Country / City Santiago, Chile

University / School Pontificia Universidad Católica de Chile

Academic year 2018

Title of the project The Water Line. Landscape Infrastructure for Water Extremes

Authors Catalina Isabel Madrid Stevenson

TECHNICAL DOSSIER

Title of the project	The Water Line. Landscape Infrastructure for Water Extremes
Authors	Catalina Isabel Madrid Stevenson
Title of the course	Landscape as Infrastructure for Risk Reduction and Urban Resilience to Natural Disasters
Academic year	2018
Teaching Staff	Osvaldo Moreno and Arturo Lyon
Department/Section/Program of belonging	Magister en Arquitectura del Paisaje (MAPA)
University/School	Pontificia Universidad Catolica de Chile

Chile is currently going through one of the largest water crises in history, and due to Climate Change it is predicted that this crisis will increase, intensifying extreme hydrological events: floods and droughts. Every day, our rainwater is evacuated through closed pipes that are full of urban pollutants, instead of being used to irrigate gardens and groves as nature itself has taught us in the gorges of its mountains. The challenge is to take the principles of nature and integrate them into our cities, transforming the crisis into an opportunity. Following this principles, this project — located in Talca — demonstrates that the water balance of a city can be recovered through a water-sensitive design.
This green infrastructure proposal for the city of Talca is highly resilient to floods, incorporating sustainable drainage systems on its streets, squares and parks. This infrastructure takes advantage of rainwater to mitigate drought, recharging its aquifers through infiltration systems, and establishing storage points that allow to manage the vital resource in the driest periods. This would allow maintaining an interconnected network of green spaces that are support for various human activities, also offering a multitude of ecosystem services that improve the environmental quality of the entire city.

For further information
Máster d'Arquitectura dePaisatge -DUOT - UPC

T: + 34 93 401 64 11 / +34 93 552 0842
Contact via email at: biennal.paisatge@upc.edu

Máster d'Arquitectura dePaisatge -DUOT - UPC
ETSAB - Escola Tècnica Superior
d'Arquitectura de Barcelona
Avenida Diagonal, 649 piso 5
08028 Barcelona-Spain

CLIMATE CHANGE AGAIN

11th International Biennial Landscape Barcelona

Barcelona September 2020

SCHOOL PRIZE

DIAGNOSIS

Talca is a city in the Central Valley of Chile, which is crossed by multiple streams and channels due to its agricultural and industrial roots. Many of these channels have been closed over time, and as consequence, all their associated vegetation has been lost, intensifying even more the deficit of green areas present in the city.

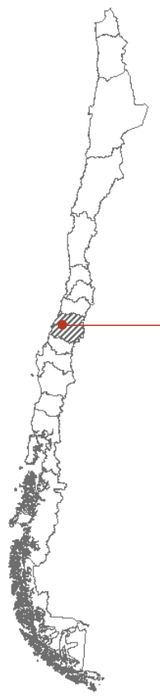
Every winter the city is affected by numerous floods that collapses its rainwater infrastructure based on collectors and sinks. Opposite situation of summer, where the lack of water is evident in the loss of its urban vegetation and in the drought of its aquifers.

A study of hydrological flows based on topography, shows an interior watershed that concentrates the greatest number of flood and drought points, reflecting a clear hydric imbalance. This watershed drains into an interior line that used to be an stream that crossed the city in all its latitude and which has been strongly modified with the urban expansion.
This line receives the water that falls in an area of 17 km2, and can receive about 2 million m3 of water in 72 hours, equivalent to 807 potential Olympic swimming pools.

Inundation Points (1-5)

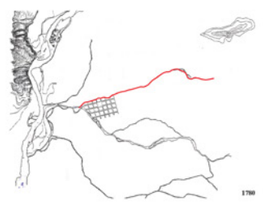
Open channels (6)

Closed Channels (7)



TALCA, CHILE

EVOLUTION OF THE CITY IN RELATION TO BAEZA HISTORIC STREAM



TALCA 1780

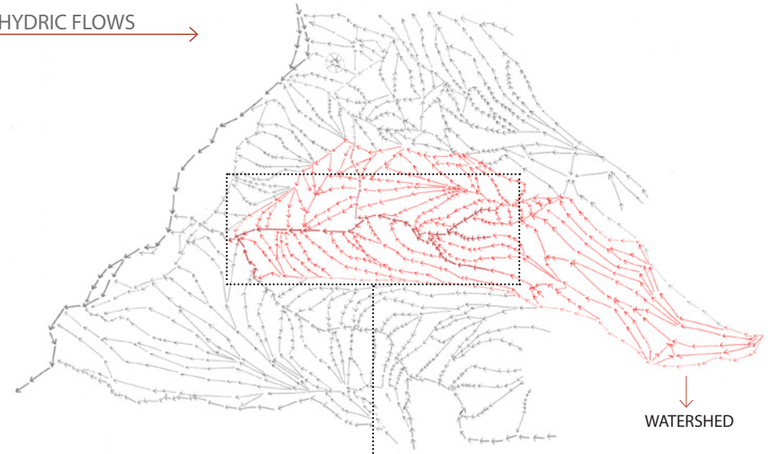
TALCA 1904

TALCA 1929

TALCA 1966

TALCA 1982

HYDRIC FLOWS



WATERSHED

FORMS OF WATER
Detailed mapping of main flood zones and water infraestructure along the drainage line

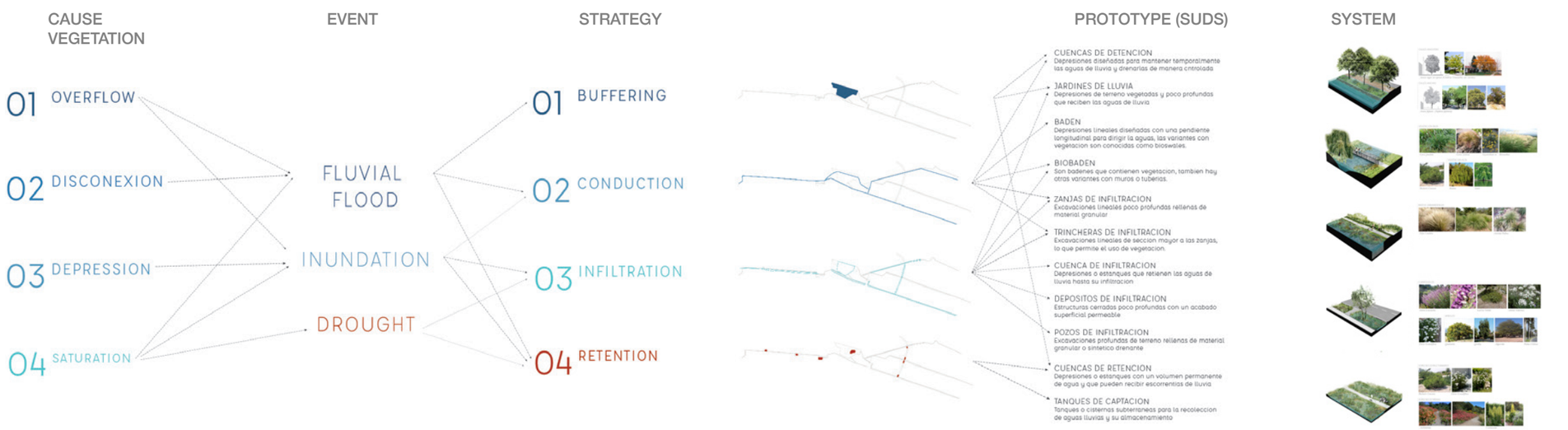
SYMBOLOGY — Constructed pipe — Projected pipe — Open Channel — Flood Area — Drought Area

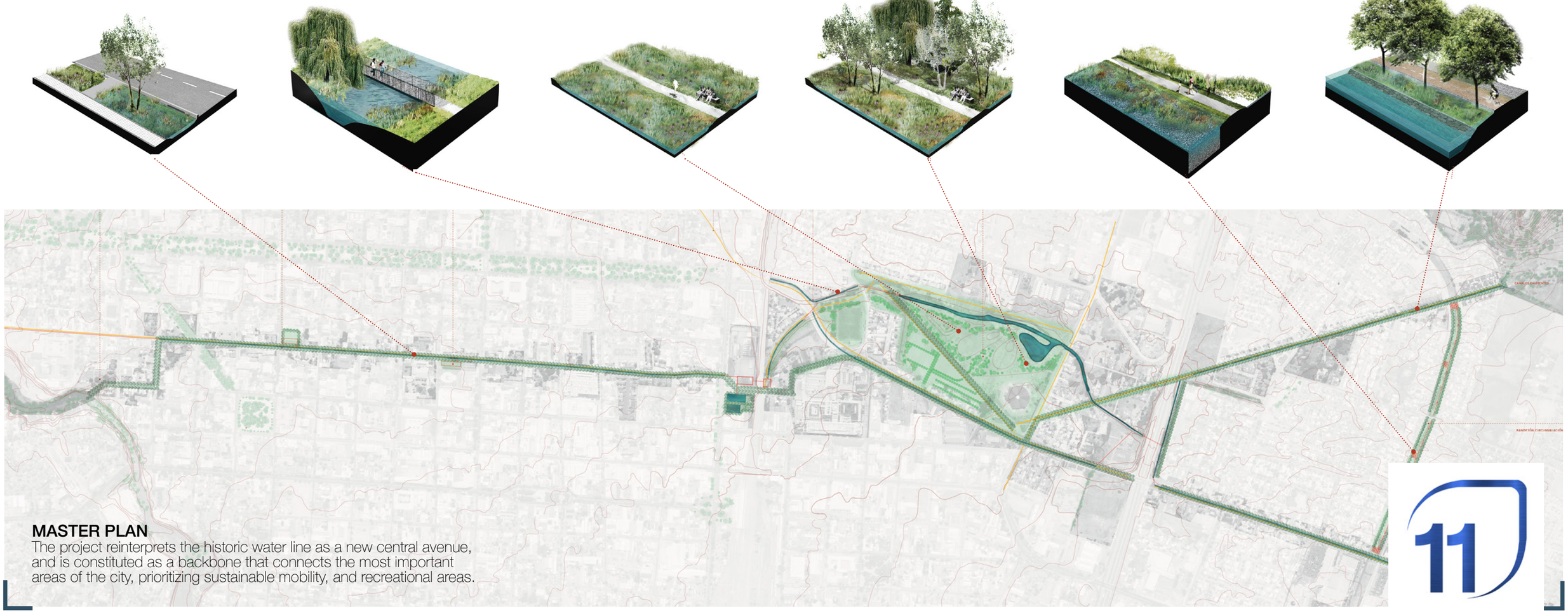
STRATEGIES

From a deep analysis of the causes of the floods, multiple strategies are proposed scattered in a linear and extensive infrastructure that allows managing the rainwater of all the watershed. Each of this strategies is associated to different prototypes of sustainable urban drainage (SUDS).
The axis of the historic stream function as the main water line, which collects all the flows.

All these strategies are integrated into an interconnected system of green areas, giving coherence and unity to the entire city. The project also recovers abandoned or deteriorated sites since the 2010 earthquake and transforms them into parks or squares associated to the central water line.

These strategies are combined in 6 basic systems, results of the dynamics between water and vegetation. Specific vegetation is proposed that adapts to the different hydric situations.

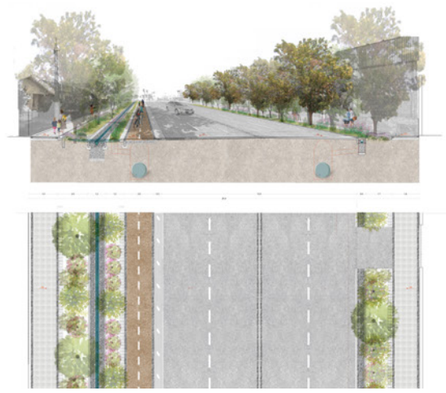




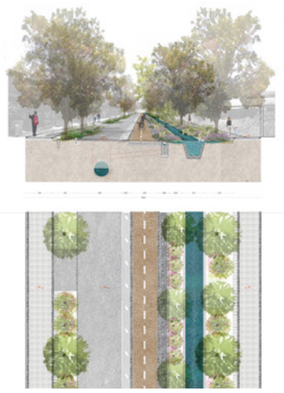
MASTER PLAN
The project reinterprets the historic water line as a new central avenue, and is constituted as a backbone that connects the most important areas of the city, prioritizing sustainable mobility, and recreational areas.

RECOVERED SQUARE IN HISTORIC AREA

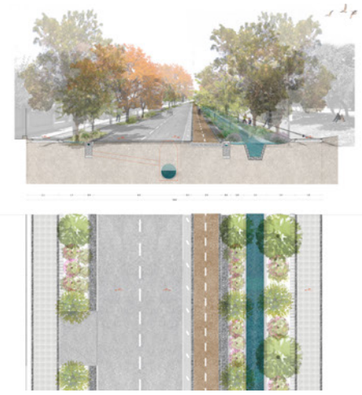
HISTORICAL PATH



CENTRAL PATH



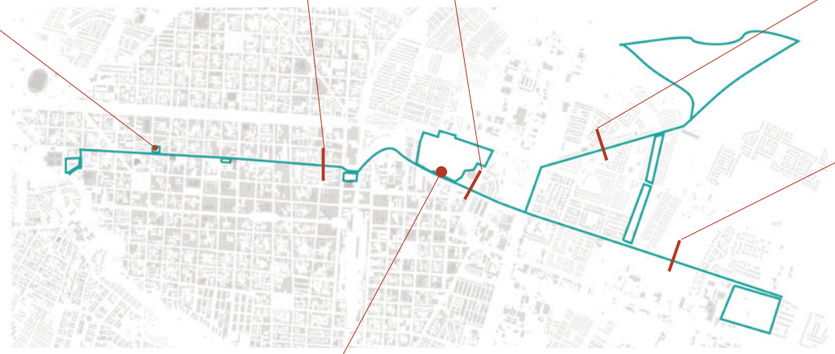
DIAGONAL PATH



EXPANSION PATH

SECTIONAL PLAN (Above)
This new avenue has been classified into 4 different sections according to its morphological and urban characteristics. Each one is designed in detail based on reference sections, they integrate urban channels as open systems and complement it with sustainable drainage systems.On the meeting points with squares and parks storage areas are planned, which help maintain the system during the dry season.

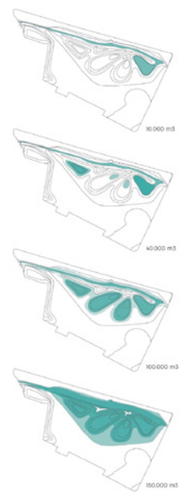
FLOODABLE CENTRAL PARK (Below)
In the central area of the project a floodable park is proposed, its topography allows the buffering of more than half of the rainwater in the watershed. This park reconnects the citizens of Talca with the last remnants of the historic Stream, and invites to reconnect with nature even in the heart of the city.



CENTRAL PARK

GENERAL VIEW

GENERAL PLANE



FLOOD SEQUENCE

SEASONAL SCENARIOS

FOR MORE INFORMATION ABOUT THIS PROJECT VISIT