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Lowering your emissions through innovation in transport and energy infrastructure

# Survey

## OZEV Open EV Chargepoint Data Alpha

# Accessibility Data

In collaboration with

Office for Zero Emission Vehicles

July 2022

# Contents

# Background

## Consumer Experience Survey

In spring 2021 The Office for Zero Emission Vehicles (OZEV) ran a public consultation on "The consumer experience at public chargepoints" which set the government's expectations and ambitions in four key areas:

- Making it easy to pay;
- Opening up chargepoint data;
- Using a single payment metric; and
- Ensuring a reliable charging network.

In addition, evidence was sought on three emerging policy areas:

- Accessibility for disabled consumers;
- Weatherproofing and lighting; and
- Signage

## Open Electric Vehicle Chargepoint Data Discovery

In November 2021 a discovery project on the topic of "Open electric vehicle chargepoint data" was completed. This work recognised the need for a standard for public chargepoint accessibility as well as accessibility data. It concluded that there is currently no precedent for providing chargepoint accessibility information to those who need it.

*"When a person who uses a wheelchair is looking for a chargepoint, they must drive around looking for one that has a wide enough bay, is on a road with good pavement clearance, is reachable from their position and, if it has a screen, the screen is low enough to see. No CPOs have this information, so no services can share it. Users are forced to keep a mental map of all accessible chargepoints and share this information with others through comments in the apps they use."*

The central purpose of this discovery project was to investigate how to make broader chargepoint data (e.g., location data) openly available at a central location, creating a single source of truth. The recommended implementation was to use the Open Chargepoint Interface (OCPI). Therefore, the discovery recommended expanding the scope of OCPI to include accessibility data, with a view to the following future vision:

*"People with mobility needs look at their mapping app and see detailed information regarding accessibility, including manoeuvrability, bay size, lighting, proximity to entrance/exit etc."*

## PAS (Publicly Accessible Standard) 1899

OZEV has been working with the British Standards Institution (BSI) and disability charity Motability to create a new standard for accessibility of public EV chargepoints in the UK. The first draft was released for public review in March 2022 and is now undergoing edits in readiness for an expected publication date in September 2022[1].

As drafted, this standard is expected to place requirements on the procurer of public chargepoints to ensure that both the chargepoint itself and the wider installation meet defined best practice accessibility requirements. PAS 1899 does include a placeholder clause for "information provision"

[1] British Standards Institution - PAS 1899

which is not yet drafted. The standard is looking to follow the results from this work to define data requirements.

# Context within Open Chargepoint Data Alpha

## Open Chargepoint Data Alpha Objectives

This survey is being completed as part of the Open Chargepoint Data Alpha project, which follows on from the recommendations delivered in the discovery phase.

The Alpha project has three workstreams, of which the third covers the topic of accessibility data:

| Workstream | Title | Objectives | Lead |
|---|---|---|---|
| 1 | Chargepoint data collection | Identify and prove a technical architecture for effectively collecting & governing data from CPOs | PA Consulting |
| 2 | LA & Government data access | Identify the data needs of LA & government users & determine how best they can access open data | PA Consulting |
| 3 | OCPI Accessibility data | Take leadership on the integration of accessibility data into OCPI. | Cenex |

Table 1: Open Chargepoint Data Alpha Workstreams

## Alpha Workstream 3 Progress

The Alpha project began on 11th May 2022 and is being run as a 12-week agile project. The focus so far has been on engagements with:

1. Accessibility "advocates". These are organisations that have already been proactively involved in the subject of EV charging accessibility. Cenex ran two workshops in June 2022 to gather feedback on issues experienced by EV users with disabilities.
2. The EVRoaming Foundation (which maintains OCPI) and the wider OCPI development community. To understand the feasibility of updating the protocol with new properties on accessibility.

From these engagements we have been able to form recommendations for what accessibility data should be openly provided by Chargepoint Operators (CPOs) for public EV chargepoints in order for e-Mobility Service Providers (eMSPs) to present this information to users.

As part of this project, we will also be planning to engage EV users with disabilities, to understand whether the proposed accessibility data is suitable for user needs. This would build on work previously done by Motability, Designability, The Research Institute for Disabled Consumers (RIDC), Ricardo, Urban Foresight and others.

## This Survey

The scope and purpose of this survey is as follows:

- Share the accessibility issues that users currently experience with public EV chargepoints.
- Propose a data specification to allow users to assess whether a public chargepoint will meet their accessibility needs and gather feedback from CPOs and eMSPs on whether the data is relevant, appropriate, and realistic to obtain.
- Present the proposal to implement this accessibility data standard within OCPI.
- Present OZEV's timelines for compliance and gather feedback from the industry.

# Responding to this Survey

! It is imperative that when responding to this survey that the reader remembers that the aim of this work is to create a specification for accessibility data. The purpose of this is to ensure that the necessary data is available to be used by eMSPs to provide services that help EV users with accessibility needs understand whether a public chargepoint will be accessible for them when planning their charging events and journeys. Requirements for the design and installation of accessible chargepoints are not within scope.

## Response Method

Responses to this survey are to be submitted on JotForm using the following link:
https://form.jotform.com/221803302616041

## Survey Deadline

The survey will be open until midnight on Sunday 17th July (British Summer Time, GMT+1).

## Intended Audience

The survey is designed to capture feedback on the accessibility data specification proposed in this document. It can be completed by anyone with an interest in public EV charging accessibility. However, it is primarily designed for public Chargepoint Operators (CPOs), e-Mobility Service Providers (eMSPs), and stakeholders working on the topic of disabled accessibility of EV charging or other public places.

## Confidentiality Statement

- All submissions will be treated in accordance with Cenex's Privacy Policy.
- Individuals or companies will not be named in any public research outputs without prior consent.
- Individual survey responses will not be published.

The research is being carried out for the OZEV by Cenex and PA Consulting as part of the Open EV Chargepoint Data Alpha project.

## Questions

If you have any questions regarding this survey, please submit them to samuel.abbott@cenex.co.uk

# 1 The Justification for Accessibility Data

## 1.1 Introduction

Research by Motability has estimated that one in five people in the UK are disabled, there will be 2.7 million disabled drivers or passengers by 2035[2], of which 50% are expected to be “wholly or partially reliant on public charging infrastructure”. It is widely acknowledged that a significant proportion of existing chargepoint installations have not been designed for accessibility.

It is imperative that accessibility of public EV chargepoints does not disadvantage disabled people in the transition to electric vehicles. Part of the solution to this challenge – alongside work to improve chargepoint and installation standards – is ensuring users have access to information to decide whether a chargepoint will meet their individual accessibility needs.

There are currently no known eMSPs providing accessibility data as part of their service. The most useful existing data for users to judge accessibility of existing chargepoints is crowd-sourced photographs of chargepoint installations on eMSP platforms. However, coverage is entirely dependent on EV user submissions and not all photographs will be useful to understand accessibility. In addition, purely relying on photographs has shortcomings that will be discussed in 1.3.

## 1.2 Accessibility Issues

The issues experienced by EV users with disabilities when using public EV charging – identified from existing research - are categorised and listed in Table 2. During the workshops with accessibility “advocates”, stakeholders were asked to rank each issue in order of priority for data to help users assess whether a chargepoint will meet their accessibility needs. The resulting ranking is shown in Table 2.

| Category | Sub-Category | # | Accessibility Issue | Priority for data[3] |
|---|---|---|---|---|
|  Location |  Installation & parking bay | 1 | "I'm not able to [easily] enter or exit my vehicle or remove mobility aids." | High |
| | | 2 | "I'm not able to [easily] move to and from my vehicle and the chargepoint." | High |
| |  Parking bay markings and signage | 3 | "Information on parking restrictions are missing or unclear." | Low |
| |  Security | 4 | "I feel insecure or exposed when charging my vehicle." | Low |
| | Manual interfaces | 5 | "I'm not able to [easily] reach the chargepoint sockets or tethered cables.” | High |

[2] Electric Vehicle charging infrastructure for people living with disabilities (motability.org.uk)

[3] These values were outputs from the two accessibility “advocates” workshops run by Cenex in June 2022. Delegates were asked to rank each issue in order of importance for data. The issue ranked highest would score 10 and the lowest 1. Scores were averaged over the two events. Scores have then be categorised as follows: >7 = “High”; 5-7 = “Medium”; <5 = “Low”

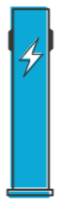
| | | | | |
|---|---|---|---|---|
|  Chargepoint |  | 6 | "I'm not able to [easily] insert cables into socket outlets or remove or replace tethered cables from and into holsters." | Medium |
| | | 7 | "I'm not able to [easily] manage heavy and lengthy cables." | Medium |
| |  Information, displays and controls | 8 | "I'm not able to [easily] read information or interact with physical displays, screens, controls or payment terminals." | Low |
| | | 9 | “The instructions given and process to charge are difficult to use or follow." | Low |
| Other | Other | 10 | "I do not know in advance what other facilities, including assistance services, are available at the location, or if I will be able to access them." | Medium |

Table 2: Public EV Charging Accessibility Issues

Note that some accessibility data, particularly information on signage and security (issues 3 and 4), whilst especially important for users with disabilities, can help improve the consumer experience for all EV users.

These issues will be referenced when discussing data properties and types in section 2.

? Do the ten issues above cover all public EV charging accessibility barriers? If no, please provide further feedback.

? Do you agree with the allocated category for priority for data (i.e., high, medium, low) for each issues? Please provide further feedback.

## 1.3 The Case for Detailed Data

A key part of this piece of work is ensuring that the detail provided in the accessibility data specification is appropriate. There is a balance to be found; ensuring that sufficient data is provided to meet the needs of end-users whilst ensuring that the data is not unnecessarily onerous for CPOs to gather and maintain.

There is a wide spectrum with regards to the level of detail for the data specification. At the least detailed end of this spectrum, CPOs could simply share whether a chargepoint installation is compliant with PAS 1899. At the other end, data could be shared on every single aspect of accessibility of the chargepoint, its installation, the wider built environment and the facilities associated with the chargepoint’s location.

The data specification recommended in section 2 is undoubtedly towards the more detailed end of this spectrum. The justifications for detailed data are as follows:

- The individuality of accessibility. PAS 1899 contains many requirements to improve standards of accessibility of EV chargepoints. As all individuals’ accessibility needs are unique to them, for many people a chargepoint may be accessible even if it is not fully PAS 1899 compliant. Providing more detailed data allows the individual to make the decision on whether a chargepoint will meet their accessibility needs.
- Photographs are powerful but must be supported by other data types. Photographs can convey a lot of unambiguous information to the user, particularly around the chargepoint’s placement. Additionally, images are already supported by OCPI and are simple data for the CPO to capture. Therefore, when a user is reviewing the accessibility of a single chargepoint, photographs are extremely powerful. However, their shortcoming is when the user wishes to

review the accessibility of multiple chargepoints. Other data types (see 2.1) will allow the user to filter a long list of chargepoints based on their own preferences to remove unsuitable installations. This is not possible with photographs alone.

- More data helps the user plan their charging event. Research has shown that disabled users are more likely to spend greater time planning their journeys and charging events. Providing detail lets the user know what to expect when they arrive at a certain EV chargepoint, and to plan appropriately. For example, information on the parking bay and chargepoint placement would allow a user to plan how they will park, exit their vehicle and move to their chargepoint.
- Promotes eMSP innovation. Requiring CPOs to provide more "raw data" will allow eMSPs to explore different ways for users to view and interact with this data. This will encourage competition between eMSPs, resulting in users having greater choice, and ultimately an improved consumer experience.
- Encourage CPOs and Local Authorities to support accessibility. Internal continuous improvement on accessibility standards will be encouraged by requiring CPOs to gather data on accessibility for their chargepoints. Additionally Local Authorities could gather data on accessibility to ensure there is a balance of accessible provision in their area.
- Data burden. It is acknowledged that gathering, uploading and maintaining accessibility data will require some additional resource for CPOs. This is particularly true for those market players with large existing networks. However, even the simplest end of the data spectrum – a mark of PAS 1899 compliance – would require a site visit and assessment to review the installation's compliance with the various requirements of the standard.

| | |
|---|---|
| ? | Do you agree with the accessibility data specification strategy to use a combination of photographs and other data types? Please provide further feedback. |

# 2 Recommended Accessibility Data Specification

## 2.1 Data Types

In this section the chargepoint and chargepoint installation properties that can be included in the OCPI accessibility data specification to allow a prospective user to judge whether a public chargepoint will be accessible for them will be discussed. Equally important as the properties that are included is what are the data types that are used. The options shown in Table 3 will be considered.

| Data Type | OCPI Type | General Use Case | Example |
|---|---|---|---|
| Boolean | Boolean | Identify whether feature is present or compliance with specific standard or regulation. | Hatched marking present around parking bay yes/no. |
| (Multiple) selection from list | Bespoke enumerated list | When there is a discrete set of values that can apply | Connector configuration – tethered cable or socket outlet |
| Open text | String | Can be used for most properties | Description of holstering/unholstering mechanism of tethered cable connector |
| Numerical | Number | Measurements and other numerical values | Parking bay size (m) |
| Photograph | Image class (contains URL location, image type etc.) | Alternative data type to a written description for many properties | Wide angle photograph of chargepoint and associated parking bays |
| Diagram | | Alternative data type to numerical values. | Diagram of parking bay showing size, location of chargepoint, proximity of other features such as drop kerbs. |

Table 3: Data Types

All of these data types are recommended for at least one property, with the exception of diagrams. Whilst the concept of diagrams – potentially to succinctly depict parking bays and chargepoint placement – is interesting, the following two reasons are given as to why diagrams are not recommended:

1. Sharing raw data (i.e., numerical measurements) allows eMSPs the choice of how to represent this data to its users, including as diagrams if desired.
2. Diagrams have the same disadvantage as photographs; they cannot be used for data filtering.
3. Creating and sharing diagrams rather than sharing only raw data creates an additional burden for CPOs.

The potential for diagrams has been discussed with eMSPs and CPOs via the OCPI community and the decision not to use diagrams for accessibility data was endorsed.

## 2.2 Photograph Specification

Five types of photographs are included within the specification:

1. For the charging location, one or more wide-angle photographs to show features of the whole location such as overhead cover.
2. For each parking bay, a unique wide-angle photograph of the bay, showing the relative location(s) of associated chargepoint(s).
3. For each chargepoint, a unique photo of the entire chargepoint itself showing the location of its components and the immediate surrounding area.
4. For each chargepoint, one or more close-up photo(s) of all components (refer to 2.3.3 for a list of components included).
5. For each parking bay, a photograph of any signage provided, with all text readable, indicating the restrictions placed on the usage of the bay.
6. For the charging location, a photograph of any signage provided giving further information about the EV charging present.

! Note that the OCPI structure would allow the same photograph to be used for multiple chargepoints or parking bays. For photographs 3 and 4, it is proposed that doing so would be permissible to avoid unnecessary duplicate photographs. However, for photographs 1 and 2, the image is recommended to be unique to each parking bay or chargepoint.

? Do you think the photographs recommended in section 2.2 are necessary and appropriate, and realistic to obtain?

## 2.3 Data (non-photograph) Specification

In this section the data properties in addition to photographs are listed, including a discussion of which accessibility issue(s) each property is relevant to, and a justification for the data type specified.

### 2.3.1 Parking Bay

Proposed properties to include:

- Size
- Protected areas around parking bay
- Surface material
- Smoothness and levelness
- Obstructions
- Parking direction
- Chargepoint position (relative to parking bay)
- User restrictions
- Signage
- Directions

Relevance to accessibility issues: Including these parking bay properties helps a prospective user understand whether they will be able to enter/exit their vehicle and remove mobility aids (Issue 1) and/or move to/from the chargepoint (Issue 2). Data on parking direction and chargepoint position relative to the parking bay helps the user understand whether the parking bay will be suitable given the charging inlet position for their vehicle. Finally, information on parking bay user restrictions and signage overcomes accessibility issue 3.

#### Parking Bay: Size

Potential data types:

| Data Type | Potential use | |
|---|---|---|
| Boolean | Could define a minimum size for a “large” parking bay and data owner selects whether the parking bay is “large” yes or no. | Not recommended |
| (Multiple) selection from list | Create categories for parking bay sizes (e.g., small, medium, large) and data owner selects from list. | Not recommended |
| Open text | Not applicable. | Not recommended |
| Numerical | Width and length of parking bay in metres. | Recommended |
| Photograph | Photograph 2 - (Wide angle) photograph of parking bay and chargepoint. | Relevant |

Table 4: Parking Bay Size Recommended Data Types

Recommended Data Type Discussion: Providing raw dimensions of the parking bay size affords eMSPs the flexibility to choose how to represent the parking bay size to users. This could be by simply showing the raw data to the user, creating categories or even diagrams. This is needed in addition to a wide-angle photograph of the parking bay and chargepoint for data filtering purposes, and also as it will be difficult to show true scale of parking bay(s) with a photograph.

### Parking Bay: Protected Areas Around Parking Bay

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | Hatched markings present yes or no? | Not recommended |
| (Multiple) selection from list | Select one or multiple from:<br>• To front of parking bay<br>• To left of parking bay<br>• To right of parking bay<br>• To rear of parking bay | Recommended |
| Open text | Description of the hatched markings provided. | Not recommended |
| Numerical | Dimensions of the hatched marking areas. | Not recommended |
| Photograph | Photograph 2 - (Wide angle) photograph of parking bay and chargepoint. | Relevant |

Table 5: Hatched Markings Recommended Data Types

Recommended Data Type Discussion: The practice of providing hatched markings around parking bays varies and therefore a simple binary yes/no is not sufficient. Using a multiple selection will allow the data owner to fully describe the hatched marking arrangement around the bay. This is needed in addition to a wide-angle photograph of the parking bay and chargepoint for data filtering purposes.

### Parking Bay: Surface Material and Smoothness

! Note that this combines two properties into one. This is because the surface material of the parking bay will influence its smoothness (free of raised areas or indentations). Levelness (slope) is covered separately.

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | Smooth and consolidated surface yes/no. | Recommended |
| (Multiple) selection from list | Selection from a list from list of material types such as concrete, asphalt, tarmac, gravel, resin bound, cobbled, paved, grass etc. | Not recommended |
| Open text | Description of parking bay surface. | Not recommended |
| Numerical | Not applicable. | Not recommended |

| | | |
|---|---|---|
| Photograph | Photograph 2 - (Wide angle) photograph of parking bay and chargepoint. | Relevant |

Table 6: Parking Bay Surface Material and Smoothness Recommended Data Types

Recommended Data Type Discussion: Capturing data on the material type used for the parking bay is deemed to be too detailed and would require many options to be provided within OCPI to cover all of the parking bay material types. Therefore, requiring CPOs to self-certify whether the parking bay is smooth, flat and consolidated is recommended, as this is the information the user will be interested in. Should an eMSP wish to provide additional information to its users, it could do so by capturing further detail from the photograph of the parking bay provided.

### Parking Bay: Levelness

Potential data types:

| Data Type | Potential use | |
|---|---|---|
| Boolean | Level yes/no. | Not recommended |
| (Multiple) selection from list | Categories of maximum parking bay gradient to align with categories depicted in PAS 1899. I.e.,<br>• Gradient < 1:40<br>• 1:40 ≤ Gradient < 1:60<br>• Gradient ≥ 1:60 | Not recommended |
| Open text | Data owner's description of levelness of parking bay. | Not recommended |
| Numerical | Measurement of maximum parking bay gradient. | Recommended |
| Photograph | Levelness: slope will be difficult to portray with a wide-angle photograph and relies on the photo itself being level. | Not relevant |

Table 7: Parking Bay Levelness Recommended Data Types

Recommended Data Type Discussion: A measurement of the maximum parking bay gradient would give most flexibility for eMSPs to decide how to present this information to its users. This is recommended above a selection from a list of categories as the intervals for gradient used by PAS 1899 could change. A numerical value is also preferred to a simple yes or no evaluation as non-level but only gradually sloping parking bays may still be appropriate for some users.

### Parking Bay: Obstructions

! Note that this property is intended to cover any obstructions present in the parking bay that prevent the user reaching the intended chargepoint user position. Obstructions immediately in front of chargepoint components fall within scope of data on reach distance (2.3.2)

Potential data types:

| Data Type | Potential use | |
|---|---|---|
| Boolean | Parking bay area free from obstructions? yes/no. | Not recommended. |
| (Multiple) selection from list | Selection from: | Recommended. |

| | | |
|---|---|---|
| | - Parking bay area has obstruction(s) with less than 1050 mm between any obstruction(s) and the edge of the parking bay.<br>- Parking bay area has obstruction(s) but with 1050 - 1200 mm between any obstruction(s) and the edge of the parking bay.<br>- Parking bay area has obstruction(s) but 1200-1800 mm between any obstruction(s) and the edge of the parking bay.<br>- Parking bay area has obstructions but >1800 mm between any obstruction(s) and the edge of the parking bay.<br>- Parking bay area from obstructions | |
| Open text | Description of obstructions in parking bay area. | Not recommended. |
| Numerical | Not applicable. | Not recommended. |
| Photograph | Photograph 2 - (Wide angle) photograph of parking bay and chargepoint. | Relevant |

Table 8: Parking Bay Obstructions Recommended Data Types

Recommended Data Type Discussion:

### Parking Bay: User Restrictions

Any restrictions on users allowed to park in the parking bay is already covered by the parking_restrictions property in OCPI. It has the enumerated data type and allows for zero or more values to be selected, including specifying that the parking bay is for “disabled people with valid ID” only.

**8.4.17. ParkingRestriction** *enum*

This value, if provided, represents the restriction to the parking spot for different purposes.

| Value | Description |
|---|---|
| EV_ONLY | Reserved parking spot for electric vehicles. |
| PLUGGED | Parking is only allowed while plugged in (charging). |
| DISABLED | Reserved parking spot for disabled people with valid ID. |
| CUSTOMERS | Parking spot for customers/guests only, for example in case of a hotel or shop. |
| MOTORCYCLES | Parking spot only suitable for (electric) motorcycles or scooters. |

### Parking Bay: Signage

Potential data types:

| Data Type | Potential use | |
|---|---|---|
| Boolean | Signage provided yes/no. | Not recommended |
| (Multiple) selection from list | Not applicable. | Not recommended |

| | | |
|---|---|---|
| Open text | The information given on parking bay signage entered as open text. | Not recommended |
| Numerical | Not applicable. | Not recommended |
| Photograph | Photograph 5 – parking bay signage. | Relevant |

Table 9: Parking Bay Signage Recommended Data Types

Recommended Data Type Discussion: It is not recommended to include any other data types on parking bay signage other than a photograph. The justification for this is that it is not likely that users would need to filter chargepoints on an eMSP platform based on whether or not signage is provided, and therefore a photograph of the signage (with readable text) can provide all the necessary information to the user for individual chargepoints.

#### Parking Bay: Infrastructure for Resting

Potential data types:

| Data Type | Potential use | |
|---|---|---|
| Boolean | Infrastructure for resting provided within close proximity of the parking bay. | Not recommended |
| (Multiple) selection from list | Selection from list of infrastructure for resting provided (e.g., hand rail, bench etc.). | Not recommended |
| Open text | Description of infrastructure for resting provided within close proximity of the parking bay. | Not recommended |
| Numerical | Not applicable. | Not recommended |
| Photograph | Photograph 2 – wide-angle photograph of parking bay and chargepoint. | Relevant |

Table 10: Parking Bay Signage Recommended Data Types

Recommended Data Type Discussion: Whilst knowing whether there is infrastructure for resting (e.g., benches) available within close proximity of the parking bay, describing its accessibility from the parking bay will be overly complicated within OCPI. Therefore, it is recommended that this is only covered by provision of a wide-angle photograph of the parking bay and chargepoint (Photograph 1).

? Do you agree that the properties and data types recommended in section 2.3.1 for parking bays are necessary and appropriate, and realistic to obtain? If not, please provide reasons.

### 2.3.2 Chargepoint to Parking Bay Relative Position

A key charging accessibility issue for all EV users including those with disabilities is the position of the chargepoint relative to the parking bay. As there is a many-to-many relationship between parking bays and chargepoints (i.e. one chargepoint may be useable from multiple parking bays and likewise one parking bay may be able to use multiple chargepoints) this data is complex to construct in OCPI. The data proposed is:

- Coordinates of any three parking bay corners (numerical data type, latitude and longitude in degrees) – this allows the eMSP to understand the exact global location of the parking bay.
- The bearing of any parking direction restriction (numerical data type, degrees) – this allows the CPO to show any global limitations in parking direction. For example, an on-street parking bay may only allow a vehicle to park parallel with the flow of traffic. If this value is not provided by the CPO then the default assumption is that there is no restriction on parking direction.

eMSPs will be able to show users relative positions of the parking bay and each chargepoint it is associated with by also using the chargepoint(s)' location coordinates (see 2.3.4). An example for an on-street parking scenario on a one-way street is shown in Figure 1. In this instance both parking bays 1 and 2 are designed to "access" the chargepoint. Each parking bay is defined globally by any three corner point coordinates and the chargepoint's global position is also defined by coordinates. The parking restriction bearing for both parking bays would be 90° (East).

A user with a vehicle with a socket-inlet located on the nose would know to prefer to use Parking Bay 1 with this information. The greater distance between chargepoint and vehicle charging socket could mean that Parking Bay 2 does not meet certain individuals' accessibility needs.

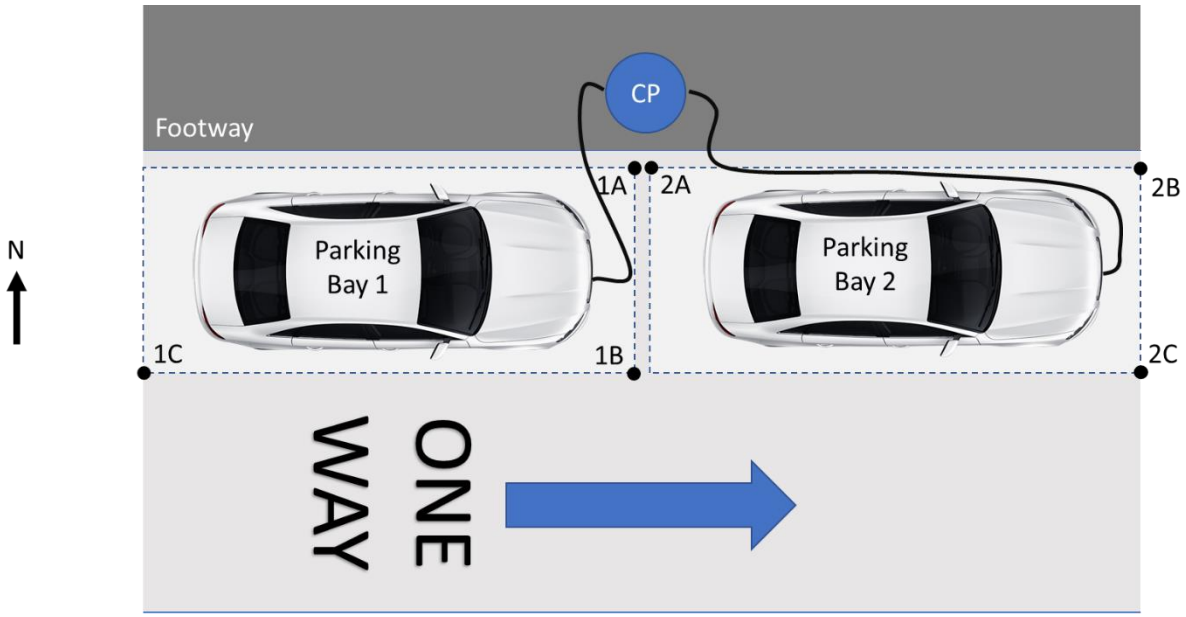



Figure 1: Chargepoint position relative to parking bays - On-street scenario

Another scenario is presented in Figure 2 which represents a rapid charging hub where Parking Bay 1 is provided for larger vehicles such as electric vans, trucks or buses. Both Parking Bay 1 and Parking Bay 2 can "access" CP1. However, the traffic flow restrictions at the site restrict the parking direction for these larger vehicles mean that the parking restriction bearing for Parking Bay 1 is 0° (North). This could be very useful information as the chargepoint may not be useable – or will require a very long tethered cable (see 2.3.5) - if the van or truck's socket inlet is on the left-hand side of the vehicle.

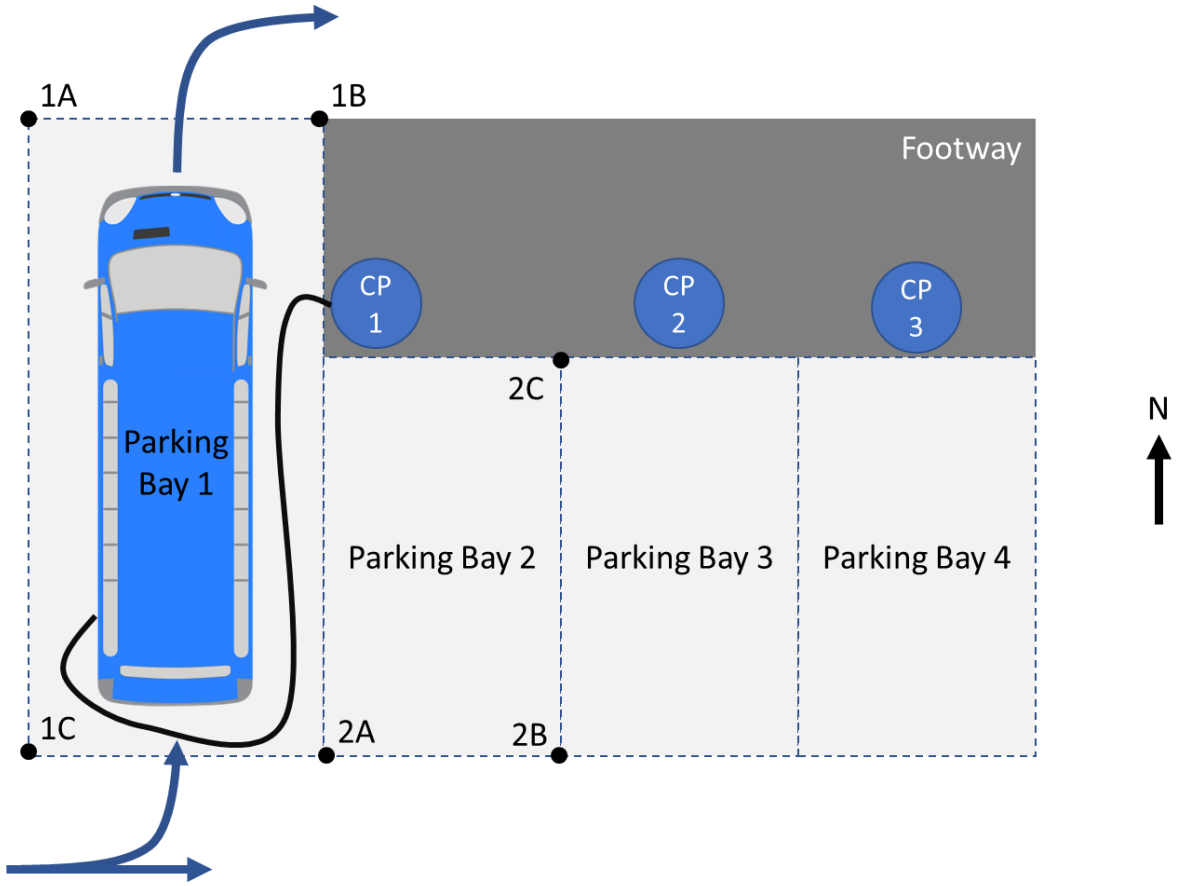



Figure 2: Chargepoint position relative to parking bays - Rapid charging hub scenario

? Do you agree with the proposed data approach for relative positions of parking bays to chargepoints given the many-to-many relationship?

? Do you agree that the properties and data types recommended in section 2.3.2 for chargepoint to parking bay relative position are necessary and appropriate, and realistic to obtain? If not, please provide reasons.

### 2.3.3 Chargepoint Placement – Components

Whether or not the chargepoint has been placed such that its components are accessible is a complicated topic. There are a number of properties involved, and design of an appropriate data specification becomes even more complex when considering that each chargepoint component may be oriented in a different direction and therefore be accessed from different user positions.

It is therefore recommended that the necessary properties are captured for each of the following chargepoint components:

- Connector (socket outlet or tethered cable)
- Payment terminals
- Visual displays (screens or physical display)
- Controls (touchscreens or physical buttons or switches)

Doing so also future proofs the data specification for scenarios where certain components such as payment terminals are located on a central EVSE with connectors at separate satellite EVSE.

Proposed properties for chargepoint components to include:

- Access position level
- Height from intended user position
- Clear space in front of component
- Reach distance from intended user position

Relevance to accessibility issues: The accessibility of interfaces is a combination of issues on moving from the vehicle to the chargepoint interface (Issue 2) and being able to reach the interface from the intended user position (Issues 5, 8).

? Question – Are you supportive of including data for each chargepoint component separately?

### Access Position Level

Providing data on the access position level for each component is important as this allows the data consumer to understand whether information on kerbs (2.3.4) is relevant. Some users may prefer to avoid chargepoints that are not deployed at carriageway level.

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | Level access to component intended user position yes/no. | Not recommended |
| (Multiple) selection from list | Selection from list:<br>• Access from carriageway level<br>• Access from footway level<br>• Other | Recommended |
| Open text | Description of how access to component user position. | Not recommended |
| Numerical | Not applicable. | Not recommended |
| Photograph | Photograph 3 – Photograph of whole chargepoint showing location of components and immediate surrounding area. | Relevant |

Table 11: Component Access Position Recommended Data Types

Recommended Data Type Discussion: Specifying whether the component is accessed from the carriageway or footway level, combined with other data on provision on drop kerbs and kerb heights (2.3.4) gives sufficient information for the user to understand whether they will be able to access the intended user position.

### Height

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | Compliant with PAS 1899 height range for component YES/NO | Not recommended |
| (Multiple) selection from list | Selection from ranges:<br>• < PAS 1899 compliant height range<br>• Within PAS 1899 compliant height range<br>• > PAS 1899 compliant height range | Not recommended |
| Open text | Not applicable | Not recommended |
| Numerical | Measurement of actual component height (mm) | Recommended |

| | | |
|---|---|---|
| Photograph | Photograph 3 – Photograph of whole chargepoint showing location of components and immediate surrounding area. | Relevant |

Table 12: Component Height Recommended Data Types

Recommended Data Type Discussion: It is recommended that the measured height of the chargepoint component from the intended user position level (e.g. carriageway or footway) is given. This gives richer information to the user than a selection from range or simply whether it is compliant with PAS 1899. It also means that should the requirements of PAS 1899 change, then the data does not need to be updated.

### Clear Space

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | Meets minimum clear space requirement from PAS 1899 (1200 mm) YES/NO? | Not recommended |
| (Multiple) selection from list | Selection from ranges:<br>• < 1050 mm clear space in front of component<br>• ≥ 1050 and < 1200 mm clear space in front of component (not PAS 1899 compliant)<br>• ≥ 1200 mm and < 1800 mm clear space in front of component (PAS 1899 minimum compliance)<br>• ≥ 1800 mm clear space in front of component (PAS 1899 “ideal” compliance) | Recommended |
| Open text | Description of the clear area in front of chargepoint component. | Not recommended |
| Numerical | Measurement of clear space in front of chargepoint component. | Not recommended |
| Photograph | Photograph 3 – Photograph of whole chargepoint showing location of components and immediate surrounding area. | Relevant |

Table 13: Component Clear Space Recommended Data Types

Recommended Data Type Discussion: The PAS 1899 clear space ranges are based on established guidance for the built environment and are therefore unlikely to change. Therefore, a selection from list is recommended rather than a measurement.

### Reach Distance

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | Less than maximum reach distance from PAS 1899 (300 mm) YES/NO? | Not recommended |
| (Multiple) selection from list | Selection from ranges:<br>• > 300 mm reach distance (not PAS 1899 compliant) | Recommended |

| | | |
|---|---|---|
| | • ≥200 mm and < 300 mm reach distance (PAS 1899 minimum compliance)<br>• <200 mm reach distance (PAS 1899 "ideal" compliance) | |
| Open text | Not applicable | Not recommended |
| Numerical | Measurement of reach distance to chargepoint component. | Not recommended |
| Photograph | Photograph 3 – Photograph of whole chargepoint showing location of components and immediate surrounding area. | Relevant |

Table 14: Component Reach Distance Recommended Data Types

Recommended Data Type Discussion: The PAS 1899 clear space ranges are based on established guidance for the built environment and are therefore unlikely to change. Therefore, a selection from list is recommended rather than a measurement.

? Do you agree that the properties and data types recommended in section 2.3.2 per component for chargepoint placement are necessary and appropriate, and realistic to obtain? If not, please provide reasons.

### 2.3.4 Chargepoint Placement – Additional Properties

In addition to the properties already listed for chargepoint placement that are recommended to be provided for each chargepoint component, further properties are recommended for each chargepoint:

- (Presence and location of) drop kerbs
- Kerb height
- Ground conditions around chargepoint

Relevance to accessibility issues: These additional properties are also relevant to issues associated with moving from the vehicle to the chargepoint interface (Issue 2) and being able to reach the interface from the intended user position (Issue 5).

#### Drop Kerbs

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | Drop kerbs provided yes/no. | Not recommended. |
| (Multiple) selection from list | Selection from:<br>• Drop kerb provided, within X m of chargepoint<br>• Drop kerb provided, not within X m of chargepoint<br>• No drop kerb provided<br>• Not applicable – chargepoint installed at carriageway level or user position for all components at carriageway level. | Recommended. |
| Open text | Description of drop kerb provision. | Not recommended. |
| Numerical | Distance to nearest drop kerb. | Not recommended. |
| Photograph | May be difficult to show locations of drop kerbs easily by photograph as they may not be immediately adjacent to parking bay. In some | Partially relevant |

| | | |
|---|---|---|
| | cases, will be shown by Photograph 2 - (Wide angle) photograph of parking bay and chargepoint. | |

Table 15: Drop Kerbs Recommended Data Types

Recommended Data Type Discussion: Selection from list allows data owner to give richest information on the provision of drop kerbs, and also to cover the eventualities whereby a drop kerb is not required as the chargepoint is installed at carriageway level or where all components are accessed from carriageway level.

### Kerb Height

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | Not applicable | Not recommended. |
| (Multiple) selection from list | Selection from specified height ranges. | Not recommended. |
| Open text | Not applicable | Not recommended. |
| Numerical | Kerb height (mm) | Recommended. |
| Photograph | An impression of kerb height will be provided by Photograph 2 - (Wide angle) photograph of parking bay and chargepoint. See 2.3.8. | Relevant |

Table 16: Kerb Height Recommended Data Types

Recommended Data Type Discussion: Selection from list allows data owner to give richest information on the provision of drop kerbs, and also to cover the eventualities whereby a drop kerb is not required as the chargepoint is installed at carriageway level or where all components are accessed from carriageway level.

### Ground Conditions Surrounding Chargepoint

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | Ground around chargepoint flat, level, firm and consolidated (not loose) yes/no. | Recommended. |
| (Multiple) selection from list | Selection from a list of specified ground conditions. | Not recommended. |
| Open text | A description of ground conditions around chargepoint. | Not recommended. |
| Numerical | Not applicable | Not recommended. |
| Photograph | An impression of ground conditions around chargepoint will be provided by Photograph 3 – Photograph(s) of chargepoint showing components and immediate surrounding area. See 2.3.8. | Relevant |

Table 17: Ground Conditions Recommended Data Types

Recommended Data Type Discussion: A binary indication of whether the ground conditions around the chargepoint are flat, level, firm and consolidated (not loose) gives the necessary information to the user.

### Chargepoint Location

OCPI has an existing property within the EVSE object that the CPO can use to provide coordinates of the chargepoint location. This is useful to provide in combination with associated parking bay coordinates and bearings (see 2.3.2) in order for eMSPs to show users the relative positions of parking bays and chargepoints.

| Property | Type | Card. | Description |
|---|---|---|---|
| coordinates | GeoLocation | ? | Coordinates of the EVSE. |

Figure 3: Existing EVSE object coordinates property

? Do you agree that the properties and data types recommended in section 2.3.4 for additional properties for chargepoint placement are necessary and appropriate, and realistic to obtain? If not, please provide reasons.

## 2.3.5 Cables, Sockets, Connectors

Relevance to accessibility issues: The properties presented are relevant to accessibility issues associated with using cables, sockets and connectors (issues 6 and 7).

### Connector Configuration

Knowing whether a chargepoint outlet(s) is a tethered cable or a socket outlet is very important for users with physical disabilities (issues 6 and 7). This is already covered within OCPI by the Connector format property as part of the Connector object. The property is an enumerated type, as shown by Figure 4:

**8.4.4. ConnectorFormat *enum***

The format of the connector, whether it is a socket or a plug.

| Value | Description |
|---|---|
| SOCKET | The connector is a socket; the EV user needs to bring a fitting plug. |
| CABLE | The connector is an attached cable; the EV users car needs to have a fitting inlet. |

Figure 4: OCPI ConnectorFormat property

### Cable Length

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | Not applicable | Not recommended. |
| (Multiple) selection from list | Selection from ranges of cable lengths. | Not recommended. |
| Open text | Not applicable | Not recommended. |
| Numerical | Actual cable length (m) | Recommended. |
| Photograph | Not applicable | Not relevant. |

Table 18: Drop Kerbs Potential Data Types

Recommended Data Type Discussion: Providing the actual cable length provides richer information to the user. It could also allow eMSPs to innovate by combining the measurement with parking properties (bay sizes, chargepoint position, parking direction) to provide greater insight into which vehicles will be able to use the chargepoint.

### Cable Management Systems

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | Cable management system present yes/no | Recommended. |
| (Multiple) selection from list | Selection from list of the functionality that the cable management system provides, e.g.,<br>- Supports weight of cable<br>- Automatically pays out cable<br>- Automatically recoils the cable<br>- Directs cable | Not recommended. |
| Open text | Description of the functionality provided by the cable management system. | Recommended. |
| Numerical | Not applicable | Not recommended. |
| Photograph | The cable management system can be shown by a specific photo (Photograph 4 – Close up photograph(s) of specific chargepoint components and features). See 2.3.8. | Relevant. |

Table 19: Cable Management Systems Recommended Data Types

Recommended Data Type Discussion: Firstly, a Boolean indicator to show whether the chargepoint includes a cable management system will be important to allow users to filter on this feature. There is much innovation in the industry concerning the design of cable management systems. Therefore, it would be difficult to capture all potential functions of cable management systems with an enumerated list. Consequently, an Open text is recommended to allow the CPO to describe the full functionality of the system.

### Single-handed Operation

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | A self-assessment by the CPO of whether the chargepoint's socket outlet or tethered cable has been designed for single-handed operation. | Recommended. |
| (Multiple) selection from list | Not applicable | Not recommended. |
| Open text | A description of how the socket-outlet or tethered cable allows for single handed operation | Recommended. |
| Numerical | Not applicable | Not recommended. |
| Photograph | The socket-outlet or tethered cable can be shown by a specific photo (Photograph 4 – Close up photograph(s) of specific chargepoint components and features). See 2.3.8 | Relevant. |

Table 20: Single-handed Operation Recommended Data Types

Recommended Data Type Discussion: The recommended specification for this property is the same as for cable management systems. As there is much innovation taking place with chargepoint design

for single-handed operation, the recommendation is first to provide a yes/no Boolean indicator as to whether the chargepoint tethered cable or socket-outlet is designed for single-handed operation, supported by an open-text description of how this is achieved.

### Connector grips

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | Tethered cable grip design compliant with all requirements of PAS 1899 yes/no. | Recommended. |
| (Multiple) selection from list | Could select from individual requirements of PAS 1899 (material, ergonomics design, diameter, robustness, reliability, maintenance). This is too detailed and therefore not recommended. | Not recommended. |
| Open text | A description of how the tethered cable connector grip has been designed for accessibility could be given. This is not recommended. | Not recommended. |
| Numerical | Not applicable | Not recommended. |
| Photograph | The tethered cable connector can be shown by a specific photo (Photograph 4 – Close up photograph(s) of specific chargepoint components and features). | Relevant and supporting. |

Table 21: Connector Grips Recommended Data Types

Recommended Data Type Discussion: PAS 1899 breaks down the specification for cable connector grips into multiple requirements (material, diameter, ergonomics etc). This is too much detail for the data specification; it is recommended that a binary yes or no compliance with all PAS 1899 requirements is given. This will be useful for filtering in eMSP platforms. A close-up photo of the connector grip will support this.

### Cable Weight and Stiffness

The weight and stiffness of cables – particularly tethered cables for high power ultra-rapid chargepoints – is a potential barrier for users with physical limitations such as reduced strength, energy and mobility. However, the weight and stiffness of cables can be difficult to measure. Additionally, measurements of weight and stiffness are unlikely to be informative to the average user. Therefore, it is recommended that these properties are not included within the accessibility data specification at this time; potential users can use information on the chargepoint power and cable management systems to understand whether the cable will be manageable for them.

### Socket Insertion Force

As with the cable weight and stiffness, a measurement of forces required to insert cables into socket outlets is unlikely to be informative to the average user. Therefore, it is recommended that this property is not included within the accessibility data specification.

? Do you agree that the properties and data types recommended for cables, sockets and connectors are necessary and appropriate, and realistic to obtain? If not, please provide reasons.

? Do you agree that measurements of cable weight, cable stiffness and socket insertion force are excluded from the accessibility data specification?

### 2.3.6 Displays, Instructions and the Charging Process

Relevance to accessibility issues: The properties presented are relevant to accessibility issues associated with following instructions on the charging process (issue 9).

#### Display Tilt

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | Screen / visual interface visible from both a standing and seated position YES/NO. | Not recommended. |
| (Multiple) selection from list | Multiple selection from:<br>- Screen / visual interface visible from standing position.<br>- Screen / visual interface visible from seated position. | Recommended. |
| Open text | Description of how the screen / visual interface is designed to be visible from standing or seated position. | Not recommended. |
| Numerical | Angle of tilt. | Not recommended. |
| Photograph | Not applicable. | Not relevant. |

Table 22: Lighting Recommended Data Types

Recommended Data Type Discussion: The key information needed is that the chargepoint has been designed such that the screen or visual interface is visible from both a seated and standing position. However, a multiple selection of the designed-for user positions is more informative than a binary selection.

#### Visual Interface Design

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | Screen or visual interface designed for compliance with both:<br>- PAS 1899 requirements on light, colours and text size.<br>- PAS 1899 requirements on considerations for people with a learning disability or neurodiverse condition | Recommended. |
| (Multiple) selection from list | List of design features for screen or visual interface for inclusive design of screens and visual interfaces. | Not recommended. |
| Open text | Description of design features for screen or visual interface for inclusive design of screens and visual interfaces. | Not recommended. |
| Numerical | Not applicable. | Not recommended. |
| Photograph | Not applicable. | Not relevant. |

Table 23: Lighting Recommended Data Types

Recommended Data Type Discussion: There are a large number of requirements that make up the wider requirements for screen / visual interface design within PAS 1899. Therefore, for simplicity, it is recommended that compliance with two higher level requirements is self-assessed by the CPO.

#### Accessible Technologies

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | A binary indication of whether a particular accessible technology is provided. | Not recommended. |
| (Multiple) selection from list | A selection from a list of accessible technologies (e.g., hearing loops) provided. | Recommended. |
| Open text | A description of the accessible technologies provided. | Not recommended. |
| Numerical | Not applicable. | Not recommended. |
| Photograph | Not applicable. | Not relevant. |

Table 24: Lighting Recommended Data Types

Recommended Data Type Discussion: A selection from the list of the accessible technologies provided gives the most information to the end user and by specifying the allowable values within OCPI the data becomes easily filterable on an eMSP platform. However, it is necessary to ensure that all potential technologies are included.

? What accessible technologies should be selectable from an enumerated list?

? Do you agree that the properties and data types recommended for displays, instructions and the charging process are necessary and appropriate, and realistic to obtain? If not, please provide reasons.

### 2.3.7 Location

Relevance to accessibility issues: The properties presented are relevant to accessibility issues associated with exposure and vulnerability (issue 4) and other aspects such as assistance services (issue 10).

#### Overhead Cover

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | Overhead cover provided yes/no. | Recommended. |
| (Multiple) selection from list | Not applicable. | Not recommended. |
| Open text | Description of any overhead cover provided. | Not recommended. |
| Numerical | Not applicable. | Not recommended. |
| Photograph | Photograph 1 – Charging location | Relevant. |

Table 25: Lighting Recommended Data Types

Recommended Data Type Discussion: A Boolean indication of whether overhead cover is provided at the charging location is sufficient to allow a filter to be created by eMSPs. Further detail can be communicated to the user by Photograph 1.

### Lighting

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | Lighting provided for:<br>- Location (yes/no)<br>- Chargepoint (yes/no) | Recommended. |
| (Multiple) selection from list | Selection of different parts of installation for which lighting is provided. This would not work with the existing structure of OCPI (see section 3). | Not recommended. |
| Open text | An open text description of the lighting arrangements for the parking bay and/or the chargepoint. | Not recommended. |
| Numerical | Not applicable. | Not recommended. |
| Photograph | Lighting arrangements may be shown by the wide-angle photograph of the parking bay and chargepoint (Photograph 2) but does not need to be shown explicitly. | Relevant and supporting. |

Table 26: Lighting Recommended Data Types

Recommended Data Type Discussion: Two Boolean indicators of whether lighting is provided for the wider location and the chargepoint itself are recommended and expected to be sufficient to give users the information required.

### Security

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | Not applicable | Not recommended. |
| (Multiple) selection from list | Selection from a list of security services such as: CCTV; manned site; barrier access; emergency help button etc. | Not recommended. |
| Open text | A description of the security services provided at the site. | Recommended. |
| Numerical | Not applicable. | Not recommended. |
| Photograph | Photographs 1 or 2 may show services such as CCTV but this is not its explicit purpose. | Potentially relevant and supporting. |

Table 27: Security Recommended Data Types

Recommended Data Type Discussion: An Open text of security services provided at the location is recommended above a selection from a list, as this allows the CPO to provide more detailed information to the user.

### Assistance Services

Potential data types:

| Data Type | Potential use | Recommendation |
|---|---|---|
| Boolean | Assistance services available at the location yes/no. | Recommended. |
| (Multiple) selection from list | Selection from a list of the assistance services available. | Not recommended. |
| Open text | Hours of availability + how to access<br>Where to access more information on location accessibility. | Recommended. |
| Numerical | Not applicable. | Not recommended. |
| Photograph | Not applicable. | Not relevant. |

Table 28: Assistance Services Recommended Data Types

Recommended Data Type Discussion: The binary indicator allows eMSPs to provide a simple filter based on whether any assistance services are available at the location. The open text then allows the CPO to provide more detailed information on aspects such as hours of availability and instructions on, for example, how to book these services.

### Accessible Facilities

OCPI already has the functionality to list facilities associated with the chargepoint location. This is provided by the Facility property, which forms part of the Location object, as shown in Figure 5:

**8.4.12. Facility** *enum*

| Value | Description |
|---|---|
| HOTEL | A hotel. |
| RESTAURANT | A restaurant. |
| CAFE | A cafe. |



| Value | Description |
|---|---|
| MALL | A mall or shopping center. |
| SUPERMARKET | A supermarket. |
| SPORT | Sport facilities: gym, field etc. |
| RECREATION_AREA | A recreation area. |
| NATURE | Located in, or close to, a park, nature reserve etc. |
| MUSEUM | A museum. |
| BIKE_SHARING | A bike/e-bike/e-scooter sharing location. |
| BUS_STOP | A bus stop. |
| TAXI_STAND | A taxi stand. |
| TRAM_STOP | A tram stop/station. |
| METRO_STATION | A metro station. |
| TRAIN_STATION | A train station. |
| AIRPORT | An airport. |
| PARKING_LOT | A parking lot. |
| CARPOOL_PARKING | A carpool parking. |
| FUEL_STATION | A Fuel station. |
| WIFI | Wifi or other type of internet available. |

Figure 5: OCPI Facility Property

Whilst we do not recommend including details of the accessibility of the wider location within OCPI, a simple change would be to update the existing Facility property with the following additional values that would be beneficial for accessibility:

- Toilet(s)
- Accessible Toilet(s)

## Directions

OCPI already has the functionality to provide directions to the chargepoint location. This is provided by the directions property, which forms part of the Location object, as shown in Figure 6:

| Property | Type | Card. | Description |
|---|---|---|---|
| directions | DisplayText | * | Human-readable directions on how to reach the location. |

Figure 6: OCPI Directions Property

## Site Owner

One CPO suggested during a previous engagement that much of the accessibility of public EV chargepoints is determined by the site owner rather than the CPO. Therefore, it is important to register the site owner for each charging location, such that this data can be included for any metrics on accessibility. This can be done using the existing owner property that forms part of the Location object in OCPI.

| Property | Type | Card. | Description |
|---|---|---|---|

| | | | |
|---|---|---|---|
| owner | BusinessDetails | ? | Information of the owner if available. |

Figure 7: Existing OCPI location owner property

? Do you agree that the properties and data types recommended for location are necessary and appropriate, and realistic to obtain? If not, please provide reasons.

### 2.3.8 Alternative Strategy - Chargepoint Make and Model

A CPO suggested during a previous engagement that supplying the chargepoint make and model would be a simpler way for CPOs to provide some of the accessibility properties included within the recommended specification. The properties included in the data specification for component heights (2.3.2) and cables, sockets, connectors (2.3.5) could then theoretically be taken by eMSPs from manufacturer's chargepoint specifications. There are two main reasons why this approach is not recommended:

1. Component heights will be affected by the placement of the chargepoint and therefore these values cannot be taken from the manufacturer's chargepoint specification alone.
2. Each chargepoint model has variations and options in components provided. Therefore, it would be easy for the precise model number to be wrongly specified by the CPO or misinterpreted by the eMSP resulting in the wrong information being provided to the end user.

? Do you think that requiring eMSPs *to gather properties from manufacturer's chargepoint* specifications based on the make and model provided by the CPO is a viable and robust approach for accessibility data?

# 3 OCPI Implementation

In this section the updates required to OCPI (based on v2.2.1) to accommodate the recommended data specification are proposed.

Note that only the Locations module of OCPI is within scope for the updates. All other modules are unaffected.

## 3.1 Structure Changes

The current hierarchy of objects within the OCPI Locations module is as shown in Figure 8. This structure allows for multiple EVSEs to be associated with each location and likewise multiple connectors to be associated with one EVSE.

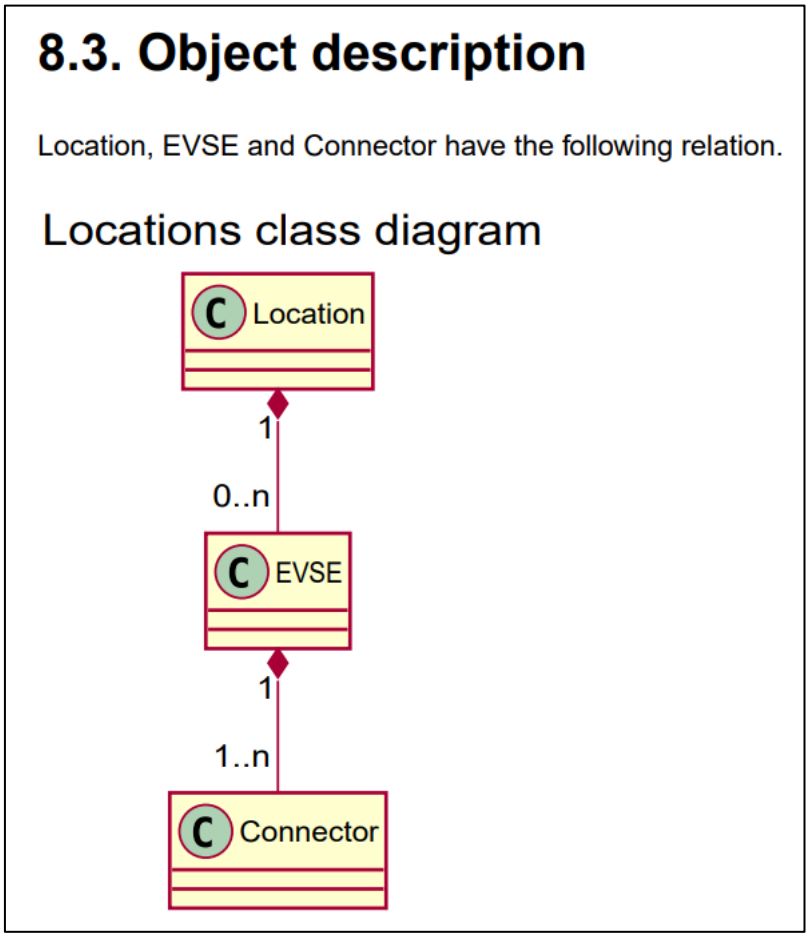



Figure 8: Current OCPI Locations Module Hierarchy

The only structure change recommended is the addition of a parking bay object to capture the properties concerning accessibility of the parking bay rather than the chargepoint. The parking bay object sits at the same level as the EVSE object, such that multiple parking bays can be associated with a single location (many to one); each parking bay can be associated with one or more EVSEs and each EVSE can be associated with zero or more parking bays (many-to-many) to truly represent the design of the deployment.

This new structure is shown in Figure 9:

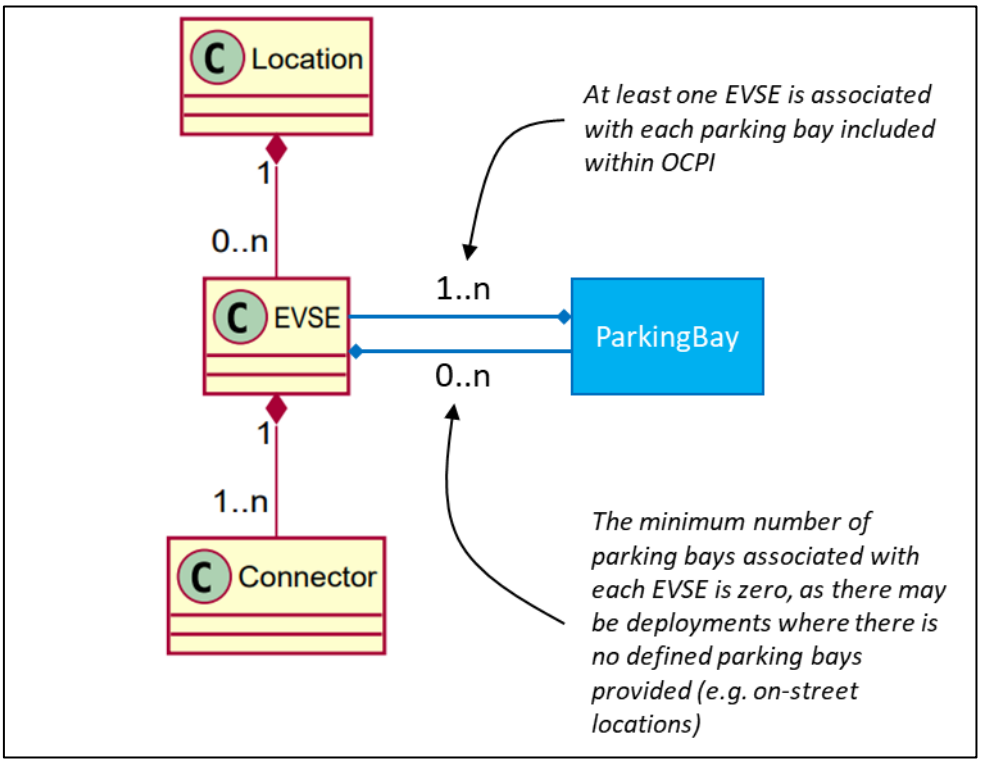



Figure 9: New Recommended OCPI Locations Module Structure

## 3.2 Property Additions

### 3.2.1 Locations Object

| Property | Type | Card. | Description |
|---|---|---|---|
| overhead_cover | Boolean | ? | Defines if overhead cover is provided at the location. |
| lighting | Boolean | ? | Defines if lighting is provided for the location. |
| security | DisplayText | ? | Defines the security services (e.g. CCTV, emergency help buttons, manned location) provided at the location. |
| assistance_services | AssistanceServices | ? | Defines if any on-site assistance services are available for EV charging at the location and gives details if available. |

Table 29: Location Object Additional Properties

### 3.2.2 EVSE Object

| Property | Type | Card. | Description |
|---|---|---|---|
| parking_bays | ParkingBay | * | List of zero or more parking bays that are associated with the EVSE. |
| component_accessibility | ComponentAccessibility | * | Defines the accessibility of EVSE components such as payment terminals, screens, visual displays, controls. |

| | | | |
|---|---|---|---|
| kerbs | Kerbs | ? | Defines the presence of drop kerbs and kerb height, if applicable. |
| ground_conditions | Boolean | ? | Defines whether the ground immediately around the chargepoint is flat, level, firm and consolidated. |
| accessible_technologies | AccessibleTechnologies | * | Defines whether alternative accessible technologies (e.g., hearing loops are provided). |

Table 30:EVSE Object Additional Properties

### 3.2.3 ParkingBay Object

| Property | Type | Card. | Description |
|---|---|---|---|
| evses | EVSE | + | List of one or more EVSEs that the parking bay is associated with. |
| bay_width | number | ? | Defines the width of the parking bay in metres. |
| bay_length | number | ? | Defines the length of the parking bay in metres. |
| protected_areas | ProtectedAreas | * | Defines the extent of protected areas (e.g., hatched markings) around parking bay. |
| surface | Boolean | ? | Defines whether the parking bay surface is smooth, flat, and consolidated. |
| levelness | String(5) | ? | Defines the maximum slope of the parking bay. E.g., 1:60. |
| obstructions | Obstructions | ? | Defines the obstructions present in the parking bay. |
| restrictions | ParkingRestriction[4] | * | Defines the user restrictions that apply to the parking bay. |
| location | BayLocation | ? | Defines the location of the parking bay by coordinates of any three corners. |
| bearing | Int | ? | Defines the compass bearing in degrees of any restricted parking orientation, if present. E.g., 90° = East. |

Table 31: Parking Object Additional Properties

### 3.2.4 Connector Object

| Property | Type | Card. | Description |
|---|---|---|---|
| cable_length | number | ? | Defines the length of tethered cables. |
| cable_managementsystem | CableManagement | ? | Defines whether the tethered cable has a management system and the details of the design. |

[4] Note that this is an existing enumerated data type in OCPI. The recommendation is to move the property from the EVSE Object to the new ParkingBay Object.

| | | | |
|---|---|---|---|
| singlehanded_operation | SingleHandedOperation | ? | Defines whether the tethered cable connector or socket outlet is designed for single handed operation and the details of the design. |
| connector_grip | Boolean | ? | Defines whether the tethered cable connector grip is compliant with the requirements of PAS 1899. |
| connector_accessibility | ComponentAccessibility | * | Defines the accessibility of connectors. |

Table 32: Connector Object Additional Properties

## 3.3 Data Type Additions

### 3.3.1 AssistanceServices class

| Property | Type | Card. | Description |
|---|---|---|---|
| assistance_services_present | Boolean | ? | Defines if there are any assistance services provided on-site at location. |
| assistance_services_details | DisplayText | ? | Gives the details on the assistance services offered. |

Table 33: New Data Type – AssistanceServices

### 3.3.2 ComponentAccessibility class

| Property | Type | Card. | Description |
|---|---|---|---|
| component_type | ComponentType | 1 | Type of component. |
| access_level | AccessLevel | + | Defines whether the component is accessed from footway and/or carriageway level. |
| height | number | 1 | Defines height of component from access position in metres. |
| clear_space | ClearSpace | 1 | Defines the clear space in front of the component. |
| reach_distance | ReachDistance | 1 | Defines the reach distance from the user position to the component. |
| display_tilt | DisplayTilt | * | Defines the accessibility of displays from standing and seated positions (SCREEN, TOUCHSCREEN, VISUAL_DISPLAY component types only). |
| displaydesign_visibility | Boolean | ? | Defines whether the visual display has been designed for compliance with PAS 1899 requirement on light, colours and text size. (SCREEN, TOUCHSCREEN, VISUAL_DISPLAY component types only). |
| displaydesign_neurodiveristy | Boolean | ? | Defines whether the visual display has been inclusively designed for people with learning |

| | | | |
|---|---|---|---|
| | | | disabilities or neurodiverse conditions as per PAS 1899 requirements. (SCREEN, TOUCHSCREEN, VISUAL_DISPLAY component types only). |

Table 34: New Data Type – ComponentAccessiblity

### 3.3.3 ComponentType enum

| Value | Description |
|---|---|
| CONNECTOR | Connector |
| PAYMENT_TERMINAL | Payment terminal |
| SCREEN | Digital non-touch screen |
| TOUCHSCREEN | Digital touch screen |
| VISUAL_DISPLAY | Physical visual display (not a screen) |
| CONTROL | Control feature. |

Table 35: New Data Type – ComponentAccessiblity

### 3.3.4 AccessLevel enum

| Value | Description |
|---|---|
| CARRIAGEWAY | Access to component from carriageway level. |
| FOOTWAY | Access to component from footway level. |
| OTHER | Access to component from other level. |

Table 36: New Data Type – AccessLevel

### 3.3.5 ClearSpace enum

| Value | Description |
|---|---|
| CLEARSPACE_VERYPOOR | < 1050 mm clear space in front of component (not PAS 1899 compliant). |
| CLEARSPACE_POOR | 1050-1200 mm clear space in front of component (not PAS 1899 compliant). |
| CLEARSPACE_OK | ≥ 1200 mm and < 1800 mm clear space in front of component (PAS 1899 minimum compliance). |
| CLEARSPACE_GOOD | ≥ 1800 mm clear space in front of component (PAS 1899 “ideal” compliance). |

Table 37: New Data Type – ClearSpace

### 3.3.6 ReachDistance enum

| Value | Description |
|---|---|
| REACHDISTANCE_POOR | > 300 mm reach distance (not PAS 1899 compliant). |
| REACHDISTANCE_OK | ≥ 200 mm and < 300 mm reach distance (PAS 1899 minimum compliance). |
| REACHDISTANCE_GOOD | < 200 mm reach distance (PAS 1899 “ideal” compliance). |

Table 38: New Data Type – ReachDistance

### 3.3.7 Kerbs class

| Property | Type | Card. | Description |
|---|---|---|---|
| drop_kerbs | DropKerbs | 1 | Defines the proximity of drop kerbs to the chargepoint. |
| kerb_height | Number | 1 | Defines the height of the kerb at the chargepoint. |

Table 39: New Data Type – Kerbs

### 3.3.8 DropKerbs enum

| Value | Description[5] |
|---|---|
| PROVIDED_COMPLIANT | Drop kerb provided, within TBC m of chargepoint. |
| PROVIDED_NOTCOMPLIANT | Drop kerb provided, not within TBC m of chargepoint. |
| NOTPROVIDED | No drop kerb provided. |

Table 40: New Data Type – Drop Kerbs

### 3.3.9 DisplayTilt enum

| Value | Description |
|---|---|
| STANDING | Display is visible from a standing position. |
| SEATED | Display is visible from a seated position. |

Table 41: New Data Type – Display Tilt

### 3.3.10 AccessibleTechnologies enum

| Value[6] | Description |
|---|---|
| HEARING_LOOPS | Hearing loops. |
| BRAILLE | Braille. |
| OTHER | Other accessible technologies. |

Table 42: New Data Type – Accessible Technologies

### 3.3.11 ProtectedAreas enum

| Value | Description |
|---|---|
| FRONT | Protected area in front of parking bay. |
| LEFT | Protected area to left of parking bay. |
| RIGHT | Protected area to right of parking bay. |
| REAR | Protected area to rear of parking bay. |

Table 43: New Data Type – ProtectedAreas

### 3.3.12 Obstructions enum

| Value | Description |
|---|---|
| OBSTRUCTIONS_VERYPOOR | Parking bay area has obstruction(s) with less than 1050 mm between any obstruction(s) and the edge of the parking bay. |
| OBSTRUCTIONS_POOR | Parking bay area has obstruction(s) but with 1050-1200 mm between any obstruction(s) and the edge of the parking bay. |
| OBSTRUCTIONS_OK | Parking bay area has obstruction(s) but with 1200-1800 mm between any obstruction(s) and the edge of the parking bay. |
| OBSTRUCTIONS_GOOD | Parking bay area has obstructions but > 1800 mm between any obstruction(s) and the edge of the parking bay. |
| OBSTRUCTIONS_NONE | Parking bay area from obstructions. |

Table 44: New Data Type – Obstructions

[5] Proximity values to updated with values defined in PAS 1899 when available.

[6] Full list of values yet to be finalised.

### 3.3.13 BayLocation class

| Property | Type | Card. | Description |
|---|---|---|---|
| corner1_location | GeoLocation | 1 | Coordinates of parking bay corner 1. |
| corner2_location | GeoLocation | 1 | Coordinates of parking bay corner 2. |
| corner3_location | GeoLocation | 1 | Coordinates of parking bay corner 3. |

Table 45: New Data Type – BayLocation

### 3.3.14 CableManagement class

| Property | Type | Card. | Description |
|---|---|---|---|
| cablemanagement_present | Boolean | 1 | Defines whether or not a cable management system is provided for the connector. |
| cablemanagement_design | DisplayText | ? | Defines the details of the cable management system design. |

Table 46: New Data Type – CableManagement

### 3.3.15 SingleHandedOperation class

| Property | Type | Card. | Description |
|---|---|---|---|
| singlehanded_operation | Boolean | 1 | Defines whether or not the connector or socket outlet is designed for single handed operation. |
| singlehanded_design | DisplayText | ? | Defines the design of the single-handed operation connector or socket outlet. |

Table 47: New Data Type – SingleHandedOperation

## 3.4 Data Type Changes

### 3.4.1 Facility enum

Additional values for Facility enum:

| Value | Description |
|---|---|
| TOILETS | Toilet(s). |
| TOILETS_ACCESSIBLE | Accessible toilet(s). |

Table 48: Data Type Changes – Facility

### 3.4.2 ImageCategory enum

Additional values for Facility enum:

| Value | Description |
|---|---|
| COMPONENT | Close up photograph of a chargepoint component. |
| PARKING_BAY | Wide-angle photograph of parking bay showing relative position(s) of chargepoint(s) |
| SIGNAGE | Photograph showing parking bay signage. |

Table 49: Data Type Changes – ImageCategory

### 2.8. Cardinality

When defining the cardinality of a field, the following symbols are used throughout this document:

| Symbol | Description | Type |
|---|---|---|
| ? | An optional object. If not set, it might be `null`, or the field might be omitted. When the field is set to null or omitted and it has a default value, the value is the default value. | Object |
| 1 | Required object. | Object |
| * | A list of zero or more objects. If empty, it might be `null`, `[]` or the field might be omitted. | [Object] |
| + | A list of at least one object. | [Object] |

# 4 Data Summary

## 4.1 List of New Properties

| Ref | Property | Data Type(s) |
|---|---|---|
| N1 | Parking bay size (width and length) | Numerical; Numerical |
| N2 | Protected areas around parking bay | Enumerated |
| N3 | Parking bay surface material and Smoothness | Boolean |
| N4 | Parking bay levelness | Numerical |
| N5 | Parking bay obstructions | Enumerated |
| N6 | Parking bay relative position – corner coordinates | Numerical |
| N7 | Parking bay relative position – parking direction bearing | Numerical |
| N8 | Chargepoint component access position level (per component) | Enumerated |
| N9 | Chargepoint component height (per component) | Numerical |
| N10 | Chargepoint component clear space (per component) | Enumerated |
| N11 | Chargepoint component reach distance (per component) | Enumerated |
| N12 | Drop kerbs | Enumerated |
| N13 | Kerb height | Numerical |
| N14 | Ground conditions surrounding chargepoint | Boolean |
| N15 | Cable length | Numerical |
| N16 | Cable management systems | Boolean; Open Text |
| N17 | Single-handed operation | Boolean; Open Text |
| N18 | Connector grips | Boolean |
| N19 | Display tilt | Enumerated |
| N20 | Screen or visual interface design | Boolean; Boolean |
| N21 | Accessible technologies | Enumerated |
| N22 | Overhead cover | Boolean |
| N23 | Lighting | Boolean; Boolean |
| N24 | Security | Open Text |
| N25 | Assistance services | Boolean; Open Text |

Table 50: List of proposed new properties in OCPI

## 4.2 Use of Existing OCPI Properties

| Ref | Property | Data Type(s) |
|---|---|---|
| E1 | Chargepoint coordinates | Numerical |
| E2 | Parking bay user restrictions | Enumerated |
| E3 | Connector configuration | Enumerated |
| E4 | Accessible facilities | Enumerated |

| | | |
|---|---|---|
| E5 | Directions | Open text |
| E6 | Site owner | Open text |

Table 51: List of existing properties in OCPI to use or update and use for accessibility

## 4.3 Total Data Types Use

Figure 10 shows the total numbers of recommended properties by data type for both new and existing OCPI properties.

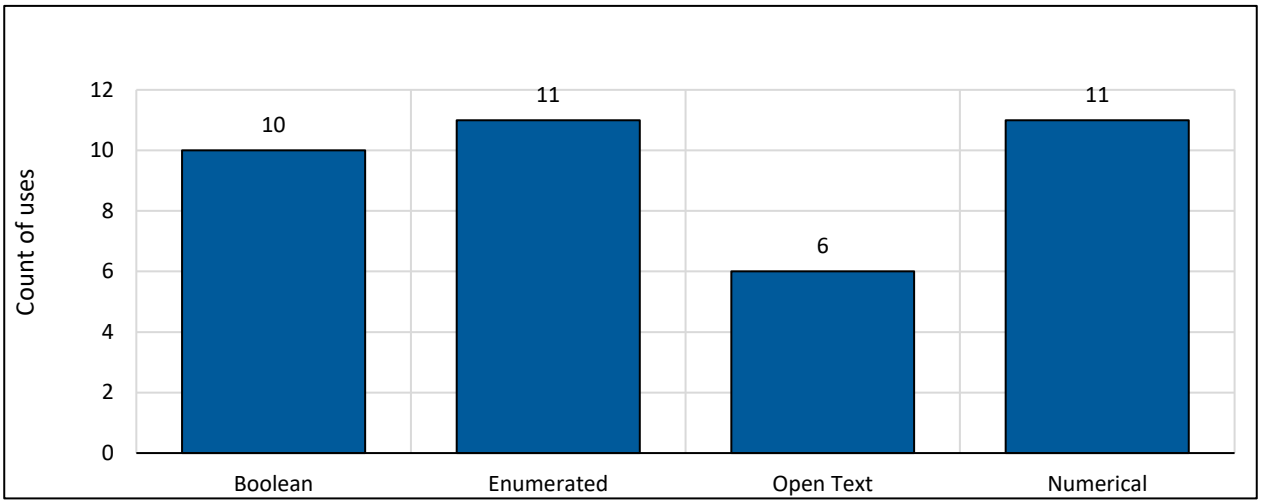



Figure 10: Total Data Type Use - New and Existing OCPI Properties

? Have any properties been missed in the recommended data specification?

# 5 Data Governance

## 5.1 Mandatory or Optional?

Whether the data is mandatory or optional to provide will differ from the perspective of OCPI and within future UK legislation.

### 5.1.1 OCPI

All proposed new properties should be optional only. This is because OCPI is an international standard. Many other countries' EV charging industries are working on the subject of public charging accessibility but will have either no plan for mandating that CPOs provide accessibility data via OCPI or will have differing timescales to here in the UK. It would therefore not be appropriate to make any of the accessibility data properties mandatory within OCPI.

### 5.1.2 UK Legislation

The priority for data per accessibility issue has given a good indication of which properties are most important. However, this has not yet been validated by user research. Therefore, no recommendation is made on which data will be mandatory in future legislation at this time.

? What data, if any, do you think should be made mandatory for public CPOs to provide within future legislation?

## 5.2 Maintaining Data Accuracy

All of the data included within the specification is static. However, some properties may change over time that improve or worsen accessibility. Some of these changes will be beyond the control of the CPO. Likely changes include:

- Resurfacing of parking bays
- Addition of new street furniture that creates obstructions in the parking bay or surrounding the chargepoint
- Replacement of chargepoint hardware

The recommendation is for all data should be checked at least once every year to ensure accuracy. This inspection could be arranged to coincide with a planned maintenance visit.

? Do you have any concerns about the additional resource required to keep data up to date?

? Do you think a requirement for a yearly inspection to ensure data accuracy is appropriate?

## 5.3 Timescales

It is not currently expected that government will enforce PAS 1899 in legislation. However, the UK government is proposing to lay legislation which requires CPOs to provide accessibility data via OCPI for all public chargepoints. This legislation is expected to be created by the end of 2022 with a 12-month period for compliance. We will continue to work with CPOs to understand what data can be made available and the most effective way to support a better consumer experience. OZEV's final position will be confirmed in the Future of Transport consultation response.

It is acknowledged that there will be a resource requirement for CPOs – particularly those with large existing public networks – to capture and store this accessibility data. Site visits will be required where the data cannot be found from installation drawings, chargepoint specifications and installation evidence. However, it is believed that this data is key to helping remove the barrier to the electric transition for the millions of future EV users with disabilities and improving the consumer experience for all.

This is subject to the OCPI standard being updated with the changes recommended in 3.

The work being done to mandate that public CPOs provide open data via OCPI is being covered by a parallel stream as part of the Open Data Alpha project.

? Do you think the proposed legislation timescales are appropriate?

# 6 Closing Remarks

The objective of this work is to:

"Design a specification of chargepoint accessibility data for CPOs to share with eMSPs via OCPI to subsequently give EV users the information they require to know in advance whether a public EV chargepoint will meet their accessibility needs."

The following final questions are included to give respondents the opportunity to comment more generally on the proposals.

? Any further comments or feedback on the proposals for accessibility data for public EV chargepoints?

For CPOs only:

? This data specification recommends the use of OCPI. Please indicate your readiness to provide accessibility data via OCPI.

? Which OCPI modules are you planning to, or have you already implemented?

? How many chargepoints do you operate in your current public network?

? How many chargepoints do you expect to operate in your public network by 2030?

For eMSPs only:

? Do you agree that the data specification (photographs and other data) will allow you to present useful accessibility data to your public EV charging users?

? Do you agree that OCPI is the appropriate data standard to use for accessibility data?

# 7 About the Author

Cenex was established as the UK's first Centre of Excellence for Low Carbon and Fuel Cell technologies in 2005.

Today, Cenex focuses on low emission transport & associated energy infrastructure and operates as an independent, not-for-profit research technology organisation (RTO) and consultancy, specialising in the project delivery, innovation support and market development.

We also organise Cenex-LCV, the UK's premier low carbon vehicle event, to showcase the latest technology and innovation in the industry.

Our independence ensures impartial, trustworthy advice, and, as a not-for-profit, we are driven by the outcomes that are right for you, your industry and your environment, not by the work which pays the most or favours one technology.

Finally, as trusted advisors with expert knowledge, we are the go-to source of guidance and support for public and private sector organisations along their transition to a zero-carbon future and will always provide you with the insights and solutions that reduce pollution, increase efficiency and lower costs.

To find out more about us and the work that we do, visit our website:

www.cenex.co.uk