

ARCHITECTURE HERITAGE and DESIGN

Carmine Gambardella

XVIII INTERNATIONAL FORUM

Le Vie dei
Mercanti



World Heritage and Contamination

ARCHITECTURE | CULTURE | ENVIRONMENT | AGRICULTURE | HEALTH | ECONOMY
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Collana fondata e diretta da Carmine Gambardella

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Carminé Gambardella

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Conference report 300 abstracts and 650 authors from 44 countries:

Albania, Arizona, Australia, Benin, Belgium, Bosnia and Herzegovina, Brasil, Bulgaria, California, Chile, China, Cipro, Cuba, Egypt, France, Germany, Georgia, Greece, India, Italy, Japan, Jordan, Kosovo, Lebanon, Malaysia, Malta, Massachusetts, Michigan, Montenegro, Montserrat, New Jersey, New York, New Zealand, Poland, Portugal, Russian Federation, Serbia, Slovakia, Spain, Switzerland, Texas, Tunisia, Turkey, United Kingdom.

Preface

At the state of art, with profound pride I register that the previous editions of the Forum 'Le Vie dei Mercanti' have favored the creation of an international scientific community with over six thousand researchers, distinguished professors, institutional and business sector representatives from more than one hundred Universities and Research Centers from fifty countries in the world. The XVIII edition of the Forum titled 'World Heritage and Contamination' aims to create a cross-critical dialogue, open to cultural contamination and 'without limits', in a logic of integration between competences which extends, and is not limited to, the following disciplines: Architecture, Culture, Environment, Agriculture, Health, Landscape, Design, Territorial Governance, Archeology, Economy, e-Learning. The activities of protection and promotion of World Heritage, understood as a asset shared by all Humanity, are particularly relevant in Italy, responsible towards the world of custody of the largest number of assets protected by the UNESCO. To the World Heritage Properties is added a landscape heritage of enormous variety and beauty to be protected also through the regeneration of degradation and of the 'minor heritage', in line with the provisions of the UNESCO Conventions on material and intangible assets as well as the European Landscape Convention. In this framework the multidisciplinary topics of the Forum represents a 'thing tank' of confrontation, exchange and cultural contamination oriented towards the United Nations Millennium Development Goals. The location of the Forum is of excellence. Campania Region with six World Heritage Properties, two Unesco Man and Biospheres, three assets registered on the Intangible Heritage List is one of the richest Regions in the world for cultural and landscape heritage, particularly 'contaminated' by Mediterranean cultures. No coincidence that the Forum takes place in Naples and Capri, with site visits and presentations of scientific research and operational projects by the Benecon University Consortium, consisting of five Italian Universities, head office of my UNESCO Chair on Landscape, Cultural Heritage and Territorial Governance. The papers, selected by the Forum's Scientific Committee, will be published in the Proceedings of international relevance. Furthermore, the most innovative research and projects will be published in the 'Quaderni' of the A Class international magazine 'Abitare la Terra / Dwelling on Earth'.

*Prof. Carmine Gambardella, General Chair XVIII Forum
UNESCO Chair on Landscape,
Cultural Heritage and Territorial Governance*

Con profondo orgoglio, allo stato dell'arte, registro che le precedenti edizioni del Forum 'Le Vie dei Mercanti' hanno favorito la creazione di una comunità scientifica internazionale costituita da oltre sei mila ricercatori, distinguished professors, rappresentanti istituzionali e del settore dell'impresa provenienti da più di cento Università e Centri di Ricerca di cinquanta paesi nel mondo. La XVIII edizione del Forum 'World Heritage and Contamination' si propone di creare un dialogo critico trasversale, aperto alle contaminazioni culturali e 'senza limiti', in una logica di integrazione fra le competenze che si estende, e non si limita, alle seguenti discipline: Architecture, Culture, Environment, Agriculture, Health, Landscape, Design, Territorial Governance, Archeology, Economy, e-Learning. Le attività di tutela e promozione del Patrimonio Mondiale, inteso come bene condiviso da tutta l'Umanità, sono particolarmente rilevanti in Italia, responsabile nei confronti del mondo della custodia del maggior numero di beni tutelati dall'Unesco. Alle Properties del World Heritage si aggiunge un patrimonio paesaggistico di enorme varietà e bellezza da tutelare anche attraverso la rigenerazione del degrado e del 'patrimonio minore', in linea con quanto previsto dalle Convenzioni Unesco sui beni materiali e immateriali e dalla Convenzione Europea del Paesaggio. In questo framework i topics pluridisciplinari del Forum rappresentano un 'thing tank' di confronto, scambio e contaminazione culturale orientati verso gli Obiettivi di Sviluppo del Millennio delle Nazioni Unite. La location del Forum è d'eccezione. La Campania con sei siti iscritti nella lista del Patrimonio Mondiale, due Man and Biospheres Unesco, tre beni iscritti nella Lista del Patrimonio immateriale è una delle regioni più ricche al mondo per beni culturali e paesaggistici, particolarmente 'contaminata' delle culture del Mediterraneo. Non a caso il Forum si svolge a Napoli e Capri, con sopralluoghi e presentazioni di ricerche scientifiche e progetti operativi a cura della Consorzio Universitario Benecon, costituito da cinque Atenei italiani, sede della mia Cattedra Unesco su Paesaggio, Beni Culturali e Governo del Territorio. I paper, selezionati dal Comitato Scientifico del Forum, saranno pubblicati negli Atti di rilevanza internazionale. Inoltre, le ricerche e i progetti più innovativi saranno pubblicati nei 'Quaderni' della Rivista internazionale di Classe A 'Abitare la Terra/Dwelling on Earth'.

*Prof. Carmine Gambardella, General Chair XVIII Forum
UNESCO Chair on Landscape,
Cultural Heritage and Territorial Governance*



CARMINE GAMBARDELLA

UNESCO Chairholder on Landscape, Cultural Heritage, and Territorial Governance; President and CEO of Benecon ScaRL University Consortium - Research Centre on Cultural Heritage, Ecology, Economy (University of Campania “Luigi Vanvitelli”, Pegaso University, University Federico II of Naples, University of Salerno, University of Sannio). Full Professor of Drawing at the Pegaso University and at the University of Campania. President of the International Forum “Le Vie dei Mercanti” since its first edition in 2003 to the XVIII edition in 2020. Editor and Founder of the series “Surveying is/or Project”, “Knowledge Factory” and “Architecture, Heritage and Design”. Component of the Scientific Committee of International Class A Magazine *Abitare la Terra/Dwelling on Earth* (Gangemi Editor International Publishing). He covered various roles for the University of Campania, including the Pro Rector of Institutions, Academic Senator, Director of the Department of Architecture and Industrial Design Luigi Vanvitelli, Dean of the Faculty of Architecture Luigi Vanvitelli, Director of the Department of Culture of Design, Director of Doctoral School in the Discipline of Architecture, Coordinator of the PhD in Protection, Safety and Representation of the Environment and Structures and Territorial Governance, Coordinator of the PhD Program in Surveying and Representation of Architecture and the Environment. He is author of numerous scientific international papers, publications and proceedings on surveying and representation of the built and natural heritage.



World Heritage and Contamination

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Towards Eco-Planning principles. Torre-Cancello decommissioned railway in Campania Region a regeneration masterplan proposal

Salvatore LOSCO,¹ Claudia de BIASE,²

⁽¹⁾ Engineering Department, University of Campania *Luigi Vanvitelli*, Aversa, Italy

Salvatore.losco@unicampania.it

⁽²⁾ Architecture and Industrial Design Department, University of Campania *Luigi Vanvitelli*, Aversa, Italy

Claudia.debiase@unicampania.it

Abstract

The town itself is spreading more and more out along the territory even though the notion of traditional city is changing urbanity circumscribed about the urbs together with the spatial forms through which it spreads in the territory; it is however an urban condition, though new and not a typical one. This new urbanity is made up of very different realities and parts. In some of them urbanization is thicker, human presence is heavier, relationship flows among people and activities are deeper, while the presence of nature is weaker. In others, on the contrary, human presence is weaker, the density of urbanization and the intensity of flows are lower. The expansion of the city on the territory does not set the territory against the city anymore: it is included in the territory so much as to give birth to the definition of *urbanized* or *anthropized territory* as a reality including together cities and territory. The land use also modifies the balance of territorial ecosystems, these effects are not always immediately clear, they manifest itself after a long time and/or in far places from where the land use occurred. For these reasons, the battle for a sustainable development is to fight in the cities and especially in the areas of urban/metropolitan suburbs and urban sprawl. City-planners thus need a set of overarching principles that provoke thought about larger concerns fundamental to improving and ensuring the quality of urban life. These principles are basic to think about urban growth in terms of creating livable, sustainable places. The first part of the paper proposes and defines nine principles of a modern city planning towards 21st century Eco-Planning, they are: sustainability, accessibility, diversity, open space, compatibility, incentives, adaptability, density and identity. The second part presents a regeneration masterplan hypothesis of Torre Annunziata - Cancello decommissioned railway in Campania Region to exemplify a test of the identified principles to a real brownfield site because much other can be learned from applying these principles to a specific region, province, city or neighborhood. The paper ends with some considerations concerning the role played by the regeneration of disused railways in the implementation of local green infrastructure also highlighting some uncertainties in the Italian legislation that hinder the achievement of this objective.

Keywords: Territorial/urban Regeneration, Eco-Planning, Green Infrastructures, Greenways, Decommissioned Railways

1. Towards 21st century man-made territory

The economic model adopted in developed and emerging countries has resulted in increasingly less compact and more widespread settlements, with clear signs of landscape fragmentation, segmentation and isolation of habitats and natural or semi-natural ecosystems. The growth of new areas of urban transformation (residential, productive, leisure) consumes soils with high agronomic potential, with a double effect: the division of agricultural areas with the parcelling out of the land mosaic into areas unsuitable for agricultural activities and the insularisation [1] of agricultural areas, determined by the creation of road transport networks essential to ensure accessibility to newly urbanised areas. Building good cities in the 21st century, with **Transit Oriented Development** and high density will require new ways of planning the territory, with the primary objective of pursuing a high

quality of life in human settlements. To do this, it is necessary to go beyond the traditional logic of urban and architectural design as problem solving, in favour of problem setting, and consider air, water, vegetation, habitat, energy, soil, waste and any other environmental component as determining factors for the sustainable planning of cities in the next decades. In addition to environmental factors, the historical and geographical factors of the places which are fully involved in the planning of the future of existing cities and cities of the future should, of course, not be overlooked. Environmental transformations located many kilometres away can negatively affect man-made or natural areas (**As Low As Reasonably Achievable**) [2], while the conservation of certain activities, such as agriculture, could contribute to maintaining the overall balance in the context of a more complex transformation of a specific territory. In this background it is useful to codify a set of general principles that can guide planning choices, orienting them towards the creation of more liveable and sustainable places. These principles must be characterized by actions to be implemented, since the construction of the city is an active and continuous process. Many cities are growing due to an expanding economy, while other cities are losing population due to the decline of their economy. These two opposite situations require different planning approaches, although both imply the need to guide and coordinate the population distribution on a larger scale than the urban one. The declining city, in order to be re-located in a virtuous economic network, requires large-scale spatial planning, including the use of incentives to attract new investment. Symmetrically, the growing city must plan transformation processes to accommodate the new inhabitants, both by increasing the population density of already inhabited areas and by directing the new population towards non-urban areas that have sufficient *carrying capacity* [3] to mitigate the natural impacts of the new population on soil, air and water. In both situations, proximity to primary infrastructures is essential, especially for mobility. The *environmental carrying capacity* of a city or region is a measure of its sustainability and determining this capacity (energy, water, air and land consumption) is fundamental to understanding the demographic limits of that territory. Finding the balance between *environmental carrying capacity* and the demographic dimension is a field of research for innovation in spatial planning theory and techniques.

2. About the nine planning principles of 21st century Eco-Planning

The imperative to innovate territorial and urban planning in order to answer to the irruption of environmental issues is determining a rethinking, by scholars, of the basic principles of physical planning, born in response to the needs of territorial planning imposed by the industrial revolution. The book by John Lund Kriken, *City Building. Nine planning principles for the twenty-first century*, published by Princeton Architectural Press in 2010, is of particular relevance for the considerable effort of synthesis it proposes to the scientific debate. The nine principles proposed by the author summarize, through key concepts, the problems to be solved and suggest possible solutions, exemplified through particularly representative *emblematic/paradigmatic* case-studies [4].

1 - *Sustainability* is the first principle in the construction of smart land and city in 21st century and represents the framework for the other eight principles. The planner will have to assess whether a given choice will consume irreplaceable land, such as first-class farmland, land that supports important ecosystems and with special landscape qualities, what it may entail in terms of energy waste, soil consumption, air and water pollution. It is a question of including environmental ethics in planning, so as to design intelligent territories and cities, with an eye to sustainable development and not just growth [5]. The slogan could be *committing to an environmental ethic*.

2 - *Accessibility*. A good city promotes easy and cheap exchanges between people, goods, services and ideas. The most successful cities are characterised by very compact urban centres, equipped with powerful mobility systems and also integrate residential, commercial and office use in a coordinated way. The presence of the functional mix, high concentration and interconnection, an articulated and multimodal mobility system, an allotment with fine grain and narrow service roads, a redundancy of the urban and territorial system represent some possible solutions to implement this principle. The slogan here could be *facilitating ease of movement*.

3 - *Diversity*. The monofunctionality, the lack of facilities, the monotonous and repetitive urban landscape, the unsatisfactory urban environment is the result of the use of standardized design logics and are the negative features of many contemporary settlements. Variety and choice of housing, job opportunities, functional and social mix, fine-grained allotment, as well as various and articulated design choices represent some solutions to the problems of lack of diversity. The slogan could be *maintaining variety and choice*.

4 - *Open spaces*. Loss or reduction of natural ecosystems, insufficient and/or inadequate open spaces for play and outdoor sports, abnormal amount of building, excessive waterproofing are recurrent problems of contemporary settlements. Open space can be a cornerstone of city design, the type and character of open space varies according to climate and culture, but the construction of a good city requires that a certain natural quality always softens the urban hardness and blurs the boundaries of the built environment. In 1900 the *City Beautiful Movement* [6] declared that the greening of American cities was essential for the mental health and physical well-being of city dwellers. Since the 1960s, the

principles and practices of sustainability articulated by the *California Tomorrow Plan* [7] have gradually been implemented through a series of major efforts to preserve open space. The slogan could be the watchword of the *Greenbelt Alliance* [8]: *regenerating natural systems to make cities green*.

5 - *Compatibility*. Neighborhoods and infrastructures built without any relation and/or discordant with the places where they are located are generators of degradation. In good planning practice, according to the principle of compatibility, visual interrelationships must be established that are consistent with the characteristics of a specific location. The design of the city involves different scales and entrusts each of them with different objectives. At the smaller scale the project must pay attention to the streets, the blocks and the individual buildings, as well as the critical intermediate spaces [9], to borrow the title of Nathaniel Owings' book published in 1973. When designing on a small scale, an important and not irrelevant question to be resolved is the relevance to the context in the design choices, i.e. whether the sense of place should dominate the specific project or whether it should stand out from the context as a new reference point. The identification and realization of a correct relationship with the context, the identification of the correct scale of intervention, the search for harmony and balance on a territorial, urban planning and building scale with the surrounding environment represent the possible solutions for the implementation of this principle. The slogan could be *maintaining harmony and balance*.

6 - *Incentives*. Cities change over time: in some periods the transformations are the result of growth and/or development, in others they are the result of socio-economic decline. Declining territories and cities present themselves with disused and/or underused infrastructure, areas and buildings. With the use of a wide range of creative incentives, the effects of abandonment can be remedied. The assumption is that many public incentives can stimulate new investment: tax relief, subsidies for land costs, assembly and site preparation, new transport infrastructure and public services, health care, education and public safety services, beautification of the open space and landscape, additional density factors to achieve the renewal objectives. The search for incentives should be aimed at territorial and urban regeneration, through the regeneration of disused or abandoned heritage. The slogan could be *renewing declining cities/rebuilding brownfields*.

7 - *Adaptability*. Planners in the 21st century must start from this assumption: the end result of a transformation can never be predicted with absolute precision. The time required for the implementation of projects is long, so that adaptations/changes are inevitable, both during the design and during the completion of the project. The principle of adaptability to changing situations marks the difference between good urban design and self-referential architectural design. Indeed, it can be argued that good design should anticipate change, be able to tolerate the continuous change of physical elements and uses and still be able to maintain a sense of integrity over time. The modular design, the enhancement of interconnections with the existing, the framework of multiscale rationality are possible solutions to these problems. The slogan could be to *facilitate integrity and positive change*.

8 - *Density*. This principle aims to remedy the damage and waste produced by the growth of anthropization in a widespread and uncoordinated way. Density, which measures the number of people living or working in a surface unit of land, varies according to a number of factors; the average residential space per family can also vary, as can the workspace. High-density cities, i.e. compact cities, have a number of important advantages: less need for primary infrastructure, conservation of valuable land and natural habitats, less pollution and less time wasted travelling. Planning and building compact cities, strengthening public and private mobility systems with high environmental sustainability, coordinating these choices with socio-economic sustainability are the possible solutions, which can be summarized in the slogan *designing compact cities with appropriate transit*.

9 - *Identity*. Good planning must make the identity of places recognizable, highlighting their most particular characteristics: the natural ones, those of climate, culture and architecture are the primary roots, through which cities reach individual identity. All cities pursue economic, social and environmental improvement; in the same way, private investment aims to minimize risks, replicating a consolidated and successful development. This leads to the replication of urban landscapes, without any attention to the specific characteristics of the places of transformation, with the result that cities are all the same. Designing, which are identifiable, has become the greatest challenge for modern designers, who must use special, unusual and special features to make each city unique and memorable. Designing new cities and neighbourhoods in rapid growth, preserving and strengthening the sense of places, building unique and memorable places, protecting and enhancing landmarks and natural environments, preserving and enhancing valuable architectural fabrics represent the only solutions to safeguard the principle of identity. The slogan could be *creating/preserving a unique and memorable sense of place*.

3. **Decommissioned railways and greenways**

Between the second half of the 19th century and the beginning of the 20th century, the railway played an important role in promoting the socio-economic development of many regions and in shaping

territorial organisation: it brought towns closer together and encouraged the mobility of the inhabitants, made rural areas accessible and facilitated the transport of goods. After World War II, however, situation changed. The development of the automobile industry, with the consequent mass motorization, accompanied by the creation of an impressive road network, with the result that within a few decades private road transport has taken on the role of priority carrier in the movement of people and goods. It is sufficient to consider that in 1970 the railways transported 21% of the goods handled in the 15 countries then members of the European Union, while in 2000 this share had fallen to 8.1%; in the meantime the percentage of goods transported by road rose from 30.8% to 43.8%. [10]. This evolution towards types of transport considered more efficient at the time led to the disposal, in all industrialised countries, of tens of thousands of kilometres of railway lines; to these, in recent decades, have been added many sections of lines still in operation, abandoned following the construction of route variants to improve their efficiency, competitiveness and level of service. In Italy, in particular, there are more than 7.600 kilometres of abandoned railways [11], in very few cases due to changes to the route, in most cases as a result of traditional economic assessments, which have encouraged a model of private mobility by road. Today, with the rethinking of the economic model towards a green economy perspective, this railway heritage must be reused, both by reactivating some lines and regenerating others as the backbone, at various scales, of a green infrastructure [12], in which soft cycle-pedestrian mobility also plays a fundamental role in the creation of a widespread network of *greenways*. It is important to focus on the concept of *greenways*: introduced in 1968 in the United States of America by William H. Whyte [13], it indicates a *system of routes dedicated to slow and non-motorized circulation, able to connect people with the resources of the territory* (natural, agricultural, landscape, historical-cultural) *and with the centers of life of urban settlements, both in cities and rural areas*. With the declaration of [14] Lille, signed by the main European associations on 12 September 2000, it is specified that the *greenways must have characteristics of width, slope and pavement such as to guarantee a mixed use in conditions of safety by different types of users in any physical condition*. In particular, the reuse of abandoned canal towpaths and railway lines is the preferred tool for the development of greenways. In order to be defined as greenways, routes must, on the one hand, be physically separated from the ordinary road network and, on the other hand, allow smooth traffic (e.g. due to limited slope) and wide accessibility for users (with different characteristics and abilities). The first greenways of disused railway lines began in the United States of America in the mid-1960s, with the aim of preserving these abandoned corridors with a view to future restoration of the railway service, while at the same time allowing them to be reused for the movement of people. Landscape and physical-mental movement (of ourselves, of our body) are vital needs, in mutual reference. It is the landscape that invites us, pushes us to movement; and vice versa it is movement that makes us desire the landscape. Two types of transport meet this need: the bike and the train. Both, although so different, almost incomparable in size, power, speed, mode of use, one individual and the other collective, are today associated, in the post-modern and post-industrial lifestyle, to the contemporary landscape, which is conceived as form, design, identity of a territory that can be crossed and perceived on a geographical scale. Landscape made not only of mountains, rivers, woods, hills, plains, skies and horizons, but also of roads, bridges, paths, embankments, embankments, escape routes, wandering places, passable without ever meeting or hearing or smelling a combustion engine. It is precisely the roads, bridges, paths, embankments, and crossings that give a sense to the appearance of the landscapes, that allow us to look at those oases of emptiness and silence, moving with the rhythm of our steps or with that of our pedals, approaching us, entering us, and again moving away. The regeneration of the former railways with the transformation to cycling is, therefore, a perspective that can be perceived as natural and immediate: it is a matter of returning the use of those spaces to public and collective use, [15] spaces accessible, practicable, continuous, spaces destined to be traveled yesterday by train, today by bike (or on foot) in respect of the environment and in full enjoyment of the landscape [16].

4. Torre Annunziata-Cancello decommissioned railway in Campania Region a regeneration masterplan proposal

The Torre Annunziata Centrale-Cancello Scalo railway line, which connected the Caserta hinterland with the industrial area of Torre Annunziata on the coast, was decommissioned in 2014. Starting from Cancello, the railroad track heads south into the agricultural plain of the Lagni Regions, consisting of a network of canals built following a hydraulic reclamation in 1600, then approaches the base of Mount Somma, which first hides the view of Vesuvius, which then appears on the right, as you continue towards the sea. On the left there are the mountains of Sarno and, on the opposite, the Monti Lattari of the Sorrento peninsula. The track approaches the Gulf of Naples and the archaeological sites of Pompeii and Oplontis, the Roman villas of Boscoreale and Terzigno, with the agricultural areas that have been progressively replaced by an increasingly widespread and sometimes spontaneous building, up to the town of Torre Annunziata (Fig. 1).

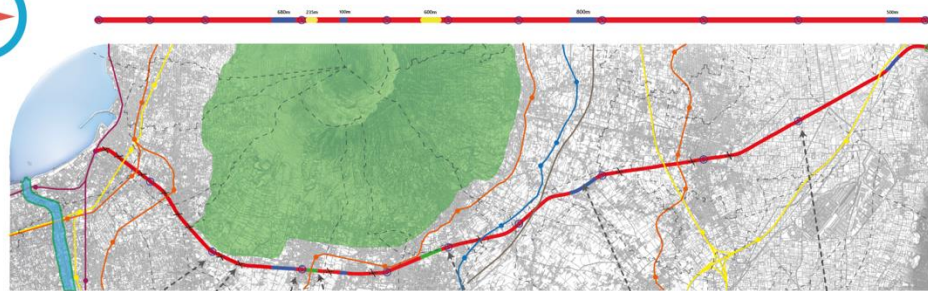
- SAN FELICE A CANCELLO
km 0,0
- MARIGLIANO
km 8,5
- SPARTIMENTO SCISCIANO
km 12,2
- REVIGLIONE-SOMMA VESUVIANA
km 14,8
- OTTAVIANO
km 17,2
- SAN GIUSEPPE VESUVIANO
km 19,3
- TERZIGNO
km 22,4
- BOCCIA AL MAURO
km 24,5
- BOSCOREALE
km 27,2
- TORRE ANNUNZIATA
km 31

SCHEDA TECNICA

Linea di confluenza	Roma-Cassino-Napoli / Napoli-Reggio Calabria
Regione	Campania
Lunghezza della linea	31 km
Dismissione definitiva	D.M. n. 420 del 10 ottobre 2014
Proprietario	RFI SpA
Presenza di binari e/o tecnologie	Si binari – Si impianti tecnologici
Fabbricati viaggiatori e/o altri fabbricati	8 fabbricati viaggiatori – 25 case cantoniere
Rilevanti opere d'arte	35 ponti – 74 passaggi a livello



Comune	Lunghezza Ferovia (Km)	Superficie Pianura (Ha)
Torre Annunziata	1,8	1,98
Boscoreale	2,27	3,12
Terzigno	5,6	7,18
S. Giuseppe Vesuviano	2,4	3,65
Ottaviano	2,5	3,27
Somma Vesuviana	4,3	5,61
Scisciano	3,1	4,03
Marigliano	4,3	5,61
Aversa	2,1	2,84
Cancello	0,8	1,4



Infrastrutture in uso Ferrovie dello Stato Ferrovia Circumvesuviana Autostrade Strada Statale 268	Infrastrutture Dismesse Stazione FS Stazione Circumvesuviana Linea Ferroviaria Dismissa Simbolo Autostradale Svincolo SS 268 Stazione Ferroviaria Dismissa Linea Ferroviaria Dismissa Passaggio a livello	Ambiente Parco Nazionale del Vesuvio Parco Regionale del Bacino Idrografico del Fiume Sarno	Andamento Altimetrico Binari a raso Binari sopraelevati Binari in trincea
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Fig. 1: Top-down. Railway technical data sheet. Planimetric layout and longitudinal profiles (courtesy of RFI - Italian railway network company). State of the place analysis: urban and building decay. Graphics by Valerio Izzo - Master's degree thesis in Urban Planning Tools Design academic year 2018/2019.

The design of the Masterplan was based on a state of the places and the rule of law analysis. In order to make this check, the urban planning tools in force in the municipalities crossed by the railway were consulted and mapped out: Torre Annunziata, Boscoreale, Terzigno, San Giuseppe Vesuviano, Ottaviano, Somma Vesuviana, Scisciano, Marigliano and San Felice a Cancelli. Most of these municipalities still have old PRG (Municipal Land-use plan) in force today, approved between the 1980s and 2000, dating back to the time when the railway was still in operation (in Torre Annunziata there is an inter-municipal PRG, which is part of the original Torre Annunziata-Boscotrecase PRGI): obviously, since they are infrastructures, the areas affected by the railway do not belong to any Homogeneous Territorial Area (zoning technique used by land-use plan). The

municipalities with PUC (municipal town planning plan articulated in structural and operational planning provisions) are only those of Terzigno (in force from 2011), Ottaviano (in force from 2015) and Boscoreale (in force from 2019). It has been verified from the consulting of the provisions of these PUC that the redevelopment of the disused railway line has not been planned by the urban planning tool in question, leading to the absence in the future of a possible rule of law in the areas affected by the disused railway track. The analysis of the actual condition of the sites has revealed a low level of building degradation and a significant and widespread urban degradation with a low provision of areas for local public facilities. Then, the areas affected by the railway track were quantified for each municipality and it was verified that they reach a considerable extension, so that their regeneration could increase the supply of local public facilities or urban planning standards, which is strongly lacking in all municipalities of the Vesuvian area; all the points of commercial, environmental and cultural interest that the route connects, such as the nearby national and regional parks of Vesuvius and the Sarno river basin, the important archaeological sites of Torre Annunziata, Pompei, Boscoreale, museums and intermodal exchange areas, have also been reported (Fig. 2). Starting from these elements, a regeneration masterplan of these areas, both those owned by RFI and those directly contiguous, public and/or private, that interact with them by reason of the specific territorial situation, has been hypothesized; guidelines have been identified for the typical interventions to be carried out along the track, which is characterized by recurring cross-sections, to aim at the regeneration of the abandoned railway in environmental green infrastructure, with proposals for the mitigation of visual impacts, for the relations with the landscape and for the service structures. Along the track, allochthonous plant species must be eliminated and autochthonous species must be restored; the remaining uncultivated areas must be enhanced and put into a system with the elements that structure the landscape, the ecological corridors must be restored and, finally, the former toll booths and railway stations must be restored, maintaining their original architectural features and used as resting points of the new ecological network. It also quantifies the contribution that the redevelopment of abandoned railway areas adds to the increase in local public facilities for each municipality (Fig. 3).



Fig. 2: Measurement of existing local public facilities. Existing or planned points of interest, infrastructures and natural parks. Graphics by Valerio Izzo - Master's degree thesis in Urban Planning Tools Design academic year 2018/2019.

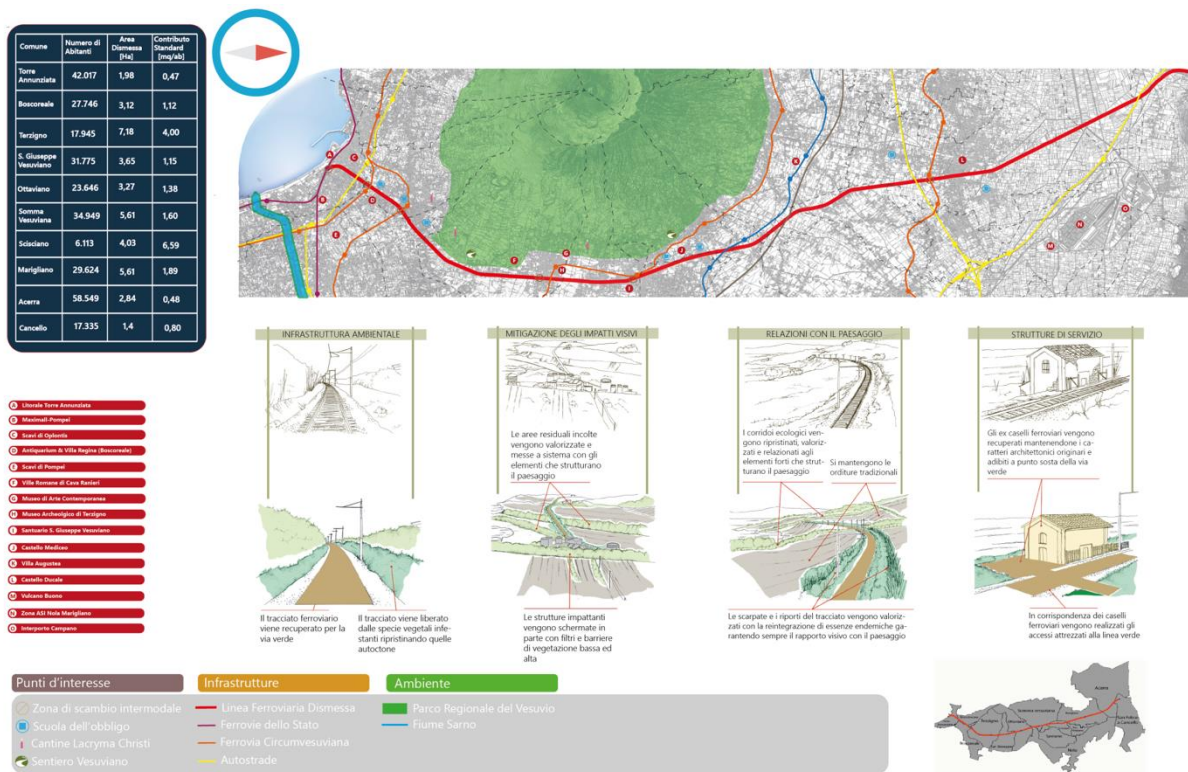


Fig. 3: Masterplan proposal. The greenway and the increase in public local facilities. Project guidelines. Graphics by Valerio Izzo - Master's degree thesis in Urban Planning Tools Design academic year 2018/2019.

The regeneration masterplan proposal of this decommissioned railroad has a double interest: on the one hand, the area crossed by the railway - the south-eastern part of the metropolitan city of Naples [17], characterized by the coexistence of a series of territorial problems typical of metropolitan areas [18], the landscape of the slopes of Vesuvius, affected by hydrogeological, seismic and volcanic risks - is emblematic [4] of the problems of contemporary man-made territory; on the other hand, an intervention along the railroad can represent a paradigmatic case [4] of eco-planning, which fully responds to the nine planning principles of 21st century city. Following are some short notes in support of what has been asserted for each principle.

- **Sustainability.** The regeneration of a brownfield site represents an intervention in favour of the natural environment, since, by intervening on the land-use management, the carrying capacity is reduced and the smart city is built, through the implementation of an environmental infrastructure that determines sustainable development.
- **Accessibility.** The greenway redevelopment of the abandoned railway facilitates the movement of people, especially in compact development, differentiates the types of transport thus contributing to the redundancy of the system and facilitates circulation through ecological corridors (land reserves) in the territory.
- **Diversity.** The regeneration of the railway track in environmental green infrastructure contributes to the visual variety of the landscape through the conservation and/or design variation of the urban landscape, the close interaction with the fabric (small parcels) crossed and the mixed use of the territory, thanks to the low cost of use (affordability) and proximity to the anthropized territories.
- **Open spaces.** The regeneration of natural systems to make cities greener is the basic principle. The redevelopment of the disused railway track allows the recovery of the areas used for infrastructure (in our case, the railway) restoring natural or renaturalized habitats to the community for spaces for leisure and sport adapted to new lifestyles.
- **Compatibility.** The strong relationships to context characterize the redevelopment of the railway track that involves the territorial, urban and building features (building scale and character), through a multiscale intervention of conservation (historic preservation) and enhancement of the existing.
- **Incentives.** The proposal of the transformation into greenway represents a planning (masterplanning) that aims at the development of the environmental quality (quality development), the beauty of the landscape (beautification) and the economic value of the areas concerned (value enhancement). These objectives should be supported by public incentives (public facilities) to facilitate the transit towards a green economy model.
- **Adaptability.** The regeneration of the abandoned railway is a particular case of adaptability to changing situations, with a number of obvious advantages: the transformation into greenway promotes the various land uses (use changes) through the adaptability of open-space adaptability and buildings

(adaptability of buildings), allows the separation of slow traffic from vehicular traffic (traffic separation), improves the health of the context by providing it with high visibility and sense of completion.

- *Density*. The creation of new physical connections with the recovery of the abandoned railway line provides a decisive contribution to the improvement of the territorial context in terms of compactness, encouraging proximity and Transit Oriented Development.

- *Identity*. Transforming a decommissioned railway into a green infrastructure strengthens the identity of places and enhances their characters:

identity by *natural feature*, improving conservation, repair, visual and physical access and view-corridors;

climate, offering good protection from the sun (sun protection) and improving local ventilation (breeze) in hot periods and sunny places (sun exposure), protecting from wind and rain (wind and rain protection) in cold periods;

cultural by restoring the historical identity of places and enhancing landmarks;

urban and architectural, contributing to the strengthening of territorial and building quality through the design of a new anthropized territory.

5. Some conclusive remarks

The environmental dimension of territorial and urban planning requires a rethinking of the traditional theories and techniques of spatial planning, also in relation to the new demands expressed by the settled community that have shifted from expansion/addition to requalification/regeneration of the anthropized territory. In addition to this, the acquired awareness of the limited resources is able to open a new design season, linked to the search for reversible development models, temporary balances rather than definitive solutions, alternative production systems, fed by weak, seasonal, eco-compatible genetic energies. The contemporary city has completely offset itself from the functions on which it was built and has spontaneously fluidized, adapting to new needs. The fundamentals of contemporary design thus change, highlighting new categories of reference, such as the reversibility of processes and uses, the dismantling of architectural systems and, above all, the need to integrate the planned environment with the natural environment, the artifice with nature [19]. The compact city comes back to the forefront, in contrast to the sprawl model, while the criteria of environmental sustainability are leading to an innovation of urban planning public facilities with the codification of new ecological-urban public equipments. In the strategy for the reconstruction of a relationship of complementarity between town and country, the urbanized countryside [20] plays a fundamental role, which is no longer agricultural and is not yet urbanized; the reconquest of the urban arises from the regeneration of these areas. All residual, marginal or interstitial spaces within the anthropized territory, if recovered and used for an environmental or eco-compatible agricultural production function, can play an active role in rebalancing the entire territory. The renewal of territorial planning finds in the metaprinciple of *sustainability* the main reference to which the principles of *accessibility*, *diversity*, *open spaces*, *compatibility*, *density*, *incentives*, *adaptability* and *identity* must be informed. These nine principles are strongly interconnected, they reinforce each other and, although they constitute an interpretative model, strongly characterized by operativeness, of the territorial complexity inherent in an urban settlement, they lend themselves to direct the choices for the 21st century territorial planning. The general relevance of these principles has been confirmed by the application to the case study examined, the contextualization has highlighted an articulated variety of territorial situations that fall within each general principle confirming the operational fecundity of this framework. Specifically, the recovery of a decommissioned railway is an element of the intercommunal/local ecological network [21] and contributes decisively to the shaping of a green infrastructure [12]. There remain some open questions highlighted by the case-study, which involve most of the Italian urban transformations resulting from a regulatory framework based on hypotheses and territorial issues dating back to the 1960s and now completely modified. The growing population, the inexhaustibility of environmental resources and a market economy have been replaced at the same time by a declining population, the exhaustion of environmental resources and a greener economy. These new conditions cause new problems recurring today in the territories, whose solution requires a renewal of the regulatory system and planning tools to eliminate the difficulties and, in some cases, even the illegality of some proposals for planning and realisation of territorial and urban regeneration. In particular, in the recovery of disused railways, the inadequacy of the overall regulatory framework is compounded by the uncertainties of the specific rules governing the ownership and management of the Italian rail network. The main reason for the limited measures implemented in Italy is the difficulty of acquiring the first sites or the right to use them, caused by the absence of a single stakeholder and the lack of direct involvement of the route owners in a national development project. In this context, the succession of laws and decrees that have affected railway issues in the 20th century has led to a substantial difference between train paths operated by FS in the past and those operated under concession by private companies. In the former case, under Law No 210/1985, the buildings, works and installations of both the lines in operation and those already abandoned were transferred from the

State to the new entity which, once a line is closed, has full access to it and can freely dispose of it, so that entities wishing to recover abandoned train paths as greenways often have to buy the old sites at market price. In the case of lines licensed to private individuals pursuant to Legislative Decree No 422/1997, the assets, installations and infrastructure of the lines in operation and most of those abandoned were transferred to the Regions, which in many cases made themselves available to grant the use of the old lines to local authorities interested in recovering them as green lines against payment of an annual fee [22]. The latter solution may in some cases have favoured the recovery of old tracks. In the United States of America the recovery as greenways of abandoned railway lines has been promoted by a particular legislative provision, railbanking [23], introduced in 1983 with the amendments (Section 8d) to the National Trail System Act, with the aim of maintaining the integrity of the national railway system with a view to possible future reuse for transport functions, allowing the temporary conversion of lines no longer in operation into routes dedicated to non-motorised users. In Italy, in order to overcome this obstacle, it is essential to identify technical-legal tools that, following the example of American railbanking, can encourage recovery interventions such as greenway/ecological network/green infrastructure, not limiting themselves to the construction of individual elements, but promoting a system planning at various scales that identifies priorities and inserts each section in an overall vision of regeneration of the territory crossed, in the knowledge that such interventions contribute to the enhancement of the characteristics of the places and the emergence of new jobs.

Attributions

Within the present contribution, which is the result of the authors' common drawing up, personal contributions can be identified as specified below: *Towards 21st century man-made territory and Decommissioned railways and greenways and Some conclusive remarks* (Claudia de Biase), *About the nine planning principles of 21st century Eco-Planning and Torre Annunziata-Cancello decommissioned railway in Campania Region a regeneration masterplan proposal* (Salvatore Losco), *Abstract joint drawing up*.

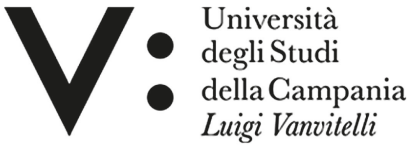
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- [22] The instability and regulatory uncertainty that govern the ownership and management of the Italian railway network determine the ungovernability of the railway assets. Excessive fragmentation and coordination difficulties can make the use of a given resource unmanageable, entailing considerable costs to negotiate agreements and achieve an efficient use [of assets], DALLERA G., *La teoria economica oltre la tragedia dei beni comuni* in: MARELLA M. R., *Per un diritto dei beni comuni*, Ombre corte, Verona, (2012), p. 98. This is the main problem faced by the Italian railways, as hostage to a dichotomous condition between public and private, which has led to a lack of planning with regard to the many disused, abandoned or those sections never activated. It seems nodal to build integrated projects for the unused railway heritage that involve several public actors (Region, Provinces, Municipalities, Mountain Communities, etc.) and operational support tools, which are the responsibility of each of the bodies involved, correlated by the necessary planning agreements and programme agreements VENTI D., *Preface* in: PETRUCCI M. A., UFFREDUZZI T. (edited by), *Aree dismesse e sviluppo locale nella Provincia di Terni*, Terni, Provincia di Terni, Agenzia Umbria Ricerche, 2006, p. 13.
- [23] Typically in the USA the ownership of a railway line is mixed (part of the railway company, part of the owners of the adjacent land on which there is an easement and part public) and therefore, normally, after the decommissioning, the railway site is divided into many portions, with different owners. With railbanking, a public or private organization that wants to recover a disused line as a route dedicated to non-motorized users (rail-trail) can, before the Surface Transportation Board (STB) authorizes the abandonment of the line, enter into an agreement with the railway company to acquire the right to use the land for its own purposes. Railbanking is not a means of acquiring ownership of the sediments free of charge, as railway companies generally demand fair compensation for the sections of line they own, but it prevents the fragmentation of the sediments. In addition, the entities promoting green routes have the advantage of being able to acquire the entire route by dealing only with the railway company and do not have to pay for those parts of the line that the company used under easement or government concessions, as they do not own it. <https://www.railstotrails.org/build-trails/trail-building-toolbox/acquisition/railbanking/>, website visited April 30, 2020.



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