

October 2025

Translating research into design opportunities

Key Insights



About ncat

The National Centre for Accessible Transport (ncat) works as an Evidence Centre developing high quality evidence, best practice and innovative solutions to inform future disability and transport strategy, policy, and practice by:

- Engaging with disabled people to better understand their experiences and co-design solutions
- Amplifying the voices of disabled people in all decision making
- Collaborating widely with all transport stakeholders
- Demonstrating good practice and impact to influence policy

ncat is delivered by a consortium of organisations that includes Coventry University, Policy Connect, The Research Institute for Disabled Consumers (RiDC), Designability, Connected Places Catapult, and WSP. It is funded for seven years from 2023 by the Motability Foundation.

For more information about ncat and its work please visit our website www.ncat.uk

To contact ncat, either about this report or any other query, please email info@ncat.uk

Our consortium partners:



Our funder:



What does ncat do?

- ▶ We work **directly with disabled people** to undertake research and develop solutions
- ▶ We centre the **voices of disabled people** in our decision-making and collaborate widely with transport stakeholders, disability organisations, and policy makers
- ▶ We follow **the social model of disability**, where disability refers to the restrictions caused by society
- ▶ We lead with **good practice** and impact to influence policy
- ▶ We **embrace equality, diversity and inclusivity.**



Why did we do this work?

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Accessibility is often inconsistent and fragmented across different types of public transport, creating significant challenges for disabled passengers.

We wanted to understand the accessibility barriers experienced by disabled people across different types of public transport, where there is also an opportunity to use a human-centred design (HCD) approach to create new solutions to overcome these barriers.

HCD is a design methodology that prioritises users' needs, experiences, and preferences at every stage of the design, development and implementation of new products, services, or systems.

Building on ncat's Understanding and [Identifying Barriers to Transport study \(2024\)](#), our project explored the everyday realities of disabled travellers, translating our findings into practical, inclusive design opportunities.



What did we do?

We focused user engagement on five key areas:

- 1 Station and stop design
- 2 Noisy, crowded or bright stations
- 3 Seating on vehicles
- 4 Live travel information
- 5 Planning and booking journeys

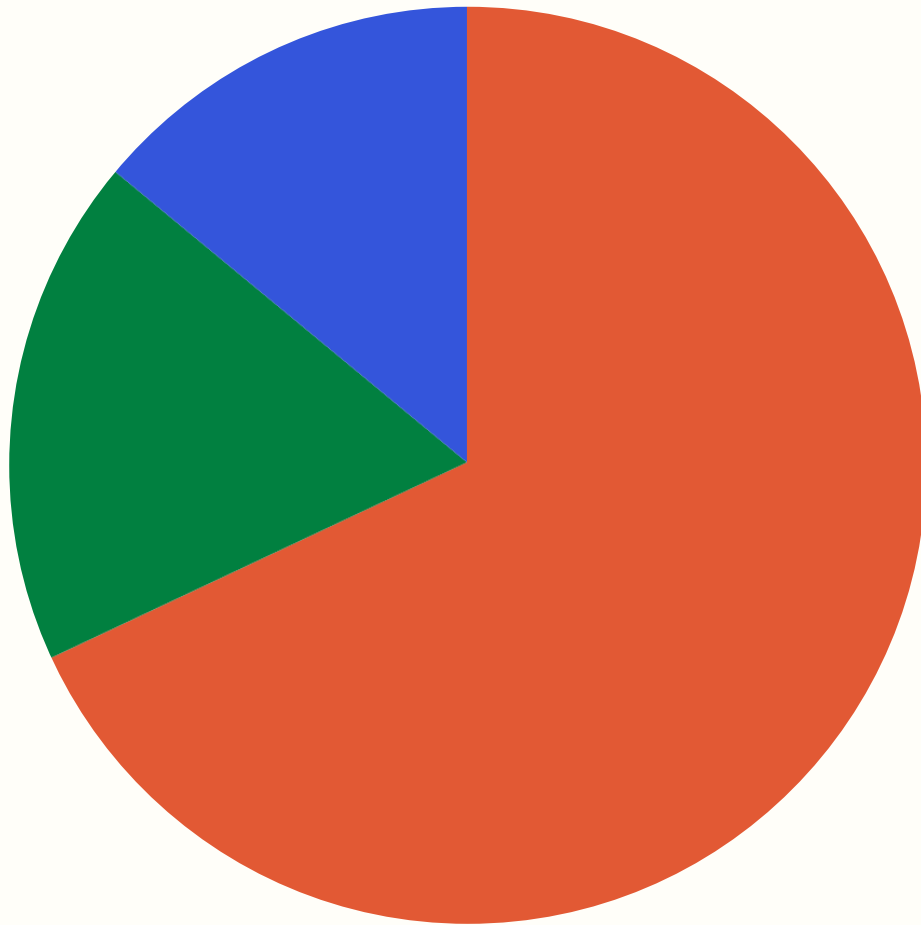


We concentrated on buses, overground and underground trains as these modes were most used and most often linked to access barriers in ncat's database.

User engagement and evaluation

- 1** 482 responses to our discovery survey via the CAT panel.
- 2** Explored experiences across the five key areas.
- 3** 50 participants in qualitative engagement: 7 focus groups (34 people), 9 online interviews and 7 in-person station interviews.
- 4** Participants represented a wide range of demographics and experiences.
- 5** Findings were grouped into topic areas to translate barriers into design opportunities.

The 50 engagement participants



34 people attending focus groups

9 people taking part in online interviews

7 people taking part in in-person station interviews

Developing design opportunities

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- 1** Synthesised findings into evidence-based insights
 - 2** Clustered insights into themes
 - 3** Framed each theme as a design opportunity
 - 4** Defined objectives, opportunity areas, and stakeholders
 - 5** Reviewed and refined into eight design briefs
- ▶▶ **Each opportunity combines lived experience evidence with potential for design and service innovation.**

What did we find?

- ▶ **Discovery survey highlighted recurring accessibility challenges**
 - ▶ **Engagement activities added depth and nuance**
 - ▶ **Barriers varied in extent, impact, and context**
 - ▶ **Emotional and practical consequences were revealed**
 - ▶ **Participants also suggested ideas for change.**
-
- ▶▶ **Insights are structured by eight design opportunities, each tagged (#) to link challenges with potential solutions.**

8 Design Opportunities

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- 1** Bus stop accessibility
- 2** Bus interior flexibility and accessibility
- 3** Personalising 'live' travel information
- 4** Train station accessibility
- 5** Awareness of diverse travel needs
- 6** Improving existing assistance services
- 7** Clarifying operator-passenger commitments
- 8** Identifying and sharing inclusive transport practices



#Environments

Bus stop accessibility

Design opportunity:

How might we design bus stops that are universally accessible, predictable, and informative for people with diverse impairments so they can travel with autonomy, dignity, and confidence?



Bus stop accessibility



Barriers

- ▶ Uneven surfaces, lack of dropped kerbs, and unclear boarding points make access difficult.
- ▶ Cluttered layouts and inconsistent placement of shelters, poles, and signage reduce navigability.
- ▶ Limited visual, tactile, and audio cues hinder orientation and confidence for people with sensory impairments.
- ▶ Poor visibility of route numbers or approaching buses creates uncertainty and missed services.
- ▶ Lack of real-time or accessible information adds stress and limits independence.
- ▶ Safety concerns arise during boarding and waiting, particularly in crowded or poorly lit environments.

What did we find?

Key insights from interviews and focus groups:

- ▶ Confusion and stress in locating stops and identifying buses.
- ▶ Wheelchair users anxious about inconsistent boarding points and limited manoeuvring space.
- ▶ Blind and partially sighted participants rely on auditory cues, often unreliable or absent.

“

When it's not a designated bus stop, and the driver just pulls up somewhere random, that's really hard. I never know where the door will open or if there's space to get on.

”

Participant with mobility impairment using manual wheelchair

#Vehicle/modes

Bus interior flexibility and accessibility

Design opportunity:

How might we redesign bus interiors to be more flexible, dignified, and intuitive for people with a range of impairments, so they can travel safely, comfortably, and independently?



Bus interior flexibility and accessibility



Barriers

- ▶ Fixed interior layouts offer little flexibility for varied mobility or seating needs.
- ▶ Limited and contested wheelchair/pram spaces create tension and restrict independence.
- ▶ Priority seating is inconsistently used or understood by other passengers.
- ▶ Narrow aisles and crowded layouts make moving through the bus difficult and unsafe.
- ▶ Lack of clear visual or tactile cues hampers orientation and confidence.
- ▶ Interiors prioritise capacity over comfort, resulting in inaccessible and stressful travel experiences.

What did we find?

Key insights from interviews and focus groups:

- ▶ Inflexible layouts create physical and emotional challenges.
- ▶ Wheelchair users compete with prams for limited space, often facing conflict.
- ▶ Blind and partially sighted participants struggle with inconsistent layouts and missing cues.
- ▶ Unpredictable features reduce confidence and increase stress.
- ▶ Priority seating issues lead to frustration and hesitation.

“**The amount of stress I get from getting on a bus and seeing a pram in the wheelchair space is awful. Then you have to have the conversation, and sometimes the drivers won't back you up.**”

Participant with mobility impairment using manual wheelchair

#Environments

Personalising 'live' travel information

Design opportunity:

How might we personalise and improve access to live travel information so that disabled passengers can travel with greater confidence, clarity, and control over their journeys?



Personalising 'live' travel information

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Barriers

- ▶ Inconsistent or missing real-time updates across modes and operators.
- ▶ Audio announcements often unclear, too fast, or not repeated.
- ▶ On-screen information may be too small, low-contrast, or placed out of view.
- ▶ Digital formats rarely allow personalisation (e.g. text size, contrast, repetition).
- ▶ Limited multi-modal formats exclude users with sensory or cognitive impairments.
- ▶ Uncertainty about service changes, stop closures, or space availability undermines confidence to travel.
- ▶ Systems are designed for non-disabled users, lacking clarity, trust, and adaptability in the moment.



What did we find?

Key insights from interviews and focus groups:

- ▶ Personalised, multimodal information is essential.
- ▶ Standardised formats don't meet diverse needs.
- ▶ Vision-impaired and neurodivergent participants face major gaps.
- ▶ Inaccurate or missing updates reduce confidence and deter travel.

“ I need more than just a screen: I need it spoken, clear, and repeated. I can't keep up if it flashes past or disappears. ”

Blind participant with a guide dog

#Services/experiences

Train station accessibility

Design opportunity:

How might we design train stations that are intuitive, navigable, and predictable for disabled passengers, so they can move confidently and independently through spaces and access the services they need without stress or delay?



Train station accessibility



Barriers

- ▶ Long distances between key facilities (entrances, platforms, toilets, seating).
- ▶ Poorly positioned or inconsistent signage makes navigation difficult.
- ▶ Inaccessible toilets, waiting areas, and seating reduce comfort and autonomy.
- ▶ Unreliable or unclear information about lift and service outages causes major disruptions.
- ▶ Complex layouts and variable platform designs hinder orientation and independence.
- ▶ Overwhelming lighting, noise, and crowding create anxiety for sensory-sensitive passengers.
- ▶ Many stations are shaped by infrastructure constraints, not inclusive design principles.

What did we find?

Key insights from interviews and focus groups:

- ▶ Navigation challenges, especially at peak times or during disruptions.
- ▶ Blind/partially sighted users rely on inconsistent staff help.
- ▶ Wheelchair users face inaccessible layouts and poorly signposted lifts/toilets.
- ▶ Sensory-sensitive participants overwhelmed by noise, lighting, and crowds.
- ▶ Clearer, multisensory cues and calmer environments would improve autonomy.

“ There are signs, but they’re high up, small print, and not consistent. I end up walking in circles trying to find where I’m going. ”

Participant with low vision and cognitive impairment

#Experiences

Awareness of diverse travel needs

Design opportunity:

How might we raise public awareness of the diverse access needs of disabled passengers, including those with non-visible disabilities, to create a more respectful, empathetic, and equitable transport experience?



Awareness of diverse travel needs



Barriers

- ▶ Non-visible impairments often dismissed or misunderstood by staff and passengers.
- ▶ Difficulty accessing priority seating or requesting space without judgement or confrontation.
- ▶ Passengers with mobility aids or guide dogs face hostility or lack of cooperation when boarding.
- ▶ Constant need to explain or justify access needs causes emotional fatigue.
- ▶ Low public awareness of schemes like Sunflower lanyards and priority signage.
- ▶ Inconsistent staff training leads to uneven levels of understanding and support.
- ▶ Stigma and lack of empathy undermine confidence and comfort when travelling.

What did we find?

Key insights from interviews and focus groups:

- ▶ Constant self-advocacy is exhausting, especially for non-visible disabilities.
- ▶ Fear of confrontation makes requesting assistance stressful.
- ▶ Participants reported anxiety, frustration, and vulnerability.
- ▶ Lack of awareness undermines discreet signals like sunflower lanyards.
- ▶ Greater public education and an inclusive travel culture are needed.

“**I wear a sunflower lanyard, but people either ignore it or don't know what it means. I still have to explain everything from scratch. People assume I'm faking it because they can't see my disability. It's exhausting always having to explain myself.**”

Participant with autism experiencing chronic pain

#Services/experiences

Clarifying operator- passenger commitments

Design opportunity:

How might we design clear, transparent ways for disabled passengers to understand what to expect from transport services and frontline staff, and for operators to communicate what they can reliably deliver?



Clarifying operator-passenger commitments



Barriers

- ▶ Passenger Assistance and on-board support often inconsistent or unavailable.
- ▶ Poor communication about lift outages or service changes creates stress and delays.
- ▶ Passengers frequently unaware of their rights or entitlements when support fails.
- ▶ Operators rarely communicate their limitations or responsibilities clearly.
- ▶ Lack of shared standards erodes trust and forces disabled travellers to over-plan journeys.
- ▶ Inconsistent staff training and unclear expectations lead to variable experiences.
- ▶ No established framework for mutual accountability between passengers and operators.

What did we find?

Key insights from interviews and focus groups:

- ▶ Frustration and mistrust linked to unreliable Passenger Assistance.
- ▶ Emotional toll of uncertainty when support is missing or unclear.
- ▶ Bus driver support (ramps, waiting, stop announcements) is inconsistent.
- ▶ Clearer, accountable communication about rights and support is vital.

“ I booked Passenger Assistance, but when I got there, no one knew. I never really know if I’ll get the help I was promised. It’s humiliating. ”

Participant with neurological condition using powered wheelchair

#Services/experiences

Improving existing assistance services

Design opportunity:

How can we enhance and expand travel assistance services to provide disabled passengers with greater autonomy, confidence, and real-time control over their journeys, from planning to arrival?



Improving existing assistance services

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Barriers

- ▶ Support is fragmented, inconsistent, and unreliable across modes and operators.
- ▶ Passengers often unsure how or where to request help, or whether staff will be available.
- ▶ Booked assistance frequently fails to arrive, eroding trust and confidence.
- ▶ Experiences vary widely depending on individual staff attitudes and awareness.
- ▶ Tech-based tools show promise but remain poorly integrated and not fully inclusive.
- ▶ Lack of real-time visibility or confirmation of assistance causes stress and uncertainty.
- ▶ Assistance often reinforces dependence rather than enabling independence.

What did we find?

Key insights from interviews and focus groups:

- ▶ Participants frustrated by unpredictable support at stations and stops.
- ▶ Anxiety linked to booked assistance not showing up.
- ▶ Interest in reliable, accessible tech (for example, real-time tracking apps).
- ▶ Desire for more personalised support and consistency across modes.
- ▶ Lack of accountability leaves travellers feeling powerless.

“If the assistance could be tracked on your phone, like a taxi app, you’d at least know someone is coming. Right now it’s blind hope.”

Participant with limited upper limb mobility using powered wheelchair

#Resources

Identifying and sharing inclusive travel practices

Design opportunity:

How might we identify, document, and share inclusive design practices in public transport so that what works well in one place becomes standard practice everywhere?



Identifying and sharing inclusive travel practices

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Barriers

- ▶ Accessible design solutions exist but are applied inconsistently across regions and modes.
- ▶ Good practices (e.g. tactile paving, clear signage, quiet spaces) often remain isolated or undocumented.
- ▶ Lack of shared standards and guidance leads to duplication and uneven quality.
- ▶ Local authorities and designers may lack confidence or resources to implement proven solutions.
- ▶ Inclusive features are frequently lost during upgrades or procurement changes.
- ▶ Knowledge sharing across operators is informal, fragmented, and reliant on individual initiative.

What did we find?

Key insights from interviews and focus groups:

- ▶ Frustration with inconsistent design, even within one region.
- ▶ Good practices discovered by accident, not by system.
- ▶ Strong call to document and standardise what works.
- ▶ Disabled people must be central in evaluating practices.

“**In my town, the buses kneel automatically and say the number aloud. When I visited my sister’s, none of that happened. Why isn’t it the same everywhere?**”

Participant with visual impairment and partial hearing loss

Cross-cutting themes

Throughout our detailed engagement activities, several recurring themes emerged strongly, highlighting broader systemic issues:

- 1 Inconsistent support and services.**
Unreliable assistance and information created anxiety and mistrust.
- 2 Anxiety and emotional impact.**
Fear, judgment, and uncertainty were as limiting as physical barriers.
- 3 Personalisation and flexibility.**
Clear demand for adaptable, human-centred solutions across environments, information, and services



What conclusions did we come to?

Discovery survey responses (n = 482) and in-depth engagement with 50 disabled participants revealed that accessibility is not just a matter of infrastructure or policy, but also of everyday experience, shaped by physical design, social interactions, and access to real-time support.

- ▶ Accessibility is shaped by design, social interactions, and real-time support.
- ▶ Inconsistency, uncertainty, and poor communication undermine confidence and independence.
- ▶ Disabled people want to co-create solutions that respect dignity and autonomy.
- ▶ Deep engagement revealed emotional, social, and practical complexities beyond survey data.
- ▶ Translating findings into design opportunities makes insights usable for partners and sector stakeholders.

What should happen next?

Recommendations for transport manufacturers:

- Use the eight design opportunities as a foundation for improvements.
- Address awareness, education, and attitudes alongside physical design.
- Prioritise inclusive co-design with disabled users.
- Implement near-term fixes: clearer seating signage, consistent boarding points, better live information.
- Explore systemic solutions: flexible interiors, personalised journey planning, integrated journeys.



What should happen next?

Recommendations for ncat and its future activities:

- **Facilitate further inclusive research, engaging under-represented groups.**
- **Share design opportunities widely with industry, policymakers, and operators.**
- **Use opportunities as a basis for co-design, prototyping, piloting, and scaling solutions.**
- **Build strong partnerships with industry to enable practical implementation.**
- **Act as a convening partner, connecting disabled people, designers, and providers.**

References

-  Campaign for Better Transport: Better Bus Stops: Creating a national bus stop standard, 2024
-  Motability: The Transport Accessibility Gap, 2022
-  National Centre for Accessible Transport – Transport Barriers Database
-  ncat (2023). Understanding and Identifying Barriers to Transport - National Centre for Accessible Transport.
-  Transport for All: Are we there yet? 2023
-  Department for Transport: Bus Back Better: National Bus Strategy for England, 2021

Find out more

Visit the [Translating research into design opportunities project page](#) to find links to the full report, along with a shorter ‘highlights’ version that is also translated into easy-read and BSL.

The main project page also has direct links to the 8 individual design opportunities as below:

1. Bus stop accessibility
2. Bus interior flexibility and accessibility
3. Personalising ‘live’ travel information
4. Train station accessibility
5. Awareness of diverse travel needs
6. Clarifying operator-passenger commitments
7. Improving existing assistance services
8. Identifying and sharing inclusive transport practices (vehicle, infrastructure, service, etc.)

Key insights

This report just gives key insights.

ncat encourage you to freely use the data available in this report for your research, analyses, and publications.

When using this data, please reference it as follows to acknowledge ncat as the source: **‘ncat (2025). ‘Translating research into design opportunities’. Available at www.ncat.uk’**

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