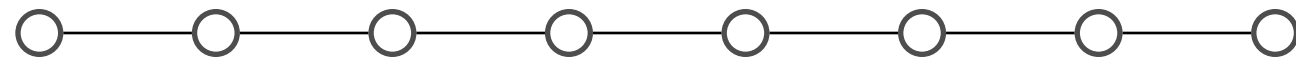


Department for Transport

KHARKIV RECONSTRUCTION TRANSPORT STRATEGY

Reference: 305238-00

April 2026



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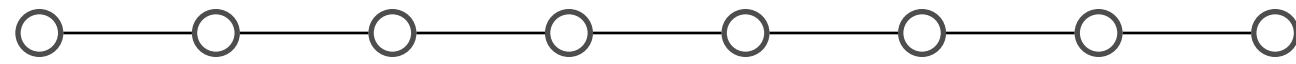
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FOREWORD

UK Secretary of State for Transport



It is with complete commitment to the Ukrainian people that I have the honour of presenting this Reconstruction Transport Strategy for the city of Kharkiv, developed as part of the enduring partnership between the United Kingdom and Ukraine.

The beginning of 2025 marked a historic alliance between the UK and Ukraine, with the Prime Minister and President Zelenskyy signing the 100 Year Partnership. This will deepen relationships across a range of sectors, including transport cooperation, for mutual benefit.

Since the start of Russia’s illegal invasion of Ukraine, Kharkiv’s transport network – like much of Ukraine’s critical infrastructure – has endured widespread devastation. Yet even in the face of destruction, the people of Kharkiv have demonstrated extraordinary resilience. Their courage and determination to rebuild serve as a powerful reminder that cities are defined not just by their infrastructure, but by the strength and spirit of their communities. Reliable, efficient and safe

transport is not a luxury; it is a lifeline. It enables the delivery of humanitarian assistance, supports the mobility of communities most affected by the war, and facilitates trade.

The UK is committed to supporting the strategic planning and preparatory work required to aid Kharkiv’s transport recovery. A Memorandum of Understanding with Igor Terekhov, the Mayor of Kharkiv and my Department, reflects this - committing the UK to deliver a multimodal Reconstruction Transport Strategy to support the city’s reconstruction master-planning.

This Reconstruction Transport Strategy is designed to support Kharkiv’s long-term social and economic recovery, and to underpin the city’s ambitious vision for reconstruction. It will lay the foundations for a renewed, thriving city through transport projects that honour its heritage, embrace its rivers and industry, and unlock its potential in housing, science and innovation. It will also support Kharkiv to “build back better” after the war, while reconnecting citizens with one another, with Europe, and with the rest of the world.

I recognise that the task ahead is substantial, and the private sector has a critical role to play in it. I would like to acknowledge the vital role of Arup International Projects Ltd – a UK design

and engineering company and member of the UK–Ukraine Transport Partnership – who were commissioned by my Department to support the development of this Strategy.

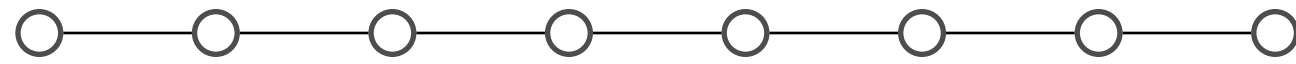
Arup’s expertise and close collaboration with my Department, Kharkiv City Council and others exemplifies **the powerful role that the UK’s public and private sector can play in working together towards Ukraine’s reconstruction and recovery.**

Despite the challenges, this is a moment of opportunity. By investing in transport reconstruction, we invest in the future of Kharkiv, and of Ukraine. **I hope this strategy shows that there are many meaningful opportunities to support reconstruction** – opportunities that will support the people of Kharkiv and Ukraine in the present, and lay the foundations for a stronger, more connected future.

My officials will continue to work with our Ukrainian and industry partners to support the implementation of this Reconstruction Transport Strategy. At the same time, I urge the international donor community to explore the projects set out within this Strategy, ensuring it is not just a plan for infrastructure, but a practical framework for recovery, partnership and long-term growth.

Heidi Alexander MP UK Secretary of State for Transport





FOREWORD

Arup



Kharkiv stands at a turning point. Russia's invasion of Ukraine has severely damaged the city's transport infrastructure, with more than 70 per cent of the network destroyed.

Rebuilding its transport system is not only a response to wartime damage; it is a chance to create one of Europe's most resilient, low-carbon and people-centred mobility networks.

Arup is honoured to have led the development of this city-wide Kharkiv Reconstruction Transport Strategy, working with the City of Kharkiv and the UK's Department for Transport.

This strategy reflects our long-term commitment to Ukraine's reconstruction, and builds upon our previous work on the Kharkiv Reconstruction Masterplan, developed since 2022 in partnership with the City, the Norman Foster Foundation, and United Nations Economic Commission for Europe (UNECE).

At Arup we approach every commission through the principle of Total Design, adding value by taking the most comprehensive view of what's possible, desirable and commercial. By encouraging curiosity, understanding the broadest context, maintaining rigorous technical excellence and creating meaningful connections across disciplines, we deliver the best outcomes for our clients, society and the environment.

For this strategy, our transport planning and wider team of experts have worked closely with the Department for Transport and Kharkiv's mayoral team to craft a comprehensive roadmap for the city's recovery. Our masterplanning and development specialists have set out a clear process for identifying, assessing and prioritising transport initiatives. And our strategy team has considered the different ways to fund new infrastructure to ensure it gets delivered.

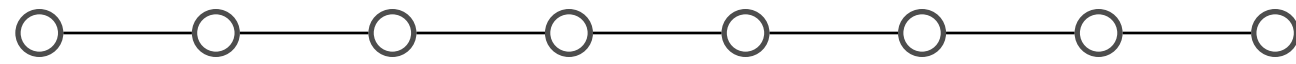
The result is a framework that the City of Kharkiv can use to accelerate progress, establish lasting foundations for the five pilot projects under the Kharkiv Reconstruction Masterplan, take forward our long-listed projects, and review other future initiatives to support sustainable development across the city.

Collaboration has been central to developing this strategy. We have worked with Pinsent Masons and Transport Economics Ltd alongside the DfT and mayoral team to integrate recent, region-specific expertise and ensure the strategy is practical and forward-thinking.

Local engagement has also been key. Through surveys and direct consultation, we have ensured that proposed solutions align with the needs and aspirations of residents and city officials alike.

That joined-up approach must continue if we are going to deliver on this strategy. We are proud to have had the opportunity to lead this work, and we invite government partners, investors, civil society and industry to join the journey and help turn this vision into a transport network that serves every resident, today and for generations to come.

Paula Walsh Arup UKIMEA Managing Director



FOREWORD

Mayor of Kharkiv



I am sincerely grateful to the UK Department for Transport and the people of the UK for their continued support of Ukraine – political, financial and military. In these difficult times, your assistance is invaluable for our country and the city of Kharkiv.

Our transportation system has suffered significant destruction: over 65% of the surface and underground infrastructure has been damaged. The enemy has destroyed a lot of public transport units, depots, roads, and utility networks. The current situation requires new solutions and brave approaches to recovery.

Therefore, we are currently working on a new concept of a Kharkiv Reconstruction Masterplan together with the Norman Foster Foundation and the United Nations Economic Commission for Europe. The Reconstruction Transport Strategy is an integral part of this document.

A modern city cannot exist without a sophisticated transportation system. This strategy encompasses pilot projects aligned with the new Masterplan Concept and emphasizes the implementation of innovative solutions to ensure comfort and ease of mobility throughout the city.

The Reconstruction Transport Strategy, created with the support of the UK Department for Transport, will serve as a main document for the restoration and development of Kharkiv’s transport infrastructure. We will be implementing it step by step to achieve high standards of quality, safety and sustainable development.

In the face of significant challenges, we must also recognize a moment of opportunity. Rebuilding Kharkiv’s transport infrastructure is more than a necessity—it is a strategic investment in the city’s future and in the broader recovery of Ukraine.

I believe this approach will strengthen the confidence of our international partners and donors by highlighting numerous meaningful and practical opportunities for collaboration. The initiatives outlined in the document are designed to deliver short - term benefits to the residents of Kharkiv whilst fostering lasting improvements in the city’s resilience and social cohesion.

I sincerely hope that Kharkiv will continue its close and productive partnership with the United Kingdom to ensure the successful implementation of the Reconstruction Transport Strategy.

At the same time, I call on the international donor community to view the projects outlined in this Strategy as a foundation for sustainable recovery, strategic partnership and long-term development.

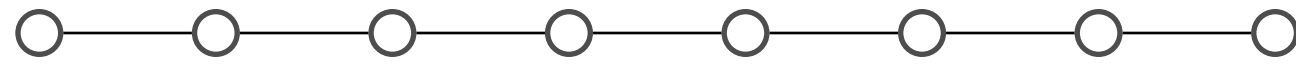
Igor Terekhov
Mayor Of Kharkiv





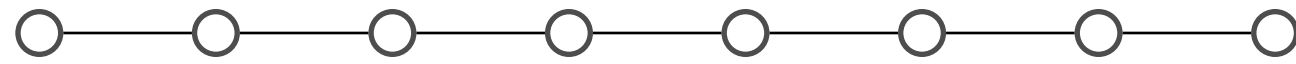
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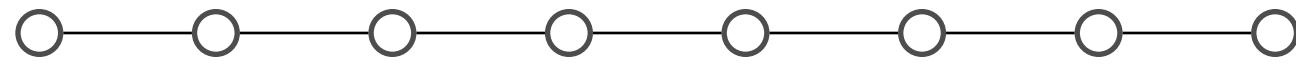
ABBREVIATIONS

BRT	Bus Rapid Transit
CCTV	Closed-Circuit Television, video surveillance cameras
DBOM	Design, Build, Operate, and Maintain
DfT	Department for Transport, UK
EIB	European Investment Bank
EBRD	European Bank of Reconstruction and Development
IFI	International Financial Institution
KCC	Kharkiv City Council
KRTS	Kharkiv Reconstruction Transport Strategy
MCA	Multi - Criteria Assessment
NFF	Norman Foster Foundation
PT	Public transport
PTAL	Public Transport Accessibility Level
RTPI	Real-Time Passenger Information
SUMP	Sustainable Urban Mobility Plan
TDM	Travel Demand Management
TEN-T	Trans-European Transport Network
UNECE	United Nations Economic Commission for Europe
WB	World Bank



GLOSSARY

Accessibility	In this context is specifically refers to removing barriers to allow individuals to participate fully in society, through physical design changes such as addressing barriers to those who are mobility impaired or other visible and non-visible disabilities.	Bus Rapid Transit (BRT)	A segregated bus service system designed to have higher capacity, reliability, and other quality features.	Dropped kerbs	Lowered sections of pavement that create a smooth step-free transition between a footway and a road, making it easier for wheelchairs, prams, and vehicles to cross safely and accessibly.	TEN-T	Trans-European Transport Network.
Active travel	Journeys made by modes of transportation that are fully or partially powered by a person, regardless of the purpose of the journey, including walking, wheeling (wheelchair users, scooting) and cycling.	Chicane	A sharp double bend created to form an obstacle on a road to slow drivers down.	Feeder connections	Local walking, cycling, or public transport routes that link neighbourhoods/residential area to main public transport corridors or hubs, enabling seamless access to wider transport networks.	UNECE	United Nations Economic Commission for Europe.
Audio and visual support	Audio and visual enhancements to support passengers with visual or hearing impairments, e.g. audio signals at junctions, digital displays on buses etc.	Connectivity	Ease and ability to move between places using various transport modes.	Fleet	A group of vehicles (such as buses, trains, or service vans) owned or managed by an organisation for operational use, typically coordinated under a single system to deliver transport services, logistics, or maintenance functions.	WB	World Bank.
Bike-sharing, e-scooter sharing scheme	A system that allows people to rent bikes or e-scooters for short trips, with flexible pick-up and drop-off at designated locations.	Delineation	Marking or defining boundaries between different types of road users, for example between people walking and cycling and drivers.	RTPI	Real-Time Passenger Information.	Green corridor	A landscaped, car-free route prioritising people walking and cycling, designed to connect key urban spaces such as central squares and riverside parks, while supporting biodiversity, microclimates, and active travel across a neighbourhood.
		Distributor road	A road that connects local streets to main roads or highways, helping traffic move between neighbourhoods and larger routes.	SUMP	Sustainable Urban Mobility Plan.	Green and park zones	Areas set aside in cities for nature, recreation, and public wellbeing, often featuring trees, grass, and walking paths.
		Docking station	A designated location where shared bikes are securely parked, picked up, or returned, often equipped with locking infrastructure and sometimes integrated with payment or tracking systems.	TDM	Travel Demand Management.	Ground floor speed	Speed at which a vehicle moves along the ground.



GLOSSARY

Invasion	Russia's full-scale invasion that started in February 2022.	Military protection	Shelter areas designed and constructed in public spaces to provide protection during military attacks.	Pilot Projects	Strategic project sites as defined by the Kharkiv Reconstruction Masterplan.	Traffic calming	Measures such as speed bumps, narrowed roads, or chicanes used to reduce vehicle speeds and enhance safety for all road users.
Local mobility	Movement of people within neighbourhoods or small urban areas using accessible, low-impact modes such as walking, cycling, shared micromobility, and local public transport.	Mixed-use development	A type of urban development that combines residential, commercial, cultural, educational and other uses within a single area or building.	Road users	Anyone who uses a road, such as someone walking, cycling or someone driving a motorised vehicle.	Traffic management	Planning and control of traffic flows to reduce congestion, improve safety, and ensure efficient use of road space.
Masterplan	A long-term strategic document that outlines a comprehensive vision for a development and use of land within a defined area, integrating land use, transport, infrastructure, environment, and community needs to guide future growth and investment.	Multi-modal station	A transport hub that enables seamless transfers between different modes of transport—such as rail, bus, cycling, and walking—through integrated design, signage, and services.	Segregated cycle lanes	Dedicated cycle lanes that are physically separated from motor traffic and people walking to improve safety and comfort.	Travel Demand Management (TDM)	Application of strategies and policies to increase efficiency of transportation systems, that reduce travel demand, or to redistribute this demand in space or in time.
Micromobility	Small, lightweight vehicles such as bicycles, e-bikes, and e-scooters used for short trips, supporting low-carbon, flexible urban travel.	Navigation maps	Printed or digital maps designed to help users plan and follow routes across transport networks, often incorporating real-time data and accessibility features.	Severance	The negative impact of transport infrastructure or traffic on the ability of people, especially people walking and cycling, to access and use public spaces.	War	Russia's full-scale invasion that started in February 2022.
		Permeability	An extent to which urban forms permit easy and direct movement of people through developments and across transport infrastructure.	Speed bump	A raised section of road designed to slow down vehicles and improve safety, especially in residential or pedestrian-priority areas.	Wheeling	The act of using a wheelchair to move from one place to another, encompassing the full range of self-propelled or assisted mobility for wheelchair users and also those using other forms of movement (such as children using scooters).
				Tactile pavement	Textured ground surface indicators that help visually impaired people navigate public spaces safely, often found at crossings and transit stops.		

1 INTRODUCTION

This Kharkiv Reconstruction Transport Strategy (KRTS) outlines key opportunities for the planning, management and development of the transport network in Kharkiv. The strategy has been designed and developed to support Kharkiv City Council’s Reconstruction Masterplan and presents a vision-led transport approach, or a long-term strategic method to transport planning. It centres the role of sustainable transport in the reconstruction and recovery of the city post-war.

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1.1 The need for a reconstruction transport strategy

Kharkiv is the second-largest city in Ukraine and serves as a strategic and economic hub at the centre of the Kharkiv Oblast, a metropolitan area in the northeast of Ukraine comprising of many satellite towns.

The population of the City of Kharkiv at the beginning of 2022 was approximately 1.4 million people, increasing to approximately 1.7 million people when the satellite towns are included. Figure 1 illustrates Kharkiv’s strategic location, the population of key cities, and relevant Trans-European Transport Network (TEN-T) priority projects.

Kharkiv’s location close to the border with Russia has meant that the city has been on the receiving end of attacks for more than three years following the February 2022 Russian invasion. This has resulted in major impacts on human life and infrastructure, with approximately one million people displaced from Kharkiv in the immediate aftermath of the invasion (many of which have since returned)¹ and Ukrainian officials reporting that up to a quarter of Kharkiv has been destroyed².

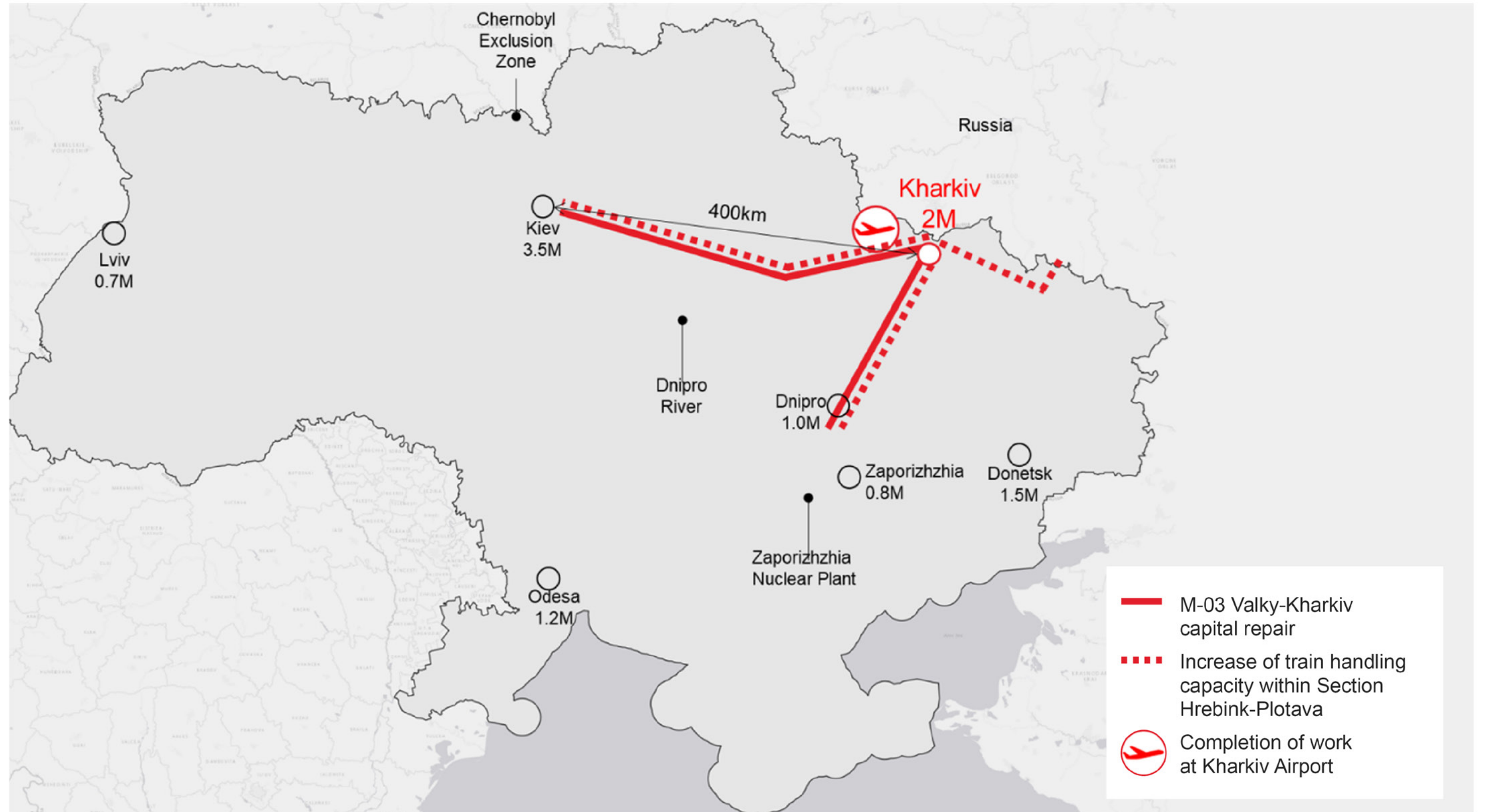
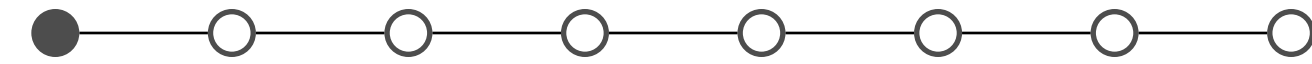


Figure 1 Kharkiv location and relevant strategic TEN-T projects

Source: Arup based on Kharkiv Reconstruction Masterplan and Centre for Transport Strategies

¹ Ukraine Returns Report, UN International Organisation of Migration (April 2024)

² Ukraine’s air defence shortages leave Kharkiv more exposed to Russian bombs | Reuters (April 2024)



Damage spans various modes of transport, including roads, railways, bridges and public transport, which has impacted rolling stock, public transport systems, and essential facilities like tram tracks and traction substations.

In particular, 80% of the train rolling stock, 60% trolleybus rolling stock and 70% of city bus rolling stock need to be renewed. Also, 35km of contact network and almost half of the city roads require repairs. The operational capacity of the metro has been affected by the damage to infrastructure and metro stations – 30 of which also serve as shelter during hostilities. Figure 2 below summarises Kharkiv recovery needs in transport infrastructure.

This situation presents a clear need for wide-ranging reconstruction programme for the city, including significant rehabilitation of Kharkiv’s transport networks and reconstruction of transport infrastructure, which has been extensively damaged. This is essential because Kharkiv is of great national significance in terms of culture, education, science, industry, and more. As a key hub in the region for both road and rail connectivity, Kharkiv plays a vital role in facilitating the movement of people and goods and supporting growth.

Beyond the need for reconstruction, there is also a recognised need for a more strategic and integrated approach to Kharkiv’s transport and urban planning. There is therefore an opportunity to build back better and deliver an improved transport network through reconstruction by leveraging the international expertise of Ukraine’s partners and combining that with the close contextual understanding of local stakeholders.

Recovery needs in transport infrastructure:

Renewal of train rolling stock



Renewal of bus rolling stock



Repair of contact network



Traction substations



Road surface

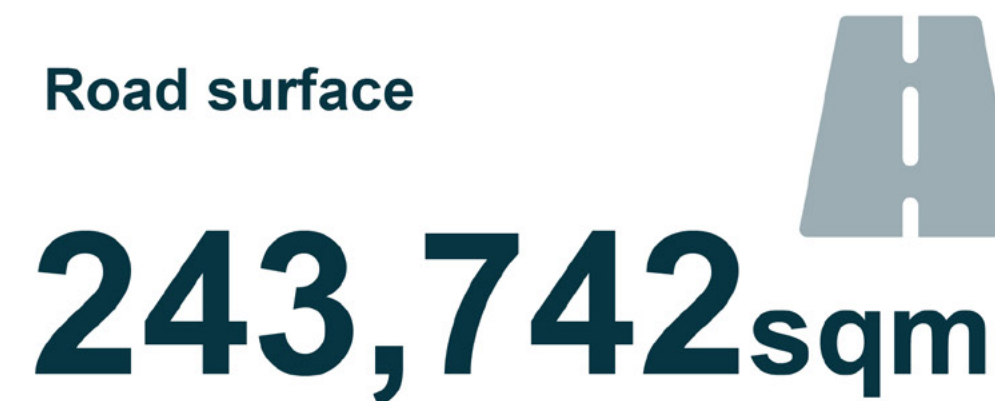


Figure 2 Recovery needs in transport infrastructure in Kharkiv

Source: Arup based on Kharkiv Reconstruction Masterplan, photo from open sources

1.2 Current situation

The current transport situation in Kharkiv presents a number of challenges and opportunities as described in this Chapter.

Modal split

Pre-war, the modal split (as in the share of people travelling by different modes of travel) in Kharkiv was already showing a high uptake of sustainable transport modes, with private cars only being used for 21% of total trips, and a further 39% of trips being made using electrified public transport collectively (metro at 23%, trolleybus at 9% and tram at 7%). Walking mode share was at 27%, while people cycling had the smallest percentage of mode share (around 1%). Trolleybuses had a higher mode share than the trams, while marshrutkas (informal minibuses) had the smallest mode share of public transport. Detailed pre-war modal split diagram can be seen below in Figure 3.

The impact of the 2022 invasion on daily life in Kharkiv has been immense and has caused significant disruption to transport. Whilst there was a dramatic drop in the resident population in the immediate aftermath of the invasion, this has largely recovered to what it was in early 2022.

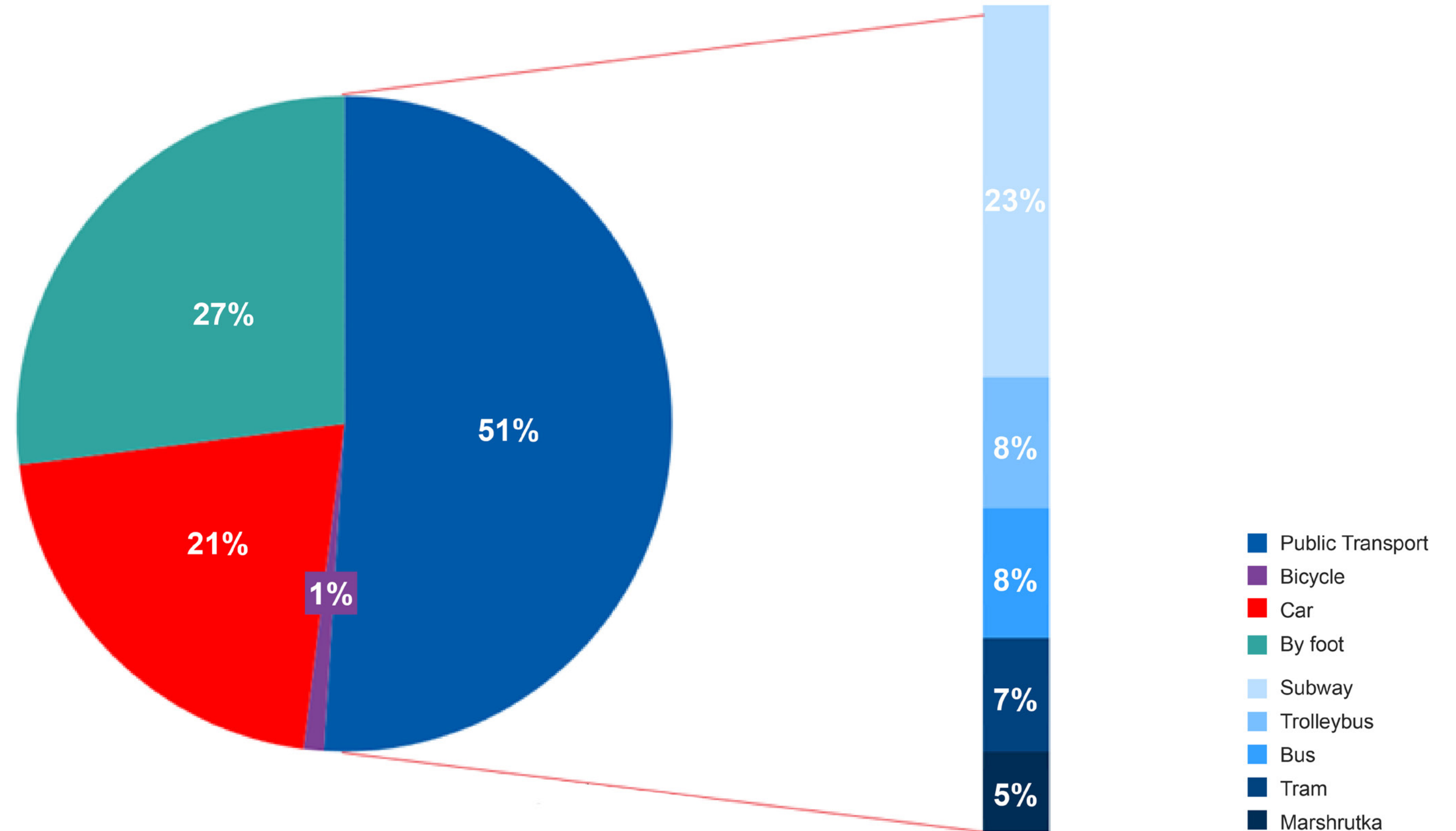


Figure 3 Modal split of all trips in Kharkiv
 Source: Arup based on Dornier data (pre-war)

Passenger demand, particularly for the metro, has at points risen since the invasion due to the return of evacuees to Kharkiv and due to the settling of internally displaced persons to Kharkiv from other parts of Ukraine. There has been a notable shift towards buses since the invasion, partly because of their relative resilience and fewer infrastructure requirements (with the exception of electric buses) compared to other public transport modes.

To put this modal split into context, it was compared against modal splits of other European cities, that are comparable to Kharkiv in terms of population. Modal splits for Munich, Barcelona, Cologne and Warsaw are illustrated in Figure 4 opposite.

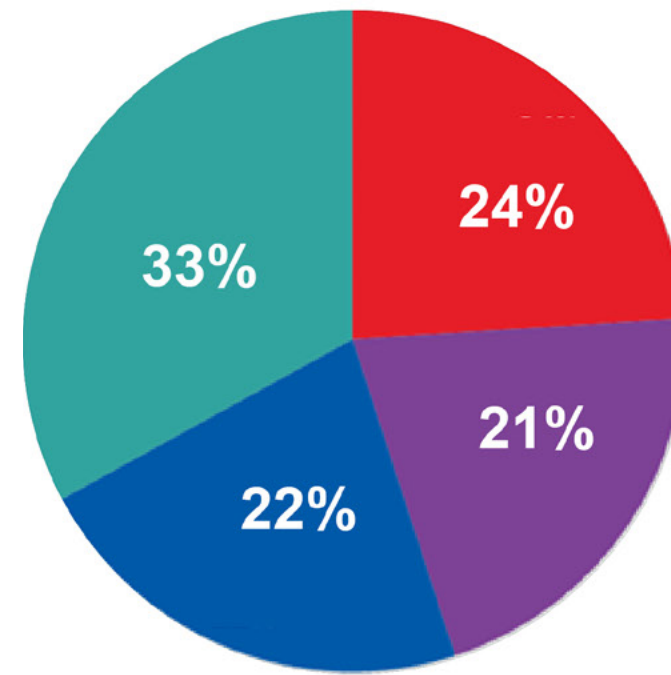
The walking mode share in Kharkiv (27%) is similar to that in Munich (33%) and Cologne (33%). The total public transport share in Kharkiv (52%) is higher than in any of the cities presented, Warsaw being the closest with 47%. The car mode share in Kharkiv (21%) is very similar to the car use in all four cities, where it ranges between 24% and 32%. Finally, Kharkiv's cycle share of 1% is the lowest when compared to these other benchmark cities.

To understand what makes Kharkiv's modal split already so sustainable and unique, it is important to review where its transport networks are in terms of their development. A detailed description of all travel modes, respective transport networks and their user feedback follows later in this chapter.

Mode Share City Centre

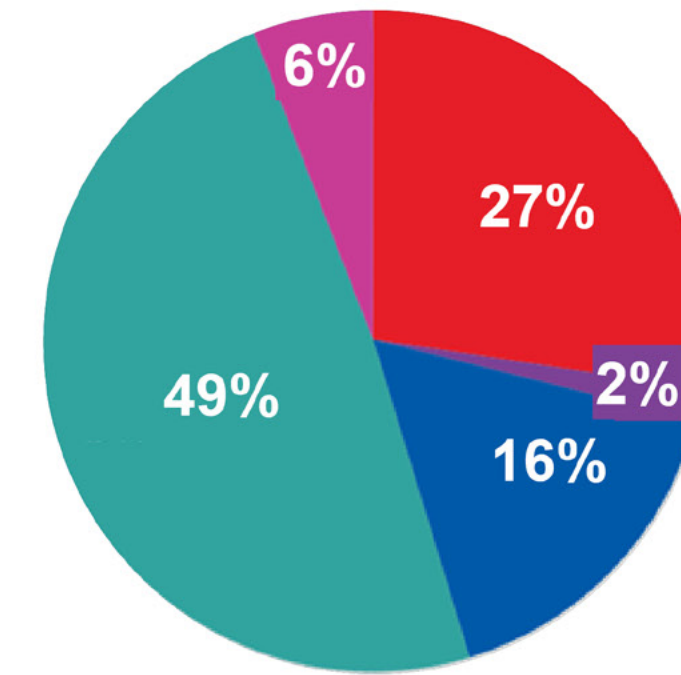
Munich

2023 Data, population ~ 1.5 million



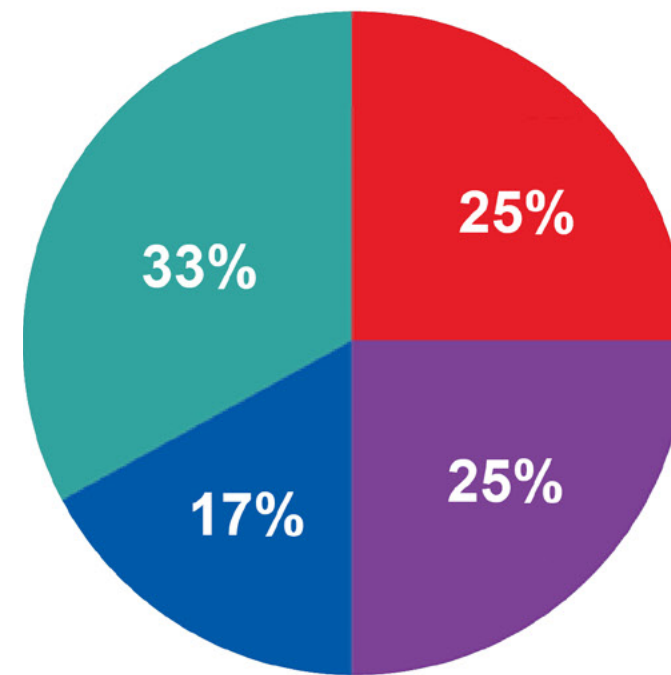
Barcelona

2023 Data, population ~ 1.6 million



Cologne

2022 Data, population ~ 1.1 million



Warsaw

2018 Data, population ~ 1.9 million

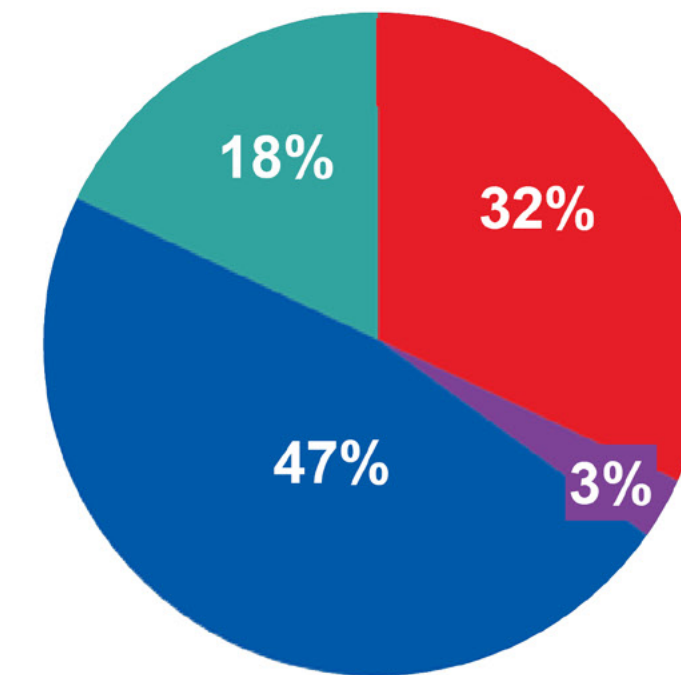
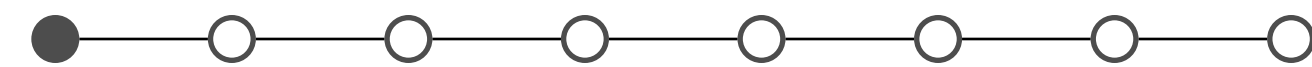


Figure 4 Modal split in other European cities
Source: Arup



Active travel

As a major industrial, scientific, and cultural centre with numerous attractions and some high-density residential neighbourhoods, Kharkiv has a high demand for transport connectivity and active travel infrastructure. Walking, in particular, is a popular choice of travel as discussed previously, whilst cycling does not currently attract the same number of users.

There is generally a basic level of provision in Kharkiv for people walking, but less so for people cycling (only 30km of cycle paths as of 2024); however overall, pedestrian and cycling infrastructure is inadequate in many parts of Kharkiv, particularly outside the city centre. Whilst main streets in the city have basic provision including footways and zebra crossings at major junctions, many secondary and residential streets in the city are unpaved and without footways, despite often having the space to accommodate these. Pedestrian crossings often lack essential safety features, such as road markings, signs, and dropped kerbs for people with reduced mobility.

While new traffic lights have recently been installed to improve safety, a more comprehensive walking network, including both crossings and associated infrastructure along streets, is needed. As for cycling, dedicated infrastructure is very limited, therefore people cycling generally travel on the carriageway, shared with vehicles, or on footpaths with people walking. This is generally considered not best practice and can result in unsafe conditions for both people cycling and walking.

In some areas, lack of walking and cycling infrastructure provision is a result of cars dominating the space, with Freedom Square being a good example of where a large central part of the square is used for car parking.

In some areas, lack of walking and cycling infrastructure provision is a result of cars dominating the space, with Freedom Square being a good example of where a large central part of the square is used for car parking.

Overall, significant improvements could be made to make active travel more desirable and attractive. Any programme of active travel improvements should start with ensuring a consistent and comprehensive coverage of the 'basic' infrastructure such as accessible footways and safe carriageway crossings for people walking and cycling in areas of high footfall and elevated safety need. It could include improvements to integrate walking and cycling with other transport modes, responding the surround land use through the introduction of safe, consistent, and segregated infrastructure, as well as designing-in accessibility and inclusivity considerations.

To start addressing some of the above problems, the Department of Construction and Road Management administered and commissioned the development of a Concept for the Development of Cycling Infrastructure in 2024. The Concept promotes the creation of a safe and barrier-free cycle network for Kharkiv, identifying a hierarchy

of cycle routes and, proposing the introduction of 757 km of cycling infrastructure, including 349 km of arterial routes, 272 km of peripheral routes and 127.3 km of recreational routes.



Damaged buildings in Kharkiv © Norman Foster Foundation



Damaged residential buildings in Kharkiv © Norman Foster Foundation

Public transport

The public transport provides a significant level of connectivity across Kharkiv and is a crucial component of the overall transport and movement networks, comprising primarily of a metro network of three lines, a network of trams, trolleybus services, bus services, and marshrutkas (routed taxis / minibuses). The Kharkiv public transport network is shown in Figure 5, which illustrates the wide coverage of public transport services in the City, as well as their variety.

High public transport ridership levels also present challenges around capacity of the networks. Analysis undertaken by Dornier as part of the SUMP found that the metro is well-used and sees high ridership on most sections, but other public transport networks have often imbalanced distribution of demand with short high-use sections and longer low-use sections.

There is a significant lack of integration between transport and land use planning. One example of this problem is the residential district of Saltivka which lacks mass-transit connections to the city centre and beyond, despite the fact that it is one of the densest city districts and only has a single dedicated metro station serving it. During the initial concept for the design of the Saltivska metro line (1960–1970), it was planned that the line would pass through the central part of the Saltivka residential area, providing equitable access to the metro from all neighbourhoods. However, financial constraints on construction

forced a rerouting of the line to the southwest, placing it along the Kharkiv River at the periphery of the residential district rather than its core. Although there were plans to extend the metro line in the direction of Eastern Saltivka, these proposals were never implemented. As a result, the current metro line alignment in Saltivka has created significant connectivity gaps at several stations:

- Kyivska metro station was constructed within an area of dense low-rise private housing, which lacked major activity centres and therefore generated minimal passenger demand when it opened in 1984).
- Akademika Barabashova metro station is at a considerable distance from the surrounding high-rise residential housing areas. Although originally bordered only by private houses, it later became the site of a large commercial hub, which led to excessive station congestion.
- Akademika Pavlova metro station, located near a former brick factory and within a private housing sector, remains distant from the main residential areas.
- Studentska metro station is located at the edge of the Saltivka residential area and experiences high demand during peak hours.
- Saltivska station is located at the edge of the district, adjacent to areas that were still undeveloped at the time of construction.

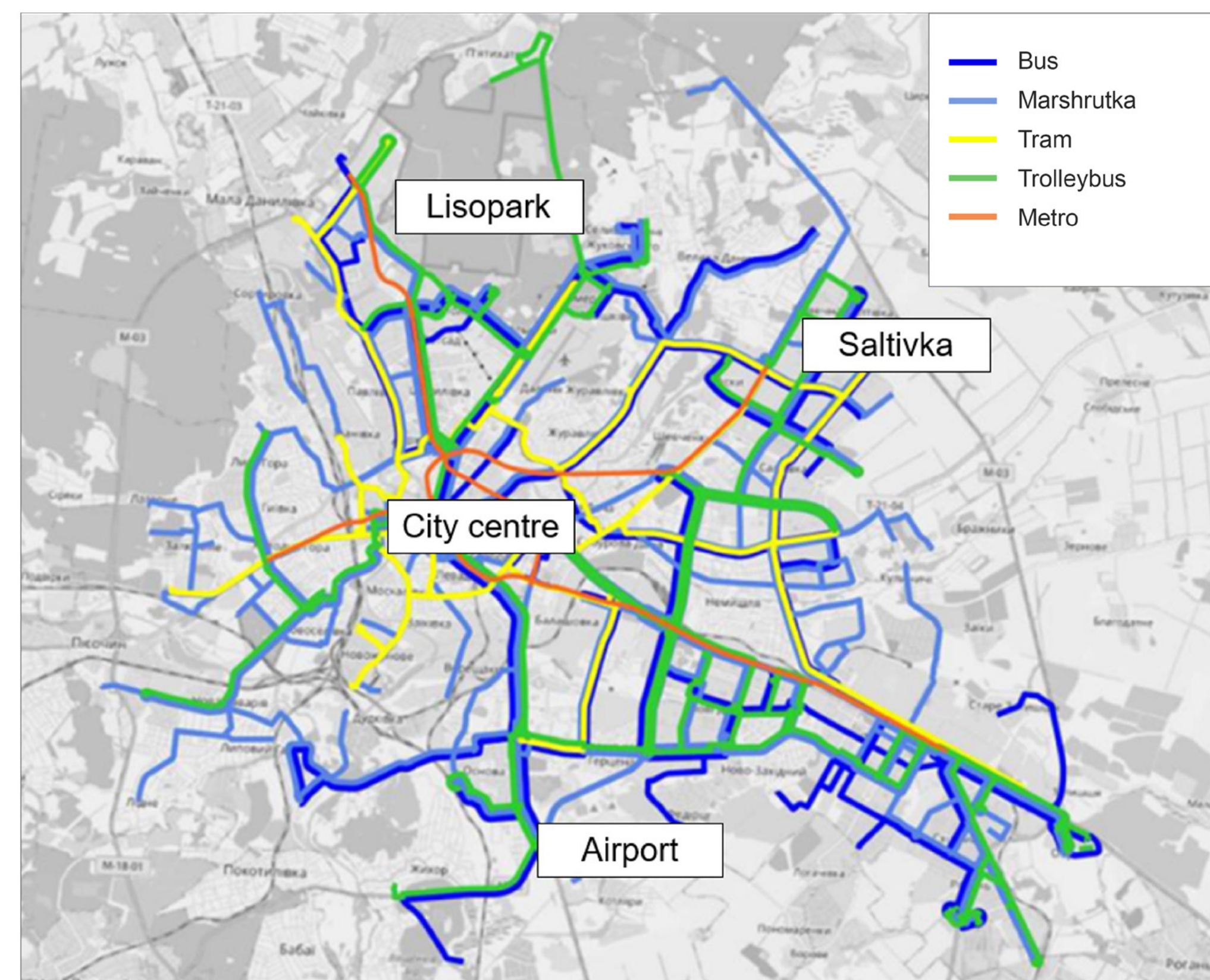
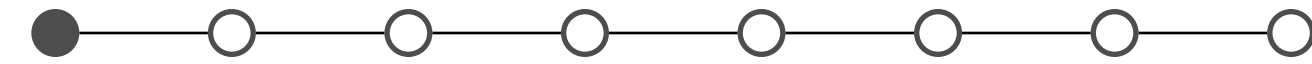


Figure 5 Public transport networks in Kharkiv
 Source: Kharkiv SUMP (produced by Dornier)



Due to the historical shift of the metro line to the edge of the residential area, the major activity centres of Saltivka remain poorly connected to the network. Most residents must walk long distances to reach the nearest metro station and rely on multiple transport modes to travel to the city centre or other districts. This has contributed to significant congestion at intermediate transport nodes, particularly at Akademika Barabashova station, which handles the majority of passenger flows from Eastern Saltivka. The resulting overcrowding during peak hours also strains ground transport services, such as buses, trolleybuses and trams, which act as feeder routes to the metro. This situation illustrates a broader systematic weakness within the city's transport network, in particular the poor integration between land-use planning and mass transit, which leads to excessive congestion on certain metro stations, inefficient passenger distribution, longer travel times, increased congestion of surface transport routes.

Another challenge is the lack of direct and efficient connections to strategic destinations to the south of the city, such as the Kharkiv International Airport, as well as potential future development sites in post-industrial areas.

Key attractors and high-density residential areas should be strategically planned around public transport hubs and high-capacity transport corridors, but this is not always the case at present.

Figure 5 also shows that all transport networks are predominantly comprised of radial transport corridors, and there are not many orbital connections that can be useful for suburban connectivity. For example there is a lack of direct links between residential districts and the Lisopark area to the north of the city.

Other challenges related to public transport include severe damage to rolling stock and other infrastructure as a result of the invasion, despite efforts to restore services, as well as a need for modernisation and upgrades to make public transport more attractive and accessible for all users.

Car ownership, traffic levels, and car parking

Car ownership and traffic levels in Kharkiv have historically been low relative to similar-sized cities elsewhere in Europe. However, between 2017 and 2021 the number of passenger vehicle registered in Kharkiv increased, reflecting an improving economic performance and rising levels of disposable income among residents during this period. The road network of Kharkiv is illustrated in Figure 7.

As it can be seen in Figure 6, the road network consists of a typical mix of strategic and high-capacity highways, primary roads, secondary roads, and residential / tertiary roads. Overall, the road network operates under capacity, with SUMP analysis indicating that traffic levels peak at around 60% of capacity in the early morning peak hour and operate at approximately 50% for most of the day – the full traffic profile is shown in Figure 6.

These numbers represent an average for the overall network, and specific locations are likely to experience localised congestion during peak times, especially where traffic regulations are not observed, and traffic incidents occur. The network-wide utilisation suggests that, according to pre-invasion congestion data, there is potential to reallocate significant levels of road space to alternative, sustainable modes using existing road capacity. It also suggests that the existing road network is sufficient to meet overall demand with some targeted interventions and management to address traffic hotspots. Car parking in Kharkiv is represented by several types of parking: on-street

parking, particularly in residential areas; private parking associated with businesses (enclosed yards or gated parking); off-street public parking serving shopping centres or other key attractors in the city centre. Informal and illegal parking is common throughout the city, particularly in residential areas where many vehicles park on the verge between a kerb and a footway. This leads to obstructed footways, which disrupts both the movement of vehicles and people walking and increases the risk of incidents occurring.

The existing road network in Kharkiv presents challenges such as increased risk of traffic incidents due to high traffic speeds and poor infrastructure for active travel users, significant car parking issues, particularly in the central business district where demand far exceeds capacity. There is also a lack of strategic thinking around allocation of road space. Efforts have been made to improve the road network including modernisation and formalisation of car parking provision, and the expansion of existing road capacity, but with varying degrees of success.

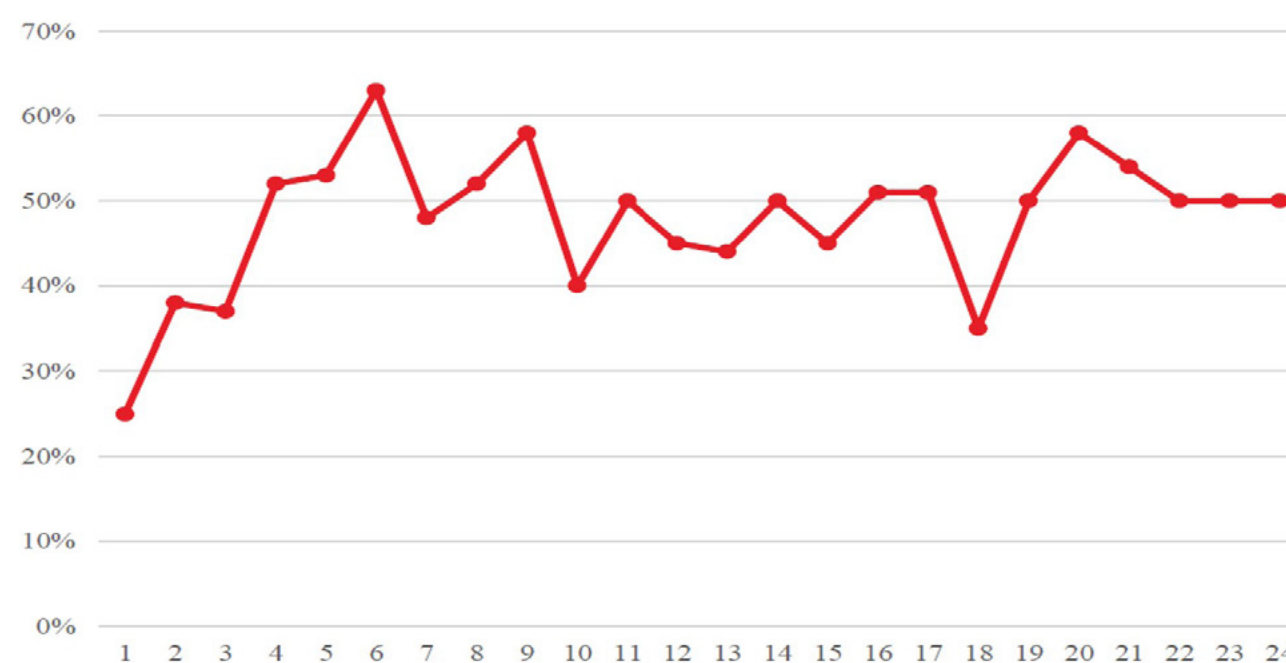


Figure 6 Hourly profile of traffic congestion levels on the road network
Source: SUMP, Dornier

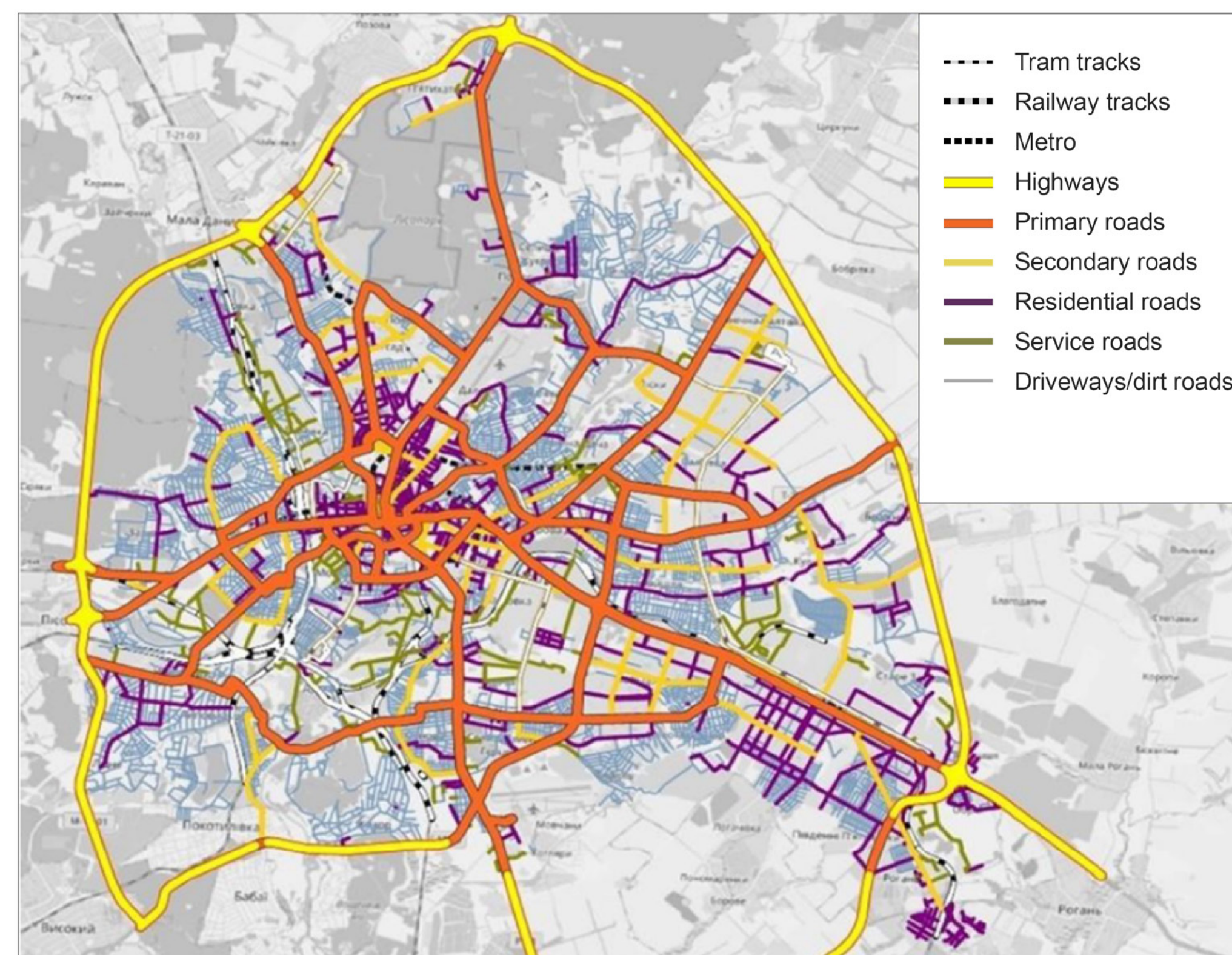


Figure 7 Kharkiv tiered road network
Source: SUMP, Dornier

1.3 What people have told us

Stakeholder Engagement has been an essential component of the KRTS development and included two consultations, one with the Kharkiv City officials (Kharkiv Department Consultation) and another one with the residents (Public Consultation). Key findings of both are presented below.

Kharkiv Department consultation

The departmental questionnaire was circulated to the following Kharkiv City Council Departments with 11 responses received:

- Department of Construction and Road Management (formerly Department of Infrastructure)
- Department of Urban Planning and Architecture
- Department of Inclusion, Accessibility and Barrier-Free Movements

Overview of this consultation is presented below with more details provided in Appendix 3:

- The department survey results reveal that 27% of respondents agreed that viability and stability of transport operations are the main strength of the Kharkiv transport system. 18% of respondents also said that the current scale of the transport network and its service coverage represent another strength of the system.

- Accessibility was highlighted by 55% of respondents as an aspect of the transport network that should be improved. Only 9% of the officials described Kharkiv’s transport network as accessible, while 64% believed it to be only partially accessible. Accessibility was also identified as a transport-related challenge and opportunity for the delivery of four of the five pilot projects - Science Neighbourhood, Housing, Industry, and Heritage. 18% of respondents agreed that accessibility should be a priority of the KRTS.
- Additionally, 45% of the respondents felt that the Kharkiv transport network was only partially inclusive for different users, while 18% agreed that it was not inclusive at all.
- 73% of respondents agreed that the Kharkiv transport network is affordable which is already a good position, but that there is still room for improvement.
- Modernisation was another area of improvement identified, with 27% of respondents agreeing it should be a priority. This includes the restoration of damaged infrastructure and the introduction of innovative and greener transport options.
- Connectivity, including the expansion and introduction of public transport routes and street integration to enhance connections, was identified as an opportunity relevant to all pilot projects. This also encompasses better land use integration.
- Developing active travel infrastructure, place-making, parking management, and road safety were also mentioned as areas needing improvement.
- There was a unanimous agreement that the hierarchy of transport users should prioritise people walking and wheeling, and place private vehicle at the bottom to improve sustainable transport networks in Kharkiv, as presented in Figure 8. However, 55% agreed that public perception is the main challenge to achieving this, noting that changes to parking provision and additional regulation could raise concerns.

The consultation with the Kharkiv officials identified the following overarching aspirations:

- Car parking management and regulation
- Promoting accessibility and inclusion
- Encouraging active travel
- Better place-making
- Promoting integrated planning

World-leading transport and land use policies rely on the transport user priority pyramid.

This foundational model is a blueprint for sustainable transport planning used to guide policies and investments.

The pyramid prioritises pedestrian users placing active travel modes at the top of the planning process and private cars at the bottom.

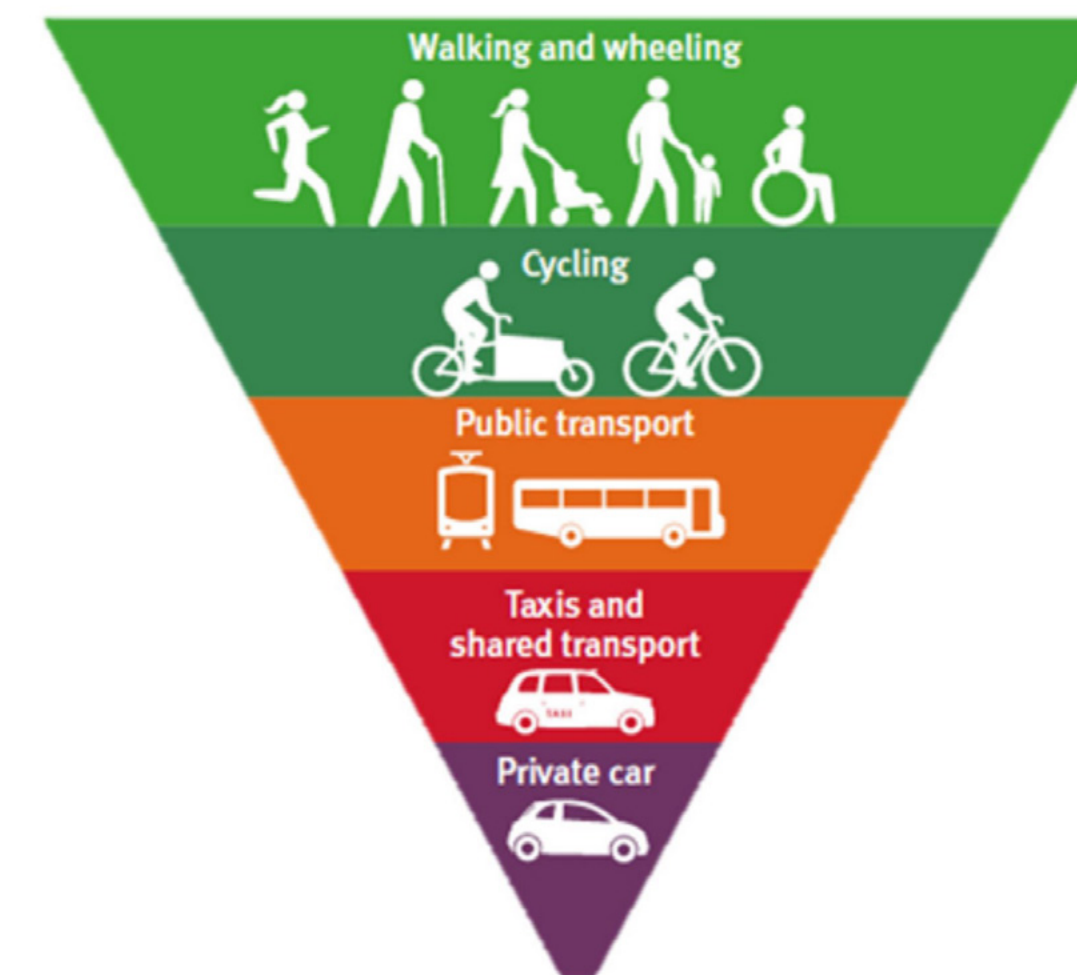


Figure 8 Transport User Hierarchy
Source: Arup

Public consultation

The public questionnaire was circulated to the city residents and more than 1,060 responses were received. An overview of the consultation is presented further in this section, with more detail provided in Appendix 3: Residents were asked what transport modes they use most often for their typical daily journeys. Figure 9 summarises their responses.

Public transport

The responses show that public transport is the most used travel option for commuting, with many residents using it every day or several times a week. The key outcomes from the survey are that:

- Metro is the most popular travel mode (21%) followed by trolleybus, bus and then tram. Women are more likely to use public transport compared to men.
- 60% of respondents said they are satisfied with the general quality of public transport.
- 82% of respondents indicated they find transport networks to be physically inaccessible for different users.
- When asked whether public transport is safe or not, the respondents were split 50/50, but more women answered “no” suggesting there is a higher need for improvement in personal safety for women and girls on public transport.

- A significant majority (90%) of respondents said that public transport is affordable, suggesting that there are no financial barriers to public transport for most citizens.
- When asked about attractiveness of public transport (good quality of vehicles, clear information, polite staff etc), respondents also split 50/50 with men appearing to be more dissatisfied than other groups.

Walking and wheeling

A substantial number of the respondents also walk or wheel every day, with walking being the second most common method of commuting. The key outcomes from the survey are that:

- 63% of respondents said they were not satisfied with the quality of pedestrian infrastructure and 59% said they do not find it safe and secure.
- Pedestrian infrastructure was also noted to be having significant issues regarding accessibility and not being satisfactory for users with limited mobility, 88% of all respondents find the current pedestrian infrastructure to be having poor accessibility features (footway widths, kerbs, tactile paving, etc).

Cycling

Cycling is not a very common mode of transport, although some find it attractive, and, overall, men are more likely to walk and cycle everyday than women. The key outcomes from the survey are that:

- 89% of respondents said they were not satisfied with the quality of cycling infrastructure and 79% of respondents said they do not find it safe and secure.
- Nevertheless, many respondents suggest that cycling is a potentially attractive and interesting way of travel for city residents.

Driving and parking

Driving is not the primary mode of commuting, but some people still rely on it and, notably, men are more likely to drive when compared to women. The key outcomes from the survey are that:

- There were mixed responses about the quality of the road network and traffic conditions with responses being split 50/50.

- There is significant dissatisfaction with the parking system in Kharkiv and there are concerns around availability of parking spaces, quality of parking and general ability to park easily (75% of respondents).

Public consultation summary

- Overall, the public consultation identified the following overarching concerns and aspirations:
- Improving accessibility and inclusion
- Introducing high-quality infrastructure and systems
- Improving personal safety
- Improving cycling and walking infrastructure
- Improving car parking and traffic management
- Expanding public transport networks

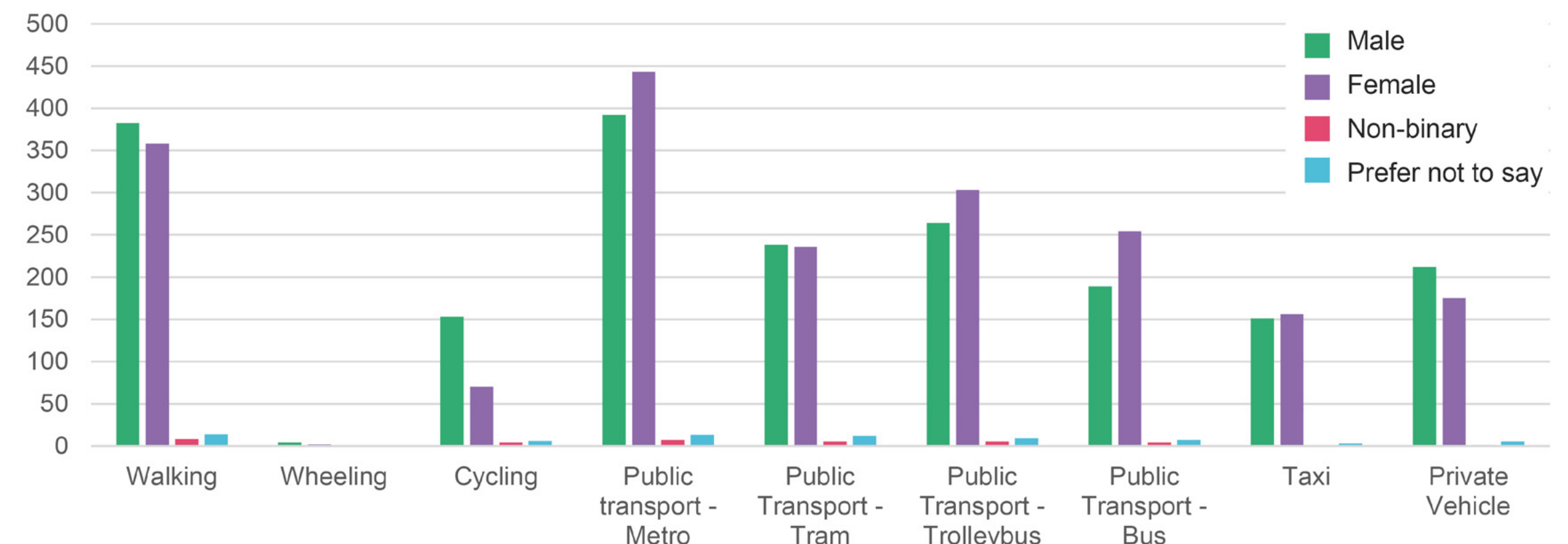


Figure 9 Transport User Hierarchy
Source: Arup

1.4 Strategy and policy framework

The KRTS is designed to inform and complement the Kharkiv Reconstruction Masterplan and the Kharkiv Sustainable Urban Mobility Plan (Kharkiv SUMP), which together form the local policy framework for transport planning and wider urban planning. A more detailed description of both is provided in this section.

Kharkiv Reconstruction Masterplan

A concept masterplan for the future of Kharkiv was developed by Norman Foster Foundation (NFF) together with local and international partners in 2022-2024. It is comprised of five city-wide strategies including Transport, Energy, Water, Nature and Economy and outlines the following key objectives:

- Re-build buildings, infrastructure, and assets;
- Retain Kharkiv’s identity and build on its heritage;
- Re-develop with sustainability, safety, and resilience at the core;
- Attract investment and talent to secure long-term economic prosperity; and

- Re-purpose and renew industry and other under-utilised city space for new use

As part of this masterplan work, NFF, Arup, Kharkiv City Council, UNECE, and local architects in Kharkiv, along with other stakeholders, conducted a community questionnaire that identified five key areas for development. These findings were the basis for the five pilot projects that were proposed, three of which focus on new urban developments that will serve as new attractions in the city.

An illustration of the five pilot projects overlaid on a map of the city is shown in Figure 10: (1) Heritage, (2) Rivers, (3) Industry, (4) Housing, (5) Science Neighbourhood. It should be noted that whilst some of these pilot projects are location specific, others have a wider geographic spread across the city.

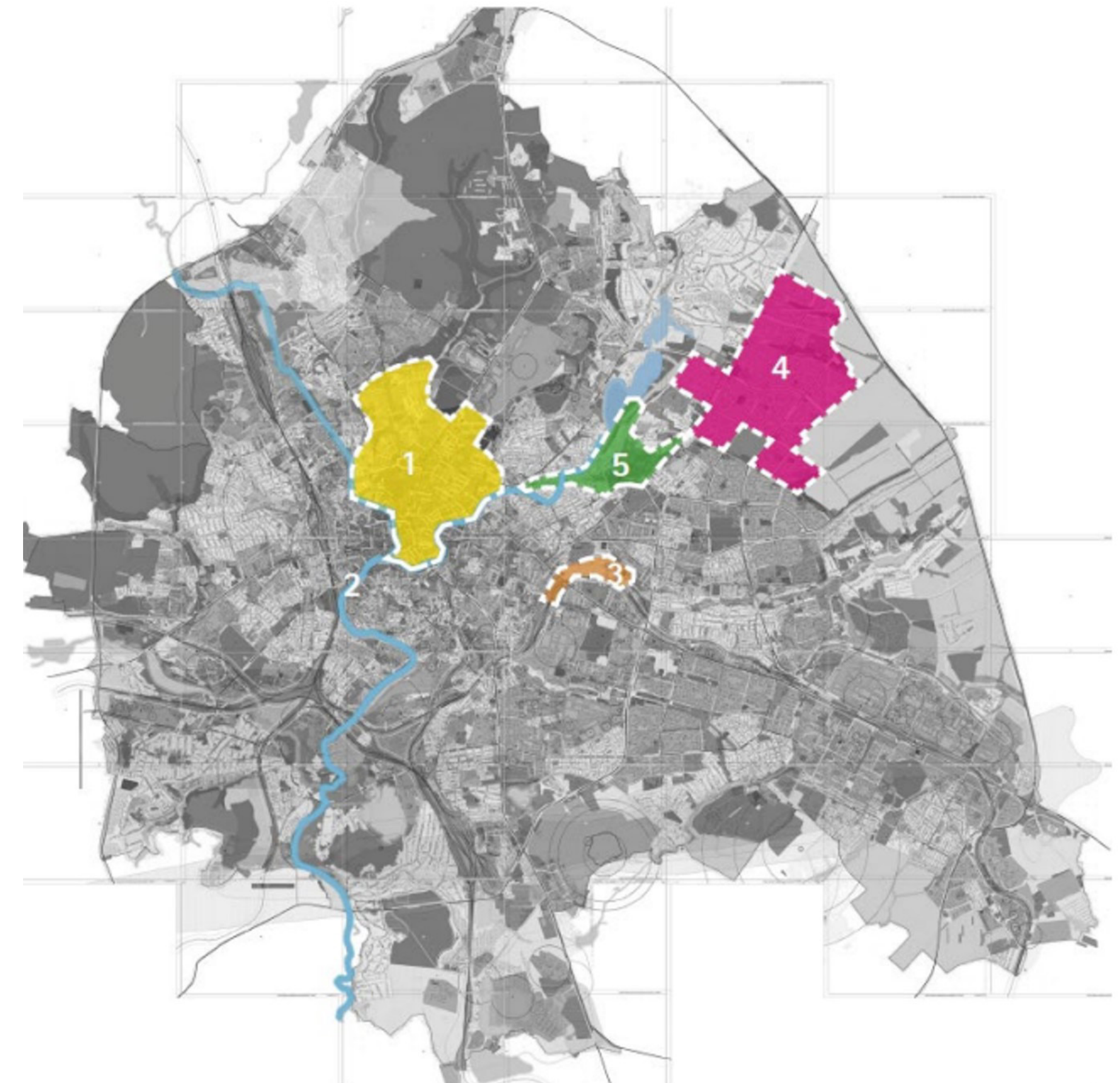
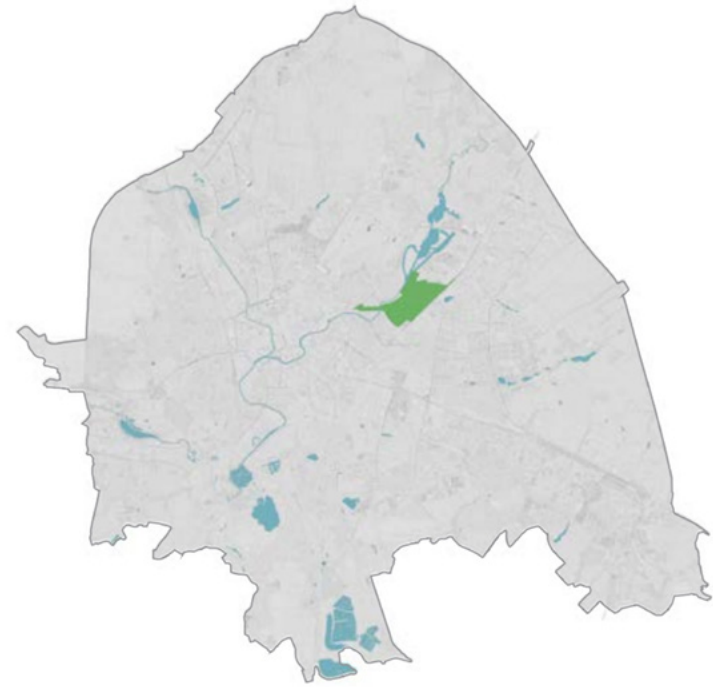


Figure 10 Kharkiv Reconstruction Masterplan five pilot projects
 Source: Kharkiv Reconstruction Masterplan (produced by NFF and project partners)

Science Neighbourhood



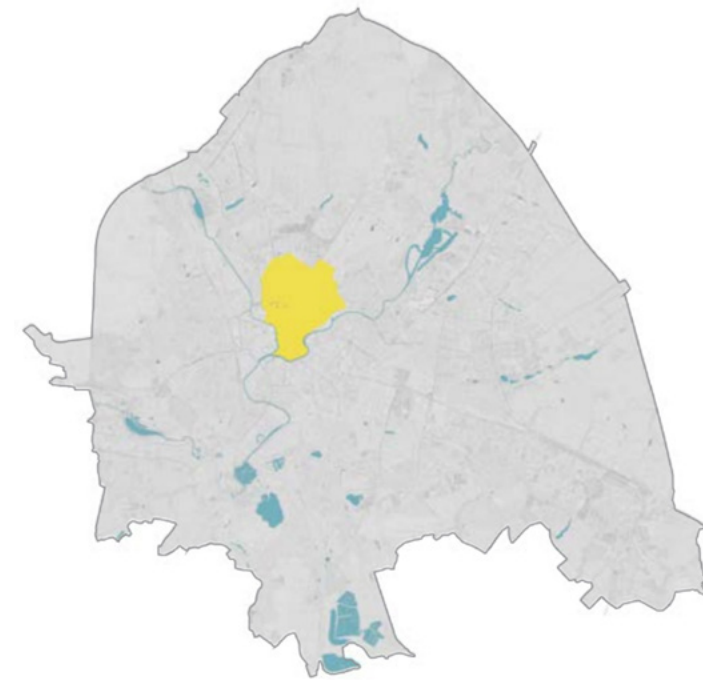
Science Neighbourhood location
Source: Kharkiv Masterplan

The Science Neighbourhood Pilot Project includes the following components:

- Redeveloping areas around the Barabashova Market.
- Developing an exemplar and iconic neighbourhood with modern and efficient housing, university faculties, supporting tech companies and natural public spaces.
- Creating safe and inviting public spaces for people walking and cycling; improving access to science, education, technology and innovation.

At the time of the KRTS development, this Pilot Project has already undergone the masterplan development stage. The masterplan document presents concepts ideas for the development of this area. These masterplan proposals were reviewed though the Framework of Transport Principles.

Heritage (Freedom Square)



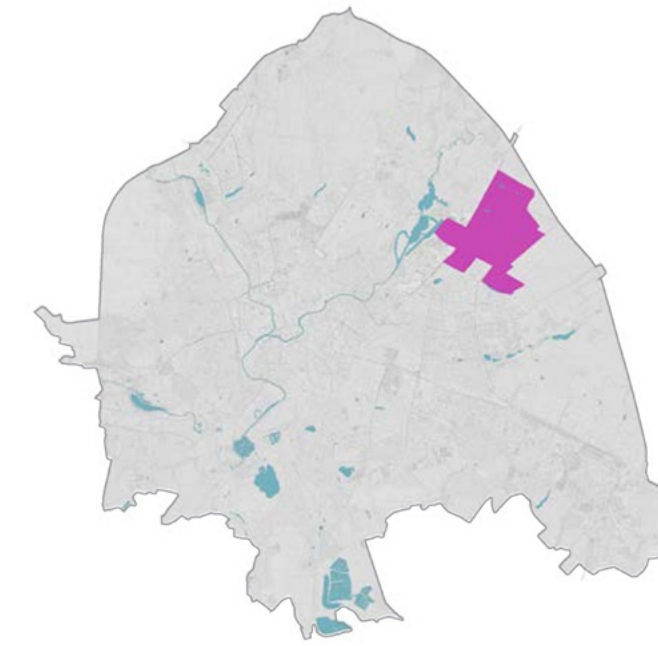
Heritage Pilot Project location
Source: Kharkiv Masterplan

The Heritage Pilot Project includes the following components:

- The project site covers Freedom Square including public space and Regional Administration Building.
- Redesigning public spaces and streets of Freedom Square to be a centre point of the cultural quarter and to create a new cultural landmark.
- Prioritising walking and cycling, improving access to historical landmarks, culture and art.

At the time of the KRTS development, this Pilot Project has already gone through the initial competition stage, where number of architects had a chance to develop early concept ideas for this area. These ideas were reviewed though the Framework of Transport Principles.

Housing (Saltivka)



Housing Pilot Project Location
Source: Kharkiv Masterplan

The Housing Pilot Project includes the following components:

- Rebuilding and retrofitting existing buildings in the northern part of Saltivka District.
- Upgrading housing to improve citizens living standards and creating safe, resilient and dynamic neighbourhoods.
- Making walking and cycling attractive for local mobility; improving connectivity with public transport.

At the time of the KRTS development, this Pilot Project has already undergone through the initial competition stage, where number of architects had a chance to develop early concept ideas for this area. These ideas were reviewed though the Framework of Transport Principles.

Kharkiv Sustainable Urban Mobility Plan (SUMP)

In tandem with progress on the central masterplan initiative, a SUMP for Kharkiv has been developed by Dornier Group and partners with funding from the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), the main German Development Agency.

Based on mobility surveys, a multi-modal transport model, and workshops with the municipality, the vision for Kharkiv's SUMP was agreed: ***“Kharkiv is a city of safe, environmentally friendly, and affordable mobility with a modern and high-quality transport infrastructure”***.

This vision includes five priorities and corresponding objectives, shown in Figure 11. These vision, priorities and objectives will guide further planning of specific measures to develop sustainable mobility in the city, as well as the creation of an effective monitoring system for their implementation.



Figure 11 Priorities and objectives of the Kharkiv SUMP
 Source: Kharkiv SUMP (produced by Dornier)

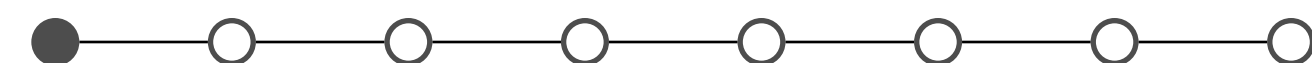
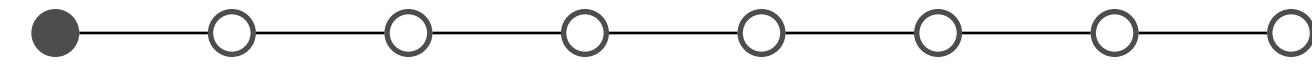


Table 1 Strengths and weaknesses of transport in Kharkiv

Strengths	Weaknesses
<p>Advanced policies – Kharkiv has existing and somewhat advanced policies setting out the approach to transport and planning in the urban environment, which help to ensure that the KRTS principles align with existing national and local policies and direction.</p>	<p>Inconsistent approach to housing density – The heterogeneous housing density across Kharkiv and the lack of a transport-oriented development approach limits the potential of the wide-reaching, high-capacity public transport network and potentially negates opportunities for careful mixed land use planning with the transport network.</p>
<p>Strong identity and industry – The City has a relatively young population, is a major industrial centre, and has a low unemployment rate. Only 12% of the population commutes to/from Kharkiv. The invasion has significantly affected the demographics, economy, and urban environment of Kharkiv, but the underlying base of the city’s identity and industry remains as an enabler for reconstruction, with transport playing a key role.</p>	<p>Inadequate walking infrastructure – Whilst a high level of walking trips has been noted as a strength, this strength is limited by a poor provision for pedestrians in many parts of the city which results in a walking network that is not comprehensive and faces severance, discontinuity, and accessibility challenges. The quality of the walking network varies significantly, with some secondary and residential streets lacking essential provision and safety features.</p>
<p>Resilient sectors and dynamic attractors – There is a strong presence of sectors and industries in Kharkiv which are dynamic in their activity and resilient to external factors, most notably the presence of higher education institutions in the city. This strength could help to facilitate reconstruction efforts, and higher education is an attractor that will draw people back to the city, thus using its transport system and contributing to recovery.</p>	<p>Limited provision for cycling – Dedicated infrastructure provision for cycling in Kharkiv is very limited, and other challenges such as overdesign of roads and illegal car parking present further barriers to cycling as a choice of travel. The winter climate and topography also present challenges to increasing uptake of cycling.</p>
<p>High levels of walking trips – Approximately 27% of trip are made by walking, indicating a strong walking culture and propensity to travel on foot. Pedestrian provision in the city is not comprehensive but there is good coverage of footpaths and other infrastructure which can be developed further.</p>	<p>Public transport congestion and crowding – Whilst the high level of ridership on public transport in Kharkiv is markedly a positive feature, the metro system regularly operates at or over capacity at peak times which results in crowding and likely suppresses demand. In general, public transport in Kharkiv exhibits short high-use sections and longer low-use sections which can in part be attributed to weaknesses noted on housing density and land use planning.</p>
<p>Cycling culture – Although cycling is not widespread in the city, there is an existing cycling culture, mainly for leisure and sport. If the city was to begin developing dedicated cycling infrastructure – noting the point of there being an over-provision of capacity on most of the road network – then this cycling culture could be the base on which to encourage cycling uptake.</p>	<p>Poor integration of transport systems – Inter-modal travel in Kharkiv is made more challenging than necessary because different transport systems are not strategically integrated to enable seamless and convenient transfers. This is particularly true across the several public transport systems operating in the city, which are often not well integrated with one another.</p>
<p>Public transport – Despite damage to some key infrastructure, Kharkiv’s public transport network was, before the invasion, and is still well developed. The public transport network is robust and well-used, with over 50% of trips made using public transport modes.</p>	<p>Increasing levels of car ownership – Whilst not a negative in itself, particularly as spare levels of road network capacity have been noted, the increasing levels of motorisation and car ownership observed in Kharkiv prior to the invasion could present challenges of congestion and induced demand in the future if the trend is not carefully managed.</p>
<p>Road capacity – The road network in Kharkiv generally allows for good vehicle traffic flow without significant congestion on a network-wide basis, with spare capacity on many routes and nodes at most times of day including during peak hours. This spare capacity on parts of the network offers potential for rationalisation, re-routing, and re-allocation initiatives if desired.</p>	<p>Over provision and design of roads – Oversized roads in Kharkiv mostly allow for efficient movement of traffic flows and provide capacity resilience, however, modern transport planning understands this approach to road planning to be an enabler of congestion, inevitably inducing road demand and resulting in the associated disbenefits of increased car usage. Oversized roads also lead to increased traffic speeds and higher risk and rate of traffic incidents.</p>
	<p>Car parking management – Demand for car parking, particularly in the city centre and the central business district, is significantly higher than car parking capacity. This has in part contributed to further challenges regarding illegal and inappropriate car parking, which has significant knock-on effects for other users of the Kharkiv transport network such as obstruction of roadsides and footpaths, barriers to accessibility, and a higher risk of traffic incidents. It may be necessary to find alternative solutions than building more car parks, which present their own challenges and often do not represent effective use of city space.</p>



Through the above review and conversations with key stakeholders, it was established that the KRTS should be focussed around the three key priorities for the post-war development of the Kharkiv transport system. These include:

Safety: all transport networks in Kharkiv should be safe for all users, at all times.

This safety should consist of three critical dimensions including:

- **Road safety** should ensure accidents occurring on transport networks are minimised.
- **Personal security** should ensure that people feel secure and confident whilst using transport networks and there is no crime on transport networks.
- **Wider security** should ensure that transport networks are designed with protective facilities that can shield people in a military escalation scenario or another extreme event that can cause destruction (e.g. severe weather)

Resilience: the overall Kharkiv transport system should be resilient to ensure the city continues functioning during events of disruption and can effectively bounce back from system shocks caused by external events and recover quickly.

This resilience should consist of several components:

- **Alternative travel modes:** residents should always have at least two travel options available to them for the same type of trip. For example, if networks that rely on energy supply are disrupted (metro, tram, trolleybus), there should be other sustainable travel options available such as cycling or buses, or even car.
- **Alternative routes:** there should always be a rerouting strategy in place in case if critical primary routes are not available for use due to disruption. For example, if one route is affected due to road works or due to a bridge being closed, there should be alternative formal routes available. This can be particularly critical for the city supply chain operation.
- **Self-sufficient districts/neighbourhoods:** all city districts/neighbourhoods should be designed so that they can provide all basic functions to its residents in case they are temporarily cut off from transport networks and lack wider connectivity. This means people should be able to access all essential needs by walking and cycling. This also means that alternative ways of living should also be available to people and supported by the city, for example working/studying from home when not able to travel.

Attractiveness: all Kharkiv transport networks should be attractive for residents to enable quick and effective economic recovery post-war.

This entails the following:

- **High-quality transport networks:** where needed existing infrastructure and rolling stock need to be upgraded to new modern standards, any new infrastructure needs to be designed in line with the new modern design practices.
- **Accessibility and inclusion:** all infrastructure and rolling stock needs to be accessible and inclusive so that people with mobility impairments can easily access and use, and so that barrier-free movements are enabled.
- **Integration:** all transport networks should be integrated to enable quick and convenient interchanges between different transport modes and to promote hassle free movement.
- **Affordability:** residents and visitors need to be provided with affordable travel options.

These priorities can help the city to set its planning and implementation into the direction of a swift post-war recovery and to develop a transport system that enables achievement of the wider reconstruction objectives as set out in the Kharkiv Reconstruction Masterplan and Kharkiv SUMP.

2 VISIONS AND GOALS

Our vision for the KRTS is to deliver a greener, safer, more resilient and accessible transport system that responds to the city’s evolving needs.

The Strategy will help to restart business and grow the economy, while reconnecting residents and communities with one another, with Europe, and the rest of the world.

The KRTS represents a single, comprehensive programme for the development of the entire transport system of Kharkiv City. It aligns with the Kharkiv Reconstruction Masterplan and expects all future projects and feasibility studies to integrate into a city-wide network concept.

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2.1 Overarching aims of the KRTS

Kharkiv has developed a SUMP. This work began pre-war and continued during the invasion until it was fully completed end of December 2024.

The Kharkiv SUMP developed the vision for sustainable urban mobility development in Kharkiv as shown in Figure 12.

This vision was analysed against the KRTS priorities set out in the previous chapter, and it was established that it already encompasses and addresses all of them under its umbrella. Therefore, it was decided the KRTS should adopt the same vision. This approach also ensured that the KRTS workstream aligns with the wider SUMP context and becomes a dedicated sub-component under it. It seeks to ensure there are no conflicts between the two policies and they can work in tandem. The primary aim of the KRTS is to integrate and join-up previous studies and ongoing initiatives to create a coherent and comprehensive transport framework for Kharkiv’s reconstruction.

The KRTS aims to apply a reconstruction perspective to the findings and outcomes of the SUMP, which presents a deep understanding of transport in Kharkiv.

The comprehensive, relevant evidence base for transport in Kharkiv provided by the SUMP has been used to develop a consistent approach to transport and urban planning which references the broader vision and objectives of the Reconstruction Masterplan and appreciates the cumulative city-wide transport context.

Once the vision was established, it was split into three vision themes which are:

Theme 1: Environmentally Friendly Transport

Theme 2: Safe Transport

Theme 3: Modern and High-Quality Transport

The theme of affordability, that is also a part of the KRTS/SUMP vision, was not defined as a standalone theme, as it was agreed it is cross-cutting to the whole process and will be automatically enabled through successful implementation of the above three themes.



Figure 12 The Kharkiv SUMP vision
Source: Kharkiv SUMP, Kharkiv City Council

2.2 Transport Principles

Once the vision and vision themes were established, it was important to develop an approach to a more detailed analysis of the five pilot projects.

A framework of transport principles was developed so that it could be applied to every project. This process is illustrated in Figure 13.

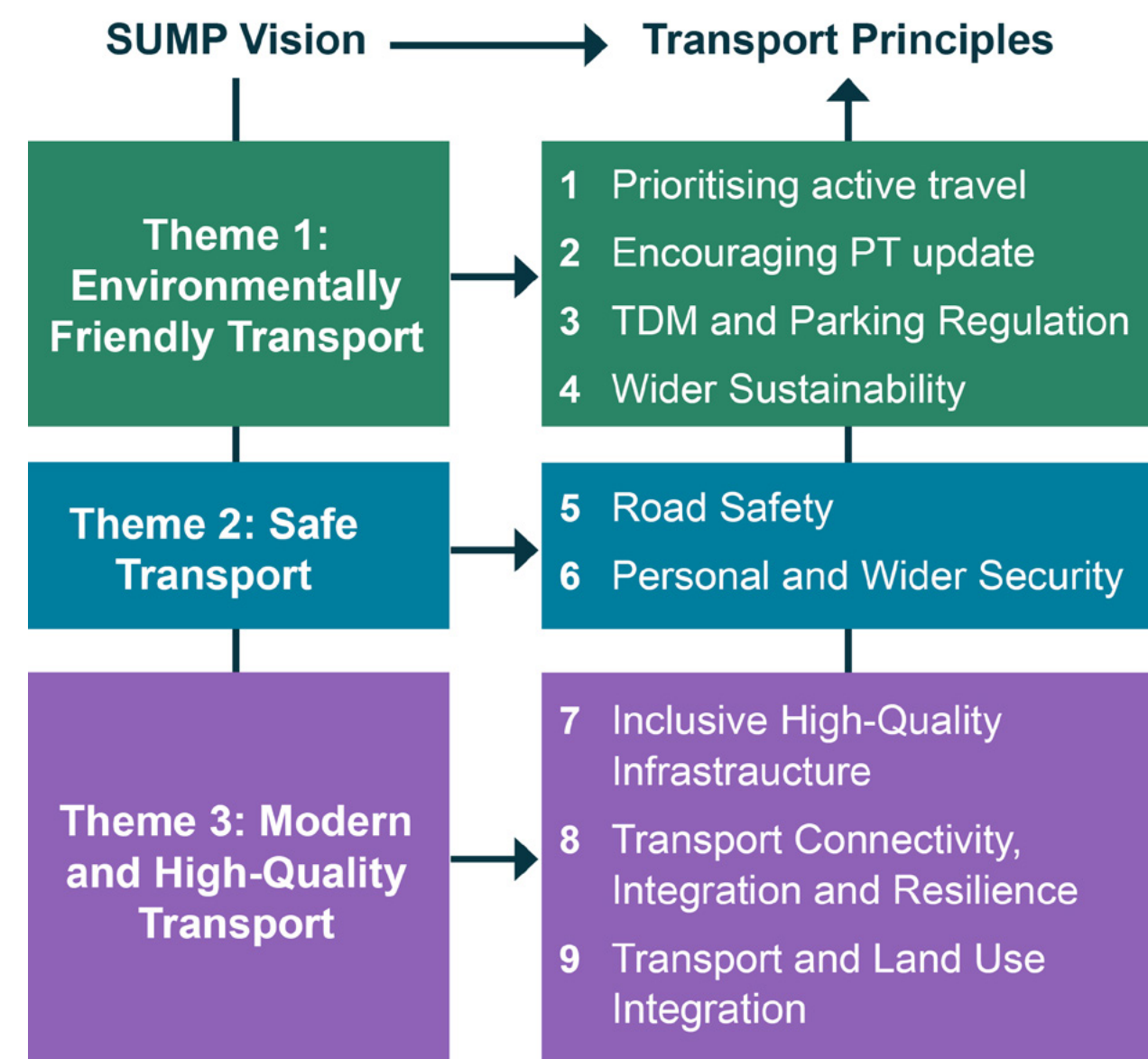


Figure 13 Deriving a framework of Transport Principles through the vision themes
Source: Arup

A detailed description of vision themes and respective Transport Principles is set out below:

Theme 1: Environmentally Friendly Transport

- Making sure that all transport solutions enable environmental sustainability through the following Transport Principles:
- Proposals should prioritise active travel modes
- Proposals should encourage Public transport uptake
- Proposals should promote Travel Demand Management (TDM) and parking regulation
- Proposals should incorporate solutions for wider sustainability (e.g. decarbonisation etc)

Theme 2: Safe Transport

- Making sure that transport solutions embed safety in all its forms through the following Transport Principles:
- Proposals should ensure road safety (aiming for zero road accidents)
- Proposals should ensure personal and wider security (aiming for zero crime rate and providing protective facilities for extreme emergencies like military escalation, severe weather, pandemic etc.)

Theme 3: Modern and High-Quality Transport

- Making sure that transport networks are attractive for residents through the following Transport Principles:
- Proposals should lead to inclusive high-quality infrastructure (aiming for improved accessibility for all users including people with special needs and ensuring pleasant travel experience through provision of modern upgraded facilities)
- Proposals should contribute to the wider transport connectivity, integration and resilience
- Proposals should enhance transport and land use integration

It is important to note that vision themes and Transport Principles have natural overlaps and often work in tandem enhancing each other. Once these principles and proposals are embedded across the City, they will create a holistic transport system with effective interconnections between different transport modes (e.g. metro, buses, trams, cycling and walking) available in every city district.

3 THEME ONE: ENVIRONMENTALLY FRIENDLY TRANSPORT

Thematic goal: To create a sustainable transport system that contributes positively to the city’s environment, supports healthier communities, and contributes to the long-term resilience of Kharkiv.

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3.1 Headline data

- Pre-war, the mode share of walking was 27% and especially popular among residents located in the central part of the city.
- In comparison, cycling only made up around 1% of the modal share, and this was reflected 89% of respondents requesting improvements to the quality of cycling infrastructure (2025 consultation).
- As per the 2025 resident consultation, 63% and 89% of respondents are not satisfied with the quality of walking, and cycling, infrastructure respectively, and 88% of respondents found walking infrastructure to have poor accessibility.
- Kharkiv City have already developed and administered the Concept for the Development of Cycling Infrastructure (2024) that promotes creation of a safe, barrier-free network of cycle routes in Kharkiv. It identifies a network and hierarchy of cycle routes for Kharkiv which includes introduction of 757 km of cycle routes in Kharkiv including 349 km of arterial cycle routes, 272 km of peripheral routes and 127.3 km of recreational routes (in contrast to the current cycle route provision of only 30km).
- 61% of respondents were satisfied with the quality of public transport in Kharkiv, with 92% using transport as a way of commuting.
- Between 2017 and 2021, the number of passenger vehicles registered in Kharkiv

- increased from approximately 45,000 to 70,000, increasing their use by population from 31% in 2017 to 49% in 2021 (Dornier, GIZ, 2024).
- A high proportion of the Kharkiv public and private transport trips rely on fossil fuels, including 21% of trips made by individual motorised road transport, 8% of trips made by bus and 5% of trips made by local marshrutkas (minibuses). This results in a high concentration of air pollutants. As of 2020-2021, volume of pollutant emissions from transport into the atmosphere was 38.2 kg/person (Dornier, GIZ, 2024).
- Pre-war the share of electric public transport, both ground and underground, was 39% including 23% for subway, 9% for trolleybus and 7% for tram. However, since the start of the invasion, numerous military hostilities and targeted attacks on energy and transport infrastructure has meant that electric-based public transport often operates with disruptions and some part of it is completely out of operation. Trolleybus, tram lines and fleet were heavily damaged. In addition to this, Kharkiv metro stations have also been used as shelters for people, which often impacts their normal operation. As a result of this destruction, the use of buses and marshrutkas increased. This has enabled resilience of the city transport system overall, but has contributed to an increase in emissions (GIZ, Dornier, 2023).

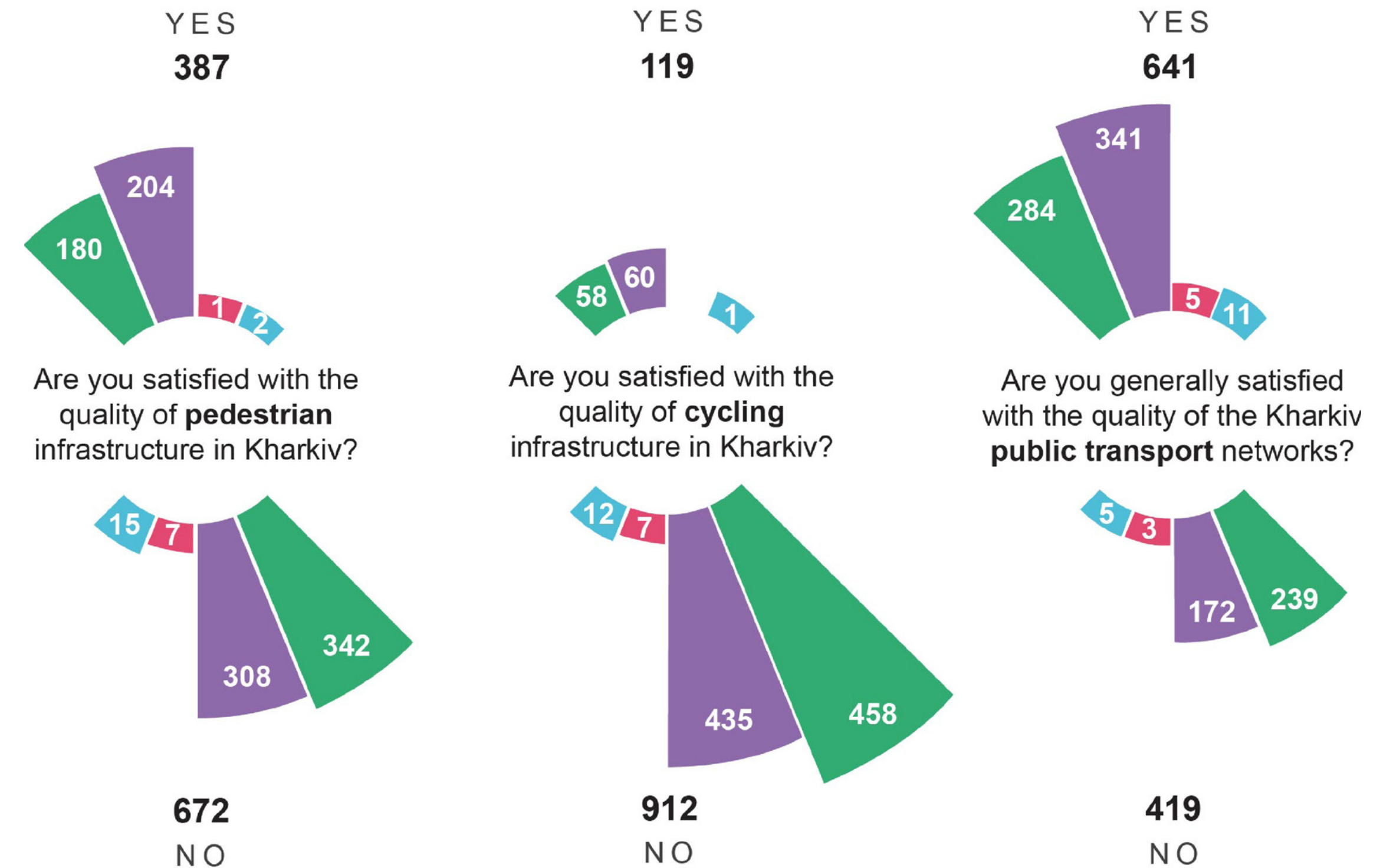


Figure 14 Survey of passenger opinions on pedestrian and cycle infrastructure, and public transport networks in Kharkiv.
Source: 2025 public consultation

Male
Female
Non-binary
Prefer not to say

3.2 Why is it important?

Ukraine has set ambitious climate goals to achieve net-zero emissions, to align with EU standards, including 65% reduction in greenhouse gas emissions by 2030 compared to 1990 levels and 60% reduction in transport sector emissions by 2030 compared to 1990 levels³.

Transport significantly contributes to environmental issues like air and noise pollution, greenhouse gas emissions, and the depletion of natural resources. Therefore, focusing on transport solutions that prioritise environmental sustainability is essential to mitigate these impacts on our planet and future generations. An approach is required to lay a solid foundation for building a sustainable transport system, that minimises environmental impacts and promotes long-term benefits, contributing to healthier and more liveable environments worldwide. For Kharkiv, a focus on sustainability and the environment is particularly important given the current context of reconstruction and future development.

Prioritising environmentally friendly transport solutions offers Kharkiv a unique opportunity to rebuild sustainably, fostering a more resilient and healthier city for its residents in the long term. Furthermore, aligning with European aspirations for strong environmental protection could potentially pave the way for future cooperation and funding opportunities, which is critical to Kharkiv reconstruction.

In addition to this, Kharkiv’s Concept for the Development of Cycling Infrastructure (2024) already sets an ambitious plan to create a safe and barrier-free network of cycle routes with total length of 757 km. The KRTS recognises the Cycling Concept as a foundational element for sustainable Active Travel mobility and recommends that any future policies and projects should take this concept into account.

3.3 What could Kharkiv do?

- **Prioritise low carbon transport modes** for internal connectivity such as walking and cycling within residential districts.
- **Promote behaviour change** by establishing a travel demand management approach to network management, traffic control, and parking regulations.
- **Reduce emissions in transport** through city-wide roll-outs and trials to decarbonise public transport fleet and introduce electric vehicle infrastructure;
- **Optimise public transport operations** to provide better service coverage, more effective route planning, and scheduling.
- **Facilitate collaborative logistics** to encourage businesses to share delivery vehicles and optimise cargo loads to reduce the number of trucks on the road, improve fuel efficiency, and lower emissions.
- **Foster community engagement** to attract community to sustainability initiatives to increase public awareness and support for environmentally friendly transport solutions.

³ https://unfccc.int/sites/default/files/NDC/2022-06/Ukraine%20NDC_July%2031.pdf

3.4 Environmentally Friendly Transport strategic policies

In order to deliver key projects under this theme, there are a number of suggestions for strategic policies for Kharkiv that would underpin their successful delivery. They are set out in Table 2.

Table 2 Environmentally Friendly Transport – strategic policies

Policy	Key components
Walking Strategy	<ul style="list-style-type: none"> • This strategy should identify a network and hierarchy of walking routes based on existing usage and future demand • Audits of the network will be required to identify areas that need improvements • Review and develop planning and design standards for walking which should include defining requirements for design elements like footpath width, lighting, pedestrian crossings, waiting areas, rest areas, green areas, and make sure these requirements respond to local context • Ensure that the standards incorporate exemplar accessibility requirements (kerbs, ramps, lifts, audio and visual support etc), this could include the requirement for tactile paving and dropped kerb to be provided at every new junction, crossing and intersection. • Incorporate safety and security requirements (lighting, CCTV, passive surveillance, shelter areas and associated navigation routes) • Develop and roll-out a city-wide programme of walking improvements. • Recommend policy that requires all new developments to provide pedestrian connections that meet the standards developed in this strategy. • Align with other relevant policies such as the “National Strategy for the Creation of a Barrier-Free Environment” • Ensure this strategy is a material consideration when developing any transport project in the city • Set targets for implementation and identify budget to deliver

Policy	Key components
Cycling Strategy	<p>The Concept for the Development of Cycling Infrastructure (2024) currently serves as a Cycling Strategy for Kharkiv. It should be regularly reviewed to ensure it continues meeting the following criteria:</p> <ul style="list-style-type: none"> • It identifies a network and hierarchy of cycle routes based on existing usage and future demand • It recommends regular audits of the network to identify areas that need improvements • It develops and sets planning and design standards for cycling which should include defining requirements for design components like cycle lane width, lighting, crossings, rest areas, green areas, as well as planning components like cycle parking standards for different types of developments, and make sure these requirements respond to local context • It should ensure that the standards incorporate exemplar accessibility requirements (kerbs, ramps, lifts, audio and visual support etc) • It develops and sets safety and security requirements (lighting, CCTV, passive surveillance, shelter areas and associated navigation routes etc) • It develops and rolls-out a city-wide programme of cycling improvements. • It recommends policy that requires all new developments to provide cycle routes that meet the standards developed in this strategy/Concept • It ensures that this strategy is a material consideration when developing any transport project in the city • It sets targets for implementation and identifies budget to deliver

Policy	Key components
Public Transport Strategy	<ul style="list-style-type: none"> • Ensure this strategy supports delivery of well-connected and transit-oriented developments. • This strategy should identify public transport sites/routes/corridors for improvement or expansion based on existing usage and future demand. • Review city-wide travel demand and origin-destination of trips to prioritise frequency and reliability on core routes or underserved areas, review public transport service capacity and coverage. • Review and develop planning and design standards for public transport network development which should include defining requirements for design and planning components like service coverage, frequency, speed etc and make sure these requirements respond to local context, for example ensure that in network development bus stops are provided every 400m along a route to maximise opportunities for public transport connectivity. • Develop a toolkit of typical measures and solutions that can be used for the implementation of this strategy, this could include solutions like bus priority measures, dedicated bus lanes, digital signalling, improved frequencies, extended routes, new routes etc. • Develop and roll-out route improvement and expansion programme. • Set targets for implementation and identify budget to deliver.
Travel Demand Management and Parking Strategy	<ul style="list-style-type: none"> • Assess city-wide travel demand and behaviour to establish baseline for car usage. • Review strategic street and road network, including components like road hierarchy, functions, and capacities. • The strategy should provide guidance on parking regulation and traffic circulation for central and residential areas to prevent excessive parking provision that can undermine cycling, walking and public transport use. • Review and develop regulation mechanisms for parking demand and supply, this could include controlled parking zones for on-street parking to discourage commuter car use, development of car parking standards that set maximum car parking requirements at varying levels dependent on connectivity to public transport. • Review planning standards and traffic regulations for servicing, emergency vehicles, and maintenance parking for new developments. • Incorporate travel demand management and behaviour change into transport governance. • Ensure this strategy is a material consideration for all new developments in the city. • Set targets for implementation and identify budget to deliver.

Policy	Key components
Transport Decarbonisation	<ul style="list-style-type: none"> • Assess transport networks for decarbonisation improvements based on existing usage and future needs. • Introduce targets for petrol and diesel vehicle registrations and EV take-up in public transport fleet and private vehicles. • Develop and roll-out a multi-modal fleet decarbonisation programme which could include rail electrification plan, zero emission freight and logistics network, zero emission bus fleet. • Develop programme to roll-out EV charging infrastructure which could include providing shared charging facilities. • Develop standards for EV charging points for new developments • The strategy should support trials of alternative fuels. • Develop complementary policies on congestion and emissions, for example congestion charging, low emission zones etc. • Promote and implement other green solutions like installing solar canopies on surface car parks to provide energy for the maintenance of these car parks as well as to generate and sell additional energy for the main grid supply, etc. • Set targets for implementation and identify budget to deliver.

3.5 Environmentally Friendly Transport projects

Project 1.1 Freedom Square

Active travel, accessibility improvements and public transport integration.

Description of proposals

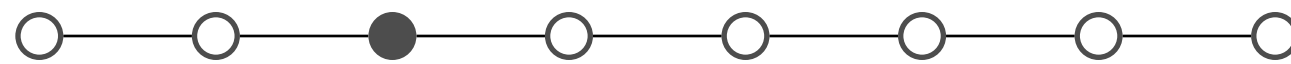
This project would aim to improve walking infrastructure and introducing cycle infrastructure around Freedom Square, including improvements to accessibility and public transport integration between metro stations and other modes, including the following components:

- **Removing car parking spaces** from the square. This should start with a traffic and parking study to understand nature of traffic movements and parking needs on the square). Removal of car parking spaces should be supported through the provision of alternative parking and travel options. Parking regulation and enforcement should be put in place and wider TDM should also be utilised where relevant.



Figure 15 Project 1.1 - Freedom Square – Active travel improvements and accessibility improvements, public transport integration

Source: Arup



Theme One



- **Improving walking routes** to and around the square. This should start with a detailed audit of the existing network of footways, footpaths and pedestrian crossings to identify issues and user conflicts. Once problematic areas are identified improvements to the routes should be developed and implemented. These improvements could include footway surface improvements, widening, removal of barriers and obstacles, navigation maps, sheltered areas for severe weather and military protection etc.
- **Developing cycle routes** to the square. This should start with a review of the existing street and road network around the square as well as of potential origins and destinations of cycle trips and definition of potential cycle routes. All options should be discussed and reviewed together with local stakeholders and residents, and once preferred options are identified, the cycle routes should be developed alongside the provision of cycle parking facilities. These should be in the square, but also near metro stations and bus stops to enhance integration.
- **Accessibility improvements** active travel and public transport networks around the square should be made more accessible. This should start with a study to identify areas that lack inclusive accessibility for all users and should be followed by development and implementation of those improvements. The improvements could include dropped kerbs and tactile paving at crossings, audio and

visual support, ramps and lifts near metro stations and removal of barriers (such as guard railings) and obstacles.

- **Safety and security improvements** to the transport network serving the square. The current conditions should be studied for safety and security problems, and a programme of improvements should be developed and put in place. These improvements could include better delineation of the street and road space for different users, with a priority for people walking and cycling that could be done through additional road markings, signage and physical separation. Security measures could include better lighting, more frequent CCTV, sheltered areas and clearly signed navigation routes to them.
- **Integration improvements** to ensure all transport modes at the square are well integrated. This could be achieved through measures including cycle parking facilities near metro stations and bus stops, Real-Time Passenger Information (RTPI) displays at public transport stops, and navigation maps showing key routes connecting to public transport.

Project contribution to the wider objectives (KRTS, SUMP and Masterplan)

Contribution to KRTS Themes:

- Theme 1: Environmentally friendly Kharkiv
- Theme 2: Safe Kharkiv
- Theme 3: Modern and high-quality Kharkiv

Contribution to SUMP Objectives:

- Objective 1.2: Ensuring the safety of transport system users in case of military emergencies.
- Objective 2.2: Developing micromobility and walking infrastructure in an inclusive and barrier-free manner to meet existing and future demand.
- Objective 2.3: Ensuring a high level of integration of sustainable mobility modes
- Objective 2.4: Improving the parking system for environmentally friendly modes of transport.
- Objective 4.2: Increasing the level of transport accessibility.
- Objective 5.1: Applying the principles of sustainable development in the restoration of transport and road facilities.

Contribution to Masterplan Pilot Projects:

- Heritage

Project 1.2 Sumska Street and Freedom Square

Active travel and accessibility improvements supporting wider master planning and regeneration opportunities

Description of proposals

This project would support the wider redevelopment along Sumska Street, through road space reallocation, permeability and accessibility improvements to maximise walking connections and to introduce new cycling infrastructure, with the aim to create better public spaces and to integrate better with heritage and historic landmarks located along the street. The following components should be included:

- **Improvement of the existing pedestrian network** This could start with a review of the existing pedestrian infrastructure, such as footways, footpaths and crossings, to identify areas needing improvements. Improvements could include better and higher-quality paving materials, clear signage and road marking at crossings, attractive areas for rest, shelter areas for severe weather and military protection, navigation maps showing key destinations around the area and signed/coloured pedestrian routes connecting to these destinations.

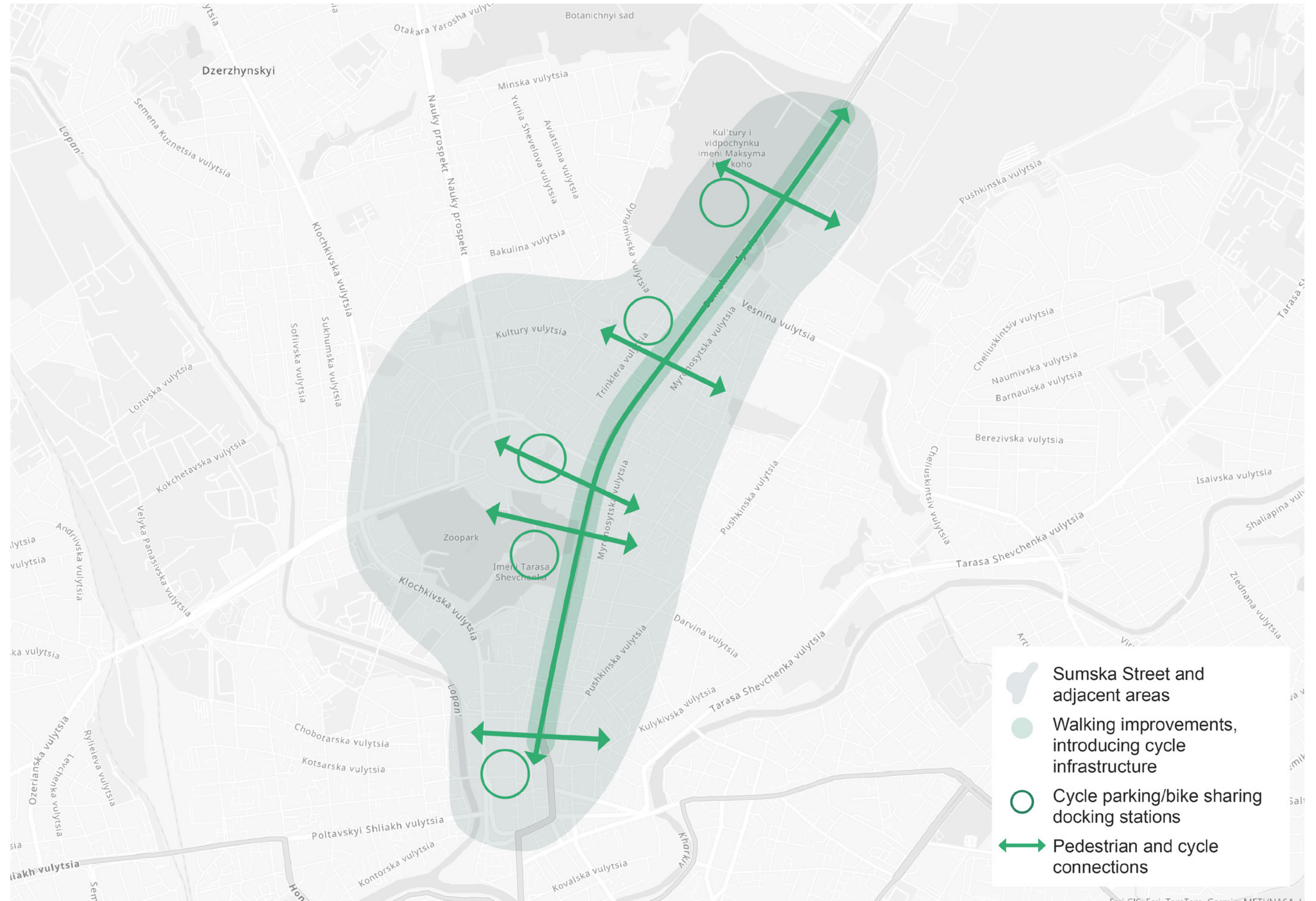
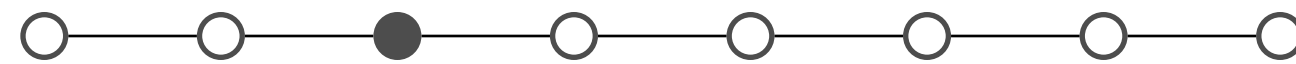


Figure 16 Project 1.2 - Sumska Street and Freedom Square – Active travel and accessibility improvements supporting wider master planning and regeneration opportunities

Source: Arup



Theme One



- **Introduction of cycle network** This could start with a review of the existing street and road network to identify option for cycle routes. When developing the new network measures to be investigated are the inclusion of segregated cycle lanes, road marking and signage to clearly sign the routes, cycle pockets at junctions, dedicated crossings at junctions, introduction of cycle parking facilities at key destinations, overall this area has a good potential for a successful introduction of a bike-sharing or e-scooter sharing scheme with bike docking station to be introduced at key destinations.
- **Accessibility improvements** active travel and public transport networks connecting to the street and running along the street should be made accessible (this should start with a study to identify areas that lack accessibility, and should be followed by a development and implementation of accessibility improvements, these improvements could include dropped kerbs and tactile pavement at crossings, audio and visual support at crossings, ramps and lifts near metro stations, removal of barriers and obstacles);
- **Safety and security improvements** Transport networks connecting to the street and the street itself should be studied for safety and security problems, and a programme of improvements should be developed and put in place, these improvements could include better delineation of the street and road space for different users with a priority given for people walking and cycling, that can be done through additional road markings, signage, physical separation, security measures could include better lighting, more frequent CCTV, sheltered areas and clearly signed navigation routes to them);

Project contribution to the wider objectives (KRTS, SUMP and Masterplan)

Contribution to KRTS Themes:

- Theme 1: Environmentally friendly Kharkiv
- Theme 3: Modern and high-quality Kharkiv

Contribution to SUMP Objectives:

- Objective 2.3: Developing micromobility and walking infrastructure in an inclusive and barrier-free manner to meet existing and future demand.
- Objective 4.1: Reducing the distance and time of population movement.
- Objective 4.2: Increasing the level of transport accessibility.
- Objective 5.1: Applying the principles of sustainable development in the restoration of transport and road facilities.

Contribution to Masterplan Pilot Projects:

- Heritage

Project 1.3 Riverfront redevelopment

Masterplanning and regeneration supported by new Active travel routes

Description of proposals

This project proposes the transformation of a 6-km long strip between the Kharkiv and Nemyshlya rivers into an ecological, walking, and cycling connector that will evolve into a city-wide mobility network, including the following components:

- **Re-developing river embankments** to support major redevelopment of the riverfront to create attractive embankments and dedicated green and park zones, this will include a variety of engineering works (ground, water, civil) to provide new riverfront infrastructure;
- **Walking network improvements** to introduce dedicated walking infrastructure along the riverfront as well as improving walking network in adjacent residential areas to connect them to the river network, measure could include provision of wide footpaths, rest areas, high-quality frequent lighting, navigation maps with routes than can be taken;

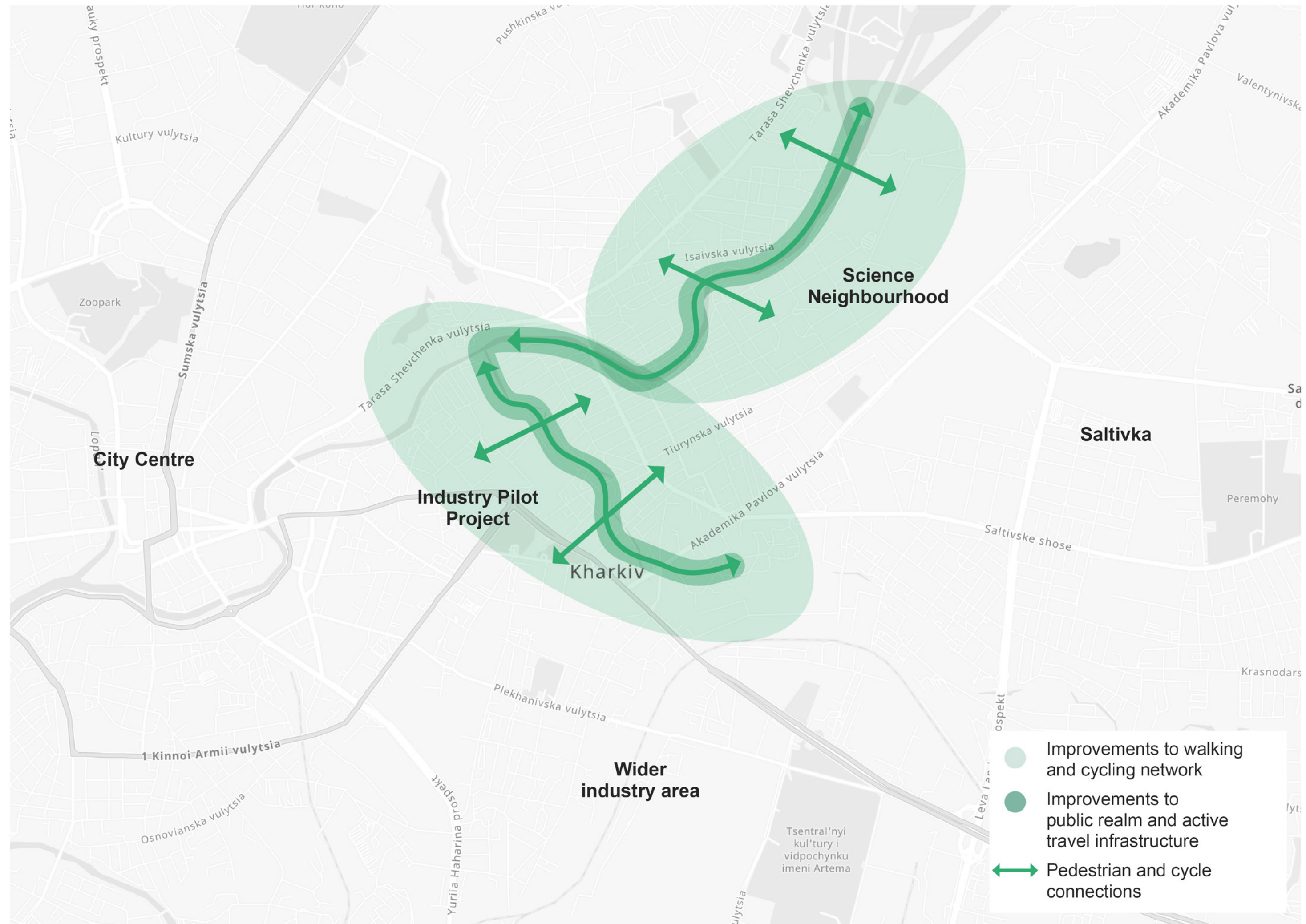


Figure 17 Project 1.3 - Riverfront redevelopment – masterplanning and regeneration supported by new active travel routes

Source: Arup

- **Cycling network improvements** to introduce cycling infrastructure along the riverfront including cycle routes and cycle parking, as well as developing cycle network in adjacent residential areas to connect them to the river network, there is a good potential for a successful introduction of a bike-sharing or e-scooter sharing scheme with docking station to be introduced along the river corridor;
- **Accessibility measures** across all transport networks along the rivers could be delivered, with measures including the introduction of ramps and lifts where there are level differences, dropped kerbs and tactile pavements on the walking and cycling routes and audio and visual support measures at all crossings.
- **Safety and security measures** could include clear segregation between walking and cycling routes. Where shared space is used a low-speed regime should be promoted for cycling. Frequent lighting and CCTV should be put in place and dynamic digital tracking tools could be introduced for users that travel through the river parks at darker times, supported by evening patrol officers to enhance security. Design should promote passive surveillance by supporting a variety of activities.
- **Water transport** which could include investigating opportunities for both passenger and freight routes on the rivers. River passenger transport can be an interesting option for both leisure and commuting trips.

Project contribution to the wider objectives (KRTS, SUMP and Masterplan)

Contribution to KRTS Themes:

- Theme 1: Environmentally friendly Kharkiv
- Theme 3: Modern and high-quality Kharkiv

Contribution to SUMP Objectives:

- Objective 1.4: Reducing air pollution from transport.
- Objective 2.2: Developing micromobility and walking infrastructure in an inclusive and barrier-free manner to meet existing and future demand.
- Objective 5.1: Applying the principles of sustainable development in the restoration of transport and road facilities.

Contribution to Masterplan Pilot Projects:

- Rivers



Riverfront development in Kharkiv © Norman Foster Foundation

4 THEME TWO: SAFE TRANSPORT

Thematic goal: To create a safe and secure transport system that fosters a thriving and liveable Kharkiv where residents feel confident in their personal safety and protection.

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4.1 Headline data

- Pre-war, the annual number of road accidents reached 7 per 1,000 inhabitants, with a share of 19.4% being serious and 1.6% fatalities (Dornier, GIZ, 2024). The risk of road accidents in the city was growing in line with gradual increase in car ownership and use, with the main reason cited was where speeding was a contributing factor. Since the invasion the number of road accidents initially decreased as a result of lower traffic volumes during martial law, but with population returning this trend has once again started to increase.
- Research and survey results indicate that pedestrian crossings often lack essential safety features, such as dropped kerbs for people with reduced mobility, road markings and clear signs. While new traffic lights have recently been installed to improve safety, a more comprehensive pedestrian network, including both crossings and infrastructure along streets, is needed. Dedicated cycling infrastructure is lacking resulting in unsafe conditions due to people cycling on footways, footpaths or carriageways. The existing road network in Kharkiv presents challenges such as increased risk of traffic incidents due to high traffic speeds and poor infrastructure for active travel users, significant car parking issues,

particularly in the central business district where demand far exceeds capacity. In addition to this, there is no automated emergency system in place.

- 59% and 79% of the survey respondents found pedestrian and cycle infrastructure, respectively, not very safe and secure (2025 consultation). The consultation also showed a relatively even split between respondents on whether they find public transport safe and secure.
- Crime on public transport has historically been low in Kharkiv. To maintain this situation, personal security should remain an essential component of all KRTS policies and projects.
- With regards to the wider security, Kharkiv has unfortunately been a regular target for military aggression since the beginning of the full-scale invasion in February 2022. Residential and industrial areas often come under intensive military shelling which put people's lives at risk. In 2,023 Kharkiv started a civil defence construction programme, and since then 14 dedicated stop-shelters, known as 'Zakhyst' stop-shelters, were introduced near public transport routes (Dornier, GIZ, 2024). In addition to this, where possible, underground metro stations have also been used as shelters.

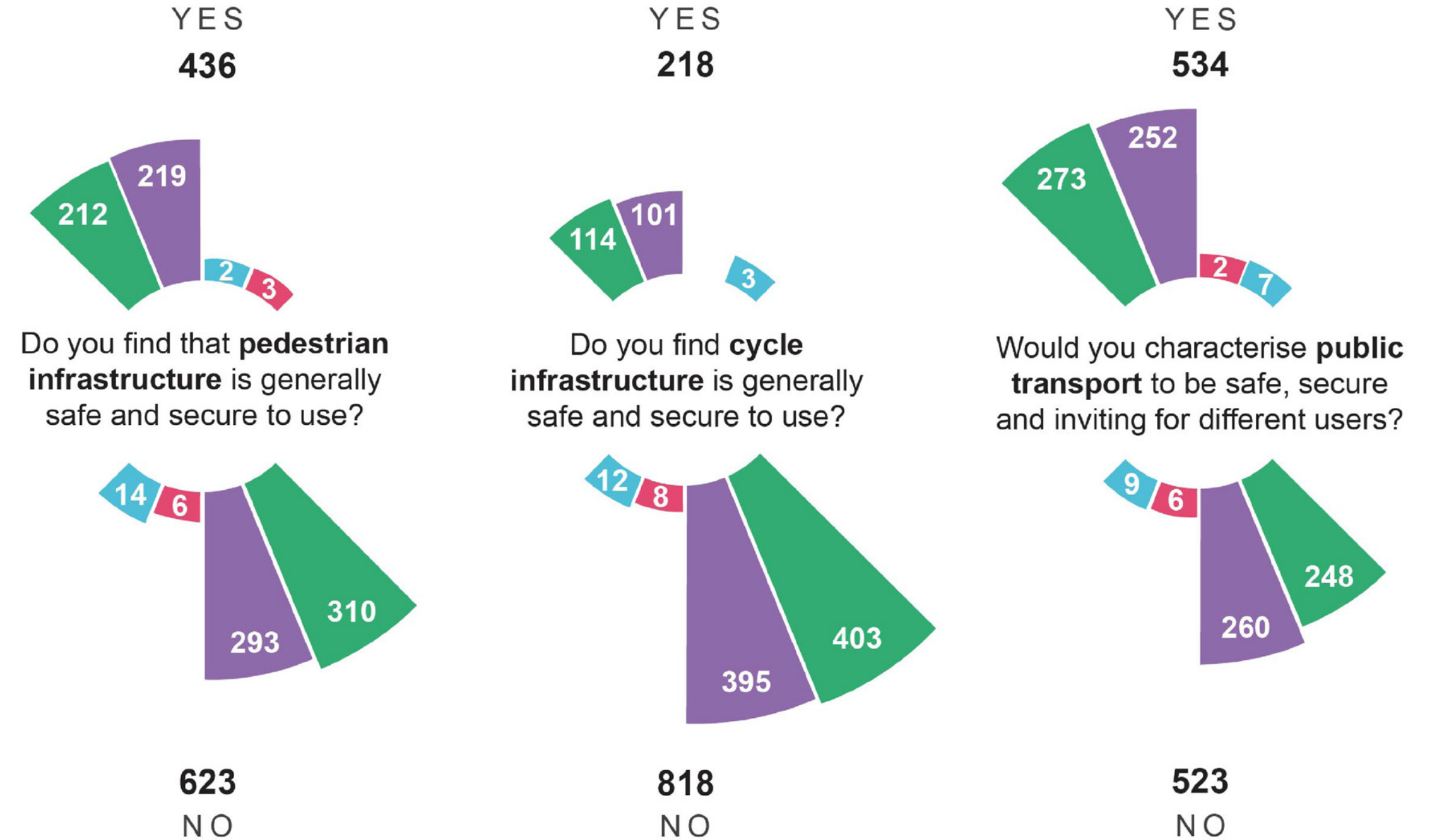


Figure 18 Survey of passenger opinions on pedestrian and cycle infrastructure, and public transport networks in Kharkiv.
Source: 2025 public consultation

4.2 Why is it important?

Road traffic injuries are the tenth leading cause of death globally⁴ and Ukraine has one of the highest road accident fatality rates of European countries per 1 million inhabitants (Ukraine, Road Safety in Ukraine Cooperation with the European Union, 2016). Ukraine is part of the UN's Decade of Action for Road Safety, with the aim to decrease road traffic deaths by at least 50% by 2030⁵, compared to 2019 levels. The government is already working with international institutions to finance urban road safety improvements in major cities including Kharkiv⁶.

Transport significantly contributes to environmental issues like air and noise pollution, greenhouse gas emissions, and the depletion of natural resources. Therefore, focusing on transport solutions that prioritise environmental sustainability is essential to mitigate these impacts on our planet and future generations.

An approach is required to lay a solid foundation for building a sustainable transport system, that minimises environmental impacts and promotes long-term benefits, contributing to healthier and more liveable environments worldwide.

For Kharkiv, a focus on sustainability and the environment is particularly important given the current context of reconstruction and future development. Prioritising environmentally friendly transport solutions offers Kharkiv a unique opportunity to rebuild sustainably, fostering a more resilient and healthier city for its residents in the long term. Furthermore, aligning with European aspirations for strong environmental protection could potentially pave the way for future cooperation and funding opportunities, which is critical to Kharkiv reconstruction.

4.3 What could Kharkiv do?

- **Enhance road safety** by establishing safety standards for urban planning, street design, construction and maintenance and developing an approach to identifying and addressing safety pinch points.
- **Reducing car use** by establishing accessible and barrier-free travel alternatives and by promoting behaviour change measures to encourage their use.
- **Prioritise safety for vulnerable groups** by undertaking measures focused on understanding and improving safety for vulnerable groups across gender, age, race and ability.
- **Continue investing into personal security** on public transport, walking and cycling networks and establish a wholistic approach to communication, surveillance and emergency management.
- **Provide stop shelters** within transport networks and infrastructure to provide protective facilities for travellers in case of a military strike or similar destructive event.
- **Develop advance evidence bases** by improving and streamlining data collection that can be used for decision-making with regards to safety and security.
- **Provide real-time digital tracking** within transport networks to monitor and protect passengers and assets.

⁴ Developing global targets for road safety risk factors and service delivery mechanisms

⁵ UNRSC Side Event; concept_note_-_15_oct_-_unrsc_-_halving_road_deaths_and_injuries_by_2030.pdf

⁶ Ministry of Infrastructure of Ukraine; PowerPoint Presentation

4.4 Safe Transport strategic policies

In order to deliver key projects under this theme, there are a number of suggestions for strategic policies for Kharkiv that would underpin their successful delivery. They are set out in Table 3.

Table 3 Safe Transport – Strategic Policies

Policy	Key components
Road Safety and Wider Transport Safety	<ul style="list-style-type: none"> • Review the existing road network and all associated components (including road user behaviour, road infrastructure, technology and processes) and identify areas/pinch points for safety improvements. • Review and update relevant planning and design standards to ensure they incorporate best practice on safety. • Establish traffic calming principles for existing and new developments and provide guidelines for their implementation, for example, set out how traffic calming measures should be implemented within shared road space to make allowance for people walking and cycling. • Identify design standards and requirements for different types of traffic calming, for example, low speed areas, physical measures like speed bumps, cushions, raised tables, special road pavement, narrowing road width etc. • Identify and implement speed limits for different roads across road hierarchy, for example, 20km/h for internal district roads. • Implement enforcement measures such as cameras, vehicle activated speed signs. • Develop planning guidelines for new developments to ensure low speed regime is promoted through master plan solutions, for example, through narrow streets, speed bumps, walking-friendly footways. • Set out legislations that ensures traffic calming/speed control is a material consideration when developing any transport and land use project in the city. • Promote safety culture amongst organisations, for example, encourage regular reports and discussions on safety issues. • Establish and promote Risk Management as a daily practice for all transport related projects to ensure control of safety risks and timely implementation of proposed mitigation measures, this could include developing a Risk Register listing all relevant risks with their likelihood and impact scores as well as proposed mitigations measures. • Set targets for implementation and identify budget to deliver.

Policy	Key components
Personal Security	<ul style="list-style-type: none"> • Develop a city-wide strategy to promote and implement secure transport solutions. • Review and update planning and design practices to ensure they embed personal security, for example streets should be designed to maximise passive surveillance, this means they should be well lit, have high-quality walking and cycling infrastructure, provide active facades, have a variety of functions and activities to attract people. • Develop a toolkit for typical security improvements including measures like lighting, CCTV cameras, access control, security officers/patrols. • Investigate and implement new digital solutions, for example developing and providing a digital application for real-time user tracking that can be used throughout the city. • Identify problematic areas and develop a city-wide programme of security improvements. • Set targets for implementation and identify budget to deliver.
Wider Security	<ul style="list-style-type: none"> • Identify a strategic vision for wider security, define typical risks/ adverse events and develop respective mitigation strategies. • Review and update planning and design standards to ensure developments and transport networks incorporate solutions for typical adverse events, for example shelters that can be used during military strikes. • Develop a city-wide programme to provide stop-shelters across the whole transport network, ensure all transport facilities have clear signage and routing for emergency shelters/stop-shelters. • Establish communication protocols for public awareness, for example carry out regular tests of city-wide emergency announcements. • Promote and provide regular training to educate organisations and citizens on how to behave in emergency situations, for example during military strikes. • Set targets for implementation and identify budget to deliver.

4.5 Safe Transport theme projects

Project 2.1 Science Neighbourhood

Liveable neighbourhoods.

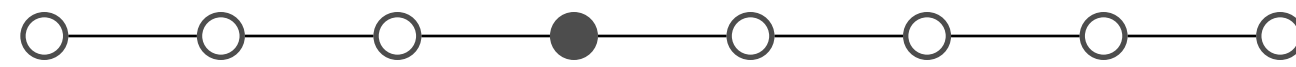
Description of proposals

This project proposal includes the creation of self-sufficient neighbourhoods that are designed with facilities for all essential needs. This is supported through the development of walking and cycling infrastructure and a traffic-calmed/slow speed environment that prioritises and promotes active travel modes for internal connectivity within the neighbourhood, including the following components:

- **Walking networks** that facilitate effective local mobility and allows for optimal connectivity with all key destinations accessible within a 10/15-minute walk. This could include designing pedestrian priority streets that give high priority to walking while allowing low-speed motor vehicle traffic. For the Science Neighbourhood this includes the introduction of a green corridor, running along the central north-south axis of the master plan and central square, which are focal points for pedestrian activity. This also includes introducing colonnades at the central square to create covered walkways and areas for retail activity, providing continuous walking lanes for sports and leisure activities and providing



Figure 19 Project 2.1 - Science Neighbourhood - Liveable neighbourhoods
Source: Arup



Theme Two



new and enhanced pedestrian crossings on Akademika Pavlova Street and on the way to Kharkiv River. Also supported by, providing parks and green areas with a variety of paths.

- **Cycling networks** that facilitate effective local mobility and allows for optimal cycle connectivity with all key destinations accessible within a 10/15-minute cycle. This could include designing and introducing ‘bike-friendly streets’ to encourage internal cycle trips, providing segregated cycle lanes alongside the pedestrian network and providing high-quality, direct and continuous cycleways connecting to key destinations within the masterplan. The proposals also include providing new cycle lanes and crossings on Akademika Pavlova Street and on the way to Kharkiv River, to provide continuous walking and cycling lanes for sports activities (jogging and cycling) and providing high-quality and secure cycle parking facilities at both residential and commercial developments.
- **Mixed-use developments** that have all essential functions on-site including local shops, banks and ATMs, pharmacies and medical centres, nurseries, schools and places of employment;

- **Parking regulation and traffic management** that aims to reduce on-street private car use through street design prioritising active travel. This could include establishing traffic management approaches that minimise through-vehicular trips and supported by establishing and adopting maximum parking standards for new developments.
- **Traffic calming interventions** that support the establishment and enforcement of low ground floor speeds of 20km/h on local residential streets and up to 60km/h on bigger distributor roads. This could be achieved through measures such as physical design, including speed bumps, chicanes etc, as well as introducing cameras for better speed enforcement.
- **Accessibility measures** that should be incorporated neighbourhood wide, such as dropped kerbs and tactile paving at junctions, audio and visual support at junctions, ramps and lifts where there are level differences, particularly in public transport stations, whilst minimising physical barriers and obstacles.
- **Safety and security measures** that provide high-quality and frequent lighting, as well as CCTV coverage, providing shelters for military protection and severe weather conditions and signed navigations routes to them.

Project contribution to the wider objectives (KRTS, SUMP and Masterplan)

Contribution to KRTS Themes:

- Theme 1: Environmentally friendly Kharkiv
- Theme 2: Safe Kharkiv
- Theme 3: Modern and high-quality Kharkiv

- Objective 5.3: Creating investment-attractive conditions for the reconstruction and post-war development of the transport system.

Contribution to SUMP Objectives:

- Objective 1.1: Approaching zero deaths in road accidents.
- Objective 1.4: Reducing air pollution from transport.
- Objective 2.2: Developing micromobility and walking infrastructure in an inclusive and barrier-free manner to meet existing and future demand.
- Objective 2.3: Ensuring a high level of integration of sustainable mobility modes.
- Objective 4.1: Reducing the distance and time of population movement.
- Objective 4.2: Increasing the level of transport accessibility.
- Objective 4.3: Balanced development of mobility in administrative districts and micro-districts of the city.
- Objective 5.1: Applying the principles of sustainable development in the restoration of transport and road facilities.

Contribution to Masterplan Pilot Projects:

- Science neighbourhood

Project 2.2 Saltivka

Liveable neighbourhood.

Description of proposals

This project proposal includes the creation of self-sufficient neighbourhoods that are designed with facilities for all essential needs. This is supported through the development of walking and cycling infrastructure and a traffic-calmed/slow speed environment that prioritises and promotes active travel modes for internal connectivity within the neighbourhood, including the following components:

- **Walking networks** that facilitate effective local mobility and allows for optimal connectivity with all key destinations accessible within a 10/15-minute walk. This could include designing pedestrian priority streets that give high priority to walking while allowing low-speed motor vehicle traffic. This could also include providing continuous walking lanes for sports and leisure activities, providing new and enhanced pedestrian crossings on key roads;
- **Cycling networks** that facilitate effective local mobility and allows for optimal cycle connectivity with all key destinations accessible within a 10/15-minute cycle. This could include designing and introducing 'bike-friendly streets' to encourage internal cycle trips, providing segregated cycle lanes alongside the pedestrian network and providing high-quality,

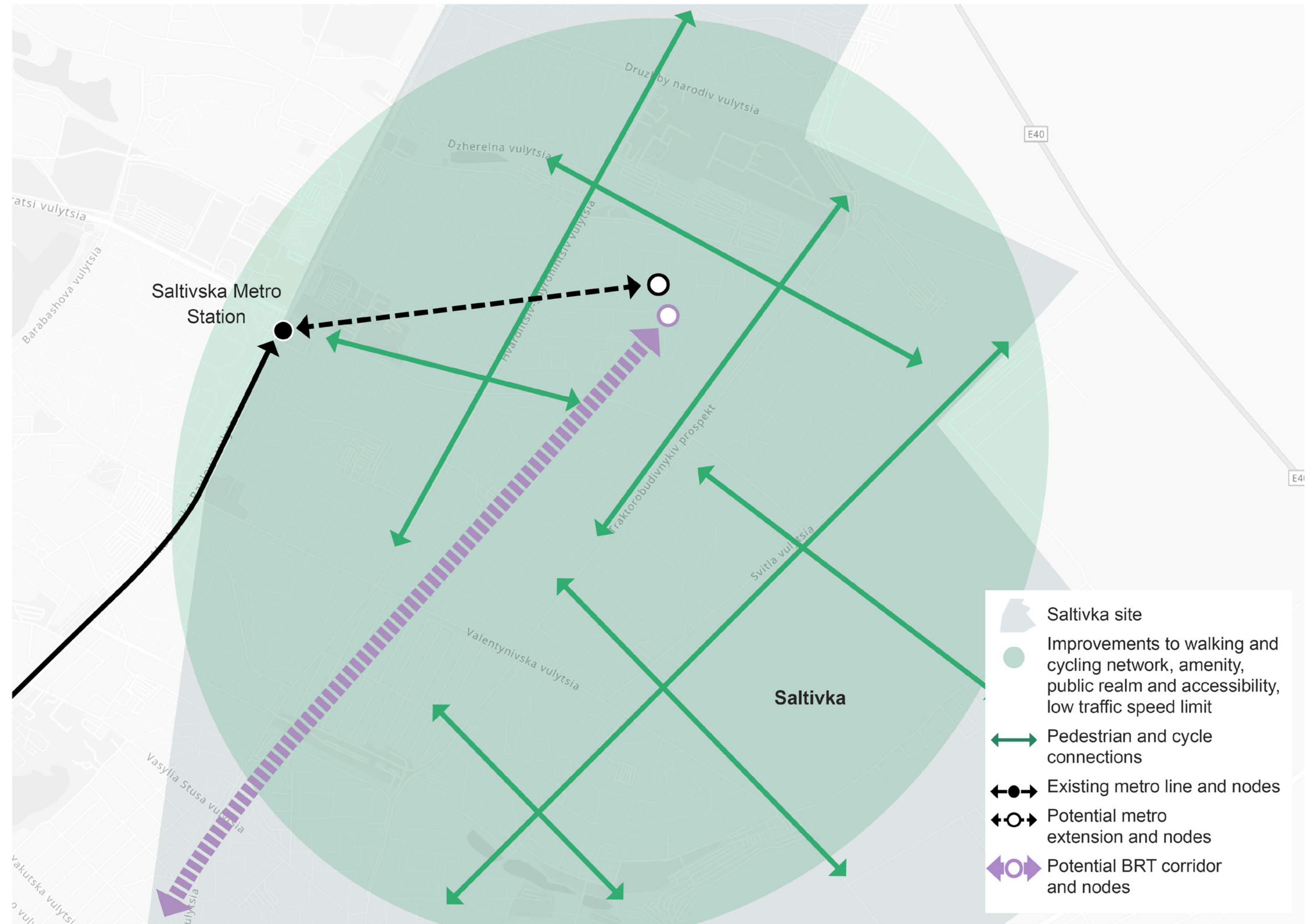
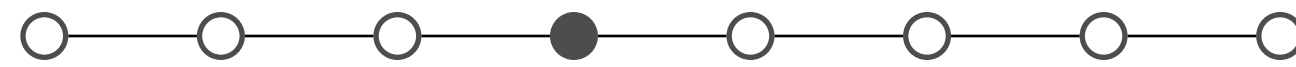


Figure 20 Project 2.2 - Saltivka – Liveable neighbourhood
Source: Arup



direct and continuous cycleways connecting to key destinations within the district. This could also provide new cycle lanes and crossings on key roads, providing continuous walking and cycling lanes for sports activities, also providing high-quality and secure cycle parking facilities at both residential and commercial developments.

- **Mixed-use developments** that have all essential functions on-site including local shops, banks and ATMs, pharmacies and medical centres, nurseries, schools and places of employment;
- **Parking regulation and traffic management** that aims to reduce on-street private car use through street design prioritising active travel. This could include establishing traffic management approaches that minimise through-vehicular trips and supported by establishing and adopting maximum parking standards for new developments.
- **Traffic calming interventions** that support the establishment and enforcement of low ground floor speeds of 20km/h on local residential streets and up to 60km/h on bigger distributor roads. This could be achieved through measures such as physical design, including speed bumps, chicanes etc, as well as introducing cameras for better speed enforcement.

- **Feeder connections** to integrate with public transport that ensure that walking and cycle networks are designed to connect to key public transport nodes and effective integration measures are put in place, including high-quality and secure cycle parking facilities at public transport stations, navigation maps and signage and Real-Time Passenger Information.
- **Accessibility measures** that should be incorporated neighbourhood wide, such as dropped kerbs and tactile paving at junctions, audio and visual support at junctions, ramps and lifts where there are level differences, particularly in public transport stations, whilst minimising physical barriers and obstacles.
- **Safety and security measures** that provide high-quality and frequent lighting, as well as CCTV coverage, providing shelters for military protection and severe weather conditions and signed navigation routes to them.

Project contribution to the wider objectives (KRTS, SUMP and Masterplan)

Contribution to KRTS Themes:

- Theme 1: Environmentally friendly Kharkiv
- Theme 2: Safe Kharkiv
- Theme 3: Modern and high-quality Kharkiv

- Objective 5.3: Creating investment-attractive conditions for the reconstruction and post-war development of the transport system.

Contribution to SUMP Objectives:

- Objective 1.1: Approaching zero deaths in road accidents.
- Objective 1.4: Reducing air pollution from transport.
- Objective 2.2: Developing micromobility and walking infrastructure in an inclusive and barrier-free manner to meet existing and future demand.
- Objective 2.3: Ensuring a high level of integration of sustainable mobility modes.
- Objective 4.1: Reducing the distance and time of population movement.
- Objective 4.2: Increasing the level of transport accessibility.
- Objective 4.3: Balanced development of mobility in administrative districts and micro-districts of the city.
- Objective 5.1: Applying the principles of sustainable development in the restoration of transport and road facilities.

Contribution to Masterplan Pilot Projects:

- Housing

5 THEME THREE: MODERN AND HIGH-QUALITY TRANSPORT

Thematic goal: To deliver a comprehensive, and integrated transport system that meets the mobility needs of all Kharkiv residents and visitors by providing attractive, affordable and accessible transport options through effective interconnections between all transport modes (e.g. metro, buses, trams, cycling and walking), across every city district.

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5.1 Headline data

- The pre-war public transport system in Kharkiv was already one of the most developed in Ukraine.
- There are metro lines that pass through almost all areas of the city, but the distribution of the 30 metro stations between different residential district is not equal. The metro rolling stock has been operating historically over a long time, impacting the quality of the service. It is estimated that the current wear level of the rolling stock is 95.3% (Dornier, GIZ, 2024).
- The Kharkiv trolleybus and tram networks represent ground electric transport modes that connect remote residential areas and the city centre, metro stations and industrial areas. The routes pass through almost all administrative areas of Kharkiv, but the density of provision varies from district to district. It is estimated that 46.9% of tram tracks, 40.2% of the contact tram network, 41.2% of the contact trolleybus network, 52.7% of the high-voltage cable network and also a significant part of equipment and buildings of traction substations need to be replaced (Dornier, GIZ, 2024).
- According to the SUMP, at the beginning of 2022, there were 1,400 ground public transport stops in Kharkiv within 500-meter walking distance covering 90% of the population.

However, only 67% of the stops were equipped with waiting pavilions, and only about 1% had electronic information boards (Dornier, GIZ, 2024).

- Step-free access within Kharkiv metro stations is very limited, with only two metro stations being equipped with lifts for people with limited mobility.
- There are 350+ electronic ticket terminals in the city and all halls and platforms of the metro stations are equipped with video surveillance systems to control and respond rapidly to changes in passenger traffic. Existing digital solutions include an automated ground electric dispatching system for trip planning and operational control and monitoring, as well as video information systems on new metro cars (Dornier, GIZ, 2024).
- As per the 2025 resident consultation, 61% of respondents are satisfied with the quality of public transport networks. However, 82% of respondents agree public transport is not accessible for all users.
- 55% of department officials consulted identified accessibility and 27% identified modernisation as areas for improvement in the transport network.
- The invasion has significantly impacted the Kharkiv transport system. Vehicle fleet, trolleybus, tram lines have been heavily damaged.

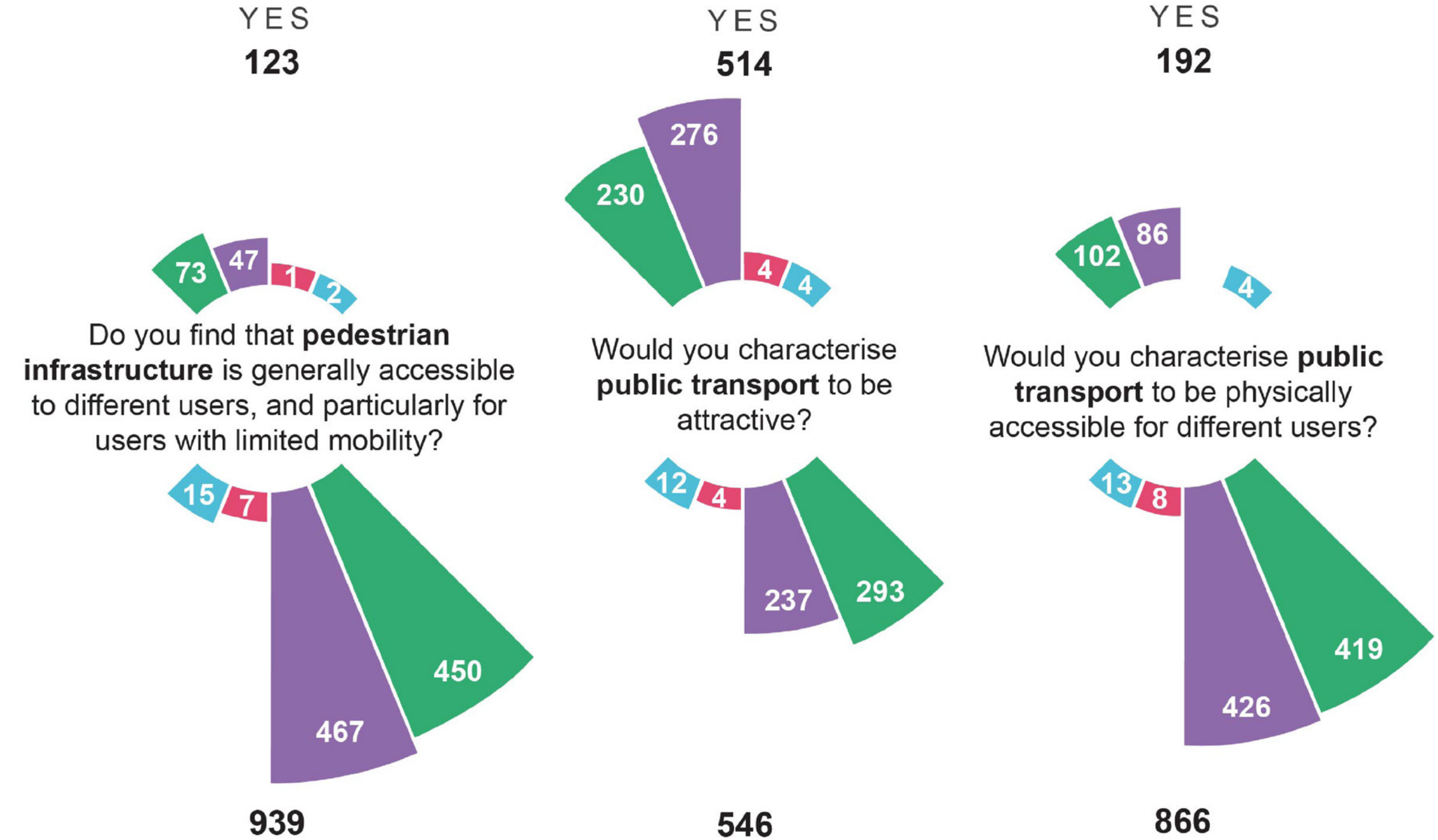


Figure 21 Survey of passenger opinions on pedestrian and cycle infrastructure, and public transport networks in Kharkiv.
Source: 2025 public consultation

Male
Female
Non-binary
Prefer not to say

5.2 Why is it important?

The National Transport Strategy for 2030 aims to increase the share of public transport fleet accommodating people with disabilities to 50% (Ukraine, National Transport Strategy of Ukraine 2030, 2018). The 2025-2026 Action Plan for Ukraine’s National Strategy for creating a barrier-free environment includes 798 measures and 110 tasks aimed at meeting accessibility targets by 2030 as part of the European integration agenda⁷.

National Transport Strategy also aims to increase percentage of population covered by scheduled bus transport, increase the overall share of public transport in general infrastructure and reduce fixed assets wear to 45% (Ukraine, National Transport Strategy of Ukraine 2030, 2018).

Delivering modern and high-quality transport infrastructure is crucial to the future liveability and prosperity of Kharkiv, particularly in the post-war and recovery context. High-quality infrastructure is necessary to effectively meet people’s complex and varied mobility needs, with a need to embed accessibility and inclusivity in the planning and design of transport to ensure that the network does indeed serve all users.

In a post-war environment this may be of heightened importance, given the likely higher proportion of persons living with long-term injury and restricted mobility. Ultimately, no one should be denied opportunities or have their potential stunted by a lack of suitable transport options.

Ensuring that transport is attractive, efficient, and well-designed will form the essential foundation for Kharkiv’s economic and social revival, with its potential to deliver a higher quality of life which, in turn, will attract residents, businesses, and visitors to come to Kharkiv. Unlocking this potential will require the city to modernise its existing infrastructure and embrace increasing digitalisation and rapid technological changes – both in transport and beyond – and to prioritise sustainable and resilient transport solutions.

Kharkiv must also embrace multi-modal integration and the integration of transport with land-use planning. This approach champions the role of public transport to strategically maximise capacity, enhance city-wide connectivity, and deliver growth, and champions the role of active travel in connecting compact, well-planned neighbourhoods and city districts. Furthermore, the pre-invasion trend in Kharkiv of increasing levels of car ownership can be managed by providing high-quality travel alternatives.

⁷ Government revises national strategy for barrier-free environment in Ukraine

5.3 What could Kharkiv do?

- **Promote accessibility and inclusion** in the transport network through the development of design standards for infrastructure and fleet and a city-wide campaign for improvement and awareness.
- **Improve attractiveness of public transport** with a roll-out of a city-wide programme to upgrade and modernise public transport networks including infrastructure and fleet.
- **Improve transport and land use integration** by establishing an approach to connect development density and transport connectivity and capacity, as well as by development of standards for transport accessibility and mixed-use developments. Provide effective interconnections between all transport modes (e.g. metro, buses, trams, cycling and walking) to enable seamless, reliable and convenient multimodal journeys for all users in every city district.
- **Expand and improve quality of interchanges** between walking, cycling and public transport for by developing standards for integration and through a variety of measures like step-free access, real-time information, navigation etc.
- **Build resilience into the transport network through** scenario planning and development of mitigation strategies, as well as through behaviour change.

5.4 Modern and High-Quality Transport strategic policies

In order to deliver key projects under this theme, there are a number of suggestions for strategic policies for Kharkiv that would underpin their successful delivery. They are set out in Table 4.

Table 4 Modern and High-Quality Transport – strategic policies

Policy	Key components
Comprehensive Transport System	<ul style="list-style-type: none"> • Develop a single comprehensive programme for the development of the entire transport system of Kharkiv City. • Define a single concept of the city’s transport networks • Define interconnections between the Reconstruction Masterplan Pilot Project areas and inter-district corridors. • Support development of high-capacity transport corridors including metro, Bus Rapid Transit (BRT) and tram corridors.
Accessibility	<ul style="list-style-type: none"> • Develop a strategic vision for inclusion and accessibility in transport. • Identify disadvantaged and vulnerable user groups which could include people with disabilities, the elderly, children, women. • Review accessibility and inclusion in all public transport modes based on current usage and future needs. • Review and update planning and design standards to ensure they incorporate accessibility requirements, for example ensure that all new public transport stations have step-free access and provide facilities like ramps, lifts etc, ensure that public transport fleet enables step-free access. • Identify accessibility pinch points and problematic areas in transport system (fleets and infrastructure) and develop a programme of city-wide improvements. • Develop and implement public awareness campaign on what accessibility and inclusion in transport networks mean and why they are important. • Align with other relevant policies such as the “National Strategy for the Creation of a Barrier-Free Environment” to ensure this strategy is a material consideration when developing any transport project in the city. • Set targets for implementation and identify budget to deliver.

Policy	Key components
Resilience	<ul style="list-style-type: none"> • Develop a strategic vision for resilience in transport - ensuring that every citizen always has at least two travel options available for the same type of journey. • Review all transport networks to identify current and potential vulnerabilities across modes. • Carry out scenario planning and develop mitigation strategies, for example – if one transport network is out of operation, what needs to be done to ensure residents have alternative travel options and disruption is minimised and the network can be recovered as quickly as possible. • Develop comprehensive incident management plan for major events, and external disruptions. • Develop a toolkit of typical go-to solutions for every scenario, for example – alternative travel routes during road closures, alternative times of travel during busy peak hours, alternative access to work and education if it is not possible to travel, evacuation plans for emergency events like fires, physical and structural defences in case of severe weather events like floods, provision of stop shelters for military strikes, backup power systems for energy outage etc. • Set targets for implementation and identify budget to deliver.
Modernisation	<ul style="list-style-type: none"> • Develop a strategic vision for transport modernisation – safe, accessible, green, high-quality, reliable, attractive, digital, innovative etc. – and align it with the current and future needs of the transport system. • Review and develop fleet and infrastructure standards that embed accessibility, safety and comfort. • Prioritise low-carbon solutions in new fleet and infrastructure, with clear targets set for transitioning existing assets. • Prioritise accessible and inclusive solutions in new fleet and infrastructure, with clear targets set for transitioning existing assets. • Provide for evolving user needs through measures like phone charging, air conditioning, Wi-Fi, real-time information and updates, audio and visual support etc. • Monitor and embrace new technologies. • Set targets for implementation, identify budget to deliver. • Prioritise development of key high-capacity corridors including metro, BRT and tram corridors.

Policy	Key components
<p>Transport Integration</p>	<ul style="list-style-type: none"> • This strategy should promote seamless transitions between different modes and provide solutions for its implementation. • Provide effective interconnections between all transport modes (e.g. metro, buses, trams, cycling and walking) across every city district, enabling seamless and reliable multimodal travel. • Strengthen planning and integration of interchange hubs and feeder services to improve multimodal connections and reduce transfer times. • Develop and implement solutions for seamless transitions between modes which could include multi-modal hubs, integrated timetables, through-ticketing, provision of real-time information, step-free access, provision of maps and clear signed navigation, restructuring of fares, electronic payments and booking, cycle parking facilities at public transport stations etc. • Aim to enhance digitalisation of transport infrastructure across modes which could include integration of real-time data, digital signalling etc. • Expand use of data in operations, planning and performance monitoring to optimise decision-making and user experience. • Set targets for implementation and identify budget to deliver.
<p>Integration with Land-Use</p>	<ul style="list-style-type: none"> • This strategy should aim to deliver well-connected and transit-oriented developments. • Develop requirements for integration between transport and land use planning, for example, requirements should recommend all new developments are in close proximity to public transport stops/stations and within coverage of key transport corridors, or that new transport links provided to serve new developments, there should be standards connecting land-use densities and transport capacities. • Aim to use passenger demand to guide long-term housing and infrastructure delivery which could require plans for integrated transport models, data collection and analysis to drive evidence-based decision making. • Create a coordinated framework to align transport planning with local spatial planning processes and economic growth plans, environmental and public health objectives, set out clear governance structure to support coordinated decision-making across relevant departments and transport modes including establishing lead authority, defining roles and responsibilities, and partnership agreements. • Incorporate strategy into statutory plans or policies to mandate compliance. • Set targets for implementation and identify budget to deliver.



Trolleybus in Kharkiv © Norman Foster Foundation

5.5 Modern and High-Quality Transport theme projects

Project 3.1 Science Neighbourhood

New multi-modal interchange.

Description of proposals

This project proposal includes the development of a new multi-modal interchange to facilitate easy and efficient transfers between different transport networks serving the site, including the existing Akademika Barabashova and Akademika Pavlova metro stations, bus and tram routes running along Akademika Pavlov Street, as well as a potential future Bus Rapid Transport corridor connecting to Saltivka and future public transport and active travel connections running through Science Neighbourhood over the river to the city centre. Proposals include the following components:

- **Introduction of a multi-modal station** at the central square through a redevelopment/expansion of the existing Akademika Barabashova metro station within the existing metro network.
- **Seamless local connections** between the station and the southern and northern areas of the masterplan. This could be achieved through a design that ensures maximum local permeability, for example, through the availability of multiple exit/entrance points and variety of passageways that integrate with the wider masterplan on both sides.

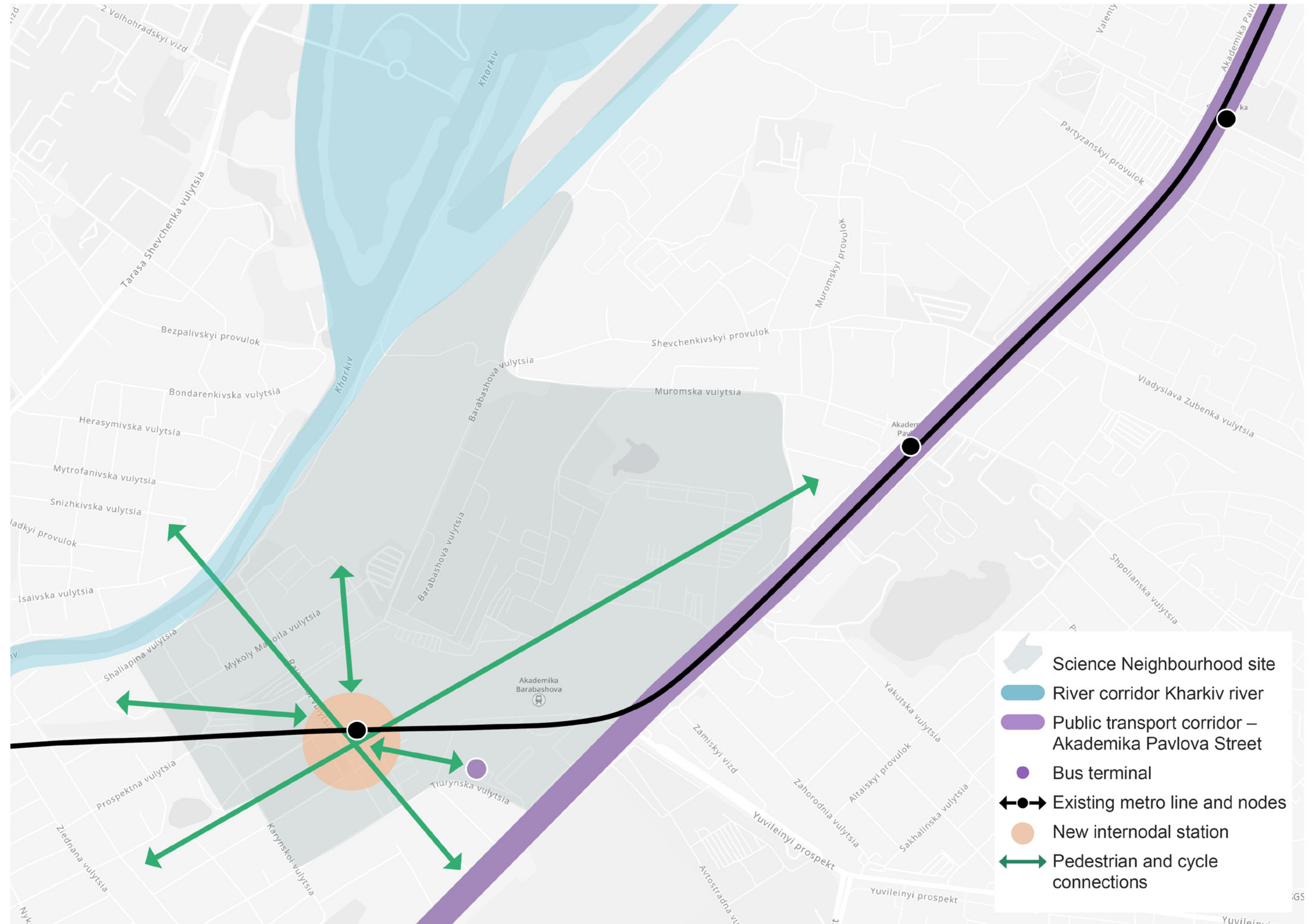
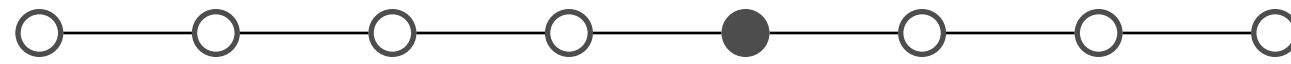


Figure 22 Project 3.1 - Science Neighbourhood - new multi-modal interchange
Source: Arup



Theme Three



- **Integration with the long-distance bus terminal** located immediately to the south-west of the station. This could be achieved through a provision of dedicated passageway/link between the two as well as with the help of measures such as wayfinding signage and Real-Time Passenger Information being provided at both stations arrivals and departures.
- **Integration with Akademika Pavlova metro station** through dedicated and signed walking routes between the two.
- **Integration with the tram and bus network** on the Akademika Pavlova Street corridor through dedicated and signed walking routes between the two, as well as with the help of Real-Time Passenger Information being provided at stops, as well as integrated ticketing.
- **Pedestrian connectivity** that would improve walking access to the station through a provision of dedicated, clearly signed and well-lit routes.
- **Cycle connectivity** that would be introduced through new feeder cycle connections to the station and providing high-quality secure cycle parking in accessible locations at the station.
- **Accessibility measures** such as dropped kerbs and tactile paving, audio and visual support on walking/cycling routes connecting to the station, provision of ramps and lifts, and minimising physical barriers and obstacles on walking and cycling routes connecting to the station.
- **Safety and security measures** that would ensure segregation between different road users, provision of pedestrian and cycle crossings at junctions, providing high-quality and frequent lighting as well as CCTV coverage, providing shelters for military protection and severe weather conditions and signed navigations routes to them.

Project contribution to the wider objectives (KRTS, SUMP and Masterplan)

Contribution to KRTS Themes:

- Theme 1: Environmentally friendly Kharkiv
- Theme 3: Modern and high-quality Kharkiv

Contribution to SUMP Objectives:

- Objective 2.1: Modernising and developing of public transport infrastructure.
- Objective 2.3: Ensuring a high level of integration of sustainable mobility modes.
- Objective 4.1: Reducing the distance and time of population movement.
- Objective 4.2: Increasing the level of transport accessibility.
- Objective 4.3: Balanced development of mobility in administrative districts and micro-districts of the city
- Objective 5.1: Applying the principles of sustainable development in the restoration of transport and road facilities.
- Objective 5.3: Creating investment-attractive conditions for the reconstruction and post-war development of the transport system.

Contribution to Masterplan Pilot Projects:

- Science Neighbourhood

Project 3.2 Kharkiv River Bridge

New active travel and public transport bridge connecting the science neighbourhood to city centre.

Description of proposals

This project proposal includes the construction of a new active travel and public transport only bridge across the river to provide connections between the new Science Neighbourhood and the city centre. The project will include the following components:

- **Active travel connections** delivered across the bridge, as well as routes connecting to the bridge on each side of the river, segregation between walking and cycling should be designed in.
- **Public transport connections** delivered through new bus infrastructure on the bridge.
- **Providing access to Kharkiv River** through the introduction of walking and cycling routes along the river that also connect and provide access to the bridge.

Project contribution to the wider objectives (KRTS, SUMP and Masterplan)

Contribution to KRTS Themes:

- Theme 1: Environmentally friendly Kharkiv
- Theme 3: Modern and high-quality Kharkiv

Contribution to SUMP Objectives:

- Objective 2.1: Modernising and developing of public transport infrastructure.
- Objective 2.2: Developing micromobility and walking infrastructure in an inclusive and barrier-free manner to meet existing and future demand.
- Objective 2.3: Ensuring a high level of integration of sustainable mobility modes.
- Objective 4.1: Reducing the distance and time of population movement.
- Objective 4.2: Increasing the level of transport accessibility.
- Objective 4.3: Balanced development of mobility in administrative districts and micro-districts of the city.
- Objective 5.1: Applying the principles of sustainable development in the restoration of transport and road facilities.

Contribution to Masterplan Pilot Projects:

- Science Neighbourhood
- Rivers



Figure 23 Project 3.2 - Kharkiv River Bridge - new active travel and public transport bridge connecting the science neighbourhood to city centre
Source: Arup

Project 3.3 Saltivka

Public transport extension (metro and/or bus/BRT)

Description of proposals

The project proposals include the introduction of a new high-capacity public transport corridor linking Saltivka to the wider city, which could be delivered through an extension to the existing metro and/or introduction of a new BRT corridor. There are several parts to this corridor: within Saltivka itself, from Saltivka to Science Neighbourhood, from Science Neighbourhood to the city centre, as well as opportunities for further extensions beyond the city centre. There are several options that are proposed for further review and investigation:

- **Option 1:** Extend the existing metro line from Saltivska metro station to the centre of the Saltivka district and introduction of a new metro station at the heart of the Saltivka district, increasing the walking catchment area to access the station.
- **Option 2:** Introduce a new BRT corridor connecting Saltivka to the Science Neighbourhood and beyond to the city centre, potentially via stop or an enhanced new multi-modal hub at Akademika Barabashova metro station; and
- **Option 3:** Delivery of a combined of Option 1 and Option 2 to deliver a step-change in connectivity, provide resilience and support future sustainable development growth.

In addition to the above, modernisation of the tram and bus networks within Saltivka and Science Neighbourhood should also be considered as this can complement and enhance the BRT/metro proposals by serving feeder connections to them. Tram and bus infrastructure will remain critical components of Kharkiv’s long-term mobility vision, particularly in dense districts such as Saltivka and Science Neighbourhood.

Project contribution to the wider objectives (KRTS, SUMP and Masterplan)

Contribution to KRTS Themes:

- Theme 1: Environmentally friendly Kharkiv
- Theme 3: Modern and high-quality Kharkiv

Contribution to SUMP Objectives:

- Objective 2.1: Modernising and developing of public transport infrastructure.
- Objective 2.3: Ensuring a high level of integration of sustainable mobility modes.
- Objective 4.1: Reducing the distance and time of population movement.
- Objective 4.2: Increasing the level of transport accessibility.
- Objective 4.3: Balanced development of mobility in administrative districts and micro-districts of the city.
- Objective 5.1: Applying the principles of sustainable development in the restoration of transport and road facilities.

Contribution to Masterplan Pilot Projects:

- Housing



Figure 24 Project 3.3 - Saltivka - public transport extension (metro and/or bus/BRT)
Source: Arup

Project 3.4 Serp I Molot Industry masterplan

Unlocking development site through transport interventions

Description of proposals

The project proposals include developing local and strategic transport interventions that support the development of a masterplan for the former Serp I Molot site, accounting for the unique opportunity to create a new area for development, that can be designed to be fully connected and integrated into wider Kharkiv.

Proposals include the following components:

- **Internal connectivity** that is maximised through specific transport interventions that enable local permeability to ensure that newly proposed developments are well-integrated with nearby areas including residential areas, the river and industrial spaces. This could be achieved through introduction of a network of direct high-quality walking and cycling routes that run continuously through the development and connect to both existing and potential future development areas either side of the masterplan. Other measures should also include pedestrian and cycle crossings at junctions, provision of high-quality secure cycle parking, green open space areas for leisure and sport activities.

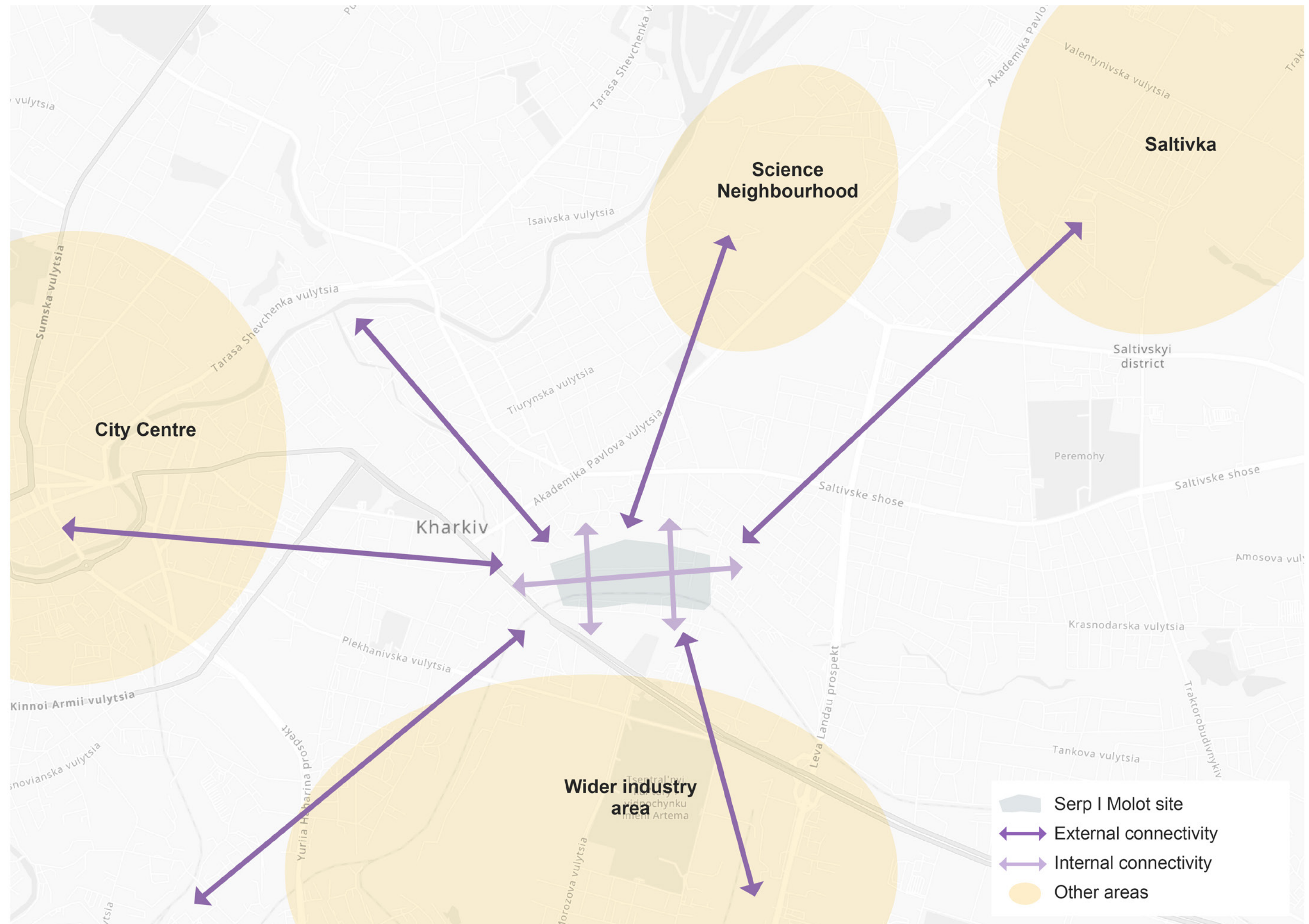


Figure 25 Project 3.4 - Serp I Molot Industry masterplan – unlocking development site through transport interventions

Source: Arup

- **External connectivity** that is facilitated through the provision of new public transport routes and connections linking into the existing transport systems of the city, which would provide access to areas such as the Science Neighbourhood to the north, city centre to the east and the Airport to the south. To enable good public transport connectivity, public transport stops and stations should be provided in close proximity to the development or within the development. Public transport networks should be integrated to enable quick transfers enabled through the provision of signed navigation routes between different public transport nodes, provision of Real-Time Passenger Information and integrated ticketing.
- **Accessibility measures** should be incorporated, such as dropped kerbs and tactile paving at junctions, audio and visual support, ramps and lifts where there are level differences, particularly at public transport stations and minimising physical barriers and obstacles.
- **Safety and security measures** should be provided through high-quality and frequent lighting as well as CCTV coverage, providing shelters for military protection and severe weather conditions and signed navigations routes to them.

Project contribution to the wider objectives (KRTS, SUMP and Masterplan)

Contribution to KRTS Themes:

- Theme 1: Environmentally friendly Kharkiv
- Theme 2: Safe Kharkiv
- Theme 3: Modern and high-quality Kharkiv

Contribution to SUMP Objectives:

- Objective 2.3: Ensuring a high level of integration of sustainable mobility modes.
- Objective 4.2: Increasing the level of transport accessibility.
- Objective 5.1: Applying the principles of sustainable development in the restoration of transport and road facilities.
- Objective 5.3: Creating investment-attractive conditions for the reconstruction and post-war development of the transport system.

Contribution to Masterplan Pilot Projects:

- Industry



Residential district in Kharkiv © Norman Foster Foundation

Project 3.5 - Saltivka/Science Neighbourhood

Public transport modernisation

Description of proposals

The project proposals include the modernisation of the core public transport corridor between Saltivka and the Science Neighbourhood, including new and/or upgraded infrastructure and new fleet/rolling stock, all to include accessibility and integration improvements. The Saltivka PT extension could be one of the corridors where this modernisation can be introduced.

Proposals include the following components:

- **Modern high-quality fleet** delivered through a providing new, modern and high-quality vehicles and rolling stock for comfortable and attractive journeys. Facilities could include comfortable seats, spacious carriages, on-board ticketing machines, displays showing information on routes and stops, audio announcements about routes and stops, RTPi on other routes and transport networks, phone charging, Wi-Fi, and electronic ticketing and booking.

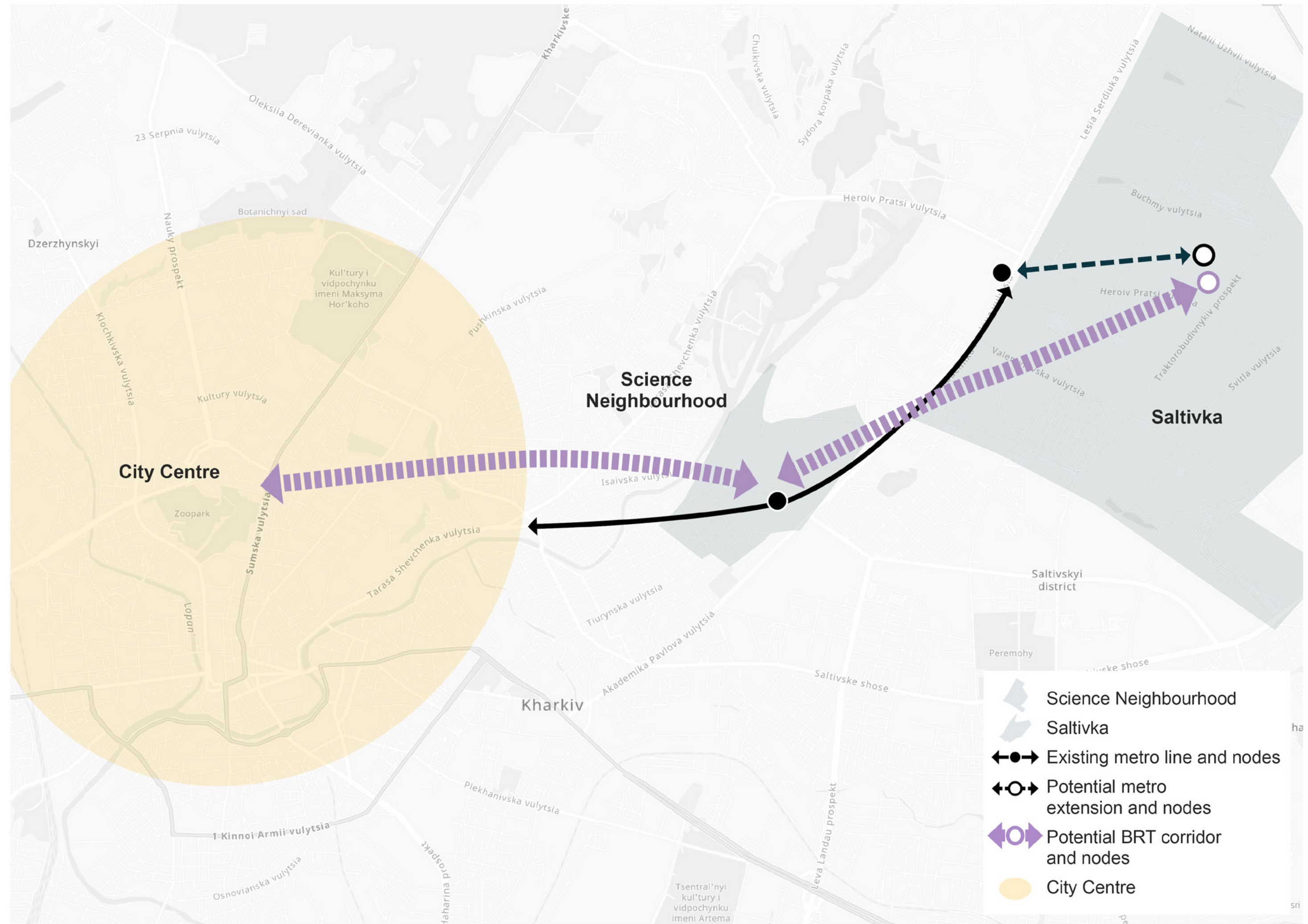
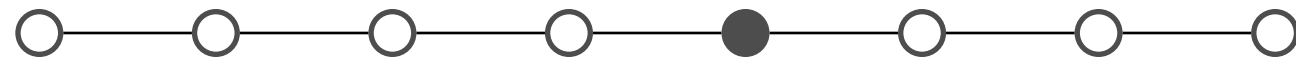


Figure 26 Saltivka/Science Neighbourhood public transport modernisation

Source: Arup



Theme Three



- **Decarbonisation** of the network through provision of a green fleet of vehicles. This could include provision of a fully electric, zero-emission fleet or a fleet with greener fuel options such as various derivatives of biofuels, natural gas, synthetic fuels. Whilst decarbonisation is important it should be balanced with more traditional fuels until the risk of military associated disruption to the energy supply is minimised.
- **Accessibility improvements** through ensuring any new fleet is compatible with the existing infrastructure, for example making sure that platform heights and fleet doors are aligned and there is no gap or step between them and providing special equipment for wheelchair users access where it is not possible to provide step-free access. All stations should be equipped with ramps or lifts, timetable information should be provided both visually and through audio announcements, fleet should have spaces areas for users with special needs such wheelchair users, pregnant women and parents with pushchairs.
- **Safety and security measures** delivered through ensuring the new fleet has features such as seat belts where relevant, escape doors/windows, CCTV cameras on board, dial-in options to contact security or emergency services and others.

Project contribution to the wider objectives (KRTS, SUMP and Masterplan)

Contribution to KRTS Themes:

- Theme 1: Environmentally friendly Kharkiv
- Theme 2: Safe Kharkiv
- Theme 3: Modern and high-quality Kharkiv

Contribution to Masterplan Pilot Projects:

- Science Neighbourhood
- Housing

Contribution to SUMP Objectives:

- Objective 1.4: Reducing air pollution from transport.
- Objective 2.1: Modernising and developing of public transport infrastructure.
- Objective 2.3: Ensuring a high level of integration of sustainable mobility modes.
- Objective 3.2: Digitalising the urban mobility system
- Objective 3.3: Using modern technologies in making management decisions to improve the mobility system.
- Objective 3.4: Ensuring the implementation and proper functioning of innovative transport management technologies
- Objective 4.2: Increasing the level of transport accessibility.
- Objective 5.1: Applying the principles of sustainable development in the restoration of transport and road facilities.
- Objective 5.3: Creating investment-attractive conditions for the reconstruction and post-war development of the transport system.

6 IMPACT OF THE STRATEGY

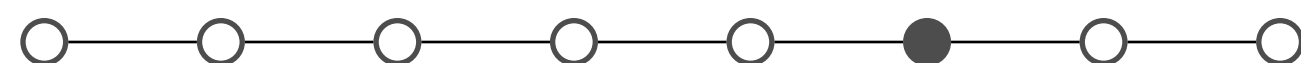
The KRTS sets out a range of strategic policies and projects that together aim to support recovery and reconstruction in Kharkiv, and the development of attractive and sustainable transport post-war.

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6.1 Impact of the Strategy

It is expected that once implemented, the KRTS proposals will lead to the following outcomes:

- **Walking experience will become safer, more pleasant and more attractive** for the city residents. It will also become the main travel option for local movements within neighbourhoods and districts.
- **Cycling will emerge as a new travel alternative** for local mobility, but also for longer trips connecting to attractions in nearby neighbourhoods and districts. It will also serve as feeder connection to public transport hubs enabling wider transport integration.
- **Public transport networks that were damaged by military action will be gradually restored**, but also improved as part of the wider modernisation programme. Key infrastructure will be upgraded to the leading accessibility and safety standards. The fleet will be renewed to include more attractive and sustainable vehicles. Key transport interchanges and hubs will become easier and quicker to use due to real-time information and improved navigation. Overall, the public transport experience will become more attractive and pleasant for the city residents, and they will continue relying on it for the majority of their cross-city journeys.
- **The majority of the city residents will use private transport only occasionally**, for example for leisure trips over weekends, but will not rely on it as their main mode of transport for typical day-to-day activities within the city. When they use private transport, it will be easy for them to find a place to park and pay for it. Within residential districts, there will be sufficient and regulated car parking provision, but avoids over-supply and promotes low-car living.
- **Local neighbourhoods and districts will become more self-sufficient** because of improved and increased walking and cycling, as well as due to mixed-used development coming forward and potentially as more people work a proportion of their work-week from home. As a result, shorter distance journeys will become more popular, and the need for longer cross-city journeys will decrease.
- **Residential districts that were affected by military action the most will be gradually reconstructed** and integrated back into the wider transport system with the help of upgraded and new high-capacity transport corridors.
- **The overall transport system will become more resilient**, meaning that Kharkiv residents will have a variety of efficient and reliable travel options available to them. In case one network becomes disrupted, other networks will still be functional to facilitate essential movements.
- More detailed outcomes associated with each of the KRTS Themes are presented in the following sections, as well as in Appendix 6.



6.2 Outcomes for Theme 1: Environmentally Friendly Transport

Table 5 Theme 1 – Environmentally Friendly Kharkiv - anticipated outcomes of the proposals

Transport Principles	Key outputs	Key outcomes
Prioritising active travel	<ul style="list-style-type: none"> Quality of the existing walking infrastructure is improved. Cycle infrastructure is introduced. 	<ul style="list-style-type: none"> Residents become more satisfied with the quality of infrastructure and the overall walking experience becomes more attractive for shorter journeys. Residents start cycling for commuting as well as for leisure. More people switch to walking and cycling for shorter journeys and as a result less people drive, leading to better air quality. People become more active, resulting in healthier lifestyles.
Encouraging Public Transport Uptake	<ul style="list-style-type: none"> Quality of the existing public transport infrastructure and fleet is improved. New public transport infrastructure is provided to address gaps in the network. 	<ul style="list-style-type: none"> Residents become more satisfied with the quality of the public transport provision. Overall public transport connectivity and accessibility has improved. People who already use public transport continue using it, more people switch to public transport for longer journeys, less people drive leading to better air quality.
Travel Demand Management and Parking Regulation	<ul style="list-style-type: none"> Parking becomes more regulated (paid, enforced etc). Wider TDM solutions become available. 	<ul style="list-style-type: none"> Residents change their travel behaviour: they travel less when possible, they travel using other alternative routes, they travel different time of a day, they switch from driving to other travel modes. Less people drive leading to better air quality. There is less parking on street, resulting in more space available for other sustainable uses, for example Active travel or green spaces.
Wider Sustainability	<ul style="list-style-type: none"> Public Transport fleet is decarbonised. Infrastructure for EVs is introduced. 	<ul style="list-style-type: none"> Residents use decarbonised public transport fleet. Residents switch to EVs. Less emissions and better air quality.

6.3 Outcomes for Theme 2: Safe Transport

Table 6 Theme 2 – Safe Kharkiv - anticipated outcomes of the proposals

Transport Principles	Key outputs	Key outcomes
Road Safety	<ul style="list-style-type: none"> Installation of traffic calming infrastructure. Reduced speed limits and better enforcement of traffic rules. Improved street configuration for people walking and cycling. Crossing facilities are improved. 	<ul style="list-style-type: none"> Improved pedestrian and cyclist experience and increased foot and cycling traffic. Increased public awareness. Fewer accidents and injuries. Increased use of transport and public spaces from improved safety perception. Roads become safer for all users. Better quality of life for residents. Liveable streets and more social interaction.
Personal and Wider Security	<ul style="list-style-type: none"> Improved signage and maps. Installation of CCTV and lighting network. Evacuation and emergency plans. Designated safe zones and routes. 	<ul style="list-style-type: none"> Reduced road and foot congestion. Reduced crime rates. Improved preparedness and protection during emergencies and incidents. Improved risk and crowd management. Improved public safety and confidence.

6.4 Outcomes for Theme 3: Modern and High-Quality Transport

Table 7 Theme 3 – Modern and High-Quality Kharkiv - anticipated outcomes of the proposals

Transport Principles	Key outputs	Key outcomes
Inclusive, High-Quality Infrastructure	<ul style="list-style-type: none"> Active travel and public transport crossings. Modern and accessible bus stops and stations. Installed accessible road infrastructure. Modern rolling stock. 	<ul style="list-style-type: none"> Transport networks become more accessible for different users. Improved journey quality and comfort. More people switch to public transport reducing car use and driving wider sustainability. Improved attractiveness and popularity of public transport networks.
Transport Connectivity, Integration and Resilience	<ul style="list-style-type: none"> Multi-modal interchange hubs. Transport apps. Digital signage and maps. Advanced ticketing and payment. Expansive public transport network. Expansive walking and cycling network. 	<ul style="list-style-type: none"> Transport interchanges become quicker and easier to make, overall journey times or perception of it reduces. Transport offer is resilient, residents always have several/alternative travel or access options. Improved journey quality and comfort. Increase in sustainable transport modes for longer trips, reducing car use and driving wider sustainability. More balanced use across various transport networks.
Transport and Land Use Integration	<ul style="list-style-type: none"> Self-sufficient developments with land uses serving all essential needs. High-capacity corridors for areas with high population density. 	<ul style="list-style-type: none"> More efficient access to trip attractors, services and transport network transport. Less crowded services. Increase in sustainable transport modes resulting in better air quality and safety. Vibrant and liveable neighbourhoods with increased social interaction.



Damaged residential building in Kharkiv © Norman Foster Foundation



7 DELIVERY AND IMPLEMENTATION ROUTE MAP

The KRTS represents a unified and comprehensive programme for the development of the city of Kharkiv’s entire transport system. It aligns with the Kharkiv Reconstruction Masterplan and requires all future projects and feasibility studies to be integrated within a coherent, city-wide network concept.

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This Chapter presents the proposed implementation route map for the KRTS and its projects and includes a proposed delivery timeline and principles that underpin the approaches to funding projects, the governance required to deliver them and key elements of monitoring and evaluation to ensure

that delivery progress is managed and successes recorded. The final KRTS framework is illustrated in Figure 24. This brings together all elements of the vision, the overlap with the SUMP and sets out how the themes, strategic policies and key projects are all connected.

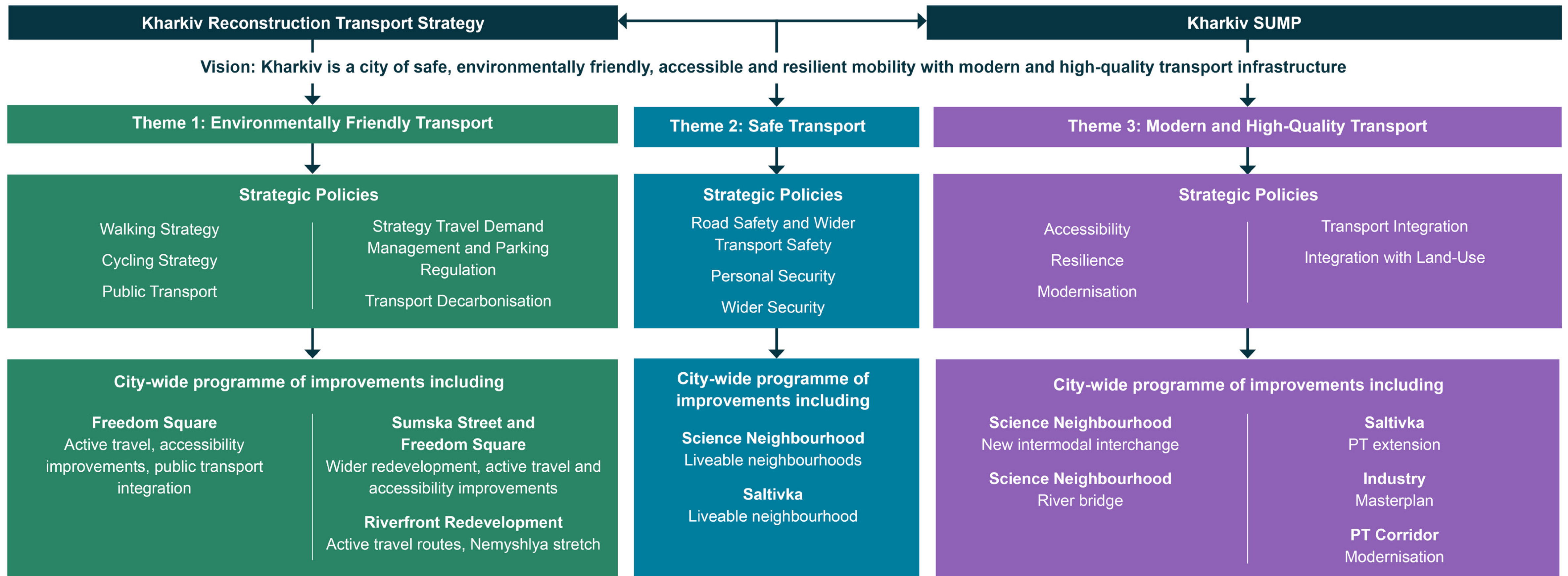
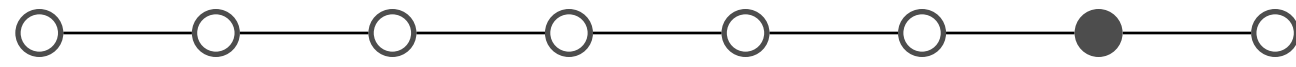


Figure 27 Final KRTS framework
Source: Arup



7.1 Implementation Plan and Delivery Timeline

The implementation plan and indicative timeline for all projects and their delivery is presented in Figure 25. The implementation plan sets out a route map for the delivery of the key components of the strategy, including the **strategic policies** (as detailed in previous Chapter), a number of **city-wide programmes** (as proposed by the strategic policies), the **transport projects**, that set out place-specific improvements and all supported by an **indicative timeline for implementation**, giving an indication of a likely timeline needed for planning, design and delivery.

It should be appreciated that due to the ongoing Russian invasion, until a just and lasting peace has been achieved in Ukraine, the estimated delivery timescales will be subject to a heightened degree of uncertainty. As such, a flexible and adaptive approach will be essential, with all aspects of these timelines requiring regular review and adjustment as necessary.

		Short-term (0-12 months)	Medium-term (1-5 years)	Long-term (5+ years)
Strategic Policies	Developing walking and cycling strategy	█		
	Developing public transport strategy including policies on modernisations, resilience, transport and land use integration	█		
	Developing travel demand management and parking strategy	█		
	Developing transport decarbonisation strategy	█		
	Developing strategy for transport safety and security	█		
	Developing strategy for accessibility	█		
City-wide Programmes	Walking improvements	█		█
	Cycling network introduction and expansion	█		█
	Public transport improvements and expansion	█		█
	Public transport decarbonisation	█		█
	Accessibility improvements	█		█
	Road safety improvements	█		█
	Wider-security programme	█		█
Transport Projects	Freedom Square: active travel improvements, PR integration	█		█
	Saltivka: PT extension (metro and/or bus)	█		
	Science Neighbourhood: New multi-modal interchange	█		
	Industry: Masterplan development	█		
	Saktivka: Liveable neighbourhoods	█		█
	Science Neighbourhood/Rivers: River bridge for active travel and PT	█		
	Freedom Square/Sumska Street: Wider redevelopment, active travel	█		█
	PT modernisation: Achieving high-quality modern PT corridor	█		█
	Science Neighbourhood: Liveable neighbourhoods	█		
	Riverfront Redevelopment: Active travel routes	█		

Figure 28 KRTS Implementation Plan and Delivery Timeline

7.2 Priority projects

A Multi-Criteria Assessment (MCA) and prioritisation exercise were undertaken, and this resulted in three key transport projects being prioritised and selected for further analysis.

They are (1) Project 3.3 - Saltivka - public transport extension, (2) Project 3.1 - Saltivka - Liveable Neighbourhood, and (3) Project 2.2 Science Neighbourhood - New multi-modal interchange. Key attributes and components of these project are further presented in the project fiches below.

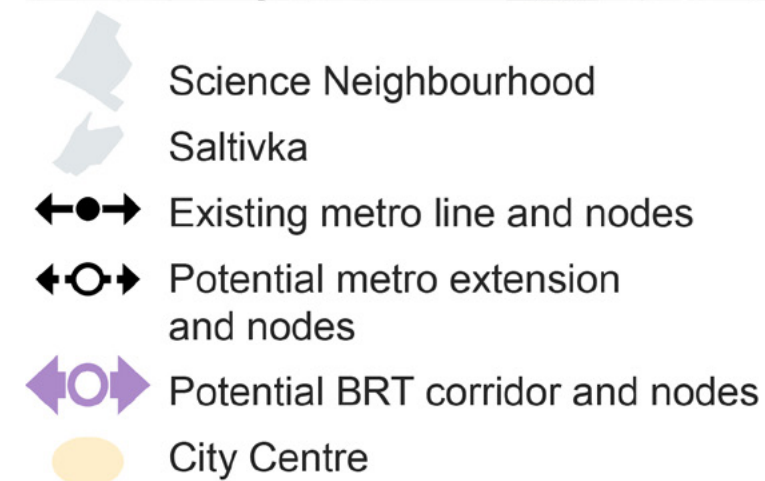


Figure 29 Project 3.3 - Saltivka - public transport extension (metro and/or bus/BRT)
Source: Arup



Figure 30 Project 3.1 - Science Neighbourhood - new multi-modal interchange
Source: Arup

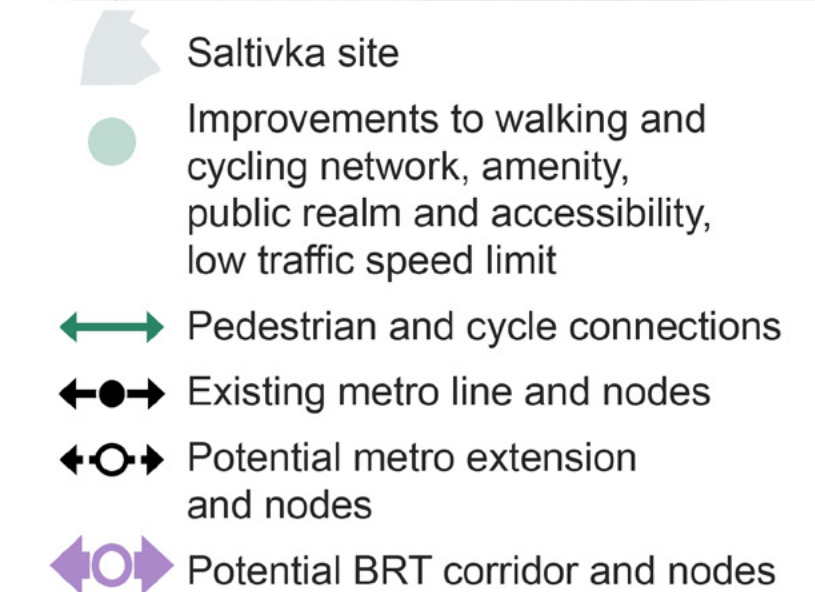
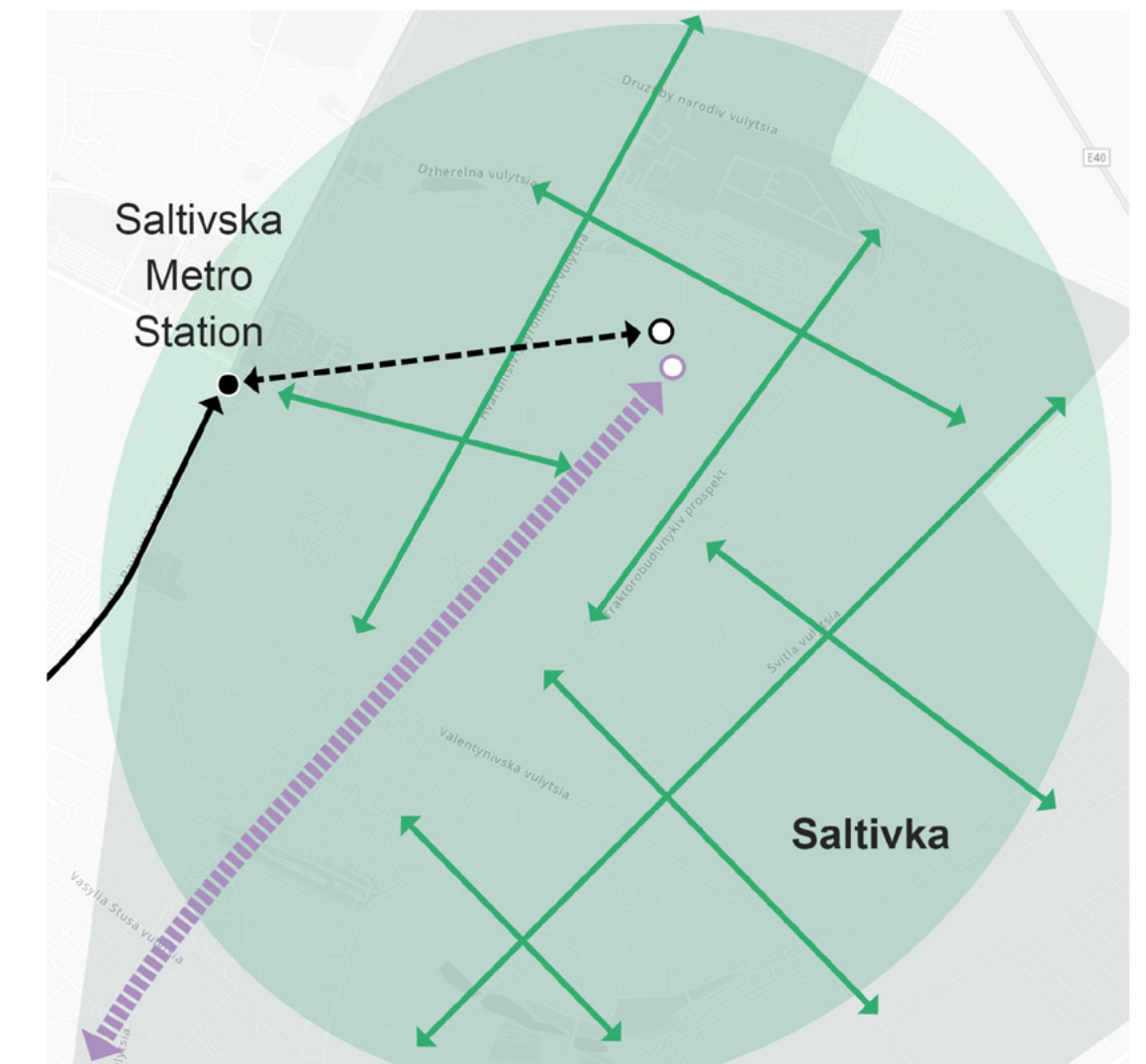
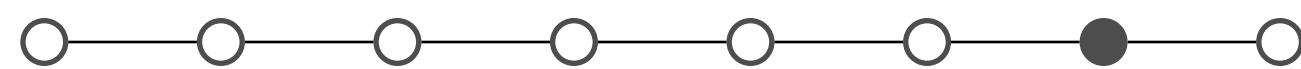


Figure 31 Project 2.2 - Saltivka – Liveable neighbourhood
Source: Arup



Delivery and
Implementation Route Map



PRIORITY PROJECT 1 FICHE

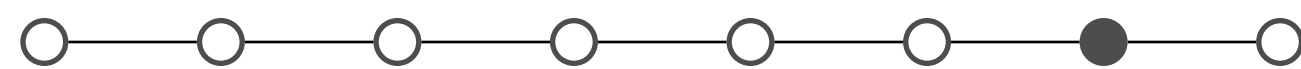
Project 3.3 Saltivka – PT extension (metro and/or bus)

Theme 3: Modern and High-Quality Transport

Table 8 Priority Project 1 Fiche: Project 3.3 - Saltivka – PT extension (metro and/or bus)

Transport mode	Public Transport (Metro and/or Bus)
Problem description	<p>Low transport connectivity for Saltivka, one of the densest residential districts in the city.</p> <p>Current transport connection is prone to disruption and operates at capacity and there are no alternatives in place.</p> <p>Better and several high-capacity connections needed to the city centre and beyond.</p>
Description of the project	<p>This extension is a part of a bigger transport corridor that can include several stages:</p> <ul style="list-style-type: none"> • Extension into Saltivka itself • Saltivka to Science Neighbourhood connection • Science Neighbourhood to the city centre connection • Potential further connections to the south, for example to the Airport and future developments in post-industrial areas. <p>This project looks at the Extension to Saltivka part and there are several options:</p> <p>Option 1: extending existing metro line from Saltivska metro station to the district centre and creating a new station at the heart of Saltivka</p> <p>Option 2: introducing BRT corridor connecting to Saltivka (with a potential to be then further extended to Science Neighbourhood and beyond, can be also paired with the Active travel corridor)</p> <p>Option 3: a combination of Option 1 and Option 2 for resilience</p>
Benefit (in brief)	<p>Saltivka district will be better connected to the city centre Balanced integration between land use and transport will be achieved. More resilience as there will be different travel options available. Potential for further corridor extension that can unlock connectivity for other areas of the city.</p> <p>Contribution to KRTS Themes</p> <p>Theme 1: Environmentally friendly Kharkiv Theme 3: Modern and high-quality Kharkiv</p>
Beneficiaries	City population Kharkiv City Council

Current status	Concept idea
Design period	2-5 years
Construction period	5-10 years
Financing source	International finance institutions, government contributions and donor grants
Typical costs for key components (approximates)	<p>Metro extension</p> <p>Civil works £50 - £170M per km Stations £12 – £50M each Systems & Others (excluding vehicle) £21 - £70M Another Kharkiv metro extension project suggests circa £80M per km including stations and rolling stock</p> <p>BRT corridor</p> <p>£8 - £13M per km</p>
Owner/responsible party	Kharkiv City Council Department of Construction and Road Management
Third parties involved	Public transport operators Parking operators
Indicators	% Project completion, km built/operated Number of trips made per month/year
Relation with other projects	<p>Project 3.1 Science Neighbourhood - new multi-modal interchange</p> <p>Project 3.2 Kharkiv River Bridge - new active travel and public transport bridge connecting the science neighbourhood to city centre</p>
Constraints and risks	Dialogue with all affected parties will be important, securing funding early will be critical, holistic approach to financing is essential.



**Delivery and
Implementation Route Map**



PRIORITY PROJECT 2 FICHE

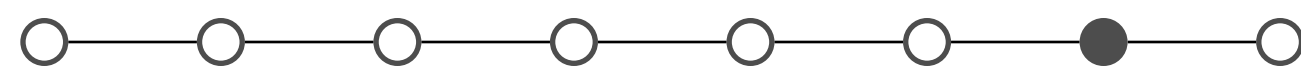
Project 3.1 Science Neighbourhood – New multi-modal Interchange

Theme 3: Modern and High-Quality Transport

Table 9 Priority Project 2 Fiche - Project 3.1 Science Neighbourhood – New multi-modal Interchange

Transport mode	Public Transport (metro, bus, trolleybus and tram) Active travel (walking, wheeling and cycling)
Problem description	<p>The Science Neighbourhood site has a number of physical constraints that represent barriers for both local and wider connectivity, including the Kharkiv River, industrial and market infrastructure, existing transport corridors like metro line and Akademika Pavlova Street.</p> <p>Several travel options are already available in this area, but they are not integrated and lack quality in terms safety, accessibility, ease of use and general attractiveness.</p> <p>If unresolved, these issues will block further development of this area.</p>
Description of the project	<p>Creating a new multi-modal interchange to facilitate quick transfers between different transport networks serving the site including the existing Akademika Barabashova and Akademika Pavlova metro stations, bus and tram routes running along Akademika Pavlova Street, as well as potential future BRT corridor connecting to Saltivka and future public transport and Active travel connections running through Science Neighbourhood over the river to the city centre.</p> <ul style="list-style-type: none"> • A multi-modal station is proposed at the central square within the metro network, enabling seamless connections between the southern and northern areas of the masterplan as well as to the long-distance bus terminal. • Integration with Akademika Barabashova and Akademika Pavlova metro stations • Integration with the bus station • Integration with the tram network on Akademika Pavlova Street • Improving pedestrian access to the station • Introducing cycle connections to the station and cycle parking at the station, both on-street short-stay and secure hubs for long-stay • Accessibility improvements (step free access from street to platform to metro via ramps or elevators, dropped kerbs at pedestrian crossings, tactile pavements to signal crossings, platform edges, audio and visual support and announcements, wider pavements to support wheelchair / pushchair users or those with guide dogs) • Safety improvements (segregation of different users, including protected cycle lanes and segregated pedestrian crossings, raised pedestrian crossings to slow traffic and improve visibility) • Security measures (lighting, CCTV coverage on buses, trams, metro and at the station, help or emergency call points at station, shelters and navigation routes)

Benefit (in brief)	The interchange will enable easy, quick and seamless transfers between different transport modes, which will improve the overall attractiveness of active travel and public transport travel options for city residents. It will also strengthen the strategic role of Science Neighbourhood as of a connector between the city centre and residential areas such as Saltivka.
Beneficiaries	City population Kharkiv City Council
Current status	Concept idea
Design period	2-5 years
Construction period	5-10 years
Financing source	International financial institutions, government contributions and donor grants
Typical costs for key components (approximates)	Station (civil, structural works) - £12 - £50M Improved bus stop (covered shelters/on-demand bus pick-up) - £4,000 - £6,000 each Multi-modal ticket machine - £1,000 each Wayfinding (Totem Pole) - £2,500 - £5,000 each New light column - £380 each Secure cycle parking with facilities - £84,000–£590,000 per site Cycle parking - £1,200 per space (E)-cycle hire - £4,200 for an area of 5sqm concrete base connecting to power and data Shared e-bike - £2,500 per e-bike Build out taxi rank - £13,000 - £15,000 each
Owner/responsible party	Kharkiv City Council Department of Construction and Road Management
Third parties involved	Public transport operators Parking operators
Indicators	% Project completion, km built/operated, number of trips made per month/year
Relation with other projects	Project 3.3 - Saltivka – PT extension (metro and/or bus) Project 3.2 - Kharkiv River Bridge - new active travel and public transport bridge connecting the science neighbourhood to city centre
Constraints and risks	Dialogue with all affected parties will be important, securing funding early will be critical, holistic approach to financing is essential



**Delivery and
Implementation Route Map**



PRIORITY PROJECT 3 FICHE

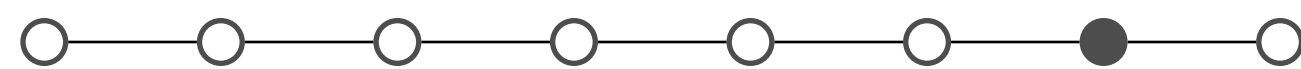
Project 2.2 Saltivka Liveable Neighbourhood

**Theme 2:
Safe Transport**

Table 10 Priority Project 3 Fiche: Project 2.2 - Saltivka Liveable Neighbourhood

Transport mode	Active travel (walking, wheeling and cycling) Integration with Public Transport (metro/bus) Parking regulation and traffic management
Problem description	Saltivka is a high-density residential area with many local and wider trips being made every day. There are no comprehensive walking and cycling networks in place. Quality of the existing street and road infrastructure has been deteriorating in many places. There is a lot of informal and uncontrolled parking on streets. Parts of Saltivka have been severely damaged as a result of military action.
Description of the project	<p>Creating self-sufficient neighbourhoods that are designed with facilities for all essential needs through development of walking and cycling infrastructure and traffic calmed/slow speed environment to prioritise and promote active travel modes for internal connectivity within the neighbourhood. Also focus on direct routes to feed into public transport connections – improving integration. Proposals include:</p> <ul style="list-style-type: none"> • Developing comprehensive walking and cycle networks (e.g. segregated cycle lanes on key corridors, develop wayfinding signage and mapping, including walking times and cycling distances). • Integrating walking and cycling with public transport (e.g. on-street and secure cycle parking, hire hubs for e-bikes at key interchanges, introduce bike racks on buses, trams and metro) • Providing mixed-used developments facilitating all essential needs of residents (e.g. incentivise ground floor commercial use in new residential developments through design codes or funding mechanisms) • Introducing parking regulation and traffic management to minimise unnecessary local car travel (e.g. introduce controlled parking zones and access restrictions to discourage car travel through sensitive areas like school streets, introduce fare discounts, capping schemes or free travel initiatives for certain age groups or unemployed to incentivise behavioural change to public transport use.) • Introducing traffic calming for safer environment (e.g. implement speed limits around schools, supported by signage and enforcement, install speed ramps at crossing points and junctions, redesign streets with build – outs and tree planting to slow traffic, trial school street schemes that restrict vehicle access during drop-off and pick-up times). • Accessibility measures (e.g. ensure accessible seating and rest points are provided along pedestrian routes, install dropped kerbs, tactile paving and audible signals for blind and particularly sighted users at crossings.) • Safety and security measures (e.g. improve lighting along walking and cycling routes, particularly in quiet streets or parks, develop a public awareness campaign around reporting safety or harassment concerns, with a text or app-based system.)

Benefit (in brief)	Saltivka will become an inviting and attractive district with exemplar high-quality walking and cycling networks that provide easy and quick access to all essential needs as well as to key public transport nodes. Streets and places will become safer and more attractive for various business and leisure activities.
Beneficiaries	City population Kharkiv City Council
Current status	Concept idea
Design period	2-5 years
Construction period	1-3 years for existing areas (improvements) 2-5 years for new areas (new construction)
Financing source	International financial institutions, government contributions and donor grants
Typical costs for key components (approximates)	<p>Community space (planters, street art, seating and lighting) - £50,000 each One-way street - £20,000 each Street greening - £1,000 - £3,000 each Contra-flow cycle street - £20,000 each New or improved crossing - £10,000-£50,000 each Major junction improvement - £520,000 each Secure cycle parking with facilities - £35,000 – £60,000 per site Cycle parking - £1,500 per space Cycle parking hangar - £7,000 each (E)-cycle hire - £5000 for an area of 5sqm concrete base connecting to power and data Shared e-bike - £2,700 per e-bike</p>
Owner/responsible party	Kharkiv City Council Department of Construction and Road Management
Third parties involved	Public transport operators, Municipal companies (managing streets, water, energy etc)
Indicators	% Project completion, Number of trips made per month/year
Relation with other projects	Project 3.3 - Saltivka – PT extension (metro and/or bus)
Constraints and risks	Dialogue with all affected parties will be important, securing funding early will be critical



**Delivery and
Implementation Route Map**

7.3 Governance

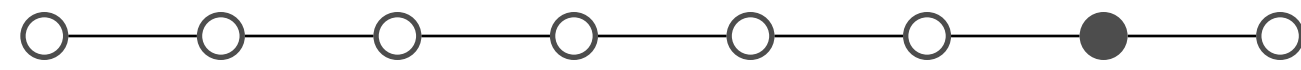
The KRTS establishes a single, cohesive programme to guide the development of Kharkiv’s transport system. It is fully aligned with the Kharkiv Reconstruction Masterplan and directs all future projects and feasibility studies to be developed as part of a unified, integrated into a city-wide network framework. The KRTS will be delivered by the Mayor of Kharkiv and Kharkiv City Council (KCC). The KCC Departments that will be involved in the KRTS planning and implementation as well as their key roles and responsibilities are presented in Table 11.

- **Integrated Planning:** collaboration to create comprehensive plans that address technical, urban, and accessibility needs simultaneously. For example, when designing a new metro line, consideration should not only be given to engineering requirements, but also how it fits into the city’s spatial layout and whether it is accessible to all users.
- **Policy Alignment:** working together to align transport projects with local, national and international policies, such as EU standards for sustainable and inclusive development.
- **Consistent Community Engagement and Communication:** the departments should conduct engagement with local communities to gather input and ensure that projects meet the needs of residents.
- **Effective Data Collection, Exchange and Analysis:** the departments should collaborate effectively on all processes associated with data including data mapping, data collection, data processing, data exchange and analysis, as these processes are essential for Monitoring and Evaluation of the KRTS proposals.

Table 11 Proposed governance structure for the KRTS planning and implementation

Source: Arup and Kharkiv SUMP

Team/Department	Key Roles and Responsibilities
The Mayor of Kharkiv’s team	Executive and strategic decisions with regards to the KRTS planning and implementation, and particularly financing and funding. Cross-city and wider communication and representation of the KRTS. Ensuring collaborative working on the KRTS within the City Council.
Department of Construction and Road Management (formerly Department of Infrastructure)	Planning and implementation of the KRTS including strategic, operational, technical, logistical and financial tasks. Working together with all transport operating companies and contractors to ensure successful implementation of all projects. Managing data collection, Monitoring and Evaluation. Ensuring compliance with safety standards. Support to the KRTS planning and implementation where relevant and particularly with regards to projects that include road management and construction components.
Department of Urban Planning and Architecture	Support to the KRTS planning and implementation where relevant, and particularly on projects including Urban Planning and Architecture components. Making sure the KRTS projects and initiatives align with sustainable city layouts, promote efficient integration with land use and support urban growth. Involvement into further consultations to align the KRTS with urban planning documents and the Kharkiv Reconstruction Masterplan.
Department of Inclusion, Accessibility, and Barrier-Free Movements	Support to the KRTS planning and implementation where relevant, and particularly on projects in relation to Inclusion and Accessibility improvements. Developing and embedding Inclusion and Accessibility standards, ensuring compliance with them. Making sure that physical and systemic barriers in transport infrastructure for different users are eliminated.
All Departments	Data collection, processing and analysis.
Department of Public Affairs	Stakeholder engagement and public consultation. Communication, awareness raising.
Department of International Cooperation	International relations. International positioning of the KRTS and associated projects. Support with securing international funding.



7.4 Funding

Historically, the City of Kharkiv has demonstrated a strong financial position and ability to adjust its budget to new realities.

The KRTS is envisaged to be funded through a combination of sources as outlined in Table 12.

There are some key considerations, potential challenges and opportunities associated with funding of transport projects, which include:

- International funding requirements for the World Bank, ERBD, EIB etc. require satisfaction of Key Performance Indicators (KPIs) to ensure that transport projects meet their objectives and deliver value.
- Public-Private Partnerships (PPPs) represent one of the funding approaches that could work for delivering the KRTS. Ukraine has established legal frameworks to facilitate PPPs, allowing private sector involvement in transport projects. This includes clear guidelines on risk-sharing, financial arrangements, and long-term contracts. In 2019, the “On Concessions” law was adopted, facilitating the launch of pilot PPP concession projects. The law streamlined tender procedures, improved the balance of responsibilities and

increased protections for investors, including the right to select the foreign governing law and to enter into direct agreements. Based on that new framework, new PPP projects were awarded, including to international companies. The first Road PPP Programme was announced, involving long-term (20+ years) output and performance-based road contracts with availability payments to be made from the State Road Fund.

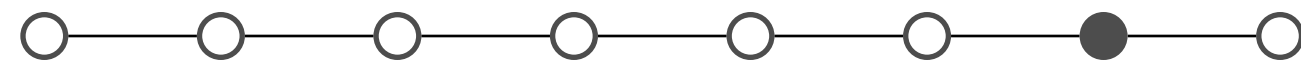
- Crowd funding represents a new creative way of financing projects. Typically, it assumes raising money from a large number of people (city residents and user groups) that each contribute a relatively small amount, usually via internet through specially developed crowd funding platforms/website/applications. This option can be particularly relevant for micro-investment and is gaining popularity in various cities.

More advice on the funding context and best practice to support the delivery of the KRTS is provided in Appendix 1.

Table 12 Proposed KRTS funding sources

Source: Arup analysis and Kharkiv SUMP

Funding Source	Description
Local City Budget	The Kharkiv budget is comprised of personal income tax, local taxes and fees other sources of income including corporate income tax, lease of municipal property, fees for administrative services etc). In 2023, this budget reached circa 14,491 million UAH. This budget includes revenue associated with transport schemes such as public transport fares and paid parking.
State/National Budget	Kharkiv City traditionally receives an allocation of the State/National budget as a support for projects and initiatives that the City cannot fund through the local budget. In 2023, this allocation reached 3,680 million UAH.
International Funding	Kharkiv has been successful in working with international financial institutions like European Investment Bank (EIB), European Bank for Reconstruction and Development (EBRD) and the World Bank (WB). Through 2023-2024 it has been receiving international funding support for restoration of transport infrastructure, reconstruction of heating facilities and construction of shelters. International funding will be critical for major infrastructure projects like Mass Rapid Transit corridors and public transport fleet modernisation.



7.5 Monitoring and Evaluation

General Principles: Monitoring and Evaluation (M&E) of the KRTS progress towards the Vision is crucial to underpin successful implementation.

It should be based on the following principles:

- Strategic outcome-based Key Performance Indicators (KPIs) should be developed for each Vision Theme/Principle/Package, they will be used to monitor the KRTS progress towards the Vision.
- Project specific output- and outcome-based KPIs should be developed so that every project can be monitored and evaluated in relation to its effectiveness and cost-efficiency.
- A data-mapping exercise should be carried out to establish what data sets are available, what data sets are missing, what data sets are needed for defined KPIs.
- Regular data collection should be arranged, data collection requirements should be established for each KPI (required data sets, format, frequency, responsible parties etc).
- Data processing and data analysis approaches should be established.

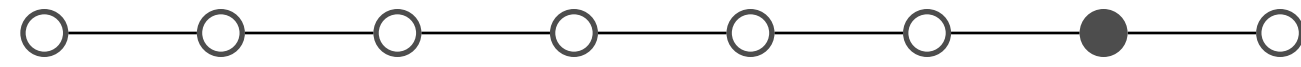
- Once KPIs and all associated data processes are defined, it is important to identify two critical elements for each KPI – base value (the current situation) and target value (what KRTS aspires to achieve), these two values set benchmarks for further M&E.
- M&E processes should be established/agreed. The monitoring process is a regular tracking of the progress from a base value to a target value, whilst evaluation process is understanding whether selected measures and projects were effective in achieving a set target. Concrete evaluation/appraisal/assessment techniques and tools should be identified for all transport projects.
- Frequent reviews should be held (e.g. quarterly for place-specific projects, annual for the strategy overall) to evaluate effectiveness and cost-efficiency of various proposals and see if any adjustments/refinements are needed.
- Responsible parties should be identified for all M&E processes.
- Progress against the KRTS vision, themes, and principles should be measured annually with the primary responsibility of this process held by Kharkiv City Council.

KPI Requirements

All KPIs should align with the principles of being SMART (Specific, Measurable, Achievable, Relevant, and Time-bound) and should typically include/cover the following:

- Hierarchy of KPIs: it is important to set up both Output KPIs and Outcome KPIs. Output KPIs measure physical tangible outputs delivered, e.g. kms of cycle lanes built or number of cycle parking spaces provided. In comparison, Outcome KPIs measure an impact/change in travel behaviour that results from physical output having been provided, e.g. number of cycle trips using built cycle lanes and provided cycle parking facilities. It is also important to differentiate between Strategic KPIs that are set for the whole KRTS and for the whole city and Local/Project-Specific KPIs that are set for a particular area affected by a particular project. Overall, it is important to establish a comprehensive hierarchy of KPIs and establish relationships between them.

- Project Development Objectives (PDOs): KPIs are designed to measure how well the project achieves its stated development goals, such as improving connectivity or reducing travel time. Projects must demonstrate their contribution to the welfare of the country.
- Value for Money (VfM): KPIs assess whether the project delivers efficient use of resources, achieves cost-effectiveness, financial sustainability, and beneficial fiscal impact. Consideration of alternatives to ensure the project is the best option is also required. Demonstration of good governance and financial reporting mechanisms are required.
- Environmental and Social Standards: KPIs monitor compliance with Environmental and Social Frameworks, ensuring projects mitigate risks like forced labour and environmental degradation.
- Supplier Relationship Management (SRM): KPIs evaluate the performance of suppliers and contractors, focusing on timely delivery and quality of work.



- M&E: Impact evaluations are conducted to measure the effectiveness of transport investments. For example, the ieConnect program of the World Bank uses rigorous analytical approaches to assess outcomes like improved mobility and economic empowerment. An emphasis on data-driven decision making, with appropriate use of data systems, including geospatial and sensor data, to inform transport investments is part of funding expectations. These systems help evaluate project impacts and build local capacity for evidence-based policymaking.
- These indicators help ensure that transport projects are impactful, sustainable, and aligned with broader development goals.

Interface with Kharkiv SUMP

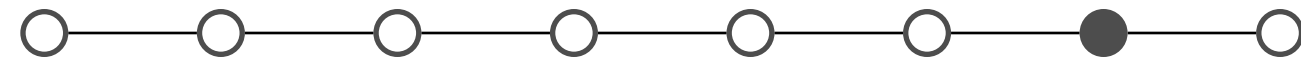
The Kharkiv SUMP that was adopted by the City of Kharkiv in 2024 has already developed a recommended framework for M&E which includes proposed KPIs and associated data collection requirements, potential responsible parties for every KPI and objectives, and the overall monitoring and evaluation mechanisms.

The KRTS M&E approach should be part of the wider SUMP M&E Framework to ensure their strategies work in tandem and duplication of efforts is avoided.

The potential interface of the KRTS and SUMP M&E is illustrated in the following section.



Metro station in Kharkiv © Norman Foster Foundation



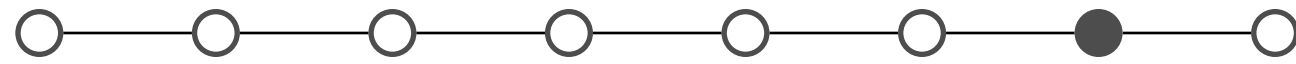
**Delivery and
Implementation Route Map**

**Theme 1: Environmentally
Friendly Transport**

Table 13 Theme 1 – Environmentally Friendly Kharkiv - potential KPIs and interface with the SUMP monitoring

Source: Arup and Kharkiv SUMP

Transport Principle	Potential KPIs	Relevant SUMP Objectives	Relevant SUMP KPIs
1. Prioritising active travel	<p>Strategic outcome KPI: Active travel mode share, %</p> <p>Strategic output KPIs: Length of high-quality cycle lanes, km Length of high-quality footpaths, km Number of cycle parkin places/ stations provided, n Number of pedestrian zones, n or area</p>	Objective 2.2 “Developing micromobility and pedestrian infrastructure for inclusive and barrier-free environment”	2.2.1. Length of equipped micromobility lanes, km 2.2.2. Lengths of equipped micromobility paths, km 2.2.3. Density of the network of cycling routes, km/km2 2.2.4. Area of permanent pedestrian zones in the city, km2 2.2.5. Area of temporary pedestrian zones in the city, km2 2.2.6. Share of micromobility, % 2.2.7. Share of walking, % 2.2.8. Length of reconstructed sidewalks and pedestrian lanes in accordance with the state construction codes and principles of barrier-free and inclusive environment, km
		Objective 4.1 “Reducing the distance and time of population movement”	4.1.4. Average travel time by micromobility transport, min 4.1.7. Average travel distance by micromobility transport, km
		Objective 2.4 “Improvement of the parking system for environmentally friendly modes of transport”	2.4.1. Number of equipped locations for temporarily parking of micromobility vehicles (without protection from precipitation) near the most important public facilities, n 2.4.2. Number of equipped locations for long-term storage of micromobility vehicles (with protection from precipitation), n
		Objective 4.2 “Increasing the level of transport accessibility”	4.2.2. Number of operating bike-sharing services, n 4.2.3. Number of operating scooter-sharing services, n 4.2.5. Number of bikes available for sharing in the city n 4.2.6. Number of scooters available for sharing in the city n

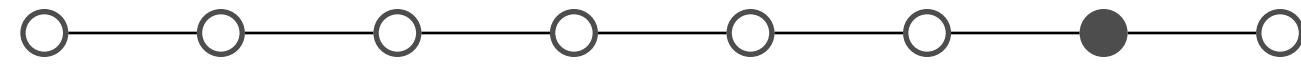


**Delivery and
Implementation Route Map**



**Theme 1: Environmentally
Friendly Transport**

Transport Principle	Potential KPIs	Relevant SUMP Objectives	Relevant SUMP KPIs
2. Encouraging Public Transport Uptake	<p>Strategic outcome KPIs: Public transport mode share, % Number of public transport trips Population within public transport catchment, % Average travel time, min Average travel distance, km</p> <p>Strategic output KPIs: Length of restored/damaged public transport infrastructure Length of public transport networks, km Density of public transport networks, km per head of population Number of public transport stations/stops, n</p>	Objective 2.1 “Modernising and developing public transport infrastructure”	2.1.3. Length of modernised tram tracks, km 2.1.4. Length of modernised tram and trolleybus overhead power lines, km 2.1.5. Length of modernised metro tracks, km 2.1.10. Number of new metro stations, n 2.1.11. Share of public transport trips, % 2.1.12. Density of the public transport route network, km/km ² 2.1.13. Length of dedicated public transport lanes, km 2.1.15. Share of modernised public transport stops in accordance with the state building codes and principles of barrier-free and inclusive environment %
		Objective 4.1 “Reducing the distance and time of population movement”	4.1.2. Average travel time by public transport, min 4.1.5. Average travel distance by public transport, min 4.1.8. Number of operating BRT routes, n 4.1.9. Length of operating BRT routes, n
		Objective 5.1 “Applying the principles of sustainable development in the restoration of transport and road facilities”	5.1.2. Number of restored traction substations of underground transport stations, n 5.1.3. Number of restored substations of the DS-TS control of the underground public transport, n 5.1.4. Number of restored substations of the CTS depot of the underground public transport, n 5.1.5. Number of restored transfer substations of the underground public transport, n 5.1.6. Number of restored step-down substations of the underground public transport, n 5.1.7. Number of restored traction substations of the ground public transport, n 5.1.8. Length of restored overhead power lines of the ground public electric transport, km 5.1.9. Length of restored network of tram tracks, km 5.1.10. Number of restored electric and tram depots, n

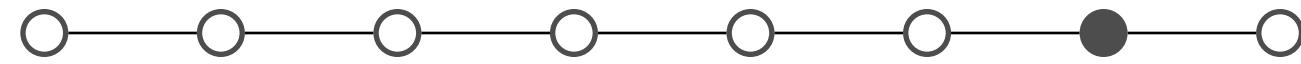


Delivery and
Implementation Route Map



Theme 1: Environmentally
Friendly Transport

Transport Principle	Potential KPIs	Relevant SUMP Objectives	Relevant SUMP KPIs
3. Travel Demand Management and Parking Regulation	<p>Strategic outcome KPIs: Modal split, % Proportion of removed trips (e.g. working/studying from home), % Average travel time Average travel distance</p> <p>Strategic output KPIs: Number of car parking spaces, n Number of regulated/paid parking spaces, n or % Number of TDM initiatives, n</p>	Objective 4.1 “Reducing the distance and time of population movement”	4.1.2. Average travel time by public transport, min 4.1.3. Average travel time by individual transport, min 4.1.3. Average travel time by individual transport, min 4.1.5. Average travel distance by public transport, km 4.1.6. Average travel distance by individual transport, km 4.1.7. Average travel distance by micro mobile transport, km
		4.2 “Increasing the level of transport accessibility”	4.2.2. Number of operating bike-sharing services, n 4.2.3. Number of operating scooter-sharing services, n 4.2.4. Number of operating electric car-sharing services, n 4.2.5. Number of bikes available for sharing in the city, n 4.2.6. Number of scooters available for sharing in the city, n 4.2.7. Number of electric cars available for sharing in the city, n 4.2.8. Number of equipped parking lots for vehicles from sharing service, n
4. Wider Sustainability	<p>Strategic outcome KPIs: Share sustainable travel modes, % Level of air emissions associated with private transport, kg/person Level of air emissions associated with public transport, kg/person Level of air emissions associated with servicing vehicles, kg/person</p> <p>Strategic output KPIs: Share of electric public transport fleet, % Share of electric vehicles, % Number of EV charging stations, n Number of EV infrastructure for public transport, n or % of upgrade</p>	Objective 1.4 “Reducing air pollution from transport”	1.4.1. Volume of pollutant emissions from transport into the atmosphere kg/person 1.4.4. Share of electric vehicles in the ground public transport fleet % 1.4.5. Share of electric vehicles in the fleet of municipal enterprises responsible for landscaping and maintaining the city’s territory %
		Objective 2.1 “Modernising and developing public transport infrastructure”	2.1.16. Number of renewable energy facilities (solar panels/wind turbines) installed at the depots of municipal transport operators n
		Objective 5.1 “Applying the principles of sustainable development in the restoration of transport and road facilities	5.1.1. Number of restored transport and road facilities using environmentally friendly materials and renewable energy sources n



**Delivery and
Implementation Route Map**

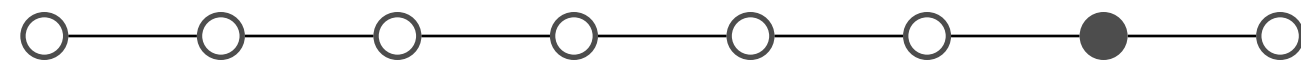


**Theme 2:
Safe Transport**

Table 14 Theme 2 – Safe Kharkiv - potential KPIs and interface with the SUMP monitoring

Source: Arup and Kharkiv SUMP

Transport Principle	Potential KPIs	Relevant SUMP Objectives	Relevant SUMP KPIs
5. Road Safety	<p>Strategic outcome KPIs: Number of road accidents, Number of road accidents with fatalities, n or % Number of road accidents with injuries, n or %</p> <p>Strategic output KPIs: Number of safety upgrades/improvements on transport networks, n Number of enforcement/control measures, n</p>	Objective 1.1 “Approaching zero deaths in road accidents”	1.1.1. Number of road accidents per 1000 inhabitants, n 1.1.2. Share of road accidents with fatalities, % 1.1.3. Share of road accidents with victims, % 1.1.4. Share of traffic lights equipped with audio warning systems, % 1.1.5. Share of unregulated pedestrian crossings equipped with contrast lightning, % 1.1.6. Number of improved traffic management schemes in places of concentration of road accidents, n
		Objective 1.3 “Increasing the level of control over traffic violations”	1.3.1. Share of road accidents recorded by the automated traffic violation detection system % 1.3.2. Number of registered violations for driving under the influence of alcohol/drugs, n 1.3.3. Number of registered violations for speeding in the city, n
6. Personal and Wider Security	<p>Strategic outcome KPIs: Number of injuries on transport networks associated with military emergencies, n</p> <p>Number of fatalities on transport networks associated with military emergencies, n</p> <p>Number of crimes on transport networks, n</p> <p>Strategic output KPIs: Number of shelters provided, n Number of security measures introduced, n</p>	Objective 1.2 “Ensuring the safety of transport system users in case of military emergencies and/or terrorist attacks”	1.2.1. Number of equipped “Zakhyst” stop-shelters near public transport routes, n 1.2.2. Share of ground public transport vehicles equipped with automated systems for informing about an emergency or its coming threat, % 1.2.3. Share of ground public transport vehicles equipped with inclusive maps showing shelter locations along routes, % 1.2.4. Share of ground public transport routes with developed movement schemes to the nearest protection facilities for passengers and crews, % 1.2.5. Number of end public transport stops equipped with inclusive maps showing shelter locations along the routes, n 1.2.6. Number of training sessions conducted to raise awareness among transport enterprise employees on procedures for military emergencies, terrorist attacks, or unlawful interference, n 1.2.7. Number of training sessions held to improve coordination among local governments, managers, and employees of enterprises responsible for ensuring the operation of the city’s transport system during military emergencies, terrorist acts, and illegal interference,



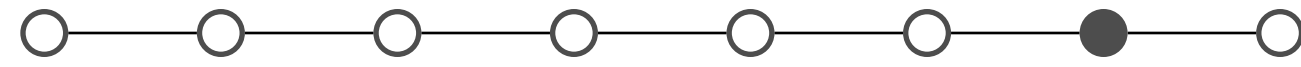
**Delivery and
Implementation Route Map**

**Theme 3: Modern and
High-Quality Transport**

Table 15 Theme 3 – Modern and High-Quality Kharkiv - potential KPIs and interface with the SUMP monitoring

Source: Arup and Kharkiv SUMP

Transport Principle	Potential KPIs	Relevant SUMP Objectives	Relevant SUMP KPIs
7. Inclusive, Accessible and High-Quality Infrastructure	<p>Strategic outcome KPIs: Public transport mode share, % Active travel mode share, % Accessibility satisfaction rate, % General transport satisfaction rate, %</p> <p>Strategic output KPIs: Completion of accessibility improvements programme, % Completion of infrastructure modernisation programme, % Completion of fleet modernisation programme, %</p>	Objective 2.1 “Modernising and developing public transport infrastructure”	2.1.1. Number of public transport traction substations replaced with modular ones, n 2.1.2. Number of public transport substations with modernised power equipment, n 2.1.3. Length of modernised tram tracks, km 2.1.4. Length of modernised tram and trolleybus overhead power lines, km 2.1.5. Length of modernised metro tracks, km 2.1.6. Number of modernised escalators used by passengers during movement, n 2.1.7. Number of renewed electric transport (metro cars/ tram cars/ trolleybuses), n 2.1.8. Number of renewed buses, n 2.1.9. Number of modernised/new public transport depots, n 2.1.10. Number of new metro stations, n 2.1.11. Share of public transport trips, % 2.1.15. Share of modernised public transport stops in accordance with the state building codes and principles of barrier-free and inclusive environment, % 2.1.16. Number of renewable energy facilities (solar panels/wind turbines) installed at the depots of municipal transport operators, n
		Objective 2.2. “Developing micromobility and pedestrian infrastructure for inclusive and barrier-free environment”	2.2.8. Length of reconstructed sidewalks and pedestrian lanes in accordance with the state construction codes and principles of barrier-free and inclusive environment
		Objective 4.3 “Balanced development of mobility in administrative districts and micro-districts of the city”	4.3.4. Level of public satisfaction with transport services %



**Delivery and
Implementation Route Map**



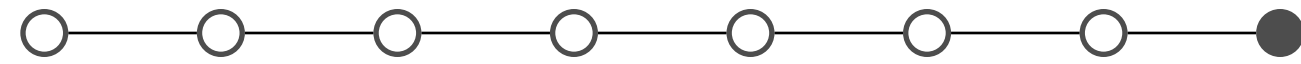
Theme 3: Modern and High-Quality Transport

Transport Principle	Potential KPIs	Relevant SUMP Objectives	Relevant SUMP KPIs
8. Transport Connectivity, Integration and Resilience	e.g. develop a PTAL-type system to measure public transport connectivity and ensure X% of new development is located within high-scoring areas Increase proportion of population within 500m of a fully accessible, step-free public transport service by X%	Objective 2.1 “Modernising and developing public transport infrastructure”	2.3.2. Average waiting time of passengers during transfers, min 2.3.3. Transfer coefficient 2.3.4. Number of public transport stops with pedestrian access to micromobility sharing services (#) 2.3.5. Number of public transport stops near the cycling routes (#) 2.3.6. Share of sustainable movements (public transport, micromobility and walking), %
		2.3 “Ensuring a high level of integration of sustainable mobility modes”	2.3.2. Average waiting time of passengers during transfers, min 2.3.3. Transfer coefficient 2.3.4. Number of public transport stops with pedestrian access to micromobility sharing services (#) 2.3.5. Number of public transport stops near the cycling routes (#) 2.3.6. Share of sustainable movements (public transport, micromobility and walking), %
9. Transport and Land Use Integration	e.g. develop a PTAL-type system to measure public transport connectivity and ensure X% of new development is located within high-scoring areas e.g. increase proportion of metro stations with over-station development / retail / office floor space etc by X%	Objective 4.1 “Reducing the distance and time of population movement”	4.1.1. Coefficient of indirectness of ground public transport routes 4.1.2. Average travel time by public transport, min 4.1.3. Average travel time by individual transport, min 4.1.4. Average travel time by micromobility transport, min 4.1.5. Average travel distance by public transport, km 4.1.6. Average travel distance by individual transport, km 4.1.7. Average travel distance by micromobility transport, km 4.1.10 Number of arranged exits from the city street to the ring road n
		Objective 4.2 “Increasing the level of transport accessibility	4.2.1. Share of the population living within 500 metres or less from public transport stops,

8 NEXT STEPS

The KRTS sets a framework for planning and implementation of transport proposals that will ensure sustainable recovery of the Kharkiv transport system post-war and enable growth and enhancement.

8.1 Priority Project Tasks 86



Next Steps

To ensure successful implementation of the Strategy, there are a number of steps that are important to make to ensure momentum is maintained, as summarised below.



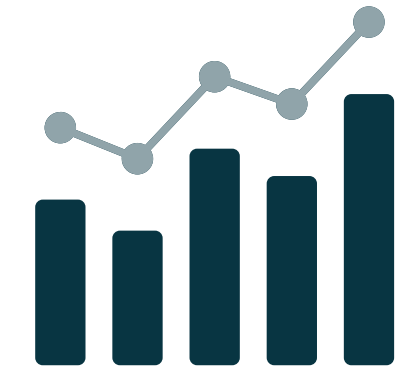
Establishing a Governance Framework meaning all roles and responsibilities should be reviewed and confirmed between the Kharkiv City Council departments and any relevant operating companies as well as local district municipalities.



Creating a dedicated KRTS/SUMP Forum for all relevant KCC Departments and Operating companies to regularly get together to review the KRTS progress, to resolve any arising challenges and to discuss any potential opportunities.



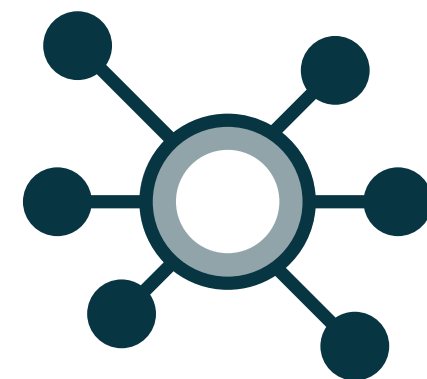
Establishing a Monitoring and Evaluation Framework including components like KPIs and their base and target values, data collection requirements, responsible parties, evaluation and appraisal mechanisms.



Initiating and completing all Strategic Policies on the KRTS Implementation Plan to establish a comprehensive city-wide understanding of the current situation for different transport networks and components, and to develop respective city-wide strategies and programmes of improvements to set the direction for further development. This also includes reviewing what is currently covered by the SUMP and other plans and identifying where there may be opportunities to appropriately enhance design and planning standards.



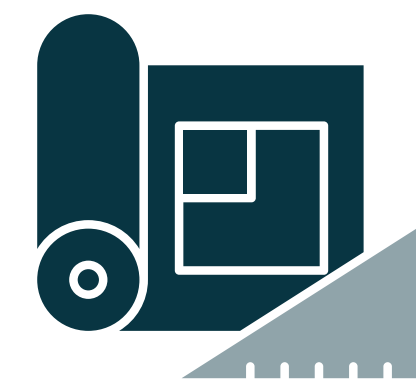
Developing a route map/action plan for positioning and raising awareness of the KRTS/SUMP locally amongst population, and seeking their views and thoughts to ensure residents are involved in the co-design of solutions and that they understand and support the KRTS proposals.



Developing a route map/action plan for position and raising awareness of the KRTS/SUMP locally, regionally and nationally amongst all critical stakeholders to ensure they engage in planning and implementation of the KRTS proposals



Developing a route map/ action plan for positioning and raising awareness of the KRTS/SUMP internationally amongst potential financial institutions and engineering/design companies to attract financial support and to find partners for the KRTS implementation.



Building on the work undertaken through the development of the KRTS and explicitly set out within the fiches for the Priority Projects, the key next step is to take this detailed work and seek opportunities, with reference to funding, capability and capacity to develop the identified Priority Projects to pre-concept.

8.1 Priority Project Tasks

An indicative route map for the implementation of the three key Priority Projects is presented in Figure 26. It outlines the order of key project development stages and assigns an indicative timeline to them.

It is important to acknowledge that due to the ongoing Russian invasion, until a just and lasting peace has been achieved in Ukraine, estimated delivery timescales will be subject to a heightened degree of uncertainty. As such, a flexible and adaptive approach will be essential, with all aspects of these timelines requiring regular review and adjustment as necessary.

To account for this, the KRTS framework and particularly its prioritisation methods have been developed to allow for maximum flexibility in the strategy planning and implementation.

In summary, as the key recommendations and immediate priority next steps for the implementation of the KRTS identified projects are:

- Securing funding: initiating a dialogue with local, national and international sponsors to investigate potential funding mechanisms for different stages of the projects;

- Stakeholder mapping and engagement: identifying stakeholders that are important to work with on the projects including planning authorities, operating companies, design and construction companies, city residents and different user groups;
- Feasibility studies: initiating feasibility studies to better define projects including all associated attributes and components, such project area, constraints and opportunities, potential design options etc., this would be the beginning of the strategic definition phase, investigate whether local budget can be used to kick-start these studies;

- Housing Pilot Project: The KRTS Project 3.3 - Saltivka Liveable Neighbourhood would be a key enabler of Housing Pilot Project identified in the Kharkiv Masterplan, the KRTS delivery team should seek synergies with other disciplines and the wider Masterplan workstream

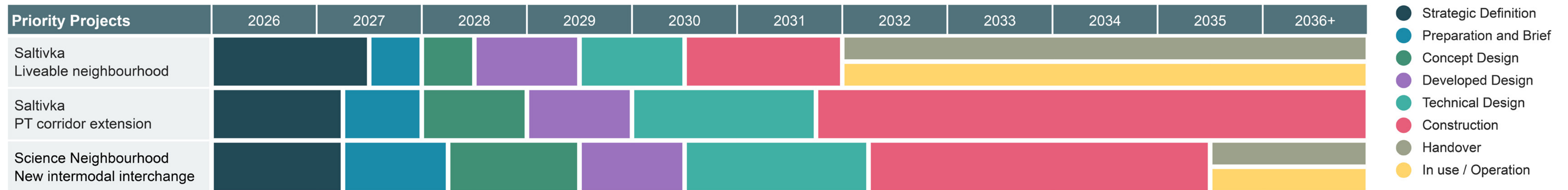
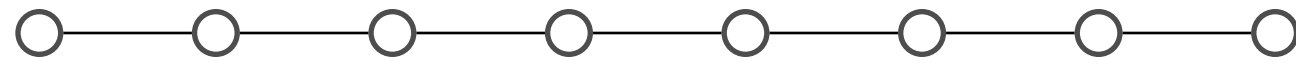


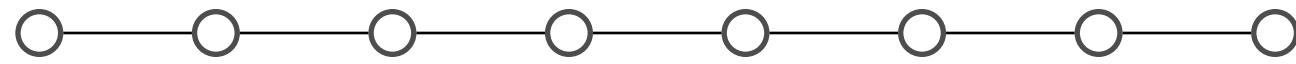
Figure 32 Indicative implementation route map for priority projects

Source: Arup



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