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Towards more sustainable communities in Ljubljana region

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Towards more sustainable communities in Ljubljana region

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Abstract

The spread of scattered single-family housing is typical for the suburban areas of Ljubljana. Such type of housing means the wasteful use of land and has frequently insufficient communal infrastructure. These districts generate a large volume of transport, especially by car. They need urban restructuring and renewal, condensation of settling and better connection with an effective public transport. We propose the model of decentralised settlement concentration, which will be presented on the regional (Ljubljana functional region) and local levels. The criteria for the new sustainable communities have been developed with consideration of socio-economic, environmental, and cultural issues. We emphasise the qualities of community design which establish compact layout, mixed land use, car traffic minimalisation concept, pedestrian scale, ecological optimisation, public participation etc. The focus of the paper is on the answers how to organise new planned communities in a more sustainable way, with the case study in the southern part of Ljubljana. During our multi-disciplinary work we connected various professionals and we also shortly present a feasible implementation of the project with some adequate instruments of the land policy (including the land readjustment) and the economic justification of investment.
1. Introduction

Political changes in central European countries have caused different social and economic conditions that affect urban spaces. During the last decade in Slovenia the new development possibilities and the typical contemporary turns towards globalisation and market economy demand new attitudes to further urbanisation and housing construction. The influential factors of the transitional period have also been new investment policy, bigger private initiatives, denationalisation and reprivatisation, rapid increasing values of city space and constructions etc.

Development trends in Slovene cities are similar to those in other countries of European Union. Our cities have in last decades involved into sprawling agglomerations of central town and one of the main problems is the great extent of suburban sprawl. The spread of scattered single-family housing is typical for the suburban areas of bigger cities such as Ljubljana, Maribor, Celje and the coastal towns. This type of housing means the wasteful use of land and has frequently insufficient communal infrastructure. Such districts generate a large volume of transport, especially by car. They need urban restructuring and renewal.

In our study projects the criteria for the new sustainable communities have been developed with consideration of socio-economic, environmental and cultural issues. After the consideration of the variety criteria (functional and sustainable indicators) in the evaluation of potential urban models for renewal of suburbanised areas we chose the model of decentralised concentration of settlement. The most appropriate solution is the combination of the compact central city and decentralised densening in suburban areas (tied to public transport) connected into a polycentric network. In the macro structure the important characteristics of urban quality are: adaptability for change, social and economic conditions, possibilities for different building forms, social diversity, good environmental conditions, access to open spaces, leisure etc. In the urban micro structure we demand a high level of functionality adapted to the inhabitants need, mobility and access to basic provision and other services. Besides a well-organised motor transport, especially public transport, appropriate care has to be given to cycling connections and walkable distances.

2. Decentralised concentration strategies

The comprehensive approach demands dealing with cities in the wider, regional sense. The main aim is the sustainable development, since activities tied to urban processes impose the greatest changes and burdens on the environment (respect for the principles of Agenda 21 and Habitat Agenda). Good planning and design of settlements can reduce resource inputs and pollution outputs. Thus environmental protection strategies have to be tied to social, economic and other policies (connecting economic development, environmental protection, transports, housing and planning etc.).

Model of regional city oriented towards sustainability include two strategies:

A. Development of the central built-up urban area and its historical core
   Central urban places demand renewal, revitalisation and transformation of urban surfaces.
B. In suburbanised areas decentralised densening, with smaller concentration centres and good network connection between them
An important principle of the decentralised concentration model is to connect regional structures of urban growth to public transport routes and their stations. The principle enables regeneration of these areas, which need new economic investments, with restructuring and new urban functions.

The basic principle is obvious: to put into force a decentralised scheme on the regional level. The construction is concentrated in the subcentres where mixed use of land prevails (housing and the corresponding public use of surfaces, shops, and services) on strategic points, along the routes of the regional public transport system. The key aspect of the concept is to create a lively urban community within walking distances.

Towards the end of the 20th century the way of life and work has changed essentially. The differences between the city and the countryside with regard to lifestyle and access to information have been diminished, not only due to traffic connections but also, because of new information and communication technologies. The operational area of work is not limited only to a compact industrial production. Most workplaces can be found in the service field and remain within the living environment. In the spirit of planning for sustainability, close links between living and working is a priority.

3. The Model of Decentralised Concentration in Ljubljana Functional Region
(Figure 1)

A star-like shape is typical of the regional development of Ljubljana: almost densely built-up city area stretches up to the round by-pass. From the by-pass outwards, the city has been expanding in the shape of five branches. Along those directions, dispersed housing of one-family houses prevails, frequently as dormitories that need the concentration of functions and upgrading in the sense of creating new job opportunities.

There are about 270,000 inhabitants within the municipal boundary, but inclusion of the outlying districts (in the functional urban region) increases the total to more than 500,000 inhabitants. The level of motorization is high (1 car per 2.2 inhabitants) and the mobility (per day) is already 2.4 travels per inhabitant. The increase of private car traffic and the decrease of public transport represent one of the main problems in transportation system and a threat for the environment.

Densely built-up city within the circle created by the by-pass has possibilities of development by rehabilitating degraded areas (»grey zones«), by renovating older urban areas and by improving the local pattern. Taking into consideration the sustainable aspects of the city development and the problems caused by the motor traffic in the inner city, the solution to this issue is to discharge the pressure on the centre by applying the decentralised settlement model. This model gives priority to the development of several urban subcentres or densely built-up settlements (providing housing, services, employment opportunities, recreation) that would function almost independently along public transport lines. In such a way, the dispersed suburban housing pattern of mainly detached one-family houses would become more densely built-up and improved by a better supply. The city would grow along densely built-up axes with centres linked to a rapid public transportation system. The green intermediary spaces would enable transversal communication between landscape elements and would preserve the integrity of urban units.
Figure 1: The Model of Decentralised Concentration in Ljubljana Functional Region. Author: Dr. Mojca Šašek Divjak, UI RS, 2001
In designing new or upgraded communities, the existing construction should be taken into consideration as well as the existing central surfaces in the smaller suburban agglomerations. At the same time the dispersed built-up area in the suburbs should become more densely built-up. New or improved central surfaces would represent the central part of the development areas and settling around them should be designed as an autonomous unit within walking distances where functions are intermixed (shops, services, public use of space, housing, etc.) Within such a framework, new job programs would be feasible, as well as new residential areas.

4. The new compact centre Ilovica in southern Ljubljana

In Ljubljana the demand for building land is very high, especially for housing. We can establish that in the last years the scope of complex housing development has been diminishing, but because of the growing demand prices of land and homes have correspondingly been growing. Besides, in the wider area of Ljubljana dispersed housing is rather extensive. These are unorganised low-density areas (mostly detached single-family houses), often with deficient utilities and low environmental standards. The prevalent circumstances demand sanation, suitable densening in well-accessible areas and the creation of complementary structures with mixed uses, such as: businesses and commercial programmes, services, crafts and manufacturing programmes, but above all, denser housing patterns with better use of building land. Thus we could alleviate the issues caused by dispersed housing and provide these areas with missing contents, which would also benefit their economic revitalisation.

Besides urbanistic and architectural planning, solving of technical-technological issues, one of the key conditions for implementing such a project is the adequate use of land policy instruments (land readjustment etc.). Important is also a well-prepared investment programme, which is based on the assessment of economic feasibility (preparation of the building land and construction, the communal infrastructure and the buildings themselves).

At The Urban Planning Institute we were aware of these requirements when we were commissioned by the Municipality of Ljubljana to undertake a project about issues of dispersed and denser settlements (Šašek Divjak et al., 2001, 2002 etc.). In one of these projects (Šašek Divjak et al. 2004) we did a detailed study of the Ilovica area (planning zones VS1/5 and VK1/1), which was also a test case study project for the contractor. We tried to complete a comprehensive research of all the emergent issues. Thus working in a multi-disciplinary team of various disciplines and professionals was essential (architect-urban planner, building mechanics engineer, hydrologist, surveyor, civil engineer and economist). Only such cooperation, which is a consequence of mutual action, can lead to good results with synergetic effects.

4. 1 Dealing with the Ilovica site (between the roads Ižanska cesta, Jurčkova cesta, Peruzzijeva ulica and the southern ring road) (Figure 2)

Because of its vicinity to the city centre and green hinterland of Golovec Hill and the Ljubljansko Barje (Ljubljana Marsh), the area has a beneficial position. With the completion of the southern ring road its accessibility significantly improved. Its setting
enables good connections to the business and shopping centre Rudnik, as well as the nearby commercial, health care and cultural centre Rakovnik.

**Figure 2:** Representation of the wider area of the Ilovica neighbourhood
(Author: Dr. Mojca Šašek Divjak, UIRS 2004)

Towards the East, the Rudnik sport’s park is planned, which articulates the development area’s edge. According to the Spatial development concept of Ljubljana (MOL 2001) this is also the green park prospect connecting the two entities of Golovec and Barje. Nearby, towards the West, lies the interesting waterfront area of the Ljubljanica River, while towards the North lies the hilly Golovec. Both are easily accessible from the proposed new neighbourhood.

Appeals against the plans prepared in the 80s consisted of objections about the area’s scope and possible number of new residents in the area (according to the proposal from 1987, more than 20,000, and slightly less – 15,000, in 1988).
Despite the area’s size, this number of new residents would be too high and a serious ecological burden. Therefore it was necessary to reconsider the relationship between built and un-built surfaces, number of inhabitants and building economics. The morphological concept of Ljubljana (MOL 2001) suggested low and medium density building amidst greenery.

In the analytical phase of the research the following was included:

- Analysis and critique of ongoing planning in the area,
- Specific issues and weaknesses in the area (building on marshy ground, issues of dispersed settlement and other extant developments, deficient utilities infrastructure, hydrological problems, need for dry water retention surfaces),
- Advantages and qualities in the area (living quality, structural and visual qualities …),
- Possibilities and obstacles concerning use of land policy instruments, with respect for the new planning laws (the new Spatial Planning Act and revised Construction Act),
- Etc.

Based on these findings a first draft of the layout and programme scheme was prepared. In the second phase of the project, which is presented in this article, for the chosen area Ilovica we further elaborated the following:

- Building proposal with programme concepts and phases of development,
- Proposal for drainage and accumulating water in the area,
- Test case of re-plotting building land with stated spatial measures needed for implementation of the planned development,
- Approximate calculation of land preparation costs with consolidation and costs of equipment: clearing the land, construction of the traffic and utilities infrastructure and preparation costs,
- Estimate of economic feasibility of the investment, which answered the following questions:
  - What is the value of investment for purchasing the land needed for construction of the utilities infrastructure and public programmes?
  - How much starting capital does the municipality need to enter the process as an active player in the project?
  - How soon the municipality investment will return?

4.2 The neighbourhood's programme and capacity

Basic guidelines

- The analyses and estimates concerning spatial qualities of the wider and immediate area showed that that area can offer good residential quality and a healthy environment. From the landscape design aspect the Ilovica area, as part of the Ljubljana marsh (Barje) is rather degraded. Because of rapid urbanisation in the last decade (dispersed, often illegal developments) it is steadily losing its typical character of marsh-land cultivation and colonisation. Despite these increments of dispersed development the area has still preserved some structural and visual qualities, which were seriously considered during planning.
• The water management study, done for the area, defined areas susceptible to flooding and gave calculations of high water. The findings were used when positioning and calculating necessary retention surfaces, which were dealt with in detail in the proposal for drainage and water retention.

• Because of the findings from research concerning noise and air pollution because of motorised traffic, but also those concerning flooding, we kept the southern part of the area empty or as a reserve surface for development (combination of manufacturing and housing programmes. The advantage was given to preservation of green surfaces, which could help in easier water management and provide the neighbourhood with an additional green recreation space.

• Our proposal for developing the particular blocks follows directives concerning sustainability of residential neighbourhoods. Particular quarters are organised as entities where various programmes intertwine, we enforced mixed use, mainly along the more important communication routes and varied building typology. The mix of compatible activities is also important.

The predominant land use is housing, which also includes complementary activities (schools, kindergartens, shops for elementary supply, personal services, health-care institutions, parks, sports and children’s playgrounds). Jobs will be found in areas intertwined with housing, thus the area will not be zoned into separate units. However areas for businesses, supply, various services, catering etc. lie adjacent to the public and easily accessible surfaces. Smaller production or manufacturing facilities are positioned in a manner that doesn’t hinder the housing functions.

We were highly respectful to the extant structures and preserved them. The area of new development (without the green passage PST, intermediate built structures and water retention surfaces) covers 46.3 hectares. The parameters of the development testing, that follows the new directives, demands and also variations, show that the possible area capacity is:
– number of housing units: 1900–2300
– number of new residents: 5700–6900
– number of jobs: 650–900.

4.3 Traffic

The Jurčkova Street will have to take on the substitute role of primary road from Dolenjska Street, especially because the latter singly feeds the wider Rudnik area. The development proposal brings better traffic accessibility throughout the Peruzzijeva Street and besides the extant low housing includes several higher buildings that determine the entrance from the ring road to the city. The E-W connection links the central communication from Peruzzijeva Street to Ižanska Street, and runs all the way to the Ljubljanica River. In the N-S direction the main communication is the extant Mihov štradon, which links to the widened and partly new Lahova path.

The area lies adjacent to the Dolenjska railroad, which should be modernised according to the plans for the Ljubljana urban region and equipped with a railway stop for better regional passenger service. At present accessibility by public transport is poor, but in the long run a proposed light-rail line will run along Jurčkova Street within the wider network of the city’s tramway system.
The entire area will be equipped with cycling and pedestrian paths that are integrated along the roads. The main pedestrian path runs in the green cleft in the N-S direction and joins the housing areas and other areas with public programmes with both the public transport stops. It connects to the main traverse pedestrian path, running in the E-W direction that runs along Peruzzijeva Street to the waterfront of the Ljubljanica River.

4.4 Description of the neighbourhood structure and programmatic scheme (Figure 3)

- The primary green rift (N-S and E-W) divides the neighbourhood into four parts. All were treated as rather independent units, we proposed different patterns of building (multi-apartment blocks to detached houses), different heights (predominantly low, from 4 to 1 floors) and varied programmes.
- The extant buildings and the green PST cut the area and hinder the plan’s comprehensiveness. Therefore it is necessary to immediately enforce measures that would prevent further unorganised occupation of the land.
- We proposed emphasised mixing of functions along the main communication routes, with basically central programmes (business, retail, catering), which have already started to take roots.
- Near the central park area (N-S direction) and along the PST, public programmes are grouped (primary school, two kindergartens, home for the elderly, community hall).
- Two public transport stops (bus) are planned in the neighbourhood at reasonable walking distances (400–500 m pedestrian access). They represent the central organisation points of the neighbourhood, which are complemented with commercial, business and public programmes.
- We were respectful for city-building elements along the more important communication routes: there we formed a street, while the places for gathering and socialising are the squares, parks and open perimeter blocks with internal green surfaces.
- Larger buildings with predominantly business, retail and catering programmes by the important communications are aligned by the street space and emphasised on either side with lines of trees, which give the streets an urban character.
- The open perimeter block layout, blocks and villa-blocks are complete multi-apartment housing units, where independent neighbourhood communities can emerge with common green surfaces for recreation, play and socialising.
- The types of compact single-family housing in the neighbourhood’s interior and larger green surfaces are: row housing, chain housing, atrium housing, growing housing. In the south part we proposed a combined manufacturing-housing area (houses with production and warehousing extensions).
- Because of the necessary comprehensive dealing with the area during construction of roads and the utilities infrastructure and the need to prepare substantial quantities of building plots in early phases of the project (consolidation) with parallel re-plotting, we decided to propose two phases of preparation and construction. However, because of the site’s size, probably more construction sub-phases will be necessary. The logical division is into four sub-phases, since these quarters represent relatively independent entities.
4.5 Possibilities for integrating real estate policy parameters

In the Ilovica area, re-plotting is a possible instrument. The problem of small plot structure and dispersed ownership can be effectively alleviated by a re-plotting procedure. The area is rather expansive, which can prove a benefit or hindrance in the re-plotting procedure. The benefit is above all, economic rationality. Re-plotting for a large area is more rational and sensible and in general provides better results (larger manipulative space). Because of the large number of re-plotting participants the procedure can be lengthy and also difficult to manage (we nevertheless have to be careful to remain in the eight year time-span as is proscribed for location plans).

If the municipality wishes to start a re-plotting procedure in Ilovica, it has to obtain a somewhat larger share of “active” land, so that it can be the initiator of the procedure. It is not very likely that the municipality will purchase 67% of the necessary land, which would entitle it to undertake the procedure by itself. Probably other investors will appear that have large land-ownership shares and will be interested to undertake the proposed
development. It is however vital for the municipality to have a large enough share to have an active role in the re-plotting procedure.

Since the area is so large we believe that re-plotting organised by the landowners themselves is practically impossible. The procedure should therefore be managed by the municipality (besides the administrative procedure it should also be active in stimulating the owners, preparation works, caring for simultaneous preparation of the planning document and the re-plotting procedure), which would also provide financial backing. In exchange for the financial support it would gain the necessary common surfaces.

### 4.6 Approximate calculation of costs of preparation and utility provision and assessment of economic feasibility of investment

The calculation of costs of preparation and equipping the land includes clearing the land and construction of the traffic and utilities infrastructure, including costs of preparatory work. The construction of the utility lines was calculated on the guidelines from the geomechanical report, which suggested building the utilities infrastructure in consolidated ground. Because of uniform consolidation covering as much of the land as possible, it is sensible to undertake the consolidation of roads together with parking areas and open spaces by the buildings (public and private). The investor should also strive for clearing of as much as possible simultaneously. Simultaneously to clearing the surfaces for roads, or with a very short pause, the municipality should try to clear all surfaces for parks and public buildings and find possibilities to do the same for privately owned land.

Parallel to the decision to develop the described area Ilovica, the Municipality of Ljubljana should first change the land use of part of the area from agricultural to building land, thus creating the necessary condition for urbanisation. The estimate of economic feasibility was undertaken from the set programme guidelines for the proposed development, which determined uses for the different areas, approximate calculation of costs of land preparation with consolidation and utilities equipment, which were then used to calculate the possible communal levy and compensation for using building land.

To ease the re-plotting phase, the area was divided into two phases. Preparation of the location plan and re-plotting occur simultaneously. A smaller time break (six months) happens between the first and second phase, during the preparation of the plans for clearing the land and beginning of the land consolidation exercise, as well as land preparation and building itself. The buildings planned for the second phase should be completed one year after completion of those of the first phase.

Corresponding to the stated phase benchmarks the following was done:
- Estimate of costs of land preparation, including costs of land consolidation,
- Estimate of construction costs of the primary and secondary utilities infrastructure,
- Estimate of direct investment effects (communal levy and compensation for using building land),
- Description of indirect investment effects,
- Definition of economic feasibility of the investment.

The indirect, measurable effects of investment were determined on the basis of estimated costs – expenditure and income. This was followed by calculation of investment effectiveness, indicated by the duration of returns on the invested resources.
includes costs of investment, i.e. purchase and preparation of land with consolidation and utilities equipment. Income includes payments from the communal levy and compensation for using building land.

The financial flows showed that the time of return was shorter than the economic age of the investment (individual utilities 30 years, road on marshy ground 10 years, averaging 20 years). The calculation of financial flows showed that the time of return of invested resources would be 11 years. According to the stated indicator we can ascertain that the investment into land preparation and construction of the utilities infrastructure is justified.

5. Conclusion

The article presents the comprehensive approach to planning of the new, sustainable designed housing estate Ilovica in southern Ljubljana. It was executed as a model of a larger densely populated settlement, which would also ensure the reconstruction of the extant area of low-density housing with deficient utilities provision. We prepared a model for denser settlement and pointed out possibilities for implementation for the Ilovica area. The municipality can find various motives in such a model of denser settlement:

− Strategic (the municipality can increase land occupation in areas of dispersed settlement, improve the extant condition, limit illegal developments and thus increase and stimulate organised forms of building);
− Economic (the municipality can activate previously invested resources and activate capital, which is lying dormant in land and the utilities infrastructure);
− Developmental (answering the demand for building land for housing – for owner-occupied or rented homes and to stimulate certain types of programmes).

From our assessment of economic feasibility we can ascertain that the planned investment could be implemented, but because of the project’s demands respect for the proposed measures and good organisation of the entire development scheme are of key importance. Of course the services of experts akin to building on marshy lands would be compulsory. Such multi-faceted projects demand multi-disciplinary approaches, whereby only the full participation of various experts and also wider community can lead to better results with synergetic effects that are the result of common endeavour. The planning and execution phases demand the integration and linking of numerous other actors: the municipality, various investors, financial institutions, funds, but also the participation of the local community, present residents and all other interested citizens.
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