JOURNEYMAN INTERNATIONAL, INC.

DESIGN AND CONSTRUCTION PROPOSAL

GLOBAL OUTREACH MISSION DENTAL FACILITY

INDEPENDENCE, BELIZE

OUR VISION

As entrepreneurs and trade professionals, we acknowledge the radical humanitarian needs faced in developing countries. More importantly, we recognize our ability to step up and provide relief. At Journeyman International we are committed to designing and constructing sustainable buildings in developing nations around the globe. With no cost to the selected community, we implement this responsibility in order to serve developing parts of the world and, in turn, do our part to restore the declining global environment.

The specific purpose of this corporation is to provide humanitarian relief in developing nations through the implementation of sustainable design and construction projects. Journeyman International provides the framework and expertise to assist humanitarian ministries and local governments with sustainable, affordable, and cutting-edge green-building fundamentals. Our primary mission is to develop sustainable and reputable model facilities that can be repeatedly implemented worldwide.

WHO IS JOURNEYMAN INTERNATIONAL?

Journeyman International is a by-product of a vision. Our vision is to responsibly integrate sustainable design and construction methods with humanitarian projects worldwide. When implemented appropriately, sustainable methods prove financially feasible, socially acceptable (among any culture), and environmentally responsible. At the point in time when green construction benchmarks prove beneficial among impoverished cultures, we will see the Green Revolution spreading throughout developing nations. Additionally, we intend to provide design and construction services for humanitarian relief organizations. As a green construction based organization, we offer LEED construction consultation along with an appropriate design framework for relief organizations planning new infrastructure.

Journeyman International is a charity based public benefit organization with state and federal tax exemption status. Through the support of sponsorships and fundraising, we aim to provide medical facilities (dental, eye care, immediate care, etc.), social facilities (counseling centers, youth facilities, homeless shelters, orphanages, etc), educational infrastructure (day cares, schools, universities) and religious facilities (churches).

Concurrently, we are developing a Journeyman International Associate program through our community network (located at Journeymaninternational.org). The associate program coordinates volunteers, professionals, and missionaries who are passionate about our cause, and who desire to be actively involved. Associates will have the ability to collaborate with fellow associates, post progress updates, track project accounts and access project details. Additionally, Journeyman International will update associates via newsletters, emails and web postings. The staff and Journeyman International will organize labor teams, coordinate accommodations and direct associates in the field.

table of contents

part one

context


Road
Access

project summary

what

Architectural design, engineering and construction of a fully functional dental clinic including a multi-use housing unit to support the community and the work of Global Outreach Mission in Belize.

where

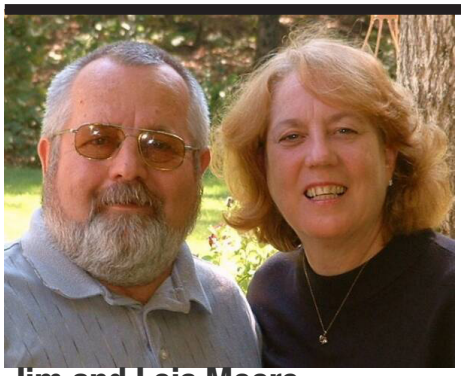
Independence, Belize. Population: ~3,000 (2000 est.) Independence is one of the major towns and transportation hubs along the coast in southern Belize.

INDEPENDENCE, BELIZE

project background

The Independence Dental Clinic is a joint venture by Journeyman International and Global Outreach Mission. Global Outreach Mission (GOM) is a Christian missionary organization who has had much experience working in Belize. Two of the missionaries, Jim and Lois Moore, identified the need for a dental clinic in the coastal town of Independence in Southern Belize. In order to receive dental care, the local Belizeans currently have to drive for over an hour outside of Independence. John Look, another missionary from GOM with experience as a professor of dentistry at the University of Minnesota has focused his attention and resources to realize this need.

project team



Jim and Lois Moore

John Look

Global Outreach Mission

JI Team

Daniel Wiens and Steve Shimmin

Belize is a developing nation in Central America known for having the second longest barrier reef in the world, exotic flora and fauna in the tropical rainforest, ancient Mayan ruins, and a multicultural tourist friendly population. Belize is the only Central American country where English is the official language due to its history as a British colony. The rich natural beauty and widespread fluency in English has made Belize a popular travel destination for tourists from the United States and other western nations. Tourism and agriculture are Belize's most profitable industries and account for much of its wealth. However, Belize is still very much a developing nation with a third of the population living below the poverty line. Our goal is to implement our backgrounds in architecture, construction, sustainability, and dentistry to lift the quality of life of Southern Belize and serve as a catalyst for further development in the community.

about Belize








program

Clinic Operations

The clinic will be maintained by the efforts of donations as well as charging minimal fees for services. Dentists and personnel will not earn from revenue, rather 100% of money taken in will go to the maintenance of practice and facilities, purchasing supplies and regulating the upkeep of the building itself. The beauty of the Green building movement is the fact that sustainability is an inherent part of its structure. There will be decreased utilities used and less economical and environmental impact as a result of employing LEED™ building techniques.

Design Objective

The desired outcome for this project is the completion of the dental clinic in Independence, Belize, housing the dentists and their families as well as being the primary location for the residents of Independence and surrounding areas to seek dental care. This evaluation will be based on the degree of completion of the project and the time it was accomplished. The project manager will evaluate the extent to which objectives were successfully completed.

Content

The building is two stories high and roughly 3,400 square feet. The first floor is designed for the dental clinic and with lab and operating rooms flanking a central reception/lobby space. The lab and operating rooms are currently designed to be air conditioned. The second floor is a residence that can be adapted for use by a family or a larger short term missions team of six to ten people.

FLOOR 1 DENTAL CLINIC

RECEPTION 725 SQFT
OFFICE 226 SQFT

INCLUDES SPACE FOR EQUIPMENT AND STORAGE

LAB 214 SQFT
3 OPERATION ROOMS 196 SQFT, 172 SQFT, 221 SQFT

RESTROOM 55 SQFT

COMMUNITY EVENT ROOM 225 SQFT

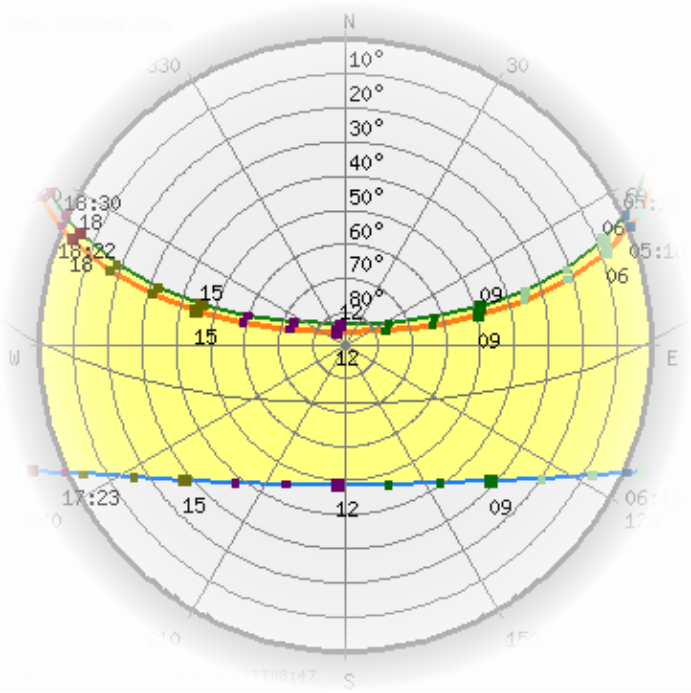
FLOOR 2 PRIVATE RESIDENCE

DINING ROOM/KITCHEN 284 SQFT
LIVING ROOM 370 SQFT

DOUBLE BEDROOM 150 SQFT
DORM ROOMS (X2) 236 SQFT, 212 SQFT

3/4 BATH 44 SQFT
FULL BATH 50 SQFT

climate



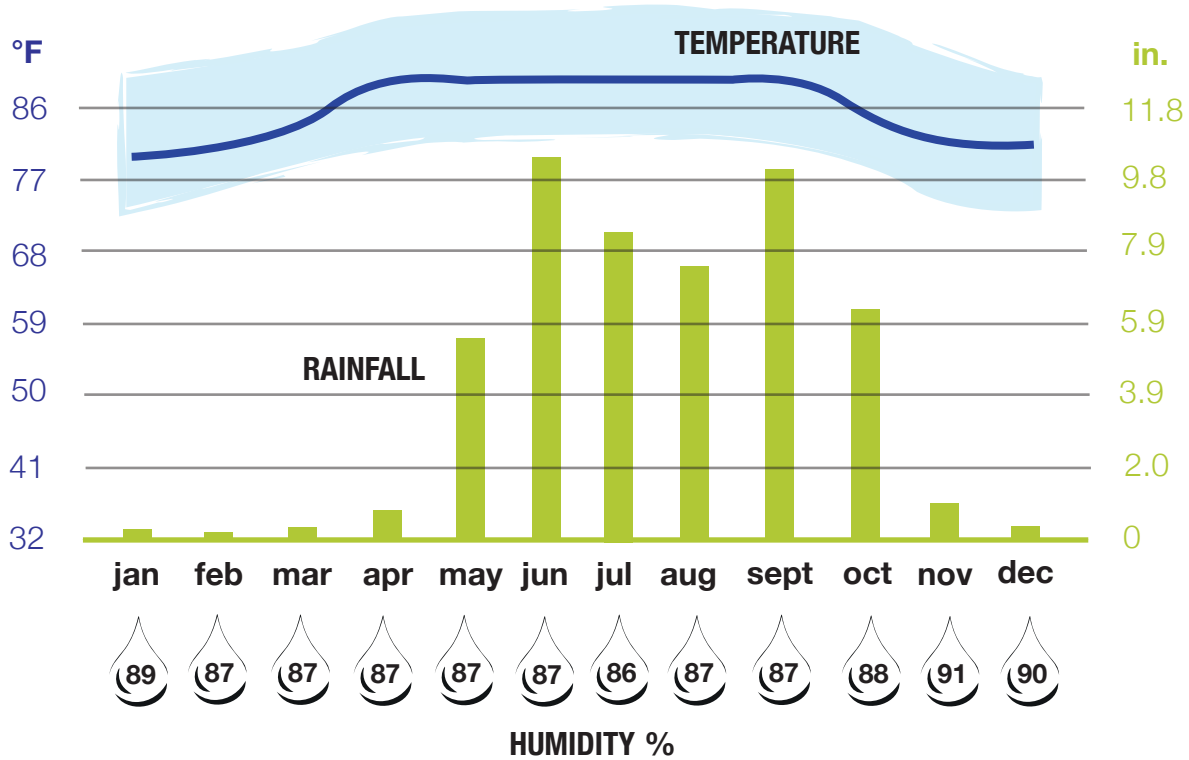
sun path diagram

Average Temperature Ranges from 72 °F in the dry season to 88 °F in the wet season

Average Rainfall Ranges from 50 to 200 inches per year (higher rainfall in South Belize)

Dry Season December - May

Rainy Season June - November

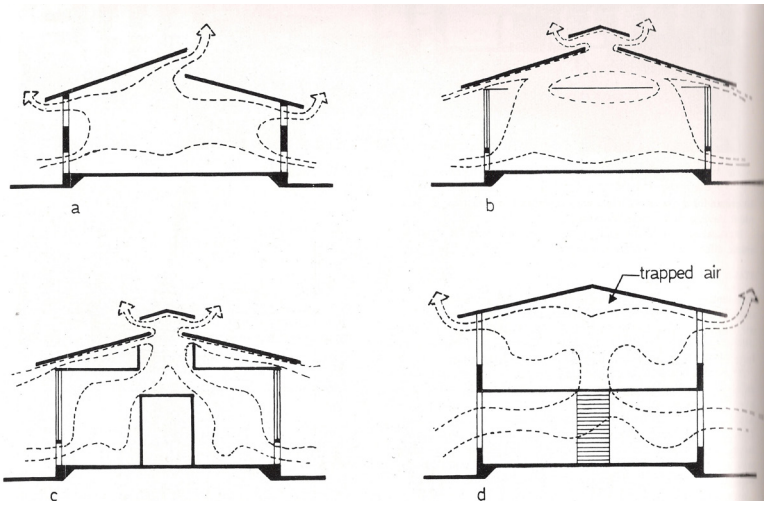


climate data

tropical design strategies

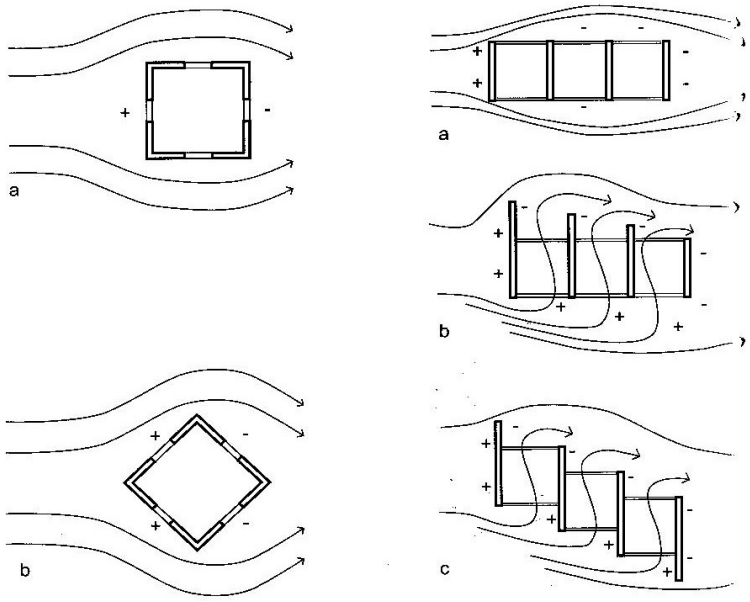
Building in the Tropics

Tropical climates are characterized by hot temperatures year-round, high levels of humidity, and a lot of precipitation. As a result, buildings in tropical climates are designed to shelter people from the elements as well as provide a relief from the intense heat. Providing shade from the sun and moving air through the building are the most effective means for cooling a building naturally. There are many successful vernacular strategies used to accomplish this such as using a light building envelope, filtering wind through the building, large ceilings to create a stack effect, shading the building with a large roof and trees, raising the building off the ground and minimizing direct sun exposure through proper orientation along the east-west axis.



shade and airflow

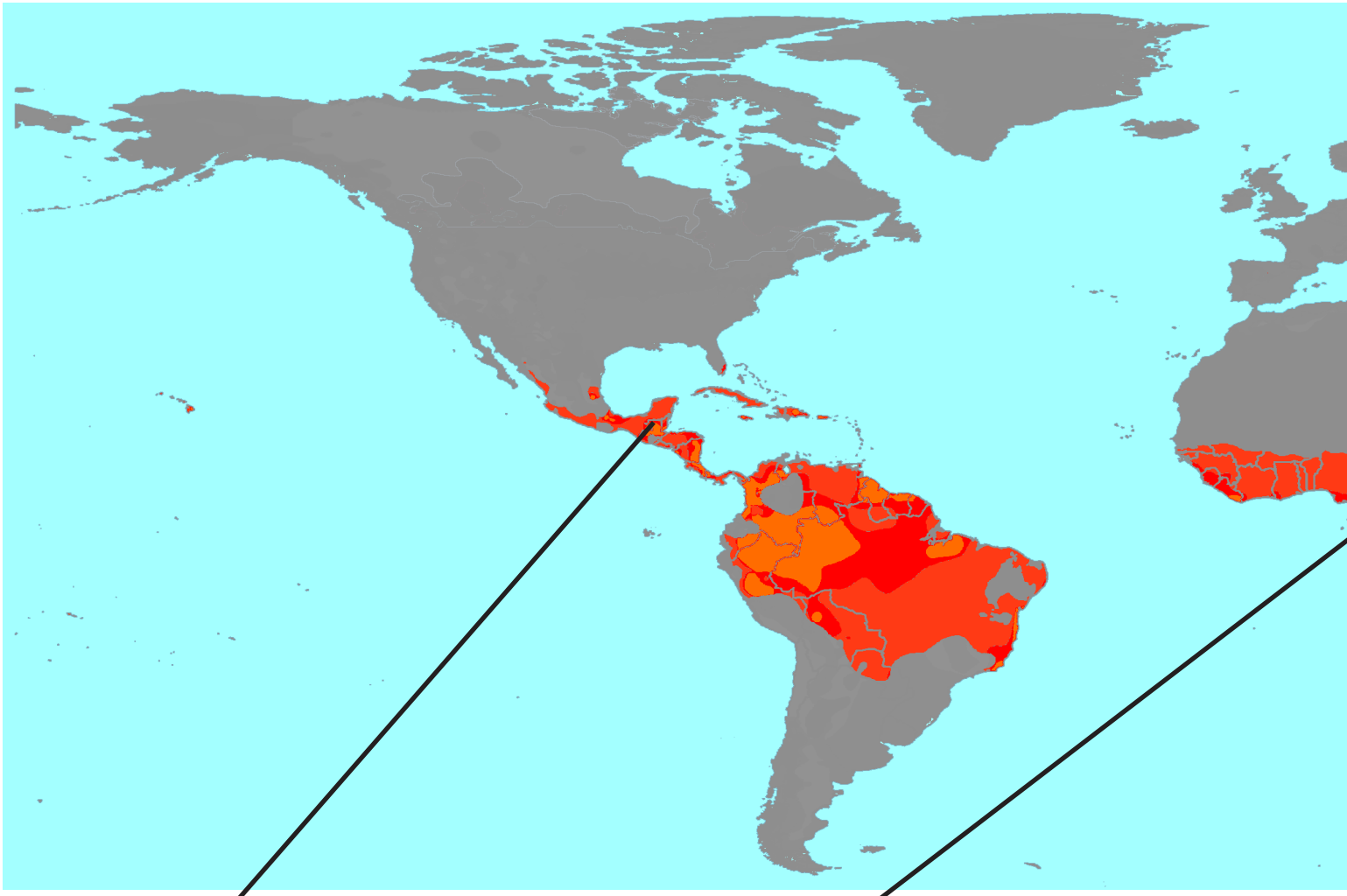
- Light building envelope
- Make use of wind for natural ventilation
- High Ceilings - “Stack Effect” to create flow of hot air from floor to ceiling
- Trees and landscaping for shade
- Building raised off ground
- Minimize direct sun exposure



proper orientation to site

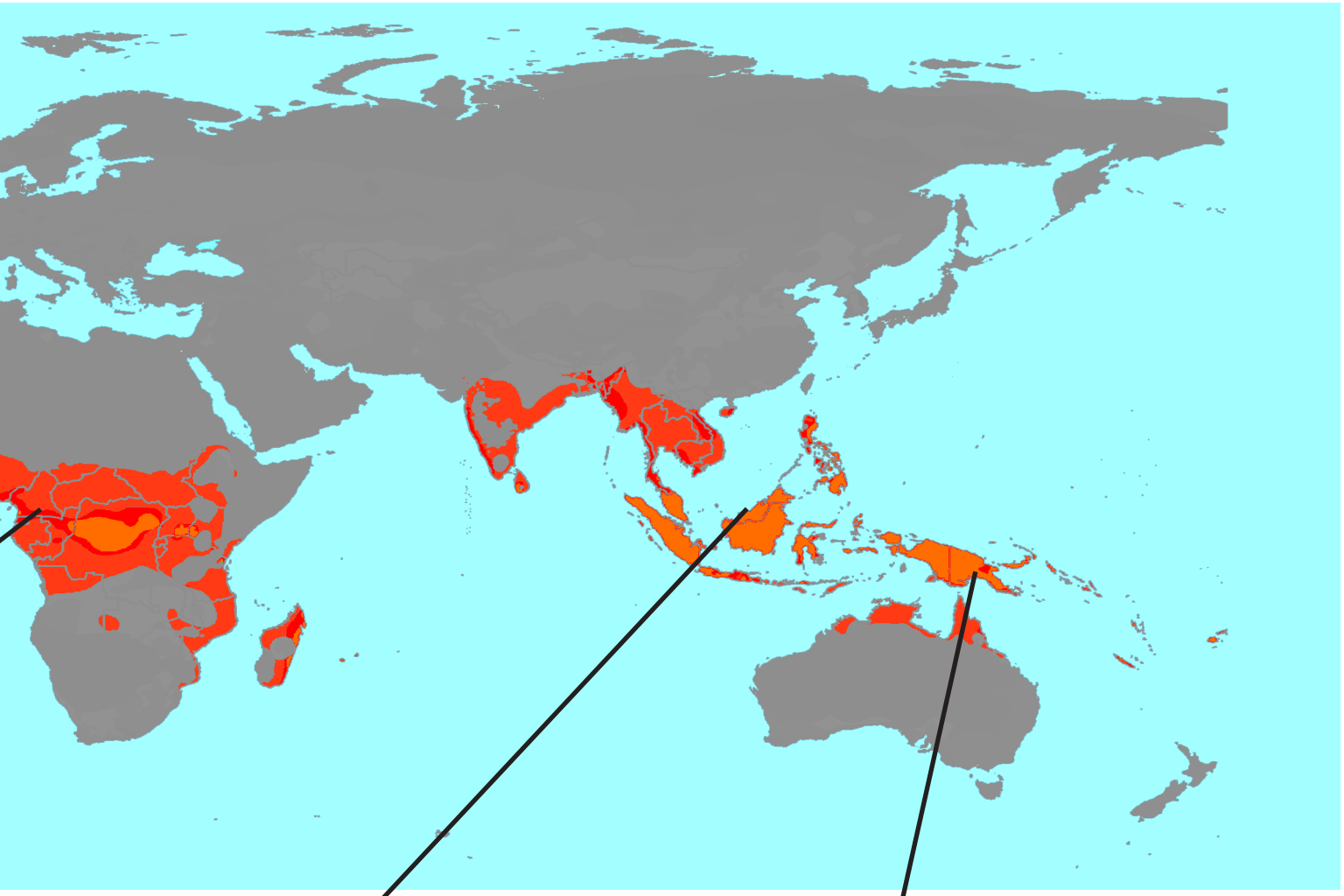
- Solar - long sides face North/South
- Wind - elongated along prevailing wind direction

tropical climate regions



THE CARIBBEAN

CENTRAL AFRICA



INDONESIA

SOUTH PACIFIC

“Intensive ventilation is also necessary to maintain and protect buildings in the warm and humid climatic zone from deterioration by water from perspiration. The constant high relative air humidity means that, in contrast to the warm and dry climatic zone, the dew-point temperature is generally very close the air temperature. Even slight differences in temperature between air and surface temperature of a building’s structure, or of the fittings, can lead to the temperature falling below dew point, causing condensation on the surfaces as well as attack by algae and the growth of mold. Therefore all of the building elements, as well as the fittings, must be constantly well aired. Above all, cavities or voids should not be created unless they can be adequately ventilated.”

vernacular tropical buildings

Cameroon

"...the building elements must be as light as possible and should store no or only very little heat, as the storage of heat dampens the course of the surface temperatures and shifts its peak temporally compared with air temperature, thereby increasing the danger of condensation. Thus, for the warm and humid climatic zone the most suitable mode of construction is lightweight construction…However, particular attention must be paid to providing sufficient thermal insulation, especially in those parts of the building that are exposed to direct sunshine. Where possible, these building parts should be constructed of two separate , well-ventilated layers. "

vernacular tropical buildings

Indonesia

vernacular tropical buildings

Belize

“The Caribbean is a microcosm within Latin America. The constellation of islands is both a factor of union and disunion. From the continent, people long to come to the magic world of secret and unknown islands. On the other hand, the hell of slavery and the age-old eradication of transplanted Africans came from the continent. Hence the latent contradictions: the isolation generated by insularity; the superposition of races and social groups; the desire to be integrated into a universal culture. For this reason, the definition of the Caribbean as a crossroads implies a persistent necessity of confrontation of the inhabitants of the islands with the universal avant-gardes in order to form their own identity.”

vernacular tropical buildings

The Caribbean

"Tropicalist architecture has emerged in great part as a response to two major challenges that have arisen since Second World War. The first is post colonialism. Indeed, if there is a common feature unifying the highly diverse contries of the tropics – besides their climate – it is that they are, without exception, former colonies. Postcolonialism involves the issue of identity and otherness in a cultural world predetermined by a once hegemonic power. But the end of traditional colonialism has also meant that major architects are either local or commissioned by local clients and that, instead of being imposed top-down from a dominating outside power, architecture has, in principle, been allowed to eveolve out of a specific local cultural and economic conditions and meet the specific cultural and economic needs.

The second and more recent challenge is globalization…"

typical features of Caribbean architecture

- Shade and ventilation
- Covered walkways, porticos and entries
- Vernacular "primitive hut"
- Classical European style
- Blending of interior/exterior space
- Landscaped trees for shade
- Brise Soleil

part two

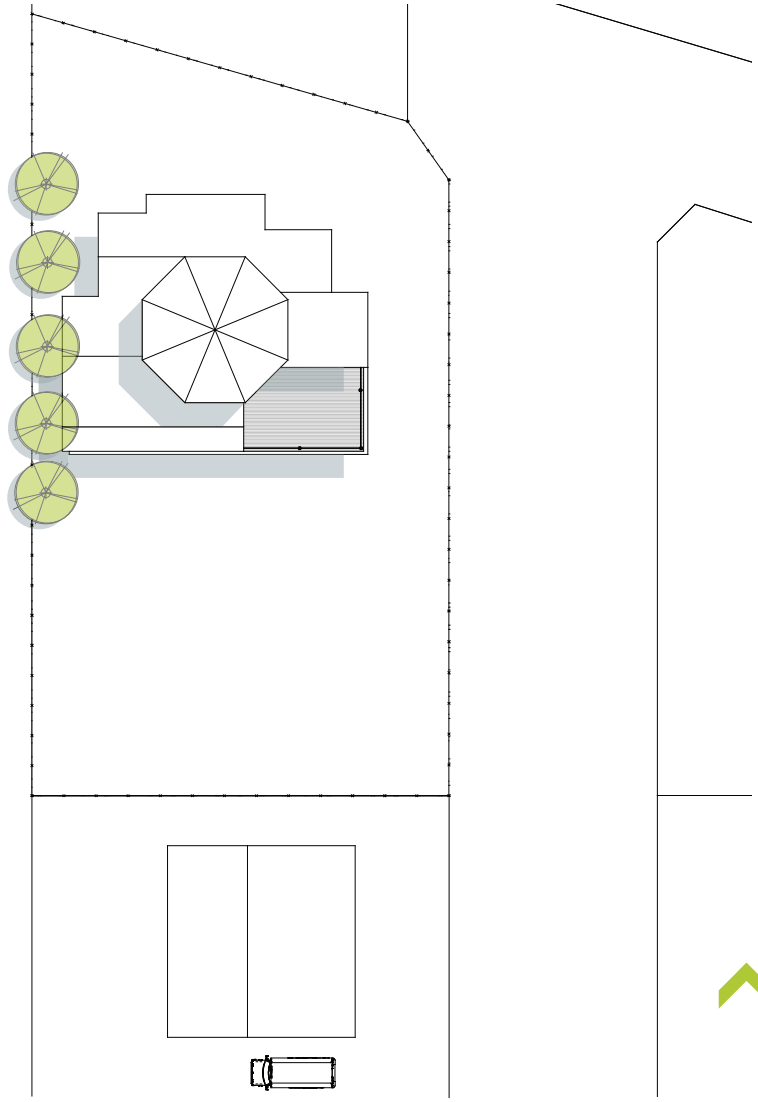
design

the site

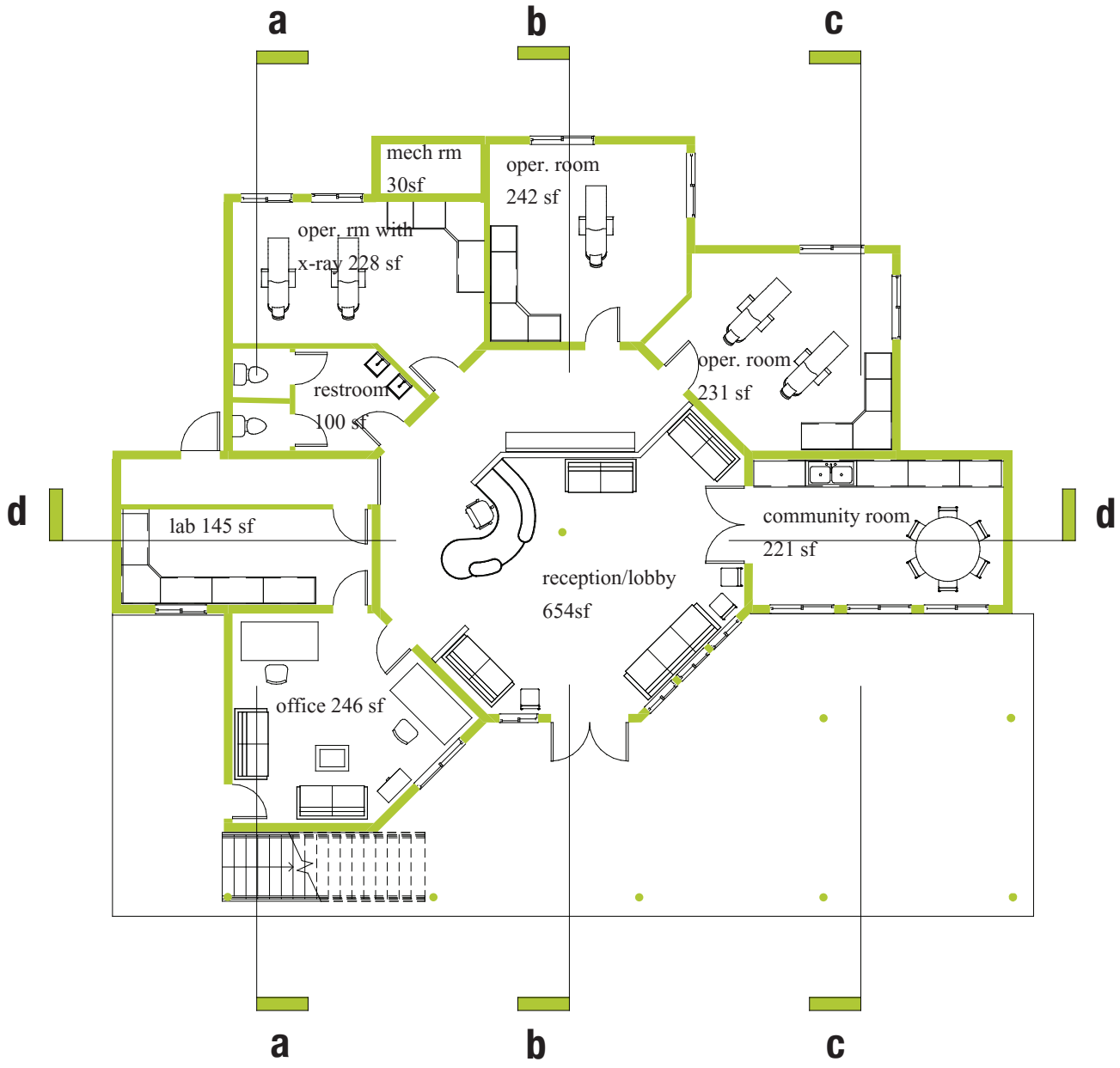
need something else here...

site information? what is surrounding it?

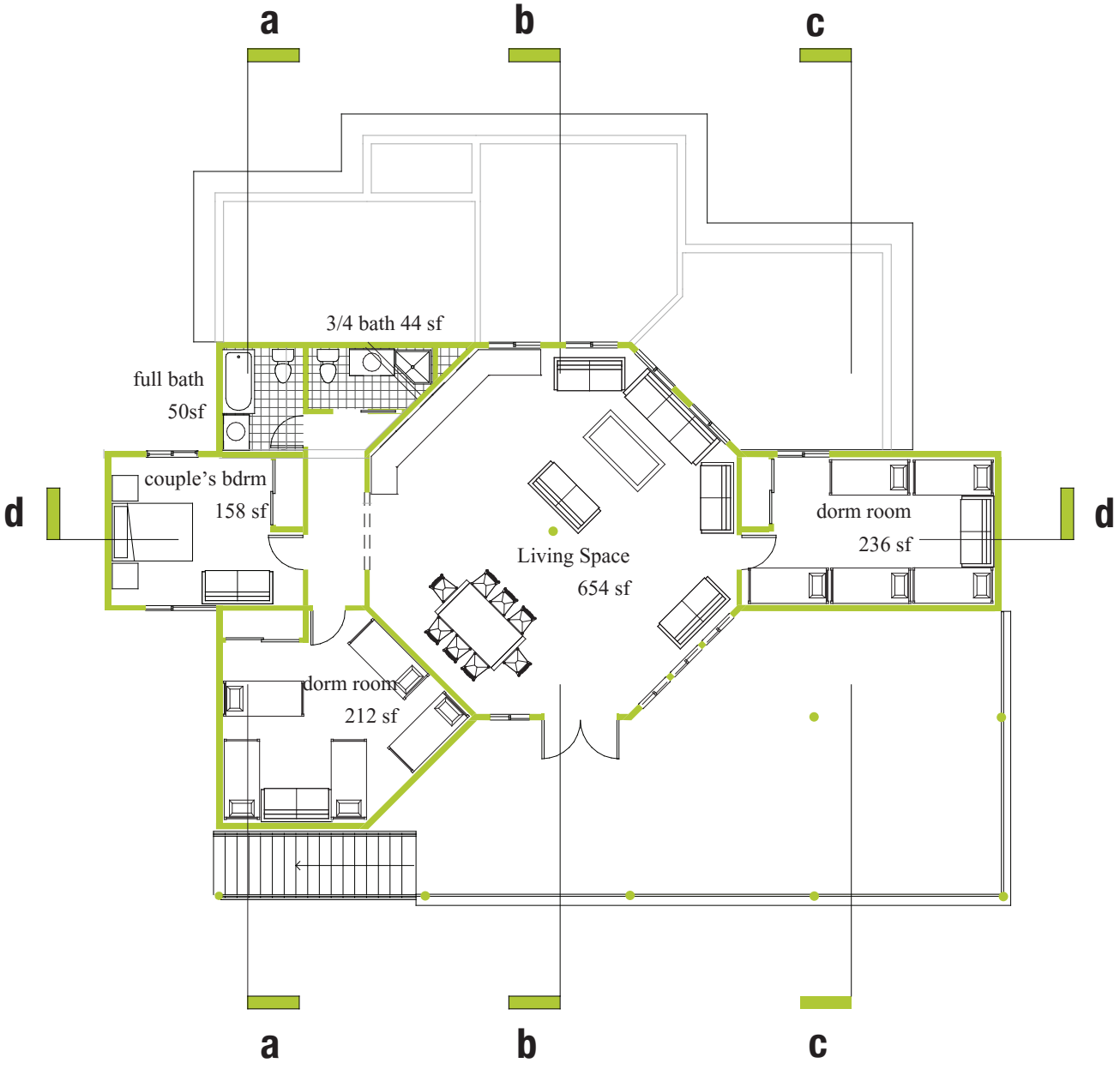
site plan



floor plans

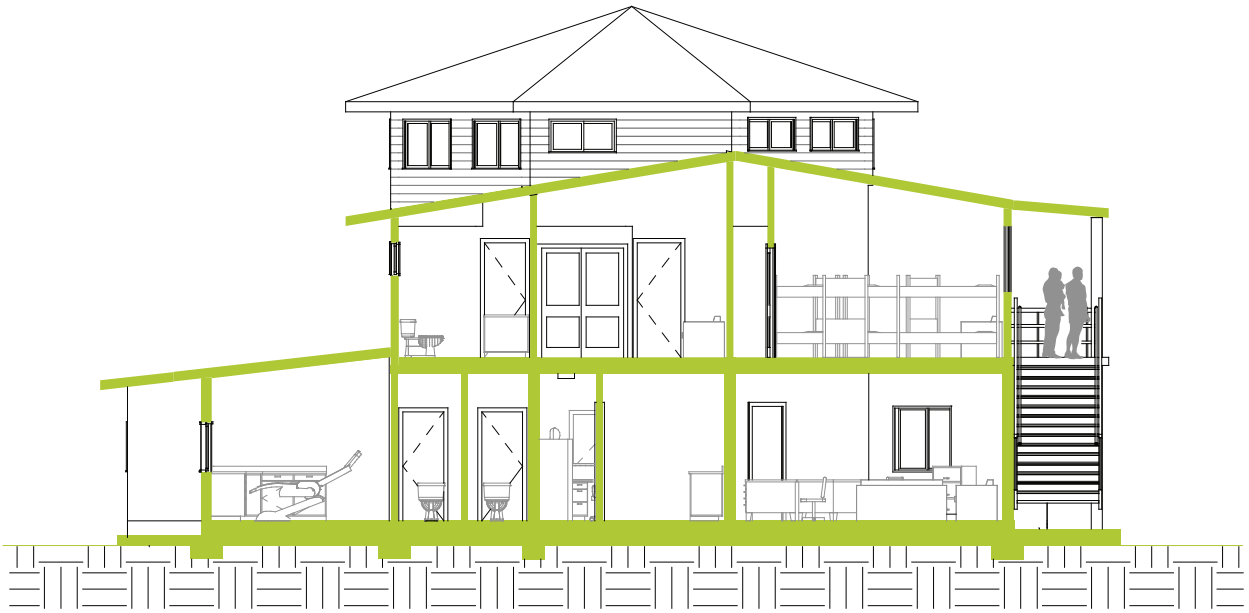


first floor plan



second floor plan

sections



section a-a

section c-c

section b-b

section d-d

elevations

north elevation

east elevation

south elevation

west elevation

design strategy

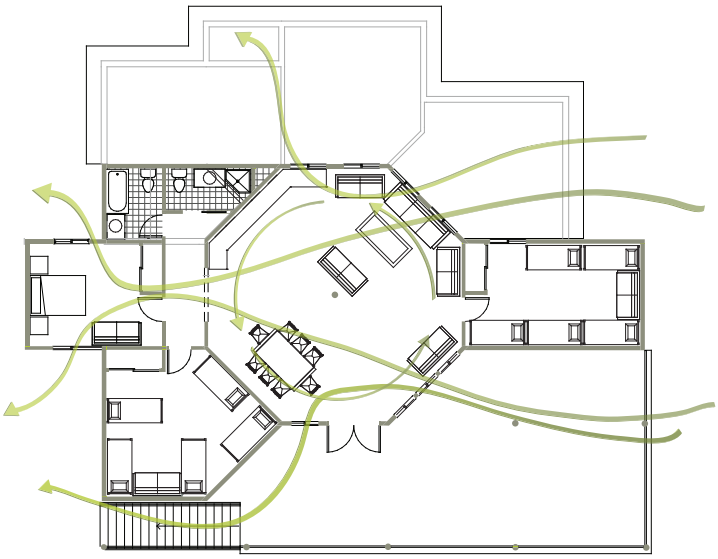
SUSTAINABILITY SUMMARY

The larger non air-conditioned sections of the building use a variety of natural cooling techniques to keep the building cool during the warm seasons. Strategically placed windows and openings promote cross breezes through the building. The building is oriented along the East-West axis with the longer sides of the building facing the North and South. Overhanging balconies and a large roof shading the building limits the direct sunlight hitting the walls. The air conditioned rooms are on the north side of the building which minimizes the direct sunlight hitting the walls and saves on energy costs. These rooms are enclosed by thicker more insulated walls to minimize heat gain. When cooler weather is present, these rooms have operable windows that can be opened to allow for cross breezes. The non air conditioned rooms are enclosed by lighter wood stud walls with many operable windows to encourage maximum airflow.

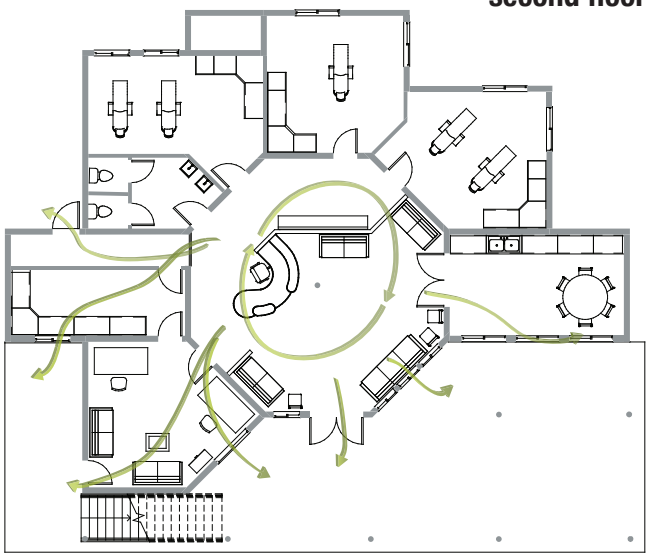
natural ventilation & stack effect

WIND

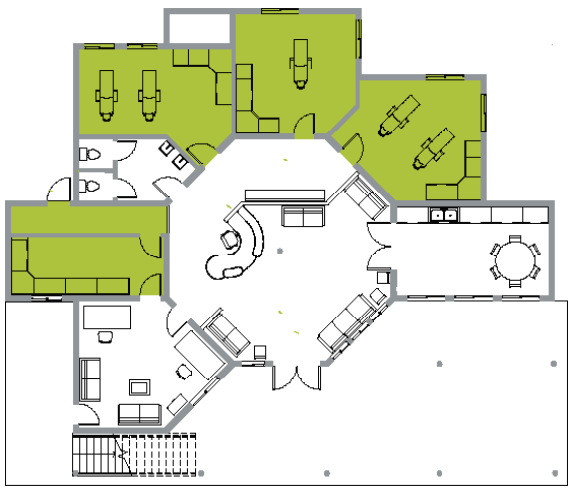
The best way to naturally cool a building in a hot and humid climate is to allow breezes to move through the building. The two best ways for this to happen is to 1)have a very light building frame that allows breezes through the building and 2) Control and capitalize on the benefits of the wind. Using the laws of physics, wind can be accelerated through a building by having large intake openings and small outlets. The prevailing wind on our site blows from the East and sometimes the North. The building orientation allows the wind to blow from East to West throughout the length of the building. This clinic requires a clean, safe and sealed environment. Ergo, we will have an operable (opening and closing) natural ventilation system.



second floor



first floor

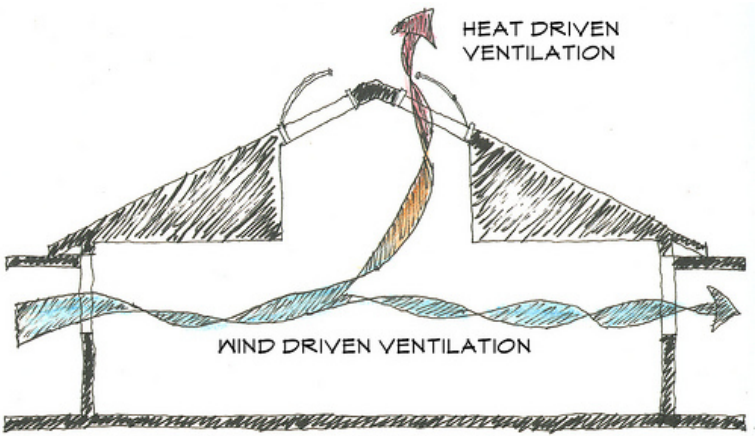


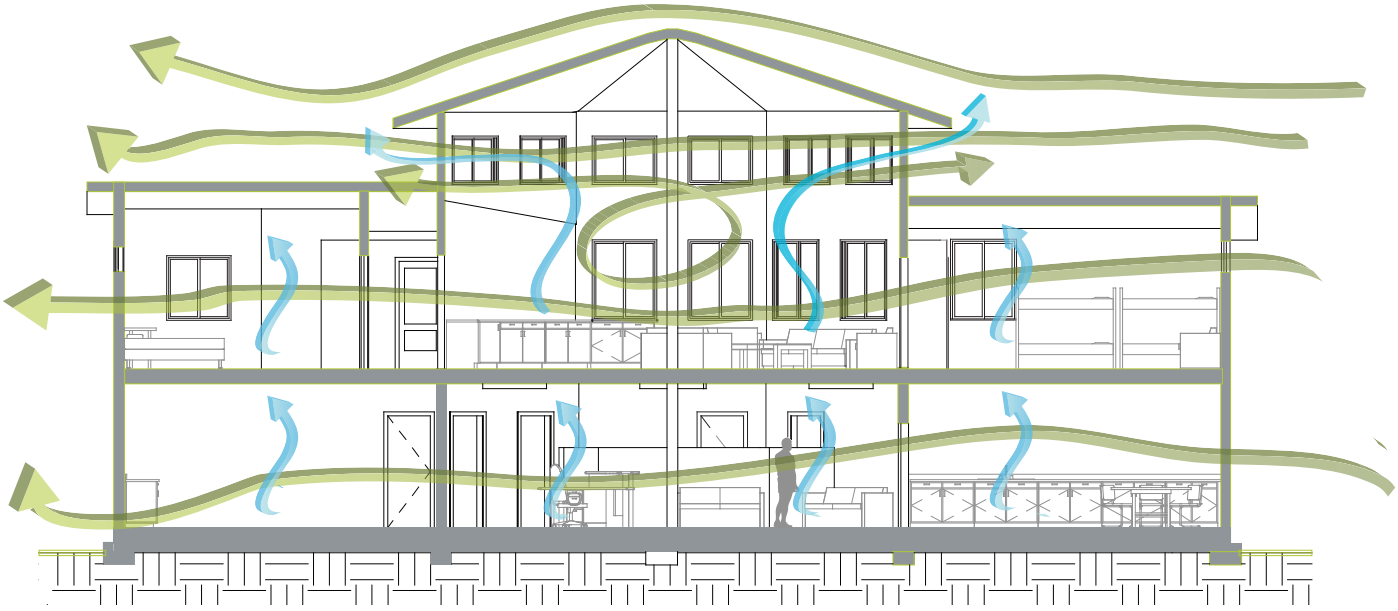
AIR CONDITIONING

Parts of the dental facility will have air conditioned rooms for the operating rooms, bathroom and lab. These rooms will be on the north side of the building and protected against direct sunlight. The more protected these rooms are from the sun will minimize the cost of cooling. The lobby, office and reception on the south side of the building will not have air conditioning but will employ sustainable natural cooling techniques.

VENTILATION IN THE TROPICS

“For human beings the sultry climate of the warm and humid zone is the most difficult and is acceptable only if there is sufficient air movement. Optimal climatic conditions, can therefore only be ensured through the use of forced air-conditioning, that is, by means of cooling and dehumidifying the air coming from outside – an energy-intensive and expensive operation. However, with correct climatically adjusted design it is nevertheless possible to achieve a tolerable room climate in warm and humid climates using only natural climate control, as many traditional buildings show. The primary design rule is always to ensure sufficient air movement in the living areas.”





“To cool down buildings naturally the most economic method is to lower the temperature of the air before it enters, using water or vegetation, and also by speeding up the air velocity when it enters the building using some method that makes use of differences of air pressure. These could be forms of monitors that capture the air circulating on roof surfaces and introduce it into the interior of the building, accelerating it in the process, and then expel it upwards. At the same time this flow of air around the roof surfaces draws in the air entering via the windows and removes it through the opposite end of the monitor.

Wide eaves, canopies and sunshades will always reduce the amount of light penetrating the interior, which means it is important to compensate for this loss by creating apertures in the roof that will allow light to enter. As is known, in the northern hemisphere light coming from the north is the most consistent, making smaller contrasts of light and shadow, compared to light coming from a southerly direction. This makes its use ideal for achieving an even illumination throughout interior spaces.”

PLUMBING

The north face of the building will be the only “wet” wall. All of the bathrooms, lab and kitchen will be along this wall. Stacking all the plumbing on this wall will minimize construction costs and labor.

RESIDENCE

The second floor of the building will be a 3 bed/1 bath residence suited to house a missionary doctor and his/her family or a group of 6-8 people. The residence will not be air conditioned. Because it is on the 2nd floor, wind will be faster than on the ground level. Proper shading, a large roof, natural ventilation, and fans will be used to cool the residence. The walls will feature a light wood construction with many waterproof air intakes. There will also be a large deck that serves as shading for the ground level. Parts of the deck will be shaded by the roof.

ROOF

The roof will be a large tall structure to promote the “stack effect” The stack effect describes how hot air rises and exits a building, thus cooling the space people occupy. Combing this with wind blown ventilation can be very effective at cooling the building naturally. The roof will also provide shade on the south side to minimize direct sunlight heating the walls.

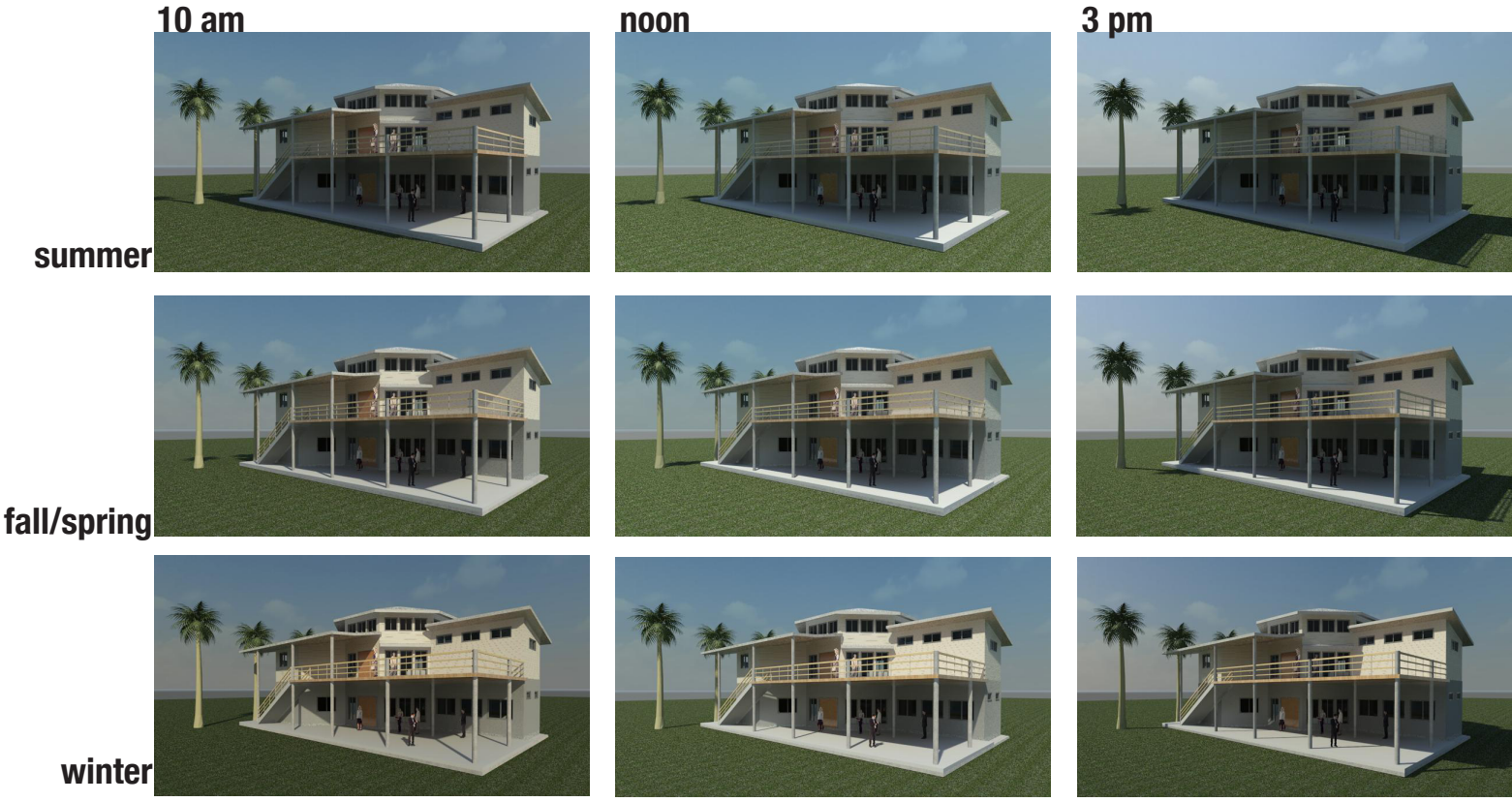
sun studies

SOLAR ORIENTATION

Building is oriented with “short” sides facing East/West and “long” sides facing North/South. This minimizes the direct light hitting the building. There is no direct sunlight that hits the north side of the building and the southern side can be easily shaded with overhangs. It is very difficult to shade the low direct sunlight in the morning and evening on the east and west sides of the building. Less direct sunlight on the building will keep it cooler than if it has a lot of sun exposure.

PUBLIC SHADED SPACE

There will be a large covered shaded space on the south side of the building. This will be a pleasant outdoor shaded space for people to enjoy. This can be used as an extension of the waiting room inside or can support other community events hosted by the clinic.



MATERIALS

The A/C parts of the dental clinic will be made of CMU masonry construction and clad in stucco. This will provide adequate insulation for the cooled rooms as well as a strong structure to support the second floor. The rest of the building will be made of a light wood framing. Roof will be constructed with the common Belizean sheet metal roofing.


TAXI
Belize
PREVIA
SP D-0127
COMPANY LIMITED
Now serving the community at
2 locations in San Pedro Town
FINE JEWELRY

part three

construction

materials

WALLS & SIDING

Concrete Masonry Blocks
stucco
Wood Framing
Wood Siding
Painted Gypsum Board

DOORS & WINDOWS

Wood doors (with windows?)(5 exterior)
Hollow core wood doors (with windows?) (12 interior)
Screen door for residence entry
Sliding glass door for residence to back deck
Clearstory Hopper Windows (wood trim)
Slider Windows (wood trim

ROOF

Corrugated Steel Roofing
Dimensional Lumber framing

FLOOR

Tile/linoleum?/vinyl? flooring(Clinic)
Reinforced Concrete slab floor structure (Clinic)
Hardwood Floor (Residence)
Dimensional Lumber structure (Residence)

OTHER

Wood deck
8x8 lumber columns for roof structure


1X8X10
1X12X10
1X12X14
1X12X12

construction process

grading the site

digging the trenches for footings

pouring the footings

pouring the slab

building the walls

building the roof

part three

budgeting

construction scope & materials

Mechanical	A/C unit (Dental Rooms) Gutters
Electrical	Service Box Meter Base Main Breaker Wire Outlets and Switches Grounding Rod Conduits Generator Connection Lighting Fixtures Security System
Plumbing Fixtures	Toilets Sinks Bathtubs and Showers Water Heater (Natural Gas) Submersible Pump Pressure Tank (Dental)
Plumbing	PVC Septic Lines Hot and Cold Water Lines Compressed Air for Dental Natural Gas Lines Roof Drains
Exterior Finishes	Window and Door Trim Stucco Webbing or Chicken Wire Stucco Paint
Interior Framing	Light Gauge Steel Lumber Anchor Bolts and Tie Downs Blocking Insulation Drywall Drywall Mud and Tape GreenBoard (Wet Rooms)
Roof System	Steel Deck Roofing
Interior Finishes	Flooring Door and Window Trim Base and Crown Molding Cabinets ,Countertops and Shelving Texture Paint Doors, Windows, and Hardware

Equipment	Wheelbarrows Shovels, Rakes, Picks, etc. Concrete Trowels Scaffolding Hand Compactor Hand Tools Power Tools Vehicles for Compaction Concrete Truck Concrete Mixer String and Stakes Rebar Cutter and Bender Wire Cutters Ladders Remington Plumbing Equipment
Sitework	Fill Grading Compaction Drainage Underground Utilities Septic System
Foundation System	Trenching Gravel and Sand Compaction Formwork Tarping Reinforcing Steel (Rebar) Concrete Footings CMU Stem Wall Concrete Slab
Concrete Flooring System (2nd Floor)	Shoring Formwork Rebar Concrete Beams and Decking
Wood Flooring System (2nd Floor)	Lumber CMU Bolts Beams Blocking Plywood or Lumber Subfloor Hangers
Structural Wall	Layout CMU Wall System (Rebar and Mortar) CMU Waterproofing Door and Window Headers

Phase I construction

PHASE I

Phase I will complete the site and foundation systems and erect the four dental operating and laboratory rooms. This will allow Dental care to become immediately upon completion of Phase I. Exterior finishes will substantially be postponed until the completion of phase II.

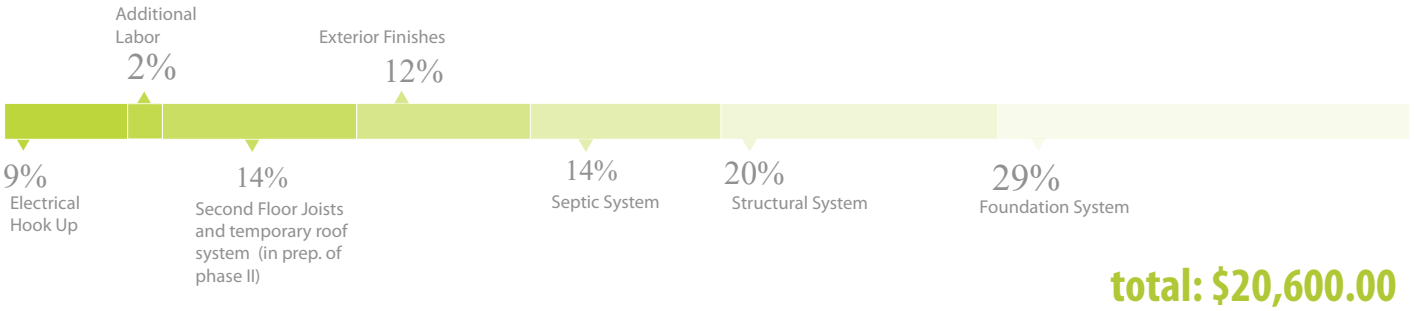
SCOPE

Structural Wall
Wood Flooring System
Plumbing
Plumbing Fixtures
Mechanical
Electrical
Interior Framing
Interior Finishes
Exterior Finishes

PHASE I EQUIPMENT

Wheelbarrows
Shovels
Compactors
Concrete Truck
Concrete Trowels
Scaffolding
Hand Tools *(Hammers, Chalk Lines, Trowels, Chisels, Cat's Paw, Metal Snips)*
Power Tools *(Skilsaws, Table Saw, Drills, Sawsall)*
Concrete Mixer
Rebar Cutter and Bender
Ladders
Remington *(Nail Driver)*
String
Drywall *(Trowels,Sanders)*
Painting *(Rollers, Brushes, Trays)*

First Story Shell Estimate 1600 sf



total: $20,600.00

ELECTRICAL HOOK UP	$1,800
ADDITIONAL LABOR	$500
SECOND FLOOR JOISTS	$2,900
EXTERIOR FINISHES	$2,500
SEPTIC SYSTEM	$2,800
STRUCTURAL SYSTEM	$4,100
FOUNDATION SYSTEM	$6,000

Key Estimate Considerations:

- Concrete roof system a possibility. Plywood formwork for such a system, although recyclable, is very expensive.
- With a CMU(brick) or insulated concrete (defined below), we can easily construction a second story flooring system with wood joists.
- We are looking into an insulated concrete structural system (walls). Cost data not yet determined
- The following shell estimate is preliminary, and viable to change with the design. It should however, provide a good baseline of construction costs for the clinic.
- NOT Included in the Shell estimate: Electrical and Mechanical Systems, Interior finishes, Appliances, Dental Furnishings, Second Story (Missionary housing)

Phase II construction

PHASE II

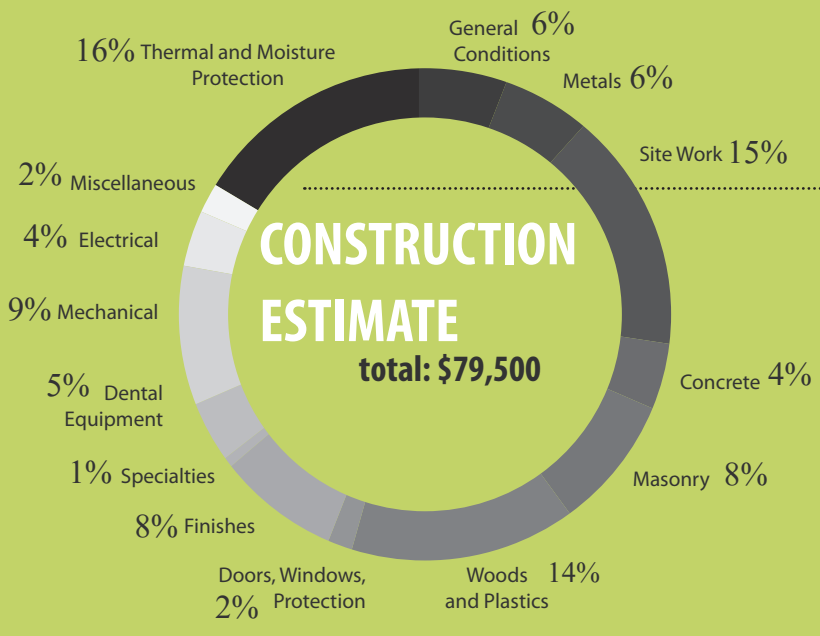
Phase II will complete the first floor, including the reception hall, main office, community room, and first floor restroom. A temporary roofing system will be utilized until phase III construction begins.

SCOPE

Sitework
Foundation System
Concrete Flooring System
Plumbing
Plumbing Fixtures
Mechanical
Electrical
Interior Framing
Interior Finishes
Exterior Finishes

PHASE II EQUIPMENT

Wheelbarrows
Shovels
Concrete Trowels
Scaffolding
Hand Tools (*Hammers, Chalk Lines, Trowels, Chisels, Cat's Paw, Metal Snips)*
Power Tools *(Skilsaws, Table Saw, Drills, Sawsall)*
Concrete Mixer
Rebar Cutter and Bender
Ladders
Remington *(Nail Driver)*
String
Drywall *(Trowels, Sanders)*
Painting *(Rollers, Brushes, Trays, Tarps)*



GENERAL CONDITIONS	$4,700
SITE WORK	$12,300
CONCRETE	$3,400
MASONRY	$6,700
METALS	$4,700
WOODS AND PLASTICS	$113,000
SPECIALITIES	$450
DENTAL EQUIPMENT	$1,350
MECHANICAL	$7,400
ELECTRICAL	$3,150
MISCELLANEOUS	$1550
THERMAL AND MOISTURE PROTECTION	$3,1,050
FINISHES	$6,400

acknowledgments

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