

Recommendations for Mobility Master Planning



Working Group for Transport Planning
Committee: General Issues in Transport Planning
Subcommittee: Guidelines for the Further Development of Integrated Municipal Mobility Master Planning

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Preliminary note

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Translated by:

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German Partnership for Sustainable Mobility

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Preface to the translation

These “Recommendations for Mobility Master Planning (MMP)” are translated from an original German version and reflect transport planning processes in towns and regions in the Federal Republic of Germany.

Accordingly they refer to the German planning levels:

- | | |
|---------------------|---|
| – Bund | National (Federal) |
| – Land | State |
| – Kreis | County |
| – Stadt – kreisfrei | Larger city/town, which is independent and not part of the county |
| – Gemeinde/Stadt | Community |

According to the principle of subsidiarity, the most local level of government is responsible as much as possible. In this respect communities play an important constitutional role. Interests of the different levels have to be balanced out according to the principle of counter flow (Gegenstromprinzip).

In Germany, plans are divided into legally required formal plans defined through legislation and into informal plans for which the processes are not legally defined.

Some formal plans with relevance for transport are:

- | | |
|---------------------------------------|-----------------------------|
| – Landesentwicklungsplan (LEP) | State Development Plan |
| – Flächennutzungsplan (FNP or F-Plan) | Land Use Plan (LUP) |
| – Bebauungsplan (B-Plan) | Zoning Plan (ZP) |
| – Nahverkehrsplan (NVP) | Public Transport Plan (PTP) |
| – Luftreinhalteplan (LRP) | Clean Air Plan (CAP) |
| – Lärminderungsplan (LMP) | Noise Action Plan (NAP) |

The implementation of infrastructure measures requires in particular either a zoning plan (B-Plan) or a legally defined plan approval procedure (Planfeststellungsverfahren), which guarantees participation, balancing pros and cons and the compensation of interests.

Informal plans with relevance for transport are:

- | | |
|----------------------------------|-----------------------------|
| – Stadtentwicklungsplan (StEP) | City Development Plan (CDP) |
| – Verkehrsentwicklungsplan (VEP) | Mobility Master Plan (MMP) |
| – Bereichs- or Stadtteilpläne | Neighbourhood Plans |
| – Fachpläne | Sectoral Plans |

The different types of regions and cities are defined in Germany by the Bundesamt für Bauwesen und Raumordnung (Federal Office for Building and Regional Planning):

- | | |
|-----------------------|---|
| – Kernstadt | Core city in an agglomeration area and urban region |
| – Verdichtetes Umland | Densely-populated area in high to mid-density region in agglomeration areas and urban regions |
| – Ländliches Umland | Peripheral area with agglomeration tendencies |
| – Ländlicher Raum | Peripheral area with very low density |

These definitions are in addition to the use of Christaller’s “Theory of Central Places”, in which regions and cities in Germany are categorised into a hierarchical system based on their functional role (health and public services, culture, education, shopping, etc.) for the surrounding area:

- | | |
|-----------------|---------------------|
| – Oberzentrum | Higher-order centre |
| – Mittelzentrum | Middle-order centre |
| – Unterzentrum | Lower-order centre |
| – Grundzentrum | Basic centre |

In addition, the reader finds a glossary of selected German planning terminology with the corresponding English translation used in these recommendations in Appendix 6. It is intended to assist the ease of understanding.

1 Introduction

The basic methodological approach for developing mobility master plans (MMP) is described extensively in the “Leitfaden für Verkehrsplanungen” (Manual for Transport Planning) from the Forschungsgesellschaft für Straßen- und Verkehrswesen (German Road and Transport Research Association – FGSV) from 2001¹. Modern mobility master plans in Germany evolved out of previous generations of so-called General Transport Plans or Local Transport Plans (LTP) and are today, considering a series of paradigm shifts, referred to as Mobility (Master) Plans or, in the European context, as Sustainable Urban Mobility Plans (SUMP). The “Manual for Transport Planning”, which describes the working steps of integrated and goal-oriented transport planning processes in general, will be described in these recommendations in more detail and will be developed further for municipal and regional mobility master planning. Amongst other things, these recommendations suggest differentiating the planning activities of mobility master planning into an overarching strategic-conceptual level and an implementation level for the development of measures², which are derived from the strategies (cf. Fig. 1).

The new bi-level working method described in these recommendations will be called “mobility master planning” in order to emphasise a goal-oriented, comprehensive transport planning and its integration into spatially-oriented development planning. The integrative approach of this working method corresponds, both in content and methodology, with the demands of sustainable urban mobility plans (SUMPs) recommended by the European Union (EU).

Until the middle of the 1990s, LTPs and MMPs were the major strategy, framework and action plans at the municipal level in Germany. They were also a requirement for receiving federal funding through the Gemeindeverkehrsfinanzierungsgesetz (Municipal Transport Financing Law – GVFG) and, as special sectoral plans, they determined the main traffic networks for urban land use planning. As a result of national and European laws, the status of these plans has changed over the last ten to fifteen years, during which the demands on coordination and strategic integration of many other sectoral plans has increased. Aside from informal MMP³, public transport plans (PTP), clean air plans (CAP) and noise action plans (NAP), amongst others, have been introduced as required formal planning instruments. These need data from mobility master planning and, to a certain extent, contain identical measures. As such, the MMP, as a necessary foundation for other formal plans– in particular for urban land use planning – is de facto an obligatory task, since the required formal plans could not be derived without it.

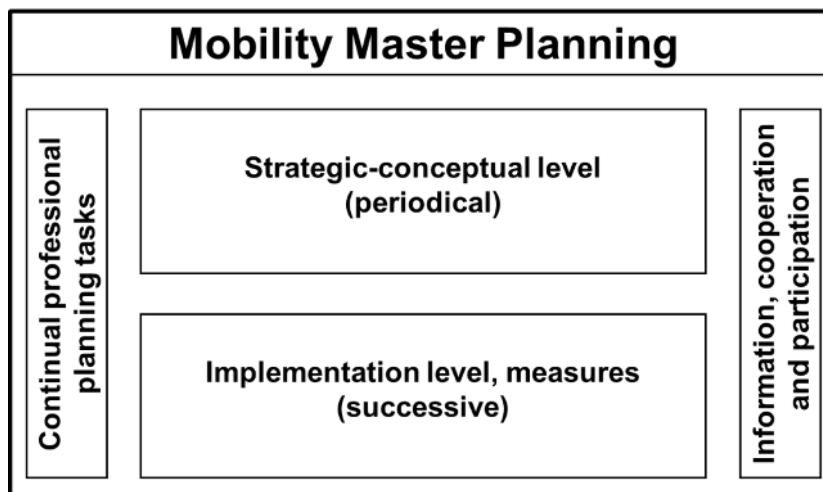


Fig. 1: Levels and planning activities of mobility master planning

¹ FGSV (2001).

² Cf. SCHNÜLL (2009).

³ The preparation and processes of MMP are not formally regulated by law in Germany, however they are implicitly required through German building code (Baugesetzbuch) as the special sectoral transport plan as the basis for land use planning.

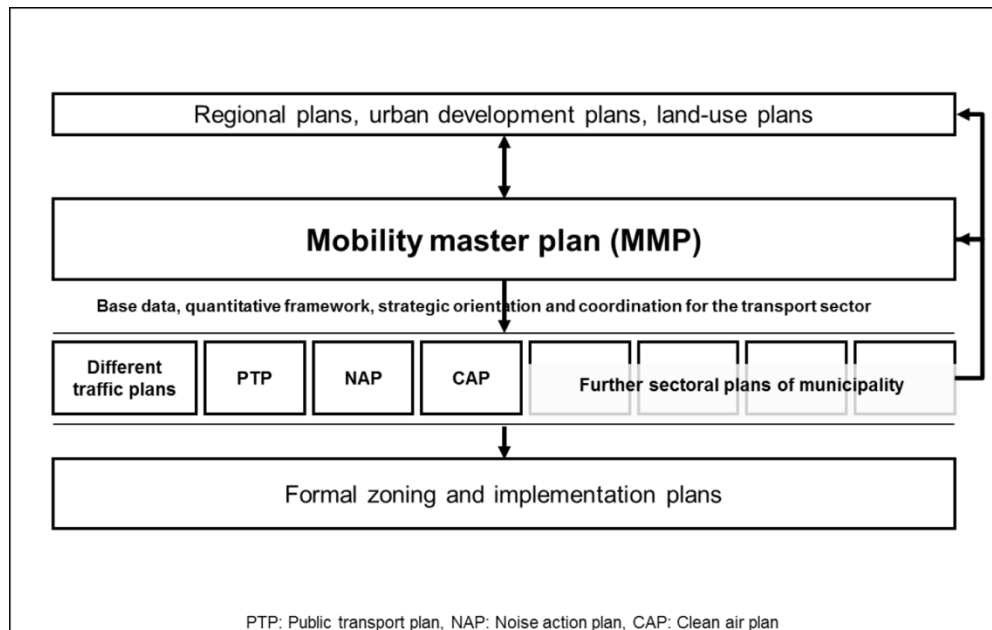


Fig. 2: New strategic integration and coordination requirements in mobility master planning

The introduction in 2005 of the Strategic Environmental Assessment⁴ (SEA) for formal planning processes (such as federal transport planning, spatial and urban land use planning) led to increased consideration of environmental effects during the development of plans and schemes, however, partially in separate and no longer integrated procedures. As a result, it has become more difficult to avoid incongruities between authorities and a relapse into sectoral (transport) planning and isolated processes. Coordinating mobility master planning on the strategic-conceptual level and on the implementation level had to be adapted to these changed conditions. Without questioning the relevance and general importance of clean air plans (CAP) and noise action plans (NAP), transport-related goals, concepts and measures have to be coordinated and strategically incorporated into these new sectoral plans through mobility master planning (cf. Fig. 2).

New challenges, which result in modified objectives, concern the transport sector to a great degree. Attention needs to be paid to, amongst other things, demographic changes, climate change, the globalisation of the world economy, international competition in commercial transport, the increasingly strict demands of environmental and health protection, new individualised mobility services, the minimization of energy and resource use, new vehicle and propulsion technology (electro, hybrid, optimized combustion engines), the changing values in society, an increasing multimodality, re-urbanisation and settlement dispersion with the thinning out of rural areas, segregation, exclusion and computerisation.

In light of this and the associated increased requirements, mobility master planning has to also ensure the coordination and integration of objectives and analyses as well as a unified, strategic orientation and agreement between plans with relevance for mobility and transport⁵. It is especially important to guarantee and improve mobility and accessibility with the least amount of traffic and with fewer negative effects through traffic.

The “Recommendations for Mobility Master Planning” presented here deal with current advancements in procedures, methodologies and content in mobility master planning at municipal and regional level.

⁴ The basis for the implementation of SEA at a national level in Germany is the European SEA Directive. According to the SEA Directive, plans must be subjected to a Strategic Environmental Assessment before being adopted. Germany implemented this directive with the Gesetz über die Umweltverträglichkeitsprüfung (Environmental Impact Assessment Act) (cf. also BMVBS, 2006).

⁵ Mobility means, regardless of transport mode, opportunities for people to participate in daily life, the enabling of their activities as well as guaranteeing processes of exchange. Transport has a supportive function in this case and is the summation of, in general physical changes in location of people, goods, energy, information or data. Location changes take place on transport routes (people, goods) or across wires, pipelines and other networks (goods, energy, information, data). Mobility and transport are therefore two different things and their definitions should be handled accordingly.

The main focus of these recommendations is on:

- Systematic consideration for aspects of integration⁶ (section 3)
- Establishment of mobility master planning as an indispensable, continual municipal and regional task as the basis for further formal plans (section 5)
 - for strategic-conceptual planning of mobility and transport
 - for the preparation of data and the coordinated creation of plans at the implementation level, of Public Transport Plans (PTP), of Clean Air (CAP) and Noise Action Plans (NAP) as well as additional sectoral plans with relevance for transport
 - for aligning municipal and spatial development plans with the strategies and measures of mobility master planning and as such
 - for the guidance of desired changes in the transport system, such as in modal split, trip distances, kilometres travelled and in addition
 - as a framework for holistic quality management in transport with continuous monitoring of results, evaluation and updating of strategies and measures.
- Consideration of conditions specific to the local situation and the resulting technical requirements (section 8) such as
 - differentiated requirements depending on the size of a municipality or region,
 - historical, topographic, location-specific, economic, infrastructural and spatial characteristics as well as
 - elaboration of regional and cross-border MMPs while taking into account different responsibilities
- Description of important tasks and working steps (sections 4, 6 and 7) such as
 - creation, on-going adaption and updating of the strategic-conceptual transport planning and of the action plans, which are relevant to the transport system,
 - creation, on-going adaptation and updating of spatial, sectoral and transport-related sub-concepts,
 - assurance of the compatibility of clean air and noise action planning with the objectives and measures of mobility master planning,
 - integration of mobility master planning into municipal, spatial and site development,
 - regular assessment and preparation of an unified data basis,
 - periodical update of data for current and projected conditions and updating scenarios,
 - on-going analyses of objectives and deficiencies as well as
 - monitoring of results through evaluation of planning processes, measures and quality of operation.

The Recommendations for Mobility Master Planning, in addition to the Manual for Transport Planning, describe the state of the art and science in sustainable, integrative transport planning or mobility master planning as a tool for planning practice. The primary focus is the framework and design of technical, methodological and procedural necessities for integrative planning processes. However, there is also a focus on the interplay between technical responsibilities in preparing decisions and the actual political decision-making. These recommendations were developed in accordance with the “Recommendations on Participation and Cooperation in Transport Planning”⁷.

⁶ A quality of modern mobility master planning is the complete consideration of all relevant aspects of integration, i.e. accounting for goals and requirements from other planning sectors, planning levels, neighbouring planning regions, for all transport modes and purposes, for diverse options of measures, for aspects of time and for the participation of all actors and stakeholders.

⁷ FGSV (2012b).

2 Necessity of mobility master planning

As a result of societal demands and new technical understanding, mobility master planning has been continually advanced over the last decades. The necessity of mobility master planning and other strategic planning areas in the transport field has been documented multiple times by legally binding requirements and constraints which must be considered at all planning levels. The following aspects make this clear:

Mobility master planning makes it possible to derive an implementation plan from a conceptual strategy focused on integrated objectives while considering the interactions between transport and spatial planning.

A special feature of mobility master planning is that it is the only planning to provide consideration for all transport carriers, means of transport and transport purposes. The interactions between measures for various means of transport are determined and evaluated using a system of objectives. The forecast horizon delivers a qualitatively demanding consideration of the future to identify deficiencies and to derive measures to resolve them.

Apart from interactions within the transport system, mobility master planning, as an integrative planning discipline, also takes into consideration the interactions between transport and municipal or regional development. It offers a qualitative basis for incorporation into spatial planning, in particular for zoning plans. Mobility master planning is therefore a part of urban land use planning and, as such, it is in Germany practically a required municipal responsibility.

Potential changes in prevailing conditions require mobility master planning to have a process-oriented focus.

One major shift in prevailing conditions is demographic change. This phenomenon is shaped by the simultaneousness of opposed developments, by growth and shrinking as well as sub- and re-urbanisation processes, which are partially driven by completely different segments of the population in different regions. Changes in age structure imply changes in mobility behaviour and travel demand. Only an integrative comprehensive transport plan can provide the appropriate consideration for such differentiated developments and respond with suitable strategies and measures which also include, amongst other things, pricing policies and mobility management programmes.

Other dynamically evolving conditions can likewise be given the proper consideration by mobility master planning. Examples include the increasing urgency to act on climate change, price increases as a result of finite oil resources as well the effects of globalisation, changing values and further structural changes concerning the economy, settlement structure and travel behaviour.

Mobility master planning coordinates formal and informal planning processes with relevance for transport.

Along with transport-related formal planning, such as urban land use planning, public transport planning, clean air planning and noise action planning, informal plans are also further developed, for example through climate change mitigation and adaptation. All of these planning disciplines generally use their own data and evaluation standards, even transport-related data. For its continually updated data basis for various applications, mobility master planning as a coordination instrument makes it possible to use a uniform data basis for various plans. This avoids the use of non-compatible data from various sources; planning authorities achieve synergies and increases in efficiency. This is also true of other informal plans, such as integrated urban development concepts or sectoral components of urban development plans in areas such as climate, demographics, economy, jobs, green and open spaces.

Public participation processes in mobility master planning improve the chances for achieving consensus-based solutions and increase the acceptance of transport measures.

The changing political and societal demands on the participation of citizens along with an increasing scepticism amongst the public in regards to the findings of expert reports – with their analysis of alternatives and cost-benefit analyses – are increasing the demands on transport planning. Transport projects, in particular large projects, require increasingly transparent planning processes and extensive information, in

order to achieve societal and political approval. The participatory processes established in mobility master planning show that, even while not leading to consensus for all concepts and measures, the mutual understanding between groups with often contrary arguments is usually improved. Ultimately, mobility master planning is therefore a suitable instrument to develop and to express the intentions of transport policy. By means of a participatory process accompanying all stages of a mobility master plan, complex interdependencies and requirements can be recognized early on. The result can be a climate of opinion which increases the acceptance for individual measures derived from the plan. Furthermore, strategies and concepts developed through consensus promote political acceptance for individual measures as well as a continuity of action in transport.

Mobility master planning increases the liability and legal certainty of transport measures.

Mobility master planning, with its continually updated data basis and methods of weighing and balancing, provides an important basis for formal processes in urban land use planning, regional planning and/or planning approval procedures. For mode-specific, singular and individual analyses, it prevents contradictions between assumptions and results, reduces the danger of legal complaints in formal planning practices and therefore leads to more legal certainty.

Mobility master planning is important for federal funding of transport measures.

Government funding of transport measures requires a basis for decisions. This is delivered through mobility master plans which take into consideration numerous interrelations, including those outside of transport, as well as cost efficiency. Statements of intent and project examples of the Commission of the European Union show that financial support for municipal transport programmes depends increasingly on the existence of sustainable transport concepts, called “Sustainable Urban Mobility Plans” (SUMPs) in the Transport White Paper 2050⁸.

Mobility master planning is the central strategic and implementation instrument for the development of an efficient transport system.

Integrative mobility master planning considers the mutually complementary function (multi- and inter-modality) of all modes of transport as well as the effects of transport on other areas. The arguments presented above for the necessity of mobility master planning always also have, in addition to their integrated requirements of spatial planning, a clear relation to costs. Integrative mobility master planning, which is carried out as an on-going task, often makes expensive, error-prone individual analyses unnecessary. Sectoral or ad hoc planning practices each require the time-consuming and expensive extra processes of compiling input data. Considering the limited possibilities for integrating this data into other processes, such planning practices often require subsequent data collection or modifications of implemented measures due to unintended side effects in other areas. They also hide incalculable cost and impact risks. Already the costs of a comparably small (unnecessary or wrongly planned) construction considerably exceed the costs of a mobility master plan. The analysis and evaluation of impacts from all measures alone, along with the agreed order of priorities in a mobility master plan, offer the possibility for ensuring an economical use of funds according to the goals of transport policy while minimizing risks.

Excursus: Sustainable Urban Mobility Plans (SUMPs) as defined by the European Union

The European Commission recommends a stronger focus of planning on the sustainable development of urban mobility. It recommends conducting Sustainable Urban Mobility Plans (SUMPs) as goal-oriented, integrative mobility master plans, developed in a process with feedback loops. Guidelines for SUMPs were published in 2011 for practitioners and decision-makers⁹. Thus MMPs (SUMPs) have the demanding task of describing a process of transformation. An accordingly strong emphasis is put on the process character with the inclusion of important local actors and leaders of opinion in building consensus for attaining sustainable mobility. In this respect, these recommendations point out, amongst other things (see Figure 3):

⁸ See “Excursus: Sustainable Urban Mobility Plans as defined by the European Union” below

⁹ BÜHRMANN/WEFERING/RUPPRECHT (2011). Cf. also WOLFRAM/BÜHRMANN/RUPPRECHT (2009).

- the guidance of transport developments according to defined goals and objectives,
- the use of scenarios,
- an active participation of the public,
- the verification of goal achievement as part of public reporting and
- an integrated catalogue of measures with increasing use of soft measures (mobility management) as well as increasing user financing also through indirect beneficiaries of the transport system and through traffic generating institutions.

This orientation of Sustainable Urban Mobility Plans is a product of the goals of the European Commission which were most recently expressed in the Transport White Paper 2011 (in Section 2.5)¹⁰ as expectations for urban mobility in 2030 and 2050. For example, goals are specified for reducing the number of accidents and, in the context of a post fossil mobility strategy, the goal of completely refraining from “the use of ‘conventionally-fuelled’ cars” in cities by 2050.

Accordingly, the White Paper identifies perspectives and strategies for urban transport that combine land use planning, pricing schemes, public mobility services and, increasingly, infrastructure for non-motorised transport along with possibilities for refuelling or charging environmentally friendly vehicles into an effective, integrated set of measures. As such, a MMP (SUMP) becomes at the same time an instrument for implementing various policies for sustainable development in municipal planning areas.

Cities above a certain size should be urged to develop MMP (SUMP) according to the standards for urban mobility plans recommended in the guidelines and congruent with urban and regional development planning. With respect to urban mobility plans, the EU is seeking to establish procedures (audits) for urban mobility and a European Urban Mobility Scoreboard based on collective development goals.



Fig. 3: Essential elements of the process of sustainable urban mobility planning shown as a cycle¹¹

¹⁰ Cf. COM (2011) as well as COM (2007).

¹¹ BÜHRMANN/WEFERING/RUPPRECHT (2011), p. 13.

The European Commission is therefore providing support for those cities that embrace the principles of urban mobility plans in their own MMP. Beginning with access to the network of cities CIVITAS and continuing with the European Regional Development Fund and the Cohesion Fund, the submission of urban mobility plans and a corresponding certification become eligibility conditions for receiving financial support for mobility development from the European level. Considering the limited public funding available, such mechanisms are intended to increase the cost-effectiveness of financial support for achieving the goals of sustainable development. This has been the case for a long time in several European countries where the development of mobility plans is obligatory at municipal level.

It therefore becomes clear that developing integrated mobility master plans in accordance with the state of knowledge on planning and the goal of transformation in a European context is seen as indispensable.

3 Aspects of integration in mobility master planning

Overview

Mobility master planning should take into account all aspects of integration and at the same time try to keep the complexity of planning and the necessary coordination and information processes as simple as possible. Figure 4 presents a compilation of aspects that outline in principle the demands on integration in modern mobility master planning. At the same time, they are characteristic qualities of good and thoroughly developed mobility master planning and serve as a checklist.

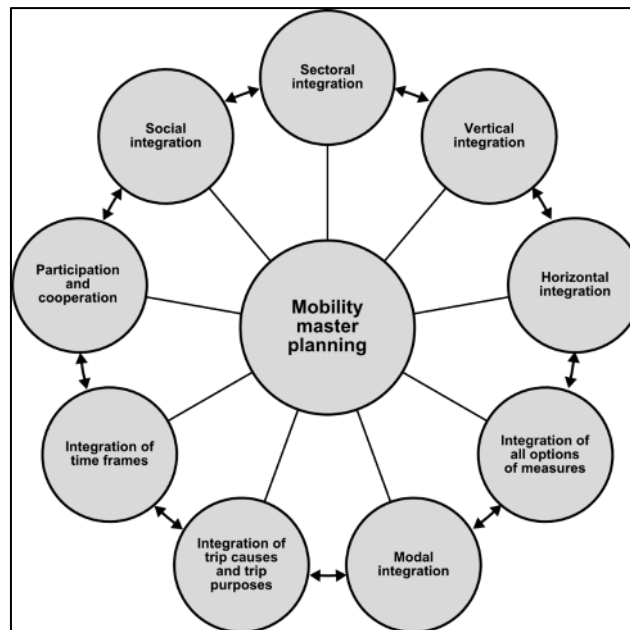


Fig. 4: Aspects of integration in mobility master planning¹²

Sectoral integration¹³

- Strategic consideration, inclusion and coordination of legally required plans, of informal and voluntary plans developed on a regular basis as well as of plans from various concrete projects
- Integration of goals, guidelines and requirements from planning areas with relevance for transport into mobility master planning
- Elaboration of a MMP and its goals as an integrative element of urban planning and development; consideration and coordination of decisions concerning the location of business and residential areas, schools, sports facilities etc.
- Coordination of all goals and measures related to the protection of climate and health with plans for air quality, noise reduction, climate and health protection and energy and resource efficiency
- Consideration of problems and tasks specific to a location and their impact on the transport system, e.g. flood control, demands due to snowfall, regular major events, economic development, resiliency (self-regulation, stability) of transport infrastructure or individual transport systems
- Consideration of conditions from financial and investment planning

¹² Based on BECKMANN/KREITZ (1999).

¹³ Appendix 4 contains a list of selected sectoral and cross-sectional planning areas with relevance for mobility master planning.

Vertical integration

- Consideration for dependencies and interconnections between higher and subordinate planning levels according to the principles of subsidiarity and “counterflow” (such as national transport planning, state and regional transport plans, cf. Figure 5)
- Consideration and implementation of collectively functioning, inter-regional and local planning tools (e.g. state development plan, urban development plan, land use plan)
- Consideration of the regional relations of mobility master planning for example in plans to complete infrastructure and in transport and mobility management

Horizontal integration

- Integration of mobility master planning into city and regional contexts through
 - Consideration of interdependencies, interrelations and goals of neighbouring planning areas, locally predominant forms of collaboration, inter-municipal cooperation through to common plans and concepts for action
 - Seeking mutual agreement with different planning disciplines in neighbouring planning areas

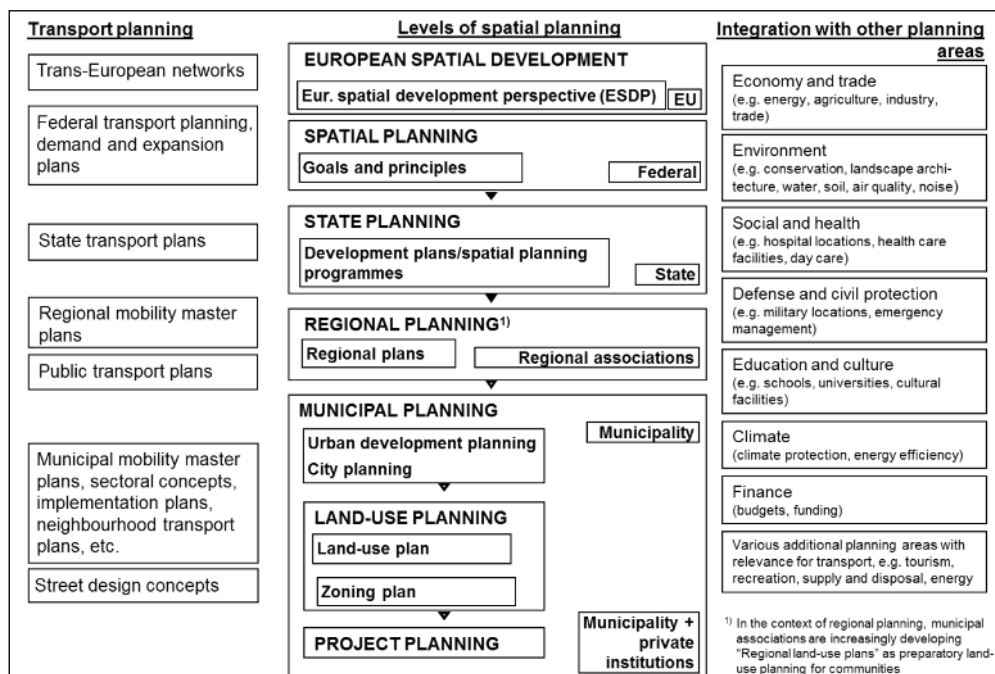


Fig. 5: Levels of spatial planning with the associated transport planning in Germany¹⁴

Integration of all options of measures

- Holistic concepts and measures, including “hard” infrastructure measures, such as the expansion, redesign or new construction of transport infrastructure, along with “soft” measures focusing on transport and mobility management as well as pricing and regulatory policies, organisational, advisory and measures of information and education
- Consideration of development options that focus on existing infrastructure as well as on maintenance, renovation and/or integrated planning of replacement structures or replacement systems
- Consideration of demands on measures for promoting multi- and inter-modal mobility

¹⁴ The integration with other planning areas (right-hand column in the diagram) takes place at all levels of transport and spatial planning.

- Consideration of travel behaviour and the development and promotion of a municipal and regional mobility culture that focuses on mutual respect and the harmonious interaction of all transport users
- Development of a priority and implementation concept that describes, in particular, measures that can be realised quickly, existing interdependencies and cost estimates

Modal integration

- Integration of all individual transport systems (motorised individual transport, public transport, bicycle and pedestrian transport) as well as passenger and goods transport into a whole, complete transport or mobility system
- Definition and recommendation of the strategic framework for the development of individual concepts and measures (usually focused on a short time range such as public transport plans, bicycle plans, park and ride concepts but also other sectoral concepts or concepts for smaller spaces)

Integration of trip causes and trip purposes

- Differentiation of various trip purposes in passenger and goods transport and examination of their causes
- Mutual agreement within planning concerning spatial development and location concepts from a transport perspective
- Consideration of mobility behaviour (differentiated by transport-related, socio-demographic characteristics or categories of goods), demographics, spatial and economic development as well as additional transport-related changes in influencing factors, e.g. development of costs or individual values

Integration of time frames

- Continual or periodic collection and maintenance of data as well as updates of model parameters and elements¹⁵
- Continual quality management and evaluation of working processes and of the impacts of measures (monitoring)
- (Partial) updating of the MMP when significant changes in transport-related, structural, economic or societal conditions or in respect to goals were observed
- Continual or periodic review of the necessity for updating strategies and concepts of the MMP

Participation and cooperation¹⁶

- Extensive, systematic inclusion of politicians, citizens, stakeholders, initiatives, interest groups and institutions as well as planning agencies directly involved in mobility and transport in the respective planning area
- Continual public relations in connection with implementation and updating
- Targeted addressing and continual inclusion of various demographic, ethnic and other social groups in order to ensure their mobility

Social integration

- Securing social participation in activities and public life for all age groups, all ethnic and all other social groups in the population (cf. Section 7.3.2)
- Consideration of gender mainstreaming issues (gender neutrality and equity) and accessibility for disabled people as part of all concepts and measures including their impacts

¹⁵ Cf. Section 7.1.

¹⁶ Cf. Section 6.1 and FGSV (2012b).

4 Process of mobility master planning

4.1 OVERVIEW

The table in Appendix 2 provides an overview of the order and organisation of the working steps for elaborating or updating a mobility master plan and its component plans. They are based on the phases of the transport planning process (fig. 6), which applies to the tasks of the strategic-conceptual level and the level of measures and implementation. On this level the results of the strategic-conceptual level have to be realised and checked in feedback loops.

The key elements of the working steps are summarised in the categories

- What,
- How,
- Why,
- When,
- Leadership,
- Participation,
- Comments.

The table in Appendix 2 is intended as a quick orientation. It refers primarily to the tasks of the strategic-conceptual level. Not all of the presented steps need necessarily to be carried out. Nor does the table claim to be complete. The process of mobility master planning depends, amongst other things, on the particular problem to be solved, the state of local planning, political tasks, the initial reasons for elaborating or updating the mobility master plan, the size of the planning area (small town, large city, part of a region, region as a whole), the available data and the desired level of specificity.

The individual working steps, including those of the level of measures and implementation, are grouped into the main phases

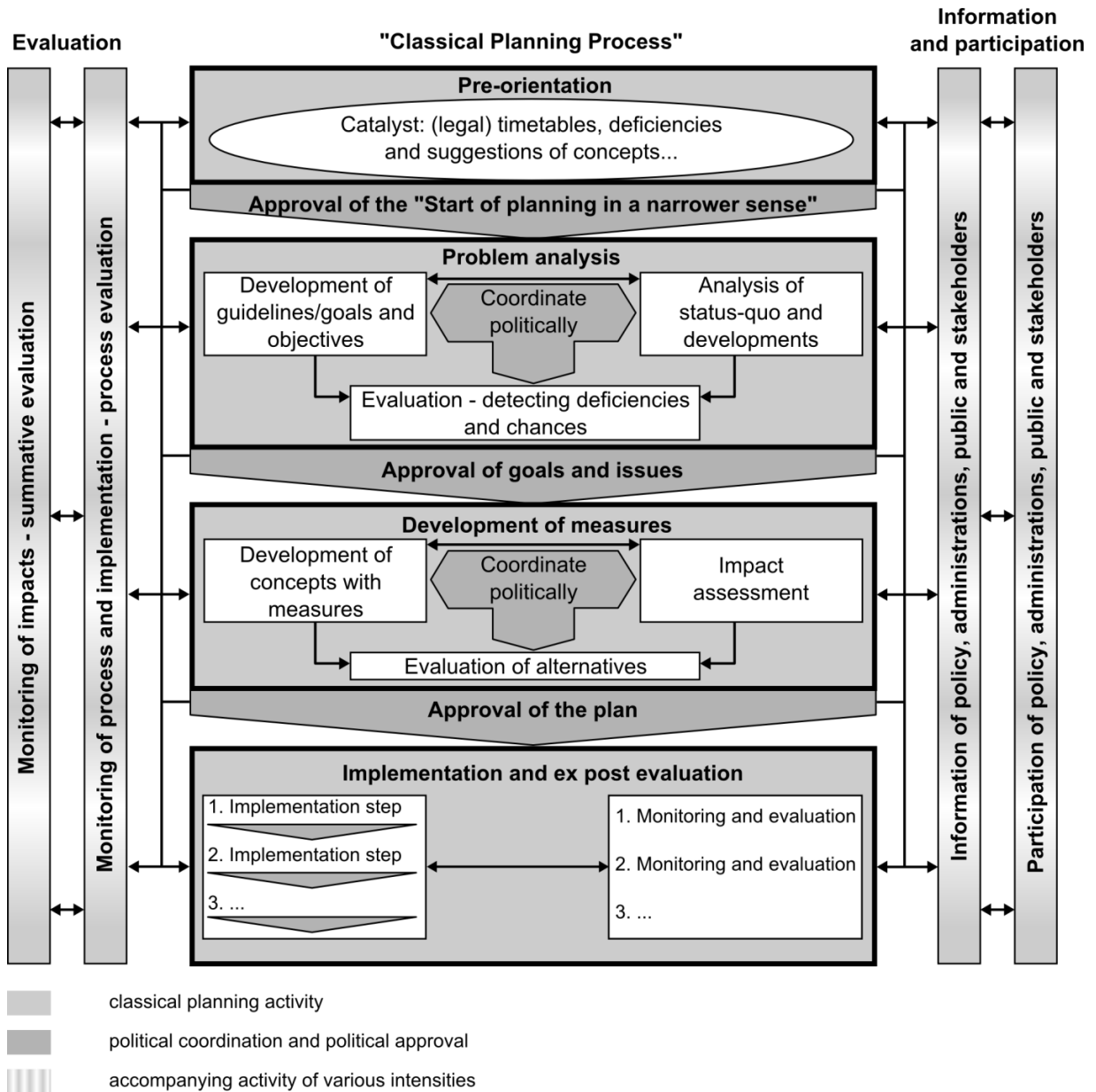
- Pre-orientation,
- Problem analysis and definition of goals and objectives,
- Development of measures with weighing of pros and cons and decision making as well as
- Implementation and monitoring (ex-post evaluation)

in accordance with the classical process of goal-oriented transport planning, as described in the “Leitfaden für Verkehrsplanungen” (Manual for Transport Planning)¹⁷. This is shown in Figure 6 and is based on the classical planning process in five phases. In addition, the political coordination and political decision-making elements of the four main phases are highlighted. Furthermore, accompanying activities are emphasised. These include information dissemination and participation as well as continual evaluation and monitoring on the basis of continuously updated data.

4.2 PRE-ORIENTATION PHASE

In the pre-orientation phase, the task of those responsible for transport planning at the planning authority is to pre-structure the process. In order to give the entire planning process a reliable foundation, and thereby secure the required personnel and financial resources, the legitimacy should be made binding in this phase by obtaining the approval of the appropriate political decision-making body regarding the “Start of planning in a narrower sense” (cf. Figure 6). This presupposes an initial, rough estimate of the costs and necessary time frame as well as a preliminary justification of the activities.

¹⁷ Cf. FGSV (2001), p. 13.



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Fig. 6: Transport planning process¹⁸

¹⁸ HOLZ-RAU (unpubl.) based on FGSV (2001), p. 13.

After legitimising the project, its structure and responsibilities must be refined and specified in more detail. This also includes a coordinated participation concept for integrating planning authorities, political decision makers and the public¹⁹. Due to the increased importance of participation and for reasons of legitimacy, it is advisable to allow policy makers to decide on the essential features of the participatory process as well as the institutions that will be involved in committees accompanying the project (such as project advisory board, regional advisory council, citizen forums, roundtables, scientific advisory council). Such decisions are also useful even in planning areas where mobility master planning has already been established as a continual process and where it is only revised on a regular basis.

While the planning area is generally based upon administrative boundaries, within which the political decision-making body has authority, the study region must be defined considerably larger due to the interconnections of transport processes (cf. example in Figure 7). Decisions regarding content as well as organisational and procedural aspects of the working process are to be prepared. In addition, it must be determined whether the tasks and given conditions require the use of computer-aided transport models or which models seem appropriate for answering the given questions and whether or not they are available (cf. in this respect Section 7.2). Where institutionalized regions exist, the individual communities have the opportunity to strive for a joint mobility master planning with a corresponding enlargement of the planning area and study region.

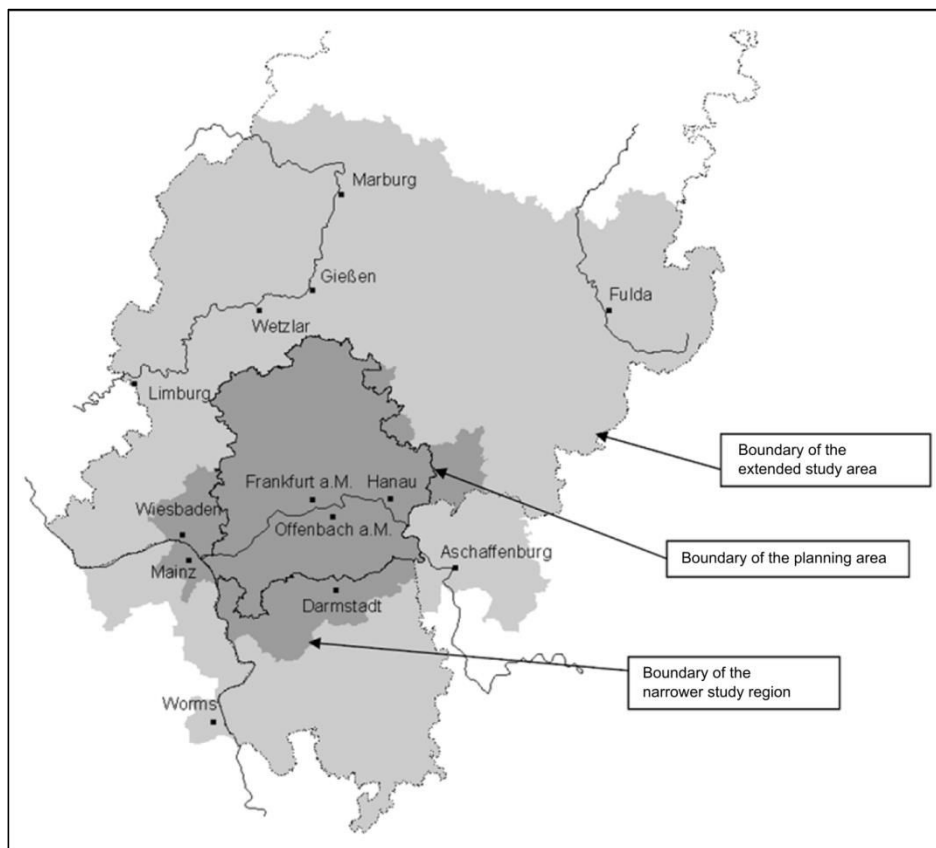


Fig. 7: Example of the planning area²⁰ and study region²¹ of the Regional Authority FrankfurtRheinMain

¹⁹ Cf. FGSV (2012b).

²⁰ The planning area encompasses the area of the Regional Authority FrankfurtRheinMain, specifically the area covered under the regional land use plan, including the transport tasks that had to be dealt with.

²¹ Within the narrower study region, relatively detailed (at the neighbourhood or block level) structural and other data (e.g. on network and travel supply) are made available. In the extended study area, data are provided in more aggregated units (for municipalities or parts of counties) or in simplified form. The narrower study region extends beyond the planning area's boundaries where there are particularly pronounced transport and structural interrelations.

4.3 PROBLEM ANALYSIS AND GOAL DEFINITION PHASE

In the problem analysis phase, at the latest, it must be decided to what extent the planning authority itself has the capacity to carry out all stages of the process, to which extent contracts will have to be given to external consultants and in which working steps, in what form and to which degree other administrative areas, policy makers and the public are to be included. In every case, the work programmes must be put into more concrete terms. For the awarding of contracts it is further necessary to prepare the contract documents or tender notice that serve as the basis for the submission of offers and the awarding of the tasks to the most eligible consultant.

Based on analyses of the current situation as well as the orientation of policy and planning experts, the problem analysis phase covers in particular the articulation and political adoption of integrative, transport-related ideals and goals. They determine significantly the strategy of mobility master planning. During the working process, sets of objectives with multiple criteria are derived out of the ideals and goals and aligned with the goals and objectives of (in part legally binding) planning documents from other areas (e.g. from land use, urban development or noise action planning). In general, the aim should be to achieve the greatest possible congruency between the goals of these plans and those of the MMP. These sets of objectives are, in turn, the basis for defining quantitative and qualitative evaluation criteria and indicators with which the effects of the current situation (status quo analysis) as well as those of projected situations and measures that have to be evaluated and compared²².

During problem analysis, findings from the analysis period are used to complete the following main tasks:

- status quo analysis
- definition of goals
- determination of quality profiles for the current situation with particular consideration of deficiencies to be remedied, of opportunities that arise and of existing risks.

In this phase of the process, any previous planning documents (mobility master plan, general transport plan etc.) are to be evaluated and compared. This concerns the goals, suggested strategies and recommended measures of the existing plans, in particular with respect to a comprehensive impact assessment or evaluation.

It is thereby useful to operationalise the working steps in such a way as to enable the continual necessary assessments of the current situation, scenarios and future cases using consistent and comparable qualitative and quantitative methods (quality management, monitoring).

The qualitative analysis and assessments resulting from the problem analysis (and, later, for sets of measures) leads to an “impact profile”. The goals must be converted into target criteria of the set of objectives. Comparing the impacts with the corresponding targets leads to a profile of qualities, which directly shows all obvious deficiencies (impacts worse than target values).

Different qualitative and quantitative methods are available for carrying out the comparative impact analyses and assessments that serve as the basis for political decisions. The selected methods should contain “compatibility analyses”. These have to display the quality structures of the situations to be compared and evaluated in a transparent and understandable manner, so that the results can be discussed.

For this purpose it is necessary to look at various situations or future cases. The status quo analysis represents the baseline situation, for which land use data, socio-demographic data as well as data of transport networks and travel supply with traffic volumes of the base year are used as input. An **appropriate base year** would be the most recent year, for which the necessary data are either already available in full or for which they are able to be derived.

The impacts of different developments can be presented using the form of the status quo analysis. The evaluation of different scenarios and future cases requires a consistent reference case (often referred to as zero scenario (with no measures) or trend scenario). Included in this reference case can be developments with a high probability of occurrence such as expected changes in spatial structure and socio-demographic changes until the year of the selected planning horizon. In the reference case, so-called “secure” measures dealing with transport infrastructure or travel supply are often assumed to have been realised. “Secure”, or

²² Cf. FGSV (2010).

non-negotiable, measures are defined as measures for which the legally required political decisions, financing and/or contracts are considered “secure” during development of the mobility master plan and therefore very likely to be implemented.

When deriving the reference case, it is helpful to analyse the impacts of different developments during various intermediate stages. For example, it can be useful to initially consider only external influences such as socio-demographic and economic developments in a so-called baseline scenario (cf. Section 4.4), since the assumptions of the non-negotiable impacts and changes can greatly influence travel patterns. When developing alternative scenarios, additional transport infrastructure or travel supply measures can then be added to the reference case, whereby different combinations of planned measures can be used to analyse several future cases or scenarios simultaneously.

When comparing the effectiveness and benefits of measures with the reference case, only systematic and compatible processes of comparison and evaluation in the problem analysis phase as well as during the development of measures allow

- the general vision and system of goals to be derived in an appropriate and measurable manner and
- an objective comparison of the impacts of measures to be achieved.

Without specifying criteria to evaluate the achievement of objectives, a transparent comparison of supply, demand and impacts as well as the level of goal achievement would not be possible.

4.4 MEASURE DEVELOPMENT AND SCENARIO PHASE

In general, comparing different scenarios and sets of measures serves as the basis for developing strategies and measures. Possible developments are evaluated in a comparative and compatible manner. Some of these developments cannot be influenced while others can be influenced through measures.

In order to take into consideration future developments of factors influencing mobility and traffic (such as spatial, population, economic and pricing structures as well as travel behaviour), it is first necessary (normally already during the problem analysis phase) to derive so-called baseline scenarios for demographic and economic development. Travel behaviour is increasingly determined by changing attitudes and values, which can hardly be influenced by changes in spatial structure or travel supply. Possible development tendencies in this area should likewise be analysed using scenarios.

Due to the amount of resources necessary, most mobility master plans choose just one of the baseline scenarios. With the key developments and results from the selected baseline scenario, the reference case (trend scenario) and the scenarios of measures or future cases can be developed and, with respect to their impacts, analysed and evaluated.

Since external developments (such as demography, economy and price structures) can be expressed as a range of values, this must be made clear, considered and discussed, at least qualitatively, in order to develop strategies and measures that are as robust as possible.

The developed measures and scenarios should describe the impacts of different policy directions and in doing so strengthen the systems knowledge of those participating in the planning process. The scenarios are determined, on the one hand, by visions and goals as the framework for planning activities. On the other hand, they are also determined by the deficiencies and opportunities that have been identified in the problem analysis.

It can, however, also be useful to analyse scenarios that are purposefully one-sided and do not necessarily fit with the goals (e.g. only an expansion of the road network or improvements only in public transport and/or non-motorised transport modes) in order to clearly show these impacts, as well, and to use these outcomes for better argumentation.

In this way, not only can the complete range of potential impacts be determined, but the associated risks can be shown, as well. This can provide essential insight and lead to higher acceptance for the selected strategies and measures. It also promotes the development of integrated, multi-modal strategies and measures.

Such an approach is a systematic analysis and variation of potential future situations that form the basis for developing robust strategies and measures for an uncertain future that can be expected within a certain range. It allows the strategies and measures of the MMP to be selected and recommended in a justifiable manner.

After the strategies and sets of measures are developed and selected for the MMP based on impact assessment and scenario evaluations, it is recommended that additional analyses be carried out in order to examine the elasticity and robustness of the action plan. The analyses are carried out using adjusted structural data where the values have been set higher and lower. In this way information can be won regarding the stability of the selected strategies and sets of measures. This allows an evaluation of the complete range of transport-related impacts resulting from the action plan or from large major projects, also if developments in external conditions change.

It therefore becomes clear that the transport system is no longer adapted to fit demand merely on the basis of a single forecast as it was done in the past with demand-oriented conventional transport planning. Instead, strategies and measures for achieving goals and influencing demand in a desired direction are used. In the process, the analysis of several scenarios and future cases serves to provide insight into which strategies and measures can support desired, goal-oriented developments and prevent unwanted developments.

For less extensive mobility master plans – e.g. in small municipalities or small, easy to manage areas – the use of computer-aided transport models is often not (necessarily) required or not affordable. However in principle the approach is also similar here and scenarios can be described for alternative visions of the future.

In place of the model, verbal and qualitative argumentation is used, which presents appropriate outcomes using reasoning by analogy, values based on experience along with hand-calculated or computer-aided analyses of individual cases.

4.5 WEIGHING OPTIONS AND DECISION-MAKING PHASE

In the fourth phase of elaborating or updating a mobility master plan, the available findings, impact assessments and their evaluation serve as the foundation for comparing coherent strategy and framework plans as well as implementation plans and for developing and selecting an appropriate action plan. This includes the task of presenting the associated figures and facts of the impacts. Variations in political assessment and weighting can likewise be clearly illustrated using an evaluation with the variation of values. In the end, selecting and adopting a MMP is a decision of the responsible political body. The working steps necessary for this are generally carried out as part of an iterative process, which can encompass the use of current findings to modify sets of measures or future planning cases, estimates of their impacts and the final evaluation of the elaborated action plans.

Part of the outcome of mobility master planning is also the development of implementation strategies. These include cost estimates, financing opportunities and the time frame for implementation along with the specification of priority levels. This results in financing plans and the preparation of the necessary political decisions leading to the legally required plan approval for individual measures or for securing the necessary land area.

The cooperatively elaborated draft of the MMP should be presented to and debated upon by all stakeholders, individuals/institutions affected and the public before being advised upon in the political decision-making bodies. This is important for securing the necessary acceptance for the realisation of suggested measures. However, it needs to be made clear to all participants in the planning process that, in a representative democracy, helping in preparing decision-making cannot replace the actual decision of those legitimized. Nevertheless, the discussions with stakeholders, political decision makers and the public can and should be conducted openly in respect to the results. Only after the public has been informed and has discussed the recommended strategies and measures should the MMP be submitted to the responsible political decision-making body for final consultation and adoption.

4.6 IMPLEMENTATION AND MONITORING PHASE

The fifth phase of the mobility master planning process is the step-by-step implementation of the adopted strategies and measures of the mobility master plan. The implementation phase often begins with the realisation of uncontroversial, immediate measures that are easy to finance and for which the legal planning

framework (e.g., land use plan, required plan approvals) and financial security (funding applications, budget bill) are quickly established. However, this requires creating the necessary organisational conditions²³.

After implementing measures or packages of measures in the individual implementation steps, an evaluation of the impacts (e.g. before and after studies) need to be carried out (cf. Section 6.3).

Likewise, a continuous process of regular monitoring and updating is essential for the successful implementation of the mobility master plan. In order to ensure continuity it is recommended that those experts who were active in the problem analysis and the development of measures be involved (at least in an advisory role) in the implementation²⁴.

The necessary data basis concerning transport and planning has to be continually or periodically updated (cf. Section 7.1) for the purposes of formal planning procedures, impact assessment and monitoring, a review of the necessity for updating plans and, as such, for the general purposes of quality management in transport planning (cf. Section 6.3). In addition, the data for the reference case and the scenario containing the anticipated measures have to be kept up to date and made available in a uniform way for all planning areas with relevance for transport (land use plans, required plan approvals, construction and reconstruction plans, public transport plans, noise action plans, clean air plans).

This forms the foundation for the continuous or periodic review of the adopted strategies and resulting packages of measures as well as goals as part of the quality management or monitoring process²⁵. If it becomes clear that surrounding conditions have changed significantly, so that the impacts of strategies or measures are different than expected or the selected goals are unattainable or can only be achieved with difficulty, then the measures need to be reviewed and/or the goals need to be adjusted. In this case it may be necessary to redefine or adapt the goals and conduct new analyses (Figure 8).

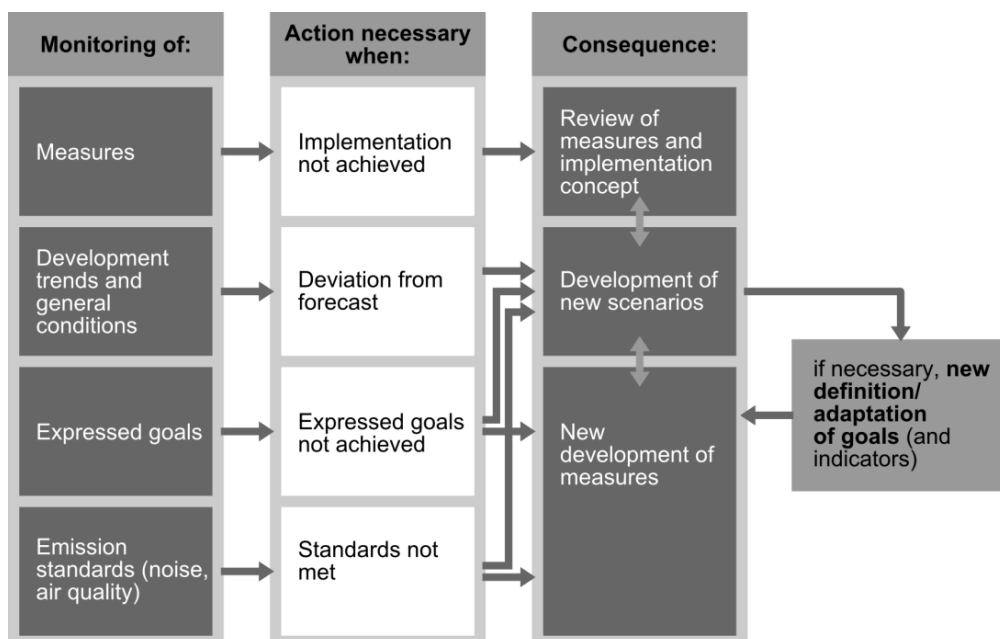


Fig. 8: Check list as part of MMP monitoring²⁶

²³ Cf. FGSV (2001), p. 20 f. and 49 ff.

²⁴ Cf. FGSV (2001), p. 20.

²⁵ Cf. MENTZ (2012) and WITTIG (2012).

²⁶ Modified diagram based on GERTZ/STREICH (2006), p. 145.

The findings from monitoring and evaluation should be submitted to the political decision-making body and the public at least every two years to prevent undesirable developments in advance by altering strategies or measures and, in particular, to reinforce positive developments through modified, supporting measures.

A comprehensive evaluation of the transport system, and thus a review of the necessity for updating strategies and measures, should be carried out at least every five years or whenever there are changes in the surrounding circumstances, e.g. at the beginning of a legislative period with new political majorities.

A comparatively large amount of resources is necessary for a complete review and update of the mobility master plan. For cost reasons, it is therefore generally desirable to carry out the comprehensive, strategic-conceptual planning in larger intervals. This seems reasonable when the mobility master planning process is understood as a continual task conducted in detail with on-going or periodic adjustment. In this way, it can be shown whether the need to update the planning exists and where corrections are necessary.

5 Differentiating the strategic-conceptual level and the implementation level

5.1 INITIAL SITUATION

Long, drawn out planning processes with little transparency no longer meet the expectations of political decision-makers or the public. As a result, the new challenges mentioned in the introduction and the associated, increasingly dynamic planning conditions lead to changing and increasing demands on mobility master planning. These new demands and limited financial resources for transport infrastructure require a new way of thinking about the focus of mobility master planning. Planning must in particular function more strongly and be applied as an efficiency-link between public revenues and expenditures in the transport sector.

Mobility master planning has traditionally been carried out within a wide spectrum with differing focal points. In some municipalities and regions, the strategic-conceptual orientation has been well developed while in others, the work on developing measures and on their implementation had more significance. Both levels are important and necessary. In large planning areas, the strategic-conceptual level is naturally given more consideration than in small municipalities. Figure 9 attempts to illustrate the fact that the level of importance and amount of resources required of the strategic-conceptual level is greater in large cities and regions than in small towns. Examples of the individual tasks and outcomes are listed in the trapezoid for each level.

The following aspects and conditions are thereby decisive in defining the quality, content and scope of mobility master planning:

- Planning resources: Continuing reductions in personnel and planning budgets require more effective action than before.
- Public participation: Increasing demands for cooperation, communication and participatory processes require more personnel and competency for guiding these processes.
- Legal certainty for planning: Justifying and evaluating planning measures so that they would hold up in a court of law require current and consistent data and, on the basis of that data, uniform, demand and cost calculations that also consider the effects on other modes.
- From planning to process: Increasing demands require that planning processes be developed further towards a continual, strategic-conceptual integrated transport planning.

At the same time, elaborating and implementing mobility master plans and transport planning related concepts is becoming more complex, demanding and time-intensive.

Considering this initial situation, a rational, useful and efficient work scheme and organisational structure is recommended and explained in detail below.

5.2 LEVELS OF MOBILITY MASTER PLANNING

In order to fulfil its role as a central instrument in transport planning, it is useful for practical and economic reasons to differentiate mobility master planning into

- the strategic-conceptual level and
- the implementation level (cf. Figure 10).

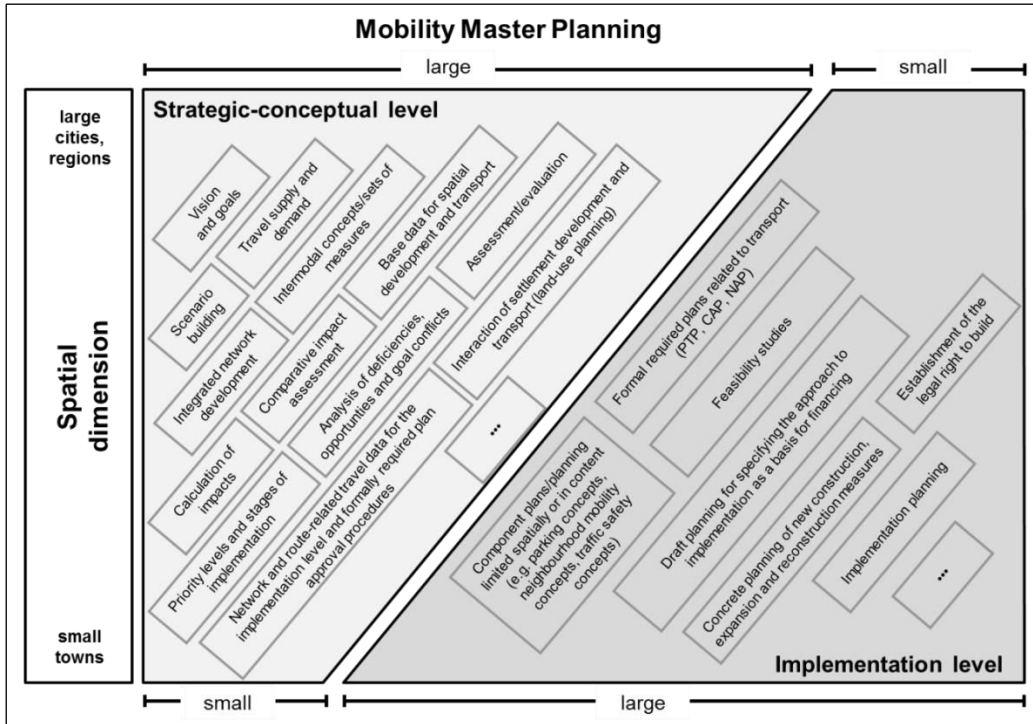
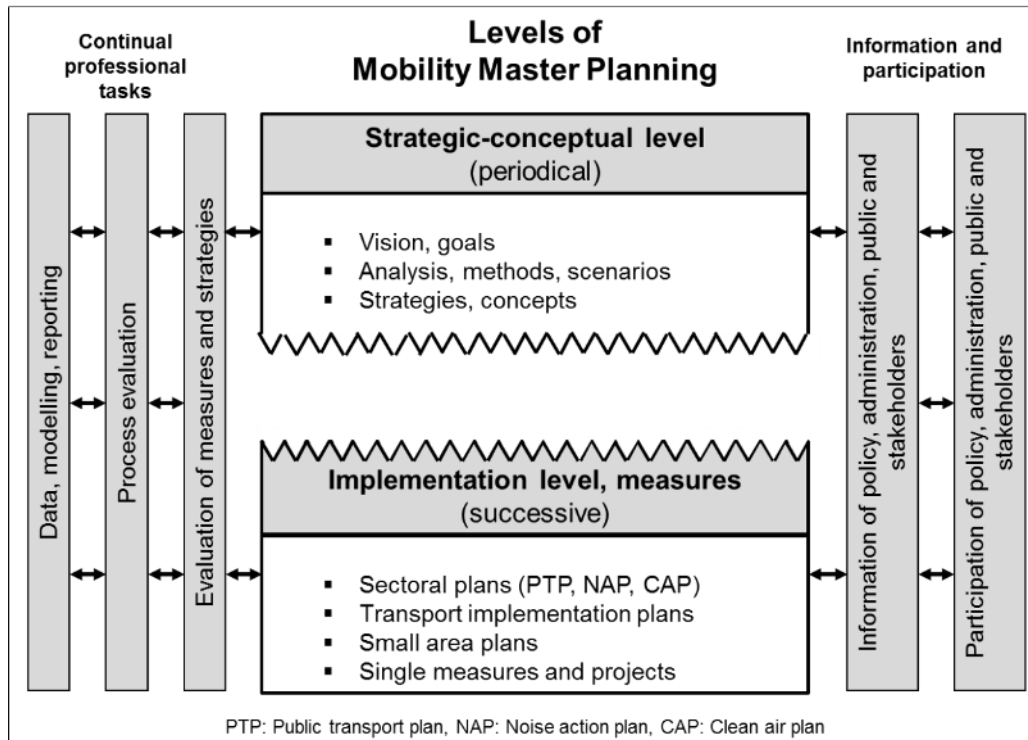


Fig. 9: Weight of strategic-conceptual level and implementation level in small and large planning areas



PTP: Public transport plan, NAP: Noise action plan, CAP: Clean air plan

Fig. 10: Levels of mobility master planning

Both levels are closely linked. The line dividing the levels is fluid and depends on the local situation. Continual tasks serve to inform and accompany the levels.

Differentiating the two levels follows, in particular, the objectives of

- establishing mobility master planning as a continual process and working towards sets of outcomes in order to adapt the quality of planning to current societal demands by setting respective priorities,
- planning not only long-term and strategically but also implementation-driven,
- implementing only those measures which are compatible with the goals and action plans of the strategic-conceptual level by continually reincorporating the outcomes of both levels,
- providing a uniform data basis for all transport related planning documents and formal plans such as urban land use plans, plan approval procedures, public transport plans (PTP), noise action plans (NAP) and clean air plans (CAP) as well as
- coordinating and incorporating other plans.

The permanent process of mobility master planning on two levels supports a continually updated planning basis and sets of outcomes along with periodically updated strategies and concepts. This differentiates and provides a system for the MMPs of the past, which were extensive and elaborated in large time intervals.

This form of continuous mobility master planning has to be embedded in the planning authority in such a way as to make it administratively and materially possible to constantly update the basic information and bring about the necessary decisions for transport planning.

The division between the strategic-conceptual level and the implementation level depends on the problems to be analysed, the size of the city and the administrative structure. Measures are also developed, and their impacts analysed and evaluated, at the strategic-conceptual level in order to devise strategic action plans. The difference between this and the implementation level is the degree of detail. At the strategic-conceptual level, the focus is on the interplay between measures, the effects on other sets of goals and the impacts on all modes of transport. At the implementation level, the realisation of measures is described in detail, however, a multi-modal estimate of the impacts is not carried out anew. Concrete questions regarding realisation, such as construction, legal framework, financing and political implementation including their possible variations, are the focus of the implementation level.

The fact that the line separating the two levels can be fluid is explained in an example:

The question of the organisation of parking is traditionally divided into two parts. At the strategic-conceptual level, a general strategy can be developed for managing parking and handling the required land area. In addition, areas of the city could be specified in which an in-depth analysis of the parking situation is advisable. However the actual parking study in a neighbourhood or district is a task of the implementation level. In some cases this might require a detailed survey effort and differentiated implementation planning with comprehensive public participation and political discussions at local level.

5.3 CONTENT OF THE STRATEGIC-CONCEPTUAL LEVEL

The strategic-conceptual level functions as a foundation for the implementation level by providing, amongst other things, periodically updated strategies, concepts and goals as well as data and parameters for travel demand on a continual basis. Mobility master planning therefore becomes a continuous, rolling system. This does not necessarily need to be associated with the use of transport models, in particular in small cities. However, for situations with relations across administrative boundaries, it is advisable for municipalities and regions to collaborate in close coordination with land use and regional planning in order to secure an exchange of data and planning information.

It is useful to publicly discuss in regular time intervals the necessity of updating the strategic-conceptual part of the mobility master plan and, in some cases, to adopt a political resolution (cf. 4.6). Only in this way can a binding, up-to-date foundation be provided for the strategic-conceptual orientation of transport planning and, as such, for transport policy, in general.

Elaborating a MMP at the strategic-conceptual level is mainly characterised by

- the clarification of conflicting uses and demands as well as the development of sets of goals that are as compatible as possible,
- transport network development and action concepts for the entire planning area and all transport modes and their interrelations (use of a range of integrated “hard” and “soft” measures, cf. Section 3),

- the development of packages of measures and multi-stage action concepts, for which intermodal impacts are analysed with a model, compared and evaluated with respect to goal achievement.

The continual tasks of the strategic-conceptual level include:

- analysis and forecasts of the data basis for spatial development and transport with particular consideration for providing network and link-specific transport data for the implementation level as well as for formal procedures (land use plans, plan approval procedures, public transport plans, noise action plans and clean air plans),
- analysis of current and future deficiencies, quality improvements (opportunities) and conflicting goals,
- impact evaluation for measures, e.g. using a transport model with respect to parameters such as number of trips per day, kilometres travelled, mode choice,
- continual evaluation, control and monitoring with feedback loops to outcomes of the implementation level as well as to construction and operation,
- continual adaptation and required reporting with respect to political committees and the public,

The periodic tasks of the strategic-conceptual level include:

- definition, review and where necessary adjustment of integrated ideals, sets of goals and objectives,
- clarification of cause-and-effect relationships with criteria from several sets of goals
- feedback and updating due to changed conditions and new constraints for the implementation of measures, the necessary specification of strategies and feedback loops to existing plans such as the land use plan (LUP), noise action plan (NAP) and clean air plan (CAP),
- analysis of travel supply and demand for all transport modes for the area of study based on forecasts and scenarios,
- comparative impact analysis for scenarios with differing conditions for future development of transport and spatial structures as well as differing packages of measures, plans of action or future planning cases,
- elaboration of priority rankings and implementation stages for action plans, since a measure's effect depend to a significant degree on the order and point in time of implementation as well as on its effects within the network.

In principle, strategic-conceptual considerations have a long-term orientation. Continual monitoring and impact analyses with updated data are a prerequisite for – if necessary also short-term – reviewing or readjusting of strategies and action plans.

As long as the continual tasks are accomplished and data is kept current, the process of periodically updating the strategic-conceptual portion of mobility master planning can be carried out in a relatively concentrated time period of less than two years, including all preliminary considerations, participatory processes and committee decisions.

The lead party responsible for these tasks is the planning authority. It should form an internal working group that organises the process, provides an initial review of general principles and goals and updates these where necessary.

The procedural steps involved in updating the strategic-conceptual level of mobility master planning are further explained in Section 4 and Appendix 2.

The following issues, amongst others, have to be clarified at the beginning of the periodic tasks of the strategic-conceptual level:

- Which constraints and developments have changed to such an extent that principles and goals are outdated, new deficiencies have resulted or new strategies and measures have to be developed?
- What are current and future transport problems and is it advisable to analyse these at the strategic-conceptual level?
- Which of the available concepts have to be reviewed and where necessary to be adapted?
- Which topics have to primarily be addressed?

- Which transport issues are of concern to political decision-makers?
- What can be accomplished in which time frame?

The passing of a current resolution through the political decision makers can simplify administrative actions, in particular in regard to the implementation of measures and cooperation between administration and policy makers. Confidence in this cooperation increases if a basic consensus on ideals, principles, sets of goals, objectives, strategies and essential measures is achieved or reaffirmed by a renewed resolution and agreement. In addition, transport-related objectives from the policy programmes of decision makers can be aligned with objectives and action plans of the strategic-conceptual level. This is always the case for changed or new political majorities.

5.4 CONTENT OF THE IMPLEMENTATION LEVEL

On the implementation level, the individual plans for implementing measures, such as a bicycle concept, commercial transport concept, parking concept and neighbourhood transport concepts, are elaborated and the ideas of the strategic-conceptual level are put into more concrete terms. Measures are prepared in general for realisation. The implementation level covers the analysis of technical, financial, legal and organisational influences. More detailed data collection may likewise be necessary. A characteristic part of the implementation level is the preparation of policy decisions at municipal level for the realisation of measures as well for securing financing for measures in medium-term financial and budgetary planning.

Outcomes of the implementation level have to be evaluated for compatibility with the action plans of the strategic-conceptual level before passing a political resolution. The main questions of the evaluation are:

- Are the goals of the strategic-conceptual level able to be achieved with the specific measure?
- Do cost-benefit aspects of a measure allow it to be further pursued?
- Is the measure able to be financed?

Other formal plans with relevance for transport (PTP, NAP, CAP) already contain specific goals and guidelines of quasi-legal status which need to be considered in mobility master planning, including at the implementation level. They cannot replace the MMP since they do not have many of its elementary features (such as analyses for all modes of transport, cf. Section 2).

Along with measures from formal sectoral plans, the implementation level also includes plans and programmes directly related to implementation:

- measures for specific target groups or facilities,
- traffic safety programmes,
- programmes for commercial traffic and concepts for directing heavy goods vehicles,
- programmes for promoting shorter non-motorized trips and for improvement of nearby opportunities,
- plans for promoting bicycling,
- measures for influencing generated trips and mode choice,
- measures for managing traffic flow,
- inter and multi-modal programmes such as P+R, B+R, public bicycle renting and car sharing concepts,
- parking concepts,
- desired networks of barrier-free connections,
- neighbourhood mobility concepts.

Finally, plans for reconstruction and concrete, individual measures are also part of the implementation level:

- redesign of route segments for public transport,
- redesign of arterials and collector roads,
- redesign of streetscapes and plazas.

Lastly, the implementation level can contain

- sectoral spatial plans such as urban land use plans and public infrastructure plans,
- transport concepts for special urban development areas or special large major projects and
- in depth analyses such as feasibility studies for measures.

The focal points of the measures are ideally already specified in the action plans of the strategic-conceptual level.

Plans and measures of the implementation level differ therefore from the strategic-conceptual level in particular in the following points:

- Time frame: Implementation planning has a beginning and ends when the measure goes into realisation.
- Degree of detail: The implementation level has a finer degree of detail.
- Feasibility: The implementation level is specifically concerned with a prompt realisation.
- Outcome: The implementation level leads to concrete changes that are felt by transport users.

A planning process with an increasing level of specificity allows policy makers and administration to avoid making isolated, individual decisions at the implementation level with undesired side effects. This is achieved through strategic commitment, continual coordination and consistency between sectoral component plans and measures.

Measures and their realisation must likewise be subject to continual monitoring and impact analyses.

An obligatory reporting system for political decision makers and the public about the current state of realisation at the implementation level along with the state of transport infrastructure can be an essential basis for updating mobility master planning and for its continuity at the strategic-conceptual level.

5.5 ORGANISATION OF THE INTERACTION BETWEEN THE STRATEGIC-CONCEPTUAL LEVEL AND THE IMPLEMENTATION LEVEL

Important elements of successful mobility master planning on these two levels are cooperation and interdisciplinary collaboration. In order to make these possible and to minimize potential conflicts in everyday planning situations, the planning leadership for both levels of mobility master planning should be in one hand. An administrative organisation, however, can only provide the framework. The cooperative and coordinated completion of tasks at both levels depends substantially on local planning culture and practises as well as on the engagement and readiness to cooperate of the individuals responsible.

It should be avoided that the strategic-conceptual level is unable to coordinate and control the elaboration of plans and projects at the implementation level so that the achievement of goals is not attempted consequently enough. Cooperation and control of decisions can ensure the compatibility of both levels. Corresponding cooperation also includes self-limiting at the strategic-conceptual level regarding the number and scope of specifications and assignments that are passed on to the implementation level. By concentrating on the essentials and achieving the greatest benefit with limited resources, planning at the implementation level must lead to outcomes that are usable and realisable within the cycle of updating the strategic-conceptual level.

In so doing, it must be ensured that interactions between sectoral concepts at the implementation level are recognised and evaluated. Side effects that are counterproductive from an integrative, holistic viewpoint can therefore be discussed and minimised. If it becomes clear at the implementation level that the requirements of the strategic-conceptual level are not able to be met, the strategic-conceptual level of mobility master planning needs to be re-evaluated and adapted (cf. Figure 8). This can be the case if a measure is not able to be implemented, e.g. due to it being uneconomical or unable to be financed or because it does not receive a political majority, details cannot technically be resolved or the regulatory framework has changed.

Overall, success is determined to a significant degree by the consistency between both planning levels. The desired quality of the transport planning process as well as in the actual transport system can only be achieved, if both levels ensure feedback loops to the other level.

6 Additional guidance on the process, procedures and organisation of mobility master planning

6.1 INFORMATION, PARTICIPATION AND COOPERATION

“Societal decision-making processes are characterised just as much by identifying interests and those affected as they are by balancing interests and building consensus. It is therefore necessary to carry out the process of transport planning in an interactive and participatory manner. The ability to achieve consensus surrounding the outcomes of transport planning is increased by gaining acceptance early on, considering representatives of various interests and recognising transport planning as a social and political process. This also decreases opposition during the phases of deciding on and implementing measures. Information campaigns, public participation and public relations are therefore very important elements of the process organisation. They serve to accelerate process procedures and to improve suggested measures.”²⁷

Information and participation along with an intense, internal cooperation within the administration are therefore essential elements of mobility master planning. For this reason it is recommended that the participation of all other disciplines, groups and institutions with relevance for transport planning be possible from the beginning and be ensured throughout the entire planning process.

The stakeholders of participatory and cooperative procedures have to be regarded as an integral part of the planning process (cf. Figure 11). The guidance provided in Appendix 2 explains when and to which extent or intensity participation is necessary in the individual procedural stages of elaborating a mobility master plan. In doing so, it is not only necessary to consider the administration or supporting planning firm but also policy makers, the public and affected parties.

As already emphasised, it is recommended that a working group be formed within the administration before work on a MMP has begun. This working group is responsible for coordinating all analytical steps and contracts as well as the concept for involving stakeholders and information for policy makers and the public. The various interest groups, institutions and organisations can additionally be integrated into the process and the forming of opinions through an external work or advisory group.

In order to enable participation and cooperation, public relations should be conducted to inform all participating parties equally to stimulate their interest in mobility master planning or an individual project. New media should thereby be used, as well.

Deciding which form or method of participation and cooperation in the respective process phase (pre-orientation, problem analysis, development of measures and decision-making, implementation and ex-post evaluation) is appropriate for what groups and stakeholders must be done on an individual basis while taking local conditions into consideration. The means of communication between planners, stakeholders, policy makers and the public are shown in Figure 11 from “Hinweise zur Beteiligung und Kooperation in der Verkehrsplanung”²⁸ (Guidelines for participation and cooperation in transport planning).

²⁷ Taken from FGSV (2001), p. 7.

²⁸ FGSV (2012b).

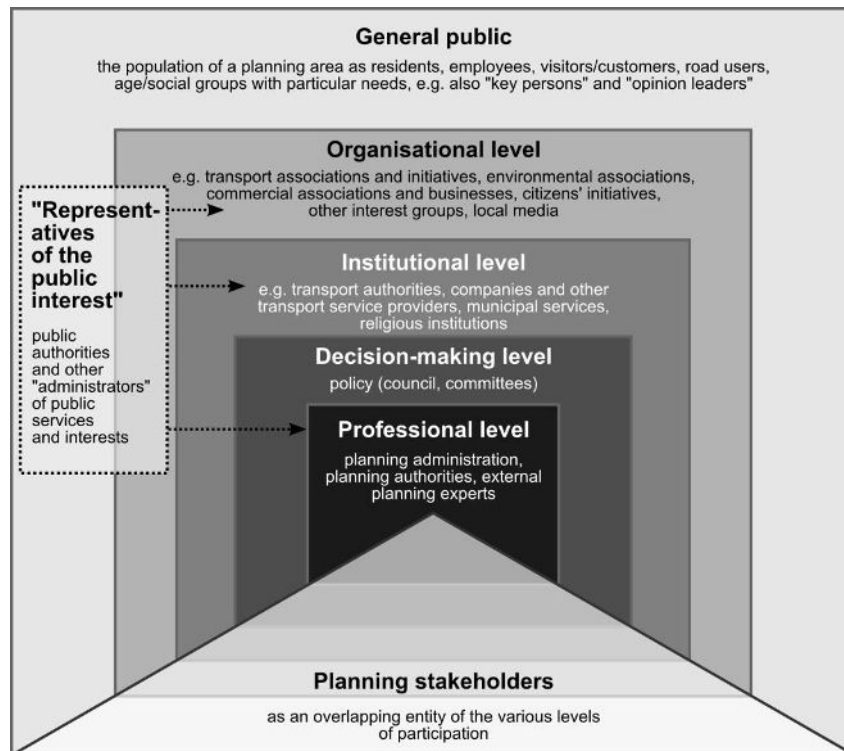


Fig. 11: Levels of participation²⁹

Because mobility master planning only prepares the decisions of the responsible committees, a polarisation of municipal politics is not always avoidable, even with well-founded expert information. Including political decision makers is therefore indispensable for fostering continual, goal-oriented mobility master planning. It is thereby the task of planners to create a broad political and societal consensus at the strategic-conceptual level and at the implementation level. A strategic participatory concept that targets the integration of municipal policy makers and all relevant social groups can reduce the potential for conflicts, even when political majorities change, and increase acceptance for a compromise solution.

Appropriate forms of participation and cooperation depending on planning situation and phase can be found in the "Guidelines for participation and cooperation in transport planning"³⁰.

6.2 INTEGRATION AND CLASSIFICATION OF LEGALLY REQUIRED PLANNING DOCUMENTS RELATED TO TRANSPORT

As discussed in Section 3 regarding sectoral and vertical integration, other legally required sectoral plans such as the public transport plan (PTP), noise action plan (NAP) and clean air plan (CAP) have to be coordinated and integrated into the mobility master planning process, in particular at the implementation level. This is likewise the case for the urban development plan and zoning plan (land use plan), since their role as integrated, general plans at municipal level means they contain a large number of strategic elements and measures that are derived from mobility master planning (and vice versa). These formal plans along with additional, relevant informal plans have to be well networked with mobility master planning not only when determining goals but also when selecting measures (cf. also Figure 2).

Firstly, the goals of the mobility master plan need to be closely aligned with those of other areas of planning at the strategic-conceptual level. Mobility master planning can thereby function in a coordinating and moderating role. This helps reduce conflicts between goals and reconcile or minimise contradictions.

²⁹ Taken from SCHÄFER (2009), p. 7.

³⁰ FGSV (2012b).

According to state-level public transport laws, existing infrastructure along with regional and state-wide planning goals, among other things, have to be taken into consideration when establishing public transport plans. The strategic goals of mobility master planning are likewise indispensable for determining public transport supply. As such, the public transport plan (PTP) is a sectoral component plan of the mobility master plan, for which the strategic-conceptual level must prepare the general transport data and goals. Ideally, the action plan for public transport from the MMP is simultaneously the infrastructural basis for the PTP. In counties and administratively independent cities, the commissioning authority for the PTP is generally the same planning authority responsible for the mobility master plan. For this reason, the PTP should be seen as and realised as part of the implementation level of mobility master planning wherever organisationally possible. This becomes more difficult in large independent cities or in towns that are part of a county, since the town's MMP has to be coordinated with the PTP of the entire county and a large city's MMP has to be coordinated with the PTP of the regional joint association of public transport providers. Even in these cases integrative and cooperative strategies and procedures with feedback loops are likewise possible and useful.

In Germany, the legally mandated obligation to update the PTP means, in turn, that regularly updating the strategic-conceptual level of mobility master planning is likewise an obligatory task.

Emission reduction demands and legally specified air pollution limits from the clean air plan (CAP) have to be incorporated into mobility master planning and made binding. On the other hand, the previously mentioned, uniform data basis provided by mobility master planning is cost-effective and should be used for successive sectoral planning, since a legally sound evaluation of infrastructural noise and air pollution is only possible with a uniform data basis that is as consistent as possible.

Although the authorities responsible for a MMP and for legally required sectoral plans often differ (e.g. transport planning: municipality – air quality: state environmental protection agency), an early and close coordination is in the interest of all participants.

The strategic-conceptual level of mobility master planning in Germany plays a legally required preliminary role for the land use plan by developing the main transport networks. At the same time, the MMP may not be reduced to a sectoral, transport-related technical contribution for the land use plan. Rather the MMP encompasses the overall coordination of urban development and transport instead of only securing rights of way for transport infrastructure as part of the land use plan. With the help of MMPs transport models, transport-related effects of settlement development and the absorption capacity of the transport system in the case of planned land use changes, amongst other things, can be examined. Planned links from previous, outdated plans can likewise be investigated in terms of their usefulness.

Similarly, other related sectoral plans should build on or make reference to the measures of the implementation level of mobility master planning and vice versa. Due to the ever increasing complexity of planning documents, coordinating and simultaneously elaborating plans fosters cost-effective, synergetic effects while maintaining quality. The authorities responsible for preparing the plan also generally depend on investments from the transport sector in order to realise air quality or noise reduction measures.

An overview of selected, important sectoral plans in Germany with relevance for mobility master planning can be found in Appendix 4.

6.3 EVALUATING MOBILITY MASTER PLANNING

In the past in mobility master planning it was almost always common to conduct ex-ante impact evaluations of measures as part of strategic and/or implementation planning³¹. What had been missing up to this point was ex-post impact evaluation after implementation in order to determine and evaluate the state of implementation achieved (output) or long term effects (outcome). As a result, neither founded statements on the measures' effectiveness and efficiency nor the ex-ante impact models with their assumed impact mechanisms were able to be verified.

However, evaluation has already been an established element of German methods and processes on mobility master planning for a long time. This can be seen in the phases of the planning process as described in the "Manual for Transport Planning"³² where the final step is the implementation and ex-post evaluation phase.

³¹ Evaluations that take place before implementing a measure.

³² FGSV (2001).

The evaluation process and quality management are explained in detail in the “Hinweise zur Anwendung von Qualitätsmanagement in kommunalen Verkehrsplanungsprozessen”³³ (recommendations for the Use of Quality Management in Municipal Transport Planning Processes) and the “Hinweise zur Evaluation von verkehrsbezogenen Maßnahmen”³⁴ (Recommendations for Evaluating Transport-related Measures).

Evaluation is therefore not a procedure that is merely added onto a MMP but rather a strategic instrument for properly conducting the entire planning process. In light of the magnitude of investment required for mobility and transport, an evaluation of the process itself as well as impact evaluations is necessary for the efficient use of resources.

Estimating impacts ex-ante

By analysing impacts, the level of goal achievement can already be estimated in the planning phase. A simple evaluation matrix showing goals and measures clearly identifies problem areas and shows whether objectives have been specified in a balanced and achievable manner, whether conflicts between goals can be balanced or whether strategic approaches have to be changed.

Monitoring

By now many municipalities have a monitoring system with which indicators of mobility and transport can be observed (e.g. Vienna and Munich³⁵). The basis for this is the regular collection and updating of the necessary data, which is primarily gained through household surveys, traffic counts and other statistical data. The monitoring of impacts of measures uses counts and surveys that are carried out either by the administration responsible for realising the measures or by external partners. Due to budgetary pressures, however, large gaps in knowledge are seen as acceptable, even though the costs for measures that fail to achieve the intended goals are generally of a much higher magnitude than the costs for planning and monitoring including the associated data management.

Evaluation

Evaluation refers to a detailed examination of the interrelations of changes observed through monitoring, which contributes significantly to avoiding and reducing deficiencies and any resulting damages. In addition, the learning process and feedback of an evaluation help benefit and improve subsequent projects. This evaluation can also be conducted internally by the administration or by an external consulting firm. In each case it is of central importance for the validity and credibility of the results that the evaluation is conducted independently.

The evaluation (cf. Figure 12) determines and evaluates

- the process quality and
- the impacts from packages of measures (also from individual measures).

Process evaluation

Evaluating the process provides stakeholders with guidance on arranging planning and implementation processes as favourably as possible. The central question is to what extent during the stepwise planning process the previously defined goals regarding time frame, procedural steps, participation and acceptance were pursued and achieved.

Process evaluation involves assessing the entire process of mobility master planning, from pre-orientation through defining objectives, developing impact models and determining indicators (as a prerequisite for measuring goal achievement) all the way to developing and implementing measures. Besides the working phases, process evaluation also involves an assessment by the participants or actors. The relevant conditions of the planning and implementation process are examined in order to identify external influences and unintended side effects (the so-called context monitoring).

³³ FGSV (2007).

³⁴ FGSV (2012c).

³⁵ Cf. MENTZ (2012).

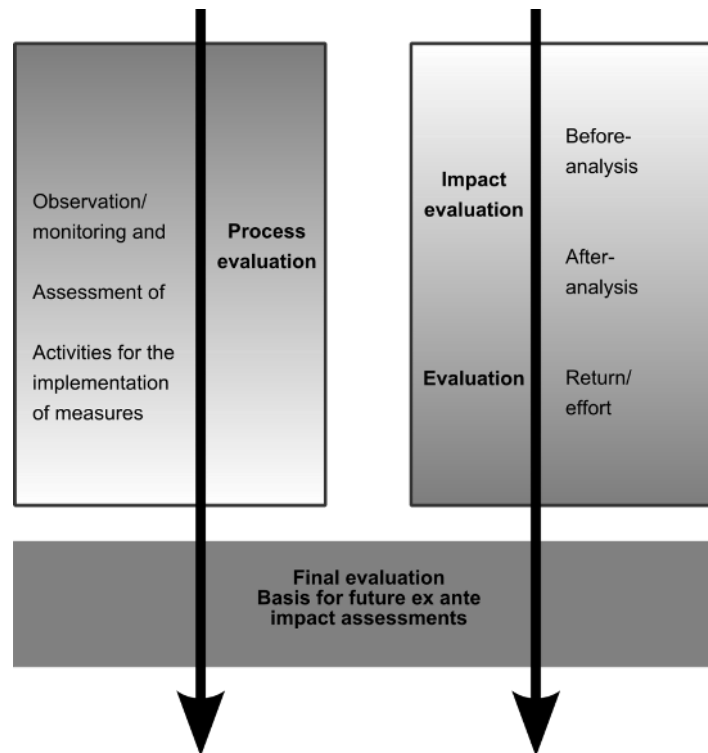


Fig. 12: Areas of evaluation³⁶

Whether and to what extent the participants or actors are actually satisfied should be determined at an early stage. Acceptance and credibility can be endangered to a significant extent due to dissatisfaction with the design and transparency of the participatory process on the part of policy makers, administrators or the planning firm, failing to include potential participants and stakeholders or deficiencies in communication. Questionnaires can identify and eliminate these problems early on. In addition, the evaluation concept itself along with its results should be communicated in an open and transparent manner.

Impact evaluation

The impact evaluation identifies the impacts resulting from a package of measures with regard to the planning goals (cf. also Section 4.3). In particular, the evaluation concept specifies the goal of the evaluation, determines the indicators to be analysed and decides the analytical process. Of considerable importance for the validity of the results of the impact evaluation is the chosen study design.

The impact evaluation of several measures (summative evaluation) takes place in two steps:

- The first step focuses on the measurable net effects of measures determined, for example, by conducting surveys or measurements. A before and after comparison requires external influences to be deducted, which can be achieved by using a similar control area, in which measures were not implemented, for comparison. Such a comparison also serves to verify whether or not the ex-ante impact forecasts and hypotheses derived from the impact model were correct.
- The second step describes first the effectiveness and then the efficiency with regard to use of financial resources, e.g. using procedures such as benefit-cost analysis, goals achievement matrices and cost-effectiveness analysis.

If the impact evaluation indicates that the planning process or measures have not had their intended impacts, then modifications in the measures, specified goals or choice of indicators are necessary.

³⁶ Taken from FGSV (2012c), p. 14.

7 Guidance on methods and content

7.1 REGULAR COLLECTION AND PROVISION OF DATA

Transport analyses and forecasts, along with daily decisions and procedures, are based to a large extent on differentiated considerations supported by data. The quality of studies, models and thus also the resulting decisions depends significantly on the quality of the base and input data.

In this regard, the completeness and accuracy of factors relevant for balanced decision-making as well as the timeliness of analyses (data basis) take on a central role. This is often the case during the legal review of transport measures by courts. Continually or periodically analysing, updating and providing transport related data is therefore one of the most important continuous basic tasks of mobility master planning.

There are a number of data requirements and possible, existing data sets. Along with the “classical” data sets such as official statistics and manual or automated traffic counts, data can often be obtained from secondary sources. These include, e.g. data from detectors at traffic signals or databases from associations such as the Chamber of Industry and Commerce or environmental organisations. Transport related data is increasingly offered by commercial providers (network data, travel time data, data on demography and economy). The results of surveys on transport behaviour (household surveys such as *Mobility in Germany – MiD* or *Mobility in Towns – SrV*) and on commercial transport (operator and driver surveys such as *Motor Vehicle Transport in Germany – KiD*) are of particular importance for modelling and monitoring. An overview of data requirements, usage and content is provided in the table “Data requirements in mobility master planning” in Appendix 3.

From a methodological and basic perspective, the necessary data for mobility master planning (and thus also for the official plan approval for the implementation of large projects) should be gathered “regularly”. The repetitive cycle of providing data should not exceed five years. A five year rhythm was already recommended in 1999 as the result of research projects³⁷. This is confirmed in the “Recommendations for Travel Surveys” (EVE)³⁸.

Expensive, ad-hoc surveys and studies for individual projects as part of official plan approval procedures or local land use planning would be unnecessary by regularly providing and updating data and results of demand analysis during the continually or periodically completed working steps of mobility master planning for analysing the current and future situations. The results of the isolated surveys and studies can be replaced by higher quality and more complex networked data structures. With such coordinated approaches, the results of sectoral plans become more congruent and comparable.

Regular data maintenance is therefore a part of the strategic-conceptual level of mobility master planning. It encompasses the following points:

- continually gathering and if necessary surveying of all relevant basic data for status-quo analyses, forecasts and scenarios,
- preparing all basic data in a relevant data structure appropriate for the planning purposes,
- securing a uniform data basis that is as current as possible for all action concepts, plans of measures and transport related plans (PTP, NAP, CAP), regular reports on “mobility and transport” for the planning area,
- periodically updating the basic data for forecasts and scenarios.
- comparing the actual development with the assumptions and calculations made thus far.

The demands on an updated and comprehensive data basis are applicable for all mobility master planning processes regardless of whether or not a transport model is used. Depending on the use of computer-aided models, the demands can partly differ considerably. Modelling principles and data maintenance are discussed in more detail in Section 7.2.

³⁷ Cf. RÜHLE/ROMMERSKIRCHEN/RIEDLE/SCHAD/SCHULZ/WENTE (1999).

³⁸ Cf. FGSV (2012a).

It is recommended that participating planning agencies, transport companies, commissioning authorities (responsible for infrastructure and operation) and other institutions come to an agreement on the cooperative use and maintenance of data and specifically assign the personnel or institution responsible as an in-house task or through a contracted planning firm. This allows significant cost savings and avoids contradictions and suspicion regarding the data of other authorities and planning departments.

7.2 USE OF COMPUTER-AIDED TRANSPORT MODELS

7.2.1 PRINCIPLES OF MODELLING

Transport models are a tool for mobility master planning. They describe the supply and demand structure as well as the complex decision-making processes in passenger and goods transport on the basis of empirical data and assumptions. They therefore primarily allow a representation of the transport situation under certain conditions or as a result of changes in infrastructure. In macroscopic travel demand models mostly four modelling steps are differentiated. These are run either in an integrated or iterative manner with feedback loops³⁹:

- Trip generation calculates the number of trips that are generated or attracted by a spatial unit (transport analysis zone). The basis for this step is provided by spatially and thematically differentiated information about the study area (statistical data) and data on activity and behavioural patterns (e.g. number or time of trips per person and purpose) of the population and businesses.
- The choice of destination (or trip distribution) links the generated trips with the individual areas of activity (destinations). The selection of visited destinations is accomplished by combining their attractiveness with the resistance of getting there (e.g. travel time or costs). This results in a trip distribution which is represented in an origin-destination matrix.
- The modal split or mode choice designates the mode of transport for each trip.
- Route choice (or trip assignment) assigns the modal specific trips to the individual paths (nodes and links) of the transport network or the lines of public transport networks. This results in volumes of links or lines, information on the mix of traffic flows and travel times.

Even if most transport demand models do follow this basic sequence, the range of methods used is diverse. Research in particular increasingly uses agent-based simulation methods which simulate the decisions of individual actors. Due to increased data requirements, long computation times and a limited relevance for standard problems, these approaches have not been used in practice too often. When using models it is advisable to document model assumptions, model validation, the areas of possible application and the limits and accuracy of model results.

In addition to calculating passenger transport it is necessary to consider commercial and goods transport. Relationships in commercial transport are generally more complex than those in (private) passenger transport. Commercial transport should nevertheless be taken into consideration, in particular because of its increasing importance (deliveries and service trips).

The results of transport demand models can be used for programming traffic signals, for determining traffic quality and calculating emissions, energy use and pollution concentrations.

7.2.2 AREAS OF APPLICATION FOR MODELLING

Qualified transport demand models help to analyse in particular the following planning issues:

- analysis of the status quo transport situation and of future situations for all transport modes, e.g. in order to determine traffic volumes, travel times and capacity restraints as well as for a comparison with one or more reference cases (e.g. with the status quo or different scenarios),
- determination of changes in travel demand due to influences from spatial structure and land use, the composition of the population, motorization as well as economic developments or changed conditions from pricing policies,

³⁹ Cf. FGSV (2010).

- impacts of changes in supply or operation of public transit on roads and rails (ridership numbers, changes in modal split),
- changes in link volumes due to changes in infrastructure of the road network (shifts in travel due to changes in choice of destination, mode or route, changes in travel times and accessibility) for motorised transport and increasingly for bicycle transport, where transport zone divisions and sufficient traffic volumes make this possible; differentiated models, which take into account intersection restraints and use suitable trip assignment methods, can to a certain extent determine volume changes at intersections in the main road network,
- quantification of transport emissions (as the basis for air quality, climate protection and noise action plans).

Model results serve to evaluate scenarios, concepts and measures in the mobility master planning process on a quantitative basis. Transport demand models primarily serve to address issues on the strategic-conceptual level. The quality of input data, level of aggregation for analyses and planning on the strategic-conceptual level and uncertainties in the forecasts all determine the quality of model results. More detailed urban spatial or transport analyses often require in-depth models and the use of differentiated tools (e.g. microscopic traffic flow simulations).

When deciding to build or use macroscopic transport demand models in mobility master planning, the following aspects have to additionally be considered:

- description of issues to be examined using the model and the expected scope of results as a basis for estimating the necessary level of detail of the model,
- assurance of the availability of adequately differentiated and quality-managed input data as well as their transparency and ease of updating (cf. Section 7.1),
- estimate of the necessary time, personnel and costs for preparing the model (including supply of data),
- consideration of general quality requirements of transport demand models⁴⁰,
- assurance of model maintenance and ease of updating the models for use as a continuous planning tool as well as the transferability of the models for use by others (in particular when consultants are delivering the model); this requires a thorough documentation.

7.2.3 NECESSITY OF MODELLING AS PART OF MOBILITY MASTER PLANNING

If mobility master plans are to serve as the basis for formal sectoral plans and one of the goals is the quantitative analysis of impacts, then the use of transport demand models is indispensable. Larger study regions or complex problems, in particular, make the use of transport demand models as a rule necessary. In this case, integrated (multimodal) models are compulsory. Without the use of transport models, the description of forecasted impacts in the transport system – the core element of mobility master planning – is not possible. When using transport models it is necessary to discuss the quality and reliability of the results.

For mobility master planning in small or mid-sized cities, in which the main issues are non-motorised transport, the design of public spaces, mobility management or organisational regulations, the use of a transport demand model is generally not necessary.

A simplified use of models with other computer-aided methods can be helpful for various issues within mobility master planning. This includes, for example, the use of geographic information systems (potential analyses of locations and location evaluation) and of routing programmes (determination of travel times/accessibility analyses) or also the combined use of various programmes for comparative analyses (e.g. information on time tables and routing programmes to compare travel times of individual and public transport).

⁴⁰ For the reliability of results, it is particularly important to pay attention to the quality of input data and their further use in a travel demand model. The travel demand model must correspond to the state of the art and directly reference data on spatial structure. The model may not be derived solely from traffic count data.

Existing regional models can be used (e.g. the forecasts at state level in Berlin/Brandenburg, North Rhine-Westphalia, Saxony or the models of metropolitan areas such as Greater Nuremberg or Frankfurt/Rhine-Main). In general, however, these have to be further differentiated.

When deciding on the use of a transport demand model, the factors of financing and time frame need to be weighed against the questions to be answered. In so doing, the possible costs associated with extensive project-specific analyses, which may become necessary at a later point in time, for determining travel demand and modal shifts during land use planning or legal plan approval procedures must also be considered. The results of such analyses are often won using simplified approaches, and are not of the same quality and therefore not economical.

A great advantage is an altogether uniform data basis for as many various projects as possible such as is available as part of comprehensive mobility master planning.

7.2.4 USE OF MODELS AS PART OF MOBILITY MASTER PLANNING

The decision whether to develop a new transport demand model or to activate and update an existing one must be done at an early stage, so that the process of mobility master planning will not be unnecessarily drawn out by work on the model. In addition, the boundaries of the planning area and study region of the mobility master plan must be consistent with the area of the model. The transport demand model can be used to analyse the travel supply situation in order to highlight weak points of the status quo situation and to represent the reference case for the impacts of forecasts or scenarios. As part of the impact analysis of forecasts, scenarios or individual projects, the transport demand model is used to determine the direct impacts on transport (e.g. differences of traffic volumes) as well as other indicators with relevance for the evaluation.

At the same time, the areas of application and limitations to the use of transport demand models must be considered. It has to be ensured that, in particular, the impacts of the so-called soft measures are quantified, even if they are difficult to determine with a macroscopic transport demand model. They easily lose their importance or are misjudged during the further working process of the mobility master plan when their impacts are only determined in a qualitative manner. The same is true of indicators from the system of objectives that are not able to be derived or described using the transport demand model. On the other hand, indicators that are easily determined quantitatively should not be overvalued just because they are easy to manage. A transport demand model is always merely a tool in the planning process and cannot replace the critical discussion of input values and results. Therefore the quality of the input data for modelling has to receive particular attention, and the limitations of model outputs and associated interpretations have to be demonstrated. Likewise, the scope of measures in mobility master planning should not be determined just by their ability to be represented in the transport demand model. Models are and remain only support tools for describing situations and the impacts of measures.

7.2.5 CONTINUAL MAINTENANCE OF MODELS

In order to be able to utilise the transport demand model as a continual planning instrument it is necessary to update the input parameters when there are changes in surrounding conditions. However, the costs of continual data maintenance are generally lower than gathering data again at a later point in time. Data maintenance makes quick access possible when addressing current issues. The responsibility for data maintenance should therefore be clearly defined. If data maintenance is externally contracted, it must be ensured that the model remains fully accessible to the commissioning public authority. Maintaining the model encompasses the monitoring and updating of all input data such as route information (changes in the network), time table data and statistical data for the status quo analysis and forecasts (e.g. population data, employment). Changes to the network should be continually updated. Statistical data, surveys and new calculations of forecasts and scenarios should be updated in larger time intervals of two to five years.

It is important for the further implementation of measures and the justification of measures in formal plans that all individual projects within the planning area be based on the uniform and thus consistent data of mobility master planning.

7.3 CONSIDERATION OF NON-TRANSPORT IMPACTS

7.3.1 ENVIRONMENTAL IMPACTS

On all levels transport is a substantial cause of environmental burdens. Protecting resources and more sustainability are therefore important goals of mobility master planning. They are firmly integrated into the planning process through more required environmental compatibility as a major area of goals.

An environmental impact assessment is not legally required for mobility master plans in Germany, as for formal (legally regulated) plans. However, without an integrated estimate of environmental impacts, strategic-conceptual as well as implementation level planning would have significant deficits when weighing and balancing decisions. They would, in addition, fail to fulfil the requirements of an integrated planning. Estimating environmental impacts in mobility master planning is therefore naturally a part of both the strategic-conceptual and the implementation level. This is the state of the art. Furthermore, acceptance for transport programmes, strategies and measures can only be achieved, if a broad consideration and assessment of all impacts, particularly those on the environment, is conducted in a sufficient manner. Besides determining planning related environmental impacts (e.g. land consumption), mobility master planning is especially concerned with choosing appropriate and optimised measures for avoiding or reducing emissions in a preventive manner and at the source.

On the strategic-conceptual level of mobility master planning, environmental data also has to be collected and provided on a continual basis for the analysis and forecasts of transport data. Scenarios have to be developed likewise under environmental aspects and evaluated with regard to their environmental impacts. It is necessary to continuously incorporate feedbacks from the most recent scientific findings, changing individual values, the reactions of those affected or from changed interests. The determination of environmental objectives and criteria for mobility master planning also takes place on the strategic-conceptual level.

On the implementation level, concrete recommendations, alternatives and modifications for measures also from an environmental perspective are developed and introduced into the planning process. The environmental impacts of individual measures and/or selected packages of measures are determined and evaluated by using the indicators from the environmental goals as a basis. Transport indicators for the evaluation of impacts on the environment include for example kilometres travelled in the entire network by transport mode, from which the energy use and emissions can be calculated.

The interdisciplinary working teams and project groups for mobility master plans decide on a project-specific basis the extent to which environmental criteria are to be included. Besides specific sectoral necessities, other decisive factors thereby include, amongst other things, town-specific conditions and practices as well as the available budget.

On the whole, mobility master planning must work closely with other planning areas of urban development (cf. Section 3 “Sectoral integration” and Section 6.2). The content of sectoral plans is, for the most part, closely related to mobility master planning. For many of these plans, an environmental impact assessment is already obligatory. Cooperation and coordination at an early stage can reduce the amount of resources necessary for planning and avoid redundant assessments.

Independent of continually collecting environmental data and conducting integrated environmental impact assessments in mobility master planning, project-specific plans, such as a new public transit route or the design of a new main road, which are part of the implementation level, are subject to an environmental impact assessment (EIA) in Germany. It contains a detailed analysis of the project’s impacts on humans, animals, plants, soil, water, air, climate and landscape as well as on cultural and material goods. This includes a discussion of interrelated effects along with measures for avoiding, reducing and compensating.

In any case integrated consideration of environmental aspects increases the quality of a mobility master plan (cf. Figure 13).

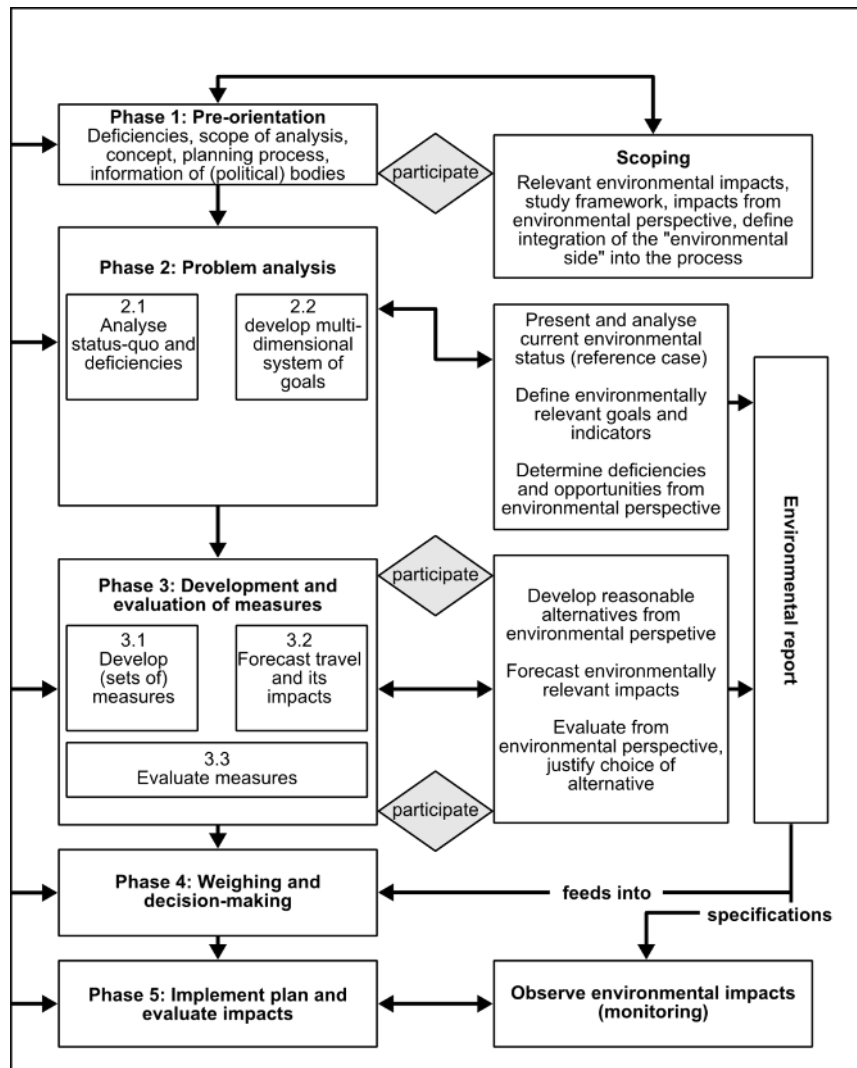


Fig. 13: Possible integration of environmental aspects into mobility master planning based upon the German strategic environmental assessment (SUP)⁴¹

7.3.2 SOCIAL IMPACTS

The discussion of the integration aspects in mobility master planning in Section 3 already emphasised the necessity of ensuring societal participation in activities and public life through all social groups of the population. Guaranteeing the accessibility of central facilities and central places for everyone is a fundamental aspect in the provision of public services legally required in Germany and therefore a central goal of mobility master planning.

A social requirement of the transport system is the accessibility of socially and in part spatially marginalised districts in order to improve their potential of participation in public life of the city as a whole. Elements of the so-called "social town", formally identified areas in some German towns, or results of socio-spatial analyses provide information on neighbourhoods, in which conditions e.g. for walking and cycling and the quality of public transport should receive particular attention in planning.

Accessibility of jobs, educational, shopping and healthcare facilities without an own vehicle is also of concern for these neighbourhoods and not merely of particular relevance for rural public transport planning. This can be illustrated in the MMP e.g. with a GIS accessibility analysis. In light of rising energy prices, permanently securing the required provision of public services also for rural areas demands integrating mobility master planning into urban and regional planning. As such, also ensuring the accessibility of social infrastructure at

⁴¹ Taken from BMVBS (2006), p. 17.

municipal level, e.g. of hospitals and educational institutions, is a social goal of municipal mobility master planning.

Transport related issues of environmental equity⁴² include socially-differing levels of exposure to transport emissions as well as accident risk and separation effects of transport routes with differing traffic volumes, which have an impact on the level of contact and social cohesion in streets as public spaces. All these are socially relevant themes of transport planning.

Social integration also refers to ensuring the mobility of people with disabilities in regard to the accessibility of the built environment and public transport systems. This is of particular relevance for planning in countries with an aging society where people over 80 years old are the fastest growing age group.

Contacting representatives of disability groups or respective local organisations at an early stage is likewise recommended in mobility master planning, analogous to the German consultation requirements for the public transport plan (PTP). In Germany accessibility for people with disabilities – in accordance with the laws of the federal states – and compliance with anti-discrimination laws are eligibility requirements for infrastructure funding and a legally binding obligation.

⁴² The connection between environment, health and equal opportunities according to the current state of interdisciplinary research is examined in the anthology *Umweltgerechtigkeit* (cf. BOLTE/BUNGE/HORNBERG/KÖCKLER/MIELCK, 2012).

8 Consideration of urban form, settlement structure and other conditions

8.1 INITIAL SITUATION

The content, approach and potential results of mobility master planning are heavily influenced by regional structures and developments as well as the size of the municipalities or cities carrying out the planning. Mobility master planning, as a holistic, acceptance-oriented preparation and coordination of formal sectoral plans and of many municipal measures, is generally appropriate for all cities and municipalities regardless of their size. With the process, however, different goals are pursued. While the predominant issues in smaller communities with many villages are often accessibility in rural areas and the development of safe road networks. Medium-sized towns are more concerned with bypass roads and organisational aspects of transport in their central areas. Large cities and metropolitan areas have to deal primarily with managing demand (congestion, bottlenecks) and the negative effects of transport. This means in particular attempting a modal shift to more efficient and environmentally friendly means of transport, facilitating the necessary commercial transport as well as limiting the environmental impacts of motorised transport.

In the following the various characteristics of mobility master planning are described according to city size and spatial structure. Additionally, features and organisational structures of regional mobility master planning are illustrated using examples. Further examples for MMP in study regions of varying sizes can be found in Appendix 1.

8.2 COOPERATION ACROSS ADMINISTRATIVE BOUNDARIES

Particularly in densely built areas, most transport issues can only be solved in a regional context (cf. Section 3 “Horizontal integration”). This is a result of increasing connectivity between (large) cities and their surroundings and, in many cases, the resulting division of housing, working, education and leisure. Generated and attracted trips in a region shape the largest part of urban passenger and goods transport. Similarly, transport systems such as light rail, commuter rail and regional bus lines travel in the city and its region. Incompatible planning from the different responsible planning agencies can therefore hardly achieve the goals of the large interrelated area. Important objectives such as the adjustment of settlement development to the public transport corridors or the reduction of CO₂ emissions can only be achieved at a regional level.

Despite the large amount of regional traffic the municipal planning authority ends at a city’s boundaries. As such, individual municipalities are not able to react to regional interdependencies and to the movements of commuters within the municipality’s jurisdiction with a regional plan or regionally effective measures. Though coordination or joint analyses are possible, a regional authority for adopting and implementing regional transport concepts is generally lacking. It is therefore necessary to utilise existing administrative structures or, if these do not exist, to create the respective cooperative structures so that, in future, development in municipal authorities and regions can be carried out in an integrated manner. Wherever medium-sized or large cities need municipal mobility master planning it is significantly more cost-effective to utilise synergetic effects and develop a regional MMP instead of having individual municipalities plan separately and then attempt to solve, often controversially, their common problems and cross-boundary projects.

Depending on the spatial and administrative structures there are various possibilities for facilitating cooperation. For small and medium-sized communities with limited planning resources, it is often useful to form traditional inter-municipal planning organisations. For large cities and dense areas without regional planning bodies, new such structures are necessary. As a minimal solution, an ad-hoc working group “Regional Transport” or a round table with neighbouring municipalities should be established.

8.3 ACCOUNTING FOR CHARACTERISTICS SPECIFIC TO TOWN SIZE

The contents and elaboration of mobility master plans as well as the determination of the study region are strongly coupled with the size and structure of the responsible local authority that intends to elaborate a MMP. Whether or to which extent the surrounding area should be included, and the consideration of spatial, modal and other aspects of integration, depends upon the administrative structure of the city and its surroundings as well as the problems to solve. The tradition of neighbourly relations, competition and

political majorities also play a role. Spatial scope and content can differ significantly, e.g. between a small or medium-sized town in a sparsely populated rural region and a medium-sized or large city in a densely populated area.

The following situations are typical:

MMP in spatially-large, incorporated communities in municipal cooperations and similar municipal structures

In recent years, regional reforms in Germany and many other countries have resulted in the creation of very large communities. These consist of many formerly independent villages and towns which therefore have to face new tasks and issues. In states that still have smaller communities, inter-municipal structures have been formed in order to more efficiently and cost-effectively manage public responsibilities. As a result transport issues are increasingly addressed, for which mobility master planning provides a quite appropriate basis.

Typical issues are:

- accessibility of the individual communities within the road network (including parking),
- connections between the main structural concentrations (shops, administration, schools, etc.) of the surroundings/region,
- network connectivity between community neighbourhoods under particular consideration of school-planning, bicycles and pedestrians,
- promotion of a compact mobility with shorter trips by walking and cycling (active mobility),
- compatibility of motorised individual transport (fewer accidents, reduced space consumption and emissions),
- influence of public transport supply for which the district or county is usually responsible, of joint mobility management and information-services, alternative operating forms in public transport,
- aspects of accessing public transport stops or stations including P+R and B+R facilities.

For the development of communities in this category, it is particularly important that tasks, for which e.g. highway administrations, districts, counties or transport associations are responsible, will be jointly discussed in detail as part of mobility master planning. In addition, such communities can seldom employ qualified transport experts in their administrations.

In general it is not possible for communities of this size to develop transport demand models as part of mobility master planning. Mobility data is potentially only available from traffic counts or commuter statistics. In some cases regional models can be utilised. For federal or state highways information about traffic volumes can be obtained from the regular counts on these streets. The main issues here are primarily qualitative aspects for the implementation level such as accessibility, design suggestions for selected streets or other transport facilities, the combination of subsystems and joint information.

MMP in small and (small) medium-sized cities

Characteristic of small and medium-sized cities with up to 50,000 residents in Germany is that they are generally not the authority responsible for the existing, classified roads of district, state or federal level. Except for cities that are a district themselves, they are also not responsible for public transport. Small cities are often solely served by regional public transport routes. In many medium-sized cities there is also local public transport.

While a qualitatively-oriented mobility master planning is often sufficient in small cities, tasks can arise for which the use of transport demand models is beneficial. Mobility data typical for the region should in this case be available from national mobility surveys, e.g. *Mobility in Germany – MiD*. However, study-specific surveys that allow for a comparison with other cities are better. These results are also available as base data sets for some communities (directly or at least as a special evaluation for the respective city size and topography). Traffic counts of state highway administrations are generally not enough and have to be further supplemented with a community's own counts.

The following issues are typical of cities in this group:

- appropriateness of town bypasses for classified roads or improvement measures (e.g. safety, environmental aspects) on main through streets,
- (re)design of main roads through towns,
- optimal/efficient supply of local public transport with the use of regional public transport for travel demand within the city, coordinated mobility management and information services, alternative services, where applicable,
- opportunities for strengthening development of the central city (such as traffic reduction, parking organisation, traffic calming, design of streetscapes and plazas),
- concepts for bicycle and pedestrian transport.

Development of a MMP in small cities is usually more sporadic and initiated by a particular concern. Monitoring tools play an increasing role, particularly since new approaches are required through strategic noise maps and action plans which have to be drawn up every five years in accordance with the EU's Environmental Noise Directive.

Due to administrative structures of communities of this size, seeking competent, external consultation on transport issues is often of major importance.

MMP in large cities (and large medium-sized cities)

The demands on mobility master planning in large cities are generally significantly higher, also because it has to develop the technical foundation for the major transport networks as part of the formal urban land use plan. The scope of the tasks, the particular environmental requirements and goals which are, in part, legal specifications, the pressure of problems and the dynamics of urban development all make it necessary, more here than in small cities, to conduct the process of mobility master planning as a continuous interplay between initiation and development, monitoring and updating. It is thereby completely irrelevant whether the city's development is characterised by growth, stagnation or decline. The tasks as part of developing a mobility master plan encompass the entire range of transport issues.

In large cities, a high degree of cooperation between the city and its surroundings is necessary due to regional interdependencies. Defining the area of cooperation can take place, for example, either by using the structures of transport networks or by an initial commuter analyses (e.g. using commuter data) and should be potentially identical with the boundaries of the defined MMP study region. The cooperation should extend beyond the minimum requirements of data and information exchange. Ideally, joint goals are defined and the strategic-conceptual approaches for goal achievement are worked out. Likewise, individual measures that affect both the core city and selected, surrounding communities can, or rather must be dealt with in inter-municipal cooperation. Examples of inter-municipal cooperation are the city of Dresden ("Regional Round Table" during MMP development) or the joint MMP of the cities Ulm and Neu-Ulm.

Large cities cannot forego the use of (modally) integrated transport demand models during mobility master planning. Due to commuter relationships the surrounding study area has to be part of the model. The use of current, study-specific data on the mobility of the local and regional population should be a must. Regular periodical surveys are beneficial in this respect (such as the German survey *Mobility in Towns – SrV* conducted every five years) in order to sufficiently consider specific, local influential factors and trends. In addition a comparison of mobility (in particular the modal split) across cities is helpful for the political discussion. Furthermore mobility data is essential for the monitoring that accompanies the MMP (cf. Section 7.1). As in small cities, existing transport data and knowledge on transport performance in large cities are often not sufficient and have to be supplemented through mobility master planning. It is helpful to establish a system for data collection and quality management that is then used for continual monitoring (cf. Section 6.3) as well as for noise action planning and others.

Administrations in large cities usually have either departments that are explicitly responsible for transport issues or at least the accordingly qualified personnel. For this reason planning as a continuous process can be better organised and implemented here than in smaller cities.

MMP in metropolitan areas

The larger the city, the greater is as a rule the size of the surrounding area that has to be integrated into the development of the MMP. Depending on spatial structure and the particular problems to be solved, it can be advantageous to prepare the MMP in these relevant parts in cooperation with communities and/or districts

of the city. Otherwise it is hardly possible in closely interrelated regions to develop constructive approaches for the major networks of roads, public transport and partly also for bicycle transport and intermodal aspects. Especially in connection with parking concepts, cooperation and integrated management and pricing policies are helpful in order to avoid distortions in competition for customers and unfavourable modal split effects.

Not least because of the substantial time and costs required but also for reasons of effectiveness, it is useful to focus the cooperation on dealing with questions that need to be solved on the strategic-conceptual level. As a result, particularly on the implementation level, various MMP can be developed in parallel: one regional MMP with overarching strategic-conceptual analyses as an umbrella for local MMPs for questions of relevance for the respective municipalities.

For cooperation in mobility master planning in metropolitan areas there are a number of examples:

- MMP for a region through the regional planning authority Hannover Region (cf. Example Hannover Region),
- Metropolitan transport data basis (computer model for transport modelling as well as demand and supply data) for municipal MMPs as well as for local, municipal and partly regional transport analyses in the Frankfurt/Rhine-Main Region (cf. Example Regional Authority FrankfurtRheinMain),
- voluntary cooperation between a city and its surroundings as part of preparing the MMP in Dresden,
- MMP for an urbanised area (county/district of Rhein-Erft),
- cooperation between several cities in the preparation of a joint MMP (inter-municipal MMP Hemer-Menden-Iserlohn⁴³ with a total population of almost 190,000 residents).

Multimodal transport demand models are an indispensable tool in metropolitan areas for dealing with all current questions and problems of mobility master planning adequately.

– Example Hannover Region

The Hannover Region has sole responsibility for regional planning, public transport, county highways, bicycle facilities and traffic management in the area surrounding Hannover. It operates all roads in the region. The state capital city Hannover is responsible for the road network within the city limits. Modal split objectives, for example for public transport, can only be achieved and implemented on the regional level. These shared responsibilities have both benefits and disadvantages for mobility master planning. It is possible to assign the region tasks such as public transport and traffic management and have them performed centrally. However this also increases the need of coordination and divides responsibilities.

Regional mobility master planning takes place primarily on the strategic-conceptual level. It is mainly concerned with the impacts of infrastructure measures, especially since changes in road and public transport networks mostly affect areas larger than just the city itself. The transport demand model, which can be used by both partners, allows city-wide and regional analyses of scenarios and forecasts to be conducted. Currently Hannover Region has developed a mobility master plan “Pro Klima” (Pro Climate), under which 450,000 metric tonnes of CO₂ are to be saved. The state capital Hannover has prepared a “Masterplan Mobilität” (Master Plan for Mobility), under which the modal split for bicycling is to be increased up to 25 percent.

– Example Regional Authority FrankfurtRheinMain

The example of Frankfurt shows that there are generally several main parties involved in regional transport planning. In the Rhine-Main region these are

- the Regional Authority FrankfurtRheinMain, which because of its core responsibility, regional land use planning, is required under the building code (German zoning, planning and construction law) to deal with regional mobility master planning,
- the communities,
- Hessen Mobil – Straßen- und Verkehrsmanagement (Road and Transport Management) as the highway authority responsible for most of the classified roads (federal highways for which the states

⁴³ Cf. POTT (2009).

have to organize the administrative arrangement for the federal government, state highways and numerous county/district roads as assigned from most Hessian counties),

- the Rhine/Main Regional Transport Association (RMV) as (regional) public transport umbrella authority and
- the Gesellschaft für Integriertes Verkehrs- und Mobilitätsmanagement Region FrankfurtRheinMain (Association for Integrated Transport and Mobility Management – ivm) as the institution responsible for issues of regional mobility management.

The spatial boundaries of the respective areas of responsibility, however, differ substantially from each other. In addition there are, as informal partners, many organisations that have to do with transport, such as interest groups, institutions and all kinds of trip generators.

In light of this, the Regional Authority (or rather its predecessors, the Umlandverband Frankfurt (Greater Frankfurt Authority) and the Planungsverband Ballungsraum Frankfurt/Rhein-Main (Metropolitan Planning Association)) initiated a joint regional transport data basis (Verkehrsdatenbasis Rhein-Main – VDRM) more than 20 years ago as the foundation for regional transport planning together with Hessen Mobil, the RMV and the city of Frankfurt. Besides the four initiators and owners of the regional transport data set, ivm as well as the cities of Darmstadt and Offenbach have been brought in as additional partners.

The VDRM is comprised of a transport demand model including the associated software and data sets. The data contain statistical and mobility data as well as travel supply data for the road and public transport network. The data is updated on a regular basis (approx. every five years) in regard to values of the analysis year (status quo data) as well as for the updated forecast horizon (forecast data). The other elements of the VDRM are also further developed and adapted to the state of the art. Using the VDRM, the current and future transport situation can be calculated and evaluated in an integrated manner. In this way, effects and interrelationships of motorised road traffic (to a certain degree also bicycle traffic) and public transport can be presented. The VDRM is therefore the basis for integrated transport planning in the Rhine-Main region which also serves as the basis of the transport contribution for the formally required regional land use planning.

The VDRM is a tool for estimating the transport related impacts of both transport infrastructure measures as well as changes in settlement structure (e.g. population and employment). It is available to the municipalities of the Regional Authority free of charge and forms the basis for all transport analyses of motorised road traffic and, to an extent, for rail transport in the region. Transport analyses based on the VDRM are recognised by courts and their judges as accepted expert assessments according to the state of the art because they apply methodologically demanding approaches that are coordinated between regional partners. In addition the VDRM is the basis for models of short-term and dynamic transport forecasts. It can also be used for the evaluation of locations as part of zoning (e.g. of large retail facilities).

Cross-border MMP

A special form of cooperation is cross-border mobility master planning. There are a number of cities along Germany's borders that are closely interwoven with neighbouring countries, for example:

- Kehl/Strasbourg along the Rhine river on the German-French border
- Lörrach/Basel on the German-Swiss border
- Görlitz/Zgorzelec and Frankfurt(Oder)/Ślubice on the German-Polish border

Although there are collaborative projects in these cities, in particular in public transport infrastructure, cross-border, integrated comprehensive transport concepts in the sense of a mobility master plan are not known at this time. Due to cultural and language barriers as well as diverging technical provisions and funding guidelines, such cooperations would require an extensive effort. In general this leads to limiting the cooperation to the most important shared aspects and projects.⁴⁴

⁴⁴ Cf. AHRENS/SCHÖNE (2008).

9 Conclusion – Central elements of mobility master planning

Mobility master planning is an integrated, forward-looking and systematic preparation and execution of decision-making processes. Its purpose is to influence transport movements in a planning area according to defined goals and objectives using measures and policies in the areas of spatial development, construction, operation, regulation, pricing and information/public relations.

The following characteristics are important for the success of these processes for the implementation of strategies and of measures:

Interdisciplinary and broad participation and cooperation

Consensus-oriented planning is a precondition for the acceptance of planning processes and necessary measures. “Non-participation” or a lack of communication and coordination of plans almost always leads to delays in the planning process or implementation of measures. Mobility master planning should therefore be carried out based upon a clearly defined concept for participation, in which a regional inter-municipal collaboration and a close cooperation of the neighbours are of particular importance. Increasingly, joint MMP are being developed for several communities or for a region.

Goal orientation and scenario techniques

Integrated mobility master planning is no longer adaptive planning based upon a given demand (designing transport facilities on the basis of forecasts). As a one-dimensional sectoral planning which counterproductively induces new trips, adaptive planning was already in the 70s no longer the state of the art⁴⁵.

Based upon clearly stated goals and possible future scenarios, sets of measures are chosen such that the targets and quality standards of various disciplines are achieved in the most compatible manner possible.

Division into a strategic-conceptual level and an implementation level

For pragmatic reasons, the tasks of the MMP are divided into an overarching strategic-conceptual level and an implementation level focusing on the realisation of measures. The strategic-conceptual tasks are conducted on a periodic basis as the result of monitoring and continual evaluation. Plans for the realisation of measures are implemented in a successive manner depending on the availability of personnel and materials. It becomes clear that on both levels mobility master planning has to be understood, organised and carried out as a continual process.

Mobility master planning as a continual process

In light of dynamic changes in general conditions for mobility and transport, it must be ensured that transport planning adapts to current developments. The goals and strategies as well as the data basis for mobility master planning must therefore be reviewed regularly and adjusted or updated to correspond with current developments. This is a continuous process and requires, most importantly, the continual updating and provision of data and methods for quality management. With a continually or periodically updated MMP framework, measures that are to be implemented are easier to justify, in particular from a legal perspective. In addition, in this way they can be placed into the holistic planning context in a compatible manner.

Within continual mobility master planning as a permanent preparation of the obligatory tasks of the administration, manageable work packages to be carried out by the employees have to be defined and adopted politically.

Evaluation and monitoring

The planning process and the results of mobility master planning, along with goal achievement of measures, must be reviewed and evaluated constantly. This requires clearly defined goals, objectives and continual evaluation using updated data (monitoring of central parameters as a manageable subset from the base data)

⁴⁵ Cf. FGSV (1979).

as well as the publication of findings. Continual mobility master planning is an essential element of a holistic quality management in transport.

Necessity of current data

Transport models and planning decisions can only be as good as the knowledge about characteristics and interrelationships of the transport system. For this purpose, transport related data has to be continually or periodically collected and updated. Developments and interrelations have to be documented for experts, decision-makers and the public. Besides continual counts, the results of household surveys on mobility behaviour are particularly important for modelling and the monitoring of the MMP. They should be carried out at least every five years when possible and be used as the basis for monitoring.

Intensive preparation and legitimisation of the working steps of mobility master planning

The working stages of the strategically and politically important mobility master planning require intensive preparation regarding methodology, goal orientation, the definition of the planning area and study region, the workflow with an estimate of the necessary materials, financial and human resources, time frame and data requirements.

In order to ensure the necessary work steps, it is recommended that the development of the plan be adopted through a resolution by the political decision-makers with the basic principles for the planning process.

Establishing MMP as an “informal obligatory task”

According to professional opinions the relatively flexible, location-specific management of mobility master planning as an informal, consensus-oriented planning is preferable to a legally mandated formal planning. In this way, innovative and qualitative results, but most importantly the desired consensus, are more likely to be achieved. However, in every case mobility master planning is a necessary preliminary process for formal procedures, in particular for zoning, and as such a necessary coordinating and preparatory obligatory task. In Germany, the quality of such a preparatory MMP can also be “indirectly” examined during legal review processes of the formal procedures.

Mobility master planning has an indispensable preparatory, coordinating and strategic guidance function in regard to legally mandated plans in Germany such as the public transport plan (PTP), clean air plan (CAP) and noise action plan (NAP). It has to therefore be treated as a central, municipal obligatory task. This is the case in particular with most municipalities lacking financial resources. In Germany, for such critical cities, the state supervises and tries to secure their budget. If MMP would be considered a voluntary task, the city would not be allowed to spend money on this so that developing or updating the MMP would not be approved by the supervisory authority.

Such consequences would be counterproductive since the MMP saves costs by preventing not only undesirable development but also isolated, more cost-intensive ad-hoc planning and infrastructure deterioration. Unplanned and uncoordinated action, just like neglected servicing and maintenance of infrastructure, leads to large cost risks.

Specifically tailored MMP for each planning area

These recommendations were not established as a “recipe book”. They refer to varying planning areas with varying transport problems. Each planning authority must find and pursue its own path and react locally to individual particularities and changes, e.g. political and personnel changes, financial problems, critique and opposition. The regional cooperation and orientation of planning all the way up to inter-municipal mobility master planning is thereby of particular importance.

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Appendix 1: Examples

Profile City Development Plan for Transport Berlin/Stadtentwicklungsplan (StEP) Verkehr Berlin	
1. Characteristics City/Region	
Population:	3.47 mil. (2010)
Spatial type according to BBSR ⁴⁶ :	Urban region, inner central area agglomeration area, core city
Additional characteristics:	<p>Land area: 892 km²</p> <p>Population density (residents per km²): 3,890</p> <p>Polycentric city with short trips</p> <p>Vehicle ownership: 324 cars/1,000 residents</p> <p>45 % households without an own car</p> <p>Employees: 1,664,100 (2009)</p> <p>Low number of commuters (approx. 210,000 entering/120,000 leaving)</p> <p>Visitors 2010: 9 mil.</p> <p>Overnight stays 2010: 20.8 mil.</p>
2. Precursor of the Mobility Master Plan	
<ul style="list-style-type: none"> – First interim report <i>Verkehrsentwicklungsplanung für die Region Berlin</i> (Mobility Master Planning for the Berlin Region), October 1990 – Updated interim report <i>Verkehrsentwicklungsplanung für die Region Berlin</i>, March 1993 – <i>Verkehrsplanung für Berlin – Materialien zum Stadtentwicklungsplan Verkehr</i> (Transport Planning for Berlin – Materials on Transport for the Urban Development Plan (StEP)), July 1995 – Urban Development Plan Transport <i>Mobil 2010</i>, July 2003 with Senate approval from 8 July 2003 	
3. Reason for Updating	
<ul style="list-style-type: none"> – Resolution from the Abgeordnetenhaus (House of Representatives) 8 June 2000 – submission of a draft urban development plan - transport (= MMP) – Senate decision from 8 July 2003 requesting progress reports every 2 years and the necessity for updates when there are changes in the development of transport or the requirements from other transport-related areas (noise reduction, air quality, climate protection, traffic safety) – Changed conditions while updating in 2008: current and expected demographic development, population forecasts for Berlin, findings from noise action planning as well as clean air planning, continually declining traffic volumes in road traffic 	
4. Specific Features	
<ul style="list-style-type: none"> – Basis for a long-term, strategic transport policy in the State of Berlin; defines the framework for transport policy over the next 15 years <ul style="list-style-type: none"> • “outward” and “inward” integration • is seen in the context of other policy areas • formulates requirements for the Federal and European levels • considers all transport modes and the varying demands on transport operations – Temporal integration <ul style="list-style-type: none"> • short and middle-term measures tested for their ability also for long-term future options and requirements 	

⁴⁶ Bundesinstitut für Bau-, Stadt- und Raumforschung – Federal Institute for Research on Building, Urban Affairs and Spatial Development

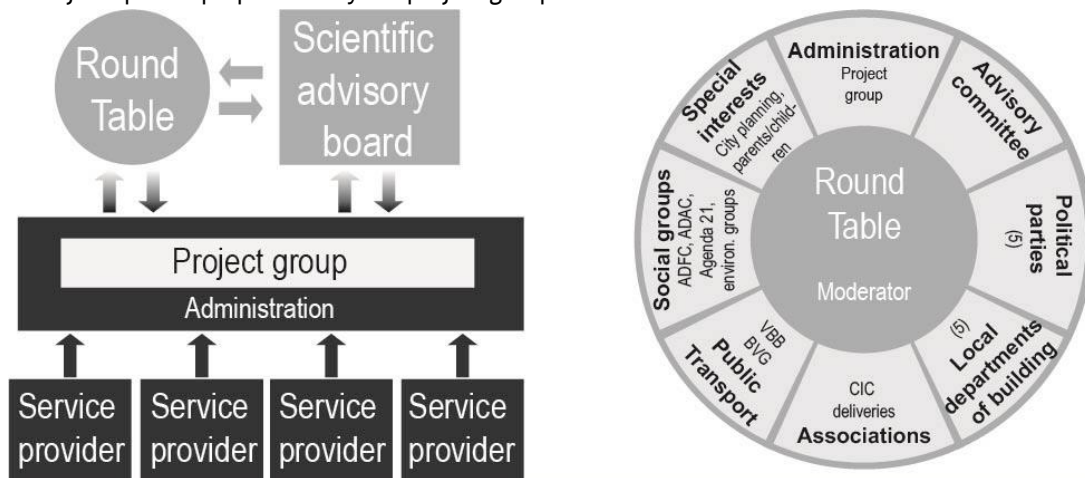
- comparison of long-term options of measures (infrastructure) with realistic, current development expectations
- Integration of all describable general conditions with an influence on mobility and travel (such as network structure, environmental legislation, household situation and predicted development, demographic development in Berlin and Brandenburg, social structures and predicted developments, transport development and forecasts)
- Successive and interrelated elements:
 - Vision up to the year 2040
 - goals (objectives for action and quality, categorised according to the sustainability criteria economic, environmental, social, institutional)
 - for better handling seven individual strategies (with respect to spatial area and content)
 - catalogue of measures organised according to fields of action
- Extensive methodological studies to evaluate the impacts of measures and goal achievement (impact assessments) including questions of the consequences of traffic (air pollutants such as NO₂, PM₁₀, noise, accessibility, CO₂)
- Continuation of evaluation and monitoring reports
- Participation of the Round Table in regular intervals according to approval

5. Features of Process Organisation and Participation

Consulting and cooperative planning approach

- Round Table with external moderator and the participation of the speaker of the scientific advisory board
- Scientific advisory board with representatives of various disciplines (traffic safety, urban development, ecology etc.)

With subject specific preparation by the project group of the Senate



Collective development of a vision

- Based upon the principles and visions of the first Urban Development Plan Transport 2003 with
 - new impulses,
 - overlapping areas with other policy and planning areas and
 - its own creative requirements (ideals and vision, capture of necessary changes)
- Practical aid and instrument for understanding and communication but also especially for common identification, especially of the subsequent steps (goals, strategies and measures), meaning ambitious but realistic



Extensive evaluation of measures and scenarios (impact assessments)

- Extensive impact assessments and calculations of the consequences of traffic based upon the national traffic forecasts for 2025 (multi-modal travel forecast for Berlin Brandenburg)
- Step 1: examination of individual measures in order to show what would happen if, in addition to implementing all of the measures from the first Transport-StEP from the year 2003, only the respective individual measure would be implemented. At the suggestion of the scientific advisory board and the Round Table amongst others, the individual assessment only examined measures that
 - were either controversial,
 - appeared to be ambiguous in their impacts or
 - were classified as very promising in regard to their impacts
- Step 2: building of scenarios in order to show which effects extending beyond the first Transport-StEP are able to be achieved through a combination with the discussed measures
- Step 3: calculation of the consequences of traffic (air, noise, accessibility)

6. Contact, Publications

Senate Administration for Urban Development and the Environment of the State of Berlin

Department VII Transport

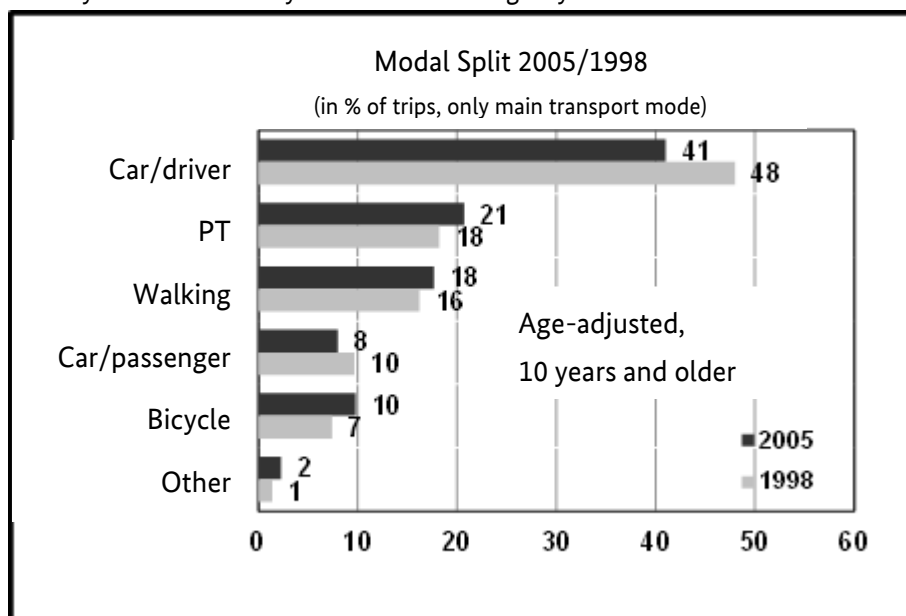
Division VII A "Grundsatzangelegenheiten der Verkehrspolitik, Verkehrsentwicklungsplanung" (General Issues of Transport Policy and Mobility Master Planning)

Senate approval from 29 March 2011, published as a brochure *Stadtentwicklungsplan Verkehr Berlin* (Urban Development Plan for Transport Berlin, Transport-StEP))

Profile Mobility Master Plan Dortmund/Masterplan Mobilität Dortmund 2004	
1. Characteristics City/Region	
Population:	578,000 (2011), forecast 2025 approx. 573,000
Spatial type according to BBSR:	Core city in agglomeration area
Central function according to State Development Plan (SDP):	Higher-order centre in the eastern Ruhr Region
Additional characteristics:	Stagnation of population in a decreasing region. Lowest forecasted population-losses in the Ruhr Area.
2. Precursor of the Mobility Master Plan	
<ul style="list-style-type: none"> – General transport plans in the 1960s and 1970s for road and rail – Individual mobility master plans for city districts in the 1990s 	
3. Reason for Updating	
<ul style="list-style-type: none"> – Structural change, re-use of former steel and coal mining locations – Changing population distribution within the city-limits – Preparation of a new land use plan, of integrated development concepts for city districts and so called master plans for various sectoral issues (e.g. retail, housing) – Calculation of new travel demand matrices 	
4. Specific Features	
<ul style="list-style-type: none"> – Close connection with the land use plan, further master plans and integrated district development concepts (InSEkt) – Vision in two parts with values and planning-oriented action goals – Consideration of various scenarios – Nine action concepts with a strong focus on non-motorised transport – Selection of key measures 	
<p>The diagram illustrates the flow of information and planning from local tasks to regional development. It shows how interdisciplinary tasks and departmental master plans (Economy, Environment, Mobility, Housing, Shopping, etc.) are integrated into InSEkt concepts at the neighborhood level. These then inform the Landscape Plan (LP) at the city level, the Land Use Plan (LUP) at the city level, and the Regional Development Plan (RDP) at the regional level. A large arrow indicates that these processes culminate in a formal process.</p>	

5. Features of Process Organisation and Participation

- Intensive participatory process as an accompanying working group with politicians, administration, organisations, institutions and other societal groups
- Fifteen externally moderated meetings of the accompanying working group within just two years
- Public events and discussions
- Internet documentations
- Consensus within the accompanying working group regarding the Masterplan Mobilität (Mobility Master Plan)
- Broad political majority for the council approval in May 2004
- Only approx. three years from the initial decision to prepare a plan until council's approval
- Continuation of the process with yearly focus issues (e.g. mobility management, commercial transport, bicycle transport, parking)
- Household survey from 2005 already shows an increasing bicycle modal share



- Update of the Masterplan Mobilität planned for 2014

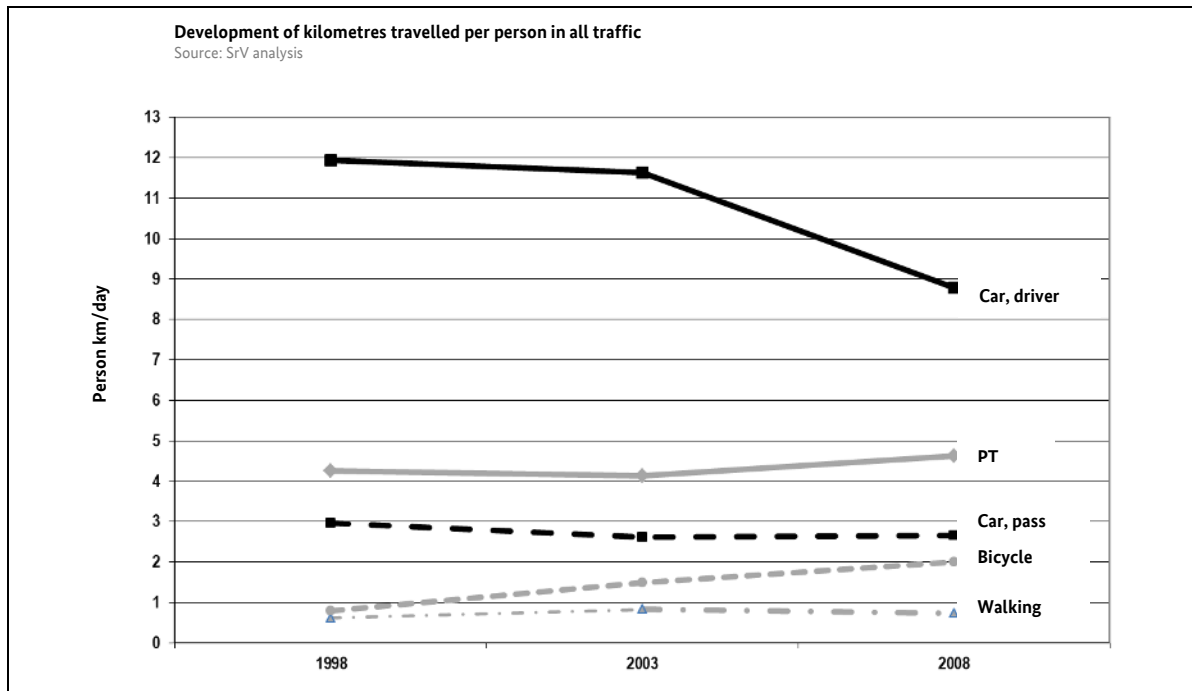
6. Contact, Publications

City of Dortmund, Department of Urban Planning and Building (DE):

http://www.dortmund.de/de/leben_in_dortmund/planen_bauen_wohnen/stadtplanungs_und_bauordnung_samt/stadtplanung/verkehrsplanung/gesamtstaedtische_verkehrsplanung/masterplan_mobilitaet/index.html

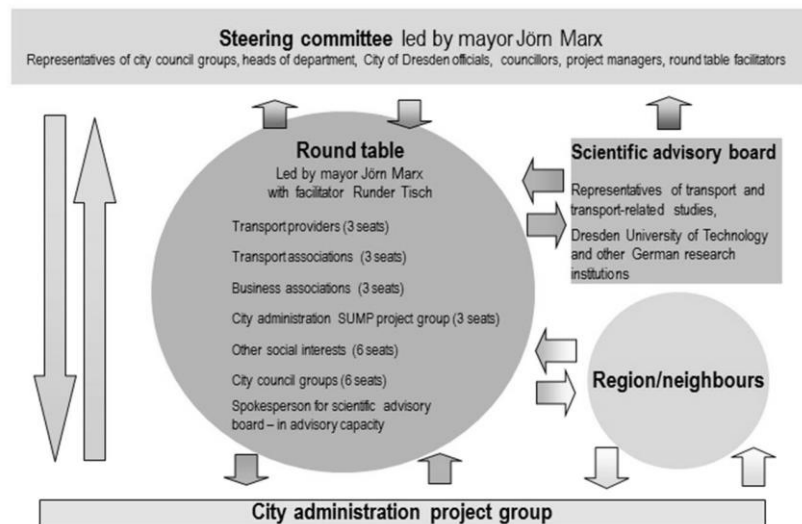
Masterplan Mobilität in 2004 from City Council approved and published

Profile Mobility Master Plan Dresden 2025plus/Verkehrsentwicklungsplan Dresden 2025plus	
1. Characteristics City/Region	
Population:	520,000 (2010), forecast approx. 550,000 (2025)
Spatial type according to BBSR:	Inner central area with mostly urban surroundings
Central function according to SDP:	Higher-order centre in densely populated area (metropolitan region Upper Elbe Valley)
Additional characteristics:	City growing since 15 years in a strongly to very strongly shrinking region
2. Precursor of the Mobility Master Plan	
<ul style="list-style-type: none"> – First transport concept after German reunification approved in 1994 – Administration updates in 2003/2007, however, without approval from City Council 	
3. Reason for Updating	
<ul style="list-style-type: none"> – Extensive changes in transport infrastructure due to large infrastructure measures in the last 15 years (new federal motorway A 17, expansion of the fast train and tram network, new Waldschlößchen Bridge) – Considerable updating and integration requirements from clean air policy, noise reduction and climate protection – Updating of the goals and objectives for mobility and travel over the next 15 to 20 years based on the general urban development goals – Harmonisation of political ideas with technical, sectoral and legal requirements 	
4. Specific Features	
<ul style="list-style-type: none"> – Very good empirical foundation: continual automatic traffic counts, time series data on mobility (every five years household survey “SrV”), road pavement management with status-quo assessments of road network – Comprehensive analysis on this basis of findings for the subsequent planning process – Stagnating motorisation since 15 years, from around 2003 declining – Despite increasing population for years no increase in motorised traffic – Particular effects from the duality of a growing city and a shrinking region – Observations of modal split do not sufficiently reflect developments, e.g. increase of 4 % in bicycle modal share from 1998 to 2008, however, due to population development and increases in travel distances almost a tripling of kilometres travelled by bike – Decoupling of urban development and development of (motorised) transport under certain conditions also in the forecast – Division into a strategic level (2025+) und an action concept – Strong focus on non-infrastructure measures – Early integration of cost aspects 	



5. Features of Process Organisation and Participation

- Very short deadlines in work processes
- As a result, consequences for the participatory process: participation mostly afterwards – however, difficult in the process, since participation is being demanded (“Round Table”, municipal politics)
- Comprehensive participatory structure



6. Contact Partners, Publications

City Administration Dresden, Urban Planning Department, Division of Mobility Master Planning

- Approval in Autumn 2014
- Publication in internet (DE):
http://www.dresden.de/de/03/verkehr/verkehrsplanung/verkehrsentwicklungsplanung/vep/003_Aktuelles.php

Profile **Mobility Master Plan Düsseldorf 2025/VEP Landeshauptstadt Düsseldorf 2025**

1. Characteristics City/Region

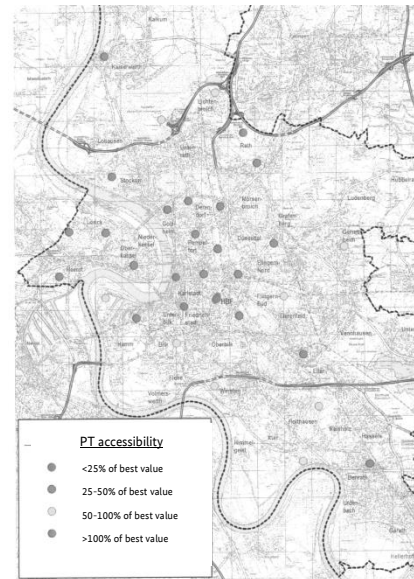
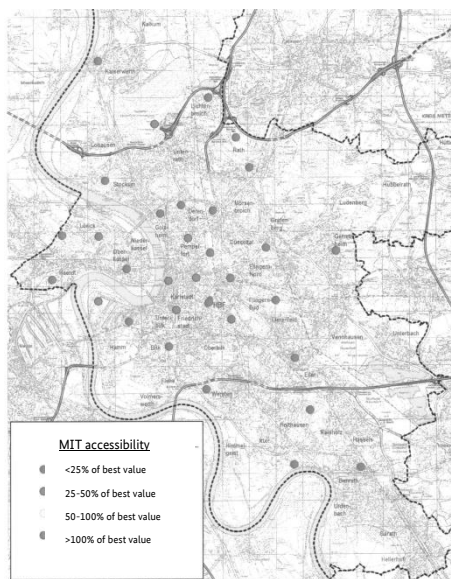
Population:	590,000 (2011)
Spatial type according to BBSR:	Large city in high density area of the Rhine Ruhr
Central function according to SDP:	Higher-order centre with airport of importance for the state
Additional characteristics:	Growing city, large share of highly qualified jobs, high housing prices, over 300,000 daily commuters

2. Precursor of the Mobility Master Plan

- General transport plan from the 1960s
- Sectoral MMP from the 1990s (bicycle transport, goods transport, transport concept)
- Mobility master plan 2020 (set up as a process from the very beginning, approved by City Council on 9 November 2006)

Features of MMP 2020:

- European-wide tendering process
- Calculation of the transport analysis and scenarios with travel demand model of the city
- Systematic assessment of compatibility and tolerance of street spaces (approx. 300 km)
- Systematic analysis of parking demand structure (at the level of model's travel zones)
- Systematic accessibility analysis for 32 locations in analysis and the scenarios



- No focus on the special promotion of any one mode of transport
- Limiting the programme of measures on the basis of the financial leeway up to the year 2020
- Process was accompanied by working groups and discussion forums
- Broad public relations with exhibitions and accompanying brochures
- Mandate for regular reporting in city council's planning committee regarding the state of implementation of the MMP (every two years) and the necessity for updating

3. Reason for Updating

In particular

- New basic assumptions on development of population and jobs (MMP 2020: decrease to 559,800 residents, MMP 2025: increase up to 605,000 residents)
- Change in settlement development planning (more housing, less office space)
- Integration of Clean Air Plan
- Strengthening of regional focus

4. Specific Features

No extensive new version since the basic strategy of the MMP 2020 is to remain valid. Therefore:

Continuation/Updating of elements “Travel Forecast” and “Environment”

- Expert report *Grundlagen für die Düsseldorfer Verkehrsprognose 2025* (Foundation for the Düsseldorf Transport Forecasts) together with neighbours

Trend scenario	Scenario Red	Scenario Blue
Mobility costs 2002-2010: MIT +21%; PT +30%	Strong economic growth	Introduction of car tolls to finance transport infrastructure (maintenance, expansion, new construction)
Household net income 2002-2010: +12%	Strengthening of municipal finances	Internalising external costs with car and truck tolls
Continuation of trends	Strengthening and service improvements in PT	Decreasing regionalisation funds
		Increasing scarcity of energy supply (oil, nuclear phase-out)
		Increasing energy demand and costs
Mobility costs > Household net income	Mobility Costs < Household net income	Mobility costs >> Household net income
+10%*	-5%*	+25%*

Quelle: protrans/prognos 20.12.2011 (authors' translation)

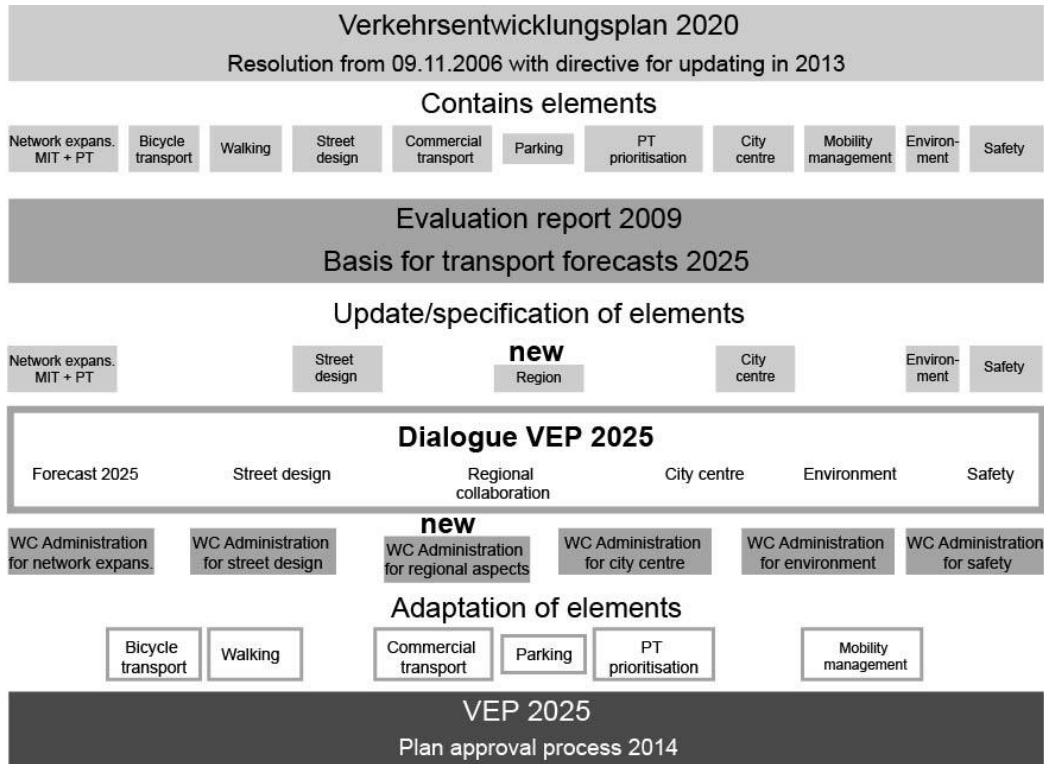
- New evaluation of infrastructure measures from the MMP 2020
- Environment (linking with clean air and noise action planning)

Detailing/concretisation of to an extent conflicting elements

- Transport concept for central city (strategic guidelines)
- Safety (with particular consideration for demographics and developments in bicycle transport)
- Street design (dealing with narrow cross sections for the implementation of handicap accessibility, raised train platforms (trams) and bicycle facilities)
- Region (creation of a joint data basis with neighbouring districts and cities (SrV 2013) and development of a strategy for regionally coordinated mobility master planning)

5. Features of Process Organisation and Participation

- Coordinated with the process of the urban development concept 2025+
- Instead of formal working groups and discussion forums (cf. MMP 2020) public dialogues on individual areas of transport development (central city, street design, traffic safety, environmental planning, regional mobility master planning) in the form of conferences
- close collaboration with the region



6. Contact Partners, Publications

Landeshauptstadt Düsseldorf, Amt für Verkehrsmanagement (State Capital Düsseldorf, Department for Traffic Management)

VEP Brochure Series: VEP6: Rückblick 2009-2012, Stand 2012, Ausblick 2025 (A Look Back 2009-2012, Status 2012, Outlook 2025, respectively)

Profile Overall principle and transport concept Görlitz 2011/Gesamtverkehrskonzept (GVK) Görlitz 2011

1. Characteristics City/Region

Population:	55,000 (2010), forecast approx. 49,000 residents (2025)
Spatial type according to BBSR:	Peripheral area with rural surroundings
Central function according to SDP:	Higher-order centre with shared functions
Additional characteristics:	Shrinking city since 1956 in a region that has been heavily shrunk for 20 years Located on the border with partner city Zgorzelec (approx. 35,000 residents) on the Polish side

2. Precursor of the Mobility Master Plan

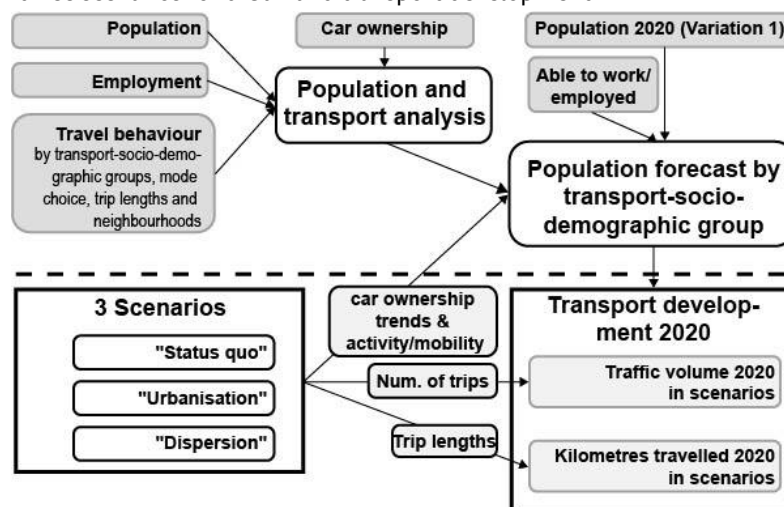
- Mobility Master Plan 1993
- Public Transport Concept 1996
- Transport concepts for the Old Town and three urban renewal districts since 2005

3. Reason for Updating

- Structuring of handling infrastructure (existing stock and expansion needs)
- Perspectives for the tram (preservation/expansion/closure)
- Demographic background
- Requirements of cross-border traffic
- Systematic structures for bicycle transport
- Tourism requirements
- Large expansion of city in north-south direction (almost 20 km)
- Updating and integration requirements from noise action planning
- Development of a vision and general principles for mobility up to 2020

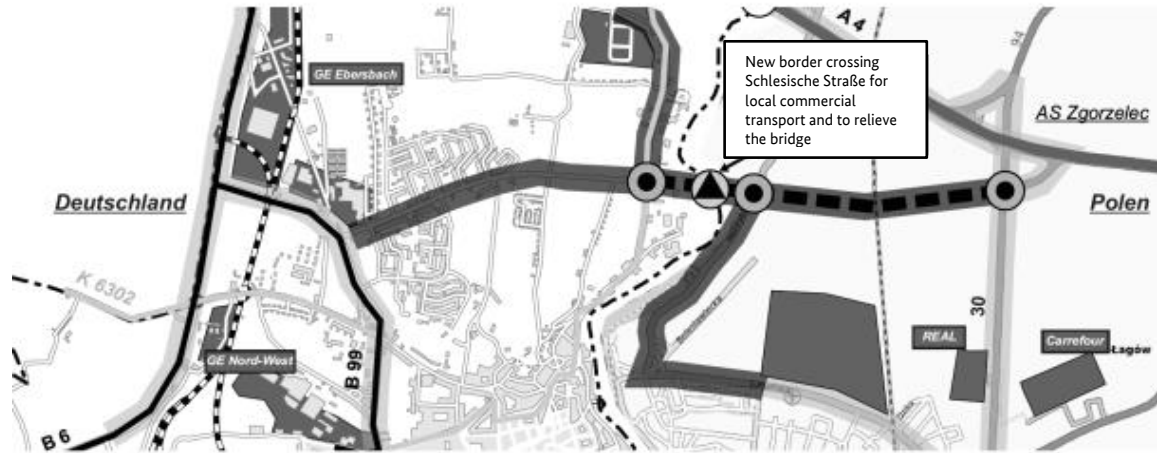
4. Specific Features

- Good empirical foundation through SrV 2003 as well as household surveys on both the German and Polish sides
- Development of three scenarios for urban and transport development



- Decision on an overall vision and transport policy goals 2020
- Elaboration of a transport demand model for evaluating measures – justifiable omission of various “planning ideas” from recent decades was possible
- In the end an implementation concept with a total of 30 recommendations for action in seven action areas including non-infrastructure measures (in particular design, bicycle transport and tourism)

- Clear prioritisation of cross-border network development for motorised individual travel, commercial, bicycle and touristic transport, keeping in mind the ability to act of a peripheral and shrinking city with potential
- Presentation of measures that are intended to enable detailed discussion with the Polish partner city and which are perceived more as ideas of partnership than as fixed measures



- Consideration of the requirements of individual neighbourhoods in the city
- Comprehensive communication process in the neighbourhoods and with citizens and politicians
- City council's adoption of the plan without political opposition

5. Features of Process Organisation and Participation

- Cross-border issues
- Development of a model only for the German side, however with extension-options for the Polish side
- Comprehensive participatory process
- Illustration of transport-related impacts of a strongly shrinking city – in particular on the road network and on PT
- Tight financial budget

6. Contact Partners, Publications

Stadtverwaltung Görlitz, Stadtplanungs- und Bauordnungsamt (City Administration of Görlitz, Department of Urban Planning and Building Regulations)

Overall principle and transport concept approved by City Council in 2010 and 2011, respectively

Profile Mobility Master Plan Munich 2005/VEP Landeshauptstadt München 2005	
1. Characteristics City/Region	
Population:	1.38 mil. (2000), 1.42 mil. (forecast 2015)
Spatial type according to BBSR:	Inner central area with mostly urban surroundings
Central function according to SDP:	Higher-order centre in high density area and core of the European Metropolitan Region Munich (EMM)
Additional characteristics:	Dynamic economic region with an increasing number of residents and jobs in the city and in particular in the surrounding area.
2. Precursor of the Mobility Master Plan	
<ul style="list-style-type: none"> – Status quo analysis of transport in Munich (1995) – “Münchner Perspektiven einer stadtverträglichen Mobilität” – Munich Perspectives for a City Compatible Mobility (1995) – Preparation of a new city development concept “Perspective Munich” with transport as integrated theme (1998) 	
3. Reason for Updating	
<ul style="list-style-type: none"> – City council request to update the last MMP from 1983 in coordination with all transport-related areas – Lead project for the city development concept “Perspective Munich” – Investigation of necessary transport infrastructure measures for continuing economic and settlement development – Investigation of the impact of various strategies in order to satisfy increasing environmental demands – Preparation of a coordinated concept as basis for investment measures in transport 	
4. Special Features	
<ul style="list-style-type: none"> – Good empirical foundation: continual traffic count stations in main road network in the city and at the city boundary; household surveys on transport with a city-specific increase in sample size (Mobility in Germany and Munich 2002) – Travel simulation model for the city and surroundings that was updated and expanded into a multi-modal comprehensive travel model as part of the preparation of the MMP – Beside the status quo analysis 2010 and the baseline scenario 2015, a planning firm in cooperation with the administration developed and calculated three scenarios (focus on motorised individual travel, focus on PT as well as a focus on traffic and mobility management) – Preparation of a concept for action and measures with consideration for environmental impacts and a regional mobility culture 	

5. Features of Process Organisation and Participation

- Extensive participatory process with citizens as well as with all transport-related areas and institutions in the city and in the region
- Preparation of a preliminary draft from the administration as a basis for discussion
- Preparation of a draft with status quo analysis and future scenarios by a team of experts in cooperation with the city administration
- Extensive events for public discussion of the draft with citizens, politicians and representatives from commerce, science and the administration
- Preparation of a concept for action and measures following the documentation and evaluation of the results of the phase of public hearings as well as approval by City Council on 15 March 2006

6. Contact Partners, Publications

Landeshauptstadt München, Referat für Stadtplanung und Bauordnung, Abteilung Verkehrsplanung (State Capital Munich, Department for Urban Planning and Building Regulations, Division of Transport Planning)

Publication of the Mobility Master Plan by the Department for Urban Planning and Building Regulations, 2006

Profile **Mobility Master Plan Pforzheim 2010/Verkehrsentwicklungsplan Pforzheim 2010**

1. Characteristics City/Region

Population:	116,000 (2008), forecast approx. 112,000 (2025)
Spatial type according to BBSR:	Inner central area
Central function according to SDP:	Higher-order centre
Additional characteristics:	Topography of the entire city is characterised by hilly terrain, close to the metropolitan areas Stuttgart and Karlsruhe, cityscape determined extensively by motor vehicles

2. Precursor of the Mobility Master Plan

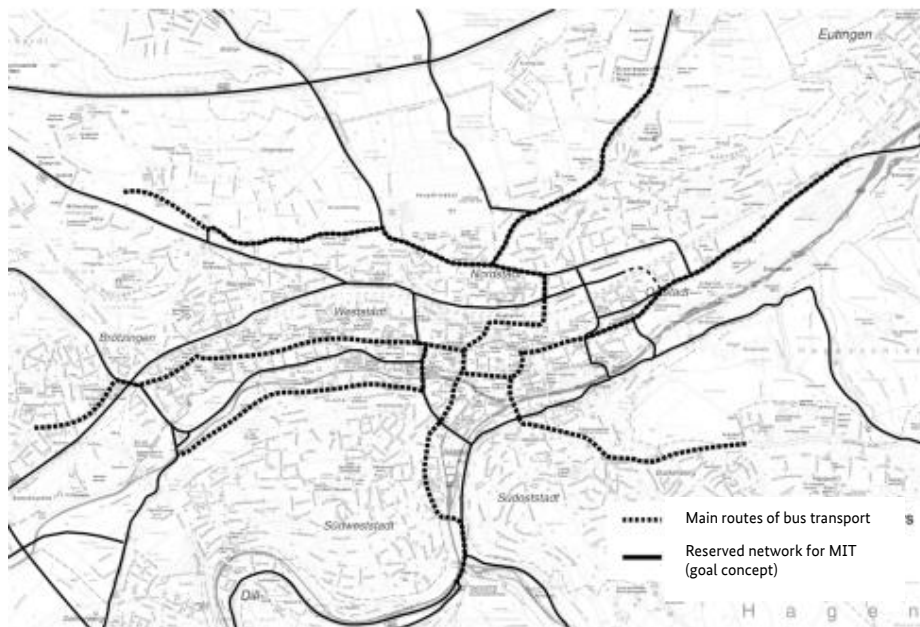
- Mobility Master Plan 1990 (not decided upon in City Council)

3. Reason for Updating

- Updating and continuation of the Mobility Master Plan 1990
- Evaluation of extensive road construction measures that are either already planned or being considered
- Reversal of the trend of increasing motorised individual travel by intensive promotion of environmentally friendly travel modes
- Investigation of high-quality improvements in PT

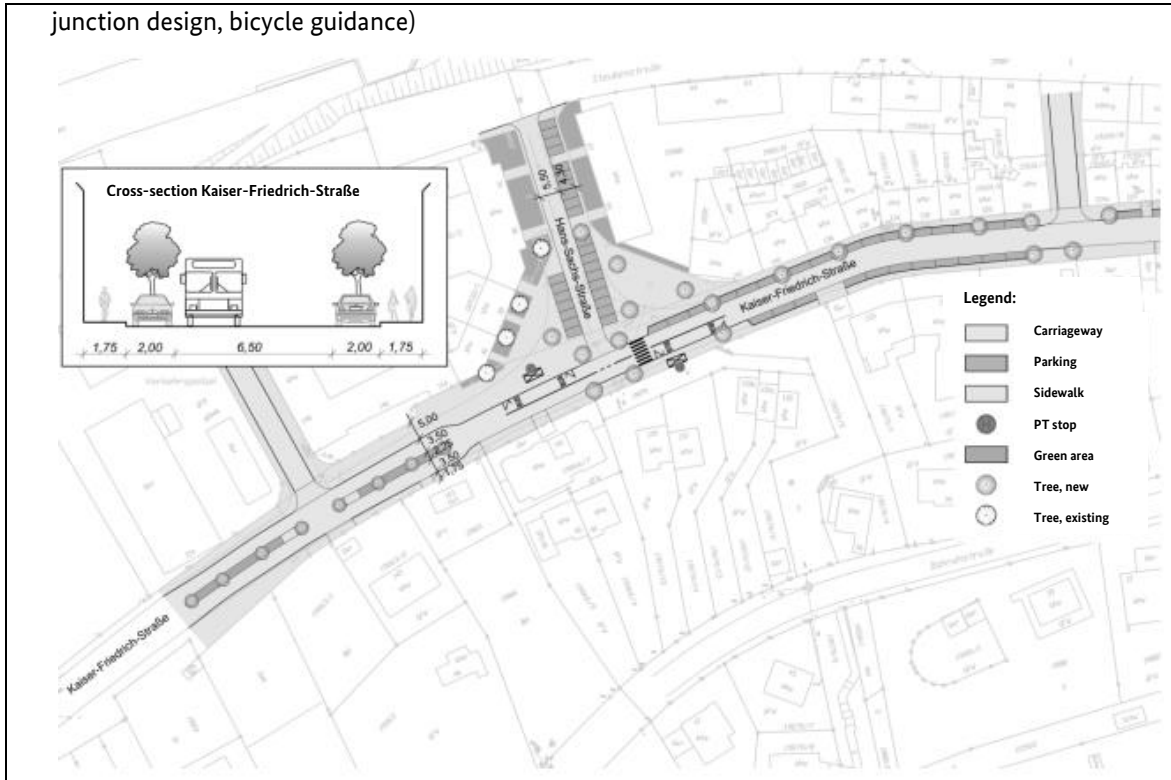
4. Special Features

- Very good empirical foundation (travel survey and motor vehicle counts, household survey, intensive surveys of households (panel), survey of school children, parking, status quo analysis of bicycle and pedestrian network)
- Development of a vision with goals for urban development as basis for the subsequent process of mobility master planning
- Investigation of network variations for a detailed examination of individual impacts
- Combination of the network variations into scenarios and elaboration of a target concept



- Evaluation of transport-related impacts of various PT expansion possibilities (transit rail, tram and a high-quality bus system) using a travel demand model
- Preparation of a realisation concept with recommendations for the implementation of measures in stages
- Concrete, exemplary suggestions for solutions to individual themes and problematic areas (such as

junction design, bicycle guidance)



5. Features of Process Organisation and Participation

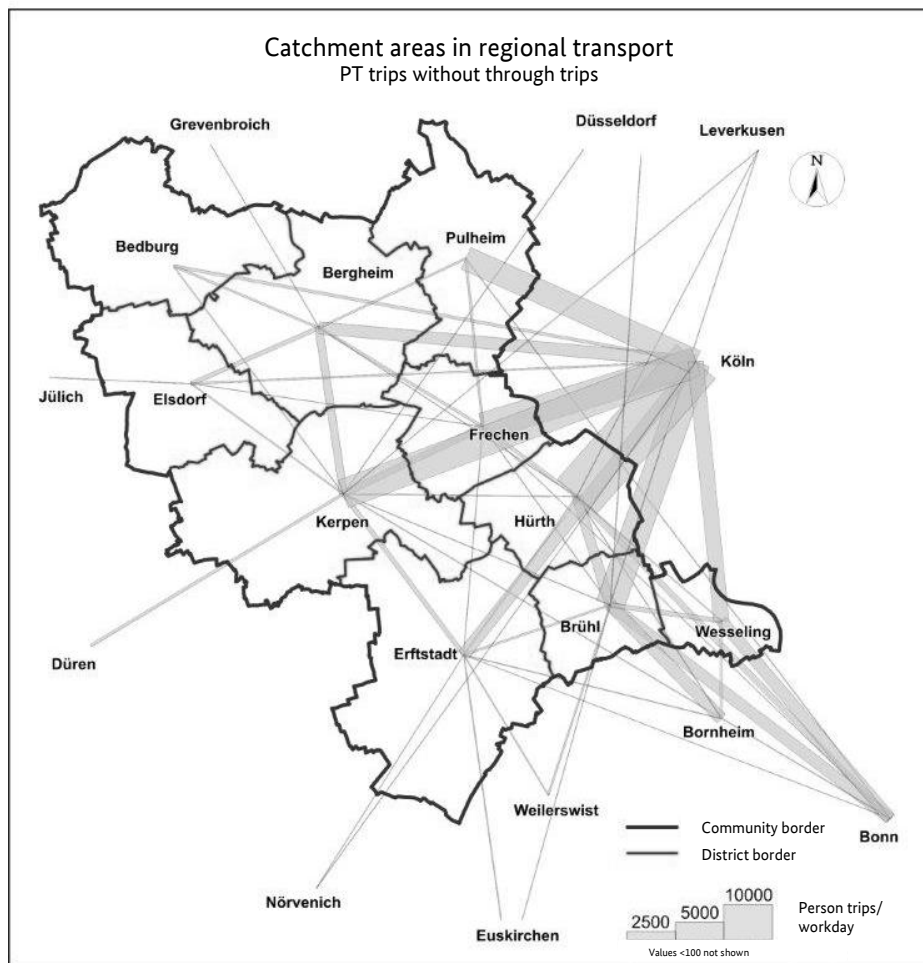
- Presentation of results in civic committees and councils
- Meetings accompanying the working process in the project advisory board and in the working group (with the participation of experts from city administration, the city council, representatives from other departments and organisations along with external experts)
- Comprehensive information and intensive participation of the public (information-events, thematic discussion forums, internet forum)

6. Contact Partners, Publications

Stadt Pforzheim, Grünflächen- und Tiefbauamt (City of Pforzheim, Department for Parks and Public Works)

- Resolution on vision and goals, July 2008
- Resolution on the MMP, December 2009

Profile Mobility Master Plan Rhein-Erft County 2015 Verkehrsentwicklungsplan Rhein-Erft-Kreis 2015	
1. Characteristics City/Region	
Population:	Ten cities, six of which with $\geq 50,000$ residents each, make up the Rhein-Erft-Kreis with approx. 465,000 residents in the area of the district (2010), forecast approx. 500,000 residents (2020)
Spatial type according to BBSR:	Inner central area with mostly urban surroundings
Central function according to SDP:	Mostly on the border of metropolitan area (west of Cologne)
Additional characteristics:	For a long time district with disproportionately high growth in a growing metropolitan area
2. Precursor of the Mobility Master Plan	
<ul style="list-style-type: none"> – First district-wide mobility master plan from 1993 (the Rhein-Erft-Kreis was at the time a model region for a “regional MMP”) – Municipal mobility master plans in individual towns of the district 	
3. Reason for Updating	
<ul style="list-style-type: none"> – Dynamic trends in population and traffic – Monitoring after more than 10 years of the MMP in Rhein-Erft-Kreis – High rate of implementation of measures from 1993 – Update and continuation of concepts of goals and measures for regional motorised individual travel, bicycle transport and PT 	
4. Specific Features	
<ul style="list-style-type: none"> – Very good empirical foundation (population survey, automatic traffic count stations for motorised transport, PT origin-destination study for the area of the PT umbrella organization, status quo evaluations for the bicycle network) – Dynamic development of large commercial land uses – To an extent a heavy influence of open coal pits on land use and the road network – Perspectives for development in rail transport (extending well beyond the time frame of the PT Plan) – Strong focus on infrastructure measures 	



5. Features of Process Organisation and Participation

- Extensive participation of municipalities of the district
- Extensive participation from NGOs
- Regular reporting in political councils and committees (public)
- Partially supplementary citizen workshop (selective, depending on local issues)

6. Contact Partners, Publications

Rhein-Erft-Kreis, Amt für Straßenbau (Amt 66), (Rhein-Erft-District, Department for Road Construction and Transport (D 66))

Profile **Mobility Master Plan Winnenden 2020/Verkehrsentwicklungsplan Winnenden 2020**

1. Characteristics City/Region

Population:	28,000 (2007), forecast approx. 29,500 (2020)
Spatial type according to BBSR:	Inner central area
Central function according to SDP:	Lower-order centre on a state development axis
Additional characteristics:	Growing town up to 2002, afterwards stagnating population development

2. Precursor of the Mobility Master Plan

- Local Transport Plan 1989, update 2000

3. Reason for Updating

- Amended version of the land-use (zoning) plan and the urban development plan
- Comprehensive transport concept in conjunction with the relocation of the B 14 from a main through road to a bypass road (2010)
- Creation of a basis for a consolidation of town planning

4. Specific Features

- Extensive surveys of car traffic, parking as well as bicycle traffic; household survey
- Development and maintenance of a travel demand model for motorised individual travel



Status 2007



Forecast 2020 (reference case)

- Preparation of two alternatives for routing and guiding traffic through the town centre
- Consideration of the construction of a hospital for the Rems-Murr-district in Winnenden
- Development of a comprehensive PT concept including neighbouring communities

5. Features of Process Organisation and Participation

- Regular meetings of working groups
- Regular reporting in City Council
- Extensive public information and participation
- Presentation of the results in the local gazette
- Continuation of the process of mobility master planning through regular meetings of a working group on the reorganisation of public transport (PT)

6. Contact Partners, Publications

Stadt Winnenden, Stadtentwicklungsamt (City of Winnenden, Department for Urban Development)

Vision and goals as well as the Mobility Master Plan were approved by the City Council in 2008 and 2009. The public transport concept is being implemented in 2012. Urban design competitions for important areas of the city were initiated.

Appendix 2: Working steps for preparing a mobility master plan

Pre-orientation phase

What	How	Why	When	Leadership	Participation	Comments
1 Estimate of necessary resources, time and financing for the tasks of the strategic-conceptual level and, if possible, of the implementation level, as well	Estimate of the general magnitude, e.g. request current prices from comparable communities and comparable conditions	Provide a time frame for development		Administration		Providing a time frame is helpful for time and workflow planning as well as for the organisation of a results-oriented working process
2 Legitimation for developing/ updating a MMP	<ul style="list-style-type: none"> – Through decision of the responsible political committee – Council approval, since the environment, urban planning and finances are affected in addition to transport – A draft resolution can be submitted by an administrative department or a political party. 	<ul style="list-style-type: none"> – Necessary for legitimation through municipal policy – Reserving budgetary resources – Setting aside personnel – Acceptance of participation concept – Approval of content orientation and where necessary of the main elements of elaboration 	At the latest before starting comprehensive internal tasks or awarding contracts	Administration	<ul style="list-style-type: none"> – Political decision-makers – Responsible municipal decision-making bodies/committees 	<ul style="list-style-type: none"> – Type and extent of the resolution depend upon the town-specific context. Content and orientation can be presented either in detail as a table of contents or as a rough outline, a concrete concept for participation can also be presented later at the beginning of problem analysis.
3 Definition of the study region	Presentation of relevant transport-related relationships between the city and its surroundings based on spatial structure	<ul style="list-style-type: none"> – Developing recommendations that extend across administrative boundaries – Expansion of data basis for mobility master planning to include the surrounding urban region for the presentation of relevant origin, destination and through trips 	Before completing traffic counts and travel surveys and before activating travel demand models	Administration	<ul style="list-style-type: none"> – Municipalities, transport associations, transport operators – Public transport and local rail commissioning authorities – Regional associations – Road construction authorities – Where necessary regional planning 	A change in travel behaviour, e.g. of commuters, should be able to be modelled as precisely as possible. Commuter routes therefore have to be represented with sufficient quality in order to be able to depict changes in travel supply outside of the planning area and the impacts on the planning area.

What	How	Why	When	Leadership	Participation	Comments
4 Definition of the boundaries of the planning area	<ul style="list-style-type: none"> – External boundaries of the regional authorities involved in the planning – Possibility for developing inter-municipal or regional mobility master plans 	<ul style="list-style-type: none"> – Planning independence of individual municipalities – Responsible agencies and authorities present/missing – Sharing of costs between participating municipalities, transport associations and operators 	At the start of the elaboration process or, as the case may be, at the start of travel demand modelling	Administration	<ul style="list-style-type: none"> – Municipalities, transport associations, transport operators – Public transport and local rail commissioning authorities – Regional associations – Road construction authorities – Where necessary regional planning 	The study region (item 3) is larger than the planning area and focuses on the relevant transport interrelations.
5 Clarification of the project management structure, the personnel responsible for parts of the MMP and the extent of decision-making	<ul style="list-style-type: none"> – Project management, participants – Establishment of an internal working group within the administration 	Clearly define the decision-making levels in the technical administration	If possible before preparing the tender notice, at the latest when awarding the contract or, as the case may be, when beginning work internally (if external planning consultants are not being used)	Head of the department or technical division	Internal working group (WG) within the administration	Adapted to fit the city and administrative structure
6 Concept for participation	<ul style="list-style-type: none"> – Clarification of which groups (or in some cases the public) are to participate, when, through which representatives, to what extent and with what technical resources – Decision by committee 	A strong participation requires a clear structure	As early as possible before beginning work, at the very latest before the analysis phase	Head of the department or technical division	<ul style="list-style-type: none"> – Internal WG within the administration – Political decision-makers – Responsible municipal decision-making bodies/committees 	<ul style="list-style-type: none"> – Also relevant for “internal marketing” (within the administration) – Where necessary a decision by the responsible political committee is also helpful for legitimising the participation concept in addition to the accompanying roundtable, scientific advisory committee and public forums – cf. FGSV (2012b)

What	How	Why	When	Leadership	Participation	Comments
7 Clarification of whether or not a travel demand model should be used in the MMP	Examination of whether or not the issues make the use of a model necessary or vice versa, whether or not there are even models and data available that fit the issues	Weighing of resources and benefits	Before preparing tender notices	Head of the department or technical division	Internal WG within the administration	<ul style="list-style-type: none"> – The use of models is highly recommended for large planning areas, however for smaller and mid-sized cities not absolutely necessary – cf. Sections 7.2 and 8.3 Fehler! Verweisquelle konnte nicht gefunden werden.
8 Quality management of the travel demand model	Specification of standards if a new model is being developed	Ensuring the independence of individual actors and supposed constraints		Head of the department or technical division, if necessary inclusion of external consultants	Internal WG within the administration, professional preparation of the travel demand model	<ul style="list-style-type: none"> – Deliverance of the model to the contracting authority in order to ensure continual data maintenance – When designing the travel demand model it can be helpful to incorporate external consultants

Problem analysis phase and goal definition

What	How	Why	When	Leadership	Participation	Comments
9 Determination of tasks to be completed externally and those to be completed in-house	Tendering as a package or in separate contracts	<ul style="list-style-type: none"> – Optimisation of personnel and resources – Making use of the strengths of individual planning consultants – Stretching of financial resources, distribution across multiple fiscal years 	Before preparing tender notices, after clarification of the project structure	Head of the department or technical division	Internal WG within the administration	<ul style="list-style-type: none"> – Internal tasks are helpful in increasing the competency of the administration, in small administrations, however, only affordable to a limited extent – Internal tasks as initial support for mobility master planning as a continual process

What	How	Why	When	Leadership	Participation	Comments
10 Preparation of tender notice (TN) and work programme (WP)	Definition of minimum requirements of the WP	The preparation of the TN serves to form opinion at the contracting authority, define the desired scope of the MMP, compare prices of external services and to provide security for the contracting partner	After the decision to prepare the MMP	Head of the department or technical division	<ul style="list-style-type: none"> – Internal WG within the administration – Municipalities, transport associations, transport operators 	<ul style="list-style-type: none"> – General tender notice: quick to prepare but difficult to calculate for planning consultants, can result in problems later when accepting services, requires the definition of work packages before beginning – Differentiated tender notice: planning consultants can submit an offer that has been calculated in more detail, misunderstandings and their effects can therefore be avoided. However due to the necessary, precise definition of content more effort is required in advance. The working dynamic, however, requires flexible modifications of the WP in order to prevent the unnecessary completion of tasks that are no longer required – The TN has to be formulated in accordance with the grounds for political decision-making – Under no circumstances should the creativity of the competing planning consultants be restricted, alternative tenders must be allowed

What	How	Why	When	Leadership	Participation	Comments
11 Obtaining offers from external planning consultants	Invitation to tender or free allocation after comparing prices		After preparing the TN	Head of the department or technical division	<ul style="list-style-type: none"> – Internal WG within the administration – Planning consultants submitting offers 	Observe procurement law (optimise resources) ⁴⁷
12 Allocation of contracts	<ul style="list-style-type: none"> – Issuing a report or an award decision, as the case may be – Observe applicable procurement law 		<ul style="list-style-type: none"> – After completion of discussions with bidders and securing financing – Observe internal procurement guidelines 	Head of the department or technical division	If applicable inclusion of the advisory project committee for legitimising the selection of planning consultant	<ul style="list-style-type: none"> – Observe procurement law regarding evaluation criteria – Economic efficiency is not solely attainable by minimizing costs – It may eventually be necessary to clarify that the selection of planning consultant(s) before goal definition is helpful for a swift completion of the project and does not represent a particular orientation for the MMP.
13 (Transport) vision for the strategic-conceptual and implementation levels	<ul style="list-style-type: none"> – Description of what transport should look like in the future and through which principles (sustainability, local mobility) it should be characterized – It is recommended that the responsible decision-making committee pass a resolution 	In order to build consensus beyond just the MMP, that can be used for all transport design issues	Before starting the concrete discussion of goals	Head of the department or technical division	<ul style="list-style-type: none"> – Internal WG within the administration – Political decision-makers – Neighbourhood assemblies – Accompanying (external) working committee (WC) – Public, where applicable 	<ul style="list-style-type: none"> – One vision is important as a common basis – Ideal: incorporation into an overall vision for the town

⁴⁷ The formal requirements of an EU-wide invitation to tender are extensive, however in this way it is also possible to contract out a comprehensive service such as concept development and model preparation in one process. Alternatively, individual contracts can be awarded for parts of the mobility master plan or the travel demand model and the MMP separately.

What	How	Why	When	Leadership	Participation	Comments
14 Specification of operational goals	<ul style="list-style-type: none"> – Goals are derived from the vision – Level of goal attainment should, where possible, be measurable – A system of objectives should be striven for that is lean, as transparent as possible but also holistic. It should fit regional circumstances with a weighting of individual goals. – Consideration of existing systems of objectives from other (in particular legally binding) plans (these may have to be made more specific and adapted) – Examination of goals from previous MMP and other plans – Observe local goals of (urban) subregions – Different possibilities for developing goals (planning consultants, public forums, external WC) – Secure the system of objectives as well as goals through political resolution (at the very least, provision of information for policy makers) 	Analysis of the status quo and assessment of the impacts of scenarios, concepts and/or measures	At the beginning of or potentially parallel to analysis	Head of the department or technical division	<ul style="list-style-type: none"> – Internal WG within the administration – Contracted planning consultant(s) – External WC – Political decision-makers – Public, where applicable 	<ul style="list-style-type: none"> – Contains goals for environmental impacts, e.g. reducing CO₂, along with social and economic effects – Objectives that are detailed and difficult to achieve are often politically difficult to implement

What	How	Why	When	Leadership	Participation	Comments
15 Derivation of indicators from the system of objectives	<ul style="list-style-type: none"> – Quantitative, qualitative and intangible criteria and indicators – Assigned to goals – Specification of the assessment method (benefit-cost analysis, utility analysis, ranking assessment with multiple criteria) 	<ul style="list-style-type: none"> – Calculation of impacts – Comparison of measures – Basis for deficiency analysis, evaluation and monitoring – Systematic representation of advantages and disadvantages 	After specifying system of objectives and goals	Head of the department or technical division	<ul style="list-style-type: none"> – Internal WG within the administration – Contracted planning consultant(s) – External WC 	<ul style="list-style-type: none"> – Criteria must clearly illustrate differences – Indicators must cover all goal categories – cf. FGSV (2001), Section 5.3
16 Transport analysis (supply and demand)	<ul style="list-style-type: none"> – All transport modes; walking, cycling, PT, private vehicle – Inter and multi-modality – Mobility management – Commercial transport (goods and service transport) – Depending on local supply and the relevant regional supply – Use of existing surveys – With an acceptable level of effort while considering measures to be developed – New/follow-up survey if necessary data not available – Show deficiencies and opportunities (results of the analysis) – Reporting to political committees 	<ul style="list-style-type: none"> – Comparison of supply and demand – In order to reveal shortcomings of the current transport system in goal attainment 	Before developing scenarios	Head of the department or technical division	<ul style="list-style-type: none"> – Internal WG within the administration – Contracted planning consultant(s) – External WC – Public – Political decision-makers 	<ul style="list-style-type: none"> – With the participation of policy makers the administration can recognise whether the politically important questions have been covered – Observe goals for level of quality from national or state/local guidelines as the case may be

Measure development phase

What	How	Why	When	Leadership	Participation	Comments
17 Scenarios of future spatial development (reference cases)	<ul style="list-style-type: none"> – Estimate of spatial and demographic developments – Estimate of changes in travel demand – Specification of differing financial, political and economic conditions – Use of base data from other plans (national, state, regional, land-use plans) – If available, use of existing urban development scenarios 	<ul style="list-style-type: none"> – Preparation of planning activities based on future developments (the transport impacts of differing spatial developments can be calculated and evaluated) – Basis for the definition of the business-as-usual case 	<ul style="list-style-type: none"> – Gathering of data relatively early on – Before running the model, should a corresponding data basis not be available 	Head of the department or technical division	<ul style="list-style-type: none"> – Internal WG within the administration – Contracted planning consultant(s) – External WC 	<ul style="list-style-type: none"> – The connections and feedback loops between transport and spatial structure must be accounted for through a coordinated preparation of the land-use plan and MMP as part of urban development planning. – It must be specified which determining factors are to be varied and which are to remain constant. – cf. Section 4.4
18 Business-as-usual case (trend scenario)	<ul style="list-style-type: none"> – Forecast of spatial, demographic and economic data – Specification of forecasted network/travel supply – Specification of implemented measures – Specification of planning horizon (10-15 years, data from national/state level must be available) – For all transport modes – Consideration of requirements from higher planning levels (national, state) – Analysis of future opportunities and deficiencies in the business-as-usual case 	Reference case for evaluating concepts of measures (item 19)	Gathering of data relatively early on should a corresponding data basis not be available	Head of the department or technical division	<ul style="list-style-type: none"> – Internal WG within the administration – Contracted planning consultant(s) – External WC 	<ul style="list-style-type: none"> – It must be reviewed, whether projects from previous plans, which haven't been implemented yet, are to be included in the business-as-usual case – On the one hand, when specifying the planning time frame, consideration should be given to the fact that preparing a MMP can take several years. On the other hand, it should be reviewed, with which quality spatial, demographic and economic forecasts are already available.

What	How	Why	When	Leadership	Participation	Comments
19 Concepts of measures and further development of measures	<ul style="list-style-type: none"> – Development of infrastructural, operational and regulatory measures for all transport modes – Setting of main focus town-specific – Including cross-sectional concepts (by trip purpose, spatial structure, subregion/neighbourhood) – Differentiation of supply and demand-oriented measures – Together with public and policy makers – Reports to policy makers 	<ul style="list-style-type: none"> – Remedy deficiencies identified in the status quo analysis or trend scenario, achieve specified goals – Consideration of economic feasibility – In goal-oriented mobility master planning, handling travel demand is just one of many performance criteria. – Differing planning visions are evaluated and chosen as a basis for action. 	<ul style="list-style-type: none"> – After deficiency analysis and after specifying goals or the system of objectives as the case may be – Before scenarios of measures, in order to develop them 	Head of the department or technical division	<ul style="list-style-type: none"> – Internal WG within the administration – Contracted planning consultant(s) – External WC – Political decision-makers – Public 	In the spectrum of measures, the available resources and the authority of public administration need to be taken into consideration. In general there is a lot of room for action, since there are no requirements in Germany for which measures are allowed or not allowed to be planned in a MMP.
20 Scenarios of measures	<ul style="list-style-type: none"> – For structuring the concepts of measures – If applicable exaggeration in order to show effects – Reveal conflicting goals – Simulation of impacts from measures that do not lie within municipal authority such as regional mobility pricing – Linked with the reference cases of residential and spatial development for the planning time frame 	<ul style="list-style-type: none"> – Preparation of the estimate of impacts – As a basis for choosing the orientation, e.g. which transport mode should be more strongly promoted in order to achieve the goals 	<ul style="list-style-type: none"> – After development of the (concepts of) measures – Items 20, 21, 22 as an iterative process 	Head of the department or technical division	<ul style="list-style-type: none"> – Internal WG within the administration – Contracted planning consultant(s) – External WC 	Using the impacts on transport from spatial changes (reference case), the scenarios of measures provide planners with knowledge of the system of transport, allowing them to determine with which measures the goals are best able to be achieved without unwanted side effects.

What	How	Why	When	Leadership	Participation	Comments
21 Estimate of impacts	<ul style="list-style-type: none"> – Estimate impacts in the goal categories using the indicators – Not everything is quantifiable 	<ul style="list-style-type: none"> – Prerequisite for the evaluation in order to show the diverse and indirect impacts of transport measures (advantages and disadvantages) – Illustration of the impacts of certain (sets of) measures 	Items 20, 21, 22 as an iterative process	Head of the department or technical division	<ul style="list-style-type: none"> – Internal WG within the administration – Contracted planning consultant(s) – External WC 	Put the results of the estimates up for discussion and reflect on them in hearings of experts
22 Evaluation of impacts from measures or sets of measures	<ul style="list-style-type: none"> – Evaluation of impacts from measures while considering the goal categories, goals and the indicators as well as weighted importance according to the chosen evaluation method – Consideration of costs for infrastructure and operation 	With limited financial resources to achieve the highest level of goal attainment	<ul style="list-style-type: none"> – Before preparing the action plans – Items 20, 21, 22 as an iterative process 	Head of the department or technical division	<ul style="list-style-type: none"> – Internal WG within the administration – Contracted planning consultant(s) – External WC 	<ul style="list-style-type: none"> – Account for sensitivity of results (e.g. through differentiated weighting of goal categories and goals) – The comparison of impact and goal should lead to a quality grading for each criterion

Weighing options and decision-making phase

What	How	Why	When	Leadership	Participation	Comments
23 Action plan for strategic-conceptual level and for the measures to be implemented	Derivation, discussion and evaluation of scenarios and concepts of measures	Basis for resolution on the MMP while considering personnel and financial resources for implementing measures	After the iterative process of items 20, 21, 22	Head of the department or technical division	<ul style="list-style-type: none"> – Internal WG within the administration – Contracted planning consultant(s) – External WC 	

What	How	Why	When	Leadership	Participation	Comments
24 Presentation of the draft MMP	In political committees and in the public	As a basis for discussion for the resolution	Before deciding on the resolution	Head of the department or technical division	<ul style="list-style-type: none"> – External WC – Political decision-makers – Public – Media 	The draft version of the MMP should be presented to the public and made publicly available. The draft stage is necessary for allowing political parties to comprehensively address the draft plan and introduce their desired changes
25 Decision on the MMP	Decision by the responsible committees	<ul style="list-style-type: none"> – Necessary basis for legitimising the implementation of the content of the MMP – Self-commitment by the municipal decision-making committee – Integration of the results into formal plans 	After presenting the draft MMP	Political resolution by municipal decision-making committee		Basic statements on evaluation, monitoring and process continuity should be part of the resolution

Implementation and monitoring phase

What	How	Why	When	Leadership	Participation	Comments
26 Implementation strategies	<ul style="list-style-type: none"> – Preparation of an action plan – Time frames for implementation – Consideration of current conditions (finances, personnel) – Show ranking of measures for implementation 	<ul style="list-style-type: none"> – For implementation of measures – Use of personnel and financial resources in the administration – Self-commitment – Aid for coordination and integration with other planning areas – Quality management 	Part of the resolution on the MMP	Head of the department or technical division	Departments or technical divisions that will be heavily involved in implementation (such as transport operator, department of public works, road traffic authority)	<ul style="list-style-type: none"> – Cost estimates for measures are necessary – If applicable, modification to align with legislative periods helpful

What	How	Why	When	Leadership	Participation	Comments
27 Continuity of the process of mobility master planning	<ul style="list-style-type: none"> – Ongoing execution of measures – Monitoring – Reporting duties in responsible technical committee, e.g. presentation of a progress report and infrastructure report every two years – Specification of time frame and personnel responsible for implementing strategies and measures of the MMP – If applicable, establishment of a continual WG “integrated mobility master planning” – Regular (yearly) meeting of the accompanying working committee – Specification of main themes taking into account transport-related plans PTP, CAP, NAP – Detailed studies on topics in the MMP that were only able to be dealt with on the strategic-conceptual level – Continual updating of data 	<ul style="list-style-type: none"> – Efficient use of resources – Demonstrate that the resolution is being carried out – Simplification of updating 	Part of the resolution on the MMP	Head of the department or technical division		<p>The long processing time, as well as duration of the plans, makes mobility master planning a long-term task. The process orientation should be brought into the foreground instead of piecemeal plans that are too ambitious. A continual planning process is necessary if mobility master planning wants to keep pace with the increasing dynamics of political, economic, demographic and value-changing processes.</p> <p>In order to fulfil this requirement, it is recommended that the corresponding resolutions of major individual transport measures establish the connection to the MMP and decide on the individual measures as partial updates to the MMP. In this way, projects that may be contrary to the general objectives of the mobility master plan can be identified and handled analogously.</p>

What	How	Why	When	Leadership	Participation	Comments
28 Evaluation	<ul style="list-style-type: none"> – Before-and-after comparison – Specification of the criteria for evaluation can be decided on in the resolution to the MMP – Evaluation criteria have to be reviewed with respect to their explanatory power regarding both the effect on change, which is to be studied, as well as the economical use of resources. – Report to the responsible political committee 	<ul style="list-style-type: none"> – Monitoring – Opportunity to correct unintended developments or reinforce favourable developments – Part of the quality management to be introduced in the transport sector, as well 	Stepwise after implementation of measures from the action plan	Head of the department or technical division	<ul style="list-style-type: none"> – Internal WG within the administration – Contracted planning consultant(s) – Political decision-makers 	<ul style="list-style-type: none"> – Continual reporting to the responsible decision-making committee – Have evaluation decided on together with resolution on MMP in order to create transparency surrounding the implementation of measures (creates trust amongst the public and policy makers towards the MMP and binds the administration)

Appendix 3: Data requirements for mobility master planning

Data	Content	Use	Source	Comment Basic data	Approach for forecasting
1 Statistical data	Population or number of residents by age group, sex and spatial differentiation, number of employees, visitor statistics (if applicable with forecasts)	<ul style="list-style-type: none"> – Basis for travel demand models – Basis for visualisation with maps – Basis for participation process – Basis for development perspectives and goal definition – Basis for scenario building 	Registration office, visitor statistics, Chamber of Industry and Commerce, economic development, business registries	Pupils, students, apprenticeships, jobs, vehicle ownership, possession of driving licence	– Population forecast using assumptions about aging/death and birth rates as well as in- and out-migration
2 Land use data	Information on land use and localisation of significant traffic generators	<ul style="list-style-type: none"> – Basis for travel demand models – Basis for visualisation with maps 	Land use plan, economic development	Visitor data for significant destinations (such as leisure establishments, hospitals) are useful	Compilation of planned changes in land use or as the case may be designation of new building land and uses
3 Socio-economic data	Statistics on residential areas and places of work at municipal level	<ul style="list-style-type: none"> – Basis for travel demand models – Description of the function of the city 	Federal Employment Agency	<ul style="list-style-type: none"> – Only contains employees required to pay into social security – Requires considerations of weekday or weekend commuters as the case may be 	Depending on study region, modification to fit modelling
4 Network information road transport	Topology of road network differentiated by user (cars, heavy goods vehicles, cyclists)	<ul style="list-style-type: none"> – Basis for travel demand models – Basis for network analyses – Basis for visualisation with maps 	<ul style="list-style-type: none"> – Existing travel demand model or basic network data – Otherwise through commercial providers – Open source uses 	Consider possibilities for continual data maintenance	Assumptions about measures already committed to being realised
5 Network information public transport	Segment and route information, station placement and timetables	<ul style="list-style-type: none"> – Basis for travel demand models – Basis for network analyses – Basis for visualisation with maps 	Transport operator or transport association as the case may be	If necessary construct integrated networks private vehicle/public transport	Assumptions about measures committed to being realised (infrastructure and operation)

Data	Content	Use	Source	Comment Basic data	Approach for forecasting
6 Household travel surveys	Traffic volumes, travel data, modal split, local differentiation, trip distances	<ul style="list-style-type: none"> – Basis for travel demand models – Description of the transport situation 	<ul style="list-style-type: none"> – Own, current surveys – Add-on sample areas (German national travel survey <i>Mobility in Germany – MiD</i>) – Analysis by area size <i>MiD</i> – <i>Mobility in Towns – SrV</i> (German household travel survey in cities/urban regions) 	Methodological mix possible using town-specific survey (add-ons to household travel surveys) and supplemental data from standard surveys	<ul style="list-style-type: none"> – Basis for conducting analysis – Shown in the forecast with the help of models
7 Supplemental surveys on commercial transport	Traffic volumes, modal split, destinations, logistical processes – particularly relevant for singular traffic generators	<ul style="list-style-type: none"> – Basis for travel demand models – Description of the transport situation 	Own, current surveys, for complex areas with personal interviews	Methodological mix possible using town-specific survey and supplemental data from standard surveys (national commercial transport surveys)	<ul style="list-style-type: none"> – Basis for conducting analysis – Shown in the forecast with the help of models
8 Household surveys on preferences and options	Surveys on perceptions of the transport situation, if applicable inquire on behavioural options	<ul style="list-style-type: none"> – Basis for deficiency analysis and goal concept – Description of the transport situation – Deciding on and acceptance of measures 	Own surveys necessary	Where applicable in combination with a quantitative survey	<ul style="list-style-type: none"> – Basis for conducting analysis – Shown in the forecast with the help of models
9 Mode-specific surveys	Surveying of transport users (MIT, pedestrians, cyclists, PT) regarding origin, destination, purpose and general assessment	<ul style="list-style-type: none"> – Adjustment of the travel demand model – When not using a model: estimate of travel patterns to describe the current situation 	Own surveys necessary		<ul style="list-style-type: none"> – Basis for conducting analysis – Shown in the forecast with the help of models
10 Counts in the planning area	Counts of traffic volumes (motor vehicles, pedestrians, cyclists, PT users) by time of day, if applicable cordon or licence plate survey	<ul style="list-style-type: none"> – Calibration of the travel demand model – Description of the current situation – Identification of bottlenecks 	Continual traffic count stations, detectors, rider surveys	<ul style="list-style-type: none"> – With existing data, the up-to-dateness needs to be considered (e.g. no changes to the network) – Check the plausibility of the data 	Traffic volumes in forecasts are a result of modelling

Data	Content	Use	Source	Comment Basic data	Approach for forecasting
11 Travel time measurements, accessibility analyses	Measurement of travel times on roads (motorised transport, where applicable bicycle transport or PT)	<ul style="list-style-type: none"> – Calibration of the travel demand model – Identification of bottlenecks – Comparison of mode-specific travel times – Derivation of measures 	Where applicable commercial providers	Useful, but not required	Travel times and accessibility in forecasts are a result of modelling

Appendix 4: Other planning areas with relevance for transport planning (selection)⁴⁸

Planning area	Responsible	Formal/informal	Potential for integration	Examples of measures	Additional topics
Land use planning	Municipality as planning authority	Formal	Land for building areas and main transport network	<ul style="list-style-type: none"> – Land for roads – Land for cycling infrastructure (of municipal importance) – Public transport rights of way 	Land for housing, businesses, industry, special areas, open space, nature conservation
Landscape and green space planning	Municipality	Formal	Transport facilities as a part of landscape planning	<ul style="list-style-type: none"> – Landscape bridges, selection of rights of way from the perspective of nature conservation – Crossing aids for animals 	Protection and development of nature, landscape and fauna
Noise action planning	Municipalities in urban areas with more than 100,000 residents, construction authorities, national railway authority	Formal	Transport as a source of noise	Noise barriers, bundling (e.g. of truck routes), speed limits, road surfaces	Industry, leisure facilities
Clean air planning	State	Formal	Transport as a cause of air pollution	Driving bans, low emission zones, mobility management, traffic signal control	Industry, house fires, background levels
Public transport planning	Contracting authorities (independent cities, counties)	Formal	Integrate all transport carriers into the multimodal urban transport system	Orientation of PTP and MMP towards joint goals	
Binding zoning planning	Municipality	Formal	Streetscapes and public spaces	Main or secondary routes for bicycle transport	Building forms and street design
Climate protection and energy concepts	Municipality, county, voluntary partnerships	Informal	Transport as a cause of substances that are harmful for the climate	Mobility management, bicycle promotion, promotion of walking	Shopping behaviour, saving energy, thermal insulation for buildings
Framework planning for urban development/neighbourhood-scale planning	Municipality	Informal	Compatible development and accessibility, local mobility, design of streets and public spaces	Network of routes, network of barrier-free routes, development concept, design concept	Environmental protection, safety, mobility for special groups

⁴⁸ Cf. also Fig. 5 in Section 3.

Planning area	Responsible	Formal/informal	Potential for integration	Examples of measures	Additional topics
City development planning	Municipality	Informal	Transport as specific plan in city development		Housing construction, population development, social infrastructure
Health promotion	Municipality	Informal	Daily trips as possibility for physical activity	Promotion of non-motorised transport	Public sports offerings, preventive offerings
Local agenda	Municipality, county	Informal	Goals and indicators in transport, concrete transport projects	Carpooling platform, monitoring of indicators in transport	Social projects, One World projects, indicators for various aspects of development, sustainability report
Location searches for schools, cultural establishments, leisure establishments	Municipality		Search for locations integrated into the transport system	Use of available infrastructure, parking	

Appendix 5: List of abbreviations

BBSR	Bundesinstitut für Bau-, Stadt- und Raumforschung – Federal Institute for Research on Building, Urban Affairs and Spatial Development
BMVBS	Bundesministerium für Verkehr, Bau und Stadtentwicklung – Federal Ministry of Transport, Building and Urban Development
CAP	Clean Air Plan
CO ₂	carbon dioxide
EIA	Environmental Impact Assessment
EU	European Union
EVE	Empfehlungen für Verkehrserhebungen – Recommendations for Travel Surveys
FGSV	Forschungsgesellschaft für Straßen- und Verkehrswesen – Road Transport and Research Association
GIS	geographical information system
GVFG	Gemeindeverkehrsfinanzierungsgesetz – Municipal Transport Financing Law
IT	individual transport
ivm	Integriertes Verkehrs- und Mobilitätsmanagement Region FrankfurtRheinMain - Association for Integrated Transport and Mobility Management
KiD	Kraftfahrzeugverkehr in Deutschland – Motor Vehicle Transport in Germany
LTP	Local Transport Plan
LUP	Land Use Plan
MiD	Mobilität in Deutschland – Mobility in Germany
MIT	motorised individual transport
MMP	Mobility Master Plan
NAP	Noise Action Plan
PT	public transport
PTP	Public Transport Plan
RMV	Rhein-Main-Verkehrsverbund – Rhine/Main Regional Transport Association
SDP	State Development Plan
SEA	Strategic Environmental Assessment
SrV	System repräsentativer Verkehrsbefragungen – system of representative travel surveys (Mobility in Towns)
SUMP	Sustainable Urban Mobility Plan
TN	tender notice
WC	working committee
WG	working group
WP	work package

Appendix 6: Glossary of German planning terminology

Analysefall	status quo analysis: an analysis of the current situation of transport, land-uses and travel behaviour
Analysejahr	base year: the year for which the status quo analysis was carried out
Aufgabenträger	commissioning authority: the city or district authority responsible for commissioning services (e.g. public transport service)
Basisszenario	baseline scenario: scenario using the transport system of the status quo analysis as input data and only examining external influences from socio-demographic and economic developments
Bezugs- oder Maßnahmenszenario	scenarios of reference cases or of strategies and measures: baseline scenarios with the addition of transport infrastructure and policy measures; scenarios with measures that have already been politically decided upon and for which implementation is considered “secure” – are often called business-as-usual or trend-scenario
Erweitertes Untersuchungsgebiet	extended study area: peripheral area surrounding the study region and still affected by measures of the planning area due to regional interdependencies
Kosten-Nutzen-Analyse	cost-benefit analysis
Kosten-Wirksamkeit-Analyse	cost-effectiveness analysis
Leitbild	vision: guiding principle(s) for the planning process
Mängelanalyse	deficiency analysis: analysis showing problem areas for which action is required
Nahmobilität	compact mobility: the concept of a town or neighbourhood with compact infrastructure which promotes facilities for shorter trips by walking and cycling
Nutzwertanalyse	goals achievement matrix: a method of multi-criteria analysis
Planungsgebiet	planning area: the core area being examined
Planungsträger	planning authority: the city or district authority responsible for planning activities
Prognosehorizont	forecast horizon: time frame covered by the forecast, expressed as the forecast year
Straßenbaulastträger	road construction authority: state, county or city/community institutions responsible for construction, maintenance and safety of roads
Straßenverkehrsbehörde	authority for road traffic: state, county or city/community institutions responsible for the operation and safety (traffic signs) of public roads
Untersuchungsgebiet	study region: the area immediately surrounding and still affected by measures of the planning area
Verkehrsaufkommen	number of trips
Verkehrsleistung	kilometres travelled
Verkehrsstärke	traffic volume

