Rialtas na hÉireann
Government of Ireland

zevi
Zero Emission
Vehicles Ireland

Universal Design Guidelines for Electric Vehicle Charging Infrastructure

Public Consultation Summary Report

1. Background

In 2023, Zero Emission Vehicles Ireland (ZEVI), a division of the Department of Transport, published the Universal Design Guidelines for Electric Vehicle Charging Infrastructure. The Universal Design Guidelines (also referred in this report as 'the Guidelines'), were developed by reviewing existing legislation and standards, identifying national and international industry best practices and engaging with a diverse group of stakeholders. They summarise key considerations for accessibility when installing electric vehicle charging stations across three main areas.

These areas are:

- Charging Station Design;
- Site Design; and
- Information and Communications.

The Guidelines intend to support the National Electric Vehicle Charging Infrastructure Strategy 2022-2025 and its commitment to delivering a national electric vehicle charging network across the country. They are not legally binding but are provided as technical recommendations to help entities design, install and operate infrastructure that is accessible for everyone.

On June 30th, 2023, ZEVI held a public consultation on the Guidelines on the Irish government website for approximately 3 months, concluding on September 26th, 2023. The documents were fully accessible and available in both Irish and English. ZEVI promoted the consultation across several media channels.

The public consultation was held with the objective to gather feedback, opinions and insights from the public and relevant stakeholders regarding the proposed content outlined in the Guidelines. An in-depth analysis has been carried out to ensure that the relevant input received is captured and utilised to update the contents of the Guidelines.

This report summarises the findings of the submissions received in response to the public consultation and highlights some of the emerging discussion topics. It also presents next steps, defining a path forward that emphasises the essential role of stakeholder engagement. This commitment remains essential in the continuous development of the Guidelines, ensuring a thorough consideration of all user needs.

2. Methodology and Sources of Responses

Public consultation submissions were invited both through an online survey hosted in Microsoft Forms and through the zeviconsultations@transport.gov.ie email address. For each individual submission, an assessment was conducted to determine whether the response was relevant to the Guidelines. The relevant feedback and insights will be incorporated into the Guidelines. The survey was anonymous and therefore no personal data was collected (refer to Appendix A for survey questions). A total number of 388 responses were received through the survey and 13 email submissions were received to the email address provided.

For each of the proposed recommendations, the survey prompted participants to share their opinions using a "Likert scale" question, ranging from "Strongly Disagree" to "Strongly Agree". Following this, an open-ended question was presented, inviting respondents to elaborate on any additional considerations they believed should be taken into account regarding that particular recommendation. In the survey, none of the questions were mandatory and users were allowed to skip sections.

The data from the public consultation survey was downloaded from the secure website server and saved as a database in a Microsoft Excel document.

The data received included:

- User Group;
- Previous experience driving an electric vehicle;
- Level of agreement with recommendation statement ("Likert scale" question); and
- Written input (open-ended question).

In total, 388 survey submissions were received from various user groups which are presented in the pie chart below.

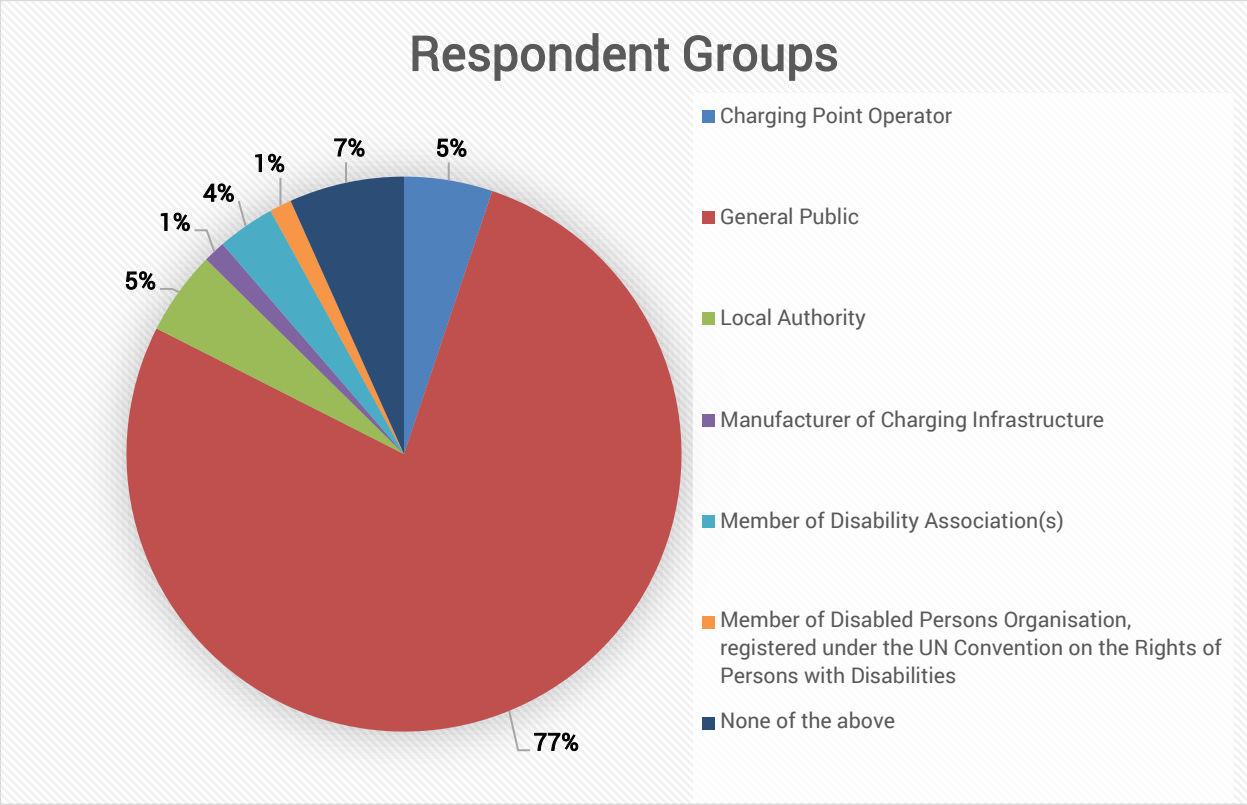


Figure 1: Distribution of total survey respondents by User Group.

The majority of respondents identified as members of the 'General Public' (300), followed by 'None of the Above' (26), 'Charge Point Operators' (20) and 'Local Authorities' (19). In the public consultation survey, 13 respondents represented disability organisations as 'Members of Disability Association(s)', while an additional five respondents were 'Members of Disabled Persons Organisation, registered under the UN Convention on the Rights of Persons with Disabilities'. Finally, five responses were submitted by 'Manufacturers of Charging Infrastructure'.

From the survey responses, 312 respondents had previously charged an electric vehicle and only 76 respondents had not (see Figure 2).

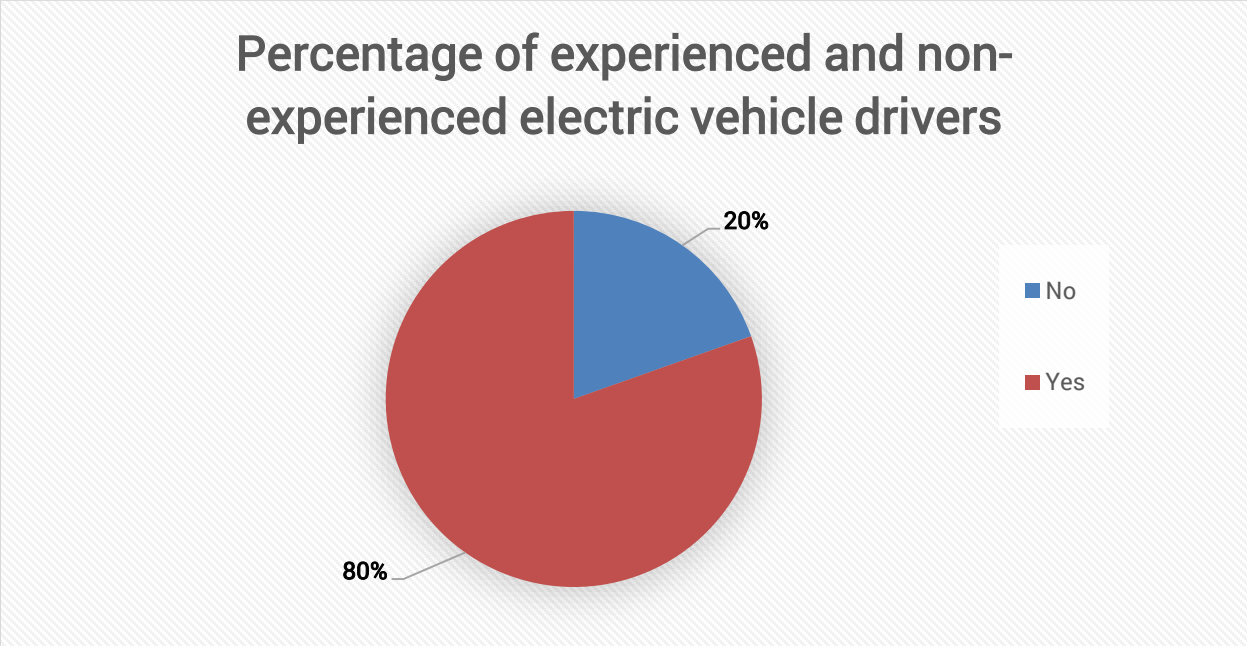


Figure 2: Percentage of experienced and non-experienced electric vehicle drivers among survey respondents.

3. Analysis of survey submissions

An in-depth analysis of each survey submission has been carried out. All the responses were analysed and taken into account when in scope with the recommendations. Some of the responses were out scope, referred to other recommendations in the document, or were unclear.

Among the 388 people who took part in the public consultation survey, 57 respondents were in total agreement[1] with all the 39 recommendations contained within the Universal Design Guidelines.

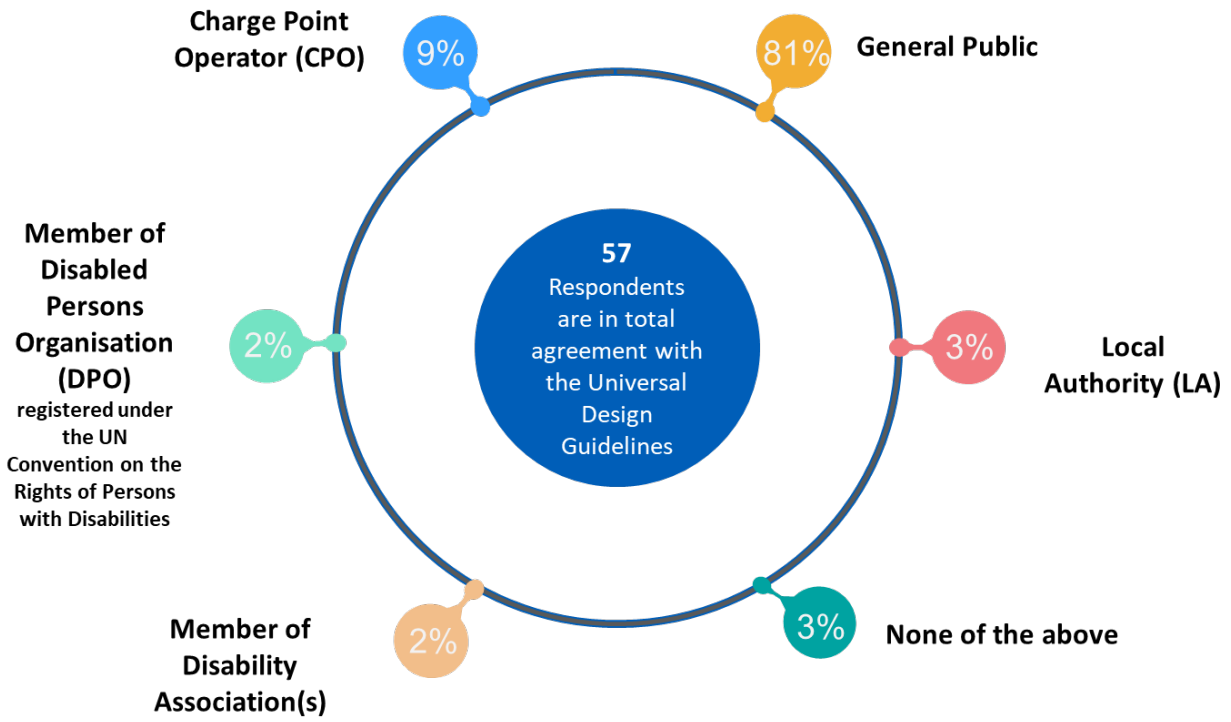


Figure 3: Distribution of survey respondents that are in total agreement with all the 39 recommendations contained within the Universal Design Guidelines, by user group.

The analysis by the key main survey themes is presented below.

[1] Among the 388 respondents, 57 are in total agreement ("Strongly Agree" or "Somewhat Agree") with the Universal Design Guidelines.

3.1 Charging Station Design

Respondents were asked about 13 recommendations for Charging Station Design, regarding the Universal Design of the charging station components such as Cable Length and Plug Handle (see Figure 4 below). For each recommendation, they were asked to what extent they agreed or disagreed and whether they had any additional considerations. In total, there were 277 responses in Charging Station Design.

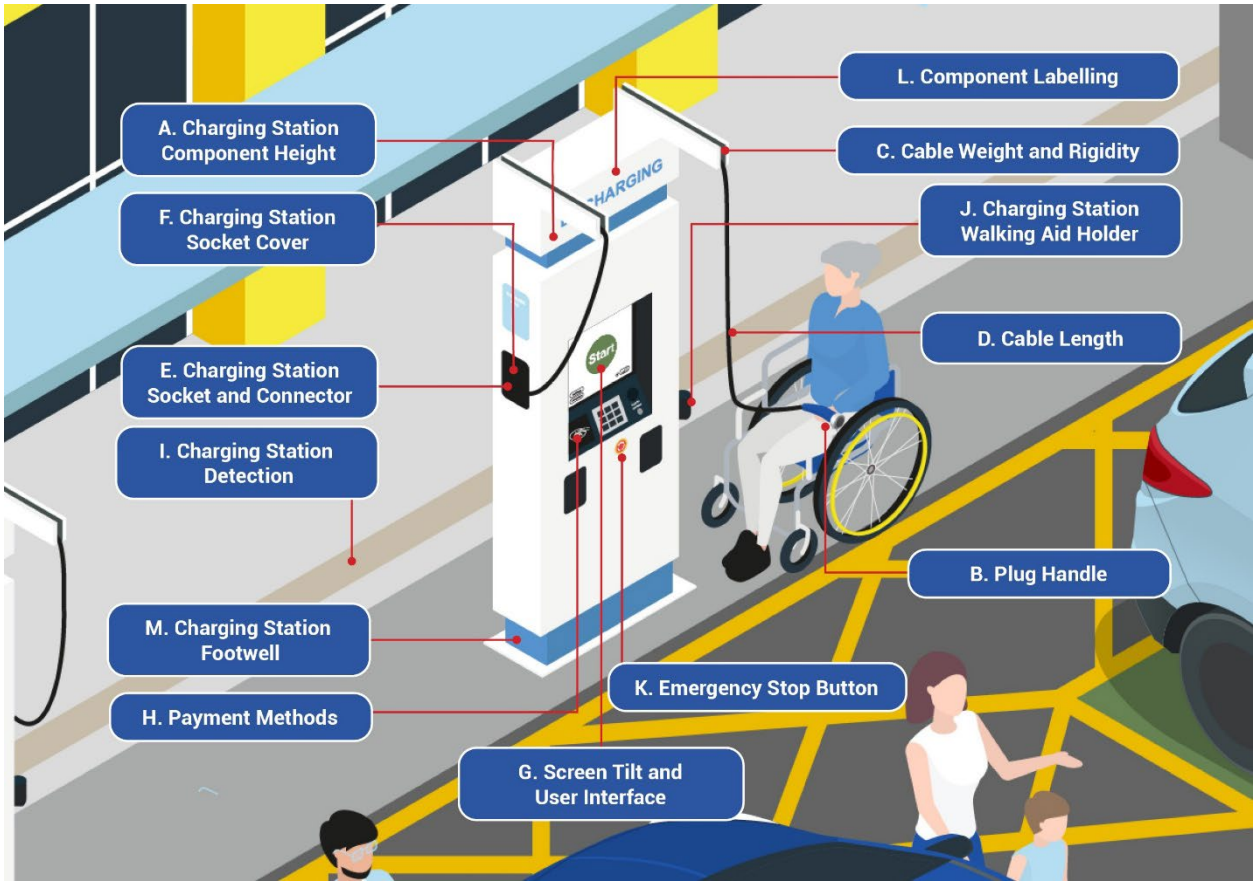


Figure 4: Components of Charging Station Design.

Across the elements of Charging Station Design, 135 respondents agreed[2] with all the recommendations proposed. Component Labelling and Charging Station Detection received the highest level of acceptance.

[2] 135 respondents agreed ("Strongly Agree" and "Somewhat Agree") with all the recommendations proposed in Charging Station Design.

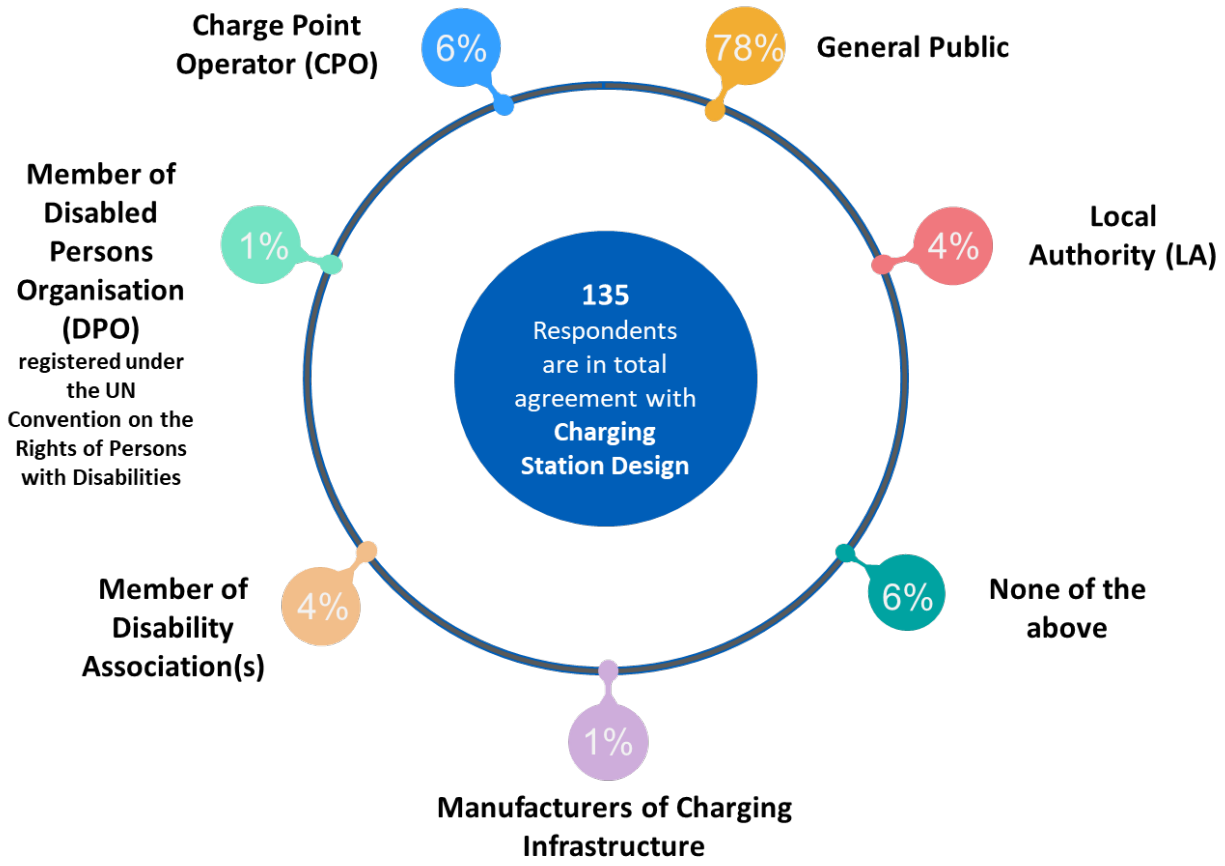


Figure 5: Percentage of respondents per user group that agreed with all aspects of Charging Station Design.

There was consensus on some issues addressed in the Guidelines such as cables being too heavy, the need to provide more space around the vehicle, the need to avoid creating obstacles in the public space and required accessibility considerations for all users. Although not fully in scope, vandalism was a common concern identified by several users. Respondents also cited several existing standards and regulations at the EU and Irish level and recommended that these should be used as the main reference for the development of the Guidelines. Other respondents also provided examples of charging stations which they had had positive experiences with.

Across the Charging Station Design section, only four respondents disagreed[3], with all the recommendations proposed. Screen Tilt and User Interface and Payment Methods received the highest level of opposition.

[3] Four respondents disagreed ("Strongly Disagree" and "Somewhat Disagree") with all the recommendations proposed in Charging Station Design.

Many respondents proposed different alternatives across different recommendations where they did not fully agree such as, for example, alternative payment methods or alternative displays for the user interface. Respondents also brought up issues they had encountered when interacting with electric vehicle charging infrastructure and discussed the limitations of some recommendations in solving those challenges. Other participants, mostly Charge Point Operators, also provided technical input regarding feasibility concerns with some of the proposed recommendations.

Respondents suggested that the use of dual languages (Irish and English) should be provided at charging stations, in line with the Official Languages Act 2003. However, since charging points are private rather than public infrastructure, it is the responsibility of the Charge Point Operators to comply with the legislation where applicable.

It is worth noting that Charging Station Walking Aid holders had the highest level of 'No opinion'. As this is not a common practice, discussions around whether this was needed or not emerged, and other alternatives were presented. Nevertheless, it was seen positively by many respondents who suggested that it as a potential element that could improve accessibility. As mentioned in the Guidelines, Designability's Design Guidance for Accessible Electric Vehicle Charging has proposed a prototype of a charging station with a walking aid holder.

Figure 6 below shows the survey responses for participants regarding their level of agreement and disagreement with the recommendations in Charging Station Design.

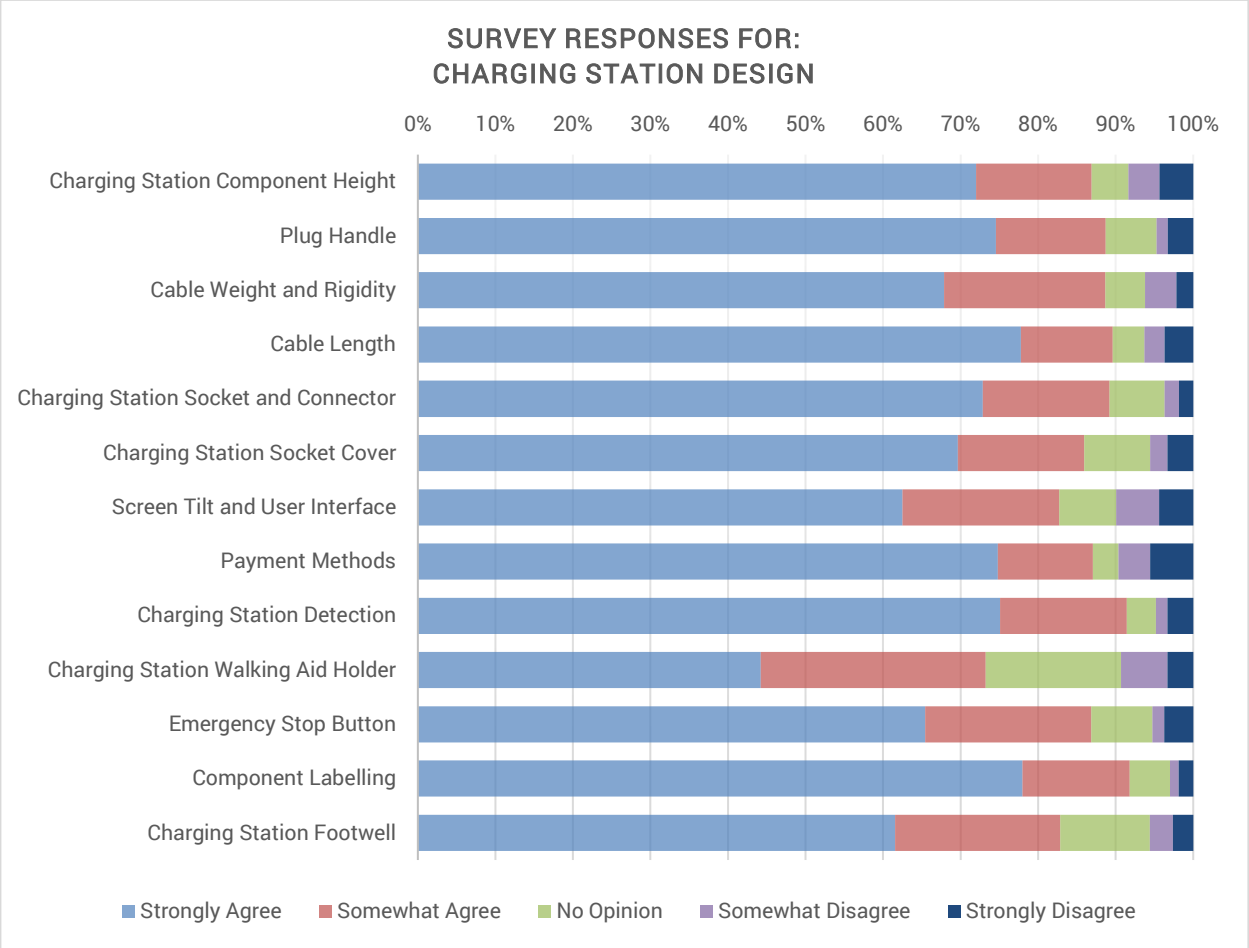


Figure 6: Survey responses from participants regarding their level of agreement or disagreement with the recommendations related to Charging Station Design.

3.2 Site Design

For Site Design, respondents were asked about 15 recommendations, covering the physical aspects of the environment surrounding the charging station, such as Ground Surface Type, Weather Protection and Parking Bay Dimensions (see Figure 7 below). In total, there were 275 responses in the Site Design section.

Figure 7: Components of Site Design.

Across the elements of Site Design, 124 respondents agreed[4] with all the recommendations proposed. Site Maintenance and Lighting received the highest level of acceptance. Figure 8 below shows the percentage of respondents per user group, that agreed with all aspects of Site Design.

[4] 124 respondents agreed ("Strongly Agree" and "Somewhat Agree") with all the recommendations proposed in Site Design.

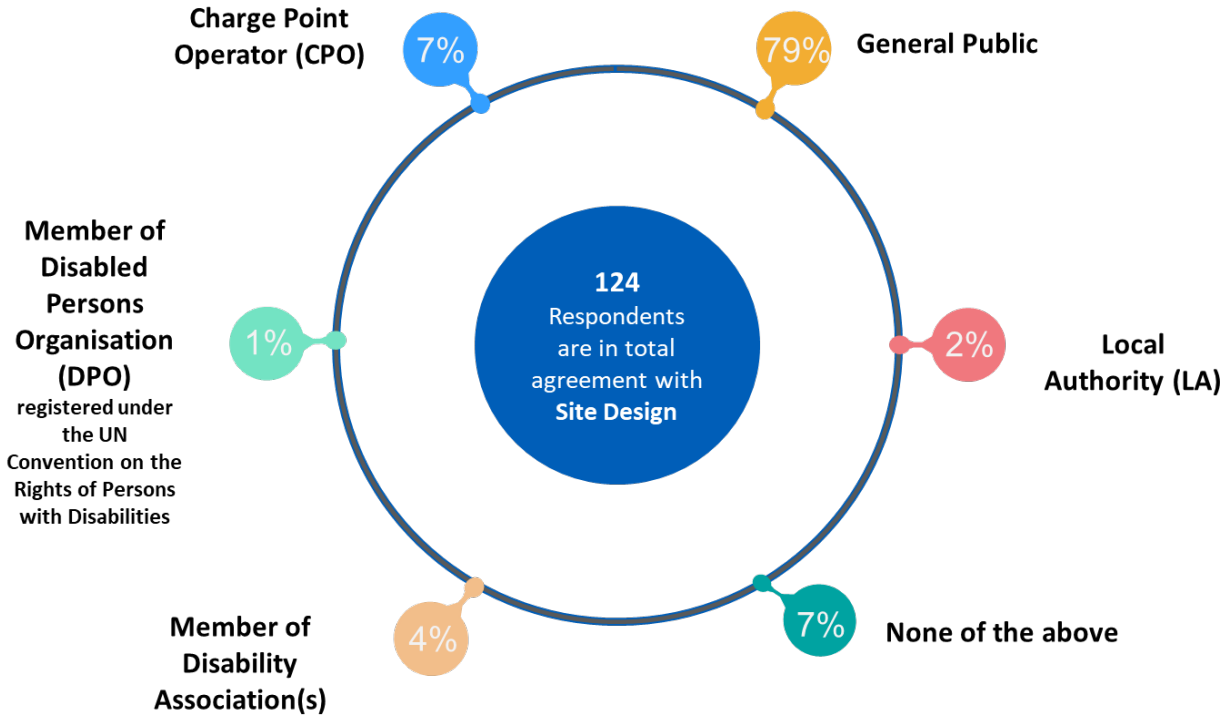


Figure 8: Percentage of respondents per user group that agreed with all aspects of Site Design.

Several respondents suggested rewording “parking bays” to “charging bays”, to avoid drivers using the charging bays as a parking spot, as well as providing more clarity to the Parking Bay Access recommendation. Many respondents across all user groups, with the exception of Members of Disability Association(s) and Member of Disabled Persons Organisation, raised concerns about the size of the charging bays proposed within Parking Bay Dimensions. Particularly, concerns were raised regarding the potential reduction in the number of charging stations available in favour of larger bay dimensions. Referring to the Ground Surface Height Differences, several respondents requested clarification, to avoid the placement of charging stations on footpaths. It was also requested that the Weather Protection could cover not only the charging station, but also users when charging their vehicle.

As per the previous section, respondents referred to both EU and Irish standards and regulations, which will be taken into account in the rewriting of the Site Design section.

Across the Site Design section, only three respondents disagreed[5], with all the recommendations proposed. Weather Protection and Parallel Parking Bays received the highest level of opposition due to concerns regarding the cost of weather protection that would be borne by Irish citizens and that space would be taken away from footpaths and roads.

The highest number of "No Opinion" was given to Disabled Person's Parking Card Holders. Figure 9 below shows the survey responses for participants regarding their level of agreement and disagreement with the recommendations in Site Design.

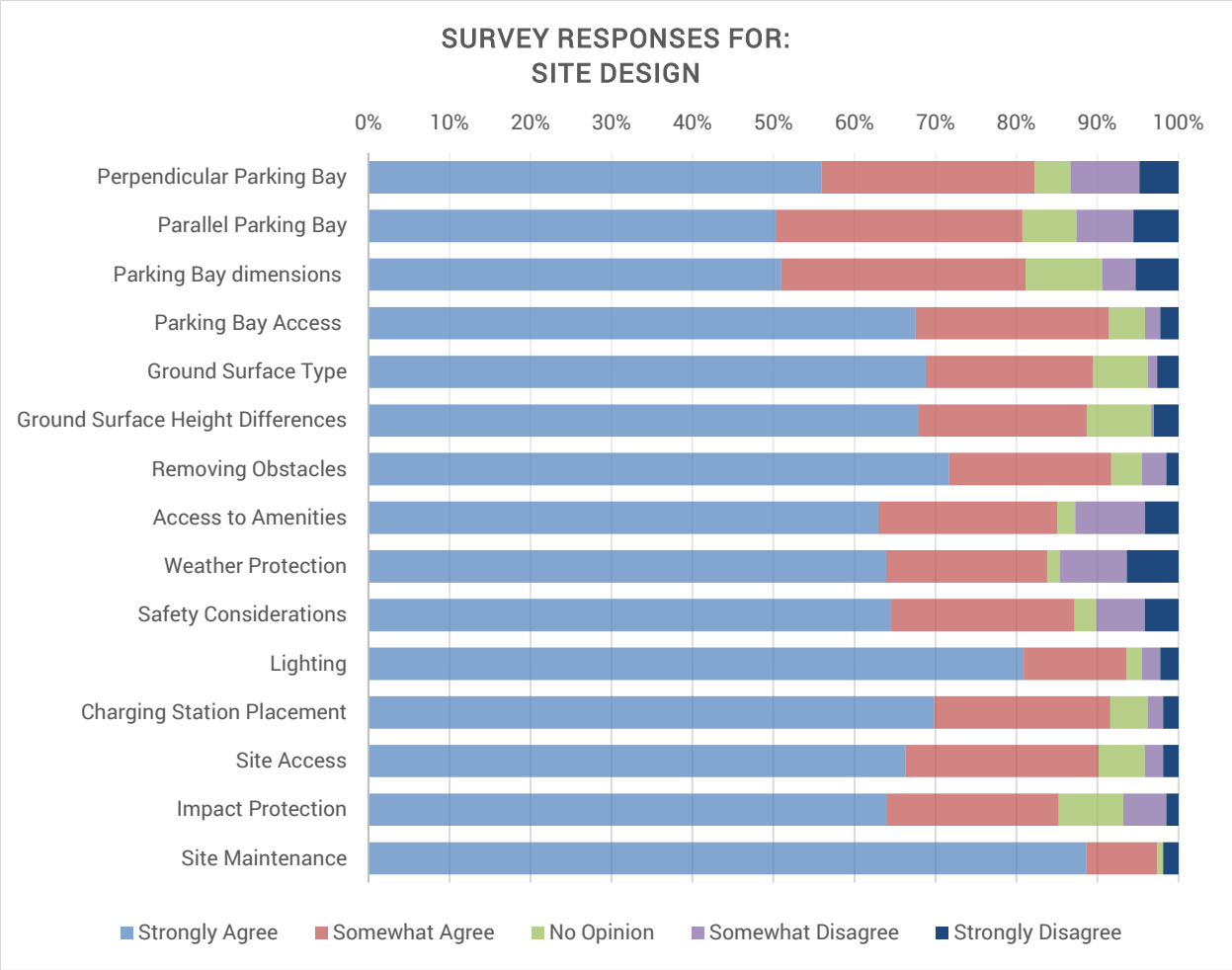


Figure 9: Survey responses from participants regarding their level of agreement or disagreement with the recommendations related to Site Design.

[5] Three respondents disagreed ("Strongly Disagree" and "Somewhat Disagree") with all the recommendations proposed in Site Design.

3.3 Information and Communications

Respondents were asked about 11 recommendations of Information and Communications, such as Online Charging Station Information and Navigation Signage, which aim to improve user awareness and experience before, during and after recharging (see Figure 10 below). As per the previous sections, for each recommendation, they were asked to what extent they agreed or disagreed and whether they had any additional considerations. In total, there were 255 responses in this section.

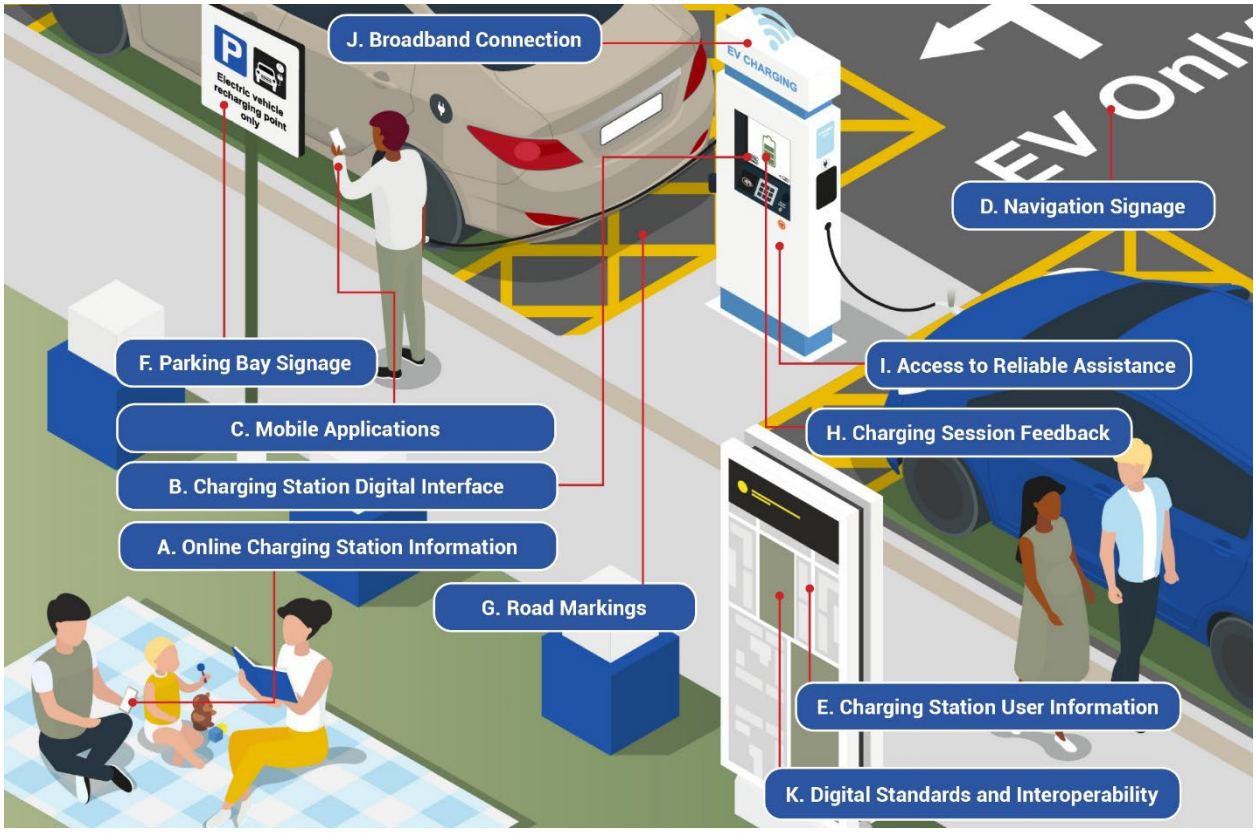


Figure 10: Components of Information and Communications.

Across the elements of Information and Communications, 173 respondents agreed[6] with all the recommendations proposed. Navigation Signage received the highest level of acceptance.

[6] 173 respondents agreed ("Strongly Agree" and "Somewhat Agree") with all the recommendations proposed in Information and Communications.

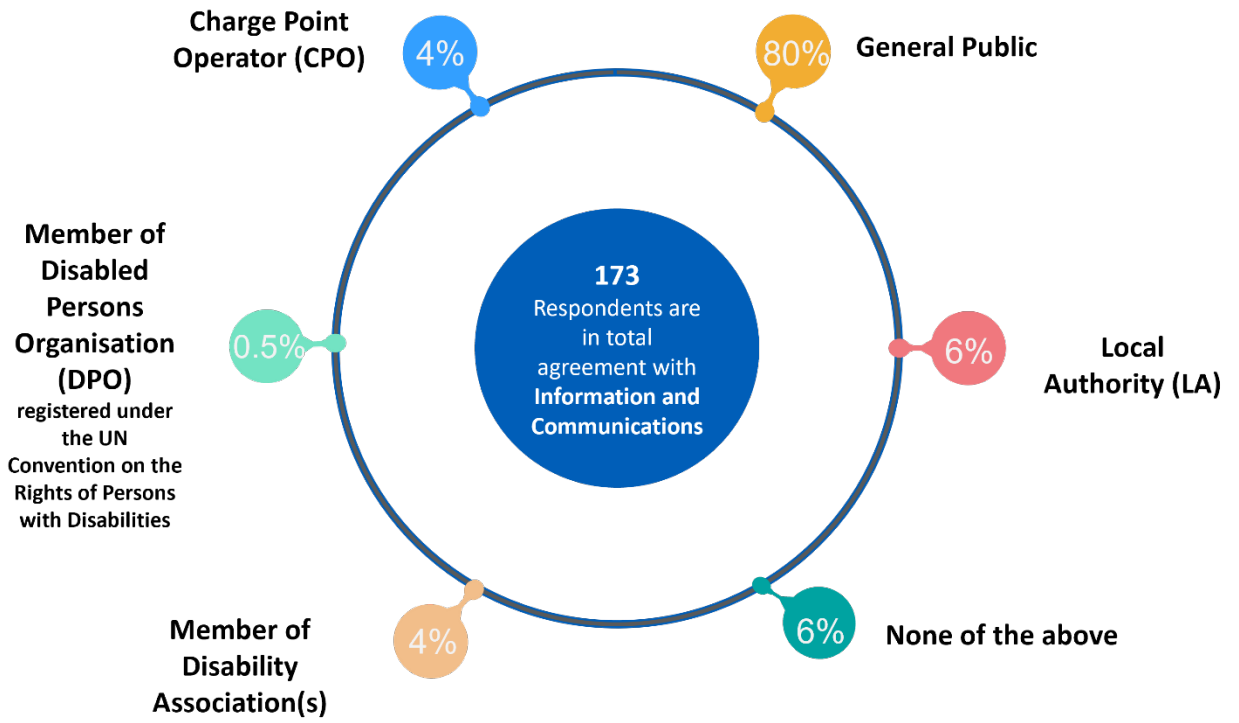


Figure 11: Percentage of respondents per user group that agreed with all aspects of Information and Communications.

There was overall consensus among several respondents on the difficulty to locate charging stations due to insufficient and/or unclear signage and the need for real-time data from a single source to be able to charge and pay. Consistency with existing regulations and across the different information provided to users was once again advised. The need to avoid street clutter and visual impact through excessive signage was stressed across several recommendations. Another key discussed topic was the role of mobile applications in the charging process, as many commented that they should support the charging process but not be fully required for it.

Across the Information and Communications section, only four respondents disagreed[7] with all the recommendations proposed. Mobile Applications and Broadband Connection received the highest level of opposition.

Among the disagrees, participants proposed wording changes to terminology that was perceived as unclear (e.g. 'next generation technology') or where the recommendation was only suggesting rather than mandating a crucial accessibility requirement. As commented previously in Site Design, 'parking bay' was suggested to be reworded to 'charging bay' to ensure a clear distinction between both terms.

[7] Four respondents disagreed ("Strongly Disagree" and "Somewhat Disagree") with all the recommendations proposed in Information and Communications.

Furthermore, different suggestions were presented for the different types of signage, and some information was proposed to be removed or updated to maximise clarity.

As previously commented in Charging Station Design, several respondents suggested implementing dual language (Irish and English) at charging stations. In this instance, regarding public signage, compliance with the Official Languages Act 2003 will be achieved through the future alignment with the road signage specified in the Traffic Signs Manual.

Finally, Digital Standards and Interoperability had the highest level of "No opinion" within Information and Communications. This could be explained by a potential lack of understanding with the proposed recommendation.

Figure 12 below shows the survey responses for participants regarding their level of agreement and disagreement with the recommendations in Information and Communications.

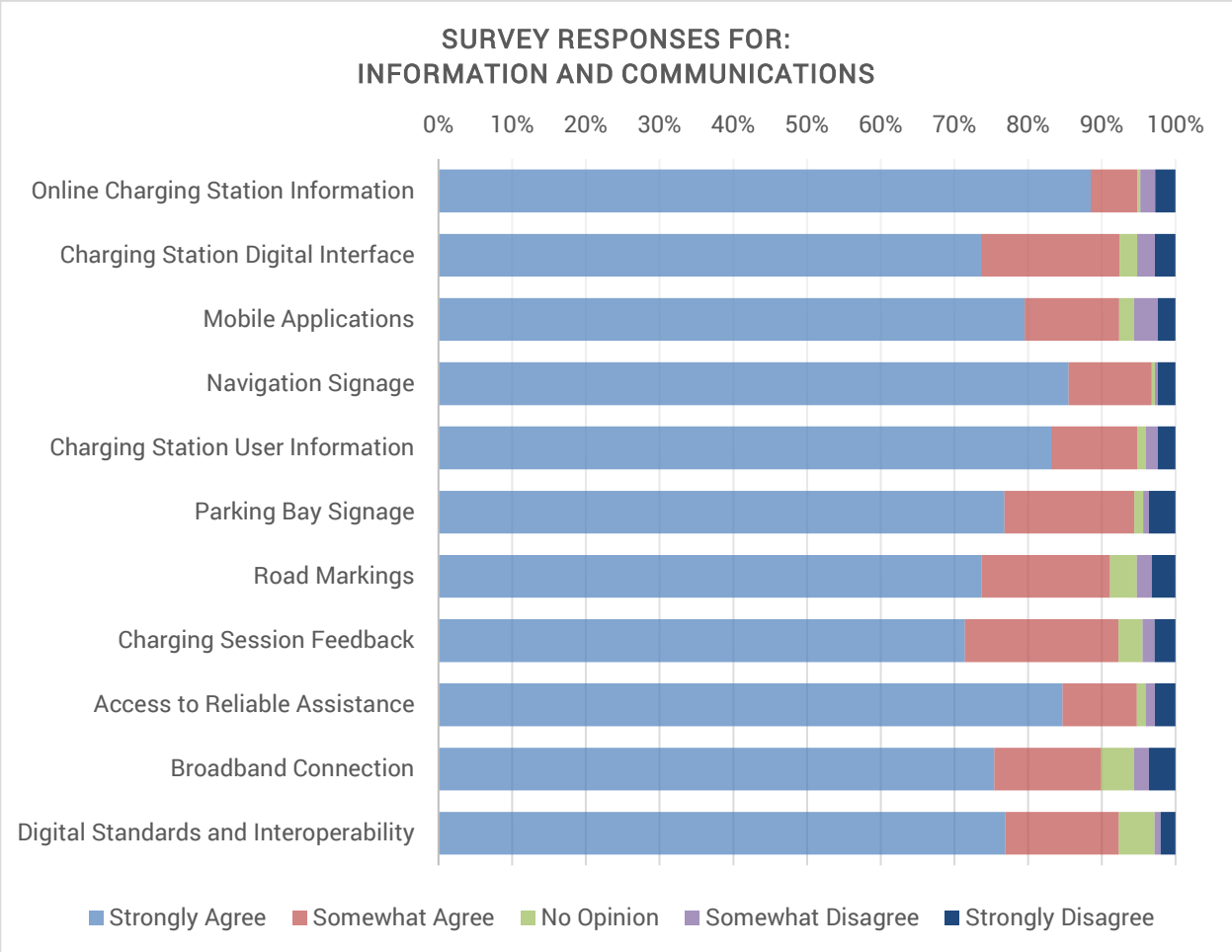


Figure 12: Survey responses from participants regarding their level of agreement or disagreement with the recommendations related to Information and Communications.

3.4 Open-Ended Question

At the end of the survey, respondents were given the opportunity to respond to a free text question asking whether they had encountered any barriers or difficulties in accessing electric vehicle charging infrastructure that had not been considered in the presented recommendations.

Several comments had already been provided as part of previous sections in the survey, such as the length of the cable, concern that drivers may use the charging bays as a parking space without charging the vehicle, or the lack of chargers.

Additional suggestions were given regarding topics not addressed in the Guidelines. Those suggestions deemed within the scope of the Universal Design Guidelines, will be taken into account during the process of revising and rewriting the Guidelines.

4. Email Submissions

A separate thorough review of the email submissions has also been carried out. It is worth noting that several similarities were identified with the survey responses.

Across these submissions, some respondents presented the challenges they had encountered when interacting with electric vehicle charging infrastructure. As a result, they advised on modifying some recommendations based on their accessibility requirements, other users' needs and future technologies and standards, providing suggestions to either remove or replace the text in some recommendations.

Several participants also cited relevant documentation and resources, including current regulations and standards from both EU and Irish contexts. These documents outline regulatory requirements and were recommended for inclusion in the Guidelines. Respondents also emphasised the importance of ensuring consistency in the terminology and contents of the Guidelines (e.g., dimensions, definitions) with such documentation.

Finally, some respondents also highlighted the pivotal role of user testing and the continued engagement with specific user groups as a central component of the development of the Guidelines, suggesting its explicit inclusion in the document.

5. Recommendations and next steps

The public consultation has provided invaluable insights across the general public, electric vehicle user groups and organisations and disability organisations, including Disabled Persons Organisations, on their views, expectations, and aspirations on the future of universally designed electric vehicle charging infrastructure. As a result, the constructive feedback received will be carefully considered and incorporated into the Guidelines.

As part of the commitment to ensuring the relevance and application of these Guidelines, ZEVI will carry out a process of user testing in the next months following the publication of the Universal Design Guidelines. The user testing will involve interviewing real users as they interact with electric vehicle charging infrastructure. Following the process of user testing, the Guidelines will be modified accordingly. The update of the Guidelines will be an iterative process through which the contents will be refined where appropriate and in accordance with new standards, regulations and emerging technologies.

ZEVI would like to give a special thank you to all participants for the continued engagement and looks forward to working together to create a set of Guidelines that truly reflect the collective needs and expectations of all users.

Appendix A

ZEVI Universal Design Guidelines for Electric Vehicle Charging Infrastructure

388	50:14	Closed
Responses	Average time to complete	Status

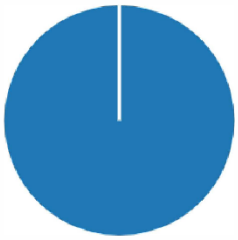
ZEVI Universal Design Guidelines for Electric Vehicle Charging Infrastructure

1. If you would like to participate in the survey, click on 'Yes, I agree to participate' below. With this, you declare:

   - I have read and understood the Disclaimer information above
   - I agree to participate in the survey
   - I give my consent to Zero Emission Vehicles Ireland to process my data (Article 6 GDPR Act)
   - I reserve the right to stop the survey at any time I wish

Yes, I agree to participate 388

No, I do not agree to pa... 0



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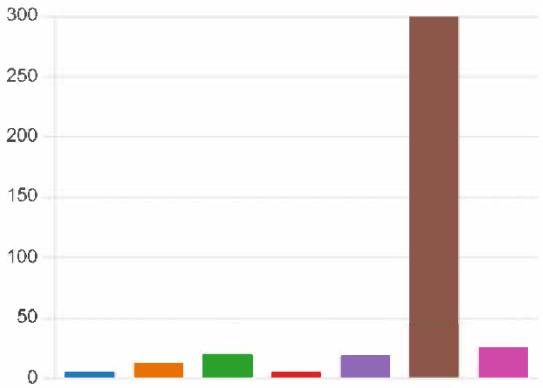
2. Which of the following user groups do you identify with most closely? (please select one)

Member of Disabled Per...	5
Member of Disability Ass...	13
Charging Point Operator...	20
Manufacturer of Chargin...	5
Local Authority (LA)	19
General Public	300
None of the above	26



3. Have you charged an electric vehicle before?

Yes	312
No	76

4. Would you like to provide comments on Charging Station Design?

Yes	277
No (skip section)	111

5. **Charging station component height:** The height of all charging components, including the socket, payment method, and screen, should accommodate users with varying height requirements and mobility aids. Components should be placed within reach (between 0.9 metres and 1.2 metres).

Strongly disagree	12
Somewhat disagree	11
Somewhat agree	41
Strongly agree	198
No opinion	13

6. Is there anything else we should consider about **charging station component height**?

84
Responses

7. **Plug handle**: The plug handle of the charging station should be ergonomic and easy to grip without slipping. This may include considerations around surface finish and handle design. For both tethered and non-tethered cables there should be an option to grip the plug handle with one or two hands without relying on strength or dexterity. The plug receptacle should be ergonomically designed to ensure ease of use.

Strongly disagree	9
Somewhat disagree	4
Somewhat agree	39
Strongly agree	205
No opinion	18

8. Is there anything else we should consider about **plug handle**?

81
Responses

9. **Cable weight and rigidity:** The weight and rigidity of the cable must be manageable for people of all physical abilities and statures. The weight of the charging cable may increase significantly if the charging station has a high-power output (especially for fast charging). In such cases, it is important to include a cable management system if applicable.

Strongly disagree	6
Somewhat disagree	11
Somewhat agree	57
Strongly agree	186
No opinion	14

10. Is there anything else we should consider about **cable weight and rigidity**?

91
Responses

11. **Cable length:** The tethered cable length should be long enough to reach any type of vehicle with varying socket positions. The cable should also be adaptable to all parking positions applicable to the parking bay. Where applicable, a cable management system (e.g., overhead cable support) should be used to avoid the cable forming an obstacle on footpaths or roadways and to avoid it being dragged across the ground. Fast chargers in particular should provide cable support to alleviate the weight of the cable. Where non-tethered cables (portable and owned by the user) are required, the charging station should provide a system to support and manage the cable.

Strongly disagree	10
Somewhat disagree	7
Somewhat agree	32
Strongly agree	210
No opinion	11

12. Is there anything else we should consider about **cable length**?

117
Responses

13. **Charging station socket and connector:** The charging station socket should be easy to see and stand out visually for the user. It should also clearly indicate the plug type and orientation. Tilting the socket upwards at a slight angle can help taller users see the socket without compromising use for seated users. The connection force for inserting and removing the charging cable, both from the charging station and from the electric vehicle, should be accommodating to all users.

Strongly disagree	5
Somewhat disagree	5
Somewhat agree	44
Strongly agree	196
No opinion	19

14. Is there anything else we should consider about **charging station socket and connector**?

69
Responses

15. **Charging station socket cover:** Socket covers, including a hinge in socket cover door, a push down socket cover, or a slide up socket cover, should be designed with user needs in mind. Where a socket cover is present, users should be able to easily open the socket cover and insert the connector using one hand.

Strongly disagree	9
Somewhat disagree	6
Somewhat agree	44
Strongly agree	188
No opinion	23

16. Is there anything else we should consider about **charging station socket cover**?

50
Responses

17. **Screen tilt and user interface**: The angle of the screen at the charging station should ideally be adjustable to improve readability from a seated or fully upright position and to mitigate sun glare. Additionally, the charging station screen should be touch-sensitive for ease of use, and be sufficiently sized, with a surface with adequate contrast, sufficient brightness and anti-glare properties. Buttons and controls on the charging station should be tactilely and visually distinguishable, including night-time functionality.

Strongly disagree	12
Somewhat disagree	15
Somewhat agree	55
Strongly agree	170
No opinion	20

18. Is there anything else we should consider about **screen tilt and user interface**?

99
Responses

19. **Payment methods:** Versatile and user-friendly (e.g. tap-and-go) payment methods should be provided to accommodate a range of user needs and make the process as simple and clear as possible. To ensure a seamless customer experience, plug and charge functionalities should be considered. The use of card readers that require the physical insertion of a card should be avoided in favour of contactless card readers. Where this is unavoidable, a tactile number pad should be included.

Strongly disagree	15
Somewhat disagree	11
Somewhat agree	33
Strongly agree	202
No opinion	9

20. Is there anything else we should consider about **payment methods**?

161
Responses

21. **Charging station detection:** The charging station should be easily detectable to road-users by ensuring adequate indicators are in place, such as light, tactile elements, and different surfaces around the charging station. Using consistent and contrasting colours for the charging station, its components and surrounding environment can enhance user friendliness. Components that may stick out should be clearly demarcated. Charging stations can serve as important way finders on large open parking spaces for people with visual impairments. Ideally, charging station locations should be integrated in digital navigation aids.

Strongly disagree	9
Somewhat disagree	4
Somewhat agree	44
Strongly agree	202
No opinion	10

22. Is there anything else we should consider about **charging station detection**?

103
Responses

23. **Charging station walking aid holder:** Incorporating a walking aid holder to the charging station provides a convenient space for users to rest walking sticks or crutches. This facilitates the charging process as it allows users to use their hand(s) to grab the plug handle. The holder can also be used to hang excess cable, which can help the user manage a non-tethered cable easier.

Strongly disagree	9
Somewhat disagree	16
Somewhat agree	78
Strongly agree	119
No opinion	47

24. Is there anything else we should consider about **charging station walking aid holder**?

50
Responses

25. **Emergency stop button:** Fast-charging stations should provide a covered stop button that, in case of an emergency, could be pressed to halt the charging process. An auto-reset system should be applied to re-activate the charging station if no fault is detected.

Strongly disagree	10
Somewhat disagree	4
Somewhat agree	57
Strongly agree	174
No opinion	21

26. Is there anything else we should consider about **emergency stop button**?

75
Responses

27. **Component labelling:** Clear labelling of key features on the charging station, including the connection type and payment system, should be included.

Strongly disagree	5
Somewhat disagree	3
Somewhat agree	37
Strongly agree	209
No opinion	14

28. Is there anything else we should consider about **component labelling**?

51
Responses

29. **Charging station footwell:** A footwell to allow clearance for wheelchair footplate, at the base of the charging station should be considered.

Strongly disagree	7
Somewhat disagree	8
Somewhat agree	57
Strongly agree	165
No opinion	31

30. Is there anything else we should consider about **charging station footwell**?

44
Responses

31. Would you like to provide comments on Site Design?

Yes	275
No (skip section)	113

32. **Parking bay dimensions**: Parking bays should be designed to accommodate all users to get in and out of their vehicles, move around the vehicle safely, access the charging station, and park comfortably. These Guidelines address the most common types of parking: perpendicular and parallel parking. These two examples can help inform the design of other parking types.

    (A1) Perpendicular parking bays

    To ensure universal access, perpendicular charging bays should be 4.8 metres by 7.2 metres, which includes a 1.2 metres access zone on both sides, in front and behind each bay. Where possible the 1.2 metres access zone should be increased to a 1.5 metre access zone between the parking bay and the charging station. For side-by-side parking bays an appropriate access zone (1.5 to 1.8 metres) between parking bays should be provided.

Strongly disagree	13
Somewhat disagree	23
Somewhat agree	71
Strongly agree	151
No opinion	12

33. Is there anything else we should consider about **(A1) Perpendicular parking bays**?

98
Responses

34. **Parking bay dimensions**:

(A2) Parallel parking bays

To ensure universal access, parallel on-street charging bays should be 3.6 metres by 7.2 metres, which includes a 1.2 metres access zone in the front, back, and along the roadside of the parking bay. Where a minimum width of 3.6 metres cannot be guaranteed, level access along the full length of the pavement should be provided.

Where the space permits, the access zone of 1.2 metres around the parking bay should be increased to 1.5 metres.

Strongly disagree	15
Somewhat disagree	19
Somewhat agree	82
Strongly agree	136
No opinion	18

35. Is there anything else we should consider about **(A2) Parallel parking bays**?

77
Responses

36. **Parking bay dimensions:**

Furthermore, the dimensions of the charging bay must meet the existing planning regulations, and where possible, fully adopt the proposed dimensions to ensure universal access. Where it may not be possible to apply the full dimensions, a 1.2 metres access zone between the vehicle and the charger should be retained as a minimum. In this case, other provisions should be made to accommodate disabled person's parking card holders, such as providing a designated disabled parking charging bay.

Strongly disagree	14
Somewhat disagree	11
Somewhat agree	80
Strongly agree	135
No opinion	25

37. Is there anything else we should consider for accommodating disabled person's parking card holders where universally designed charging bays may not be available?

57
Responses

38. **Parking bay access:** The parking bay should be in an area where there is enough space for manoeuvring while parking. This will make it easier for users to park their vehicles and access the charging station. Where applicable, adequate head room should be considered to accommodate taller vehicles (e.g., multi-purpose vehicles, commercial vehicles).

Strongly disagree	6
Somewhat disagree	5
Somewhat agree	64
Strongly agree	181
No opinion	12

39. Is there anything else we should consider about **parking bay access**?

67
Responses

40. **Ground surface type**: The public charging station must be installed on a flat, stable, and non-sloping surface with adequate grip. Different surfaces should be applied in the immediate vicinity of the charging station to inform orientation and presence of an obstacle. An appropriate slope (surface gradient) should be provided underneath the charging station, and water drainage facilities should be in place to prevent puddles from forming around the charging station.

Strongly disagree	7
Somewhat disagree	3
Somewhat agree	55
Strongly agree	183
No opinion	18

41. Is there anything else we should consider about **ground surface type**?

40
Responses

42. **Ground surface height differences**: Where possible, the charging stations should be positioned on the same level as the roadway to allow for easy access. However, where height differences are unavoidable, disabled access such as kerb drops and ramps built following existing regulations should be provided. Drainage infrastructure should not be placed in a way that it inhibits access to the charging station.

Strongly disagree	8
Somewhat disagree	1
Somewhat agree	55
Strongly agree	180
No opinion	21

43. Is there anything else we should consider about **ground surface height differences**?

30
Responses

44. **Removing obstacles:** Obstacles around the charging station should be removed where possible. Any obstacles such as wheel stops, bollards, safety barriers, drainage infrastructure, or kerbs should be placed appropriately to allow adequate access to the charging station and avoid being an obstacle for other road users. Unmanaged cables (tethered or untethered) are a trip hazard and should not form an obstruction for other road users, including on footpaths and cycling lanes.

Strongly disagree	4
Somewhat disagree	8
Somewhat agree	53
Strongly agree	190
No opinion	10

45. Is there anything else we should consider about **removing obstacles**?

38
Responses

46. **Access to amenities:** Charging stations should be installed as close as possible to any available amenities in the immediate vicinity, such as shops, toilets, cafes, or other services. Universally designed public seating in the vicinity of the charging station may be provided where this does not cause obstruction to individuals.

Strongly disagree	11
Somewhat disagree	23
Somewhat agree	59
Strongly agree	168
No opinion	6

47. Is there anything else we should consider about **access to amenities**?

82
Responses

48. **Weather protection**: Where possible, adequate overhead weather protection should be placed around charging stations and along access routes from the charging stations to nearby amenities or facilities to minimise the impact of adverse weather conditions on users.

Strongly disagree	17
Somewhat disagree	22
Somewhat agree	53
Strongly agree	170
No opinion	4

49. Is there anything else we should consider about **weather protection**?

93
Responses

50. **Safety considerations**: Ensuring a safe and secure charging environment is essential for all users. Clearly visible security cameras with a direct view of the charging stations can help deter crime. Sightlines to other users and nearby amenities should also be considered and charging infrastructure should be placed near facilities. Charging should be in the most highly trafficked sections of a carpark to facilitate passive surveillance and a feeling of safety for users.

Strongly disagree	11
Somewhat disagree	16
Somewhat agree	60
Strongly agree	171
No opinion	7

51. Is there anything else we should consider about **safety considerations**?

71
Responses

52. **Lighting:** Adequate and consistent lighting following relevant standards throughout different parts of the day is crucial. This will allow all users to safely navigate the environment surrounding the charger, use the equipment, and access the routes between the public charging stations and nearby amenities.

Strongly disagree	6
Somewhat disagree	6
Somewhat agree	34
Strongly agree	216
No opinion	5

53. Is there anything else we should consider about **lighting**?

43
Responses

54. **Charging station placement:** The charging station should be placed in such a way that it does not obstruct sightlines for other road users and can be safely operated. It should also be placed in a way that it accommodates differences in vehicle types and limits obstruction in its surroundings for other road users. To provide users with more options to orientate their vehicle, charging stations should be placed in variable positions to allow for multiple parking orientations. For on-street locations, charging stations should be placed on kerb extensions to avoid cluttering footpaths. For en-route fast charging stations, a side-on layout similar to that of existing petrol stations may be considered to accommodate longer vehicles. If there is a charging station that serves multiple charging bays, it should be located in the middle between those bays.

Strongly disagree	5
Somewhat disagree	5
Somewhat agree	57
Strongly agree	183
No opinion	12

55. Is there anything else we should consider about **charging station placement**?

54
Responses

56. **Site access:** Barriers or policies that would prevent access to the public charging station at any time of the day should be avoided (e.g., height restrictions) where possible. Measures should also be in place to ensure accessibility of ticketing machines within a closed/barrier-controlled parking area to prevent these becoming an obstacle to using the charging station.

Strongly disagree	5
Somewhat disagree	6
Somewhat agree	63
Strongly agree	175
No opinion	15

57. Is there anything else we should consider about **site access**?

44
Responses

58. **Impact protection:** To ensure the safety and protection of the charging station from potential vehicle impact damage, impact protection measures such as wheel stops should be installed in high-risk areas. However, it is crucial to ensure that these measures do not obstruct road users or create obstacles for users to access and use the charging station. Additionally, they must be in contrast with the surrounding environment to avoid reflecting the light.

Strongly disagree	4
Somewhat disagree	14
Somewhat agree	56
Strongly agree	169
No opinion	21

59. Is there anything else we should consider about **impact protection**?

36
Responses

60. **Site maintenance**: To ensure safe and accessible use of the charging stations, operators should ensure that electric vehicle charging infrastructure is kept in proper working condition throughout its commercial lifetime, and the quality and access of charging stations maintained.

Strongly disagree	5
Somewhat disagree	0
Somewhat agree	23
Strongly agree	234
No opinion	2

61. Is there anything else we should consider about **site maintenance**?

75
Responses

62. Would you like to provide comments on Information and Communications?

Yes	255
No (skip section)	133

63. **Online charging station information:** Providing information about charging stations remotely gives users greater confidence that they can access them before driving to the location. Some key considerations include the exact location of the charging station, booking options, power output, accessibility, charging costs, available payment types, charger availability, vehicle compatibility, language on the display, and nearby facilities.

Strongly disagree	7
Somewhat disagree	5
Somewhat agree	16
Strongly agree	223
No opinion	1

64. Is there anything else we should consider about **online charging station information**?

87
Responses

65. **Charging station digital interface:** Where suitable, adopt next generation technology to provide a seamless user experience. Where a charging station digital display is required, this should provide clear and simple instructions at every step of the charging process. The text size and interactive buttons should be adjustable, and visuals should be displayed in a high-contrast format, including commonly recognised symbols and images where appropriate. Instructions should be in layperson's terms and language options should be available. Speech-based navigation and screen reader mode could be integrated to aid the user through the charging process.

Strongly disagree	7
Somewhat disagree	6
Somewhat agree	47
Strongly agree	184
No opinion	6

66. Is there anything else we should consider about **charging station digital interface**?

54
Responses

67. **Mobile applications:** Mobile applications are a common way to facilitate the charging process and to improve the user experience by providing access to information before, during and after a charging session. Remote feedback during the charging process can help users avoid the need to repeatedly exit or return to their vehicle to check on the charge status or to stop the charging process.

Strongly disagree	6
Somewhat disagree	8
Somewhat agree	32
Strongly agree	198
No opinion	5

68. Is there anything else we should consider about **mobile applications**?

66
Responses

69. **Navigation signage:** Clear, visible, and consistent signage should be displayed to help users locate charging stations, for instance, at the entrance of a car park.

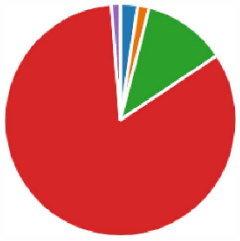
Strongly disagree	6
Somewhat disagree	1
Somewhat agree	28
Strongly agree	212
No opinion	1

70. Is there anything else we should consider about **navigation signage**?

56
Responses

71. **Charging station user information**: Key information should be clearly displayed on or near the charging station, such as who can use it, how to use it, whether parking charges apply, charging prices, connector and socket type, charging speed, customer service contact, and potential time limits and penalties.

Strongly disagree	6
Somewhat disagree	4
Somewhat agree	29
Strongly agree	207
No opinion	3



72. Is there anything else we should consider about **charging station user information**?

58
Responses

73. **Parking bay signage:** To ensure that users are well-informed, signage at the charging station should include clear and comprehensive information about the charger. This should include details such as the type of vehicle that is allowed to use the charger (e.g., electric or hybrid vehicles), as well as any other relevant information, such as the charging cost and payment methods. Signage should be installed at an appropriate height and supplement road markings.

Strongly disagree	9
Somewhat disagree	2
Somewhat agree	44
Strongly agree	192
No opinion	3

74. Is there anything else we should consider about **parking bay signage**?

48
Responses

75. **Road markings:** Road markings should indicate the boundaries of both on-street and off-street parking bays. The parking bay should be clearly identified, with the words 'Electric Vehicle Charging' or 'EV Charging' written on the roadway in letters at least 0.35 meters in height. To differentiate with regular parking bays, the standardised white 'EV' symbol on a green background should be prominently displayed. The surrounding access zone should be hatched in yellow.

Strongly disagree	8
Somewhat disagree	5
Somewhat agree	43
Strongly agree	182
No opinion	9

76. Is there anything else we should consider about **road markings**?

41
Responses

77. **Charging session feedback**: Feedback during the charging process can help communicate to users what stage in the charging process their vehicle is at, provide confirmation that various actions were successful (e.g., when the connector is plugged in successfully, when the connector is ready to unplug, etc.), and confirm that the payment process was successful. Additionally, the charging station should provide clear next steps in case that the charging process fails (e.g., the next available charging station). Where light cues are used, these should be consistent across charge point operators and clearly visible even in daylight. These Guidelines recommend using three different colours to represent the three main charging stages: "operational," "charging is complete," and "possible issue", and a flashing light during the "charger in use" stage. To ensure inclusivity, audio cues can be added to avoid confusion in case the user is colour-blind. Supplementary audio cues should be included to enhance inclusivity and vibration cues should be avoided.

Strongly disagree	7
Somewhat disagree	4
Somewhat agree	51
Strongly agree	175
No opinion	8

78. Is there anything else we should consider about **charging session feedback**?

39
Responses

79. **Access to reliable assistance:** 24/7 responsive assistance should be available via phone, text, voice command or a help button when in-person service is not available. Open channels should be in place for misuse reporting. Customer support should be accessible to all users and a customer service number should be clearly displayed on or near the charging station.

Strongly disagree	7
Somewhat disagree	3
Somewhat agree	25
Strongly agree	210
No opinion	3

80. Is there anything else we should consider about **access to reliable assistance**?

39
Responses

81. **Broadband connection:** The charging location should preferably have adequate broadband or mobile phone coverage to accommodate the use of mobile applications during the charging process.

Strongly disagree	9
Somewhat disagree	5
Somewhat agree	36
Strongly agree	187
No opinion	11

82. Is there anything else we should consider about **broadband connection**?

43
Responses

83. **Digital standards and interoperability**: Charging stations should be interoperable in line with national and EU regulations. A separate data strategy is being developed by ZEVI to address interoperability of national data requirements for electric vehicle changing infrastructure.

Strongly disagree	5
Somewhat disagree	2
Somewhat agree	38
Strongly agree	190
No opinion	12

84. Is there anything else we should consider about **digital standards and interoperability**?

30
Responses

ZEVI Universal Design Guidelines for Electric Vehicle Charging Infrastructure

85. Have you encountered any barriers or difficulties in accessing electric vehicle charging infrastructure that have not been considered in these recommendations?

247
Responses

38/38