



D2.1 – User-centered Design Approach and Inclusive Active Mobility Solutions



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DELIVERABLE 2.1

User-Centered Design Approach and Inclusive Active Mobility Solutions

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Executive Summary

Deliverable 2.1 User-Centered Design Approach and Inclusive Active Mobility Solutions outlines the User-Centered Design (UCD) approach for the AccesS project and the key findings related to **user needs, expectations and challenges for accessibility of built environment and active mobility solutions** across the six demo sites focusing on three different types of buildings:

1. **Case of cultural heritage buildings**, which covers the Brancacci Chapel in Florence, Italy and Christo and the Jeanne-Claude Center in Gabrovo, Bulgaria.
2. **Case of people care facilities**, which covers the Droom je Thuis Foundation in Naaldwijk, Netherlands and the Casa Girasole in Massagno, Switzerland
3. **Case of public services buildings**, which covers the Palazzo di Citta in Bari, Italy and the Mercado de Verónicas in Murcia, Spain.

The objective of this deliverable is to **inform and guide the design priorities and development of the AccesS solutions** by understanding the needs, expectations, and barriers faced by diverse user groups, particularly people with disabilities, those with reduced mobility, and other vulnerable populations across six demo sites. This assessment focuses on two key dimensions: **the built environment within the sites** and **active mobility in the surrounding areas**. To this end, the project has adopted a **UCD approach that follows six main steps: (1) the definition of the design challenge, followed by the phases of (2) discover, (3) define, (4) develop, (5) prototype and test, and (6) deliver**. Deliverable 2.1, as foundational effort to the project activities, explores and reports on the first 3 steps of UCD approach, i.e., framing the design challenges; discovering the context and identifying and engaging the key actors; and defining the user insights, needs, challenges and expectations that emerged from the engagement of actors for each pilot site. The subsequent steps, develop, prototype and test, and deliver will be applied during the remaining phases of the project. The deliverable also presents a tailored roadmap for each demo site, which outlines considerations for applying the remaining UCD phases. These roadmaps serve as a guide for local stakeholders and project partners as they move forward with the development, testing, and implementation of the AccesS solutions. Additionally, the mobility-related insights also provide broader sectoral recommendations that may inform future policy or planning efforts beyond the project's scope.

Across all six demo sites, data were gathered through a **combination of desk research, surveys, interviews, and focus group discussions with end users, workers, citizens, local authorities and disability organisations**. The results across the demo sites identified several recurring barriers for people with disabilities and other vulnerable groups to inclusive access for the built environment and mobility.

- Across all six demo sites, **wayfinding was identified as a significant barrier** to accessibility. Users and stakeholders emphasised the need for **clear, intuitive, and inclusive navigation systems** that support independent movement throughout buildings and its surrounding areas. Commonly requested features included **tactile maps, large-print and high-contrast signage, directional floor markings, audio and video guides, and digital tools** with real-time information. These were particularly important for **persons with visual, hearing, and cognitive disabilities**, as well as **first-time visitors** unfamiliar with the spaces. While some environments, such as Naaldwijk and Massagno, were already considered accessible by users, other sites,

such as Bari and Murcia revealed considerable gaps in signage, orientation aids, and spatial clarity.

- Similarly, across all demo sites, **horizontal and vertical circulation** was identified as a fundamental element of physical accessibility. Users consistently highlighted the need for **barrier-free, wide, and navigable interior spaces** that support independent movement for persons using wheelchairs, mobility aids, or with reduced mobility. Common challenges included **narrow corridors, heavy or manual doors, obstructed pathways, lack of ramps or lifts, and the absence of step-free access**. In Gabrovo, Florence, and Bari, users or actors pointed to physical barriers that restricted movement, including steep staircases, manual door systems, and obstructed transitions between areas. Naaldwijk further emphasised the importance of **lightweight, automatic doors** and well-organised shared spaces, particularly in care settings where multiple assistive devices are in use. Across Naaldwijk and Bari, a key issue was the inadequacy or limited availability of elevators. In Florence, specific issues were raised around the usability of wheelchair lifts and ramps, with concerns about their size, maintenance, and ease of use. In Murcia, stakeholders stressed the need for safe, independent movement throughout the market, especially for users with mobility aids.
- Users and actors emphasised the need for tailored accessibility in specific functional areas. Common needs included **accessible seating and resting areas** in Florence, Murcia and Bari, adapted kitchens and fixtures to support independent living in Naaldwijk, and **inclusive design of service areas and public spaces** in Bari and Murcia. Sites like Gabrovo highlighted opportunities to integrate multisensory exhibitions, while feedback across sites also stressed the importance of furniture layout and lighting in enabling safe, independent use of shared spaces. Across the sites, only Bari identified sanitary accommodation as a major barrier, citing lack of space and absence of basic accessible features like handrails and wide stalls.
- Users and actors also highlighted the **need for inclusive, user-centred engagement supported by trained staff, clear information, and accessible digital tools**. Common priorities included adapted communication formats (e.g., audio guides, tactile displays, sign language videos), intuitive interfaces, and assistive technologies that promote independence, especially for persons with cognitive, sensory, or mobility disabilities. Sites like Florence and Bari highlighted gaps in service accessibility and staff training, while Naaldwijk and Massagno underlined the importance of smart, user-friendly systems to reduce reliance on caregivers.
- In Florence and Murcia, stakeholders stressed the need for **visual emergency signage, improved lighting, and inclusive alert systems** to support persons with sensory disabilities during emergencies. Naaldwijk raised issues related to **smoke detector maintenance**, while feedback from Bari suggested that current **entry and exit points may not adequately support safe evacuation**.
- Environmental conditions, particularly **lighting, acoustics, air quality, and thermal comfort** were recognised across several demo sites as crucial to ensure safety and user comfort. Florence, Bari, and Murcia reported challenges with **inadequate lighting**, particularly in common or transitional areas. In Bari, poor **ventilation and temperature regulation** were frequently cited, along with concerns about **cleanliness and noise**.

- **Pedestrian infrastructure remains an ongoing obstacle**, with broken, constricted sidewalks, blocked routes, absence of curb ramps, tactile strips, and inadequate lighting noted at all sites—particularly in Gabrovo, Bari, and Naaldwijk—restricting independent, safe mobility.
- **Micromobility is underserved** but there is a great demand for its adaptation (tandem bikes, e-scooters) across Gabrovo, Bari, and Naaldwijk, where the modal share is low due to safety concerns, lack of familiarity, poor docking infrastructure, and a lack of adapted vehicles.
- **Public transportation accessibility is uneven** in places like Massagno and Florence that may provide subsidized or partially accessible services with gaps in vehicle design (e.g., absence of low floors), stop placement, and wayfinding—adding barriers for users with mobility or sensory disabilities.
- **Navigation and digital assistance are missing** across all the sites and there is a need for digital mobility planning tools to be more readily available. There is potential in tools like KIMAP in Florence, but awareness, integration, and usability are low.
- **Inclusive design is reactive, not proactive**. While there are some inclusive features (e.g., Florence's lifts, Massagno's ramps), they are retrofitted rather than part of a systematic plan and thus create fragmented or uneven mobility paths.
- **Topography and heritage status are compounding factors**, especially in cities such as Gabrovo and Florence that have hilly terrain or heritage-based design restrictions, demanding innovative, negotiated solutions between preservation and accessibility.
- There is a willingness for change across sites, with local authorities, disability organizations, and residents keen to adopt inclusive mobility practices—provided that this is subject to institutional support, user training, and co-design with affected communities.

Insights and recommendations gathered through this user-centered process will guide the design and development of AccessS solutions at each demo site and will serve to establish a strong foundation for creating accessible, inclusive, and user-responsive environments that support the autonomy and dignity of all individuals, during the project's implementation and beyond.

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List of Acronyms and Abbreviations

Term	Description
AI	Artificial Intelligence
AEM	Azienda Elettrica di Massagno
ASPANPAL	Association of Parents of Children with Hearing and Language Impairment
ASTRAPACE	Association for the Treatment of People with Cerebral Palsy and Related Conditions
BIM	Building Information Modelling
BHA	Bruco Huisvesting Adviseurs BV
BOMS	Building Operation and Management System
BRT	Bus Rapid Transit
CETEM	Technology Centre of Furniture and Wood of the Region of Murcia
DDA	Disability Discrimination Act
DT	Design Thinking
ENS	National Deaf Association
EV	Electric Vehicle
EU	European Union
E@W	Energy@Work Società Cooperativa
FAMDIF	Federation of Associations of People with Physical and Organic Disabilities
FASEN	Federation of Deaf People
FESORMU	Federation of Deaf People of the Region of Murcia
ICT	Information and Communication Technology
IS	International Sign
KPIs	Key Performance Indicators
LIS	Italian Sign Language
MHS	Museum of Humor and Satire
MIW	MY ENERGIA ONER SL
MoG	Municipality of Gabrovo
PEBA	Plan for the Elimination of Architectural Barriers
PNRR	Italy's National Recovery and Resilience Plan
SME	Small and Medium Enterprises
SCCR	Smart City Control Room

SUMP	Sustainable Urban Mobility Plan
TWSIs	Tactile Walking Surface Indicators
UCD	User-Centered Design
UICI	Italian Union of Blind and Partially Sighted People
UNESCO	United Nations Educational, Scientific and Cultural Organization
VH	Virtual Humans
VR	Virtual Reality
VUM	Virtual User Model
WP	Work Package

1. Introduction

1.1 Scope and Objectives of the Deliverable

Deliverable 2.1 User-Centered Design Approach and Inclusive Active Mobility Solutions outlines the User-Centered Design (UCD) approach for AccesS and key findings related to user needs and challenges for accessibility of built environment and active mobility across the six demo sites of AccesS project. The objective of this deliverable is to ensure that the design and development of AccesS solutions across the project's demo sites are informed by a deep understanding of needs and challenges faced by individuals with disability, reduced mobility and other vulnerable groups at the six demo sites. The deliverable presents the findings from the following two tasks within WP2 'Social Inclusion and User-Centered Design Approach':

- **Task 2.1 'Building User-Centered, Inclusive and Comfortable Environments'** - The aim of this task is to **define a User-Centered Design (UCD) approach for the development of the AccesS solutions** by conducting comprehensive user research and engagement. The activities within the task integrated desk-based analysis and direct stakeholder engagement to gain an in-depth understanding of the **needs, expectations, and challenges of diverse user groups**, including citizens, individuals with disabilities, disability organisations, and city authorities across the demo sites in relation to the built environment of the demo buildings.
- **Task 2.2 'Promoting Accessible and Inclusive Active Mobility Solutions: Needs Assessment and Barrier Analysis'**: The aim of this task is **to assess user needs and identify existing gaps to promote accessible and inclusive active mobility solutions**, with a focus on individuals with reduced mobility and other vulnerable groups. This involved **analysing barriers** related to physical infrastructure, policy frameworks, and socio-economic conditions across demo sites. Moreover, the task provided a **set of recommendations** tailored to local contexts, with the aim of enhancing safety and encouraging the use of micromobility and electromobility.

Within the scope of this deliverable, a **common methodology based on User-Centered Design approach** was adopted for Task 2.1 and Task 2.2, which included **data collection in form of surveys, interviews and focus groups discussions with end users, people with disabilities, disability organisations, city authorities, and other stakeholders** across the six demo sites to understand the existing needs, challenges and expectations in relation to the built environment and the mobility aspects of the demo sites.

The findings within this deliverable are presented across the six demo sites of the project which will guide and inform the design priorities and development of AccesS solutions to the extent this is possible within project's scope, ensuring that they effectively respond to the diverse needs of its user base. The deliverable also outlines a **roadmap** per demo site with key considerations for project partners to implement a User-Centered Design approach throughout the design and development of the AccesS solutions and beyond.

1.2 Structure of the Deliverable

The deliverable consists of two primary sections:

1. **Chapter 2 ‘AccesS User-Centered Design Approach’** is an introductory chapter that outlines the **methodological framework adopted**, namely the **AccesS User-Centered Design (UCD) approach**. This approach is based on the principles and methods at the heart of User Centred Design and Design Thinking, including, first and foremost, the centrality of people in the design process. The AccesS User-Centered Design approach consists of six main steps: the definition of the design challenge, followed by the phases of discover, define, develop, prototype and test, and deliver. This chapter also provides a comprehensive overview of data collection activities implemented related to social inclusion, user-centered design and mobility aspects.
2. **Chapter 3 ‘Demo Sites - Insights’** which is organized into **six sub-chapters, one per demo site**, namely the Brancacci Chapel in Florence, Italy; the Christo and Jeanne-Claude Center in Gabrovo, Bulgaria; the Droom je Thuis Foundation in Naaldwijk, Netherlands; the Casa Girasole in Massagno, Switzerland; the Palazzo di Citta in Bari, Italy and the Mercado de Verónicas in Murcia, Spain. Each sub-chapter follows the steps of UCD approach: starting with design challenge, the stakeholder engagement activities undertaken and then illustrating the main findings from the discover and define phases of the UCD approach. The next steps defined in the AccesS UCD approach (develop, prototype, test, and deliver phases) are addressed in this document as a roadmap, containing key topics and considerations, so that each pilot site can continue to adopt this approach for the remaining project timeline in relation to the built environment and active mobility. Additionally, in terms of active mobility, the section also highlights recommendations at a sectoral level that are not to be especially addressed in the project.

Additionally, a concluding chapter (**Chapter 4**) synthesizes the key conclusions and insights derived from this deliverable and delineates the next steps for future development activities in the project.

1.3 Relation to Other Tasks and Deliverables

WP2 ‘Social Inclusion and User-Centered Design Approach’ aims to establish a User-Centered Design (UCD) approach for implementing AccesS solutions. The efforts of Task 2.1 ‘Building User-Centered, Inclusive and Comfortable Environments’ and Task 2.2 ‘Promoting Accessible and Inclusive Active Mobility Solutions: Needs Assessment and Barrier Analysis’ are supported by the goals outlined by WP1 - ‘Design and Integration of the AccesS Framework’: Setting the Foundations for a Smart and Accessible Built Environment’ and specifically by the deliverable ‘[D.1.1 Evaluating Technologies and Market Dynamics for Accessibility, Mobility and Energy Efficiency](#)’. Moreover, joint data collection activities were developed in collaboration with WP1, specifically Task 1.2 ‘Preliminary Design and Master Planning for Demonstrators’ to ensure alignment in methodology and consistency in the collection of insights from demo site leaders across the demo sites.

Moreover, WP2 activities are connected to WP3 ‘Towards a Common Evaluation and Certification Framework for Accessibility and Inclusiveness’ and the relative deliverable ‘D3.1 Review of Existing Certification Schemes and Integration of Stakeholder Insights’.

The insights generated in this deliverable have the potential to inform several activities across the AccessS project, particularly those related to the development, testing, and demonstration of AccessS solutions. These include the development of the digital tools supporting accessible and inclusive design of the built environment (WP4 & WP5), the development of the digital tools supporting inclusive, adaptive and sustainable operation of the built environment (WP6) and concluding with the Universal Accessibility Assessment Tool (T7.1) and the integration into one unified platform, the AccessS Universal Accessibility Suite in WP7. The demonstration and evaluation of the AccessS tools and innovations take place in WP10, WP11 and WP12 for the case of Cultural Heritage Buildings, People Care Facilities and Public Services Buildings respectively.

2. AccesS User-Centered Design Approach

2.1 User-Centered Design

User-Centered design (UCD) is an iterative design process in which users and their needs are a key focus at each stage of the design process. In UCD, users are involved throughout the design process thanks to a series of research and collaborative design methods and tools, to ensure that the developed products, services or systems meet their needs, expectations and priorities.

In general, the UCD design process consists of four stages:

1. First, an **understanding of the context** and context-specific requirements.
2. Secondly, the **needs of the users are assessed, identified and analysed**.
3. Then, this is followed by a **design phase for the development of solutions** addressing the contextual requirements and users' needs.
4. These **solutions are then evaluated** thanks to a further users' involvement, aimed at testing how the designed solutions correspond to the specific context and meet all the users' needs.

User-Centered Design and Design Thinking

User-Centered Design (UCD) shares many connections and principles with the design approach called Design Thinking (DT), such as the fact that both methods put the user at the centre of the design process and encourage an iterative and collaborative approach. Key features of Design Thinking, which also correspond to key features of User-Centered Design, are described below:

- **User centrality:** Design Thinking puts the user at the centre of the design process, with the aim of deeply understanding users' needs, desires and challenges. This empathetic approach helps to create solutions that are truly useful and desirable.
- **Iterative approach:** the Design Thinking process is not linear but iterative. Ideas are continuously tested, refined and improved based on the feedback received. In particular, the Design Thinking process goes through a cycle of subsequent stages (described in the following paragraph), which are not linear and often overlap, with continuous returns to the previous stage in order to improve the final solution.
- **Multidisciplinary collaboration:** Design Thinking promotes collaboration between people with different skills and perspectives. Multidisciplinary teams work together to tackle complex challenges, stimulating innovation and creativity.

As in the case of User-Centered Design, the Design Thinking approach also consists of multiple, interconnected and iterative phases, fostering a continuous cycle of involvement and improvement. There are many different models describing the Design Thinking approach, but we can identify below some common activities that generally occur in this type of design process:

1. **Empathise:** This stage aims to gain an understanding of users' needs, experiences, and priorities through qualitative field research and direct involvement.
2. **Define:** after collecting and analysing data, this phase synthesises the information gathered to create insights for defining more specific and focused challenges that will orient the rest of the process.

3. **Ideate:** in the ideation phase, the objective is to explore possible solutions to the challenges defined, and then select those that are most relevant to the users, feasible and sustainable.
4. **Prototype:** In this phase, the selected ideas are transformed into tangible quick prototypes, allowing for more concrete idea visualisation and obtaining early feedback, by engaging users and stakeholders again.
5. **Test and improve:** Prototypes are tested with real users to gather feedback, identify potential problems, and further refine the solution.

AccessS User-Centered Design approach

In general, both UCD and DT approaches share many methodological similarities. Both approaches are based on **users' needs** and **interconnected and iterative phases**, fostering a continuous cycle of improvement and innovation. While DT tends to have a more holistic and long-term focus and is applied in a wide range of contexts, from product development and service design to business and social innovation, UCD is more oriented toward the implementation of specific products or services.

In the AccessS project, we developed an approach derived from the User-Centered Design approach and integrated into Design Thinking. We therefore formulate the following methodological proposal:

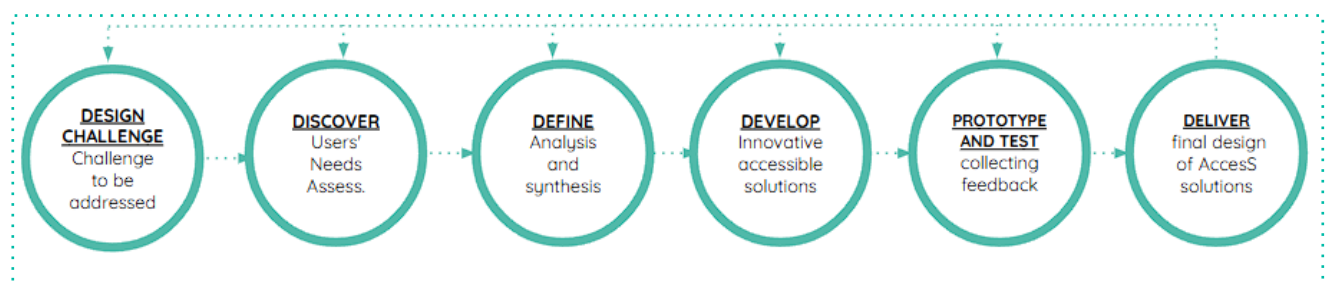


Figure 1. AccessS User-Centered Design Approach

2.1.1 Design Challenge

At the very beginning, the general challenge to be addressed in the project is identified as a generative question. For example, *'How might the AccessS project create barrier-free environments and facilitate smooth mobility to innovate the accessibility and inclusivity of smart buildings, also ensuring equal access to essential services and facilities for people with disabilities and other vulnerable groups?'*

By defining the boundaries of the design challenge, a mapping of key stakeholders to be involved in all UCD phases initiates here. AccessS focuses on three distinct building typologies across the six demo sites, each with its own specific design challenge, as illustrated in the following table.

Table 1. General design challenge across the AccesS demo sites

Typology	Demo sites	Location	General design challenge
Case of cultural heritage buildings	Brancacci Chapel	Florence, Italy	<i>'How can we improve the accessibility of museums and cultural spaces and its surroundings for people with disabilities, ensuring easy navigation, inclusive experiences and enhanced comfort for all visitors and workers?'</i>
	Christo and Jeanne-Claude Center	Gabrovo, Bulgaria	
Case of people care facilities	Droom je Thuis Foundation	Naaldwijk, Netherlands	<i>'How can we make care facilities and its surroundings accessible and comfortable for patients, families, visitors, and workers, addressing their accessibility and vulnerability needs?'</i>
	Casa Girasole	Massagno, Switzerland	
Case of public services buildings	Palazzo di Città	Bari, Italy	<i>'What solutions can we implement to make public buildings and spaces and its surroundings more accessible and inclusive while ensuring usability and comfort for all citizens?'</i>
	Mercado de Verónicas	Murcia, Spain	

These **broad design challenges** serve as a **starting point for context-specific exploration**. Within each demo site sub-chapter, further detailed and specific design challenges are developed based on the insights gathered through stakeholder engagement and context analysis.

2.1.2 Discover

Mapping key stakeholders is followed by the **definition and designing of specific tools and methods to assess the needs and priorities of users and actors** identified. This phase involves listening to each group of stakeholders with the aim to gather context specific insights. A combination of qualitative and quantitative methods, such as **interviews, focus group discussion, online surveys, and desk research** was employed to gather data from demonstrator site leaders, end users, public authorities, and disability advocacy organisations across demo cities (Gabrovo, Florence, Naaldwijk, Massagno, Bari, and Murcia) to understand site-specific requirements, barriers, and user needs related to accessibility and active mobility. Table 2 presents an overview of the various stakeholder groups engaged across the six demo sites. Their involvement was facilitated through the efforts of the demo site leaders and the design of specific and customized data collection tools according to contextual needs and characteristics. The level and nature of engagement varied from site to site, depending on the availability, relevance, and priorities set by the demo site leaders/managers across the sites.

Table 2. List of demo site leaders, governmental actors, users and disability advocacy groups involved in the research activities

1. Demo site leaders			
Objective: Understand the site-specific context, including user requirements for accessible infrastructure, existing local policies, and active mobility solutions. Identify priorities and expectations for creating inclusive environments and identify local actors and users to engage.			
Name/ Organisation	Location	Description	Engagement tools
Municipality of Gabrovo (MoG)	Gabrovo	Responsible for demo site activities and set-up.	Survey
Museum of Humor & Satire (MHS)	Gabrovo	Support in demonstration activities and set-up.	Survey
Municipality of Florence	Florence	Responsible for demo site activities and set-up.	Survey
Bruco Huisvesting Adviseurs BV (BHA)	Naaldwijk	Responsible for demo site activities and set-up.	Survey
Azienda Elettrica di Massagno SA (AEM)	Massagno	Responsible for demo site activities and set-up.	Survey
Municipality of Bari	Bari	Responsible for demo site activities and set-up.	Survey
Energy@Work Società Cooperativa (E@W)	Bari	Support in demonstration activities and set-up.	Survey
Murcia City Council	Murcia	Responsible for demo site activities and set-up.	Survey
MY ENERGIA ONER SL (MIW)	Murcia	Support in demonstration activities and set-up.	Survey

2. Users of demo sites

Objective: Collect first-hand insights on user experiences related to accessibility, mobility, safety, and comfort. Identify the physical and socio-economic barriers users face in the built environment and understand their needs and preferences to improve the accessibility and active mobility solutions at the sites.

Name/ Organisation	Location	Description	Engagement tools
Employees	Gabrovo	Workers of the center and MHS	Survey
Artists	Gabrovo	Working for the center	Survey
Visitors	Florence	Visitors to the Chapel	Survey
Employees, conservators and researchers	Florence	Workers within the Chapel	Survey
Tourist guides	Florence	Tourist guides working at the Chapel	Interview
Religious community	Florence	Friar community at Santa Maria del Carmine Church	Interview
Caregivers	Naaldwijk	Workers assisting the children	Survey
Visitors	Naaldwijk	Family and relatives visiting the facility	Survey
Caregivers	Massagno	Workers assisting the elderly population	Survey
Employees	Massagno	Workers of the care facility	Survey
Visitors	Bari	People visiting the municipality	Survey
Employees	Bari	Workers within the municipality	Survey

Visitors	Murcia	People visiting the market	Survey
Shop owners	Murcia	Owners of the shop in the market	Survey
3. Governmental Actors			
Objective: Identify physical, economic, and policy barriers to realising accessible and inclusive environments. Gather detailed insights into current urban planning, policy-making efforts, user needs and regulatory frameworks that aim to promote active mobility and inclusivity for vulnerable populations.			
Name/ Organisation	Location	Description	Engagement tools
Municipality of Gabrovo	Gabrovo	Responsible for demo site activities and set-up. Representatives such as the head of the Department of Social Activities and Healthcare.	Interview & Workshop
Municipality of Florence	Florence	Responsible for demo site activities and set-up. Representatives such as the Disability Manager of the Municipality.	Interview & Workshop
Municipality of Westland	Naaldwijk	Public authority is external to the project. Representatives such as urban planners, civil engineers or architects could be engaged.	Interview
Municipality of Massagno	Massagno	Public authority is external to the project. Representatives such as urban planners, civil engineers or architects could be engaged.	Interview & Workshop
Municipality of Bari	Bari	Responsible for demo site activities and set-up. Representatives such as urban planners, civil engineers or architects could be engaged.	Written feedback
Municipality of Murcia	Murcia	Responsible for demo site activities and set-up. Representatives such as urban planners, civil engineers or architects could be engaged.	Interview & Workshop

Municipality of Yecla	Murcia	Responsible for governing and administering the municipality of Yecla in Murcia, Spain.	Focus Group Discussion
4. Disability advocacy groups, architects and planners			
Objective: Provide specific insights into the unique needs and challenges of individuals with disabilities, reduced mobility, and other vulnerable groups. Help validate the findings related to user needs.			
Name/ Organisation	Location	Description	Engagement tools
Day Care Center for Adults with Disabilities	Gabrovo	The center supports young people with disabilities post-school by offering a structured environment for personal development, social connections, and independence. Services include occupational therapy, psychological support, and daily living skills training.	Interview
Foundation Care for children with disabilities	Gabrovo	The foundation can provide insights into how the center can be tailored to accommodate the needs of children with disabilities, ensuring inclusivity in design and programming.	Interview
Mother Care Society	Gabrovo	Advocates for mothers and children, ensuring that the center provides an inclusive environment for families, particularly those with children who have special needs.	Interview
Addicts Support Community Foundation	Gabrovo	Supports the inclusion of recovering individuals by providing art therapy, training, and rehabilitation programs within the center.	Interview
Permanent Council for people with disability	Florence	Acting as interlocutor with institutional bodies/associations and city departments	Interview
Italian Union of Blind and Partially Sighted People	Florence	The organisation represents and protects the moral and material interests of the blind and low vision people towards public	Interview

		administration. It was actively involved in meetings with FLO on the quality and accessibility of existing digital services and remote experience.	
National Deaf Association	Florence	The main organisation in Italy, dedicated to the representation and protection of deaf people.	Interview
PG Westland	Naaldwijk	Platform Gehandicapten Westland (PG Westland) is a volunteer organization advocating for equal opportunities and accessibility for people with physical disabilities, offering advice on building plans and assessing accessibility in the Westland region.	Interview
Plena Inclusión	Murcia	Provide support and opportunities that enable people with an intellectual or developmental disability, along with their families, to pursue and enhance their quality of life.	Survey & Focus Group Discussion
Federation of Murcian Associations of People with Physical and Organic Disabilities	Murcia	A national-level platform for representation, defence and action of Spanish citizens with disabilities.	Survey & Focus Group Discussion
Association of Parents of Children with Hearing and Language Impairment (ASPANPAL)	Murcia	Supports children with hearing and language disabilities and their families through advocacy, resources, and specialized services.	Focus Group Discussion
Federation of Deaf People of the Region of Murcia (FESORMU)	Murcia	Advocates for the rights, inclusion, and accessibility of deaf individuals in the Murcia region, providing support services and promoting sign language.	Focus Group Discussion
ASTRADE	Murcia	ASTRADE is an association dedicated to supporting individuals with Autism Spectrum Disorders (ASD) and their families, providing resources and services to improve their quality of life.	Focus Group Discussion

ASTRAPACE	Murcia	Association for the Treatment of People with Cerebral Palsy and Related Conditions.	Focus Group Discussion
Federation of Deaf People (FASEN)	Murcia	Federation of Deaf People (FASEN) is a federation that represents and supports individuals with hearing disabilities, advocating for their rights and promoting their integration into society.	Focus Group Discussion
FUNDOWN	Murcia	Fundown, known as the Fundación Síndrome de Down de la Región de Murcia, is a non-profit organization established in 1994, dedicated to the social and labor integration of individuals with Down syndrome and other intellectual disabilities.	Focus Group Discussion
COAMU - Architects Professional Association	Murcia	Established in 1981, COAMU is a public law corporation that represents architects in the Murcia region of Spain. It offers various services to both professionals and the public, including information dissemination, professional guidance, exhibitions, conferences, and cultural events.	Focus Group Discussion

2.1.3 Define

The data analysis lays the foundations for shared knowledge and the emergence of more specific and relevant areas of interest (*insights*), that identify more focused accessibility, inclusion, and sustainability challenges in the given context of each demo. Within this phase, insights are defined for each demo site in further sections, comprising findings from Task 2.1 and Task 2.2, thanks to **an integrated and site-specific approach**.

The insights related to the built environment are categorised based on the key areas adapted from the **European Standard EN 17210:2021 for accessibility and usability of the built environment** [\[1\]](#), namely:

1. **Wayfinding** - navigation, signage, and orientation support within spaces.
2. **Horizontal circulation** - accessibility of entrances, doors, windows, patios, terraces, and the suitability of surface finishes and materials.
3. **Vertical circulation** - features such as ramps, stairs, handrails, lifts, and escalators that support movement between different levels.
4. **Specific areas, equipment, and provisions** - includes service counters, seating areas, waiting zones, storage areas, kitchenettes, and accommodations for assistance dogs.
5. **Sanitary accommodation** - accessible toilets and washroom facilities designed for diverse user needs
6. **Engagement** - user interfaces, controls, switches, and interactive elements that support user engagement and autonomy
7. **Evacuation and emergency exit** - inclusive fire safety measures and accessible emergency exit routes for all users.
8. **Environmental conditions** - factors such as lighting, acoustics, and indoor climate that impact comfort and usability.

The insights can be then formulated as generative questions (e.g., *'How might we make the signage of the Brancacci Chapel in Florence more accessible for people with low vision or blindness?'*). Each generative question will be addressed with **considerations** and **areas of focus to be carefully considered in each demo**. The roadmap is defined at project level, covering the next three steps of the UCD approach (develop, prototype and test, deliver), that entails the considerations for the project partners to ensure the UCD principles are applied while designing and delivering the AccesS solutions. For the mobility section the user needs are defined based on key barriers encountered by people with disabilities and reduced mobility such as disconnected infrastructure, absence of inclusive micromobility services, insufficient last-mile connectivity, and lack of digital accessibility. These needs underscore recurring barriers such as fragmented infrastructure, poor sidewalk continuity, low public transport accessibility, inadequate micromobility adaptation, and low levels of user autonomy in mobility-related decisions and inform potential solutions including the development of safe, accessible pedestrian and cycling infrastructure; the co-design of adaptive micromobility services; integration with public transport; and digital navigation tools tailored to diverse abilities.

The design strategy outlined is structured around five central pillars:

1. **Inclusive Pedestrian Infrastructure and Spatial Continuity**
2. **Inclusive Micromobility Design and integration**

3. **Access to Public Transport**
4. **Digital Inclusion and Mobility Platforms**
5. **Accessible Active Mobility Infrastructure**

The roadmap for the active mobility solutions was developed through the user-centered design (UCD) methodology. The roadmap is reflected along with the roadmap for the building environment at project level, connected to the AccesS solutions, as well as beyond project level into three progressive phases—short-, medium-, and long-term—tailored to each site’s needs, challenges and barriers defined. Design strategies were synthesized across pilots, ensuring that proposed solutions are both site-specific and scalable across diverse urban and care-based contexts.

2.2.4 Develop

The technical solutions developed within the AccesS project are specifically designed to address the diverse needs of individuals with disabilities, aiming to create accessible and inclusive built environments. The user insights gathered during the *Define phase* offer a perception or expectation-based understanding of these needs and challenges on various accessibility areas across the demo sites. While not all identified issues or expectations can be fully addressed within the scope of the project, these insights play **a key role in shaping the design and development of the AccesS tools and use case scenarios**. The following tools are being developed as part of the project, and many of the identified user needs and expectations will directly inform their design and functionality:

- **Energy Efficient and Sustainable Design Tool** leverages Building Information Modelling (BIM) technology to support the design of sustainable buildings. It integrates with multiple software services to simulate various usage scenarios, enabling designers to assess and optimize energy performance throughout the building.
- **Energy Comfortness Tool** explores the connection between energy efficiency and user comfort. It evaluates how different energy-saving strategies affect indoor environmental quality, helping ensure that sustainable solutions also promote wellbeing and comfort for all users.
- **ErgoFlow** offers expert-driven design recommendations to enhance ergonomics and comfort for furniture items in indoor environments. Tailored to meet the needs of people with disabilities and older adults, it helps ensure that spaces are functional, inclusive and easy to navigate.
- **Virtual User Models (VUM) and VUM-based Virtual Humans (VH)** simulate the physical and behavioral characteristics of users with different abilities. These models provide realistic representations of people with disabilities, enabling designers to anticipate accessibility challenges from the early stages of design.
- **3D Simulation Environments** - The VUM and VH models will be assessed in 3D simulation environments to improve design issues under different scenarios and deliver spaces designed for all.
- **Adaptive Building Operation and Management System (BOMS)** is a smart system that connects with existing building infrastructure to gather real-time data on energy use, occupancy, and environmental conditions. Powered by AI and big data analytics, it

continuously optimizes building performance and user comfort by adapting operations to changing needs and behaviors.

- **Micromobility and Inclusive City Planning** aims to develop a proof-of-concept design for a micromobility solution, suitable for the elderly, and an analysis of micromobility options, enhancing accessibility and inclusivity while promoting sustainable transportation choices for all.
- **Integrated e-Mobility** component integrates electric vehicles (EV) directly into the building ecosystem. It enables EVs to function as active energy components within the system, supporting sustainability goals while ensuring that mobility solutions are accessible and user-friendly.
- **Universal Accessibility Assessment Tool** helps in evaluating the accessibility of buildings and urban environments. It identifies architectural, physical, and technical barriers for people with disabilities and older adults, offering actionable recommendations to enhance inclusivity and compliance with accessibility standards.
- **The AccesS Suite** is the main integrated platform for accessing and managing all components, interfaces, and services of the AccesS digital tools and as such it will be designed with a focus on accessibility, making it easier for individuals with disabilities and older persons to use and navigate the system.

For detailed technical description of the project's components and solutions, Business Scenarios & Use Cases Definition of these tools please refer to **Deliverable 1.2** 'AccesS Framework architecture, use cases and master planning for demonstrators'.

2.2.5 Prototype & Test

When the design of proposed solutions is in a preliminary phase, demo site leaders can involve key stakeholders to **collect feedback about the site-specific proposed solutions**. Based on the input gathered from this second engagement activity, the final version of the proposed solutions is defined according to the UCD iterative approach. Stakeholders' engagement activities in each demo site will be guided by the considerations within the site-specific roadmap. Moreover, a general consideration across the pilot sites is that **evaluation activities should systematically collect feedback** on the following Key Performance Indicators (KPIs) as proposed within the AccesS evaluation framework (developed in Task 1.4 and described within Deliverable 1.3 'AccesS Evaluation Framework').

- o2 Accessibility of buildings
- o3 Accessibility of buildings' surrounding area
- o4 Ease of circulation
- o5 Safe wayfinding
- o6 Usability and operation
- o8 Number of end-users directly engaged in demonstration activities
- o9 User satisfaction with the accessibility of digital solutions
- o10 Comfort of buildings
- o13 Adoption Rate of Smart Accessibility Technologies in Buildings
- o14 Enhanced user awareness of building energy efficiency
- o15 Effectiveness of Energy Management Tools

-
- o20 Products/furniture designed under ergonomics principles
 - o21 EV Charging Infrastructure Improvements

For more information and description please refer to the KPIs of Table 23 in D1.3_AccesS Evaluation Framework.

2.2.6 Deliver

In this final stage, the AccesS tools undergo a **last round of validation with key stakeholders** to ensure that the iterative design process has effectively addressed user feedback and requirements. The delivery of the solutions is not seen as an endpoint but as part of a continuous cycle of improvement. Therefore, it is essential that:

- **Feedback mechanisms** are integrated into the tools, allowing users to share their experiences and suggestions in an accessible and straightforward manner.
- **Usability and maintenance procedures** are designed to be inclusive and easily manageable by all user groups, including individuals with disabilities and older adults.
- **Clear guidance and support resources** are provided to facilitate long-term adoption and adaptation of the tools in real-world contexts.

This ensures that the solutions remain responsive to evolving user needs and continue to promote accessibility, usability, and inclusivity beyond the project's lifecycle.

3. Demo Sites - Insights

3.1 Brancacci Chapel, Florence, Italy

The Brancacci Chapel is located in one of the central districts of Florence, Italy. The Chapel is situated within the boundaries of the **UNESCO area** and is housed in the Santa Maria del Carmine Church. It is one of the most significant examples of the Renaissance era in Florence, with frescoes by Masaccio, Masolino, and Filippino Lippi, and operates as a **civic museum**, owned by the Municipality of Florence.

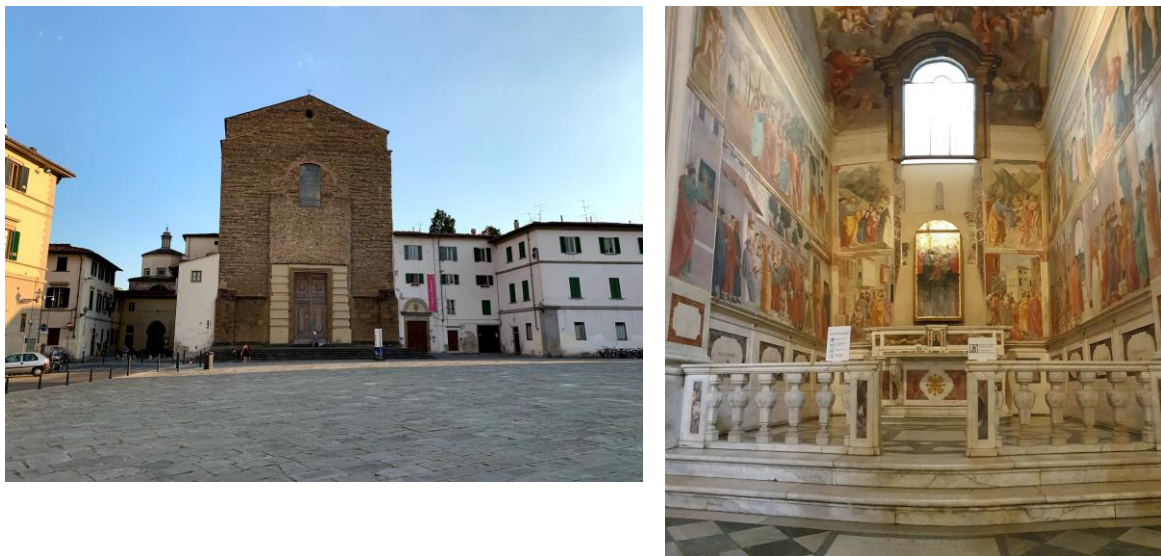


Figure 2. External view of the Church of Santa Maria del Carmine and detail of the inside of the Brancacci Chapel

The Brancacci Chapel is intended to serve as a model for Florence, promoting accessibility for all and exemplifying urban sustainable regeneration that incorporates the surrounding area into the city's smart framework, reflecting the principle of **“no person and no place left behind”**¹. Accordingly, the Municipality aims to ensure that cultural and artistic venues are entirely accessible and inclusive. This encompasses the **development of various services to inform visitors of available options and to provide diverse tour packages tailored to all individuals**, including those with disabilities or special needs, thereby enriching the cultural experience - i.e. FeelFlorence² mobile app and website connected to a Content Management System and a Big Data platform, with thematic routes that include accessible ones, walking routes, and those suitable for children. The AccessS pilot site at the Brancacci Chapel will allow a step forward to further improve accessibility and comfort while preserving cultural heritage.

For a detailed description of the demo site, please refer to Deliverable 1.2 at paragraph 3.2 “The Brancacci Chapel, Florence, Italy”.

¹ https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

² <https://www.feelflorence.it/en>

3.1.1 Design Challenge

The AccessS demo site in Florence aims to **enhance visitor experience and heritage conservation through integrated monitoring and digital solutions**. By coupling environmental monitoring with visitor tracking, the Municipality seeks to manage access, understand how much the presence of visitors and the duration of visits and air/temperature parameters impact on the conservation of the frescoes and find a balance between accessibility and heritage conservation needs. Additionally, sensors will be installed to assess the conservation status of wall paintings and structures, enabling visual inspections. The project will explore leveraging 3D models from the Brancacci Virtual Reality project and developing BIM models for improved site management. Further, Florence aims to expand the Brancacci VR initiative with enhanced Virtual and Augmented reality functionalities, promoting accessibility and inclusivity.

The **design challenge** for the demo site is as follows:

'How might we enhance the accessibility and conservation of the Brancacci Chapel and its surroundings with digital solutions, ensuring that people with disabilities can easily access visit information, fully engage in the Chapel's historical and artistic relevance, and experience an inclusive, comfortable and welcoming environment while also preserving its cultural heritage?'

3.1.2 Discover

3.1.2.1 Context Analysis

City-level perspective

Florence, the capital of Italy's Tuscany region, has a population of 365.675 (2024 Census)³. Over the past decade, the city has seen a modest population decrease by 1.99% between 2011 and 2021⁴, with an aging demographic and a declining birth rate.

Renowned as the cradle of the Renaissance, Florence boasts a rich cultural heritage and a strong academic tradition. **Tourism plays a crucial role in the local economy**, attracting millions of visitors annually but also contributing to challenges such as rising housing costs, commercialization of historic districts, and gentrification. Alongside tourism, the city maintains an **industrial base**, particularly in luxury fashion, leather goods, and artisanal craftsmanship.

Florence is a city with a historically layered urban fabric that shapes its contemporary mobility patterns. Its compact layout, narrow streets, and widespread pedestrian zones provide a high degree of walkability, particularly in the historic center. However, the city also faces significant mobility challenges, including traffic congestion, limited parking availability, and constraints imposed by the ZTL (Zona a Traffico Limitato), which restricts vehicular access in key central areas to reduce pollution and

³<https://www.comune.fi.it/pagina/statistiche-demografiche>

⁴<https://www.comune.fi.it/pagina/statistiche-demografiche>

preserve heritage sites. Public transportation is primarily served by buses and tram lines, connecting peripheral areas to the city center, with ongoing efforts to improve frequency and coverage. In recent years, Florence has invested in sustainable transport initiatives, such as expanding its tram network and introducing shared mobility services like bike and scooter rentals. Nonetheless, balancing the needs of residents, tourists, and logistics within a historic environment continues to require innovative planning and infrastructure strategies to ensure efficient, inclusive, and environmentally responsible urban mobility.

The main characteristic of Florence's historic center is that it is remarkably compact and navigable. The historic heart of Florence, with its dense network of narrow streets, open piazzas, and pedestrian zones, naturally supports a walkable urban lifestyle. Many of the city's most treasured cultural landmarks, including the Brancacci Chapel, are located within easy walking distance of one another, making Florence especially friendly to slow, experiential travel. While challenges remain—particularly for individuals with specific accessibility needs—the overall layout, scale, and atmosphere of the city contribute to an inviting environment for active mobility.

Despite being a medium size population city, Florence has a high mobility demand due to the many daily commuters and over 10 M visitors per year. Considering the densely populated metropolitan area surrounding the city, with a population of over 1 M, both private and public transport management has to face challenges similar to those of bigger and more populated cities. Moreover, the development of the city is strongly limited by the need of preserving and protecting the rich historical and monumental heritage that very often represents a real obstacle to the most ambitious projects.

In the last decade, Florence strongly invested in a modern tramway infrastructure with two lines operating since 2010, connecting three of the areas most hit by traffic to the central railway station (city airport, regional level hospital and the south-west neighbourhood, one of the most populated within the Florence belt). The route of the T2 line has been extended with the Alternative Variant to the Historic Center (VACS), with work taking place between 2022 and 2024, with the Fortezza-San Marco section allowing it to reach Piazza della Libertà (Local Public Transport interchange) and Piazza San Marco (area of high tourist interest).

The Municipality is firmly committed to supporting sustainable modes of transport in order to reduce traffic congestion and to increase air quality. Within the next two years, the city plans to introduce 82 electric buses into its public transport fleet, contributing to its sustainable mobility goals and enhancing multimodal transport connectivity⁵. Public transport together with infomobility is the key lever to accomplish this goal. At the same time, the city prepared a wide communication campaign with the aim to raise the citizens' awareness of green mobility solutions and the benefits for the entire community deriving from more eco-friendly behaviours. This urban configuration fosters opportunities to enhance inclusive mobility practices in harmony with the city's cultural and historical context.

⁵<https://www.ratpdev.com/en/newsroom/publications/italy-autolinee-toscane-new-electric-buses-contribute-florences-sustainable>

Policy perspective

Florence is strategically **diversifying its economy** beyond tourism through integrated policies, investment in innovation, and focus on sustainability, as evidenced by local initiatives and alignment with broader agendas. The city has invested in innovation hubs, creative industries, and sustainable fashion to reduce reliance on tourism. **Florence also promotes sustainable tourism through initiatives like Feelflorence⁶**, a mobile app and website that offers alternative itineraries, real-time crowd monitoring, and accessibility-focused features, helping visitors engage with local culture while avoiding overcrowded areas. The platform also includes a **dedicated section for accessible tourism⁷**, highlighting museums and sites that provide services for people with disabilities. Several attractions offer free admission for individuals with disabilities and their companions, and most civic museums have implemented ad-hoc services to support the accessibility and inclusivity of disabled people, including sensory and tactile paths.

The city's extensive historical and monumental heritage poses challenges to urban development because of legal boundaries. Energy efficiency projects, for example, must align with strict landscape and heritage constraints.

The **Smart City Plan⁸** (adopted in 2010) serves as a strategic framework aimed at achieving tangible objectives for the city through solutions designed to enhance quality of life for all citizens. This planning tool offers a cohesive view of urban life from architectural, town-planning, infrastructure, mobility, energy efficiency, and environmental sustainability perspectives, with a continuous emphasis on social dimensions, with a focus on social dimensions and the well-being of citizens.

The **UNESCO Management Plan⁹** (updated in 2022) exemplifies the city's approach to implementing a holistic management system that amalgamates cross-sector expertise to protect and enhance the social and biocultural assets of the city as a **smart destination**.

Florence is actively collaborating with regional and international stakeholders to develop intelligent solutions and systems to address current challenges such as climate change, digital transition, ecological sustainability, and urban resilience. Through the **REPLICATE EU project¹⁰**, the city implemented smart city solutions within a pilot district, aiming for scalable applications at the metropolitan level. The **Smart City Control Room (SCCR)**, initially developed under REPLICATE, now serves as the central hub for data-driven city management, integrating a big data platform.

Demosite level information

The Chapel's structure allows **access for small groups** (max 30 people) and requires reservation. There is a limit of 30 accesses every half hour. At the moment, initiatives and visits with schools are carried out but there are no visits or initiatives for special audiences (e.g., elderly, people with disability). As in all Civic Museums in Florence, people with a disability certificate can get free priority access for themselves and a companion if this is indicated in the disability certificate¹¹.

⁶ <https://www.feelflorence.it/en>

⁷ <https://www.feelflorence.it/en/taxonomy/term/145>

⁸ https://ambiente.comune.fi.it/sites/ambiente.comune.fi.it/files/2019-11/Smart_City_Plan_eng.pdf

⁹ <https://www.firenzepatrimoniomondiale.it/en/management-plans/>

¹⁰ <https://replicate-project.eu/>

¹¹ https://bigliettimusei.comune.fi.it/termini_it.html#:~:text=Accessibilit%C3%A0%20disabili,previsto%20nel%20certificato%20di%20disabilit%C3%A0

The area surrounding the Chapel has been integrated into the sustainable regeneration plan of the city center. The City invested in a **restyling of Carmine Square**, focusing on limited access for private vehicles, transforming it into a pedestrian area, and creating a more vibrant setup of the square with urban furniture (such as benches), while refurbishing the traditional stone pavement. This ensures innovative well-being planning alongside the preservation of cultural heritage.

In 2021, a **diagnostic and conservation project** dedicated to the Brancacci Chapel began with the collaboration of conservation laboratories such as Opificio delle Pietre Dure and scientific centres like CNR¹². Throughout 2022, the project conducted in-depth investigations into the causes of deterioration of the frescoes in the Chapel and the executive techniques of the work. A comprehensive analysis was carried out, providing relevant data and information about state-of-the-art diagnosis and innovation technologies to be used¹³. During the diagnostic and conservation project, the Municipality envisaged the opportunity to create an “**open museum accessible for all**” at the site.

Given the public interest in visiting the Chapel and learning about the frescoes and their conservation, the initiative is advancing toward the **development of augmented reality experiences**, to engage both in-person and remote visitors. This initiative aims to provide equitable access to cultural heritage, enabling individuals to explore the museum in a fully remote format while preserving historical significance. It will serve as a model for a liveable, accessible, and sustainable city, catering to both residents and tourists. The **Point of View (BrancacciPOV)**¹⁴ feature will offer a hybrid experience, combining virtual tours with guided insights for a richer exploration of the Chapel's artistic narratives. Accessible via various devices, BrancacciPOV enhances educational opportunities and broadens access to this cultural site.

User characteristics

The Brancacci Chapel has an **average daily entry of 200 units or 70,000 visitors/year**. From 2023 Customer Satisfaction data collection, the most frequent visitors to the Brancacci Chapel are between 46 and 65 years old. The gender distribution among visitors is fairly balanced. Most visitors to Brancacci Chapel are Italian, with some tourists primarily English-speaking and French-speaking. For Italian visitors, the majority come from various regions within Italy, with the highest percentage from Tuscany. The majority of visitors were visiting the Brancacci Chapel for the first time. The most common reasons for visiting the Chapel were as part of a longer trip and for religious interest¹⁵.

At the site, there are three companies and cooperatives that provide services and ticket office, security and cleaning staff, for a total of 30 people working, with an average of 6 per day. During the conservation and diagnostic projects, conservators and researchers were also active at the site.

¹²https://www.ispc.cnr.it/it_it/terza-missione/technology-and-knowledge-transfer/brancacci/

¹³<https://www.mdpi.com/2072-4292/15/4/1146>

¹⁴<http://brancaccipov.cnr.it/>

¹⁵ Customer Satisfaction 2023 <https://musefirenze.it/wp-content/uploads/2024/08/MUSE-Annual-Report-2023-web-2.pdf>

3.1.2.2 Involved Stakeholders & Data Collection

The following tables summarise the stakeholders and users involved in the engagement activities at the Brancacci Chapel.

Table 3. Internal and external stakeholders involved at Brancacci Chapel

Internal Stakeholders: Actors who are directly involved in a project and have direct influence on decision-making within project activities		
Name	Type	Role
City of Florence	Governmental actor	Responsible for demo site activities and set-up. Representatives such as the Disability Manager.
External Stakeholders: Actors or groups that are not part of the project and do not have direct decision-making power within the project but are affected by, can affect or have an interest in its outcomes.		
Name	Type	Role
Permanent Council for people with disability	Disability organisation	Acting as interlocutor with institutional bodies/associations and city departments.
Italian Union of Blind and Partially Sighted People (UICI)	Disability organisation	The organisation represents and protects the moral and material interests of the blind and low vision people towards public administration. It was actively involved in meetings with FLO on the quality and accessibility of existing digital services and remote experience.

National Deaf Association (ENS)	Disability organisation	The main organisation in Italy, dedicated to the representation and protection of deaf people.
Religious Community of the Santa Maria del Carmine Church	Other stakeholder	A group of Carmelite friars residing in the convent adjacent to the church, responsible for the religious affairs of the institution.

Table 4 Data collection activities at Brancacci Chapel

Tool	Objective	Target group	When
Questionnaire	● Understanding the context: Identify the site-specific requirements, priorities and expectations related to the built environment and in the context of active mobility solutions. Existing local policies, regulations/ standards or programs for ensuring accessibility for individuals with disabilities. Existing infrastructure and kind of accessibility features are in place. Type of active mobility solutions available to the site. ● Site-specific perspectives and preliminary insights on user needs, preferences for the built environment, active mobility solutions and challenges (physical, socio-economic, and policy-related barriers) faced by individuals with disabilities. ● Identify relevant actors and users that could be engaged in the data collection.	Demo site leaders: City of Florence	September 2024
Workshop		Demo site leaders: City of Florence	October 2024
Online interview	● Understanding the context: Barriers (physical, economic, policy-	Governmental actors: Disability	January 2025

	related, etc) hinder the realisation of accessible and inclusive built environment and mobility solutions within the city. ● Perspectives and insights on user needs, preferences for the built environment and challenges (physical, socio-economic, and policy-related barriers) faced by individuals with disabilities, reduced mobility and vulnerable groups in relation to active mobility solutions within the city. ● The existing landscape of policies, regulations, and urban planning initiatives aimed at creating an inclusive built environment and promoting active mobility in the city.	Manager of the Municipality	
Online survey	● Understanding the site-specific user experiences, needs, preferences, expectations, and existing barriers regarding accessibility, safety, comfort, and convenience for the built environment. ● Understanding the needs and barriers related to active mobility solutions.	End users: tourists, workers and conservators and researchers VISITORS: 22 respondents WORKERS: 11 respondents, 8 from security services and 3 from the ticket office CONSERVATORS AND RESEARCHERS: 5 respondents, among conservators from Opificio delle Pietre Dure and freelance, and researchers at Florence Consiglio Nazionale delle Ricerche	December 2024-February 2025 The survey for visitors was executed via the Customer Satisfaction Questionnaire implemented across all civic museums in Florence.

Online Interview		End users: tourist guide	January 2025
In presence interview		End users: Prior of the religious community at Santa Maria del Carmine Church	March 2025
In presence Interview	● Specific insights on needs and challenges faced by users with disabilities, reduced mobility, and vulnerable groups when accessing the built environment and active mobility solutions at the EU and city level. ● Understand site-specific requirements/needs and challenges. ● Identify best practices.	Disability organisation: President of the Italian Union of Blind and Partially Sighted People (UICI)	December 2024
		Disability organisation: President of the Permanent Council for people with disability	February 2025
		Disability organisation: Representative of the National Deaf Association (ENS)	March 2025

3.1.3 Define

The results of the data collection activities are described below. These activities were guided by the following generative questions, developed during the **Define phase** of the project, to explore key aspects of accessibility at the Brancacci Chapel:

- *'How might we improve the accessibility of the Brancacci Chapel's facilities for people with diverse mobility needs, including those with limited strength, balance, or stamina, as well as wheelchair users?'*
- *'How might we enhance the signage and information provision in the Brancacci Chapel to cater to individuals with low vision or blind, considering tactile, auditory, and large-print formats?'*
- *'How might we ensure that the design and layout of the Brancacci Chapel's spaces facilitate ease of movement and access for staff and visitors with diverse needs and abilities?'*
- *'How can we leverage digital technologies, such as augmented reality, virtual tours, and accessible mobile applications, to enhance the visitor experience and provide inclusive access to information within the Brancacci Chapel?'*
- *'How can we improve the accessibility of the Brancacci Chapel's surroundings by promoting seamless connections with public transportation networks, providing accessible pedestrian routes, and encouraging active mobility options like cycling and walking?'*

3.1.3.1 User Needs & Barriers - Built Environment

Both the **questionnaire** and the **workshop for the demo site leader** conducted in Florence provided **understanding of the context**, useful for the introduction (3.1.2.1 Context Analysis) of this chapter. Together with the **online interview** carried out with the **Disability manager of the Municipality**, it also helped in **orienting the following data collection activities**, with the suggestion that solutions must be tailored to specific disabilities, as a one-size-fits-all approach is not feasible.

Interviews with various stakeholders provided **valuable insights into the broader accessibility landscape of Florence's cultural sites**.

A touristic guide highlighted **several critical barriers affecting visitors with physical, sensory, and cognitive disabilities**, such as **limited sensory experiences**. The **Opera del Duomo Museum's tactile reproductions**¹⁶ were mentioned as a **good practice**, but further efforts are needed across the city. The needs of individuals with invisible disabilities, also remain largely unaddressed. On the contrary, the Brancacci Chapel offers multiple access points, a quiet environment, and staff flexibility regarding visiting times, representing a positive example.

The interview with the President of UICI (Italian Union of Blind and Partially Sighted People) further emphasized challenges for visitors with sight disability, including **legal and bureaucratic barriers** such as limited free entry granted only to those with certification, which excludes individuals without official disability recognition. The **lack of trained staff for assisting blind or low vision visitors** and the **lack of alternative accessibility solutions beyond Braille tools** were also highlighted. The UICI president

¹⁶ <https://duomo.firenze.it/en/projects-for-accessibility/touchable>

mentioned **positive examples of tactile experiences at the Uffizi Gallery¹⁷** and of **sensory tours at the Giardino delle Rose¹⁸**.

The interview with the ENS (National Deaf Association) representative revealed that **communication barriers are the primary challenge for deaf individuals** in accessing cultural sites in Florence. Solutions include sign language video guides, mobile device accessibility, and staff training. The importance of organized group tours with interpreters and the need for improved mobility information through apps were emphasized.

To enhance accessibility at the city level, recommendations included **specialized training for tour guides** (particularly in assisting blind visitors and deaf visitors) and improved **digital tools for managing crowd density**. The importance of **effectively communicating the availability of accessible features** for cultural heritage navigation was emphasized to promote best practices.

In regards of the demo site, the President of the Permanent Council for People with Disability confirmed an overall good accessibility at the Brancacci Chapel (e.g., visible panels, functional wheelchair lift, ramps), but noted **remaining barriers such as the manual door at the ticket office, potentially problematic emergency exits, and the lack of chairs with armrests**.

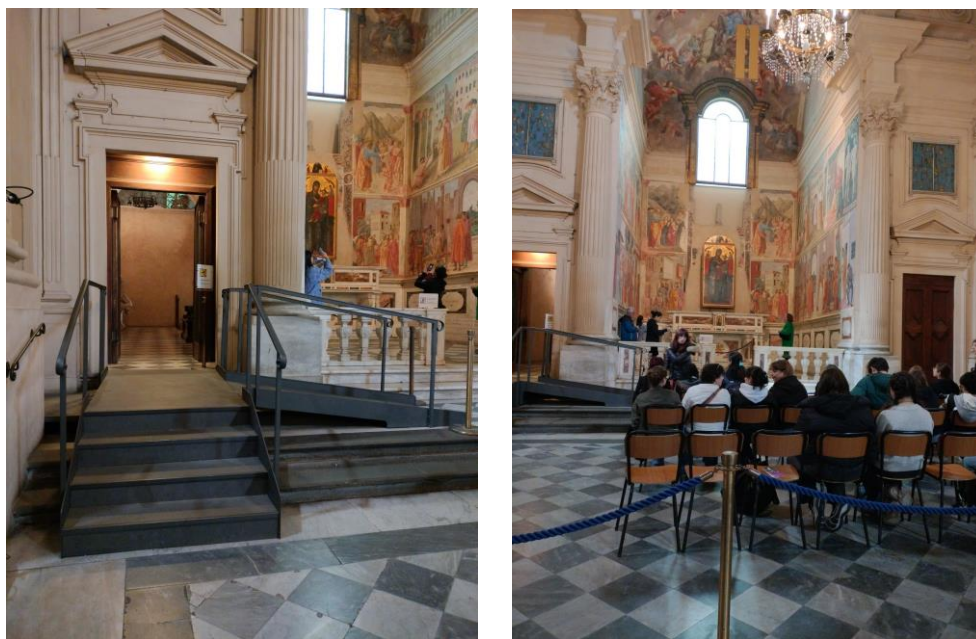


Figure 3. Ramps and chairs situated in front of the Chapel

The interviewee proposed a solution to better understand the frescos within the Chapel, such as **rigid multi-language descriptive panels** as the one present at another Civic Museum in Florence, the Fondazione Romano¹⁹.

¹⁷ <https://www.uffizi.it/en/special-visits/uffizi-by-touch>

¹⁸ <https://www.comune.fi.it/comunicati-stampa/un-nuovo-percorso-sensoriale-al-giardino-delle-rose-da-oggi-il-gioiello-verde>

¹⁹ <https://cultura.comune.fi.it/pagina/musei-civici-fiorentini/fondazione-salvatore-romano>

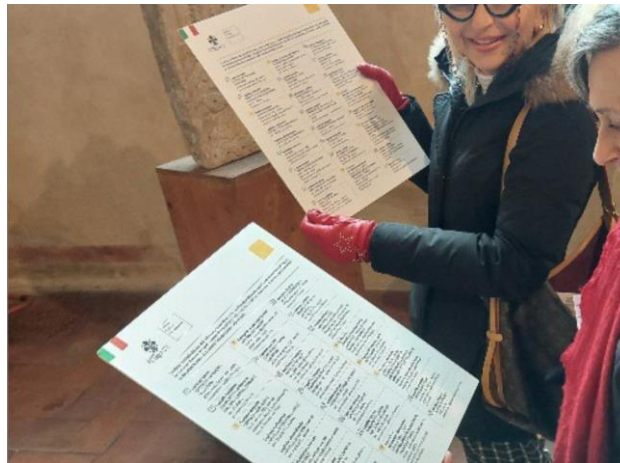


Figure 4. Rigid multi-language descriptive panels

Source: Courtesy of the Permanent Council for People with Disability.

The interview with the Prior of Santa Maria del Carmine Church, representing the religious community, offered a unique perspective on the site's accessibility, particularly concerning the **daily needs of the faithful and the impact of tourism**. It demonstrated the complexities of managing a site with dual functions and the need for solutions that **accommodate both religious practices and tourist visits**. Additionally, the data collection activities provided a range of insights into **specific accessibility challenges and needs at the Brancacci Chapel in terms of accessibility of the building**:

Wayfinding:

- The survey conducted among workers identified the need to make signage clearer and to place the ticket office in a more visible location of the building. The visitors' survey did not highlight any difficulty in finding the ticket office.
- The interview with the Prior of the Carmelitan Friars mentioned the Combined entrance for Friars and tourists as a possible cause of challenge.
- Both the Disability Manager and the UICI President indicated that staff training to better interact with neurodivergent and visitors with sensory disabilities could improve wayfinding.
- The touristic guide emphasized the need for tour guides for specialised training in assisting visitors with disability and information about the accessibility features present at various cultural heritage sites.
- The UICI President cited legal and bureaucratic barriers, such as the free entry granted only to those with certification. The interviewee also mentioned the lack of alternative accessibility solutions rather than Braille tools. Suggested solutions included Braille maps, signage with large, high-contrast letters, and clearly marked sensory paths.
- The ENS interview touched on the need for improved information through apps, and video guides with both subtitles and LIS (Italian Sign Language) explanations.

Horizontal circulation:

- The President of the Permanent Council for People with Disability noted that the ticket office has a manual door, which presents a challenge for wheelchair users.
- The surveys conducted among workers, researchers and conservators identified obstructed pathways as a challenge.

Vertical circulation:

- Visitor feedback, also collected via the survey conducted among workers, highlighted issues with the wheelchair lift, which was described as small, sometimes out-of-order, and difficult to use, particularly for visitors with reduced mobility. A comment regarding the limited usability of ramps and handrails was noted in the employees' survey.

Specific areas:

- The surveys conducted among researchers and conservators recommended enhancing seating arrangements for visitors in front of the Chapel. In this regard, the President of the Permanent Council for People with Disability highlighted the absence of chairs with armrests, which could pose challenges for individuals with reduced mobility or elderly visitors.

Sanitary accommodation:

- No issues or challenges were reported, apart from a general suggestion to keep the restrooms clean.

Engagement:

- The customer satisfaction survey conducted among visitors indicated the service efficiency at the ticket office - meaning the waiting times - as a critical aspect. There is a general need to enhance staff availability for visitor support and adaptability to specific needs. Suggestions included better navigation tools and tactile displays for sensory-sensitive individuals.
- The survey conducted among workers identified unclear signage as a challenge.
- The President of the Permanent Council for People with Disability suggested a solution to better understand the frescos within the Chapel, such as rigid multi-language descriptive panels.
- The UICI President highlighted the lack of trained staff for assisting blind or partially sighted visitors and a lack of alternative accessibility solutions beyond Braille. Suggested solutions included touchscreen totems with voice synthesizers and automated audio guides.
- The ENS representative highlighted the absence of targeted visit solutions for deaf visitors, and suggested sign language video guides, as well as staff training. The importance of organized group tours with interpreters was emphasized.

Evacuation and emergency exits:

- The President of the Permanent Council for People with Disability indicated that emergency exits may pose challenges in case of a blackout. On the same topic, the ENS representative emphasised the significance of utilizing light-based emergency signals.

Environmental Conditions:

- The survey conducted among workers identified inadequate lighting and slightly uncomfortable climate conditions during the winter months at the ticket office location as areas of concern. Additionally, the President of the Permanent Council for People with Disability suggested improvements in lighting at the Chapel.

The following table summarises the key findings regarding accessibility for the Brancacci Chapel derived from engagement activities, along with related user needs and insights to inform subsequent phases of the user-centered design approach.

Table 5. User needs and challenges at the Brancacci Chapel

User challenges and needs at the Brancacci Chapel				
Key areas of accessibility	User task	Target group	User challenges	User needs/ insights
Wayfinding	Accessing the exhibits or services	First time visitors, neurodivergent visitors	Lack of wayfinding aids	Improved orientation and navigation, with clear indications
			Lack of trained staff	Adequate training for employees to interact with people with disabilities
		Religious community	Combined entrance for Friars and tourists	-
Horizontal circulation: entrances, doors, windows, patios, terraces, surface finishes and materials	Entering the building	Visitors with reduced mobility and wheelchair users	Manual door at ticket office	Improved ease of movement through spaces, independent entry
		Old people, also from the religious community	Limited usability of handrail	
	Moving within the building	Workers at the site	Obstructed pathways	

Vertical circulation: ramps, stairs, handrails, lifts, escalators	Moving inside the building	People with reduced mobility and wheelchair users	Small and sometimes out-of-order wheelchair lift	Improved reliable assistance with level changes
			Limited usability of handrail or ramps	
Specific areas, equipment and provisions: service counters, seating, waiting & storage areas	Finding seating	Visitors	Lack of resting areas, and uncomfortable seating	Need to consider comfort and support of furniture
		People with reduced mobility	Chairs without armrest	
Sanitary accommodation	Restrooms	Visitors and workers	No challenge described	
Engagement-User interface, controls and switches	Accessing the exhibits or services	Neurodivergent visitors	Lack of trained staff	Improved support and understanding from staff
		Neurodivergent visitors	Long waiting times	Consider possibility for longer visits, especially for visitors with reduced mobility
		Visitors with reduced mobility	Short visit times	

	Interacting with exhibits or services	Visitors with sight disability	No audio descriptions, difficult to read signs	Consider better navigation tools (such as, audio and video-guides, descriptive panels, maps and apps) and tactile displays for sensory-sensitive individuals
		Blind or low vision visitors	No informational and navigation materials in Braille or in high contrast and big letters	
		Deaf visitors	No informational and navigation materials in LIS (Italian Sign Language) or with subtitles	
Evacuation and emergency exits	Emergency exits	Deaf or blind visitors	Emergency exits hard to access	Accessible emergency exits, clear evacuation procedures
	Evacuation	Visitors with reduced mobility	Problematic emergency exits in case of blackouts	
Environmental conditions in buildings: lighting, acoustics, indoor climate	Lighting	Visitors and workers	Poor lighting	A comfortable and supportive environment, sensory management
	Acoustics		No challenge described	
	Indoor climate	Workers	Uncomfortable climate conditions during the winter months	

3.1.3.2 User Needs & Barriers - Active Mobility Solutions

The active mobility analysis for Florence garnered extensive insights from various user groups, including visitors, tourism professionals, religious communities, government officials, and disability advocacy organizations. This section offers a comprehensive synthesis of quantitative findings and qualitative insights.

Visitors mostly arrived at Cappella Brancacci on foot (80%), indicating a high pedestrian orientation pattern. 60% of the respondents to the survey indicated that they did not have any problem arriving at the Chapel, while 40% had difficulty mainly because of non-existent, confusing, or poor signage and poor online information. Satisfaction with the Chapel accessibility from the visitors was moderate: 50% rated it as "fairly accessible," and 25% as "little accessible." Particular challenges the visitors faced encompass navigating through the historic center's pedestrian areas, limited parking availability nearby, and unclear or insufficient signage and information on how to best access the museum.

The interviewed **tourist guide** highlighted that the Brancacci Chapel is located in a predominantly pedestrian zone that facilitates walkability and quiet access. For moving between museums, according to the tourist guide, visitors prefer walking at a slow pace or arriving by taxi or parking at the central station, especially families and people with disabilities. Moreover, specialized agencies, such as Moveris, provide adapted scooters for individuals with reduced mobility. However, the adjacent cobblestone streets may pose challenges for visitors utilizing wheelchairs or mobility aids because of their irregular surfaces and auditory disturbances. The ZTL (Limited Traffic Zone) restricts vehicular access, impacting both tourists and local residents, including the elderly. The tour guide stressed that there is a need for greater or more dispersed wayfinding and information communication when it comes to accessibility services, such as hiring scooters. One of the possible elements of resolving some of these challenges is KIMAP²⁰, an online navigation tool producing accessible urban routes. The tool has been recognized for helping users, particularly those with mobility difficulties, find the most suitable paths between key cultural destinations. Although the tour guide mentioned that awareness of such tools, their awareness remains limited among visitors and tourism professionals. With more visibility and integration into museum websites and tourist information systems, such tools can become an essential tool in planning accessible visits and navigating the historic city center more independently.

The **religious community**, represented by the Prior of the Brancacci Chapel, has embraced the evolving role of the site as both a worship location and cultural destination. They see the benefits of the pedestrianized setting, which encourages a peaceful and accessible means of arriving at the Chapel for most visitors. Notably, existing amenities such as ramps and an internal lift already afford greater access for elderly parishioners and visitors with reduced mobility. Nevertheless, some accessibility issues are believed to be caused by the pedestrianization of the square and the implementation of restricted traffic zones (ZTL) that have caused lack of parking. Also, these urban interventions impact elderly visitors, who predominantly rely on car access or convenient parking. The Prior also expressed pragmatic concerns of cycling because of potholes, emphasizing walking is still the foremost—but progressively cumbersome—method of transport for their largely ageing congregation. They advised

²⁰ <https://kimap.it/guide/firenze/>

doubling provision for parking spaces, improving road safety for walkers, and supporting public transport supply on religious festivals in order to redress mobility issues

Regarding **Governmental Actors & Disability Management**, we had the participation of the Disability manager of the Municipality, the President from the Italian Blind and Visually Impaired Union (UICI), the President of the Permanent Council for People with Disability, and a representative from the National Deaf Association (ENS).

The President from the **Italian Blind and Visually Impaired Union (UICI)** acknowledged good progress in museum accessibility in Florence, especially due to partnerships enabling multisensory experiences at places like the Giardino di Boboli and the Archaeological Museum but also stressed the difficulties individuals with low vision or blind face when independently navigating Florence's urban environment, despite generally adequate accessibility inside cultural sites. Priorities are the absence of audio announcements on public transport, low contrast on signs, and uneven pedestrian infrastructure, i.e., better tactile paths, higher-contrast signage, and audible systems on both pedestrian paths and public transport. The union recommended enhancing pedestrian paths, public transport accessibility, and coordination among cultural attractions and city-wide mobility services to facilitate independent access.

The **Permanent Council for People with Disability President** indicated increased accessibility of Florence's museums, but also stressed ongoing mobility issues in terms of mobility challenges especially involving the surrounding infrastructure near cultural sites, especially Cappella Brancacci and Piazza del Carmine. The shortage and inadequate location of disabled parking significantly complicate accessibility in the area. This interview highlighted that private vehicles are often the easiest way for people with reduced mobility to navigate the city, while public transportation lacks accessible features on buses. Additionally, historic stone paving poses additional difficulties for visitors with reduced mobility. The representative called for an increase in disabled-friendly parking spaces close to cultural sites and improvements in the overall pedestrian infrastructure to facilitate easier access.

The representative of the **National Deaf Association (ENS)** highlighted that deaf visitors generally typically exhibit a greater degree of mobility independence than other disability groups. However, challenges with orientation and navigation in public transportation still exist. The representative emphasized the significant contributions of navigation and micromobility apps to the mobility of deaf individuals and recommended that the availability and utilization of these technological tools be expanded to improve autonomy.

The following development areas **in terms of active mobility solutions** are crucial for **enabling access to all for the Brancacci Chapel**.

1. Inclusive Pedestrian Infrastructure and Spatial Continuity

The historic center of Florence promotes pedestrian movement due to its compact layout and ample pedestrian pathways. The cobblestone streets, limited pedestrian pathways, and lack of ramps or tactile signage present significant challenges for wheelchair users and individuals with reduced mobility. The presence of cobblestone streets, narrow pathways, and the absence of ramps or tactile signage poses considerable obstacles for wheelchair users and

individuals with reduced mobility. Although 80% of the surveyed visitors accessed the Chapel on foot, 40% experienced challenges in reaching it, mainly due to insufficient signage, substandard surface conditions, and a deficiency of available information.

2. Inclusive Micromobility Design and Integration

Despite the fact that there are already specialized companies like **Moveris that offer adapted scooters in Florence**, yet awareness and access regarding their services remain low among tourists and professionals. The lack of **dedicated micromobility lanes, parking zones, and user guidance** hinders broader adoption, particularly for those who could benefit from tailored mobility options but lack confidence in navigating in such uneven or busy streets.

3. Access to Public Transport

The public transportation system in Florence continues to lack the fundamental aspects of accessibility for people with visual and cognitive disabilities. The most significant shortcomings are the absence of audio signals, low contrast in signage, and low tactile markers at the streets. These barriers reduce the efficiency of the public transportation system as an accessible mode of transportation, especially for people with disabilities who have to use private other transportation modes more frequently to access the Chapel area.

4. Digital Inclusion and Mobility Platforms

Digital tools like **KIMAP** show strong potential in enabling accessible route planning, especially for mobility- and hearing-related disabilities. However, these tools are still **underused** due to limited integration with museum websites, tourist platforms, and wayfinding systems. Greater promotion and user education are needed to turn them into standard tools for independent navigation.

5. Accessible Active Mobility Infrastructure

Brancacci Chapel as a building, includes accessible features (i.e., ramps, internal lift). Nevertheless, the **ZTL (Restricted Traffic Zone)** and **limited parking for people with disabilities** nearby reduce its access for elderly and disabled visitors. Advocacy groups have highlighted the need for an **increase in disabled-friendly parking spaces** and improved linkages between public transport, pedestrian zones, and cultural destinations to support inclusive, end-to-end mobility.

Table 6. User needs and challenges for mobility at the Brancacci Chapel

User challenges and needs for mobility at the Brancacci Chapel				
Key areas of mobility solutions	User task	Target group	User challenges	User needs/ insights
Inclusive Pedestrian Infrastructure and Spatial Continuity	Navigate historic center on foot	General visitors, elderly	Confusing navigation, uneven cobblestones	Improved wayfinding signage, smoother or designated walking paths
	Use assistive aids on pedestrian paths	Wheelchair users, reduced mobility visitors	Cobblestone surfaces, lack of tactile cues	Smoother transitions, ramps, tactile paths, reduced surface vibrations
	Access chapel from nearby areas	Blind or individuals with low vision, neurodiverse users	Absence of clear landmarks and orientation aids	Tactile guidance, auditory cues, shaded rest areas
Inclusive Micromobility Design and Integration	Use e-scooters or adapted bikes	Tourists, visitors with mild disabilities	Lack of adapted devices, docking far from entrance	Inclusive scooters, closer docking, marked slow zones
	Learn about and access rental options	Tourists, caregivers	Low awareness of services like Moveris	Visibility through tourism channels, user training, on-site promotion

Access to Public Transport	Reach the site via city buses or trams	Visitors with sensory or mobility related disability	No audio/visual updates, irregular stops	Accessible buses, real-time info, clearer signage at stops
	Coordinate transfers from remote parking or tram stops	Disabled visitors, elderly	<i>Long or poorly marked connections</i>	“Last mile” shuttles, clear walking links, improved intermodal signage
Digital Inclusion and Mobility Platforms	Navigate city with digital tools	Visitors with hearing or reduced mobility	Low integration of tools like KIMAP into public channels	App promotion, museum integration, visual navigation aids
	Access live info about accessibility and transport	Tourists, guides	Lack of centralized, accessible info	Centralized platform, multilingual support, real-time alerts
Accessible Active Mobility Infrastructure	Transition between micromobility, Public Transport, and walking	Tourists, residents, employees	No dedicated transfer zones, poor infrastructure integration	Intermodal hubs, seamless paths between cultural and transit areas
	Enter and move through chapel building	Visitors with reduced mobility or sensory disabilities	Small lifts, no tactile signage, noise sensitivity	Larger lifts, Braille and contrast signage, quiet spaces

3.1.4 Access Roadmap

The subsequent table provides a structured roadmap for implementing accessibility features, emphasizing the importance of user feedback and inclusive practices at every stage for built environment and active mobility solutions.

Table 7. AccessS roadmap for the Brancacci Chapel

DEVELOP (M10 - M18)	
TARGET GROUPS	CONSIDERATIONS (while developing AccessS tools, pay attention to the following points)
Wheelchair users or those with reduced mobility	• Precise measurements of doorways, pathways, and inclines to ensure wheelchair and mobility aid accessibility. • Reliable and spacious wheelchair lifts and improved handrail usability. • Design of seating areas with varying heights and armrest options for diverse comfort needs • Layout of emergency exits, ensuring clear and accessible routes for all mobility levels • Design accessible micromobility vehicles (adapted e-scooters/bikes) • Improve pedestrian pathways: remove obstacles, level surfaces, add ramps. • Design rest points and shaded seating along routes
Deaf visitors	• Development of clear video guides, both in LIS and with captions and navigation cues • Emergency exit instructions include visual alerts • Development of video guides for public transport • Train staff in basic sign language and deaf awareness • Offer navigation apps with visual cues and vibration alerts
Blind or visitors with low vision	• Integration of Braille and high-contrast informational materials, and audio descriptions for exhibits • Development of clear navigation with tactile floor markers • Research into appropriate lighting levels to minimize glare while maximising visibility • Install tactile paving and high-contrast visual signage on key routes • Enhance public transport with audio announcements and GPS-integrated navigation apps. • Promote use of accessible tools with real-time wayfinding

Neurodivergent visitors	• Trained staff for better support and understanding, accommodating cognitive and sensory processing needs • Simplified navigation, using clear symbols and concise language, and consistent layout and wayfinding to reduce confusion • Reduced waiting times with digital queue systems • Offer quiet mobility options and predictable travel routes
Elderly and other vulnerable groups (including religious community members)	• Improved handrail usability • Easy to read fonts in all signage • Comfortable seating areas with armrests • Improve access to key sites like Brancacci Chapel through better wayfinding and signage. • Provide accessible drop-off zones and expanded disabled parking • Enhance pedestrian safety with smoother surfaces, lighting, and handrails • Introduce accessible micromobility solutions such as scooters with seats
Workers at the site	• Control over lighting, sound, and temperature levels to create a comfortable sensory environment • Ensure unobstructed pathways for movement • Training to understand and accommodate the needs of diverse visitors • Ensure access to secure and inclusive micromobility for commuting
PROTOTYPE & TEST (M13 - M36)	
CONSIDERATIONS (while prototyping & testing, understand feedback from the following end users or actors)	
It is essential to actively engage demo site leaders and involve all relevant organizations in the testing phase to ensure comprehensive stakeholder participation. It is important to collect feedback from visitors of the chapel and employees, conservators and restorers working in the chapel. Moreover, you may consult the following stakeholders when gathering feedback on the tools: Concerning deaf end users - National Deaf Association Concerning blind or low vision visitors - Italian Union of Blind and Partially Sighted People Permanent Council for people with disability Religious Community of the Santa Maria del Carmine Church	

New stakeholders to be involved -

[Tuscan Paraplegic Association \(ATP\)](#)

[Società della Salute \(SdS\)](#)

Note: There is an **existing survey at the Chapel** to collect visitors' feedback conducted by the municipality of Florence; this channel could be utilised during the prototyping and testing phase to gather valuable user insights.

Evaluation activities should systematically collect feedback on the Key Performance Indicators (KPIs) as proposed within the AccesS evaluation framework, to assess the effectiveness and applicability of AccesS tool. Furthermore, the implementation of **structured feedback loops** will facilitate continuous improvement, enabling iterative refinements based on user insights.

DELIVER (M19 - M36)

GENERAL CONSIDERATIONS

(while delivering AccesS tools, pay attention to the following points)

- Develop a comprehensive accessibility guide in multiple formats (print, digital, audio, Braille, and easy-to-read versions) to ensure inclusivity.
- Provide clear and accessible information on the Chapel's website, including LIS (Italian Sign Language) and International Sign (IS) videos and screen-reader-friendly content.
- Ensure that all digital tools (apps, websites, and multimedia content) are fully accessible and including features such as text-to-speech, high contrast modes, and voice navigation.
- Provide clear instructions and tutorials on how to use digital tools, available in multiple languages and formats (text, video, and audio).
- Engage internal stakeholders and end users (including people with disabilities) to test, validate, and refine the AccesS tools before full implementation.

3.1.5 Recommendations for implementation of Active Mobility Solutions beyond AccessS

A roadmap for the implementation of the active mobility solutions proposed by the AccessS project has been presented in the preceding section. This section outlines the modifications that may occur across three distinct time scales, which are outside the purview of AccessS, yet can facilitate the active mobility of Florence and Brancacci Chapel. The interventions are categorized into three timeframes: short-term (0-2 years), medium-term (3-5 years), and long-term (6+ years), offering municipalities guidance for implementable changes. The proposed roadmap corresponds with the needs and obstacles identified in the AccessS project, as well as the urban mobility strategies of the city, to promote a more equitable, accessible, and sustainable environment.

Short-Term (0–2 Years): Quick Wins for Immediate Improvement

In the short term, the focus is to address immediate hazards on cobblestone streets to make walking safer and easier. This can include installing temporary ramps or rubber mats over particularly uneven cobbles and gaps, creating smoother paths for wheelchairs and strollers²¹. Repaint and highlight crosswalks around Piazza del Carmine to improve visibility, and add signage or bollards to slow down vehicles in shared streets. These small changes will reduce the risk of trips and falls on the uneven surface and enhance pedestrian safety in the area.

Additionally, Public Transport enhancements can leverage and promote existing public transit to serve the chapel. All Florence city buses and trams are already low-floor and wheelchair-accessible²², which ensures visitors know they can use these options. For instance, publicize the electric mini-bus routes (such as lines C1–C4) that crisscross the historic center²³ and come near Santa Maria del Carmine. Clear wayfinding signs can be added at nearby stops (e.g., at Serragli/Santa Monaca) to guide visitors to the Brancacci's chapel entrance. Minor scheduling tweaks or an extra stop could be introduced if needed during peak visiting hours. By making public transport more convenient and visible, even in the short-term fewer people will feel the need to drive into the area.

Parking & Drop-off Solutions can alleviate the lack of disabled-friendly parking by creating a designated drop-off/parking spot as close to the chapel as possible. If Piazza del Carmine allows vehicle access, allocate a reserved parking space for people with disabilities with clear signage and curb ramps for wheelchair users. Work with the city's mobility department to ensure drivers with disability permits can easily obtain access to the ZTL (limited traffic zone) for this purpose. For general visitors, provide information on nearby parking garages or street parking outside the immediate historic core, and encourage use of those along with walking or a shuttle/ micromobility modes for the "last mile."

Micromobility Options can introduce and encourage sustainable "last mile" mobility like bikes and e-scooters in the Oltrarno. Florence already offers free-flow bike sharing (RideMobi/Mobike) and has recently added electric scooter sharing²⁴. In the short term, install a bike-sharing station or a

²¹ <https://eurocities.eu/stories/greater-mobility-fewer-cars>

²² <https://www.feelflorence.it/en/dalle-redazioni/getting-around-barrier-free>

²³ <https://www.feelflorence.it/en/dalle-redazioni/bus-and-tram-florence>

²⁴ <https://www.feelflorence.it/en/node/45826>

micromobility parking area near Cappella Brancacci so visitors can conveniently pick up or drop off bikes. Mark safe routes from the city center across the river into Oltrarno for cyclists and scooter users (e.g., via Ponte Santa Trinita and along calmer back streets), and create slow zones to ensure these devices don't endanger pedestrians. By expanding these services near the chapel, tourists and locals gain a green alternative to cars for reaching the site.

Awareness and Accessibility Information could be enhanced by launching a focused awareness campaign about available accessibility services, as many visitors are currently unaware of them. This could include training local tour guides and hotel staff to inform visitors about options like wheelchair/scooter rentals (several agencies offer mobility scooters or modified wheelchairs for rent, though this remains little-known). Ensure the chapel's website and the city's tourist information platforms highlight the accessible route to the Brancacci Chapel (through the cloister elevator, which makes the interior fully accessible²⁵). Distribute the Accessible Florence map and promote apps like Kimap, which shows barrier-free routes through the historic center²⁶. By quickly boosting communication in multiple languages (online, on-site, and via brochures), visitors with disabilities or special needs will be more aware of how to reach and enjoy the chapel safely.

Medium-Term (3–5 Years): Infrastructure Upgrades and Policy Changes

In the medium run, the city should invest in more permanent pedestrian infrastructure upgrades in the surrounding streets. For example, sections of Via Santa Monaca or Piazza del Carmine can be repaved or treated to make the surface smoother while respecting historic aesthetics – using flatter paving stones or filling gaps between cobbles to reduce vibrations for wheelchairs. Key pedestrian routes to the chapel should have widened sidewalks or clearly marked pedestrian lanes, even if it means removing a few parking spots or narrowing lanes for cars. Installing raised crosswalks or curb extensions at intersections will slow traffic and give pedestrians a level passage across cobbled streets. These modifications will greatly improve comfort and safety for walkers, seniors, and wheelchair users alike, creating a more accessible micro-area around the chapel.

Furthermore, a small electric shuttle or mini-bus loop specifically serving historic Oltrarno attractions could be implemented. Building on Florence's success with electric mini-buses in the city center²⁷, a new route could connect Cappella Brancacci with nearby sites like Piazza Santo Spirito, Palazzo Pitti, and maybe across the river to the Cathedral area. This shuttle would provide convenient, hop-on-hop-off mobility for tourists and residents, using zero-emission vehicles that can navigate narrow streets. It can run at frequent intervals (e.g., every 10–15 minutes), reducing the need for private cars or taxis on these short hops. Partnerships with the city or a local transit provider could integrate the shuttle fare into the main transit ticket system. An Oltrarno shuttle service not only improves access to the Brancacci Chapel but also knits together multiple cultural sites with sustainable transport – a model that can later be replicated in other districts.

Additionally, focus should be given to the identification of strategic parking solutions to reduce congestion while still accommodating those who need to drive. One approach is creating a “park and

²⁵ <https://www.feelflorence.it/sites/www.feelflorence.it/files/2021-02/Accessibility%20to%20museums%20in%20Florence%2018feb21.pdf>

²⁶ <https://www.feelflorence.it/en/dalle-redazioni/getting-around-barrier-free>

²⁷ <https://www.feelflorence.it/en/dalle-redazioni/bus-and-tram-florence>

walk” or “park-and-ride” hub near the perimeter of the Oltrarno. For example, a portion of the Calza/Porta Romana area (just outside the ZTL) or an underused lot nearby can be upgraded as a parking facility where visitors can leave their cars and then either walk (~10 minutes) or catch the new shuttle to Cappella Brancacci. The city is already moving toward intermodal exchange systems – Florence pioneered a drive-in tram park-and-ride at Villa Costanza on Tram Line T1²⁸– so a similar concept on the south side of the river would encourage drivers to switch to transit for the final leg. Clear signage on main roads directing museum-goers to these parking areas, plus real-time availability info via app, will make it user-friendly. Additionally, ensure at least one disabled parking bay is established and enforced near the chapel for those with permits, and consider a short-term loading/drop-off zone for tour vans so they don’t block the street. With these measures, car traffic in the immediate vicinity can be cut down without reducing accessibility.

By year 3–5, Florence’s plan to build a “Bicipolitana” (bicycle highway network) will be taking shape²⁹– and the Oltrarno must be part of it. Advocate for a dedicated bike lane or safe cycling route connecting the Oltrarno with the city center and other neighborhoods. For instance, a protected cycle path along the Lungarno (riverbank) or a parallel street could link into the broader network and lead cyclists near Piazza del Carmine. Increase the number of bike/scooter share docks in Oltrarno and add mid-trip amenities like public bike repair stations or water fountains to encourage active mobility. In this phase, the city can also pilot e-bike incentive programs (e.g., rent-to-own or tourist rental discounts) to get more people using bicycles on a daily basis. Expanding these sustainable options not only benefits visitors but also offers residents of the area a convenient, eco-friendly way to move around, reducing reliance on cars.

Alongside physical improvements, the city could introduce policies that solidify a pedestrian- and transit-first approach. Expand the Limited Traffic Zone: currently Florence’s effective ZTL covers the central core, and plans call for extending such restrictions more broadly beyond the historic center³⁰. Over 3–5 years, the ZTL or similar permit-only access can be extended to more of the Oltrarno, limiting through-traffic on small streets like those around the Brancacci Chapel. Implement citywide 30 km/h speed limit zones in residential and historic areas to calm traffic and increase safety (many Italian cities are adopting 30 km/h limits, which significantly reduce crashes and injuries). Encourage the shift to cleaner vehicles by expanding low-emission zones— for example, only allowing electric/hybrid buses or service vehicles in the immediate center by this time. Meanwhile, continue to promote accessibility: require that any newly repaved streets or renovated sidewalks follow universal design standards (wide, non-slip, ramped), and improve public awareness of services like accessible taxis and guided tours for disabled visitors. By updating traffic rules and urban policies, Florence will make walking, cycling, and transit the default easy choices for moving around, in Oltrarno and beyond.

Long-Term (6+ Years): Sustainable Urban Mobility Transformation

In the long run, aim to transform the entire historic center – including areas like the Oltrarno around Cappella Brancacci – into a predominantly car-free zone. This means greatly restricting private vehicle access in these heritage areas, except for residents, deliveries, and special needs (and those remaining

²⁸ <https://eurocities.eu/stories/greater-mobility-fewer-cars/>

²⁹ <https://www.feelflorence.it/en/node/17033>

³⁰ <https://eurocities.eu/stories/greater-mobility-fewer-cars>

vehicles should be electric). Over 6+ years, streets can be gradually converted into pedestrian-only promenades or “pedestrian priority” shared spaces. As Florence’s mobility planners note, the goal is not simply to replace every car with an electric car, but to reduce the number of cars overall and shift toward walking, cycling, and transit as primary modes³¹. In practice, this could turn Piazza del Carmine and adjacent streets into a spacious pedestrian piazza with benches, shade, and perhaps small electric shuttles quietly ferrying people. Such pedestrianization will drastically cut noise and air pollution, preserve the historic atmosphere, and make the city center universally accessible. Visitors of the 2030s might experience Florence’s art and architecture in a pleasant urban environment free of traffic jams – a big change from today.

By this time frame, Florence’s major investments in public transport will be realized, providing alternatives to driving for nearly all city itineraries. New tram lines currently in planning will be operational – for example, the line from Piazza Libertà to Bagno a Ripoli (serving the southeast) is expected by 2026, and another toward Campo di Marte (the stadium area) is in the pipeline³². In the 6+ year horizon, the city can further extend the tramway or implement Bus Rapid Transit to cover the Oltrarno and other underserved quarters, knitting together a comprehensive network. A future tram or high-capacity electric bus route could loop near the Oltrarno (e.g., a line crossing the Arno and serving Santo Spirito/Carmine) to directly connect this area to the main rail station and other transit hubs. Additionally, the entire bus fleet will likely be electric or hydrogen by then, making public transport not only convenient but also zero-emission. With a robust, citywide transit network in place, both locals and tourists will find it easy to move between any points of interest – from the Brancacci Chapel to the Uffizi or Fiesole – without a private car. This reduction in car dependency contributes to Florence’s broader climate goals while keeping the city accessible.

The long-term horizon is an opportunity for Florence to adopt cutting-edge mobility innovations to further enhance active mobility and accessibility. One idea is to deploy **on-demand autonomous shuttles** in the historic center – small self-driving electric pods that can be summoned via app to help people cover short distances or reach areas not served by trams. These could especially help elderly or disabled visitors move around pedestrianized zones comfortably. Another innovation could be **smart infrastructure**: for example, smart traffic signals that give priority to pedestrians and cyclists at crossings, or sensor-enabled crosswalks that make streets safer. The city might also invest in additional urban elevators or ramps in hilly areas (imagine a discreet elevator connecting riverside level to San Miniato al Monte, for instance) to overcome topographical barriers without needing a car. **Mobility-as-a-Service (MaaS) platforms** would be fully developed – a single app integrating transit tickets, bike rental, shuttle booking, and even museum tickets, making multimodal travel seamless. **Large-scale projects** like an underground parking garage at the city outskirts (with direct tram connections) could remove the incentive to drive into the center at all. All these transformations will make sustainable mobility convenient and default. The historic city will remain a living, accessible space, proving that even a Renaissance-era urban layout can coexist with modern mobility technology in a harmonious, eco-friendly way.

³¹ <https://eurocities.eu/stories/greater-mobility-fewer-cars>

³² <https://www.visitflorence.com/moving-around-florence/by-bus.html>

3.2 Christo and Jeanne-Claude Center, Gabrovo, Bulgaria

The Christo and Jeanne-Claude Center is centrally situated in Gabrovo, Bulgaria and will be located within the premises of the **former vocational textile high school**, owned by the Municipality of Gabrovo. The building comprises two interconnected four-story buildings linked by a two-story passageway. Abandoned since 2009, the building is in a state of significant disrepair and **has several accessibility challenges**. Currently, the center is in the preliminary planning and design phases of an extensive renovation, with construction works foreseen to start by mid-2026. The Center is part of integrated territorial investments planned under **Gabrovo's Integrated Development Plan** (2021-2027), which includes the renovation of the building and the revitalisation of the adjacent riverside zone as part of integrated territorial investments. The municipality plans a substantial investment of €20 million for the renovation and equipping of the building, along with an additional €5 million for the development of the adjacent riverside recreation zone.

The renovation efforts aim to meet high energy efficiency standards, aligning with Gabrovo's strategic objectives for smart, sustainable and inclusive growth. The vision for the Center is to become a **hub of creativity, innovation, and cultural engagement**. Its programming will feature the works of Christo and Jeanne-Claude, famous for their large-scale environmental works of art, alongside temporary art exhibitions, artist residencies, and workshops. The Center also plans to support collaboration and entrepreneurship activities through co-working spaces and research initiatives while promoting cultural exchange and community engagement with educational programs and communal spaces.

Additionally, the restoration and development of the Center are being implemented with support from the European Commission's **New European Bauhaus initiative**, receiving technical assistance from Ramboll Management Consulting. Another cultural institute close to the site is the Museum of Humor and Satire (MHS), partner in the AccessS project, which serves as an advisor in ensuring the building's functionality and alignment with cultural objectives.

For a detailed description of the demo site, please refer to Deliverable 1.2 "AccessS Framework architecture, use cases and master planning for demonstrators" at section 3.1 The Christo and Jeanne-Claude Center, Gabrovo, Bulgaria.



Figure 5. The Christo and Jeanne-Claude Center, Source: [2]

3.2.1 Design Challenge

The AccesS project offers a valuable opportunity to actively **contribute to the design phase of the renovation work** by identifying and understanding the key accessibility needs and expectations for the built environment and mobility aspects of the surrounding riverside zone. These insights and requirements can be thoughtfully integrated into the design and development of the Christo and Jeanne-Claude Center, ensuring that accessibility becomes a central component of its transformation.

The **design challenge** for Gabrovo demo site is as follows:

‘How we might enhance the accessibility of Christo Jeanne-Claude Center and its surrounding area, ensuring people with disabilities can easily access and navigate within and around the center, fully engage in the center’s exhibitions and activities, and experience an inclusive, comfortable and welcoming environment?’

3.2.2 Discover

3.2.2.1 Context Analysis

City-level perspective

Gabrovo is situated in the centre of northern Bulgaria along the Yantra river. According to the 2021 Census, the population of Gabrovo stands at 45,940³³.

Over the past few decades, the municipality has been experiencing a steady population decline, with an annual **population decrease of -2.3% between 2011 and 2021**³⁴. This demographic decline is primarily driven by rural-to-urban migration and **out-migration toward larger urban centres** such as Sofia, Plovdiv, and Varna, as well as international destinations, where better economic opportunities attract younger generations. Alongside population decline, **Gabrovo faces an ageing demographic structure**, which presents additional socio-economic challenges.

Despite these demographic challenges, Gabrovo remains an important industrial and cultural hub, with a strong presence in key sectors such as **mechatronics, machine building, textiles and plastic manufacturing**. The city's industrial legacy continues to play a crucial role in Bulgaria's economy, contributing significantly to innovation and production. However, to ensure long-term economic stability and sustainable growth, investment in local employment opportunities remains a key priority, fostering entrepreneurship, supporting small and medium-sized enterprises (SMEs), and enhancing collaboration between educational institutions and industries to develop a skilled labour force. The general economic status of the area surrounding the Christo and Jeanne-Claude Center in Gabrovo reflects the broader trends of the city. Key emerging economic trends in this area include a focus on innovation, smart city solutions, and the integration of green spaces and energy-efficient technologies, all of which aim to create a sustainable future for Gabrovo while leveraging its industrial roots.

However, the economic profile of the region is now diversifying as Gabrovo seeks to blend its industrial heritage with emerging sectors such as creative industries and tourism. The municipality of Gabrovo highlights that addressing the population decline will likely require a comprehensive, multi-level approach, integrating national and local strategies that prioritise job creation, social infrastructure development, and overall improvements in living conditions and accessibility.

With regards to transport and mobility, Gabrovo is currently facing long-term problems of urban mobility, mainly attributed to its ineffective public transport system, poor pedestrian infrastructure, and absence of cycling paths. These limitations especially affect individuals with mobility disabilities or those without access to private vehicles. The landscape surrounding the Christo and Jeanne-Claude Center, within a topographically challenging context, presents serious obstacles to pedestrians and wheelchair users, which is exacerbated by unpaved walkways that hinder safe crossing. Public transportation is marked by poor coverage of services and the absence of real-time travel information systems, thereby rendering trips for residents challenging to plan and undertake. Furthermore, high vehicle traffic and an insufficient number of pedestrian crossings present notable safety hazards.

³³ https://www.citypopulation.de/en/bulgaria/gabrovo/gabrovo/14218_gabrovo/

³⁴ https://www.citypopulation.de/en/bulgaria/gabrovo/gabrovo/14218_gabrovo/

Policy perspective

In general, Gabrovo municipality has initiated various urban regeneration projects to improve infrastructure, revitalise public spaces, and improve the overall quality of life. The **long-term vision of Gabrovo municipality is to be green, innovative and sustainable**³⁵. These initiatives seek to make Gabrovo a more attractive place to live and work for its current residents as well as young professionals who might otherwise relocate to larger urban centres. Gabrovo follows **Bulgaria's national accessibility regulations**, which require **universal design** in the built environment. These regulations also align with European standard EN 17210:2021 on 'Accessibility and usability of the built environment', ensuring that new constructions and renovations include essential accessibility features such as ramps, lifts, tactile indicators, and accessible toilets. Urban planning and building permits in Gabrovo must comply with these standards to create an inclusive public infrastructure [3].

While Gabrovo adheres to national building codes and European accessibility standards, according to the stakeholder consulted, the **practical implementation of these regulations presents ongoing challenges** and is often treated as a legal formality rather than a core design principle. Social services, managed by the municipality, offer various support formats, and accessibility features like ramps and elevators are incorporated into these facilities. However, the surrounding urban infrastructure and older buildings often lack consistent accessibility. National programs support home accessibility modifications, but the **enforcement of accessibility standards in public spaces remains inconsistent**.

The city faces a need for greater systemic reform, extending beyond mere compliance to foster genuine inclusivity. Historical sites require creative adaptations to balance preservation with accessibility, and a broader shift in societal attitudes is essential to fully integrate people with disabilities into everyday life. Stakeholders involved also noted that existing policies primarily address people with reduced mobility, while visual, cognitive, and psychosocial disabilities receive less attention. In addition, bureaucratic complexity and administrative delays hinder progress, with change often driven by committed individuals or organisations. Although Gabrovo is making strides, particularly with EU-funded initiatives and strategic planning, the city must address the gap between regulatory compliance and the creation of truly accessible and inclusive urban spaces.

Cultural and educational initiatives are being implemented to revitalise the city's appeal and strengthen its identity as a dynamic and liveable urban centre. In recent years, **Gabrovo's economic development has been supported by European Union funding** and other strategic initiatives **aimed at improving urban infrastructure, accessibility, and sustainability**, which have contributed to the city's overall economic revitalisation. For example, Gabrovo is part of the European Commission's Horizon 2020 project called [RESPONSE](https://www.interregeurope.eu/urbancoop/news-and-events/news/advisory-council-supporting-urban-sustainable-development) (2020-2025) which aims to establish a strategic vision for **Smart Cities Energy Transition**.

Regarding urban mobility, Gabrovo has launched **Integrated Territorial Strategies for Sustainable Mobility (2030)**³⁶ and has begun the deployment of **electric buses** to modernize the public transport

³⁵ <https://archive.urbact.eu/gabrovo>

³⁶ <https://www.interregeurope.eu/urbancoop/news-and-events/news/advisory-council-supporting-urban-sustainable-development>

network (March 2024)³⁷. Additionally, the Integrated Development Plan of Gabrovo (2021–2027) presents a holistic approach to improving mobility and urgent challenges. The plan aims to modernize public transport services, reduce carbon emissions, and create accessible active mobility through improved pedestrian and cycling infrastructure. The city is committed to enhancing **cycling and pedestrian infrastructure** as part of its alignment with the **New European Bauhaus principles**, promoting sustainability and innovation. Gabrovo is also a participant in the **NetZeroCities** initiative, focusing on deep renovation of buildings, integration of renewable energy systems, and fostering public-private partnerships to achieve carbon neutrality by 2030³⁸.

Demosite level information

The **Christo and Jeanne-Claude Center** represents a shift towards a more creative and innovation-driven economy. The center's location in the former textile technical school with integrated development projects like the riverside zone revitalisation showcases a **new approach to urban regeneration**, combining cultural heritage and sustainability. This could contribute to economic growth and community engagement and helps attract younger generations and tourists interested in Gabrovo's cultural offerings. They offer new opportunities for cultural exchange, education, and creativity, thus enhancing Gabrovo's profile as a creative city.

The **building as well as its surroundings faces several accessibility challenges and while the building itself has been inactive over the past years**, however, it has hosted a variety of community events. These events have been primarily artistic and musical in nature and have also included presentations on the renovation plans and an architectural competition for defining the future uses of the building and surrounding area.

User Characteristics

The **Christo and Jeanne-Claude Center** will cater to a diverse range of users, broadly classified into two main categories: **employees and resident artists working within the building** and **visitors** engaging with its cultural and artistic activities. The first category includes **museum staff** responsible for administration, curation, visitor engagement, security, and maintenance. Additionally, **artists-in-residence** will use the space for creative activities, exhibitions, and performances, contributing to the museum's cultural and artistic offerings. These individuals will require functional workspaces, accessible infrastructure, and collaborative areas to support artistic creation and exhibition preparation. The second category of users consists of visitors, who will engage with the museum through various activities and events. The museum will attract the general public, including **local citizens** interested in exhibitions, performances, and other cultural activities. **Students and scholars, university students, and researchers**, will visit for guided tours and educational programs. **Tourists, both domestic and international**, will explore Gabrovo's cultural heritage through exhibitions and artistic showcases.

³⁷<https://chariot-electricbus.com/chariot-motors-delivers-five-new-electric-buses-for-cleaner-transport-in-gabrovo/>

³⁸<https://netzerocities.eu/gabrovo-pilot-activity-netzerohour>

Although the Christo and Jeanne-Claude Center is still in the process of being established and does not yet host regular activities, a number of artistic events, community engagements, and planning processes have already taken place on site. However, as these are still occasional and linked to the development phase, the visitor data from the nearby Museum of Humor and Satire (MHS), an established cultural institution and project partner provides a more stable reference point. The museum reported approximately 50,000 visitors in 2023 and 47,000 in 2024, including nearly 1,000 visitors with disabilities. Given the larger scale, broader scope, and more diverse functionality planned for the Christo and Jeanne-Claude Center, these figures can serve as a useful benchmark when estimating its future potential reach and impact, which we expect the Center will exceed.

3.2.2.2 Involved Stakeholders & Data Collection

The following tables below provide an overview of key internal and external stakeholders engaged and data collection tools implemented respectively in the demo site.

Table 8. Internal and external stakeholders involved at Christo and Jeanne-Claude Center

Internal Stakeholders: Actors who are directly involved in a project and have direct influence on decision-making within project activities.		
Name	Type	Role
<u>Municipality of Gabrovo (MoG)</u>	Governmental actor	The owner of the building and the main initiator for participation in the project. The municipality is responsible for overseeing all activities related to the infrastructure and social interventions in the area.
<u>Museum of Humor and Satire (MHS)</u>	Cultural actor	A cultural partner involved in developing projects related to contemporary art and socially engaged practices. The museum can contribute expertise in cultural initiatives and the societal impact of such projects.
External Stakeholders: Actors or groups that are not part of the project and do not have direct decision-making power within the project but are affected by, can affect or have an interest in its outcomes.		
Name	Type	Role
Artists based in the Christo and Jeanne-Claude Center	Artists	Contribute to the creative vision and collaborative work being carried out at the center. Their involvement in the center provides a practical perspective on artistic spaces and accessibility for diverse user groups.

Faculty of Fine Arts, Veliko Tarnovo University	University	A key academic partner helping to integrate art, design, and cultural heritage in the center's programming.
National High School for Applied Arts "Trevnenska Shkola"	Academic actor	Collaborates in organising workshops and programs focused on upcycling and renewing furniture and equipment. Their work supports sustainability and social inclusion through creative education.
Foundation Care for Children with Disabilities	Disability organisation	Organisation was established by parents of children with disabilities and works in the public interest.
Day Care Center for Adults with Disabilities	Disability organisation	The center supports young people with disabilities post-school by offering a structured environment for personal development, social connections, and independence. Services include occupational therapy, psychological support, and daily living skills training.
Women's Charitable Society "Mother Care"	Disability organisation	Organization provides significant support to vulnerable individuals in Gabrovo.
Foundation "Community for Supporting Addicts"	Disability organisation	Foundation provides essential support for individuals recovering from addiction.

Table 9. Data collection activities at Christo and Jeanne-Claude Center

Tool	Objective	Target group	When
Questionnaire	Understanding the context: Identify the site-specific requirements, priorities and expectations related to the built environment and in the context of	Demo site leaders - MoG, MHS	September 2024

Online Interview	active mobility solutions. Existing local policies, regulations/ standards or programs for ensuring accessibility for individuals with disabilities, with reduced mobility and vulnerable groups. Existing infrastructure and kind of accessibility features are in place. Type of active mobility solutions available to the site. ● Site-specific perspectives and preliminary insights on user needs, preferences for the built environment and challenges (physical, socio-economic, and policy-related barriers) faced by individuals with disabilities, reduced mobility and vulnerable groups in relation to active mobility solutions. ● Identify relevant actors and users that could be engaged in the data collection.	Demo site leaders - MoG, MHS	October 2024
Workshop		Demo site leaders - MoG, MHS	November 2024
Interview	● Understanding the context: Barriers (physical, economic, policy-related, etc) hinder the realisation of accessible and inclusive built environment and mobility solutions within the city. ● Perspectives and insights on user needs, preferences for the built environment and challenges (physical, socio-economic, and policy-related barriers) faced by individuals with disabilities, reduced mobility and vulnerable groups in relation to active mobility solutions within the city. ● The existing landscape of policies, regulations, and urban planning initiatives aimed at creating an inclusive built environment and promoting active mobility in the city.	Governmental actors: Department of Social Activities and Healthcare at the Municipality of Gabrovo	March 2025
Online survey	● Understanding the site-specific user experiences, needs, preferences, expectations, and existing barriers regarding accessibility, safety, comfort, and convenience for the built environment. ● Understanding the needs and barriers related to active mobility solutions. ● Identify best practices	Artists of the center and employees of MHS 10 responses received	February 2025

Interview	● Specific insights on needs and challenges faced by users with disabilities, reduced mobility, and vulnerable groups when accessing the built environment and active mobility solutions at the EU and city level. ● Understand site-specific requirements/needs and challenges. ● Identify best practices.	Manager of the Day Care Center for Adults with Disabilities	February 2025
		Director of the Day Center for Children and Youth with Disabilities	February 2025
		Vice-chairman of the Women's Charitable Society "Mother Care"	March 2025
		Manager of the Foundation "Community for Supporting Addicts"	February 2025
Interview	● Understanding the site-specific user experiences, needs, preferences, expectations, and existing barriers regarding accessibility, safety, comfort, and convenience for the built environment. ● Understanding the needs and barriers related to active mobility solutions. ● Identify best practices	6 architects and planners active in Gabrovo	March 2025

3.2.3 Define

The results of the data collection activities are described below. These activities were guided by the following generative questions, developed during the **Define phase** of the project, to explore key aspects of accessibility at the Christo and Jeanne-Claude Center:

- *‘How might we design the Christo and Jeanne-Claude Center as an inclusive and accessible art and culture center, including facilities for people with diverse mobility needs?’*
- *‘How might we enhance the cultural program at the Christo and Jeanne-Claude Center to attract individuals with disabilities or special needs?’*
- *‘How might we ensure that the physical accessibility of indoor and outdoor spaces at the Christo and Jeanne-Claude Center facilitate ease of movement and access for staff, artists and visitors with diverse needs and abilities?’*
- *‘How might we improve access to the Christo and Jeanne-Claude Center for people who rely on walking aids, wheelchairs, or assisted mobility services, given the hilly terrain and poor pedestrian infrastructure?’*
- *‘How might we connect the Christo and Jeanne-Claude Center with Gabrovo’s public transport and future micromobility network to enable safe and independent access for visitors and staff with disabilities?’*

3.2.3.1 User Needs & Barriers - Built Environment

The context analysis for Gabrovo demo site, derived both from the **questionnaire** and the **workshop with the demo site leader**, provided **valuable input** for this chapter’s introduction (3.2.2.1 Context Analysis). Together with the **interview** with the head of the **Department of Social Activities and Healthcare at the Municipality of Gabrovo**, it offered insights into accessibility features within social services institutions and the challenges posed by surrounding urban infrastructure, such as sidewalks and streets, which fall under other municipal departments. The interviewee stressed the importance of human factors, noting that service quality and the staff attitude significantly impact the welcoming nature of spaces for people with disabilities.

Furthermore, interviews with various stakeholders provided **valuable insights into the broader accessibility landscape of Gabrovo’s cultural sites**. They highlighted several critical barriers affecting visitors with physical, sensory, and cognitive disabilities in cultural institutions: **simple measures such as tactile guides, audio descriptions, and ramps are often missing**. Despite regulations mandating accessibility in public spaces, enforcement is inconsistent, leaving many historical buildings inaccessible.

Regarding the future of the Christo and Jeanne-Claude Center, the head of the Department of Social Activities and Healthcare sees an **opportunity for collaboration for inclusive activities**, such as craft workshops. Similarly, the vice-chair of the Women’s Charitable Society “Mother Care” suggested integrating such initiatives into the center’s program.

Further interviews underscored the importance of inclusive spaces, **considering both physical and intellectual disabilities**. Directors from the Day Care Center for Adults with Disabilities and the Foundation for Care for Children with Disabilities proposed **integrated multisensory exhibitions, featuring tactile maps, audio signals, and digital formats**. The director of the Foundation for Care for Children with Disabilities shared international good practices, involving features such as automatic doors and tactile paving. The representative of the Foundation for Community Support and Assistance for Addicts emphasized **user involvement in planning and design**, with the objective of fostering a sense of belonging and participation for all members of the community. He also cited examples of **successful collaborations with cultural institutions and social enterprises in Gabrovo**. For instance, he mentioned how participants in the Foundation's programs have volunteered at local events, such as the Golden Cat Festival³⁹, and contributed to community projects like cleaning public spaces.

In addition, in the relation to the future renovation of the Center, the interviews with architects and planners provided insights into **specific architectural accessibility policies and regulations**, relevant to the chapter's introduction (**3.2.2.1 Context Analysis**). Furthermore, the interviews provided insightful perspectives on the Christo and Jeanne-Claude Center renovation project, highlighting several critical areas related to accessibility.

Firstly, it emerged that the current project phase focuses on conceptual development, **deferring detailed accessibility analysis to later stages**. Currently, the building lacks any accessibility provisions, making its implementation a pivotal aspect of the renovation. The knowledge gained from the AccesS project will be valuable, but its impact will be more significant in subsequent design phases, where specific requirements can be integrated into agreements with architects and contractors. At present, accessibility is not a primary focus in the competition criteria, but broader principles, such as openness to diverse audiences, are included in the design brief.

Secondly, the **importance of an accessibility approach driven by the direct experiences** of affected individuals and **community involvement in the design process** was emphasized. Accessibility is often perceived differently by various stakeholders, and gathering diverse perspectives is crucial. The challenge lies not only in designing better spaces but also in fostering a mindset where accessibility and mobility are considered essential to urban life, rather than secondary concerns.

Finally, the **issue of digital accessibility** was raised. While physical accessibility is more commonly addressed, digital services often fail to accommodate users with disabilities. This includes difficulties in navigating online platforms, using public service websites, or accessing digital information in adapted formats.

The online survey conducted among employees and artists active at the Center highlighted needs and obstacles for operating there, particularly in relation to people with disabilities.

Many people mentioned **limited resources or funding** and **lack of training or knowledge** for supporting accessibility improvements. The importance of staff training was highlighted, to ensure that each group of people with disabilities can experience the cultural product in at least one area of the center.

³⁹ For more information see:

<https://goldencat.eu/en/%D0%BF%D1%80%D0%B8%D0%BC%D0%B5%D1%80%D0%BD%D0%B0-%D1%81%D1%82%D1%80%D0%B0%D0%BD%D0%B8%D1%86%D0%B0/>

Regarding additional features or services that would make the Christo and Jeanne-Claude Centre more accessible to people with disabilities, the importance of first **ensuring building accessibility** was emphasized, followed by a **focus on presenting art that is accessible to this audience**.

Improvements related to exhibitions should be implemented promptly, in parallel with the creation of the initial exhibitions. A priority service should be dedicated to individuals with low vision or blind who often experience the most significant access limitations. Furthermore, the needs of neurodivergent individuals, who tend to be excluded from the understanding and experience of art and culture, should also be considered.

Good practices were mentioned, as the **Peabody Essex Museum**⁴⁰ that promotes an accessible and positive experience for visitors with diverse sensory needs and reduced mobility.

Beyond providing an accessible environment, it is recommended to collaborate purposefully with organizations of people with disabilities for specific events. Furthermore, the Center should actively promote itself as an **accessible cultural institution, ensuring people with disabilities are aware of the accommodations provided**. Interactive exhibitions and meetings, especially those involving diverse disability groups in the design process—artists, audience members, and employees—were also suggested.

The data collection activities highlighted the user expectations⁴¹ and necessity for a holistic approach to accessibility, encompassing both physical infrastructure and the sensory and social experiences of visitors. The following development areas **in terms of accessibility of the building**, categorised according to EN 17210:2021, are crucial for **transforming the Christo and Jeanne-Claude Center into an inclusive space**.

Wayfinding:

- Interviews with planners and architects stressed the importance of **seamless transitions from arrival points to entrances**, implementing solutions like elevators, ramps, and step-free thresholds across all zones.
- The digital survey conducted among employees and artists, similar to the interviews with different disability organisations, proposed activities such as lectures, workshops, and exhibitions to familiarize visitors with the Center's layout, **promoting it as an accessible cultural institution**. Participants expressed a desire for multisensory experiences. Additionally, the importance of mediators was highlighted, particularly for children, minority groups, and other vulnerable groups.

Horizontal circulation:

- The digital survey conducted among employees and artists stressed the importance to guarantee **all spaces are navigable for diverse mobility needs**. Similarly, the director of the Foundation for Care for Children with Disabilities highlighted the need for **accessible entrances**, such as sensor-operated doors that automatically open for wheelchair users, and

⁴⁰ <https://www.pem.org/visit/accessibility>

⁴¹ Results presented for this site differ from those of other pilots due to the Center's current non-operational status. The data collected includes expectations and recommendations aimed at ensuring the renovated building is inclusive and accessible for everyone.

for **tactile paving** with varying textures to help individuals with low vision or blindness navigate.

Vertical circulation:

- The digital survey conducted among employees and artists, similar to the interviews with disability organisations, proposed features such as **elevators, ramps**, and specialized **mobility equipment**, accessible to people with visual and motor disabilities.

Specific areas:

- In planners and architects' opinion, each function within the center, workspaces, recreational areas, the hotel, and restaurant, must have **tailored accessibility solutions**.
- The digital survey conducted among employees and artists proposed the design of interactive and multisensory exhibitions. Also, it was suggested to provide **dedicated spaces for specific activities**, such as workshops and discussions, and ensure permanent exhibitions have a minimum level of accessibility for all major disability groups.

Sanitary accommodation:

- No specific suggestions were made.

Engagement:

- The director of the Foundation for Care for Children with Disabilities noted the importance of **color schemes in public spaces**, as certain colors can overstimulate individuals with cognitive disabilities.
- The digital survey conducted among employees and artists proposed features such as **tactile features, audio guides, magnifying glasses** for reading exhibition texts. Also, involvement with people with disabilities in the design of events and exhibitions and collaboration with organizations of people with disabilities for specific events were suggested.
- Many interviewees suggested the implementation of regular and embedded in the center's programming **workshops and exhibitions dedicated to vulnerable groups**, and **engagement of the community** in the activities of the Center.
- Interviews with planners and architects noted the need to address **digital accessibility**: this includes difficulties in navigating online platforms, using public service websites, or accessing digital information in adapted formats

Evacuation and emergency exits:

- No specific suggestions were made.

Environmental Conditions:

- No specific suggestions were made.

The following table summarises the key findings regarding accessibility for the Christo and Jeanne-Claude Center derived from engagement activities, along with user expectations to inform subsequent phases of the user-centered design approach. Results presented for this site differ from those of other pilots due to the Center's current non-operational status. The data collected includes expectations and recommendations aimed at ensuring the renovated building is inclusive and accessible for everyone.

Table 10. User expectations at Christo and Jeanne-Claude Center

User Expectations for the Christo and Jeanne-Claude Center			
Key areas of accessibility	User task	Target group	User expectations
Wayfinding	Accessing information	All visitors, especially the ones with disabilities	Accessible information on features, layout, events and exhibitions
	Accessing the exhibits or services	Visitors with mobility and sensory disabilities Neurodivergent visitors	Cultural products with specific accessibility accommodations
			Need for clear, intuitive signage and mediator support
Horizontal circulation: entrances, doors, windows, patios, terraces, surface finishes and materials	Entering the building and moving within the building	Visitors with reduced mobility or wheelchair users	Need for sensor-operated doors that automatically open for wheelchair users
		Blind or low vision visitors	Need for tactile paving with varying textures to help individuals with sight disability navigate

Vertical circulation: ramps, stairs, handrails, lifts, escalators	Moving between levels inside the building	People with reduced mobility or wheelchair users and visual disabilities	Need for features easily navigable for people with diverse mobility needs (ramps, elevators, handrails, other mobility aids)
Specific areas, equipment and provisions: service counters, seating, waiting & storage areas	Accessing creative activities and exhibitions	Artists, all visitors and workers	Need for dedicated spaces for specific activities, such as workshops and discussions, and ensure permanent exhibitions have a minimum level of accessibility for all major disability groups
			Tailor accessibility solutions to each functional area, including workspaces, recreational spaces, and the restaurants
Engagement- User interface, controls and switches	Interacting with exhibits or services	City community, with special focus for people with disabilities	Actively involve people with disabilities in event and exhibition design, and collaborate with disability organizations for specific events
			Integrate regular workshops and exhibitions dedicated to vulnerable groups into the center's programming, fostering community participation
		Visitors with sensory disabilities	Enhance sensory experiences with tactile features, audio guides, and magnifying tools. Address digital accessibility by ensuring online platforms, public websites, and digital information are accessible

3.2.3.2 User Needs & Barriers - Active Mobility Solutions

The active mobility analysis for Gabrovo presented extensive insights from various user groups, including artists, academic entities and disability organisations. This section offers a comprehensive analysis of quantitative findings and qualitative insights.

Disability Service Providers and Social Care Managers who are the officers of Gabrovo's Department of Social Activities and Healthcare, and directors of local day centers for disabled children, youth, and adults emphasized that even though interior accessibility is typically secured by institutional provisions such as ramps and lifts, the immediate city surroundings remain severely restrictive in terms of mobility, having significant obstacles especially for users with physical or cognitive disabilities. They pointed out that sidewalks are cracked and in poor condition, there is a lack of ramps and tactile markings, while private cars often block pedestrian routes. Such physical barriers isolate Christo and Jeanne-Claude Center, especially for people who cannot utilize cultural or social activities independently. Public transportation lacks accessibility for individuals with physical disabilities, necessitating their reliance on expensive taxis. The utilization of micromobility vehicles is hindered by security concerns and infrastructural deficiencies. Nonetheless, stakeholders indicated a willingness to embrace inclusive micromobility solutions, contingent upon the integration of suitable safety measures, secure parking options, and training or oversight systems.

The **local Architects and Urban Planners** who have worked on planning the Christo and Jeanne-Claude Center, particularly those working on riverside redevelopment stated that the law requires a certain level of physical accessibility, but professionals say that implementation isn't always fair and is too focused on people with mobility issues, forgetting about people with sensory, cognitive, and neurodiverse needs. Professionals said that Gabrovo's public transportation network was functionally adequate for a medium-sized city, but its coverage is limited and didn't run often enough to be a strong alternative to private transportation. A difficult terrain with steep slopes was identified as a barrier to the development of cycling infrastructure in the city. Still, planners said that the recent investments in the riverside corridor showed that more inclusive design practices were starting to appear. This includes making a two-way cycling lane that runs along both sides of the river, connecting key points in the city, gradual slopes, ramps for pedestrians, tactile paving, and accessible pathways to ensure that everyone can navigate the space comfortably. Despite those interventions, the city's topography has significant difficulty providing accessibility requirements such as the 5% gradient ramp. Compromise solutions have been employed innovatively, yet balancing regulation and reality remains a major concern. Planners also saw that disabled users have yet to be included in micromobility design and that integrating the latter in the hilly cityscape of Gabrovo is inhibited by issues of safety and lack of proper parking infrastructure.

Staff and artists who took part in the survey on the Christo and Jeanne-Claude Center identified notable shortcomings in Gabrovo's current mobility and accessibility framework. The majority of the respondents (60%) reported reaching the Center on foot, while 40% used motorized vehicles, such as private cars or electric scooters. Public transport and micromobility options were not used by any of the participants. When asked how they believe that people with disabilities typically access the area, 60% responded "other" or were unsure, suggesting a widespread lack of awareness or available accessible infrastructure to support inclusive mobility due to incompleteness of the building. Modes of

transport were evaluated and were found to have poor to moderate accessibility for most types of disabilities, particularly for individuals with reduced mobility and blindness. For others, such as those with hearing or intellectual disabilities, perceived accessibility was somewhat better but still fell behind inclusive standards. Participants emphasized the need for the modernization of pedestrian infrastructure including wider and safer sidewalks, curb ramps, tactile paths, and safe pedestrian crossings, especially taking into account the location of the Center in a highly trafficked zone.

In addition to general accessibility, the active mobility infrastructure was perceived as significantly insufficient. Participants pointed out issues such as missing or broken sidewalks, inadequate wheelchair-accessible pathways, and a total lack of facilities for inclusive cycling. Suggested improvements included adding ramps and elevators, establishing dedicated cycling paths, and enhancing connectivity with nearby green spaces and recreational areas.

The accessibility of micromobility services like e-bikes and scooters was considered limited, with diverse opinions on their usability. A considerable number of participants expressed a desire for more inclusive micromobility options; however, they raised concerns regarding safety (19%), insufficient infrastructure coupled with a lack of designated parking (19%), and reduced user confidence (24%)—especially among individuals with disabilities or those who have limited prior experience using such services.

Respondents highlighted the necessity for accessible features (e.g., ramps, low platforms), accommodation for mobility aids, and technological assistance such as navigation applications to improve micromobility for individuals with disabilities. Ergonomics, seating comfort, and safety stabilization features were also emphasized. There was unanimous agreement on the imperative to design inclusive vehicles tailored to individual user requirements rather than modifying standard models.

Sustainability was identified as a common value among participants, with a significant majority asserting its necessity for future inclusive mobility solutions to be environmentally responsible and consistent with Gabrovo's overarching sustainability agenda.

The following development areas **in terms of active mobility solutions** are crucial for **enabling access to all for the Christo and Jeanne-Claude Center**:

- 1. Inclusive Pedestrian Infrastructure and Spatial Continuity**

There was consensus across all the participating stakeholder groups that the surrounding pedestrian infrastructure of the Christo and Jeanne-Claude Center is critically inadequate. Existing sidewalks are cracked, narrow, and often obstructed by parked vehicles. The absence of ramps, tactile pathways, and level crossings severely restricts access for individuals with physical and sensory disabilities. Enhancing spatial continuity through wide, obstacle-free walkways, tactile and visual guidance systems, and pedestrian-safe crossings is therefore a primary intervention need.

- 2. Inclusive Micromobility Design and integration**

Current micromobility services in Gabrovo are both underdeveloped. While there is interest in the use of inclusive micromobility stakeholders expressed serious concerns about safety and

parking infrastructure. Furthermore, integration into the urban fabric requires designated routes, docking areas, and support services such as training or volunteer assistance.

3. Access to Public Transport

Although the public transport network of Gabrovo is considered adequate for a medium-sized city, it has low spatial coverage and low frequency. More seriously, it is not entirely accessible for wheelchair users and other individuals with reduced mobility. Without accessible vehicles, stops, and links to pedestrian networks, a lot of passengers must rely on expensive taxis. Bridging this gap involves retrofitting infrastructure (e.g., low-floor buses, ramps, real-time audio-visual announcements) and better coordination with inclusive urban planning goals.

4. Digital Inclusion and Mobility Platforms

No comments regarding this topic.

5. Accessible Active Mobility Infrastructure

In addition to the point-specific improvements, a systematic approach is necessary to enable active mobility throughout Gabrovo. The lack of bike paths and the poor connectivity of the Christo and Jeanne-Claude Center with a number of other leisure or cultural areas were highlighted by participants.

Table 11. User needs and challenges for mobility at the Christo and Jeanne-Claude Center

User challenges and needs for mobility at Christo and Jeanne-Claude Center				
Key areas of mobility solutions	User task	Target group	User challenges	User needs/ insights
Inclusive Pedestrian Infrastructure and Spatial Continuity	Navigate sidewalks to reach the Center	Wheelchair users, elderly, visually disabled	Cracked or narrow sidewalks, lack of curb ramps, no tactile guidance	Wide, continuous, obstacle-free sidewalks; curb cuts; tactile paving and clear orientation signage
	Walk to nearby cultural or green spaces	Visitors, artists, staff	Incomplete pedestrian paths, poor lighting, lack of connectivity to the riverside	Improved pedestrian corridors with shade/rest points, clear directional signage, and safe crossings
Inclusive Micromobility Design and Integration	Use adapted scooters or bikes for local travel	People with mild intellectual disabilities	Lack of adapted vehicles, safety concerns, unfamiliarity with usage	Inclusive micromobility with low boarding, speed control, ergonomic seating, and user training
	Park or charge mobility scooters safely	Residents and caregivers using scooters	No secure docking/charging areas; indoor charging poses fire hazard	Safe outdoor charging stations; reserved, visible, and accessible micromobility parking zones
Access to Public Transport	Take bus or shared transport to the Center	Residents with physical/sensory disabilities	Infrequent service, no audio/visual cues, inaccessible stops	Low-floor buses, audio announcements, better stop placement, and on-demand connections

	Use taxis or mobility services to attend activities	Caregivers and staff transporting residents	High cost, long waiting times, inconsistent scheduling	More available taxis, combined trip planning, subsidized transport solutions
Accessible Active Mobility Infrastructure	Connect walking/micromobility routes with public transport	Commuters, cultural visitors	No integration of paths and stops, unsafe road crossings	Intermodal hubs with smooth transitions, designated safe zones for switching modes
	Travel between the Center and nearby public or recreational areas	Residents, tourists, citizens with disabilities	Fragmented access, lack of protected paths, barriers on hilly terrain	Accessible paths with gentle gradients, handrails, multifunctional public spaces with mobility inclusivity in design

3.2.4 AccessS Roadmap

The subsequent table provides a structured roadmap for implementing accessibility features, emphasizing the importance of user feedback and inclusive practices at every stage for built environment and active mobility solutions.

Table 12. AccessS roadmap for the Christo and Jeanne-Claude Center

DEVELOP (M10 - M18)	
TARGET GROUPS	CONSIDERATIONS (while developing AccessS tools, pay attention to the following points)
Artists and Center staff	• Ongoing accessibility training programs and resources and guidelines for creating accessible content, promoting awareness of diverse user needs. • Adequate resources for implementing accessibility solutions, encouraging collaboration with people with disabilities in the creative process. • Include staff involvement in co-design workshops for infrastructure planning and cultural programming, to ensure inclusivity is embedded in project design. • Create internal feedback loops to capture staff observations on day-to-day access challenges faced by visitors and co-workers.
Visitors and city community	• Programs that actively involve people with and without disabilities, including multisensory and interactive activities and events promoting accessibility awareness. • Provide clear and accessible information about the center and its services, with alternative formats, such as audio, braille, digital versions. For instance, audio guides can be complemented by video guides in sign language to support deaf users. • Collaboration with local disability organizations, also to provide trained mediators (such as sign language interpreters) to assist individuals with diverse needs. • Ensure walkable connections between nearby urban points and the center (e.g., riverside path), with inclusive signage and safety infrastructure.

	Promote sustainable, community-based mobility solutions (e.g., volunteer-driven shuttles) that bridge gaps in public transport.
Wheelchair users or those with reduced mobility	- Precise measurements of doorways, pathways, and surfaces to ensure wheelchair and mobility aid accessibility - Installation of ramps and elevators with accessible controls - Ensure exterior paths to the center are restructured with appropriate slopes, surface conditions, and uninterrupted pedestrian continuity. - Develop inclusive parking/drop-off points near the entrance, particularly due to the site's placement near a high-traffic road
Blind or low vision visitors	- Development of clear navigation with tactile paving - Information in braille and large print and provide audio versions of written materials - Ensure staff is trained to guide and assist visitors with sight disability
Neurodivergent visitors	- Provide quiet spaces and sensory-friendly environments, with spaces dedicated to different uses - Train staff to recognize and respond to sensory and communication needs
PROTOTYPE & TEST (M13 - M36)	
CONSIDERATIONS (while prototyping & testing, understand feedback from the following end users or actors)	
It is essential to actively engage pilot site leaders and involve all relevant organizations in the testing phase to ensure comprehensive stakeholder participation. It is important to collect feedback from staff, artists and visitors of the Center. Moreover, you may consult the following stakeholders when gathering feedback on the tools: Concerning other vulnerable groups - Foundation Care for Children with Disabilities Day Care Center for Adults with Disabilities	

Women's Charitable Society "Mother Care"
Foundation "Community for Supporting Addicts"

New stakeholders that could be involved -

Union of the Blind in Bulgaria
Faculty of Fine Arts, Veliko Tarnovo University
National High School for Applied Arts "Trevnenska Shkola"
Union of the Deaf in Bulgaria

Evaluation activities should systematically collect feedback on the Key Performance Indicators (KPIs) as proposed within the AccesS evaluation framework, to assess the effectiveness and applicability of AccesS tool. Furthermore, the implementation of **structured feedback loops** will facilitate continuous improvement, enabling iterative refinements based on user insights.

DELIVER (M19 - M36)

GENERAL CONSIDERATIONS

(while delivering AccesS tools, pay attention to the following points)

- Develop a comprehensive accessibility guide in multiple formats (print, digital, audio, Braille, and easy-to-read versions) to ensure inclusivity.
- Provide clear and accessible information on the Center's website, including International Sign (IS), videos and screen-reader-friendly content.
- Ensure that all digital tools (apps, websites, and multimedia content) are fully accessible and including features such as text-to-speech, high contrast modes, and voice navigation.
- Provide clear instructions and tutorials on how to use digital tools, available in multiple languages and formats (text, video, and audio).
- Engage internal stakeholders and end users (including people with disabilities) to test, validate, and refine the AccesS tools before full implementation.

3.2.5 Recommendations for implementation of Active Mobility Solutions beyond AccessS

A roadmap for the implementation of the active mobility solutions proposed by the AccessS project has been presented in the preceding section. This section outlines the modifications that may occur across three distinct time scales, which are outside the purview of AccessS, yet can facilitate the active mobility of Gabrovo and Christo and Jeanne-Claude Center area. The interventions are categorized into three timeframes: short-term (0-2 years), medium-term (3-5 years), and long-term (6+ years), offering municipalities guidance for implementable changes. The proposed roadmap corresponds with the needs and obstacles identified in the AccessS project, as well as the urban mobility strategies of the city, to promote a more equitable, accessible, and sustainable environment.

Short-Term (0–2 Years): Quick Wins for Immediate Improvement

While the Christo and Jeanne-Claude Center remains under renovation planning until mid-2026, early actions must focus on removing barriers and enabling accessible arrival and navigation to the construction site and surrounding riverside paths. In this stage, the emphasis should be placed on temporary but inclusive infrastructure to support early site visits, community activities, and preparatory urban works.

Firstly, all pedestrian pathways along the riverside should be cleared, levelled, and marked with high-contrast temporary indicators and portable ramps for wheelchair users and people with walking aids. These economic, quick-win interventions will also pave the way for more intense visitor and construction traffic, as well as improve the early user experience most forcefully articulated by stakeholders involved in AccessS consultations.

Secondly, Gabrovo should initiate a public mobility awareness campaign focused on informing citizens about upcoming construction phases and promoting safe walking and cycling access to the area. To improve early-stage navigation, temporary signage systems should be introduced, including visual cues and simple directional maps—especially useful for elderly visitors and users unfamiliar with the zone.

Access to public transport also needs to be improved. With many residents relying on walking, Gabrovo's aging demographic and lack of taxi alternatives means that last-mile solutions for seniors or people with limited mobility will need to be shuttle-based. These should be piloted in collaboration with the municipal fleet and subsidized through EU mobility funds.

Medium-Term (3–5 Years): Infrastructure Upgrades and Inclusive Mobility Services

The main construction of the Center will take place over a longer span of time, and during this time medium term interventions must focus on the structural accessibility improvements and implementation of inclusive, multimodal mobility services shelters around the site and the riverside park.

In terms of active mobility, Gabrovo should design and implement a safe cycle and pedestrian corridor from the central city to the Center and the riverside. The pathway should be free of barriers, sufficiently lighted, clear of obstructions, supplemented with benches and information signs, so all

ages and mobility types can access the path. This pathway can also benefit local commuters and encourage eco-tourism.

Additionally, digital accessibility must be codified. There should be a dedicated sector within the Gabrovo mobility app or a novel cultural access app containing real-time data on shuttle buses, building accessibility, and event schedules. This website must include accessibility options like voice guidance, text magnification, and screen reader compatibility after testing in conjunction with the users and organizations such as the National Association for People with Disabilities in Bulgaria.

Long-Term (6+ Years): Smart Infrastructure, Cultural Connectivity, and Policy Continuity

In the long term, Gabrovo must aim for systemic inclusion of active and accessible mobility across all cultural infrastructure projects. The Christo and Jeanne-Claude Center can become a reference point not only for art and innovation but also for universal design leadership.

Furthermore, the city needs to create a policy strategy to monitor accessibility KPIs—physical access quality, through to user satisfaction with assistive digital tools and inclusive transport. These measures, including potentially measurements of the AccessS Evaluation Framework, would facilitate yearly accessibility audits and co-design workshops with community stakeholders.

Finally, in order to ensure replication within other cultural institutions in Gabrovo, the municipality needs to develop a "Cultural Inclusion Toolkit". The guidance document of this toolkit can consolidate knowledge from the Christo and Jeanne-Claude Center and provide step-by-step recommendations on the inclusion of universal design in public facilities, exhibitions, and open spaces across the city.

3.3 Droom je Thuis Foundation, Naaldwijk, Netherlands

“A home where care comes together with love, conviviality, friendship and an eye for each other.”⁴²

The Droom je Thuis Foundation is a residential care facility in the heart of Naaldwijk, dedicated to providing individuals with multiple or intellectual disabilities a secure and supportive environment characterized by warmth and a sense of belonging.

The facility was realized by a parent-initiated foundation, The Droom je Thuis Foundation, for providing residential care 24-hours for twelve young adults with intellectual or multiple disabilities. The parents' initiative started in 2012 when the foundation Stichting Droom Je Thuis was founded aiming at building a home for their children, close to the families. The project as a whole, from the phase of securing funding, acquiring land, development, and construction, took a total of 10 years, and in April 2023 Droom Je Thuis care facility was ready: a beautiful, modern building in the heart of Naaldwijk, with 12 spacious care flats, fine communal areas and fully equipped with state-of-the-art care technology.

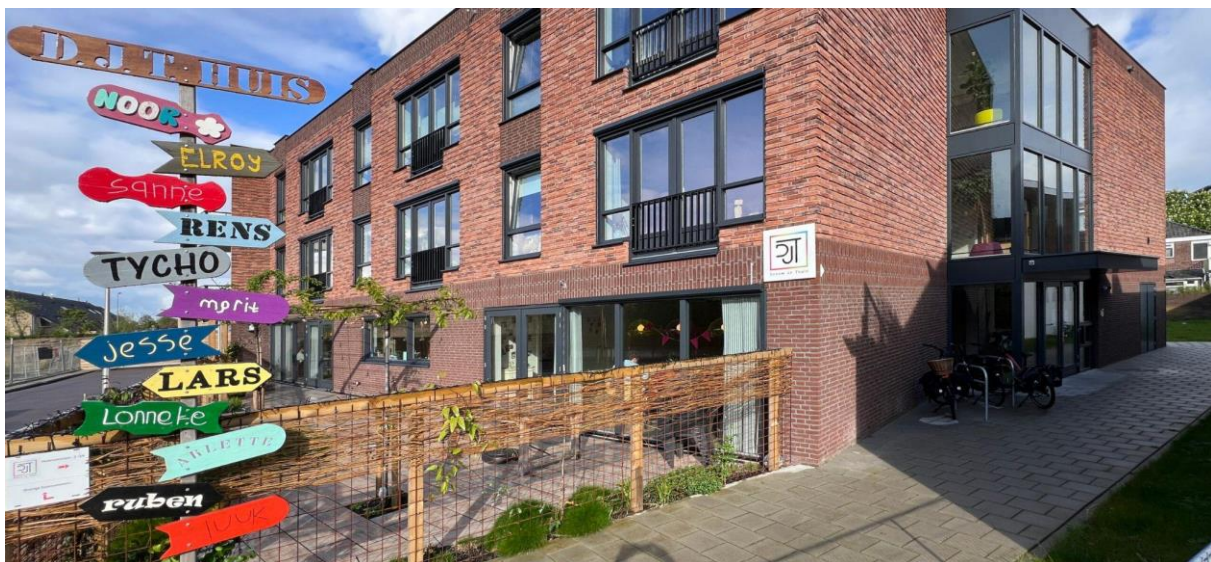


Figure 6. Droom Je Thuis care facility

(Source: [Website of Droom Je Thuis care facility](https://droomjethuis.nl/))

The foundation's core mission is to cultivate a supportive, small-scale living environment prioritizing individualized care, companionship, and personal attention. The Droom Je Thuis residence fosters resident independence while maintaining readily accessible care and familial support.

⁴² Source: <https://droomjethuis.nl/>



Figure 7. Resident at the care facility

(Source: [website of Droom Je Thuis care facility](#))

For a detailed description of the demo site, please refer to Deliverable 1.2 “Access Framework architecture, use cases and master planning for demonstrators” at Section 3.3 “Droom je Thuis Foundation, Naaldwijk, Netherlands”

3.3.1 Design Challenge

The AccessS project pursues a multi-faceted approach in enhancing accessibility in the Droom je Thuis demo site. Through assessing the accessibility of the building, extending to the immediate surrounding environment, and understanding existing barriers and areas of improvement in terms of accessibility and active mobility solutions, the ultimate and highest objective is to explore new opportunities to **foster a more inclusive living environment** for residents. More specifically, the project goal is to **promote greater autonomy of the care facility residents** while reducing reliance on parental and professional assistance.

The **design challenge** for the demo site is as follows:

‘How we might increase the independent living of the Droom je Thuis residents, ensuring they can easily carry out their daily activities, within and around the building, reducing the reliance on parental and professional assistance and still experience an inclusive, familiar and lovely environment?’

3.3.2 Discover

3.3.2.1 Context Analysis

City-level perspective

Naaldwijk, situated within the municipality of Westland in the province of South Holland, Netherlands, serves as the administrative center of the Westland municipality (formed by the aggregation of the other cities of De Lier, 's-Gravenzande, Monster and Wieringen). With a population of 22,945 (2024), and a considerable population density of 2,475 inhabitants per km², it represents a sizable population center, contributing to the region's overall density. Naaldwijk experiences a moderate annual population increase of approximately +130 individuals. Regarding migration background, the population comprises 7% with a non-Western and 9% with a Western migration background.

In recent years, Westland has also experienced economic growth (+2.7% in 2022), with a substantial concentration of greenhouses and related agricultural businesses driving local employment and contributing to the Dutch agricultural sector. Additionally, residents' disposable income exceeds national and provincial averages.

Naaldwijk, has a well-integrated regional transport system with the advantages of a compact semi-urban setting. Mobility patterns in the region are influenced by a mix of local cycling culture, personal car dependency, and public transport services that, although limited, are effective. Similar to most municipalities in the Netherlands, Naaldwijk has an extensive network of cycling paths linking residential areas with schools, commercial areas, and surrounding towns, thereby encouraging active transport and convenient short-distance travel by bicycle. Walking is also a viable option encouraged by the town's generally flat topography and pedestrian-friendly town center.

The city's public transportation is mostly utilised by regional bus services, allowing its connection to nearby major centers like The Hague, Delft, and Rotterdam. Despite that, the connection with the rail is limited, requiring users to make transit changes in cities close by, like Schiedam or Delft. Despite the fact that the bus system adequately meets the citizens' demand for transportation, last-mile access requires enhancements to be used by people with disabilities.

In response to these challenges, community-driven projects, such as Rolbus Westland (semi-public, on demand bus service for subscribers) and the Droom je Thuis bus (private bus for the facility's residents), have been developed to provide more personalized, on-demand transport services—particularly for older people and those with mobility issues. As Naaldwijk grows in the future, continued emphasis on inclusive transport planning, the development of active mobility infrastructure, and promoting sustainable travel options will be imperative in ensuring equitable and future-proof mobility.

Policy perspective

The national legislation in The Netherlands is committed to ensuring that people with disabilities have equal opportunities for participation and inclusion in society. The Dutch government has implemented several policies and laws to achieve this goal, including the **Long-Term Care Act (Wlz)**, which aims to provide comprehensive care for people with disabilities who require long-term care. People who, having applied to the **Care Indication Center (CIZ)**, receive a Wlz indication, can receive care either at

home or as a resident in an institution like a nursing home⁴³. Persons with disabilities are given a choice as to how they receive assistance: they can opt to receive a **Personal Budget (PGB)** and purchase the assistance services they need themselves, choosing their own providers and customising their own assistance plan⁴⁴.

In the Netherlands, policies to support people with disabilities represent an important step towards the inclusion and autonomy of people with disabilities. These national policies, along with the local policies of the Municipality of Westland regarding the accessibility of built environment, provide an important legislative framework within which to implement projects that promote accessibility for people with disabilities, such as the AccessS project.

In the Municipality of Westland, the **Building Decree on the Living Environment** sets out the technical and functional requirements that buildings must meet to ensure accessibility for all, regardless of their physical capabilities. These requirements cover several aspects, including the accessibility of entrances, the presence of lifts and ramps, the design of accessible interior spaces, and the adequacy of toilet facilities⁴⁵.

Also, the Plan 2023-2027 for the **Management, Maintenance and Development Of Public Space and Real Estate** is a strategic plan that defines the priorities of the municipality in terms of the management and development of public space and real estate. For example, this plan includes specific objectives to improve the accessibility of outdoor spaces, such as parks and pavements. In addition, the municipality is working to improve the accessibility of existing buildings through renovation and adaptation [4].

The Municipality is responsible for the Urban planning and mobility in the city. While the Building Decree on the Living Environment (Bbl) and the NEN1814 addresses building accessibility, the Territorial Plan 2023-2027 identifies existing accessibility areas and possible future improvements in public outdoor spaces. The Municipalities express the willingness to work on good accessibility and reachability of the recreation areas, especially for slow traffic, for people and that necessary improvements and adjustments will be taken up as soon as possible (for example, poor footpaths will be refurbished).

Naaldwijk is promoting public transport usage through the Dutch government's **Tax Plan 2025**⁴⁶, which allows employers to reimburse employees' private public transport trips untaxed. Additionally, under the **Voluntary Agreement on Zero Emission Bus Transport**⁴⁷, all new buses in the Netherlands will utilize 100% renewable energy or fuel from 2025 onwards, aiming for a fully emission-free bus fleet by 2030. The city is also enhancing its cycling infrastructure and integrating local mobility plans with regional strategies to ensure cohesive and sustainable urban mobility solutions. The **Droom je Thuis Foundation Facility**, constructed in 2022/2023, offers fully wheelchair-accessible apartments for young adults with disabilities, emphasizing minimal energy consumption and inclusivity.

⁴³ <https://www.ciz.nl/en>

⁴⁴ <https://www.gemeentewestland.nl>

⁴⁵ NEN 1814 – Accessibility of buildings, guidelines for minimum dimensions and facilities to ensure wheelchair accessibility in buildings (e.g., turning circles, door widths, ramps, and toilets); NEN 9120 – Accessibility of buildings and public spaces, a comprehensive standard covering accessibility for people with various disabilities (physical, visual, auditory, intellectual). Applies to both buildings and outdoor areas. Are more specific in addition to The Building Decree on the Living Environment

⁴⁶ <https://www.ns.nl/en/business/mobility-advice/private-travel-untaxed>

⁴⁷ <https://il.boell.org/en/2023/03/30/promoting-sustainable-mobility-view-netherlands>

Demosite-level information

Droom je Thuis care facility is dedicated to providing individuals with multiple or intellectual disabilities a home, where they can benefit from the assistance of experienced professionals and cutting-edge care equipment to ensure safe and independent living, while also having family members close to the building.

The home is provided with common areas for enhancing shared activities (such as two living rooms, a kitchen where residents can help with cooking, a sports room, wheelchair and bicycle garage and two gardens near the house where residents can enjoy outdoor moments during summer) and 12 private flats for independent living. The accessibility of the structure is guaranteed by an integrated accessibility system, that is enabling persons with disabilities to navigate to their residences or social spaces independently and also ensures that residents who are not allowed to go outside are unable to do so.

The building has been designed with a focus on minimal energy consumption and does not rely on gas usage. Indeed, it is equipped with PV panels, heat pumps (one heat pump for each apartment, two for ground floor and sensory room to provide heating and hot water), an air handling unit and floor heating installed all over the house.

Lastly, the building is equipped with a [Salto access control system](#) for remote control, while data is stored in a database (ensured by dedicated procedures requested for data access due to privacy concerns).

When it comes to accessibility, the building facade entrances, communal areas, corridors, and half of the residential units have automated door mechanisms. Salto access control system governs entry to the main doors, living spaces, utility areas, offices, and storage. Vertical movement is facilitated by both stairways and an elevator, while all doorways feature level thresholds. Furthermore, select apartments are fitted with specialized overhead lifts in bathrooms and sleeping quarters, tailored to the specific needs of disabled residents. Currently, an IoT system is being developed to automate legionella prevention by controlling the heat pumps and monitoring the temperature fluctuations.

The area surrounding Droom je Thuis, is relatively quiet but it presents considerable challenges for inclusive mobility. The streets might be quiet, and the sidewalks are sufficiently wide, but, uneven, lacking essential accessibility features, such as curb ramps and tactile guidance, making them difficult for wheelchair users or residents with physical disabilities to navigate. As a result, some individuals are forced to walk on the road (instead of the sidewalks), creating safety risks. Public transport in the immediate area is limited, inefficient and inaccessible, which increases the dependence of the Droom je Thuis residences on family and caregivers' modes of transportation, taxis, or the Droom je Thuis private bus—a dedicated service used for group outings. Micromobility tools like wheelchair bikes and tandems are in use by some Droom je Thuis residences, and there are secure parking and charging facilities inside the premises.

For a more detailed description of the demo site technologies, please refer to D1.2 “D1.2 AccessS Framework architecture, use cases and master planning for demonstrators” par. “3.3.1. Description of the pilot site”

User Characteristics

The Droom je Thuis residence in Naaldwijk is home to **young adults with multiple and intellectual disabilities**, who require 24-hour care and support while striving for as much autonomy as possible in their daily lives: the residents are 12, with ages ranging from 20 to 30 years as of 2024; the gender distribution is balanced, with 5 women and 7 men; all residents have intellectual disabilities, and approximately 50% also have physical disabilities. The group is noted to be **diverse in terms of their level of functioning and need of support**.

In particular, residents at Droom je Thuis present diverse disabilities, primarily in the following categories:

- **Cognitive disabilities:** many residents have cognitive disabilities that affect their decision-making, problem-solving, memory, and ability to navigate spaces independently. Some require assistance in understanding written or abstract information, while others benefit from structured routines and clear visual or sensory cues in their environment.
- **Multiple disabilities and mobility challenges:** some residents have physical disabilities affecting movement, balance, and coordination, requiring wheelchairs, walkers, or other mobility aids. This means the built environment must be fully step-free, with wide passageways, accessible furniture, and ergonomic design elements to enable safe movement.
- **Sensory sensitivities and autism spectrum conditions:** a subset of residents have heightened sensitivity to noise, lighting, and sensory stimuli, which can impact their comfort and well-being in shared spaces. This group benefits from predictable, calm environments with controlled sound and light levels, as well as spaces for quiet retreat when overwhelmed.

While **all residents need some level of daily care from caregivers**, many can perform tasks like dressing, eating, and using the bathroom independently if the environment is properly adapted. Most residents **struggle with complex spatial navigation**, especially in areas without clear visual markers, signage, or structured pathways. Residents at Droom je Thuis engage in a wide variety of daily activities outside the premises, often supported by caregivers, parents, or volunteers. These include recreational and therapeutic outings such as swimming, frame running, horse riding, theatre visits, music lessons, trips to the forest or beach, and market or grocery shopping. Activities like church attendance, cinema visits, DJ sessions, and even vacations are also part of their routines, enriching their social lives and supporting wellbeing. While most of these outings require some level of assistance, a few residents are able to walk independently, go to the supermarket alone, or drive around the immediate surroundings, demonstrating varying levels of autonomy and participation in the community.

While some residents can use basic digital tools (e.g., touchscreens, voice commands), **many are not able to navigate complex digital interfaces independently**. Any smart solutions (e.g., digital wayfinding apps, voice-activated assistants) must be highly intuitive and supplemented with non-digital alternatives (e.g., physical buttons, printed guides). Given the cognitive and physical limitations of residents, passive or automated accessibility solutions (e.g., motion-activated doors, voice-guided prompts, sensor-based room adaptations) are preferred over interfaces requiring active control.

3.3.2.2 Involved Stakeholders & Data Collection

The following tables summarise the stakeholders and users involved in the engagement activities at the Droom je Thuis Foundation.

Table 13. Internal and external stakeholders involved at Droom Je Thuis

Internal Stakeholders: Actors who are directly involved in a project and have direct influence on decision-making within project activities.		
Name	Type	Role
Bruco Housing Advisors BV	SME	Responsible for the demo site and the activities at the Droom je Thuis Foundation, also leading the Demonstration and Impact Assessment for the Case of People Care Facilities. BHA formulated the spatial and technical program of requirements and supervised the construction of the Droom je Thuis building and is pilot manager for the site, having the support of the Droom je Thuis Foundation.
External Stakeholders: Actors or groups that are not part of the project and do not have direct decision-making power within the project but are affected by, can affect or have an interest in its outcomes.		
Name	Type	Role
Droom Je Thuis Foundation	Foundation - Non-profit organization	The Foundation organizes and provides the care facilities for the 12 residents, whereby continuity and quality are guaranteed through cooperation with a professional care provider (WoonDroomZorg).
Droom Je Thuis residents	End users - Residents of the building	The group of 12 residents consists of 5 young women and 7 young men, all between the ages of 20 and 30 (2024). The composition of the residents is mixed, in terms of disability, gender, level of functioning and origin. The residents have intellectual disability, and around 50% are also physically disabled. They are all unemployed, earning an annual income < € 16.584.

Parents and relatives of Droom je Thuis residents	Other stakeholder	Stichting Droom je Thuis is a so-called parent initiative: it was founded by parents of children with disabilities. The goal was to offer people with multiple disabilities or intellectual disabilities a safe environment where warmth and cosiness can be experienced. Parental participation is essential for the proper functioning of this place. At least four times a year, parent meetings with the Board of Directors are organised. During these meetings, parents are informed about the latest developments and financial policy. They also think about current affairs and future plans.
Westland Municipality	Governmental actor	The Westland Municipality plays a crucial role in ensuring that public spaces and infrastructure are designed to be inclusive and accessible for all residents, including individuals with disabilities. The municipality is responsible for developing and implementing policies in social support, mobility, and urban planning, with the aim of fostering an inclusive society where everyone can fully participate. Through its Accessibility Coordinator, the municipality ensures that accessibility considerations are integrated into urban planning, infrastructure development, and public services. This involves improving sidewalks, crossings, public transport facilities, and municipal buildings to ensure that people with disabilities can navigate the built environment independently and safely.
Assistants and caregivers (WoonDroomZorg)	Professionals - Workers in the building	In 2023, when the residential initiative was realized, Droom Je Thuis foundation signed an overarching contract with WoonDroomZorg for the professional care and guidance of the residents, offering tailor-made care 24 hours a day. WoondroomZorg (WDZ) is an organization founded in 2007, with the intention to interpret the care relationship in a way and with content that makes the resident's life as pleasant and meaningful as possible. WoondroomZorg has WTZi recognition and could therefore provide Care in Kind, but choose the financing via a PGB in order to guarantee the patient's own control over the content and form of care.
PG Westland	Disability organisation	Platform Gehandicaptten Westland (PG Westland) is a volunteer-driven organization dedicated to advocating for the rights and well-being of individuals with physical disabilities in the Westland region of the Netherlands. Their mission is to ensure that people with physical disabilities or chronic illnesses have the same opportunities as those without disabilities, promoting an accessible and inclusive society. This includes advising on plans for new and existing buildings, assessing accessibility based on drawings and on-site measurements.

Table 14. Data collection activities at Droom Je Thuis

Tool	Objective	Target group	When
Questionnaire	• Understanding the context: Identify the site-specific requirements, priorities and expectations related to the built environment and in the context of active mobility solutions. Existing local policies, regulations/ standards or programs for ensuring accessibility for individuals with disabilities, with reduced mobility and vulnerable groups. Existing infrastructure and kind of accessibility features are in place. Type of active mobility solutions available to the site. • Site-specific perspectives and preliminary insights on user needs, preferences for the built environment and challenges (physical, socio-economic, and policy-related barriers) faced by individuals with disabilities, reduced mobility and vulnerable groups in relation to active mobility solutions. • Identify relevant actors and users that could be engaged in the data collection.	Demo site leader: BHA	September 2024
Online Interview			October 2024
Workshop		Demo site leader: BHA	November 2024
Interviews	• Understanding the site-specific user experiences, needs, preferences, expectations, and existing barriers regarding accessibility, safety, comfort, and convenience for the built environment. • Understanding the needs and barriers related to active mobility solutions.	Parents and relatives of Droom je Thuis residents: 8 respondents	December 2024 - February 2025
		Assistants and caregivers: 5 respondents	February 2025
Questionnaire	• Understanding barriers (physical, economic, policy-related, etc) hinder the realisation of accessible and inclusive built environment and mobility solutions within the city.	Westland municipality - Accessibility Coordinator: 1	February 2025

	● Perspectives and insights on user needs, preferences for the built environment and challenges (physical, socio-economic, and policy-related barriers) in relation to active mobility solutions within the city. ● Understanding the existing landscape of policies, regulations, and urban planning initiatives aimed at creating an inclusive built environment and promoting active mobility in the city.	respondent	
Questionnaire	● Gathering specific insights on needs and challenges faced by users with disabilities, reduced mobility, and vulnerable groups when accessing the built environment and active mobility solutions at the EU and city level. ● Understand site-specific requirements / needs and challenges. ● Identify best practices.	Disability organisation, PG Westland: 1 respondent	February 2025

3.3.3 Define

The results of the data collection activities are described below. These activities were guided by the following generative questions, developed during the **Define phase** of the project, to explore key aspects of accessibility at the Droom Je Thuis building:

- *'How might we improve the physical accessibility of indoor and outdoor spaces at Droom je Thuis to support safe and independent mobility for residents using wheelchairs, walkers, or other assistive devices?'*
- *'How might we adapt kitchens, bathrooms, and shared living spaces to better support residents in carrying out daily life activities with minimal assistance from caregivers?'*
- *'How can we ensure that digital tools and control systems used at Droom je Thuis are intuitive, reliable, and inclusive for residents with limited digital skills or physical disabilities?'*
- *"How might we enhance the safety and accessibility of pedestrian routes around Droom je Thuis to encourage more outdoor movement and reduce reliance on transport with private vehicles?"*
- *"How might we introduce inclusive micromobility options that are usable by residents with physical and cognitive disabilities?"*
- *"How might we improve access to public transportation and ensure that last-mile mobility is reliable, comfortable, and dignified for all residents?"*

3.3.3.1 User Needs & Barriers - Built Environment

Interviews with caregivers and assistants provided **first-hand insights into daily mobility challenges**, highlighting barriers to independent movement, such as heavy doors, lack of automated access. They also emphasized the need for intuitive wayfinding and assistive technologies to reduce reliance on staff for basic tasks.

Interviews with **parents and relatives of Droom je Thuis residents** offered a long-term perspective on residents' evolving needs, **focusing on independent living skills and the balance between safety and autonomy**. They stressed the importance of seamless transitions, sensory-friendly environments, and outdoor accessibility to ensure full participation in community life.

Interview with the **advocacy group** brought a broader, systemic view on accessibility, identifying gaps in cognitive accessibility (e.g., inconsistent signage, lack of clear spatial markers) and reinforcing the need for universal design principles. They also highlighted the importance of alternative access solutions beyond digital tools, ensuring inclusivity for all residents.

Interview with **Westland Municipality** provided policy and infrastructure context, acknowledging ongoing public space improvements while recognizing current limitations in sidewalk accessibility, crossings, and integration of mobility solutions. Their perspective reinforced the necessity of aligning built environment upgrades with municipal accessibility plans for long-term impact.

Wayfinding

- Residents with intellectual disabilities require environments that are easy to understand and navigate, supporting their cognitive abilities. This means clear wayfinding inside the building, simple cues for recognizing locations (their own flat, the dining area, exits), and intuitive design that reduces confusion. For users with cognitive disabilities to feel confident in moving independently, the environment should facilitate predictability and familiarity, ensuring they can safely and efficiently reach their destinations without requiring constant guidance from caregivers.
- Stakeholder feedback did not indicate significant wayfinding issues inside the Droom je Thuis building. According to caregivers and parents, residents appear familiar with the layout and there are no major reports of disorientation or navigation difficulties within the facility. The structure seems to already accommodate residents' cognitive needs effectively.

Horizontal circulation (entrances, doors, windows, patios, terraces, surface finishes and materials)

- All residents **require barrier-free physical access to move without difficulty or danger**. This includes moving between their private flats and common areas, entering/exiting the building, and navigating the immediate neighbourhood (e.g., visiting a nearby shop or going to a community activity).
- As reported by the Advocacy organization PG Westland, one of the most important aspects in care facilities is **door usability**. Doors should be lightweight and easy to operate, ensuring that residents, including those using wheelchairs or walkers, can open and close them independently. The remark can be referred to care buildings in general, while at Droom je Thuis, almost all doors are equipped with an automatic opening system. **Automatic or sensor-activated doors** further enhance accessibility, reducing the need for physical effort and making movement between spaces effortless.
- Beyond doorways, interior circulation must allow for smooth and safe movement. **Corridors should be wide enough to accommodate wheelchairs and other mobility aids** without difficulty, and shared spaces should be arranged to prevent unnecessary congestion. The design should also consider residents who rely on multiple assistive devices, such as tricycles or race runners, ensuring that storage areas are available and well-organized.
- Despite being a modern and well-designed facility, Droom je Thuis still presents some practical challenges that hinder independent movement for its residents.
- The caregivers have indicated that it would be **preferable for automatic doors to be equipped with a sensor instead of a push button**. This would eliminate an extra step for the staff. For the front door, they expressed a preference for installing a sliding door, as the current door often malfunctions.
- Another concern is the **functionality of entrance systems**, such as the front door and doorbell mechanism - which was reported being sometimes not functioning.
- Corridors and shared spaces are considered spacious and well-arranged, but one parent reported that sometimes they become congested due to the presence of multiple assistive devices. Some residents require more than one mobility aid - such as a wheelchair for indoor movement and a tricycle or race runner for outdoor use - which can lead to storage challenges.

Vertical circulation (ramps, stairs, handrails, lifts, escalators)

- For residents of Droom je Thuis, ensuring smooth vertical circulation within the facility is essential to maintaining independence and accessibility. Many residents use wheelchairs, walkers, or other mobility aids, while others may have limited strength, balance issues, or cognitive disability that require additional support when navigating different floors.
- To accommodate these needs, **the elevator system must be spacious enough to accommodate a wheelchair user along with an accompanying caregiver, medical equipment, or assistive devices.** This is particularly important given that some residents require specialized mobility aids or transport carts that must move with them between floors.
- Stakeholder feedback has highlighted limitations in the elevator system, which directly affect residents' mobility and independence. One of the caregivers reported that the current elevator is too small to accommodate a wheelchair and an additional transport cart simultaneously. If a resident requires both a wheelchair and additional mobility aids, such as a medical support cart or walker, the elevator space may not allow for both, leading to separate trips or reliance on caregivers.
- **Specific areas, equipment and provisions (service counters, seating, waiting & storage areas, kitchenettes, facilities for assistance dogs etc.)**
- The residents need **an environment that empowers them to perform daily life activities as independently as possible** – including personal care, cooking or food preparation, leisure activities, and other routine tasks. Even though many have significant support needs, the goal (echoed by both families and staff) is to let each person do as much for themselves as they can, within a safe framework. This requires that apartments and common areas be **equipped with accessible fixtures and assistive features** that match the users' abilities, so that reliance on caregivers can be reduced for basic tasks.
- One of the caregivers pointed out specific practical challenges that still limit residents' independence in the kitchen areas at Droom je Thuis. Wheelchair users struggle to reach certain kitchen elements, likely due to storage spaces and appliances being positioned at inaccessible heights. As a result, residents often require caregiver assistance for basic tasks that should ideally be manageable independently, reducing their ability to engage in daily food preparation.
- As reported in the horizontal circulation analysis, one parent highlighted that the wheelchair garage feels overly full, making navigation more difficult for individuals using larger mobility aids. The lack of optimized storage solutions means that equipment sometimes could obstruct circulation, limiting free movement within the facility.

Sanitary accommodation

- Bathrooms should be designed to accommodate wheelchair users and individuals with limited mobility, ensuring that they can use the facilities safely and comfortably without unnecessary assistance. Stakeholders, including PG Westland, also emphasized the importance of keeping accessible toilets clean and well-maintained, as hygiene plays a crucial role in ensuring that residents feel comfortable using the facilities.

- No specific accessibility barriers related to sanitary accommodation were reported at Droom je Thuis.

Engagement- User interface, controls and switches

- For residents of Droom je Thuis, simple and intuitive control systems are essential to promoting independence and reducing reliance on caregivers for everyday interactions with their environment. Many residents have **limited digital literacy, cognitive or physical disabilities**, which means that interfaces, controls, and switches must be designed with accessibility in mind.
- **Reliable Wi-Fi connectivity** is becoming increasingly essential in assisted living environments, supporting digital communication tools, assistive technology, and emergency alert systems. However, poor Wi-Fi coverage in certain areas of Droom je Thuis has been reported and may limit the usability of digital devices, affecting residents' ability to use communication aids or future technology-based accessibility solutions.
- Currently, there is **no intercom system**, particularly one that connects apartments with key locations like the kitchen, from where the caregivers would call the residents by an intercom when meals are ready.
- Another issue reported is the **battery drainage of fire alarm pagers**.

Evacuation and emergency exits

- Battery issues for fire alarm pagers were reported by caregivers.

Environmental conditions in buildings (lighting, acoustics, indoor climate)

- For the residents of Droom je Thuis, environmental conditions such as lighting, acoustics, and indoor climate play a crucial role in ensuring safety, comfort, and accessibility. Many residents have sensory sensitivities, mobility, or cognitive disabilities, meaning that well-designed environmental features can significantly enhance their quality of life.
- There are no reported issues regarding the indoor environmental conditions.
- The only concern raised relates to outdoor lighting. A caregiver noted that the area immediately outside the residence lacks sufficient lighting, which could affect visibility and safety.

The following table summarises the key findings regarding accessibility for the Droom Je Thuis derived from engagement activities, along with related user needs and insights to inform subsequent phases of the user-centered design approach.

Table 15. User needs and challenges at Droom Je Thuis

User needs and challenges at Droom Je Thuis				
Key areas of accessibility	User task	Target group	User challenges	User needs/insights
Wayfinding	Finding the different areas of the building	Residents (young adults with cognitive and multiple disabilities)	No significant issues inside the building	Easy to understand and navigate environment; intuitive layout and predictable spatial organization
Horizontal circulation: entrances, doors, windows, patios, terraces, surface finishes and materials	Entering and moving inside the building	Residents	Entrance door malfunctions; congestion in shared spaces due to assistive devices	Automatic or sensor-activated doors; accessible handles; wide corridors; organized storage areas for mobility aids
Vertical circulation: ramps, stairs, handrails, lifts, escalators	Moving inside the building, use of the elevator	Residents Caregivers and assistants	Elevator too small to fit both a wheelchair and a cart	Spacious and accessible lift; enough space for assistive equipment; alternatives for safe vertical movement

Specific areas, equipment and provisions: service counters, seating, waiting & storage areas	Accessing kitchen tools, storing assistive devices	Residents	Kitchen elements not at accessible height; storage areas sometimes crowded	Adapted kitchen layout; accessible countertops and storage; supportive seating; better organization of assistive devices
Sanitary accommodation	Using bathroom facilities independently	Residents	No specific challenges reported	Spacious and accessible bathrooms; adequate grab bars and fixture height; clean and well-maintained facilities
Engagement- User interface, controls and switches	Use of wi-fi connectivity, using access systems, communicating with caregivers, controlling doors or devices	Residents Caregivers and assistants	Malfunctioning doorbell; battery failures in access system; no intercom from kitchen; poor Wi-Fi coverage	Reliable and easy-to-use interfaces; accessible positioning; intercom system for internal communication; improved Wi-Fi
Evacuation and emergency exits	Emergency evacuation	Residents Caregivers and assistants	Battery issues in fire alarm pagers	Reliable alarm and evacuation systems; accessible emergency signage and protocols
Environmental conditions in buildings: lighting, acoustics, indoor climate	Comfort, safety, navigation, especially in shared spaces and entrances	Residents Caregivers and assistants	No barriers reported inside; insufficient outdoor lighting at the entrance	Comfortable and calm indoor environment; improve external lighting for visibility and safety

3.3.3.2 User Needs & Barriers - Active Mobility Solutions

The active mobility analysis for Naaldwijk, Netherlands has emerged from extensive stakeholder engagement across local governmental authorities, caregivers, parents, and disability advocacy groups. The key focus was to understand the day-to-day mobility experiences of the Droom je Thuis residential care facility that is supporting young adults with intellectual and multiple disabilities and identify practical, inclusive mobility solutions for users with varying accessibility requirements.

The **Municipality of Westland** already offers various services to support the mobility of vulnerable groups, such as the regiotaaxi Wmo vervoersvoorziening⁴⁸ for people with disabilities, when also additional efforts are being made to improve the accessibility of public transportation and pedestrian and cycling infrastructure. They recognize that locations like Zuideinde lack accessibility, since the main connecting road to the city center does not meet accessibility standards and residents are forced to walk or use their wheelchairs on the roadway, which creates unsafe conditions. So, the area would benefit from improvements designed to better accommodate pedestrians and wheelchair users, including the development of safer and wider pathways. Positively, the Municipality is currently engaged in long-term initiatives, including the Mobiliteitsvisie 2040⁴⁹ and the OV agenda, which focuses on enhancing connectivity and accessibility for everyone. The Municipality has been gradually placing more focus on creating inclusive urban spaces, improving cycling infrastructure, expanding pedestrian zones, and making public spaces more accessible and safer for micromobility users. Although micromobility options are still being assessed in light of local circumstances, their openness to exploring future solutions provides a hopeful perspective.

Caregivers provided rich and detailed insights into how residents engage with their surroundings. Since a broad spectrum of activities is regularly organized outside the premises with varying levels of support from parents and caregivers, the transportation of the residents is essential. They highlighted that the majority of the residents of Droom je Thuis cannot undertake activities independently (two residents are allowed to visit the supermarket on their own, while others can go for short walks or ride around the facility) while they rely their transportation mainly on the facility's dedicated bus for transportation. Other modes of transportation used by the residents include specialized bicycles (tandems, wheelchair bikes), while fixed-route public transport is rarely used. Respondents noted that most public transportation lacks adequate accessibility features, such as low-floor vehicles, reserved seating, real-time travel information, or appropriately located stops. On-demand mobility services like car sharing and bike sharing are generally not used. Taxis are more common, though their affordability and availability are major concerns. In some cases, ride-sharing on request was mentioned as an alternative. Respondents noted that most public transportation lacks adequate accessibility features, such as low-floor vehicles, reserved seating, real-time travel information, or appropriately located stops.

Based on the Caregivers answers, key barriers to mobility include limited transportation options for non-drivers, a strong reliance on parents and caregivers (some of whom are exhausted or unavailable), and the **high cost and unreliability of taxis**. Respondents also cited **long wait times, inconsistent**

⁴⁸ <https://www.zorgwijzer.nl/faq/wmo-vervoer>

⁴⁹ <https://www.vlaanderen.be/mobiliteit-en-openbare-werken/duurzame-mobiliteit/vlaamse-mobiliteitsvisie-2040>

arrival schedules, and **inefficient planning** of shared trips as recurring challenges, which often create anxiety or tension among residents.

Positive mobility enablers include the presence of dedicated transport (e.g., more taxis available, additional staff at the Droom je Thuis bus) and the availability of volunteers who occasionally assist with resident transport. In a few cases, good internal communication and the ability to combine resident trips were identified as drivers of more efficient mobility service provision.

Looking ahead, stakeholders emphasized the need for better coordination between transport providers, more reliable scheduling, increased driver availability, and institutional support for combining routes. Importantly, some called for the introduction of structured solutions that ensure consistency—such as pickups occurring at the same time daily—which would help reduce anxiety and foster greater independence among residents.

Parents expressed appreciation for the mobility options within Droom je Thuis that do work well. They also expressed concerns about particular challenges, such as a lack of secure pathways to the city center, as it has been also stated from the Municipality representatives.

Advocacy organizations (e.g., PG Westland) contributed valuable, experience-based suggestions focused on improving inclusivity in Naaldwijk. Advocacy organizations confirm caregivers' statements that residents use a combination of walking (with or without aids), mobility scooters, and limited public transport services whose accessibility remains inconsistent, varying by location and infrastructure. Public transport is not widely used among Droom je Thuis residents, since there are only few truly accessible options available at present. Additionally, wheelchair users primarily rely on wheelchair-accessible buses or rides provided by family members, while those with mild intellectual disabilities may use bicycles or public buses for short distances.

Several important gaps in inclusive mobility infrastructure were identified from the Advocacy organizations. At the moment, residents who do not have mobility restrictions either walk or use a tricycle or tandem bike. They do not use e-bikes or e-scooters as they lack familiarity, or have limited skills. Nevertheless, there is a lack of secure parking and charging facilities for mobility scooters, which not only limits their usage but also poses fire safety risks when charging indoors.

There is interest in exploring inclusive micromobility, especially for users with mild intellectual disabilities. However, uptake would depend heavily on ensuring that adapted features—such as easy boarding, space for mobility aids, comfortable seating, and digital support tools like navigation apps—are included. Concerns persist about secure parking, rental costs, and general confidence in using unfamiliar mobility solutions.

1. Inclusive Pedestrian Infrastructure and Spatial Continuity

The main connecting road (Zuideinde) lacks accessible pedestrian infrastructure; wheelchair users often find themselves on the carriageway, and safety is at risk. Sidewalks are blocked, discontinuous, or narrow, which hinders independent mobility for residents with wheelchairs or walkers. Parents and carers frequently identify the lack of safe and direct access to the city centre as a key impediment to mobility. Improvements to infrastructure must prioritize the provision of even, wide sidewalks with dropped curbs and tactile features to allow safe and independent movement for all.

2. Inclusive Micromobility Design and Integration

Those who have mild intellectual disability utilize tandems or tricycles but not e-bikes or e-scooters due to lack of skills and unfamiliarity. There is also an expressed interest in accessible micromobility, provided that designed features are included (e.g., low boarding, mobility aid storage, speed limitation). Lack of proper secure parking and charging points limits scooter/bike use and causes fire hazards when devices are charged indoors. Micromobility solutions must be engineered for safety and stability, backed by training and assistance from caregivers, to provide confidence.

3. Availability of Public Transport

Public transport remains underutilized by locals, primarily due to the fact that it is not accessible: few low-floor buses, no reserved seats, and no tactile or real-time information. Access relies greatly on the Droom je Thuis bus service and family transport, thus continuing to promote social and economic disparity. Taxi availability is unreliable, costly, and logistically unpredictable—often causing inconvenience to residents. Enhancements to fixed-route transit service, stop location optimization, and scheduled coordination can greatly enhance accessibility.

4. Digital Inclusion and Mobility Platforms

There are no structured digital instruments which are utilized for coordinating or easing mobility among residents of Droom je Thuis. Digital solutions (e.g., for real-time ride scheduling or tracking) must be cognitively accessible, intuitive, and matched to low digital literacy levels of residents. Both parents and staff outline the requirement for systems that assist in planned and reliable transportation planning, such as concurrent daily pickups. Way-finding support and micromobility applications with simple interfaces can facilitate greater independent mobility.

5. Accessible Active Mobility Infrastructure

Although mobility aids such as wheelchair bikes and tandem bicycles are utilized, the existing infrastructure is characterized by fragmentation and inadequate support. There is no such infrastructure for supporting active mobility in the vicinity of Droom je Thuis (e.g., protected bike lanes, signage, safe crossings). Micromobility and walk modes are also not yet incorporated into public transportation, which limits multi-modal choices for travellers. National and local collaboration is necessary to incorporate accessibility in long-term mobility and transport policies (e.g., OV Agenda, Mobiliteitsvisie 2040).

Table 16. User needs and challenges for mobility at the Droom je Thuis Foundation

User challenges and needs for mobility at Droom je Thuis Foundation				
Key areas of mobility solutions	User task	Target group	User challenges	User needs/ insights
Inclusive Pedestrian Infrastructure and Spatial Continuity	Reach the facility or nearby destinations via pedestrian routes	Residents with physical or intellectual disabilities, caregivers	Narrow or broken sidewalks, missing curb ramps, no tactile paths, unsafe road sharing	Continuous, obstacle-free paths, curb ramps, tactile paving, safe crossings
Inclusive Micromobility Design and Integration	Store and charge micromobility devices	Caregivers, staff	Indoor charging creates fire hazard, lack of outdoor docking	Weatherproof, fire-safe charging hubs near facility
Access to Public Transport	Use bus or taxi services to reach day programs, shops, or city center	Residents with disabilities, staff	Limited availability (bus), inaccessible stops, high cost and unreliability (taxi)	Reliable, affordable transport, accessible stops, better scheduling and routing
Digital Inclusion and Mobility Platforms	Schedule and coordinate transport via digital tools	Caregivers, staff	No tools currently used; residents have low digital literacy	Simple, intuitive platforms with large icons, scheduling consistency, alerts for caregivers
Accessible Active Mobility Infrastructure	Connect walking and micromobility infrastructure with public areas	Residents, visitors, staff	Fragmented paths, lack of protected crossings, missing ramps	Barrier-free corridors, integrated design between active modes and public areas

3.3.4 AccessS Roadmap

The subsequent table provides a structured roadmap for implementing accessibility features, emphasizing the importance of user feedback and inclusive practices at every stage for built environment and active mobility solutions.

Table 17. AccessS roadmap for the Droom Je Thuis

DEVELOP (M10 - M18)	
TARGET GROUPS	CONSIDERATIONS (while developing AccessS tools, pay attention to the following points)
Wheelchair users and residents with reduced mobility	• Ensure all doorways and thresholds are compatible with wheelchairs and walkers, including turning radius and approach space • Consider automated or sensor-based doors to reduce reliance on physical force • Include accessible kitchens and bathrooms, with adjustable or lowered surfaces and appliances
Residents with intellectual or cognitive disabilities	• Consider simple, consistent layouts and predictable spatial organization • Develop visual cues, icons, and color-coded systems to aid in recognition of spaces • Avoid overstimulation: favour clear design and minimize visual noise • Support memory and routines through reminders, symbolic markers
Residents with multiple disabilities	• Combine design solutions that support both mobility and cognitive needs
Caregivers and assistants	• Ensure smooth workflows through intuitive design and automated systems (e.g., remote-controlled doors, central communication panels) • Design equipment solutions to facilitate care delivery without congesting the space • Involve staff in the testing of assistive features to ensure ease of use and integration in daily care routines

Family members and visitors	• Ensure all doorways and entrance point are compatible with wheelchairs and walkers, including turning radius and approach space • Involve families in the testing of assistive features to ensure ease of use and integration in daily care routines
PROTOTYPE & TEST (M13 - M36)	
CONSIDERATIONS (while prototyping & testing, understand feedback from the following end users or actors)	
It is essential to engage the pilot site leader and actively involve the Droom je Thuis Foundation, caregivers, and parents in the prototyping and testing of AccesS tools, to ensure that solutions respond effectively to real-life needs and respect the organizational, technical, and emotional context of a residential care setting. Feedback should be collected from the following actors and groups. Residents of Droom je Thuis: to understand how accessible and intuitive the tools are from the perspective of users with cognitive, physical, or sensory disabilities. Include observation-based feedback and communication through caregivers where direct interviews are not feasible. Caregivers and assistants (WoonDroomZorg): to assess the practical integration of tools into daily care routines, and gather feedback on usability, time-saving potential, and accessibility improvements for staff operations. Parents and relatives of residents: consult parents on perceived impacts on independence, safety, and quality of life, and verify whether tools align with residents' evolving autonomy needs. Droom je Thuis Foundation Board: to evaluate how tools integrate into the organizational functioning of the facility and assess implications for management and long-term sustainability. Note: The building owner should be kept informed about prototypes that affect shared infrastructure, such as automated doors, access control systems, or energy management tools. Communication with the building owner can also support the long-term sustainability of solutions.	
Evaluation activities should systematically collect feedback on the Key Performance Indicators (KPIs) as proposed within the AccesS evaluation framework, to assess the effectiveness and applicability of AccesS tool. Furthermore, the implementation of structured feedback loops will facilitate continuous improvement, enabling iterative refinements based on user insights.	
DELIVER (M19- M36)	

GENERAL CONSIDERATIONS

(while delivering AccesS tools, pay attention to the following points)

- Involve caregivers, family members, and residents in the final testing and validation phase, allowing them to trial the tools in realistic daily scenarios and provide feedback before full rollout
- Provide alternative non-digital access options for all key functionalities, to ensure inclusion of residents with limited digital literacy or cognitive difficulties
- Ensure that controls and interfaces are physically accessible, with clearly marked, tactile buttons, easy-to-reach placements and logical sequencing for users with reduced mobility or cognitive disabilities.
- Validate that all technologies respect privacy and safety regulations, especially where personal or health-related data is involved (e.g., access control systems, monitoring tools)

3.3.5 Recommendations for implementation of active mobility solutions beyond AccessS

A roadmap for the implementation of the active mobility solutions proposed by the AccessS project has been presented in the preceding section. This section outlines the modifications that may occur across three distinct time scales, which are outside the purview of AccessS, yet can facilitate the active mobility of Naaldwijk and Droom je Thuis Foundation area. The interventions are categorized into three timeframes: short-term (0-2 years), medium-term (3-5 years), and long-term (6+ years), offering municipalities guidance for implementable changes. The proposed roadmap corresponds with the needs and obstacles identified in the AccessS project, as well as the urban mobility strategies of the city, to promote a more equitable, accessible, and sustainable environment.

Short-Term (0–2 Years): Quick Wins for Immediate Improvement

In the short term, Naaldwijk should focus on addressing urgent accessibility needs related to the daily transportation from Droom je Thuis Foundation to the city centre are. Sidewalk conditions and safety were mentioned as major issues—as with Zuideinde street—where the lack of ramps and proper pedestrian infrastructure requires wheelchair users and pedestrians to travel on the road. What the municipality needs to do is to enlarge the footpath with tactile paving and lowered curbs.

The municipality should also promote greater community awareness and involve users in temporary micromobility pilots that are tailored to specific needs, using solutions such as low-speed adapted cargo bikes and Droom je Thuis's own wheelchair-accessible bus fleet.

Medium-Term (3–5 Years): Infrastructure Upgrades and Policy Changes

The medium-term phase transitions into more systemized and organized improvements. The supportive infrastructure surrounding Droom je Thuis needs restructuring to emphasize pedestrian-friendly areas with wider, unbroken paths that are accessible to body and mind alike. Public bus stops and shared transport in the locality should be provided with lowered levels, audio-visual announcements, and roofed waiting shelters. All such improvements are significant in the context of addressing the problem of last-mile connectivity from the facility to the remaining urban transportation system.

Micromobility initiatives can begin to be piloted at this stage, in close collaboration with local suppliers. Adaptive transport such as tandem bikes and wheelchair trikes ought to be introduced alongside reserved parking bays with fire-resistant outdoor charging points. The pilots must include staff training and assisted-use procedures for comfort and safety. Concurrently, a basic digital platform could be introduced to help caregivers coordinate and organize transportation activity. The platform should focus on ease of use, combining user friendly and appealing interfaces with real-time alerts about route schedules or modifications.

This stage also promotes coordination of the municipality and Droom je Thuis to plan transport collectively, for instance, grouping tours to limit waiting time in addition to tiredness for caregivers.

Long-Term (6+ Years): Sustainable Urban Mobility Transformation

In the long term, Droom je Thuis ought to be incorporated fully into an inclusive citywide mobility system. Principles of inclusive design need to be strongly infused into all future transportation and infrastructure planning exercises in Naaldwijk. It should aim to have intermodal mobility hubs in the vicinity of the facility, thereby facilitating seamless transfers between public transport, micromobility, and walking.

It is critical that the city establishes an ongoing enhancement plan by gathering feedback and developing a monitoring system between residents, workers, and caregivers. Such a system would form the foundation for ongoing development of mobility services based on empirical evidence and experience. Policy transformation must take into account both the dynamic character of accessible transportation usage and the growing interdependence between caregiving environments and public mobility systems.

In this way, Droom je Thuis is able to evolve from a partly connected care institution to a fully integrated component of an open, user-centered mobility ecosystem.

3.4 Casa Girasole, Massagno, Switzerland

Casa Girasole⁵⁰ is a non-profit residential care home located in Massagno (Switzerland), owned by the Municipality, offering care services outside the hospital environment, since 2002. It is dedicated to senior citizens who can no longer manage independent living and are in need of professional care and assistance. The home care aims at providing a secure and comforting atmosphere, ensuring residents receive essential care to preserve their well-being and life quality.

In addition to the permanent residence, Casa Girasole offers temporary accommodation for elderly persons who require short-term care due to the absence of family support or who need rehabilitation.

Lastly, Casa Girasole actively participates in the 'Motta District' energy community, demonstrating a proactive approach to energy transition, thanks also to the municipality supports to Casa Girasole's inclusion in the energy community, aiming at fostering energy transition within the urban district of Via Motta in Massagno.



Figure 8. Casa Girasole, via Motta 64, Massagno (Switzerland)

(Source: [website of Comune di Massagno](https://www.comune.massagno.ch/))

3.4.1 Design Challenge

The aim of the demo is **improving accessibility and sustainability of Casa Girasole**, addressing the lack of a charging network in the neighbourhood, and thus **increasing the opportunities for slow mobility and e-mobility for people accessing the facility** (both visitors and workers).

⁵⁰ <https://girasole.massagno.ch/>

The primary focus of Casa Girasole is to explore and implement further **enhancements to the EV charging infrastructure**, with an accessible solution replicable in other sites in the Municipality. While keeping this focus, recommendations concerning the **energy efficiency upgrade of the building, indoor air quality and comfort** of the residents can also be of added value.

The **design challenge** for the demo site is as follows:

How might we improve the accessibility of the building, focusing also on the improvement of the parking area in front of the building with accessible infrastructure that includes EV charging points, for workers or visitors with reduced mobility?

3.4.2 Discover

3.4.2.1 Context Analysis

City-level perspective

The Municipality of Massagno is situated in the Canton of Ticino, in southern Switzerland, in the proximity of Lugano. Massagno has generally experienced steady population growth in recent years, reaching 7,034 citizens registered by the Population Control Office as of 31 December 2024.

The composition of Massagno's population reflects a significant presence of foreign nationals. Swiss citizens comprise 55.3% of the population, while foreign nationals account for a substantial 44.7%. According to recent statistics conducted by the Municipality, the population can be categorized into three age groups: seniors (over 65), working-age adults (20-64), and young people (under 19). Seniors represent 20.3% of the population, indicating a relatively aging population. The working-age population (20-64), comprising 61.8% of the population, represents the primary workforce and contributes significantly to the local economy. Finally, young people (under 19) make up 17.9% of the population⁵¹.

Economically, Massagno benefits from its integration into the wider Lugano area. While hosting local businesses and services, its economy is significantly influenced by its connection to the wider economic fabric of Lugano. This inter-connection means that employment opportunities for Massagno residents often extend beyond the municipal boundaries, with many commuters travelling to Lugano and the surrounding areas. Understanding the interaction between Massagno's local economy and its regional context is crucial to assessing its long-term economic viability.

From a geographical perspective, the municipality is situated on a hill, with a maximum altitude of 439 m s/m (top of Praccio Hill) and a minimum of 321 m s/m (Punta)⁵².

⁵¹<https://www.massagno.ch/Comunicato-statistica-popolazione-2022-f0b6a300#:~:text=La%20popolazione%20sale%20a%20quota%206922&text=Prosegue%20il%20trend%20positivo%20iniziato,grafico%20sotto>

⁵² <https://www.massagno.ch/Scopri-Massagno>

Massagno is a residential, small hill town with a dense urban settlement. Regarding mobility and transport, the town is mostly served by a local public transport network linking the town to the surrounding urban areas, the most popular means of transport being buses. Walking is a popular form of transport among locals because of the proximity of the points of interest, though mobility options are affected by the steep gradients in certain parts. Cycling is less popular, because of the hilly terrain but multiple infrastructures for cycling exist in the area along with a bike-sharing structure. The overall mobility context is an organized, shared context within which private vehicles coexist with public and active modes of transport, but the levels of utilization differ in relation to age, physical ability, and proximity to transport origins and destinations.

The hilly nature of Massagno can represent a significant challenge in terms of mobility and accessibility especially for people with physical disabilities.

Accessibility is indeed a crucial factor in quality of life, ensuring that all residents, regardless of age or ability, can participate fully in the community. At the local level, Massagno is expected to implement policies and initiatives related to public transport, pedestrian and bicycle infrastructure, and public space design.

Policy perspective

Massagno's commitment to **accessibility** is grounded in a robust framework of national and cantonal regulations, aligning with Switzerland's broader efforts to ensure inclusivity. Key among these is the Federal Act on the Elimination of Discrimination against People with Disabilities (**Disability Discrimination Act, DDA**), which establishes the fundamental legal basis for equal access, influencing local policy. The DDA mandates that public and private entities provide barrier-free environments, fostering autonomy and participation for individuals with disabilities⁵³.

Moreover, the implementation of accessibility standards in Massagno is heavily influenced by the Swiss Society of Engineers and Architects (SIA) standards, notably **SIA 500 «Barrier-free Construction»** and **SN 640 075 «Barrier-free Circulation Space»**. SIA 500 (focusing on barrier-free buildings) provides comprehensive guidelines for the design and construction of buildings, focusing on eliminating physical barriers: buildings must ensure threshold-free entry, adequate circulation, and accessible sanitary facilities, while public spaces prioritize level surfaces and clear pathways⁵⁴.

The national regulation SN 640 075, addressing accessible circulation spaces, concentrates on the design of public spaces, including streets, sidewalks, and pedestrian areas. This standard emphasizes the creation of continuous, obstacle-free circulation paths, with particular attention to surface textures, gradients, and signage⁵⁵.

The interaction between the DDA and these technical standards (DDA provides the overall legal mandate, while SIA 500 and SN 640 075 offer the practical guidelines for its implementation) allows for a holistic approach to accessibility in Massagno, promoting inclusive urban design and ensuring accessibility for all residents. This regulatory framework requires that all new constructions and

⁵³ <https://www.fedlex.admin.ch/eli/cc/2003/667/en>

⁵⁴ https://architettura-senzaostacoli.ch/norme_e_pubblicazioni/sia-500-costruzioni-senza-ostacoli/

⁵⁵ https://architettura-senzaostacoli.ch/norme_e_pubblicazioni/sn-640-075-spazio-di-circolazione-senza-ostacoli

significant renovations adhere to these accessibility requirements, fostering a progressively more inclusive urban environment.

In parallel, Massagno is pursuing its commitment to **sustainable policies**, with a proactive approach to energy efficiency, renewable energy integration, and sustainable resource management, allowing the city to obtain the “**Città dell’energia**” (“City of energy”) label in 2002. The “Città dell’energia” framework mandates continuous improvement, requiring Massagno to implement and monitor measures across various sectors, including building energy performance, transportation, and public awareness⁵⁶.

To improve sustainable mobility, Switzerland's **Electromobility Roadmap 2025** aims to increase the share of electric vehicles to 50% of new registrations and expand the public charging network to 20,000 stations by the end of 2025⁵⁷. Starting March 1, 2025, Switzerland will permit self-driving cars on its motorways, marking a significant shift towards innovative mobility solutions. Massagno's active mobility plans focus on developing pedestrian zones and expanding bike lanes, ensuring a shift towards non-motorized transport solutions⁵⁸. The **Casa Girasole Project** is pioneering electric mobility integration into senior living spaces, making mobility more accessible for elderly residents while reducing the urban carbon footprint.

By integrating all these initiatives, the city of Massagno is working towards creating a more sustainable, accessible and inclusive urban environment.

Demosite-level information

Casa Girasole, is a non-profit municipally owned residential care facility, providing essential services to elderly individuals who require assisted living. The public ownership of Casa Girasole underscores the Municipality’s dedication to social welfare and the provision of quality care for its senior citizens, while the smart and inclusive design of the building reflects a strong commitment to accessibility and the well-being of its residents. Also, the Municipality directly oversees the facility's operations, ensuring adherence to quality standards⁵⁹.

The facility consists of four floors and a basement that hosts technical facilities, storage rooms and similar spaces. It has 58 single rooms and 4 double rooms, with a total of 66 beds. Each room is equipped with a private bathroom with wheelchair accessible shower, direct dial telephone, balcony and basic furnishings. Additionally, the kitchen opens directly onto a spacious multi-purpose area. This area features adaptable partitions, allowing for the creation of a dining space as required, alongside a recreation room and a chapel. The building is also equipped with IoT devices for monitoring temperature, humidity and CO₂ level.

Casa Girasole is also part of the energy community “Motta District” of the urban district of Via Motta in Massagno, consisting of approximately 20 residential flats and single houses.

⁵⁶ <https://www.massagno.ch/Massagno-Citta-dell-energia-d4892500>

⁵⁷ alternative-fuels-observatory.ec.europa.eu

⁵⁸ [swissobserver.com](https://www.swissobserver.com)

⁵⁹ <https://www.massagno.ch/La-Casa-Girasole-8afb3500>

The area around the facility will undergo urban planning development led by the Municipality in order to enhance slow mobility alternatives, socializing areas, green parks, and an event space.

A particular focus is given by the AccesS project to the parking area outside of the house, owned by the Municipality. The pilot is interested in improving this area with infrastructure that includes EV charging stations, for addressing the need of workers or visitors with reduced mobility to park close to the entrance and use a charging station before entering the building.

User characteristics

Casa Girasole primarily serves **elderly people facing reduced autonomy**. These individuals often require different levels of assistance with daily living activities, encompassing personal care, medication management, and nutritional support. The facility offers both long-term residency and temporary assistance (for those who need rehabilitative activities or lack family support for certain periods) catering to diverse needs arising from age-related fragility, chronic issues or post-hospitalization recovery.

Beyond the core user group, represented by elderly people (aged between, Casa Girasole's user base extends to its **healthcare and management employees**. This team comprises professionally qualified nurses, caregivers, administrative personnel, volunteers to animate leisure time with recreational activities and the parish priest. Their roles are crucial in delivering comprehensive care and fostering a supportive and stimulating environment⁶⁰.

⁶⁰ <https://www.massagno.ch/Servizi-e-cure-b4974f00>

3.4.2.2 Involved Stakeholders & Data Collection

The following tables summarise the stakeholders and users involved in the engagement activities at Casa Girasole.

Table 18. Internal and external stakeholders involved at Casa Girasole

Internal Stakeholders: Internal Stakeholders: Actors who are directly involved in a project and have direct influence on decision-making within project activities.		
Name	Type	Role
Azienda Elettrica di Massagno SA [AEM]	Private company	Responsible for the demo site in Massagno (Switzerland) and the activities at the elderly care home facility, leading AccessS evaluation for the Case of People Care Facilities (T11.2).
External Stakeholders: Actors or groups that are not part of the project and do not have direct decision-making power within the project but are affected by, can affect or have an interest in its outcomes.		
Name	Type	Role
Municipality of Massagno	Governmental actor	The Municipality has a central role in the pilot, being the owner of the building and coordinator of the Casa Girasole activities. The activities are indeed carried out in compliance with the Health Promotion and Health Coordination Act (Health Act).
Caregivers and Facility manager	Users	Care at Casa Girasole is provided by teams comprising SRC-qualified nurses, socio-medical workers, care assistants or auxiliaries, and DSS-certified trainees. A dedicated care manager is responsible for resident care ⁶¹ .

⁶¹ <https://girasole.massagno.ch/Assistenza-8433bb00>

The following tables summarise the engagement activities at the Casa Girasole.

Table 19. Data collection activities at Casa Girasole

Tool	Objective	Target group	When
Questionnaire	• Understanding the context: Identify the site-specific requirements, priorities and expectations related to the built environment and in the context of active mobility solutions. Existing local policies, regulations/ standards or programs for ensuring accessibility for individuals with disabilities, with reduced mobility and vulnerable groups. Existing infrastructure and kind of accessibility features are in place. Type of active mobility solutions available to the site. • Site-specific perspectives and preliminary insights on user needs, preferences for the built environment and challenges (physical, socio-economic, and policy-related barriers) faced by individuals with disabilities, reduced mobility and vulnerable groups in relation to active mobility solutions. • Identify relevant actors and users that could be engaged in the data collection.	Demo site leader (AEM)	September 2024
Online Interview			October 2024
Workshop		Demo site leader (AEM) and internal stakeholders	November 2024
Online Questionnaire	• Understanding the site-specific user experiences, needs, preferences, expectations, and existing barriers regarding accessibility, safety, comfort, and convenience for the built environment. • Understanding the needs and barriers related to active mobility solutions.	Facility manager of Casa Girasole	December 2024 - February 2025
		Assistants and caregivers	
Online Questionnaire	• Understanding barriers (physical, economic, policy-related, etc) hinder the realisation of accessible and inclusive built environment and mobility solutions within the city. • Perspectives and insights on user needs, preferences for the built environment	Massagno municipality	February 2025

	and challenges (physical, socio-economic, and policy-related barriers) in relation to active mobility solutions within the city. • Understanding the existing landscape of policies, regulations, and urban planning initiatives aimed at creating an inclusive built environment and promoting active mobility in the city."		
Online Questionnaire	• Gathering specific insights on needs and challenges faced by users with disabilities, reduced mobility, and vulnerable groups when accessing the built environment and active mobility solutions at the EU and city level. • Identify best practices.	Local organisation	Disability February 2025

3.4.3 Define

3.4.3.1 User Needs & Barriers - Built Environment

The **data collection activities** provided a range of insights into specific accessibility challenges and needs at the Casa Girasole, referring to the built environment and the mobility solutions. The pilot collected qualitative-quantitative data in order to deepen the needs of its beneficiaries, explore the challenges of vulnerable groups, understand the site-specific experiences of the pilot users and identify possible development paths to improve the accessibility of the building and its surroundings. The tools used for the data collection were **online questionnaires** customised for each one of the stakeholder categories involved, from the **workers of Casa Girasole (facility manager and caregivers), to a local Disability organisation and a reference person of the Municipality**. The data collected through the involvement of these stakeholders was also integrated and expanded thanks to interviews with the responsible person of the pilot (AEM) and thanks to an in-depth desk research on the context and its characteristics.

The **data analysis** was then conducted in order to find meaningful insights able to inform and orient the following user-centered design phases of the AccesS project (Develop, Prototype & Test, Deliver). This data analysis is also structured according to the European standard on accessibility and usability of the built environment and aims to cross-inform the **common European criteria on accessibility of the built environment, identified in the EN 17210:2021**: Wayfinding, Horizontal circulation, Vertical Circulation, Specific Areas, Sanitary accommodation, Engagement, Evacuation and emergency exits, and Environmental Conditions.

Casa Girasole stands as an advanced case study in accessibility, having proactively addressed and met a significant part of its residents' needs through thoughtfully designed spaces and comprehensive facilities. Furthermore, the Municipality demonstrates a strong commitment to maintaining and enhancing the quality of this environment, ensuring that tools and facilities remain cutting-edge and well maintained. Some elements for further improvement of the accessibility level are identified below:

Wayfinding

- The main users of the building are elderly people who are no longer able to live independently at home and who require care and assistance from professionally qualified staff. In this context, clear and diverse navigation supports are crucial to enhance the mobility within the facility for people with disabilities (visual, hearing and/or mobility) and reduce reliance on caregivers' assistance. Improvements in the **internal wayfinding**, can represent an opportunity for both the residents and the workers: for example, the use of tactile maps, visual cues, hearing aids and the integration with digital tools (e.g., apps, electronic signage) can represent an opportunity to further increase the use of spaces both for the residents and the workers.

Horizontal circulation

- Both the Facility Manager and the reference person from the Municipality explained that the horizontal circulation in the internal spaces is good, guaranteed by the availability of **mobility aids provided by the care facility** for its guests (e.g., wheelchairs, walkers, canes, mobility scooters), and it is also facilitated by **internal signs** for the identification of the different areas.
- In order to continuously and effectively ensure the horizontal movement of residents, according to the Facility manager and the workers of the facility, the **main challenge is the maintenance of the building and the devices** used by both the residents and the workers.
- For the purpose of enhancing an independent mobility of people with reduced mobility, the local Advocacy Group provides some general suggestions, for example the installation of **automated accessibility solutions** such as automated door opening through the use of phones. These suggestions also do not forget to consider the **physical accessibility of common areas** (such as the kitchen, outdoor spaces) for wheelchair users.

Vertical Circulation

- Both the Facility manager and the workers of Casa Girasole indicated that Vertical Circulation is guaranteed through diverse features available in physical internal spaces: **two lifts and stairs with handrails**. In the outdoor area, access to the building is facilitated by **a dedicated ramp, located in the car park behind the facility**.
- No issues or challenges were collected in terms of Vertical Circulation.

Specific Areas

- The initial context analysis, carried out in collaboration with the pilot leader (AEM), revealed the challenge related to the current **lack of a charging station in the neighbourhood** for any type of group with disabilities or specific needs.
- Implementing a charging area for electric vehicles in the parking adjacent to Casa Girasole represents an opportunity to not only enhance the immediate facility outdoor area, but also significantly **improve the overall accessibility and sustainability of the neighbourhood** of Via Motta. This solution, designed with accessibility as a core principle, offers a replicable model for deployment across other sites within the municipality, facilitating the systematic expansion of accessible e-mobility solutions and thus contributing to a more inclusive and sustainable urban environment, in line with the Municipality's commitment to sustainable energy transition.

Sanitary accommodation

- The data collected from the workers of Casa Girasole highlight an **excellent level of comfort and accessibility** of the Restrooms and Air quality of the facility.

Engagement (User interface, controls and switches)

- No issues or challenges were collected.
- Some general suggestions were, nevertheless, collected from the **disability organisation** to improve the overall user experience within a physical building. A clear emphasis emerged on the strategic integration of technology to augment the accessible experience within the facility, addressing potential physical barriers and empowering individuals with reduced mobility to independently navigate the building, reducing reliance on external assistance. Specifically, the organization explained the relevance of the following technological solutions:
 - **Remote Control Systems:** The integration of remote-control technologies for key infrastructure elements, such as door actuation and lifts' remote-control system allowing for pre-emptive call and floor selection, thus streamlining vertical transit.
 - **Accessible Elevator Controls:** In addition to remote lift control, accessible elevator control panels could improve usability for blind or individuals with low vision or reduced mobility.
 - **Digital Wayfinding and Maps:** The provision of comprehensive digital building maps could be crucial to cater to diverse sensory and cognitive needs.

Evacuation and emergency exits

- The Facility Manager informs that the security of the facility's residents is guaranteed by the presence of an **alarm and direct communication channels** in each room of the building.
- No issues or challenges were collected around the topic of Fire Safety for All.

Environmental Conditions

- No critical issues or challenges were found in this pilot; however, the facility is committed to further improve comfort and quality of living in the accommodation, equipping the building with additional IoT solutions in selected areas of the building such as battery-powered sensors to **monitor humidity and temperature and visualize the values on a display**.
- When it comes to further improvements in internal environmental conditions, workers of Casa Girasole highlight the importance of **lighting** in key areas of the building, suggesting for example the installation of LED lights with motion sensors in corridors and common areas.

The following table summarises the key findings regarding accessibility for Casa Girasole derived from engagement activities, along with related user needs and insights to inform subsequent phases of the user-centered design approach.

Table 20. User needs and challenges at Casa Girasole

User needs and challenges at Casa Girasole				
Key areas of accessibility	User task	Target group	User challenges	User needs/ insights
Wayfinding	Finding the different areas of the building	Residents		Improvements in the internal wayfinding, through the use of signage that works for different senses (sight, hearing, touch etc.) and is thus accessible to people with different disabilities
		Users with disabilities or reduced mobility		
		Casa Girasole Facility manager and workers	No issues or challenges were collected in terms of Wayfinding	
Horizontal circulation: entrances, doors, windows, patios, terraces, surface finishes and materials	Entering and Moving inside the building	Residents	Autonomous mobility	The availability and proper functioning of the mobility aids is crucial to independent movement in the building
		Visitors with disabilities or reduced mobility		Integration of technology for automated accessibility solutions can be explored (e.g., automated door opening)
		Casa Girasole Facility manager and workers	Maintenance of the building and the devices	The main challenge is the maintenance of the building and the devices used by both the residents and the workers

Vertical circulation: ramps, stairs, handrails, lifts, escalators	Moving inside the building	Residents, Users with disabilities or reduced mobility, Casa Girasole Facility manager and workers	No issues or challenges were collected in terms of Vertical Circulation.	
Specific areas, equipment and provisions: service counters, seating, waiting & storage areas	Parking area outside the building	Residents, Users with disabilities or reduced mobility	Lack of charging stations in the neighbourhood for any type of disability or specific needs	Installing charging station, designed with accessibility as a core principle, in the parking adjacent to Casa Girasole represents an opportunity for both visitors and workers
		Casa Girasole Facility manager and workers		
Sanitary accommodation	Restrooms	Residents, Users with disabilities or reduced mobility, Casa Girasole Facility manager and workers	Excellent level of comfort and accessibility of the Restrooms	
Engagement-User interface,	Overall user experience within a	Residents	Integration of technology to augment the	Remote Control Systems, such as door actuation and lifts’ remote-control system;

controls and switches	physical building	Users with disabilities or reduced mobility	overall accessible experience	Accessible elevator control panels (incorporating tactile markings, auditory feedback, and adjustable display options); Comprehensive digital building maps and wayfinding tools, such as audio descriptions and customizable routes.
Evacuation and emergency exits	Emergency exits	Residents, Users with disabilities or reduced mobility, Casa Girasole Facility manager and workers	No issues or challenges were collected in terms of Evacuation and Emergency exits.	
	Evacuation			
Environmental conditions in buildings: lighting, acoustics, indoor climate	Lighting	Residents, Users with disabilities or reduced mobility	Appropriate lighting	Integration of technology for automated accessibility solutions can be explored (e.g., LED lights with motion sensors in corridors and common areas)
	Air quality	Residents, Users with disabilities or reduced mobility, Casa Girasole Facility manager and workers	The current indoor environmental conditions of the building are good. Further improvement of energy efficiency and indoor air quality and comfort can be made by installing sensors to monitor humidity and temperature and display the values on a display.	

3.4.3.2 User Needs & Barriers - Active Mobility Solutions

This Section consolidates the findings from the surveys and interviews that took place with various stakeholders in Massagno as part of the AccesS project, with a focus on defining the needs and the barriers regarding the state of active mobility solutions at the area of Casa Girasole. Data were collected from municipal officials, carers, advocacy groups, and staff at Casa Girasole. The aim was to familiarize oneself with current mobility issues and to identify opportunities to enhance inclusivity and accessibility in the built environment and in transport systems.

Caregivers at Casa Girasole reported that residents make use of assistive aids like mobility, sensory, and communication aids to a great extent and noted the presence of physical accessibility facilities in the building such as ramps and elevators. While most reported that the existing tools were adequate, challenges related to maintenance and clarity in wayfinding still remain for the residents. Active mobility solutions are underused, largely due to the non-autonomous status of many residents, who rely on dedicated transportation. Thus, there is limited relevance or interest in micromobility due to the lack of residents' needs for such. General key challenges related to mobility that were identified include lack of clear signage, insufficient lighting in common areas, and limited relevance or interest in micromobility due to residents' needs.

The **Municipality of Massagno** formulates its accessibility strategies in accordance with the Federal Act on the Elimination of Discrimination against People with Disabilities and SIA500 standards. Active mobility is facilitated through infrastructure projects and services such as subsidized public transport subscriptions. In regard to mobility, the municipality is also investing in urban public transport revitalization and electrification. The key actions and proposals towards mobility are a dedicated bike-sharing space, proposed walking routes between schools and residential neighbourhoods, and multifunctional public spaces in development. The main barriers are geographic constraints due to hilly terrain and challenges in adapting solutions to varied types of disabilities.

A key challenge in terms of environmental conditions, as indicated by both the Municipality and the Facility Manager, lies in the **area's geographical features**. Specifically, the hilly terrain of the city presents significant obstacles to providing active mobility services for individuals with disabilities or reduced mobility. Additionally, the geographical layout makes it challenging for people with reduced mobility to access points of interest in the area.

Advocacy Groups referred to continued architectural and navigational obstacles in the built environment, and geographic constraints of hilly terrain. They emphasized the importance of the use of digital tools, such as apps for navigation and easy-language content. Accessible micromobility was, in their view, still underdeveloped, but with potential in its penetration when designed to be inclusive. Most critical requirements and recommendations are universal city accessibility maps, greater support staff availability or support initiated by an app, and user-friendly, secure, inexpensive micromobility vehicles. Most critical concerns are safety problems with micromobility, unfamiliarity to use, and affordability of products available now.

Casa Girasole Facility Manager testified that the structure is equipped with access features and technology. The main challenge is maintaining devices and the physical environment constantly. Micromobility is not used by residents due to the fact that it requires constant assistance. Transport

arrangements involve the use of special vehicles for resident mobility, and public transport is accessible and funded by the municipality. The Facility Manager especially reports that the facility works hard in order to make the residents actively participate in city-wide initiatives. The facility addresses this need by providing two vehicles with drivers, enabling residents to access nearby locations through specialized transport tailored for individuals with disabilities.

The following development areas **in terms of active mobility solutions** are crucial for **enabling access to all for the Casa Girasole**.

1. Inclusive Pedestrian Infrastructure and Spatial Continuity

Hilly landscape presents inherent geographical impediments to walking and makes infrastructure improvement more difficult. Architectural and way-finding obstacles, including confusing signage and inadequate lighting in shared or outdoor spaces, were also noted by stakeholders. Improved maintenance of paths and access features like ramps and tactile surfaces continues to be a requirement. Recommended municipal initiatives involve improving pedestrian connectivity through enhanced safer walking routes between residential areas and schools.

2. Inclusive Micromobility Design and Integration

Micromobility is not ideally utilized in Casa Girasole currently because of the non-autonomous nature of the majority of residents and dependence on assisted transportation. Stakeholder advocacy organizations pointed out scope for inclusive micromobility if designed to be safe, easy to use, and accessible. The mentioned barriers were unawareness, unavailability of adapted vehicles, and unaffordability, which restrict the feasibility of current micromobility services.

3. Access to Public Transport

There is subsidized and public transportation by the Municipality of Massagno that offers an essential mobility connection for inhabitants. There are Casa Girasole resident-specific vehicles that reduce the need for conventional transit for numerous individuals. While formally available, individuals continue to encounter first- and last-mile access obstacles because of environmental conditions. There are urban public transportation rejuvenation and electrification investments that have the potential to enhance accessibility system-wide.

4. Digital Inclusion and Mobility Platforms

Advocacy organizations suggest utilizing navigation applications and simple-to-use digital tools to facilitate independent travel for individuals with sensory or cognitive disabilities. The requirement for real-time support, i.e., app-initiated assistance from care staff or volunteers, was also presented as a prospective strategy. Universal access mapping and simple interfaces to assist users in navigating both indoors and outdoors is of interest. Nevertheless, the use of these tools remains low, pointing to an awareness creation necessity and digital literacy for caregivers and residents alike.

5. Accessible Active Mobility Infrastructure

Physical access facilities and assistive technologies (i.e., ramps, elevators) are already in place at Casa Girasole but are problematic in terms of maintenance. Although mobility aids are intensively used inside the building, with few links to outdoor environments and wider infrastructures, the municipality is investing in multifunctional public spaces that have the potential to facilitate inclusive mobility but whose design needs to be sensitive to universal accessibility ideals. Further urban initiatives—like bike-share and better pedestrian paths—must make sure they are inclusive of disability requirements.

Table 21. User needs and challenges for mobility at the Casa Girasole

User challenges and needs for mobility at Casa Girasole				
Key areas of mobility solutions	User task	Target group	User challenges	User needs/ insights
Inclusive Pedestrian Infrastructure and Spatial Continuity	Reach facility entrance or nearby services using pedestrian paths	Residents, caregivers, visitors	Geographic constraints (hilly terrain), unclear signage, insufficient lighting	Safe, continuous pathways; improved lighting; tactile signage; maintenance of accessible routes
Inclusive Micromobility Design and Integration	Use scooters or adapted bikes for local movement	Residents with mild disabilities, caregivers	Low use due to dependence, lack of adapted vehicles, unfamiliarity, safety concerns	Adaptive vehicles, simplified controls, secure docking, future integration with mobility training
Access to Public Transport	Use bus or special transport for daily activities	Residents (with assistance), caregivers	Limited autonomy, dependency on special transport, geographic distance to stops	Continued subsidized transport; better pedestrian links to transit; assistive support for access
Digital Inclusion and Mobility Platforms	Utilize digital tools for travel planning or requesting support	Caregivers, residents with cognitive or sensory disabilities	Low awareness, limited digital literacy, no current systems in use	Universal access maps; real-time assistance features; easy-to-use interfaces; digital literacy support
Accessible Active Mobility Infrastructure	Move between indoor and outdoor spaces or public areas	Residents, staff, visitors	Indoor mobility tools not linked to external routes; unclear integration with public realm	Inclusive public realm upgrades; maintenance of access features; integration of building and street-level pathways

3.4.4 AccessS Roadmap

The subsequent table related to the **Casa Girasole demosite** provides a structured roadmap for implementing accessibility features, emphasizing the importance of user feedback and inclusive practices at every stage for built environment and active mobility solutions.

Table 22. AccessS Roadmap for Casa Girasole

DEVELOP (M10 - M18)	
TARGET GROUPS	CONSIDERATIONS (while developing AccessS tools, pay attention to the following points)
Residents (elderly people with reduced mobility, hearing and low vision or blind)	• Clear and diverse navigation supports (for example: the use of tactile maps, visual cues, hearing aids and the integration with digital tools such as apps, electronic signage) to ensure circulation for people with physical disabilities (visual, hearing and/or mobility) and reducing reliance on caregivers' assistance • Improve and facilitate the movement from one space to another in the building, through the installation of automated accessibility solutions, such as automated doors • Appropriate space for wheelchair movements in common areas • Evaluate lighting levels in different interior spaces to maximise visibility (e.g., installation of LED lights with motion sensors in corridors and common areas) • Improve energy efficiency and indoor air quality and comfort through the installation of battery-powered sensors to monitor humidity and temperature and visualize the values on a display • Ensure clear and accessible routes to emergency exits for all mobility levels and instructions include visual alerts.
Technology developers	• While developing new technologies or improving existing ones, take into account that the current main challenge is the maintenance of the building and devices used by both the residents and the workers.

Users (family members and Casa Girasole workers) with disabilities or reduced mobility,	• Install a charging area for electric vehicles, designed with accessibility as a core principle, in the parking adjacent to Casa Girasole for improving accessibility for both visitors and workers
PROTOTYPE & TEST (M13 - M36)	
CONSIDERATIONS (while prototyping & testing, understand feedback from the following end users or actors)	
It is essential to actively engage pilot site leaders and involve all relevant organizations in the testing phase to ensure comprehensive stakeholder participation. It is important to collect feedback from visitors (family members) and workers (caregivers, Facility manager and other employees, also volunteers). Moreover, you may consult the local disability organisation to gather feedback on developed solutions and prototypes. Lastly, the Municipality should always be engaged in the Prototype and Testing phase in order to ensure all solutions are aligned with the care facility requirements and all the accessibility regulations at city level.	
Evaluation activities should systematically collect feedback on the Key Performance Indicators (KPIs) as proposed within the AccesS evaluation framework, to assess the effectiveness and applicability of AccesS tool. Furthermore, the implementation of structured feedback loops will facilitate continuous improvement, enabling iterative refinements based on user insights.	
DELIVER (M19 - M36)	
GENERAL CONSIDERATIONS (while delivering AccesS tools, pay attention to the following points)	
• Provide clear and accessible information on the Casa Girasole website, including videos and screen-reader-friendly content; • Ensure that all digital tools (apps, websites, and multimedia content) are fully accessible and including features such as text-to-speech, high contrast modes, and voice navigation; • Provide clear instructions and tutorials on how to use digital tools, available in multiple languages and formats (text, video, and audio); • Engage internal stakeholders and end users (including people with disabilities) to test, validate, and refine the AccesS tools before full implementation.	

3.4.5 Recommendations for implementation of active mobility solutions beyond AccessS.

A roadmap for the implementation of the active mobility solutions proposed by the AccessS project has been presented in the preceding section. This section outlines the modifications that may occur across three distinct time scales, which are outside the purview of AccessS yet can facilitate the active mobility of Massagno and Casa Girasole. The interventions are categorized into three timeframes: short-term (0-2 years), medium-term (3-5 years), and long-term (6+ years), offering municipalities guidance for implementable changes. The proposed roadmap corresponds with the needs and obstacles identified in the AccessS project, as well as the urban mobility strategies of the city, to promote a more equitable, accessible, and sustainable environment.

Short-Term (0–2 Years): Quick Wins for Immediate Improvement

In the short term, the focus must be on removing fundamental barriers related to mobility and access, especially for users such as elderly residents and reduced mobility persons who frequently move from and to Casa Girasole. Based on the findings from the survey and interview conducted in Task 2.2 of the AccessS project, critical obstacles include lighting conditions, a lack of tactile and visual signage, pedestrian signage, and problematic curb transitions for wheelchair or walking aid users.

To meet these requirements, the municipality must prioritize tactile ground markers and accessible signage around Casa Girasole, preferably utilizing easily comprehensible symbols, multiple languages, and contrasting colour schemes. Enhanced illumination, especially during night time or winter months, can be achieved by installing motion-sensitive LED systems along the access routes to the care facility. The incorporation of curb ramps and the levelling of irregular door thresholds will significantly improve daily accessibility.

To facilitate prompt behavioral adaptation and enhance user confidence, the city could introduce a user-friendly digital mobility information tool. This may be a mobile application or kiosk that delivers real-time public transport information, including accessibility features, electric vehicle charging availability, and micromobility options tailored for caregivers and staff. Massagno's collaboration with Azienda Elettrica Massagno SA (AEM), a leading site in AccessS, will be pivotal in providing efficient energy infrastructure and facilitating accessible installations of EV chargers.

Medium-Term (3–5 Years): Infrastructure Expansion and Service Design

As Massagno is considering its forward-thinking active mobility strategy, the mid-term focus should be to expand safe, inclusive, and multimodal infrastructure around Casa Girasole. After the city's mobility objectives under the updated Piano Energetico Comunale (PEC) 2020–2030 and its involvement in the "Città dell'energia" initiative, Massagno has a focus on promoting walking, cycling, and low-emission transport system usage through investing further in EV charging, pedestrian facilities, and shared mobility (Massagno, PEC 2020–2030). Infrastructure upgrades should include the installation of weather-sheltered and accessible transit stops near Casa Girasole, along with shaded seating and rest

areas along pedestrian routes. Paving pedestrian routes with anti-slip surfacing and providing shaded green areas for physical respite were two of the most common requirements cited by older users and carers in the AccessS survey campaign.

Docking points for accessible micromobility—e.g., backrest scooters or cargo e-bikes—need to be made available. Not only do they help caregivers and personnel, but they enhance options for visiting relatives to the facility. Such concepts are under the city's existing pilot experiments under its investment plan in electromobility that includes adaptive micromobility and e-bike trials around residential facilities (Massagno Mobility Strategy 2023–2026, internal presentation).

Furthermore, the AccessS methodology emphatically advocates for the implementation of co-design practices. Mid-term implementation must incorporate design thinking workshops with caregivers, elderly users, and representatives from disability organizations to develop services that address genuine needs and foster collective ownership of public spaces.

Long-Term (6+ Years): Integration and Transformation

The long-term vision should pursue the systemic integration of active mobility within Massagno's urban and digital planning frameworks. The project entails the development of a Mobility-as-a-Service (MaaS) platform that offers user-centric trip planning capabilities across public transportation, pedestrian pathways, cycling routes, and micromobility systems. The platform must enable intelligent routing for users with varying requirements, including wheelchair-accessible pathways, conventional resting areas, and routes for individuals with visual or cognitive disabilities. These features conform to the guidelines established in EN 17210:2021 and national accessibility legislation in Switzerland, which Massagno is already complying with through federal regulations (SIA 500 / SN 640 075 standards).

Furthermore, Casa Girasole serves as an experimental venue demonstrating how the integration of technology and inclusive design enhances mobility and autonomy. The municipality must institutionalize insights from the pilot by integrating them into local building and zoning regulations. This aligns with the Swiss Federal Roads Office (FEDRO) and the Electromobility Roadmap 2025's directives to document and test inclusive transport models for nationwide implementation (Electromobility Roadmap 2025, FEDRO).

Finally, urban sensor networks and feedback mechanisms can make infrastructure "hear" the user. By integrating IoT with open-data systems in new infrastructure, the city can monitor usage data, accessibility feedback, and environmental parameters in real time, enabling agile, responsive city planning (Swiss Digital Strategy, 2023 update).

3.5 Palazzo di Città, Bari, Italy

Palazzo di Città functions as the central administrative hub of the municipal government, offering a range of essential public services, for instance it provides information, guidance, and assistance to citizens regarding municipal procedures, manages the issuance of official documents, such as residence and family status certificates, registration of births, marriages, and deaths, etc.

Palazzo di Città, is situated in the city's historic core and has undergone multiple transformations since its establishment in the mid-19th century. The **building is architecturally significant**, that frames historic **Teatro Piccinni**. Originally developed in response to growing municipal needs, its construction began in the 1860s, with subsequent expansions in the early 20th century to accommodate government offices. The **building houses notable artistic and historical elements**, including frescoes by Nicola Colonna, intricate woodwork, and sculptures, which highlight Bari's artistic heritage. The Mayor's Office and the Giuseppe Massari Room contain valuable artifacts and artwork reflecting the city's political and cultural evolution⁶².



Figure 9. Palazzo di Città and Teatro Piccinni

Source: [5]

3.5.1 Design Challenge

Within the AccessS project, Municipality of Bari seeks to identify and address the key requirements for transforming Palazzo di Città and its surrounding public spaces into fully inclusive and universally accessible environments. At present, certain common areas of the building, including the public relations office on the ground floor, the council rooms, and various offices are accessible via elevators and meet basic accessibility requirements. However, significant interventions are still needed to achieve comprehensive accessibility across the entire built environment.

⁶² <https://www.comune.bari.it/palazzo-di-citta>

The municipality has acknowledged that individuals with disabilities face significant barriers, particularly due to the limited online availability of essential documentation and difficulties in accessing relevant communications and events. As a result, enhancing digital accessibility, with a focus on ensuring that municipal websites and digital services are fully accessible, has become a key priority.

The **design challenge** for the demo site is as follows:

'How can we transform or reimagine the Palazzo di Città and its surrounding spaces into an inclusive, accessible, and user-friendly environment that caters to the needs of individuals with disabilities and other vulnerable groups, ensuring equitable access to information, public services, participation, and an enhanced user experience?'

3.5.2 Discover

3.5.2.1 Context Analysis

City-level perspective

Bari is a historic port city **situated in southern Italy on the Adriatic Sea** and is the capital of the Puglia region. It is the second most important economic centre after Naples of mainland Southern Italy, with an economy centered on its port, university, and service industries. As of 2024, the population of the city of Bari is 316,212 with an area of 117.4 km².⁶³ The city faces several demographic, socio-economic and economic challenges impacting urban development. With an **aging population** constituting approximately 25.8%⁶⁴ of residents aged 65 and over, Bari needs to adapt its infrastructure, public spaces, and social services to meet the needs of older adults. Additionally, the **number of immigrants continues to grow**, highlighting the importance of ensuring inclusive urban policies that support integration and equitable participation for all community members, regardless of their background. Regarding citizenship, 14,805 residents held foreign citizenship as of 2024, accounting for about 4.7% of the total population.⁶⁵ The demographic transition highlights the **necessity of ensuring that public services are accessible to a growing and increasingly diverse population**. The municipality of Bari highlights that it **requires adequately trained and well-structured municipal offices** capable of addressing the evolving needs of the community.

Moreover, a primary concern is the **high unemployment rate, notably among youth**. The city faces challenges with persistent urban inequalities and economic disparities, reflected in an unemployment rate of approximately 5.7% as of 2024⁶⁶. Additionally, many neighbourhoods suffer from inadequate spatial quality, characterized by deteriorating infrastructure and limited access to essential services,

⁶³ https://www.citypopulation.de/en/italy/puglia/bari/072006_bari/

⁶⁴ https://www.citypopulation.de/en/italy/puglia/bari/072006_bari/

⁶⁵ https://www.citypopulation.de/en/italy/puglia/bari/072006_bari/

⁶⁶ <http://dati.istat.it/Index.aspx?QueryId=25524&lang=en>

which hampers residents' quality of life. Furthermore, there is a pressing **need to strengthen social cohesion within communities** to ensure that all citizens can actively participate in the city's development and benefit from its growth [\[6\]](#).

Like many historic cities, Bari faces significant challenges in making its built environment fully accessible. For instance, the old town's narrow streets, high curbs, and centuries-old buildings often lack ramps or elevators, impeding wheelchair users and those with reduced mobility.

Policy perspective

Bari's **Smart City Vision 2050** aims to become a sustainable, inclusive, and accessible city for everyone, a welcoming urban environment offering numerous opportunities to study, work, and innovate. To enhance accessibility, the Municipality of Bari has initiated various policies, led by the welfare department. Each year, the municipality formulates and updates accessibility objectives that address both the physical and digital accessibility of public services and infrastructure. These policies aim to remove barriers to inclusion and ensure that urban spaces and digital platforms are accessible to all citizens. For instance, the Municipality of Bari has actively pursued the **Plan for the Elimination of Architectural Barriers (PEBA)**, implementing approximately 40 interventions across the city to facilitate the use of public spaces for individuals with motor or sensory disabilities. These efforts aim to create a more inclusive urban environment by ensuring that public spaces and buildings are fully accessible.

Furthermore, Bari's policy approach incorporates national guidelines **under Italy's National Recovery and Resilience Plan (PNRR), specifically within Mission 5** where the municipality aims to actively promote autonomy and social integration for individuals with disabilities by developing URBAN spaces and community facilities tailored to their needs. By the end of 2025, Bari aims to significantly advance these objectives, ensuring tangible improvements in daily autonomy for individuals with disabilities [\[7\]](#).

When it comes to urban mobility, Bari's mobility infrastructure is hindered by a **lack of designated crossings** and **limited public transport options**, making commuting inefficient for residents. The absence of proper pedestrian crossings poses a significant road safety risk, particularly for vulnerable populations such as cyclists and individuals with reduced mobility. Additionally, the city's **lack of real-time transport data** and the **absence of an integrated ticketing** system complicate multimodal travel and public transport efficiency.

To address these issues, Bari has approved an **Urban Parking Plan⁶⁷** and a two-year **Parking Implementation Plan (2025-2027)** to improve traffic management and implement regulated parking solutions. The city is also acquiring 135 new electric buses by 2026, with an initial order of 36 buses from manufacturers Iveco and Industria Italiana Autobus. This initiative is financed through EU funds from Italy's National Recovery and Resilience Plan (PNRR) and aims to modernize Bari's public

⁶⁷ mic-hub.com

transport system⁶⁸. Bari's **Smart City Action Plan** and the **PEBA initiative** focus on eliminating architectural barriers, expanding the cycling network, and improving pedestrian accessibility⁶⁹. These initiatives align with the **Bari Smart City Initiative (2010)** aiming to enhance sustainable development, improve residents' quality of life, and make the city more secure and sustainable, by joining the European Smart Cities project⁷⁰.

Demosite-level information

The pilot site, Palazzo di Città, has undergone significant physical enhancements in alignment with the Plan for the Elimination of Architectural Barriers (PEBA). As a result, major physical obstacles have been addressed, and gradients have been suitably adjusted to facilitate building access. The **building now features two elevators and ramps** to ensure access for individuals with physical disabilities. Despite these advancements, several areas remain inadequately addressed; for example, specific pathways and guidance systems for blind and low vision individuals have not yet been implemented. Moreover, the Municipality of Bari recognizes the **importance of enhancing digital accessibility**, particularly through structural improvements to its official website and digital services. There is a need to upgrade the municipality's website to meet established standards for digital accessibility, facilitating equitable and effortless access to municipal services and information for individuals with disabilities and other vulnerable populations.

User characteristics

The Palazzo di Città serves a diverse range of users, including **municipal employees, local citizens** accessing administrative services and visitors engaging in various events and public interactions. The Municipality of Bari employs approximately 1,800 staff members, who are distributed across multiple municipal offices located throughout the city. Of these, **122 employees have their primary workplace at the Palazzo di Città**. Considering the distribution of employees and the building's administrative functions, the municipality estimates that **approximately 500 individuals, including municipal staff, citizens, and visitors, access the central office on a daily basis**.

Among these users, special attention is given to **employees with reduced mobility**. To accommodate these employees effectively, their workstations are strategically **located on the ground floor** of the Palazzo di Città, an area specifically designed to be obstacle-free and accessible. This arrangement aims to facilitate their autonomy, ensuring smooth navigation. However, the broader goal remains to extend this level of accessibility throughout the entire building, creating a fully inclusive environment for all users, including those with visual or other sensory disabilities.

⁶⁸ <https://www.electrive.com/2023/10/25/italian-city-of-bari-wants-to-procure-135-e-buses-in-three-years>

⁶⁹ <https://www.polisnetwork.eu/article/funding-sustainable-mobility>

⁷⁰ https://www.kireti.it/wp-content/uploads/2020/04/20200402_CH_Bari_ENG.pdf

3.5.2.2 Involved Stakeholders & Data Collection

The following tables provide an overview of key internal and external stakeholders engaged and data collection tools implemented respectively.

Table 23. Internal and external stakeholders involved Palazzo di Città

Internal Stakeholders: Actors who are directly involved in a project and have direct influence on decision-making within project activities.		
Name	Type	Role
Municipality of Bari	Governmental actor	It is the administrative body governing Bari and within the project is responsible for demo site activities and set-up.
Energy@Work	SME	E@W is an innovative Italian SME, active in ICT and AI based technologies development for smart manufacturing and energy efficiency in buildings and energy grids in Bari, Italy.
External Stakeholders: Actors or groups that are not part of the project and do not have direct decision-making power within the project but are affected by, can affect or have an interest in its outcomes.		
Name	Type	Role
Visitors	User	Local citizens visiting Palazzo di Città for different municipal services.
Employees	User	Employees working in Palazzo di Città.

Table 24. Data collection activities for Palazzo di Città

Tool	Objective	Target group	When
Questionnaire	• Understanding the context: Identify the site-specific requirements, priorities and expectations related to the built environment and in the context of active mobility solutions. Existing local policies, regulations/ standards or programs for ensuring accessibility for individuals with disabilities, with reduced mobility and vulnerable groups. Existing infrastructure and kind of accessibility features are in place. Type of active mobility solutions available to the site. • Site-specific perspectives and preliminary insights on user needs, preferences for the built environment and challenges (physical, socio-economic, and policy-related barriers) faced by individuals with disabilities, reduced mobility and vulnerable groups in relation to active mobility solutions. • Identify relevant actors and users that could be engaged in the data collection.	Demo site leaders - Municipality of Bari, E@W	October 2024
Online survey	- Understanding the site-specific user experiences, needs, preferences, expectations, and existing barriers regarding accessibility, safety, comfort, and convenience for the built environment. - Understanding the needs and barriers related to active mobility solutions.	Employees working in the building (number of responses: 33)	February - March 2025
Online survey	• Understanding the site-specific user experiences, needs, preferences, expectations, and existing barriers regarding accessibility, safety, comfort, and convenience for the built environment. • Understanding the needs and barriers related to active mobility solutions.	Visitors to the building (number of responses: 11)	March 2025

Online survey	• Specific insights on needs and challenges faced by users with disabilities, reduced mobility, and vulnerable groups when accessing the built environment and active mobility solutions at the EU and city level. • Understand site-specific requirements/needs and challenges. • Identify best practices	Disability organisations (respondent was part of the mailing list of Municipality of Bari)	March 2025
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3.5.3 Define

The results of the data collection activities are described below. These activities were guided by the following generative questions, developed during the **Define phase** of the project, to explore key aspects of accessibility at the Palazzo di Città building :

- *How might we transform the physical infrastructure of the Palazzo di Città to enable seamless, barriers free access and independent movement **for individuals with reduced mobility, using mobility aids** or those with limited stamina?*
- *How might we improve the design, comfort, and accessibility of workspaces and shared areas within the Palazzo di Città to ensure that all **employees**, including those with specific physical needs, can work in safe, supportive, and inclusive environments?*
- *How might we enhance spatial orientation and information access within the Palazzo di Città for individuals with **low vision or blind or other sensory disabilities**, using tactile, auditory, and digital tools that support autonomous navigation.*
- *How might we improve pedestrian access and micromobility infrastructure in the historic city center to ensure safe, independent movement for users with mobility needs?*

3.5.3.1 User Needs & Barriers - Built Environment

The questionnaire to the demonstration site leader, along with an online survey conducted with a disability organisation, offered contextual information that supports the introductory section (3.5.2.1) of the chapter on context analysis. Specifically, the **online survey targeting end users of the building**, with a total of **44 respondents**, provided main insight into the accessibility related needs and challenges observed or experienced by users.

Of the 44 respondents, **33 (75%) were employees working within the building and 11 (23%) were visitors**. Among the employees, two individuals reported living with a disability. One identified as a person with visual disability, while the other indicated a combination of physical and intellectual disabilities. Among the 11 visitors, six were male and five were female. Most visitors, specifically 8 (73%) respondents, were between the ages of 30 and 49, suggesting that the sample largely consisted of middle-aged adults and one visitor reported having a visual disability. In terms of visit frequency, 5 (45%) visitors stated that they visit the building weekly, another 5 (45%) visitors indicated they visit occasionally, and one respondent reported visiting monthly, indicating that most visitors surveyed have recurrent exposure to the building and are likely familiar with its layout and facilities.

Among the employees, 15 (45%) respondents considered the building to offer an adequate level of inclusiveness for people with disabilities, suggesting the presence of some accessibility measures that partially address users' needs. In contrast, **14 (42%) employees perceived the building's inclusiveness as limited**, indicating that existing provisions are insufficient to ensure equitable access. Only 3 (9%) employees regarded the building as fully inclusive while one employee explicitly stated that the building was not inclusive at all for people with disabilities, pointing to the persistence of significant barriers. Employees identified several interconnected barriers that limit the building's accessibility and inclusiveness for individuals with disabilities. **A lack of tactile maps and clear signage was frequently**

noted, making independent navigation difficult, particularly for people with visual or cognitive disabilities or visitors unfamiliar with the space. The **absence of rest areas, combined with narrow corridors and inaccessible internal passageways**, further hindered movement, especially for those with reduced mobility. Difficulties in accessing the building itself, particularly due to the **absence of ramps, elevators, and continuous circulation paths**, were seen as a major physical barrier. These structural limitations were accompanied by **communication-related issues**, such as unclear information on the services offered, **limited staff assistance** for individuals with disabilities and **inaccessible digital services**, as well as the discomfort caused by crowded or noisy environments. Additional issues included **poor lighting**, insufficient cleanliness, and unsafe internal passageways, which were described as narrow, dimly lit, and difficult to navigate.

When considering priorities for improving accessibility, employees emphasised the **need for structural modifications** to enable step-free movement throughout the building. There was strong support for improved wayfinding through updated signage and tactile tools; renovation of restrooms to ensure accessibility and hygiene; and improved lighting and environmental maintenance, especially in shared areas, were also highlighted. Many employees stressed the importance of training staff to assist individuals with disabilities as a routine part of service delivery. While some employees considered current conditions acceptable, others suggested that a full reassessment of the building for inclusive use is necessary before undertaking further improvements.

Visitor feedback identified navigation as a central area of concern within the building. Several respondents reported difficulty understanding the layout and emphasised the lack of clear signage, indicating that wayfinding provisions are inadequate, particularly for individuals with visual, cognitive, or intellectual disabilities. In addition, visitors reported physical barriers such as **narrow or obstructed pathways, difficulties using stairs, and inaccessible bathrooms**. Environmental discomfort was also noted, with poor air quality in certain areas. Visitors also reported that the information desk and service counters were not accessible. These responses suggest that the physical environment and the organisation of services within the building requires some attention to ensure a more inclusive and user-friendly experience for all visitors, especially those with disabilities.

The feedback provided by the disability organisation offered a strategic perspective on accessibility within the Palazzo di Città. While the building was considered relatively inclusive, the organisation pointed to several structural and systemic barriers that limit full access. These include **narrow internal passages, a lack of sufficient information points, particularly digital ones, and the difficulty in reaching certain offices due to the number of staircases**, which poses challenges even for individuals without disabilities. To address these limitations, the organisation emphasised the importance of guidance provided by designated personnel to support users with varying needs. It also advocated for improving ease of access through measures that are specifically tailored to different types of disabilities. The integration of assistive technologies, such as voice-guided systems and digitally guided pathways, was identified as a key solution for enhancing navigation and user autonomy within public buildings. The organisation also highlighted the potential of artificial intelligence to support inclusive access to information.

The data collection activities provided a range of user perspectives and insights into **specific features in terms of accessibility of Palazzo di Città Bari should cover in the future:**

Wayfinding

- Wayfinding was identified as one of the most significant and consistently reported barriers to accessibility within the building. Among the employees, **17 (52%) respondents rated signage and wayfinding as either not accessible at all or poorly accessible**, indicating widespread dissatisfaction with the building's current wayfinding or orientation systems for visitors. In particular, **22 (67%) employees highlighted the absence of tactile maps as a major obstacle** for individuals with visual or cognitive disabilities. The lack of clear and intuitive spatial guidance was described as limiting users' independence and contributing to confusion, especially for first time visitors unfamiliar with the layout of the building.
- Employees highlighted the need for improved visual and navigational cues, suggesting the introduction of **directional floor markings and maps available in accessible formats such as Braille and large print**. There was a strong emphasis on ensuring that signage should be accessible by all and clearly visible, regularly updated, and strategically positioned throughout the premises of the building. One of the employees specifically noted the **need for clearer signage indicating the locations of offices and rooms**, which would be particularly helpful for first time visitors. Another employee suggested **signage at the main entrance** to support initial orientation upon entry. Additionally, concerns were raised about the absence or outdated nature of corridor maps, which further contributes to the overall lack of navigational support.
- Feedback from visitors reflected similar concerns, 6 visitors (55%) rated signage and wayfinding as not very accessible, confirming that the difficulties identified by employees are experienced by citizens. Overall, there is a need for a comprehensive wayfinding system that supports visitors, and that accounts for diverse sensory and cognitive needs.

Horizontal circulation

- Horizontal circulation within the building was identified as a critical area of concern, particularly in relation to the movement of people with reduced mobility: **14 (42%) employees reported that the absence of ramps, elevators, or adequate circulation paths significantly impedes access for wheelchair users** or those relying on mobility aids. The most frequently mentioned priority for improving accessibility was the installation of ramps to facilitate step free access across all areas of the building. Employees consistently emphasised that the current reliance on staircases creates substantial barriers to independent navigation, making large sections of the building inaccessible to many users with reduced mobilities. One employee highlighted the specific issue of **narrow internal doors and constricted corridors**, drawing attention to the passage that connects the main wing, accessible from Corso Vittorio Emanuele, to the secondary wing on Via Cairoli. This corridor, which passes adjacent to the Council Hall, was described as particularly problematic due to its **low ceilings and steep staircases**, posing risks to people with disabilities and to all users of the building. In response to these constraints, several employees called for substantial structural modifications within the building. These included the removal of architectural barriers, the reconfiguration of internal doors to allow for wider passage, and the redesign of corridors to improve accessibility and safety.
- Among the visitors, while 7 (64%) visitors indicated that they had not encountered difficulties related to physical mobility within the building, 4 (36%) reported experiencing some form of

challenge. Among these, the most commonly cited issue, mentioned by 3 (27%) individuals, was **difficulty in understanding the layout of the building**. Two respondents referred to the lack of clear signage or directional information as a contributing factor, and one person noted the presence of narrow or obstructed internal pathways. Another visitor shared a specific incident in which access to public areas such as city council meetings or institutional appointments was restricted by the presence of local police.

Vertical circulation

- Vertical circulation within the building presents a significant accessibility challenge, primarily due to the **limited number of elevators, with only two serving the entire building**. This constraint was frequently mentioned in the open-text responses, where employees expressed concern about the **inaccessibility of the upper floors**, especially the second and third levels. The limited availability of lifts severely restricts independent access for individuals who use wheelchairs or mobility aids, effectively excluding them from substantial portions of the building and certain public services housed on upper levels. Several employees proposed interim solutions to address these challenges, particularly in areas where the installation of permanent elevators or structural ramps may not be immediately feasible. Suggestions included the **use of mobile or removable ramps, as well as inclined platform lifts** to provide temporary access across level changes. One of the employees specifically recommended **replacing chair lifts with portable ramps**, implying that the current equipment may be either non-functional or unsuited to the needs of users.
- Among the visitors, 2 (18%) respondents reported difficulties using the stairs, and one respondent highlighted **safety concerns specifically related to the staircases leading from the Via Cairoli entrance**. Moreover, the disability organisation also pointed at the inaccessibility of certain offices within the building due to staircases for people with reduced mobility.

Specific areas

- Several specific areas within the building were identified as inadequate in meeting the requirements of accessibility and inclusiveness. A prominent concern, reported by **17 (52%) employees, was the absence of designated seating or resting areas throughout the premises**. This gap particularly affects individuals with reduced mobility, older adults, those experiencing chronic fatigue, and pregnant women. In addition to this, employees noted that certain internal doors are too narrow to accommodate mobility aids, and that corridors, especially **stairwells are poorly lit and insufficiently maintained**. Public-facing service areas, including the **information desk and service counters, were each rated poorly accessible by 10 (30%) employees**. Indicating features such as counter height, physical spacing, and staff preparedness do not adequately support interaction with users who may require accommodations. Such shortcomings can lead to significant barriers for individuals with disabilities seeking assistance or attempting to engage with public services. **Concerns also extended to office environments**, several employees noted that the ergonomic conditions of workspaces are inadequate, with requests for adjustable desks, seating options, and improved ventilation. These deficiencies are particularly challenging for individuals with specific physical needs, as they directly impact productivity, comfort, and well-being during the workday.

Sanitary accommodation

- Bathrooms were identified as **one of the most inaccessible features of the building, with 16 employees (48%) indicating that they were either not accessible or poorly accessible**. In the open-text responses, employees described the restrooms as **physically restrictive, lacking adequate space for movement, and failing to meet basic standards of hygiene** and dignity, further diminishing their usability and comfort for individuals with disabilities or other specific needs. There was a strong consensus among employees that the renovation of sanitary facilities should be treated as a matter of urgency. Respondents emphasised that accessible bathrooms are a fundamental component of an inclusive public space and called for modifications that would bring these areas into alignment with universal design principles, including the installation of wider stalls, support handrails, and accessible fixtures. In addition to physical changes, there was a clear need for improvements in cleanliness, regular maintenance, and overall attention to user dignity.
- The importance of accessible sanitary facilities was also reflected in the feedback from visitors. One visitor reported direct difficulty using the bathrooms, mentioning them as inaccessible.

Engagement

- The **accessibility of service points** and the **quality of public engagement within the building were identified as significant areas of concern**. Among employees, 10 (30%) reported that both the information desk and service counters were either poorly accessible or not accessible at all. These findings suggest that the physical design and layout of these areas do not adequately accommodate individuals with diverse mobility or communication needs. In addition to these structural issues, **9 (27%) employees indicated that the information provided about services was difficult to understand by the visitors** which points to limitations in the clarity, format, or mode of communication used, which may exclude individuals who require simplified language, visual supports, or alternative formats. Support from staff was also perceived as inadequate by several employees. **7 (21%) respondents observed that assistance provided to visitors with disabilities was insufficient**, raising questions about both institutional preparedness and the availability of trained personnel. 2 (6%) employees reported that digital services offered by the building were inaccessible, indicating that challenges in service engagement extend beyond the physical environment to include digital infrastructure. Disability organisation also highlighted the **need for well-trained staff who are capable of providing consistent assistance to individuals with disabilities**. This support was not seen as something to be offered only in exceptional circumstances, but rather as a standard aspect of public service. The introduction of formal training programmes for front-facing personnel was recommended, as was the clear designation of staff members responsible for accessibility related assistance.
- Among visitors, 2 (18%) reported difficulties using the facilities and services within the building, and they specifically highlighted the **lack of clear and accessible information about what services are available and how they can be accessed**. 4 (36%) visitors rated the information desk as not very accessible, while one noted that the service counters were difficult to use. The disability organisation also drew attention to the limited availability of

information points within the building, including digital ones. Disability organisation highlighted the potential of artificial intelligence to enhance guided access, suggesting that technology could play a key role in improving the clarity and accessibility of information provided throughout the building.

Evacuation and emergency exits

- Evacuation procedures and emergency exits were not directly mentioned by employees or visitors in their responses. However, insights related to entry and exit points suggest potential concerns in this area. Among the employees, **3 (9%) reported that entry and exit points were entirely inaccessible, while 12 (36%) rated them as poorly accessible**. Additionally, one visitor noted that the building's entry and exit points were not very accessible. Although these responses did not explicitly refer to evacuation scenarios, they imply that current entry and exit infrastructure may not adequately support rapid or safe movement, particularly for individuals with a range of physical and sensory needs.

Environmental conditions

- Concerns related to environmental conditions within the building were raised frequently, with particular emphasis on lighting, air quality, and overall comfort in shared spaces. **8 (24%) employees reported that lighting in common areas was inadequate**, especially in stairwells and corridors during afternoon and evening hours. Poor illumination in these areas was described as disorienting and potentially unsafe, particularly for individuals with low vision or balance difficulties. One employee specifically recommended the installation of LED ceiling fixtures to improve both lighting quality and energy efficiency.
- Air quality also emerged as a significant concern: **10 (30%) employees described ventilation and temperature control as insufficient in various parts of the building**, including both workspaces and public areas. Several employees highlighted the **need for improved thermal comfort**, noting that corridors and shared offices often lacked effective heating or cooling depending on the season. Employees also highlighted the **need for more ergonomic workstations**, particularly for those with physical needs, and emphasized that working conditions should be adapted to accommodate a wider range of users. Cleanliness also emerged as an issue, particularly in stairwells as one of the respondents noted that these areas were not only poorly lit but also inadequately maintained. Moreover, 2 (6%) employees reported a crowded or noisy environment within the building.
- Among the visitors, one respondent reported that lighting in common areas was not very accessible. In addition, **3 (27%) visitors described poor air quality within the building**, referencing inadequate ventilation, weak airflow, or unpleasant odours. These issues further point to the need for better environmental management to ensure that the building offers a comfortable and safe space for all users.

The following table summarises the key findings regarding accessibility for Palazzo di Città derived from engagement activities, along with related user needs and insights to inform subsequent phases of the user-centered design approach.

Table 25. User needs and challenges at Palazzo di Città

User needs and challenges at Palazzo di Città				
Key areas of accessibility	User task	Target group	User challenges	User needs/ Insights
Wayfinding	Navigating the building independently and locating rooms or services	People with visual, cognitive or intellectual disabilities	Absence of tactile and accessible wayfinding	Braille and large print maps; directional floor markings; digital navigation aids
		First time visitors	Difficulty with layout; lack of initial guidance or clear signage	Signage at entrances; orientation support for first-time users; user-friendly maps with location of different rooms and offices
Horizontal circulation: entrances, doors, windows, patios, terraces, surface finishes and materials	Moving across the same floor; accessing different parts of the building	People with reduced mobility	Lack of ramps; obstructed or unsafe internal pathways; narrow internal corridors and doors	Step-free access; installation of ramps; accessible surface finishes; widened corridors
		Employees	Narrow internal corridors and doors	Reconfiguration of internal doors to allow for wider passage; redesign of corridors; improved internal circulation
		First time visitors	Difficulty understanding layout; lack of directional signage within the building; narrow or obstructed pathways	Clear wayfinding signage within the building, unobstructed access routes

Vertical circulation: ramps, stairs, handrails, lifts, escalators	Accessing upper floors and transitioning between levels	People with reduced mobility	Inaccessibility of upper floors due to limited elevators; reliance on stairs; unsuitable chair lifts	Additional elevators; mobile or inclined ramps; improved vertical access equipment; temporary solutions such as portable ramps or platform lifts
		Visitors	Safety concerns related to specific staircases (e.g., Via Cairoli entrance)	Review or redesign of stair-dependent areas; improved access points for public visitors
Specific areas, equipment and provisions: service counters, seating, waiting & storage areas	Using public services and interacting with staff	People with physical or sensory disabilities	Service counters and information desks are poorly accessible; counter height and layout are unsuitable	Redesign of service counters; accessible counter height and spacing
	Working in office environments	Employees with disabilities	Poor ergonomic conditions; lack of adjustable furniture	Ergonomic workstations; adjustable desks and chairs
	Waiting for the services	People with reduced mobility or chronic fatigue	Lack of designated seating or rest areas	Provision of adequate seating areas throughout the building
Sanitary accommodation	Using the restrooms	Wheelchair users or visitors with disabilities	Bathrooms are physically restrictive; have inadequate space for movement; and poor hygiene	Renovation to meet universal design standards; wider stalls; handrails; accessible fixtures; improved cleanliness and maintenance

Engagement- User interface, controls and switches	Interacting with the visitors	Employees	Lack of trained staff to cater to the needs of visitors with disabilities	Need for well-trained staff who are capable of providing consistent assistance to individuals with disabilities
	Accessing information and services	People with mobility disabilities	Service counters are not physically accessible; layout does not accommodate wheelchair users	Accessible counter height and layout; designated staff support for users with mobility disabilities
		People with visual disabilities	Information is not available in accessible formats; lack of tactile or auditory guidance	Provision of Braille, large print, and audio formats; voice-guided or AI-assisted information systems
		People with cognitive or intellectual disabilities	Service information is unclear or overly complex; lack of simplified communication	Use of easy-to-read language, icons, and visual aids; trained staff to provide step-by-step support
		First time visitors	Difficulty finding services; lack of orientation; Inadequate physical and digital information points	Visible and clear service maps; accessible digital interfaces
Evacuation and emergency exits	Safely exiting the building during emergencies	People with reduced mobility, hearing, low vision or blind or with cognitive or intellectual disabilities	Inaccessible entry and exit points; Lack of visual or auditory cues during emergencies	Barrier-free emergency routes; accessible exits; visual alarms for deaf individuals; auditory signals for blind users; high-contrast, tactile exit signs
		Visitors and employees		

Environmental conditions in buildings: lighting, acoustics, indoor climate	Working or moving through spaces safely and comfortably	People with low vision or blind	Inadequate lighting in stairwells and corridors	Improved lighting in common areas; use of high-contrast, glare-free lighting design; Installation of LED fixtures; enhanced ventilation
		All users	Poor air quality; inadequate lighting in the common areas	
		Employees	Insufficient thermal comfort and ventilation	Improved heating and cooling systems; air quality management

3.5.3.2 User Needs & Barriers - Active Mobility Solutions

Bari, the capital of the Apulia region in southern Italy, is a historic port city undergoing an urban transition toward inclusive and sustainable mobility. The city's compact center, traditional neighbourhoods, and coastal promenades offer a strong foundation for pedestrian activity. However, accessibility remains uneven, especially in terms of infrastructure continuity, transport integration, and accommodation of different disability groups.

The city of Bari was actively involved in the AccesS survey in order to understand active mobility behaviour with a particular focus on the perceptions of visitors, employees, and disability organizations. Analysis of the active mobility solutions in Bari revealed the severe challenges as perceived by different stakeholders involved, such as visitors (11 participants), employees (33 participants), and disability organizations. This chapter combines results obtained through questionnaires administered among these groups of respondents, providing precious information and opportunities for development in terms of active mobility within the Bari metropolitan area.

Visitors primarily use private motorized vehicles, followed by public transport, with limited micromobility usage for reaching the Palazzo di Città. While most perceived the transport options as generally accessible (60%), key barriers were also reported (40%) such as poor integration with public transport (36%) and insufficient inclusive micromobility solutions. Safety concerns (36%) and lack of safe parking for micromobility (45%) were considered as significant barriers as well, although there was strong interest in adopting inclusive micromobility solutions (91%) if available.

- **Transportation Method:** 5 (45%) used private motorized vehicles, 4 (36%) public transport, and 2 (18%) micromobility options.
- **Accessibility Perception:** Most respondents (around 73%) rated transport options as "quite accessible" for various disabilities, while 36% identified poor integration with public transport and limited inclusive micromobility as significant challenges.
- **Concerns with Micromobility:** Major concerns included lack of safe parking (45%) and safety issues (36%). However, 91% showed willingness to use inclusive micromobility if available.

Employees largely rely on public transport for reaching the Palazzo di Città (58%), yet the usage of private vehicles is also high. Accessibility challenges were prominent, particularly regarding limited mobility especially for people with visual disabilities. Integration issues, unsafe crossings, and insufficient docking stations were major concerns as well. Despite safety concerns, a significant proportion of the respondents showed interest in inclusive micromobility options.

- **Transportation Method:** 19 (58%) public transport, 9 (27%) private vehicles, 4 (12%) pedestrian/cycle paths.
- **Accessibility Perception:** "Not very accessible," highlighting limited mobility (58%) and visual disability (45%).
- **Key Challenges:** Integration with public transport (55%), traffic and crossing safety (55%), docking stations for mobility devices (48%).
- **Micromobility Usage:** Interest at 55%, concerns primarily safety (79%) and accessibility (39%).

The sole **disability organization** respondent reported persistent issues with uneven pavements, a lack of audio/visual guidance, insufficient signage, and inaccessible micromobility. Suggestions included enhanced tactile routes, real-time navigation tools, accessible drop-off options, and improved coordination across transport and public facilities. This feedback supports the AccessS project's approach of implementing universal design, inclusive micromobility, and digital navigation aids to create a more equitable urban environment in Bari.

Overall, the following bullets reveal the key mobility issues identified in Bari based on the stakeholder's consultation.

1. Inclusive Pedestrian Infrastructure and Spatial Continuity

Bari's old town, which is pedestrianized, could offer the same active mobility, yet pedestrian infrastructure is unequal and disjointed. Unsafe crossing issues, uneven surfacing, and a lack of tactile or visual signals disproportionately impact individuals with reduced mobility or visual disabilities. Obstruction-free, continuous pedestrian routes, more tactile surfacing, and crossing safety features were prioritized for all user groups to ensure safe, independent mobility for all types of users.

2. Inclusive Micromobility Design and Integration

While micromobility is yet to be exploited, there is an increasing demand for existing micromobility services, with 91% of tourists and 55% of commuters ready to use them if suitable adapted services are offered. Key barriers are the absence of adapted vehicles, few adapted docking stations, low levels of security, and lack of familiarity with existing formats. Stable vehicles, safe parking, and multimodal system integration are what is required for disabled or reduced mobility individuals' micromobility services.

3. Access to Public Transport

Public transportation is used regularly—especially by commuters (58%)—but held back by integration issues, inaccessibility of stops, and discontinuity of service. For passengers with low vision or reduced mobility, obstacles are insufficient audio/visual information and insufficient last-mile connectivity. To provide independent and secure access by public transportation, there needs to be better coordination of transport modes, set-down points near the Palazzo, and universal accessibility criteria in vehicle and stop design.

4. Digital Inclusion and Mobility Platforms

Especially underdeveloped are digital aid tools that offer real-time instruction or on-demand instructions. Partners requested universal design navigation apps that offer haptic maps, voice announcements, and real-time information for public transportation and micromobility travellers. Enabling accessible digital interfaces to assist in trip planning for people who have sensory or cognitive disabilities could greatly enhance confidence and independence in navigating the city environment.

5. Accessible Active Mobility Infrastructure

Infrastructure for All Generally, active mobility infrastructure in Bari is still inadequate for persons with disabilities. Stakeholders suggested ensuring that docking stations are accessible,

offering routes free of obstacles, and providing better interlinkage among mobility services and cultural or administrative attractions such as the Palazzo di Città. Such infrastructural gaps will have to be plugged by applying universal design principles and safety norms to facilitate equal mobility across the city.

Table 26. User needs and challenges for mobility at Palazzo di Città

User challenges and needs for mobility at the Palazzo di Città				
Key areas of mobility solutions	User task	Target group	User challenges	User needs/ insights
Inclusive Pedestrian Infrastructure and Spatial Continuity	Navigate city center and reach the Palazzo on foot	Visitors, residents with reduced mobility, blind or with low vision	Uneven pavements, obstructed paths, insufficient curb ramps and tactile paving	Continuous, well-maintained sidewalks, clear tactile guidance, safe crossings
Inclusive Micromobility Design and Integration	Use shared or adapted micromobility devices to access city services	Tourists, employees, people with disabilities	Lack of adapted vehicles, limited docking stations, safety concerns	Adaptive micromobility, safe parking zones, training programs, closer docking stations
Access to Public Transport	Access and navigate buses or metro lines to reach the Palazzo	Commuters, blind or with low vision mobility-restricted individuals	Low availability of accessible vehicles and stops, lack of audio/visual info	Audio announcements, level boarding, stop improvements, last-mile integration
Digital Inclusion and Mobility Platforms	Plan trips using digital tools and real-time updates	Users with cognitive, sensory, or mobility disabilities	Limited access to real-time data, unfamiliar or inaccessible tools	Accessible mobile platform, voice navigation, tactile support, integration with museum/transport apps

3.5.4 AccessS Roadmap

The subsequent table provides a structured roadmap for implementing accessibility features, emphasizing the importance of user feedback and inclusive practices at every stage for built environment and active mobility solutions.

Table 27. AccessS roadmap for Palazzo di Citta

DEVELOP (M10 - M18)	
TARGET GROUPS	CONSIDERATIONS (while developing AccessS tools, pay attention to the following points)
Wheelchair users or those with reduced mobility	• Ensure seamless, step-free access at all public entry points and within internal circulation routes through the installation of ramps, wide corridors, and automatic doors. • Elevators or inclined platforms must be reliable and accessible across all floors, particularly where municipal services are located. • Need accessible restrooms with sufficient space, support bars, and easy-to-reach fixtures. • Require service counters at accessible heights and layouts designed for wheelchair users. • Improve pedestrian pathways: remove obstacles, level surfaces, add ramps. • Design rest points and shaded seating along routes. • Deploy adapted micromobility vehicles, including seated scooters and low-step e-bikes, with designated docking hubs.
Blind or low vision visitors	• Require tactile and auditory guidance, such as Braille signage, large-print maps, and voice-based navigation tools. • Ensure all public information, online and physical is compatible with screen readers, available in audio formats, and presented with clear visual contrast. • Install non-glare, well-distributed lighting in corridors, stairwells, and service areas to improve visibility and orientation. • Enhance public transport with audio announcements and GPS-integrated navigation apps. • Promote use of accessible tools with real-time wayfinding

People with cognitive or intellectual disability	● Need simplified signage, easy-to-read maps, and visual aids to navigate the building independently. ● Ensure staff are trained to provide simple explanations and visual cues when offering services.
People with sensory disabilities	● Implement visual communication tools including text-based announcements, visual alert systems for emergencies, and service counters equipped with visual display screens. ● Offer public service information in Italian Sign Language (LIS), captioned video, and written instructions.
People with chronic fatigue or visitors	● Require seating and resting areas throughout the building to pause and recover during visits.
Employees	● Need improved ventilation, lighting, and thermal regulation in shared workspaces. ● Ensure ergonomic, inclusive work environments with adjustable desks, appropriate seating, and accessible staff facilities ● Offer training on inclusive service delivery and communication with citizens with diverse needs. ● Equip staff with feedback channels to report accessibility incidents and manage real-time BOMS adjustments.
PROTOTYPE & TEST (M13 - M36)	
CONSIDERATIONS (while prototyping & testing, understand feedback from the following end users or actors)	
It is essential to actively engage pilot site leaders and involve all relevant organizations in the testing phase to ensure comprehensive stakeholder participation. It is important to collect feedback from visitors and employees working in the building. Prototyping and testing should be approached as a co-design process, where user feedback directly informs iterative improvements of AccesS solutions. Note: To engage disability organisations and community-based groups, the Municipality of Bari's mailing list could be leveraged as an outreach channel for consultations and feedback collection.	
Evaluation activities should systematically collect feedback on the Key Performance Indicators (KPIs) as proposed within the AccesS evaluation framework, to assess the effectiveness and applicability of AccesS tool. Furthermore, the implementation of structured feedback loops will facilitate continuous improvement,	

enabling iterative refinements based on user insights.

DELIVER (M19- M36)

GENERAL CONSIDERATIONS

(while delivering AccesS tools, pay attention to the following points)

- The delivery of AccesS tools must be inclusive, transparent, and user-informed.
- Develop comprehensive accessibility guide in multiple formats (print, digital, audio, Braille, and easy-to-read versions) to ensure inclusivity for the tools developed;
- Provide clear and accessible information on the municipality's website, including LIS (Italian Sign Language) videos and screen-reader-friendly content;
- Ensure that all digital tools associated with AccesS (apps, websites, and multimedia content) are fully accessible and including features such as text-to-speech, high contrast modes, and voice navigation;
- Provide clear instructions and tutorials on how to use digital tools, available in multiple languages and formats (text, video, and audio);
- engage internal stakeholders and end users (including people with disabilities) to test, validate, and refine the AccesS tools before full implementation.

3.5.5 Recommendations for implementation of active mobility solutions beyond AccessS

In the previous sections a roadmap for the implementation of the active mobility solutions has been proposed. This Section details the modifications that can take place within AccessS project - short-term proposals (0-2 Years) but also provides guidance to the cities for changes that can be implemented. The scope of the measures is to enhance pedestrian access, public transport use, parking management, and sustainable active mobility options around the chapel, with solutions that also tend to benefit Bari as a whole.

Short-Term (0–2 Years): Quick Wins for Immediate Improvement

The short-term goal is to eliminate significant physical and perceptual barriers preventing full access to Palazzo di Città and the several issues under concern, including narrow or obstructed pavements, lack of separate pedestrian paths, lack of curb ramp integration, and insufficient visibility of public transport information. In particular, respondents with visual and motor disabilities reported that they encounter difficulties when walking due to uneven pavement, parked vehicles, and a lack of adequate tactile paving or distinctive directional signage.

First, the city needs to offer tactile floor signage, Braille maps, and high-contrast directional signage at the main access points, such as principal pedestrian paths and entrances to the Palazzo di Città. Secondly, vertical signage needs to have high-contrast lettering, universally recognized pictograms, and QR codes connecting to real-time, accessible wayfinding tools. The improvements will be directed towards conforming to Bari's compliance with national accessibility standards (DM 236/1989 and UNI 11168:2005) and will be guided by the European universal access design principles set out in EN 17210:2021. To improve inclusive pedestrian accessibility, the suggestion is to create ramp entrances, intersection curb ramps, and modernized crosswalk signals with tactile or audible components, at the streets surrounding the Palazzo.

Meanwhile, the city government can initiate an information campaign alongside conducting an accessibility audit of the entrances, drop-off areas, and main square of Palazzo. The aim of such a campaign should be to promote awareness of any current shuttle or mobility-on-demand services and increase public awareness of accessibility enhancements already achieved within the PUMS (Piano Urbano della Mobilità Sostenibile) and PRUACS (Urban Plan for Sustainable Commercial Areas) strategies.

Later, an accessible micromobility program must be inaugurated in collaboration with VAIMOO, with adapted scooters and bikes featuring stabilizers, low-step frames, and especially assigned docking points in proximity to Palazzo di Città. This will facilitate both public travellers and city workers to experiment with new transport modes that are accessible to every degree of ability.

Medium-Term (3–5 Years): Infrastructure Renewal, System Integration, and Civic Co-Design

At the mid-term, the emphasis should change from removing barriers to improving urban infrastructure and services, thereby creating an inclusive and integrated setting that facilitates independent and multimodal accessibility for all. As highlighted by user reactions through the AccessS project, most of the issues identified at the short term continue to apply at the system level. Users and

municipal employees noted the lack of comfortable resting points, inconsistent curb heights, and missing connections between transportation nodes and civic spaces.

A key priority is to expand transport accessibility across multiple modes. Bari should retrofit municipal buses and nearby metro stations with audio-visual announcement systems, tactile interfaces, and level boarding features that ensure smooth entry for users with wheelchairs, walkers, or visual disabilities. These interventions align with Bari's 2018 PUMS (Piano Urbano della Mobilità Sostenibile) goals and are increasingly supported by national funding streams such as the PNRR (Piano Nazionale di Ripresa e Resilienza) for smart and green infrastructure.

Simultaneously, the city should accelerate the digital integration of transport and access services. A centralized platform—accessible via both web and mobile—should be developed to offer real-time updates on public transport, micromobility availability, accessible routes, and building access information. Such a platform would enhance decision-making autonomy for people with disabilities and caregivers and facilitate smoother trip planning across modes. This recommendation aligns with Bari's objectives, which aim to be realized through participation in the national Smart City initiatives, and it is also consistent with the broader aspirations of the European Union regarding the digital transformation of urban transportation networks.

With regard to the design of public spaces, there is a need for the city to ensure that there are improvements in accessibility in the surrounding piazzas, pedestrian sidewalks, and seafront promenades and within the municipality. Consistent with the feedback from users with sensory and physical disabilities, improvements should prioritize continuous, barrier-free paths, tactile walking surface indicators (TWSIs), and shaded rest zones. These should follow the EN 17210:2021 guidelines on outdoor environments and be guided by Italy's Linee guida per l'accessibilità urbana.

This midterm change must be based on active participation in government. The city should start regular meetings with disability rights groups in the area, like those working on the AccesS project, to talk about how to improve things now and work together to make things better in the future. During the consultation, both city representatives and citizens have backed these open and welcoming approaches (Section 3.5.2.2). Setting up these feedback loops in an annual "Accessibility Assembly" or similar civic forum would make it normal for users to be involved and ensure that policies that include everyone stay in place.

By enhancing transport accessibility, integrating digital services, reimagining public space design, and institutionalizing civic feedback processes, Bari can move toward a truly user-centered, inclusive mobility system that allows all citizens—not just to move, but to fully engage with urban life.

Long-Term (6+ Years): Sustainable Urban Mobility Transformation

In the long term, Bari needs to grow beyond isolated inclusive mobility initiatives to a city-wide strategy incorporating accessibility, flexibility, and sensitivity to users into the fabric of public infrastructure, transportation systems, and policy-making.

The first step towards this transformation is to institutionalize inclusive mobility norms in all future urban development. The city must ensure that all newly constructed or renovated infrastructure is accessible by formally integrating universal design principles into urban planning and public procurement processes. This measure ensures the implementation of EN 17210:2021 in accordance

with the Italian accessibility standards, including DM 236/1989 and UNI 11168:2005, throughout the entire life cycle of infrastructure projects in Bari. It would also go beyond what the PUMS and the national policy on inclusive planning prescribes should be carried out. In the second scenario, Bari needs to adopt intelligent infrastructure solutions that provide flexible, data-driven access control in its public buildings and government areas. The installation of Building Management Systems (BMS) in all the city's buildings, including the Palazzo di Città, should be considered a prime consideration, which would enable the monitoring of environmental and accessibility conditions in real time.

BMS platforms have the potential to enable automatic door setups based on user profiles, real-time dynamic elevator operation changes, or event- and occupancy-driven dynamic signage changes. Such intelligent solutions would serve to enhance Italy's digital transformation strategies under PNRR Mission 1 – Digitalizzazione and drive AccesS's vision of creating barrier-free intelligent public areas. A third priority objective is to expand inclusive micromobility services by extrapolating pilot projects launched in the near term into a comprehensive municipal system. The launch should feature a range of vehicle types—e.g., low-step electric bicycles, electric tricycles, seated scooters, and electric wheelchairs—serving a wide range of mobility needs. The city should pursue inclusive zoning strategies, targeting locations with dense populations of seniors, disabled persons, or caregivers, and calibrating deployment plans based on these populations. These services need to be integrated fully into the MaaS platform of the medium term in order to enable trip planning, payment, and user feedback possibilities to be seamless.

Ultimately, the sustainable vision necessitates the support of a continuous feedback mechanism alongside policy revisions. Bari must establish a well-defined user feedback system incorporating surveys, mobile application interfaces, and regular participatory workshops. The collected data must be organized into a monitoring dashboard designed to assess performance indicators, including trip completion rates, user satisfaction scores, micromobility adoption across demographic categories, and compliance of public spaces with accessibility standards. Data should inform annual policy revisions for Bari's PUMS and direct funding priorities, technological investments, and personnel training.

3.6 Mercado de Verónicas, Murcia, Spain

The Mercado de Verónicas is a main municipal **food market** in Murcia, situated in the Plano de San Francisco, close to landmarks such as the Convento de Verónicas and the Segura River. Designed by Pedro Cerdán Martínez between 1912 and 1916, it is a two-floor historic building with a surface of 3.000 m² to be renovated; it has served as a focal point for commerce and social interactions for over a century. Although the facade has remained intact, the market's interior has been modified over time to meet changing commercial needs. In 1975, architect Daniel Carbonell Ruiz added a mezzanine level, reorganizing the space to include 116 stalls on the ground floor and 120 on the upper level, primarily for selling fish and vegetables⁷¹. The Murcia City Council has approved the initial phase of renovating the Mercado de Verónicas, allocating €3.7 million to the project⁷². The **first phase** (ongoing) **restores the exterior**, enhancing energy efficiency while preserving its historic character. The **second phase** (from 2027 onwards) **will upgrade the interior**, modernizing systems and layout to improve accessibility and functionality.



Figure 10. Mercado de Verónicas, Murcia, Source:[8]

⁷¹ <http://www.arquitecturadebarrio.com/murciaalazar/index.php/es/cartas/contemporanea/10>

⁷² <https://murciaplaza.com/murciaplaza/murcia-da-luz-verde-a-la-primera-fase-de-rehabilitacion-del-mercado-de-veronicas>

3.6.1 Design Challenge

As part of the **AccessS project**, the market space is envisioned as an inclusive, accessible, and user-friendly environment. The key expectations for its transformation include:

- **Enhanced accessibility:** Implementing targeted physical upgrades and digital solutions to improve navigation and usability, particularly for **older adults and individuals with disabilities**.
- **Smart infrastructure:** Integrating **real-time occupancy monitoring systems** to optimize crowd management, ensuring a more **comfortable and accessible** experience, especially during peak hours.

The **design challenge** for the demo site is as follows:

‘How can we transform or reimagine the Mercado de Veronicas building and its surrounding spaces into an inclusive, accessible, and user-friendly environment that caters to the needs of individuals with disabilities, older adults, and other vulnerable groups, ensuring equitable access, participation, and an enhanced user experience?’

3.6.2 Discover

3.6.2.1 Context Analysis

City-level perspective

Murcia is located in the south-eastern part of Spain, with a population of 474,617 in 2024⁷³. It is characterized as an industrial and commercial city with a vast and fertile territory irrigated by the Segura River. Its economy is primarily based on services, tourism, and agriculture. In terms of demographic challenges, **the Municipality of Murcia** acknowledges the growing concerns related to an **aging population and the increasing prevalence of disabilities**. Currently, the **40 to 57 age group** represents the **largest segment of the population**, highlighting the need for **inclusive solutions and urban policies** that cater to the needs of both older residents and individuals with disabilities⁷⁴.

In terms of urban development, one of the key challenges that the city faces is the **ageing infrastructure**, many buildings and public spaces in Murcia were constructed before modern accessibility standards were established. Retrofitting these structures to accommodate individuals with disabilities can be complex and costly. For example, a study analysing heritage buildings used as museums in the Region of Murcia found that while the feasibility of removing barriers was high, it required significant investment and planning [9]. Moreover, balancing the need for **accessibility with the preservation of these heritage sites** presents unique challenges, as modifications must respect historical integrity while providing necessary access. The municipality highlights that greatest

⁷³ <https://www.ine.es/consul/serie.do?d=true&s=DPOP13855>

⁷⁴ <https://cadenaser.com/murcia/2025/01/31/la-franja-de-edad-entre-los-40-y-los-57-anos-es-la-que-concentra-el-mayor-numero-de-poblacion-del-municipio-de-murcia-radio-murcia/>

challenges arise in existing buildings, where physical and technical constraints make implementing accessibility measures difficult, often compounded by the **lack of dedicated budget allocation**. In buildings with historical or artistic value, these challenges are even more pronounced due to higher technical complexities and costs. In private residential properties, **a significant barrier is the lack of awareness among property owners** regarding the accessibility needs of common areas. Stakeholders involved also highlighted that there is also a significant **lack of understanding around cognitive and sensory disabilities**. While physical barriers are more easily recognised, cognitive accessibility, such as clear, understandable communication or user-friendly signage is often overlooked due to insufficient **technical standards and regulations**. Another recurring theme also specified by the stakeholders involved is the **lack of training and preparedness among staff**, particularly in public buildings, where employees may not know how to interact with people with disabilities, including those who are deaf or on the autism spectrum.

This also highlights the need for features like induction loops, non-aggressive acoustics, and quiet rooms. Stakeholders emphasised that **accessibility often depends on the sensitivity and commitment of those responsible for design and management**.

Murcia's mobility infrastructure has undergone significant transformation over the last decades through a combination of historic development, investment in infrastructure, and technological change. Murcia's mobility development has been characterized by a gradual shift from utilizing antiquated means of transport to a plural system with air, road, and rail transport. Murcia's geographical location in the south-east of Spain historically made it a commercial and transport point. Historically, transport was controlled by road and local networks, but the tourism boom in the second half of the 20th century added another factor to organize mobility in the region. The trend of mobility that is observed in the city of Murcia is one with high dependency on private automobiles, indicating high demand from its citizens, greatly owing to the city's vast geographical spread across a number of suburban areas. All of the transport infrastructure is confronted with challenges, for instance, congestion due to short-distance travel between the city center and outer suburbs and huge disparities in public transport accessibility across areas. Notwithstanding these challenges, there is continued momentum in the direction of sustainable transport, as exemplified by projects such as the rollout of Bus Rapid Transit (BRT) lanes, improvement of cycling infrastructure, and increasing popularity of electric vehicles as well as micromobility choices like e-scooters. However, further development of public transport is needed, particularly in the periphery, to reduce the reliance on cars and address the diverse requirements of society, which encompasses a high proportion of elderly and disabled individuals. There is an attempt to integrate mobility planning with broader urban policies with the aim of achieving more sustainability, accessibility, and social equity in Murcia's mobility system.

Policy perspective

Murcia's urban development strategy is strongly aligned with improving accessibility and sustainability. By leveraging smart technologies, digital services, and infrastructure upgrades, the city is creating a more inclusive environment for all residents. Several strategies, such as **Urban Agenda 2030, Smart City Plan, and MiMurcia**, position Murcia as one of the leading city in urban innovation and accessibility in Spain. The Urban Agenda 2030 emphasizes **active citizen participation in urban**

planning processes, ensuring that the diverse needs of the community are considered in the development of accessible public spaces and services. The renovation of the Mercado de Veronicas is partly financed by the Program to Promote the Rehabilitation of Public Buildings, included in the Recovery, Transformation and Resilience Plan (PRTR)⁷⁵. It is estimated that 22,000 people in the area with some type of disability will be able to benefit from its remodelling to achieve full inclusion in municipal public building⁷⁶.

In urban development, there is a strong emphasis on enhancing **digital accessibility**. Initiatives like **MiMurcia** aim to make **municipal services more user-friendly and accessible** to all citizens. However, ensuring that **all demographic groups** can fully benefit from these digital platforms requires addressing **disparities in digital literacy and access to technology** [10]. Moreover, when it comes to **policy and regulatory frameworks**, the stakeholders involved highlighted that at the national level, Order TMA/851/2021 of July 23⁷⁷ plays a central role, as it elaborates on the technical requirements ensuring basic accessibility and non-discrimination in urbanised public spaces. Complementing this, the [Accessibility Guide for Urbanized Public Spaces \(Version 1.0\)](#) offers comprehensive guidelines and recommended best practices for creating inclusive environments. For deaf or hard of hearing individuals, the [UNE Standard on Subtitling for Deaf and Hard-of-Hearing Individuals](#) establishes clear criteria to ensure audio-visual content is accessible through appropriate subtitling. Additionally, Law 27/2007 of October 23⁷⁸ formally recognises Spanish sign languages and sets out legal provisions for supporting oral communication among deaf, hard-of-hearing, and deafblind individuals.

When it comes to the transportation aspects, Murcia struggles with **limited pedestrian-friendly pathways and a lack of dedicated cycling lanes**, discouraging residents from using active transport options. The **absence of a dedicated electric bus network** limits sustainable public transportation, and **overcrowding in major transport hubs** creates additional safety concerns for pedestrians and micromobility users. Furthermore, the city's **lack of digital accessibility solutions** prevents effective smart mobility integration, making it difficult to optimize urban transport networks.

Murcia is enhancing its public transport system with the immediate incorporation of 23 new fully electric and accessible buses, aiming to improve various city lines before the end of 2024 and in early 2025. This initiative is part of the city's new transport plan, which seeks to provide comprehensive service coverage to 98% of the territory and 96% of the population, increasing the number of bus lines from 44 to 70 and expanding the fleet to 170 accessible and eco-friendly vehicles. The plan also includes the extension of public transport subsidies, offering free commuter trains and 50% discounts on bus and metro tickets until June 2025. To encourage sustainable travel, Murcia has extended **Public Transport Discounts until June 2025**, offering **free commuter train access and 50% discounts on bus**

⁷⁵ Spain's national strategy for economic recovery and modernization, funded primarily by the **European Union's NextGenerationEU** program.

⁷⁶<https://cadenaser.com/murcia/2025/02/11/objetivo-convertir-veronicas-en-el-primer-mercado-cien-por-cien-accesible-radio-murcia/?utm>

⁷⁷<https://accessibilidades.es/en/2021/08/order-tma-851-2021-of-july-23-which-develops-the-technical-document-on-basic-conditions-of-accessibility-and-non-discrimination-for-access-and-use-of-urbanized-public-spaces/>

⁷⁸ <http://sid.usal.es/idos/F3/LYN11795/LEYLSE.pdf>

and metro fares. Additionally, the city is preparing for the launch of a **Single Ticket System (2025)** to facilitate multimodal transport access⁷⁹.

Murcia's recent transport policies are mainly focused on sustainability, congestion reduction, and enhancement of urban quality of life. Murcia faces challenges including significant congestion from short-distance trips and territorial inequalities in accessibility to public transportation, highlighting a need for enhanced integration and connectivity. According to the Sustainable Urban Mobility Plan (SUMP) for 2025–2032, Murcia encourages inclusive and sustainable mobility solutions, prioritizing the role of walking, cycling, public transport, and electric vehicle and micromobility roll-out, including e-scooters. To adapt to present network conditions, the strategy recommends interventions such as the implementation of Bus Rapid Transit (BRT) lanes, an extensive cycling network, and road safety and universal accessibility as the highest priority. These interventions will reduce environmental footprint, improve air quality, and foster equitable access to transport, integrating Murcia's mobility system within the broader regional and European sustainability goals.

Demosite-level information

The **renovation of the market is planned in two phases**. The **first stage** (ongoing) **will concentrate on restoring the market's exterior**, including its facades and thermal envelope, to **improve energy efficiency** while minimising disruption to vendors and preserving the market's historic aesthetic. Key activities in this phase include repairing damp and structural deterioration, replacing the fibre cement roof to meet thermal insulation regulations, and relocating the first-floor stalls to the ground floor. A **second phase**, expected to start around **2027**, will focus on **refurbishing the interior**, upgrade of electrical and ventilation systems, and modernizing the market's **layout and structure**. This phase aims to improve **accessibility and functionality**, ensuring that the market remains a commercial and cultural landmark for the city.

According to the Municipality of Murcia, a primary requirement is to enable **independent and safe mobility**, particularly for users reliant on wheelchairs, mobility aids or electric scooters, alongside **adequate lighting** throughout the market to facilitate clear and safe navigation. Given the high and fluctuating levels of market occupancy throughout the day and week, **safety and comfort in crowded conditions** must also be considered. To mitigate the impact of crowd density, the municipality highlights that there is a need to implement systems that **flatten attendance peaks**, such as by providing **real-time occupancy updates**. Moreover, the acoustic environment plays a significant role in accessibility; therefore, **noise reduction measures** are essential to create a calmer shopping experience, particularly for individuals with sensory sensitivities or cognitive disabilities.

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<https://cadenaser.com/murcia/2024/12/20/el-ayuntamiento-de-murcia-se-adelanta-al-nuevo-plan-de-transportes-con-la-incorporacion-de-23-nuevos-autobuses-cien-por-cien-electricos-y-accesibles-a-su-flota-radio-murcia>



Figure 11. One of the entrances to the market (left) and inside the market (right)

Access to information is another critical area. There is a pressing need for **simple, intuitive, and accessible communication tools** that provide real-time updates on market layout (including the location of shops, restrooms, elevators, and escalators), operational status of essential infrastructure, and environmental conditions (e.g., humidity or floor safety). These tools must accommodate a broad user base, including those with limited digital literacy. The municipality highlights that the **digital transformation** of the Verónicas Market will be essential to maintain its economic viability and attract newer generations of consumers. However, this digitalisation process must be **integrative**, ensuring that it does not create **barriers for older users** or others less familiar with digital technologies. Accessibility must therefore be embedded into digital solutions from the outset. Finally, any data collection to support these digital services must adhere to **strict data protection standards**, including the **anonymisation of user data**, to ensure ethical and legal compliance.

User characteristics

The Mercado de Verónicas serves a diverse group of end users, primarily consisting of shopkeepers and customers who frequent its food market for fresh, high-quality produce. The market attracts two main demographic segments: **middle-aged and elderly shoppers, as well as younger, health-conscious consumers**. A significant portion of the visitors are individuals aged 50-60 and retirees, many of whom reside in the surrounding neighbourhood. Moreover, the market occasionally draws **tourists** who visit Murcia and seek authentic local experiences.

The market has a highly variable occupancy depending on the time of day or day of the week. On average, the market receives **500+ daily users**, including **52 regular shopkeepers, 430 consumers** (estimated from 1,720 daily tickets divided by four), and **60 tourist visitors**.

3.6.2.2 Involved Stakeholders & Data Collection

The following tables presents the stakeholders involved and the data collection activities undertaken at Murcia site.

Table 28. Internal and external stakeholders involved at Mercado de Verónicas

Internal Stakeholders: Actors who are directly involved in a project and have direct influence on decision-making within project activities.		
Name	Type	Role
Municipality of Murcia	Governmental actor	Responsible for demo site activities and set-up within the project.
MIWenergía	Technology provider	MIWenergía is an energy company founded in 2013 in Murcia which offers innovative energy solutions that provide improvements in service and autonomy to consumers.
CETEM	R&D centre	The Technology Centre of Furniture and Wood of the Region of Murcia (CETEM) is a private and non-profit organisation located in the town of Yecla, one of the most important furniture clusters in Spain. The vision of CETEM is to be an international Centre of Excellence as a knowledge and technology provider and a pioneer in furniture-related technological knowledge.
External Stakeholders: Actors or groups that are not part of the project and do not have direct decision-making power within the project but are affected by, can affect or have an interest in its outcomes.		
Name	Type	Role
Plena Inclusión	Disability organisation	An association for people with cognitive disabilities. Provide support and opportunities that enable people with an intellectual or developmental disability, along with their families, to pursue and enhance their quality of life.
Federation of Murcian Associations of People	Disability organisation	It is an organization that brings together many organizations that work for the rights of people with disabilities in Spain.

with Physical and Organic Disabilities		
<u>Association of Parents of Children with Hearing and Language Impairment</u> (ASPANPAL)	Disability organisation	Supports children with hearing and language disabilities and their families through advocacy, resources, and specialized services.
<u>Federation of Deaf People of the Region of Murcia</u> (FESORMU)	Disability organisation	Advocates for the rights, inclusion, and accessibility of deaf individuals in the Murcia region, providing support services and promoting sign language.
ASTRADE	Disability organisation	ASTRADE is an association dedicated to supporting individuals with Autism Spectrum Disorders (ASD) and their families, providing resources and services to improve their quality of life.
ASTRAPACE	Disability organisation	Association for the Treatment of People with Cerebral Palsy and Related Conditions.
Federation of Deaf People (FASEN)	Disability organisation	FASEN is a federation that represents and supports individuals with hearing disabilities, advocating for their rights and promoting their integration into society.
<u>FUNDOWN</u>	Disability organisation	Fundown, known as the Fundación Síndrome de Down de la Región de Murcia, is a non-profit organization established in 1994, dedicated to the social and labor integration of individuals with Down syndrome and other intellectual disabilities.
<u>COAMU</u>	Architects Professional Association	Established in 1981, COAMU is a public law corporation that represents architects in the Murcia region of Spain. It offers various services to both professionals and the public, including information dissemination, professional guidance, exhibitions, conferences, and cultural events.

Municipality of Yecla	Governmental actor	The town council responsible for governing and administering the municipality of Yecla in Murcia, Spain.
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Table 29. Data collection activities at Mercado de Verónicas

Tool	Objective	Target group	When
Questionnaire	● Understanding the context: Identify the site-specific requirements, priorities and expectations related to the built environment and in the context of active mobility solutions. Existing local policies, regulations/ standards or programs for ensuring accessibility for individuals with disabilities, with reduced mobility and vulnerable groups. Existing infrastructure and kind of accessibility features are in place. Type of active mobility solutions available to the site. ● Site-specific perspectives and preliminary insights on user needs, preferences for the built environment and challenges (physical, socio-economic, and policy-related barriers) faced by individuals with disabilities, reduced mobility and vulnerable groups in relation to active mobility solutions. ● Identify relevant actors and users that could be engaged in the data collection.	Demo site leaders (MUR, MIW & CETEM)	September 2024
Interview			October 2024
Workshop			November 2024
Focus Group Discussion & Survey	● Specific insights on needs and challenges faced by users with disabilities, reduced mobility, and vulnerable groups when accessing the built environment and active mobility solutions at the EU and city level. ● Understand site-specific requirements/needs and challenges. ● Identify best practices.	Governmental actors; Disability Organisations; Architects (e.g., Plena Inclusión; FAMDIF; ASTRADE; FUNDOWN; FESORMU; ASPANPAL; FASEN; COAMU; ASTRAPACE; Municipality of Yecla)	February 2025



Online survey	• Understanding the site-specific user experiences, needs, preferences, expectations, and existing barriers regarding accessibility, safety, comfort, and convenience for the built environment. • Understanding the needs and barriers related to active mobility solutions.	Visitors of the market (128 respondents for the section of Built environment and 114 for section of Mobility)	March - April 2025
Online survey		Shopkeepers of the market (32 respondents)	March - April 2025

3.6.3 Define

The results of the data collection activities are described below. These activities were guided by the following generative questions, developed during the **Define phase** of the project, to explore key aspects of accessibility at Mercado de Verónicas:

- *How might we enhance **navigation and mobility** within and around the market for blind, people with low vision, deaf individuals, and those with limited mobility to ensure an intuitive, independent, and inclusive shopping experience?*
- *How might we improve the **environmental conditions** (lighting, ventilation, noise control, and cleanliness) of the market to create a more comfortable and inclusive environment for visitors and shopkeepers who spend extended periods in the market?*
- *How might we redesign the **market's service counters and facilities** to ensure equitable access for all users, including those with disabilities, children, and staff?*
- *How might we use **real-time data and digital tools** to improve service availability, manage crowds more efficiently, and enhance the daily operations for shopkeepers and the experience for all market users?*

3.6.3.1 User Needs & Barriers - Built Environment

The focus group discussion with different stakeholders offered contextual information that supports the introductory section (3.6.2.1) of the chapter on context analysis. Specifically, the **survey targeting shopkeepers and visitors**, provided main insight into the accessibility related needs and challenges observed or experienced by users. A total of **32 shopkeepers from the market and 128 visitors to the market participated in the survey** regarding the built environment of Mercado de Verónicas. Table 30 below describes their composition of gender, age group and type of disability.

Table 30. Characteristics of users engaged

	Shopkeepers (32 responses)	Visitors (128 responses)
Gender composition	• 17 (53%) were female • 13 (41%) were male	• 69 (54%) were female • 54 (42%) were male • 5 (4%) preferred not to disclose their gender
Age group	• 15 (47%) aged 30–49 • 11 (34%) aged 50–64 • 3 (9%) aged 65–79 • 2 (6%) aged 18–29	• 86 (67%) aged 30–49 • 25 (20%) aged 50–64 • 8 (6%) aged 65–79 • 5 (4%) aged 18–29 • 4 (3%) over the age of 80.
Disability condition	1 (3%) respondent reported experiencing visual disability.	22 visitors (17%) reported having a disability. Of these:

		• 6 (27%) cited reduced mobility, • 6 (27%) reported cognitive or intellectual disabilities, • 4 (18%) experienced speech related disability, • 1 (5%) indicated hearing loss, • 1 (5%) had visual disabilities, • 1 (5%) reported multiple disabilities, and • 7 (32%) selected other conditions, which included chronic cervicgia, brachial paralysis, and unassisted mobility difficulties.
Engagement / Frequency of visit	Most shopkeepers reported frequent and sustained engagement in the market: • 22 (69%) stated they operate their store 5–6 days per week • 7 respondents (22%) reported daily operation • A small minority indicated less frequent activity, with 1 respondent each (3%) opening their store 3–4 days and fewer than 3 days per week, respectively.	In terms of frequency of visits, the market appears to be a routine destination for most. • 71 respondents (55%) reported visiting weekly • 29 (23%) visit occasionally, • 17 (13%) visit monthly • 8 (6%) daily • Only 3 individuals (2%) were first-time visitors
Time spent at the market	• Nearly half of the respondents (15; 47%) reported staying 6–8 hours daily • 12 respondents (38%) said they spend more than 8 hours per day. • Only a few reported shorter durations: 3 shopkeepers (9%) spend less than 4 hours, and 1 respondent (3%) spends 4–6 hours at the market.	• The largest group, 69 respondents (54%), typically stay 1–2 hours • 40 (31%) spend more than 2 hours • A smaller portion stay 30–60 minutes (7; 5%) or less than 30 minutes (3; 2%), and 9 (7%) were unsure.

	Overall, a significant majority (85%) are present on-site for six or more hours daily.	
Perception of crowding at the market	25 shopkeepers (78%) observe the market as crowded during specific times, especially weekends. 5 respondents (16%) reported the market is occasionally crowded. 1 respondent (3%) considered it rarely crowded. When asked about peak visitor times: 18 respondents (56%) identified the morning hours (8 AM to 12 PM) as the busiest period. 18 respondents (56%) also pointed to weekends (Saturday and Sunday) as peak days. 9 respondents (28%) cited weekdays (particularly Thursdays and Fridays) 9 (28%) mentioned seasonal peaks, such as Easter, Christmas, or special events. - Only 3 shopkeepers (9%) observed higher activity during the afternoon (12 PM to 4 PM). Overall, market footfall is highest in the mornings and on weekends, with secondary peaks linked to specific weekdays and festive seasons.	92 respondents (72%) found the market crowded at specific times, such as lunchtimes or weekends. 24 (19%) described it as slightly crowded 10 (8%) as extremely crowded, - Only 2 (2%) said it was rarely crowded. This indicates that peak-time congestion is a common experience, with potential implications for comfort and accessibility.

Disability organisations and stakeholders involved stated that the **market is currently not inclusive** for people with physical, sensory, or cognitive disabilities. Several barriers were identified that may discourage vulnerable groups from visiting the space. One of the key barriers being the **noisy environment**. The market lacks **accessible information** to help deaf individuals navigate or understand the services available. Stakeholders also pointed out that **furniture design and layout** play a critical

role in accessibility and should be considered in any improvement efforts. Lastly, concerns were raised about the **lack of cleanliness** and the market's **poor visual appeal**, which further detracts from its inclusivity and overall user experience. They highlighted several key features and tools as essential for improving the accessibility of public market spaces for people with disabilities and other vulnerable groups.

For **deaf individuals, eliminating communication and information related barriers** is a top priority, providing clear visual signage, visual and acoustic emergency signals accessible from any point, elevators with translucent doors for visual communication, and video intercom systems for emergencies. They also stressed the need for **trained staff capable of communicating in sign language** or through online video interpretation services, as well as digital screens displaying subtitles. **Accessible websites that include sign language and subtitles** were also seen as necessary to ensure full access to information. Proper signage is crucial to guide deaf individuals both at the entrance and throughout the market, while QR codes with information about market spaces and services can further support independent navigation. Additionally, quality lighting, a high-quality public address system, and visual emergency information, such as illuminated indicators and emergency signage, are essential to ensure safety in emergency situations. For people who are hard of hearing, installing **induction loop systems** in noisy environments like market halls is considered essential, making communication easier for those using assistive hearing devices.

For **people with physical disabilities**, the main challenges highlighted by the stakeholders involved are uneven surfaces and architectural obstacles that hinder or prevent mobility. Stakeholders recommended ensuring step-free access and resolving any level changes through inclusive, alternative routes. Market layouts should include ramps, wider paths, handrails, and well-placed rest areas, with furniture designed to be accessible for wheelchair users. **Individuals with visual disability** benefit from strong visual contrasts and navigation tools such as **Navilens**⁸⁰, which support independent movement through the market.

Disability organisations and stakeholders involved also emphasised the need to approach accessibility from a **universal and transversal perspective**, ensuring that public spaces are designed to be inclusive from the outset. This includes providing **level access without steps**, creating **accessible routes**, and organising the **placement and design of furniture** so that wheelchair users can move freely and use facilities comfortably. Stakeholders also highlighted the importance of **acoustically friendly environments** to support clear communication, especially for those with hearing disabilities. Furthermore, **emergency evacuation procedures** must be inclusive and take into account the specific needs of people with various disabilities, ensuring safe and equitable responses in crisis situations like fires. Stakeholders involved recognised the valuable role that **technological and digital innovations** can play in enhancing accessibility in public spaces. They highlighted the importance of using technology to **eliminate communication barriers**, for example by providing access to **Spanish Sign Language** and technical aids that support oral communication for the deaf community. Beyond retail environments, they noted that innovations should also be used to support accessibility in broader public areas, such as **monitoring parking availability in city centres** and enhancing access to **public spaces like beaches**, thereby promoting inclusion across various aspects of daily life.

⁸⁰ NaviLens is a navigation tool that provides guidance and information to users, particularly those with visual disabilities. For more information see: <https://www.navilens.com/en/#navilens-section>

The stakeholders also emphasised several **examples of good practices** from other public market environments that may be considered for improving accessibility in the current context. Notably, Plaza de Abastos del Carmen and Mercado Saavedra Fajardo in Murcia have implemented key infrastructural features such as elevators and tactile signage integrated into pavements. In addition, the Spanish Confederation of Deaf People FIAPAS⁸¹ has documented a range of strategies to promote acoustic accessibility and sustainability in public environments.

Shopkeepers at Mercado de Verónicas identified several key accessibility and operational challenges. 12 shopkeepers (38%) called for **clearer signage and maps to support customer orientation**. Regarding mobility, 4 (13%) noted the **absence of ramps** and 2 (6%) reported **narrow or obstructed pathways**. Vertical circulation posed difficulties for 10 respondents (31%), particularly due to unreliable escalators and elevators. 8 shopkeepers (25%) highlighted the **lack of resting areas**, and 26 (81%) emphasized the **need for clean, accessible restrooms**: one even requesting dedicated toilets with showers for staff. Environmental discomfort was a common barrier, with 12 (38%) citing **poor lighting or ventilation** and 4 (13%) noting excessive noise. Additionally, 10 respondents (31%) **supported the use of real-time data to manage crowds** and improve service planning. These insights highlight the need for infrastructural upgrades and inclusive design to better support both vendors and visitors.

Among the 128 visitors surveyed, **45 (35%) reported facing some or many challenges navigating the market**, while 71 (55%) stated they encountered no difficulties, and 12 (9%) felt they didn't visit the market frequently enough to provide an opinion. Among the visitors who faced challenges, the most commonly **reported navigation barriers included a lack of clear signage or directions** (26 respondents; 20%), crowded spaces (21 respondents; 16%), and **narrow or obstructed hallways** (20 respondents; 16%). Additional concerns were **inadequate lighting and difficulty understanding the market layout**. Visitors also noted several facility-related issues: **limited areas for seating or resting** (20 respondents; 16%) difficulty accessing restrooms (19 respondents; 15%), and difficulty using stairs or escalators (17 respondents; 13%). Sensory and environmental discomforts were also significant, with high noise levels (13 respondents; 10%), inadequate ventilation or temperature control (12 respondents; 9%), and poor lighting in shared areas (11 respondents; 9%) commonly reported. Long waiting times at popular stalls (10 respondents; 8%) further reflected operational inefficiencies that may impact visitor comfort and accessibility.

The data collection activities provided a range of insights into specific accessibility challenges and needs in the market:

⁸¹ The Spanish Confederation of Deaf People (FIAPAS), declared a public entity, is made up of 47 affiliated entities. It operates nationwide, constituting the largest platform representing families of deaf people in Spain. For more information, see: <https://fiapas.es/conocenos/>. For example: [FIAPAS-produced video](#) which highlights best practices aimed at improving acoustic accessibility in shared public spaces; The [‘Comer sin ruido’](#) platform, offers a curated selection of dining establishments characterised by low background noise levels, thereby facilitating an improved auditory environment for users, especially those with hearing impairments; and an [article](#) on acoustic comfort provides practical recommendations for noise reduction in restaurants to enhance the overall well-being and experience of patrons.

Wayfinding:

- Disability organisations and stakeholders involved identified a **lack of accessible information as a key barrier**, particularly for deaf individuals who are unable to independently navigate or fully understand the services offered within the market.
- Among the shopkeepers, when asked about areas for improvement in accessibility, 12 respondents (38%) recommended **clear signage and maps** to assist with orientation, indicating a demand for improved wayfinding systems within the market.
- While the majority of visitors reported being able to locate shops and services with ease: 61 respondents (48%) stating it was somewhat easy and 56 (44%) saying it was very easy. Despite general familiarity among frequent users, many highlighted the need for clearer guidance. Specifically, **11 individuals (9%) experienced difficulty locating specific shops or services**. When further asked to rate the accessibility of signage and wayfinding in the market, **71 respondents (55%) rated signage as not very accessible or not at all accessible**, suggesting that directional cues and orientation tools are often unclear, inconsistent, or insufficient presenting challenges especially for first-time users and those with visual or cognitive disabilities. Reflecting this concern, **49 visitors (38%) explicitly recommended clearer signs and maps as a key improvement**, reinforcing the need for more intuitive, inclusive, and well-maintained wayfinding infrastructure throughout the market.

Horizontal circulation:

- Among **shopkeepers**, key concerns included the **lack of ramps (4 respondents; 13%)** and **narrow or obstructed paths (2 respondents; 6%)**, which hinder ease of movement and accessibility. When asked about priority improvements, a significant number: **18 shopkeepers (56%)** recommended the **installation of ramps, handrails, and other mobility aids** to support users with limited mobility. Additionally, 5 respondents (16%) **suggested wider pathways** to facilitate smoother navigation for wheelchair users and for those with strollers or carts. To further reduce congestion, 7 shopkeepers (22%) proposed **better organization of stalls and aisles**. Notably, one shopkeeper raised safety concerns regarding the existing ramps, calling for safety audits and potential redesigns.
- Among **visitors**, similar challenges were observed. **21 respondents (16%)** pointed to **crowded spaces** as a significant barrier to movement, and **20 respondents (16%)** cited **narrow or obstructed hallways** as a limiting factor, particularly affecting individuals with reduced mobility. Visitors' feedback on **vendor stall layout** was mixed. While 66 respondents (52%) found the stall arrangement moderately accessible and 21 (16%) rated it very accessible, **36 (28%) found it not very accessible and 5 (4%) considered it not accessible at all**. This suggests that while many find the layout functional, **nearly one-third of users face challenges**, emphasizing the need for **wider aisles, better spatial flow, and improved visibility**. In terms of areas of improvements, 40 visitors (31%) recommended **better organization of stalls and aisles**, and 37 visitors (29%) supported the inclusion of **ramps, handrails, and mobility aids**, and **59 respondents (46%)** supported **wider aisles** to improve navigation and comfort reinforcing the urgent need for inclusive infrastructure that enables safe and comfortable circulation for all market users.

Vertical Circulation:

- Among **shopkeepers**, vertical mobility presents significant challenges. **10 respondents (31%)** reported **difficulty using stairs or escalators**, while 8 respondents (25%) noted **issues with elevators**. One shopkeeper specifically raised concerns about the **difficulty and risk faced by older individuals** when accessing upper levels. Additionally, **escalators were frequently reported as out of service**, with **14 respondents (44%) rating them as not accessible and 9 (28%) as somewhat inaccessible**. Only a small minority rated them as moderately (4; 13%) or very accessible (2; 6%).
- Among the **visitors**, 17 (13%) reported difficulty using stairs, escalators or lifts. When further asked to rate about their accessibility, 54 (42%) rated escalators and lifts as moderately accessible, 23 (18%) as very accessible, while **28 (22%) found them not very accessible, and 21 (16%) rated them as not at all accessible**. In total, **38% of visitors** experienced **some level of difficulty with vertical mobility** in the market. One visitor emphasized that **shoppers using carts, strollers, or wheelchairs** struggle with vertical circulation due to inadequate infrastructure, and suggested the installation of **large-capacity mechanical ramps or freight elevators** as a solution.

Specific Areas:

- **Disability organizations and stakeholders** emphasized the importance of addressing **specific physical components such as furniture design and spatial arrangement**, which can either facilitate or restrict access for individuals with reduced mobility. These elements must be central to any comprehensive accessibility strategy.
- Among **shopkeepers**, the lack of **resting areas** was noted by 8 respondents (25%), and 3 respondents (9%) reported issues related to **receiving or managing deliveries**. When asked about priority improvements, **19 shopkeepers (59%) emphasized the need for seating areas**, pointing to a lack of strategically located rest spots throughout the market. These concerns were also reported in accessibility ratings: 14 respondents (44%) rated resting areas as somewhat inaccessible and 10 (31%) as not accessible at all, while only 4 (13%) and 2 (6%) considered them moderately and very accessible, respectively. Additional open-ended feedback from shopkeepers called for the **installation of a ramp or elevator** connecting the market to the **parking area**.
- From the **visitor perspective**, **limited seating** was the most frequently cited challenge, reported by **20 respondents (16%)**. This points to a significant gap in accommodating users who may require periodic rest, such as older adults, people with disabilities, mobility aids or those with children. Regarding **service counters**, 67 respondents (52%) rated them as moderately accessible and 24 (19%) as very accessible. However, **29 (23%) found them not very accessible, and 7 (5%) not at all accessible**, pointing to issues such as **counter height, queuing space, and clarity of design**. These results highlight the need for **universal design principles**, including **accessible counter heights, clear signage, and unobstructed access**. Broader concerns were raised about the **market's overall cleanliness, organization, and appearance**, with one respondent noting that it falls short of the standard set by reference markets like **San Miguel or La Boquería**, highlighting the need for **aesthetic and operational upgrades**. One visitor also pointed to deteriorating infrastructure, adding to calls for revitalization.

In terms of improvement suggestions, 62 visitors (48%) called for **more inclusive seating and rest areas**. Visitors also envisioned the market as a **cultural and social destination**, suggesting initiatives such as **tasting zones, dedicated areas for local products**, and exhibitions celebrating regional identity. Proposals included **creating shaded terraces or bar areas**, and **beautifying adjacent public spaces** such as the garden, which was described as neglected. Some also proposed **faster checkout systems** and **enhanced payment processes** at stalls, aiming to improve both convenience and operational efficiency. While several respondents expressed enthusiasm for modernization, one emphasized the importance of **preserving the traditional character** of the market during renovations.

Sanitary accommodation:

- Among **shopkeepers**, perceptions of restroom accessibility were mixed: **12 respondents (38%) rated them as moderately accessible, while 10 (31%) found them somewhat difficult to access, and 4 (13%) considered them not accessible at all**. Only 4 respondents (13%) regarded the restrooms as very accessible. Reflecting this concern, a strong majority: **26 shopkeepers (81%) identified clean and accessible bathrooms as a top priority for improvement**. One shopkeeper further emphasized the need for dedicated toilets with showers specifically for market workers, pointing to the lack of appropriate staff facilities.
- From the **visitor perspective**, **19 respondents (15%) reported difficulty accessing restrooms**, with multiple open-ended comments describing facilities as small, outdated and unhygienic. In some cases, restrooms were considered unusable, and one respondent highlighted the absence of **child-friendly adaptations**, reinforcing the need for more inclusive sanitary infrastructure. When further asked to rate the on the accessibility of restrooms, 48 respondents (38%) rated them as moderately accessible, **47 (37%) found them not very accessible, 18 (14%) considered them not at all accessible**, and only 13 (10%) rated them as very accessible. Overall, **more than half of the respondents (51%) viewed restroom accessibility as inadequate**, underscoring a widespread need for significant upgrades. Supporting this, **65 visitors (51%) also selected clean and accessible restrooms as their top suggestion for improving the market experience**.

Engagement:

- Among **shopkeepers**, a few raised concerns about **crowd management, with 2 respondents (6%) citing difficulties in maintaining smooth customer flow** around their stalls. Additionally, **10 shopkeepers (31%) supported the implementation of real-time updates on crowd levels and facility availability** (e.g., elevators, vendor stalls), highlighting the need for better operational transparency and planning tools to ease congestion and improve the customer experience.
- Among **visitors**, while 64 respondents (50%) reported no difficulty using market facilities, a significant **45 respondents (35%) encountered occasional or recurring barriers**. These figures suggest that while the market functions well for many, a sizable portion of users experience varying levels of discomfort or exclusion. **Long waiting times** at popular stalls or services were another challenge, cited by **10 visitors (8%)**, pointing to the need for **better crowd flow management**. A few participants also

recommended **extending market opening hours**, indicating a desire for more flexible access. Moreover, 27 respondents (21%) specifically requested **real-time information on crowd levels and service availability**, reflecting a growing demand for smart, responsive infrastructure. Additionally, individual comments highlighted broader **inclusivity concerns**. One visitor called for **sign language communication services**, reinforcing the need to accommodate deaf and hard of hearing users. Another emphasized the importance of **accessible payment terminals**, noting that technological design can create unintended barriers for older adults and individuals with visual or motor disabilities.

Evacuation and emergency exits:

- Although not addressed specifically for Verónicas Market, disability organisations stressed the importance of **inclusive emergency evacuation procedures**, particularly for people with disabilities. They emphasized the need for **adequate lighting, reliable public address systems, and clear visual emergency signage** to ensure safety for all during a crisis.
- In terms of everyday access, **shopkeepers rated the market's entrance and exit points positively**: 26 respondents (81%) found them either moderately or very accessible (13 respondents each, 41%), while only 4 respondents (13%) found them somewhat or not accessible.
- **Visitors** also viewed these access points favourably compared to other facilities. 55 respondents (43%) rated them as moderately accessible, and 47 (37%) as very accessible. A smaller group, 22 (17%), found them not very accessible, and 4 (3%) rated them as not at all accessible.

Environmental Conditions:

- Disability organisations and stakeholders described the current **acoustic environment of the market as inadequately conditioned**, posing challenges for individuals who are deaf or hard of hearing. Additionally, they raised concerns regarding the overall hygiene and visual appearance of the market, noting that these environmental factors detract from the space's inclusivity and accessibility.
- Among **shopkeepers**, environmental discomfort was frequently reported: **12 respondents (38%) cited inadequate lighting** in or around their stalls. Another 12 (38%) noted **poor ventilation or temperature control**. 4 respondents (13%) mentioned **high noise levels**, and open comments also pointed to the need for **controlling unpleasant odours**. When asked about improvements, **adequate lighting for safety and comfort** received the strongest support from shopkeepers, with **26 (81%)** identifying it as a priority. **Temperature control solutions** such as shading, fans, or heaters were also suggested by **24 shopkeepers (75%)**.
- Visitor feedback supported these findings: **lighting was a significant concern**. 51 respondents (40%) rated it as not very accessible, and 8 (6%) as not at all accessible, while 52 (41%) found it moderately accessible. Only 17 (13%) rated it as very accessible. **Ventilation and temperature discomfort** was reported by 12 respondents (9%), while 13 (10%) raised concerns about **high noise levels**. Among visitors, when asked about improvements, 59 respondents (46%) called for **better lighting** and 37 respondents (29%) requested **temperature regulation measures**.

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- Open feedback from both groups reinforced the importance of **cleanliness**, with suggestions to prioritize hygiene inside and outside the market and to properly handle the waste containers to reduce visual clutter and odours.

The following table summarises the key findings regarding accessibility for Mercado de Verónicas derived from engagement activities, along with related user needs and insights to inform subsequent phases of the user-centered design approach.

Table 31. User needs and challenges at Mercado de Verónicas

User needs and challenges at Mercado de Verónicas				
Key areas of accessibility	User task	Target group	User challenges	User needs/ Insights
Wayfinding	Navigating the market independently and locating shops	Deaf or hard of hearing individuals	Lack of accessible signage or information; unclear or inconsistent wayfinding; difficulty with layout	Clear visual signage; sign language support; QR codes; digital screens with subtitles; video intercom systems; accessible websites
		First-time visitors; people with cognitive disabilities	Unclear, inconsistent wayfinding; difficult layout	Orientation support; intuitive signage and maps; improved layout design
Horizontal circulation: entrances, doors, windows, patios, terraces, surface finishes and materials	Moving across the same floor; accessing different shops in the market	People with physical disabilities, wheelchair users, people with shopping carts or strollers	Uneven surfaces; architectural barriers; narrow paths; obstructed circulation; poor furniture	Step-free access; ramps; handrails; wider paths; inclusive surfaces; reconfigured furniture; rest areas; clear, wide access routes
	Facilitating smooth customer flow and delivery of goods	Shopkeepers	Narrow or obstructed paths; poor stall organization; delivery difficulties; unsafe ramps	Wider aisles; better stall layout; clear delivery access routes; safety audits of existing ramps

Vertical circulation: ramps, stairs, handrails, lifts, escalators	Accessing upper floors and transitioning between levels	People with mobility challenges; wheelchair users, people with shopping carts or strollers, older individuals	Escalators out of service; limited or unsafe access via stairs - risky for older individuals	Additional or upgraded elevators; mechanical ramps; platform lifts
	Accessing service counters and interacting with staff	People with physical or sensory disabilities	Counters too high or crowded; unclear queue layout	Universal design counters; clear pathways; ergonomic setup
Specific areas, equipment and provisions: service counters, seating, waiting & storage areas	Using seating or resting areas	Shopkeepers and visitors spending extended time in the market; visitors with mobility aids; older individuals; individuals with children	Lack of resting areas	More rest areas for visitors and shopkeepers throughout the market; inclusive and accessible seating design
	Using the restrooms facilities	People with disabilities; wheelchair users; families with children	Physically restrictive, unhygienic restrooms; no child-friendly features	Renovated facilities with wider stalls, handrails, accessible fixtures, cleanliness, child-friendly features
Sanitary accommodation		Shopkeepers	Inadequate staff facilities	Dedicated staff restrooms with showers
	Interacting with market services and information	Deaf or hard of hearing individuals	Lack of sign language communication; no subtitle or visual translation	Sign language-trained staff; video interpretation services; subtitled screens
Engagement-User interface,				

controls and switches	Payment for services	Older adults; people with visual or motor disabilities	Inaccessible terminals; complex digital interfaces	Accessible payment systems; simplified layouts; staff support
	Managing customer flow	Shopkeepers	Crowd congestion; Limited tools to monitor crowd flow or service status	Digital systems for real-time crowd and service information; improved layout for smoother navigation
Evacuation and emergency exits	Safely exiting the market during emergencies	People with sensory, mobility, or cognitive disabilities	Lack of visual/auditory cues; inaccessible routes	Visual alarms, tactile signage, public address systems, clear illuminated exits
Environmental conditions in buildings: lighting, acoustics, indoor climate	Working or moving through market safely and comfortably	People with low vision or blindness	Inadequate lighting; low contrast	Improved lighting; high-contrast surfaces; glare-free design
		Deaf or hard of hearing individuals	high noise levels	installing induction loops in noisy environment
		Shopkeepers or visitors spending extended time in the market	Poor air quality; lack of cleanliness; thermal discomfort	Improved ventilation and climate control; hygiene; waste management

3.6.3.2 User Needs & Barriers - Active Mobility Solutions

The feedback collected through the stakeholder engagement process in Murcia yields valuable insight into the experience and perception of diverse user groups concerning active mobility in the urban context of the city. Views were gathered from organizations representing people with disabilities, officials from local authorities, urban planning practitioners, and other community stakeholders. All these opinions shed light on the shortcomings, gaps, needs, and priorities for creating a more inclusive urban mobility framework.

Individuals with **Physical Disabilities Representatives from FAMDIF**, the Federation of Associations of People with Physical and Organic Disabilities, highlighted the physical barriers that result in lower active mobility for those who have mobility issues. The narrow pathways in the city, continuous changes in levels, and poorly maintained curbside areas create significant obstacles, particularly for wheelchair users and those who rely on mobility aid devices. The stakeholders highlighted that slight elevation differences can make a zone totally inaccessible, thereby transforming everyday activities into major obstacles. FAMDIF was concerned that existing micromobility alternatives cause more issues than the ones they resolve. These transportation modes are usually operated at high speeds and without set, secure itineraries, adding tensions in shared public areas and without adequately helping individuals with mobility limitations. Their comments signalled the importance of active mobility systems that not only physically open up but are also designed in the first place with universal usability in mind.

Individuals with **Sensory Disabilities (Deaf and Hard of Hearing) The Federation of Deaf People of the Region of Murcia (FESORMU)** pointed out the neglect of addressing the problem of sensory accessibility in active mobility plans in the city. For deaf people, the lack of visual warning and comprehensible signs is a primary obstacle, particularly in environments with a high level of noise, i.e., markets or busy transport terminals. FESORMU asserted that accessibility is not only about physical access but also about the fields of communication and information transmission. They proposed the extensive implementation of visual alarm signals, video intercom systems, readily visible digital signage with subtitles, and induction loops for public spaces. They further stated that digital technologies, when suitably designed, can improve navigation and communication, such as through QR code links to sign language information or via interactive digital assistants. But it is essential that such technological advancements are followed through with appropriate staff training and infrastructure development to enable fair and uniform delivery of services throughout the city.

Plena Inclusión representatives of people with intellectual and cognitive disabilities spoke of the unique issues individuals with intellectual or cognitive disabilities face while navigating cities and especially Murcia. Their statements reflected that challenging signs, too much sensory information, and lack of adequate information make individuals with intellectual and cognitive disabilities lost or excluded. Especially marketplaces were mentioned as places where a great deal of noise and unclear signs can be very stressful. Thus, the stakeholders recommended the use of clear, readable, and familiar signs and designing quiet resting areas within transport terminals and public areas. These would benefit individuals with intellectual disabilities and improve the city perspective in general for older individuals and others who find it difficult to navigate in busy or cluttered environments.

FASEN—the Federation of Deaf People— highlighted that people with hearing impairments, apart from their overall interests in information and signage, heavily depend on acoustically healthy spaces. They claimed that public buildings and markets have the potential to magnify noise, worsening accessibility barriers for people who depend on assistive hearing devices. They also drew attention to including induction loops in public areas and emphasized the need to train staff in basic communication skills with the deaf. In their opinion, awareness in combination with technical tools is needed for the successful prevention of communication obstacles in public buildings and active mobility environments.

Urban Planners and Municipal Authorities Representatives from the Murcia City Council and the Yecla City Council recognized the advances, as well as the current shortcomings in tackling active mobility demands in the metro region. They referred to the city's revised Sustainable Urban Mobility Plan (SUMP) 2025–2032 as a blueprint for reshaping the mobility environment through increased pedestrian space, bike infrastructure, and integrated public transport. Still, it was noted that accessibility is still uneven, particularly in far-flung areas where investment in infrastructure has not been proportional. Planners at the regional level underscored the importance of embedding universal design principles in all future developments and added that digital tools—like real-time navigation apps and virtual building tours—are key to catering to a wide range of users. Additionally, they added that embracing digital innovation must be realised with caution in order to avoid widening the digital divide among the elderly or the economically disadvantaged.

Several general concerns were raised across all stakeholder groups. A prevailing issue that was repeated was the **inadequacy of current micromobility schemes** in terms of accessibility. Organizations such as CERMI noted that these options, while touted as green and modern, often **exclude major segments of the populace and do not include basic accessibility features**. The lack of safe pedestrian infrastructure, coupled with the frequent invasion of sidewalks by delivery trucks or urban furniture, adds to the difficulties faced by people with disabilities. On the other hand, some stakeholders pinpointed the renovation of the Saavedra Fajardo Market as a positive example of successful application of universal design principles and improvement of accessibility in public spaces. It was taken for granted that active mobility planning should be designed to fit the needs of the most excluded people and that these groups needed to not only be consulted, but they should also be actively engaged in urban mobility system design and governance.

The following development areas in terms of active mobility solutions are crucial for enabling access to all for the Mercado de Verónicas area.

Physical Infrastructure Improvement: Incorporate and maintain pathways, remove redundant grade changes, and implement good curbside management to ensure obstacle-free transit, particularly for individuals who utilize wheelchairs and other mobility devices. Dedicated routes for micromobility options like e-scooters and bikes must be clearly marked, safe, and controlled to be accessible and compatible for people with mobility impairments.

Enhancement of Visual and Auditory Signage: Institute inclusive visual warning systems, readable digital signage, induction hearing loops, and video intercom systems throughout public areas, transportation centers, and marketplaces to enhance accessibility for deaf and hard-of-hearing individuals.

Clear and Understandable Information: Provide clear and understandable signage, minimize sensory overload, and provide some quiet rest areas in public spaces to assist people with intellectual and cognitive disabilities. **Improvement of Acoustically Comfortable Environments:** Implement noise reduction strategies and fit induction loop systems in public buildings and market stalls, and conduct comprehensive training of all staff in basic communication skills to facilitate easy interaction with individuals with hearing disabilities.

Universal Design in Urban Planning: Implement universal design principles universally to urban developments, including pedestrian facilities, cycling facilities, and public transportation facilities, to ensure equal access for every citizen. **Digital Innovation with Equity:** Inclusive digital tools, such as real-time navigation apps and virtual tours, need to be developed and promoted so that technological advancement does not widen existing gaps in accessibility, especially for older adults or those who are economically disadvantaged.

Active Participation of Stakeholders: Regular engagement and participation of disability organizations, along with other marginalized groups of users, in the designing, planning, and governing of urban mobility systems must be ensured so that the solutions developed meet their needs adequately.

Micromobility Accessibility-Focused Infrastructure: Ensure micromobility services incorporate key accessibility features, transcending current limitations and not leaving out significant population groups. **Pedestrian Safety and Management:** Enhance safety for pedestrians by tightly managing sidewalk use, preventing the incursion of urban furniture or delivery vehicles, to provide secure and continuous pedestrian paths, particularly for people with disabilities. **Scaling up Successful Best Practices:** Expand replicable models of universal accessibility, such as the Saavedra Fajardo Market redevelopment, to other public areas in order to incrementally improve inclusivity and accessibility throughout the city.

Table 32. User needs and challenges for mobility at Palazzo di Città

User challenges and needs for mobility at the Palazzo di Città				
Key areas of mobility solutions	User task	Target group	User challenges	User needs/ insights
Inclusive Pedestrian Infrastructure and Spatial Continuity	Navigate market and city center on foot	People with reduced mobility, blind, low vision	Narrow sidewalks, curbs, steps, pavement obstacles, poor tactile guidance	Level sidewalks, continuous pedestrian routes, better signage and surface treatments
Inclusive Micromobility Design and Integration	Use shared or adapted micromobility devices to reach the market	People with physical, sensory or cognitive disabilities	Inaccessible or unsafe micromobility devices; lack of inclusive design	Safe, inclusive micromobility options, adapted docking stations, user guidance systems
Access to Public Transport	Use public buses, taxis or accessible shuttles to reach the market	Elderly, blind or low vision users, persons with reduced mobility	Low availability of adapted vehicles and accessible stops	Audio announcements, level boarding, well-signed stops, better stop proximity
Digital Inclusion and Mobility Platforms	Plan trips using digital tools and real-time updates	Users with cognitive, sensory, or mobility impairments	Limited access to real-time data, unfamiliar or inaccessible tools	Accessible apps with tactile/voice feedback, integration with transport services

3.6.4 AccessS Roadmap

The subsequent table provides a structured roadmap for implementing accessibility features, emphasizing the importance of user feedback and inclusive practices at every stage for built environment and active mobility solutions.

Table 33. AccessS roadmap for Mercado de Verónicas

DEVELOP (M10 - M18)	
TARGET GROUPS	CONSIDERATIONS (while developing AccessS tools, pay attention to the following points)
Wheelchair users or those with reduced mobility, strollers or shopping carts	• Ensure step-free access across all areas of the market to support independent mobility. • Install accessible ramps and sturdy handrails wherever there are level changes. • Widen pathways to accommodate wheelchairs, mobility aids, and shopping carts. Reconfigure stall layout to reduce congestion and create wider aisles for strollers and mobility aids. • Provide accessible restrooms with appropriate fixtures and support bars. • Design seating and furniture (service counters) with appropriate height and clearance for wheelchair users. • Provide mechanical or inclined ramps as alternatives to stairs and escalators.
Deaf or hard of hearing individuals	• Include sign language-trained staff or video interpretation services for better communication. • Install visual and acoustic emergency alerts that are accessible from all areas of the market. • Equip elevators with translucent doors to enable visual communication. • Use digital signage and screens with subtitle support for announcements and service information. • Provide accessible websites and information portals with Spanish Sign Language and subtitle options.
People with cognitive or intellectual disability or first-time visitors	• Use simplified, consistent signage with clear symbols and plain language. • Design intuitive navigation aids such as color-coded paths and logical spatial layouts. • Incorporate visual icons and tactile maps to support users with cognitive challenges. • Use user-friendly digital navigation aids (e.g., QR codes) to guide first-time visitors. • Provide staff support or guidance stations to help newcomers find their way easily.

People with visual disabilities	● Improve lighting quality with LED fixtures that reduce glare and increase visibility. ● Use high-contrast colour schemes and tactile signs for easier orientation. ● Design wayfinding to support navigation for users with low vision.
Shopkeepers	● Provide dedicated rest zones for shopkeepers to rest during long working hours. ● Install clean, dedicated restroom facilities with showers for market staff. ● Use real-time data systems to manage crowd levels and service availability for operational planning. ● Improve thermal comfort, ventilation and air circulation to reduce discomfort during warmer months and improve overall air quality. ● Improve lighting systems to ensure bright, glare-free, and consistent illumination that supports both visibility and safety
People with chronic fatigue, older individuals, families with children	● Install resting areas at regular intervals to accommodate those who need breaks. ● Ensure family-friendly restrooms with changing stations for children.
All visitors	● Install visual alarms and illuminated exit signs to guide people during emergencies. ● Provide tactile signage and auditory emergency announcements. ● Ensure emergency exits are barrier-free and clearly marked from all areas. ● Ensure regular hygiene and sanitation within the market and its surroundings. ● Minimize noise levels
PROTOTYPE & TEST (M13 - M36)	
CONSIDERATIONS (while prototyping & testing, understand feedback from the following end users or actors)	
It is essential to actively engage pilot site leaders and involve all relevant organizations in the testing phase to ensure comprehensive stakeholder participation. It is important to collect feedback from visitors and shopkeepers working in the market . Prototyping and testing should be approached as a co-design process, where user feedback directly informs iterative improvements of AccesS solutions.	

Note: To engage disability organisations and relevant stakeholders, Municipality of Murcia's channels could be used.

Evaluation activities should systematically collect feedback on the Key Performance Indicators (KPIs) as proposed within the AccesS evaluation framework, to assess the effectiveness and applicability of AccesS tool. Furthermore, the implementation of **structured feedback loops** will facilitate continuous improvement, enabling iterative refinements based on user insights.

DELIVER (M19- M36)

GENERAL CONSIDERATIONS

(while delivering AccesS tools, pay attention to the following points)

- The delivery of AccesS tools must be inclusive, transparent, and user-informed.
- Develop comprehensive accessibility guide in multiple formats (print, digital, audio, Braille, and easy-to-read versions) to ensure inclusivity for the tools developed
- Provide clear and accessible information on the market's website, including Spanish Sign Language and International Sign (IS) videos and screen-reader-friendly content;
- Ensure that all digital tools associated with AccesS (apps, websites, and multimedia content) are fully accessible and including features such as text-to-speech, high contrast modes, and voice navigation;
- Provide clear instructions and tutorials on how to use digital tools, available in multiple languages and formats (text, video, and audio);
- Engage internal stakeholders and end users (including people with disabilities) to test, validate, and refine the AccesS tools before full implementation.
- Integrate feedback mechanisms within digital tools, ensuring ongoing user involvement in refining accessibility features over time.

3.6.5 Recommendations for implementation of active mobility solutions beyond AccessS

A roadmap for the implementation of the active mobility solutions proposed by the AccessS project has been presented in the preceding section. This section outlines the modifications that may occur across three distinct time scales, which are outside the purview of AccessS, yet can facilitate the active mobility of Murcia and Mercado de Verónicas area. The interventions are categorized into three timeframes: short-term (0-2 years), medium-term (3-5 years), and long-term (6+ years), offering municipalities guidance for implementable changes. The proposed roadmap corresponds with the needs and obstacles identified in the AccessS project, as well as the urban mobility strategies of the city, to promote a more equitable, accessible, and sustainable environment.

Short-Term (0–2 Years): Quick Wins for Early Improvement

The short-term phase emphasizes on specific, quantifiable actions at the market demonstration area, with the aim of addressing significant mobility issues for individuals with disabilities and the general quality of public spaces.

In the pedestrian area, an audit should be conducted to identify physical barriers such as narrow pavements, curb height discrepancies, and interruptions in tactile paving. Quick redesigns can then create flat, continuous walking surfaces with high-contrast and tactile floor signage for visually impaired users. These actions respond directly to stakeholder concerns and reflect the SUMP priorities of walkability and territorial cohesion.

Short-term improvements to public transport include the addition of audio-visual real-time information displays at stops, the introduction of level boarding for one or two trial routes at least, and the addition of tactile floor signs connecting stops to building entrances. These will facilitate independent journey-making by individuals with sensory or mobility impairments and enhance both the legibility and efficiency of the system.

Parking lots near the market might be rearranged to provide higher priority to drop-off points for people with disabilities and to test the efficiency of intelligent parking signs providing real-time availability feedback. Although minor in nature, they form part of broader objectives to retake space for sustainable transportation and enhance access equity.

In terms of micromobility, trials with inclusive e-bikes or scooters tailored to the requirements of deaf cyclists and others who indicated through feedback that they were willing should be launched. The vehicles should be supported by secure docking stations and accessible interfaces such as sign-language directions and large-print, voice-supported instructions.

Improvements in digital wayfinding need to include the installation of an accessible digital mobility guide for easier navigation. These improvements should be complemented by strong stakeholder engagement and feedback mechanisms, such as post-use surveys and co-assessment workshop participation, to ensure co-design from the beginning and continuous improvements.

Medium-Term (3–5 Years): Infrastructure Renewal, Systems Integration, and Civic Co-Design

Medium-term phase prolongs the impact of AccesS interventions across the city, guided by Scenario 1 of the city's SUMP. It includes the integration of accessible mobility within the wider infrastructure and governance reforms. Pedestrian routes and networks throughout the urban area should be upgraded based on the norms developed in the Verónicas area. Highways should be designed with rest areas, shaded zones, clear signage, and noise-reducing materials to ensure mobility for everyone, regardless of age or cognitive and sensorial disabilities.

The public transport network must have a citywide introduction of accessible stops, low-floor buses, and multi-sensory passenger information. These improvements must be introduced with co-design activities where users from disability organizations are included, so that the improvements to infrastructure are tailored to actual needs.

Parking policy needs to move towards less on-street automobile space and more pedestrian areas, complemented by intelligent systems for convenient vehicle monitoring and enforcement. Logistics access in sensitive commercial areas such as Verónicas needs to be reconfigured so as not to take up pedestrian space and curb ramps.

Micromobility integration needs to be codified in city policy and contracts. Operators are required to provide universally accessible vehicles, design clearly signed and protected routes, and make their platforms and pricing structures work for a wide range of people. Equitable micromobility infrastructure can decrease the reliance on private automobiles and make a practical alternative for short trips.

City-scale digital systems have to be integrated to encompass planning, payment, accessibility information, and feedback collection. The interface should be configurable, with visual, tactile, and voice interaction, and understandable by those with low digital literacy levels. Civic co-design, through workshops and participatory design laboratories, has to be at the forefront of these systems' development.

Long-Term (6+ Years): Sustainable Urban Mobility Transformation

In the long run, Murcia can achieve a substantial shift towards fully inclusive, low-emission, and social cohesion mobility. This vision is based on the SUMP's most ambitious Scenario 2 and is dependent on the foundation laid by AccesS and subsequent phases.

The pedestrian realm should be fully integrated into a polycentric urban model, ensuring that every neighbourhood enjoys safe, accessible, and aesthetically welcoming streets. Universal design becomes embedded not only in guidelines but also in local culture and planning practices.

Public transport becomes fully electrified, high-frequency, and accessible across all lines, embedded within a regional mobility-as-a-service (MaaS) ecosystem. Travel planning is seamless, personalized, and accessible to all users, regardless of physical disability or digital ability.

Parking is largely relocated or replaced by multimodal hubs that serve both people and goods, supporting last-mile accessibility through sustainable vehicles and shared services. Smart curbside management replaces static regulations, improving efficiency and freeing up space for public use.

Inclusive micromobility becomes a mainstream option, with stable and diverse vehicle fleets, embedded safety features, and cross-neighbourhood interoperability. Protected lanes and adaptive infrastructure support safe use for a wide range of users, including those with mobility aids.

Digital tools are functioning as open ecosystems for service providers, planners, and users. User-generated data in real time offers a way of enhancing decision-making and backing adaptive planning. Ongoing monitoring guarantees that mobility interventions continue to be inclusive, equitable, and on track to meet climate objectives. Regeneration of the Verónicas neighbourhood functions as a live lab and feasibility test, stimulating further large-scale urban renewal initiatives that benefit all residents of Murcia.

4. Conclusions

This deliverable has outlined the foundational role of User-Centered Design (UCD) in the development of inclusive and accessible environments across the AccesS pilot sites. Grounded in **co-creation, stakeholder engagement, and context analysis**, the described methodology supports the project's broader ambition to **improve accessibility of the built environment for persons with disabilities and older persons**, in line with a Design for All approach.

The deliverable aimed to identify and assess the needs, expectations, and challenges experienced by diverse user groups, individuals with disabilities, reduced mobility, and other vulnerable groups across six demo sites, with a dual focus on the accessibility of the built environment and the inclusivity of active mobility solutions. The approach aims to ensure that technological and infrastructural innovations respond effectively to the real needs of users.

The activities carried out in this phase contribute directly to the first pillar of the AccesS architecture, which focuses on the development of a methodological framework for UCD. This work has provided a **roadmap for capturing the diverse needs of end-users**, especially those with cognitive, physical, or multiple disabilities **and translating them into actionable insights for the development and implementation of AccesS tools and mobility solutions and plans**.

Moreover, the analysis of the pilot sites has highlighted the **diversity of challenges faced by users not only in terms of physical accessibility, but also regarding cognitive, sensory, and social aspects**. The process of adequately addressing the full spectrum of disabilities such as sensory, cognitive, and psychosocial dimensions, remains a continuous learning effort. Equally important is the need to ensure **accessible information and communication**, which must be designed to accommodate diverse needs, including multiple formats (such as Braille, sign language, easy-to-read versions, and digital tools). Accessible information and effective communication systems are essential for enabling independent navigation, active participation, and informed decision-making by all users, particularly those with communication or sensory disabilities. There is a need for deeper collaboration with disability advocacy groups, experts in inclusive design, and local communities to ensure that future design iterations are comprehensive and representative of all user groups.

The analysis of user needs has shown that **accessibility, usability, comfort, and sustainability are not separate goals, but deeply interconnected dimensions of inclusive innovation**. The findings collected so far will guide the prototyping and testing phases, enabling iterative development of smart and adaptable tools co-created with stakeholders and tested in real-life settings to support active mobility, energy awareness, and digital inclusion.

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