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WATER: A SOFT INFRASTRUCTURE FOR THE CITY OF LATERZA

Abstract

This paper presents an urban project for Laterza, a small town in the province of Taranto, awarded with the first prize at the 15th edition of Europan, an international competition for young architects. Laterza stands on the deepest of the canyons that characterizes the evocative landscape of the Parco delle Gravine, which, with its gorges and vast plateaus, shapes and draws the territory of the Tarantino Ionic arch. The project aims to answer to the competition main topic (productive cities - changing metabolism and circular economy) by integrating the local heritage enhancement with climate resilience aspects, preserving a connection with the historical settlement system. The urban structure of cities in this territory was conceived and built as "hydraulic machine", organized to manage, preserve and discard the most precious natural resource: water.

Keywords: Laterza, Europan15, hydraulic machine, soft infrastructure, productive city

Introduction

The project experience presented here was developed on the occasion of the international competition for young architects "Europan 15": the theme of the competition was "productive cities" and concerned the project for the reorganization of a system of three squares in Laterza, a small town with characteristics similar to those of nearby Matera, in the province of Taranto. It was, at first sight, a traditional redevelopment project of the "central" places of a small town. However, this project required a wider research because two elements intervened strongly to orient it: the first was the extraordinary power of the geographical dimension of the Gravina on which Laterza stands (the largest of the canyons that make up the "parco delle Gravine"), the second was the awareness that the territory surrounding Laterza has been the victim, in recent years, of extreme weather events due to climate change (such as the flooding of Matera in autumn 2019 [1] or the flood that affected Ginosa in 2013 [2]) and is considered a territory of high hydrogeological risk.

The project was therefore born from the hypothesis that these central places could represent the "missing fragment" of a territory that functions as a complex hydraulic machine and that was able to show and defend the "fragility" of an extraordinary landscape. The

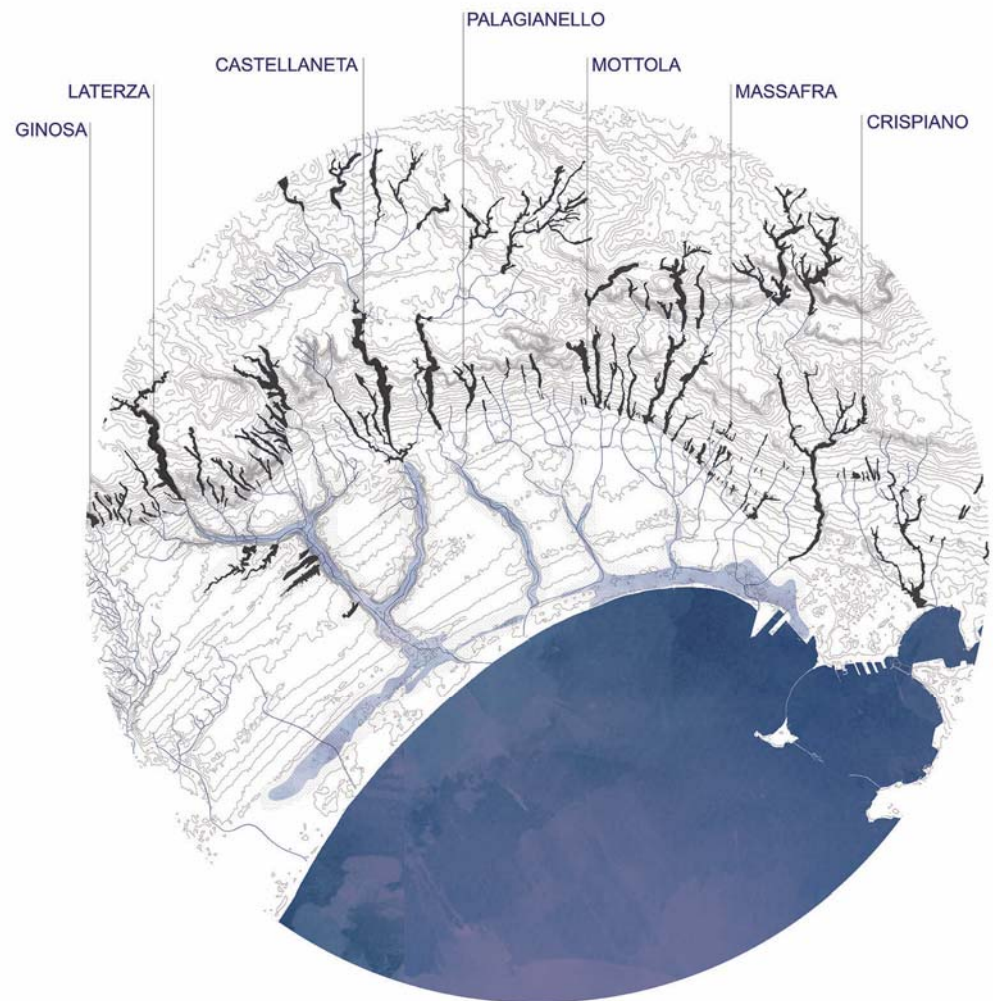


Fig. 1. The Ionian Arch.

analysis of this fragility together with the research on the particular geographical and naturalistic conditions and settlement traditions, linked to the "heavy" presence of complex hydrological systems, allowed the development of the project strategy aiming to redesign the project area as an integral part of the cultural landscape of Laterza and its surroundings.

The cognitive framework: the Tarantino Ionic Arch and the Murge plateau

Therefore, the design process began with a study that aimed to understand the geographical and territorial conditions and their relationship with the settlement

principles that have always characterized these places; Laterza is a small town with a population of 15000 inhabitants located in the western part of the province of Taranto, almost on the border between Puglia and Basilicata. The municipality extends to the northern edges of the *ionico tarantino arch*¹ (Fig.1), on the final part of the Murge's plateau which, a few kilometres further south, plunges to the coastal plain [3]. Despite its peripheral position, far from the large urban centres, this territory has a strong historical, morphological and naturalistic connotation. The *ionico tarantino arch* has an extension of 1,325.80 km² and is defined by the Bradano valley on the west side, the Murge's foothills on the north side, and the



Fig. 2. Urban evolution [8].

northern Salento to the east, including 20 municipalities.

Its morphological structure is the result of atmospheric agents modelling in addition to sea level oscillations occurred during the middle-Superior Pleistocene. Therefore, this territory appears as a terraced amphitheater that reaches 400m amsl. The plateau where the small towns of the Ionic arch, including Laterza, are situated is a carbonate platform, therefore an ancient seabed, with three types of calcareous rocks: Cretaceous limestones, terraced marine deposits and Altamura limestones. The extensive rock has an abundant underground water circulation, as well as an hydrographic network which draws a radial pattern on the plateau's surface with narrow and deep fractures of the limestone, abovementioned *Gravine*, that reach the Gulf of Taranto. These orographic and geological peculiarities are translated in an extremely complex and heterogeneous natural landscape, in which we can recognize three prevailing scenarios that correspond to different altitudes: A coexistence of these three ecosystems in a restricted territory generates a great biological variety unique in its kind. The plateau looks like an endless and arid expanse on which the different land uses form a varied mosaic of agricultural areas, pastures, and small oak woods including the typical Fragno (*Quercus trojana*). The canyons, which are frequently overlooked by urban centres, look like complex ecosystems; they have a characteristic "V" shaped section where, due to thermal inversion phenomena² (Fig. 2), around 200-300m above sea level, among the countless plant species, grow the only European specimens of Aleppo Pines (*Pinus halepensis*). The coastal area has sandy and very deep soils that allow the development of intensive agricultural activities interrupted by watercourses that reach the Ionian Sea and by the canalizations of the agricultural reclamations.

The *Gravina di Laterza*, which extends for about 24 kilometres and reaches a depth of more than 200m, hosts the nesting of a remarkable variety of birds, such as the Egyptian vulture (*Neophron percnopterus*), a rare migratory vulture.

In this territory, the first settlements dating back to the Neolithic Age were mainly located on the limestone plateau near the *Gravine*. Simultaneously with the earliest settlements, were created the first territorial organization which aimed to regiment water, to be exploited and preserved without endangering the communities [4], and to infrastructure the territory of the *arch* through a dense network of paths. Most of these tracks developed mainly from the matrices of the *tratturi*³ (Fig. 3) that connect the different villages and follow the

ground levels, from the peaks of the plateau to the valley floor of the *Gravina*. The road network is developed from the long-distance tracks that run essentially alongside the Via Appia (*tratturo* Martinese) from which smaller routes ramify connecting villages and farmhouses. Throughout history this system has favored an intense exchange network based on territorial mobility, on which the protected and fortified towns are based. Many of these settlements have similar urban structures: almost all the building units are built starting from underground cavities, product of natural erosion or human excavations [5], [6], [7]. The old town of Laterza is an extremely distinctive example of this urban structure; its oldest nucleus, jutting over the deep canyon, is located between the two *Lame*⁴ (Fig. 4) of water that flow into the *Gravina*. Throughout history the limestone has been progressively excavated and dwellings, productive activities, and places for rituals have developed not only on the surface, but also in the deep cavities of the ground.

The creation of these spaces that proliferate vertically, as well as horizontally, creates climatic conditions that during the different seasons protect against heat and cold, preserve food and store water.

This primitive shelter had a descending section in order to provide protection against the sun in the summer months as well as light and heat in the winter months. The sunlight was able to reach the bottom of the cavity, where water, that flowed there by gravity, was stored. The evolution of the urban settlements developed from the closure of the natural cave, the terracing for agricultural purposes of the terrain in front of it and the arrangement of paths along the direction of the water flow; over time, an external construction was added to this structure, the *lamione*⁵ (Fig. 5), which extended the internal surface [8]. Finally, when new residential units grew around the original cave, the terrace was enclosed between the houses, creating a protected horseshoe-shaped environment called *vicinato*⁶ (Fig. 6). In the



Fig. 3. Via delle Concerie [8].

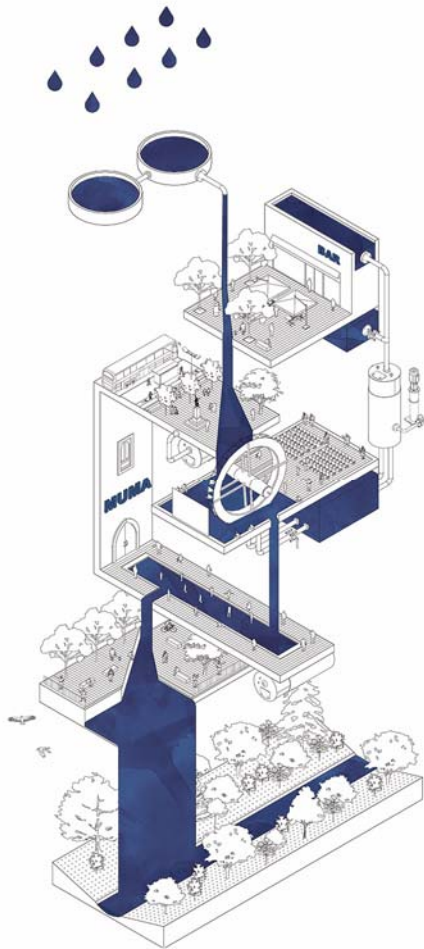


Fig. 4. The Hydraulic Machine.

middle of this space there was a common cistern that collected water from the roofs of all the surrounding dwellings. This settlement system was developed on several levels, often transforming the roofs of the houses into paths, creating the typical urban landscape visible in Matera and in many other centres of the *Ionian Arch*.

This type of space system is clearly recognizable at Laterza near via delle Concerie, an ancient road that follows the western blade and where even today we can still read the succession of cistern-cave-terracing on overlapping levels. Here also developed numerous productive activities related to the collection and management of water, from agriculture and breeding which are still visible today, to the craft production, among which the manufacture of majolica and the processing of leather (from which the road takes its name). The entire production system, as well as the urban structure, turns around water management [9]: an example of this relationship is the sixteenth-century fontana dei *Mascheroni* that collects water before flowing into the Gravina and where, now and in the past, take place the rituals of the collective life of Laterza's inhabitants together with the productive life.

The method: research as a project and the construction of an hypotheses [10]

The methodology developed during the ideation process was based on the study of the morphological characteristics of the territory and its settlement principles; this knowledge made it possible to identify the element of

water as the engine that guided the strategies and design choices, assuming that this element was able on one hand to interact with the different levels that compose Laterza's landscape, and on the other hand to develop added value in terms of climate resilience and reuse processes of raw materials that can develop forms of circular economy. However, being guided in project choices by the desire to integrate an element such as water into the design of urban space in order to improve the conditions of habitability, is also (and perhaps above all) an attempt to respond to a request that seems increasingly urgent, to rethink our relationship with natural elements, which is no longer only interested in their exploitation, but in understanding and respecting their mechanisms and balances.

The themes of climate resilience and the activation of circular economies open to an investigation on the possible responses to the two main elements of fragility that *laertino* territory presents today: the hydrogeological risk and the depopulation.

The increased possibility of particularly intense meteorological phenomena occurring in the area [11], [12], shows the inadequacy of the rainwater management and disposal systems; in particular in Laterza rainwater is managed through a storm drainage system, which is absent in some parts of the city, that discharge into the two "lama" that cross the city center and then reach the "gravina". The western "lama", the one in which all the rainwater that affects the south-western part of the city centre and the entire historic centre, convey, has been

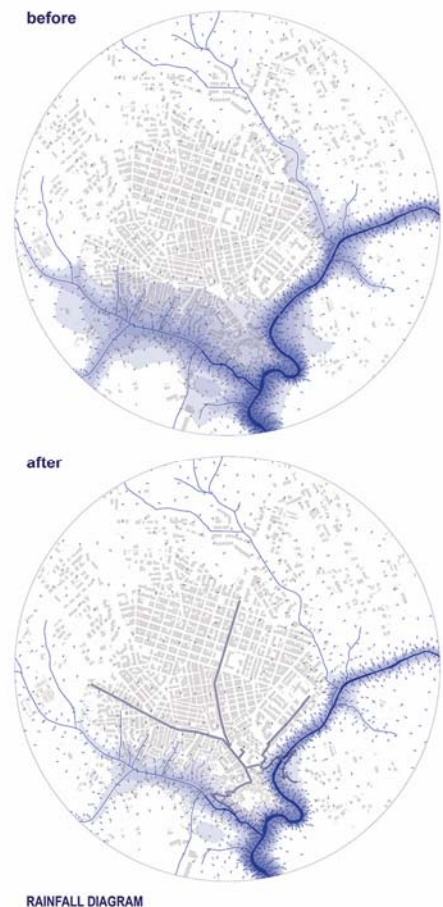


Fig. 5. Rainwater urban management - before and after.



Fig. 6. Project overview of Piazza Vittorio Emanuele.

over time mostly filled and coincides with Via delle Concerie. People of Laterza have nicknamed this road "o sciuvilo" because, when heavy rainfall occurs, the drainage system is unable to withstand the load of water and floods the road, transforming it into a dangerous "slide" that flows towards the "Gravina".

At the same time, those who visit Laterza today discover a beautiful old town perched on the edge of the wonderful canyon, with tiny winding alleys that open up into breathtaking views of the almost completely abandoned landscape. Two main factors have contributed to this: the urban morphology, for which the old town is paradoxically located on the edge of the inhabited area, and the history of the city, which has long seen the old town become a ghetto in which the Rom community (now completely integrated) was isolated; the extreme difficulty encountered in trying to identify and map precisely the different layers of cavities and caves, makes very complex to develop a systematic project for the reuse of the historic centre, despite the good will and stubbornness of some groups of citizens who recognize its potential and beauty and would be ready to invest energy and resources in the recovery of those places. The project therefore attempts to systematise these elements of fragility and transform them into opportunities through the water, its collection and its management in the urban space. A system of canals and tanks for the collection and disposal of rainwater "on sight", that crosses the project area and invades the historic centre, builds different urban scenarios according to the different conditions that may occur; the new canalisation system considerably lightens the water load on via delle Concerie, redirecting the flows through controlled paths that discharge directly into the *gravina*.

However, the system is also designed to reuse and exploit part of the accumulated rainwater, encouraging the development of a circular economy, meant as a process made up of best practices and political, urban and economic choices that do not waste potential resources. The architectural theme of water is symbolically intertwined with all the most characteristic activities of the city of Laterza, from the production of ceramics to the processing of leather, to the food and wine tradition, and the design of the public space becomes here an opportunity to promote a tourism not aimed at consumption and

commodification, but at exchange and participation.

The project as an "open" answer

Considering the complicated issues identified through the research path, the project has no intention of providing a definitive and univocal solution, but aims to give a "backbone" to the light infrastructure that imagines and foreshadows changing spaces, which are transformed according to the climate, the seasons, the hours of the day, the functions that are required from time to time; public space nowadays has to face new needs, it must be able to accommodate various and unpredictable uses; therefore architecture can no longer produce creations based on finished and completed works that crystallize defined spatial configurations; instead it is necessary "to infrastructure" the public spaces in a way that allows different things to happen, where places can be continually modified and reinterpreted according to changing desires and needs. We have seen how various factors have contributed, over time, to modify the value system through which the local community traditionally interacted with landscape, both natural and urban, and how this has led to deep transformations of landscape itself.

The main objective was to imagine some possible conditions in order to restore this relationship. Through the unitary design of the system of three squares that are the subject of the competition, the project proposes to look at this area as a "missing fragment" of a potential route that follows the direction of the small *tratturo 82* (Bernalda-Ginosa-Laterza); this connects the old town with its deserted alleys, the lush and forgotten canyon and the consolidated city with its streets teeming with traffic, people and shops.

The rainwater canalization system accompanies this new pedestrian axis, exploiting the natural slope of the land, crossing the city to reach the *gravina* and using the *neviere*⁷ (Fig. 7) and underground caves as cisterns to collect water in order to reuse it in the driest months.

The water path crosses all the productive areas that the project identifies and enhances with its connection.

Starting from the lively commercial promenade of Via Roma, up to the first square, Piazza Fratelli Barberio, a new intermodal junction, and point of convergence of the two rainwater lines coming from different parts of the city.

Water enters Piazza Vittorio Emanuele, the second square and centre of Laterza's sociality, crossing it on one side and then flowing into two large pools: when particularly intense rains occur water accumulates here, on the other hand when the weather is dry these become places for daily sociality.

The main pool is a large open and free space that can assume different configurations depending on the seasons, moments of the day, or needs: it can be a space for games, markets, or turn into a space for events; inside the pool there is a floor fountain with water games that are activated in the driest and warmest periods and can fill the pool artificially.

At the back of the square a terrace overlooking the Gravina becomes the first outlet of the water system and a branch of the canal leads to an additional pool on the overhang. From here the water is brought to the bottom of the Gravina, crossing the levels of terraces that characterize the bank. Next to the basin, a space with seating and vegetation is created, as well as a pedestrian descent that partially follows the direction of an ancient *carbonari*⁸ path. Always following the water, we finally arrive in the third square, Piazza del Plebiscito, the access point to the historic centre; here the system opens into another small basin and then reaches Via delle Concerie, where another fountain is placed.

From Via delle Concerie the route deviates to provide the parts of the old town centre that are not equipped with drains and do not have rainwater management systems.

The idea of a mutable space is a key element of the project: these tanks, which are filled and emptied according to different circumstances, are designed to build different sets for urban life (Fig. 8).

Together with the elements of water management and canalization, a fundamental role is played by stone: this material has been used for all the paving and fixed furnishings of the project, thus creating a sort of "extension" of the historic center in the consolidated city, in a movement opposite to the one made by water, trying to rebuild the link between parts of the city that seem disconnected, which could be strongly valued through the reconstruction of their unity (Fig.9).

In this sense, another key role is played by the vegetation, which climbs up the ravine and enters the urban space, composed exclusively of local essences: the *holm oaks* follow the main

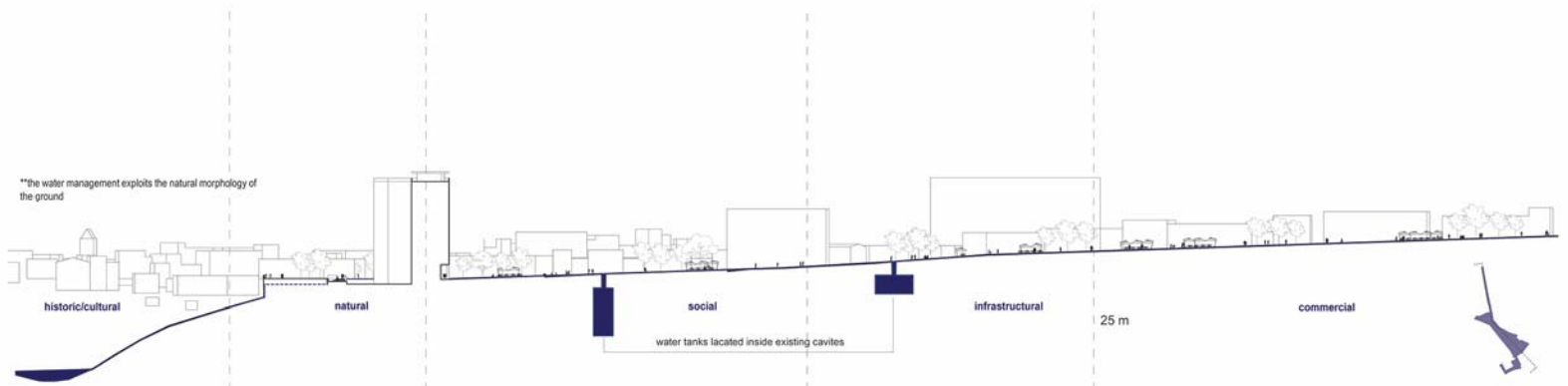


Fig. 7. Longitudinal section.

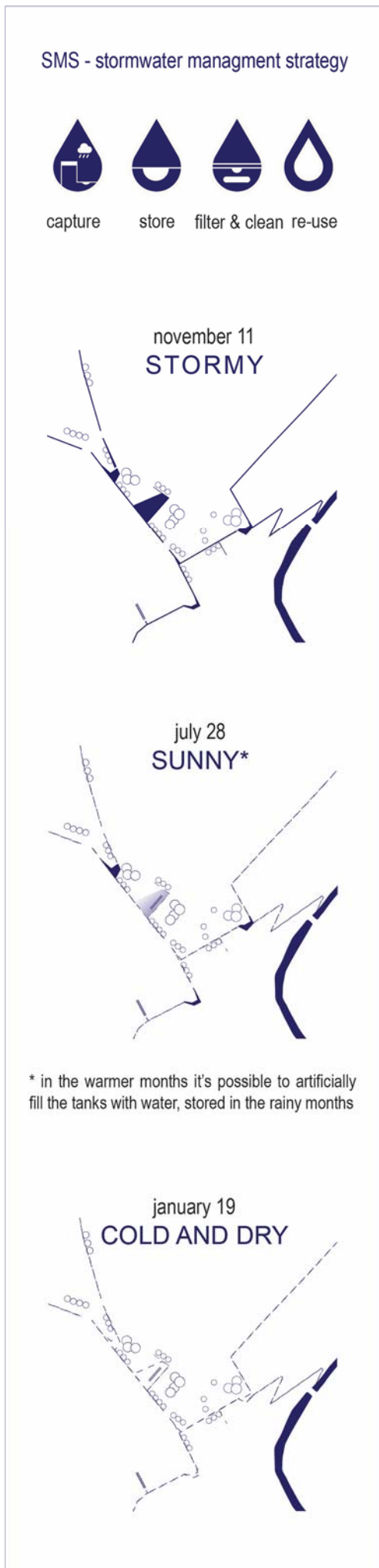


Fig. 8. Stormwater management system.

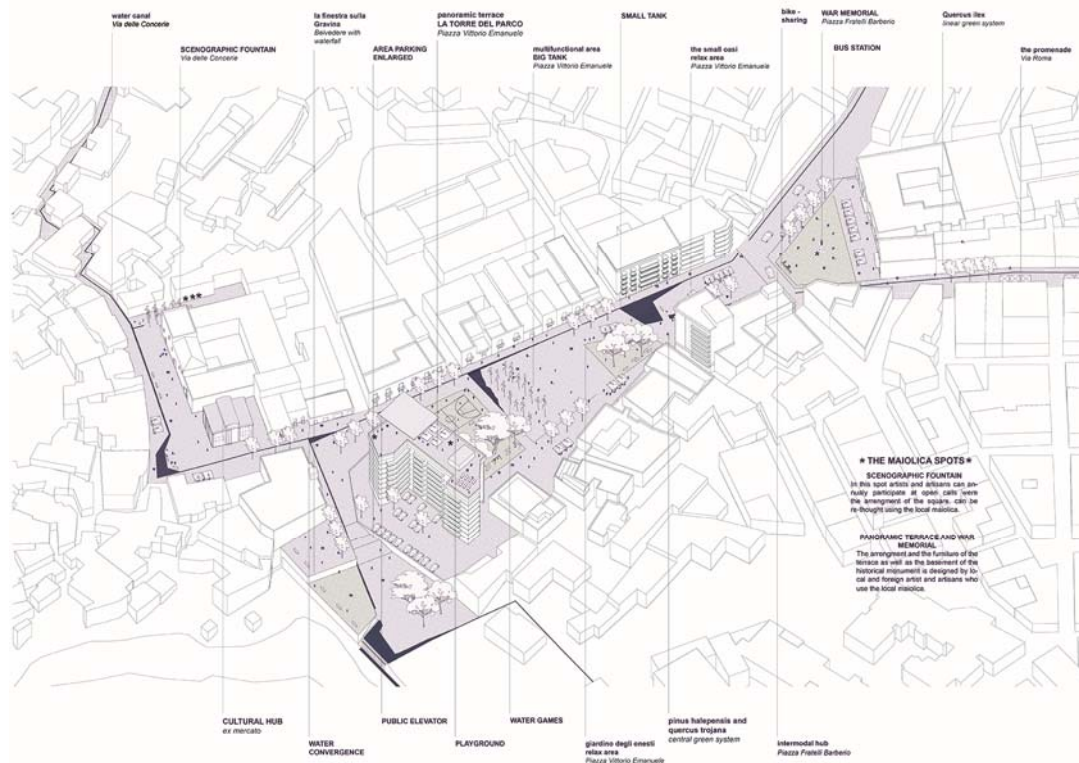


Fig. 9. Axonometric view.

path, the *Aleppo pines* and the *Fragni*, a particular type of deciduous oak that generates changing scenarios depending on the seasons, identify the places of rest.

When crossing the city, this new infrastructure revitalizes some problematic or undervalued buildings, including them in the public space system and transforming them from problems into opportunities. The large and unpleasant 10-storey building, that excludes the view of the landscape from the square, is transformed into the new "park tower": the large building terrace becomes an extension of the public space, a new belvedere overlooking the "Gravina" and the old city.

The former covered market of piazza Plebiscito represents instead an opportunity to start and give life to the project through a virtuous practice of sharing and participation. This becomes in fact a "theatre" for exchange and meeting: a "Permanent Urban Laboratory", a design hub where the inhabitants will play an active role within the transformation process of Laterza, exploiting the synergies and alliances that contexts like this one, a small village, have the possibility to create.

Conclusion

The Laertine landscape can represent a significant case in which the great issue of climate change influences the life and structure of a place that has a relatively small scale. Integrating the area of the three squares into a much wider territorial system and interpreting it as a part of a more complex and extensive machine, reveals the attitude to deal with an idea of landscape, which is made up of its geographical, morphological, naturalistic, historical and cultural features; at the same time it points out the will to work on these stratified landscapes, not looking for rigid answers that come from above, but trying to

explore solutions that are not definitive but able to build possibilities for a fragile yet so powerful landscape.

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NOTES

1. The name is derived from the territory’s shape which reminds an arch.
2. The phenomenon of thermal inversion consists in the inversion of the traditional relation between temperature and altitude. In Laterza’s Gravina this allows to identify on the valley bottom species which are usually located in medium mountain environments, while climbing the slopes you can find species typical of the Mediterranean scrub.
3. Shepherd’s tracks.
4. Small tributary of the *gravina*.
5. traditional expression for a brick construction added to the cave.
6. Lit. neighbourhood.
7. Underground cavities used to store snow.
8. Patriots fighting for the unification of Italy in the XIX century.