

MOBILITY MANAGEMENT AND LAND USE PLANNING ISSUES ON THE BASE OF SPATIAL PLANNING AREAS

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ABSTRACT. Spatial and transport planning state the base during process of urban structure creation. This process should ensure sustainability in land use planning (LUP), improve transport efficiency and minimize transportation needs. European Union Project MAX concerns the better integration of Mobility Management (MM) with LUP. In Poland, LUP is almost completely separate from sustainable transport planning and MM. Based on the MAX approach, paper will present how sustainable transport is included in Local Development Spatial Plan and in the City Center in Krakow.

REZUMAT. Planificarea spațială și de transport constituie elementul de bază al procesului de creare a structurii urbane. Acesta trebuie să asigure durabilitate în planificarea utilizării terenurilor (LUP), să amelioreze eficiența transportului și să minimizeze necesitatea de transport. Proiectul MAX al Uniunii Europene se referă la o integrare mai bună a managementului mobilității (MM) cu LUP. În Polonia, LUP este aproape complet separat de planificarea durabilă a transportului și de MM. Lucrarea prezintă, pornind de la abordarea MAX, modul în care transportul durabil este avut în vedere în Planul spațial de dezvoltare locală și în Centrul Orașului Cracovia.

Keywords: sustainable transport, Mobility Management (MM), Land Use Planning (LUP), Local Spatial Development Plan (LSDP).

Cuvinte cheie: transporturi durabile, managementul mobilității (MM), planificarea utilizării terenului (LUP), plan local de dezvoltare spațială (LSDP).

1. SUSTAINABLE TRANSPORT, MOBILITY MANAGEMENT AND LAND USE PLANNING – THE KEY FOR BETTER TRAVELING

Sustainable transport is a base which most of European countries make use for creating transport network. It gives chance to reduce private transport impacts on environmental, citizens' health and safety, congestion on roads or spending money on fuel. The main aspect of transport planning is to create such demand that could be fulfilling in the majority by public transport service, bicycle connection or alternative use of car (carpooling, car sharing). All those assumptions are involved in Mobility Management (MM), which is characterized as flexible, easy and fast in realization. MM is constructed as measures sequence for implementation, e.g. mobility offices which inform and give advice for travel, travel plan which gives possibilities to travel by environmental friendly transport (buses, trams, bicycles) or provide alternative forms for car use. MM causes also decrease number of private car trips to/from origin, as result of changes in urban planning – localization in one area investments as shopping, housing and employ-

ment. That kind of support for transport planning is helpful in cities, where congestion increases and transport network could not to ensure good conditions for travel by private car. In cities, it is more and more visible that travel by private transport get more time than public. Unfortunately, citizens choose a car in their daily trips because of the habit, comfort and still unsatisfying public transport service. MM could be also occasion for create a modern transport network and service and in the same time to take an action for changing environmental behaviors.

One of the most important demands is improve of access area for public transport and bicycle. Development which generates lots of trips (e.g. offices, shops, housing) should be concentrated at nodes and along the corridors of the public transport, bicycle network or at the very least in places that have the potential to become public transport nodes. However, it could be only achieve when awareness of sustainable transport among planners, politicians, authorities and users will be higher and identified in strategic and local plans, possibly by the use of accessibility measurement. Sustainable transport and land use planning integration could be set in planning documents which has a legislative form, so to support land use and transport

measures, complementary transport policies are necessary. In those policies, it should be requirement to prepare travel plans for new development, its transport impacts should be assessed and its location should take into account its transport needs. If the transport impacts of the development are predicted to be too large then a different location may need to be selected. For example, it may be necessary to strengthen transfer nodes and/or create new corridors in the public transport system by opening new routes and lines, or increasing service frequencies. In some countries, e.g. UK or Switzerland, public sector could impose conditions on new developments such that developers pay the cost of all or some of the transport system improvements are associated with the development. The same situation could be with improved cycling and walking environments. However, in Poland, there is very little recognition of sustainable transport as an objective of land use planning in policies documents.

2. INTEGRATION OF MOBILITY MANAGEMENT AND LAND USE PLANNING IN POLISH PRECONDITIONS

In Poland, there are three governance units who are responsible for planning process. On the country level, the Ministry of Regional Development with National Council for Spatial Development prepares general Master Plan for Poland, which consist outlines for Master Plans on regional/local level in the field of main transport corridors. Regional Spatial Development Plan establishes conditions of transport infrastructure location. Existing legal state there are two kinds of the urban planning documents: Spatial Development Policy (describe preconditions for development and create generally future land use for community) and Local Spatial Development Plans (document of local law, essential for sustainable development area and prepared for whole community, but mostly for some selected urban units). During the enact process, accordance of the Local Spatial Development Plan is checked with all planning documents on the country, regional and local level. On the local level, the mayor of the city prepares and City Council approved the Local Spatial Development Plans (LSDP). In practice, the Urban Development Planning Office is responsible for preparing LSDP for city. Depending on the planning area, the planners should prepare the LSDP including the housing, cultural, scientific, technological, and industrial, sports, green areas, etc. However, preparing one LSDP takes about two years. It is very long way to enact, because of

citizens' opposition for transport or urban development on theirs area. At the moment in Krakow from 2003 year, the areas covered by LSDPs do not exceed 14%. LSDP, as a planning instrument, defines the role of the site, land use, building and transport infrastructure, etc.

If developer wants to build a new investment, if there is no LSDP for the site, before getting building permission, he must apply of building conditions. For building permission decision, the investor prepares scheme (Partial Plan) with defining the structure of the new site, infrastructures needs, traffic circulation and accesses to the public road. Solution of public transport service is not obligatory, but in some cases, investor prepares it. Moreover, new developments shouldn't be even located close to the public transport corridors.

However, in Poland, there exist some documents that could be helping in integrating sustainable transport, mobility management and land use planning. For example transport plans are included in following documents: Transport Policy, Development Strategy, Spatial Development Policy and Integrated Public Transport Development Plan. Some of those documents exist on country, regional and local level, but not always. Transport Policy is the main law document, which take into consideration transportation aspect in whole. It plays a great role in making decisions of transport development. On the national level, "Transport Policy for State for 2006-2025" [12] defines main transport problems, diagnoses transport/roads preconditions, and proposes solutions between harmful causes of transport and citizens health. Transport Policy for Malopolska Region (Krakow is the capital for Malopolska) doesn't exist. The main assumptions for transport development are contained in Krakow Development Strategy [1] and Spatial Development Policy [2] for Krakow. In the local level, Transport Policy defines main transport problems, diagnoses transport/roads preconditions and proposes solutions between harmful causes of transport and citizens health. In Krakow, the Transport Policy [3] exists since 1993. The most important conclusion is the priority for public transport in site of investments and roads (bus streets and lanes, priorities in traffic lights etc). This document is focused on improving of public transport accessibility, especially for the development areas, decreasing traffic level in the downtown (due to assume the traffic transit by ring-roads), better access to bus, rail stations and parking systems "Park&Ride", increasing of the number of bike paths and improving the bicycles connections. There is also another document which focuses on public transport role in transport service. In 2004, Krakow City Council enacted "Integrated Public Transport Develop-

ment Plan for Krakow” [4], which focused on the great plan for improving public transport service. The main assumptions of those documents will influence in favor the use of MM measures as fundamental guidelines for simulation process advisability. Another document, which could have a great impact for improve in daily trips sustainable transport is Parking Policy. Parking Policy is one of important planning measure that establishes recommended or maximum parking spaces for new/renews development. That document exists in only few Polish cities (Kielce, Poznan), in other cities it is included in Spatial Development Policy. In Krakow, for whole city, recommended and maximum parking spaces are established depending on the building development intensity. For example, for City Centre maximum of parking places is two on 1000 sq.m and five on 100 employments [2].

3. SUSTAINABLE TRANSPORT IN DEVELOPING AREAS – THEORY OR PRACTICE?

Creating environmental friendly transport in new/renew areas is very difficult because of lacks in policy documents, awareness among decision makers, planners and citizens’ oppositions. However, in Krakow, there exist planning units which try together with some federations (e.g. Polish Association of Transport Engineers, Bicycle and Environmental Clubs) to share transport service with environmental protection for investments/ areas. It is a chance to including MM measures to land use planning, even if that approach is not demand from legislative side.

In Krakow, we can find at least two areas, where MM issues could be taking into account in transport and urban planning. It is highly likely that two areas could be changed turn on the sustainable transport service.

One of the concepts concerns the new traffic circulation concept in the Krakow City Centre [5]. Old Town as a part of the Centre plays important role in the city, because there are 7 million tourists in each year. City Centre is surrounded by “first ring road” which is open for public transport, with constrains for private car traffic. However, some sections of the first ring road takes a role as transit connection from south to north parts of the city quarters. There are also big problems with parking on the streets and side-walk. Krakow as a big city hasn’t complete outer ring road “– there are only southern and western part. This is one of the reasons why most of all travels by cars must cross city centre. In future road development, city authorities predict to build the rest of outer ring road sections (as fourth ring roads)

and to develop third ring road. All of those plans could make possible to change traffic circulation in the city centre – for decrease number of individual transport travel and theirs impact for environment, ancient buildings, health, calmness and safety for tourist and citizens.

The concept of the new traffic circulation in the Krakow city centre has been proposed by designers as an updating and extending of the concept produced by the Department of the Public Utilities and Environmental Protection together with Road and Transport Administration in Krakow in March 2003 (Fig.1). Thanks to realization of the concept, through traffic in city centre will be reduced, number of surface parking places will be much lower (as an outcome of news underground parking) and public transport and bicycle service will be much better. New scheme for traffic circulation with changes for circulation covered the area with 400 m radius.

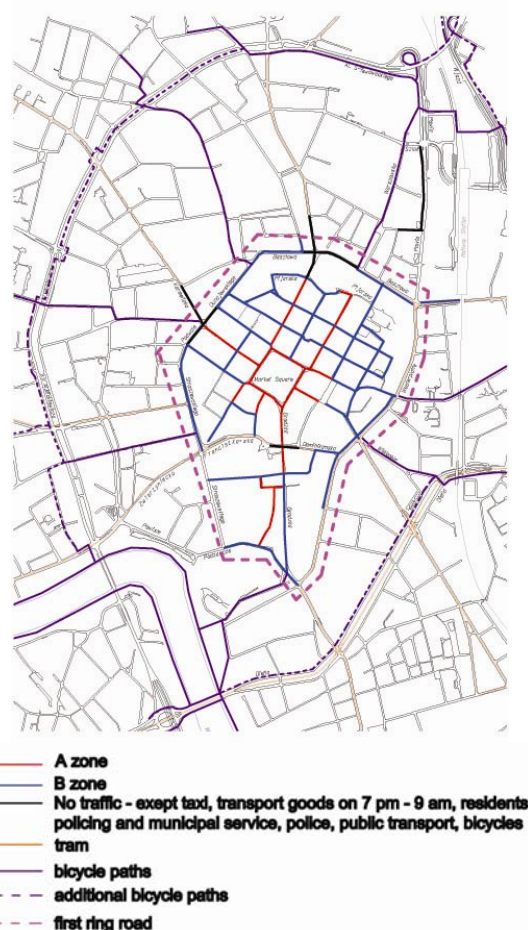


Fig. 1. Traffic circulation concept for the City Center.

Nowadays, analysis area is covered by 3 zones (A, B and C) with parking restriction and charges. In A zone there are 140 parking places (for residents and hotel

guests), in B zone 750 parking places and in C zone 9200 parking places. Traffic circulation scheme predicts to build 10 underground parking available also for inhabitants. Volume of parking will be 300 - 1300 places. All parking will accommodate about 6 000 parking places. Those parking will be financed by private investor – investor will take charges for parking including residents. However, not all the cubature of parking will be possible to build because of the conservation constraints. Most of all spaces for parking are not covered by LSDPs. So, in practice, based on the urban planning law, no one of investors could solicit for building condition and agree for building housing, commercial investments. Due to lack of potential investment for parking and great demand for housing area, possibilities to build, all predicted parking are lower.

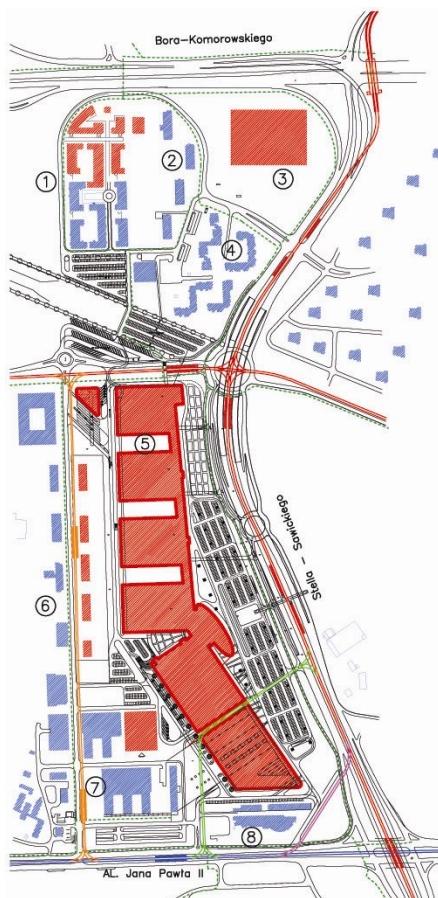
In the traffic circulation concept, the planners cancel of most of parking places on A zone and B zone extension. Planners predict also to close of the three intersections on the first ring road for private cars but open for tram, urban buses, taxi, and bicycles. This area is also open for delivery cars between 7 p.m. - 9 a.m., technical service, and residents of few buildings near the intersection. In the concept there are also new bicycle paths. However, it seems to be that public transport is not taken into account in sufficient way. Krakow takes a part in European Project CIVITAS CARAVEL [6], where there is concept for clean public transport corridor on first ring road with number of priorities for trams/buses on the intersections and streets. Concept for new bicycle paths not includes Cracow University of Technology students of needs for connection in sufficient way. It is also necessary to take into account possibilities to ensure bicycles parking and bicycle paths connections with it. New traffic circulation concept is very brave for city transport – there are number of oppositions from shop owners and the City Council. Shop owners don't perceive the necessities for decrease traffic transit through the city center because they have apprehensions about transport goods for their shops in all day and loss the clients. However, transport goods issue is a quite big problem in Krakow – in city center the delivery cars often occupy the sidewalks in hours where the pedestrian volume is high. The most of the City Council members is rather opposite for environmental friendly transport solutions and restrictions in City Centre. On March 2008 r., the City Council enacted resolution regarding European Union proposition for "Green Paper on urban mobility" [7]. Resolution opposes for notations as – supporting policy and instrument demands which provide to make up infrastructure arrears, especially for parking investments; limiting free public transport market; creating mobility transport offices; establishing CO₂ emission standards

and technology demands [8]. That opinion seems to have the influence to the structure of the city budget. That resolution could not help with sustainable transport development in Krakow.

Second area where sustainable transport could be including in urban planning is a quarter in Krakow which is significant for economical and technological site. That quarter is named "Czyżyny Dąbie". That area has a LSDP which was enacted in 2007 by City Council [9] "Czyżyny Dąbie" quarter is an analysis object for European Union MAX Project. MAX measures will try to integrate Mobility Management approach in land use planning [10]. One of the research fields is direct to framework conditions (legal, political, governance) influence the possibilities of integrating MM into the planning process. For chosen area "the planning simulation" was carried out – it was meeting with city authorities, planners, investors, developer, residents and students on which the main aspect for integrating sustainable transport in "Czyżyny Dąbie" spatial planning were discussed.

Analysis site is situated between historical city town and industrial area Nowa Huta. Analysis area is located on visible board which separate large housing estates from development city area, as well. It is limited by three main streets (from the northern by Bora-Komorowskiego St, from the southern by John Paul II Avenue and from eastern side by Stella-Sawickiego St.). Function of those streets is very important in existing transport network. Distance to the centre does not exceed 6 km. Chosen area will state the economic, technological and sciences quarter. On existing land (Fig.2,3), there are some housing buildings (also for Cracow University of Technology - CUT employees), student hostels, university campus of CUT and existing buildings of software companies. Chosen site is also covered by green area with old runway. In the future, the city predicts to develop a great Cracow Exhibition and Conference Centre (CECC – see fig.4) with hotel, shopping centre, but also new buildings of CUT campus with swimming pool there. CECC should be ready for use in 2011. Multifunction halls will be able to accommodate 8,000 people. CECC will be also developed as place for banquets and balls, besides that as sport and concert hall through the extensible walls and decomposed tribunes/platforms. Visitors will have also possibilities to use old runway for getting to conferences or congress by small planes. Polish Aviation Museum, which is located near that site, is trying to reactive old runway, due to redevelopment museum predicted. CECC will cost 215 million € and will be financed by European Union, state budget and from private investors. Land, on which CECC will be build, belongs to CUT. Investor predicts a large number of parking places – 2800, due to development character (number of parking

places is predicted as requirement parking standards for that kind of investments – based on LSDP [9]). However, existing and planning road network do not ensure efficient transport service. Existing accessibility by public transport is possible by tram and bus - tram service is only possible on the south side, bus lines are located on the north and east side of the area. Existing distance to the bus stop come to at approximately 200 m, to the tram stop come to at approximately 450 m. Bus and tram frequency is dependent on the line, with the timetable headway 10 - 15 min.



- Blue lines – existing buildings and tram lines
- Red lines – planned buildings and tram lines
- Green lines – existing/planned bicycle paths
- Orange, green and rose lines – tram lines variants
- 1 – Private housing area
- 2 – Students hostels
- 3 – Shopping/housing area
- 4 – Private housing area (also for CUT employees)
- 5 – Krakow Exhibition and Conference Centre
- 6 – Software companies, e.g. COMARCH
- 7 – CUT buildings (Faculty of Mechanical Engineering) with planned swimming pool
- 8 – Car shop

Fig. 2. Spatial development concept for area.

Planned public transport network in analysis area will be denser as a result of new tram lines passing by the site. LSDP and CECC planners predicted new tram lines only through main road on the east side of investment. That line is not sufficient for west side area service. Nowadays, distance to the nearest bus is approximately 200m or tram stop is approximately 400 m – it is too far. Therefore, it is necessary to predict new tram line which will pass in the middle of the area and provide good access to the tram stops. For CECC it is also chance to ensure good connection for visitors from railway/bus station to exhibition place. Special document for CECC transport service was prepared, especially taking into account of parking standards and tram lines [11]. It is possible to decrease number of parking places, as a result of new tram lines. However, that number will still generate too much traffic. On pictures below, there is plan with CECC buildings, new housing and University investments, tram line variants, bicycle paths.

Existing bicycles paths are located along Stella-Sawickiego St (leading on north-south direction). LSDP for Czyżyny Dąbie predicts new bike paths along John Paul II Avenue, some part of Bora-Komorowskiego and new road in the middle of the area (on east-west direction) and along the local streets inside the housing area. However, planned network paths seem to be insufficient, including students and future CECC user's demands. Therefore, MAX team present additional bicycle paths especially including students needs.

As a part of “planning simulation”, there were present also mobility management measures which could be helping for better alternative transport service than private car. The main MM measures are:

- travel plans for employees, visitors and students;
- car pooling scheme;
- car sharing possibilities;
- real-time information at the bus/tram stops;
- integrated ticket for public transport and entrance for CECC;
- new bicycle parking places;
- installation of showers and storage facilities for bicycle users;
- car parking restrictions;
- parking charges;
- reserved parking for car pooling;
- personal travel advice – mobility office;
- promotional events and exhibitions;
- information and advertisement campaigns.

Planning simulation meeting was shown that planners and administrative units perceive the necessities for including sustainable transport on spatial planning level. However, there also specify that there are huge

problems with realization of that approach – either lacks in law regulation and lack of awareness has a strong impact on sustainable transport infrastructure. Nevertheless for integrating mobility management and land use planning there is possibilities including that issues in law document. There is a one of important policy/law document – Local Spatial Development Plan. Based on Spatial Development Policy, which has not a law power, LSDP assumptions are prepared. LSDP must be prepared including law notation in Spatial and Urban Planning Act (in country level). Spatial and Urban Act is quite difficult to change, but Spatial Development Policy get a chance to include some sustainable transport and mobility management notation. Another important obstacle for sustainable transport realization is very low awareness and readiness for mobility management realization among City Council. City Council member don't notice that improve public and bicycle transport service is essential transport means for inhabitants.

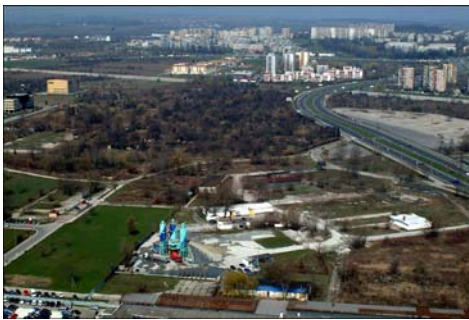


Fig. 3. Existing buildings of Czyżyny Dąbie area.



Fig. 4. Planning area with Cracow Exhibition and Conference Centre.

Main investor – “Fairs in Krakow” don't perceive that if he improve public transport connections/service then number of visitors will be higher. It seems to be that crucial future work for sustainable transport awareness much be addressed for decision makers (City Council) and developers/investors. All participants agree that tram line must be passing through CECC for better access to tram stop (green line on picture 2). They also agree that mobility management measures are essential for improve public and bicycle service.

CONCLUSIONS

Integration Mobility Management, sustainable transport with land use planning is a crucial challenge for better transport conditions on Polish cities. It is necessary that planners, administrative units, decision makers, authorities and future users perceive all advantages for uses public and bicycle service. Nowadays, the biggest awareness for sustainable transport is among the planners and administrative units. The lowest is in the decision makers, especially in City Council and inhabitants. That problems and barriers must be solving. One of the possibilities is to inform, to educate and to show good examples from others countries – how the western countries realize public transport improvements, bicycle paths network and traffic and parking restriction in City Centre. In Poland, there are a good practice to improve public transport and bicycle network – new traffic circulation concept for Krakow City Centre with restrictions for individual transport and parking, and providing new tram lines in new development areas. That kind of work is carried on in all days by a lot of people – administrative, ecology or private units. However, if the travel regulation and awareness of decision makers and group of inhabitants won't be changed, all activities in sustainable transport idea will be very difficult and long in performance. Luckily, the European Union projects, which are re-

alizing in Polish cities, from month to month had more and more great impact on human behavior and habits changing. MAX and CIVITAS CARAVEL project influence on human thinking about travel possibilities by education, implementation of mobility management measures and evaluation of travel changes.

REFERENCES

- [1] City Council of Krakow Resolution Nr LXXV/742/05, (2005), *Krakow Development Strategy*.
- [2] City Council of Krakow Resolution Nr XII/87/03, (2003), *Spatial Development Policy for Krakow*.
- [3] City Council of Krakow Resolution Nr XVIII/225/07 (2007), *Transport Policy for Krakow*.
- [4] Rudnicki, A. with team (2004), *Integrated Public Transport Development Plan for Krakow*.
- [5] Polish Association of Engineers and Technicians of Transportation, (2007), *Traffic organization in City Center in Krakow*.
- [6] European Union CIVITAS CARAVEL Project (2005), Sixth Framework Programme – *Measure Description*.
- [7] Commission Of The European Communities, Brussels (2007), *GREEN PAPER Towards a new culture for urban mobility*.
- [8] City Council of Krakow Resolution Nr 20/XXXVI/08 (2008), *Resolution of City Council about opposition for notations in GREEN PAPER*.
- [9] City Council of Krakow Resolution Nr XXXI/398/07 (19 December 2007), *Local Spatial Development Plan for Czyżyny – Dąbie area*.
- [10] European Union MAX Project, Sixth Framework Programme – Successful Travel Awareness Campaigns and Mobility Management Strategies – *State of The art – WPD Package*.
- [11] Rudnicki, A., Kulpa T. (2007), *Transport service verification and proposition of solutions for Krakow Exhibition and Conference Centre*.
- [12] Ministry of Infrastructure, (2005), *Transport Policy for State for 2006 - 2025*.