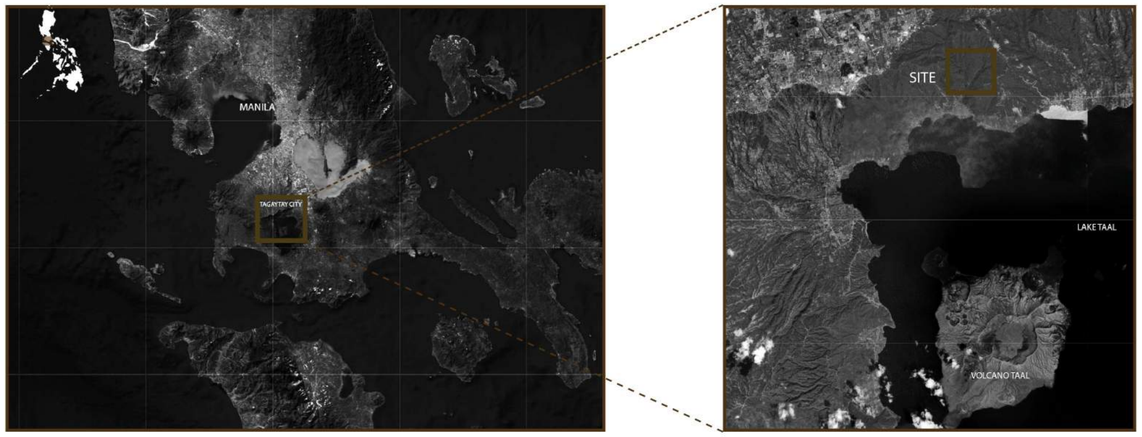
reROOT

reROOT foresees a future in which language, culture, and environment converge to shape sustainable, disaster-resilient housing anchored to the tropical hillside. As our climate continue to warm and get more humid with more frequent and intense natural disasters, we looked at designing a housing prototype that could be used to rebuild, reroot, and sustain through future disasters. Our design expresses protection, resilience, and endurance. By marrying time-tested traditional wisdom with innovative contemporary architecture, we aim to create dwellings that honor heritage, safeguard communities, and adapt to the challenges of a changing climate. Rather than rebuild with the exact same structures that were devastated by a natural disaster, a number of our prototypes could be erected in their place and provide strength to withstand the forces of the next natural disaster while offering comfort and providing a sense of joy for their residents; the calm after the storm.



Site Context and Narrative
Location: Tagaytay City, Cavite

Tagaytay was chosen for its distinctive setting along the Tagaytay Ridge, offering panoramic views of Taal Lake and Volcano. Its hot & humid climate and elevated terrain make it one of the most desirable areas in Southern Luzon — yet also one that demands resilience against typhoon, seismic, and volcanic risks.

Rationale for Site Selection

Tagaytay embodies both beauty and vulnerability. Its rapid urban and tourism growth underscores the need for adaptive, sustainable, and disaster-resilient design. The site serves as an ideal platform to explore how architecture can harmonize with a dynamic environment — transforming risks into opportunities for innovation and ecological balance.

Design Narrative

The design redefines resilience — not just resistance to hazards, but the capacity to adapt and thrive.

Key strategies include:

- Passive Design: Maximizing natural ventilation, daylight, and thermal comfort.
- Water Systems: Rainwater harvesting and greywater reuse for sustainability.
- Local Materials: Promoting low-carbon, regionally sourced construction.
- Landscape Integration: Green buffers and native vegetation for soil stability and biodiversity.
- Structural Resilience: Flexible systems to withstand seismic and wind loads; elevated and modular layouts adaptable to hazards.
- Community Spaces: Multi-use areas functioning as social hubs and safe zones.

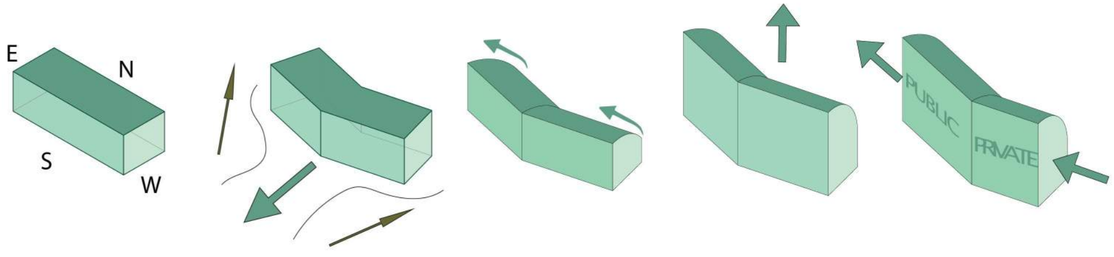
Vision

The project envisions a community that mirrors Tagaytay's essence — peaceful yet powerful, rooted in nature yet forward-looking. It aims to prove that safety, comfort, and sustainability can coexist, serving as a model for resilient living in harmony with the earth.

Site Analysis Summary

- Accessibility: Easily reached via major highways, linking the site to nearby cities and key services.
- Topography: Rolling ridges allow contour-sensitive design that manages stormwater naturally.
- Environmental Risks: Proximity to Taal and seismic zones addressed through elevated platforms, slope stabilization, and vegetation buffers.
- Land Use: A blend of residential, agricultural, and tourism areas; existing trees are preserved and integrated into communal spaces.
- Socio-Cultural Context: Inclusive design supports both residents and visitors, fostering community and disaster awareness.

Overall, the proposal demonstrates architecture as both protection and partnership with nature — a sustainable prototype for future communities in evolving hot and humid environments like Tagaytay experiencing ever increasing frequency and strength in natural disasters as they become more prevalent in our world with climate change.



Long narrow bar to conform to site slope, reduce E-W exposure for heat gain, and maximize PV electricity generation

Bend the bar North to conform to site contour and allow for flow of mudslide and rain debris around the building while reducing straight South exposure, also creating separate public and private bars

Curve the roof to create better aerodynamics, reducing uplift, during typhoons and allow for better capture of updraft air flow up slope for passive cooling

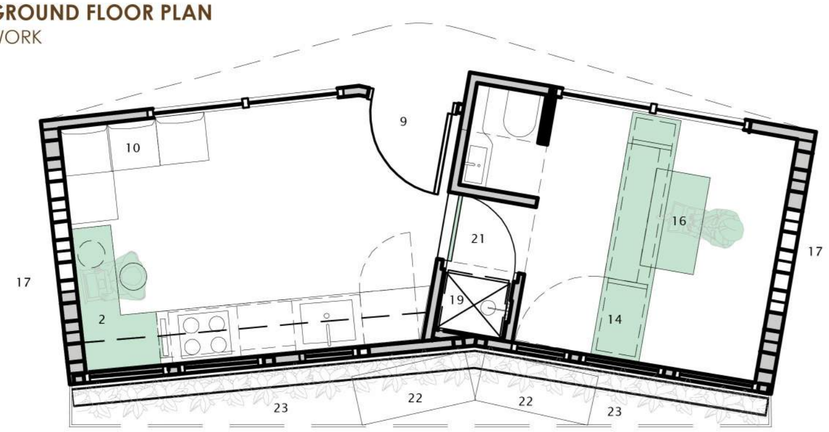
Increase the height for better stratification of air improving passive cooling through convection, pulling cool air through the buidling

Reduce the private bar and increase the public bar for better usability of square footage when hosting and more flexability in the public bar

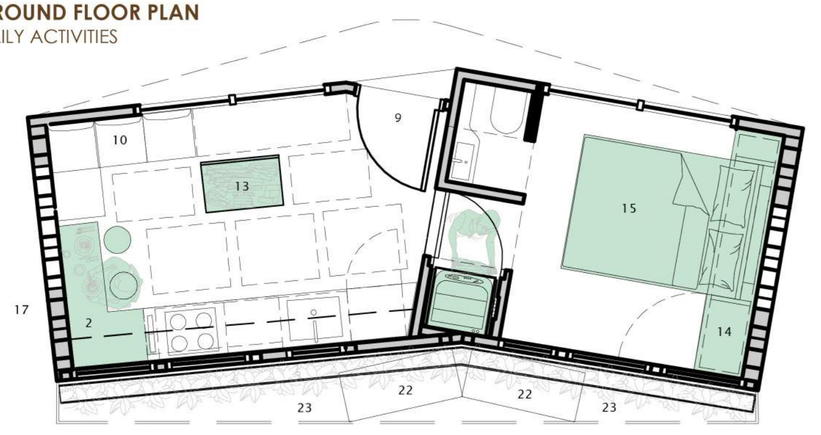
GROUND FLOOR PLAN
GATHERING

1:50

GROUND FLOOR PLAN
WORK



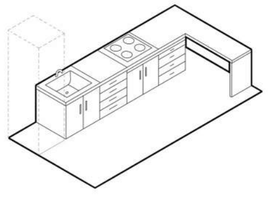
GROUND FLOOR PLAN
DAILY ACTIVITIES



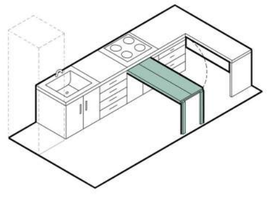
1. Foldable Table
2. Breakfast Bar/Work Station
3. Induction Cooktop
4. Kitchen Sink and Acacia Countertop
5. Refrigerator/Freezer
6. Base Cabinet
7. Drawers with Integral Steps
8. Upper Cabinets
9. Front Entry
10. Configurable Cube Sofa/Chair Pieces
11. Waterless Composting Toilet Pedestal
12. Bathroom Sink and Acasia Countertop/Shelves
13. Under Floor Compartments
14. Moveable Wall w/ Shelving and Murphy Bookshelf Door
15. Murphy Bed
16. Fold Down Desk
17. Hexagon Wall w/ Integral Shelving, Green Wall and Windows/Ventilation
18. Pocket Bathroom Door with Capiz Shell Panel
19. Shower/Disaster Safe Room
20. Lowerable Washer/Dryer Combo Unit Above
21. Combination Door For Shower and Bedroom with Capiz Shell Panel
22. Slimline Water Tanks
23. Planters Beds with Rainwater Filtration Below

VIEW OF THE LIVING AREA FROM THE ENTRANCE OF THE MICROHOME

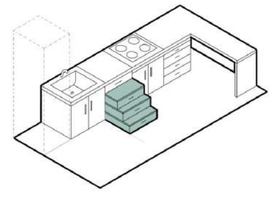
FLEXIBLE KITCHEN - NTS



FOLDABLE TABLE - NTS

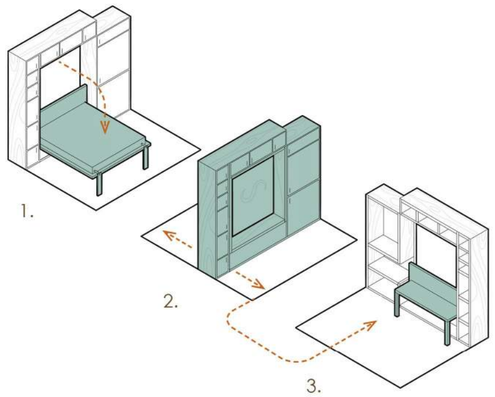


DRAWERS WITH INTEGRAL STEPS - NTS



VIEW OF THE MANEUVERABLE WALL – OPEN

VIEW OF THE MANEUVERABLE WALL – CLOSING

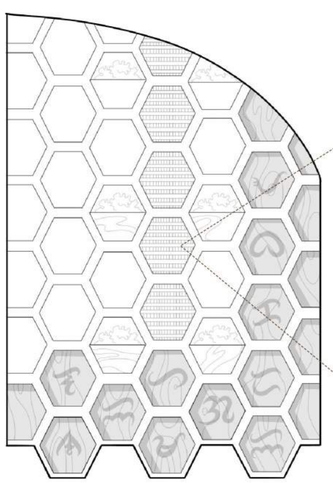


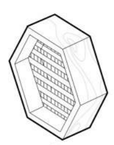
MOVE-ABLE WALL SEQUENCE - NTS

The moveable wall module can be manipulated to best utilize the privatized bedroom. It is equipped with:

1. A **murphy bed** that will fold down for the residents to complete their nightly routine.
2. A **bench/lounge** for reading or leisure activities. Access is provided upon closing the murphy bed.
3. A **desk** for personal work; accompanied by usable wall shelves.

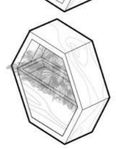
HEX WALL - NTS





HEX PIECE 1: Sun screen for passive shading

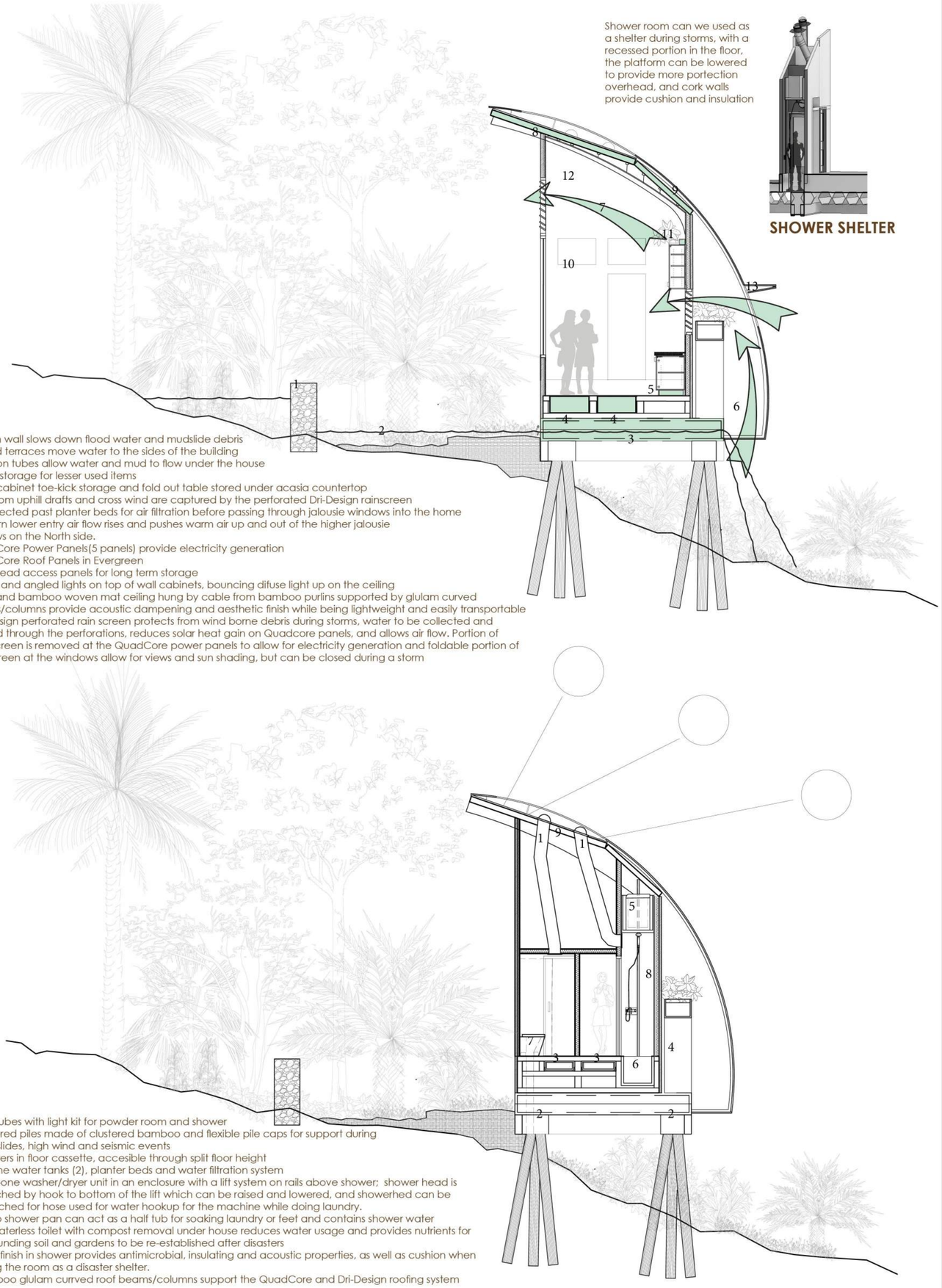
HEX PIECE 2: Solid panel, featuring traditional baybayin characters



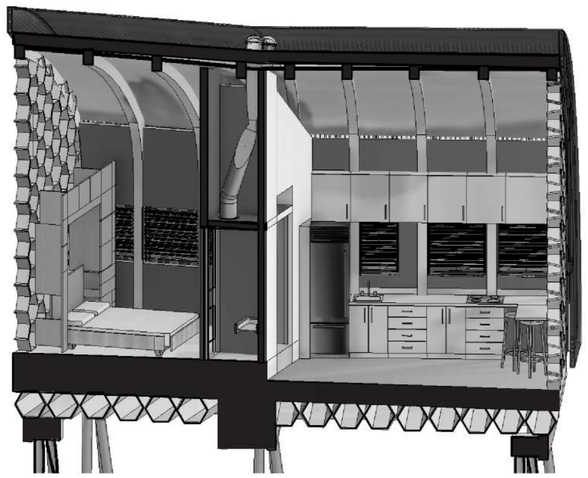
HEX PIECE 3: Potted plant

HEX PIECE 3: Interior shelving

HEX PIECE 4: Standard glazing with operable panel to allow for passive air flow

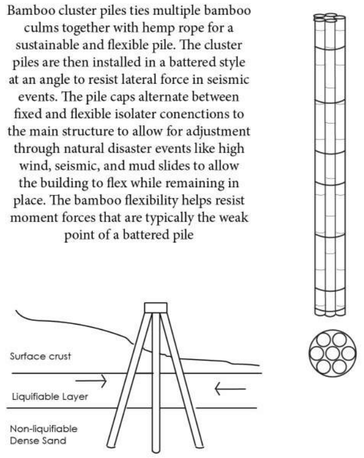


Section Perspective

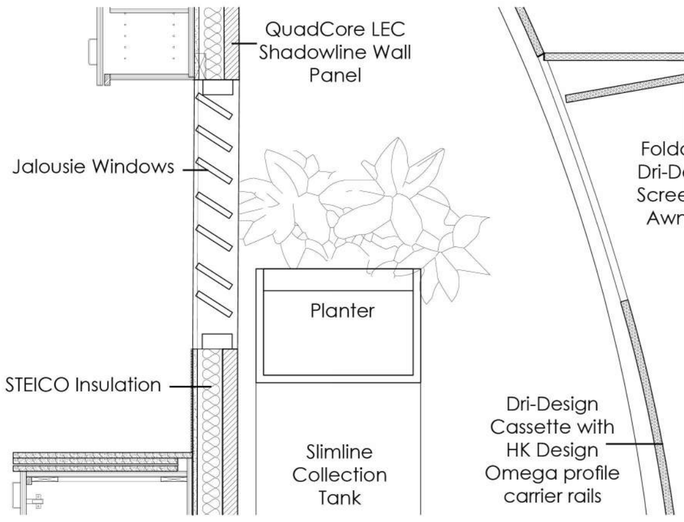


Bamboo Cluster Pile Detail

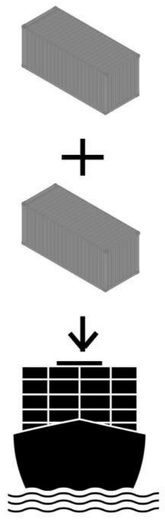
Bamboo cluster piles ties multiple bamboo culms together with hemp rope for a sustainable and flexible pile. The cluster piles are then installed in a battered style at an angle to resist lateral force in seismic events. The pile caps alternate between fixed and flexible isolater conenctions to the main structure to allow for adjustment through natural disaster events like high wind, seismic, and mud slides to allow the building to flex while remaining in place. The bamboo flexibility helps resist moment forces that are typically the weak point of a battered pile



Wall Section



Site Transportation



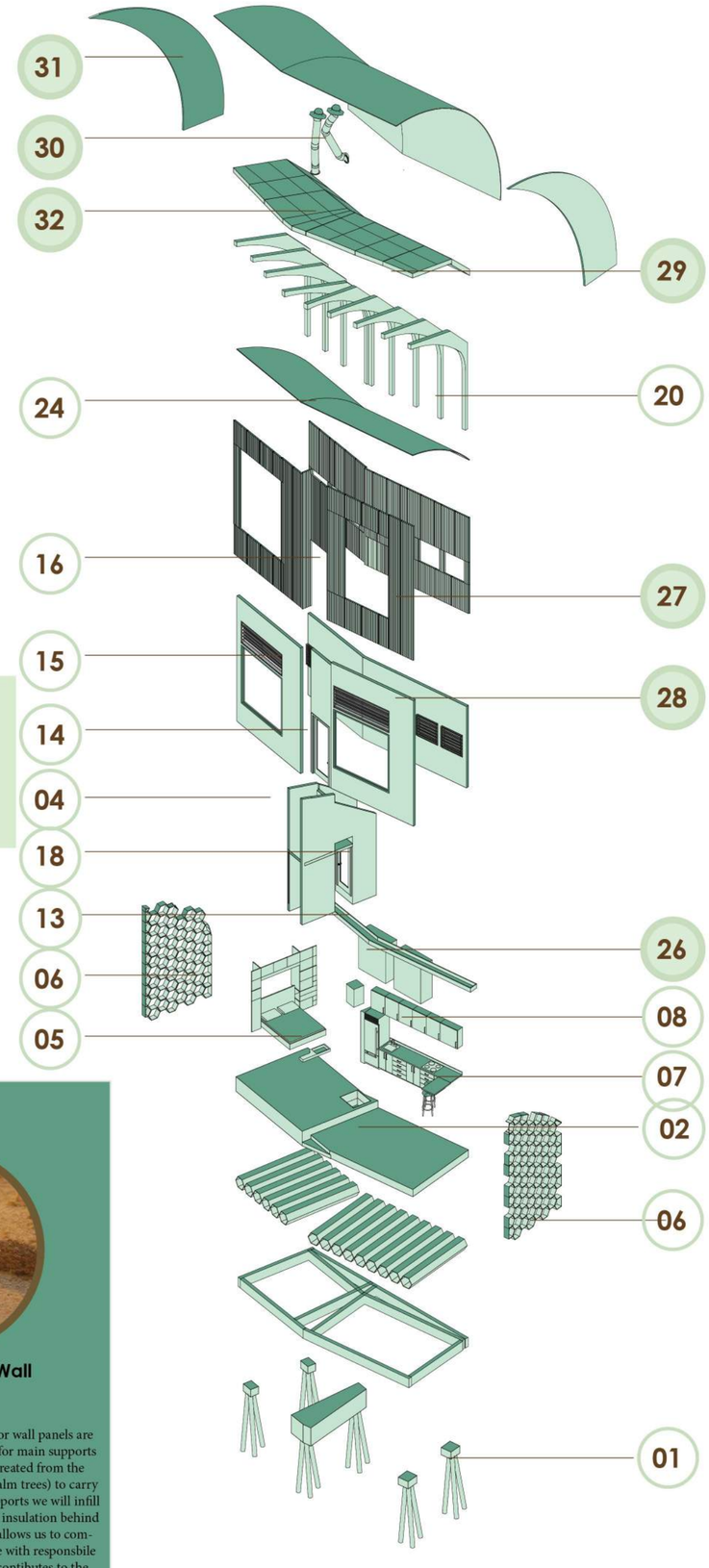
reROOT Flat-Packed Prefabricated Modular MicroHome

Kit of Parts Cost Breakdown

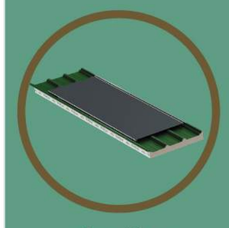
01	Six 9m-tall clusters of driven bamboo piles: down to 6m below grade, or to refusal, allowing for field-adaptable stilt-height to react to the sloping grade and provide a level foundation for the carrier beams of the superstructure. € 1,719
02	25 square meter floor cassette prefabricated to include: € 16,346 a) Interior + exterior floor finishes (25 sq.meters of Bamboo flooring) b) CF 4 Continuous Composting Waterless Toilet c) Deep Shower pan "tub" d) Batteries, Transformer, Inverter, and cabling for photovoltaic power storage e) Kitchen + Lavatory drainage f) Living area millwork (includes fold-out table and four chairs) g) 15 x hollow pre-engineered wood (GluLam) hexagonal tubes h) Weather-tight finished underside i) 13cm x 38cm engineered wood (GluLam) carrier beams
03	3000-liter water collection/filtration system € 4,488
04	Zoro Select 1/6hp Potable Water Circulating Pump € 743
05	Moveable bedroom / study wall (Includes framing, guidrails + hardware, one fold-away queen-sized bed, one queen-sized mattress, one bookcase, one fold-away desk) € 2,078
06	East and West façade bamboo hex-walls stained to match acacia wood € 2,063
07	Kitchen counter surface (2.51 square meters of solid 3cm thick acacia wood, properly sealed) € 557
08	Four Kitchen base cabinets & six wall cabinets € 1,817
09	Bathroom base cabinet € 232
10	Bathroom vanity € 148
11	One tankless water heater € 568
12	Bathroom counter surface (0.42 square meters of 3cm thick acacia wood, properly sealed) € 93
13	Fiberglass planters, bags of organic earthen materials, and native seedlings for green water retention and filtration system € 1,141
14	88.26 square meters of traditional lumber framing € 5,707
15	Six operable polymer-frame jalousie insulated window units (two wide high North, six narrow low South) € 1,720
16	Two exterior LED sconces (2500K) Anabrenda Black 2 - Bulb Integrated LED Outdoor Armed Sconces by Wade Logan € 120
17	Two solid core doors + Schlage hardware (One exterior-rated, one moisture-rated) € 757
18	1.95 square meters of Capiz diffuse light panels € 169
19	3.66 linear meters of bookshelf with integrated LED uplight € 448
20	Nine GluLam bamboo fiber structural curved column/beams € 3,366
21	Eurofase Modern Pendant, Gold, 35W Integrated LED € 1,166
22	Cluster of six x Quill 1 aged brass LED pendant lights with up- & down-lighting € 1,114
23	Two exhaust fans. (One kitchen E.F., and one for the shower area / wetroom) € 258
24	19 square meters of cork and woven mat ceiling € 869
25	Complete construction package of low VOC adhesives, connections, and simple tools € 2,151
€ 49,838	**Subtotal Kit of Parts - MicroHome 10 Competition Cost**
26	*3,000 Litre Stormwater Detention / Retention Kingspan SlimLine Water Tank potable water storage system € 2,377*
27	*58.22 square meters of Kingspan QuadCore Insulated Wall Paneling € 5,647*
28	*58.22 square meters of STEICOFlex insulated structural panels for the walls & ceiling € 5,647*
29	*18.58 square meters of Kingspan QuadCore Insulated Roof Paneling € 1,802*
30	*Two Kingspan SolaTube 160 DS HVHZ Skylight Kits - 25cm Diameter - Hurricane Zone Certified with Pitched Roof Flashing & Extension Tubes with Light Add On Kits € 1,283*
31	*74.32 square meters of Kingspan DriDesign Rain Screen system € 8,239*
32	*Five Kingspan QuadCore Power Panels € 2,563*
€ 20,109	**Subtotal Kingspan Products Kit of Parts**

€ 49,838	**Subtotal** Kit of Parts - MicroHome 10 Competition Cost
€ 345	12.029 meter Standard Shipping Container + Freight << Rotterdam to Manilla >>
€ 1,562	Customs / Taxes / Port Fees
€ 20,109	***Subtotal*** *Kingspan Products actual cost*
€ 12,903	Local Construction Labor
€ 2,000	A pre-packaged house-warming kit can be purchased separately (to include bath & bed linens, cutlery, dishes, kitchen smallware, compostable toilet paper, etc.) but remains outside the scope of this project.
€ 86,757	**Total Turnkey Value of reROOT Model of MicroHome**

Kit of Parts and Budget

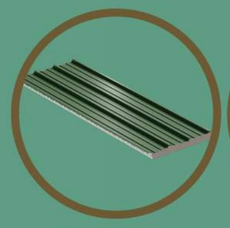


KINGSPAN PRODUCT SELECTION



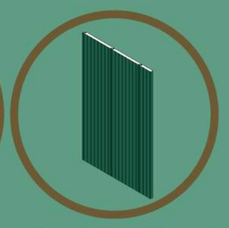
QuadCore PowerPanel- Evergreen

We chose to include 5 QuadCore Power Panels on our roof, providing a streamlined and integrated solar strategy while still meeting the electricity generation needs and thermal insulation required in this hot climate. The average micro home needs approx. 1-5kW daily and each panel produces between .46 to .475 kW. At 5 panels, we would average between 2.3 and 2.375kW. The Power panels would be paired with an inverter and battery stored in the floor cassette.



QuadCore LEC Insulated Roof Panel- Evergreen

QuadCore LEC insulated roof panels and wall panels were selected due to their exceptional thermal performance, and superior fire protection which made them ideal in an area that has to deal with volcanic ash and hot humid weather. The QuadCore LEC technology is also rooted in the Filipino culture of working in harmony with the enviornment, with its low embodied carbon , low VOC and certified Environmental Product Declaration showing Kingspan's dedication to sustainability in all aspects of its products. The slope of the QuadCore roof panels combined with the corrugated profile assists with water collection and funneling rainwater to the planter beds and Slimline collection tanks below.



QuadCore LEC Shadowline Wall Panel-Evergreen

Dri Design Flat Face Fastened Perforated Cassette-Bronze 0001

We chose to include the Dri-Design flat faced perforated cassette to be panelized and mounted to cureve the wall and roof profile, creating better aerodynamics and protection to the glazing and QuadCore panels from wind brone debris during high wind/typhoons while acting to allow air through and funnel it into the building for passive cooling when its hot and humid. The Dri-design cassette allows the building to breathe and protect the building like a skin.Where the panels transition to the vertical through the curve, support transfers from the QuadCore to the HK-Design omega profiles carrier rails.

SolaTube Tubular Skylight w/Light Add on

The SolaTube we used to bring natural light into our powder room and shower spaces in the middle of the building, while being able to give the valuable roof space mostly to the QuadCore Power Panels. It also allowed us to forgo putting windows into the spaces, so that they can be used as disaster shelter rooms during severe natural disasters, allowsing for greater protection. We went with the hurrican zone certification due to typhoon winds being present in the area and added a light add on kit so the space can utilie the SolaTubes for both day and night light

Rainwater Harvesting SLIMLINE Tank

We utilized the slimline rainwater harvesting tanks for water collection and usage in the building for the sinks, irrigation, shower and washer machine. The Dri-design perforated screen allows water through to the QuadCore roof ribbed roof panels that collect and funnel the water to the planter beds above the Slimline tanks. Percolation through the vegetation, soil and filter fabrics cleans the water before entering the first tank. The water is pumped through an additional active charcoal and ultraviolet filtration system to the second tank to be stored for potable water use.

STEICO flex036 Wall Insulation

Behind the QuadCore exterior wall panels are engineed laminated bamboo for main supports and coco lumber (lumber created from the byproduct heart of coconut palm trees) to carry the panels. In between the supports we will infill with the STEICO flex036 wall insulation behind the interior wall finish. This allows us to complete the wall assembly in line with responsbile forestry products, that also contibutes to the thermal insulation between the hot humid climate and the interior, further contributing the the passive cooling strategy.