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Introduction

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Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 16481

Sustainable mobility and transportation — Digital governance — Strategic needs regarding ISO 37101 purposes of sustainability

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ISO/TC 268/SC 2

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 268, Sustainable cities and communities, Subcommittee SC 02, Sustainable mobility and transportation

A list of all parts in the ISO ##### series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This standard aims at structuring the needs and specifying the digital governance capabilities on a mobility system to make it more sustainable.

It will support mobility stakeholders and especially transport authorities in the emergence and the realization of contributive solutions to the objectives of sustainability depicted in ISO 37101.

This standard is the first item of an intended set composed of the following items:

- ISO 16481: «Sustainable mobility and transportation – Digital Governance – Strategic needs regarding ISO 37101 purposes of sustainability» to build a vision about the functional and environmental needs on systems composing the mobility system.
- ISO 16483: «Sustainable mobility and transportation – Digital Governance – Indicators» to identify and standardized the metrics that will help define strategic goals and quantify the evolution of the sustainable mobility system.

And the forthcoming New Work Item Proposal:

- “Sustainable mobility and transportation – Digital Governance – Mobility data framework”

Mobility data governance is the cornerstone of the capabilities of a sustainable system, that is, to recall it, a complex system of systems: Standardizing data semantics, data services and data exploitation rules are among the key topics of the proposal.

This standard set initiative contributes directly to reduce energy consumption and air pollution issued from mobility. It introduces a systemic approach on sustainable mobility of a city or a territory.

This is unprecedented and complements the numerous standard initiatives that are contributive on specific aspects of mobility solutions. This standard set mentioned above guides transport authorities to translate sustainability ambitions into concrete plans thus define the associated mobility policies; it defines the common rules among the systems composing the mobility system that allows the systemic governance of the mobility system to implement strategic choices. As example, all measures creating directly or indirectly energy savings and air pollution, as well as improving resilience of the solutions are described and leverages are given for decision makers to make enlightened choices.

From the guidance of the purposes of sustainable cities and territories, especially “Preservation and improvement of environment”, “Resilience” and “Responsible resource use”, the contribution of mobility is analyzed and associated needs are identified. Relevant actions levers are used to specify mechanisms and behaviors on the systems composing the mobility system.

Thus, the use of this standard set, starting with ISO 16481 aims at helping transport authorities in implementing their sustainability strategies and implement a governance able to handle the complexity of a mobility system.

This document covers the ISO 16481 only.

This standard deals with the strategic needs of digital governance for sustainable mobility. It is organized in two parts:

0.1. Use-case of part 1

- The first part presents the links between the sustainability purposes and issues of the ISO 37101 and mobility needs:

It introduces the high-level needs of a sustainable mobility system.

This part of the standard supports the transport authorities of an urban area to build a vision about the functional, social and environmental needs on the systems composing the mobility system to develop sustainability. Examples of users of this standard are detailed in [annex B](#).

- First, the users of this standard should apply the recommendations depicted in [clause 4.1](#) to prepare the assessment and evolution plans of the mobility system. It helps also, in later stages, to potentially adapt the organization to efficiently deal with the governance of the mobility becoming more digital.
- Second, the users should apply the process depicted in [clause 4.2](#) to assess the sustainability purposes and issues and define/ challenge the ambitions of the territory.

0.2. Use-case of part 2

The second part transposes the high-level needs on the mobility system to high-level needs on digital systems that are involved in sustainable mobility, named “High-level digital needs» afterwards.

- Awaiting the availability of the next standards identified in the introduction clause, the high-level digital needs per sustainability purpose of [clause 5](#) and the ones per mobility systems of [clause 6](#) help in specifying or designing systems contributing to the mobility system. This approach provides a way to check that key digital features have been well covered and are consistent with the overall strategic sustainable mobility plan of the territory.

0.3. Introduction to the backbone of this standard

[Figure 1](#) below represents the structure of this standard:

- The back end-coloured rectangles clarify the type of handled objects: The green ones deal with needs, the blue one deals with requirements positioned as potential solutions to expressed needs.
- The green rectangle on the top, labelled “Mobility system needs domain” represents the structure of “part 1” described in clause 0.1 above. This is a process to produce a mobility project for the users of this standard.
- The following blue rectangle labelled “Mobility system solution domain” and the green one on the bottom, labelled “Digital needs onto contributory systems of the mobility system” represent the structure of “part 2” described in clause 0.2 above. This is a solution to identify the digital strategic needs on the systems contributing to the mobility system.

This standard uses two generic analyses. They are identified in [figure 1](#) by orange blocks:

- The first one is labelled “Sustainable mobility purposes generic analysis”, it identifies sustainability mobility issues associated to sustainability purposes of the 37101 and proposes a combination into high-level needs. This is further developed in [clause 4](#) of the standard.
- The second one is labelled “Clusters of requirements”, it identifies a breakdown of requirements able to fulfil the whole set of high-level needs. This is further developed in [clauses 5](#) and [6](#) of the standard.

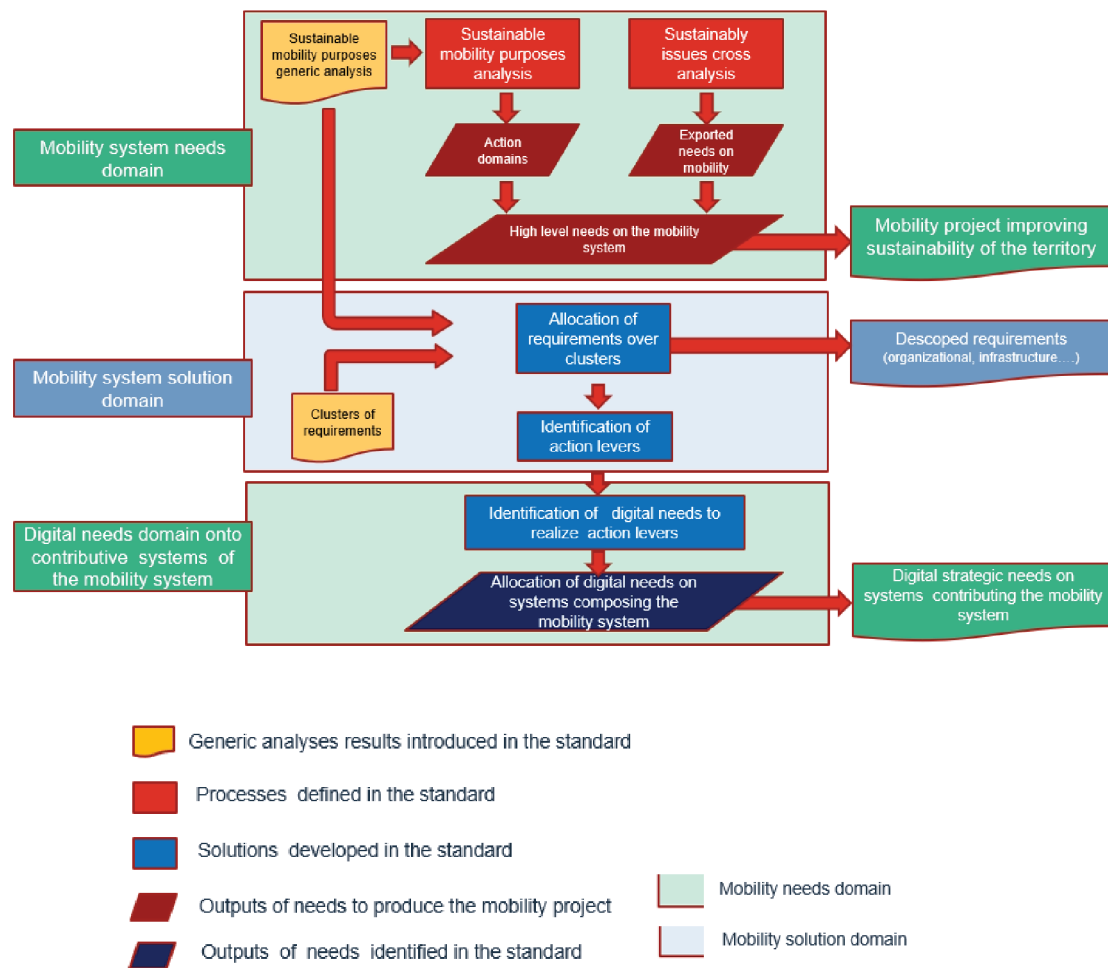


Figure 1 — Graphical representation of the standard structure

Sustainable mobility and transportation — Digital governance — Strategic needs regarding ISO 37101 purposes of sustainability

1 Scope

This international standard applies to the digital Governance part of the mobility system of a city engaged in sustainability. It aims at achieving sustainability goals of the local community.

It targets U

urban mobility and its connections with intercity and other long-distance transport solutions. It applies to mobility of people and goods.

An urban mobility system is a system of transport systems, whether those systems: contribute to dimensioning and governance of the mobility as a whole,

- contribute to transport solutions: orchestrated, on demand, shared or not,
- provide mobility services.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 37101:2016, *Sustainable development in communities — Management system for sustainable development — Requirements with guidance for use*

ISO 37104:2019, *Sustainable cities and communities — Transforming our cities — Guidance for practical local implementation of ISO 37101*

ISO WD 16483-202x: Sustainable Mobility and Transportation – Digital Governance – Indicators

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.0

Action levers

identified means to realize a targeted objective

3.1

Baseline review

the baseline review (5.2 in the ISO 37104) is an initial diagnosis mapping the local situation, with regard to the six purposes of sustainability

[SOURCE: ISO 37104:2019]

3.2

Local community

the community of the area of interest

3.3

Digital needs

Defines the part of needs that concern computerized systems. Other parts of needs relate e.g. to physical infrastructure, or policies.

3.4

High-level needs

Global expectations on the mobility system of the concerned territory. They define the desired characteristics, dimensioning, choices shaping or animating the mobility system.

3.5

Strategic needs

Global expectations on the systems composing the mobility system of the concerned territory. They define the essential characteristics, dimensioning and choices allowing the achievement of the requirements on the targeted mobility system.

3.6

High-level strategic needs

highest granularity of reported strategic needs

3.7

High-level requirements

specification of objectives that describe the scope, the context and the targeted results intended to fulfil expressed needs. High level requirements are the proposed replies to high-level needs.

3.8

KPI

Key Performance Indicator is a quantifiable measure of performance over time for a specific objective

3.9

GHG, Greenhouse gas emission

total mass of a greenhouse gas released to the atmosphere over a specified period of time

[SOURCE: ISO 14064-1, 2006, 2.5]

3.10

Hypervision system

a supervision system at mobility system level: a monitoring and control system of the mobility flows and multimodal services

3.11

EAS (Exploitation Aided System)

system that assists the mobility operators in their diagnosis and any support to intervene. It regulates the concerned system

3.12

Data policy manual

a governance manual that provides roles and responsibilities related to data governance through policies, processes and procedures. It may also provide remedies.

3.13

Passenger

person who has a reservation to travel or is travelling in a vehicle except for any crew, staff or drivers

[SOURCE: ISO/TS 14812:2022]

3.14

Traveller

person who is headed to a destination

[SOURCE: ISO/TS 14812:2022]

3.15

Vulnerable person

weak person with no protection and that can easily be hurt physically (such as people living with disabilities, children, pregnant women and the elderly)

4 Instantiating ISO 37101 sustainability purposes through the prism of mobility

4.1 Implementing the management system for sustainable mobility development in communities described in ISO 37101 and ISO 37104.

The management system specified in ISO 37101 and ISO 37104 describes the methodology to design and implement a scheme that contributes to the sustainable development of cities and local communities.

Figure 2 represents this management system to drive sustainability ambition over the 12 relevant sustainability issues faced by communities versus the 6 sustainability purposes depicted in ISO 37101.

It shows that, to instantiate ISO 37101 through the prism of mobility, sustainability purposes and sustainability issues have to be analyzed in terms of mobility.

The users of this standard shall first get acquainted with ISO 37101 and 37104, especially ISO 37101 “Context of the organization” (clause 4) and ISO 37104 “Political commitment: leadership, responsibilities, organization and capacity building” and “Implementing a management system for sustainable development” (clauses 4 and 5).

It can be useful for the user to get acquainted with the ISO 37154 “Smart community infrastructures - Best practice guidelines” for transportation in order to support the infrastructure development vision.

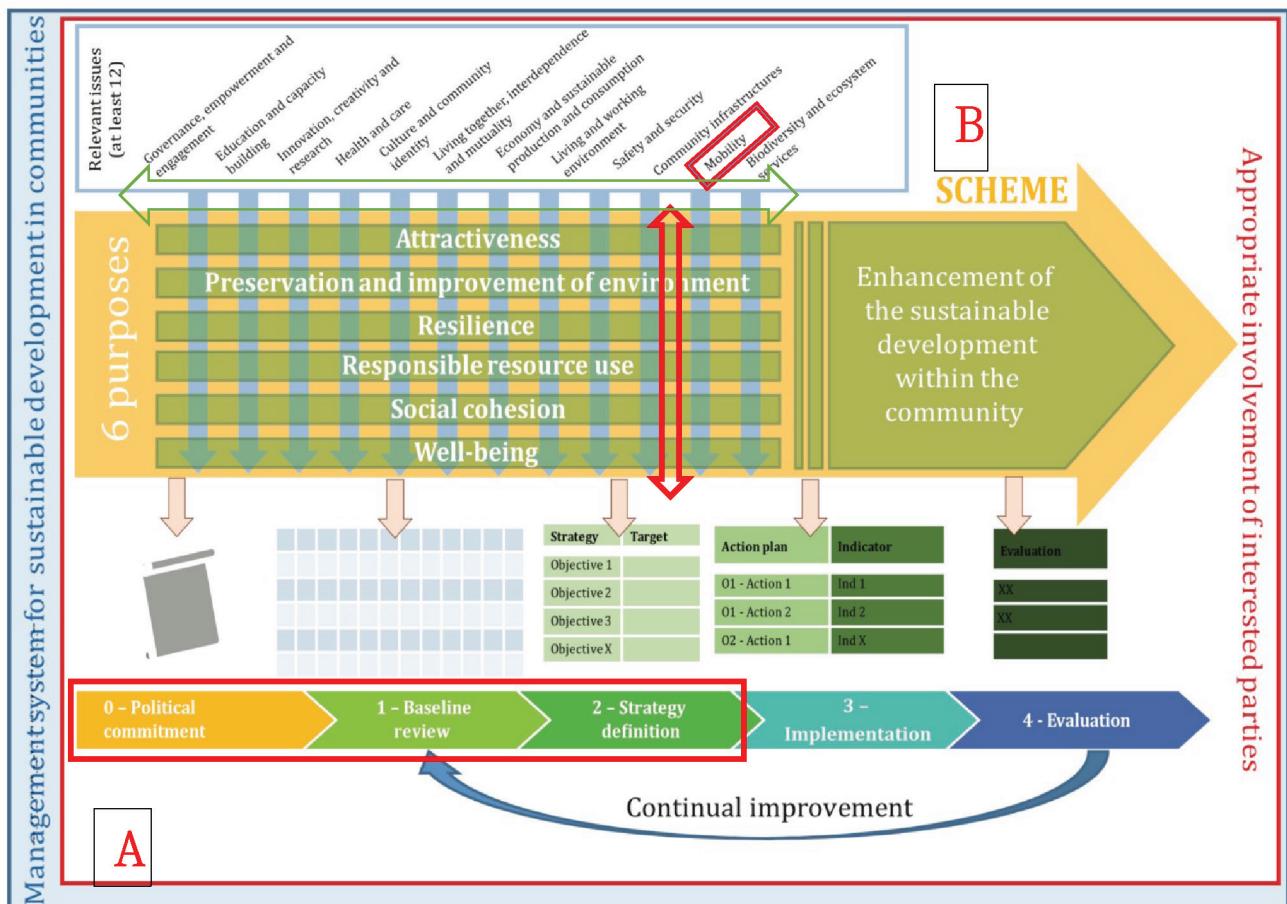


Figure 2 — Management system for sustainable development derived from ISO 37104

4.2 Defining the mobility project

The mobility project will be defined or iterated by unfolding the 3 first steps of the process as shown in the red rectangle labelled “A” in [figure 2](#).

Those 3 steps are identified as political commitment ([clause 5.1.a](#)), baseline review ([clause 5.2](#)) and strategy for sustainable development ([clause 5.3](#)) in the ISO 37104. They are instantiated for sustainable mobility as described below:

4.2.1 Step1 - Political Commitment

ISO 37104 political framework shall be refined and detailed relating to mobility organizations, decisions, funding, regulations, and areas of competencies of the concerned area. It will be needed to build the mobility project plan with the right sequences of actions, decisions, and founding.

4.2.2 Step2 - Baseline review

The baseline review aims at identifying the relevant mobility ambitions to realize a step towards a more sustainable community. Mobility ambitions must be understood as the targeted mobility needs.

This review shall be executed in the following order:

4.2.2.1 Sequence 1:

This sequence identifies mobility issues through following activities:

- map and describe the local situation,
- establish the diagnosis (for instance, by performing a SWOT analysis),
- benchmark and/or organize peer learnings,
- formulate, and rank the ambitions browsing the 6 sustainability purposes as shown under the Label “B” in [figure 2](#) (vertical red arrow).

ISO 37101 sustainability purposes and issues should be reviewed by the organization to get a clear picture of mobility issues and to identify new objectives consistent with the established global sustainability vision and constraints of the city.

The [Annex A](#) “Sustainable mobility purposes generic analysis” provides a high-level needs generic analysis on the mobility system for each purpose of sustainability. This analysis should be seen as a help to initiate the local situational analysis.

Stakeholders should go through the items listed in the 6 matrices (§[A.1](#) to §[A.6](#)) to come-up with some facts that help to evaluate the performance status and set the ambition of the concerned urban zone.

The outputs of this review are the sustainable mobility needs for a given situational analysis of a city. They are also a help to prioritize strategic needs in the retained project.

4.2.2.2 Sequence 2:

Sequence 2 aims at doing a cross analysis between mobility and the 12 issues identified in ISO 37101.

Beyond the objective to get a mobility system sustainable, mobility serves also sustainable and resilient territories ambitions, thus status or plans of other sustainability issues (the 12 issues identified in ISO 37101) of the concerned territory create dependencies or expectations towards mobility.

Each of the 12 issues shall be reviewed versus mobility issue as shown under label “B” in [Figure 2](#) (horizontal green arrow). The findings are used to influence and supplement the ambitions list established in sequence 1. [Figure 3](#) illustrates this sequence.

Attention point: To achieve completely this sequence consistently with the intent of the ISO 37101, It is assumed that the same analysis described in sequence one ([clause 4.2.2.1](#)) is executed for each of the 12 sustainability issues, thus resulting in a complete picture of dependencies, exported constraints and influences involving mobility. The corresponding analyses are not developed in this standard.

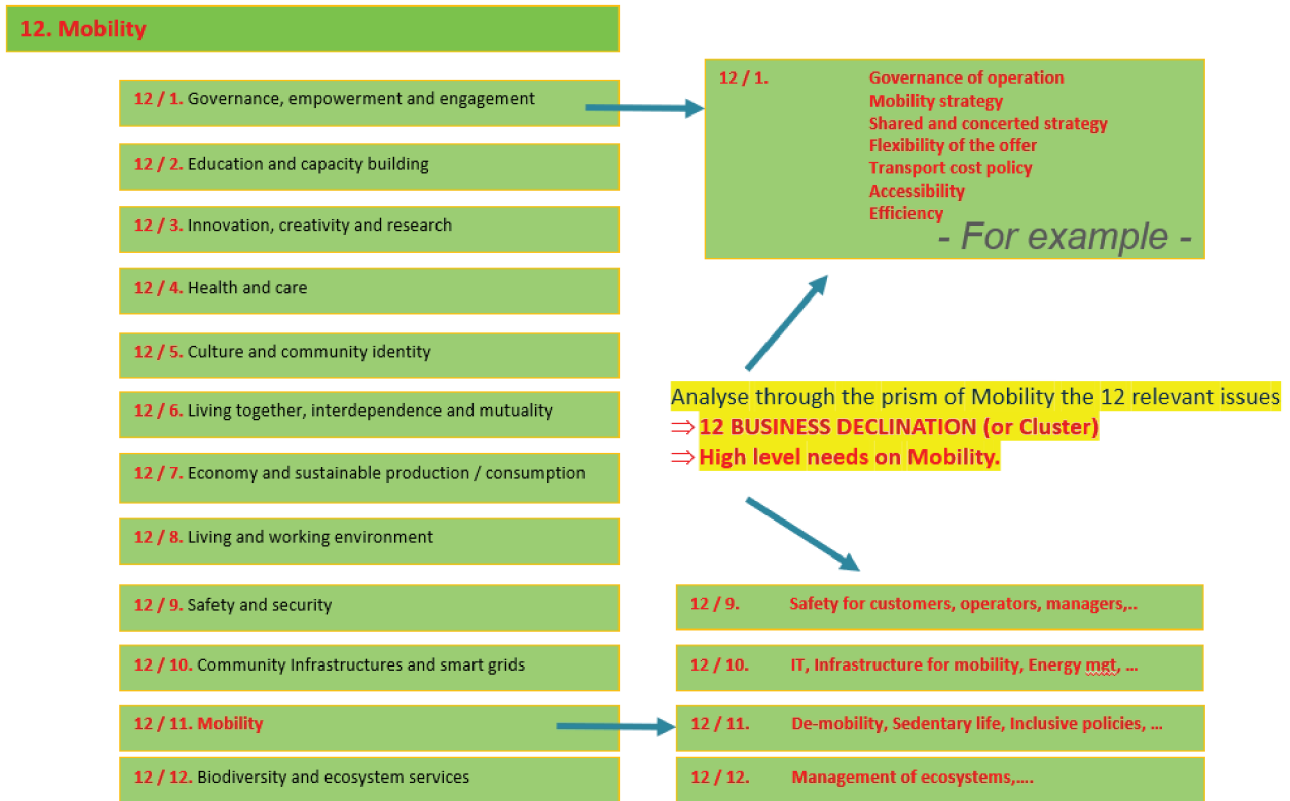


Figure 3 — example of cross analysis of sustainability issues versus mobility

4.2.2.3 Sequence 3:

This sequence summarizes selected mobility ambitions with their associated priorities and dependencies.

[Table 1](#) illustrates a possible synthesis board of ranked needs with the dependencies and associated strategic triggers.

Table 1 — Example of a synthesis of retained ambitions and their dependencies

Mobility project <i>Name</i> sustainability improvement review						
Scope analysis	items	Action #	Priority	dependency	description	comments
Sustainability purposes	Attractiveness	1	1	-urbanism plan	Adapt mass transit capacity to urbanism plan and city mobility plan	
		2	1	New car park and road exchange	Realize an extra multi-modal hub at location XXXX	
		3	2	Action # 2	Hub XXXX supervision	Optimization of multimodal connections
	Preserv. & improv. Of environment	4	1	-	Switch to hydrogen bus for next bus investments	Prepare new energy infrastructure
		5	2	Action #N+a	Implement low consumption mode	Synchronize transport services
						
	Resilience	N	1		Implement a central transport Data service to improve MaaS information	Log of dynamic transport information
	Responsible resource use	.....				
	Social cohesion	.....				
	Well being	.....				
Sustainability issues	Governance	N+a	1		Implement an operational governance of mobility policies	Means to monitor traffic and activate regulation mechanisms
						
	Education	.....				
						
	Innovation	.....				
	Health	.....				
	Culture	.....				
	Living together	.....				
	Economy	.....				
	Living env.	.....				
	Safety and security	N+x	1		Surveillance means of buses and trams stop stations	
	Infrastructures	.....				
	Mobility	.....				
	Ecosystem	.....				

4.2.3 Step 3 - Strategy definition: Making-up the mobility project

This step mainly consists in formalizing the objectives of sustainable development that are the key priorities retained among the identified ambitions.

The retained part is the outcome of project convergence phase; it is done as any project that faces feasibility constraints. This is a combination of accessible means, operational constraints and global context (e.g. political, economic, events, ...). The outcome becomes the action plan for sustainable mobility.

The definition of the strategy is the third step in the sustainability management process. It should contain:

- The formulation of the city/ territory development vision that is targeted;
- The allocation of leadership;
- The retained strategic priorities and sustainable objectives issued from the step 2 of the process;
- The definition of the selected affordable strategy to realize those objectives, including steps and terms that takes into account human, environmental and financial resources;
- The related KPIs that fit with the objectives of the project;
- The principles of governance including the implementation of stakeholders' commitment.

5 Strategic digital needs of individual systems contributing to the mobility system to match sustainable mobility ambitions

5.1 Identification and allocation of high-level requirements from high-level needs

[Annex A](#) (Clause 8) provides a high-level needs generic analysis on the mobility system for each purpose of sustainability. This a key input used in [clause 4](#) to establish the mobility project.

The matrices of clause 8 are also the starting point of this clause to allocate requirements to the sustainable mobility system in front of the high-level needs; thus, the tables of [Annex A](#) are extended with the allocated requirements. Those new tables are grouped in [Annex C](#) (Clause 9).

Requirements are part of the solution domain; they provide replies to the specified needs. As a starting point, clusters of requirements are used to position the expected type of solution, named high-level requirements clusters.

The following set of 8 high-level requirements clusters covers all the high-level needs identified in the matrices of needs (§8.1 to §8.6).

The scope definition of these clusters is described in the [table 2](#) below.

Table 2 — definition of the clusters of high-level requirements

High-level requirements clusters	Scope definition
Mobility offer	This cluster of requirements regroups all design and dimensioning aspects of the transport solutions.
Mobility policies	This cluster of requirements deals with all the mobility rules that define implementation choices, mobility behavior and urbanism solutions such as infrastructure design (streets/roads, stations, hubs, green ways, VRU protections,...) societal layout of the urban area,.....
Mobility regulation	This cluster of requirements contains the mobility flow monitoring and control aspects as well as perturbation and crisis management features.
Transport capacity adjustment	This cluster of requirements addresses dynamic adjustment of the offer versus demand cases.
Mobility information	This cluster of requirements regroups the digital information that formalizes and communicates traffic information, dynamic MaaS services, rerouting assistance.