Set of drawings

FIG. 4.1.1

FIG. 4.1.2



FIG. 4.2.1



FIG. 4.3.1





FIG. 4.2.2



FIG. 4.3.2



SITE SELECTION

The most suitable site to intervene is the system from the Martesana Canal in Cassina de Pomm to the Vallone Canal. The idea is to reopen this part of the water system in the city by reconnecting it to the Darsena and the existing canals (Naviglio Grande and Naviglio Pavese).

Criteria corroborating this decision are multiple: according to its form, the Navigli system intersects different parts of the urban fabric in a transition of different scenarios and building typologies by interacting with a dense palimpsest. The branched and continuous form of the water system makes it a possible corridor that reconnects the ecosystem. Reclaiming the waterway and greening it can be a way to disrupt vehicular mobility and address global warming: the emergent green space can act as a cooling system, insinuating itself between the solids and voids of the urban grid and rejecting the elimination of buildings. Furthermore, by developing from north to south and interacting with different soil types, the canal route can be the designated place to recharge the aquifer and clean the water. From a social perspective, the system is located near the "headquarters" of different social groups that can take care of it by developing a community program.

Although the condition analysis motivates site selection, it is equally important to remember that this part of the traditional water system has been part of Milan's collective imagination as a water city for centuries. In my opinion, it can still be a viable alternative that respects the site's character, which revives the sense of community through public spaces appropriate to society.

FIG. 4.1

Via Melchiorre Gioia at the beginning of the XX century (Milano sparita e da ricordare, 2020) and the current situation (Author, 2023).

FIG. 4.2

Via San Marco at the beginning of the XX century (Milano sparita e da ricordare, 2020) and the current situation (Author, 2023).

FIG. 4.3

Via Conca del Naviglio at the beginning of the XX century (Milano sparita e da ricordare, 2020) and the current situation (Author, 2023).



- Infrastructure
- Water basin
- Waterway
- --- Culverted waterway



- Built environment
- Waterway
- --- Culverted Naviglio

Ecological network

- Green area
- Forest
- → Species migration
- ** Possible ecological corridor



Built environment

--- Culverted Naviglio



FIG. 4.4

Matrix of maps depicting the traditional water system, the fragmented ecological network, the temperature, the water-related features, and the social groups in Milan (Author, 2023).



- Built environment
- Waterway _
- --- Culverted Naviglio



- ↔ Bridge ✓ Sluice
- m Sciostra
- Port
- T Washhouse



- Built environment
- Waterway _
- --- Culverted Naviglio

Social groups



- Church
- 🛤 Library
- <u>ش</u> Museum



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Religious groups Libraries, Museums Neighbourhood scale



Urban scale

5



FIG. 4.5.2





PARCO AGRICOLO SUD









Fondazione di Comunità MILANO CITTÀ, SUD OVEST, SUD EST, MARTESANA







UNIVERSITÀ DEGLI STUDI DI MILANO







- Built environment
- Green areas
- Daylighted Naviglio
- --- Culverted Naviglio
- --- Culverted system with polluted water
- Bridge
- မှိ Port
- Water supply
- Reconnection with the urban tissue

DESIGN CONCEPT & MASTERPLAN

The indispensable foundaments for my design are:

• Reshaping the Navigli through the bank greening and other water forms to solve climate change urgencies.

• Declining water into different experiences, from navigation to tangible experiences.

• Designing with care, including the society and other forms of interactions like non-human ones.

• Adapting, reusing and re-earning the waterworks to enhance the site's identity and the landscape.

• Creating a lively landscape by involving nutrition, biodiversity, and activities with adaptable spaces.

• Creating a circular economy and a natural profit on navigation and water-related spaces.

The urban-scale design includes the reopened canals and the linear green space that develops on the docks. Within the city, the water in the canals flows from northeast to southwest. Thinking of reopening all the Navigli in a single intervention would be too bold a choice, especially if the project aims to reinterpret the Navigli as the landscape out of the front door by stimulating the sense of care of the citizens appealingly. To deter the use of cars in the city centre and to structure the reopening of the canals in a bottom-up approach, it is necessary to design in phases.

At first, the Naviglio della Martesana that reconnects to the existing part, the Naviglio San Marco, and the Naviglio Vallone that flows into the Darsena will be recovered. Although the Cerchia Interna is kept culverted the sediments that impeded the flow of water are removed to reconnect the blue network to the Darsena.

By including social groups, the constructon will be realised by the promoters of ecological companies (such as Forestami and 3Bee), already active in Milan and correlated with the bureaucratic system.

Adjacent to the historic port known as Laghetto di San Marco, the traditional commercial function will be restored, also taking advantage of the presence of the local street market; despite the culvert of the ports and their neglection, it is interesting how these spaces are still linked to the buying and selling of goods.

As for water supply, the Seveso can no longer be considered an acceptable source because of its polluted water. Therefore, the river will remain culverted, and it will be diverted to run parallel to the Naviglio and flow into the Redefossi drainage canal. From there, it will flow south to the existing Milano Nosedo sewage treatment plant, where the water will be purified. As the problems brought by global warming intensify, the river could be redesigned and reopened by taking advantage of the Parco Nord to create water rooms where water could be naturally purified and stored. By excluding river Seveso from the existing water supplies, we take advantage of the soil properties by introducing a new source at the intersection of Via Melchiorre Gioia and Via San Marco.

FIG. 4.5

Masterplan of the first phase of the canal daylight in Milan and the actors involved in the construction (Author, 2023).



Built environment

- Green areas
- Daylighted Naviglio
- --- Culverted Naviglio
- --- Culverted system with polluted water
- Bridge
- **پ** Port
- Water supply
- Reconnection with the urban tissue
- ★ Pedestrian system

FIG. 4.6 Masterplan of the final phase of the canal daylight in Milan (Author, 2023).



Break the problem down into less complex ones



Focus on the details



Design piece by piece

The second phase, on the other hand, envisions the daylighting of the Inner Circle. The water experience in the city centre will be slow and pedestrian-friendly, and it will seek to enhance the historical heritage and interaction with water and the new symbiosis of nature and culture. In this sense, the transitional spaces between the two canals are the most interesting, considering water flow, the built environment, social exchange, and water works.

Designing in phases is crucial to gradually shape the landscape as it analyzes and breaks down the complexity of the traditional water system and focuses on the specifics of the place by starting to design from detail. In addition, through phase planning, the design can be modified during the project by pandering to the proposals of the benefiting community.

In the project, emerging green spaces will take over semi-abandoned sites in transitional places that reflect the problems of public spaces in Milan.

FIG. 4.8



FIG. 4.7

Diagram about the bottom-up approach (Author, 2023).

FIG. 4.8

A bottom up initiative for an oasis in via Pacini, Milan (Fondazione per l'Architettura).





FIG. 4.9.2





Buildt environment shaping the bank

FIG. 4.9.3





WATER AND URBAN FABRIC

Although the water system is continuous, the canals present different forms as they interrelate with the built-up area. For this reason, it is crucial to intervene with different strategies on the urban fabric, such as the mild, the architectonic and the hybrid approach.

Therefore, it is necessary to identify the different parts of the city intersected by the canals and their profoundly different appearance: Via Melchiorre Gioia, for instance, is a wide street that is very similar in conformation to a French boulevard and differs well from San Marco, which is part of the medieval urban fabric. In this area, the streets are narrow, and buildings lean against the former canal. Finally, the structure of the Cerchia interna and the Vallone Canal is configured as medium width, with 2/3 driveway lanes, a bicycle lane in both directions and street-side sidewalks.

The **mild approach** consists of the naturalization of the bank with gentler banks and permeable beds. The vegetation of different heights and the trees define the shady paths along the canals. The difference in level of the canal bed provides multiple kinds of experiences with the water. The **architectonic approach** addresses the historical built environment; the built canal banks contain the water and protects the buildings, while the canal bed is impermeable. Presenting a narrow section, the only way to interact with the water is through the walkway system slightly above the water table and inspired by the traditional alzaia (tow path). Not lending itself as a space for planting trees, the vegetation is introduced directly on floating platforms adjacent to the path to make it more mysterious and adventurous and to attract wild species.

The **hybrid approach** mixes mild and architectonic approaches by adapting to medium-sized street sections. It presents architectural banks and a permeable bed suitable for recharging the surface aquifer. In proximity to widenings or landmarks, the canal bank becomes more natural and organic. Since it addresses the non-navigable section of the Navigli system, it re-elaborates the water works meaning it engages the citizens.

FIG. 4.9

The different urban tissues that the Navigli system should addressed:

1. Via Melchiorre Gioia

- 2. Via San Marco
- 3. Via Conca del Naviglio

Some schematic diagrams summarise the character of each building typology (Author, 2023).











Plan and section of the mild approach in via Melchiorre gioia showing how the naturalisation of the canI bank enhance sociality at the small scale (Author, 2023).

FIG. 4.11

The keymap shows roads that are designed according to the mild approach (Author, 2023).







Plan and section of the architectonic approach in via San Marco showing how nature can be incorporated into the built environment to enhance the new vocation of the canals as an ecological and recreational infrastructure (Author, 2023).

FIG. 4.13

The keymap shows roads that are designed according to the architectonic approach (Author, 2023).

FIG. 4.14







Plan and section of the hybrid approach along the Cerchia Interna showing how the water system address to the existing green areas (Author, 2023).

FIG. 4.15

0 5 10m | | | | | | | | |

The keymap shows roads that are designed according to the hybrid approach (Author, 2023).







Forestami

Papaver rhoeas

rhoeas



Papaver rhoeas

Rosa Canina L.

The Gardens of care

Once the form of the canals has been developed, it is crucial to ask how to revive the interaction between citizens and the urban landscape. Gardens of care arise as a solution to foster the social component in the landscape. These spaces are typical of the mild approach and are located between the residential and working fabric, particularly at the intersections of the neighbourhoods, for further interaction.

More specifically, these are ad hoc green areas for the community to cultivate or have their own outdoor space. Anyone can join this project and have a fragment of the garden at their disposal. Every piece is delimited by wild species chosen by environmental companies (e.g., 3Bee and Forestami) to encourage biodiversity and pollination and cultivation in urban space.

However, it would be utopian to think that, in an ever-changing city, citizen interest can be constant. It is also true that, as already expressed in the theoretical framework, the sense of care does not only refer to human beings. For this reason, in the event of a lack of care, the grid defined by wild species will close in, encompassing green spaces and tending to become a single forest. Faced with the formation of a forest, a last human attempt could be attempted by the ecological companies using this fragment of forest for their projects by inserting bee hives or experimenting with tree species. Hence, when human interest fails, the sense of care manifests itself in the third landscape by creating a succession of punctual forests along the channel and potential oases for flora and fauna.

In the case of the architectonic and hybrid approaches, gardens of care could be declined to the form of flower beds out of the front door. Evaluations of Forestami advise against introducing trees in confined spaces; therefore, each part of the city is entitled to its form.

FIG. 4.16

1. Plan of a Garden of Care under the influence of humans (Author, 2023).

2. wild flowers, bushes, and young trees introduced to define the limits of each private garden (Author, 2023).





Papaver rhoeas



Daucus carota



Malva sylvestris



Medicago sativa







Matricaria chamomilla





FIG. 4.17.2



Sections depicting the natural evolution of the Gardens of Care after the loss of interest by humans (Author, 2023).

FIG. 4.18 The keymap shows the location of the Gardens of care (Author, 2023).











Human care



FIG. 4.19 Diagram showing the design with time and the inverse proportion between human and non-human sense of care (Author, 2023).



CONTEMPORARY CITY SKYLINE



Unicredit Tower





Porta Nuova



Bosco verticale



Diamante Tower



Solaria Tower



Opera Pia Cucine Economiche



Ponte delle Gabelle Baths



Incoronata sluice



SITE 1 CUCINE ECONOMICHE

The design is located in Alfredo Malgeri Park, a neglected green space marginalised by the infrastructures. Based near the Porta Nuova complex, thus a mixed fabric, it has to confront the contemporary city skyline. Nearby we find:

- The Unicredit Tower, the tallest skyscraper in Italy, and Gae Aulenti Square;
- The Solaria Tower, the tallest residential skyscraper in the country;
- The Diamante Tower, with its characteristic square shape;
- The Bosco Verticale, with its hanging gardens.

Thus, it lends itself to be a strategic space for workflows and a transitional space to the historic centre where the Martesa Canal flows into the Naviglio San Marco.

The site also boasts the proximity to the city's historical heritage: in most of the cases, it is related directly to the Naviglio, such as the Gabelle Bridge, and the Conca dell'Incoronata, designed by Leonardo da Vinci, and Porta Nuova. Although past sources suggest that this was a recreational space with water, only the shape of the buildings beyond the Gabelle Bridge hints at the period when the block hosted the public baths. The historical heritage includes the building known as Opera Pia Cucine Economiche, which was built to provide food to the indigent in the first phase of the development of Milan's capitalist system. When the massive urbanization led to the so-called "worker question", it was one of the first examples of social philanthropy that arose, where social cooperatives, mutual aid societies, and consumer cooperatives collaborated to guarantee new food outlets. It is a social model that might be worth recovering.



FIG. 4.21.2



FIG. 4.20

Masterplan showing the design location and the main landmarks, including both the histical heritage and the modern skyscrapers (Author, 2023).

FIG. 4.21

The urban urgencies clealy visible in Alfredo Malgeri Park:

1. The driveways fragment the urban fabric and make the street unsafe.

2. The green area is just used as a transitory space and results neglected and poorly maintained. /Authour 2023)



- Built environment
- Design location
- Remain of the canal bed
- --- Culverted Naviglio
- 📩 Porta Nuova
- Gabelle bridge
- Incoronata sluice
- Tow path
- School

It is equally interesting to note that the site benefits from its proximity to three schools. Although marginalized by the infrastructure (and, from this point of view, unsafe for children's transit), they could be enhanced through a green design that involves them in its program.

Therefore, the project aims to enhance the landscape through an interactive and interconnected water space that can act as further water source instead of Seveso by creating a circular system.





FIG. 4.22

Masterplan representing the social groups and the waterworks that might be an opportunity for landscaper design (Author, 2023).

FIG. 4.23

The social vocation of Opera Pia Cucine Economiche depicted in the painting "Alle cucine economiche" by Attilio Pusterla (II Mediano, 2020).

FIG. 4.24

Public functions in the design context (Geoportale, 2023)

0 50 100 m IIIIIIIIII



Plan and section of the new vision for Attilio Mlageri Parks, which includes water recration, water circularity, social and spatial reconnection (Author, 2023).

FIG 4.26

Conceptual drawing of the basic form of the park (Author, 2023).

The water spaces in question are the water playground, the vertical farming plaza, and the bio-pool.

The space takes shape from the plan of the Cucine Economiche to create a mirrorlike green plaza to enhance the theme of nutrition through vertical farming, fruit plants, and refreshment areas where to spend leisure time outside the office.

It keeps the orography of the park intact, and it takes advantage of the difference in height between the Gabelle bridge and the park level to create the passage under the bridge to overcome the limitation posed by the infrastructure. Since it is a delicate transitional space because of the navigation sluice, the canal bank follows the architectonic approach.

The park is crossed by a linear route based on the existing accesses. A system of strolling paths is introduced that is more organic and immersed in wild species with flowers and shrubs to stimulate the curiosity of young children. The elevated path, typical of the architectonic approach, connects the park to a middle school providing new safe access to the school away from vehicular traffic, while, to the east, the path connecting the park to the elementary school is maintained.

Wilderness defines the park boundaries and flows and consist of various local flower species and fruit trees to encourage the crops' pollination. The space dedicated to vertical farming respects the seasonality of vegetables, avoiding monocultures: in this way, cultivated plants can also be sustenance for bees and other nectariferous animals. A line of fruit trees provides privacy for the adjacent schoolyard.





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FIG. 4.27 View of the park (Author, 2023).



The water in the park comes from the deepest layers of the subsoil, composed of layers of gravelly strata alternating with clay. Thanks to an artesian well that reaches about 330 meters deep and brings deep mineralized water to the surface, an initial children's area will be alimented. The water is then channelled into the vertical farming plaza and flows into a trench where aquatic plants and gravel purify the water. The flow then enters the bio-pool and finally into the Naviglio. It is a flexible solution, as the good works during warmer periods, while, for the rest of the year, the water space serves as a retention area.

Programmatically, the two schools, now connected to the park, and the community from the close Biblioteca degli Alberi can be the social groups in charge of the management and the harvesting the crops, even though this is an experience open to all. Less formally, the park can become an afterschool gathering place for children, a place of refreshment thanks to the furnished spaces in the plaza that can be used during lunch breaks or after work to be with family.



NATURAL WATER INFILTRATION

Diagram showing the circularity of water within the design by taking advantage of the soil properties (Author, 2023).





Darsena of Milan







Viarenna sluice monument



Arena 21 kindergarten



Underground parking lot

0 100 200 m I I I I I I I I I

SITE 2 CONCA DI VIARENNA

The design is in the Attilio Rossi Garden, in the final part of the Naviglio Vallone that connects directly to the Darsena. Before becoming a social hub, the Darsena had been abandoned for many years. However, this condition involved only the human sphere, as the site's inactivity made it an oasis of biodiversity. The reuse project implemented in 2010 erased all traces despite the benefits in ecological terms.

At the local scale, the park is in a residential area with tall invasive buildings and features neighbourhood services such as stores, a kindergarten, and an underground parking lot. The latter and the marginalising streets have made the green space infrequently used: it does not dialogue with its surroundings and it is, on the contrary, introverted, fragmented by inaccessible flower beds and fenced-off spaces. It is no accident that it is the target of violence and vandalism. A picturesque element is the Chiesa del Buon Pastore and the adjoining oratory that respects the heights of traditional buildings. Other noteworthy elements are along the rest of the Naviglio Vallone and enrich the palimpsest. For instance, the monument of the Viarenna sluice (the first navigation lock in Italy) which has been relocated in an enclosed garden that followed the ancient route of the canal. Today it is not accessible. The project aims to enhance the park and existing features by creating a natural water landscape made dynamic by human intervention with the regulation of the sluice. Through the natural landscape, we also want to give importance to the historical heritage by taking the aesthetics of the former nature reserve in Darsena as a model.



FIG. 4.30.2



FIG. 4.29 Map of the context (Author, 2023).

FIG. 4.30

The urban urgencies clealy visible in Attilio Rossi Garden:

1. The fences fragment the garden

2. The green area is enclosed by the infrastucture, therefore, subject to vandalism and poorly maintained (Authour 2023)



Plan and section of the new vision for Attilio Rossi garden, which enhance ecology through water an human manipulation of the water works (Author, 2023). Dealing with a space delimited by buildings, one seeks to emphasise the Chiesa del Buon Pastore as a possible reference for the park community, the monument of the sluice in memory of water technology, and the parking lot as part of the palimpsest in a renewed city that rejects car mobility.

While the first section of the Naviglio Vallone is designed according to the hybrid approach, the end section widens near the sluice. It shapes a water basin with a slightly sloping beach, encouraging passersby to approach the water.

Water flows regularly from north to south in the first section of the channel, while adjacent to the sluice, it shapes a body of water with an island that hosts the monument. The sluice regulates water fluctuation and the surrounding nature: it defines either a wet or humid ecosystem. The fact that the Cerchia Interna is not navigable allows greater height jumps between one part of the mechanism to the other: water enegy can be produced through the sluice.

In addition to the green space facing the body of water, a plaza is created by daylighting the underground parking while keeping its supporting structure intact. The regular scanning of the pillars becomes a compositional element for the park's base form.

The eastern retaining wall of the enclosed garden becomes the supporting structure of a wild and inaccessible green space that recalls the past vision of the Dock and houses the monument. Attention is given to a new basin vision that can be nature-friendly and celebratory of the water city.

A more direct pedestrian path surrounds the park and connects it with main points of interest, including the shore, the water path, and the plaza. The water path follows the structural mesh of the parking lot connecting the church, the monument and, finally, the plaza. Its supporting structure makes use of the parking lot pillars. In addition to maintaining the four main accesses, the bridges become the element from which to observe the basins. New accesses are defined adjacent to the kindergarten and church to accentuate their role in the park.



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FIG. 4.31.2

FIG. 4.32.1









FIG. 4.32.2



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To hide the invasive buildings, the park has tree-lined green spaces with uncultivated grassy areas. The untamed areas concentrate on biodiversity and become a shelter for animals. New tree types are introduced and placed to enhance view lines from access points.

The real added value is the rethinking of the sluice: once an element for navigation, now a regulatory element for the basin's water table. It is manoeuvred by the social groups involved. Thus, either a humid or a wet environment with related ecosystems can develop. It is an amphibious landscape, dynamic in its natural evolution, that can derive energy from the water flow, and it is configured as the alternative ecological port to the Darsena. By reviving the tradition, the canals can serve, once again, as infrastructure, in this case, for the exchanges within a species.

It could even be a creative solution to store fresh water in expectation of the hot season. In this context, Arena21 Kindergarten and the community belonging to the Chiesa del Buon Pastore are the two social groups that take care of the park. Open air lectures, ecological fieldtrips, and events will take place in an entirely naturalized context.

FIG. 4.32

Key plan and sections of the slice regulation (Author, 2023).

FIG. 4.33

Sections and sketches depictinf the flora and the fauna colonising the amphibious landscape (Author, 2023).



FIG. 4.34.2

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FIG. 4.34.3







FIG. 4.34.4



FIG. 4.34.5



FIG. 4.34.6



At the neighbourhood scale, the new park vision becomes one of the tiles in the historical mosaic that distinguishes the surroundings. The landmarks are enhanced through a routing system based on the different historical water uses.

Some points of interest are:

- San Lorenzo Columns as symbol of the latent roman culture, as to them is attributed the first water diversion;
- Porta Ticinese Medievale which recalls the past use of water as a defensive line;
- The Arena that celebrates of water as a recreational element in naumachies;
- The sciostra in via Conca del Naviglio as a water work and the core of production and trading;
- The Viarenna sluice which rethinks the navigation feature to enhance the natural environment;
- The Darsena as the main historical port.

FIG. 4.34

The routing system based on water heritage:

- 1. San Lorenzo Columns
- 2. Porta Ticinese Medievale
- 3. The Arena
- 4. The sciostra
- 5. The Viarenna Sluice Park
- 6. The Darsena
- (Author, 2023).

FIG. 4.35 Axonometric view of the system (Authour, 2023).