



CORVINUS UNIVERSITY OF BUDAPEST
 FACULTY OF LANDSCAPE ARCHITECTURE
 AND URBAN PLANNING
 LANDSCAPE ARCHITECTURE AND LANDSCAPE
 ECOLOGY DOCTORAL SCHOOL

DÓRA HUTTER

Improving the green system of Budapest
 by transforming railway rust areas

THESES OF
 PhD DISSERTATION

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Doctoral school

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The candidate met the requirement of the Phd regulations of the Corvinus University of Budapest and the thesis are accepted for the defence process.

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THE MOST IMPORTANT QUESTIONS AND OBJECTIVES

The Industrial Revolution had a negative impact on both the city and the environment. By the second half of the 19th century the urban erosion of industrial cities cried for direct intervention and curing. The methods developed either along an urban or an anti-urban philosophy, resulted the new models of green belt systems aimed to solve all the main urban problems with restructuring the urban fabric, controlling the urban spread into the rural landscape, the lack of green areas and open spaces for recreation and social life, and the lack of green spaces for ventilation.

Nowadays the major cities and capitals around the globe are competing for such titles as healthier, more liveable or even greener city. Given the unfortunate attributes of the urban structure in the historical cities the development of new transportation sites or green areas is an extremely difficult issue. On the other hand in the big cities the brownfield sites are considered as reserve areas for sustainable urban development. Reusing the brownfields and rust areas is already a land-saving urban development approach, and in case of a complex and ecological urban rehabilitation it can underlie the development of an efficient urban green system and green network.

The aim of our research was to identify those rust areas that hold potentials for greensurface development following the principles of sustainable and ecological urban development. The linear structural elements of the railway network can replace the missing elements of the ring-radial urban green system. Therefore among the various brownfield rehabilitation possibilities I were focusing on the formal railway sites. After reviewing the literature on the urban green system of Budapest and on its railway rust areas, I established the following research hypothesis:

How can brownfield rehabilitations improve the urban green system and the green network connections?

MATERIAL AND METHOD

I. Analysing the urban green system:

1. Reviewing the literature – Types and changing of urban green areas in Budapest and abroad. Development of urban green system and urban green network terminology.

(sources: publications, theoretical papers, historical maps)

2. Reviewing the literature – Green system and green network of Budapest: past, present and future

(sources: publications, historical maps; maps and databases of the vegetation intense; historical and current maps, programs, concepts, urban plans for the green system of Budapest)

II. Analysing the brownfield zone:

1. Reviewing the literature – Development of railway system and industry of Budapest.

(sources: literatures in urban planning and transport history, historical maps, cadaster map of the brownfield zone of Budapest from 2000/2004.)

2. Cadaster work – analysing the current brownfield zone of Budapest.

Separate the industrial rust areas, the railway sites and the green surface elements of the brownfield zone ;
Focusing on the railway sites, separate and analyzing the abandoned railway areas

(sources: satellite images, urban plans and documents of the capital and the urban districts, cadaster map of the brownfield zone from 2002.; development plans for the hungarian railway system, maps and databases of the vegetation intense of Budapest, site analyzing

III. Synthesis of the 2 topic (green system and railway rustbelt)

1. General positive effects in the urban planning and development with rehabilitation of the urban green system

(sources: literature in urban ecology)

2. International case studies for the green surface rehabilitation of railway rust areas

(sources: site analyzing, photo documentation, official web sites)

3. Synthesis of the own railway rustbelt cadaster map and the green system of Budapest – specifically analyzing the urban ecology topics of the urban plans and programs of Budapest.

(sources: satellite images, own cadaster map, urban plans and concepts of Budapest)

4. Database - generally proposals for the types of railway rust areas

5. Modell-area - Particular analyze and proposals along the railway in the North side of Pest.

IV. Summary – database and schematic maps shows the results; thesis and practical results of the research

LIST OF PUBLICATIONS

Journal articles:

HUTTER, Dóra (2012): *Budapest zöldfelületi rendszerének megújítása barnamezős területek rehabilitációjával.* in: KERÉKES, JÁMBOR (szerk.): *Élhető Települési Táj Tudományos Közlemények és Értekezések* Budapesti Corvinus Egyetem, 2012. 153-162. old. ISBN: 978-963-87922-4-2 ISSN: 1787-6613 különszám

HUTTER, Dóra – ALMÁSI, Balázs,- KAPOVITS, Judit (2014): *Zöldút fejlesztési lehetőségek felhagyott vasútvonalak mentén/Greenway development potentials on abandoned railway sites.* In: *4D Tájépítészeti és Kertművészeti Folyóirat* Nr. 34. 28-45. old. ISSN: 1787-6613

HUTTER, Dóra - Mezősné SZILÁGYI, Kinga (2014): *Improving the urban green system and green network through the rehabilitation of railway rust areas.* In: *Acta Universitatis Sapientiae, Agriculture and Environment*, 6. 69–88p. ISSN 2065-748X

Conference proceedings, full papers and electronical publications:

HUTTER, Dóra - SZÖBÖLÖDI, Anita - TAKÁCS, Dániel (2011): *The case of Millenáris park in Budapest.* In: GIBAS, PAUKNEROVA, STELLA (szerk.): *Non-Humans in Social Science: Animals, Spaces, Things.* Charles University in Prague 189-201.old ISBN:978-80-74-65-010-9

HUTTER, Dóra (2014): *Barnamezőben rejlik Budapest jövője.*
<http://www.mut.hu/?module=news&action=getfile&aid=37748>
(2014.06.02)

HUTTER, Dóra (2014): *The urban green structure development with rehabilitation of the railway rustbelt.*
http://mobex2013.weebly.com/uploads/1/8/3/3/18336639/mobelix_hd.ppt
(2014.05.12)

Part of Books:

HUTTER, Dóra - SZABÓ, Gyöngyvér - SZÖBÖLÖDI, Anita - TAKÁCS, Dániel: *Boxundary: A familiar phenomena of suburban landscapes all over Europe.* in : CZINKOCZKY, KERÉKES, PODRUZSIK (szerk): *Economical, Social and Landscape Aspects of Sustainability and Liveability.* Corvinus University of Budapest, Budapest 29-43. old. ISBN: 978-963-503-501-4

Mezősné SZILÁGYI, Kinga - ALMÁSI, Balázs - HUTTER, Dóra - SZABÓ, Lilla (2012): *A várostervezés szürke-zöld dilemmái. A városi térszerkezet alakítása és az élhető város elve.* in: SZILÁGYI, JÁMBOR(szerk): *Fenntartható fejlődés, Élhető régió, Élhető települési táj, 1. kötet.* BCE, Budapest 205-226. old. ISBN: 978-963-503-504-5

Design competitions:

Feasibility study for the rehabilitation of Vasvár Granary. Savaria Urban Planning Summer School, Szombathely, 08. 2011.– 3th. price (Bota - Hutter - Imre - Majoros - Farkas)

Environmental Planning of Törökbálint Wienerberg- Factory site- Design Competition of Architecture Master School, 07. 2014. - 3th. price (Balázs – Baranyi – Hutter – Sámson - Lévai)

THESES (NEW SCIENTIFIC RESULTS)

1. There are certain land uses in the settlement network which should be appointed on the basis of a network-based-ideology and these should be respected against any momentary or individual interest. The green system of Budapest will only be able to fulfill its role on the merits if it is developed in optimal ratio, quality and structure. Due to the attributes of the capital landscape structure the idyllic axial-radial green system has been degraded into a mosaic structure.

The railway rust areas along with the connecting industrial brownfield areas are the last resources to replace in the missing structural elements and provide the necessary connections in the green system. For the urban ecological, environmental quality, and health protection point of view therefore these area-uses should be favoured against other land uses.

2. **Compared to the industrial rust areas, the releasable areas in the railway network and the railway rust areas - due to their settled ownership rights, areal homogeneity, and general regulations - are more adequate to be used in the development strategy of the capital.**

The industrial brownfields are very mosaic, in many cases the ownership status is not clear, or they are over-fragmented. Compared to the railway areas they are state owned, and form a connecting network.

Part of them (mainly the open lines, and those areas which are not involved in the public service) belong to the public purse, while others (the mainly traffic zones) are owned by MAV Ltd. These are all considered as transport areas land use category.

3. The safety zones of the former railway segment and the railway rust areas (abandoned rails, former industrial and service areas) in most cases resulted a development of a spontaneous vegetation. In many of these places a high vegetation intensity is recorded, thus the green areas along the railways are considered as an important part of the urban green system.

There is a connection between the vegetation index and original function, the time that has passed since the abandonment, in other words with the disturbance level. The higher - even 80% - greensurface intensity is typical for the green areas of safety zones, and the railway deltas which can include valuable tree lines or larger forestal areas.

On the slowly, gradually abandoned rust areas that might be even treated by weed killers due to the railway operations mostly ruderal vegetation can be observed. These areas - from the settlement ecological point of view - may be a good starting point for the next step, but on the long-term it requires a constant maintenance and stock replacement.

4. In the technical and ecological and urban structure aspect of the linear elements - crossing various urban districts - can be well used in replacing the missing areal connections and important corridors in the axial-radial green system of Budapest and to provide new eco-friendly transport lines of the green network.

There are over 150 km long linear green areas along the railway network that can be categorised in 3 main groups:

1. The abandoned railways of the open-line areas altogether 26,3km which consist from 8 - mostly 1, 3 or 10 km long units-.
2. These corridors can be increased more by using the linear line formed by the connecting nearby railway rust areas (abandoned stations and service areas) which in many cases can add an extra 5km. These valuable can increase the total estimated value.
3. The development of the “empty” lines along the railway lines can provide areas for future developments. There is an almost 124km long area that is suitable for green corridor development, from which there are 3-7 km long sections that often run along the two sides of the railway.

To summarize it the currently (mostly proposed new green corridors provide various recreational lines, which could connect the focus points of the green network - the big city parks, thematic open spaces, natural sights, and the future_ green surface elements developed from the rust belt. These recreational lines define various connecting eco-friendly, 10 km long pathways in the urban fabric.

5. The abandoned railway stations, transfer stations, service areas, safety railway deltas can replace the valuable elements of the green system. Due to the complex rehabilitation of new green network elements can be created in the neighbourhoods now lacking public green spaces.

The potential railway rust areas of Budapest is estimated to be over 245 ha. From this:

1. the major transport areas and service areas that add up to 146 km
2. In between the railway deltas and junctions an average 5 ha can be designated for development.
3. The station and the abandoned areas of each cover 2 ha on average.

We can state that even the smaller units are suitable for developing respective stock climate public parks, thematically green areas and can create various new focus points in the green system and network of Budapest.

6. The larger connecting railway rust areas - even with wider brownfield connection - can be the centres of complex neighbourhood revitalisation, or ideal sub-city centers. To achieve this it is unavoidable to increase the low biological activity - that is typical for the industrial brownfield to protect the ventilating corridor with the valuable vegetation that has been settled along the railway. In other words to provide the settlement-ecological aspects in the city-rehabilitation program.

The scheduled development and temporary use are important during the long-term plannings. In many cases - mainly in those areas where future construction is unlikely - a preforestration could be advised and a few years later a recreational development.

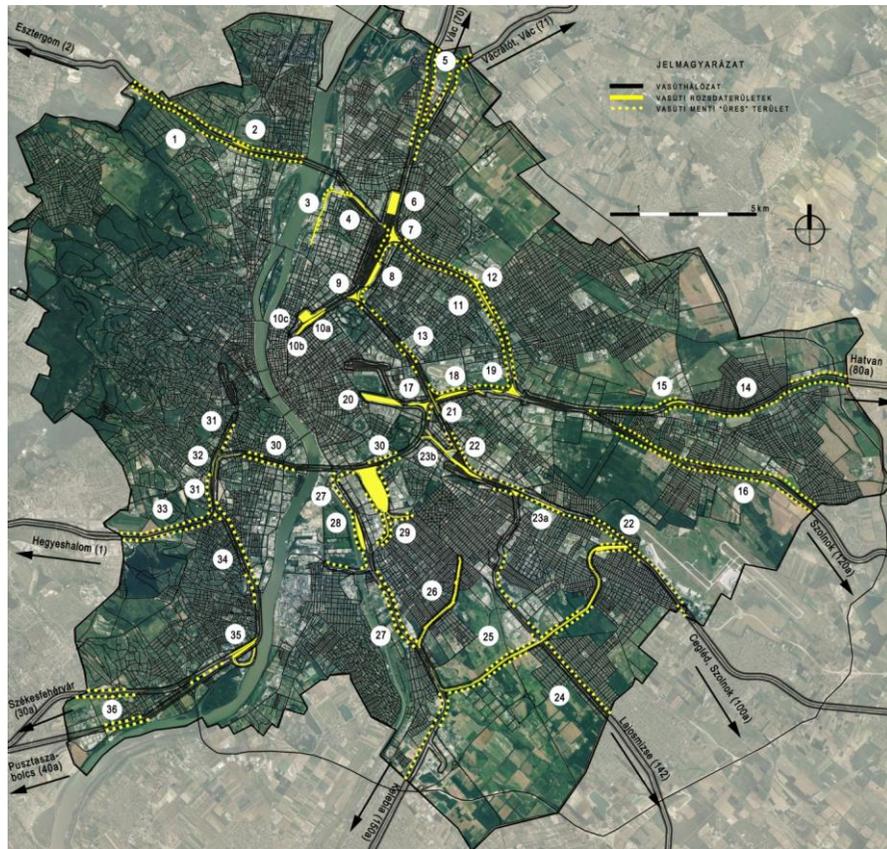
7. The national inventory and strategy that would deal with the green areas from an ecological and a green network prospective is still incomplete.

The regional building regulations cannot unite the comprehensive development plans such as creating a linear green elements including new recreational transit lines.

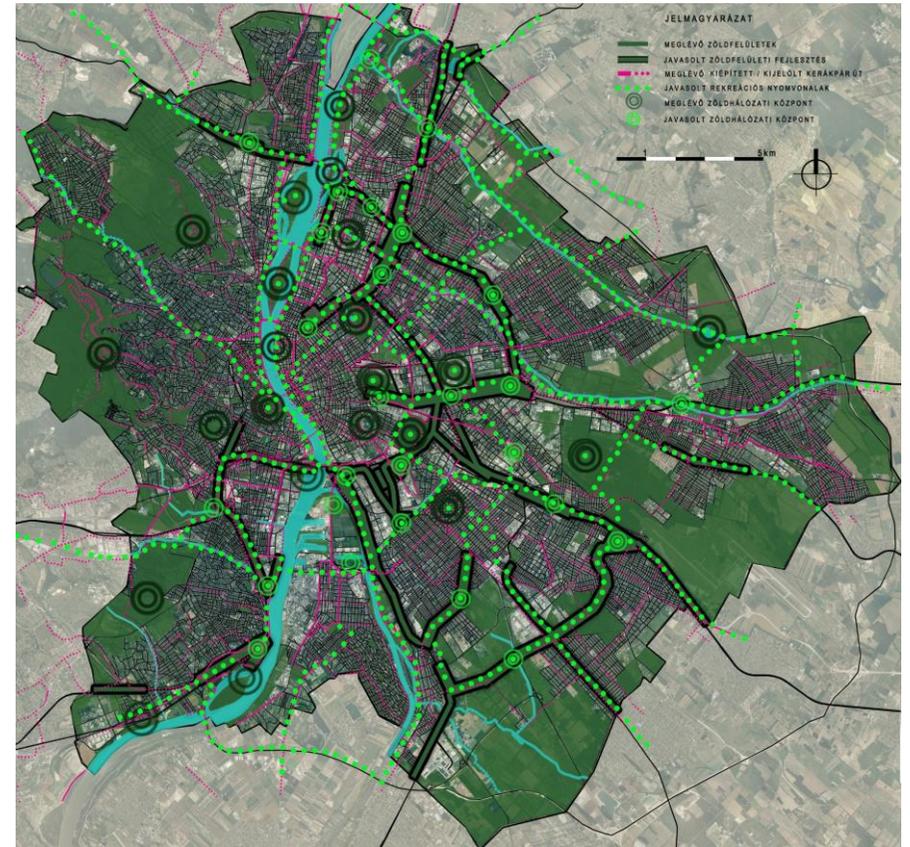
As the railways mainly pass along the district boundaries and cross entire zones, it is highly important to create a new city-scale regulatory system regarding the green areas developed from former railway rust areas.

8. The comprehensive cadaster and development map in the dissertation supports the relations between the railway rust areas and the zfr - green network in the urban structure.

The analysis of the urban structural during my research supports the idea that apart from texts it is essential to provide a visual representation (map 1., 2.) of the urban structural connections, in any phase of the urban development or settlement plans.



CADASTER MAP OF RAILWAY RUST AREAS ;
 The most important areas of railway rustbelt and the 'empty areas' along the railway system
 (source: Dóra Hutter)



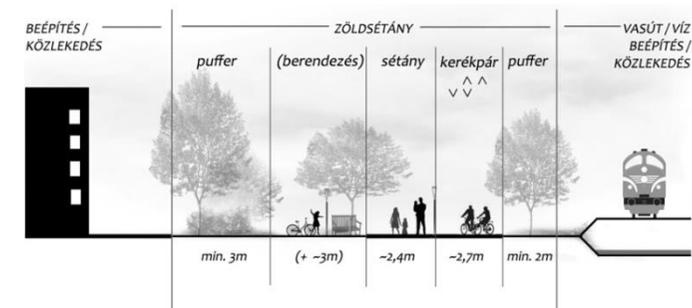
SCHEMATIC CONCEPT FOR THE GREEN SYSTEM AND GREEN NETWORK OF BUDAPEST- BASED OF RAILWAY RUST AREAS;
 Current (dark green) and proposed (black) areas of green system with current bicycle lines (pink) and the new proposed recreation axes (light green points)
 (source:: Dóra Hutter)

9. To create the linear element of the green system and network, the green promenade should be defined as a new land use category. Its own regulatory category could facilitate to define such a green area lane that:

- has a high green surface rate (50%, multilevel stock)
- can incorporate sufficient pavement for the urban uses, built up elements, (a min. 10m wide, long running section with min. 5 m multifunctional promenades and other reserve zones).
- to provide the background for the presently scanty regulation on the key linear element of the green network and the urban green area network.

From a landscape aspect it is important to highlight the green promenades, trails that form the column of the green network but differ from the traditional greenways. Their target groups are citizens thus these provide opportunities for walks, short relaxation, everyday recreation. Its pavement rate is more permissive than the forests'. But it has a more levelled green surface, than the afforested public spaces.

Due to its linear characteristics its functional arrangements (pedestrian and non-motorised traffic corridors, green surfaces) are considerably constant. Therefore a general cross section can be estimated and maintained. Green corridors has to be created based on open-space plan as landscape architect work, involving transportation engineer and further professionals.



General section of a parkway, where the minimal wide 10m (additional functional and furniture zone 3m), the green surface rate 50%
(source: Dóra Hutter)

