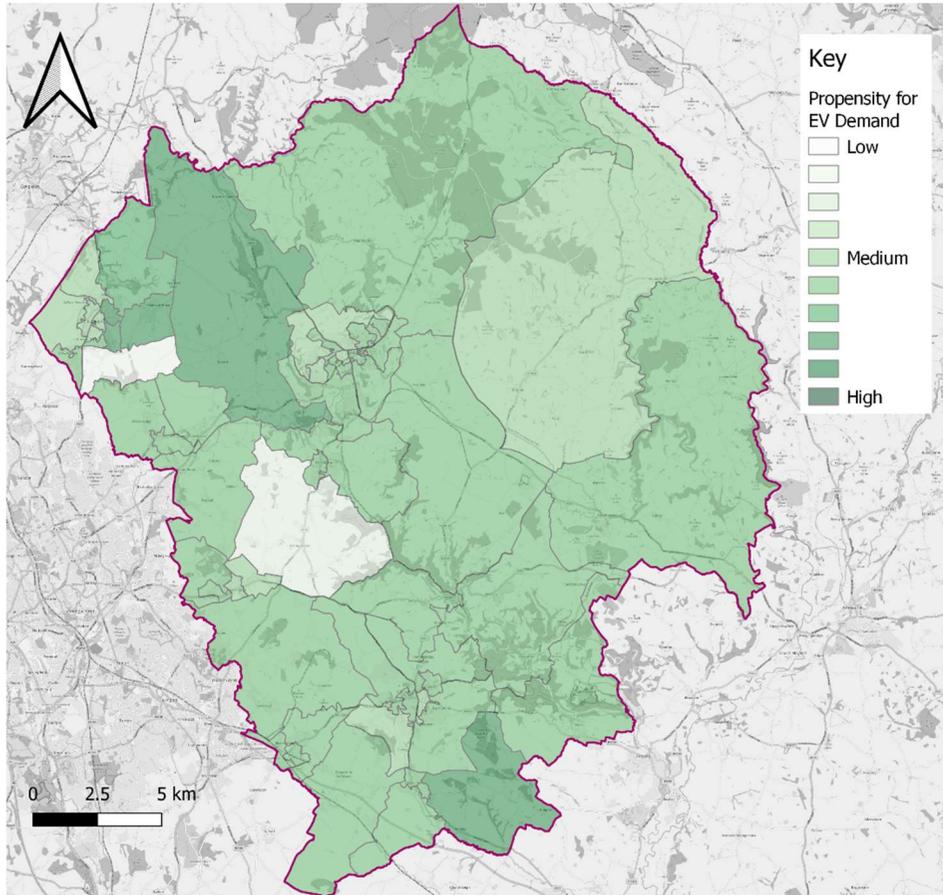


Figure 25: Staffordshire Moorlands Propensity

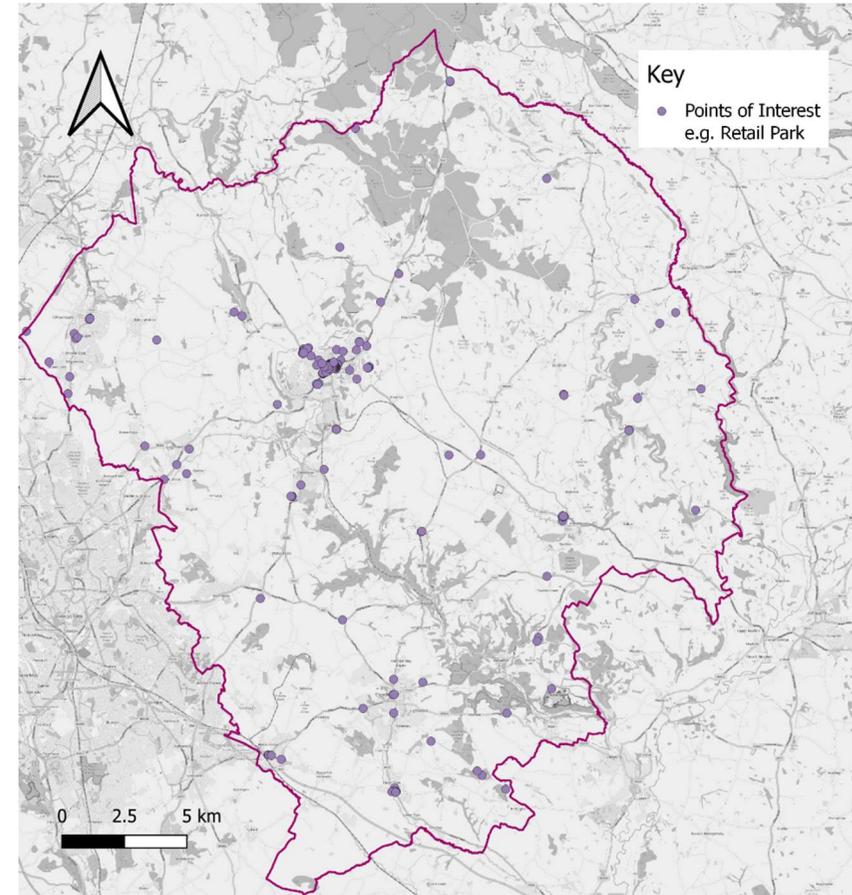
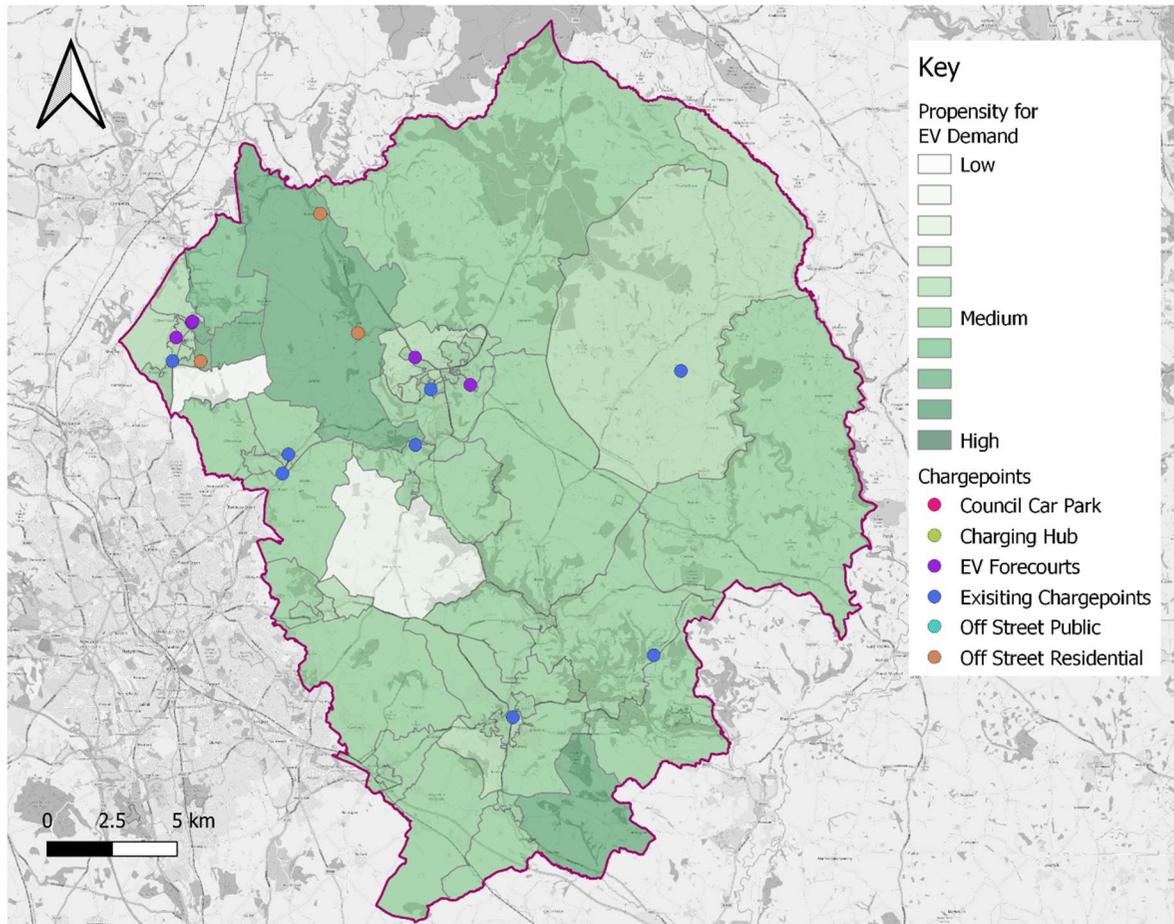


Figure 26: Staffordshire Moorlands Points of Interest

Staffordshire Moorlands – Proposed Locations



EV Charging Hub	EV Forecourt	Off-street public	Off-street residential
Suggested multiple fast, rapid, or ultra-rapid at specifically designed locations	Existing fuel stations (highly likely to be converted to EV over the coming years)	Suggested chargepoints at car parks	Main areas where private chargepoints should be encouraged at residences (e.g. on driveways)
<b>Action:</b> Investigate private operators to build and run an EV charging location / hub	<b>Action:</b> Engage with fuel stations to confirm their plans; avoid coordinating EV charging in close proximity	<b>Action:</b> Engage with the district council to ensure ownership and facilitate EV charging infrastructure	<b>Action:</b> The district council should engage residents and support where possible
<b>Council Car Park</b> - Action: Engage with the district council to ensure ownership and provide support to facilitate EV charging installation.			
For suggested chargepoints: EV charging hubs, off-street public and off-street residential the suggestions are locations within a 1km area.			

Figure 27: Staffordshire Moorlands – Proposed Locations

**Tamworth Propensity and Points of Interest**

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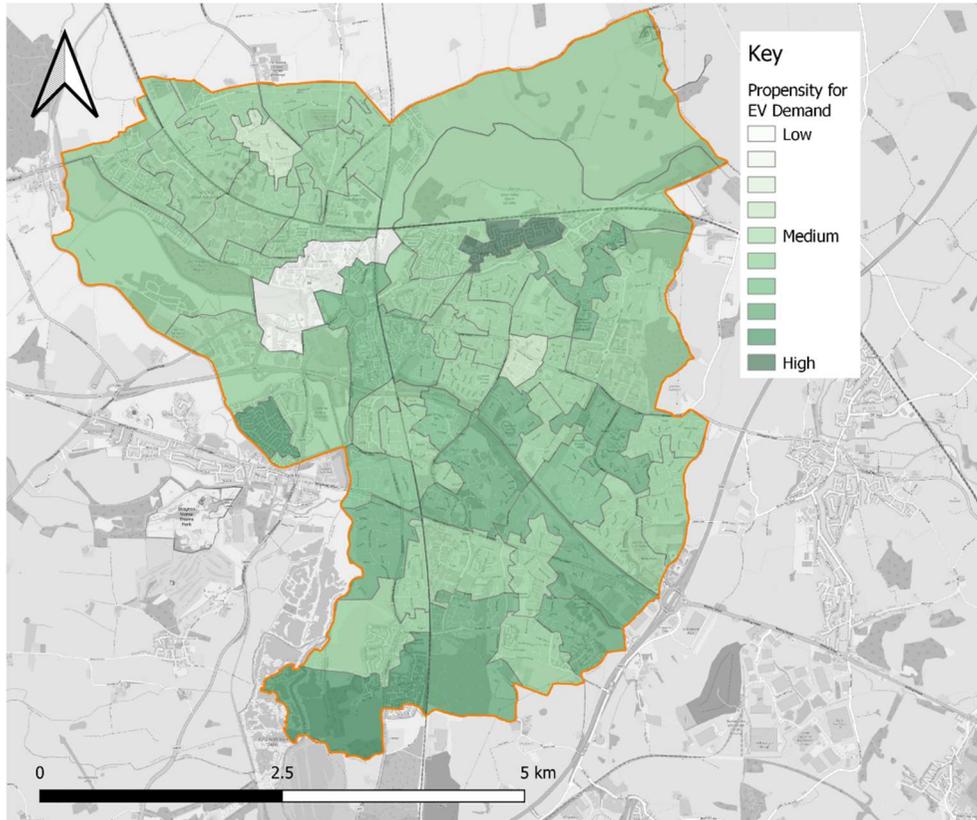


Figure 28: Tamworth Propensity

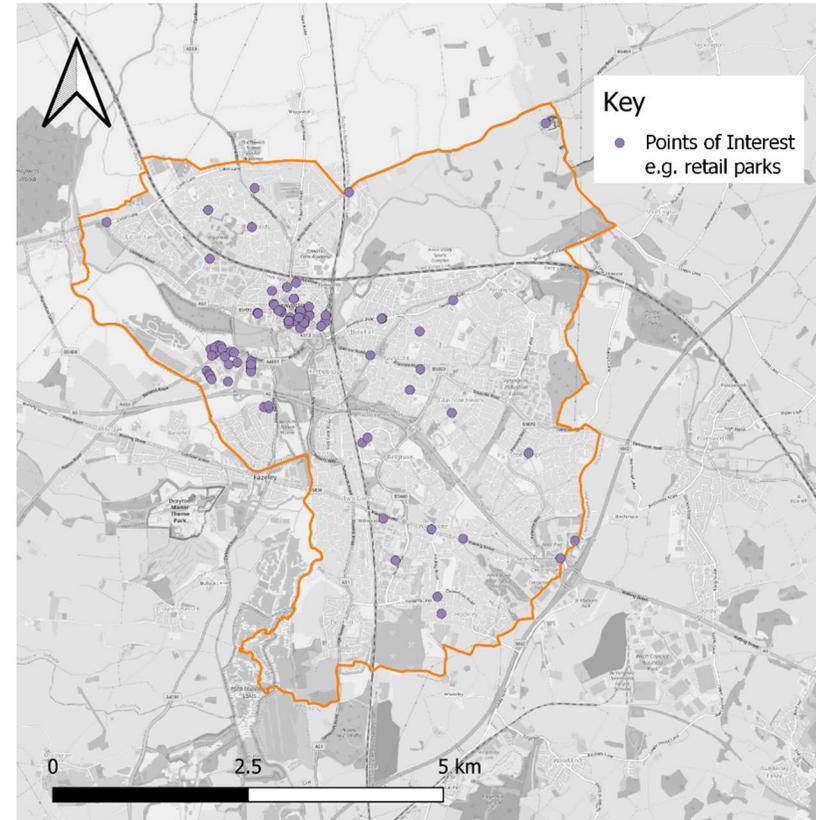


Figure 29: Tamworth Points of Interest

Tamworth – Proposed Locations

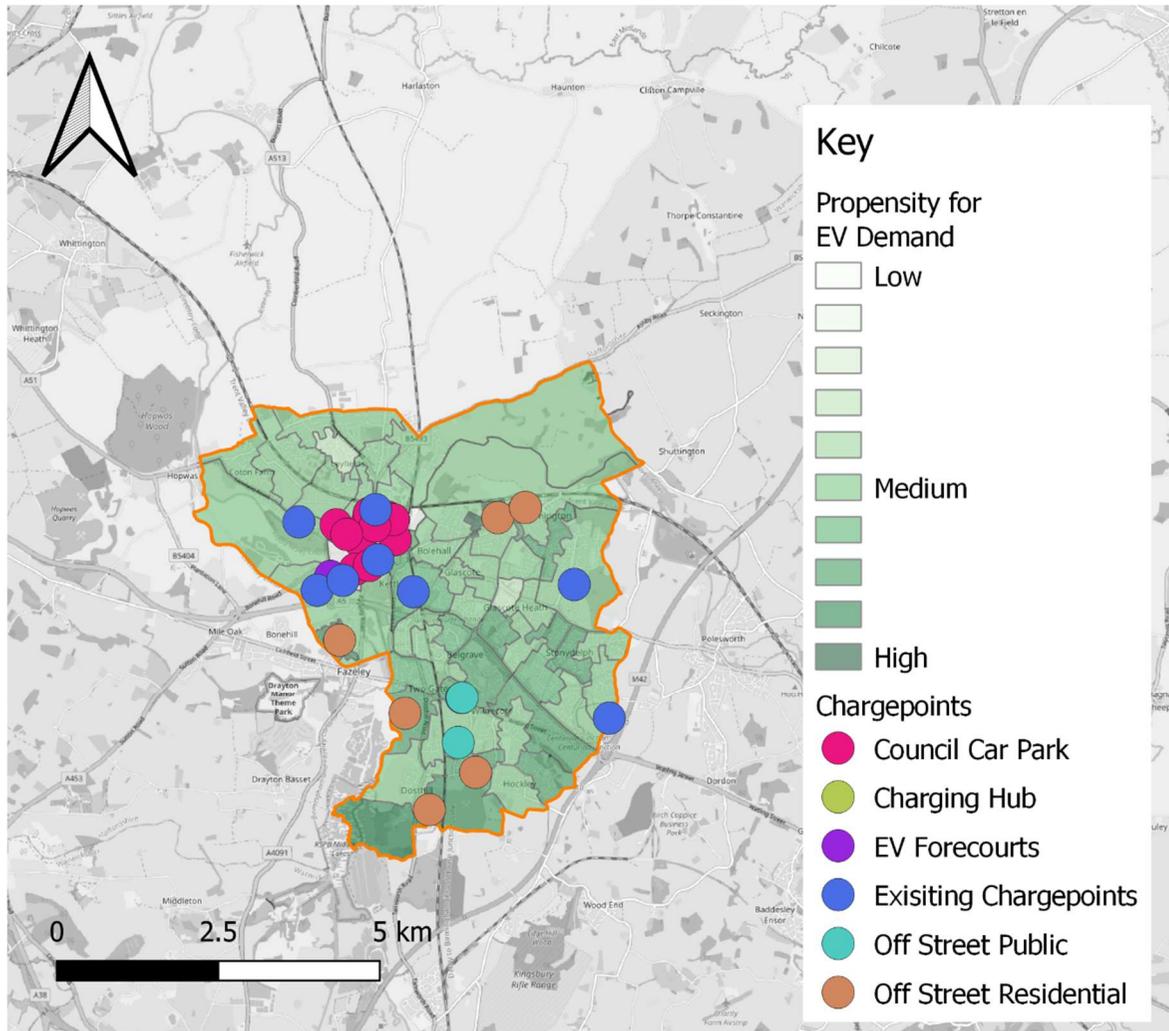


Figure 30: Tamworth - proposed locations

EV Charging Hub	EV Forecourt	Off-street public	Off-street residential
Suggested multiple fast, rapid, or ultra-rapid at specifically designed locations	Existing fuel stations (highly likely to be converted to EV over the coming years)	Suggested chargepoints at car parks	Main areas where private chargepoints should be encouraged at residences (e.g. on driveways)
<b>Action:</b> Investigate private operators to build and run an EV charging location / hub	<b>Action:</b> Engage with fuel stations to confirm their plans; avoid coordinating EV charging in close proximity	<b>Action:</b> Engage with the borough council to ensure ownership and facilitate EV charging installation	<b>Action:</b> The borough council should engage residents and support where possible
<b>Council Car Park</b> - Action: Engage with the borough council to ensure ownership and provide support to facilitate EV charging installation.			
For suggested chargepoints: EV charging hubs, off-street public and off-street residential the suggestions are locations within a 1km area.			

## 5.4. Demand Analysis – Mosaic

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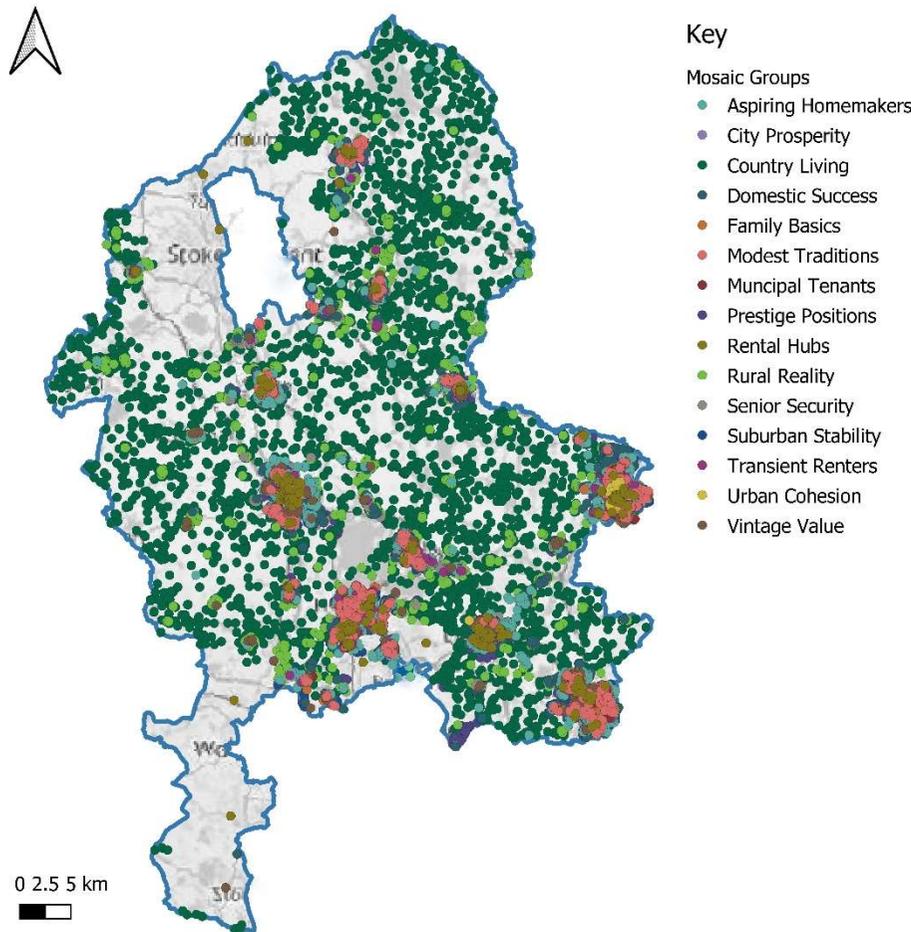


Figure 31: Staffordshire Mosaic data

Mosaic is a geodemographic profiling tool which classifies residential postcodes into one of 15 Groups and 66 Types. It is based on data from Experian, Census (2011), Electoral Roll, Council Tax valuations, house sale prices, self-reported lifestyle surveys, OFCOM data and other consumer information.

All these datasets are aggregated to provide composite personas of the types of adults living in an area and an accurate understanding of the lifestyles and behaviours of households, this enhances the demographic data by helping to understand the likely behaviours of residents.

This information is better viewed and understood through the use of interactive GIS systems along with a full understanding of the category meanings; these maps are included as they help to illustrate the methodologies that can be employed.

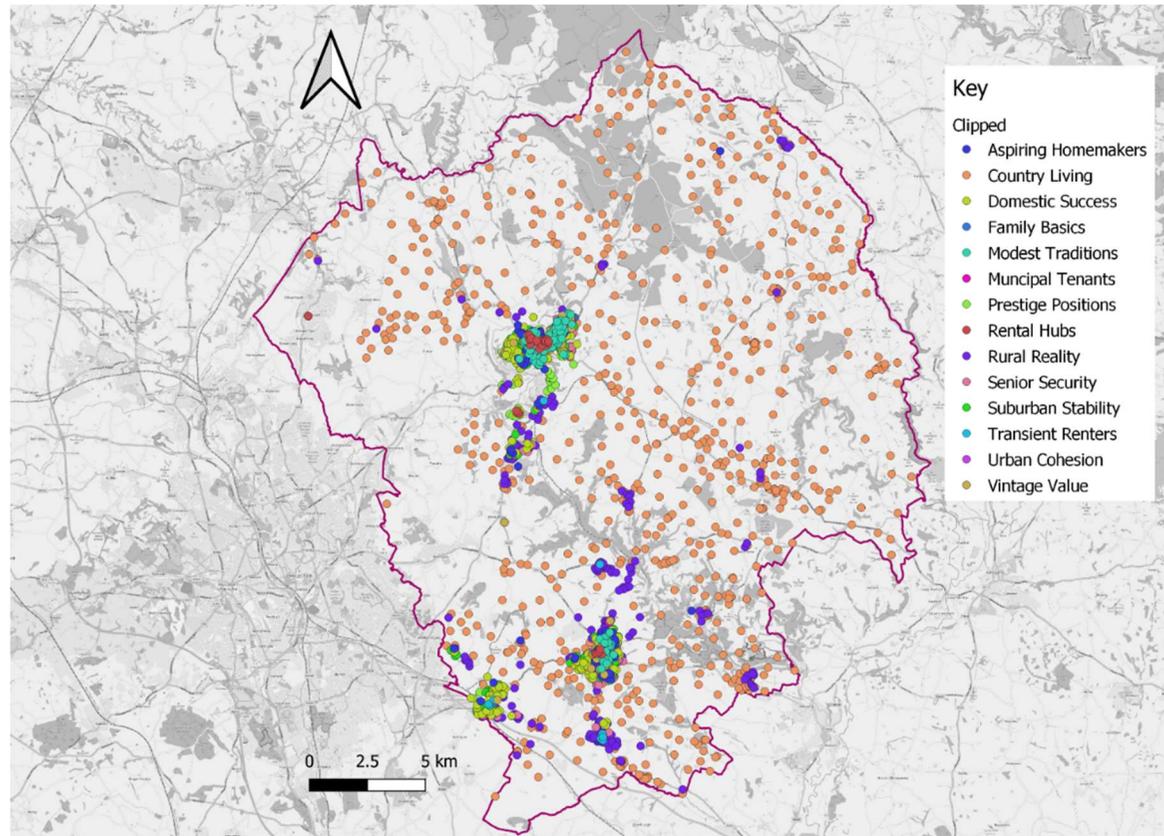


Figure 32: Example of Mosaic data applied to Staffordshire Moorland

Mosaic data and its' interpretation is an example of a deeper level of demand analysis that could be completed by the individual district and borough councils to identify more specific locations and to target campaigns.

## 5.5. Staffordshire County – Further analysis

From combining all of the datasets – largely represented by the maps above, each of the 'chargepoint services' have specific requirements and meet specific needs within the charging network. The table below outlines each of the primary charging solutions.

Chargepoint service	Typical chargepoint type	Location type	Demand met
<b>EV charging hub</b>	Rapid charging	4 or more chargers in the same location often with the opportunity to add other modes of transport or at transport hubs such as train stations	Depending on scale can support a community uptake in EVs or target high volume traffic routes such as the Strategic Road Network, to support longer EV journeys to or through the area
<b>EV forecourt</b>	Rapid charging	Existing petrol stations	Support the switch to EV while there is still a need for petrol vehicles. Often there are partnerships between oil companies and chargepoint operators for example BP now also provides and operates chargepoints
<b>Residential off-street charging</b>	Slow charging	Private residents with off-street parking	Support private car owners to switch to EV
<b>Off-street charging</b>	Fast / rapid charging	Charging in car parks both private and Council owned	Support destination charging
<b>On-street charging</b>	Fast / rapid charging	Residential areas where there is no or limited access to private driveways	Support private car owners switch to EV

Table 1: Charging Solutions for district and borough councils in Staffordshire

The available charging solutions are then analysed as a combined network across the county to ensure charging demand can be met. While the focus of this strategy is EV charging infrastructure, the entire transport network of Staffordshire is considered as it is important that EV charging infrastructure is part of the overall solution.

Consideration should also be made of how chargepoint locations could also link to public transport solutions such as the installation of chargepoints at stations, and how EV charging could support other agendas such as active travel.

## 5.6. Findings

The key findings from the demand analysis outline that there are opportunities to grow the use of EV in Staffordshire and this should be supported by assisting district and borough councils to develop a consistent charging network for the county. The ambition to achieve net zero by 2050 alongside the decarbonisation objectives will be supported by growing the use of EVs. In addition to the decarbonisation objectives, wider transport objectives were considered such as ensuring accessibility options when installing chargepoints and active travel.

All the provided maps help illustrate the location of current charging solutions and the potential areas to assist and coordinate EV charging solutions for the public. Locations are identified by markers, but it is important to note that the markers do not denote specific locations but approximate areas.

Significant insight into the challenges and potential of the county was seen through the analysis. Over 50% of households within Staffordshire have one or two cars and with 'commute by car' being the most

common transport mode. There is a demonstrable need for endorsing the switch to EV or other modes of transport where possible.

The suggested networks include a large proportion of off-street charging infrastructure solutions, both residential and based in public car parks. Analysing the current likely areas for EV ownership, it has been suggested that a large proportion of these could be best served through off-street residential solutions. Where off-street residential charging wasn't a suitable solution but there was high propensity for EV transition, EV hubs or off-street charging has been suggested. The number and capacity of car parks available also offers potential for planned growth of the charging network, through coordinating the installation of a small number of chargepoints to encourage growth and continuing to increase this as demand grows. To ensure futureproofing, reduce costs, and meet changes in policies - ducting and cabling for further chargepoints can be installed with the installation of the initial chargepoints. By also including larger scale EV charging hubs on key routes for those travelling through or to the county, drivers of EVs would have confidence that there would be chargepoints available. Those who may be residents on the outskirts of the county could even consider switching as the network grows.

The current level of EV ownership and charging infrastructure, depicts low EV ownership and the early stages of a sustainable and effective charging network. Overall, this indicates that the suggested network and its current capacity will need to be developed over a relatively short period of time and will need to be continually expanded by the time net zero ambition across Staffordshire are met around 2050. The analysis completed suggests that the focal points of the charging network be off-street residential and off-street charging, for example car parks. From there, EV hubs can be used to enhance the network. The assumption is that the private sector will drive the installation of chargepoints in EV forecourts.

Through the analysis, a suggested EV charging hierarchy has been developed. The hierarchy considers the propensity analysis, solution analysis and the specific solutions suited to the Council. The objective of the hierarchy is to enable SCC and district and borough councils to coordinate solutions best suited for Staffordshire. A review of On Street Charging has been provided in Appendix C.

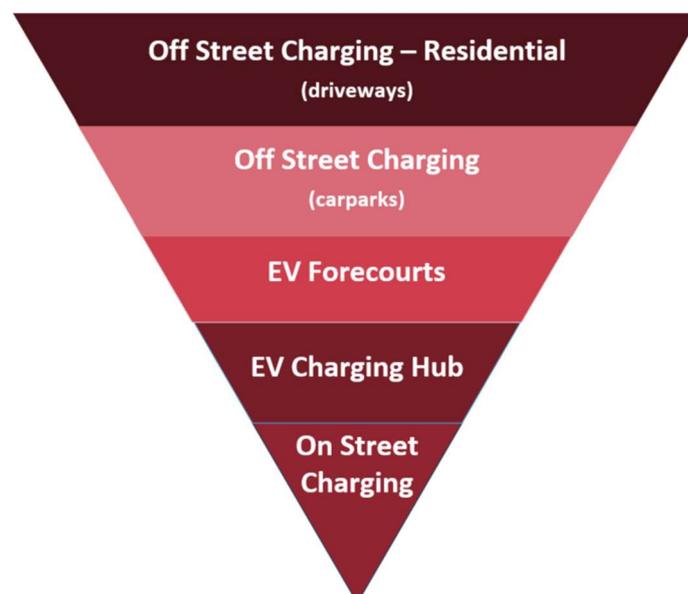


Figure 33: Hierarchy of Charging Options

SCC and district and borough councils should coordinate support and communications in the order displayed, though these priorities will change over the coming years as government initiatives are deployed, the market matures, and public demand patterns change over time. For local reasons the priorities may differ for each of the district and boroughs of Staffordshire.

## 6. Technology and Market Review

This section of the report forms a review of the existing and emerging EV charging technology, Appendix C contains a review of slow charging, on-street and lamppost charging and how these impact the choices and decisions made across the county.

### 6.1. Technology Overview

EV charging technology has primarily been driven by private companies focussed on developing and operating the charging infrastructure. With increased demand and market growth, there is increased benefit for these companies to explore faster and more innovative technology. There is a lack of standardised terminology from the speed of charging to the technological requirements to use a charger. For example, fast charging can refer to different kW across charging operators. This means a broad understanding of the underlying technology and requirements is essential for identifying suitable solutions. This has been achieved by establishing a baseline for charging infrastructure in modes, types and solutions.

In addition to the charging technology, consideration has also been given to developments in EV technology. Battery capacity continues to improve and become a key consideration in users purchasing choices. The battery capacity is a consideration in the development of charging infrastructure due how capacity impacts charge time. Furthermore, there are now around 100 EV models on the market. SCC understands that the number of models will continue to grow and will take this into account when facilitating the implementation of a charging network to ensure the widest compatibility.

Charging falls into two categories: Alternating Current (AC) and Direct Current (DC). AC provides alternating current to the vehicle and then technology within the vehicle converts it to DC for charging. Whereas a DC chargepoint converts an alternating current to a direct current within the chargepoint before providing it to the vehicle. While not always the case, DC chargepoints tend to be faster charging, use higher power, and therefore do not fit every solution, and are not compatible with all vehicles.

In addition to the categories of AC and DC charging, there is also tethered and untethered charging. Tethered charging is when the chargepoint has the cable hard-wired to it. Tethered charging is usually found at chargepoints installed at resident properties, and at DC chargepoints. Untethered charging refers to when the cable is not provided at the chargepoint and is usually stored within the vehicle.

While the charging technology itself is critical, it is also key to have an effective charging network integration with communications and management software so that links with back-office systems can be ensured. This will enable chargepoints to receive system updates, meaning compatibility with newer vehicles can be better ensured. Connectivity also allows data capture and monitoring which supports users, operators, and the Council to build insights for EV best practice. This connectivity also links to the access to the chargepoint whether it is free or paid for and gives users remote access.

For the purposes of this review, only options that are relevant within Staffordshire have been considered. Due to the evolving market, key innovations have also been highlighted to ensure the long-term futureproofing of a Staffordshire charging network.

### 6.2. EV Charging Modes

Alongside AC and DC types, the BS EN 61851-1 standard defines 4 'modes' for charging, effectively defining the chargepoints technology. Modes specify the type of circuit, the socket and therefore the power that can be utilised. It is important to understand that modes impact the speed of charging, and each mode is not necessarily compatible with all cars. As innovations enter the market these definitions and standards will continue to evolve.

### Mode 1

Mode 1 covers the charging of an EV by plugging it into a 13amp / three-pin plug socket. This is the mode least recommended for public use as it offers little protection as there is no in-cable control box (ICCB) to provide communication between the outlet and the vehicle ensuring safe charging. Due to the low current this mode is more relevant to electric vehicles such as mopeds, and many newer EVs will not be compatible to charge through Mode 1.



Figure 34: Mode 1 Graphic

### Mode 2

Mode 2 covers the use of a 13amp / three-pin plug socket, but the cable importantly incorporates an in-cable control and protective device (ICCPD). The ICCPD will ensure that the charging is set to a specific charging power and provides protection against injury by detecting any imbalance in the currents across the circuits and if detected cuts the power.

Mode 2 is most suitable for EVs that have moderate charging needs, for example PHEVs. It is also an important back-up charging option if there are no dedicated EV chargepoints. It is important to note that Mode 2 is still not a recommended charging option and, like Mode 1, not all EVs are compatible with the mode. Vehicles that are Mode 2 compatible are often supplied with a Mode 2 cable with Mode 3 as an optional extra. Mode 2 usually sees the charge limited to 2.4kw.

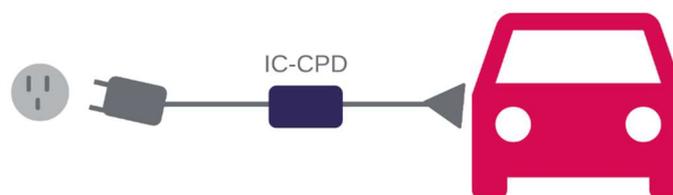


Figure 35: Mode 2 Graphic

### Mode 3

Mode 3 uses a separate dedicated circuit and is suitable for residential, public and workplace charging. Mode 3 is provided through a dedicated chargepoint and has communication between the vehicle and the chargepoint. Mode 3 sees a broader range of charge that can be supplied to a vehicle and is the most suitable for charging BEVs. Due to the dedicated chargepoint, a tethered or untethered cable can be used. If tethered, this will usually be suited to the vehicle expected to be charged.

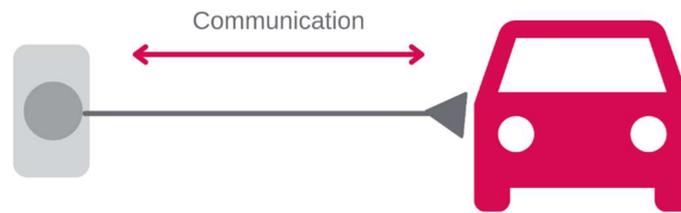


Figure 36: Mode 3 Graphic

#### Mode 4

Mode 4 is provided through dedicated EV equipment. Rather than providing AC, Mode 4 uses a charger built into the chargepoint to provide DC directly to the vehicle via a tethered cable. Mode 4 chargepoints are commonly in the 20-50kW range and charging in excess of 350kW level may be available in the medium term. This can see an EV charged to 80% in approximately 15 minutes. This approach requires enhanced infrastructure and currently Mode 4 is not available as residential charging.

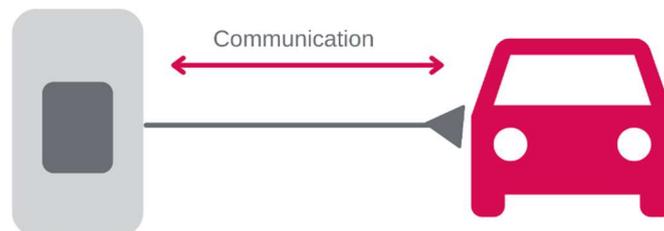


Figure 37: Mode 4 Graphic

### 6.3. EV Connector Type

As it currently stands, the EV charging market has not agreed to one connector type. There are 4 common types of connectors in the UK although Type 1 is now least common. The connectors impact the mode of charging and the maximum capacity.

The time to charge a vehicle is a key consideration for most users. There are situations when a slower charging period would be acceptable, for example at a residential off-street chargepoint overnight. However, a fast charge would be preferable at a shopping centre car park. It is therefore key to understand the compatibilities across the modes and type, and their optimum use cases.

Table J: Connector types and charge durations

Charging Speed	Power Output	Typical charging location	Charge Time*	Compatible connection types
Slow	3 to 7kW	Home, workplace, on-street (lamp column)	16 hours	Type 1 
				Type 2 
Fast	7 to 22kW	On-street, public car park, workplace	2 to 7 hours	Type 1 (max 7kW) 
				Type 2 
Rapid	Up to 50kW	On-street, public car park, forecourt, service station, EV Charging Hub	Up to 1 hour	Type 2 
				Combined Charging System (CCS) 
				CHAdeMO 
Ultra-rapid	120 - 350kW	Forecourt, service station, EV charging hub	Up to 40 minutes	Type 2 (Tesla adapted only) 
				Combined Charging System (CCS) 
				CHAdeMO 

\* 0% to 80% of a standard 60kW EV battery

The table presents the connector types and the charging durations. The speed at which a vehicle can be charged is commonly termed; slow, fast, rapid or ultra-rapid. Across these speeds there are requirements based on mode and type, as well as vehicle compatibility.

## 6.4. EV Charging Solutions

Within this strategy five EV charging solutions have been identified, providing Staffordshire with the optimum network. The solutions are listed below, these solutions are explained through this document:

- EV hub
- EV forecourt
- Off-street residential charging
- Off-street charging
- On-street charging

These solutions are suitable based on several factors and the locations for these have been identified through the completed demand analysis. However, across each of these locations, multiple types of chargepoint could be implemented to meet requirements. A key factor as to the type of chargepoint recommended in each solution is the speed at which EVs could be charged and the compatibility across vehicle types. In this strategy we have identified three charging speeds: slow, fast and rapid/ultra-rapid. Across each of these speeds we have indicated the solution it best suits and the relevant types of chargepoint have been identified.

There are currently large investments in emerging EV technologies within in the UK. To ensure that Staffordshire charging infrastructure is futureproofed, key innovations have also been highlighted.

### Slow Charging

The definition of a slow charging solution is a charge of 3kW – 7kW and either Mode 2 or Mode 3. Slow charging is often suited to off-street residential solutions, as in these cases vehicles can be charged overnight, and this aligns with the Department for Transport recommendations of charging overnight.

The decision to use the slower types of charging mechanisms is closely linked to the problem you are trying to resolve. The situation as it exists across Staffordshire has been considered in detail and is described in Appendix C.

## Fast Charging

The definition of a fast charging is a charge of 7kW-22kW and modes 2, 3, CHAdeMO or Combined Charging System. Often when installing fast chargepoints, power supply upgrades can be required to ensure the required electrical infrastructure. Fast charging can be delivered through a variety of chargepoints, kerbside units, dedicated parking bays or residential charging units.

Fast charging can suit a variety of situation and use cases. Fast charging can support the top-up of EVs while visiting points of interest such as supermarkets, retail parks or tourist locations. In addition, fast charging can be used in off-street residential solutions and can be helpful in multiple EV households.

The benefit of the speed of fast charging is key and as EVs continue to develop more vehicles will be able to charge at the highest rate.

## Rapid/Ultra rapid

The definition of rapid/ultra-rapid charging is a charge of 50kW or more and Modes 3, 4, CHAdeMO or Combined Charging System. Like fast charging installations, the electricity supply and capacity need to be examined before installation. This is critical if many rapid/ultra-rapid chargepoints are installed in one location. Across the UK rapid/ultra-rapid chargepoints are the smallest proportion of chargers. Currently off-street and on-street residential solutions cannot facilitate rapid/ultra-rapid charging and it is more commonly found at forecourts, charging hubs or at commercial locations.

Ultra-rapid charging is still relatively new technology and therefore is not compatible with all EVs. Rapid/ultra-rapid charging is provided through locations with dedicated parking bays. This charging offers a similar benefit as fast charging but providing a larger battery charge in a shorter period of time; especially at locations such as service stations, supermarkets or retail parks. Rapid/ultra-rapid charging can also be beneficial for EV users on longer distance journeys.

### Electric Charging Hub

Electric charging hubs offer an opportunity to provide large scale publicly accessible charging. This is beneficial in the move to EVs in supporting the removal of charge anxiety on longer journeys and ensuring short charges provide enhanced benefit to EV users.

In addition to the scale of charging available at a hub the space can also provide other benefits such as community spaces, retail or food.

An example of a charging hub within the UK is Braintree near Essex with space for 36 vehicles to charge and the utilisation of solar and renewable energies.



Figure 38: GRIDVOLT charging hub

## Innovation

Technology within the EV charging market is continually developing and endeavouring to meet user demands for convenience and speed while providing viable solutions.

Wireless charging, which is now commonplace for smart phone charging, and other at-home technology is now being explored for EV charging. The technology used is a similar form of inductive charging with the electrical charge passing through an air gap from one magnetic coil to the other. This could provide charging through charging bays with a stationary vehicle, while some companies are also exploring the possibility of charging while driving. This technology is not at implementation stage although there are several trials across the UK for example in Nottingham and Milton Keynes. This charging would be beneficial to not only private EVs but buses, taxis or commercial vehicles.

Another area of innovation is vehicle to vehicle (V2V) and vehicle to grid (V2G) charging and integration. This is possible when a charger includes the technology to allow current to flow bidirectionally. The benefit of vehicle to grid integration is that depending on the demands on the grid, power can flow either to or from the vehicle. This would allow EVs to support the grid during peak times. The benefits of vehicle-to-vehicle charging are similar in that EVs could support other EVs when charging is required. With this we are seeing that the development of EV charging infrastructure could be used to support wider infrastructure challenges.

There is substantial work developing around the use of solar energy and battery storage that will allow the harvesting of renewables such as daylight and wind power to supplement the grid and allow energy to be fed back into the grid, companies such as myenergi [4] have commercial solutions for home energy management.



Figure 39: Wireless in road charging

## 7. Commercial Models

When considering the installation of a charging network, several commercial models will often provide the best fit for both the charging solution across the county and for the individual districts and boroughs. If a range of charging infrastructure solutions are installed, this may lead to several commercial models being utilised.

Off-street residential charging can be considered separately, as this would not require council support, but instead would require investment from the intended user with two key costs. Firstly, an installation cost, which can be offset by applying for funding support such as OZEV's Electric Vehicle Homecharge Scheme. Secondly, there would then be the on-going electricity cost, and many electricity providers are now offering tariffs to cater for EV charging.

For off-street, on-street, EV charging hubs, and EV forecourts there are a variety of models that could be seen across Staffordshire to allow users to access the chargepoint. Authorities may choose to own and operate the chargepoints themselves and set the cost for charging a vehicle. There are examples where authorities choose to make chargepoints and/or parking free to EV users. Other models bring operators in to manage and install the chargepoints.

When considering the models utilised across Staffordshire, each authority will need to consider:

- Cost to the user
- Cost to the authority
- Customer service implications
- Marketing capability and requirements
- Capability and responsibility of installation
- Capability and responsibility to maintain chargepoints
- Ongoing support and management of EV charging systems and suppliers
- Ongoing support and management of infrastructure

## 7.1. Model Assessment

There are five key commercial models to be considered for public EV charging solutions across Staffordshire, excluding off-street residential. The table below outlines the key points of the different models and what should be considered in each case.

Model	Description	Key Considerations
Own and Operate	<ul style="list-style-type: none"> <li>Local Authority (LA) tenders for a Chargepoint Operator to install chargepoints</li> <li>LA own the Chargepoints (gov. funding)</li> <li>LA takes revenue</li> <li>LA pays CPO to maintain Chargepoints.</li> </ul>	<ul style="list-style-type: none"> <li>This model would involve LAs appointing suppliers to deliver and manage the chargepoint infrastructure for a set period with all revenue being retained.</li> </ul>
Match Funding	<ul style="list-style-type: none"> <li>The OZEV grant offers up to 60% of the funding for eligible costs.</li> <li>The remaining 40% will need to be provided by the LA or a third party i.e. CPO.</li> <li>This could also be achieved if government funding is not available, but the LA and the operator agree to match funding.</li> </ul>	<ul style="list-style-type: none"> <li>Likely to reduce the revenue received and limiting the overall control the LA can exert on the facility.</li> </ul>
Concession Framework	<ul style="list-style-type: none"> <li>The operational costs and risks are shared in part or completely with the operator.</li> <li>This model is often a revenue share.</li> </ul>	<ul style="list-style-type: none"> <li>The LAs safeguard their resources and revenue but then must accept diminished input in determining facility locations.</li> <li>This approach is best suited where demand is proven, or operators are confident of a return on investment.</li> </ul>
Land Rental	<ul style="list-style-type: none"> <li>Private sector investment, installing, maintaining the chargepoints while paying rent to the LA (or other) for land</li> </ul>	<ul style="list-style-type: none"> <li>Revenue for the LAs would solely be from the land rental which would reduce some risks. However, operators would look to ensure demand.</li> </ul>
Leasing/Hosting	<ul style="list-style-type: none"> <li>Chargepoints leased to the LA for a monthly fee</li> </ul>	<ul style="list-style-type: none"> <li>Provides control of location to the LAs and maintenance to the operator.</li> <li>LAs would not receive any revenue and would need to decide if monthly fees would be covered by cost to users.</li> </ul>

Table K: Commercial Model Overview

It is likely that across Staffordshire, several of these commercial models could be utilised, depending on the type of infrastructure installed. The advantages and disadvantages of each model are outlined below.

Model	Advantages	Disadvantages
Own and Operate	<ul style="list-style-type: none"> <li>All revenue is retained by the LA</li> <li>Locations selected by the LA</li> <li>Streamline procurement</li> <li>UK Government has established procurement frameworks to expedite process and encourage supplier confidence</li> </ul>	<ul style="list-style-type: none"> <li>Funding would need to be identified</li> <li>On-going maintenance costs</li> <li>Updates to technology are the LA's responsibility</li> <li>Any key performance indicators and or contractual service level agreements may be difficult to enforce</li> </ul>
Match Funding	<ul style="list-style-type: none"> <li>Partner ownership incentivises better provision, improved quality of service for users</li> <li>Reduced risk and responsibility for maintenance costs</li> <li>The chargepoints can be futureproofed depending on the partnership agreement</li> </ul>	<ul style="list-style-type: none"> <li>Reduced revenue share</li> <li>Contractual and financial arrangements may not suit all suppliers and so pool of available partners is reduced.</li> <li>Partners require confidence that revenue will be achieved in any locations</li> </ul>
Concession Framework	<ul style="list-style-type: none"> <li>Reduced risk and responsibility for maintenance costs</li> <li>The chargepoints can be futureproofed depending on the partnership agreement</li> <li>Depending on the agreement the council may retain ownership of the chargepoints or electrical connections</li> </ul>	<ul style="list-style-type: none"> <li>Operators require confidence that revenue will be achieved and therefore locations would need to be agreed</li> <li>Delivery can be slowed due to negotiations and the time to make a contractual award</li> <li>Reduced revenue share</li> </ul>
Land Rental	<ul style="list-style-type: none"> <li>Reduced risk and responsibility for maintenance costs</li> <li>Agreed revenue through rent</li> </ul>	<ul style="list-style-type: none"> <li>Operators require confidence that revenue will be achieved and therefore locations would need to be agreed</li> <li>Delivery can be slowed due to negotiations</li> </ul>
Leasing/Hosting	<ul style="list-style-type: none"> <li>Reduced risk and responsibility for maintenance costs</li> <li>The chargepoints can be futureproofed depending on the leasing agreement</li> <li>Locations selected by the councils</li> </ul>	<ul style="list-style-type: none"> <li>No revenue share</li> <li>Delivery can be slowed due to negotiations and the time to make a contractual award</li> <li>Expected that the monthly cost would need to be covered by charges to users</li> </ul>

Table L: Model assessment

## 7.2. Promoting charging infrastructure

There are a variety of methods to promote the creation of an EV charging network that does not require each council to lead on installation or location identification. This could include:

- Workplace charging points
- Trial implementations
- Development & planning considerations
- Vehicle trials

### **Workplace charging points**

This could involve coordinating the deployment of charging facilities at workspaces for employees to utilise. This can be achieved by creating a framework through which standardised new charging infrastructure can be deployed for use at workplaces. Agreements in terms of the adoption, long-term maintenance etc. and the initial cost can be built into contracts between the operator and landowner in this instance the workplace. This can help provide the best rate to chargepoint users if there is a cost to charge.

For workplaces there are national schemes, such as the Workplace Charging Scheme which could be engaged with. Workplace chargepoints support local authorities to roll-out charging infrastructure across the county. In addition, many workplaces now have sustainability targets internally and by encouraging the uptake of EVs with their staff and visitors, these targets can be met.

### **Trial implementations**

This would see the local authorities engage with chargepoint operators to trial the technology for a set amount of time. This is usually implemented in the case of innovations within the charging market, for example through a trial of pop-up chargers. The benefits are threefold as the local authority can test the demand for charging infrastructure, operators are able to trial new technology or back-office innovations and users are given access to new chargepoints. Depending on the trial agreement, installed equipment could be kept after the trial.

### **Development & Planning considerations**

Planning policies and developments across the county offer an opportunity to grow the charging network. Section 106 agreements (between councils and a developer) should include provision for EV charging infrastructure and, assuming this is to be included within the wider adoption, a standard can be mandated. With the introduction of National Model Design Code guidance will be provided on how policies and design can be best utilised in the decarbonisation of transport. In addition, there are building regulations that should be implemented including requirements for EV charging infrastructure.

### **Vehicle trials**

Through engagement with various suppliers, it is possible to facilitate the trial of an electric vehicle (private hire vehicles, vans and eCargo cycles) as a way to actively engage organisations to consider adoption of EV technology.

## 8. Recommendations & Next Steps

### 8.1. Engagement

Through developing this strategy document, SCC acknowledges the importance of engaging with district, borough and parish councils to facilitate a consistent and effective EV charging solution for the people of Staffordshire and its visitors.

It is important to bring both district and borough councils and the residents along with Staffordshire County Council on this journey to coordinate a solution for the benefit of all; the development and delivery of an engagement programme will be key. To support the work of the district and borough councils, an EV Toolkit [See Appendix B] has been developed. The EV Toolkit has been developed and delivered for SCC, and further explains the charging options and answers key questions for district and borough councils to use, to help inform and support.

Alongside this, each district and borough council have been provided with an EV Charging Action Plan that identifies most steps required to deploy and manage EV charging solutions [see Appendix A].

Through developing an improved understanding of current and future vehicles along with the associated infrastructure, district, borough, and parish councils will aim to provide residents with the confidence to switch and thereby increase the speed at which net zero is reached.

Parish councils have a strong connection with their local communities and can be instrumental in raising the local perception of EV charging. They should be encouraged to support initiatives such as car share schemes and installing charge points at local community buildings for the benefit of their local residents.

It is also expected that chargepoint operators operating across the county will engage with local users, taking onboard feedback and ensuring that the solutions meet demand and expectations. Each district and borough council should ensure that all engagement considers feedback received from users. It is expected that all operators engaged by the district and borough councils will have a Service Level Agreement that ensures the fit for purpose nature of their offering.

Each district and borough council will also be engaging external stakeholders such as developers, businesses, and landowners to support installation on their land and promote the new charge-point network where relevant.

**Recommendation 8.1:** Local authorities should review this EV Charging Strategy and ensure feedback they receive from chargepoint users and stakeholders at key delivery points is included in further plans and actions.

### 8.2. Procurement

There are several potential procurement routes available to each of the councils. To utilise the most effective procurement route, each council will need to engage with relevant stakeholders such as their procurement teams and Councillors, to agree the preferred approach. In addition, a review of any existing models utilised by the councils will need to be undertaken along with an in-depth review of the potential operational and commercial models to ensure that the procurement process will support the agreed objectives.

**Recommendation 8.2:** Local authorities should engage with their procurement teams to assess the appropriate avenues for procurement, taking into account the operating and commercial models that are optimal for each local authority. Continued assessment of appropriate and relevant funding for the councils to install chargepoints will support their residents in making the transition to EVs.

### 8.3. Locations and Feasibility

The demand analysis has identified suitable locations based on relative levels of demand and a high-level infrastructure analysis. Before any chargepoint solution is installed, a detailed feasibility of the proposed areas for EV charging sites is required. This would confirm location and solution suitability by completing:

- Site visits
- Electrical feasibility study
- Civils' feasibility study
- Detailed analysis of the users in the area
- Detailed assessment of installation cost
- Adhering to standardised installation processes (The IET Code of Practice for Electric Vehicle Charging Equipment Installation and Accessible Charging BSI PAS 1899:2022)

Accessibility will also be a consideration in all locations and chargepoint solutions. This should focus on ensuring that all users can, and also feel enabled, to utilise the facilities. For example, those who may have disabilities may have specific concerns or needs with regards to the type of charge-point installed, the amount and availability of pavement space or the implications of trailing cables. The accessibility review should also evaluate the local area with regards to lighting, general safety, CCTV and crime and disorder prevention alongside other general requirements being met.

**Recommendation 8.3.1:** Local authorities should ensure a feasibility study is undertaken that follows good practice with well-developed processes and procedures for installing any chargepoints that will be publicly accessible.

**Recommendation 8.3.2:** Staffordshire County Council will continue to engage with all district and borough councils to provide a consistent approach to EV rollout across Staffordshire.

### 8.4. Funding

As part of the strategy, a high-level funding review has been completed. In implementing the strategy, SCC will co-ordinate with district and borough councils to develop joint bids and gain access to relevant funding from UK Government, the Department for Transport and Office for Zero Emission Vehicles. This will allow each district and borough council to deploy funding to support the widest distribution of charge-point solutions. In addition to this form of funding, district and borough councils should also explore the commercial partnership opportunities which may be applicable with a particular focus on EV charging hubs.

District and borough councils should also help ensure that the residents of Staffordshire are kept up to date on funding that is available to them as private car owners for EV purchasing and chargepoint installation.

**Recommendation 8.4:** SCC should co-ordinate joint bids to maximise opportunities and each district and borough council should aim to support residents in staying up to date with relevant funding information.

## 8.5. Operators

Each district and borough council should ensure that operators in their area meet expectations in both the technology provided and through using Key Performance Indicators (KPI's). As with any type of service provision users' rights should be protected - Ofgem continues to ensure these rights and protections meet with new chargepoint services. Access to charging can be confusing with different operators using many different methods. The supplied EV Charging Toolkit should provide users with a clear source of information.

**Recommendation 8.5:** District and borough councils should engage as a group with private chargepoint operators to ensure they follow best practice and encourage charging solutions at locations tailored to the requirements of each area, for the benefit of as many citizens as possible.

## 8.6. Monitoring

Monitoring the chargepoint network should be a key responsibility of each district and borough council and their appointed operators. Monitoring will allow each council to understand usage and track demand which will then feed into enhancements to chargepoints or expanding the network. As the use of EVs and chargepoints grows, each council should aim to monitor the impact on air quality and emissions.

**Recommendation 8.6:** Each district and borough council should ensure a monitoring system is in place to review the impact of their EV charging strategy and feed this back to the public where relevant. When new data is available, the analysis should be updated. The developed EV Charging Action Plan should be adopted by each council and implemented against a common timeframe.

## 9. Conclusion

This Public EV Charging Strategy outlines a methodology to help district and borough councils meet the anticipated growth in demand. This is based on current data, predictions, and the impact of upcoming policies. Through coordinating development of the charging infrastructure networks across the county; SCC can support the local authorities in the creation of a sustainable charging network for the benefit of residents and visitors to the county; all of which will produce positive steps towards reaching net zero.

SCC has been clear in their objectives for decarbonisation and their commitment to supporting local authorities and residents in producing modal shift. The Public EV Charging Infrastructure Strategy considers not just existing EV users but potential users. It examines the transport network across Staffordshire and aims to facilitate modal shift to a more sustainable travel network for the future.

As EV use grows, this data led approach can be further updated and adapted to recognise where further charging demand and infrastructure is required. As policies continue to be implemented both UK wide and across Staffordshire, the implementation of this charging infrastructure strategy will ensure each of the district and borough councils are prepared to meet policy changes and the challenges ahead.

SCC's position should continue to be supporting the district and borough councils with information, consistent approaches, developing bids and broad support; whilst promoting options and funding choices for the public. Implementing all these steps will enable the successful growth of EV chargepoint installations across the county.

## 10. References

- [1] [UK Electric Vehicle Infrastructure Strategy \(GOV.UK\)](#) Accessed 13/06/2022
- [2] [EV Chargepoint Grant guidance for customers - GOV.UK \(www.gov.uk\)](#) Accessed 08/08/2022
- [3] [Midlands Connect | Supercharging the Midlands](#) Accessed 10/05/2022
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- [5] [How many charge points are there in the UK 2022 - Zap-Map](#) Accessed 13/06/2022
- [6] [Government announces tenfold expansion in charge points by 2030 - zap-map](#) Accessed 13/06/2022
- [7] [MC - STP Doc Digital \(midlandsconnect.uk\)](#) Accessed 13/06/2022
- [8] [The future of rural mobility report final \(midlandsconnect.uk\) \[pdf\]](#) Accessed 08/08/2022

# Appendix A: EV Charging Action Plan

To support district and borough councils in their EV charging infrastructure journey, an action plan has been produced. This document sets out all the steps required and allows the capability to track and manage each EV charging project.

**Electric Vehicle Charging - Action Plan**  
Public EV Charging Document  
CONR-HSEQ-4D-SCS303 / Version 3.1  
09/02/2022

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**Introduction**

The Action Plan sets out an indicative and high-level timetable of the most and medium-term measures which can encourage and support the deployment of an electric vehicle (EV) charging strategy.

**Geographical context**

The context of the EV Charging Strategy and the supporting action plan is intended to further develop and deliver EV charging across Staffordshire County Council (SCC) and the surrounding District and Borough authorities.

**Staffordshire County Council's role**

- Lead Staffordshire Borough Council
- Staffordshire Moorlands
- South Staffordshire Council
- Conventry City Council
- North Staffordshire Council
- Stafford
- Tamworth
- Help these councils through joint administration of SCC

**Context of proposed actions**

In July 2016, SCC selected Amey Consulting to deliver the EV charging strategy. The strategy is to be delivered across all services and estates. The EV Charging Strategy represents an important part of the County Council's commitment to sustainability and innovation and provides a valuable benefit beyond just these public assets.

The strategy is to be implemented in a phased and iterative manner across the region. The Action Plan will outline a detailed and a series of actions that should contribute to the rapid advancement of the overall EV charging strategy across all of Staffordshire.

We recommend the use of a simple traffic light display for highlighting progress:

- Green** - On track
- Yellow** - At risk
- Red** - Off track

Notes and the current status are provided in a separate (not shown) table. These data should be shared with the relevant local authority.

There are 2 clear and separate themes to EV charging:

- Delivering public EV charging both on and off-site (external/ public)
- Delivering council estate EV charging (internal)

Whilst the SCC EV strategy will be used with the overall approach, the project team are focused on working with the District and Boroughs to deliver a consistent approach to an 'Internal/Local' EV charging strategy.

**10 High Level EV actions checklist**

Action	Status	Priority	Progress	Date
1. Internal stakeholder engagement	Green	High	Complete	01/02/2022
2. External stakeholder engagement	Green	High	Complete	01/02/2022
3. Internal EV charging plan	Green	High	Complete	01/02/2022
4. External EV charging plan	Green	High	Complete	01/02/2022
5. Funding and commercial	Green	High	Complete	01/02/2022
6. Internal EV charging plan	Green	High	Complete	01/02/2022
7. External EV charging plan	Green	High	Complete	01/02/2022
8. High level EV charging actions	Green	High	Complete	01/02/2022
9. Progress and delivery status	Green	High	Complete	01/02/2022
10. Mapping EV charging actions	Green	High	Complete	01/02/2022

**Action table 1: Internal stakeholders**

Ensure that all relevant services within your authority have been contacted and are aware of progress.

Stakeholder	Internal Stakeholder	Priority	Progress	Date
County Council				
Senior Management				
EV fleet				
Asset management				
Highways & Parking				
Revenue				
Public Transport				
Health & Care				
Climate Change & Sustainability				
Human Resources				
Procurement / Legal				
Other services				

Figure 40: Electric Vehicle charging plans

## Appendix B: EV Charging Public toolkit

A toolkit has been provided for SCC that sets out key information that the public will want to know when it comes to owning and running an EV. This will be published on the county council's website as a resource for all to use.



### How to charge an electric vehicle

Critical for any user of an electric vehicle is to understand how you can charge the vehicle. This includes the speed at which it charges, the compatibility of the charging cable and where you will be charging.

You should consider where you plan to charge your vehicle most of the time. This may be at home in a garage or on a driveway via a dedicated residential chargepoint; at work; or at a public chargepoint.

Charging at home is likely to be the cheapest option if you have access to a private driveway or garage and a dedicated chargepoint is highly recommended in this situation (you must not trail a cable across a public footpath!).

Although a new vehicle may be supplied with an electric vehicle equipment charging cable, which will enable charging via a standard 3-pin plug, this should be avoided except in an emergency. In no circumstances should an extension cable be used.

If you do opt to charge at home, consider smart charging to adjust the time of charge to take account of varying electricity tariffs, and potentially switch to a discounted electricity tariff suitable for electric vehicles.



## Charging your electric vehicle

### Where to charge an electric vehicle

There are a variety of locations to charge electric vehicles across Staffordshire and the UK. Generally, these can be split in to five categories:

1. Residential chargepoints where an EV owner has off-street parking to install their own chargepoint.
2. Off-street chargepoints in supermarkets, service stations or other types of carpark.
3. Forecourts - chargepoints at current fuel stations.
4. EV charging hubs - dedicated facilities to charge EVs typically using rapid or ultra-rapid chargepoints.
5. On-street chargepoints installed on the highway, primarily for residents.

### How to pay for public charging

Publicly accessible chargepoints are available across Staffordshire, some chargepoints are free to use, but common methods of payment include:

- A monthly membership, accessed via a smartphone app or an RFID card
- Contactless payment to allow pay-as-you-go customers

There are a number of variables that impact the cost of charging at home or at public chargepoints such as what type of chargepoint is used, the cost of electricity or how much charge is required.

Zap-Map provides a tool to calculate the costs of charging for a specific make and model of vehicle which can be found here: <https://www.zap-map.com/tools/>



### How to search for where there are EV chargepoints

**Zap-Map** is the most commonly used app and platform for EV drivers to search for chargepoints and plan for journeys. It is also a source of EV information and news.

### Chargepoint accessibility

A large proportion of the publicly accessible chargepoints in Staffordshire are accessible at private or public car parks or retail parks. Generally, accessibility is relatively simple, but users should note any requirement to pay for parking as well as charging, so as not to be liable for additional fines or fees.

Many on street chargepoints and car parking facilities will give a minimum or a maximum parking time, which you should consider in relation to the amount of time you want to charge your vehicle and also ensuring you have enough time to return without incurring additional fines or fees.

Similarly, most chargepoint car park spaces require you to be actively charging your vehicle when in use. They are not designated as purely parking spots for electric vehicles, but charging bays, and fees or fines may be incurred if you choose only to park in a bay rather than park and charge.

[View our EV charging FAQs](#)

Figure 41: EV Charging - public toolkit

## Appendix C: Slow Charging Review

The definition of a slow charging solution is a charge of 3kW –7kW and either Mode 2 or Mode 3. The benefit of a slow charging solution is that it is unlikely to require enhancements to the electrical infrastructure to which it is connected.

Slow charging is best suited to off-street residential solutions, as in these cases vehicles can be charged overnight, and this aligns with the Department for Transport (DfT) recommendations of charging overnight. This type of solution would also be suitable of PHEVs which do not require a continuously available chargepoint.

Though Elexon regulatory approval is required, lamp column chargepoints use the adaptation of traditional lighting columns to provide charging. However, the cabling for streetlights can generally only support charging of between 3 – 5 kW. Lamp post charging relies on the lighting column being next to the road so that charging cables don't stretch across footways causing an obstruction. In common with many local authorities, and in line with best practice, Staffordshire County Council has undertaken a programme to move lighting columns to the back of the footway. This reduces street clutter and therefore improves visibility for drivers whilst making more space on footways for pedestrians, wheelchairs, buggies and those living with sight loss. The authority is very mindful that we need to ensure that our pavements are safe for all pedestrians (particularly those with visibility impairments) and other highway users, and that we don't expose the County Council or individuals to excessive liability or risk and therefore does not permit trailing cables across a footway.

Despite the relatively low level of power delivered by each unit, the cumulative impact means that generally only a small number of lamp posts can support charging on any one street which means that this solution isn't scalable.

Pop-up chargepoints fit within the category of charging infrastructure known as kerbside units. The key difference in this innovation is that the charging unit retracts into the kerb. This supports the removal of street clutter and street space can then be utilised by other users and support those who have accessibility concerns.

However, in an on-street location, it is recommended that each chargepoint installed needs to have a dedicated EV charging bay with it. This effectively provides a protected private parking space for the resident who has requested the chargepoint (if there are initially no other plug-in owners on the street). To bring in parking restrictions requires a residents' parking permit scheme which requires the support of a proportion of residents on the street.

Additionally, it would be unreasonable to require a resident to continue using a plug-in vehicle. With leasing now the dominant form of new car 'ownership' it is increasingly common for car users to swap vehicles after 12, 24 or 36 months. This means that whilst a resident may have a plug-in vehicle when they request a chargepoint, they are not required to keep doing so. This issue also applies to ownership/tenancy at the address, which again could not reasonably be conditioned. Whilst in theory any established bays could be used by a new owner/tenant of the property or new EV owners on the street, in practice additional EV owners are more likely to request a facility outside of their property and given current plug-in vehicle rates it is highly unlikely that any new owner/tenant will have a

qualifying vehicle. This would then mean that they wouldn't be able to park in front of their property even if the bay was unused.

In both the above cases scalability is an issue. This means that whilst the first few requests on a road may be met, subsequent requests could not. This is not equitable and doesn't deliver our goal of supporting EV take up at scale. A 7-kW charger is a meaningful additional electrical load. It is equivalent to half the total import capacity of a house with a 60-amp fuse and about one third of the import capacity for a house with a 100-amp fuse. From a technical point of view, if additional capacity is needed in a street, it can be provided. However, the cost of this varies significantly from street to street depending upon the existing electrical supply. In some cases, no upgrades will be required. In streets where upgrades are needed, the costs can vary from tens of thousands of pounds to hundreds of thousands of pounds, sometimes in adjoining streets. This creates a postcode lottery which would lead to some residents having requests rejected whilst neighbours may have requests accepted. Through the recommendation that on street facilities require a dedicated parking bay, this effectively creates a protected private parking space for one resident.

These solutions either require high user tariffs (and therefore are not equivalent to home charging options) or will require ongoing revenue support from the Council to cover the cost of operation and maintenance. As a core principle of the public network is that user tariffs should support day to day costs, we would have to implement a high tariff. This would make the on-street solution less attractive for users and mean that they are more likely to seek out cheaper charging alternatives which would lead to underuse of chargepoints and a shortfall in revenue. It would be unreasonable to require residents to commit to using an on-street charger they have requested on an ongoing basis. This leads to a high likelihood of stranded assets, ongoing financial liabilities with no income, and unused spaces which is likely to cause ongoing issues for residents. Providing dedicated private car parking spaces does not support the governments' long-term goal of reducing the need for private car ownership dependency and encouraging active modes of travel. This is particularly important in areas where there are existing issues with lack of space for car parking, limited footway space and congestion.

Public chargepoints can support multiple vehicles, this is particularly true for Rapid and Ultra-Rapid chargers but also applies to Fast chargers. On street residential chargers will generally support one vehicle. A ratio of one charger to one vehicle is resource inefficient and as such does not support Climate Change and Sustainability objectives, it will also hold back the uptake of EVs as one for one charger deployment will take far longer and cost far more than public facilities.

A socially equitable public charging network is needed to provide affordable alternatives to home charging to ensure that those without access to off-street parking are not disadvantaged. Failure to provide alternatives could delay the transition to EVs for many Staffordshire residents. For residents without the ability to charge EVs off-street a number of alternative options to home charging will be important in enabling a transition to EV use.

Workplace charging during the day will also be an important option. In locations with poor public transport accessibility and where employees are dependent on car travel; we will engage with both public and private sector employers to encourage them to make use of the Government Workplace Charging Grant to establish and expand a workplace EV charging offer as part of a wider review of workplace car parking requirements for employees. We will engage with large public sector employers such as hospitals, schools and colleges and medical centres with workplace car parking to determine

EV charging infrastructure requirements. Retail and leisure destination car parks with dwell times of an hour or more also offer an opportunity to provide alternative EV charging options. Working with district and borough councils, together we will investigate opportunities to expand the charging network in local authority owned car parks in town and district centres and at other local authority assets such as car parking at leisure centres, gyms, libraries, community and health centres and recreation / sports facilities.

We will engage and work with private EV charging infrastructure providers and operators to coordinate them to install chargepoints off-street in retail and leisure destinations and community charging hubs in residential areas could also provide an alternative option in some locations. Where there are residential areas with significant on-street car parking we will investigate opportunities to facilitate off-street community charging hubs on a case-by-case basis where appropriate locations can be found and look at options that will enable residents to use these facilities for overnight charging where possible. These community charging hubs could potentially include charging bays for EV Car Club vehicles as well as other mobility services such as cycle hire or e-bike hire facilities, offering residents alternatives to private car ownership.

## Appendix D: National Policies

Policy Title	Summary	Date of publication	Charge-point impact	Key Considerations	Chargepoint solution	Funding Opportunities	Timeframe
<b>National Policies</b>							
<b>Reducing emissions from road transport: Road to Zero Strategy - GOV.UK (www.gov.uk)</b>	The Government's long-term strategy to transition to zero emission road transport	2018	<ul style="list-style-type: none"> <li>• New street lighting columns to include charging points.</li> <li>• Highway Infrastructure Code of Practice and the Network Management of Traffic Equipment Code of Practice – that highway authorities refer to as part of the management and maintenance of their assets – to include a section on the benefits of introducing EV lamppost chargepoints.</li> </ul>	<ul style="list-style-type: none"> <li>• A cohesive, integrated, and affordable net zero public transport network, designed for the needs of the passenger, will empower consumers to make sustainable end-to-end journeys and enable inclusive mobility.</li> <li>• Clean Air Zone cities should continue to be used as a tool to achieve net zero.</li> </ul>	<ul style="list-style-type: none"> <li>• Off-street</li> <li>• On-street</li> <li>• EV Forecourts</li> <li>• EV Charging Hubs</li> </ul>	<ul style="list-style-type: none"> <li>• On-street Residential Chargepoint Scheme (ORCS) for local authorities</li> <li>• EV Charging Infrastructure Investment Fund</li> <li>• Tax and grant support increasing EV uptake</li> <li>• EVHS grant</li> </ul>	Medium - 2 - 5 years
<b>Automated and Electric Vehicles Act 2018</b>	Regulation of consumer experience of charging infrastructure, including requirements and prohibitions	2018	<ul style="list-style-type: none"> <li>• Regulations may impose requirements on operators of public charging or refuelling points in connection with—</li> <li>(a) the method of payment or other way by which access to the use of public charging or refuelling points may be obtained;</li> <li>(b) performance, maintenance and availability of public charging or refuelling points;</li> <li>(c) the components of public charging or refuelling points that provide the means by which vehicles connect to chargepoints.</li> </ul>	<ul style="list-style-type: none"> <li>• The information considered likely to be useful to consumers and users or potential users of the chargepoint, for example information about—</li> <li>(a) the location of the chargepoint and its operating hours, (b) available charging or refuelling options, (c) the cost of obtaining access to the use of the chargepoint, (d) the method of payment or other way by which access to the use of the point may be obtained, (e) means of connection to the point, (f) whether the point is in working order, and (g) whether the point is in use.</li> </ul>	<ul style="list-style-type: none"> <li>• Off-street</li> <li>• On-street</li> <li>• EV Forecourts</li> <li>• EV Charging Hubs</li> </ul>		Short - under two years

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Policy Title	Summary	Date of publication	Charge-point impact	Key Considerations	Chargepoint solution	Funding Opportunities	Timeframe
				<ul style="list-style-type: none"> <li>Building regulations may require operators to—                             <ul style="list-style-type: none"> <li>(a) provide a prescribed method of payment or verification for obtaining access to the use of public charging or refuelling points;</li> <li>(b) co-operate with each other for the purposes of a requirement imposed by the regulations (for example, by sharing facilities or information);</li> <li>(c) take prescribed steps for the purposes of such a requirement (for example, to provide information to a prescribed person).</li> </ul> </li> </ul>			
<b>EV Charging in Residential and Non-Residential Buildings</b>	The Government proposal on charging requirements for residential and non-residential buildings	2019	<ul style="list-style-type: none"> <li>Every residential building undergoing major renovation with more than 10 car parking spaces to have cable routes for electric vehicle chargepoints in every car parking space.</li> <li>Every new non-residential building and every non-residential building undergoing a major renovation with more than 10 car parking spaces to have one chargepoint and cable routes for an electric vehicle chargepoint for one in five spaces.</li> <li>A requirement of at least one chargepoint in existing non-residential buildings with more than 20 spaces, applicable from 2025.</li> </ul>	<ul style="list-style-type: none"> <li>Within Building Regulations, the government will apply a requirement for cable routes to be installed in all residential buildings with more than 10 parking spaces undergoing major renovation, with some exemptions.</li> <li>The Government will lay down requirements for the installation of a minimum number of chargepoints in all existing non-residential buildings with more than 20 parking spaces. This requirement must be set by March 2020 and will come into force by 1st Jan 2025.</li> </ul>	<ul style="list-style-type: none"> <li>Off-street</li> <li>On-street</li> </ul>	<ul style="list-style-type: none"> <li>OZEV</li> </ul>	Short - under two years

Policy Title	Summary	Date of publication	Charge-point impact	Key Considerations	Chargepoint solution	Funding Opportunities	Timeframe
<b>Future of mobility: urban strategy - GOV.UK (www.gov.uk)</b>	Outlining the benefits, the Government wants to see from mobility innovation.	2019	<ul style="list-style-type: none"> <li>• New modes of transport and new mobility services must be safe and secure by design.</li> <li>• Mass transit must remain fundamental to an efficient transport system.</li> </ul>	<ul style="list-style-type: none"> <li>• The marketplace for mobility must be open to stimulate innovation and give the best deal to consumers.</li> <li>• The commercial benefits of innovation in mobility must be available to all parts of the UK and all of society.</li> <li>• New mobility services must be designed to operate as part of an integrated transport system combining public, private and multiple modes for transport users.</li> <li>• Data from new mobility services must be shared where appropriate to improve choice and the operation of the transport system.</li> <li>• Preparing the urban environment, through publishing Building Regulations guidance to support local decisions about the design and allocation of urban space.</li> </ul>	<ul style="list-style-type: none"> <li>• Off-street</li> <li>• On-street</li> <li>• EV Forecourts</li> <li>• EV Charging Hubs</li> </ul>	<ul style="list-style-type: none"> <li>• £90 million of funding in Future Mobility Zones.</li> <li>• Unspecified support of the automotive industry to adapt, by continuing to fund the research and development of low carbon technologies.</li> </ul>	Medium - 2 - 5 years
<b>Workplace Charging Scheme (WCS)</b>	The scheme is a voucher-based scheme providing support towards the cost of the purchase and installation of chargepoints up to 75% of the costs and capped at £350 for each socket.	2020	<ul style="list-style-type: none"> <li>• The minimum technical specification for the Workplace Charging Scheme has been updated. Chargepoint models under 'fast DC' with a charging output greater than 3.5kW and not greater than 22kW are now eligible.</li> </ul>			<ul style="list-style-type: none"> <li>• 75% of chargepoint costs up to £350 per chargepoint and maximum 40 chargepoints.</li> </ul>	

Policy Title	Summary	Date of publication	Charge-point impact	Key Considerations	Chargepoint solution	Funding Opportunities	Timeframe
<b>Transport Decarbonisation Plan</b>	The plan that follows on from Decarbonising transport published in March 2020 which set out the scale of reductions from transport needed to deliver the carbon budgets and net zero. The plan now sets out the commitments and actions made to decarbonise the UK transport system.	2021	<ul style="list-style-type: none"> <li>• A driver should never be more than 25 miles away from a rapid (50kW) chargepoint anywhere along England’s motorways and major A roads.</li> <li>• The Energy White Paper sets out framework to ensure that there is investment to power transition to EVs.</li> </ul>	<ul style="list-style-type: none"> <li>• Ofgem is currently reviewing the ways EV charging infrastructure is allocated and has recently published a consultation proposing that all network reinforcement costs should be socialised across electricity bill payers, rather than falling on the individual connecting consumer.</li> <li>• The National Model Design Code sets out a process for developing local design codes and guides, with supporting design guidance on movement and public spaces including streets. It outlines an expectation that development should consist of a well-connected network of streets with good public transport and an emphasis on active travel modes including walking and cycling.</li> <li>• Manual for Streets aligns with these principles and is routinely used for plan making and decision taking to secure better outcomes for our streets and public realm.</li> </ul>	<ul style="list-style-type: none"> <li>• Off-street</li> <li>• On-street</li> <li>• EV Forecourts</li> <li>• EV Charging Hubs</li> </ul>	<ul style="list-style-type: none"> <li>• £120 million in zero emission buses through the Zero Emission Bus Regional Areas scheme</li> <li>• £50 million provided through the All-Electric Bus Town or City scheme</li> <li>• £1.3 billion to accelerate the roll out of charging infrastructure</li> <li>• £1.3 billion over the next four years for charging</li> <li>• A new £90 million Local EV Infrastructure Fund, opening in 2022,</li> <li>• £880 million Air Quality Grant</li> <li>• £4.8 billion Levelling-Up Fund</li> <li>• £1.5 billion between April 2015 to March 2021 to support the early market and remove barriers to EV ownership and £2.8 billion package of measures to support the switch to clean vehicles</li> <li>• £1 billion to build an internationally competitive electric vehicle supply chain at pace and scale in the</li> </ul>	Medium - 2 - 5 years

Policy Title	Summary	Date of publication	Charge-point impact	Key Considerations	Chargepoint solution	Funding Opportunities	Timeframe
						UK. • £582 million for new vehicle grants until 2022-23. • £1.5 billion - Transport decarbonisation R&D investment by mode • £1.5 billion - Transport decarbonisation R&D investment by strategic priority	
<b>EV Smart Charging</b>	The Government published its final response to the electric vehicle smart charging consultation that was closed in May 2020.	2021	<ul style="list-style-type: none"> <li>Smart charging technology will be required of all new chargepoints, phase one focuses on domestic and some workplace charge-points.</li> </ul>	<ul style="list-style-type: none"> <li>Interoperability allowing consumers to switch chargepoint operators will be required in Phase Two.</li> <li>Data share across operators is being explored for commercial opportunities by Government.</li> </ul>	<ul style="list-style-type: none"> <li>Off-street</li> <li>On-street</li> </ul>		Short - under two years
<b>Ofgem EV Strategy</b>	Ofgem is the energy regulator and has launched a strategy aimed at supporting EV infrastructure and technology while ensuring consumers are protected.	2021	<ul style="list-style-type: none"> <li>Support will be given to ensure the network capacity is in place to support the required charging infrastructure.</li> <li>Costs to large electric consumers such as EV charging infrastructure to be brought down when reinforcement is required.</li> </ul>	<ul style="list-style-type: none"> <li>Support the development of vehicle to grid technologies where EV owners can earn money exporting electricity back to the grid.</li> <li>Support the adoption of EVs by working with the sector to ensure the widest range of products, tariffs and services are available.</li> </ul>	<ul style="list-style-type: none"> <li>Off-street</li> <li>On-street</li> <li>EV Forecourts</li> <li>EV Charging Hubs</li> </ul>		Long - 5 years +

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Policy Title	Summary	Date of publication	Charge-point impact	Key Considerations	Chargepoint solution	Funding Opportunities	Timeframe
<b>Net Zero Strategy: Build Back Greener</b>	The strategy outlines the steps to be taken to cut emissions, take advantage of economic opportunities and support private investment.	2021	<ul style="list-style-type: none"> <li>• By early 2030s 25% of cars will be electric which will require a charging network to support.</li> <li>• Later in 2021 an EV infrastructure strategy will be published.</li> <li>• Support developments in smart charging.</li> </ul>	<ul style="list-style-type: none"> <li>• Support the move to EV for goods deliveries.</li> <li>• In decarbonising the transport sector new employment opportunities will be created.</li> <li>• Local Transport Plans will set out place-based strategies for improving transport networks with focus on carbon reduction and a move to net zero.</li> <li>• Ensure consumers have access to the required technologies.</li> </ul>	<ul style="list-style-type: none"> <li>• Off-street</li> <li>• On-street</li> <li>• EV Forecourts</li> <li>• EV Charging Hubs</li> </ul>	<ul style="list-style-type: none"> <li>• £620 million for zero emission vehicle grants and EV Infrastructure, including further funding for local EV Infrastructure, with a focus on local on street residential charging</li> <li>• Allocating a further £350 million from the up to £1 billion Automotive Transformation Fund (ATF) to support the electrification of UK vehicles and their supply chains</li> <li>• £70 million to roll out home, on-street and workplace chargepoints</li> </ul>	Long - 5 years +
<b>Rapid Charging Fund</b>	The Rapid Charging Fund (RCF) will support motorway and major A road service operators prepare for net zero.	2021	<ul style="list-style-type: none"> <li>• By 2023, to have at least 6 high-powered, open-access chargepoints (150-350 kW capable) at motorway service areas in England.</li> <li>• By 2030, we expect around 2,500 high-powered, open-access chargepoints across England's motorways and major A roads.</li> <li>• By 2035, we expect around 6,000 high-powered, open-access chargepoints across England's motorways and major A roads.</li> </ul>		<ul style="list-style-type: none"> <li>• EV Charging Hubs</li> </ul>	<ul style="list-style-type: none"> <li>• Fund £950 million</li> </ul>	Long - 5 years +
<b>The Ten Point Plan for a Green Industrial Revolution</b>	The Ten Point Plan outlines key areas of focus and targets for the	2021	<ul style="list-style-type: none"> <li>• Targeted support on rapid charging points on motorways and major roads.</li> </ul>	<ul style="list-style-type: none"> <li>• In 2021 a Green Paper was to be published which outlines the post-EU emissions regulations.</li> </ul>	<ul style="list-style-type: none"> <li>• Off-street</li> <li>• On-street</li> <li>• EV Forecourts</li> </ul>		Long - 5 years +

Policy Title	Summary	Date of publication	Charge-point impact	Key Considerations	Chargepoint solution	Funding Opportunities	Timeframe
	continued development to net zero.			<ul style="list-style-type: none"> <li>• A focus on building the EV manufacturing industry in the UK</li> </ul>	<ul style="list-style-type: none"> <li>• EV Charging Hubs</li> </ul>		
<b>Future of transport: regulatory review: zero emission vehicles</b>	The reviews aim to address outdated transport policies. The review is seeking views on the introduction of requirements to chargepoints.	2021	<ul style="list-style-type: none"> <li>• Statutory obligation to provide charging infrastructure.</li> <li>• Requirements to install chargepoints in non-residential car parks.</li> <li>• New powers supporting the delivery of the rapid charging fund.</li> <li>• Requirements to improve the experience for electric vehicle consumers.</li> </ul>	<ul style="list-style-type: none"> <li>• The review will consult on whose duty it will be to enact the legislation. This may be local authorities, chargepoint operators or energy companies.</li> <li>• Provision of the chargepoints will likely fall on the landowners.</li> <li>• Accessibility and safety will be key consideration within the user experience.</li> </ul>	<ul style="list-style-type: none"> <li>• Off-street</li> </ul>		Short – under two years
<b>Plug-in Grant Scheme</b>	From December 2021 the grant scheme for zero-emission vehicles was updated to target less expensive models.	2021	<ul style="list-style-type: none"> <li>• There will be £1,500 for vehicles under £32,000 with vehicles that are wheelchair accessible being prioritised with a higher grant.</li> <li>• There are also changes to the Plug-in Van Grant making the scheme more sustainable.</li> </ul>	<ul style="list-style-type: none"> <li>• The aim of the changes to the grant is to increase the speed of EV uptake. This will have an impact on the charging infrastructure requirements.</li> </ul>	<ul style="list-style-type: none"> <li>• Off-street</li> <li>• On-street</li> <li>• EV Forecourts</li> <li>• EV Charging Hubs</li> </ul>	<ul style="list-style-type: none"> <li>• Fund £620 million</li> </ul>	Short – under two years
<b>Taking Charge: The Electric Vehicle Infrastructure Strategy</b>	The strategy combines the aims, objectives and funding provided by the UK Government.	2022	Outlining the continues support and objectives for charging infrastructure across the UK.	<ul style="list-style-type: none"> <li>• Outline the strategic aims and objectives of the UK Government for charging infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>• Off-street</li> <li>• On-street</li> <li>• EV Forecourts</li> <li>• EV Charging Hubs</li> </ul>	<ul style="list-style-type: none"> <li>• £450 million Local EV Infrastructure Fund (LEVI)</li> <li>• A further £50 million in LEVI funding local delivery support</li> <li>• £950 million rapid charging fund</li> </ul>	Long - 5 years +

Table M: National EV policies

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