

Highways England Grant for the Provision of Rapid Electric Vehicle Charge Points

Operational and Technical Requirements

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1. INTRODUCTION

1.1 Purpose of this document

1.1.1 This document describes the operational and technical requirements for electric vehicle charge points funded by the *Highways England Grant for the Provision of Rapid Electric Vehicle Charge Points*, including the following aspects:

- a. the gaps in existing rapid charging point provision along the strategic road network (SRN) in England which are to be filled by new charge points;
- b. the siting of new charge points with regard to the proximity of the SRN, adjacent amenities and utility services, and the safety and security of users;
- c. the service life, availability, functionality and performance of new charge points;
- d. the infrastructure associated with new charge point sites including electrical supplies, parking, vehicle restraint systems, road traffic signage and, where necessary, lighting.

1.1.2 This document must be read in conjunction with the grant conditions applicable to the *Highways England Grant for the Provision of Rapid Electric Vehicle Charge Points*.

1.2 Background

1.2.1 The funding of new rapid charge points by Highways England forms part of the realisation of Highways England's aim, under the Road Investment Strategy: for the 2015/16 - 2019/20 Road Period, "of ensuring that 95% of the SRN will have a charging point every 20 miles. Wherever possible, these will be rapid charging points that can charge a battery-powered electric vehicle in less than 30 minutes."

1.2.2 The provision of new rapid charge points in proximity to the SRN is intended to support the uptake of electric vehicles and their use on the SRN with the overall effect that carbon emissions from vehicles on the SRN will be reduced. Specifically, new charge points will:

- a. expand the public charging infrastructure available to users of the SRN; and
- b. alleviate range anxiety (i.e., worry about being unable to reach a recharging facility) by giving electric vehicle users confidence that public charge points exist at regular intervals across the whole of the SRN.

1.2.3 The provision of each new public charge point is also expected to benefit the community in which it is located because it will provide an additional public recharging facility for local electric vehicle users.

2. CHARGE POINT LOCATIONS

2.1 Siting with respect to gaps in existing charge point provision

2.1.1 Each charge point funded by the *Highways England Grant for the Provision of Rapid Electric Vehicle Charge Points* must be located so that it fills a gap in the existing provision of rapid charge points in proximity to the SRN. The gaps in the existing provision of rapid charge points in proximity to the SRN are defined in the schedule in Appendix A.

2.1.2 Any part of a gap will be deemed to have been filled when that part is within 10 miles of a new or pre-proposed rapid charge point.

2.2 Site-specific criteria for locating charge points

2.2.1 Charge points shall be located in a place:

- a. which fills a gap in the existing provision of rapid charge points in accordance with section 2.1 in the most efficient way whilst recognising the customer needs set out in sub-sections b, c and d (below);
- b. no more than 2.5 miles of driving distance from the SRN;
- c. which is accessible to the public and the operator and maintainer of the charge point at all times;
- d. where patronage from both SRN and local users is likely to be maximised because of the following factors:
 - i) readily available access to and from the SRN, and local routes;
 - ii) the presence of other amenities (e.g., retail outlets; cafés or restaurants; tourist or leisure attractions, public toilets) which offer electric vehicle users the opportunity to undertake another activity whilst recharging is taking place;
 - iii) users' perceptions of safety and security because of, for example, well-maintained surroundings; low crime rates for the area or type of location; regular throughput of people or vehicles, night-time lighting and CCTV surveillance;
 - iv) restrictions can be put in place to limit parking in the bay(s) associated with a charge point to those recharging an electric vehicle; and
 - v) signs can be provided to clearly identify the charge point location; and
- e. where sufficient electricity supply and telecommunications services connections are available at a reasonable cost.

2.2.2 In selecting a preferred charge point location where several potential sites exist, consideration must be given to the extent to which each potential site meets the criteria given in section 2.2.1. The Project Plan or feasibility study completed as part of the grant funding agreement should be used to record the considerations and decisions made.

2.2.3 Relaxations of the criteria stated in this section 2 will only be permitted with the explicit written agreement of Highways England.

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3. OPERATIONAL REQUIREMENTS

3.1 Operational Service Life

3.1.1 The operational service life of each charge point site funded by the *Highways England Grant for the Provision of Rapid Electric Vehicle Charge Points* shall be a minimum of ten years from the point of installation.

3.1.2 The required operational service life must be reflected in:

- a. the quality of the design, fabrication and installation of each charge point unit and the associated infrastructure;
- b. the regime devised to operate the charge point unit;
- c. the regime devised to inspect, test and maintain the charge point unit and the associated infrastructure; and
- d. all agreements to access and use the land on which a charge point site will be placed.

3.2 Service Availability

3.2.1 Throughout the operational service life of each charge point site, the charge point unit and all directly related parking, payment and support services shall be available for use by electric vehicle users for at least 95% of any one calendar year.

3.3 Charging Point Type

3.3.1 Charge point units must satisfy the minimum requirements described in Appendix B.

3.4 User Support and Payment Services

3.4.1 Charge point units and their current status must feature in publically information sources in accordance with the grant funding agreement.

3.4.2 The charge point operator must also provide a customer telephone helpline facility which is available at all times. As a minimum, the telephone helpline must be able to advise and assist customers with:

- a. use of the charge point;
- b. pricing;
- c. payment;
- d. recording charge points faults and defects identified by customers, and tasking appropriate maintenance resources; and
- e. the identification of alternative recharging facilities should the charge point be unavailable.

- 3.4.3 In at least 95% of all helpline calls in any one calendar year, customers using the telephone helpline and wishing to speak to an operator must be connected to an operator within 3 minutes of commencing the call.
- 3.4.4 Customers using the telephone helpline must not incur unreasonable call charges from, for example, the use of a premium rate telephone number (e.g., one commencing with 09) or by being required to wait to speak to an operator.
- 3.4.5 Where electric vehicle users are to be charged a fee for recharging at a charge point, users must have the option to Pay As You Go (PAYG) using a debit or credit card. This option must be available via:
- a. debit and credit card payment equipment included within the charge point unit; and
 - b. the charge point operator's telephone helpline in circumstances where, for example, payment equipment included within the charge point unit is not functioning.
- 3.4.6 A charge point may also form part of the charge point operator's network of charge points for which users pay membership fees. Users must not be obliged to subscribe to the charge point operator's network services in order to use the charge point.
- 3.4.7 The telephone helpline number, tariffs and methods of payment must be clearly displayed on signage either on or adjacent to the charging unit.

3.5 Data Collection

- 3.5.1 Arrangements must be put in place for the collection and dissemination of charge point operational data in accordance with the grant funding agreement.

3.6 Maintenance, Repair and Renewal

- 3.6.1 Arrangements must be put in place for the ongoing inspection, testing, maintenance, repair and renewal of the charge point unit and associated infrastructure so that they remain in a safe and serviceable condition throughout the operational service life stated in section 3.1.
- 3.6.2 The impact on customers during maintenance, repair and renewal activities must be minimised through:
- a. the effective planning and delivery of such activities;
 - b. the availability of maintenance resources to respond on site to:
 - i) emergencies (e.g., unsafe situations) within 2 hours of notification; and
 - ii) other defects within 48 hours of notification; and
 - c. the provision of remote, real-time access to each charge point unit.
- 3.6.3 Remote, real-time access to each charge point unit via a secure telecommunications connection shall facilitate:
- a. diagnostics for the majority of potential charge point unit faults;

- b. resolution of a high proportion of electronic or software faults;
- c. software updates;
- d. payment transactions; and
- e. operational data collection.

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4. INFRASTRUCTURE REQUIREMENTS

4.1 Overview

4.1.1 Each charge point site must be subject to a formal design process in which:

- a. the design and layout of the site is determined in accordance with the requirements of this document, the particular requirements of the charge point unit supplier and recognised industry standards and guidance;
- b. designs and documentation are prepared for the purposes of securing any necessary permissions for use of the site, and procuring and safely constructing the site; and
- c. consideration is given to the safe operation, maintenance, renewal and decommissioning of the site, and the measures necessary to address any residual safety hazards for individuals that may come into contact with the site once it is operational.

4.1.2 On completion of construction and installation activities at each site, as-built documentation and operations and maintenance manuals shall be compiled and distributed to the site owner, operator and maintainer, as appropriate, to promote the safe operation, maintenance, renewal and decommissioning of the site.

4.1.3 In general, each charge point site will comprise:

- a. the charge point unit, its foundations and a surrounding paved area;
- b. parking bays;
- c. signage;
- d. an incoming electrical supply, electricity feeder pillar and associated electrical installations; and
- e. external lighting.

4.2 Site Layout

4.2.1 Each charge point site must be designed and constructed so that the needs of disabled electric vehicle users are met. Guidance in BS 8300 must be applied in determining the standard of provision for access routes to the charge point unit and the location and orientation of the charge point unit and the associated infrastructure.

4.3 Parking Bay(s)

4.3.1 A minimum of one dedicated parking bay shall be associated with each charge point. This bay shall have the minimum dimensions and features which have been derived from BS 8300 and which are shown in Figure 1.

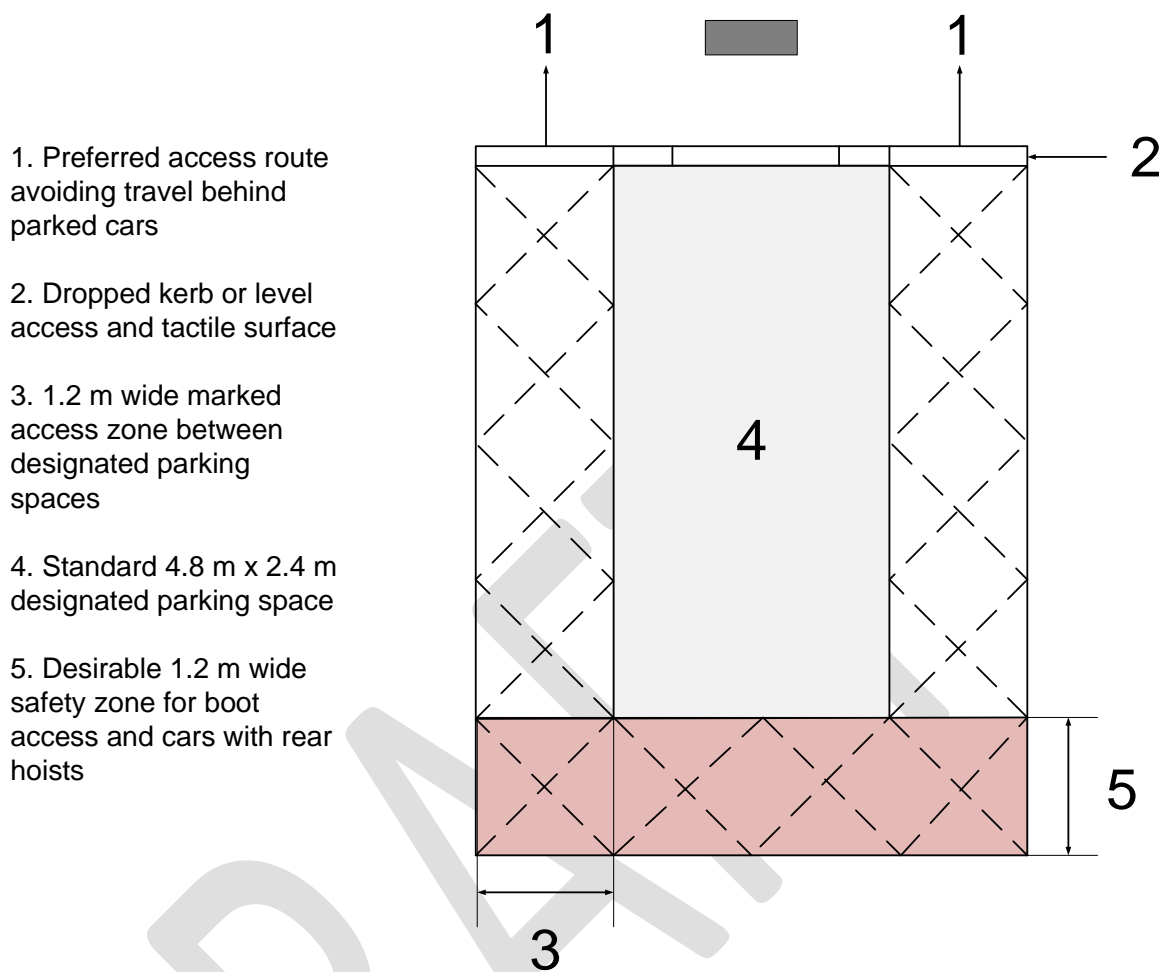


Figure 1

4.3.2 Where practicable, an additional dedicated parking bay shall also be provided within range of a charge point unit to allow another customer to recharge from the same unit. The additional bay should have minimum dimensions of 2.4m wide by 4.8m long.

4.3.3 Vehicle access to and from each dedicated parking bay shall be readily available from the adjacent roadway.

4.4 Vehicle Restraint System

4.4.1 Charge point units shall be protected from low speed impacts by errant vehicles using an appropriate vehicle restraint system.

4.4.2 The vehicle restraint system employed must not obstruct access to the charge point unit by customers or maintenance personnel.

4.5 Signage

- 4.5.1 Each charge point site must be furnished with clear road traffic signing and road markings to indicate:
- a. the dedicated parking area where vehicles can access a charge point unit;
 - b. user access routes to and from the dedicated parking area and charge point unit; and
 - c. the restrictions applicable to users of the dedicated parking area.
- 4.5.2 Where possible, each charge point site should be identified on road traffic signs located at the nearest interface with the public highway.
- 4.5.3 Road traffic signs must comply with the Traffic Signs Regulations and General Directions 2016.
- 4.5.4 An appropriate symbol or text road marking should also be used to identify a dedicated parking bay. Road markings used to demarcate a dedicated parking bay should employ a different colour to that used to identify any adjacent parking areas.

4.6 Electrical Installations

- 4.6.1 Electrical installations must comply with BS 7671.
- 4.6.2 The cost of procuring an incoming electrical supply for a charge point must be assessed at the earliest opportunity to determine whether the provision of a charge point unit in the chosen location will provide best value for money. Sites must be relocated where the cost of procuring an incoming electrical supply does not represent value for money.

4.7 Lighting

- 4.7.1 The charge point unit and dedicated parking area must be externally illuminated so that:
- a. users of the charge point can move around the area and use the charge point unit in safety and with expediency; and
 - b. criminal behaviour is deterred.
- 4.7.2 Where necessary, existing lighting must be supplemented or new lighting provided at the charge point site so that the requirements of BS 5489-1, BS EN 12464-1 and BS 5266-1 are met with respect to urban outdoor car parks.

4.8 CCTV

- 4.8.1 Where practicable, the charge point site should be included in a CCTV monitoring regime as a safety provision for customers and to deter criminal behaviour.

5. PROCUREMENT REQUIREMENTS

5.1 Quality Criteria

5.1.1 Each supplier appointed to provide or operate charge point units must:

- a. have demonstrated and provided evidence of consistent availability of its equipment and systems in an operational environment of at least 95%; and
- b. have demonstrated and provided evidence of its commitment to continual improvement of its product and services in conjunction with electric vehicle original equipment manufacturers (OEMs).

5.1.2 Each supplier appointed to install or maintain charge point units must:

- a. be charge point unit manufacturer-trained;
- b. have demonstrated and provided evidence of experience of working with charge point units and high power electricity supplies.

6. GUIDANCE

6.1 Further Information

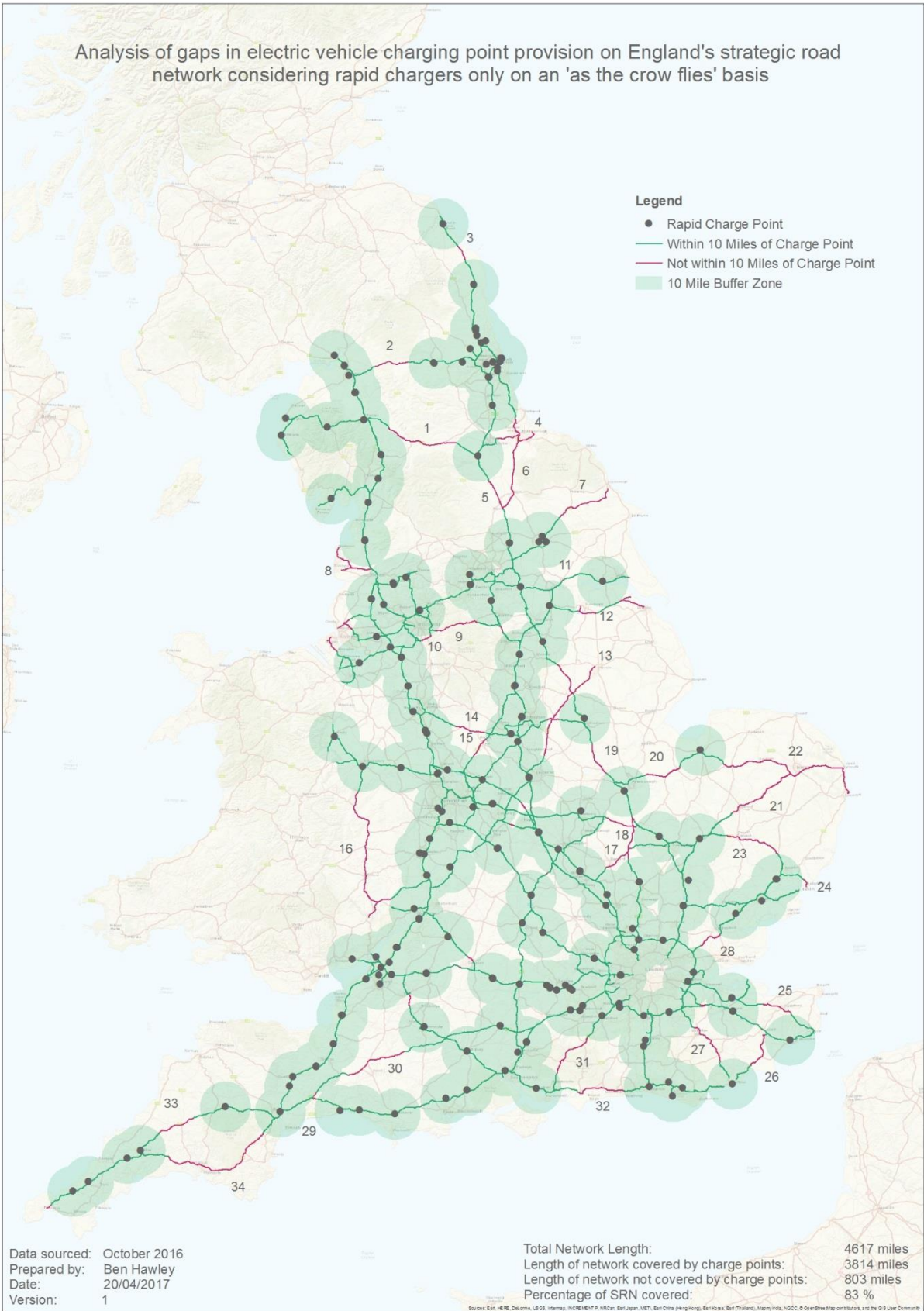
- 6.1.1 For further guidance on the provision of electric vehicle charge points, reference shall be made to the *General procurement guidance for electric vehicle charge points* (UK Electric Vehicle Supply Equipment Association, 2015).

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APPENDIX A Gaps in Existing Rapid Charge Point Provision

Gap Number	Road Number	Gap Length (miles)	Start Town / Village	Start Latitude	Start Longitude	End Town / Village	End Latitude	End Longitude
1	A66 / A67	29.8	Long Marton	54.607450	-2.539451	Greta Bridge	54.519658	-1.880900
2	A69	15.2	Brampton	54.946784	-2.693192	Bardon Mill	54.976209	-2.349132
3	A1	7.0	Low Middleton	55.631360	-1.864389	Warenford	55.559933	-1.789131
4	A19 / A1046	8.9	Stainton	54.528795	-1.276483	Grangetown	54.581161	-1.139320
5	A1(M) / A168	17.2	Leeming Bar	54.305457	-1.554871	Boroughbridge	54.095603	-1.415523
6	A19 / A684	20.7	Dishforth	54.152104	-1.435388	Trenholme Bar	54.425430	-1.317454
7	A64 / B1248	25.6	Crambeck Villaghe	54.093597	-0.885348	Crossgates	54.246560	-0.410841
8	M55 / A585	12.0	Blackpool	53.792833	-2.974890	Broughton	53.804254	-2.701960
9	A616 / M67	17.8	Hyde	53.459681	-2.061868	Langsett	53.502095	-1.686979
10	M60 / A34	5.2	Cheadle	53.399011	-2.218506	Bredbury	53.435853	-2.121572
11	M62 / A614	7.9	Goole	53.723203	-0.879522	Gilberdyke	53.765376	-0.718685
12	A180 / M180	29.4	Beltoft	53.55532	-0.755876	Grimsby	53.573392	-0.090876
13	A46	42.7	Thrussington	52.745095	-1.060179	Lincoln	53.242692	-0.565644
14	A50	14.2	Beamhurst	52.919798	-1.927298	Hilton	52.876391	-1.616806
15	A38	8.6	Walton-on-Trent	52.750601	-1.711987	Stretton	52.838324	-1.613214
16	A49	52.5	Church Stretton	52.531161	-2.806291	Ross-on-Wye	51.913822	-2.618237
17	A421 / A6	10.7	Bedford	52.099177	-0.499470	Chawston	52.189348	-0.306773
18	A1	18.2	Blunham	52.146918	-0.307532	Alconbury	52.389753	-0.254710
19	A1	14.2	Colsterworth	52.804696	-0.605531	Stamford	52.633945	-0.492109
20	A47	16.1	Thorney	52.620377	-0.128926	Wisbech	52.668432	0.207769
21	A11	26.5	Thetford	52.415103	0.733356	Norwich	52.597320	1.221364
22	A47	49.1	Dereham	52.670688	0.931411	Lowestoft	52.473951	1.751450
23	A14	23.2	Risby	52.265138	0.616826	Needham Market	52.149295	1.077011
24	A14	5.3	Trimley St Martin	51.993650	1.299020	Felixstowe	51.959981	1.325612
25	A2	14.8	Faversham	51.299056	0.852692	Bishopsbourne	51.237833	1.139728
26	A2070 / A259	17.2	East Guldeford	50.960196	0.756054	Ashford	51.127559	0.889668
27	A21	20.6	Tonbridge	51.192753	0.236505	Robertsbridge	50.984290	0.482488
28	A12	12.1	Shenfield	51.637326	0.311524	Howe Green	51.707134	0.526487
29	A30	1.6	Honiton	50.804248	-3.177349	Beacon	50.831502	-3.144960
30	A303	30.8	Ashwell	50.944314	-2.906177	Wolverton	51.082088	-2.300829
31	A3	21.1	Clanfield	50.946400	-0.983224	Thursley	51.147096	-0.702910
32	A27	27.4	Emsworth	50.856186	-0.933186	Worthing	50.837924	-0.385425
33	A30	19.1	Bolventor	50.579128	-4.534712	Ebsworthy Town	50.691182	-4.173258
34	A38	50.5	Liskeard	50.454681	-4.476484	Chudleigh	50.598653	-3.604764

Analysis of gaps in electric vehicle charging point provision on England's strategic road network considering rapid chargers only on an 'as the crow flies' basis



APPENDIX B Minimum Requirements for Rapid Charge Points

B1. General

B1.1 Each charge point outlet must:

- a. cater for the majority of the makes and models within the United Kingdom's current fleet of electric and plug-in hybrid cars and vans; and
- b. provide sufficient power output to provide at least an 80% battery charge within 30 minutes for an electric car or van meeting the criteria given in section B1.1 a.

B1.2 A relaxation of the requirements given in section B1.1 b. will only be permitted where electricity supply constraints preclude the provision of a charge point unit with the necessary power output and no alternative site with the required electricity supply exists or can be provided cost effectively. Any relaxation is subject to the explicit written agreement of Highways England.

B1.3 References to standards or regulations in these *Minimum Requirements for Rapid Charge Points* refer to the current edition of such standards or regulations at the time of the installation.

B1.4 Manufacturers and suppliers of the proposed charging equipment shall demonstrate compliance with this specification.

B2. Charging Equipment – Common Requirements

B2.1 The design and installation of charging equipment shall permit compliance with the requirements and guidance of BS 8300:2009 + A1:2010.

B2.2 Charging equipment shall be CE marked and a copy of the EC declaration of conformity provided to the purchasing authority in accordance with EC Directive 768/2008/EC.

B2.3 Charging equipment shall be compliant with BS EN 61851 Part 1.

B2.4 Mode 1 or Mode 2 charging shall not be compliant with this specification.

B2.5 Charging equipment shall utilise tethered cables (BS EN 61851:1 Case C connection).

B2.6 This specification requires multiple vehicle connectors to be associated with a single outlet. Only one vehicle connector shall be active, and all other connectors shall be inactive, when the outlet is in use.

B2.7 For AC charging, equipment:

- a. output power shall be measured or calculated at a nominal supply voltage of 400Vac three-phase;
- b. shall be compliant with BS EN 61851 Part 22;
- c. shall use Mode 3 charging; and

- d. shall be fitted with one tethered cable with one BS EN 62196 Part 2 Type 2 vehicle connector per outlet.

B2.8 For DC charging, equipment:

- a. shall be compliant with BS EN 61851 Part 23;
- b. shall use Mode 4 charging;
- c. shall be fitted with:
 - i) one tethered cable with a CHAdeMO vehicle connector per outlet; and
 - ii) one tethered cable with a Combined Charging System (CCS) vehicle connector per outlet.

B2.9 For charging equipment with embedded generation capability (V2X):

- a. Charging equipment with embedded generation capability of up to and including 16A per phase shall be compliant with ENA Engineering Recommendation G83.
- b. Charging equipment with embedded generation capability greater than 16A per phase shall be compliant with ENA Engineering Recommendation G59.

B3. Installation

- B3.1 Charging Equipment shall be installed in accordance with BS EN 61851, the IET Wiring Regulations (BS 7671); the recommendations of the IET Code of Practice for Electric Vehicle Charging Equipment Installations (as amended); and all other applicable standards.
- B3.2 In cases of apparent inconsistency in electrical installation requirements, the IET Wiring Regulations (BS 7671) shall take precedence.
- B3.3 Installations on the public highway shall use a contractor registered through the Highways and Electrical Registration Scheme (HERS).
- B3.4 The electrical supply of the final installation should allow the charging equipment to operate at full rated capacity. Where local supply constraints prevent operation at full rated capacity, the charging equipment shall be classified according to actual output capacity.

B4. User Interface

- B4.1 Charging equipment status shall be indicated using lights, LEDs or display.
- B4.2 Simple and clear information describing how to use the charge point unit must be displayed on the unit and must include provisions such as diagrams for non-English speakers.
- B4.3 Details of any precautions necessary to ensure safe operation with Active Implantable Medical Devices shall be provided and must also be clearly displayed on the charging equipment.

B4.4 Charging equipment shall display instructions for payment/access (as appropriate) and equipment operation.

B5. Data requirements

B5.1 Data communications to allow remote data collection shall be provided.

B5.2 A data acquisition system compatible with the Charge point Usage Data Requirements (refer to Annex F of the grant conditions) shall be provided.

B5.3 Each outlet shall provide measurement of energy supplied, to be output to both display (where fitted) and data acquisition system compatible with the Charge point Usage Data Requirements (refer to Annex F of the grant conditions). Where a Measuring Instruments Directive (MID) (2004/22/EC)-approved meter is not used details of metering and accuracy shall be provided.

B6. Servicing and Maintenance

B6.1 Charging equipment shall be supplied with a warranty on parts and installation which, as a minimum, includes on-site repair and replacement for the three-year post installation.