UPPER

Unleashing the Potential of Public Transport in Europe

D3.4 Urban space allocation and design toolbox

WP3 Supporting tools and solutions to plan and develop user-centric and PT

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Document history

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CO: Confidential, only for members of the consortium (including the Commission Services);
EU-RES: Classified Information - restraint UE;
EU-CON: Classified Information - confidential UE;
EU-SEC: Classified Information - secret UE

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Abstract

Deliverable D3.4 documents the progress of task T3.4, focusing on measures and/or initiatives aimed at advancing sustainable and public transport-oriented urban spaces across pilot sites. The task emphasizes two core areas: the redistribution of urban space and the seamless integration of multiple transport modes. The redistribution of urban space involves reconfiguring urban areas to prioritize pedestrians, public transport, and sustainable modes such as cycling by repurposing roadways and parking spaces. Multimodality focuses on the integration of various transportation options and the enhancement of multimodal hubs to facilitate seamless travel between different modes of transport, including walking, cycling, buses, trains, and micro-mobility options. This deliverable includes reference guides, tools, and initiatives beneficial for developing these types of measures, alongside collaborative workshops to exchange best practices and recommendations. This deliverable builds upon previous work in WP2, particularly tasks T2.2 and T2.4, which defined the scope, objectives, and requirements of the measures. D3.4 transitions these measures from conceptualization (WP2) to full development and readiness for demonstration, outlining the steps taken by pilot sites to develop their measures. D3.4 serves as a crucial resource for the UPPER consortium and external professionals interested in implementing similar measures.

Keywords

Public transport-oriented urban spaces, multimodal hubs, toolbox, push and pull measures, multimodality, urban mobility planning

1.Introduction

1.1. Scope of the Document

The deliverable D3.4 aims to document the efforts undertaken in task T3.4, which seeks to advance towards sustainable, public transport-oriented urban spaces by enhancing multimodal hubs, redesigning urban neighbourhoods to prioritize public transport and active mobility, reallocating urban space from parking to PT and social purposes, and integrating innovative urban mobility planning concepts. In particular, this task is focused on the developments required by each of the pilot sites to develop measures around two main topics:

- **Redistribution of Urban Space:** These measures involve the strategic reconfiguration of urban areas to shift the emphasis from private vehicles towards pedestrians, public transport, and sustainable modes like cycling. By repurposing roadways, parking spaces, and public spaces, this category seeks to create a safer and more attractive environment for alternative modes of transportation, making the urban landscape more conducive to walking, cycling, and using public transport. This is also a key approach to achieve behavioural change in favour of public transport and active modes. The redistribution of urban space could be therefore considered as the physical interventions to achieve this objective.
- **Multimodality (Physical Integration of mobility services and Hub Creation):** This category encompasses the establishment of multimodal transportation hubs and the introduction of diverse transportation options within those hubs. By connecting various modes of transportation such as walking, cycling, buses, trains, and potentially micro-mobility services, these measures aim to simplify and streamline the process of switching between different transport modes for a more seamless travel experience.

This task looks at reference guides, tools and initiatives helpful for the partners involved in the development of this type of measures. Likewise, it also carries out collaborative workshops to favour the exchange among cities and to identify good practices and recommendations to support the preparation of such measures.

This task builds on the work done in WP2, especially in tasks T2.2, where the scope and objectives of the measures were defined in detail, as well as in task T2.4, where the requirements to be fulfilled by each of them were detailed. This information forms the basis of the work carried out in this task, where these measures progress from being a concept/idea (WP2) to being fully developed (WP3, WP4, WP5) until they are ready to be demonstrated (under WP6).

This deliverable is a key outcome, first of all, for the UPPER consortium, since it details the steps undertaken by the demo sites to develop their measures and establishes the basis for their subsequent implementation and demonstration, which will take place under WP6. Secondly, it becomes a key outcome of the project for any professional (outside the UPPER consortium) willing to implement similar measures in their city, since it contains reference documents, guides and tools, high-level recommendations identified by experts in the field, and as already mentioned, step-by-step description on the process followed to develop measures of that type.

The lead author would like to thank to all UPPER sites' representatives and their local collaborators for their active contribution, interest and information provided with respect to the steps followed to develop and prepare their measures. Likewise, the lead author would like to thank the horizontal partners that were involved in the appraisal of the measures to maximise their impact and on the execution of the workshops to identify cross-cutting recommendations. Lastly, an acknowledgement to all those who provided input, insights and comments to this document.

1.2. Intended audience

The intended audience of this document is all those professionals involved in the PT improvement and urban planning, including mobility managers in municipalities, public companies and private companies, transport operators and authorities.

This document presents the measures developed within the framework of the UPPER project aimed at redesigning urban spaces around public transport and active modes, as well as measures to enhance connectivity between sustainable transport modes. The detailed description of the steps taken to prepare these measures, along with recommendations derived from collaborative workshops, can serve as case studies for other mobility and urban planning professionals seeking to implement similar measures in their respective cities.

In addition, the collection of reference documents, guides and tools are also recommended reading for professionals seeking to transform urban environments to favour public transport and active modes as well as those aiming to improve multimodality and better connect sustainable transport modes.

1.3. Structure of the document

This document is divided into six sections, starting with a brief introduction. The second section details the methodologies used to conduct various activities within the task. This includes the systematic review methodology used to gather reference guides and tools, methodologies followed for conducting two collaborative workshops, and the process to support demonstrator sites as they prepare their measures.

Sections 3, 4, and 5 present the outcomes of the task. Section 3 provides a concise overview of the systematic review conducted by consortium members to identify tools, guidelines, and best practices beneficial for cities and regions looking to redesigning urban space around public transport, and enhancing multimodality and seamless connectivity between transport modes.

Section 4 directly reflects the results from the two workshops conducted under task T3.4, and participated by the cities, the horizontal partners, and in general all the partners involved in the task. Two workshops are described: a first one focused on sharing experiences and good practices among cities involved in T3.4, and a second one aimed to produce ‘points of attention’ to be considered by the demo sites to maximise the impact of their measures. This section not only presents the outputs of these workshops but also provides a series of cross-cutting recommendations useful for stakeholders interested in implementing similar measures.

Section 5 offers a detailed description of the steps taken by the demonstrator sites to develop and finalise the process of preparing their measures for subsequent implementation and demonstration.

Measures have been grouped thematically in this section (Redistribution of Urban Space and Multimodality) to aid readers in finding pertinent information. Each measure includes a step-by-step description of its preparation process, results achieved during such steps, challenges encountered, mitigation strategies employed, and next steps to conclude the preparation process.

The final section presents the conclusions drawn from the activities conducted in this task.

1.4. Measures included under Task 3.4

This task addresses the preparation of 13 measures aimed at transforming urban environments to favour pedestrians, public transport, and cycling, while establishing hubs that seamlessly connect diverse transportation option. In particular:

- Under the category of **“Redistribution of Urban Space”**, the following measures have been prepared:

- **VAL_01:** Redistribution of urban space with a focus on Mobility as a Right.
- **ROM_08:** Designing the urban space to promote active travel modes, PT and environmental 30 zones.
- **MAN_08:** Redesign urban space and test alternatives of using it for social purposes.
- **LIS_05:** To enhance multimodal interconnection with the peri-urban municipalities.

- Under the category of **"Multimodality (Physical Integration of mobility services and Hub Creation)"**, the following measures have been prepared:
  - **VAL_02:** Creation of a network of multimodal hubs.
  - **ROM_03:** New mobility services in multimodal interchange nodes.
  - **OSL_02:** Consistent visual identity for PT and mobility hubs.
  - **OSL_06:** More inclusive micromobility.
  - **MAN_07:** Create a network of mobility hubs in cooperation with the regional transport association, open for multi mobility providers.
  - **LIS_09:** To improve the integration of PT and active travel modes.
  - **TES_02:** To simulate and analyse the needs of PT for LEZ demand fulfilment.
  - **HAN_03:** Added-value services in multimodal nodes to integrate PT with active modes.
  - **TES_08:** To create new incentive based services in the MDMS to increase the use of PT.

2.Methodology

2.1. Supporting resources: A systematic review

A systematic review of reference projects and best practices (knowledge coming from inside or outside the consortium) has been carried out to identify relevant tools and guides that can support the cities in implementing measures aimed at both: 1) (re)designing public transport-oriented urban spaces that prioritize public transport and active mobility and 2) improve multimodality by better and seamlessly connecting different transport modes.

The systematic review was aimed at generating a collection of guides, reference projects, tools and initiatives, useful for the cities carrying out mobility measures linked to T3.4, as references to support the definition, design and development of their related measures. The partners involved in the systematic review were: ETRA, UITP, EPF, and POLIS.

The approach followed to categorize the identified relevant resources follows the structure established in the "CIVITAS Urban Mobility Tool Inventory." This tool inventory facilitates filtering information according to various parameters, including

- **Tool type** (Guidance document / Manual; Hardware; Indicator set; Method / Approach; Application; Option generator; Serious game; Software; Project).
- **Thematic area** (Active mobility; Behavioural change & mobility management; Clean fuels and vehicles; Collective passenger transport & shared mobility; Demand & urban space management; Integrated and inclusive planning; Public involvement; Road safety and security; Smart & connected mobility; Urban logistics).

- **Application area** (Analysis, scenarios and measure selection; Appraisal and assessment; Data gathering; Dissemination and communication; Evaluation and monitoring; Exploitation and business plans; Financing, procurement, legal aspects, measure implementation).
- **Language**.

For each of the resources identified, the following information has been retrieved:

- Name of the supporting resource.
- Brief description of the supporting resource.
- Latest update.
- Assistance required.
- Assistance data.

Even though the systematic review produced a large list of relevant tools and guides, it was decided to limit the list to a maximum of 25 entries, trying to select the ones better fitting with the measures being developed by the cities in the scope of the UPPER project and, in particular, of the task T3.4.

2.2. Measures support workshop series

2.2.1. High-level approach

To support the cities along the development stage of the mobility measures, to facilitate the information exchange among the cities and to take benefit of the know-how and knowledge of the horizontal partners of the UPPER's consortium, it was proposed to organise participated workshops in both formats, in-person and online.

The first workshop, an in-person workshop organised during the second GA meeting, was aimed in sharing learnt lessons and experiences among pilot sites. The second one, in a virtual format, was aimed in reviewing the mobility measures, arising points of attention related to the measures that could support cities' teams in the final steps of the development process.

2.2.2. Workshop 1: Self-identified challenges and good practices

The aim of this workshop was to foster an open reflection and discussion session whereby city representatives self-evaluate their progress in developing measures within a task. They then present their progress, with a focus on what they consider as enabling factors for measure development and on challenges faced. Project partners who develop measures in the same category, as well as issue-based advocacy organisations within the project were expected to have faced broadly similar challenges within their respective contexts. As all partners attended with at least one staff member, the UPPER General Assembly organised in Rome in January 2024 was selected as an opportunity to run a workshop session to exchange good practice on the topic. During the meeting two workshops were held in parallel and meeting attendees could freely choose which session to attend. Due to the large number of measures developed in the framework of task 3.4, two such workshops were organised: the first focusing on multimodal hubs and Public Transport interfaces (several measures developed in T4.5 were discussed in this session as well); and the second on the redistribution of urban space.

2.2.3. Workshop 2: Critical appraisal from partners. Points of attention for maximizing measures' impact

The aim of the workshop is to support cities in their tasks of developing UPPER measures, by challenging and improving their initial measure description (as presented in UPPER Deliverable 2.2 Annex) The process is structured around several steps that are common across all the UPPER tasks where measures are developed.

In the WP3 online workshop (duration 1,30h) horizontal partners presented the points of attention previously identified, together with potential recommendations or best practices of how these can be addressed. Representatives from the UPPER partners responsible for the development and subsequent measures actively reacted and participated.

Rupprecht Consult (RC), as WP3 leader, was the overall coordinator of the WP3 workshop. RC defined the main structure and contents of the workshop and, with the support from ETRA and POLIS, distributed the responsibilities for the workshop among the horizontal partners with resources in tasks T3.4 and T3.5. EUROCITIES and UITP led the event organization, including the preparation of the required material, set-up of the agenda and moderation of the plenary sessions. IBV coordinated the appraisal of the measures and follow up with reviewers (IFP, ECF, UITP EUROCITIES, POLIS, EPF, ICLEI, ETRA, IBV and RC) to ensure timely and adequate identification of points of attention.

Cities had the opportunity to see in advance the points of attention referring to the measures they are developing and to respond to and actively engage with horizontal partners. Following a plenary introduction of the points of attention, 4 breakout sessions were organized in parallel, thus fostering engagement and a lively exchange between the participants. Each session was run and moderated by two horizontal partners identified based on their experience on the topic. Rupprecht also created a Miro board to structure the inputs during the breakout sessions. The online workshop was recorded, and a short report included in the deliverables to be produced for the WP3 tasks. Some sections/presentations may also be used as part of the communication tasks of the project or included in the U-TRANSFER/U-KNOW tools.

Four breakout rooms were identified:

	UVARs and parking	**Public space design**
First round	Hannover Leuven Rome Versailles Thessaloniki **Moderators: Laura (RC) and Javier (ICLEI)**	Lisbon Manheim Valencia Budapest Oslo **Moderators: Holger (ECF) and Mario (IFP)**
	Traffic prioritization in PT	**Multi-modal hubs**
Second round	Hannover Leuven Thessaloniki Valencia Budapest **Moderators: Lottie (UITP) and Juan (IBV)**	Lisbon Manheim Oslo Rome Versailles **Moderators: Mario (IFP) and Katie (EPF)**

The objectives of the agenda were:

1. Reflect on selected points of attention identified as common importance during the appraisal exercise
2. Generate exchange among city representatives and horizontal partners to propose recommendations and solutions moving to the implementation phase

OBJECTIVES AND AGENDA

- Reflect on selected points of attention identified as common importance during the appraisal exercise
- Generate exchange among city representatives and horizontal partners to propose recommendations and solutions moving to the implementation phase

Time	Activity
15 min	Recap on points of attention
30 min	First breakout rooms round • UVARs and parking • Public space design
30 min	Second breakout rooms round • Public transport prioritisation in traffic mgmt. • Multimodal hubs
15 min	Feedback and workshop recap

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2.3. The Measures Support Leaders Group

WPs 3,4 and 5 share common goals; to develop the UPPER tools and to make sure that all the necessary steps have been taken in order to get the 78 measures ready for implementation, in the framework of WP6. Having identified from the very beginning his common goal, the participating horizontal partners (WP and Task leaders) decided from the very beginning to join forces. More specifically, aiming to ensure that all partners involved in the development of the measures, including cities and horizontal partners, are aware of their responsibilities and the corresponding timeline, they decided to formulate a group, entitled “Measures Support Leaders Group” (MSLG) which was created at the beginning of the duration of these tasks, in M8.

CERTH being the leader of WP4, under which most of the measures are prepared, was appointed leader of the MSLG. The group consisted of the leaders of the tasks under which the measures are developed (T3.4, T3.5, T4.2, T4.3, T4.4, T4.5, T5.2, T5.3, T5.4), while meetings were held in a monthly basis. The table below presents the UPPER partners forming the MSLG.

Table 1. Members of the Measures Support Leaders Group.

Task	Leader
T3.4 “Re-design the urban mobility space to promote the use of PT”	ETRA
T3.5 “Definition of new operational and policy-based measures and solutions regarding zonal and network-based UVAR and parking”	POLIS
T4.2 “New services for users and PT operators based on the existing mobility data collection and sharing”	IFPEN

T4.3 “Improved PT efficiency addressing specific needs and situations such as expected and unexpected events”	FACTUAL
T4.4 “Improved information and added-value services enhancing multimodality”	CERTH
T4.5 “Improved comfort, convenience, safety and attractiveness of transit services”	UITP
T5.2 “Incentivize PT offer and active modes in the living labs”	FACTUAL
T5.3 “Innovative strategies and solutions to improve public perception of PT”	FIT
T5.4 “Behavior-change oriented mechanisms to promote the use of PT”	IBV

The aim of the group may be summarized as follows:

- To meet the goals foreseen in the Grant Agreement, in relation to the aforementioned tasks;
- To provide meaningful support to the cities’ representatives during the development of their measures;
- To ensure that all task leaders provide the same level of support to the cities developing measures under their task;
- For the cities to acquire a clear understanding of the steps needed to develop their measures and the support they will receive from task leaders (and other horizontal partners involved in the task);
- To monitor the progress of the measures’ preparation process and timely identify any challenges/delays.

To achieve all these, a template entitled Monitoring Template was created and used in order to monitor the progress of all measures’ development. The first draft was created by the group’s leader but was then circulated among all members to review it. Once it was finalized, each member of the MSLG had to fill it in for all the measures under their task. The aim of the template is to briefly present each measure and its expected outcomes (extensive measures’ descriptions are included in D2.2) and to identify all steps needed to develop the measures. For each step a responsible partner is assigned as well as specific deadline. In addition, each step should be accompanied by a monitoring indicator; this indicator is not related to the evaluation process but it refers to the main output of the step so that the step is considered completed. The fields to be defined for each step in the Monitoring template are shown in the figure below:

Steps to ready-to-demo measure

Steps	Description	Involved partners/externals	City contact person	Category of action	Deadline	Monitoring indicator	Comments
1	Define the step e.g., Definition of the area and the use cases	Define the partners responsible for this step	Email of the responsible person (Partner’s name)	Choose from Data/Infrastructure/Legal/Safety/Social/ Technical/Software	Define the data when the step should be completed	Define what the output of the step will be e.g., Description of area and use cases	Include any clarifications etc.
2							
3							
4							
5							
LAUNCH OF THE DEMO (please fill in the date)							

Fig 1. Table of steps to be defined by Project partners in the Monitoring template.

Once the task leaders had filled the templates in, the templates were sent to the corresponding cities to review and finalize them. One monitoring template was created per measure. These templates were then utilized by each task leader to track the progress of the defined steps for the measures under their task. This was done through the following procedure: prior to each monthly MSLG meeting, each task leader contacted the partners responsible for the measures' development to ask about the progress of each measure under their task. A short but concrete presentation was then created and presented during the meeting in order to report the progress and any challenges or delays (if applicable).

The template of the monitoring template, along with the completed templates for the 13 measures prepared under Task 3.4 can be found in *Annex 2: Monitoring templates of T3.4 measures.*

3.Supporting resources: Reference tools and guides

In this section, the main documents and reference projects identified regarding the (re)design of public transport-oriented urban spaces and the improvement of multimodality by better and seamlessly connecting different transport modes are presented. The original documents are accessible on the website following the references included in the Table 2.

Table 2. Supporting resources: Reference tools and guides.

#	Tool short name	Description	Language	Latest update	Assistance required	Assistance data	Tool type	Thematic area	Application area	LINK
1	MORE project tools	MORE project developed design concepts that encourage street activity and reduce traffic dominance by considering the needs of all road users. MORE explored experimental options such as flexible use of kerb space and dynamic allocation of road space to accommodate distinct functions.	EN	2022	No	No	Project	Integrated and inclusive planning - Spatial/land-use planning		https://www.roadspace.eu/results
1.1	MORE: Better Streets for Better Cities	It is handbook for active street planning, design and management. The objective of Part B of this handbook is to provide cities with a comprehensive approach to the redesign of their busy urban streets that takes into account local policies (e.g. as set out in their Sustainable Urban Mobility Plan - SUMP) and enables priority to be given to certain Movement and Place Street uses. Part B outlines each step of the street redesign process (Developing a detailed design brief; Generating design options; Modelling impacts and scheme appraisal) and identifies the relevant tools to support it (such as Design Brief, option generation, stakeholder engagement, micro-simulation of street user behaviour, and a multi-modal appraisal tool).	EN	2022	No	No	Guidance document / Manual	Integrated and inclusive planning - Spatial/land-use planning	Analysis, scenarios and measure selection	https://morewebsite.wpenginepowered.com/results/better-streets-for-better-cities
1.2	MORE Option Generation Tools: Streetspace Interventions Tool	Open access web-based application that generates broad options for policy interventions to redesign, reallocate, or regulate streetspace, showing how they address the needs of different street users and potentially meet policy objectives. The tool provides planners with information on the characteristics of different interventions in comparison with alternatives.	EN	2022	No	Intervention objectives	Option generator	Integrated and inclusive planning - Spatial/land-use planning	Analysis, scenarios and measure selection	https://ifpedestrians.org/roadoptions/public/
1.3	MORE Option Generation Tools: Street Designs Tool	Open access web-based application that generates detailed streetspace allocation designs, in cross section, combining different street design elements (e.g. cycle lane, lanes for motorized traffic). Each element can assume different widths.	EN	2022	No	The width currently allocated to each design element; The political priorities of each type design element	Option generator	Integrated and inclusive planning - Spatial/land-use planning	Analysis, scenarios and measure selection	https://ifpedestrians.org/roadoptions/public/
1.4	MORE LineMap	LineMap is used to create and enhance design options by designers and other professionals. The output are digital design options, displayed as road markings or as coloured blocks. LineMap is an application for creating and managing road marking designs. Using a library of national standard road markings, LineMap can create detailed representations of markings, compatible with computer-aided design (CAD). A high-level view of any design can be created using blocks of colour, matching those employed in the Street Layout Toolkit. The LineMap application is hosted in the Buchanan Computing Cloud and provided as 'Software as a Service'. The application can be accessed via any browser.	EN	2022			Software	Integrated and inclusive planning - Spatial/land-use planning	Analysis, scenarios and measure selection	Description: https://morewebsite.wpenginepowered.com/wp-content/uploads/2022/04/MORE-D4.6-Tools-for-stakeholder-engagement.pdf

1.5	MORE Traffweb	Web mapping application with tools for public consultation and stakeholder engagement. It consists of a public area where stakeholders can feedback on issues within the study area, as well as comment on proposed designs. A private area of the website, accessed by designers, allows dashboard reporting on consultation feedback, as well as control over the consultation period.	EN	2022	No	No	Software	Integrated and inclusive planning - Spatial/land-use planning	Data gathering	Description: https://morewebsite.wpenginepowered.com/wp-content/uploads/2022/04/MORE-D4.6-Tools-for-stakeholder-engagement.pdf
1.6	MORE Street Layout Toolkit	It is a physical design toolkit that enables local stakeholders, such as residents and business owners, to collaborate in the street design process at workshops.	EN	2022	No	No	Method / Approach	Integrated and inclusive planning - Spatial/land-use planning	Analysis, scenarios and measure selection	General information: https://morewebsite.wpenginepowered.com/results/better-streets-for-better-cities
1.7	MORE Option Appraisal Tool	It is an open access Excel application for the appraisal of options for streetspace reallocation through street redesign. The tool compares options for streetspace allocation through street design, considering the needs of multiple street users and a range of policy objectives. The tool includes three independent assessment modules: Political and Technical Assessment ;Cost-Benefit Analysis; Multi-Criteria Analysis.	EN	2022	No	No	Application	Integrated and inclusive planning - Spatial/land-use planning	Appraisal and assessment	Description: https://morewebsite.wpenginepowered.com/results/appraisal-tool-for-assessing-and-prioritising-street-design-options Open access tool: https://discovery.ucl.ac.uk/id/eprint/10144317/
2	How to make stations lively hubs for citizens and public transport users: Trends	This study focuses on mobility hubs, which are multimodal stations and serve as entry points to public transport systems but also provide ancillary services and social activities. Beyond exchange of knowledge, best practices and recommendations, the aim of "Stations of the future" project is to provide operators and other relevant stakeholders industry ideas and inspiration of how to adapt stations in the future.	EN	2022	No	No	Guidance document / Manual	Integrated and inclusive planning - Multimodal hubs	Analysis, scenarios and measure selection	https://cms.uitp.org/wp/wp-content/uploads/2022/12/Stations-of-the-Future_FINAL.pdf
3	How to make stations lively hubs for citizens and public transport users: Solutions	This study identifies the needs and expectations of distinct groups of passengers, and to explore how stations can be made more welcoming and inclusive for all. The study used journey mapping to understand the main stages of the passenger experience at the station and to identify essential touchpoints for improvement	EN	2023	No	No	Guidance document / Manual	Integrated and inclusive planning - Multimodal hubs	Analysis, scenarios and measure selection	https://cms.uitp.org/wp/wp-content/uploads/2023/05/SoF-How-to-make-stations-lively-hubs-for-citizens-and-public-transport-users-Solutions.pdf
4	Mobility hubs: steering the shift towards integrated sustainable mobility	This paper will help you to understand the variety of hubs and the benefits of organising coherent networks of hubs. The focus on the newest types of mobility hubs will provide concrete examples along with recommendations, particularly for authorities and public transport operators, on how to play a driving role in the shift towards sustainable mobility.	EN	2023	No	No	Guidance document / Manual	Integrated and inclusive planning - Multimodal hubs	Analysis, scenarios and measure selection	https://cms.uitp.org/wp/wp-content/uploads/2023/06/Policy-Brief-Mobility-hubs-web.pdf

5	Better urban mobility playbook	This playbook is an update of the UITP report “Better Mobility in Urban Areas”, published 20 years ago. It highlights the various challenges cities are facing and offers solutions with concrete steps that can be applied to redeveloping more sustainable liveable, healthy and inclusive cities.	EN	2021	No	No	Guidance document / Manual	Integrated and inclusive planning - Spatial/land-use planning	Analysis, scenarios and measure selection	https://cms.uitp.org/wp/wp-content/uploads/2022/02/Report-BETTER-URBAN-MOBILITY-PLAYBOOK.pdf
6	ENSURING OPTIMUM ACCESSIBILITY OF PEDESTRIAN ZONES	The scope of this UITP Policy Brief is about the creation of large pedestrian zones including whole streets and public squares and ensuring their accessibility by involving all concerned stakeholders and especially public transport. This paper aims at demonstrating the critical role public transport and combined mobility play to ensure optimum accessibility of pedestrian zones and hence the need to involve these actors from the very beginning of the project.	EN	2020	No	No	Guidance document / Manual	Integrated and inclusive planning - Spatial/land-use planning	Analysis, scenarios and measure selection	https://cms.uitp.org/wp/wp-content/uploads/2020/06/PolicyBrief-8dec-LR.pdf
7	Mobility post-pandemic: A strategy for healthier cities	This Knowledge Brief will identify actions taken by cities to help maintain a good level of mobility access and to influence different demand and mobility behaviours, with the aim of better understanding the impact Covid-19 could have on cities’ mobility strategies.	EN	2020	No	No	Guidance document / Manual	Integrated and inclusive planning - Spatial/land-use planning	Analysis, scenarios and measure selection	https://cms.uitp.org/wp/wp-content/uploads/2021/01/Knowledge-Brief-Mobility-Strategy_AUG_2020.pdf
8	Preparing for a better future: How Transport Authorities have managed the crisis	To reach this goal, transport authorities have exercised a key leadership role throughout the pandemic, in preparation for a better future. With international experiences, this Knowledge Brief showcases how some of UITP’s Organising Authorities members have dealt with the crisis and the key lessons learnt to build back better	EN	2021	No	No	Guidance document / Manual	Integrated and inclusive planning - Cooperation of policy fields and stakeholders	Analysis, scenarios and measure selection	https://cms.uitp.org/wp/wp-content/uploads/2021/07/Knowledge-Brief-Covid_Leadership_JUN2021_DEF.pdf
9	Bus network planning: From the operators' perspective - Bus planning introductory chapter	This document outlines the critical role of bus network planning for the perspective of the public transport operators, emphasizing efficiency, customer satisfaction, and urban sustainability. It discusses the use of innovative tools and technologies to enhance service quality and support future network designs, aiming to improve city liveability and reduce carbon emissions.	EN	2022	No	No	Guidance document / Manual			https://cms.uitp.org/wp/wp-content/uploads/2022/10/Report-Bus-Network-planing-Oct22-web-2.pdf
10	New mobility and urban space: How cities can adapt?	This document explores the evolving urban landscape influenced by climate change, health concerns from poor air quality, and digital advancements. It emphasizes shifting mobility paradigms away from individual cars towards public transport and active mobility, and addresses challenges and strategies for integrating new mobility services sustainably	EN	2020	No	No	Guidance document / Manual	Integrated and inclusive planning - Multimodal hubs	Analysis, scenarios and measure selection	https://cms.uitp.org/wp/wp-content/uploads/2020/05/Policy-Brief-New-mobility-services-and-urban-space.pdf
11	The impact of electric buses on urban life	The objective of this policy brief is to provide decision makers, urban planners and authorities with an overview of the benefits electric buses can bring to cities and to help them understand their various infrastructural impacts on urban spaces and space needs.	EN	2019	No	No	Guidance document / Manual	Clean fuels and vehicles	Analysis, scenarios and measure selection	https://cms.uitp.org/wp/wp-content/uploads/2020/06/UITP-policybrief-June2019-V6-WEB-OK.pdf

12	How to Evaluate Street Transformations	Building on GDCI's experience implementing street transformation projects and with a focus on metrics and data collection, How to Evaluate Street Transformations offers cities a new way of measuring, evaluating, and communicating the impact of pop-up and interim projects related to road safety and its co-benefits.	EN, ES, PT	2022	No	No	Guidance document / Manual	Integrated and inclusive planning - Spatial/land-use planning	Evaluation and monitoring	https://globaldesigningcities.org/publication/how-to-evaluate-street-transformations-english/
13	Visual branding eHUBS	This is a short, simple, and highly intuitive guide about the development of visual branding for mobility services. It focuses on electric HUBS or eHUBS, although the information it provides is applicable to any service related to urban mobility.	EN	2020	No	No	Guidance document / Manual	Behavioural change & mobility management	Dissemination and communication	https://vb.nweurope.eu/media/11480/deliverable_31_branding_ehubs-min.pdf
14	Territorial and Local Development Strategies	This Handbook is designed as a policy-learning tool for policymakers, helping them become aware of the different options they have. It offers inspiration and food for thought on how to tackle the most relevant or recurring policy challenges that territorial development actors may encounter during the process of strategy making by providing them with a number of practical tips, concrete examples and recommendations, as well as references to existing literature, guidance and tools.	EN	2022	No	No	Guidance document / Manual	Integrated and inclusive planning - Cooperation of policy fields and stakeholders	Analysis, scenarios and measure selection	https://publications.jrc.ec.europa.eu/repository/bitstream/JRC130788/ter-handbook_online.pdf
15	PARK4SUMP: Parking Standards as a Steering Instrument in Urban and Mobility Planning	The Park4SUMP project addresses parking standards for new developments, which are also called parking requirements or norms. The paper concentrates on standards for new residential areas and mixed-use spaces, excluding purely commercial areas.	EN	2021	No	No	Guidance document / Manual	Integrated and inclusive planning - Spatial/land-use planning	Analysis, scenarios and measure selection	https://park4sump.eu/sites/default/files/2021-02/EN%20%28web%29.pdf
15.1	PARK4SUMP: PARKPAD tool	This is a locally applied audit process that helps cities to review parking policies, achieve consensus on improvements and finally develop an action plan that fits the cities SUMP. The PARKPAD tool optimises proven approaches in quality assessment of cycling policies (BYPAD) and SUMPs (QUEST).	EN	2022	Certified auditor from ParkPAD	Current parking management policies and practices	Method / Approach	Demand & urban space management - Parking management & pricing	Analysis, scenarios and measure selection	https://parkpad.eu/
16	CoMoUK: Mobility Hubs Guidance	CoMoUK's Mobility Hubs guidance, developed in collaboration with the EU's "SHARE-North" project, is aimed at city and regional authorities, consultants, and partners. It offers an introduction to mobility hubs and their advantages, along with advice on adapting hubs to local contexts through case studies. The guide directs readers to resources for turning hub concepts into reality, including branding, technical drawings, and impact monitoring.	EN	2019	No	No	Guidance document / Manual	Collective passenger transport & shared mobility - Intermodality	Analysis, scenarios and measure selection	https://uploads-ssl.webflow.com/6102564995f71c83fba14d54/618d29b3d06c81de72c38fdc_CoMoUK%20Mobility%20hub%20guidance%20_Oct%202019.pdf
16.1	CoMoUK: Mobility hub accreditation	CoMoUK, a charity supporting the development of shared transport, has worked with partners to create a set of standards for assessing the quality of mobility hubs. The standards incorporate six factors which should be considered for successful scheme design: visibility and accessibility; choice of sustainable modes; safety; ease of switching modes; practical facilities; and social and community appeal. For each type of hub (as identified in the "Mobility hubs guidance"), a set of elements required to	EN	2022	No	No	Method / Approach	Collective passenger transport & shared mobility - Intermodality	Appraisal and assessment	https://www.como.org.uk/mobility-hubs/accreditation

		meet the standards and achieve accreditation have been suggested.								
16.2	CoMoUK: The design process - mobility hubs realised	CoMoUK: This is a guidance for designers. This document describes the design and delivery process that can be used by built-environment professionals to further their understanding of what a mobility hub is, how it is designed what it may cost the elements that make up a mobility hub.	EN	2022	No	No	Guidance document / Manual	Integrated and inclusive planning - Multimodal hubs	Analysis, scenarios and measure selection	https://www.como.org.uk/documents/the-design-process-mobility-hubs-realised
16.3	CoMoUK: Mobility hubs toolkit	This toolkit aims to provide both transport professionals and interested individuals in communities with a plan on how to deal with many of the issues faced when considering the setting up of mobility hubs. The main areas it deals with are as follows: **Guidance on hub feasibility and viability** (What to consider in the design stage; Key factors for a successful hub; Types of sites and their different requirements; Branding and signage; Ongoing maintenance); **Business models** (Procurement options; Operating and managing the hub; Planning for capital and operating costs; Funding opportunities and income); and **Community engagement and consultation** (Establishing clear aims; Developing a community engagement plan; Running a successful consultation process)	EN	2021	No	No	Guidance document / Manual	Integrated and inclusive planning - Multimodal hubs	Analysis, scenarios and measure selection	https://www.como.org.uk/documents/comouk-mobility-hubs-toolkit
17	FLOW project: Using FLOW's Multimodal Transport Analysis Techniques in the Transport Planning Profession	This document has been written for those involved in transport businesses. These include transport planning and engineering consultants as well as producers of transport equipment and supplies (e.g., pavement systems or cycling rack builders). It can assist such businesses in communicating improved methods for analysing multimodal transport system performance (developed in the 3-year EU research project, FLOW) to decision makers, local authority staff and (other) transport consultants.	EN	2018	No	No	Guidance document / Manual	Active mobility	Evaluation and monitoring	https://ec.europa.eu/research/participants/documents/downloadPublic?documentIds=080166e5ba47fdbc&appId=PPGMS
17.1	FLOW project: Walking and Cycling: A Multimodal Approach to Congestion Management	This document outlines the activities carried out during FLOW and summarises the project's main results. These include Assessing conventional transport analysis and modelling techniques; Developing improved transport analysis techniques and models; Making recommendations for improving multimodal transport assessment, and; Preparing communication resources for further information	EN	2018	No	No	Guidance document / Manual	Active mobility	Analysis, scenarios and measure selection	https://www.rupprecht-consult.eu/fileadmin/migratedRupprechtAssets/Documents/FLOW_Multimodal_Approach_Recoms_and_Summary__UK_.pdf
18	Sustainable Urban Development Strategies	The "Handbook of Sustainable Urban Development Strategies" provides methodological support for integrated urban strategies aligned with EU cohesion policy. With six chapters, it covers key aspects: - Strategic Dimension: Emphasizes strategies as roadmaps for Sustainable Urban Development. - Territorial Focus: Explores aligning territorial needs with spatial scales, including urban-rural connections. - Governance: Covers planning, financing, and multi-level,	EN, BG, ES, EL, IT, HU, PL, RO	2020	No	No	Guidance document / Manual	Integrated and inclusive planning - SUMPs	Analysis, scenarios and measure selection	https://urban.jrc.ec.europa.eu/urbanstrategies/

		participatory governance. - Cross-Sectoral Integration: Addresses overcoming sectoral divisions for policy coherence. - Funding and Finance: Explores funding sources, financial instruments for sustainability. - Monitoring: Guides effective progress tracking. The handbook provides suggestions, examples, and references, aiding local authorities, managing authorities, and stakeholders in strategy creation, implementation, and monitoring for Sustainable Urban Development.								
18.1	Self-Assessment Tool for Sustainable Urban Development strategies	The tool aims to support Local Authorities and relevant actors to assess to what extent the strategy builds on an integrated and participatory approach as set in the New Leipzig Charter and supported in Cohesion Policy 2021-2027. Furthermore, it provides guidance when evaluating the strategy's completeness and quality, from its design and implementation to its monitoring and evaluation. Managing Authorities can also use the tool when assessing the strategies and providing feedback to Local Authorities during the strategy design and implementation processes.	EN	2021	No	No	Method / Approach	Integrated and inclusive planning - SUMPs	Evaluation and monitoring	https://urban.jrc.ec.europa.eu/sat4sud/es
19	Mind the Gap - Making the Multimodal Journey the Easy Journey	To enhance consumer choice and sustainable transport via the MDMS initiative, key principles should be incorporated: - Shared data among operators, managers, and intermediaries under fair conditions. - Strict identification and prohibition of unfair practices by operators or MDMS platforms. - Neutral, timely info on schedules, fares, and travel times for consumer preferences. - Transparent data-sharing costs not unfairly transferred to consumers. - MDMS platforms accountable for services, bolstering consumer rights during multimodal travel. This paper elaborates on these policy suggestions and outlines challenges for consumer MDMS benefits.	EN	2018	No	No	Guidance document / Manual	Collective passenger transport & shared mobility - Intermodality	Data gathering	https://www.beuc.eu/sites/default/files/publications/BEUC-X-2023-032_Multimodal_Digital_Mobility_Services_initiative.pdf
20	The MaaS Ecosystem Canvas	MaaS Ecosystem Canvas; it allows you to visualize the key elements of an ecosystem including stakeholders, target groups, offerings etc. Furthermore, it can be used as a tool to facilitate communication and exchange between players to establish collaborative relationships and trust. The canvas helps to understand one's own role in the ecosystem more clearly and to distinguish it from other actors.	EN	2020	No	Modal split, CO2-levels, knowledge of the ecosystem (stakeholders, user groups)	Method / Approach	Integrated and inclusive planning - Cooperation of policy fields and stakeholders	Analysis, scenarios and measure selection	https://www.fluidtime.com/en/maas-ecosystem-canvas/
21	Topic guide: Decarbonisation of urban mobility	This guide aims to help planners and decision-makers responsible for tackling climate change and for developing transport plans, at all levels, to understand which measures to introduce within Sustainable Urban Mobility Planning (SUMP) and the types of impact that are to be expected from those	EN	2022	No	No	Guidance document / Manual	Integrated and inclusive planning - SUMPs	Analysis, scenarios and measure selection	https://civitas.eu/sites/default/files/sump_topic_guide_decarbonisation%20%281%29.pdf

		measures, to achieve the relevant GHG emissions reduction targets. It focuses on personal mobility.								
21.1	Carbon Reduction Strategy Support Tool	The transition to achieve net-zero carbon targets by 2050 requires radical and urgent change to existing policies. However, cities often lack the knowledge and expertise to understand how different scales and timings of policy strategies impact on carbon emissions, especially when dealing with such long timescales as up to 2050. The Carbon Reduction Strategy Support Tool has been developed to fill that knowledge gap and assist cities in identifying a suitable mix of high-level policy strategies, and their timings, which will achieve carbon targets while also respecting and supporting the other objectives that cities are looking to deliver. The tool provides a 'backcasting' frame to identify strategies needed to reach the desired future, rather than 'forecasting' from the current situation.	EN	2022	No	No	Method / Approach	Integrated and inclusive planning - SUMPs	Evaluation and monitoring	https://sump-plus.eu/resource?t=Carbon%20Reduction%20Strategy%20Support%20Tool
22	Appraisal tool for assessing and prioritising road design options	This tool performs an appraisal of options for the reallocation of road space among users. It compares the performance of each option considering the movement and place function of roads, and broader economic, social, and environmental objectives.	EN	2022	No	Road design, movement function, place function and wider impacts (economic, social, environmental)	Method / Approach	Integrated and inclusive planning - Spatial/land-use planning	Analysis, scenarios and measure selection	https://discovery.ucl.ac.uk/id/eprint/10144317/
23	Public Transport Benefits Toolbox	Public transport makes our cities, our lives and our planet better. Without it streets are congested, air turns grey with smog, and the economy slows down. Besides walking and cycling, public transport is the most climate friendly and sustainable way to travel. The ‘Public Transport Benefits Toolbox’ contains brochures, posters, visuals and much more, to help you communicate this message to the public, policy makers and other stakeholders.	EN	2023	No	No	Other	Behavioural change & mobility management	Dissemination and communication	https://www.uitp.org/news/uitp-launches-global-public-transport-benefits-toolbox/
24	PedBikePlanner: Stimulating safe walking and cycling within a multimodal transport environment	The PedBikePlanner webtool provides tailor-made evidence-based recommendations for cities and municipalities to achieve a modal shift in favour of walking and cycling without compromising road safety, security and comfort. The dynamic tool with more than 50 fact sheets of measures to stimulate walking and cycling. Based on the characteristics of the city, the tool ranks the different measures based on their potential to improve walking and cycling in this city. The instrument advises based on local conditions of the city, such as current travel patterns and modal split, road safety, the road environment, population and policy ambitions. Implementation costs are also considered in the recommendations.	EN	2019	No	No	Option generator	Active mobility	Analysis, scenarios and measure selection	https://www.pedbikeplanner.eu/#home

25	NODES toolbox	The NODES Toolbox is a catalogue of integrated planning, design and management tools which aim at helping to build modern urban transport interchanges. In total 83 tools have been integrated in the final Toolbox. The NODES Toolbox is a true EU reference for interchange design, allowing every interchange stakeholder, to use the tools developed, to identify good practices elsewhere, and to understand the performance of others. The Toolbox will allow each interchange manager to make an informed decision, supporting him from the initial planning phase of an interchange, up to the actual management of the station, surrounding area, and information provision to the traveller and citizens in the catchment area.	EN	2015	No	No	Guidance document / Manual	Integrated and inclusive planning - Multimodal hubs	Other	NODES deliverable: "nodes-toolbox-ref-wp3_12"
26	Walk'n'Roll Cities Guidebook	Walk'n'Roll Cities Guidebook offers insights into urban challenges linked to car-dependency and presents a strategic framework for cities to transition towards more sustainable and people-centred environments. The guidebook's three booklets cover the reasons behind the challenges (Booklet 1), potential solutions (Booklet 2), and the implementation process (Booklet 3), utilizing real-world examples and collaborative knowledge from various city networks. Its content can come at hand for local politicians and decision-makers as mayors and council members, who can use it to better understand what are the mobility and public space related challenges that affect sustainability and liveability in their own city and, most importantly, why it's so crucial to tackle these issues. The different booklets can also help them to have a high-level overview of the innovative visions and interventions local authorities can adapt, together with citizens in a participative way.	EN	2022	No	No	Guidance document / Manual	Behavioural change & mobility management	Analysis, scenarios and measure selection	https://urbact.eu/sites/default/files/2023-01/walknroll.pdf

To review the sections format ...

4.Measures support workshop series

4.1. Workshop 1: Self-identified challenges and good practices

4.1.1. Results

The multimodal hubs and PT interfaces workshop session had presentations from the cities of Mannheim and Lisbon. Mannheim presented their work developing measure MAN_04, with a particular focus on greening existing PT infrastructure. Especially interesting for other participants was the potential to install and add photovoltaic panels on the roofs of shelters in tram stops, taking advantage of the already-existing electricity installation required for light rail operation.

Lisbon presented their work to facilitate the integration of the bike-sharing and public transport system, taking advantage of the complementarity of the modes. An important good practice was learning from previous experiences and improving upon systems that had been put in place previously. Lisbon started working on ways to integrate micromobility with public transport services in 2019, and measure LIS_09 in UPPER builds upon the requirements and resolves the challenges of previous iterations.

The redistribution of urban space workshop featured presentations from Valencia (measure VAL_01) and Oslo (OSL_04). In Oslo the innovative approach lay in the cooperation with housing associations to allow the re-purposing of space (previously used for private car parking) to allow hubs dedicated to shared mobility services to be placed within the associations. This bottom-up approach focuses on close contact with the respective housing associations, but also takes the opportunity to tap into a previously under-used resource of space within residential complexes. However, this workshop also served as an opportunity to understand that the measure itself is more geared towards identifying and providing the incentives for this cooperation, rather than the use of space itself. As such, it was reassigned to task T5.3.

Valencia presented their work on measure VAL_01, focusing on the challenges posed by changing the road layout on a bus corridor within the city to allow better use of space in a highly used area of the city. The plans in place involve the removal of some parking lanes along Blasco Ibáñez avenue (relevant avenue in the city, as it connects the city centre and the sea facade) and the re-use for shared purposes, including additional space for sidewalk and bicycle lanes. The main challenge identified shows the importance of engaging with both citizens and decision-makers to advocate the benefits of using space for other uses, including more efficient mobility options.

4.1.2. Conclusions

Assessing the implications of measures – specifically changes to the use of existing infrastructure – on unprotected road users or groups at risk of exclusion has been identified as an area where efforts must consistently be put in to ensure that all people can benefit from the measures implemented. A good practice example was highlighted by Lisbon's experience in cooperating with the National Institute for Rehabilitation for the development of measure LIS_06.

An important note all presenters and audience experts agreed on was the need of a multi-disciplinary project team which can champion the desired interventions in a variety of contexts, ensuring cooperation and buy-in from various departments, units or other organisations. The work in most cities following the workshop in Rome highlighted this aspect and broader teams were formed for the development of the measures presented. It was also agreed that not only professionals should be part of these teams (electric network integration, urbanists, traffic management professionals, ...), but also citizens-neighbours as illustrated by the OSL case.

4.2. Workshop 2: Points of attention for maximizing measures' impact

4.2.1. Recommendations per measures

Horizontal partners with effort booked under the various tasks were asked to critically review the measures proposed by the cities. The partners decided among themselves which measures to review based on their expertise, previous work, etc. In conducting the critical review of the measures, horizontal partners have taken into account the various documents already produced in UPPER, including but not limited to the user personas and experience notebooks of D2.1, the SWOT analysis included in D2.2, or the supporting policy frameworks and policy requirements in D2.4.

Based on the critical review of the measures to be developed within Work Package 3, the horizontal partners commonly agreed on a limited number of "Points of attention", areas where they consider the cities and measures should be focusing more attention and should be addressed moving into the implementation phase. The goal of these "Points of attention" is to extract common challenges that are shared in the design/development of several measures within the same work package, rather than a checklist per measure. The full list of "Points of attention" identified after the horizontal partners appraisal can be found in *Annex 1: Workshop 2 'Points of attention'.*

8 Points of attention categories were identified

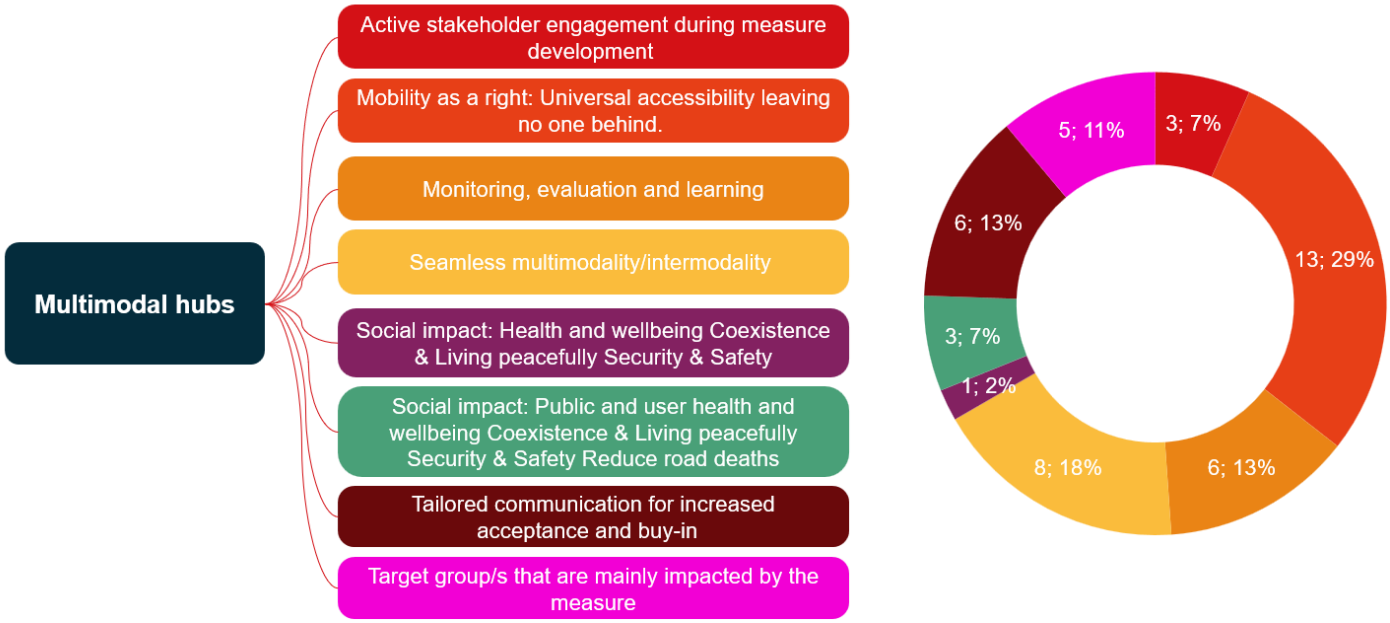

Fig 2. Points of attention categories for "Multimodal hubs" measures.

Recap on points of attention appraisal – Public space design

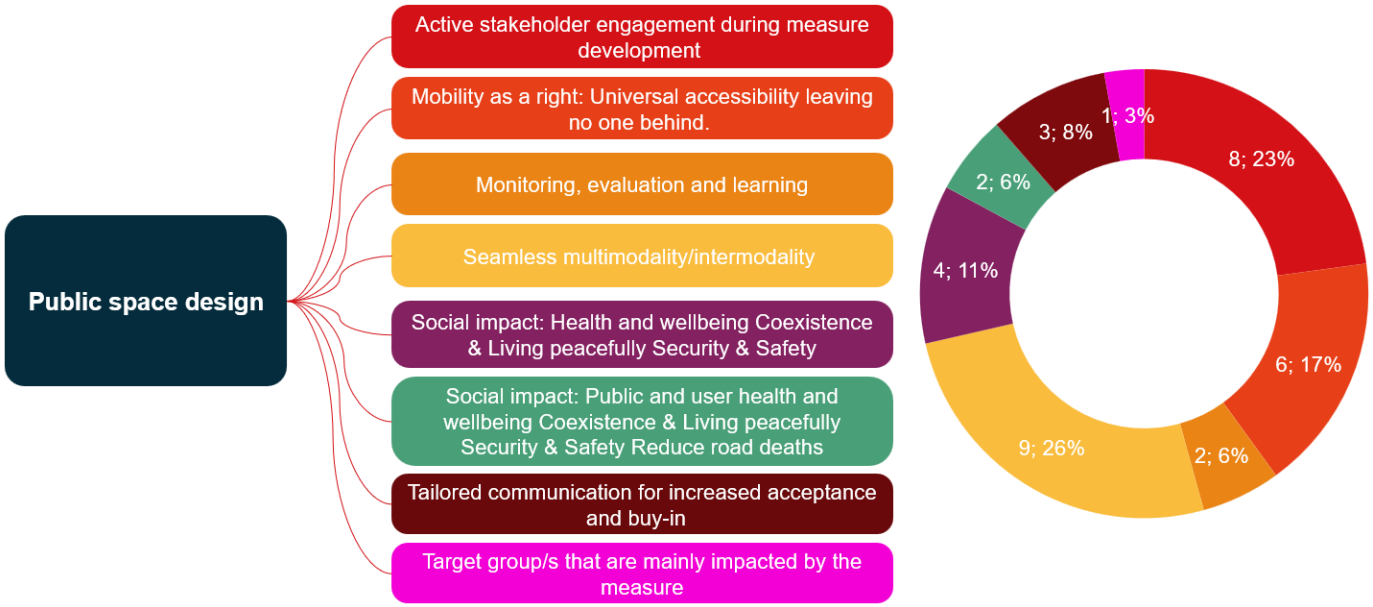

Fig 3. Recap on points of attention categories for "Public space designed" measures.

4.2.1.1. Redistribution of Urban Space

Based on the review of measures, the moderators from ECF and IFP agreed to summarise the points of attention that were identified during the review in the following three questions for the city representatives:

1. **Communication + stakeholder engagement:** How do you ensure that all relevant stakeholders, including local cyclist and pedestrian associations, are included in the planning process of the measures? Public space redesign, changing the status quo from space for cars to space for PT/active mobility, has often led to resistance/backlash. How will you handle this?
2. **Mobility as a right:** How do you ensure universal accessibility, considering the needs of different user groups? The Social Climate Fund will open funding opportunities targeted at users at risk of transport poverty, how could these opportunities be used based on the UPPER measures?
3. **Catchment area:** In your measure, are you considering the comfort and safety of the catchment area of the PT hub? Are you properly counting walking/cycling trip stages in multimodal trips when you collect data?

On the first question regarding communication and stakeholder engagement, the city of Valencia presented a possible solution consisting in the submission of citizen proposals through an engagement platform. Citizens can submit proposals for improvements in their neighbourhood, and a vote is organised on which proposals will be implemented. It was however suggested that formal organizations like *Valencia Camina* or *Valencia en Bici* (ConBici) should be included in the decision process and can help to organize engagement sessions. The city of Oslo reported on its engagement efforts with the cycling community, involving bike shops, online surveys among cyclists, and plans to involve cyclists' organisations as well.

On the second question on Mobility as a Right, the city of Oslo presented efforts to accommodate different types of bicycles in their plans and the different user profiles that they are linked to (e.g. cargo bikes to transport children, which are used more often by women). An avenue to investigate regarding the relatively high price of these bikes is tax or other financial incentives for bicycles provided by companies to their employees. UITP mentioned that cities need to make sure that public transport works to connect the city and provide access, rather than break up public spaces. Good

examples where public transport can access pedestrian spaces are Seville and Bordeaux. An example of a measure where special attention to this point should be made is BRT separation from car traffic, which should still allow pedestrian crossing (this may be done by timing traffic lights, etc.). Unfortunately many BRT projects have two adjacent lanes of traffic making it very difficult access to the stations.

On the third question regarding the catchment area of public transport stops, Valencia reported that the city and operators are taking more attention to these areas - e.g. reducing crashes in these areas, dealing with potential conflicts between bike lanes and public transport passengers, using cameras to analyse bike trips. EUROCITIES recommended to collect data on "black spots" with high concentrations of crashes. In-depth information on this point can be found in the shared UPPER&SPINE workshop *"Streets for Life" – lower speed limits and better public transport available* on the project YouTube channel[1].

For Mannheim, their representatives reported on the collaboration between the city administration and the public transport operator to improve road safety and data collection in the catchment areas of public transport stops.

4.2.1.2. Multimodality (Physical Integration of mobility services and Hub Creation)

Based on the measures review, the IFP and EPF moderators agreed on a set of discussion questions for this breakout session.

See below for the list of questions:

1. What design solutions are being implemented to ensure that multi-modal hubs are accessible, safe and comfortable to all groups, especially those vulnerable to exclusion?
2. How do you plan to monitor and evaluate the effectiveness of multimodal hubs, particularly regarding the integration of different transport modes and the impact on traffic flows and modal shifts (including the quality of the first and last mile)?
3. How are you involving local associations (cyclists, pedestrians, passenger organisations) and other relevant stakeholders, in the development and evaluation of multimodal hubs to ensure that their expertise and feedback are incorporated?
4. What measures are being considered to ensure seamless integration of various modes (e.g. bus, bike, metro, shared mobility etc) at multimodal hubs, and how are issues related to safety, parking, ticketing, and end user information being addressed?

Session participants were invited to share their actions, experiences and lessons learned related to the above points. The participants' input was noted in the workshop Miro board and can be summarised as follows:

Related to the first question about design solutions, IFP recommended that the UPPER cities consider "the catchment area", as this is quite important and is often forgotten when planning mobility hubs. Furthermore, it requires speaking with different stakeholders to obtain their feedback and knowledge. Comfortable and safe catchment areas are key to increase Public Transport usage.

The UPPER cities also provided input on active mobility and the situation in their cities. Rome for example commented that cycling safety is generally a challenge in the city, while there seem to be less issues with walking safety – however this should be further accessed and researched (gender related fears are a common element in most international studies).. Furthermore, they noted that in addition to UPPER, they are partners in the Move21[2] project, where they are

[1] https://www.youtube.com/watch?v=dXEmx5aMGpY&t=1225s

[2] https://move21.eu/city/rome/

actively working to enhance the integration different modes. As a follower city to Oslo, they are implementing measures to promote active mobility surrounding the main public transport nodes. At the same time, they are working with the city of Bologna on the design of mobility hubs; many of which have eliminated car parking and are providing incentives for walking.

The cities cited additional challenges they face related to stakeholder involvement. Oslo for example commented on the difficulty to recruit active mobility users, as many of them do not have safe bike parking spaces at home. Local organisations do help to reach those groups.

The cities also commented on their activities around the seamless integration of various modes and the quality of the first and last mile. Lisbon for example discussed its measure to integrate monthly public transport passes with bike sharing systems to bring people to active modes. They also noted that they are in touch with ferry operators to integrate water transport as well.

In Rome, an agreement was signed that people with annual Public Transport passes can access free micro-mobility services, which has become quite successful. Due to this, they are now working on the next steps to include benefits for monthly pass holders. Rome also noted that within the current agreement, the micro-mobility operators are responsible for covering the costs. However, this may not work in every context and may require future re-evaluation. IFP noted the importance of distinguishing between e-scooters and active mobility.

4.2.2. High-level recommendations

All four breakout rooms proved to be an insightful moment for cities to go through several measures helped by the discreet guidance of moderators and horizontal partners.

Even though sometimes moderators had to solicit cities to speak out and share their experiences (either good or bad) the exercise helped city representatives to reflect on the many selected points of attention identified as common importance during the appraisal phase. It also generated exchange among city representatives as well as horizontal partners to propose recommendations and solutions moving to the implementation phase. Due to the limited time of the workshop and the broad themes some aspects were not fully addressed so it would be interesting to check the measures development in future U-Transfer workshops. Similarly, because many of workshop topics were often complemented measures in other UPPER tasks, it would be helpful to group them by city or theme to better understand the bigger picture.

In future activities, we can also allow more opportunities for the cities to ask questions or specific feedback to the horizontal partners in case they need support with any aspects of their implementations. It is therefore important to continue the dialogue between the cities and the horizontal partners, who can provide such insights and support.

Lastly, it can be challenging to engage people in an online setting. As some participants seemed less willing to provide input during the breakout sessions, we can consider creative ways to make future workshops more engaging and attractive.

At the end of the workshop the following question was posed to the workshop participants via Mentimeter (Fig 4), the result shown in the graphic below was positive

In light of the info provided, was the workshop useful to fulfil your tasks?

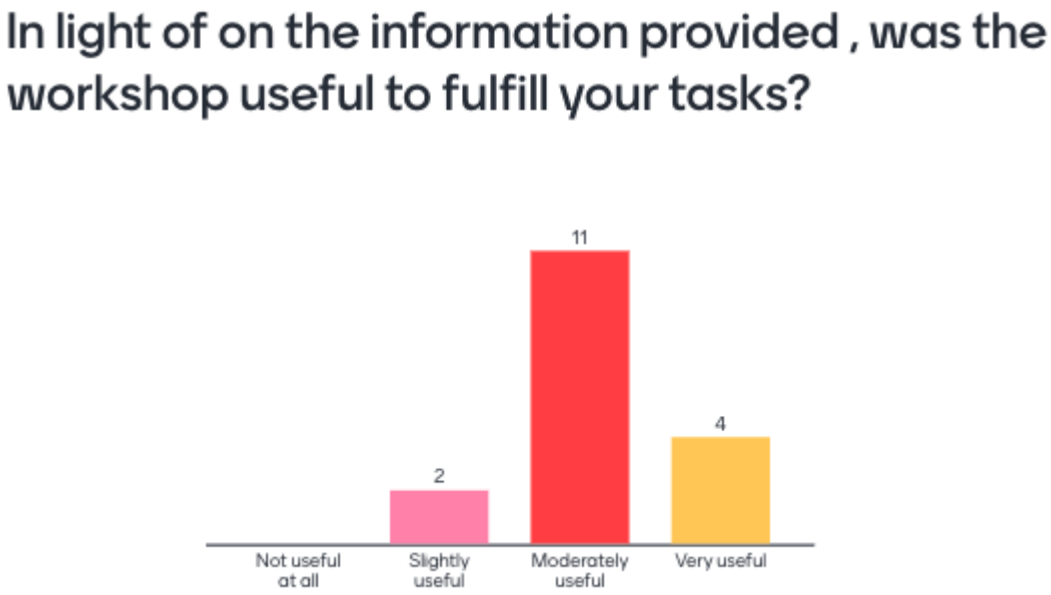

Fig 4. Feedback from participants in the WP3 workshop.

5.Measures preparation process

5.1. Redistribution of Urban Space

5.1.1. VAL_01 Redistribution of urban space with a focus on MaaR

5.1.1.1. Description of the measure and main outcomes expected

This measure is part of the major construction project being prepared for the redistribution of urban space in Av. Blasco Ibañez. This major construction project aims to: Make public transport routes wider and create a dedicated bus lane; Improve pedestrian and cyclist accessibility and access to public transport and; Adapt the sidewalks, pedestrian crossings and bus stops in accordance with the new road design.

The construction works will include, among other actions, the segregation of a lane for Bus Rapid Transit (BRT) along Blasco Ibáñez Avenue. In this avenue, three different sections are distinguished due to the different road configurations in it. For the execution of the segregation, the initial and final sections require the execution of works, so they are not included in this measure and will be completed later, with the support of Next Generation funds, but outside the scope of UPPER. Thus, this measure only includes the segregation of traffic for the BRT in the intermediate section of the avenue (Aragón Avenue– Doctor Manuel Candela Street and Ramón Llull Street) through the installation of traffic lane separators on road markings.

The aim of this measure is to support the design and implementation of the BRT system in the intermediate section of Blasco Ibáñez. To achieve this, this measure will:

- Carry out an **operations study** that includes the prescription of optimal bus stop locations, signage improvements and traffic light priority devices.
- Launch a public contract for the supply and installation of **public transport segregation elements**. Subsequent validation of the installed elements.

Civil works: will be supported with Next Generation funds (outside the scope of UPPER).

5.1.1.2. Preparation of the measure

Step 1: Characterization of the current state of Blasco Ibáñez Avenue

Based on the existing cartography, the real interferences between the different road users along the avenue have been studied, taking into account the points of greatest influx (universities, hospitals...), street furniture and connection with other modes of transport: Network metro, metropolitan buses, bicycle rental service .

Step 2: Study of alternatives

Different road layouts have been analysed to provide an optimal solution to the existing interferences between different users, adapting all of them to the creation of an exclusive lane for the BRT bus.

The preliminary analysis of alternatives has taken into account:

- Description of the action and objectives.
- Simplified timeline
- Interdependencies with other interventions

Section 2 of Avenida Blasco Ibáñez (between Av. Aragón – C. Doctor Manuel Candela and C. Ramón Llull) has merging lanes from the streets that cross the avenue and numerous intersections with reduced distance between them. In addition, there are sections where the available road width is also quite reduced. For this reason, the segregation of the bus line will be materialized through road markings and separating elements, without altering the current distribution of lanes. The work on this section will include the relocation of bus stops, the adaptation of vertical and horizontal signage and the replacement of any services that may be affected, street furniture or tree pruning, as appropriate. The study will contain all the necessary elements to guarantee the priority of public transport in the segregated lane (including road markings and separation elements).

Step 3: Validation of the optimal solution

Validation process with EMT (PTO) of the first draft of the road plan and distribution of bus stops.

Criteria of commercial speed, security, inclusion and accessibility have been considered to integrate an optimal BRT solution. In addition, to define a viable technical solution, the following key requirements have been considered:

1. **Corridor selection and route planning:** to ensure the connectivity between BRT area and major residential areas, educational institutions, hospitals, multimodal nodes and other key destinations.
2. **Lane configuration:** consider the possible interferences / pain points between BRT and turning vehicles and pedestrians.

3. **Bus stations and stops:** taking into account the location of bus stops and the design of bus stops: to locate stations at key intersections and near high-demand areas; and to ensure stations are accessible, inclusive, innovative, well-lit and secure.
4. **Safety and security:** consider the integration of safe pedestrian crossings and safe bike lanes through the entire BRT route.
5. **Social equity and sustainability:** to ensure that the BRT system serves diverse customer profiles, including low-income and marginalized communities, families and pregnant women, older people and people with disabilities.

Currently, lines 31 and 81 share a large part of their route, running jointly along the entire Blasco Ibáñez Avenue and the entrance to Ciutat Vella. Line 81 would be converted into an express line from its current origin at the Renfe Cercanías station in Cabanyal or from a new terminus next to the Malvarrosa Hospital, running along Blasco Ibáñez to join Puerta de la Mar through Puente del Real, running along Calle Colón and returning through the center, crossing Puente de la Exposición, to Blasco Ibáñez again. This line would have different services assigned to it, stopping at half or even a third of the stops it currently makes (those with the highest demand).

In order to take advantage of the possibilities of the bus lines and their exploitation as an express line, it is necessary that Blasco Ibáñez Avenue have priority at traffic lights for buses and the section of the street will have to be reformed so that the new express line could improve its commercial speed.

In addition, specific stations for this line should be included, elevated and with an innovative, inclusive and convenient design, in order to speed up the bus loading process.

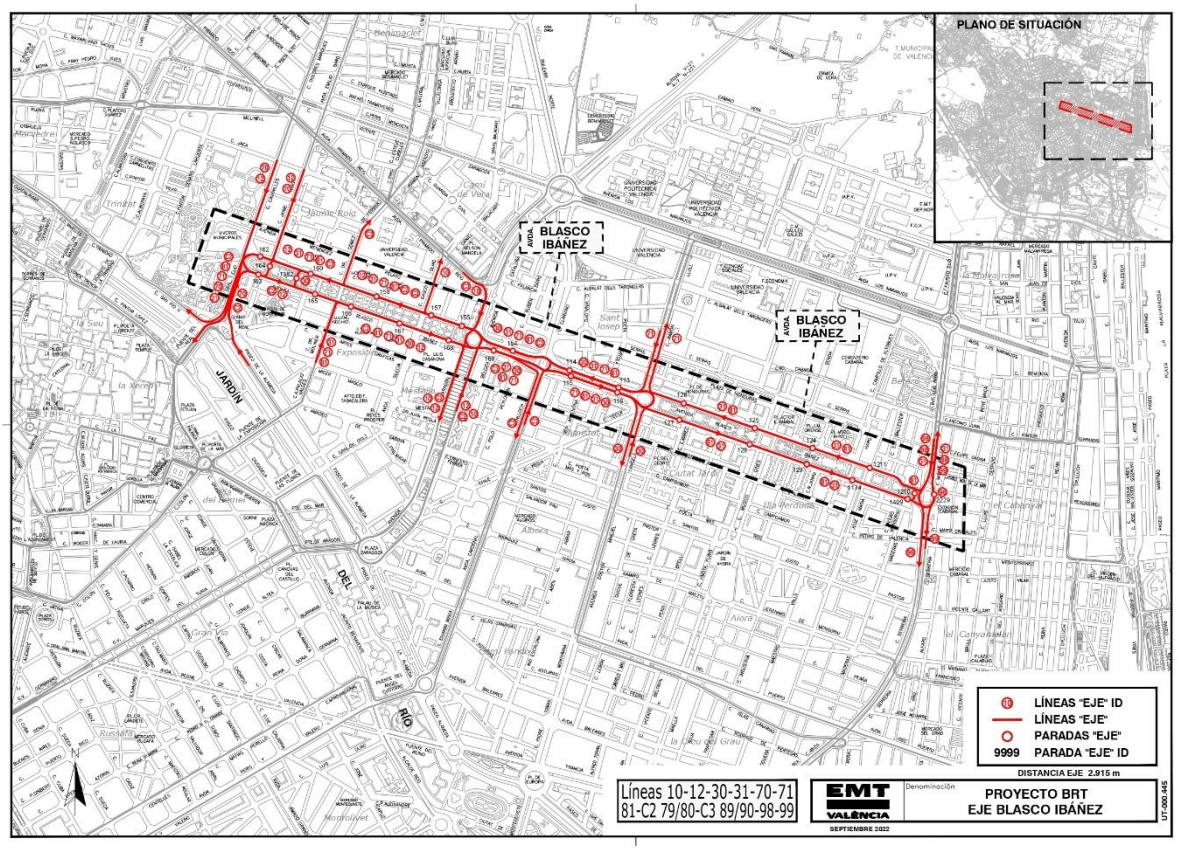

Fig 5. Location of the planned intervention, Blasco Ibáñez Avenue is represented in the central area of the image.

Step 4: Subcontracting process of the operation study, through the public contracting process

This process requires defining the technical and administrative specifications. Following steps (in WP6) will include the processing of the contract for the drafting of the operation study, finally including the supervision of the operation study. (Step initiated and in process).

The operation study aims to provide a detailed study of the technical aspects to assess the BRT implementation.

The objective of the study is the design / drafting of a road plan that includes: the location of bus stops on the axis of Av. Balsco Ibáñez, modifications to the distribution of urban space for the formation of the BRT, expansion of the space available for pedestrians and segregation of the bike lane on the road, including improvements in travel times and safety at intersections.

Methodology:

The methodology is based on the characterization of the road and traffic analysis, for the evaluation of the demand for bus stops adapted to the design of the BRT, in accordance with the new redistribution of spaces planned and a study of the necessary priority devices for buses.

Milestones of the public procurement process:

- **Preparation of the public procurement process:** this subphase includes determining the object, establishing the estimated budget and preparing the contract documentation (conditions, requirements and budget justification).
- **Request for offers, awarding of the public contract and contract formalization** *(part of WP6).*
- **Execution of the contract** *(part of WP6).***:** this subphase includes problem definition, data collection, data analysis and reporting (generation of a Policy recommendation). Once the work is completed, Valencia City Hall and EMT will carry out a post-implementation review (pilot testing) and will publish a Policy recommendation.
- **Reception of the work carried out and validation of results** *(part of WP6).*

The forecast is that the operation study will be carried out during the third quarter of the year 2024, and the validation and acceptance of the results of the study during the fourth quarter of 2024.

According to the preliminary results of the operation study, public transport segregation elements will be implemented on Avda. Blasco Ibáñez - BRT Blasco Ibáñez (Section 2: Av. Aragón – C. Doctor Manuel Candela and C. Ramón Llull).

To clarify the interdependence between steps 4 and 5 it is necessary to highlight that a comprehensive approach to technical conditions of BRT is required, in other words step 4 will provide the minimum viable knowledge to successfully initiate and complete step 5: Subcontracting process for the installation of **traffic lane separators** on road markings.

Step 5: Subcontracting process for the installation of traffic lane separators on road markings

This process requires, on the one hand, defining the technical and administrative specifications and, on the other, the processing of the contract for the supply and placement of traffic lane separators on road markings (Step initiated and in process).

The subcontracting process for the installation of **traffic lane separators** on road markings aims to provide the supply and installation of road markings and fixed separating elements intended to improve the efficiency and safety of public bus transport services on Avda. Blasco Ibáñez for the implementation of a Bus Rapid Transit (BRT).

Technical conditions:

- **Priority traffic lane separators:** priority **traffic lane separators** will guide decision-making, resource allocation and progress assessment.

Milestones of the public procurement process:

- **Preparation of the public procurement process:** this subphase includes determining the object, establishing the estimated budget and preparing the contract documentation (conditions, requirements and budget justification).
- **Request for offers, awarding of the public contract and contract formalization** *(part of WP6).*
- **Execution of the contract** *(part of WP6):* this subphase includes infrastructure completion, system testing and system integration.

  Once the work is completed, Valencia City Hall and EMT will carry out a post-implementation review (pilot testing).
- **Reception of the work carried out and validation of results** *(part of WP6).*

To sum up, the main output of this step will consist of the supply and placement of fixed traffic lane separators on road markings aimed at improving the efficiency and safety of the public bus transport service on Blasco Ibáñez Avenue for the implementation of a bus rapid transit (BRT).

The installation of traffic lane separators on road markings and the consecutive validation and acceptance of the results of the pilot tests is expected to start in the fourth quarter of 2024.

5.1.1.3. Challenges and mitigations

Bus rapid transit (BRT) systems are considered a solution to urban mobility challenges due to their cost-effectiveness, efficiency and flexibility compared to private cars or other polluting systems. However, there are several challenges associated with the operation of BRT systems, and each challenge has corresponding mitigations. Below are some key challenges and possible mitigations:

Challenges:

- Define a coherent BRT mobility solution according to existing urban and mobility planning (PMUS and draft EMT Master Plan).
- Addressing the wide variety of interests and needs of clients and businesses around Blasco Ibáñez Avenue.
- Integrate BRT infrastructure within existing urban roads without causing significant disruption.

Mitigations:

- **Phased implementation:** start with a Policy recommendation to demonstrate the benefits and co-benefits of implementing measures that promote the redistribution of urban space with a focus on Mobility as a Right.

5.1.1.4. Next steps towards implementation

The next steps necessary to proceed with the implementation of the measure (already taking place under WP6) are briefly described below.

Study of offers and award of contracts

- Evaluation of technical proposals (tender process).
- Awarding of the public contract and contract formalization.

- Execution of the contract.
- Reception of the work carried out and validation of results.

Reception of documentation / installation of traffic lane separators on road markings:

- Execution of technical tasks: technical analysis and proposal of technical work.
- Validation and acceptance of the technical document/supply and facilities.

5.1.2. ROM_08 Designing the urban space to promote active travel modes, PT and environmental 30 Km/h zones

5.1.2.1. Description of the measure and main outcomes expected

The promotion and development of pedestrian mobility is connected not only to increasing the liveability of the urban areas, urban regeneration and increasing accessibility levels, but also to guaranteeing optimal road safety standards, especially for weaker users and PT passengers.

The SUMP and the actions for the development of 'soft' mobility aim to reduce the rate of motorisation, which is among the highest in Europe: by reducing car traffic, in particular the space occupied by parked cars, it will be possible to carry out a new organisation of the available road space, which favours not only the PT, but the development of alternative mobility systems, offering new spaces for gathering and socialising, and raising the levels of liveability and road safety, as well as safety and security in general.

The measure aims to achieve several objectives, already included in the SUMP, concerning increased road safety and the accessibility and safety to PT stops.

The Administration drew up a **Zone 30 Plan,** which was presented to municipal offices and the political and technical representatives of the districts; the Plan identifies the zones within which the representatives of the districts indicate the roads for which the 30 km/h speed limit will be introduced. These will be the subject of interventions, including experimental ones, to limit speed and make crossings and intersections safe; within these areas, raised pedestrian crossings, raised intersections at pavement level, chicanes will be created.

5.1.2.2. Preparation of the measure

Select new 30km/h zones

The 30 km/h zones (Fig 6, Fig 7) have been identified according to the needs presented by each boroughs to RSM technicians and Mobility Department: from operative point of view the technicians identify the “Environmental Islands” (see the next map), that include street reorganization, traffic calming measures and speed limits and the design of new spaces for pedestrian citizens along the main pedestrian routes and street reorganisation, improving the accessibility to bus stops.

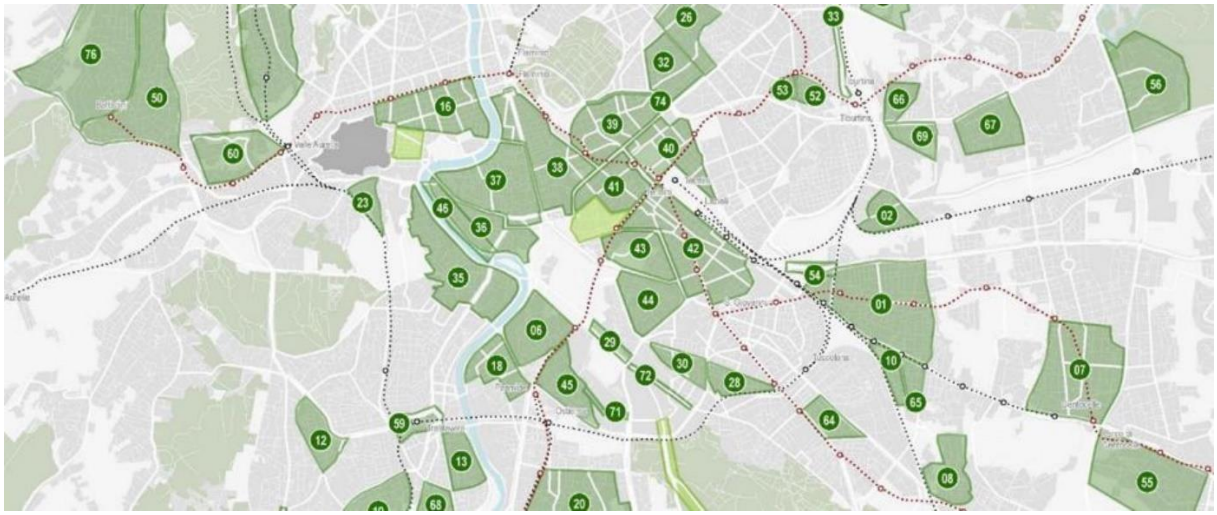

Fig 6. ROM_08: New 30km/h zones for Rome (I).

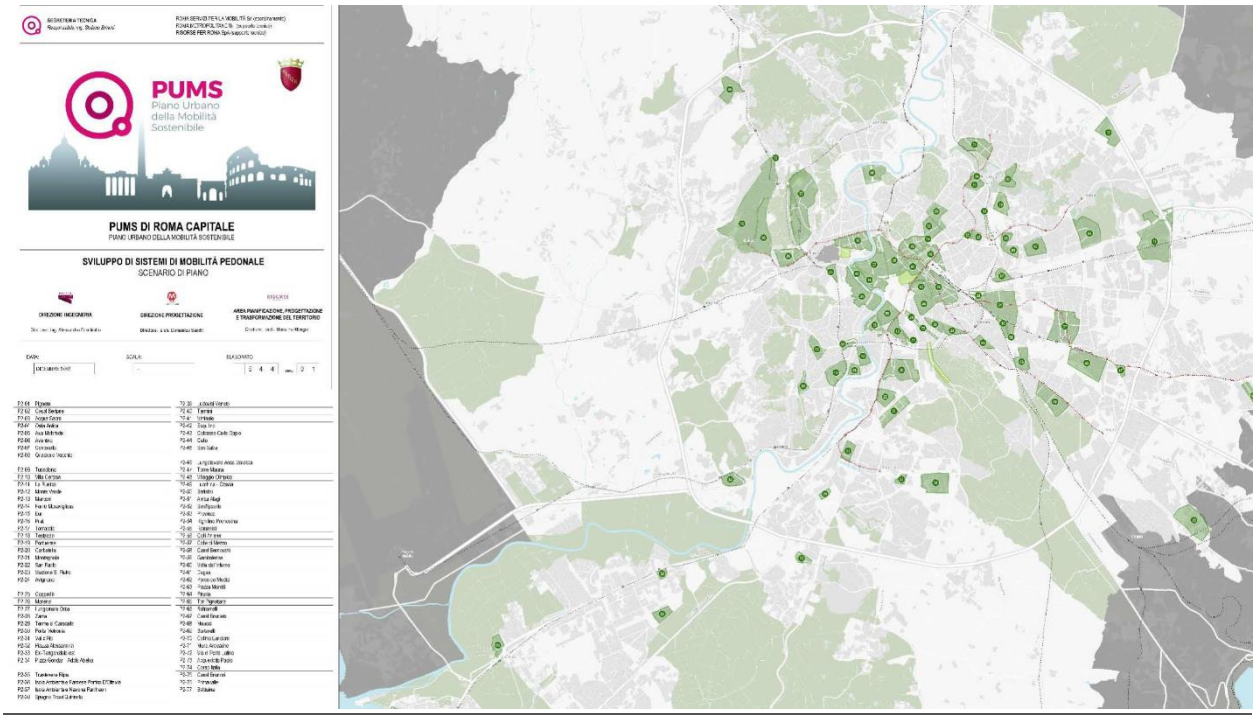

Fig 7. ROM_08: New 30km/h zones for Rome (II).

Within the scope of UPPER project, the focus will be in monitoring the set-up of some of these 30km/h zones, and the ex-post evaluation of these interventions.

The actuation zones are located in:

- North-east quadrant (Casal Monastero)
- Southern city district (Fonte Meravigliosa “environmental island”)
- City centre (6 environmental island)

Define new traffic schemes for new 30km/h zones.

For each of the new 30 km/h zone, new traffic scheme need to be defined so as to avoid the traffic crossing of the area, favouring the reduction of the speed and the local journey, as showed in the next scheme.

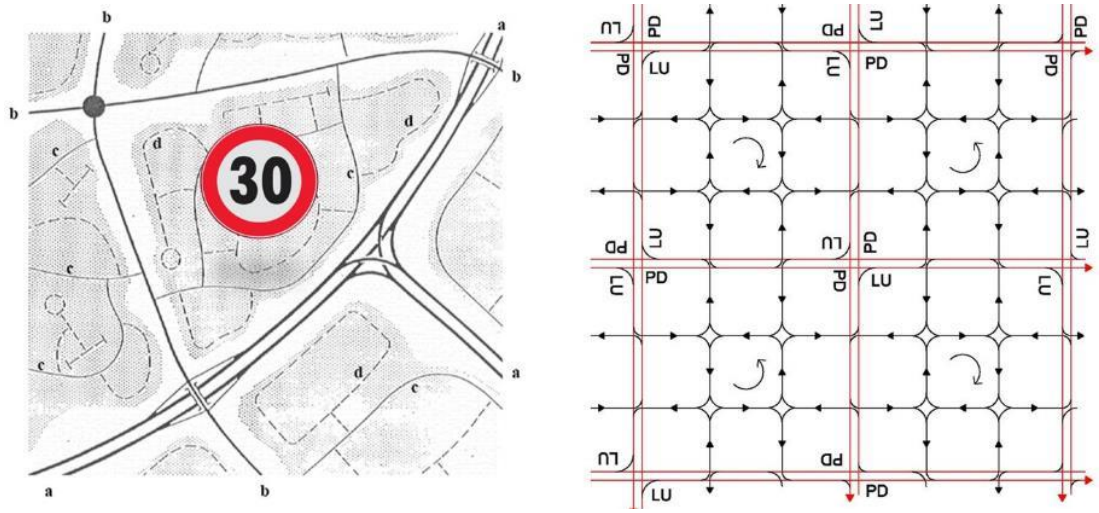

Fig 8. New traffic schemes for new 30km/h zones.

The definition of the policy and the new traffic schemes required the involvement of residents and relevant stakeholders. To do so, a participatory planning process was held to share the planning proposal and receive feedback and suggestions from participants. As a result, detailed Traffic Plans are defined for the environmental islands by Mobility Department and borough.

Setting-up the 30km/h zones and environmental islands

The main pedestrian routes from/to the PT stops were identified and the need for improvement was assessed. Along the identified main pedestrian routes, new urban spaces for pedestrians and citizens were designed. Finally, the implementation of new urban spaces along the main pedestrian routes was prepared.

Below is the **"Casal Monastero"** urban space project (Fig 9, Fig 10) for lower speed, opened at the end of January 2024, in the north-east quadrant of the city. A 'Zone 30' has been implemented to significantly reduce vehicle speeds, prioritizing pedestrian safety, especially for those accessing or leaving the school on the avenue. This initiative also led to the establishment of a spacious pedestrian zone and a new large square in the central area, designed with a focus on safety for vulnerable users such as the elderly and children.

In terms of urban redevelopment, a former car park in the middle of the road has been transformed into a large green space. Additionally, architectural barriers were removed, and sidewalks were expanded, effectively narrowing the two lanes of traffic. Pedestrian areas are now safeguarded by continuous pedestrian protection elements, which also serve as deterrents against unauthorized parking, enhancing protection for the newly redesigned area.

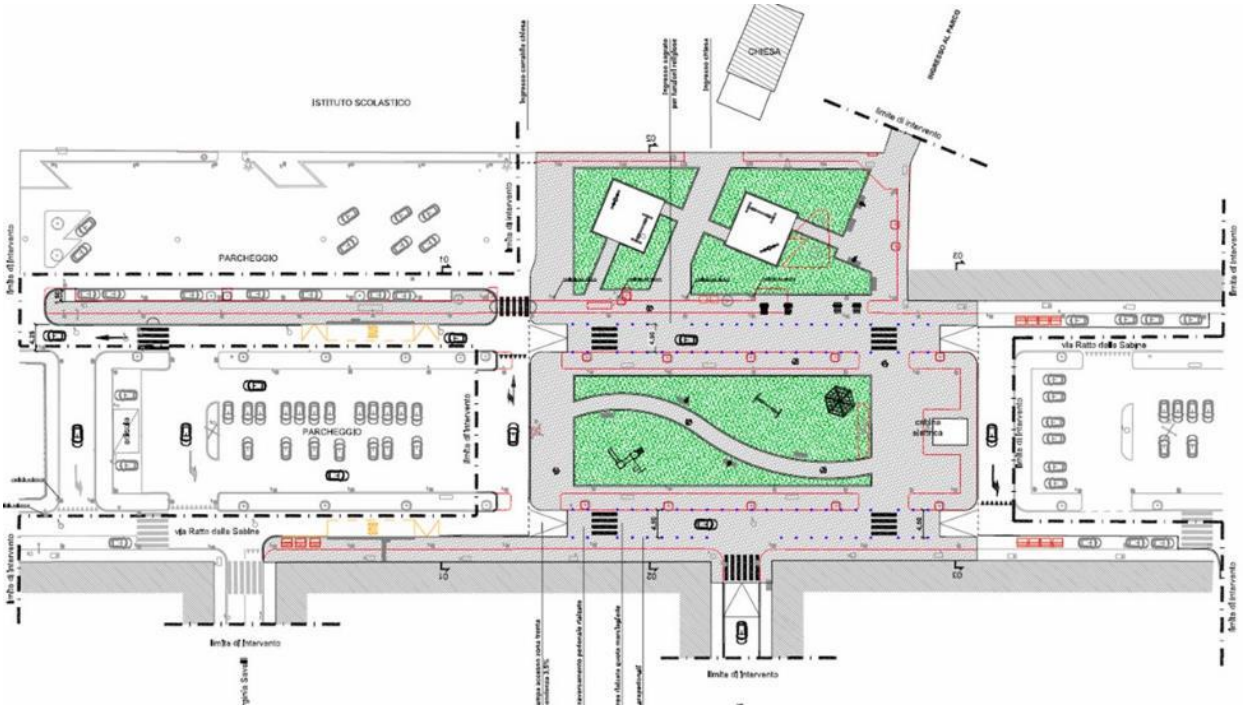

Fig 9. "Casal Monastero" urban space project (I).

Fig 10. "Casal Monastero" urban space project (II).

The second 30 km/h Zone is placed in the southern side of the city, in the area named **Fonte Meravigliosa** (Fig 11): the intervention includes safe and continuous pedestrian paths and spaces to move within the environmental island, as well as the creation of a local cycle network that allows short journeys to be made. Opposite one-way streets are planned, infrastructures are created to facilitate gentle mobility, such as pedestrian and cycle paths, and to improve road safety. Finally, a cycle path connection will be created towards the Laurentina metro interchange hub, connected with the new cycle path. The next pictures show the construction site, soon to be opened.

Fig 11. " Fonte Meravigliosa" urban space project.

Prepare the communication campaigns towards the stakeholders involved.

Regarding the promotion of cycling, the Mobility Department, supported by RSM technicians, are setting up the “Biciplan” to improve the network and reconnect the actual bike lines, favouring the accessibility toward main mobility hubs of public transport, as recommended by the SUMP.

5.1.2.3. Challenges & Mitigations

For the intervention of Fonte Meravigliosa, the delay is due to a change in regulations that prevented the widening of the pavement: the technicians are waiting for an opinion from the Environment Department.

5.1.2.4. Next steps towards implementation

As recommended by the SUMP, the Administration will carry out the Detailed Traffic Plans, functional to the identification of other Environmental Islands and related 30 km/h Zones, in the central and peripheral areas: Plans for the Historic Centre have been approved by the Borough Hall and the Mobility Department, while waiting for the funds allocated in the budget. Currently, with the support of the Mobility Department, RSM is agreeing on six technical and economic feasibility projects (for the 6 environmental islands to be deployed in the city centre). By the end of the year, the official act (Council Resolution) will be ready to start the projects, including the measure to secure the bus stops (measure already implemented for Fonte Meravigliosa and Casal Monastero).

The map below (Fig 12) shows the six areas described: the main road network could be covered by electric minibuses.

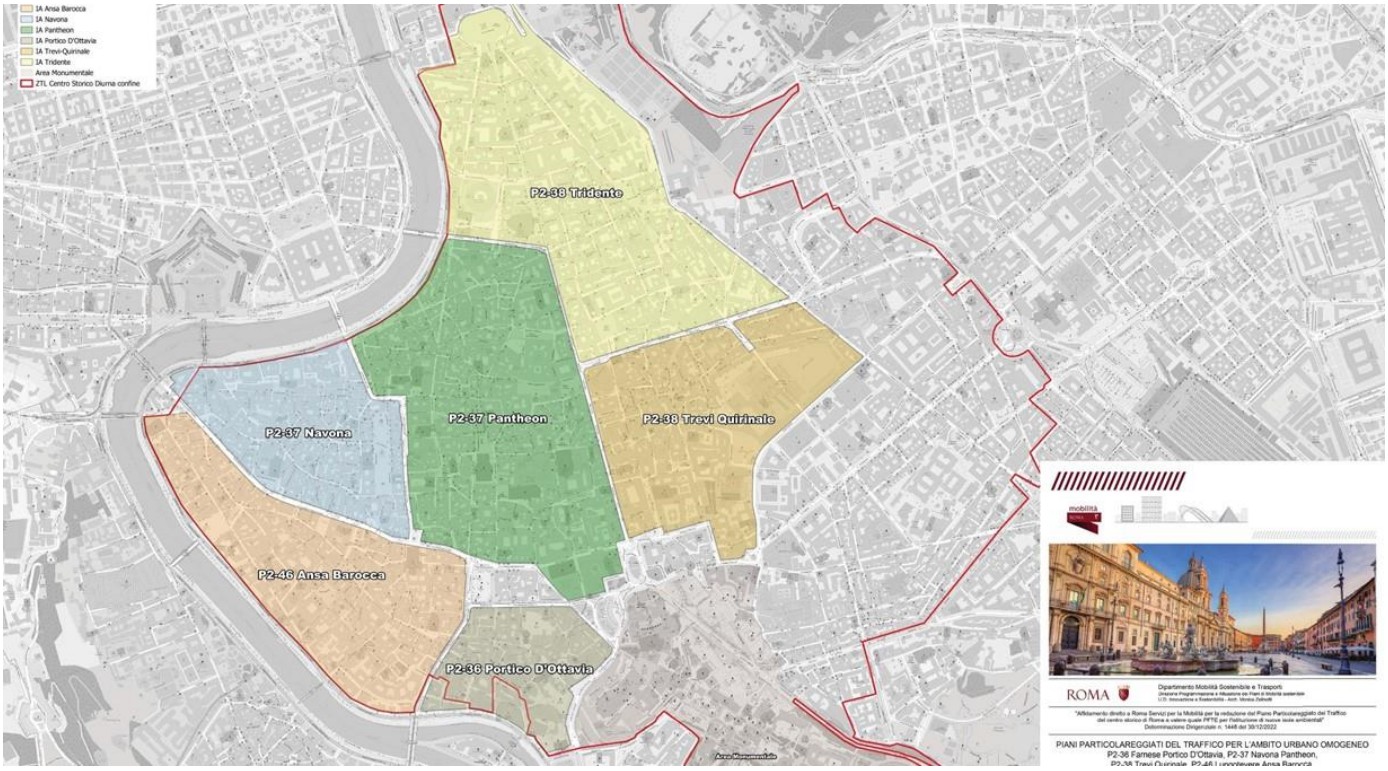

Fig 12. Environmental islands in the city centre.

5.1.3. MAN_08 Redesign urban space and test alternatives of using it for social purposes

5.1.3.1. Description of the measure and main outcomes expected

Mannheim is already taking numerous measures to redesign public spaces in favour of sustainable forms of mobility. One such measure is the conversion of car parking spaces into bicycle parking spaces or areas for gastronomy. Currently, a Master Plan is being developed to reduce the use of private transport.

In Mannheim, as in many other German cities, parking was not clearly regulated with road markings in all streets and partial parking on pavements to the detriment of pedestrians was tolerated for a long time. The city of Mannheim is now going to replan street-side parking in accordance with state law. This means that especially in areas with narrow pavements, cars will not be longer allowed to park. Partial parking on pavements will only be tolerated on very broad pavements where signs and road markings clearly allow it.

In the context of parking space reorganization, the existing situation of parking is first recorded across entire city districts and then reallocated and redistributed. This process also provides opportunities to reallocate public space and improve the functionality of streets for the safe coexistence of all road users. These ambitions require the development of a template pattern that allows for shared standards while also providing enough flexibility and innovative solutions for parking spaces.

The reduction of parking spaces in urban areas, the redesign of public spaces, and in a later step outside of the project also a possible alternative uses for purposes such as bike-parking are key components of this initiative. The process of re-allocation of parking spaces may serve as a trigger for citizens to consider alternative modes of transport such as PT.

5.1.3.2. Preparation of the measure

Define the framework and coordinate the measure framework in the administration

In preparation for the implementation of the new parking regulation, a project group was formed at the City of Mannheim for the topic. This group developed the basic guidelines and rules for the procedure as a reaction of the city to the new directive of the Bundesland of Baden-Württemberg. For example, it was clarified under which conditions which forms of parking can be permitted in future, when signage or markings are necessary or structural restrictions are imposed by bollards. This process took place outside of the project due to its city-wide relevance. It also ensured that all responsibilities within the city administration were clearly allocated and clarified. This concerns the responsibilities for recording and re-planning, as well as for authorisation and implementation.

Define the relevant quarters, where action is needed

The next step was to define in which neighbourhoods, and in which order the parking space should be re-planned. The new regulation will gradually be implemented throughout the city and has already been implemented in certain areas. As part of the UPPER project, however, the focus will be on the district of Schönau, serving as a model quarter in the project. Mannheim-Schönau is as residential district in the northern outskirts of the city particularly suitable for various reasons. The district is about 9km away from the centre and good connected to a national highway. It is mainly characterized by a mix of high-rise apartment buildings and single-family homes. There are only a few employment options in the neighbourhood itself, causing that most residents commute to other areas for their work. The area benefits from well working public transport connections with Tram Line 1 to the city centre and the south of the city as well as tangential Bus Lines 50 and 51. Local amenities such as schools, shops, and healthcare facilities are conveniently located, making Schönau a well-connected and self-sufficient community within Mannheim. However, as typical for a suburban residential neighbourhood car ownership is rather high despite the good PT connection.

Carry out planning in a certain neighbourhood and identify needs

The current parking situation in the neighbourhood was then recorded and assessed (Fig 13). This was done partly by analysing satellite pictures of the streets as well as analysing the situation on site. Up to now, there have been four main options in areas where parking has not been precisely regulated:

- Parking completely on the road if the road width is sufficient.
- Half-side parking on the pavement.
- Complete parking on the pavement.
- Areas with no parking space at all.

In future, stricter standards will apply (Fig 14), ensuring that at least 1.50 metres of pavement must remain free (previously in extreme cases approx. 1 metre), as well as a remaining road width of 3.5 metres (previously up to 3.16 metres). These legal regulations and concepts were then used to work out how the car park should be redesigned in future.

Fig 13. Illustration of different parking modes

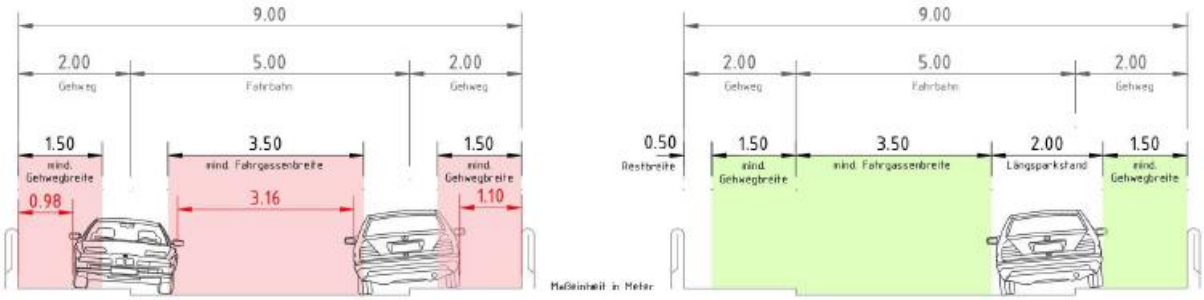

Fig 14. Guidelines on Necessary Remaining Width

In some cases, changes in the road space were also pre-drawn with spray chalk purely for planning purposes.

Fig 15. Changes pre-drawn with spray chalk for planning purposes

As a result of the planning process, a total of almost 19 kilometres of roadside, which are currently parked without regulation, need to be planned over. In future, almost 4.02 kilometres of roadside parking will be dropped in the area. In the next steps, this planning must now be verified and confirmed again by various bodies. The measure will then be implemented with new markings, road signs, bollards, and controls. At the same time, the reorganisation of parking will also provide new spaces on sidewalks that make it easier to repurpose the space in future, for example for bicycle parking facilities or outdoor gastronomy. Mainly the reorganisation will however ensure that pedestrians will have a usable pavement at all, as the following exemplary picture (Fig 16) of the current situation at Karlsberger Weg 5 shows. In future, it will no longer be possible to park here at all, instead of parking on the pavements, which were previously blocked by cars.

Fig 16. Example of parking not regulated

The following maps (Fig 17, Fig 18, Fig 19) show in which road sections parking will be reorganised in future and what type of parking will be regulated in future.

Area 1 Schönau North

Fig 17. Road sections parking to be reorganised in Area 1 Schönau North.

Area 2 Schönau Centre

Fig 18. Road sections parking to be reorganised in Area 2 Schönau Centre.

Area 3 Schönau South

Fig 19. Road sections parking to be reorganised in Area 3 Schönau South .

Key for Newly Regulated Roadsides

- Parking on Road
- Parking half on Pavement
- Parking on Pavement
- No Parking

5.1.3.3. Challenges & Mitigations

The implementation of the measure is challenged above all by the fact that the labour market is currently experiencing a considerable shortage of skilled workers. As a result, the transport planning department and the traffic authority for authorisation are under a considerable workload. This is leading to delays in the implementation of the measure. However, it was possible to handle the task mostly with already existing staff, although not as quickly as previously planned.

Another challenge is the numerical comparison of how much parking space has been changed in the future. Previously, no parking space was signposted in most areas, but roadside parking was largely tolerated. As a result, it is not possible to quantify exactly how many parking spaces there were before the conversion. However, it is at least possible to roughly estimate how many metres of parking space will be reorganised in the future.

Originally, it was also planned to accompany the measure with public relations work. Nevertheless, this cannot be realised with the existing forces and resources. Instead, the city of Mannheim informs the citizens via the neighbourhood councils. Another challenge is that this measure is causing a great deal of public controversy. In many areas, public acceptance of a reorganisation of parking space is very low. At the same time, the public order service lacks the personnel resources to ensure compliance with the new parking rules across the board and to sanction offences. Unfortunately, the administration lacks the human resources for a detailed accompanying communication campaign, apart from ongoing press relations work and communication with the neighbourhood councils. Thus this part could not be realized.

5.1.3.4. Next steps towards implementation

The next step is to discuss and approve the new plans internally and submit them to the relevant committees. This will be done after the summer break 2024. The local district advisory council will be involved in autumn and their objections will be recorded and analysed. The planning will then be officially approved by the traffic authority. This can then be implemented with new road markings and signs. Appropriate construction companies will be commissioned with the implementation, which will then be carried out road by road (estimated in Summer 2025).

5.1.4. LIS_05: To enhance multimodal interconnection with the peri-urban municipalities

5.1.4.1. Description of the measure and main outcomes expected

This measure has two sub-measures described below as task 1 and 2.

Sub-Task 1: Review the cycling infrastructure plans – an audit to the city's cycling network has identified the main problems of the network and the prioritization of the interventions to be carried out. Based on that, the network plan was redesigned, and its milestones planned.

Sub-Task 2: Plan for the expansion of the bike sharing system – the development of the expansion plans supported by data (namely, user demand) in order to expand to major interfaces and the neighbouring cities is sought.

5.1.4.2. Preparation of the measure

Sub-Task 1: Review the Cycling Infrastructure

Public tender to purchase the technical audit concerning existing bike lanes

In this sub-task, CML launched the public tender to purchase the technical audit, which was adjudicated in March'23 to the company Copenhagenize.

Delivery of the cycling network improvement audit

Through March to December'23 we followed-up the company's (Copenhagenize) technical field work. Specifically, in June'23 CML launched an online survey for the population in order to gather data and understand their perception of the cycling network in the city and biking habits. We had almost 5000 answers.

Furthermore, on October 24th to 27th Copenhagenize planners travelled to Lisbon to conduct a Knowledge Transfer Workshop with a group of ~20 members of different planning departments from the city of Lisbon. This event was also used to lobby with Vice Mayor that has responsibilities on this matter, to inform about the current state of the assessment.

Fig 20. Front cover of the audit Report

The cycling network improvement final Audit was delivered, in December 2023. This Report is constituted by: a network analysis that combines extensive on-site observation with data-driven spatial analysis to assess Lisbon's bicycle network according to 8 criteria - Directness, Connectivity, Intermodality, Attractiveness, Comfort, Safety, Coherence, Readability. The observation data were combined with open-source data and data provided by the City of Lisbon to conduct quantitative and qualitative analysis, carried by Copenhagenize, of the network using GIS.

Identification of cycling network improvement locations

The identification of the cycling network improvement locations was carried out based on the results of that analysis, therefore as the calendar for its execution. The 8 criteria above gave us the structure for the definition of the missing

links of our network. This process led to the network expansion milestones planning. This work was publicly presented by the Mayor and Vice-Mayor on the 23rd of May. The work was also published online.[3]

Fig 21. Online publication "Lisbon cycling network redesigned with more safety and functionalities."

The baseline identified in the public presentation[4] includes the following components:

- 14 High level missing links
- 54 Missing links
- 30 Intersections with problems

The Action Plan (Fig 22) defines:

- Increase cycling network in 50%
- Create 56 bike lanes/missing links
- 13 M€ investment
- + 90 Kms
- 1.7 M€ for cycling network maintenance

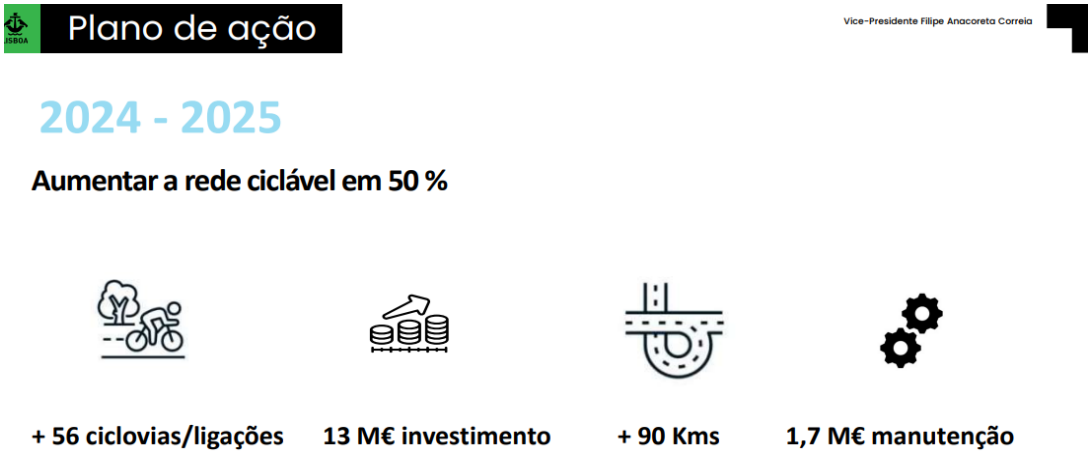

Fig 22. Action Plan key figures, as presented by the Lisbon Mayor (23.05.2024)

[3] https://www.lisboa.pt/temas/mobilidade/estrategia#c2382 & https://informacao.lisboa.pt/noticias/detalhe/rede-ciclavel-de-lisboa-redesenhada-com-mais-seguranca-e-funcionalidades

[4] Full version can be consulted at: https://informacao.lisboa.pt/fileadmin/portal/temas/mobilidade/rede_ciclavel/Apresentacao_Plano_Acao_24_25_Rede_Ciclavel.pdf

Below, the plant with the cycling network expansion planning is presented (Fig 23).

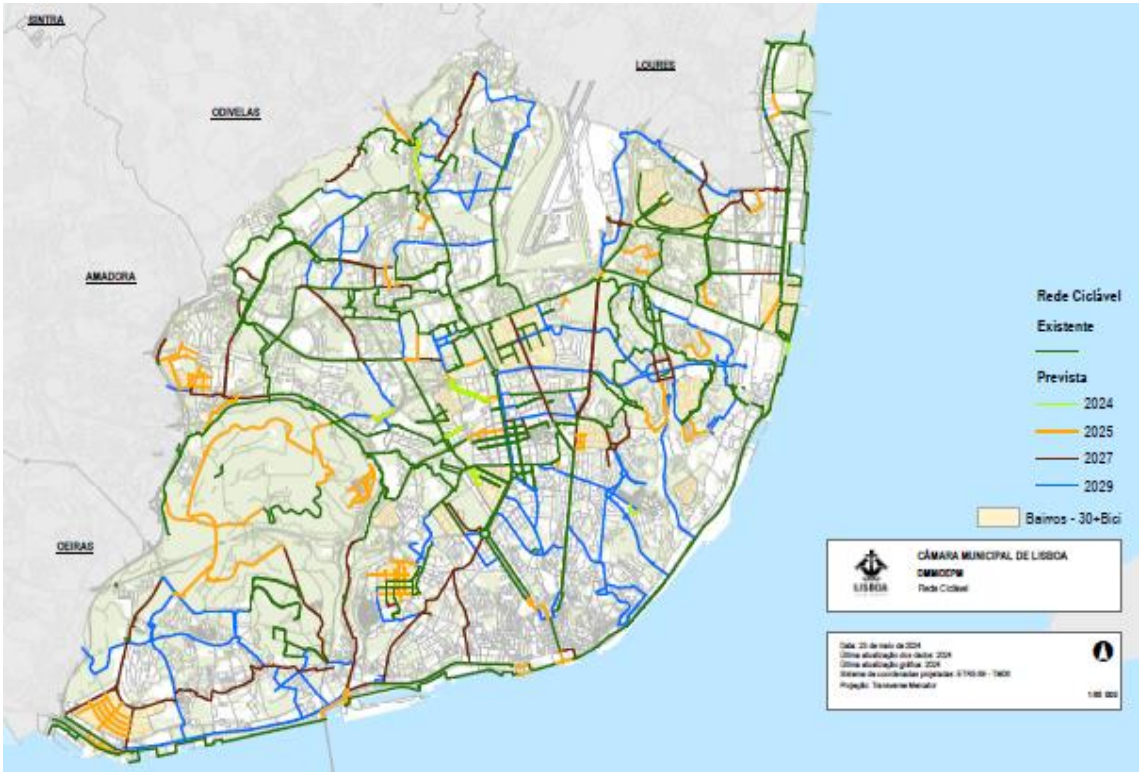

Fig 23. Cycling network expansion planning

Sub-Task 2: Plan for the Expansion of the bike Sharing System (GIRA)

Data collection and analysis

CML collected and analysed Data from several sources, namely: heat maps from the users' preferential routes of the GIRA system and demand/feedback requests from citizens though municipal public platforms (*Naminharua* Lx website; EMEL website; on site public citizen service Stores).

Selection of areas to expand bike sharing network.

Based on the analysis of the collected data, the planning of the areas of the bike sharing system were (re)defined – the areas with more citizens' requests and with stronger heat maps were taken in higher consideration in the decision when selecting the areas for expansion of the bike system planning, also matching with the political decision for serving every parish in the council.

Delivery of the bike-sharing system expansion plan

The several cycling network expansion phases (Fig 24) are as follow:

- Macroplanning
- Project
- Operation

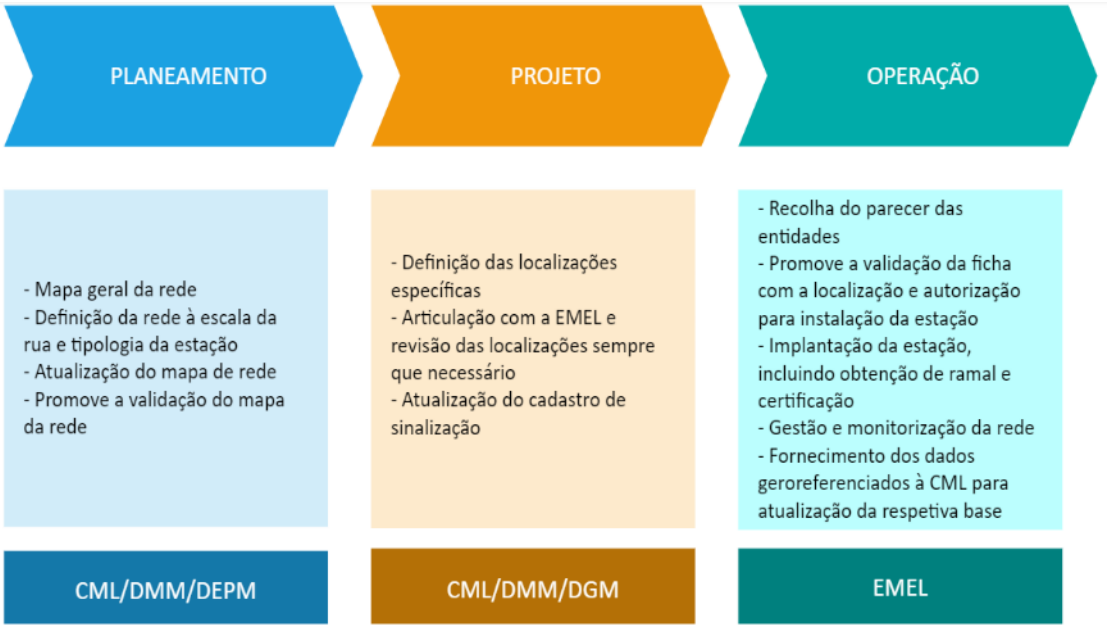

Fig 24. Bike Sharing expansion phases

The main technical planning criteria were:

- Assume the continuity along certain axes and stations boundaries - therefore, the definition of network expansion must overcome administrative limits (neighbouring municipalities of Lisbon), ensuring a cohesive and coherent structure that encourages the adoption of this means of transport;
- Assume locations of several generating poles (1st and 2nd level interfaces, Metropolitan and boat stations, markets and areas with expressive offices, shopping/restaurant streets, universities, hospitals and stadiums), with the areas with the highest population density, close to cycling networks and with a preferential distance of 400m between stations and inferring proposals for the installation of future priority stations, in line with recognized good practices in this field.

At the moment CML already has a preliminary version of the bike sharing system plan of expansion. This preliminary version focus the milestones for the upcoming year (2025).

Below, the plan with the expansion of the bike Sharing planning is presented (Fig 25).

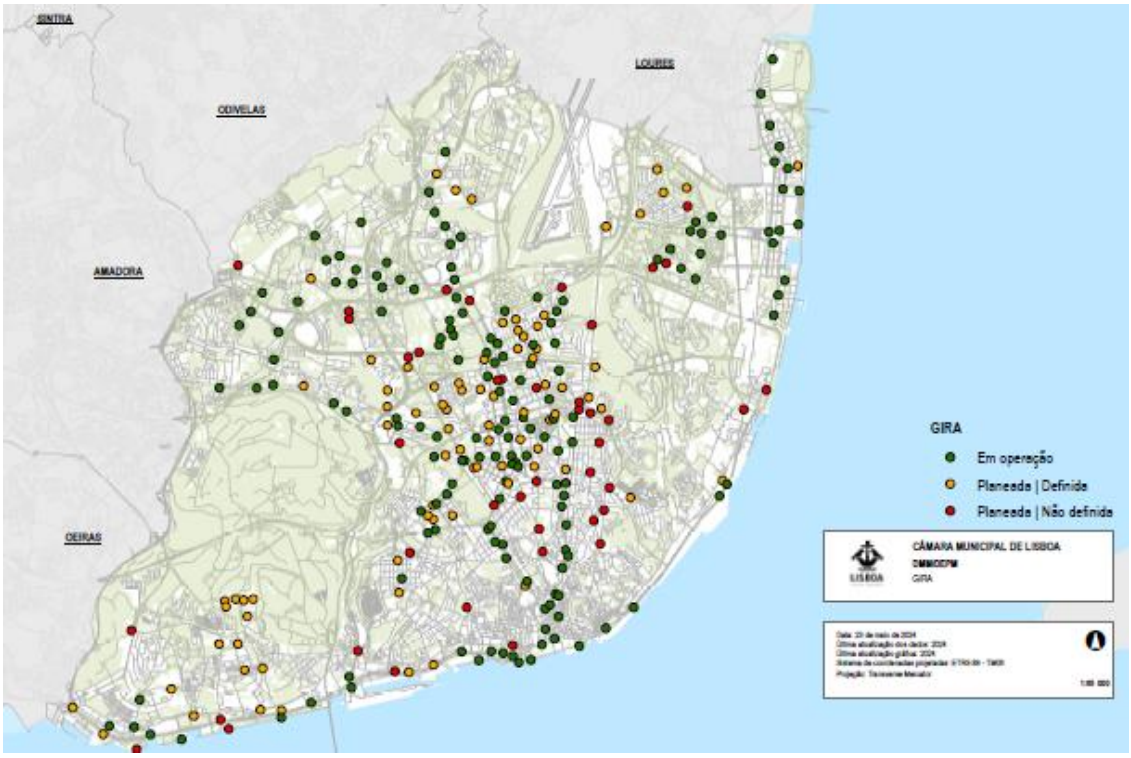

Fig 25. Bike Sharing planning

The first public announcement of the bike Sharing planning was conducted by the Mayor and Vice-Mayor on the 23rd of May, defining the milestones[5].

The milestones presented are as pictured in the figure below (Fig 26).

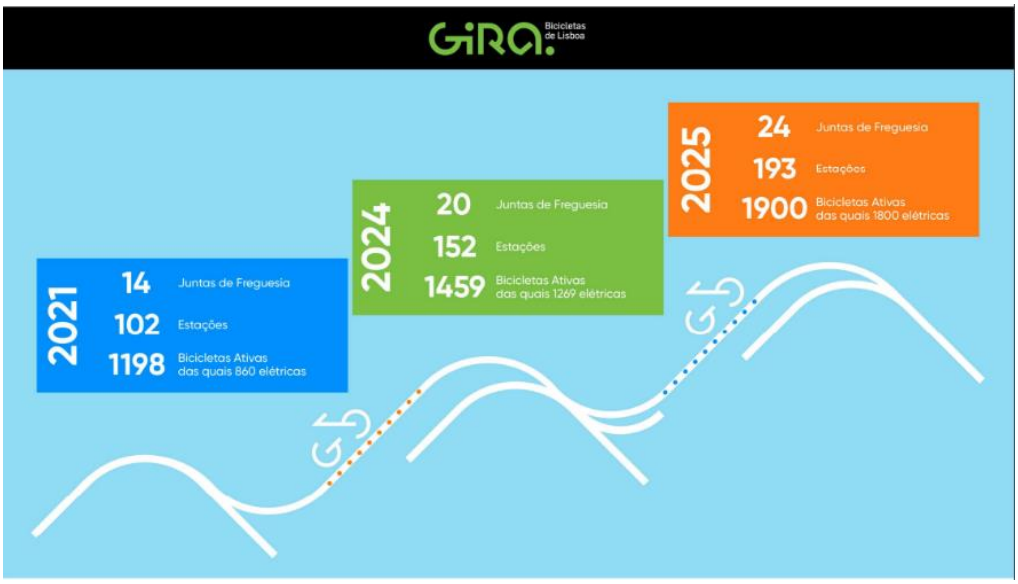

Fig 26. Milestones for bike sharing system expansion, as presented by the Lisbon Mayor (23.05.2024)

[5] Please refer to online publication here https://informacao.lisboa.pt/noticias/detalhe/rede-ciclavel-de-lisboa-redesenhada-com-mais-seguranca-e-funcionalidades or https://www.lisboa.pt/temas/mobilidade/estrategia#c2382

5.1.4.3. Challenges & Mitigations

Sub-Task 1: Review the Cycling Infrastructure

The political executive of the municipality had some questions regarding the technical conclusions of the audit report that needed to be clarified, which delayed the public announcement.

Sub-Task 2: Plan for the Expansion of the bike Sharing System

The biggest challenge was to plan the expansion of the bike sharing system, without having any parish underserved which will be accomplished.

The fact of the GIRA expansion being developed by EMEL (municipal company) sometimes brings some organizational constraints which require ongoing attention and follow-up.

5.1.4.4. Next steps towards implementation

Sub-Task 1: Review the Cycling Infrastructure

Even though the LIS_05 measure output is already reached, CML will start the planned network expansion plan by developing the specific implementation projects (design, review) which will be followed by the infrastructural works.

Sub-Task 2: Plan for the Expansion of the bike Sharing System

Installation of new bike stations. The planning and its execution is an ongoing process and also incremental, therefore it´s expected successive development stages/milestones.

5.2. Multimodality (Physical Integration of mobility services and Hub Creation)

5.2.1. VAL_02 Creation of a network of multimodal hubs

5.2.1.1. Description of the measure and main outcomes expected

This measure aims to establish a network of multimodal hubs in Blasco Ibáñez avenue, one of the main arteries of the city. The goal is to facilitate the seamless and efficient transitions between different transport modes in the hubs created both, along the avenue and in the main connection points to the same.

This effort is part of the broader Blasco Ibáñez redesign project, aimed at enhancing sustainable mobility along this route. The initiative includes an evaluation of the corridor's current transportation services, identifying needs and barriers to encourage modal shift. Building on the gathered insights, the hubs' transportation services will be enhanced, focusing on improving intermodal connections. Particularly, the measure includes the installation of real-time multimodal information panels, ensuring travellers have up-to-date information on available transportation options at each hub.

VAL_02 will deliver a network of multimodal hubs in Blasco Ibañez Avenue. The actuation over each hub includes:

- Improvement of the PT frequency.
- Better connection between PT modes, including the redistribution of the location of the PT stops.
- The deployment of multimodal panels with real-time information on the sustainable and PT mobility offer in the hub, including maps clearly and easily showing the situation of every mobility service.

5.2.1.2. Preparation of the measure

Blasco Ibáñez avenue is one of the main backbones of the city, connecting the maritime area with the city centre. This is why this axis has been chosen for the implementation of this measure, aimed at creating a network of multimodal hubs to promote the change to more sustainable forms of mobility, both in terms of public transport and active mobility.

When talking about the establishment of a network of multimodal hubs, it's important to understand that a mobility hub transcends mere transit stations. These hubs encompass major transport nodes and their surrounding areas, playing a vital role in the regional transport system as starting points, destinations, or transfer points for a substantial portion of journeys. They serve as pivotal points of connectivity, seamlessly integrating various modes of transportation—from walking and cycling to public transit—while also serving as hubs for communities where people live, work, shop, and engage in recreational activities.

To establish this network of multimodal hubs, three critical factors have been considered:

- Infrastructure: This involves strategically reallocating stops for various modes of transport and ensuring close proximity between them to facilitate rapid mode switching.
- Frequency: Emphasis is placed on ensuring frequent services to promote seamless and efficient intermodality.
- Information provision: Access to real-time and consolidated data on sustainable transport options is crucial for guiding user decisions.

Study of the mobility offer in the implementation area

A study of the service offer in Blasco Ibáñez was carried out to prepare the "Blasco Ibáñez Master Plan" and the "actions to be implemented in Blasco Ibáñez based on the master plan". The objective was to evaluate the current PT offer in the actuation area and to identify gaps and opportunities to improve the service.

The study focused on the merging of bus lanes 31 and 81, since both share a large part of their route, running jointly along the entire Blasco Ibáñez Avenue and the entrance to Ciutat Vella.

Definition of actuation plan to improve connection among PT modes in the hub

As a result of the study of service in Blasco Ibáñez avenue, an actuation plan to improve service offer was established. The actuation plan refers to two relevant aspects:

- The redistribution of the location of the stops for the bus. This study is linked to the construction project being tendered in measure VAL_01. Therefore, the redistribution of PT stops can only be determined once the tender is closed and awarded (end of 2024).
- Regarding the improvement of the PT offer in Blasco Ibáñez, a Master Plan was defined. Line 81 would be converted into an express line from its current origin at the Renfe Cercanías station in Cabanyal or from a new terminus next to the Malvarrosa Hospital, running along Blasco Ibáñez to join Puerta de la Mar through Puente del Real, running along Calle Colón and returning through the centre, crossing Puente de la Exposición, to Blasco Ibáñez again. This line would have different services assigned to it, stopping at half or even a third of the stops it currently makes (those with the highest demand). In order to take advantage of the possibilities of the bus lines and their exploitation as an express line, it is necessary that Blasco Ibáñez Avenue have priority at traffic lights for buses and the section of the street will have to be reformed so that the new express line could improve its commercial speed (VAL_01 and VAL_04).

Selection of locations for the multimodal panels with real-time information form PT services

An analysis of optimal locations for deploying multimodal panels has been conducted jointly by EMT and ETRA. The study focused on identifying areas where centralizing real-time information on diverse and sustainable public transport options was crucial. Criteria considered included:

- **Public Transport Offer:** The panels are essential in areas with extensive and diverse public transport network, where centralized, real-time information is crucial for users seeking sustainable transport options.
- **High Demand Zones:** Emphasis was placed on locations with significant passenger traffic, such as near universities, hospitals, football stadiums, and train stations.

The selected deployment sites are illustrated in Fig 27 and detailed below:

- **Puerta del Mar:** This area concentrates 10 bus stops (2255, 2256, 2257, 2253, 2252, 2251, 2250, 2258, 1263, 2281), 2 bike-sharing stations (028, 013), 2 metro station (Colón and Alameda).
- **Facultats:** This area concentrates 5 bus stops (165, 160, 1382, 166, 158), 4 interurban bus stops (5102010106, 5107510108, 5102020204, 5104010119), 4 bike-sharing stations (87, 88, 89, 90), 1 metro station (Facultats).
- **Plaza Cardenal Vicente Enrique y Tarancón:** This area concentrates 7 bus stops (155, 168, 169, 154, 157, 2213, 1057), 7 interurban bus stops (5904210202, 19000010102, 19000010202, 5904210111, 5256150204, 5256100110, 92633201207), 1 bike-sharing stations (092), 1 metro station (Aragón).
- **Cabanyal station:** This area concentrates 5 bus stops (1210, 1409, 1755, 1211, 1768), 1 bike-sharing station (100), 1 metro and tram station (Marítim), 1 train station (Estació del Cabanyal).
- **Xàtiva station** (alternatively to Cabanyal station): This area concentrates 6 bus stops (1858, 2261, 2277, 2278, 2309, 2330), 2 bike-sharing stations (017, 148), 3 metro stations (Xàtiva, Bailén and Plaza España), 1 tram station (Alacant), 1 train station (Estació del Nord).

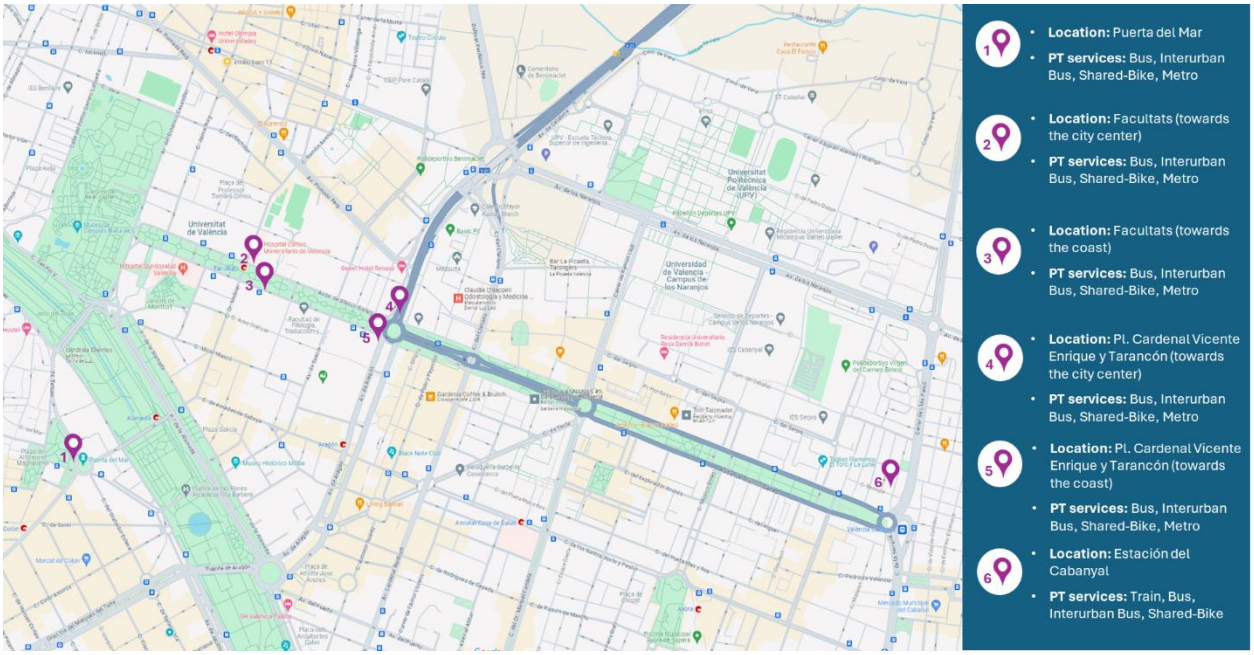

Fig 27. Location of the multimodal panels for VAL_02

Developments around the multimodal panels:

Definition of data and infrastructure requirements for multimodal panels deployment:

After some bilateral discussions between ETRA (which integrates the TFT in the post, develops the digital display interface and integrates the multimodal information), PRIMUR (which supplies the post where the TFT will be integrated) and EMT (the PTO), a list of technical requirements was defined and is presented in Table 3.

Table 3. Multimodal panels deployment (Table of requirements)

ID	Technical Requirements	Category
VAL02_TR01	The information panels must show multimodal information	Data
VAL02_TR02	The information panels should display up-to-date location of the nearest multimodal stations / stops over a map	Data
VAL02_TR03	The system must be protected against water and dust from the outside	Infrastructure
VAL02_TR04	The system should be equipped with a high-resolution colour screen with sufficient luminance and view angle to ensure readability in outdoor environments with acceptable quality	Usability
VAL02_TR05	Internet connectivity for regular updates of the displayed information to ensure accuracy	Performance
VAL02_TR06	Enable remote management capabilities for software updates and troubleshooting	Performance
VAL02_TR07	Display several visualizations on the screen without requiring user interaction, ensuring each visualization remains visible long enough for users to comfortably read the information	Usability
VAL02_TR08	The panels should display real-time information about the different transport modalities	Data
VAL02_TR09	The system should be connected to a stable power supply to ensure continuous operation	Performance
VAL02_TR10	The system components should withstand wind loads, vibrations, and other environmental factors, such as extreme temperatures	Performance
VAL02_TR11	Coordinate with transportation agencies, and other stakeholders to ensure the panel meets the needs of all parties involved.	Stakeholder Engagement
VAL02_TR12	They size of the digital display is conditioned by the dimensions of the post provided by PRIMUR.	Infrastructure

The multimodal panels should integrate real-time information from the public and shared transport services operating in the area of influence of the post. In this regard, the information displayed in the panel will include:

- EMT (bus) updated info per line on: Arrival of the incoming bus; Arrival of next bus; Disruptions/ Alerts.
- Valenbisi (shared bike) updated info about the nearest stations: Name (and number) of the stations; Available bikes; Distance walking to the station (in meters).
- ATMV (interurban bus) updated info per line on: Arrival of the incoming bus; Arrival of next bus; Disruptions/ Alerts.
- Metrovalencia (metro and tram) updated info per line on: Arrival of the incoming metro and/or tram; Arrival of next metro and/or tram; Disruptions/ Alerts.
- FGV (train) updated info per line on: Departure of the next trains; Disruptions/ Alerts.
- Furthermore, a live map will be able to show: Bus, interurban bus, tram and metro locations; Location of the panel; Bus, interurban bus, metro and tram routes and stops; Location of the nearest Valenbisi stations with number of available bikes.

Infrastructure design (Hardware)

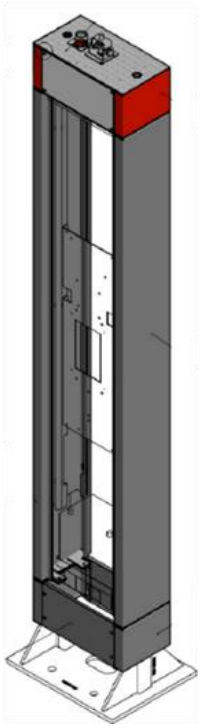

Fig 28. Multimodal information post.

EMT is currently undertaking a total renovation of its bus stops, which includes both bus shelters and posts. PRIMUR, the contracted company, is responsible for supplying the new bus shelters and posts.

The bus stop post has been designed as a backlit monolith with a rectangular section, featuring transparent glass displays that can be opened on two sides to access and update information inside. Due to its capability to accommodate digital screens, it was agreed with EMT to adopt this model of post as the structure for the multimodal information posts (Fig 28). In this case, instead of acting as a bus stop post, it will function as a multimodal information post.

The main areas for action regarding the hardware design of the post include:

- Integration of a TFT display equipped with the following features:
- Size: 15,6”
- Resolution: Full HD
- Luminance: 1800 cd/m2
- Integration of a Raspberry equipped with the following features:
- Model: Raspberry Pi 4
- RAM: 2 GB
- USB Ports: x2 (USB 3.0), x2 (USB 2.0)
- Modem 4G

Replacement of the current EMT vinyl at the top of the pole. This area will now display logos representing various modes of transportation (bus, metro, train, bike, etc.) whose information will be showcased on the digital screens.

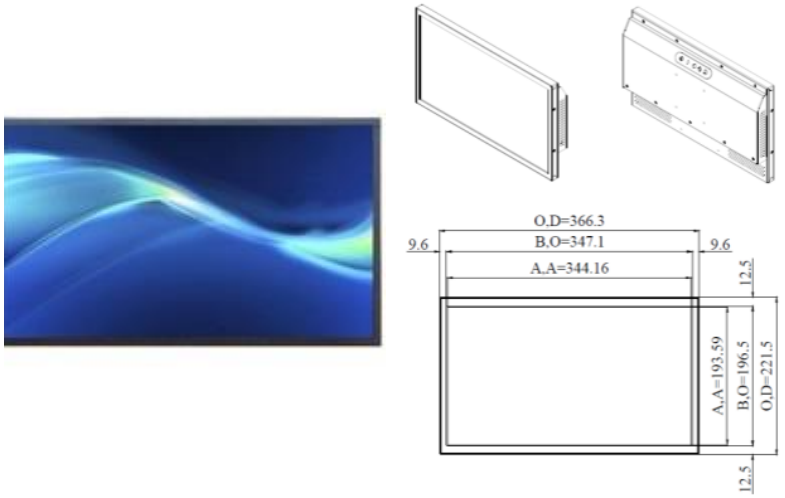

Fig 29. Screen selected to display multimodal information

Fig 30. Raspberry PI model 4 selected to process the multimodal panel information

Agreement with mobility service providers for provision of real-time information

One of the core steps related to the development of the multimodal panels was related to the access to real-time data of the different public and shared transport services offered in the actuation area. ETRA establish contact with different mobility service providers (EMT, ATMV, FGV, Renfe…) in order to identify data sources and establish the basis for the data sharing.

Regarding the integration of static information, data from the following transport operators has been properly integrated: EMT (bus), ATMV (interurban bus), FGV (metro/tram), Renfe (train), Valenbisi (shared bike). Regarding dynamic information, data from the following transport operators has been properly integrated so far: EMT (bus), Valenbisi (shared bike). Train departures will be obtained from the static GTFS. With respect to interurban buses (ATMV) the real-time information (GTFS-RT) will be integrated once it is available (potentially during 2025). For metro/tram information (FGV) the dynamic information is expected to be retrieved from a webservice (discussion ongoing). However, once the GTFS-RT is available (potentially during 2025), it will be integrated into the panels. Here below the details of the data integration.

Table 4. Data availability from Valencia PTOs

Company Name: **EMT** Type of vehicle: **Bus**
Static info: GTFS GTFS or API URL: https://www.transit.land/feeds/f-ezp8-emtvalencia https://opendata.vlci.valencia.es/dataset/ab058cf8-ad3e-4d9c-ac89-0c6367ecf351/resource/c81b69e6-c082-44dc-acc6-66fc417b4e66/download/google_transit.zip Authentication needed: NO Type of authentication (if so): - Credentials (if so): -
Dynamic info: Private access to an API service with estimated arrival times (not standardized yet) API URL: https://apipre.emtvalencia.es/transportes/v1/sae/estimacion Update window time: (in seconds or minutes): 1 second Data format received: (JSON, GeoJSON, …): GeoJSON

Data schema (example):


```
{
   "data": [
      {
         "disponible": true,
         "bus": {
            "adaptado": false,
            "numBus": 2202,
            "retraso": 0,
            "distancia": 724
         },
         "desviado": false,
         "itinerario": {
            "codigo": "2",
            "destino": "Cntr.Històric",
            "nombre": "Est.del Nord - Blanqueria",
            "ruta": {
               "codigo": "C1",
               "nombre": "CENTRE HISTÒRIC"
            },
            "nombreCorto": "C1"
         },
         "programado": false,
         "tiempos": {
            "minutos": 3.85836155590587,
            "segundos": 231,
            "fecha": "2024-05-17T12:03:20",
            "salidaViaje": "2024-05-17T11:49:00"
         }
      },
      {
         "disponible": false,
         "bus": null,
         "desviado": false,
         "itinerario": {
            "codigo": "3",
            "destino": "Natzaret",
            "nombre": "Porta de la Mar - Natzaret",
            "ruta": {
               "codigo": "4",
               "nombre": "NATZARET - PL. AJUNTAMENT"
            },
            "nombreCorto": "4"
         },
         "programado": true,
         "tiempos": {
            "minutos": 0,
            "segundos": 0,
            "fecha": "0001-01-01T00:00:00",
            "salidaViaje": "0001-01-01T00:00:00"
         }
      }
   ]
}
```


Company Name: **ATMV (PTA)**
Type of vehicle: **Peri urban bus**

Static info: GTFS
GTFS or API URL: https://nap.transportes.gob.es/Files/Detail/1325
Authentication needed: YES
Type of authentication (if so): - user/password (registration needed in the *mitma* webpage)
Credentials (if so): -

Dynamic info: Not yet available. GTFS-RT potentially available during 2025.
API URL: -
Update window time: (in seconds or minutes): -
Data format received: (JSON, GeoJSON, …): -
Data schema (example): -

Company Name: **FGV**
Type of vehicle: **Metro / Tram**

Static info: GTFS
GTFS or API URL: https://nap.transportes.gob.es/Files/Detail/967
https://transitfeeds.com/p/ferrocarriles-de-la-generalidad-valenciana/1039
Authentication needed: YES
Type of authentication (if so): - user/password (registration needed in the *mitma* webpage)
Credentials (if so): -

Dynamic info: Webservice (discussion ongoing). Once GTFS-RT is available (potentially during 2025), it will be integrated.
API URL: -
Update window time: (in seconds or minutes): -
Data format received: (JSON, GeoJSON, …): -
Data schema (example): -

Company Name: **RENFE Cercanías**
Type of vehicle: **Train**

Static info: GTFS
GTFS or API URL: https://nap.transportes.gob.es/Files/Detail/929
Authentication needed: YES
Type of authentication (if so): - user/password (registration needed in the *mitma* webpage)
Credentials (if so): -

Company Name: **Valenbisi**
Type of vehicle: **Bike Sharing**

Static info: Lat-long & capacity of stations and total number of bikes
GBFS or API URL: https://api.citybik.es/v2/networks/valenbisi
https://valencia.opendatasoft.com/explore/embed/dataset/valenbisi-disponibilitat-valenbisi-dsiponibilidad/table/
Authentication needed: NO
Type of authentication (if so): -
Credentials (if so): -

Dynamic info: Availability and status of bikes
API URL: https://api.citybik.es/v2/networks/valenbisi
https://valencia.opendatasoft.com/explore/embed/dataset/valenbisi-disponibilitat-valenbisi-dsiponibilidad/table/
Update window time: (in seconds or minutes): 8-15 minutes
Data format received: (JSON, GeoJSON, …): GeoJSON
Data schema:

```
interface License {
  name: string;
  url: string;
}

interface Location {
  city: string;
  country: string;
  latitude: number;
  longitude: number;
}

interface Extra {
  address: string;
  banking: boolean;
  bonus: boolean;
  has_ebikes: boolean;
  last_update: string; // Should be a valid date-time string
  slots: number;
  status: string;
  uid: number;
}

interface Station {
  empty_slots: number;
  extra: Extra;
  free_bikes: number;
  id: string;
  latitude: number;
  longitude: number;
  name: string;
  timestamp: string; // Should be a valid date-time string
}

interface JsonResponse {
  company: string[];
  href: string;
  id: string;
  license: License;
  location: Location;
  name: string;
  source: string;
  stations: Station[];
}
```

Interface design

Following the requirements initially identified, ETRA proceeded with the design of the digital display interface. The integration of the real-time information has been organized in two main screens: One including the list of the available public and shared transport services and real-time information from them (route, ID, time…); and a second screen displaying the live map showing the routes, stops and vehicles positioning (Fig 31).

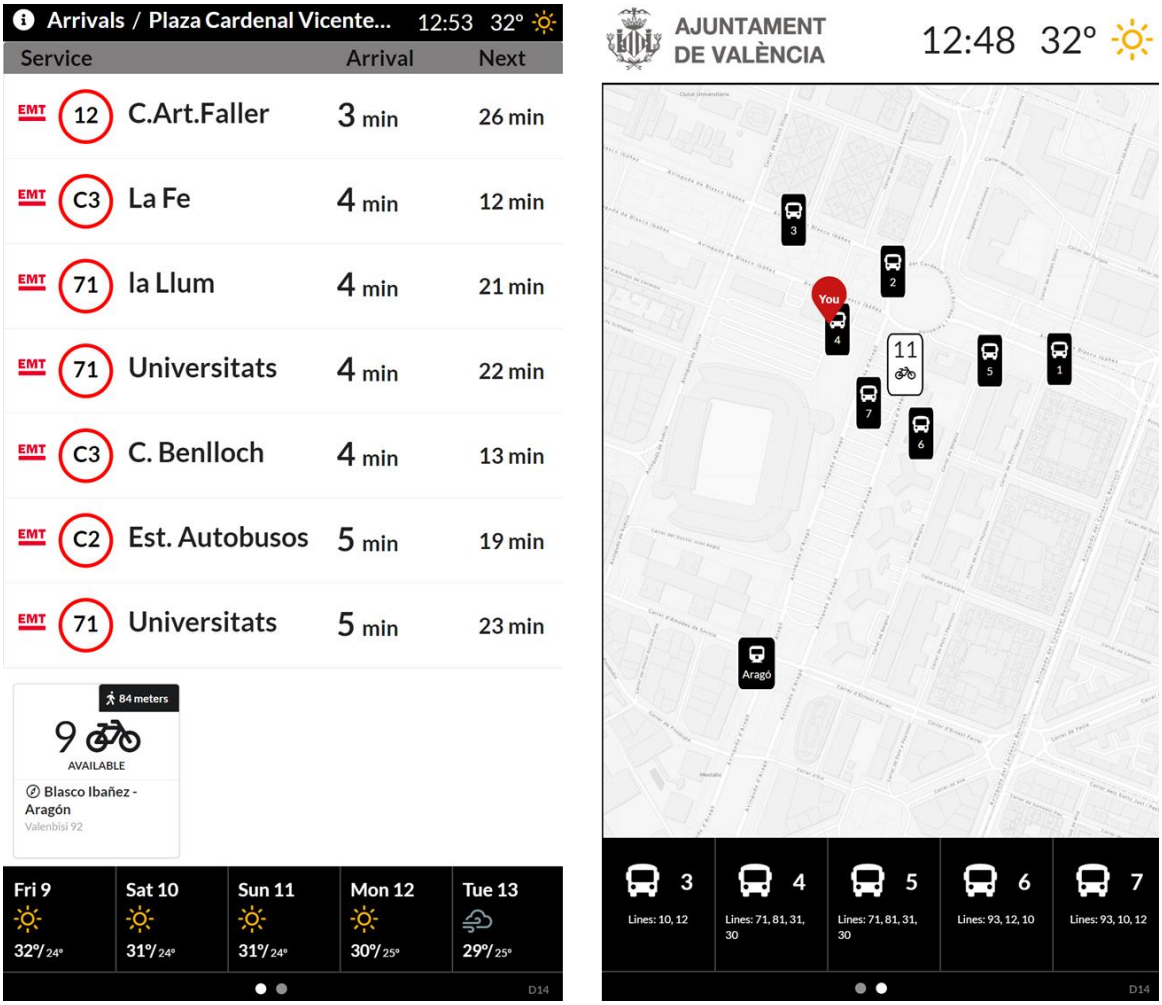

Fig 31. Preliminary interface design of the digital panels

5.2.1.3. Challenges & Mitigations

The main challenges faced during the preparation of this measure relates to the access to real-time information. Currently, EMT systems do not offer GTFS-RT, but instead publish a private API with estimated time of arrival at stops. This service is updated every second and provides not only the estimated time of arrival at a desired stop and bus line, but also the delay and distance to the stop, among other attributes. For the purpose of the measure, the use of this service is sufficient to meet the objectives of receiving real-time information, such as estimates. The same applies to the metro/tram (FGV). GTFS-RT is not yet available, but estimated times can be provided directly by FGV. For these two cases, and also for the interurban bus (ATMV), it is within their plans to have GTFS-RT data during 2025 (some tenders need to be prepared). Once the GTFS-RT is available for any of these operators, it will be integrated into the panel.

The second challenge affects not the preparation of the measure, but its deployment and implementation. Some multimodal panels will be deployed along Blasco Ibañez Avenue. However, this avenue is scheduled for reconstruction throughout the upcoming year (beginning in January 2025 and concluding in December 2025). These construction activities will impact the deployment schedule for some multimodal panels.

To address this challenge, the deployment of the multimodal panels will be phased. Initially, panels will be deployed at Puerta del Mar and Xàtiva to start monitoring their performance and impact. Subsequent deployments will align with the progress of the construction works, ensuring a coordinated rollout.

5.2.1.4. Next steps towards implementation

By the submission of this report, the design of the multimodal panel is already defined (in terms of both, software and hardware). The next steps to be undertaken include: (1) Purchase of the remaining digital displays and their integration into the posts and; (2) Request of permits to the Municipality to deploy the multimodal panels in the selected locations.

5.2.2. ROM_03 New mobility services in multimodal interchange nodes

5.2.2.1. Description of the measure and main outcomes expected

The objective of this measure concerns the creation of interchange nodes and the optimization of existing ones in order to connect the different transport systems, attract new transport users, favouring alternative travel choices, also thanks to sustainable mobility systems.

Increasing accessibility to the network by removing architectural barriers for people with reduced mobility, improving access to services and safety are the key aspects to be taken into account during the planning phase of a multimodal interchange node.

The SUMP aims to strengthen intermodality, with the objective of shifting part of the user base, firstly from the private transport system to Local Public Transport (LPT), and secondly users of suburban and local public transport services, from road to rail. These objectives will be achieved through the coordination of LPT timetables, the integration of information (also thanks to the development of MaaS), pricing and ticketing systems, and services, including innovative ones.

The measure concerned the adaptation of interchanges and interchange car parking through measures to increase the supply of parking spaces at existing railway and metro stops, with the introduction of services to promote multimodality.

The car parking and interchange nodes considered are the following:

- 2 new parking & ride along the metro line B1, Conca d'Oro and Annibaliano
- 1 P&R on the Metro line A (Anagnina)
- 1 P&R on the suburban railway line linking the city with the main airport (Villa Bonelli)

5.2.2.2. Preparation of the measure

Definition of the areas of intervention and financing sources:

In order to provide a fast and efficient public transport service for residents and visitors in the north-eastern part of the city, Line B1 metro line, a branch of Line B, was inaugurated in 2012. The line comprises four stations: Sant'Agnese/Annibaliano, Libia, Conca d'Oro and Jonio. It also interchanges with Line B at Bologna station and with regional railway lines at Tiburtina station.

On March 28th 2007, the Mayor of Rome, in his role as Extraordinary Commissioner for the Traffic and Mobility Emergency, ordered the construction of the new section from Conca d'Oro to Jonio and drew up a plan for supplementary and complementary works on Line B1, aimed at creating the conditions for full functionality of the line, including the construction of public car parking in Piazza Annibaliano and Piazza Conca d'Oro at the stations.

Through the Order of 28 March 2007, the Commissioner Mayor entrusted Roma Metropolitane Srl with the function of contracting station and all the tasks related to the design and construction process of the Conca d'Oro - Jonio line and

the related supplementary and/or complementary works mentioned above. Regarding the two planned car parking, the completion (finishing and installation of plant equipment) was the subject of a further contract.

The four car parking are financed by the POR FERS, European Regional Development Fund 2014-2020 - Axis 4 'Sustainable Energy and Mobility' for the 'Realisation of infrastructures and interchange nodes aimed at increasing collective mobility and the environmentally friendly distribution of goods and related transport systems.

Data collection on the current status of the interchanges:

During car parking construction, data was collected (RSM and ATAC) on the current status of services, timetable programming, and information integration. Passenger data recorded at the turnstiles of the two stations (Table 5) and the frequency of trains and surface public transport services concerning the area were analysed. The surface bus network had already been entirely redesigned with the opening of the new metro B1 (June 2012) to serve newly built neighbourhoods or areas not yet covered by the surface public transport network and to maintain direct connections to the city centre for destinations not covered by the new metro line. There are currently no plans to reschedule bus lines.

Table 5. Data collected at the turnstiles of two P&R stations in Rome.

Monthly entrances (pax) 2024	1	2	3	4	5	6	Total
CONCA D'ORO	34'882	26'041	37'882	45'979	41'612	26'364	212.760
S.AGNESE ANNIBALIANO	55'855	62'149	73'490	76'432	71'429	59'029	398.384

Data analysis to identify gaps and needs for improvement:

The two car parking have been fully operational for a few months. At the moment, data on PT user entrances at the two metro stations are available, while data on the number of vehicles using the car parking and the number of users of bike boxes service will be requested from the Public Transport Operator (PTO). Other data concerning such as the installation of charging stations, bicycle racks, interventions to improve accessibility and the parking and subway interchange will be evaluated with the introduction of new services.

Participatory process with stakeholders to define requirements to improve service supply on the interchanges selected:

Intense and constant dialogue was conducted with local administrations, economic operators, neighbourhood committees and newspapers, and citizenship during the construction phase (metro stop and car parking), which made it possible to agree on and improve certain aspects of the work organisation. Any changes in the layout of the construction sites and the road system were communicated in advance.

The realisation of the interchange car parking also involved the redevelopment or creation of pedestrian spaces above the metro stops. The municipality involved stakeholders and residents to share the design proposals of the engineers, both for the new areas and for the characteristics of the car parking, also explaining the unforeseen events that occurred during the start-up of the car parking, future services to ensure the multimodality (bike racks), electric charging points and communication campaigns to illustrate parking tariffs and facilities for PT users.

Definition of data requirements for PT schedule coordination, and integration of information:

For the two car parking already in operation, no timetable coordination is foreseen, while for the other two, timetable coordination and information integration will be ensured by the cooperation between the PTO and the Department of Mobility, by analysing the current PT offer, the new tram line that will affect the Anagnina node and possibly new sharing services for PT users.

Modelling, evaluation, and refinement of the services supply:

The described interchanges are part of a larger project carried out by the Administration and recommended by the SUMP, concerning the role of mobility hubs, in which a series of services are added including bike boxes and lockers (as described for Conca d'Oro parking) and not just the simple interchange from one mode of transport to another. In particular, with the support of the Public Transport Operator (PTO), it will be possible to measure the use of bike boxes,

through the number of users and usage per hour slot. At the moment, the appropriate positioning of the sharing service in the redeveloped areas is under discussion, in order to make the use of PT more accessible and attractive.

Once the use of parking and auxiliary services has been assessed, the different services can be refined and, if necessary, revised, with the cooperation between Public Transport Operator and Mobility Department.

Establish a cooperation framework with the mobility companies in sharing and collecting information:

The collection and sharing of information with mobility companies has been activated through a dedicated platform for Conca d'Oro and Annibaliano.

Services implementation:

The **Conca d'Oro** car parking is operational since March 2024 (Fig 32). It is a multi-storey structure on two underground levels with 198 parking spaces, 5 of which are reserved for the disabled; in addition, there are 14 parking spaces for mopeds. The car park is equipped with a photovoltaic system, currently being activated, for approximately 30 kW, which will contribute to the reduction of energy costs.

The interchange node is also equipped with 72 bike boxes to guarantee PT-bike intermodality and two lockers with 150 drawers for collecting or sending parcels, concentrated in a single point.

The accessibility also for users with reduced mobility is ensured by a system of lifts connecting the parking area to the square and from the square to the metro platform.

The parking will be free of charge for public transport season ticket holders and other exempt categories. For other users it will cost 1.50 euro for the first 12 consecutive hours of parking; 2.50 euro up to 16 consecutive hours of parking.

The total cost of the structure is 2.6 million euro.

Fig 32. Conca d'Oro P&R

The **Annibaliano** car parking is operational since April 2024 (Fig 33), with 268 parking spaces, 6 of which are reserved for the disabled and 5 for pregnant women, is built in a multi-storey structure on three underground levels and includes 20 parking spaces set up for electric charging.

The accessibility also for users with reduced mobility is guaranteed by a ramp with a minimum slope (according to law) that directly connects the car park to the metro platform.

The tariff plan is 2 euro for the first 12 consecutive hours of parking; 3 euro up to 16 consecutive hours of parking. Public transport subscribers and other categories exempt from paying parking fees will be able to use them free of charge.

The total cost of the structure is 3.7 million euro.

Fig 33. Annibaliano P&R

The construction of the two car parks described above is part of a broader project to upgrade the interchanges at additional metro stations and to create interchange car parks serving the existing stations of the metro B line and the regional railway line respectively, in order to promote modal interchange in situations of total inadequacy of supply, if not total absence of supply.

5.2.2.3. Challenges & Mitigations

Initially, 4 potential locations for P&Rs were considered: Conca d'Oro, Annibaliano, Anagnina and Villa Bonelli.

However, the starting of the works at Villa Bonelli and Anagnina was delayed due to the price increase after the Covid period, which led to a new economic framework and comparison between the Administration and the contractor. In addition, for the Villa Bonelli car park, the type of foundations of the structure changed during the design phase, further delaying the start of the work, without causing the costs to increase.

Due to the delays foreseen for Villla Bonelli and Anagnina, it was decided to focus the measure ROM_03 on the set-up of the other two P&Rs: Conca d'Oro, Annibaliano. Nevertheless, the lessons learnt during the set-up of these two P&Rs will be used as a reference in the future for the construction of the Villa Bonelli and Anagnina P&Rs.

5.2.2.4. Next steps towards implementation

The P&Rs of Annibaliano and Conca d'Oro are already implemented, so the measure is ready to start the demonstration phase.

However, this measure will also closely follow-up the construction of the other two P&Rs: Villla Bonelli and Anagnina.

- Parking Villa Bonelli: the structure is located adjacent to the regional railway line that connects the city with Fiumicino airport and public transport lines. The project consists of a single-storey car park, composed of a structure consisting of frames and decks, supported by several pillars that discharge loads through direct foundations. Despite the difficulties described, the contractor will resume work shortly.
- Parking Anagnina: The project is located within the Anagnina metro interchange and envisages the expansion of the existing surface car park, which currently offers 514 parking spaces, through the installation of a new modular structure for 258 parking spaces: again, work will resume shortly.

With Legislative Decree 50/2002, the Government allowed the unit prices of materials to be increased and updated to compensate for the increase during the COVID pandemic. Currently, the economic coverage of the prices is requested from the Lazio Region, which manages the financing funds.

5.2.3. OSL_02 Consistent visual identity for PT and mobility hubs

5.2.3.1. Description of the measure and main outcomes expected

Ruter has recently launched a new visual identity which is used in their official communication, branding material and digital user interface. This visual identity (applied to screens at stops and inside vehicles, apps and websites, interior and exterior of vehicles, directions to and from stations, landmarks and signs, timetables, maps and marketing) ensures consistent communication across channels and a better user experience. With this measure, the aim is to expand Ruter's visual identity to also include mobility hubs and belonging (new) services such as bike lockers, car sharing etc. In doing so, we will increase the visibility and uniformity of mobility services and build on Ruter's ambitions to provide mobility rather than public transportation only.

At city level, this measure will follow a holistic approach, across modes of travel and across suppliers/competitors, to improve the user experience when travelling in the city and the surrounding areas. By doing so, the aim is to simplify life without a car.

The visual identity should make mobility points visible and ensure visual consistency across services and points by using a consistent design manual. This creates recognition from the physical surfaces to the digital interface and ensures that Ruter owns the design of the points, in line with the company's overall visual profile. Furthermore, Ruter's position is utilized to promote collaboration and sustainability, while also ensuring universal design.

Services that can be included in the concept:

- **Shared mobility:** includes car-sharing, self-driving cars, taxi/kiss & ride, carpooling, on-demand transport, and possibly trailers.
- **Micromobility:** includes city bikes, electric scooters, and cargo bikes.
- **Other services:** covers parcel lockers, bike hotels, bike parking, warming cabinets, and parking spaces.

5.2.3.2. Preparation of the measure

Step 1: Data collection. Mapping of existing data and insight, gaps in insight and gathering new data

We have mapped and collected data/insight from similar projects in Norway and abroad. We identified what has worked, what hasn't, and why. Several workshops have been held throughout the process.

Through the mapping, we discovered that a visual representation would be relevant for various stakeholders, including the Agency for Urban Environment (BYM), homeowner associations, companies and commercial buildings, as well as Bane NOR. It will also be useful for Ruter employees working on sales and support for mobility, Sporveien, Viken County, and the industry in general for inspiration.

Step 2: Analysis of user and operator needs related to visual identity.

A successful visual identity will make it easy for people to use the profile to find services, while also making the mobility points and services feel like an integrated part of Ruter's offerings. It will strengthen Ruter's reputation by showcasing Ruter as a mobility provider, not just a public transport provider. Visually presenting the concept will also make it easier to discuss and understand what a mobility point is, creating demand for it among both customers and stakeholders. The

identity must be adaptable over time and enduring. It should accelerate user adoption and nudge towards sustainable solutions while being practically feasible.

A visual identity that illustrates how a mobility point should look will also prevent those creating them from having to start from scratch each time, and establish a system for the various points and services that both customers and stakeholders will recognize and actively use. Furthermore, the identity should include visual examples of different types of points, serving as a simple, easy-to-understand guide. Accessibility for all users is crucial.

Throughout the process, it has become clear that it is vital for Ruter to be seen as the sender and that the collection of services should not be perceived as a new brand.

Step 3: Ideation workshop and development of 2-3 concepts / visual directions. Feedback on sketches and low level MVP. Choosing and merging concepts into one final visual direction.

Our goal is to ensure a holistic and well-thought-out branding strategy that appeals to our users and strengthens the service's position in the market. To do so, we have outlined various directions for visual design to explore whether a new name, logo/symbol, and colour scheme would be most useful.

- **Name:** In the process of developing a visual identity, we also explored naming options (Fig 34). We considered whether a name was necessary to create a common language when communicating the service. The name "Mobilitetspunkt" (mobility point) is a long and less communicative name, and through workshops, we explored other potential names. The selected names were tested with various users from the target audience in order to gather insights into users' preferences and associations with the proposed names. In particular, feedback was collected from 12 different individuals from the target group.

  The feedback received played a crucial role in the decision-making process regarding which name we will move forward with. The selected names are used as a basis for further visualization work. This involves developing graphic elements and visual concepts that align with the name and support the service's brand identity.

Fig 34. Name workshop.

- **Icon:** We drafted several icons, tested them in workshops, and refined them further. The workshops conducted were focused on developing a new icon or symbol for our service. In this process, we engaged various internal creative resources to ensure that the new icon/symbol clearly reflects the core values and objectives of the service in a visually appealing manner.

  The learning from this process is that it is crucial that the icon is not perceived as a new brand. If an icon is to be used, it must support the concept and make communication clearer.

- **Sketches:** Through design sketches, we explore how the visual identity for this service can be integrated into existing elements like columns and signs. These will be used to communicate the project and test it with potential users. The top design sketches resulting from the icon workshop are presented below:
  - Points meet at an intersection (Fig 35):

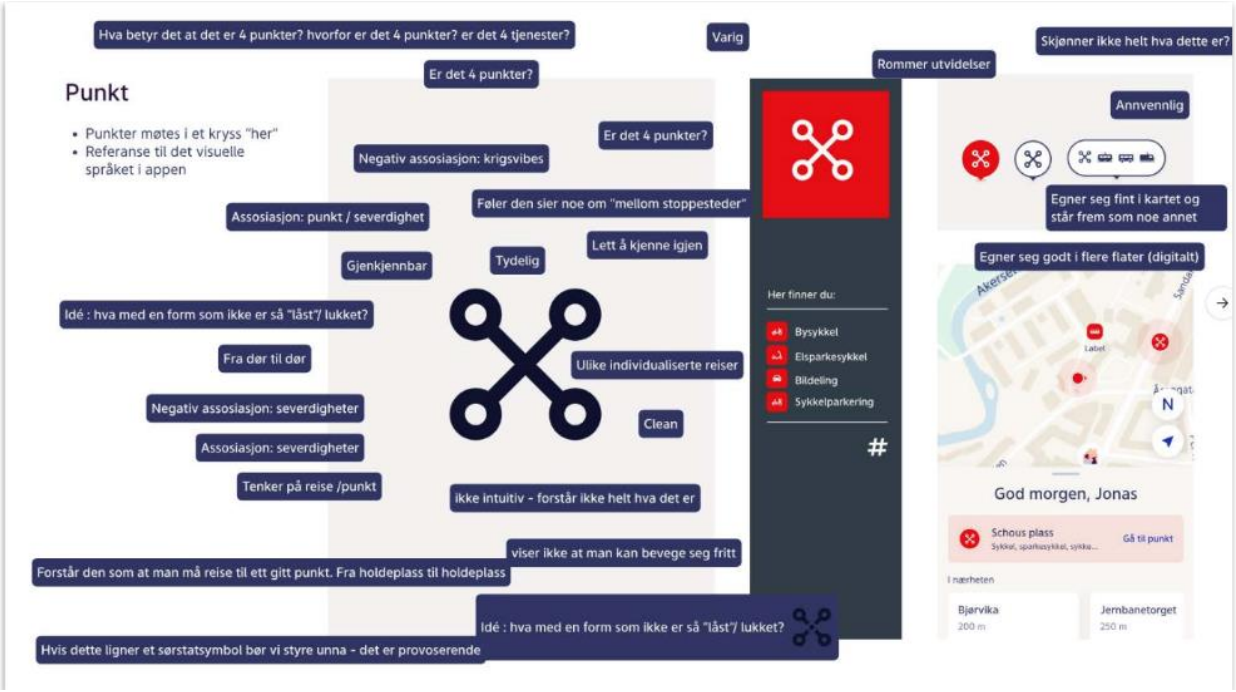

Fig 35. Sketches resulting from the icon workshop (I).

  - Point visualized via arrows/roads that meet (Fig 36):

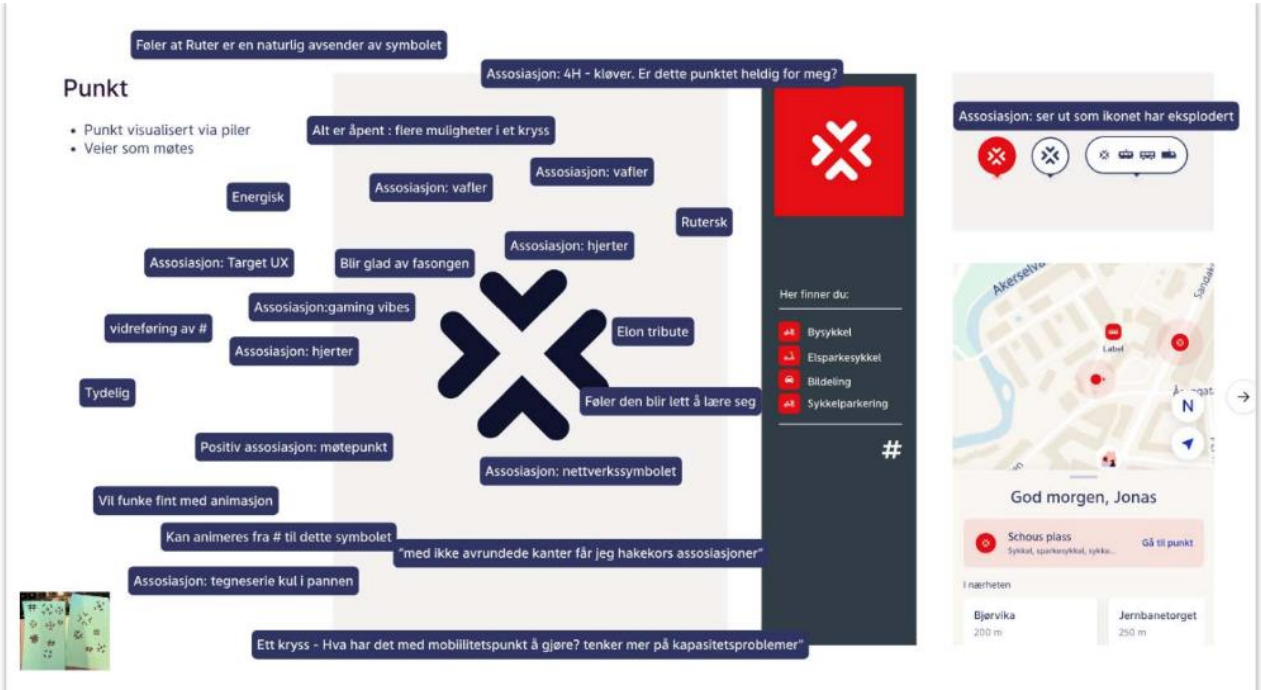

Fig 36. Sketches resulting from the icon workshop (II).

- Ruter becomes a clear sender with the use of the logo (Fig 37):

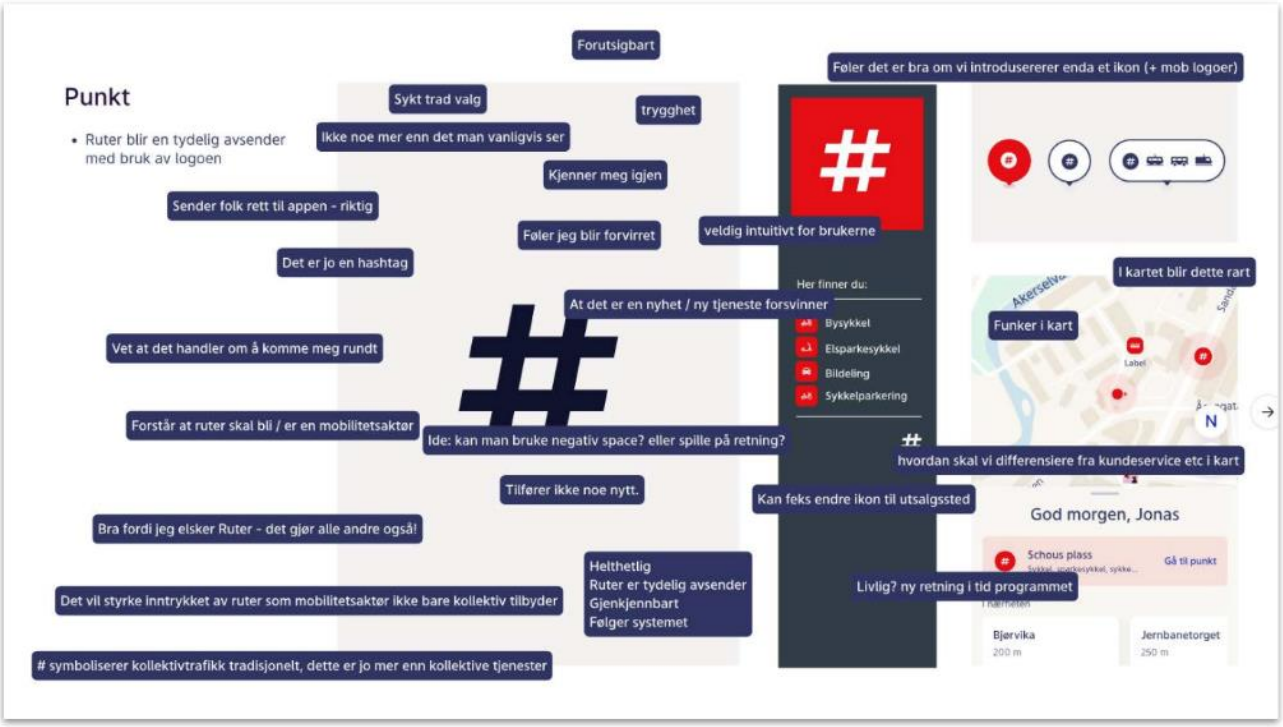

Fig 37. Sketches resulting from the icon workshop (III).

- The name becomes the logo (Fig 38):

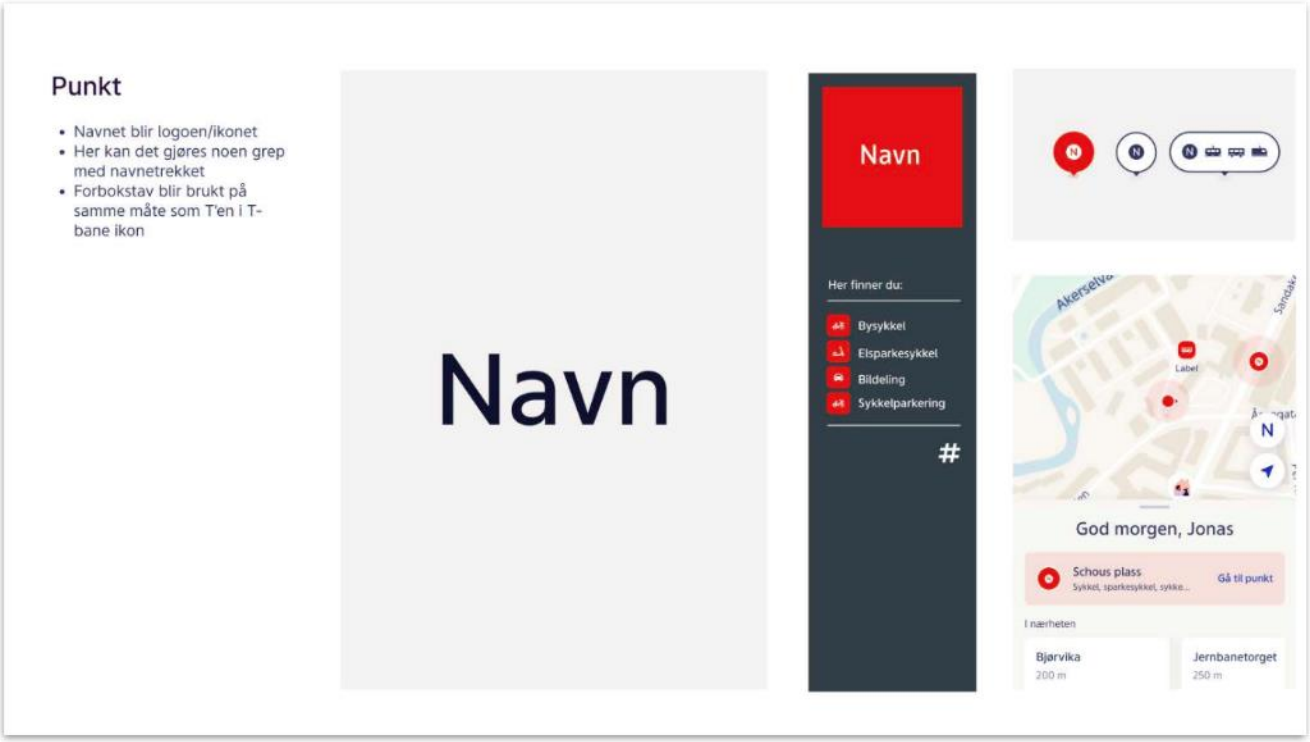

Fig 38. Sketches resulting from the icon workshop (IV).

5.2.3.3. Challenges & Mitigations

No challenges were identified, the measure preparation went according to the plan.

5.2.3.4. Next steps towards implementation

The next step will be to finalize a visual design for Ruter's mobility hubs (visual identity MVP) sufficient for testing with a potential target group, including external and internal stakeholders, as well as Ruter employees.

5.2.4. OSL_06 More inclusive micromobility

5.2.4.1. Description of the measure and main outcomes expected

We see considerable potential in including a bicycle subscription service as part of Ruter's existing business solution. Therefore, we aim to create a comprehensive and attractive mobility offer that covers various transport needs, encouraging more people to choose public transport and/or bicycles to commute to and from work instead of private cars. We aim to better understand the interaction between a bicycle subscription service and Ruter's other modalities and services.

The project will enhance the mobility network's refinement and relevance, providing customers with more choices and increased freedom of movement. Additionally, the project will support companies' sustainability goals by offering environmentally friendly transport alternatives that also inspire physical activity and efficiency in everyday life. By integrating various forms of micro-mobility into the existing mobility offer, we can free up space on public transport for other user groups, such as wheelchair users.

At measure level the objective is to expand Ruter's B2B solution by including e-bike subscriptions to reduce the use of private cars for commuting. By offering a more comprehensive mobility solution that meets the diverse transport needs of various user groups, the objective at a city level is to make green transport alternatives more attractive than using private cars for commuting.

5.2.4.2. Preparation of the measure

Use case and scope

We will carry out a pilot directed towards employees in larger companies centrally located in Oslo, and employees who want to test electrical bikes when commuting by making e-bikes available at a more reasonable price through a subscription. The service targets employees who typically have not tested electric bikes before, and who want to test the offer at a lower fixed monthly price. The offer includes both regular electric bikes and cargo bikes to meet employees with different transport needs, such as traveling with children (Fig 39).

Fig 39. New mobility service for OSL_06

The employees that sign up get access to a personal electric bicycle. Users receive a discount code when registering in Ruter's business portal (RuterBedrift), to use when registering in the supplier's own systems. RuterBedrift works as a common portal for various services and as a holistic solution for invoicing and the overall administration. Businesses are billed directly and forward the bills to the employees through their payslips. The offer is delivered in collaboration with one or more suppliers, and a subscription can include additional services such as winter tyres, insurance, service and support, test cycling etc.

The project has identified the following learning objectives, through discussions internally in Ruter, the municipality, and private service providers as mentioned later:

- Will the service reduce private car use?
- Who are the users?
- Will the service contribute to more people traveling by public transport and/or by bicycle?
- Which means of transport do we convert the users from?
- Will the service motivate to a lasting change in the employees' travel habits?
- What are the drivers and barriers to the use?
- How does the bicycle service interact with the public transport?
- What is needed to motivate greater use among end-users?

Partnerships – service providers

We sent out a Request for Information (RFI) to the private market in March and got six answers from different types of bike service providers. These answers, and follow-up meetings with three of these service providers, are input for the terms, conditions and business model of the subscription.

After discussions with the municipality and the service providers, a list of requirements was defined for the service providers, as described in Table 6.

Table 6. Requirements for the new mobility service defined in OSL_06.

Category	Requirements
Vehicle	The type of electric bikes is limited to midtail/longtail cargo bikes and/or regular electric bikes to ensure the most standardized offer possible.
	The bicycles must be suitable for year-round use in the Norwegian, including winter cycling.
	Maximum weight of the bikes is 35 kg, and they must be easy to handle and have a good performance.
	It is desirable that the supplier offers additional functionality included in the subscription (for example shipping options for luggage, insurance, child seat, winter tyres, helmet and other).
	The supplier must be able to deliver a sufficient number of vehicles within two months of the order at the latest.
Design of the service	The subscription agreement should have a commitment period of no longer than 1-3 months, to ensure the users with flexibility and reduced barriers to sign up without the long-term commitment.
	The supplier must provide trial cycling at companies at least twice a year, so that potential users can try the bikes.
	The supplier's system must be compatible with discount code handling via RuterBedrift.
	The supplier must offer customer service with a response time of less than 24 hours in case of any problems or need for assistance.
	The supplier is responsible for all communication with the users.
Operation and maintenance	The supplier must offer maintenance of the bikes.
	To ensure good service, regular operational meetings should be held, and the parties must work together to collect insights and data, for example through user surveys.
	The supplier must provide a dedicated contact person who can handle inquiries and provide support to companies.

We have also been reviewing the regulations that apply to public procurement as we are about to enter into a new type of collaboration agreement between public and private entities. At the same time, we have decided on methods of procurement of the e-bike service. The requirements mentioned above will be used as input in the procurement of service providers.

Partnerships – companies

We aim to collaborate with 2-3 pilot companies (both public and private). After input from service providers and discussions with the municipality, following requirements were identified for companies participating in the pilot:

- Based on experience, you have to count on a maximum of 10% sign-ups of the number of employees in a company for ordinary e-bikes and significantly lower for cargo bikes. Therefore, it is important that the company is large enough and that there's a focus on various measures to increase user adoption.
- The management and/or the contact persons in the company must be motivated and should be able to link the measure to their strategy. This is desirable so that they can contribute to increase the user adoption through informing the employees about the pilot and being willing to arrange various motivational measures during the pilot, such as competitions, kick-off etc.
- The company must provide safe bicycle parking, and it must be safe for the employees to cycle to work, for example with good cycle paths. We are currently working together with the municipality to prepare a guide on what is included in safe bicycle parking for the companies.
- Employees participating must also ensure safe parking at home.
- All employees participating in the pilot must respond to user surveys, to ensure that the project captures insight and the effect of various motivation measures.

Plan of execution

We have detailed a plan of execution for the pilot which will ensure that the project captures important insights and learning during the pilot, and to ensure that relevant stakeholders are involved at the right time. We are currently in dialogue with key stakeholders, such as the Climate Agency and the Agency for Urban Environment in Oslo Municipality.

5.2.4.3. Challenges & Mitigations

The original aim was to launch the pilot in the beginning of the September. However, we are somewhat delayed, and are working towards launching at the end of September / beginning of October, depending on when the agreements with the service providers are signed.

However, based on the service providers experience, it will be difficult to recruit bicycle users in the autumn, as it is mostly the biggest cycling enthusiasts that are cycling at this time of the year. We will therefore run a soft launch in the first half of the year, with a focus on making the offer known among the employees to ensure the greatest possible adoption in the spring.

5.2.4.4. Next steps towards implementation

Next steps towards the implementation of the measure include:

- Sign agreements with service providers and add the actual services to the administrative interface i RuterBedrift
- Sign agreements with public and private entities that wants to participate in the pilot

After launching the service, a questionnaire will be distributed to units participating in the pilot. Moreover, we will launch a guide in collaboration with the municipality, to inform about how to provide good cycle parking.

5.2.5. MAN_07 Create a network of mobility hubs in cooperation with the regional transport association, open for multi mobility providers

5.2.5.1. Description of the measure and main outcomes expected

Under this measure rnv develops a connected mobility concept integrating shared mobility into the planning, construction, and operations of public transport stops (Fig 40). This concept will systematically incorporate existing micro-mobility services such as e-scooters, bike sharing, and car sharing, alongside active modes like walking and biking. The goal is to create seamless transitions between these modes by physically integrating them at PT stops, increasing their visibility, and therefore improving accessibility. Furthermore, this measure aims at realizing at least one pilot site in accordance with the newly developed concept.

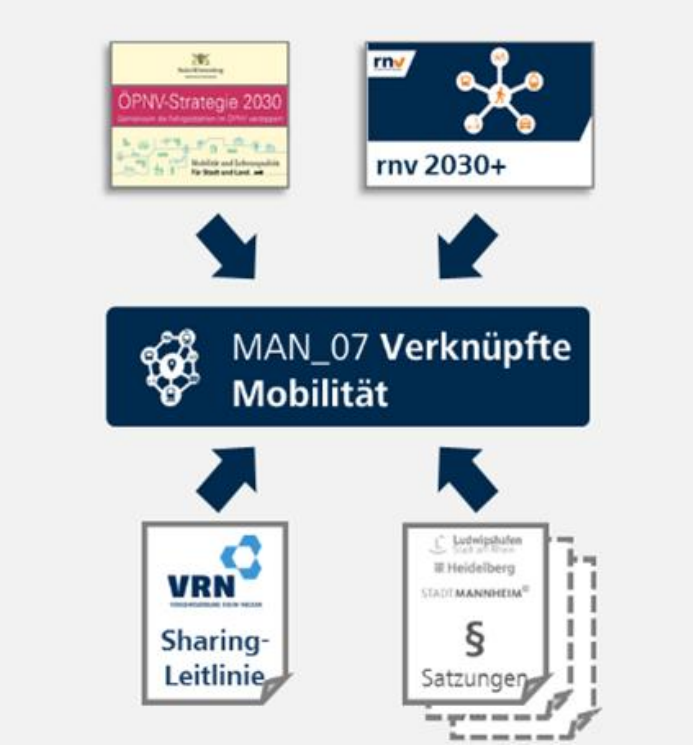

Fig 40. Scheme of MAN_07 with preliminary work & inputs.

5.2.5.2. Preparation of the measure

Evaluate shared mobility framework & identify mobility providers & options

In a first step, all relevant documents and regulations in the field of shared and public mobility were gathered as well as actors identified. In order to achieve this, an online search was conducted to obtain relevant documents. Furthermore, existing guidelines and documents already known were gathered and reviewed. Finally, relevant agencies and organisations, such as the regional transportation authority, the state ministry of transport, and the regional approving authority were screened in order to obtain further relevant information and documents. All information gathered was then reviewed by a project team member and key results were presented and discussed among the project team conducting the measure. Key results include a digital reference book providing all relevant information filterable in one place (see *Annex 3: MAN_07 Reference book on local/ regional shared mobility framework).* This reference book connects the original document via weblink or link to the PDF document with relevant meta information on the author, year of publishing or date of taking effect, the spatial coverage, the (binding) character etc. Combined with excerpts of the most

relevant chapters and passages, a filterable table was created that allows to provide an easy and quick overview of all relevant documents on pone specific topic, e.g. covering the city of Mannheim as well as bike parking. During the drafting of the concept, specific aspects hence can be cross-checked with this reference book, ensuring that all relevant political goals, focus areas, as well as guidelines and regulations are considered.

Furthermore, mobility services and providers as well as relevant actors were identified and assessed. This assessment of mobility providers included options such as bike sharing, car sharing, and ride-hailing based on criteria like service coverage, pricing models, user feedback, and technological capabilities.

Evaluate possible Mobility Hub formats, experiences, options

Step two was started alongside step one and includes regular exchange with other mobility hub operators, implementing cities and other experts in this field, both on a national as well as through UPPER and CIVITAS on a European level. Best-Practice examples are gathered, and insights and first-hand experiences are exchanged. Amongst others, the project team of MAN_07 gained detailed insights into mobility hub projects in Leipzig, Dresden, Dusseldorf, Berlin, Karlsruhe This task will continue throughout the measure preparation and implementation. The three key results of this evaluation were the relevance of a uniform design and brand, the benefits of cooperative approaches, were different actors build uniform hubs as well as the benefit of a digital representation (MaaS-App) of the physical hubs. These insights influenced the measure design directly, e.g. regarding the incorporation of the regional VRN design or the multi-stakeholder approach chosen. Even though the digital representation is outside of the scope of this measure, contacts on the issue have been established with the VRN-team responsible for the MaaS-App. Thus, it will be assured, that any necessary data that will be needed for digital services later on, e.g. on the exact location of specific services on the spot, will be considered and collected if possible, during construction. Furthermore, many practical tips and experiences were discussed and exchanged, such as marking and signage in accordance to German road traffic act, service and operational issues ranging from faulty locks to vandalism, or details on the dimensioning on bike and scooter parking areas.

The example of mobility hubs in Dusseldorf has a focus on location in the neighbourhoods, bike park and shared mobility, but so far no PT integration (Fig 41).

Fig 41. Example of mobility hubs in Dusseldorf *(Source: Connected Mobility Düsseldorf GmbH CMD)*

The example of mobility hubs in Leipzig has a multi-actor approach were the PT-operator (Fig 42), a public provider for car charging points and a car sharing operator built multimodal hubs along a uniform design and approach.

Fig 42. Example of mobility hubs in Leipzig *(Source: Leipziger Verkehrsbetriebe LVB).*

The example of Freiburg offers a visionary concept for rural hubs (Fig 43), combining a mobility hub with a service hub (shops, co-working, mail, market, etc.)

Fig 43. Concept for a rural, multifunctional mobility hub in Freiburg *(Source: Energieagentur Regio Freiburg).*

Mobility hubs in Dresden offer a unified, modular approach with brand and digital representation orchestrated by PT Operator with large scale implementation (Fig 44).

Fig 44. Schematic picture of mobility hubs in Dresden *(Source: Dresdner Verkehrsbetriebe DVB).*

The mobility station in Berlin presents a unified, modular approach with brand and digital representation with large number of different providers, multiple service specific digital representations and a spatially flexible set-up (Fig 45).

Fig 45. Schematic picture of mobility station in Berlin *(Source: Berliner Verkehrsgesellschaft BVG).*

Identify pilot site

As a third step, a pilot site was chosen to implement and test multimodal features. As lead time for construction projects is longer than a project cycle, the decision had to be taken considering the window of opportunity between the UPPER timeline, the needed time for implementation (planning, approval, and construction) as well as the measure timeline, as the concept is needed as base for the implementation as well. These constraints limit the number of options for a pilot site, thus making an easier decision, while other challenges around the pilot site arose. In the end, it was decided to use the Mannheim central station as pilot site, as it is one of the most frequented transportation hub in the city with many multimodal options already present and larger rebuilt coming up in 2025, which serves as a perfect opportunity to implement and showcase multimodal connectivity.

Mannheim central station is a railway station in Mannheim in the German state of Baden-Württemberg (Fig 46). It is the second largest traffic hub in southwestern Germany behind Stuttgart, with 658 trains a day, including 238 long-distance

trains. It is also a key station in the Rhine-Neckar S-Bahn. 100,000 passengers embark, disembark or transfer between trains at the station each day. The station is located on the southern edge of central Mannheim. Travellers reach the platforms via escalators and lifts in the wings of the entrance hall, which lead to a northern and a southern subway under the tracks. The routes to the platforms have been upgraded to make them accessible for the disabled. Lifts, escalators, and a direction system for the visually impaired enable all travellers to reach the trains without assistance.

The station forecourt has stops for several tram and bus lines of Rhein-Neckar-Verkehr and the bus lines of Busverkehr Rhein-Neckar. In 2022 and 2023 construction work on an upgrade program for the forecourt started, finishing the first two phases (green and red areas) by spring 2023. For the time of the national garden show during summer of 2023 the construction was halted, and it is expected that construction work will continue in 2025 with the final phase three (blue area) of the work.

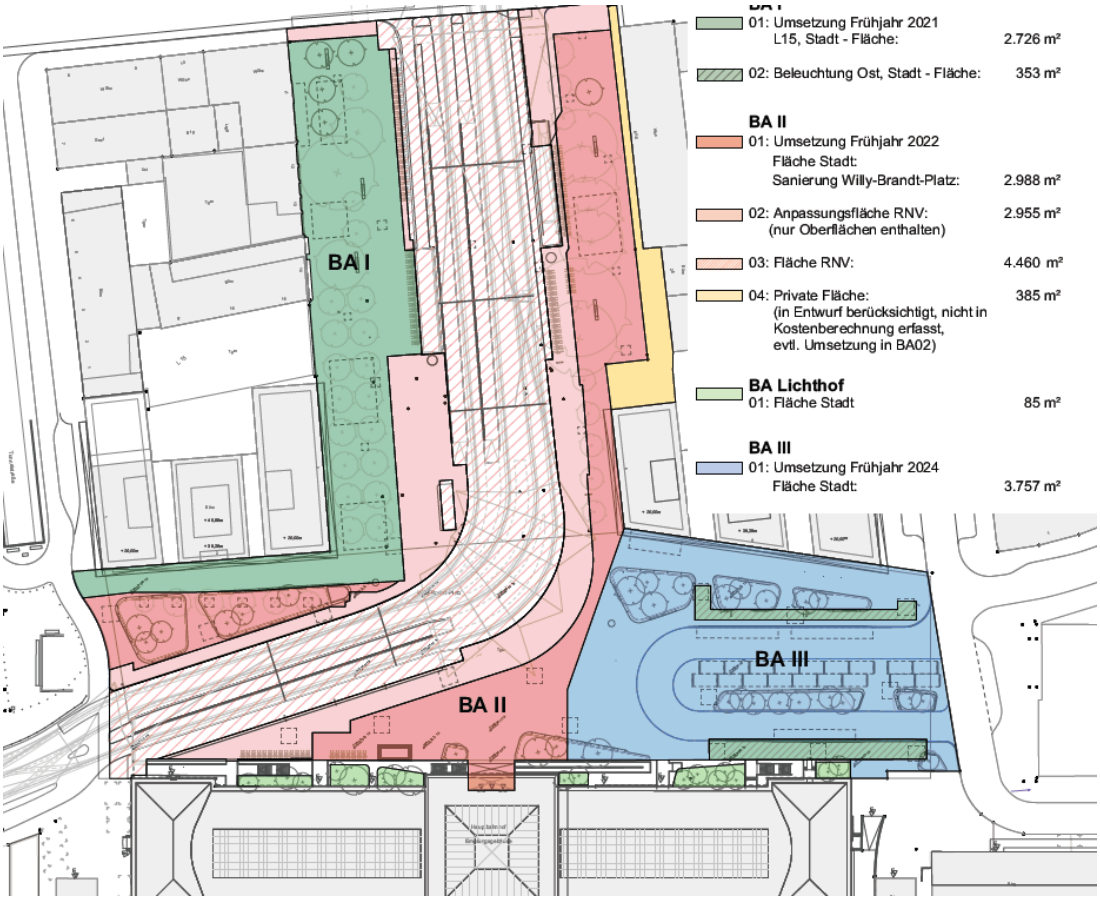

Fig 46. Site plan of Mannheim central station forecourt *(Source: city of Mannheim).*

Development of concept

Work on the fourth step of developing the concept just started and a first draft is to be expected by September.

Consultation with VRN and city of Mannheim on the concept

To be successful with this measure, relevant organizations, partner and stakeholders have to be consulted. The most important, central actors for this measure is the regional transport authority as well as the city of Mannheim. The Verkehrsverbund Rhein-Neckar (VRN, TA) is a transport association covering parts of the German states of Baden-Württemberg, Rhineland-Palatinate and Hesse in south-west Germany. Founded in 1989, it initially served the Rhein Neckar Area, but has since grown beyond its borders to cover an oblong area of 10,000 km² with a population of 3 million, including Mannheim and Ludwigshafen, Heidelberg, Kaiserslautern, the entire Palatinate Forest and the northernmost parts of Baden-Württemberg. The VRN is owned by the three states, cities and rural districts whose area it serves. This step was also moved forward and the first consultation with the central actors from the city of Mannheim

and the regional transport association VRN has already taken place, regular follow-ups, and a close cooperation especially regarding the pilot were agreed upon.

5.2.5.3. Challenges & Mitigations

The preparation of this measure started at an earlier point than most other measures included in the UPPER project. As this measure was not outlined in detail before the proposal, as well as due to its complex nature with multiple public and private actors involved in the topic, quite a lot of preparatory tasks had to be conducted first. This included the detailed project planning together with relevant internal experts from the infrastructure and mobility planning departments, as well as the required internal PMO and approval process along with multiple feedback loops. Work on the measure itself therefore started in April 2024. To mitigate the delay in measure preparation, the timeline of work packages within this measure have been moved forward and tasks have been parallelized, to stay on track for the implementation. Furthermore, just recently an issue with the funding of the pilot implementation arose, that is currently discussed with project management and controlling experts from all parties involved.

5.2.5.4. Next steps towards implementation

Once the concept is finalized, it will undergo review and approval by key stakeholders, including VRN (Verkehrsverbund Rhein-Neckar) and the City of Mannheim. Their feedback will be incorporated to refine and enhance the concept further. Parallelly, an implementation plan will be crafted, outlining tasks, timelines, responsibilities, and budgetary considerations (T6.3). This plan ensures a systematic approach to executing the shared mobility initiative. Once all technical requirements are outlined and the overall construction process timeline is set, the procurement process will be initiated to source necessary services or equipment for the mobility infrastructure at the pilot site. Finally, securing official approval from relevant authorities is essential before proceeding with the full-scale implementation of the shared mobility framework in all future PT construction projects in the Mannheim region.

5.2.6. LIS_09: To improve the integration of PT and active travel modes

5.2.6.1. Description of the measure and main outcomes expected

LIS_09 has as main objective to foster the integration of PT and active travel modes in Lisbon metropolitan area. The idea is to generate debate on the importance of the integration of PT and active modes as complementary solutions of mobility at local level. This integration, both at infrastructure and service level, respectively through the installation of cycling infrastructure at PT interfaces and the combination of PT and shared cycling services, is key to raise competitiveness against the use of private car.

The LIS_09 measure intends to increase opportunities for multi-modal trips with bikes and PT through physical and ticketing integration. This need for action in both infrastructure and services, led to two different approaches, and therefore two sub-tasks, described below:

Sub-Task 1: Study of bike parking infrastructure on PT interfaces and stations. The general objective of this sub-task is to analyse the status of cycling parking infrastructure at PT interfaces, and create better conditions in some of them, as pilot and example for others to follow.

Sub-Task 2: Integrate Lisbon bike sharing in PT ticketing system. The general objective of this subtask is to award PT regular users with the possibility of using city shared bikes for free, therefore promoting complementarity of use and solving last-mile issues. This is to be done by technologically integrating GIRA Lisbon municipal bike sharing services, managed by the municipal company EMEL, with PT ticketing services.

5.2.6.2. Preparation of the measure

LIS_09 measure started with an internal strategic discussion on how to better promote the complementary of PT and active modes at local level. The focus on the integration of both PT and cycling networks led to the identification of two main problems:

1. Bike users find it difficult to park bikes when reaching the PT network, which results in low use or the transport of bikes in PT vehicles, with consequences to comfort inside the vehicles and limitations at peak hours.
2. PT users that do not use their bikes to complement PT commuting, also find it limiting to have to pay for bike sharing services and use different access features (no ticket and access integration).

This has led to the definition of two practical solutions:

1. The creation of parking infrastructures in PT interfaces.
2. The integration of PT and bike sharing services, both at tariff and ticket levels.

These 2 solutions were assumed as the two sub-tasks of LIS_09 UPPER measure.

Sub-Task 1: Study of bike parking infrastructure on PT interfaces and stations

In this sub-task, special focus is given to the increase on cycle parking infrastructure at interfaces.

Step 1: Identification of PT interfaces where to implement bike parking infrastructure

The definition of the strategy to follow in the implementation of cycling infrastructure on Lisbon metropolitan PT interfaces, started by studying the recent EC project SmartHub methodologies and evaluating if they would be adequate to this UPPER measure.

Then, the topic was discussed with local stakeholders, namely the metropolitan municipalities, the infrastructure owners and the PT operators, to evaluate the importance given to the subject and the interest in participating in the initiative.

At the same time, in the scope of LIS_03, in the development of the Lisbon metropolitan area SUMP, a hierarchy of PT interfaces was defined, based in several criteria. This has also been used in the definition of which PT interfaces should be chosen for the bike parking integration.

Step 2: Engagement of PT interface owners for implementation of the bike parking infrastructure

The results of conversations with stakeholders crossed with bike user experience and the interface ranking, pointed that the interventions in the boat interfaces could be a good solution.

Therefore, deeper discussions were undertaken with the boat operator, Transtejo, and field visits were done to their main interfaces.

Step 3: Definition of interfaces and site visits / Step 4: General definition of requirements for the bike parking installation

Following discussions and visits, a methodology was designed to do the intervention, that included the following steps:

- Preparation and signature of a protocol between the parties to frame the UPPER initiative.
- Technical visits to stations.
- Definition of spaces for installing these bike parking infra-structure.
- Design of the different interventions – one per interface.
- Clarification of the investments to be made.
- Acquisition of components.

- Study and decision of the management/maintenance/cleaning business models.
- Creation of user access rules for bike users.
- Implementations/installations/works.
- Opening to the public.

As main features, the following discussions led the teams to define the following issues:

- to make investments valuing work solutions and acquisition of separate parts (access control, sheffields, fences, cctv...), that prioritize bicycle safety and protection against bad weather, as commuters' bikes tend to remain in the interface for a few hours.
- always ensure the bicycles can be tied to secure infrastructure, that guarantees full security: inverted U / Sheffield type racks and equipment's, guarantee access control whenever possible, etc.
- if possible, install fences that guarantee exclusive access to PT users, namely unlocked by the "navegante" monthly ticket from the rain and the sun.

Two interfaces were selected to be the first to hoist the bike parting infrastructure: Terreiro do Paço and Barreiro. The interfaces were visited and studied, the current use of bikes was monitored, the expected demand was evaluated. As a result, different intervention scenarios were already discussed for each location.

Sub-Task 2: Integrate Lisbon bike sharing in PT ticketing system

In this sub-task, special focus is given to the integration of PT and public bike sharing services at tariff and ticketing level.

Step 1: Analysis of the PT and bike sharing ticketing systems / Step 2: Definition of technical requirements for ticket integration

This service has become known to the general public as "GIRA NAVEGANTE", and is only available to residents that are PT users with a valid PT monthly ticket "navegante" in the current month. Only those can access the product, and therefore use the GIRA bike sharing system for free.

The general steps undertaken to the preparation and development of this measure were:

- TML and the City of Lisbon discussed the integration of the Lisbon public bike sharing system GIRA with the Lisbon PT ticketing system 'navegante' (Fig 47).
- The City of Lisbon politically decided to sponsor the free use of bikes by Lisbon inhabitants that use PT services in a regular basis, that is to say, people who live in Lisbon and have a valid monthly PT ticket (named navegante).
- TML, that manages the PT ticketing system in Lisbon metropolitan area, and EMEL, the Lisbon municipality company that manages the Lisbon public bike sharing system GIRA, got together to discuss the technical integration of both systems.

Step 3: Developments to integrate the public bike sharing system GIRA and the PT ticketing system 'navegante'

Regarding the integration, a TML webservice was adapted to be used, including identification of the user and identification of its associated transport card "navegante". The procedure is the following:

- The user acquires a "navegante" PT monthly ticket.
- The user opens GIRA app and chooses the "GIRA NAVEGANTE" product.
- The user inserts his/hers "navegante" card number.
- The GIRA service launches a call to the TML webservice, to check if the card exists and if the monthly ticket for that user for that month is valid.

- The webservice then proceeds to verify if the card belongs to the identified user and if the monthly pass was purchased for the month in question.
- If so, the GIRA system concedes free access to the GIRA bike sharing service for free for this user until the end of the month.

Each month, the procedure is repeated.

Fig 47. Integration of the public bike sharing system GIRA and the PT ticketing system 'navegante'.

By the submission of this report, this sub-measure has been completed and is already in a demonstration phase. In particular:

- The integration was done.
- Tests were conducted.
- The service was launched.

5.2.6.3. Challenges & Mitigations

Sub-Task 1: Study of bike parking infrastructure on PT interfaces and stations

Main challenges and mitigations included:

- Depreciation cost rules were an obstacle to the definition of the solutions, so solutions that do not need to be considered under those rules were given priority.

- The boat operator is taking too much time to validate the measure and decide on the solutions to be implemented, therefore TML is looking to other interface owners/managers to implement the sub-task.
- The definition of quality spaces to implement the bike infrastructure were difficult to find, but in the end solutions were found.

Sub-Task 2: Integrate Lisbon bike sharing in PT ticketing system

Main challenges and mitigations included:

- The clients in the GIRA system are identified by the national fiscal number and in many cases the “navegante” system did not include that information, which resulted in the failure to match the client to the card. As a mitigation measure, clients were directed to make an update on their navegante information by email. Also, monthly vouchers were attributed to clients when EMEL, the municipal company that manages GIRA, physically validated the client information and monthly pass acquisition.
- The transport monthly pass is valid for a calendar month. When a client adheres to GIRA in the middle of the month the access to bikes is only valid for the rest of the month. Communication was reinforced in this case.
- The “navegante” system sales operation are not performed online with the system that validates the validity of the Gira access. This means that e a client purchases the monthly pass and immediately tries to access GIRA it will give an error indicating the pass has not been acquired. For the moment the client is urged to retry later. Additionally at a back-office level, EMEL, the municipal company that manages GIRA, implemented a mechanism to also retry without additional user input.

5.2.6.4. Next steps towards implementation

Sub-Task 1: Study of bike parking infrastructure on PT interfaces and stations

The work is following in a continuous base. Currently:

- Transtejo is doing some benchmarking and looking into the market for competitive commercial solutions for bike parking in buildings.
- Transtejo is designing interventions for different scenarios.

Next steps towards implementation include:

- Transtejo Board will validate the proposed approach.
- Investments to be made will be defined.
- The bike associations will be called to give their opinion of the different scenarios, solutions, equipments and infrastructure management rules.
- Management/maintenance/cleaning business models will be studied.
- Transtejo Board will choose the solutions to be implemented in each interface.
- User access rules for bikers will be made.
- Acquisition of works and components will take place (part of T6.2).

The implementation and demonstration phase (WP6) will include:

- Implementations/installations/works will take place
- Opening to the public

- TML will look into other interfaces for a possible second round of interventions
- Eventually, a campaign will be designed to showcase the measure

Sub-Task 2: Integrate Lisbon bike sharing in PT ticketing system

This sub-measure is already implemented. During the demonstration phase, the next activities will be conducted:

- Systems maintenance
- Evaluation of customers opinions/complains
- Debugging / correction of errors
- Evaluation of the measure (data analysis)
- Implement notification interface to inform Gira system when new information arrives at “navegante” system

5.2.7. TES_02: To simulate and analyse the needs of PT for LEZ demand fulfilment

5.2.7.1. Description of the measure and main outcomes expected

Thessaloniki’s measure 02 aims to investigate the impact of different spatial forms of a Low Emission Zone (LEZ) in the city on the public transport accessibility, as well as to identify how public transport services should be rearranged for providing sufficient levels of accessibility in the case of implementing a LEZ (assuming that public buses will not be allowed to circulate within the LEZ). This measure aims to support the implementation of Thessaloniki’s Sustainable Urban Mobility Plan (SUMP), which proposes the implementation of a LEZ in a relatively small area of the city centre.

5.2.7.2. Preparation of the measure

The first step towards the measure’s preparation was to define some variations of the LEZ, using as a basis the one that is proposed by city’s SUMP. In parallel, required data were collected, such as bus lines, stops, points of interest (POIs). Then, KPIs for assessing PT accessibility were defined and calculated for the different LEZ variations.

LEZ variations: The LEZ suggested by Thessaloniki’s SUMP (LEZ_Variation 1) was the basis for defining the other three LEZ variations as shown in Fig 48. The concept is that each variation extends the LEZ to a bigger area and thus the effect of the area’s size in relation to its accessibility can be studied. It should be noted that for the purpose of this measure, bus lines are not permitted to enter the LEZ.

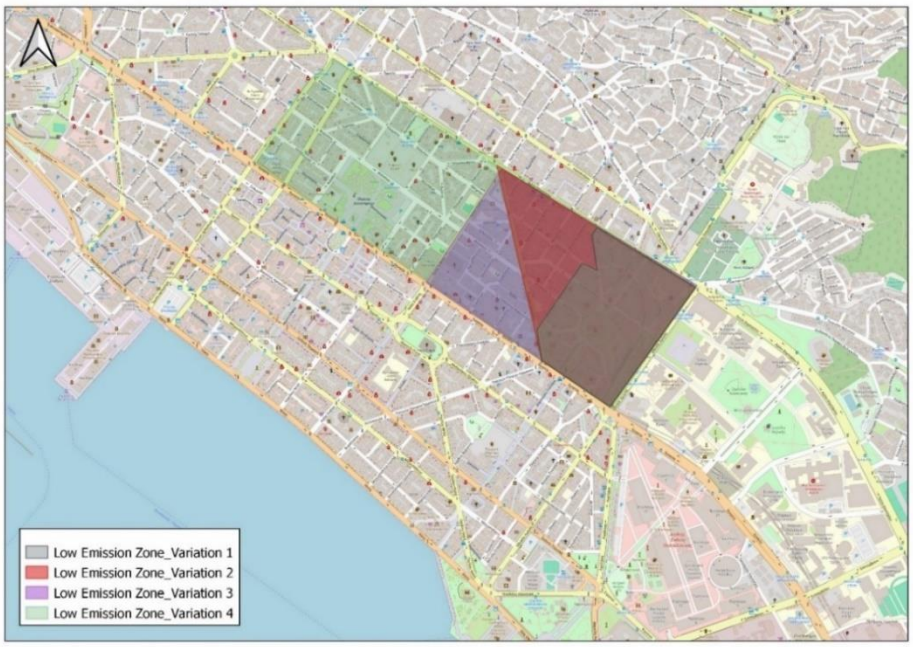

Fig 48. LEZs variations defined under TES_02.

The area of each LEZ variation is shown in Table 7.

Table 7. Areas of LEZs' variations.

LEZ Variation 1	0.128 km^2
LEZ Variation 2	0.195 km^2
LEZ Variation 3	0.276 km^2
LEZ Variation 4	0.521 km^2

Data collection: The data needed for this measure was the road network, the bus stops and bus lines of Thessaloniki city, as well as the POIs. In addition, some data regarding the acceptable travel time by bus were collected from a questionnaire carried out for TES_10 and were utilized to calculate KPI 5 "Access from LEZ". More details are included in the description of KPI 5 calculation.

KPIs' definition: The KPIs defined aim to assess the access to/from the LEZ using public transport taking into consideration that buses are not permitted in the area. Table 2 shows the defined KPIs.

Table 8. KPIs for assessing PT accessibility.

#	KPI	Unit
KPI1	Bus lines service	Number of lines / area (km^2)
KPI2	Bus lines service directional	Number of lines/area (km^2) per direction
KPI3	Bus frequency directional	Number of buses/line/ hour and direction
KPI4	Catchment area	% of covered area walked in the LEZ from the bus stops (BS)
KPI4a	Catchment area per gender	% of covered area walked in the LEZ from the bus stops per gender
KPI4b	Catchment area for elderly	% of covered area walked in the LEZ from the bus stops for elderly
KPI4c	Catchment area for people with disability (PwD)	% of covered area walked in the LEZ from the bus stops for PwD

KPI5	Access from LEZ	The maximum distance covered from the LEZ within an acceptable travel time
KPI6	Catchment area for points of interest (POIs)	Number of POIs covered within the accepted travel time by bus and walking / area (km2)
KPI6a	Catchment area POIs per gender	Number of POIs covered within the accepted travel time by bus and walking / area (km2)
KPI6b	Catchment area for POIs for elderly	Number of POIs covered within the accepted travel time by bus and walking / area (km2)
KPI6c	Catchment area for POIs for people with disability (PwD)	Number of POIs covered within the accepted travel time by bus and walking / area (km2)
KPI7	Bus stops	Number of stops / area (km^2)

Accessibility analysis – KPIs' calculation: The KPIs are calculated for all LEZ variations previously presented.

KPI 1: In order to calculate the bus lines serving each LEZ, new polygons were created that corresponded to the half of each LEZ. Then, a buffer zone of 400m was created around these new polygons. The distance of 400m was selected as it is the most commonly cited acceptable walking distance to reach a bus stop[6]. The rationale of the new polygons in the half of each LEZ is to consider an average location in the LEZ. The bus lines intersecting this buffer zone are considered to serve the LEZ. The number of bus lines serving each LEZ was divided by its area (bus lines/km^2), for comparability purposes. The results are presented in Table 9.

KPI 2: This KPI is similar to KPI1 but here the bus lines are categorized per direction. In more detail, the city of Thessaloniki due to its shape, may be divided into Western, Central and Eastern city. The results of this KPI are also presented in Table 9.

Table 9. Results of KPI1 and KPI2 calculation.

	KPI 1	**KPI 2 (Central)**	**KPI 2 (Eastern)**	**KPI 2 (Western)**
LEZ Variation 1	132.813	132.813	78.125	85.938
LEZ Variation 2	87.179	87.179	51.282	56.410
LEZ Variation 3	57.971	57.971	32.609	36.232
LEZ Variation 4	49.904	49.904	21.113	30.710

KPI 3: The frequency of each bus line serving the LEZs under study was calculated. The frequency during morning (7-9 am) and afternoon (4-6 pm) peak hours was defined according to the timetables published on the official operator's website. These frequencies were then multiplied with the percent of scheduled kilometres that were actually made by each bus line in 2023. An average frequency (buses/hour) was calculated per direction and then divided by the LEZs' area. The results are presented in Table 10.

Table 10. Results of KPI3 calculation.

	KPI 3 (Central)	**KPI 3 (Eastern)**	**KPI 3 (Western)**
LEZ Variation 1	24.219	26.562	25.781
LEZ Variation 2	15.897	17.436	16.923
LEZ Variation 3	11.232	12.319	11.956
LEZ Variation 4	6.334	6.718	6.334

[6] https://humantransit.org/2011/04/basics-walking-distance-to-transit.html

KPI 4: In order to calculate the percentage of LEZ's area covered by walking from the bus stops, first the bus stops considered should be defined. The bus stops should be outside but close to the LEZ, and thus it was decided to consider the ones intersecting with the polygons created under KPI 1. The next step was to create isochrone maps. The starting points for all isochrone maps are the aforementioned bus stops. The distance defined is 400m (aligned to KPI 1 calculations) and the network is the road network of Thessaloniki. As shown in Fig 49, all LEZs are completely covered within 400m of walking from the nearest bus stops outside each LEZ.

It should be noted that due to inadequate data for defining specific acceptable travel times for men/women, elderly and people with disability in Thessaloniki, KPI 4a, 4b and 4c were not calculated. The same applies for KPI 6a, 6b and 6c. However, they are still maintained as important KPIs because if such data exist, it is considered quite valuable information as for elderly and people with disabilities more travel time is usually required to reach a destination and they are generally perceiving a shorter distance as acceptable.

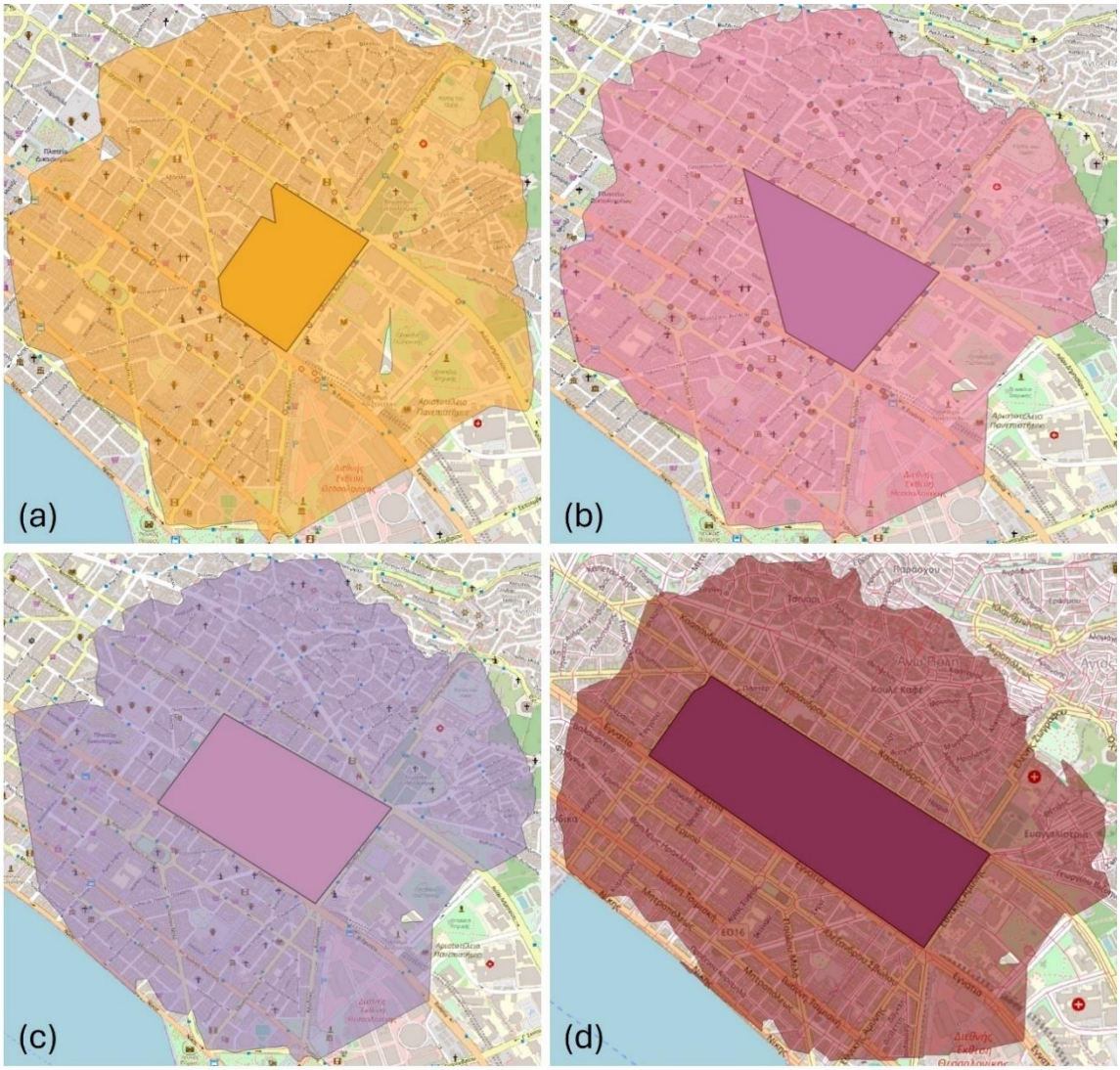

Fig 49. Results of KPI 4 calculation. (a) Isochrone map of 400m from bus stations near LEZ 1. (b) Isochrone map of 400m from bus stations near LEZ 2. (c) Isochrone map of 400m from bus stations near LEZ 3. (d) Isochrone map of 400m from bus stations near LEZ 4

KPI 5: In order to calculate KPI 5, the average acceptable travel time by bus in Thessaloniki is needed. This information was retrieved from the survey conducted under TES_10 where participants were asked which is the acceptable travel

time by bus to reach several destinations such as University, Health facilities etc. The first step was to group these responses into categories. Three different destination clusters were identified based on the responses:

1. Travel to Health facilities/Travel for Entertainment: 12,5 min
2. Travel to Education/Public services: 14 min
3. Travel for shopping: 15,8 min

Next step was to create isochrone maps (separately for each LEZ) using as starting point the bus stops near to each LEZ (bus stops considered in KPI 4) and as network the bus routes serving each LEZ correspondingly. It should be noted that 100m of walking are considered as part of these maps so as to include the walking from the disembarkation stop. Table 11 presents the area (km^2) covered if traveling by bus from each LEZ for the three travel destinations.

Table 11. Results of KPI 5 calculation.

	KPI 5 (Access to Health facilities/ Entertainment)	KPI 5 (Access to Education/Public services)	KPI 5 (Access to shops)
LEZ Variation 1	9.743	10.584	11.654
LEZ Variation 2	9.860	10.663	11.728
LEZ Variation 3	9.952	10.798	11.856
LEZ Variation 4	13.064	14.544	16.382

The maximum distance covered from the LEZ within an acceptable travel time is also presented graphically in Fig 50. The figure shows the isochrone maps of the 15.8 minutes bus journey from all LEZs. Both Table 11 and Fig 50 show that LEZ Variation 4 scores better in terms of covered distance; however, this result is not really indicative since it is affected by the size of each LEZ. More indicative are the results of KPI 6.

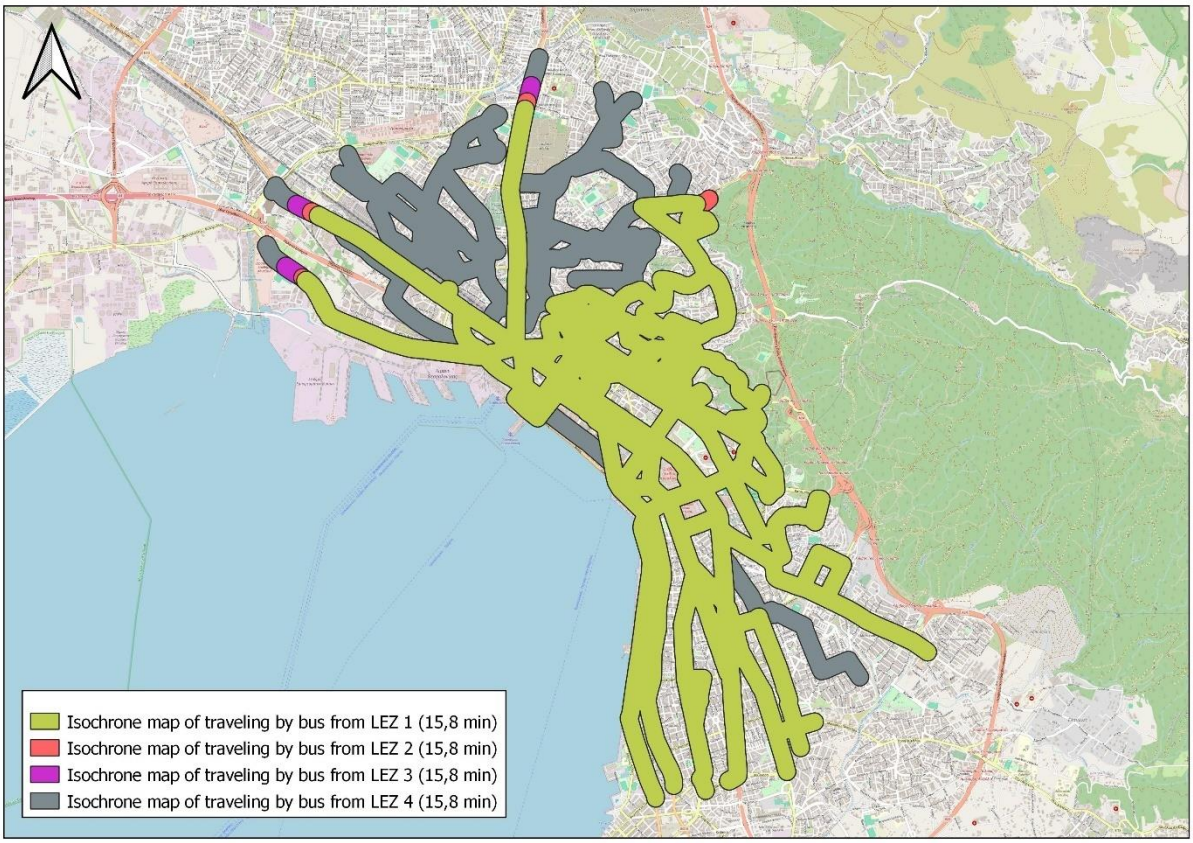

Fig 50. Isochrone maps of the 15.8 minutes bus journey from all LEZs.

KPI 6: Given the isochrone maps created under KPI 5, KPI 6 refers to the points of interest reached when traveling by bus from each LEZ. The number of points reached was calculated based on the corresponding travel time for each POIs category. For example, the number of POIs related to health facilities was calculated based on travel time of 12,5 min, while to public services 14 min isochrone map was used. For comparability purposes, the number of reached POIs was divided by the area (km^2) of each LEZ. The results are shown in the table below. It is noted that for the "shopping" category results are not presented, due to lack of available data. The results of KPI 6 show that the access to POIs is significantly reduced for larger LEZs.

Table 12. POIs reached per LEZ area when traveling by bus.

	KPI 6 (Health facilities)	KPI 6 (Education)	KPI 6 (Public services)	KPI 6 (entertainment/ culture)
LEZ Variation 1	2335.938	257.813	828.125	726.563
LEZ Variation 2	1533.333	169.231	543.590	476.923
LEZ Variation 3	1083.333	119.565	384.058	336.957
LEZ Variation 4	619.962	65.259	213.052	201.535

KPI 7: The bus stops considered to be reached by foot from each LEZ are the ones intersecting the polygons created under KPI 1. In order to calculate KPI 7, the number of these bus stops is divided by the area (bus stops/km^2) of each LEZ. The results are presented in Table 13.

Table 13. Results of KPI 7 calculation.

	KPI 7
LEZ Variation 1	289.063
LEZ Variation 2	210.256
LEZ Variation 3	163.043
LEZ Variation 4	111.324

5.2.7.3. Challenges & Mitigations

No challenges were identified during the preparation of this measure.

5.2.7.4. Next steps towards implementation

The preparation of this measure was completed through the steps analysed in the “Preparation of the measure” section. The implementation will be done using PTV Lines software in order to identify appropriate public rearrangements to better serve the LEZ and ensure that even larger LEZs will not affect significantly PT accessibility. The process of purchasing the software is on-going at the moment of writing this deliverable and is expected to be soon completed. In addition, during the implementation phase, it is foreseen to organize events for presenting the measure’s results and recommendations and gathering stakeholders’ feedback.

5.2.8. TES_08: To create new incentive based services in the MDMS to increase the use of PT

5.2.8.1. Description of the measure and main outcomes expected

Thessaloniki’s measure 08 aims to identify accessibility gaps, identify potential synergies between PT and shared mobility services and provide guidance about where shared mobility services should operate. TES_08 has two outputs: a) an accessibility analysis focused on the city of Thessaloniki, b) a neutral platform that is demonstrated for the city of Thessaloniki but it can be adopted also by other cities (if the required data are available). The purpose of the analysis was to identify areas in Thessaloniki with high travel demand where public transport provides inadequate services and micromobility can improve travel time and have commercial potential. The neutral platform aims to assist in evidence-based decision-making of local authorities and micromobility operators. More specifically, its goal is to demonstrate the potential that micromobility services have for attracting a reasonable modal share for specific Origin-Destination pairs.

5.2.8.2. Preparation of the measure

The first steps towards the preparation of the measure were to define the methodology for the accessibility analysis and to collect the required data. Following these, the accessibility analysis was conducted. Then, with regards to the neutral platform, the architecture and the methodology were initially defined. Then the development of the back-end and the user interface was carried out.

Accessibility analysis: The basis of the analysis is the Traffic Analysis Zones (TAZs) of the study area. TAZs are universally used in travel demand modelling to represent the spatial distribution of trip origins and destinations, as well as the population, employment and other spatial attributes that generate or otherwise influence travel demand. Except for the TAZs, the analysis also utilizes the Origin-Destination (OD) matrices of Thessaloniki’s SUMP, which actually

express the number of trips that are being conducted on a daily basis between each pair of TAZs. The analysis was carried out using QGIS 3.28.6.

First, isochrone maps[7] were created using as network the road network of Thessaloniki and as start points the bus stops. The considered mode of transport was walking and the time defined was 10 minutes. The purpose of this step was to identify any existing gaps, meaning areas of the city that are not accessible from a bus stop within 10 minutes of walking. With this step, the spatial coverage of the bus lines was essentially checked; no gaps were identified.

The trips considered were those either destinating to or originating from Thessaloniki's centre. Given the OD matrix the total number of trips of each TAZ from and to the centre area was calculated. In more detail, the following trips were calculated: a) trips from each TAZ outside of this area to the centre area, b) trips from the centre area to each TAZ outside of this area.

The number of calculated trips were divided by the area of each TAZ, for comparability purposes. Then the trips/km^2 were categorized in 4 classes of equal intervals. The class with the highest values included 17 TAZs. It was then checked if the selected TAZs were within the current operation zone of the main shared-mobility provider (HOP). Only 3 out of 17 selected TAZs were outside HOP's operation zone (Fig 51). The rest of the steps are focused on these three TAZs.

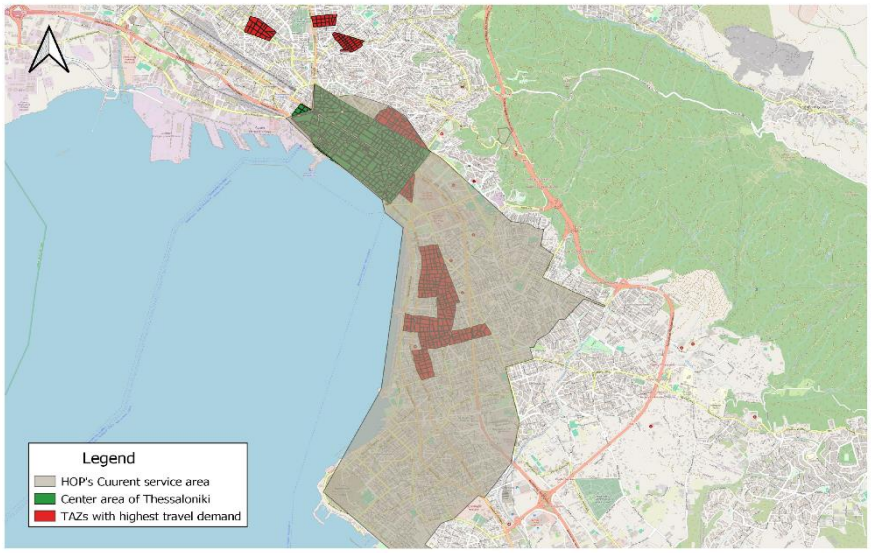

Fig 51. TAZs with the highest travel demand to/from the centre area of Thessaloniki and HOP's current operation zone.

The bus lines that connect the three selected TAZs with the centre area of Thessaloniki were identified. For each bus line the Level of Service (LoS) was calculated using data of Thessaloniki's Public Transport Authority (TheTA). The LoS of public transport is defined by the calculation of a set of indicators considering frequency, travel time etc. The indicators calculated in this analysis are the following: a) frequency during peak hours, b) hours of operation, c) percentage of completed vehicle kilometres to planned. The purpose of this step was to identify which of the selected TAZs are not sufficiently served by PT and thus could benefit from micromobility. According to the results (Fig 52):

- TAZ 513 – LoS B and C
- TAZ 516 – LoS C
- TAZ 615 – LoS D

[7] Isochrone maps, also known as travel time polygons or travel time maps, are maps that show all reachable locations within a specified limit by a specified mode of transport. They are mostly used to depict travel times, such as drawing a 30-minute travel time perimeter around a start location.

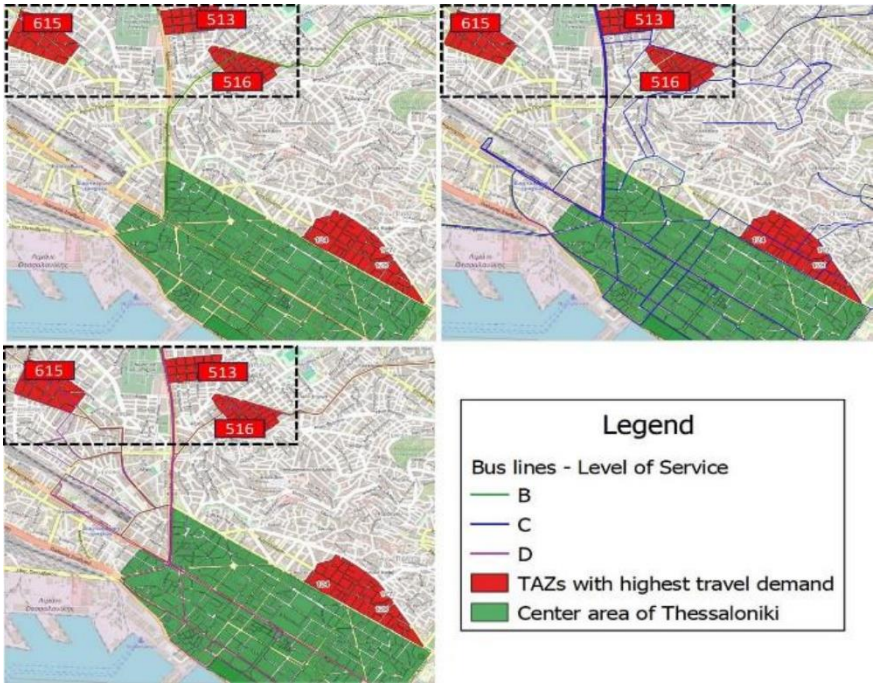

Fig 52. Level of service of bus lines that serve the selected TAZs outside HOP's operation zone (TAZ 513, 516 and 615).

The mean slopes of these three zones were checked to verify if travel by electric scooters is suitable; all TAZs are considered suitable for electric scooters. Also, for identifying whether the combination of PT with shared mobility forms a competitive alternative, the following were calculated:

- Travel time by PT from each zone's centroid to three main points of interest (POIs): In order to calculate travel times, the average speed per bus line was used as provided by the TheTA. For each TAZ the bus line with the highest Level of Service was considered. The walking time to/from the nearest bus stop was estimated as well as the waiting time. The waiting time was calculated as half the frequency. If, for example, there is a bus every 20 minutes, the waiting time was estimated 10 minutes. The total travel time by 'PT' is the sum of walking time, waiting time as well as the bus travel time.
- Travel time by scooter & PT from each zone's centroid to three POIs: A bus stop served by many bus lines and is within the average scooter travel distance (2500m) was selected. The bus stop selected is KOLOMVOU on Egnatia Street. Then the shortest path from the centroid of each zone to KOLOMVOU was calculated using the average scooter speed based on historic micromobility data that are available from the city of Thessaloniki (13.75km/h). Then the bus line with the highest Level of Service was selected and given the average speed, the time travel by bus was calculated. Waiting time as well as walking time from the nearest bus stop to the final destination were calculated. The waiting time was calculated as half the frequency. The total travel time by 'scooter & PT' is the sum of the above calculated times. It is worth noting that the time needed to find an available scooter is not considered and it is assumed that the user will find an e-scooter close to his/her place.

The results are presented in Table 14.

Table 14. Comparison of travel times by 'PT' and by 'scooter & PT' from selected TAZs to 3 POIs.

Origin	Destination	PT travel time (1)	Scooter + PT travel time (2)	Difference (2-1)
TAZ 513	POI 1 (Dikastiria)	19,3 min	10,6 min*	-8,7 min
	POI 2 (Agia Sofia)	26,3 min	24,2 min	-2,1 min

	POI 3 (Confex park)	33,7 min	32,7 min	-1 min
TAZ 516	POI 1 (Dikastiria)	16 min	8,8 min*	-7,2 min
	POI 2 (Agia Sofia)	20,2 min	22,2 min	+2 min
	POI 3 (Confex park)	35,5 min	30,9 min	-4,6 min
TAZ 615	POI 1 (Dikastiria)	24,3 min	9,9 min*	-14,4 min
	POI 2 (Agia Sofia)	33,4 min	24,9 min	-8,5 min
	POI 3 (Confex park)	47,4 min	33,3 min	-14,1 min

*Travel only by scooter - distance is less than 2500m.

Based on the calculated travel times and the LoS of bus lines, it is concluded that TAZ 615 has both high potential for the operators and contributes to enhanced accessibility. However, the other two TAZs can also have potential for the operators. Thus, two alternative extension scenarios were formed, one covering only TAZ 615 and one covering TAZs 615, 513 and 516. For both alternatives the area and population coverage was calculated (Table 15).

Table 15. Area and population served currently (by HOP) and after the two alternative extensions.

	Area	Population
Currently operating zone	15,932 km^2	364640
Extended operating zone a (TAZ 615)	16,229 km^2	373870
Extended operating zone b (TAZs 615, 513, 516)	16,905 km^2	398140

Neutral platform:

Architecture

The high-level platform architecture (Fig 53) consists of the frontend component, a Node.js backend component and a Python backend component for the algorithm.

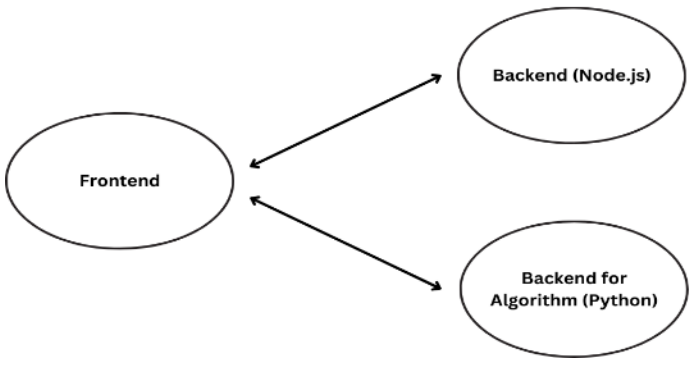

Fig 53. TES_08 high-level platform architecture.

- Frontend: The frontend component is written in Angular[8] and provides all the functionalities needed in a dashboard view. So, the user has to make a registration (for the first time) and login in order to have access to the dashboard.
- Backend (Node.js): It is the backend component (written in Node.js[9]) that serves the dashboard needs. For example, it is used for functionalities such as registration and login. For this reason, it is connected with a MySQL[10] database.
- Backend for algorithm (Python): It is a backend component for the needs of the algorithm. Except for the algorithm code that is written in Python[11], Flask[12] is used in order to allow communication with the frontend component.

Inputs

The user has to fill a form with the algorithm inputs, so that the algorithm delivers the desired results. The inputs are the following ones:

- Origin and destination coordinates: the neutral platform provide results at an OD level.
- Traffic analysis zone: Traffic analysis zone (TAZ) file (in .geojson or .shp format) contains detailed geographical data and attributes used for analyzing travel demand. It outlines zone boundaries and includes information about the TAZ I, the coordinates of the zones and the name of the area.
- OD matrix: The OD matrix file (in .xls or xlsx format) provides information about travel demand between specific OD pairs. It includes three columns; From, To, Trips.
- Available micromobility stations: This station data file (in .geojson or .shp format) has the locations of the micromobility stations.
- Unlocking cost of micromobility: The unlocking cost is the initial fee (in euros) a person has to pay to start using the micromobility vehicle.
- Rental cost of micromobility per minute: Rental cost per minute is the fee charged for each minute that the micromobility vehicle is in use.
- Available stations of shared cars: This station data file (in .geojson or .shp format) has the locations of the shared car stations.
- Unlocking cost of shared cars: The unlocking cost is the initial fee (in euros) a person has to pay to start using the shared car.
- Rental cost of shared cars per minute: Rental cost per minute is the fee charged for each minute that the shared car is in use.
- Micromobility vehicles real-time availability: It is an API containing detailed information about dockless vehicles (both micromobility vehicles and shared cars). The details include unique vehicle IDs, type of vehicle and precise GPS coordinates.
- Bus stations**:** Bus stations (in .geojson or .shp format) contain geographic data about the locations of bus stations.

[8] Angular: https://angular.dev
[9] Node.js: https://nodejs.org
[10] MySQL: https://www.mysql.com
[11] Python: https://www.python.org
[12] Flask: https://flask.palletsprojects.com

- PT time schedule**:** GTFS files (in .txt format) contain information about the bus schedule including stop times, ID of the bus, routes, calendar, and frequency of the bus.
- PT price for one-way tickets: This parameter is defined as the price of a one-way ticket, representing the cost for a single bus travel.
- Average fuel price**:** The average price of fuel is measured in euros.
- Average fuel consumption for cars: Fuel consumption (L/100 km) is the average consumption of a car.

Methodology

The platform includes six different transport options (micromobility, shared car, bus, walking, car, and multimodal) and calculates the optimal routes for each option. With regard to the routing data that are necessary for the platform, we use the API provided by OSRM[13] (Open Source Routing Machine).

Micromobility (bicycles, scooters): The user has to enter API (for dockless micromobility) and upload a file for micromobility stations. So, there are two types of vehicles that the algorithm takes into consideration (dock-based and dockless micromobility). The average speed is assumed equal to 15km/h and the user has to determine two parameters: the unlocking cost and the rental cost per minute. The algorithm initially identifies the nearest micromobility vehicle to the origin coordinates of the trip and calculates the walking distance that the person has to travel from the origin point. Then, it calculates the micromobility distance from the location of the nearest micromobility to the final destination and incorporates the cost parameters (unlocking cost and rental cost per minute) that the user has initially determined to calculate the outputs.

Shared car: The user enters an API (for dockless cars) and has to upload a file for shared car stations. The average speed is assumed equal to 30km/h and the user has to determine: the unlocking cost and the rental cost per minute. Based on these, the algorithm selects the nearest shared car to the origin coordinates of the trip which the person has to take by walking. So, the algorithm calculates the walking distance from the origin point to the nearest shared car. Then, the algorithm calculates the car distance from the location of the nearest shared car to the final destination and incorporates the cost parameters (unlocking cost and rental cost per minute) that the user has initially determined to calculate the outputs.

Bus: The average speed is assumed equal to 15km/h and the user has to determine the price of a one-way ticket. The user uploads a GTFS file and the bus routes files to provide the platform with accurate data on bus operations. The algorithm utilizes the uploaded files in order to identify the appropriate bus that the person should take. The person typically has to walk from the origin to the bus stop, travel with the bus to the bus stop which is nearest to the final destination and also has to walk from the bus stop to the final destination. If a second bus is required, the algorithm calculates the walking distance from the bus stop where the person got off to the nearest bus stop for the second bus. Then, when the person leaves the second bus, the algorithm calculates the walking distance to the final destination. So, the algorithm provides with the following information: which bus(es) the person needs to take to reach the destination, information about the bus stops, the distance the person will have to walk to the bus stop, the distance the person will have to walk after getting off the bus, either to catch a second bus or to reach the final destination.

Walking**:** Regarding walking, the user does not upload any files and it is assumed that the average speed is 4.5km/h. The algorithm calculates the optimal walking distance and time it will take to move from the origin coordinates to the destination coordinates.

Car: The average speed is assumed equal to 30km/h and the user has to determine the average fuel price and the fuel consumption for the car. The algorithm calculates the optimal car distance and time.

Multimodal: With regard to multimodal, the optimal solution is based on the minimum generalized cost. So, the algorithm has to calculate each combination separately. The currently examined multimodal combinations are: “bus-shared car”, “shared car-bus”, “micromobility-bus”, “bus-micromobility”, “shared car -micromobility”, “micromobility-shared car”. The

[13] OSRM: https://project-osrm.org

algorithm compares all the combinations and selects the one with the lowest generalized cost. These combinations may include walking as well. The algorithm presents results only for this optimal solution.

Results

The results of the algorithm are:

- Generalized cost: Generalized cost (GC) is calculated separately for each transport mode based on specific parameters, such as the distance travelled, the time taken, the value of time (VOT) and costs parameters (unlocking cost and rental cost for micromobility and shared car, one-way ticket for bus, average fuel price and fuel consumption for car).
- Modal share: Modal share is also calculated for each transportation mode separately. Each value is between 0 and 1, while the sum of the modal shares must be equal to 1 (or 100%). The modal share is calculated based on the generalized cost and specifically using the following equation:

$$\text{MScar} = \frac{e^{-GCcar}}{(e^{-GCcar} + e^{-GCbus} + e^{-GCwalk} + e^{-GCmicro} + e^{-GCmulti} + e^{-GCshcar})}$$

- Number of daily trips: The number of daily trips is calculated specifically for micromobility, shared car, bus, and multimodal. It is derived from the Origin-Destination (OD) matrix file that the user uploads. This calculation involves multiplying the modal share of each transport solution by the daily travel demand between specific zones as indicated in the OD matrix.
- Daily income: Daily income depends on the number of daily trips. It is applicable exclusively to micromobility, shared car, bus, and multimodal (in which the daily income is calculated separately for each mode).

User Interfaces

Initially, the user has to fill in a registration form. After a successful registration, the user has to fill in the login form in order to have access to the platform. After the user's login, the user views a dashboard that consists of the pages "Trip Planner" and "Account". On the "Account" page, the user can view the account details or change password. For the needs of this document, we will present in detail only the "Trip Planner" page which is the page that includes the main functionalities of the platform.

On the "Trip Planner" page (Fig 54), the main part of the page consists of the form for the basic scenario, while on the right side there is a big map. The user selects the origin and the destination by adding two markers (blue for the origin and red for the destination) to the map. With regard to the form, the user has to upload files and enter values. The user inputs are presented in the following categories: Shared micromobility, Shared car, Public transport, Car, Travel demand, Traffic analysis, Shared mobility (dockless vehicles). The required inputs have the "*" symbol.

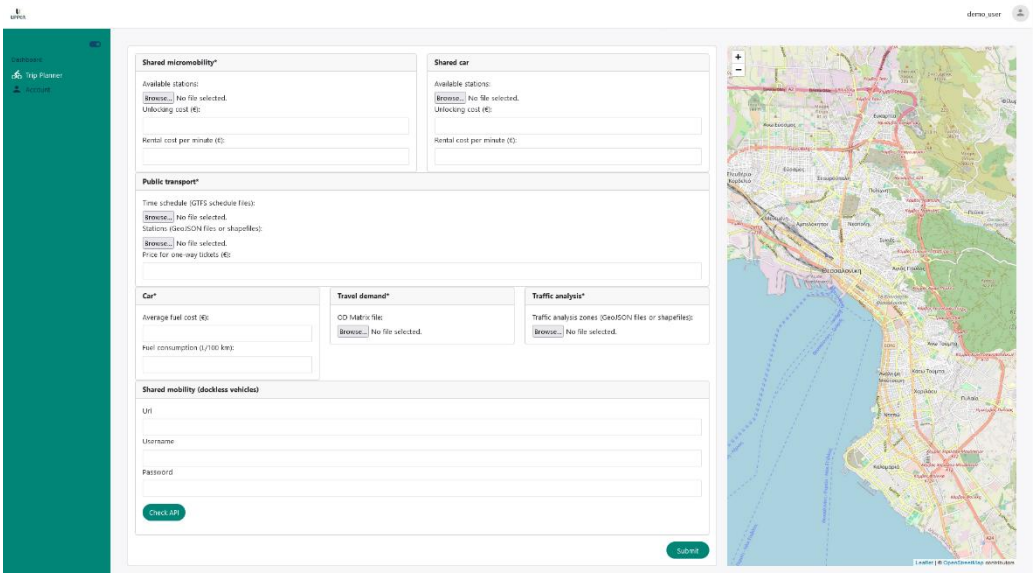

Fig 54. The form for the basic scenario.

After adding the Origin-Destination markers, filling in all the required fields and clicking on the “Submit” button, the results for the basic scenario are presented (Fig 55). There is a result for each supported transported mode: Micromobility, Shared car, Bus, Walking, Car and Multimodal. For each transport mode there is a card with results and a map. The map presents the optimal solution for each transport mode. Each route is depicted as a line. A map can have lines with different colours. For example, the map for Micromobility has a green and a purple line. As it is explained in the bottom part of the card, the green line symbolizes the walking route, while the purple line the micromobility route. There is information about the distance and the time for each route as well. Moreover, each card presents in its main part the following information: Generalized cost, Modal share, Number of daily trips, Daily income, Total distance, Total time.

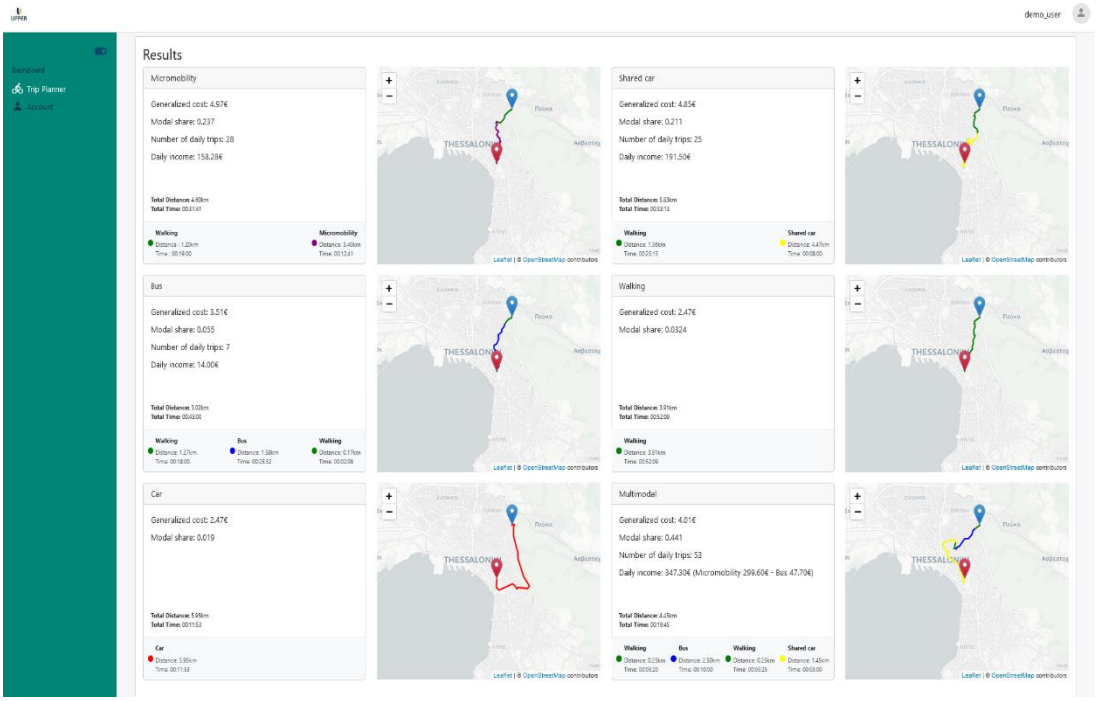

Fig 55. The results for the basic scenario.

Below the results there is the “Test scenario” button. After clicking on this button, a new window with a form about the test scenario is presented (Fig 56). With regard to the test scenario, the user can change only the inputs concerning Micromobility or Shared car. For each transport mode the user can upload a file with the available stations. After uploading the file with the stations, the multiselect component presents all the stations as checked (activated). The user can uncheck one or more stations in order to deactivate them. Moreover, the user can enter new values for the unlocking cost and the rental cost per minute. We suppose that the user makes the following changes in the test scenario:

- The user adds Micromobility station “M1003”.
- Micromobility unlocking cost changes from 0.90 to 1.00.
- Micromobility rental cost per minute changes from 0.15 to 0.20.
- The user deactivates Shared car station “C1002”.
- Shared car unlocking cost changes from 1.00 to 1.10.
- Shared car rental cost per minute changes from 0.20 to 0.25.

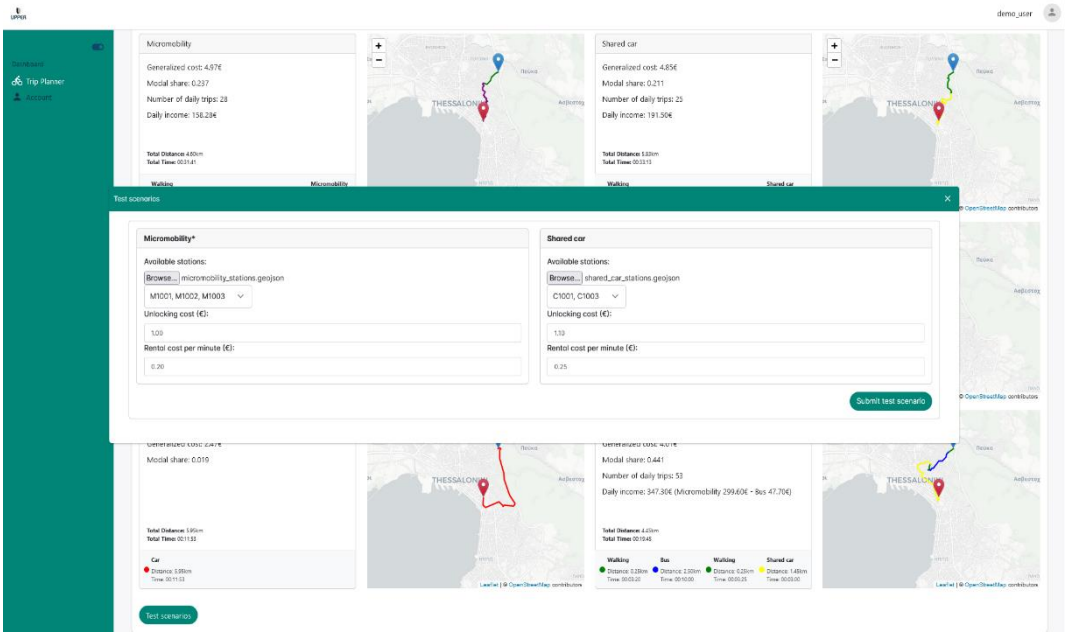

Fig 56. The form for the test scenario.

After clicking on the “Submit test scenario” button, the comparison results of Fig 57 are presented. On the left side there are the results of the basic scenario, while on the right side the results for the test scenario are presented. As the user can make changes in the test scenario only regarding Micromobility and Shared Car, there are three transport modes with possible changes in their routes: Micromobility, Shared car and Multimodal. So, the user can compare the results of the basic scenario with the results of the test scenario for Micromobility, Shared car and Multimodal.

It is out of scope to describe all the changes in the results. As an example, we could mention that the addition of a Micromobility station (“M1003”) reduced the walking distance and time in the Micromobility test scenario. The reason is that the algorithm found a closer micromobility vehicle (at the station added) to the origin. Furthermore, the deactivation of a Shared car station (“C1002”) increased the walking distance and time in the Shared car test scenario, as the distance between the origin and the closest shared car increased.

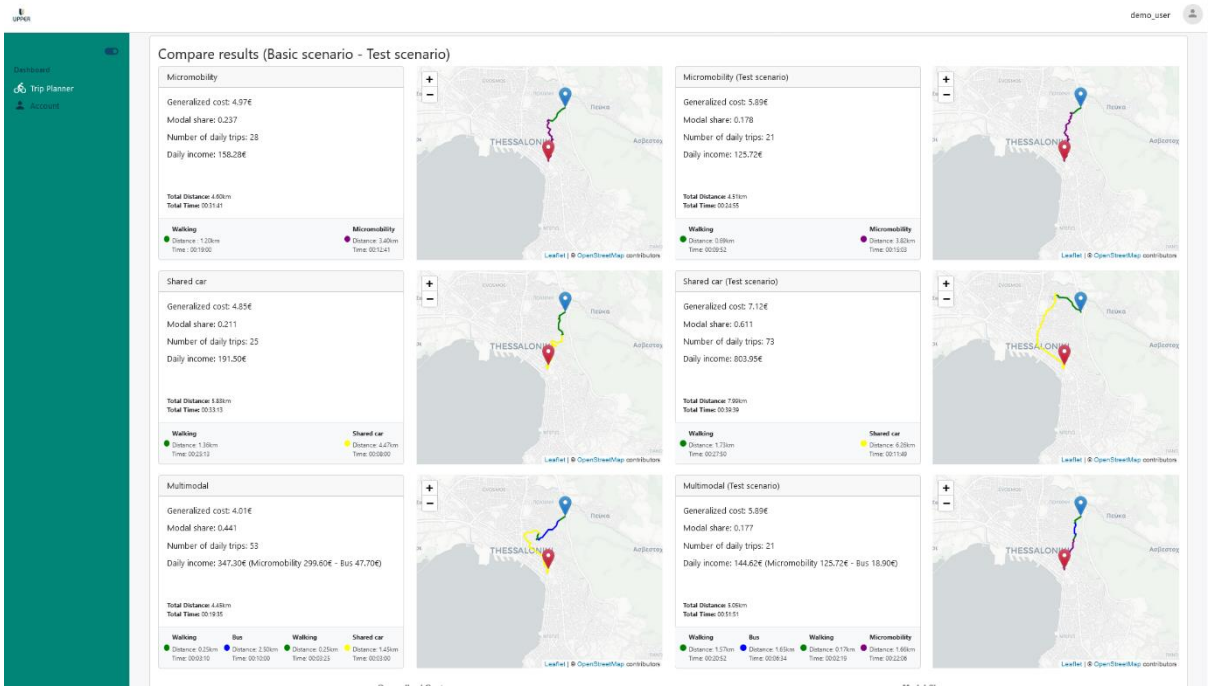

Fig 57. Comparison of results (basic scenario on the left side - test scenario on the right side).

Moreover, there are four bar charts for the comparison between the basic scenario and the test scenario (Fig 58). There is a bar chart for each output of the algorithm: Generalized cost, Modal share, Number of daily trips and Daily income. In each bar chart there are blue bars for the basic scenario and orange bars for the test scenario. For each transport mode there is the bar of the basic scenario next to the bar of the test scenario. So, the comparison is easy and helps the decision making.

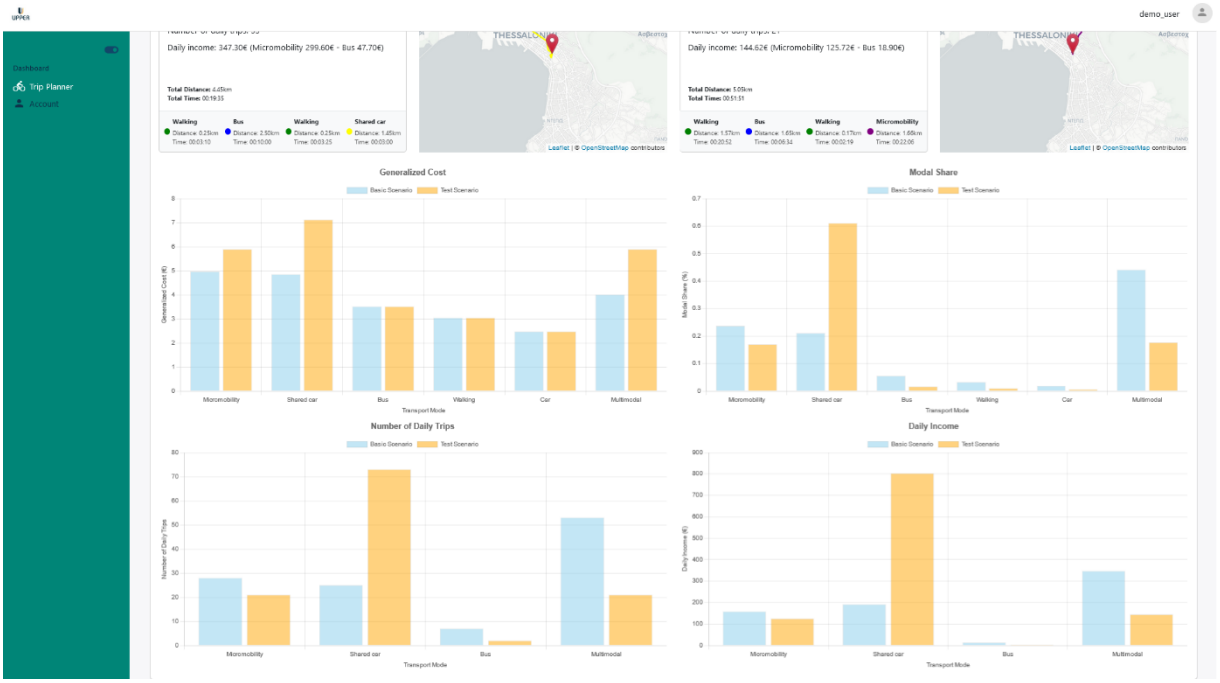

Fig 58. Comparative analysis of generalized cost, modal share, number of daily trips, and daily income for basic and test scenario across different transport modes.

5.2.8.3. Challenges & Mitigations

The challenges that were identified along with the respective solutions are the following.

Bus trip: One of the most challenging aspects of ensuring the algorithm functions correctly involves integrating various data sources, such as GTFS data, bus routes and Transportation Analysis Zone (TAZ) files. This integration is crucial for accurate and effective algorithm performance for the bus. Moreover, the calculations can become too complicated if the algorithm has to take any combination of buses into account. For this reason, the maximum number of different buses that the algorithm will examine needs to be determined in order to find the optimal bus trip solution. With regards to Thessaloniki, a person can move from east to west with a maximum combination of three different buses. So, the algorithm should examine the combination of two or three buses maximum.

Multimodal trip: The integration of multiple transportation modes in a single journey introduces significant complexity to the calculation of generalized costs and modal shares. Unlike unimodal transportation, multimodal journeys require the combination of different cost structures, travel times, and value of time parameters for each mode. This necessitates a sophisticated algorithm capable of accurately calculating and optimizing these combined metrics. For these reasons, we have determined which combinations of multimodal trips should be examined by the algorithm, based on relevant research.

Generic: An important requirement was that the platform code should be as generic as possible. The aim is to use the same platform for scenarios of other cities, except for Thessaloniki, in the future. So, the platform could be used for other cities, by making small changes in the code or even without any changes needed. For this purpose, the user uploads all the necessary files and enters the API about the dockless vehicles.

5.2.8.4. Next steps towards implementation

The next steps for TES_08 are the following:

- The results of the accessibility analysis have been already presented to the micromobility operator (HOP) and there are currently discussions regarding the possibility of extending their operation area.
- Internal testing of the neutral platform will continue for identifying possible bugs and fixing them. Real big datasets that cover the whole city of Thessaloniki will be used in this process.
- The neutral platform will be presented both to local authorities and micromobility providers for getting their feedback and optimizing the user experience based on it.
- The bus trip algorithm currently provides solutions that combine the use of maximum two buses, but it will support the combination of three buses in the future. Moreover, the platform will take waiting time at bus stations into consideration as well.
- The algorithm will take more possible multimodal solutions into account in order to find the optimal multimodal trip. For example, the combination “micromobility-bus-micromobility” will be added to the possible multimodal solutions.

5.2.9. HAN_03: Added-value services in multimodal nodes to integrate PT with active modes

5.2.9.1. Description of the measure and main outcomes expected

The goal of the measure is to accompany the development of railway stations into mobility hubs and to evaluate how the user experience can be improved at selected Bike + Ride stations. Attractive B+R stations not only promote multi-

modality but also intermodality. The evaluation will also take into account the connection to existing and planned cycle highways. If B+R stations are attractive and there are many opportunities to choose different modes of transport or simply park your bike safely, it will also be easier to leave your own car behind and switch to sustainable mobility. This also influences the modal split.

HAN_03 will analyse ways of improving the passenger experience at Bike+Ride facilities (this includes secure bicycle parking, on-site bike sharing services, and bicycle repair options). As part of the project, two Bike&Ride facilities will be evaluated:

- The bike tower built is Wunstorf (project of the Hanover region, the construction was partially funded)
- The mobile station in Großburgwedel (construction of the mobile station 'Mobilpunkt' is part of the model region for PT (funded by the federal government)).

The usage of both Bike&Ride stations will be monitored and evaluated. The objective is to create a comprehensive report on how to enhance user satisfaction and convenience at Bike+Ride stations. The challenges in the planning and operation of B+R stations and the bicycle will be also identified.

5.2.9.2. Preparation of the measure

Follow up of the design and implementation of B+R Stations in Hannover Region

The construction of the B+R stations is out of the scope of UPPER, but it is the pre-requisite to start the evaluation of the same. However, it is worth to mention that the construction of the bike tower in Wunstorf has benefited from some of the outcomes of the "Serious Games" organized by Hannover Region at the beginning of the UPPER project. Further details are provided below.

- **Bike parking tower in Wunstorf**

The main focus of the evaluation in this measure will be on the fully automated bike parking tower in Wunstorf, which was opened in November 2023[14].

The bike tower consists of two towers with a total of 244 parking spaces for bikes. A parking space can be booked in advance or spontaneously using a specific app. Using the app and a pre-set PIN number, the screen on the tower can also be unlocked and the bike stored. As the bike tower is fully automatic, the bike is simply placed in a holder (moved at ground level) and automatically stored in a theft-proof manner within 30 seconds. The bike is returned in the same way. Pictograms have been placed at the entrances to the two towers to show which types of bikes and up to which sizes can be stored in the tower. This makes it easy to understand.

In August 2023, the **'serious game'** took place there as part of UPPER. We played this planning game together with people with disabilities (limited mobility), who all arrived by bike. There was a briefing and explanation of the bicycle tower. The fact that not only the provided bike was stored, but also one of the participants' bikes, helped to break down any fears and barriers among the participants. The participants got into direct dialogue with us and gave feedback on the existing system and the explanatory boards, for example. The suggestions on the explanatory diagrams were then incorporated and implemented so that many things are now easier to understand.

[14] https://www.hannover.de/Leben-in-der-Region-Hannover/Verwaltungen-Kommunen/Die-Verwaltung-der-Region-Hannover/Region-Hannover/Weitere-Meldungen-der-Region-Hannover/2023/Fahrradturm-in-Wunstorf-ist-eingeweiht

Fig 59. Closer view of the two entrances to the cycle tower. The lockers are also visible here *(Copyright: Region Hannover, Terzka).*

The bike tower not only has a bike parking facility, but also the option of using a locker (Fig 59,Fig 60). Bookings are made via a screen directly on the tower. Some of the lockers also have a power socket that can be used to charge the battery of an e-bike, for example.

Fig 60. Wunstorf bike *tower (Copyright: Region Hannover, Terzka).*

- **Mobile station in Großburgwedel**

The mobile station in Großburgwedel (the correct name will later be ‘’mobile point‘’) is currently under construction. The first construction phase (civil work is currently underway) is scheduled for completion in August 2024. The second

construction phase will then continue until December 2024, and the third construction phase is scheduled to be completed in quarter 1 or 2 of 2025. The contract for the building construction has already been awarded and construction is scheduled to start in calendar week 20. The overall completion is planned for 10/2025.

The following services are planned for the mobile point in Großburgwedel:

- Bike sharing offer with 10 bikes
- B+R facility with a closed and open area
- Bike service station
- Taxi stop (our on-demand transport sprinti could also stop here)
- DHL packing station
- Snack vending machine
- Children's play equipment
- Table tennis table

A press release with further information is also available for the Mobilpunkt[15]:

Fig 61. The B+R station in Langenhagen *(Copyright: Region Hannover).*

[15] https://www.hannover.de/Leben-in-der-Region-Hannover/Verwaltungen-Kommunen/Die-Verwaltung-der-Region-Hannover/Region-Hannover/Weitere-Meldungen-der-Region-Hannover/2024/Am-Bahnhof-in-Gro%C3%9F%C2%ADburg%C2%ADwedel-entsteht-eine-Mobil%C2%ADstation.

Fig 62. View from the other side of the B+R station in Langenhagen *(Copyright: Region Hannover).*

The two images of the B+R facility in Langenhagen (Fig 61,Fig 62) can be seen as representative images of what the new station in Großburgwedel will look like once completed. There will also be more equipment in Großburgwedel to increase the quality of stay at the mobility hubs. A link with the sprinti on-demand system is also planned.

The aim of the measure is therefore to create an evaluation with the idea of finding out how user satisfaction at B+R stations can be increased and what attractive mobility hubs at railway stations could/must look like so that they are used.

Define data collection mechanisms

Various steps are necessary for the successful evaluation of the user experience and satisfaction level in the B+R stations. The preparatory process of the measure involved the definition of the data collection mechanisms and the definition of potential applications of the collected data.

The data collection mechanisms have been defined after a dialogue with the operator of the bike tower and are already in place for this B+R station. The data is collected by the service provider that provides the bike tower software and app. Occupancy data is already being collected for this Bike&Ride station. Initial analyses of existing data have already taken place. The aim is to start the evaluation one year after the opening of the bike tower.

For the mobile point in Großburgwedel, the data collection mechanisms will be set in place once the construction works of the same finalise.

The collected data will be used to evaluate specific use cases such as the seasonal utilisation of the bike tower or whether a rail strike has an impact on bookings.

Define the contents of the evaluation (table of contents)

One of the main challenges for the bike tower is to remove barriers to use. One of the barriers to be addressed includes making the process of parking and unparking as quick and easy as possible. In the future, it should be possible to start the process simply by holding up a smartphone. We are in close contact with real users and the service provider and are already implementing the first solutions.

The evaluation of the B+R stations defined in this measure aims to support the identification of additional barriers limiting or discouraging the use of the B+R stations. The first data collected from the bike tower show that the tower is currently

being used well and the number of bookings is increasing, but overall there are still too few bookings in relation to the utilisation of the tower. The same applies to the other, already existing, smaller B+R stations. Solutions need to be found to improve the overall user experience.

In addition, the number of bookings varies from day to day (Fig 63,Fig 64). There is no constant ramp-up. One day there are only two bookings for the entire tower, while the next day there may be 35 bookings. It is also important to find out what triggers this problem. The evaluation to be carried out in this measure should examine this topic.

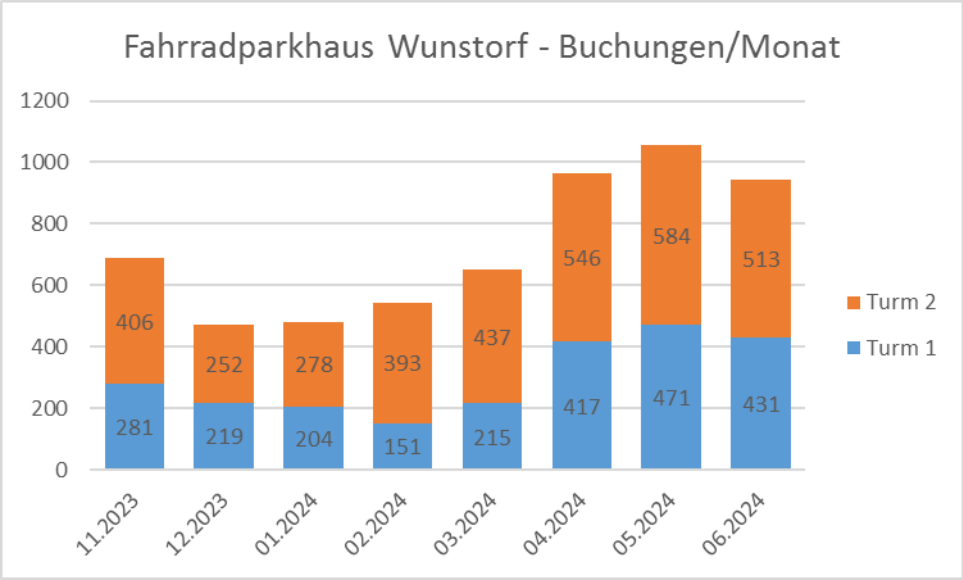

Fig 63. Development of bookings in the first few months after opening. Tower 1 is blue, tower 2 is orange *(Copyright: Region Hannover).*

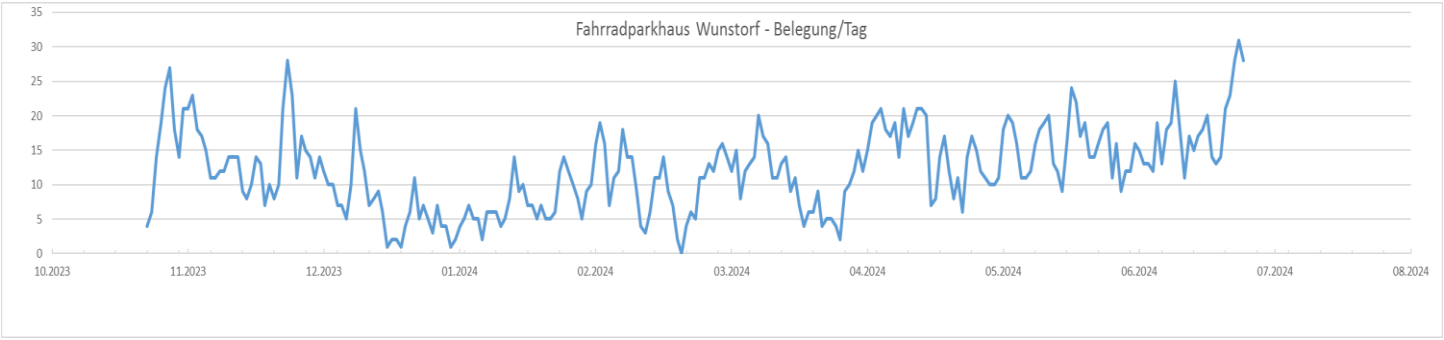

Fig 64. Development of bookings per day over the course of the months. The number of bookings varies from day to day. There is no constant ramp-up, although users use the tower regularly *(Copyright: Region Hannover).*

The evaluation report to be delivered as main output of this measure will carry out a data analysis to identify the main barriers limiting the use of the B+R stations and minoring the user satisfaction. The report will identify the triggers for such problems and will provide a set of prospects and recommendations to improve the user experience and satisfaction in this type of infrastructures. A first version of the ToC of the evaluation report is presented here:

- Introduction
- Project Description
- Methodology
- User Experience Assessment
- Findings and Insights

- Future Prospects and Recommendations
- Conclusion

5.2.9.3. Challenges & Mitigations

No challenges were identified during the preparation of this measure.

However, the implementation of this measure may pose some challenges due to the potential delays in the construction of the mobile station, which might limit the capacity to collect the required data to afterwards generate the report for that Bike&Ride station. However, at the moment, the construction work is completely on schedule.

5.2.9.4. Next steps towards implementation

Next step towards the implementation of the measure include the final clarification of which contents are to be covered within the evaluation (finalisation of the ToC). Once this step is finished the implementation phase will start, which will include further data collection, the subsequent data analysis and finally the creation of the evaluation report.

6.Conclusions

This document reports the activities performed within the task T3.4 of the UPPER project to support living labs of the project and twining cities to develop mobility measures aimed advancing sustainable urban spaces by prioritizing public transport, active mobility, and innovative urban planning. This includes:

- Redistribution of Urban Space: 4 measures of the project involve reconfiguring urban areas to favour pedestrians, public transport, and cycling over private vehicles. This strategy aims to create safer and more attractive environments for alternative transportation modes.
- Multimodality and Hub Creation: 9 measures of the project involve establishing multimodal transportation hubs to facilitate seamless transitions between modes such as walking, cycling, buses, trains, and micro-mobility services.

The deliverable serves as a valuable resource for both the UPPER consortium and external professionals, since it includes reference guides, tools, high-level recommendations, and a detailed process description for developing similar measures in other cities. Some key outcomes of the work carried out in this task, especially of the collaborative workshops and partners exchanges include:

- **Inclusivity and Accessibility**: Measures should rigorously assess their effects on unprotected road users and vulnerable groups to ensure equitable benefits. Effective practices, like Lisbon's collaboration with the National Institute for Rehabilitation, illustrate the importance of addressing potential exclusions and ensuring that all user groups can access and benefit from the changes.
- **Formation of Multi-Disciplinary Teams**: The involvement of multi-disciplinary teams is essential to support interventions across various contexts. Such teams, incorporating diverse expertise, are crucial for fostering cooperation and securing buy-in from different departments and organizations, as evidenced by the cities' experiences following the workshops.
- **Stakeholder Engagement and Communication**: Successful implementation relies on robust stakeholder engagement. Cities need to ensure that all relevant parties, including local organizations and affected

communities, are involved in planning and decision-making processes. Addressing resistance and pushback, as seen in Valencia's citizen engagement efforts, is key to gaining support and improving outcomes.

- **Monitoring and Evaluation**: The effectiveness of implemented measures should be monitored and evaluated. This includes ensuring multimodal hubs are accessible and comfortable, as well as addressing safety and integration issues. Evaluations should consider the quality of first and last-mile connectivity and the comfort and safety of catchment areas.

Annex 1: Workshop 2 'Points of attention'

Public space design

Measure ID	Appraised by	"Point of attention" category	Evaluation result: Point of attention/Comment	Solutions/best practices/references
LIS_05	ECF	Mobility as a right: Universal accessibility leaving no one behind.	Both for the cycling infrastructure network and the bike sharing system, maybe include an analysis of which groups are using it and which not (income, age etc.), and how it could become more inclusive and also target groups that are vulnerable to transport poverty for example. This could also help to get financing for targeted interventions under the Portuguese national plan of the EU Social Climate Fund.	Use the TIRE tool developed at the University of Porto to assess the equity impact of cycling infrastructure: https://www.sciencedirect.com/science/article/pii/S0967070X22003560#abs0010
LIS_05	ECF	Active stakeholder engagement during measure development	Also involve local cyclist/pedestrian association to benefit from their expertise and get them on board as enthusiastic proponents of the urban space redesign.	
ROM_08	ECF	Active stakeholder engagement during measure development	Also involve local cyclist/pedestrian association to benefit from their expertise and get them on board as enthusiastic proponents of the urban space redesign.	
ROM_08	ECF	Monitoring, evaluation and learning	Measure also cyclist and pedestrian flows to see the impact of the measure on active modes	Install automatic counters or carry out manual counting
VAL_01	ECF	Target group/s that are mainly impacted by the measure	It's really great that the improvement of conditions for pedestrians and cyclists is included from the beginning in this measure. This could may be reflected a bit more also in the data collection part, to evaluate if the measure really has led to the desired results also for these groups.	Measure travel speed of cyclists before/after the measure; install cyclist/pedestrian counters if they are not already there; on-site satisfaction surveys among pedestrians/cyclists; collect and analysis crash data for road safety impact
ROM_08	EPF	Seamless multimodality/intermodality	Consider accessibility and inclusivity in the design to ensure that all members of society can benefit. How will you ensure safety and comfort for the cyclists?	Prioritize the safety and comfort of pedestrians and cyclists through the development of traffic calming measures (protected bike lanes), emphasise the importance of accessibility (PRMs etc) and inclusivity in the design to ensure that everyone benefits; provide clear and accessible information to the public about the benefits of active travel modes and the new infrastructure improvements through targeted campaigns and educational initiatives.
VAL_01	EPF	Active stakeholder engagement during measure development	Will you do any citizen engagement activities? Risk of population inconveniences and citizen resistance	Citizen engagement activities foster acceptance(workshops, interviews ...)
LIS_05	EUROCITIES	Social impact: Public and user health and wellbeing Coexistence & Living peacefully Security & Safety Reduce road deaths	Point of attention 1: when prioritising interventions for network improvements to connect the city with peri-urban municipalities always place active mobility user's safety first. Car speed limitations and segregated solutions could help. 2: consider the creation of cycling hubs nearby existing pt stations 3: equip the cycling network with cycling amenities	
ROM_08	EUROCITIES	Tailored communication for increased acceptance and buy-in	Point of attention: a robust communication campaign has to be foreseen in order to mitigate the usual backlash from malcontent motorists as well as political representatives. #Bologna30 is a good example of communication towards citizens	
VAL_01	EUROCITIES	Mobility as a right: Universal accessibility leaving no one behind.	Point of attention: consider planning to identify and solve different groups issues and harmonize them all with the final solution	
LIS_09	IFP	Social impact: Health and wellbeing Coexistence & Living peacefully Security & Safety	Include pedestrian accessibility of the catchment area	It is important to make sure the first and last mile is safe and comfortable for pedestrians

MAN_08	IBV	Social impact: Public and user health and wellbeing Coexistence & Living peacefully Security & Safety Reduce road deaths	How will it be guaranteed that the different groups of users (young people, families, elderly), and their different expectations and interests, coexist harmoniously (without social conflict) with the solution?	
MAN_08	POLIS	Active stakeholder engagement during measure development	Point of attention: Include shared mobility + delivery/logistic service operators in dialogue to enrich data collection & parking space use case scenario (potential for active mobility hubs development)	
ROM_08	POLIS	Seamless multimodality/intermodality	Points of attention: 1. Coordinate with parking policy to ensure the new cycle lanes, mobility hubs, and pedestrian ways to PT are easy to access even for external commuters approaching the city with a car; 2. Engage cyclists in the design of the cycle lanes to ensure continuity with existing bike infrastructure & all types of pedestrians in the design of pedestrian roads to PT stops; 3. Coordinate with logistics policy to ensure last mile delivery solutions.	
LIS_05	UITP	Seamless multimodality/intermodality	Bringing together several disconnected bike infrastructure projects and building it together as one coherent bike network requires one leading governance body and clear roles/responsibilities/clarity on priorities. User groups, neighbouring municipalities, transport sector must be consulted from the beginning, be open to modifying the plans based on their feedback and identify priority areas where better connection is required because you cannot build it all at once. Also, depending on the space requirements on certain streets, you will need to adapt the local traffic plan to prioritise certain modes, and even create shared lanes for bikes and buses if really necessary.	
LIS_05	UITP	Tailored communication for increased acceptance and buy-in	To build one coherent bike network, you need to make this clear to the user. Striking visual identity is key. Opportunity to work with local people to build this identify, and in turn supports their buy-in to use the network	
LIS_05	UITP	Monitoring, evaluation and learning	The indicators could also measure how far people are willing to walk/travel to bike-sharing stations. Also compare the modal share with other modes, not just focusing on bikes and shared bikes. Look at the intermodality with bike-sharing i.e. does it support the public transport? More attention towards behavioural change - how to get people out of their cars and choosing other modes of transport, like cycling? Looking at other surrounding municipalities don't just measure km on cycling network, but also what other infrastructure and policies will impact cycling e.g. do they offer free parking? Can you park in the city centre? Do they have sufficient bike parking facilities? Do you provide free bike maintenance facilities? Consider also using U-NEED tool for multimodality	
LIS_05	UITP	Mobility as a right: Universal accessibility leaving no one behind.	Make sure you are working with users with different disabilities so that you build bike lanes that suits different bikes adapted to different needs, crossings at intersections and around public transport stops are clear and safe for both pedestrians and cyclists, and there is a continuity of the lanes.	
VAL_01	UITP	Mobility as a right: Universal accessibility leaving no one behind.	Prioritise public transport on main roads, and walking/cycling/public transport in the feeder streets Co-creation methodology with users with differing needs - not just a feedback system.	See UITP project brief on co-creating methodology, following the TRIPS EU-funded project
VAL_01	UITP	Tailored communication for increased acceptance and buy-in	Public awareness campaigns directed at everyone but also specific marketing campaigns to car users, teaching them about the changing public space/prioritisation	
VAL_01	IFP	Seamless multimodality/intermodality	Adapt the sidewalks, pedestrian crossings and bus stops in accordance with the new road design. Just the Avenue? What about accessibility, comfort and safety the catchment area?	Collect data on trip stages (first and last mile) and analyse accessibility, comfort and safety the catchment area.
VAL_01	IFP	Active stakeholder engagement during measure development	Include pedestrians (especially elderly and persons with disabilities), cyclists	Contact Valencia Camina and conbici

ROM_08	IFP	Social impact: Health and wellbeing Coexistence & Living peacefully Security & Safety	Excellent measure to introduce 100 km of new cycle lanes. All the space will be taken away from the car?	Cycling paths on the sidewalk are dangerous for cyclists and pedestrians. Use cycle paths to reduce parking and car lanes.
ROM_08	IFP	Active stakeholder engagement during measure development	Engage with pedestrians and cyclists organizations	Movimento Diritti dei Pedoni https://movimentodirittideipedoni.org/
MAN_08	IFP	Active stakeholder engagement during measure development	Engage with pedestrians organizations	Contact Fuss eV or IFP www.fuss-ev.de
LIS_05	IFP	Active stakeholder engagement during measure development	Engage with pedestrians organizations	Contact Estrada Viva or ACA-M EstradaViva.pt and aca-m.pt
LIS_05	IFP	Social impact: Health and wellbeing Coexistence & Living peacefully Security & Safety	Any bike paths on the sidewalk?	Bike paths on the side walk are dangerous for cyclists and pedestrians
TES_02	IFP	Seamless multimodality/intermodality	Include first and last mile of pedestrians and cyclists	It is important to make sure the first and last mile is safe and comfortable for pedestrians
Val_04	IFP	Seamless multimodality/intermodality	Pay attention to accessibility and safety to the BRT stop by pedestrians count with pedestrians crossing at mid-block	It is important to make sure the first and last mile is safe and comfortable for pedestrians
LIS_02	IFP	Social impact: Health and wellbeing Coexistence & Living peacefully Security & Safety	"Improve road safety for bikes, cars and PT; " Include pedestrians	Road safety is a crucial element for pedestrians to feel comfortable in public space
TES_03	IFP	Seamless multimodality/intermodality	Include walking in modelling and simulations	Use models that include walking like Vissim
VAL_08	EPF	Mobility as a right: Universal accessibility leaving no one behind.	VAL_08: will you engage with citizens especially those vulnerable to exclusion to give them a voice and hear about what they want?	citizen engagement through workshops, surveys, focus groups, walk or ride along, could help you find out more about what the users actually want and also attract people who normally do not use PT
LIS_06	EUROCITIES	Mobility as a right: Universal accessibility leaving no one behind.	Include in the research team local NGOs representing people with mobility issues to have a real time and accurate response.	Take inspirations from the successful Oslo's 'Mind the gap' initiative
MAN_04	IFP	Seamless multimodality/intermodality	Good that the measure does not focus only on essential accessibility but also on thermic comfort. However other aspects should also be taken into consideration: ergonomic comfort, facilities for passengers and other modes.	Consider adding bike parking, charging points, toilets, for example.
MAN_04	IFP	Seamless multimodality/intermodality	The focus on bus stops and stations is good but far from enough. More attention should be given to the quality of the first and last mile of the trip.	Do an analysis of the accessibility, comfort and safety of the catchment area.

Multimodal hubs

Measure ID	Appraised by	"Point of attention" category	Evaluation result: Point of attention/Comment	Solutions/best practices/references
LIS_09	IBV	Mobility as a right: Universal accessibility leaving no one behind.	What architectural solutions are going to be proposed to combine PT stops/stations with active and multimodal mobility?	
HAN_03	ECF	Monitoring, evaluation and learning	The planned indicators for evaluation, including cyclist flows around the multimodal hubs, are very comprehensive and a good example for other cities.	
MAN_07	ECF	Active stakeholder engagement during measure development	Also involve local cyclist/pedestrian association to benefit from their expertise	

OSL_02	ECF	Active stakeholder engagement during measure development	Maybe use the occasion of the user survey to also find out more about the satisfaction of users with the multimodal solutions themselves, not only the visual identity.	
OSL_06	ECF	Monitoring, evaluation and learning	An excellent approach. Maybe consider using the results of the pilots to enter into a dialogue with public authorities about what they could mean for the regulation and financial support for bike sharing and micromobility.	
TES_08	ECF	Mobility as a right: Universal accessibility leaving no one behind.	Include a special focus in the accessibility analysis on different population groups (income, age etc.), and how PT + shared mobility solutions could become more inclusive and also target groups that are vulnerable to transport poverty for example. This could also help to get financing for targeted interventions under the Greek national plan of the EU Social Climate Fund.	
TES_08	ECF	Seamless multimodality/intermodality	The analysis should also include the state of cycling infrastructure, since this will have a big influence on the use of bike sharing etc. to PT stops.	
VAL_02	ECF	Active stakeholder engagement during measure development	One of the main barriers to the use of multimodal solutions might be the state of cycling/walking infrastructure needed for the last-mile journeys from/to the multimodal hubs. There should be a focus on this in the initial user survey.	Integrate questions on satisfaction + perceived safety of cycling/walking infrastructure around the multimodal hubs in the citizen survey.
VAL_02	ECF	Monitoring, evaluation and learning	The evaluation should include not only PT use, but also indicators on the other modes connected to PT at the multimodal hubs.	Install cyclist/pedestrian counters on main routes around the multimodal hubs.
LIS_09	ECF	Monitoring, evaluation and learning	The evaluation should also look at the influence of the measure on traffic flows and modal shift, for PT, cycling and walking	Install cyclist/pedestrian counters on main routes around the multimodal hubs.
LIS_09	EPF	Seamless multimodality/intermodality	Cycling infrastructure and combined ticketing alone are not enough. Active mobility usage is sustainable and healthy but not everyone knows how to cycle.	Safety of the cyclists should also be taken into account. Trainings of how to use active mobility modes is important.
LIS_09	EPF	Seamless multimodality/intermodality	Can you explain what is meant by 'bike boxes'? What capacity will they have? Are the open or covered? Will they be monitored for safety? Will people be able to use them for free or is it a paid service? 'Number of bikes transported in PT': is this possible on buses or trams?	
MAN_07	EPF	Mobility as a right: Universal accessibility leaving no one behind.	Consider the needs of potentially vulnerable groups in the design, e.g. elderly people, PRM, people lacking digital skills. On shared mobility: try to make also these more inclusive (cf. for ex. SMALL project). Pay attention to explaining how it works and note that some people have no credit cards and/or smartphone to book and pay for NMS.	Important to note that not all users are the same. End-user engagement is important to ensure that others are not left behind.
MAN_07	EPF	Seamless multimodality/intermodality	Mobility hubs should also be attractive rather than just 'appropriate' - an opportunity to improve overall image of PT / multimodality. Physical integration of modes is excellent. Further integration also needed in terms of information, ticketing, timetables where applicable.	
OSL_02	EPF	Mobility as a right: Universal accessibility leaving no one behind.	Communication efforts should take into account needs of users with e.g. visual or cognitive impairments.	Test materials on user groups - hereby include also people with various types of disabilities (e.g., sufficient contrast, easy to understand icons)
OSL_02	EPF	Tailored communication for increased acceptance and buy-in	Mobility hubs should also be attractive rather than just 'appropriate' - an opportunity to improve overall image of PT / multimodality. Physical integration of modes is excellent. Further integration also needed in terms of information, ticketing, timetables where applicable.	
OSL_06	EPF	Mobility as a right: Universal accessibility leaving no one behind.	Excellent approach and consistent with #MaaR. The Interreg project SMALL is working specifically on making new & shared mobility services more inclusive - see https://www.interregnorthsea.eu/small.	
OSL_06	EPF	Target group/s that are mainly impacted by the measure	Keep in mind that the users you engage will be interested in staying updated when the pilot is implemented. It's very rewarding for them to see how their input was used	

ROM_03	EPF	Mobility as a right: Universal accessibility leaving no one behind.	Ensure accessibility and inclusion, in terms of a.o. affordability and accessibility of information in apps.	Consider groups vulnerable to exclusion in the development. Outreach and communication campaigns to educate people about the benefits of the new mobility services can encourage behaviour change towards more sustainable transport options.
ROM_03	EPF	Seamless multimodality/intermodality	The measure description seems to focus on P&R only - what about other modes - metro, train, bus, bike, shared mobility, … and other types of integration (mentioned in the intro but not in the 'implementation of the measure' part): 'PT schedule coordination, integration of information, fares and ticketing systems, services at nodes'?	Address potential challenges related to the integration of information, fares, and ticketing systems among different PT users. Ensure integration also with other modes rather than just P&R.
TES_02	EPF	Mobility as a right: Universal accessibility leaving no one behind.	This might be a financial burden for citizens, particularly for owners of older/less fuel-efficient vehicles who may need to upgrade or pay fees to enter these zones. Additionally, there might be people with disabilities that find car usage easier .	
TES_08	EPF	Mobility as a right: Universal accessibility leaving no one behind.	The name of the measure (MDMS, PT) doesn't seem to match the description (focus on shared mobility)? Look at Oslo's approach to ensure accessible and inclusive new and shared mobility services. Check out Interreg project SMALL also dealing with this topic.	
VAL_02	EPF	Seamless multimodality/intermodality	Pay attention to accessibility and inclusivity in the design to ensure that all members of society can benefit. How will you ensure that the existing transportation patterns and travel behaviours will have a positive impact when you deploy the multimodal hubs? How will you ensure safety and security in and around the multimodal hubs especially around peak hours? What about user-centric amenities and services within the hubs? Design hubs that are attractive rather than 'just appropriate'. Integration needed also in terms of timetables, information & payment...	Foster collaboration and coordination among different PTOs to streamline connections and improve efficiency and reliability. Prioritise the deployment of user-centric amenities and services (kiosks, toilets, seating areas..) to enhance the overall user experience. Address potential concerns related to safety and security.
OSL_02	EUROCITIES	Target group/s that are mainly impacted by the measure	Point of attention: Identify in advance target groups to engage with and decide how to approach them	
LIS_09	UITP	Seamless multimodality/intermodality	The two sub-measures seem quite narrowly thought if they wish to increase the modal share of PT and active modes: how do they connect to other measures, planned or not? Example: connection with bike lanes? how do bike boxes and integrated ticketing make a better user experiences and more attractive services and facilities? Need to elaborate more on the methodology and how these two specific measures improve the overall trip experience. Also need to specify what exactly the ticketing integration entails? is it more of an interoperability measure, like with the navegante pass you can unlock a GIRA shared bike OR/AND is it a payment system, like with the navegante card you can pay for GIRA OR/AND is it a tariff integration with a new type of pass or ticket OR something else?	
HAN_03	IBV	Social impact: Public and user health and wellbeing_ Coexistence & Living peacefully Security & Safety Reduce road deaths	Will this measure develop communication campaigns based on behavioural change, to relate active mobility to improved health and well-being? Currently, the groups of users most inclined to use active mobility are low income people, young people and adults with children, and women and older people emerge as groups to be encouraged.	
MAN_07	IBV	Target group/s that are mainly impacted by the measure	According to the results of user research, people with functional diversity, older people and women (security) are the ones who use active and shared mobility the least. How will these groups be incentivized to use new mobility hubs solutions?	

MAN_07	IBV	Mobility as a right: Universal accessibility leaving no one behind.	How the information and signage will be presented in order people with functional diversity and elderly can be autonomous users of the hubs?	
OSL_06	IBV	Target group/s that are mainly impacted by the measure	According to the results of user research, low income people, young people and families with children are the main users of active and shared mobility. How are these groups going to be incentivized to use new micromobility solutions?	
ROM_03	IBV	Mobility as a right: Universal accessibility leaving no one behind.	How the information and signage will be presented in order people with functional diversity and elderly can be autonomous users of the hubs?	
ROM_03	IBV	Mobility as a right: Universal accessibility leaving no one behind.	Physical barriers can be a real impediment to discouraging the use of hubs for people with functional diversity and elderly people. What type of architectural solutions will be considered to promote the use of the hub by these groups?	
VAL_02	IBV	Mobility as a right: Universal accessibility leaving no one behind.	How the information and signage will be presented in order people with functional diversity and elderly can be autonomous users of the hubs?	
VAL_02	IBV	Target group/s that are mainly impacted by the measure	Considering that low income people, young people and women can be potential users of these multimodal hubs, what type of incentives are planned to encourage their use?	
MAN_07	POLIS	Social impact: Public and user health and wellbeing Coexistence & Living peacefully Security & Safety Reduce road deaths	Points of attention: 1. Consider including charging infrastructure with e-bikes, e-scooters, etc.; 2. Consult all user types to ensure inclusiveness of the hubs; 3. Evaluate road safety & social interaction around the mobility hub.	
TES_02	POLIS	Tailored communication for increased acceptance and buy-in	Points of attention: 1. Integrate LEZ design with parking policy to support shift from cars to PT or active mobility in the LEZ; 2. Include communication campaigns & incentives in the digital service & KPIs about the LEZ.	
TES_08	POLIS	Tailored communication for increased acceptance and buy-in	Points of attention: 1. Consider communication campaign towards citizens and incentive policy to encourage modal shift exploiting the newly available integrated services; 2. Integrate with parking policy to make active modes & PT accessible also for external travellers coming from further away by car.	
LIS_09	IBV	Social impact: Public and user health and wellbeing Coexistence & Living peacefully Security & Safety Reduce road deaths	What incentive strategies are going to be undertaken for the different population groups (low income, women, adults with children, young people, ...)? Is it going to be considered linking this measure of active mobility with health and well-being?	
HAN_03	EPF	Tailored communication for increased acceptance and buy-in	Some points to consider or elaborate upon: Is the bike parking for free (sometimes we see different prices for open vs secured indoor parking)? It would be useful (as suggested) to include a sensor system to know which parking spots are available and where (as bike parking can fill up easily!). In Ghent for ex. there's a big problem with bikes being left in the parking for a long time / abandoned. Taking away those 'orphan bikes' creates more space again. Will there be security monitoring the parking (e.g., cameras, guards, locks)? Not much is said about the 'Bike Services' (which can be useful, if opening hours are adapted to people's commute times, i.e. early in the morning & in the evening too), nor on the shared bikes - to further elaborate how to create a seamless travel experience, including e.g. integrated ticketing bikes & PT.	
LIS_09	UITP	Tailored communication for increased acceptance and buy-in	Please consider involving or at least communicating with travellers and citizens about these measures. This is important to increase the potential of the implementations.	
OSL_02	UITP	Monitoring, evaluation and learning	Consider user satisfaction/demographic split of users before and after the implementation of the visual design.	
OSL_02	UITP	Tailored communication for increased acceptance and buy-in	Public awareness campaign to coincide with the deployment of the visual identify	

ROM_03	UITP	Seamless multimodality/intermodality	Utilise data between users parking and taking to public transport to further improve pt services e.g. service optimisation during peak times/reduction of services when not needed, understanding where users travel to/from to better plan network. Locational strategy of P&R? Make sure they are complementary to overall transport network, so as to avoid bringing additional congestion to those areas. Identifying brownfield areas which can be converted to such parking areas, and/or have the flexibility to support other services such as pickup/delivery lockers for online commerce and develop them into mobility hubs with micromobility services and car-sharing services.	
ROM_03	UITP	Social impact: Health and wellbeing Coexistence & Living peacefully Security & Safety	Locational strategy for P&R - consider areas of higher deprivation and this is often where supporting infrastructure is not as widely available nor accepted. Rome has a LEZ and so people may not be able to afford changing their car as quickly as other areas - such P&R facilities allows them to travel into the city without having to pay the congestion charges.	
VAL_02	UITP	Monitoring, evaluation and learning	The evaluation should not only include public ridership, but also indicators on the other modes related to the multimodal hubs, and the impact on whether it is helping to get people out of their cars, road safety/accidents, economic benefits such as users spending money on other non-transport services in those areas....	
MAN_04	ICLEI	Mobility as a right: Universal accessibility leaving no one behind.	(MAN_04) How will you ensure that the needs of all the reduced mobility or specific requirements groups are comprehensively addressed in the design of the measure?	Possibility of implementing participatory design workshops with representatives from all target groups to gather detailed feedback and ensure that their specific needs are met.

Annex 2: Monitoring templates of T3.4 measures

Monitoring template for ‘Measure ID’_‘Measure name’

Objectives of the measure

List the main objectives of the measure:

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Description of the measure

Provide a short description of the measure (full description is already included in deliverable D2.2)

Measure outputs:

This measure will deliver:

-

-

Related UPPER tools:

Please, specify if this measure aims to use any of the U-tools to support the preparation and implementation of the measure

Steps to ready-to-demo measure

Steps	Description	Involved partners/ externals	Category of action (data/infrastructure/ legal/safety/social)	Deadline	Monitoring indicator	Comments
1						
2						
3						
LAUNCH OF THE DEMO (xx/xx/xxxx)						

Monitoring template for Measure VAL_01 “Redistribution of urban space with a focus on MaaR”

Objectives of the measure

- To ensure MaaR through PT and pedestrian-focused design of new road section in the surroundings of Avenida Blasco Ibañez.
- Redistribution of urban space under sustainability mobility parameters.
- Improvement of a heavily car-dependent area implementing more PT services.

Description of the measure

This measure is part of the major construction project aimed at redistributing urban space in Av. Blasco Ibañez with a focus on MaaR, which involves widening public transport routes, creating a dedicated bus lane (BRT), and improving accessibility for pedestrians and cyclists. This measure will specifically support the implementation of the BRT lane in the avenue's intermediate section, from Aragón Avenue to Doctor Manuel Candela Street. The measure specifically involves carrying out a detailed operations study to determine optimal bus stop locations ensuring good accessibility, signage improvements, and traffic light priorities. It also includes a public contract for the supply and installation of road markings and fixed separating elements intended to improve the efficiency and safety of public bus transport services on Avda. Blasco Ibáñez for the implementation of a Bus Rapid Transit (BRT).

Measure outputs:

This measure will deliver:

- An operations study that includes the prescription of optimal bus stop locations, signage improvements and traffic light priority devices for the intermediate section of the BRT corridor of Blasco Ibañez Avenue.
- Supply and installation of public transport segregation elements for the intermediate section of the BRT of Blasco Ibañez.

Civil *engineering works will be supported by the Next Generation funds (out of the scope of UPPER).*

Related UPPER tools:

- **U-SIM.plan:** Can be used to assess & plan the impact of the urban space reallocation (TBD with VAL and EMT).

Steps to ready-to-demo measure

Steps	Description	Involved partners/ externals	Category of action	Deadline	Monitoring indicator	Comments
1	Characterization of the current state of Blasco Ibáñez Avenue	VAL, EMT	Data/Technical	Nov 2023	Preliminary study finalized	
2	Study of alternatives	VAL, EMT	Technical	Dec 2023	List of alternatives	
3	Validation of the optimal solution	VAL, EMT	Technical	Jan 2024	Design criteria established. Validation process with EMT (PTO)	
4	Preparation of the public procurement process for the operation study	VAL, EMT	Legal	Sep 2024	Launch of tender	
5	Preparation of the public procurement process for the supply and installation of beacons and road markings	VAL	Legal	Sep 2024	Launch of tender	
7	Study of offers and award of contracts for the operation study	VAL/ Tenderers	Technical	Dec 2024	Award of contracts	Out of the preparation process. Part of WP6
8	Study of offers and award of contracts for the supply and installation of beacons and road markings	VAL/ Tenderers	Technical	Dec 2024	Award of contracts	Out of the preparation process. Part of WP6
LAUNCH OF THE DEMO (January 2024)						

Monitoring template for Measure ROM_08 “Designing the urban space to promote active travel modes, PT and environmental 30 Km/h zones”

Objectives of the measure

- To reduce private motorized traffic providing more road space for pedestrians.
- To improve pedestrian accessibility to public transport stops.
- To increase safety by lowering vehicle speeds through traffic calming measures.
- To encourage and support multimodality and “active mobility”.

Description of the measure

The Local Authority expects to extend the cycling network by 100 km and implement several local “30 Km/h Zones”. These openings will impact congestion in terms of reduced space for motorized traffic, and they will give new opportunity to “active mobility” and multimodality, regenerating the area involved. Mobility hubs will be created in correspondence with PT interchange nodes, with possibility to leave bikes, shared vehicle and use PT main lines.

Measure outputs:

This measure will deliver:

- New 30km/h zones, including:
  - 4 new 30 Km/h zones, also called “30 zones”.
  - New traffic scheme to reduce the speed of motorized vehicles.
- Safe routes towards PT, including:
  - New safe, identifiable and accessible pedestrian routes towards bus stops and rail/metro stations.
  - Creation of new areas for pedestrians and new “micro-squares” along the main pedestrian routes.
- New micro-hubs with bike parking facilities close to the main PT nodes and stations
- 100 km of new cycle lanes to reconnect/consolidate the existing cycle network.

Related UPPER tools:

- **U-GOV** for the acceptance and community engagement.
- **U-SUMP** to monitor the effects of the measure.

Steps to ready-to-demo measure

Steps	Description	Involved partners/ externals	Category of action	Deadline	Monitoring indicator
1	Select new 30km/h zones.	RSM technicians and officials of the municipalities involved	Technical		Actuation zones selected.
2	Identify main pedestrian routes from/to PT stops and need for improvement.	RSM technicians and officials of the municipalities involved	Technical		Main routes identified and actuation areas selected.
3	Define new traffic schemes for new 30km/h zones.	RSM techniciens	Technical		New traffic schemes defined.
4	Design new urban spaces for pedestrians and citizens along main pedestrian routes.	RSM techniciens	Technical		Design of the new urban spaces finalized.
5	Meet all the stakeholders relevant for the definition of the policy to explain and share the solutions.	Neighbourhood representatives and RSM	Legal		Agreements reached.
6	Participatory planning to define the policy	Mobility Department and RSM	Legal/ Technical	Periodic participatory planning	Policy defined and new traffic schemes ready for deployment.
7	Prepare the implementation of new urban spaces along the main pedestrian routes through tactical urbanism.	RSM	Technical		Implementation plan through “tactical urbanism” defined.
8	Purchase new equipment and furniture for new pedestrian areas and paths.	RSM implement the tender and RSM purchase the equipment	Infrastructure		Equipment and furniture ready for deployment.
9	Prepare the communication campaigns towards the stakeholders involved.	Mobility Department and RSM	Social	Already prepared for southern city district. For city center October 2024	Target users identified and communication campaigns prepared.
LAUNCH OF THE DEMO (30/06/2024 for southern city district; Historical center 30/04/2025)					

Monitoring template for Measure MAN_08: “Redesign urban space and test alternatives of using it for social purposes”

Objectives of the measure

- Improve the attractiveness, accessibility and use of urban space

Description of the measure

This measure will develop and implement a concept for parking space reorganisation to improve the functioning of streets and to ensure a safe co-existence of all road users. The developed concept will provide enough flexibility as well as solutions for parking spaces, piloting, testing, and evaluating of new use-cases for public spaces. This measure will implement a pilot that will address the reduction of parking spaces available in the urban area, the redesign of public spaces, and the test of alternatives to use them for social purposes.

Measure outputs:

This measure will deliver:

- A concept for parking space reorganisation, addressing:
  - Public space formerly blocked by parking cars becomes available for new use-cases.
  - Clear regulation of parking spaces in neighbourhoods.
  - Pavements are available in full width and make walking more attractive which also has a positive impact on PT ridership.
- Implementation of a pilot in certain city districts.

Related UPPER tools:

None.

Steps to ready-to-demo measure

Steps	Description	Involved partners/ externals	Category of action	Deadline	Monitoring indicator	Comments
1	Define the relevant quarters, where action is needed	MAN	Technical/ Data	01/08/2023	Quarters identified	
2	Define the framework and coordinate the measure framework in the administration	MAN	Technical/ Legal	01/04/2024	Concept / framework finished	
3	Carry out planning in a certain neighborhood and identify needs	MAN	Data/ Technical	01/05/2024	Recording (data collection) of parking spaces in a district. Identify changes needed.	
4	Discuss planning internally and with local bodies	MAN	Technical/ Social	01/08/2024	Decision of the respective bodies and offices.	
LAUNCH OF THE DEMO (January 2025)						

Monitoring template for Measure LIS_05 “To enhance multimodal interconnection with the peri-urban municipalities”

Objectives of the measure

- Amplified cycling infrastructure planning;
- Minimize gaps in the city´s cycling network;
- Expand bike sharing network towards neighbouring municipalities of Lisbon;
- Improve bicycle lanes network connecting towards neighbouring municipalities of Lisbon.

Description of the measure

This measure will review the cycling infrastructure plans, to facilitate integration with other municipalities. An audit of the city’s cycling network will allow finding out the existing problems and establish a prioritization of the interventions to be carried out. Moreover, this measure will work on a plan for expanding the bike sharing system (in direction) to the periphery of the city (where viable) or to the major interfaces that relate to neighbouring cities.

Measure outputs:

This measure will deliver:

- Report on the evaluation of the city´s cycle lanes;
- Bike sharing systems expansion plan.

Steps to ready-to-demo measure

Steps	Description	Involved partners/externals	Category of action	Deadline	Monitoring indicator	Comments
Sub-Task : Review the Cycling Infrastructure						
1	Public tender to purchase the technical audit concerning existing bike lanes	CML	Legal		Tender finalized	
2	Delivery of the cycling network improvement audit	Copenhagenize	Social/ Technical	December 31st, 2023	Audit report	
3	Identification of cycling network improvement locations	CML (DMM/DGM)	Technical	June 30th, 2024	Description of locations	
LAUNCH OF THE DEMO **October 30th, 2024** **(Planning to implement some of the proposed changes of the cycling network)**						

Steps	Description	Involved partners/externals	Category of action	Deadline	Monitoring indicator	Comments
Sub-Task : Plan for the Expansion of the bike Sharing System						
1	Data collection e analysis	EMEL CML	Data	November 30th, 2023	Database analyzed	
3	Selection of areas to expand bike sharing network.	EMEL CML	Technical/ political	June 2024	Areas Identified	
4	Delivery of the bike-sharing system expansion plan	CML EMEL	Social/ Technical	June 2024	Approval of the expansion of bike sharing system network	
LAUNCH OF THE DEMO January 31st, 2025 **(Planning to implement some of the plan)**						

Monitoring template for Measure VAL_02 “Creation of a network of multimodal hubs”

Objectives of the measure

- Improve the sustainable and public transport offer in the multimodal hubs.
- Deploy user-centric multimodal hubs, adapting the mobility offer to the citizens’ needs.
- Improve connections among PT modes.

Description of the measure

This measure aims to establish a network of multimodal hubs in Blasco Ibáñez avenue, a set of connectivity spaces where different modes of transportation will come together seamlessly. This measure will address:

- Improvement of the mobility offer in the hub.
- Improvement and efficient connection of the different transport modes.
- Provision of real-time information of the mobility offer in the hub through a set of multimodal panels.

Measure outputs:

This measure will deliver two multimodal hubs in Blasco Ibañez Avenue: one at Cabanyal Station, start of the corridor, the other one at Porta de la Mar, end of it, including:

- Improvement of the PT offer and better connection between PT modes.
- Deployment of multimodal panels with real-time information on the mobility offer in the hub.
- Local maps clearly and easily showing the situation of every mobility service.

Related UPPER tools:

- **U-TWIN:** This tool could integrate real-time information from different transport modes (bus, metro, train, shared bike,…) and will act as a data lake to feed additional systems, like the multimodal panels.
- **U-GOV:** This could be used for:
    - **Preliminary analysis:** To identify and select the most convenient services for the hub (surveys to different user groups, VRUs,…).
    - **Evaluation of the measure:** To collect citizens' feedback, before and after the implementation of the measure.

Steps to ready-to-demo measure

Steps	Description	Involved partners/ externals	Category of action	Deadline	Monitoring indicator	Comments
1	Study of the current mobility offer in the implementation area and selection of locations for the multimodal panels.	EMT, VAL	Data	M14	Current mobility offer analyzed and gaps identified. Location of the multimodal panels defined.	"Needs identification " phase
2	Definition of data and infrastructure requirements for multimodal panels deployment.	ETRA, *(EMT, VAL as data providers)*	Data	M15	Data sources identified and requirements established.	"Needs identification " phase
3	Definition of actuation plan to improve connection among PT modes in the hub.	EMT, VAL	Technical	M16	Actuation plan established and ready for implementation.	"Planning" phase
4	Agreement with mobility service providers (FGV, Valenbisi, MetroValencia, Renfe…) for provision of real-time information.	ETRA, EMT, VAL / Mobility service providers	Data	M18	Agreements achieved.	"Planning" phase
5	Developments around the multimodal panels (physical design, panel interface and data integration).	ETRA	Software and infrastructure	M20	Multimodal panels ready for construction.	"Development" phase
LAUNCH OF THE DEMO (M25-January 2025**)**						

Monitoring template for Measure ROM_03 “To adapt the PT offer and include new mobility services in multimodal interchange nodes”

Objectives of the measure

- To increase PT efficiency through integration and operational coordination among PT operators.
- To increase accessibility to PT.
- To increase PT share.

Description of the measure

This measure aims to upgraded and made more accessible, both in terms of parking space and in the efficiency of the inter-modality, the PT infrastructure. In particular, this measure will add or expand park and rides making them more efficient accessible and sustainable. Moreover, it will improve multi-modality offer near park and rides, increasing accessibility and inclusion in the MaaS ecosystem.

Measure outputs:

This measure will add, expand, adapt, or build facilities to favour the modal exchange in 4 P&Rs, including:

- 2 new P&Rs along the metro B1 line (Annibaliano, Conca d’oro)
- 1 P&R on the Metro Line A (Anagnina)
- 1 P&R on the suburban railway line linking the city with the main airport (Villa Bonelli)

Related UPPER tools:

- **U-NEED** to understand how people move in the city and enhance multi-modality.
- **U-SUMP** can support the monitoring of the measure effect on the SUMP.
- **U-GOV** to support the participatory process with stakeholders.

Steps to ready-to-demo measure

Steps	Description	Involved partners/externals	Category of action	Deadline	Monitoring indicator	Comments
1	Definition of the areas of intervention and financing sources.	Local Authority, Mobility Department, Lazio Region RSM, RFI	Technical	done	Areas of intervention selected, and financing model defined.	Financing sources redefining
2	Data collection on the current status of the interchanges (services supply, PT schedule coordination, and integration of information).	RSM, PT operator (ATAC)	Data	Conca d'Oro and Annibaliano will be fully operational by 30/06/2024.	Report on the current status of each interchange.	
3	Data analysis to identify gaps and needs for improvement.	RSM	Data		Gaps and needs for improvement on each interchange.	
4	Participatory process with stakeholders to define requirements to improve service supply on the interchanges selected (including new services and enlargement of parking supply).	Mobility Department, RSM	Technical		Requirements to improve the service supply on each interchange.	
5	Definition of data requirements for PT schedule coordination, and integration of information.	RSM	Technical	Activities done during PT planning	Requirements to improve the PT schedule coordination and integration of information.	
6	Modelling, evaluation, and refinement of the services supply	Mobility Department, PT Operator (ATAC), RSM	Technical	6 months after the implementation	Roadmap of service supply adaptations on each interchange.	
7	Establish a cooperation framework with the mobility companies in sharing and collecting information.	RSM	Legal		Data agreements to improve the PT schedule coordination and integration of information.	
LAUNCH OF THE DEMO (31/06/2024 - Conca d'Oro ed Annibaliano)						

Monitoring template for Measure OSL_02 “Consistent visual identity for PT and mobility hubs”

Objectives of the measure

- Improve the user experience when travelling in the city and the surrounding areas.
- Provide mobility rather than public transportation only.

Description of the measure

Ruter has recently launched a new visual identity which is used in their official communication, branding material and digital user interface. This visual identity (applied to screens at stops and inside vehicles, apps and websites, interior and exterior of vehicles, directions to and from stations, landmarks and signs, timetables, maps and marketing) ensures consistent communication across channels and a better user experience. With this measure, the Ruter’s visual identity will be expanded to also include mobility hubs and belonging (new) services such as bike lockers, car sharing etc. This will increase the visibility and uniformity of mobility services.

Measure outputs:

This measure will deliver:

- Updated visual identity for Ruter.
- Mock-up of the new visual identity in at least one hub.

Related UPPER tools:

U-GOV may help gain a better understanding of the customers’ expectations, serving as a platform/facilitator for interaction, involvement, and discussions.

Steps to ready-to-demo measure

Steps	Description	Involved partners/externals	Category of action	Deadline	Monitoring indicator	Comments
1	Insight 1: Data collection. Mapping of existing data and insight, gaps in insight and gathering new data.	RUTER	Data	01.03.2024	Insight summary	
2	Insight 2: Analysis of user and operator needs related to visual identity (through survey, workshop, interviews).	RUTER, Bymiljøetaten, suppliers of the services provided at the mobilityhubs (eg. Tier, Hyre, posten ect.)	Social	29.03.2024	Completion of user and operator survey, reporting of needs analysis user and operator needs.	
3	Design: Ideation workshop and development of 2-3 concepts / visual directions. Feedback on sketches and low level MVP. Choosing and merging concepts into one final visual direction.	Operators, users, Ruter design department	Technical /Social	30.08.2024	Visual identity MVP for Ruters mobility hubs. Final concept/visual direction with description for design choices based on feedback and insight	MVP: low fidelity test of concept
LAUNCH OF THE DEMO (Jan 2025)						

Monitoring template for Measure OSL_06 “More inclusive micromobility”

Objectives of the measure

At measure level:

- Increased usage of shared micromobility amongst more user groups, both as a part of multimodal travels and for one modal travelling.

Contributing to city level objectives:

- Reduce trips made by private vehicles
- Increase freedom of movement and supplement current first/last mile solutions

Description of the measure

This measure aims to test a new inclusive shared micromobility scheme. We want to involve members from different interest groups, as well as other user groups (for instance inhabitants in certain geographical areas and owners of private bikes). When we have identified a barrier of adoption for a large enough user group, we will through dialogue with relevant operators and stakeholders aim to design a pilot scheme.

Measure outputs:

- The measure will deliver:
  - Workshop with stakeholders and user surveys for improved understanding of current adoption barriers for shared micromobility. Both in general, and in a local context where adoption is considered very high (source: fluctuo)
  - Learning points for how the existing shared micromobility offering can be tailored to new user groups
  - Pilot of shared micromobility with vehicles that gives a more inclusive shared micromobility scheme

Related UPPER tools:

U-GOV could be used to take account to the user’s needs.

Steps to ready-to-demo measure

Steps	Description	Involved partners/externals	Category of action	Deadline	Monitoring indicator	Comments
1	Design: Use case and scope	Ruter, service providers	Data, social, technical	1. Feb 2024	Description of use cases and user groups	Identification of user pains
2	Preparation: Partnerships and plan of execution	Ruter, service providers	Social, technical	1. April 2024	Detailed tentative plan of execution based on user group and needs and data from market	Deciding on methods of procurement of services
LAUNCH OF THE DEMO				January 2025		

Monitoring template for Measure MAN_07 “Create a network of mobility hubs in cooperation with the regional transport association, open for multi mobility providers”

Objectives of the measure

- Improve integration of shared mobility options with PT
- Improve availability of multimodal options at PT stops

Description of the measure

This measure will develop and implement a connected mobility concept to consider shared mobility options as standard in the planning, construction and operations of PT stops. The goal of the concept is to provide people with a seamless transition between sustainable mobility modes (PT, car sharing, bike sharing, e-Scooters, walking, and cycling), by bringing them physically together, increasing visibility and improving accessibility. The scope of this measure is to develop and implement the concept and realize at least one pilot mobility hub.

Measure outputs:

This measure will deliver:

- Concept of shared mobility integration in PT planning and operations.
- Improvement of at least one PT stop with regards to their multimodal mobility offer.

Related UPPER tools:

None.

Steps to ready-to-demo measure

Steps	Description	Involved partners/ externals	Category of action	Deadline	Monitoring indicator	Comments
1	Evaluate shared mobility framework & identify mobility providers & options	RNV, MAN	Technical/ Data	01/03/2024	Mobility services and providers identified	
2	Evaluate possible Mobility Hub formats, experiences, options	RNV, MAN	Technical	01/05/2024	Completion of the evaluation process	
3	Identify pilot site	RNV, MAN	Technical	01/08/2024	Pilot site selected	
4	Development of concept	RNV, MAN	Technical/ Social	01/08/2024	Concept developed	
5	Consultation with VRN and city of Mannheim on the concept	RNV, MAN	Technical/ Legal	01/12/2024	Final concept approved	

Monitoring template for Measure LIS_09 “To improve the integration of PT and active travel modes”

Objectives of the measure

- To generate debate on the importance and complementary of PT and active modes at local level, regarding infrastructure and service;
- To discuss and promote cycling infrastructure at PT interfaces;
- Increase opportunities for multi-modal trips with bikes and PT through physical and ticketing integration.

Description of the measure

The UPPER local partners will sponsor the strategic discussion of promoting the complementary of PT and active modes at local level, with special focus given to: increasing the quality cycle parking infrastructure at interfaces and the integration of PT and public bike sharing services at ticketing level. The bike parking infrastructure on PT interfaces and stations will then be studied, using SmartHub methodologies. As a result, some bike parking will be created at some interfaces, and their use will be monitored. At the same time, TML and the City of Lisbon will discuss and implement the integration of the Lisbon public bike sharing system GIRA in the Lisbon PT ticketing system ‘navegante’.

Measure outputs:

This measure will deliver:

- Bike parking infrastructure at PT interfaces;
- PT and public bike sharing ticket integration.

Related UPPER tools:

U-NEED may help on the definition of the higher relevant PT interfaces to start implementation from, as it will help analyse demand, allowing for the planification of interventions with higher impact.

Steps to ready-to-demo measure

SubTask 1: Study of bike parking infrastructure on PT interfaces and stations, using SmartHub methodologies						
Steps	**Description**	**Involved partners/ externals**	**Category of action**	**Deadline**	**Monitoring indicator**	**Comments**
1	Identification of PT interfaces where to implement bike parking infrastructure	TML	Technical / Data	31st October 2023	Interfaces identified and defined	Following SmartHubs methodologies
2	Engagement of PT interface owners for implementation of the bike parking infrastructure	TML + interface owners	Technical / Social	30th November 2023	Stakeholders engaged; agreement on the bike boxes installation reached	
3	Definition of interfaces and site visits	TML + interface owners	Interface / Technical	31th March 2024	Sites visits done	
4	General definition of requirements for the bike parking installation	TML + interface owners	Technical	30th May 2024	Requirements defined	
5	Terms of Reference for the bike parking infrastructure	TML + interface owners	Technical	31st August 2024	ToR written	
LAUNCH OF THE DEMO (January 2024)						
SubTask 2: Bike sharing integration in the PT ticketing system.						
Steps	**Description**	**Involved partners/ externals**	**Category of action**	**Deadline**	**Monitoring indicator**	**Comments**
1	Analysis of the PT and bike sharing ticketing systems	TML/EMEL	Technical/ Data	31st April 2023	Design of the integration of PT ticketing system and the bike sharing system	
2	Definition of technical requirements for ticket integration	TML/EMEL	Technical	30th May 2023	List of requirements	
3	Developments to integrate the public bike sharing system GIRA and the PT ticketing system 'navegante'	TML/EMEL	Software	02nd June 2023	Test and operation of the app	
LAUNCH OF THE DEMO (05th June 2023)						

Monitoring template for Measure TES_02 “Simulation and analysis of PT needs for LEZ demand fulfilment”

Objectives of the measure

- Understand and develop directions-KPIs for PT planning LEZs.
- Improve PT service.
- Provision of better connectivity and interoperability.
- Improve PT user satisfaction.
- Improve environment.

Description of the measure

In the context of this measure, a LEZ will be defined in Rotonda area. Following this, PT service in this area will be adapted optimally through simulation processes. Existing data will be collected regarding the LEZ area, including size, origin destination data, PT stations, vehicles and frequency/schedules. An analysis will be carried out for understanding how PT system should be rearranged in order to provide the same levels of accessibility to those affected by the LEZ.

Measure outputs:

This measure will deliver:

- An analysis that will facilitate PT planning in LEZs.
- KPIs to support decision making when implementing LEZs.

Related UPPER tools:

U-NEED: May be used along with already existing methodologies of CERTH to understand travellers needs to/from LEZ.

U-SIM.plan: May be used in conjunction with Thessaloniki’s strategic traffic model, developed by CERTH, to get modal split shares.

Steps to ready-to-demo measure

Steps	Description	Involved partners/externals	Category of action	Deadline	Monitoring indicator	Comments
1	Definition of variations of LEZ	CERTH, TheTA	Social/Technical	31/01/2024	Definition of LEZ boundaries	City's SUMP already proposes a LEZ; variations/extensions of it will be defined
2	Collection of data	CERTH, TheTA	Data	31/01/2024	Data ready for the analysis	PT related data (stops, frequency etc.)
3	Definition of KPIs for assessing PT accessibility	CERTH, TheTA	Technical	29/02/2024	List and description of KPIs	The potential of defining different KPIs per population group will be examined
4	Accessibility analysis	CERTH	Data	30/06/2024	Calculated KPIs	The defined KPIs will be calculated for the existing situation, as well as for the defined variations of LEZ
LAUNCH OF THE DEMO (January 2025)						

Monitoring template for Measure TES_08 “To create new incentive-based services in the MDMS system to increase the use of PT”

Objectives of the measure

- Identify accessibility gaps and assess the impact of new shared mobility stations.
- Define and establish potential synergies between PT and shared mobility services.
- Offer competitive alternatives to the use of private cars, also for people living in peri-urban areas.

Description of the measure

The outcome of this measure will be a study regarding accessibility in the city of Thessaloniki and a tool (neutral platform) for assisting evidence-based decision-making for developing viable and personalized mobility packages, as well as targeted behavioural change activities by identifying the areas which can be significantly benefited by shared mobility.

Measure outputs:

This measure will deliver:

- An accessibility analysis for the city of Thessaloniki.
- Report on how PT can be combined with shared mobility services for offering a competitive alternative to private cars.
- A digital service for planners and micromobility operators, for assisting evidence-based decision-making.

Related UPPER tools:

U-NEED It can be used for assisting in performing an accessibility analysis in the territory of Thessaloniki’s metropolitan area.

Steps to ready-to-demo measure

Steps	Description	Involved partners/ externals	Category of action	Deadline	Monitoring indicator	Comments
1	Definition of methodology for the study	CERTH/HIT	Technical	30/11/2023	Methodology description	
2	Data collection	CERTH/HIT, TheTA	Data	31/12/2023	Data ready to be used in the analysis	The possibility of collecting survey data will be considered depending on the outcome of step 1
3	Accessibility analysis	CERTH/HIT	Technical	15/02/2024	Identification of areas where shared mobility has potential	
4	Definition of user requirements for the digital tool	CERTH/ITI CERTH/HIT	Technical	30/04/2024	Description of user requirements in user stories format and use case diagrams	
5	Analysis of trips generalized cost	CERTH/HIT	Technical	15/05/2024	Conclusions on how shared mobility in combination with PT can be a competitive option against private car	
6	Definition of system requirements and architecture	CERTH/ITI	Technical	28/06/2024	Description of system requirements and component diagram for the architecture	
7	Development and Testing of digital tool	CERTH/ITI	Software	31/08/2024	Platform to be fully operational	
LAUNCH OF THE DEMO (January 2025)						

Monitoring template for Measure HAN_03 “Added-value services in multimodal nodes to integrate PT with active modes”

Objectives of the measure

- Transformation of train stations into multi-modal nodes, including connection to cycle route network and designated spaces for shared mobility.
- Promotion of intermodal mobility.

Description of the measure

Hannover Region wants to make the stations more passenger-friendly and add Bike+Ride stations to make it easier to switch to other modes of mobility. Within the lifetime of UPPER project, one (and possible) two B&R stations will open (financed through other funds). This measure aims to evaluate their use and provide guidelines to improve the user experience at B+R stations.

Measure outputs:

This measure will deliver:

- An evaluation on how to increase the user experience at B+R Stations
- Attractive mobility hubs around railway stations

Related UPPER tools:

U-GOV could be used to take account to the user’s needs in the design and function of Bike + Ride Stations.

Steps to ready-to-demo measure

Steps	Description	Involved partners/ externals	Category of action	Deadline	Monitoring indicator	Comments
1	Follow up of the design and implementation of B+R Stations in Hannover Region	HANNOVER REGION	Infrastructure	First half of 2024	B+R stations in place	The construction of the stations is out of the scope of UPPER, but it's the pre-requisite to start the evaluation of the B+R stations.
2	Define data collection mechanisms	HANNOVER REGION/ Service Provider of Bike Tower	Data	06/2024	Data collection mechanisms in place	
3	Define the contents of the evaluation (table of contents)	HANNOVER REGION	Technical	08/2024	Final table of contents for evaluation	
LAUNCH OF THE DEMO (02/11/2024 – one year after bike tower opened)						

Annex 3: MAN_07 Reference book on local/ regional shared mobility framework

Source ID	Titel	Document ID	Document name	Spatial relevance	Reference ID	Topic of reference	Type of reference	Page of reference	Content preview
1	Masterplan Mobilität Mannheim	101	2023_07_06 Protokoll Stadtteilforum Kernstadt Masterplan Mobilität 2035 am 06.07.2023	MA	1	Sharing	Civic engagement	7	Auswertung Kundenbefragung: Inter- und Multimodalität Es wird die Anregungen vorgebracht, auch Wassertaxis als Mobilitätsoption zu betrachten. Darüber hinaus wird die Rolle der Elektrotretroller diskutiert. Störend ist weniger das Fahrzeug an sich, sondern die ungeordnete Abstellung mit vielen Behinderungen für den Fuß- und Radverkehr. Es sollten geeignete Abstellanlagen bereitgestellt werden, um den öffentlichen Raum nicht zu vermüllen.
1	Masterplan Mobilität Mannheim	101	2023_07_06 Protokoll Stadtteilforum Kernstadt Masterplan Mobilität 2035 am 06.07.2023	MA	2	Bike & ride	Concept	24	Concept Radverkehr: Fahrradparken an PT-stopn, in Stadtteilzentren, an Einzelzielen und im Wohnumfeld
1	Masterplan Mobilität Mannheim	101	2023_07_06 Protokoll Stadtteilforum Kernstadt Masterplan Mobilität 2035 am 06.07.2023	MA	3	PT stop	Concept	17	Concept ÖPNV: Aufwertung Zugangspunkte und bessere Umstiege innerhalb des ÖPNV an Verknüpfungspunkten (v.a. S-Bahn-Halte)
1	Masterplan Mobilität Mannheim	101	2023_07_06 Protokoll Stadtteilforum Kernstadt Masterplan Mobilität 2035 am 06.07.2023	MA	4	Mobi-hubs	Concept	30	Concept Innovative Mobilität: Aufbau eines Netzes von Inter- und multimodalen Schnittstellen (Mobilstationen)
1	Masterplan Mobilität Mannheim	102	2023_07_07_Protokoll Stadtteilforum Mannheim Süd Masterplan Mobilität 2035 am 07.07.2023	MA	x	x	x	x	s. Verweis 1-4 aus Dokument 101
1	Masterplan Mobilität Mannheim	103	2023_07_08_Protokoll Stadtteilforum Neckarstadt Masterplan Mobilität 2035 am 08.07.2023	MA	x	x	x		s. Verweis 1-4 aus Dokument 101
1	Masterplan Mobilität Mannheim	104	2023_07_013_Protokoll Stadtteilforum Nord Masterplan Mobilität 2035 am 13.07.2023	MA	x	x	x	x	s. Verweis 1-4 aus Dokument 101
1	Masterplan Mobilität Mannheim	105	2023_07_014_Protokoll Stadtteilforum Ost Masterplan Mobilität 2035 am 14.07.2023	MA	x	x	x	x	s. Verweis 1-4 aus Dokument 101
1	Masterplan Mobilität Mannheim	106	3_leitbild-eckpunkte-und-ziele-des-masterplans-mobilitat-2035	MA	5	Mobi-hubs	Objective	5	Die Stadt Mannheim strebt – gemeinsam mit der Region – eine verbesserte Verknüpfung der unterschiedlichen Mobilitätsangebote sowohl über infrastrukturelle Angebote und integrierte Zugangs- und Vermarktungssysteme an.

1	Masterplan Mobilität Mannheim	106	3_leitbild-eckpunkte-und-ziele-des-masterplans-mobilitat-2035	MA	6	Multimodality	Concept	13	A.3 Förderung verkehrlicher Innovationen, moderner Mobilität und Multimodalität zur Steigerung der Nachhaltigkeit. Förderung des Prinzips „Nutzen statt Besitzen“, z.B. durch flächendeckendes Angebot von LeihPkw und -fahrrädern/ Vernetzung Bezahl- und Zugangsysteme fördern
1	Masterplan Mobilität Mannheim	106	3_leitbild-eckpunkte-und-ziele-des-masterplans-mobilitat-2035	MA	7	Multimodality	Objective	15	Stärkung multimodaler Angebote für eine große Wahlfreiheit der Bürger bei der Verkehrsmittelwahl
1	Masterplan Mobilität Mannheim	106	3_leitbild-eckpunkte-und-ziele-des-masterplans-mobilitat-2035	MA	8	Bike & ride	Concept	20	Ausbau des Angebots an sicheren Fahrradabstellanlagen (flächenhaft und punktuell an wichtigen Einrichtungen sowie ÖPNV-PT-stopn) auch für größere Fahrräder (z.B. Lastenräder)
1	Masterplan Mobilität Mannheim	106	3_leitbild-eckpunkte-und-ziele-des-masterplans-mobilitat-2035	MA	9	Bike & ride	Concept	23	Der zunehmenden Bedeutung des Radverkehrs für das Mobilitätsverhalten der Mannheimer Bevölkerung soll durch eine Stärkung der Abstellmöglichkeiten im öffentlichen Raum, an wichtigen Einrichtungen und an ÖPNV-Verknüpfungspunkten nachgegangen werden. [...] besser auch auf neuere und größere Fahrradformen ausgelegt werden.
1	Masterplan Mobilität Mannheim	106	3_leitbild-eckpunkte-und-ziele-des-masterplans-mobilitat-2035	MA	10	Mobi-hubs	Objective	21	Verknüpfung unterschiedlicher Verkehrsmittel, z.B. an Bahnhöfen, ÖPNV-PT-stopn und P&R-Plätzen/ Förderung von Verknüpfungspunkten zwischen den Verkehrsträgern (z.B. B&R, Mobilitätsstationen)
1	Masterplan Mobilität Mannheim	107	5_alle ergebnisse der stadtteiforen 021	MA	11	Bike & ride	Objective	7	Schaffung attraktiver Voraussetzungen für Fuß- und Radverkehr: Fahrradparken
1	Masterplan Mobilität Mannheim	107	5_alle ergebnisse der stadtteiforen 021	MA	12	Bike & ride	Objective	8	E.4 Bereitstellung und Bewirtschaftung von – an Nachhaltigkeitszielen ausgerichteten – Parkraumangeboten für Kfz und Fahrräder: Fahrradparken
1	Masterplan Mobilität Mannheim	107	5_alle ergebnisse der stadtteiforen 021	MA	13	Bike & ride	Civic engagement	122	Spezifische Eindrücke aus Mannheim Süd – Rad- und Fußverkehr: Kein flächendeckendes Angebot Fahrradparken
1	Masterplan Mobilität Mannheim	107	5_alle ergebnisse der stadtteiforen 021	MA	14	Bike & ride	Civic engagement	20	Spezifische Eindrücke aus Mannheim Nord – Rad- und Fußverkehr: Wenig nennenswerte öffentliche Fahrradabstellanlagen im Straßenrau
1	Masterplan Mobilität Mannheim	107	5_alle ergebnisse der stadtteiforen 021	MA	15	PT stop	Civic engagement	20	Spezifische Eindrücke aus Mannheim Nord – Rad- und Fußverkehr: Verkehrsachsen als Barrieren der Quartiersverknüpfung und Zuwegung zu Einrichtungen/ PT-stopn (B 44 in Sandhofen und Waldhof, Bahngleise östlich Schönau und in Waldhof)
1	Masterplan Mobilität Mannheim	108	06_Auswertung der ersten online Befragung 2021	MA	16	Mobility behaviour	Civic engagement	11	Verteilung der Mobilitätstypen & Verteilung der Mobilitätstypen nach Stadtbereich
1	Masterplan Mobilität Mannheim	108	06_Auswertung der ersten online Befragung 2021	MA	17	Bike & ride	Civic engagement	18	Bedarf an Fahrradabstellmöglichkeiten: Radabstellmöglichkeiten fehlen insbesondere an Wohnorten und StraßenbahnPT-stopn. Radabstellmöglichkeiten fehlen insbesondere an Wohnorten und StraßenbahnPT-stopn.
1	Masterplan Mobilität Mannheim	108	06_Auswertung der ersten online Befragung 2021	MA	18	Bike & ride	Civic engagement	19	Ein Vergleich der Stadtbereiche zeigt, dass vor allem bei innenstadtnahen Wohnorten Fahrradabstellanlagen fehlen. Wogegen außerhalb der Kernstadt darüber hinaus ein deutlicher Bedarf an den PT-stopn des ÖPNV genannt wurde (siehe Grafik 13

1	Masterplan Mobilität Mannheim	108	06_Auswertung der ersten online Befragung 2021	MA	19	Mobility behaviour	Civic engagement	28	Die räumlich differenzierte Betrachtung macht deu[...] deutlich höher. (S. 9 Das Fahrrad steht demnach fast jeder befragten Person zur Verfügung, Fahrradsharing steht vermehrt in der Kernstadt zur Verfügung, Private Elektrofahrräder/Pedelecs sind außerhalb der Kernstadt stärker verbreitet.)
1	Masterplan Mobilität Mannheim	109	09_Auswertung der zweiten online Befragung 2022	MA	20	Mobility behaviour	Civic engagement	10	Szenariowahl. So haben sich 70% der Teilnehmenden für das Szenario 2 „Aktiv und multimodal“ entschieden, wohingegen nur 30% der Teilnehmenden für das Szenario 1 „Angebotsoffensive“ als Vorzugsszenario gewählt haben.
1	Masterplan Mobilität Mannheim	109	09_Auswertung der zweiten online Befragung 2022	MA	21	Mobility behaviour	Civic engagement	18	4.5 Bewertung des Maßnahmenbündels „Innovative Mobilitätsangebote“ : Innerhalb des Maßnahmenbündels „Innovative Mobilitätsangebote“ wurde die Maßnahme zur Weiterentwicklung firmenbezogener Mobilitätsangebote (Jobtickets/Dienstwagen) zu Mobilitätsbudgets mit Buchungsoptionen auf alle Mobilitätsdienstleiter (ÖPNV, CarSharing, BikeSharing etc.) sehr begrüßt. Auch die weiteren Maßnahmen wurden im Mittel als „wichtig“ bewertet.
1	Masterplan Mobilität Mannheim	109	09_Auswertung der zweiten online Befragung 2022	MA	22	Mobility behaviour	Civic engagement	22	5.5 Bewertung des Maßnahmenbündels „Innovative Mobilitätsangebote“ Die Maßnahmen rund um das Handlungsfeld „Innovative Mobilitätsangebote“ wurden im mittel alle als „wichtig“ eingeschätzt und die Bewertungen decken sich weitestgehend mit der Bewertung aus Szenario 1 in Kapitel 4.5.
1	Masterplan Mobilität Mannheim	110	16_04_2021 Beteiligungsconcept Masterplan Mobilität	MA	x	x	x	x	x
1	Masterplan Mobilität Mannheim	111	Lastenheft Masterplan Mobilität GR 2019	MA	23	Multimodality	Concept	6	S. 6 Klärung, Analyse, Bewertung und Harmonisierung der zu berücksichtigenden Vorarbeiten/Concepte und Datengrundlagen - Vorschläge zur Darstellung und Abbildung von Inter- und Multimodalität
1	Masterplan Mobilität Mannheim	112	mm2035_Auswertung Onlinebefragung 2023	MA	24	Mobility behaviour	Civic engagement	8	S: 8 2.2 Mobilitätstyp - Verteilung Mobilitätstypen in MA (Stichprobe
1	Masterplan Mobilität Mannheim	113	mm2035_Auswertung Onlinebefragung 2023	MA	25	Mobility behaviour	Civic engagement	18	S.18 Priorität für den Ausbau von ÖPNV und Radverkehr: Äußerungen zu einem Umdenken vom Fokus des Kfz-Verkehrs hin zu einer Verminderung und stattdessen zu einer höheren Priorität des ÖPNV und Fahrradverkehrs werden in dieser Kategorie zusammengefasst.
2	Regulierung E-Tretroller LU	201	vereinbarung_qualitaeten_e_rollerangebot	LU		Sharing	Concept	2	S.2 §2 Regulierung der Flottenstärke im Gebiet
2	Regulierung E-Tretroller LU	201	vereinbarung_qualitaeten_e_rollerangebot	LU		Sharing	Concept	3	S.3 §4 Abstellung der E-Tretroller
2	Regulierung E-Tretroller LU	201	vereinbarung_qualitaeten_e_rollerangebot	LU		Sharing	Concept	4	S.4 Datenanalyse und Bereitstellung der Daten
3	Regulierung E-Tretroller MA	301	Anlage1_Concept_v04	MA		Sharing	Concept	7	S.7 Sondernutzungsgebühren pro Fahrzeug
	Regulierung E-Tretroller MA	301	Anlage1_Concept_v04	MA		Sharing	Concept	7	S.7 Festlegung Flottenobergrenze im Stadtgebiet
	Regulierung E-Tretroller MA	301	Anlage1_Concept_v04	MA		Sharing	Concept	7	S.7-9 Auswahlverfahren und Antragstellung (hier Regulierung durch Stadt im Hinblick auf gerechte Verteilung)

	Regulierung E-Tretroller MA	301	Anlage1_Concept_v04	MA		Sharing	Concept	10	S.10-12 Abstellen und Verteilungsmanagement (Definierte Verbotszonen und definierte feste Abstellbereiche, etc.)
	Regulierung E-Tretroller MA	301	Anlage1_Concept_v04	MA		Sharing	Concept	15	S.15 Integration in den ÖPNV
	Regulierung E-Tretroller MA	301	Anlage1_Concept_v04	MA		Sharing	Concept	16	S.16-21 Datenüberlassung, Monitoring, Evaluation sowie Anlagen
	Regulierung E-Tretroller MA	302	B-Vorlage_E-Tretroller_v03	MA		x	x	x	x
4	Regulierung E-Tretroller HD	401			02.05.2024	x	x	x	noch kein Dokument vorhanden "Die Stadtverwaltung Heidelberg arbeitet derzeit mit Priorität an der Umsetzung einer Conception, die trotz der gesetzlichen Rahmenbedingungen die Situation rund um E-Tretroller langfristig verbessern soll, z.B. durch das Einrichten von Abstellflächen."
5	VRN Leitfaden Mobilitätsstationen	501	VRN Leitfaden_mobilstationen_web	alle	26	Mobi-hubs	Objective	3	S.3 Sinn und Zweck adaptierbar
		501	VRN Leitfaden_mobilstationen_web	alle	27	Mobi-hubs	Concept	4	S.4 Aspekte
		501	VRN Leitfaden_mobilstationen_web	alle	28	Mobi-hubs	Concept	6	S.6 Bewertung und Potenzialanalyse
		501	VRN Leitfaden_mobilstationen_web	alle	29	Mobi-hubs	Concept	14	S.14 Fördermöglichkeiten
6	VRN Leitfaden Mikromobilität	601	VRN Leitfaden_sharing-mobilitaet	alle	30	Sharing	Concept	3	S.3 Präambel
6	VRN Leitfaden Mikromobilität	601	VRN Leitfaden_sharing-mobilitaet	alle	31	Sharing	Concept	5	S.5 relevante zusammenhänge
6	VRN Leitfaden Mikromobilität	601	VRN Leitfaden_sharing-mobilitaet	alle	32	Sharing	Concept	8	S.8 Anforderungen Fahrradvermietsystem /Abstellflächen Stationen
6	VRN Leitfaden Mikromobilität	601	VRN Leitfaden_sharing-mobilitaet	alle	33	Sharing	Concept	12	S.12 Carsharing+ÖPNV Integration, E-Fahrzeuge für Unterhalt
7	Nahverkehrsplan MA	701	nvp_mannheim_2018_web	MA	34	PT stop	Objective	65	S. 64: "5.4.7 Maßnahmen zur Verbesserung der Zuwegung An einzelnen StadtbahnPT-stopn sind Maßnahmen im Sinne einer verbesserten Zuwegung sinnvoll (...)"
7	Nahverkehrsplan MA	701	nvp_mannheim_2018_web	MA	35	Bike & ride	Objective	71	S. 70 "5.7 Ergänzende Mobilitätsangebote 5.7.1 Bike and Ride (B+R)" inkl. Kirterien zur Auswahl/ Bewertung PT-stopn für B+R Angebot + Liste konkreter Maßnahmen (aktueller Stand?) azuch Prognose steigender Radanteil in MA
7	Nahverkehrsplan MA	701	nvp_mannheim_2018_web	MA	36	Sharing	Objective	74	S. 73: "5.7.3 Sharing-Systeme (...) Auf die dargestellten Veränderungen im Verkehrsverhalten muss der ÖPNV reagieren. Er bildet die Grundlage für ein funktionierendes inter- und multimodales Angebot. (...)"
7	Nahverkehrsplan MA	701	nvp_mannheim_2018_web	MA	37	Sharing	Objective	75	S. 74: "Fahrradvermietsysteme Grundsätzlich liegen weitere potenzielle Standorte für ein Fahrradvermietsystem u.a. an SPNV- und Stadtbahnhalten
7	Nahverkehrsplan MA	701	nvp_mannheim_2018_web	MA	38	Sharing	Objective	78	S. 77: " Car-Sharing Gemeinsam mit den vorhandenen Carsharing-Anbietern ist abzustimmen, ob in der Stadt Mannheim weitere stationsbasierte Standorte sinnvoll eingerichtet und bestehende Standorte zu Mobilitätsstationen ausgebaut werden können. Insbesondere in weniger eng besiedelten, flächenmäßig kleineren

									Stadtteilen bietet eine Mobilitätsstation die Chance, die geübten Wege zu den ÖPNV-PT-stopn zu nutzen, um Kunden an multimodale Angebote heranzuführen." In innenstadtnahen Lagen, wo bereits PT-stopn und evtl. Leihfahrradstationen vorhanden sind, bietet sich die Ertüchtigung zu Mobilitätsstationen mit einer kombinierten Carsharing-Station mit Ladestation (eFahrzeug und konventionelles Fahrzeug) an. Beispielsweise auf dem Lindenhof, in der Neckarstadt-Ost und der Schwetzingerstadt gibt es dafür Potenzial
7	Nahverkehrsplan MA	701	nvp_mannheim_2018_web	MA	39	Sharing	Objective	80	S. 79 "5.7.5 Stadtteilbezogene Betrachtung Die Ergebnisse der vorherigen Kapitel zu den Themen B+R, Bikesharing und Carsharing werden zusammenfassend in einem gesamtstädtischen Überblick dargestellt und nachfolgend im Detail in einer stadtteilbezogenen Betrachtung beschrieben (Abbildung 50)."
7	Nahverkehrsplan MA	701	nvp_mannheim_2018_web	MA	40	Mobi-hubs	Objective	85	S. 84: "Einrichtung von Mobilitätsstationen" Ideen, Concept und Liste mit potentiellen Standorten
8	Nahverkehrsplan LU	801	nvp_lu_lr	LU	41	Mobi-hubs	Objective	59	"S. 58 - 61: ""5.5 Verknüpfungspunkte (...) Liste PT-stopn mit Anzahl Fahrgästen (...) Liste bestehender Verknüpfungspunkte (...) Liste bestehender B+R & P+R Anlagen (...) Zuwegung Radverkehr"
8	Nahverkehrsplan LU	801	nvp_lu_lr	LU	42	Sharing	Objective	66	S. 64 - 65: ""5.6 Ergänzende Mobilität" allgemeine Infos zu Mietrad und CarSharing"
9	Nahverkehrsplan VRN	901	der_nahverkerhsplan_im_vrn	alle	43	Mobility behaviour	Objective	x	eher allgemeines Dokument/ Strategie, keine relevanten Vorgaben/ Rahmenbedingungen, Grundlagen für AP1.1
10	Nahverkehrsplan RNK	###	nvp-rnk	RNK, HD	44	Bike & ride	Concept	20	S. 20: "3.16 Verknüpfungspunkte (P+R und B+R) Im Nahverkehrsplan werden unter den Maßnahmen N3-1 bis N3-10 Schienenhaltepunkte genannt, deren Ausbau zu Verknüpfungspunkten (P+R, B+R, Busverknüpfung) oder Modernisierung weiterverfolgt werden sollte"
10	Nahverkehrsplan RNK	###	nvp-rnk	RNK, HD	45	Mobi-hubs	Concept	72	S. 72: "5.4 Verknüpfungspunkte (...) Grundsätzliche Anforderungen an die Abstellanlagen sind in Abbildung 48 dargestellt."
10	Nahverkehrsplan RNK	###	nvp-rnk	RNK, HD	46	Bike & ride	Civic engagement	73	S. 73: "P+R und B+R - Erhebung des Bestandes und Handlungsbedarf" m Frühjahr 2016 wurden an den Schienenstrecken des Rhein-Neckar-Kreises die 78 PT-stopn auf vorhandene P+R- und B+R-Anlagen hin untersucht.
10	Nahverkehrsplan RNK	###	nvp-rnk	RNK, HD	47	PT stop	Concept	75	S. 75: "Zusätzliche Ausstattung " & "Zuwegung Fuß- und Radverkehr zu PT-stopn – generelle Anforderungen"
10	Nahverkehrsplan RNK	###	nvp-rnk	RNK, HD	48	Sharing	Concept	79	S. 79 - 83: "5.6 Ergänzende Mobilität" + Liste PT-stopn mit Infos zu B+R/ P+R Ausstattung
10	Nahverkehrsplan RNK	###	gnvp_teilfortschreibung-rhein-neckar-2023	RNK, HD	49	PT stop	Objective	6	S. 6/7: Vorgaben zu "Standard für PT-stopnschilder im VRN" "2.8 (...) Die Berücksichtigung weiterer vor Ort vorhandener ÖPNV-Angebotsformen, die hier nicht aufgelistet sind, ist unbedingt mit dem VRN abzustimmen."
11	Nahverkehrsplan RPK	###	vrn_rpk_2018_lr	RPK	50	Mobi-hubs	Concept	43	S. 43 s. NVP RNK "5.4 Verknüpfungspunkte (...) Grundsätzliche

									Anforderungen an die Abstellanlagen sind in Abbildung 48 dargestellt."
12	Klimamobilitätsplan HD	-	1100_KMP HD-Akr5-2023_10_16_Präsentation_im_Nachgang.pdf	HD	51	Mobi-hubs	Objective	15	S.15 Multimodalität, Innovation, Verkehrsmanagement (hier Maßnahmen 52-54 und 60) - P+R sowie Mobilitätsstationen in "Klima-Szenarien"
13	Straßenverkehrsordnung	-	was davon ist ggf. für uns relevant	12.04.2024		PT stop		x	verweist auf andere Gesetze (z.B. CarSahring Gesetz, Elektromobilitätsgesetz) umfasst wie Beschilderung ausgestaltet werden kann §45 Grundsätze CarSharing, Mikromobilität §46 Sondernutzung bezieht sich auf Sharing, nicht Mietrad
14	Quelle RP	-		alle		x	x	x	keine relevanten Inhalte, Infos zu Fördermöglichkeiten LGVFG s. Aufgabe 2.2.
15	Quelle NVBW	-		alle		x	x	x	keine eigenen Inhalte
16	Quelle VM BW	-	Leitfäden?	alle		x	x	x	Keine Details, Anforderungen oder Vorgaben: lediglich Kapitel in ÖPNV-Strategie 2030 sowie Hinweis auf https://www.mobilitaetssaeulen-bw.de/
17	Quelle FGSV	-		alle		Mobi-hubs	Objective	21	"4 Intermodale Verknüpfungspunkte Intermodale Verknüpfungspunkte bilden die physische Schnittstelle zwischen den Verkehrsmitteln unterschiedlicher Modi, so dass ein Wechsel des Nutzenden ermöglicht wird."
18	NVBW	###	Leitfaden Bike + Ride	alle	52	Bike & ride	Concept	7	Die Sicht der Akteure
18	NVBW	###	Leitfaden Bike + Ride	alle	53	Bike & ride	Concept	10	Qualitätsstandards B+R Anlagen
18	NVBW	###	Leitfaden Bike + Ride	alle	54	Bike & ride	Concept	22	Richtwerte und Bedarfsabschätzung
18	NVBW	###	Leitfaden Bike + Ride	alle	55	Bike & ride	Concept	27	Betrieb und rechtlicher Rahmen
18	NVBW	###	Leitfaden Bike + Ride	alle	56	Bike & ride	Concept	31	marketing
18	NVBW	###	Leitfaden Bike + Ride	alle	57	Bike & ride	Concept	33	Finanzierung und Fördermöglichkeiten
18	NVBW	###	Leitfaden Bike + Ride	alle	58	Bike & ride	Concept	36	Good-Practice Beispiele