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**Papa, E. and Trifiletti, E.G.**

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# **Transit infrastructures and urban housing design: examples of integrated projects in Europe**

**Enrica Papa**

Department of Spatial Planning DiPiST  
University of Naples, Naples, Italy  
e-mail: [enpapa@unina.it](mailto:enpapa@unina.it)

**Emilia Giovanna Trifiletti**

Department of Spatial Planning DiPiST  
University of Naples, Naples, Italy  
e-mail: [trifilet@unina.it](mailto:trifilet@unina.it)

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## **Abstract**

Transport systems have always played an important role in cities evolution and transformation [1; 2; 3]. In last decades many metropolitan areas have carried out integrated planning practices between urban housing design and transit infrastructures. This paper has the aim of analyzing four best- practices in Europe, where transit infrastructure construction represented occasions for housing renewal and development projects: new transit stations and new tram lines were strategic element for real estate development in Helsinki, housing rehabilitation in Naples, district renewal in Grenoble and urban transformation in Lyon. Furthermore the study proposes a comparative analyses highlighting strength and weakness points and the results of each project.

## **1 Transport infrastructures and urban housing design: theories and practices**

The combined environmental, economic and social costs of automobile dependence [4] are forcing a rethink of the way cities are built [5]. Cities are attempting to reconnect land use with transport and are going towards “transit – oriented” development schemes according to “New Urbanism” theories. The new principles aim at putting transport planning back in its urban context [6]: cities are pedestrianizing their historical centers and building new walking scale housing estate complex. Cities are reconnecting transport and urban housing design.

According to *TOD* (Transit-Oriented Development) and *TJD* (Transit-Joint Development) principles, development and renewal projects around transit can promote compact development, multiple uses and pedestrian orientation [7]. These strategies have been applied in many American and European cities. However each urban context needs particular interventions in order to build sustainable and livable community around transit infrastructure, according to specific urban milieu and financial, juridical and social features. In fact it is necessary to analyze in details different urban projects, in order to study various opportunities and risks of each urban transformation process.

It is for this reason that this work proposes a focus on four different study cases where new transport infrastructures construction was a key element for carry out real estate development or housing renewal. In each project, urban housing projects near transit had a great potential of maximizing transport investments and supporting density increase, functional mix and urban quality development. In fact new transit infrastructures, in the examined cities, were the opportunity to develop more livable residential districts or to renew urban areas. In the longer period these transit-oriented projects aim at increasing transit use and at controlling urban sprawl.

The paper is made up of two main parts. In the first one, integrated transport and urban projects are described. In particular the first paragraph deals with the Helsinki case, where the residential quarter of *Arabianranta* is being developed at the same time with a new tramway line construction. The second paragraph concerns with a new tram line construction and the creation of new identity for *Echirrolles* area in Grenoble. The third analyzed city is Lyon where new metro station opening constituted the occasion of housing development and public spaces renewal in *Lyon Confluence* area. The fourth paragraph deals with the Naples case, where new metro lines construction were the occasion to renew urban areas as in *Salvator Rosa* station area. In the second part a comparative analysis is proposed and final conclusions are drawn.

## **2 Integrated transit and urban projects: best practices in Europe**

### **2.1 New tram lines and housing estate development in Helsinki**

Situated on the northern shore of the Gulf of Finland, Helsinki is the economic, administrative and cultural centre of Finland and has become increasingly cosmopolitan since Finland joined the European Union in 1995. The Helsinki region comprises four cities: Helsinki, Espoo, Vantaa and Kauniainen, together the home of nearly one million of the total Finnish population of just over five million [8]. Helsinki has been defined as the European capital with the best life quality and is one of the European cities that is growing more rapidly. At the beginning of 2002 Helsinki had a population of 560.500, which shows an increase of approximately 70.000 inhabitants over the previous decade, that correspond to a 14% increase [9].

Under pressure to provide housing for the steadily expanding population, Helsinki quickly founded suburbs whose aesthetic qualities and urban planning became subject of severe criticism. The architecture of the 1980s produced some completely new housing ideas, a good example being *Länsi-Pasila*. Another good example is the old Arabia factory area on the eastern shores of the downtown area, where transport and land use are being part of the same integrated planning process. In this area in fact is being built a residential area for about 10,000 inhabitants, around educational institutions, research in industrial art and business. The new district is called *Arabianranta*, located on the eastern shoreline of the inner city, on the coast of the old Helsinki bay. The area is 85 hectares, with 29 hectares of new block area and 44 hectares of urban park. Housing and services for 7000 residents and 7900 jobs will be built by the year 2013 and will consist of 260.000 square meters of residential floor area and 315.000 square meters of job floor area.

The new residential area, whose construction started in 1998, will consist of two equally sized parts, which will be linked by amenities as a school, a sports park and day care centres. A main feeder road with access roads branching off will form the traffic framework in both areas [10]. These access roads will be cul-de-sacs terminating at the edge of the shoreline park. This means there will generally be only pedestrian and cycle traffic between the housing yards and the shore. A central axis passes through the Arabia factory buildings leading via a pedestrian gallery to the industrial art and design square continuing as an esplanade-like. The tramway will form the public transport backbone to the new area and it will connect the new *Arabianranta* quarter with the Helsinki city centre. The tramway design and the line construction are completely integrated in the housing and urban scheme. Transport and housing design were parts of the same planning process. As figure 1 shows, in the housing building sites the tram line and the housing construction started simultaneously. This underlines the transport and land use strictly connection, both in the planning and in the construction phases.



Figure 1: *Arabianranta* new houses and the tramway (source: [www.helsinki-virtual-village.fi/](http://www.helsinki-virtual-village.fi/))

## 2.2 The tram as a key element for the creation of the urban identity of Grenoble-Echirolles

Grenoble has a population of 160.000 inhabitants and it is located in the south-east of France. It is the capital of the *Isère* department that has a population of 514.000 inhabitants.

The project area is located in the *Echirolles* district, that has an extension of 765 hectares and a population of 35.000 inhabitants. *Echirolles* is placed along the north-south axis that links Lyon to Grenoble and it was born as the urban expansion of the city of Grenoble towards south.

Before the project, Echirolles was a blighted area, both from a qualitative and functional point of view and with scarce accessibility. The project purpose was the creation of a new Echirolles “urban identity” by implementing an urban renewal project [11]. The main strategies were to carry out pedestrian open spaces, to introduce new amenities and to construct a tram line, linking Echirolles with Grenoble [12]. In particular the tramway construction was fundamental in the whole revitalization project and it played the role of the transformation process start up.

*Echirolles* revitalization began in 1975 with the definition of two ZAD zones (*Zones d’Aménagement Différé*) and precisely a 50 hectares zone for the urban centre construction and a 80 hectares zone for an environmental protection area. Between 1980 and 1990 numerous interventions were carried out finalized to the rehabilitation of the central area and of the surrounding residential districts.

However, only in 1996 the renewal process had a spin off, with the tramway inauguration along the central district axis. The tram opening included the road axle *Etats-Généraux* rehabilitation and it contributed to the central area definition: a great pedestrian square that covers a surface of 19.200 square meters (see Fig. 2). Following the streetcar opening, new urban functions as the “Media and the

Communication Institute” were inaugurated. In 2000 the housing area transformation begun driven by an Agenda 21. Finally in 2004 the new *SNSF* Echirolles railway station opened. It constitutes the new transport interchange node among the tramway, the rail transit and a great park-and-ride area. The points of strength of Echirolles transformation consist in the integrated planning process between transit services, land use and urban revitalization.



Figure 2: The new tram line in Echirolles and the new square (photo by Enrica Papa)

### 2.3 New tram station and urban transformation in Lyon

Lyon is the third French city and it is situated in the southeast zone of the country. The metropolitan area has 450.000 inhabitants on a surface of 478 square kilometres. The old centre is situated on the west hill of the Saône, and the institutional, commercial and cultural centre is situated in the peninsula among the two rivers called *Presqu'île*.

With the approval in 1992 of the *Schéma Directeur Lyon 2010* Lyon started a renovation process. The congestion increase of the central areas and the open spaces physical blight, were the main reasons of the city renewal process start off. With the integrated temporal development of the Mobility Plan (*Plan des déplacements urbains*) and of the Urban Renewal Plan (*Schéma of aménagement des espaces publics*) a urban transformation process started [13; 14]. These plans synergy guided an integrated renewal process, where the transport system (subway and tram lines) constituted the strategic element of the urban renewal.

The main urban transformation project is called *Lyon Confluence* and it is being developed in the *Presqu'île* area. The greater part of the site is occupied by facilities that are due for closure (commercial port, wholesale market), open to redevelopment (French Rail) or relocatable. In addition, the Rhône and Saône provide the site with 5 km of riverbank, splendid views and magnificent landscaping potential.

The *Lyon Confluence* aims to create a new downtown neighbourhood, to develop urban leisure activities, to highlight the rivers and to open up the southern *Presqu'île*, notably via public transport. The project is strength point to integrate urban transformations, new housing construction with public transport facilities improvement. From the outset the T1 tram route was intended to continue to Rue Montrochet, and the extension along Cours Charlemagne went into service in September 2005. The line serving the Confluence Museum will be extended to the Pont Pasteur bridge in 2008. At the same time the ZAC Phase 1 will create 340,000 square meters usable floor space of mixed building. The



new metro stations and tram lines will have the role of making accessible new areas and of defining new open spaces in the new housing districts (see Fig. 3).



Figure 3: Lyon Confluence project (source: [www.lyon-confluence.fr/](http://www.lyon-confluence.fr/))

#### 2.4 New rail stations and housing renewal in Naples

Naples, located in the south of Italy, lays on surface of 10.364 hectares and has a population of 1.004.500 inhabitants. In 2004 Naples Municipality approved the new Master Plan that defines the strategic purposes of the planning agenda: to stop the uncontrolled urban expansion, to renew the historical and blighted areas in the city centre and to restructure the rail transit network [15].

In order to achieve these purposes, the Municipality approved specific planning tools in order to define the new mobility network. The future transport system will be oriented not only to facilitate people journeys but also to increase areas accessibility and urban quality. The transport network became the spin off for housing rehabilitation in historical and suburban areas. In particular in 2003 Naples Municipality approved the “100 Stations Plan” and several renewal projects started in many station areas with different interventions: station accessibility improvement, artworks introduction, high quality stations construction. Furthermore the projects are finalized to eliminate the urban blight, caused by the existing transport infrastructures [16].

A lot of projects have been assigned to international architects in order to build an efficient transport project in conjunction with high quality design. As result, five stations of the new *Line 1*, constructed between 2001 and the 2003, (Museo, Dante, Salvator Rosa, Materdei and Cilea) have been recognized as the “Stations of art” and won the Milan Triennial gold Medal in 2003.

One of these line 1 new stations, called Salvator Rosa station, is located in the historical centre of the city. The station is placed in a residential context characterized by scarce housing quality and by a high residential density (362 ab/km<sup>2</sup>). The station project, designed by Mendini studio, was the occasion to fill an empty urban space and to built high quality architecture. The most significant innovation brought by the station construction is the renewal of the existing housing in the station area. The building fronts have been turned into artworks by contemporary artists (see Fig. 4). Through the use of the art, the building’s fabrics has now an architectural and artistic charm. The station and its contest are one of the best example of transport and housing integrated transformation: the transit network was the spin off for the blighted residential areas rehabilitation.



Figure 4: Salvator Rosa station area and housing front renewed (photos by Emilia Trifiletti)

### 3. Comparative analysis and conclusions

The common strategy of the study cases is to integrate transit infrastructure construction with housing development or renewal. However the particular urban and juridical context in which the projects are located imply some differences.

The cases studied (Helsinki, Naples, Grenoble and Lyon) have been selected from a wider directory of examples where transport and housing design have been integrated in the same planning process. The four cases have been chosen in order to propose a complete reference scheme of experiences that differ from one another in some features described below (see table 1):

- Context features (geographical location, urban area). Study cases differ from one another in geographical location and they belongs to three European macro areas: south Europe (Naples), central Europe (Grenoble and Lyon) and north Europe (Helsinki). The four cities differ also in their physical dimension (metropolitan area, medium city or small town).
- Urban area features (project location, blight elements before the project). Study cases are different from one another in project area location: historical centre (Naples and Lyon) or suburban areas (Helsinki and Grenoble) and in blight features existing before the projects (urban sprawl, congestion, physical and functional blight).
- Projects features (purpose, strategy and interventions, planning tool). Study cases differ in design purpose, strategy and planning tools that managed the transformation process.

All the projects are characterized by specific interventions on the transport system and at the same time by interventions on the urban and housing system.

In Helsinki, the integration between urban project and transport infrastructure construction had the purpose to control urban sprawl and to built new transit-oriented housing district. The main project principle is to locate urban development in transit accessible areas. The new housing estate area is in fact located near new tramway stations.

Lyon study cases is an example of land-use/ transport integrated planning, where the transit task is to conduct organization processes in urban areas in transformation. In Lyon example the subway network construction is carried out at the same time with transit station areas transformation. The dismissal area transformation is guided by transit-oriented principles: to built quality housing in a central area and to make it accessible by transit facilities. This will contribute to construct a high quality housing district and to reduce the whole metropolitan area traffic congestion. In Naples case, the new transit stations construction are the occasion to renew central blighted areas. The rail transit role is to guide the rehabilitation process in different areas of the city. The artworks insertion make this project unique and has the purpose to make transit services more attractive.

Finally in the Grenoble case, the tramway line is a strategic element for a whole town regeneration. The areas that become accessible by the new transit services are transformed, with new housing and amenities construction. The new transport infrastructure was the chance for renewal and urban transformation of blighted suburban areas.

The studied examples have also in common a general weak point: the planning process was not guided by an integrated transport and land use plan, with the exception of Naples. Each city have in fact implemented transport and urban interventions following separated projects. Furthermore the study demonstrate that the success factor depends on the integration between transport and urban interventions. For this is become essential to develop guidelines and procedures for the definition for integrated transport - land use plan, finalized to increase the liveability of our cities.

Table 1: Study cases comparative analysis table

			Helsinki	Echirolles	Lyon	Naples		
			1	2	3	4		
Context features	Geographical location	North Europe Central Europe South Europe	x	x	x	x		
	Urban area	Metropolitan area	x			x		
		Medium city			x			
Small town			x					
Project area features	Location in the urban area	Central area			x	x		
		Suburban area	x	x				
	Blight elements before the project	Urban Sprawl	x					
		Congestion			x	x		
	Physical or functional blight		x	x	x			
Project features	Purpose	Sustainable mobility system development		x	x	x	x	
		Congestion reduction				x	x	
		<i>Sprawl</i> reduction and urban development control		x				
		Housing rehabilitation			x		x	
		Physical and functional quality improvement			x		x	
	Strategy and interventions	On the urban system	Housing development		x		x	
			Housing renewal			x		x
		On the transport system	Rail transit construction				x	x
			Tramways construction		x	x	x	
			Vehicles restriction and pedestrian area construction			x	x	x
	Planning tool	Transport plan			x	x		
Urban plan		x	x	x				
Transport-land use plan					x			



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