
Winaca Design Center Project

A compendium of research, process and specifications for Phase I

During June, 2007, interns Raneen Nosh and Jeff Werner, Industrial Design students from the Emily Carr Institute in Vancouver, Canada, worked with the Winaca Foundation in the Cordillera region of the Philippines. The project was to design and build a bamboo home as the first phase of a future international student design center.

This document, created June 25, 2007, is a final compilation of Raneen and Jeff's research, process and specifications and is intended as a reference for both Winaca and future students.

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Project Goals

The Phase I Living Quarters of the Winaca Design Centre is a basic facility that sleeps four people with two bedrooms, a bathroom, kitchen, and a common all-purpose area.

The structure will use, as much as possible, local, sustainable materials with low 'true' costs: each material must undergo a review to determine the cost (financial, environmental, social) involved in its creation, transportation and eventual discarding / recycling. Weighed against concerns like

financial cost, availability, and maintenance, each material used can be justified.

One of Winaca's goals is to position this building as a showcase alternative to concrete housing. In order to overcome the stigma associated with the 'poor rural nipa hut,' yet encourage people to build with bamboo, this home must be functional, fairly affordable, modernized and aesthetically-pleasing.

If this first phase can inspire and set a positive example, then bamboo as a building material can be accepted across social and financial barriers.

Frameworks

Two initial design frameworks were developed, each speaking to differing priorities. We soon realized a balance between Model A and B was needed to accurately apply Winaca's desires

while integrating sustainability, cultural incentive and pragmatics. Thus Model C was used throughout the design of the Living Quarters and should be applied to future sections of the Design Center.

Model A

- All local materials (back yard, city, province, nation)
- Low true cost
- Sustainability priority over design (traditional influence with contemporary details)
- Educational lifestyle (ignite a behavior change through design limitations)

Model B

- Design priority over sustainability (contemporary influence with traditional details)
- Local and assistive materials
- Educational thinking (speaks of sustainability but doesn't teach how to live it)
- Mid-to-high cost materials and labour

Model C

- Local with justified assistive materials
- Fusion of traditional and contemporary design
- Indirectly educational
- Low 'true' cost materials and labour



A sample of initial sketch models presented for the bamboo Living Quarters. June 5, 2007.

Context

Map of the Cordillera region showing the six provinces and nine tribal groups.



Context

Cordillera Region

Administration

The Cordillera is the mountainous region of Northern Luzon in the Philippines and is also a distinct government administrative area with headquarters in La Trinidad. Within the Cordillera boundary are six provinces:

- | | |
|-----------|---------------------|
| 🌿 Apayao | 🌿 Mountain Province |
| 🌿 Abra | 🌿 Ifugao |
| 🌿 Kalinga | 🌿 Benguet |

Architecture

A hut (or bahay kubo) is the traditional house of the Philippines and is usually constructed with indigenous materials such as bamboo, cogon, runo, and rattan. These small structures are fitted with palm-thatched roofs and open, airy walls, making them a refuge from the tropical sun, rain and wind of the tropics.

Cordillera traditional, indigenous homes have either ground-level or raised floors and are built near water. They have steeply thatched roofs, wooden columns set deep into the ground supporting trusses, timber/bamboo walls with screens to keep out the sun and wind. Furnishings are sparse: only low tables, chests, and woven straw mats for sleeping.

Tribal Groups

The general name to describe the tribes of the Cordillera region is Igorot, however this term should be used sparingly as some tribes do not care to be blanketed under one identity.

Each tribe in the Cordillera demonstrate different architectural styles for domestic spaces. There nine major ethnolinguistic groups are the:

- | | |
|------------|------------|
| 🌿 Isneg | 🌿 Ifugao |
| 🌿 Tinguian | 🌿 Kankanay |
| 🌿 Kalinga | 🌿 Ibaloi |
| 🌿 Bontoc | 🌿 Ilongot |
| 🌿 Gaddang | |



Walsiyan, 72, one the elders of the Pikong village, in traditional costume after performing the two-day Begnas di Latab ritual ceremony that must precede the annual rice harvest. Sagada, Mountain Province, June 13, 2007.

Background

Winaca Foundation, Inc.

The Winaca Foundation was formed by Narda and Wilson Capuyan and Dr. David B. Baradas in part as a response to the 1990 Baguio earthquake. The Foundation provided relief shelter and assistance to displaced locals. Today it aims to promote and develop the livelihood, heritage and self-sufficiency of the indigenous communities of the Cordillera.

The Foundation is responding to the increased use of chemical fertilizer in local farming by promoting, practicing and educating people about organic agricultural practices. It has held training seminars on farmer health, bamboo propagation, indigenous fiber use and participates in internationally-related conferences.

The Foundation has a number of programs and commitments in the areas of education, the environment, micro-credit financing, health, research and moral and spiritual values development. Its headquarters are at Narda's Commercial Center in La Trinidad, close to Baguio.

Winaca Eco Cultural Village

The Winaca Foundation is developing an eco-tourist and education destination for local and international visitors interested in the cultural heritage and applied arts and craft of the Cordillera region.

The Village's primary cultural component will feature "a series of old authentic houses of the different Cordillera ethnic groups set in a culturally defined space of their own."

This collection will include examples from the nine ethnolinguistic groups of the Cordillera, as well as one of relevance from the coastal lowlands, and will serve to preserve Cordilleran craft and history while providing educational materials to the public about these cultures. Each authentic home will be furnished and feature traditional craftsman (carvers and weavers) and crafts of that region on site.

Winaca Design Center

A component of the Eco Cultural Village will be an international education exchange campus. The Design Centre is in part a public response to the present wood crisis in the Philippines, and the environmental damage that entails, with most locals resorting to either illegal logging or building homes of concrete and galvanized iron.

The Design Centre will attempt to incorporate sustainable structures and materials, such as bamboo and native grasses, and will showcase and educate students from around the world, as well the Cordillera community, about alternative, indigenous materials and traditional technologies—in particular bamboo construction—combined with new concepts and contemporary applications.



Above: Original Bontoc home that Wilson Capuyan was raised in, now at Winaca. June 11, 2007.

Left: Emily Carr Institute Professor Sam Carter inside the Bontoc home. June 11, 2007.

People

Narda & Wilson Capuyan

Co-Founders, Winaca Foundation



Narda, a Bontoc indigenous weaver from the Cordillera region, is credited with reviving, innovating and transforming Ikat weaving in the Cordillera Provinces of the Northern Philippines. Her work, in the last thirty years, focuses on the cultural wellbeing and economic development of Indigenous communities.

Her husband, Wilson, runs a major home and business construction company in La Trinidad.

The Capuyan's are the primary financial contributors to the project and are providing their personal land as the location for the Winaca Eco Cultural Village.

Narda and Wilson are the managers of the Winaca project; Wilson provided us with technical and historical considerations for the design of the bamboo home as well as advising us on suitable locations on their property to build it. Narda was our main contact and go-to person, as well as Sheila's and Sam's, throughout the internship.

Dr. David B. Baradas

Chairperson, Winaca Foundation



Born and raised in the Philippines, David has a BA in Sociology from the College of Wooster, Ohio, and a Doctorate of Philosophy, Anthropology, University of Chicago.

David has served as a professor at Mindanao State University; Director / Curator of major Manila museums; Consultant for Arts & Humanities, The Ford Foundation, Manila; and as a Consultant on Rural Development, The Asia Foundation, Manila.

An exhibition designer, David remains a member of the Executive Committee of the UNESCO Philippine Committee for Intangible Heritage.

David is a close friend and collaborator of the Capuyans and has designed interior spaces and landscapes for their various projects. For Winaca, David provides the primary expertise on Cordillera history and culture. He is also contributing his knowledge to the design of the bamboo home.

Ambrosio B. Tomlayan

Architect, La Trinidad



Ambrose is from Bontoc in the Mountain Province of the Cordillera. He is a certified architect and specializes in small-scale design and construction. Ambrose is a vegetarian and his interests include meditating and solitude.

Throughout the project Ambrose worked with us to develop the plan for the bamboo house, advising us on both local and international construction conventions as well as spiritual ones, such as door and window placements and pre-building rituals.

People

Sheila Hall

Instructor, Emily Carr Institute



Sheila has a degree in Art History and a master's in Photography and Printmaking from the University of British Columbia. She has received numerous grants and her work is shown internationally. She has made Foundation and Critical studies at ECI her base for the past seventeen years.

Sheila is involved with international student learning collaborations in Ethiopia, Malaysia, and the Philippines.

As the instrumental person behind coordinating our internship, Sheila both established our contacts in the Cordillera and was the first to spark our interest in the Winaca project. She visited Baguio before our arrival and advised us on directions to take with the project before returning to Vancouver, where she continued her mentoring via email.

Sam Carter

Assoc. Prof., Emily Carr Institute



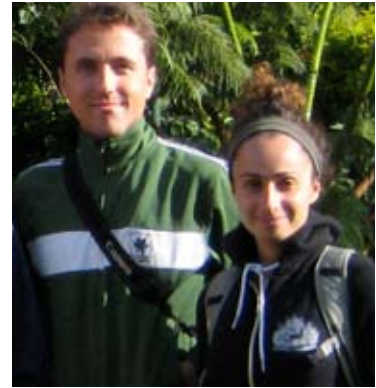
Sam has over thirty years of experience in exhibition design, ceremonies and public art.

Sam is a Visiting Distinguished Professor at the University of California, Davis as well as at the Humanistic Olympic Studies Centre, Renmin University of China. Sam holds degrees from California State University, Long Beach (BA-MA), University of Toronto, BLArch and Diploma from Ikenobo Ikebana, Kyoto, Japan.

Together with Sheila, Sam organizes ECI student projects in Africa, China, Malaysia and the Philippines. Sam visited us during our stay and provided direct feedback on technical as well as more esoteric considerations such as cultural management, global economies and education.

Jeff Werner & Raneen Nosh

Students, Emily Carr Institute



Jeff and Raneen were selected by Sam and Sheila to participate in the Summer 2007 International Student Learning Collaboration, occurring this year in the Philippines, which included working with the Rurungan sa Tubod Foundation in Palawan and later the Winaca Foundation. Both students are majoring in Industrial Design at ECI and compiled this document (Hi!).

Raneen is a graduate of the Vancouver Film School diploma program and was co-owner of a design firm in Vancouver. Jeff is a freelance web designer and has a degree in Art History and Journalism from the University of Victoria.

Research

Activities

Working with Winaca members, assistants from Narda's Handwoven Arts & Crafts, and architect Ambrose Tomlayen, we designed and initiated the building of a bamboo structure that is the first phase of an education center for local and international design students. It will be located within the Eco Village on the Capuyan farm.

We helped design a sustainable bamboo system, learned about the region's vernacular architecture and its native bamboo, its identity in the Philippines, its properties, and its traditional and contemporary applications.

We visited multiple bamboo farms throughout the La Union coastal region and toured the Ecosystem Research and Conservation Center bamboo nursery in Baguio. We collected a bamboo resource list, in particular its relation to contemporary and vernacular architecture and other indigenous materials, as well as a contact list of experts and contributors to the project so far.



A cluster of thorny 'kawayan tinik' bamboo growing wild on a harvesting farm, La Union Province, June 3, 2007.

Influences and Attributes

General philosophy

- Dialogue between exterior / interior spaces
- Great use of light and space, allowing breeze to flow through rooms (cooling and circulating)

Common features

- Steeply pitched roofs—used to release hot tropical air and to drain off heavy rain
- Thatched roofs—usually made of cogon or runo. In order to avoid decay and leakage they need to be changed every ten years
- Lanai—verandah with wide eaves to shelter interior from sun, open to elements on at least three sides, place to lounge, relax and eat (acts as an alternative to a dining room)
- Capiz shells—associated with authentic Ilocano homes of the Luzon coastal range, semi-translucent capiz shells are set into wooden-grid windows; this architectural feature was introduced by the Spanish in the 16th century and inspired by Japanese shoji screens.

Fusion of styles and influences

- Integration of Filipino, Spanish, Japanese, Chinese, Mediterranean, Mexican
- Mixed Style—Spanish colonial, use of stone, tile, and sliding panels of translucent capiz shell panes (16th C.)
- Frank Lloyd Wright's Prairie Style—integration of the building with its landscape, horizontal planes and organic-looking materials, asymmetrical floor plans, minimal partitions between rooms, large roof and long windows that spread horizontally
- International Style (50s-80s)—influence by modernism, pares down design to essentials, beauty in function of each part, materials are attractively applied, only popular in Filipino office and furniture design

Research



Binding runo reeds with rattan for use as ceiling panels. Winaca Village, June 11, 2007.

- 🌿 Fusion Style (late 60s)—nationalist movement influenced Philippines' architecture, opening buildings to light and air, appreciation of natural and indigenous materials, use of tropical craft and techniques, integrated exteriors into interiors with living areas connected to gardens by a lanai
- 🌿 Baliesque (80s)—SE Asian influence, wood over concrete (natural integrated with processed material)

Bamboo

There are four main types found in the Philippines:

1. Bayog (*Bambusa Blumeana* variety *Luzonensis*) has the same diameter as kawayan tinik but with thicker walls and is used for the superstructure of buildings and homes. Bayog often have curved culms and may be used for furniture for a desired effect. Bayog is slightly thorny and grows in the lowlands
2. Kawayan Tinik (*Bambusa Blumeana*) is of the same diameter but with thinner walls and is used for secondary components of a structure such as rafters and flooring. It may also be used for furniture. The Ilocano term for 'tinik' is 'siantan,' which literally means 'thorn'
3. Bolo is a very thin bamboo that grows in the midlands, it can be planted by seed or offset, and is for 'sawali' (traditional woven wall)
4. Benguet / Chinese Bamboo (*Desdroca Lamus Aspen*) is imported but now grows throughout the Philippines and is used for room dividers or similar applications.

Some advantages of bamboo include low weight (ease of transport / handling), unusual strength, low cost, sustainability (grows rapidly and abundantly).

Other Indigenous Materials

Cogon—is a swamp grass that is found in the lowlands of Luzon. Cogon is harvested from the base, as it is a thin stock that runs from base to tip. The grass can be used for thatched roofs, walling for storage areas, and even handmade paper. When used for roofing, the leaves are folded over a stick and hand-sewn near the fold with rattan, layer by layer the cogon bunches are layered onto the truss.

Runo—is a reed with both a body stock and leaves and can be found in the Cordillera highlands. It is harvested before fully matured so to yield more leaves. Both the reeds and leaves can be used for thatched roofing. It can also be used for ceiling aesthetics, sleeping mats, and roll up shades.

Rattan—is a rainforest reed and is found throughout the Philippines. However, due to deforestation of the rainforests, rattan is increasingly more difficult to find and expensive. Rattan is now imported from neighboring countries such as Borneo, Indonesia, and Malaysia. Rattan looks similar to bamboo, has a solid stock, varies greatly in diameter, is lightweight, durable, and flexible. It

Research

is commonly used for furniture, sleeping mats, binding, or as weaving material for baskets and such.

Anahaw—is the national leaf of the Philippines. Much like rattan, anahaw is a rainforest reed and is commonly found throughout the Philippines. However, due to deforestation of the rainforests, rattan is increasingly becoming rare and costly. The leaf is a large fan-shaped palm and is desired for its aesthetic appeal when applied to a thatched roof. It is durable and long lasting.

Nipa—leaves are found in the Cordillera highlands and can also be used for thatched roofing.

Coco—trees are found throughout the Philippines. Amidst the Filipino wood shortage, coco lumber has increased in demand over the past ten years. Coco lumber is harvested from trees that are diseased or have yet to bear fruit. The lumber is not very durable and is inexpensive, making it a prime candidate for scaffolding and construction supports.

Current Housing Materials

Concrete—As a result of the wood shortage in the Philippines, concrete is a primary material for the superstructure of commercial and residential buildings. It is cheap and readily available in truckloads. Concrete is sold in bags and mixed by hand with gravel and sand. Cement costs P185 per bag (~\$4 CAD), gravel P750 / cubic meter (~\$17 CAD), and sand P700 / cubic meter (~\$16 CAD).

Galvanized Iron—as a result of the shortage of wood throughout the Philippines, galvanized iron (GI) is often the material of choice for cladding small commercial buildings and residential homes. Corrugated GI is used for roofing and is widely available in sheets 144" x 32" for P310 (roughly \$7 CAD). Plain GI is used for walls and is widely available in 4' x 8' sheets for P280 (roughly \$6.50 CAD).

Nipa Hut Stigma

Many people associate traditional homes with the poor and view their materials as embarrassing as well as inadequate in an environment of increased rains, typhoons and earthquakes. The use of current housing materials are in many ways both practical and symbolic.



Section of an untreated bamboo culm with insect damage. La Union Province, May 28, 2007.



Ifugao house at the Winaca Eco Cultural Village, Acop, Benguet Province. May 28, 2007.

Research

Characteristics of Three Traditional Houses

Bontoc House

- Uniformly shaped
- Steeply pitched thatched roof (of cogon swamp leaf) extends to nearly one meter off the ground requiring one to crouch to access the door
- Shallow interior space; one cannot stand up straight inside
- Pine wood panels for walls
- Fire pit along walls provides heat to dry rice stored above; doubles as cooking area
- Common area for cooking, eating, sleeping, socializing
- No ventilation
- Second floor of wooden planks used for storing 'pelay' (rice husks) or basket of rice kernels
- Interior furnishings are minimal
- Joinery clamps tied by rattan or vine
- Entire house is roughly 30m² (including cooking area and elevated platform along sides)
- Although it fits a large family (6-10 people), a Bontoc house remains small as children seven and older move to a separate dormitory called 'ulog' for girls and 'ato' for boys; the ato institution is where unmarried males live with and learn from their elders the rules, methods, legends, and history of their tribe

Ifugao House

- Square structure with wooden floors, windowless walls and pyramidal thatched roofs
- Cogon thatched roof
- Shallow interior space; one cannot stand up straight inside
- Narra wood used for paneled wall construction
- Fire pit along walls provides heat to dry rice stored above; pit also doubles as cooking area
- Second floor made of wooden planks that are only used for storing 'pelay' (rice husks)
- Interior furnishings are minimal

- Joinery made of friction-fit cuts with additional support by rattan vine binding
- Elevated from ground by four tree trunks; one tree post is buried, the other three remain as exposed tree roots; this unique foundation system carries a 10m² structure; a wooden ladder is used to climb up to the living quarters during the day and is pulled up at night to prevent entry by enemies and wild animals; there is a back door in case of intrusion or attack
- Wooden discs fixed to the tops of the foundation posts stop animals from climbing up
- Bottom of house used actively; outside women weave, men carve, and the family hosts rituals
- Much like a Bontoc house, an Ifugao home can fit up to six people, however the structure remains small as children seven and older move into a separate dormitory called 'ulog' for girls and 'ato' for boys; the ato institution is where unmarried males above seven years live with and learn from their elders the rules, methodology, legends, and history of their tribe

Ibaloi House

- Runo thatched roof
- Slightly larger than the Ifugao with higher interiors; unlike the others, one can stand up straight
- Average size is 16m² and fits up to five
- Pine wood for paneled wall construction
- Joinery of friction-fit cuts with additional support by flexible / durable vine for binding
- Back door in case of an intrusion or an attack

Design

Overview

All Winaca Design Center structures are proposed to be open air with either no walls or collapsible wall systems. We wanted to incorporate an open flow of space and mountain breeze, the integration of interiors and exteriors, versatility / flexibility of space, display of natural materials, open but protected, minimal tools for construction, minimal disturbance to the land (maximize the slope of the plotted location), use natural lighting as much as possible, reduce wiring / plumbing, and integration of a water collection system.

The Center was also designed with the following in mind: balancing private with communal treatment of space, build to withstand strong winds and rain during monsoon season, protect from mosquitoes, and consideration of the lifespan of the materials (ex. the need to replace thatch roofs every 5-10 years).

The Design Center's future Social and Study Quarters will be designed and built by subsequent participants. The former will be an open circular structure incorporating a rest platform, an open shaded space, and conference area; the latter will have a library, open space for activities, and a small exhibit space.

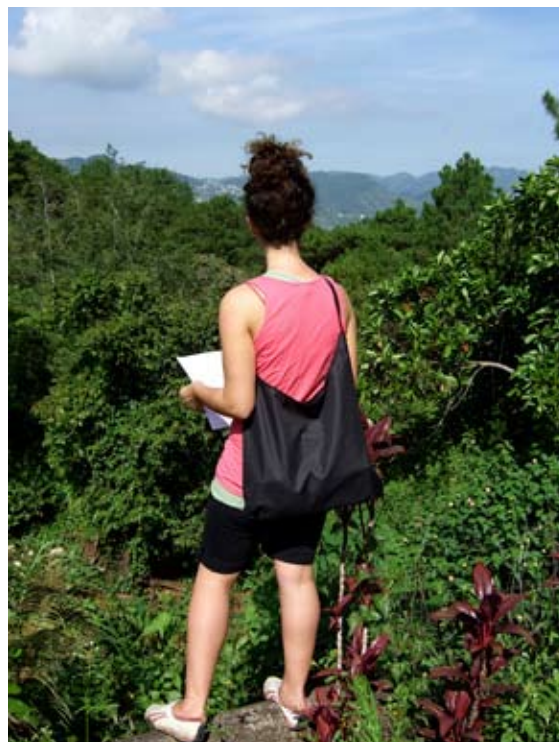
Details

Overall structure

The overall structure was based on an in-depth research of indigenous materials and vernacular architecture found throughout the province of Luzon, as well as examples of contemporary Filipino architectural trends. We also took into consideration the spiritual belief systems found within Filipino culture and the design constraints and opportunities they provided.

Communal Floor Plan

It was important for the design to provide an open area for communal activity such as eating, socializing, studying and working. Traditionally known as a lanai, we designed this open area as the central focus of the interior by providing easy access from any location in the house.



Scouting a potential location for the design centre home. La Trinidad (near Baguio), June 8, 2007.

Design

We wanted to keep the feeling of open space throughout the structure while allocating functions for different spaces. We recessed the lanai floor 12", which also doubles as seating. This creates a comfortable place for individuals to sit, work, and socialize while subtly dividing the working space from the kitchen and the remainder of the house.

The Chinese 'bagwa' symbol, an octagon formation often used for protection, was incorporated into the lanai flooring. The verandah was also shaped into an octagon, providing functional planes for shutters, and a spiritual reference for the inhabitants. The material applied to the flooring will aesthetically complete the octagonal shape by a subtle change in pattern or material.

In order to work with the landscape and avoid cutting unnecessary forest we incorporated a living tree into the design. The floor and roof work around the tree, exposing it and reminding inhabitants of the nature that surrounds.

Roofing

Traditional roofing for nipa huts commonly use local grasses such as cogon, runo, or anahaw. Methods of construction may include traditional thatched roofing or bamboo tiling.

All three types of grasses are used in indigenous homes and will be showcased.

Open Wall System, Room Partitions, Sliding Doors

Inspired by the open use of space and the integration of exteriors / interiors commonly found in Filipino architecture, the design took shape as an open-wall—or lack-of-wall—structure.

Instead of enclosed walls around the lanai verandah, the room integrates the recessed floor / seating as the lower portion of the verandah walls. As much as we wanted a no-wall system it was integral to provide a method to shield the interiors from rain, wind, and mosquitoes. Runo or rattan shutters are fixed to the ceiling providing individuals the ability to open or collapse the 'walls' as needed.

Pull-down drapes of natural material are used to separate the bedrooms from the remainder of the house. Through the design we wanted to emphasize the importance of community, however it was important to provide sufficient privacy for the bedrooms. As a solution a pair of drapes hang from the ceiling, allowing individuals to roll up one drape while leaving the other down if so desired.



A weaver from Narda's helps plant bamboo culms at the Winaca Eco Cultural Village. June 4, 2007.

Design

The main entrance is created by a set of shoji-style sliding doors that integrate semi-translucent material as the windowpanes. Along the sides are floor-to-ceiling windows that are of the same design and materials as the sliding door. Depending on the availability and cost of material, either capiz shells, frosted glass, or a resin-based material can be used for the inserted windowpanes.

The same door treatment may be used at the bottom of the stairs to the bathroom, but instead of sliding doors there will be a regular door.

If need be, split / flattened bamboo panels, sawali, or woven runo may be used aesthetically for interior walls (bedrooms, small partitions, etc.).

Interiors

To keep with a simple and sustainable living philosophy, interior furnishings will be used sparingly. By providing recessed flooring and versatile spaces throughout the home, the structure is designed to reduce the need for excess furniture.

However, it's important to provide a comfortable space for the inhabitants so cushions, pillows, and carpets may be used in the lanai to provide seating and lounging. A table and chairs may be used near the kitchen for eating or working. Rattan mats, simple sleeping mattresses, and minimal dressers can furnish the bedrooms.

Lighting

The primary interior illumination will be natural light. There will also be electric lighting using warm fluorescent (compact or regular) bulbs.

One inspiration is British architect John Pawson. His minimal use of backlighting along floorboards, edges, corners and crevasses is both

elegant and comfortable. Lighting can be integrated into our bamboo pole crevasses, providing ambient light while simultaneously highlighting materials. Slits or cuts can be applied to certain bamboo sections. Light sources may be inserted directly into the bamboo. If need be, long light fixtures can hang from the ceiling as task lighting.

Stairs

According to feng shui, stairs should not end on the number three and should always be climbing upwards to bring good health and fortune to the space.

Keeping this in mind, we designed all stairs to have four steps. The front entrance stairs span 16.4' across, with each stair being 6" high and 12" deep. The bedroom stairs are also 6" high and 12" deep.

Terraced Platforms

To maximize the slope of the land and minimize the structure's impact certain rooms are set at different heights. Also, in order to keep within the stair guidelines, the bedrooms are 24" higher than the main floor. To further create a proportional design the lanai is recessed 12". The main entrance floor is 32" from the ground.

Bathroom

The bathroom is integrated into the surrounding forest below the extended main floor verandah. In doing so the integration of natural elements flow into the facilities and make for a refreshing visit to the outdoors while performing personal duties. Although exposed, a sense of privacy is maintained by the densely forested area surrounding the facilities and the addition of freestanding partition walls.

Design

Water Collection System

Due to the heavy rainfall during the monsoon season, it was important to integrate a rainwater collection system into the structure. Due to the small scale of the bamboo facility, a simple water-well with pump will be installed nearby. In the future a sand-filtering system, providing gray and drinkable water may be considered.

As the Winaca village grows in the future, a larger water collection system will be built. Ideas discussed were to create a damn in the creek below, pump the water up through a sand filtering system and feed it into the house, creating gray and drinking water.

Before creating this damn, an assessment should be conducted to make sure it wouldn't be disturbing the ecosystem surrounding the creek.

Electricity

Electrical outlets will be installed in various bamboo posts throughout the home. Due to the project's small scale, electricity will likely come from the power lines currently running to the farm. As the Village grows, a more sustainable method for electrical power such as solar panels, hydro power, or a biogas system may be integrated.

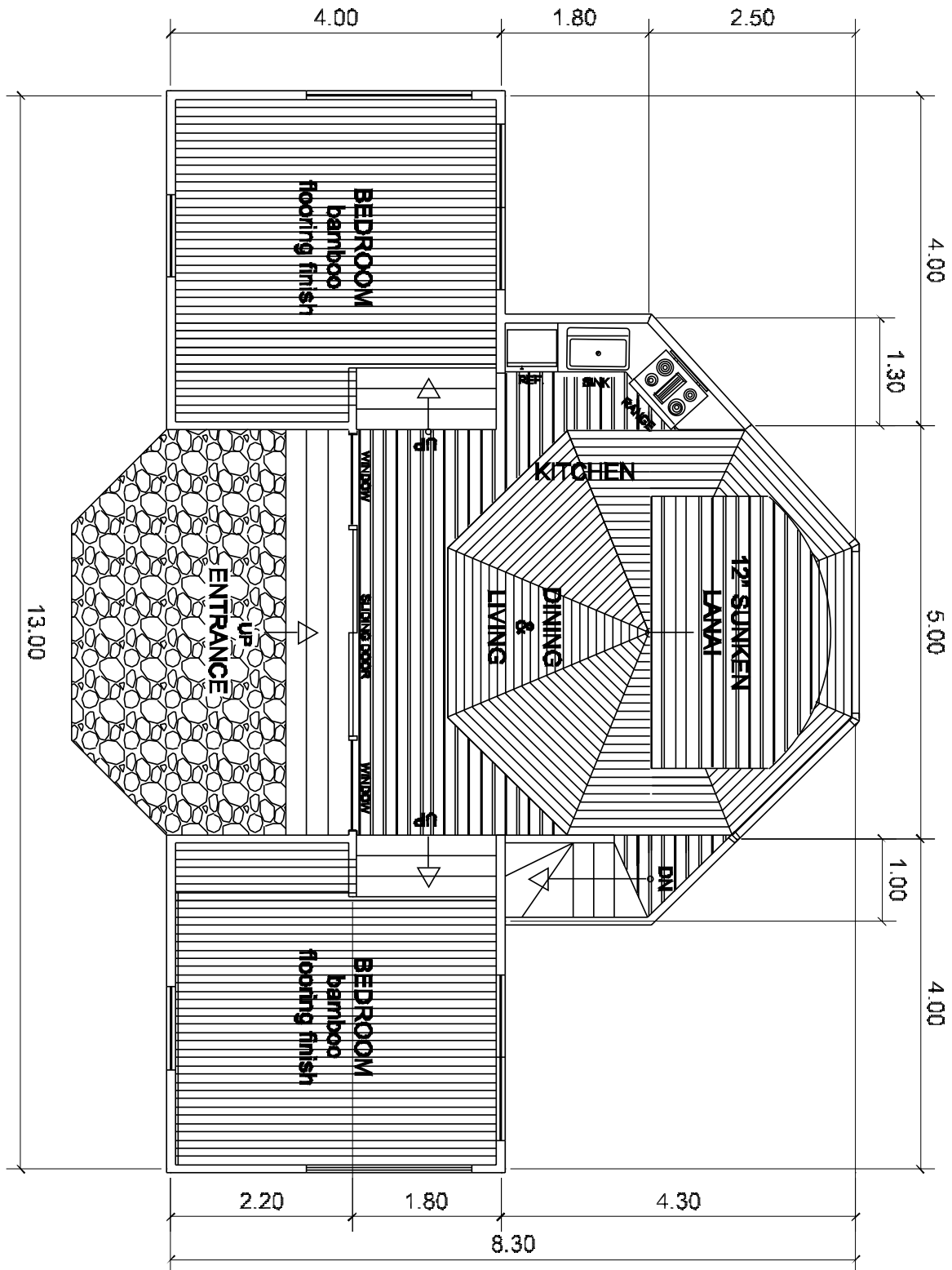
Landscaping

Different species of bamboo are and will be planted throughout the property, with stone pathways to connect different sections. Outdoor bamboo sculptures by local artists may also be installed.



Runo bundles collected from the Winaca Village property for use in the Living Quarter structure. June 8, 2007.

Floor Plan



Costs

The following estimates were compiled by Ambrose on June 25, 2007. All prices in Philippine Peso.

General Materials

Item	Quantity	Unit Price	Total
20' bamboo, various	600	100 / piece	60,000
Transport bamboo	1	15,000 / trip	15,000
Runo	100 bundles	150 / bundle	15,000
Cogoon	100 bundles	300 / bundle	30,000
Rattan / ready to use	200 bundles	500 / bundle	10,000
Bolts & straps, assorted	—	—	5,000
Nails, assorted	100 kilos	75 / kilo	7,500
2 x 6 x 10 Lumber	80 pcs	30 / bdf	15,000
Solignum (natural colour)	10 gals	500 / gal	5,000
Sanding sealer	30 gals	500 / gal	15,000
Dead flat varnish	30 gals	500 / gal	15,000
Lacquer thinner	20 gals	300 / gal	6,000
Sandpaper (asst.)	—	—	1,500
#16 tie wire	3 rolls	1,300 / roll	3,900
#14 stranded elect. wire	4 rolls	3,000 / roll	12,000
#12 stranded elect. wire	4 rolls	3,000 / roll	12,000
2 gang co. outlets	12 sets	100 / set	12,000
Single switch	10 sets	100 / set	1,000
2 gang switch	10 sets	100 / set	1,000
12 hole panel box	1 pc	1,500 / pc	1,500
60 amps breaker	1 pair	600 / pr	600
100 amps breaker	1 pair	600 / pr	600
20 amps	4 pairs	400 / pr	1,600
30 amps	4 pairs	400 / pr	1,600
15 amps	2 pairs	400 / pr	800
Porcelain receptacle	25 pcs	20 / pc	500
Electrical tape	1 box	250 / box	250
1/2" PVC pipe	50 pcs	200 / pc	10,000
Water closet	1 set	7,000 / set	7,000
Lavatory	1 set	3,000 / set	3,000
Kitchen sink	1 set	5,000 / set	5,000
4" PVC pipe for toilet	14 pcs	300 / pc	4,200
1/2" 61 metal pipe S-40	10 pcs	400 / pc	4,000
Shower valve	1 set	2,000 / pc	2,000
PVC solvent	2 ltrs	500 / lt	1,000
			346,750
Contingency		15%	+ 52,012
Total			403,762

Concrete Materials

Item	Quantity	Unit Price	Total
Footings			
16mm reinforc. steel bar	60 pcs	305 / pc	9,150
Cement	48 bags	185 / bag	8,880
Gravel G1	6.5 cu.m	850 / cu.m	5,525
Sand, washed	4 cu.m	750 / cu.m	3,000
#16 GI tie wire	4 kgs	52 / kg	208
Columns			
16mm reinforc. steel bar	60 pcs	305 / pc	18,300
12mm reinforc. steel bar	60 pcs	182 / pc	10,920
10mm deformed bar	70 pcs	130 / pc	9,100
#16 GI tie wire	15 kgs	52 / kg	780
Cement	48 bags	185 / bag	8,325
Gravel	6 cu.m	850 / cu.m	5,100
Sand	4 cu.m	750 / cu.m	3,000
Beams			
16mm reinforc. steel bar	80 pcs	305 / pc	24,400
10mm deformed bar	90 pcs	130 / pc	11,700
Cement	45 bags	185 / bag	8,325
Gravel G1	5.2 cu.m	850 / cu.m	4,420
Sand, washed	3.5 cu.m	750 / cu.m	2,625
#16 GI tie wire	30 kgs	52 / kg	1,560
Formworks			
2 x 3 10 Lumber 70 pcs	350 bd-ft	24.50 / bd-ft	8,575
Plywood	15 pcs	305 / pc	4,575
Common Wire Nail	15 kilos	52 / kilo	780
			149,248
Contingency		15%	+ 35,235
Overhead and Misc.		15%	+ 35,235
Supervision		15%	+ 35,235
Total			254,953

Costs

Labour

Job	People	No. Days	Fee	Total
Engineer	1	90	20,000	60,000
Architect	1	90	20,000	60,000
Supervisor	1	90	25,000	75,000
Foreman	1	90	15,000	45,000
Carpenter	4	90	12,000 x 4	2,500
Mason	2	7	3,000 x 2	6,000
Steel Man	2	7	3,000 x 2	6,000
Electrician	1	7	3,000	3,000
Plumber	1	4	2,800	2,800
Labourer	6	90	7,500 x 6	45,000
Total				330,800

Amenities

Item
Working area shade
Electrical supply
Water tank
Toilet / wash area
Office (optional)
Stock rooms
First aid kit (medicine)

Equipment

Item	Quantity
Backhoe (optional)	1
Bagger mixer	1
Vibrator	1
Wheelbarrow	2

Total costs

Item	Cost
General Materials	405,202
Concrete Materials	254,953
Labour	330,800
Total Project Cost	1,005,995

Timeline

This timeline was prepared by Ambrose on June 24, 2007. The first month corresponds to the start of the project at the beginning of June, 2007.

Construction Timeline

Activity	1 st Month	2 nd Month	3 rd Month
Planning	[Bar spanning 1st Month]		
Site selection	[Bar in 1st Month]		
Site preparation, cleaning	[Bar in 1st Month]		
Bamboo collection delivered to site	[Bar in 1st Month]		
Runo collection, cleaning, drying	[Bar in 1st Month]		
Cogoon collection delivered to site	[Bar in 1st Month]		
Cogoon preparation, clean, tie	[Bar in 1st Month]		
Bamboo preparation, cut to size	[Bar in 1st Month]		
Metal fabrication for joints	[Bar in 1st Month]		
Layout structure	[Bar in 1st Month]		
Excavation of foundation	[Bar in 1st Month]		
Form fabrication	[Bar in 1st Month]		
Rebar fabrication	[Bar in 1st Month]		
Set footing & column rebar, form	[Bar in 1st Month]		
Pour concrete columns, footings	[Bar in 1st Month]		
Form work for beam & layout of rebar	[Bar in 1st Month]		
Pour concrete, beams	[Bar in 1st Month]		
Floor joist installation	[Bar in 1st Month]		
Erect bamboo columns, walls	[Bar in 1st Month]		
Erect roof framing, install ceiling	[Bar in 1st Month]		
Install electrical, plumbing	[Bar in 1st Month]		
Install flooring, roofing	[Bar in 1st Month]		
Bamboo treatment, varnishing	[Bar in 1st Month]		
Retouch, repair to finish	[Bar in 1st Month]		
—Contingency (weather) +15 days	[Bar in 1st Month]		

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Final Notes

Future Interns

Possible opportunities include:

- 🌱 Stay at the Winaca Village
- 🌱 Design / build remaining Design Center components
- 🌱 Design / build Design Center entrance shelter
- 🌱 Work with local experts to build traditional Ilocano bamboo home
- 🌱 Work with Wilson Capuyan to source remaining seven authentic tribal homes
- 🌱 Learn traditional craft with carvers / weavers
- 🌱 Research and field study with the indigenous groups of the Cordillera region
- 🌱 Hands-on learning about bamboo harvesting and production
- 🌱 Design educational / marketing materials for Village
- 🌱 Design way-finding system for Village
- 🌱 Design / build Village website

The future intern may also pursue an applied project with the Ecosystem Research and Conservation Center in Baguio. The student would work with the research team and manufacturers on applied bamboo projects (furniture, architecture, or art), learn about bamboo species, their propagation and sustainable applications.

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We want to thank everyone involved with providing us this opportunity to work with such an incredible team and wonderful project. Amongst those we have already mentioned we'd also like to thank the following; Lucia and all the ladies in the Winaca office for their warm hospitality, Norma for showing us around everywhere, Malene for providing us with wonderful meals and an endless supply of bread and bananas, the security guards for keeping us feeling safe, and Jun for driving us everywhere.



Cutting the bamboo culms with a bulo, or machete. Bamboo farm, La Union Province, June 3, 2007.

Quotes

“Change the perception of materialism—there’s too much appreciation of what’s foreign”

— Narda Capuyan

“Flexibility and unexpected outcomes is the process of design—not the government or private sector. It’s your friends and those [like Narda, Wilson and David] who deliver”

— Sam Carter

Bibliography

Printed Works

- Architecture for Humanity, eds. Design Like You Give a Damn. Metropolis Books, New York, 2006.
- Blueprint (magazine), Manila.
- Casal, Father Gabriel, Regalado Trota Jose, Jr. et al. The People and Art of the Philippines. University of California, Los Angeles, 1981.
- Francione, Gianni and Luca Invernizzi Tettoni. Bali Houses: New Wave Asian Architecture and Design. Periplus, Signapore, 2002.
- Maramba, Roberto. Form and Splendor: Personal Adornment of Northern Luzon Ethnic Groups, Philippines. Bookmark, Inc., Makati City, Philippines, 1998.
- Reyes, Elizabeth V. and A. Chester Ong. Tropical Living: Contemporary Dream Houses in the Philippines. Periplus, Hong Kong, 2000.
- Tettoni, Luca Invernizzi and Edric Ong. Sarawalk Style. Times Offset, Singapore, 1996.
- Villegas, Marcelo. Tropical Bamboo. Rizzoli, New York, 1990.
- Villegas, Marcelo and Ximena Londono. New Bamboo: Bamboo architecture and design. Villegas Editores, Bogotá, 2003.
- Voss, Joachim. Ritual / Life: Sagada Photographs 1976-1982. A-Seven Publishing, Baguio, Philippines, 2005.

Websites

- Addison, Keith and Midori Hiraga. Journey to Forever. <<http://journeytoforever.org/>>, accessed 25 June 2007.
- "Ethnic groups in the Philippines." Wikipedia, The Free Encyclopedia. 1 Jun 2007, 15:40 UTC. Wikimedia Foundation, Inc., accessed 24 Jun 2007 <http://en.wikipedia.org/w/index.php?title=Ethnic_groups_in_the_Philippines&oldid=135109319>.
- "Igorot." Wikipedia, The Free Encyclopedia. 26 May 2007, 15:21 UTC. Wikimedia Foundation, Inc., accessed 24 Jun 2007 <<http://en.wikipedia.org/w/index.php?title=Igorot&oldid=133652613>>.
- Pawson, John. <<http://www.johnpawson.com/architecture/residential/pawsonhouse1999>>. Accessed 24 Jun 2007.
- Villalon, Augusto F. Bahay Kubo and the Filipino Concept of Space. <http://www.seasite.niu.edu/TAGALOG/Tagalog_Default_files/art_news_and_features.htm> 21 Jun 1999, accessed 24 Jun 2007.
- Biogas Systems. <<http://www.fao.org/docrep/T4470E/t4470e09.htm>>. Accessed 24 Jun 2007.



Bamboo culms harvested for furniture making are often treated with kerosene to protect them from insect damage. La Union Province, May 28, 2007.

Appendix

Included with select hardcopy versions of this document are a collection of relevant photocopies taken from books, magazine, sketchbooks (ours and Ambrose's) and material we encountered and produced during the research and development of the Design Center project.

This is also the last page of the compendium: thanks for reading!