



*Built and natural resources of the Tratturo Magno*

# Environmental design, building reclamation and slow tourism for a sustainable development

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## ABSTRACT

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With the project Valore Paese - Cammini e Percorsi, addressed to the buildings located along the historical-religious itineraries and cycle paths, Italy aims to reclaim the abandoned buildings through the slow tourism development, motivated by cultural and sporting interests. The project, included in the Strategic Plan of Tourism and the Special Plan of Tourism Mobility, involves private operators, companies, cooperatives, associations and start-ups composed mainly of young people under 40, who will have the task of re-using the constructions in question.

A study on Slow mobility has been developed (in the BikeFlu research, of the G. D'Annunzio University Architecture Department for the Abruzzi Region) for using the Abruzzi landscapes - coast, hill, foothill and mountain - through the reclamation of abandoned buildings (for centres and cycle-workshops, services, refreshment points, cycle-hotels, museums and workshops) for a tourism directly linked to the slow mobility and the territory enhancement. A redevelopment of pre-existing facilities is proposed aimed at providing all the comforts to make the cycle paths attractive and practicable, for a wide range of users (children, young people, adults, agonists, beginners, etc.). The redevelopment proposals include works aimed at securing and preserving buildings and transforming works through addition and grafting to promote sustainable development processes for a useful and appropriate reuse of abandoned resources.

The transformative logic is based on the will to ensure the sustainability of design choices and the enhancement of local resources, above all through the control of safety performance, environmental protection, well-being, usability, management, integration and architectural quality of building systems.

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## KEYWORDS

*enhancement, reuse, transformation, slow tourism*



## 1. INTRODUCTION

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In this writing it is reported, in summary, a part of the work entitled *The redevelopment of the green paths*. The tratturi system, carried out with reference to the theme of *Slow Mobility*, in the context of the *BikeFlu* research that the G. D'Annunzio University Architecture Department is carrying on for the Abruzzi Region. The work developed is inspired by the objectives of the project *Valore Paese - Cammini e Percorsi*, presented by the Agenzia del Demanio and addressed to the buildings located along the historical-religious itineraries and cycle paths, with which Italy aims to reclaim the abandoned building through the development of forms of slow tourism, motivated by cultural and sporting interests.

The project, included in the Strategic Plan of Tourism and the Special Plan of Tourism Mobility, which foresees the involvement and support of operators in prevalence under 40 to re-use the buildings in question, puts tourism as the first engine for youth employment and the exploitation of built-up resources.

The main objectives of the work in question are the enhancement and use of the landscapes of Abruzzo - from the coastal, to the hills, to the foothills and mountains - through the rehabilitation of abandoned buildings to be allocated to service centers and cycle-workshops, services, refreshment points, cycle-hotels, museums and workshops for a form of tourism directly linked to slow mobility. In this direction, it is proposed a useful and appropriate reuse (Di Battista, 2006) of the resources built in a state of abandonment, both through works for the safety and preservation of pre-existences and through transformation works with addition and grafting interventions (Forlani, Radogna, Viskovic, 2014), aiming to provide all the comforts necessary to make cycling routes attractive and practicable, for a wide range of users (children, young people, adults, agonists, beginners, etc.), in the promotion of sustainable development processes. The field of application chosen for the development of

the study is the system of tratturi and, more precisely, the Abruzzo stretch of the *Tratturo Magno* (Fig. 1).

The tratturi system is a territorial, trans-regional, integrated system: mobility, residency, trade, land use, agricultural, pastoral, cultural and social systems. These are tracks that involve different regions: Puglia, Molise, Abruzzo, Umbria, Lazio, Marche, Tuscany. The tratturi are a dense and hierarchical network of roads that have indelibly marked the history of the places they travel: they have aggregated people along their route, triggered localization processes of the town, structured the fields with a particular and recognizable physiognomy. The tratturi, 'place' of transhumance, define 3,100 kilometers of route (111,60 meters wide) with about 21,000 hectares of available surface, integrated by a capillary sub-system of *tratturelli* (1,590 kilometers) and *braccia* (161 kilometers).

Along the route, there were also areas for stops and 'supply': the so-called *riposi* or provisional pastures that had an extension ranging from 3 to 56 hectares. Many of these routes, starting from the last century, have been used as 'bases' for the definition of driveways around which different urbanizations have been articulated.

These urbanizations, for the tratturi routes, have defined a new nature: they have in fact populated them with heterogeneous functions such as residential, commercial and artisan, without prejudice to the destination of the cultivated area still reserved for many areas<sup>1</sup>. The reasons for this unusual choice emerged, therefore, as well as by the renewed interest in transhumance also by the stimulating analogies with 'phenomena' linked to contemporary anthropic development; the topic that cyclically seems to return to the attention of scholars, but not only, lends itself in fact to numerous readings from time to time addressed to fill gaps of historical knowledge, socio-economic, landscape or aimed at identifying new opportunities for relaunching local image and, consequently, to promote economic development and to support an improvement in the quality of life (Forlani, 2010; Forlani 2009).



Figure 1.

*The Abruzzo piece of the Tratturo Magno*

## 2. METHODOLOGY AND RESULTS

### 2.1 RECOGNITION OF RECOVERABLE PATHS AND BUILDING SYSTEMS

Over time, the tratturi have undergone important modifications to the point of being difficult to recognize and fragmented today because they have been deleted entire sections for the construction of new artificial elements but also for the lack of maintenance on natural elements. Therefore, the first phase of the work developed coincided with the detection and analysis of the characteristics of both passable tratturi passages and of artefacts, placed near the same tracks, in a state of abandonment (Fig. 2). With the aim of adopting slow mobility as the driving force of the considered routes development, the detected tratturo segments were assessed on the basis of data provided by the IMBA (International Mountain Bicycling Association) for the classification of the routes, in terms of difficulty (slopes and soil quality) and length, to indicate the physical effort and technical effort required. This evaluation was useful for defining, also through the reuse of secondary sections, different paths usable by various categories of users (children, young people, adults, agonists, beginners, etc.) and not only by cycling enthusiasts at a competitive level.

We started with some considerations on the development of the American Parkway, even if with a goal that is totally opposite to that directed towards the diffusion of the automobile; in fact, we only referred to the separation of traffic, vehicular and pedestrian, and the desire to configure integrated systems with nature and equipped with recreational areas aiming to determine panoramic fruitive modes allowed by slow mobility.

In the planning hypothesis the main path - called 'landscaping' - doubles and multiplies in other spaces through other runways that run from or depart from it; the routes secondary (cycling, equestrian, pedestrian, etc.) are characterized by particular gaits, different 'speeds' that lead, in the 'right time' possible and in a multiple variety of rhythms, towards 'subjectivized goals' from the choices of stops and the terminals that open in continuous and new horizons; a path, therefore, always different for every 'traveler' and in every season that follows.

The study of particular environmental realities, such as the residential diffusion on the margins of the tratturi ways, has allowed observations useful for the understanding of the 'scattered house' phenomenon, even if this represents one of the most energy-intensive models with the greatest impact environmental, in terms of land use, necessary infrastructure and induced mobility.

In the specific case of widespread urbanization around



Figure 2.  
The paths and building systems object of the project proposals

the sheep tracks, the wide band available allows, with greater ease than the usual development situations along the roads, to find the spaces necessary for the community and to configure an integration between the agricultural landscape and the built, limiting the building increment.

The artifacts and their appurtenances define an articulated series of closed and open spaces - in a minute scale compared to the entire area considered, but equally significant - to be redeveloped and reused by intervening with new uses, to provide a capillary system of 'places' to be reconnected through the mesh of the road network.

## 2.2 IDENTIFICATION AND SATISFACTION OF THE NEEDS OF USERS NEEDS

Upstream of the hypothesis of intervention on the built-up, the demanding frameworks descending from the types of slow mobility have been put in focus, to identify the use destinations to be installed and evaluate their compatibility with the characteristics of the building systems to be transformed and reused (Pinto, 2004). Figure 3 shows the concept of the transformation project of a farmhouse in a bike-hotel, which is expressed with addition works. The same image also shows the functional program derived from the study of the demanding framework and translated into metaprojectual choices.

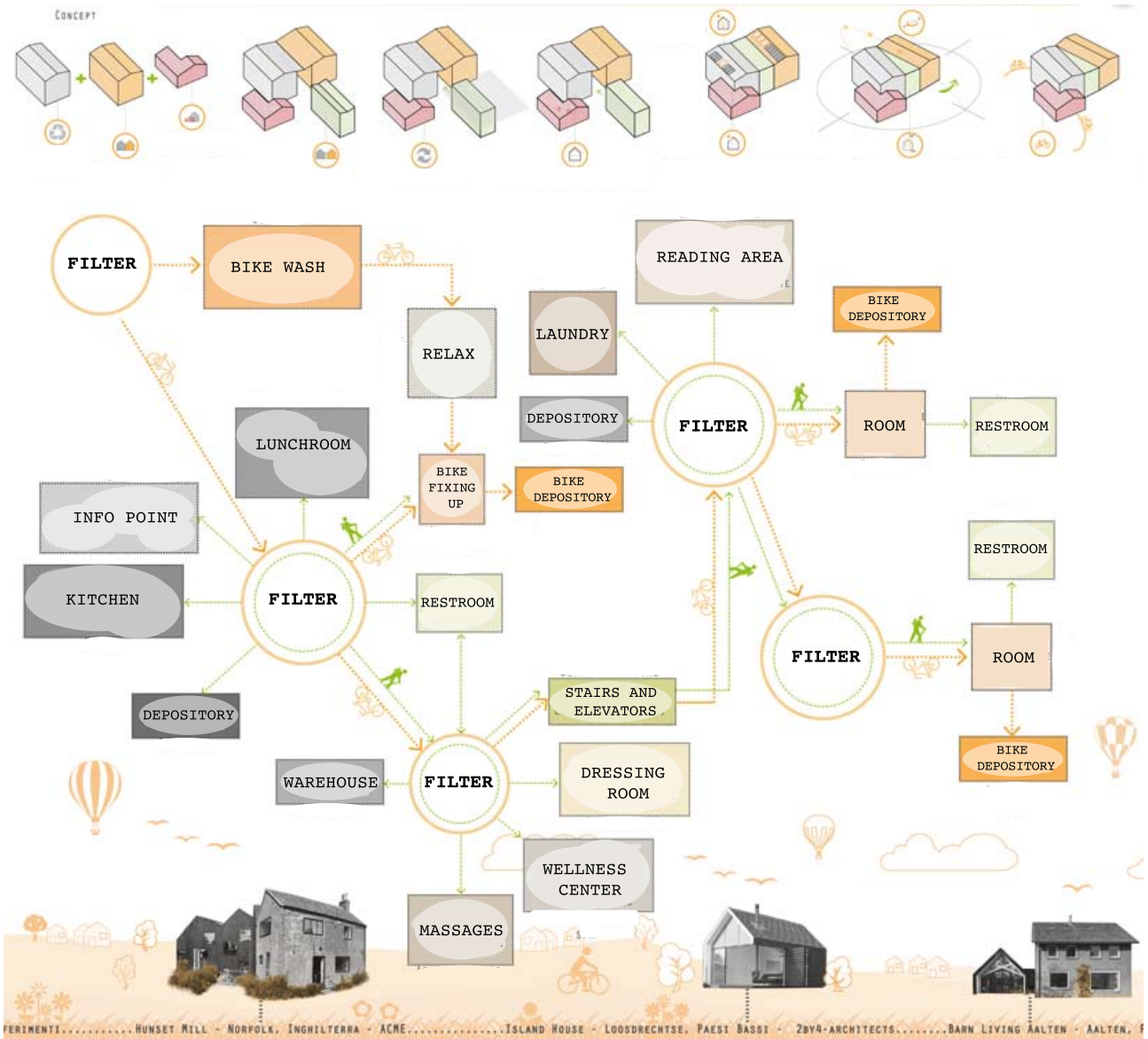


Figure 3.  
Concept and metaprojective choices for the conversion of a farmhouse into a bike-hotel



### 2.3 CRITERIA FOR A USEFUL REUSE OF ABANDONED SYSTEMS

To promote a 'convenient' and appropriate reuse of building systems in abandoned conditions, the objectives to be put upstream of the project activities have been specified. This specification is aimed at achieving a high quality of construction that must be characterized primarily by environmental quality and, therefore, by the containment of polluting and climate-altering emissions, waste production and consumption of resources (building materials, water, energy and soil), ie a process (design, construction and management) that sees the choice of materials, construction systems and management, assessed in a life cycle. In particular, it is necessary to aim at high performance levels of:

- security (eminently for seismic risk protection);
- environmental protection (low impact materials, reduction of energy consumption, toxic emissions and waste production);
- well-being (non-toxic materials, control of comfort conditions);
- appearance (control of formal, dimensional, material and chromatic factors for the control of architectural quality); - usability (optimization of the possibilities of use of spaces, distribution flexibility), (Radogna, 2008);
- management (easy and economic maintainability); - integrability (control of addition and grafting of new volumes), (Gaspari, 2012).

Particular attention was paid to satisfying the needs of security, static and seismic, in correlation with all the other requirements listed above. This goal has been pursued by adopting a reinforcement system that can also facilitate the re-use of existing masonry structures, often in a state of neglect, and defined as a grafting of wooden structures configured as three-dimensional frames. With the insertion of a wooden frame inside a masonry, we arrive at a mixed structural system: the existing masonry parts, appropriately restored and consolidated, collaborate with the new three-dimensional frame skeleton.

For the purpose of improving the seismic behavior,

the new floors are constructed as rigid diaphragms in their horizontal plane, by means of double-layer crossed wooden planks, connected to the vertical elements of the wooden frames and to the walls. In fact, the improvement of the seismic behavior of a masonry structure is obtained, as is well known, firstly by ensuring a 'box-like' behavior, which allows the horizontal actions to be distributed as best as possible and to absorb the overall torsional actions.

The aforesaid behavior is therefore easily obtained in the case of grafting of wooden structures provided with rigid horizontal diaphragms.

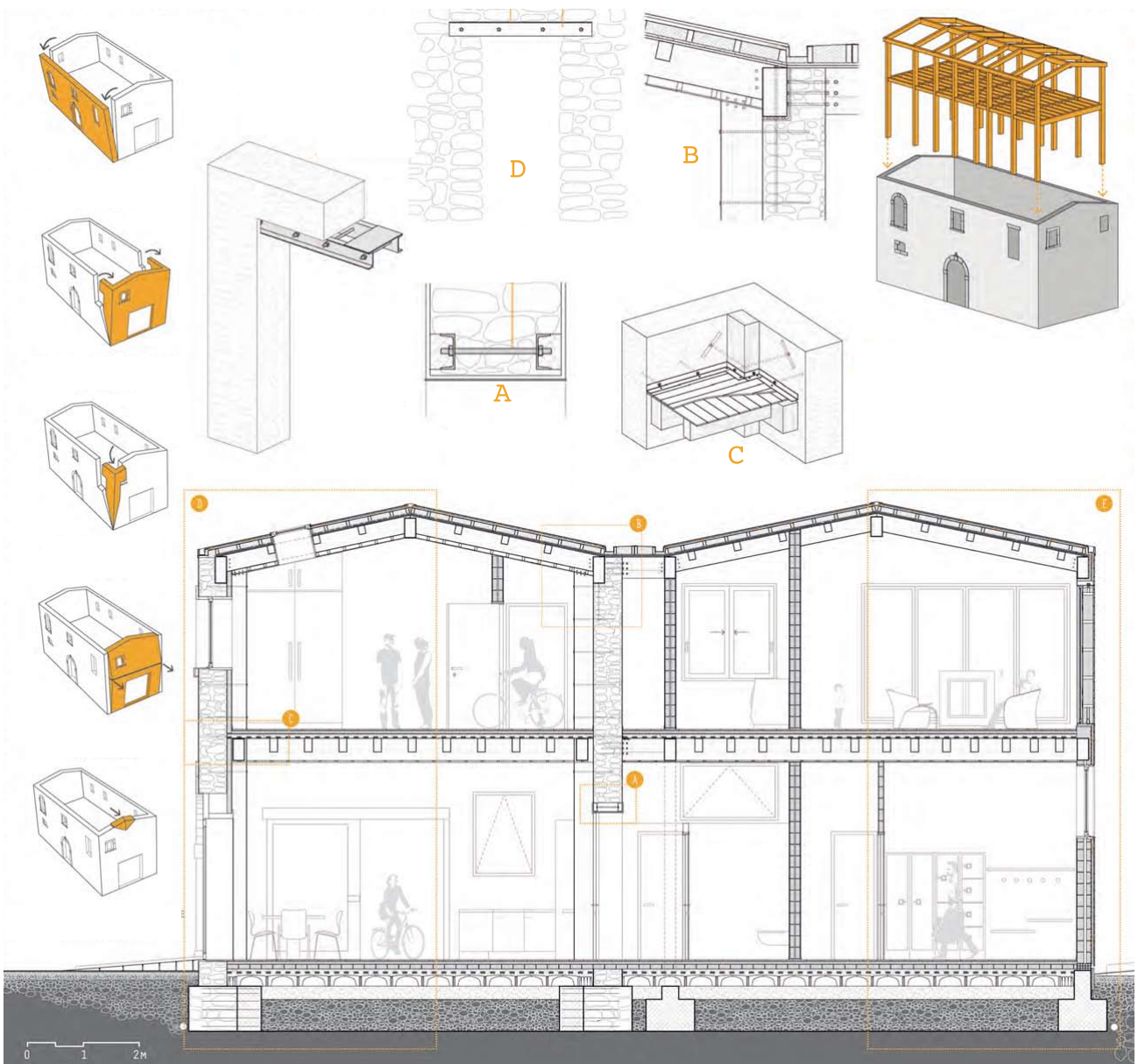
To complete this structural configuration, even the roof pitches are stiffened by double crossed planks and anchored to the walls.

In addition to improving the overall box behavior, the insertion of wooden frames also improves the local behavior of the walls, both for orthogonal actions to their medium plane and for actions parallel to it.

In the first case the collaboration between the wooden structure and the masonry develops from the first manifestation of a horizontal action, in contrasting the bending and the overturning of the walls of the walls. Vice versa, in the second case, the collaboration is activated mainly in the non-linear phase, since the walls are generally more rigid in the elastic phase. For the improvement of the local behavior with actions in the plane of the walls, the vertical frames are stiffened by means of wooden bracing or septa in CLT (Cross Laminated Timber) and this collaboration increases both the strength and the overall flexibility of the structure (Fig. 4).

To evaluate and quantify the effectiveness of this intervention philosophy, numerical simulations were performed, both linear and non-linear (push-over) on a case study reported in the 2014 Rehabend conference in Santander (Forlani, Radogna, Viskovic, 2014) and in the SAHC convention 2012 in Wroclaw (Forlani, Radogna, Viskovic, 2012). In this case study, a significant improvement in the structural behavior and the level of seismic safety achieved with this intervention method has been demonstrated.

Together with the class of safety requirements, that of safeguarding the environment is the class that, in this historical period, determines binding demands and important limitations in the decision-making



**Figure 4.**  
*Structural reinforcement works realized by means of the grafting intervention*



phases of the project (Radogna, 2008). Nevertheless, environmental requirements are an important stimulus for activating new forms of local economy, for example by encouraging the creation of activities for sustainable construction products through the use of local materials from renewable or decommissioned and recyclable sources (Gangemi, 2004).

To promote the diffusion of an eco-sustainable architecture (of which energy efficiency is an integral part) it is necessary to verify the impacts and outcomes of every hypothesis of 'design quality'; therefore, for the type of interventions presented, a quantitative evaluation of the material and functional choices is foreseen. Methods and tools according to the LC (Life Cycle) approach, in fact, are currently consolidated in the environmental sector and consider the impact on the natural environment, on human health and the exhaustion of natural resources, determined by the interactions between technosphere and ecosphere. To quantitatively assess the environmental sustainability of the materials used and of the entire building, it is therefore desirable that the same materials are characterized by indicators of their environmental performance, such as the Carbon Footprint and the Water footprint), assessed in accordance with current technical regulations: Life Cycle Assessment (LCA), environmental performance (ISO 14040-44: 2006), LCA-based ISO 14067: 2012, Carbon Footprint of Product and ISO 14046: 2014 Water Footprint Products, process and organizations.

In the proposals developed, the answer to these questions was embodied in the definition of principles and guiding criteria for design choices, ie essentially in the explanation of indications for:

- contain energy consumption through the design of appropriate enclosures with respect to climatic characteristics;
- use only energy from renewable sources;
- use zero-kilometer materials, LCA-certified and recyclable;
- adopt constructive systems able to maximize the possibility of reusing and recycling the technical elements, in a future phase of disposal;
- contain water consumption through the collection and reuse of rainwater and the treatment of wastewater;

- recycle waste, both organic fertilizers and dry ones to be sent to special recycling centers.

The satisfaction of wellness needs includes the definition of systems for the control of the conditions of thermo-hygrometric, luminous, acoustic and psychological comfort. The implementation of these systems involves the adoption of materials, semi-finished products and biocompatible products (based on local wood species, hemp, sheep's wool, etc.) as well as special attention to the climatic characteristics (sunshine, prevailing winds, precipitation, temperatures). The appearance performances provided by the developed proposals concern the control of the characteristics of the added or graft integrated systems (Fig. 5), in terms:

- formal and dimensional (often unchanged compared to the original ones);
- materials (often different from the original ones: integration of light dry systems in heavy masonry systems);
- chromatic (often different from the original ones; use of colors deriving from the natural elements that make new works immediately distinguishable from pre-existing elements).

The characteristics of usability provided by the transformed building systems derive directly from the study of the demanding frameworks of activities linked to slow mobility, determining destinations of use with very different spaces from those commonly known (the environmental system of a cycle-hotel, for example, is considerably different from that of a traditional hotel, in this case, in fact, it was necessary to provide, for example, specific environmental units for the passage, washing and storage of bicycles).

One of the main objectives of the pilot projects developed is to reduce the costs of managing building systems by adopting not particularly sophisticated and low-cost technical solutions, dry-layered to facilitate inspection, replacement and end-of-life operations. Therefore the class of compulsory integrability is an important and peculiar point of the proposals developed because it required specific solutions for the connection between different construction systems (Imperadori, 2001).



Figure 5.  
*Transformation of a farmhouse  
into a bike-hotel*

### 3. CONCLUSIONS

The results of the work carried out consist of guidelines and pilot projects for the re-use of the building designed to encourage the development of cycle tourism through the use of the valorised territory. In the hypothesis of an alternative use of the territory for tourism purposes, the reuse of ancient travel jerseys, the relative hubs and the structures of stops, allows to rethink in concrete - in line with the structuring of transhumance - to the system of hierarchization of mobility : it derives a system of connection of the areas for free time, other than the traditional one, to be covered with alternative means to the motorized ones and above all to be used even in situations different from the motion or in the stops and in the destinations.

The proposals presented, precisely because they are aimed at 'slow' activities, outline a consonance of objectives between tourism development, protection of the environment and health, protection of local assets and resources. The work carried out emphasizes the importance of working with approaches capable of identifying the real capacity for regeneration and resilience (Fabbricatti K., 2013) characterizing the resources of the intervention contexts, ie of the communities and of the natural and built environments. The same work also underlines the need to recognize in the policies of controlled transformation one of the few viable ways to really put the built heritage (Longo D., 2007) and its surroundings into operation, with specific reference to environmental issues and those related to seismic risk and according to an attitude of responsibility, prudence and convenience with respect to available resources.

### NOTES

1 All the information about the tratturi history and characteristics were deduced from Forlani M.C. (1993) *Sperimentazione progettuale: la valle del Sinello*. Poman Poligrafica, Pescara and Forlani M.C. (1995) *Recupero dell'edilizia residenziale sparsa. Il caso dei tratturi*. In: Donato F., Marano A. (ed.), *Concetti di prodotto per gli interventi di qualificazione ambientale*. Poman Poligrafica, Pescara.

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