Using Post-industrial Landscape Transformation as an Urban Development Strategy – Tales from Portugal

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Abstract

It is increasingly acknowledged that previously developed land, e.g. postindustrial landscapes, constitutes an undervalued asset towards urban redevelopment. In fact, this idea is supported by the six key challenges for producing a sustainable built environment presented by the European Council for Construction Research, Development and Innovation: urban sprawl; redeveloping industrial sites; regenerating brownfield sites; sustainable construction; green space, and regenerating distressed neighborhoods. However, even if it is widely recognized that the reclamation of postindustrial landscapes constitutes an important strategy towards city's development, it is not fully recognized by national, regional and local authorities and decision makers that redevelopment projects should be associated to multidimensional objectives based somehow on a twist of sociocultural, economic and environmental issues. This paper aims to exemplify the importance of these aspects in postindustrial redevelopment by presenting a set of eight Portuguese redevelopment proposals / projects where it is possible to identify the relevance of more than one of the sustainability dimensions to urban development. By assessing and identifying the significance and the benefits associated to postindustrial redevelopment, this article highlighted that postindustrial landscapes should be viewed as a great opportunity for urban renewal and redevelopment.

***Key words**: urban development, postindustrial landscapes, redevelopment.*

Anotacija

Vis labiau pripažįstama, kad anksčiau apdirbamos žemės, pavyzdžiui, postindustriniai kraštovaizdžiai, yra nepakankamai vertinamas turtas miestų pertvarkymo atžvilgiu. Faktiškai, idėja sukurti tvarią urbanistinę aplinką yra palaikoma šešiais pagrindiniais uždaviniais, pateiktais *Europos statybos mokslinių tyrimų, eksperimentinės plėtros ir inovacijų Tarybos*, kurie yra susiję su miestų plėtra, pramonės objektų pertvarkymu, apleistų vietų atstatymu, darnia statyba, žaliųjų plotų ir apleistų kaimyninių teritorijų regeneravimu. Vis dėlto, net jei plačiai pripažįstama, kad postindustrinių kraštovaizdžių melioracija yra svarbi miesto plėtros strategija, nacionalinės, regioninės ir vietos valdžios institucijos bei asmenys, priimantys sprendimus ne visiškai pripažįsta, kad pertvarkymo projektai turi būti susiję su daugiamačiais tikslais, grindžiamais socialinių, kultūrinių, ekonominių ir aplinkosaugos problemų sprendimu. Šiame straipsnyje siekiama parodyti šių postindustrinių kraštovaizdžių pertvarkymo svarbą, pristatant aštuonis portugalų pasiūlymus / pertvarkymo projektus, kuriuose galima identifikuoti daugiau nei vieną aspektą, aktualų tvariai miestų plėtrai. Įvertinant ir nustatant postindustrinio pertvarkymo reikšmę ir naudą, šiame straipsnyje pabrėžiama, kad postindustriniai kraštovaizdžiai turėtų būti vertinami kaip puiki miestų atnaujinimo ir pertvarkymo galimybė.

***Reikšminiai žodžiai:** urbanistinė plėtra, postindustriniai kraštovaizdžiai, pertvarkymas.*

Introduction

The number of derelict, obsolete, and abandoned postindustrial infrastructures and sites we face today is the result of human current and former uses of land. "*As the world moved from agriculture to industry, a mechanist view of the universe began to supplant the idea of an organic nature. A desire for "progress" and faith in technology implied that the earth was a place to extract resources and its "complementary" idea: that the earth could absorb anything humankind asked of it*" (Krinke, 2001). Still, as we know today, this vision was completely incorrect, and former production and consumption patterns are no longer acceptable. As these landscapes become economically disadvantaged, environmentally degraded and socially distressed, several planners, designers and urban developers started to react to decline, both by looking for answers to the social and economic problems caused by growing wastelands (Secchi, 2007) and by developing new methods to transform them, considering that the issues facing postindustrial land transformation today are multidimensional, including sociocultural, environmental and economic aspects.

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In fact, as mentioned before, it is increasingly acknowledged that previously developed land constitutes an undervalued asset towards urban redevelopment. As mentioned by Loures (2011) this idea is supported by the six key challenges for producing a sustainable built environment presented by the European Council for Construction Research, Development and Innovation (European Council for Construction Research, Development and Innovation, 2001): urban sprawl; redeveloping industrial sites; regenerating brownfield sites; sustainable construction; green space, and regenerating distressed neighborhoods.

Somehow, all these principles may be directly or indirectly connected with postindustrial land transformation processes. However, even if it is argued by several authors that investing in the redevelopment of existing sites may be preferable to developing new areas (Tyman, 2008, Pediatri et al., 2005, Miller et al., 2001 and De Sousa, 2000), and that several redevelopment/land transformation programs provide decision-making tools that help to augment the profits of redeveloped sites reducing political conflicts, economic barriers and environmental problems, it is still hard to assess such options scientifically, and to demonstrate that one is better than another, at least at design, conception and programmatic levels (EPA, 2009).

Nevertheless, all over the world, several regions and countries have begun to embrace the notion that postindustrial landscapes offer unique opportunities to the creation of multifunctional landscapes, viewing their value to society in a broader sense. Recognizing that more than ecological and environmental opportunities these sites embodied alternative social, cultural and economic values (Doick et al., 2006).

These new trends are evident not only in specialized literature (Berger, 2006, Waldheim, 2006, Greenstein and Eryilmaz, 2004, Balcells and Bru, 2002, Kirkwood, 2001 and Corner, 1999), but also in several international design competitions promoted to transform large scaled postindustrial sites all over the world (Loures et al., 2015), which showed that perceptions concerning what might constitute land transformation and redevelopment have changed towards environmentally cognizant sensibilities and contributions from a broad array of specialists (Turner, 2004) because more than greening, as mentioned in this study, partially published before (Loures et al., 2015) it is necessary to create conditions that enable economic development and attract people to those spaces.

Methodological approach

Any effort to strengthen the quality of future urban development must embody the principles of sustainability, in this regard the present research is based on a methodological approach centered on the verification of the presence of specific aspects in the design strategy used in the analyzed projects, considering the integration of specific criteria, put forward by Loures (2011).

In this regard, in order to understand and evaluate the complex relationship between postindustrial landscape redevelopment and urban sustainability (considering the three sustainability pillars), a set of Portuguese redevelopment projects that represent specific examples of multifunctional redevelopment as catalyst for urban regeneration and economic development was selected, and their impact on sociocultural, economic and environmental aspects assessed. For this purpose, 8 case studies were selected for analysis, using objective criteria according to a pre-established methodological framework (Fig. 1.) divided in three phases. These case studies were analysed independently according to the specific sociocultural, economic and environmental benefits identified by Loures et al., 2015.

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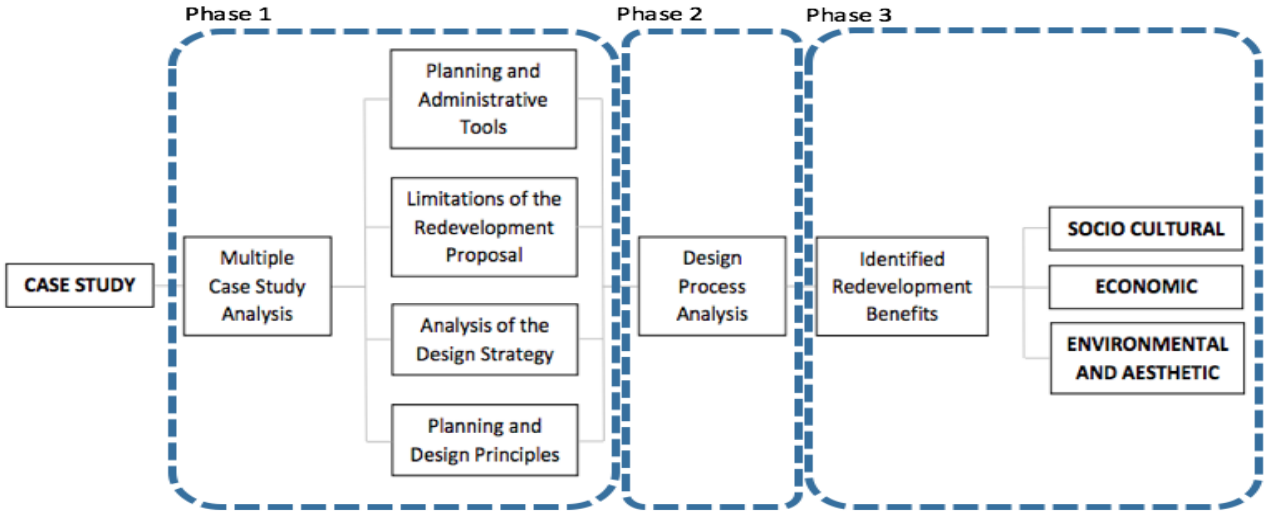

Fig. 1. *Methodological approach – simplified diagram*

Case studies – analysis and results

Considering the various sources of data gathered (e.g. literature review, interviews with key participants and site users) eight case studies (Table 1) were identified and analyzed in order to assess their impact on urban sustainability pillars and their significance and benefits to urban development at different levels, that as presented in table one, in some cases were felt at all the sustainability pillars: environmental, social and economic. The dimension was only considered when the project had a positive impact in more then two benefits associated to a specific sustainability dimension.

Table 1. *Analyzed case studies and their impact on urban sustainability*

Case Study	Design Team	Former Use	Location	Sociocul-tural	Economic	Environ-mental
1. Auditório Municipal de Olhão	António Meireles and Vibeiras	Canning Factory	Olhão, Portugal	✓	✓	
2. Braga Municipal Stadium	Souto Moura Arq. Lda + Daniel Monteiro	Quarry	Braga, Portugal	✓	✓	✓
3. Jardim de Santa Luzia	Topiáris	Sugar Factory	Funchal, Portugal	✓	✓	✓
4. Marina Lofts & Apartments – A Fábrica	NLA - Nuno Leónidas Arquitectos	Brick Factory	Lagos, Portugal	✓	✓	
5. Parque Tejo-Trancão	PROAP + Hargreaves Associates	Industrial Waterfront	Lisbon, Portugal	✓	✓	✓
6. Parque Urbano de Santa Iria da Azóia	Biodesign	Landfill	Santa Iria da Azóia, Portugal	✓		✓
7. Quimiparque	RISCO + Juan Busquets BAU	Industrial District	Barreiro, Portugal		✓	✓
8. Requalificação Urbana da Lisnave	Richard Rogers	Industrial Waterfront	Almada, Portugal		✓	✓

Auditório Municipal Olhão, Portugal – designed by architects António Meireles and Vibeiras, this infrastructure (Fig. 2.) was a former canning factory which has been transformed into an auditorium with capacity for 416 people, occupying an area of 1.470 square meters. With the

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objective of creating a modern infrastructure the designers chose to protect only a small part of the old industrial structure, the chimney, demolishing the rest of the building. This fact has been criticized by those who believe that the industrial heritage might function as a catalyst for urban redevelopment. Regarding the outdoor space, a simple design was established to cover the 2.500 square meters, enhancing an engine used in the canning industry.

Braga Municipal Stadium – Braga, Portugal – designed by Souto Moura Arquitectos Lda. (stadium) and Daniel Monteiro (landscape design) over a former derelict quarry situated in the urban area of Braga for the needs of the Euro2004 football competition, the Braga Municipal Stadium (Fig. 3.) is part of a sports complex built in an area occupying more than 74 hectares. The site includes the stadium with capacity for 30.100 people, Olympic pools, and numerous other multifunctional facilities connected by numerous paths where it is possible to contact with nature and feel the spirit of the old landscape – the quarry. Although developed separately the proposed design strategies intended to treated architecture and its surroundings as the same thing, using similar principles and techniques, to reach the same goal: the development of a unique balance. However, they were differentiated by their degree of visibility. While the stadium appears as an imposing structure, the landscape design was planned in order to be with the surrounding natural environment.

Jardim de Santa Luzia – Funchal, Portugal – Designed by Topiáris – Arquitectura Paisagista, this abandoned sugar mill and surrounding areas have been transformed into a relevant park (figure 4) in the Madeira Island. The main design strategy for the site was to celebrate the Madeira landscape by resolving the ten meter height difference between the North and South intervention limits, with two platforms and four thematic areas (Fig. 4.) associated with the different landscapes: the *Laurissilva* Garden, the Terraces Garden, the Water Garden and the Tropical Garden. Contrary to what is usual in many contemporary projects, this redevelopment did not forget the industrial heritage present on site. Instead, it has successfully enhanced and integrated it into the plan and design strategy. The significance of the project was associated with a varied program that attracts visitors creating a noteworthy park in the Funchal center.

Marina Lofts & Apartments: A Fábrica – Lagos, Portugal – designed by NLA – Nuno Leónidas Arquitectos. The former brick factory was converted into a 50 apartment residential block in one of most privileged locations in the Algarve (Fig. 5.). This was a ground-breaking project regarding industrial heritage transformation in the region. The employed design strategy focused on the conservation of the architectural character by maintaining the structural volume and the original facades, while providing a contemporaneous style which integrates and combines the original infrastructure with the two new nearby buildings. The project also enhances the industrial past with preservation of the old brick chimney and furnace. The applied strategy highlighted the importance of the former use as an asset to attract investors.

Parque do Tejo e do Trancão – Lisbon, Portugal – designed on a join venture by PROAP Estudos e Projectos de Arquitectura Paisagista, Lda. and Hargreaves Associates this urban park (Fig. 6.) located at the oriental part of Lisbon, in an industrial area marked by abandonment and environmental degradation, is one of the most emblematic redevelopment projects realized in Portugal. The high levels of contamination of this landscape, the proximity of the Natural Reserve of Tagus' estuary and the objective to develop the world exposition "Expo 98" constituted significant arguments for the intervention in this specific area. Based on the overall concept of the Expo 98 (the oceans) the design strategy considered the site's problems and converted them in the opportunities of artistic expression. Along with the ecological and functional sense of the proposed structure, the plan serves the parallel objective of setting a spatial organization to translate a coherent and formal unity reading the site.

Parque Urbano de Santa Iria da Azóia – Santa Iria da Azóia, Portugal – planned by Biodesign, this park (Fig. 7.) with a total area of 24 hectares was the first one in which a landfill was converted into an urban park in Portugal. The proposed design strategy focused on securing the

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landfill stability while providing the necessary program to attract visitors to this redeveloped site constituted an innovative approach to landfill redevelopments in the country, constituting a milestone in this type of project. The envisioned approach promoted also the use of sustainable design techniques, as is the case of the introduction of well adapted species resistant to water drought, the application of durable materials and the creation of water retention basins. The site was divided into two main areas, the large flat area associated to the landfill, which is a wide open space covered with small grasses and herbaceous species, due to technical constraints; and the small inferior platform that concentrates the vegetation and recreation activities, such as the amphitheater, the playground and an environmental education area.

Fig. 2. *General views and design details from the Auditório Municipal de Olhão redevelopment project (photos by Loures, 2011 – all rights reserved)*

Fig. 3. *General views from the Braga Stadium redevelopment project. Source: Câmara Municipal de Braga – all rights reserved*

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Fig. 4. *General views from the Jardim de Santa Luzia and Landscape Architecture Project by Topiaris. Source: Loures, 2011 and Topiaris – all rights reserved*

Fig. 5. *General view of the Project by NLA. Source: Nuno Leónidas Arquitectos – all rights reserved*

Quimiparque – Barreiro, Portugal – designed by RISCO and Juan Busquets BAU Quimiparque (Fig. 8.) is a huge industrial area that is under redevelopment, inserted in the *Arco Ribeirinho do Sul* project. The master plan for the site has around 500 hectares, and includes the areas of the CUF industrial complex and a transportation hub. The design strategy aimed to establish several public green spaces linked by an interconnected corridor system, which will serve as the city's structural grid. Another important objective of the redevelopment of the site was to create conditions to link it to Lisbon both by a new bridge and a subway connection. The proposed plan is developed around three main areas: a new transportation hub, the existing port facing the Atlantic, and the existing maritime transportation hub.

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Fig. 6. *General views and design details from Parque do Tejo e do Trancão. Source: Loures 2011 – all rights reserved*

Fig. 7. *General views from Parque Urbano de Santa Iria da Azóia. Source – Biodesign – All rights reserved.*

Requalificação Urbana Lisnave – Almada, Portugal – designed by Richard Rogers the *Arco Ribeirinho do Sul* project (Fig. 9.), corresponds to a master plan for a 115 hectares site which comprehends the former dockyards and part of Almada urban area stretching for 2 kilometers along the waterfront. The proposed design strategy envisions the development of new uses, and leisure and cultural activities, while creating a new city center focused on the Tagus estuary. In this regard, several actions were proposed, as is the case of: the circulation network, with a new subway link to Lisbon, a water taxi service and the expansion of the existing ferry terminal; the dockyards exploration, with a new waterfront promenade, a cruise terminal, a maritime museum, several

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marinas, and also a research center; and a sustainable approach, with use of solar energy, a heating and cooling systems that the docks use as heat sinks, a new energy center and eco-park, and a rain water collecting system along with a water treatment plant.

Fig. 8. *General views from Quimiparque, redevelopment project. Source: RISCO – All rights reserved*

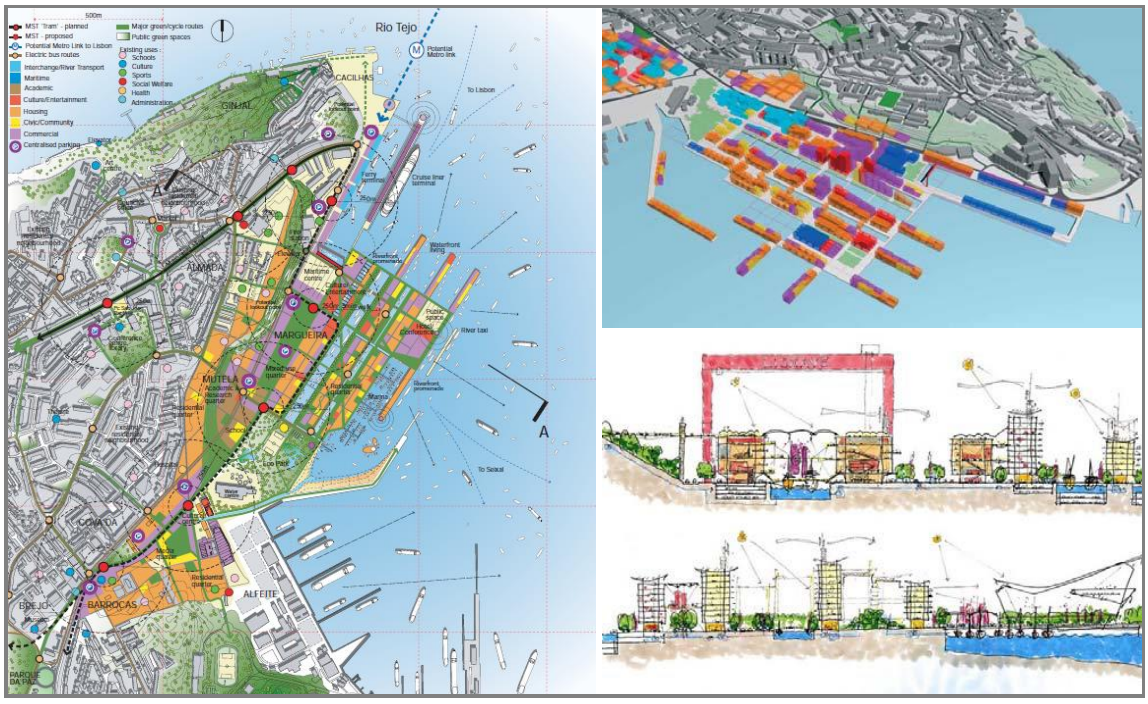

Fig. 9. *General master plan for the Lisnave redevelopment project. Source: Richard Rogers – All rights reserved*

Considering the analyzed case studies, it was possible to identify several benefits directly related to postindustrial redevelopment projects, which represent important elements towards sustainable urban planning, considering the three sustainability pillars at equal level (Table 2). In fact, resulting very often from public-private partnerships, postindustrial redevelopment projects are generally promoted under the argument that the reutilization of former postindustrial infrastructure contributes to improve the quality of life not only at local level but also in the surrounding

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landscapes, while fostering the maintenance of an important part of people's collective memory. However, as mentioned by Loures and Panagopoulos (2006), even if redeveloping an underused site is generally beneficial, people's needs and desires need to be taken into consideration in order to assure that the new development may be both resilient and sustainable. In fact, this research highlighted that the social acceptability of a certain project should never be underestimated and that urban nature, especially urban parks, extremely important for citizens' quality of life, contribute generally to increase land value and foster sustainable city development. Furthermore, this research puts forward that redeveloped postindustrial sites constitute valued spaces, both by experts and the general public, which contribute to strengthen the overall quality of the urban spaces in which they are inserted.

Moreover, the analyzed case studies highlighted the fact that the incorporation of people's preferences in the proposed redevelopments is a safeguard to achieve success, reinforcing project acceptability especially by local citizens. This is particularly important in areas where postindustrial developments might be somehow controversial.

Table 2. *Analyzed case studies and their impact on urban*

ANALYZED CASE STUDIES	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Sociocultural								
Increase sense of belonging	✔	✔	✔		✔			
Increase pride in community	✔	✔	✔	✔		✔		
Increase in park-land and open space		✔	✔		✔	✔		✔
Increase quality of life		✔	✔		✔			
Encouraging recreation and connectivity		✔	✔	✔	✔	✔		
Protect and highlight industrial heritage	✔	✔	✔	✔				✔
Neighborhood revitalization	✔	✔		✔	✔	✔	✔	
Economic								
Utilize existing infrastructure	✔	✔	✔	✔	✔	✔	✔	✔
Reduce urban sprawl – reuse		✔	✔	✔	✔	✔	✔	✔
Reduce infrastructure cost			✓		✓		✓	✓
Increase property values	✓	✓	✓	✓	✓		✓	✓
Encourage inner city investments	✓		✓	✓	✓		✓	✓
Job creation, increased income and investment	✓	✓		✓	✓		✓	✓
Increase value of cultural assets	✓	✓	✓					✓
Environmental and aesthetic								
Remove contaminants from the environment	✓	✓		✓	✓	✓	✓	✓
Create and protect wildlife habitat		✓			✓	✓	✓	✓
Increase flora and fauna diversity		✓	✓		✓	✓	✓	✓
Increase human / environment connections		✓	✓		✓	✓		
Create open space and recreational opportunities		✓	✓		✓	✓	✓	✓
Reduce greenfield consumption		✓		✓	✓	✓	✓	✓
Improve aesthetic quality of urban fabric	✓	✓	✓	✓	✓	✓	✓	✓

Discussion and Conclusions

The analysis of the presented case studies corroborates with the ideas put forward by several studies developed all over the world, according to which the redevelopment of postindustrial areas promotes sustainability, reduces the negative environmental impacts of postindustrial sites, foments economic prosperity, social inclusion, multifunctionality and improves the quality of life (Loures and Panagopoulos, 2010, Shaw, 2002 and Krinke, 2001).

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However, though it is recognized that the presented postindustrial redevelopment project contributed to increase not only landscape quality but also life's quality of local inhabitants, it is arguable that the design solutions developed for some of the presented projects, failed in the application of some best-practice techniques of postindustrial redevelopment, presented by Loures (2011) as is the case of:

- Introducing public participation in the redevelopment process, ensuring that the community can play a role in shaping the redevelopment proposals;
- Ensuring that development responds both to site and context, reinforcing the sense of place and local distinctiveness;
- Promoting the continuity of multifunctional spaces associated with industrial buildings and street frontages; and
- Ensuring that proposed redevelopment approaches create places that have variety and choice through a mixture of different uses, functions and activities.

Still, the analyses of the case studies presented in this article enabled us to conclude that even if in Portugal, as well as in several other countries, postindustrial sites are commonly experienced negatively, as fragmented and incoherent because it is difficult to conceive a legible whole, the redevelopment of these landscapes may enable a sense of spatial enlargement, with high degree of complexity and with diverse ecological and social benefits, contributing to local redevelopment.

In sum, even if redeveloping underused sites is generally beneficial, people's needs and desires need to be taken into consideration in order to assure that the new development may be resilient and sustainable.

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List of literature

1. Balcells, C. and Bru, J., 2002. *Alongside: Boundaries, Borders and Frontiers*. Editoral Gustavo Gili, Barcelona.
2. Berger, A., 2006. *Drosscape: Wasting land in urban America*. Princeton Architectural Press, New York.
3. Corner, J. (Ed.), 1999. *Recovering Landscape.* Princeton Architectural Press, New York.
4. De Sousa, C., 2000. Brownfield Redevelopment versus Greenfield Development: A Private Sector Perspective on the Costs and Risks Associated with Brownfield Redevelopment in the Greater Toronto Area. *Journal of Environmental Planning and Management*, 43(6). P. 831–853.
5. Doick, K., Sellers, G., Hutchings, T. and Moffat, J., 2006. Brownfield sites turned green: realizing sustainability in urban revival. *WIT Transactions on Ecology and the Environment*, 94. P. 131–140.
6. Environmental Protection Agency (EPA), 2009c. *Superfund*. Retrieved June 12, 2009. Internet link: http://epa.gov/superfund/policy/cercla.htm
7. European Council for Construction Research, Development and Innovation, 2001. *Building the Future.* Office for Official Publications of the European Communities, Luxembourg.
8. Greenstein, R. and Eryilmaz, Y. (Eds.), 2004. *Recycling the city: The Use and Reuse of Urban Land*. Lincon Institute of Land Policy, Cambridge.
9. Kirkwood, N. (Ed.), 2001. *Manufactured sites: Rethinking the Post-industrial Landscape*. Taylor and Francis, London and New York.
10. Krinke, R., 2001. Overview: design practice and manufactured sites. In: Kirkwood, N. (Ed.), Manufactured Sites: Rethinking the Post-Industrial Landscape. Taylor & Francis, New York. pp. 125–149.
11. Loures, L. and Panagopoulos, T., 2006. Rehabilitation of degraded mountainous villages in Algarve, Portugal. In: Lafortezza R. and Sanesi G., (Eds.), *Patterns and processes in forest landscapes: Consequences of human management*. AISF Press, Florence.
12. Loures, L. and Panagopoulos, T., 2010. Reclamation of derelict industrial land in Portugal -greening is not enough. *International Journal of Sustainable Development & Planning*, 28 Vol. 5(4) 343–350.
13. Loures, L., 2011. Planning and design in post-industrial landscapes: East Bank Arade River e Lagoa, case study. Ph.D thesis. Portugal: UAlg.
14. Loures, L., Meireles, F., Costa, L., Loures, A. e Nunes, J., 2015. The effectiveness of postindustrial redevelopment towards urban sustainability – the Portuguese experience. In: Bulucea, A., Burley, J. e

* Kontaktinis asmuo / Corresponding author

Machemer, T., 2015. *Advances in Energy and Environmental Science and Engineering*. Pp. 55–59 - Athens: WSEAS Press.
15. Miller, K., Greenberg, M., Lowrie, K., and Mayer, H., 2001. Brownfields Redevelopment Fights Sprawl. *New Jersey Municipalities*, 78(3). P. 26–29.
16. Pediaditi, K., Wehrmeyer, W. and Chenoweth, J., 2005. Monitoring sustainability of brownfield redevelopment projects - the Redevelopment Assessment Framework. *Land Contamination and Reclamation*, 13(2): 173–183.
17. Secchi, B., 2007. Section 1: Wasted and Reclaimed Landscapes: Rethinking and Redesigning the Urban Landscape. *Places*, 19(1). P. 6–11.
18. Shaw, R., 2002. The International Building Exhibition (IBA) Emscher Park, Germany: A Model for Sustainable Restructuring? *European Planning Studies*, 10(1). P. 77–97.
19. Tyman, S., 2008. *Gunpowder Park: A Case Study of Post-Industrial Reinhabitation*. Master Thesis, University of Oregon, Oregon.
20. Turner, T., 2004. *City as Landscape: A post-modern view of Design and Planning*. Spon Press – Taylor & Francis Group, London and New York.
21. Waldheim, C. (Ed.), 2006. *The Landscape Urbanism Reader*. Princeton Architectural Press, New York.

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