



1.underground housing

CLASSIFICATION

Fenestration Arrangement



CHAMBER



ATRIUM

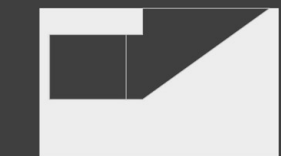


ELEVATIONAL



PENETRATIONAL

Ground Surface Relationship



SUBGRADE



BERMED (earth covered)



BERMED (no earth on roof)



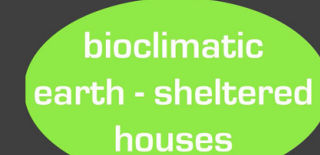
HILLSIDE

Advantages

> It preserves limited surface open space. > **Limit visual impact.** > Promotes efficient land use. > **Provides a noise-free.** > Reduces energy costs by reducing heat loss increasing the potential for earth cooling. > **Dampens daily temperature fluctuations.** > Reduces life-cycle and maintenance costs. > **Offers protections from natural disasters.**

Disadvantages

> Increased construction costs. > **Limit or no natural light.** > Limited access and air circulation. > **Limited visibility.** > Negative psychological reactions and site restrictions.



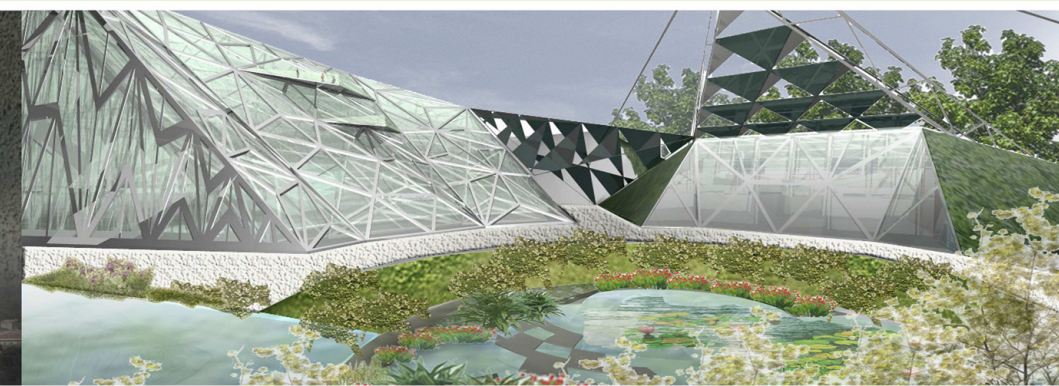
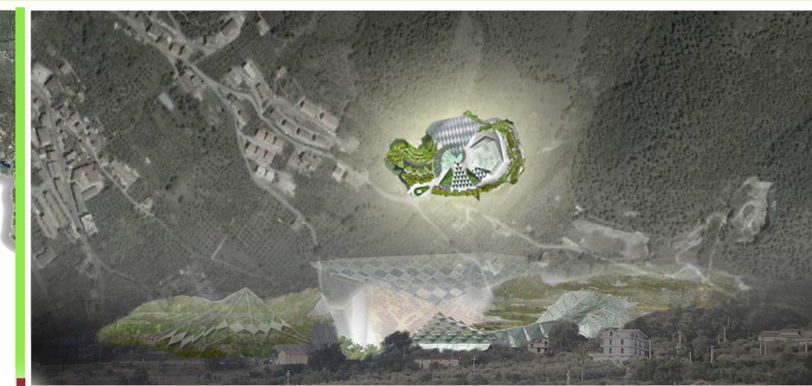
Concept The faculty of Art and Design - Singapore Mecanoo's Library - Delft

The earth covered spaces are free from many of the technical disadvantages of underground building while able to enjoy the spatial advantages. It is open to natural light which is able to penetrate the space with no special techniques.

DESIGN and BUILDING TECHNOLOGIES

- > SITE TOPOGRAPHY and ORIENTATION
- > USE THE HILL TO MINIMISE CUTTING
- > GOOD DRAINAGE
- > WATER PROOFING
- > MINIMAL OR NO GLAZING TO NORTH
- > BRISE - SOLEIL AND TREES FOR SOLAR CONTROL
- > GLAZING TO SOUTH TO PROVIDE HEAT DURING WINTER SEASON AND NATURAL LIGHT
- > GREEN ROOFS: INTENSIVE or EXTENSIVE

2.a case study in southern Italy



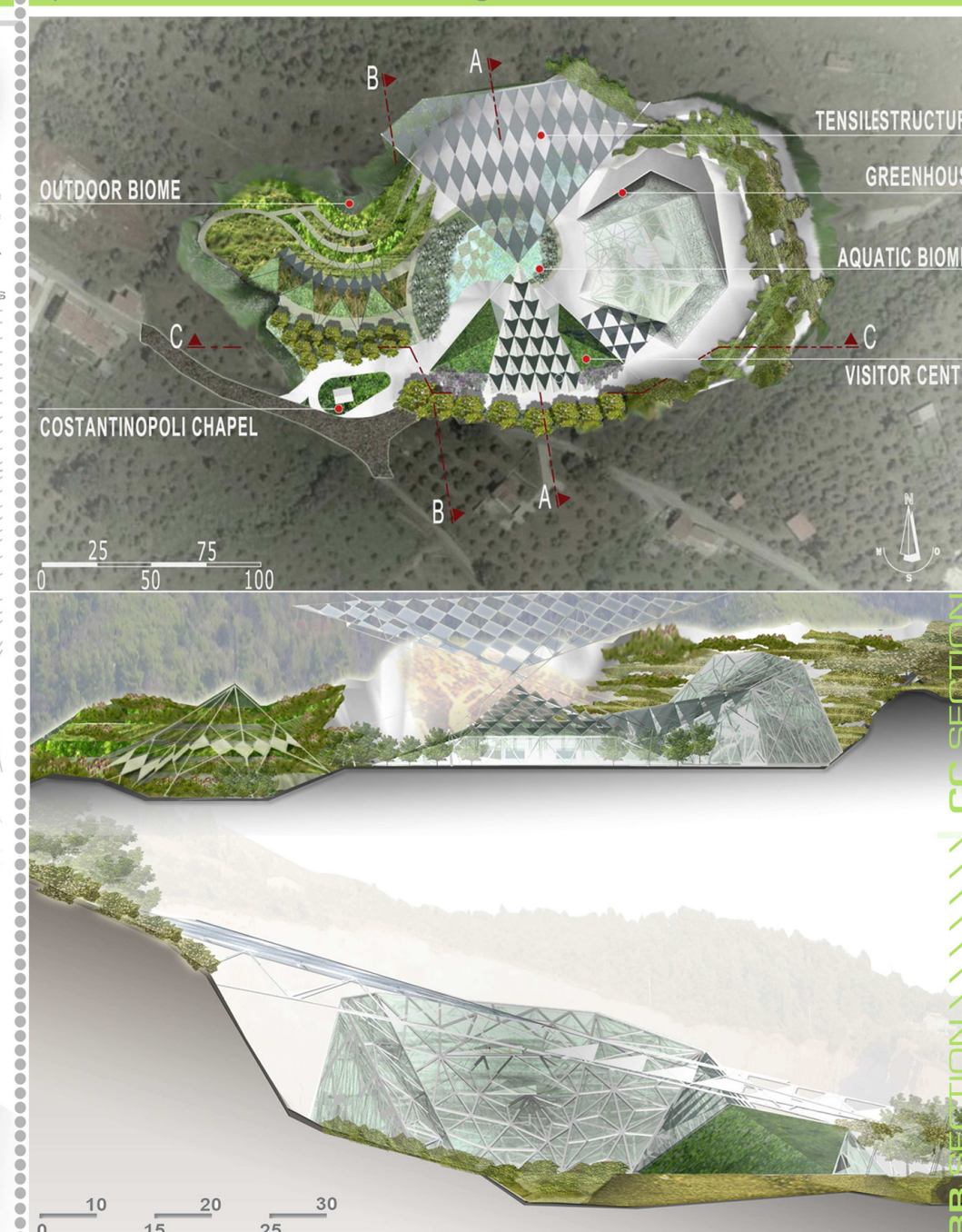
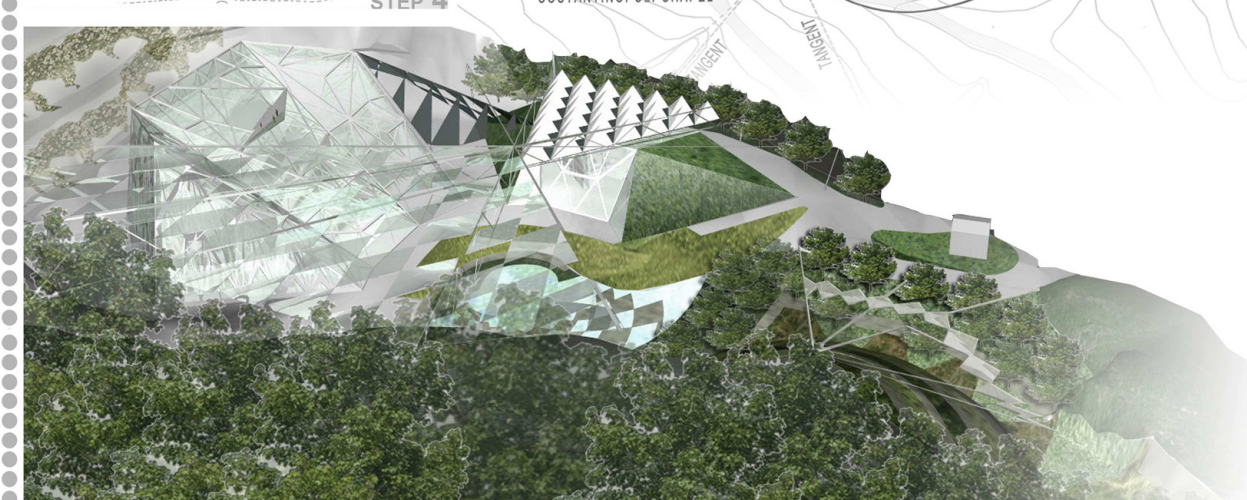
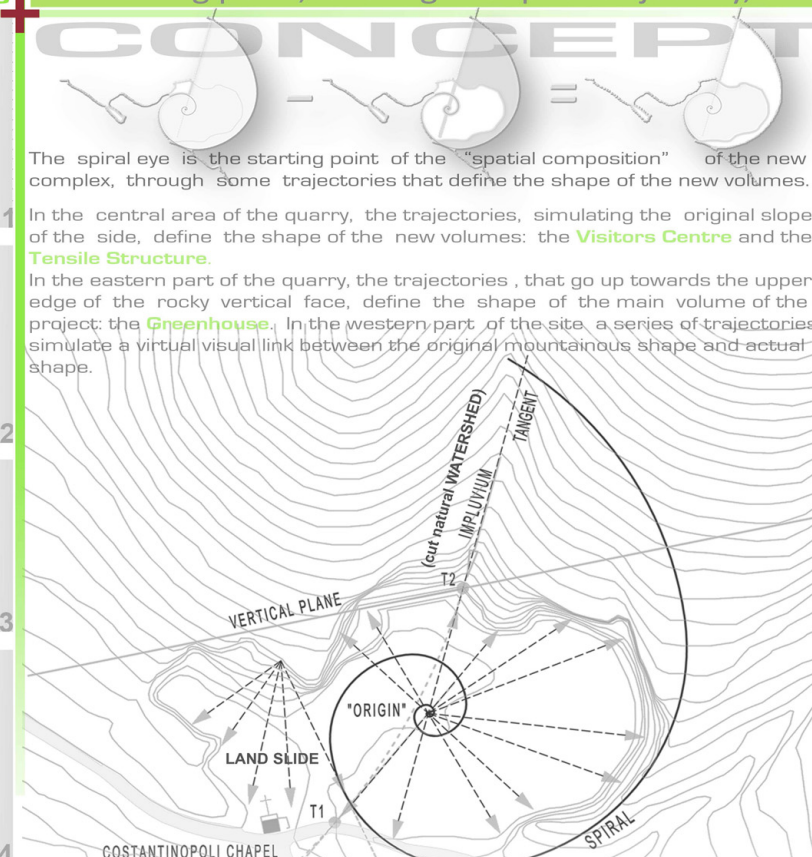
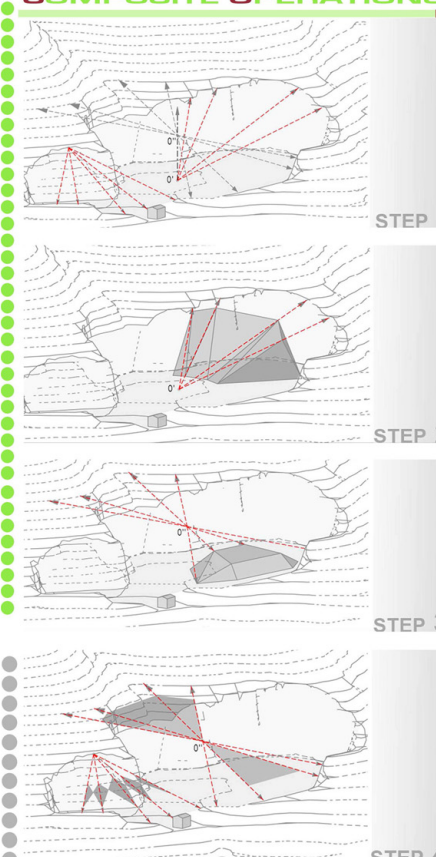
The idea of "RE-USE" | The project provides a "new green economy" through the development of a bio-agriculture, a biofactory and an eco-sustainable research and combines ecology, horticulture, science, art, architecture and traditions of "Vallo di Diano". It is aimed to educate visitors about the importance of a sustainable environment through the study of plants and sustainable strategies. The solution were inspired by looking through nature, fractal geometry and the landscapes of the site.

The PROJECT | The final result of the composite process is a park, that is characterised by the presence of closed spaces and outdoor areas. From the starting point, covering the spiral trajectory, the

following project areas have been defined: a open air space, covered by the Tensile Structure, the Greenhouse, the Visitors Centre, the Outdoor Biome and the Aquatic Biome. The covered open air space is characterized by the presence of the natural rocky face that can generate chimerical visual effects as well as becoming a large screen for lighting effects and for projections.

Many of the design choices are realized by means of a reinterpretation of natural transformations of the site and a definition of a new architectural spatial system that is inspired by natural growth (SPIRAL) and fractal geometry. Through the relationship between main elements of the quarry it has been defined a virtual point that symbolizes the beginning of composite operations. The spiral is a symbol of a sunflower, a vortex. The environmental education, as knowledge, is the light that illuminates the humans' mind. The mind's organic development requires an organic architecture, the spirit of nature annexed in a building.

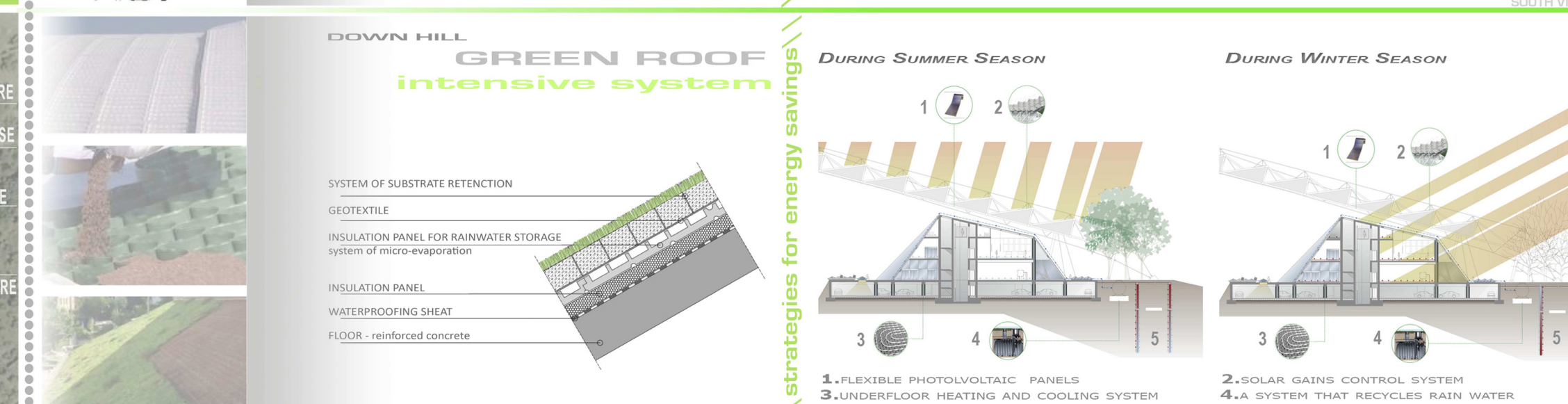
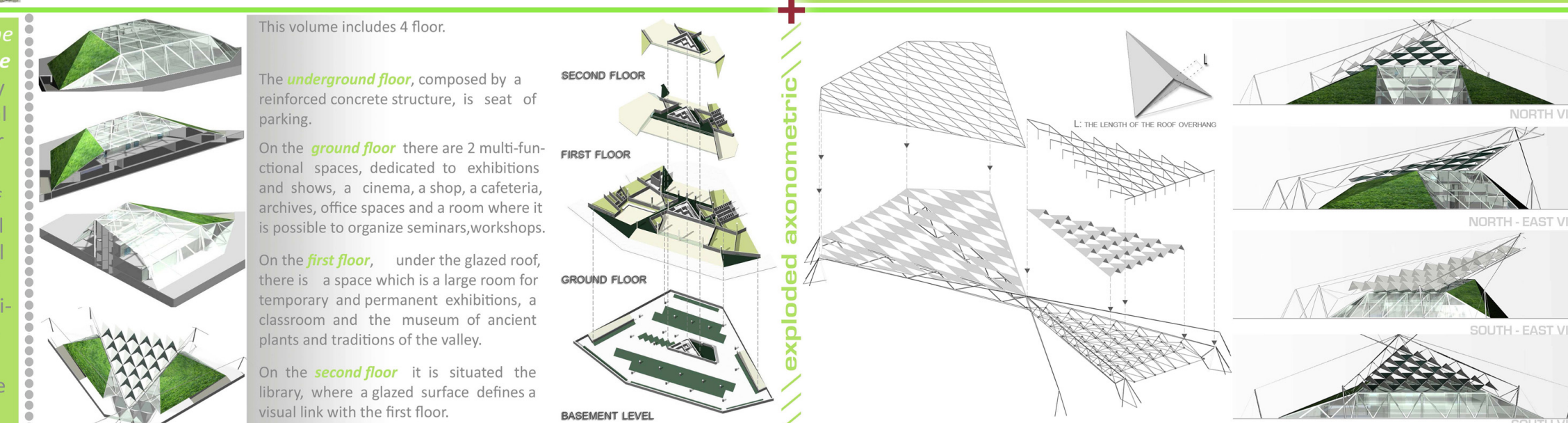
COMPOSITE OPERATIONS



The "VISITORS CENTRE" | The Visitors Centre provides the park with an education facility, incorporating classrooms and exhibition spaces. The shape of this volume has been defined through a new re-interpretation of original slope of the side. The building appears like a rocky portion of the surrounding scenery as it looks like as it is "growing" out the ground. The fractal shape of the green roof is designed as decomposition of plane surfaces with triangular shape. The southern façade is characterized by a glazed surface. The eastern and western envelope are partially covered by a "green living roof".

The TENSILE STRUCTURE | is covered by a tubular steel space-frame, suspended to a tensile structure. The steel space-frame includes: > **photovoltaic cells** that are placed on triangular surfaces; > a series of tridimensional elements, covered by a glass-silicone membrane, for the **control of the direct solar radiation.**

the VISITORS CENTRE and the TENSILE STRUCTURE



the GREENHOUSE and the "Re - NATURALIZATION"

