Wokingham Borough Council

ELECTRIC VEHICLE CHARGING STRATEGY

Contents

Tables

Figures

Appendices

Executive summary

Overview

Wokingham Borough Council (WBC) commissioned WSP to write an Electric Vehicle (EV) Strategy for the borough. This piece of work includes helping WBC understand the likely demand for EVs and, consequently, Electric Vehicle Charge Points (EVCPs) across the borough. The study comprised of the following elements:

- Understanding the local and political context of Wokingham Borough;
- Current and future EVCP technology reviews;
- Forecasting EV uptake and associated charging demand across Wokingham Borough;
- Delivery models and funding options for EVCP installation and operation; and
- Recommendations and action plan.

This strategy presents the analysis undertaken and provides key recommendations to aid the proliferation of EVs and reduce carbon emissions.

Baselining and research

As of June 2023, there were 219 publicly available EV charging sockets (130 devices) across the borough and around 3% of registered vehicles were EVs – roughly 3,000.

A wide variety of technologies are available depending on the use case, and more technologies are expected to emerge. The report presents a series of considerations related to charging technologies, including on/off-street charging technologies, design principles for EVCPs and standards.

Grid capacity is often a key constraint on EVCP provision, and therefore high-level analysis of grid capacity was undertaken. The analysis found that the uptake of EVs across the borough will increase the demand on the network and will likely require reinforcements to the electrical network to ensure that the grid can supply and match the demand. Although reinforcements will be necessary, some demand could be deferred through smart charging, increasing demand diversification, by deferring the load, and reducing the load during the times at which the network is busiest (peak demand), including through the use of local renewable energy generation.

Policy Context

WBC has already conducted numerous pieces of research into EVs and EVCPs in the area, so these offered a starting point for this piece of work. There are also a number of national strategies concerning EVs.

In 2019, the Council declared a climate emergency and devised an action plan setting out the commitment to play as full a role as possible, leading by example as well as by exhortation, in achieving a carbon neutral borough by 2030. Taking into consideration that the road transport sector is the biggest emitter of greenhouse gases nationally, and the second largest locally (following the domestic sector), and that the sale of new petrol and diesel cars and vans will be phased out by 2035, the Council is seeking to take immediate actions towards the decarbonisation of the transport system. EVs have a key role to play along with public transport and active travel in reducing greenhouse gases, improving air quality and tackling climate change. According to WBC's Climate Emergency Action Plan the Council targets for a 50% reduction in Internal Combustion Engine (ICE) private car mileage, with 33% of this coming from a switch to EVs.

In spring 2021, WBC undertook a survey to gauge EV charging demand and understand the barriers that prevent residents from buying EVs. The survey was completed by 260 respondents. The results of the survey revealed that the biggest barriers were 'range anxiety (the ability to complete your journey within your battery range)', 'vehicle purchase price' and 'availability of a chargepoint at destination'. It was also discovered that those without access to off-street parking were far less likely to own an EV. Since the commission of this survey the EV market has changed rapidly, with more public chargepoints in the borough, greater choice of EVs in different price ranges and improvements in battery capacities. However, some of the barriers are still relevant, especially those related to households who lack off-street parking and therefore rely heavily on public chargepoints.

During work on this report, it was announced that WBC had been successful in a bid for funding and had been awarded £173,500 through the On-Street Residential Chargepoint Scheme to install chargers in residential locations that lack off-street parking.

Forecasting EV uptake and EVCP requirements

WSP's in-house *EV: Ready* tool was used to derive forecasts for future EV uptake. The tool allows sophisticated EV uptake forecasting and scenario testing. It generates forecasts to a neighbourhood level, accounting for highly localised spatial variations in the key determinants of EV uptake rates, including: consumer profiles, socio-demographics, the availability of off-street parking, vehicle ownership, vehicle sales and turnover rates, and vehicle ownership trends. Full details of the work can be found in the section "Forecast Charging Demand".

The forecast uptake of EVs across Wokingham Borough by 2030 is around 40,000 – roughly 33% of vehicles compared to just 1.08% at the start of the decade in 2020. This increase, and subsequent decrease in Internal Combustion Engine Vehicles (ICEVs), could lead to approximately 12% decrease in CO_2 emissions in the borough, from nearly 152,000 tonnes in 2020 to around 133,000 tonnes by 2030.

More urban areas such as Wokingham, Winnersh, Earley, Woodley, and Twyford are predicted to have the greatest uptake of EVs by 2030. This broadly reflects the socio-economic realities in the area. Wargrave, Spencers Wood and the edge of Crowthorne are also predicted to have a high take up of EVs. The more rural areas will see a lower uptake of EVs, particularly in the north of the borough towards Henley and the south-central part of the borough.

The report predicts the level of EVCP requirement up to 2030, based on low, mid, and high levels of provision. Under the high level, an additional 1,392 fast charging sockets ("Fast" refers to AC chargers with between 7kW ("standard") and 22kW ("fast") speeds) and 320 rapid charging sockets ("Rapid" refers to DC chargers, with speeds greater than 50kW) will be required by 2030. This indicates a significant ramp up in the delivery of EVCPs. Of these chargers, the public sector is likely to have to facilitate the deployment of 783 fast and 49 rapid chargers.

Spatial analysis and demand forecasting highlights likely gaps in the provision of EVs based on population and demographic data. This shows that areas to the north and south of the borough are where there is likely to be a larger gap in the provision of EVCPs.

The work involved detailed reviews and research of market trends including looking at EVs and EVCP technologies, charging habits, as well as having consulted with a number of chargepoint operators (CPOs). The work concluded that whilst there is a keen appetite to invest in EV charging infrastructure from the private sector, this is primarily focused around providing rapid chargers in the more economically viable short stay locations. As such there are likely to be gaps in provision in areas where there is not yet a commercially viable site, either due to limited demand or barriers to delivery, such as grid constraints, or a lack of suitable sites.

The report presents a range of funding options and opportunities, including public funding and a range of blended public/private sector funding and delivery models.

A deficit in public EVCP availability in certain areas would serve to exacerbate range anxiety, and a feeling that EVs are not yet a realistic proposition for residents or businesses in those areas. Therefore, the provision of effective and easy to use public charging infrastructure is widely recognised as being fundamental in encouraging drivers to transition from ICEVs to EVs. There is a clear role for the public sector to intervene to plug these gaps, at least in the short- to medium-term until the market matures, to avoid a lack of charging infrastructure stifling the transition to EVs.

Our Vision and Recommendations

Based on the work completed in this Strategy we have agreed a vision for 2030 which aligns with the Climate Emergency Action Plan Target. Our vision is to support the rollout of public EV chargepoints, catering for any existing and future EV demand, whilst facilitating zero emission trips that can't otherwise be made by sustainable transport modes.

By 2030, this will be achieved by:

- Ensuring charging provision for EVs keeps pace with demand;

- Ensuring all new chargepoints are accessible for all;
- Ensuring the solution is future proofed;
- Providing a variety of charging options to accommodate the range of residents within the borough and their diverse needs;
- Making the most of funding opportunities, looking for funding from various government departments and changes in industry to seize the opportunity;
- Encouraging the private sector to invest in EV charging infrastructure in the borough;
- Monitoring updates to EV infrastructure in building regulations and enforcing these through the planning process;
- Working with the DNO to ensure there is adequate grid capacity;
- Leading by example electrifying our own fleet of vehicles and ensuring our staff travel choices are environmentally friendly;
- Continuing the community engagement to raise awareness and meet users' needs; and
- Annually tracking EV uptake and monitoring EVCP usage and uptime.

Acronym	Description
AC	Alternating Current – an AC charger uses an onboard charger in the vehicle that converts power before feeding into the vehicle's battery.
BEV	Battery Electric Vehicle – fully powered by electricity and has to be plugged in to charge.
CCS	Combined Charging System – is a standard for rapid charging used by most European and American car manufacturers.
CHAdeMO	CHAdeMO is a standard for rapid charging predominantly used by Japanese car manufacturers.
CPO	Charge Point Operator – a provider and operator of EVCPs.
DC	Direct Current – a DC charger has the converter inside the charger itself, meaning it can feed power directly to the vehicle's battery.
DfT	Department for Transport.
DNO	Distribution Network Operator – a company that owns and operates the infrastructure that connects properties to the electricity transmission network.
EV	Electric Vehicle – any vehicle that uses electricity for propulsion including PHEVs and BEVs.
EVCP	Electric Vehicle Charging Point – a location where EVs can plug-in and charge. Note a EVCP may have more than one charging sockets which vehicles plug into. Therefore, the number of vehicles that a EVCP can recharge at once is typically equal to the number of charging sockets.
ICEV (P,D)	Internal Combustion Engine Vehicle, petrol, diesel
kW	Kilowatt – a kilowatt is 1,000 watts, which is a measure of power.
kWh	Kilowatt hour - a unit of measurement that equals the amount of energy used if a 1,000 watt appliance is running for an hour.
LEP	Local Enterprise Partnership.
LGVs	Light Goods Vehicles
MVA	Megavolt Amperes – a unit used for measuring the estimated available capacity at electric substations.
OCPI	Open Charge Point Interface
OCPP	Open Charge Point Protocol

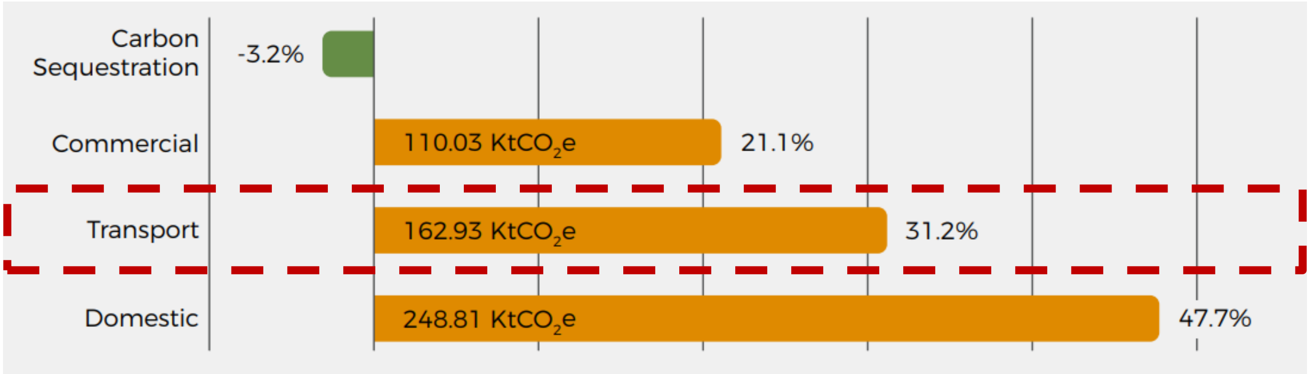
Acronym	Description
OZEV	Office for Zero Emission Vehicles – a team working across government to support the early market for ultra-low emission vehicles (ULEV).
PHEV (P) Alt. HEV	Plug-in Hybrid Electric Vehicle – a vehicle that can be plugged in and charged but also has a petrol engine.
TRO	Traffic Regulation Order – enables local highway authorities to place temporary, experimental or permanent restrictions on traffic, including parking restrictions.
ULEV	Ultra-Low Emission Vehicle - vehicles that are reported to emit less than 75g of carbon dioxide (CO_2) from the tailpipe per kilometre travelled. In practice, the term typically refers to battery electric, plug-in hybrid electric and fuel cell electric vehicles.
WBC	Wokingham Borough Council

INTRODUCTION AND CONTEXT

The problem – Why an EV strategy is needed

In July 2019, Wokingham Borough Council declared a climate emergency and is committed to playing as full a role as possible – leading by example as well as by exhortation – in achieving a carbon neutral borough by 2030[1]. Transport is the second largest contributor, following the domestic sector, to the borough's carbon emissions, responsible for 31.2% in 2020.

Figure 1– WBC Footprint 2020 (ktCO_2e). Domestic, Commercial and Transport adds up to 100% and Carbon sequestration reduces total emission by 3.2%[1]



Internal Combustion Engine Vehicles (ICEVs) are a leading cause of transport emissions and so Electric Vehicles (EVs) have a key role to play in reducing greenhouse gases, improving air quality and tackling climate change.

Looking at the total carbon emissions released from all cars registered in Wokingham borough in 2020 (152 KtCO_2e), petrol and diesel vehicles were responsible for 97% of these emissions.

While this report focuses on the switch from ICEVs to EVs, it is important to consider other modes of transport as well. Simply switching all vehicles from ICEVs to EVs will not solve issues around congestion or public health. According to the Council's Climate Emergency Action Plan, there is a 50% reduction target in ICE private car mileage to reduce carbon emissions from transport. Increasing the number of EVs within the borough can help achieve 33% of this reduction, while the remaining 17% would come from reduced travel, an increase in public transport usage and an increase in active travel.

Our Vision

Increasing the number of Electric Vehicles in place of Internal Combustion Engine Vehicles is a key priority of Wokingham Borough Council to help reduce the carbon emissions from transport.

1 Wokingham Borough Council (2022) Climate Emergency, available from: https://www.wokingham.gov.uk/climate-emergency Accessed 4 September 2023

To facilitate the increased use of EVs, by 2030, we must have in place a comprehensive and inclusive chargepoint network one that our residents, businesses and visitors can trust, and they are confident using.

Our vision is therefore to support the rollout of public EV chargepoints, catering for any existing and future EV demand, whilst facilitating zero emission trips that can't otherwise be made by sustainable transport modes.

This strategy has been designed to support our goals of improving air quality and addressing climate change by working towards carbon neutrality.

EVs and ICEVs comparison

Leading literature strongly indicates that EVs outperform and have stronger propensity to enable mass decarbonisation in the transport sector relative to ICEVs when the entire life cycle is considered. Life cycle assessment considers not just vehicle use and manufacturing emissions, but also the emissions from processes such as fuel synthesis/generation and transport, and the end-of-life stage and associated carbon impacts. Recent figures show that in a relatively clean energy mix (in the UK or European Union) EVs outperform ICEVs to the magnitude of ~70% when the full life-cycle impacts are considered[2]. This figure will continue to grow as energy systems decarbonise further in the future.

However, there are still some uncertainties, particularly regarding increased EV battery prices as a result of mineral scarcity. To account for such uncertainties, an in-depth assessment and comparison between EVs and ICEVs has been undertaken with the main points presented below:

Key points to consider

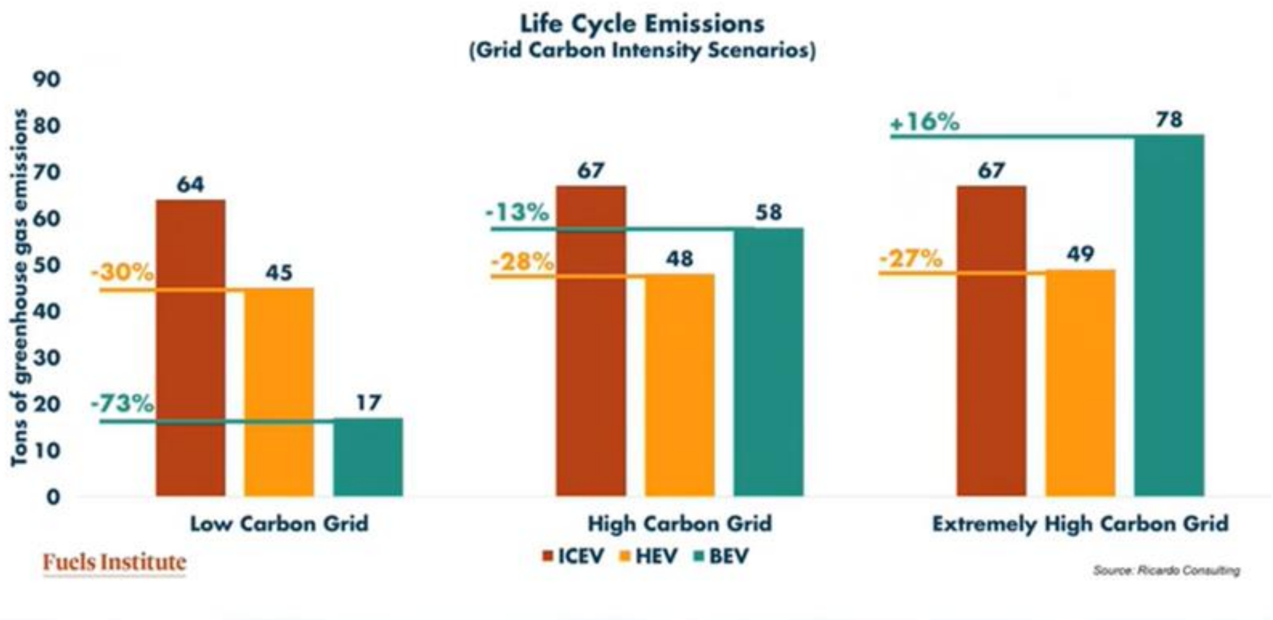
- In the short to medium term, it is likely that EVs have a higher carbon impact than ICEVs at the manufacture and end-of-life stage. This is due to the long lifespans of ICEVs (approximately 20 years) and the well-established supply chains for easier scrappage and recycling of materials. However, this is likely to be improved in the future as the same supply chains for EVs begin to grow.
- EVs have lower whole life cycle GHG emissions than ICEVs but the main problem faced by EVs is the toxic emissions created by the minerals processing needed for EV batteries[2]. A graph showing the typical use of minerals in EVs as well as in ICEVs can be found in Appendix A.
- Due to the UK's very clean electricity mix, a typical EV is estimated to save around 65% GHG emissions compared to an equivalent conventional petrol car.

[2] European Environment Agency (EEA) (2018) Electric Vehicles from Life Cycle and Circular Economy Perspectives, TERM 2018 Report available from https://www.eea.europa.eu/publications/electric-vehicles-from-life-cycle/download Accessed:06 April 2022.

Improvements in battery technology, battery manufacturing and end-of-life treatment are projected to significantly reduce GHG emissions further. It is therefore estimated that by 2030, EVs could deliver up to approximately 76% GHG reduction compared to an equivalent petrol car[3]. A graph summarising the breakdown of the overall lifecycle greenhouse gas impacts for lower medium cars can be found in Appendix A.

- The energy mix / system in which EVs operate is shown to be the crucial lynchpin to EVs efficiency and true life-cycle carbon impact. As seen in Figure 2, in a low carbon energy mix, EVs can be 73% less carbon intensive over their lifetime compared to ICEVs[4]. Therefore, it is important that renewables in the energy system are increased to maximise these carbon savings.
- Many sources are reporting that total cost of ownership of EVs is now lower than ICEVs[5].

Figure 2 – Electric Grid Sensitivities



Policy Context

This section provides the policy context for EVCP provision, both nationally and locally within our borough. In addition to our climate emergency declaration, the UK Government has committed to net zero carbon emissions by 2050. Whilst on a national level other

---

3 Office for Zero Emissions Vehicles by Ricardo, for the Department for Transport (2022) 'Lifecycle Analysis of UK Road Vehicles' available from https://www.gov.uk/government/publications/lifecycle-analysis-of-uk-road-vehicles Accessed: 06 April 2022

4 International Energy Agency (IEA) (2021) The Role of Critical Minerals in Clean Energy Transitions, World Energy Outlook Special Report, available from https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions page 89. Accessed: 06 April 2022.

5 https://www.uswitch.com/electric-car/ev-charging/what-is-the-lifetime-cost-of-an-electric-vehicle/

industries have reduced carbon emissions considerably over the last 30 years, transport has become the largest polluting sector. The policies below demonstrate how EVs can be part of the decarbonisation of the transport sector.

National Policies and Guidance

- **Taking Charge: The Electric Vehicle Infrastructure Strategy** (2022)[6] – This strategy sets out the vision and action plan for the rollout of electric vehicle charging infrastructure in the UK. By 2030, it is expected there will be around 300,000 public EVCPs as a minimum in the UK. The report states there are currently a number of problems with EV uptake, particularly due to the rollout of EVCPs which has not been at an adequate pace. However, this plan has a clear vision to remove all real and perceived barriers associated with EV charging infrastructure, which will ultimately establish EV charging as cheaper and more convenient than refuelling at a petrol station. The strategy also aims to encompass the needs of disabled users when accessing EVCPs.
- **Transport decarbonisation: local authority toolkit** (2022)[7] – This toolkit aims to provide local authorities advice on planning and taking measures to reduce carbon emissions from transport. The toolkit also briefs local authorities on the uses and aspirations of EVs in a range of scenarios which involve: active travel, car clubs, demand responsive transport (DRT), zero emission buses and fleets and accessibility to chargepoints in rural locations. The toolkit provides specific requirements for modal shift and EV infrastructure provision, which can allow for the aspirations to be achieved.
- **Infrastructure for the charging of electric vehicles – Approved Document S – 2021 Edition** (2022)[8] – This Approved Document provides technical guidance regarding the installation and chargepoint requirements in Part S of the Building Regulations. The document applies to a range of building types both new and undergoing renovation and provides insight on the standards for EVCPs and cable routes.
- **Net Zero Strategy: Build Back Better** (2021)[9] – The Net Zero Strategy contains policies and proposals which aim to decarbonise the UK and reach net zero by 2050. Transition to EVs is identified as central to decarbonising transport, and a key policy

---

6 Taking charge: the electric vehicle infrastructure strategy. Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1065576/taking-charge-the-electric-vehicle-infrastructure-strategy.pdf Accessed: 10 May 2022.

7 Source: https://www.gov.uk/government/collections/transport-decarbonisation-local-authority-toolkit. Accessed: 10 May 2022.

8 Infrastructure for the charging of electric vehicles Approved Document S– 2021 Edition: Available at https://www.gov.uk/government/publications/infrastructure-for-charging-electric-vehicles-approved-document-s. Accessed: 6 May 2022.

9 Net Zero Strategy: Build Back Greener (2021) HM Government. [online] available from:https://www.gov.uk/government/publications/net-zero-strategy. Accessed: 12 May 2022.

of the strategy is introducing a zero-emission vehicle mandate which will set targets for a percentage of manufacturers' new car and van sales to be zero-emission from 2024.

- **Transitioning to Zero-Emission Cars and Vans: 2035 Delivery Plan** (2021)[10] – This plan sets out the commitments and actions required to reach the Government target of having all new cars and vans fully zero emissions at the tailpipe by 2035.
- **Transport Decarbonisation Plan: A Better, Greener Britain** (2021)[11] – This plan sets out how reductions in UK transport emissions will be achieved. There are six strategic priorities: 1. Accelerating the modal shift to public and active transport, 2. Decarbonising road transport, 3. Decarbonising how we get our goods, 4. Establishing the UK as a hub for green transport technology and innovation, 5. "By 2050 every place in the UK will have its own net-zero transport network", 6. Reducing carbon in a global economy: UK aviation will meet net-zero by 2040.
- **The Ten Point Plan for a Green Industrial Revolution** (2020)[12] – In this plan, the Government commits to investing £1.3 billion to accelerate the rollout of charging infrastructure, targeting support for rapid chargepoints on motorways and major roads and installing more on-street chargepoints near homes and workplaces.
- **Clean Air Strategy** (2019)[13] – The report outlines the UK strategy to tackle sources of air pollution and reduce emissions, highlighting how the priority has shifted from large individual sources of pollution to the contribution of smaller, more diffused sources of air pollution. Notes that the transport sector (inclusive of road transport, domestic shipping, aviation and rail) is responsible for 50% of nitrogen oxides, 16% of fine particulate matter (PM2.5) and 5% of non-methane volatile organic compounds.
- **The Road to Zero Strategy** (2018)[14] **–** This report outlines the government's strategy to transition to zero emission road transport by 2030. Included in the report is that new petrol and diesel cars/vans will not be allowed to be sold in the UK from 2030 onwards. However, in September 2023, the Prime Minister announced that this ban

---

10 Transitioning to zero emission cars and vans: 2035 delivery plan (2021) HM Government. [online] available from:https://www.gov.uk/government/publications/transitioning-to-zero-emission-cars-and-vans-2035-delivery-plan Accessed: 12 May 2022.

11 Transport Decarbonisation Plan: A Better, Greener Britain (2021) HM Government. [online] available from:https://www.gov.uk/government/publications/transport-decarbonisation-plan Accessed: 12 May 2022.

12 The Ten Point Plan for a Green Industrial Revolution (2020) HM Government. [online] available from:https://www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution Accessed: 12 May 2022.

13 Clean Air Strategy 2019 (2019) Department for Environment Food & Rural Affairs. [online] available from:https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf Accessed: 12 May 2022.

14 The Road to Zero - Next steps towards cleaner road transport and delivering our Industrial Strategy (2018) HM Government. [online] available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/739460/road-to-zero.pdf Accessed 01 December 2022.

has been pushed back until 2035, although it is still expected that most of the vehicles will be electric by this time[15].

Local Policies and Strategies

WBC has a clear vision for improved future EV usage in the borough as the below policies set out.

- **Climate Emergency Action Plan** [16] – The Council has developed a Climate Emergency Action Plan that sets out actions to help the borough reach its target of doing as much as possible to be carbon neutral by 2030 from its 2017 baseline footprint of 580.9 ktCO_2e per annum. The Council has adopted a phased approach to increase EVCPs over a period between 2019 to 2030. The Plan includes a 33% reduction in ICE private car mileage by 2030 from EV registrations, the Council's car fleet to become entirely ultra-low emission by 2028; and from 2023, all new residential and non-residential buildings to be designed and built to be EV ready. As part of the wider EV actions, the plan also recommends the development of an EV Strategy which forecasts the EV chargepoints requirements encouraging the adoption of EVs.
- **Living Streets – A highways Guide for Developers in Wokingham Borough** (2019)[17] – The document aims to outline the key principles to follow when producing new highway layouts and sets guidelines to provide accessible EVCPs. This includes the fact that all residential planning applications are required to provide EV charging facilities per dwelling. The guidance will be updated in 2024 to align with current standards and national policies.
- **Wokingham Borough Council Air Quality Action Plan** (2018)[18] – This plan outlines the actions that are recommended to be taken to improve the air quality in Wokingham borough between 2017 – 2026. This includes EV related policies such as: 1. Consider implementation of new parking charges related to vehicle types like free parking for EVs, 2. Consider removal of on-street parking, to provide more space for cycle lanes, EVs, car clubs, and provision of on-street EVCPs, 3. Provision of car clubs with or without EVs, 4. New Local Plan and Local Transport Plan 4 – Sustainable Transport to include EV chargepoints for new developments.

---

15 Net zero: Rishi Sunak pushes back ban on new petrol and diesel cars to 2035 - BBC News

16 Climate Emergency Action Plan (2020) Wokingham Borough Council. [online] available from: https://www.wokingham.gov.uk/sites/wokingham/files/2023-07/Climate%20Emergency%20Action%20Plan%20Council%2023012020.pdf Accessed: 04 September 2023.

17 Living Streets – A highways Guide for Developers in Wokingham (2019) Wokingham Borough Council. [online] available from: https://www.wokingham.gov.uk/planning-policy/advice-developers/highways-development-advice. Accessed: 04 September 2023.

18 Wokingham Borough Council Air Quality Action Plan (2018) Wokingham Borough Council. [online] available from: https://decisionmaking.westberks.gov.uk/documents/s64418/6.%20Appendix%20B%20AQAP%20Twyford%20and%20Wokingham%20TC.pdf. Accessed: 04 September 2023.

- **Wokingham Borough Council Local Transport Plan 3** (2011)[19] – The Local Transport Plan (LTP) details how the Council intends to improve transport and accessibility over a 15-year period from 2011 to 2026. The council have set a target for 2026 to establish a network of EVCPs across the borough. The LTP 4 is currently being developed and is expected to be published in the summer of 2024. One of the core principles of the plan will be to enhance the environment, with a focus on reducing carbon emissions within the borough.
- **Core Strategy Development Plan Document** (Adopted 2010)[20] – This plan sets out where development will occur within the borough by 2026, taking into account its residents' health, well-being, and quality of life. This includes policies about homes, shops, offices and factories to libraries, schools and health & leisure facilities.
- **The Managing Development Delivery Local Plan (MDD)** (Adopted 2014)[21] – This adds extra detail to the policies within the above Core Strategy. The document considers the need to provide sufficient vehicle charging facilities for EVs or at least provide for the easy adaptation of parking provision to enable chargepoints to be rolled out as and when demand rises. It suggests that locations that may be particularly suitable for chargepoints are medium to large workplaces, homes, and shopping centres.
- **Local Plan Update[22]** – The Local Plan Update (LPU) is the emerging new local plan that will replace the Core Strategy and MDD. Numerous consultations have taken place to date, including a full draft plan in 2020 and a Revised Growth Strategy (Nov 2021 – Jan 2022)[23]. The strategy proposed in the LPU is to deliver the majority of growth through large scale, infrastructure rich developments. This is considered the most sustainable solution to meeting development needs in a way that responds to the challenges of climate change, given large developments offer an opportunity to design in sustainability from the outset including measures to lessen the need to travel by private car and promoting sustainable / cleaner modes of transport. The emerging LPU contains policies requiring the provision of adequate electric vehicle charging facilities in new developments. Consultation on a Proposed Submission Plan is expected in 2024 with adoption of the LPU potentially in 2025.

---

19 Local Transport Plan 3 2011 to 2026 (2011) Wokingham Borough Council. [online] available from: https://www.wokingham.gov.uk/_resources/assets/attachment/full/0/210332.pdf Accessed: 06 May 2022.

20 Wokingham Borough Core Strategy Development Plan Document (Adopted – 29 January 2010) Wokingham Borough Council. Available at https://www.wokingham.gov.uk/sites/wokingham/files/2023-06/Final%20adopted%20Core%20Strategy%20inc.%20cover.pdf. Accessed: 04 September 2023.

21 Managing Development Delivery Development Plan (wokingham.gov.uk)

22 Wokingham Borough Council Local Development Scheme 2023-2026 (July 2023) Wokingham Borough Council. [online] available from: https://www.wokingham.gov.uk/sites/wokingham/files/2023-08/WBC%20updated%20Local%20Development%20Scheme.pdf Accessed: 04 September 2023.

23 Revised Growth Strategy Consultation Document Nov 2021-Jan 2022 (2021) Wokingham Borough Council. [online] available from: https://www.wokingham.gov.uk/planning-policy/planning-policy-information/revised-growth-strategy-consultation. Accessed: 04 September 2023.

- **Wokingham Borough Council Workplace Travel Plan Guidance** (2011)[24] – This plan is used as a guide for organisations based in Wokingham borough that are preparing travel plans. The travel plan programme includes ensuring the availability of EVs on-site for use in other buildings.
- **My Journey Wokingham Borough[25]** – This is a borough-wide active and sustainable travel behaviour change campaign that aims to help and inspire Wokingham borough residents, employees, and visitors of all ages to walk, scoot, cycle or use public transport. The website also provides information on how to make car journeys more efficient, which helps to minimise carbon emissions whilst the EV FAQ document provides answers to some the most common questions raised by residents regarding the EV chargepoint provision in the borough.
- **Wokingham Borough Council Car Club Strategy** – A car club strategy was commissioned by WBC and is being completed in parallel with this strategy. Car clubs can and should be part of the wider transport hierarchy through enabling the population to forego owning a vehicle.

Existing Accessibility Policies

A study by the Research Institute for Disabled Consumers (RIDC)[26] found that disabled people would only consider buying an EV if charging was made more accessible. Some felt that lifting and manoeuvring the charging cables would either be difficult or very difficult to do.

A further study by Zap-Map[27] had similar results. Issues with the lack of dropped kerbs around chargepoints and unsuitable parking arrangements made accessibility harder for those with disabilities. It is anticipated that these issues contribute to a lower proportion of drivers with disabilities using EVs, compared to those who do not have a disability.

When considering new EVCPs the following policies should be considered to ensure solutions are inclusive and accessible for all:

- **The Equality Act (2010)**[28] – states that any goods or services (including Petrol Filling Stations) are obliged to make reasonable adjustments to their facilities to improve accessibility for all. However, these requirements are not prescriptive and often lead to design inequalities that impact on user experience for those with disabilities.

---

24 Wokingham Borough Council Workplace Travel Plan Guidance (2011) Wokingham Borough Council. [online] available from: https://www.wokingham.gov.uk/EasySiteWeb/GatewayLink.aspx?alId=183918. Accessed: 09 May 2022.

25 Source: https://www.myjourneywokingham.com/ Accessed: 09 May 2022.

26 Research Institute for Disabled Consumers (2021) Inaccessible Charging is Barrier to Electric for Disabled and Older Drivers [online] available from https://www.ridc.org.uk/news/inaccessible-charging-barrier-electric-disabled-and-older-drivers Accessed: 21 April 2022.

27 Zap-Map (2021)Electric Vehicle Chargepoints 'Lack Accessibility' [online] available from https://www.zap-map.com/electric-vehicle-charge-points-lack-accessibility/ Accessed: 21 April 2022

28 HM Government (2010) Equality Act 2010 https://www.legislation.gov.uk/ukpga/2010/15/contents. Accessed: 21 April 2022.

- **Inclusive Mobility A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure (2021)**[29] – The document provides guidance on width and height clearance when there is an obstacle such as lamp columns, signposts or EVCP on footways and footpaths.
- **PAS 1899:2022 Electric Vehicles – Accessible Charging – Specification[30]** – This is a new specification on accessible public chargepoints for electric powered vehicles. It covers the design and placement of chargepoints, including the location spacing and surrounding environment, as well as the information, signals and indicators to be provided.

Previous work undertaken by Wokingham Borough Council

This is not the first work in the EV field for WBC, this report has reviewed the following studies to give us context and background for this EVCP strategy.

- Electric Vehicle and Charging Forecasts for the UK & Thames Valley: Wokingham Borough Summary Report (2021) ev.energy, Hubject Consulting & Adept Live Labs;
- Electric Vehicle Overview and Benchmarking (December 2020);
- Electric Vehicle Charging: Public Engagement Summary (June 2021); and
- Executive Paper regarding the Installation of Electric Vehicle Chargepoints for On-Street Residential and Council-Owned Car Parks (November 2021). (The aims and goals of this paper have now been superseded).

Overall findings and key points

- The Adept funded study indicated that there would need to be a **78% annual increase in the number of public EVCPs** to meet base demand.
- The WBC Public Engagement survey highlights that residents' **range anxiety and a perceived lack of charging infrastructure remain a core barrier**. As a result, increased publicly available EVCPs in residential areas have the potential to facilitate greater EV uptake. In addition, of those respondents in the surveys: **61% do not own an EV; 85% usually park their vehicle within private parking overnight; 83% would prefer to charge their EV the majority of the time at the same place where they usually park overnight.**

---

29 HM Government (2021) Inclusive Mobility A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure [online] available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1044542/inclusive-mobility-a-guide-to-best-practice-on-access-to-pedestrian-and-transport-infrastructure.pdf Accessed: 21 April 2022.

30 British Standards Institution (2022) PAS 1899:2022 PAS 1899:2022 Electric vehicles - Accessible charging – Specification [online] available from https://standardsdevelopment.bsigroup.com/projects/2021-01846#/section Accessed 9 May 2022.

- Since the commencement of this strategy WBC had been awarded £173,500 through the On-Street Residential Chargepoint Scheme that is being administered by OZEV and EST to install 38 chargepoints in 18 residential locations that were deemed suitable fulfilling the criteria of the Grant Scheme. This will enable residents who lack off-street parking to have equal access to a chargepoint and realising the benefits of owing an EV.

EV CHARGING BACKGROUND

Types of EV charging infrastructure

The range of charging solutions for EVs is evolving rapidly and reflects the ongoing technological developments and increasing investment in this market, as well as the range of different users and use cases for charging. This section provides a review of existing chargepoint technologies, including charging types, rates and layouts/format. A series of tables will outline the different types of EVCP, the ideal EVCP locations, the requirements by land use and how the different types and locations best combine. Note that the time it takes to charge an EV also depends on the maximum power that the vehicle's onboard equipment can handle, the state of charge of the vehicle’s battery and load management. Some chargepoints are designed to provide high levels of power, but not all vehicles can accept that level of power.

Table 1 – Summary of EVCP types

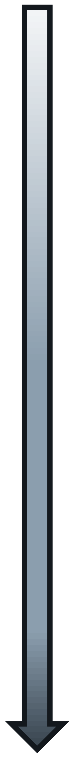
Chargepoint types		Maximum Power Output (Kilowatts)	Current/ Supply Type	Input Voltage (Volts)	Maximum Current (Amps)	Socket / Plugs	Charging duration (40kW battery)
	Domestic Socket	2.3-3kW	AC – Single Phase	230	10-13A	Type 1/2	Approx. 17 hours
	Low speed	<3.7kW	AC – Single Phase	230	16A	Type 1/2	Approx. 11 hours
	Standard	3.7 to <8kW	AC – Single Phase	230	32A	Type 1/2	Approx. 6 hours
	Fast	8 to <50kW	AC – Three Phase	400	16-32A per phase	Type 2	Approx. 2-4 hours
	Rapid	50 to <150kW	AC – Three Phase	400	60A per phase	Type 2	Approx. 55 mins

Chargepoint types		Maximum Power Output (Kilowatts)	Current/ Supply Type	Input Voltage (Volts)	Maximum Current (Amps)	Socket / Plugs	Charging duration (40kW battery)
	Fast / Rapid	20 to <50kW	DC	400	100A	CHAdeMO / CCS Combo 2	Approx. 40 mins
	Tesla Super Charger	75-250kW	DC	Up to 400	Up to 800A	Tesla adapted Type 2 & CCS Combo 2	Approx. 10-20 mins
	Ultra-Rapid	150kW to <1,000kW	DC	Up to 920	Up to 500A	CCS Combo 2	Approx. 7-16 mins

Table 2 – Recharging Locations

Recharging Location Types	Recharging Location Types	Recharging Location Types	Approximate Share of Charging Demand
	**Home-based Charging** **(including on-street charging)**	Home based charging includes driveways, garages, and off-street residents' parking, and are assumed to be private and not accessible to the general public unless part of a 'community charging' scheme like Co-Charger or JustPark. The vast majority of EV charging is currently home based, with overnight charging at the owner's home typically being the lowest cost and most convenient option, but also generally matching the longest charge times with the longest dwell times.	75-80%
	**Workplace Charging**	Workplace charging, where available, is a convenient option for employees, and well suited to the long dwell times typical of workplace parking, as well as the availability of private parking. Increasingly fleet vehicles such as company cars and vans are switching to EVs, which are often charged at the workplace.	10-15%
	**Destination Charging**	Destination charging sites are public sites where the driver has chosen to go to a site for other purposes, i.e., somewhere they would already have parked, such as a supermarket, railway stations, retail, leisure, hotels etc. On-street parking can also be considered as a publicly accessible destination, or more accurately as origin charging.	5-10%

Long Dwell; Low Cost



Short Dwell; High Cost

Recharging Location Types	Recharging Location Types	Recharging Location Types	Approximate Share of Charging Demand
	**Intermediate / en-route Charging**	Intermediate/en-route charging describes locations such as public chargepoints at motorway service stations and fuel filling stations. These are typically used for longer journeys, or where a quick turnaround charge is required.	5%

Table 3 – Charging requirements by land use type

Land use Type	Land Use Classification	Typical Use Case	Typical Dwell Time	Typical Charging Requirements	Typical EVCP Provision
Residenti al	Class C3 – dwelling houses	Resident	Long dwell time (over 3 hrs)	Slower speeds – typically overnight charging	Slow / Standard Charger
Offices / Industrial (with staff car parks)	Class B – further business and industrial activities	Employee	Long dwell time (over 3 hrs)	Slower speeds – typically occasional daytime charging	Slow / Standard Charger
Offices / Industrial (with staff car parks)	Class B – further business and industrial activities	Visitor	Medium dwell time (1-3 hrs)	Moderate speeds – typically occasional daytime charging	Standard / Fast Charger
Offices / Industrial (with staff car parks)	Class B – further business and industrial activities	Fleet	Medium dwell time (1-3 hrs)	Moderate speeds – daytime or overnight charging	Standard / Fast Charger
Offices / Industrial (with staff	Class B – further business and	Fleet	Short dwell time (less than hour)	Higher speeds – reflecting short dwell time	Rapid Charger

Land use Type	Land Use Classification	Typical Use Case	Typical Dwell Time	Typical Charging Requirements	Typical EVCP Provision
car parks)	industrial activities				
Shops / Retail / Leisure / Hotels (with customer / visitor / public parking)	Class A – shops (including some services) Class C1 – hotels Class C2 – Residential institutions Class D – non-residential institutions	Customer / Visitor	Medium dwell time (1-3 hrs)	Moderate speeds – typically occasional daytime charging	Standard / Fast Charger
Shops / Retail / Leisure / Hotels (with customer / visitor / public parking)	Class A – shops (including some services) Class C1 – hotels Class C2 – Residential institutions Class D – non-residential institutions	Customer / Visitor	Short dwell time (less than hour)	Higher speeds – reflecting short dwell time	Rapid Charger
Shops / Retail / Leisure / Hotels (with customer / visitor / public parking)	Class A – shops (including some services) Class C1 – hotels Class C2 – Residential institutions	Employee	Long dwell time (over 3 hrs)	Slower speeds – typically occasional daytime charging	Slow / Standard Charger

Land use Type	Land Use Classification	Typical Use Case	Typical Dwell Time	Typical Charging Requirements	Typical EVCP Provision
	Class D – non-residential institutions				
Shops / Retail / Leisure / Hotels (with customer / visitor / public parking)	Class A – shops (including some services) Class C1 – hotels Class C2 – Residential institutions Class D – non-residential institutions	Fleet	Medium dwell time (1-3 hrs)	Moderate speeds – daytime or overnight charging	Standard / Fast Charger
Shops / Retail / Leisure / Hotels (with customer / visitor / public parking)	Class A – shops (including some services) Class C1 – hotels Class C2 – Residential institutions Class D – non-residential institutions	Fleet	Short dwell time (less than hour)	Higher speeds – reflecting short dwell time	Rapid Charger

Table 4 – Preferences for EVCP deployment location by type

Deployment type	Charging speed	Dwell time	Typical Locations
Off Street	**Off Street**	**Off Street**	**Off Street**
Destination Chargers	Moderate speeds – typically occasional daytime charging and top up charging using 7-22kW AC chargers	Medium dwell time (1-3 hrs)	▪ Shops / Retail / Leisure / Hotels (with customer / visitor / public parking) ▪ e.g. super-markets, leisure centres ▪ Park & Ride sites. ▪ Key visitor attractions. ▪ Council owned / public car parks.
Residential / Community Charging Hubs	Slower speeds – typically overnight charging 7kW AC chargers	Long dwell time (over 3 hrs)	▪ Residential/ suburban environments within an off-street car park. ▪ Important requirement for flats / apartment type developments. ▪ Car parks in residential areas, where on street charging is not practical. ▪ Housing estates that have local centres and shared parking areas.
Residential / Community Charging Hubs	Higher speeds – 50-350kW DC chargers	Short dwell time (less than hour)	▪ Residential/ suburban environments within an off-street car park. ▪ Important requirement for flats / apartment type developments. ▪ Car parks in residential areas, where on street charging is not practical. ▪ Housing estates that have local centres and shared parking areas.
Rapid Hub	Higher speeds – 50-350kW DC chargers.	Short dwell time (less than hour)	▪ Along main transport routes to serve through traffic, including the SRN and Major Road Network (MRN), including adjacent to these routes and at motorway service areas. ▪ Fleet locations e.g., bus and taxi fleets.

Deployment type	Charging speed	Dwell time	Typical Locations
On Street	**On Street**	**On Street**	**On Street**
Residential On-Street Chargers	Slower speeds – typically overnight charging 3-7kW AC chargers	Long dwell time (over 3 hrs)	▪ Residential areas with limited off-street parking. ▪ Car club bays
Destination On-street Chargers	Moderate speeds – typically occasional daytime charging and top up charging, 7-22kW AC chargers.	Medium dwell time (1-3 hrs)	▪ Destination charging is highly dependent on where power is available. ▪ Taxi ranks/ parking. ▪ Shopping locations – High Streets / local centres.
Destination On-street Chargers	Higher speeds – 50-150kW DC chargers	Short dwell time (less than hour)	▪ Destination charging is highly dependent on where power is available. ▪ Taxi ranks/ parking. ▪ Shopping locations – High Streets / local centres.

On-street charging

When catering for residents without off-street parking, a number of options are available, including:

- Conventional on-street chargers with dedicated EV only bays;
- ‘Community charging’, meaning residents who share their off-street EVCP via a digital platform;
- Lamp column / kerbside charging;
- Cable gullies to allow residents trail a cable from their property, underneath the footway through a tunnel or gully, to their vehicle parked on-street;
- Residents’ charging hubs in nearby car parks; or
- Remote rapid charging hubs.

In the report *Positioning chargepoints and adapting parking policies for electric vehicles (2019)*[31] it is recommended that EVCPs are not placed at the back of the footway to avoid cables running across it. If a EVCP cannot be placed due to limited space, a lamp column chargepoint could be explored, as shown in Figure 3. However, most of WBC's lamp columns are placed at the back of the footway, and therefore this is unlikely to be an option for the borough.

Figure 3 – Lamp column EVCP[32]

Enforcement and signage

Current legislation (Traffic Management Act 2004) allows councils to have the powers necessary to enforce on-street and off-street EV charging bays that are under their ownership. This includes contravention code 14 for on-street parking, and contravention code 71 for off-street parking. To enable enforcement, a relevant TRO must be put in place by the local authority. For on-street parking, some local authorities have marked out dedicated EV charging bays, supported with an accompanying TRO to enable enforcement. Sometimes the TRO process can add cost, uncertainty and delay the installation process.

Regarding signage and bay marking, Figure 4 and Figure 5 show how an off-street parking place may be reserved for EVs. WBC needs to consider accessibility for disabled users at the design of EV bays. Some authorities, including Bristol City Council, are preparing bespoke design guidance for EV charging bays to promote best practice and ensure high quality design.

31 Energy Saving Trust (2019) Positioning chargepoints and adapting parking policies for electric vehicles [online] available from https://www.energysavingtrust.org.uk/sites/default/files/Local%20Authority%20Guidance%20-%20Positioning%20chargepoints.pdf Accessed: 21 April 2022.

32 https://www.jojusolar.co.uk/portfolio_page/lamp-post-charging-points-reading/

Figure 4 – Good practice example of off-street EV bay signage

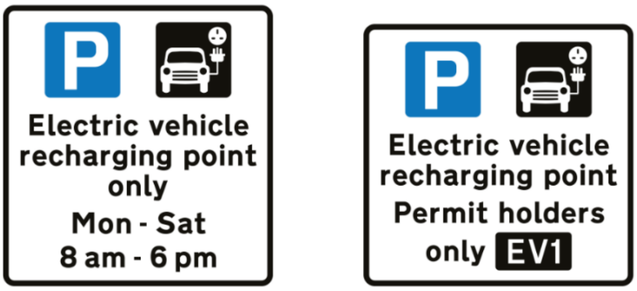
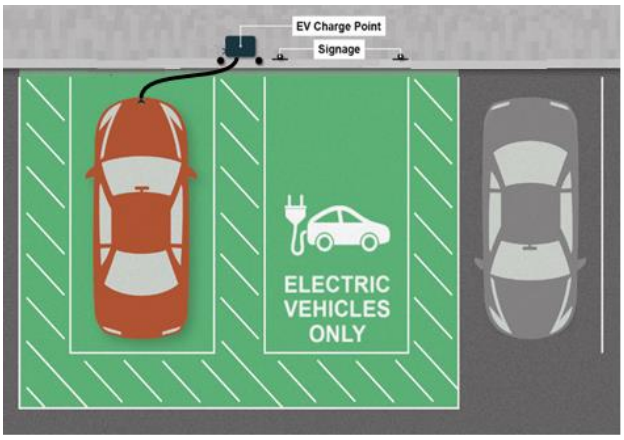


Figure 5 – Good practice example of off-street EV bay layout with markings



Technical Standards

Technical standards and specifications for EVCPs can be accessed via the following documents:

- The Office for Zero Emission Vehicles (OZEV)[33]
- BEAMA Guide to Electric Vehicle Infrastructure[34]
- The UK Electric Vehicle Supply Equipment Association (UK-EVSE) Procurement Guide[35]

33 Office for Zero Emission Vehicles [online] available from https://www.gov.uk/search/all?organisations%5B%5D=office-for-zero-emission-vehicles&order=updated-newest&parent=office-for-zero-emission-vehicles Accessed: 21 April 2022.

34 BEAMA (nd) A Guide To Electric Vehicle Infrastructure [online] available from https://www.beama.org.uk/asset/3D15B964-64C4-4AF0-827C0FF6E07A05B3/ Accessed: 21 April 2022.

35 UK Electric Vehicle Supply Equipment Association (2019) Making the right connections General procurement guidance for electric vehicle chargepoints [online] available from https://www.r-e-a.net/wp-content/uploads/2020/03/Updated-UK-EVSE-Procurement-Guide.pdf Accessed: 21 April 2022.

- The IET Code of Practice for Electric Vehicle Charging Equipment Installation, 4th Edition[36]

Load Management

Load management is a critical function in supporting scalability. Load management is where the charger automatically divides the available power over the vehicles that are actively charging. This means that faster charging is available when fewer points are in use, and that power is reduced when there are more vehicles plugged in so that the overall demand is managed within the supply capacity.

Static load management evenly distributes power across all EVs connected to chargepoints, based on a pre-set load limit.

Dynamic load management (also known as active load management) enables each charger to operate at a different charge rate, based on the requirements of each vehicle. This maximises the number of vehicles that can utilise faster charging when only a small number of vehicles are charging.

Future proofing

Passive charging provision is where a parking bay is fitted with the necessary cabling, ducting and metal tray to an isolator, distribution board, as well as the reserved power supply. This means the bay can have a chargepoint installed cheaply and quickly at a later date, when required and coordinated to function as part of a wider system. Passive charging, as well as active charging, is a requirement for new developments and retrofits.[37] Additionally, some public chargepoints can now be installed using generic groundworks, meaning they can be easily removed and replaced.

Smart Charging

Smart chargers enable active communications between the chargepoint and the EV (known as Mode 3 charging). A smart charger can receive, process and respond to information or signals (such as adjusting the rate of charge), transmit, monitor and record information such as energy consumption data, comply with requirements around security, and be accessed remotely. From a wider grid balancing perspective, smart chargers make it possible to control groups of chargers to manage demand in peak periods. Since 2019 all new

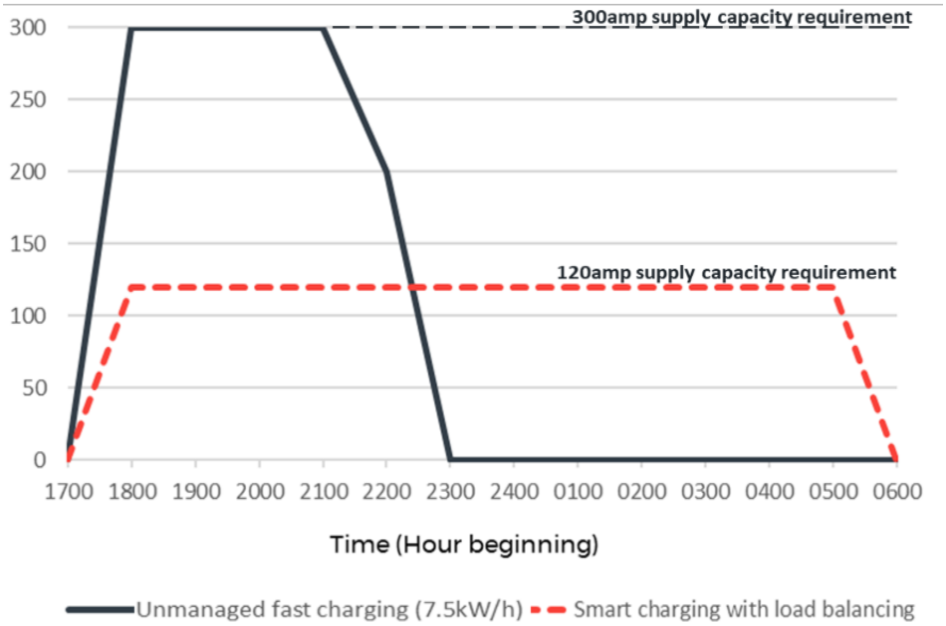
---

36 The IET (2020) Code of Practice for Electric Vehicle Charging Equipment Installation, 4th Edition [online] available from https://electrical.theiet.org/wiring-matters/years/2020/80-may-2020/the-iet-code-of-practice-for-electric-vehicle-charging-equipment-installation-4th-edition/ Accessed: 21 April 2022.

37 The HM Government (2022) Approved Document S: infrastructure for charging electric vehicles [online] available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1057375/AD_S.pdf. Accessed: 21 April 2022.

chargepoints deployed in the UK must be capable of smart charging in order to access grant funding, as stipulated by the Automated and Electric Vehicles Act 2018.[38]

Figure 6 – Smart Chargers and Load Management to reduce peak loads and reduce supply capacity requirements (each charging 20 cars)



Capital and operating costs of EVCPs

The costs presented in Table 5 represent an average per EVCP for both fast and rapid chargers. These are based on industry engagement and quotes recently received by other local authorities.

In practice there are a wide range of factors that may impact costs. There are economies of scale when installing multiple units per site, equally economies of scale when tendering for multiple EVCPs at once. The exact specifications including quality of equipment and location (on or off-street) affects price. The delivery model will also impact costs, preferential rates may be provided under a long-term supply agreement or concession.

DNO connections present the biggest cost uncertainty when installing EVCPs. Quotes are provided by the DNOs for each specific site, based on the specific local conditions and the amount of power required.

The costs presented in Table 5 represent an average of quotes recently received by other local authorities. It does not reflect the highest possible prices, on the assumption that alternative sites would be selected if these quotes were received.

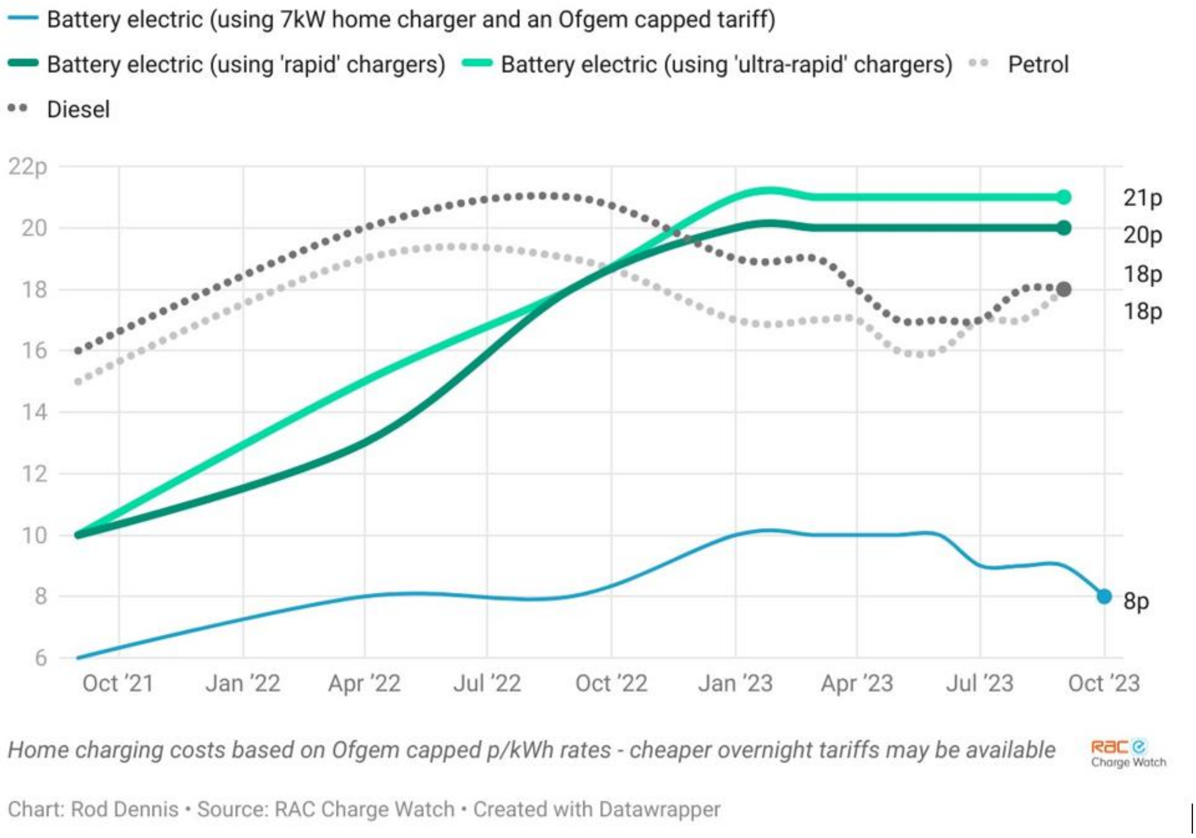
38 UK Public General Acts (2018) Part C [online] available from https://www.legislation.gov.uk/ukpga/2018/18/part/2/enacted Accessed: 21 April 2022.

Table 5 – Indicative capital and operating costs per EVCP

	Fast	**Rapid**
Capital costs	£10,000	£45,000
Grid connection	£5,000	£5,000
Total	**£15,000**	**£50,000**
Annual operating costs	£450	£1,800

Figure 7 below presents the average cost per mile of driving an electric car and compared this to a per-mile cost of driving a petrol or diesel car. According to this, until October 2022, the cost of charging an EV using any form of charger was lower than the cost of fuelling a petrol or diesel car. Since then, and as of October 2023, charging an EV using either a rapid or ultra rapid charger is between 2 and 3p more expensive than fuelling a petrol or diesel car. However, charging an EV using a home charger continues to be the cheapest method.

Figure 7 – Running an EV: cost per mile comparisons[39]



39 Electric car public charging costs | RAC Charge Watch | RAC Drive [online] available from https://www.rac.co.uk/drive/electric-cars/charging/electric-car-public-charging-costs-rac-charge-watch/ Accessed: 25/10/2023

Future chargepoint technologies

There are several emerging developments for EVCPs, as more innovative solutions are sought to further encourage the uptake of EVs. These new charging innovations should be monitored but are not currently widely deployed.

Cable gullies

There are a number of options coming to the market to enable homeowners who have no off-street parking to lay a cable across paving so they can charge their car from a domestic socket or chargepoint. The legality of these and whether they meet paving regulations are still not confirmed and it is often decided by the Local Authority[40]. The installation of any gully may need to conform to Highways Act 1980 Section 178(1) and any cable would need to meet the electrical regulations BS7671. Lastly, there is still a grey area around who would be responsible for the upkeep of the gully and who is responsible for any accidents that the gully may cause.

However, cable channels have proved popular in trials[41]. A trial in Oxford highlighted that cable channels were the public's favoured solution. Since this study, some solutions have been brought to market, including the Green Mole[42].

Inductive charging[43]

This is a wireless system which uses the principle of electromagnetic induction. Electricity is transferred through an air gap from one magnetic coil in the charger to a second magnetic coil fitted to the car. The charging pads can be embedded within parking bays. Whilst inductive charging technologies have been around for a number of years, the issue has always been cost, due to a lack of standardisation and interoperability meaning a bespoke kit is required for each vehicle type which does not come as standard on vehicles. The market is beginning to catch up with the technology in this area and in the medium term may begin to be more prevalent for off-street charging. It is considered an enabler of autonomous vehicles, as a vehicle could potentially drive to an inductive charging bay for charging, without relying on a user to plug in the vehicle.[44]

---

40 https://www.hants.gov.uk/transport/licencesandpermits/cables
41 https://www.tsu.ox.ac.uk/pubs/2019-GULO-Phase-1-Final-Report.pdf
42 https://green-mole.co.uk/ev-charging-for-terraced-households/
43 Current-News (2020) Connected Kerb to rollout wireless EV charging https://www.current-news.co.uk/news/connected-kerb-announce-wireless-ev-charger-rollout Accessed: 21 April 2022.
44 Electrive.com (2020) SAE introduces standard for wireless charging up to 11 kW. https://www.electrive.com/2020/10/24/sae-introduces-standard-for-wireless-charging-up-to-11-kw Accessed: 21 April 2022.

Dynamic charging[45]

This is an innovative solution based on inductive charging where charging pads transmit electricity wirelessly to the battery mounted in EVs. However, in this case dynamic charging allows EVs to charge on the move thanks to the under-road charging pads installed all the way.

The solution could eliminate range anxiety and minimise the time wasted at charging stations. Another prominent advantage of dynamic charging is space efficiency. Electric road systems could mean that none of the charging infrastructure is visible which make more space for other investments. However, the charging roads infrastructure would require a major overhaul of roadways which makes dynamic charging a very large operation in terms of construction and installation costs. It is still unknown how such wireless charging will impact on the power grid. There are several ongoing research trials that aim to deliver solutions to make dynamic charging affordable, safe and efficient.

Mobile charging[46]

Is a method of recharging an EV that involves bringing the charging infrastructure to the vehicle. Some companies offer on-demand mobile EV charging services, where they dispatch a charging vehicle to the persons location, such as at their home or workplace, to charge their EV. Mobile charging units avoid some challenges associated with fixed EV charging infrastructure, as they avoid the need for designated EV bays and enforcement, can be disconnected as soon as charging is complete, and potentially require less upfront investment. They can also be repositioned or sold if demand does not materialise.

Vehicle to Grid (V2G)[47]

V2G enables certain EVs fitted with the CHAdeMO protocol the ability to feed electricity back into a home, workplace, or grid, when demand is at its highest, before then charging at off-peak times during the day or night. This effectively uses the EV as a portable energy storage system, which will become increasingly useful as the share of intermittent renewable generation increases. A single EV can provide 3-4 days electricity for a family home according to the Japanese electricity utility Tepco, which invented bi-directional charging technology. It also presents the user with an opportunity to generate revenues through energy arbitrage (the process of purchasing energy at off-peak hours when it is

---

[45] Intelligent Living (2021) Roads That Charge Electric Cars Wirelessly Are Springing Up Everywhere https://www.intelligentliving.co/roads-that-charge-electric-cars-wirelessly-springing-up-everywhere Accessed: 21 April 2022.

[46] Center on Global Energy Policy Columbia | SIPA (2019) Electric Vehicle Charging in China and The United States [online] available from https://energypolicy.columbia.edu/sites/default/files/file-uploads/EV_ChargingChina-CGEP_Report_Final.pdf Accessed: 21 April 2022.

[47] Reuters Events (2020) Why V2G holds the key to the electric vehicle revolution [online] available from https://www.reutersevents.com/sustainability/why-v2g-holds-key-electric-vehicle-revolution Accessed: 21 April 2022.

cheapest and stored for peak demand) and peak shaving. It is estimated that by 2050, up to 45% of households will actively provide V2G services[48].

Co-locating EV chargers with battery storage and renewable generation

The co-location of EVCPs with battery storage and renewable energy generation has been promoted for sites with constrained grid capacity which can limit the number or type of EVCPs provided. This can be used to reduce the peak demand of the installation, avoiding or at least deferring costly grid upgrades. The batteries act as a buffer, charging at a low rate during off-peak times or when on-site renewable generation is available, and then discharging to support the grid connection when demand exceeds the site's capacity limit. This enables the charging site to access low-cost electricity, while the revenues could also be supplemented through using the batteries to provide grid services.

Summary

The above section highlights the various technologies and systems that are available for charging EVs.

Whilst many of these technologies will be costly to install, the Council has an opportunity to set the agenda and work with the private sector to ensure that there is a mix of different solutions available that will cover the EV charging needs of residents, businesses and visitors.

This strategy provides guidance on the number and type of publicly available EVCPs that need to be installed across the borough by 2030. The Council must ensure that they have rules and regulations that prevent residents being locked-in to expensive services or cause undue damage to the built environment. There is an opportunity available now to create an EV charging ecosystem in the region that will comfortably serve the residents before the market begins to provide services only where there is a profit to be made.

When installing EVCPs, the Council should ensure the issues faced by those with physical and hidden disabilities are considered, as better design is required to make EV ownership accessible to all. The Council could work with accessibility organisations and bodies to set suitable standards for the infrastructure design. Specific to the deployment of EV charging infrastructure, good design should be applied to each step of the process:

- **Parking bay size and layout** – Bay length and width sufficient to allow manoeuvrability around vehicle, including buffer zone between vehicle and carriageway.

[48] The Future of Vehicle to Grid EV charging - CrowdCharge (crowd-charge.com) Accessed: 25/10/2023

- **Bay markings, signage and enforcement** – Bays should be marked appropriately along with accompanying signage to make road users aware if a bay is available for general use or reserved for specific users (e.g. those with disabilities). Appropriate enforcement should also be applied to discourage misuse.
- **Footway and kerb layout** – Footway width sufficient to accommodate a chargepoint and not intrude on comfort of footway users, including those with disabilities. Dropped kerbs to allow ease of movement between parking bay and footway.
- **Chargepoint interface** – The chargepoint should be easy to operate for all users, such as those who face dexterity issues. Instructions on operating the chargepoint should also be easy to understand. In the instance where a user struggles to understand, a 'help' or 'call for assistance' option may be provided.
- **Rapid chargers featuring effective cable management** – Where the cable is less likely to trail on the floor when not in use, and is more manoeuvrable when plugging in, given the additional weight of rapid charging cables.
- **Safety and Security** – Additional measures such as providing suitable lighting and CCTV will improve comfort of chargepoint users where natural/active surveillance is limited during dark hours. This improves the setting for all users, especially those who are alone.

BASELINE ANALYSIS

Local context

According to the ONS 2021 Census[49], Wokingham has a population of 177,500, with 77% of the population in the 0-60 age group. Wokingham is classified as 'Urban with City and Town', with an overall population density of 992 people per sq.km.

As of 6 June 2023, ZapMap[1] showed there were 219 publicly available EV charging sockets (130 charging devices) at all speeds across the borough (details of their locations can be found in Figure 12 – Existing EVCP locations across Wokingham Borough Council. Of these, 75 were rapid charging or above sockets. A list of these existing EVCPs can be found in Appendix B.

Parking in Wokingham Borough

A key factor in determining where EVCP provision, and particularly public sector provision, will be needed, is the reliance residents have on on-street parking. Figure 8 and 9 show the current parking situation in the borough. High reliance on on-street parking is most noticeable in urban areas like Wokingham, Winnersh, Woodley, Earley and Twyford where many residential houses do not have their own private driveway, as seen in Figure 8.

Figure 9 shows there are 33 publicly owned car parks across the borough and of these, 8 (24%) have EVCPs installed. These car parks include:

- Bulmershe Leisure Centre;
- California Country Park;
- Carnival Pool multi-storey;
- Coppid Beech Park and Ride
- Dinton Pastures;
- Winnersh Triangle Park and Ride;
- Wokingham Council Offices East; and
- Wokingham Council Offices.

[49] Office for National Statistics (2020). [online] available from: https://www.nomisweb.co.uk/ Accessed: 11 April 2023.

Figure 8 – Off-street parking availability across Wokingham Borough Council

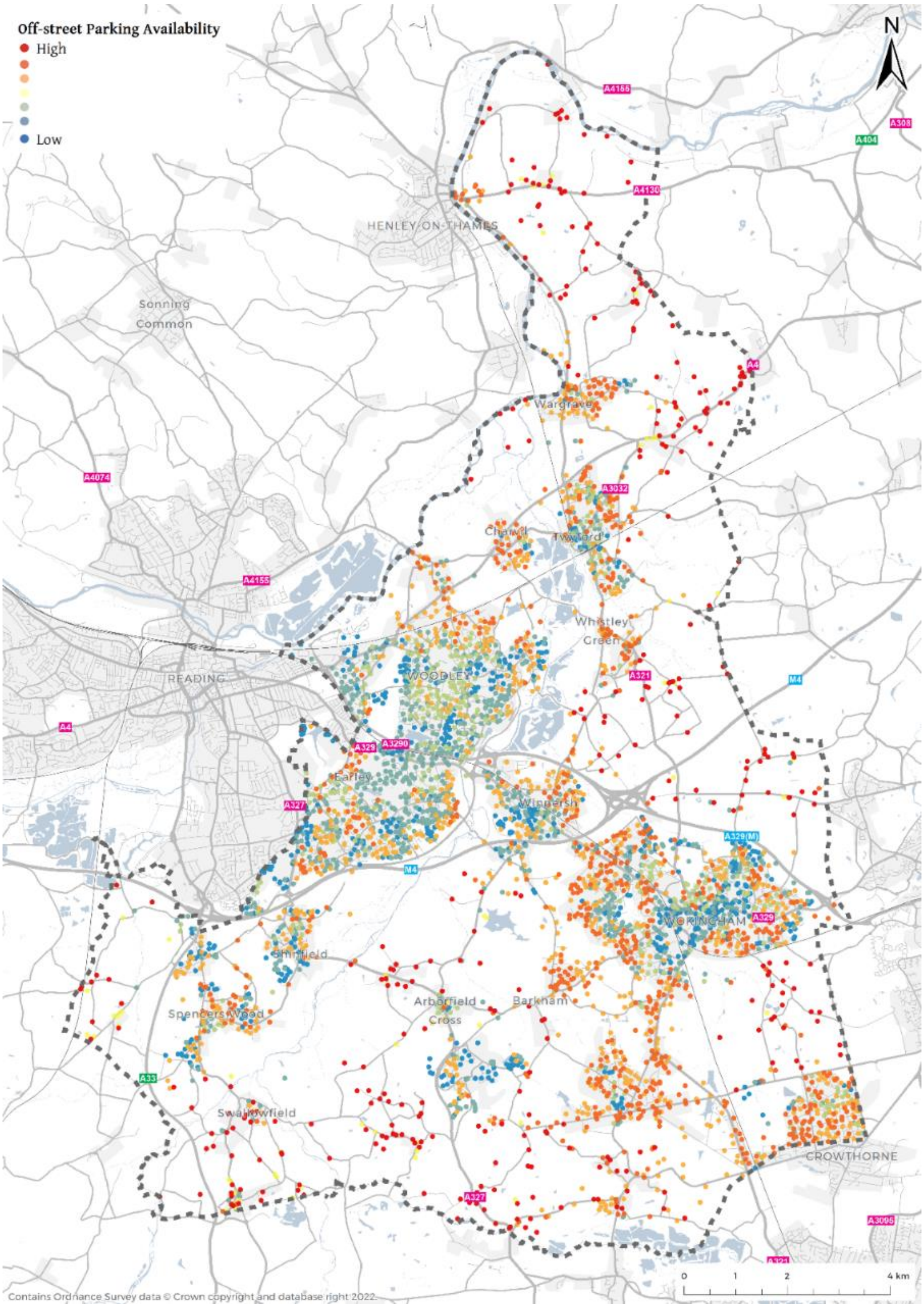
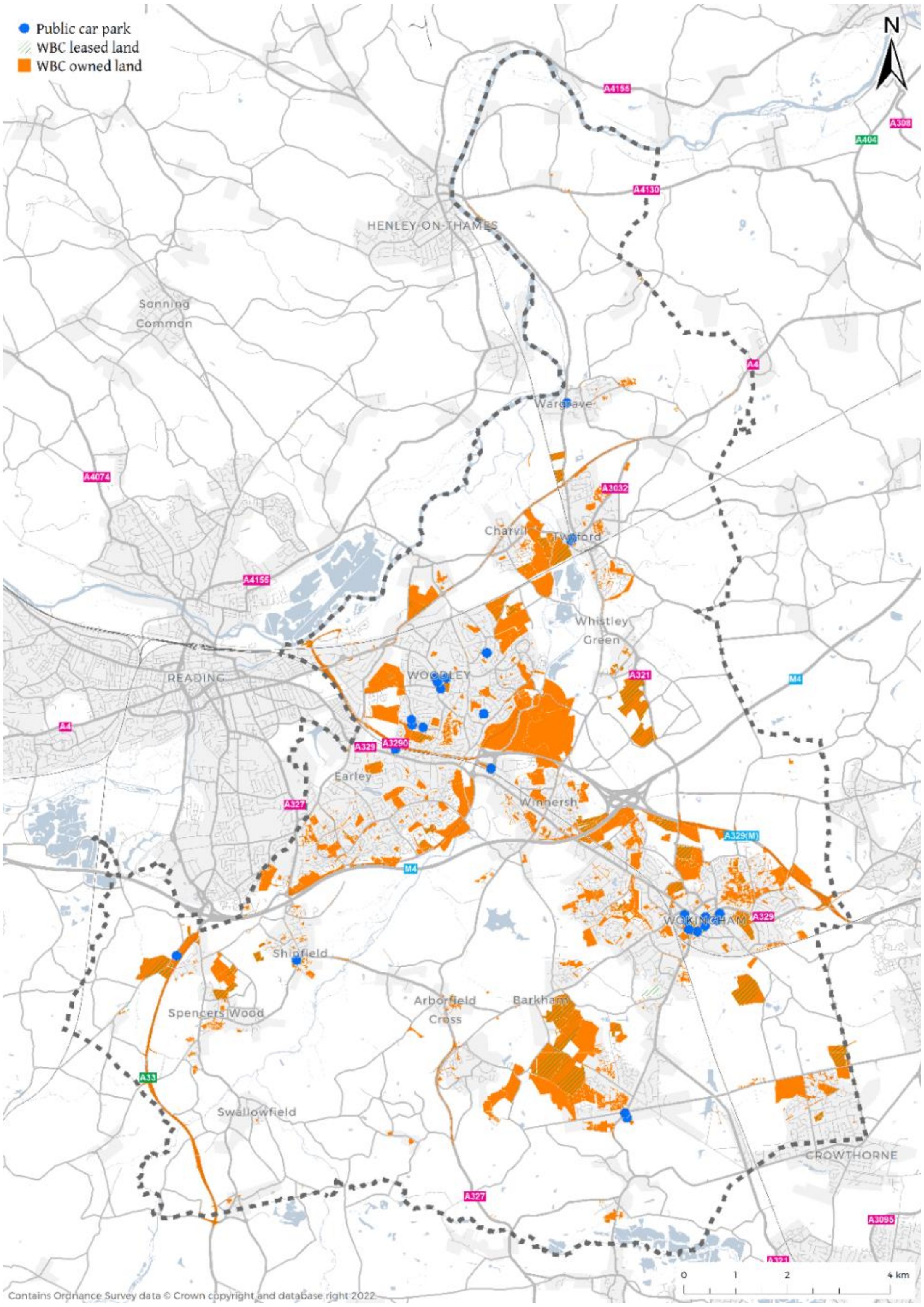


Figure 9 – Public car parks and council owned land in Wokingham Borough Council



Electric vehicles and chargepoints

This section provides a description of the trends in EV uptake, existing EVCP network and parking locations in the WBC area. The information identifies current EV uptake across the area by analysing current EV registrations. The data looks at how uptake has changed over the years, and comparisons are made between Wokingham Borough and the national average. This section also identifies existing EVCP usage and the ratio of EVCPs to EVs.

EV ownership

This section identifies current EV registrations across the WBC area using data from the DfT and looks at the current situation regarding EVCP delivery.

ULEV refers to vehicles that are reported to emit less than 75g of CO_2 from the tailpipe for every kilometre travelled. In practice, the term typically refers to battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs) and fuel cell electric vehicles (FCEV). The term ULEV is now less widely used, and so for ease of reference within this report the term EV is used instead to cover both BEVs and PHEVs. It is important to note that the EV uptake data are based on locations where vehicles are reported to be formally registered within published DfT data, in some cases this can include the presence of large commercial vehicle leasing. This does not appear to be the case in Wokingham Borough, as the share of vehicles registered to companies rather than individuals is well below the national average (see the Keepership section).

Data on the number of EVs is available from the DfT vehicle licensing statistics dataset. Data on the number of licensed vehicles is available by quarter since 2010.

Figure 10 below shows how the number of EV vehicles in the UK has increased from 10,026 at the end of 2012 Q3 to 991,419 at the end of 2022 Q3[50].

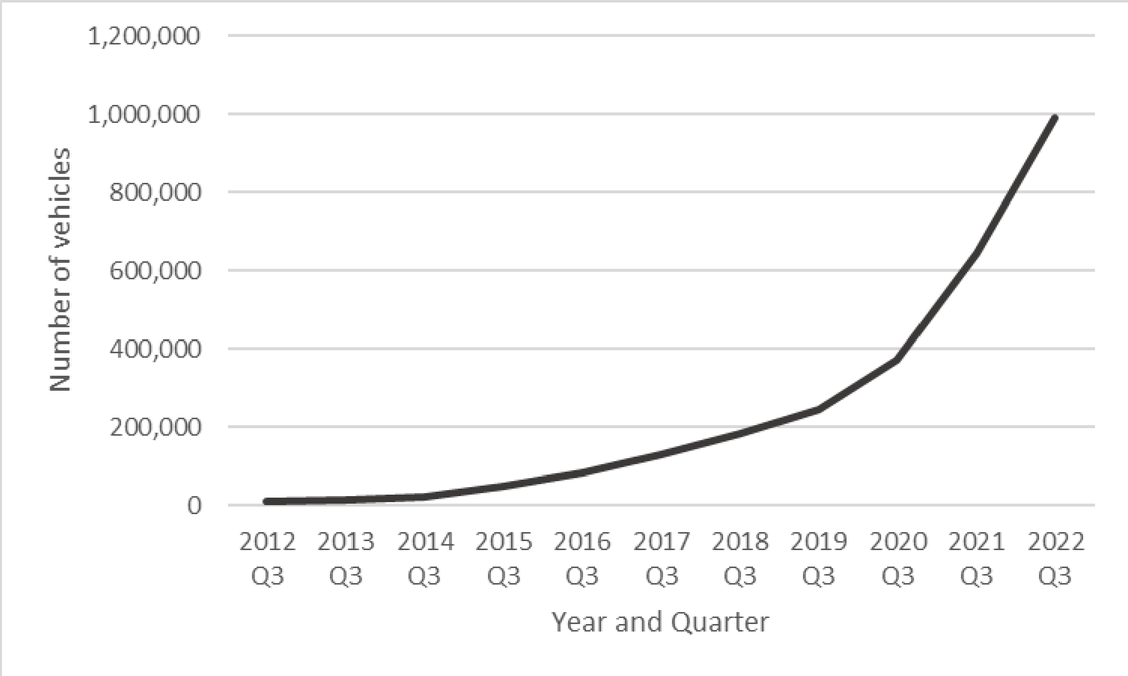
According to the Society for Motor Manufacturers and Traders (SMMT) reports, in 2021 more new BEVs were registered than over the previous five years combined[51]. BEV and PHEV together accounted for 18.5% of all new cars registered in 2021. Strong policy support in the UK has been a key driver in EV uptake for both consumer demand and further industry investment. The UK has also re-asserted targets under Net Zero to support low emission vehicles.

---

50 Department for Transport (2021) VEH0132: Licenced ultra-low emission vehicles by local authority: United Kingdom [online] available from https://www.gov.uk/government/statistical-data-sets/vehicle-licensing-statistics-data-tables Accessed: 12 April 2023.

51 Society for Motor Manufacturers and Traders (2022) Covid stalls 2021 UK new car market but record EV sales show future direction [online] available from https://www.smmt.co.uk/2022/01/covid-stalls-2021-uk-new-car-market-but-record-ev-sales-show-future-direction/ Accessed: 21 April 2022.

Figure 10 – UK EV ownership from 2012 Q3 to 2022 Q3[63]



Of the 991,419 licenced EVs in the UK in 2022 Q3, a total of 602,692 (61%) were BEVs and 363,367 (37%) were PHEVs. The other 2% of EVs were unknown. This is significant as until 2020 Q4, PHEVs have had a greater market share than BEVs, highlighting there is now a shift towards fully electric vehicles.

As can be seen in Table 6, as of 2022 Q3[52], when considering all vehicles registered in the UK, there were 40,772,400 vehicles registered. Of these, 2.43% were EVs in 2022 Q3[53].

Table 6 – EV Penetration in Total Licensed Vehicles (Q3 2022)

	EV	Total licensed vehicles (in thousands)	EV penetration (end of 2022)
Wokingham Borough	2,839	116.7	2.43%
West Berkshire	2,424	115.8	2.09%
Bracknell Forest	1,466	98.1	1.49%

52 The most recent data set available at the time of writing. Department for Transport (2022) Licensed vehicles at the end of the year by body type and upper and lower tier local authority, including diesel cars and vans, United Kingdom [online] available from https://www.gov.uk/government/collections/vehicles-statistics Accessed: 12 April 2023.

53 Department for Transport (2021) VEH0132: Licenced ultra-low emission vehicles by local authority: United Kingdom [online] available from https://www.gov.uk/government/statistical-data-sets/all-vehicles-veh01 Accessed: 12 April 2023.

	EV	Total licensed vehicles (in thousands)	EV penetration (end of 2022)
Reading	1,308	77.3	1.69%
England	899,379	34,385.5	2.62%
United Kingdom	991,419	40,772.4	2.43%

According to the SMMT, there was a decline by 14.3% in new car sales in March 2022 compared to the previous year[54]. It is highlighted as the weakest March since 1998, which was prior to the introduction of the two-plate system. The SMMT attribute this decline to the constraints in supply chains due to the impact made by global semiconductor shortage and the Ukraine invasion. Furthermore, economic factors such as rising energy costs, fuel costs, inflation and a squeeze on household incomes could also be impacting demand. Whilst diesel and petrol car sales have seen a decrease of 55.2% and 25.6%, respectively, by contrast, BEVs have seen an increase of nearly 79%. Table 7 shows that EV market share has increased from 13.9% in 2021 to 22.7% in 2022.

Table 7 – SMMT March 2022 Car Registrations Overview of Vehicle Type Registrations in the UK[55]

	2022	2021	% change	Mkt share - 22	Mkt share - 21
Diesel	13,736	30,730	-55.2%	5.6%	10.8%
Petrol	102,349	137,557	-25.6%	42.0%	48.4%
Mild Hybrid EV (MHEV) diesel	11,569	23,273	-50.3%	4.8%	8.2%
Mild Hybrid EV (MHEV) petrol	32,716	31,472	4.0%	13.4%	11.1%
Hybrid Electric (HEV) – Non-plug-in	27,737	21,599	28.4%	11.4%	7.6%
BEV	39,315	22,003	78.7%	16.1%	7.7%
PHEV	16,037	17,330	-7.5%	6.6%	6.1%
TOTAL	243,459	283,964	-14.3%		

54 New car market feels supply chain squeeze during critical 'new numberplate' month - SMMT
55 SMMT (2022) Vehicle Data Car Registrations [online] available from https://www.smmt.co.uk/vehicle-data/car-registrations/ Accessed: 21 April 2022

EV registrations in Wokingham

The latest total registered vehicle data from the DfT reveals that in 2022 there were 116,700 vehicles registered in Wokingham borough, with 2,839 of these being EV. This means that across Wokingham, 2.43% of vehicles were EVs in 2022 Q3. This is the same proportion compared to the UK average, though slightly lower than the England average, which saw 2.62% of registered vehicles in 2022 Q3 being EVs.

EV ownership has increased significantly in Wokingham over time, presented in Figure 11. Table 8 shows the percentage change in EV ownership incrementally for Wokingham borough, England and the UK.

The number of licensed EVs in Wokingham borough has increased from 346 vehicles in 2017 Q3 to 2,839 in 2022 Q3, which equates to an increase of over seven times. Between 2021 Q3 and 2022 Q3, Wokingham saw a substantial increase of 58% in EV registrations, which was 4% higher than both the UK and England.

At the national level, EV ownership has increased from 129,006 in 2017 Q3 to 991,419 in 2022 Q3, which is also an increase of over seven times.

Figure 11 – Wokingham Borough EV ownership from 2012 Q3 to 2022 Q3[57]

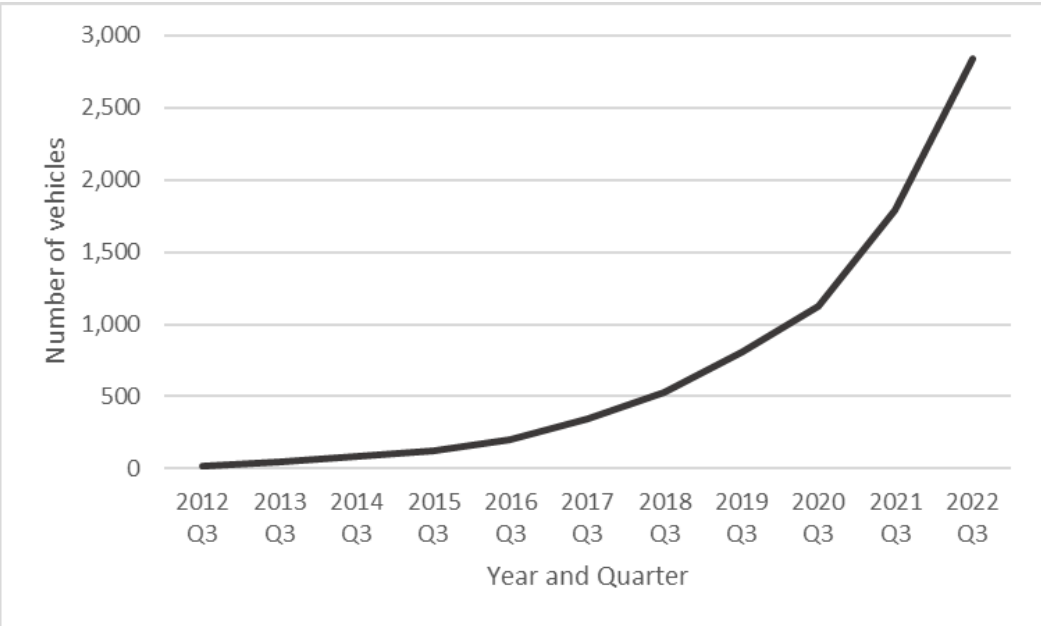


Table 8 – EV ownership and percentage change in Wokingham Borough, England, and the UK (DfT 2022)

	2022 Q3	2021 Q3	2020 Q3	2019 Q3	2018 Q3	2017 Q3
United Kingdom	991,419	643,543	372,136	243,992	182,289	129,006
% Change	54%	73%	53%	34%	41%	53%
England	899,379	584,370	338,518	221,485	165,982	117,830
% Change	54%	73%	53%	33%	41%	53%
Wokingham Borough	2,839	1,788	1,122	803	529	346
% Change	58%	59%	40%	52%	53%	70%

Keepership

Keepership of a vehicle is described by the DfT as the person/body responsible for registering and taxing the vehicle and is not necessarily the owner or driver. Vehicles under private keepership are registered to an individual in private ownership, and company keepership is to a business[56]. Table 9 below shows the percentage share of EVs by keepership type across the UK, England and Wokingham borough.

Table 9 – Percentage share of EVs by Keepership across the UK and Wokingham Borough 2022 Q3[57]

	Total EV	Private	%	Company	%
Wokingham Borough	2,839	2,481	87%	358	13%
England	899,379	384,758	43%	499,592	56%
United Kingdom	991,419	436,047	44%	540,155	54%

56 Department for Transport (2022) Vehicle Licensing Statistics: Notes and Definitions [online] available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/917624/vehicle-licensing-statistics-notes-definitions.pdf Accessed: 21 April 2022.

57 Department for Transport (2021) VEH0132: Licenced ultra-low emission vehicles by local authority: United Kingdom [online] available from https://www.gov.uk/government/statistical-data-sets/all-vehicles-veh01 Accessed: 21 April 2022.

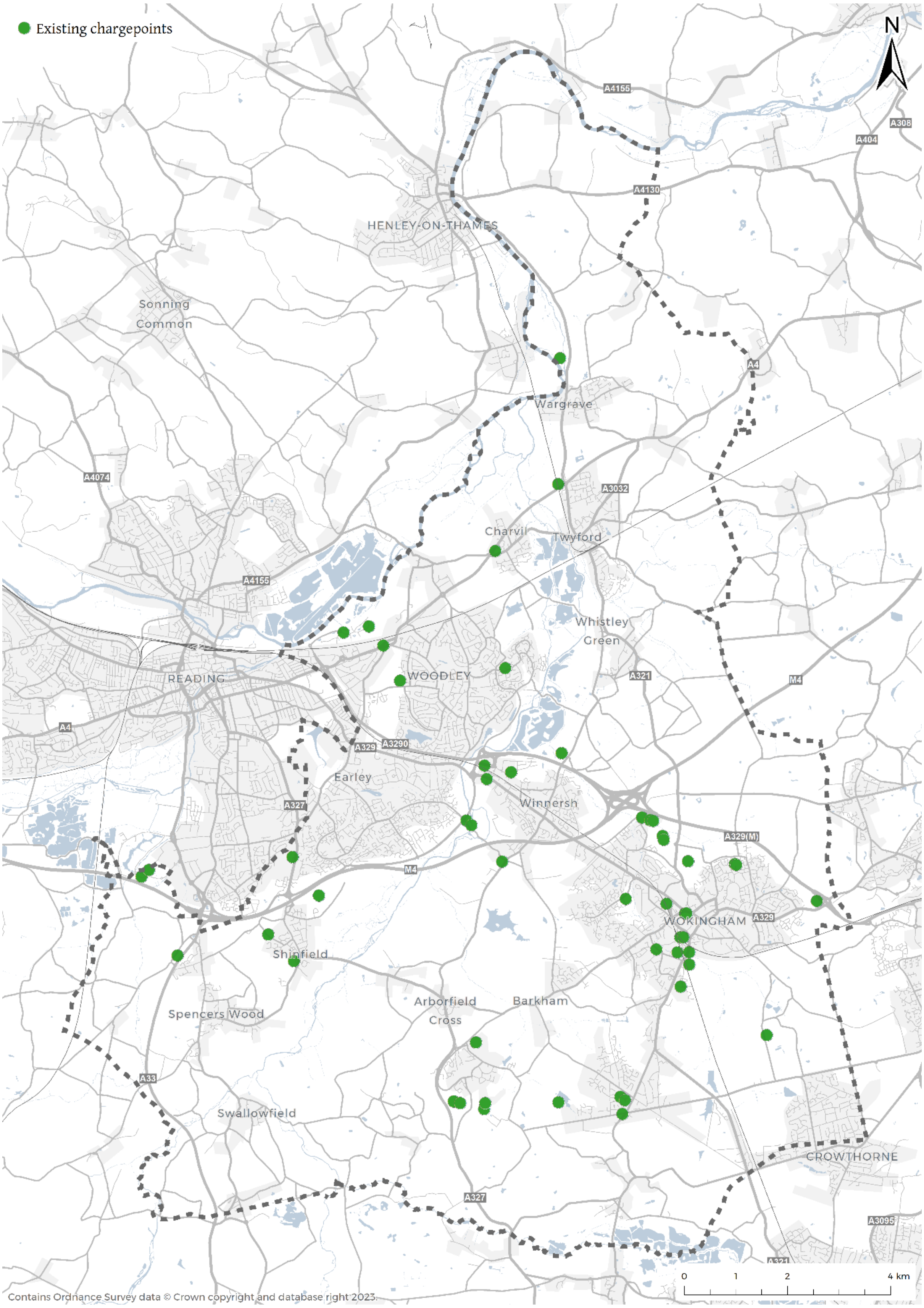
Across the UK, there is a somewhat even split between private and company keeperships of EVs, with 44% registered to private keepers and 54% to company. In England, the total EV ownership shows a similar split among the private and company keepers, with 43% and 56%, respectively. However, across the WBC area, EV registrations are dominated by private keeperships at 87%, leaving 13% registered to company keepers. WBC will explore why company keepership is significantly lower than the national average, and as part of their actions, they will look to encourage more businesses to switch to EVs.

Existing chargepoints

The WBC area already has 219 publicly available charging sockets across 130 charging devices (as of 6 June 2023) and currently plans to expand the network with more chargepoints in car parks, and on-street locations. At the time of writing, the locations of the existing public chargepoints are shown in Figure 12. These locations are according to those marked as publicly available on Zap Map (as of June 2023)[58].

58 Map of electric charging points for electric cars UK: Zapmap (zap-map.com) Accessed: 17 May 2023

Figure 12 – Existing EVCP locations across Wokingham Borough Council



Ratio of Electric Vehicle Chargepoints to Electric Vehicles

Given the differences in population size and total vehicle registrations, it is useful to consider the ratio of EVCPs to EVs as a comparator between Wokingham, England and the UK, as shown in Table 10. Note these figures are just there to provide a comparison against national figures, as many EV owners have access to a domestic EVCP, and visitor EV users in the borough are not accounted for. The figures presented also represent EVCP devices rather than sockets.

Across Wokingham, on average there is currently one public EVCP for every 22 EVs, which is ahead of both the national and UK average, where there are between three and four more EVs for every EVCP. Regarding rapid chargers, Wokingham, on average, has one rapid EVCP for every 69 EVs. This is also better than the UK and England average, where there is one rapid EVCP per 159 vehicles and 118 vehicles, respectively. In short, Wokingham Borough is already ahead of the national average EVCP provision per EV.

Table 10 – EVs per EVCPs in the UK and Wokingham Borough (as of April 2023)[59]

Area	EV	EVCPs (total)	EV per EVCP (total)	EVCPs (rapid or above)	EV per EVCP (rapid or above)
Wokingham Borough	2,839	130	22	41	69
England	899,379	34,203	26	7,647	118
United Kingdom	991,419	40,150	25	6,253	159

Table 11 illustrates that Wokingham is slightly higher than the UK and England averages, at 73 EVCPs per 100,000 population compared to 60 and 61 EVCPs, respectively. However, when considering the provision of rapid chargers, across the WBC area there are 22 rapid EVCPs per 100,000 population, which is substantially higher than the UK and England levels. The provision of rapid chargers is over double than that of the national average. This indicates that WBC is ahead the UK and England averages of overall EVCPs as well as in terms of rapid charger provision.

59 Results presented are drawn from: DfT, Electric vehicle charging device statistics: April 2023 tables[online] available from Electric vehicle charging device statistics: April 2023 - GOV.UK (www.gov.uk) and DfT Ultra low emission vehicles (ULEVs) licensed at the end of the quarter by upper and lower tier local authority, Table VEH0132a, 2021 Q3 Vehicle Licensing Statistics [online] available from https://www.gov.uk/government/collections/vehicles-statistics Accessed: 12 April 2023.

Table 11 – EVCPs per 100,000 population in the UK and Wokingham Borough (as of April 2023)[60]

Area	Total EVCPs per 100,000 population	Rapid EVCPs per 100,000 population
Wokingham Borough	73	23
England	61	11
United Kingdom	60	11

Local electricity grid constraints

This section of the report covers the high-level assessment of local electricity network constraints within the Wokingham borough. The local Distribution Network Operator (DNO) is Scottish and Southern Electricity Networks (SSEN). Based on publicly available information on the SSEN Network Capacity Heat Map[61] and cross-referencing the Wokingham borough border using information available on Google Maps, there are 11 substations within, or within the immediate proximity of, the Wokingham borough border.

60 DfT, Electric vehicle charging device statistics: April 2023 tables[online] available from https://www.gov.uk/government/statistics/electric-vehicle-charging-device-statistics-april-2023 Accessed: 17 May 2023.

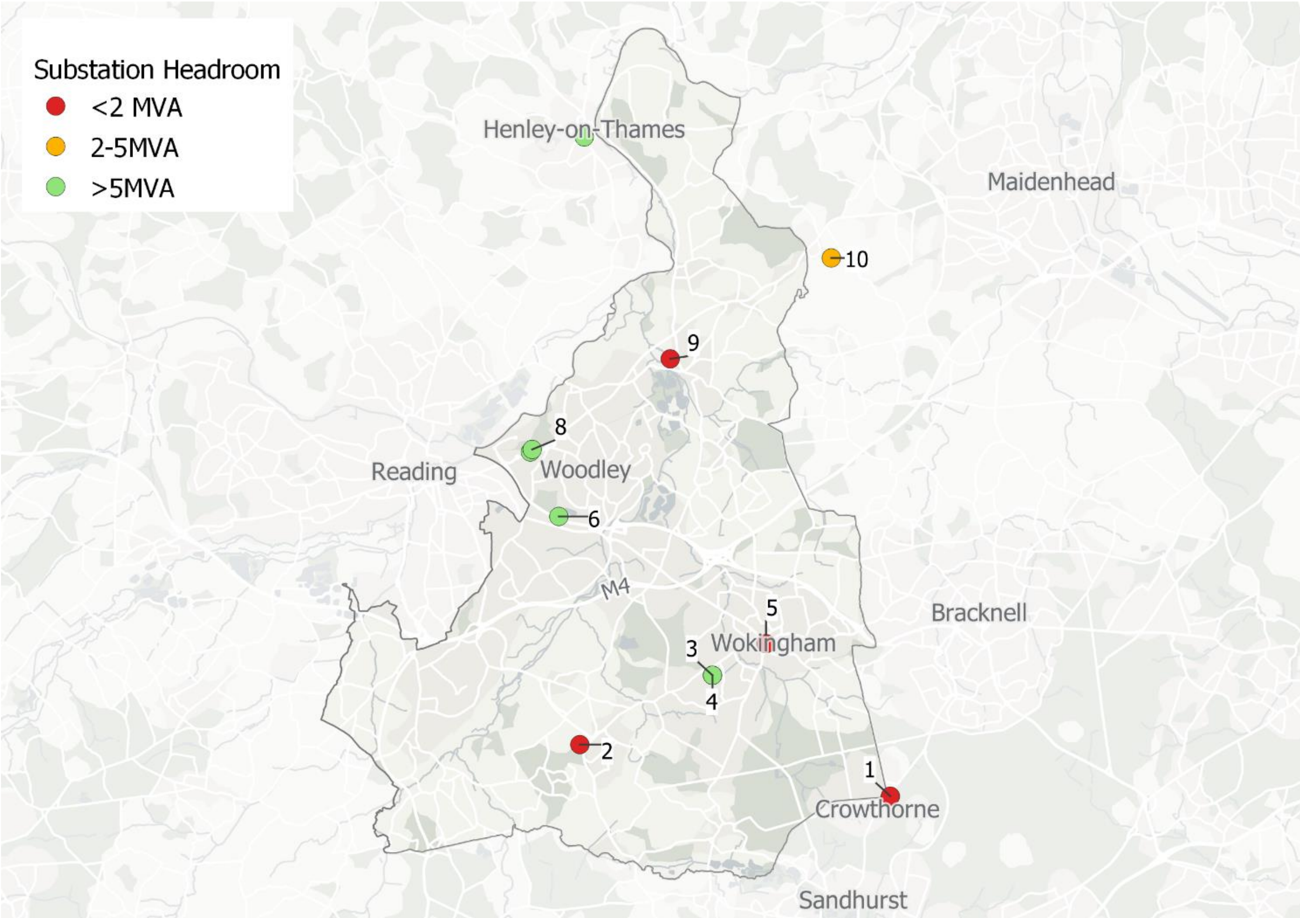
61 SSEN Network Capacity Heat Map, Online, available from https://network-maps.ssen.co.uk/opendataportal Accessed: 28 April 2022.

Table 12 – Substations within, or within the immediate proximity of, Wokingham Borough border

ID	Substation Name	Group	Substation Type	Grid Supply Point	Voltage Level	Latitude	Longitude
					kV		
1	Crowthorne	Camberley Main	Primary	FLEET BRAMLEY	33/11	51.371953	-0.78787716
2	Arborfield	Reading	Primary	BRAMLEY (BASI)	33/11	51.385867	-0.90996432
3	Wokingham	Wokingham	Bulk Supply Point	FLEET BRAMLEY	132/33	51.402441	-0.85724149
4	Wokingham	Wokingham	Primary	FLEET BRAMLEY	33/11	51.402441	-0.85724149
5	Elms Road	Wokingham	Primary	FLEET BRAMLEY	33/11	51.410027	-0.83594476
6	Little Hungerford	Reading	Primary	FLEET BRAMLEY	33/11	51.442159	-0.91692717
7	Reading	Reading	Primary	FLEET BRAMLEY	33/11	51.458165	-0.92778979
8	Reading	Reading	Bulk Supply Point	FLEET BRAMLEY	132/33	51.45877	-0.92704155
9	Twyford	Reading	Primary	FLEET BRAMLEY	33/11	51.48058	-0.87198034
10	Knowl Hill	Maidenhead	Primary	FLEET BRAMLEY	33/11	51.504816	-0.80771168

ID	Substation Name	Group	Substation Type	Grid Supply Point	Voltage Level	Latitude	Longitude
					kV		
11	Henley	Reading	Primary	FLEET BRAMLEY	33/11	51.535587	-0.90464784

Figure 13 – Wokingham Borough boarder superimposed on SSEN Network Capacity Heatmap



Using data from SSEN's most recent Long Term Development Statement (LTDS)[62], the below information was derived:

Table 13 – Wokingham Borough Demand Capacity data derived from SSEN LTDS

ID	Substation Name	Substation Type	Group	Grid Supply Point	Voltage Level (kV)	Demand 20/21		Forecast Load Information					Firm Capacity	Minimum Load Scaling Factor	Accepted Schemes	Accepted Demand (MVA)	Transmission Constraints	Transmission Works	Transmission Reinforcement Completion Date	Distribution Constraints	Distribution Reinforcement Works	Distribution Reinforcement Completion Date
						MVA	Pf	2021/22	2022/23	2023/24	2024/25	2025/26										
1	Crowthorne	Primary	Camberley Main	FLEET BRAMLEY	33/11	21.6	0.99	21.8	22.5	22.7	23.2	23.8	30.0	0.25	2.0	10.3	Constrained	uneven sharing of primary transformers	2030	Constrained	Major reinforcement at 132kV/GSP level – all import connections constrained until completion of these works	2030
2	Arborfield	Primary	Reading	BRAMLEY (BASI)	33/11	10.0	0.97	9.5	12.3	14.2	15.7	17.1	18.0	0.00	1.0	2.7	Constrained	Reading to Little Hungerford to Arborfield – 33kV circuit reinforcement, 33 kV Little Hungerford circuit limit, New 132kV switchboard triggered at Bramley. 132kV 42onnection to wait until this is completed	01/11/2020 2030 for 132kV/GSP reinforcement	Constrained	Connections might not be possible prior to Bramley Green-Arborfield reconfiguration. 132kV circuit reinforcement	2025
3	Wokingham	Bulk Supply Point	Wokingham	FLEET BRAMLEY	132/33	26.7	0.91	28.0	29.9	40.1	66.4	68.7	114.0	0.3	0.0	0.0	Constrained			Constrained	Major reinforcement at 132kV/GSP level – all import connections constrained until completion of these works	2030
4	Wokingham	Primary	Wokingham	FLEET BRAMLEY	33/11	9.4	0.91	9.5	9.8	9.9	9.9	10.0	30.0	0.2	0.0	0.0	Constrained		2030	Constrained	Major reinforcement at 132kV/GSP level – all import connections constrained until completion of these works	2030
5	Elms Road	Primary	Wokingham	FLEET BRAMLEY	33/11	17.3	0.91	19.1	19.2	21.1	22.8	23.7	24.5	0.3	0.0	0.0	Constrained		2030	Constrained	Major reinforcement at 132kV/GSP level – all import connections constrained until completion of these works	2030

62 SSEN Long Term Development Statement, Dated 04/03/2022, Available via request on https://www.ssen.co.uk/our-services/tools-and-maps/long-term-development-statements-ltds/

ID	Substation Name	Substation Type	Group	Grid Supply Point	Voltage Level (kV)	Demand 20/21		Forecast Load Information					Firm Capacity	Minimum Load Scaling Factor	Accepted Schemes	Accepted Demand (MVA)	Transmission Constraints	Transmission Works	Transmission Reinforcement Completion Date	Distribution Constraints	Distribution Reinforcement Works	Distribution Reinforcement Completion Date
						MVA	Pf	2021/22	2022/23	2023/24	2024/25	2025/26										
6	Little Hungerford	Primary	Reading	FLEET BRAMLEY	33/11	24.5	0.97	24.9	25.5	25.7	25.8	26.0	42.0	0.3	0.0	0.0	Constrained	Reading to Little Hungerford to Arborfield – 33kV circuit reinforcement, after taking Arborfield	01/11/2020 2030 for 132kV/GSP reinforcement	Constrained	Major reinforcement at 132kV/GSP level – all import connections constrained until completion of these works	2030
7	Reading	Primary	Reading	FLEET BRAMLEY	33/11	26.8	0.97	29.2	30.0	30.7	30.9	31.1	55.0	0.4	1.0	0.3	Constrained	limited by 33/11kV non-CER Transformer spr/aum	2030	Constrained	Major reinforcement at 132kV/GSP level – all import connections constrained until completion of these works	2030
8	Reading	Bulk Supply Point	Reading	FLEET BRAMLEY	132/33	122.0	0.97	129.4	137.2	142.6	143.9	145.3	228.0	0.3	5.0	7.0	Constrained	uneven sharing of BSP transformer		Constrained	Reinforcement at BSP triggered Major reinforcement at 132kV/GSP level – all import connections constrained until completion of these works	2030
9	Twyford	Primary	Reading	FLEET BRAMLEY	33/11	11.8	0.97	12.0	12.1	13.3	14.0	14.8	15.0	0.2	2.0	3.7	Constrained		2030	Constrained	Major reinforcement at 132kV/GSP level – all import connections constrained until completion of these works	2030
10	Knowl Hill	Primary	Maidenhead	FLEET BRAMLEY	33/11	3.9	0.97	3.9	3.9	4.1	4.1	4.1	6.5	0.16	0.0	0.0	Constrained	Limited headroom at primary. Transformer replacement required	2030	Constrained	Major reinforcement at 132kV/GSP level – all import connections constrained until completion of these works	2030
11	Henley	Primary	Reading	FLEET BRAMLEY	33/11	15.2	0.97	15.9	16.0	16.8	16.9	17.0	30.0	0.3	0.0	0.0	Constrained		2030	Constrained	Major reinforcement at 132kV/GSP level – all import connections constrained until completion of these works	2030

The data provided in Table 13 displays the critical information required for performing a high-level EV assessment, highlighting: each substation, the future forecast demand in the area, the site firm capacity, the number and capacity of all other accepted demand applications and any planned transmission/distribution reinforcement works and their estimated completion dates.

The firm capacity of the substations can be defined as the maximum demand capacity for which that substation can provide. From this, taking into consideration the existing (forecast) and accepted demand at each site, the substation headroom can be determined, and a Red, Amber & Green (RAG) status can be assigned as shown below in Table 14.

Table 14 – Wokingham Borough Headroom Calculation

ID	Substation Name	Substation Type	Firm Capacity (MVA)	Forecast Demand 2025/26 (MVA)	Accepted Demand (MVA)	Headroom (MVA)
1	Crowthorne	Primary	30.0	23.8	10.3	-4.1
2	Arborfield	Primary	18.0	17.1	2.7	-1.8
3	Wokingham	Bulk Supply Point	114.0	68.7	0.0	45.3
4	Wokingham	Primary	30.0	10.0	0.0	20.0
5	Elms Road	Primary	24.5	23.7	0.0	0.8
6	Little Hungerford	Primary	42.0	26.0	0.0	16.0
7	Reading	Primary	55.0	31.1	0.3	23.6
8	Reading	Bulk Supply Point	228.0	145.3	7.0	75.7
9	Twyford	Primary	15.0	14.8	3.7	-3.5
10	Knowl Hill	Primary	6.5	4.1	0.0	2.4
11	Henley	Primary	30.0	17.0	0.0	13.0

Key:

<2MVA	2-5MVA	>5MVA

Based on the findings in Table 14, it can be noted that there are several sites which have greater than 5MVA of demand capacity headroom, making them a strong contender for the connection of small-scale demand connections from a demand capacity perspective. Reference should also be made to the Transmission and Distribution reinforcement work constraints highlighted within Table 13, although changes brought about by Ofgem's Access Significant Code Review (SCR) will mean the cost of any reinforcement work will be less[63].

The information provided in this section is based on a high-level assessment of electricity grid capacity at the sub-station level. This analysis gives an indication of possible upgrade costs required when installing EVCPs. All 11 sites are located in area with a strong probability of high grid upgrade costs. However, DNO assessments need to be carried out to understand exact costs. Further details of these works will likely be obtainable through budgetary estimates/connection applications and more information may also be obtainable from attending DNO DG Surgeries.

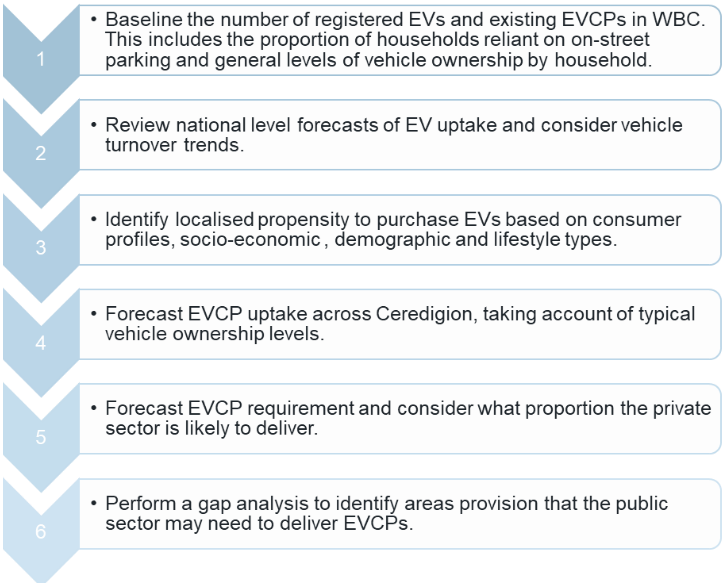
[63] Significant Code Review - SP Energy Networks. Accessed: 18 October 2023.

FORECAST CHARGING DEMAND

Approach

This section focuses on the future uptake of EVCPs, forecasting demand and requirements to 2030. The approach utilises WSP's in-house EV:Ready tool (Figure 14) to derive forecasts for future EV uptake. EV:Ready enables sophisticated EV uptake forecasting and scenario testing. It generates granular forecasts at a neighbourhood level, accounting for highly localised spatial variations in the key determinants of EV uptake rates, including consumer profiles, socio-demographics, the availability of off-street parking, vehicle ownership, vehicle sales and turnover rates and vehicle ownership trends.

Figure 14 – Steps taken as part of EV:Ready

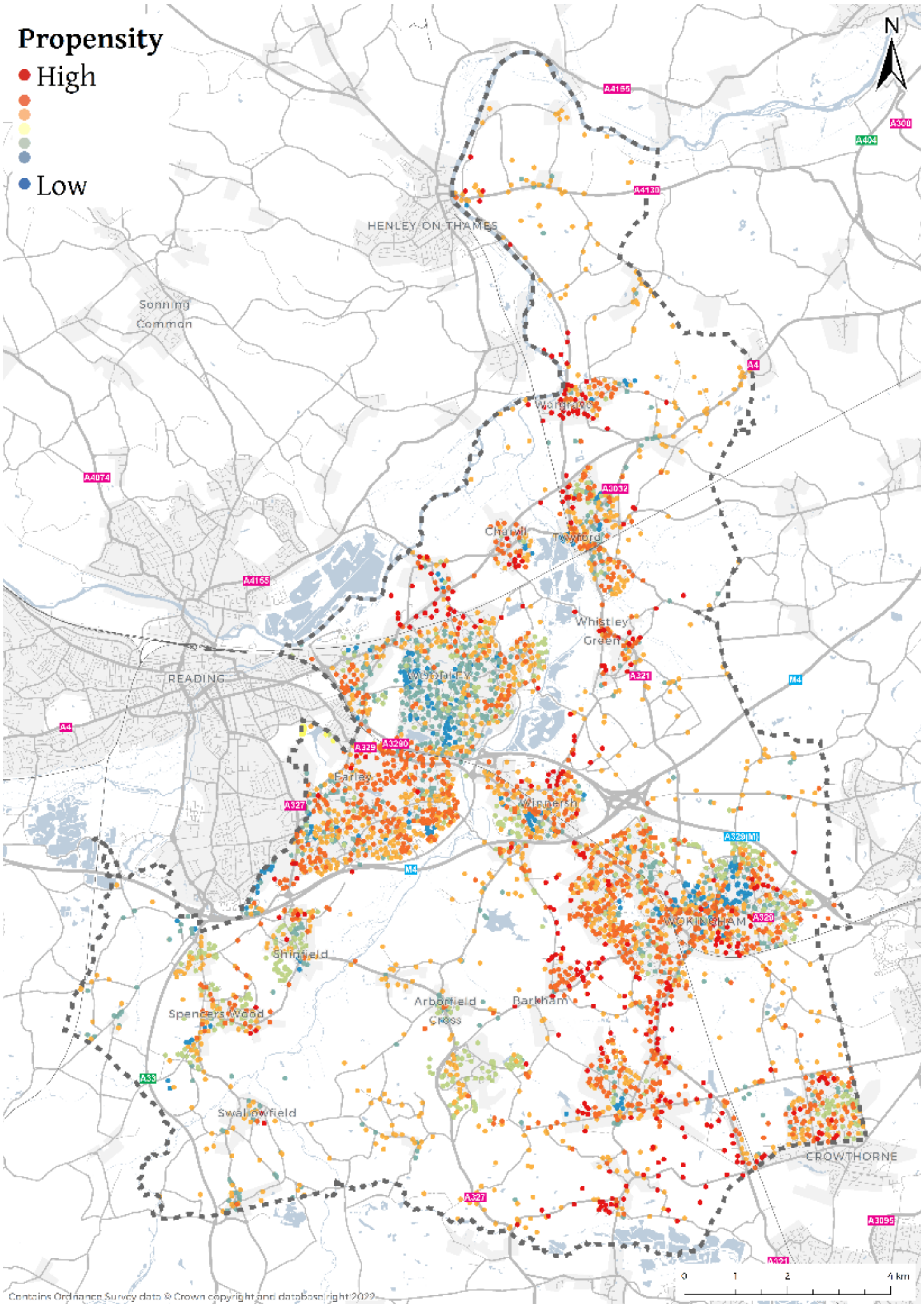


Propensity of local residents to switch to an EV

Figure 15 presents the forecast propensity of residents to purchase an EV across Wokingham borough, based on the socio-demographic factors such as earnings, education, and lifestyles, including attitudes towards new technology and to environmental issues, as well as their likelihood to buy a new vehicle, and hybrid vehicle ownership.

These findings indicate that there is quite a strong propensity to switch in most of the major urban areas. However, these are only some of several factors influencing EV uptake, as discussed on the following pages.

Figure 15 – Forecast propensity of residents of Wokingham Borough to switch to EVs



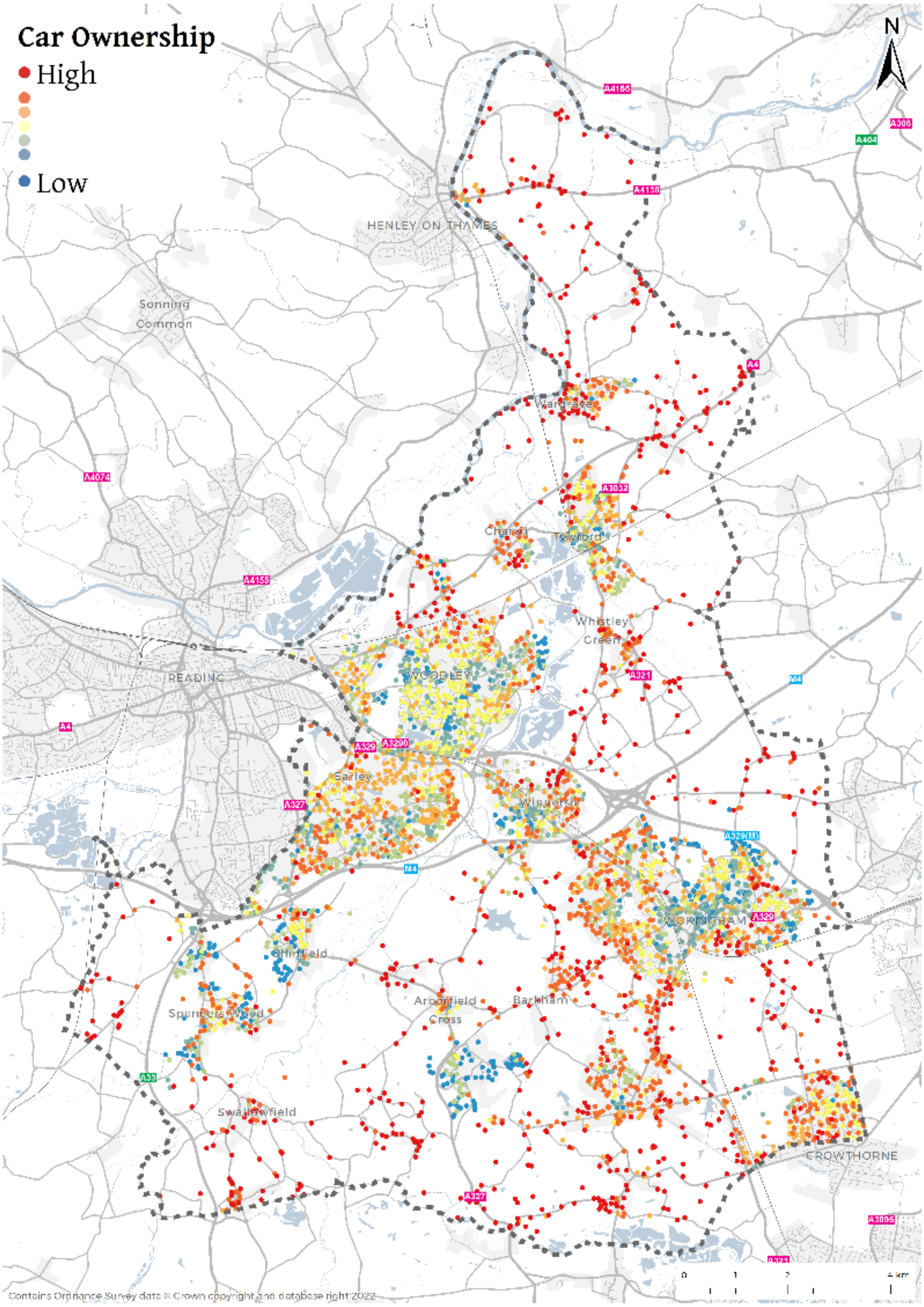
Vehicle ownership levels

Figure 16 presents average vehicle ownership levels by household at a postcode level, based on ONS data, relative to vehicle ownership levels in the region.

As described earlier, understanding the baseline car ownership levels across the borough is important, as whilst some local populations may have a high propensity to switch to an EV in principle, if they are not already a vehicle owner, they would not be expected to become one just to purchase an EV. So, EV propensities must be considered in conjunction with the car ownership levels of a given area.

The areas of lower car ownership are concentrated mainly in and around central Wokingham, Winnersh, Woodley and Shinfield. Lower levels are also observed in some smaller pockets across the borough. In addition to the socio-economic factors, this is likely due to easy access to public transport and active travel but reduced availability of parking. The more rural areas of the borough have a much higher proportion of car ownership, potentially due to a combination of accessibility factors.

Figure 16 – Vehicle ownership by household in Wokingham Borough



Off-street parking

In the Committee on Climate Change's 'Plugging the Gap' (2018) study[64] it was found that those with access to off-street charging are three times more likely to switch to an EV. It also showed 93% of EV owners are estimated to have access to home charging, despite between 20-40% of vehicles nationally having no such access. The likelihood of an area having access to off-street parking is based on the typical property types of the predominant Experian Mosaic[65] group at a postcode level and assumes that terraced dwellings and converted flats would be reliant on on-street parking. The detrimental impact of a lack off-street parking is expected to lessen over time as EV ranges increase, recharging times shorten, and public infrastructure improves.

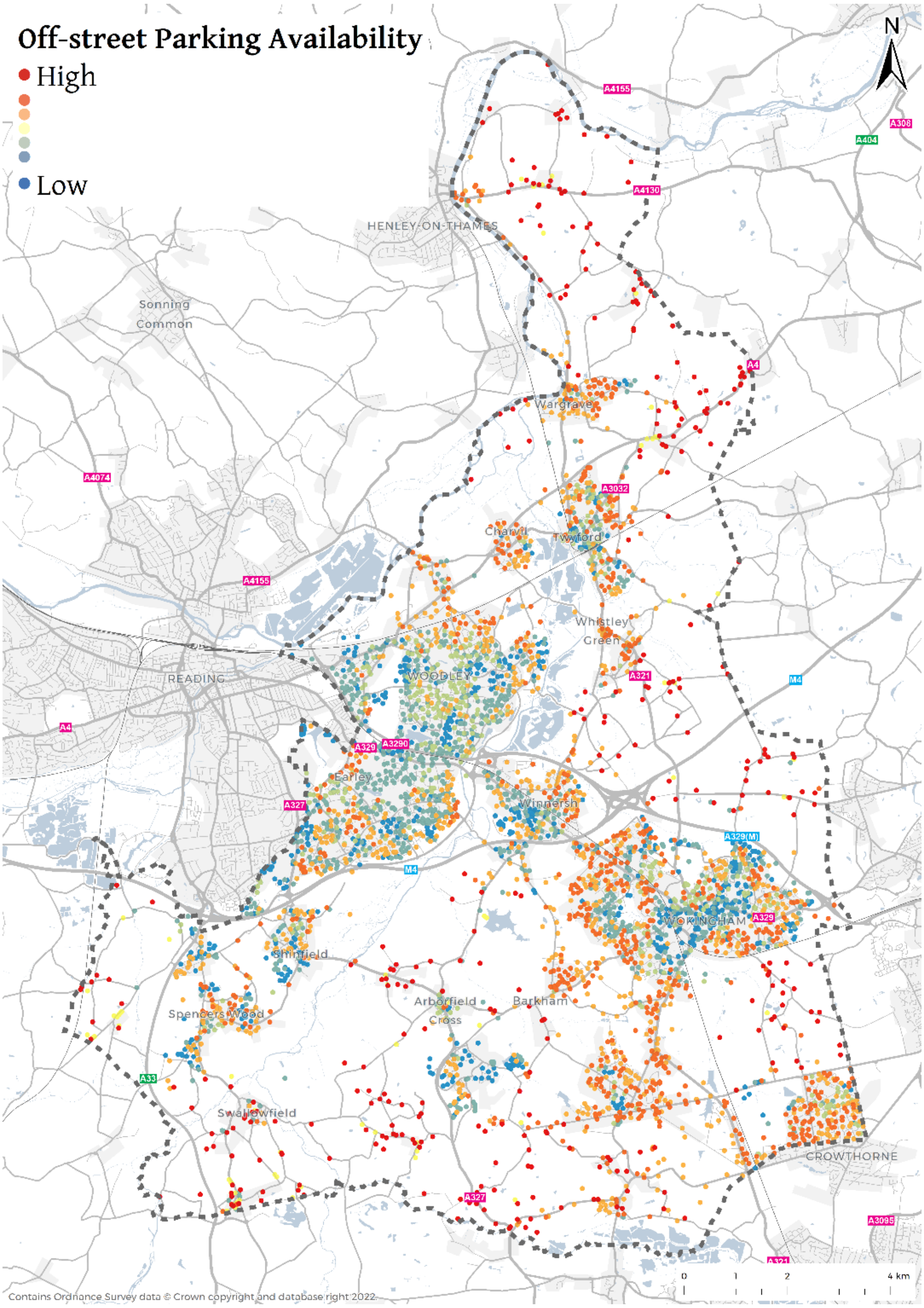
A total of 32% (22,783) of households in Wokingham borough do not have access to off-street parking. A map showing the availability of off-street parking within the borough is displayed below in Figure 17.

It is therefore important for this strategy to particularly focus on these households, given they would be reliant on public EVCPs.

64 https://www.theccc.org.uk/wp-content/uploads/2018/01/Plugging-the-gap-Assessment-of-future-demand-for-Britains-EV-public-charging-network.pdf

65 https://www.experian.co.uk/business/platforms/mosaic

Figure 17 – Residences with off-street parking availability in Wokingham Borough as of 2020



Forecast EV ownership in Wokingham

Figure 18 shows how EV uptake is expected to increase.

By 2030, 40,000 EVs are forecasted to be registered in our borough and this equates to over 30% of registered cars.

In 2033, EVs in Wokingham are expected to account for the majority of the fleet for the first time. It will then continue to rise up to 2050, at which point it will plateaux at 98% of the total vehicles being electric.

Figure 18 – Forecast EV uptake and decline of ICEVs

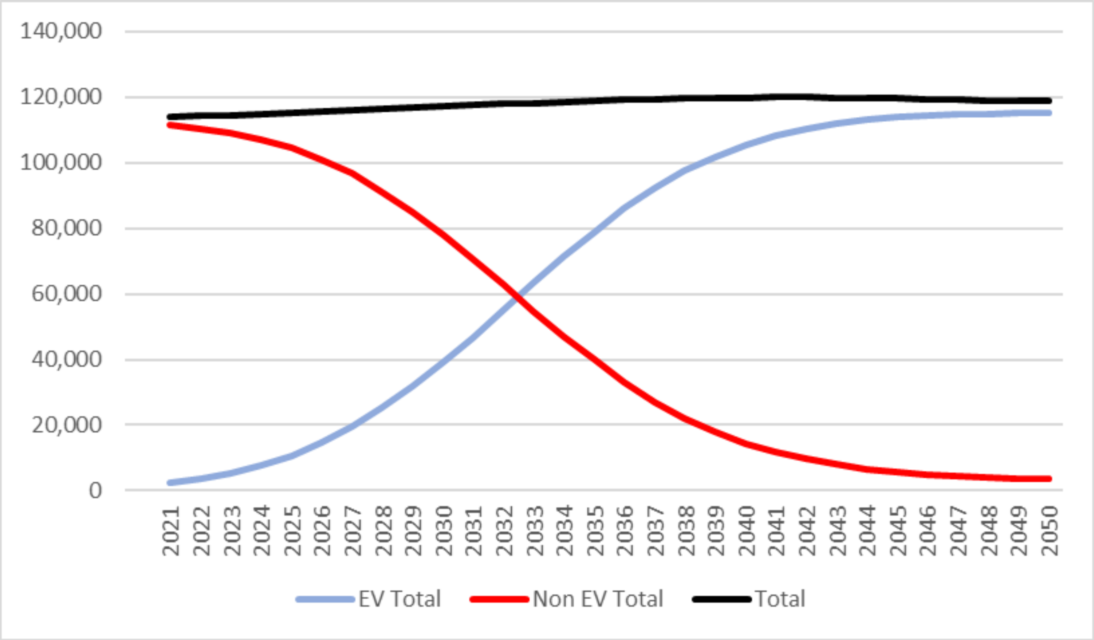
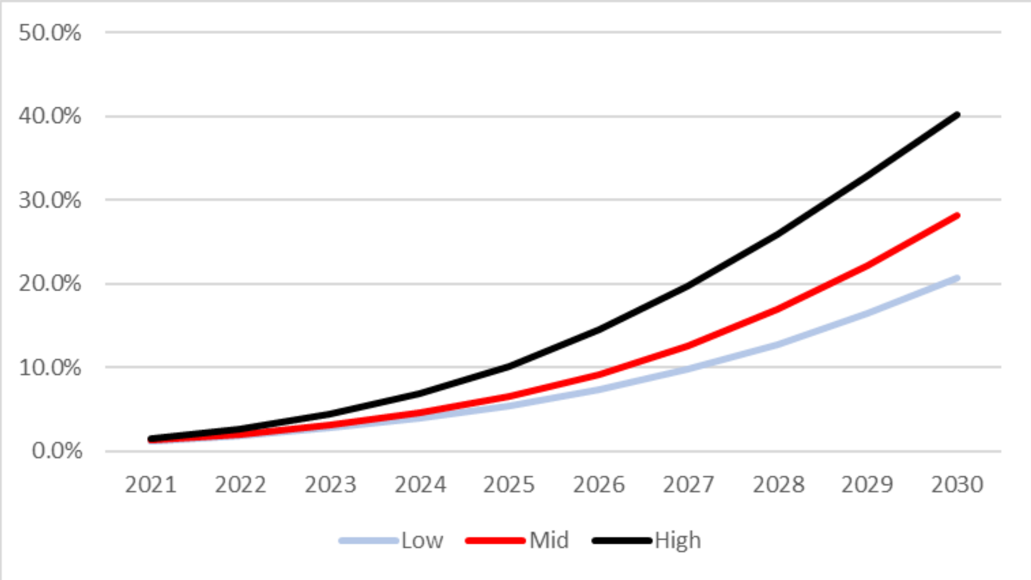


Figure 19 shows the results of the three EV uptake scenarios. The mid scenario, shown above, represents the most likely level of uptake expected by 2030. However, the wide range between the scenarios represents the uncertainties in predicting EV uptake during this period of rapid technological and behavioural change. Government policy/legislation and subsidies are also susceptible to change.

Figure 19 – Forecast EV uptake by 2030 (EV:Ready scenarios)



Under the mid scenario it is expected that EV uptake in Wokingham will rise from 2.43% in 2022, to 9.32% in 2025 and 33.38% in 2030.

The rate of EV uptake in Wokingham is expected to be faster than the UK average. In 2030 there will be 5% more EVs in the Wokingham vehicle fleet than the UK fleet. This is due to Wokingham residents having a higher propensity to switch to EVs.

Table 15 below shows the carbon savings attributed to passenger cars under five different scenarios. According to the future mid scenario, the forecast increase of EVs and subsequent decrease in ICEVs, could lead to approximately 12% decrease in CO_2 emissions in the borough, from nearly 152,000 tonnes in 2020 to around 133,000 tonnes by 2030.

Table 15 – Forecast carbon emissions attributed to passenger cars only

Scenario	$KtCO_2e$
2020 Baseline	152
2030 Future (no EVs)	194
2030 Future (Low EVs)	149
2030 Future (Mid-range EVs)	133
2030 Future (High EVs)	107

Spatial analysis of forecast uptake

As can be seen in Figure 21 and Figure 22, the competing influences of the local populations' propensity for switching to EV, their car ownership levels, and the extent to which they are reliant on on-street parking serve to create a nuanced picture of EV ownership across Wokingham borough. This is because areas with high propensities towards EV ownership are often partly offset by also being in urban areas where there tends to be lower car ownership and greater reliance on on-street parking.

In 2020, the areas around Wokingham, Winnersh, Woodley, Earley and Twyford had the highest concentrations of EVs.

High on the scale represents the areas where the most EVs are likely to be registered, whereas low on the scale represents areas that are likely to have the least EVs registered.

Figure 20 – Number of EVs registered 2020

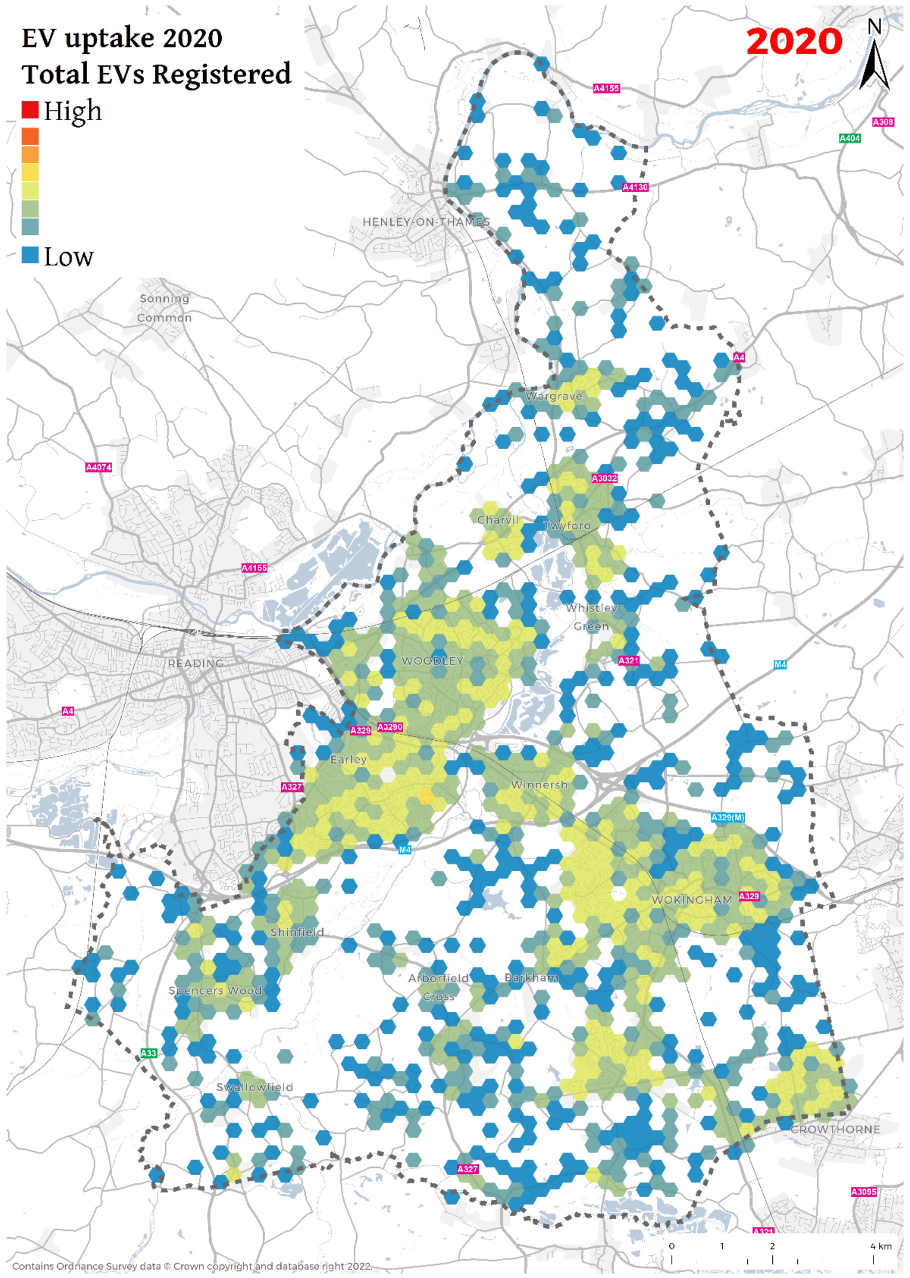


Figure 21 – Forecast EV uptake across Wokingham Borough (Number of EVs registered) 2025

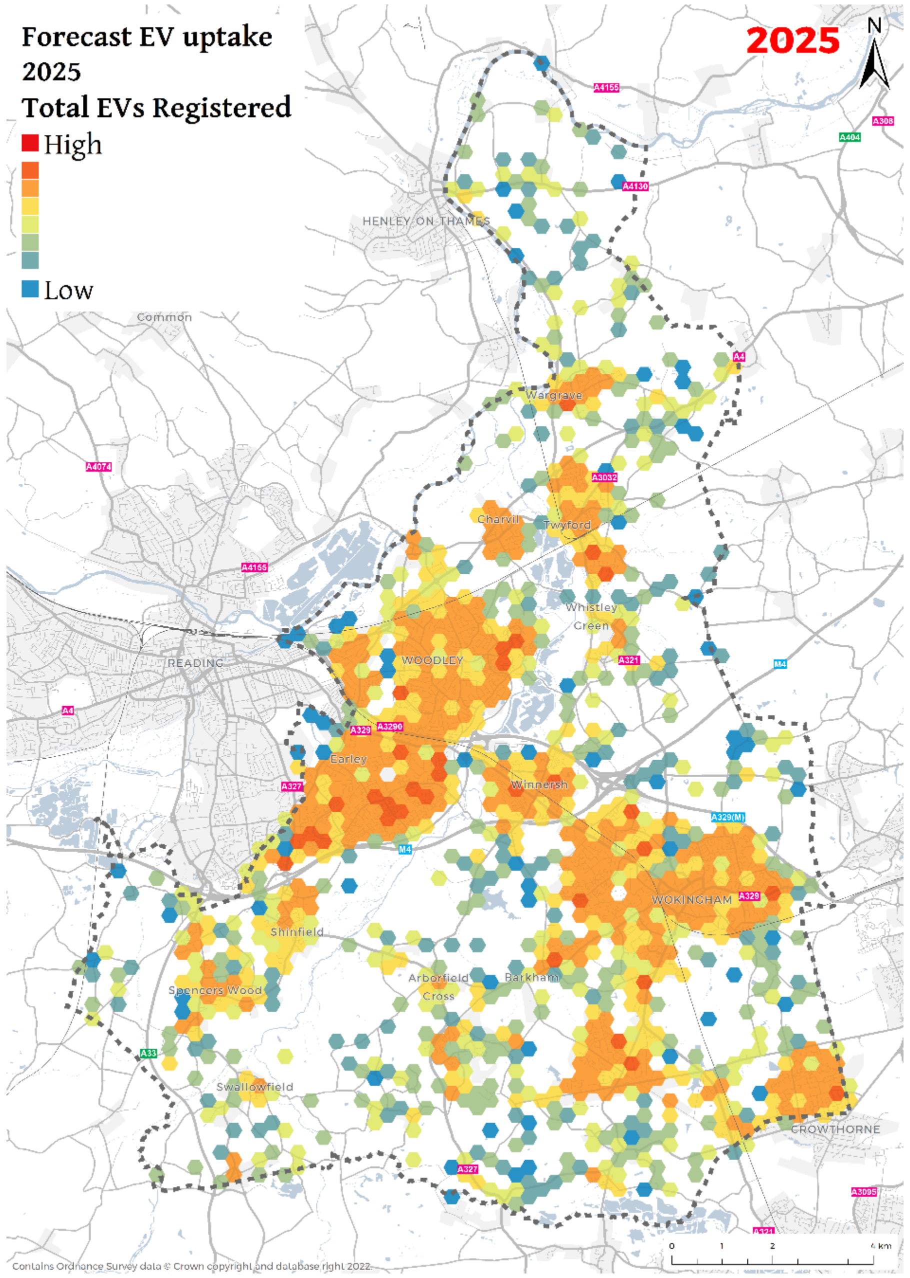
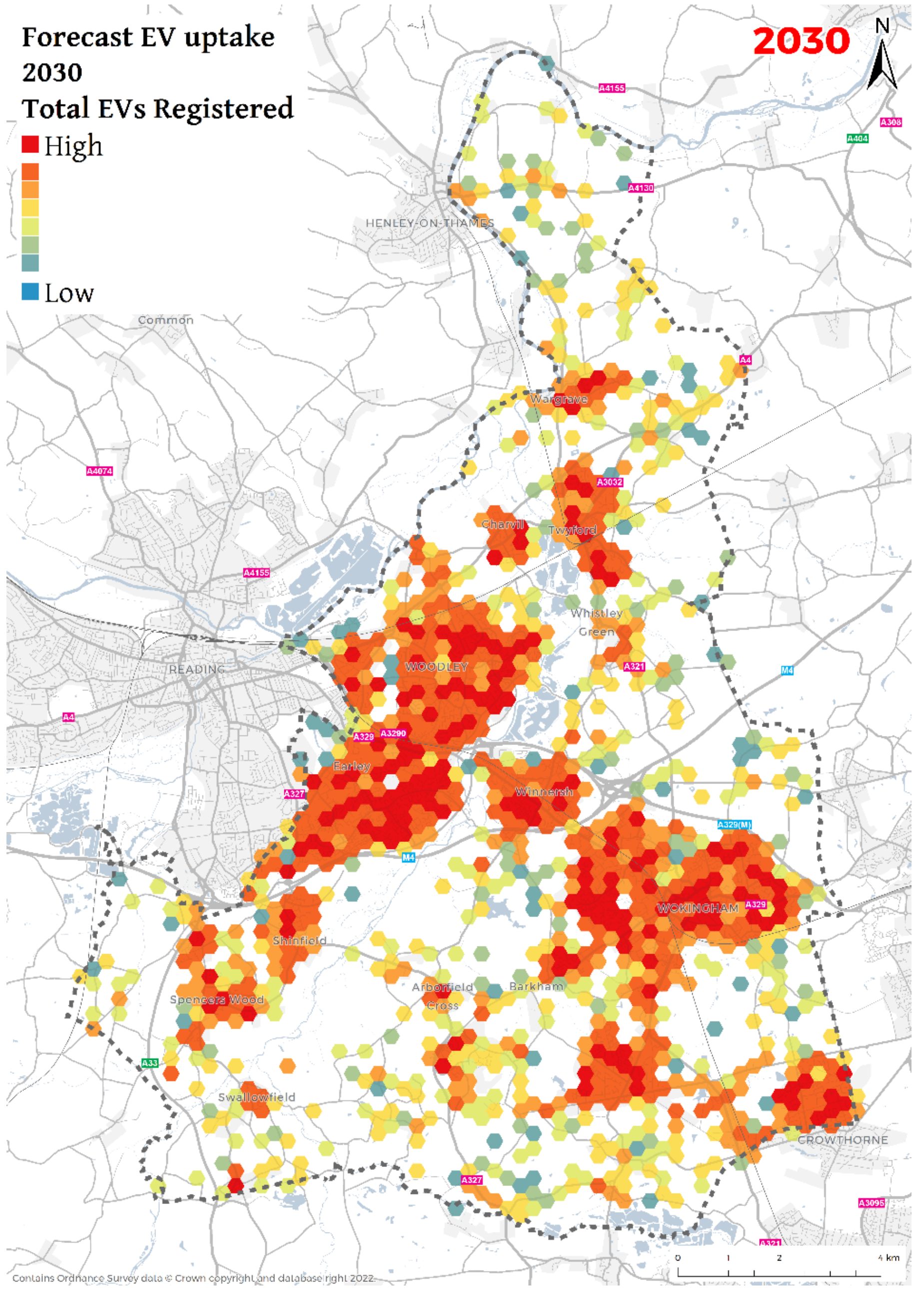


Figure 22 – Forecast EV uptake across Wokingham Borough (Number of EVs registered) 2030



Share of vehicles

As can be seen in Figure 25 it is estimated that by 2030, 25-45% of registered vehicles will be EVs across the majority of Wokingham borough. The higher end of the range is likely to be within the suburban areas, which is reflective of the numbers and information above – including socio-economic factors and access to off-street parking. There is particularly high predicted ownership in the north towards Henley and to the south of Wokingham.

The figure also shows there are a handful of points across the borough in which only 5% or less of registered vehicles are EVs. These are likely to be anomalies or areas of very few dwellings.

The areas with lower uptake would benefit from greater communications and more targeted work around on-street chargepoints.

Figure 23 – Share of registered vehicles made up by EVs (%) in 2020

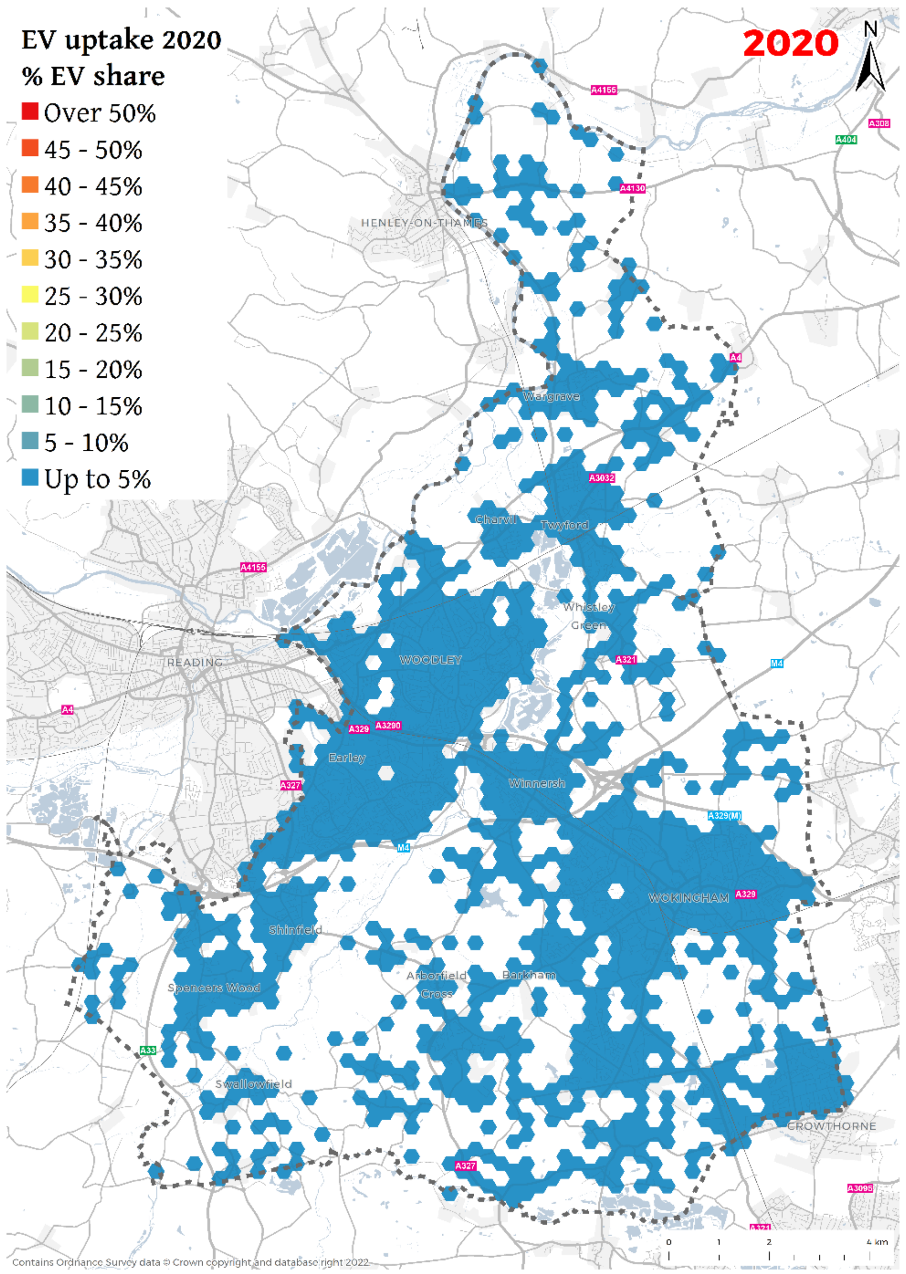


Figure 24 – Forecast share of registered vehicles made up by EVs (%) in 2025

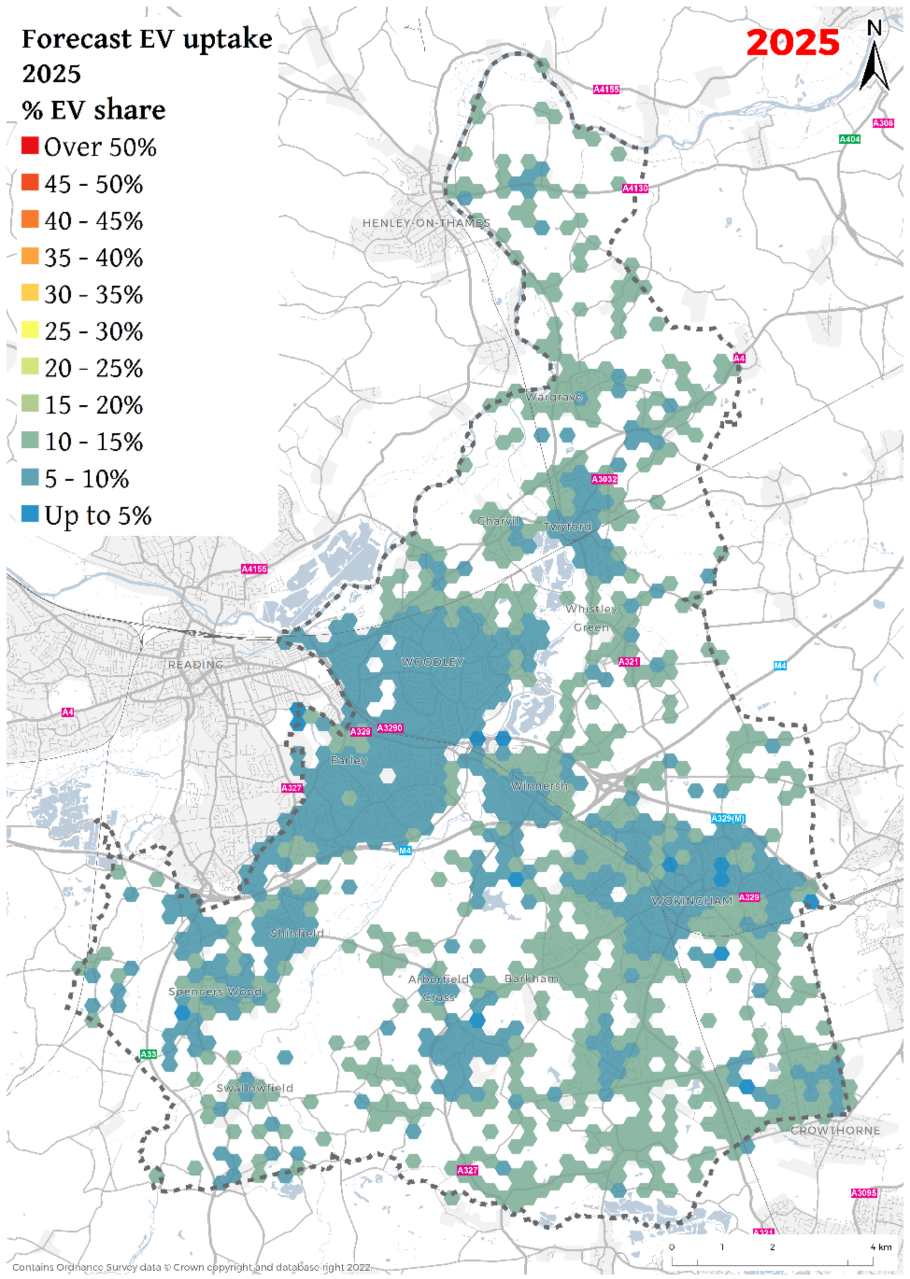
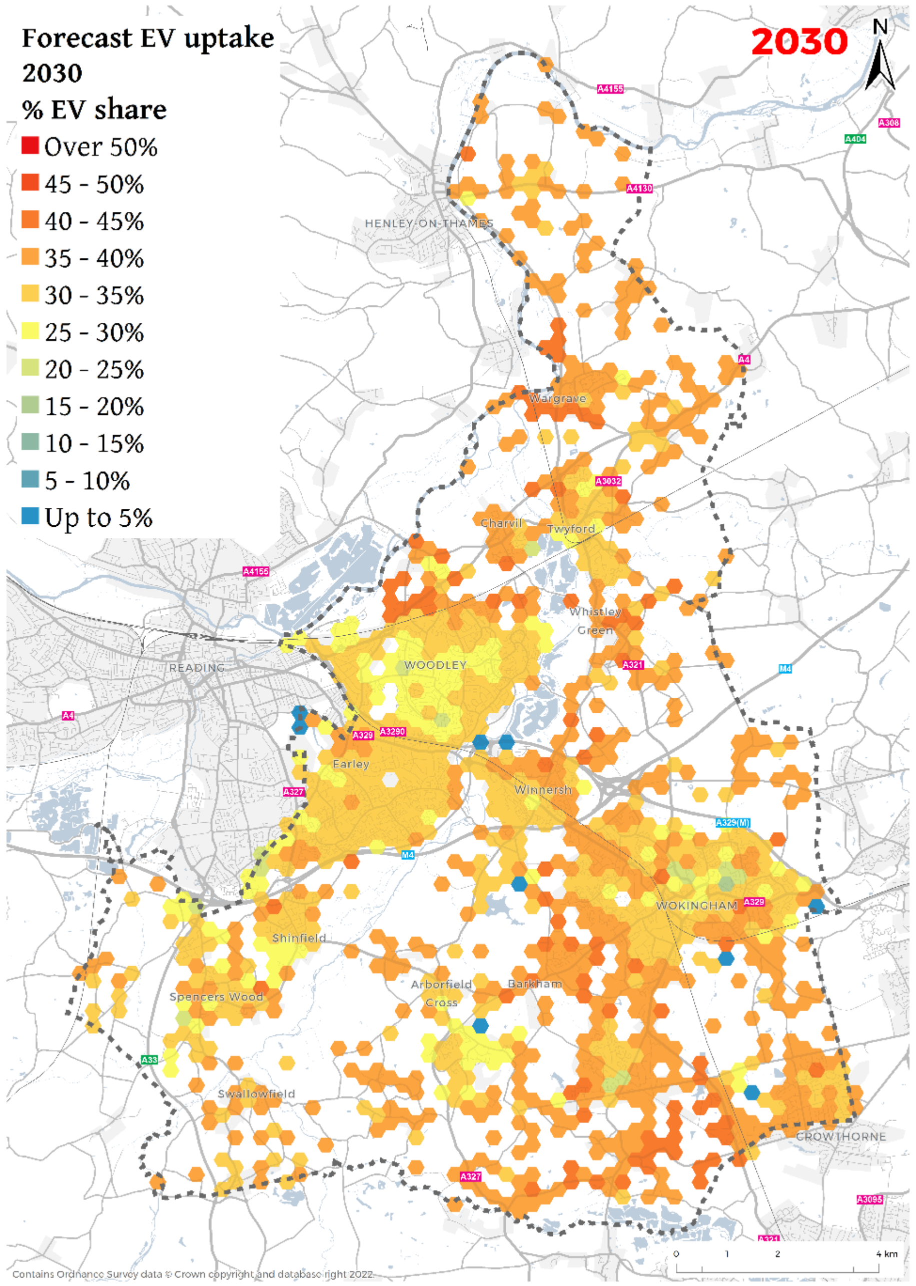


Figure 25 – Forecast share of registered vehicles made up by EVs (%) in 2030



EVs per household

Figure 26 reports the forecast number of EVs per household, which provides a further means of reviewing how uptake may vary, once accounting for household densities. This illustrates that the areas outside the main built-up areas see relatively high EV registrations, in part reflecting the greater car dependency and increased availability of off-street parking. Woodley, Wokingham, and Shinfield are predicted to have areas with a lower number of EVs per household, which is due to lack of off-street parking, the availability of public transport, and a lower level of car ownership in general. However, this is not to say that households within these areas will not own an EV, as the following section highlights.

Demand for residential charging

Figure 27 shows postcodes where residents are both more reliant on on-street parking and are also forecast to experience relatively high levels of EV ownership – those with off-street parking are likely to be less reliant on public chargers. Even if these are not the areas with the highest levels of predicted EV ownership (Figure 27 only highlights high priority areas), they should be investigated as a priority during any EVCP site selection process. The map presents 23 residential streets within the following five locations:

- Woodley (9 streets);
- Earley (8 streets);
- Wokingham (4 streets);
- Finchampstead (1 street); and
- Shinfield (1 street).

A full list of the streets can be found in Appendix C.

Operating chargepoints in residential areas with limited off-street parking is challenging for chargepoint operators who often find they are not commercially viable. Reasons for this include:

- High delivery costs relative to the units of electricity delivered per day. The low powered chargers best suited for residential charging have low utilisation rates compared to rapid chargers, which limit their potential income.
- TROs, particularly in on-street settings, are often contentious amongst the wider public, especially where parking is limited.
- Challenges in finding available space for on-street chargers and feeder pillars where footways are narrow, or basements, trees and other street furniture prevent deployment.

To support and enable EV uptake in these areas, prospective EV owners will need to be able to access convenient public chargepoints, to remove any barriers posed to those without access to off-street parking, which will otherwise stifle EV uptake.

On-street chargepoints at these locations, or residential charging hubs in nearby off-street car parks are important to enable EV uptake in these areas.

Figure 26 – Forecast number of EVs per household by 2030

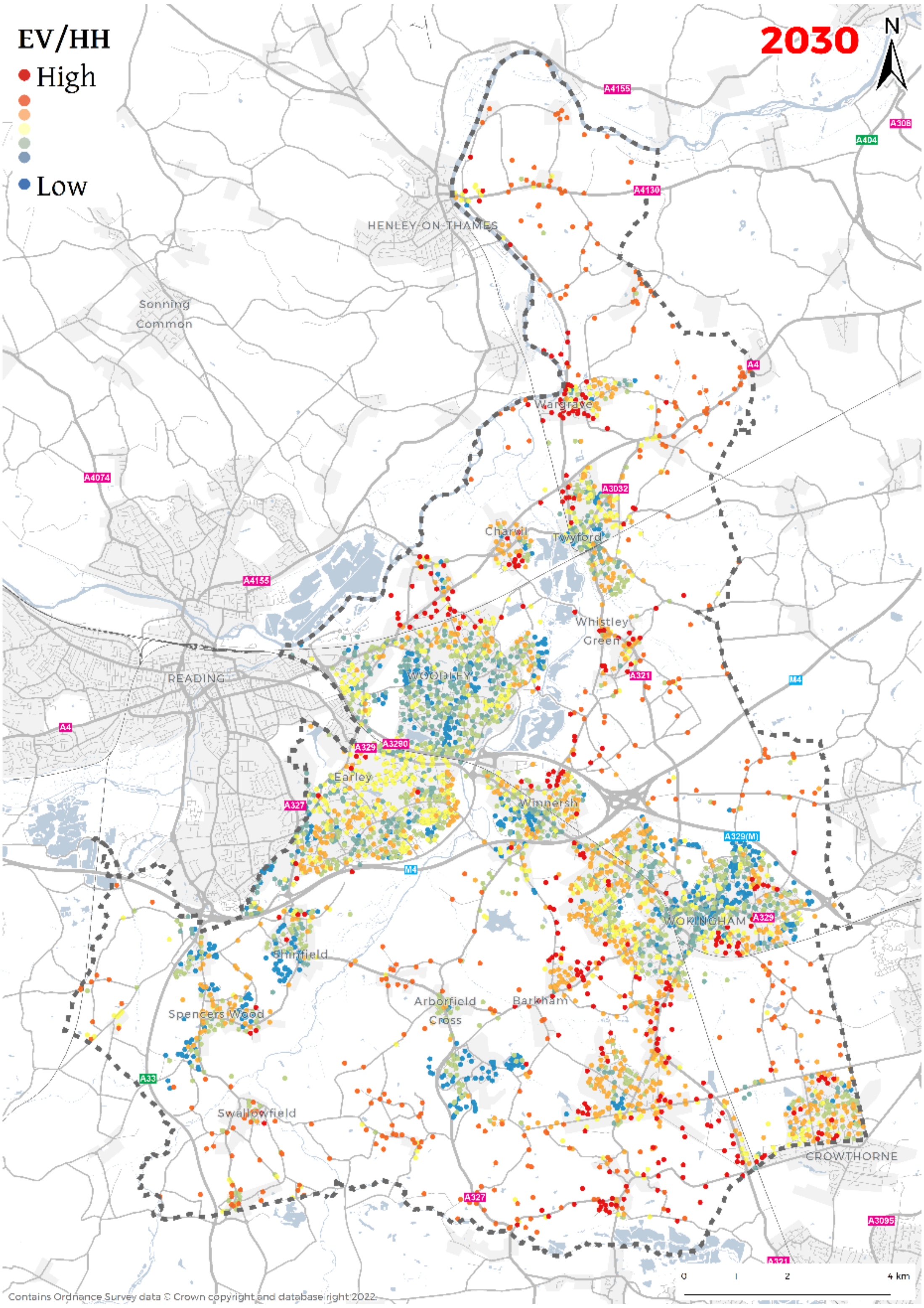
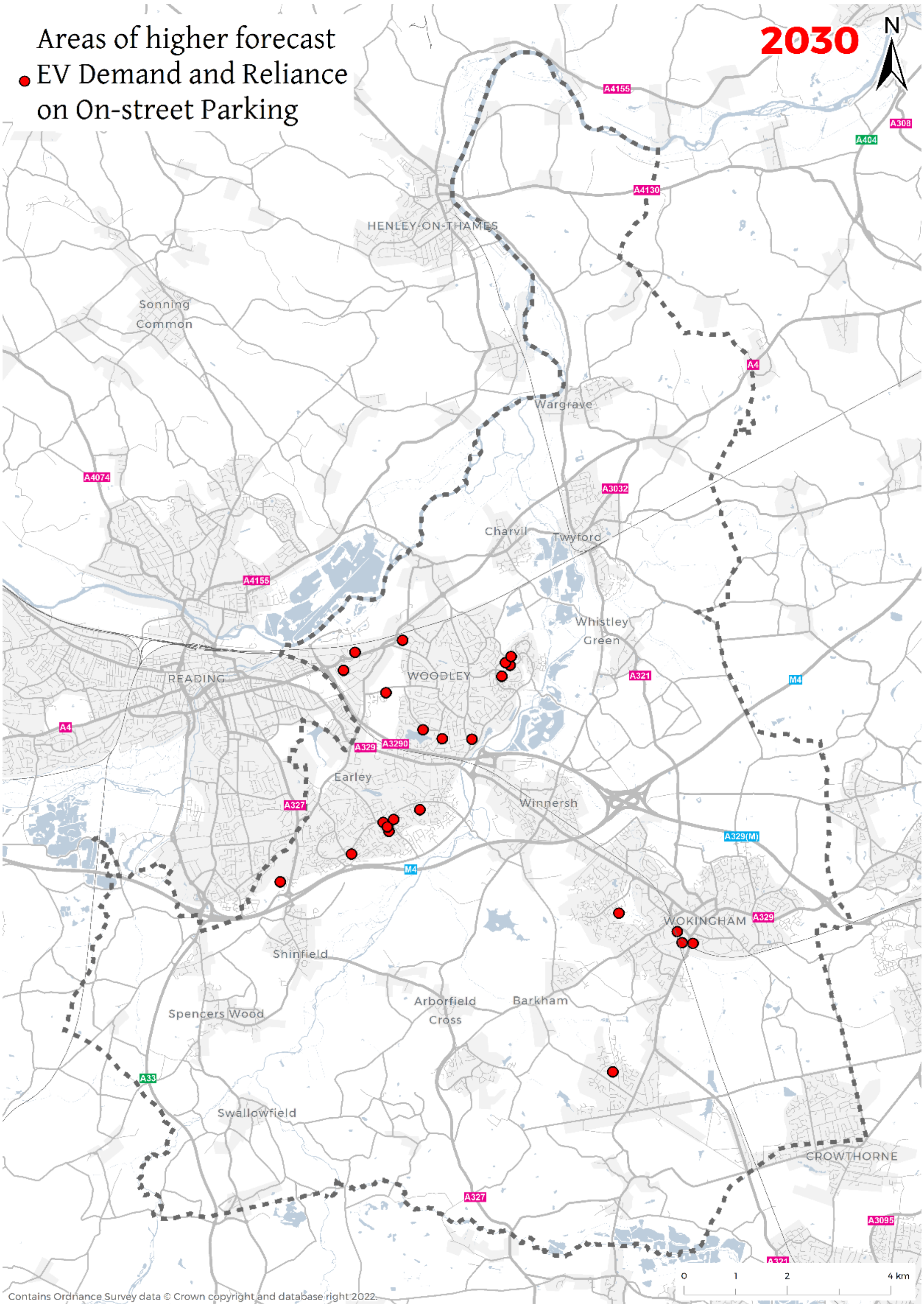


Figure 27 – Areas of high priority for public EVCPs (areas with high demand for EV and reliance on on-street parking. The points represent postcodes.



Forecast EVCP requirements

This section summarises the forecast demand for chargepoints up to 2025 and 2030. For the purposes of this assessment the chargepoint demand being considered is limited to public chargepoints. Forecasting public charging infrastructure requirements presents several challenges and is a matter of some debate within the industry, with wide ranging estimates based on a number of critical assumptions and forecasts, including:

- **Forecast EV growth**;
- **Charging habits** – Public vs private charging, rapid vs standard chargers;
- **Vehicle mileage and efficiency**;
- **BEV and PHEV ratios**, and PHEV mileage in electric mode;
- **Off-street parking availability**; and
- **Trends in vehicle and charger technologies**, including range and charging rates.

Three scenarios are presented (low, mid-range and high) which each represent a different ratio of EVs to EVCPs.

- **High ratio** – approximately 22 EVs per EVCP, i.e., a more generous level of public charging provision, assuming each charger is utilised less intensively, with lower average charging rates.
- **Mid ratio** – a middle ground between these two extremes, with approximately 39 EVs per EVCP.
- **Low ratio** – approximately 70 EVs per EVCP, i.e., fewer public chargepoints, assuming chargers are optimally deployed, with higher average charge rates.

Figure 28 and Table 16 present the additional number of charging sockets required up to 2030. The figures are estimates and are based on assumptions and forecasts.

For the purposes of this study, two categories of chargers were modelled: “fast” and “rapid”. In both cases these are used to refer to a range of charger types. “Fast” refers to AC chargers with between 7kW (“standard”) and 22kW (“fast”) speeds. “Rapid” refers to DC chargers, with speeds greater than 50kW, although speeds of over 300kW are being installed, particularly at en-route charging hubs.

There will be a need for a significant ramp up in the delivery of EVCPs to meet demand, and therefore WBC should aim for the highest level of provision of EVCPs under the high scenario. This will hopefully not only cater for the expected demand but help encourage others to buy in to an EV by knowing there is plenty of EV charging infrastructure.

- Under the high scenario, by 2025, a significant increase in the number of public chargers required is forecasted – in the region of an additional 514 fast charging sockets and 120 rapid charging sockets.
- Looking at 2030, the requirement for EVCPs is forecasted to accelerate further, with an addition of 1,392 fast charging sockets and 320 rapid charging sockets in the high scenario.

Figure 28 – Forecast EV charging socket requirements

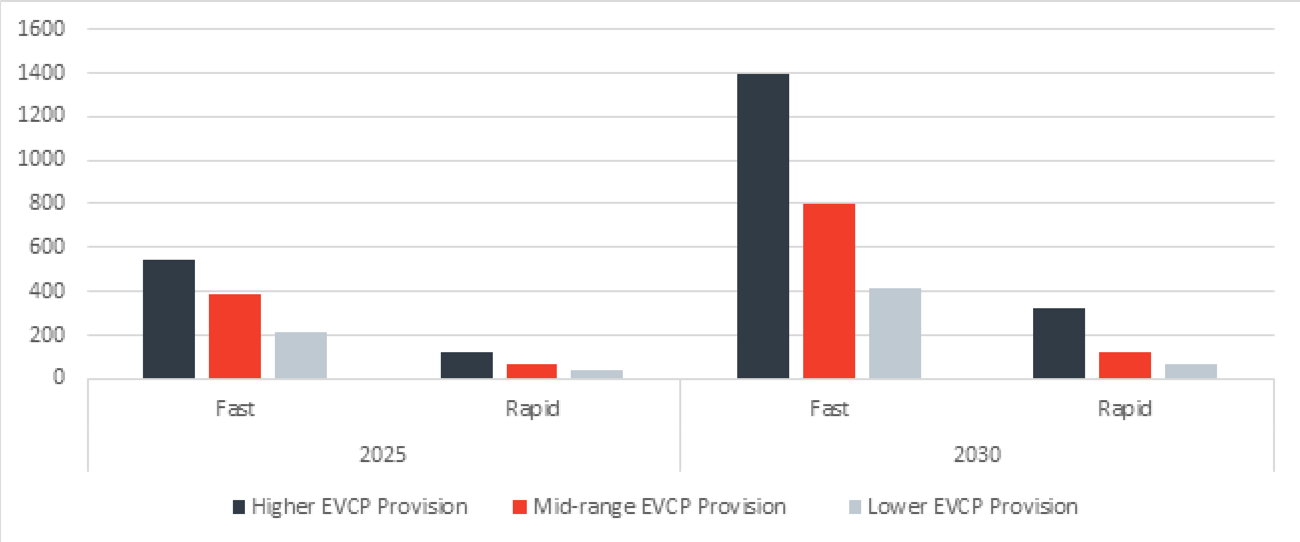


Table 16 – Forecast additional charging socket requirements (rounded)

Scenario	Existing EVCPs - 2023[66]	Existing EVCPs - 2023[67]	Forecast EVCPs – 2025	Forecast EVCPs – 2025	Forecast EVCPs – 2030	Forecast EVCPs – 2030
Scenario	**Slow – Fast**	**Rapid or above**	**Fast**	**Rapid**	**Fast**	**Rapid**
Low			216	38	418	68
Mid-range	144	75	384	64	796	124
High			514	120	1,392	320

66 As of 6 June 2023
67 As of 6 June 2023

Indicative forecast for publicly deployed EVCPs

Figure 29 and Table 17 show the forecast of EVCPs that need to be deployed in the borough by the public sector.

- In the high scenario, the installation of 357 additional fast charging sockets and 29 additional rapid charging sockets needs to be facilitated by the public sector by 2025 whilst
- By 2030, the demand of public sector intervention is higher with the requirement of 783 additional fast and 49 additional rapid charging sockets.

Numbers shown are indicative only and are intended to provide a broad suggestion of the volume of chargepoints required.

Over time utilisation rates will rise as EVCPs become more profitable, allowing the private sector to invest more widely. However, for the period modelled the demand for public sector intervention is still expected to increase year on year, given the larger overall demand. To ensure an equitable chargepoint network, engagement with DNO is crucial to identify areas with constrained grid capacity, where the costs of installing a DNO connection are commercially unviable for the private sector.

Figure 29 – Forecast public sector deployed EV charging socket requirements

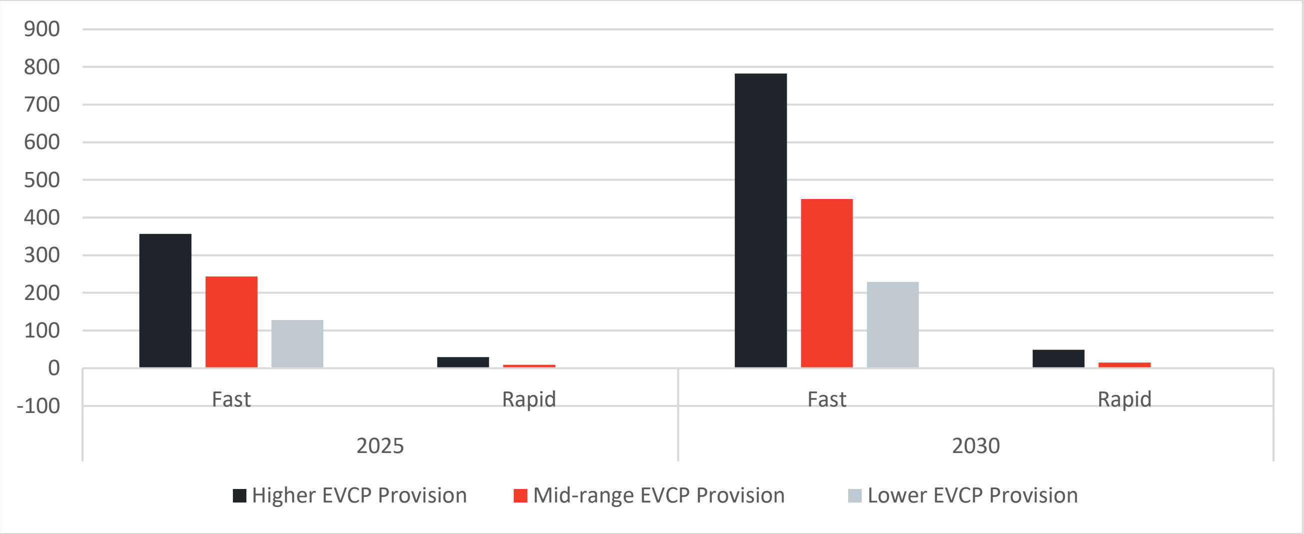


Table 17 – Forecast additional public sector deployed EV charging socket requirements

Scenario	Existing EVCPS – 2023	Existing EVCPS – 2023	Forecast EVCPs – 2025	Forecast EVCPs – 2025	Forecast EVCPs – 2030	Forecast EVCPs – 2030

Scenario	Slow – Fast	Rapid or above	Fast	Rapid	Fast	Rapid
Low	144	75	128	0	229	3
Mid-range			244	9	449	15
High			357	29	783	49

Spatial analysis of public EV charging demand

Demand: Based on the preceding analysis of the potential requirements for public EV charging infrastructure, a spatial analysis of the likely distribution of EVCP demand was undertaken. This analysis is informed by:

- Forecast EV uptake by postcode;
- Number of destination land uses by postcode;
- Proximity to high traffic volumes; and
- Reliance on on-street parking.

The areas of greatest demand are located where EV uptake is forecast to be high and there is limited private off-street parking where drivers could charge their vehicles. The map demonstrates that these areas are generally more urban, and in close proximity to major roads. Demand is particularly high in Wokingham, Winnersh, Woodley, Earley, Finchampstead and Shinfield.

Supply: Further analysis was undertaken to understand where the private sector is likely to provide EVCPs. Factors considered included grid constraints, proximity to the strategic route network and proximity to destination sites suitable for EVCPs.

Gap analysis:

By combining the supply and demand forecasts an assessment can be made of where demand for EV charging will be high, but the private sector is unlikely to provide chargers. The dark red points on Figure 32 show where the ‘gaps’ are most likely expected to occur and yellow points are the least likely. If equality of EVCP provision is to be achieved, then the public sector will have to intervene to ‘plug the gaps’ that are predicted to be left by the private sector.

High on the demand scale represents areas where demand for a public EVCP would be highest due to residents having an EV but a lack of off-street parking.

High on the supply scale represents areas where there would be many public EVCPs.

High on the gap analysis scale represent priority areas, where demand is high but supply is low.

Figure 30 – Forecast distribution of EVCP demand, 2030

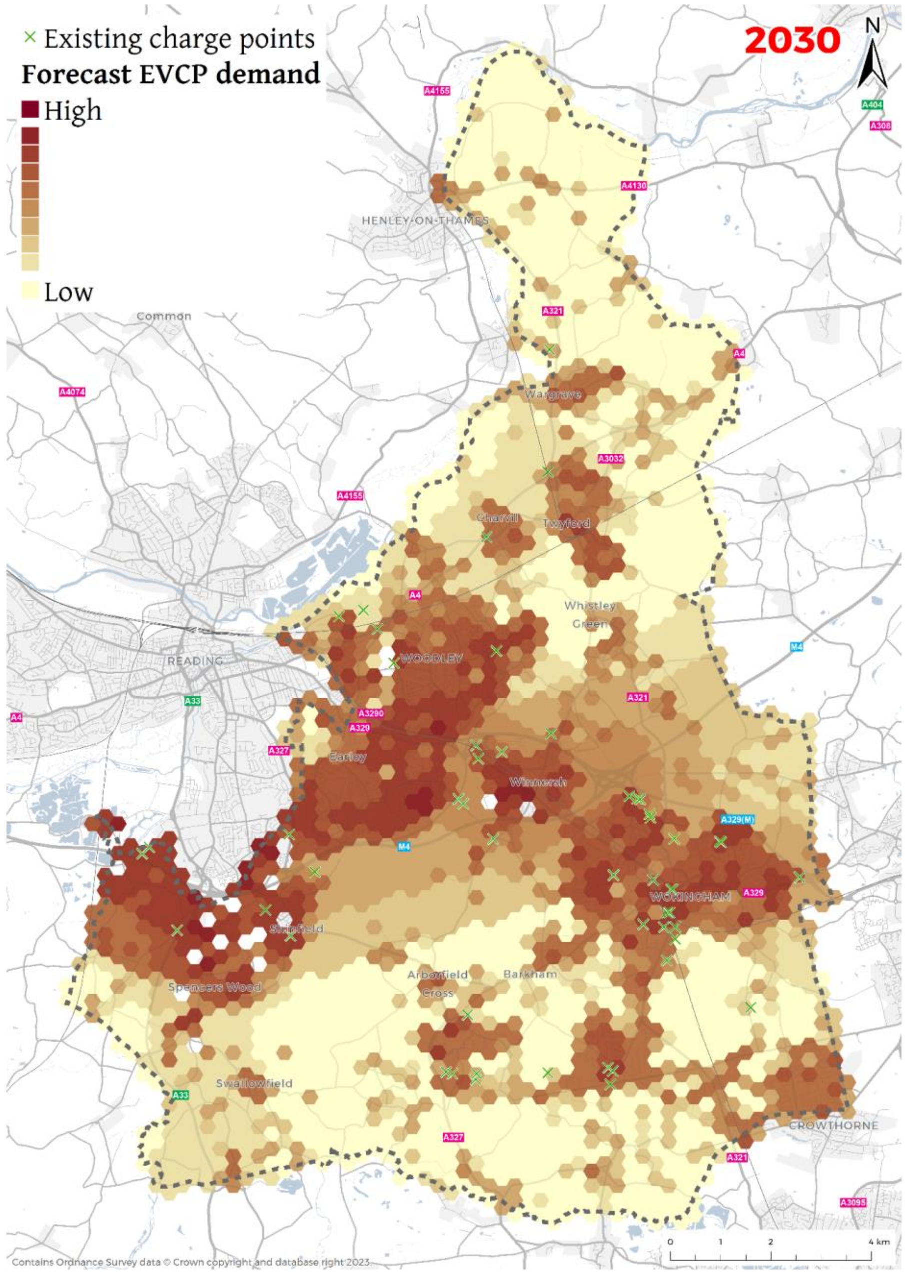


Figure 31 – Forecast distribution of EVCP supply, 2030

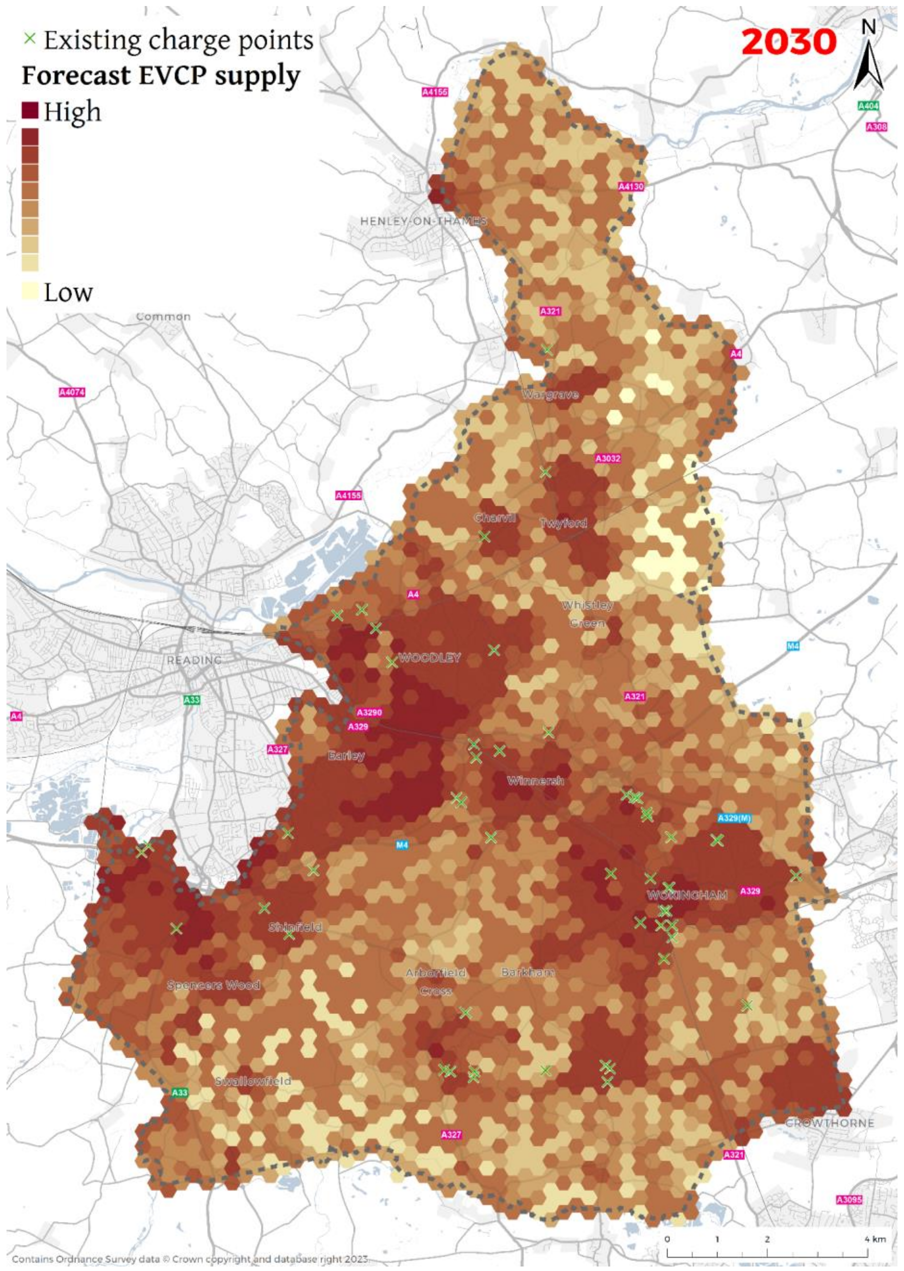
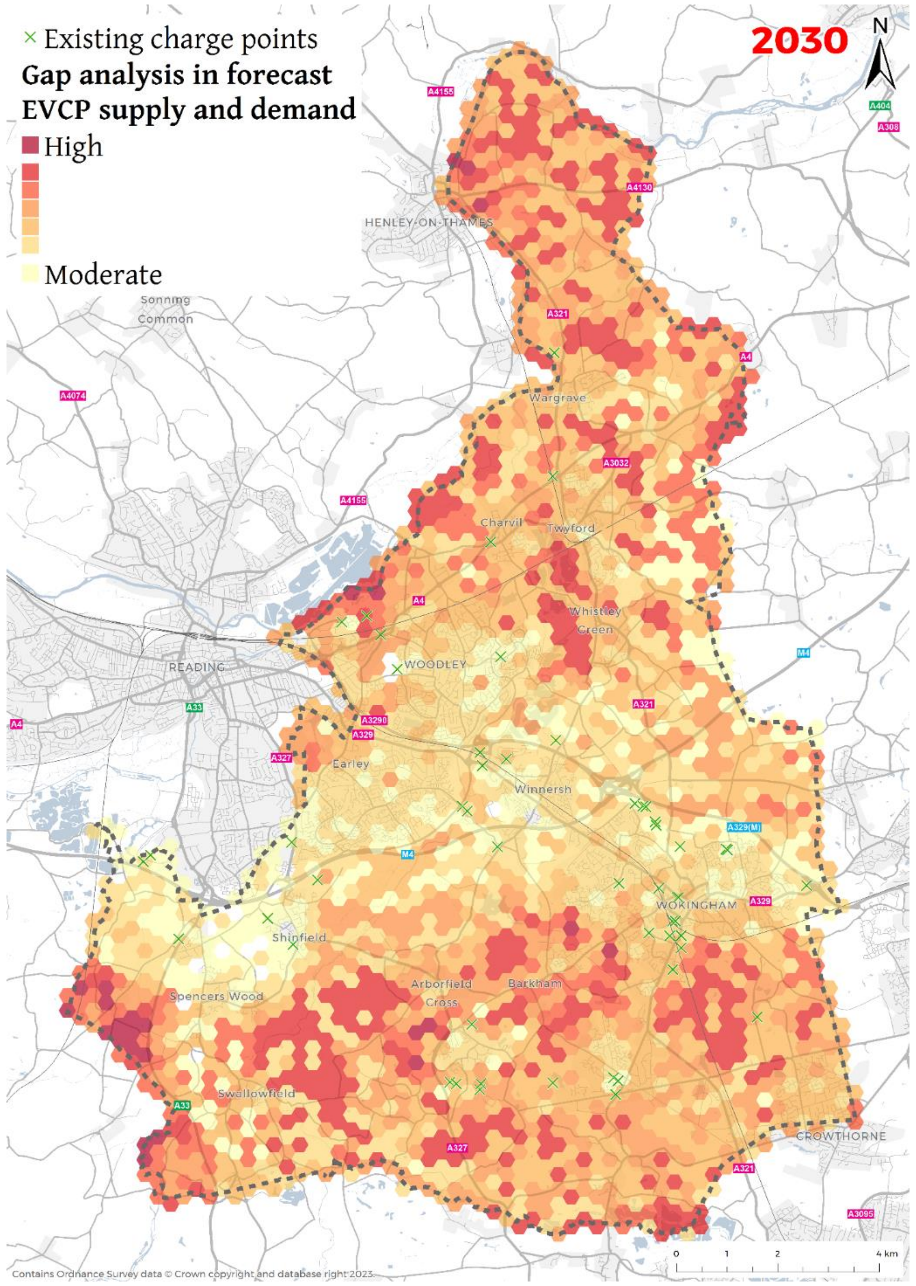


Figure 32 – Forecast chargepoint demand/supply gap analysis



NEVIS DATA

In addition to the data provided from WSP's in-house EV:Ready tool, data has been obtained from Cenex's National EV Insights and Strategy (NEVIS) service[68] to compare the two datasets.

Cenex was established in 2005 as the UK's Centre of Excellence for Low Carbon and Fuel Cell technologies. They are an independent, not-for-profit research technology organisation and consultancy, providing guidance and support for the public and private sector to help with their transition to a zero-carbon future. They are also part of the LEVI Fund Support Body.

The NEVIS service grew as more organisations and local authorities wanted reliable and up-to-date information on EVs and the associated infrastructure. The service is free for all local authorities in England.

The data presented in the subsequent sections has been obtained from NEVIS' Insight Toolkit.

Scenarios

The data presented within NEVIS is based on four projections depending on the speed of uptake of EVs (PHEV or BEV).

The projections are based on government targets, specifically the 2030 ban on the sale of new petrol and diesel cars, and historic uptake projections. Note this analysis was undertaken before the Government's announcement to delay the ban on new petrol and diesel new car sales to 2035. The scenarios are described below:

- **2030 ban (high)** – based on the 2030 ban, this follows an exponential growth pattern and uptake does not slow as the 2030 ban date nears
- **2030 ban (medium)** – based on the 2030 ban, this also follows an exponential growth pattern, but uptake does slow down as the 2030 ban date nears. This produces an S-shaped curve
- **Road to Zero (high)** – based on reaching 70% of the sale of new cars to be ultra-low emission by 2030
- **Road to Zero (medium)** – based on reaching 50% of the sale of new cars to be ultra-low emission by 2030

Projected number of vehicles in Wokingham

Table 18 below outlines the projected proportion of cars by fuel type in Wokingham in 2030.

68 National EV Insight and Strategy (NEVIS) https://nevis.cenex.co.uk/ Accessed: 30 March 2023

Table 18 – Projected proportion of cars in Wokingham in 2030

	Percentage of diesel cars	Percentage of petrol cars	Percentage of hybrid cars	Percentage of EV cars
2030 ban (high)	13%	39%	2%	45%
2030 ban medium)	14%	43%	3%	40%
Road to Zero (high)	17%	50%	3%	31%
Road to Zero (medium)	19%	55%	3%	23%

The table shows that by 2030, EVs would make up nearly 45% of cars in Wokingham in the 2030 ban (high) scenario. In the Road to Zero (medium) scenario, there would be nearly half as many EVs in 2030, with a proportion of just 23% of all cars.

For petrol and diesel cars, in the 2030 ban (high) scenario they would make up 52% of all cars. However, in the Road to Zero (medium) scenario, they would make up nearly 75% of all cars in Wokingham.

The predictions from WSP's EV:Ready Tool presented in the section above are comparable to this NEVIS data but predict slightly lower levels of EV uptake in all scenarios. For example, WSP's high scenario predict 40% EVs by 2030 and in their low scenario they predict just a 20% share of EVs by 2030.

Emissions baseline – 2020

The NEVIS data outlines the breakdown of emissions generated by the cars and LGVs within Wokingham. This information is only available for 2020 and covers CO_2, NO_x and particulate matter (PM10, from combustion and road, tyre, and brake wear). This information is provided in Table 19 below. All values provided are in tonnes.

Table 19 – Baseline emissions from cars and LGVs in Wokingham in 2020

	Total CO_2 emissions (tCO_2)	Total NOx emissions (tNOx)	Total PM10 emissions (tPM10)	Total PM emissions (road, tyre and break wear) (tPM10)
Cars	175,572	334	5	27
LGVs	38,682	119	1	6

The table shows that combined, cars and LGVs in Wokingham contributed nearly 215,000 tonnes of CO_2 emissions in 2020.

Government datasets on local authority greenhouse gas emissions[69] show that in total, 269,100 tonnes of CO_2 emissions were emitted by transport within Wokingham in 2020. Across all sectors, a grand total of 616,800 tonnes of CO_2 were emitted in the borough.

Projected emissions in 2030

Table 20 shows the projected emissions from cars and LGVs in Wokingham by 2030 under each of the four scenarios.

Table 20 – Projected emissions from cars and LGVs in Wokingham in 2030

	Total CO_2 emissions (tCO_2)	Total NO_x emissions (tNO_x)	Total PM10 emissions (tPM10)	Total PM emissions (road, tyre and break wear) (tPM10)
Cars	**Cars**	**Cars**	**Cars**	**Cars**
2030 ban (high)	143,930	174	3	26
2030 ban (medium)	148,511	186	3	27
Road to Zero (high)	158,264	212	3	27
Road to Zero (medium)	165,845	232	4	27
LGVs	**LGVs**	**LGVs**	**LGVs**	**LGVs**
2030 ban (high)	41,470	111	1	7
2030 ban (medium)	41,591	112	1	7
Road to Zero (high)	43,166	118	1	7
Road to Zero (medium)	44,623	123	1	7

69 UK local authority and regional greenhouse gas emissions national statistics: https://www.gov.uk/government/collections/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics [Accessed: 3 April 2023]

The table shows that in the 2030 ban (high) scenario, CO_2 emissions from cars would decrease by over 30,000 tonnes in 2030. This compares to just a decrease of less than 10,000 tonnes in the Road to Zero (medium) scenario.

For LGVs in the borough, all four scenarios show there would be an increase on 2020 levels. This would range from an increase of approximately 3,000 tonnes in the 2030 ban (high) scenario to an increase of around 6,000 tonnes in the Road to Zero (medium) scenario. The projections show LGV CO_2 emissions would increase until 2027 before decreasing thereafter.

Projected number of chargepoints in Wokingham

This section of the NEVIS data outlines the type and number of EVCPs required to meet the energy demand generated by the projected number of plug-in-vehicles. The figures quoted are only based on public charging demand, and not domestic EVCPs or those installed in the workplace.

The values shown are the optimised number of EVCPs for the long-term. However, in the short-term it is likely that greater numbers of EVCPs will be needed to encourage users to make the switch to EVs.

The values in the subsequent tables below are derived from:

- The number of vehicles each type of EVCP can support;
- The split between the different types of charging; and
- The proportion of drivers using the public charging network.

Table 21 presents the total number of chargepoint sockets that are required in Wokingham by 2030 to meet the demand based on the four scenarios.

Table 21 – Total number of chargepoint sockets needed in Wokingham by 2030

	Total number of ‘fast’ sockets required	**Total number of ‘rapid’ sockets required**	**Total number of sockets required**
2030 ban (high)	1,148	62	1,210
2030 ban medium)	1,083	59	1,142
Road to Zero (high)	887	49	936
Road to Zero (medium)	683	38	721

The table shows the 2030 ban (high) scenario would need the most EVCPs by 2030, with a total of 1,210 charging sockets (991 excluding existing). Most of these (95%) would be between 7kW and 22kW. The Road to Zero (medium) scenario on the other hand would require a total of 721 (502 excluding existing) charging sockets by 2030, with again most of these between 7kW and 22kW.

Comparing these forecasts to those made in WSPs EV:Ready Tool, outlined in the section above, 721 more additional charging sockets are forecasted in WSP's high scenario compared to the NEVIS data. For the low scenario, there are 16 less additional charging sockets forecast through WSP's tool than the NEVIS data.

Using NEVIS' 2030 ban (high) scenario, Table 22 outlines how many new EVCPs will need to be installed each year between now and 2030 to meet the target.

Table 22 – Number of new EVCPs needed each year in Wokingham by 2030

	Number of new 'fast' sockets required	Number of new 'rapid' sockets required	Total number of new sockets required
2023	49	4	53
2024	68	4	72
2025	92	5	97
2026	119	6	125
2027	152	8	160
2028	189	13	199
2029	199	10	209
2030	197	9	206

The table shows there would be a steady increase in the number of new charging sockets being installed each year between now and 2030. Most of these would be between 7kW and 22kW sockets, which are used to charge vehicles at slower speeds and are typically found in residential areas where there is a longer dwell time.

Summary

The NEVIS data has showed that EVs could make up between 23% and 45% of vehicles in Wokingham by 2030.

Currently within the borough, cars and LGVs combined contributed nearly 215,000 tonnes of CO_2 emissions in 2020. However, there are likely to be emission reductions, with the data projecting CO_2 emissions for both cars and LGVs combined to range between 185,400 tonnes and 210,468 tonnes.

The four scenarios projected a total of between 721 and 1,210 charging sockets (including existing) within the borough by 2030. This compares to WSP’s in-house EV:Ready tool where the low scenario estimates a total of 705 charging sockets and the high scenario estimates 1,931 (including existing) charging sockets.

Therefore, for the borough to be ambitious in its EVCP installation, the high scenario from WSP’s in-house EV:Ready tool should be used as a target for Wokingham. This will cater for the predicted demand and help encourage residents to make the switch to EVs.

CHARGEPOINT DELIVERY

Delivery models

There are a number of delivery models available for delivering chargepoint infrastructure, which are summarised in Table 23.

Table 23 – Delivery model options for EVCP deployment

		Potential Control / Income	**Potential Risk / Control**	**Advantages**	**Disadvantages**
Public Ownership	All chargepoint costs are paid by the public sector, with capital and maintenance costs recouped from usage charges. Chargepoints are owned by the public sector, with back-office and operation of chargepoints typically contracted to a private sector CPO for a fixed fee.	Highest	Highest	Highest potential income Local authority can determine locations, irrespective of commercial viability ensuring equity of access Easiest to incorporate wider environmental and social value goals	Requires significant grant funding which may not be available or may require local match funding (typically 25%) Highest risk in terms of ongoing liability, stranded assets, and maintenance costs Use of public funds comes with accountability to taxpayer and political risk CPO has least incentive to repair faults
Concession model: public funded	Chargepoints are installed and funded by the public sector, using available grant funding, and then operated and maintained by			Some income shared (higher levels of potential public sector income from higher initial public sector investment)	Reduced income share compared to full ownership Requires a greater understanding of what the market can offer, and tender process may be more complex

		Potential Control / Income	Potential Risk / Control	Advantages	Disadvantages
	a CPO for an agreed period under a profit share arrangement.			CPO incentivised and responsible for maintenance of the network, leading to better end-user experience Reduced risk for public sector Depending on agreement, public sector may maintain ongoing ownership, and can incorporate wider goals	than public ownership Risk that CPOs will not accept the agreement terms, leading to negotiation or a failed tender Needs to be a relatively large number of sites (>25) so that CPO can balance risk across sites. Potential for disputes over responsibility for site failures and expensive termination clauses
Concession model: public/private funded	Chargepoints are part funded by the public sector, with a CPO also investing in capital costs. The CPO then operates and maintains the chargepoints for an agreed period under a profit share agreement.			Some income shared (higher levels of potential public sector income from higher initial public sector investment) CPO incentivised and responsible for maintenance of the network, leading to better end-user experience Reduced risk for public sector	Reduced income share compared to full ownership Requires a greater understanding of what the market can offer, and tender process may be more complex than public ownership Risk that CPOs will not accept the agreement terms, leading to negotiation or a failed tender Needs to be a relatively large number of sites

		Potential Control / Income	Potential Risk / Control	Advantages	Disadvantages
				Depending on agreement, public sector may maintain ongoing ownership, and can incorporate wider goals	(>25) so that CPO can balance risk across sites. Potential for disputes over responsibility for site failures and expensive termination clauses
Fully funded option: revenue share	All costs are borne by the CPO, with a long-term lease/licence over which the CPO can recover their costs.	Lowest	Lowest	Lowest risk. Rental agreements can provide guaranteed income over a number of years. CPO heavily incentivised to provide good end user experience.	Lowest potential income to public sector Least control and ability to incorporate wider goals Likely to involve long agreement periods or exclusion areas Many areas currently unlikely to be commercially viable without public investment

Funding

The funding mechanisms that are currently available to local authorities to deploy EV charging infrastructure are listed in this section.

On-street Residential Chargepoint Scheme (ORCS)[70]

The ORCS is specifically for local authorities to access grant funding for charging infrastructure that is located on-street, or in local authority owned car parks, for use by residents. This is designed to help those without access to off-street parking transition to an

70 On-Street Residential Chargepoint Scheme guidance for local authorities (2022) The Office for Zero Emission Vehicles. [online] available from:https://www.gov.uk/government/publications/grants-for-local-authorities-to-provide-residential-on-street chargepoints/grants-to-provide-residential-on-street chargepoints-for-plug-in-electric-vehicles-guidance-for-local-authorities. Accessed: 19 May 2022.

EV. The scheme gives local authorities access to grant funding that can be used to part-fund the procurement and installation of on-street EVCP infrastructure for residential needs.

The scheme is administered on behalf of OZEV by Energy Saving Trust, Cenex and PA Consulting.

For the FY 2022-23, a total of £20m was made available. WBC were successful in securing £173,500, which would provide a maximum of 60% of the project capital costs.

As part of the funding requirements, OZEV could fund up to a maximum of £7,500 per chargepoint, or £13,000 in areas where the cost of connecting chargepoints to a supply are higher than normal.

At the time of writing, WBC was using the funding to install 38 EVCPs across 18 sites around the borough. Locations of the EVCPs were chosen based on resident requests, grid connection costs, accessibility, and safety. It is expected the sites will become available for public use from late 2023.

Local Electric Vehicle Infrastructure (LEVI) Fund[71]

For the FY 2022-23, in addition to the continuation of ORCS, OZEV announced the launch of the LEVI pilot fund.

The Government was investing a total of £500m to bring public chargepoints to communities across the UK. This included a £450m LEVI fund, which funded projects such as EV hubs and on-street charging solutions and up to £50m which funded staff to work on local challenges and public chargepoint planning. It is part of a £1.6 billion strategy to deliver a network of 300,000 EVCPs by 2030.

To test the design of the new scheme, the government has launched a £10 million pilot competition, which will fund between 3 and 8 projects. Eligible projects will include the introduction of on-street slow and fast chargepoints, rapid chargepoints (when installed as part of a wider project that includes on-street slow and fast chargepoints), street or site adaptations and solar canopies and battery storage.[72]

WBC has been awarded £282,000 under the LEVI Capability Fund (covering the financial years 2022-2025). This provides an injection of upfront resource funding to ensure the Council has dedicated staff to undertake the planning and delivery of local EVCPs, particularly for residents who do not have access to off-street parking.

WBC have also been allocated £264,000 in LEVI capital funding to support the roll out of EVCP delivery within the borough. This funding is designed to install primarily low powered EVCPs (below 22kW) that will be used by residents who do not have access to off-street

---

71 Apply for local electric vehicle infrastructure (LEVI) pilot funding (2022) The Office for Zero Emission Vehicles. [online] available from:https://www.gov.uk/guidance/apply-for-local-electric-vehicle-infrastructure-levi-pilot-funding. Accessed: 19 May 2022.

72 The successful LAs were Dorset, Durham, Kent, Lincolnshire, Barnet, North Yorkshire, Nottinghamshire, and Suffolk.

parking and therefore are unable to install their own private chargepoint. At the time of writing, WBC are preparing their stage 2 application to obtain the funding in the 2023-24 FY.

EV Chargepoint Grant[73]

The EV chargepoint grant is provided by OZEV. The grant provides funding of up to 75% towards the cost of installing EV smart chargepoints at domestic properties across the UK. It replaced the Electric Vehicle Homecharge Scheme (EVHS) on 1 April 2022.

The reformed grant is made available to local authorities to help with the provision of chargepoints in social housing. Other public authorities such as government departments and their agencies, the armed forces, the NHS and emergency services can also apply.

The scheme currently provides up to a maximum £350 per socket towards the cost of installing chargepoints in a residential property. Local authorities (and other private and public landlords) will be able to apply for up to 200 such grants a year. These may be across a number of properties and installations or just for one property[74]. An additional fund allocated under EV chargepoint grant for residential car parks is made available to help furnish the parking of existing apartment blocks (multiunit residential properties) with chargepoints. This may provide up to £30,000 per building. This will also be open to local authorities[75].

Workplace Charging Scheme[76]

The Workplace Charging Scheme is open to businesses, charities and public sector organisations. Its aim is to help support businesses to provide chargepoints for their workplace staff parking, and fleet vehicle depots (long- or short-stay).

The maximum grant fund is £350 per socket or 75% of the cost of equipment supply and installation, whichever is less. A company or school can apply for a maximum of 40 sockets and funding is not given for charging equipment with output power of > 63 kW.

In 2022, the eligibility criteria of the WCS have changed to allow small accommodation businesses, such as B&Bs, and charities to use the scheme to provide chargepoints for

73 Grant schemes for electric vehicle charging infrastructure (2022) The HM Government. [online] available from:https://www.gov.uk/government/collections/government-grants-for-low-emission-vehicles#ev-chargepoint-grant. Accessed: 19 May 2022.

74 EV chargepoint grant for landlords: customer guidance (2022) The Office for Zero Emission Vehicles. [online] available from:https://www.gov.uk/government/publications/ev-chargepoint-grant-for-landlords-customer-guidance/ev-chargepoint-grant-for-landlords-customer-guidance. Accessed: 19 May 2022.

75 EV infrastructure grant for residential car parks: customer guidance (2022) The Office for Zero Emission Vehicles. [online] available from:https://www.gov.uk/government/publications/ev-infrastructure-grant-for-residential-car-parks-customer-guidance/ev-infrastructure-grant-for-residential-car-parks-customer-guidance. Accessed: 19 May 2022.

76 Workplace Charging Scheme: guidance for applicants (2022) The Office for Zero Emission Vehicles. [online] available from:https://www.gov.uk/guidance/workplace-charging-scheme-guidance-for-applicants. Accessed: 19 May 2022.

guests and visitors. Additionally, businesses with 249 employees or fewer can apply through the EV infrastructure grant for staff and fleets.[77]

The schemes are run by OZEV and administered by the Driver and Vehicle Licensing Agency (DVLA).

Air Quality Grant[78]

The scheme supports local authorities to make air quality improvements and to meet their statutory duties under the Environment Act 1995. It has awarded more than £81 million in funding to a variety of projects since it started in 1997. The fund is aimed at "Projects which reduce air pollutant exceedances (primarily for nitrogen dioxide) especially in those areas that are projected to remain in exceedance of the UK's legal targets".

Other funds

In September 2021, the UK Government announced the Rapid Charging Fund, a £950 million fund to future-proof electrical capacity at motorway and major A road service areas. This funding will support the rollout of at least 6,000 high powered super-fast, open-access (150-350 kW capable) chargepoints across England's motorways by 2035. The fund is not yet open for applications.[79]

Charging Infrastructure Investment Fund (CIIF) is a £400m private-public fund to invest in private sector businesses deploying EV charging infrastructure. The CIIF is managed and invested on a commercial basis by private sector partners, and government invest up to £200m to be matched by private investors. In 2019, Zouk Capital was appointed fund manager. Previous investments have been made into Instavolt, a rapid charging provider, and Liberty Charge, a provider of on-street residential EV charging.[80]

Finally, local authorities do not necessarily need to provide all of the capital funding EV charging infrastructure deployments. There are a number of common business models available to work with the private sector, as discussed previously.

77 EV infrastructure grant for staff and fleets: customer guidance (2022) The Office for Zero Emission Vehicles. [online] available from:https://www.gov.uk/government/publications/ev-infrastructure-grant-for-for-staff-and-fleets-customer-guidance/ev-infrastructure-grant-for-for-staff-and-fleets-customer-guidance. Accessed: 19 May 2022.

78 Air quality grant programme (2022) Department for Environment, Food & Rural Affairs. [online] available from:https://www.gov.uk/government/collections/air-quality-grant-programme#:~:text=Defra's%20air%20quality%20grant%20scheme,under%20the%20Environment%20Act%201995.. Accessed: 19 May 2022.

79 Guidance Rapid charging fund (2021) The Office for Zero Emission Vehicles. [online] available from: https://www.gov.uk/guidance/rapid-charging-fund Accessed: 19 May 2022.

80 Charging Infrastructure Investment Fund (2019) Infrastructure and Projects Authority and HM Treasury. [online] available from:https://www.gov.uk/government/publications/charging-infrastructure-investment-fund. Accessed: 19 May 2022.

RECOMMENDATIONS AND ACTION PLAN

Ensure charging provision for EVs keeps pace with demand

The findings from the above analysis recommend using WSP's high scenario as a target for the number of EVCPs across the borough by 2030, given this would provide the highest level of provision out of all scenarios analysed.

This would lead to an additional **1,712 publicly available charging sockets** across the borough by 2030, consisting of an additional 1,392 fast (between 7kW and 22kW) and 320 rapid (greater than 50kW). Of these, the deployment of **783 fast** and **49 rapid** charging sockets should be facilitated by the public sector. It is worth noting that these figures do not include EVCPs in workplaces or domestic sockets in residential homes.

Installing this number of EVCPs within the borough would help cater for future projections in EV ownership, where 40,000 EVs are forecasted to be registered in the borough by 2030 (this equates to over 30% of registered vehicles). This increase, and subsequent decrease in ICEVs, could lead to approximately 12% decrease in CO_2 emissions in the borough, from nearly 152,000 tonnes in 2020 to around 133,000 tonnes by 2030.

Considering that most of the EV charging happens at home where dwell times are longer and that 32% (22,783) of households in Wokingham Borough do not have access to off-street parking, the installation of the additional 783 fast charging sockets (between 7kW and 22kW) should be focused on residential areas where off-street parking is not available. This will enable residents who rely on on-street parking make the switch to an EV and realise the benefits of owning one. The priority areas for public EVCPs - streets that have a high reliance on on-street parking and where there is expected to be a high demand for EVs by 2030 - are presented in Figure 27. These priority areas are within the following locations: **Wokingham, Woodley, Earley, Finchampstead and Shinfield**.

Once EVCPs have been installed at the above locations, the focus should move to **Winnersh and Twyford**. The analysis shows these areas are also likely to have a high EV uptake as well as having a low availability of off-street parking (as seen in Figure 22 and Figure 17 respectively).

An allowance should also be given for fast charging sockets that are requested by WBC residents. Residents who do not have access to a private garage or driveway can send an email request for a public EVCP near their properties. These requests should be taken into consideration when planning for future chargepoints and should be assessed on a case-by-case basis.

The installation of the additional 49 rapid charging sockets (greater than 50kW) should be targeted at the following locations:

- **Council owned car parks.** Where feasible, all council owned car parks to have at least one fast or rapid EVCP by 2030[81].
- **Locations where dwell times are shorter or for people visiting or driving through the region to get a faster turnaround.** These will typically be in car parks near retail/leisure locations or on/near major roads for those travelling through the borough. This would include Wokingham and Twyford town centres, as well as near to the M4 and A329(M) key strategic corridors. Multiple sockets per site will provide greater guarantee of a chargepoint being available.

Expected financial costs

Using the costs presented in Table 5 the high scenario would cost a total of £26,440,000 until 2030 (including capital and grid connections costs). This is based on 696 fast EVCP devices (assuming each device contains two sockets) and 320 rapid EVCP devices (assuming each device is a single socket). For those to be funded by the public sector, this would cost WBC approximately £8,322,500 (£5,872,500 for fast chargers and £2,450,000 for rapid chargers.

For annual operating costs, the additional number of EVCPs forecast in the high scenario would cost a total of £889,200 a year (based 696 fast and 320 rapid). Of those funded by the public sector, this would cost WBC £264,375 a year (£176,175 for fast and £88,200 for rapid).

For the publicly funded EVCPs, WBC's preferred method for delivering these would be a **concession model**, where they would be part funded by external funding sources and part funded by the private sector (CPOs). This model is preferred due to the reduced risk for the public sector, as the CPO would provide a proportion of the capital costs and be responsible for operating and maintaining the EVCPs for an agreed period. The income would be shared between WBC and the CPO, proportionate to the initial capital funding provided by each party. When central government or regional grants are not available, fully funded models provided by the CPOs could also be explored where suitable; however, this will minimise the amount of control the Council has.

Ensure chargepoints are accessible to all

The Council aims to provide an inclusive, equitable and accessible EV chargepoint network that caters for the needs of all residents, visitors and businesses. With these goals in mind, WBC should ensure that **all new deployed electric vehicle infrastructure is in compliance with legal requirements and best practice guidance regarding accessibility and inclusive design**. Consideration should be given to the following and all current standards and guidance at the time of installations:

[81] Where separately named car parks are in close proximity to one another, chargepoints may be co-located in one of the car parks for economies of scale.

- PAS 1899:2022 PAS 1899 - Electric vehicles accessible charging specification;
- Inclusive Mobility - A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure (2021);
- Equality Act 2010; and
- BS 8300-1:2018 Design of an accessible and inclusive built environment - External environment. Code of practice

The Council should also work with local accessibility organisations and bodies to set their own suitable design standards for the installation of electric vehicle infrastructure.

Ensure the solution is future proofed

When there are planned works that involve resurfacing roads and/or car parks in local highway authority land, and there is evidence of existing or forecasted demand for EV charging at these locations, **passive infrastructure should also be considered**. This could be during initial construction, during a significant renovation or during other scheduled construction work. It could also be done when chargepoints are first being installed at a given site.

By removing the need to dig up and resurface roads every time additional charging infrastructure is installed, passive infrastructure contributes to maintaining the integrity of road and/or car park surfaces and significantly decreases future EVCP installation costs. This reduces the need for surface repairs and extends the lifetime of the surface, both of which contributing to reducing road surface maintenance costs. It also allows for a simpler switch to a new operator, or different charging technology, at the end of a contract.

Provide a variety of charging options to accommodate the range of residents within the borough and their diverse needs

There are a number of different options for local residents and the likely solution is a mix of technologies and chargepoints, including:

- Conventional on-street chargers with consideration of dedicated EV bays where this is deemed appropriate;
- Kerbside charging;
- Shared EVCP as part of a ‘Community charging’ offer;
- Residents charging hubs in nearby car parks;
- Remote rapid charging hubs; and
- Cable gullies for houses without off-street parking.

WBC should ensure the chargepoints can be accessed by a number of different vehicle types and users, including taxi drivers and van users. These users will typically need larger bays and faster chargers.

To remove some of the blockers to home charging and support electric vehicle growth, awareness of community charging schemes such as CoCharger and JustPark should also be increased enabling neighbours to rent out and share home EV chargers. Schemes like these utilise existing resources – chargepoints, space, infrastructure and finance contributing to the scale up of chargepoint infrastructure.

Until further evidence is gathered from different authorities on how successful cable gullies are, and the release of government guidance around the use of cable gullies, WBC's current position is that residents are not allowed to install them within the borough. This therefore highlights the importance of providing a network of public EVCPs, which will allow residents who do not have access to off-street parking to charge their EV.

Trailing cables across public footways and verges is not permitted by the Council. This presents a significant trip hazard, is detrimental to inclusive mobility and contravenes the Highways Act 1980.

Make the most of funding opportunities

While WBC will undoubtedly have a big role to play in facilitating the deployment of EV charging infrastructure, there is a range of different funding opportunities that WBC and residents can use to subsidise the cost of this infrastructure. The Council should investigate which funding streams are relevant for the borough and assign ownership for the applications to guarantee that all options are considered.

Encourage the private sector to take the risk

While WBC has a role in ensuring EV infrastructure is adequate, allowing the private sector to take the strain allows WBC to operate in a more hands off manner. Many of the private landowners in the region will already have deals with CPOs which will allow for quick rollout. The Council should seek opportunities to bring providers and landowners together to create a network for the provision of private sector EVCPs.

The Council should also encourage organisations, businesses and other owners of commercial public and private land to deploy public EV charging infrastructure where it is appropriate.

WBC should focus where private organisations will not pick up the slack and in their own properties.

Monitor updates to EV infrastructure in building regulations and enforce these through the planning process

In order to provide adequate EV charging infrastructure, WBC must ensure that all new developments align with future forecasts and current building regulations for EV charging.

For new buildings with associated car parking, as well as existing buildings undergoing major renovation, **active and passive infrastructure should be provided in line with the**

requirements of the latest Building Regulations. At the time of writing this Strategy, the Building Regulations 2010, Infrastructure for the charging of electric vehicles – Approved Document S – 2021 Edition came into force in England. According to this every new home, including those created from a change of use, with associated parking must have an EV chargepoint from June 2022. Approved Document S applies to new residential and non-residential buildings; buildings undergoing a material change of use to dwellings; residential and non-residential buildings undergoing major renovation; and mixed-use buildings that are either new or undergoing major renovation. WBC has a role to ensure these building regulations are followed by ensuring EVCPs are included at the planning application stage.

Given that the landscape around the chargepoints' policy is changing rapidly, it is important that WBC stays on top of new regulations and developments that might change how and where EVCPs are installed updating accordingly their local planning guidance.

In addition, WBC should explore producing a Supplementary Planning Document that aims for developments within the Borough to install a higher level of EVCP provision than the requirements set out in Document S.

Work with the DNO to ensure there is adequate grid capacity

WBC should continue engaging with the DNO to inform them on the key outcomes of this report, including the total number of EVCPs they are looking to install across the borough by 2030 and the priority locations where these will be installed. The Council should work collaboratively with the local DNO to ensure that there is enough capacity for the future, especially where grid constraints have been identified.

Lead by example

One way to influence others, is to lead by example. In line with our Climate Emergency action Plan, the Council should decarbonise all WBC owned fleet as the vehicles come up for renewal. The Council currently operates a fleet of 16 vehicles ranging from minibuses, cars and a tractor in Dinton Pastures.

In readiness for the decarbonisation of WBC fleet, the Council should review the parking locations of these vehicles and identify opportunities for chargepoints installations.

In addition, the Council should revise the tender specifications to make EV fleets a desirable characteristic when assessing suppliers.

The Council should also incentivise the use of EVs among the WBC staff and encourage employees to use more environmentally friendly transport modes such as walking, wheeling, cycling and reducing private vehicle ownership and mode share.

Continue the community engagement to raise awareness and meet users' needs

The Council should continue engaging with the public and the fleet operators to understand their EV charging requirements and what systems and infrastructure they need to encourage them to shift to EVs.

The Council should also continue exploring users' attitudes towards other forms of sustainable travel, including walking and cycling. This will help to see what are the barriers that people face preventing them from travelling in ways other than the private vehicle.

Continue to monitor EV uptake and EVCP usage

Monitoring and keeping track of progress currently takes place through the Climate Emergency Action Plan progress report. The fourth progress report was published in September 2023.

WBC should stay on top of the changes. As we move away from the pandemic and people start travelling more frequently, and in new patterns, pent up demand may lead to changes more rapid than predicted.

Action Plan

The table below outlines the actions that are needed from WBC to increase the number of EVCPs within the borough.

The duration of the timescales is as follows:

Short term: 1-2 years

Medium term: 3-5 years

Long term: Over 6 years

Table 24 – Action Plan

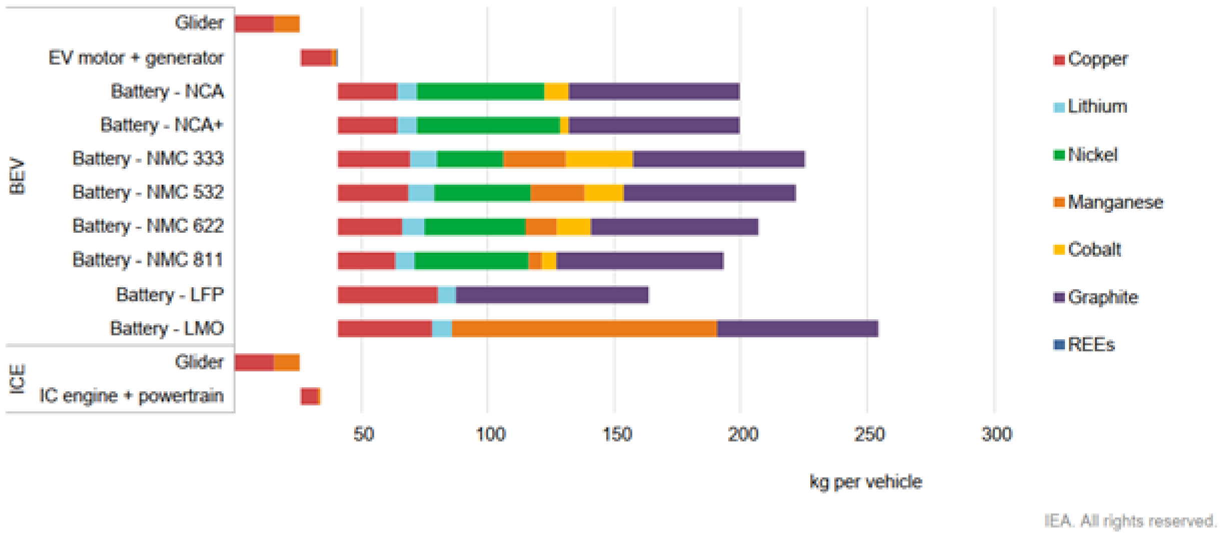
Objective	Action	Priority	Term
Ensure charging provision for EVs keeps pace with demand	Accelerate chargepoint deployment, expanding the local network, to promote EV uptake to reach high-range scenario of an additional 1,712 EV charging sockets by 2030 (832 of which to be delivered by the public sector). Prioritise a mixture of areas with high forecast demand, areas reliant on on-street parking and anticipated gaps in private sector provision. This includes Wokingham, Woodley, Earley, Finchampstead, Shinfield, Winnersh and Twyford. Review council-owned sites for potential installation of fast and rapid chargepoints for public use. Focus on public car parks and council owned land. Where feasible, all council-owned car parks to have at least one fast or rapid EVCP by 2030. When external funding sources are available, seek to deliver the identified no. of chargepoints as part of a public private commercial partnership model operated as a concession scheme. Fully funded models could also be explored where suitable; however, this will minimise the amount of control the Council has. Continue collaborating with neighbouring authorities coordinating the placement of charging infrastructure near authority borders. Consider bidding for chargepoint projects with neighbouring local authorities, securing pan Berkshire economies of scale and allowing chargepoint operators to prioritise larger programmes.	1 - High	Short/Medium
Ensure the solution is future proofed	Passive provision should be installed where there is forecast demand for charging, or where there are planned works scheduled that would mean resurfacing is required. Providing this passive provision means there is less initial cost than if a fully operational chargepoint was being installed. However, passive provision should not be provided where there is already a high demand for chargepoints and should only be installed in new developments as per the regulations.	2 – Medium	Short/Medium
Ensure all new chargepoints are accessible for all	All chargepoints installed within the borough should be in compliance with legal requirements and best practice guidance regarding accessibility and inclusive design. WBC will work with local accessibility organisations to develop their own design standards for the deployment of EV infrastructure.	1 – High	Short/Medium
Provide a variety of charging options to accommodate the range of residents within the borough and their diverse needs	A mixture of technologies and types of chargepoints should be delivered across the borough to accommodate not just standard cars but a variety of vehicles/transport modes such as e-bikes, taxis and vans, which will be used for a range of journey purposes. WBC will monitor the development of new technologies to ensure they remain up to date on how people are travelling around the area. Continue engaging with other local authorities and monitor and review the new technological EV charging solutions that they have introduced or trialled to learn from their experiences. Establish which technologies would be suitable in the borough and develop WBC's set of design standards / guidance for the installation of these technologies and chargepoints. Increase awareness of community charging schemes.	1 – High	Short/Medium
Make the most of funding opportunities	Monitor bidding opportunities and proactively seek public funding options	2 - Medium	Short/Medium
Encourage the private sector to take the risk	To help WBC roll out their programme of chargepoints, the private sector should be encouraged to provide investment. WBC will continue engaging with various chargepoint operators so that they can work together to deliver the number of chargepoints outlined within this Strategy. As mentioned previously, due to the financial challenges that the Council is facing and to transfer some cost and risk liabilities to the private sector, as well as harness suppliers' expertise in chargepoint deployment, a concession model is the preferred commercial	1 – High	Short/Medium

Objective	Action	Priority	Term
	arrangement for WBC when external funding sources are available. In any other cases, fully funded models could also be explored where suitable; however, this will minimise the amount of control the Council has.		
Monitor updates to EV infrastructure in building regulations and enforce these through the planning process	Stay on top of new regulations that might change how and where EVCPs are installed updating accordingly WBC's local planning guidance. Ensure that the requirements of the regulations are applied, as appropriate, to all developments and masterplans providing an adequate chargepoint provision.	1 - High	Short
Work with the DNO to ensure there is adequate grid capacity	WBC will continue engaging with the DNO so they are aware of their charging infrastructure plans. They can help identify suitable sites where DNO connection costs will be low and can ensure there is enough capacity for future charging needs.	1 – High	Short/Medium
Lead by example	Review opportunities for the WBC fleet, in particular small vehicles/vans to be decarbonised by switching to EVs or hybrid. Develop a phased approach so that that our fleet is 100% zero carbon by 2030. At the time of writing this Strategy, WBC were preparing a separate Car Club Strategy. This will explore the possibility of providing an EV car club scheme within the borough and if this could be used in replacement of the Council's own fleet of vehicles. Carry out a full review of the existing parking locations for WBC fleet vehicles readiness of decarbonising the council owned fleet. Identify opportunities for installation of EVCPs and staff training. Revise tender specifications to make EV fleets a desirable characteristic when assessing suppliers. Encourage WBC staff to switch to EVs by implementing a salary sacrifice EV scheme for Council staff members to use. Install chargers outside the Council office buildings for use by staff and for residents/tourists nearby. Only offer electric or plug-in hybrid pool cars for staff use.	1 – Medium	Short/Medium
Continue the community engagement to raise awareness and meet users' needs	WBC should continue engaging with the public to understand their charging requirements and barriers that are preventing them from buying an EV. The areas with lower uptake would benefit from greater communications and more targeted work around on-street chargepoints. At the same time, they can explore their attitudes towards other forms of sustainable travel, including public transport, walking and cycling. Host a series of promotional events or a pop-up EV experience centre. Help encourage individuals and businesses to switch to EVs and install their own private EVCP by advertising grant opportunities for individuals/local community groups, providing basic support for applications and general updates on actions the Council is taking.	2 – Medium	Short/Medium
Monitor EV uptake and EVCP usage	The Council will monitor the progress of chargepoint delivery through their CEAP progress reports, which are published annually. This will include how many new chargepoints they have installed and any data they have on usage, which would be provided by the chargepoint operator.	1 – Hight	Short/Medium

Appendix A

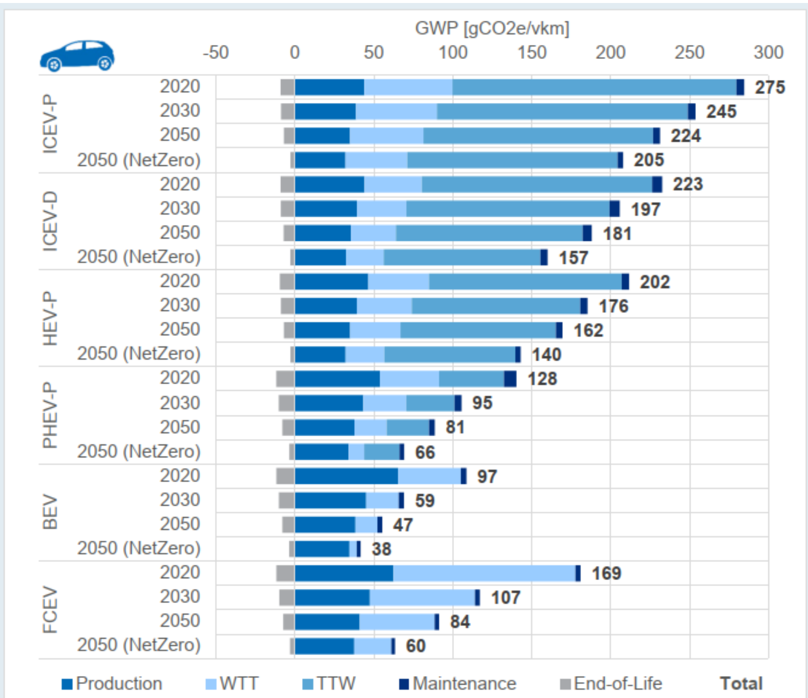
Impact of EV’s compared to ICE’s

Typical use of minerals in an internal combustion engine vehicle and a battery electric vehicle



Notes: For this figure, the EV motor is a permanent-magnet synchronous motor (neodymium iron boron [NdFeB]); the battery is 75 kilowatt hours (kWh) with graphite anodes. Gliders are self-built EVs, NCA= Nickel-cobalt-aluminium, NCM= Lithium Nickel Manganese Cobalt Oxide,

Summary of breakdown of overall lifecycle greenhouse gas impacts for Lower Medium Cars for selected powertrain types (Baseline scenario for 2020, 2030 and 2050, Net Zero Power for 2050)



Notes: GWP = global warming potential for greenhouse gas emissions. Key for lifecycle stages: Production = production of raw materials, manufacturing of components and vehicle assembly; WTT = fuel/electricity production cycle; TTW = impacts due to emissions from the vehicle during operational use; Maintenance = impacts from replacement parts and consumables; End-of-Life = impacts/credits from collection, recycling, energy recovery and disposal of vehicles and batteries. Results for ‘2050’ are for the Baseline scenario conditions (e.g. improved energy mix, vehicle efficiency) and results for ‘2050 (NetZero)’ present results for the Net Zero Power scenario with much more significant improvements in vehicle efficiency and energy mix.

Appendix B

Existing EVCP’s in Wokingham Borough

Sockets	Devices	Location	Speed
6	3	The Big Plant Nursery (RG10 9PN)	Fast
1	1	Val Wyatt Marine	Fast
4	2	Wee Waif (RG10 9RJ)	Fast
13	13	Now Building (RG6 1PT)	Fast
4	2	Thames Valley Park Drive	Fast
4	2	BP Sonning Cutting Connect (RG6 1BG)	Rapid
2	1	Crosfield School (RG2 9BL)	Fast
2	1	Rutherford Estates Ltd Thames Valley (RG2 9LH)	Fast
4	2	School Green Centre (RG2 9EH)	Slow
2	2	Arborfield C2 (RG2 9GB)	Fast
8	4	Arborfield C2 (RG2 9GB)	Fast
4	2	Cresswells Garage	Rapid
3	3	Luckley House School	Fast
6	3	Loddon Vale Centre (RG5 4UL)	Rapid
4	2	Winnersh Business Park (RG41 5TS)	Rapid
6	3	Wickes/Pets at Home (RG41 5HH)	Rapid
16	16	Wokingham Supercharger	Rapid
3	1	DoubleTree by Hilton Reading	Rapid
4	2	Micro Focus (RG41 1QN)	Fast
3	1	Morrisons Wokingham Woosehill	Fast/Rapid
4	2	Self Storage Wokingham	Fast
2	1	Arnett Avenue North Hennerton	Slow
2	1	Arnett Avenue South Redlands	Slow
2	1	Bohunt School	Fast

2	1	Bohunt School Staff	Fast
2	1	Bulmershe Leisure Centre	Fast
4	2	California Country Park	Fast
4	2	Cantley Park Café	Fast
9	5	Carnival Pool Carpark	Fast
3	1	Oakingham Belle	Fast/Rapid
4	3	Dinton Pastures Country Park	Fast
10	5	Farley Hill Primary	Fast
6	2	Mereoak P&R	Rapid
2	1	Phoenix Avenue Cliveden House	Fast
2	1	Phoenix Avenue Vyne House	Fast
4	4	Wokingham Council Offices East Car Park	Fast
3	1	Wokingham Council Offices	Rapid
6	3	Wokingham Train Station	Slow
4	2	St Cecilia Primary School Staff	Fast
8	4	St Cecilia Primary School	Fast
3	1	Toutley Depot	Rapid
4	4	Toutley Depot Staff	Fast
6	2	Winnersh Triangle P&R	Rapid
1	1	L'ortolan Restaurant	Fast
8	4	Green Park Supercharger	Rapid
3	2	Bayer Plc	Fast
2	1	Nirvana Spa	Slow
2	2	Squires Garden Centre	Fast
4	2	Tesco Superstore Wokingham	Fast

2	1	Eden Hyundai Wokingham	Fast
2	1	Wokingham SF Connect	Rapid

Appendix C

Priority locations

Street	Town	Postcode
Cirrus Drive	Shinfield	RG2 9FL
Hanwood Close	Woodley	RG5 3AB
Wallace Close	Woodley	RG5 3HW
School Drive	Woodley	RG5 3PZ
Rivermead Road	Woodley	RG5 4DH
Lysander Close	Woodley	RG5 4ND
Hartigan Place	Woodley	RG5 4SH
Shackleton Way	Woodley	RG5 4UU
Donaldson Way	Woodley	RG5 4XL
Rosedale Cres	Earley	RG6 1AS
The Drive	Earley	RG6 1EG
Engledfield Place	Woodley	RG6 1FR
Chilcombe Way	Earley	RG6 3DA
Westminster Way	Earley	RG6 4BX
Fleetham Gardens	Earley	RG6 4BY
Fleetham Gardens	Earley	RG6 4BZ
Colmworth Close	Earley	RG6 4DZ
Ratby Close	Earley	RG6 4ER
Oakey Drive	Wokingham	RG40 2DT
Outfield Crescent	Wokingham	RG40 2ET
Carey Road	Wokingham	RG40 2NP
Roycroft Lane	Finchampstead	RG40 4HN
Jupiter Way	Wokingham	RG41 3GE