

The Aguada Flood-Park: Recovering a post-industrial urban stream in Santiago de Chile.

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Abstract

Proposed by the External Services Unit at The Catholic University in Santiago, the Aguada Park solves centuries of abandonment and neglect in the Zanjón de la Aguada, a seasonal urban stream running through the lowest section of the Santiago Basin. The project proposes innovative urban development strategies, designing a hydraulic open system that manages higher streams at a lower cost than any alternative, recovering 60 hectares of riverbank areas with sectors that flood on a controlled basis during winter rains and can be used during the rest of the year for civic uses such as sport fields or recreational ponds. This new linear park not only restores one of the city's main ecological corridors but becomes the driver for development and urban revitalization for one of its poorest and most difficult areas. The paper will develop the case and methodology to demonstrate that infrastructural works integrated with urban landscape generate benefits beyond their mere hydraulic function.

1. THE SANTIAGO INNER RING INITIATIVE

The Santiago Inner Ring Initiative is an Urban Recovery Strategy promoted by the Chilean government as one of the emblematic projects for the celebration of the bicentenary of the Republic in 2010. The initiative is aimed to make Santiago a more efficient and sustainable city, while improving the quality of life of life. The inner ring concept was early developed by a group of students and researchers at the Universidad Católica¹, who detected the opportunities for recovering the urban areas degraded by the presence of abandoned railway infrastructure and under-utilized industrial zones around the old belt-line of Santiago. The

¹ Presented in 1995 as part of their undergraduate thesis work, Marcelo Reyes and Roberto Moris under the guidance of Professors Gustavo Munizaga and José Rosas presented the opportunity opened by the vacant rail yards surrounding downtown Santiago. The proposal was later presented in early 2000 by Hans Muhr and a group of researchers at the Pontificia Universidad Católica to the Presidential Bicentennial committee in order to be considered among the priority urban projects by the government.

development potential covers about 250 hectares located near the center of the city, most of them owned by the State Railway Company, the Office of National Assets, the Housing and City Planning Service (SERVIU) and some Municipalities. This significant amount of land owned by governmental agencies makes it possible to implement a strategic management plan that is driven by the public sector.

The inner ring initiative aims to create the conditions necessary to convert degraded areas into neighborhoods equipped with better public spaces, new green areas, community services and enhanced connectivity and transportation.² These improvements will trigger the necessary real estate development to increase building density in the city center, reduction of travel time and pollution, and the creation of a new urban image for this neglected section of Santiago. The old railway line coincides with the boundary between the municipalities of Santiago and the twelve municipalities that surround it; an inter-district sector structured over four axes: the Mapocho River to the north, Exposición and Matucana Avenues to the west, the Zanjón de la Aguada to the south, and Vicuña Mackenna Avenue to the east. (Figure1)



Figure 1: Scheme of downtown Santiago depicting the area comprised by the Inner Ring Initiative, red lines and dots correspond to former rail yards. Source: DPU MINVU. 2006.

The inter-district nature of the ring required a strategy based on high levels of community participation, from the preparation of the diagnosis to the definition of the **Urban Master Plan** to incorporate local expectations.³ In this context the Aguada Park concept was proposed by the SEREX-UC team. An action strategy for the Ring was defined Based on the Master Plan, giving priority to the project areas offering the greatest potential for re-conversion and highest social and environmental benefits. This strategy refers to specific actions on the regulation and zoning codes, management and execution of new infrastructure and public areas, coordinated in order to encourage private development in the areas. The priority areas were : (1) The New Yungay Center and Stage IV of Parque de los Reyes; (2) Parque la Aguada and its immediate surroundings; (3) Refurnishing of the former San Diego station site; (4) Urban re-conversion of the San Eugenio Rail yards; and (5) Re-utilization of the old railway line. The Regional Secretary of Housing and Urbanism created a special task force - the Urban

² The potential of this area has been recently recognized with a significant amount of investment, both public and private, including new urban highway concessions, the extension of the subway system (Metro), the recent construction of the 120.000 square meter New Justice Center, the Quinta Normal Intermodal Station, the Matucana 100 Cultural Center, and the new Regional Library, totaling more than \$ 350 US million in construction and implementation.

³ This work was carried out during 2002 and 2003 with the support of consultants URBE Arquitectos and the participation of four Universities (U. de Chile; Universidad de Santiago, Universidad Central and the Pontificia Universidad Católica).

Projects Division-⁴ in order to coordinate the different entities and consultants involved in the ring projects.⁵

2. PARQUE LA AGUADA

The Zanjón de la Aguada is a natural stream that runs south of the Ring, through the lowest section of the Santiago Basin, carrying mostly storm water westbound from the Andes Mountains. Historically the Zanjón de la Aguada was the backstage of Santiago's urban life, while the neighboring Mapocho river is the main civic space for the city, the Zanjón de la Aguada became the area where most industries, slums and waste grounds were located. Even today, it is home to the city's main penitentiary and slaughterhouse, along with abandoned industrial buildings. In the 20th century, the city's development leap-frog over this "open ditch," consolidating its neglect and honoring its infamous denomination as "the beggars promenade". Moreover, lack of planning and infrastructure have limited the stream's capacity, so every winter the area and surrounding neighborhoods are severely flooded, with increasing economic and social costs.

In most of the downtown section, the stream runs tunneled for more than 4 kilometers, a duct built in the mid-20th century is incapable to handle high intensity torrents in rain season. This is the main reason of the flooding, since all the excess water has to run through surface streets and neighborhoods, affecting an area of more than 60 hectares.

The proposal is based in the following fundamental operations:

1. Recognize the value of a new urban river for Santiago: recovering the ecological corridor and capitalizing on current investments in hydraulic infrastructure.
2. Celebrate the post-industrial character of the area: with a longitudinal park and Singular projects that will trigger economic and social development for the adjacent communities.
3. Integrate both sides of the city by bridging and adjusting the road network in the longitudinal and cross-section extension of the area

These three operations will be achieved in the "Thickness" of the corridor by means of a linear park whose principal characteristic is that of making it an alternate course for the excess of storm water.

⁴ The task force for the Santiago Inner Ring Project has been lead by architects Veronica Serrano, Marcelo Reyes Busch, Patricio Montedonico and Francisca Astaburuaga, acting as manager and coordinators for the various projects while fostering interaction with other public institutions (MOP, SECTRA, CONAMA, Chile Deportes, Municipalities, etc.) and the private sector.

⁵ To coordinate and facilitate the necessary agreements to implement the Inner Ring projects, a Project Board of Directors was established in June 2003, chaired by the Minister of Housing and Urbanism and comprised by the Minister of Public Works, the Assistant Secretaries of the Ministries of Transportation and Telecommunications and Public Works; the Governor of the Metropolitan Region, the mayor of the District of Santiago and the Chairman of the INVIA Board of Directors (real estate affiliate of the State Railway Company (EFE), the main public owner of the sites available in the area of the Santiago Inner Ring Project.)



Figure 2: Map of Santiago comparing the existing Mapocho river park system (above) to the proposed Aguada Park (below) mirroring the city's main public space in some of the poorest areas of the city



Figure 3: Rendering of the Aguada Park showing the permanent ornamental stream and the park sections determined to flood. All pedestrian bridges and river walls are designed to uphold the maximum capacity in the event of a severe flood.

The SEREX-UC project departed from these constraints and opportunities, proposing an urban development strategy that capitalizes on a series of investments already committed by the Government for storm water management. The Ministry of Public Works has been working in a Storm water and Sewage Plan for Santiago that contemplates to conduct and treat all sewage water separately from rain water by year 2009. In this plan, the government plans to increase the capacity of the existing tunnel by building a second one, which would carry the overflow from the original tunnel once its capacity reached limit. This option of was preferred by government engineers among other two alternatives.⁶ Despite its functional efficiency, the second tunnel option presented a US \$ 25 Million solution that would be active just few days a year hiding forever the stream without any social benefits apart from the avoided damage.

As an alternative for the second tunnel, SEREX-UC proposed the “Aguada Park,” a hydraulic open system that could restore and manage a higher stream than the tunnel option at a lower cost. The purpose of the park is to leverage the 25 Million Dollar investment allowing for the construction of green areas and the channeling of the rain water, so that a pleasant public space is created in this sector of the city. This floodable park was developed together with specialists from the Department of Hydraulic Engineering at The Catholic University, considering the latest trends in the design of urban streams. These practices are based on the principle that infrastructural works integrated with the urban landscape generate benefits beyond their mere hydraulic function.

The proposed “Floodable Park”, covers 60 hectares of green areas along the banks of the Zanjón de la Aguada, with sectors allowed to flood on a controlled basis during winter rains and which can be used during the rest of the year for other purposes, such as sports grounds, open-air theaters, recreational ponds, water sports, etc.

This new linear park not only restores the ecological corridor of the Zanjón de la Aguada, but also will become the driver for development and urban revitalization of one of the most difficult areas of the city. The Aguada Park seeks to become an Integral Green Urbanism Project that will change the image of, and encourage the construction development in, the sector. Its construction will be associated with the refurbishing of extensive sites located along its borders, such as the former San Eugenio Rail Workshops and the former San Diego station, generating an incentive for the development of the sites of various private industries located in the sector which amount to some 100 hectares.

The Aguada Park will not only become a new public space or green place for Santiago, but also an element of urban suture between the downtown area and the communities located to the south of the park. The park will include a series of structural and thematic elements that will recognize and celebrate the postindustrial character of the area, incorporate facilities such as sport fields and temporary venues for massive events and other short-term programs, to be dismantled in case of flooding. The proposed management model will incorporate innovative mechanisms for a self-sufficient maintenance of the park, supporting itself with private concessions, cross-subsidies and a recently implemented law of shared financing (between local governments and private operators).

⁶ The other two options were a deep high-pressure tunnel and the increasing of the existing tunnel section.



Figure 4: View of the wider section of the park, with light vegetation on the flooding areas and permanent vegetation on the dry perimeter. Bicycle lines and sports facilities are to be located in the flooding areas.

Some of the difficulties faced by the project were related to the natural fear of local communities to the idea of controlled flooding, concerns over maintenance costs from the side of the municipalities, and more importantly, aversion towards innovation from the side of governmental agencies. This aversion built up to the point when the whole project was jeopardized by a flaw in the economic and social evaluation process. The multidisciplinary approach presented by the Aguada Park lacked any methodological support from the side of the governmental agencies dedicated to project evaluation (MIDEPLAN), since there was no integrated methodology to scrutinize infrastructural projects that incorporated a park. This analytical flaw ignored any potential economic benefits derived from the park construction in terms of value increase on surrounding properties, hedonic indicators and environmental benefits among others. The different alternatives were evaluated based only in the avoided damage; despite the fact the park alternative was less expensive in terms of hydraulic works, thus making it more expensive than the other options if the construction and maintenance of the park had to be included.

To uphold this situation, the SEREX-UC team developed an integrated social evaluation methodology considering the real benefit change to the population by the construction of a new park. The benefits were calculated through the expected variation of property and parcel prices in the park's area of influence, including all social costs associated to expropriations, construction and maintenance of the park. If analyzed just by the park's social benefits, the park alternative presented a negative Net Present Value of almost US \$ 1 million, discounted at a social rate of 10% through a 25 year period, making the park option unfeasible in economic terms. Nevertheless, if the benefits derived from the avoided flood damage were included, the Net Present Value of the Park option turned a positive social return. This analysis became the main argument for the park option, convincing authorities to develop the first and major urban flood-park in Santiago.

3. Conclusions

The only way to revert the damage and abandonment the area has historically experienced is to integrate infrastructure with landscape and urban design. In order to do this, investment in infrastructure should no longer be thought solely for its functional role, but what also must be considered is its ability to integrate and incorporate as a fundamental part of a memorable

and efficient urban space, triggering economic and social revitalization at a scale larger than its mere logical function.

The Aguada Park proposed as an idea in the 2002-03 Urban Master Plan was developed further by SEREX-UC during 2005 in a pre-feasibility study for the park requested by the Water System Department of the Ministry of Public Works, where the design of the Floodable Park was calibrated to accommodate the complexities of the hydraulic modeling of the stream. This study was specifically aimed at creating a viable, innovative proposal for the design of the water system and landscaping, enabling MOP to currently develop the final engineering for the works to begin in 2007.



Figure 5: Aerial view of the project towards the west of Santiago, showing potential developments in the neighbouring areas.

Literature review

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