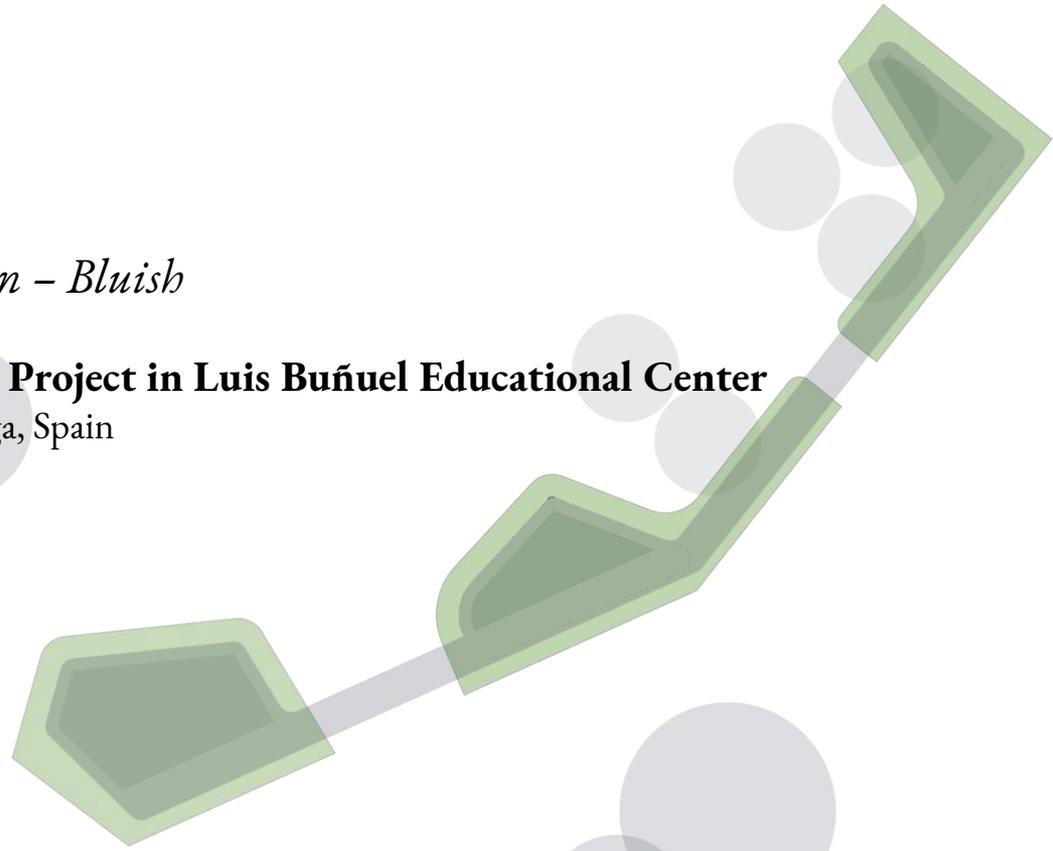


*Green – Bluish*

**SUD Project in Luis Buñuel Educational Center**  
Málaga, Spain





# IES Universidad Laboral

*This project was launched by the Agricultural Department of the Center for Vocational Training nº1 Universidad Laboral (Málaga, Spain) as part of the 'Learning with companies 2018' programme.*



**Aprendiendo con las empresas 2018**  
Proyectos de Entornos estratégicos Centros - Empresas



Unión Europea  
Fondo Social Europeo  
*"El FSE invierte en tu futuro"*



**Typology:** Infiltration trench and rain garden

**Promotor:** Center for Vocational Training nº1 Universidad Laboral | Junta de Andalucía | [www.universidadlaboraldemalaga.es](http://www.universidadlaboraldemalaga.es)

**Location:** Málaga, Spain

**Surface area:** 870 m<sup>2</sup>

**Cost:** 6.905,10 €

**Project team:** Celia Martínez Hidalgo, Mercedes Pérez Villalón.

**Collaborating firms:**

Participation Team | **CuartoCreciente** | *Virginia Navarro Martínez, Ana Parejo Farnés* | [www.cuartocrecientearquitectura.wordpress.com](http://www.cuartocrecientearquitectura.wordpress.com)

Designer and construction coordinator | **Dra. Arquitecta Celia Martínez Hidalgo**

Construction management | **D. J. P. Y E. Mediterraneum S.L.** | [www.mediterraneumpaisajismo.es](http://www.mediterraneumpaisajismo.es)



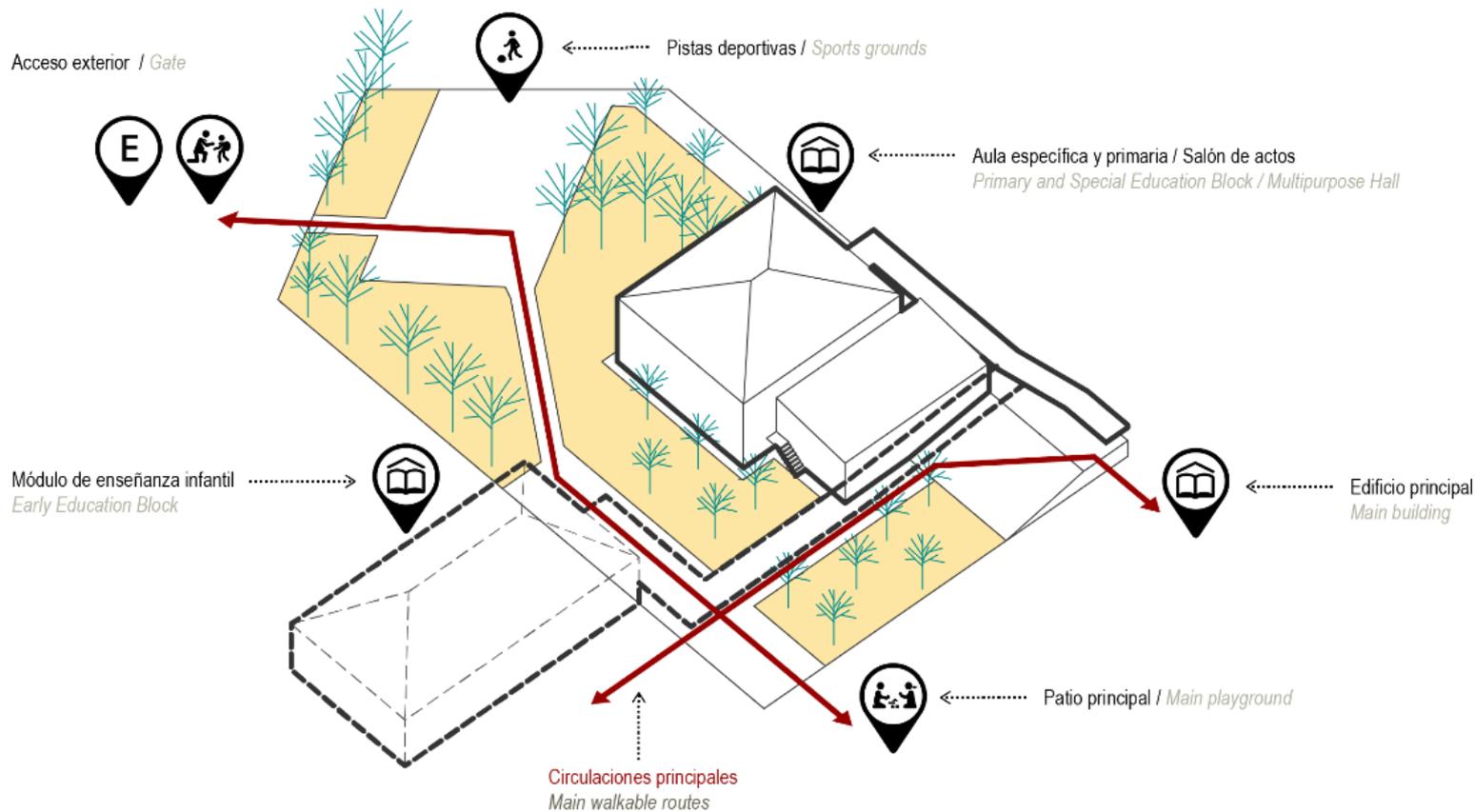
Mediterraneum  
PAISAJISMO • JARDINERÍA

**Design and construction team:** Advanced specific vocational training pupils (in Forestry, Agronomy and Landscaping)

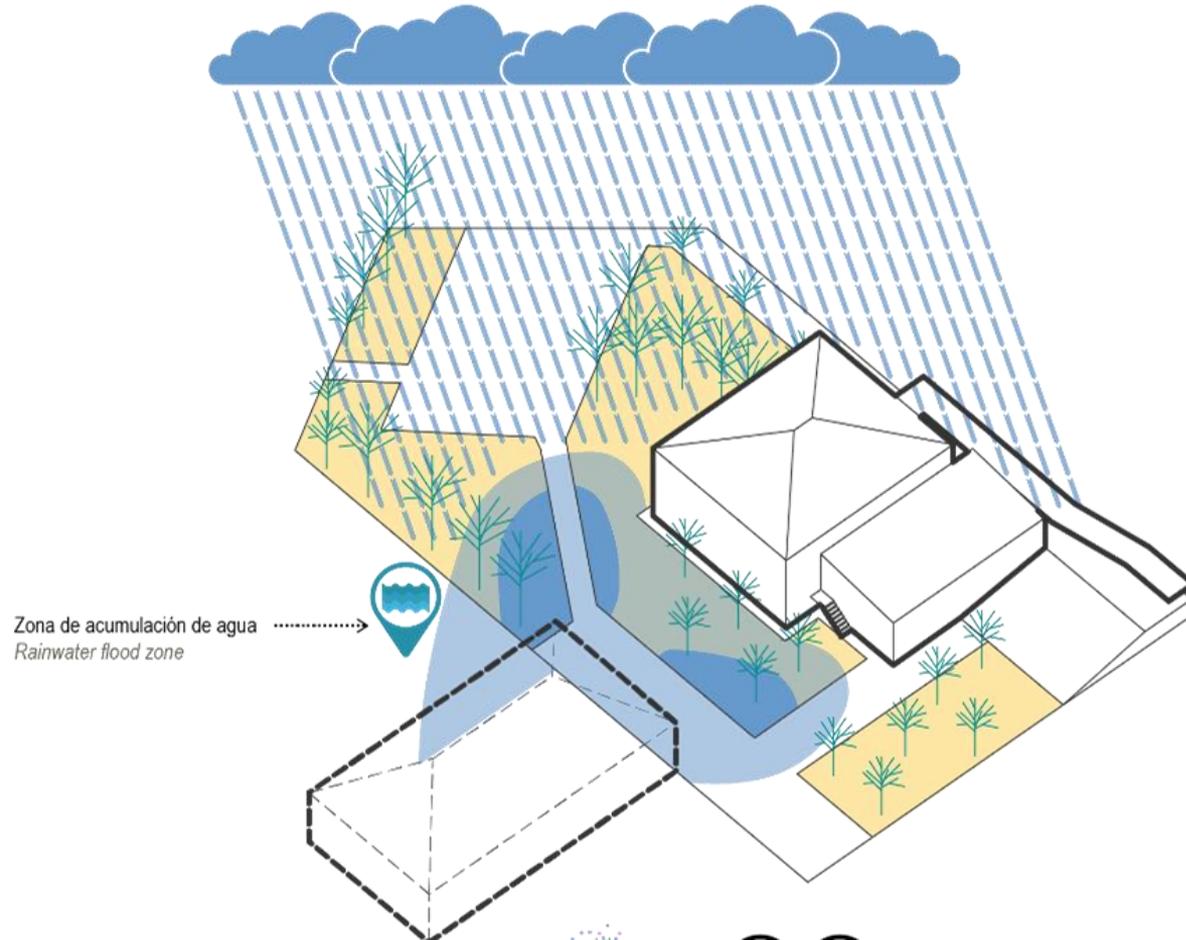
**Date of design and construction:** 2018



# SPACE USAGE SCHEME



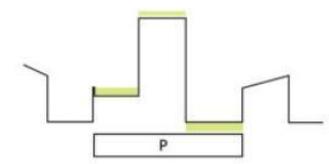
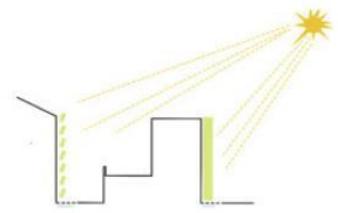
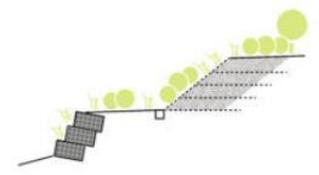
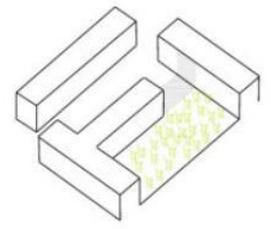
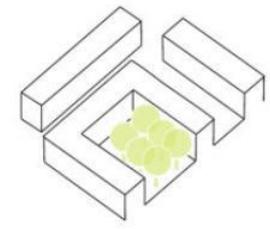
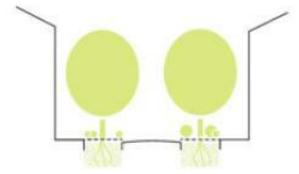
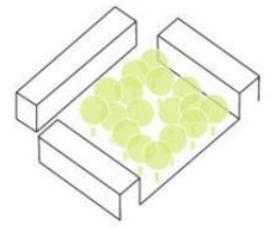
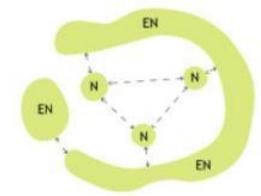
# WHAT IS THE PROBLEM?

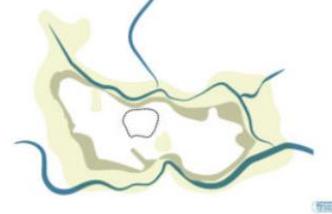
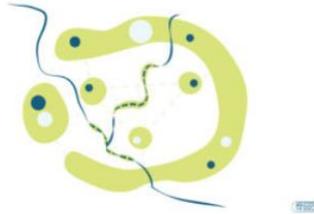
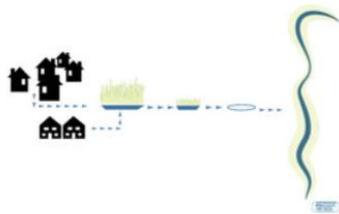
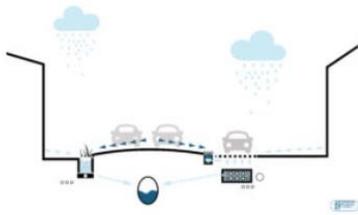
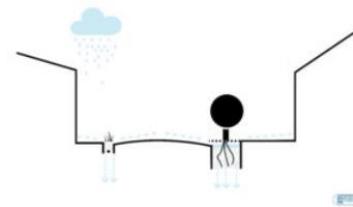
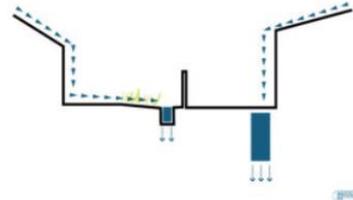
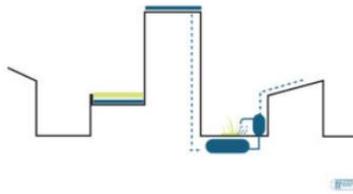
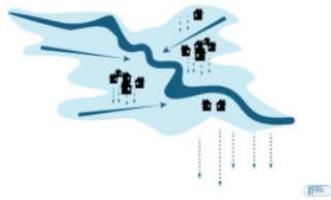




**Video:** Flood zone

# NATURE- BASED SOLUTIONS

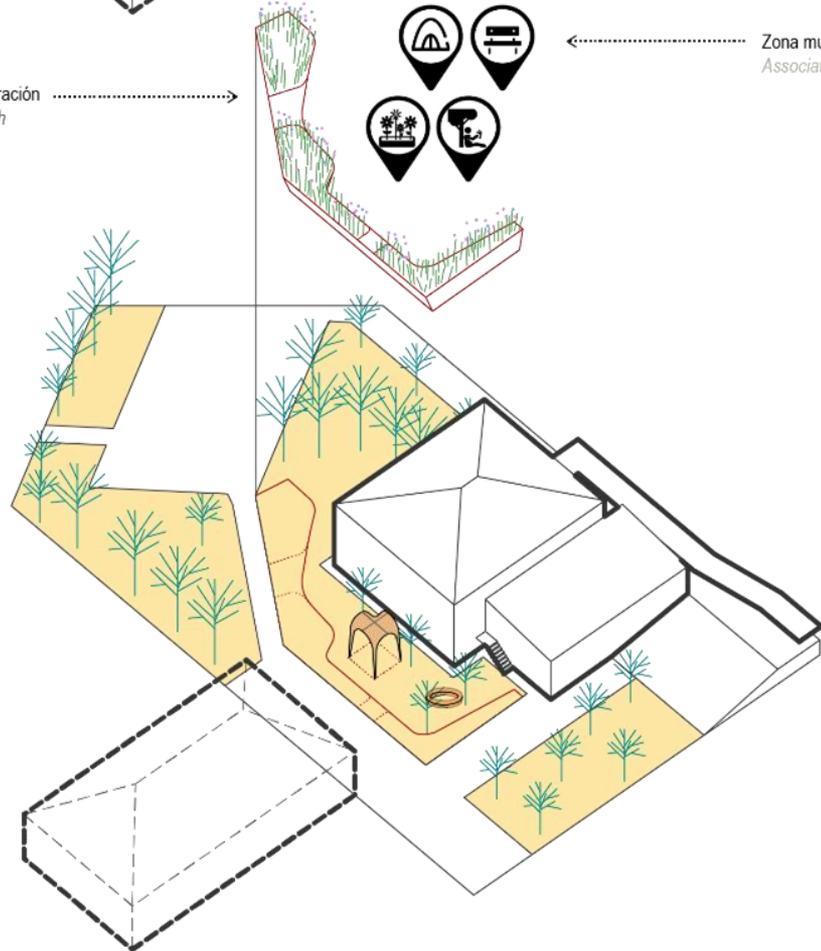




# PROPOSAL SCHEME\_Raingardens and infiltration trench

Jardines de lluvia y zanja de infiltración  
Raingardens and infiltration trench

←..... Zona multiusos asociada  
Associated multipurpose zone

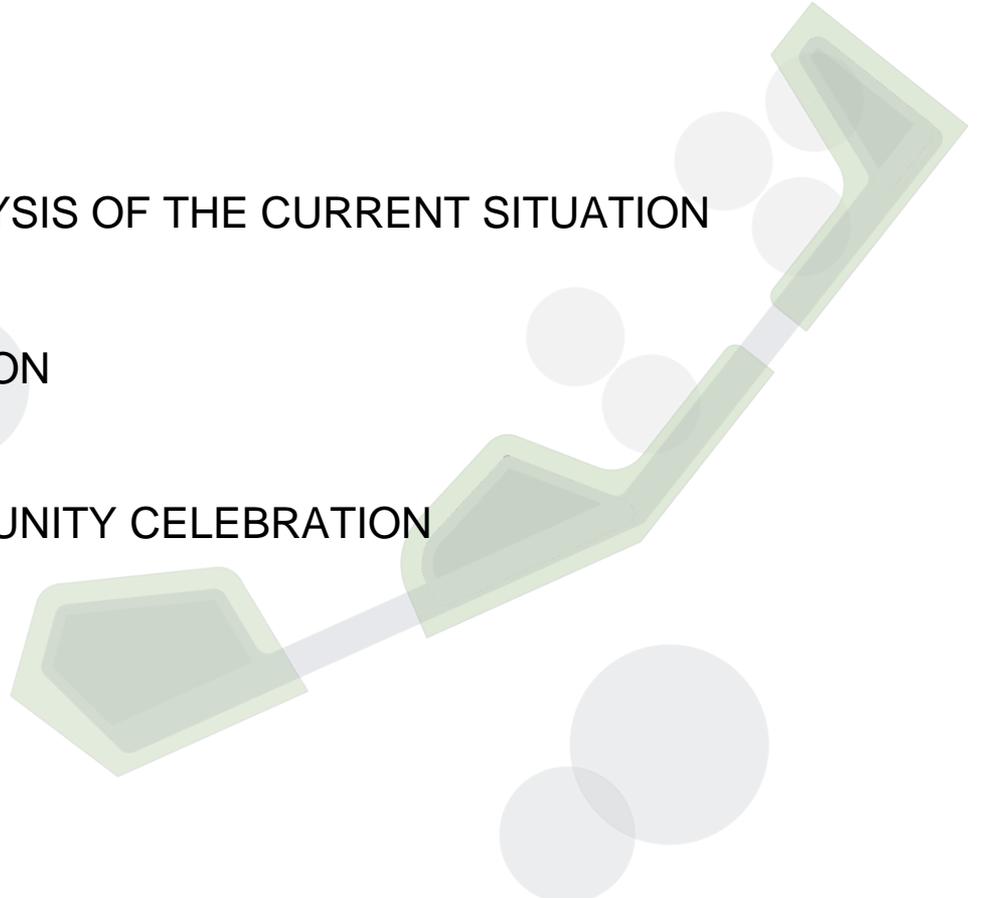


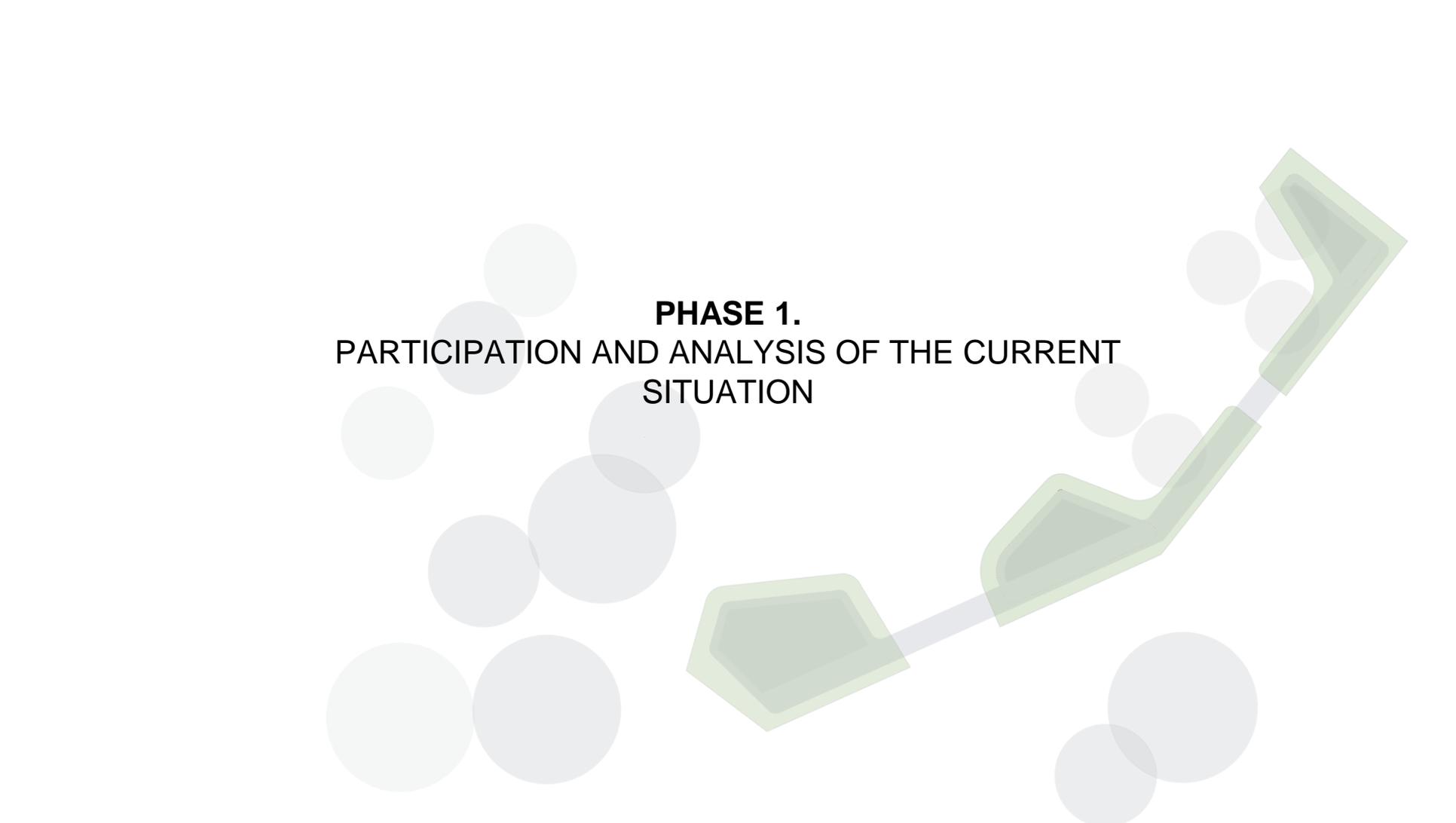
# PHASES OF THE PROJECT

**PHASE 1. PARTICIPATION AND ANALYSIS OF THE CURRENT SITUATION**

**PHASE 2. DESIGN AND CONSTRUCTION**

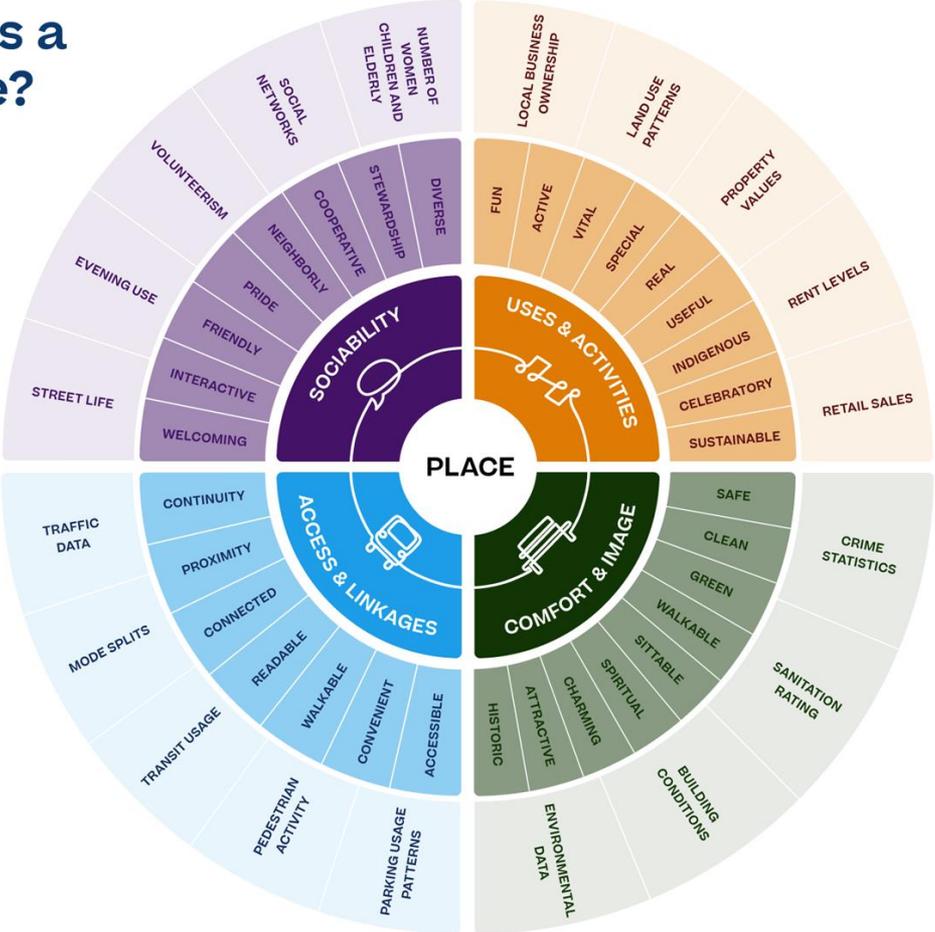
**PHASE 3. MAINTENANCE AND COMMUNITY CELEBRATION**



The background features a collection of semi-transparent, light grey circles of various sizes scattered across the page. A prominent green graphic element, consisting of a thick, semi-transparent line with a double-line effect, starts from the bottom center and curves upwards and to the right, ending in a sharp, upward-pointing arrowhead. The text is centered horizontally and vertically in the upper half of the image.

**PHASE 1.**  
PARTICIPATION AND ANALYSIS OF THE CURRENT  
SITUATION

# What Makes a Great Place?



Project  
for Public  
Spaces





Luis Buñuel





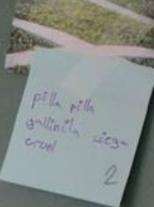


1

2



dos pisos 2



plata pilla  
galletita sica-  
cruel 2



si el intercambio  
de el medio es Ando  
del papa papa 2



Al momento  
mas paisajes  
muy 2



Patina C. Moravia 2



del lado de las  
fotos  
mas de  
pilla pilla 2



ocular en  
la foto 2



pl. m. 2



Cuarenta normal  
o de abstracción 2



Escalera  
pilla pilla  
siente  
en un piso 2



pilla pilla  
barra de resaca 2



EXCALA 2



3 o 4  
medios  
bucles  
sobre  
barra 2



PH. PH. a la zona 2



2



2



2





## PHASE 1:

- Analyse the characteristics of the site: topography and geology
- Identify natural flow paths, existing watercourse and surface water and potential infiltration zones.
- Inspiring by, supporting by or copying from nature: natural drainage systems.

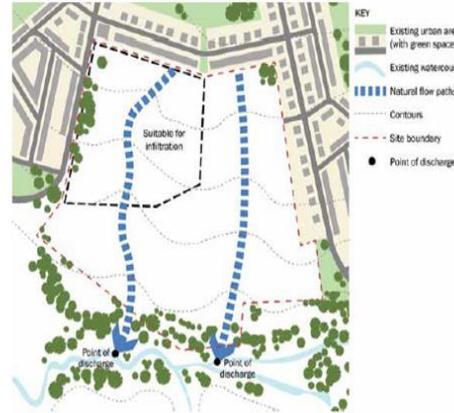


Figure 7.4 Characterising flow routes and discharge points

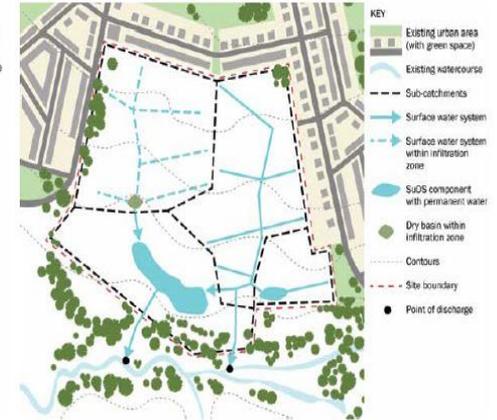


Figure 7.6 Defining surface water sub-catchments

### **Planning for SuDS - making it happen (C687):**

[https://www.eastcambs.gov.uk/sites/default/files/C687%20Planning%20for%20suds.pdf\\_0.pdf](https://www.eastcambs.gov.uk/sites/default/files/C687%20Planning%20for%20suds.pdf_0.pdf)



## PHASE 2:

- Reducing water runoff: Minimise large pavement areas and Increasing permeable surfaces.
- Define flood routing, potential infiltration areas or water storage systems in the design.
- Understand opportunities and constraints of the site and the design requirements (uses, activities, ...)

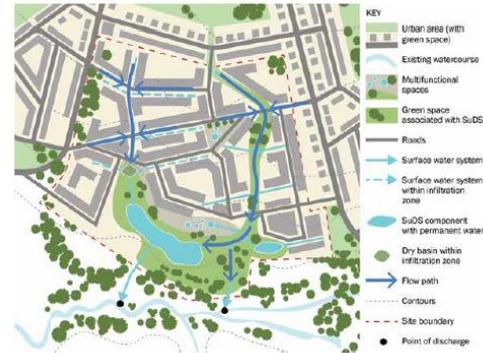


Figure 7.10 Defining exceedance routes

### **Planning for SuDS - making it happen (C687):**

[https://www.eastcambs.gov.uk/sites/default/files/C687%20Planning%20for%20suds.pdf\\_0.pdf](https://www.eastcambs.gov.uk/sites/default/files/C687%20Planning%20for%20suds.pdf_0.pdf)



X=369.120  
Y=4.065.800

MALAGA  
MALAGA

CL TAMAYO Y BAUS

Zona 1

Zona 2

Zona 3

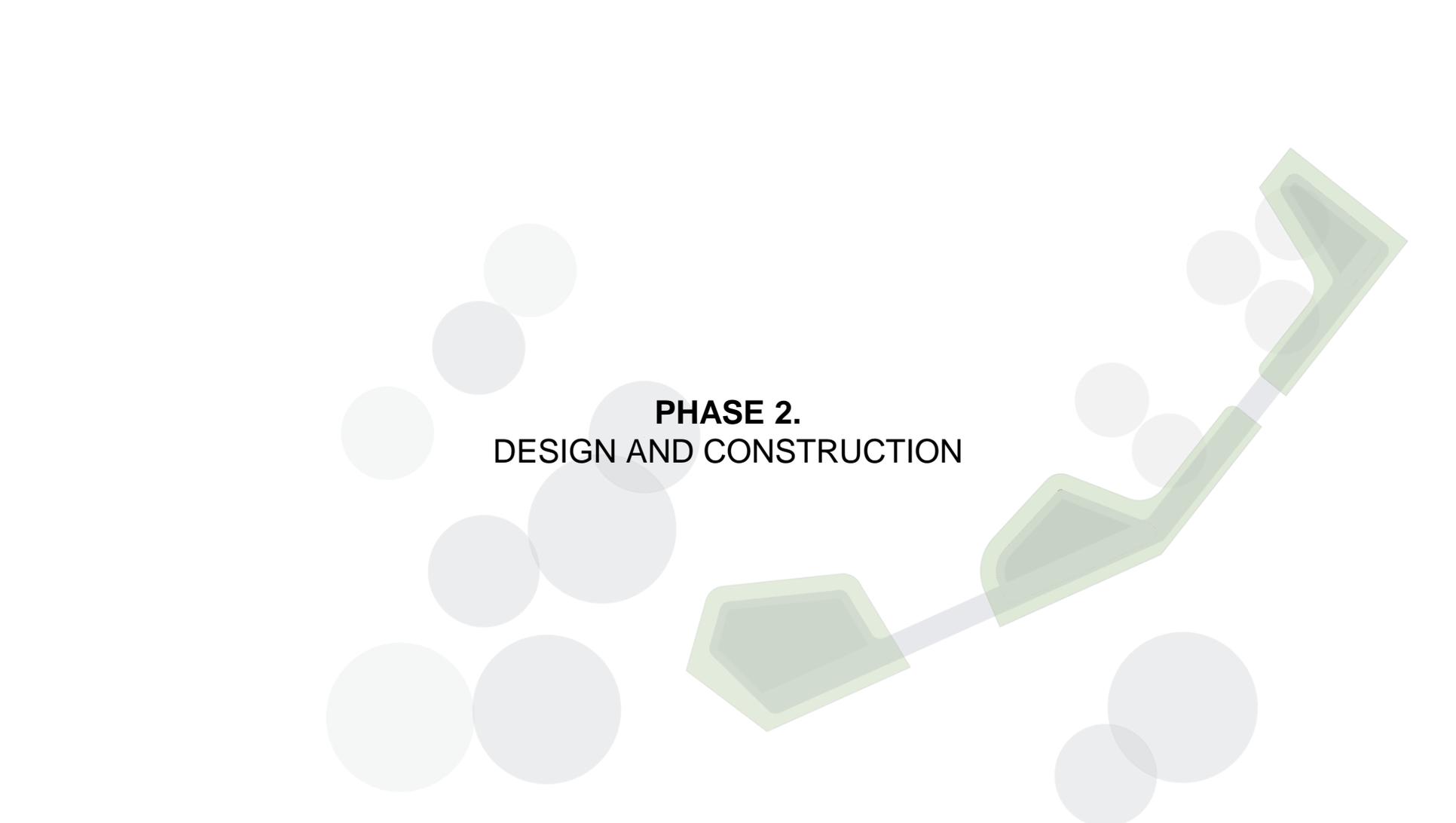
X=368.982  
Y=4.065.724









An abstract graphic featuring a light green path that starts as a pentagon on the left and curves upwards and to the right, ending in a trapezoidal shape. The path is composed of several segments connected by a thin grey line. Scattered around the path are numerous semi-transparent grey circles of varying sizes. The overall composition is clean and modern, with a white background.

**PHASE 2.**  
DESIGN AND CONSTRUCTION



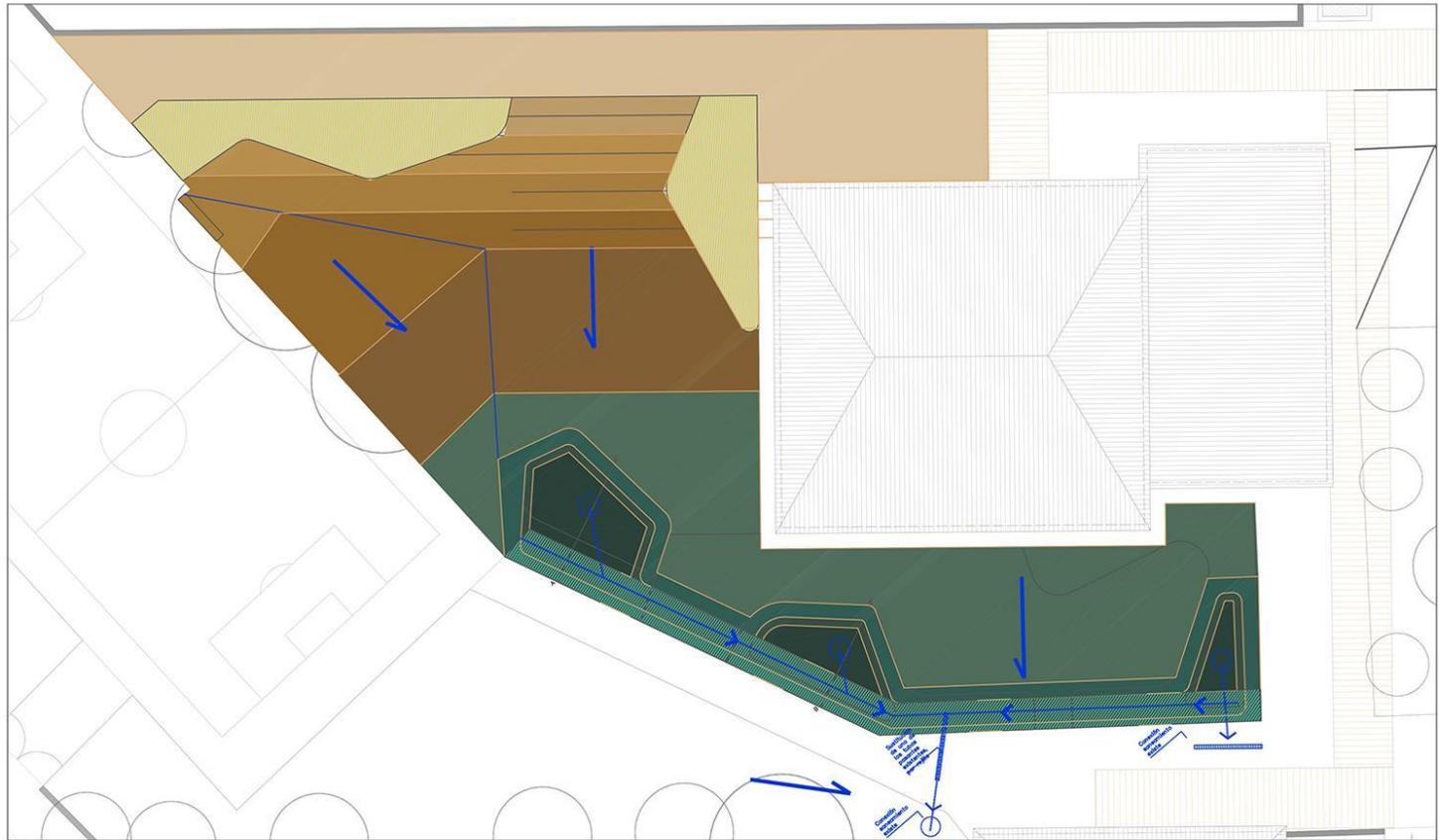
**PARAMETERS**

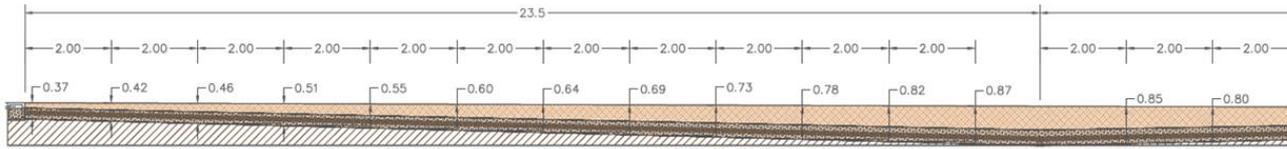
- Permeability
- Water table
- Climatological values
- Rainfall flow rate
- Infiltration flow rate



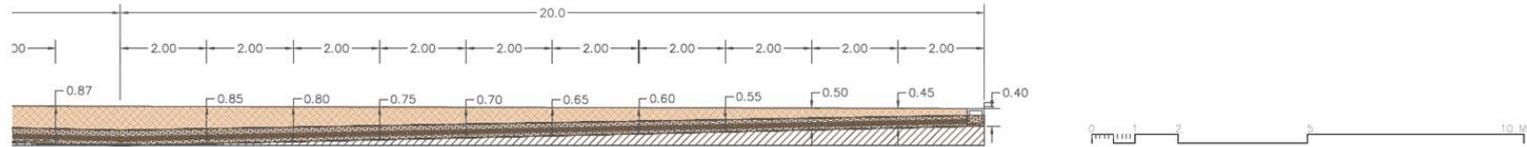
Drainage area  
(SuDS area)

Depth of drainage area

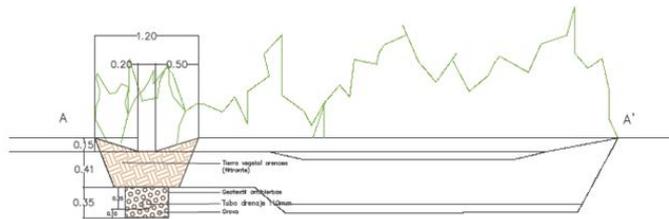




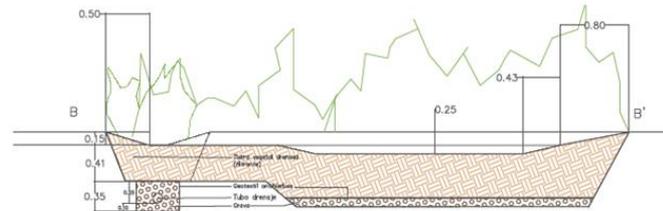
**Infiltration trench section - Tranche 1 and 2**



**Infiltration trench section - Tranche 2 and 3**



**Infiltration trench type section**



**Infiltration trench and rain garden type section**

-  Planting soil layer (min. 15 cm)
-  River stone or gravel
-  Geotextile filter
-  Perforate drain pipe (2,5%)



## PLANT SELECTION

*Ammophila arenaria* (1)  
*Bupleurum fruticosum* (2)  
*Bulbine frutescens*  
*Carex albula* (3)  
*Centranthus ruber* (4)  
*Iris sp*

*Juncus inflexus* (5)  
*Myrtus communis* (6)  
*Pistacia lentiscus*  
*Tulbaghia violacea*  
*Verbena bonariensis* (7)  
*Vitex agnus castus* (8)





























**PHASE 3.**  
MAINTENANCE AND COMMUNITY CELEBRATION







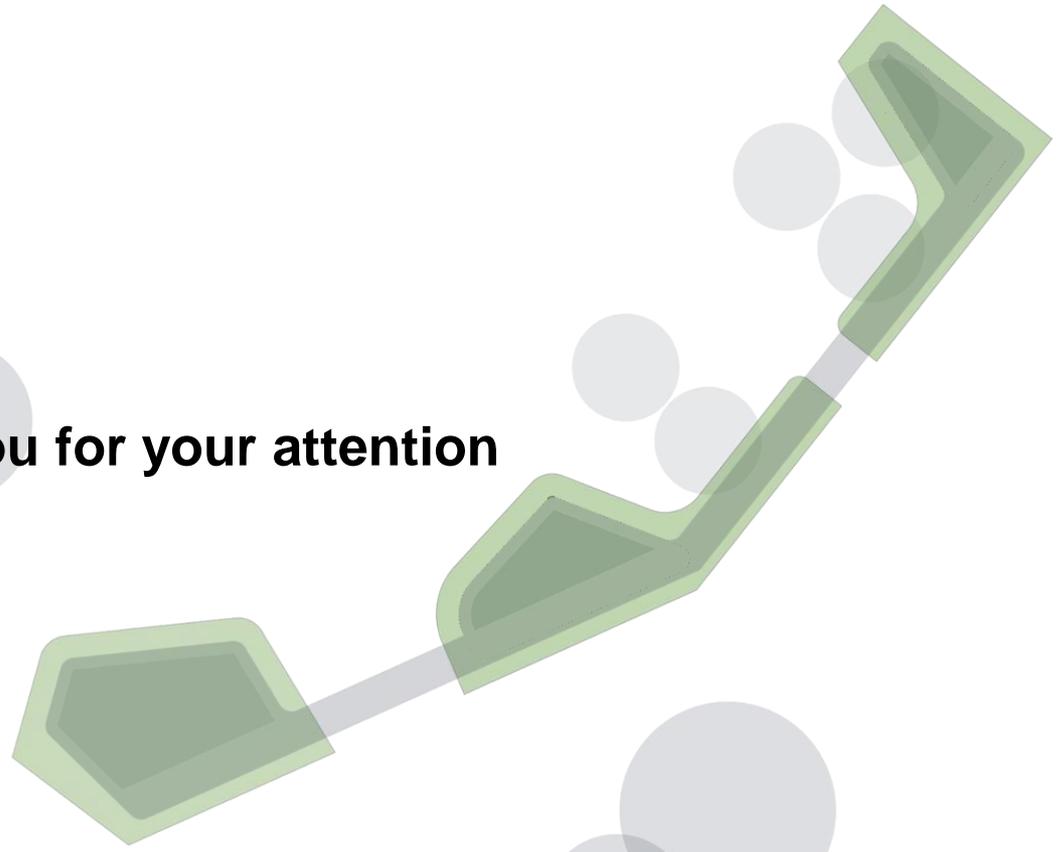








**Thank you for your attention**



**Aprendiendo con las empresas 2018**  
Proyectos de Entornos estratégicos Centros - Empresas

