Sustainable Urban Mobility Plans (SUMP)
Workshop – Analysis of mobility situation

# Approach to analysis for a SUMP

***Approach and tools for best practice transport analysis and diagnose***

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Joseba Izquierdo

Jaspers
Joint Assistance to Support Projects in European Regions

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1. Key SUMP stages and the role of analysis
2. Key aspects of analysis
3. Key components of analysis
4. Types and tools of analysis
5. Analysis results
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# Key SUMP stages and the role of analysis

We undertake plans in order to inform and structure our decision making.

Within a plan, well-informed and meaningful analysis is crucial to establish a solid link between perceived problems, opportunities and the most suitable ways to address these.

"Analysis is the detailed study or examination of something in order to understand more about it"

**1**: Set up working structures
**2**: Determine the planning framework
3: Analyse mobility situation
**4**: Build and jointly assess scenarios
**5**: Develop vision and strategy with stakeholders
**6**: Set targets and indicators
**7**: Select measure packages with stakeholders
**8**: Agree on actions and responsibilities
**9**: Prepare for adoption and financing
**10**: Manage implementation
**11**: Monitor, adapt and communicate
**12:** Review and learn lessons

# Key aspects of analysis

## Analysis of the mobility situation (SUMP)

- The analysis phase of a SUMP must result in a **robust diagnose** of the current and likely future situation, leading to a logical and traceable process: **analysis – objectives – scenarios and operational alternatives – measures**;
- Analysis results must provide sufficient **understanding to inform decisions**, being able to assess (confirm or discard) the main perceived transport issues;
- Analysis is the best means to **test** our current and future ability to respond to **higher-level policies and strategic objectives**;
- Analysis must be used also be able to **investigate suitable solutions**.

- **Importance of scoping:**

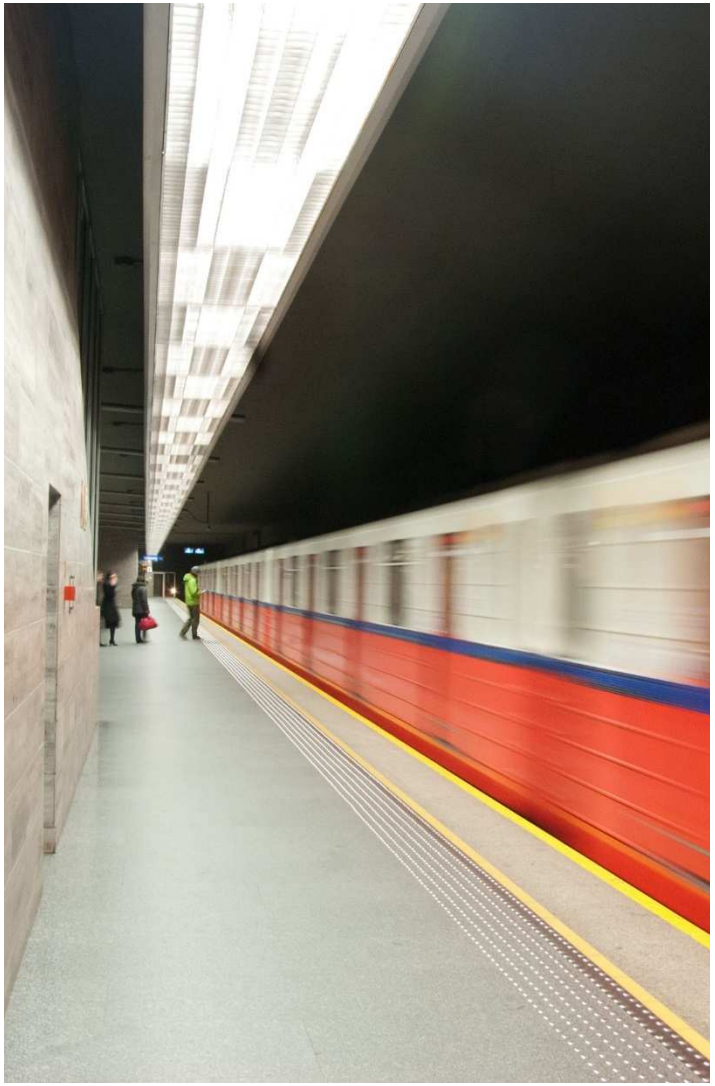
  - Mitigation of timing and budget risks is done through analysis that is realistic (e.g. data and skills exist) and suit for purpose;
  - Local understanding is crucial, blindly imitating other SUMPs may not lead to success!
  - Initial stakeholder, public and other initial inputs should be evauated to define the required SUMP analysis and the associated needs (tools, data).

# Key components of analysis

**Through analysis we must assess and understand…**

1. The socio-economic basis generating the transport needs (demography, behavior, economy, land use plans and policies, resulting transport patterns);
2. The performance of the transport system, consisting of all modes and interfaces and their joint operation;
3. Results / impacts from transport activity and measures (environmental, economic, social, climate change, etc.).

**…so that measures based on real needs can be proposed.**



# Types and tools of analysis (I)

**"I suppose it is tempting, if the only tool you have is a hammer, to treat everything as if it were a nail."**

- Different types of **analysis** are used to meaningfully **inform the plan**, confirming identified problems and opportunities, by using particular tools;
- Different types of **analytical tools** are at our disposal. The structure of the analysis and the tools proposed **must work together, follow and assist our methodology**;
- The **scoping stage** will be key to establish the **(1) types of analysis, (2) the tools that will be required and (3) the way these will all be integrated**;

- Concerning analytical tools:
  - These should generate sound, clear, timely and useful (usable) results;
  - Standard market software packages, tailored tools or / and a combination of those can be used;
  - Where different suitable choices are available, flexibility should be allowed, while ensuring quality (fit for purpose, sound and timely results, easy use and interface);
  - Tools can also play a key role in processing and communicating the results;
  - Consider available local tools (e.g. transport model), albeit with a proper understanding of their shortcomings.

# Types and tools of analysis (II)

- **Demand analysis:** demand modelling aims at providing a good understanding of the main drivers for mobility and the associated needs to accommodate them:

  - Land use transport models: evaluate the mobility needs likely to be generated from different spatial development and land use policies;
  - Four-step transport models: Under its full functionality, it enables calculation of overall generated travel, trip distribution, mode and route choice, based on socio-economic and network data;
  - Transport and traffic simulation tools: replicating the operation of a given part of the transport system, for a limited period, often based on external demand data.
- **Accessibility modelling and GIS based spatial analysis:** travel time door to door, severance, social accessibility;
- **Safety assessment:** based on accident data, potentially combined with spatial analysis;
- **Operational assessment:** for the whole system or a given sector, to establish efficiency and room for improvement (e.g. municipal buses, traffic and / or parking management, infrastructure condition and maintenance);
- **Economic assessment:** likely to be conducted later in the plan;
- **Environmental / social impact** analysis (e.g. of the current transport situation); and
- **Climate change** mitigation and adaptation.

# Analysis results

## Making good use of analysis

- The results of the analysis phase comprise a series of quantitative, qualitative, graphical outputs, which need to be turned into clear conclusions, linked to the identified transport issues;
- This process will require processing, harmonization and consolidation of different outputs;
- Further work may be desirable to produce suitable reports and communication materials in addition to the usual technical reports. This can be used to convey the findings of the analysis to the public and decision makers (e.g. Stakeholder and public consultation), enabling discussion and consensus prior to the next crucial steps of the plan;
- Sufficient time and resources should be allocated to these tasks, to ensure a comprehensive diagnose of the transport situation and avoid poor use of very valuable data;
- Use of a GIS based platform may greatly simplify the work, if well planned and conceived in advance.

# Conclusions and recommendations

**Analysis is not an end on itself – it should lead to solid conclusions!**

- The **analysis phase of a SUMP** must result in a **proper and thorough understanding of the transport situation**, confirming the **real issues and their primary causes**;
- Analysis should cover the **main socio economic drivers for mobility**, the **operation** of the transport system **and** transport related social, economic, environmental and climate change **impacts**;
- **Adequate scoping** of the analysis phase **is crucial** to the quality of the plan. The different analyses conducted and the tools to enable it must be **fit for purpose, provide clear, timely and usable results**;
- **Analytical work** will be undertaken **across several other stages of the plan**, predominantly based on the analysis conducted and tools utilized during the analysis phase;
- Analytical outputs do not constitute the final results of the analysis. **Harmonization, processing and logical analysis of initial results will be required**;
- A **robust analysis phase will result in clear and substantiated conclusions** informing the further stages of the plan.

Approach to analysis for a SUMP

# Examples

1. GIS based analytical tools
2. Demand assessment tools
3. Safety assessment
4. Scoping example 1
5. Scoping example 2
6. Scoping example 3

# Example 1 – GIS based analytical tools

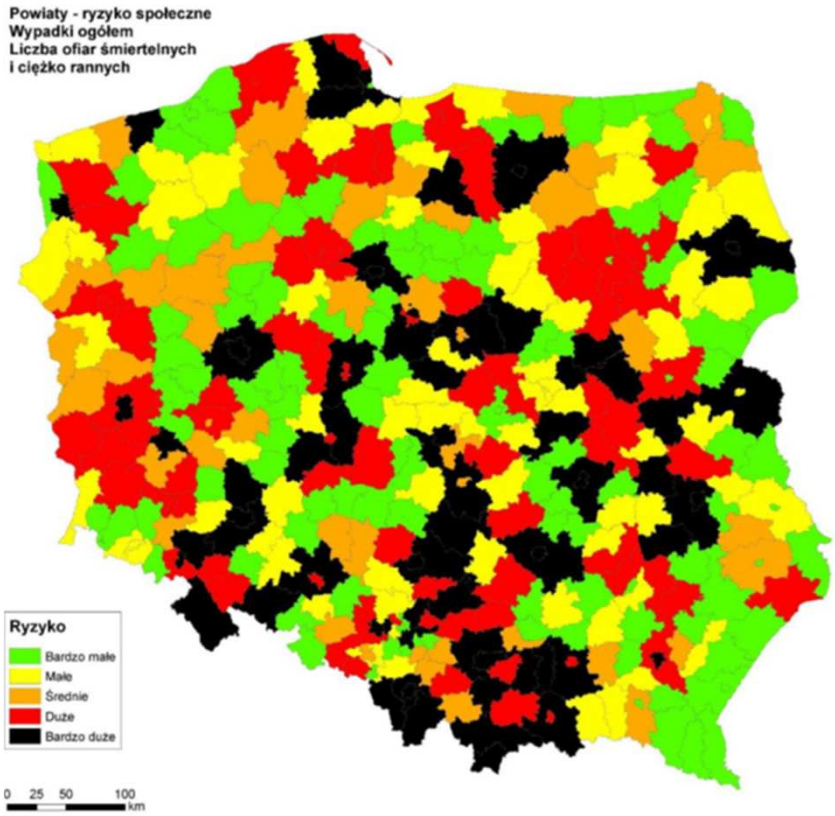
- Geographical Information systems are a standard and well-established way to store, georeference and analyse socio economic, transport and other data.
- A main advantage of this approach is enabling a single data and analysis platform to inform the planning process (from the scoping phase all the way to communication of results).
- GIS (often in conjunction with other tools) has many potentially useful applications when undergoing the analysis phase of a SUMP:

  - It can be the **basis for gathering and storing data** on transport issues received from the public, for example, by means of an online tool (potential advantages over a classical survey);
  - A GIS database **can relatively easily incorporate inputs from big data** (e.g. anonymized travel info from smartphones) ;
  - **Spatial analysis** based on demographic, economic and transport data (e.g. to evaluate the walking catchment of the public transport system)
  - While specific packages may also exist, GIS can serve as the basis to **assess transport related environmental impacts** at the planning level;
  - Significant potential exists in relation to **Climate Change adaptation** (e.g. ensuring that proposed infrastructure measures avoid areas deemed particularly sensitive to extreme climate events).

# Example 1 – GIS based analytical tools (II)

**BRD, diagnoza, klasyfikacja ryzyka**

**powiaty**



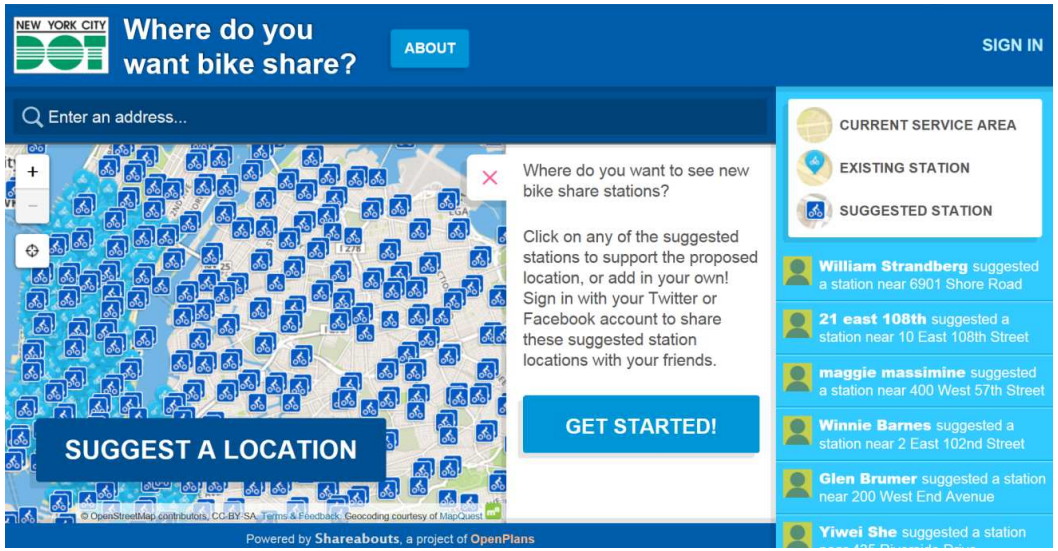

**drogi wojewódzkie**

http://krbrd.gov.pl/pl/pozostale.html

# Example 1 – GIS based analytical tools (III)

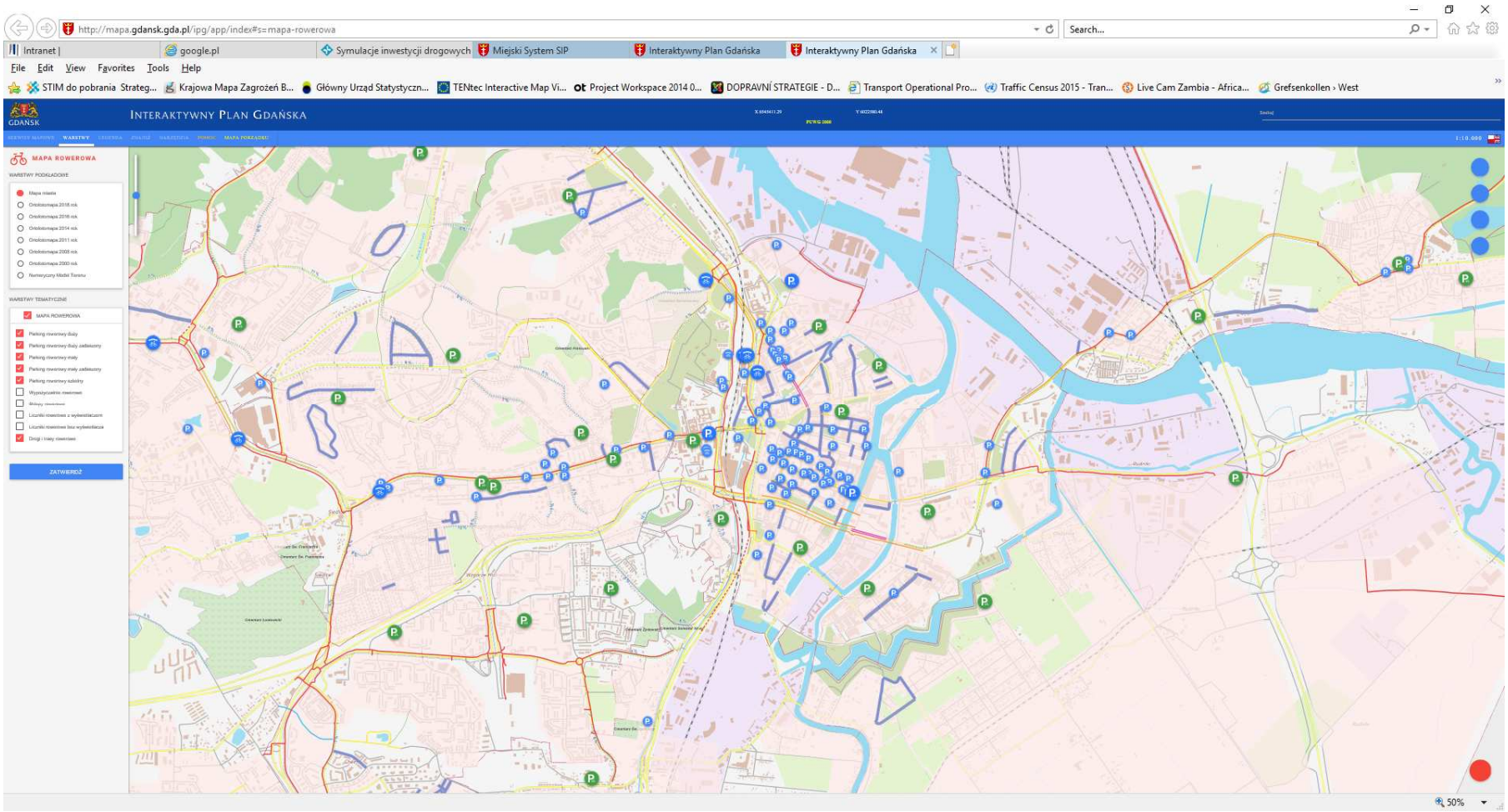
## Interactive and collaborative tools

- GIS based collaborative mapping;
- Local perspective on current issues;
- Brainstorming, option generation;
- Feedback, consultation throughout the whole planning and implementation process;
- Geo-referenced, compatibility and combinability with other sets of data; and
- Low cost, transparency, accessibility (data base).




Source: NYC DOT (http://nycbikeshare.herokuapp.com/ )

# Example 1 – GIS based analytical tools (III)




Source: http://gis.gdansk.pl/#portfolio

# Example 1 – GIS based analytical tools (IV)

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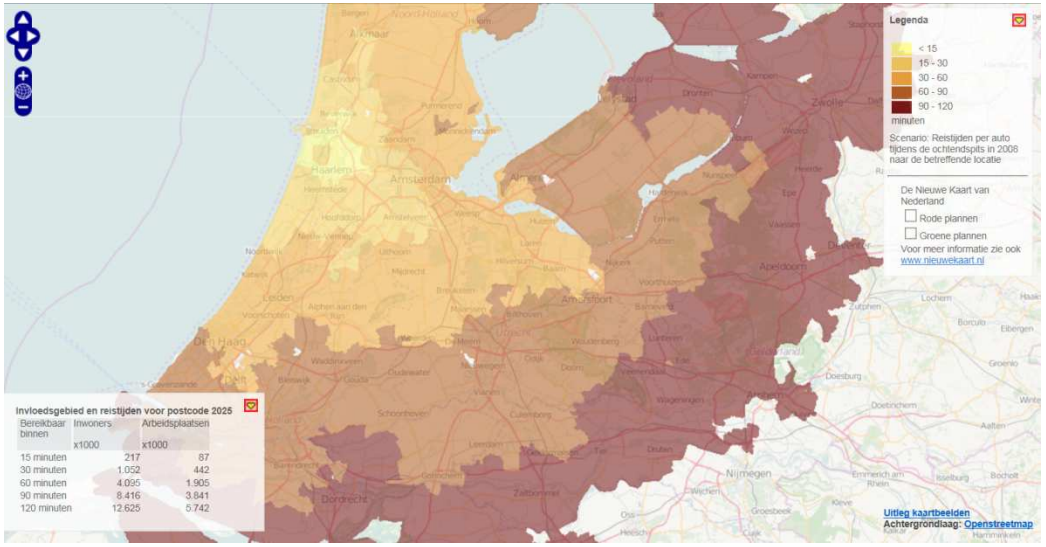
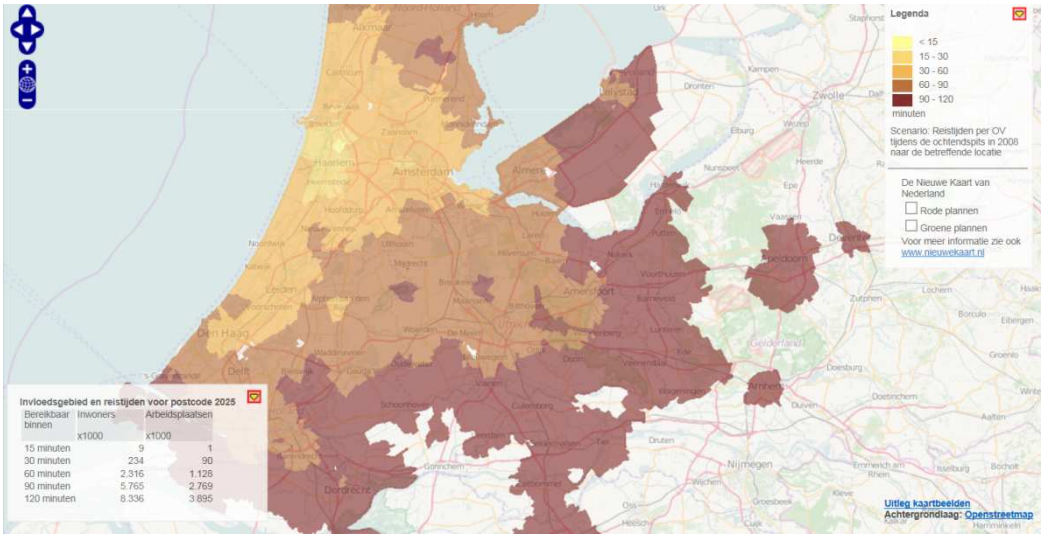
## Spatial Analysis (GIS based)

- Mapping of socio economic / transport or other data;
- Combined journey time, isochrones and accessibility;
- Testing of land use policies;
- Accident analysis;
- PT & cycle network coverage and service optimization;
- OD desire lines;
- Visual, easy to understand outputs. Demonstration of measure / strategy benefits backed up with analytical outputs;
- Opportunities associated with smart cities / big data;
- Compatibility with other GIS based assessment tolls (e.g. transport model).

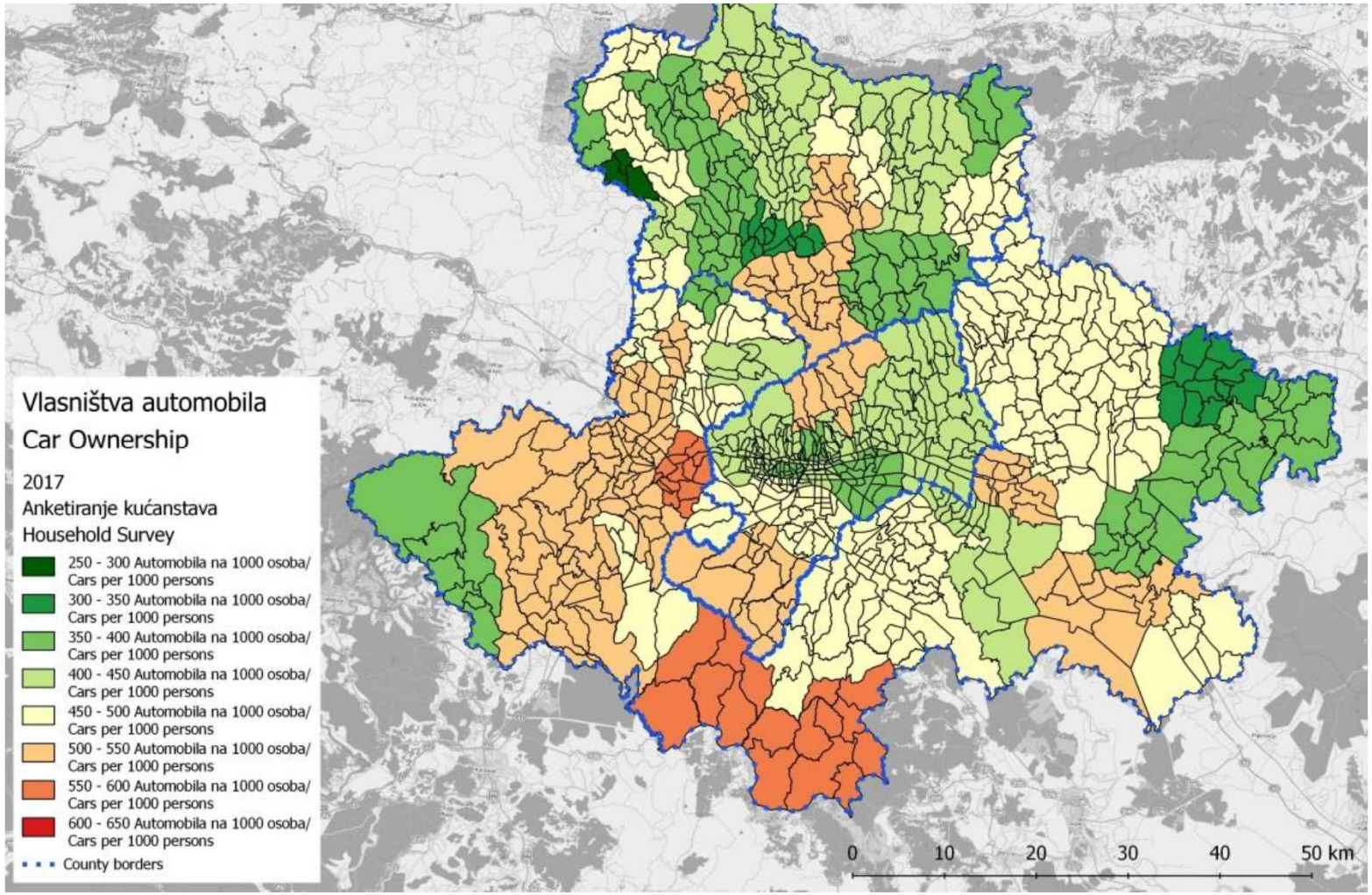



Source: De Nationale Bereikbaarheidskaart (http://www.bereikbaarheidskaart.nl/)

# Example 1 – GIS based analytical tools (V)

**Spatial Analysis (GIS based)**

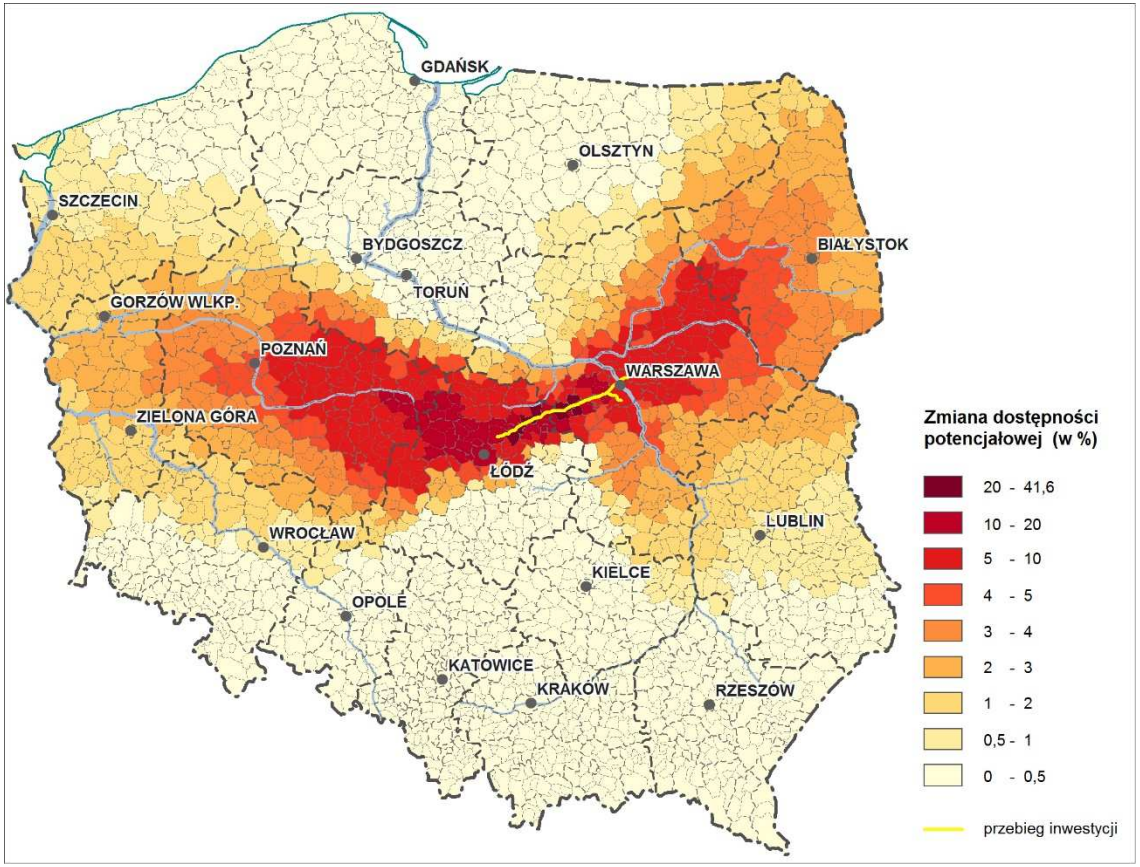


# Example 2 – Demand assessment tools (I)

**Spatial analysis**

**Dostępność transportowa Polski**

Road network development impact assesement



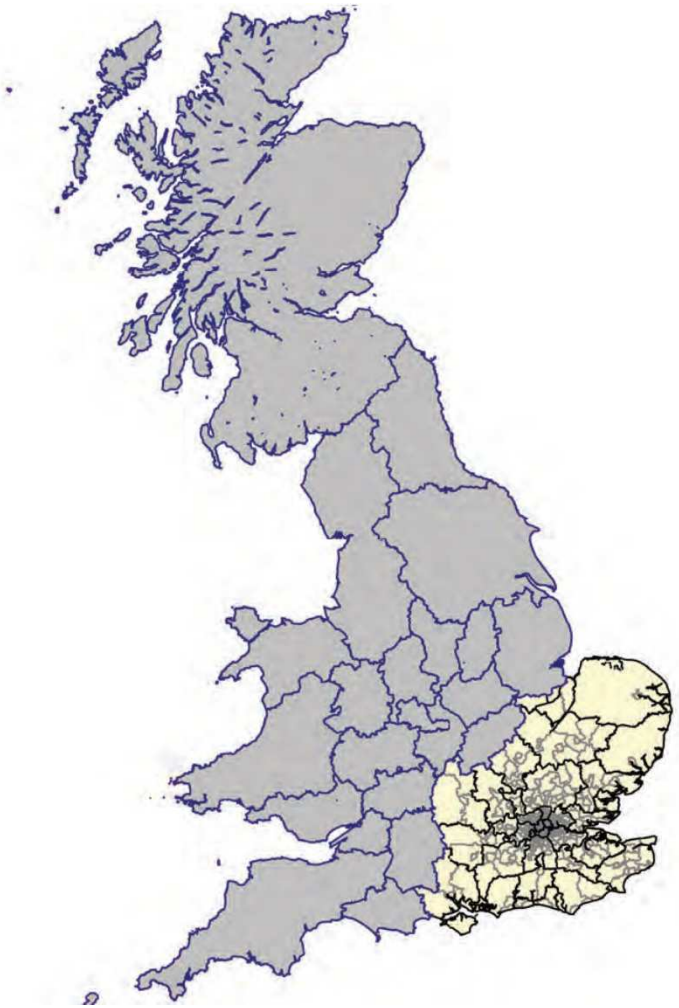

Autostrada A2 na odcinku Łódź - Warszawa i odcinki S2 i S8 w Warszawie

http://www.igipz.pan.pl/accessibility/pl/mapy.html

# Example 2 – Demand assessment tools (I)

**Land use and transport models**

- Trip generation and distribution;
- Good strategic understanding and analysis of demand;
- Relatively easy and quick to use;
- Limited traffic data requirements;
- Can serve as base for four-step transport model;
- Ideal to evaluate long-term land use, agglomeration planning policies and their impact on the transport situation;
- Can be used to support decisions on improvements of infrastructure or service along certain corridors;
- Environmental / emissions footprint / planning;
- Examples: Brussels, Cambridge, London, Dortmund, San Francisco.



Source: Transport for London (TfL) (http://www.tfl.gov.uk)

# Example 2 – Demand assessment tools (II)

## Microsimulation tools

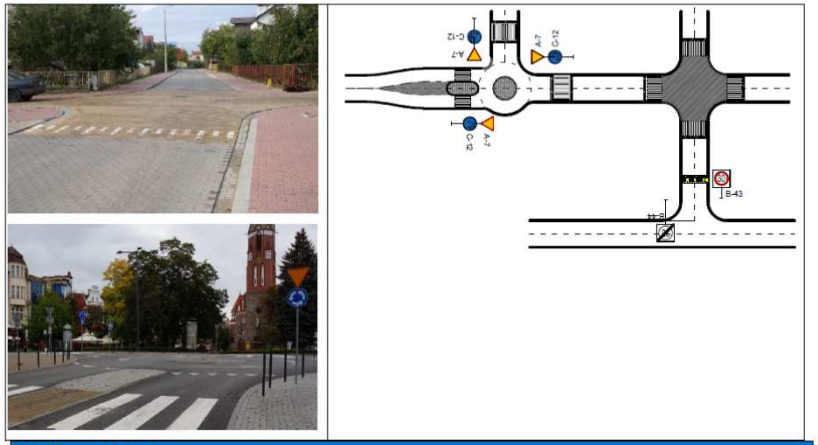
- Generally not suitable for the strategic level. Tailored to analyse limited areas with mixed functionalities and complex interaction, under peak demand conditions;
- While more suitable to assess future scenarios and measures, it can be very useful in analysis of existing capacity issues / problem areas;
- Only traffic or multimodal. Can reliably simulate walking and cycling;
- Visual output, useful for communication purposes. Average data can be difficult to process;
- Crowding issues, large events;
- Traffic and parking management plans;
- Complex junctions (e.g. urban motorway bypass);
- Complex bus or railway operations (e.g. assessment of opportunity charging system for buses);
- A measure from a SUMP can be to conduct a more detailed traffic study

# Example 3 – Safety assessment

**Obszarowe ograniczenie prędkości**

**realizowane środkami uspokojenia ruchu**

- Required to identify and confirm safety issues / problem areas;
- Can be combined with GIS based spatial analysis;
- Traffic assessment tools may be needed to test current traffic conditions (or proposed measures);
- Analysis of traffic environmental and social impacts can also be carried out;
- Consideration of active modes.



**Efektywność środka**

| Środek | Lokalizacja | Redukcja wypadków | Rodzaj wypadków | Ciężkość wypadków | Uwagi |
|---|---|---|---|---|---|
| Wprowadzenie „stref za-mieszkania" lub stref „Tempo 30" | tereny miejskie | 22% | wszystkie | lekko ranni | |
| | tereny miejskie | 37% | związane z prędkością | lekko ranni | |
| | tereny miejskie | 35% | wszystkich | ofiary śmiertelne, ciężko ranne | |
| | tereny miejskie | 53% | związane z prędkością | ofiary śmiertelne, ciężko ranne | |

*Źródło: Wytyczne zarządzania prędkością na drogach samorządowych – część I*

Wytyczne zarządzania prędkością na drogach samorządowych – część I"

http://krbrd.gov.pl/pl/pozostale.html

# Example 4 - Scoping for small town

*A small city of 50 000 inhabitants has a simple structure, which is replicated by its public transport system, comprising of two bus lines along a common central corridor, serving each the two main suburbs. Moderate morning and afternoon peak traffic congestion occurs, mostly around schools and in the centre, where most jobs are located. There are also some transport related issues concerning safety (numerous accidents, mostly cars running over cyclists and pedestrians). While population is forecast to remain stable, a large shopping centre may be opened soon, targeting customers from the whole region (a location is yet to be established by the municipality).*

*Strategic vision for the city and challenges?*

*What are the main transport problems currently faced by the city? Safety, low PT use?*

*What are the main transport problems likely to be faced by the city? Commercial / leisure traffic?*

*How can we best assess and confirm / discard them? Safety assessment? User preferences? Current future PT catchment?*

*Which tools are best suited to conduct this assessment? What data and input will be needed?*

*How can we ensure a legacy for the work? Full results open for further use? Interaction and synergies with land use planning team?*

# Example 5 - Scoping for mid sized city

*A city of 250 000 inhabitants with declining and ageing population. The city is served by a trolleybus and bus network, which struggles financially and is perceived as unattractive. A highway bypass is planned to deal with increased traffic in the city and to serve recently developed residential and commercial areas. There is a large university and student community. The city has ambitious plans for implementing sustainable and zero-emission, innovative solutions in all sectors.*

*Strategic vision and challenges? Is it feasible? What would be the impact? How can we achieve it?*

*What are the main transport problems? Low PT use? Urban spread? PT tariffs ?*

*What are the main transport problems likely to be faced in the future? Degradation of PT system? Further car dependence? Meeting mobility needs for ageing population?*

*How can we best assess and confirm / discard them? GIS spatial analysis? User survey? Demand modelling?*

*Which tools are best suited to conduct this assessment?* What data and input will be needed?

*How can we ensure a legacy for the work? Creation of GIS and analytical department ? Custody of transport model? Feedback and recommendations regarding city vision and ambitions?*

# Example 6 – Scoping for large urban area

*A large conurbation of 1 000 000 inhabitants with several municipalities. A comprehensive public transport network exists, but full service and tariff integration is lacking, particularly with the regional railways. The agglomeration is facing increased car use and traffic congestion, with many large suburban residential and commercial developments recently opened and more in the pipeline. Large heavy industry base. A new HS rail service linking to the capital will be brought into the city, with major changes to the current railway offer.*

*Strategic vision and challenges? Does it exist? Feasible / likely impact? How can we achieve it? Do major planning and policy discrepancies exist between municipalities?*

*What are the main transport problems? Imbalanced / inefficient demand patterns? Low PT use? Urban spread? Traffic congestion?*

*What are the main transport problems likely to be faced in the future? Re-organization / of regional train services to accommodate HS? Further uncoordinated land use development?*

*How can we best assess and confirm / discard them? GIS spatial analysis and land use transport model (spatial development patterns and their impact)? Review of PT concept for agglomeration (capacity, reliability, multimodality, affordability, catchment and accessibility)? Demand modelling?*

*How can we ensure a legacy for the work? Creation of an agglomeration planning department? Feedback and recommendations regarding land use plans? Consultantion with and recommendations for the different railway stakeholders?*

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http://jaspers.eib.org