RE:MAKE

A sustainably-designed educational center for waste pollution

Overview

Re:Make is a sustainably-designed education center in Cambodia that addresses the problems of **waste pollution** and **resource depletion**. It serves as a hub for **promoting** sustainable practices and **raising awareness** about environmental challenges. The center focuses on creating an **energy-efficient** building and implementing innovative solutions to combat excessive resource consumption. Through a variety of programs such as workshops on upcycling waste, retail areas featuring upcycled projects, and a zero-waste restaurant, Re:Make aims to **educate and inspire** the community towards a greener and more sustainable lifestyle. By leading through example and advocating for responsible resource management, the center strives to create a **positive impact** on waste reduction and the preservation of our limited resources.

Topic

Waste pollution is currently one of Cambodia's hardest-to-solve issue. In addition to the **increasing amount of waste** produced, there is also a **lack of after-care**. Approximately 44% of waste collected is dumped into landfills and another 46% remains uncollected and littered throughout the city. As the waste remian unprocessed, it poses as a very big threat due to the unknown chemical substances that it releases into the environment. Because of the **lack of exposure** to this problem, most citizens are not aware of solutions and precautions that they can take in order to be part of the solution. (Pheakdey et al., 2022)

Municiple Waste Treatment in Cambodia. (https://doi.org/10.3390/ijerph19148458)

Project Brief

Re:Make is an educational center located in Phnom Penh, the capital city of Cambodia that offers facilities to **teach and promote** to **families** and **local communities** about **waste pollution issues** and the solutions also known as ways to **reduce and recycle/upcycle** waste. Re:Make features a variety programs that fall under three umberellas of **Interaction and collaboration, exploration and education and experiential.** The building is designed focusing on **sustainable approaches**
materiality.

Target Users

PRIMARY USERS

Families with children aged 7-12

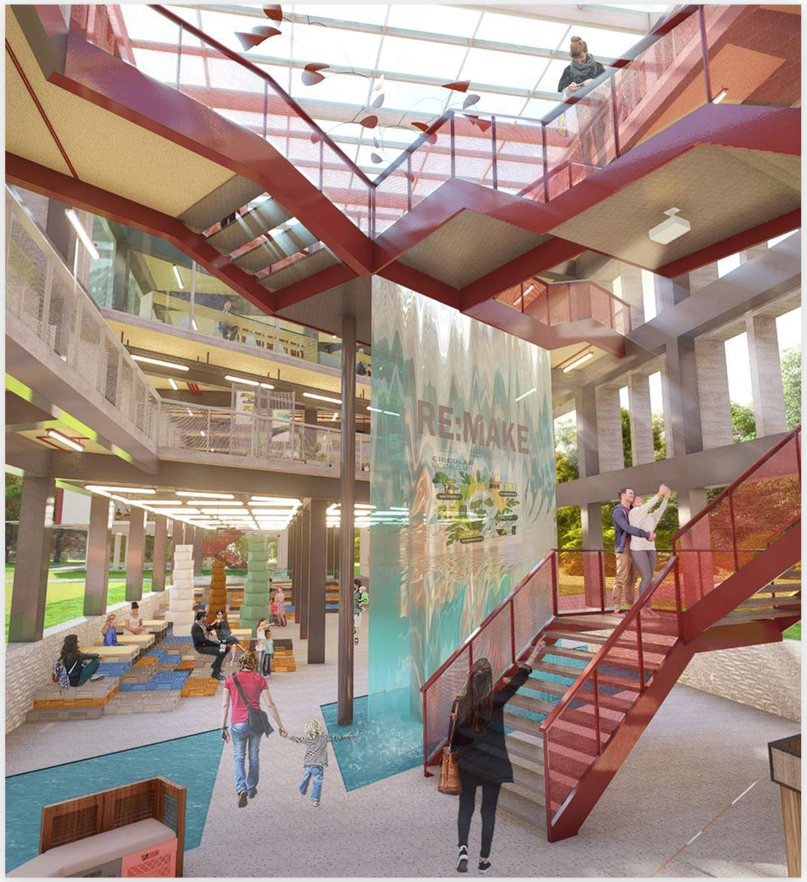
SECONDARY USERS

Local Cambodian communities in the area

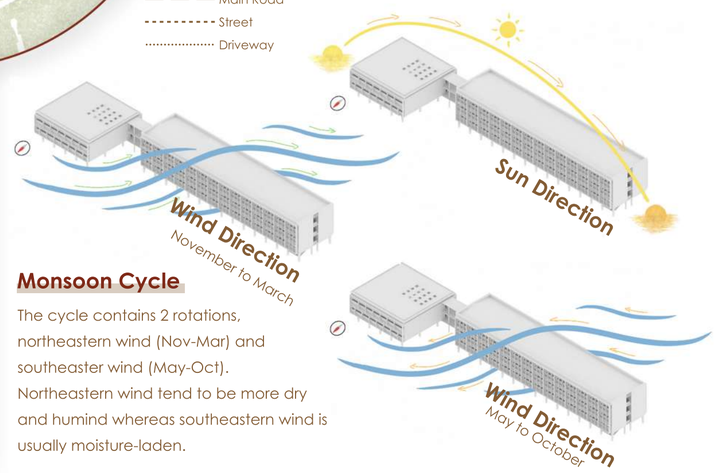
Site

Former Pasteur Institute, Chhroy Changvar, Phnom Penh, Cambodia

Constructed in 1965 to 1967, the building was a originally a medical research facility that also had housing for the staff. The architect of the building is Van Molyvann, famously known for his use of concrete finihses and incorporation of sustainable features such as stilts and openingings on walls and ceilings adapted for the climate of Cambodia. Because of the Khmer Rouge Genocide in the 70s, the building was abandoned without care and left in disrepair. Currently, it is occupied as housing by low-income families.



Site
Main Road
Street
Driveway



Monsoon Cycle

The cycle contains 2 rotations, northeastern wind (Nov-Mar) and southeaster wind (May-Oct). Northeastern wind tend to be more dry and humind whereas southeastern wind is usually moisture-laden.

Site Features

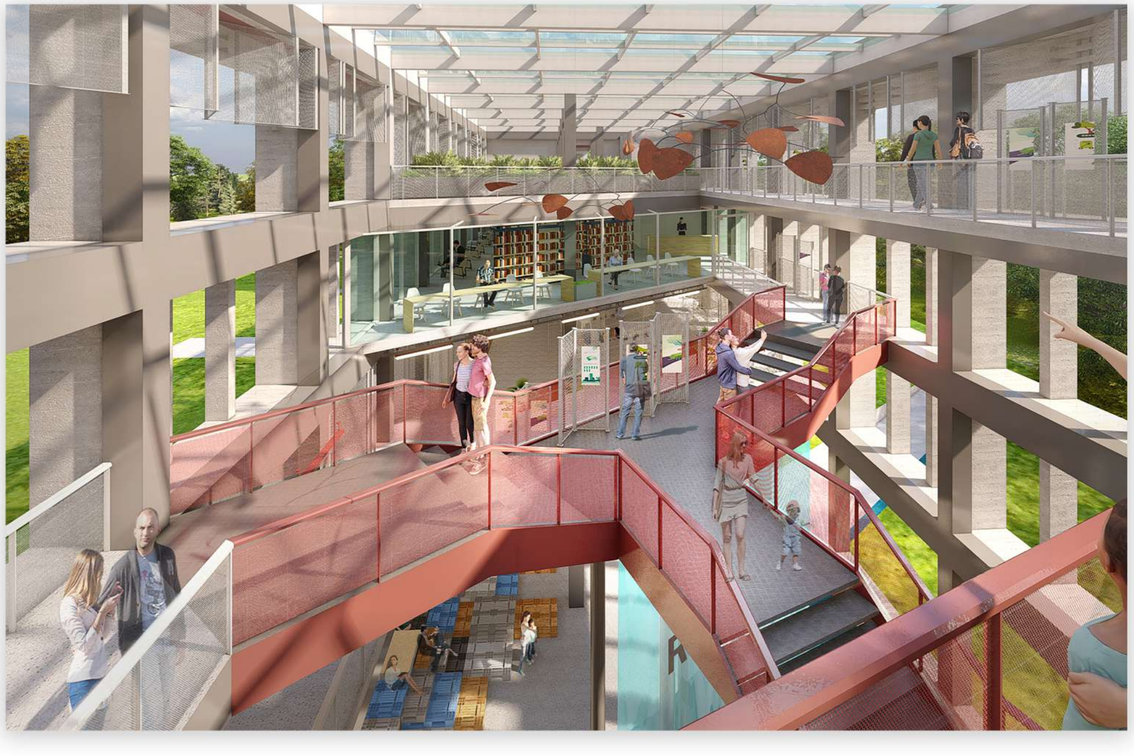
Van Molyvann's buildings generally are designed in the New Khmer Architecture style and this building is no different with finishings mainly consisting of raw concrete, brick and yellow paint. However, Van Molyvann was considered one of the top architects of his time due to his ability to insert sustainable systems within the building's design to enhance the energy efficiency. He is generally known for his use of stilts and slit openings on walls to increase ventilation. As a sustainable approach and retaining a historical site, much of the original building structure remains as is with enhancements made to the sustainable systems as well as new finishings.

The long walkway that connects the two building. Originally was designed to be open wth railings but is currently covered with walls on both sides.

Slit openings protrudes out for ventilation on the top walls on each floor. This acts as ventialtion as well as a little shelter for rain.

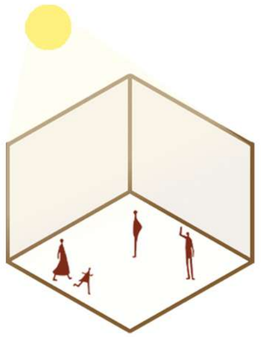
Open block sky windows to allow for natural light passage. The windows can also be openned and provide ventilation through the voids of each floor to the first floor.

Stilts are holding up the building structure. This feature can often be seen in traditional houses in Cambodia due to flooding. However, it also has the additional purpose of ventilation.

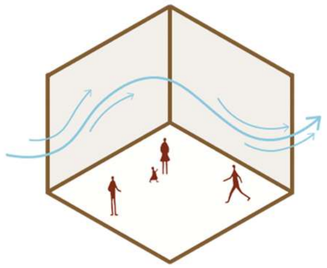


Design Concept

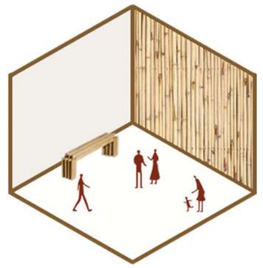
The concept of the building centers around **A Journey into Sustainability** as a topic. This means that everything design-related in the center is made with the intention of being sustainable and increasing efficiency. The programmes through this journey is focused on the main aims of **Exploration and Education, Interaction and Collaboration, and Experiential.** This is to provide users with a glimspe of a 'greener' lifestyle and give them the confidence that they can make lifestyle changes for the environment.



Design that allows for efficient use of **natural lighting**.

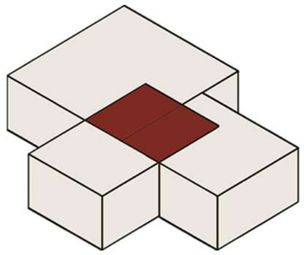


Design that allows for effective **passive cooling** systems.

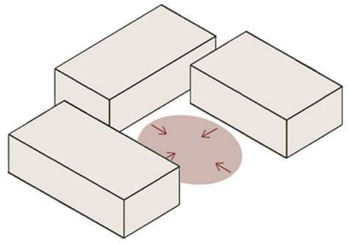


Design that uses local **sustainable** and **recycled materials**.

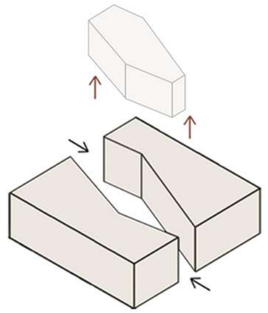
Design Strategies



Interconnected Zones
Having main zones for its respective program purposes and connecting those zones to lead the users through a journey of the center



Central Area
Creating a main space that connects the programs, a gathering area to stimulate interaction.



Void Insertions
Creating a pathway for air circulation, light passage and visual connection between the zones.

Programmes

INTERACTION & COLLABORATION
EXPLORATION & EDUCATION
EXPERIENTIAL

1ST FLOOR

BLDG A
Reception
Lounge
Lounge Exhibition
Managament Office
Male/Female Toilet
Handicap Toilet
Mother's Room

BLDG B
Indoor-Outdoor Plaza
Stage

2ND FLOOR

BLDG A
Exhibition Area
Retail Area
Farmer's Market
Male/Female Toilet
Handicap Toilet
Mother's Room

BLDG B
Juice Bar
Zero-Waste Restaurant
Kitchen

3RD FLOOR

BLDG A
Plastic & Glass Workshop
Library
Male/Female Toilet
Handicap Toilet
Mother's Room

BLDG B
Lounge
Dining Area
Pantry
Cooking Workshop

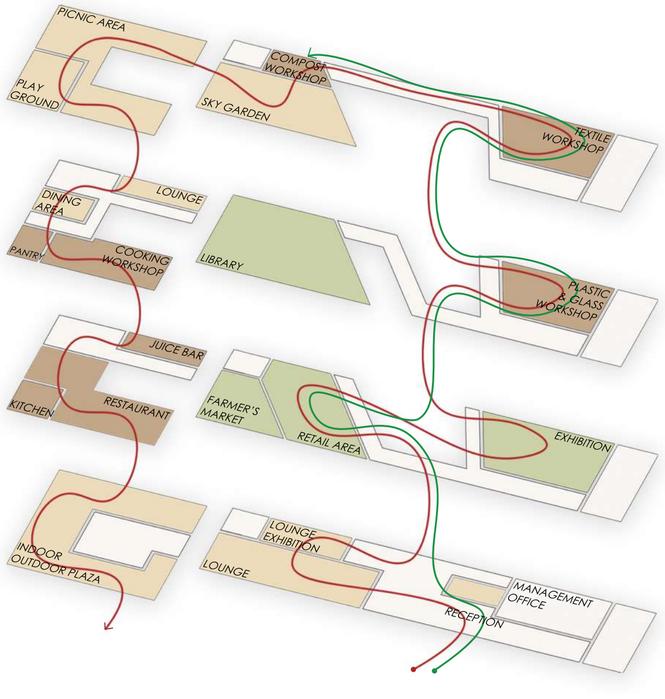
4TH FLOOR

BLDG A
Textile Workshop
Compost Workshop
Sky Garden
Male/Female Toilet
Handicap Toilet
Mother's Room

BLDG B
Picnic Area
Playground

PRIMARY USERS

SECONDARY USERS



Materiality

The main finishes for Re:Make is raw and industrial in order to suit the finishings of the original building without contrasting too much. There are also accent colors of red and green that is incorporated. All building materials are chosen with sustainability as the main priority as Re:Make aims to use materials that are reflective of the center's purpose.

Wire Panels

Wire panels are featured on the main facade of both buildings. By inserting wire panels on both sides of the buildings, it will help to increase the strength of wind passing through the building and therefore cool down the building and the users within significantly. The wire panels are also a great way to allow natural light into the area without compromising users privacy.

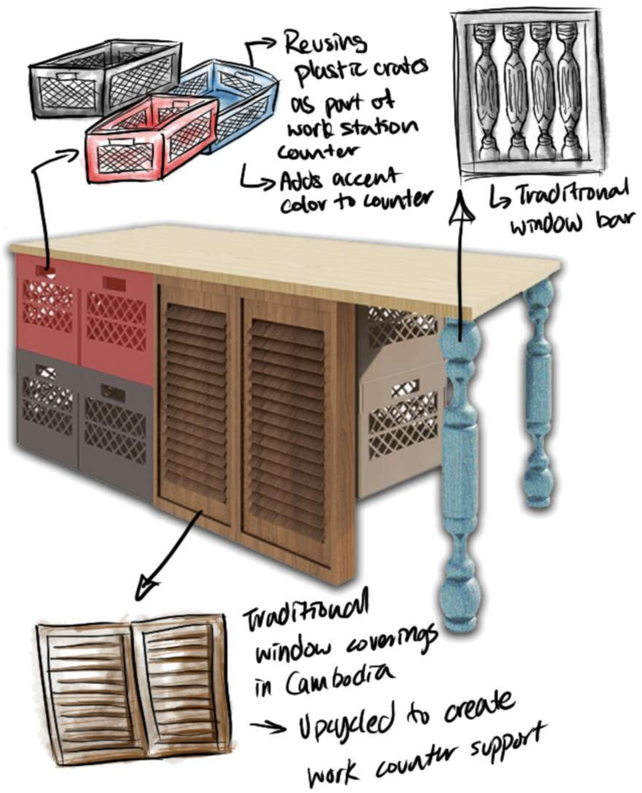
1. Beige stucco plaster
2. Grey drywall
3. Walnut wood veneer
4. Grey brushed aluminium
5. White stucco plaster
6. Exposed aggregate concrete
7. Checkered steel
8. Red brushed aluminium
9. Concrete terrazzo
10. Red wire panel railing
11. Grey wire panel

Eco Bricks

The general idea of eco bricks is to stuff all waste that cannot be recycled into a plastic bottle and use it as a brick to build walls instead. Most waste that is stuffed inside is plastic waste. Eco bricks are used in hopes of seeing a decreasein plastic waste. By using this material, it reinforces the idea of a circular waste cycle to the local communities and to the industry as well. Usually these eco bricks are encased in concrete both standing and laying flat.

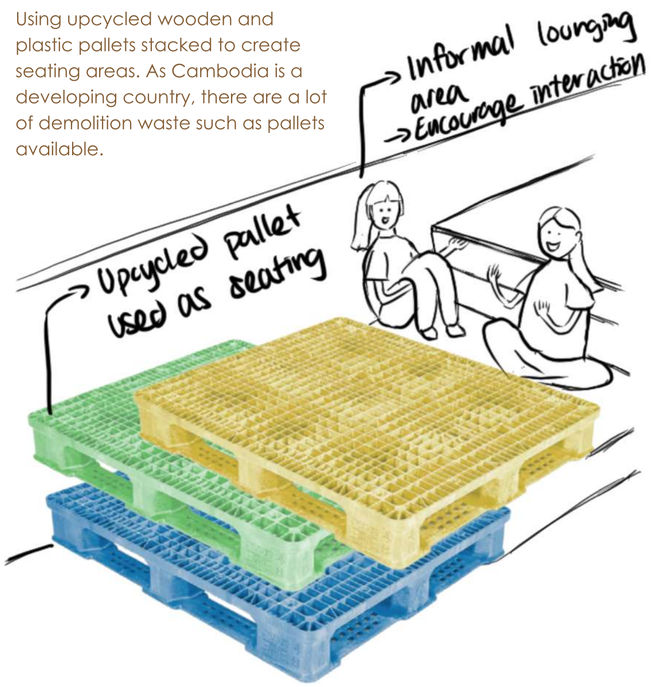
Upcycled Stool

Upcycled Workstation



Upcycled Pallets

Using upcycled wooden and plastic pallets stacked to create seating areas. As Cambodia is a developing country, there are a lot of demolition waste such as pallets available.



Recycled Glass Terrazzo

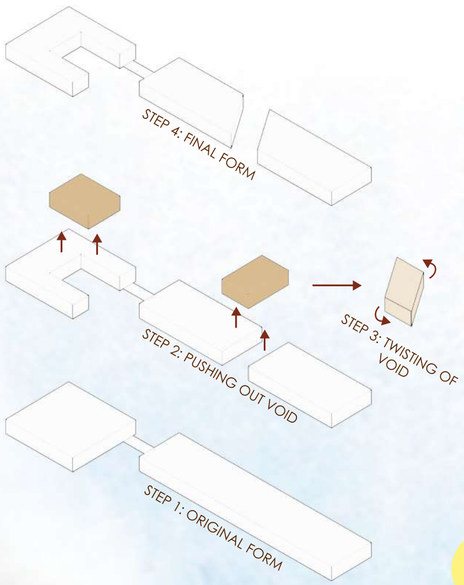
Recycled glass terrazzo is the main flooring material for the whole center. By breaking down glass waste and seperating them by colors or mixing the colors of glass, an endless combination of color of terrazzo can be made.

Sustainability

Sustainability is the main body of Re:Make. Every design decision whether it be in the form of the building, design language or furnishings are made with sustainability as the priority. As the original building already had systemable systems in place, they will all be retained and enhanced. Alongside the exisitng systems, new strategies will be applied to aid with the efficiency of energy used in the building.

Volumetric Diagram

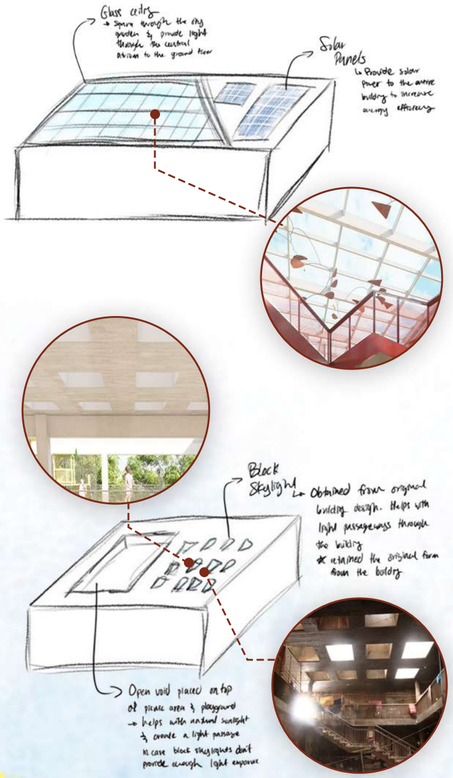
The original form of the building consist of two structures, a square and rectangle. Voids were added in both structures to help with the ventilation of the building and create natural light passageways. As an enhancement to the void in the rectangular building, the shape of it was twisted diagonally to form a parallelogram. This will help with the wind passage as the slant can increase the strenght of the wind passing by.



Strategy 01

Natural light & Solar energy

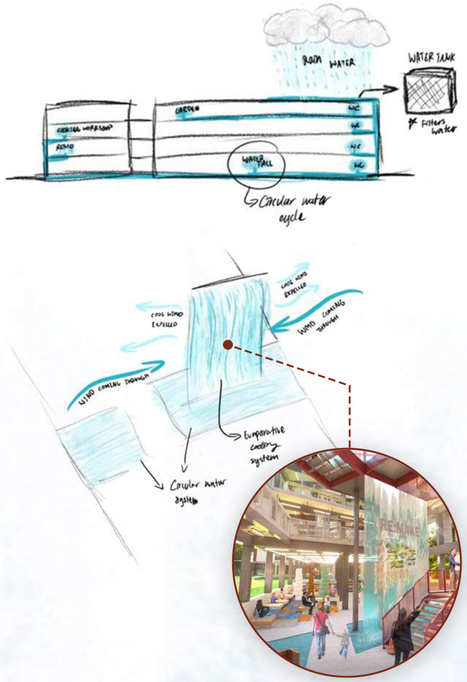
In order to increase the natural light in the building, a sky light was added to both buildings. In the bigger building, a long span of the ceiling is glass and alights the area through the central atrium to the first floor. On the other quarter of the roof that isn't glass, solar panels are placed to help with the energy usage within the building.



Strategy 02

Evaporative cooling and Rainwater Harvesting

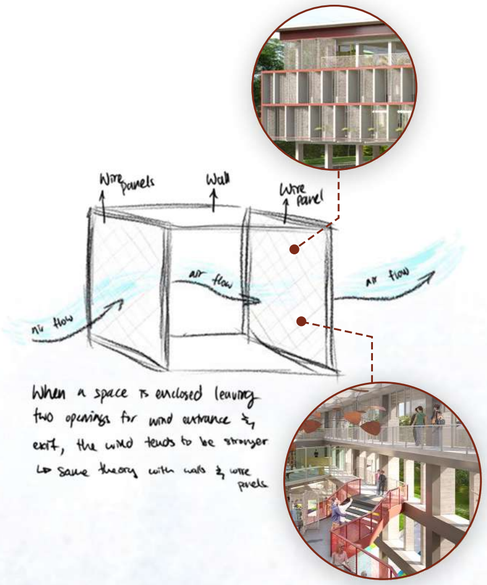
At the main central atrium in the bigger building, there is a waterfall feature. This waterfall falls into a shallow pond below that cuts through the buidling vertically. This will create an evaporative cooling system where the wind that passes through will pass by the water resulting in cooler temperature. A rainwater harvesting system is also in pace at the roof and will accomodate the water usage in the building and the waterfall feature.



Strategy 03

Voids and Wire Panels

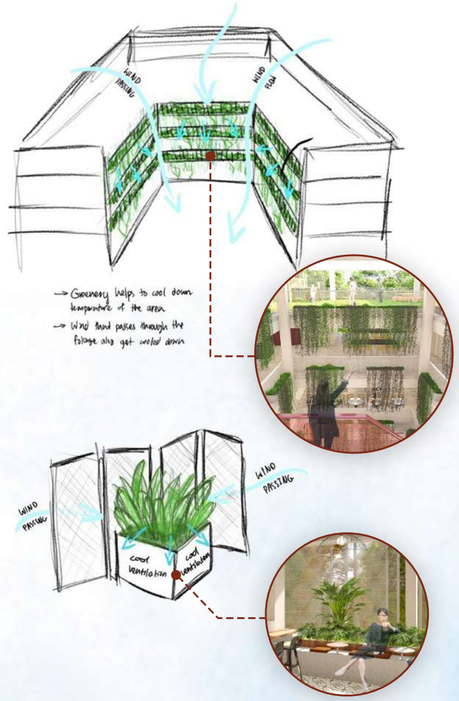
As most of the programmes in the center are in open spaces without enclosures, voids are inserted intentionally and designed so that it would enhance the wind passage through the building. To help with the ventilation and wind flow throughout the building, wire panels cover the main facade in slanted directions to help guide the wind flow.

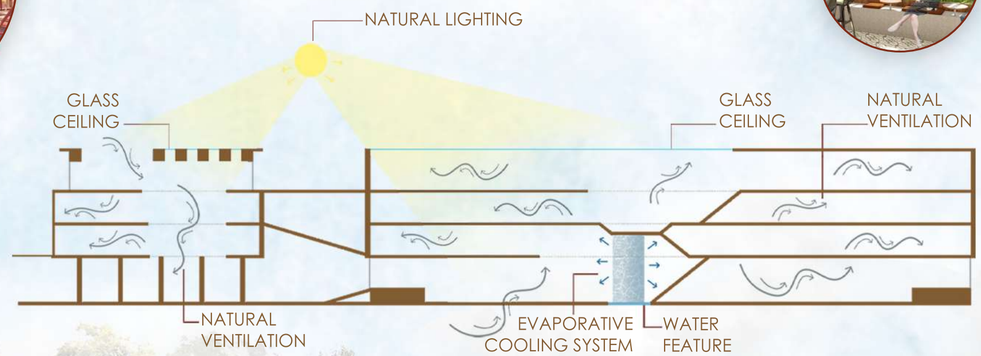


Strategy 04

Greenery

Surrounding the site are mainly greenery. This is benefcial as the greenery will help to cool down the area. In the void of the smaller building, foliage will wrap the perimeter of the void building in the cooling of the area. Greenery is also placed along the walls with wire panels to help with cooling the area and creating some privacy for users.





RE:MAKE WALK THROUGH QR

https://youtu.be/AyDfSX_IH74

User Journey

The primary user journey is targetted towards first-time visitors at the center or those who want to experience the complete process of Re:Make. The journey will take users from seeing the potential of waste through the exhibition and retail area to actually having them try to do it themselves in the workshops and finally experiencing the taste of zero-waste in order to make changes in their own lives. This journey intends to shed a light to users on green living and inspire them to choose green living.

PICNIC & PLAY AREA

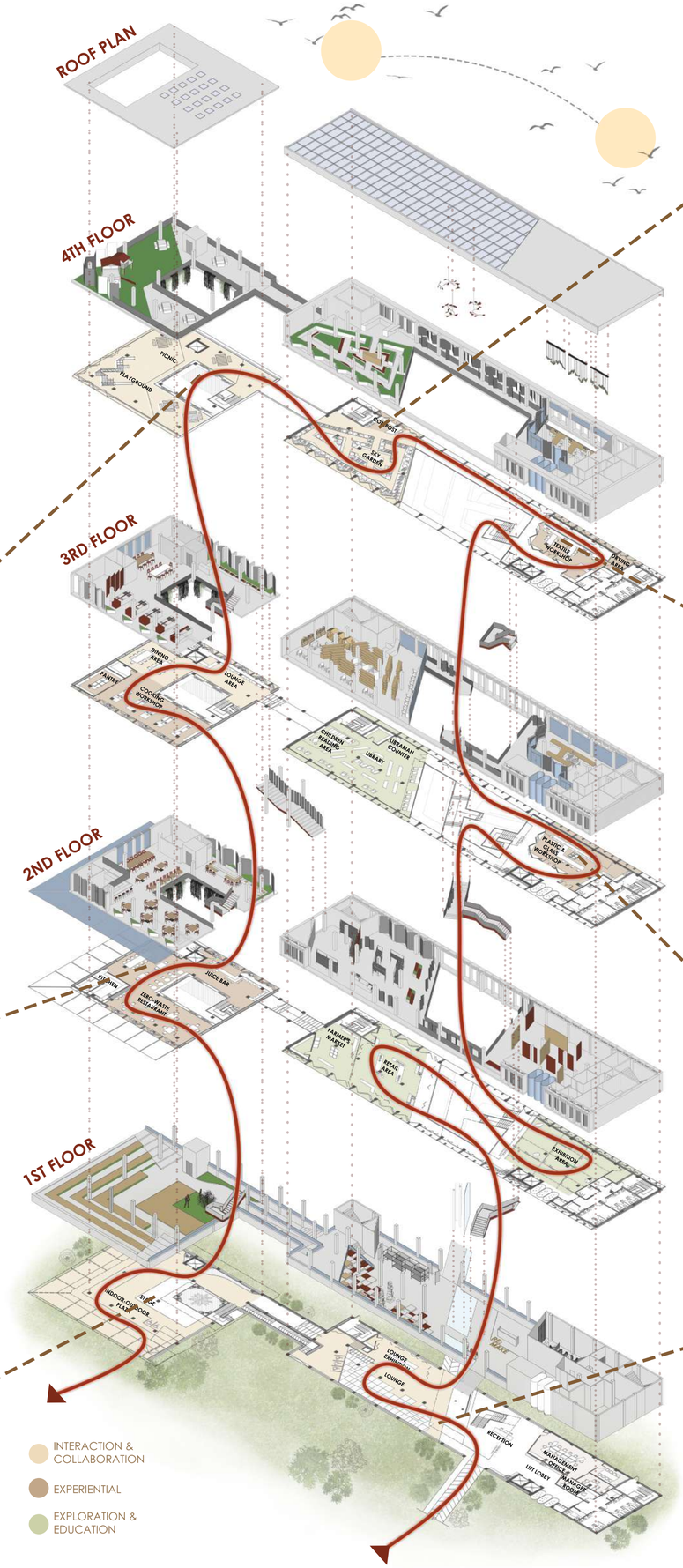
Walking through the bridge connecting the two buildings, users will come accross the atrium in building B that is descends in size by floor. Atop are framed glass sky lights obtained from the original building design. Greenery is placed at the perimeter of the voids which helps with cooling the air that flows through the atrium.

ZERO-WASTE RESTAURANT

Moving down to the second floor of building B is a contemporary zero-waste restaurant. The design's main feature uses recycled rattan panels from locals. The restaurant aims to introduce zero-waste cooking methods to users so that it caninspire them in their own lifestyles as well.

INDOOR-OUTDOOR PLAZA

Finally, on the first floor of building B is where users will reach the end of the journey which is an open plaza space with a stage for events and performances as well as seating area for users to gather and converse on their respective journey through Re:Make.



COMPOST WORKSHOP

Placed next to the reception, users can gather around to lounge and interact before beginning their journey. They can also catch a glimpse of what is to come in Re:Make Center at the adjacent lounge exhibition.

TEXTILE WORKSHOP

This workshop is fully equipped with sewing machines and other appliances needed to upcycle clothing items. There is also a long horizontal void against the facade that connects to the plastic and glass workshop underneath which helps to create an interconnected zone between the programs.

PLASTIC & GLASS WORKSHOP

The first experiential program in the journey, fully supplied with tools for upcycling plastic and glass waste and a sewing loom in the center to make plastic textile. Users can also bring their own waste to upcycle.

LOUNGE AREA

Placed next to the reception, users can gather around to lounge and interact before beginning their journey. They can also catch a glimpse of what is to come in Re:Make Center at the adjacent lounge exhibition.