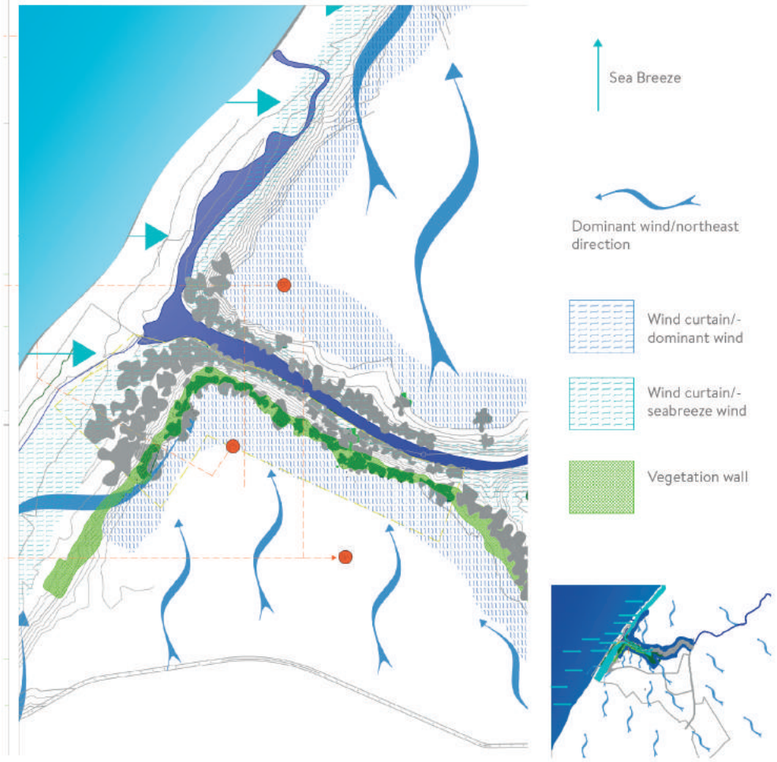
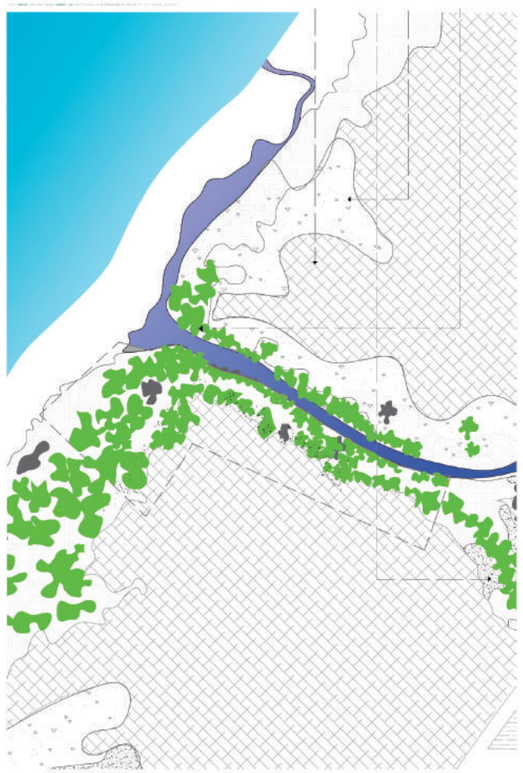
TECOLAPA GREEN LODGE

Sustainable Tourist development following a craddle to craddle approach, in a rural area of Nicaragua



WIND ANALYSIS- Dominant winds from north-east/ Sea breeze in daytime



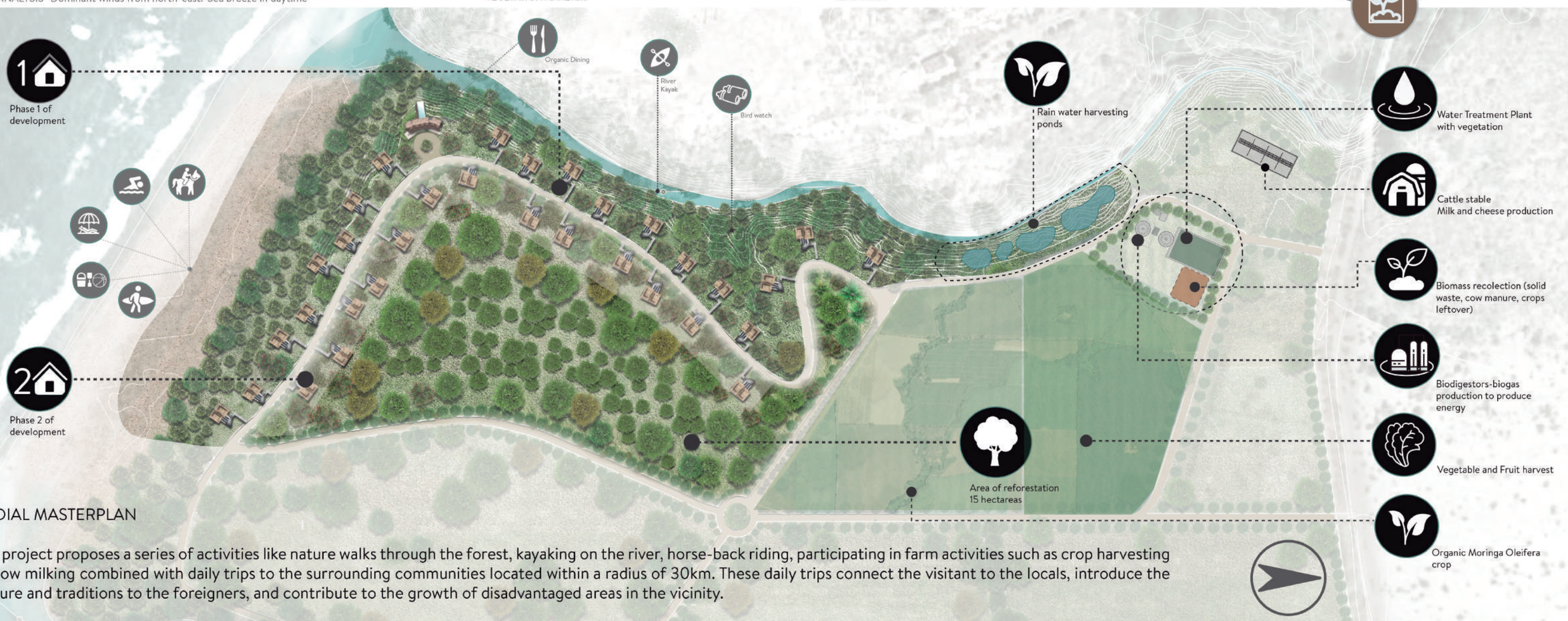
VEGETATION ANALYSIS

SOIL STUDY

Types of soil

The development's layout originates from a series of site analysis. The local climate conditions, wind, soil, geomorphology, sun orientation, and vegetation informs the orientation of the villas, and the position of the components. The masterplan is formulated facing the wind to allow maximum exposure and the location of the villas are placed strategically to protect the interior from solar exposure.

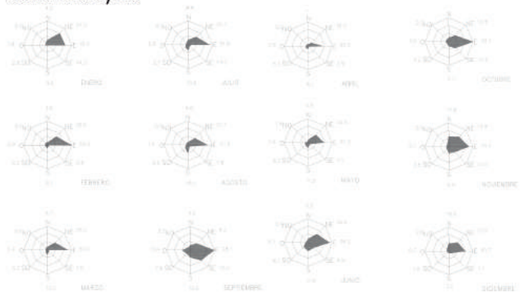
The development recreates the cycles of nature in which no waste is produced. Water, energy and construction materials become cogs of a closed cycle in which waste becomes usable substances, which are disposed of again after used. For example, the sewage water coming from the Villas is processed into fertilizer for the crops and biogas for energy production.

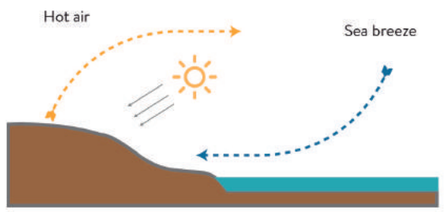


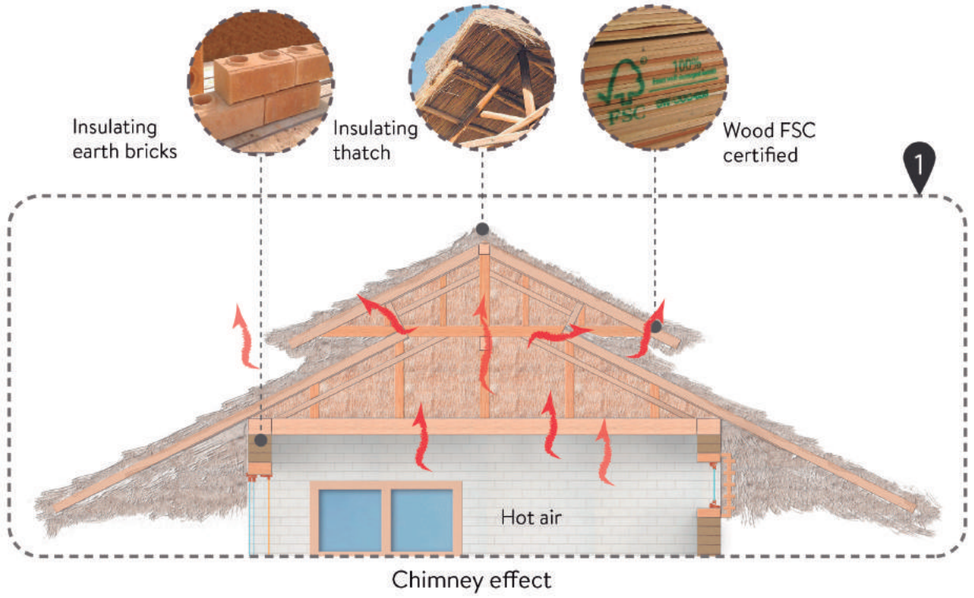
RADIAL MASTERPLAN

The project proposes a series of activities like nature walks through the forest, kayaking on the river, horse-back riding, participating in farm activities such as crop harvesting or cow milking combined with daily trips to the surrounding communities located within a radius of 30km. These daily trips connect the visitant to the locals, introduce the culture and traditions to the foreigners, and contribute to the growth of disadvantaged areas in the vicinity.

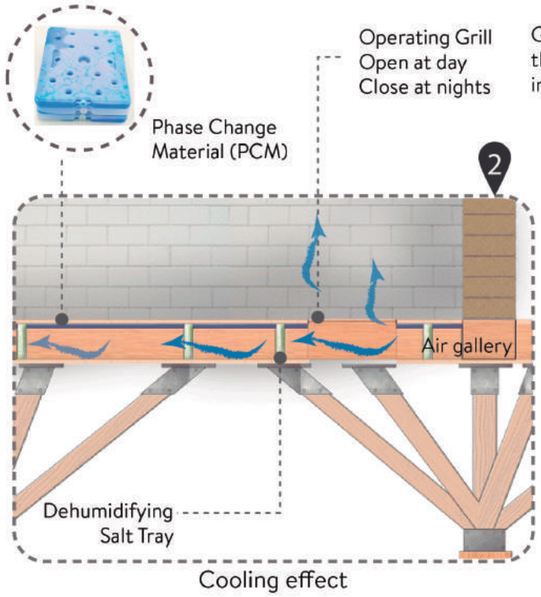
Solar analysis



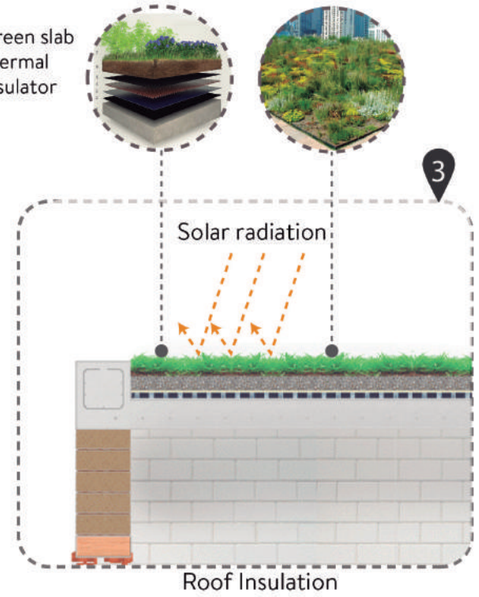




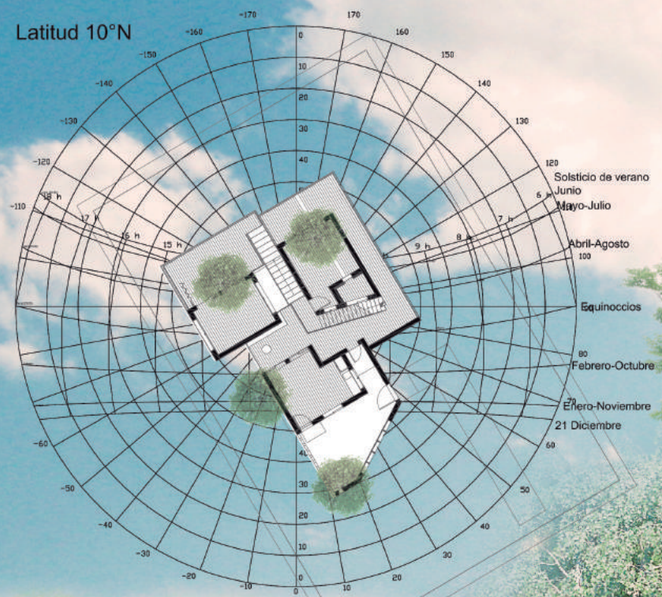
Chimney effect



Cooling effect



Roof Insulation



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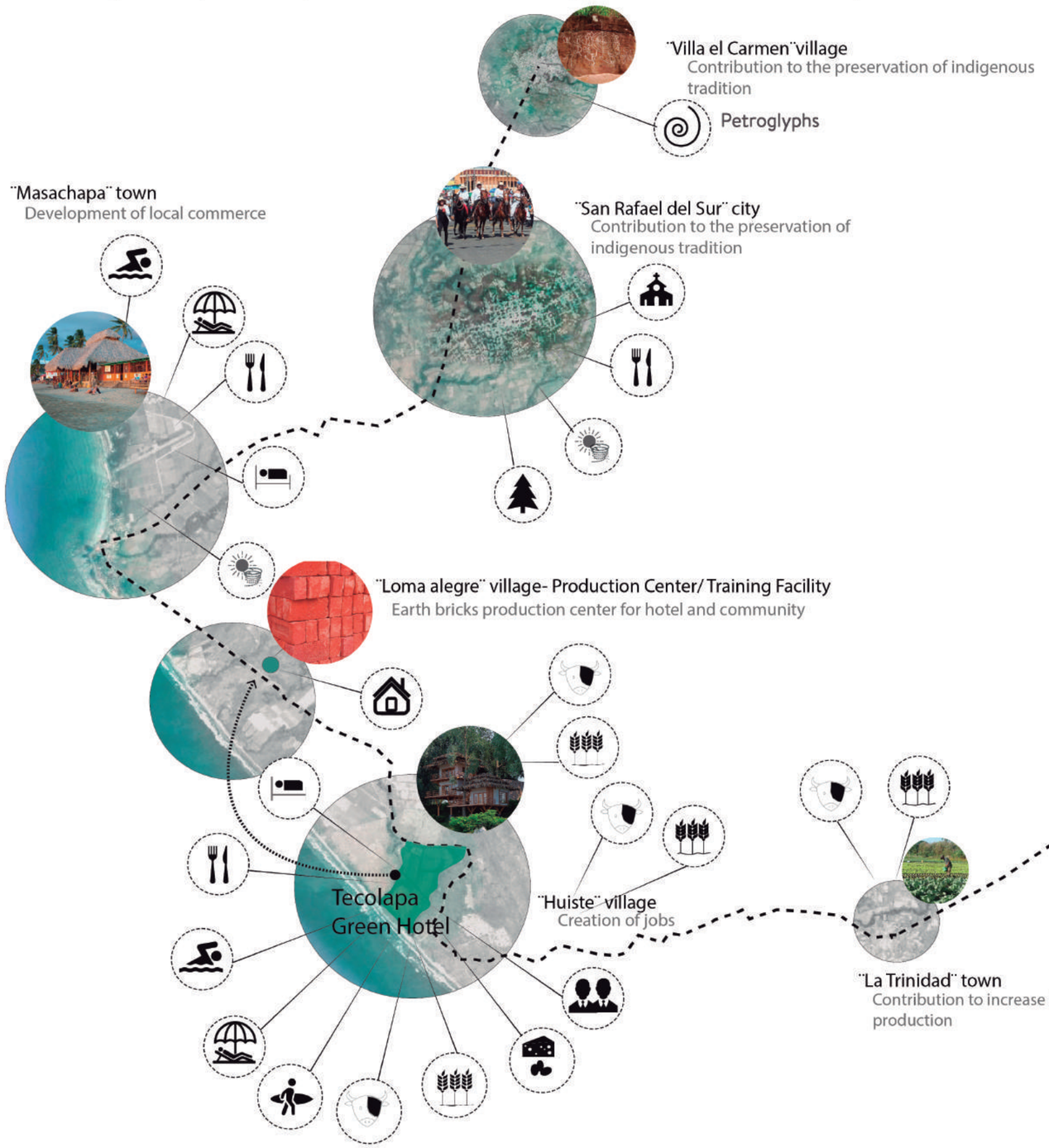
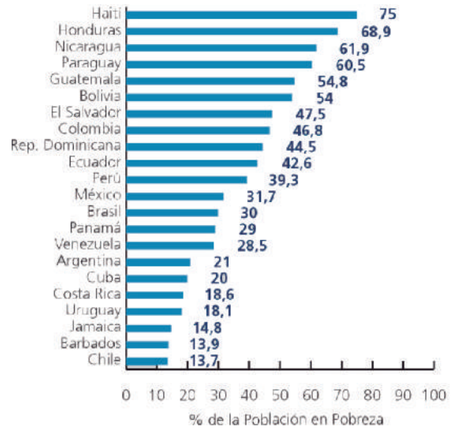
The Latin-American region still shows high indexes of poverty levels. In the region, one out of three people lives in poverty, and one out of eight in extreme poverty. Nicaragua is one of the poorest countries of the region with more than 60% of its population living in poverty.
This proposal aims to contribute to decreasing the level of poverty in Nicaragua by formulating a tourist development that it is framed under the principals of sustainable tourism. Tourism as motor of prosperity, in hand with protecting the natural resources and respecting the destined locality and culture, plays an important role as a catalyst for economic development.

A route of local activities is created to take the tourists through communities in the region and introduce the cultural richness of these areas. In a town called ¨Villa El Carmen¨ clients can learn of indigenous art and beliefs by looking at petroglyphs dated form the pre-columbine times. This tour is led by an indigenous decent settler of the town. In the town called Diriamba, visitors can walk through a colonial city, explore the insides of traditional catholic churches and climb the clock tower, the signature building of Diriamba. These routes are just examples of the possibilities available in the region that enrich the visitor's expierence and leave income in the communities.



TOURIST ACTIVITIES THROUGHOUT THE LOCAL COMMUNITITES



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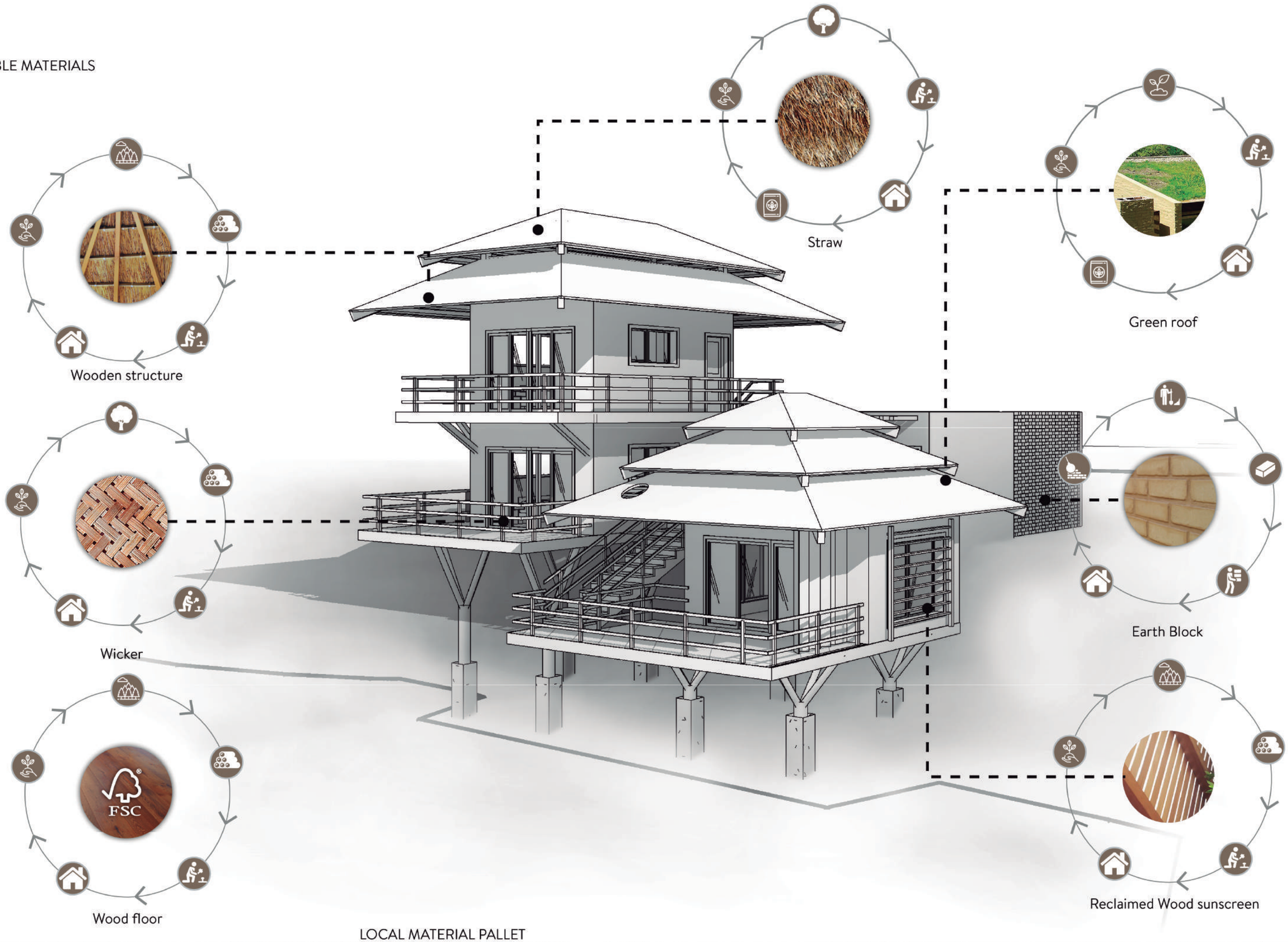
RE-USABLE MATERIALS

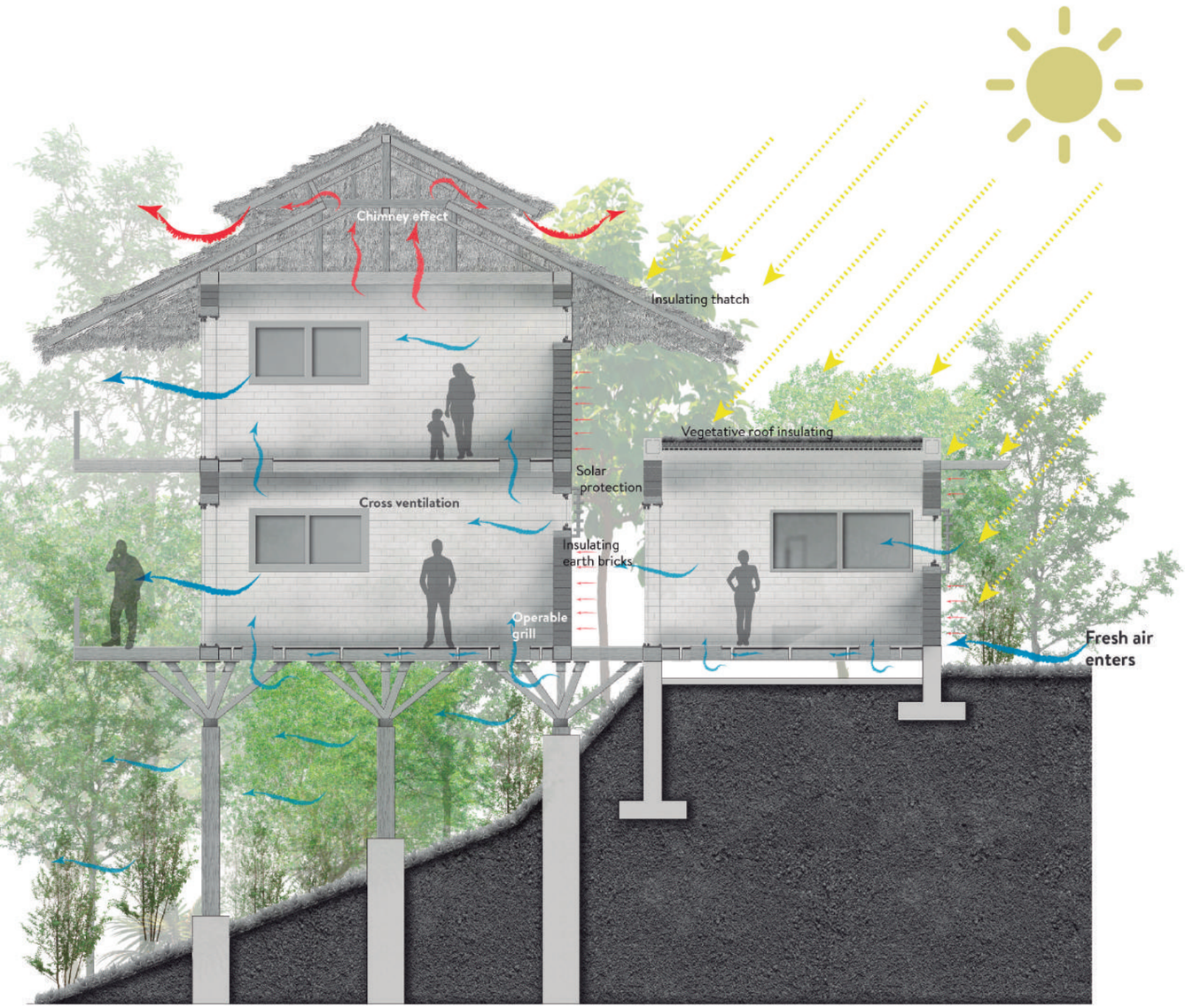


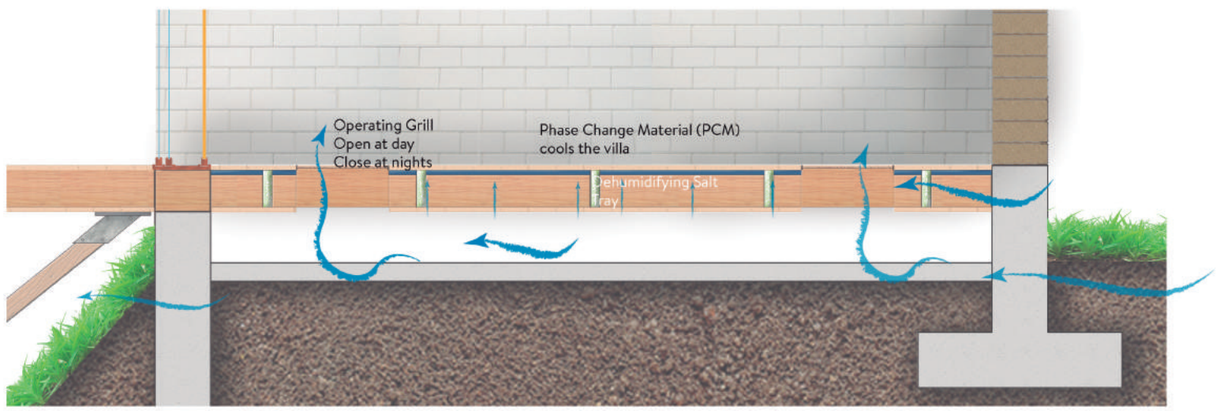
LOCAL MATERIAL PALLET

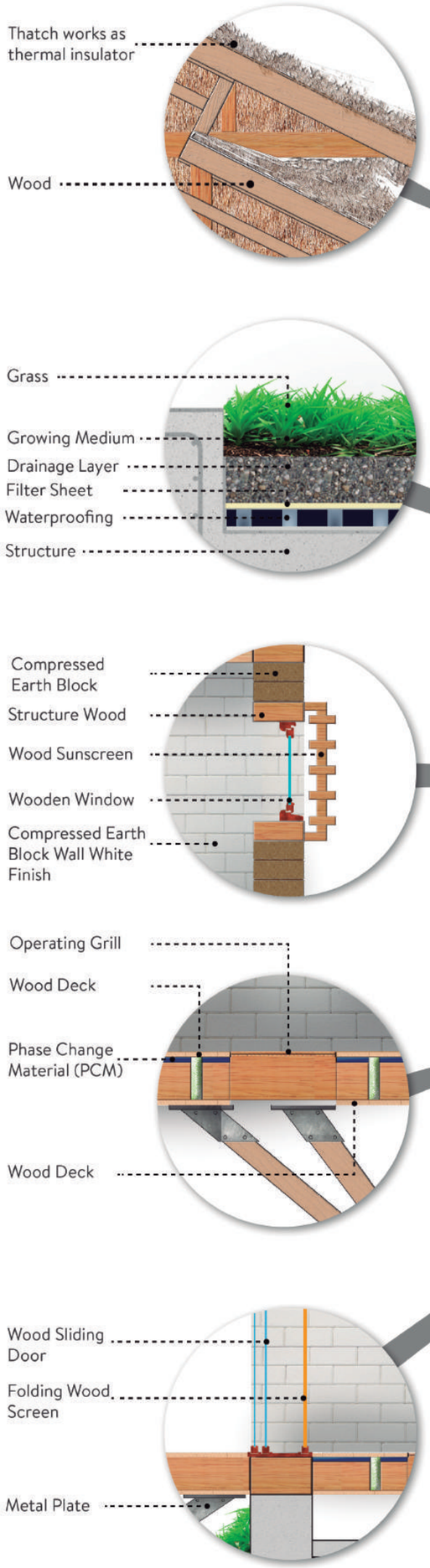
Passive Design strategies

The Hotel Villa reduces the overall energy demand by integrating passive design strategies. Some of these strategies are:

- Air gallery and chimney effect: The fresh air passes through a chamber with salt trays located at the bottom of the house that take humidity away from the air. This air enters through operable grill located at the flooring deck.
- Cross ventilation: The house receives the dominant winds, which enter the interior through operable shutters, screens, and sliding doors.
- Solar protection: The façades respond to the sun orientation
- Insulating materials: The enclosure material is made of compressed earth bricks that naturally regulate the micro-climate of the Villa
- Cooling materials: The decking system integrates a Phase Change Material (PCM) that absorbs heat as the external temperature rises.

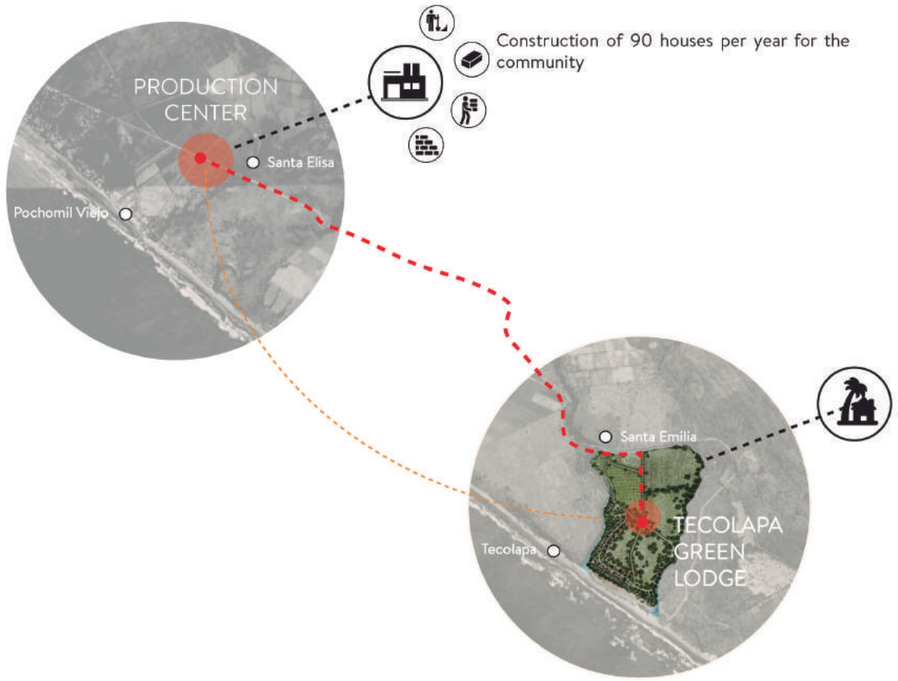






SOCIAL CONTRIBUTION

Compressed earth blocks production for the community



Check the measures (5)

Dry for two days (6)

Compressed block (4)

Construction of walls (7)

Site material (1)

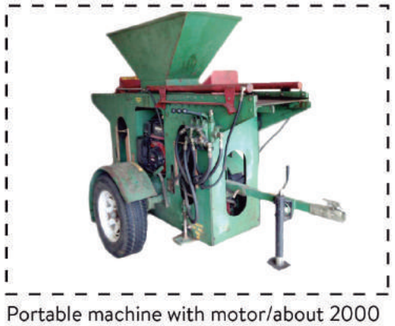
Mixture of cement, water and earth (2)

Fills molds and apply pressure (3)

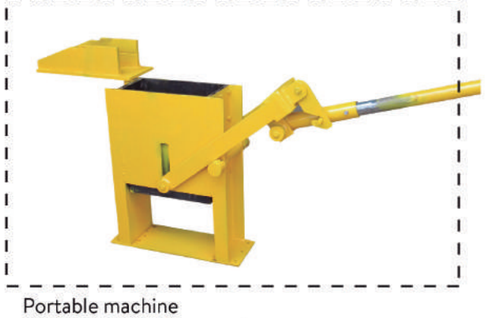
Finished walls (8)

The compressed earth blocks are produced on site using a mixture of 8% cement and 92% clay soil compressed at a minimum 1,900 psi .The compressed earth blocks have a small carbon footprint since they have very low embodied energy and require almost no transportation. The compressed earth blocks are water resistant and fire resistant.

The plant for earth brick production will be placed 7km away from the hotel and employ local labor and will use locally sourced clay soil. Moreover, the plant will have an educational component with a training center for earth-brick production and construction.
By decreasing indoor humidity these earth-brick houses tackle many common respiratory illnesses directly related to poor air quality and contribute to the well being of the local community.



Portable machine with motor/about 2000 blocks everyday



Portable machine
About 200 blocks everyday

GENERATION OF RENEWABLE ENERGY

Each Hotel Villa has an individual mechanic thermic solar system that generates energy from water steam and stores energy so it can also be consumed during the night.

The tank, also known as a thermic chamber includes a deposit of sodium and potassium nitrates at the bottom and a carbon foam supporting a graphite layer at the top.

1. Mirrors (Heliostats) are placed to concenrate incoming sunlight and redirect them to a copper bar
2. Translucent Glass allows the solar rays penetrate to the top layer made of graphite
3. The steam concentrates into a boiler
4. A top layer of graphite flakes and an carbon foam is placed afloat to intensify the solar intensity and produce steam faster
5. 16 m3 Hot water tank
6. Water Evaporation is performed through vaporizing tubes
7. Salt deposit stores energy during the nightime and allows to keep creating steam
8. Pre-Designed Turbine SST - 010
9. 7KW Alternator to 3000 RPM
10. Electric Panel
11. 6 m3 Gray and rain water storage used to replenish hot water tank

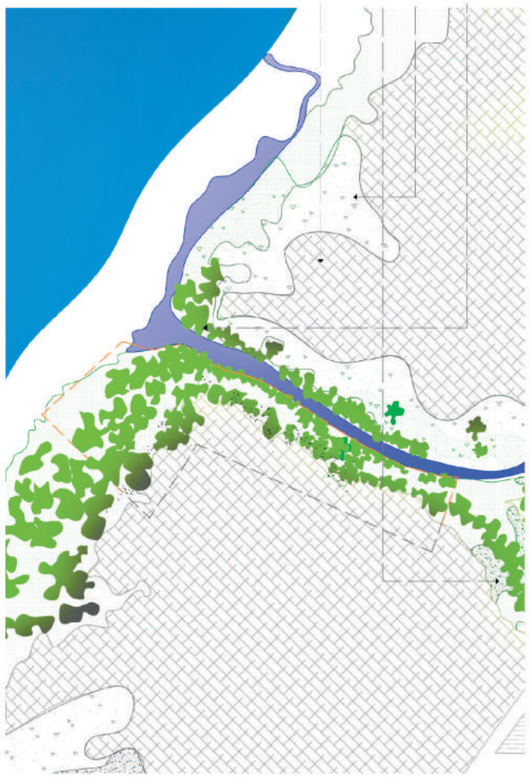
Grey water produced by person 60 lts daily

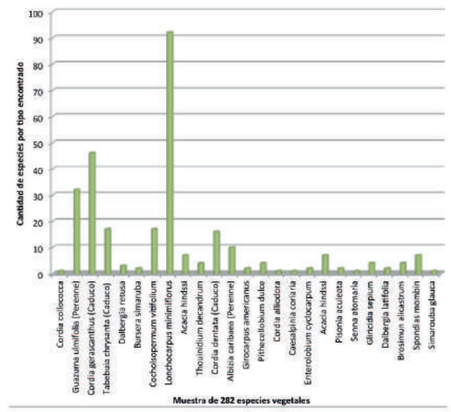
Grey water injection to replace the lost liquid from the boiler by evaporation

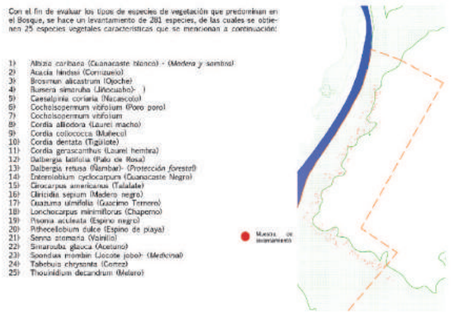
9 Alternator

8 Turbine

4 Graphite and carbom foam layer







Study of the tree composition of the site

Kayak

Reforestation with native species

Micro anagement
Water and water coking

Rehabilitation of the natural habitat
of the autochthonous species

Reforestation First year 3.75 Mz

Reforestation Second year 3.75 Mz

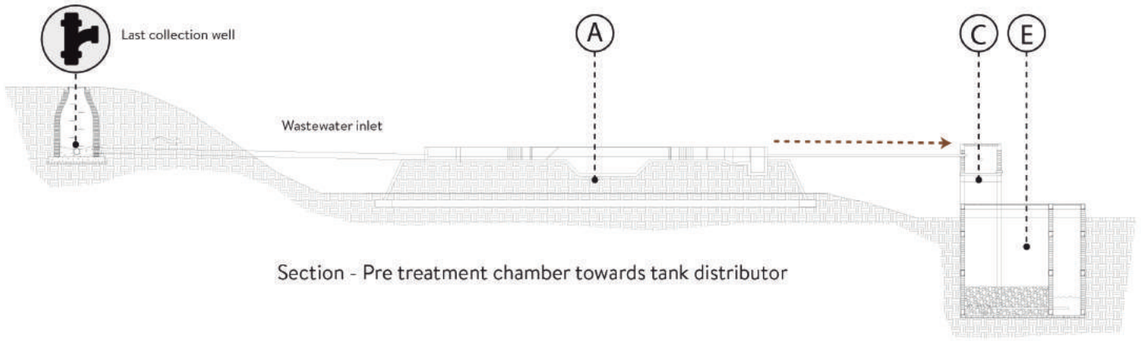
Reforestation Third Year 3.75 Mz

Reforestation Fourth year 3.75 Mz

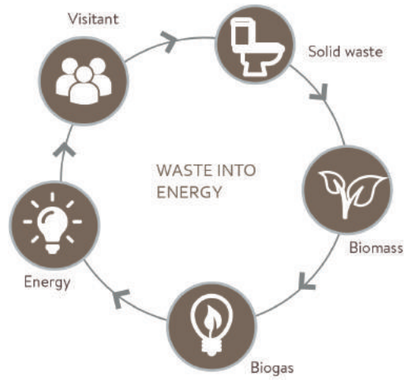
Trekking

Bird watching

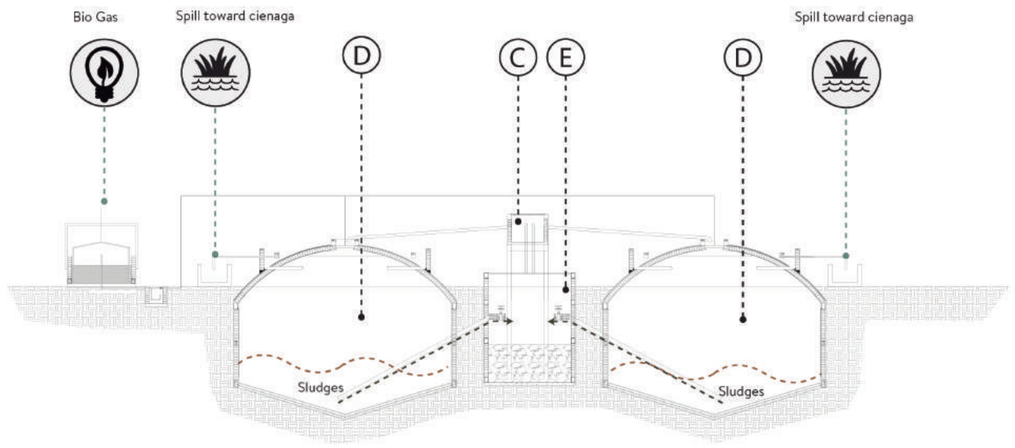
Reforestation
area

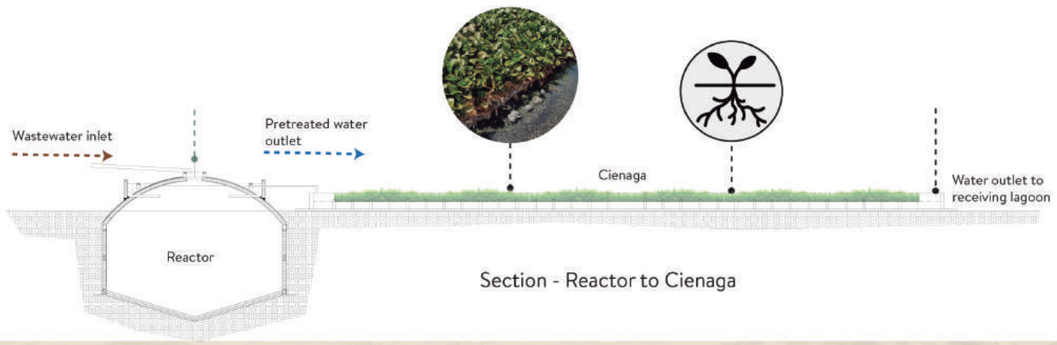


Section - Pre treatment chamber towards tank distributor

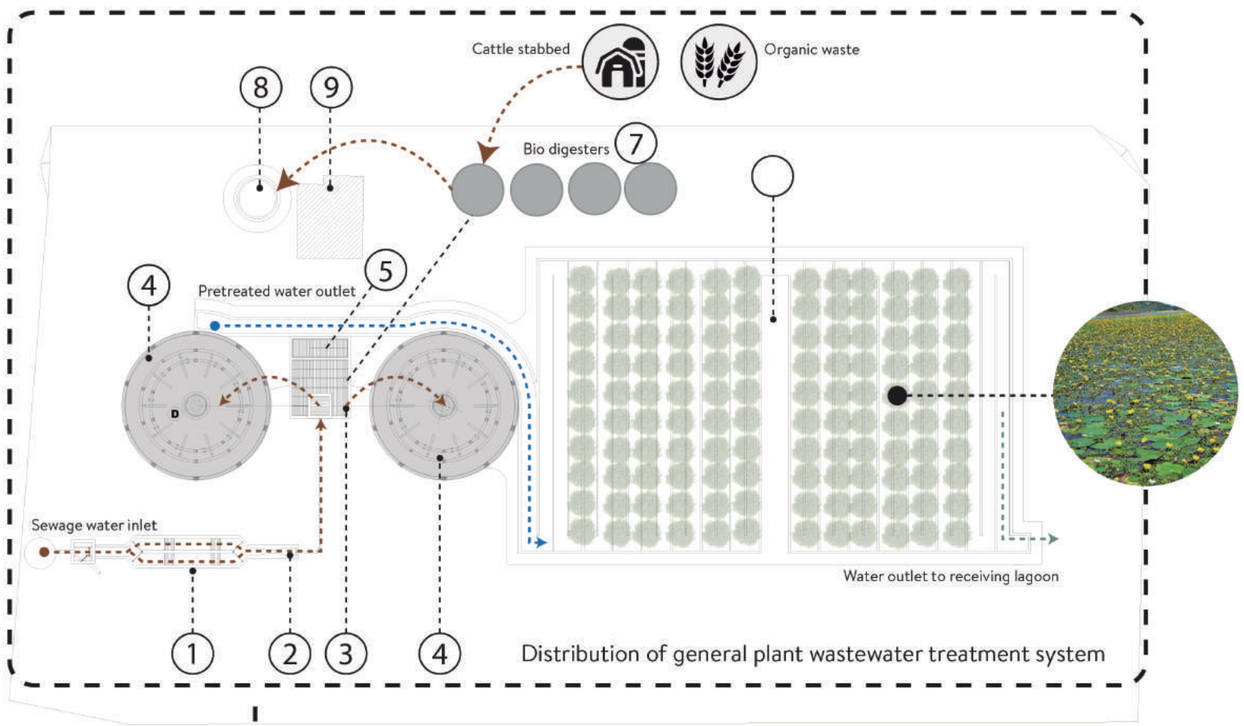


1. Pretreatment
2. Power diverter
3. Breaking tank
4. Anaerobic reactor
5. Sludge drying tank
6. Cienaga/Macrofites swamp
7. Biodigestors
8. Gas tank
9. Machine room





Section - Reactor to Cienaga



Distribution of general plant wastewater treatment system