

PAS 1899:2022

Electric vehicles – Accessible charging – Specification



Office for
Zero Emission
Vehicles



Motability

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Contents

Foreword	iii
0 Introduction.....	v
1 Scope	1
2 Normative references	2
3 Terms and definitions	3
4 General requirements.....	6
5 Physical chargepoint design.....	8
6 Chargepoint placement.....	18
7 Streetscape and public realm around the chargepoint.....	24
8 Digital platforms and information provision for chargepoints.....	28
Annexes	
Annex A (informative)	
Establishing an inclusive and safe environment around public chargepoints.....	31
Annex B (informative)	
Designated accessible parking bays – off-street chargepoints.....	34
Annex C (informative)	
Designated accessible parking bays – on-street chargepoints	41
Annex D (normative)	
Wireless/inductive chargepoints.....	47
Annex E (informative)	
Checklists for requirements and good practice guidance for accessible public chargepoints	48
Annex F (informative)	
Determining forces required for charging cable manoeuvrability	65
Bibliography	68

List of figures

Figure 1 – Roles and responsibilities for PAS 1899	viii
Figure 2 – Navigating the structure of PAS 1899	ix
Figure 3 – “Concentric” model for requirements within PAS 1899:2022	6
Figure 4 – Chargepoint component heights: Socket-outlet and holster heights	10
Figure 5 – Chargepoint component heights: Screen/visual interface and payment terminal heights	10
Figure 6 – Space around chargepoint and position of impact protection barriers.....	19
Figure 7 – Space around chargepoint and position of bollards	22
Figure B.1 – Additional space allowance surrounding off-street designated accessible parking bays with public chargepoints	36
Figure B.2 – Additional space allowance surrounding designated accessible parking bays with public chargepoints – placement of wheel stops	37
Figure C.1 – Additional space allowance surrounding on-street kerbside designated accessible parking bays with public chargepoints.....	43
Figure C.2 – Additional space allowance surrounding on-street kerbside designated accessible parking bays with public chargepoints with angled footway access area	44
Figure C.3 – Additional space allowance surrounding designated accessible parking bays with public chargepoints – angled parking bays (off- and on-street)	45
Figure F.1 – Linear forces required to operate a public chargepoint	66

List of tables

Table 1 – Chargepoint scenarios for PAS 1899	ix
Table 2 – Height range requirements for chargepoint components	9
Table E.1 – Checklist: Core standard for minimum requirements for accessibility for all public chargepoints	48
Table E.2 – Checklist: Supplementary good practice accessibility guidance for all public chargepoints.....	56
Table E.3 – Checklist: Good practice accessibility guidance for chargepoints installed adjacent to off-street designated accessible parking bays	58
Table E.4 – Checklist: Good practice accessibility guidance for chargepoints installed adjacent to on-street designated accessible parking bays	62

Foreword

This Publicly Available Specification (PAS) was sponsored by the charity Motability and the Office for Zero Emission Vehicles (OZEV). Its development was facilitated by BSI Standards Limited and it was published under licence from The British Standards Institution. It came into effect on 31 October 2022.

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- AccessAble
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- Disabled Persons Transport Advisory Committee (DPTAC)
- Easee
- Electric Vehicle Association (EVA) England
- Gemserv
- GHD
- Jane Simpson Access
- Leonard Cheshire
- Motability
- National Highways
- NI Civil Service
- Office for Zero Emission Vehicles (OZEV)
- Pod-point
- R-E-A (Renewable Energy Association)
- Scope
- Transport Scotland
- Transport for Wales
- UK Charity, Designability
- UK Power Networks
- Zap-Map

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Presentational conventions

The provisions of this PAS are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. "organization" rather than "organisation").

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Compliance with a PAS cannot confer immunity from legal obligations.

In particular, attention is drawn to the following specific regulations:

- Equality Act 2010 [1];
- Building Regulations 2010 and subsequent amendments [2];
- Building (Amendment) (Wales) Regulations 2014 [3];
- Building (Scotland) Regulations 2004 and subsequent amendments [4];
- Building Regulations (Northern Ireland) 2012 and subsequent amendments [5];
- Traffic Signs Regulations and General Directions 2002 [6].

NOTE Attention is also drawn to Article 9 in the UN Convention on the Rights of Persons with Disabilities [7], which states that appropriate measures should be taken to ensure that disabled people have access on an equal basis with others to the physical environment, transportation, information and communications, and to enable them to live independently and participate fully in all aspects of life.

0 Introduction

0.1 Context for PAS 1899

Government policy and intervention is leading to an increase in uptake of electric vehicles, which necessitates a significant network of commercially viable public electric vehicle chargepoints across the UK. With an estimated 14 million disabled people in the UK and 2.7 million predicted disabled drivers and/or passengers in ten years' time¹⁾ [8], with this figure expected to grow further, it is essential that chargepoint deployment aligns with government policy, strategy and guidance including "Inclusive Mobility: A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure"²⁾ [N1], "The Inclusive Transport Strategy: Achieving Equal Access for Disabled People", and "Taking charge: the electric vehicle infrastructure strategy"³⁾. Alignment with these policies and strategies will mean that all chargepoints are inclusive and accessible and can be used by all consumers, designed to relevant standards.

The policy direction for road transport has been set by UK Government with a phase out on sales of new petrol and diesel cars and vans set for 2030. UK Government is committed to making the UK's transition to zero emission road transport inclusive for all, and policy developments focused on improving the consumer experience of using public chargepoints⁴⁾ [9] and setting accessibility standards for public chargepoints⁵⁾ [10] are contributing to this vision.

There is a growing suite of research focused on ensuring accessibility of chargepoints for disabled people. Major market and industry players, charities, research institutions, public sector bodies and distribution network operators, amongst others, have undertaken research efforts that highlight the additional barriers faced by disabled people in their use of chargepoints. The resolution of these barriers can also contribute to accessibility and inclusivity for other groups of consumers, including older people, and ensure that the requirements of a diverse range of disabled people are considered⁶⁾.

NOTE 1 "Accessibility" is considered in relation to users, drivers and passengers, and others nearby, and in relation to disabled people, people of other protected characteristic groups, and including, older people and those with children, thereby making chargepoints inclusively designed for a general population as well as for disabled drivers.

¹⁾ Motability & Ricardo (2020), *Electric Vehicle charging infrastructure for people living with disabilities*. Available from <https://www.motability.org.uk/media/ngmmmyu0/electric_vehicle_charging_infrastructure_for_people_living_with_disabilities_ricardo_energy_and_environment.pdf>.

²⁾ Department for Transport (2022), *Inclusive Mobility: A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure*. 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>.

³⁾ HM Government (2022), *Taking charge: the electric vehicle infrastructure strategy*. Available from <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1065576/taking-charge-the-electric-vehicle-infrastructure-strategy.pdf>.

⁴⁾ OZEV (2021), *Consumer Experience at Public Chargepoints: Government Response to the 2021 Consultation on the Consumer Experience at Public Chargepoints*. Available from <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1066972/government-response-to-the-2021-consultation-on-consumer-experience-at-public-chargepoints.pdf>.

⁵⁾ OZEV (2021), *Future of transport regulatory review: zero emission vehicles*. Available from <<https://www.gov.uk/government/consultations/future-of-transport-regulatory-review-zero-emission-vehicles/future-of-transport-regulatory-review-zero-emission-vehicles>>.

⁶⁾ It is against the law to discriminate against anyone because of "protected characteristics", which are age, gender reassignment, being married or in a civil partnership, being pregnant or on maternity leave, disability, race including colour, nationality, ethnic or national origin, religion or belief, sex, and sexual orientation [1].

The UK Government's policy developments, combined with this suite of research, have highlighted strong industry appetite to understand and address accessibility of public chargepoints. Whilst a majority of current electric vehicle charging occurs in private locations such as households with off-street parking, research has shown that up to half of disabled people in the UK will be partially or wholly reliant on public charging by 2035⁷⁾. This highlights a clear need to define what accessible charging comprises, and how to implement accessibility in consideration of public chargepoints.

There is notable European and international interest in addressing accessibility of chargepoints. Prior research commissioned by Motability identified an absence of common standards that address disabled people's access when designing and installing chargepoints. Subsequently, there is growing appetite from European and international bodies to implement such standards and to ensure zero emission transport is inclusive for all.

Importantly, research undertaken in the fields of accessibility and electric vehicle charging has indicated an increased willingness of disabled people to transition to electric vehicles if charging was more accessible⁸⁾. There is an opportunity to ensure that accessibility is embedded in public chargepoints during design and installation, avoiding a need to reposition, reconfigure or remove chargepoints that are not accessible to all users, thereby contributing to improving the commercial case for public chargepoints by avoiding the cost of retrofitting.

The intention of this PAS is to provide requirements and recommendations to any party involved in procuring and providing public chargepoints, including installers and manufacturers of public chargepoints, local authority planners, highways authorities, chargepoint providers, chargepoint location landowners, chargepoint owners and others who will be responsible for the locally built environment for any publicly available chargepoint in the UK. The PAS delivers on the UK Government's commitment to develop new standards for accessible public chargepoints.

The PAS sets out the minimum specification for an accessible public chargepoint, providing a new standard to ensure this infrastructure is accessible to users. In addition, the PAS provides best practice guidance for the provision of accessible chargepoints specifically adjacent to designated accessible parking bays. This approach supports the objective that all electric vehicle chargepoints meet certain minimum requirements for accessibility, regardless of whether the parking bay to which it is attached is a standard or designated accessible parking bay, whilst also ensuring that for those who require designated accessible parking, chargepoints installed in those designated accessible parking bays also meet their needs.

The provision of clear standards on how to install more inclusively designed chargepoints is expected to improve the experiences of disabled people using public chargepoints, and can increase public engagement and confidence in the future of electric vehicle charging. The implementation of these standards in combination with the best practice guidance provided in the UK Government's "Inclusive Mobility" [N1] has the potential to have additional benefits for others in the public realm, such as pedestrians and cyclists, by maintaining accessibility in surrounding areas.

NOTE 2 *This PAS is applicable to all public chargepoints, with a definition for public chargepoints provided in 0.2.6; however, in consideration of key differences in types of public chargepoints, some clauses are only applicable to specific types of chargepoints, and annexes provide supplementary best practice guidance for accessibility for all public chargepoints, and best practice guidance for chargepoints installed specifically adjacent to designated accessible parking bays.*

NOTE 3 *UK Government has announced its intention to introduce consumer experience regulations in response to known issues experienced by users of electric vehicle chargepoints [9]. The regulations announced by UK Government address five key areas of market failure:*

- *Minimum payment method: consumers should be able to charge their vehicle and pay with ease, using a payment method that is not specific to a brand and does not require a payee's mobile or internet signal.*

⁷⁾ Motability & Ricardo (2020), *Electric Vehicle charging infrastructure for people living with disabilities*. Available from <https://www.motability.org.uk/media/ngmmyu0/electric_vehicle_charging_infrastructure_for_people_living_with_disabilities_ricardo_energy_and_environment.pdf>.

⁸⁾ <<https://www.ridc.org.uk/transport/inaccessible-charging-barrier-electric-disabled-and-older-drivers>>.

- *Payment roaming: consumers should be able to access and pay at all public chargepoints easily with membership cards or smartphone apps enabling payment roaming.*
- *Open data: all drivers should be able to locate available and working chargepoints that suit their needs easily when they need to charge their vehicle, with openly available static and dynamic (i.e. data types that are subject to change on a regular basis such as whether the chargepoint is in use or available) data.*
- *Pricing transparency: consumers should be able to understand and compare pricing offers across the UK charging network, using a pence per kWh metric which is clearly displayed in advance of charging.*
- *Reliability: consumers should feel confident that the UK charging network is reliable and easy to use, with a 99% reliable charging network and with a free 24/7 helpline when consumers experience issues.*
- *The requirements within this PAS align with the announced consumer experience regulations. The consumer experience regulations are referenced where relevant throughout this PAS.*

0.2 Instructions for using PAS 1899

0.2.1 General

The chargepoint landscape is inherently complex due to the range of different bodies involved in the provision and installation of public chargepoints, along with the different types and locations of public chargepoints. There is also an inherently complex range of existing guidance and standards related to the provision of public chargepoints. All requirements within this PAS have been developed using an inclusive design approach, the principles of which design for all people with different accessibility requirements including those with permanent and temporary impairments. Clause 4 provides instructions for interpreting and navigating PAS 1899; users of this PAS will also need to cross-refer to existing guidance, which has been noted in this PAS where relevant.

0.2.2 Roles and responsibilities

The provision, installation and operation of public chargepoints inherently involves many different bodies, including but not limited to:

- chargepoint designers, manufacturers and installers;
- local authority or city planners and infrastructure planners;
- chargepoint location landowners and others who are responsible for the local built environment;
- chargepoint owners;
- urban design professionals;
- distribution network operators;
- highways authorities;
- chargepoint operators; and
- end users, including both private and professional/commercial drivers.

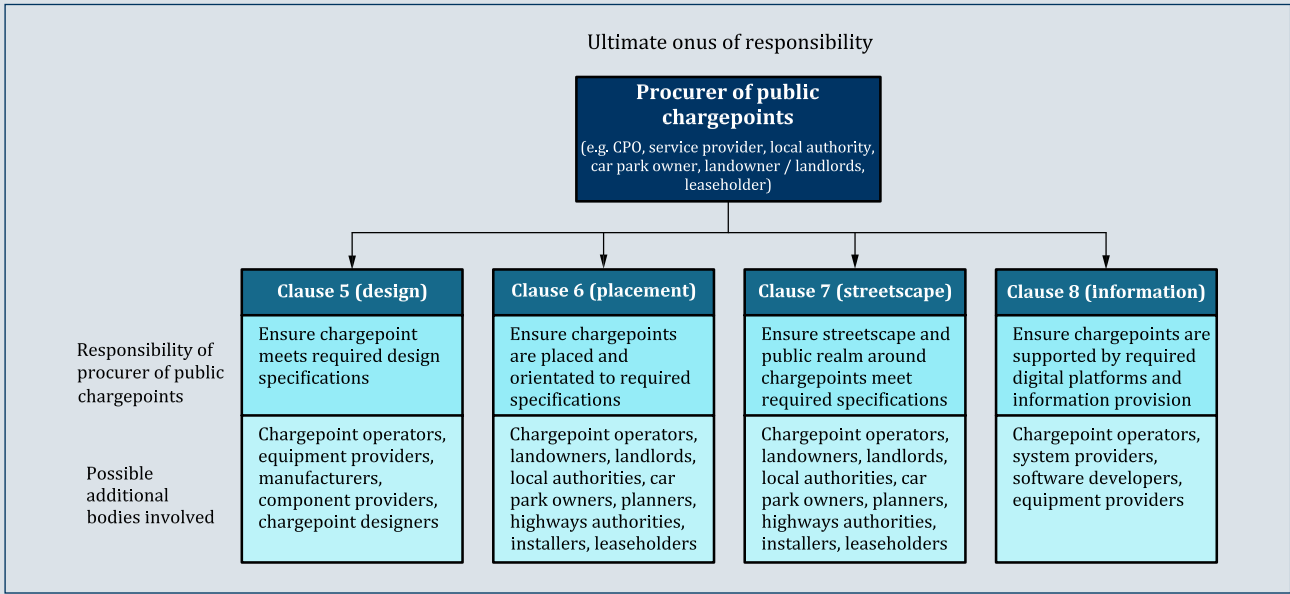
As such, there are roles and responsibilities for the different categories of bodies to be taken into account for accessibility of public chargepoints.

The ultimate onus of responsibility for conforming to the requirements within PAS 1899 is on the procurer of public chargepoints. The procurer can comprise a range of different bodies including the chargepoint operator, the service provider, a local authority, or other landowners or leaseholders such as a car park owner. In using this PAS, the procurer of public chargepoints is responsible for meeting the requirements within this standard, ensuring that chargepoints procured are designed to the specifications necessary for accessibility and that appropriate information provision and support is available; and for satisfying accessibility requirements related to the placement of the chargepoints and the surrounding built environment. The procurer is also responsible for complying with equality legislation and taking into account supplementary best practice accessibility guidance for all parking bays (Annex A), and for implementing best practice guidance for designated accessible parking bays (Annex B and Annex C), as outlined throughout this PAS.

Whilst the onus of responsibility for conforming to the requirements within PAS 1899 is on the procurer of public chargepoints, the requirements within PAS 1899 have impacts on other bodies involved in the provision, installation and operation of public chargepoints – for example, requirements for the physical design of a chargepoint have an impact on chargepoint designers and manufacturers. Some aspects, such as continued maintenance of public chargepoints, will require the procurer to ensure appropriate contractual agreements are in place.

Figure 1 explains the roles and responsibilities for implementing PAS 1899 broken down by clause, including the ultimate responsibility for the procurer of public chargepoints and the range of other bodies that may be involved. As shown in Figure 1, engagement and collaboration with other bodies is essential in the provision of accessible public chargepoints.

Figure 1 – Roles and responsibilities for PAS 1899



Additionally, the supplementary best practice guidance for accessibility of public chargepoints (Annex A) includes guidance for a range of other bodies involved in public chargepoint provision – whilst much of the guidance in Annex A is considered outside the direct control of the procurer of public chargepoints, the procurer of public chargepoints should nevertheless ensure that this guidance is implemented by engaging with other bodies involved in the installation process. Annex D covers requirements related to wireless/ inductive chargepoints.

In order to assist the procurer of public chargepoints in understanding the implementation of the requirements within this PAS, Annex E provides a checklist which covers each of the individual requirements included within this PAS.

NOTE This PAS is applicable to all public chargepoints, with a definition for public chargepoints provided in 0.2.6; however, the PAS can also be used to improve the accessibility of chargepoints not covered by the definition provided in 0.2.6.

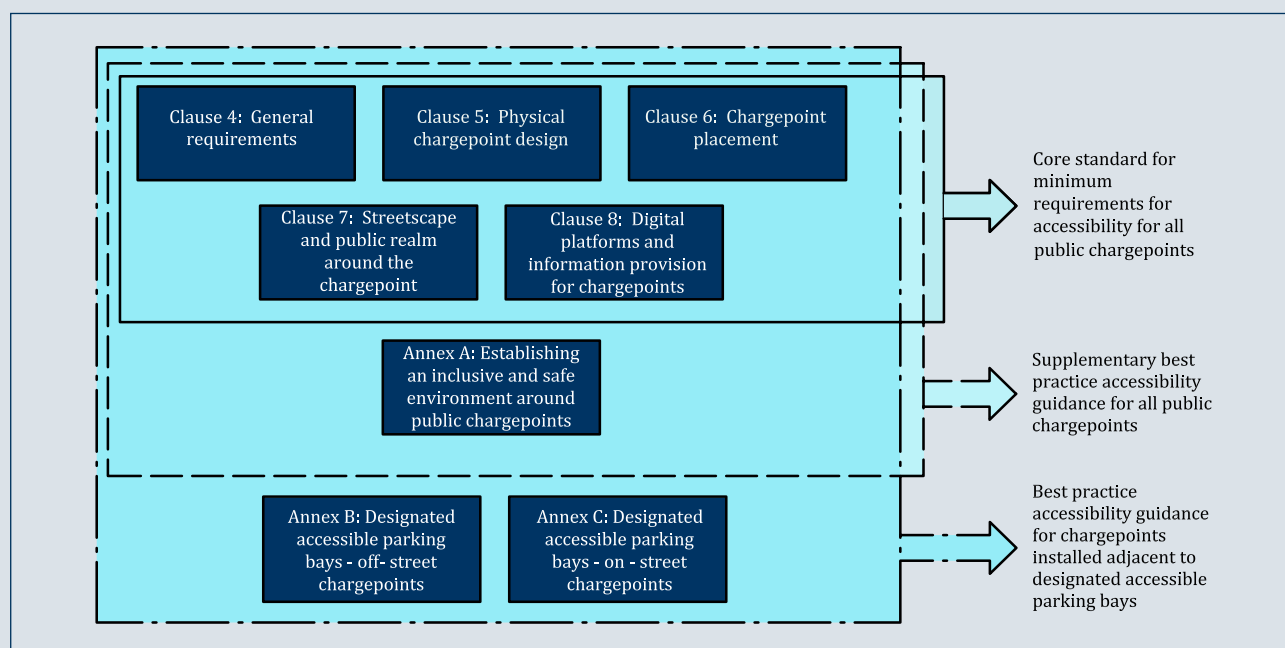
0.2.3 Provision of minimum requirements for accessibility for all public chargepoints and best practice accessibility guidance for chargepoints installed adjacent to designated accessible parking bays

The aim of this PAS is to specify minimum requirements for accessibility for all public chargepoints whilst also providing supplementary best practice guidance for all public chargepoints as well as best practice guidance for chargepoints installed specifically adjacent to designated accessible parking bays. The PAS therefore has three main focus areas:

- core standard for minimum requirements for accessibility for all public chargepoints (Clauses 4–8);
- supplementary best practice accessibility guidance for all public chargepoints (Annex A); and
- best practice accessibility guidance for chargepoints installed adjacent to designated accessible parking bays (Annex B and Annex C).

In order to cater for these different focus areas, the PAS is necessarily divided into normative clauses to address minimum accessibility for all public chargepoints, and informative annexes to address the supplementary best practice guidance for all public chargepoints and the guidance for chargepoints installed specifically adjacent to designated accessible parking bays. Figure 2 provides an explanation of how to navigate the structure of this PAS – as shown, for designated accessible parking bays, all requirements in Clauses 4–8 need to be followed, along with implementing the best practice guidance in Annex B or Annex C.

Figure 2 – Navigating the structure of PAS 1899



Wireless and inductive charging is addressed in Clause 4 and Annex D – similar to the diagram above, the clauses and annexes described in Figure 2 need to be implemented for wireless and inductive charging in addition to conductive charging, following the same process dependent on where the wireless charging is located.

0.2.4 Types of public chargepoints

Due to the nature of the chargepoint market, there are different types, locations and configurations of chargepoints that have differing accessibility requirements. The requirements within this PAS are applicable to all public chargepoints, but some requirements are specifically for a certain “scenario” of chargepoints, such as requirements specifically for on- or off-street parking bays, or requirements for higher-powered or lower-powered chargepoints. For the purposes of this PAS, four chargepoint scenarios are defined, as outlined in Table 1.

Table 1 – Chargepoint scenarios for PAS 1899

Category	Description
Scenario A	Low-powered off-street
Scenario B	High-powered off-street
Scenario C	Low-powered on-street
Scenario D	High-powered on-street

For Table 1:

- “Low-powered” refers to chargepoints with a power rating of 22 kW and below.
- “High-powered” refers to chargepoints with a power rating above 22 kW.
- “Off-street” refers to any chargepoint location that is not on the public highway, such as car parks, charging hubs and service areas.
- “On-street” refers to any chargepoint location that is on the public highway, such as in residential areas and on high streets.

0.2.5 Chargepoint components

Public chargepoints have different chargepoint components dependent on their physical configuration. These components can include:

- cable management system;
- charging cable;
- charging connector;
- connector dock or holster;
- charging socket-outlet;
- feeder pillar;
- payment terminal; and
- screen/visual interface.

Requirements within this PAS related to individual chargepoint components are only applicable if the physical configuration of the chargepoint includes the component being addressed. This is also applicable to other components external to the chargepoint, for example protective bollards surrounding or adjacent to a chargepoint. For full definitions of each of the chargepoint components, see 3.9.

0.2.6 Definition of public chargepoints

This PAS specifies requirements for all public chargepoints. The definition of “public chargepoint” is as outlined in the Alternative Fuels Infrastructure Regulations 2017 (AFIR)⁹⁾ [11], as follows:

A recharging or refuelling point is accessible to the public if it is—

- (a) *intended for use by members of the general public (including those situated in public car parks, whether or not those car parks are available only to consumers of specific goods or services); and*
- (b) *not intended for—*
 - (i) *exclusive use in respect of a vehicle produced by a specific manufacturer;*
 - (ii) *use by persons engaged in specific occupations;*
 - (iii) *use by persons whilst at their place of employment (including visitors); or*
 - (iv) *exclusive use by occupiers of, or visitors to, residential premises.*

“Recharging point” means an interface which is accessible to the public and is capable of charging one electric vehicle at a time, or exchanging a battery of one electric vehicle at a time.

Whilst at a minimum the PAS applies to chargepoints in scope of the AFIR 2017 definition, including on-street chargepoints, destination chargepoints (e.g. in supermarkets), en-route chargepoints (e.g. at motorway service areas), and chargepoint hubs, the requirements as outlined in this PAS are also relevant and useful for other categories of chargepoints, including residential (e.g. car parks for residential buildings), workplace, and semi-public (i.e. chargepoints that might be private during some times of the day whilst public at other times, with limitations or conditions applied on usage) chargepoints. It is strongly recommended that this PAS is incorporated for categories of chargepoints that fall outside the AFIR 2017 definition to ensure accessibility at a wider range of chargepoints.

0.2.7 Compliance with PAS 1899

PAS 1899 is voluntary on implementation. The PAS represents the benchmark of what can be reasonably expected for the provision of accessible public chargepoints, thereby supporting demonstration that appropriate levels of accessibility have been taken into account.

The approach to PAS uptake is not covered in this document as it is a question of policy and regulation, not of standards definition.

PAS 1899 is intended to improve accessibility of all newly installed public chargepoints as defined in 0.2.6. The PAS can be used to assess the accessibility of existing public chargepoints, but as the question of PAS uptake is one of policy, this document does not address whether this PAS should apply to existing chargepoints that might need to be retrofitted. The PAS is applicable to public chargepoints in the UK, but the requirements may also be used to improve accessibility of public chargepoints internationally. In order to assist with complying with the requirements within this PAS, checklists of the requirements within each of the clauses in this PAS are provided in Annex E.

⁹⁾ UK Parliament (2017), *The Alternative Fuels Infrastructure Regulations 2017*. Available from <<https://www.legislation.gov.uk/uksi/2017/897/contents/made>>.

1 Scope

This PAS specifies requirements for the provision of accessible public chargepoints for electric vehicles to all potential users, including, for example, disabled people and older people. The PAS is applicable to all public chargepoints. The PAS primarily addresses requirements for conductive charging (i.e. plug-in vehicle charging), with wireless/inductive charging addressed where relevant.

The focus of this PAS is on chargepoints used to charge motor vehicles (e.g. cars and vans) due to their greater spatial needs and requirement for dedicated infrastructure, rather than charging for mobility aids such as mobility scooters that are charged off-street. Moped and motorcycle users can also benefit from the requirements within the PAS. Larger vehicle categories such as minibuses are addressed where relevant, as users of larger vehicle categories can also benefit from the requirements within the PAS.

The PAS covers:

- the physical aspects of the environment surrounding fixed chargepoints (e.g. kerb height, ground type);
- the location, placement and spacing of chargepoints within the streetscape/public realm and relative to other infrastructure and/or objects (e.g. placement of chargepoints relative to individual parking bays, adequate space surrounding the chargepoint and vehicle);
- factors to be taken account of in the design and specification of accessible chargepoints and their more immediate surrounding areas (e.g. height of chargepoint components, cables and cable management systems, bollard spacing, interface tilt, colours used, accessibility of language within communications, weight and associated forces required to use equipment in an accessible manner); and
- information (physical and digital), signals and indicators provided.

In addition to normative requirements for all public chargepoints to address minimum requirements for accessibility, informative best practice guidance is subsequently provided within this PAS, in terms of supplementary accessibility guidance for all public chargepoints, and best practice accessibility guidance for chargepoints specifically located adjacent to designated accessible parking bays where additional space considerations are required.

The PAS covers both tethered and non-tethered chargepoints, along with chargepoints that can be attached to existing street furniture such as lamp post chargepoints or bollard or pillar chargepoints, as well as wall-mounted chargepoints and dual-socket chargepoints (for example those used in car parks or in on-street locations).

The PAS does not cover:

- electric chargepoints and charging systems used within domestic/private environments;
- specific materials used within a chargepoint;
- charging rates, charging prices, and software for payment methods;

***NOTE 1** Payment methods and payment metrics are addressed in the UK Government's announced consumer experience regulations.*

- user personal safety and protection;
- NOTE 2** General principles for a more inclusive environment are within the scope of the PAS. Guidance on access standards to and within curtilages and associated infrastructure is available in BS 8300-1 and BS 8300-2.*
- grid connections for public chargepoints, other than equipment in the immediate vicinity of public chargepoint equipment such as feeder pillars;
 - parking policy related to restrictions on parking in parking bays adjacent to public chargepoints including designated accessible parking bays, and related to retrofitting or otherwise existing designated accessible parking bays with chargepoints; and
 - planning policy related to specifying a proportion of designated accessible parking spaces within a car park to be equipped with electric vehicle charging.

The PAS should be used in combination with guidance within BS 8300-1 and BS 8300-2, the UK Government's "Inclusive Mobility" [N1] guidance, and the UK Government's "Manual for Streets" guidance¹⁰.

This PAS solely covers inclusivity and accessibility of public chargepoints, and should be used in combination with other standards addressing the installation and connection of public chargepoints in general, as referenced throughout this PAS.

***NOTE 3** Although the PAS is developed with the intended use in the UK, it might also be suitable for international use.*

¹⁰⁾ <www.gov.uk/government/publications/manual-for-streets>.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this PAS¹¹⁾. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 7671:2018+A2:2022, *Requirements for Electrical Installations – IET Wiring Regulations*

BS 8300-1:2018, *Design of an accessible and inclusive built environment – Part 1: External environment – Code of practice*

BS 8300-2:2018, *Design of an accessible and inclusive built environment – Part 2: Buildings – Code of practice*

BS EN 17186:2019, *Identification of vehicles and infrastructure compatibility – Graphical expression for consumer information on EV power supply*

BS EN 17210:2021, *Accessibility and usability of the built environment – Functional requirements*

BS EN 62752, *In-cable control and protection device for mode 2 charging of electric road vehicles (IC-CPD)*

BS EN 301549:2021, *Accessibility requirements for ICT products and services*

BS EN IEC 61851-1:2019, *Electric vehicle conductive charging system – Part 1: General requirements*

BS EN IEC 61851-21-2, *Electric vehicle conductive charging system – Part 21-2: Electric vehicle requirements for conductive connection to an AC/DC supply – EMC requirements for off board electric vehicle charging systems*

BS EN IEC 61851-23:2014, *Electric vehicle conductive charging system DC electric vehicle charging station*

BS EN IEC 61851-25, *Electric vehicle conductive charging system – Part 25: DC EV supply equipment where protection relies on electrical separation*

BS EN ISO 17409:2020, *Electrically propelled road vehicles – Conductive power transfer – Safety requirements*

Other publications

[N1] DEPARTMENT FOR TRANSPORT, *Inclusive Mobility: A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure*. 2022

¹¹⁾ Documents that are referred to solely in an informative manner are listed in the Bibliography.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 accessibility

degree to which a product, device, service, or environment (virtual or real) can be independently accessed or used

3.2 accessible

capable of being independently accessed and used

3.3 accessible parking bay

parking bay, either on-street or in a car park, that is clearly identified as reserved for use by disabled people and for people holding a Blue Badge parking card (3.4), which is larger than standard parking bays to provide additional space requirements surrounding the vehicle, or in some cases to provide for larger vehicles such as larger wheelchair accessible vehicles (3.27)

3.4 Blue Badge

parking card displayed upon parking a vehicle in a designated accessible parking bay within the UK, part of the Blue Badge Scheme¹²⁾ which helps disabled people to park closer to their destination

3.5 bollard

post of minimum 1 000 mm height installed adjacent to a chargepoint to protect the chargepoint from vehicle collision

[SOURCE: BS 8300-1:2018, 8.2.1.2, modified]

3.6 built environment

human-made surroundings that provide the setting for human activity, ranging in scale from buildings and parks or green space to neighbourhoods and cities that can often include their supporting infrastructure

3.7 carriageway

way constituting or comprised in a highway, being a way (other than a cycle track) over which the public have a right of way for the passage of vehicles

3.8 chargepoint

equipment that supplies electrical power for charging electric vehicles

3.8.1 higher-powered chargepoint

chargepoint that has a power rating above 22 kW and has larger infrastructure requirements, such as heavier cables and a larger physical chargepoint

3.8.2 lamp post chargepoint

chargepoint that uses an existing lamp post both as the physical location of the chargepoint and as the source of power for an electric vehicle, where an electric vehicle plugs into the lamp post-mounted chargepoint

3.8.3 pillar chargepoint

chargepoint that is installed in the ground, requiring an individual physical piece of infrastructure to charge an electric vehicle

3.8.4 public chargepoint

chargepoint intended for use by members of the general public, including those situated on-street and in car parks provided for public use, whether or not those car parks are available only to consumers of specific goods or services

NOTE See 0.2.6 for full definition.

3.8.5 wall-mounted chargepoint

chargepoint where the chargepoint itself and associated infrastructure such as cabling and mounting plates are mounted on a wall rather than being installed in the ground

3.8.6 wireless/inductive chargepoint

wireless transfer of electrical power between a chargepoint and an electric vehicle, without the need for cables or plugging into an electric vehicle

¹²⁾ UK Government, 2022, 'Apply for or renew a Blue Badge', <<https://www.gov.uk/apply-blue-badge>>.

3.9 chargepoint component

various physical components that make up a chargepoint and allow the utilization of a chargepoint

3.9.1 cable management system

organization, support and routing of charging cables utilizing sufficient equipment to manage wiring to ensure an orderly, uncluttered and manageable cable storage, ranging from simple cable arms to support the charging cable to mechanical equipment to wind back the charging cable

3.9.2 charging cable

flexible cable or cord used to establish the connection between an electric vehicle and the supply network or a chargepoint, which can be tethered (3.9.11) or untethered (3.9.12)

[SOURCE: BS EN IEC 61851-1:2019, modified]

3.9.3 charging cable holster/dock

physical holder for chargepoint connector attached to chargepoint within which the chargepoint connector is stored when not in use

3.9.4 charging socket-outlet

electric accessory on a chargepoint having socket-contacts designed to engage with the contacts of a plug and having terminals for the connection or cables or cords, intended for inserting the connector of an untethered charging cable, to charge an electric vehicle

[SOURCE: BS EN IEC 61851-1:2019, 3.5.10, modified]

3.9.5 feeder pillar

physical electrical infrastructure cabinet that houses the electrical equipment used to power the chargepoint, installed in close proximity to the chargepoint

3.9.6 height mounting base

physical base on which a chargepoint can be mounted to increase the height of the chargepoint and associated chargepoint components

3.9.7 minimum payment method

minimum/simplest means of providing impromptu access to chargepoints by chargepoint operators and ensuring consumers can rely on a familiar payment method across chargepoint networks

3.9.8 payment terminal

device which interfaces with payment cards or radio-frequency identification cards to make electronic funds transfers

3.9.9 screen/visual interface

mechanical or digital flat panel or area of a chargepoint on which visual content is displayed, and through which in some cases operation of the chargepoint can be administered

3.9.10 screen/visual interface tilt

tilt angle from the vertical plane of a chargepoint screen or visual interface towards the user

3.9.11 tethered charging cable

charging cable that is attached to a chargepoint at one end, with a connector on the other end of the cable for connecting to the vehicle

3.9.12 untethered charging cable

charging cable with a connector on each end, for connecting the cable to the vehicle and to the chargepoint

3.10 chargepoint operator (CPO)

body that operates and maintains public chargepoints so drivers can charge their electric vehicles

3.11 disability

physical or mental impairment which has a substantial and long-term adverse effect on a person's ability to carry out normal daily activities

3.12 dropped kerb

area where a kerb is lowered to meet the level of the carriageway or parking bay to facilitate movement of people including disabled people

3.13 electric vehicle

vehicle with a rechargeable energy storage system that is used for electrical propulsion to drive their wheels some or all of the time, including battery electric vehicles and plug-in hybrid electric vehicles that plug in to an external source of electricity

3.14 footway

way comprised in a highway which also comprises a carriageway, being a way over which the public have a right of way on foot only, also including people using mobility aids such as wheelchairs and mobility scooters designed for use on the footway, and people with physical, sensory or cognitive impairments who are travelling on foot

3.15 impact protection barrier

low-level barriers of maximum 600 mm height placed immediately in front of or surrounding a chargepoint to protect against vehicle impact

3.16 inclusive

relating to the approach to the design of the environment, including infrastructure and the surrounding built environment, to ensure that they can be accessed and used by everyone

[SOURCE: BS 8300-2:2018, 3.8, modified]

3.17 level access point

provision of continuous access between a carriageway or parking bay and the surrounding pavement/footway by raising the level of the carriageway to that of the kerb over a short distance, or where the pavement/footway and kerb are dropped to carriageway or parking bay level

3.18 light reflectance value (LRV)

total quantity of visible light reflected by a surface at all wavelengths and directions when illuminated by a light source

[SOURCE: BS 8300-1:2018, 3.10]

NOTE For information on light reflectance values, see BS 8300-1:2018, Annex B and UK Government's "Inclusive Mobility" [N1].

3.19 mobility aid

device designed to improve the mobility of people with a mobility impairment or to assist walking

3.20 orientation

relative physical position or direction of someone or something

3.21 plug-in vehicle

road vehicle that can be recharged from an external source of electricity using a plug-in technology and the electricity stored in the rechargeable battery packs drives or contributes to drive the vehicle

3.22 radio-frequency identification (RFID)

method for tracking goods and services by means of tags which store information readable via radio signal

3.23 service area service station services motorway service area (MSA)

places where drivers can leave a road to stop and take a break in the course of their journey including facilities such as refuelling/recharging, resting, eating and drinking, shopping or staying in an on-site overnight hotel, including for motorways, A-roads and trunk roads and other areas where chargepoint hubs are located

3.24 slope

inclined surface with a gradient steeper than 1:60 and shallower than in 1:20

[SOURCE: BS 8300-2:2018, 3.13.10]

3.25 street furniture

objects placed or fixed in the street for public use, such as post-boxes, traffic signs and benches

3.26 tactile paving

profiled paving surface which is part of a national system providing guidance or warning to people who are blind or partially sighted

[SOURCE: BS 8300-1:2018, 3.14]

3.27 wheelchair accessible vehicle (WAV)

vehicle constructed or converted specifically so that they can accommodate one or more people seated in their wheelchairs when entering the vehicle, and in some cases when travelling in their wheelchair inside the vehicle, or transferring from a wheelchair inside the vehicle to a passenger or driver seat (internal transfer WAV), or when driving from a wheelchair (drive from wheelchair WAV)

3.28 visual contrast

perception of a difference visually between one surface or element and another by reference to their light reflectance values (LRV)

4 General requirements

COMMENTARY ON CLAUSE 4

Differing types (e.g. power ratings) and locations of public chargepoints have varying requirements for provision of minimum accessibility – the level of accessibility that can be reasonably achieved will depend on a number of factors, for example, some chargepoints have tethered cables whilst others do not, some higher-powered chargepoints have heavier cables, and on-street chargepoints might face additional spacing constraints. Clause 4 specifies the requirements for navigating and interpreting this PAS based on the category of public chargepoints being installed, along with PAS navigation guidance for public chargepoints specifically installed adjacent to designated accessible parking bays. A diagram showing how to navigate this PAS is available in Figure 2.

4.1 Categories of public chargepoints for minimum accessibility for all public chargepoints

NOTE 1 Annex A provides further guidance and best practice on establishing an inclusive and safe environment around public chargepoints. It is strongly recommended that this guidance is implemented for all public chargepoints to improve the accessibility of public chargepoints for all users.

The provision of low-powered off-street public chargepoints shall follow all requirements within Clauses 5, 6, 7 and 8, including those specifically labelled for Scenario A.

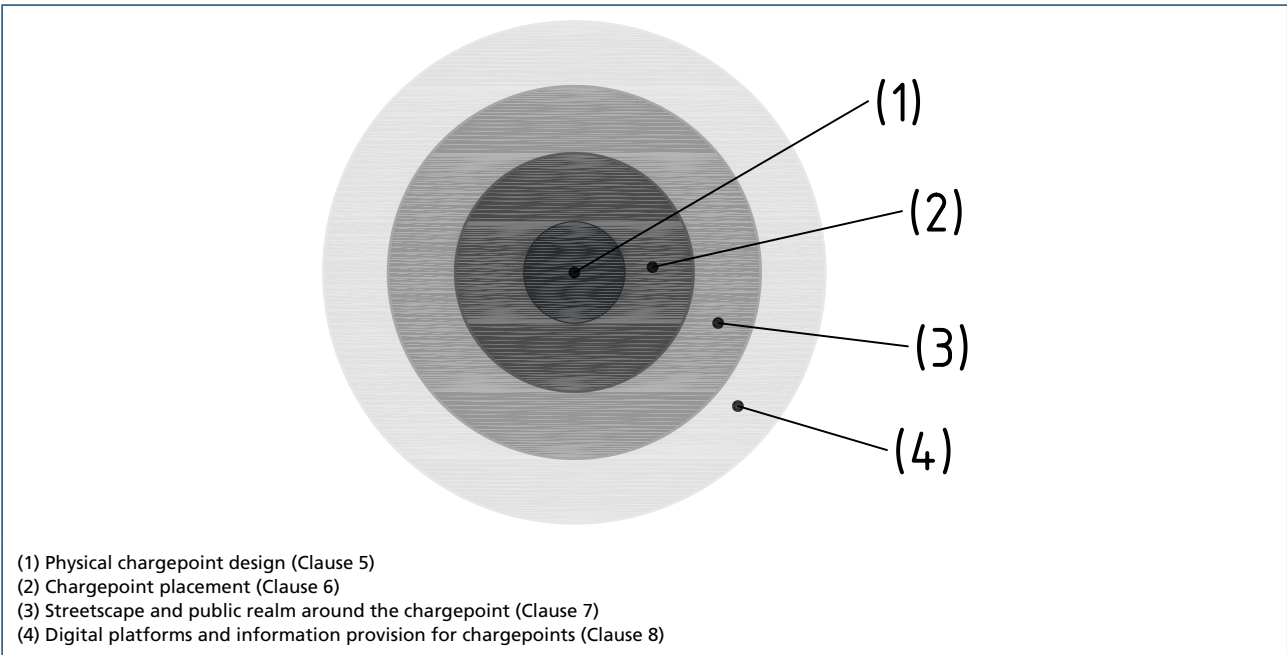
The provision of high-powered off-street public chargepoints shall follow all requirements within Clauses 5, 6, 7 and 8, including those specifically labelled for Scenario B.

The provision of low-powered on-street public chargepoints shall follow all requirements within Clauses 5, 6, 7 and 8, including those specifically labelled for Scenario C.

The provision of high-powered on-street public chargepoints shall follow all requirements within Clauses 5, 6, 7 and 8, including those specifically labelled for Scenario D.

NOTE 2 The requirements within this PAS have been designed using a “concentric” model, initially focusing on the physical design of the chargepoint, and then extending outwards to chargepoint placement, the streetscape and public realm around the chargepoint, and digital platforms and information provision for chargepoints. Figure 3 illustrates the “concentric” model for this PAS. The concentric model of the requirements within this PAS can assist with understanding how to implement the requirements within the PAS in a sequential manner.

Figure 3 – “Concentric” model for requirements within PAS 1899:2022



4.2 Chargepoints installed adjacent to designated accessible parking bays

NOTE 1 Annex A provides supplementary best practice guidance on establishing an inclusive and safe environment around public chargepoints. It is strongly recommended that this guidance is implemented to improve the accessibility of all public chargepoints.

The provision of off-street public chargepoints (Scenarios A and B) specifically adjacent to designated accessible parking bays shall follow all requirements within Clauses 5, 6, 7 and 8 at a minimum.

NOTE 2 Annex B provides best practice guidance on accessibility for public chargepoints specifically installed adjacent to off-street designated accessible parking bays – it is strongly recommended that this guidance is implemented to ensure additional accessibility is implemented for chargepoints installed adjacent to designated accessible off-street parking bays.

The provision of on-street public chargepoints (Scenarios C and D) specifically adjacent to designated accessible parking bays shall follow all requirements within Clauses 5, 6, 7 and 8 at a minimum.

NOTE 3 Annex C provides best practice guidance on accessibility for public chargepoints specifically installed adjacent to on-street designated accessible parking bays. It is strongly recommended that this guidance is implemented to ensure additional accessibility is implemented for chargepoints installed adjacent to designated accessible on-street parking bays.

4.3 Wireless/inductive charging requirements

The provision of wireless/inductive public chargepoints shall be in accordance with Annex D.

NOTE 1 Annex A provides supplementary best practice guidance on establishing an inclusive and safe environment around public chargepoints. It is strongly recommended that this guidance is implemented to improve the accessibility of public chargepoints for all users.

NOTE 2 For wireless/inductive chargepoints specifically installed within an off-street or on-street designated accessible parking bay, it is strongly recommended that the guidance in Annex B and Annex C, respectively, is implemented to improve accessibility for public chargepoints installed specifically within a designated accessible parking bay.

5 Physical chargepoint design

COMMENTARY ON CLAUSE 5

People can be faced with a range of issues and barriers with respect to the usability of chargepoints. Individuals with different (e.g. physical, sensory and/or cognitive) impairments and needs can experience different barriers to using chargepoints, including those related to dexterity/strength, access and comprehension. People can also experience a combination of these impairments. The physical design of a chargepoint and its components should therefore take into account the range of needs of users, including disabled people, in order to achieve inclusive design.

NOTE 1 For all public chargepoints mentioned within Clause 5, user testing with disabled people has shown that the points of access (i.e. the access areas immediately in front of chargepoint components) of chargepoint components are of utmost importance in terms of ensuring accessibility of public chargepoints. The reach, spacing and visibility requirements for public chargepoints (as outlined in Clause 6) help ensure that the needs of disabled users of chargepoints are met.

NOTE 2 Guidance on a “design for all” approach in products, goods and services is provided in BS EN 17161.

NOTE 3 The requirements within this PAS are for public chargepoints that require a cable for a vehicle to be plugged in. Many requirements are also relevant for wireless/inductive charging – refer to Annex D for requirements and guidance for wireless/inductive charging.

5.1 General

The design of public chargepoints shall conform, when applicable, with other standards focused on the design of chargepoints, in accordance with:

- BS EN IEC 61851-1:2019;
- BS EN IEC 61851-21-2;
- BS EN IEC 61851-23;
- BS EN IEC 61851-25; and/or
- BS EN 62752.

NOTE 1 The general design requirements for public chargepoints are summarized in the IET’s Code of Practice for Electric Vehicle Charging Equipment Installation¹³⁾ [12].

The design of public chargepoints shall take into account the guidance within BS 8300-1:2018.

NOTE 2 See also the guidance in the UK Government’s “Inclusive Mobility” [N1].

5.2 Chargepoint component height

COMMENTARY ON 5.2

The heights of the various components of public chargepoints (such as the height of the chargepoint socket-outlet, charging cable, screen and/or visual interface height and the height of a payment terminal) should be suitable for all users including disabled people, in particular users of wheelchairs, other mobility aids, those of short stature and those who have dexterity impairments. The heights of different chargepoint components should be accessible from both a fully standing and seated position.

NOTE 1 Some public chargepoints can be placed on the footway but accessed from carriageway level lower than the footway, which might affect the height of each of the chargepoint components mentioned in 5.2 and thereby the usability of the chargepoints for disabled people. Where this configuration is necessary, the effect of kerb height on chargepoint component height can be mitigated by considering the impact of kerb height (typically 100-125 mm) during the physical design process of a chargepoint, i.e. by factoring in the required height range of chargepoint components to accommodate the required installed height when mounted on a kerb. Such mitigation might need to include the use of different height mounting base/column components to accommodate variations in kerb height to vehicle bay level, to accommodate the required accessible heights for interaction by all potential users where the chargepoint is located at kerb height and operated by users at carriageway level. The preferred solution will generally be to have the chargepoint located at the same level as the vehicle parking bay with space required for user accessibility in front of the points of access of the chargepoint and associated chargepoint components, providing this can be accommodated and does not conflict with highway regulations.

¹³⁾ IET (2020), Code of Practice for Electric Vehicle Charging Equipment Installation, 4th Edition. Available from <<https://shop.theiet.org/code-of-practice-for-electric-vehicle-charging-equipment-installation-4th-edition>>.

NOTE 2 Reference is made in 5.2 to chargepoints placed at footway level along with level access points and dropped kerbs. Reach requirements for public chargepoints placed at footway level but accessed from carriageway level are further addressed in 6.4. Level access points and dropped kerbs are further addressed in 7.3.

For public chargepoint components, including the chargepoint socket-outlet, charging cable, screen and/or visual interface and payment terminal, the installed access heights of the chargepoint components shall be in accordance with Table 2 and as illustrated in Figure 4 and Figure 5.

Table 2 – Height range requirements for chargepoint components

Chargepoint component	Minimum height (mm)	Maximum height (mm)
Chargepoint socket-outlet (centreline)	800	950
Tethered charging cable connector handle when in holster (bottom of handle)	800	950
Screen/visual interface	Bottom of screen/visual interface at 800	Top of screen/visual interface at 1 300
	Bottom of interactive aspects (e.g. buttons, touchscreen) at 800	Top of interactive aspects (e.g. buttons, touchscreen) at 1 200
Payment terminal (bottom edge)	800	1 000

NOTE 3 The height ranges for chargepoint components in Table 2 are the heights relative to the user location, i.e. relative to where the chargepoint is accessed from for user interaction. As such, the heights should be interpreted as including any kerb height if mounted on a kerb, or including any height mounting base (see 3.9.6) or column component on which the chargepoint is mounted.

NOTE 4 The heights in Table 2 were developed from comprehensive user testing and vary due to the respective forces required to carry out the charging process, such as lifting a chargepoint connector from its holster. The user testing involved users who have different disabilities, including wheelchair users and ambulant users. The heights are reflective of the effort involved in manoeuvring chargepoint cables – 5.3.2 addresses cable weights and required forces.

NOTE 5 Not all public chargepoints have each of the components mentioned in Table 2 above – the height requirements are only applicable where a chargepoint has the component in its physical infrastructure.

NOTE 6 5.5.1 addresses the tilt angle of any screen or visual interface as part of the chargepoint. For untethered cables, a cable rest can assist accessibility, positioned between 800 mm and 950 mm height.

NOTE 7 Different users might have different height preferences for chargepoint components – for example, seated users might prefer a chargepoint socket-outlet at the lower end of the height range, whilst ambulant users might prefer a socket-outlet at the higher end of the height range. Provision of two socket-outlets should be considered to satisfy all user needs.

Figure 4 – Chargepoint component heights: Socket-outlet and holster heights

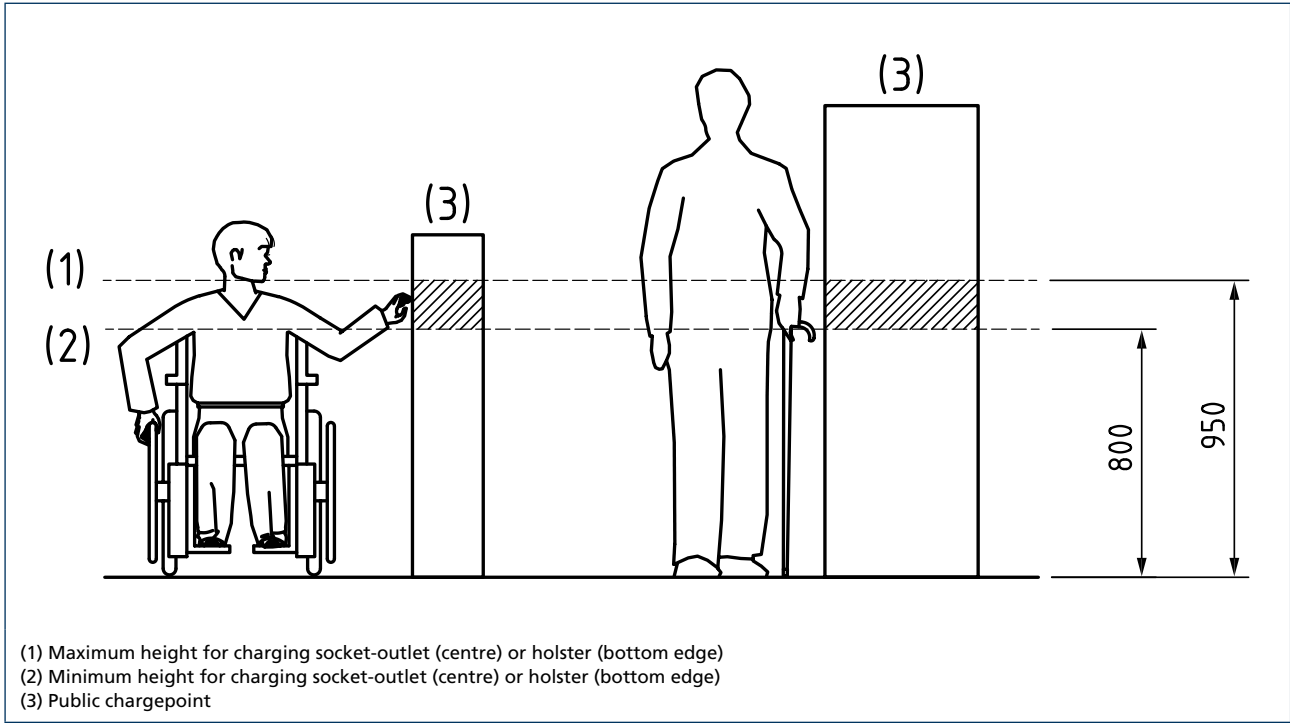
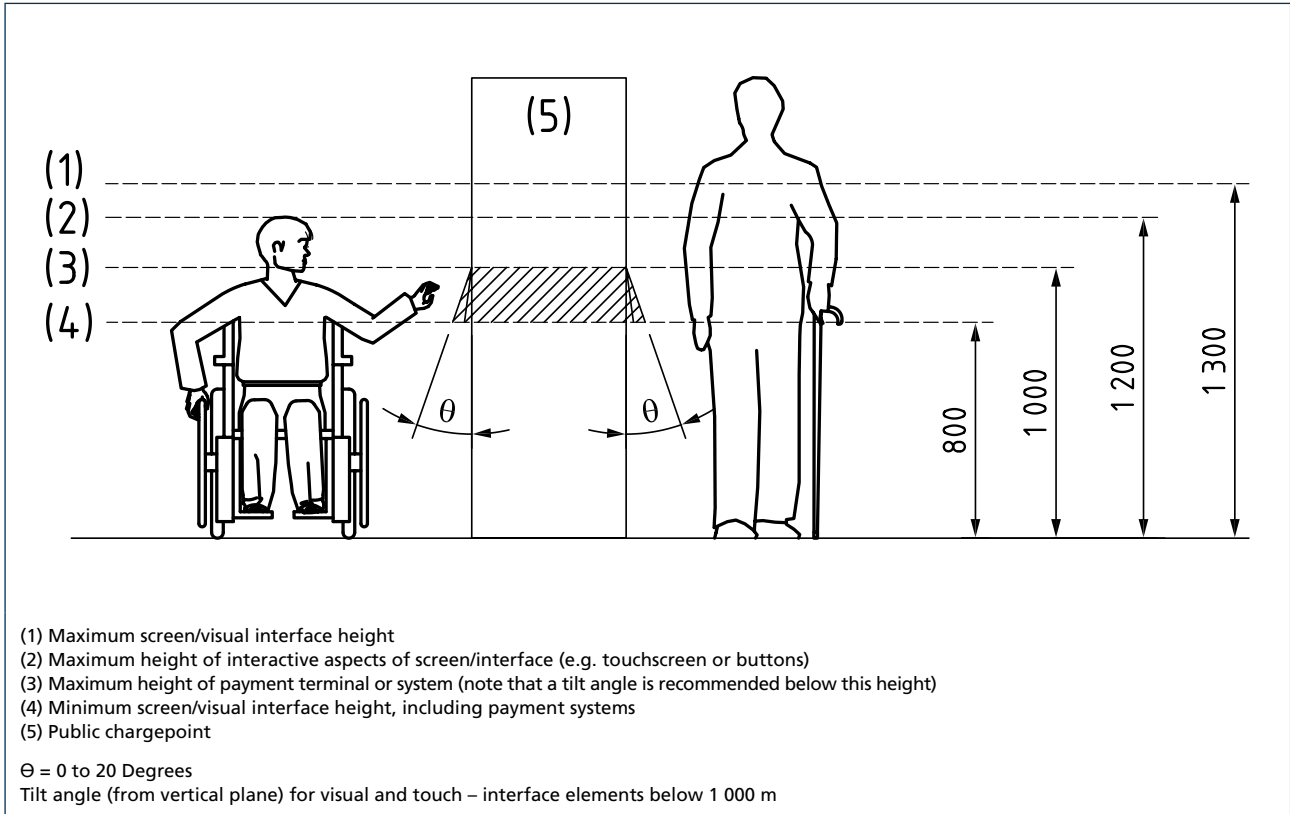


Figure 5 – Chargepoint component heights: Screen/visual interface and payment terminal heights



In the case of a public chargepoint installed at footway level, and where no level access point is provided to use the chargepoint (i.e. the chargepoint is accessed from carriageway level), the height of the charging components on any public chargepoint shall take into account the height of the kerb in its design, including the usage of any height mounting base or column component on which the chargepoint is mounted, such that access still falls within the required ranges in Table 2.

NOTE 8 As outlined in 7.3, in the first instance it is preferable that the installation of public chargepoints should establish whether level access can be provided at the parking bay to access and use the chargepoint, or whether the chargepoint can be accessed and used from carriageway level.

5.3 Chargepoint cables

COMMENTARY ON 5.3

The usability and manoeuvrability of chargepoint cables can be particularly problematic for some users, including older and disabled people. Wheelchair users and people reliant on other mobility aids can have issues holding, manoeuvring and positioning the cable; similarly, those with strength and dexterity impairments and those of short stature can experience difficulties with the weight of the cables and with plugging in the chargepoints. User testing has found that usability of chargepoint cables is amongst the biggest barriers facing disabled people; aspects to be addressed include the weight of the cable (particularly for higher-powered chargepoints) and the associated usage of cable management systems to support charging cables, the length of the cable (and associated distance from the chargepoint to the vehicle), and the ease of holding, manoeuvring and positioning a cable.

NOTE 1 5.3 is specifically focused on cables that are tethered to public chargepoints, rather than cables that an electric vehicle user carries around in their vehicle (i.e. untethered charging cables).

NOTE 2 The usage of wireless/inductive charging can have particular benefits for disabled people, as it avoids having to utilize and manoeuvre charging cables. Wireless/inductive charging is covered in Annex D.

5.3.1 Cable length

COMMENTARY ON 5.3.1

The length of a tethered chargepoint cable has been cited as an issue for disabled people in the usability of chargepoints. Public chargepoint cables should be long enough to accommodate a range of vehicle parking positions and vehicle socket-outlet locations, as there is no standardized position on electric vehicles where a socket-outlet is located. However, user testing with disabled people found issues with long cables, such that they can trail along the ground in an undesirable way both during and after charging, causing uncomfortable usability conditions for those in wheelchairs or those that use other mobility aids particularly during adverse weather conditions, and as such lengths should not significantly exceed what is reasonably required to accommodate the needs of anticipated users of the chargepoints. Cable lengths that are too short can also be difficult to manipulate into the required position for charging a vehicle.

NOTE 1 The lengths of charging cables are implicitly considered in the force measurements as described in 5.3.2; for example, having a cable length where a proportion of the charging cable can rest on the ground when the cable is being operated and manoeuvred can lessen the required forces-in-hand for utilization. Consideration should be given to positioning and routing of longer cables so that they do not become obstructive to users when the chargepoint handle is docked in its holster or when a vehicle is being charged.

For tethered public chargepoints, the length of the cable shall be sufficient to accommodate a range of vehicle parking positions, vehicle sizes and vehicle socket-outlet locations whilst ensuring the cable does not cause obstruction to the surrounding streetscape during the charging process, thereby causing accessibility issues for disabled people and others.

For tethered public chargepoints, when the chargepoint is not in use, the cable length shall be supported by appropriate cable routing at the chargepoint and/or an appropriate cable management system, so that the cable length does not present a trip hazard for users and pedestrians.

For tethered public chargepoints, when the chargepoint is in use and connected to a vehicle, the unused cable length shall be supported either on the ground adjacent to a vehicle or by an appropriate cable management system so it does not present a trip hazard for users and pedestrians. It shall be determined how best to route cables beside vehicles whilst they are charging, in accordance with force requirements detailed in 5.3.2.

The free cable length for standard parking bays (i.e. the length of cable not supported by a cable management system or other form of cable storage) shall not exceed 7.5 m when not in use, in accordance with accessibility requirements within BS EN IEC 61851-1:2019, 11.7.

NOTE 2 User testing has found that including a second handle on a chargepoint cable can assist with manoeuvrability of the charging cable.

5.3.2 Cable weight and cable management systems

COMMENTARY ON 5.3.2

Different chargepoints have different types of tethered charging cables – low-powered chargepoints with a power rating of 22 kW and below (Scenario A and Scenario C chargepoints) might have lighter cables, with less mass per meter and a smaller cable diameter, whilst higher-powered chargepoints with a power rating above 22 kW (Scenario B and Scenario D chargepoints) might have heavier cables, with a greater mass per meter and a larger cable diameter. Chargepoints with a power rating of 200 kW and above typically require liquid-cooled or air-cooled charging cables, adding weight to the cable. Charging cable weight and stiffness are directly affected by the power of the chargepoint, the thickness of charging cables, and the presence of insulation materials, as examples. The measurement of cable weight does not consider the impact on the user in terms of their capability of operation; rather the measurement and specification of forces required for cable operation provides a more user-centric measurement of the accessibility of a charging cable.

This PAS addresses issues related to cable weight and manoeuvrability by specifying requirements for maximum force-in-hand measurements for charging cables for linear chargepoint forces, which can be tested to assess whether charging cables can be considered accessible for all chargepoint users. A full explanation of the determination of forces required for charging cable manoeuvrability is available in Annex F.

NOTE 1 The requirements in 5.3.2 focus on linear forces required for charging cable manoeuvrability, i.e. upward forces and linear pull forces. It is strongly recommended that the design of public chargepoints takes into account other forces to operate a charging cable, including twisting, tilting, and rotational forces, as outlined in Annex F.

The upward force required to remove a chargepoint connector from the associated charging cable holster/dock shall not exceed 60 N.

NOTE 2 The force of 60 N was developed through user testing and chargepoint testing, as outlined in Annex F. The ergonomics and mechanical wear of charging cable holsters or docks should be assessed for ease of charging cable connector removal and for continued maintenance of the holster or dock.

In the first instance, charging cables shall be extended to a distance of 4 m from the chargepoint with the charging cable suspended in the air, or for the full extension length of the charging cable if this is less than 4 m, to assess whether the linear force-in-hand measurement to hold and manoeuvre the charging cable exceeds 60 N.

NOTE 3 Where possible, charging cables should be operational using a linear force-in-hand measurement of far less than 60 N for both upward force and lateral pull force – different people have different impairments, and some users might still find 60 N forces to operate charging cables inaccessible to them. Additionally, the tilting, twisting and rotational forces required for operation might make manoeuvrability of charging cables more difficult – see Annex F for further details.

NOTE 4 Charging cables are recommended to be measured at a distance of 4 m as standard parking bays are 4.8 m in length; as such, a distance of 4 m will account for a majority of parking positions, noting that the location of charging ports on vehicles varies by vehicle. Additionally, the force when the charging cable is extended to this distance is greater than when it is extended to a lesser distance, allowing for contingency in the force measurement.

Where the linear force-in-hand measurement at a distance of 4 m with the charging cable suspended in the air, or for the full extension length of the charging cable if this is less than 4 m, exceeds 60 N, support to the cable shall be provided to reduce the force-in-hand required to hold and manoeuvre the charging cable to a maximum of 60 N but preferably lower. This shall be administered either by increasing the length of the charging cable to allow a proportion of the charging cable to rest safely on the ground adjacent to the vehicle, or through the inclusion and utilization of an appropriate cable management system that reduces the measured force required to operate the cable through provision of appropriate support.

Where it is not feasible to reduce the linear force-in-hand measurement to a maximum of 60 N at a distance of 4 m with the charging cable suspended in the air, or for the full extension length of the charging cable if this is less than 4 m, additional assistance shall be provided at these chargepoints in accordance with 7.5.

NOTE 5 When a charging cable is long enough such that a proportion of the cable can rest safely on the ground adjacent to a vehicle (i.e. adjacent to the vehicle and not presenting a trip hazard), this greatly reduces the required forces to operate and manoeuvre the charging cable. Care should be taken to ensure that long cables do not become obstructive to users and block the surrounding space adjacent to vehicles both when the chargepoint handle is docked in its holster and when a vehicle is plugged in to charge – see Annex F for further details. Trailing cables, in general, should be avoided for all public chargepoints as they have a negative impact for all people trying to make use of a footway, including disabled people.

NOTE 6 Cable management systems encompass the organization, protection and routing of wiring systems. In the context of public chargepoints, cable management systems can assist in alleviating barriers to tethered chargepoint cable usability experienced by disabled people by reducing the required weight of the cable to be carried (and associated operational forces), thereby mitigating barriers experienced by those with strength and dexterity impairments.

NOTE 7 It is acknowledged that installations of chargepoints with a power rating of 200 kW and above, where liquid-cooled or air-cooled cables are typically required, might experience difficulty in achieving the stated measured force of 60 N for operation and manoeuvrability of the charging cable due to the heavier cables. However, user testing has shown that disabled people will have difficulty in operating chargepoint cables in excess of this force-in-hand measurement. Chargepoints where a force-in-hand greater than 60 N is required as specified in 5.3.2 cannot be considered accessible for independent use for any chargepoints in accordance with this PAS. Provision of suitable cable management systems to support the unused length of the cable might assist in reducing the forces required for charging cable operation.

NOTE 8 There are various designs that can be incorporated into cable management systems for higher-powered chargepoints such as the cable being suspended from arms or the chargepoint having a pull-back mechanism that supports the weight of the unused portion of the cable. Consideration should be given to different proprietary solutions that are suitable for different types of chargepoints, in terms of ensuring the weight of the cable is less prohibitive for disabled people.

NOTE 9 Continuing need for assisted access for some disabled people is likely to remain where tethered chargepoints are provided, especially for higher-powered chargepoints. 7.5 provides further requirements for provision of additional assistance in locations such as service areas.

The design of cable management systems for all tethered public chargepoints shall be such that charging cable connectors and handles are simple to locate back onto their holster or dock after use through appropriate ergonomic design of holsters or docks.

NOTE 10 Requirements for cables for chargepoints in general are provided in BS EN 50620:2017+A1:2019, Clause 6. Prevention of overheating of cables or cable assemblies used in stored or partially stored position is covered in BS EN IEC 61851-1:2019, 11.7.

5.3.3 Cable connector grip

COMMENTARY ON 5.3.3

Disabled people with strength or dexterity impairments and older people can find it difficult to grip a chargepoint handle or connector without appropriate consideration to the design of the chargepoint handle. It is important to consider the ergonomic design of the connector grip or handle. Ergonomic design of a connector grip should consider single hand use, two handed use, and those who might grip without digits (amputation and reduced use of hands).

The design of a chargepoint cable connector grip or handle shall be of a suitable material and ergonomic design to be usable by people including disabled people with strength or dexterity impairments.

The diameter of the gripping portion of a chargepoint connector grip or handle shall be between 19 mm and 43 mm.

The design of a chargepoint cable connector or grip shall ensure the connector is robust, reliable, and easy to maintain.

NOTE The design of handrails is covered in BS 8300-1:2018, which can assist with the design of a cable connector grip. According to BS 8300-1:2018, handrails should be easy and comfortable to grip with no sharp edges, but able to provide adequate resistance to prevent hand slippage. In locations subject to extremely cold or hot temperatures, handrails should not become excessively cold or hot to touch, while being of a material that, if necessary, is sufficiently robust to resist vandalism or misuse.

5.3.4 Cable and connector visibility

NOTE 1 For untethered chargepoints, users bring their own cable to the chargepoint, and as such the chargepoint equipment manufacturer does not have control over cable visibility. However, whilst outside the scope of this PAS, it is strongly advised that any untethered cable supplied by vehicle and cable manufacturers and suppliers should also satisfy the relevant requirements within 5.3 of this PAS.

The design of a tethered chargepoint cable and connector shall be of suitable visibility so as to provide a visual contrast for chargepoint users including disabled people along with other footway users, in accordance with light reflectance value and visual contrast principles in BS 8300-1:2018, Annex B.

NOTE 2 BS 8300-1:2018, Clauses 11, 12 and Annex B provides guidance on utilization of light reflectance value requirements; 30 LRV is suggested for chargepoints, and 70 LRV is suggested for signage.

NOTE 3 Consideration should also be given to visibility during the night-time, using the principles outlined in BS 8300-1:2018, Clause 11.

5.4 Chargepoint connection

NOTE 1 Subclause 5.4 addresses the physical connection of a chargepoint. Positive forms of feedback to indicate when certain stages of the charging process have initiated or concluded, using tactile, audible or visual feedback, are addressed in Annex A.

Any chargepoint connector, and any associated chargepoint socket-outlet cover to protect from water or dust, shall be operable without excessive force for a wider range of user populations, including those with strength and dexterity impairments and for those with the use of only one hand. An assessment of the maximum operating force (i.e. when inserting or removing the connector or using the chargepoint socket cover) shall be undertaken to determine whether this force exceeds 60 N.

Where it is not feasible to reduce the force required to operate any chargepoint connector, and any associated chargepoint socket-outlet cover, to a maximum of 60 N, additional assistance shall be provided at these chargepoints in accordance with 7.5.

NOTE 2 IEC 62196-1:2022, 16.16 states a maximum insertion and extraction force of chargepoint connectors of 100 N. However, user trials have found difficulties experienced by many elderly and disabled people when inserting and removing a chargepoint cable, and connection forces exceeding 60 N cannot be considered accessible. Options should be considered by chargepoint designers to reduce the force as much as possible to enable ease of insertion and removal of cable connectors at chargepoints (and at electric vehicles), to ensure ease of user operation. Where possible, this connection force should be limited to a maximum of 15 N.

Chargepoint connectors or socket-outlets shall be clearly and unambiguously labelled to indicate the type of chargepoint connector, in accordance with BS EN 17186:2019.

NOTE 3 From a safety perspective, it is desirable to incorporate a safe connector release mechanism into the chargepoint connector, to ensure an electric vehicle user can drive away whilst a vehicle is charging if their safety is perceived to be at risk, or in the event of accidental drive-off whilst a vehicle is still connected. Further information on interlock functions for chargepoints is available in BS EN ISO 17409:2020, Clauses 8 and 9.

NOTE 4 Some users with restricted strength and/or dexterity can experience issues when trying to remove and/or replace rubber dust caps that cover the ends of untethered charging cables. Whilst outside the scope of this PAS, it is nevertheless recommended that the forces required to remove and/or replace rubber dust caps are kept to a minimum, with a maximum operating force of 30 N but preferably limited to 15 N.

5.5 Chargepoint screen/visual interface

COMMENTARY ON 5.5

Public chargepoints can require user interactions with a screen or visual interface (see 3.9.9) to operate the chargepoint, rather than being operated by another means such as a smartphone or by making a phone call. The screen or visual interface on a public chargepoint should be designed to ensure accessibility for disabled people. Aspects to consider for screens and visual interfaces include whether the text is clear, whether it is easily readable for people who are colour blind, and whether plain English and/or Welsh language (as appropriate to geographic location) is used for those with learning disabilities and for those with neurodiverse conditions.

NOTE 1 Not all public chargepoints will be fitted with a screen or visual interface. Subclause 5.5 is solely applicable to chargepoints that have a screen or visual interface installed as part of the chargepoint design.

NOTE 2 5.5 is focused on screens or visual interfaces physically attached to a public chargepoint; 8.2 covers remote digital platforms related to chargepoint operation, such as smartphone applications.

NOTE 3 Related guidance on inclusive mobility in terms of digital technology is available in UK Government's "Inclusive Mobility" [N1], Section 12, along with BS 8300-2:2018, 15.3 and 15.4.

NOTE 4 The UK Government has committed to consumer experience regulations that require a minimum payment method to be installed on all newly installed chargepoints with a power rating above 7.1 kW and all existing public chargepoints with a power rating of 50 kW and above that is not specific to a brand and does not require a payee's mobile or internet signal (refer to Clause 8 commentary). Where the payment terminal forms part of the screen or visual interface, the requirements within 5.5 apply to payment terminals.

5.5.1 Screen/visual interface tilt

COMMENTARY ON 5.5.1

The height of a chargepoint screen or visual interface has been highlighted as a prominent barrier for disabled people within 5.2, particularly for those in wheelchairs or those that are unable to bend down to read the screen or visual interface. Implementing an optimum tilt position for a screen or visual interface on a chargepoint can assist readability from a seated or fully standing position.

For public chargepoints with a screen or visual interface, the screen or visual interface shall be oriented to ensure it is readable from both a fully standing and a seated position.

For screens or visual interfaces on public chargepoints including any touch interface elements, the screen or visual interface shall be tilted at an angle of between 0° and 20° upwards from the vertical plane towards the user of the chargepoint, as outlined in Figure 5.

NOTE 1 Where a touchscreen and/or other interactive elements (such as physical buttons) are located below 1 000 mm, it is recommended that the touchscreen and/or interactive elements are tilted at an angle of between 10° and 20° upwards from the vertical plane towards the user of the chargepoint – user testing has shown that tilting at an angle of between 10° and 20° for a touchscreen or other interactive elements below 1 000 mm can enable usage of the screen or visual interface from both a standing and seated position.

NOTE 2 A tilt angle is not necessary if two separate screens or visual interfaces are provided, or if a larger screen is provided (i.e. a screen covering more of the physical spacing between the recommended heights of 800 mm and 1 300 mm, as outlined in 5.2), thereby serving the needs of both standing and seated users. Any screen tilt can either be permanent or adjustable.

NOTE 3 If a larger screen is used, there is a possibility for interactive elements to be positioned lower for seated users and higher for standing users, such that the screen content can be positioned to suit the user. This has been demonstrated on touch screen ticket systems in train stations, using an accessibility icon to lower the screen for seated users.

NOTE 4 There is no requirement for the screen or visual interface to protrude from the unit (e.g. the screen or visual interface can be recessed).

5.5.2 Screen/visual interface light, colours and text size

NOTE 1 The UK Government's "Inclusive Mobility" [N1], Section 12 contains considerations including visibility, legibility, touch screen and button functionality, and audio and visual information.

NOTE 2 The guidelines in 5.5.2 also apply to instructions provided on a chargepoint which does not have a screen (i.e. physical information provision at the chargepoint).

The content and composition of any screen or visual interface on a public chargepoint, including font size, colours, contrast, and layout, shall be designed so that the content is accessible to a broad range of users, in accordance with BS EN 301549:2021, Clause 11.

The content and text on a screen or visual interface on a public chargepoint shall be easily readable for those with vision impairments and colour blindness. The needs of those for whom English and/or Welsh (as appropriate to geographic location) is not their first language, including British Sign Language users, shall also be taken into account.

NOTE 3 *Considering the needs of those for whom English and/or Welsh (as appropriate to geographic location) is not their first language, including British Sign Language users, can be achieved through the use of illustrations and symbols or access to a relay interpretation service, as well as options to change the text to additional languages, as examples.*

NOTE 4 *As described in 5.2, the heights of screens or visual interfaces vary dependent on their composition, and seated and standing users will have different viewing heights that are best suited to them. Minimizing the information displayed on a screen or visual interface can assist with improving the accessibility of screens and visual interfaces, such as by simply displayed key variables such as the cost per kWh¹⁴⁾, the estimated charging time, and the cost of the charging session. The size of the text should be sufficient to cater for a number of different user positions at the point of access to the screen or visual interface.¹⁵⁾*

NOTE 5 *Further guidance on accessibility of software and interfaces from an ergonomic perspective is located in BS EN ISO 9241-171:2008, Clause 10.*

Screen or visual interface content and text on a public chargepoint shall be clearly visible in outdoor conditions, minimizing the effects of ambient lighting and glare such as from sunlight and ensuring any internal lighting on the screen or visual interface is illuminated in outdoor conditions, such as by using anti-glare coating on the screen or visual interface.

NOTE 6 *The effects of ambient lighting can also be minimized through the use of LCD screens or via provision of canopies over stations to minimize outdoor lighting.*

5.5.3 Screen/visual interface interaction

The location of a screen or visual interface on a public chargepoint, including any payment terminal on the chargepoint, shall be clearly identifiable by users such as by illumination of the screen or visual interface.

All interactive features on a screen or visual interface on a public chargepoint shall be clearly and unambiguously labelled for their specific purpose and shall be designed to take into account the needs of users with mobility and manual dexterity impairments.

Where a touchscreen is provided on a public chargepoint, the touchscreen interface shall be positioned at a height of between 800 mm and 1 200 mm, in accordance with 5.2 and as illustrated in Figure 5.

Where a touchscreen is provided on a public chargepoint, the interaction with the touchscreen shall take into account the accessibility guidance in BS 8300-2:2018, 15.4.

NOTE *The UK Government's "Inclusive Mobility" [N1], Section 12, contains additional information on touch screen functionality.*

5.5.4 Screen/visual interface considerations for instructions and language used

The instructions and information provided on any screen or visual interface on a public chargepoint shall be produced in easily understandable language for all users, and any text shall use plain English and/or Welsh as appropriate to geographic location, and shall incorporate the use of simple symbols to convey information.

NOTE 1 *"Easy read principles" can be used to ensure that language used is understandable for people with a learning disability [13]; further guidance is available in UK Government's "Inclusive Mobility" [N1], Sections 12 and 13.*

NOTE 2 *Audio instructions should be considered, for example through the charging equipment and/or by other suitable means (e.g. smartphone application, as covered in 8.2).*

NOTE 3 *Clearly labelled emergency stop buttons for public chargepoints have been highlighted as beneficial to ensure users know they can stop the charging process quickly.*

¹⁴⁾ DfT (2022), *Consultation outcome: The consumer experience at public electric vehicle chargepoints*. Available from <<https://www.gov.uk/government/consultations/the-consumer-experience-at-public-electric-vehicle-chargepoints>>.

¹⁵⁾ Source: Ref: SOSCI User Trial Report Dec 2021: Recommendation R15 – 17. <<https://www.accessidc.com/accessible-electric-vehicle-charging>>.

NOTE 4 *Guidance on accessibility of information from a cognitive perspective is available in BS EN ISO 9241-20:2021, 7.6.*

For the utilization of any screen or visual interface on any public chargepoint, unambiguous instructions shall be provided to support a user through the process of setting up and using the chargepoint, including for first time users.

NOTE 5 *Instructions can be provided to the user through several means including on the screen or visual interface, on the chargepoint itself, and/or via other suitable means such as a smartphone application. The point of access to information provision should be considered – see 6.2. The UK Government’s consumer experience regulations also require a 24/7 helpline to be available to all users – see Clause 8 commentary.*

6 Chargepoint placement

COMMENTARY ON CLAUSE 6

The placement and positioning of a public chargepoint has a large impact on the accessibility of the chargepoint. Users including disabled people should be able to access the various components of the chargepoint such as the charging cable, the charging socket-outlet and any screen or visual interface or payment terminal installed on the chargepoint. This should include positioning the chargepoint so that it is accessible for users and not be obstructed by obstacles that would create barriers to users such as wheelchair users or users of other mobility aids to access the chargepoint. Additionally, the placement of a chargepoint should not obstruct or block movement past the chargepoint or access to other amenities or destinations near the chargepoints for other users of the public realm, including those with disabilities, those with prams or pushchairs, or those who need more space for other reasons. The cumulative impact of the chargepoint and existing obstacles in the public realm should be fully considered.

NOTE Requirements within Clause 6 are to be interpreted as being for minimum provision of accessibility for all public chargepoints. For best practice accessibility guidance for chargepoints installed adjacent to designated accessible parking bays, see the guidance within Annex B for off-street chargepoints and Annex C for on-street chargepoints, which include recommendations for greater spacing allowances.

6.1 General

The placement and installation position of public chargepoints shall take into account parking provision and horizontal movement best practice accessibility guidance for the built environment (including pedestrian routes) within BS 8300-1:2018, Clauses 7 and 8, respectively, along with the guidance within the UK Government's "Inclusive Mobility" [N1].

NOTE The UK Government's *Manual for Streets*¹⁶⁾ provides design guidance on creating streets for people and encourages built environment professionals to consider the place function of streets. The *Manual for Streets* guidance should also be factored into inclusive street design.

Connections for public chargepoints shall be in accordance with BS 7671:2018+A2:2022.

6.2 Chargepoint orientation and space surrounding chargepoint

COMMENTARY ON 6.2

There are interdependencies when considering the various aspects of chargepoint placement – where there are unavoidable obstacles inhibiting access to a chargepoint, the various components of a chargepoint may be positioned or oriented in a different way to ensure sufficient space is available to enable access for users including disabled people, including wheelchair users or users of other mobility aids. Subsequently, access to the chargepoint should not be obstructed by other obstacles. The needs of pedestrians and potential hazards of chargepoints encroaching onto footways should also be considered – the positioning should be such that it does not have negative impacts on the accessibility of adjacent footways for other road users (as addressed in 7.2). Reference is made within 6.2 to chargepoints placed at footway level and at carriageway level. Reach requirements for chargepoints accessed from carriageway level are addressed in 6.4 and level access points and dropped kerbs are further addressed in 7.3.

For all public chargepoints, the chargepoint shall be positioned and oriented such that its components can be easily viewed, reached and operated from a seated or fully standing position, by providing adequate spacing in front of the points of access to the chargepoint components.

A minimum space of 1 200 mm shall be provided in front of the points of access to all chargepoint components, enabling access space for straight line movement in front of and passed the points of access to chargepoint components for a range of users including wheelchair users or users of other mobility aids (with allowance for low-level obstacles/kerbs – see 6.4), as shown in Figure 6.

NOTE 1 Chargepoint components for 6.2 include the chargepoint socket-outlet, charging cable/chargepoint connector, screen/visual interface and payment terminal (such as contactless or RFID payment).

NOTE 2 The minimum recommended spacing in front of chargepoints of 1 200 mm is based on straight line travel past the chargepoint, thereby enabling side reach to the points of access of chargepoints and chargepoint components. Where space permits, it is strongly recommended that additional spacing is provided – a minimum space of 1 600 mm would enable

¹⁶⁾ <www.gov.uk/government/publications/manual-for-streets>.

a wheelchair to turn through a 90° angle, as shown in Figure 6, and a minimum space of 1 800 mm would enable a wheelchair to turn through a 180° angle.

NOTE 3 The spacing requirements in 6.2 are to be interpreted as minimum requirements for accessibility for all public chargepoints. For spacing requirements for designated accessible parking bays, please refer to Annex B for off-street designated accessible parking bays and Annex C for on-street designated accessible parking bays. Further guidance on other permutations of designated accessible parking accompanied with public chargepoints is available in other research projects, such as the 'Scaling on Street Chargepoint Installations' (SOCSI) project¹⁷⁾.

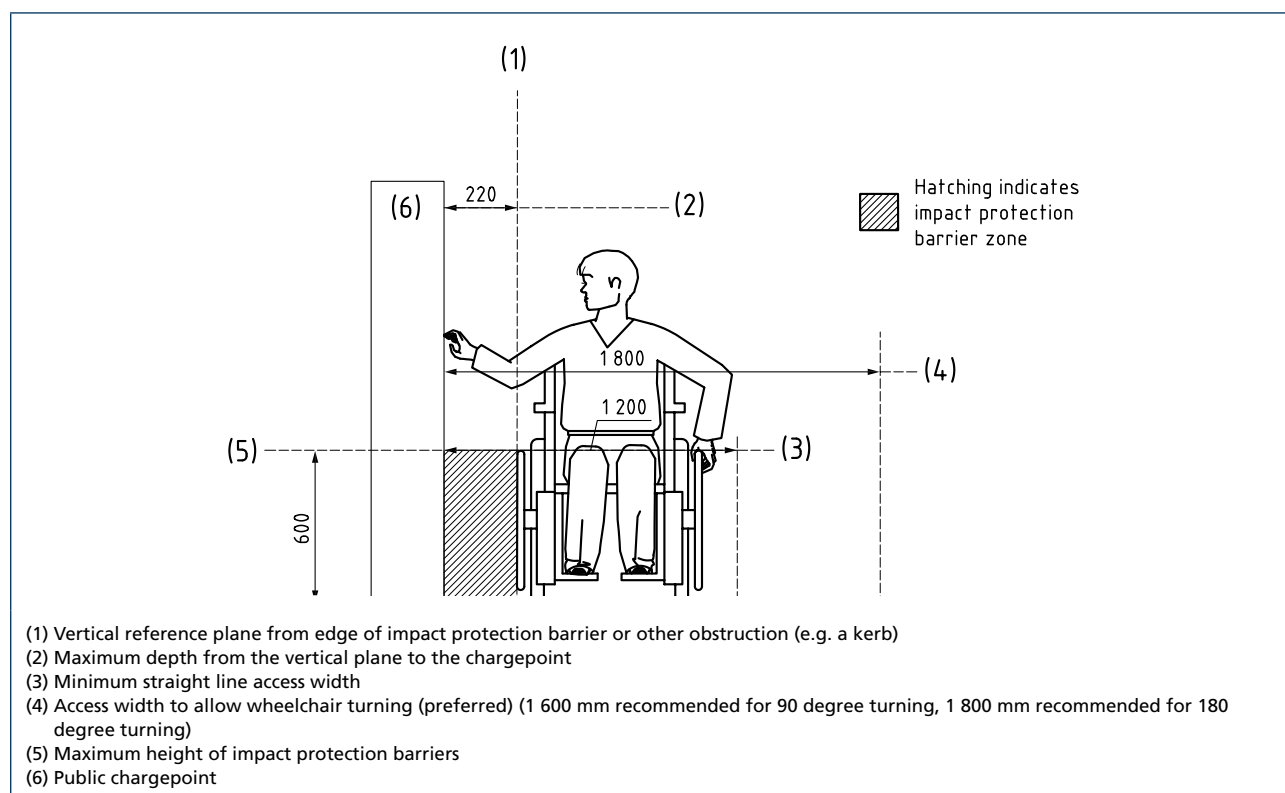
NOTE 4 The spacing requirements are based on a combination of user testing¹⁸⁾ and BS 8300-1:2018 and BS 8300-2:2018. The spacing requirements are based on movements of wheelchair users and users of other mobility aids, which implicitly considers the spacing needs of powered mobility scooters. "Infrastructure for charging electric vehicles: Approved Document S"¹⁹⁾ of The Buildings Regulations 2010²⁰⁾ [2] also contains information relevant to chargepoint provision for designated accessible parking bays.

Where a public chargepoint is installed at footway level and where no level access point is provided to use the chargepoint (i.e. the chargepoint is accessed from carriageway level), the placement and orientation of the chargepoint shall be done in such a way that access and reach is ensured for the usability of the chargepoint components (with allowance for low-level obstacles/kerbs; see 6.4).

NOTE 5 Spacing within and surrounding parking bays has been highlighted as a key issue facing disabled people in manoeuvring around the parking bays and accessing public chargepoints, in terms of the sizes of current parking bays with increasing vehicles sizes along with spacing between parking bays. Whilst it is beyond the scope of this PAS to recommend increasing parking bay sizes or requiring spacing between bays, it is strongly recommended that these aspects are considered in the design of parking bays to improve accessibility. 900 mm spacing between bays is recommended as a minimum.

The tilt and design of a screen or visual interface on a public chargepoint shall be such that the effects of ambient lighting are minimized, in accordance with 5.5.1 and 5.5.2.

Figure 6 – Space around chargepoint and position of impact protection barriers



¹⁷⁾ <<https://www.accessidc.com/accessible-electric-vehicle-charging>>.

¹⁸⁾ DESIGNABILITY & MOTABILITY, *Accessible EV Charging – User Engagement Report*. 2021. Available from <https://designability.org.uk/wp-content/uploads/2021/08/User-Engagement-Report_Accessible-EV-Charging_Motability_FINAL.pdf>.

¹⁹⁾ <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1057375/AD_S.pdf>.

²⁰⁾ <<https://www.legislation.gov.uk/uk/si/2010/2214/schedule/1>>.

6.3 Ground surface type below and around chargepoint

The requirements for ground surface type below and around chargepoints as described throughout 6.3 shall cover the spacing requirements in front of the points of access to chargepoint components as outlined in 6.2 at a minimum.

The ground surface type below and surrounding the public chargepoint shall be smooth (but not slippery in normal or wet conditions) and stable (without grass, mud, gravel or other potholes or surface deformities) in accordance with BS 8300-1:2018, 8.4.

The ground surface below and surrounding the public chargepoint shall be made of any material suitable for and with slip resistance appropriate for footway use and shall include suitable drainage to prevent significant accumulation of water in the vicinity of the chargepoint.

NOTE 1 For chargepoints under Scenario A and Scenario B, some car parks have porous surfaces with loose materials designed to provide adequate drainage. Whilst this is necessary for drainage, where possible chargepoints should not be installed where these loose materials are located.

Visual contrast shall be provided between the chargepoint and surrounding surfaces in both wet and dry conditions.

NOTE 2 Guidance on using light reflectance values to assess visual contrast is available in BS 8300-1:2018, Annex B.

The provision of a smooth and stable ground surface type below and surrounding public chargepoints shall be uniform to allow, at a minimum, a user full and easy access from the chargepoint to plugging in their vehicle.

NOTE 3 Where possible, public chargepoint locations should be installed on flat, level ground rather than sloping ground for all public chargepoints in on-street and off-street locations. Flat and level ground is a necessity for chargepoints installed adjacent to designated accessible parking bays, as outlined in Annex B and Annex C.

The ground surface surrounding any public chargepoint shall be well-maintained.

NOTE 4 The ground surface surrounding chargepoints can become slippery due to aspects such as oil spillage from vehicles. The "Code of Practice for Well-managed highway infrastructure" provides further guidance on highway maintenance [14].

Where a public chargepoint is placed and installed within a planted area (i.e. where a concrete base has been extended into a planted area), the concrete base beneath the chargepoint shall extend at surface level to maintain a clear and obstruction-free area for chargepoint usage and access.

6.4 Chargepoint reach distance and low-level obstacles

COMMENTARY ON 6.4

Public chargepoints might have unavoidable low-level obstacles (for example, manhole covers, wheel stops, impact protection barriers or kerbs) immediately in front of them, which can inhibit accessibility. Similarly, public chargepoints mounted on the ground can either be placed at carriageway level (i.e. at the same level as a parking bay) or at footway level/within footways. Chargepoints located at footway level but accessed from carriageway level can cause additional accessibility issues, particularly if the chargepoint is set too far back from the edge of the kerb and the points of access to chargepoint components are facing the carriageway, thereby preventing some users, such as those with mobility impairments, wheelchair users and users of other mobility aids, from being able to view, reach or operate the components of the chargepoint. Those moving past the chargepoint at footway level should also be considered.

NOTE 1 Public chargepoints should, where possible, be placed at carriageway level rather than footway level, as this reduces the additional risk of obstructing the footway, though noting that this is often not the case for on-street chargepoints (Scenario C and Scenario D). Additionally, where possible, chargepoints should be installed without any low-level obstacles in the vicinity of the chargepoint.

NOTE 2 Permitted development rights require chargepoints to be installed no closer than 2 m from any active road carriageway. Whilst this does not frequently affect chargepoints being installed adjacent to carriageways (e.g. on-street parking bays should be at least 1.8 m wide), a chargepoint positioned too close to a running carriageway lane might require planning permission.

In the first instance, public chargepoint orientation and placement shall assess whether installation can be achieved without any low-level obstacles in front of the points of access to public chargepoint components.

Where there are unavoidable low-level obstacles immediately in front of the public chargepoint [for example, manhole covers, wheel stops, impact protection barriers (see 6.5) or kerbs], all chargepoint components shall be at a reach distance not exceeding 220 mm, with any low-level obstacles included in this reach distance as illustrated in Figure 6.

NOTE 3 *Where possible, chargepoints should be installed where there is no need for reach, i.e. a reach distance of 0 mm and with no low-level obstacles in front of the points of access to chargepoint components.*

NOTE 4 *Chargepoint components include chargepoint socket-outlet, charging cable/connector, the screen or visual interface, and any payment terminal.*

NOTE 5 *Side reach is to be interpreted as the minimum accessibility distance. Further guidance on front and side reach, related to ICT products and services, is available in BS EN 301549:2021, 8.3; further best practice guidance on accessibility for chargepoints specifically installed adjacent to designated accessible parking bays is available in Annex B and Annex C for off-street and on-street chargepoints, respectively.*

Where public chargepoints are placed and installed at footway level, and where chargepoint operation is from carriageway level and the points of access of chargepoint components are facing towards the edge of the kerb, all chargepoint components shall be placed at a reach distance not exceeding 220 mm from the edge of the kerb, to enable side reach as a minimum.

All other prior requirements related to the height (see 5.2) and orientation (see 6.2) shall apply to chargepoints that are placed and installed at footway level, irrespective of where the points of access of chargepoint components are located.

Where the placement of a public chargepoint is in the vicinity of low-level obstacles, mitigation shall be provided to minimize the risk of trip hazards from these low-level obstacles, such as by visually contrasting the obstacle to the adjacent surfaces.

NOTE 6 *Visual contrast is acceptable for where low-level obstacles are unavoidable; for all chargepoint installations, the surrounding area should be assessed for whether it can be free from any low-level obstacles. Further guidelines on low-level obstacle mitigations are provided in BS 8300-1:2018; guidance on using light reflectance values to assess visual contrast is available in BS 8300-1:2018, Annex B.*

The placement and installation of public chargepoints shall be administered such that the chargepoint and the associated points of access to the chargepoint components are not obstructed or obscured by plants, foliage, or other shrubbery.

6.5 Bollards and impact protection barriers

COMMENTARY ON 6.5

Public chargepoints, particularly higher-powered chargepoints, are often surrounded by bollards and/or impact protection barriers to prevent vehicle collision, thereby mitigating against serious electrical damage and improving user safety. However, user testing with disabled people identified bollards and impact protection barriers as an additional obstacle to the usability of the chargepoint. There is a need, therefore, to ensure both the safety and accessibility of the chargepoints.

NOTE 1 *This PAS does not require all public chargepoints to have bollards and/or impact protection barriers. Subclause 6.5 solely stipulates requirements for bollards and impact protection barriers where they are deemed to be necessary, such as to protect chargepoints. Should bollards and/or impact protection barriers be installed adjacent to chargepoints, it is crucial that the siting of the bollards and/or impact protection barriers does not impede the points of access to chargepoint components.*

NOTE 2 *In 6.5, bollards are clearly distinguished from impact protection barriers. As outlined in 3.5, a bollard is a post of minimum 1 000 mm height installed adjacent to a chargepoint to protect the chargepoint from vehicle collision, whilst as outlined in 3.15, impact protection barriers are low-level barriers of maximum 600 mm height placed immediately in front of or surrounding a chargepoint to protect against vehicle impact.*

NOTE 3 *Bollards and impact protection barriers for public chargepoints can have a number of different designs, such as impact protection barriers encircling the chargepoint or bollards on either side of the chargepoint. The requirements in 6.5 apply to all bollards and impact protection barriers surrounding chargepoints, irrespective of the design chosen for the bollards; 6.5 does not recommend one configuration of barriers and impact protection barriers over another.*

The usage and placement of protective bollards or impact protection barriers surrounding a public chargepoint shall be solely for the purposes of electrical safety and protection of vehicles, the chargepoint, and users.

The outside distance between any impact protection barriers and a public chargepoint shall not exceed 220 mm so as not to obstruct usage for wheelchair users or users of other mobility aids and to satisfy the reach distance requirement, in accordance with 6.4 and as illustrated in Figure 6.

Where a public chargepoint is installed at footway level and accessed from carriageway level (i.e. the chargepoint components face the carriageway), the provision of impact protection barriers shall fall within the reach distance requirement of 220 mm, in accordance with 6.4 and as illustrated in Figure 6.

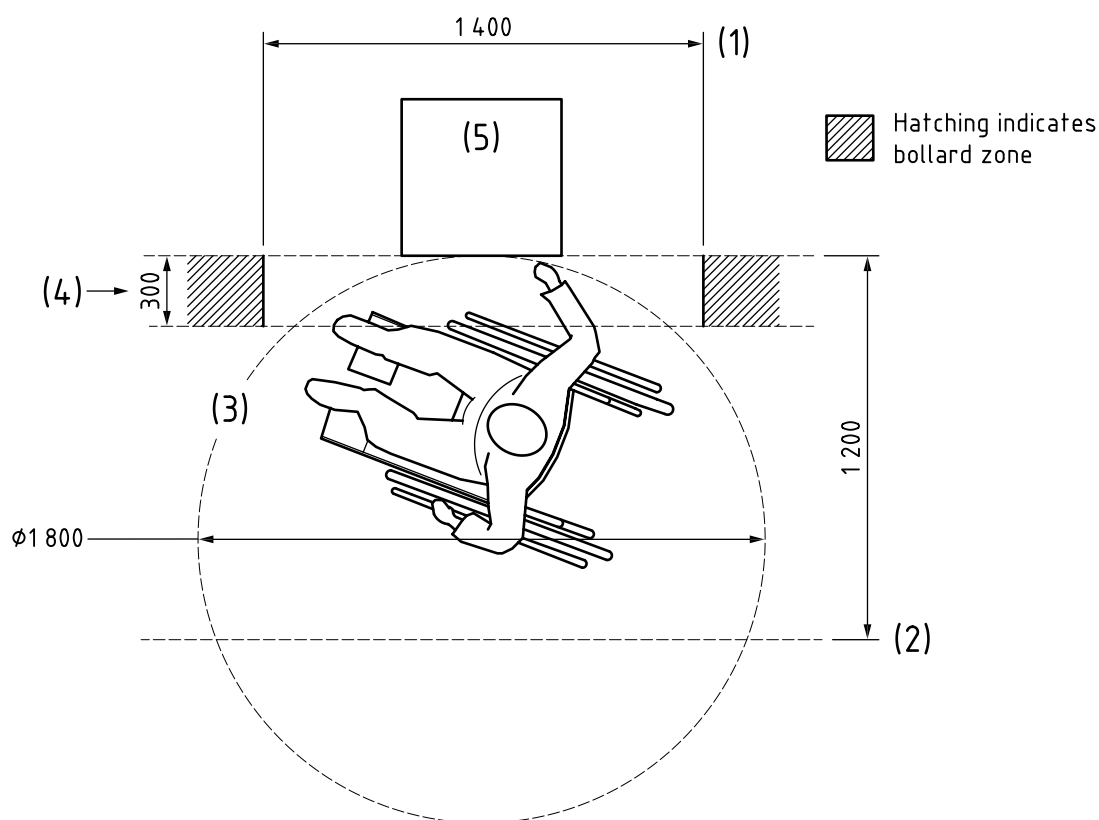
The height of impact protection barriers surrounding a public chargepoint shall not exceed 600 mm to enable access to the chargepoint components from both a seated and a standing position.

Bollards adjacent to public chargepoints shall be at least 1 000 mm from ground level, in accordance with BS 8300-1:2018, 8.2.1.2 and "Inclusive Mobility" [N1] Section 4.7.

NOTE 4 Bollards should also contrast visually with the background against which they are seen, with a recommended 150 mm deep contrasting strip at the top of the barrier, a surface finish that is not highly reflective, and contrasted with the ground to be visible to people with sight-loss, in accordance with BS 8300-1:2018, 8.2.1.2. Bollards should preferably also have a diameter not exceeding 100 mm.

The spacing of bollards relative to other bollards and other temporary or permanent obstructions in the vicinity of a public chargepoint shall provide sufficient space for wheelchair users and users of other mobility aids to manoeuvre into their preferred position close to the chargepoint, allowing a minimum of 1 400 mm spacing between bollard centres, as illustrated in Figure 7.

Figure 7 – Space around chargepoint and position of bollards



- (1) Minimum width between bollards
- (2) Minimum straight line access width from chargepoint
- (3) Access to allow wheelchair turning (preferred) (1 600 mm recommended for 90 degree turning, 1 800 mm recommended for 180 degree turning)
- (4) Maximum protrusion forward of bollards from chargepoint
- (5) Public chargepoint

NOTE Diagram assumes no level of change.

NOTE 5 Typically, where bollards are provided, impact protection barriers are not necessary to also be installed. Provision of both bollards and impact protection barriers and inhibit the accessibility of the chargepoint from a spacing perspective.

The extremities of bollards shall not be located more than 300 mm forward or to the side of a public chargepoint, depending on the points of access to the chargepoint and associated chargepoint components.

NOTE 6 Increased clearances between bollards is required for some wheelchair users and users of other mobility aids to enable their manoeuvring into position for close approach and reach when interacting with the chargepoint components. To enable improved accessibility for persons with large wheelchairs and for users of other mobility aids with restricted reach and/or dexterity, bollards should preferably be located no more than 50 mm to 100 mm forward or to the side of the public chargepoint.

NOTE 7 The interpretation of bollard spacing here is for protective bollards around chargepoints. Bollards are sometimes installed for hostile vehicle mitigation – in this case, the Centre for the Protection of National Infrastructure requires a maximum gap of 1 200 mm between bollards.

NOTE 8 Further guidance on the functional requirements of bollards in general, from an accessibility perspective, is available in BS EN 17210:2021, 7.2.8.

7 Streetscape and public realm around the chargepoint

COMMENTARY ON CLAUSE 7

The built environment surrounding a public chargepoint should be accessible to all users, including disabled people and users of wheelchairs and other mobility aids. Aspects such as obstructive street furniture, inability to approach a chargepoint at the intended level, and the distance between chargepoints and amenities, can impede the accessibility of chargepoints for disabled people and other users.

NOTE 1 Requirements within Clause 7 are to be interpreted as being for minimum provision of accessibility for all public chargepoints. For best practice accessibility guidance for chargepoints installed adjacent to designated accessible parking bays, see Annex B for off-street chargepoints and Annex C for on-street chargepoints.

NOTE 2 Locational planning for chargepoints, including chargepoints installed specifically adjacent to designated accessible parking bays, is beyond the scope of this PAS. Guidance on planning for accessible public chargepoint locations is available in other research projects, such as the 'Scaling on Street Chargepoint Installations' (SOCSI) project²¹⁾.

NOTE 3 Many local authorities are installing public chargepoints on parking "build-outs", i.e. provision of a concrete base in a parking bay at the same level as the adjacent footway. This can be particularly advantageous from the point of view of reducing further street clutter caused by public chargepoints on footways. The requirements throughout this PAS also apply to chargepoints installed on build-outs, such as provision of sufficient space in front of the points of access to chargepoint components.

7.1 General

The built environment surrounding public chargepoints shall take into account accessibility guidance for the built environment within BS 8300-1:2018, Clauses 7, 8, 9, 10 and 11, along with the guidance within the UK Government's "Inclusive Mobility" [N1].

NOTE 1 The referenced clauses within BS 8300-1:2018 address parking provision, horizontal movement, vertical movement, public facilities, and lighting. These clauses provide guidance for accessibility of the built environment.

NOTE 2 The UK Government's Manual for Streets²²⁾ provides design guidance on creating streets for people and encourages built environment professionals to consider the place function of streets. The Manual for Streets guidance should also be factored into inclusive street design.

7.2 Street furniture in the vicinity of public chargepoints

COMMENTARY ON 7.2

Street furniture (i.e. any infrastructure installed on a street or in a built environment, such as streetlights, electrical feeder pillars and post-boxes) should not present obstacles to disabled people. Public chargepoints can comprise an additional piece of street furniture, and as such the surrounding environment needs to be considered in such a way that chargepoints do not present an additional obstacle to disabled people. Other users of electric vehicles and the built environment, including wheelchair users and users of other mobility aids, people with visual impairments, older people and those with prams or pushchairs, are also considered in 7.2. Of note, bollards and impact protection barriers can comprise street furniture which are addressed in 6.5.

²¹⁾ References:

Project website: <<https://www.accessidc.com/accessible-electric-vehicle-charging>>.

Specific report: <https://www.accessidc.com/_files/ugd/0e21ac_36ae33f64b52427080773342de2153c7.pdf>.

²²⁾ <www.gov.uk/government/publications/manual-for-streets>.

A public chargepoint shall be installed such that the impact of the chargepoint in combination with other existing street furniture does not further compromise the accessibility of the surrounding environment, in particular for wheelchair users, users of other mobility aids and visually impaired people.

NOTE 1 Whilst it is not feasible to stipulate a minimum level of access for existing street furniture in combination with all newly installed public chargepoints, best practice indicates that a minimum traversable distance of 1 200 mm will allow for wheelchair users and users of other mobility aids to traverse an area in a straight line comfortably, and 1 600 mm or preferably 1 800 mm to enable wheelchair users to effectively manoeuvre the surrounding area whilst allowing sufficient space for other passers-by. Further detail on absolute minima for wheelchair users and users of other mobility aids is available in BS 8300-1:2018 and BS 8300-2:2018, along with the UK Government's "Inclusive Mobility" [N1].

NOTE 2 Street furniture is particularly a problem for people who are blind or partially sighted. Guidance on tonal and colour contrast for street furniture is available in BS 8300-1:2018, Clause 8, along with the UK Government's "Inclusive Mobility" [N1], Section 4.1, and the UK Government's Manual for Streets²³⁾.

Where public chargepoints are installed in a row in car parks or in the same bank of on-street parking bays, a minimum space of 1 200 mm shall be provided between chargepoints to ensure wheelchair users and users of other mobility aids can effectively and easily traverse between the chargepoints and the surrounding built environment, in accordance with 6.2.

NOTE 3 Similar to 6.2, the minimum recommended spacing between chargepoints of 1 200 mm is based on straight line travel between the chargepoints. Where space permits, it is strongly recommended that additional spacing is provided between chargepoints – a minimum space of 1 600 mm would enable a wheelchair to turn through a 90° angle, and a minimum space of 1 800 mm would enable a wheelchair to turn through a 180° angle.

NOTE 4 Installation of a row of chargepoints should take into account whether this could further impede the free flow of a walkway, as this could physically prevent accessibility between two specific items of street furniture.

Where supporting electrical infrastructure for public chargepoints is installed, the installation shall be such that this infrastructure does not reduce the accessibility of the surrounding built environment in combination with other existing street furniture, in accordance with BS 8300-1:2018, 8.2.1.

NOTE 5 Examples of supporting electrical infrastructure include electrical feeder pillars or substations for higher-powered chargepoints (i.e. Scenario B and Scenario D).

NOTE 6 Further guidance on the siting of street furniture in general, from accessibility and positioning perspectives, is available in BS 8300:1-2018, 8.2.1, and the UK Government's Manual for Streets²³⁾.

To assist visually impaired people, the siting of public chargepoints, and any associated bollards and/or impact protection barriers, shall be easily detected during the sweep of a cane and there shall be a good visual contrast with the background against which they will be seen, to reduce the risk of collision with the chargepoint, in accordance with BS 8300-1:2018, Clause 8.

Where it might be deemed that the siting of a public chargepoint might be an obstacle, appropriate warning, guidance and/or information shall be provided to people who are blind or partially sighted, in accordance with BS 8300-1:2018, Clause 8.

NOTE 7 UK Government's "Inclusive Mobility" [N1], Section 6 contains further information on provisions that can assist visually impaired people, including tactile paving.

7.3 Level access points and dropped kerbs

COMMENTARY ON 7.3

Level access points can be provided by raising the level of the carriageway to that of the kerb over a short distance with appropriate tactile paving or through provision of a dropped kerb. Inaccessibility of footways is already considered a barrier for disabled people in the built environment, with access from a vehicle to the footway in close proximity to an on- or off-street designated accessible parking bay where a vehicle is parked being an example. A lack of level access points or nearby dropped kerbs in combination with public chargepoint provision can add to this complexity and act as a major barrier to the usability of chargepoints by disabled people, particularly wheelchair users and users of other mobility aids.

²³⁾ <www.gov.uk/government/publications/manual-for-streets>.

NOTE 1 Where feasible, provision of level access to a public chargepoint is considered the most accessible installation for public chargepoints. Additionally, where a dropped kerb is necessary, the dropped kerb should not be placed immediately in front of the chargepoint, thereby having a sloped point of access to the chargepoint.

In the first instance, the installation of public chargepoints shall establish whether level access can be provided at the parking bay to access and use the chargepoint, or whether the chargepoint can be accessed and used from carriageway level, by following the principles of ensuring accessibility of points of access to chargepoint components as outlined in Clause 6.

Where public chargepoints are placed and installed at footway level, and the chargepoint is positioned or oriented such that any of its components (i.e. the chargepoint socket-outlet, charging cable/connector, the screen or visual interface, and any payment terminal) cannot be accessed, viewed, used or operated from carriageway level, a dropped kerb shall be provided within a maximum of 20 m distance of the chargepoint, where no existing dropped kerbs or pavement access areas exist.

NOTE 2 Dropped kerbs should preferably be provided adjacent to a parking bay and within a maximum of 8 m distance of a chargepoint, where no existing dropped kerbs or pavement access areas exist. Suitable marking and protection should be provided to prevent blocking of the dropped kerb by any vehicle or other potential obstacles, along with enabling the footway to be safely accessed from the carriageway by minimizing the distance to and from vehicles to dropped kerbs and by considering the movement of vehicular traffic in the region of the dropped kerb.

NOTE 3 The provision of dropped kerbs should be accompanied by appropriate engagement with local stakeholders, including (where relevant) the local authority for cases where a chargepoint is installed on land owned by a local authority without existing provision of a dropped kerb within the distance requirements, to ensure the dropped kerb is provided in consideration of local circumstances and to ensure all local stakeholders are consulted in the process.

Where public chargepoints are required to be positioned at footway level (i.e. where the carriageway is not raised to include the chargepoint), the installation of public chargepoints shall identify how access can be provided to the surrounding footway and/or built environment in consideration of safely accessing the footway and in close proximity to the chargepoint.

NOTE 4 Where possible, the user should be able to operate the chargepoint from either the carriageway or the footway (depending on the level they exited their car), without having to move up and down levels. If this is not possible, the number of times that the user is required to change levels should be minimized.

NOTE 5 The design of a dropped kerb should be in accordance with the UK Government's "Inclusive Mobility" [N1], Section 4.11. In general, the design of a dropped kerb should ensure that it cannot be blocked by a parked vehicle or other obstacles.

Where dropped kerbs and level access points are installed, dropped kerbs and level access points shall be accompanied with appropriate tactile paving.

NOTE 6 As tactile paving needs to be implemented in combination with a dropped kerb, tactile paving should be provided in accordance with the UK Government's "Inclusive Mobility" [N1], Section 6. Recommended layouts for tactile paving are also within the UK Government's Guidance on the Use of Tactile Paving Surfaces [15]. Usage of tactile paving is also covered in BS 8300-1:2018, 8.4.

7.4 Distance between public chargepoints and amenities or a venue

COMMENTARY ON 7.4

Whilst designated accessible and family parking bays are often located near venues or amenities for which the designated accessible parking bay is associated, public chargepoints installed for general use in car parks and other locations can be situated in any location. Due consideration should be given to the accessibility of the chargepoints for disabled motorists and the proximity of the chargepoints for disabled people to venues and amenities in a similar manner as designated accessible parking bays.

NOTE 1 Public chargepoints located in prominent locations within car parks can also promote the availability of the chargepoints, thereby having a positive impact on electric vehicle awareness.

NOTE 2 There are many factors affecting the distance between any chargepoint and nearby amenities, including supply of power. Consultation with distribution network operators can assist with addressing issues related to accessing sufficient power supply.

Chargepoints located in a car park, other location where parking is invited or allowed, or other on-street location adjacent to amenities or a venue shall assess how situation and installation of public chargepoints can be in prominent and visible locations in close proximity to amenities or a venue to improve accessibility of amenities or a venue from public chargepoints.

7.5 Provision of additional assistance for chargepoints and at service areas

COMMENTARY ON 7.5

Even with effective cable management systems, there might be instances where disabled people are unable to effectively use and operate a higher-powered chargepoint, especially those with strength and dexterity impairments or wheelchair users or users of other mobility aids, along with older people. As such, additional assistance to use chargepoints might be required in some locations where higher-powered chargepoints are located, such as at staffed service areas where multiple higher-powered chargepoints are located.

NOTE 1 The 2010 Equality Act²⁴⁾ [1] Section 20 is the basis of UK anti-discrimination laws and includes a provision on anticipatory reasonable adjustment duty, a duty to anticipate in which ways disabled people (including anyone with a mobility impairment) are placed at a substantial disadvantage in accessing services, and to therefore take reasonable steps to avoid this happening. This can be done by:

- a) altering provisions, criteria and practices;
- b) changing physical features; and
- c) providing additional aids and services.

NOTE 2 For 7.5, “service areas” refers to any service area (e.g. a motorway service area or a service area/ service station on an A-road or a trunk road), fuel retailer, or a location where multiple higher-powered chargepoints are located specifically to charge electric vehicles, such as a charging hub. These service areas are more likely to have higher-powered chargepoints but can also include lower-powered chargepoints.

NOTE 3 For Scenario B, for the installation of any public higher-powered chargepoints at service areas, due consideration should be given to the provision on “Anticipatory Reasonable Adjustment Duty” in the Equality Act 2010 [1] due to the additional weight and restricted manoeuvrability of charging cables.

For Scenario B, those responsible for the provision of the higher-powered chargepoints (i.e. the procurer of the chargepoints) shall ensure additional assistance is available at service areas for disabled people who are unable to use and operate the higher-powered chargepoint without such assistance.

For public chargepoints that cannot meet the linear force-in-hand requirements as outlined in 5.3.2 or the connection force requirements as outlined in 5.4, those responsible for the provision of these chargepoints (i.e. the procurer of the chargepoints) shall ensure additional assistance is available for disabled people who are unable to use and operate the chargepoints without such assistance.

NOTE 4 Provision of additional assistance at service areas can be achieved through a number of means, including having personnel or an attendant available at the service area, having a booking, reserving or phone ahead function, or having a physical function located at the chargepoint (such as a contact system) linked to the service area to contact a member of staff. This PAS does not specify the exact additional assistance that is required, rather it specifies the required functionality of the assistance.

NOTE 5 The continuous provision of additional assistance at service areas, including hours of operation and how attendees are summoned, might be beyond the direct control of the procurer of public chargepoints. However, the procurer of public chargepoints can ensure appropriate contractual agreements are in place to enable the continuous provision of additional assistance at service areas.

NOTE 6 Chargepoints located at service areas can experience queuing of vehicles at the chargepoints as the service areas become more well-utilized. Consideration should be given to the design of the surrounding environment to accommodate vehicles waiting to use the chargepoints, along with designing for vehicle flows to designate conflicting movements of vehicles, thereby reducing collision potential. Consideration should also be given to physical or digital systems to facilitate the queuing process to prevent conflicts between drivers waiting to utilize chargepoints, such as smartphone applications, queue position numbers, and systems to pre-book public chargepoints in advance of arrival.

²⁴⁾ Equality Act 2010. Available from <<https://www.legislation.gov.uk/ukpga/2010/15/contents>>.

8 Digital platforms and information provision for chargepoints

COMMENTARY ON CLAUSE 8

Operation of and interaction with public chargepoints is often carried out via remote digital platforms such as smartphone applications. As these remote digital platforms are intrinsically linked with usage and operation of public chargepoints, it is essential that these are designed in consideration of accessibility for disabled people and other users. Additionally, these platforms provide a very effective means of sharing further information with electric vehicle users on locations and characteristics of public chargepoints.

NOTE 1 UK Government has announced its intention to introduce consumer experience regulations in response to known issues experienced by users of electric vehicle chargepoints [9]. As described in 0.1, the intention of the regulations is to address areas including provision of a minimum payment method, payment roaming, open data, pricing transparency, and a reliability metric for the public chargepoint network. The regulations are intended to address these areas, considered as important to improve accessibility of public chargepoints, through the following requirements:

- **Minimum payment method:** all newly installed public chargepoint sites with a power rating above 7.1 kW, and all public chargepoint sites with a power rating of 50 kW and above, will be fitted with a minimum payment method that is not specific to a brand and does not require a payee's mobile or internet signal.
- **Payment roaming:** all public chargepoints will be enabled with payment roaming to allow consumers to use and pay at all public chargepoints easily with membership cards of smartphone apps, improving interoperability of public chargepoint networks.
- **Open data:** all public charging networks for all public chargepoints will adopt the Open Chargepoint Interface Protocol (OCPI)²⁵⁾ data standard to ensure that chargepoint data is openly available allowing drivers to locate available and working chargepoints easily when they need to charge their vehicle; all static and some dynamic data (i.e. data types that are subject to change on a regular basis such as whether the chargepoint is in use or available) will be made available for public chargepoints.

- **Pricing transparency:** all public chargepoints will provide information on pricing in a single pence per kWh metric, with the pricing offer clearly displayed to the consumer before the charging commences, whether this is on the chargepoint or through a separate device such as an app or website; the price is not able to increase once charging has commenced.
- **Reliability:** a 99% reliable network across the public rapid chargepoint network, including the strategic road network (SRN), trunk roads, and motorway services areas (MSA); all public charging networks for all public chargepoints are to have a free 24/7 helpline for consumers to call to support operation of chargepoints and to report any faults or issues with public chargepoints.

NOTE 2 The outcomes of UK Government's consumer experience consultation show that contactless payment is the widely preferred minimum payment method by a vast majority of consumers, followed by chip and pin payments [9]. This aligns with the preferences of disabled people as investigated through other research efforts – starting and stopping charging using an RFID card, a contactless payment card and/or a smartphone application have been highlighted as being of particular benefit.

8.1 Remote digital platforms for public chargepoints

COMMENTARY ON 8.1

Remote digital platforms can allow for interaction with and/or operation of public chargepoints. Whilst the outcomes of the UK Government's consumer experience consultation specified that a minimum payment method will be fitted on some public chargepoints (as outlined in Clause 8) that does not require a payee's mobile or internet signal, the inclusion of a remote digital platform for public chargepoints can assist with accessibility of public chargepoints, including for information provision.

²⁵⁾ <<https://evroaming.org/ocpi-background/>>.

8.1.1 Provision of remote digital platforms for public chargepoints

Operation of and interaction with public chargepoints shall be supported by a remote digital platform, such as a smartphone application, including all necessary back office operational requirements.

8.1.2 Content and composition of remote digital platforms for public chargepoints

The content and composition of remote digital platforms used for public chargepoint operation and usage shall be designed such that the content is accessible to a broad range of users, including font size, colours, contrast and layout, following all relevant requirements in 5.5.2.

NOTE 1 *The Web Content Accessibility Guidelines (WCAG)²⁶⁾ are an internationally recognized set of recommendations for improving web accessibility and can assist with ensuring accessibility of remote digital platforms.*

The instructions and information provided on remote digital platforms used for public chargepoint operation and usage shall be produced in easily understandable and plain English and/or Welsh as appropriate to geographic location, and shall incorporate the use of symbols to convey information, following all relevant requirements in 5.5.4.

NOTE 2 *Remote digital platforms used for public chargepoint operation and usage should take into account provision of audio instructions and voice activation options.*

NOTE 3 *Chargepoint operators might change their prices for charging at different times of the day, and as such physical provision of pricing information at chargepoints might not be appropriate. The name of the chargepoint operator should be clearly visible at public chargepoints so that consumers are aware of how to investigate pricing offers of charging.*

NOTE 4 *The ability to pre-book or reserve chargepoints can assist with certainty of use of public chargepoints. User testing with disabled people has shown that the ability to book in advance can add confidence in making journeys in electric vehicles.*

8.2 Information provision for chargepoints

COMMENTARY ON 8.2

Provision of data and information regarding the locations and characteristics of public chargepoints can assist disabled people in knowing in advance where they are able to charge their vehicles, thereby giving greater confidence to disabled drivers to plan their journeys in advance.

NOTE 1 *National Highways and AccessAble [16] have partnered to produce 'AllAccess' guides for motorway service areas²⁷⁾ [17], which provide information on the amenities available at motorway service areas. This serves as an example of best practice of information sharing for disabled motorists on locations and characteristics of public chargepoints, particularly for designated accessible parking bays.*

NOTE 2 *Open data is included as part of the UK Government's announced intention to introduce consumer experience regulations. Categories of data considered in UK Government's public consultation²⁸⁾ for the consumer experience regulations, which are considered useful to contribute to accessibility of data provision, include:*

- *Static data: chargepoint ID; owner/operator; location (address and coordinates); operating hours; power (kW); connector type (Type 2, CHAdeMO, CCS); payment method (RFID card, contactless, smartphone app, QR code); cost of obtaining access; parking enforcement arrangements (and physical access restrictions); disabled access information.*
- *Dynamic data: availability (such as in-use, available, booked); state of repair; pricing (p/kWh).*
- *Additional data categories: booking information; ancillary services on site; who is charging; queue length; new chargepoints coming online soon; historic (aggregated) usage data; historic utilization; periodic aggregated view of UK public chargepoint network.*

²⁶⁾ <<https://www.gov.uk/service-manual/helping-people-to-use-your-service/understanding-wcag>>.

²⁷⁾ Access and Mobility Professional (2021), *Highways England issues disabled guides for motorway services*. Available from <<https://www.accessandmobilityprofessional.com/highways-england-issues-disabled-guides-for-motorway-services/>>.

²⁸⁾ <<https://www.gov.uk/government/consultations/the-consumer-experience-at-public-electric-vehicle-chargepoints/the-consumer-experience-at-public-chargepoints>>.

NOTE 3 The UK Government's announced intention to introduce consumer experience regulations for open public chargepoint data includes encouraging current best practice in the provision of disabled access information that can assist in determining whether a public chargepoint is suitable for the user's needs. The categories of accessibility data that are encouraged to be provided, where applicable and relevant, include:

- **Parking bay properties:** data which helps users understand the suitability of a parking bay (such as the layout of the charging space, whether they will be able to enter/exit their vehicle, use mobility aids, freely move between the vehicle and the chargepoint, whether the parking bay is a designated accessible parking bay).
- **Chargepoint placement properties:** data which helps users understand the accessibility to the chargepoint unit (such as accessible placement of chargepoint components, including socket-outlets/connectors, payment terminals, user interfaces, indicators, and controls).
- **Cables, socket-outlets and connector properties:** data which gives confidence to users that they can connect their vehicle for a charge (such as connector configurations and usage, cable lengths, and cable management).
- **Chargepoint usage properties:** data that enables users to meet accessibility needs interacting with the user interfaces of the chargepoint (such as design of user interfaces and controls, and support for accessible technologies).
- **Location properties:** data about the location that supports accessibility needs (such as venue facilities and services, directional information, venue ownership, and whether additional assistance is available/whether a chargepoint service area has staffing).

NOTE 4 Where possible, information on chargepoint usage and chargepoint types should be included at the chargepoint itself in addition to digital sources such as websites and smartphone applications.

NOTE 5 Data and information should be made available in easy-to-understand language and in terms that are meaningful to users.

NOTE 6 Provision of data regarding parking conditions, such as parking restrictions, parking fees, time-specific parking rates, penalties, and car park hours of operation, has been highlighted as being beneficial to disabled users' understanding of public chargepoint utilization. Whilst provision of parking data is not in scope of this PAS and is not strictly related to accessibility of the chargepoints, consideration should be given to providing this data in a dynamic format for all chargepoint users, in consultation with local authorities and/or landowners. Signage for public chargepoints is addressed in A.3.

NOTE 7 User testing and consultation have highlighted that provision of photographs of public chargepoints and their surrounding environments can improve understanding of the accessibility of public chargepoints. At a minimum, photographs should be provided showing:

- 1) a wide-angle view of the location;
- 2) the unique parking bay, showing a clear view of any potential obstructions, uneven surfaces and/or protected areas; and
- 3) the chargepoint and its immediate environment, showing connectors, cable management, and other components in clear view.

Those responsible for the provision of public chargepoints (i.e. the procurer of public chargepoints) shall provide data regarding the accessibility of public chargepoints in an openly available format to consumers where data is available, including data categories such as type of associated parking bay (i.e. designated accessible or standard size), accessibility of chargepoint location and placement, accessibility of chargepoint components, and the provision or otherwise of additional assistance and/or any nearby amenities.

NOTE 8 The format of the open data for accessibility of public chargepoints can be via OCPI or other crowd-sourced data platforms. Provision of photographs of public chargepoint installations should be strongly considered.

Annex A (informative)

Establishing an inclusive and safe environment around public chargepoints

COMMENTARY ON ANNEX A

There are additional considerations that can assist in ensuring that the environment surrounding chargepoints can be more inclusive for disabled people, and can improve the usability of the chargepoints and the safety of the surrounding environment. These considerations include provision of lighting and security cameras, ensuring sufficient signage to indicate where chargepoints are located, and the usage of signals (e.g. tactile, audible, or visual feedback such as lighting to indicate when the various aspects of the charging process have initiated or concluded) to highlight the various stages of the charging process.

The best practice provided within Annex A can fall outside the direct responsibility of the procurer of public chargepoints; however, where the best practice outlined in Annex A falls outside the direct responsibility of the procurer, it is strongly recommended that the procurer of public chargepoints engages with relevant bodies to ensure an inclusive environment is established around public chargepoints.

A.1 Lighting around public chargepoints

COMMENTARY ON A.1

Provision of sufficient lighting can contribute to providing an inclusive, safe, and secure environment for all users including disabled people. Good external environment lighting is crucial in enabling people who are partially sighted (including passengers), and people who have sensory/neurological processing difficulties, to be able to use the external environment conveniently, safely and securely. The lighting of the external environment needs to take account of the wide range of illuminance that can occur during the day, night and during inclement weather. This is applicable to not only the chargepoints and parking bays, but also to the surrounding hinterland and routes where people access and egress buildings.

The surfaces of the various elements of street furniture can be highly reflective. The illuminance on exterior surfaces, the quality of the lighting and the avoidance of glare are key factors to be considered.

Whilst it might be necessary in some locations to preserve the darkness of the external environment and thereby reduce light pollution, the type and location of external lighting can be considered at an early stage. The lighting of roads and highways is covered in BS EN 13201-2:2015.

Provision of sufficient lighting above and around public chargepoints, including provision on chargepoint components, is good practice in general and can provide greater confidence to those utilizing public chargepoints, providing a more inclusive experience.

Provision of lighting around public chargepoints should give due consideration to BS 8300-1:2018, Clause 11.

NOTE 1 Further guidance on lighting provision is available in BS 8300-2:2018, Clause 14.

Lighting/illuminance should be provided:

- a) in the environment surrounding public chargepoints to enable safe vehicle navigation to the chargepoint;
- b) to illuminate chargepoints, the surroundings of chargepoints, the components of the chargepoint that the user interacts with, and charging socket-outlets on the chargepoint; and
- c) to illuminate the routes from public chargepoints to any nearby venues or amenities.

NOTE 2 Lighting and illuminance of a chargepoint can consist of aspects including lighting surrounding the chargepoint, lighting of the screen/visual interface and lighting of the cable holster. LED lighting can contribute to visibility in all levels of ambient lighting and weather conditions.

NOTE 3 For specific lux values, BS 5489-1:2020, 7.4.14, states that electric vehicle chargepoints are to be the same lighting class as the adjacent road, and 20 lux in heavy areas. BS 8300-1:2018, 11.1 states that 50 lux is required for reading signs from an accessibility perspective.

A.2 Provision of security cameras around chargepoints

COMMENTARY ON A.2

User testing and research has shown that provision of security cameras in the vicinity of public chargepoints can help establish an inclusive, secure and safe environment for all users, including for disabled people.

It is generally best practice to provide security cameras in the vicinity of public chargepoints or to locate public chargepoints in the vicinity of existing security cameras to improve the safety of chargepoint users. Locating chargepoints in well-used areas and avoiding placing chargepoints in more remote areas can also contribute to establishing a more secure and safe environment.

Security cameras should be provided in the vicinity of public chargepoints or public chargepoints should be installed in the vicinity of existing security cameras, particularly in the vicinity of public chargepoints located at designated accessible parking bays.

Security cameras should be visible such that it is obvious that an area containing public chargepoints is protected by the security cameras, and should be maintained in good working order for monitoring and maintenance.

Areas containing public chargepoints that are protected by security cameras should be provided with sufficient lighting for the cameras to capture the area in all weather conditions, in accordance with A.1.

NOTE The planning and implementation of security cameras might fall outside the responsibility of the procurer of public chargepoints and is site-specific. All security cameras are to be installed using appropriate technical specifications led by the provider of the security cameras. Additionally, security cameras are to be well-planned and enable sufficient coverage of the entire area, rather than clustering security cameras (and chargepoints) in one specific area of a car park or other area with parking provision.

A.3 Signage provision local to chargepoints

COMMENTARY ON A.3

Once public chargepoints are installed in an accessible manner (i.e. following the requirements within this PAS), it is desirable to be able to identify where chargepoints are located. This can take the form of signage indicating where public chargepoints are located.

NOTE 1 Signage for on-street and off-street chargepoints are considered separately within A.3 – signage for on-street locations is regulated through The Traffic Signs Regulations and General Directions 2002²⁹⁾ [6]. Signage should also align with the relevant codes of practice developed by private parking companies.

NOTE 2 The recommendations in A.3 do not cover availability of information regarding chargepoint accessibility via online resources or interactive maps. Requirements for provision of information on accessibility of public chargepoints are located in 8.2, whilst best practice guidance in providing information on accessible chargepoint locations is available in C.4 for off-street chargepoints and D.4 for on-street chargepoints.

NOTE 3 Provision of any signage should not further impede access to the surrounding streetscape, as per the requirements in 7.2.

A.3.1 Signage for off-street chargepoints to indicate location

COMMENTARY ON A.3.1

User testing with disabled people has recognized a need to ensure that chargepoints within a car park are identifiable to disabled people and other users. Improved signage at public chargepoints in car parks can increase their visibility and simultaneously raise awareness of the public chargepoint network.

NOTE 1 It is generally good practice to provide signage to indicate where public chargepoints are located within a public car park, from the entrance and throughout a car park, in accordance with BS 8300-1:2018. Additionally, it might be beneficial to provide signage in close proximity to off-street public chargepoints indicating, for example, whether parking fees apply to use the chargepoint, the maximum time permitted to use a chargepoint before a penalty is incurred, and whether use of the chargepoint is restricted.

²⁹⁾ UK Government (2016), *The Traffic Signs Regulations and General Directions 2016*. Available from legislation.gov.uk.

NOTE 2 For chargepoints in car parks, consideration should be given BS 8300-1:2018, 8.3, which addresses best practice accessible signage requirements for car parks, along with the UK Government's "Inclusive Mobility" [N1], Section 8.

For Scenario A and Scenario B, signage should be provided in public car parks in the vicinity of public chargepoints to indicate that the parking bays are enabled with chargepoints.

For Scenario A and Scenario B, the design of any signage indicating locations of public chargepoints, in terms of text size, font, colour, visual contrast and layout should be in accordance with BS EN 17210:2021, 6.6.

NOTE 3 Further guidance on accessible signage is available in BS 8300-2:2018, Clause 12.

NOTE 4 To improve consistency of information provision and consumer experience, it is recommended that signage within car parks incorporates the electric vehicle charging symbol prescribed for on-street parking within The Traffic Signs Regulations and General Directions 2002 [6], as this symbol is widely recognized.

For Scenario A and Scenario B, signage adjacent to chargepoints should be in a location where the signage can be clearly seen whilst traversing the car park, and by people at seated or standing height on a carriageway or on a footway, and from inside the parking space including from inside the vehicle.

For Scenario A and Scenario B, signage adjacent to chargepoints should be located and positioned such that it does not further impede access to the surrounding footway and/or built environment, and minimizes the risk of causing injury to users or passers-by.

NOTE 5 Signage can be mounted on existing street furniture in car parks so that it does not add further clutter to the surrounding footpath or built environment.

A.3.2 Signage for on-street chargepoints to indicate location

For Scenario C and Scenario D, signage indicating the locations of on-street chargepoints and designated accessible on-street parking bays is prescribed in The Traffic Signs Regulations and General Directions 2002 [6].

NOTE Advice on the use of prescribed traffic signs is given in the Traffic Signs Manual – Chapter 3 covers regulatory signs.

A.4 Charging process signals

COMMENTARY ON A.4

User testing with disabled people has shown that it is valuable to provide positive forms of feedback (e.g. tactile, audible, or visual feedback such as lighting) to indicate when the various aspects of the charging process have initiated or concluded, or when payment has occurred. User testing has also indicated that the set-up process might fail to allow disabled people enough time to complete physical set up steps before the system times out, thus making it inaccessible.

NOTE 1 User testing has indicated that tactile feedback should not include vibration as an option.

The design of chargepoints should take into account how to provide positive forms of feedback to indicate when certain stages of the charging process have initiated or concluded, using tactile, audible or visual feedback as examples, such as clear feedback given to:

- support a user in understanding at what stage they are at in setting up the charging process;
- confirm to a user that each action during setting up the charging process has been successfully carried out, such as removing a connector, plugging in a chargepoint to a vehicle socket-outlet, and replacing a connector correctly; and
- confirm to a user that payment for the charging process has been successful.

NOTE 2 Research efforts have investigated the usage of coloured lighting to indicate the various stages of the charging process. One research effort³⁰⁾ has recommended the following colours for the different operational stages: green = operational; blue = device is in use; red = device is non-operational; and blue flashing = charging is finished. Whilst this is not a standardized process, it serves as an example of how coloured lighting can be used to indicate stages of the charging process.

Where visual feedback is provided in the form of lighting, any illuminated features on the chargepoint that are used to provide information or feedback should be clearly visible in direct sunlight.

Sufficient time should be provided to the chargepoint user to perform any given charging physical set up processes without the system timing out and having to restart.

³⁰⁾ Source: <<https://www.accessidc.com/accessible-electric-vehicle-charging>>.

Specific report: SOSCI Electric Vehicle Charge-Point Guidance Development Project Stage 3 Report – Guidance for Designers and Manufacturers [on that website]

Annex B (informative)

Designated accessible parking bays – off-street chargepoints

COMMENTARY ON ANNEX B

Public chargepoints situated adjacent to designated accessible parking bays in off-street locations can benefit from implementing best practice accessibility guidance with respect to verifying the usability of chargepoints and providing additional space around designated accessible parking bays to enable access to the chargepoints by disabled people, along with establishing a more inclusive environment around chargepoints installed adjacent to designated accessible parking bays.

NOTE 1 In general, situating chargepoints in off-street public areas is best practice for public chargepoints in designated accessible parking bays due to the additional space located in these areas, particularly in areas close to amenities where parking bays are situated.

NOTE 2 BS 8300-1:2018, Table 2 recommends a minimum provision of designated accessible parking spaces and enlarged parking spaces dependent on the type of car park, with an approximate 5% of parking bays recommended to be designated accessible parking bays and 5% of parking bays recommended to be enlarged spaces. Whilst BS 8300-1:2018 does not cover provision of public chargepoints, it is anticipated that provision of chargepoints adjacent to designated accessible parking bays will become more commonplace as electric vehicle adoption increases.

B.1 Designated accessible off-street parking bays with chargepoints – general requirements

The accessibility guidance provided in Annex B should only be interpreted as being applicable for public chargepoints within Scenario A and Scenario B.

At a minimum, a public chargepoint should be installed adjacent to a designated accessible parking bay in order for it to be considered an accessible charging bay for the best practice accessibility guidance provided in Annex B.

Public chargepoints installed adjacent to designated accessible parking bays should consult 4.2 prior to implementing best practice accessibility guidance.

B.2 Placement of chargepoints and the surrounding built environment – designated accessible off-street parking bays with chargepoints

COMMENTARY ON B.2

Public chargepoints specifically installed adjacent to designated accessible parking bays can benefit from implementing best practice accessibility guidance in terms of the placement of the chargepoints and the design of the surrounding built environment including sufficient space around the chargepoint, as the public chargepoints are specifically dedicated to disabled people.

NOTE Locational planning for chargepoints, including chargepoints installed specifically adjacent to designated accessible parking bays, is beyond the scope of this PAS. Guidance on planning for accessible public chargepoint locations is available in other research projects, such as the 'Scaling on Street Chargepoint Installations' (SOCSI) project³¹⁾.

B.2.1 Surface gradient at off-street designated accessible parking bays with chargepoints

COMMENTARY ON B.2.1

Chargepoints installed on a sloping surface can be problematic for users including disabled people such as wheelchair users, particularly whilst carrying charging cables.

Any off-street public chargepoint installed adjacent to a designated accessible parking bay and its surrounding area should be on flat, level ground rather than sloping ground, and the ground should be smooth and stable in accordance with 6.3.

³¹⁾ Project website: <<https://www.accessidc.com/accessible-electric-vehicle-charging>>. Specific report: <https://www.accessidc.com/_files/ugd/0e21ac_36ae33f64b52427080773342de2153c7.pdf>.

The surface on which a chargepoint is placed for chargepoints located adjacent to designated accessible parking bays should have a fall to enable surface water drainage. The fall should not be steeper than 1:50, and preferably not steeper than 1:60, in accordance with BS 8300-1:2018 and the UK Government's "Inclusive Mobility" [N1].

Any ramps required to gain access to a public chargepoint and its surrounding area should be installed in accordance with the guidance located in BS 8300-1:2018, 9.2.

B.2.2 Reach distance and space in front of public chargepoints adjacent to designated accessible off-street parking bays

COMMENTARY ON B.2.2

Subclause 6.2 covers the required space in front of all public chargepoints in terms of minimum accessibility, whilst 6.4 covers the reach requirements for all public chargepoints for minimum accessibility. C.2.2 addresses best practice guidance for accessibility of off-street public chargepoints installed specifically adjacent to designated accessible parking bays.

For public chargepoints specifically installed adjacent to off-street designated accessible parking bays, there should ideally be no obstacles in front of the chargepoint resulting in no reach distance to access the public chargepoint (i.e. a reach distance of 0 mm).

For public chargepoints installed at footway level but operated at carriageway level, the reach distance (i.e. the distance from the edge of the kerb to the chargepoint) should be as close to 0 mm as possible, and no greater than 220 mm.

NOTE 1 *Subclause 6.4 specifies that the reach distance to public chargepoints should be no greater than 220 mm.*

NOTE 2 *In the first instance, installation of chargepoints installed adjacent to designated accessible off-street parking bays should assess whether level access can be provided between the parking bay and the points of access to chargepoint components.*

For public chargepoints installed specifically adjacent to off-street designated accessible parking bays, additional space should be provided at the points of access to where a disabled person accesses the chargepoint components, such as providing a space of 1 850 mm x 2 100 mm at the points of access to the chargepoint and its components, in accordance with BS 8300-1:2018, Figure 7, and UK Government's "Inclusive Mobility" [N1], Section 8.5.

B.2.3 Additional space allowance surrounding off-street designated accessible parking bays with public chargepoints

COMMENTARY ON B.2.3

The requirements in Clauses 6 and 7 of this PAS are aimed at providing minimum requirements for sufficient space around public chargepoints in order to be operated by disabled people. The guidance within B.2.3 provides supplementary best practice guidance for verifying sufficient space around vehicles, as well as around chargepoints and points of access to chargepoint components, for designated accessible parking bays located in off-street locations such as car parks.

B.2.3.1 General requirements – additional space allowance surrounding off-street designated accessible parking bays with public chargepoints

NOTE 1 *When installing parking spaces in a new car park (i.e. not just designated accessible parking bays), or when reconfiguring car park spaces, it is generally best practice to either widen/lengthen spaces to account for larger vehicles or provide buffer room when allocating parking spaces. This can improve the accessibility of both the parking bay and the access to a chargepoint located adjacent to the parking bay.*

At a minimum, designated accessible parking bays located in public car parks should be designed in accordance with guidance for off-street parking provision within BS 8300-1:2018, 7.4, 7.5, 7.6, 7.7, 7.8 and 7.9. Due consideration should also be given to the UK Government's "Inclusive Mobility" [N1], Section 8.

With respect to accessing a public chargepoint once a vehicle is parked in a designated accessible parking bay, consideration should be given to providing sufficient space around the vehicle for wheelchair users and users of other mobility aids to disembark the vehicle whilst minimizing the distance from the chargepoint to the vehicle.

NOTE 2 *Modified vehicles for disabled people can include adaptations for disembarking (e.g. ramps) and/or stowage adaptations (e.g. boot hoist, rooftop hoist), which might require additional space to disembark the vehicle in addition to utilising the chargepoint. Space allowances for wheelchair manoeuvring and access to vehicles are addressed in BS 8300-1:2018, Annex C.*

Consideration should be given to maintaining the sufficient space and routes around the vehicle whilst the vehicle is plugged to charge, taking into account the open vehicle socket-outlet flap and plugged-in connector, to allow safe movement for all people.

When installing on-street chargepoints adjacent to designated accessible parking bays, consideration should be given to minimizing the impact of trailing cables on the surrounding environment so that they do not present a trip hazard for users of the built environment.

B.2.3.2 Additional space allowance surrounding parallel off-street designated accessible parking bays with public chargepoints

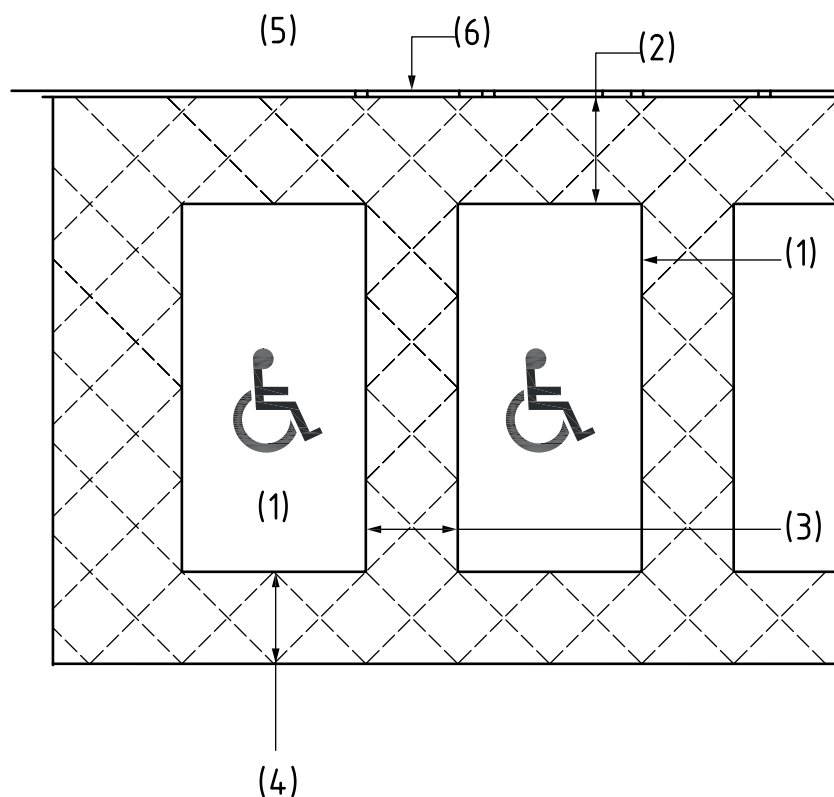
Where public chargepoints are installed adjacent to designated accessible off-street parking bays parallel to the kerb, consideration should be given to the arrangement principles as illustrated in Figure B.1, including:

- a) sufficient space on both sides of a parking space to allow people to fully open their door and enter and exit the vehicle safely, including those using mobility aids and those that might need to deploy side stowage and access adaptations such as ramps, hoists and lifts, with 1 200 mm spacing as a minimum and ideally 1 600 mm as illustrated in Figure B.1;

- b) sufficient space at the end of a parking space to allow people to move behind the rear of the vehicle safely and comfortably, including wheelchair users and users of other mobility aids, and to accommodate the safe loading/deployment of any adaptations such as ramps, hoists and lifts from the boot of a vehicle, with 1 200 mm spacing as a minimum and ideally 1 600 mm as illustrated in Figure B.1; and
- c) sufficient space at the chargepoint end of a parking space to allow wheelchair users and users of other mobility aids to manoeuvre between the chargepoint and the nearest end of the vehicle safely and comfortably, i.e. space at the front and the rear of the vehicle with 1 600 mm spacing as a minimum and ideally 1 850 mm as illustrated in Figure B.1.

NOTE 1 *Dropped kerbs and level access for public chargepoints installed adjacent to designated accessible parking bays are addressed in B.2.4; design of dropped kerbs is addressed in 7.3.*

Figure B.1 – Additional space allowance surrounding off-street designated accessible parking bays with public chargepoints



- (1) Standard 2 400 mm x 4 800 mm designated accessible parking space
- (2) Marked access zone at front of parking space (1 600 mm minimum, 1 850 mm preferred)
- (3) Marked access zone between and at either side of parking space (1 200 mm minimum, 1 600 mm preferred)
- (4) 1 200 mm wide marked safety zone for boot access and cars with rear hoists outside the traffic zone
- (5) Preferred access route avoiding the traffic zone in consideration of BS 8300-1:2018
- (6) Dropped kerb or level access

NOTE 2 Figure B.1 can be interpreted as very good practice for off-street accessible chargepoint bays with an adjacent public chargepoint, with hatching provided at all sides of the parking bay. There are many permutations of designated accessible off-street parking, with varying configurations of hatching surrounding the parking bay. Further guidance on other permutations of designated accessible off-street parking accompanied with public chargepoints is available in other research projects, such as the ‘Scaling on Street Chargepoint Installations’ (SOCSI) project³²⁾.

NOTE 3 Figure B.1 does not indicate an exact placement position for a chargepoint to be installed adjacent to the designated accessible parking bay. There is no single location for a public chargepoint to be installed adjacent to a designated accessible parking bay that can be considered the “most” accessible. The optimum location of the public chargepoint can be assessed by following other principles as outlined throughout this PAS; additionally, the “Scaling on Street Chargepoint Installations” (SOCSI) project³³⁾ provides further guidance on placement positions for public chargepoints next to designated accessible parking bays. One possible arrangement for chargepoints located adjacent to designated accessible parking bays is also provided within “Infrastructure for charging electric vehicles: Approved Document S”³⁴⁾ of The Buildings Regulations 2010³⁵⁾ [2].

NOTE 4 Where public chargepoints are installed adjacent to off-street designated accessible parking bays that are angled to a kerb, the arrangement and spacing principles outlined in C.2.3 can be taken into account.

NOTE 5 Space at the front and the rear of the vehicle might be needed at the same time by disabled people, as the vehicle might be charging from the front of the vehicle at the same time as a disabled person enters or exits the vehicle from the rear.

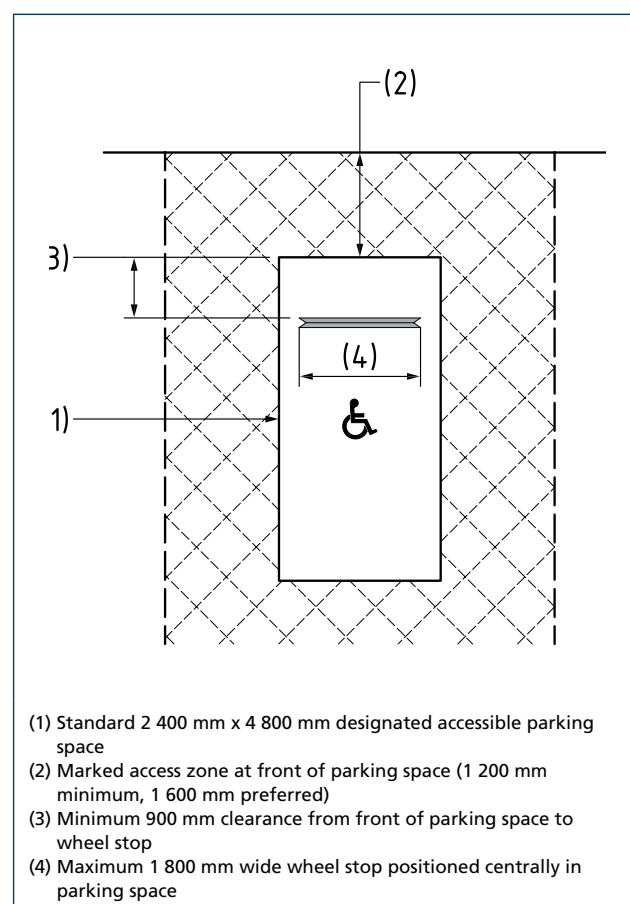
NOTE 6 BS 8300-1:2018, Table C.2 provides guidance for the required widths for access at the side and the rear of a vehicle or between vehicles in a car park for ramps, hoists and lifts.

B.2.3.3 Placement of wheel stops within off-street designated accessible parking bays with public chargepoints

Where a wheel stop is installed within a designated accessible off-street parking bay with an adjacent public chargepoint, the installation of the wheel stop should be provided with a minimum 900 mm clearance from the front of the parking space to the wheel stop, and with a wheel stop of maximum width of

1 800 mm, in addition to the required spacing around the designated accessible parking bay (1 200 mm minimum and preferably 1 600 mm), as illustrated in Figure B.2.

Figure B.2 – Additional space allowance surrounding designated accessible parking bays with public chargepoints – placement of wheel stops



NOTE 1 Figure B.2 does not indicate an exact placement position for a chargepoint to be installed adjacent to the designated accessible parking bay. There is no single location for a public chargepoint to be installed adjacent to a designated accessible parking bay that can be considered the “most” accessible. The optimum location of the public chargepoint can be assessed by following other principles outlined throughout this PAS; additionally, the “Scaling on Street Chargepoint Installations” (SOCSI) project³⁶⁾ provides further guidance on placement positions for public chargepoints next to designated accessible parking bays.

³²⁾ <<https://www.accessidc.com/accessible-electric-vehicle-charging>>.

³³⁾ <<https://www.accessidc.com/accessible-electric-vehicle-charging>>.

³⁴⁾ <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1057375/AD_S.pdf>.

³⁵⁾ <<https://www.legislation.gov.uk/uk/si/2010/2214/schedule/1>>.

³⁶⁾ <<https://www.accessidc.com/accessible-electric-vehicle-charging>>.

NOTE 2 Space at the front and the rear of the vehicle might be needed at the same time by disabled people, as the vehicle might be charging from the front of the vehicle at the same time as a disabled person enters or exits the vehicle from the rear.

NOTE 3 Wheel stops can also be installed in any chargepoint bay.

B.2.4 Distance from off-street chargepoints installed adjacent to designated accessible parking bays to a dropped kerb or level access

COMMENTARY ON B.2.4

Disabled people might be disadvantaged by having to travel a long distance between an off-street designated accessible parking bay and accessing the footway. This issue can be exacerbated with off-street chargepoints positioned at footway level and where the points of access to chargepoint components are also from footway level. Minimizing this traversable distance improves the accessibility of the off-street chargepoints.

Where chargepoints are installed at footway level and the points of access to chargepoint components are also at footway level, in the first instance the installation of public chargepoints adjacent to off-street designated accessible parking bays should establish whether level access can be provided at the parking bay to access and use the chargepoint and the adjacent footway.

In the absence of level access to a public chargepoint where the points of access to chargepoint components is at footway level, an off-street chargepoint installed specifically adjacent to a designated accessible parking bay should have a dropped kerb directly adjacent to the parking bay or be within a maximum of 8 m distance in a safe route of a dropped kerb, to enable access to the footway and operation of the chargepoint.

The design of a dropped kerb should be in accordance with the UK Government's "Inclusive Mobility" [N1], Section 4.11.

Where dropped kerbs and level access points are installed, they should be accompanied with appropriate tactile paving. Tactile paving should be provided in accordance with the UK Government's "Inclusive Mobility" [N1], Section 6; recommended layouts for tactile paving are also within the UK Government's Guidance on the Use of Tactile Paving Surfaces [15].

NOTE Usage of tactile paving is also covered in BS 8300-1:2018, 8.4.

B.2.5 Considerations for larger vehicles

COMMENTARY ON B.2.5

Larger vehicles, such as larger wheelchair accessible vehicles or minibuses equipped with side or rear access, e.g. hoists or ramps, might require larger designated accessible parking bays due to the increased space requirements for the vehicles. For disabled users of these vehicles, who might themselves be the drivers of these vehicles, the space allocated for parking and for entering/exiting the vehicle out of the path of other moving vehicles (where drivers often do not see someone in a seated position in a wheelchair) is vital for safety, and easy manoeuvring space is required between vehicles. This in turn has an impact on the usability of a public chargepoint in the vicinity of a larger designated accessible parking bay, e.g. space might simultaneously be required at the front of a vehicle (to initiate the charging process) and at the back of a vehicle (to safely release a rear ramp for a wheelchair). A situation where a larger vehicle has to park illegally to charge (by taking up more space) is to be avoided.

Where space permits, provision of at least one large designated accessible parking/charging bay that can accommodate a larger vehicle, such as a minibus, should be provided in a car park, in accordance with BS 8300-1:2018, Table C.2.

NOTE 1 The space requirements for larger vehicles, such as wheelchair accessible vehicles, can vary significantly. Using BS 8300-1:2018, Table C.2 as an example, a WAV comprising a commercial vehicle of 5 m length, with a rear access ramp of 3 m length, and with a 1.6 m depth access aisle between the front of a vehicle and the chargepoint would require a total depth of space of 9.6 m and at least 4.8 m width, not including two side access aisles of between 1 200 mm and 1 600 mm. These dimensions vary, based on the type of vehicle and use, as outlined in BS 8300-1:2018, Table C.2.

The number of required WAV designated accessible parking/charging bays for a given location should be influenced by the facilities and services available in the vicinity of the chargepoint location; these needs should be regularly reviewed to ensure WAV parking and charging facilities are adequately available, including provision for side-access WAVs, where possible.

In order to access a public chargepoint once a vehicle is parked in a large designated accessible parking bay, there should be sufficient space around the vehicle for wheelchair users and users of other mobility aids to disembark whilst minimizing the distance from the chargepoint to the vehicle.

Where a public chargepoint is installed next to a large designated accessible parking bay, the spacing recommendations outlined in B.2.3 and illustrated in Figure B.1 should be applied as a minimum, in addition to the larger physical space of the WAV parking bay; in particular, it should be verified that there is sufficient space at the chargepoint end of the designated accessible parking bay to allow disabled people to move between the chargepoint and the front of the vehicle, and at least 3 000 mm spacing for rear-access WAV parking spaces.

Appropriate signage should be provided for large designated accessible parking bays equipped with a public chargepoint to indicate the additional space provided along with the presence of a chargepoint at the parking bay.

NOTE 2 See A.3 for further signage guidance related to accessibility.

NOTE 3 There are many permutations of WAV parking bays based on the needs of the vehicles. Further guidance on other permutations of WAV parking accompanied with public chargepoints is available in other research projects, such as the “Scaling on Street Chargepoint Installations” (SOCSI) project³⁷⁾.

B.3 Establishing an inclusive environment – designated accessible off-street parking bays with chargepoints

COMMENTARY ON B.3

When installing public chargepoints specifically adjacent to designated accessible off-street parking bays, extra measures can be implemented to improve accessibility of these accessible charging bays, in order to provide a more inclusive and comfortable charging experience for disabled people.

B.3.1 Overhead weatherproofing at service areas

COMMENTARY ON B.3.1

Electric vehicle users, including disabled people, can feel uncomfortable when charging their vehicles in unfavourable weather conditions, such as wet weather. This is particularly important due to the additional amount of time it can take disabled people to charge their vehicle if mobility aids or wheelchairs need to be removed from the vehicle in advance of the charging process. Designated accessible parking bays at service areas might require lighting as well as shelter – Annex A provides good practice information on establishing an inclusive environment, including provision of lighting.

For B.3.1, “service areas” refers to any service area (e.g. a motorway service area or a service area/service station on an A-road or a trunk road), fuel retailer, or a location where multiple higher-powered chargepoints are located specifically to charge electric vehicles, such as a charging hub.

Public higher-powered chargepoints installed at off-street service areas (i.e. Scenario B) should be provided with overhead protection from adverse weather conditions above the chargepoints, covering the area above where the chargepoint is operated and the entire vehicle parking space, particularly for public chargepoints installed adjacent to designated accessible parking bays. Where possible, overhead protection should also be taken into account for other public chargepoints located in car parks (i.e. not exclusively for higher-powered chargepoints; Scenario A).

Access routes from higher-powered chargepoints (i.e. Scenario B) to nearby amenities or buildings within service areas should be provided with overhead protection from adverse weather conditions.

As a minimum, public higher-powered chargepoints installed adjacent to designated accessible parking bays within service areas should be provided with overhead protection from adverse weather conditions, covering the area above where the chargepoint is operated and the entire vehicle parking space, along with access routes from the higher-powered chargepoints adjacent to designated accessible parking bays to nearby amenities or buildings within the service areas.

NOTE Signage could be provided at the chargepoint and/or on the route to the parking facility, to indicate the height of overhead structures so that all users are aware of the clearance from ground level.

B.3.2 Road markings for designated accessible off-street parking with chargepoints

COMMENTARY ON B.3.2

It is good practice for all parking bays to have road markings. Clear markings for bays where additional space has been provided, such as for designated accessible parking bays, is desirable to make people aware that the parking bays are reserved for people with disabilities.

Advice on the use of road markings for off-street parking bays is available from the British Parking Association [18].

³⁷⁾ <<https://www.accessidc.com/accessible-electric-vehicle-charging>>.

Where designated accessible parking is provided along with public chargepoints in off-street locations such as car parks, it should be clear that additional space has been provided for the parking bay in combination with the public chargepoint.

All charging bay access zones should be distinguished from the vehicle bay either by line marking, such as with a hatched pattern, or otherwise visually contrasted to vehicle bays, such as using colour and/or change of surface finish.

B.3.3 Signage for off-street designated accessible parking bays with a chargepoint

COMMENTARY ON B.3.3

Other guidance related to signage provision for off-street public chargepoints is available in A.3.1, including guidance for verifying signage does not add to existing street clutter.

Where a public chargepoint is installed adjacent to a designated accessible parking bay in an off-street location, signage should be provided in addition to appropriate road demarcation to indicate that the designated accessible parking bay has a chargepoint installed.

Where designated accessible parking is provided along with public chargepoints in an off-street location, all parking restrictions should be made clear to users and passers-by.

B.3.4 Distance between off-street designated accessible parking bays with a chargepoint and amenities or a venue

COMMENTARY ON B.3.4

This subclause relates to distances between designated accessible off-street parking bays with a chargepoint and amenities or a venue for which the parking bay/chargepoint is installed; 7.4 specifies requirements for the distance between all public chargepoints and associated amenities or a venue.

Public chargepoints installed for the use of disabled drivers and Blue Badge holders (i.e. adjacent to a designated accessible parking bay) in a public car park next to amenities or a venue should give due consideration to minimizing the distance between the chargepoints and the associated amenities or venue for which the off-street designated accessible parking bays and chargepoints are dedicated, in accordance with BS 8300-1:2018, Clause 9 and Clause 10, and should give due consideration to the arrangement principles within the UK Government's "Inclusive Mobility" [N1], Section 8.3.

Annex C (informative)

Designated accessible parking bays – on-street chargepoints

COMMENTARY ON ANNEX C

Public chargepoints situated adjacent to designated accessible parking bays in on-street locations can benefit from implementing good practice accessibility guidance with respect to verifying the usability of chargepoints and providing sufficient space around designated accessible parking bays to enable access to the chargepoints by disabled people, along with establishing a more inclusive environment around on-street chargepoints installed adjacent to designated accessible parking bays. Accessibility of on-street chargepoints can be more difficult than for off-street chargepoints due to highly variable streetscapes and the presence of existing street furniture and access to footways. Where an on-street chargepoint is specifically installed adjacent to a designated accessible parking bay, this additional guidance can help the primary users of these chargepoints access the chargepoints and the surrounding built environment with greater ease.

C.1 Designated accessible on-street parking bays with chargepoints – general requirements

The good practice accessibility guidance provided in this annex should only be interpreted as being applicable for public chargepoints within Scenario C and Scenario D.

As a minimum, a public chargepoint should be installed adjacent to a designated accessible parking bay in order for it to be considered an accessible charging bay for the good practice accessibility guidance provided in this annex.

Public chargepoints installed adjacent to designated accessible parking bays should consult 4.2 prior to implementing good practice accessibility guidance.

C.2 Placement of chargepoints and the surrounding built environment – designated accessible on-street parking bays with chargepoints

COMMENTARY ON C.2

Public chargepoints specifically installed adjacent to on-street designated accessible parking bays can benefit from implementing good practice accessibility guidance in terms of the placement of the chargepoints and the design of the surrounding built environment, including sufficient space around the chargepoint, as the public chargepoints are specifically dedicated to disabled people.

Locational planning for chargepoints, including chargepoints installed specifically adjacent to designated accessible parking bays, is out of scope of this PAS. Guidance on planning for accessible public chargepoint locations is available in other research projects, such as the “Scaling on Street Chargepoint Installations” (SOCSEI) project³⁸. The UK Government’s Manual for Streets guidance should also be factored into inclusive street design.

C.2.1 Surface gradient at on-street designated accessible parking bays with chargepoints

COMMENTARY ON C.2.1

Chargepoints installed on a sloping surface can be problematic for users, including disabled people, such as wheelchair users, particularly whilst carrying charging cables.

Any on-street public chargepoint installed adjacent to a designated accessible parking bay and its surrounding area should be on flat, level ground rather than sloping ground, and the ground should be smooth and stable in accordance with 6.3.

The surface on which a chargepoint is placed for chargepoints located adjacent to designated accessible parking bays should have a fall to enable surface water drainage. The fall should not be steeper than 1:50, and preferably not steeper than 1:60, in accordance with BS 8300-1 and the UK Government’s “Inclusive Mobility” [N1].

³⁸) Project website: <<https://www.accessidc.com/accessible-electric-vehicle-charging>>. Specific report: <https://www.accessidc.com/_files/ugd/0e21ac_36ae33f64b52427080773342de2153c7.pdf>.

Any ramps required to gain access to a public chargepoint and its surrounding area should be installed in accordance with the guidance located in BS 8300-1:2018, 9.2.

C.2.2 Reach distance and space in front of public chargepoints adjacent to designated accessible on-street parking bays

COMMENTARY ON C.2.2

6.2 covers the required space in front of all public chargepoints in terms of minimum accessibility, whilst 6.4 covers the reach requirements for all public chargepoints for minimum accessibility. This subclause addresses good practice guidance for accessibility of on-street public chargepoints installed specifically adjacent to designated accessible parking bays.

For public chargepoints specifically installed adjacent to on-street designated accessible parking bays, there should be no obstacles in front of the chargepoint resulting in no reach distance to access the public chargepoint (i.e. a reach distance of 0 mm).

For public chargepoints installed at footway level but operated at carriageway level, the reach distance (i.e. the distance from the edge of the kerb to the chargepoint) should be as close to 0 mm as possible, and no greater than 220 mm.

NOTE 1 6.4 specifies that the reach distance to public chargepoints is to be no greater than 220 mm.

NOTE 2 In the first instance, installation of chargepoints installed adjacent to designated accessible on-street parking bays should assess whether level access can be provided between the parking bay and the points of access to chargepoint components, in accordance with C.2.4.

For public chargepoints installed specifically adjacent to on-street designated accessible parking bays, additional space should be provided at the points of access to where a disabled person accesses the chargepoint components, such as providing a space of 1 850 mm x 2 100 mm at the points of access to the chargepoint and its components, in accordance with BS 8300-1:2018, Figure 7, and UK Government's "Inclusive Mobility" [N1], Section 8.5.

C.2.3 Additional space allowance surrounding on-street designated accessible parking bays with public chargepoints

COMMENTARY ON C.2.3

The requirements in Clause 6 and Clause 7 are partially aimed at providing requirements for sufficient space around public chargepoints in order to be operated by disabled people. The guidance within this subclause provides supplementary good practice guidance for verifying sufficient space around vehicles as well as around chargepoints and points of access to chargepoint components, for designated accessible parking bays located in on-street locations.

C.2.3.1 General requirements – additional space allowance surrounding on-street designated accessible parking bays with public chargepoints

NOTE 1 On-street designated accessible parking can be provided with many different configurations of parking bays, C.2.3 provides general good practice guidance for installations of public chargepoints adjacent to on-street designated accessible parking bays based on some configurations of on-street chargepoints. Other permutations of on-street designated accessible parking bays are outlined in other research efforts, such as the "Scaling on Street Chargepoint Installations" (SOCSI) project³⁹⁾.

Guidance for the design of designated accessible on-street parking bays should be taken into account, as outlined in UK Government's "Inclusive Mobility" [N1], Section 8.4, such as providing a greater depth for on-street designated accessible parking bays.

NOTE 2 As outlined in A.3.2, signage requirements for on-street designated accessible parking bays are prescribed in the Traffic Signs Regulations and General Directions 2002 [6]. Advice on designing signs to comply with this is given in Chapter 3 of the Traffic Signs Manual [19].

NOTE 3 Local authorities are responsible for the provision of designated accessible on-street parking bays on public roads. Local authorities are major stakeholders in the placement and positioning of on-street chargepoints and checking accessibility requirements in surrounding pedestrian environments are adhered to.

³⁹⁾ <<https://www.accessidc.com/accessible-electric-vehicle-charging>>.

Maintaining sufficient space around the vehicle whilst the vehicle is plugged in to charge in an on-street designated accessible parking bay should be taken into account, including the open vehicle socket-outlet flap and plugged-in connector.

When installing on-street chargepoints adjacent to designated accessible parking bays, minimizing the impact of trailing cables on the surrounding environment should be taken into account so that they do not present a trip hazard for users of the built environment.

The installation of on-street chargepoints adjacent to designated accessible parking bays should be positioned so as not to obstruct the footpath for vehicle users and other users of the surrounding built environment.

C.2.3.2 Additional space allowance surrounding parallel on-street designated accessible parking bays with public chargepoints

Where public chargepoints are installed adjacent to designated accessible on-street parking bays parallel to the kerb, the arrangement principles illustrated in Figure C.1 and Figure C.2 should be taken into account, including:

- d) provision of a bay of 4 800 mm length for standard accessible parking bays (Figure C.1) or 6 600 mm length for designated accessible parking bays (Figure C.2), with a minimum width of 3 600 mm and a preferred width of 4 000 mm; marked access zones between parking spaces with a minimum width of 1 200 mm and a preferred width of 1 600 mm; and
- e) access routes designed in accordance with BS 8300-1:2018, Clause 8.

NOTE 1 *Dropped kerbs and level access for public chargepoints installed adjacent to designated accessible parking bays are addressed in C.2.4; design of dropped kerbs is addressed in 7.3.*

Figure C.1 – Additional space allowance surrounding on-street kerbside designated accessible parking bays with public chargepoints

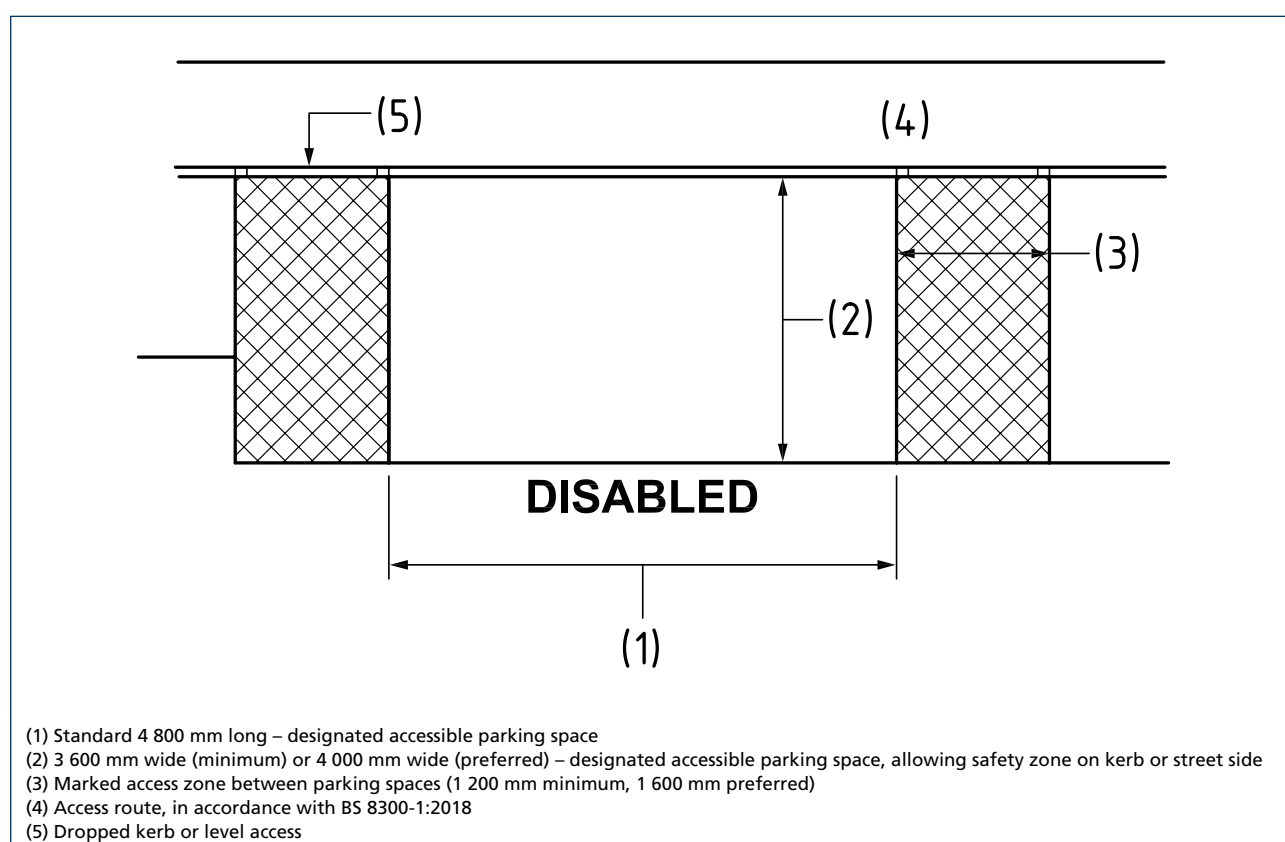
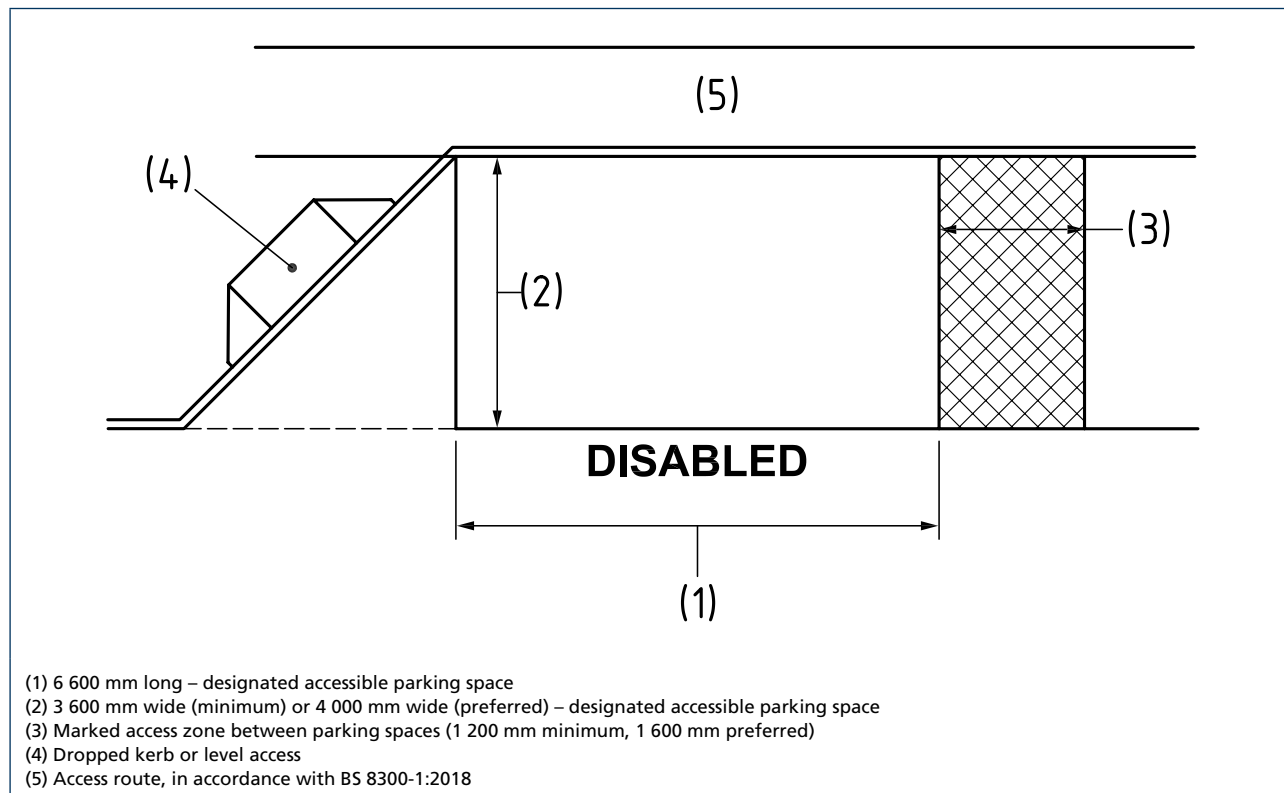


Figure C.2 – Additional space allowance surrounding on-street kerbside designated accessible parking bays with public chargepoints with angled footway access area



NOTE 2 Figure C.1 and Figure C.2 do not indicate an exact placement position for a chargepoint to be installed adjacent to the designated accessible parking bay. There is no single location for a public chargepoint to be installed adjacent to a designated accessible parking bay that can be considered the “most” accessible. The optimum location of the public chargepoint can be assessed by following other principles as outlined throughout this PAS; additionally, the “Scaling on Street Chargepoint Installations” (SOCSI) project⁴⁰⁾ provides further guidance on placement positions for public chargepoints next to designated accessible parking bays.

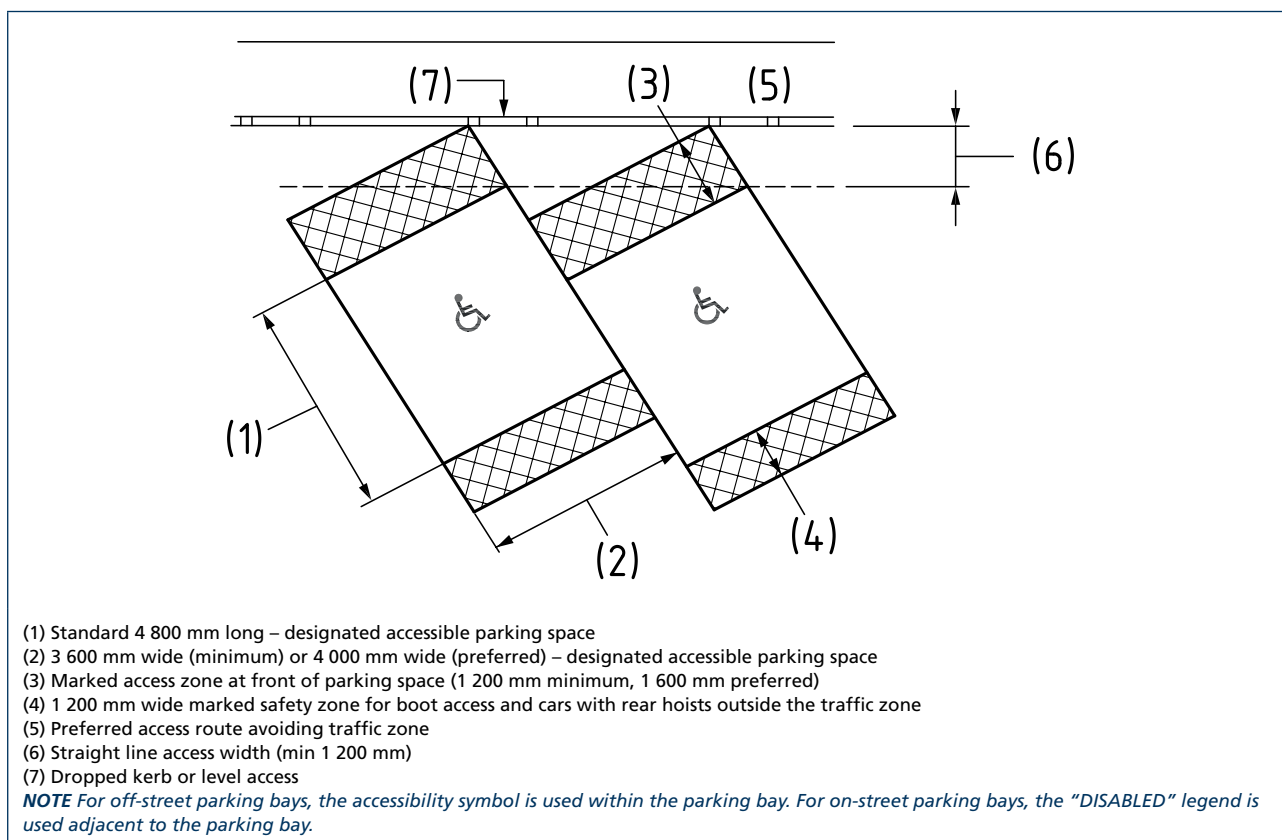
NOTE 3 Space at the front and the rear of the vehicle might be needed at the same time by disabled people as the vehicle might be charging from the front of the vehicle at the same time as a disabled person enters or exits the vehicle from the rear.

C.2.3.3 Additional space allowance surrounding on-street designated accessible angled bays with public chargepoints

Where public chargepoints are installed adjacent to designated accessible parking bays that are angled to a kerb, for both on-street and off-street parking, arrangement and spacing principles should be provided, as illustrated in Figure C.3, including marked access zones at the front of the parking spaces of minimum 1 200 mm spacing and preferably 1 600 mm spacing, and a straight-line access width to the footway of minimum 1 200 mm width.

⁴⁰⁾ <<https://www.accessidc.com/accessible-electric-vehicle-charging>>.

Figure C.3 – Additional space allowance surrounding designated accessible parking bays with public chargepoints – angled parking bays (off- and on-street)



NOTE 1 Figure C.3 does not indicate an exact placement position for a chargepoint to be installed adjacent to the designated accessible parking bay. There is no single location for a public chargepoint to be installed adjacent to a designated accessible parking bay that can be considered the "most" accessible. The optimum location of the public chargepoint can be assessed by following other principles as outlined throughout this PAS; additionally, the "Scaling on Street Chargepoint Installations" (SOCIS) project⁴¹⁾ provides further guidance on placement positions for public chargepoints next to designated accessible parking bays.

NOTE 2 Space at the front and the rear of the vehicle might be needed at the same time by disabled people as the vehicle might be charging from the front of the vehicle at the same time as a disabled person enters or exits the vehicle from the rear.

C.2.4 Distance from on-street chargepoints installed adjacent to designated accessible parking bays to a dropped kerb or level access

COMMENTARY ON C.2.4

Disabled people might be disadvantaged by having to travel a long distance between an on-street designated accessible parking bay and accessing the footway. This issue can be exacerbated with on-street chargepoints positioned at footway level and where the operation of the chargepoint is also from footway level. Minimizing this traversable distance improves the accessibility of the on-street chargepoints.

Where chargepoints are installed at footway level and the points of access to chargepoint components are also at footway level, in the first instance the installation of public chargepoints adjacent to on-street designated accessible parking bays should establish whether level access can be provided at the parking bay to access and use the chargepoint and the adjacent footway.

⁴¹⁾ <<https://www.accessidc.com/accessible-electric-vehicle-charging>>.

In the absence of level access to a public chargepoint where the points of access to chargepoint components are at footway level, an on-street chargepoint installed specifically adjacent to a designated accessible parking bay should have a dropped kerb directly adjacent to the parking bay, or should be within a maximum of 8 m distance in a safe route of a dropped kerb, to enable access to the footway and operation of the chargepoint.

The design of a dropped kerb should be in accordance with the UK Government's "Inclusive Mobility" [N1], Section 4.11.

Where dropped kerbs and level access points are installed, dropped kerbs and level access points should be accompanied with appropriate tactile paving. Tactile paving should be provided in accordance with the UK Government's "Inclusive Mobility" [N1], Section 6; recommended layouts for tactile paving are also within the UK Government's Guidance on the Use of Tactile Paving Surfaces [15].

NOTE Usage of tactile paving is also covered in BS 8300-1:2018, 8.4.

C.3 Establishing an inclusive environment – designated accessible on-street parking bays with chargepoints

COMMENTARY ON C.3

When installing public chargepoints specifically adjacent to designated accessible on-street parking bays, extra measures can be implemented to improve accessibility of these accessible charging bays, to provide a more inclusive and comfortable charging experience for disabled people.

C.3.1 Road markings for designated accessible on-street parking with chargepoints

COMMENTARY ON C.3.1

It is good practice for all parking bays to have road markings. Clear markings for bays where additional space has been provided, such as for on-street designated accessible parking bays with chargepoints installed adjacent, is required to make people aware that the parking bays are reserved for people with disabilities.

Road markings for bays where additional space has been provided, such as for on-street designated accessible parking bays, are prescribed in the Traffic Signs Regulations and General Directions 2002 [6]. This sets out a minimum bay size and prescribes the legend "DISABLED" to be used with the bay marking to indicate it is reserved for Blue Badge holders only.

All charging bay access zones should be distinguished from the vehicle bay either by line marking, such as with a hatched pattern, or otherwise visually contrasted to vehicle bays, such as using colour and/or change of surface finish.

NOTE Advice on the use of traffic signs and road markings for on-street parking bays is given in the Traffic Signs Manual, Chapter 3 [19].

C.3.2 Distance between on-street designated accessible parking bays with a chargepoint and amenities or a venue

COMMENTARY ON C.3.2

This subclause relates to distances between designated accessible on-street parking bays with a chargepoint and amenities or a venue for which the parking bay/chargepoint is installed; 7.4 specifies requirements for the distance between all public chargepoints and associated amenities or a venue.

Public chargepoints installed for the use of disabled drivers and Blue Badge holders (i.e. adjacent to a designated accessible parking bay) in on-street locations next to amenities or a venue should take into account minimizing the distance between the chargepoints and the associated amenities or venue for which the on-street designated accessible parking bays and chargepoints are dedicated, in accordance with BS 8300-1:2018, Clause 9 and Clause 10, taking into account the arrangement principles within the UK Government's "Inclusive Mobility" [N1], Section 8.4.

Annex D (normative)

Wireless/inductive chargepoints

COMMENTARY ON ANNEX D

The requirements outlined throughout this PAS apply to all public chargepoints. Wireless and inductive chargepoints are shown to have particular benefits for disabled people as there are no cables to manoeuvre and interact with, thereby removing barriers experienced by disabled people associated with charging cables. The physical infrastructure for wireless/inductive charging nevertheless might still require supporting electrical infrastructure.

Some wireless/inductive chargepoint configurations have a permanent screen or visual interface for the user to interact with in order to carry out the charging process; for other wireless/inductive chargepoint configurations, the charging process is carried out using a remote system such as a smartphone app.

Wireless/inductive chargepoints might have particular benefits for installations in designated accessible parking bays as they are dedicated to disabled people; however, vehicles still need to be fitted with the capability to be able to charge wirelessly, and not all vehicles have this capability at the outset. Good practice accessibility guidance is found in Annex B for off-street designated accessible parking bays and Annex C for on-street designated accessible parking bays.

Where wireless/inductive chargepoints are placed and installed in a public location, the placement, installation and information provision of these public wireless/inductive chargepoints shall follow the requirements within Clause 5, Clause 6, Clause 7 and Clause 8 (except those specifically related to conductive chargepoints, e.g. for cables), such as provisions for the built environment surrounding the chargepoint, and including placement and installation of any supporting electrical infrastructure for the wireless/inductive chargepoints, such as electrical feeder pillars.

Where wireless/inductive chargepoints have a supporting permanent screen or visual interface installed in close proximity to the chargepoint for the user to initiate and carry out the charging process, the screen or visual interface shall be designed in accordance with 5.1 and 5.5, and shall be physically placed in accordance with Clause 6 (except those specifically related to conductive chargepoints, e.g. for cables).

Where public wireless/inductive chargepoints are operated via remote digital means, such as a smartphone application, the design and operation of the remote application shall be in accordance with 8.1.

NOTE 1 General requirements for wireless/inductive charging are available in BS EN IEC 61980-1; specific requirements for the magnetic fields of wireless power transfer systems are available in PD CLC IEC/TS 61980-3.

NOTE 2 Concerns have been expressed on the possible impact of wireless/inductive charging on users fitted with pacemakers and other medical devices. Whilst this is beyond the scope of this PAS, there are safety features being developed to mitigate this, including foreign object detection and protection from exposure to high strength electric and magnetic fields.

Annex E (informative)

Checklists for requirements and good practice guidance for accessible public chargepoints

COMMENTARY ON ANNEX E

Annex E provides checklists summarizing the minimum requirements for accessibility and the good practice accessibility guidance, as outlined throughout this PAS, to support users of this PAS in implementing its requirements and good practice. There are different checklists provided, as follows:

- checklist for core standard for minimum requirements for accessibility for all public chargepoints – see E.1;
- checklist for supplementary best practice accessibility guidance for all public chargepoints – see E.2;
- checklist for good practice accessibility guidance for chargepoints installed adjacent to off-street designated accessible parking bays – see E.3; and
- checklist for good practice accessibility guidance for chargepoints installed adjacent to on-street designated accessible parking bays – see E.4.

E.1 Checklist: Core standard for minimum requirements for accessibility for all public chargepoints

COMMENTARY ON E.1

The checklist in Table E.1 is for the core standard for minimum requirements for accessibility for all public chargepoints (as outlined in Clause 5, Clause 6, Clause 7 and Clause 8). Users of this PAS should not solely consult this checklist to understand the requirements of the PAS, rather this checklist should be supplementary to the PAS – there are many notes and contextual information provided throughout the PAS that are not available in this checklist.

Table E.1 – Checklist: Core standard for minimum requirements for accessibility for all public chargepoints

Clause No.	Requirement	YES	NO	N/A
5	Physical chargepoint design			
5.1	General			
	The design of public chargepoints has conformed, where applicable, with standards focused on the design of chargepoints.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The design of public chargepoints has taken into account guidance within BS 8300-1:2018.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.2	Chargepoint component height			
	The centreline height of the chargepoint socket-outlet is between 800 mm and 950 mm relative to the user location.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The height of the bottom of the tethered charging cable connector handle when in its holster is between 800 mm and 950 mm relative to the user location.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The screen/visual interface on the chargepoint has a minimum bottom height of 800 mm and a maximum top height of 1 300 mm relative to the user location.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table E.1 – Checklist: Core standard for minimum requirements for accessibility for all public chargepoints (*continued*)

Clause No.	Requirement	YES	NO	N/A
	Interactive elements of the screen/visual interface on the chargepoint, such as buttons or touchscreens, are at a minimum bottom height of 800 mm and a maximum top height of 1 200 mm relative to the user location.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The height of the bottom edge of the payment terminal is between 800 mm and 1 000 mm relative to the user location.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Where a chargepoint is installed at footway level and where no level access is provided to use the chargepoint, the heights of chargepoint components fall within the above stated ranges, which include the height of any kerb and any height mounting base or column component on which the chargepoint is mounted.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3	Chargepoint cables			
5.3.1	Cable length			
	The length of the cable is sufficient to accommodate a range of parking positions, vehicle sizes and vehicle socket-outlet locations whilst not causing obstruction to the surrounding streetscape during the charging process.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	When the chargepoint is not in use, the cable length is supported by appropriate cable routing at the chargepoint and/or an appropriate cable management system, so that it does not present a trip hazard for users and pedestrians.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	When the chargepoint is in use, the unused cable length is supported either safely on the ground adjacent to a vehicle and/or by an appropriate cable management system, so that it does not present a trip hazard for users and pedestrians.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The free cable length does not exceed 7.5 m when not in use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3.2	Cable weight and cable management systems			
	The upward force required to remove a chargepoint connector from the associated charging cable holster/dock does not exceed 60 N.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The charging cable has been extended to a distance of 4 m from the chargepoint with the charging cable suspended in the air, or for the full extension length of the charging cable if this is less than 4 m, and the linear force-in-hand has been measured to assess whether this exceeds 60 N.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Where the linear force-in-hand measurement at a distance of 4 m with the charging cable suspended in the air, or for the full extension length of the charging cable if this is less than 4 m, exceeds 60 N, support to the cable has been provided either by increasing the length of the charging cable so it can rest safely on the ground or through the inclusion of an appropriate cable management system to reduce the force-in-hand measurement to a maximum of 60 N.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Where it is not feasible to reduce the linear force-in-hand measurement to a maximum of 60 N at a distance of 4 m with the charging cable suspended in the air, or for the full extension length of the charging cable if this is less than 4 m, additional assistance is provided at these chargepoints in accordance with 7.5.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The tethered charging cable connectors and handles are simple to locate back onto their holster or dock after use through appropriate ergonomic design of holsters or docks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table E.1 – Checklist: Core standard for minimum requirements for accessibility for all public chargepoints (*continued*)

Clause No.	Requirement	YES	NO	N/A
5.3.3	Cable connector grip			
	The chargepoint cable connector grip or handle is of a suitable material and ergonomic design to be usable by people, including disabled people with strength or dexterity impairments.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The diameter of the gripping portion of a chargepoint connector grip or handle is between 19 mm and 43 mm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The chargepoint cable connector grip or handle is designed so that the connector is robust, reliable and easy to maintain.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3.4	Cable and connector visibility			
	The tethered chargepoint cable and connector is suitably visible to provide visual contrast for chargepoint users, including disabled people along with other footway users, in accordance with light reflectance value and visual contrast principles in BS 8300-1:2018, Annex B.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.4	Chargepoint connection			
	The chargepoint connector and any associated chargepoint socket-outlet cover are operable without using an excessive force; an assessment has been carried out on the maximum operating force (when inserting or removing the connector or using the chargepoint socket-outlet cover) to determine whether the force exceeds 60 N.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Where it is not feasible to reduce the force required to operate any chargepoint connector, and any associated chargepoint socket-outlet cover, to a maximum of 60 N, additional assistance is provided at these chargepoints in accordance with 7.5.			
	Chargepoint connectors and/or socket-outlets are clearly and unambiguously labelled to indicate the type of chargepoint connector, in accordance with BS EN 17186:2019.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.5	Chargepoint screen/visual interface			
5.5.1	Screen/visual interface tilt			
	The screen or visual interface is oriented so that it is readable from both a fully standing and a seated position.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Where a screen or visual interface has touch interface elements, the screen or visual interface is tilted at an angle of between 0° and 20° upwards from the vertical plane towards the user of the chargepoint.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table E.1 – Checklist: Core standard for minimum requirements for accessibility for all public chargepoints (*continued*)

Clause No.	Requirement	YES	NO	N/A
5.5.2	Screen/visual interface light, colours and text size			
	The content and composition of any screen or visual interface, including font size, colours, contrast, and layout, is designed so that the content is accessible to a broad range of users, in accordance with BS EN 301549:2021, Clause 11.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The content and text on a screen or visual interface are easily readable for those with vision impairments and colour blindness, and the needs of those for whom English and/or Welsh (as appropriate to geographic location) is not their first language, including British Sign Language users, are taken into account.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Screen or visual interface content and text are clearly visible in outdoor conditions, minimizing the effects of ambient lighting and glare, such as from sunlight and ensuring any internal lighting on the screen or visual interface is illuminated in outdoor conditions, such as by using anti-glare coating on the screen or visual interface.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.5.3	Screen/visual interface interaction			
	The location of the screen/visual interface and the payment terminal are clearly identifiable by users, such as by illumination of the screen/visual interface.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	All interactive features on a screen or visual interface are clearly and unambiguously labelled for their specific purpose and are designed to take into account the needs of users with mobility and manual dexterity impairments.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The touchscreen interface is positioned at a height of between 800 mm and 1 200 mm (in accordance with 5.2).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The interaction with a touchscreen takes into account the accessibility guidance in BS 8300-2:2018, 15.4.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.5.4	Screen/visual interface considerations for instructions and language used			
	The instructions and information provided on the screen or visual interface is produced in easily understandable language for all users, and any text uses plain English and/or Welsh, as appropriate to geographic location, and considers the use of simple symbols to convey information.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Unambiguous instructions are provided at the chargepoint screen or visual interface to support a user through the process of setting up and using the chargepoint, including for first time users.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Chargepoint placement			
6.1	General			
	The placement and installation position of public chargepoints takes into account parking provision and horizontal movement good practice accessibility guidance within BS 8300-1:2018, Clause 7 and Clause 8, respectively, along with the guidance within the UK Government's "Inclusive Mobility" [N1].	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Connections for public chargepoints are in accordance with BS 7671.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table E.1 – Checklist: Core standard for minimum requirements for accessibility for all public chargepoints (*continued*)

Clause No.	Requirement	YES	NO	N/A
6.2	Chargepoint orientation and space surrounding chargepoint			
	The chargepoint is positioned and oriented such that its components can be easily viewed, reached and operated from a seated or fully standing position, by providing adequate spacing in front of the points of access to the chargepoint components.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	A minimum space of 1 200 mm is provided in front of the points of access to all chargepoint components, and preferably 1 800 mm spacing in front of the points of access to all chargepoint components, with some allowance for low-level obstacles/kerbs (see 6.4).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For chargepoints installed at footway level and where no level access point is provided to use the chargepoint, the placement and orientation of the chargepoint is done in such a way that access and reach is ensured for the usability of the chargepoint components, with some allowance for low-level obstacles/kerbs (see 6.4).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The tilt and design of a screen or visual interface on a public chargepoint is such that the effects of ambient lighting are minimized, in accordance with 5.5.1 and 5.5.2.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.3	Ground surface type below and around chargepoint			
	The ground surface below and surrounding the public chargepoint is smooth and stable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The ground surface below and surrounding the public chargepoint is made of a material suitable for and with slip resistance appropriate for footway use and includes suitable drainage to prevent significant accumulation of water in the vicinity of the chargepoint.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Visual contrast is provided between the chargepoint and surrounding surfaces in both wet and dry conditions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The provision of a smooth and stable ground surface type below and surrounding public chargepoints is uniform to allow, at a minimum, a user full and easy access from the chargepoint to plugging in their vehicle.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	There are arrangements so that the ground surface surrounding the public chargepoints remains well-maintained.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For chargepoints placed and installed within a planted area (i.e. where a concrete base has been extended into a planted area), the concrete base beneath the chargepoint is extended at surface level to maintain a clear and obstruction-free area for chargepoint usage and access.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	All ground surface requirements within 6.3 cover the spacing requirements in front of the points of access to chargepoint components as outlined in 6.2, as a minimum.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table E.1 – Checklist: Core standard for minimum requirements for accessibility for all public chargepoints (*continued*)

Clause No.	Requirement	YES	NO	N/A
6.4	Chargepoint reach distance and low-level obstacles			
	It has been established whether public chargepoint orientation and placement can be achieved without any low-level obstacles in front of the points of access to public chargepoint components.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Where there are unavoidable low-level obstacles immediately in front of the public chargepoint, all chargepoint components are at a reach distance not exceeding 220 mm, with any low-level obstacles included in this reach distance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Where public chargepoints are placed and installed at footway level and where chargepoint operation is from carriageway level and the points of access of chargepoint components are facing towards the edge of the kerb, all chargepoint components are at a reach distance not exceeding 220 mm from the edge of the kerb.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	All other prior requirements related to the height (5.2) and orientation (6.2) are applied to chargepoints that are placed and installed at footway level, irrespective of where the points of access of chargepoint components are located.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Where the placement of a public chargepoint is in the vicinity of low-level obstacles, mitigation is provided to minimize the risk of trip hazards from these low-level obstacles, such as by visually contrasting the obstacle to the adjacent surfaces.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The points of access to chargepoint components are not obstructed or obscured by plants, foliage or other shrubbery.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.5	Bollards and impact protection barriers			
	Bollards and/or impact protection barriers are solely used for the purpose of electrical safety and protection of the chargepoint, vehicles and users.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For impact protection barriers, the outside distance between the impact protection barriers and a public chargepoint does not exceed 220 mm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For impact protection barriers, and where a public chargepoint is installed at footway level and accessed from carriageway level, the provision of impact protection barriers falls within the reach distance requirement of 220 mm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For impact protection barriers, the height of impact protection barriers surrounding a public chargepoint does not exceed 600 mm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For bollards, any bollards adjacent to chargepoints are at least 1 000 mm from ground level.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For bollards, the spacing of bollards relative to other bollards and other temporary or permanent obstructions in the vicinity of a public chargepoint allows a minimum of 1 400 mm spacing between bollard centres.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For bollards, the extremities of bollards are not located more than 300 mm forward or to the side of a public chargepoint, and preferably not located more than 100 mm forward or to the side of a public chargepoint.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table E.1 – Checklist: Core standard for minimum requirements for accessibility for all public chargepoints (*continued*)

Clause No.	Requirement	YES	NO	N/A
7	Streetscape and public realm around the chargepoint			
7.1	General			
	The built environment surrounding public chargepoints takes into account accessibility guidance for the built environment within BS 8300-1:2018, Clause 7, Clause 8, Clause 9, Clause 10 and Clause 11, along with the guidance within the UK Government's "Inclusive Mobility" [N1].	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.2	Street furniture in the vicinity of public chargepoints			
	Public chargepoints are installed such that the impact of the chargepoint in combination with other existing street furniture does not further compromise the accessibility of the surrounding environment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For public chargepoints installed in a row, a minimum space of 1 200 mm is provided between chargepoints, and preferably 1 800 mm spacing between chargepoints (see 6.2).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Supporting electrical infrastructure for public chargepoints does not reduce the accessibility of the surrounding built environment in combination with other existing street furniture, in accordance with BS 8300-1:2018, 8.2.1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The siting of public chargepoints, including bollards and/or impact protection barriers, is easily detected during the sweep of a cane and there is good visual contrast with the background against which they are seen, in accordance with BS 8300-1:2018, Clause 8.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Appropriate warning, guidance and/or information is provided to people who are blind or partially sighted where the siting of a public chargepoint might be an obstacle, in accordance with BS 8300-1:2018, Clause 8.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.3	Level access points and dropped kerbs			
	It has been established whether public chargepoint installation can provide level access at the parking bay to access and use the public chargepoint, or whether the chargepoint can be accessed and used from carriageway level.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Where public chargepoints are placed and installed at footway level, and the chargepoint is positioned or oriented such that any of its components cannot be accessed, viewed, used or operated from carriageway level, a dropped kerb is provided within a maximum of 20 m distance of the chargepoint, and preferably within a maximum of 8 m distance of the chargepoint, where no existing dropped kerbs or pavement access areas exist.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Where public chargepoints are required to be positioned at footway level (i.e. where the carriageway is not raised to include the chargepoint), the installation of public chargepoints identifies how access can be provided to the surrounding footway and/or built environment safely and in close proximity to the chargepoint.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Where dropped kerbs and level access points are installed, dropped kerbs and level access points are accompanied with appropriate tactile paving.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table E.1 – Checklist: Core standard for minimum requirements for accessibility for all public chargepoints (*continued*)

Clause No.	Requirement	YES	NO	N/A
7.4	Distance between public chargepoints and amenities or a venue			
	An assessment has been carried out to ascertain how situation and installation of public chargepoints can be in prominent and visible locations in close proximity to amenities or a venue for which the chargepoints have been installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.5	Provision of additional assistance for chargepoints and at service areas			
	For higher-powered chargepoints installed at service areas, arrangements are in place such that additional assistance is available at service areas for disabled people who are unable to use and operate higher-powered chargepoints without such assistance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For public chargepoints that cannot meet the linear force-in-hand measurements in 5.3.2 or the connection force requirements in 5.4, arrangements are in place such that additional assistance is available at the chargepoints for disabled people who are unable to use and operate these chargepoints without such assistance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Digital platforms and information provision for chargepoints			
8.1	Remote digital platforms for public chargepoints			
8.1.1	Provision of remote digital platforms for public chargepoints			
	Operation of and interaction with public chargepoints is supported by a remote digital platform, such as a smartphone application, including all necessary back office operational requirements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.1.2	Content and composition of remote digital platforms for public chargepoints			
	The content and composition of remote digital platforms used for public chargepoint operation and usage is designed such that the content is accessible to a broad range of users, including font size, colours, contrast and layout, following all relevant requirements in 5.5.2.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The instructions and information provided on remote digital platforms used for public chargepoint operation and usage is produced in easily understandable and plain English and/or Welsh, as appropriate to geographic location, and incorporates the use of symbols to convey information, following all relevant requirements in 5.5.4.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.2	Information provision for chargepoints			
	Data regarding the accessibility of public chargepoints is provided in an openly available format to consumers where data is available, including data categories, such as type of associated parking bay (i.e. designated accessible or standard size), accessibility of chargepoint location and placement, accessibility of chargepoint components, and the provision or otherwise of additional assistance and/or any nearby amenities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

E.2 Checklist: Supplementary good practice accessibility guidance for all public chargepoints

COMMENTARY ON E.2

The checklist in Table E.2 is for the supplementary good practice accessibility guidance for all public chargepoints (as outlined in Annex A). Users of this PAS should not solely consult this checklist to understand the good practice guidance in Annex A, rather this checklist should be supplementary to the guidance – there are many notes and contextual information provided throughout Annex A that are not available in this checklist. As outlined in Clause 4, this supplementary good practice guidance should be taken into account when installing public chargepoints.

Table E.2 – Checklist: Supplementary good practice accessibility guidance for all public chargepoints

Clause No.	Requirement	YES	NO	N/A
A	Establishing an inclusive and safe environment around public chargepoints			
A.1	Lighting around public chargepoints			
	Provision of lighting around public chargepoints has given due consideration to BS 8300 1:2018, Clause 11.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Lighting/illuminance has been considered/provided: a) in the environment surrounding public chargepoints to enable safe vehicle navigation to the chargepoint; b) to illuminate chargepoints, the surroundings of chargepoints, the components of the chargepoint that the user interacts with, and charging socket-outlets on the chargepoint and on the vehicle; and c) to illuminate the routes from public chargepoints to any nearby venues or amenities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.2	Provision of security cameras around chargepoints			
	Security cameras are provided in the vicinity of public chargepoints or public chargepoints are installed in the vicinity of existing security cameras.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Security cameras are visible such that it is obvious that an area containing public chargepoints is protected by the security cameras and are maintained in good working order for monitoring and maintenance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Areas containing public chargepoints that are protected by security cameras are provided with sufficient lighting for the cameras to capture the area in all weather conditions, in accordance with A.1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table E.2 – Checklist: Supplementary good practice accessibility guidance for all public chargepoints (*continued*)

Clause No.	Requirement	YES	NO	N/A
A.3	Signage provision local to chargepoints			
A.3.1	Signage for off-street chargepoints to indicate location			
	For off-street chargepoints (Scenario A and Scenario B), signage is provided in public car parks in the vicinity of public chargepoints to indicate that the parking bays are enabled with chargepoints.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For off-street chargepoints (Scenario A and Scenario B), the design of any signage indicating locations of public chargepoints, in terms of text size, font, colour, visual contrast and layout is in accordance with BS EN 17210:2021, 6.6.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For off-street chargepoints (Scenario A and Scenario B), signage adjacent to chargepoints is in a location where the signage can be clearly seen whilst traversing the car park, and by people at seated or standing height on a carriageway or on a footway, and from inside the parking space, including from inside the vehicle.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For off-street chargepoints (Scenario A and Scenario B), signage adjacent to chargepoints is located and positioned such that it does not further impede access to the surrounding footway and/or built environment, and minimizes the risk of causing injury to users or passers-by.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.3.2	Signage for on-street chargepoints to indicate location			
	For on-street chargepoints (Scenario C and Scenario D), signage indicating the locations of on-street chargepoints and designated accessible on-street parking bays follows The Traffic Signs Regulations and General Directions 2002 [6].	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A.4	Charging process signals			
	The design of public chargepoints considers how to provide positive forms of feedback to indicate when certain stages of the charging process have been initiated or concluded, using tactile, audible or visual feedback as examples, such as clear feedback given to: <ul style="list-style-type: none"> a) support a user in understanding at what stage they are at in setting up the charging process; b) confirm to a user that each action during setting up the charging process has been successfully carried out, such as removing a connector, plugging in a chargepoint to a vehicle socket-outlet, and replacing a connector correctly; and c) confirm to a user that payment for the charging process has been successful. 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Where visual feedback is provided in the form of lighting, any illuminated features on the chargepoint that are used to provide information or feedback are clearly visible in direct sunlight.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Sufficient time is provided to the chargepoint user to perform any given charging physical set up processes without the system timing out and having to restart.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

E.3 Checklist: Good practice accessibility guidance for chargepoints installed adjacent to off-street designated accessible parking bays

COMMENTARY ON E.3

The checklist in Table E.3 is for the good practice accessibility guidance for chargepoints installed adjacent to off-street designated accessible parking bays (as outlined in Annex B). Users of this PAS should not solely consult this checklist to understand the good practice guidance in Annex B, rather this checklist should be supplementary to the guidance – there are many notes and contextual information provided throughout Annex B that are not available in this checklist. As outlined in Clause 4, chargepoints installed adjacent to off-street designated accessible parking bays should also follow all requirements as outlined in Clause 5, Clause 6, Clause 7 and Clause 8 (and as summarized in the checklist in E.1) in addition to the good practice accessibility guidance in Annex B.

Table E.3 – Checklist: Good practice accessibility guidance for chargepoints installed adjacent to off-street designated accessible parking bays

Clause No.	Requirement	YES	NO	N/A
B	Designated accessible parking bays – off-street chargepoints			
B.1	Designated accessible off-street parking bays with chargepoints – general requirements			
	Check 1: The chargepoint being installed is in an off-street setting (Scenario A and Scenario B).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Check 2: The chargepoint being installed is adjacent to a designated accessible parking bay.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Check 3: Subclause 4.2 has been consulted prior to implementing the good practice guidance in Annex B.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.2	Placement of chargepoints and the surrounding built environment – accessible off-street parking bays with chargepoints			
B.2.1	Surface gradient at off-street designated accessible parking bays with chargepoints			
	The public chargepoint, designated accessible parking bay and its surrounding area are on flat, level ground rather than sloping ground, and the ground is smooth and stable in accordance with 6.3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The surface on which a chargepoint is placed for chargepoints located adjacent to designated accessible parking bays has a fall to enable surface water drainage. The fall is not steeper than 1:50, and preferably not steeper than 1:60.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Any ramps required to gain access to a public chargepoint and its surrounding area are installed in accordance with BS 8300-1:2018, 9.2.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.2.2	Reach distance and space in front of public chargepoints adjacent to designated accessible off-street parking bays			
	There are, ideally, no obstacles in front of the chargepoint resulting in no reach distance to access the public chargepoint (i.e. a reach distance of 0 mm).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For public chargepoints installed at footway level but operated at carriageway level, the reach distance (i.e. the distance from the edge of the kerb to the chargepoint) is as close to 0 mm as possible, and no greater than 220 mm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The installation of the chargepoint has assessed whether additional space can be provided at the points of access to where a disabled person accesses the chargepoint components, such as providing a space of 1 850 mm x 2 100 mm at the points of access to the chargepoint and its components.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table E.3 – Checklist: Good practice accessibility guidance for chargepoints installed adjacent to off-street designated accessible parking bays (*continued*)

Clause No.	Requirement	YES	NO	N/A
B.2.3	Additional space allowance surrounding off-street designated accessible parking bays with public chargepoints			
B.2.3.1	General requirements – additional space allowance surrounding off-street designated accessible parking bays with public chargepoints			
	At a minimum, designated accessible parking bays located in public car parks are designed in accordance with guidance for off-street parking provision within BS 8300-1:2018, 7.4, 7.5, 7.6, 7.7, 7.8 and 7.9 . Due consideration is also given to the UK Government's "Inclusive Mobility" [N1], Section 8.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Consideration has been given to providing sufficient space around the vehicle for wheelchair users and users of other mobility aids to disembark the vehicle whilst minimizing the distance from the chargepoint to the vehicle.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	An assessment has been made to maintain the sufficient space and routes around the vehicle whilst the vehicle is plugged to charge, taking into account the open vehicle socket-outlet flap and plugged-in connector.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	An assessment has been made to minimize the impact of trailing cables on the surrounding environment so that they do not present a trip hazard for users of the built environment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.2.3.2	Additional space allowance surrounding parallel off-street designated accessible parking bays with public chargepoints			
	For the design of a designated accessible off-street parking bay with an adjacent chargepoint, and once a vehicle is parked, the design includes: a) sufficient space on both sides of a parking space to allow people to fully open their door and enter and exit the vehicle safely, with 1 200 mm spacing as a minimum and ideally 1 600 mm; b) sufficient space at the end of a parking space to allow people to move behind the rear of the vehicle safely and comfortably, and to accommodate the safe loading/deployment of any adaptations, such as ramps, hoists and lifts from the boot of a vehicle, with 1 200 mm spacing as a minimum and ideally 1 600 mm; and c) sufficient space at the chargepoint end of a parking space to allow users to manoeuvre between the chargepoint and the nearest end of the vehicle safely and comfortably, i.e. space at the front and the rear of the vehicle with 1 600 mm spacing as a minimum and ideally 1 850 mm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.2.3.3	Placement of wheel stops within off-street designated accessible parking bays with public chargepoints			
	Where a wheel stop is installed within a designated accessible off-street parking bay, the installation of the wheel stop is provided with a minimum 900 mm clearance from the front of the parking space to the wheel stop, and with a wheel stop of maximum width of 1 800 mm, in addition to the required spacing around the designated accessible parking bay (1 200 mm minimum and preferably 1 600 mm).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table E.3 – Checklist: Good practice accessibility guidance for chargepoints installed adjacent to off-street designated accessible parking bays (*continued*)

Clause No.	Requirement	YES	NO	N/A
B.2.4	Distance from off-street chargepoints installed adjacent to designated accessible parking bays to a dropped kerb or level access			
	Where chargepoints are installed at footway level and the points of access to chargepoint components are also at footway level, it has been established whether level access can be provided at the parking bay to access and use the chargepoint and the adjacent footway.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If level access cannot be provided, a dropped kerb is provided directly adjacent to a parking bay (or within a maximum of 8 m distance in a safe route of the parking bay) to enable access to the footway and operation of the chargepoint.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The design of a dropped kerb is in accordance with the UK Government's "Inclusive Mobility" [N1], Section 4.11.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Where dropped kerbs and level access points are installed, dropped kerbs and level access points are accompanied with appropriate tactile paving. Tactile paving is provided in accordance with the UK Government's "Inclusive Mobility" [N1], Section 6, with recommended layouts for tactile paving from within the UK Government's Guidance on the Use of Tactile Paving Surfaces [15] also considered.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.2.5	Considerations for larger vehicles, such as larger wheelchair accessible vehicles or minibuses			
	Where space permits, provision of at least one large designated accessible parking/charging bay that can accommodate a larger vehicle, such as a minibus, is provided in a car park, in accordance with BS 8300-1:2018, Table C.2.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The number of required WAV designated accessible parking/charging bays for a given location is influenced by the facilities and services available in the vicinity of the chargepoint location; there are processes in place to regularly review WAV parking bay provision to ensure WAV parking and charging facilities are adequately available, including provision for side-access WAVs, where possible.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Consideration has been given to verifying there is sufficient space around the vehicle for wheelchair users and users of other mobility aids to disembark the vehicle whilst minimizing the distance from the chargepoint to the vehicle.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The spacing considerations as outlined in B.2.3 have been applied, as a minimum, in addition to the larger physical space of the WAV parking bay; it has been verified that there is sufficient space at the chargepoint end of the designated accessible parking bay to allow disabled people to move between the chargepoint and the front of the vehicle, and at least 3 000 mm spacing for rear-access WAV parking spaces.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Appropriate signage is provided for large designated accessible parking bays equipped with a public chargepoint to indicate the additional space provided along with the presence of a chargepoint at the parking bay.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table E.3 – Checklist: Good practice accessibility guidance for chargepoints installed adjacent to off-street designated accessible parking bays (*continued*)

Clause No.	Requirement	YES	NO	N/A
B.3	Establishing an inclusive environment – designated accessible off-street parking bays with chargepoints			
B.3.1	Overhead weatherproofing at service areas			
	Public higher-powered chargepoints installed at off-street service areas (i.e. Scenario B) are provided with overhead protection from adverse weather conditions above the chargepoints, covering the area above where the chargepoint is operated and the entire vehicle parking space. Overhead protection has also been taken into account for other public chargepoints located in car parks (i.e. not exclusively for higher-powered chargepoints; Scenario A).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Access routes from higher-powered chargepoints (i.e. Scenario B) to nearby amenities or buildings within service areas are provided with overhead protection from adverse weather conditions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	As a minimum, higher-powered chargepoints installed adjacent to designated accessible parking bays within service areas are provided with overhead protection from adverse weather conditions, covering the area above where the chargepoint is operated and the entire vehicle parking space, along with access routes from the designated accessible parking bays to nearby amenities or buildings within the service areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.3.2	Road markings for designated accessible off-street parking with chargepoints			
	It is clear that additional space has been provided for the designated accessible parking bay in combination with the public chargepoint.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	All charging bay access zones are distinguished from the vehicle bay either by line marking, such as with a hatched pattern, or otherwise visually contrasted to vehicle bays, such as using colour and/or change of surface finish.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.3.3	Signage for off-street designated accessible parking bays with a chargepoint			
	Signage is provided in addition to appropriate road demarcation to indicate that the designated accessible parking bay has a chargepoint installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	All parking restrictions for chargepoints installed adjacent to designated accessible parking bays are made clear to users and passers-by.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.3.4	Distance between off-street designated accessible parking bays with a chargepoint and amenities or a venue			
	An assessment has been carried out to ascertain how situation and installation of public chargepoints installed adjacent to off-street designated accessible parking bays can minimize the distance between the chargepoints and the associated amenities or venue for which the off-street designated accessible parking bays and chargepoints are dedicated, in accordance with BS 8300-1:2018, Clause 9 and Clause 10, and due consideration has been given to the arrangement principles within the UK Government's "Inclusive Mobility" [N1], Section 8.3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

E.4 Checklist: Good practice accessibility guidance for chargepoints installed adjacent to on-street designated accessible parking bays

COMMENTARY ON E.4

The checklist in Table E.4 is for good practice accessibility guidance for chargepoints installed adjacent to on-street designated accessible parking bays (as outlined in Annex C). Users of this PAS should not solely consult this checklist to understand the good practice guidance in Annex C, rather this checklist should be supplementary to the guidance – there are many notes and contextual information provided throughout Annex C that are not available in this checklist. As outlined in Clause 4, chargepoints installed adjacent to on-street designated accessible parking bays should also follow all requirements as outlined in Clause 5, Clause 6, Clause 7 and Clause 8 (and as summarized in the checklist in E.1) in addition to the good practice accessibility guidance in Annex C.

Table E.4 – Checklist: Good practice accessibility guidance for chargepoints installed adjacent to on-street designated accessible parking bays

Clause No.	Requirement	YES	NO	N/A
C	Designated accessible parking bays – on-street chargepoints			
C.1	Designated accessible on-street parking bays with chargepoints – general requirements			
	Check 1: The chargepoint being installed is in an on-street setting (Scenario C and Scenario D).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Check 2: The chargepoint being installed is adjacent to a designated accessible parking bay.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Check 3: Subclause 4.2 has been consulted prior to implementing the good practice guidance in Annex C.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C.2	Placement of chargepoints and the surrounding built environment – designated accessible on-street parking bays with chargepoints			
C.2.1	Surface gradient at on-street designated accessible parking bays with chargepoints			
	The public chargepoint, designated accessible parking bay and its surrounding area are on flat, level ground rather than sloping ground, and the ground is smooth and stable, in accordance with 6.3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The surface on which a chargepoint is placed for chargepoints located adjacent to designated accessible parking bays has a fall to enable surface water drainage. The fall is not steeper than 1:50, and preferably not steeper than 1:60.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Any ramps required to gain access to a public chargepoint and its surrounding area are installed in accordance with BS 8300-1:2018, 9.2.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C.2.2	Reach distance and space in front of public chargepoints adjacent to designated accessible on-street parking bays			
	There are, ideally, no obstacles in front of the chargepoint resulting in no reach distance to access the public chargepoint (i.e. a reach distance of 0 mm).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	For public chargepoints installed at footway level but operated at carriageway level, the reach distance (i.e. the distance from the edge of the kerb to the chargepoint) is as close to 0 mm as possible, and no greater than 220 mm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The installation of the chargepoint has assessed whether additional space can be provided at the points of access to where a disabled person accesses the chargepoint components, such as providing a space of 1 850 mm x 2 100 mm at the points of access to the chargepoint and its components.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table E.4 – Checklist: Good practice accessibility guidance for chargepoints installed adjacent to on-street designated accessible parking bays (*continued*)

Clause No.	Requirement	YES	NO	N/A
C.2.3	Additional space allowance surrounding on-street designated accessible parking bays with public chargepoints			
C.2.3.1	General requirements – additional space allowance surrounding on-street designated accessible parking bays with public chargepoints			
	Due consideration has been given to guidance for the design of designated accessible on-street parking bays as outlined in UK Government's "Inclusive Mobility" [N1], Section 8.4, such as providing a greater depth for on-street designated accessible parking bays.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	An assessment has been made to maintain sufficient space around the vehicle whilst the vehicle is plugged in to charge in an on-street designated accessible parking bay, taking into account the open vehicle socket-outlet flap and plugged-in connector.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	An assessment has been made to minimize the impact of trailing cables on the surrounding environment so that they do not present a trip hazard for users of the built environment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The installation of on-street chargepoints adjacent to designated accessible parking bays are positioned so as not to obstruct the footpath for vehicle users and other users of the surrounding built environment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C.2.3.2	Additional space allowance surrounding parallel on-street designated accessible parking bays with public chargepoints			
	For the design of a designated accessible on-street parking bay parallel to the kerb with an adjacent chargepoint, and once a vehicle is parked, the design includes: a) provision of a bay of 4 800 mm length for standard accessible parking bays or 6 600 mm length for designated accessible parking bays, with a minimum width of 3 600 mm and a preferred width of 4 000 mm; b) marked access zones between parking spaces with a minimum width of 1 200 mm and a preferred width of 1 600 mm; and c) access routes designed in accordance with BS 8300-1:2018, Clause 8.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C.2.3.3	Additional space allowance surrounding on-street designated accessible angled bays with public chargepoints			
	Where public chargepoints are installed adjacent to designated accessible parking bays that are angled to a kerb, for both on-street and off-street parking, the arrangement and spacing principles as outlined in Figure C.3 are provided, including marked access zones at the front of the parking spaces of minimum 1 200 mm spacing and preferably 1 600 mm spacing, and a straight-line access width to the footway of minimum 1 200 mm width.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table E.4 – Checklist: Good practice accessibility guidance for chargepoints installed adjacent to on-street designated accessible parking bays (*continued*)

Clause No.	Requirement	YES	NO	N/A
C.2.4	Distance from on-street chargepoints installed adjacent to designated accessible parking bays to a dropped kerb or level access			
	Where chargepoints are installed at footway level and the points of access to chargepoint components are also at footway level, it has been established whether level access can be provided at the parking bay to access and use the chargepoint and the adjacent footway.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If level access cannot be provided, a dropped kerb is provided directly adjacent to a parking bay (or within a maximum of 8 m distance in a safe route of the parking bay) to enable access to the footway and operation of the chargepoint.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The design of a dropped kerb is in accordance with the UK Government's "Inclusive Mobility" [N1], Section 4.11.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Where dropped kerbs and level access points are installed, dropped kerbs and level access points are accompanied with appropriate tactile paving. Tactile paving is provided in accordance with the UK Government's "Inclusive Mobility" [N1], Section 6, with recommended layouts for tactile paving from within the UK Government's Guidance on the Use of Tactile Paving Surfaces [15] also considered.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C.3	Establishing an inclusive environment – designated accessible on-street parking bays with chargepoints			
C.3.1	Road markings for designated accessible on-street parking with chargepoints			
	Road markings for bays where additional space has been provided follow The Traffic Signs Regulations and General Directions 2002 ⁴²⁾ [6].	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	All charging bay access zones are distinguished from the vehicle bay either by line marking, e.g. with a hatched pattern, or otherwise visually contrasted to vehicle bays, such as using colour and/or change of surface finish.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C.3.2	Distance between on-street designated accessible parking bays with a chargepoint and amenities or a venue			
	An assessment has been carried out to ascertain how situation and installation of public chargepoints installed adjacent to on-street designated accessible parking bays can minimize the distance between the chargepoints and the associated amenities or venue for which the on-street designated accessible parking bays and chargepoints are dedicated, in accordance with BS 8300-1:2018, Clause 9 and Clause 10, and due consideration has been given to the arrangement principles within the UK Government's "Inclusive Mobility" [N1], Section 8.4.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

⁴²⁾ Legislation.gov.uk (2016), 'The Traffic Signs Regulations and General Directions 2016', <<https://www.legislation.gov.uk/uksi/2016/362/contents/made>>.

Annex F (informative)

Determining forces required for charging cable manoeuvrability

COMMENTARY ON ANNEX F

User testing has found that the usability of chargepoint cables is considered amongst the most prominent barriers facing disabled people when using public chargepoints. Wheelchair users, people reliant on other mobility aids, older people, and those with strength and dexterity impairments can face barriers in holding, manoeuvring and positioning public chargepoint cables and with plugging in chargepoints. Prominent issues facing disabled people include the weight of the cable (particularly for higher-powered chargepoints), the length of chargepoint cables (and associated distance from the chargepoint to the vehicle), the stiffness of chargepoint cables, and the ease of holding, manoeuvring, and positioning a cable.

When considering charging cables, different chargepoints have different types of tethered cables, with some higher-powered chargepoints (i.e. chargepoints with a power rating of 200 kW and above) requiring liquid-cooled or air-cooled charging cables, which adds to the weight of the cable. Cable weight and stiffness are directly affected by, e.g. the power of the chargepoint, the thickness of charging cables, and the presence of insulation materials. The measurement of cable weight does not take into account the impact on the user in terms of their capability of operation; rather the measurement and specification of forces required for cable operation provides a more user-centric measurement of the accessibility of a charging cable.

This PAS addresses requirements for cable weight and length by specifying maximum force-in-hand measurements for charging cables for linear chargepoint forces, which can be tested by chargepoint providers to assess whether charging cables can be considered accessible for all chargepoint users.

User testing with disabled people has found that single-handed use of chargepoint cables is very important – disabled users might have this requirement because one hand is commonly required by the user to maintain their body stability. It is acknowledged that the requirement for single-handed use is of greater importance to disabled users than non-disabled users, and that many users of chargepoints are capable of using both hands to manoeuvre the charging cable; however, single-handed operation of chargepoint cables provides the most relevant indication of the accessibility of charging cables, to ensure they are designed and installed to be inclusive for all chargepoint users.

Examples of users that might have use of one hand to operate a charging cable include wheelchair users with limited lower body strength/mobility; standing users supported by a walking stick, a crutch(es), or a walking frame; users who have use of only one upper limb; and standing users with impaired mobility or balance, who might support themselves by holding surrounding structures, such as a vehicle or a chargepoint.

When considering the forces-in-hand required to manoeuvre and operate a charging cable, there are five forces to consider:

- upward force (the force to hold the handle of a charging cable);
- lateral pull force (the force to pull the handle of a charging cable away from a chargepoint dock, towards the user's body);
- twisting force (the force to twist the handle of a charging cable clockwise/anti-clockwise);
- tilting force (the force to tilt handle forwards/backwards to meet an angled socket-outlet); and
- rotating force (the force to rotate the handle left/right).

The upward and lateral pull forces are measured in Newtons (N), and the twisting, tilting and rotating forces are measured in Newton metres (Nm).

In terms of the step-by-step process of a user operating a chargepoint and plugging in their vehicle:

- Step 1: User lifts cable connector from holster (upward force);
- Step 2: User extends cable (lifting/pulling forces);
- Step 3: User rotates handle/plug towards the vehicle socket-outlet (under opposing force);
- Step 4: User twists handle/plug to align it vertically with vehicle socket-outlet (under opposing force); and
- Step 5: User tilts handle/plug to the same angle as the vehicle socket-outlet (under opposing force).

The twisting forces are prevalent when a user has already extended the charging cable, reaching the location on their vehicle where the charging socket-outlet is located. The charging cable exerts an opposing force on the handle towards the chargepoint. This force is directly proportional to the distance away from the chargepoint – the resistive force of the charging cable (weight/extension length) has a substantial effect on the force required to twist, tilt, and rotate the handle/connector. The stiffness of charging cables with respect to the required rotational forces has been identified as a key barrier to use of public chargepoints for disabled users. The rotation forces can be very difficult to manage one-handed and disabled users might find these movements significantly challenging to achieve.

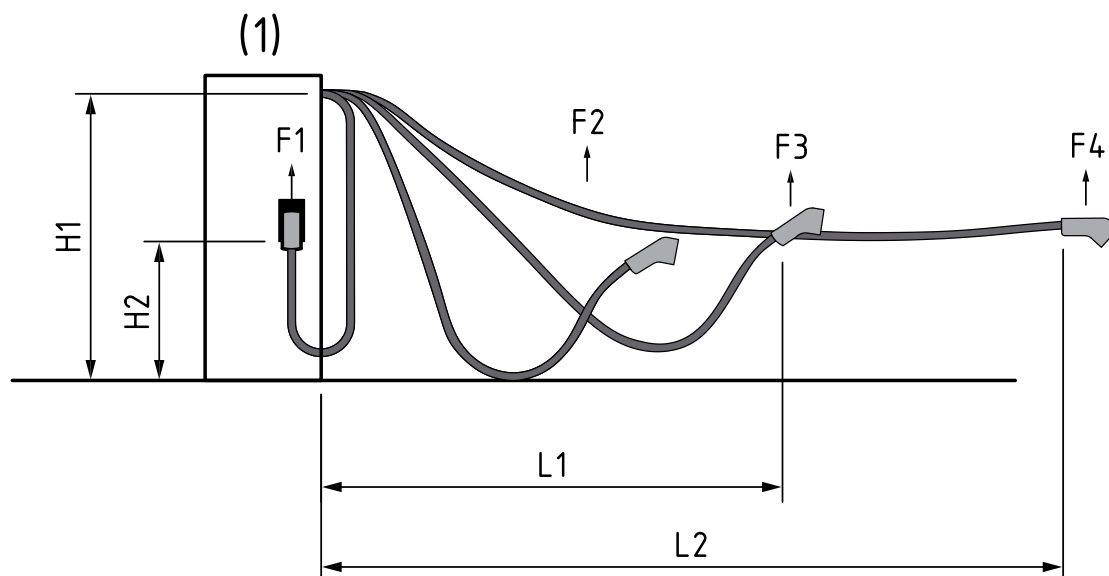
The specification of force-in-hand requirements in 5.3.2 (with cable length covered in 5.3.1) were informed by a testing method to assess when disabled users might have difficulty in operating chargepoint cables under excessive forces through single-handed use. The research and testing method involved developing and building testing rigs to simulate the experience of using a public chargepoint cable and carrying out user testing to measure the forces required to carry out tasks associated with chargepoint operation. The results of the user testing were then compared against real-world conditions of public chargepoints.

The research method for user testing recorded measurements for the five force-in-hand measurements as outlined. The research method for testing real-world conditions focused on linear forces required to operate the chargepoint at various distances of the chargepoint cable away from the chargepoint and at various conditions of chargepoint support, as follows:

- Force 1: lift handle out of chargepoint holster/dock;
- Force 2: hold the chargepoint handle away from the chargepoint, with the charging cable touching the ground;
- Force 3: hold the chargepoint handle away from the chargepoint, with the charging cable just lifted off the ground; and
- Force 4: hold the chargepoint handle at the full extension length of the charging cable.

These four forces, and associated lengths, are illustrated in Figure F.1.

Figure F.1 – Linear forces required to operate a public chargepoint



(1) Public chargepoint

H1 = height of fixed end of charging cable from ground;

H2 = height of chargepoint holster (bottom of chargepoint connector handle);

L1 = length from chargepoint when charging cable is no longer supported on the ground;

L2 = length from chargepoint when charging cable is at full extension;

LC = total charging cable length;

F1 = force to lift chargepoint connector from holster;

F2 = force to hold chargepoint connector when charging cable is supported on the ground;

F3 = force to hold chargepoint connector when charging cable is no longer supported on the ground; and

F4 = force to hold chargepoint connector at full extension of charging cable.

Measurements of these forces consider the acceleration force due to gravity ($g = 10 \text{ m/s}^2$). Whilst the mass of the charging cable per meter and the diameter of the charging cable are important considerations, they are implicitly considered in the forces required to operate the chargepoint cable.

When considering the operation of charging cables by disabled people, there are many important factors.

- The chargepoint handle and associated cable weight is relatively light and easy to support if there is a long charging cable that touches the floor, thereby reducing the forces-in-hand required to hold and manoeuvre the charging cable. The floor can support more than half of the cable weight and reduce the required forces by more than half, making it more easily manoeuvrable for the user. Long cables should not become obstructive to users and block the surrounding space adjacent to vehicles when the chargepoint handle is docked in its holster.
- When a chargepoint cable is extended to a distance that is far enough from the chargepoint that the charging cable no longer touches the ground, it is noticeably more difficult to support the weight of the cable, as the charging cable and handle get heavier and more difficult to manoeuvre as it gets further away from the chargepoint. The forces required to hold a chargepoint handle act both upward and away from the chargepoint when the charging cable no longer touches the ground. As such, the length of the charging cable has a significant impact on the required forces to operate the charging cable.
- When a charging cable is fully extended and held, the dominant force on the chargepoint handle is exerted horizontally.

In consideration of forces-in-hand for utilization, it can be concluded that a charging cable supported by the floor or by a cable management system is significantly less heavy and less difficult to manoeuvre for disabled people, which is a product of the cable length and the attachment height point of the charging cable to the chargepoint. Operation of chargepoints (i.e. cables and chargepoint connectors) within 2 m of the chargepoint and where the charging cable is either supported by the floor or fully suspended can greatly lessen the forces required to connect a charging cable to a vehicle.

It is important to note that disabled users experience a range of difficulties – some disabled users might experience challenges with access and stability even at close distances to a chargepoint, caused by the pulling force required to extend a charging cable coupled with significant resistive/returning forces in the opposite direction. Additionally, wheelchair users might have to release their wheelchair brakes and position the wheelchair at an angle that is opposed to the direction of pull, creating a natural braking force – wheelchair users might be disadvantaged by large lateral forces required to pull a charging cable due to the propensity of a wheelchair to roll without brakes on. The force requirements in 5.3.2 should be treated as the absolute maximum force for operation, and every effort should be made to reduce these forces as far as feasible.

The requirements within 5.3.2 (with cable length covered in 5.3.1) are focused on upward and lateral forces-in-hand; however, twisting, tilting, and rotational forces should be taken into account in the design of charging cables, so these forces align with the specified force requirements in 5.3.2 and that these additional forces do not inhibit the usability of charging cables for all chargepoint users.

The linear forces-in-hand required to operate a charging cable (upward force and lateral pull force), as specified in 5.3.2, should be tested using the testing method outlined in Figure F.1.

The twisting, tilting and rotational forces required to operate a charging cable and to connect it to a vehicle socket-outlet should be assessed so that the resultant forces do not exceed the maximum force requirements outlined in 5.3.2.

Bibliography

Standards publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 5489-1:2020, *Design of road lighting – Part 1: Lighting of roads and public amenity areas – Code of practice*

BS EN 13201-2, *Road lighting – Part 2: Performance requirements*

BS EN 17161, *Design for All – Accessibility following a Design for All approach in products, goods and services – Extending the range of users*

BS EN 50620:2017+A1:2019, *Electric cables – Charging cables for electric vehicles*

BS EN IEC 61980-1, *Electric vehicle wireless power transfer (WPT) systems – Part 1: General requirements*

BS EN ISO 9241-20:2021, *Ergonomics of human-system interaction – Part 20: An ergonomic approach to accessibility within the ISO 9241 series*

BS EN ISO 9241-171:2008, *Ergonomics of human-system interaction – Part 171: Guidance on software accessibility*

IEC 62196-1:2022, *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – Part 1: General requirements*

PD CLC IEC/TS 61980-3, *Electric vehicle wireless power transfer (WPT) systems – Part 3: Specific requirements for the magnetic field wireless power transfer systems*

Other publications

- [1] GREAT BRITAIN. Equality Act 2010. London: The Stationery Office.
- [2] GREAT BRITAIN. Building Regulations 2010. London: The Stationery Office.
- [3] GREAT BRITAIN. Building (Amendment) (Wales) Regulations 2014. London: The Stationery Office.

- [4] SCOTLAND. Building (Scotland) Regulations 2004. London: The Stationery Office.
- [5] NORTHERN IRELAND. Building Regulations (Northern Ireland) 2012. London: The Stationery Office.
- [6] GREAT BRITAIN. Traffic Signs Regulations and General Directions 2002. London: The Stationery Office.
- [7] GREAT BRITAIN. European Communities (Definition of Treaties) (United Nations Convention on the Rights of Persons with Disabilities) Order 2009. London: The Stationery Office.
- [8] MOTABILITY & RICARDO, *Electric Vehicle charging infrastructure for people living with disabilities*. 2020. Available from <https://www.motability.org.uk/media/nghmmyu0/electric_vehicle_charging_infrastructure_for_people_living_with_disabilities_ricardo_energy_and_environment.pdf>.
- [9] OZEV, *The consumer experience at public electric vehicle chargepoints*. 2021. Available from <<https://www.gov.uk/government/consultations/the-consumer-experience-at-public-electric-vehicle-chargepoints>>.
- [10] OZEV, *Future of transport regulatory review: zero emission vehicles*. 2021. Available from <<https://www.gov.uk/government/consultations/future-of-transport-regulatory-review-zero-emission-vehicles/future-of-transport-regulatory-review-zero-emission-vehicles>>.
- [11] GREAT BRITAIN. Alternative Fuels Infrastructure Regulations 2017. London: The Stationery Office.
- [12] IET, *Code of Practice for Electric Vehicle Charging Equipment Installation, 4th Edition*. 2020. Available from <<https://shop.theiet.org/code-of-practice-for-electric-vehicle-charging-equipment-installation-4th-edition>>.
- [13] FOUNDATION FOR PEOPLE WITH LEARNING DISABILITIES, *Easy Read*. 2021. Available from <<https://www.learningdisabilities.org.uk/learning-disabilities/a-to-z/e/easy-read>>.

- [14] CIHT, *Code of Practice 'Well-managed highway infrastructure'*. 2016. Available from <<https://www.ciht.org.uk/ukrlg-home/code-of-practice>>.
- [15] UK Government (1998), *Guidance on the use of Tactile Paving Surfaces*, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/918353/tactile-paving-surfaces.pdf
- [16] ACCESSABLE, *Motorway Services*. 2021. Available from <https://www.accessable.co.uk/searches?query=Motorway+Services&location_query=&commit=Search>.
- [17] ACCESS AND MOBILITY PROFESSIONAL, *Highways England issues disabled guides for motorway services*. 2021. Available from <<https://www.accessandmobilityprofessional.com/highways-england-issues-disabled-guides-for-motorway-services/>>.
- [18] British Parking Association (2022), *Bay sizes*, <https://www.britishparking.co.uk/Resources/bay-size>
- [19] UK GOVERNMENT, *Traffic signs manual – Guidance for traffic authorities on the use of traffic signs and road markings*. 2020. Available from <https://www.gov.uk/government/publications/traffic-signs-manual>.
- ETEC & BRITISH COLUMBIA, *Electric Vehicle Charging Infrastructure Deployment Guidelines*. 2009. Available from <<https://vancouver.ca/files/cov/EV-deployment-guidelines.pdf>>.
- LONG, M. *DfT seeks designers to make EV charge-points as iconic as telephone boxes*. Design Week, 2021. Available from <<https://www.designweek.co.uk/issues/7-13-june-2021/ev-charging-port-tender/>>.
- PEOPLE'S PARKING, *People's Parking Handbook*. 2021. Available from <<https://www.peoplesparking.org/uploads/vOdC7pFQW3qh5mWXiRXbXLPQsg1C6-T9iY1vSMRvDfs/Handbook%20updated-V1-V2.pdf>>.
- RESEARCH INSTITUTE FOR DISABLED CONSUMERS (RiDC), *Going electric? Research report into the accessibility of plug-in electric vehicles*. 2020. Available from <https://www.ridc.org.uk/sites/default/files/uploads/Research%20Reports/ElectricCars/RiDC_ElectricCars_Report.pdf>.
- SCOTTISH & SOUTHERN ELECTRICITY NETWORKS (SSEN), DISABLED MOTORING UK (DMUK), IMPACT RESEARCH and OZEV. *Equal EV public presentation*. 2021. Available from <<https://www.ssen.co.uk/news-views/2021/2021-ssen-invites-stakeholders-to-equal-ev-webinar/>>.
- SCOTTISH & SOUTHERN ELECTRICITY NETWORKS, *Equal EV project*. 2021. Available from <<http://news.ssen.co.uk/news/all-articles/2021/july-2021/ssen-first-electricity-network-to-explore-ev-accessibility-for-people-with-disabilities/>>.
- TRANSPORT SCOTLAND, *Over £1 million for transport decarbonisation challenge funds*. 2021. Available from <<https://www.transport.gov.scot/news/over-1-million-for-transport-decarbonisation-challenge-funds/>>.
- UK POWER NETWORKS, *Enable project*. 2021. Available from <<https://innovation.ukpowernetworks.co.uk/projects/enable/>>.
- WENDLER, M. *Accessibility and EV Charging Stations*. The Green Standard, 2018. Available from <<https://www.parking-mobility.org/wp-content/uploads/2019/03/18-02-Green-standard.pdf>>.
- YOU SMART THING, *EV Assist +: New funding to improve charge point accessibility*. 2021. Available from <<https://yousmartthing.com/ev-assist/>>.

Further reading

COMPETITION & MARKETS AUTHORITY (CMA), *Summary: Building a comprehensive and competitive electric vehicle charging sector that works for all drivers*. 2021. Available from <<https://www.gov.uk/government/publications/electric-vehicle-charging-market-study-final-report/final-report>>.

DESIGNABILITY & MOTABILITY, *Accessible EV Charging – User Engagement Report*. 2021. Available from <https://designability.org.uk/wp-content/uploads/2021/08/User-Engagement-Report_Accessible-EV-Charging_Motability_FINAL.pdf>.

ENERGY SAVING TRUST, *Positioning chargepoints and adapting parking policies for electric vehicles*. 2019. Available from <<https://energysavingtrust.org.uk/wp-content/uploads/2020/10/Local-Authority-Guidance-Positioning-chargepoints.pdf>>.

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