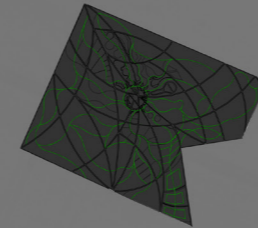


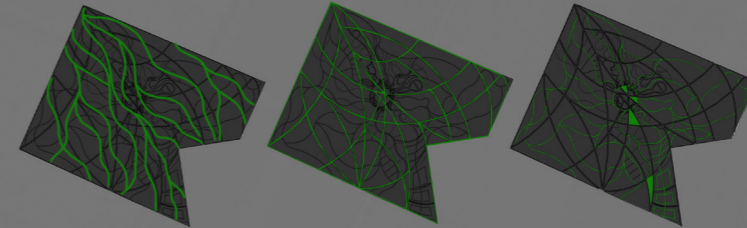


**Site Circulation Strategy**



The site consists of minimal car parking to discourage the use of vehicles which has high levels of carbon emissions. However, the site encourages walking and cycling providing bike paths and walk ways all around the site.

**Site Layout & Design Process**

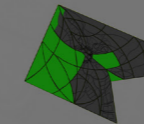


As part of the Canterbury plains, palimpsest patterns from the old river channels are still present and can clearly be seen on the satellite images. These patterns are used as a tool to connect the design to the landscape.

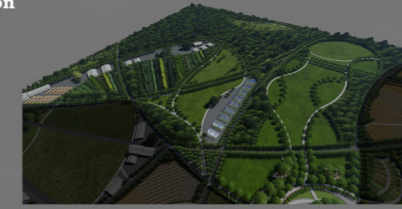
Utilizing the landscape patterns based on the deep forms theory, it formulates the roadways of the site through mimicking patterns, which determines the general layout of the design. This allows easy access throughout the site.

As the river patterns that run through the site determines the main roads, the activity assigned within these spaces act like stones placed in the running river, breaking and slowing down the water which formulates the bike paths and walk ways.

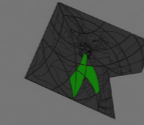
**Strategy 1: Remove Existing Carbon**



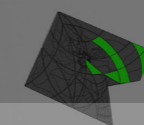
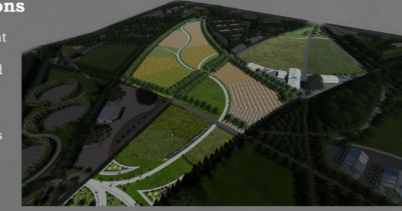
The arboretum area runs mainly along the West side of the site. Mainly this area focuses on showcasing various species of plants that are good in carbon sequestration as well as providing a multi-purpose public space for people to utilize. The arboretum stretches across the site along the internal road system formulating a solid green infrastructure.



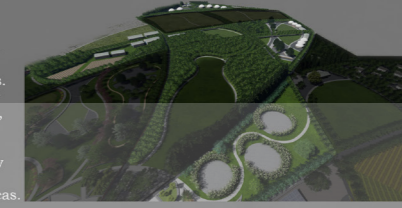
**Strategy 2: Reduce Carbon Emissions**



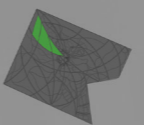
This area focuses on different ways modern agriculture can be modified and adapted to reduce carbon emissions. The area consists of farm land with different soil types and orientation which allows research to be done through experimenting different methods. The area also allows further research in water treatment and ways to filter run-offs from agricultural practice.



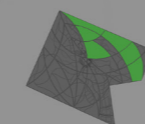
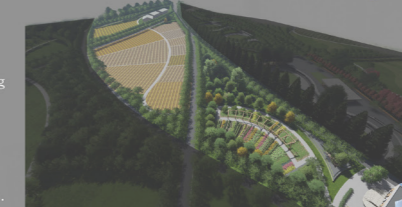
Bio energy research focuses on re-using bi-products of both plants and animals and turning them into energy we can use in the form of Biogas. As the site is surrounding by both animal and plant farms, Biowaste products from the surrounding farms can be collected and converted into energy to use on the site. The site provides the opportunity for Biochar research to be done and demonstrated on the agricultural fields of the alternative crop and agriculture areas.



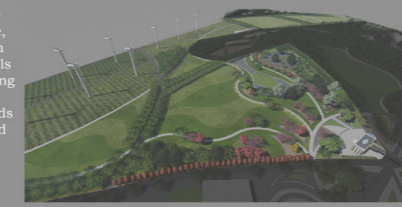
**Strategy 3: Prevent Carbon Emissions**



By growing high protein crops on the site, it provides the opportunity to demonstrate the benefits of consuming local food. By reducing the food miles practically to almost zero, it prevents the carbon emissions produced along along the transportation process. The area also researches on the growth of different crops that can be used for sustainable food options whilst these crops are also sold to the students & staff which encourages low food miles.



The area allows study and research on alternative ways of producing energy whilst being carbon free, as well as physically producing energy to run both the facility and Lincoln University. The solar panels formulate a landscape of themselves therefore being located at the far end of the site. The wind farm consists of wind turbines with additional crop fields underneath them to maximize space use. The road system that runs along the site allows easy access to the machinery for maintenance purposes. As well as being actively producing clean energy, having research and study labs right next to these facilities allow first-hand experiences for the students. This area allows different types of clean energy production methods to be tested for a better future.



**Plan Key**

- Road Access
- Asphalt
- Bike Ways & Walk paths
- Trees
- Solar Panels
- Bio Tanks
- Buildings
- Lawn
- Alternative
- Powerline Tower
- Agricultural Land

Country / City ..... New Zealand / Christchurch  
 University / School ..... Lincoln University / School of Landscape Architecture  
 Academic year ..... 4th Year  
 Title of the project ..... The Carbon Solution Project  
 Authors ..... Tanapol Chitongartpakdee

## TECHNICAL DOSSIER

Title of the project	The Carbon Solution Project
Authors	Tanapol Chitongartpakdee
Title of the course	Major Design
Academic year	4th Year
Teaching Staff	Gill Lawson
Department	School of Landscape Architecture
University	Lincoln University



Written statement, short description of the project in English, no more than 250 words

.....  
**Project Vision:**

.....  
The Carbon Solution Project will be the key for Lincoln University becoming the first carbon-free university in New Zealand. The facility will be providing various research areas based on the three main strategies of carbon sequestration. Not only will the facility improve Lincoln, but will act as a catalyst of change, demonstrating actions and coming out with solutions to problems that will lead to the ultimate goal of a carbon-free future.  
.....

.....  
The primary goal of the project is to reduce the amount of carbon in the atmosphere through three strategies. Reduce existing carbon emissions, reduce existing carbon in the atmosphere, and to prevent carbon emissions in the first place.  
.....

.....  
For further information  
**Máster d'Arquitectura del Paisatge -DUOT - UPC**

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

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ETSAB- Escola Tècnica Superior  
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Avenida Diagonal, 649 piso 5  
08028 Barcelona-Spain



# CLIMATE CHANGE AGAIN

11th International Biennial Landscape Barcelona

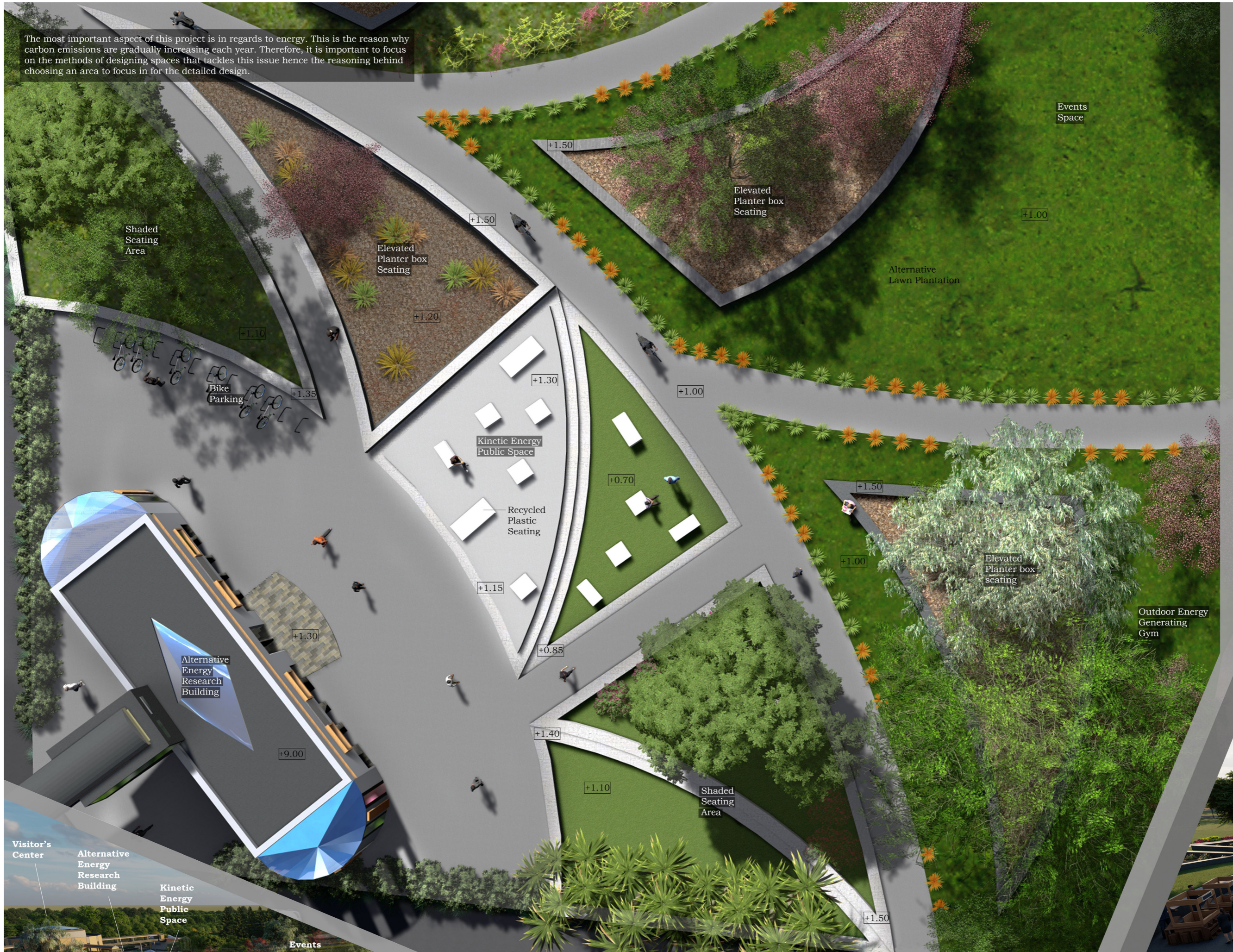
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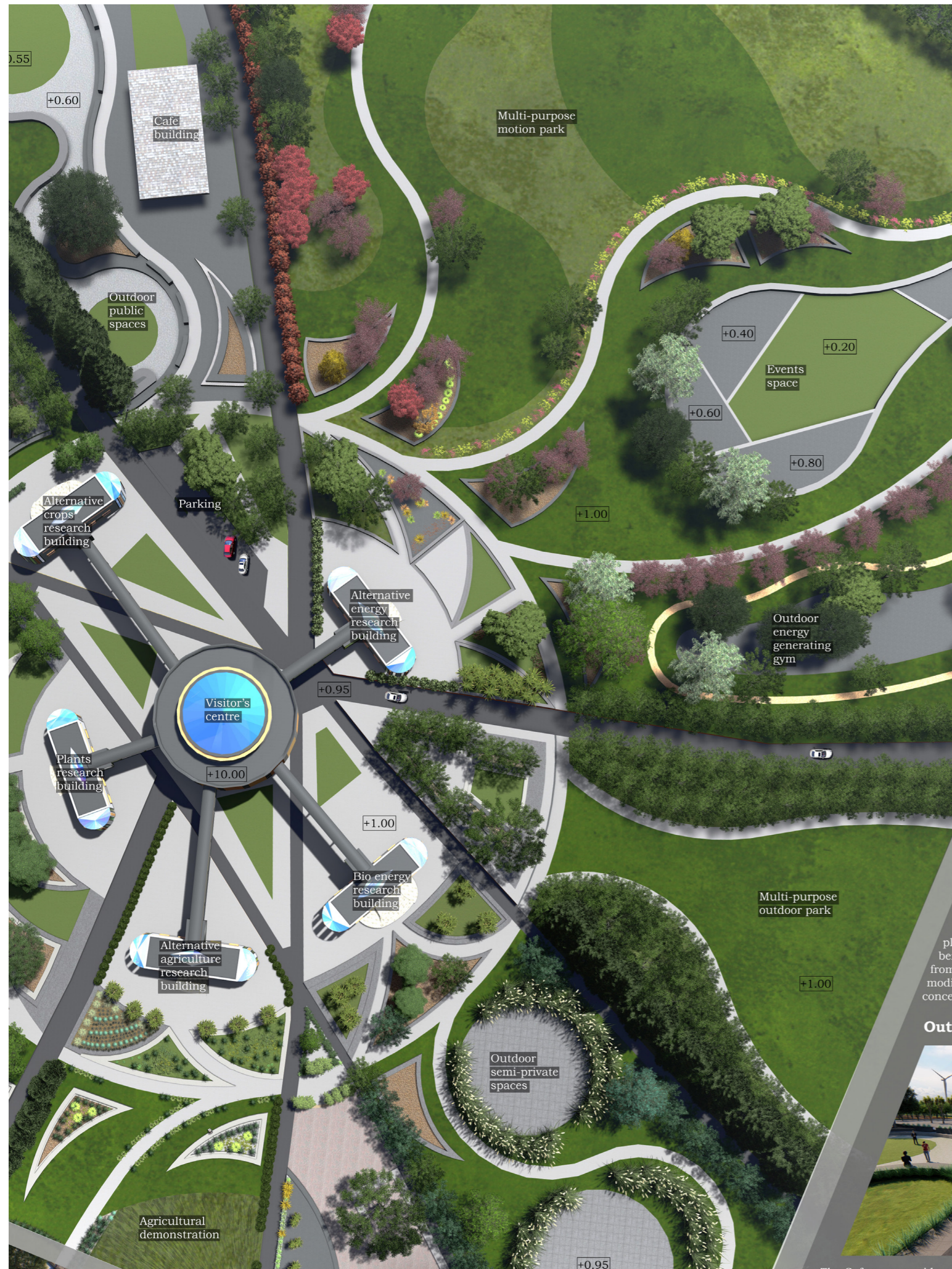
Barcelona September 2020

SCHOOL PRIZE

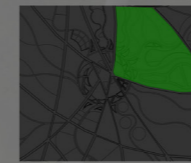


The most important aspect of this project is in regards to energy. This is the reason why carbon emissions are gradually increasing each year. Therefore, it is important to focus on the methods of designing spaces that tackles this issue hence the reasoning behind choosing an area to focus in for the detailed design.





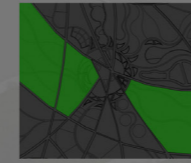
### Alternative Energy Space



This space is designed to have an energetic vibe and overall atmosphere that reminds people within the space, of energy. The area consists of an outdoor gym that allows both staff and students to have a great workout during their lunch breaks whilst at the same time generating electricity. The area also features an events area which symbolizes constant excitement and movement on the site.



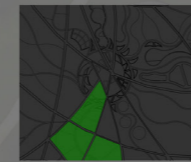
### Plant Arboretum Space



The space is designed to be spacious and showcase various species of plants and trees with capabilities of sequestering carbon. The area features outdoor open park spaces for both students and staff to use for any purpose as well as seating areas for general study or relaxation. The space provides both shaded areas and sunny areas providing people with different preferences both options.



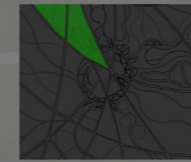
### Alternative Agriculture Space



With various crop fields to do research, the space provides the opportunity to observe the different agricultural methods that can be implemented to reduce carbon emissions. The area also provides students a first hand experience to agriculture as the fields are close to the classrooms. This also allows further study and research in water management methods tackling run-off issues.



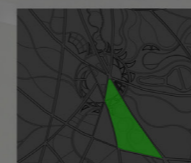
### Alternative Crops Space



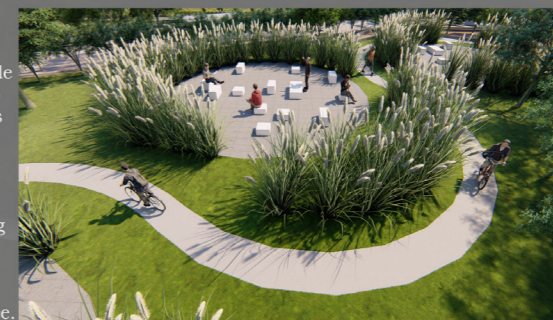
With crop fields constantly growing high protein crops, these crops can be used for demonstration and study purposes as well as food ingredients for the cafe next to the area. Not only that this promotes local food sourcing to encourage lower food miles, it allows further research on the extent local food is capable of supporting the local community. There is also an area that researches new crops.



### Bio Energy Space



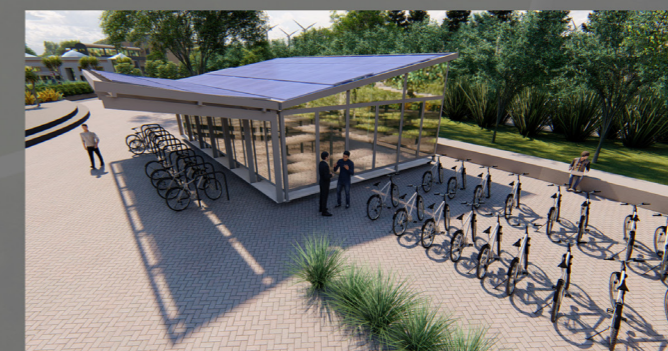
The area focuses on the concept of re-use & recycle which translates this into the design. The space has an outdoor semi-private multi-purpose spaces inspired by the form of Bio tanks. Miscanthus, a plant well known for having a variety of soil and nitrate fixing benefits, is used to form these spaces. Movable seating made from compressed and recycled polyester allows the space to be modified and moved around accordingly. This highlights the concept of recycling as well as providing a dynamic outdoor space.



### Outdoor Cafe Space



### Electric Bicycle Rental Space





## DESIGN MATERIALS



### Timber Wood (Hardscape)

- Natural material that the site can always produce from processing trees from the arboretum.
- Environmental friendly and has no carbon emissions.
- Easy for maintenance purposes.
- Creates the natural character which fits the project.



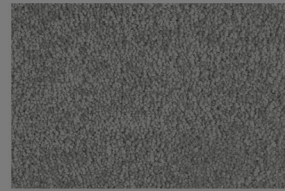
### Gravel (Swale and Paths)

- Cheap and quick for installation.
- Durable and effective.
- Environmental friendly as it permeable which doesn't kill the plants underneath the surface.
- Natural material fitting with design concept.



### Biochar

- Very important for carbon sequestration as it is capable of sequestering high amounts of carbon when added to agricultural soils and croplands.
- Increases crop yield as it improves the overall soil conditions.
- Reduces cost for fertilizers.



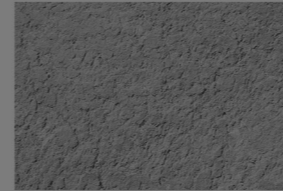
### Asphalt (Main Road)

- High durability.
- Easy for maintenance purposes.
- Minimal environmental impacts as they do not leach.
- Dark color provides the solid framework for the site, acting as the main roads running through the design.



### Stone Bricks (Outdoor seating)

- High durability.
- Creates the natural character for the project.
- They can be arranged into many forms making it very suitable for the curved forms present in the project.
- Easy for maintenance purposes.



### Biochar - Clay Plaster

This is a mixture between 50 percent Biochar, 30 percent sand, and 20 percent clay. This allows this material to be used as a building material. This material not only improves the air quality within the building through soaking up excessive moisture in the air, but also allows these buildings to act as carbon sinks. This material can be applied both the inside and outside of the building being beneficial either way.



### Concrete (Bike path and Walkways)

- High durability.
- Easy and effective to install.
- Can be recycled and re-used.
- Low energy required in the production process which means less carbon emissions.



### Compressed Recycled Plastic

- Environmental friendly as it utilizes materials that non-biodegradable.
- Light-weighted
- Customizable to any shape and form
- Cheap (if not free) to obtain and use for the design.



### Glass (Visitor's Centre)

- Natural material made from sand and glass waste.
- Material can be re-used over and over again which reduces the amount of waste.
- Allows heat from the sunlight to pass-through.
- Allows visual connection between inside and outside.



### Shredded Pine Mulch

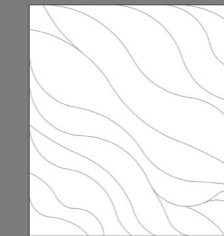
- Natural material that can be obtained from the arboretum.
- Beneficial to plants species which is a very important component of the design.
- Reduces the amount of maintenance required for the area as it controls weeds.



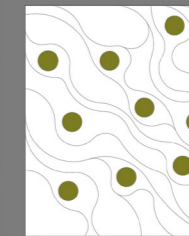
Biochar Clay Plaster used in student accommodation to help with carbon sequestration.

## FORMS INSPIRATION

### River Patterns



### Activity Spaces



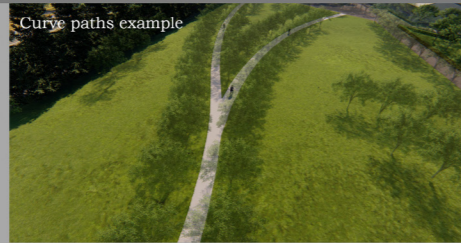
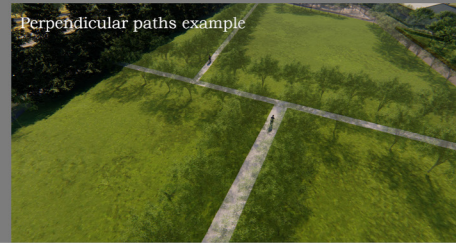
### Curved Forms Inspired By Activity Spaces



Seating area (Activity space)

Elevated walkway (Activity space)

## CYCLE PATHS : CURVES VS PERPENDICULAR



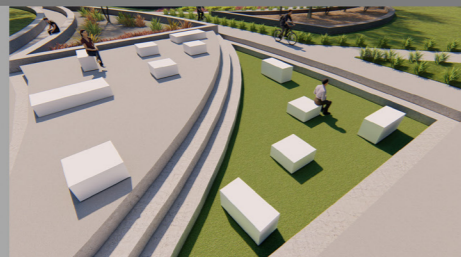
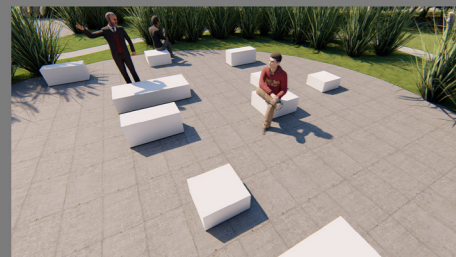
### Functional Fluidity

Firstly, the design of the bike paths and walkways are inspired from the natural form driven by the smooth movement of the river. The reasoning behind the entire design rarely having any perpendicular nodes or interceptions is to guide the cyclists smoothly along the landscape, rather than having them stop at a perpendicular intersection in order to make a decision to either go left or right.

Not only that this prevents the smooth flow of movement along the site, it could create circulation problems and even cause accidents in cases where students or staff were to have to make sharp 90 degree angle turns. Therefore, having little to no perpendicular nodes allows good circulation for cyclists around the site.



## RECYCLED MATERIALS : ADJUSTABLE SEATING AREA

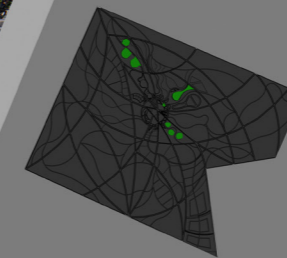


Seats does not have the same orientation each day.



They are constantly moved around.

### Movable Seating Locations

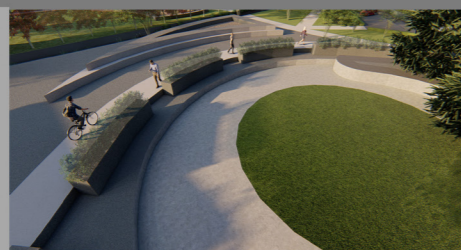
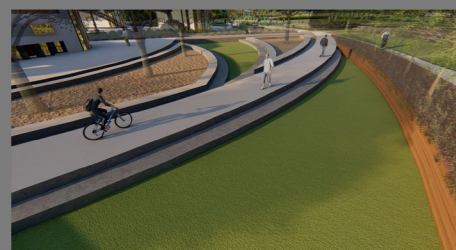


### Reuse, Reduce & Recycle

The seating blocks are made from compressed recycled plastic which allows them to be moved around according to the space user's personal needs. As they are made from recycled materials they can be shaped into different sizes and forms, yet still are light enough to move around.

The issue modern society are having today is what to do with plastic. Solutions includes landfills, burning and disposing it into the ocean. However these solutions causes even more issues. Therefore by using these materials, it puts into use, the things people are trying to get rid of.

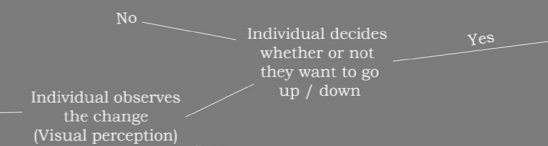
## FORMS FOR ENERGY : ELEVATION CHANGE



### Level Changes

The entire site is designed based on the main concept of energy. There are many layers when it comes to how the design addresses energy. This includes the producing energy, researching energy, and reducing energy use. But in this case, the design focuses on the concept of using energy. As site users are now required to use more energy to get to a higher or lower elevation point, this acts as another layer which addresses energy in this design.

### Elevation change in design



# FORMS AND MATERIALS