

DESIGN AND CONSTRUCTION PROPOSAL

ORPHANAGE, TRAINING CENTER, CHURCH
MANILA, PHILIPPINES





Kanlungan

AN ARCHITECTURAL
THESIS

PAIGE TAFF

2013-2014 SANDY STANNARD

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Kanlungan:

Filipino Noun:

shelter
refuge
sanctuary
haven
harbor
den

ACKNOWLEDGMENTS

Many thanks to my friends Victoria Nizzoli and Sam Poremba at Cal Poly San Luis Obispo who helped support me through the highs and lows of this project. I couldn't have made this kind of progress on my thesis without your support encouragement.

Also, an enormous thank you to Journeyman International for coordinating the efforts of NGO's worldwide. There are so many people who are able to be served because of what you do. Steph and Daniel, you have supported me through thick and thin.

Another big thanks to Wayne at 5 Loaves ministries in Murrieta, California and Luis Faller, head pastor at MVP Church in the Philippines. God truly provided for us in our hour of need. I thank you enormously for all the help you've provided in answering my questions about this project.

And finally, the biggest thanks to my fiancé, Justin, my mom, dad, and sister. You have shown me an enormous amount of patience and understanding throughout my entire college education experience. You've kept me company working all these late nights, and held off on phone calls because I was busy. I couldn't have asked for a better support system than the one I was blessed with.

Thank you to all who have made this possible!

AUTHOR BIOGRAPHY



"If you can visualize it, if you can dream it, there's some way to do it." - Walt Disney

Dear Reader,

My name is Paige Taff and I am a 5th year student at Cal Poly San Luis Obispo on the central coast of California.

My 4th year was spent in Florence, Italy. I adapted and came to appreciate their lifestyle. I found it fascinating how Europeans can live in such a large and dense city, but still feel at home on a smaller scale. Large city life is also much more invigorating than the typical American city. And while watching the countryside of the Czech Republic whir by on a train, I realized how small we are as individuals, but what large impact we can have on the world if we use our gifts, talents, and careers for a good purpose.

Over the past 4 years of college I've challenged myself to think with sustainability and others in mind. I'm really passionate about finding ways in which architecture can effect social customs and change the inefficient aspects of society that many have become accustomed to and taken for granted. I feel that I would be misusing my talents and training as an architect if I didn't use my knowledge and abilities to enact good in the world for those less fortunate than me.

Growing up I had the experience of volunteering both through my school and our church at orphanages in Mexico. I learned very early on that I am extremely lucky to be who I am and where I am. My parents instilled in me the necessity to give back to others that were not as fortunate as myself. Our family also has done charitable work through our church by funding wells to be drilled in both Haiti and India as well as donate money to the Haiti Endowment Fund.

For my fifth year, I wanted to undertake a project with Journeyman International. I really desire to help others less fortunate than myself. Journeyman International provides impoverished communities around the world with sustainable architecture. It is through them that I was able to endeavor on this project using the skills I've learned in school in a real world application.

The information in this book is the culmination of my research and design pertaining to my thesis project acquired and designed within the past six to nine months. I hope that you enjoy this work and can live vicariously through my journey.

Sincerely,

Paige Taff

paige@journeymaninternational.org

BACKGROUND

RESEARCH

DEVELOPMENT

FINAL DESIGN

BIBLIOGRAPHY

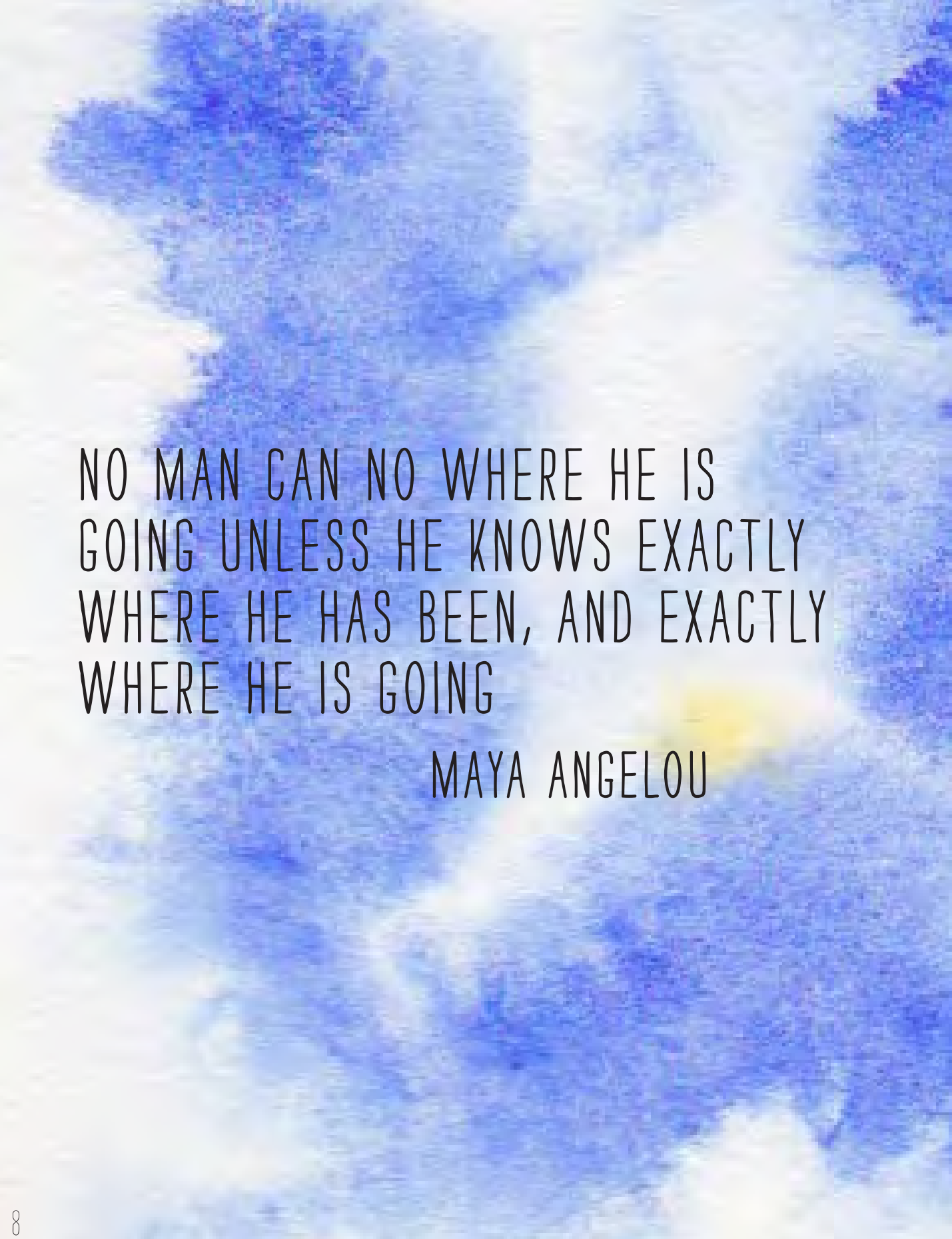
9

19

53

77

87



NO MAN CAN KNOW WHERE HE IS
GOING UNLESS HE KNOWS EXACTLY
WHERE HE HAS BEEN, AND EXACTLY
WHERE HE IS GOING

MAYA ANGELOU

BACKGROUND

ABSTRACT

Economic growth in the Philippines is among the highest in Asia, with 5.9 percent in the second quarter of 2012.¹ However, the benefits of financial growth continue to escape the poorest Filipinos and nearly 27% of the population is considered to live in poverty.² These disparate economic figures are the single largest factor driving Filipinos into human trafficking. Despite these promising economic advancements, the Philippines continues to be one of the largest sources of sex trafficking and forced labor around the world.³

The United Nations Office on Drugs and Crime defines human trafficking as: “recruitment, transportation, transfer, harboring or receipt of persons, by means of the threat or use of force or other forms of coercion, of abduction, of fraud, of deception, of the abuse of power or of a position of vulnerability or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purpose of exploitation. Exploitation shall include, at a minimum, the exploitation of the prostitution of others or other forms of sexual exploitation, forced labor or services, slavery or practices similar to slavery, servitude or the removal of organs.”⁴ Philippine trafficking victims have been found in over 37 countries across 5 continents.⁵ The Philippines lacks economic opportunities, gender role socialization, and poor family dynamics, making them exceptionally vulnerable to human trafficking crime.

Poor Filipino men, women, and children are often lured into trafficking by false financial promises. Filipino children are often sold into sex slavery, engaging in the country's unofficial sex tourism industry. Sex tourists come from Northeast Asia, Australia, Europe, and North America and engage in this industry by visiting brothels, bars with sex shows, and various restaurants and karaoke bars. Children make up a large portion of the Filipino population. Thirty-four percent of the country's population is made up of youth aged 0-14 years.⁶ Reports suggest that there may be anywhere from 60,000 to 100,000 children forced into prostitution.⁷

Filipino men also fall into trafficking because of the high disparity between rich and poor Filipinos. While these individuals don't often fall into the sexual slavery of children, they do, however, become involved in forced labor and debt bondage, finding themselves “in factories, at construction sites, on fishing vessels, on agricultural plantations, and in the shipping industry.”⁸ Women are perhaps even more victimized than men due to the fact that they can easily fall into both types of human trafficking. Women often are trafficked for domestic service or sexual slavery. These adult trafficking victims are increasingly being found in Middle Eastern countries, such as Afghanistan, Iraq, Saudi Arabia, United Arab Emirates, and Kuwait.⁹

Despite the Philippines' gross national income doubling in the past 10 years, it ranks low when compared to other countries. The average per capita income in 2012 was just under \$2,600.¹⁰ Investors, recruiters, transporters, public officials, informers, guides, crew members, enforcers, debt collectors, money movers, and other supporting personnel and specialists take advantage of the lack of economic opportunity in the Philippines to gain a financial edge in their corrupt industry.

The Philippines has maintained a Tier 2 or Tier 2 Watch List ranking on the U.S. Department of State scale.¹¹ The Department of State defines a Tier 2 country as: one “whose governments do not fully comply with the TVPA's (Trafficking Victims Protection Act) minimum standards but are making significant efforts to bring themselves into compliance with those standards.”¹² However, during 2009 through 2010, the Philippines was on the Tier 2 Watch List, meaning that the “number of victims of severe forms of trafficking was very significant or significantly increasing; [that] there was a failure to provide evidence of increasing efforts to combat severe forms of human trafficking; and/or the determination that the Philippines was making significant efforts to bring the country into compliance with minimum standards was based on commitments by the country to take additional future steps over the next year.”¹³

The Philippines government continues to take strides towards combating human trafficking within its borders. While the government has only successfully convicted 24 human traffickers in 2012, they have used various resources to assist nearly 2,600 victims by providing skills, training, shelter, medical services, financial, and legal assistance. Also in 2012, at least 223 children were rescued from sex trafficking operations and other forms of human trafficking.¹⁴

Human trafficking is a driving force in the Philippine economy. Combined with natural disasters, a poor economy, a lack of economic opportunities, unequal gender roles, and dysfunctional family dynamics, the Philippine people are falling apart socially and economically. This thesis will address the role of human trafficking in Philippine society by creating a place that provides victims with a place to escape, recover, and rehabilitate themselves through the nurturing of their religious faith and community.



THESIS

In the Philippines, many *families struggle* economically due to the lack of infrastructure and transportation. All too often these families *resort to means like human trafficking simply to survive*. Sometimes those engaging in human trafficking are *orphaned or abandoned children* since they have no family or means to support themselves. This project hopes to *rebuild* the lives of the children who have been trafficked by providing *a place for them to be loved, respected, supported and nurtured*. It will surround these broken lives with a *family atmosphere* that gives them the *support and safety* they deserve.

The church portion of this program hopes to build a community by engaging them in their spirituality. It will also bring to light the problems that so many of them face economically and ethically and offer them a *network of solutions* to face those problems. The church will also offer a variety of programs that engage the community in extra-curricular activities such as a *feeding program* and martial arts ministries. And above all, this project *will give a home to the homeless and a family to the orphaned*.

The orphanage will give street children a *place to grow up* and become prepared for adult life. It will surround them in the family that is the community and *give them strength to make a difference* in their world. This project hopes to engage its community on all levels to give a them a greater sense of purpose and to effect their larger community in a greater way.

HUMAN TRAFFICKING

is the illegal trade of human beings

#2 fastest growing criminal industry in the world

1.2 MILLION

children are trafficked each year

12-14 average age of victims sold into sex slavery

debt bondage

humans are sold because they can't pay their debts/loans

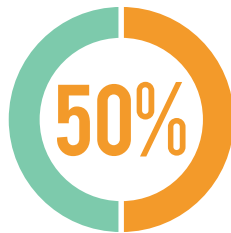
sexual slavery

people are sold into trafficking market from brothels & prostitution rings

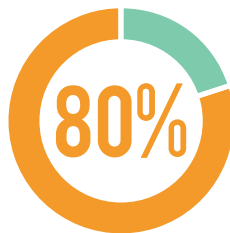
human trafficking generates **\$31,600,000,000/YEAR**



of victims are women & children



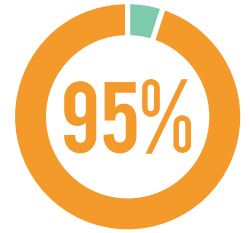
of victims are underage



of cases involve the sex industry



of cases involve the labor industry



of victims experience physical or sexual violence

IN THE PHILIPPINES

The Philippine economy is dependent on Filipinos working overseas & the government has laws that help move over 1 million Filipinos a year to jobs abroad.

Industries that drive the Philippine economy are concentrated in urban areas, especially Manila. Inadequate transportation and infrastructure make access to jobs in these industries hard for those living in rural areas. Subsistence-level existence for many Filipinos creates a scenario in which they become susceptible to offers from trafficking recruiters. This situation is propelled by the massive numbers of Filipinos with no birth records or other identity documents.

10% of the total population is employed abroad
of the GDP is made up of money sent home from abroad

3RD PLACE (tied with Mexico) in migrant remittances, behind India and China

\$2,000,000,000/YEAR

is lost from the Philippine economy due to corruption



of population is below poverty line



live on less than 2 USD a day

105TH PLACE (out of 176) on Transparency International's Corruption Index

900,000 Filipinos lack identity documents



of those ages 15-24 are unemployed

PARTNERS

5 LOAVES

Founder Wayne Dollarhide traveled to Haiti in 1999 as part of a construction team. Nothing could have prepared Wayne for what he witnessed on the ground while in country. Children were going without basic needs- food, water, clothing, among other things. In addition- kids weren't going to school and were being forced to the streets to beg for their next meal. For the next few years Wayne returned to Haiti, and also visited the Philippines where he witnessed the exact same thing.

Using his connections that he had made in the business world, as well as connections he made within the church and abroad, Wayne set out in 2005 to establish a non-profit that focused on providing for the needs of children, regardless of religion, race, ethnicity, or gender. Wayne asked God a simple question- "What can I do?" 5 Loaves was God's answer.

5 Loaves quickly became a non-profit 501 (c) (3) in 2006. 5 Loaves partners with orphanages, schools and other Non-Government Organizations (NGOs). We are having a positive social and economic impact on local communities by not only providing meals, but also providing employment for cooks, teachers, kitchen helpers, drivers, and regional food vendors.

5 Loaves currently has seven feeding programs in the Philippines. Malnutrition and even starvation have been perennial problems in the Philippines with 20% of the children suffering from second or third degree malnutrition. Filipinos also face the challenges of disease-plagued water, primitive living conditions, and the lack of financial resources has been a tremendous obstacle for these underdeveloped countries.

MVP is another feeding outreach which 5 Loaves supports. MVP feeds one chicken and noodle meal every Thursday and Saturday to approximately 100 to 300 children in Manila. They also feed eighty children on Saturdays and Sundays.



JOURNEYMAN INTERNATIONAL

This year, 6,350 students will graduate with architecture degrees from universities across the country. If these students dedicated university studio hours to humanitarian design projects, 6,858,000 hours would be dedicated to designing solutions to the greatest challenges facing our world.

By partnering student designers with local and global humanitarian organizations, JI provides sustainable design and construction methods to communities who need it most. They invest in the next generation of socially minded architects, engineers, and construction managers by addressing and anticipating the ecological, economic and social issues shaping the built environment today and tomorrow.

Because if we want a better world, we have to build one.



COMMUNITY LIFE MINISTRIES



In Manila, 5 Loaves supports Community Life Ministries who oversees four feeding programs totaling approximately 500 street children in different areas of Manila. 5 Loaves is very excited about the great vision CLM has, reaching out to a young and lost generation, breaking the repeated mistakes of past generations. It is amazing to see the impact they have already made. They have many young people who attend school, are on staff, or volunteer with CLM's outreaches. The street children whom CLM serves live in very depressed areas where most parents or relatives caring for children are very undependable and are not working, but by displaying love to their children CLM is beginning to see a change in some of the parents and relatives. CLM feeds the children on the street nutritious meals of rice, noodles, and chicken on Tuesdays and Saturdays.

MISSION & PURPOSE

OF COMMUNITY LIFE MINISTRIES

- To assist children in reaching their full potential as healthy and well-adjusted individuals by delivering a continuum of prevention, assessment, intervention, treatment, and transition services. To bring the children to a right relationship with God. To develop them to be a potential leaders of the church.
- To provide a continuum of quality, culturally sensitive, child-centered, and family-focused programming designed to meet the needs of children and their families experiencing or at risk of abuse, neglect, or emotional disturbances.
- To protect the welfare and improve the lives of children and their families through the provision of appropriate assessments, treatment, and shelter services which promote the six dimensions of wellness: Emotional, Intellectual, Physical, Social, Spiritual, and Vocational.
- To make a positive difference in the lives of children through mentoring relationships assisting them to achieve their highest potential as they grow to become confident, caring, and competent individuals.
- To strengthen, preserve and reunify families, where appropriate, with the goal of returning children entrusted in our care to secure, supportive, and nurturing home environments.
- To strengthen the connection of children to the community by maximizing their living skills in preparation for transition into independent living, so that they become productive members of society.
- To actively collaborate with other child caring agencies and organizations to advocate and coordinate services to ensure that children and families are appropriately connected and supported in the community.
- To actively collaborate with the educational system in providing related counseling and support services to children experiencing emotional disturbances and behavioral disorders, to assist in their transition to a less-restrictive educational setting.
- To provide a stimulating environment for training, education, and research supporting skill development for students, interns, and professionals in delivering therapeutic services to at-risk children and their families in a competent and compassionate manner.

In accordance with our Mission and Vision, we believe that every child deserves love, respect, and a safe, supportive, and nurturing environment.

We strive to:

- Create the opportunities that will encourage children to achieve their full potential.
- Connect each child to a sense of family.
- Connect each child to a sense of community.
- Support families when the stresses of life become problems.
- Improve ourselves and our programs while developing hope and promoting creativity.
- Partner with other agencies, organizations, and donors to effectively use resources to plan and provide services that meet the needs of the children and families within our community.

We believe that our volunteers and employees are our strength.

We promote the value of diversity and cultural competency within our staff, clients, and community.

We are an innovative and flexible organization that is responsive to the needs of clients, families, and staff.





A PEOPLE WITHOUT THE
KNOWLEDGE OF THEIR PAST
HISTORY, ORIGIN, AND CULTURE, IS
LIKE A TREE WITHOUT ROOTS

MARCUS GARVEY



RESEARCH

GEOGRAPHY



WORLD

“Philippines, island country of Southeast Asia in the western Pacific Ocean. It is an archipelago consisting of some 7,100 islands and islets lying about 500 miles (800 km) off the coast of Vietnam. Manila is the capital, but nearby Quezon City is the country’s largest city. Both are part of the National Capital Region (Metro Manila), located on Luzon, the largest island. The second largest island of the Philippines is Mindanao, in the southeast.

“The Philippines takes its name from Philip II, who was king of Spain during the Spanish colonization of the islands in the 16th century. Because it was under Spanish rule for 333 years and under U.S. tutelage for a further 48 years, the Philippines has many cultural affinities with the West. It is, for example, the second most populous country (following the United States) with English as an official language and the only predominantly Roman Catholic country in Southeast Asia. Despite the prominence of such Anglo-European cultural characteristics, the peoples of the Philippines are Asian in consciousness and aspiration.

“The country was wracked by political turmoil in the last quarter of the 20th century. After enduring more than a decade of authoritarian rule under Pres. Ferdinand Marcos, the broadly popular People Power movement in 1986 led a bloodless uprising against the regime. The confrontation resulted not only in the ouster and exile of Marcos but also in the restoration of democratic government to the Philippines

“Contemporary Filipinos continue to grapple with a society that is replete with paradoxes, perhaps the most obvious being the presence of extreme wealth alongside tremendous poverty. Rich in resources, the Philippines has the potential to build a strong industrial economy, but the country remains largely agricultural. Especially toward the end of the 20th century, rapid industrial expansion was spurred by a high degree of domestic and foreign investment. This growth, however, simultaneously contributed to severe degradation of the environment. The Philippines also emerged as a regional leader in education during the late 20th century, with a well-established public school and university system; by the early 21st century the country had one of the highest literacy rates in Asia.”
(Britannica: Philippines)



ISLAND GROUP: LUZON

“Luzon [is] largest and most important island of the Philippines. It is the site of Manila, the nation’s capital and major metropolis, and of Quezon City. Located on the northern part of the Philippine archipelago, it is bounded by the Philippine Sea (east), Sibuyan Sea (south), and the South China Sea (west). To the north, the Luzon Strait separates Luzon from Taiwan. Luzon (meaning “big light”) represents about one-third of the land area of the Philippines.

“Luzon leads the country both in industry (concentrated near Manila) and in agriculture (rice, corn [maize], coconuts, sugarcane, mangoes, bananas). A central plain stretching 100 miles (160 km) north of Manila is the major grain-producing region. Farther north are the spectacular rice terraces of the Ifugao mountaineers. There are extensive coconut plantations on the Bondoc and Bicol peninsulas. Iron, gold, manganese, and copper are mined and forested areas yield excellent hardwoods.

“In addition to Manila and Quezon City, the main cities are Pasay, Cabanatuan, Legaspi, Baguio, Batangas, and Laoag. More than half of the Filipino population lives on Luzon. Area 40,420 square miles (104,688 square km). Pop. (2000) including adjoining islands, 41,457,466; (2010) including adjoining islands, 50,746,132.”
(Britannica: Luzon)



REGION: CALABARZON

“Calabarzon (/ka-la-bar-zon/) is one of the regions of the Philippines. It is designated as Region IV-A and its regional center is Calamba City in Laguna. The region is composed of five provinces, namely: Cavite, Laguna, Batangas, Rizal, and Quezon; whose names form the acronym Calabarzon. The region is also more formally known as Southern Tagalog Mainland.

“The region is in southwestern Luzon, just south and east of Metro Manila and is the second most densely populated region. Calabarzon and Mimaropa were previously combined together as Southern Tagalog, until they were separated in 2002 by virtue of Executive Order No. 103. Executive Order No. 246, dated October 28, 2003, designated Calamba City as the regional center of Calabarzon. The largest city of Calabarzon Region and the second highly-urbanized city is Antipolo City, with Lucena City being the first. Calabarzon is the most populated region in the Philippines, with a population of 12,609,803 inhabitants.

“The region is also home to a host of important Philippine historical figures, most notable of which is the Philippines’ national hero, Jose Rizal, who was born in Calamba.”
(Calabarzon)



MANILA & THE ROAD TO CAINTA

Manila, the capital, is a dense cityscape with the country's highest concentration of population. From here, one would take a bus or car to arrive in Cainta.

Original watercolor.

PROVINCE: RIZAL

MUNICIPALITY: CAINTA

“Rizal is a province located in the Calabarzon region, just 16 kilometers east of Manila. The province was named after José Rizal.

Rizal is bordered by Metro Manila to the west, the province of Bulacan to the north, Quezon to the east and Laguna province to the south. The province also lies on the northern shores of Laguna de Bay, the largest lake in the country.

Rizal is a mountainous province perched on the western slopes of the southern portion of the Sierra Madre mountain range. Antipolo boasts of a wonderful view of Metro Manila and it is where Hinulugang Taktak, a waterfall popular with tourists, can be found.

The Rizal Province will be accessed by the future C-6 Road connecting the provinces of Bulacan and Cavite and cities of Taguig (beside Laguna de Bay), Parañaque and Muntinlupa which are located within Metro Manila.” (Rizal)



RELIEF

The islands that make up the Philippines are bounded by the Philippine Sea on the East, the Celebes Sea on the South, the Sulu Sea on the Southwest, and the South China Sea on the North and West. The entire country stretches approximately 1,150 miles from the most northern and southern extents and is about 700 miles in width. The nearest landmass to the north is Taiwan, to the east is Borneo, and to the south, Indonesia. Of the over 7,000 islands, only two-fifths have names. The islands fall into one of three groupings: (1) the Luzon group in the north consisting of Luzon, Mindoro, and Palawan; (2) the Visayas in the center, consisting of Bohol, Cebu, Leyte, Masbate, Negros, Panay, and Samar; and finally, (3) Mindanao in the south.

The Philippine islands are made mostly of volcanic rock and coral. The major mountain ranges run North to South. Almost all of the Visayan islands have a single mountain range that crosses the island longitudinally.

Although there are many volcanoes throughout the Philippines, there is little volcanic activity.

WATER

The most important rivers in the Philippines are the Cagayan, Agno, Pampanga, Pasig, and Bicol on Luzon and the Mindanao and Agusan on the island of Mindanao. Many of these rivers, especially the ones that run through metropolitan areas are heavily polluted and require significant cleaning efforts. The most unique waterway in the Philippines is the world's longest underground river on the island of Palawan that empties into the ocean at Puerto Princesa. This natural wonder was made a UNESCO World Heritage Site in 1999.

The largest lake in the Philippines is Laguna de Bay on Luzon; it covers 356 square miles. The second largest lake is Lake Sultan Alonto on Mindanao which covers 131 square miles.



SOIL

Because of the flood plains present throughout the islands, much of the soil is suitable for rice cultivation. Also due to the presence of volcanoes and their past activity, much of the soil has concentrations of volcanic ash which is very fertile. In these fertile areas, farmers grow fruit trees, pineapple, oil palm, vegetables, coffee, bananas, and other crops. In more weathered areas where the soil is red or yellow in color, cassava and sugarcane are grown as well as timber and forest harvesting.

CLIMATE

The Philippines is characterized by a tropical monsoon climate. Generally, rain comes with winds from the southwest. The rainy season usually lasts from May through October and is characterized by heavy rain throughout the islands, but is heavier on the Pacific side of the country. The dry season is ushered in from the northeastern winds which blow from November through February. Temperatures remain fairly constant throughout the islands, however, there is some cooling with elevation increases.

June through December is cyclone, or typhoon, season throughout this part of the world. These storms come in through the southeast and increase in frequency from south to north. There can be as many as 25 typhoons a year that impact the Philippines. Typhoons bring with them high winds, excessive rain, and flooding which can cause massive destruction and loss of human life.



CLIMATE

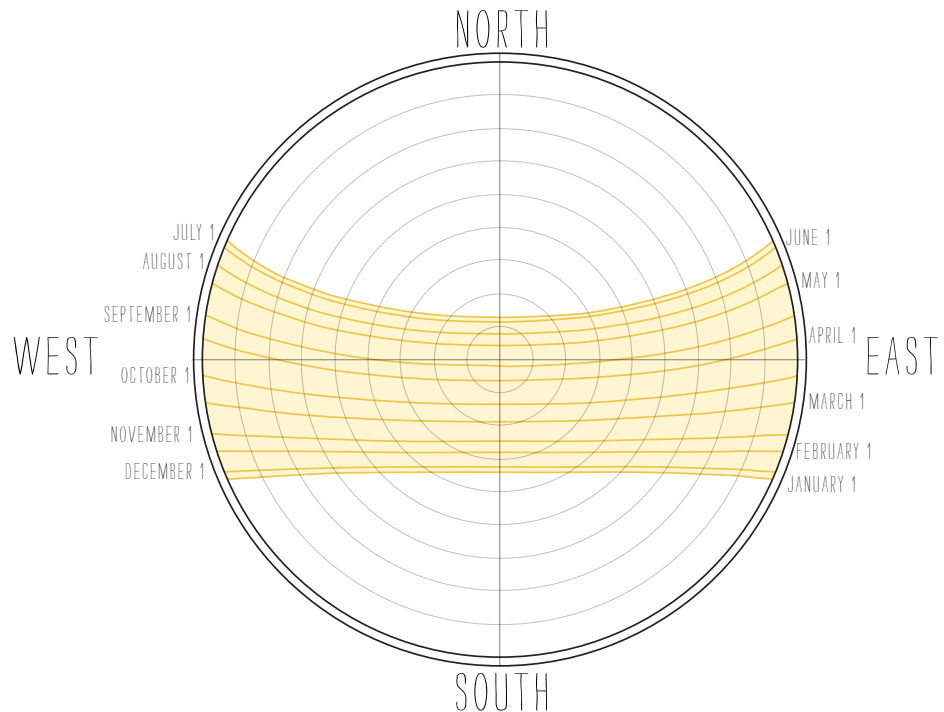
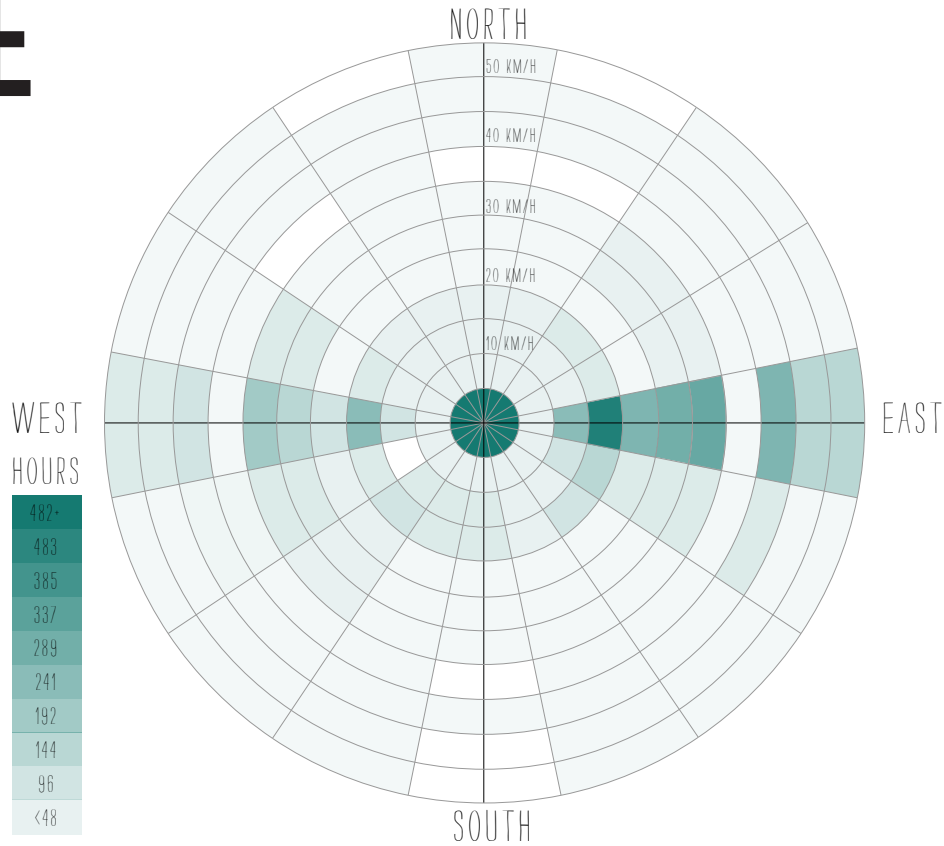
“The Philippines is located in the tropics and the weather and climate prevailing in any particular place in the country is due to its geographical location and the different wind systems that prevail in the locality during the different times of the year.” (Philippines, FAO Report).

“Typhoon season lasts from July to November. Most typhoons touch the islands between the southern tip of Samar and Northern Luzon. About 15 per cent of typhoons strike areas south of Samar. The least frequently visited is Southern Mindanao. Northern Luzon sees about 35% of typhoons, Central Luzon 20% while Southern Luzon and the Central and Northern Islands, 30%. There are four climatic types in the Philippines based on rainfall distribution...and most differences in climatic types from North to South are due to mountain barriers which are high enough to cause variations in rainfall distribution.” (Philippines, FAO Report)

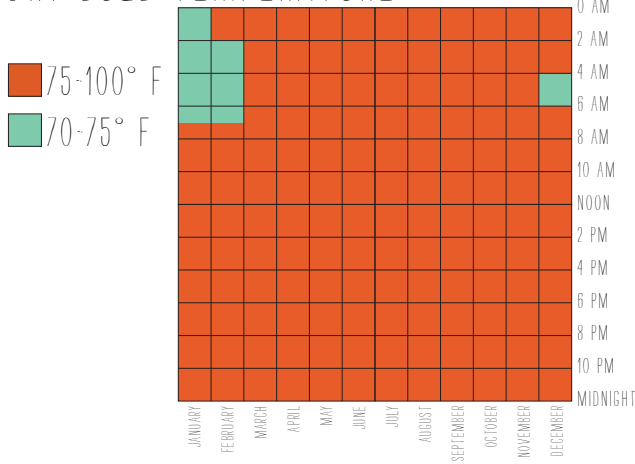
There are two main prevailing wind systems based on the dual monsoon seasons present in the Philippines. The first is from November through February where the winds come from the Northeast. The second system occurs from July through September where the prevailing winds come from the southwest.

Trade winds, which are those winds that blow during the “off season” generally come in from the East.

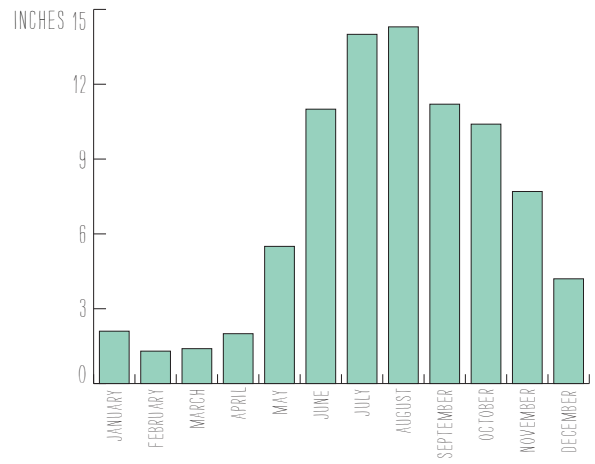
The Philippines is located just above the equator at only 11.3333° North and 123.0167° East. The sun pattern reflects the near equatorial site in that it is almost directly above the site with very little change from winter into summer.



DRY BULB TEMPERATURE



PRECIPITATION

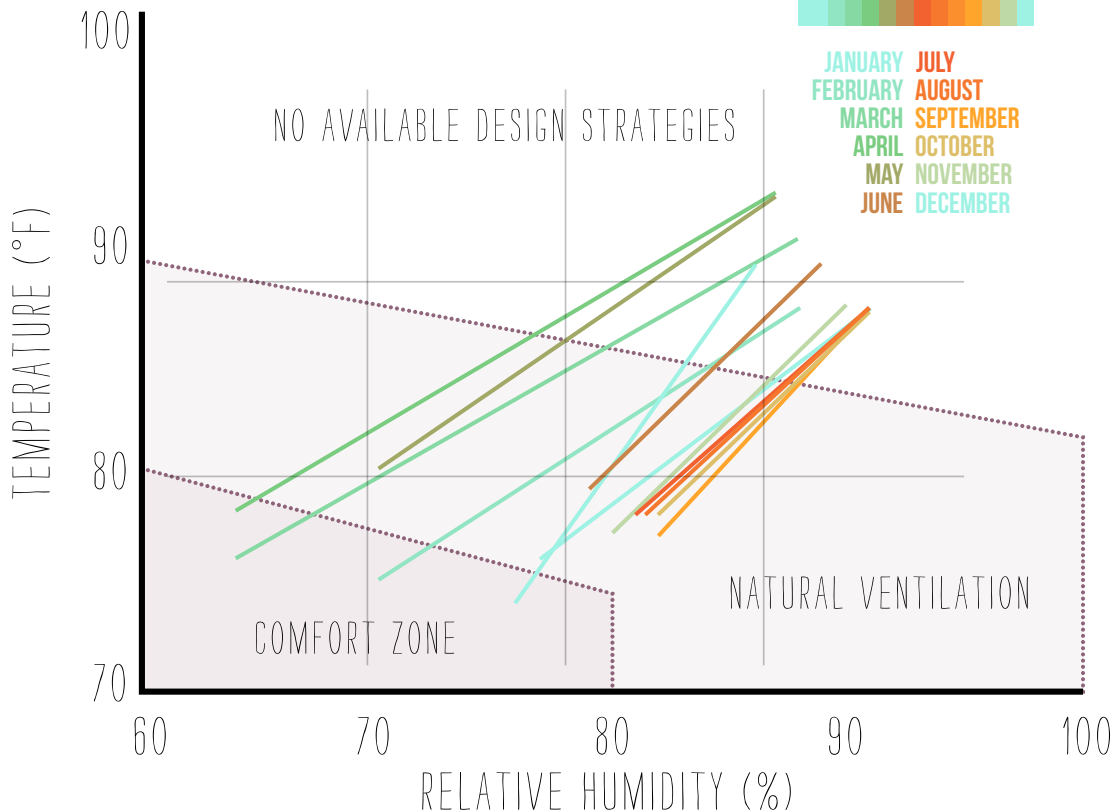


There are 2 main seasons in the Philippines: “wet” and “dry,” however, it rains significantly throughout the year. Variances in topography give different regions different amounts of rainfall and wind.

There are very few times in the Philippines where it is naturally comfortable. It is for this reason that natural ventilation must be capitalized upon. However, even upon implementation of this design strategy, there are some times where there is no other option to increase the comfort without mechanical, as opposed to passive, means.

The Philippines is located just above the Equator in a tropical region making it constantly hot. The high humidity makes natural ventilation a necessity in order to achieve comfort.

PSYCHROMETRIC CHART



FLORA & FAUNA

Philippine forests have been rapidly shrinking during the past century. Forests have been reduced by more than half as a result of logging, mining, and farming. Currently only about a quarter of the island's land is occupied by forests.

The Philippines is home to thousands of varieties of plants and animals. There are thousands of flowering plants, ferns, and orchids, some of which are extremely rare. There is also an abundance of tall grasses that have grown where forests have been lumbered or burned for agriculture.

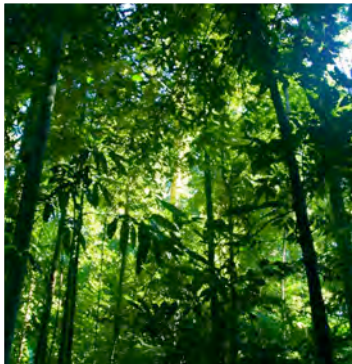
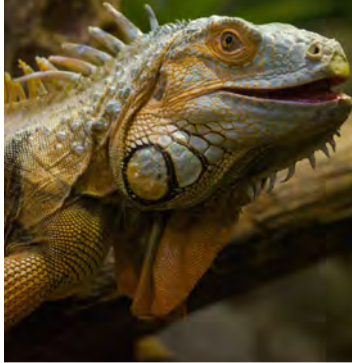
The Philippines has one of the most diverse ecologies on the planet. There are over 8,000 species of flowering plants; 1,000 varieties of fern; and 800 types of orchids. Some of these plants are indigenous to the Philippines, but the vegetation also strongly resembles that found in Malaysia.

More than 200 species of mammals, hundreds of species of birds, and over 100 species of reptiles inhabit the Philippines, some which are native to the Philippines. There is also 2,000 different species of fish in Philippine waters.

Among the mammalian inhabitants of the Philippines are: water buffalo, goats, horses, hogs, cats, dogs, monkeys, squirrels, lemurs, mice, pangolins (scaly anteaters), chevrotains (mouse deer), mongooses, civet cats, red and brown deer, and more. There are also more than 50 species of bats that are unique only to the Philippines.

There are hundreds of species of birds including: jungle fowl, pigeons, peacocks, pheasants, doves, parrots, hornbills, kingfishers, sunbirds, tailorbirds, weaverbirds, herons, quail, and the Philippine eagle. Once again many if not most of these species are unique to the Philippine islands.

In the waters surrounding the islands there are nearly 2,000 species of fish. The Tubbataha Reefs in the Sulu Sea are protected by UNESCO in its recognition of it as a World Heritage site. A popular fish to eat is the milkfish which can be found in salty waters. There are also several varieties of turtles and crocodiles that are protected. There are also more than 100 types of amphibious creatures in the islands including: skinks, geckos, snakes, and frogs. The water monitor lizard is prized for its unique leather.



DEMOGRAPHICS

ETHNIC GROUPS

The Filipino ethnic group is made up of people whose ancestors were of Malay descent from Southeast Asian mainland as well as Indonesian. There are nearly 100 culturally, linguistically, and ethnically unique groups in the Philippines. The largest are the Tagalog of Luzon and the Cebuano of the Visayas. These two groups alone make up two-fifths of the entire population. Other groups are the Ilocano (Luzon) and Hiligaynon (Visayas) make up one-fifth of the population. Other groups include the Waray-Waray (Visayas) and the Bicol of the Bicol Peninsula which make up another one-tenth. Filipino mestizos and Pampango also make up small portions of the population.

There is a small group of aboriginal inhabitants known as the Negritos. These people were of dark skin and small stature. The Negritos were made up of communities known as the Aeta, Ita, Agta, etc. These people only make up a small percentage of the population. There is also a population of Filipino-Chinese as well as emigrants from China, India, the U.S., and Spain.

LANGUAGES

There are more than 150 native languages present in the Philippines. These languages are subfamilies of the Austronesian linguistic group, specifically, the Western Malayo-Polynesian family. The most prominent of these languages is Tagalog. Both Tagalog and English are considered the official languages of the Philippines. Another prominent language found in the central and southern portions of the Philippines is Cebuano. Ilocano is widely spoken in northern Luzon and is the third most widely spoken language in the Philippines.

In the Visayas, Hiligaynon and Waray-Waray are spoken and Bicol is spoken in southern Luzon while Tausug is spoken in Palawan and the Sulu Islands.



RELIGION

The most dominant religion in the Philippines is Roman Catholicism, consisting of nearly four-fifths of Filipinos professing allegiance. Other Christian denominations make up approximately one-tenth of the population. There is an indigenous sect of Protestants called the "Iglesia ni Kristo." Islam is another dominant religion mainly found in the southern regions of the Philippines. In total, the Muslim population makes up about 5 percent of Filipinos. There are also small numbers of Buddhism practiced by the Chinese communities. Local religions are practiced by some of the rural indigenous populations.

SETTLEMENT

The places that have historically had the greatest density are the plains in the mountains. In contrast, rural areas have populations that grow rice or corn and fish to provide basic subsistence.

Rural homes are usually very small and sit on piles to increase ventilation and to accommodate potential flooding. This is especially evident in coastal areas where the buildings need to withstand tidal fluctuations.

Major cities include Manila, Cebu, Jaro, Vigan, and Naga. Metropolitan Manila is a group of several cities including Quezon City, Manila, Pasay, Caloocan, and several others. Many of the largest cities were given charters from the Spanish or the U.S.

Although these cities contain a significant portion of the population, the majority of these people live in poverty and resort to squatting illegally on land. Their homes are made of salvaged materials like bamboo, wood, and sheet metal. The urban poor also do not have access to running water, electricity, or sewage.



Density in the Philippines is high but its population distribution is uneven. Populations are hyper-concentrated in urban areas. The birth rate remains higher than the averages for the world and for Southeast Asia.

The population has been increasingly moving towards cities and towns. Four-fifths of the population lived in rural areas at the beginning of the 20th century and by the 21st century, this number was reduced to approximately two-fifths.

Emigration is significant in the Philippines. Many Filipinos have moved to the United States, Okinawa, Guam, and Canada. Some have also temporarily emigrated to the Middle East and East and Southeast Asia.

POPULATION 103,775,002 (as of 2012)

GROWTH RATE 2.04%

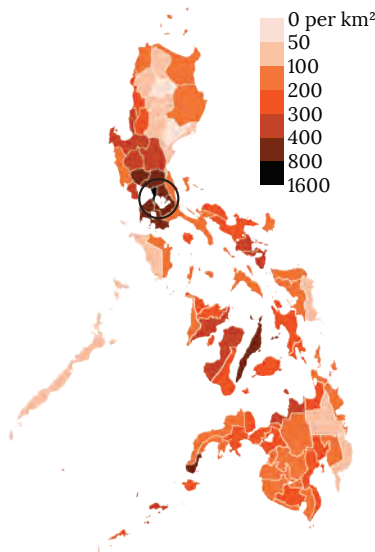
BIRTH RATE 24.62/1,000 population

DEATH RATE 4.95/1,000 population

LIFE EXPECTANCY 71.66 years

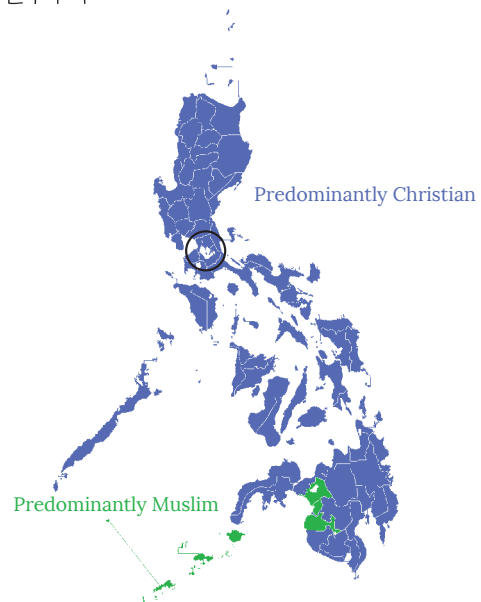
FERTILITY 3.19 children/woman

INFANT MORTALITY 19.34/1,000 live births



POPULATION DENSITY

Population density per province
2009 National density: 307.344 km2



DOMINANT RELIGIONS

Catholic 82.9%
Muslim 5%
Evangelical 2.8%
Iglesia ni Kristo 2.3%
Other Christian 4.5%
Other 1.8%
Unspecified .6%
None .1%

NET MIGRATION -1.29 migrants/1,000 population

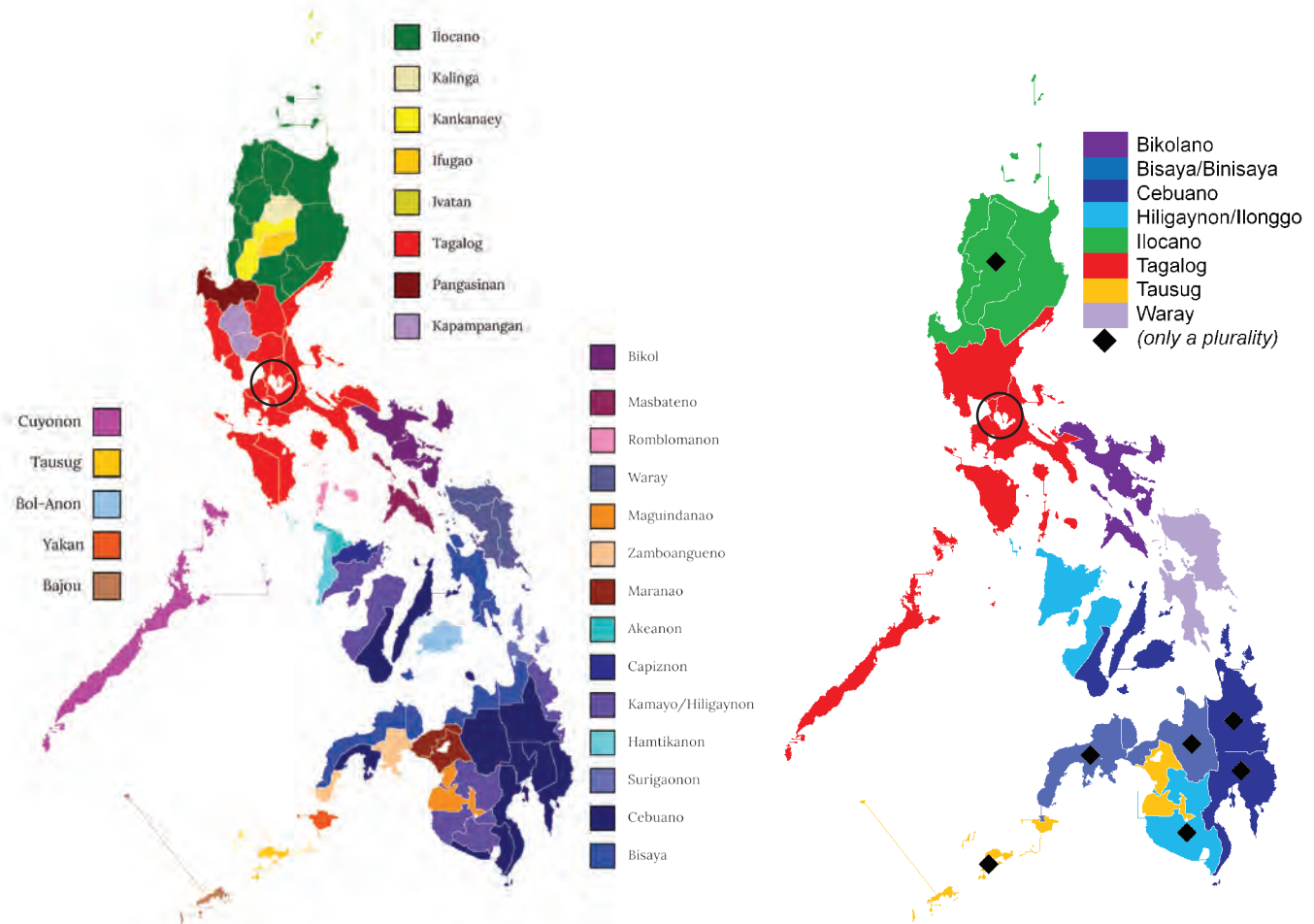
AGE STRUCTURE 0-14 years: 34.6%
65+: 4.3%

URBANIZATION RATE 2.3% annual rate of change

INFECTIOUS DISEASES **Food/waterborne:** bacterial diarrhea, Hepatitis A, typhoid fever
Vectorborne: dengue fever, malaria, Japanese encephalitis
Water Contact: leptospirosis

LITERACY Those 15+ years that can read and write
92.6%

EDUCATION School Life Expectancy: 12 years
Education Expenditures: 2.8% GDP



MAJOR ETHNIC GROUPS

- Tagalog** 28.1%
- Cebuano** 13.1%
- Ilocano** 9%
- Bisaya/Binisaya** 7.6%
- Hiligaynon Ilonggo** 7.5%
- Bikol** 6%
- Waray** 3.4%
- Other** 25.3%

LANGUAGES

Official: Filipino, English
Major Dialects: Tagalog, Cebuano, Ilocano, Hiligaynon/Ilonggo, Bikol, Waray, Pampango, Pangasinan

ECONOMY

AGRICULTURE AND RESOURCES

FARM PRODUCTS

Sugarcane Citrus
Rice Papaya
Coconuts Other fruits
Bananas Coffee
Corn Tobacco
Pineapple Abaca
Mango Maguey

RESOURCES

Gold Salt
Iron Ore Sulfur
Lead Asbestos
Zinc Guano
Chromite Gypsum
Copper Phosphate
Limestone Silica
Marble Petroleum
Asphalt Natural Gas

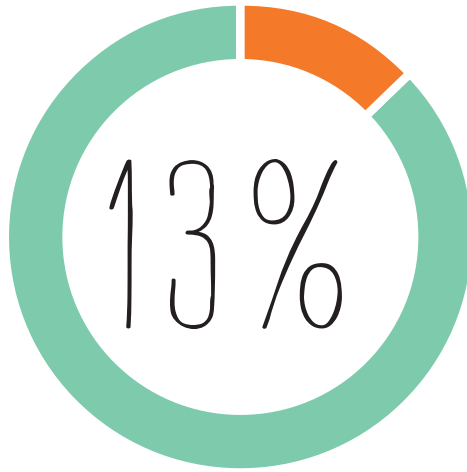
FISHING

Canned Tuna
Milkfish
Sardines
Anchovies
Scad
Mackerel

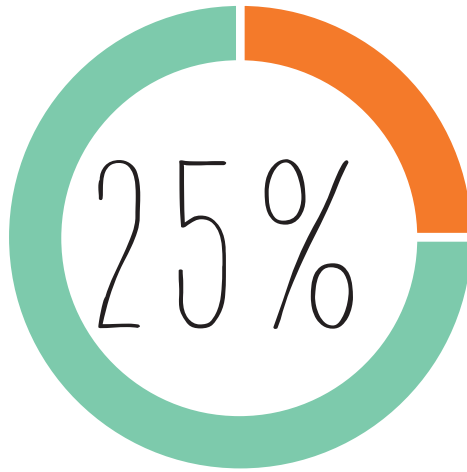
LOGGING

There are bans on the export of hardwoods due to the heavy deforestation that has left very little of Philippine forests intact. Even with this ban, hardwood continues to leave the Philippines.

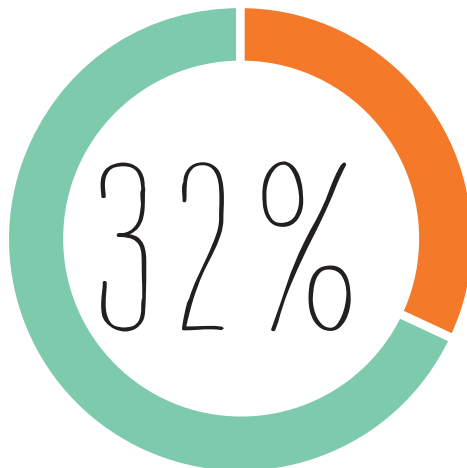
Other products derived from the Philippine forests are rattan, gutta-percha, resins, and bamboo.



13% OF GDP IS AGRICULTURE

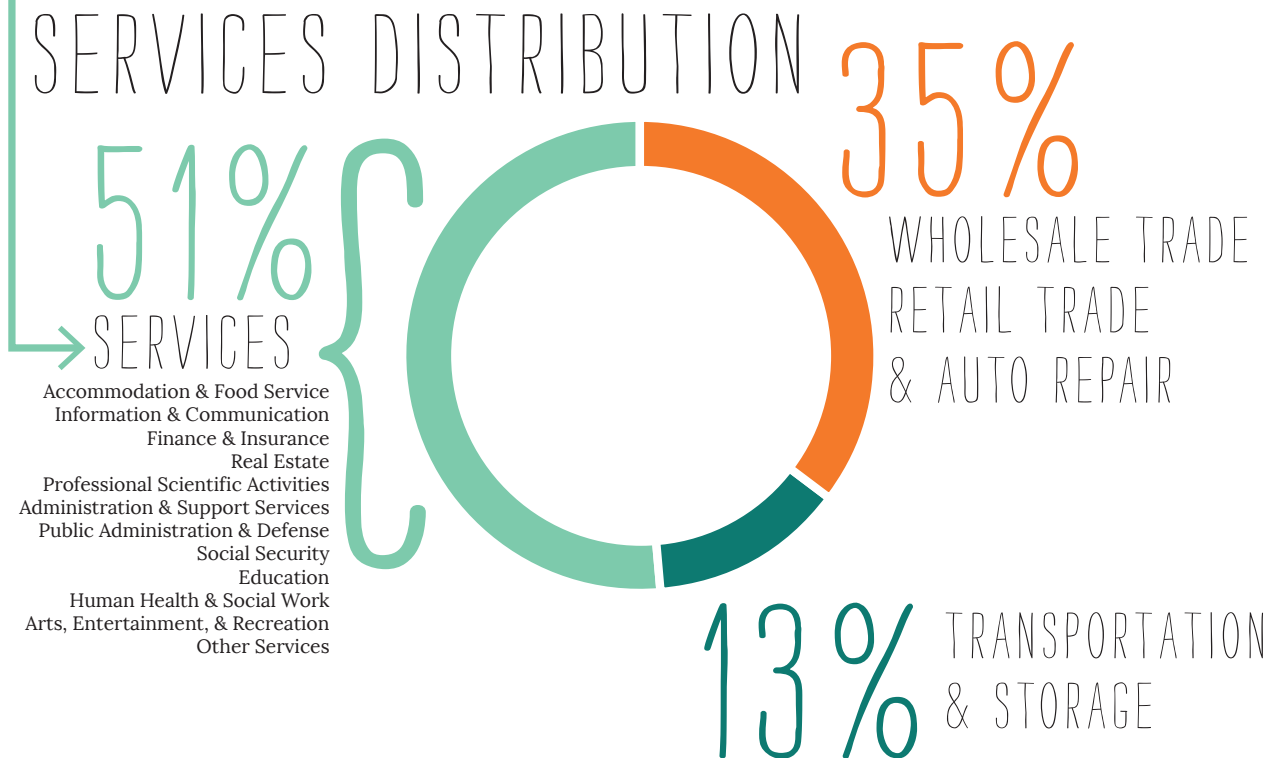
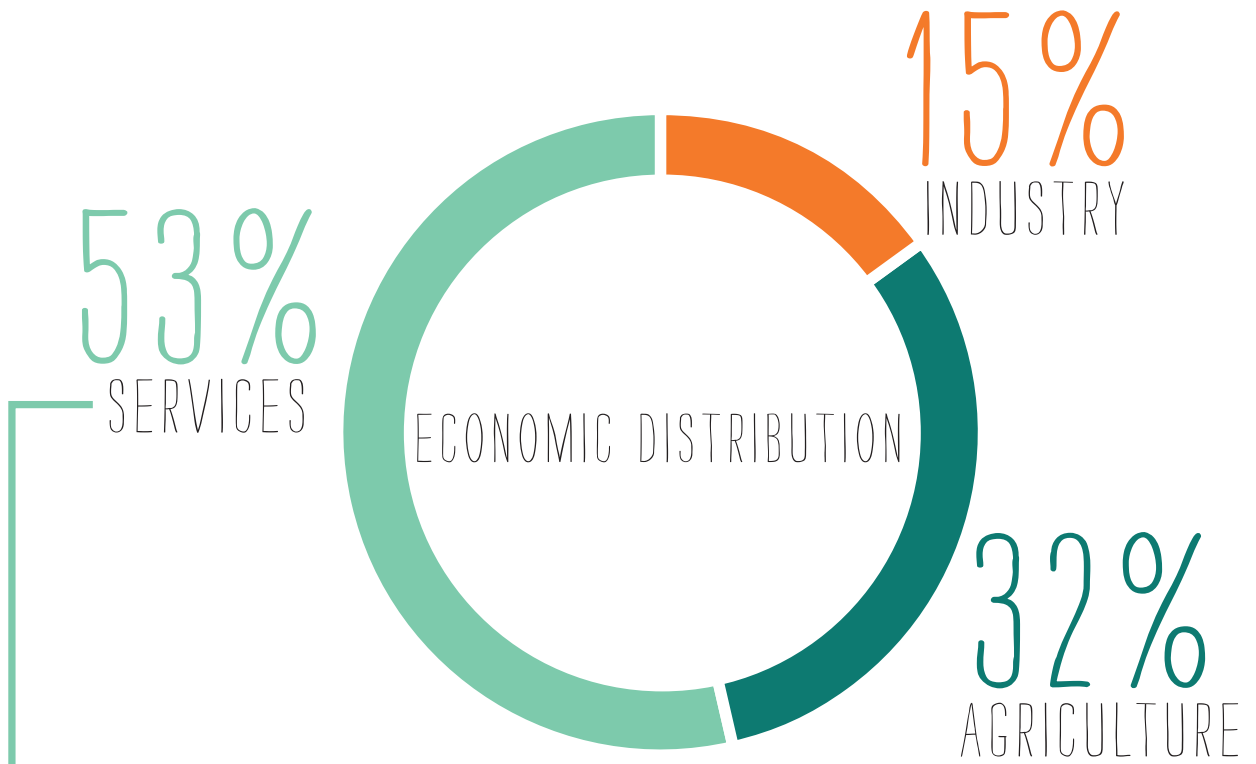


25% OF FARMLAND IS USED FOR GROWING RICE



32% OF TOTAL POPULATION IS EMPLOYED BY AGRICULTURE

EMPLOYMENT DISTRIBUTION



CULTURE

LIFE & CUSTOMS

Philippine life revolves around both the immediate and extended family. This family network gathers for all of life's major events.

National and religious holidays are observed. These include: Christmas, Easter, Eid al-Fitr, Ramadan, New Year's Day, Labor Day, and Independence Day (June 12).

Cuisine is usually centered around rice or rice noodles. This is paired with meats such as chicken, pork, goat, or fish. Meals are also served with fruits and cooked vegetables. Alcoholic drinks are made from coconut sap, sugarcane, and rice. A popular urban street item in Manila is the Balut, an embryonic duck still in the egg that has been boiled.

Most daily clothing is influenced by European designs. However, there are a few traditional dress items that still remain popular. The first being the malong which is a colorful piece of cloth sewn into a tube that can be worn numerous ways by both men and women. Men will wear an embroidered shirt called a barong and women a terno, which is a dress with "butterfly" sleeves.

ARTS

While many ancient and rural arts have diminished, some have been preserved. One of these being dance. Local dance traditions are preserved and or reinterpreted by the Bayanihan (national folk dance company), Obusan Folkloric Group, and Philippine Ballet.

Notable musicians are composers Antonio J. Molina and Felipe P. de Leon. The most well known opera singer is Jovita Fuentes.

Notable painters include Juan Luna and Fernando Amorsolo; muralists: Carlos V. Francisco and Vicente Manansala; modernists: Victorio Edades and Arturo Rogerio Luz. Sculptors include Guillermo Tolentino and Napoleon Abueva. Filipino architects include: Juan F. Nakpil, Otilio Arellano, Fernando Ocampo, Leandro Locsin, Juan Arellano, Carlos Arguelles, and Tomas Mapua. Rural artists are known for their wood carving and marble sculptures.

The written word has proven to be important in Philippine history due to its ability to inspire nationalism. Famous novelists include Jose Rizal and Nick Joaquin.



INSTITUTIONS

The National Museum in Manila is the national institution to the preservation and conservation of the country's cultural items. There are also museums at the provincial level that also seek to memorialize local history and traditions. Several universities have also established museums to their campuses. Literature has been archived in the National Library.

There are also a number of UNESCO World Heritage Sites including: its Baroque churches, the Tubbataha Reefs, the Cordilleras Rice Terraces, the Town of Vigan, and the Puerta Princesas Subterranean River. There are also nongovernmental organizations that are working to preserve local institutions.

RECREATION

Many of the sports played by Filipinos were introduced by Americans during their occupation of the country. Other sports played are tennis, golf, diving, and windsurfing.

Martial arts are also popular in the Philippines, among with include boxing, wushu, and tae kwon do. Since the end of the 20th century, local martial arts have become increasingly more popular.

In the Olympics, Filipinos have excelled in swimming, boxing, and track and field events.

A popular past time is cockfighting, locally known as sabong. This has been a popular means of gambling and is most associated with the island of Cebu in the Visayas.



PRECEDENTS

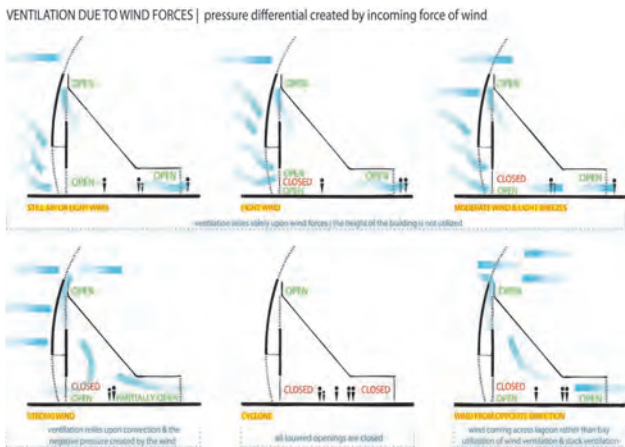
MARIKA ALDERTON HOUSE: GLENN MURCUTT

The Marika-Alderton house is important for its use of natural ventilation. Built in the hot climates of Australia, energy strategies like shading, passive lighting, and natural ventilation are key. This design also appeals to indigenous Philippine architecture in that it rests on stilts and has a gabled roof. The transform-ability of this project is also important because it can be as closed to harsh winds as it can be open to cool breezes.



TJIBAOU CULTURAL CENTER: RENZO PIANO

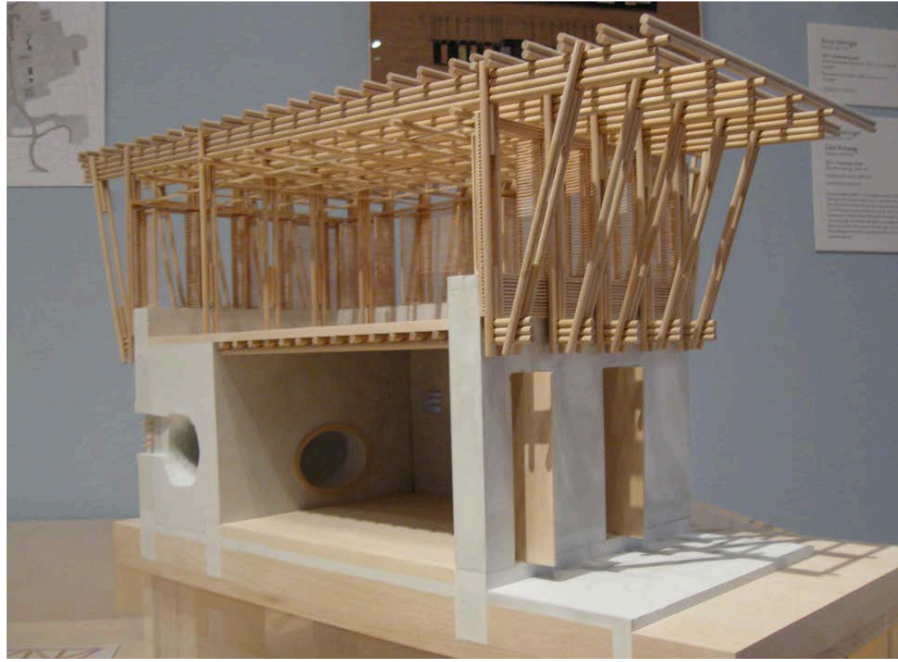
Renzo Piano's project in New Caledonia faces many environmental issues as the Philippines. A major design factor was the tropical cyclone, or typhoon. The curved shape of the buildings braces against severe winds but also has operable windows and vents behind the wooden screen. The design of the operable windows allows the building to capture cool and wanted breezes.



THE HANDMADE SCHOOL: METI ANNA HERINGER & EIKE ROSWAG

“The design began by considering local cultural, economic and ecological aspects. The school is based on regional construction and local materials but implemented with modifications that add efficiency and structural integrity, important factors in the densely populated, flood prone region.

“To allow for a second story, the designers improved the bamboo structural system and lashing. They also opted for a brick foundation with a damp proof course to overcome the inevitable rising moisture in the earthen walls. The kiln brick detail enlisted craftspeople from a district 20 kilometers away. The rest of the construction was a collaborative effort between the architects, local craftspeople, students, parents and teachers.
Learning with joy, team-based education,





and utilization of nature are all elements of this Montessori-like school. This hands-on connection was central to the architects' vision. They wanted technical improvements to become part of local knowledge for application in future development. Locally available expertise, skills and materials are all a part of the school's sustainability goals as an environmentally sound, structurally superior catalyst for the local economy and education system.

"At the center of the project are the students themselves, many who helped form the thick walls that keep their classrooms cool and hung the shutters that allow natural daylight and ventilation. Under the shaded garden façade where colorful sari material contrasts the school's earth tone walls, the students of the METI School leave their shoes along an expansive veranda and enter the handmade structure built to bring out the best in them. It is with intent that the principles guiding their education take form in the building that surrounds them. The structure, like the program within, serves as a wonderful example for a sustainable future." (Quote from openarchitecturenetwork.org)

BUTTERFLY HUTS: TYIN TENGESTUE

These structures are dormitories for Karen refugee children in the village of Noh Bo on the Thai-Burmese border. There are six woven bamboo huts, also known as Soe Ker Tie, or The Butterfly Huts for their “winged” appearance. They were designed with the children’s happiness and health in mind. These structures provide a growing child a space to call their own to learn, sleep and play in.



COLLÈGE CŒUR IMMACULÉ DE MARIE

ERIC CESAL & KATE EVARTS



“Collège Cœur Immaculé de Marie (CIM) in downtown Port-au-Prince will rebuild permanent facilities for 850 girls in grades 1-12. The school, which celebrated its 50th anniversary in 2012, was completely destroyed in the 2010 earthquake. The program for the new school will include 24 classrooms including science classrooms, a computer lab, library and media room, new administrative spaces, kitchen, new bathrooms, a large multi-purpose room, and dedicated sport courts and gardens. The project will be developed and built over the span of 24 months beginning in September 2012.”



THE GREEN SCHOOL: IBUKU

This school was an important case study for its use of bamboo. The school is also located in a typhoon prone area and it was designed to withstand the elements. It is completely open air to maintain maximum ventilation. It's wide open floor plan also maximizes flexibility and the skylight allows for daylight to penetrate the most inner parts of the structure.





NATURAL INSPIRATION: MANGROVE & BAMBOO

A great deal of inspiration was drawn from nature and plants. First, due to the extreme climate and forces of nature that impact the country, a significantly strong structure needed to be used. Both the mangrove and bamboo were examined for their strength and resilience to the elements.

The mangrove uses a web-like, branching root structure to create a strong structural system in the most precarious places. These plants have been able to withstand even the strongest hurricanes and cyclones. By studying this plant, it was noted that the bulk of this project's strength will need to lie in its foundation and having a pile-styled footing.

Bamboo was examined not only for its sustainability as a material, but for its strength and flexibility. This is due to its internal cell structure. The bamboo pole is made up of a series of cells stacked one above the other. The "band" that joins the two cells serves as a reinforcement against bending stresses.





EARTHEN SCHOOL: ROSWAG ARKITEKTEN

The Tipu Sultan Merkez Earthen School is located in the arid climate of Pakistan. Although the climate is significantly different than that of the Philippines. However, it makes good use of bamboo and locally sourced materials for innovative building techniques.



DESIGN AGAINST THE ELEMENTS

GREEN DESIGN AWARD WINNERS 2011

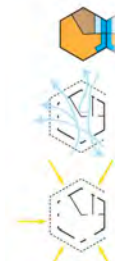
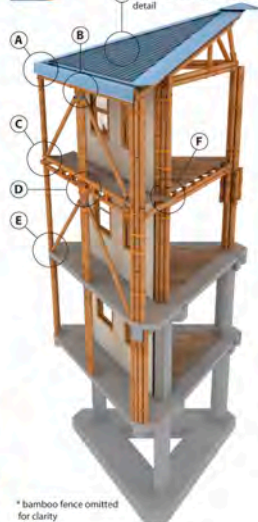
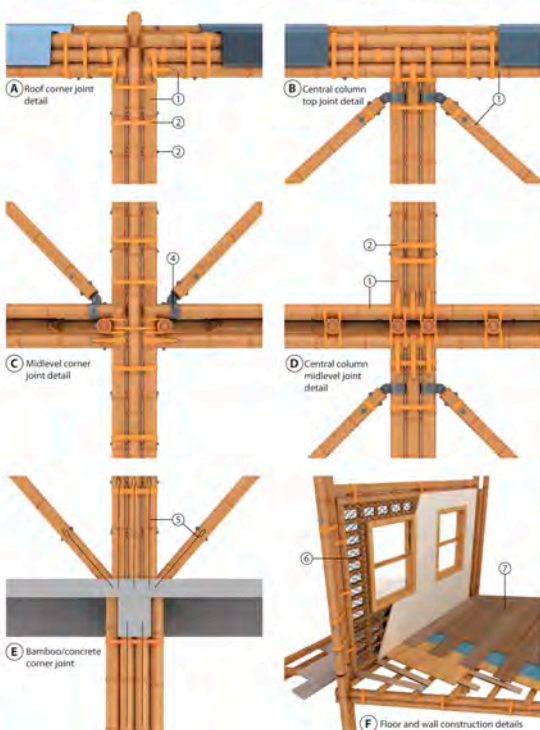
NIKOLA ENCHEV AND STEFAN VANKOV



This project was a critical case study in the project's development. It offered critical examples of potential structure as well as provide research as to structural methods that will work. Details such as joint connections and roof details were critically examined for their usefulness.

1. 100/110 mm structural bamboo member
 2. nylon lashing wrapped around members to form bands
 3. 12mm steel bolt
- NOTE: any joining of bamboo with bolts is done by injecting concrete in the corresponding cavity to prevent splitting of the culm due to bolt movement
4. bolted steel clamp - used to connect the diagonal bracing to the horizontal and vertical elements in order to resist both compression and tension forces
 5. 20mm steel reinforcement to anchor the bamboo structure to the concrete base. A hook at the end of each reinforcement piece holds the 12mm bolt down to prevent the bamboo structure being torn off by extreme winds.
 6. Wall construction: traditional bamboo frame - split bamboo lashed to vertical bamboo culms; chickenwire is then attached to the bamboo frame in order to apply 30/40mm cement based plaster.
 7. Floor construction: 100/110mm floor bamboo beams lashed with 80/90mm bamboo joists, timber planks nailed to joists, 19mm softwood sheets nailed to planks, vapour control layer, softwood flooring.
 8. Roof construction: 100/110mm lashed with 80/90mm bamboo joists, timber planks nailed to joists, 19mm softwood sheets nailed to planks, vapour control layer, standard metal roofing sheets and a peripheral gutter.

TECHNOLOGY



The internal layout of the dwelling avoids acute angles and provides a spacious environment for living. The next dwelling shares the location of west areas minimizing costs and construction.

Based on the hexagonal geometry the dwelling maximizes natural ventilation as the openings are placed to facilitate cross ventilation.

The second facade prevents unwanted hot direct sunlight but allows angle daylight. The radial geometry means that any building orientation is optimal as the interior is equally protected on all sides.

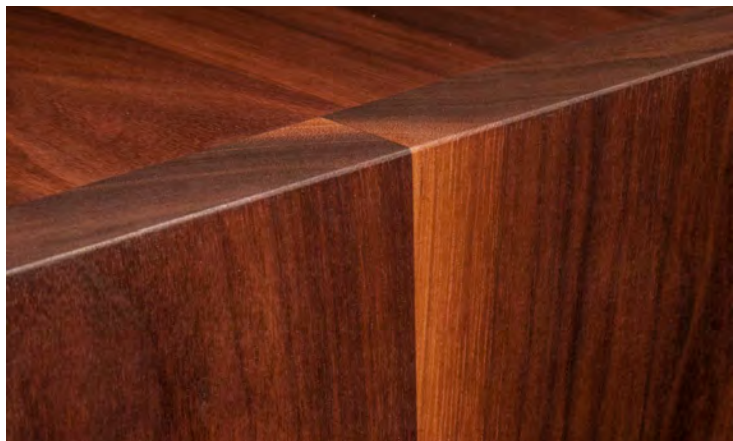
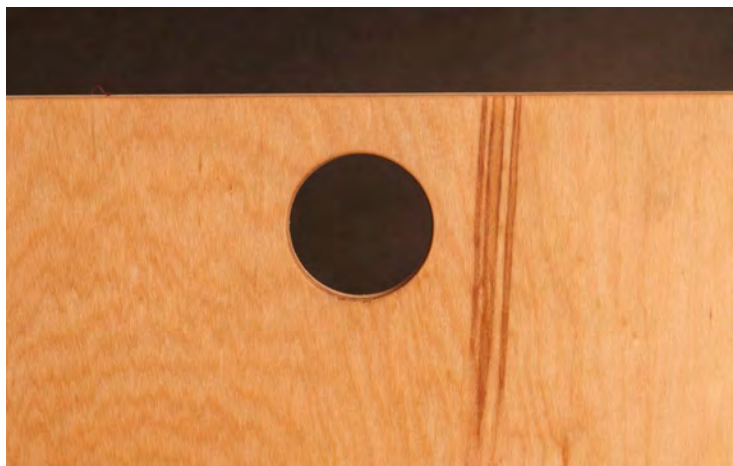
VELLUM: CAMERETTA OSCURA

The most purposeful things in life outlive the era they are created in. This holds true in everything from science, technology, art, architecture, philosophy, mathematics, etc. Humans are not only constantly trying to improve the world that they live in through the exploitation of resources, but they are constantly attempting and capturing its abundant beauty and share the way they see the world with others. The modern person is inundated with the newest gadgets and the latest technology. They live in an increasingly fast paced world where instant satisfaction and gratification is key. What many forget to do, however, is to live in the moment, and truly enjoy the thing in which they are experiencing.

The Camera Obscura (Latin; camera: room, obscura: dark) is perhaps one of the oldest forms of accurate replicative technology. Dating back to the ancient Chinese and Greek, this optical phenomenon captivated ancient scholars worldwide well into the Renaissance. It was mainly used to accurately depict the real world. While painting as an art involved some means of artistic interpretation, the image created from the camera obscura was an exact depiction of a scene; something that had never, or could never be achieved. It is, in its truest form, the earliest version of the modern camera. While modern photography seeks to extraordinarily capture memorable scenes and moments, it is easy for the professional or casual photographer to lose sight of what it is they are trying to achieve. The point of photography is to save a moment for posterity, but if there is no memorable emotion in that instant, there can be no truly memorable experience. Because photography is so accessible to so many people worldwide, access to the camera phones and expensive DSLRs is widespread, however, these individuals cannot truly appreciate its technology simply because their lives move too fast.

This piece, the “Cameretta Obscura,” seeks to engage the photographer in a unique experience by slowing them down. In order to see the scene, one has to engage in the action of creating the image. By pulling the image in and out of focus, one realizes that it is not the exact image they are looking at, and that in fact, the image they see with their own eyes has extraordinarily been inverted. This scene is also non-repeatable. It satisfies the immediate desire to see something special, but also is inherently impossible to create the same scene twice.

The technology of this is simple because it is based on the basic optic principles of convex lens curvature. In modern cameras, this is all “fixed” through the use of mirrors. Even the human optic nerve un-inverts the images projected onto the retina so that the person can “upright.” However, this is not the essence of this piece of furniture. The idea is that the photographer has to stop. They have to engage in the experience of seeing. And when they do achieve the image, it is not what they have been trained to expect to see. By confusing the expected result with reality the photographer is able to genuinely experience the world around them through the scene that they uniquely created.





A large, abstract splash of yellow watercolor paint is centered on a white background. The splash has irregular, feathered edges and varies in intensity from a pale yellow to a deeper, more saturated yellow. The text is overlaid on the left side of this splash.

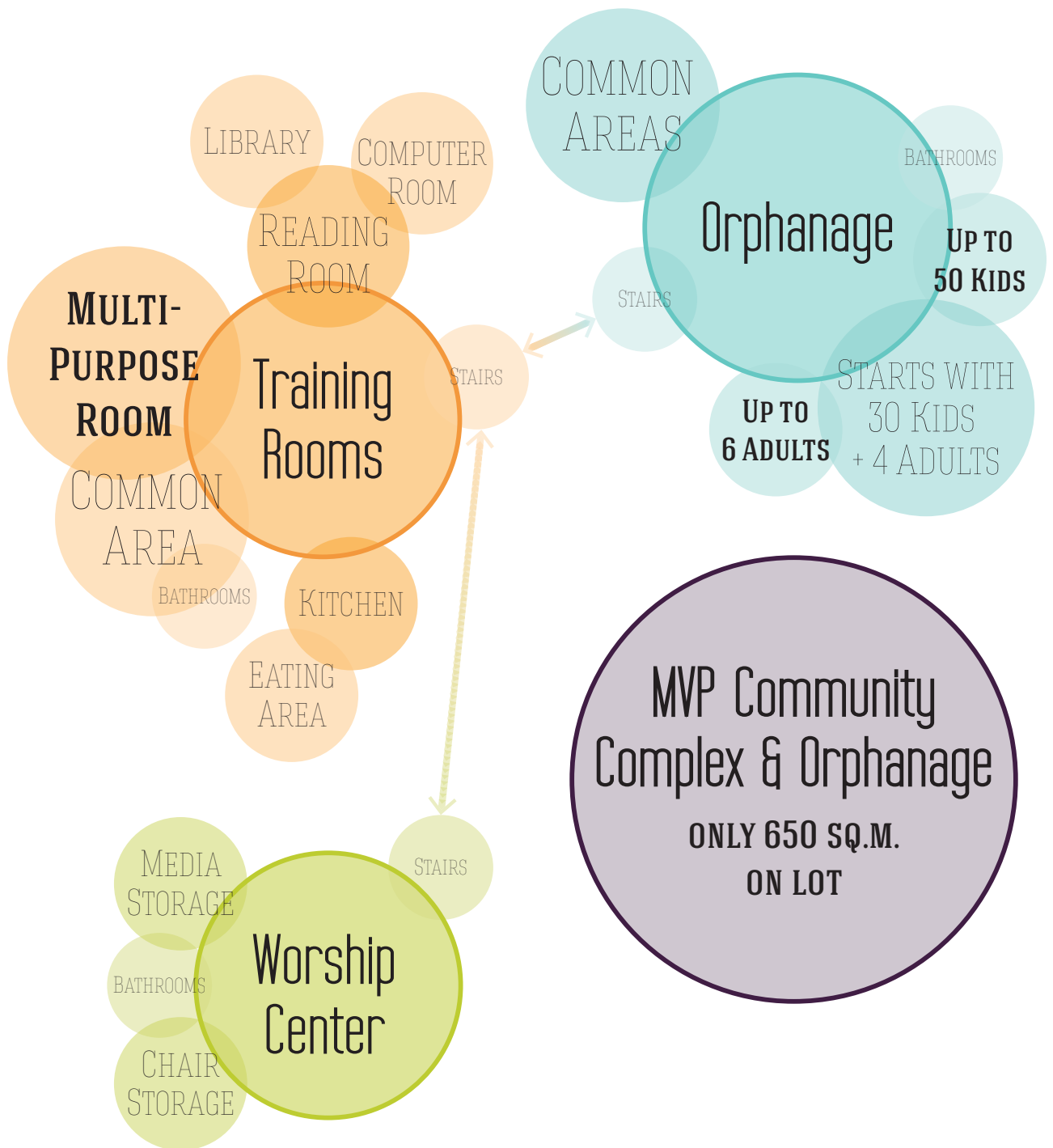
INSANITY:
DOING THE SAME THING OVER
AND OVER AGAIN AND EXPECTING
DIFFERENT RESULTS

ALBERT EINSTEIN

A large, abstract splash of yellow and orange watercolor paint dominates the left side of the page, extending towards the center. The background is a light, off-white color with some faint, scattered yellow spots.

DEVELOPMENT

PROGRAM DIAGRAM



PROJECT SITE

CLIENT NEEDS

This site is just outside of Metro Manila and approximately 10 miles outside of the Philippine capital of Manila. The project lot is bordered by the Ortigas Avenue to the south, industrial buildings to the north and east, and a squatting settlement to the west.

The Ortigas Avenue is one of the main roads that leads into Manila. By car, it takes approximately 30 to 40 minutes, and by public transit it can take approximately an hour and a half. The small indentation on the southern portion of the lot is (assuming) a bus stop with a pedestrian bridge crossing the Ortigas. Based on the shear scale of this street, with approximately three lanes in each direction, this street causes a significant amount of noise. Because this building will have certain activities that require quiet spaces (such as sleeping or praying), a decision was made to move the building to the north-west corner. By doing this, the building has access to a road that is less trafficked and also has potential for parking. It is not far enough away however, to be too far to walk from the bus stop nearby.

The accessibility of this site is important as this can encourage or deter people from coming. By having the building away from the road gives the building room to breathe, both literally and figuratively. It also gives the building a sense of mystery since it could be seen from the pedestrian bridge and the road, but it is not able to be discovered until approached and entered.

The proposed shape of the building is determined by the allowable meter-age that the client wants to spend as well as taking advantage of the fact that the entire lot will not be used. By strictly limiting the building footprint by 650 square meters, not much is left in terms of program for site development. But by creating a shape that naturally creates half of a courtyard, allows unplanned activities to take place. This space could be used for church overflow seating, play space, football matches, or simply sunbathing. The building shape in combination with an exterior pathway allows for a sort of defensible space, that is, it can be better observed and guarded by its inhabitants.

The following pages will present a series of design iterations concluding with a generalized final design. Among things studied are program and spatial analysis as well as climate performance.



BUILDINGS



ORTIGAS AVE.



PEDESTRIAN
WALKWAY



SERVICE ROADS



DESIGN STRATEGIES

APPROXIMATE NET EMBODIED CO₂ FOR THIS PROJECT:

TARGET % BETTER THAN THE MEDIAN

179 METRIC TONS

30% BETTER

ABOVE GRADE STORIES 3

SYSTEM TYPE MIXED

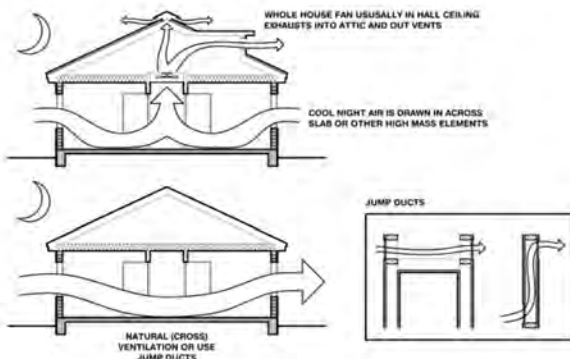
ECOREGION TROPICAL

VEGETATION 650 M²/25 M²

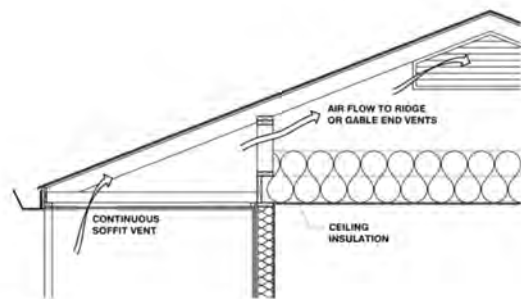
BUILDING FOOTPRINT 650 M²

GROSS FLOOR AREA 1,875 M²

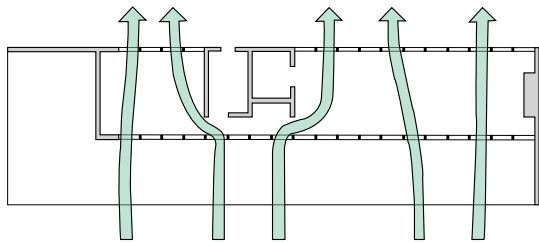
	TARGET	MEDIAN
SOURCE EUI (KBTU/FT ²)	86.2	123.1
SITE EUI (KBTU/FT ²)	42.6	60.9
SOURCE ENERGY USE (KBTU)	1,738,996.8	2,484,281.1
SITE ENERGY USE	860,316	1,229,022.9
ENERGY COST (\$)	15,506.78	22,152.54
TOTAL GHG EMISSIONS (MTCO ₂ E)	89.5	127.8



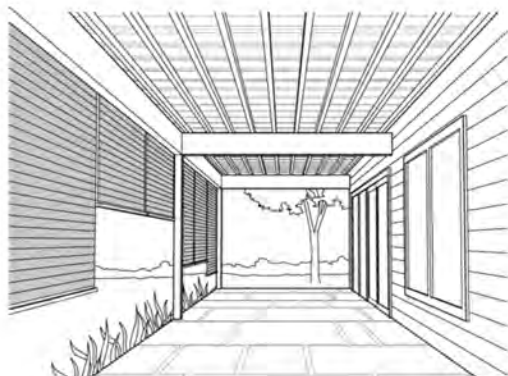
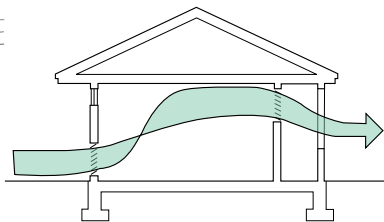
A WHOLE-HOUSE FAN OR NATURAL VENTILATION CAN STORE NIGHT TIME "COOLTH" IN HIGH MASS INTERIOR SURFACES (MIGHT FLUSHING), TO REDUCE OR ELIMINATE AIR CONDITIONING



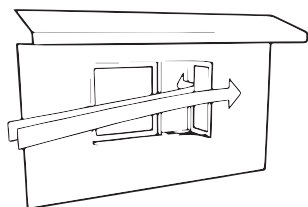
IN WET CLIMATES WELL VENTILATED ATTICS WITH PITCHED ROOFS WORK WELL TO SHED RAIN AND CAN BE EXTENDED TO PROTECT ENTRIES, PORCHES, VERANDAS, & OUTDOOR WORK AREAS



USE OPEN PLAN INTERIORS TO PROMOTE NATURAL CROSS VENTILATION, OR USE LOUVERED DOORS, OR INSTEAD USE JUMP DUCTS IF PRIVACY IS REQUIRED

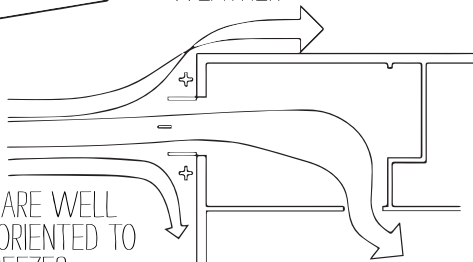


SHADED OUTDOOR BUFFER ZONES (PORCH, PATIO, LANAI) ORIENTED TO THE PREVAILING BREEZES CAN EXTEND LIVING AND WORKING AREAS IN WARM OR HUMID WEATHER

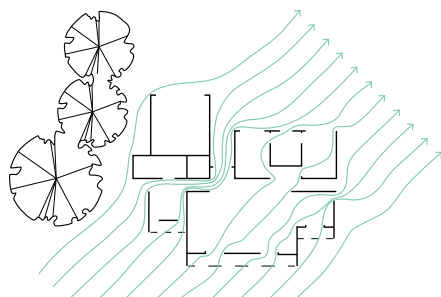


GOOD, NATURAL VENTILATION CAN REDUCE OR ELIMINATE AIR CONDITIONING IN WARM WEATHER

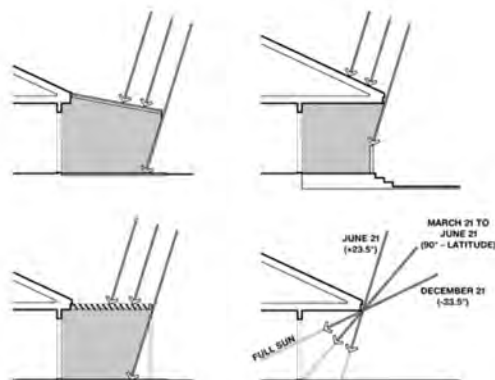
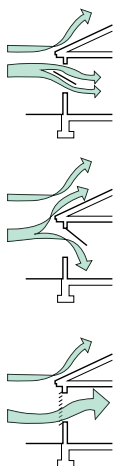
IF WINDOWS ARE WELL SHADED AND ORIENTED TO PREVAILING BREEZES



SCREENED PORCHES AND PATIOS CAN PROVIDE PASSIVE COMFORT COOLING BY VENTILATION IN WARM WEATHER AND CAN PREVENT INSECT PROBLEMS.



TO FACILITATE CROSS VENTILATION, LOCATE DOOR AND WINDOW OPENINGS ON OPPOSITE SIDES OF BUILDING WITH LARGER OPENINGS FACING UPWIND IF POSSIBLE.



WINDOW OVERHANGS (DESIGNED FOR THIS LATITUDE) OR OPERABLE SUNSHADES (AWNINGS THAT EXTEND IN SUMMER) CAN REDUCE OR ELIMINATE AIR CONDITIONING

INITIAL DESIGN ITERATIONS

IDEA #1

This is ground zero when it comes to programmatic design. The basis for this idea was that it was the simplest of building types.

Positive aspects about it are that there is ample circulation space on the exterior. There is also great flexibility of spaces both inside and out.

Drawbacks to this scheme are that it will be difficult to get daylight into the center of the building. This would require very large openings which could contribute to excess heat gain.

Elements of this scheme continue to be developed throughout the design phase, such as an exterior circulatory path.

ENERGY ANALYSIS

ENERGY USE INTENSITY

ELECTRICITY EUI.....16 KWH/SF/YR

LIFE-CYCLE ENERGY USE

ELECTRICITY USE.....8,327,466 KWH

FUEL USE.....50,959 THERMS

ENERGY COST.....\$373, 136

ANNUAL CARBON EMISSIONS

ELECTRICITY CONSUMPTION.....72

FUEL CONSUMPTION.....9

ROOF PV POTENTIAL.....-35

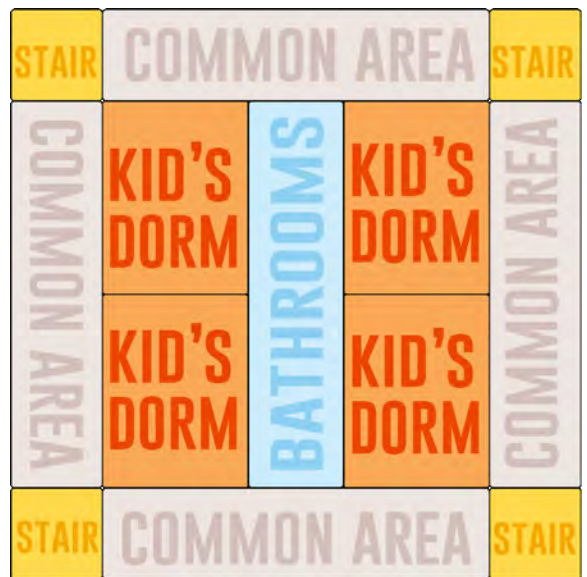
NET CO2.....46

TOTAL EUI: 66 KBTU/SF/YR

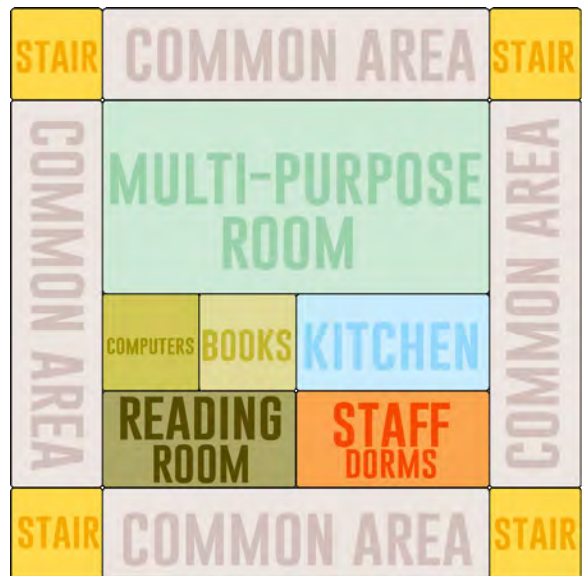
46 NET CO2 EMISSIONS:
TONS/YEAR



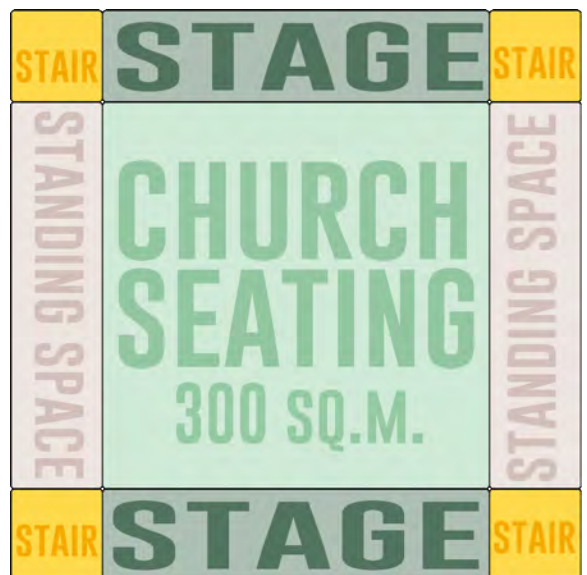
ORPHANAGE



TRAINING ROOMS



CHURCH



IDEA #2

This idea was a direct response to the issue of daylighting in idea #1. Instead of a solid mass, it implements an interior courtyard light-well. The shape of this design is mostly arbitrary, but was an effort to try something very unconventional.

Positive aspects of this design is the centrality of its nature. It is introspective quality reflects the goals of the client. It also makes good use of window area by adding the light-well. These spaces also communicate vertically (in section) as well as horizontally (or in plan).

Potential drawbacks to this idea are that it is a very unique shape and therefore may be difficult to build. Also, while the light-well has a good-intentioned purpose, it is not guaranteed that it is wide enough to provide the desired amount of light.

As mentioned previously, this idea makes use of a circulatory system, but instead of being located on the outside, is located on the inside to foster intercommunication.

ENERGY ANALYSIS

ENERGY USE INTENSITY

ELECTRICITY EUI.....17 KWH/SF/YR

LIFE-CYCLE ENERGY USE

ELECTRICITY USE.....8,990,214 KWH

FUEL USE.....55,084 THERMS

ENERGY COST.....\$402, 852

ANNUAL CARBON EMISSIONS

ELECTRICITY CONSUMPTION.....77

FUEL CONSUMPTION.....10

ROOF PV POTENTIAL.....-32

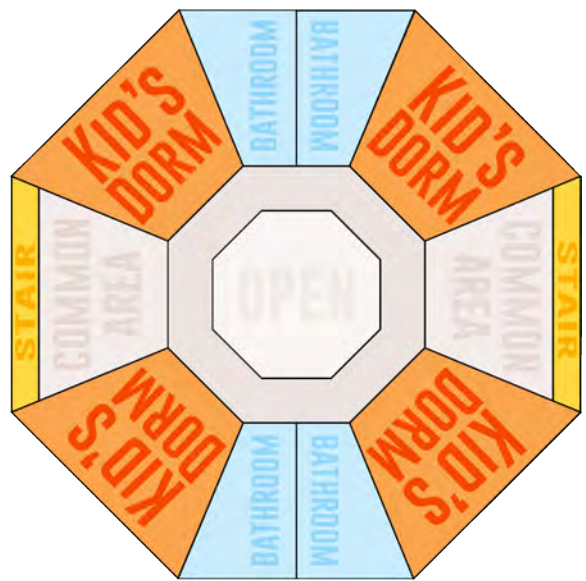
NET CO2.....55

TOTAL EUI: 68 KBTU/SF/YR

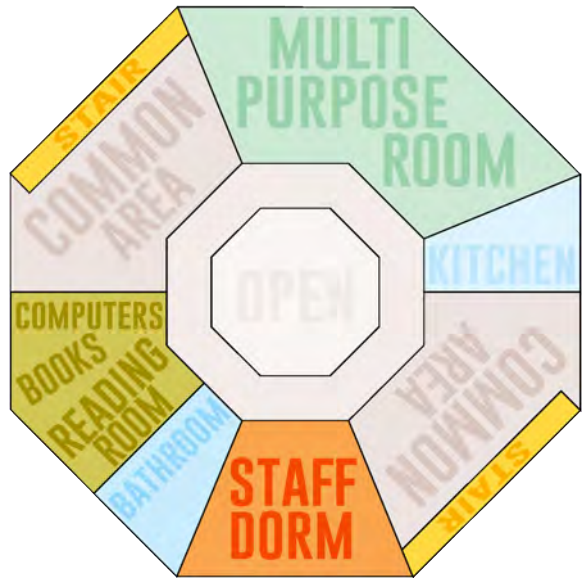
55 NET CO2 EMISSIONS:
TONS/YEAR



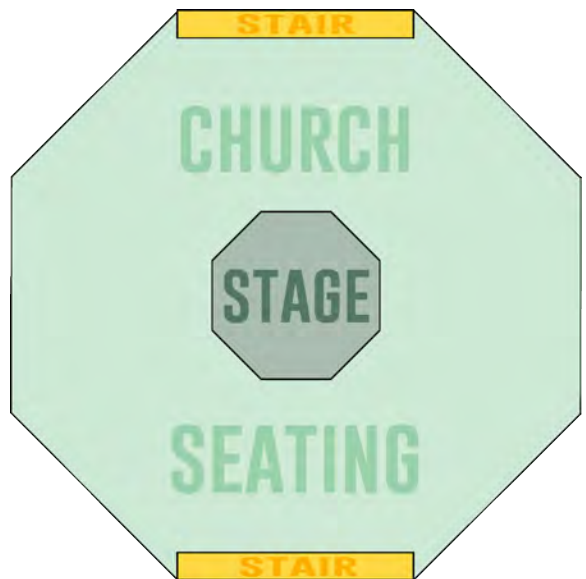
ORPHANAGE



TRAINING ROOMS



CHURCH



IDEA #3

This design performed the best environmentally (See page 71). However, it lacked a cohesiveness that the exterior circulation system failed to provide. The spaces also didn't communicate well horizontally or vertically, that is in plan and section. Aspects of this linear idea are developed later on.

In terms of the energy analysis, this building performed the best because it was able to be oriented in the best case scenario: with the North and South sides being the long ones and minimizing solar exposure on the East and West sides.

However, the energy performance did not give reason enough to use this idea as the solution to this design problem.

ENERGY ANALYSIS

ENERGY USE INTENSITY

ELECTRICITY EUI.....18 KWH/SF/YR

LIFE-CYCLE ENERGY USE

ELECTRICITY USE.....6,806,019 KWH

FUEL USE.....41,900 THERMS

ENERGY COST.....\$305,053

ANNUAL CARBON EMISSIONS

ELECTRICITY CONSUMPTION.....52

FUEL CONSUMPTION.....8

ROOF PV POTENTIAL.....-22

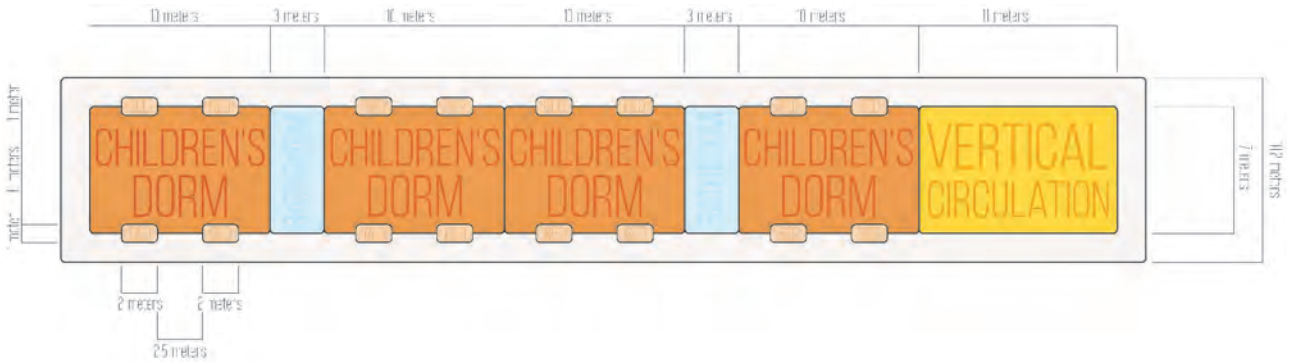
NET CO2.....38

TOTAL EUI: 71 KBTU/SF/YR

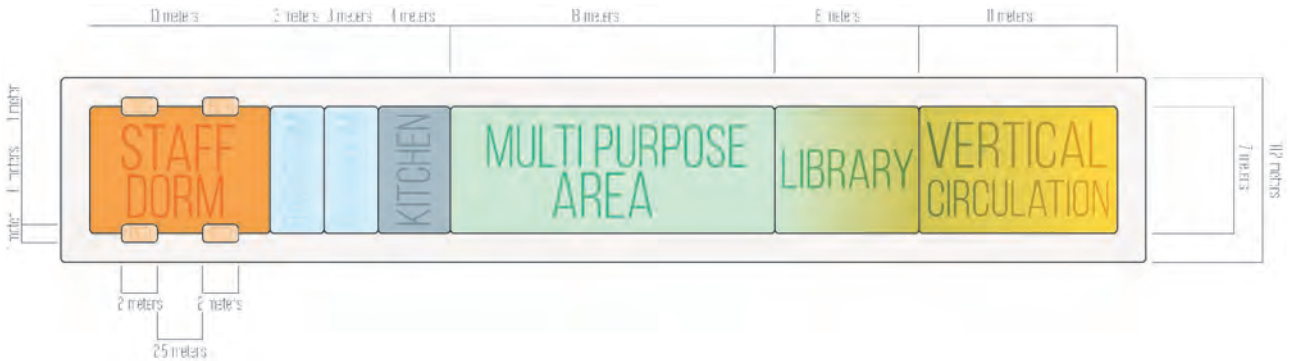
38 NET CO2 EMISSIONS:
TONS/YEAR



ORPHANAGE



TRAINING ROOMS



CHURCH



IDEA #4

This idea begins exploring the concept of a “broken” building. It adapts from the previous example, and its downfalls are similar. However, it is beginning to combine both centralized and linear plan ideas.

This design performed averagely when compared with the others. This could be due to the orientation and asymmetrical shape. It could have been improved with things like thermal mass and increasing the shading or slightly changing the orientation.

A combination of the hexagonal idea and this along with the simple rectangle are what leads to the final solution

ENERGY ANALYSIS

ENERGY USE INTENSITY

ELECTRICITY EUI.....17 KWH/SF/YR

LIFE-CYCLE ENERGY USE

ELECTRICITY USE.....6,802,047 KWH

FUEL USE.....41,143 THERMS

ENERGY COST.....\$304,614

ANNUAL CARBON EMISSIONS

ELECTRICITY CONSUMPTION.....52

FUEL CONSUMPTION.....7

ROOF PV POTENTIAL.....-2

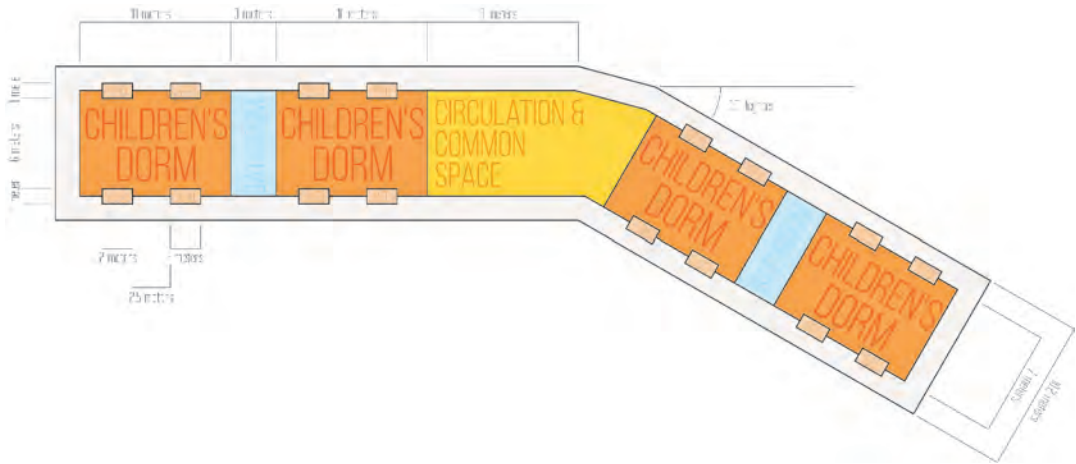
NET CO2.....57

TOTAL EUI: 68 KBTU/SF/YR

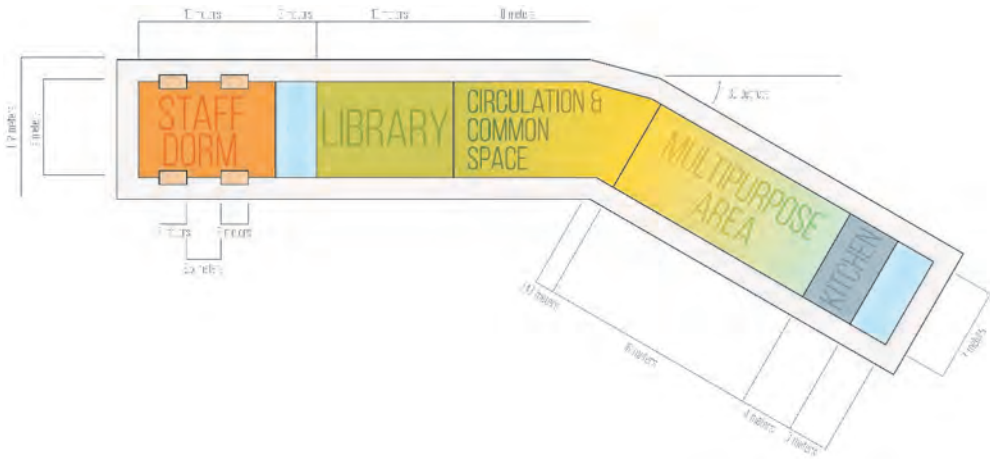
57 NET CO2 EMISSIONS:
TONS/YEAR



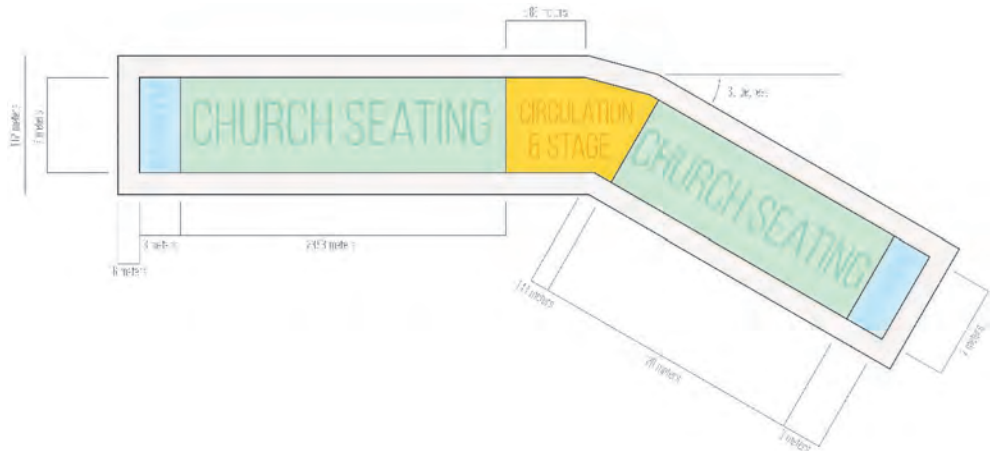
ORPHANAGE



TRAINING ROOMS



CHURCH

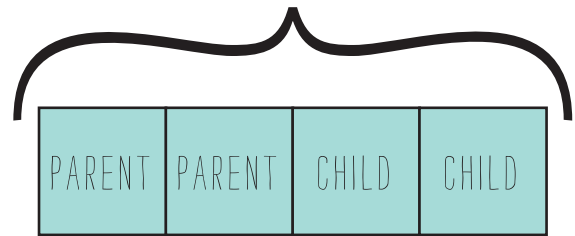


FORM DEVELOPMENT

After evaluating all the iterations performed prior, I re-examined the reasons and purposes of this project. I studied what it was exactly that was causing, if only partly, some of the problems in the family structure in the Philippines. From these studies, a form was developed both literally and figuratively. It is from here that the design begins to take shape.

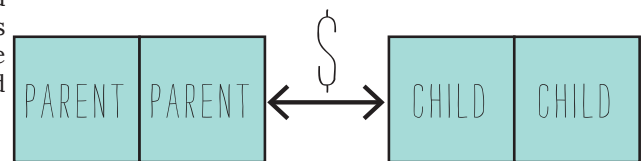
The traditional family structure in the Philippines is much like that of the American family, except for a few key differences, namely, cultural. The typical family unit consists of anywhere from two to six children and tends to be nuclear. Filipino culture encourages a group dynamic over individuality and therefore, their communities form tight-knit groups. As women are gaining independence in the workforce, this dynamic is changing.

TRADITIONAL PHILIPPINE FAMILY UNIT



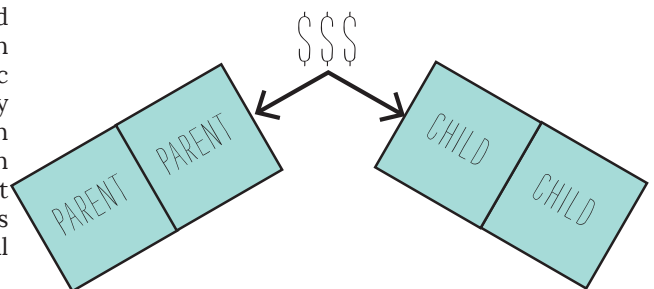
“Population growth, dependency burdens, and viewing children as economic assets contribute to keeping families poor. Of the Philippine population of 88.6 million in 2007, 29.5% live below the Asian Poverty Line (APL) of US \$1.35 a day. Many though not all poor families see child labour as a way to cope with meager family incomes evident in the 2.1 working children aged 5-17 in the country.” (ILO: Child Labor).

ECONOMIC HARDSHIPS DIVIDE THE FAMILY UNIT



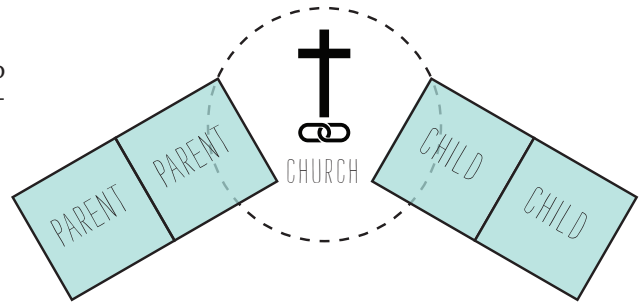
“Child labor is a common problem in the Philippines. One government report estimates that there were more than 2.2 million working children ages 15 to 17 in the country in 2009. The majority of these children work as laborers and unskilled workers, and are often exposed to hazardous working environments in industries such as mining, fishing, pyrotechnic production, domestic service, garbage scavenging, and agriculture, especially sugar cane plantations. A significant number of children are also employed in the informal sector of the urban economy as domestic workers... NGO and government officials reported cases in 2010 in which family members sold children to employers for domestic labor or sexual exploitation.” (humantrafficking.org: Philippines).

INCREASING ECONOMIC HARDSHIPS DRIVE THE FAMILY APART



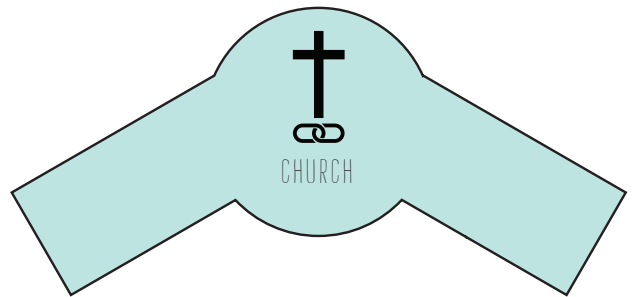
THE CHURCH AS A LINK BETWEEN PARENTS + CHILDREN & FAMILY + COMMUNITY

Because Filipino culture centers on a strong group dynamic, this project uses the church as a fulcrum to reform the family.



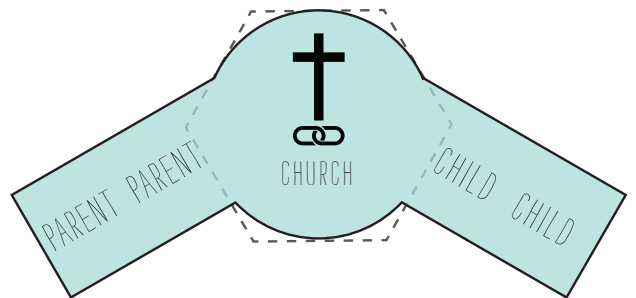
A UNITING OF THE FAMILY UNIT THROUGH THE LEADERSHIP OF THE CHURCH

By merging the support found in a group dynamic with the traditional family structure, this project will strengthen, preserve and reunify families as well as assist children in reaching their full potential as healthy and well-adjusted individuals by delivering a continuum of prevention, assessment, intervention, treatment, and transition services.



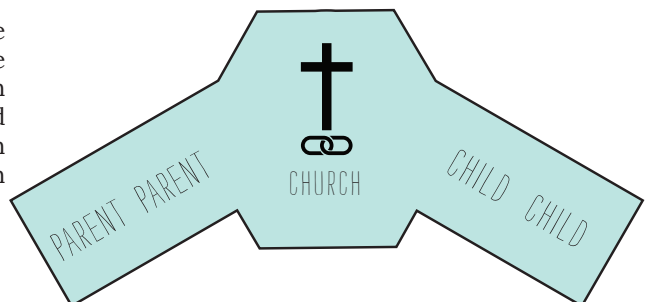
CIRCULAR FORM RATIONALIZED

Because circular forms can be difficult to implement architecturally, a more rationalized, triangulated form was used. A circular form can also be expensive to build as it does not align well with traditional building techniques.



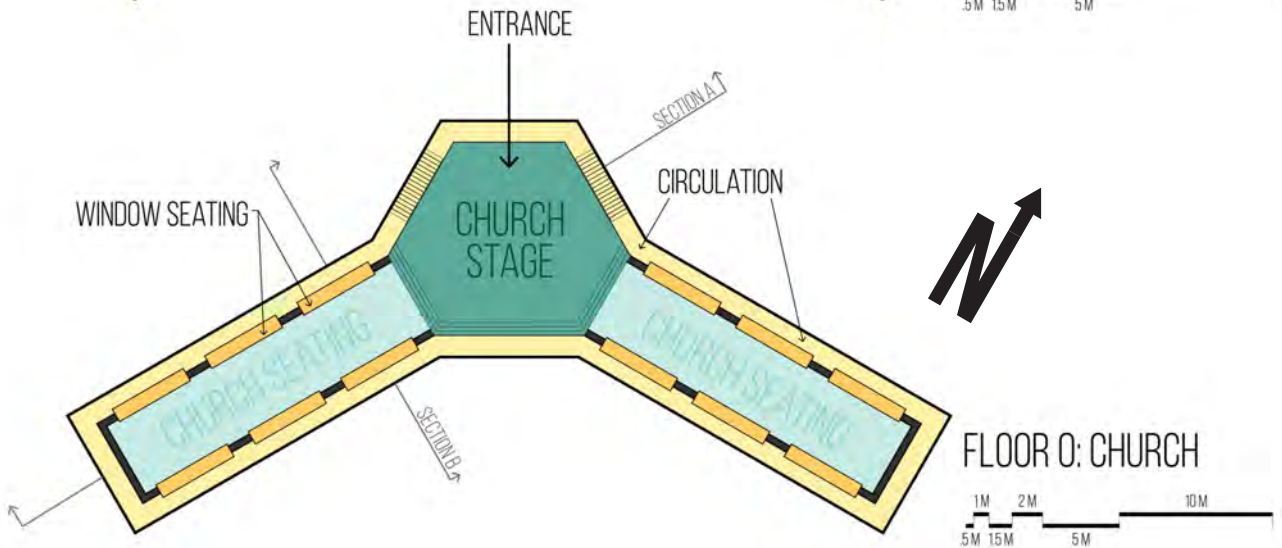
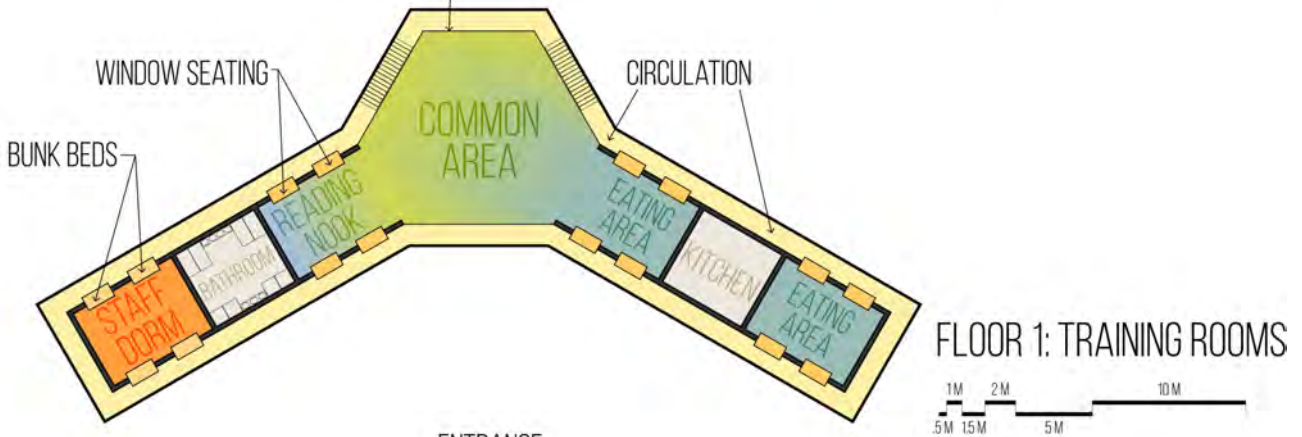
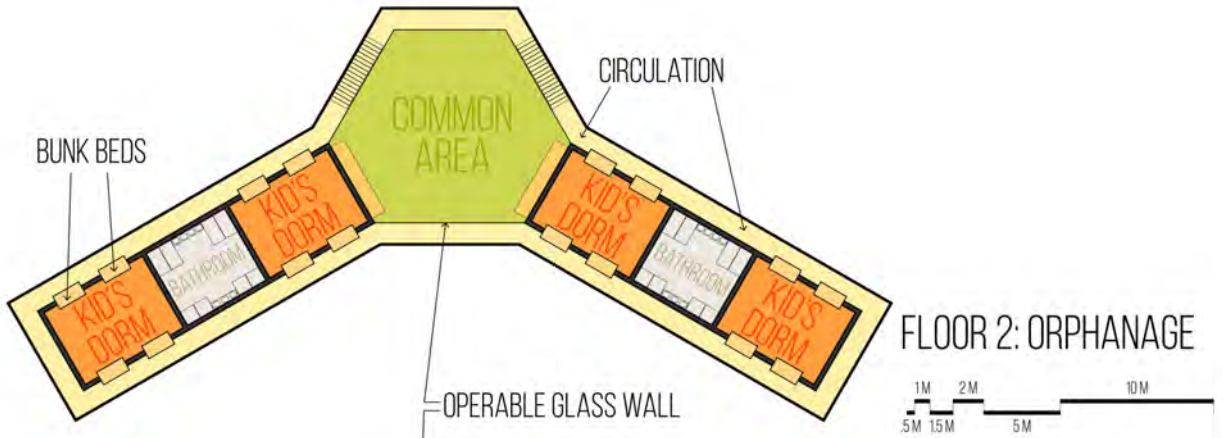
FINAL FORM

With some alterations, this form occupies minimal square meter-age on the site while fostering impromptu space uses. For example, church seating would typically occur in the wings and in the hexagon, but could occur in the bend of the shape. Children could also play on the land within the negative space of the shape with proper observation occurring on the periphery of the building.



DEVELOPMENT

DIAGRAMMATIC FLOORPLANS



SITE PLACEMENT



SECTION



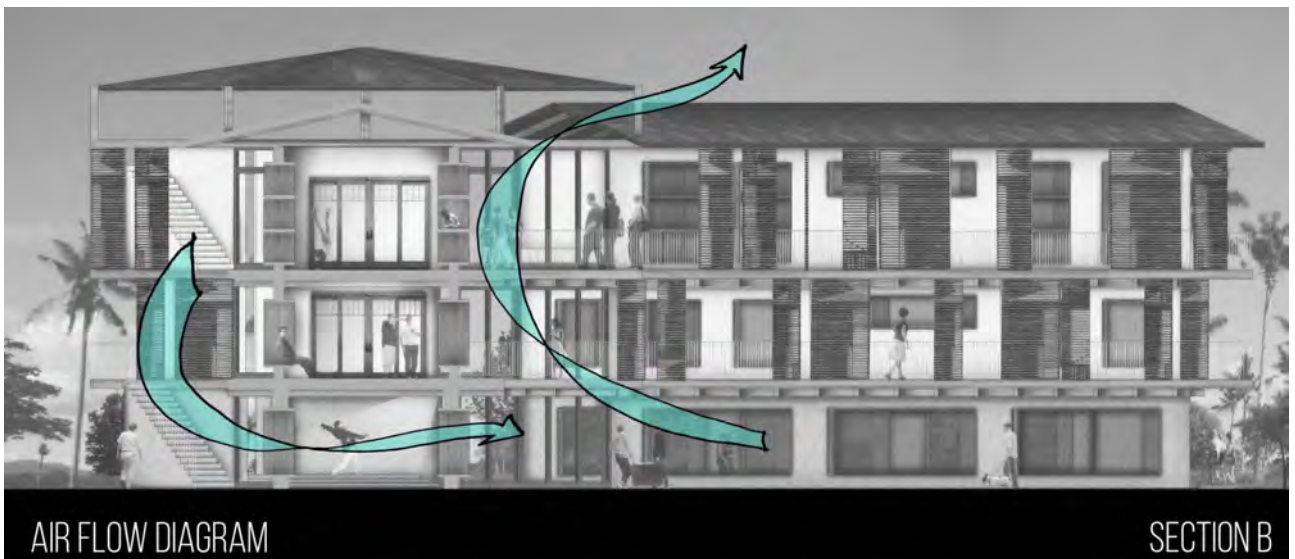
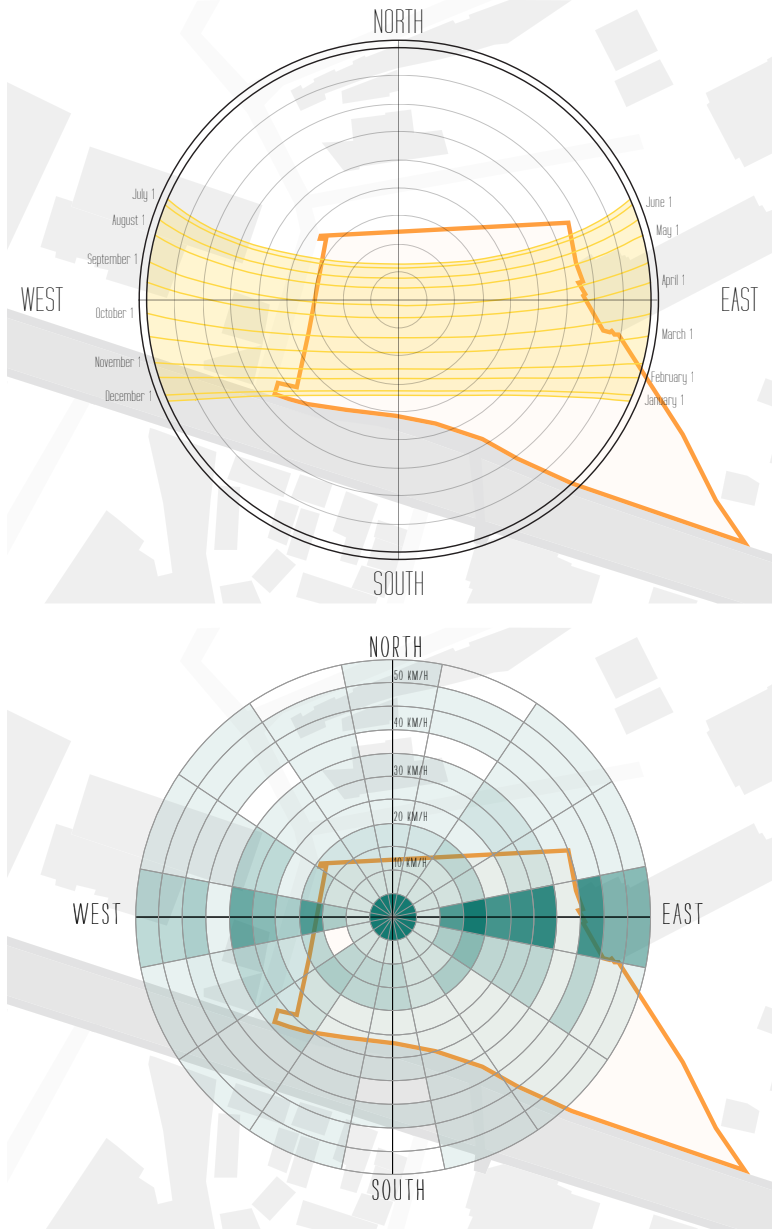
ENERGY ANALYSIS

After reevaluating the purposes of this project, I reevaluated the climactic relationships of this form on the site. Taking into account things like sun paths and wind direction, I attempted to place the building on the site in order to maximize natural lighting and ventilation.

Its energy performance is about average when compared to the other designs. It did not perform as well as the simple rectangular shape, but it did make better use of the programmatic arrangement.

Between the two energy analyses simple changes were made including increasing the shading and adjusting the mass. This had a significant result in terms of energy performance. Also, this design yielded the second greatest difference between total EUI and net CO2 emissions.

From here, I will continue to attempt to optimize the shape in order to improve the aesthetic of the building, but also the functionality and energy performance.



AIR FLOW DIAGRAM

SECTION B

ENERGY ANALYSIS

ENERGY USE INTENSITY

ELECTRICITY EUI.....25 KWH/SF/YR

LIFE-CYCLE ENERGY USE

ELECTRICITY USE.....10,090,080 KWH

FUEL USE.....50,097 THERMS

ENERGY COST.....\$447,971

ANNUAL CARBON EMISSIONS

ELECTRICITY CONSUMPTION.....77

FUEL CONSUMPTION.....9

ROOF PV POTENTIAL.....-20

NET CO2.....66

TOTAL EUI: 98 KBTU/SF/YR

66 NET CO2 EMISSIONS:
TONS/YEAR

ENERGY ANALYSIS

ENERGY USE INTENSITY

ELECTRICITY EUI.....17 KWH/SF/YR

LIFE-CYCLE ENERGY USE

ELECTRICITY USE.....8,613,039 KWH

FUEL USE.....44,054 THERMS

ENERGY COST.....\$382,853

ANNUAL CARBON EMISSIONS

ELECTRICITY CONSUMPTION.....66

FUEL CONSUMPTION.....8

ROOF PV POTENTIAL.....-22

NET CO2.....52

TOTAL EUI: 84 KBTU/SF/YR

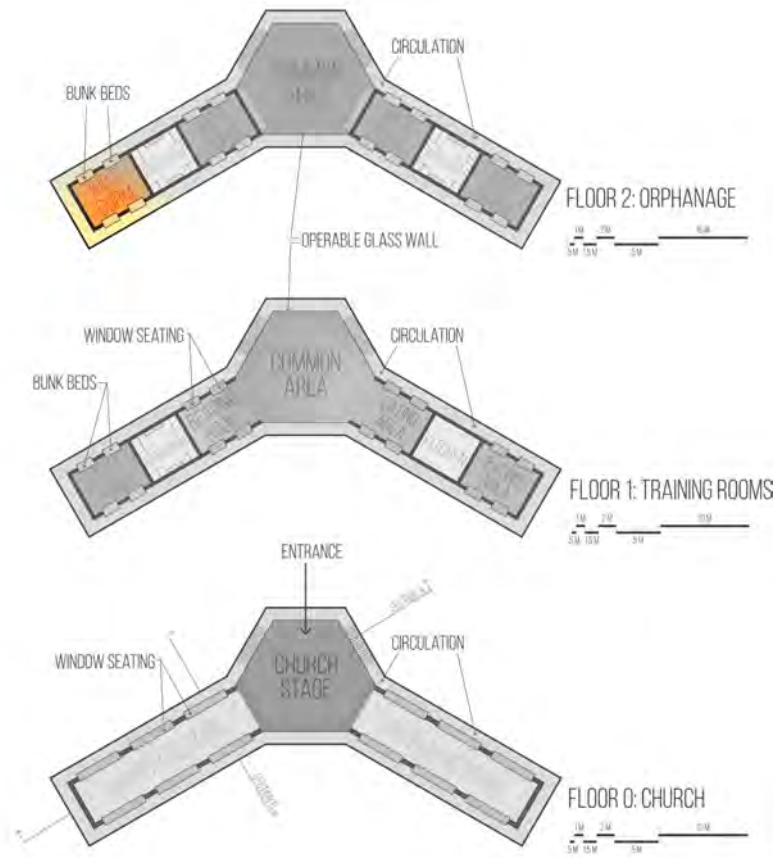
52 NET CO2 EMISSIONS:
TONS/YEAR

DETAIL

The following is the development of a detail in the project. This detail focuses on an individual dorm room within the orphanage portion of the building.

Various forms of bunk beds were studied for their form and functionality. These bunk-beds make use of storage within the built in bunk-bed structure while also using the bunk-bed itself as a form of ladder. Each bunk bed also serves as a sort of window box made of operable jalousie windows. These types of windows are very effective in hot humid climates because they provide 100% ventilation through the window, without sacrificing window space.

The material palette is made up of bamboo furniture, with concrete structural walls, and light-frame wood walls coated with a level 5 finish.





IF YOU GO TO WORK ON YOUR GOALS,
YOUR GOALS WILL GO TO WORK ON
YOU. IF YOU GO TO WORK ON YOUR
PLAN, YOUR PLAN WILL GO TO WORK
ON YOU. WHATEVER GOOD THINGS
WE BUILD END UP BUILDING US

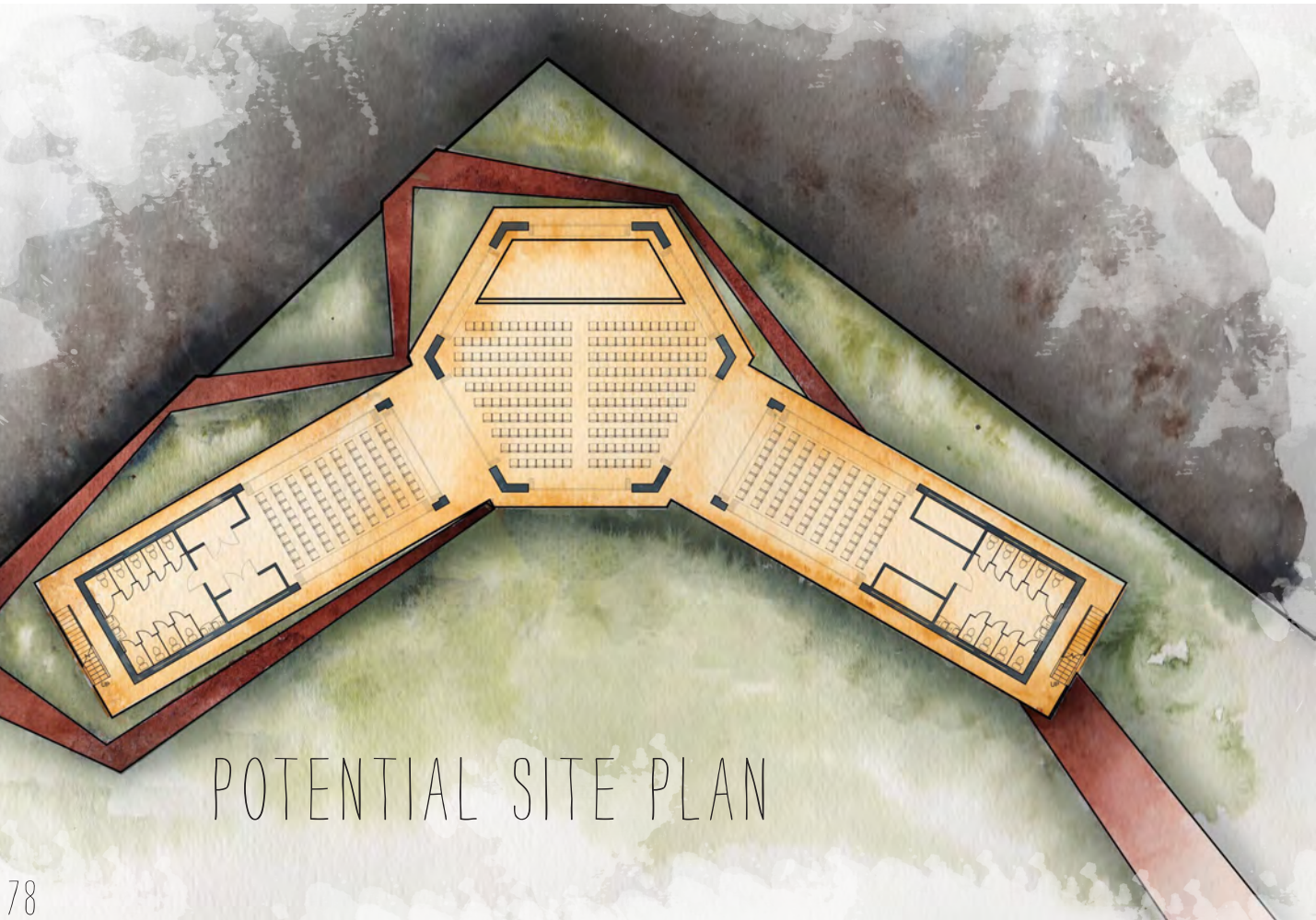
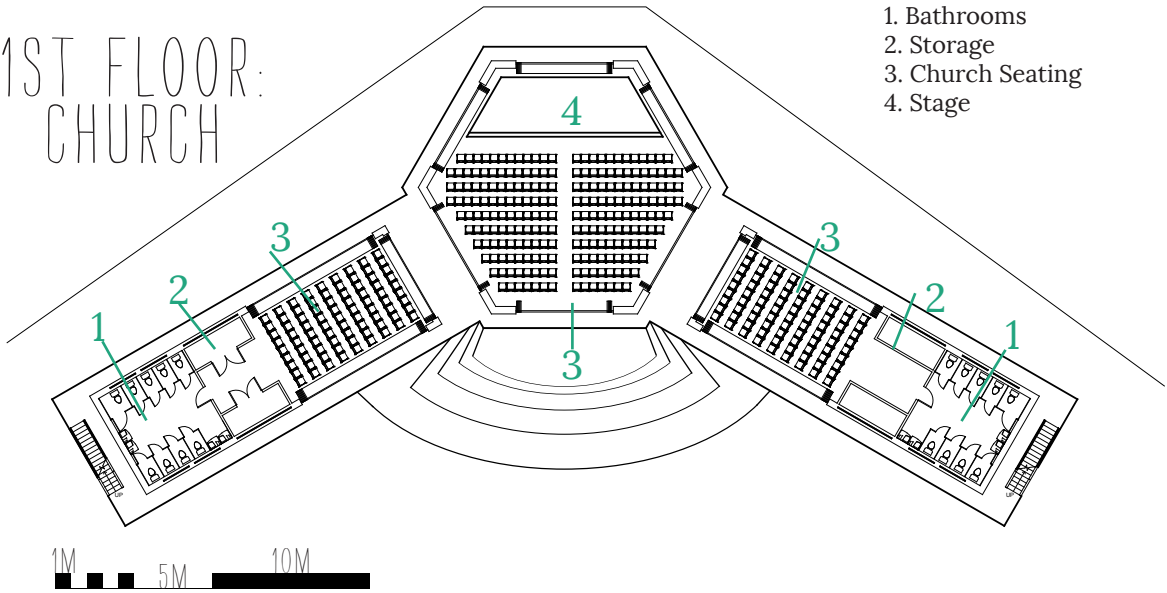
J. ROHN

A large, abstract splash of red watercolor paint on a white background, with the splash extending from the top left towards the bottom right. The paint has a textured, grainy appearance with varying shades of red and pink.

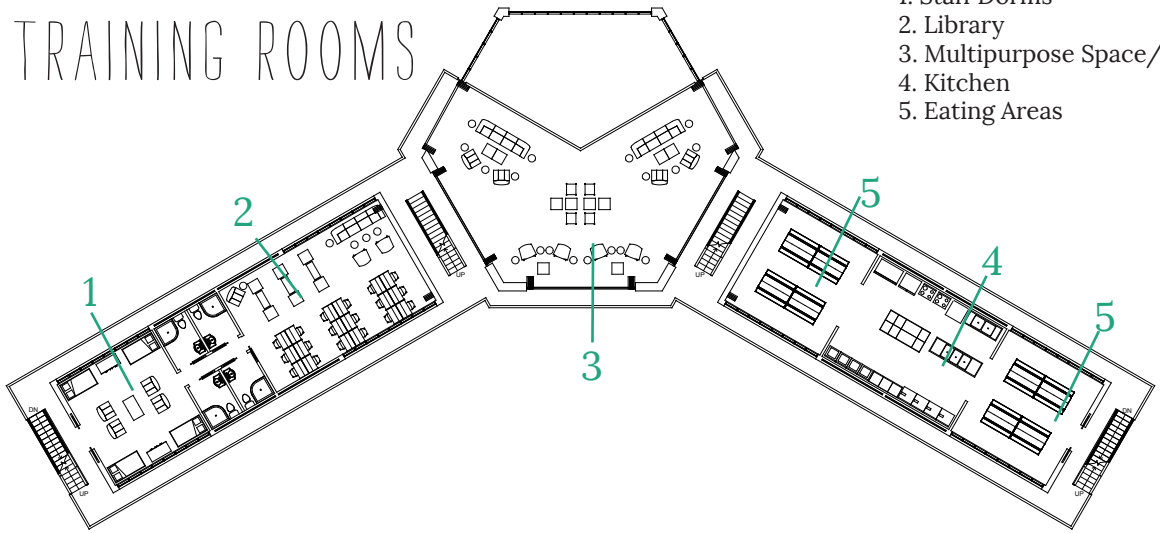
FINAL DESIGN

FLOORPLANS

1ST FLOOR: CHURCH

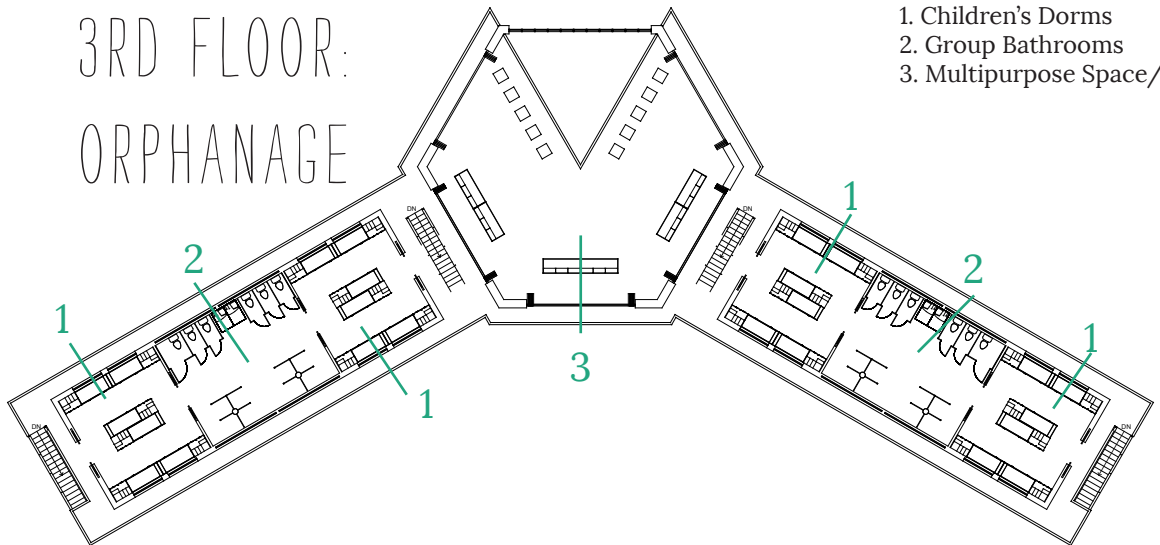


2ND FLOOR: TRAINING ROOMS



- 1. Staff Dorms
- 2. Library
- 3. Multipurpose Space/Lounge
- 4. Kitchen
- 5. Eating Areas

3RD FLOOR: ORPHANAGE



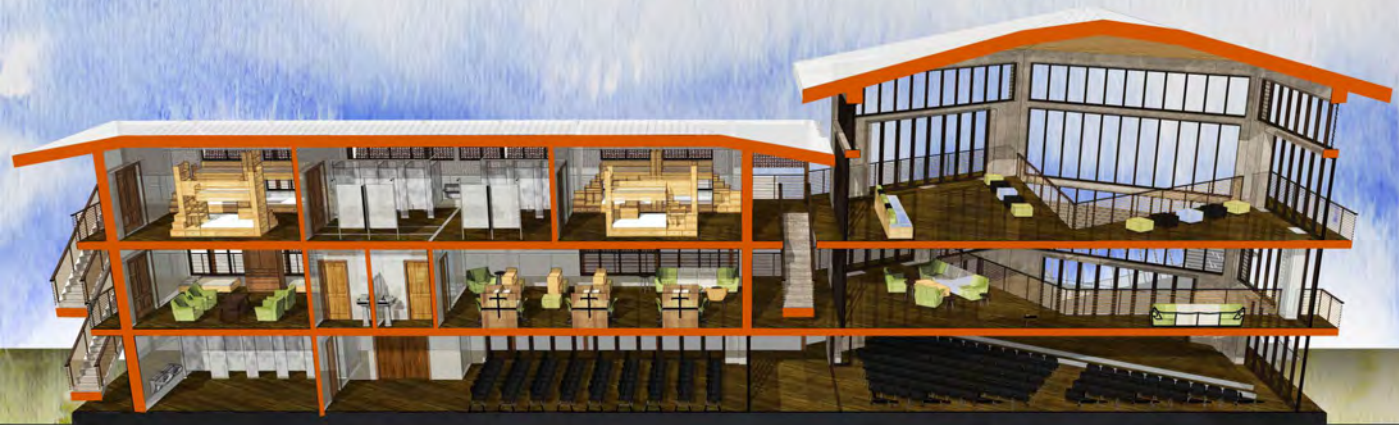
- 1. Children's Dorms
- 2. Group Bathrooms
- 3. Multipurpose Space/Lounge



SECTION A



VIEW FROM BALCONY



SECTION B

APPROACHING THE SITE





APPROACHING THE BUILDING



CHILDREN'S DORM
ROOM

LOUNGE/MULTIPURPOSE AREA



CHURCH WORSHIP AREA



ENERGY ANALYSIS

Energy performance was modeled this time using a more detailed Revit model. Performance results were similar to previous energy modeling, however they were slightly improved. This was a success due to adjustments made in orientation and materials. In going from the first energy model to the second, changes were made to the massiveness in materials, some slight adjustments in orientation, and adjustments in glazing. Some physical changes would be made to the building, but the overall shape, feel, and aesthetic of the structure would remain the same.

REFLECTIONS

This building makes use of a number of passive strategies in order to achieve comfort without any HVAC systems. While acknowledging the region's building history and local materials, a design has been achieved that respects the need of the client, while achieving the best possible energy performance.

BIRDS-EYE VIEW



ENERGY ANALYSIS

ENERGY USE INTENSITY

ELECTRICITY EUI.....15 KWH/SF/YR

LIFE-CYCLE ENERGY USE

ELECTRICITY USE.....7,603,138 KWH

FUEL USE.....45,504 THERMS

ENERGY COST.....\$402,576

ANNUAL CARBON EMISSIONS

ELECTRICITY CONSUMPTION.....65

FUEL CONSUMPTION.....7

ROOF PV POTENTIAL.....-20

NET CO2.....50

TOTAL EUI: 85 KBTU/SF/YR

50 NET CO2 EMISSIONS:
TONS/YEAR

ENERGY ANALYSIS

ENERGY USE INTENSITY

ELECTRICITY EUI.....17 KWH/SF/YR

LIFE-CYCLE ENERGY USE

ELECTRICITY USE.....7,926,739 KWH

FUEL USE.....57,736 THERMS

ENERGY COST.....\$460,428

ANNUAL CARBON EMISSIONS

ELECTRICITY CONSUMPTION.....60

FUEL CONSUMPTION.....9

ROOF PV POTENTIAL.....-20

NET CO2.....47

TOTAL EUI: 79 KBTU/SF/YR

47 NET CO2 EMISSIONS:
TONS/YEAR



BIBLIOGRAPHY

ABSTRACT

- ¹ “Human Trafficking in the Philippines: A Blemish on Economic Growth.” Accessed June 4, 2014. <http://www.diplomaticcourier.com/news/topics/security/2197-human-trafficking-in-the-philippines-a-blemish-on-economic-growth>.
- ² “Philippines.” The World Factbook. Central Intelligence Agency, n.d. Web. 12 Oct. 2013. <<https://www.cia.gov/library/publications/the-world-factbook/geos/rp.html>>.
- ³ *Ibid.*
- ⁴ “What Is Human Trafficking?” 2014. Accessed June 5. <http://www.unodc.org/unodc/en/human-trafficking/what-is-human-trafficking.html?ref=menuaside>.
- ⁵ “Philippines: 2013 Trafficking in Persons Report.” 2014. Accessed June 5. <http://www.state.gov/j/tip/rls/tiprpt/countries/2013/215544.htm>.
- ⁶ “Philippines.” The World Factbook. Central Intelligence Agency, n.d. Web. 12 Oct. 2013. <<https://www.cia.gov/library/publications/the-world-factbook/geos/rp.html>>.
- ⁷ “Human Trafficking in the Philippines: A Blemish on Economic Growth.”
- ⁸ *Ibid.*
- ⁹ *Ibid.*
- ¹⁰ “GDP per Capita (current US\$) | Data | Table.” 2014. Accessed June 5. <http://data.worldbank.org/indicator/NY.GDP.PCAP.CD>.
- ¹¹ “Philippines: 2013 Trafficking in Persons Report.”
- ¹² “Trafficking in Persons Report 2013: Definitions and Methodology.” 2014. Accessed June 5. <http://www.state.gov/j/tip/rls/tiprpt/2013/210543.htm>.
- ¹³ *Ibid.*
- ¹⁴ “Philippines: 2013 Trafficking in Persons Report.”

PHOTO SOURCES:

- Dela Cruz, Mary Jane. *Ifugao Rice Terraces, Philippines*. Digital image. Flickr. N.p., 14 Sept. 2011. Web. 30 Nov. 2013. <<http://www.Flickr/photos/giahs/7772833008/>>.
- Feed My Starving Children. FMSC Distribution Partner - Risen Savior Missions. Digital image. Flickr. N.p., 16 Mar. 2011. Web. 30 Nov. 2013. <<http://www.Flickr/photos/fmsc/6893113504/>>.
- Kéré's Library in Gando. Digital image. Wikimedia Commons. Wikipedia, 10 Aug. 2011. Web. 29 Nov. 2013.
- Loh, Nicky. *Poverty in Philippines*. Digital image. Nickyloh.com. N.p., 12 May 2010. Web. 29 Nov. 2013. <[http://nickyloh.com/portfolio-item/poverty-in-philippines/#!prettyPhoto\[1\]/0/](http://nickyloh.com/portfolio-item/poverty-in-philippines/#!prettyPhoto[1]/0/)>

THESIS

- Douglas, Mika. “Human Trafficking: Read: Share: Act.” Web log post. End Slavery Now. End Slavery Now, 13 Jan. 2014. Web. 16 Mar. 2014. <<http://endslaverynow.tumblr.com/post/29220659515/humanrights-socialjustice-slavery-spiritualawareness-stu>>.
- The Fighters. “Traffickers Prey on the Most Vulnerable.” CNN. Cable News Network, 09 May 2013. Web. 16 Mar. 2014. <<http://edition.cnn.com/2013/05/08/world/asia/freedom-fighters-stats/index.html>>.

PARTNERS

- “About.” Journeyman International. N.p., n.d. Web. 16 Mar. 2014. <<http://www.journeymaninternational.org/>>.
- “Locations: Philippines.” 5 Loaves. 5 Loaves Ministries, n.d. Web. 16 Mar. 2014. <<http://5loaves.org/locations>>.
- “Our Story.” 5 Loaves. 5 Loaves Ministries, n.d. Web. 16 Mar. 2014. <<http://5loaves.org/our-story>>.

GEOGRAPHY

- Ardoña, Nherwin. Philippines. Digital image. The Noun Project. N.p., 2013. Web. 9 Dec. 2013. <<http://thenounproject.com/term/philippines/19184/>>.
- Boatman, Edward. Flower. Digital image. The Noun Project. N.p., n.d. Web. 9 Dec. 2013. <<http://thenounproject.com/>>

term/flower/180/>.

- “Calabarzon.” Wikipedia. Wikimedia Foundation, 21 Mar. 2014. Web. 21 Mar. 2014. <<http://en.wikipedia.org/wiki/Calabarzon>>.” Wikipedia. Wikimedia Foundation, 21 Mar. 2014. Web. 21 Mar. 2014. <<http://en.wikipedia.org/wiki/Calabarzon>>.
- Hernandez, Carolina G. “Philippines.” Encyclopedia Britannica Online. Encyclopedia Britannica, 14 Nov. 2013. Web. 11 Dec. 2013. <<http://www.britannica.com/EBchecked/topic/456399/Philippines>>.
- “Luzon”. Encyclopædia Britannica. Encyclopædia Britannica Online. Encyclopædia Britannica Inc., 2014. Web. 21 Mar. 2014 <<http://www.britannica.com/EBchecked/topic/352414/Luzon>>.
- Mayon Volcano. Digital image. Luxury Villas Philippines. N.p., n.d. Web. 30 Nov. 2013. <<http://luxuryvillasphilippines.com/photos/>>.
- “Philippines”. Encyclopædia Britannica. Encyclopædia Britannica Online. Encyclopædia Britannica Inc., 2014. Web. 21 Mar. 2014 <<http://www.britannica.com/EBchecked/topic/456399/Philippines>>.
- “Rizal” Wikipedia. Wikimedia Foundation, 19 Mar. 2014. Web. 21 Mar. 2014. <<http://en.wikipedia.org/wiki/Rizal>>.
- Sall, Wayne Tyler. People Icon. Digital image. The Noun Project. N.p., 2013. Web. 9 Dec. 2013. <<http://thenounproject.com/term/people/11347/>>.
- Sheyn, Alex. Weather. Digital image. The Noun Project. N.p., n.d. Web. 9 Dec. 2013. <<http://thenounproject.com/term/weather/7747/>>.

PHOTO SOURCES: (left to right)

- “Index of Images.” [Http://www.trailadventours.com](http://www.trailadventours.com). Trail AdvenTours, n.d. Web. 16 Mar. 2014. <<http://www.trailadventours.com/images/>>. Image: 809d6b70bfe23042575d07cd54b22b9c>.
- Formen, Joshua. “Search Results.” Zamboanga.com. Zamboanga, 27 Dec. 2011. Web. 16 Mar. 2014. <http://www.zamboanga.com/z/images/e/ee/Palhi_River,_Palhi,_Baybay_City,_Leyte_01.JPG>.
- Sousa, Ellen. “Can Vegetable Gardens Be Wildlife-Friendly?” Web log post. Beautiful Wildlife Garden. N.p., 24 Sept. 2012. Web. 17 Mar. 2014. <<http://www.beautifulwildlifegarden.com/can-vegetable-gardens-be-wildlife-friendly.html>>.
- Martin, Christopher. “Lightning Strike on the Prairie.” Christopher Martin Photography. N.p., 20 July 2011. Web. 17 Mar. 2014. <<http://christophermartinphotography.com/tag/lightning/>>.

CLIMATE

- Philippines. Food and Agriculture Organization of the United Nations. Fisheries and Aquaculture Department. Brackishwater Aquaculture Development and Training Project. FAO Corporate Document Repository, 1980. Web. 20 Mar. 2014. <<http://www.fao.org/docrep/field/003/ac061e/AC061E16.htm>>.

FLORA & FAUNA

- Bristol Zoo - Philippine Cockatoo. Digital image. Flickr. Yahoo, 16 May 2007. Web. 1 Dec. 2013. <<http://www.flickr.com/photos/nickys/501058165>>.
- Britten, Ben. Rainforest. Digital image. Flickr. Yahoo, 15 May 2005. Web. 30 Nov. 2013. <<http://www.Flickr/photos/tauntingpanda/14782257/>>.
- Camperspoint. Tagaytay. Digital image. Camperspoint. Yahoo, 10 Sept. 2004. Web. 30 Nov. 2013. <<http://photos.camperspoint.com/index.php?page=2&search=Tagaytay>>.
- Charo. Manmade Forest, Bohol, Philippines. 2006. Photograph. Batuan, Central Visayas, PH. Flickr. 26 May 2006. Web. 30 Nov. 2013. <<http://www.Flickr/photos/carambs/342479867/>>.
- Delmar, David. Lantana Camara (Spanish Flag). Digital image. Ocean Tone. Yahoo, 2007-2013. Web. 30 Nov. 2013. <<http://www.oceantone.com/philippines.php>>.
- Deuchars, Graeme. Civet Cat @ GSIS - 28 August 2007 (6). Digital image. Flickr. Yahoo, 28 Aug. 2007. Web. 1 Dec. 2013. <<http://www.flickr.com/photos/12357541@N06/1263720586>>.
- Eickhoff, David. Spathoglottis Plicata. 2012. Photograph. Flickr. 29 Nov. 2012. Web. 30 Nov. 2013. <<http://www.Flickr/photos/dweickhoff/8232275923/>>.
- Faith Unlimited. Guava Tree Blossom. Digital image. Flickr. Yahoo, 25 May 2009. Web. 30 Nov. 2013. <<http://www.Flickr/photos/68441711@N00/3567129510/in/photolist-6rdtjW-6BPbE2-9EpQc5-9EpQq7-9EmUNK>>.
- Haverkamp, Arjan. Philippine spotted deer: Caroline. Digital image. Flickr. Yahoo, 20 Oct. 2009. Web. 1 Dec. 2013. <<http://www.flickr.com/photos/ajhaverkamp/4029132367/>>.
- Hernandez, Carolina G. “Philippines.” Encyclopedia Britannica Online. Encyclopedia Britannica, 14 Nov. 2013. Web. 11 Dec. 2013. <<http://www.britannica.com/EBchecked/topic/456399/Philippines>>.

- Hernandez, Carolina G. "Philippines." Encyclopedia Britannica Online. Encyclopedia Britannica, 14 Nov. 2013. Web. 11 Dec. 2013. <<http://www.britannica.com/EBchecked/topic/456399/Philippines>>.
- Jakabek, Benjamin. Philippine Sail-finned Lizard, Taronga Zoo. Digital image. Flickr. Yahoo, 12 Aug. 2010. Web. 1 Dec. 2013. <http://www.flickr.com/photos/brj_bringin_the_shit_up_in_here_bitches/4933717530>.
- Jimenez, Eric. Tarsier. Digital image. Flickr. Yahoo, 13 Nov. 2011. Web. 1 Dec. 2013. <<http://www.flickr.com/photos/ericjimenez87/6362246203>>.
- Kockzy, Trn. Fern. Digital image. Flickr. Yahoo, 1 May 2012. Web. 30 Nov. 2013. <<http://www.Flickr/photos/andrejtrnkoczy/7135095603/>>.
- L, Alan. Guava Blossoms. Digital image. Flickr. Yahoo, 28 May 2006. Web. 30 Nov. 2013. <<http://www.Flickr/photos/35188692@N00/155281029/>>.
- MacLang, John Paul. Palawan Forest. Digital image. The Travel Word. Yahoo, 29 Mar. 2011. Web. 30 Nov. 2013. <<http://www.thetravelword.com/2011/03/29/palawan-the-last-ecological-frontier-of-the-philippines/>>.
- Riall, Steve. Bubalus Arnee - Asian Water Buffalo. Digital image. Flickr. Yahoo, 3 Feb. 2013. Web. 1 Dec. 2013. <<http://www.flickr.com/photos/sriall/8521486462>>.
- Riall, Steve. "Bubalus Arnee-Asian Water Buffalo." Flickr. Yahoo!, 3 Feb. 2013. Web. 17 Mar. 2014.
- Stiefel, Klaus. Philippine Eagle. Digital image. Flickr. Yahoo, 25 Oct. 2011. Web. 1 Dec. 2013. <<http://www.flickr.com/photos/pacificklaus/6294001102>>.
- Tørrissen, Bjørn Christian. A chevrotain / lesser mouse-deer (*Tragulus kanchil*) roaming almost freely about in the Singapore Zoo. Digital image. Wikimedia Commons. Wikipedia, 8 Jan. 2012. Web. 1 Dec. 2013. <<http://bjornfree.com/galleries.html>>.
- Waters, Tim. Strongylodon Macrobotrys (Leguminosae: Papilionoideae). Digital image. Flickr. Yahoo, 28 Mar. 2004. Web. 30 Nov. 2013. <<http://www.Flickr/photos/tim-waters/95252686/>>.
- "Wildlife Survival Fund Visayan Warty Pig Conservation Programme (VWPCP)." Woodland Park Zoo. WPZ, n.d. Web. 01 Dec. 2013. <<http://www.zoo.org/page.aspx?pid=1761>>.
- Yeo, Kok Leng. Philippine Flying Lemur (*Cynocephalus Volans*). Digital image. Flickr. Yahoo, 2 Nov. 2007. Web. 1 Dec. 2013. <<http://www.flickr.com/photos/46274125@N00/2052076021>>.

DEMOGRAPHICS

- "A Country Study: Philippines." Philippines : Country Studies. N.p., n.d. Web. 22 Nov. 2013.
- "Central Intelligence Agency." The World Factbook. CIA., n.d. Web. 24 Nov. 2013.
- "Philippines." Encyclopedia Britannica Online. Encyclopedia Britannica, n.d. Web. 24 Nov. 2013.
- "Philippines." U.S. Department of State. U.S. Department of State, 17 Nov. 2010. Web. 24 Nov. 2013.

ECONOMY

- Hernandez, Carolina G. "Philippines." Encyclopedia Britannica Online. Encyclopedia Britannica, 14 Nov. 2013. Web. 11 Dec. 2013. <<http://www.britannica.com/EBchecked/topic/456399/Philippines>>.
- "Philippine Agriculture In Figures." Philippine Agriculture In Figures. Philippines Department of Agriculture Bureau of Agriculture Statistics, n.d. Web. 12 Dec. 2013. <<http://countrystat.bas.gov.ph/?cont=3>>.
- Republic of the Philippines. National Statistics Office. Labor Force Survey. By Carmelita N. Ericta. National Statistics Office, 10 Dec. 2013. Web. 12 Dec. 2013. <<http://www.census.gov.ph/content/employment-rate-estimated-935-percent-october-2013>>.

CULTURE

- Cabellon, Danny. "Photo of Jose Rizal." The Philippine Times. N.p., 26 July 2013. Web. 17 Mar. 2014. <<http://www.thephilippinetimes.com/monumental-plaque-of-jose-rizal-in-beausoleil/>>.
- Hernandez, Carolina G. "Philippines." Encyclopedia Britannica Online. Encyclopedia Britannica, 21 Jan. 2014. Web. 15 Mar. 2014. <<http://www.britannica.com/EBchecked/topic/456399/Philippines>>.
- O'Connor, Brennan. "Martial Arts Odyssey: MAO Shan State Photograph." Wikipedia. Wikimedia Foundation, 18 June 2008. Web. 17 Mar. 2014. <http://en.wikipedia.org/wiki/Martial_Arts_Odyssey>.
- Penny, Jason, MCC. "Still Image: 130318-N-FI367-077." DefenseImagery.mil. US Department of Defense, 21 Mar. 2013. Web. 17 Mar. 2014. <<http://www.defenseimagery.mil/imagery>>.

html?&guid=ee0c27527c208143a10bdfa358ef824e100afd6c>.

"Philippines." UNESCO World Heritage Centre. United Nations Educational, Scientific, and Cultural Organization, n.d. Web. 12 Dec. 2013. <<http://whc.unesco.org/en/statesparties/ph>>.

Sabrina. "Church of San Augustin, Paoay, Philippines." Web log post. Globetrotter's Wanderlust. N.p., n.d. Web. 17 Mar. 2014. <<http://globetrotterswanderlust.blogspot.nl/2014/01/church-of-san-augustin-paoay-philippines.html>>.

PRECEDENTS

"Assignment 4_Marika Alderton House." Hanjin2011. N.p., 9 Nov. 2011. Web. 21 Mar. 2014. <<http://hanjin2011.wordpress.com/2011/11/09/the-house-as-an-environmental-filter/>>.

"CCA Architecture." Peter Anderson Builds the Future Classroom -. N.p., 12 Sept. 2013. Web. 13 Dec. 2013. <<http://arch.cca.edu/?p=4257>>.

Children sitting in the Marika-Alderton House. Digital image. N.p., n.d. Web. 13 Dec. 2013. <https://lh5.googleusercontent.com/-58uLuLVvvNQ/TYE9SKfjdrI/AAAAAAAAAB8/dUJCdA_CC9U/s1600/MHouse07.jpg>.

"Collège Cœur Immaculé de Marie | Open Architecture Network." 2014. Accessed June 12. <http://openarchitecturenetwork.org/node/10020>.

Craig Owen Studio 5. Marika-Alderton House. Digital image. Dab310 The Architectural Apprenticeship. N.p., n.d. Web. 13 Dec. 2013. <<http://craigowendab310.files.wordpress.com/2011/03/marikarear.jpg>>.

"Design Against the Elements Green Design Award Winner / Nikola Enchev and Stefan Vankov." 2014. ArchDaily. Accessed June 12. <http://www.archdaily.com/108903/design-against-the-elements-green-design-award-winner-nikola-enchev-and-stefan-vankov/>.

Durkin, Luke. Facade of Kakadu Visitor Centre, designed by Glenn Murcutt. Digital image. Wikimedia Commons. Wikipedia.com, 10 June 2012. Web. 13 Dec. 2013. <http://en.wikipedia.org/wiki/File:Facade_Slats_Kakadu_NP_Visitor_Centre_Glenn_Murcutt.jpg>.

"Earthen School Tipu Sultan Merkez, Jar Maulwi, Pakistan." Sustainable by Design 2050. N.p., n.d. Web. 21 Mar. 2014. <<http://www.sbd2050.org/project/earthen-school-tipu-sultan-merkez-jar-maulwi-pakistan-75/>>.

Eschaf. Bowali Visitor's Center. Digital image. Panoramio. N.p., 11 Apr. 2008. Web. 13 Dec. 2013. <<http://www.panoramio.com/photo/9293959>>.

"Green School, Bali | Open Architecture Network." 2014. Accessed June 12. <http://openarchitecturenetwork.org/projects/greenschoolbali>.

Heringer, Anna. "Meti School." Meti School. Open Architecture Network, Architecture for Humanity, n.d. Web. 13 Dec. 2013. <<http://openarchitecturenetwork.org/projects/metischool>>.

"Ibuku Bamboo Architecture and Design." Ibuku. N.p., n.d. Web. 21 Mar. 2014. <<http://ibuku.com/>>.

Schertzer, Fanny. Tjibaou cultural center, centre culturel Tjibaou Nouméa, New Caledonia. Digital image. Wikimedia Commons. Wikipedia.com, n.d. Web. 13 Dec. 2013. <http://en.wikipedia.org/wiki/File:Tjibaou_cultural_center-Commons_transfer_2012-11-20.jpg>.

Sinclair, Cameron. "TYIN Tegnestue: 4 Projects." Open Architecture Network. Architecture for Humanity, n.d. Web. 13 Dec. 2013. <<http://openarchitecturenetwork.org/projects/5297>>.

Tjibaou Cultural Center. Digital image. Blogspot. Google, n.d. Web. 13 Dec. 2013. <http://2.bp.blogspot.com/-79_YvUuV4Cc/TZp_6J9Y29I/AAAAAAAAACI/6yzmRDEFqRo/s1600/Jean+Marie+Tjibaou+Cultural+Center_15.jpg>.

FINAL FORM DEVELOPMENT

Pondoyo, Gregor Alfonsin C. "The Filipino Family." Scribd. N.p., 3 Dec. 2011. Web. 19 Mar. 2014. <<http://www.scribd.com/doc/74642455/The-Filipino-Family>>.

Martin, Bob. "The Group Dynamic in the Home." Live in the Philippines. N.p., 28 Apr. 2009. Web. 19 Mar. 2014. <<http://liveinthephilippines.com/content/the-group-dynamic-in-the-home/>>.

"Child Labour." International Labor Organization. United Nations, n.d. Web. 19 Mar. 2014. <<http://www.ilo.org/manila/areasofwork/child-labour/lang--en/index.htm>>.

"Philippines." HumanTrafficking.org. Academy for Educational Development, n.d. Web. 19 Mar. 2014. <<http://www.humantrafficking.org/countries/philippines>>.