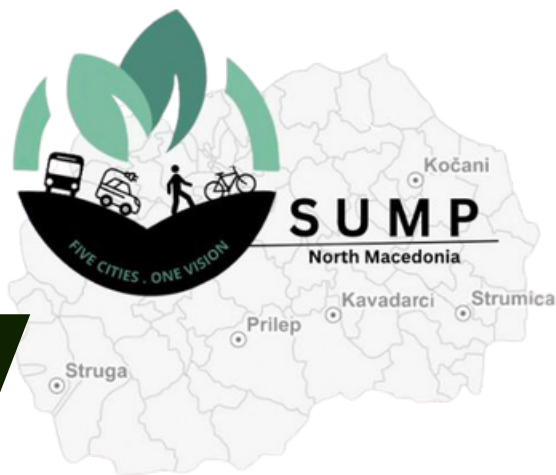
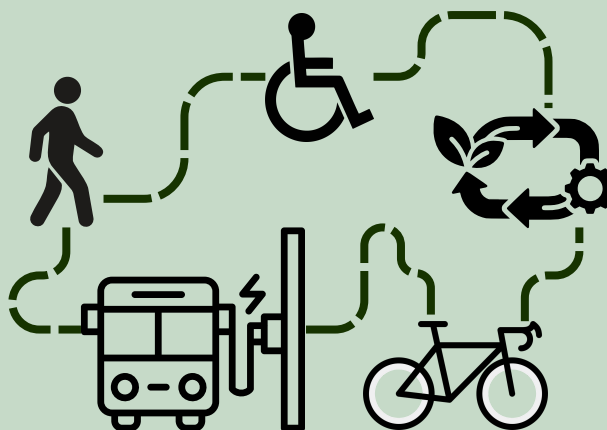


Sustainable Urban Mobility Plan 2027/2037



KAVADARCI




Republic of North Macedonia
Ministry of Transport

 **BOGAZICI
PROJE A.S.**

 **TRT**

Sustainable urban Mobility plan for Kavadarci, is developed by the Technical Assistance for Technical Assistance for Development of Sustainable Urban Mobility Plans for five Municipalities and providing training on developing and implementation of Sustainable Urban Mobility Plans (RFP No: LRCP-9034-MK-REol-CS-CQS-A.1.1.5) within the framework of the Local Road Connectivity Project (LRCP) No. P170267 which is financed by loan from the International Bank for Reconstruction and Development – World Bank and implemented by the Ministry of Transport – Project Implementation Unit.

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Glossary

ASI	Avoid/Reduce, Shift/Maintain, Improve
BAU	Business-As-Usual
CO	Carbon Monoxide
CO₂	Carbon Dioxide
EU	European Union
ITS	Intelligent Transport Systems
KPI	Key Performance Indicators
MOMOS	Sustainable MObility MOdel
NGO	Non-Governmental Organisation
NOX	Nitric Oxide (NO) and Nitrogen Dioxide (NO ₂)
PCIU	Project Coordination and Implementation Unit
PM_{2.5}	Fine Particulate Matter
PSC	Project Steering Committee
PT	Public Transport
RoP	Rules of Procedures
SMART	Specific, Measurable, Achievable, Realistic, and Time-Bound
SUMP	Sustainable Urban Mobility Plan
ToR	Term of Reference

1 Executive summary

The Sustainable Urban Mobility Plan (SUMP) for Kavadarci provides a coherent, evidence-based roadmap to improve accessibility, safety, and environmental performance while strengthening institutional capacity to implement and monitor mobility actions over the next decade. Prepared under the national initiative to develop SUMPs for five municipalities, the plan translates local priorities and technical analysis into a realistic and measurable transformation pathway.

Kavadarci faces a set of structural mobility challenges typical of medium-sized cities: high reliance on private cars, discontinuous and obstructed pedestrian infrastructure, limited public transport coverage and frequency, and almost non-existent cycling infrastructure. These constraints shape daily travel choices, reduce safe and independent mobility for children, older people and vulnerable users, and increase the pressure of traffic and parking on public space—especially in the city center.

The SUMP was developed through a structured and participatory process, led by the Project Steering Committee (PSC) and supported by stakeholder engagement activities. Public and stakeholder input helped define the key problems, validate priorities, and build ownership of the proposed direction. The outcome is a shared long-term vision for a safe, inclusive and sustainable mobility system in Kavadarci, supported by strategic objectives, indicators and targets.

Scenario testing and multi-criteria evaluation were used to identify the preferred development pathway. The preferred scenario (AS1) balances ambition with feasibility and institutional capacity, and it is supported by an integrated package of measures rather than isolated projects. By 2037, AS1 delivers strong improvements in modal balance, safety and emissions compared to the baseline, demonstrating that Kavadarci can reduce car dependency while improving quality of life.

The Action Plan operationalizes the preferred scenario through coded actions across ten policy areas—walkability, public transport, cycling, traffic calming, roads, parking, mobility management, electric mobility, urban freight and public awareness. These actions are phased in a ten-year program with implementation responsibilities, financing logic and a monitoring and evaluation framework to enable adaptive management over time.

2 Introduction and Presentation

This Final Report provides a concise, decision-oriented summary of the Sustainable Urban Mobility Plan (SUMP) for Kavadarci. It synthesizes the outputs prepared across Tasks 1.1–1.5, covering the planning framework and stakeholder engagement, the baseline mobility assessment, strategy and scenario development, measure selection, action planning, implementation approach and the monitoring framework.

A Sustainable Urban Mobility Plan is an integrated planning instrument that coordinates land-use and transport measures to improve accessibility and quality of life. It promotes safer streets, healthier travel choices and a more efficient use of urban space, while supporting climate and air-quality objectives. In Kavadarci, the SUMP focuses on practical solutions that can be delivered through phased programs aligned with local capacity and investment priorities.

The SUMP area of analysis and intervention is defined as the functional urban area, recognizing that daily travel patterns often extend beyond administrative boundaries. The planning boundaries were discussed and refined with the Project Steering Committee (PSC) to ensure that the plan addresses the core urban area as well as surrounding areas that interact with the city. The resulting study area incorporates the functional urban area together with the municipality's administrative boundary and the General Urban Plan boundaries.

The planning process was organized through a clear governance structure, including the establishment of a PSC and a participatory program tailored to Kavadarci's stakeholder landscape. Stakeholder analysis and mapping informed the selection of engagement tools such as meetings, workshops and consultations, complemented by communication and feedback mechanisms (including online channels) to ensure transparency and continuous input throughout the SUMP cycle.

This document is structured to mirror the SUMP cycle and to support quick orientation for decision-makers. Chapter 3 summarizes the preparation and analysis work and the key baseline findings. Chapter 4 outlines the strategy development phase, including the vision, objectives, indicators and targets. Chapter 5 explains measure packaging and scenario evaluation leading to the preferred scenario. Chapter 6 presents the Action Plan organized by policy areas. Chapters 7 and 8 describe implementation planning, financing considerations and the monitoring and evaluation approach. Chapters 9–11 provide the conclusion, references and annexes.

3 Preparation and Analysis Phase

Preparation and analysis form the evidence base of the Kavadarci SUMP. During this phase, the project established the working structure and decision-making arrangements, clarified stakeholders and agreed a participation program, and compiled the baseline diagnosis of the current mobility system.

The phase served three functions. First, it ensured that governance and responsibilities were clear so that the process could move efficiently from analysis to decisions. Second, it built shared ownership through structured engagement and transparent communication. Third, it produced a consolidated baseline dataset that allowed priorities, objectives and measures to be tested against real conditions rather than assumptions.

The outputs of this phase were used to identify key problems and opportunities, validate priorities with local actors and ensure that subsequent strategy development and measure planning were grounded in reliable data and a shared understanding of constraints and deliverability.

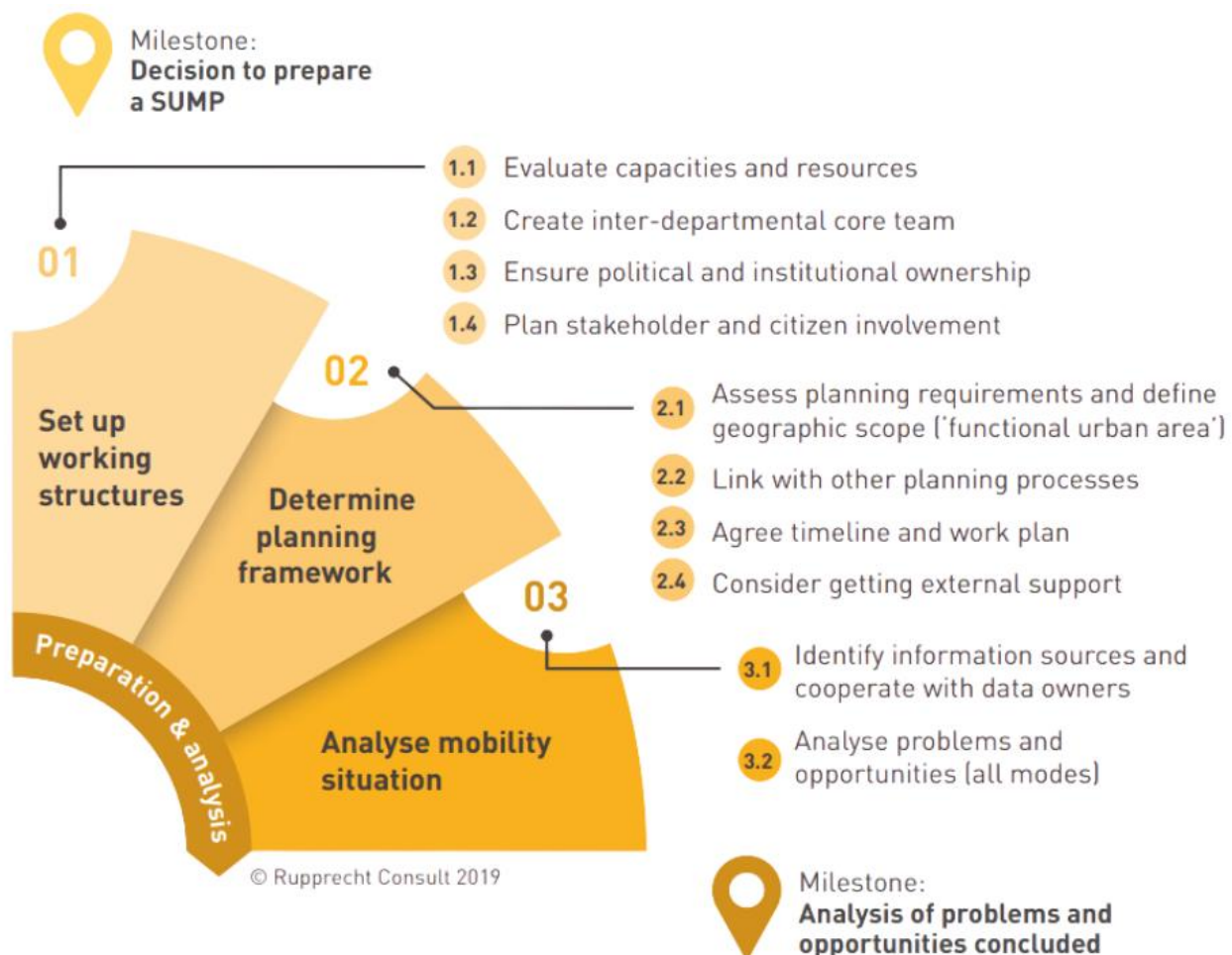


Figure 1. SUMP Cycle 1st Quarter

3.1 Establishment of Working Structure

A clear governance and coordination structure was established to manage the SUMP process and to support timely decisions. The Project Steering Committee (PSC) serves as the core platform for coordination between the Municipality, relevant institutions and the consultant team. The PSC ensures that technical work is aligned with local priorities, that necessary inputs are provided throughout the SUMP cycle, and that the plan remains implementable within Kavadarci's institutional and financial context.

The PSC operates under agreed Rules of Procedure, including arrangements for meeting convocation, quorum, documentation and decision-taking. A designated SUMP Coordinator chairs the PSC, organizes meetings and agendas, ensures continuity through substitute members where needed, and may invite external experts when additional technical input is required (e.g., road safety, public transport operations, air quality, urban design).

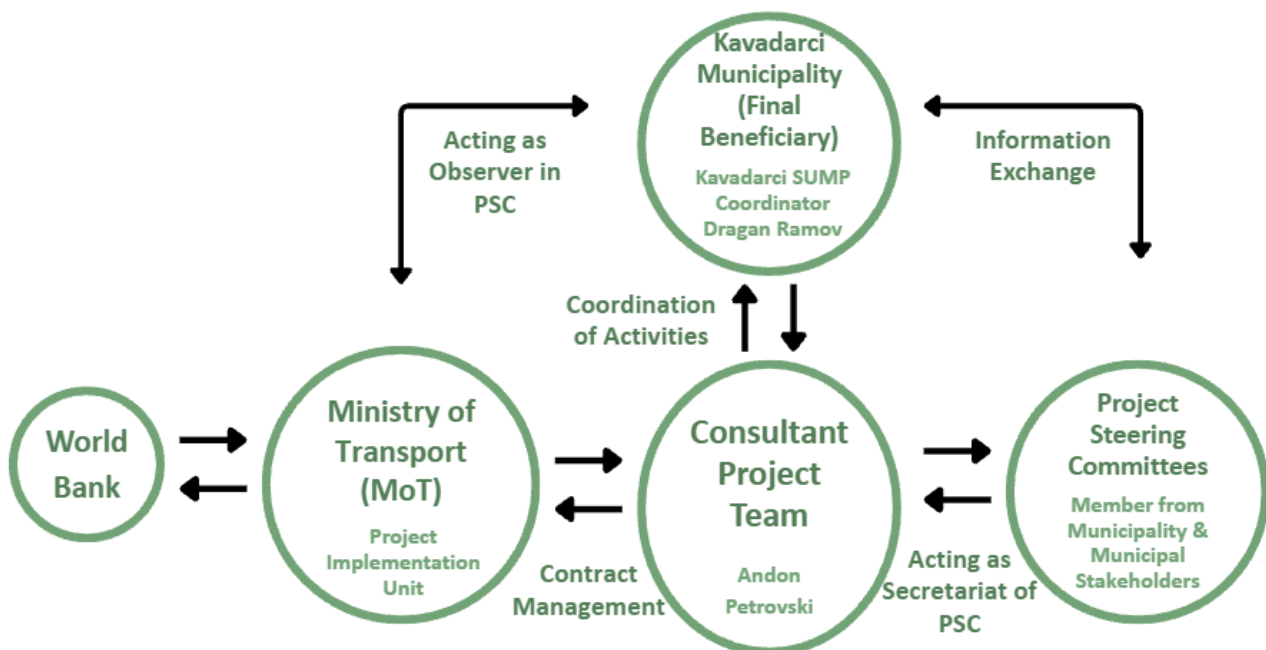


Figure 2. Project Management Structure

In practical terms, the working structure was designed to avoid a "report-only" exercise by linking analysis and drafting to decision points. Draft deliverables were presented to the PSC for validation, and feedback was integrated before moving to the next phase. This approach strengthened accountability and reduced the risk of late-stage changes.

Key functions of the PSC and working structure include:

- Guiding and validating the SUMP process and deliverables, ensuring consistency with sustainable mobility principles and local needs;
- Facilitating access to municipal and national data, plans and studies required for analysis and option development;
- Supporting inter-department and inter-institutional coordination to resolve issues and enable implementation readiness;
- Ensuring that PSC conclusions are communicated within relevant institutions and followed up through agreed actions.

3.2 Stakeholder Clarification and Participation Program

Stakeholder clarification and participation planning were carried out to ensure that the SUMP reflects local needs and builds broad ownership. A stakeholder mapping exercise identified key public institutions, service providers, businesses, civil society and citizen groups, including the needs of vulnerable and disadvantaged users. Based on influence and interest, stakeholder roles were defined to ensure that technical discussions, policy choices and public communication all reached the right audiences.

The participation program combined structured events (PSC meetings, thematic workshops and consultations) with continuous communication channels to promote transparency and encourage feedback. Digital tools (municipal web content and social media) were used to announce events, share progress and provide accessible information to the wider public, ensuring that engagement extended beyond formal meetings.

Engagement was designed to support the full planning cycle:

- Information and diagnosis: presenting baseline findings and collecting local insights on problems and priorities;
- Strategy formation: co-creating the long-term vision, agreeing strategic objectives, and discussing indicators and target directions;
- Measure development and prioritization: refining measure packages, assessing feasibility and impacts, and aligning proposals with local capacity;
- Public consultation: capturing user experience through surveys and open feedback channels and ensuring that measures respond to everyday mobility needs.

By linking engagement to decision points and deliverables, the participation program supported both legitimacy and technical quality, helping the SUMP move from analysis to an implementable Action Plan.

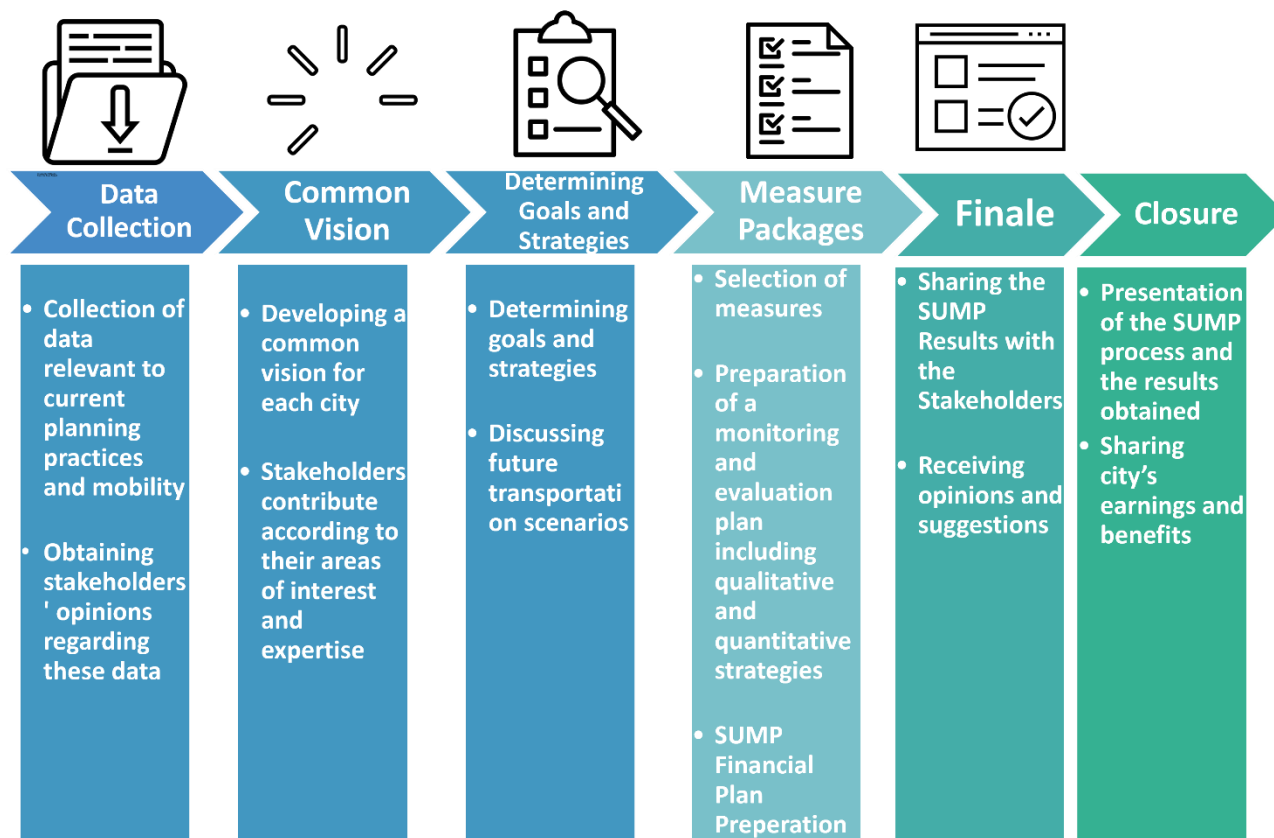
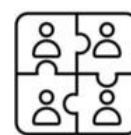


Figure 3. Stakeholder Engagement Process

3.3 Analysis of Mobility Status



3.3.1 Sociodemographic Structure

The baseline diagnosis documented the existing mobility conditions across networks, demand patterns, service quality, safety performance, demographics and environmental pressures.

Before evaluating the current transportation habits of Kavadarci, data on the sociodemographic structure related to travel habits were compiled. The sociodemographic structure of the city was analyzed considering the official statistics of North Macedonia. The following tables and graphs show the sociodemographic profile of Kavadarci in numbers.

Kavadarci's functional area includes **55 settlements** and around **35,733 residents (2021)**. The urban population is around **32,038**, while rural settlements account for around **3,695** residents. Households number approximately **11,307**, with an average household size of **3.16**. The population trend indicates a decline between 2002 and 2021 (approximately **-7.8%**), highlighting the need for mobility policies that protect access and support social inclusion while operating under constrained resources.

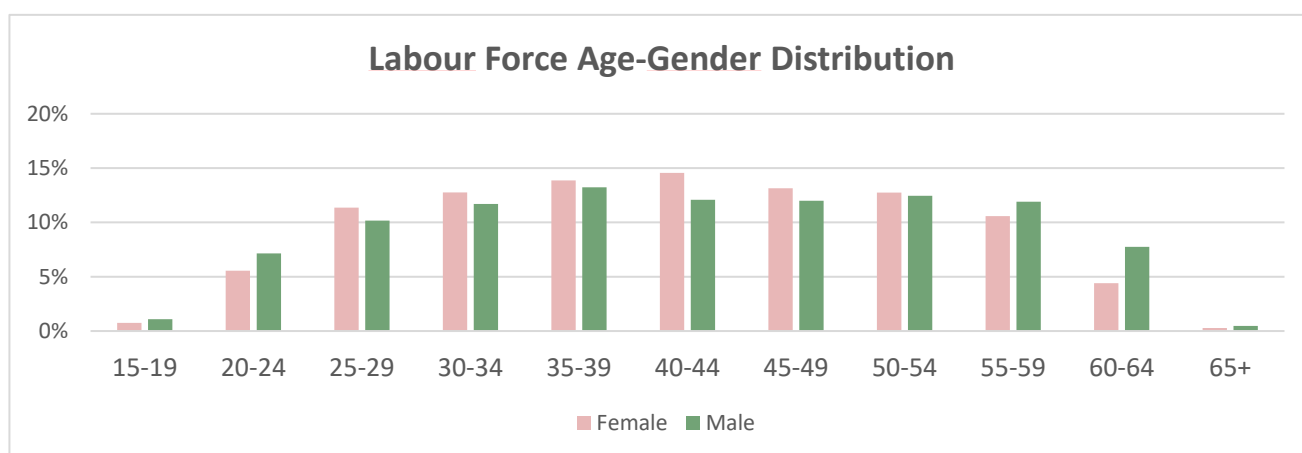
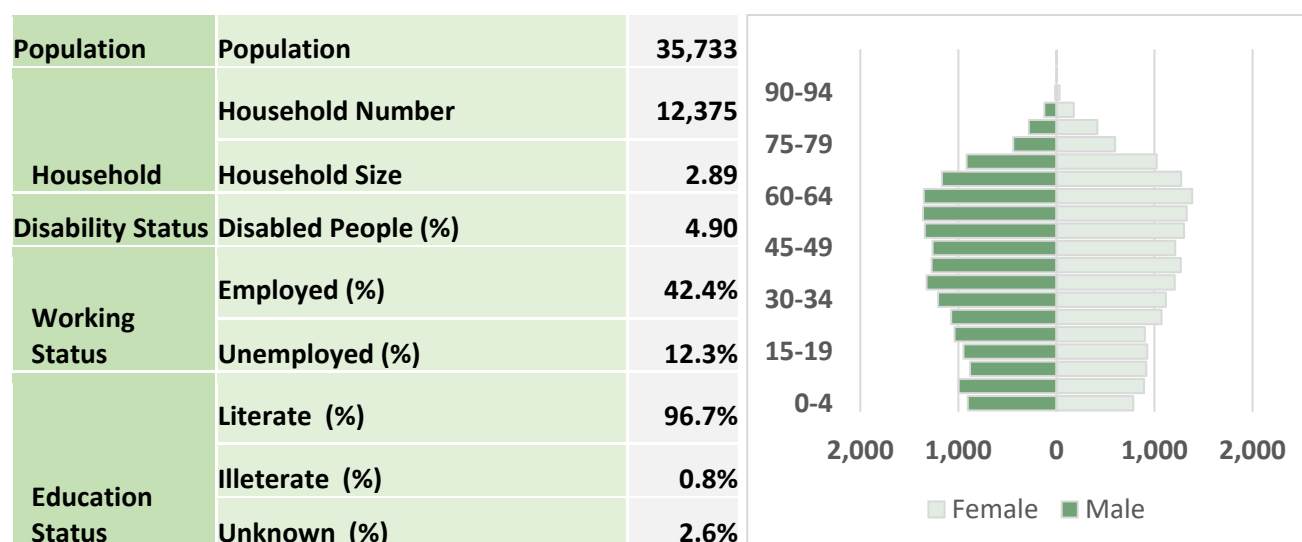


Figure 4. Kavadarci Sociodemographic Structure

3.3.2 Mobility Status

Several important variables are considered when evaluating the overall transportation structure of Kavadarci. These variables include:

- The share of active transportation modes (bicycle, walking, scooter, etc.) In all journeys,
- The service level of the public transportation system,
- The distribution of all journeys according to transportation modes,
- The infrastructure created for active transportation modes,
- The hierarchical classification of the transportation network, and its evaluation within the transportation hierarchy.



Mobility patterns indicate strong reliance on private vehicles and walking for key trip purposes. Work and school trips show the following distribution: **35% passenger car, 34% walking, 22% organized transport, 4% bus, 1% taxi.** This suggests that walking remains essential, but the city must improve the **continuity, safety and universal accessibility** of pedestrian infrastructure to support daily mobility for all users. Considering the mode choice distribution for the regular work and school trips, **the private car mode leads with %35**, which need to be regulated and shifted to the active modes.

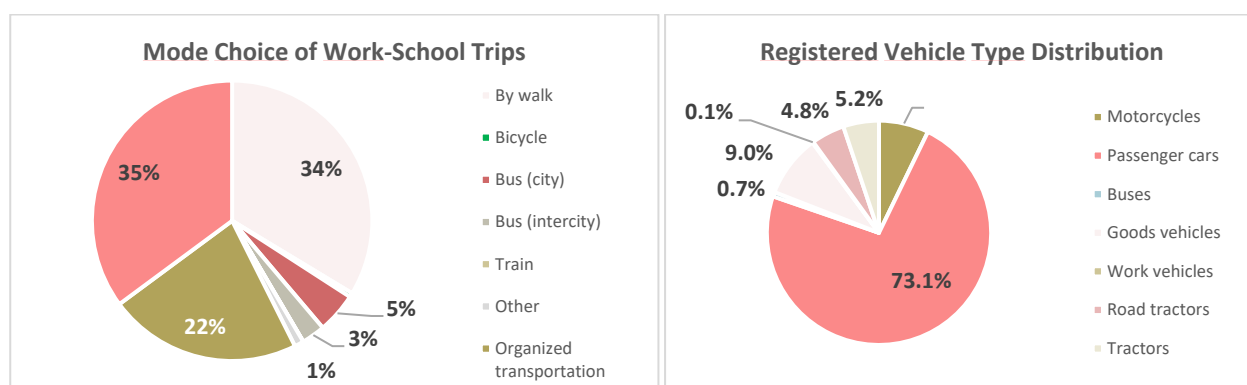


Figure 5. Kavadarci Mode Choice and Vehicle Type Distribution

Table 1. Kavadarci Population-Number of Cars Relation

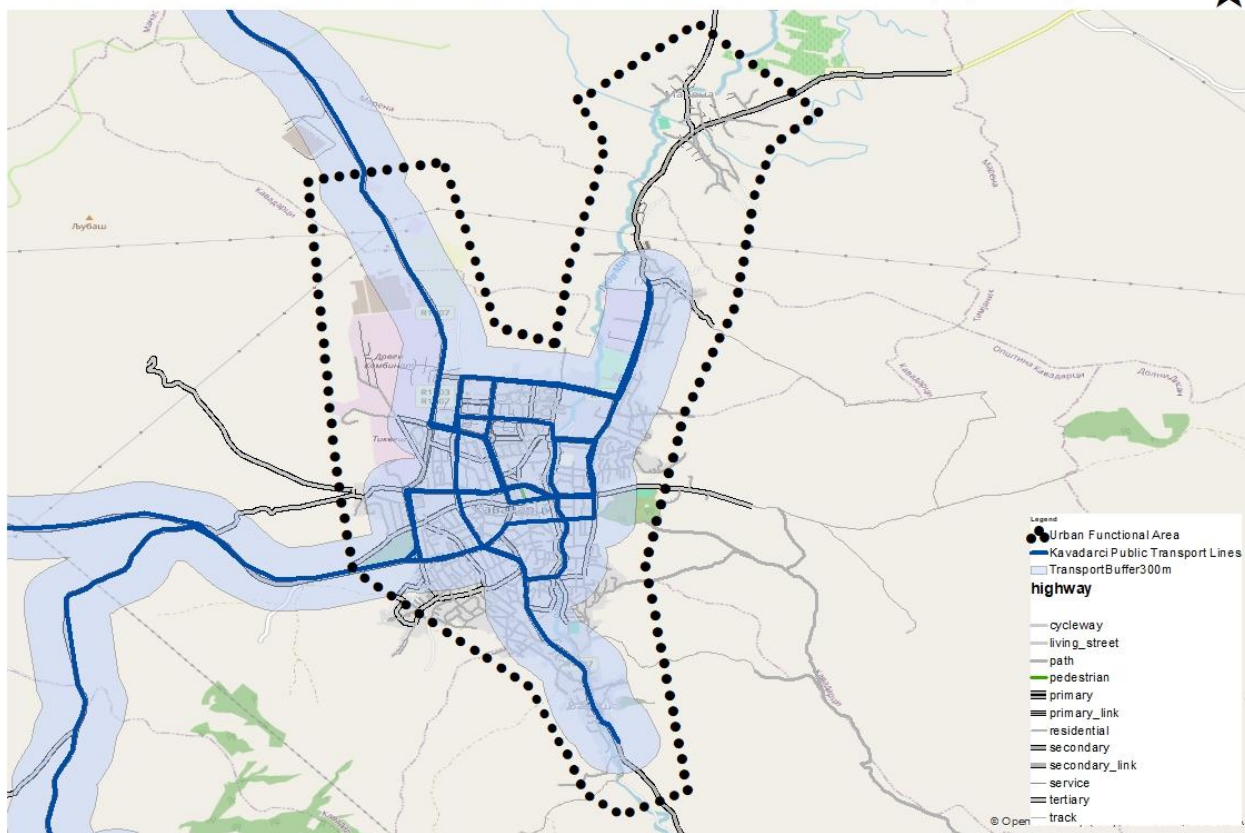
Year	Population	% (Increase/Decrease)
2002	38741	
2021	35733	-7,8%

Public transport is present but constrained by service frequency and competitiveness. Urban services often run at **50–60-minute intervals**, limiting the ability of public transport to function as a reliable everyday option. Passenger and timetable data for representative lines show that the strongest route carries substantially more users than other lines, indicating uneven demand and a need to strengthen network design and service planning. Improving frequency, coverage, passenger information and stop conditions is therefore central to delivering modal shift.

In addition to the service frequency evaluation the public transport lines and bus stops are evaluated according to the accessibility and service coverage. As seen from the images, the south-west part of the city is lacking of public transport service. This analysis shows that the line route system of the city should be taken into account to serve in an accessible way.



KAVADARCI - PUBLIC TRANSPORT ACCESIBILITY ANALYSIS



KAVADARCI - PUBLIC TRANSPORT ACCESIBILITY ANALYSIS

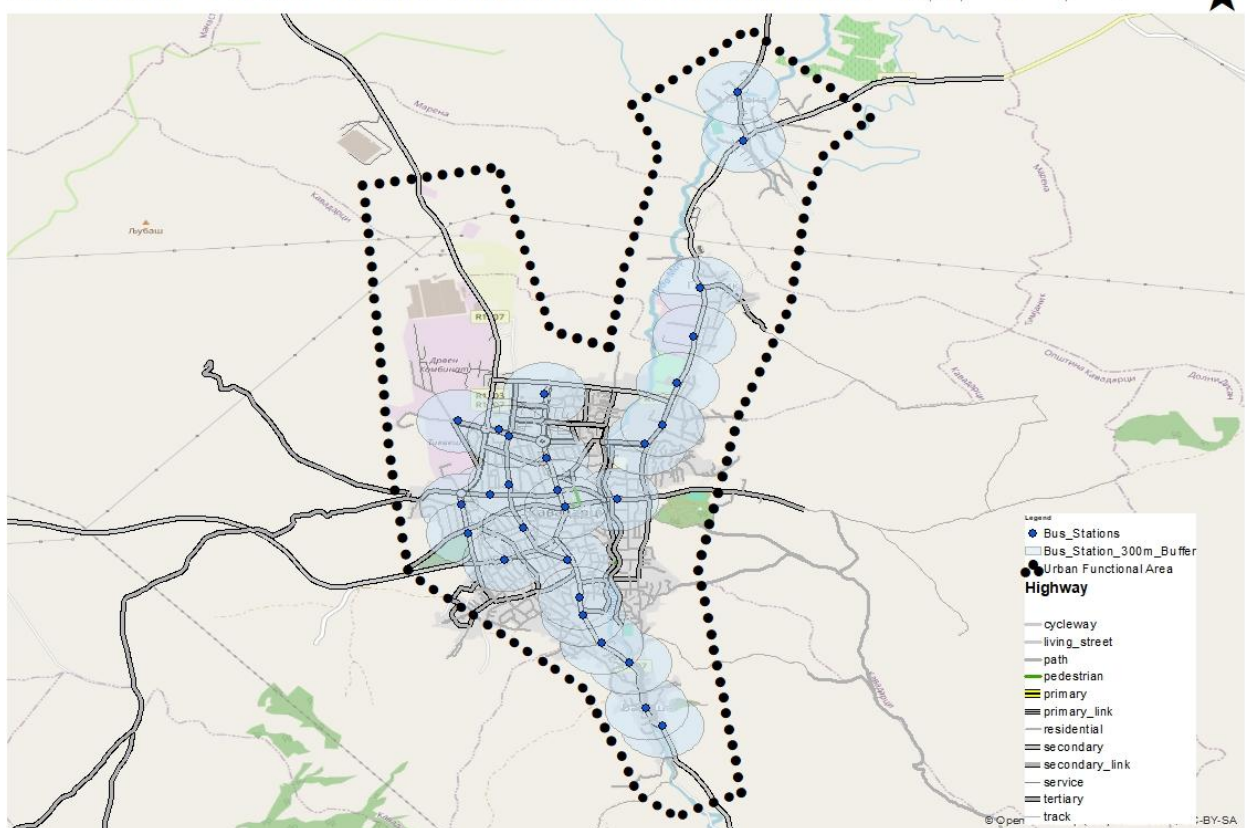


Figure 6. Kavadarci Public Transport Lines Coverage Analysis



Cycling is currently at a very low baseline. The city has **0 km of cycling infrastructure** recorded in the baseline assessment, which aligns with negligible cycling mode share. This creates both a challenge and an opportunity: cycling can grow quickly if safe, connected corridors are provided—particularly linking residential areas with schools, health facilities, services and employment areas. In the table below the bicycle system infrastructure is compared with some of the leading cities in terms of cycling.

City	Bike Line Length (km)	Bike Line Length per 1000 people (km)	Bicycle Use Rate %
Kavadarci	0	0	0
Bremen	390	0,69	20
Kopenhagen	469	0,76	36
Barcelona	181	0,11	1,5
Melbourne	135	0,89	4

Bicycle use is linked to the creation of an infrastructure with safe cycle paths, and increasing bicycle use should be supported by incentive policies that can be provided to users.

Considering the general status of the **pedestrian transportation** system in Kavadarci conducted survey results indicate **a systemic underperformance of pedestrian infrastructure, limiting walkability and social inclusion**. The current situation contradicts SUMP objectives related to safety, accessibility, modal shift, and public space quality.

Recommended measures include:

- ✓ Physical interventions: sidewalk reconstruction, protective buffers (planting strips, bollards), improved lighting, and upgraded crossings.
- ✓ Traffic management measures: intersection redesigns, speed limit reductions, and traffic calming in pedestrian-priority areas.
- ✓ Regulatory and enforcement measures: stricter penalties and active enforcement against illegal parking and sidewalk occupation.



Implementing these measures is expected to:

- ✓ Improve pedestrian safety and comfort.
- ✓ Support modal shift towards walking.
- ✓ Enhance public realm quality and urban liveability.
- ✓ Ensure compliance with EU accessibility, safety, and sustainability standards.



Road safety remains a concern in Kavadarci. Recorded traffic accidents show variation over recent years, with totals reported at **157 (2021), 178 (2022) and 135 (2023)**. These figures underline the importance of systematic safety improvements through safer street design, speed management, safer crossings and intersection redesign—especially on corridors where vulnerable users are exposed to fast traffic and poor crossing conditions.

Table 2. Kavadarci Traffic Accidents

Injury/Casualty	2021	2022	2023
Severe Consequences	74	76	64
Lethal Consequences	0	3	3
Severe Body Injuries	12	18	16
Minor Body Injuries	62	55	45

Parking management is structured through tariff zones, but requires refinement to support SUMP objectives. The system includes:

- **Zone A:** approximately **344 spaces**, typically **30 denars/hour**, with monthly tariffs varying by sub-zone and user type.
- **Zone B:** approximately **472 spaces**, typically **20 denars/hour**, with differentiated monthly tariffs.
- **Zone C:** approximately **819 spaces**, typically **10 denars/hour**, again with differentiated monthly tariffs.



The existence of tariff zones provides a strong basis for improving turnover, reducing long-stay parking in central areas, and reallocating public space to walking, cycling and public transport priority. However, effective parking policy requires clear rules, enforcement, payment systems, and the strategic use of revenues to fund sustainable mobility investments.

Overall, the baseline diagnosis concludes that Kavadarci's key mobility challenges can be summarized as: high car dependency and limited public transport attractiveness, fragmented pedestrian environment and safety deficits, lack of cycling infrastructure, pressure on public space from parking and traffic dominance, and the need to reduce emissions and improve air quality. These challenges directly informed the strategy, objectives, measure packages and the preferred scenario selection.

4 Strategy Development Phase



Strategy development translated the baseline diagnosis into a shared vision, a structured objective framework and a monitoring-oriented indicator set. The approach combined technical modelling capability with participatory visioning, ensuring that the chosen direction is both measurable and locally owned.

4.1 Common Vision Practice

The common vision was developed through structured engagement sessions, surveys and consultations disseminated via municipal channels. Citizens, councilors and PSC members contributed to questions focusing on how they want to feel when moving in the city, which modes should be prioritized, and what the mobility system should look like over a ten-year horizon. Responses consistently emphasized **safety, comfort, health**, and a desire for stronger **walking, cycling and public transport** options.

These insights were synthesized into the shared long-term vision:

“Kavadarci envisions a safe, inclusive, and accessible city where walking, cycling, and public transport are the backbone of urban mobility, supporting local identity, environmental health, and quality of life.”

The vision reflects Kavadarci’s small-city context: short trip distances can make walking and cycling highly effective if infrastructure is safe and continuous, while public transport must be strengthened to serve corridors, underserved areas and accessibility needs. The vision also supports environmental health objectives and aligns with national and EU policy directions.

4.2 Strategic Objectives



Building on the vision and consultation synthesis, the strategy defines a set of objectives that guide both investment decisions and day-to-day policy choices. The objectives are aligned with the policy areas used in the Action Plan, ensuring a direct link from strategy to implementation.

The strategic objectives include:

- **Reduce car dependency** and shift trips towards walking, cycling and public transport, particularly for short urban trips and in central areas.
- **Improve public transport performance** by increasing reliability, coverage and user experience, including accessibility and passenger information.
- **Improve road safety for all users**, with a focus on vulnerable users and high-risk locations through safer design, speed management and targeted interventions.
- **Enhance walkability and accessibility** by improving continuity and removing barriers in the pedestrian network, especially near key destinations.
- **Develop a connected cycling system** supported by safe routes, junction treatments, secure parking and integration with public transport.

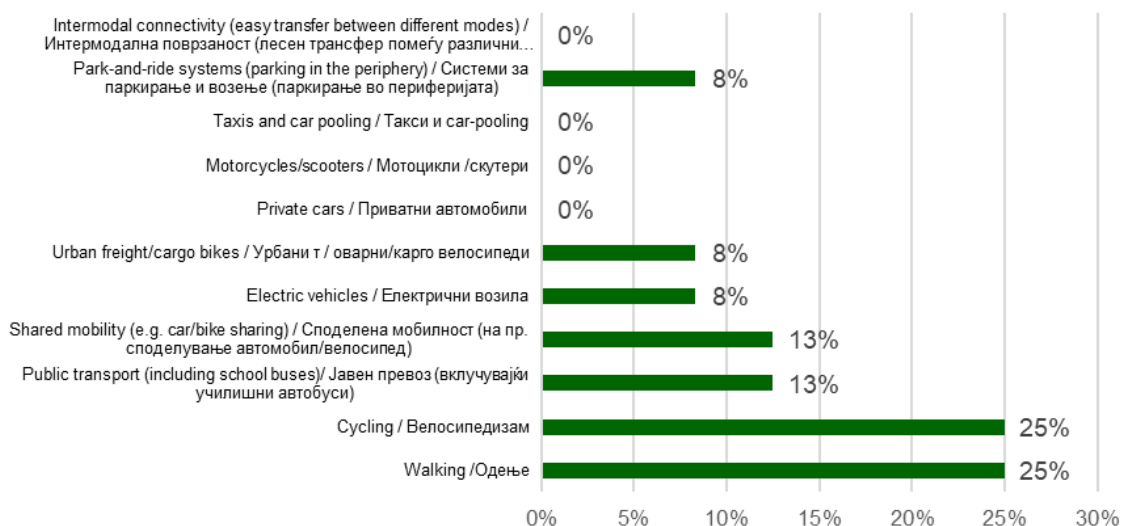
- **Reduce emissions and energy use** by supporting modal shift and cleaner technologies and aligning transport actions with air quality priorities.
- **Manage traffic and parking demand** to support livable streets and a more efficient use of public space.

To track progress, the plan adopts an indicator framework aligned with long-term outcomes. Core indicators include modal split (walking, cycling, public transport, car), car ownership rate, CO₂ emissions, PM₁₀ emissions, NO_x emissions, fuel consumption, and road safety outcomes (fatalities and injuries). Targets are expressed as trend directions toward 2037 (increase in sustainable modes and decreases in car use, emissions and casualties), and scenario evaluation provides quantitative reference values for monitoring.

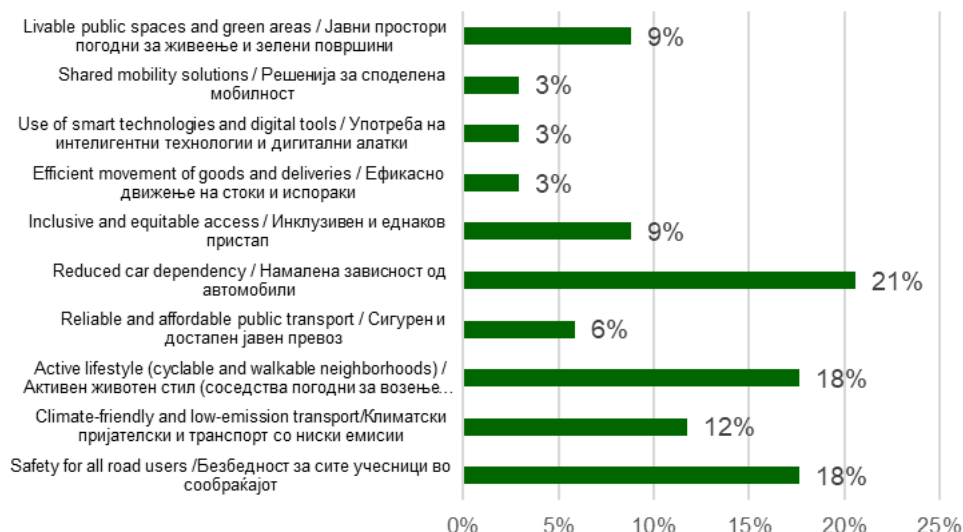
What should urban mobility in your city look like in 10 years?



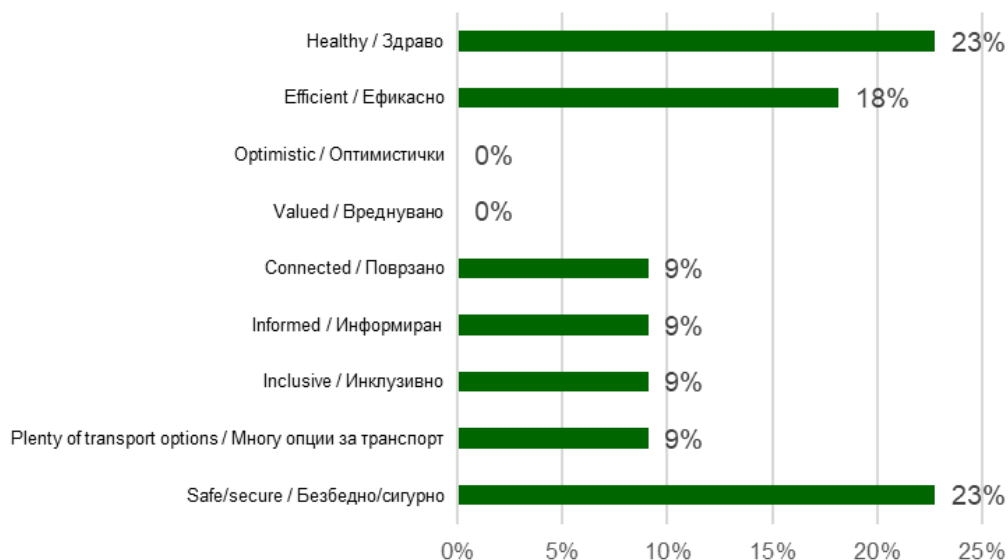
What mobility modes should your city prioritize in the long term?



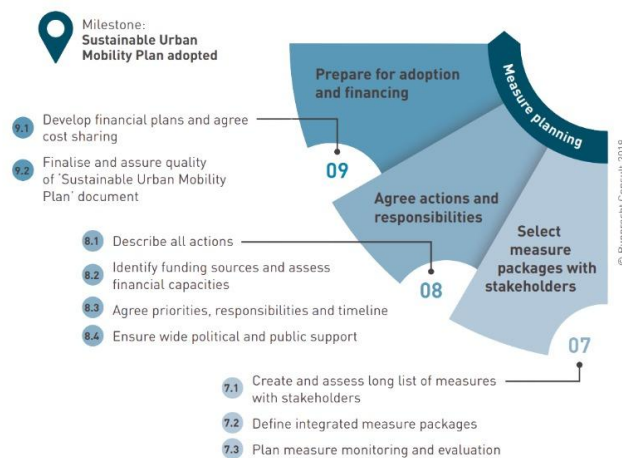
Which of these principles should shape the future mobility vision of your city?



What one word best describes how you want people to feel when moving around your city?



5 Measure Planning



Measure planning translated the long list of candidate measures into a coherent, prioritized program that can be implemented by the Municipality and partners over the SUMP horizon. Building on the diagnosis, vision and targets, the project team compiled measures across ten policy areas, assessed them for feasibility and impact, and structured them into packages that reflect the Avoid–Shift–Improve (ASI) approach.

To ensure that the final plan is both ambitious and deliverable, measures were first screened

against local constraints (institutional capacity, funding, acceptance and implementation timeframe) and then tested as integrated scenario packages using the strategic MOMOS model. This step provided evidence on how different levels of ambition would perform against the agreed indicators for safety, environment, accessibility and network efficiency.

This phase translated the strategy (vision, objectives and targets) into a coherent and deliverable set of interventions. Measures were derived from the baseline diagnosis and stakeholder input, and then structured into packages aligned with the policy areas used in the Action Plan.

A Multi-Criteria Analysis (MCA) was applied to prioritize measures in a transparent way and to assemble internally consistent scenario packages for testing. The resulting packages were then assessed through strategic modelling and an agreed indicator framework, providing the evidence base for selecting the preferred scenario.

The measure package development followed a structured sequence: identification of candidate measures, screening and consolidation, MCA-based prioritization, and integration into scenario packages.

The MCA evaluated measures across five weighted dimensions: Cost (16%), Implementation Time (14%), Financing Feasibility (27%), Efficiency/Impact (24%), and Public Acceptance (19%). The ranking supported the selection of measures that are both impactful and realistically implementable in Kavadarci.

Scenario evaluation combined strategic modelling with a harmonized indicator framework covering transport, environment and road safety. The MOMOS strategic forecasting model was used to simulate the baseline and the policy packages over the planning horizon, using local demographic, spatial and mobility inputs and agreed assumptions on exogenous trends.

Key results illustrate the expected direction of change under the preferred scenario (AS1):

- **Modal shift:** private motorized trips fall from 62.6% to 58.7%; public transport rises from 8.8% to 11.0%; cycling grows from 0.0% to 1.4%.
- **Public transport performance:** service frequency increases significantly (model assumptions support a twofold increase), improving competitiveness and coverage.
- **Environment:** GHG -18.8%, PM_{2.5} -36.3%, NO_x -50.3%, fossil fuel consumption -13.9% by 2037.
- **Road safety:** fatalities decline by 30.9% and injuries by 33.1%, reflecting the combined effect of speed management, safer crossings, and intersection improvements.

Based on performance, feasibility and stakeholder consensus, AS1 was selected as the preferred scenario. It offers a balanced pathway that delivers measurable benefits while remaining achievable within local delivery

capacity and funding realities. AS2 provides stronger ambition but implies higher investment needs and greater implementation risk.

Measures were grouped into integrated packages reflecting the main mobility policy areas:

- Walkability and Accessibility
- Access Regulation and Traffic Calming
- Road Network
- Parking System
- Urban Cycling
- Public Transport
- Mobility Management
- Electric Mobility
- Urban Freight Transport
- Public Awareness and Engagement

Based on the prioritized measures, three scenario packages were prepared for evaluation: Business-as-Usual (BAU), Alternative Scenario 1 (AS1 - Moderate Transition) and Alternative Scenario 2 (AS2 - Ambitious Transition). BAU reflects a continuation of current trends, while AS1 and AS2 represent increasing levels of policy intervention. AS1 consists of 22 integrated, cost-effective measures; AS2 comprises 31 more transformative measures with higher investment requirements.

The selected package logic and the preferred scenario are reflected in the Action Plan presented in Chapter 6.

5.1 Measure Packages

Measures were organized into policy-area packages so that actions reinforce each other (e.g., pedestrianization combined with traffic calming, or public transport upgrades paired with parking management). Packaging also supports phased delivery: quick wins and regulatory measures can start early, while larger infrastructure elements are prepared through design, budgeting and stakeholder coordination.



Figure 7. Measure Building Process

A Multi-Criteria Analysis (MCA) was applied to prioritize measures in a transparent and repeatable way. The criteria and weights were agreed through the technical process and stakeholder inputs: Cost (16%), Implementation time (14%), Financing feasibility (27%), Efficiency / impact (24%), and public acceptance (19%). The MCA results were cross-checked through stakeholder workshops and the public survey, and then used to assemble alternative packages for scenario testing.

Three scenario packages were defined for modelling and decision-making:

- **BAU (Business-as-Usual):** continuation of current trends and already-committed interventions, providing a reference against which policy choices can be compared.
- **AS1 (Preferred Scenario – balanced):** a moderate but integrated package (22 measures) combining high-performing and feasible actions across all policy areas.
- **AS2 (Ambitious Scenario):** a more transformative package (31 measures) that accelerates network transformation and decarbonization, requiring higher investment and stronger enforcement.

For each measure, a cost catalogue and MOMOS input assumptions (e.g., network lengths, coverage shares, charging infrastructure targets) were prepared to support realistic scenario testing and implementation programming. The resulting packages feed directly into the Action Plan structure in Chapter 6.

Measures were grouped into policy-area packages to ensure internal coherence and to support phased delivery. The packaging approach combined technical feasibility with stakeholder priorities and was refined through a Multi-Criteria Analysis (MCA). The MCA applied weighted criteria to compare measures consistently and to assemble scenario packages for testing.

- **MCA weighting:** Cost (16%), Implementation time (14%), Financing feasibility (27%), Efficiency/impact (24%), Public acceptance (19%).
- **Scenario packages were prepared for evaluation:** Business-as-Usual (BAU), Alternative Scenario 1 (AS1, 22 measures) and Alternative Scenario 2 (AS2, 31 measures).

The preferred scenario selection informed the Action Plan structure and the prioritized short-term and mid-long term implementation program.

5.2 Scenario Evaluation

Scenario evaluation used the MOMOS strategic model to quantify how each package performs against the SUMP objectives. The assessment covered environment (greenhouse gases and pollutant emissions) and road safety (fatalities and injuries), providing quantitative evidence to support selection of the preferred scenario.

The realization of measures is inherently contingent upon securing the requisite Financing from diverse sources or benefiting from incentives such as grants. Within this context, the evaluation of financing options plays a pivotal role, with the availability of resources garnering a high score. Recognizing the critical interplay between financial viability and project implementation, the assessment prioritizes situations where robust funding mechanisms or incentivized support exist.



Cost:

The financial dimension plays an important role in the overall scoring criteria within the project life cycle. As a result, it is expected to be between 20%-30% of the project cost to be evaluated.



Time:

Since the implementation period of the measure is directly related to the success of the application, it is expected to be between 10%-20% of the total.



Finance:

The issue of financing the measure is another important issue, therefore its weight in the total score is expected to be in the range of 10%-20%.



Efficiency:

Another important issue is the determination of measures directly related to the Chisinau Sump vision goals and objectives. Efficiency weight in the total score is expected to be in the range of 10%-20%.



Public acceptance / political prioritization:

Public acceptance weight in the total score is expected to be in the range of 10%-20%.

political prioritization weight in the total score is expected to be in the range of 5%-15%.

According to the surveys conducted with the project steering committee members the weighted average values for the criteria listed above is given.

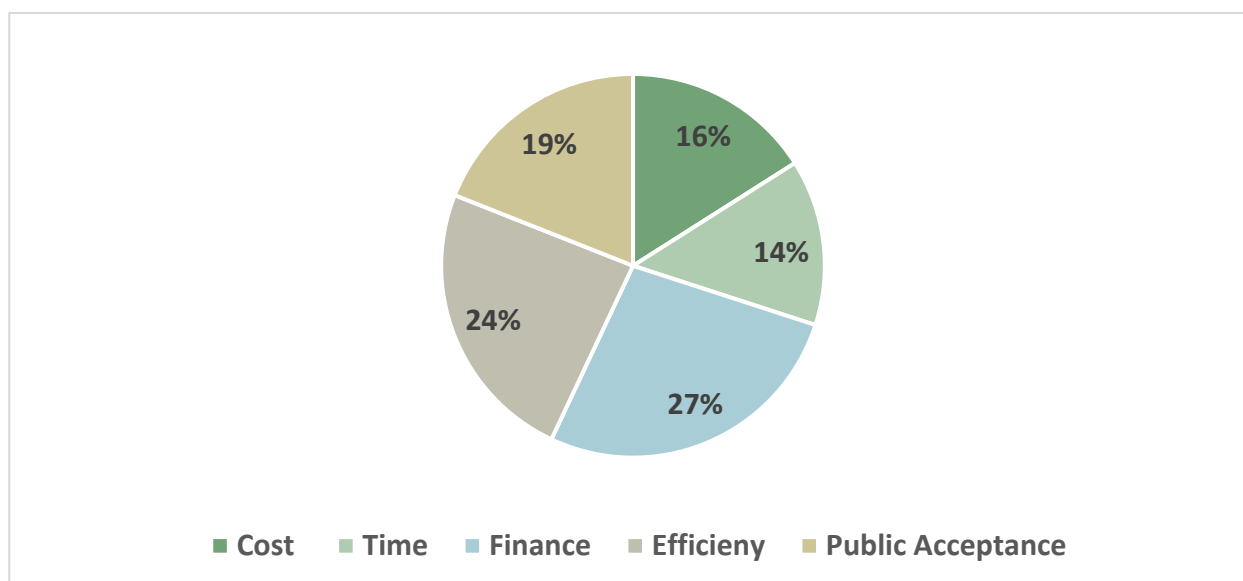


Figure 8. Criteria Weight Analysis Results

The MCA methodology followed a structured three-stage process:

- ✓ Definition of Evaluation Criteria and Weight Factors: Criteria were agreed with the PSC to reflect local priorities and strategic goals established in Task 1.3. Expert-defined ranges were provided to guide discussions and ensure consistency in scoring.
- ✓ Scoring of Measures: Each measure from the long list was scored through a collaborative assessment workshop, where PSC members applied the agreed criteria to assign relative performance values.
- ✓ Weighted Aggregation and Ranking: Scores were weighted according to the adopted factors and aggregated to produce a final prioritisation index. This allowed the identification of high-priority measures suitable for integration into scenarios and simulation through the MOMOS model.

Results show that both policy scenarios deliver clear benefits compared to BAU. By the modelling horizon year (2037), the quantified outcomes include:

- **Greenhouse gas emissions:** BAU declines from **28,910 kton CO₂-eq (2023)** to **25,266 kton (–12.6%)**. **AS1** reaches **23,475 kton (–18.8%)**, while **AS2** achieves the largest reduction at **22,420 kton (–22.4%)**.
- **PM_{2.5} emissions:** **15,562 kg (2023)** reduces to **10,741 kg under BAU (–31.0%)**. **AS1** reaches **9,912 kg (–36.3%)** and **AS2** reaches **9,719 kg (–37.5%)** by 2037.
- **NO_x emissions:** **262,371 kg (2023)** reduces to **134,630 kg under BAU (–48.7%)**. **AS1** reaches **130,420 kg (–50.3%)** and **AS2** reaches **115,936 kg (–55.8%)** by 2037.
- **Road traffic deaths:** **6.5 deaths per 100,000 inhabitants (2023)** decline to **32.3 under BAU (–11.4%)**. Policy scenarios deliver substantially greater reductions: **AS1** reaches **25.2 (–30.9%)** and **AS2** reaches **25.1 (–31.2%)** by 2037.
- **Road traffic injuries:** **643.3 injuries per 100,000 inhabitants (2023)** reduce to **564.0 under BAU (–12.3%)**. **AS1** reaches **430.2 (–33.1%)** and **AS2** reaches **425.6 (–33.8%)** by 2037.

While AS2 performs best for emissions, AS1 demonstrates a strong improvement compared to BAU while remaining more feasible within Kavadarci's delivery capacity and likely funding pathway. On this basis, AS1 was selected as the Preferred Scenario, with AS2 elements retained as a longer-term ambition set that can be activated if additional funding, institutional capacity or policy support becomes available.

Table 3. Measure Evaluation

Measure Code	Measure List	ASI	Policy Area / Measure Package	AS1	AS2	Public Acceptance Survey Results	Technical Evaluation	Weighted Average
M1.1	Develop and maintain safe pedestrian infrastructure and sidewalks	S	Walkability and Accessibility	+	+	5,00	3,75	4,00
M1.2	Improve pedestrian crossings and ensure vehicle-free access to them	S	Walkability and Accessibility		+	3,00	4,50	4,20
M1.4	Upgrade walking paths near schools and key public facilities	S	Walkability and Accessibility		+	5,00	4,69	4,75
M1.5	Create pedestrian-only zones in central and recreational areas	A	Walkability and Accessibility	+	+	5,00	4,38	4,50
M2.1	Implement car-free or low-emission zones in strategic urban areas	A	Access Regulation and Traffic Calming		+	4,00	3,13	3,30
M2.2	Apply speed limits and traffic calming measures in pedestrian-prone zones	I	Access Regulation and Traffic Calming	+	+	5,00	4,44	4,55
M2.4	Implement school streets	A	Access Regulation and Traffic Calming	+	+	5,00	3,69	3,95
M2.5	Apply tactical urbanism	S	Access Regulation and Traffic Calming	+	+	4,00	3,75	3,80
M3.1	Improve basic road maintenance and surface quality	I	Road Network	+	+	5,00	2,94	3,35
M3.2	Redesign intersections for safer crossing and traffic flow	I	Road Network		+	3,00	3,00	3,00
M3.4	Transform oversized urban roadways into multifunctional public spaces	A	Road Network	+	+	3,00	2,50	2,60
M4.2	Adjust parking fees to reduce long-term car use in central areas	A	Parking Systems	+	+	4,00	4,25	4,20
M4.4	Develop park-and-ride facilities near key transit hubs	S	Parking Systems	+	+	4,00	3,25	3,40
M5.1	Develop a connected and safe cycling network	S	Urban Cycling	+	+	5,00	3,63	3,90
M5.2	Launch public bike-sharing systems	S	Urban Cycling		+	5,00	3,13	3,50
M5.3	Install secure public bike parking solutions	I	Urban Cycling	+	+	4,00	3,25	3,40
M5.4	Facilitate the transport of bicycles on public transport and trains, with attention to accessibility and space	S	Urban Cycling		+	3,00	3,81	3,65
M5.5	Promote the use of cargo bikes as a transport solution for families and SMEs	S	Urban Cycling	+	+	4,00	2,81	3,05

Measure Code	Measure List	ASI	Policy Area / Measure Package	AS1	AS2	Public Acceptance Survey Results	Technical Evaluation	Weighted Average
M6.1	Increase the frequency of public transport services	S	Public Transport	+	+	5,00	2,88	3,30
M6.2	Extend route coverage to underserved neighborhoods	S	Public Transport		+	5,00	2,88	3,30
M6.4	Allocate dedicated lanes for PT and upgrade the conditions of stops and stations	S	Public Transport	+	+	3,00	2,75	2,80
M6.5	Invest in low-emission or electric public transport vehicles	I	Public Transport		+	4,00	2,88	3,10
M7.3	Promote flexible work and school schedules to reduce peak-hour demand	A	Mobility Management	+	+	5,00	4,75	4,80
M7.4	Collaborate with schools to develop safe routes for students	S	Mobility Management	+	+	5,00	4,75	4,80
M8.1	Install accessible public EV charging infrastructure	I	Electric Mobility	+	+	5,00	3,19	3,55
M8.3	Realize a local e-mobility strategy including sharing schemes for EVs	I	Electric Mobility		+	5,00	2,19	2,75
M8.4	Launch test drives for e-cargo bikes	S	Electric Mobility	+	+	4,00	3,50	3,60
M9.2	Develop urban logistics hubs or consolidation centers	S	Urban Freight Transport		+	5,00	3,38	3,70
M9.3	Support the use of cargo bikes for last-mile deliveries	S	Urban Freight Transport	+	+	5,00	3,50	3,80
M10.1	Launch safety campaigns targeting all road users	I	Public Awareness and Engagement	+	+	5,00	4,75	4,80

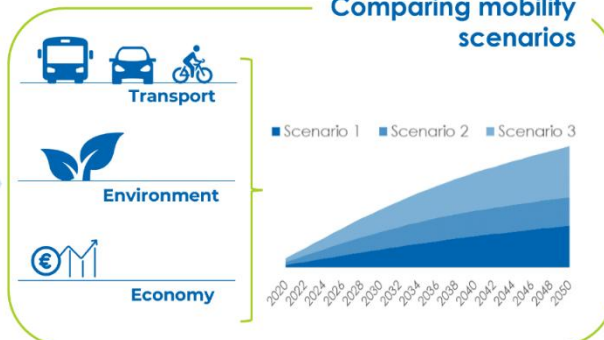
Characteristics of the urban area

Exogenous trends



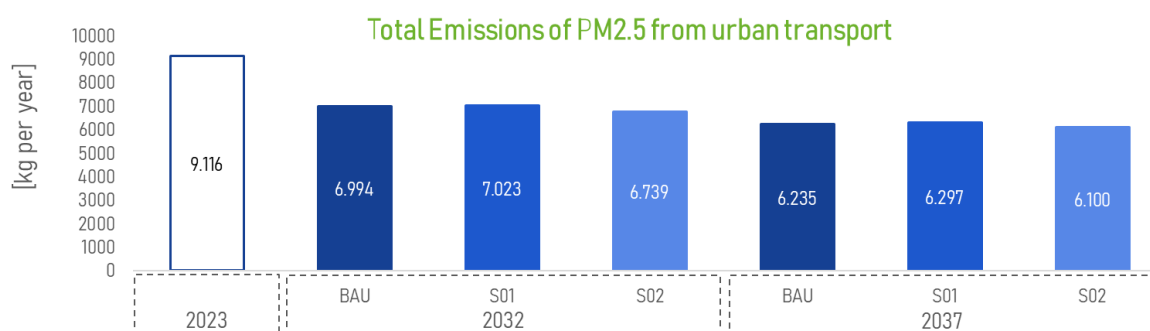
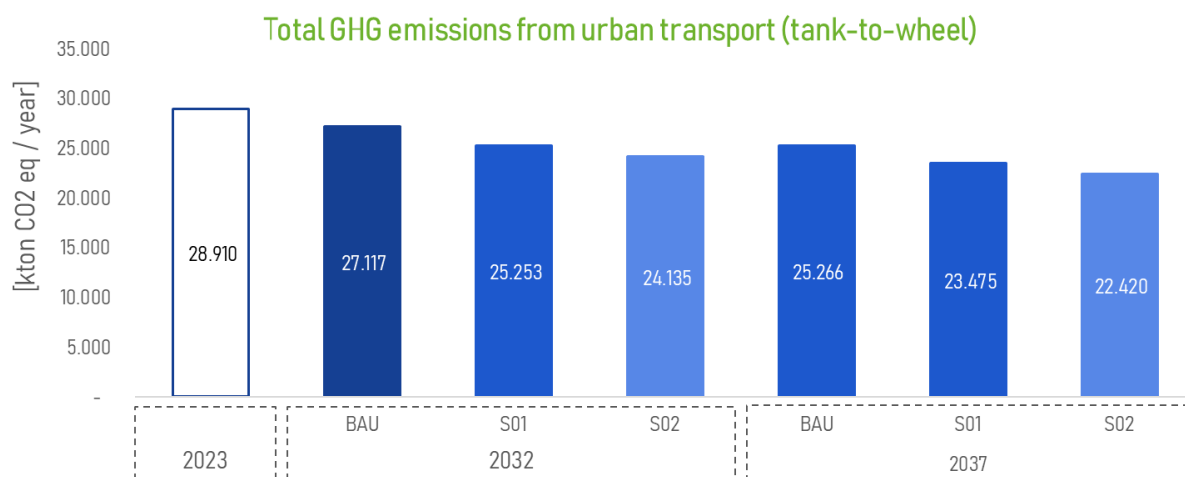
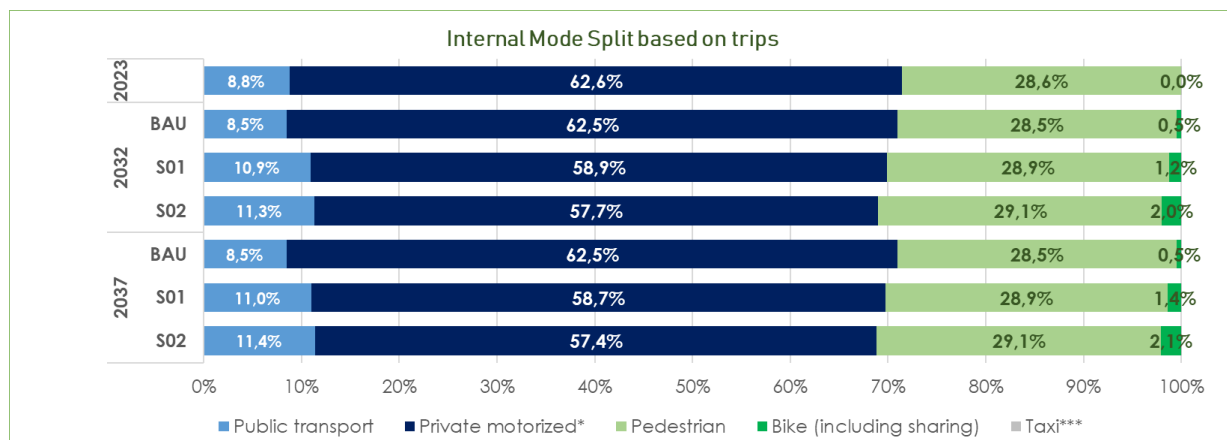
Policy measures

Comparing mobility scenarios



Beyond individual indicators, the scenario analysis demonstrates the systemic efficiency of an integrated policy package. AS1 achieves cross-cutting benefits across mobility efficiency, environmental performance and safety without relying on high-cost or institutionally complex interventions, confirming that coordinated, people-centred measures—rather than large-scale infrastructure expansion—are the most effective and

feasible pathway for Kavadarci. Some MOMOS model results for comparison of the scenarios are given in below.



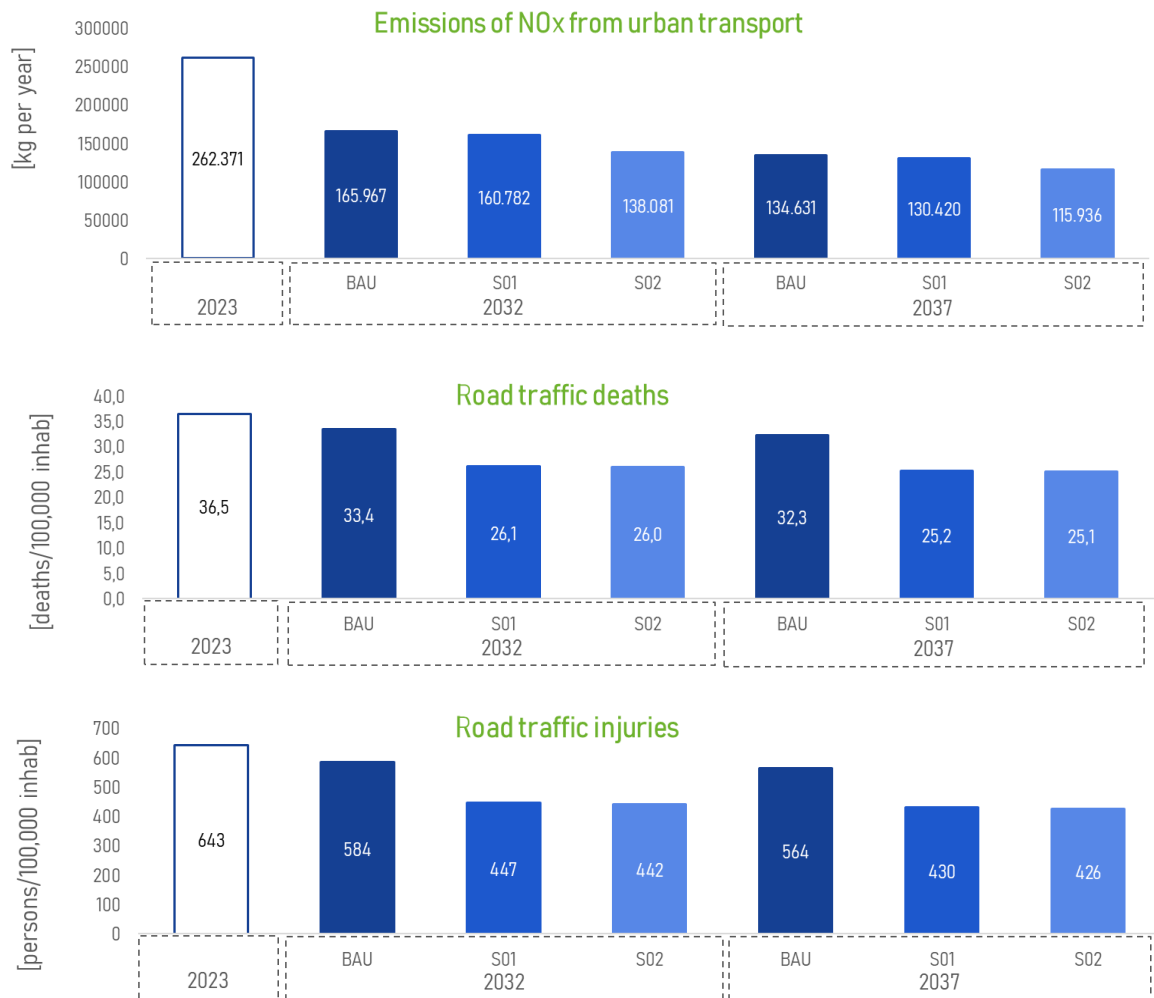
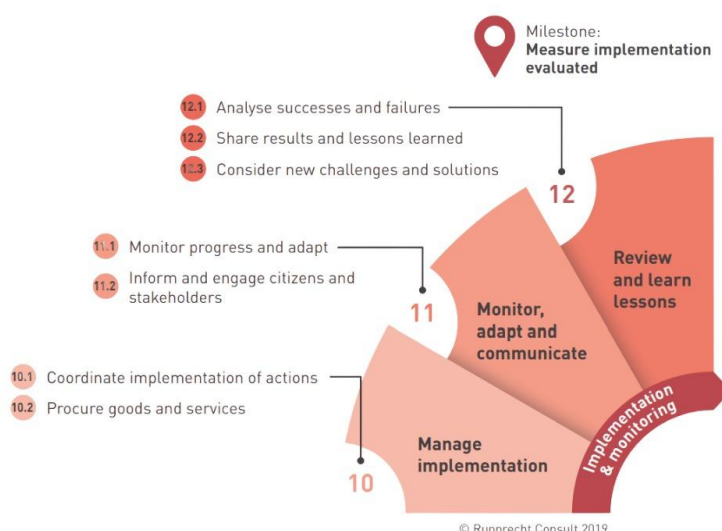


Figure 9. MoMoS Model Results – Kavadarci Scenario Evaluation

6 ACTION PLAN

The Action Plan translates the preferred scenario into a structured set of measures and actions, grouped by policy area and aligned with the ASI approach. It provides the implementation logic for the SUMP: what will be delivered, by whom, and in what sequence, including early 'quick wins' (e.g., regulatory measures, pilots and maintenance programs) and medium-term investments (e.g., corridor upgrades, network continuity and fleet renewal).

Actions are designed to be mutually reinforcing across policy areas. For example, pedestrianization and cycling improvements are supported by traffic calming and parking management; public transport upgrades are complemented by improved information, interchange quality and demand management; and freight and e-mobility actions are introduced with clear operational rules and pilot programs to build acceptance.



SUMP PROCESS HIERARCHICAL APPROACH

From General to Specific

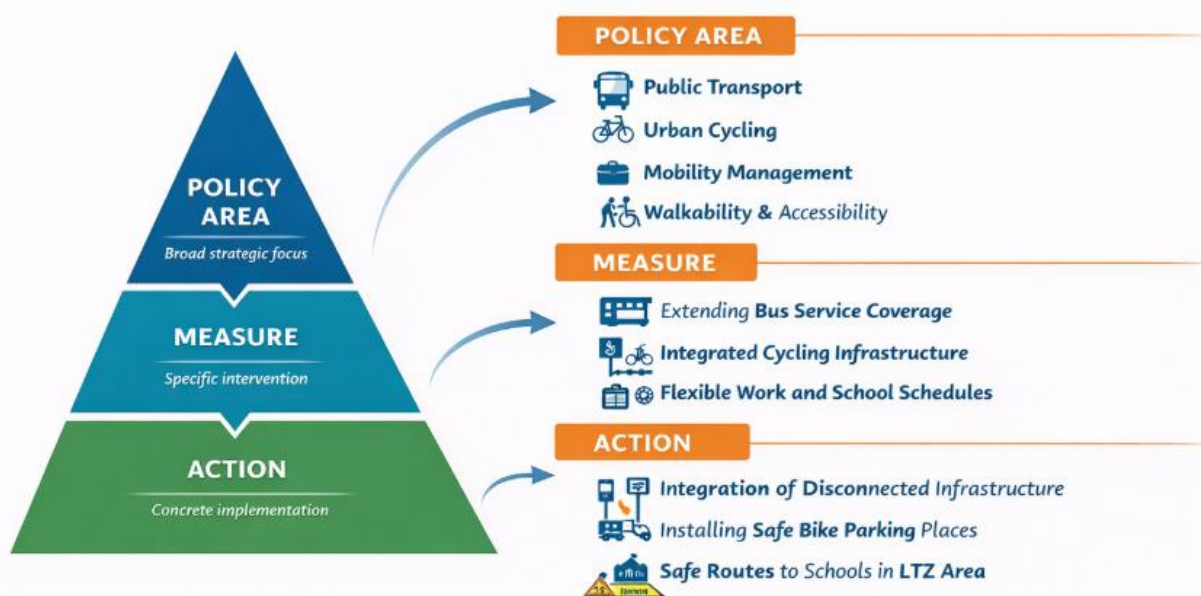


Figure 10. SUMP Process Hierarchy

6.1 Walkability and Accessibility

This policy area prioritizes a safe, comfortable and universally accessible walking environment as the foundation of urban mobility in Kavadarci. It responds to the identified challenges in the city center and around key destinations (schools, public services, markets and interchanges), where high pedestrian activity is currently affected by vehicle dominance, discontinuous sidewalks, and limited accessibility for vulnerable users.

The plan combines pedestrianization with traffic calming to create a legible hierarchy of streets and public spaces. The center-focused interventions are paired with corridor-level upgrades (crossings, lighting, curb management and maintenance) to ensure that walking becomes the default option for short trips and the primary ‘first/last mile’ mode for public transport.

Key actions under this policy area include:

- **M1.1.1 Upgrading Sidewalks and Continuous Pedestrian Corridors Across the City:** systematic repair and upgrade of sidewalks to remove discontinuities, barriers and unsafe sections, including universal accessibility measures (curb ramps, tactile guidance where relevant).
- **M1.1.2 Establishing Shaded Pedestrian Corridors and Resting Nodes:** improving comfort and microclimate through shading elements, street trees and seating at regular intervals, making walking more attractive for older people and children.
- **M1.2.1 Enhancing Pedestrian Crossings for Safety and Accessibility:** safer crossings through better design (visibility, refuge islands where appropriate, raised crossings in low-speed environments).
- **M1.2.2 Implementing Smart Lighting and Safety Monitoring at Key Crossings:** improving night-time safety and perceived security on key pedestrian desire lines.
- **M1.4.1 / M1.4.2 School and public facility corridors:** structured “safe access” corridors connecting schools and health facilities through integrated pedestrian improvements.
- **M1.5.1 Pedestrian-only zone in the city center and M1.5.2 traffic calming perimeter:** gradual transition to a people-centered center with a supportive low-speed perimeter.

For scenario testing, pedestrian areas were assumed to grow from approximately 0.5–1% of urban space in the short term (2026–2032) to 1.5–2% in the longer term (2031–2037), reflecting a gradual but sustained reallocation of space towards people.

This policy area prioritizes a high-quality walking environment as the foundation of sustainable mobility. Actions focus on creating safer, more comfortable and universally accessible streets, especially in the central area and around key public destinations.

6.2 Public Transport

Public transport actions aim to improve service quality, reliability and attractiveness so that buses become a credible alternative to private car use for daily trips. The plan addresses key issues identified in the baseline analysis, including limited-service coverage, inconsistent service frequencies, and the need for higher-quality stops, passenger information and operational management.

The approach combines network and operational improvements with supporting infrastructure. Priorities include clearer route structure, improved timetable discipline, better interchange conditions (especially where bus and rail/terminal functions coincide), and a transition toward a cleaner fleet. The measures are designed to deliver measurable gains in accessibility for residents without a car and to support wider modal shift objectives.

Key actions under this policy area include:

- **M6.1.1 Increasing peak-hour frequency on main urban bus routes and M6.1.2 real-time passenger information / dynamic timetabling:** improving service reliability and user experience, supporting the modelled increase to 11.0% PT share by 2037.
- **M6.2.1 Launching a new north–south line connecting industrial and residential areas:** improving accessibility for employment areas and underserved neighborhoods.
- **M6.2.2 Restructuring existing Line-1 to shorten travel time within the city:** increasing competitiveness by reducing travel time and improving directness.
- **M6.4.1 Upgrading bus stops and interchange facilities:** shelter, accessibility, lighting, and clear information to improve comfort and safety.
- **M6.5.1 / M6.5.2 Low-emission / electric buses and charging infrastructure:** progressive fleet greening aligned with emissions reduction targets.

Public transport improvements are designed to be mutually reinforcing with parking policy and traffic calming. As center access is managed more actively, public transport becomes a more attractive option for trips to central destinations.

6.3 Urban Cycling

Cycling has a near-zero baseline in Kavadarcı, consistent with the recorded **0 km** of cycling infrastructure. This does not imply low potential; rather, it reflects the absence of safe conditions. The Action Plan therefore focuses on building a connected core network, safe school and industrial corridors, and supportive services such as bike parking and bike sharing. Even modest network development can unlock significant growth from the current baseline.

Key actions under this policy area include:

- **M5.1.1 Developing a connected cycling network across residential and central areas and M5.1.2 safe cycling corridors to schools and industrial zones:** creating a clear backbone that connects origins to key destinations.
- **M5.2.1 Bike-sharing at the central transfer hub and M5.2.2 expansion to residential and educational areas:** lowering entry barriers and supporting short urban trips.
- **M5.3.1 / M5.3.2 Secure bicycle parking at hubs, schools, hospitals and cultural centers.**
- **M5.4.1 Bicycle carriage on buses and M5.4.2 integrated fare systems:** supporting multimodality and enabling longer combined trips.
- **M5.5.1 / M5.5.2 Cargo bikes for last-mile logistics and family mobility:** piloting new use-cases that also support sustainable freight.

Cycling measures are closely linked to traffic calming (low-speed environments) and to the reallocation of street space through road redesign measures.

6.4 Access Regulation and Traffic Calming

Access regulation and traffic calming measures manage car access and speeds in sensitive parts of the city, improving safety and the quality of public space while supporting walking, cycling and public transport. These actions are particularly relevant in the central area and around schools and other vulnerable-user destinations, where conflicts between through-traffic and local movement are most acute.

The plan proposes a step-by-step approach, starting with pilots and clearly communicated rules (signage, enforcement and exemptions), and scaling up to a coherent regulated zone network. This approach allows the Municipality to build public acceptance and operational capacity while demonstrating benefits such as reduced noise, fewer conflicts and improved conditions for local commerce and social life.

Key actions under this policy area include:

- **M2.1 Car-free or low-emission zones in strategic areas:** linked to the pedestrianization strategy and the creation of low-traffic environments.
- **M2.2 Speed limits and traffic calming in pedestrian-prone zones:** enabling safer crossings and reducing crash severity.
- **M2.4 School streets:** creating safer environments during school start/end times and strengthening safe routes to school.
- **M2.5 Tactical urbanism:** quick, low-cost pilots (temporary materials) to test street transformations before permanent construction.

These measures are essential “enablers” that allow walking and cycling investments to deliver their full benefits and support the modelled safety improvements.

6.5 Road Networks

The Road Networks policy area focuses on raising the functional quality, safety and resilience of Kavadarci’s street network. It responds to identified issues such as inconsistent maintenance, drainage and winter service gaps, limited accessibility in street design and high-risk junctions. The aim is to ensure that the existing network operates safely and efficiently for all users, while gradually transforming oversized or car-dominated corridors into balanced urban streets.

The program combines routine maintenance and asset management with targeted redesign of intersections and corridors. Safety audits, improved signage and markings, and better pedestrian crossing quality are used as near-term interventions, while corridor redesigns and complete-street upgrades are prepared as medium-term investments. Accessibility and vulnerable-user needs are integrated into all works through design standards and implementation checks.

Key actions under this policy area include:

- **M3.1.1 Improving basic road surface quality and M3.1.2 preventive maintenance programme:** shifting from reactive repairs to planned maintenance to improve safety and reduce lifecycle costs.
- **M3.2.1 Redesigning intersections for safer movement and M3.2.2 roundabouts and traffic calming at critical junctions:** reducing conflict points and improving pedestrian crossing safety.
- **M3.4.1 Reclaiming oversized urban roads for multifunctional public use and M3.4.2 green infrastructure in reallocated street space:** transforming vehicle-dominated corridors into balanced streets with space for walking, cycling, greenery and safer crossings.

Road network redesign is explicitly aligned with the safety objective (SO3) and supports the broader transition of the city’s public realm.

6.6 Parking System

Parking is already managed through tariff zones, but must evolve to support the preferred scenario and reduce long-stay car use in central areas. The Action Plan builds on the existing zoning structure (A/B/C) and introduces stronger pricing, enforcement, and park-and-ride logic where appropriate. The intent is to improve turnover, reduce illegal or obstructive parking, and use parking policy as a tool for public space reallocation.

Key actions under this policy area include:

- **M4.2 Adjust parking fees in the city center:** introduce/expand priced parking and manage tariffs to influence demand and reduce cruising.
- **M4.4 Introduce Park & Ride at strategic locations to intercept inbound car trips** and enable onward travel by public transport or walking.

Parking management supports the preferred scenario by reducing long-term car dependence in central areas, improving compliance and using pricing and supply measures to manage demand.

- Adjust parking fees and time regulations in central zones to discourage long-stay parking and to improve turnover for local activity.
- Strengthen enforcement against illegal parking, especially in pedestrian and cycling priority areas and near crossings and junctions.
- Develop Park-and-Ride facilities near key public transport hubs to intercept car trips and enable easy transfer to transit.
- Provide peripheral parking options that encourage walking into the center, complemented by clear signage and pedestrian-friendly routes.

6.7 Mobility Management

Mobility management measures focus on influencing travel behavior through organizational change, incentives and targeted programs—often with relatively low capital cost. They complement infrastructure investments by reducing peak-hour demand, improving safety for children and encouraging routine use of sustainable modes.

The plan promotes cooperation with major employers, public institutions and schools to manage trip timing and route choice. It also supports the development of safe routes and mobility education for students, helping to reduce car-based school trips and to embed sustainable habits early.

Key actions under this policy area include:

- **M7.3 Flexible work and school schedules:** reducing peak-hour pressure on the network.
- **M7.4 Safe routes and school collaboration:** institutionalizing safe access planning and linking it to infrastructure improvements and school streets.

Mobility management measures complement infrastructure and service upgrades by influencing travel choices through information, coordination and targeted programs.

- Develop school and workplace mobility initiatives that promote walking, cycling and public transport, supported by safe route planning and awareness activities.
- Provide user-friendly journey planning and service information through digital channels, integrating public transport and active mobility options.
- Introduce behavior-change campaigns and incentive schemes (e.g., targeted promotions, pilot programs) to support the shift away from private car use.
- Coordinate mobility management with major events and seasonal peaks to reduce congestion and improve safety during high-demand periods.

6.8 Electric Mobility

Electric mobility actions support Kavadarci's transition toward low-emission transport by addressing infrastructure readiness, market uptake and local operating conditions. The plan recognizes that electrification is most effective when combined with modal shift and reduced vehicle kilometers, but that it still plays a key role in reducing remaining emissions—especially for fleets and essential trips.

The program starts with a practical charging network that is accessible to residents without private driveways and that supports municipal and commercial fleet electrification. It is paired with a local e-mobility strategy that clarifies responsibilities, standards and business models for shared services and future scaling.

Key actions under this policy area include:

- **M8.1 Install accessible public EV charging infrastructure in a phased manner.**

- **M8.3 Realize a local e-mobility strategy, including regulatory readiness and sharing schemes for EVs.**
- **M8.4 Launch test drives and pilots for e-cargo bikes to build acceptance and demonstrate operational viability.**

Electric mobility actions support cleaner transport by enabling the uptake of low-emission vehicles and aligning infrastructure rollout with realistic demand and investment capacity.

- Plan and deploy a basic public charging network in strategic locations (municipal facilities, activity hubs, and mobility nodes), with clear operational responsibilities.
- Promote the gradual electrification of municipal and service fleets where feasible, ensuring procurement and maintenance readiness.
- Enable electrification for key user groups such as taxis and urban logistics operators through supportive policies, parking/charging access and pilot projects.
- Coordinate electric mobility with public transport fleet renewal to maximize emissions reduction benefits across modes.

6.9 Urban Freight Transport

Urban freight measures improve the efficiency and sustainability of deliveries while reducing conflicts in the center and residential areas. The plan addresses issues such as peak-hour delivery impacts, curbside conflicts, and the need for clearer rules for freight access in regulated zones.

The approach combines operational regulation with new logistics solutions. Off-peak delivery windows and restricted access rules reduce conflicts at the most sensitive times and places, while consolidation and last-mile alternatives (cargo bikes) reduce the number and size of vehicles entering the center. These measures are coordinated with business stakeholders to ensure practicality and compliance.

Key actions under this policy area include:

- **M9.2 Develop urban logistics hubs / consolidation solutions to reduce vehicle-kilometers and support cleaner last-mile delivery.**
- **M9.3 Support the use of cargo bikes for last-mile deliveries, integrated with regulated access rules (Freight LTZ).**

6.10 Public Awareness and Engagement

Public awareness and engagement activities ensure that infrastructure and regulatory changes are understood, accepted and used correctly. They are essential for improving road user behavior, building trust in the SUMP and sustaining political and community support over time.

The plan includes targeted safety campaigns for different user groups (drivers, pedestrians, cyclists, freight operators), complemented by ongoing sustainable travel promotion and practical information services. Communication is designed as a continuous program rather than one-off events, using schools, community organizations, media and digital channels.

Key actions under this policy area include:

- **M10.1.1 City-wide road safety awareness campaign: targeting drivers and vulnerable users with consistent messaging.**
- “

Engagement activities are integrated with monitoring and annual reporting so that residents and stakeholders can see progress, understand trade-offs and contribute to adjustments during implementation.

Public awareness and engagement actions ensure that safety and behavior change accompany physical investments, and that stakeholders remain informed and involved as implementation progresses.

-
- Launch citywide road safety campaigns targeting all road users, reinforcing safe speeds, crossing behavior and mutual awareness between modes.
 - Deliver targeted campaigns for vulnerable groups (children, older people and persons with disabilities) and for high-risk behaviors and locations.
 - Run seasonal and thematic campaigns (e.g., back-to-school, winter safety) aligned with the implementation timetable and visible improvements on the ground.
 - Maintain ongoing communication and feedback channels to build ownership, track concerns and support adaptive implementation.

[illegible]

Measure Package	Actions	Year - 1	Year - 2	Year - 3	Year - 4	Year - 5	Year - 6	Year - 7	Year - 8	Year - 9	Year - 10
	M6.2.2										
M6.4	M6.4.1										
M6.5	M6.5.1										
	M6.5.2										
M7.3	M7.3.1										
	M7.3.2										
M7.4	M7.4.1										
	M7.4.2										
M8.1	M8.1.1										
M8.3	M8.3.1										
	M8.3.2										
M8.4	M8.4.1										
M9.2	M9.2.1										
	M9.2.2										
M9.3	M9.3.1										
M10.1	M10.1.1										
	M10.1.2										

7.1 Short Term Implementation Program

The short-term program (approximately 0–5 years) prioritizes measures that are feasible to deliver quickly, visibly improve daily mobility conditions and create enabling conditions for larger investments later in the plan period. The focus is on safety, accessibility and service quality improvements, coupled with the preparatory work needed to de-risk mid/long-term projects.

Short-term delivery combines low-to-medium cost interventions with ‘enabling’ actions such as feasibility studies, detailed designs, regulatory updates, procurement preparation and improvements in baseline data systems. This ensures that when capital-intensive projects are ready to start, the required technical documentation, permits and financing pathways are already in place.

- Road safety quick wins at high-risk locations, including safer pedestrian crossings, lighting and visibility measures, and targeted intersection treatments.
- Walkability and accessibility upgrades to remove barriers, improve footway continuity and strengthen safe routes to key destinations (schools, services and central public spaces).
- Public transport service enhancements that can be implemented rapidly, such as bus stop upgrades, passenger information improvements and operational refinements to strengthen reliability.
- Early cycling network steps through pilot corridors, completion of missing links where feasible and safer junction treatments, building towards a coherent network over time.
- First-phase parking management actions (clear rules, improved enforcement, demand management pilots and better organization of on-street parking in sensitive areas).
- Mobility management and public awareness programs (e.g., school travel initiatives and behavior change campaigns) that increase acceptance of sustainable modes.
- Project pipeline preparation: feasibility and preliminary design for mid/long-term investments, including refined cost estimates and packaging for funding applications.

The short-term plan should be reviewed annually through the monitoring cycle. Adjustments should prioritize actions that demonstrate measurable progress toward the preferred scenario and that strengthen institutional readiness for scaled delivery in the second half of the program.

7.2 Mid-Long Term Implementation Program

The mid and long-term program (approximately 6–10 years) scales up the transformation by delivering measures that require larger capital budgets, multi-year procurement and stable financing arrangements. This horizon consolidates the preferred scenario by making walking, cycling and public transport structurally more attractive than private car use for a wider range of trips.

Mid/long-term delivery builds on lessons from early pilots and short-term measures, converting successful interventions into permanent upgrades and completing the network-level improvements needed for sustained mode shift.

- Completion and quality uplift of walking and cycling networks, moving from fragmented interventions to connected, legible and safe systems supported by consistent design standards.
- Public transport modernization, including investments to improve comfort, accessibility and reliability, and where applicable, fleet renewal aligned with operational funding capacity.
- Expansion of traffic calming and access management in sensitive urban areas, supported by permanent street redesign where short-term measures demonstrate positive results.
- Mature parking system reforms, progressing from organization and enforcement toward comprehensive demand management (zoning, pricing tools where appropriate and reinvestment of revenues into mobility improvements).
- Scalable electric mobility steps, expanding beyond pilots through coordinated infrastructure planning and alignment with national energy and climate programs.
- Urban freight measures that reduce conflicts in pedestrian-priority areas and improve logistics efficiency through routing, curbside management and delivery management practices.

Throughout this horizon, integration with other municipal and national strategies is essential so that mobility investments support broader objectives for public space quality, economic development, environmental performance and social inclusion.

7.3 Financial Planning and Funding Sources



The implementation of the Sustainable Urban Mobility Plans (SUMP) for **Kavadarci**, Prilep, Kochani, Struga, and Strumica requires a realistic, diversified, and phased financing strategy aligned with European SUMP principles and adapted to the fiscal and institutional context of North Macedonia. Given the limited fiscal autonomy of municipalities and competing demands on local budgets, the successful delivery of SUMP measures depends on the coordinated mobilization of municipal resources, national funding mechanisms, European pre-accession instruments, international financial institutions, and selective private sector participation.

Municipal budgets constitute the core financing source, particularly for short-term, low-cost, and high-impact measures such as traffic calming, pedestrian and cycling improvements, accessibility upgrades, signage, road markings, and awareness-raising activities. Integrating SUMP priorities into annual and multi-annual municipal budget planning is essential to ensure continuity between strategy and implementation, as well as to provide co-financing for externally supported projects.

National funding programmes related to transport, environment, climate action, and regional development represent an important complementary source of finance, especially for larger-scale or technically complex interventions. Alignment with national investment priorities and coordination with central government institutions are therefore critical for accessing these resources.

European and international funding instruments play a decisive role in enabling capital-intensive SUMP measures. In particular, the Instrument for Pre-Accession Assistance (IPA III) provides significant opportunities for financing sustainable transport infrastructure, public transport improvements, active mobility networks, intelligent transport systems, and institutional capacity building. Additional support from international financial institutions such as the European Investment Bank (EIB), the European Bank for Reconstruction and Development (EBRD), and the World Bank may be mobilised for mature projects with clear climate, environmental, and social benefits.

Parking management is recognised as both a mobility management tool and a sustainable local revenue source. Revenues generated through controlled parking systems, permits, and enforcement can be reinvested in walking, cycling, public transport, and public space improvements, strengthening the financial sustainability and public acceptability of SUMP measures.

Public–Private Partnerships (PPPs) may complement public funding for selected actions such as parking infrastructure and management, electric mobility charging, shared mobility services, and smart mobility solutions, provided that public interests, affordability, and accessibility objectives are safeguarded.

Overall, the proposed financial framework enables a phased, credible, and financially sustainable transition from planning to implementation, consistent with European SUMP guidelines and tailored to the realities of North Macedonian municipalities.

This financing approach aligns with ELTIS and European Commission SUMP guidance in the following ways:

Integration of planning and budgeting

- Clear linkage between SUMP measures, Action Cards, cost estimates, and municipal budget cycles.

Diversification of funding sources

- Combination of local, national, European, international, and private financing instruments.

Phased implementation

- Short-term low-cost measures, medium-term infrastructure investments, and long-term strategic projects.

Use of demand-management revenues

- Parking management revenues reinvested into sustainable mobility (polluter-pays / user-benefits principle).

Financial realism and prioritisation

- Measures prioritised based on affordability, impact, and implementation capacity.

Monitoring and transparency

- Financial performance monitored alongside physical implementation progress.

This structure supports bankability, improves access to external funding, and strengthens institutional credibility.

8 Monitoring and Evaluation

This chapter sets out how Kavadarci will track delivery of the SUMP, measure whether the preferred scenario is being achieved, and ensure that the plan remains a living document over the full implementation horizon. Monitoring provides regular, objective evidence on what has been delivered and what has changed in the mobility system, while evaluation assesses whether the observed changes are sufficient to meet the long-term vision and targets.

The Monitoring and Evaluation (M&E) approach combines an annual monitoring cycle linked to municipal planning and budgeting, a structured set of Key Performance Indicators (KPIs) aligned with the SUMP objectives, and two formal evaluation milestones at mid-term and at the end of the plan period. The approach is designed to support transparency, accountability and timely corrective action.



Figure 11. SUMP Monitoring Structure

8.1 Monitoring Framework and Mechanisms

A dedicated coordination and data-management function is required to run the M&E system effectively. The Municipality leads the process through the SUMP Coordinator and a small SUMP Coordination / Monitoring Unit responsible for consolidating data, maintaining indicator definitions, calculating KPIs and preparing monitoring outputs. The Project Steering Committee (PSC) provides oversight, validates annual findings and supports cross-institution coordination to resolve delivery bottlenecks.

To ensure consistency over time, all participating institutions use a common monitoring calendar, agreed data formats and clear responsibilities. Data collection draws on routine administrative sources (e.g., public

transport operations, road safety statistics, infrastructure delivery records) and is complemented by targeted surveys and periodic measurements when gaps are identified.

Annual Monitoring Cycle

The yearly monitoring cycle follows five phases across the calendar year. This structure ensures that progress is reviewed continuously, and that findings are integrated into the next year's work program and budget decisions.

- **Phase 1 – Data collection (Q1):** institutions compile previous-year data on infrastructure delivery, public transport performance, traffic and parking conditions, road safety, emissions/air quality and citizen feedback.
- **Phase 2 – Technical analysis (Q2):** the SUMP technical team analyses trends, compares results against KPIs and targets, and identifies causes of delays or underperformance.
- **Phase 3 – Annual Monitoring Report (Q3):** results are consolidated into a single report summarizing KPI values, delivery status of actions (e.g., completed / on track / delayed / not started) and priority issues.
- **Phase 4 – Stakeholder and public review (Q3–Q4):** findings are shared with the PSC and key stakeholder groups; consultations help validate results, capture user experience and identify emerging needs.
- **Phase 5 – Adjustment and next-year planning (Q4):** the Municipality updates the implementation program, refines priorities, reallocates resources where needed and integrates new opportunities (e.g., funding calls, regulatory changes).

This cycle allows Kavadarci to detect issues early, build public trust through transparent reporting, and keep the SUMP aligned with real mobility trends rather than waiting for a single end-of-plan review.

Table 5. Kavadarci Annual Monitoring Cycle

Phase	Time Period	What Happens?	Purpose	Key Actors
1. Data Collection	1 st Quarter	All institutions collect detailed data from the previous year: • New cycling or walking facilities • Road improvements • Bus frequency changes • Safety incidents • Traffic counts • Air quality levels • Citizen feedback, etc.	To obtain a complete and accurate picture of mobility developments in the previous 12 months.	• Municipal technical units • PT operators • Traffic Police • environmental agencies • ITS systems
2. Technical Analysis	2 nd Quarter	Experts analyze the collected data • Compare results with KPIs • Check if actions are on schedule • Identify early warning signs for delays underperformance, or resource gaps.	To understand • What improved? • What did not progress as intended? • Why?	SUMP Technical Team
3. Annual Monitoring Report	3 rd Quarter	All findings are consolidated into a single report summarizing the year's progress. The status of every action card is presented clearly using a color-coded system (Completed / On Track / Delayed / Not Started).	To produce an official, transparent, public record of SUMP progress.	SUMP Coordination Unit

Phase	Time Period	What Happens?	Purpose	Key Actors
4. Stakeholder & Public Review	3 rd & 4 th Quarter	- Results are shared with citizens, NGOs, schools, businesses, public transport users, and neighborhood communities. - Public workshops, online consultations, and targeted meetings are held.	- To gather feedback - Identify local needs - Increase community support and ownership.	- Municipality - Project Steering Committee
5. Adjustment & Next-Year Planning	4 th Quarter	Based on the monitoring results and public feedback, - The municipality updates the action plan for the next year - Adjusts priorities - Reallocates budget if necessary - Integrates new measures	To ensure that the SUMP remains relevant, realistic, and aligned with actual mobility needs.	Municipal leadership & technical departments

8.2 Key Performance Indicators (KPIs)

KPIs translate the SUMP vision and strategic objectives into measurable outcomes. They provide an objective basis for answering whether Kavadarci is moving toward a safer, cleaner and more accessible mobility system, and they support evidence-based decisions on which measures to scale up, redesign or postpone.

Following SUMP good practice, the KPI framework distinguishes between two complementary layers: long-term achievement indicators that describe system-level outcomes, and short-term outcome (output) indicators that track what has been delivered on the ground each year.

KPIs allow the municipality to measure the success of mobility improvements in a clear, structured, and objective way. They help answer fundamental questions such as:

- Are more people walking and cycling?
- Is public transport improving every year?
- Are road accidents decreasing?
- Are CO₂ emissions being reduced?
- Are mobility options becoming more accessible and inclusive?

To capture these changes, KPIs are the fundamental element for SUMP process.

Table 6. Key Performance Indicators

Area	What Is Delivered?	KPIs
Walkability and Accessibility	• Sidewalk repairs • Safer crossings	• Number of upgraded pedestrian crossings • Increase in pedestrian zone area (m²) • Walkability score at the neighborhood level • Total length of pedestrian path network
Access Regulation and Traffic Calming	• Traffic Calming Measures • Upgrading street designs	• Traffic calming zones (m²) • Number of streets with reduced speed limits • Number of streets upgraded with safety/traffic calming measures
Road Network	• Maintenance, Resurfacing and Drainage designs • Intersection upgrade • Smart Signaling/Monitoring System	• Km of road surface improved • Number of intersections to be upgraded with redesign • Number of intersections to be implemented in smart signaling system
Parking Systems	• Regulated zones • P+R facilities	• Share of regulated parking in city center (%) • Number of parking lots with park & ride facility • Number of parking with occupancy tracks
Urban Cycling	• New bike lanes • Improved connections • Developed bike infrastructure	• Length of cycling network constructed (km) <i>(with the detail recreational green routes)</i> • Number of bicycle users • Modal share of bike trips (%) • Bike parking capacity • Number of shared bike station <i>(if stationary option implemented)</i>
Public Transport	• New bus line routes and current routes upgrade • Modernized stops • Passenger informative system	• Number of new/renovated bus stops • Population that can reach the city center within 30 minutes by public transportation • Population ratio with public transportation access within a 500m radius

Area	What Is Delivered?	KPIs
		- Yearly Passenger-km - Modal share of public transport use (%) - Number of zero emission vehicle in the fleet
Mobility Management	- Safety - PT usage	- Number of accidents - Number of bus users
Electric Mobility	- Charging stations - E-bikes - E-vehicles	Number of public EV chargers installed
Urban Freight Transport	- Consolidation centers - Delivery policies	Off-peak delivery compliance (%)
Public Awareness and Engagement	- Workshops - Campaigns	- Participatory numbers - Performance evaluation report

9 Conclusion

The preparation of the Sustainable Urban Mobility Plan (SUMP) for Kavadarci represents a comprehensive and structured effort to guide the city toward a more sustainable, safe, and inclusive mobility future. Building on the analytical foundation established in the earlier tasks—ranging from the assessment of current mobility conditions to the development of a shared vision, scenario evaluation, and measure selection—the plan brings together all components into a coherent and actionable framework. Through this process, Kavadarci has gained a clear understanding of the challenges and opportunities shaping its mobility landscape, as well as a long-term strategy supported by measurable objectives and a robust set of interventions.

The Action Plan provides a detailed roadmap for implementation, offering practical steps that address walking and accessibility, cycling infrastructure, public transport improvements, road network management, and public engagement. These measures, grounded in local context and informed by spatial analysis, contribute directly to enhancing mobility efficiency, safety, environmental performance, and the overall quality of urban life. The 10-year Implementation Plan further ensures that actions are prioritized, phased realistically, and matched with institutional responsibilities and potential funding sources.

The Monitoring and Evaluation Plan equips Kavadarci with a structured mechanism to track progress, ensure accountability, and maintain alignment with the city's long-term goals. This iterative framework reinforces the SUMP as a living document—one that evolves through evidence, stakeholder engagement, and changing mobility needs. By integrating continuous monitoring, mid-term and final evaluations, and adaptive feedback loops, the plan supports a responsive and resilient mobility transition.

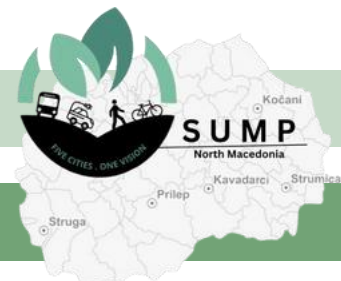
Ultimately, the SUMP positions Kavadarci to advance toward a more sustainable and future-ready mobility system. It provides the municipality with not only a technical plan but also a strategic governance tool that strengthens institutional capacity, builds public trust, and aligns with European mobility and climate objectives. As implementation progresses, the SUMP will serve as a guiding framework for improving accessibility, reducing emissions, enhancing public spaces, and ensuring a high quality of life for current and future generations.

10 Annexes

Walkability and Accessibility

M1.1: Develop and maintain safe pedestrian infrastructure and sidewalks

M1.1.1: Upgrading sidewalks and continuous pedestrian corridors across the city



Cost

675.000 €



Period

Short



Priority

High



Description

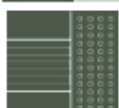
Pedestrian mobility in Kavadarci is currently limited by deteriorated sidewalks and fragmented walking corridors, which restrict safe and inclusive access to central areas and public facilities. This action foresees the comprehensive upgrading of sidewalks with durable materials, barrier-free design, and tactile surfaces to ensure accessibility for all citizens. The intervention will focus on creating continuous pedestrian corridors linking the city center with residential districts, educational institutions, and health facilities. By improving surface quality, eliminating obstacles, and enhancing legibility, the city will ensure safer conditions for vulnerable groups, promote walking as a primary mode of transport, and contribute to a healthier urban environment.



Image



Pedestrian Ramps



Guidance for the Visually Impaired



Signage and Wayfinding



Lighting



Weather Protection



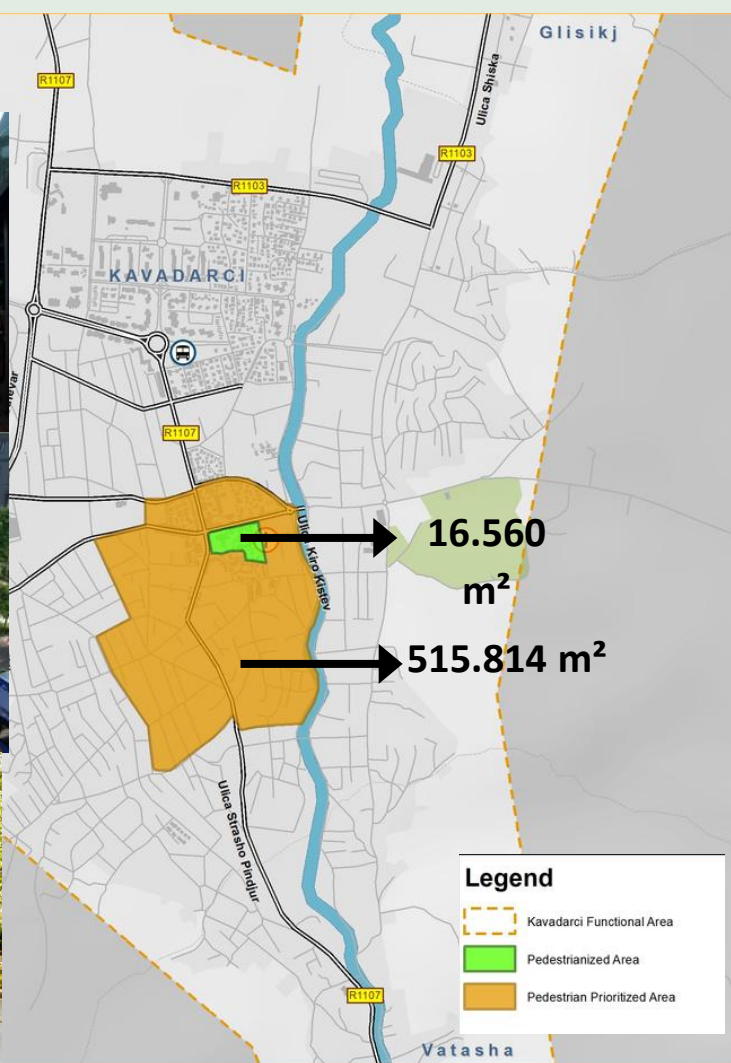
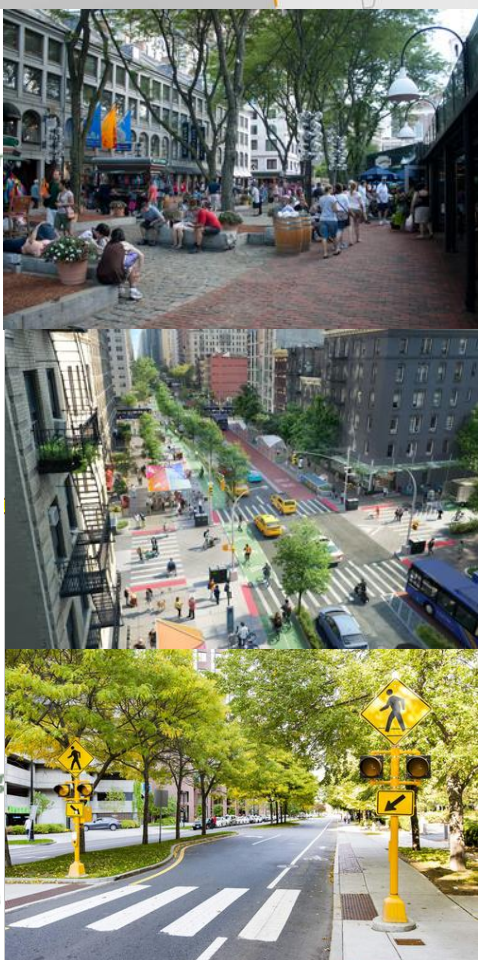
Curbs



Trees and Landscaping



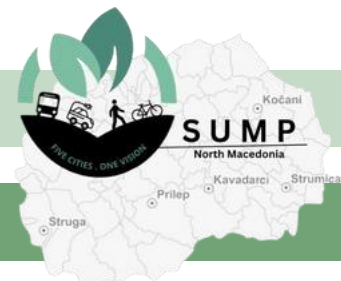
Waste Receptacles



Walkability and Accessibility

M1.1: Develop and maintain safe pedestrian infrastructure and sidewalks

M1.1.2: Establishing shaded pedestrian corridors and resting nodes



Cost

350.000 €



Period

Short



Priority

Medium

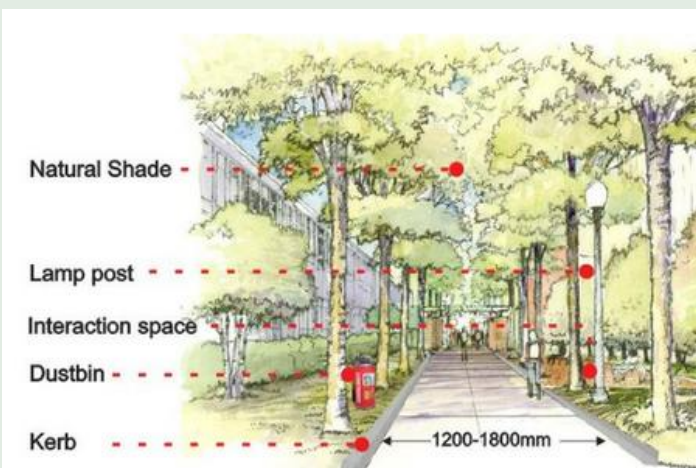


Description

In addition to basic infrastructure upgrades, the city will introduce shaded pedestrian corridors that provide comfortable and accessible walking conditions throughout the year. Resting nodes equipped with benches, lighting, and greenery will be created along main pedestrian axes, particularly those connecting the central area with educational and cultural facilities. This measure will especially benefit elderly citizens, children, and persons with reduced mobility by ensuring safe places to pause and rest during their journey. By combining functional improvements with environmental comfort, the intervention will strengthen the attractiveness of walking and increase the overall quality of life in Kavadarci. The total street length to be upgraded is around 7 km.



Image



Walkability and Accessibility

M1.2: Improve pedestrian crossings and ensure vehicle-free access to them

M1.2.1: Enhancing pedestrian crossings for safety and accessibility



Cost

250.000 €



Period

Short



Priority

High



Description

Many intersections in Kavadarci lack safe pedestrian crossing facilities, leading to conflicts between vehicles and pedestrians, particularly at busy roads connecting residential districts with the central area. This action introduces raised zebra crossings, traffic signals with pedestrian priority phases, and universal access curb ramps. These measures will particularly improve conditions for schoolchildren, the elderly, and persons with disabilities. By providing safer and more visible crossings, the city will reduce accident risks, support inclusive mobility, and promote walking as a safe and reliable option for daily trips.



Image

Crossing Types



Walkability and Accessibility

M1.2: Improve pedestrian crossings and ensure vehicle-free access to them

M1.2.2: Implementing smart lighting and safety monitoring at key crossings



Cost

850.000 €



Period

Short



Priority

Medium

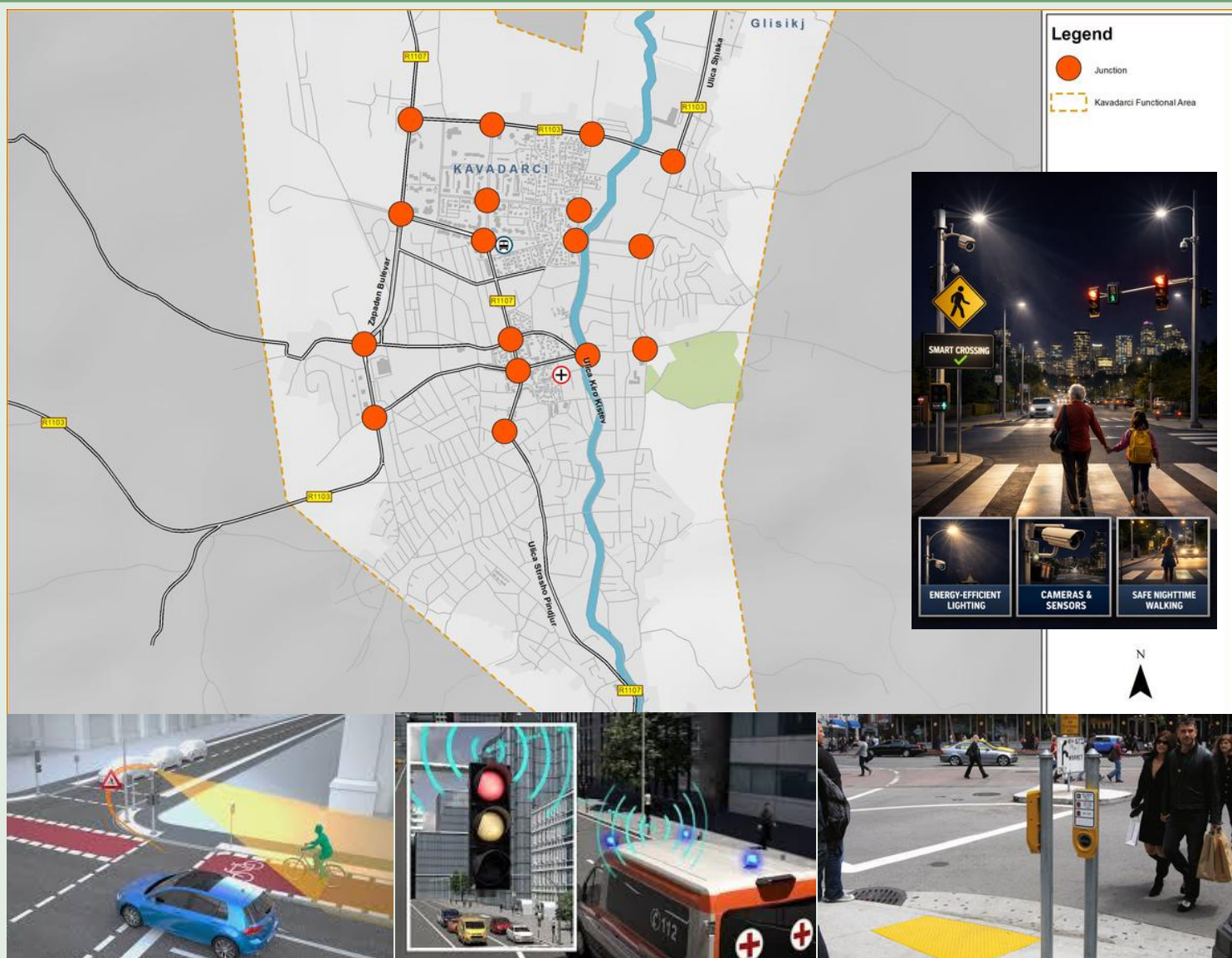


Description

To complement physical crossing upgrades, this action introduces smart lighting and monitoring systems at key pedestrian intersections. Energy-efficient streetlights will improve visibility at night, while cameras and sensors will help enforce compliance with traffic rules. Safer nighttime conditions will encourage more residents to walk, especially vulnerable groups who often avoid walking after dark. This initiative combines technology with safety policy, strengthening trust in the walking environment and ensuring that all citizens feel secure when moving around the city on foot.



Image



Walkability and Accessibility

M1.4: Upgrade walking paths near schools and key public facilities

M1.4.1: Developing safe walking paths near schools and educational facilities



Cost

450.000 €



Period

Short



Priority

High

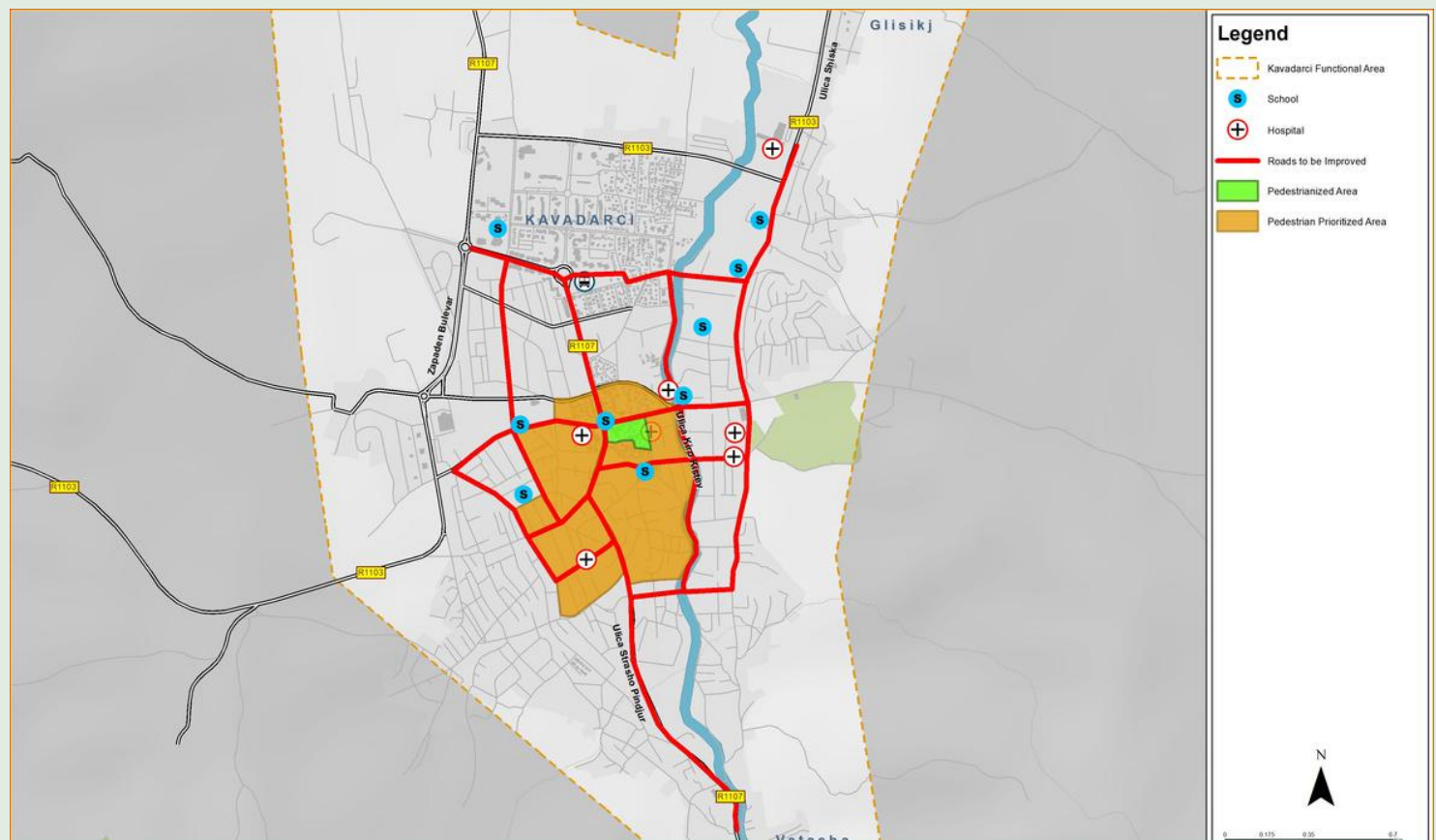


Description

Kavadarci hosts several major educational institutions, which are daily destinations for a large number of students. However, current pedestrian access routes are fragmented and lack protective measures. This action prioritizes the development of safe and continuous walking paths to schools, ensuring clear and comfortable access from nearby residential areas and public transport stops. Enhanced lighting, tactile paving, and shaded resting areas will improve safety and comfort for children and their families. This will reduce dependency on car drop-offs, ease congestion near schools, and foster healthier, more sustainable travel behavior among younger generations.



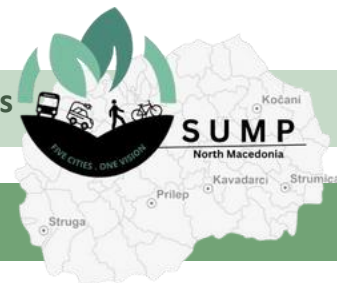
Image



Walkability and Accessibility

M1.4: Upgrade walking paths near schools and key public facilities

M1.4.2: Connecting schools and health facilities through integrated pedestrian corridors



Cost

450.000 €



Period

Short



Priority

High

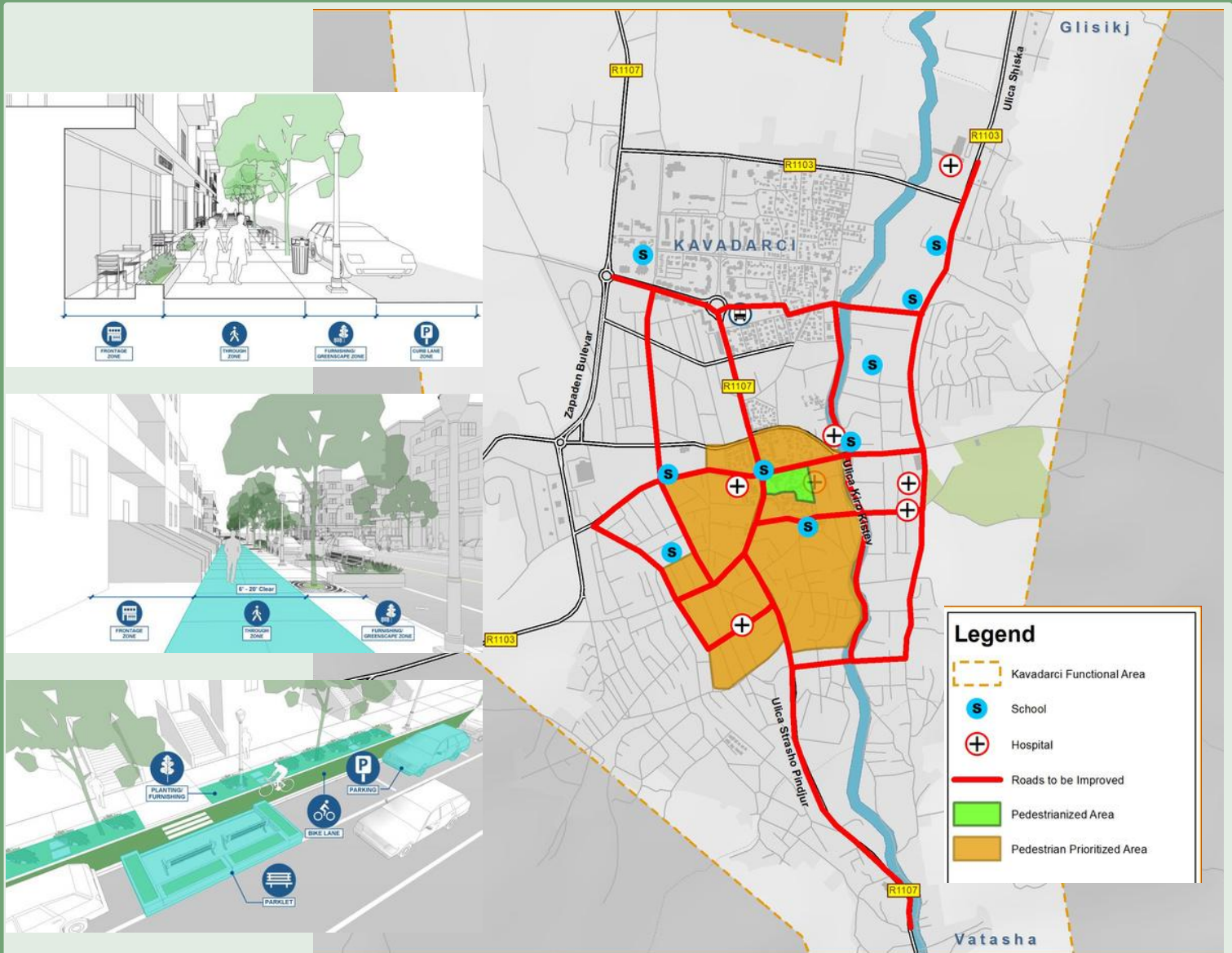


Description

This action expands pedestrian connectivity beyond schools to include health facilities and community centers. By creating integrated pedestrian corridors, the city will ensure that residents can access essential services without relying on motorized transport. These routes will be designed with inclusivity in mind, ensuring barrier-free access for people with disabilities and the elderly. The measure will strengthen the functional relationship between neighborhoods and public service hubs, reduce local congestion, and encourage sustainable travel practices across different social groups.



Image



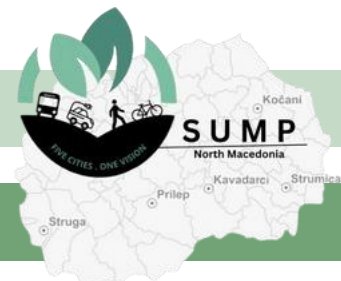
Legend

- Kavadarci Functional Area
- S School
- + Hospital
- Roads to be Improved
- Pedestrianized Area
- Pedestrian Prioritized Area

Walkability and Accessibility

M1.5: Create pedestrian only zones in central and recreational areas

M1.5.1: Establishing a pedestrian-only zone in the city center



Cost

160.000 €



Responsible Authority

Municipality of Kavadarci



Period

Short



ASI Status

Avoid



Priority

High



Efficiency

High

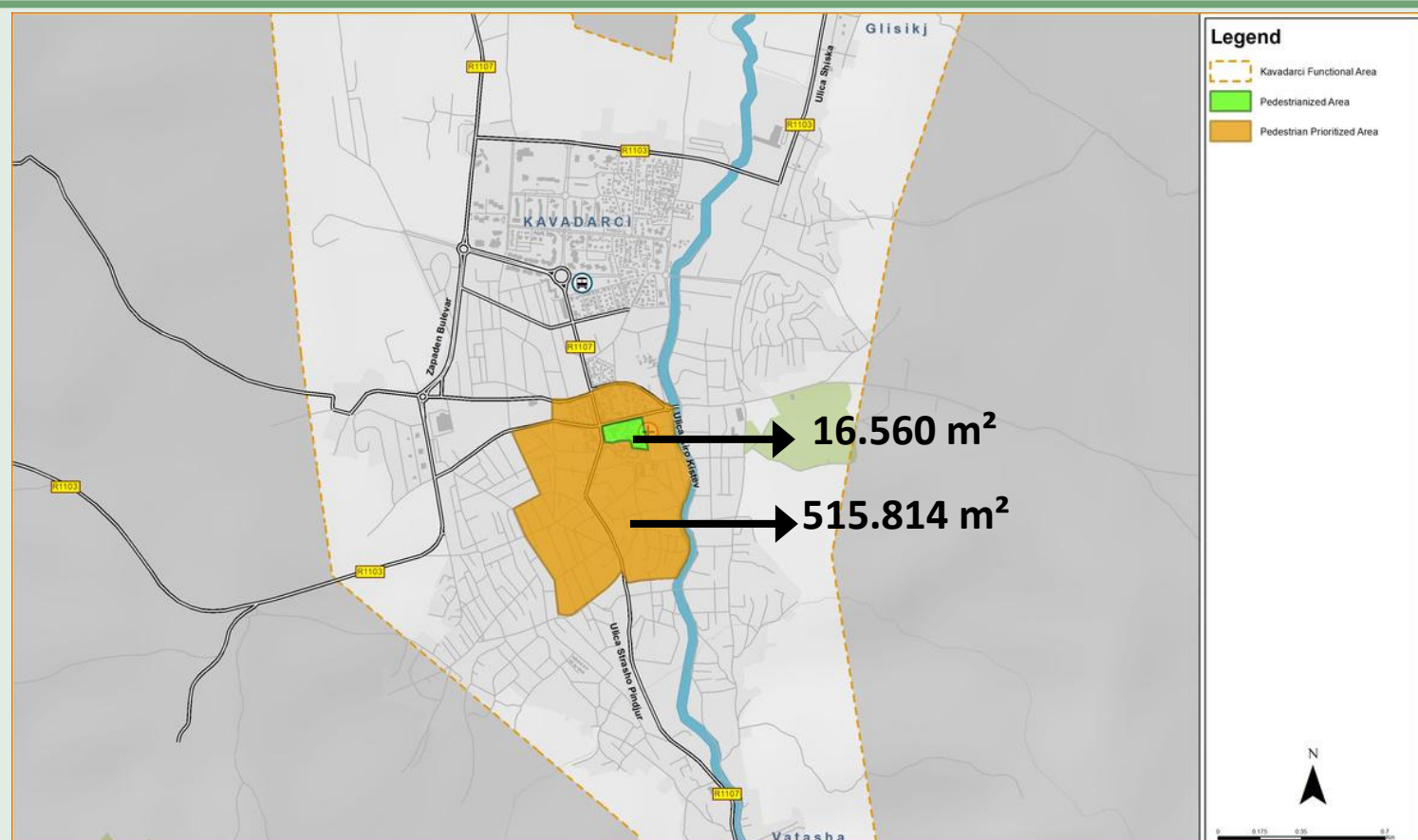


Description

The city center of Kavadarci accommodates high pedestrian volumes but currently suffers from conflicts with motorized traffic. This action introduces a fully pedestrianized zone in the central district, prioritizing walking, shopping, and cultural activities. Deliveries to businesses will be restricted to specific hours, while cargo bicycles will be promoted for last-mile logistics. The redesign will include improved paving, street furniture, and green elements to enhance the attractiveness of the area. Establishing a pedestrian-only core will significantly reduce traffic pressure, improve safety, and stimulate local commerce while creating a lively and accessible urban heart.



Image



Walkability and Accessibility

M1.5: Create pedestrian only zones in central and recreational areas

M1.5.2: Creating a traffic calming perimeter around the pedestrian zone



Cost

350.000 €



Period

Short



Priority

High

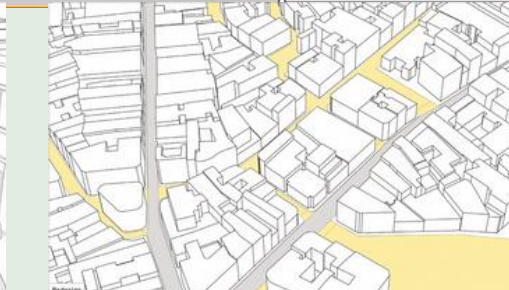
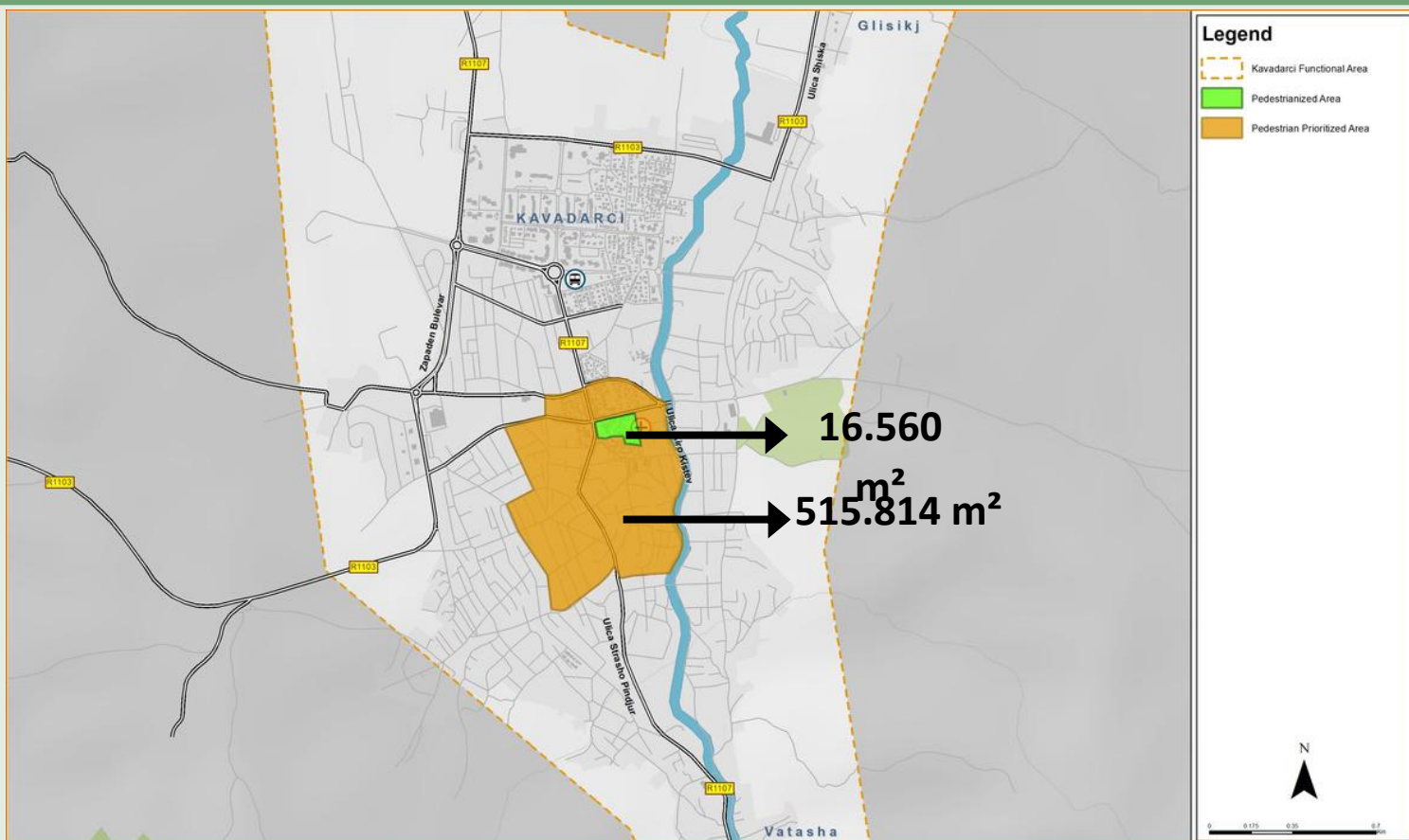


Description

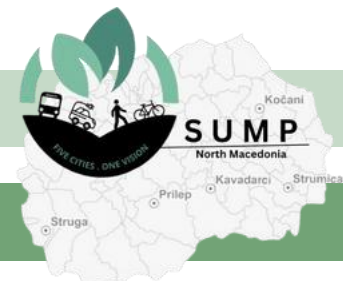
To protect the pedestrianized city center, this action establishes a surrounding traffic calming perimeter. Speed limits will be reduced, with measures such as one-way circulation, raised intersections, and speed bumps applied to discourage through-traffic. Clear signage and enforcement will ensure compliance, while improvements in public transport and cycling infrastructure will provide alternative mobility options. This perimeter will safeguard the pedestrian zone, improve road safety for all users, and contribute to a more livable and people-friendly urban core.



Image



Access Regulation and Traffic Calming



M2.1: Implement car-free or low-emission zones

M2.1.1: Establish a regulated low-traffic / low-emission zone in the central area

 Cost

60.000 €

 Period

Medium

 Priority

High

 Description

This action establishes a regulated low-traffic or low-emission zone (LTZ/LEZ) in the pedestrianised core of Kavadarci, centred around the main square and immediate city centre streets, including key commercial and civic areas. The zone reduces through-traffic in the historic centre, improves air quality, and strengthens the role of the centre as the primary destination for shopping, services, and social activities. Rather than concentrating pedestrianisation on a single street, the action applies a distributed approach, combining selective carriageway narrowing, street reallocation, and access regulation across the central area. Regional and through-traffic is redirected to the primary arterial roads R1103 (east–west) and R1107 (north–south), reducing pressure on the inner urban network.

 Image



Model Superilles



Access Regulation and Traffic Calming

M2.1: Implement car-free or low-emission zones

M2.1.2: Introduce permit-based access and time-windowed deliveries in the central zone



 Cost

30.000 €

 Period

Medium

 Priority

High

 Responsible Authority

Municipality of Kavadarci

 ASI Status

Avoid

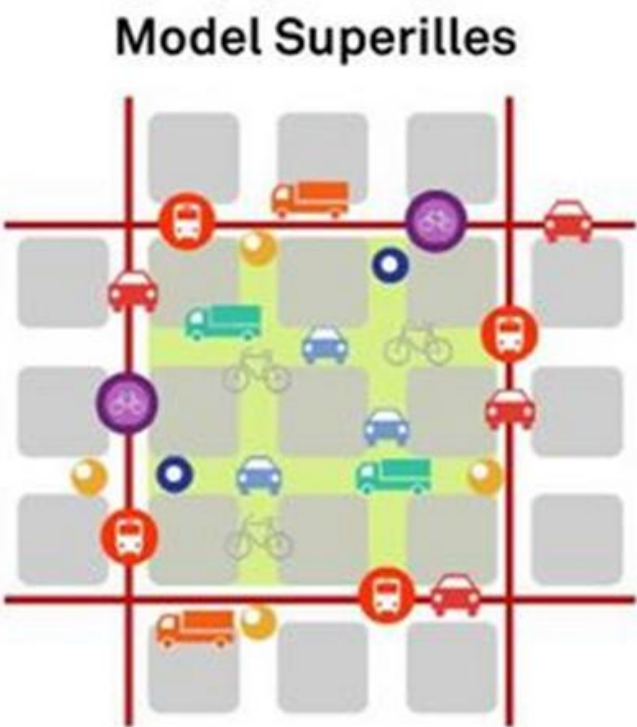
 Efficiency

High

 Description

This action defines the operational access rules for the central regulated zone through permits, exemptions, and time-based delivery restrictions. Access is maintained for residents, emergency services, public transport, and authorised deliveries, with clearly defined time windows to limit conflicts with pedestrian activity.The measure ensures operational feasibility and public acceptance, while preventing the use of central streets as shortcuts. It complements the spatial regulation by ensuring that access control is transparent, enforceable, and adaptable to different periods of the day.

 Image



Access Regulation and Traffic Calming

M2.2: Apply speed limits and traffic calming measures

M2.2.1: Introduce area-wide 30 km/h speed limits in central and residential streets



Cost

25.000 €



Period

Short



Priority

High



Description

This action introduces area-wide 30 km/h speed limits across the pedestrian-prone central area and surrounding residential neighbourhoods of Kavadarci. Speed limits are primarily implemented through signage and street hierarchy definition, covering streets connecting the centre with southern and eastern housing areas. The measure improves safety, reduces noise and emissions, and supports walkability without significantly affecting local accessibility. Regional and through-traffic is redirected to the arterial network (R1103 and R1107).



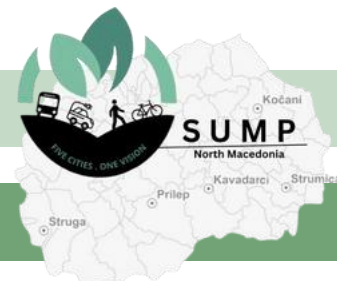
Image



Access Regulation and Traffic Calming

M2.2: Apply speed limits and traffic calming measures

M2.2.2: Implement targeted traffic calming at crossings and trip-generating locations



Cost

55.000 €



Period

Short



Priority

High



Description

This action delivers targeted traffic calming interventions at locations with high pedestrian activity, including markets, schools, hospitals, and neighbourhood centres. Measures include raised pedestrian crossings, narrowed carriageways, speed cushions, and visual street treatments. Low-cost temporary pilots (painted crossings, pop-up curb extensions) are used where appropriate to test solutions before permanent redesign. The action enhances safety and walkability on streets with mixed traffic.



Image



Responsible Authority

Municipality of Kavadarci



ASI Status

Improve



Efficiency

High

Access Regulation and Traffic Calming

M2.4: Implement school streets

M2.4.1: Introduce school streets with time-based traffic restrictions



Cost

30.000 €

Period

Medium

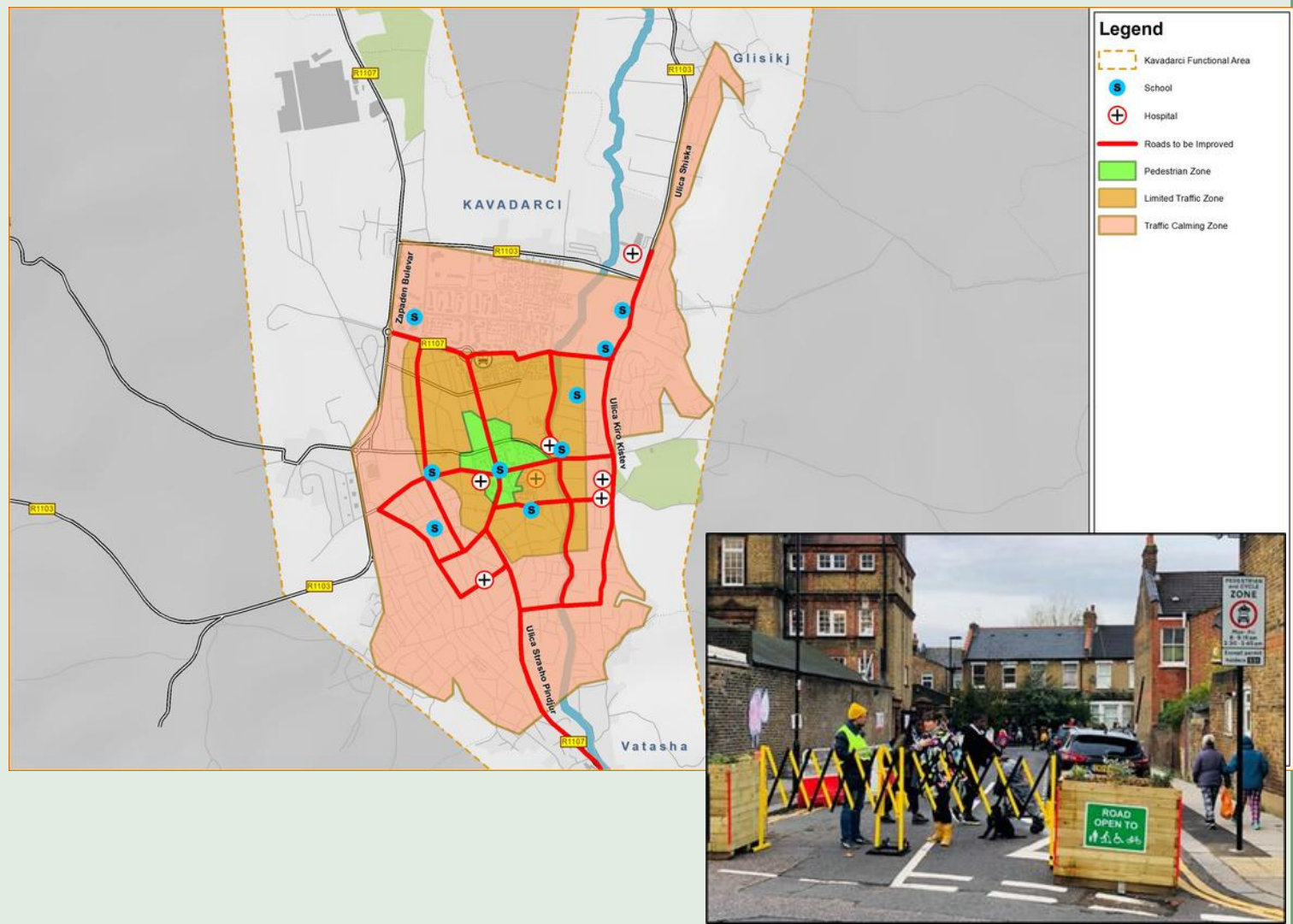
Priority

High

Description

This measure introduces temporary or permanent traffic restrictions around schools in Kavadarci during arrival and dismissal times to improve safety and accessibility for students. School streets limit or prohibit motorised traffic in the immediate surroundings of school entrances, reducing conflicts with cars and encouraging walking and cycling. The measure is coordinated with nearby traffic calming zones and pedestrian routes, contributing to safer crossings, improved air quality and a more child-friendly street environment in residential neighbourhoods.

Image



Access Regulation and Traffic Calming

M2.5: Apply tactical urbanism

M2.5.1: Implement temporary tactical urbanism interventions in central and neighbourhood streets



Cost

23.000 €



Period

Medium



Priority

Medium



Description

This measure uses low-cost and temporary tactical urbanism interventions to test traffic calming and pedestrianisation solutions before permanent redesign. Actions include the installation of planters, painted pedestrian crossings, temporary curb extensions, and pop-up pedestrian areas in the central area, in front of schools, in public squares, or in any locations where streets or open spaces are underutilized, oversized, or dominated by car traffic. By allowing rapid implementation and adjustment, tactical urbanism supports community acceptance, provides evidence for long-term investments, and accelerates the transformation of street space towards safer, more walkable, and people-oriented environments.



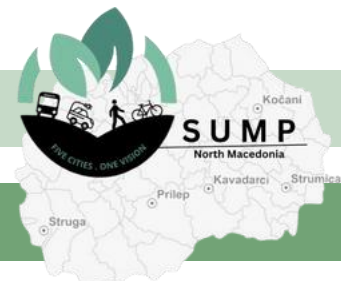
Image



Road Network

M3.1: Improve basic road maintenance and surface quality

M3.1.1: Improving basic road surface quality for safer mobility



Cost

700.000 €



Period

Short



Priority

Low

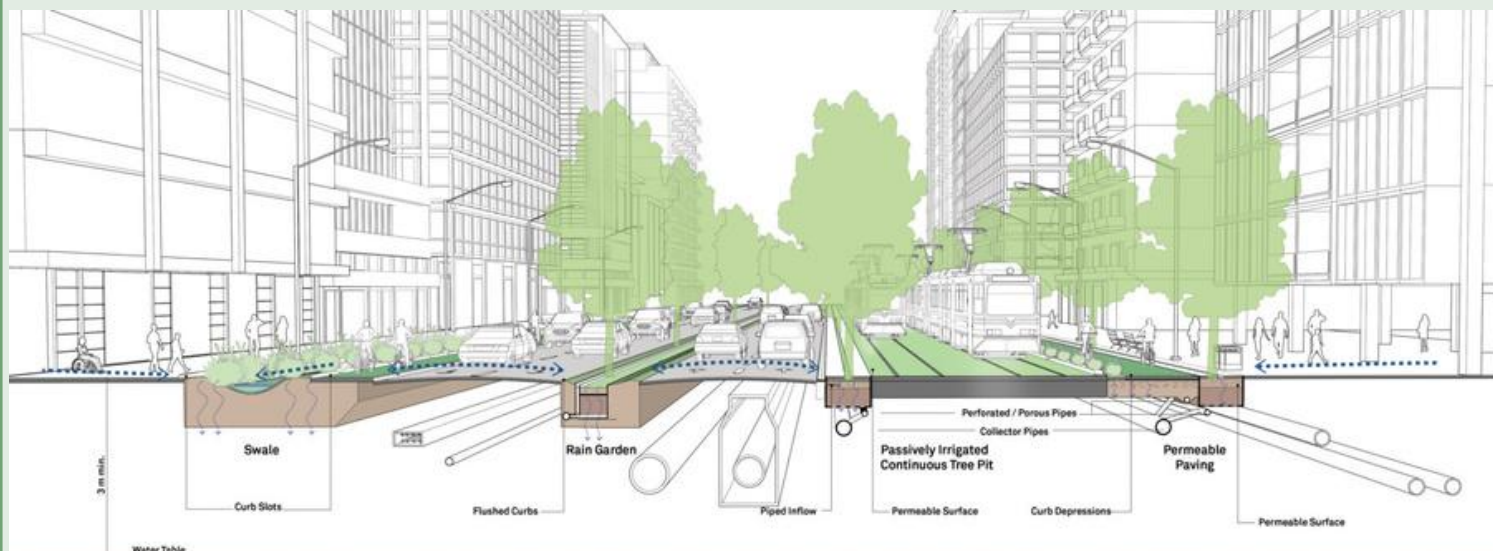


Description

The current condition of many roads in Kavadarci is characterized by uneven surfaces, potholes, and insufficient maintenance, which increase risks for all road users. This action foresees systematic resurfacing and repair programs to restore road quality, with particular focus on routes connecting residential areas with the city center and public facilities. Improved road surfaces will reduce accident risks, extend vehicle lifespan, and ensure safer conditions for cyclists and pedestrians using adjacent sidewalks. Regular inspection and preventive maintenance will further sustain the quality of the network, reducing long-term costs and improving travel comfort.



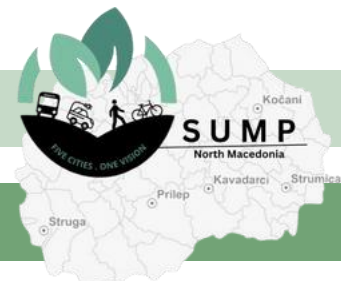
Image



Road Network

M3.1: Improve basic road maintenance and surface quality

M3.1.2: Establishing a preventive road maintenance program



Cost

150.000€



Period

Short



Priority

Low



Description

Beyond surface repairs, this action establishes a preventive maintenance strategy to ensure the durability of the road network. The program will include regular inspections, prioritization of high-traffic corridors, and early interventions to avoid costly reconstructions. Incorporating sustainable materials and climate-resilient techniques will reduce lifecycle costs while enhancing safety. By institutionalizing maintenance, Kavadarci will move from reactive repairs to a proactive system, ensuring reliable mobility conditions for residents and supporting sustainable urban development.



Image



6-Month
Checkup
Plan



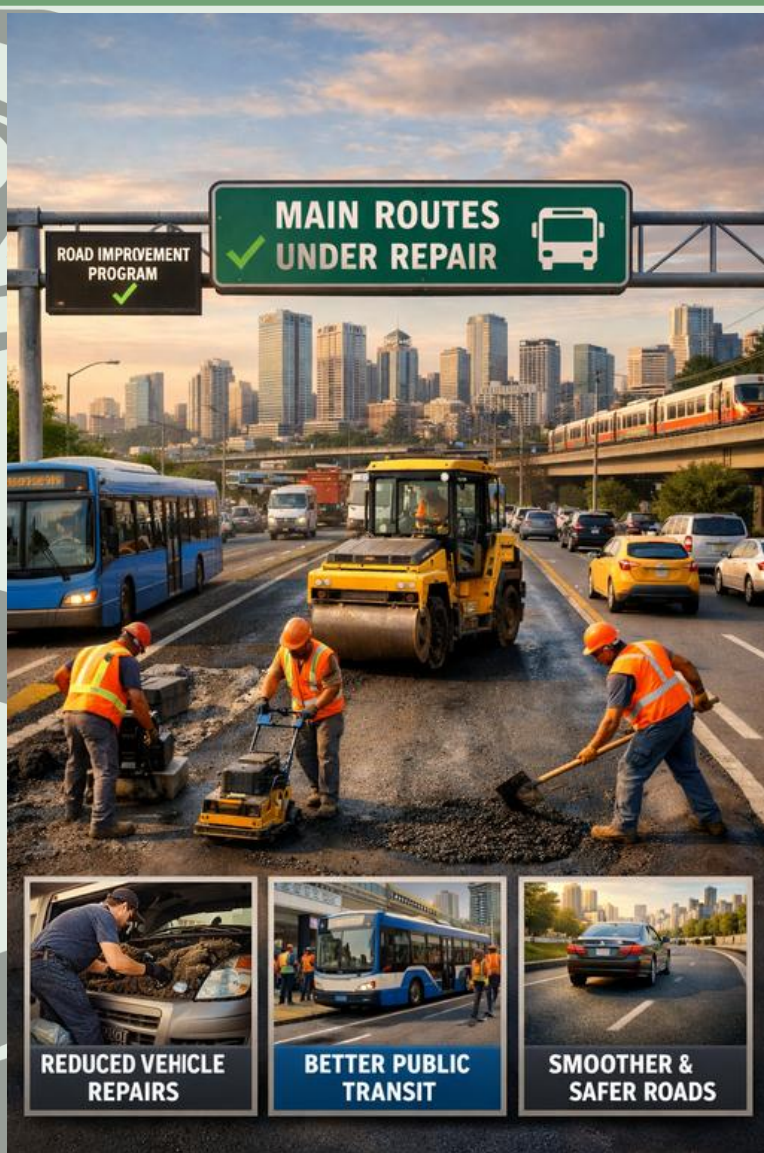
Construct
& Repair



Continuous
Repair
Program



Prioritize
& Detect



REDUCED VEHICLE
REPAIRS

BETTER PUBLIC
TRANSIT

SMOOTHER &
SAFER ROADS

Road Network

M3.2: Redesign intersections for safer crossing and traffic flow

M3.2.1: Redesigning intersections for safer pedestrian and vehicle movement



Cost

760.000 €



Period

Short



Priority

High



Responsible Authority

Municipality of Kavadarci



ASI Status

Improve



Efficiency

High

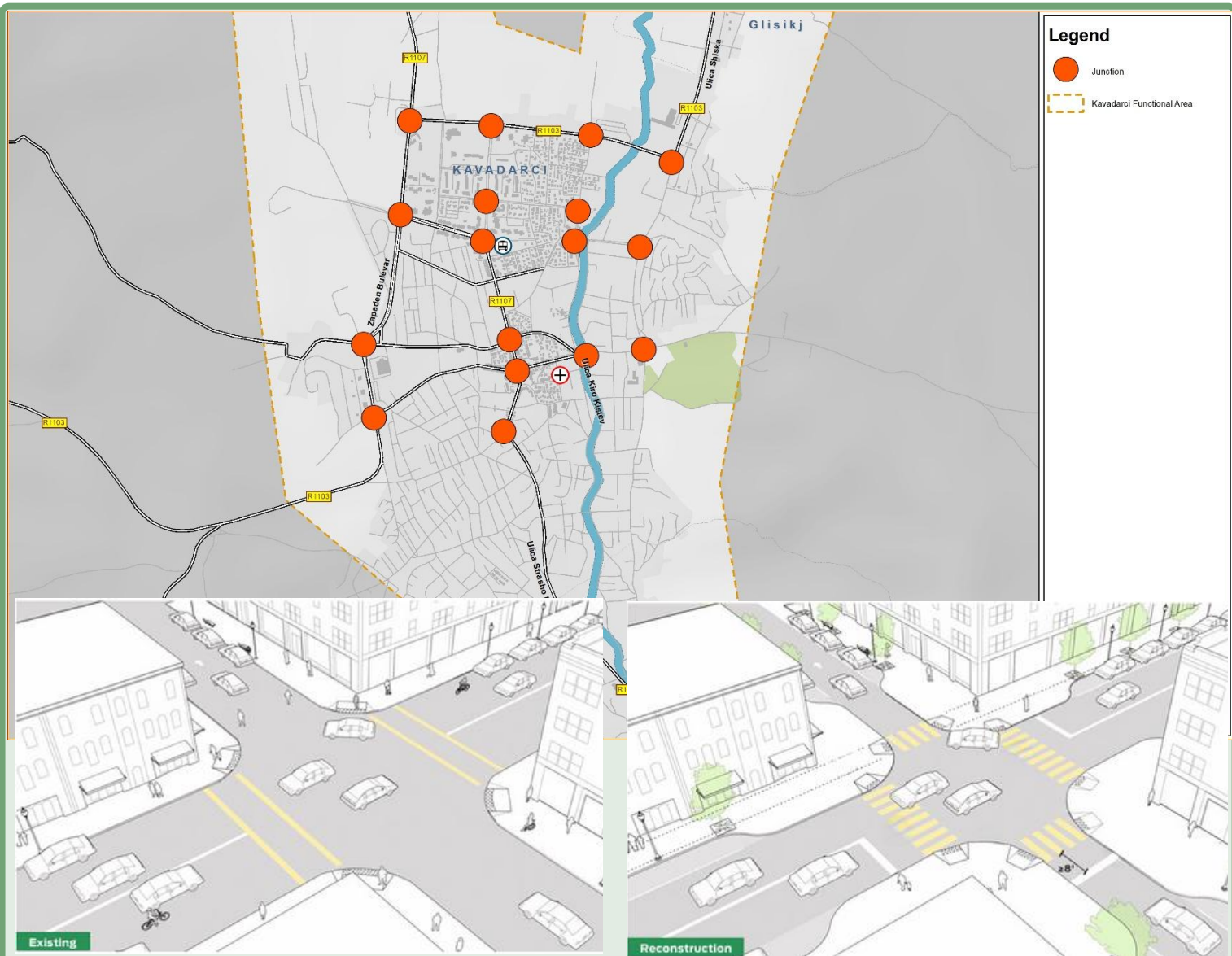


Description

Several intersections in Kavadarci are currently unsafe due to poor geometry, inadequate visibility, and lack of pedestrian priority. This action focuses on redesigning intersections to enhance safety and efficiency. Measures include reducing corner radii, implementing raised pedestrian crossings, and improving signalization for smoother traffic flow. Safer intersections will decrease accident rates, shorten waiting times, and provide more balanced conditions for cars, buses, cyclists, and pedestrians.



Image



Road Network

M3.2: Redesign intersections for safer crossing and traffic flow

M3.2.2: Introducing roundabouts and traffic calming solutions at critical junctions



Cost

250.000 €



Period

Short



Priority

High

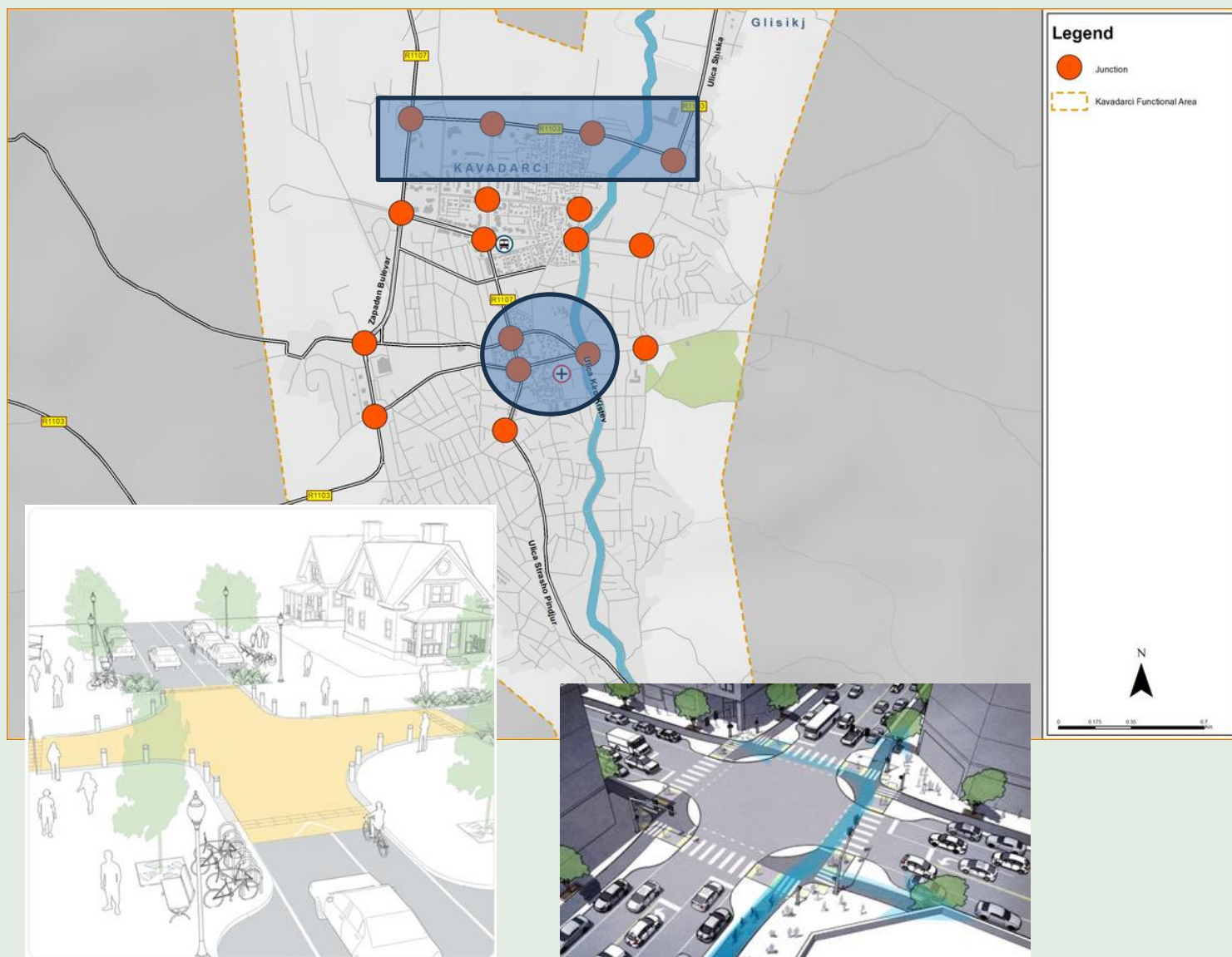


Description

At high-conflict intersections, traditional signalized designs often create congestion and safety issues. This action introduces modern roundabouts and traffic calming layouts at selected junctions to regulate flow and reduce conflict points. Roundabouts naturally slow down vehicle speeds while maintaining capacity, leading to fewer and less severe crashes. Complementary features such as pedestrian refuge islands and cycle crossings will ensure inclusivity. This redesign aligns with sustainable mobility objectives by prioritizing safety over vehicle speed and enhancing the overall quality of the urban street network.



Image



Road Network

M3.4: Transform oversized urban roadways into multifunctional public spaces

M3.4.1: Reclaiming oversized urban roads for multifunctional public use



Cost

550.000 €



Period

Short



Priority

High



Responsible Authority

Municipality of Kavadarci



ASI Status

Avoid



Efficiency

High

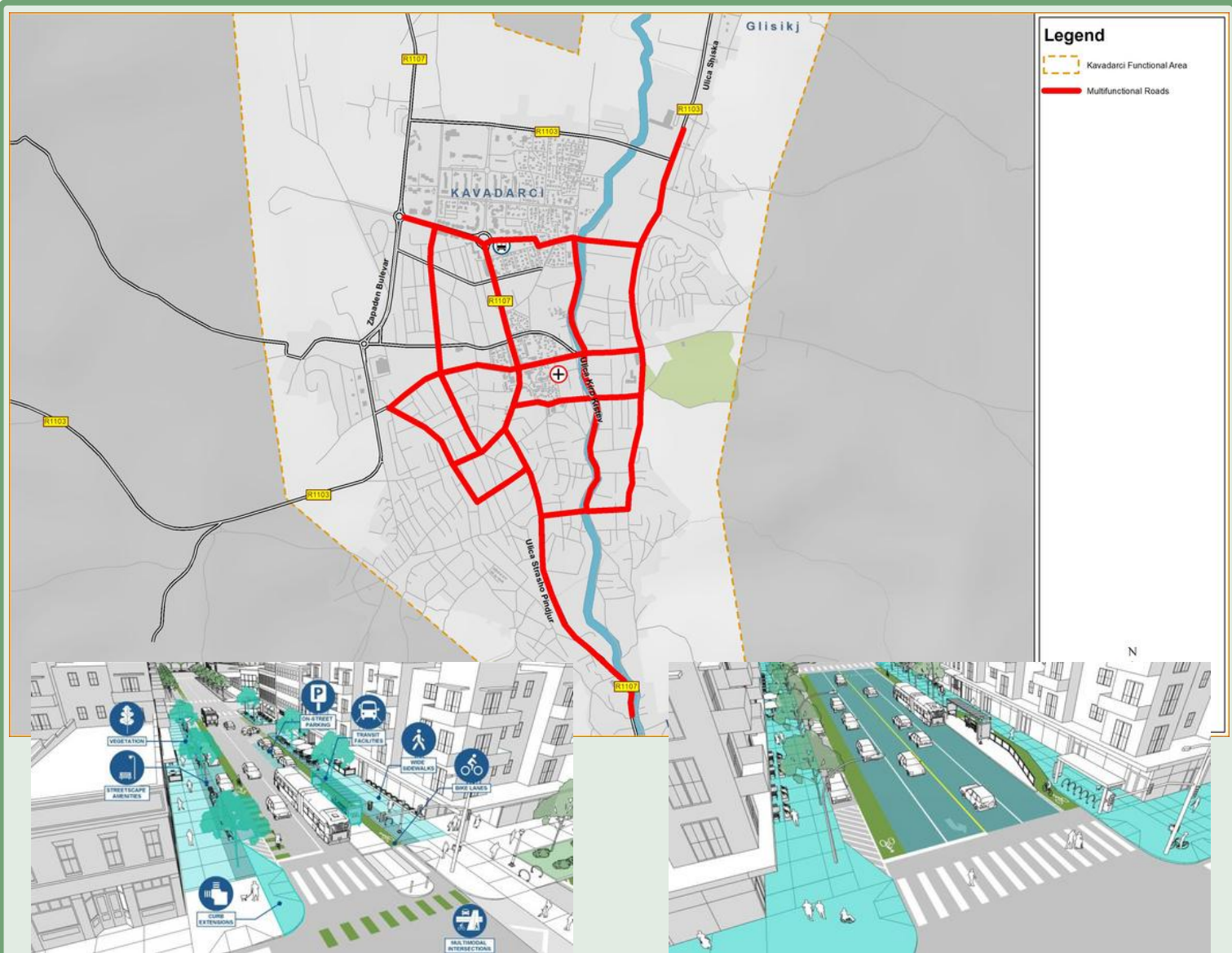


Description

Certain urban roads in Kavadarci are wider than necessary for current traffic volumes, creating unsafe and uninviting conditions for pedestrians and cyclists. This action reclaims excess road space to create multifunctional public areas, integrating wider sidewalks, greenery, seating, and dedicated cycling lanes. Such reallocation will not only improve safety but also foster social interaction, local business activity, and urban vitality. By transforming oversized streets into people-friendly avenues, the city will reinforce sustainable mobility objectives and enhance the attractiveness of its public realm.



Image



Road Network

M3.4: Transform oversized urban roadways into multifunctional public spaces

M3.4.2: Implementing green infrastructure in reallocated street space



Cost

450.000 €



Period

Short



Priority

Low



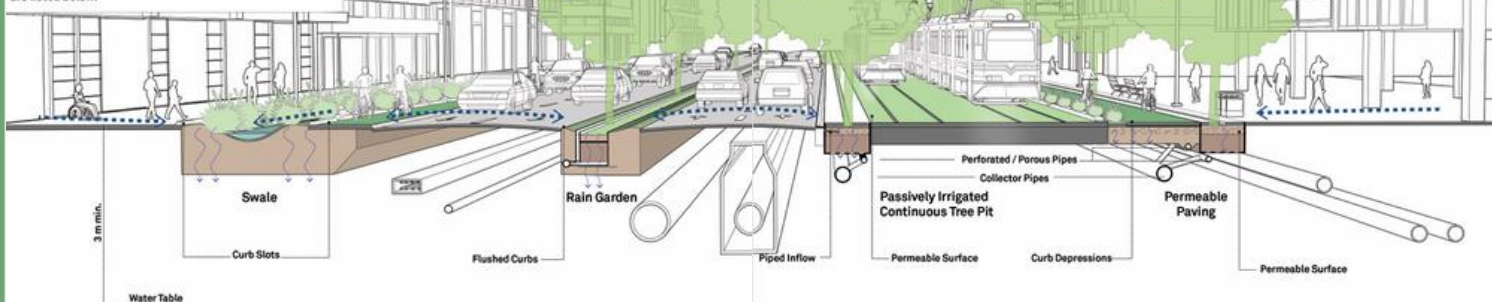
Description

Following the reallocation of oversized roads, this action focuses on integrating green infrastructure into newly created public spaces. Planting street trees, adding rain gardens, and applying permeable pavements will improve microclimatic comfort, manage stormwater, and reduce urban heat effects. These improvements will provide ecological benefits while reinforcing sustainable mobility by making walking and cycling more attractive. Through this action, Kavadarci will demonstrate how transport infrastructure can serve both mobility and environmental objectives in a balanced and sustainable manner.



Image

Green infrastructure in urban streets complements traditional piped water drainage systems. Vegetation, soils, and natural processes capture and infiltrate or evaporate water before it enters the piped system. Green infrastructure can help reduce flooding and water pollution by absorbing and filtering stormwater. It simultaneously provides a natural relief to the built environment, improves the street aesthetic, and delivers benefits to the community. Green infrastructure must be carefully coordinated to avoid conflicts with utility placement, high water table levels, and subterranean conditions such as the location of bedrock. Considering the soil conditions is critical when planning green infrastructure strategies. While the components and processes involved in green infrastructure are vast, some of the major components are listed below.



Parking Systems

M4.2: Adjust parking fees to reduce long-term car use in central areas

M4.2.1: Introduce a zoned parking tariff and time-limit system (centre / LTZ / periphery)



Cost

45.000 €



Period

Medium



Priority

High



Description

This action introduces a differentiated parking tariff and time-limit system in Kavadarci based on location and duration of stay, with the objective of reducing long-term and commuter parking in the central city area and limited traffic zone (LTZ). Higher tariffs and shorter time limits are applied to streets around the main square, core commercial streets, and adjacent civic areas, where parking demand is highest and space is limited. A clear parking zone hierarchy is established, distinguishing between central high-demand streets, transition areas, and peripheral streets. The system encourages short-stay parking for visitors and service access in the centre, while discouraging long-term parking that generates unnecessary circulation traffic. Lower tariffs or longer time allowances are maintained in peripheral areas to absorb displaced demand.



Image



Parking Systems

M4.2: Adjust parking fees to reduce long-term car use in central areas

M4.2.2: Implement resident parking permits, priority bays, and supporting enforcement measures in central neighbourhoods



Cost

90.000 €



Responsible Authority

Municipality of Kavadarci



Period

Medium



ASI Status

Shift



Priority

Medium



Efficiency

High



Description

This action complements the tariff reform by introducing resident parking permits in dense neighbourhoods surrounding the city centre, where stricter controls risk causing spillover parking. Permits improve parking availability for residents while limiting intrusion from commuter and visitor parking. In parallel, priority parking spaces are designated near key public buildings and activity nodes in the central area for people with reduced mobility, short-stay users, and service vehicles. The action also strengthens physical and regulatory enforcement, including clearer markings, bollards, and planters along pedestrian-priority streets, school areas, and new cycling routes to prevent illegal parking on sidewalks and crossings.



Image



Essential

Car Parking Rules

Every Apartment Resident

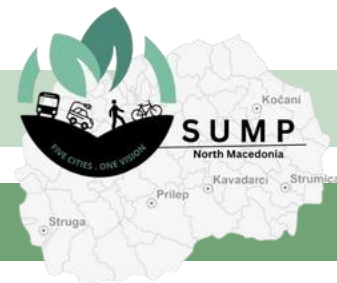
Should Know!



Parking Systems

M4.4: Develop park-and-ride facilities near key transit hubs

M4.4.1: Develop park-and-ride sites at the four main gateways of Kavadarci



Cost

330.000 €



Period

Medium/Long



Priority

High



Description

This action develops park-and-ride (P&R) facilities at strategic gateway locations on the periphery of Kavadarci to intercept incoming traffic before it reaches the city centre and LTZ. The selected sites reflect Kavadarci's real approach routes and daily travel patterns: Northern Industrial Gateway (R1107 – Metal Steel Factory area): serves commuter and employment-related traffic from the north. Glisnik / North-East Gateway: intercepts traffic from north-eastern settlements and connects well to public transport and the river-side cycling corridor. Southern Gateway (R1107 – Vatasha direction): captures daily commuter flows from Vatasha and nearby settlements. Western Gateway (R1103 – winery / industrial edge): serves traffic from western settlements and employment zones. Each site includes safe access, lighting, basic amenities, and direct connections to public transport stops and/or cycling routes, enabling a convenient final leg of the journey into the city.



Image



Parking Systems

M4.4: Develop park-and-ride facilities near key transit hubs

M4.4.2: Integrate park-and-ride facilities with pricing incentives, wayfinding, and onward travel options



Cost

65.000 €



Period

Medium/Long



Priority

High



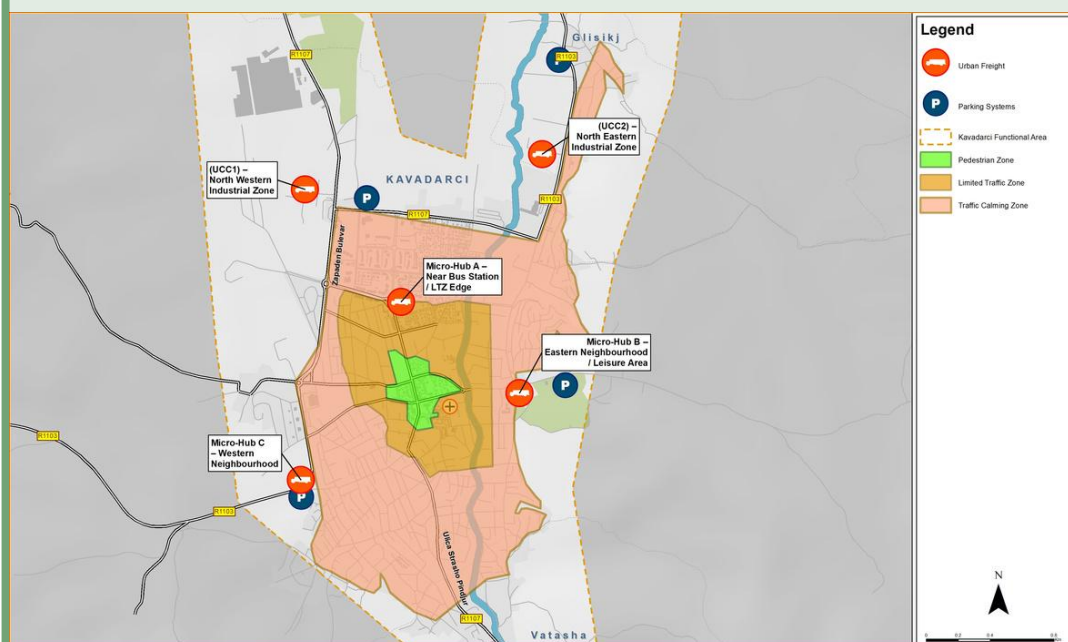
Description

This action ensures effective use of the P&R network through pricing incentives, signage, and integration with public transport and cycling. Wayfinding signage on approach roads directs drivers to P&R sites before they reach the central area. Parking tariffs are coordinated with Measure M4.2, with higher fees and stricter limits in the centre and lower or discounted tariffs at P&R locations.

Public transport stops and safe walking and cycling routes are strengthened at gateway sites—particularly at Glishnik and the industrial gateway—to ensure seamless onward travel. Seasonal and event-based adjustments are applied to manage peak demand and prevent congestion in the central area. This action ensures that the P&R system functions as a demand-management tool, supporting modal shift without banning access and strengthening the effectiveness of access regulation and parking policies.



Image



Urban Cycling

M5.1: Develop a connected and safe cycling network

M5.1.1: Developing a connected cycling network across residential and central areas



 Cost

730.000 €

 Responsible Authority

Municipality of Kavadarci

 Period

Short

 ASI Status

Improve

 Priority

High

 Efficiency

High

 Description

Cycling in Kavadarci remains limited due to fragmented and unsafe infrastructure. This action establishes a continuous cycling network linking residential neighborhoods with the city center, schools, and public transport hubs. By filling missing links, standardizing lane width, and improving signage, the network will create a safe and legible system for daily commuting. The measure will particularly benefit students and workers, reducing dependency on private cars while supporting healthier and more sustainable travel habits.

 Image



Urban Cycling

M5.1: Develop a connected and safe cycling network

M5.1.2: Creating safe cycling corridors to schools and industrial zones



Cost

730.000 €



Period

Short



Priority

High



Responsible Authority

Municipality of Kavadarci



ASI Status

Improve/Shift



Efficiency

High

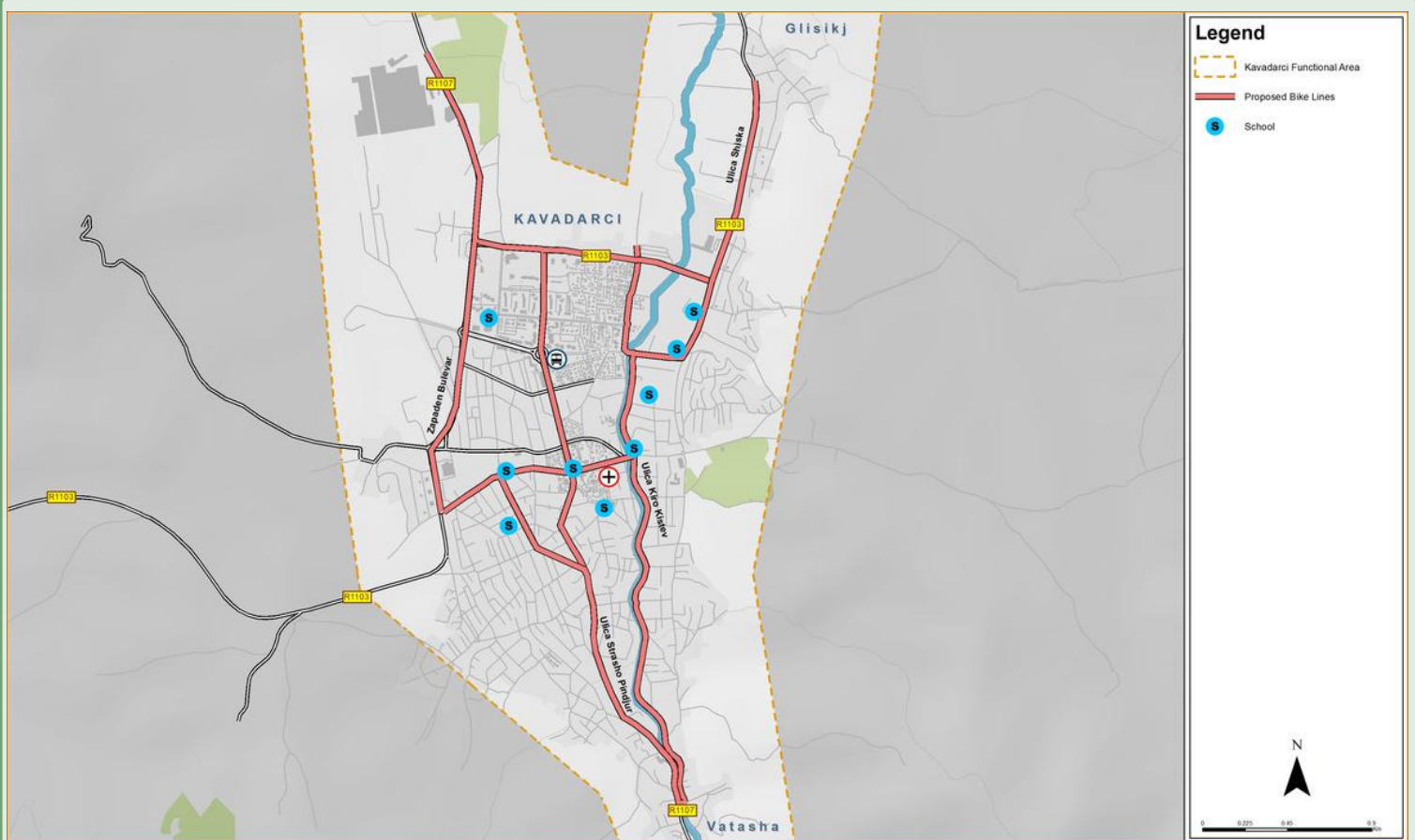


Description

This action prioritizes cycling routes serving key schools and the northern industrial area. Safe corridors will be created with physical separation from traffic, lighting, and secure crossings. These links will facilitate sustainable access to workplaces and education, reducing the reliance on company shuttles and parental car trips. By connecting employment and education hubs through reliable cycling infrastructure, the city will promote inclusivity and strengthen the role of cycling as a functional mode of transport. The entire proposed bike network covers the schools and industrial area access.



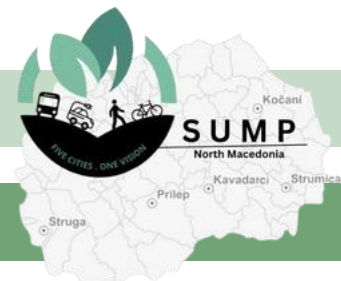
Image



Urban Cycling

M5.2: Launch of public bike-sharing systems

M5.2.1: Launching a public floating bike-sharing system



Cost

250.000 €



Period

Short



Priority

Medium



Description

To provide sustainable last-mile connectivity, the city will launch a public bike-sharing system starting from the central transfer hub near the intercity bus station. Strategically placed docking stations will allow smooth interchange with buses, taxis, and pedestrian areas. The scheme will reduce short car trips, improve accessibility to the city center, and create a modern image of Kavadarci as a cycling-friendly city. Integration with the public transport ticketing system will further encourage usage.



Image



BIKE SHARING



BIKE SHARING



Urban Cycling

M5.2: Launch of public bike-sharing systems

M5.2.2: Expanding bike-sharing stations to residential and educational areas



Cost

45.000 €



Period

Short



Priority

Medium

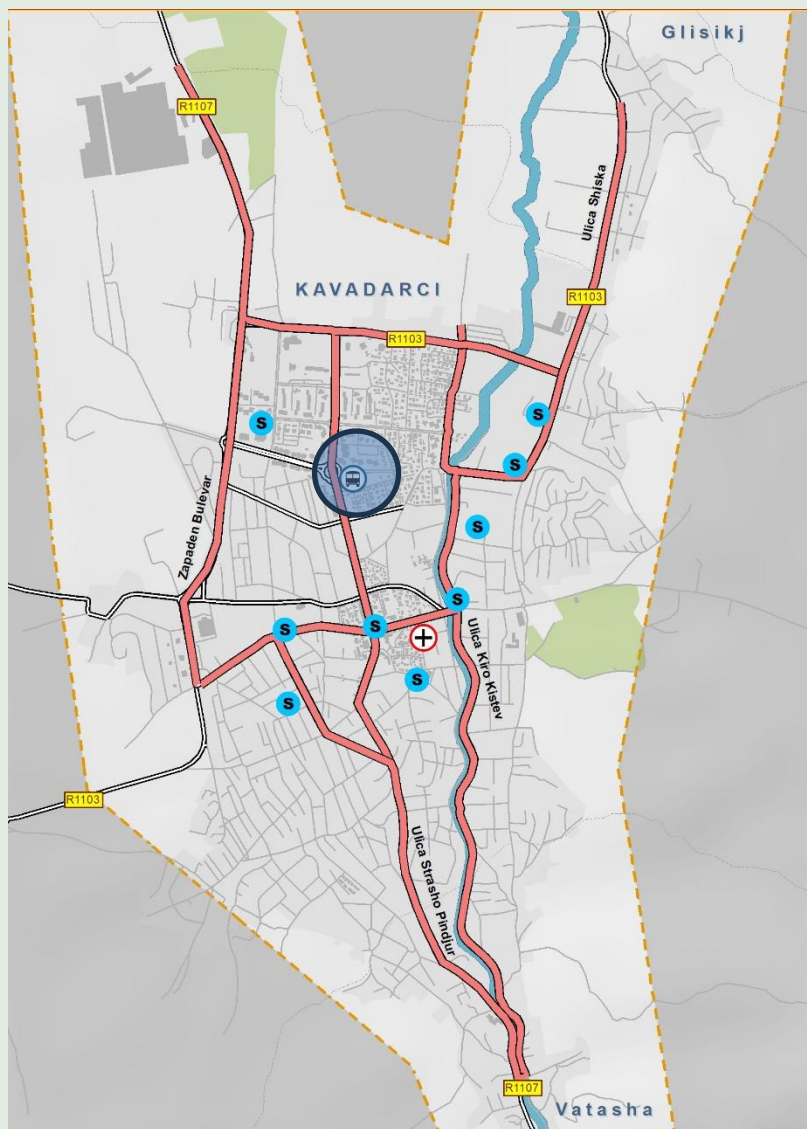


Description

Following the launch of the bike-sharing system, additional docking stations will be rolled out in residential neighborhoods, schools, and university facilities. This expansion will ensure equitable access across the Functional Area, enabling both students and workers to integrate cycling into their daily trips. Complementary awareness campaigns will increase acceptance, and financial incentives for frequent users will strengthen adoption. Expanding the system into peripheral districts will ensure long-term success and wider modal shift.



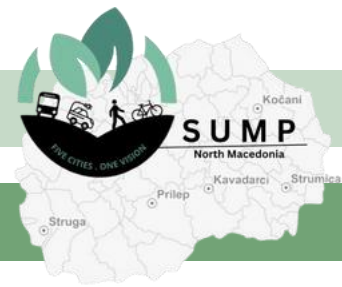
Image



Urban Cycling

M5.3: Install secure public bike parking solutions

M5.3.1: Installing secure bicycle parking at transport and service hubs



Cost

125.000 €



Period

Short



Priority

Medium

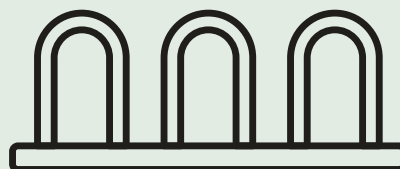
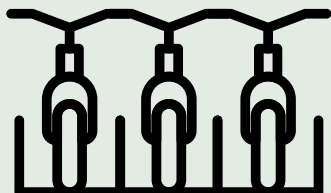


Description

Secure bicycle parking remains a significant barrier to cycling uptake in Kavadarci. This action provides high-quality bicycle racks and shelters at key transport nodes, including the bus station, city center stops, and public institutions. By ensuring that bicycles can be parked safely, residents will be more confident in choosing cycling for everyday trips. This improvement will also facilitate integration with public transport, enhancing multimodal journeys.



Image



Urban Cycling

M5.4: Facilitate the transport of bicycles on public transport and trains, with attention to accessibility and space

M5.4.1: Facilitating bicycle carriage on buses



Cost

20.000 €



Period

Short



Priority

Medium

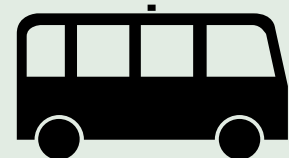


Description

To extend the reach of cycling, the city will enable bicycles to be carried on selected bus routes. Buses will be equipped with front-mounted racks or interior spaces adapted for bicycles. This action will particularly benefit residents living in peripheral areas who need longer trips combining cycling and public transport. By supporting intermodality, the city will increase flexibility, reduce car dependence, and make sustainable mobility more attractive.



Image



Urban Cycling

M5.4: Facilitate the transport of bicycles on public transport and trains, with attention to accessibility and space



M5.4.2: Integrating fare systems for bicycle and public transport users



Cost

150.000 €



Period

Short



Priority

Medium



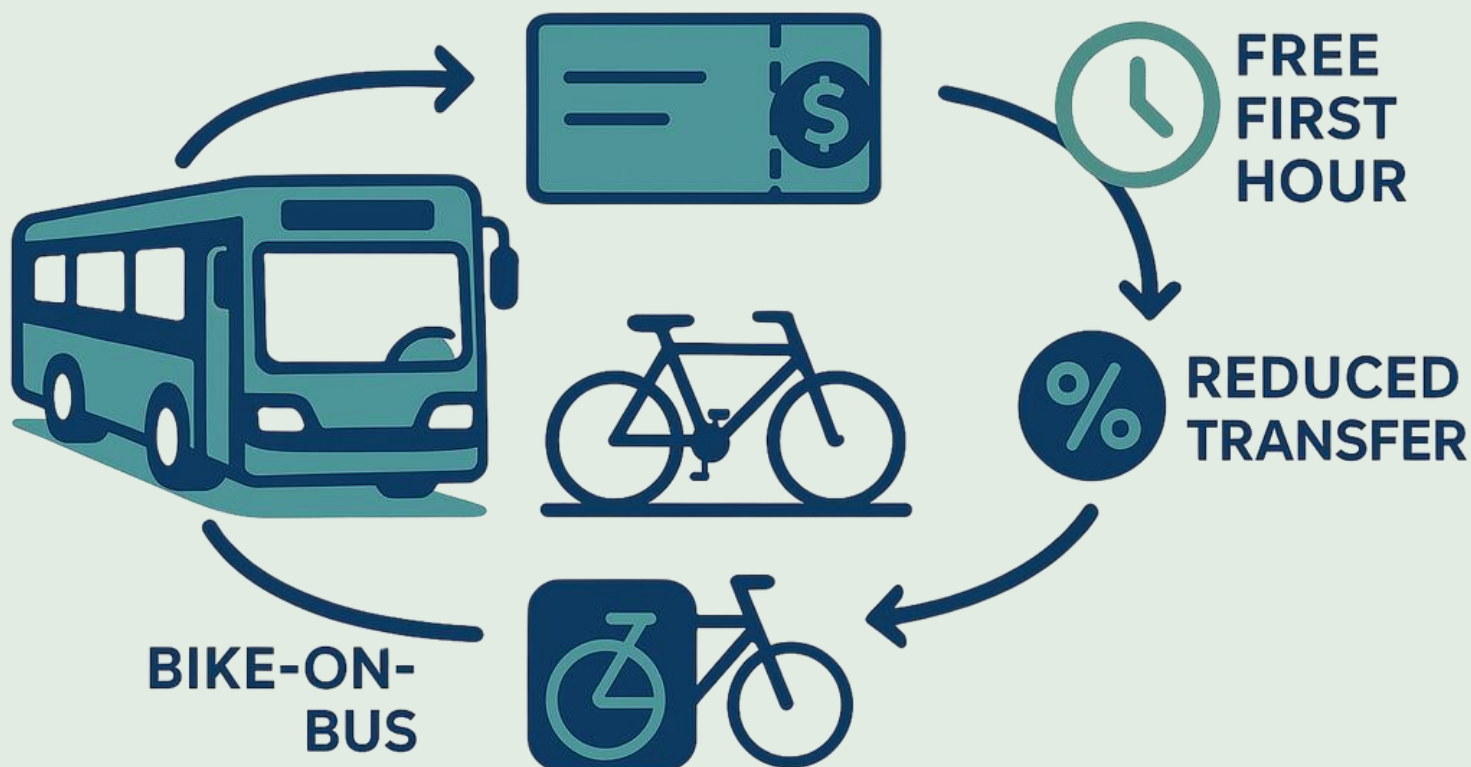
Description

Alongside the physical integration of bicycles into buses, this action foresees a unified fare system that encourages combined trips. Users of both bicycles and public transport will benefit from reduced transfer fares or free first hours of bicycle sharing. This measure will provide economic incentives for multimodal journeys, making cycling and public transport together a competitive alternative to private cars.



Image

UNIFIED FARE



Urban Cycling

M5.5: Promote the use of cargo bikes as a transport solution for families and SME's

M5.5.1: Promoting cargo bicycles for last-mile logistics in the city center



Cost

150.000 €



Period

Short



Priority

Medium

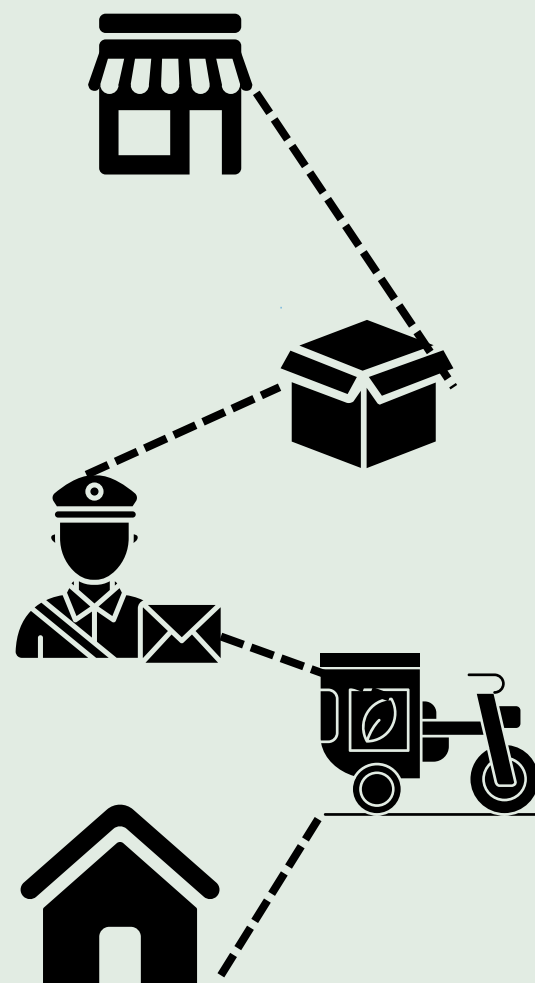


Description

The central area of Kavadarci experiences congestion from delivery vehicles, particularly during daytime hours. This action promotes the use of cargo bicycles for last-mile logistics within pedestrianized and traffic-calmed zones. Businesses will be encouraged to adopt cargo bicycles through subsidies and partnerships, reducing the environmental and spatial impact of freight operations. This measure will increase efficiency, improve urban air quality, and strengthen the pedestrian environment.



Image



Public Transport

M6.1: Increase the frequency of public transport services

M6.1.1: Increasing peak-hour frequency on main urban bus routes



Cost

125.000 €



Period

Short



Priority

High



Description

Kavadarci's existing public transport services often operate with long headways, especially during peak hours, leading to overcrowding and reduced reliability. This action foresees the deployment of additional buses to shorten intervals on the busiest urban routes, including those linking the central transfer hub with residential districts and industrial areas. Improved frequency will enhance service reliability, attract new users, and reduce dependence on private vehicles, contributing to more balanced modal distribution.



Image

OPTIMIZE FLEET

RUSH HOUR



OFF-PEAK



COMFORT



RELIABILITY

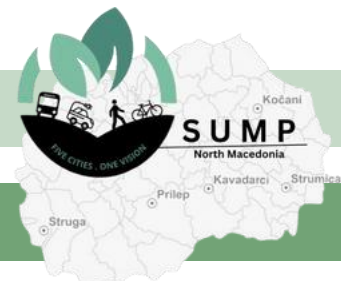


COST EFFICIENCY

Public Transport

M6.1: Increase the frequency of public transport services

M6.1.2: Introducing dynamic timetabling and real-time passenger information



Cost

400.000 €



Period

Short



Priority

Low



Description

To complement frequency improvements, the city will implement dynamic timetabling supported by digital tools. Real-time passenger information will be displayed at bus stops and accessible through mobile applications, showing expected arrival times, delays, and service changes. This action will increase user confidence, reduce waiting time uncertainty, and make public transport a more attractive alternative to private cars.



Image

Passenger Information Apps



Information System on Web Site



Call Centre



Informing with Document



Bus Stop Information Unit



Smart Stops



In-Vehicle Passenger on Board



Public Transport

M6.2: Extend the route coverage to underserved neighbourhoods

M6.2.1: Launching a new north–south bus line connecting industrial and residential areas



Cost

40.000 €

Period

Short

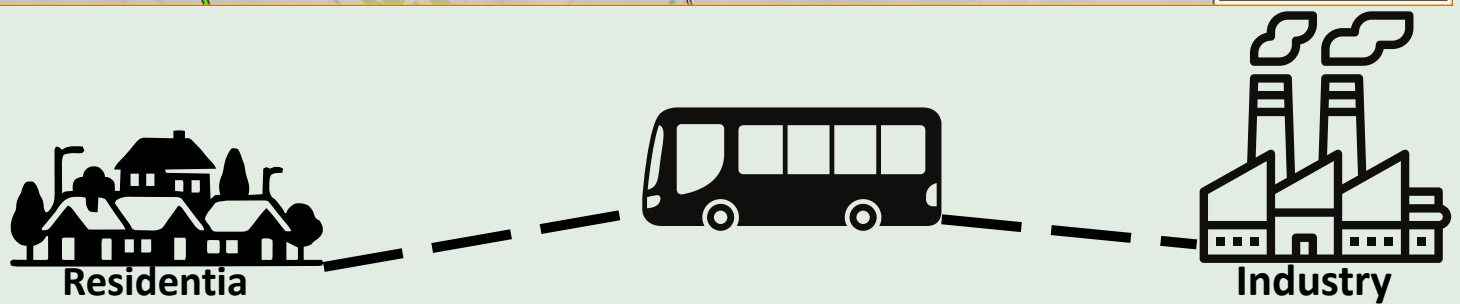
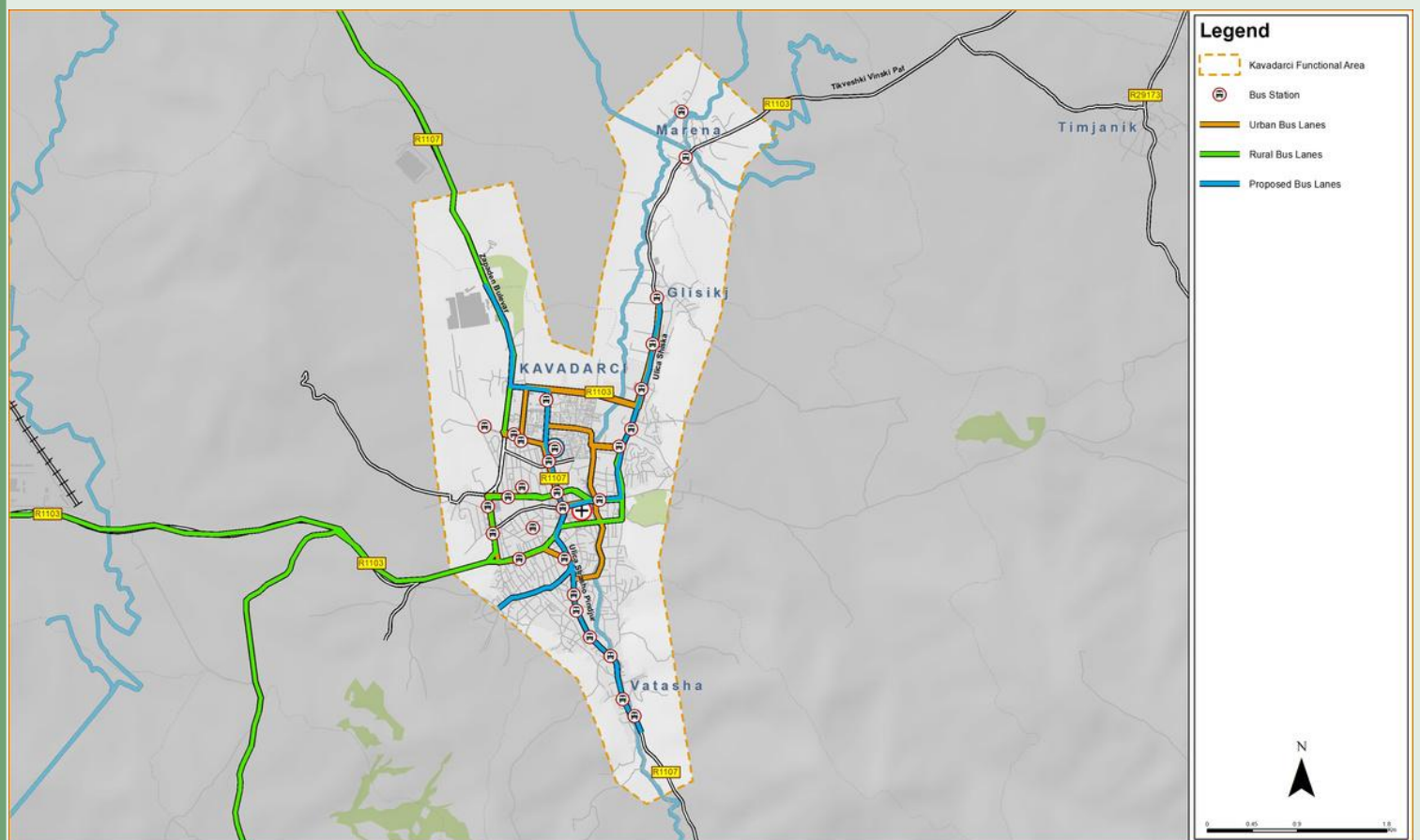
Priority

High

Description

Commuting between the northern industrial area and the southern residential zones is currently dominated by private company shuttles, which account for a large share of daily trips. This action establishes a new public bus line providing direct and frequent connections between these two poles. By offering a reliable and affordable service, the city will reduce dependence on private shuttles, improve efficiency, and extend public transport coverage to underserved neighborhoods.

Image





Cost

40.000 €



Period

Short



Priority

High

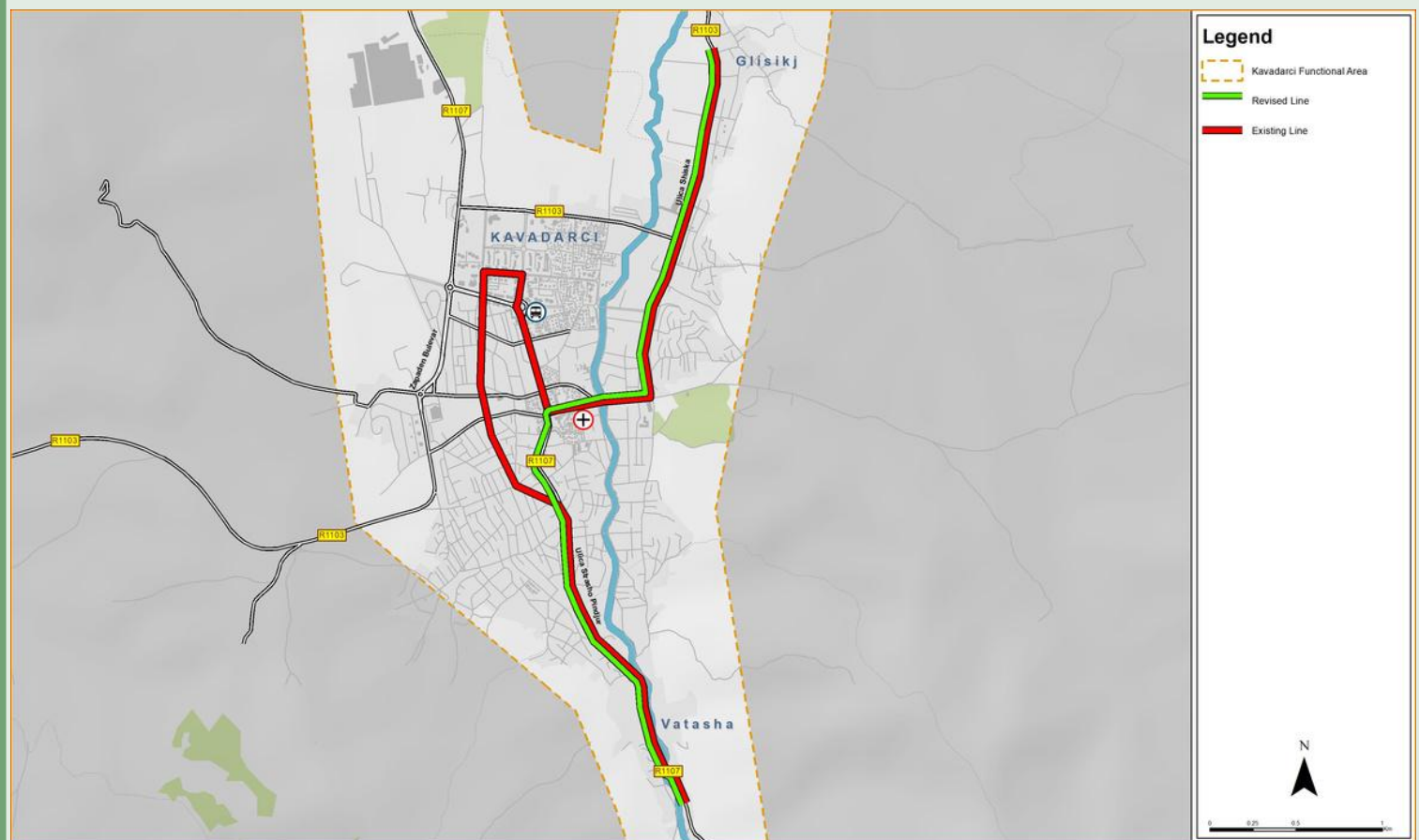


Description

Line-1 currently takes a long circular path through the city, resulting in excessive travel times. This action restructures the route by reducing unnecessary deviations, creating a more direct alignment between central areas and major destinations. Shorter travel times will make the service more competitive, attract more passengers, and improve operational efficiency by reducing fuel consumption and costs.



Image



Public Transport

M6.4: Upgrade the conditions of stops and stations

M6.4.1: Upgrading bus stops and interchange facilities



Cost

200.000 €



Period

Short



Priority

Medium

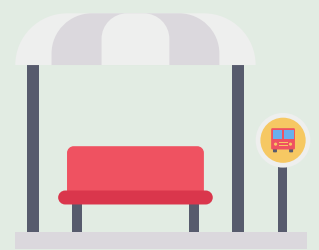
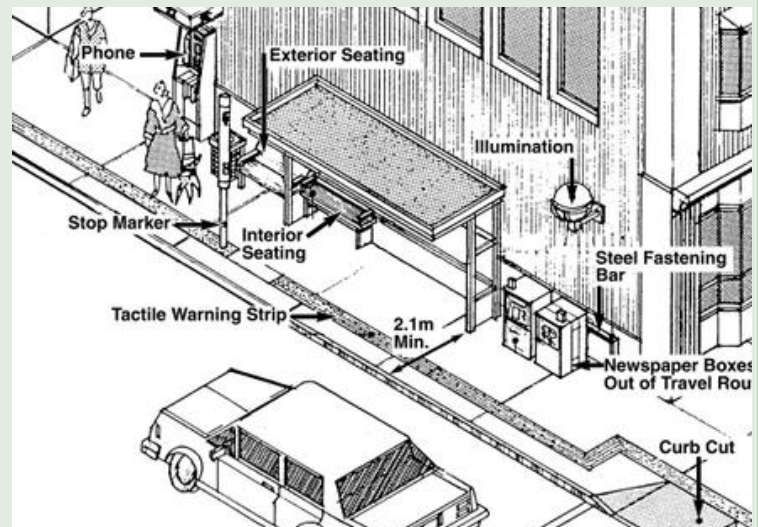
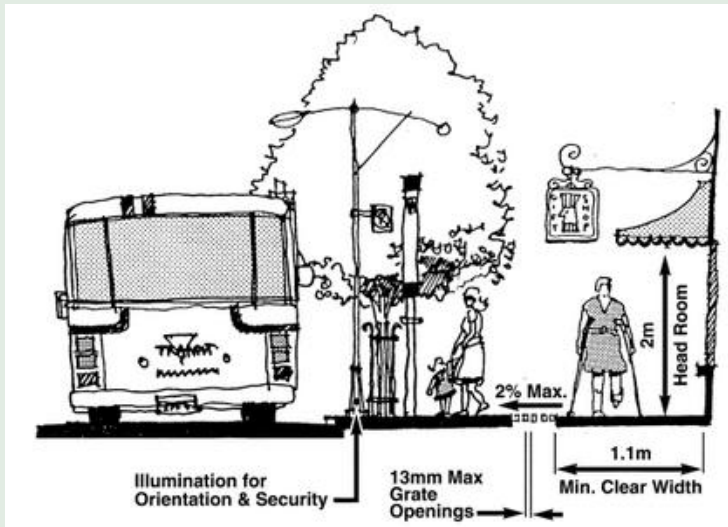


Description

This action focuses on improving the quality of bus stops and transfer facilities by adding shelters, seating, lighting, and passenger information panels. Barrier-free design will ensure accessibility for persons with reduced mobility, while enhanced comfort will improve the overall passenger experience. Upgraded facilities will make waiting times safer and more pleasant, thereby encouraging more residents to shift to public transport.



Image



Public Transport

M6.5: Invest in low-emission or electric public transport vehicles

M6.5.1: Introducing low-emission and electric buses into the fleet



Cost

2.500.000 €



Period

Short



Priority

Medium

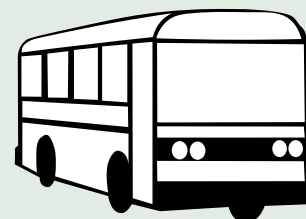


Description

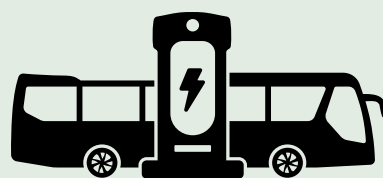
The renewal of the bus fleet provides an opportunity to improve both environmental performance and service quality. This action introduces low-emission and electric buses on urban routes, reducing greenhouse gas emissions and improving air quality in the city. Passengers will benefit from quieter, cleaner, and more comfortable vehicles. This transition supports broader sustainability goals and enhances the city's image as a modern and environmentally conscious municipality.



Image



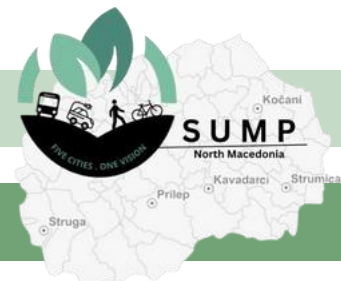
Change
old
busses
with
electrical
vehicles



Public Transport

M6.5: Invest in low-emission or electric public transport vehicles

M6.5.2: Developing charging infrastructure for electric public transport vehicles



Cost

600.000 €



Period

Short



Priority

Medium



Responsible Authority

Municipality of Kavadarci



ASI Status

Improve



Efficiency

Low



Description

To support the shift towards electric buses, the city will establish charging infrastructure at depots, transfer hubs, and major termini. The infrastructure will include fast-charging stations to allow operational flexibility and ensure service continuity. Planning will consider long-term growth of the electric fleet, integrating renewable energy sources where possible. This investment will guarantee the reliability of new electric services and lay the foundation for a cleaner, more resilient transport system in Kavadarci.



Image





Cost

20.000 €



Period

Medium



Priority

Medium



Responsible Authority

Municipality of Kavadarci



ASI Status

Improve



Efficiency

High



Description

This action promotes the voluntary adoption of flexible start and end times among large employers, public institutions, and municipal services in Kavadarci to reduce congestion during peak travel hours. Working hours are staggered within defined time windows (for example, 7:00–9:00 and 15:00–17:00), allowing trips to be spread more evenly across the day.

The program prioritises organisations located along key access corridors (R1103 and R1107) and near the city centre, where peak-hour congestion has the greatest impact on traffic flow and street safety. The municipality provides guidance, coordination, and basic monitoring support, while keeping participation voluntary to ensure feasibility and acceptance.



Image

A COMPARISON BETWEEN:

SMART WORKERS

&

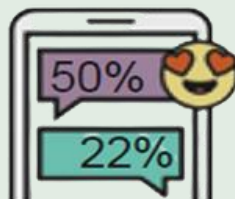
OTHER WORKERS

MOBILITY



TIME SPENT AT WORK

SATISFACTION



FULLY SATISFIED WITH HOW ONE'S WORK IS ORGANISED

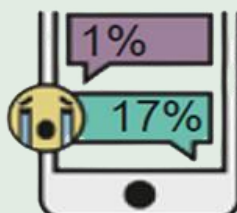
DIGITAL SOFT SKILLS



LEADERSHIP & TEAMWORKING



TIME SPENT WORKING FROM HOME OR ELSEWHERE



DISSATISFIED WITH ONE'S WORK



SELF-EMPOWERMENT



Cost

30.000 €



Responsible Authority

Municipality of Kavadarci



Period

Medium



ASI Status

Improve



Priority

High



Efficiency

High



Description

This action works with primary and secondary schools in Kavadarci to adjust arrival and dismissal times so that school-related trips do not fully overlap with the main commuter peak. Where feasible, start and end times are staggered between nearby schools to reduce concentrated traffic pressure on surrounding residential streets. The action may be supported by coordinated walking groups, school bus optimisation, or limited shuttle arrangements, particularly for schools located along narrow streets or within traffic-calmed zones. Coordination focuses on improving safety, reducing car dependency for short school trips, and supporting the functioning of school streets and pedestrian-priority measures. By addressing school travel patterns directly, this action reduces conflicts between vehicles and children and improves daily mobility conditions in neighbourhoods with high pedestrian activity.



Image

A COMPARISON BETWEEN:

SMART WORKERS

&

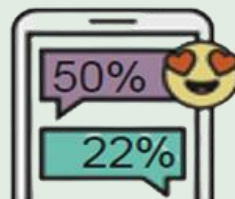
OTHER WORKERS

MOBILITY



TIME SPENT AT WORK

SATISFACTION



FULLY SATISFIED WITH HOW ONE'S WORK IS ORGANISED

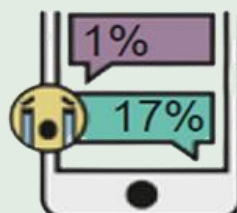
DIGITAL SOFT SKILLS



LEADERSHIP & TEAMWORKING



TIME SPENT WORKING FROM HOME OR ELSEWHERE



DISSATISFIED WITH ONE'S WORK



SELF-EMPOWERMENT



Cost

75.000 €



Period

Medium



Priority

High



Description

This action develops safe, continuous, and well-signposted walking and cycling routes to schools in Kavadarci, building on existing traffic calming, school streets, and pedestrian-priority measures. Interventions focus on streets linking residential neighbourhoods—particularly eastern and southern housing areas—to school clusters near the centre. Measures include raised pedestrian crossings, improved signage, temporary or permanent street closures during school hours, and low-cost tactical elements to reduce vehicle speeds and improve visibility. Routes are clearly mapped and communicated to schools and parents, forming a recognisable and trusted school mobility network. This action improves safety, encourages active travel, and integrates school mobility into the wider urban accessibility strategy.



Image





Cost

15.000 €



Period

Medium



Priority

Medium

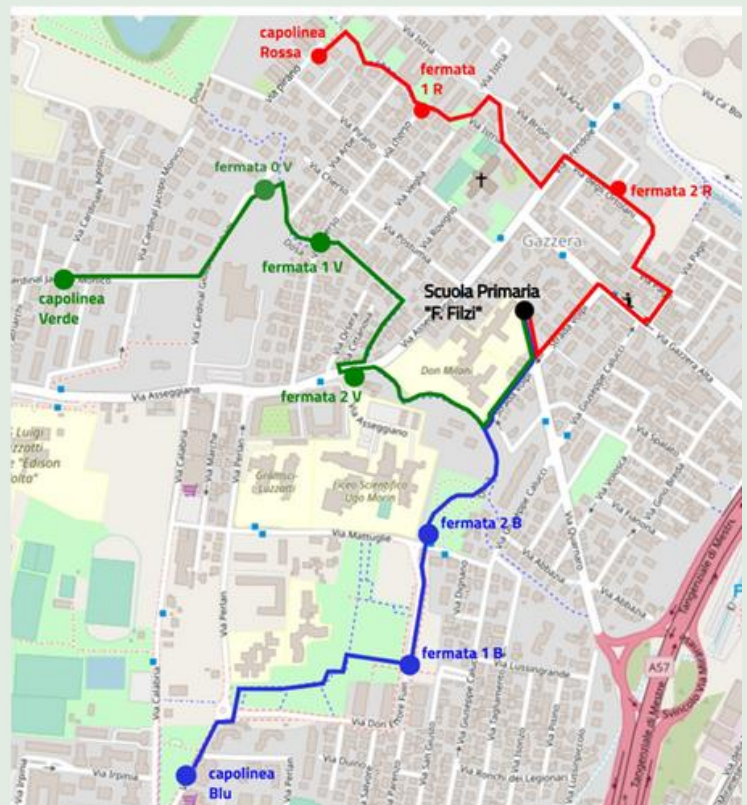


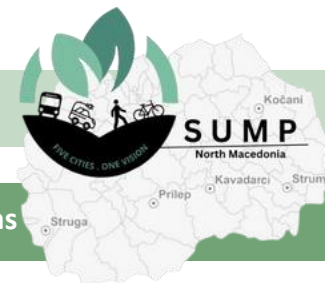
Description

This measure focuses on developing safe, continuous, and well-signposted routes for students walking or cycling to school in Kavadarci, coordinated with existing walkability and traffic-calming measures. Interventions are concentrated around school clusters, including eastern and southern residential neighbourhoods, and streets connecting schools to the city centre. Measures integrate raised crossings, 30 km/h zones, temporary school street initiatives, and targeted traffic restrictions during arrival and dismissal times. Active travel programs such as "walking school bus" and "bike bus" are introduced, enabling students to travel in groups under supervision along designated routes, improving safety, reducing conflicts with vehicles, and reinforcing school mobility within broader city-wide accessibility and mobility management strategies.



Image





Cost

90.000 €



Period

Short



Priority

Medium



Responsible Authority

Municipality of Kavadarci



ASI Status

Improve



Efficiency

High

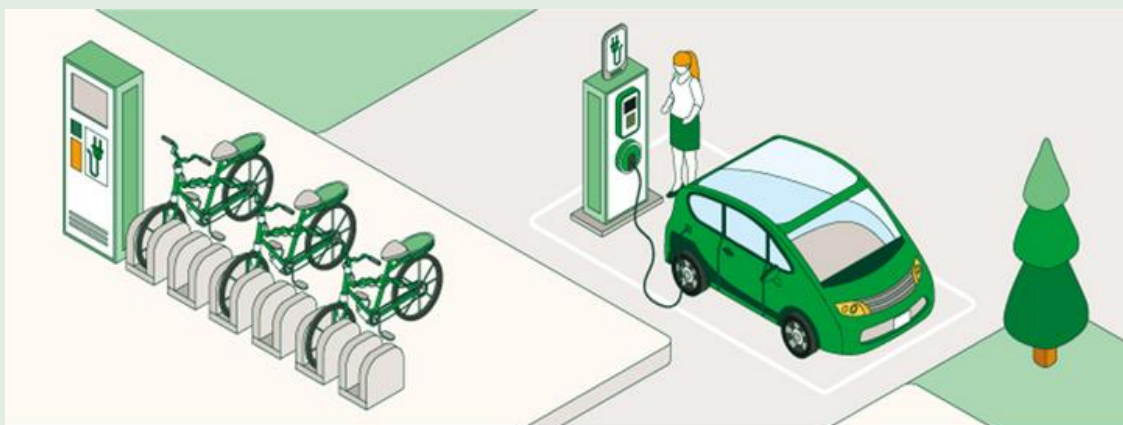


Description

This action deploys publicly accessible electric vehicle (EV) charging points at strategic locations across Kavadarci, including the city centre, park-and-ride facilities at gateway locations, and distributed residential or mixed-use areas. Charging infrastructure is implemented in coordination with energy operators to ensure professional installation, maintenance, and reliable operation. Where appropriate, existing infrastructure—such as public lighting poles or utility cabinets—is adapted for EV charging to minimise street clutter and reduce implementation costs. Site selection considers traffic patterns, proximity to key destinations, parking facilities, pedestrian areas, and public transport stops, ensuring chargers are visible, safe, and accessible. This action supports the gradual uptake of low-emission vehicles while avoiding concentration of charging activity in the most sensitive central streets.



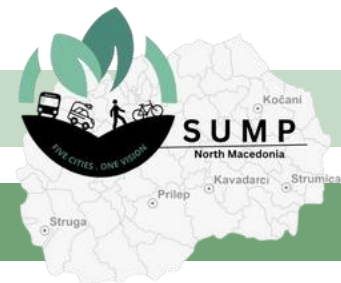
Image



Electric Mobility

M8.3: Realize a local e-mobility strategy including sharing schemes

M8.3.1: Develop and adopt a local e-mobility strategy for Kavadarci



Cost

30.000 €



Period

Medium/Long



Priority

Medium



Description

This action prepares a local e-mobility strategy for Kavadarci to guide the coordinated deployment of electric mobility solutions across the city. The strategy is based on an assessment of travel demand, short-trip potential, municipal fleet needs, and available infrastructure, and defines priority use cases for electric mobility without encouraging unnecessary car use. The strategy establishes a clear framework for: shared e-mobility schemes (e-cars, e-scooters, e-bikes), charging infrastructure coordination, electrification of municipal and service fleets, and integration with park-and-ride sites at the Northern Industrial, Southern, North-East (Glishnik), and Western gateways. By setting phased priorities and governance arrangements, the strategy ensures e-mobility supports accessibility, emissions reduction, and modal balance, rather than increasing traffic pressure in central areas.



Image



Electric Mobility

M8.3: Realize a local e-mobility strategy including sharing schemes

M8.3.2: Implement shared electric mobility schemes and electrify municipal fleets



Cost

180.000 €



Period

Medium/Long



Priority

Medium



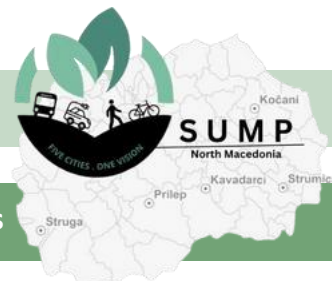
Description

This action implements shared electric mobility services in line with the adopted e-mobility strategy, allowing residents and visitors to access electric vehicles without private ownership. Shared e-cars, e-scooters, or e-bikes are introduced at selected locations, including park-and-ride sites, central areas with limited parking supply, and neighbourhood centres. In parallel, the municipality begins the gradual electrification of its own vehicle fleet, prioritising vehicles used for short urban trips and routine services. Public-private partnerships are encouraged for shared schemes to reduce financial risk and operational burden while ensuring proper regulation and spatial control. This action reduces dependence on conventional cars, supports low-emission access to the city, and demonstrates municipal leadership in clean mobility.



Image





Cost

45.000€



Period

Medium/Long



Priority

Medium



Description

This action introduces pilot test drives for e-cargobikes in Kavadarci, targeting local businesses, service providers, and households. The pilot focuses on areas with higher pedestrian activity and commercial functions, including the main square, central streets, and nearby residential neighbourhoods, as well as routes connected to public transport and cycling infrastructure. E-cargobikes are tested for last-mile deliveries, small retail logistics, family transport, and service trips, where short distances and flat terrain make them particularly suitable. Implementation may be supported through an external provider or a locally coordinated municipal programme, including temporary vehicle allocation, basic training, and simple booking or deposit systems. The pilot helps evaluate real-world demand and operational conditions while promoting low-emission, space-efficient mobility solutions that reduce congestion and conflicts in central streets.



Image



Urban Freight Transport

M9.2: Develop urban logistics hubs or consolidation centres

M9.2.1: Establish primary urban consolidation centres (UCCs) in the Northern Industrial Zone



Cost

500.000 €



Period

Medium



Priority

High



Responsible Authority

Municipality of Kavadarci



ASI Status

Shift



Efficiency

Very High

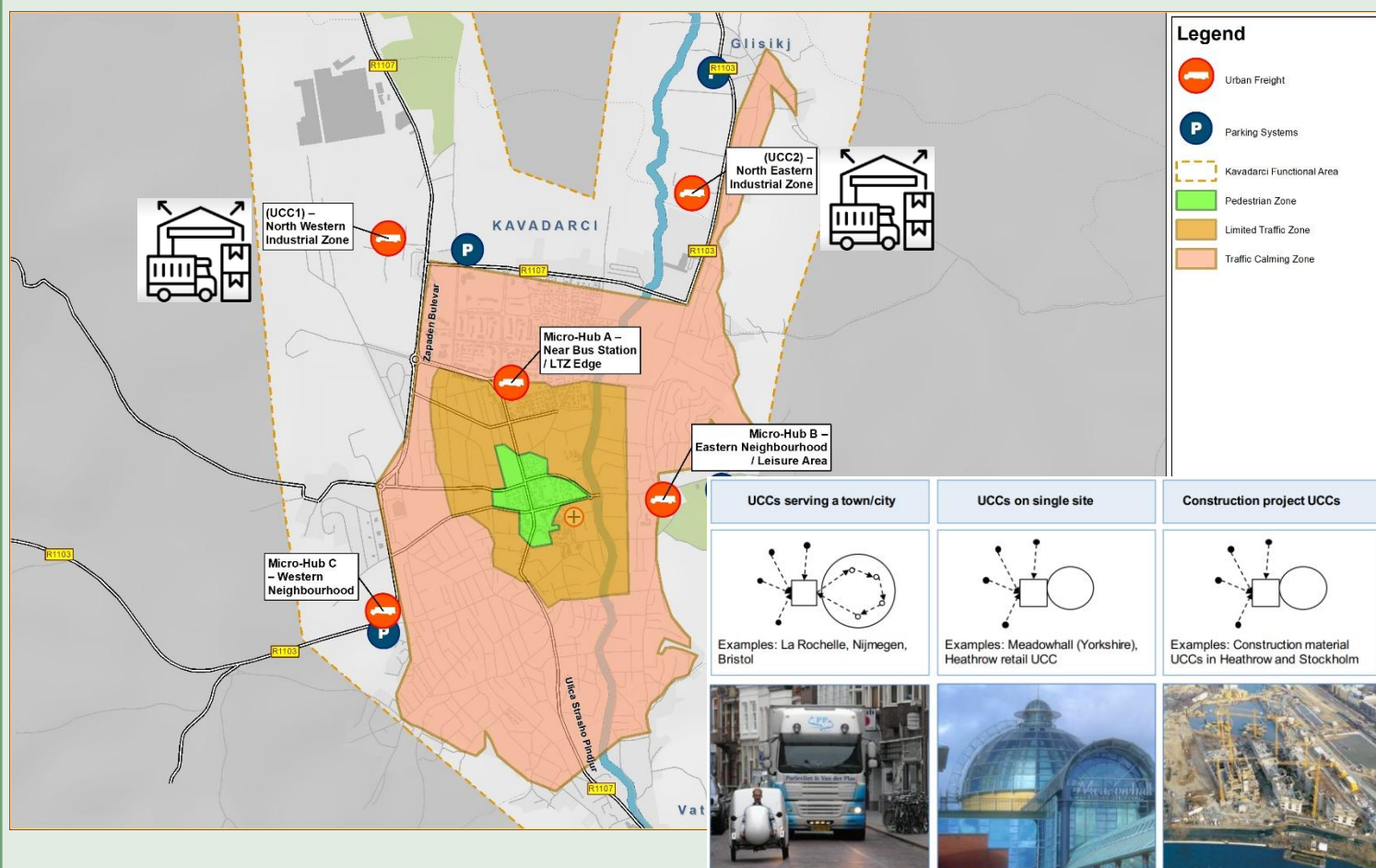


Description

This action establishes two primary Urban Consolidation Centres (UCC 1 and UCC 2) in the Northern Industrial Zone, close to the Metal Steel Factory area and with direct access to R1107 and R1103. These UCCs act as the main interception points for regional and long-distance freight, preventing heavy trucks from continuing south through the city along the vertical axis. Heavy vehicles terminate at the UCCs, where goods are consolidated and transferred to smaller, low-emission vehicles (electric vans or cargo bikes) for onward distribution. Digital scheduling and time-slot management are applied to coordinate arrivals and departures, reducing queuing and uncontrolled stopping near industrial and residential areas. This action directly addresses Kavadarci's most critical freight problem: heavy vehicle traversal through the city due to the lack of a bypass, significantly reducing noise, safety risks, and congestion along the north-south corridor.



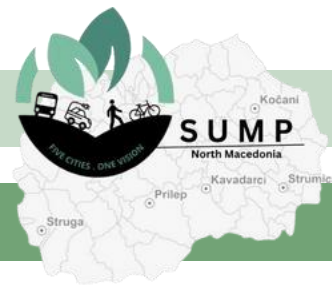
Image



Urban Freight Transport

M9.2: Develop urban logistics hubs or consolidation centres

M9.2.2: Develop urban micro-hubs for last-mile distribution at the LTZ edge



Cost

200.000 €



Responsible Authority

Municipality of Kavadarci



Period

Medium



ASI Status

Shift



Priority

High



Efficiency

High

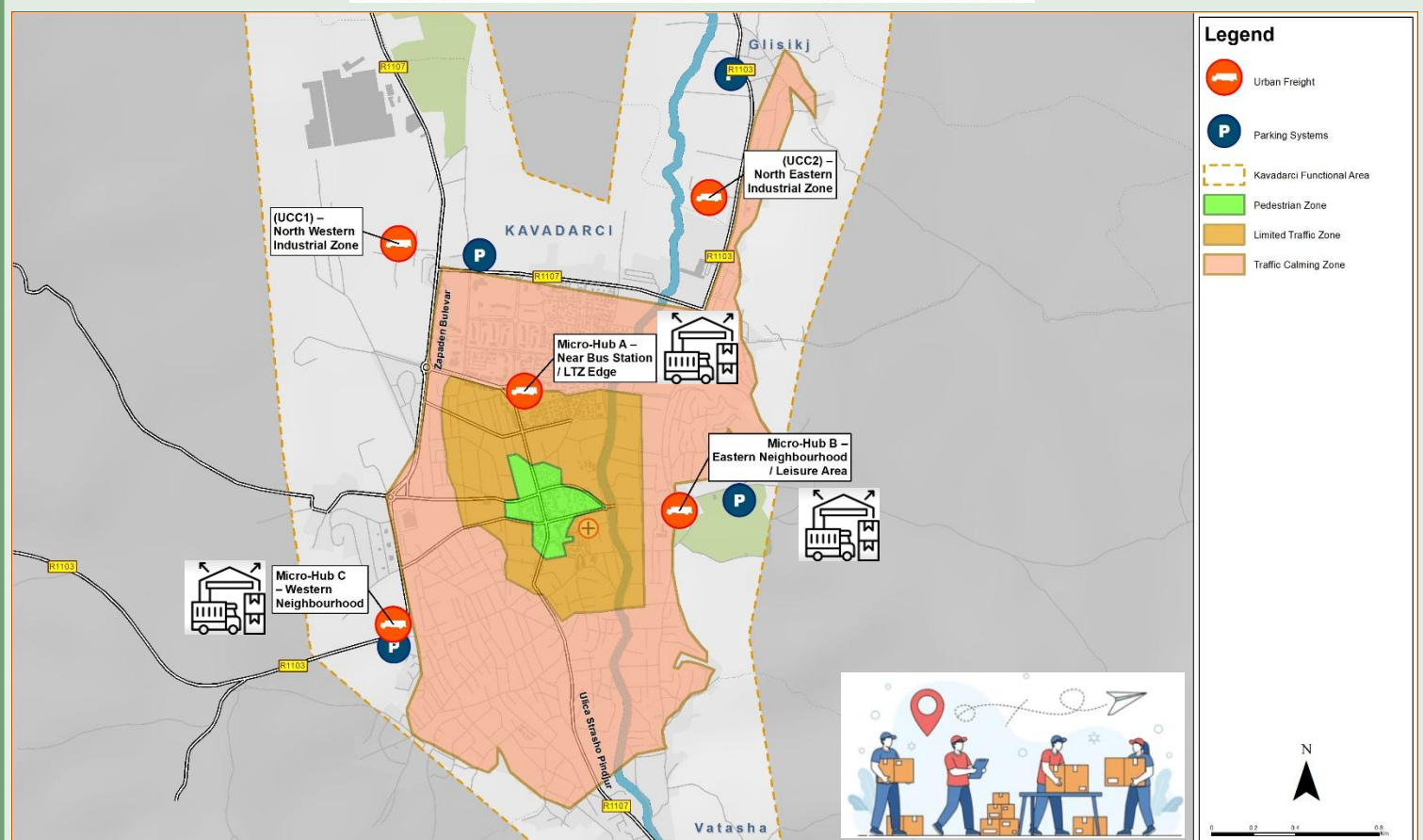


Description

This action establishes a network of urban micro-hubs located just outside the Limited Traffic Zone (LTZ) to serve last-mile deliveries into the city centre and surrounding neighbourhoods. The proposed micro-hubs include: Micro-Hub A – Near Bus Station / LTZ edge: serving central commercial streets and public institutions, Micro-Hub B – Eastern neighbourhood / leisure area: serving eastern residential and leisure destinations, Micro-Hub C – Western neighbourhood: serving western residential areas and local services. From these hubs, deliveries are carried out using cargo bikes and small electric vans, ensuring that no heavy vehicles enter pedestrian-priority streets or narrow residential roads. This structure reduces delivery traffic on local streets, improves safety for pedestrians and cyclists, and supports low-emission access to the city centre.



Image



Urban Freight Transport

M9.3: Support the use of cargo bikes for last-mile deliveries

M9.3.1: Promote cargo bikes for last-mile urban deliveries



Cost

60.000 €



Responsible Authority

Municipality of Kavadarci



Period

Medium



ASI Status

Shift



Priority

High



Efficiency

High



Description

This action promotes cargo bikes as the primary solution for last-mile deliveries in Kavadarci, operating from LTZ-edge micro-hubs into the city centre and residential neighbourhoods. Cargo bikes serve parcels, food deliveries, pharmacies, local retail goods, and municipal services, particularly on streets where vehicle access is restricted or undesirable. The measure is linked to pilot and test programmes allowing logistics operators and local businesses to experiment with cargo bike operations before scaling up. Given Kavadarci's compact urban form, short delivery distances, and flat terrain, cargo bikes offer a zero-emission, low-noise alternative that reduces conflicts with pedestrians and cyclists. This action complements consolidation centres and delivery windows, ensuring that freight activity inside the city is light, predictable, and compatible with public space use.



Image



Urban Freight Transport

M9.4: Digitalize freight logistics (tracking and scheduling) for efficiency

M9.4.1: Introduce digital freight scheduling, tracking, and access control



Cost

110.000 €



Period

Medium



Priority

Medium



Responsible Authority

Municipality of Kavadarci



ASI Status

Avoid



Efficiency

High

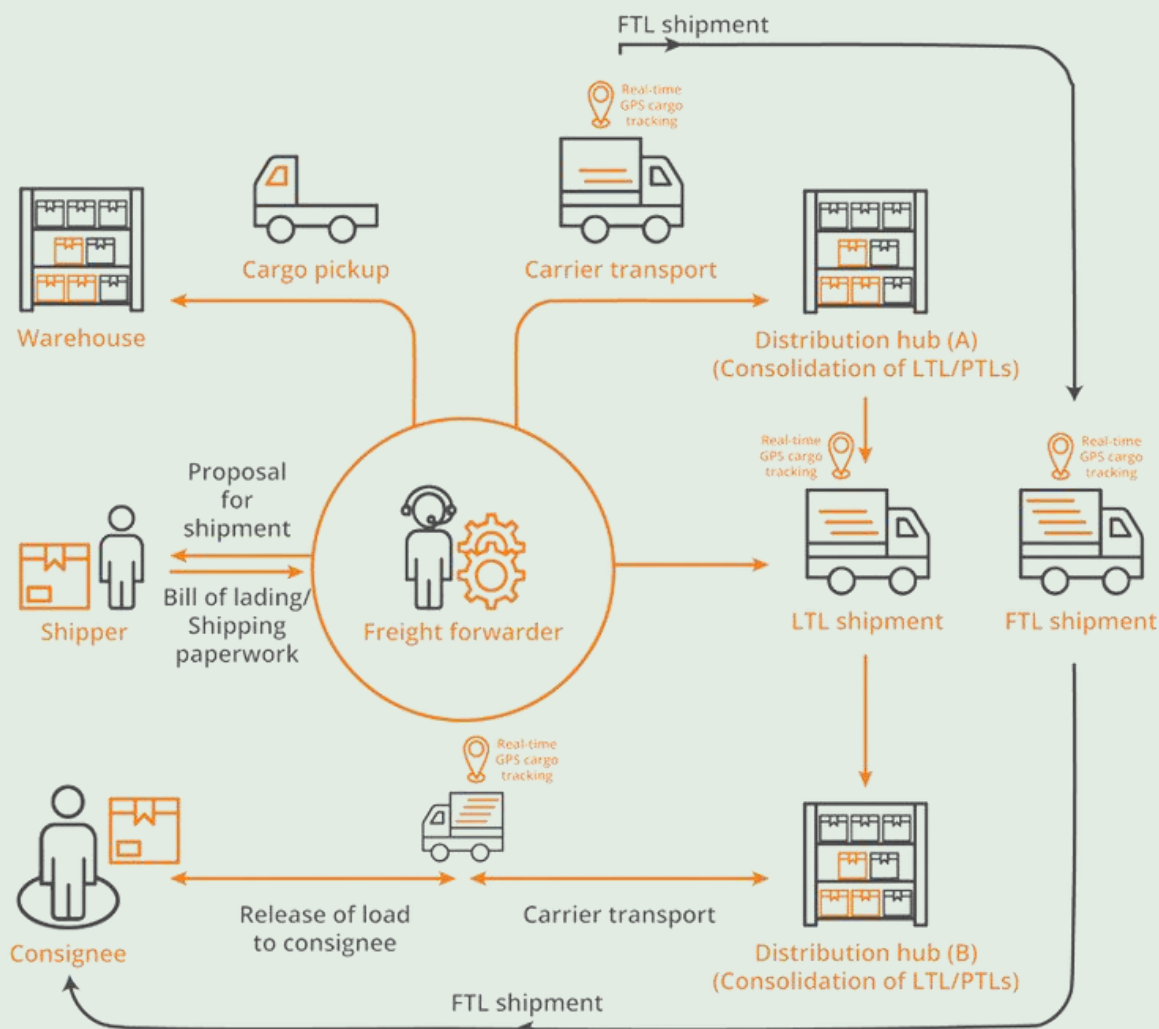


Description

This action introduces digital tools to manage urban freight operations in Kavadarci, including delivery scheduling, routing, and basic real-time vehicle tracking. The system coordinates delivery windows for the city centre, school areas, and low-traffic streets, ensuring freight access occurs only during permitted time slots. Digital tools support authorised access to the LTZ, coordination between primary UCCs, micro-hubs, and retailers, and enable differentiated rules for peak and off-peak periods. This is especially important in Kavadarci, where freight currently mixes with through-traffic along the north–south axis, creating safety and congestion issues. By improving transparency and predictability, digitalisation strengthens enforcement, reduces unnecessary trips, and enables data-driven adjustments to freight policy over time.



Image





Cost

300.000 €



Period

Short



Priority

High

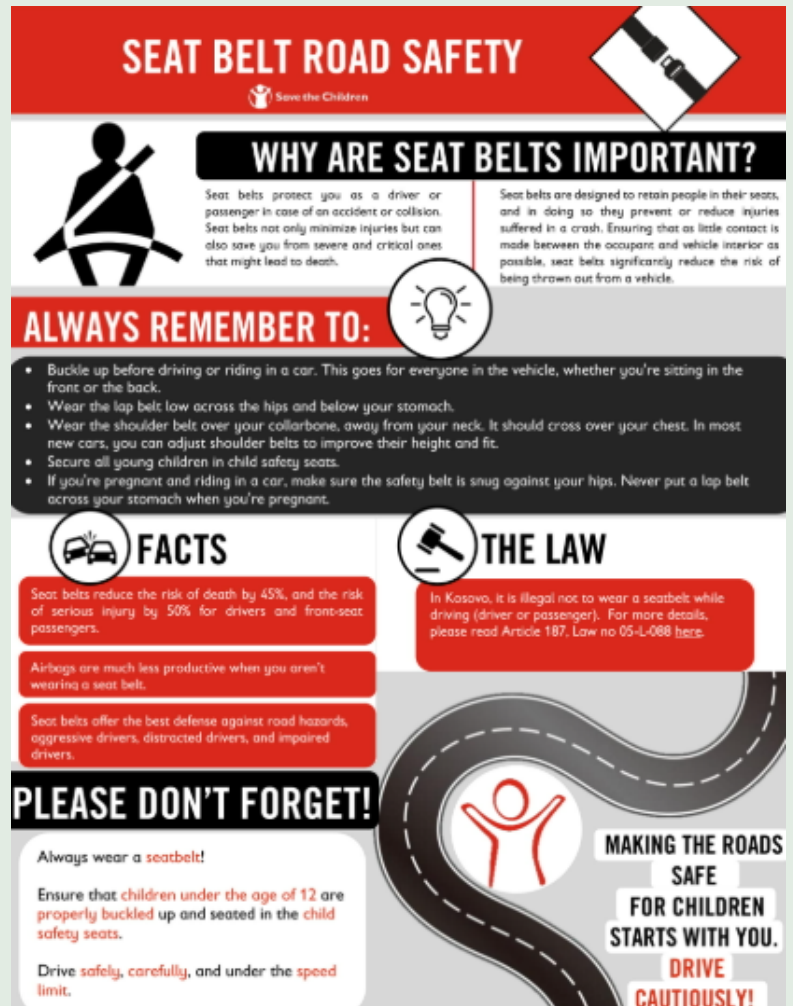


Description

Kavadarci faces persistent safety challenges, including high risks for pedestrians and cyclists in urban areas. This action implements a city-wide awareness campaign targeting all road users. Campaign elements will include posters, media spots, school programs, and community events, raising awareness about respecting pedestrian crossings, speed limits, and the rights of vulnerable users. By building a culture of shared responsibility, the campaign will reduce risky behavior, improve compliance with traffic rules, and contribute to safer mobility for all citizens.



Image





Cost

300.000 €



Period

Short



Priority

High



Description

Sustainable mobility requires active engagement from citizens to ensure that measures are widely accepted and effective. This action establishes participatory workshops and consultation platforms where residents can share feedback on mobility challenges and propose local solutions. The workshops will focus on issues such as pedestrian safety, cycling promotion, and public transport improvements, ensuring that diverse groups are represented. By giving citizens a voice, the municipality will strengthen trust, increase transparency, and align transport policies with community needs, ultimately creating a more inclusive planning process.



Image

