

THE PROJECT OF THE PASSER OF BOLOGNA: TOWARDS A TERRITORIAL PARK EXPERIMENTING AND REGENERATING UNDER INFRASTRUCTURES

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Saying "infrastructure" gives us the sense to talk about the minor components of cities; what sustains its functionality and which is on the background of physical observation, that is, underground or within other superstructures evident to our visual perception.

In fact, what do we call infrastructure and what place does it occupy in space configuration? According to the RAE: 1. f. Underground work or structure that serves as a support base for another. 2. f. Set of elements, equipment or services necessary for the proper functioning of a country, a city or any organization.

From a broader perspective, the infrastructure is at the same time an objective concept, but it also refers to the ability to manage a particular service and even an organization. So it is a systemic concept that involves components and relationships, as well as the implicit idea of management. Therefore, going to the step of the possible wrong simplifications, we clarify that the infrastructures are not under the subsoil but rather intertwine the urban space of the terrain and the flight. Infrastructure always occupies space and ends up being a material and artificial support. For example, see the number of submarine kilometers that make up the data transmission wiring networks.

The infrastructures are therefore the basic plot from which the rest of the components of the territories are constituted. The great components of urban and territorial space can be summarized in: morphology, structure, metabolism, landscape, networks and time.

In the territory we can identify large types of infrastructures: transport, energy, waste, water cycle, green infrastructure and telecommunications networks (ICT). Of singular form, those of transport and mobility are those that can generate a greater territorial impact. Often their paths solve the technocratic connections, from one point to another, but generate a number of disconnections and barriers. Moreover, from the point of view of its management, its privatization, efficient in some cases, does not always help improve functionality.

Therefore, it is interesting to explore the new trends in the design and management of the infrastructure. This is why we present the experience of the integration project of the Bologna Passante motorway, as an example of an effort to verify new devices for the improvement of existing infrastructures and the reduction of new buildings that generate so much impact on the territory and inhabitants. . This experience has also allowed us to highlight some considerations on how to design the infrastructures:

- Urban and territorial infrastructures should be public as armor of the common good and therefore of public domain, however our systems of socio-economic organization must allow a well-established public partnership partnership for the definition of the different forms of its conception, production, and management.

- All should be multimodal and intermodal in terms of mobility.
- They must train the specific functionality but must integrate other uses of the territory's space, with particular attention to margins and ecotones, avoiding barriers and building from their genesis territorial passages, both civic and ecological in the widest sense.
- Infrastructure coverage must provide new spaces by avoiding the creation of barriers in the territories.
- They must be understood as channels and treated as if they were systems of river docks through the decoupling of the pipelines.
- Metabolic management infrastructures (energy, waste management, water cycle). They have to internalize all their components in their own space without compromising the adjoining floors generating degradation.

In short, urban infrastructure, structure and form should be considered as an inseparable, inseparable whole. And therefore anticipate the effects that a schematic planning can generate and plan the new territoriality from the new infrastructural mutants and adaptable over time.

1.1 The existing Passante and the city of Bologna

The metropolitan area of Bologna, with 1 million inhabitants, represents the geographical hinge of the Italian transport system for north-south connections, both for the railway network and for the highway.

Fig. 1 The existing Passante and the city (source: JLP-TASCA)

The Bologna ring-road bypass, built between the '60s and '80s, interconnects the main national and regional traffic routes and has the function of collecting and sorting the flows coming from the central axis of the country (via the A1 motorways) and A13), from the border with Austria (via the Brenner A22 motorway) and the Adriatic coast (via the A14 motorway), as well as serving local traffic from the areas bordering the Bologna metropolitan area.

This road system is formed by the headquarters of the A14 motorway and by the two "tangenziale" roadways that are developed in coplanar on both sides of the same motorway in the stretch between Bologna Casalecchio and Bologna S. Lazzaro.

Fig. 2 Historical photos and some junctions to 2014 (source: SIT Municipality of Bologna, re-elaboration: JLP-TASCA)

The need to improve the conditions of circulation of these infrastructures has been discussed for decades, so much so that over the years different route alternatives have been presented: the North Passante, the Southern Passante and the one that has been renamed the Middle Passante. The only interventions that have been implemented over the years have been the third dynamic lane on the motorway crossing section, ie the use of the emergency lane as a lane in times of intense traffic and the expansion of the junctions of the coplanar. As a result of these interventions in the current configuration, the motorway presents adequate traffic conditions while the coplanar highlight at peak times, on an average working day, heavy and prolonged queuing.

The Passante di Mezzo project, based on the agreement signed in April 2016 by the Ministry for Infrastructures, the Emilia-Romagna Region, the Metropolitan City and the Municipality of Bologna, and the Autostrade per l'Italia Spa concessionaire, for a 13 km, consists in bringing 3 more emergency lanes the stretch of the coplanars that goes from junction 3 to junction 6 and from junction 8 to junction 13 and 4 lanes more emergency the most congested section that connects junction 6 to junction 8, in the ramps of the junctions of the coplanar showing transport problems. The current platform width stands at 41.4 m while the design platform is 61 m, considering the construction of 2 lanes in each direction in the tangential section and one more lane for the direction of the motorway.

In addition to the expansion and extension of motorway-tangential, the project involves the implementation of urbanization and environmental mitigation interventions aimed at ensuring the overall sustainability of the works within a consolidated urban context that has always suffered from the infrastructural 'cesura', and this is what transforms the Passante into a real 'civic corridor' of environmental, urban and eco-systemic services of reconnection and redevelopment of the city of Bologna.

Road works on urban roads of metropolitan and regional interest are also required to be able to guarantee the realization of an integrated and satisfactory road system for the mobility needs of the territory, even at city level.

The total work amount amounts to approximately € 750 million charged to the motorway concessionaire.

Fig. 3 Infrastructural strengthening scheme (source: Autostrade per l'Italia spa)

1.2 The Passante di Mezzo and its design criteria

In this scenario of intervention, which includes urban, environmental and urban mobility interventions in the urban and metropolitan context, the Passante represents an opportunity on a territorial scale to qualify the city and the neighborhoods around it.

Starting from this data and a reading of the specific situations, the concept of territorial framework developed in June 2016, has reinterpreted the scope of the Passante as a key to urban redevelopment of the areas that lap it and includes, in addition to upgrading, a "basket" "Articulated and integrated of interventions:

- on the urban mobility network, to improve accessibility and adduction to the tangential system;
- on the system of intermodality between the ring road and the urban transport network;
- redevelopment of the public space around the infrastructure;
- on the environmental mitigation system through differently arranged green areas;
- on the soft mobility network (cycle paths) connecting parts of today disjointed cities;
- acoustic and environmental mitigation (barriers and tunnels);

- qualification of road works of art through an integrated and identifying project of the Bologna tangential system.

Fig. 4 Concept of urban and territorial integration (source: JLP-TASCA)

All these interventions will contribute, in a medium-long term that will go beyond the upgrading of the infrastructure, to construct the Territorial Park of the Bologna Ring Road, as a renewed reference figure. The infrastructure was therefore imagined as:

- a continuous eco-system, longitudinal to the infrastructure (environmental continuity, flows and resources), although in the specific case it must be reckoned in some parts with a forced discontinuity;

- a mosaic made up of different projects (Doors, Passages, Routes, Parks, Works of Art) all included in the frame of a Territorial Park;

- an opportunity to reconfigure new geographies and new connections between territories physically contiguous but for structural breakdowns that are always distant from each other.

The design criteria adopted for the urban insertion of the interventions pursue the objective of building around the 13 km of development a real Environmental Hinge, made up of urban and ecological connections, envelopes and protections with respect to the existing context, new architectural equipment that surpass the image of the road infrastructure: a continuous thread, as in the image of a "Tombolo" around which to connect again.

The main methodological criteria that have guided the development of the unit project are:

1) considering the infrastructure as a whole, as a unique landscape to be qualified on the occasion of its transport enhancement, a real Territorial Park that, starting from its central axis, sets a vision / project of the available areas according to gradients that go from urban to natural;

2) planning with at least 2 different scales: that of the urban city project (scale 1/2000 - 1/500) that implements forms of adhesion of the infrastructure to the city and that of the project of the places (scale 1/100 - 1/20) that studies for the city of Bologna specific and innovative elements of qualification of the infrastructure;

3) reread the junctions as true entry gates to the metropolitan city of Bologna;

4) activate, where possible, the beltway of the ring road, considered up until today caesura, 'filling' it with functional uses and services also to the needs of the local community (neighborhoods);

5) work on the themes of integrated mobility and intermodality, starting from the junctions from the bypass, reasons for possible connections with the urban mobility network through the expansion of the interventions already envisaged on the local reception network, the sustainable mobility network (cycle paths), connections with the iron network (check of the SFM stations close to the ring road and possible intermodal nodes).

6) develop the project in a proactive and interactive feedback process after listening in the comparison phase.

7) deepen the degrees of sustainability and innovativeness of the infrastructure considering all the environmental components (air, noise, water, energy, soil and subsoil).

The Passante is considered as a unitary element in the urban context (it is the wall of a castle or the hill that from the south embraces the city to the north) that can improve the quality of the territory, is seen "from inside to outside" meaning the infrastructure as a platform from which the territory emerges and "from outside to inside", meaning the infrastructure as an integrated element to the urban / rural context.

The concept begins with a reading of the territory associated with the tangential arch that starts from the west and covers the entire northern area of the city to the east.

The two territorial cornerstones that delimit the arch are the Reno river to the west and the Savena canal to the east. In the course of the arch, other important environmental factors can also be found, including the pieces of parkland to the south and north, the tracks of the wooded belt, the territorial park of the long Navile, and the 'artificial hill' to the south adjacent to the Savena canal.

In addition to the environmental elements, there are near-tangential municipal services, particularly sports services, shopping centers, urban junctions of public and private roads. And finally, the metropolitan centers of importance such as airport, fair, agri-food center and FICO, which if viewed in their unitary nature and establish relationships with the Tangenziale system.

This longitudinal reading led the project towards a re-assembly of transversality that has always been the subject of caesura, in the first instance operated by the Tangenziale but reiterated by the oldest and most renewed band of the high-speed railway. The theme of the Tangenziale Territorial Park is therefore clear, as a connecting element not only transversally but also between geographies that longitudinally travel the arch of the infrastructure.

Fig. 5 The territorial Park of the Bologna Passante (Source: JLP-TASCA)

1.3 The elements of the Territorial Park project

It is based on the Concept Guide Card, intended as a support to the reading and interpretation of the territory and neighborhoods that began the study of urban infrastructure insertion considering and developing 6 spatial figures, then developed up to the level of executive project that include :

Functional areas, aimed at defining the 9 'territoriality' crossed by the infrastructure; Doors; Parks; trails; Passages (underpasses and overpasses); Elements and Works of Art (barriers, phonic galleries)

Fig. 6 Masterplan of the Territorial Park (source: JLP-TASCA)

The main executive elements of widespread redevelopment of the area around the Passante refer to:

- Redevelopment and / or qualification of horizontal and vertical surfaces for underpassing;
- Definition of the new altimetric junctions deriving from the road project and its related products;

- Construction and / or redevelopment of new entrances to existing parks upgraded and / or new plant that are provided by the strengthening of the bypass, where these are confirmed on doors and / or passages;
- New plantings of arboreal and / or shrubby elements;
- Preparation of horizontal and vertical signs;
- Integrated lighting system with plugs for the battery charging of bicycles in the presence of cycle stops;
- Communication systems (way-finding), whenever necessary, to signal in the territory the different project elements present, with indication of the services (Wi-Fi, electric loading of bicycles, QR code implementable to download various Apps related to mobility and to the neighborhood in question);
- Elements of urban furniture. Specifically, these are seats, baskets, fountains and bicycle racks;
- New lighting system that implements the cycle-pedestrian parts, integrated with electric bicycle charging systems (e-bikes);
- Construction of small service buildings useful for existing urban functions and / or new facilities.

1.3.1 The territorial areas

Within the administrative area of the 3 Neighborhoods lapped by the Passante (Borgo Panigale-Reno, Navile, San Donato-San Vitale), a more detailed reading and descended on the territory led the urban insertion project to the identification of 9 Functional areas, within which to circumscribe the interventions and which may, also as a result of the planned interventions, be subject to further programming starting from the 'civic services channel' identified in the loop of the Passante-Tangenziale. Each Area has assumed and re-read its territorial context according to the "enlarged highway" and the possibility that the re-stitching with the fabric infrastructure can give new services.

Within the areas, the systemic design concerned the following topics:

- The connection of the infrastructure with the city through the junctions seen as "Gates" to access and exit the city;
- The requalification of urban, territorial and forest areas, around the infrastructure, considering them as places in the city;
- Longitudinal paths and signs (arboreal-shrubby rows) as elements of continuity to guarantee the landscape integration of the infrastructure;
- The passages that cross the infrastructure (new overpasses, qualification of the existing ones, qualification of the underpass) as elements of rehabilitation of the territory and development and integration of sustainable mobility;
- The architectural insertion of works of art characterizing the intervention, as elements of new qualification of the city and the territory.

Fig. 7 Single Card for the framing of interventions (source: JLP-TASCA)

1.3.2 The Doors

The 12 junctions are therefore reinterpreted in key of the city's doors, assuming an identity value and providing opportunities to develop projects related to intermodality, rubber-iron exchange, public transport-gum, the implementation of the cycling network of cycling routes, services to the citizen, as well as redevelopment of public spaces around the junctions (new lighting, fixed and digital signage, paving, public transport stops, elements of urban furniture, bike parking / byke sharing, etc.).

A careful reading of some contexts that characterize the current junctions (iron network and cycle network, public road transport network and existing parking lots) allows you to have a hierarchical vision of the gates and identifies in a systemic way:

- the urban Ports with a more infrastructural character in terms of connections with the metropolitan railway system and with the existing interchange car parks (Triunvirato P01, Fiera P07, Massarenti P10);
- the urban-landscape Gates that are characterized by the passage of the cycle routes (Navile P03, San Donnino P08, Massarenti P10), in addition to the lines that intercept some Passages (Zanardi S05, Ferrarese S16);
- the landscape doors with strong environmental connotations, because they are marked by an evident relationship with the surrounding landscape (Lazzaretto P02, Navile P03, Savena P11, San Lazzaro P12).

The 12 Metropolitan Passes of the Passante di Mezzo are intended, especially in correspondence with TPM metropolitan public transport stops, as "Mobility Centers": reading and interpretation affirmed and recovered also in the Sustainable Urban Mobility Plan recently adopted (November 2018) by the Metropolitan City of Bologna.

Among the most significant interventions are: Porta Massarenti with the remodeling of the existing roundabout in favor of the creation of a real covered public square, near a major interchange hub of the metropolitan area and Porta Navile characterized by the cycle path that runs along all the new flyover of via Colombo, from the lighting system and the green upgrading of the roundabouts.

Fig. 8 Porta Massarenti (source: JLP-TASCA)

1.3.3 Parks, Passages, Routes

There are plans to redevelop existing parks, interclass areas in the junctions, construction of new rows and new wooded areas as elements to implement the 'green' continuity of the Passante: among the most significant interventions in terms of urban impact the redevelopment of the Park North, the completion of the San Donnino Park to the south of the ring road, the implementation of the wood belt system to protect the urban area, already envisaged in the 1989 PRG.

36 interventions are also planned for the implementation of the slow cycle mobility network, with a view to cycling around the Passante and 14 redevelopment interventions of the existing passages under the ring road. Also in this case the works concern the entire system of crossing the infrastructure focusing on the quality of the renewed public space and on the implementation of its degree of accessibility and usability, equipped with new elements of urban furniture.

For all the redeveloped underpasses the characterization of the heads and the lining of the internal walls is expected. In particular, the project includes the following functional and urban qualification interventions and way-finding:

- number, better if consistent with the exit of the ring road, to favor orientation in each passage;
- name of the door (to avoid ambiguity and confusion both the numbers and the names would be the same as those of the exits of the ring road where this is present);
- local map (up to the next passages to the east and west) with an indication of the tracks and the cycle facilities and other remarkable points. The panel must be replaceable for updates;
- indication "road" of the urban subways to "right and left";
- coherent signage with Biciplan of the city of Bologna.

Fig. 9 View from the north of the underpass system redeveloped to Croce Coperta (Arcoveggio, Fascia Boscata, Sostegno) (source: JLP-TASCA)

The itineraries and itineraries foreseen by the Passante provide for a high degree of cycling spread throughout the territory declined in:

- cycle path in dedicated location;
- cycle lane on the carriageway;
- internal paths to the project parks;
- internal paths to the parks to be redeveloped;
- existing routes not necessarily identified as 'cycle paths' on which to intervene in the form of vertical, horizontal and paving signs.

This weaving of paths allows to re-enact the crevices of the 'broken urban sewing' and therefore to confer even minute scale value to the infrastructural work of enlargement.

Fig.10 Step 2 Madonna (source: JLP-TASCA)

1.3.4 Major barriers and works of art

Finally, from the point of view of the works of art, new phonic barriers are foreseen with a coating system that will characterize the "infrastructural landscape", the new phonic tunnels of San Donnino and Croce del Biacco, the first connoted as a real usable square of conjunction

between 2 parts of the district, and 3 new overpasses, connotations of the same urban image that the Passante as a whole will return.

Overall, it can be said that the Passante project contributes to redefining the urban and metropolitan function of the Areas, which also crosses the image of the perceived city of infrastructure and infrastructure perceived by the city, in some way accomplishing the work started by Municipality of Bologna in the 60s at the time of the initial design of the bypass.

1.4 The working group and the status of the project

The Passante project was developed within a composite and multidisciplinary working group that saw the presence of several professionals of national and international fame involved in the various disciplines, of the motorway concessionaire (Autostrade per l'Italia Spa) and of the company engineering of the concessionaire (SPEA engineering), of the Ministry of Infrastructures and Transport, of the technicians of the local authorities (Region, Metropolitan City, Municipality). This 'critical mass' of skills has allowed to face in a joint form even the most difficult moments of the project path, where the goals and objectives of the various subjects involved did not always seem to converge.

Moreover, a process of public debate (also based on the experience of the French public Débat on infrastructural themes), held between July and November 2016, has characterized the design development process with the dual objective of presenting the project in clear language. also to non-professionals and to listen to citizens to collect proposals on how to improve the environmental and landscape integration measures and those of sound protection.

The project up to its execution phase was developed between April 2016 and December 2017. The completion of the interventions was expected by 2021.

The Passante di Mezzo obtained the Environmental Impact Assessment Decree (EIA) from the Ministry of the Environment and the Service Conference was scheduled to open with local authorities in September 2018.

The current Italian government has suspended the design and construction forecasts of the Passante di Mezzo, reopening to other and different scenarios with timing to be defined.

Fig.11 The tangential landscape (photo by Gianluca Simoni)

CREDITS

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