Land NE J10 M42 – Zero-Emission Goods Vehicles Statement

Prepared for Hodgetts Estates by
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MDS Transmodal

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1. INTRODUCTION

1.1 Hodgetts Estates have submitted proposals for a new strategic industrial/warehouse-led business park on land to the north-east of Junction 10 of the M42 motorway, North Warwickshire (Land NE J10 M42). Up to 100,000 square metres of new high-bay logistics and industrial floor space is proposed for the site, with ancillary office space, a site Hub Office and a 150 space overnight lorry park facility. MDS Transmodal have previously prepared a *Rail Terminal Connectivity Statement* (ref: 220053r_rail_final) and a *Technical Addendum* (ref: 220053r_rail_addendum_ver final) which demonstrated that the proposed warehouse development can in practice be classified as 'rail-served'. Occupiers will be able to access *Birmingham Intermodal Freight Terminal (BIFT)*, the rail terminal at Birch Coppice, on the same basis as those currently located within the business park. The site will therefore have access to low/net-zero carbon transport services from the outset.

1.2 Despite the access to BIFT, the majority of inbound and outbound flows can be expected to take place using road transport, which at present almost exclusively utilises vehicles powered by diesel or petrol. The UK is required by the Climate Change Act and various international treaty obligations to achieve net-zero greenhouse gas (GHG) emissions by 2050. The road haulage sector will therefore need to play a significant role in achieving net-zero. This report considers the following:

- The technological solutions which are emerging as potential zero-emission replacements for diesel/petrol engines; and
- The preparedness of the proposals at Land NE J10 M42 for zero-emission goods vehicles.

1.3 Both light goods vehicles (LGVs or vans) and heavy goods vehicles (HGVs) are considered – see table below. The use of LGVs to deliver freight has increased as a consequence of the growth of e-commerce retail sales, with a consequent need for new distribution buildings to handle the transfer of goods from HGVs to LGVs.

Table 1.1: Types of Freight Goods Vehicles

Vehicle Type	Definition	Emerging Alternative to Petrol/Diesel
Light Goods Vehicle (LGVs)	Any vehicle up to 3.5 tonnes gross vehicle weight. Can be driven on a standard Category B (car) driving licence	Battery-electric
Heavy Goods Vehicles	Vehicles over 3.5 tonnes gross weight up to 44 tonnes. Includes rigid vehicles, rigid vehicles towing trailers and tractor unit-semi trailer articulated combinations. Requires Category C1, C and C+E driving licence to drive	Battery-electric Hydrogen fuel-cells Electric road system

1.4 Overall, the report concludes that the planned scheme will be able to accommodate zero-emission goods vehicles, which ever emerging technology or technologies eventually becomes the long-term solution. It is therefore 'net-zero ready' and will contribute to the process of decarbonising the road transport sector.

1.5 For reference, '*zero-emission goods vehicles*' are generally recognised to be those which do not generate GHG emissions directly 'from the tailpipe' when being driven on the road network or within yards and depots. However, the replacement energy source (electricity) may still produce GHG emissions as part of its production and distribution process, which will need to be off-set against a carbon-negative activity to ensure net-zero is achieved. This issue is not considered by this report.

2. ZERO-EMISSION GOODS VEHICLES

2.1 The technological solutions which are emerging as potential zero-emission replacements for diesel/petrol engine freight vehicles are identified in various recent policy documents and reports. These provide insight into current Government and industry thinking and expectations; they are summarised below, with the consequent spatial implications for large-scale distribution facilities discussed following.

Better Delivery: The Challenge for Freight (NIC, 2019)[1]

2.2 In April 2019, the *National Infrastructure Commission (NIC)* published the report "*Better Delivery: The Challenge for Freight*". It presented the NIC's long-term advice (up to 2050) to Government on likely changes in the freight sector. In particular, it examined delivering a 'clean freight system', focusing on generating zero GHG emissions from rail and road transport and tackling air pollution. New technologies were considered alongside their implications with respect to infrastructure development and land-use planning. It was produced in-house by the NIC, albeit it's evidence base included statistical data, engagement with key stakeholders, previously published study reports and specifically commissioned studies (including one undertaken by *MDS Transmodal* on the future of freight demand[2]).

LGVs (Vans)

2.3 With respect to smaller road freight vehicles (i.e., LGVs), the NIC report states that battery-electric vans are emerging as a viable zero-emission alternative to LGVs powered by petrol or diesel engines. The report notes that while uptake has been relatively slow to date, it expects a greater choice of electric vans between 2.5 tonnes and 4.25 tonnes gross weight with a longer range to emerge over the coming years. It notes that while purchase costs are higher than petrol/diesel vans, particularly for larger models, these are outweighed by their lower operating costs (quoting running costs of an electric van being around 60 per cent lower than an equivalent diesel van). It concludes that as the choice of vehicles increases and the travel range improves, and importantly as the price difference between electric and diesel vans narrows, it is likely that uptake could increase rapidly. This is particularly important for e-commerce trade, as LGVs are the principal means of delivering directly to residential and commercial properties.

[1] https://nic.org.uk/app/uploads/Better-Delivery-April-2019.pdf
[2]https://www.nic.org.uk/wp-content/uploads/Future-of-Freight_Future-of-Freight-Demand_MDS-Transmodal.pdf

HGVs

2.4 The NIC report states that HGVs will be more '*challenging*' to decarbonise because of the heavy loads they haul and the longer distances they travel. It noted (at the time of writing in 2019) that there is currently no commercially available solution to decarbonise the heaviest HGVs, and as a consequence there remains uncertainty about the pathway to full decarbonisation, albeit three technological solutions (described below) are emerging as the most promising alternatives. All involve propulsion by means of electric motors, albeit with different sources supplying the electric current.

2.5 *E-highways (aka the Electric Road System)*. This solution is similar to electrified railways, with overhead live contact wires supported by catenary/masts delivering electric current to the HGV via a roof-mounted pantograph. The system is being developed and trialled in a number of countries, including Sweden and Germany. Due to the high infrastructure investment required, only key strategic highway routes (e.g., motorways, dual carriageways, etc..) could ever be wired in this manner, meaning that other power sources would still be required when HGVs join secondary roads, such as between the motorway and a distribution centre. E-highways HGVs will therefore probably also need to have small batteries installed to enable short-distance trips away from the wires (with the battery recharged when operating under wires but also potentially at delivery locations or HGV parks).

2.6 *Battery-electric*. The NIC report states that as the energy density of batteries increases and their costs fall due to mass production, it may be that battery-electric HGVs (BEHGVs) are the most promising option. The report notes that a number of small-medium sized models are now available for shorter urban journeys (though since 2019, larger BEHGVs have begun to be marketed by a number of truck manufacturers). Though BEHGVs are likely to have a shorter range when compared with diesel-engine HGVs, at least in the short to medium term, driver's hours regulations and the process of loading/unloading should provide opportunities for rapid re-charging, either en-route (e.g., at truck parking facilities) or where goods are collected and delivered (e.g., at distribution centres), providing sufficient charging infrastructure is available. As per battery-electric LGVs, the higher capital costs associated with BEHGVs are likely to be outweighed by lower operating costs (fuel and maintenance). It is also likely that they will have a longer economic life due to them having fewer moving parts.

2.7 *Hydrogen fuel cells*. These combine hydrogen (stored in on-board tanks) and oxygen (from air) to generate an electric current, with water produced as the by-product. They imply minimal disruption to existing operating practices as, like diesel HGVs, they would have an extended range (when compared with existing BEHGV technology) and with rapid refuelling from bunkers (at depots or en-route at HGV parks). The NIC report states that the case for hydrogen HGVs depends upon substantial falls in the costs of both vehicles and the fuel itself. It notes that running costs for hydrogen HGVs are currently around 25-30% more expensive than diesel,

meaning the cost of hydrogen would need to fall by around 20% to match that of a BEHGV. Further, fuel cell vehicles are currently estimated to have an efficiency of around 22% (it is around 33% for diesel vehicles and 70% for battery electric vehicles).

Transport Decarbonisation Plan (DfT, 2021)[3]

2.8 Published by the Department for Transport (DfT) in July 2021, the *Transport Decarbonisation Plan (TDP)* presents the path to net-zero transportation in the UK alongside the principles underpinning the approach. It sets out the commitments and actions needed to decarbonise transport, and is multi-modal in its scope covering all forms of passenger and freight transport (e.g., walking and cycling, busses and coaches, railways, fleets cars/vans, motorcycles/scooters, maritime, aviation and freight).

2.9 Delivering a zero-emission freight sector is addressed in Parts 2a ('Decarbonising all forms of transport', including LGVs) and 2b ('Multi-modal decarbonisation and key enablers', including HGVs). It states that the transition to zero-emission LGVs is already underway, noting that new petrol-only and diesel-only LGVs will be removed from sale in 2030, and that by 2035 all new vans must be 100% zero-emission 'at the tailpipe' (note, however, in September 2023 the updated *zero emissions vehicle mandate* (see below) has now delayed the ban on petrol/diesel-only cars and vans to 2035 (aligning the UK with the EU), albeit setting a target of 70% of new vans being zero emission by 2030). The working assumption is that LGVs will convert to battery-electric, supported by an expanded charging network, conforming with the conclusions set out in the NIC report.

2.10 The TDP proposes that the sale of new non-zero emission HGVs under 26 tonnes (gross weight) will be phased out by 2035, and by 2040 for all remaining non-zero emission HGVs up to 44 tonnes (gross weight). The document states that the Government intends to consult on these proposed timescales. However, the TDP notes the uncertainty about which zero-emission technology is most suitable for long-haul HGVs. The TDP therefore commits the Government to investing £20 million in trials of the three emerging options that were set out in the NIC report. The TDP states that the trials will inform the best route to a fully zero-emission road freight sector. It is also worth noting that the document supports and encourages further modal shift to rail freight as a key part of the overall process that will achieve net-zero.

2.11 The TDP also notes that the Government will publish an overarching hydrogen strategy (see below). It states that hydrogen is likely to be effective in transport areas where 'batteries cannot reach' and when energy density requirements, weight and refuelling times may well make it the most green energy source.

[3] https://www.gov.uk/government/publications/transport-decarbonisation-plan

Supercharging the Midlands (Midlands Connect, 2021)[4]

2.12 This document, published by Midlands Connect in 2021, examines the current use of electric vehicles in the *Midlands Connect* region, the infrastructure in place to support it, and the infrastructure needed to meet and drive demand for zero-emissions travel in the coming years. It is aimed at private car ownership, in particular owners that currently do not have access to off-road parking overnight (and therefore private charging). It notes that currently 93% of battery-electric vehicle (BEV) owners have access to off-road parking. In terms of public charging infrastructure, the document states that there are 2,170 charging points across the Midlands Connect region, around two-thirds being slow chargers under 22kW (at the time of writing in 2021). A list of public sector 'actions' is summarised, setting out how Midlands Connect and its member authorities will expand the number and range of public charging infrastructure.

2.13 While not directly relevant to the submitted proposals, the document further confirms the conclusions set out by the NIC and the TDP, namely that cars (and by extension LGVs) will convert to battery-electric. This will be supported by an expanded charging network, both public e.g. at parking facilities and private off-road e.g. depots.

Taking Charge: The Electric Vehicle Infrastructure Strategy (DfT, 2022)

2.14 This document, published by the DfT in 2022, set out a strategy to deliver an expanded network of public charging infrastructure for BEVs. Recognising that most BEV charging will take place at home off-road, public charging points will be needed to enable long-distance journeys and for those without access to off-street parking. It will, hopefully, remove access to charging infrastructure as a perceived or actual barrier to the greater adoption of BEVs. Again, the strategy is primarily aimed at private car ownership and is therefore mostly not directly relevant to the Land NE J10 M42 proposals. However, the document further confirms that cars and LGVs, supported by an expanded public and private charging network, will convert to battery-electric as a means of achieving net-zero.

2.15 The document notes the following key challenges:

- The pace of roll-out is too slow;
- Public chargepoints can suffer poor reliability and are expensive to use;
- The business case for commercial deployment can be challenging;
- Connecting to the national grid network can be slow and expensive; and
- Need for more local engagement and planning.

[4] https://www.midlandsconnect.uk/publications/supercharging-the-midlands/

2.16 To address these challenges, the Government is seeking to focus intervention on two crucial sectors where the pace of roll-out needs to be accelerated, namely high powered chargers on the strategic road network and transforming local on-street charging provision. In terms of delivery, the document states that it wants to maximise the opportunity for chargepoints to be delivered by the market i.e. private sector. It notes that market-led rollout will foster competition, encouraging chargepoint suppliers to provide innovative solutions that meet drivers' needs at the lowest possible cost. This clearly aligns with the proposals at Land NE J10 M42, in that the scheme will provide high powered chargers on the strategic road network and be delivered through private sector investment.

2.17 The document also states that the Government will work regulator *Ofgem* to make sure that chargepoints are easy to connect and integrate with the electricity system. It notes that the process of connecting chargepoints to the system can be a significant and costly challenge for developers. The Government is therefore focused on ensuring the connection process does not slow down the transition. Ofgem is preparing for the transition to BEVs and will support strategic investment in the electricity network to deliver the capacity needed with a clear expectation on network companies to anticipate and accommodate increasing demand.

Future of Freight Plan (DfT, 2022)[5]

2.18 The *Future of Freight Plan* was published by the DfT in June 2022. The Plan is a joint Government-freight/logistics industry response to a number of challenges which have impacted on the sector recently, including the Covid-19 pandemic and supply chain issues related to Brexit. In addition to managing these recent issues, the Plan looks to the future, including the challenges and opportunities presented by the transition to net-zero.

2.19 The Plan notes that the freight sector faces challenges from the large energy requirements of HGVs. Further research and development is therefore required into the fuels and technology of the future, with the precise mix of technologies currently remaining uncertain.

2.20 The Plan effectively builds on the TDP and the pathway/commitments contained in that document. It confirms the 2035 and 2040 phase-out dates for diesel-only 26 tonne HGVs and all HGVs respectively, that were proposed in the TDP. Developments since the publication of the TDP are described, including the establishment of a £200 million *Zero Emission Road Freight Demonstrator* programme, which is creating the evidence base on which technology is best suited to decarbonise the heaviest trucks and address the barriers to roll out. It reiterates the switch of LGVs to battery-electric power. It also notes that Tesco and Amazon have recently deployed BEHGVs to some of their operations.

[5] https://www.gov.uk/government/publications/future-of-freight-plan

2.21 Overall, the Future of Freight Plan conforms with the conclusions reached in the NIC report and the TDP; LGVs will almost certainly become battery-electric, while no single technological solution to decarbonising HGVs has yet to emerge. Three potential solutions are being tested for HGVs, with a £200 million programme underway to ascertain which is likely to be best suited in the long-term.

Fuelling the Future (HoC Transport Select Committee, 2023)[6]

2.22 The *House of Commons (HoC) Transport Select Committee* published this report in March 2023. It is a review of Government policy and strategy with respect to decarbonising transport. It is based on both oral and written evidence from the DfT and key freight sector stakeholders, including Logistics UK.

2.23 The report states that decarbonising HGVs poses more of a challenge than cars (and by extension LGVs) as they require significantly more power. Frequent re-charging will also be impractical for many road haulage operations. It notes that currently there is not a singular alternative technology that appears to be the solution. It references Logistics UK's evidence to the committee that we are still a long way from having a reliable market ready zero-emission HGV. This aligns with the conclusions presented in the NIC report, TDP and the Future of Freight Plan.

2.24 The report is also critical of the roll-out of rapid charging infrastructure and associated grid capacity. It also notes that low/zero-carbon fuel technology could play a future role, including synthetic fuels, which have so called 'drop-in' capabilities i.e., they can directly replace diesel in existing engine technology. Overall, it concludes that the Government should publish a long-term HGV decarbonisation strategy as a matter of priority.

Zero Emission Vehicle (ZEV) Mandate Consultation: Summary of Responses and Government Response (DfT, September 2023)[7]

2.25 The *ZEV mandate* is a Government policy which will force car and LGV manufacturers to sell increasing numbers of ZEVs from 2024 up to the legislated ban on diesel-only and petrol-only vehicles (currently scheduled for 2035 – see below). Car manufacturers will be required by law to meet sales targets for ZEVs (for cars and LGVs) under the Government's ZEV Mandate from January 2024. As part of the process of setting the regulatory framework, the DfT undertook a

[6] https://committees.parliament.uk/work/1711/fuelling-the-future-motive-power-and-connectivity/publications/

[7] https://www.gov.uk/government/consultations/a-zero-emission-vehicle-zev-mandate-and-co2-emissions-regulation-for-new-cars-and-vans-in-the-uk/outcome/zero-emission-vehicle-zev-mandate-consultation-summary-of-responses-and-joint-government-response

consultation exercise between March and May 2023. The aim of the consultation was to seek stakeholder views on (amongst others):

- The expected level of ZEV uptake going forward (trajectories);
- Any derogations and exemptions; and
- How to regulate the non-ZEV portion of the fleet.

2.26 It was organised as a joint consultation with the Scottish Government, Welsh Government, and Department for Infrastructure Northern Ireland, and overall 25 questions were presented to stakeholders. This document sets out a summary of the responses received. Relevant responses included:

- The regulatory framework and any targets subsequently set should be at the Great Britain wide level (rather than left to the individual devolved administrations); and
- While a wide range of responses was received with respect to the sales trajectory for LGVs, the most common was support for the central trajectory, albeit following a smoother path.

Revised ZEV Mandate (DfT, September 2023)[8]

2.27 Following the stakeholder consultation exercise described above and informed by the stakeholder responses received, at the end of September 2023 the Government subsequently set a revised mandate for car and LGV sales in the UK. The mandate now requires that 80% of new cars and 70% of new LGVs sold in Great Britain to be zero emission by 2030, increasing to 100% for both vehicle types by 2035.

2.28 The mandate itself clearly indicates that the LGV fleet which is battery-electric powered will substantially increase over the next few years, meaning that vehicle parking areas and warehouses which handles LGVs will need to be equipped with appropriate re-charging infrastructure. Note that while the mandate is 'technology neutral' when it refers to ZEVs, the clear implication is that cars and LGVs, supported by an expanded charging network, will convert to battery-electric as a means of achieving net-zero (thereby aligning with the NIC and TDP documents).

[8] https://www.gov.uk/government/news/government-sets-out-path-to-zero-emission-vehicles-by-2035

Future of Transport Regulatory Review: Zero Emission Vehicles Government Response (DfT, October 2023)[9]

2.29 The future of transport regulatory review was launched to examine how transport is regulated, particularly with respect to implementing a flexible and forward-looking framework. This consultation on zero emission vehicles ran between 28 September 2021 and 22 November 2021. The questions focused on four priority areas of the regulatory review, namely:

- Whether there should be a statutory obligation to plan for and deliver charging infrastructure;
- New powers to require installation of chargepoints in non-residential car parks;
- New powers to support the delivery of the Rapid Charging Fund; and
- Requirements to improve the experience for electric vehicle consumers

2.30 There was overwhelming support for a body or group of bodies to be responsible for the planning of and ensuring provision of chargepoints, with widespread support for that group of bodies being local authorities. As a result, the DfT is now looking to update Local Transport Plans (LTPs) to include the need for Local Transport Authorities to produce local electric vehicle (EV) charging strategies and ensure the provision of chargepoints. When parliamentary time allows, legislation will provide powers to issue directions to Local Transport Authorities to produce local charging strategies if they have not done so as part their LTPs.

2.31 With respect to chargepoints in non-residential car parks, there was majority support for Government powers covering minimum requirements to install chargepoints in non-residential car parks, that these should apply to both publicly and non-publicly accessible car parks, and for the responsibility of charging infrastructure provision to be placed on the landowner of the car park. The afore-mentioned legislation will cover local authority owned car parks, supporting chargepoint installation in those locations. In other facilities, it is expected that the market will continue to provide the charging network without government intervention.

2.32 The Rapid Charging Fund (RCF) will be used to support sites with open access charging and competition between chargepoint operators. The Government will also consider secondary legislation under the Automated Electric Vehicle Act (2018) to mandate provision of chargepoints at strategically important sites.

[9] https://www.gov.uk/government/consultations/future-of-transport-regulatory-review-zero-emission-vehicles/future-of-transport-regulatory-review-zero-emission-vehicles

Infrastructure for Zero Emission HGVs and Coaches: Call for Evidence (DfT, October 2023)[10]

2.33 This call for evidence, which is now closed, has sought information about:

- The current and future supply, uptake and use of zero emission HGVs and coaches across the UK; and
- Their refuelling and recharging requirements.

2.34 The call for evidence ran from 19 October to 14 December 2023. It sought views from stakeholders with an interest in the manufacture or use of zero emission HGVs and coaches, and their associated infrastructure. The aims of the exercise were to gather evidence:

- To support the development of a zero emission HGV and coach infrastructure strategy for the UK;
- Regarding the zero emission HGV and coach markets in the UK, including its infrastructure, both public and private (e.g. depot-based); and
- To inform future decision-making about zero emission HGVs and coaches.

2.35 Importantly, the introduction in the call for evidence document reiterates the Government's intention to end the sale of new non-zero emission HGVs weighing under 26 tonnes by 2035, with all new HGVs sold to be fully zero-emission at the exhaust by 2040. This aligns with the TDP and Future of Freight plan described above.

2.36 The introduction also notes that the transition to zero emission commercial vehicles is well underway for smaller HGVs, where battery-electric appears to be becoming the early dominant technology in the urban distribution market and for operations which have a duty cycle that brings them back to depot every day. Manufacturers are also putting this technology to use in the largest trucks. However, the document notes that batteries may not be the answer for all cases, especially for the heaviest vehicles. Hydrogen fuel cell HGVs are coming to the market, which could offer a longer range between refuelling than most BEHGVs and with operating practices similar to that of diesel. The preferred technology for specific cases will vary on factors such as vehicle operating weight, drive cycle diversity and maximum journey lengths.

2.37 The document concludes that there is still some way to go before battery or hydrogen fuel cell HGVs can deliver the practicality of a diesel HGV in every case. This conforms with the contents of the other document reviewed above in that no single technological solution to decarbonising HGVs has yet to emerge, hence the reason for undertaking the call for evidence.

[10] https://www.gov.uk/government/calls-for-evidence/infrastructure-for-zero-emission-heavy-goods-vehicles-and-coaches

Powering Up Britain (DESNZ, 2023)[11]

2.38 This document, published by the *Department for Energy Security and Net-Zero (DESNZ)* in March 2023 sets out the Government's plan to enhance the country's energy security and deliver net-zero. While it does not directly address the transition to net-zero vehicle technology (its main focus concerns electricity generation), it contains a number of initiatives which conform with and support the conclusions reached in the NIC report, TDP and the Future of Freight Plan. In summary, these include:

- Hydrogen – it states that hydrogen is a potential energy solution for hard to electrify areas, including heavy transport. The strategy plans to develop 10GW of low carbon hydrogen production capacity by 2030. The £240 million net-zero hydrogen fund will be used to support investment in electrolytic and carbon-capture hydrogen production projects.
- Electricity distribution grid – the plan states that it will accelerate the delivery of strategic transmission upgrades. It will also reform the grid connection process, which is important for plug-in and fast-charging capabilities.
- Zero emission vehicles – confirms the commitment to end the sale of all non-zero emission road vehicles by 2040.
- Charging infrastructure – promises investment in the vehicle charging infrastructure network, including investing a further £381m via the launch of the *Local Electric Vehicle Infrastructure (LEVI) fund* to help install thousands of new chargers across the country alongside private sector investment.

UK Hydrogen Strategy (BEIS, 2021)[12]

2.39 This document, published by the *Department for Business, Energy and Industrial Strategy (BEIS)* in August 2021 sets out what needs to happen to enable the production, distribution, storage and use of hydrogen (including transport usage). It takes a 'whole systems' approach, including a road map showing how the hydrogen economy can evolve and scale-up.

2.40 With regards to the future use of hydrogen, the document notes that it is likely to be fundamental to achieving net-zero in transport, potentially complementing electrification for HGVs. Hydrogen can be used as an alternative to diesel in internal combustion engines and in fuel-cells. The Government therefore expects hydrogen to play a key role in decarbonising the transport sector. By 2030, it is envisaged that hydrogen will be in use across a range of transport modes, including HGVs. Its longer-term role is likely to be in areas where energy density requirements and refuelling times make it the most suitable energy source.

[11] https://www.gov.uk/government/publications/powering-up-britain
[12] https://www.gov.uk/government/publications/uk-hydrogen-strategy

2.41 As per the other documents referenced above, it notes that large HGVs are the most challenging segment of the road sector for developing zero-emission options due to the large distances and heavy payloads involved. Also, some vehicles are in constant use and therefore require fast re-fuelling. The document references the £20 million alternative fuel trials noted in the TDP. The strategy states that hydrogen will be particularly suitable for depot-based transport, as it allows re-fuelling infrastructure to be more centralised and will be compatible with distributed hydrogen production.

2.42 Hydrogen will only be suitable as a replacement fuel if it can be produced economically and in a low-carbon manner. The strategy is based on both the electrolysis of water using renewable electricity (so called *green hydrogen*) and steam methane reformation with carbon capture and storage (from natural gas, so called *blue hydrogen*). In order to produce the required volumes economically, both processes are likely to involve large production sites with onward distribution to storage sites closer to ultimate end-users (in much the same manner as petroleum products are imported, refined and distributed).

2.43 Currently, there is limited distribution of hydrogen as it tends to be produced and consumed at the same location. Consequently, the strategy notes that there needs to be a significant scale-up of distribution and storage infrastructure for hydrogen to play a role supporting decarbonisation. The precise nature of a national distribution network for hydrogen is still being developed, and the key policy decisions will be taken up to 2030. However, it is expected to be driven by production (method and location) and demand and likely to involve:

- A national pipeline network, comprising both re-purposed gas pipelines and new infrastructure; and
- Some non-pipeline distribution using rail and road transport.

2.44 The strategy notes a variety of Government and industry research underway to identify the best options and inform the evidence base for developing hydrogen network infrastructure.

2.45 It is envisaged that the national pipeline network will supply clusters of end-users. Specialist above-ground storage tanks are noted as being suitable for many users. Such storage tanks have relatively low up-front costs, and they are quick to install and deploy. Storage facilities can also be mobile, such as tube trailers.

Electric Vehicle Report 2023 (Logistics UK, 2023)[13]

2.46 This report, published by *Logistics UK* in May 2023, explores operators' current experiences of transitioning to battery-electric vehicles and highlights the challenges to further uptake. It is

[13] https://logistics.org.uk/research-hub/reports/ev-report

derived from interviews with fleet operators who either operate or are planning to introduce electric vehicles to their fleets.

2.47 The report states that many large fleet operators already have plans to transition their LGVs to zero-emission vehicles and for this sector the majority will opt for battery-electric technology. Clearly, this finding aligns with the documents presented above. However, it also notes that while this technology is understood and the majority will take it up in the short to medium term, the pace of the roll-out of public rapid-charging infrastructure will need to increase in order to match the uptake of vehicles.

2.48 Also reflecting the conclusions reached above, the report states that much uncertainty remains over the right technology solution for HGVs. It notes that low-carbon fuels offer a transitional solution for HGVs, with up to 80% reduced emissions without the need for large vehicle modifications.

2.49 Perhaps the main conclusions to draw from this report concerns the availability and quality of public charging infrastructure for commercial vehicles, alongside issues covering the installation of new connections to the national grid network. These are now cited by many operators to be the main challenges concerning the expansion of fleet electrification rather than the cost and availability of the vehicles themselves. It notes that while the majority of operators prefer to charge their vehicles at depots, the public charging network is a vital element of electrifying fleets, with use of off-site charge points a regular part of operations or for emergencies. However, 53% of operators reported difficulties in finding an available and usable chargepoint space, with many encountering broken or inoperable chargers. There was much frustration among those who regularly use public charging infrastructure at the lack of reliable and up-to-date information about available working chargers.

2.50 In addition, the public chargepoint network has to date been focused on electric cars, resulting in chargepoint spaces that will not accommodate battery-electric vans or trucks. The report states that as uptake of battery-electric vehicles (all types) accelerates, the number of public chargepoints will need to increase to match vehicle acquisitions, and recommends that the needs of commercial battery-electric vehicles are provided for within the public charging network. It highlights the need for public chargepoints to have larger parking bays with increased headroom, longer reach cables and rapid charging facilities to accommodate commercial vehicles.

2.51 The report also cites the importance of adequate power supplies to help deliver fleet electrification. There is concern about the electricity distribution networks' ability to deliver the required power upgrades needed for large logistics fleets. The network operators need to have a greater understanding of operators' electrification plans and timetables to ensure the network will be able to co-ordinate power requirements in time.

2.52 Overall, the report notes that if the sector is to fully achieve the Government's target of net-zero by 2050, further support is needed to not only support the transition, but to provide the necessary infrastructure for those that have made the switch. As a result, Logistics UK is pressing Government for an achievable roadmap with clear timescales that reflect targets such as the phase out of sales of new non-zero emission HGVs from the 2035 and 2040 deadlines, where all new HGVs sold in the UK must be zero emission. They also highlight that there is not a single HGV-dedicated hydrogen filling point in Britain. A significant infrastructure network will therefore be needed to support the vast logistics system that supplies all sectors of the UK's economy with the goods it needs.

Conclusions and Land Use Implications

LGVs

2.53 The emerging consensus from the various documents is that zero-emission LGVs will utilise battery-electric technology, supported by an expanded fast-charging network. The NIC report (from 2019) noted that choice and travel range was improving; desk-top research indicates that the major vehicle manufacturers now offer battery-electric versions of their LGV models with a range of 250-300km between charging. These distances are within typical round-trip delivery operations, and e-commerce/parcel operators such as Amazon, Royal Mail and DPD are now expanding their battery-electric fleets. Operations in this road transport sector also tend to be during the daytime (morning through to mid-evening), meaning recharging can be undertaken overnight when vehicles are not in use.

2.54 The main impact, therefore, on land-use planning and infrastructure will come from the need to recharge large fleets of LGVs simultaneously (overnight) at a single depot location and from the same local grid connection. It will therefore be essential that new warehouse developments likely to support e-commerce deliveries (i.e., where goods are cross-docked between HGVs and LGVs) are located where existing grid capacity is sufficient or could be upgraded (network reinforcement) relatively easily and at a reasonable cost. It will also be important that such facilities are designed so that the loading docks are equipped with rapid-charging points from new or can be retro-fitted at a later date, thereby enabling vans to recharge while cargo is loaded.

2.55 Likewise, roadside parking facilities designed for LGVs will also need to be equipped with rapid-charging points, thereby enabling vans to top-up while drivers undertake break periods.

HGVs

2.56 In contrast, the conclusions emerging from the various documents with respect to HGVs suggests a significant degree of uncertainty. No single reliable technological solution (or multiple solutions) has yet to emerge which has the necessary 'buy-in' from both Government and industry. The Government is currently investing £200 million in the *Zero Emission Road Freight Demonstrator* programme in order to determine which technology is best suited to HGVs, with *Logistics UK* noting to the *HoC Transport Committee* that we are still a long way from having a reliable market ready zero-emission HGV.

2.57 Three technologies are currently being trialled under the £200 million demonstrator programme. A number of truck manufacturers (including Volvo and Scania) are now marketing battery-electric rigid HGVs and tractor units with 44 tonnes gross weight capabilities. Claimed ranges are between 250-330km, with full charge achieved in 90 minutes on rapid-charging. The UK Government is also heavily promoting the hydrogen economy, including uses in transport. The electric road system has yet to be ruled out, albeit this will have to be coupled with batteries for 'off-wire' trips. Despite this uncertainty, the Government is still planning to ban the sale of pure diesel HGVs from 2035 (up to 26 tonnes) and 2040 (all HGVs).

2.58 Given this uncertainty over which technological solution(s) will emerge, this would suggest that appropriate new-build large-scale warehouse developments and overnight lorry parking facilities will be those which have the following characteristics:

- Located close to an electric grid connection which has sufficient capacity to support the requisite rapid-charging equipment (or is capable of network reinforcement relatively easily and at a reasonable cost);
- For warehousing, a proportion of the loading docks are equipped with rapid-chargers from the outset, with other remaining loading docks being capable of retro-fitment at a later date. At truck parks, a number of the parking spaces are equipped with rapid-chargers from the outset, with other remaining spaces being capable of retro-fitment at a later date;
- There is sufficient space available within the yard/depot or parking facility estate for hydrogen storage bunkers (and associated parking when re-fuelling);
- Is located close to a modern high pressure gas main (which could be re-purposed for direct hydrogen supply to the storage bunkers) and/or located close to a site likely to host hydrogen storage facilities serving a cluster of large demand users in the immediate vicinity (road service); and
- Served from or located close to that part of the strategic highway network which will potentially form part of the electric road system.

Public Charging Infrastructure

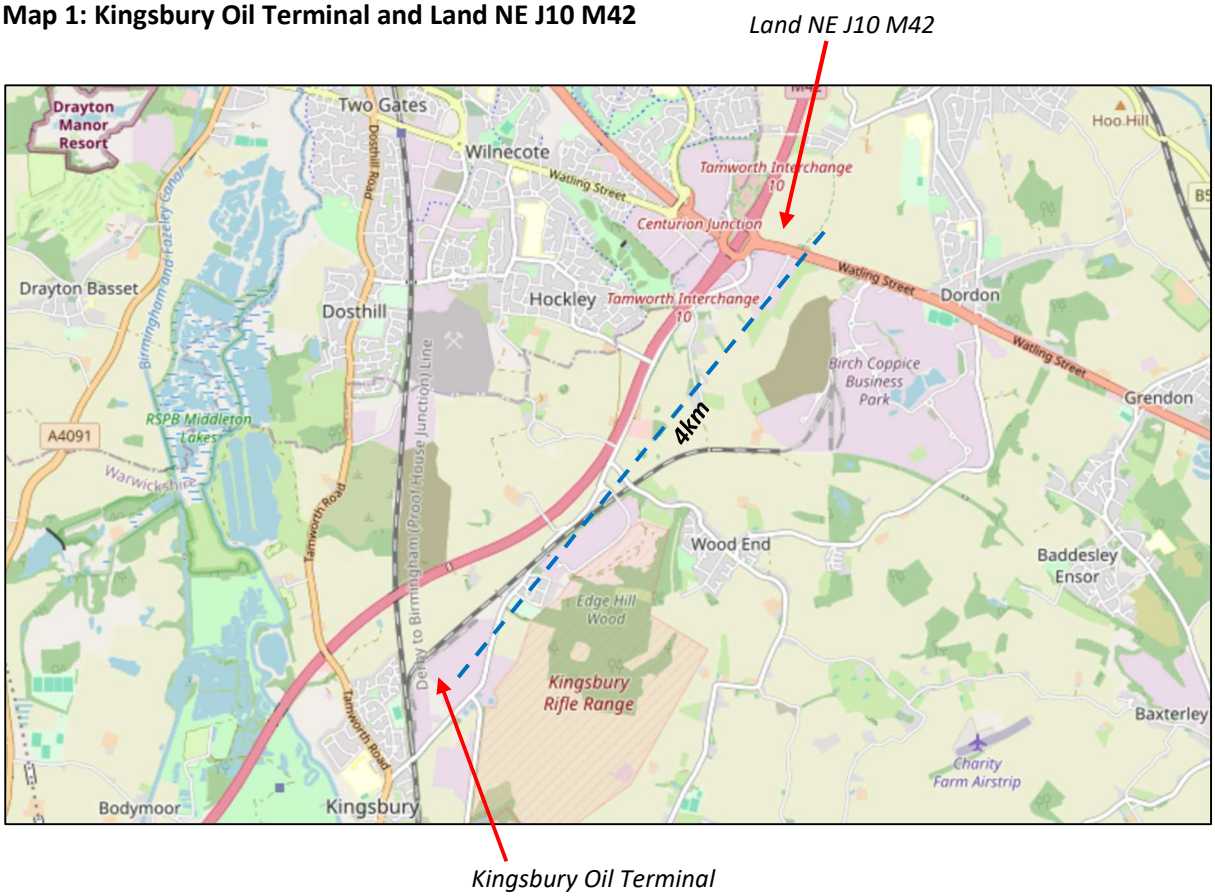
2.59 Another key conclusion to draw from the above assessment concerns the availability and quality of public charging infrastructure for commercial vehicles. Provision to date has been focused on the private car, with many facilities not being able to accommodate commercial vehicles. Those that do have sufficient space for vans or small rigid vehicles are often occupied by cars. It will therefore be important, as part of any significant expansion of public charging infrastructure, that 'freight only' facilities are provided which have the increased headroom, longer reach cables and rapid charging facilities for rapid charging. This suggests a significant role for HGV/LGV parking areas with dedicated fast-charging equipment. There is also an expectation that the private sector will invest in such facilities on a commercial basis.

Hydrogen

2.60 Despite it being currently unproven from both a technological and economic perspective, the Government appears to be heavily promoting hydrogen for use in the transport sector, particularly for heavier depot-based vehicles which move long distances. The strategy envisages production of low-carbon hydrogen to take place at a number of large-scale facilities (both green and blue hydrogen), with subsequent distribution by means of pipelines (potentially re-purposed high-pressure gas mains) to storage sites close to 'clusters' of high demand end-users.

2.61 As an example, part of the *Essar* oil refinery at Stanlow (Cheshire) is currently earmarked for conversion to a blue hydrogen production facility as part of the *Hynet* project. Interestingly, Kingsbury Oil Terminal (a short distance from Land NE J10 M42) is also operated by *Essar* and stores petroleum products produced at Stanlow and transported to the terminal by pipeline.

Map 1: Kingsbury Oil Terminal and Land NE J10 M42



3. PREPAREDNESS OF LAND NE J10 M42

3.1 Taking into account the findings and conclusions of the previous section, below the plans submitted for Land NE J10 M42 are considered with respect to their preparedness to accommodate zero-emission commercial vehicles. It is also assessed with respect to the recently adopted Local Transport Plan and existing public charging infrastructure in the immediate hinterland.

Proposed Scheme: Design Parameters

3.2 The scheme, as submitted for planning consent, will include the following infrastructure.

Charging Renewable Energy

3.3 The intention is that the electrical load requirements for the installed charging points will be generated by means of on-site renewable energy, namely solar photovoltaics (PV) panels and associated Battery Storage. However, whilst the preference will be for on-site renewable generation of electricity, enquiries made with the Distribution Network Operator (DNO) confirm that there is sufficient spare capacity in the local electricity network, with minimal upgrade requirements, to accommodate the charging requirements of the proposed development allowing the for the measures (Design Parameters) outlined below.

Electric Vehicle and Hydrogen Ready Design Parameters

3.4 A series of 'Design Parameters' have been set out in the submitted Design Guide. These have been developed to ensure that any future scheme(s) would meet the very highest level of sustainability, good design and to mitigate the impacts of climate change. These Design Parameters have been identified through the design process and are born out of the Applicant's commitment to design and the ambitious proposals to create "*The Greenest Business Park in the West Midlands*" at the site, as well as a direct response to relevant planning policy and guidance, site conditions and site context.

3.5 The specific Design Parameters relevant to electric vehicle (EV) charging are as follows:

- EV charging points and rapid charging points installed to 10% of car parking spaces, with ducting provided to a further 15% to future proof the development – 25% in total; and
- Ducting provided to 25% of lorry parking space for fully electric and hybrid electric vehicles, to future proof the development.

3.6 Through the course of the planning application and following discussions with the three highways authorities (National Highways, Warwickshire County Council and Staffordshire

County Council), the proposed EV charging measures have evolved and now comprise the following:

- SMART EV charging infrastructure to all buildings and Hub Office;
- SMART EV charging points and rapid charging points installed to 20% of car, motorcycle and LGV parking spaces across the scheme – so called 'active' EV charging points;
- Ducting provided to the remaining 80% of car, motorcycle and LGV parking spaces across the scheme so that SMART EV charging points can easily be added at a future date thus enabling businesses to occupy their space as efficiently as possible – so called 'passive' EV charging;
- SMART EV charging and rapid charging points installed to 10% of HGV parking spaces and/or loading docks for battery electric and hybrid electric vehicles, with ducting provided to the remaining 90% to future proof the development – 100% in total;
- Provide flexible building design that can easily accommodate future connections to advancing technologies such as 'solar PV ready' steel portal frame and connected battery technology, to facilitate up to 100% of EV charging from on-site renewable energy sources 24/7; and
- Extended underground ducting to enable future occupiers to install additional solar PV and battery storage facilities.

3.7 Taken together, these measures, together with other Design Parameters listed within the submitted Design Guide mean the scheme has the potential to be 'all-electric', with connected battery technology serving SMART EV charging and rapid charging points and up to 100% electricity generated from maximum solar PV coverage.

3.8 The proposals also incorporate a series of specific Design Parameters relevant to hydrogen, as follows:

- Service channels to be left clear throughout the site to provide future hydrogen mains supply to all premises and the overnight lorry parking facility;
    - This is shown on the Hydrogen Ready Plan (ref. 00091/SK3) attached to the report appendix (blue dotted line), with these mains potentially being served either from the Essar operated Kingsbury Oil Terminal (which as noted above is currently served by pipeline from the Stanlow refinery, but is earmarked for part conversion to a hydrogen production facility) or from the re-purposed high pressure gas pipelines in the immediate area;
- Hydrogen tanking (bunkers) to be provided to all buildings, subject to occupier requirements, to allow re-fuelling of HGVs onsite.

3.9 The Hydrogen Ready Plan (ref. 00091/SK3, presented in the Appendix) also incorporates another possible layout for the overnight lorry park illustrating how the facility could provide an alternative fuel station and compound, if required in the future.

3.10 Should the electric road system (e-highways) emerge as the replacement technology for HGVs, it is more than likely that the M42 and A5 would be included given that they form part of the long-distance strategic highway network.

3.11 It is therefore apparent that the scheme as planned would be able to accommodate zero-emission goods vehicles (both LGVs and HGVs), which ever emerging technology or technologies eventually becomes the long-term solution. It meets the spatial characteristics set out in the previous section with regards to what can be considered an appropriate site for new-build warehousing and HGV parking. It is therefore 'net-zero ready' and will contribute to the process of decarbonising the road transport sector. In particular, should hydrogen emerge as the long-term preferred solution for HGVs, the site aligns with the contents of the UK Hydrogen Strategy, i.e., pipeline supplied, centralised storage, high demand cluster of end-users, etc. Particularly given the close proximity of the *Essar* Kingsbury Oil Terminal.

Warwickshire Local Transport Plan (LTP4)

3.12 *Warwickshire County Council's (WCC)* new *Local Transport Plan (LTP4)* has recently been adopted. It sets out the policies to shape future transport schemes and developments within the County. The Key Policies set the overarching objectives for the LTP4. Key Policy 3 (KP3) relates to decarbonising transport and transport related infrastructure, stating that *"Transport contributes a greater proportion of carbon emissions than any other sector. WCC will pursue actions and objectives that seek to reduce pollution in general, and carbon emissions in particular, through a range of interventions."*

3.13 Freight specifically is addressed in a Freight Strategy section of the LTP4. Warwickshire plays an important role in the freight sector. It notes that there is substantial logistics activity in the County due to its central location, including the presence of several large distribution hubs/business parks on strategically important routes such as the A5.

3.14 The document states that the challenge has been developing a new LTP that supports the logistics economy while at the same time enables and encourages more sustainable freight movements. It notes that as the country as a whole moves towards net-zero by 2050, freight operators will be required to transition to alternative fuels. This represents a challenge in terms of supporting infrastructure. Policy Position F1 to F3 are particularly relevant to Land NE J10 M42, and they are reproduced in full below.

3.15 *Policy Position F1*: Promote shift from road to rail and active travel modes. WCC will work with developers, freight operators and customers to encourage a shift to more sustainable modes, helping to reduce carbon emissions, improve air quality and road safety. This may require the introduction of new and improved infrastructure and the promotion of efforts to encourage co-

operation in the freight sector, leading to rail network enhancements and greater freight capacity and connectivity.

3.16 *Policy Position F2:* Facilitate the transition to alternative fuels for freight vehicles. WCC will work with partners to help provide a network of recharging and refuelling stations that allows goods to flow freely across the county, without impacting on the environment through emissions, to provide continuity and growth of the local and sub-regional economy.

3.17 *Policy Position F3:* Support efforts to deliver a better network of lorry parking in the county. The strategic location of the county, as well as its distance of several hours' drive from major ports in the south of England, means that there is demand for good quality, safe and secure lorry parking in the area for drivers to meet their legal requirement to rest. We will work with planning authorities and developers to ensure that suitable parking supply meets this demand. Professional drivers should be safe, well-rested and best prepared to operate safely on Warwickshire's roads

3.18 It is apparent that the scheme as planned aligns with the policies set out in the LTP4 (as described). Whichever technology emerges, the scheme will support the transition to alternative fuels, providing a new recharging and re-fuelling facility and contribute to the process of decarbonising the road transport sector.

Existing Public Chargepoint Capacity

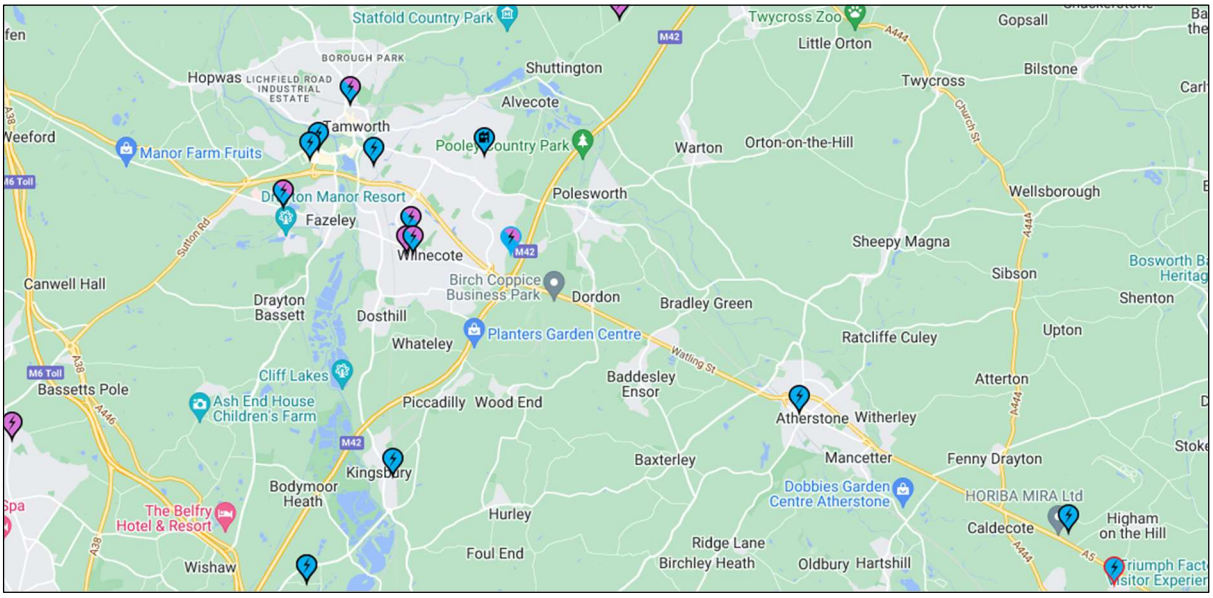
3.19 The table below shows the number of public chargepoint currently available in North Warwickshire and adjacent local authority areas. It is sourced from the current DfT 'live' inventory of chargepoints by local authority. The map following (source: Zapmap) shows the location of public chargepoint infrastructure along the A5 corridor.

Table 3.1: Number of Chargepoint by Local Authority

Local Authority	Total Number Public Chargepoints	Number of Rapid Chargepoints	Chargepoint per 100,000 population
North Warwickshire	46	20	70
Hinckley and Bosworth	45	5	40
Nuneaton and Bedworth	35	13	26
Tamworth	20	10	25
Solihull	146	38	67

Source: DfT

Map 2: Location of Public Chargepoints A5 Corridor (excluding home and accommodation)



Source: Zapmap

3.20 Overall, the provision of public chargepoint infrastructure along the A5 corridor is poor. There are only 46 chargepoints in North Warwickshire (20 rapid chargers) and 20 in Tamworth (10 rapid chargers). As per the conclusions of the Logistics UK electric vehicle report, all have been designed for cars and small LGVs. The planned scheme for Land NE J10 M42 will therefore significantly add to the chargepoint capacity along the A5 corridor, and in addition will be specifically designed for servicing the commercial vehicle sector.

3.21 This point is supported by the findings of the *South Midlands Route Strategy Initial Overview Report*[14], prepared by National Highways and published in May 2023. The A5 from Hinckley to Tamworth is identified in the report as an *Area of Interest* and in relation to such a series of *Area Issues* are set out:

3.22 *The A5 provides a **strategic south-east to north-west connection** between communities such as Nuneaton, Tamworth and Hinckley, and to the M1 and M6. It is an important road for **freight traffic**. The proportion of employment that is reliant on the strategic road network is high between Tamworth and Hinckley and Birch Coppice business park, a key **employment centre**, is located close to M42 Junction 10. The A5 between Hinckley and Tamworth is one of **Midlands Connect's priority areas** for investment. Parts of the section between the M42 junction and Atherstone have a low iRAP **safety rating**. There are average peak period delays west of Hinckley and between the M42 junction and Tamworth. There are receptors that may experience adverse air quality impacts around Tamworth and between the M42 and M69 junctions. Interested parties expressed concern over severance for people travelling between communities along this route. There is limited **information** for road users and **roadside refuelling facilities** for alternative fuel vehicles on this section of the A5.* [underlining our emphasis]

3.23 Clearly, the submitted proposals will go a significant way towards addressing the shortage of roadside refuelling facilities for alternative fuel vehicles along this section of the A5, particularly for commercial vehicles (both LGVs and HGVs).

[14] https://storymaps.arcgis.com/stories/3cbe7811819345a5be2cb41d97f3e027

4. SUMMARY AND CONCLUSIONS

4.1 The UK is required by the Climate Change Act and various international treaty obligations to achieve net-zero greenhouse gas (GHG) emissions by 2050. The road haulage sector will have a role to play in achieving the net-zero target.

4.2 The technological solutions which are emerging as potential zero-emission replacements for diesel/petrol engine freight vehicles have been identified in various recent policy documents and reports. These provide insight into current Government and industry thinking and expectations.

4.3 The emerging consensus from these various documents is that zero-emission LGVs will utilise battery-electric technology, supported by an expanded fast-charging network. Vehicle choice is expanding and the major vehicle manufacturers now offer battery-electric versions of their LGV models with a range of 250-300km between charging. These distances are within typical round-trip delivery operations, and e-commerce/parcel operators are now expanding their battery-electric fleets. The main impact on land-use planning and infrastructure will come from the need to recharge large fleets of LGVs simultaneously (overnight) at a single depot location and from the same local grid connection.

4.4 In contrast, the conclusions emerging from the various documents with respect to HGVs suggests a significant degree of uncertainty. No single reliable technological solution (or multiple solutions) has yet to emerge which has the necessary 'buy-in' from both Government and industry. Three technologies are currently being trialled under the £200 million demonstrator programme, namely battery-electric, the electric road system and hydrogen. A number of truck manufacturers (including Volvo and Scania) are now marketing battery-electric rigid HGVs and tractor units with 44 tonnes gross weight capabilities with claimed ranges between 250-330km. The UK Government is also heavily promoting the hydrogen economy, including uses in transport. The electric road system has yet to be ruled out, albeit this will have to be coupled with batteries for 'off-wire' trips. Despite this uncertainty, the Government is still planning to ban the sale of pure diesel HGVs from 2035 (up to 26 tonnes) and 2040 (all HGVs).

4.5 It is therefore apparent that appropriate new-build large-scale warehouse developments and overnight HGV parking facilities should at this stage be designed so that they can accommodate all three technologies, in particular:

- A grid connection with sufficient capacity or ability to be upgraded;
- Some electric chargepoint installed from the start with the ability to retro-fit more infrastructure at a later date;
- The ability to be supplied by hydrogen (either directly or from a close-by storage facility) with space made available for appropriate storage and re-fuelling; and

- Served from or located close to that part of the strategic highway network which will potentially form part of the electric road system.

4.6 There are also concerns over the availability and quality of public charging infrastructure for commercial vehicles. Provision to date has been focused on the private car, with many facilities not being able to accommodate commercial vehicles. It will therefore be important, as part of any significant expansion of public charging infrastructure, that 'freight only' facilities are provided.

4.7 The Land NE J10 M42 scheme, as designed, would be able to accommodate zero-emission goods vehicles (LGVs and HGVs), which ever emerging technology or technologies eventually becomes the long-term solution. It meets the spatial characteristics described with regards to what can be considered an appropriate site for new-build warehousing and lorry parking. It would also add to the chargepoint capacity along the A5 corridor, which is currently under-provided, and in addition would be specifically designed for servicing the commercial vehicle sector. In particular, should hydrogen emerge as the long-term preferred solution for HGVs, the site aligns with the contents of the UK Hydrogen Strategy, i.e., pipeline supplied, centralised storage, high demand cluster of end-users, etc.

4.8 The scheme is therefore 'net-zero ready' and would make a significant contribution to the process of decarbonising the road transport sector along a section of the Strategic Road Network (the A5 trunk road) identified as being deficient at the present time.

Appendix:

Hydrogen Ready Plan

Hydrogen Ready Plan