Design of publicly accessible charging sites for battery electric HGVs – Code of practice

June 2024 Version 1

BSI Flex 2071 v1.0:2024-06

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Published by BSI Standards Limited 2024

ISBN 978 0 539 25432 7

ICS 29.020, 29.120.99, 43.120, 91.040.10

Publication history
First published June 2024

Contents

Foreword

This BSI Flex was sponsored by Connected Places Catapult (CPC).
Its development was facilitated by BSI Standards Limited and it was released under licence from The British Standards Institution.
It came into effect on 30 June 2024.

Acknowledgement is given to the Department for Transport for funding this BSI Flex.

Acknowledgement is given to Brian Robinson, at BJR Solutions, as the technical author and the following organizations that were involved in the development of this BSI Flex as members of the Advisory Group:

- BJR Solutions
- BP
- Connected Places Catapult
- Eddie Stobart
- Energy Network Association
- GRIDSERVE
- Maritime Transport Limited
- Milence
- National Protective Security Authority
- Road Haulage Association
- Scania
- Syselek
- The Institution of Engineering and Technology
- Voltempo Group Ltd.
- Volvo
- Wincanton

This BSI Flex is not to be regarded as a PAS or British Standard.

The BSI Flex process enables a standard to be rapidly developed, on an iterative basis, in order to fulfil an immediate stakeholder need. A BSI Flex can be considered for further development as a PAS or British Standard, or constitute part of the UK input into the development of a European or international standard.

The content in this version is part of an iterative process. It is likely to change from time to time with subsequent iterations.

Relationship with other publications

This BSI Flex is part of the zero emission HGV and infrastructure demonstrator programme, alongside:

- BSI Flex 2072, *Battery electric and hydrogen-fuelled heavy duty vehicles – Workshops and protocols for maintenance and inspection – Specification*[1)]
- BSI Flex 2073, *Design and application of mobile and stationary hydrogen dispensing sites – Code of practice*[1)]

Information about this document

This is Version 1 of BSI Flex 2071, which has been released to enable stakeholders to engage with the initial content and feed back comments for further versions of the document to be developed. This is the first public consultation of this BSI Flex and so the content is not to be considered as having received wider feedback. Users are therefore encouraged to comment on this version.

This publication can be withdrawn, revised, partially superseded or superseded. Information regarding the status of this publication can be found in the Standards Catalogue on the BSI website at bsigroup.com/standards, or by contacting the Customer Services team.

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

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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1) Under development.

0 Introduction

0.1 Background

The switch to electric light-duty vehicles in the UK is progressing well, with sales of new petrol or diesel cars set to end by 2035 and interim sales targets set via the Zero Emission Vehicle mandates. In contrast, the shift to electric trucks has only just commenced. Sales of new, non-zero emission trucks less than 26 tonnes are also set to end by 2035, while all new (non-zero exhaust emission) combustion truck sales are due to end by 2040. As a result, by 2050, the vast majority of the UK HGV fleet is anticipated to be zero emission at the tailpipe and the UK is likely to be in a very strong position to achieve its net zero climate goal for the road freight sector.

The early years of this decade have seen the development and commercialization of an ever-expanding range of battery electric trucks, across all vehicle segments and in all the major developed markets, including the UK. Established truck makers are focused on bringing many more battery-powered trucks to the mass market over the next few years.

New entrants and specialist manufacturers are expected to bring innovative new concepts to the urban/short-haul, municipal and long-haul vehicle markets. Radically improved business operating models, battery chemistries and charging systems are also evolving at pace, including a transition for high power truck charging from combined charging system (CCS) to megawatt charging system (MCS) technology. While some pioneering logistics organizations are already exploiting the commercial opportunities that battery electric trucks can provide, many others are not yet able to make the switch. As well as concerns around vehicle purchase costs, driving range and payload loss, which can be significant in some use cases, there are also concerns about getting sufficient power to logistics hubs and depots and the (lack of) availability of high power publicly accessible charging infrastructure for HGVs.

In October 2023, the UK government announced the winning projects to be funded by Innovate UK as part of the £200m Zero Emission HGVs and Infrastructure Demonstrators programme (ZEHID, previously known as the Zero Emission Road Freight Demonstrators, ZERFD). The projects funded under this programme are expected to run real-world trials of battery electric and hydrogen fuel cell technologies for the largest categories of heavy goods vehicles and at scale over a five-year period. This aims to provide the sector with the essential evidence needed to make strategic, long-term national infrastructure decisions to decarbonize the nation's road freight sector. The three ZEHID projects involving battery electric vehicles are expected to install and operate networks of high-power charging sites, accessible both to the vehicles directly involved in those projects but also more generally to other heavy-duty vehicles.

The shift to zero emission HGVs is a crucial component of the low carbon transition. International harmonization and interoperability, achieved through standards and regulations, are key steps towards the viability of a wider roll-out. The drivers of eHGVs and their employers can expect the charging sites they use to be designed, built and maintained in ways that are safe, convenient and fit for purpose. Original equipment manufacturers (OEMs) are continuing to develop further generations of electric HGV models, with industry activities led by CHARIN to standardize the future technical approach to higher power charging under the Megawatt Charging System[2)].

BSI and Connected Places Catapult (CPC) are supporting the ZEHID programme led by the Department for Transport (DfT) and Innovate UK. The BSI/CPC contribution is articulated in two phases. Phase 1 of the project ran from April 2021 to March 2022 and produced a suite of outputs to help inform partners and build robust foundations for the demonstrations. Focus areas have included a trial data strategy, export potential, safety and regulations, standards and market operations.

[2)] More information available at https://www.charin.global/technology/mcs/.

Building on this foundation work, BSI/CPC are now seeking to build an industry consensus around topics such as safety and security to support the ZEHID programme and the wider scale up of zero emission HGV infrastructure.

0.2 Operational safety at charging sites

In September 2023, BSI published the *ZERFD (Zero Emission Road Freight Demonstrator) Standards Programme Prioritization Report* [1]. The report is structured around the following three activities:

- stakeholder engagement, aimed at understanding the existing barriers and constraints to the adoption of zero emission road freight vehicles;
- research and assessment of existing relevant standards at UK, European and international level; and
- prioritization of focus areas, building consensus across industry stakeholders and establishing principles to guide standards development.

This analysis and engagement work concluded that operational safety at charging sites is a priority focus area.

Numerous topics were raised in relation to the design of charging sites during the engagement activity, which are specifically linked to battery electric technology and the dwell times currently required by charging operations. Some of these were mentioned as potential areas for standardization, as follows.

- Classification of types of charging site (taxonomy)

  There might be a range of charging needs and set ups, ranging from multi-hour (e.g. overnight) charging to charging during extended breaks, and rapid top-up charging during short breaks. Charging sites can be publicly accessible (such as along motorways) or within private premises (such as distribution centres or industrial sites).

- Bay design and parking method

  Stakeholders believe that the layout of sites can induce and support safe behaviour, including avoiding reverse manoeuvring where possible, which increases the risks of collisions. Herringbone parking or drive-through solutions could be explored based on space availability, charging unit design and vehicle layout.

- Separation of vehicles by category

  Charging sites are likely to have to cater for a variety of vehicles. Separate charging units for electric cars and HGVs might also be necessary. HGV charging site planners might also wish to cater for vans, minibuses and small lorries and other large vehicles such as coaches and buses.

- Safety measures for pedestrians

  Extended dwell times entail a likelihood that drivers and passengers might exit the vehicle while waiting, thus increasing pedestrian movements around charging units. Guidance is therefore required in relation to the design of safe walking routes and management of cables.

- Signage and wayfinding at access/egress points

  Stakeholders mentioned the need for design guidance to ensure that the separation of vehicles by category/size is clear and respected by all users. Areas for HGVs, where higher voltage is in use, could potentially be gated and access provided only to those vehicles with a charging slot booked. This would reduce the number of vehicles and pedestrians in the area but would also reduce accessibility and might be challenging to implement.

- Layout harmonization

  Interviewees highlighted that, currently, in the electric car market, charging infrastructure providers have custom designs and layouts for charging points and hubs. While cars and other small vehicles can easily manoeuvre around such variable infrastructures, this is likely to be an issue with HGVs, due to their size and lower manoeuvrability. Therefore, harmonization is needed to ensure consistency in design.

0.3 Objectives

This BSI Flex is intended to build upon the foundations laid by the above prioritization work and support the roll-out and expansion of a UK-wide network of high-power charging sites for eHGVs, specifically those accessible to any suitable vehicle rather than those with access restricted only to vehicles belonging to specific organizations.

The main objectives of this BSI Flex are to:

- establish safety and security good practice in collaboration with the demonstrations, through standards and specifications; and
- accelerate the roll-out of zero emission vehicles for road freight, towards wider commercialization, through consensus-based flexible standards.

This BSI Flex is intended to aid the detailed design and layout of charging sites.

1 Scope

This BSI Flex provides recommendations on the design of publicly accessible charging sites for battery electric heavy goods vehicles (HGVs).

This BSI Flex covers:

- harmonized vocabulary and units of measurement;
- taxonomy of charging site layouts, including:
  - public access;
  - approach to segregation between vehicle types (HGVs, coaches, cars, vans);
  - interaction between vehicles and pedestrians;
- safety and design implications of vehicles with power take-offs; and
- considerations on the coexistence of various fuel types in the same site.

This BSI Flex is applicable to publicly accessible single and multi-fuel sites in the UK.

This BSI Flex is of use to the designers and operators of charging sites.

This BSI Flex might be of interest to logistics providers, electrical grid suppliers, consumer groups and any other parties concerned with charging sites or battery electric HGVs.

This BSI Flex does not cover:

- charging technologies;
- types of charging plugs/sockets;
- driver/user behaviours;
- construction safety issues;
- prior stages such as selection of suitable locations, land acquisition, grid connections or securing of planning consents; or
- dangerous goods vehicles.

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, or limits the application, of this document[3)]. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

BS EN ISO 19650-5, *Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) – Information management using building information modelling – Part 5: Security-minded approach to information management*

IEC 61851-23, *Electric vehicle conductive charging system – Part 23: DC electric vehicle supply equipment*

[3)] 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 ad-hoc charge point

charge point available for use at any time by a vehicle that needs to charge up but that has not had its charging session reserved/booked in advance

3.2 charge point

individual (tethered) cable and connector to physically plug into the vehicle

3.3 charger

physical asset/enclosure of power conversion equipment used to charge the vehicle

NOTE *Chargers may have more than one charge point to allow multiple vehicles to share an individual charger. The charge point(s) may be located remote of the charger(s). Where the charger (power conversion equipment) is remotely located, the cable is located at a dispenser.*

3.4 charging bay

ground area that a vehicle is expected to park within while charging

3.5 charging site

geographical area that encloses one or more charging bays, chargers and charge points

3.6 fuel

liquid or gaseous energy source or energy vector

3.7 heavy goods vehicle (HGV)

goods vehicle with a maximum permitted weight of more than 4.25 tonnes in UN(ECE) category N2 or N3

NOTE *The terms truck and lorry are considered interchangeable with HGV.*

3.8 maximum rated power

upper limit for power deliverable by a charge point in normal operations

3.9 multi-fuel charging site

site featuring one or more fuel dispensers in addition to a charge point or points

3.10 pre-bookable charge point

charge point that can be reserved by a user in advance of a charging session and for a specific period of time

4 Harmonization and use of vocabulary and units of measurement

4.1 Power

4.1.1 Electrical power should be referred to in integer units of kilowatts (kW) rounded to the nearest multiple of 10 or in units of megawatts (MW) rounded to no more than two decimal places.

4.1.2 The maximum rated power that a charge point can deliver (to a connected vehicle capable of receiving at least that power level) should be available to the driver, and whether this value is affected by sharing of power with other vehicles and, if shared, how that affects the value.

NOTE *This is because the full charge speed might not be available if multiple vehicles are using the charge point; 350 kW is currently the most common maximum rated power for CCS car-charging sites.*

4.1.3 If superlative prefixes for the maximum rated power that a charge point can deliver are used, they should be accompanied by displays compliant with **4.1.1** and **4.1.2**.

NOTE *Examples of these terms are "super-fast", "mega-fast" and "ultra-fast"; however, there is a risk that such terminology could be inconsistently applied across different charging sites and can lead to confusion amongst users.*

4.2 Energy

4.2.1 Electrical energy delivered to a connected vehicle should be referred to in units of kilowatt-hours (kWh) or megawatt-hours (MWh).

4.2.2 Where fixed energy pricing is used, the price should be available to the driver in units of:

a) pence per kWh (p/kWh);

b) pounds per kWh (£/kWh);

c) pounds per MWh (£/MWh); or

d) any combination of a), b) or c).

4.2.3 The choice of pricing nomenclature and units of energy delivered should be consistent with each other.

4.2.4 Where variable energy pricing is used, the current price of energy from a charge point should be available to the driver, including any changes in price anticipated during the charging session.

NOTE *This is typically achieved by displaying at the charge point, or, in situations where that is not feasible, information can be provided to inform drivers how/where to find the currently applicable pricing data.*

4.3 Vehicles

4.3.1 A heavy goods vehicle powered by electric motors and one or more externally rechargeable batteries, and which constitutes a key target market for charging sites within the scope of this BSI Flex, should be referred to as one, or any combination of, the following:

a) battery electric HGV;

b) battery electric truck (BET);

c) e-HGV; and/or

d) e-truck.

4.3.2 The terms listed in **4.3.1** should not be used for goods or commercial vehicles with a gross weight of less than 4.25 tonnes.

4.3.3 The abbreviation HDV should only be used if charge points are accessible to other large non-HGV vehicle types such as coaches.

4.4 Batteries

4.4.1 State of charge (SOC) should be quoted in units of percent.

4.4.2 If the SOC is communicated to the charger by the vehicle, this should be displayed on a screen on or near the charge point to provide an indication of charging progress.

4.4.3 In designing charging site layouts, assessing likely dwell times and developing robust fire safety protocols, designers and operators of charging sites should familiarize themselves with the various battery chemistries in use by battery electric HGVs and their differing charging speed and safety characteristics.

5 Planning and design of charging sites

5.1 Public access

5.1.1 Charging sites should be accessible to any battery electric HGV at any time, subject to the site's terms and conditions of use. Site access should not be restricted to vehicles made by particular manufacturers, or those with charge connectors at specific locations of the vehicle or those owned/operated by particular companies, unless there are over-riding issues of safety or security.

5.1.2 Site designers and planners should provide:

a) access to safe and secure parking areas (where space is available);

b) a mix of pre-bookable and ad-hoc charge points;

c) access to welfare facilities;

d) up-to-date charge point availability and energy pricing information;

e) cables capable of reaching the vehicle while in its charging station; and

f) a safe, straightforward and effective charging experience.

NOTE *Pre-bookable charge points are expected to be the norm but some ad-hoc provision is also likely to be needed to cater for unforeseen circumstances. Compliance can be confirmed, for example, by positive responses to a driver survey.*

5.1.3 Queues should be managed and information on alternative charge points given.

5.1.4 An operational plan setting out the number of charge points and their capacity should provide the basis for:

a) a traffic management plan (for lay-up of waiting vehicles and to minimize risks of the surrounding areas being adversely affected by vehicular activity);

b) fire risk assessment;

c) the protection of physical assets from vehicle impact damage; and

d) welfare provision.

NOTE *Additional topics for consideration in an operational plan (not otherwise covered in this BSI Flex) can also include:*

- *connection to a local distribution network and network stability in the event of a sudden disconnection of site power; and*
- *flood management, surface water drainage and protection of charging equipment from water ingress.*

5.2 Access by specific vehicle types

5.2.1 A charging site should be designed using appropriate tools such as swept-path modelling software to be readily accessible to the full range of vehicle heights, lengths and weights currently permitted in the UK and in general circulation, including rigid and articulated HGVs, solo tractor units and rigid HGVs pulling a drawbar trailer.

NOTE 1 At the time of publication, Highway Authorities are encouraged [2] to sign all bridges over highways with less than 5.03 m headroom at any point over the carriageway and the main vehicle maximum permitted lengths applicable to UK charging site designers are:

- *rigid HGV – 12 m;*
- *bus/coach with 2 axles – 13.5 m;*
- *bus/coach with more than 2 axles – 15 m;*
- *articulated HGV (with standard trailer) – 16.5 m;*
- *articulated HGV (with longer semi-trailer) – 18.55 m; and*
- *rigid HGV with drawbar trailer – 18.75 m.*

A charging site should also be accessible to other heavy-duty vehicle types such as coaches, with appropriate restrictions if necessary.

NOTE 2 Appropriate restrictions may, for example, include access for vehicles with driver-only (i.e. no passengers permitted in the charge point area and/or to be disembarked safely before charging commences).

NOTE 3 Site designers and planners might also wish to consider potential future changes to vehicle weights and dimension limits, use of the site by foreign-registered vehicles and provisions for exceptionally long and/or heavy vehicles. In considering potential future changes to vehicle weights and dimensions, it is suggested that vehicle types up to 25.25 m in length and up to 60 tonnes in gross weight are included.

5.2.2 Where feasible within any unavoidable, site-specific space, traffic flow or other major constraints, to minimize the need for reversing, charge points with a rated power of 300 kW or greater should be accessible using a drive-through design.

NOTE Annex A provides a suggested preference hierarchy for access to and egress from various charging bay layouts.

5.2.3 Where access to other electrically propelled vehicle types is permitted, additional risk assessments should be carried out and any safety protocols implemented, over and above those for HGVs.

NOTE Other electrically propelled vehicle types may include, but are not limited to, coaches, vans and/or cars, including cars towing caravans.

5.2.4 If non-HGV access is permitted, the needs of the non-HGV drivers and passengers should be provided for.

5.3 Safety of drivers and pedestrians

5.3.1 The safety risks to be addressed should, as a minimum, include:

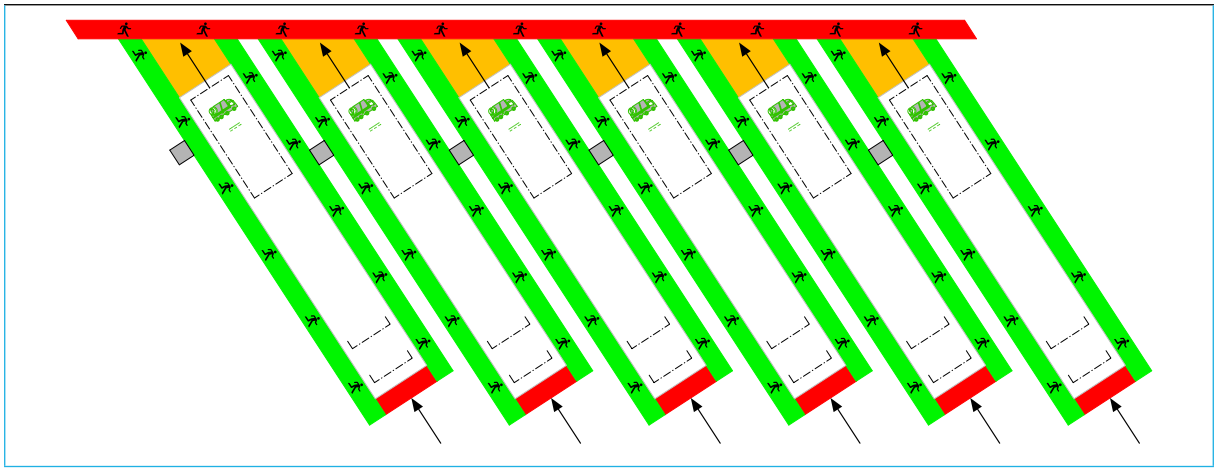
a) electrical safety and risks of electric shock;

b) fire safety; and

c) driver, other road user and pedestrian safety and risks of collision.

NOTE Site planners and designers might find the concept of a zoning method to be a useful aid to making these safety risk assessments. For example, green zones for pedestrian walkways that do not conflict with vehicle movements or other hazards, red zones for walkways or escape routes that cross live traffic lanes or are located behind vehicles that might be reversing, and amber zones for areas where pedestrian movement is unlikely but might still be subject to trip or other hazards. Figure 1 provides an illustrative example of such a zoning method approach.

Figure 1 – Illustrative example of a zoning method approach



5.3.2 Where vehicle-pedestrian conflicts are possible, barriers, fencing and/or surface markings should be installed to minimize risks of inadvertent straying of pedestrians into traffic flow zones.

5.3.3 Any additional risks arising from previous usage of the site, e.g. soil contamination, should also be assessed and controlled.

5.3.4 Where assessments for different hazards indicate different standards are required, then the most stringent control measures of the two should be applied.

5.3.5 Sites should be designed so as to allow easy and appropriate access to emergency service vehicles and personnel. Notices showing safe evacuation areas and escape routes should be provided on or near the charger(s) or charge point(s).

5.3.6 All risk assessments and control measures should be kept under review and changes made if appropriate.

***NOTE** This might be because of an incident or a change in standards, legal requirements or accepted good practice.*

5.4 Electrical safety

5.4.1 The charge point should be designed and constructed such that a suitably equipped battery electric vehicle can be connected and that in normal conditions of use, the energy transfer operates safely, and its performance is reliable and minimizes the risk of danger to the user or surroundings, even in the event of carelessness that can occur in normal use.

5.4.2 The electrical safety of the charger should conform to the electrical safety requirements of BS EN IEC 61851-1 and IEC 61851-23.

***NOTE 1** BS EN IEC 61851-23-3 is in draft form but might also be of interest to installers of DC EV supply equipment for MCS.*

Charging bays should be signed and marked prominently on the ground to allow vehicles to park close to the charging point and to prevent the stretching of charging cables.

The length of charging cables should be sufficient to allow their use with the intended equipment without risk of damage.

***NOTE 2** At the time of publication, eHGVs are expected to most commonly have charge connecting points on the right-hand (driver's) side but left-hand connecting points are likely to become more prevalent as the industry transitions to MCS.*

5.4.3 An emergency electrical disconnection device should be installed on site to isolate all active conductive parts of the charger(s) and charge point(s). Such a switch should only be accessible to emergency service personnel and authorized site staff.

NOTE This disconnection device might, for example, be remote from the charger(s) and take the form of a firefighter's switch in the low voltage feeder pillar/distribution system.

5.4.4 Protection of the disconnection device should be provided in order to prevent accidental disconnection.

5.4.5 The supply cable and connector should be permanently attached to the charge point.

5.4.6 A full earthing study should be performed before installing the charging equipment, taking into account all existing infrastructure earthing schemes and other utility supplies as well as the local ground conditions, to determine the most appropriate scheme to deploy.

5.4.7 Other relevant national and international standards should be followed wherever feasible.

NOTE Attention is drawn to BS 7671 and IET Code of Practice for Electric Vehicle Charging Equipment Installation, 5th Edition [3].

5.5 Fire safety

5.5.1 Practical passive, active and managerial control measures should be included as part of the fire risk assessment for the premises when selecting and designing areas for use as electric charging points, including factoring in whether overhead canopies/structures are used and, if so, their potential for fire suppression systems to be fitted.

NOTE More detailed fire safety guidance is available in the Fire Protection Association's (FPA) RC59: Recommendations for fire safety when charging electric vehicles [4] and Approved Documents under Part B of the Building Regulations, such as BS 9999.

5.5.2 Further measures should be taken to address the specific risks associated with electrically propelled vehicle batteries and containment in the event of an outbreak of a battery fire, including those risks arising from the containment and disposal of fire water and/or other firefighting substances.

NOTE Information on such measures and other fire safety guidance for lithium-ion batteries is available in the FPA's Need to Know Guide RE2: Lithium-ion battery use and storage [5].

5.5.3 Additional and appropriate fire safety and containment measures should be taken for any on-site electrical energy storage batteries, if present.

NOTE Fire safety guidance relevant to batteries other than lithium-ion is available in the FPA's RC61: Recommendations for the storage, handling and use of batteries) [6].

5.5.4 Control measures should be put in place for the protection of people in case of fire, including:

a) systems to detect a fire and warn people quickly via both audible and visual alarms;

b) the provision, where appropriate, of fire-fighting equipment;

c) keeping fire exits and escape routes clearly marked and unobstructed at all times; and

d) delivering training to on-site personnel on procedures to be followed, including fire drills.

5.5.5 The selection of materials used for the cladding of buildings and canopies, and signage, should be based on the needs of the specific designs and intended applications.

5.5.6 In relation to performance in a fire, the selection should take account of the most appropriate combination of material properties (i.e. ignitability, toxicity, fire load, smoke generation etc.).

5.6 Driver, other road user and pedestrian safety

5.6.1 The design of the site access and layout should take into account the safe careful management speeds, turning circles and routes around the site of the various vehicle types expected to use it.

5.6.2 The risk of collisions between vehicles and other road users or pedestrians should be minimized by the careful management of the main vehicle flows on and off the site and through the charge point area(s).

5.6.3 Separation and/or other protection from vehicle collisions for all electrical equipment, including charge points, chargers and associated switchgear, energy storage capacity and substation sites, should be provided.

5.6.4 The carriageway and surrounding area, charge point area(s) and all pedestrian walkways should always be adequately lit.

NOTE *Lighting supports safe vehicle access and egress for drivers and safe movement of people around the charge site. Further guidance on lighting at truck stops, including a ranking scheme not currently applicable in the UK, is available in Annex I of the European Commission's draft delegated regulation [7]. The Institution of Lighting Professionals has also published a Guidance Note 01/21: The reduction of obtrusive light [8].*

5.6.5 Potential route conflicts should be mitigated by the provision of extended sight lines, speed restrictions and signs and markings.

NOTE *It is good practice to avoid route conflicts as far as possible.*

5.7 Welfare facilities

5.7.1 Welfare facilities for drivers and passengers should be provided on site or be otherwise accessible from the charge point(s). Longer stay chargers should be made visible and drivers encouraged to take longer breaks on these and not the high-power chargers intended for shorter, top-up and go stops.

5.7.2 Welfare facilities should be accessible whenever the charging site is open and have available as a minimum:

a) separate toilets and washrooms for male and female users;

b) light snacks and refreshments;

c) waste bins; and

d) drinking water.

5.7.3 The design should take account of any additional risks presented by charging sites and the vehicles using them regarding fire resistance, means of escape and access for disabled people.

5.8 Canopies

*COMMENTARY ON **5.8***

Canopies can help to define the location of the charge point(s), protect users from inclement weather and provide illumination.

5.8.1 Canopies should be constructed of materials that do not readily contribute to any fire occurring within the underside of the canopy area.

***NOTE** BS EN 13501-1 and BS EN 13501-2 provide information on the fire classification of construction products and building elements.*

5.8.2 Any canopies with headroom < 5.03 m should be signed to identify the maximum height of a vehicle which can pass beneath it, in both metric and imperial units.

***NOTE** This is to avoid impact damage from high-sided vehicles, such as articulated vehicles with double-deck trailers.*

5.9 HGVs with ancillary power needs

5.9.1 Site designers and planners should provide, where it is feasible, electrical power supplies for HGVs with ancillary electrical power needs, such as fridge units.

***NOTE** HGV fridge units can usually be powered externally via either a 415 V, 32 A three-phase supply or 240 V, 16 A single phase.*

5.9.2 Where it is possible to have more than one electrical supply cable connected to a vehicle at the same time, such as when charging and (separately) powering a fridge unit, interconnectors should be used to prevent vehicle movement while one or other cable is still attached to both the vehicle and its supply point.

5.10 Site security

5.10.1 Site designers and planners should seek appropriate crime prevention and security advice to reduce crime, or the threat of crime that could affect:

a) the charging site;

b) the vehicles using the charging site; and

c) drivers and passengers in vehicles using the charging site.

5.10.2 Site designers and planners should, wherever practicable, take steps to protect physical assets located at the charging site.

***NOTE** These assets include charging equipment and any welfare or other facilities provided at the site. Users of this BSI Flex are advised to consider using components that have been demonstrated by third-party assessment to be suitable.*

5.10.3 Information regarding the design and operation of the charging site should be managed in accordance with the security minded principles set out in BS EN ISO 19650-5.

5.10.4 Where a site is not continuously staffed, site designers should incorporate appropriate lighting and CCTV systems to deter criminal and/or malicious behaviour.

***NOTE** Further guidance on security at truck stops, including a ranking scheme (not currently applicable to UK but covering perimeter security, parking areas, entry/exit points and staff procedures), is available in Annex I of the European Commission's draft delegated regulation [7]. More information on an earlier European scheme is available in the Handbook for labelling [9].*

6 Additional considerations for multi-fuel sites

The charging site owner/provider should engage with the operator of any nearby fuel forecourt for advice as to whether the charging site design and planning is affected by additional regulatory or other safety requirements.

NOTE *The Energy Institute publish detailed guidance on fuel forecourt operational safety considerations, including where such facilities are co-located with EV charging equipment. The latest published version of this document is known as the Blue Book [10].*

Annex A (informative)
Layout, access to and egress from charging bays

Annex A provides a suggested preference hierarchy covering the various options for eHGVs to enter and leave a charge point. The hierarchy prioritizes layouts that do not require eHGVs to reverse and that provide for good visibility for drivers, to minimize safety risks to pedestrians and road-side infrastructure, and uses a seven-point scale with 1 being most preferred, 7 being least.

Figure A.1 – Suggested preference hierarchy for access to and from eHGV charging bays

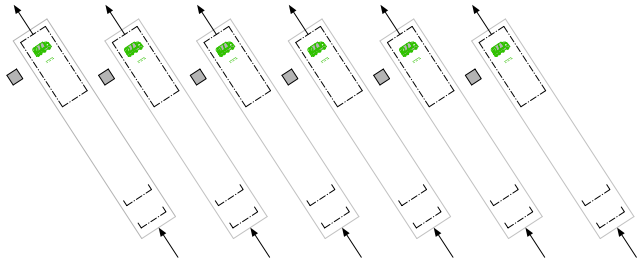
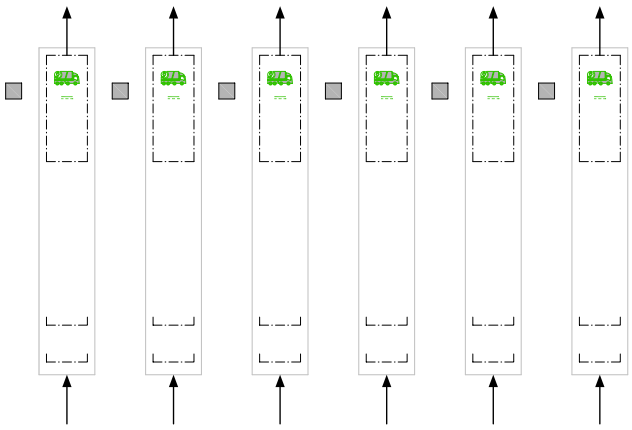
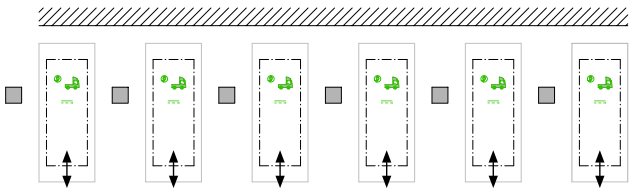
Arrangement	Layout	Preference
Laden vehicle, with travel being in a single direction. Bays arranged staggered, such that there is clear vision from one cab window to either the left or right.		1
Laden vehicle, with travel being in a single direction. Bays arranged in a line.		2
Tractor only, with vehicle travel being bi-directional from a single access (drive in, reverse out or vice-versa). Bays arranged in a line with a dead stop.		3

Figure A.1 – Suggested preference hierarchy for access to and from eHGV charging bays *(continued)*

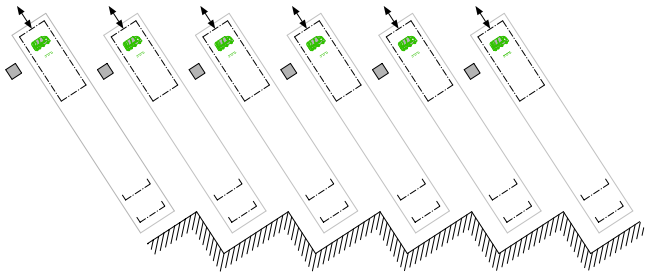
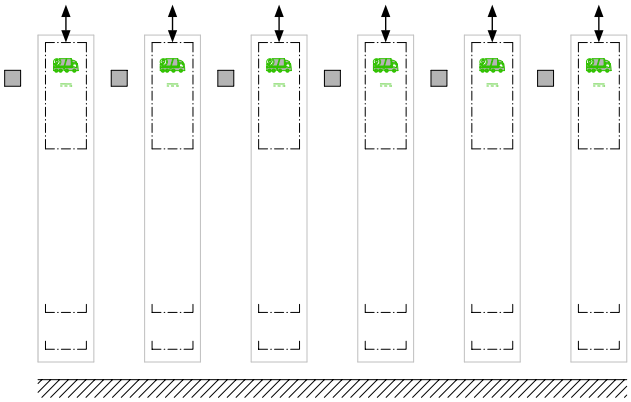
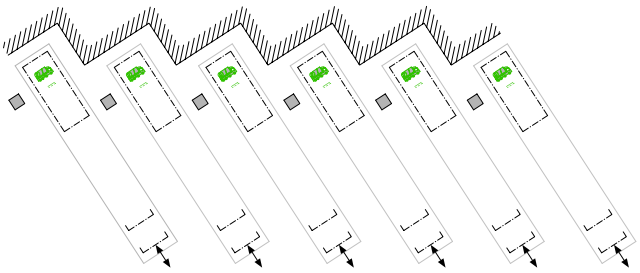
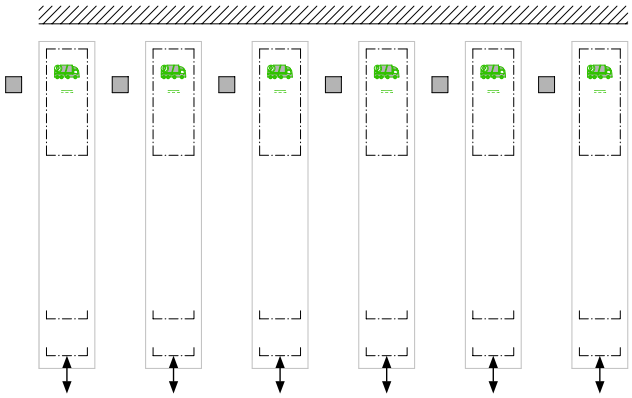
Arrangement	Layout	Preference
Laden vehicle, with travel being bi-directional from a single access (reverse in, drive out). Bays arranged staggered, such that there is clear vision from one cab window to either the left or right, with a dead stop.		4
Laden vehicle, with travel being bi-directional from a single access (reverse in, drive out). Bays arranged in a line with a dead stop.		5
Laden vehicle, with travel being bi-directional from a single access (drive in, reverse out). Bays arranged staggered, such that there is clear vision from one cab window to either the left or right, with a dead stop.		6

Figure A.1 – Suggested preference hierarchy for access to and from eHGV charging bays *(continued)*

Arrangement	Layout	Preference
Laden vehicle, with travel being bi-directional from a single access (drive in, reverse out). Bays arranged in a line with a dead stop.		7

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