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Rehabilitating the Brownfield Zones of Budapest

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Introduction

In the American literature, the notion of brownfield appeared for the first time in t the early 1980s and at that time, this notion simply meant the abandoned industrial areas. Simultaneous with the spread of the disindustrialisation process in a number of developed countries, this notion has become more extensive and was given a somewhat different meaning. In the European Union, in accordance with the wording of the CLARINET (Contaminated Land Rehabilitation Network Technologies) working group, the brownfield is the area that has already been used but is currently abandoned or less utilised, is facing discovered or presumed contamination problems, is primarily located in urban areas and is in need of intervention for the purpose of efficient re-utilisation.

In our research we have used the following definition for the brownfield: The brownfields are those ex-industrial areas that are not used efficiently (under-utilised) and are occasionally vacant. Also the mal-utilised or abandoned railway areas and the emptied military barracks fall under this definition. Unclear ownership relations and the lack of comprehensive legal regulations concerning the respective problems are similar difficulties to those represented by environmental contamination, which is usually an undiscovered problem. The extremely large proportion of the brownfields in comparison to the Western countries represents a qualitative difference when it comes to problem solving.

In relation to the delineation of brownfields, we had to define the following terms:

- *Transitional area:* the area located between the inner city and the suburbs including the brownfield and the connected, large agricultural and green areas (cemeteries, sports grounds, etc.) and the areas of transportation and traffic.
- *Brownfield areas, brown zone:* this is the traditional (ex) industrial area with transportation and housing estates inclusions. *In practise, this is the actual examination area in our researches* (it represents one-third of the territory of Budapest, which equals to approx. 68 square kilometres). A part of it has already been rehabilitated, or is in the rehabilitation phase.
- *Rust zone:* the non-rehabilitated part of the brownfield, namely those areas that had formerly been in intensive use (industrial, transportation, warehousing areas, military barracks, and – probably – residential areas, etc.), but their utilisation was given up, or the intensity of utilisation was reduced considerably (and where the unnecessary, deteriorated infrastructure of the abandoned activities – vacant workshop buildings, warehouses, industrial railway lines, etc. – can also be found).

The development policy of the European Union increasingly focuses on urban problems. Primarily as a consequence of this attention, several research programmes have been initiated during the past decade by the EU in the subject matter of brownfield rehabilitation concentrated mostly in the large cities.

Between 1998 and 2001, CLARINET, which basically aimed at the assessment of the level of contamination in the brownfields, and the elaboration of the technologies and decision-making techniques of remediation was the project of the Fifth Mainframe Programme. The CABERNET (Concerted Action for Brownfield and Economic Regeneration Network) projects were launched as the continuation of CLARINET in 2002 with the aim to raise the awareness and the level of information of the key stakeholders involved in the rehabilitation of the brownfields and to elaborate integrated conceptual models for the uniform definition and management of brownfield rehabilitation. In addition to the above objectives, finding and disseminating Best Practices was also in the focal point of these projects. The RESCUE (Regeneration of European Sites in Cities and Urban Environments) project (2002–2005) examined, through the regeneration practises of four countries (France – Nord-Pas de Calais – Great Britain – North-East England –, Poland – Silesia – and Germany – the Ruhr-area and Leipzig) how the basic principles of sustainable development could be integrated into brownfield developments. We should also mention the NORISC (Network Oriented Risk Assessment by Insitu Screening of Contaminated Sites) project (2001 and 2003), which was launched to develop a decision-making software system. Such software might be useful in – among others –assessing the contamination profile of the urban brownfields and also in the evaluation of the possibilities of re-utilisation.

Though the EU gives considerable financial support for the elaboration of the research projects, no comprehensive concept has yet been developed neither for the revitalisation of the brownfield areas nor for a uniform, EU-level legal regulation. Research and development activities were usually the result of local, regional or national initiatives. For this reason, studying the brownfield development policies of the different countries and the comparison of international practises is of utmost importance to get a comprehensive picture about the European practise.

The most important research areas of the international projects dealing with the rehabilitation of brownfields focused on the *legal issues* (ownership relations, remediation and responsibilities for the risks), on *financing* (cost-reduction strategies, involvement of the different financial resources), *on joint management of environmental problems* (definition of the indicators of sustainability, technological solutions to eliminate contamination of the environment), on *promoting co-operation* (the organisational and institutional frameworks of co-operation, local acceptance and support of brownfield developments), and on the possibilities of *re-utilisation* (residential parks, protection of industrial monuments, commercial ob-

jects, green areas, mega projects, etc). In these projects, the following subjects were also investigated: How can the basic principles of economic development be harmonised with environmental protection in the course of brownfield rehabilitation and how do the re-utilisation plans of brownfield areas fit into the long-term development concepts of the affected cities.

The first industrial plants appeared in the 1830s in Hungary. The location of these industrial plants inside the settlements was defined by „natural factors"; including transportation facilities – vicinity of river ports and docks, and the access to railway lines, freight yards and industrial railway lines after the second half of the 19th century –, the vicinity of raw-material resources, real-estate prices, allocation of plots of unbuilt ground, etc. No construction regulations or spatial plans have influenced the choice of premises of the industrial plants. In spite of the above process of scarce industrialisation, Hungary had remained an agricultural country until the First World War. In 1910, 18.3 percent of the earners worked in the industry (including small industrial). As a result, larger, coherent industrial areas had developed only in some of our larger cities: in Budapest and in a few mining and heavy-industrial towns (Miskolc–Diósgyőr, Salgótarján, Tatabánya, Ózd, Győr).

Budapest also represented the largest concentration of manufacturing industry; until 1918, on a territory of 320 thousand square kilometres inhabited by 20 million people (the country was significantly larger at that time than today), 32–33 percent of the country's manufacturing industry operated in the capital city, while during the mid-war period, on a territory of 93 thousand square kilometres, 60 percent (!) of Hungary's manufacturing industry was located on the present territory of Budapest. Already in the middle of the 19th century those industrial districts could be delineated in the capital city that accommodated the majority of the industrial premises until as late as 1990, and – somewhat shrunken – until today. The industrial districts represented about 15–16 percent of the present administrative area of the city.

After 1948, namely after the communists took over the power, the country's leadership started a forced industrialisation process. Industrialisation was put into the focus of economic development: between 1948 and 1955, industrial production increased by 130 percent, while the proportion ration of the industrial earners increased from 21.6 percent in 1949 to 34.0 percent in 1960 (these were the years of the census). A large number of gigantic industrial investments were launched in that period. Industrialisation followed 19th-century patterns, in other words, it was primarily limited to the production of raw materials, the energy sector and the classical heavy industry. Due to the shortage of capital goods, the decision-makers were forced to concentrate the investments in the existing industrial areas of the country and in the existing industrial districts of the cities. Between 1949 and 1960, the number of industrial earners doubled in Budapest, increasing from 291 thousand to 603 thousand, while the expansion of the industrial areas failed to follow

this growth. The industrial plants were used more intensely and second and third shift were introduced to find space and workplaces for the extra number of workers. As a consequence, the number of modern industrial plants was very little, thus industrial production was carried out in the old, often reconstructed and extended buildings. Between 1960 and 1970, the number of industrial earners increased with another 60 percent. This increase was then followed by stagnation for half a decade, and after 1975, the number of industrial warners started to decrease. Industrial production started to loose ground for the first time and to the greatest extent in the most industrialised areas, in the cities. The number of industrial earners started to decrease already from 1965 in Budapest (1965: 612 thousand, 1983: 483 thousand, 1988: 318 thousand). However, there were hardly any changes in the spatial extension of the industrial districts, because industrial production was given up only in some of the premises, leaving confused ownership relations, contaminated environment and unused, deteriorated buildings behind.

The transformation in the political regime in 1989–1990 dealt the country's industry another smashing blow: under market conditions, the unprofitable companies that had been artificially kept alive by the state earlier were liquidated, and the termination of the COMECON resulted in considerable losses in market share for a large number of the companies. Privatisation of industrial companies in state and local government (council) ownership was possible. Production was terminated at several industrial premises; the existing industrial buildings were either given different functions (warehousing, commercial, office-building, etc.) or were left vacant. In 1992, only 150 thousand industrial earners were registered in Budapest. Large territories abandoned by the industrial sector were created in Budapest and in some of the cities that used to be strong in industrial production.

Specific „brownfields" were created due to the fact that the Soviet troops stationed in Hungary used large areas for military purposes (military barracks, depots, shooting ranges, airport, etc.). After the departure of the Soviet troops in 1991, areas similar in nature to the brownfields (unutilised and difficult to utilise, contaminated, with deteriorated buildings) were left behind.

The Regional Research Centre of the Hungarian Academy of Sciences has been dealing with the problem of brownfields in Budapest since many years. In our first investigation we made an attempt to delineate the brownfields and to map its current land use.[1] This examination facilitated for the elaboration of uniform terminology and for the development of the spatial delineation method. In the course of our research, we interviewed by means of questionnaires about 2000 companies that were still operating at the turn of the millennium in the delineated area. The research called our attention to several, previously unknown relationships, like, for

[1] Gazdasági átalakulás Budapest barnaövezetében [Economic transition in the brownfield of Budapest]. Team leader: Barta, Györgyi. Pécs, MTA Regionális Kutatások Központja, 2002.

example, to the aspects of corporate real-estate management and real-estate ownership relations, which represent the key issue in every spatial rehabilitation programs. At the end of the research we could conclude that the economy and the corporate history of the brownfields shall be investigated, together with the railway and military areas and that the status of the environment, the ownership relations of the terminated companies and those in transition shall be mapped, that the rental systems shall be investigated in more details, and that the position of the brownfields on the real-estate market and the role of the metropolitan and district local governments shall be clarified.

This was followed by the research presenting the solutions for rehabilitation applied in the European cities through four case studies.[2] Useful conclusions could be drawn from the case studies of the West-European cities concerning certain problems: how the issues of environmental remediation are handled, which are the obstacles before brownfield rehabilitation represented by the contradictions between the administrative and regional-development systems, what is the role of the city local governments in the management of rehabilitation, how can the economic and community stakeholders be involved in the planning process and in the implementation of the plans?

Subsequently, we carried out the comprehensive examination of the brownfield in Budapest with wide research co-operation (architects, urban planners, real-estate experts, historians, economists and sociologists were involved).[3] We have presented the development of the industry in Budapest, its golden era and its withdrawal, the size and extension of the developed brownfield, its limits and use, the extent of environmental contamination, the vacant, ruined, but often valuable buildings, the difficult heritage of the miserable housing estates closed off among the factories, the spontaneous signs of renewal, and the instead of urban and spatial planning about this region.

The present volume was complied as the final study of the research finished in 2004. The 22 authors of the volume investigated different aspects of the problems of the brownfields. These studies were prepared around four specific subjects, which – built on top of each other, present the current status of the rehabilitation of brownfields in Budapest. The present volume is the synthesis of these studies, but we have kept the original structure while preparing this volume. As a consequence, it is divided into four parts.

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[2] Rehabilitációs megoldások az európai nagyvárosok barnaövezetében [Solutions for rehabilitation in the brownfields of the European cities]. Team leader: Barta, Györgyi. Pécs, MTA Regionális Kutatások Központja, 2004.

[3] Barta, Györgyi (ed.) (2004): A budapesti barnaövezet megújulási esélyei [The chances for renewal of the brownfiels of Budapest]. MTA Társadalomkutató Központ, Workshop Studies, Budapest.

- The history of the industry in Budapest, the changes in the expansion of the former industrial zone.
  The history of the industry represents the preliminaries in the development of the brownfield: in our research we put special emphasis on the economic and the geographical reasons of the allocation of the former industrial plants and their buildings, on the different aspects taken into consideration while choosing the premises, and on the changes in the extension of the industrial, transportation, etc. areas. In effect, this research in industrial history formed the basis for the delineation of the brownfield zone.

- The current status of the former industrial zone.
  This chapter deals with the varied land use of the former industrial zone. It presents was of the most crucial problems of the re-use of the Budapest brownfield: the extent of environmental contamination in the former industrial and transportation areas, the present situation of assessing the damages and hazards and of the remediation. It maps the sectoral and regional structure of the brownfield, analysing the model of economic transformation through three, spatially and characteristically different zones. Finally, it deals, separately, with the residential functions of the brownfield, and with the specific problems of the housing stock, focusing on the former workers' colonies.

- Spontaneous renewal in the brownfield of Budapest.
  This chapter present the most typical forms of transformation in the brownfields, and also the respective examples taken from Budapest. It also deals with use for office, residential and cultural purposes of the former factory and workshop buildings and presents the related issue of protecting industrial monuments, not to speak about the appearance of the shopping centres and industrial and technological parks due to the upgrading of the area especially because these structures are alien to the initial functions and the architectural heritage of the area.

- The brownfield rehabilitation plans of regional development and spatial planning.
  The final chapter of our volume deals with the future of the brownfield in Budapest. The probable scenarios of the transformation of the brownfield are presented, and the modernisation plans of the transportation infrastructure are dealt with special emphasis. The different tools of urban spatial planning and spatial development applied in Budapest are also presented. Finally, we can read about the development concept and the mid-term development programme of the capital city.

1 Gaining and loosing ground of the manufacturing industry in Budapest

Buda, located by the water-way of the river Danube establishing connection between the Balkans and the „East", and also between Central and Western Europe became the unquestionable power and economic centre and the capital city of the Carpathian basin by the early 14th century (until the end of the First World War, the Hungarian Kingdom extended to the whole Carpathian basin). However, joining up of the city to the „West" was interrupted by the expansion of the Ottoman Empire: the largest part of Hungary became under Turkish rule, and Buda herself was also occupied by the Turks between 1541 and 1686. As a consequence of the Ottoman expansion, the Hungarian Kingdom lost its independence, as after the Turks were expelled, Hungary became part of the Habsburg Empire with limited sovereignty. Buda lost its capital-city role. The city consisting of three, administratively independent settlements – Buda, Pest and Óbuda –, started to become again the economic centre of the country only at the end of the 18th century, primarily due to the intermediary trade of agricultural goods: the tradesmen of the city purchased the agricultural products of the fertile Great Hungarian Plain and exported these goods to the Western provinces of the Habsburg Empire, and – occasionally – to Western Europe. The growth of the population accelerated: in 1785, the number of the population in the three towns did not reach 50 thousand, while in 1826, 94 thousand, and in 1846, 148 thousand people lived in the cities.

Until the second quarter of the 19th century, the industry of the cities was of handicraft nature. The settlement of manufacturing industry, or its initial form, the manufactures, was hindered by the feudal conditions, the modest accumulation of capital and the lack of loans, not to speak about the competition of the more developed Check and Moravian, Low-Austrian and Styrian regions. The handicraft workshops were inserted into the residential areas, and the respective activities were usually carried out in the homes of the craftsmen. Consequently, the industrial activities of the time did not shape the urban structure. At the most, the economy shaped and influenced the urban structure through the warehouses built on both urban sides of the river Danube and by the „institutions with large space requirement" (spaces of markets, animal markets, brick-making areas, stables, boarding and eating houses, storage-places, cemeteries, etc.).

After some, mostly unsuccessful attempts to establish manufactures, the first manufacturing industrial workshops were created in Pest-Buda in the 1830s. By then, primarily through trade in land produce, certain amount of capital was accumulated in the hands of the wealthier citizens, there was a need for the processing of a part of the purchased land produce, and the increased circulation of commodities required the modernisation of transport. The shipyard of the Danube Steam

Navigation Company was put into operation in 1835 in Óbuda (it was operating at its original place until as late as the 1990s). Some years after its opening, the number of people employed reached 2000; the sugar refinery started to operate in 1834, a matches factory in 1839 (the safety matches were invented by a Hungarian chemist), and the first modern factory, the József commercial steam mill, which later had a successful career, started to operate in 1839.

In 1848, a peaceful civil revolution broke out in Hungary, and the resulting approval of acts guaranteeing the functioning of a civil society created the basis for rapid economic development. However, already in the very same year, an armed fight broke out between Hungary and the ruling Habsburgs, this was called the „fight for liberation", which ended with Hungary's military defeat in 1849, resulting in the absolutist ruling of Hungary from Vienna until as late as 1867. The „compromise" of 1867 created a dualist rule, granting Hungary considerable autonomy and political stability. The change for a civil society accelerated the economic modernisation of the country already until 1867, and rapidly increased economic performance. However, the real spectacular economic development started only after the „compromise" (1867) and the years following the compromise were the years of „gründerzeit" in Hungary.

1.1 The industry of Budapest in the bourgeois era

The circumstances for the modernisation and rapid development of the economy had a fortunate coincidence after 1848 and after 1867:

- The years after 1850 were the years of boom in Europe. Considerable excess capital had accumulated in the developed countries of the world, the capital export of these countries increased rapidly (eightfold between 1855 and 1890). Hungary – where one of the obstacles before economic growth was the lack of capital for many years – could receive unlimited amounts of foreign loans especially after 1867.
- Agricultural boom formed part of the European prosperity, and the resulting affects for an agricultural country like Hungary was at the time, were exceptionally favourable. (The agricultural products – wheat, flour, sugar, live animal, wool, etc. – were exported without any limitation to the „West" – the competition of the American wheat appears in the 1880s –, Hungary was the second largest flour-exporting country in the world, the agricultural export gave a great impetus to the construction of railways, the development of steam navigation, flood prevention and the development of food industry, etc.)

- Economic development was also promoted by the fact that in the middle of the 19th century, the first „industrial revolution" created those technical and technological conditions that facilitated for the rapid modernisation of production and for its unprecedented growth (steam engine, steam boat, railways, agricultural machinery, etc.).
- After 1867, the consolidation of the political regime, the possibility to have an independent economic policy, the development of a civil legal system and institutional network, the multiplication effect of certain sectors (the export of agricultural produce required the development of the railway lines, creating great demand for iron and steel production, for coal mining, etc.) equally stimulated the rapid growth of the economy. In the beginning (between 1850 and 1880), this growth was manifest in agricultural production and in the directly connected sectors, like transportation of goods, building out of transportation networks, flood prevention, while after 1867, also in the foundation of banks and insurance companies.

The above trends could be monitored also in Budapest through the development of the industry. The conditions for the growth of the manufacturing industry were especially favourable in the capital city during the dualist period (in spite of the lack of significant raw-material resources in the direct vicinity of the city).

- The city became the centre of the extremely centralised network already at the start of the railway constructions in Hungary. This way, the raw-material needs of manufacturing industry could be satisfied and the end-products could be transported to any region of the country. In addition to this, the city was located in the heart of the agricultural export directed from the East to the West and also in the centre of industrial export going from the West to the East, playing the role of a „switch-table".
- During the years prior to the First World War, Budapest and its suburbs represented a consumer market of more than one million people.
- Sufficient intellectual capacity was also available, as the professors of the technical university in Budapest and the engineers of the large companies contributed to the success of several sectors with a number of international patents. (The transformer, for example, was the invention of a Hungarian engineer and it became one of the most successful products of the Ganz factory; the bulb factory of Budapest broke into the world market with the production of incandescent lamps as a result of several inventions, like the wolfram-incandescent filament, bulbs filled with inert gas, etc; the first electric engine operating also under industrial circumstances was manufactured in Budapest; the telephone exchange was also a Hungarian invention, etc.).

– Budapest was the unquestionably largest money-market and power centre of the country, and it was an important factor when it came to finding financial resources and receiving government orders.

In spite of all the advantages, during the years between the end of the civil revolution (1848) and the „compromise" (1867) and the end of the 1880s, the growth of the manufacturing industry in Budapest was rather slow. Its reasons were similar to the problems of the whole country: the attention of the investors focused primarily on railway construction, the foundation of banks, and the development of a modern city (large construction activities changing the city structure, the construction of new bridges over the river Danube, building out of the infrastructure, and the construction of public buildings). As a consequence, the manufacturing industry was still represented mostly by manufacture-type workshops with low level of mechanisation in the 1850s and 1860s. However, one of the success stories of the industry of Budapest, the development of a modern milling industry had already started. At the time of the „compromise" (1867), a dozen large steam mills ready for commercial milling and export had taken advantage of the great opportunities offered by the boom. Though later, their number increased much slower, the steam mills succeeded to triple their flour production until the end of the century due to the level of technical perfection, their driving force, and the number of workforce. During these years, Hungary was the largest flour exporting country in Europe, and Budapest was the biggest milling town of the world. The other sectors of food industry (production of distilleries and breweries) were also very prosperous, and large industries were formed in other sectors by the 1880s (the Ganz corporate empire manufactured milling equipment, engines, railway carriages, the Óbuda shipyard and several factories manufacturing agricultural machinery were at their peak). By 1891, the number of industrial companies employing more than 20 people was 367 (the total number of employees at these companies was 37 thousand *(Table 1).*

Table 1

Workshops employing more than 20 people in 1891

Workshop size by the number of employees	Number of workshops	Number of employees
20 – 100	285	10,781
101 – 500	72	15,881
501 – 1,000	6	4,094
1,001 – 1,000	4	6,527
Total	367	37,283

Source: Beluszky–Győri, 2004b.

After 1890, the size of manufacturing industrial plants increased rapidly on the one hand, while several companies producing products at international level were established on the other, especially in the most modern industrial sectors of the time, where delay had already hindered the development of Budapest (electricity and telecommunication, vehicle manufacturing, incandescent-lamp production, pharmaceutical industry, etc.). Quantitative growth is indicated both by the increase in the number of the companies and in the number of people employed: by 1910, the number of manufacturing-industry plants reached 1206 (tripled in twenty years), while the number of earners quadrupled and reached 150 thousand. Manufacturing industry appeared also in the suburbs. In 1910, exactly 40 percent of the manufacturing-industry earners of the country worked in Budapest and in its suburbs, representing 49 percent of the workers of companies with more than thousand employees. In addition to the quantitative growth, the high technological level, the innovative nature of the products and the patents contributing to the „second industrial revolution" indicate the development and the – sometimes – international character of the industry in Budapest.

By the end of the dualist period, the manufacturing industry of Budapest and the related constructions – freight yards, industrial railways, warehouses, etc. – drew visible and marked lines on the map of Budapest, shaping industrial districts and industrial suburbs, whose extension has changed only a little since then. The development of the rust zones started within these limits during the period of the rapid withdrawal and partial termination of the so-called „socialist industry".

The most important factors localising the industrial zones of Budapest are the following:

- The waterway of the river Danube: As the engine of growth and development of the capital city in the 19th century was the trade and processing of agricultural produce and because during the first phase of development of the manufacturing industry, the vast majority of produce trade was realised on waterways and also because the largest part of the construction materials, the timber, the coal also came to the city on waterways, the first „industrial districts" of Pest-Buda were evidently built and developed by the river Danube. The majority of the industrial zones that were „established" and completed by the end of the dualist era were thus also located near the Danube. The railway lines had a similar role, though they did not move away from the river the industrial districts „developed by" the Danube. The first railway line was opened in 1846 in Pest. Running along the left bank of the Danube, it established a connection with Vienna in 1851. The „rail way" promoted the growth of the industrial districts brought to life by the river Danube. Large industrial zones located far away from the Danube were only developed in Kőbánya and the Outer-Józsefváros, encircled by railway lines going

in the direction of the Great Plain; though the plants of this industrial zone usually had close connection with the „rail ways" (vehicle repair plants, factories manufacturing railway equipment, pig-farms, etc.). The railways themselves, with their space-intensive stations, factory buildings, industrial railway lines (the railways occupied 4.5 square kilometres already in 1870), with their railway lines often creating obstacles in the urban structure, also markedly shaped the urban structure (nowadays, a part of the railways' buildings and establishments form part of the brownfield).

- Among the influences of natural circumstances shaping the industrial district we should also mention some of the raw-material sites: construction stones were mined in Kőbánya, then the abandoned quarries attracted the breweries into this suburb using the ex-quarries as cellars and fermentation and maturing sites. The clay suitable for the production of brick made the brick-factories settle in Óbuda and Kőbánya.
- In addition to the favourable transportation facilities and the natural circumstances, we have to take into consideration the influences of other factors as well. During the years around the unification of the city (1873) even the urban development concepts have worded the need for the development of functional construction zones. The construction plan of 1871 designated the areas South of the residential areas of the time for the industry, though only some small plants were operating in that zone on the bank of the river Danube in Ferencváros. In addition to the South-Pest industrial zone, the factory zone of the construction plan included the industrial zone of South Buda (Kelenföld) that developed later, the northern peak of the Csepel-island and a part of Kőbánya. During the following decades, extensive industrial areas were actually developed in the designated zone. The construction regulations also made an attempt to force the polluting, noisy and hazardous plants from the residential area. Naturally, the differences in real-estate prices, the possibilities and the costs of building the infrastructure out also motivated the choice of premises of the industrial plants. The relatively low real-estate prices, the moderately strict construction regulations, the growth of the suburban colonies and the increased offer in workforce living there gave a considerable impetus from the last decade of the 19th century to the expansion of manufacturing industry beyond the administrative limits of the time, namely to Kispest, Újpest, Erzsébetfalva, Csepel, etc. More than 17 thousand people worked in the manufacturing industry of the suburbs in 1910.

1.2 The industrial districts of Budapest in the era of the Dual Monarchy (1867–1918)

The river Danube and, after 1846, the railway lines running parallel with the river played a major role in the development of the *industrial zone in North Pest.* The territory between the river and the railway lines had not been built in up to the current place of the Parliament until the last third of the 19th century. The rafts floating on the river were mooring and downloading their goods (firewood, board, tile of wood, timber-goods, hay, etc.), here and some of the goods received were also processed here (sawing of fire-wood, wood-mills, parquet production, etc.). As a consequence, there were wood-storage buildings, construction-material storages, and smaller and larger workshops located alongside the river. A part of the cargo vessels using the river also landed on this section of the riverside, usually with wheat and agricultural produce transported from the Southern part of the Great Plain. This is the reason why the steam mills playing a crucial role in the economic life of Budapest in the 19th century were settled here. The sugar refinery and several distilleries settled near the railway station, while some smaller machine shops were opened by the Váci Street. The germs of the future "industrial axis" (ship repair, joinery shop, leather-processing workshops) located by the Northern part of the road taking to Vác and in the suburb of Újpest have also appeared. At the end of the 19th century, approximately 30 percent of the industrial workers of the capital city worked in this industrial district. The metal and manufacturing industries started to determine the characteristic feature of the zone. The different establishments of the state railways were also rapidly expanding after the turn of the 19th and 20th centuries: railway repair shop, engine-house, the Rákosrendező railway-station, etc. In 1910, close to 12 thousand workers were working in the factories of Váci Street and its neighbourhood.

The first „birds" of manufacturing industry also appeared relatively early, in the first half of the 19th century, in the *industrial zone of Óbuda [North Buda]*. Also in this case, one of the motivating factors for settlement was the water-way of the river Danube, while the railways joined the list of attractive features only in the 19th century (this fact hindered the growth of the industrial zone), because it was the time when the railway line to the coal-mines of Dorog was opened and the Northern railway bridge was built. The latter one offering the connection between Óbuda and the Hungarian railway network. The oldest plants and workshops of Óbuda were established in the textile sector (textile preparation and textile dying workshops). The „flagship" of the industry in Óbuda, however, was the shipyard built on the Óbudai-Island, which was opened in 1835 and was closed only recently. The steam mills and the brick-factories also appeared in Óbuda. The huge site of the metropolitan gas factory utilising the coal from Dorog was built after the opening of the railway line to the Dorog coal-mines.

The industrial zone of Outer-Józsefváros-Kőbánya started to take shape already in the bourgeois period. It has a clear connection to the railways, because the Józsefvárosi Railway Station and the railway lines offered excellent transportation connections. Initially, the trade sector profited from this favourable traffic situation. Until the end of the 19th century, Kőbánya remained the largest pig-trading centre of Europe, where the pigsties occupied more than 100 hectares of land. From the 1860s, the breweries of the city also started to settle in Kőbánya, profiting from the possibility of using the abandoned quarries as beer cellars. The settling of brick factories in Kőbánya can also be explained by the natural circumstances (availability of material suitable for brick-laying). The vehicle repair shops and the different factories of the railway manufacturing industry established at the end of the period investigated were also directly connected to the railways (by now, the Ganz-enterprise had become one of the typical bad examples suffering from all the possible problems of the „rust zone"). This industrial area had gone through permanent expansion during the dualist era, and new breweries were opened one after the other. Modern manufacturing plants and chemical plants were also built by the Cegléd railway line (for example: the Richter Pharmaceutical Factory).

It was also the waterway of the river Danube that established the future of the *South-Pest (Ferencváros) industrial zone.* As the railway lines had reached the area only after 1870, storage and commercial functions were predominant before that, though one of the largest steam mills of Budapest, the Concordia was settled here already prior to the „compromise". After having direct connection with the Southern part of the Great Plain having extensive agricultural export by the construction of the railway bridge over the river Danube, which also connected the area with Trans-Danubia, and with the only sea-port of the country, Fiume, and also as a result of the construction of the Ferencvárosi goods station, the transport situation of the area became favourable all of a sudden. Between 1879 and 1881, public warehouses were built – since about a decade, their utilisation is in the centre of heated debates –, and the „elevator", offering mechanised loading and storage of wheat shipments, was put into operation in 1880. The railway connections with the Great Hungarian Plain and the loading docks of Ferencváros functioning as river harbours promoted the settlement of food industry (steam mills, public slaughter houses, meat processing plants and canning factories, soap factory) in the first place. The plants of the developing chemical industry, the fertiliser manufacturing factory, the crude-oil processing plant and the distillery were partly settled in this area due to the water reserve of the river Danube.

In this period only a few factories were operating in the *industrial area of Kelenföld-Lágymányos,* which started its upheaval in the mid-war period.

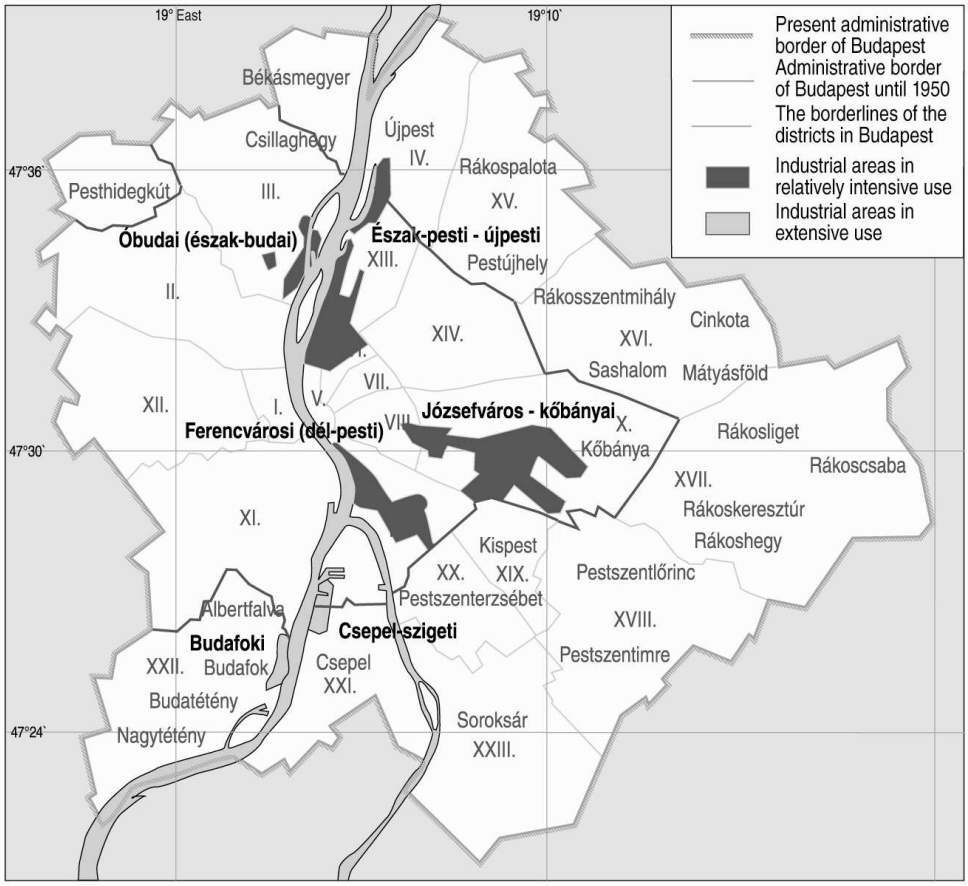
Industrialisation of the suburbs started to accelerate in the 1890s. Until the 1890s, considerable large-scale industry was found only in Újpest (leather factories and tan-yards, timber industry, distillery, ship-yard) and in Budafok (brewery, wine

and champaign production). However, on the eve of the First World War, smaller or larger industrial plants were found almost in every settlement of the suburban zone surrounding the capital city. The manufacturing industry (which was considerably restructured) of *Újpest* is still the largest. Next to the previously existing plants, the different units of the electronics industry (Egyesült Izzó, Phoebus), the textile industry (Magyar Pamutipar – Hungarian Cotton Mills) were created in this period, and Chinoin Pharmaceutical Factory was settled in Újpest in 1912. The suburban towns located South of Budapest became the number-one sites of textile industry developing in these years. While earlier, the textile plants of the metropolitan city (and its environment) were predominantly concentrated in the Northern sector (Óbuda, Újpest) the new plants built in the early 20th century were located in Kispest, Pestszentlőrinc and Erzsébetfalva. Of the factors attracting the settlement of these plants we should, in the first place, mention the cheap workforce and the relatively low real-estate prices. The large-scale industry of *Kispest* takes the lead among the Southern suburbs, where – in addition to the textile factories – two large plants of manufacturing industry were also built (the Hoffherr and the Lipták) taking advantage of the vicinity of the newly opened Budapest–Lajosmizse railway line.

The development of the industry of *Csepel* is absolutely unique. Csepel lived through the years of the unification of the city as a medium-size agricultural village in the middle of one of the islands of the Danube and was hardly connected to the suburbanisation process either. The number of citizens was just a little bit over 2 thousand in 1890. The plant of Weiss Manfréd was relocated from the other side of the Danube, from Ferencváros, in 1892. The Weiss brothers founded their canning factory in 1882, but after a couple of years, the company started to manufacture cartridge-cases and cartridges as well. The company owners were forced to relocate the factory due to an explosion. The initial military plant was gradually transformed into a heavy-industrial complex (metallurgy, rolling mill, tube-works, etc.). At the turn of the century, close to 1 thousand people, while on the eve of the First World War 5 thousand people worked in Csepel. The spectacular development was further accelerated during the First World War. The heavy-industrial plant already employed 10 thousand people in 1915, while at the end of the war 28 thousand people. In the meantime, the territory of the plant also expanded occupying 250 hectares in 1918 (of it, 37 hectares were built in with more than 200 buildings and industrial halls). *(Figure 1).*

Figure 1

Contiguous industrial-transportation areas of Budapest at the time of the Millennium



Source: Beluszky–Győri, 2004a.

1.3 The industrial zones of Budapest in the mid-war period

Hungary, being part of the Austro-Hungarian Monarchy was one of the losers in the First World War. In the so-called Versailles peace treaties putting an end to the war, the Hungarian Kingdom was forced to accept surprisingly strict conditions: six countries were given a part from the territory of the Hungarian Kingdom, resulting in the annexation of 71.5 percent of its territory and 63.6 percent of its

population to other countries. The natural-geographical unity of the country was terminated and the unity of the economy integrated during the previous decades was broken. The economic losses were also very severe (for example: the country lost 90 percent of its forests, 83 percent of its iron ore production, and close to half of the manufacturing industry. The transportation network became confused, and the developed geographical division of labour disappeared. The agricultural market protected by the protective tariffs of the Monarchy ceased to exist. In stead of being the capital city of an empire with 21 million inhabitants, Budapest became the capital of a country with less than 8 million inhabitants. The market losses of the economy and the industry of the capital city were immense, rendering excessive and unused a part of the industrial capacities (especially that of the food industry). The production of the metropolitan industry reached the level of 1913 only in 1927. As a consequence of the stagnation, there were hardly any changes taking place in the regional allocation of the industry in Budapest. The territory of the *North-Pest zone* shrivelled, as a result of the closure of several food-industrial plants and the expansion of the residential zone, including the construction of Újlipótváros. At the same time, the *South-Buda* (Lágymányos-Kelenföld) industrial district was expanding, and modern industrial sectors (production of mechanical instruments, electronics industry, cable manufacturing, textile industry) were settled also near the Fehérvári Street.

The industry of the *suburban zone* did not suffer this much from the consequences of the lost war, thus the production value of the manufacturing industry was doubled until the Second World War. Above all, the growth of the textile industry was impressive. The manufacturing industry appeared in the garden cities and the settlements of the agglomeration, having primarily residential functions earlier *(Figure 2).*

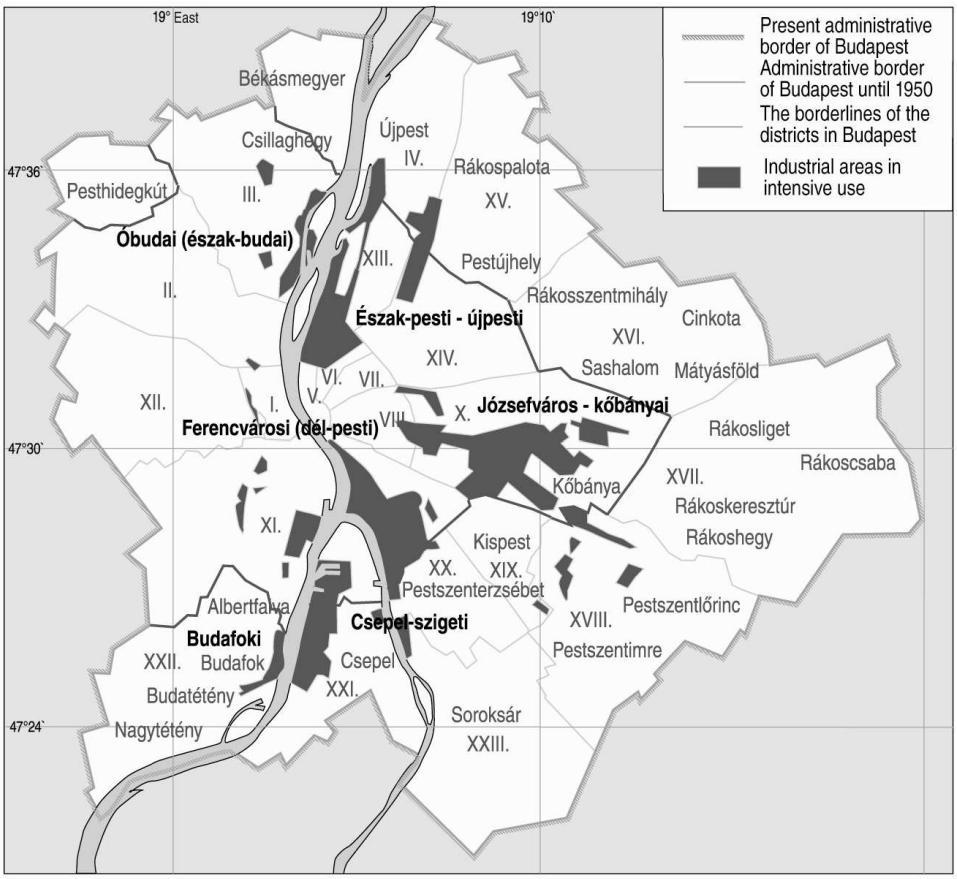
1.4 The industry of Budapest during and after the fall of state socialism

The industry of Budapest suffered great losses during the Second World War. Production was terminated in about 200 industrial enterprises out of the existing 1700, and the number of those companies that had not suffered any damages was hardly more than one hundred. During the bombardment and the siege of the city, one-third of the machinery and the buildings of the factories were destroyed, and the machinery and equipment of more than 400 factories was taken to Germany. After the war, production was re-established at a relatively rapid pace, but the industrial production of Budapest reached the pre-war level only in 1948 due the shortage of labour, raw-materials and energy.

The socialist regime exerted controversial effects on the industry of Budapest: on the one hand, it was fundamentally changed, while on the other, it was

Figure 2

Contiguous industrial-transportation areas of Budapest during the 1940s



Source: Beluszky–Győri, 2004a.

„hibernated". The ownership relations and the corporate structures were changed, the small and medium size companies disappeared, and the sectoral structure of the industry in Budapest was also altered to some extent. However, several big companies founded at the end of the 19th and in the beginning of the 20th centuries survived the forty years of the Communist regime, and the allocation of the industry did not really change inside the capital city. The administrative changes of the 1950s, the formation of the so-called „Greater-Budapest" – 23 cities and settlements were attached to Budapest – converted the industry of the suburbs into a metropolitan industry. The vast majority of the old industrial buildings remained in

industrial use until the transformation into a new regime. Technological development followed the international trends only very slowly and with a great delay.

Nationalisation started in 1946 and by December 1949, all the companies with more than 10 employees and – in certain sectors (for example: printing industry, or energy supply – companies with less than 10 employees were taken into state ownership. This way, not only the private companies disappeared from the scene, but also the pyramid of the corporate structure was turned upside down: the category of small companies had the smallest share in the structure (in 1986, the proportion ratio of the companies with less than 20 employees was below 10 percent in Budapest).

The priorities of the *investment policy* – the advantageous position of the industry at the debit of the other sectors of the economy, the stressed development of the heavy industry within the industry, giving priority to the state-owned companies among the economic organisations – were favourable for the industry of Budapest from many different aspects. In the first half of the 1950s, heavy industry was given the greatest resources in the industry of Budapest, receiving 85-90 percent of all the industrial investments.

Beginning with the 1960s, though the share of the capital city in the total investments of the country started to decrease to a certain extent (to 26–30 percent) it still exceeded the total share of the citizens of Budapest in the country's population. The share of industrial investments also decreased within the economy of the capital city. Within this change, the investment ratios were changed, though to a minimum extent, for the benefit of light industry, preserving the primacy of the heavy industry in the meantime.

The aspects of regional development appeared in the Hungarian policy in the early 1960s, immediately emphasising the need to reduce regional differences and thus the moderation of the overweight of the economy of Budapest. The fulfilment of this objective and the mitigation of the increasingly pressing lack of labour-force would have been served by the re-location of industry from Budapest, and the prohibition of the allocation of industrial enterprises in the agglomeration zone in the 1960s. However, these programmes failed to have considerable and visible achievements.

During the Communist era, no significant changes took place in the *sectoral structure of the industry in Budapest*, only the weights of the decisive industrial sectors (manufacturing industry, chemical industry, and textile and food industries) changed. There were hardly any examples for the construction of new factories as green-field investments, in stead, the existing factories were rebuilt or extended.

Technological development and innovation were missing from the mechanism of the communist system; at some occasions, economic-policy motivations gave an impetus to technical development. However, this external driving force seldom became manifest due to the closed nature of the socialist system. As the majority of

the export was directed towards the COMECON countries or the developing countries, technological competition prevailed – to some extent – only in these regions. Unlimited internal demand did not promote either the renewal of the production processes and of the products. Technological development taking place in the beginning of state socialism, and also in the 1960s kept the industry of the Central and Eastern European countries in competition with the developed world, but this region proved to be unable to adapt the Western post-industrial changes of the 1970s.

Between 1949 and 1960, the *number of industrial workplaces* increased from 300 thousand to 600 thousand in Budapest. Close to half of the new industrial jobs created in the country in the above period were located in the capital city. Until the mid–1960s, the number of people employed continued to increase, then, for the first time in the country, their number started to decrease in Budapest (to 547 thousand in 1973, to 347 thousand in 1983 and, finally, to 276 thousand by 1990). After the Second World War, increasing the number of people employed could initially be solved from the excess labour of the capital city and from those who moved to Budapest. Between 1949 and 1960, the number of citizens increased by 309 thousand in Budapest. However, the flow of migration was hindered by the lack of housing and the capacity-deficiencies of the infrastructure. This is why the number of commuters coming from the agglomeration zone taking shape outside of the administrative borders of Greater Budapest increased and reached, beginning with the 1960s, 200 thousand people. Close to 20 percent of the jobs in Budapest were taken by commuters.

The fight for resources, the prestige-battle for company growth and for the position of "large-scale company" and the fact that the number of company-founders was very small in the communist era clearly explain why the big companies had a dominant and permanently increasing weight in the corporate organisational structure. Until as late as the 1980s, the waves of re-organisation of the economy resulted in continuous centralisation and the big companies had special power position.

The companies and especially the large-scale ones continuously increased in size, as the number-one source for production growth was the increase of the number of the labour-force. When sources of local labour were exhausted, the companies started to recruit the labour supply in the countryside, transported the daily commuters with their own buses from the villages nearby, and built workers' hostels for those who lived farther away from Budapest. When even these reserves were exhausted, the companies of the capital city set up their premises in the countryside. The headquarters of the big companies, together with the strategic workplaces and the dynamic parts of production producing greater added value were left in Budapest, while routine mass production was re-located to the countryside. In 1982, the companies with Budapest headquarters had their units in 536 different

settlements, and more than 40 percent of those who were employed by a company with its headquarters in Budapest worked in these units and premises in the countryside.

At the same time, the spread of multi-premise corporate form also meant that an increasing part of the country's industry (approximately 40 percent) was controlled from the large cities, and especially from Budapest.

During the so-called „socialist era", *the spatial allocation of the industry* did not really change. The fundamental feature of the socialist production system, the lack of profit-sensitivity had a major role in it. The companies were not forced to save on their production costs, including the cost of land use or transportation costs. Thus it is not surprising that the industry maintained, moreover constantly increased its premises inside the capital city, occasionally even on the most valuable plots of the inner city.

Politics and economic policy overruled urban development policy. Partly due to this phenomenon, the industrial area remained at its original location. Spatial planners were more sensitive to the polluting and contaminating effects of the industry, but failed to enforce their principles in the urban development programmes. The industrial re-location programmes of the economic policy also failed. In the 1960s, the large-scale companies became increasingly strong, and were successfully lobbying for their interests. *In summary,* neither the economic policy, nor the urban and spatial planning policies had a considerable influence on the allocation of the industry inside the capital city. This explains why at the end of the Communist era the size and the extension of the industrial areas was practically the same as before the Second World War.

1.5 Deindustrialization after 1989

The number of industrial employees started to decrease from the middle of the sixties (the peak employment of that period offered 650 thousand working places). Until the change of the political system, the reason behind this phenomenon was rather the lack of the workforce than the effective changes of the economy. In this period we can not speak about deindustrialization yet, as the industry in Budapest succeeded to preserve its significance in manufacturing industry, in the export and in the investments as well. During the decades of state socialism, the industrial enterprises did not move from their earlier premises. Moreover, the area occupied by the industry increased significantly.

After 1989 however – similarly to the national tendencies – both the production of the manufacturing industry and the investments declined significantly in Budapest. Major companies collapsed, one third of all the bankrupt companies were based in Budapest; the role of Budapest the leader of industrial activities weak-

ened. A strong desindustrialisation process started in Budapest with all its characteristics: the proportion share of the industry within the economy decreased and its place was gradually taken over by the service sector.

Nevertheless the industry in the capital cannot be written off. The concentration of the industry in Budapest, offering 100 thousand workplaces, is still the highest nation wide. After 1994 the industry in Budapest started to develop again. This industrial development was mostly due to foreign investments dominating mainly at the start of the period, but still playing an important (however decreasing) role. Large-scale industry did not disappear from Budapest, nevertheless it is a fact that nearly half of the 30 greatest companies have ceased to exist for good, the company sites have been abandoned or temporarily have been let to several dozens of smaller ventures, warehouses, or trading activities. There is little sign for long-term renewal at the sites of the industry in Budapest that used to play an important role, as most of the time the buildings are not renovated and used on temporary basis only. After 1989 huge rust zones appeared in the industrial areas of Budapest.

1.6 Rust zones of Budapest

The contiguous industrial areas of Budapest form strong-featured districts. This ex-industrial zone forms part of the *intermediate, transitional zone,* which evolves, in the large cities, between the densely populated residential area of the inner city and the suburbs and outer districts with (basically) garden-city character. Our primary task was to delineate this intermediate zone, and then we pinpointed the exact places of areas with industrial/transport utilization. Only after the determination of the borders of the *brownfields* and on the basis of further investigations can we define where the *rust zones* are located. Those areas in extensive use that *can be investigated together* with the rust zones and can be included into the action-zone when it comes to urban development and spatial planning can also be defined. The following *zone* categories have been formed:

1) Disregard to their actual status, i*ndustrial, transport, storage, or special function* areas of originally (in 1990) larger pieces, at least one block in size. Only a part of these areas can be categorized as rust zone.

   Already after the first inspection necessary for the delineation different subtypes can be defined within this area on the basis of their current status (taken into account the process of renewal and deterioration):
   – Areas with orderly conditions overcoming full-scale and completed functional changes (i.e. MOM Park built on the premises the Hungarian Optical

Works, conversion of the workshops of Ganz Electric Co. in district 2 into a cultural center, functional changes in certain sections of Váci Street, etc.)
- Areas of temporary utilization with the original activities abandoned (i.e. workshops of Csepel Works, industrial sites of Ganz Co. in district 8, etc.).
- Areas of stabile functions where the original activities are continued (i.e. site of Tungsram, certain sites of the National Railways in intensive use also today (MÁV) intensively utilized, etc.).
- Decrease in the intensity of earlier utilization ("under-utilized" industrial and transport areas).
- Abandoned industrial, storage, etc. areas (i.e. Merkur car storage facilities at the tip of Csepel Island).

Out of the above sub-categories the areas of temporary utilization, the abandoned areas and the industrial-transport areas with low intensity of utilization can be regarded as *rust zones*. As our aim was to identify larger, contiguous areas the sites investigated include – from time to time – residential buildings, public buildings and areas of other functions.

2) Some deteriorated residential areas of low population density were also handled together with the brownfields.

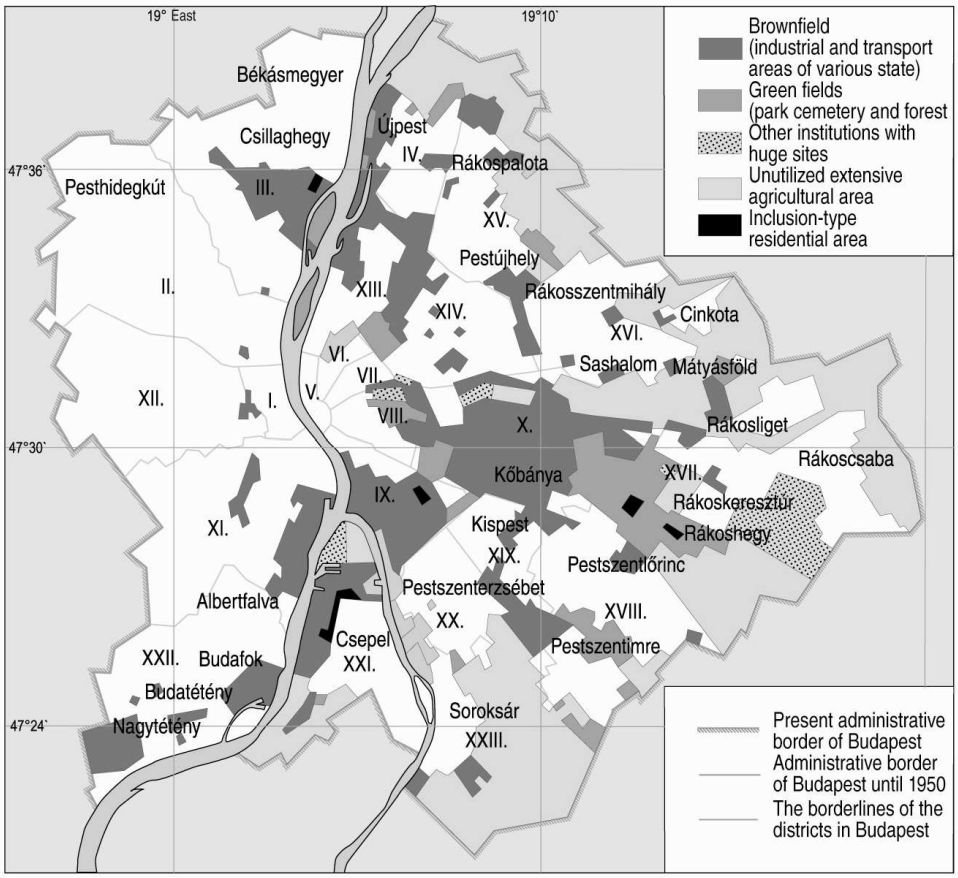
3) Within the administrative border of Budapest, there are large, unutilized, or *extensively utilized areas* as well *as areas under agricultural cultivation*. Their use represents an unsettled problem from several aspects – i.e. their ownership status, problems with their classification as inner city, landscaping problems, nature conservation problems, the special problems of protecting agricultural areas, etc. The long-term utilization of these areas would require careful investigation and the development of long-term concept.

4) The situation and the future of the large green areas connected to the industrial-transport areas are mostly independent from the future of the brownfields, but in some cases there is strong correlation between the two, therefore their positions are indicated on the map (for example: the Hajógyári-sziget is partly a green area, while it is partly occupied by the site of the ex-shipbuilding company, which is currently utilized only on temporary basis). The situation of some institutions occupying huge areas (i.e. Ferihegy Airport) is the same.

In view of the above facts the investigated sites are shown in *Figure 3* below.

Figure 3

The Brownfield and other extensively utilized areas in Budapest



Source: Beluszky-Győri, 2004b.

Conclusions:

The *size and extension of the industrial-transport areas* – based on their original function – of Budapest is large (approx. 68 sq.km), represents about 13 percent of the total administrative territory. However, if we disregard of the agricultural and green areas within the administrative borders of the capital (for example forests of the Buda hills), the proportion ratio of the industrial-transport area increases up to nearly 30 percent of the total built-in area.

The Brownfield area shows a well-defined zonal structure, the majority of the overall area forms large, contiguous territories. The industrial-transport zone was

formed between the closed, intensive residential area of Pest developed by the end of the 19th century (the so-called Városárok (City trench) at Haller Street – Orczy Road – Fiume Road – Thököly Road – Dózsa György Road – Dráva Street) and the administrative border of Smaller Budapest. Only two tips of this crescent-shape area extends to the Buda side; to the Hajógyári sziget and to Outer Old Buda (Külső Óbuda) on the North and to the Danube-bank sites of Kelenföld district in the South. The industrial-transport area advances from this zone inside along the railway lines, while it extends outside in the direction of some of the industrial suburbs (Budafok, Csepel, Újpest), which were originally outside of the administrative borders of Smaller Budapest. Institutions with huge space requirement, that are not of industrial or transport nature, are also inserted into this area (City Pak, People's Park, cemeteries, sport fields, etc.).

The brownfield forms an important and manifest element of the *city structure*. It clearly separates the inner residential zone from the peripheral residential districts, which are utilized mostly in extensive way. The brownfields and the institutions occupying huge territories – the Kerepes cemetery, the People's Park, the City Park and the various railway stations – form massive "barrier-zones" between the inner and outer districts and at many places only narrow corridors provide connection between the two macro-structural elements. If we intend to join the peripheral districts to the inner part, the above barriers shall have to be removed assuring this way the penetrability of the brown zone rendering this area attractive for the population.

The ring system of the inner residential district, the Brownfield, and the zone of the institutions with huge territories on the one hand and of the peripheral residential districts on the other has developed clearly only on the Pest side. On the Buda side – partly due to terrain conditions – the Brownfield appears only in some spots.

Basically due to its topographical location, the Brownfield of Budapest is divided into *three large* sectors:

- The *Northern Sector* includes the brownfields of district 3, 4, 13, 15 and 16. The waterway of the River Danube and the Pest-Vác railway line opened in 1846 gave birth to one of the first industrial areas of the capital city and contributed to the birth of Újpest, the first industrial suburb of Budapest. The Óbuda Shipyard, the textile manufacturing companies located here and the manufacturing plants were developed thanks to the industrial revolution of the reform period. The industrial areas are located along the transport axles leading out of the capital towards the present administrative borders of the city. As the traffic conditions are good the modernization of the area have been started, functions have been changed (first of all the commercial functions have developed). The Buda part of that section includes the traditional industrial districts of Óbuda (Old Buda).

- The heart of the *Eastern Sector* was developed along the main railway lines flanking Kőbánya – the Cegléd-Szolnok and the Újszász-Szolnok railways – forming two contiguous industrial areas (sectors), including the brownfields of district 10, 16, 18. The industrial sections have advanced inwards until the closed residential area – i.e. the workshops of Ganz Co in district 8 – while at other sites institutions with huge territories are inserted between the inner residential areas and the industrial areas (Kerepes Cemetery, People's Park, and railway stations). Going outwards along the railway lines several smaller industrial sites have emerged. Large agricultural and unutilized areas are connected to these industrial sites and forests structure the landscape. Its traffic connections with the inner city and the southern or northern industrial zones are bad. Residential areas divide the brownfields and the utilization of certain individual residential blocks is quite often of multi-purpose nature.
- The *Southern Sector* consists of the industrial-transport zones (brownfields) of district 9, 18, 20 and 21 on the Pest Side and district 11 and 22 on the Buda side. The Southern Sector includes three very large industrial areas: Outer-Ferencváros on the Pest side, the ex Csepel Works, the area of the Free Ports (Szabadkikötő) and the Baize Factory (Posztógyár) on the Csepel Island and finally the Kelenföld industrial zone on the Buda side. Smaller industrial sites in Budafok, Nagytétény and Kispest–Pestszentlőrinc complement the Southern Sector. Large agricultural and unutilized areas on the tip of Csepel Island are connected to the industrial zones. The river Danube and the Ráckeve Branch of the river clearly separate the three main units of the sector: they could have been "handled" jointly only if the new Danube Bridge was constructed.

2. Brownfield heritage in Budapest

Looking at the transformation of the brownfield, we primarily focus on environmental problems, changes in the ownership structure and space utilisation in industrial and transport areas, as well as issues of residential zones in the brownfield between them.

2.1 Typical features of the environment in the brownfield of Budapest

The general environmental problems occurring in the territory of Budapest are also present in the brownfield (high noise pollution and air pollution), but these are not primarily generated on the site itself, they come much more from the traffic of the surrounding roads. As industrial output declined, the air pollution of the plants

once operating in the territory of the brownfield has stopped, or decreased significantly, and the same conclusion can be drawn for their noise emission. The surface dust pollution from railway areas is an exception. Hazardous waste is also generated in significantly lower volumes, yet considerably more different types of hazardous wastes are created. The main reason for this is that there is fragmentation in part of the related large industrial areas of the brownfield both in terms of ownership and functionality. The buildings and building sections of former large industrial plants have been taken over by enterprises and small companies pursuing different activities, therefore, producing different types of wastes, too. The main environmental problem is not the burden imposed with the new activities and functions appearing on the area. The inherited environmental damages represent a much more severe problem, including primarily the soil and geological contamination on the sites and the surrounding areas.

Soil contamination and its suspicion represent the gravest problem in these areas today. However, apparently the disorder and obsolete buildings on a considerable part of these areas form a much more striking phenomenon. The abandoned rubble, equipment pieces and machine parts represent visual environmental pollution on the abandoned areas. Disorder attracts illegal waste dumping in the environment of the abandoned areas on the basis of the 'rubbish attracts more rubbish' principle.

The high proportion of inactive surfaces is a problem in most connected industrial sites for environmental considerations. The built-in and covered surfaces connect with each other without any conditioning green surfaces, or at least areas free of any built elements. Heat reflection from large biologically inactive surfaces is extremely high, rain water cannot be absorbed by the soil, therefore the ecological value of these sites is very low even compared to other areas in the town, and they function as heat islands and city deserts.

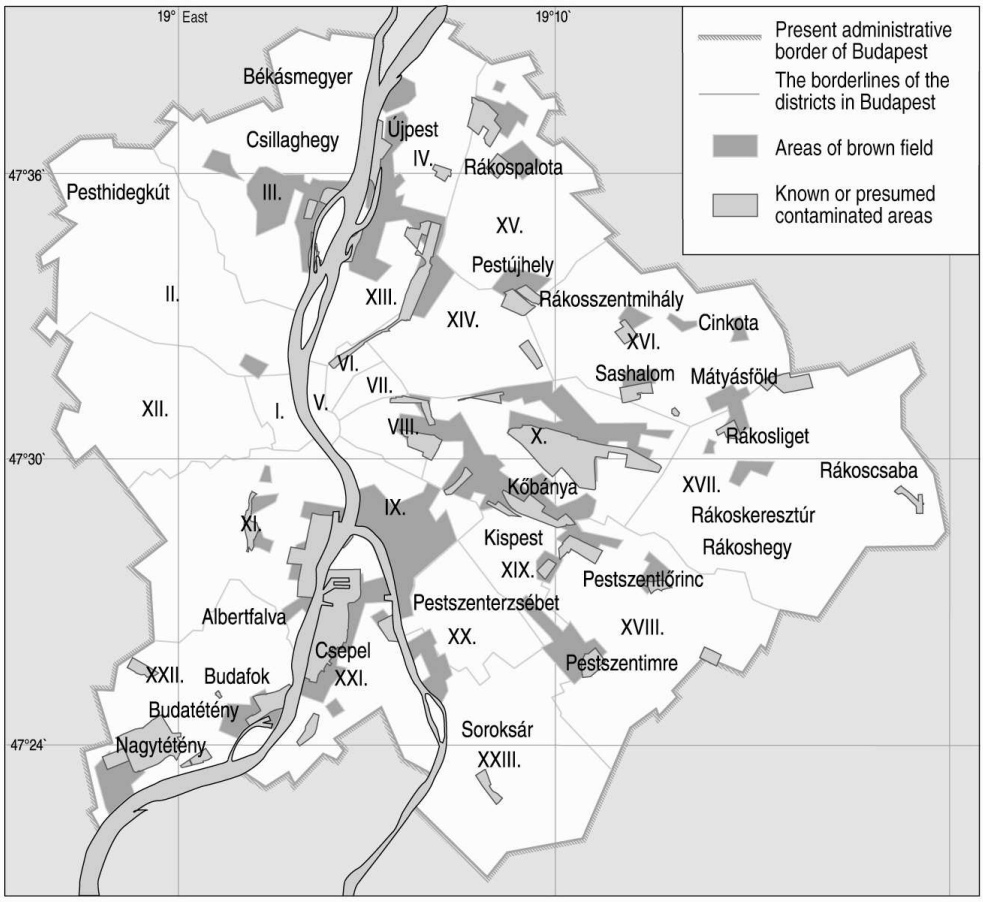
The gravest problem on the territory of the brownfield in Budapest is soil contamination both in terms of environmental protection and city development. Although we do not have any exact surveys about the accurate size of the area or the extent of pollution, some conclusions may be drawn from contamination disclosed and detected in several areas indicating that other areas may also be affected in this context. Soil contamination seems to be a problem that can be treated locally, but the contaminated areas function as ‘timed bombs’, i.e. it can spread both horizontally and vertically as time goes on. Contamination also gets into surface waters and other water collection pipes together with the rain water drained from such surfaces. It is extremely dangerous in the case of contaminated areas that are directly situated on the Danube bank.

Comparing areas whose soil is definitely or potentially contaminated *(Figure 4)*, we can conclude that contamination can be assumed on almost all areas. This assumption applies to such a large area that the problem can under no circumstances

be considered a local one. Below, we shall describe a few sites – without aiming at completeness – in order to illustrate the complexity of the problems of contamination.

Figure 4

Areas with contaminated soil



Source: Nagy, 2004.

Metallochemia site in Nagytétény

In terms of soil contamination the gravest and best-known problem in Budapest is the extensive soil contamination on Metallochemia site in Nagytétény and its 1.5 km surrounding area. Lead and other poisonous heavy metal contamination was caused by the emission into the air of pollutants from the dismantling of batteries and metallurgy. The plant processing lead and other coloured metals has been engaged in metallurgy, foundry, waste processing and treatment since the beginning of the 20th century. In the 70s, lead contamination could be felt physically, too (death of animals, ill residents in the area). In 1977, lead metallurgy stopped as a consequence of contamination.

At the moment, pursuant to the remediation plan, part of the area will be covered with a sarcophagus in relation to the construction of M6 motorway, while the replacement of soil seems to be the best solution on other areas. The National Environmental Protection Programme II contains the tasks in the period from 2003 to 2008. As a result of shared financing, the state has also committed itself to the implementation of remediation.

Óbuda Gas Plant site

The site of the former gas plant is currently in the heart of the city, on a valuable site on the Danube bank. The rehabilitation development launched on the less problematic areas of the site proves that there is significant town development potential on this area. The sludge mass, tar, etc. originating from the technology contaminated this area on the territory on the Óbuda Gas Plant, as it regularly got into contact with the soil in large concentration. Functional change and transformation are clearly held back by the soil contamination of the huge area of the plant. Óbuda Gas Plan began its operation in 1913. The main profile of the gas plant was generation of town gas from coal. As a side product, it produced coke, processed ammonia, prepared various oils and oily materials with tar distillation, as well as produced and processed benzol. Coal processing stopped in the plant in 1984. Demolition of the plants and equipment began in 1986. Gas production was completely stopped in 1987.

Remediation can be envisaged in two phases. The first phase would be the elimination of contamination floating on the surface of the ground water, including primarily hydrocarbon contamination. Then, based on a further status report, a new monitoring system will have to be operated for at least one year, to define the exact flow and speed of ground water. All this clearly shows that no quick solution can be expected in the case of Óbuda Gas Plant. However, the Graphisoft investment implemented on a less contaminated area taken out of the site of the former gas

plant is a very good example. Part of the contaminated soil was removed, and another part was deposited locally as landscape plastics.

Potentially contaminated areas

On the basis of the experiences outlined above, in addition to the known contaminated areas, all the following areas listed below should be considered areas with potentially contaminated soil:

- abandoned, not re-cultivated communal waste and rubble deposit sites,
- railway and railway plant sites,
- military barracks, shooting ranges and practice fields,
- former plants generating large volumes of hazardous waste,
- central bus garages and heavy machine storage sites,
- areas covered with extensive, illegal waste,
- and their direct environment.

Taking these into account, too, it can be concluded that soil contamination imposes a serious threat on the brownfield areas of Budapest, as well as other parts of the town, because it may even exceed the estimated size of contamination, raising urban ecological problems, too.

Relations between renewal and remediation

Soil contamination in brownfields is a significant barrier in the renewal and functional change of these areas. It especially applies to large volume and extensive surface contaminations, as well as on areas situated on the Danube bank. Rehabilitation and functional change of the area imposes a huge financial burden on the owner and investor in addition to the rate of return of the investment. However, investors are not only deterred by the financial implication of remediation, but also by the very time consuming licensing and remediation process, which takes place before the actual functional change. The preliminary identification of pollution is only the first stage, further detailed investigations may even last for one or several years (see, e.g., in the case of Óbuda Gas Plant). Consequently, a considerable portion of investors turn towards green field investments. There are some areas where the original contamination can no longer be detected, therefore, remediation may either take place from the central budget, or the new owner assumes the remediation expenses and procedures. The remediation plan of Nagytétény Metallochemia could be a very good example for shared financing, in which case the problem can be eliminated and a remedy can be found for the site in relation to a road construction project (M6).

In terms of the environment, the transition status, which still prevails on a part of the brownfield sites, is not favourable either. The area is invaded by a lot of lessees, using it for various functions. The actual users of the site are not interested in the elimination of environmental damages, or finding a remedy for the site, thus the site increasingly creates the impression of a "masterless" site in environmental aspects, too.

Another problem is that these days, there is no legislation yet that would define indices (limit values) for functions and use of sites, representing the basis for positioning certain future functions. The new functions appearing on contaminated sites cannot be ignored either. The mode and range of remediation may vary on a wide scale, but we need to know directions of the future utilisation of the site for that as well.

2.2 Transition economy in the brownfield

The brownfield in Budapest is not an empty area in ruins, as spontaneous transformation and functional changes have started in part of it. Each of the old large companies has been transformed, fallen to pieces, they have changed profiles and owners but they did not disappear without any traces. This area, which has always been an extremely important part of the economy of Budapest, still contains extensive business activities and many smaller and larger companies. The share of the brownfield in the economy of Budapest can be described with the following data: area 13%, employees 24%, share of companies 5%. The strong fluctuation of companies, the nature of economic structural changes and the external conditions of the buildings indicate that the current economy and companies of the brownfield are still in the transition phase.

There are typical differences in the settlement of companies in this area *by sector*. Taking into account an average year of occupation, transport and cargo, as well as industrial companies were established first, and they were followed by trading companies and other service institutions. There is intensive fluctuation of companies even now. Movements are extremely intensive in external Ferencváros, inner Váci út, Csepel and Kőbánya within the analysed region.

Current corporate structure of the brownfield

Corporate sizes. The average size of companies in the brownfield and companies in Budapest is different. The companies settling down in the brownfield are larger than average, while the proportion of small companies, primarily micro-enterprises, is significantly below the Budapest average. 52% of the companies contained in

our survey are small enterprises (with fewer than 50 employees), 41% are medium-sized enterprises (between 50 and 300 employees) and 7% are large companies (over 300 employees). There is also strong concentration of employees: more than 50% of the employees of the brownfield are employed by large companies, which represent only 6.5% of the total companies. Only 13% of the employees work in companies with a headcount figure of 1–50, representing two-thirds of the total number of companies.

Sectoral structure. The present brownfield was the primary area taken by industrial companies of Budapest. It is not surprising therefore, that industry is still significant in this area despite the process of the withdrawal of the industry. Of the companies contained in our survey, industry relates to 14% of the companies in the brownfield, and 18% of the area. Approximately 40% of the employees the brownfield make their living in industry. The majority of the companies can also be described with mixed activities (e.g., industrial-service office buildings). This mixed use applies to nearly 60% of the companies. Among the services, trade stands out (with 19% of companies, and 10% of employees), followed by transportation, warehousing and transport (10% of companies and 23% of employees).

Land use of companies, land ownership

The average land size of industrial companies is much higher than the average. Warehousing, logistics and transport companies demand large areas for operation. The average land used is the largest among companies engaged in industrial and agricultural services, because this category contains areas for agricultural use and large companies that are engaged in trade, as well as industrial activities; in addition, industrial parks also operate on a large area with various companies next to each other.

Two-thirds of the companies own the land on which they operate. In total, more than 80% of the land used by companies is owned by them. There are several reasons for this high proportion:

- The ownership relations of corporate land have not been stabilised yet;
- Management and business operation of the land owned by them represents a(n important) share within the revenues at companies. It is confirmed by the fact that the proportion of land not used for their activities is on average 31%, more than 90% of which is leased to third parties.
- Many land owners are waiting, speculating for the renewal of the area, and appreciation of the price of land and properties;
- It is highly probable that at present, rental costs represent a huge burden on operation, which is one of the reasons why companies try to acquire the ownership title to the land they are using.

Further analyses will be required to prove these assumptions, because a key issue of the rehabilitation of the brownfield is whether the land owned or leased by the companies. (An overall spatial renewal or capital investment project may involve the purchase of mosaic land properties.)

Companies are fully aware of the situational advantage arising from the fact that they operate in Budapest. It was also proved by another survey, according to which the majority of companies considered that the geographical location of their sites and operation in Budapest were satisfactory, and the majority also indicated that they did not intend to move from Budapest. *However, the majority of companies also found that the site on which they operated was too small* (which may indicate a shortage of space, an increase of land prices, as well as the fact that growth of companies may lead to relocation). However, there is no doubt that the reasons of company closures and relocation include disadvantages arising from the choice of a Budapest site (e.g., higher production costs, limited opportunities for physical growth, more intensive competition).

'Under-utilised' nature of the brownfield, and conditions of buildings

The utilisation rate is relative and the statement according to which the brownfield is an 'under-utilised' zone is justified primarily in comparison with inner city and suburban areas (with concentrated housing estates). Among European large cities, Budapest is one of the most loosely built towns (*Bertaud*, 1999). There is a sudden fall between the level of density in the transition zone (applicable to the brownfield, too) and the inner city.

What does the low space utilisation of companies mean within the brownfield?

- The average built-in ratio of land used by companies is below 37% and 75% of the analysed areas is built in on less than 50%.
- The average proportion of green areas is 30%, and the green area ratio is higher than 40% on almost one-third of the total area.
- Of the total buildings in the brownfield, 23% are single-floor buildings (in office parks single-floor buildings represent 6%, in industrial company buildings 19%, in commercial buildings 40%, in buildings offering mixed services 40–55%, and among residential buildings 37%).

These data prove that more intensive space utilisation will not necessarily be achieved through the move of an increasing number of industrial companies out from urban areas, but only through the renewal of buildings left behind by industrial companies and currently used for other purposes (demolition or building on unused areas), as well as through the rehabilitation of residential areas. In fact, the real problem is not that there are many vacant buildings, but rather the low intensity of their use.

Features of the spatial and geographical position of the economy and the companies in the brownfield

The brownfield can be divided into three large sectors, the northern, the eastern and the southern ones. When analysing the features of the individual sectors one cannot fail to notice the difference between the northern sector on the one hand, and the eastern and southern one, on the other hand. The most striking change in functions, and modernisation took place in the *northern sector*. That is proven primarily by a very small share of the industrial sector and the larger share of the trade-service operations there. The major portion of the companies operating there started operating after 1989 on their present location (the fluctuation and change of functions of the firms were rather fast). The structural size of the companies is comparatively balanced; the number of the employees of the companies is the lowest in this sector. The two determining areas of the northern sector – the area along Váci Road and its vicinity and Szentendrei Road and its vicinity- are dynamically changing areas mostly due to their favourable traffic position. Especially the areas close to the city centre obtained almost similar "downtown" functions and are engaged mainly in the supply of retail services. Nevertheless these axels end at the administrative borders of Budapest, in the areas resembling "city gates".

The *eastern sector* is an industrial- transportation- warehousing area. Transformation there has taken place at a lower speed: the companies established prior to 1989 possess the majority of the industrial plots (pharmaceutical companies, printing offices, breweries, etc.). The slower rate of functional changes is mainly due to the transportation and urban structural situation (and so retail trade and other retail services have also been gaining ground at a lower speed). There are, however, already new or renewed traffic centres, locations: for instance at around the terminal of metro line M2. In the eastern sector it is an urgent task to regulate the railway areas which are underutilised or inadequately utilised.

Transformation is slowest in the *southern sector* (composed of three major industrial zones: those of Ferencváros, Csepel and Kelenföld): there industrial operation continues to dominate (almost half of the corporate plots is used for a manufacturing operations), but the share of companies engaged in transportation and warehousing is also significant both from the aspects of the size of the areas and from that of the number of employees. Its transport situation is more favourable than that of the eastern sector and economic transformation has been going on at a faster speed along the newly established roads or roads the value of which has increased. Traffic within the industrial zones (for instance in Csepel) is made more difficult by the absence of roads, streets inside the former "large industrial empires" Transient area utilisation is more extensive in the southern sector. The area faces the big problem of the elimination of environmental pollution and contamination. Thus the renewal of this sector could not take place without some kind of

governmental-local governmental actions of large volume (e.g. new bridge over the River Danube, the construction of main roads, the elimination of environmental pollution, more efficient utilisation of the railway areas).

All the three sectors share the basic feature of *transience and mosaic character*. Most of the companies reflect the transient situation; they already have some elements of renewal, yet they fights against a number of problems. The mosaic character is manifested by the fact that companies of different character and dynamics are situated one next to the other or geographically close to one another. It means that a primary development of zones – which had started before World War II already – had fallen to pieces as industry was withdrawn from the area. The establishment and development of network character will take a long time. The mosaic character in space means that micro regions are developing typically of miscellaneous use. This trend is supported by the fact that in every part of the brownfield and also in its micro regions one can register sings of renewal but we have as yet no example for a comprehensive rehabilitation of any larger area in the brownfield.

2.3 Poorly utilised railway areas

Historically speaking, the establishment of Budapest as the capital city and the development of the railway system coincided in time. During the 19th century, the "heroic age" of the Hungarian railway network (in just a few decades) it became the biggest "prestige institution" of the country with the greatest effect, and its Budapest-centred structure played a decisive role in the development of the capital city. That effect has been evident from the very beginning not only with the opening of communication and mobility possibilities, but also from the unparalleled industrial, economic performances, and, consequently, it has resulted in the fast growth of the population. As a result, of all that the urban area has been continuously growing – and what is important for us – the structure has been affected by the railway-effect combination.

The railway has been influencing the environment as a major force in structuring the urban environment. As a consequence of the to-and-fro effects during over the past one-and-half century, the configuration of Budapest has become interwoven by the infrastructural effects of the railway system. With the continuous development of the railways and the town these systems held changing positions in the various periods within the –still growing – body of the settlement and that situation occasionally had positive, progressive effects on the structure of Budapest, and occasionally it hindered the configuration from developing the way it should have been developing. The railway facilities which had been established in free areas (where they disturbed nobody, moreover at times they even attracted settlers) actually helped the growth of the town with their effects, then they became

barriers of growth –as always happens with a healthy system – and so they withdraw or were transformed *(Figure 5).* The good examples of dynamic transformation can serve as lessons to show that our contemporary urban designers, decision makers can take major, brave, progressive decisions – based on surveys of adequate depth – in urban regulations (whether on the introduction or even termination of some system) as life can later prove they were right. Delayed restructuring on the other hand leads to losses, making Budapest fall behind competing developing large cities and their agglomeration.

Figure 5

Brownfields – railway zones

Source: Fábry, 2004.

MÁV Rt. is one of the companies in Hungary that owns the biggest volume of properties and manages tremendous properties. Up to the mid–1980-es these properties had been rather well utilised as at that time the volume of cargo transport was three times the present volume and passenger transport was twice the current volume and the railways employed over twice as many people as they do today. As a consequence of the economic changes which have been taking place transport by rail has drastically dropped resulting in the release of tremendous surplus capacities and also exerting an influence on the properties: a significant portion of these properties has become unnecessary, idle while as a consequence of the loss making performance of MÁV *its state has started to gradually deteriorate*.

The current restructuring processes have three effects on the railway system of Budapest:

- The process that "heavy" (not urban, not environmentally friendly) plants are moved to external zones – or rather to the countryside – has been continuing. That is naturally followed by the railway network servicing them, often as an element prepared on the side *of supply*, attracting investments and supporting the settlement of people.
- As a consequence of the economic restructuring the share of certain industrial or agricultural operations is falling (certain operations of the heavy industry close down for good), leading to a drop in demand for rail transport too. This affects not only the direct local railway service area but can also have its effect on the "back-up" of the railway operation (the traffic, space requirement of marshalling yards, plant sites).
- The railway operations themselves are also changing: new tasks, new transport technologies, new operation systems emerge, with some of them reducing, some others increasing the requirements in relation to the functional areas.

Postponement of decision making may slow down the global urban development process:

- Investments are not made at places which would be best for the structure of the city,
- In the absence of realistic functions no money is allocated for the maintenance of the area, and so its state deteriorates,
- Neighbouring areas are not developed and are not developing because of the "poor neighbourhood" and what in the worst case may lead to the formation of slums.

The urban aspects of the process of land utilisation

It is in the eminent interest of those who wish to improve the structure of the settlement to involve as big a portion as possible of the potentially valuable areas (because of their location, system of links, etc.) into the range of areas which are under a uniform planning-control system, thus increasing the reality and effectiveness of urban development – rehabilitation actions. This is especially true for the rehabilitation of valuable brownfields – located comparatively close to the downtown area –: but for real break-though (change in functions, increasing the socially recognised prestige of the area) we usually need *major urban regulation actions*, spectacular steps. A recent example: area of the former Budapest-Dunapart (Bank of River Danube) freight depot obtained the new function it really deserved by a major project without which the immediately neighbouring region would hardly have had any chance for the transformation (which has been going on gradually, at a lower speed). Naturally it could not be claimed that smaller areas have no reason to change functions, but the targeted *integration of the urban structure* would be hard to achieve without specific actions inside the brownfield, especially a railway area. From among the areas directly connected to the retained, viable railway infrastructure the released ones should be preserved along the tracks and those around the stations at the complex transport sector areas should be rehabilitated (also to increase the efficiency of the railway system). These solutions should be given priority in the course of subsequent utilisation.

From among the many underutilised railway areas of Budapest this study analyses primarily *the two large units situated in the brownfield*, and we do here not deal with other units, which are otherwise undoubtedly important and represent problems to be solved *(Figure 5).*

Integration options of "Rákosrendező"(Rákos Shunting Yard)

Up to the 1980-s Rákosrendező (the second most significant marshalling yard from among the three large marshalling yards of Budapest) had always been overburdened, it used to be one of the infamous bottlenecks of the Hungarian railway network. Because of the most intensive use and neglected modernisation its infrastructure became obsolete and with the drop in freightage transport on the national level the marshalling yard function there was terminated. As its network connections are excellent, the railways have been continuously looking for the optimum possibility for its utilisation. The current concepts calculate with hardly more than one third of its track network and the rest could be utilised as properties.

In principle a favourable passenger interchange junction could be established on the southern part of the former station with means of urban public transport. The utilisation of the former boiler station (hauling site) could offer a good example: in

case the Railway History Park opened in the course of the national millennium celebrations obtained sufficient support it could become an internationally important site displaying industrial history and could even develop into a place of tourist attraction. The original function of the Istvántelki Főműhely (Main Workshop at Istvántelek) occupying some 40 ha of land has no longer its original function, while some railway functions still operate on the site. The released some one third of the area at the edge of the original site has been subdivided into eight new plots and the companies which settled there have become well integrated into the industrial-logistic wave of the area. The traffic connections of the area are rather limited from the aspects of traffic by road or public transport so there is not much chance for large retail units or office developments to be established there.

Integration options of "Ferencváros" Shunting Yard

Despite of the significant drop in the demand for railway transport the marshalling yard of Budapest Ferencváros – the busiest railway junction of Budapest and of Hungary – continues to operate, and it will retain its function in the future also. The reduction of demand however has lead to closing down half of the original system in 1996. As long-term forecasts do not foresee significant increase in traffic one has good reason to believe that the currently unused plant area will later also not be needed. An immense hindrance of direct utilisation however is the fact that the released zone is hermetically closed as it is situated *in the middle of the network of tracks*. The owner, MÁV has performed preliminary studies on its „release" and on the possibilities of connecting it to the structure of the city and, as a result they obtained a draft of several options. By transforming the operation technology in different ways the railway action area could be more or less concentrated and so the released parts of the area could be "shifted to the side".

In the meanwhile the urban-structural studies have led to several development concepts for the region. The region is the biggest brownfield unit of Budapest, and it is in the interest of both the capital city and of the railway company to see the position of the region improved and to start its genuine revitalisation. The integration of the interwoven urban structural unit of some 60 ha, the improvement of its mosaic type structure, renewal *could not take place simply by using the method of the sale of properties;* there is a need for the Budapest Metropolitan Government, moreover for the Hungarian Government to play an active role and take concentrated measures in relation to major structural changes. As a consequence of transport and urban regulation actions the result of almost ten years of efforts is emerging on the other side of the railway line which forms the border of the area to the north.

2.4 The position and development possibilities of the residential function of the brownfield in Budapest

We need to analyse the current position and potential, future utilisation possibilities of the brownfield of Budapest also from the aspect of residential functions. After a brief summary of the history of the emergence of the zone including a survey of the emergence of residential units we analyse the data collected in the course of empirical survey to submit for the urban developers' information and recommendations.

The historic background of the emergence of the residential function in the brownfield

The establishment of the now obsolete industrial and traffic zone known today as "brownfield" and of its first permanent residences started at the end of the 1880-es. The first residential projects worth mentioning started during the last decade of the 18th century. The builders included the owners of large factories as well as the Hungarian state (the railway company) and Budapest, its public utility companies. Nevertheless the establishment of the residential function was rather sporadic, mostly low cost – low standard workers' flats had been erected typically as tenement buildings and workers' barracks. In the period between the two world wars the spread of the industrial area and the increase of the residential function received big impetus by the fact that migration from the countryside targeted not so much Budapest, but primarily the zone of suburbs. Thus most of the low-standard flats built in Budapest were situated along the edge of the town, in the industrial – traffic zone, further increasing the residential stock of today's brownfield.

The socialist era made several significant changes in the development of the industrial zone. The zone which had earlier developed – although functionally in close symbiosis with Budapest – geographically and especially from the aspect of administration separately became uniform also from the aspect of planning and administration. Moreover as from the early 1950s the new regime started the realisation of its own housing policy the key element of which was composed of the housing estates. Most of the new housing estates were built in the industrial zones in the 1950s, and even in the 1960s. The housing estates built then – because of their small sizes and moderate space requirement – could be easily fitted in the remaining areas of the industrial zone moreover they also served – to a certain extent – as tools of rehabilitation of the zone. As from the 1970s when industrial technology became generally used and the size of housing estates increased the construction of housing estates in Budapest shifted to the free areas along the borders of the city. As a consequence the industrial zones could less profit from such housing projects. During that era they could not start with a comprehensive reha-

bilitation of the residential function of that area as the social urban development policy concentrated its relevant moderate efforts to the downtown residential quarters. On the basis of the housing statistical data of the census performed in 1990 one gets a good picture on the position of the brownfields on the map of Budapest. The flats there are below the average of the flats of Budapest both from the aspect of size and comfort. After a long history of one hundred years thus the brownfields of Budapest started the 1990s with an obsolete stock of residential properties little suited for rehabilitation because of its age and technical status.

Quantity and quality features of the residential function in the brownfields

The residential properties in the brownfield represent only 1.8% of the some 800 thousand residences in Budapest. At first sight that is not a high percentage but one must not forget that the housing stock of the brownfields deserves attention primarily not because of its size but because of the state of the flats there and the social features of the population living there. On the basis of its architectural features the almost 15 thousand flats can be subdivided into *four very different categories.* Almost half of the flats in the brownfields are situated in detached *tenement buildings with several flats each* (condominia) Another some one third of those flats had been built as *housing estates.* 1634 families live in *single family cottages*, and that number represents 11% of the residential stock. 5% of the flats could not fit into any of the previous three categories as they are mostly single storey buildings, *terraced houses"*.

Analysing the age composition of the flats we can conclude that compared to the housing stock of Budapest the housing stock of the brownfields is very old. Almost every second flat there had been built before 1945. Most of those had been built in the period between the two world wars, contributing some one third of the entire housing stock. 40% of the flats in the industrial area had been built during the socialist era – most of those in the 1950s and 1960s. 10% of the total housing stock of the brownfields can be regarded as recently built, and that includes part of the buildings which had since been fully rehabilitated and residential properties now under construction. Based on external observations, according to our survey 13% of the residential properties in the brownfields would require prompt rehabilitation.

Despite of its significant geographical dispersion, the housing stock is rather concentrated in space. It is easy to identify on the map of brownfields the housing estates with over one thousand flat each; there are three centres with high density. The zone with the biggest number of flats is in the southern part of Kőbánya, and two others which need to be mentioned are situated in Angyalföld and in Ferencváros.

Scattered condominia

This is the most residential type of the brownfields. Scattered tenement houses (condominia) contribute 50% to the housing properties in the zone. The emergence of the scattered condominia is closely linked to the history of the industrial zone and they fit well the mosaic type utilisation of the zone. The smaller plots left free among the large industrial sites had been favoured by contemporary factory owners for building low standard flats with low rent for their workers. It was not by accident that most of those scattered condominia had been built before the First World War, with their majority erected in the 1920s and 1830s. As for their quality, the ratio of rehabilitated or newly erected flats there is the lowest, which means that in the future these are the types of flats which must be primarily targeted for rehabilitation.

Estates

One third of the flats in the brownfield were built as part of estates and this is the second most frequent category, The age, state and architecture of the estates is most heterogeneous as they include workers' residences honestly built before the First World War just as temporary lodgings built in the period between the two world wars, early socialist housing estates of the 1950s and residential parks erected in the 1990s. The builders of most of the estates include the state (central government and local government), state owned enterprises (railway company). On the other hand the builders of the latest estates – those erected after 1990 (in fact residential parks) are mostly property development companies. As a consequence of the continuous construction the age composition of the flats in the estates is rather balanced. 14% of the flats in the estates need rehabilitation as they are in very poor state, a high percentage, just as in the case of the condominia. It is a favourable fact that the ratio of rehabilitated and newly built flats is comparatively high (20%) suggesting certain renewal process – as against the state of condominia. The geographical position of the estates is very pronounced. Most of them are situated on the south-eastern part of the brownfields.

Family cottages

The spread of family cottages in the brownfield was typical of the socialist era; this is suggested by the fact that 2/3rd of the flats in family cottages had been built between 1945 and 1990, and a comparatively big number of family cottages were built since the change of the economic and political system, and that may give an idea for the potential new utilisation of the brownfields. Because of the age of such

housing stock the state of the family cottages is comparatively favourable. The total of the rehabilitated and new flats as well as flats in good condition is by far the highest from among the four analysed types of housing properties.

Terraced houses

The terraced houses represent the smallest housing segment of the brownfield. Among them the highest percentage is the percentage of the flats built after 1990 suggesting that that type of housing construction has become popular after the change of the economic and political system. Another big group in this category is composed of units built before World War II. The architecture and the social status of the old and newly built terraced houses greatly differ. The architecture, quality and price level of the newly built terraced houses compare to those of smaller residential parks. The terraced houses built before the First World War are single storied, with one room and a kitchen each and resemble contemporary estates, workers' colonies. Most of their builders were either the industrial companies or the state.

3 Spontaneous changes in the functions: Examples and plans

Considerable changes in function take place in the brownfields of the cities. New activities appear on the premises of former industrial plants and on the areas previously occupied by military barracks and railway lines. This spontaneous change took place within a shorter period of time in the post-socialist countries than in Western Europe. Rehabilitation of the „rusty zones" became manifest primarily with the ownership changes following the termination of industrial activities and the rearrangement of the real-estate market after 1990. Urban position of the brownfields has also changed quite often. Functional changes were characteristic of the industrial areas located close to the city centre and having other advantageous features, which meant the replacement of industry with the tertiary functions. Simultaneous with the expansion of the increasingly crowded inner city functions producing higher added value (financial services, business consulting, IT, trade and commerce, administrative jobs) gained ground on the former industrial areas, but leisure-time and cultural functions and even housing development (e.g.: lofts) may also be present.

During the privatisation, the majority of these areas were subject to speculation as after termirary use, the new owners were interested in selling the properties. The

better the final user of these properties was provided with capital, the more apt were these areas to demolition and reconstruction and the least was important the conservation of the architectural monuments preserving the original characters of the premises. In the industrial zones with good location it was easier and cheaper to reconstruct or completely demolish the buildings than in the business zone of the inner city. Nonetheless, the vast majority of the original buildings were demolished in the latter areas as well and new office buildings or shopping centres were constructed in stead. The scientific and technological parks were also typically built on these „razed" areas. Changes in function was also typical of the brownfields with less favourable location, but the typical phenomenon was the continued use of the previous buildings while simply replacing the earlier functions with commercial, warehousing and logistic activities.

Conservation and use of industrial monuments became an important issue, while cultural use of former industrial buildings became increasingly important. Office and residential functions have also become important while reconstructing the industrial premises.

3.1 The appearance of shopping centres

In Budapest, the transformation of brown zones with good location near the traffic junctions was the fastest. Near the metro- and tramlines and at the cross-sections with high transit traffic the earlier activities were considerably forced back and new functions appeared.

During the communist era there were only very few shopping centres in Budapest. The changed economic environment and the changed consumer habits had a great share in the fundamental transformation of retail activities. The construction of the third generation of shopping centres started in the mid–1990s in Hungary. New commercial centres were built with ten thousands square metres of floorspace and with extensive parking facilities. The invertors were looking for space at low price suitable for the construction of these large commercial objects with good access. The level of development of public transport and the size of the car park also had a lion's share in selecting the locations.

The premises of the commercial centres were often created in the brownfield areas with good access contributing this way to the functional changes of these areas. The shopping centres typically had a positive influence on the real-estate prices as well, as through their extensive radiation they increased the prestige of their environment contributing this way to the development of the neighbourhood and to changing the structure of commerce, the consumer habits and requirements.

These first commercial centres with regional role were opened in 1996 in Budapest in brownfield areas. The Duna Plaza was constructed on a former industrial

zone, while the Pólus Center was built on the area of a former military barrack. The access of Duna Plaza is favourable being located near the North-South metro line and the avenue leaving Budapest in the northern direction. Thanks to its success, the brownfields by the avenue were upgraded and went through functional changes. As opposed Duna Plaza, the Pólus Center was built on the edge of the city, in a district where the commercial area per thousand inhabitants was the lowest, thus the shopping centre had a significant role also in servicing the local population. The area also has a good transport contact with the settlements of the agglomeration. Sometimes later, however, Pólus Center lost a lot of its competitive advantages in comparison with the shopping centres constructed later, primarily due to its poor access by public transport from the city center.

In 1999, there were already 33 shopping centres in Budapest *(Figure 6)*. It was the year when West End City Center was opened in one of the busiest traffic junctions of Budapest (the daily transit traffic reaches 400 thousand persons), on the verge of the central business centre, right by the Western Railway Station, in the former railway zone, on close to 100 thousand square metres. Up till now, this is the largest investment in Central-Eastern Europe (200 million USD). The multifunctional centre (commerce, office, hotel) contributed to the renewal of this deteriorated part of city. According to the plans, additional, extensive entertainment and shopping centres will be created by the existing one with the involvement of additional territories currently under-utilised by the railways and by using green filed areas as well. Thanks to its favourable location, the West End is one of the most successful shopping centres, contributing to a great extent to the upgrading and renewal of its neighbourhood.

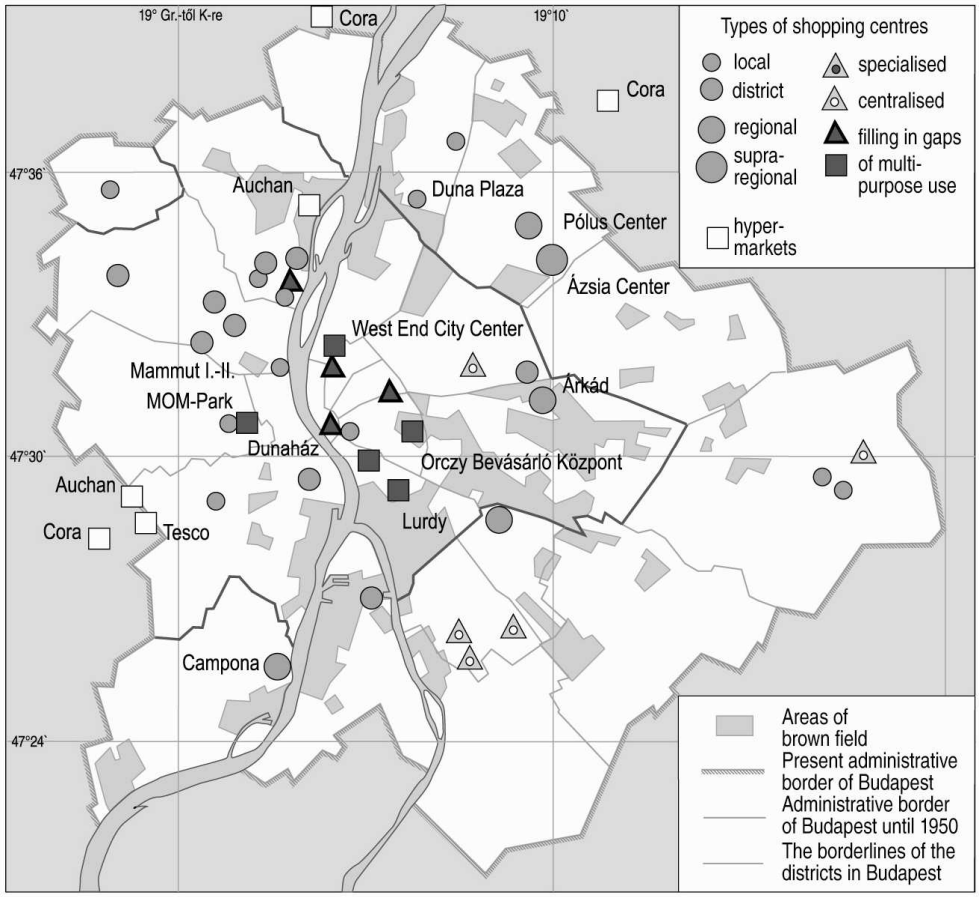
The Árkád shopping centres was built in 2002, also in a brownfield area. In one of the most important traffic nodes of Budapest, a shopping centre called Sugár was built already in the early 1980s, and a furniture store and a do-it-yourself store was later added to the complex. The zone of attraction of the two, neighbouring shopping centres is the same, but instead of weakening they strengthen each other by benefiting from the advantages of the process of agglomeration and by targeting different customer groups.

The shopping centres on the Buda side, located close to the city centre were also constructed on former industrial areas. The Mamut shopping and entertainment centre was built by the most congested traffic node of North-Buda, in the area with the highest purchase potential in Hungary. In this case, the commercial and service functions are completed with facilities provided by the Millenáris Park located nearby and also constructed on brownfield, and by MOM Park, built on the former premises of the Hungarian Optical Works (Magyar Optikai Művek – MOM). The latter complex is multi-functional, but the commercial functions in this case are rather completed with residential and office functions.

However, not all the shopping centres built in brownfields have been successful. The Lurdy-ház in South-Pest was constructed in a zone with low purchase power and has poor access. Its business utilisation index is very low and it is increasingly the office function that is gaining ground there (for example: the Hungarian Airlines moved its headquarters to Lurdy-ház).

Figure 6

Location of shopping centre sin the brownfield



Source: Sikos T., 2004.

3.2 Development of scientific and technological parks

In several countries, the development of scientific parks plays a great role in the functional changes of the brownfields. In these parks that were created on the former industrial and military areas, typically close to the university and research bases technology-oriented enterprises settled down. It was typical also of Budapest, that scientific or technological parks were created in the brownfields (Infopark, Graphisoft Park).

On the South-Buda Danube-band, on a 7-hectare brownfield, the first scientific and technological park of Central-Eastern Europe, the co-called Informatikai és Technológiai Innovációs Park (Infopark – Information and Technological Innovation Park) was developed. The area was designated for the purposes of the World Exhibition to be held in Budapest in 1996, but after the EXPO was cancelled, a new function of use had to be found. The concept of the Infopark was laid down in a government decree, and was founded on entrepreneurial bases as a state-owned share company with the co-operation of the two neighbouring higher-educational institutions, namely the largest technical and scientific universities of the country (Budapesti Műszaki Egyetem [Budapest Technical University] and Eötvös Loránd Tudományegyetem [Eötvös Lóránd University of Sciences]). The Infopark was realised in PPP-construction, on a land that will always remain in state ownership, but as a private investment, thus the investor obtained only the right for land use and construction.

The first flagship of Infopark, the American IBM appeared in 1996. The development activities on the remaining part of Infopark and the operation of the Park are conducted by a German real-estate development agency through a joint venture established with Infopark Rt. The previous company builds the office buildings and the laboratories that are then „filled with content" by the state-owned, primarily non-profit company. The Infopark promotes the process of innovation, research and development, supports the start-up companies and gives hep in organising incubational services and the setting-up of the incubation house. Besides the large multi-national companies, a number of spin-off enterprises were also established. There are more and more examples on co-operation between and among companies. The phenomenon of „co-opetition" is in progress, meaning that the smaller companies compete with each other, but in certain cases they also work together on joint projects. We can witness certain signs of clustering as well, which means the grouping of businesses in partnership, or as sub-contractors or suppliers around the larger companies.

At present, there are four operating buildings in Infopark. Thanks to the vicinity of the universities, the tenants are mostly IT, software-development, telecommunication and Internet-service provider companies (IBM, Hewlett-Packard, Magyar Telekom, Panasonic, Maxell, etc.). After the completion of the Park, approximately

4500 people will be employed. In the long run, the Infopark might become a regional high-tech centre.

Graphisoft was built, similar to the Infopark, and also as a brownfield development, on seven hectares in Northern Buda. However, it was a fully private investment and lacks the vicinity of universities. The development of the software-technological park started in 1997, and there are 15 buildings in it now. The number of leaseholders is close to twenty, including several multi-national companies (the Hungarian affiliated companies of Canon and Microsoft).

3.3 Preservation of industrial heritage

Protection of historic buildings and monuments is a conscious intervention of more than one hundred years of history into a process characterised by the constant disappearance, transformation and replacement of built heritage.

The presence of industrial culture played a very important role in the history of Europe, as it has been the driving force of economy since the industrial revolution. As a consequence of global restructuring in world economy, considerable production capacities ceased to exist. This process culminated during the years following the political and economic transformation (during the 1990s) in Hungary. An ever-increasing emphasis is put on the rearrangement of the physical environment due to closure of the factories, the termination of premises and the recultivation programmes.

The buildings represent the majority of industrial heritage, but the role of machinery, equipment, and technological appliances may also be important in certain cases. Industrial architectural monuments were started to be reconstructed during the 1960s, which was followed by focusing on engineering objects, the steel and iron structures and the railway constructions. An extensive research and conservation methodology was elaborated in Western Europe for the exploration, registration and presentation of industrial heritage. One of the major problems in this area is, that – often enough – the industrial buildings had not been built with the purpose of long-term maintenance and that the structures of these buildings were considerably deteriorated during their use.

Industrial heritage can be protected in several different ways: with the creation of museums and open-air museums of the industry, with the legal protection of technologically important monuments, and by putting the industrial buildings and complexes under protection. Presentation of industrial monuments in operation has an increasing role in the process of development of a new approach to industrial monuments. When preserving these monuments as museums, the original technologies might be presented, connecting this way the protection of industrial heritage to cultural tourism. Scientific and technological culture has a strong position

in interpreting culture. The increasing number of technical and scientific museums indicates this. Several military, transportation and industrial museums were established also in Hungary. The Közlekedési Múzeum (Museum of Transport) dating back to 1896, for example, is one of the most prestigious museums of the kin din Europe. In addition to this, there is also a foundry museum, an electro-technical collection, an elevator museum, a mill museum, a fire-police museum, a public road collection, just to mention a few, in Budapest. In spite of this, however, Budapest is far from being an exemplary city when it comes to presenting industrial heritage, especially if we take into consideration her industrial traditions and the ever-decreasing opportunities in this area.

In the Hungarian list of monuments, there are about 180 properties registered as industrial or agricultural monuments, but the industrial enterprises of the past 100 years are not represented among the protected buildings. These buildings are characterised by their large size, high-standard architecture and great quality, as – in the majority of the cases – there had been sufficient financing for the industrial investments. Preservation is hindered exactly by the large size and the complexity of these buildings, as there is no chance to maintain the whole system. Continuous maintenance of the original functions is the least feasible way, though there are some examples for this as well (breweries, infrastructure systems).

Preservation of these monuments can probably be done in the most efficient way by finding new functions for these monuments, but these are very difficult to find. Among the successful examples we should mention the Millenáris Park built on the premises of Ganz Villamossági Művek (Ganz Electric works) on the Buda side as a comprehensive industrial rehabilitation project. There are similar projects to create cultural centres in the former industrial buildings.

3.4 Cultural use

A large number of old buildings have lost its original function as a consequence of industrial transformation and the appearance of new technologies in urban public utilities. Significant buildings can be found on the respective properties, facilitating for the stabile, specifically shaped and, often, hall-like buildings for have new functions. Often enough, these form part of the national heritage, which – with their aesthetic value and individual appearance – are suitable for cultural purposes as well. It is almost fashionable to convert these buildings for cultural use, partly due to architectural-technological rationality and party due to the creation of symbolic value. Often enough, the costs of reconstruction are very high, especially when it comes to monuments, while these costs are difficult to cover due to the low profitability and non-profit nature of the cultural institutions.

It is typical of the cultural economy as a whole, that the value-added, the specific features and the individual nature of its products are represented by its symbolic nature. Cultural use of industrial buildings started at the turn of the 1960s and ‘70s, as a consequence of social and economic transformation. The first art laboratories were created as a counter-trend against the traditional, “elitist” attitude of culture where several branches of art were concentrated in one place (for example: the Factory of Warhol). The factory buildings were located in the outer districts of the cities, separate from the traditional cultural centres of the city, giving the new location a symbolic character as well. Supporting urban policy became manifest in urban policy since the 1970s, simultaneous with the appearance of large-scale, state-funded architectural and cultural prestige investments (Pompidou-centre, Musée d’Orsay in Paris, Tate Modern, Millennium Dome in London). Quality of cultural life strengthened the individual character of the cities in the intense competition among the cities. The role of cultural urban policy was increasing. In the establishment of cultural institutions, the role of PPP-constructions gained ground, and the vast majority of these projects were related to the reconstruction of former industrial buildings, creating a lot of symbolic values this way (protection of historic buildings, protection of the environment). The establishment of cultural projects gave a value added to the economic and tourist attractions of the cities and increased the value of urban land as well.

In Budapest, cultural use of industrial buildings started to become typical beginning with the second half of the 1990s. The first institution of this kind was built as early as 1985, on the premises of an industrial hall previously used for expositions and warehousing. It is called Petőfi Csarnok (Petőfi Hall), which is actually a youth entertainment centre with 930 sq. m floor space. This is the only entertainment and cultural centre of this size in Budapest even today. During the 1990s, cultural use (for concerts, parties and sometimes as studios) of former industrial buildings and warehouses appeared in sporadic form. In the first place, the ports by the river Danube and the halls of the shipyards were converted for the purpose.

The first cultural centre converted from an industrial building and operating in institutional framework was opened in 1995. It is called Fonó Budai Zeneház (Spinnery Buda Music House) and is devoted to organise folk, ethno and world music concerts. Moving this institution into an ex-industrial building located far from the city centre was not part of a conscious strategy. The first conscious attempt to create a cultural centre housing several branches of art and based on contemporary art was made in 1998 with the conversion of a former transformer station. These days, the Trafó is one of the most well known alternative cultural centres of Budapest. The Metropolitan Municipality financed the reconstruction activities and gives financial support for the operation. Due to the lack of funding in the cultural sector and the lack of sponsors or patrons civil, non-profit community initiatives were not really successful in Budapest.

Private investors capable and willing to invest into the conversion of industrial buildings into cultural centres appeared on the scene after the millennium. The first private museum called MEO opened in 2001 on the premises of a former leather factory in one of the fastest revitalising brown zones of Budapest. The art works of contemporary Hungarian artists are collected in the museum and are exhibited in two ex-industrial halls. A.P.A.! (Ateliers pro Arts), a workshop gallery for young artists was also the result of a private initiative realised in the deteriorated district VIII of Budapest. Maintenance of the non-profit institution is financed from the revenue of the restaurant and cafeteria and the extra cultural programmes.

In the West-European countries, cultural investments with government initiative and – occasionally – with the involvement of private capital have become common solutions for large cultural investments beginning with the 1980s (Tate Modern, La Villette). In addition to their political and prestige nature, these investments also have an economic, tourist and urban development and rehabilitation character. There were two such government-funded cultural investments in Budapest. The cultural block of the Millenniumi Városközpont [Millenium City Centre] in south Pest (including the new Nemzeti Színház [National Theatre] and the Művészetek Palotája [Palace of Arts]) was developed on a land previously cleaned. In North Buda, the Millenáris Park (Millenium Park) was created in a converted factory building. Initially, the basis of the thematic, entertainment and cultural park was the millennium exposition presenting the history of Hungarian inventors, discoveries and inventions, but the choice has, since then, been extended and the Park has been integrated into the international cultural life of the capital city through the cultural events organised there.

There are other plans and projects to utilise the former factory buildings. Of them, the two most important are the projected utilisation of the Duna-parti Közraktárak (Warehouses on the banks of the river Danube) and the gas-works buildings in Óbuda. A cultural and youth district is planned to be created from the Warehouses located on the left banks of the river Danube in the vicinity of the city centre, and it is intended to be connected to the Millenium city Centre. In buildings with specific architecture remaining on the premises of the Gas-works plans are ready to build a museum district (the ruins of the Roman city, called Aquincum are also located nearby).

3.5 Use for residential and office purposes

The former industrial buildings and warehouses with large floor-space providing for housing and workplace functions are called lofts. In the beginning, these were primarily used for office purposes in Europe, but nowadays when we are talking about lofts, we usually mean use for housing. Brownfield real estate development

has extra costs and high risks. Renewal of brownfield areas is feasible only through large-scale, concentrated actions requiring the participation of professional developers.

Utilisation of industrial buildings was more profitable in the rented office-building sector than on the housing market. The construction of Dorottya udvar [Dorottya Courtyard] was the first large-scale venture of this kind. A large number of office buildings offering high-quality telecommunication services were built in Budapest with the conversion of industrial buildings.

In the case of office buildings the demand for large, open surfaces is limited, while in the case of residential buildings the realistic sales price of the apartments set the limits for the large surfaces that can be created in an ideal manner with optimum engineering division in the converted industrial buildings.

The institutional frameworks for residential use have not been developed in Hungary yet. At the same time, however, there is an increasing demand for the housing projects with good infrastructure and to be realised near the city centre. In the majority of the cases, this utilisation is typical of the industrial areas enclosed by existing residential areas or located in the direct vicinity of residential areas. Such partially preserved and partially converted zones are typical, in the first place, of the districts located by the banks of the river Danube. The appearance of lofts can be expected especially in those parts of the residential areas that will be freed from transportation infrastructure. In Budapest, the first lofts were developed during 2004 and 2005 in the buildings of the former gas-works and textile factory.

4 Comprehensive projects for the rehabilitation of the brownfields

4.1 Spatial changes of the brownfields

The industry was concentrated on the Northern, Eastern and Southern parts of Budapest, and its spatial allocation had hardly changed until the transformation of the economic and political regime. During the Communist era, the real-estate market was non-existent, thus the industry maintained and continuously increased its territory within the capital city and, sometimes, also on the most valuable part of the inner city. Urban development policy had no influence in merit on the allocation of the industry inside the capital city. Initially, during the post-Second World War period, it was the functioning of the industry that had to be re-established the quickest, and the cheapest and fastest way to do so was to use the existing premises. Later on, the considerable spatial extension of the industry was connected to the former industrial areas, thus the involvement of land outside of the city was far

from being significant. The Communist regime was not sensitive either to the problems of environmental pollution caused by the industry, prohibiting urban developers from the enforcement of principles serving the purpose of environmental protection. Urban developers did not pay attention either to the multi-premises structure of the industry (it was typical also of the inner-city areas) resulting in high requirements for transportation. The industrial reallocation programme (moving industry outside of the city) of the economic policy also failed (during the 1960s and 70s, the powerful large industrial companies successfully lobbied in favour of their interests, including the prevention of industrial dislocation).

After 1989, industrial activities have changed fundamentally, resulting in profound changes in the spatial allocation of the industry inside the capital city. During the transition period from state socialism to market economy, the *ownership relations* have changed radically, and the process of privatisation started. The large state-owned companies fell apart; some of them ceased to exist, was closed down, others were transformed, changed their profile, simultaneous with the appearance of new entrepreneurs – all in all, the number of economic actors was multiplied. Industrial activities in Budapest dramatically declined, and failed to regain its former glory even after the stabilisation of the economy, thus the progress of *de-industrialisation* was unstoppable in the economy of Budapest. At the same time, the investors of the new sectors also appeared on the scene, primarily in the tertiary and quartiary sectors. The revitalised real-estate market also fundamentally affected the spatial structure of the economy and of the industry.

The increasingly tangible effects of the new ownership conditions, the transformation of the economic structure and the real-estate market have fundamentally transformed the spatial structure of the economy and of the industry.

– The new ownership conditions – primarily due to privatisation – resulted in the spatial segmentation of the real estates and of the building sites. The operating industrial areas started to shrink as a consequence of declining and decreasing industrial activities. In the areas with favourable position in the urban structure, especially on the Northern parts of Budapest (first along Váci street and in the Lágymányos zone), where the real-estate prices were relatively higher, *economic restructuring* started immediately, resulting in the replacement of industrial functions with services and residential functions. However, in the Southern, southeastern parts of the city, degradation, slow restructuring and partial survival of the industry was typical. Large properties were left vacant, large areas have become under temporary use, and the *brown zones have appeared* in Budapest. In these zones with deteriorating position the use of land is hindered by the problems resulting from unclear ownership relations, contaminated environment and housing estates in poor condition stuck in between the emptied industrial sites. In the course of

privatisation, speculation capital also appeared on the scene. A part of the new proprietors have either assumed an expectant attitude until the renewal of the zone resulting in the upgrading of their own property, or started to live up their assets. *Mosaic-type parcelling up (from ownership, economic-structural and territorial perspectives alike)* of the previously coherent *industrial areas* has started to take place (*Koszorú,* 2004).

– With the occupation of space by the new economy, with the multiplication of the economic actors and the merger of enterprises in agglomerations and their networking and clustering, and especially due to increased demand for transportation, the need for land is also increasing to an incredible extent. The other, significant spatial change, which is called *economic suburbanisation*, is related to the previous phenomenon. Resulting from changes in the real-estate market, green-field investments have become more profitable than brown-filed rehabilitation in the outskirts of the city and around the city. As to the restructuring effects of the Budapest agglomeration we can say that in the majority of the cases these trends take place without any co-ordination in regional development (it is more than enough to think about the real-estate policy of the settlements in the agglomeration zone or to refer to the endless discussions on the development of transport), thus their detailed consequences are unforeseeable. The acceleration in the offer of the incoherent and unstructured offer of the green field economic areas located around Budapest clearly indicates the scale-change – partly related to the trend of globalisation – in urban areas and the regional-size, but currently uncontrolled processes.

The fact that the economy of Budapest is the engine of Hungary's economy cannot be questioned. However, the political leadership of the millennium years – for different reasons – was not supportive of the economic policy putting into the forefront the developments in the capital city. As a consequence, uncoordinated, irrational and unconsidered development activities took place in Budapest during the past 15 years resulting in considerable losses and missed opportunities. However, the real, central role of Budapest and the Budapest agglomeration cannot be questioned, as this region is increasingly valued also in political terms. This value-change will have a positive effect on the renewal of the brownfield zones as well.

– In the future we can expect the continuation of "fragmented purchases" in terms of the changes in the regional structure of the brownfield areas, and it will be especially typical of those regions where these trends have already started.
– We can also count on large-scale real-estate developments (the Bosnyák square, the MOM [Hungarian Optical Works], the Ganz Works on the Buda side, and the Sportkórház [Sports Hospital] are already good examples of the

above trend). This opportunity will hopefully be created by the co-operation between the public and the private spheres and the joint actions of the different actors in metropolitan state administration.

- The previous economic trends, especially the terciarisation, might later be also completed with certain industrial activities (this process is strengthened by the presence of viable industries capable to produce large value added – for example: pharmaceutical industry, electronics, functioning of special and large-scale labour market, the advantages of clusterisation and networking, the interest-representation capability of transnational–global economic organisations, and the additional positive external effects). The brownfields located inside the city and the settlements in the agglomeration zone might equally be the scenes of those trends that promote the development of Budapest into a metropolis.
- In all likelihood, there will be groups of premises in the brown zone that will be more difficult to handle and will require more time to be dealt with properly. In these cases, the confused ownership relations will have to be clarified in the first place (for example: the Csepel Művek [Csepel Works], the area of Ganz-MÁVAG, etc.) and comprehensive environmental decontamination shall have to be executed. A part of the former industrial areas and of the current brownfields is waiting for new utilisation. These areas will be the ideal venues of long-desired green field expansion and of other, currently undecided functions of which we should specifically mention the significance of transport development, because it is the most fundamental and decisive means for the development of an integrated spatial structure.

4.2 Urban planning in the brown zone

After the transformation into a new political and economic system, fundamental changes have started and urban planning still faces great difficulties to handle them. The privatisation process worsened the situation of the brownfields the most. The ownership structure of the real estates was often fragmented, the situation of the plots is still unsettled. For this, roads should be constructed from private funding and the public utility planning shall be, but this requires massive financial resources. As changes and transformation can only be done with the permission of all the owners, the poor and disadvantageous status of these areas does not seem to change. The spatial planning could not keep pace with the trends, the economic and the political interests emphasises the significance of privatisation often expressing the opinion that the industrial areas in transition can become cheap incubation areas in the developing market economy (*Locsmándi*, 2004).

If we follow a chronological order in presenting the relationship between the brown zones and urban planning, we have to emphasise the so-called “city-gate”

concept which, initially, seemed to offer a break-through point from the problem of brownfield areas. The urban planning concept of 1994, which at the end was not discussed, presented the need to develop urban gates. These areas located close to the main roads would have offered suitable land for the investments that require land space and good access (in other words: for investments giving preference to green field investments on the verge of the cities). The brown zones were not suitable for the purpose of city-gates due to their poor transportation contacts, their unclear ownership relations and their contaminated soil, and they could not attract additional transportation-related activities into the inner parts of the city either.

The increased weight of private ownership and private development activities would have necessitated a more comprehensive regulation covering the whole settlement planning. One of the acts of 1997 ordained the application of the National Settlement Planning and Construction Requirements [Országos Településrendezési és Építési Követelmények – OTÉK] in all the settlements. This regulation replacing the National Construction Code [Országos Építési Szabálykönyv – OÉSZ] is used as a local construction regulation by the settlements, thus regulation plans (the former detailed spatial plans) are prepared only in certain, legally defined cases. As a result of dual administration, specific regulations were needed in Budapest. The metropolitan city elaborated a regulatory framework plan, and framework regulations defining limit values for the different zones, while the districts apply district regulatory plans and urban spatial planning regulations adopting the above limit values. The majority of the contradictions between the metropolitan city and the districts derive from the concept of categorisation into zones. The right to change the zones is in the hands of the metropolitan city, and the city management was on the opinion that the triple category shall have to continue to exist (industry causing considerable problems, industry causing minor problems and predominantly warehousing areas). In practice it meant that those areas were designated which the city continues to preserve for industrial premises. Evidently, this created resistance in the districts, as none of them welcomed industry on its area (the so-called “not in my backyard” policy). As a consequence, though the framework regulations of the city contain limit values applicable for industrial zones, the industrial zones are designated effectively.

The framework regulations of Budapest categorise the economic areas into three construction zones. The first of them is the industrial zone, which is needed, though there are no designated industrial areas, partly because of the allocation of energy-production institutions, and partly because of the probably designation of new industrial areas. Strict regulations are applicable for the industrial zone that practically keeps the industry away from the capital city. The second is called the zone of workplaces. The districts have a relatively free hand in regulating this zone, but the upper limits are defined by the OTÉK. The workplace zones with

considerable green surfaces that do not really affect the brownfields represent the third type of economic areas.

The existing metropolitan regulations offer different possibilities for the districts to decide upon the future of the industrial areas. In accordance with one of the policies, the different construction regulations are defined, in a normative manner, within the framework of urban planning regulations elaborated for the whole district. In case of individual needs, the other option is to prepare a regulation plan for a specific area (in practise, it is equivalent with the former detailed spatial plan). In those districts of Budapest where workplace areas are large, this latter solution was usually chosen as it offers greater flexibility. However, a specific legal and moral reservation can be worded as opposed to the application of this policy in the capital city: in the majority of the cases, the districts make those owners pay for the costs of the regulation plans (or, earlier, for the detailed spatial plans) who initiated the elaboration of these plans in their interest. This way it is inevitable that the leadership of the district includes, to a different extent, those ideas of the financing party that might be contradictory to those of the district into the plan, and in certain cases it may result in incorrect spatila planning.

Specific legal institutions assuring the implementation of the settlement spatial planning tasks and introduced into the act of 1997 based on German example offer additional scope of activity for the districts. In the industrial areas in transition, the right to shape the plot, while of the prohibitions the prohibition to change, the right of pre-emption, the expropriation, the registration for the purpose of service routes and residential routes, the consent for road construction and for the construction of public utilities and the compensation might be used in wider circles. For the time being, the application of legal institutions supporting the development activities of the public sector is quite rare. The most frequently applied method is the prohibition of change. The application of the tools presuming an active policy (for example: expropriation) could not become commonly used because pursuant to these legal regulations these should be included in the basically passive settlement spatial planning tools (plans, regulations). Connecting the specific legal instruments to the district-level regulation plans could offer a solution to the problem, but – due to the above reasons – it is also quite unlikely: the external, or third parties financing the preparation of the regulation plans would be limited by these specific legal institutions, thus – in the majority of the cases – the compromise solution is reached in which the private investors, who are, at the same time, the owners undertake the realisation of municipal developments.

Summarising the relationship between urban planning and the brownfields we can conclude the following:

- In the areas with high status, industrial functions are replaced by new functions without municipal interventions, exclusively due to market tendencies.

– In the remaining cases, the passive urban spatial planning practise applied instead of regulations with vision preserves the present unfavourable conditions. Application of more active policies is hindered partly by the developed system, partly by the lack of resources and initiatives by the metropolitan and district municipalities.

4.3 Development of transport and road networks in the brown zones[4]

In Budapest, the changes in spatial structure and spatial use caused by the radically rapid urbanisation trends of the 21st century have not as yet been synchronised with the development of transportation technology and, above all, with the development in motorisation. Deficiencies in the network (the under-development of the horizontal elements of the centric, ring-type network system) and the resulting crowdedness and congestion characterise the access to and the traffic inside the capital city (the roads leading to the different parts of the city usually go across the inner city; while the missing external transport among the outer parts of the city just add to the devaluation of the respective areas; not to speak about the lack of horizontal contacts and the difficulties in the penetrability of the railway network slow down and hinder the renewal of the present brown zones).

From the perspective of urban transport, the brown zones have an advantageous location. According to the plans, the complex, inter-regional traffic intersection, where 5 European transportation channels (Helsinki channels Nos. IV ,V, V/C, VII – the M1, M5, M7, M3, M6 and the river Danube, plus the North-South axle of Gdansk-Ploce crossing Budapest) cross each other, will be developed in this spatial-structural bend, located between the inner city and the garden city. There are very few strategic points with such a great significance in Central Europe! In Budapest, the complex system of water-air-road-rail connections and their intermodal connections are, in the majority, located in the transitional or brown areas. The traffic junction is attractive for future development of the economy (processing industry, commerce, catering, financial, logistics, etc.).

Challenges of fix-track transport development:

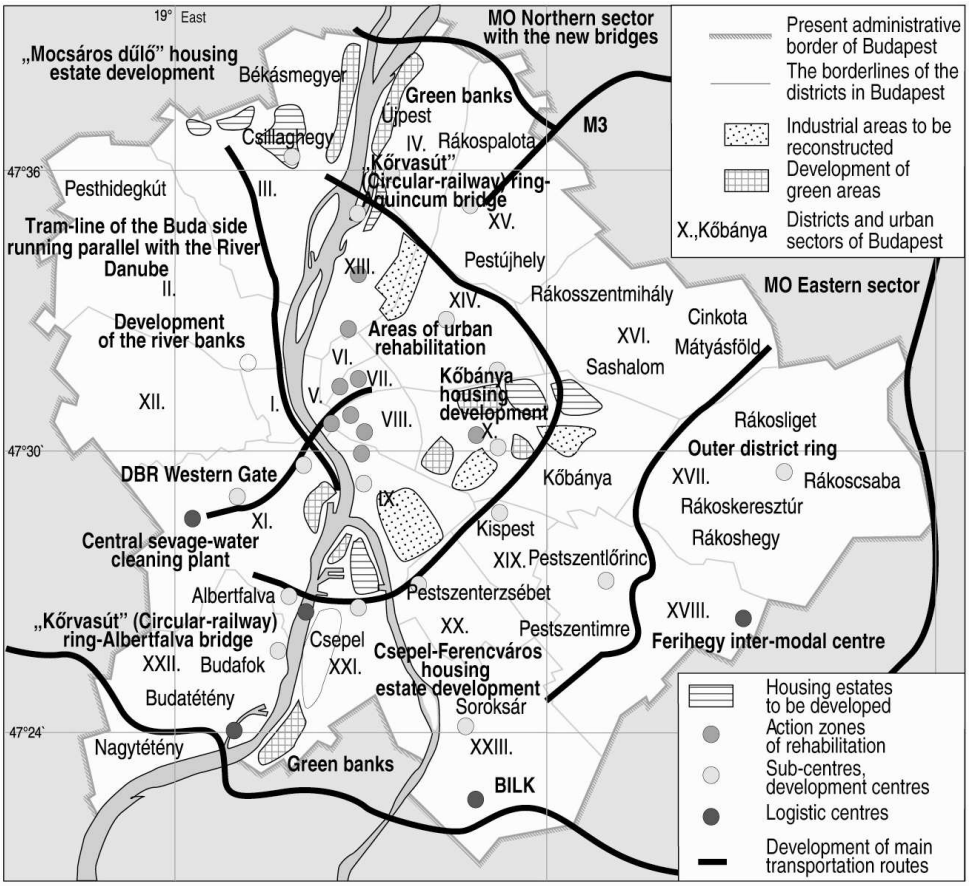
– In this area, the number-one problem is to terminate the space-dividing effects and the crossing-difficulties of the railway network.
– Suburbanisation requires co-operation between the city and its environment and the development of zones where the means of transport can be exchanged, not to speak about the intermodal nods. For this purpose, high-quality fix-track connections reaching the agglomeration ring as well have to be built, in addition to connection by fast trains in the direction of the city

[4] Molnár, 2004.

centre and horizontal electric-railway connection leading to other parts of the city that shall be completed with bus connections interweaving the region in all directions. The dense railway network has to be integrated into the transportation system of the city and of its environment. (The planned projects: connecting the North-south regional fast train, construction of metro line No. 4 and the rapid commuter train in Rákoskeresztúr, elongation of metro line No. 2, etc.). *(Figure 7).*

Figure 7

Development of significant transportation lines in the brown zone



Source: Koszorú, 2004.

The public road network of the brown zone is characterised by crowded radial and missing and split horizontal structure. The development of this network is decisive not only for the region but also for the whole capital city.

- Of the radial development plans, the new road to be built between M0 and Hungária körút [boulevard] as the metropolitan introductory section of the future M4 motorway, the extension of the Danube embankment until the line of the Duna-bridge in Aquincum, the construction of the roads by the river Danube exempting Váci street from the traffic in several sections, the joint construction of the joint sections with 2x3 lanes of the rapid road to Ferihegy Airport and Gyömrői street; the construction of the backbone road to Csepel, etc. shall be specifically mentioned.
- Of the horizontal developments we should mention the construction of several roads between Hungária Boulevard and the limits of the city, that of the rings connecting the sub-centres, the boulevard for the housing blocks, the Outer-Eastern Boulevard, and that of the Körvasúti Boulevard which is considered to be a strategic development (FIG. No. 6. ÁBRA – page 299). This latter one will hopefully assure proportionate development of the spatial structure, the connection among the outer parts of the city and the economic renewal of the brown zone. The Eastern section of the Körvasúti Boulevard is a specific target area for regional development.

4.4 The Budapest Urban Development Concept

The heart of the Budapest Urban Development Concept (BUDC) lies in the strategic objectives elaborated for a 15 year period. The Metropolitan Local Government gave the assignment for the preparation of the BUDC in 1997. Between 1998 and 2003 several versions were prepared, which, on the one hand, resulting in shifting of stress and, on the other, clearly indicate the different phases of how a compromise solution was attempted to be reached between the group of professionals making an effort to follow a complex way of thinking and the management of the city being under the double pressure of politics and financial constraints (*Tosics*, 2004).

The first version of the BUDC dates back to 1998. It defined the problem of brown zones to be solved after the rehabilitation of the inner city but before the reconstruction of the housing estates. The interpretation of the transitional zone is fairly limited in this concept (the Southern and the South-Eastern part of Budapest). Óbuda and Újpest North and the boulevards located by the Körvasút are discussed separate from the transitional zone. According to the analyses connected

to the Concept, the long-term future of the zone depends on the functional change, thus the proposed vision lies on three programme elements:

- Functional changes, accommodating the missing inner-zone and sub-urban functions,
- Re-structuring and structuring through the designation and development regulation of regional and zonal priorities,
- networking, exposure of the area, releasing the burden on the inner parts of the city.

The BUDC also makes proposals on the institutional and asset requirements of the reconstruction. Accordingly, the regulatory power of the Metropolitan Local Government shall be multiplied, regionally differentiated local tax shall be introduced, business tax, the local government shall apply an active real-estate policy in accordance with the Concept, and non-profit development companies shall be established to co-ordinate the development activities (*BUDC*, 1998). According to the opinion of the majority of analysts, the first version of the BUDC would have been suitable to be the basis of a political decision resulting in a faster and more feasible implementation. However, politics failed to realise the advantages of a quick decision-making, while the experts thought that a deeper analysis of certain problems was necessary, which resulted in a reconciliation process lasting as long as the Spring of 2003.

The additional versions of the development concept were all based on the first version, though additional elements were also included as a result of the discussions. As to the problem of the brown zone, some of the focal points have changed, and the respective plans became increasingly feasible.

The second version of the Concept, which was prepared in 1999 (*BUDC*, 1999) designated the transformation and the differentiated development of the brown zone to be the centre of the long-term strategy, while the remaining urban development objectives were refused. This concept survived until the fifth version was elaborated in 2002, because in this version there was a comeback to the approach which aimed at realising several objectives and which was thus the closest to the initial Concept. The second version of the Concept considered an integrated development realised around the notion of Körvasút Boulevard necessary, that would have resulted in garden-city route embedded in green. The third version of 2000 (*BUDC*, 2000) continued this idea, as it intended to develop the transitional zone into a park-city rich in functions, and considered the creation of intermodal nods along the Körvasút feasible. The park-city concept is one of the possible alternatives for the renewal of the brown-zone areas, and would, in addition, complete the incomplete green areas of Budapest (*Szabó*, 2004). Instead of the comprehensive park-city concept, the version of 2001 represents a more limited idea focusing on the exposure of spatial reserves, while the Concept of 2002, which is of much lar-

ger scale, considered the creation of high-prestige garden city on the areas opened up by the Körvasút necessary.

The idea of preparing concrete exemplary projects focusing on smaller areas was presented for the first time in the 1999-version of the Concept (for example: the development programme for Ferencváros–North-Csepel). In the fourth and fifth versions (*BUDC*, 2001, 2002) three such projects were elaborated: North-Buda, Csepel and South-Budapest. According to the Concept prepared in 2002, these exemplary projects that shall be fitted into the seven-year mid-term development plans as well, shall be of re-urbanisation nature, meaning that the former industrial and service type land use would be replaced by new, urban functions (*BUDC*, 2002).

Between 1999 and 2002, simultaneous with the elaboration of urban development concepts, a wide circle of the beneficiaries was interviewed. The above series of consultations started in 1999, with the presentation of the districts' proposals, which was followed by reconciliation with the Mayor's Office in 2000. The reconciliation process had a clear influence on the Concept due to the contradictions between the professional circles and the city management, which considered feasibility the number-one objective. The capital city refused the idea of brown-zone rehabilitation being the only leading project, did not consider active real-estate policy feasible with the argumentation that there was not enough money for purchasing land, and the same judgement was made about the establishment of non-profit development companies and active economic policy. Based on the above arguments, an extended version of the BUDC was elaborated by 2002, in which the rehabilitation of the transitional zone was only one of the several strategic objectives. In addition to this, this version of the Concept also worded the basic dilemma: Though the exploitation of spatial reserves would definitely be advantageous for Budapest, the requirements for its realisation would go far beyond the scope of influence and financial capabilities of the capital city.

The greater public was involved into the consultation in 2001. The most important issue of the time was the definition of the number of development priorities and the hierarchical order, resulting in the increase of strategic objectives in 2002. The need to eliminate environmental hazards and to carry out active environmental policy was also expressed at these forums, which resulted in the separation of the protection of natural environment into a separate development project in the 2002-version of the concept.

The Urban Development concept of Budapest was finally approved in March 2003 after extensive political and professional debate and consensus.

4.5 The Podmaniczky[5] Programme – The mid-Term Development Programme of Budapest

The mid-term action programme is based on the values and strategic objectives of the BUDC. This programme is the Programme of the Metropolitan Local government until 2013, consisting of 130 development projects to be realised and implemented in 9 years by the joint investments of the Metropolitan Local government and the private sphere. The European Union increases the efficiency of the developments through the Structural funds granting financing to programmes strengthening economic competition and through the cohesion funds promoting transport development in the first place. This way, there is an opportunity to for Budapest and the Budapest region to occupy a better place in the European network of cities.

The Podmaniczky Programme designated 7 specific development zones and horizontal, thematic programmes were worded based on the urban values of liveability, efficiency and solidarity. The so-called Budapest Core Programme contains the limited version of the Podmaniczky Programme, and it shall be implemented within the framework of existing, realistic financial resources with high priority. This programme focuses on strengthening community transport and knowledge-city functions, environmental-friendly thinking and sustainable urban development. Rehabilitation of the brown zone is related to several projects in the Podmaniczky Programme.

- One of the seven specific zones is the inner-transitional zone (Eastern gate), comprising of the deteriorated residential areas of Inner-Józsefváros, the brown areas in the inner part of Kőbányai Street and the built, but qualitatively poor green areas (the Népligetet and the Orczy-garden). In the complex development of the programme areas, the residential, the cultural-recreational and the commercial-industrial objectives are all represented.
- Acceleration of residential and public-area rehabilitation in the brown zone shall be mentioned of the thematic programmes. In this case, mitigation of social segregation and launching social urban rehabilitation with the districts ready for co-operation are the objectives.
- One of the specific areas of green-surface development is the brown zone. Creation of large parks is part of urban rehabilitation (for example: on the tip of Csepel-island), which shall be completed with the high-level building up of the river bends of the region.

[5] Podmaniczky, Frigyes (1824–1907) was the head of Fővárosi Közmunkák Tanácsa [Metropolitan Public works Council], playing an important role in converting Budapest into a metropolitan city (the first underground, the Opera house, three bridges over the river Danube, etc. were all built in that period).

– The problem and, at the same time, the greatest opportunity of the transitional zone is the use of ex-industrial and emptied railway premises (MÁV – Hungarian Railways) and ex-military camps for different purposes. Communication among the beneficiaries and stakeholders of brown-filed rehabilitation shall be started with the co-ordination of the Metropolitan Local Government.

The projects of brown-zone rehabilitation also appear in the Budapest Core Programme. The first task is the exemption of brown areas from damages especially in those parts that are the most attractive for the investors: on the premises of the Óbuda Gas Works, and in the areas of the Rákosrendező, Ganz, Józsefvárosi and Ferencvárosi railways. In certain cases, the preparatory works for the utilisation and function-extension of the respective areas also has to be done and the revitalisation projects have to be prepared. In the areas with limited metropolitan ownership, PPP constructions shall be realised. In addition to the elaboration of the development concepts and the regulatory framework, the Metropolitan Local Government will have an active co-ordination role in these areas.

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