
Chapter Seven

Architecture That Creates Change

“Solutions which meet the needs of today without compromising the ability of future generations to fulfill their own needs”

- Christel Vaenerberg



Seven • *Design Development*

• **The Master Plan**

“La Aldea de Esperanza y de Inspiracion”



Seven • *Design Development*

• **Design Concept 02**

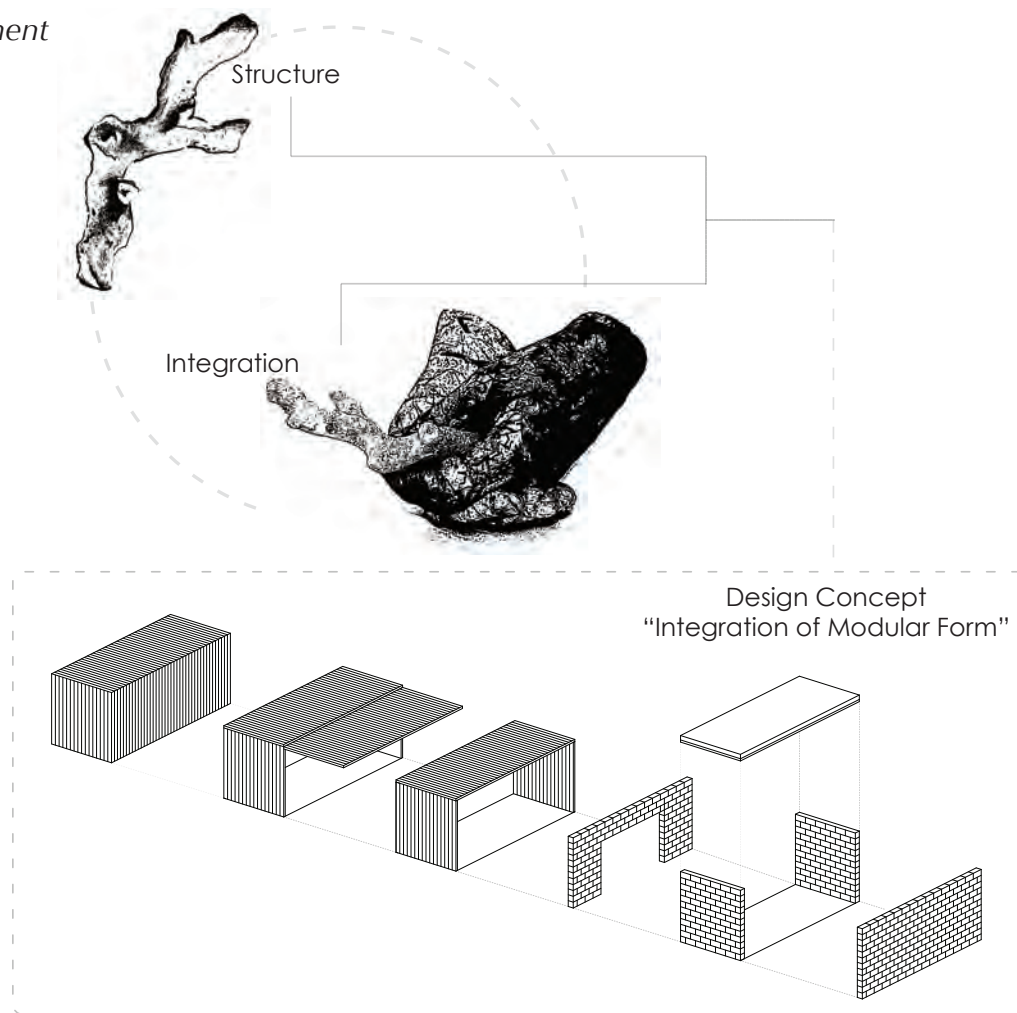


Fig. 7.1

Seven • *The Pattern Language: founded within culture to create the identification of place upon a common ground*

- **Mosaic of the Complex**

The design of the community complex allows for the variety of life styles to emerge and become one. The design does not force the user to be within a segregated environment. Connectivity within the complex allows for the continuous pathways of users to experience the built form as well as an integrated environment. The built environment that has been designed creates a mutual support and a strong sense of shared values, thus allowing for individuals to grow.

- **Network of Learning**

There is a strong emphasis of learning within the community complex, as the need for many of the building functions is specifically for the teaching of children and adults within Barahona. The complex creates the “path” that can voluntarily be taken upon by the users to enter different areas of learning and activity. Available resources

and building functions allow for teenagers to have a sense of responsibility and freedom. This encourages a self-organized learning society of their own.

- **Sacred Spaces**

The design of the building forms within the complex are located upon the “path”. This “path” then ends at a point of reflection, where upon which the chapel is situated. The users can use the chapel space to their own needs at different times of the day and year. The creation of the complex was defined by the pattern of holy ground and the progression through defined spaces. Beginning this journey within a daily functional public space; leading to a community environment for the majority of the site users; and finally ending within a holy space which reacts to the symbolic meaning of the end of one’s journey through the site. This sacred site allows for the creation of spaces throughout the pathways. These spaces become a place where the users may reflect, sit and begin to feel the presence of “place”. The entire complex can only be travelled through by foot, increasing the level of human experience. Gradually revealing the experiential qualities of the individual designed spaces within this sacred site.

- **Activity Nodes**

The major pedestrian pathways converge at the Malecons. The minor pathways create further connectivity, funneling back and fourth into the main “path”. The built forms location and proximity upon the site are grouped according to their symbolic relationship to the spaces upon the pathways. The activity nodes upon the site support one another.

- **Work Community**

The complex operates for the community of Barahona, but also for the work community employed by ‘Children of the Nations’. The workplace has been designed to function as a community. The entire complex acts as the common piece of land within the work community, which ties the individual offices and workplaces together. The work community becomes interlaced within the larger community of Barahona. The common land and Malecons exist at distinct levels, identifying public versus private spaces. The Malecon is provided for the work community as well as the users living on site.

- **Children in the City**

The complex embraces the network of learning, allowing children to explore the environment surrounding them. This complex is a safe space that will allow for the mental, physical, and spiritual growth of the children through ‘Children of the Nations’. Adults within the complex will work on a daily basis with these children transmitting their ethos and ways of life by their own actions. The children can spend their days side by side with the locals, the community, their families and volunteers; learning daily actions, skills and processes of life.

- **Water**

Rainwater will be collected from the rooftops into small catch basins, that will run through channels along garden paths and public paths. Water is seen and enjoyed by the users. The natural spring upon the site will be taken advantage of and celebrated through the integration of natural wells to collect the water from the ground. There is a great importance of bringing water into the site design.

- **Holy Ground**

The termination of the complex is the chapel. The chapel is a place of worship, spirit and contemplation. This becomes the point of reflection previously discussed, open for all to enjoy.

- **Connected Play**

Children need other children. This community complex emphasizes upon the importance of children and their relationships between others. The design lays out pathways, garden and common land: which all create the connection of play within the community complex.

- **The Malecon**

The Malecon is distinguished and redefined within parts of the common land. It is defined with more elaboration and celebration of the coming together of social groups. It is cultural accepted within the Dominican Republic, therefore the users will seek and find this special place to go. The interpretation of the Malecon contains a balance of being define but not segregating the user within that space. Any

activity which is natural to the community can develop freely within this space.

- **Local Sports**

Sport fields are scattered throughout the site for team and individual sports. These include volleyball, baseball and basketball.

- **Teenage Society**

The high school is provided for the older children as well as a small institution which is a model of adult society. These classrooms will provide adult guidance, both for the learning and social structure of society. The community hall and dining hall is provided to house social functions. This central area of the complex provides opportunities for games, counseling, eating and a network of learning.

- **Building Complex**

The community complex takes the form of a collection of small buildings connected by pathways and shared open spaces. The community center is the natural center of the site. All of the building within the complex

have been designed to form realms of movement along the connected “path”.

- **Circulation Path**

All entrances to individual buildings open directly off the circulation path. All connecting pathways extend from the main southwest path. The circulation realm is always connected from and to this path that circulates through the entire complex.

- **Entrance**

The main entrances to all of the buildings within the community complex are directly off the circulation realm, creating a facade to street relationship. The entry canopy also known as the trellised walks, denote entry and defines where the entry occurs along the long circulation path.

- **Positive “Outdoor” Space**

No outdoor spaces are merely “left over”, but are designed and placed specifically for different functional uses. Trellised walks are used at the entrance creates a positive space within an outdoor space. Placement of

proposed trees and gardens will also create the same significant effect.

- **Path and Goals**

The layout of path began with the creation of a southwest axis at a length of 1/8 mile. The entire complex elaborates the creation of path and goals all within a comfortable walking radius for the user. The goals of the site are the buildings themselves and the path is connected as a whole in order to create connectivity for the users of the site.

- **Intimacy Gradient**

The intimacy gradient can clearly be recognized through the progression of public to private space as you travel through the “path” to the end of the site. The sequence begins with the entrance and then gradually leads into more private areas, such as the housing and finally the chapel.

- **Common Area at Heart**

The common area at heart within the community complex is most obviously the community center buildings

and spaces surrounding. These buildings all correspond together although being separated for the purposes of having very large numbers of people in these buildings at one time.

- **Common Ground**

The common ground is the ultimate goal for this entire community complex. To create an environment upon which all users are equal and are allowed to grow within themselves. The paths have been designed to give access to all of the buildings, functioning as the common land. The users are allowed to feel connected to the larger social system, which is missing within the environment of the Batey and Barrio. This common land acts as a meeting place for the people of Barahona to be embraced by each other, the love, the faith, the hope and the care of volunteers and the community to evolve their community into new beginnings.

Seven • *The Users*

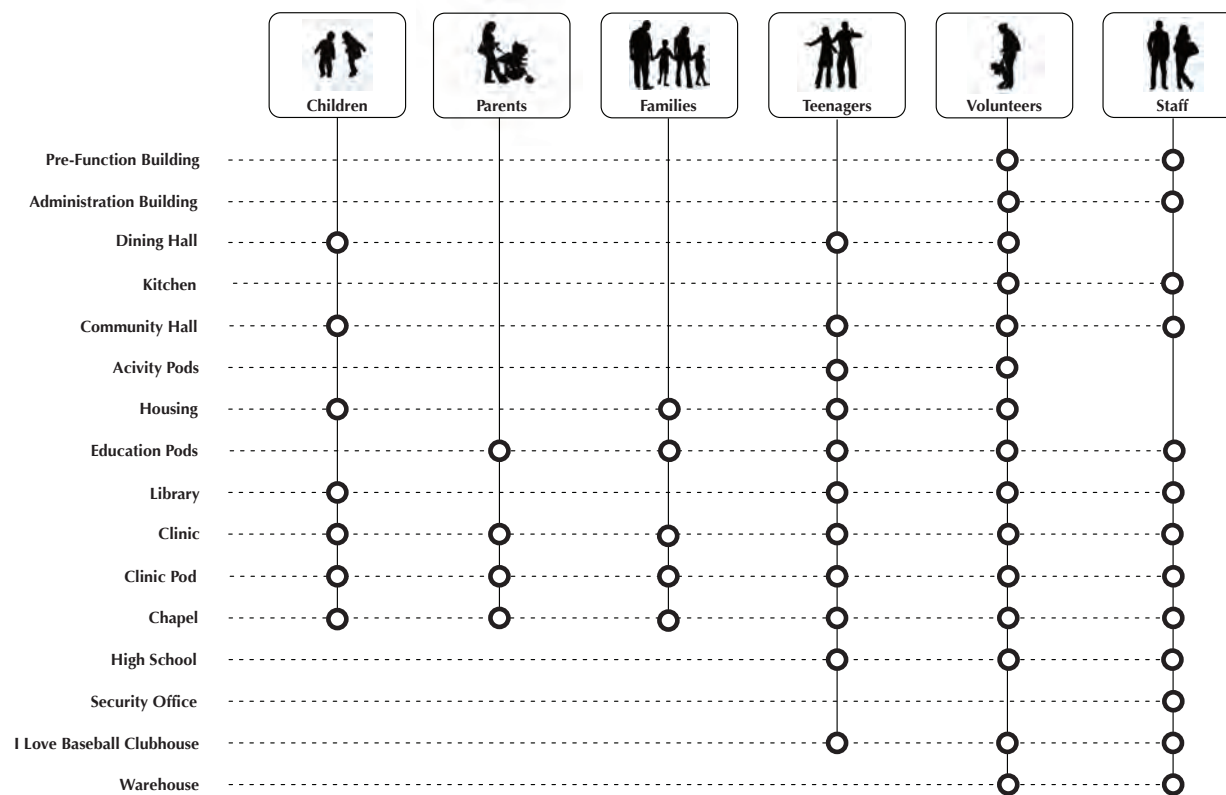
- **Interaction and Use of the Architecture**

The community complex calls for the interaction, use and housing of many different users. The user groups are broken down into six different categories of people. The first being children, the most important users upon the site. This community complex is based around the children of Barahona and the architecture is designed not only to benefit the community but to enable new environments for these children to be educated, housed, cared for and to live if necessary. The second user group is parents, mainly single mothers, as the Dominican Republic is home to a very high percentage. The community complex will offer the necessities that these single mothers require. The third user group is the families, which will use the site according to the needs of their family. The fourth user group are the teenagers, and just as the children they will use the entire complex for educational, housing and feeding needs. The fifth user group are the volunteers, which will occupy the complex at different intervals for different lengths of time, using all facilities available. The sixth user group is the staff, whom will operate this complex for the organization.

Seven • Matrix

Fig. 7.2

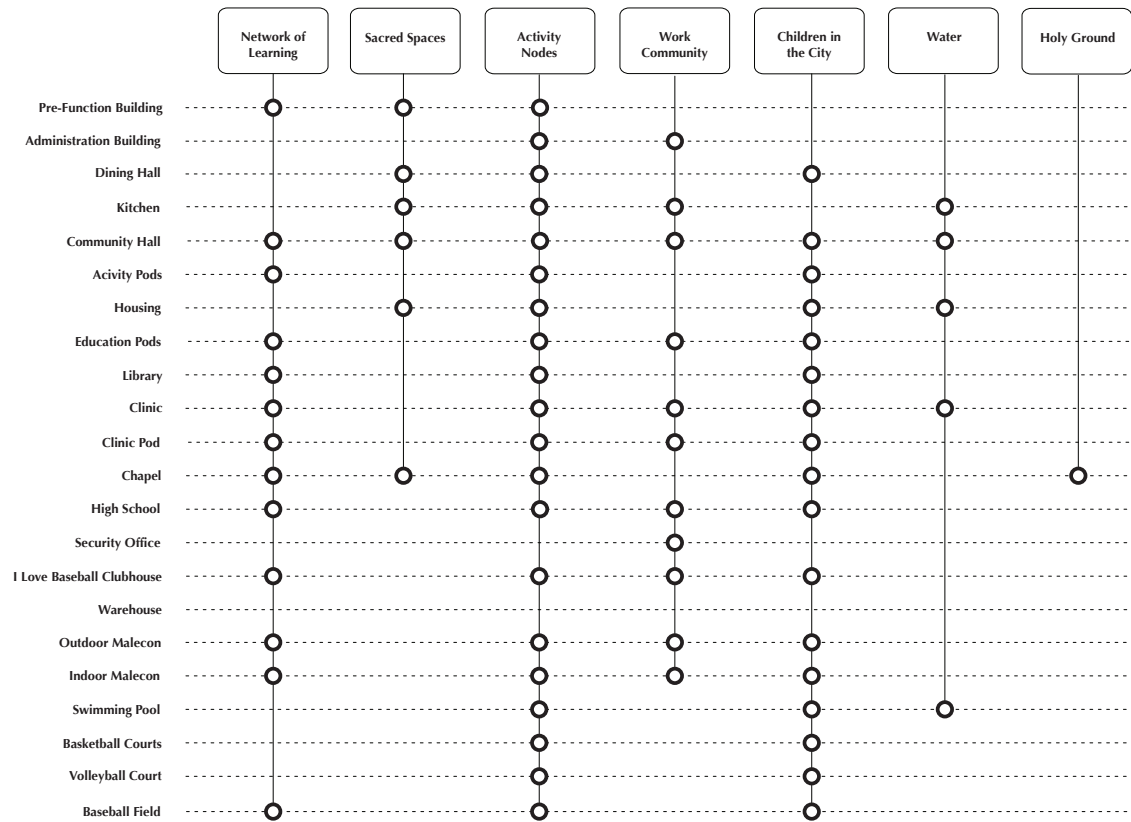
• The Users of the Community Complex



Seven • *The Pattern Language of the Complex*

Fig. 7.3

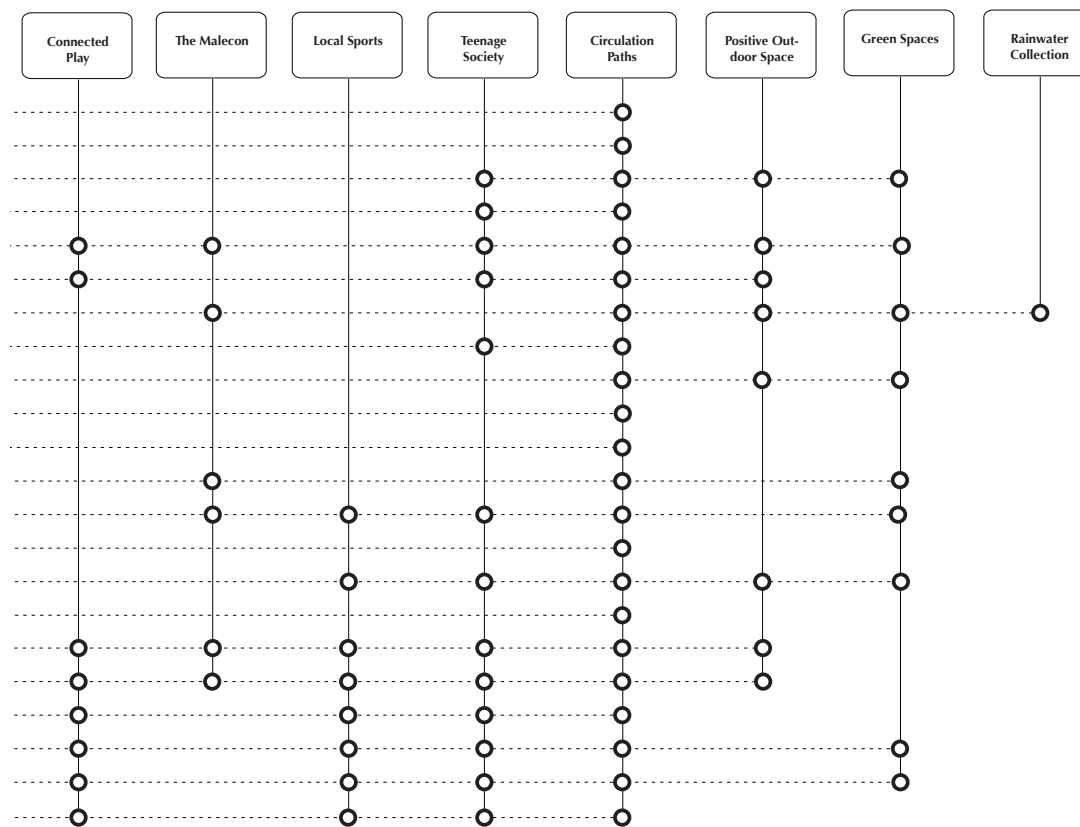
• **Symbolic Exploration of The Pattern Language I**



Seven • *The Pattern Language Matrix*

Fig. 7.4

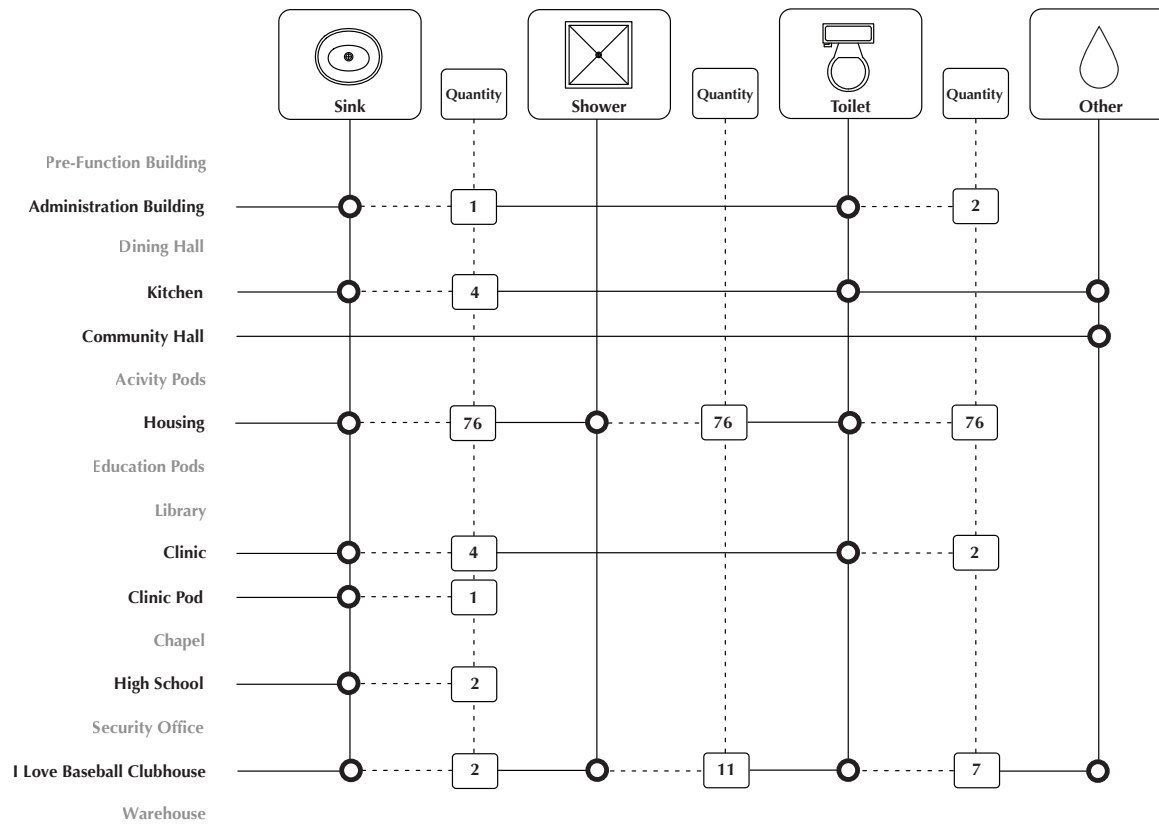
• **Symbolic Exploration of The Pattern Language II**



Seven • Matrix

Fig. 7.5

• Water Usage within the Community Complex



Seven • *Water and Power*

• **Usage of water and power within the complex**

The community complex is designed upon a site that is somewhat sparse compared to the dense downtown environment of Barahona. The ultimate goal of the community complex would be to become self-sufficient through the use of wind power and solar energy. Although this is a long-term goal for 'Children of the Nations', at the point of construction the complex will be connected to the city grid in terms of water, and power. The integration of sustainable technology allows for many new changes to occur within the built environment. The collection of rainwater is integrated into the housing units at each house. These catch basins are built into the ground and will collect rainwater that can be used for many purpose upon the site.

The sewage system upon the site will be a series of setic tanks. Each of the five spectic tanks will be connected to different housing units and other buildings upon the site that have bathroom facilities. Each septic tank is approximately 3 meters squared and holds approximately 500 gallons. The pipes used for the sewage system upon the site will be the size used currently within Barahona. This is approximately

four inches.

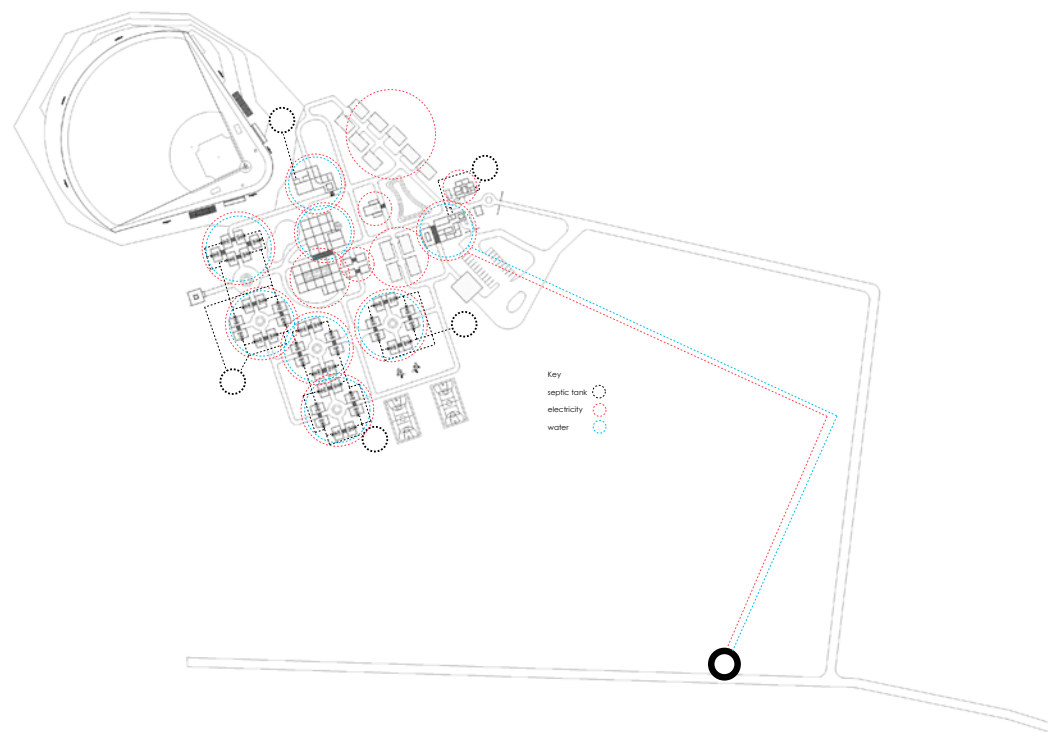
The power upon the site will be connected to the city grid of Barahona. The city power supply is located upon the main road which leads to the site from the main road into Barahona. All power lines will be connected to thse main lines upon the side of the road. The city water supply is also located upon this road. All water and power will be connected to the city grid, as seen in the diagram, which is located six feet below ground level.

Upon each of the roofs of buildings requiring water will have a water tank. This water tank is filled on a daily basis when city water is available. The water is then used accordingly for showers, etc, but not for drinking water. All drinking water upon the site will be from purified water bought at local stores.

Seven • *Diagram*

Fig. 7.7

- **Power and Water usage within the Community Complex**



Seven • Window Study

• **Module Openings Public vs. Private**

The windows throughout the entire community complex are based on a four module types. 01 is a private module frame that is 16" by 24" (1'3"x 2'). 02 is a semi-private module frame that is 48" by 24" (2'x 4'). 03 is also a semi-private module frame that is 24" by 72" (2' x 6'). 04 is a public module frame that is 72" by 48" (6' x 4').

These four module frames were developed in order to allow for the construction ease of the individual buildings having a constant module system running throughout the design, structure and detailing. These modules were also developed according to the module CMU block size of 8 inches in length, also creating ease within construction for the openings in each building facade. The placement of these four types of module frames will be based upon the interior function, light needed, and the cross ventilation that is fully developed in all buildings and within the site design itself.

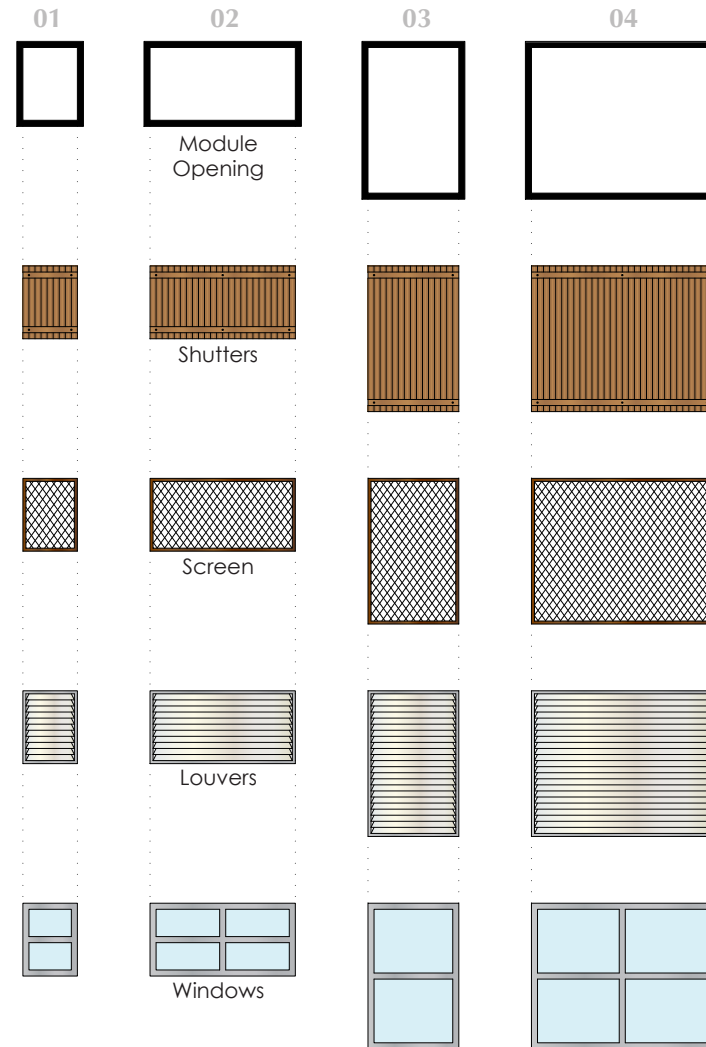


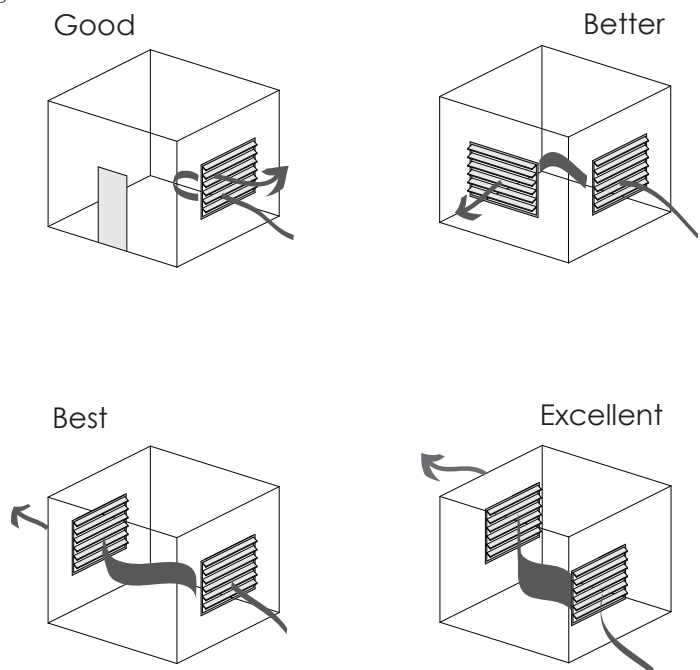
Fig. 7.8

Seven • Sustainable Techniques

• Cross Ventilation

With the use of louvred windows upon opposing walls, cool, fresh air is allowed to flow in one side of the room and hot, stale air to escape out the other. The natural flow of cool air lowers the indoor temperature of the room.

Fig. 7.9

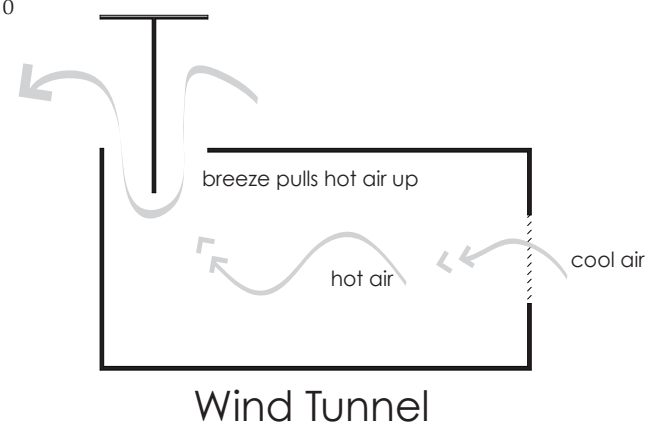


• Wind Tunnel and Thermal Chimney

Wind tunnels are appropriate for concrete block houses. The tunnel works even when there is no breeze, since the temperature inside the tower is different from the outside. The hot air inside the building continuously moves upwards allowing for the cool air to come through windows.

Louvre windows are ideal for both of these options as they are twice as open than regular windows and offer twice as much fresh, cooling ventilation.

Fig. 7.10



Seven • Construction Details

Fig. 7.11

• **CMU Block Detail**

Reinforced masonry walls will be used throughout the buildings within the community complex. The structure is based upon a module system. The majority of the buildings use reinforced masonry walls as load bearing walls. The larger buildings of the complex are designed with a two-way flat plate system based on a twenty foot grid, using one foot columns. The reinforced masonry walls will use steel reinforcing bars, of the largest size available in Barahona. The bars will be placed in thickened joints or cavities with a fluid grout mix of portland cement, aggregate, and water for greater strength in carrying vertical loads. This will also increase resistance to buckling and lateral forces. It is very important that this process is used within the construction of the CMU block buildings as it is essential that a string bond develop between the reinforcing steel, grout and masonry units. The usual construction methods within Barahona lack knowledge within this area of construction and therefore this method will be taught and perfected in order to build the best buildings possible.

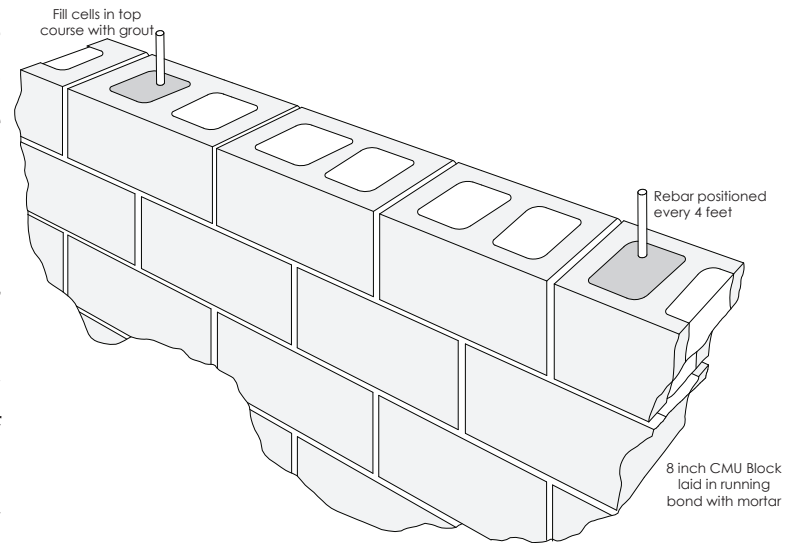
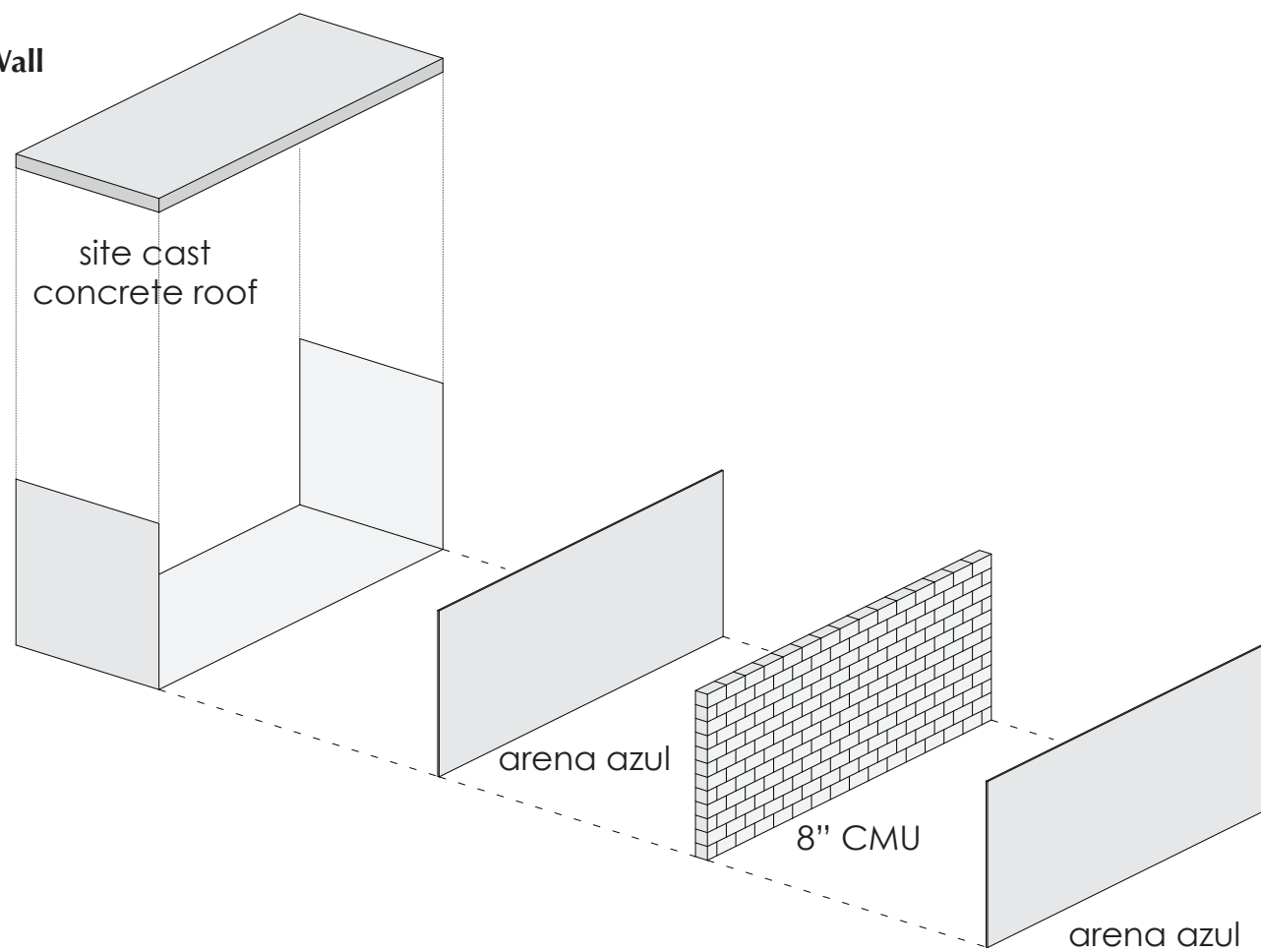


Fig. 7.12

• Typical CMU Wall



- **Module Roof Systems**

Within the design stage of all buildings upon the complex, it became apparent for the need to symbolically and structurally define three types of roof systems. These three module roofing types are the clerestory, flat and butterfly.

The clerestory roof was derived from the design exploration of the vertical quality of shipping containers within the chapel. It became apparent through the research and wind tunnels that this clerestory would achieve the same results and have an aesthetic symbolic quality to the representation of spaces and buildings. The clerestory allows for a six feet space to allow the hot air to rise out of the buildings. This roof is integrated into the Chapel, ILB Clubhouse, Clinic, Office, and Pre-Function Building.

The flat roof is used throughout the larger buildings that also integrate the clerestory roof. The flat roof is a common construction method for roofs in the Dominican Republic.

The butterfly roof is used within the housing, and

is specifically designed and used for the collection of rainwater. The water runs off the butterfly roof at the rear end of the building, falling into a catch basin built into the ground. This roof sits two feet higher in the front of the building, opening higher space to allow hot air to rise out of higher windows in the front of the building. The butterfly roof symbolically represents the housing and the units of housing.

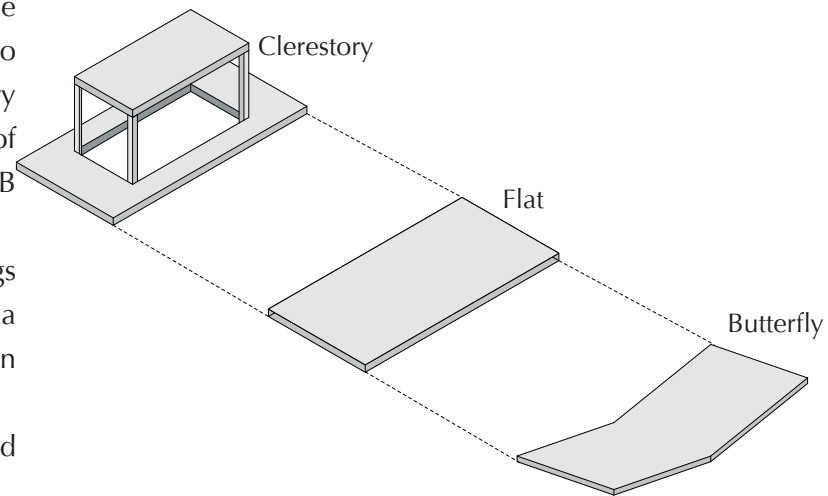


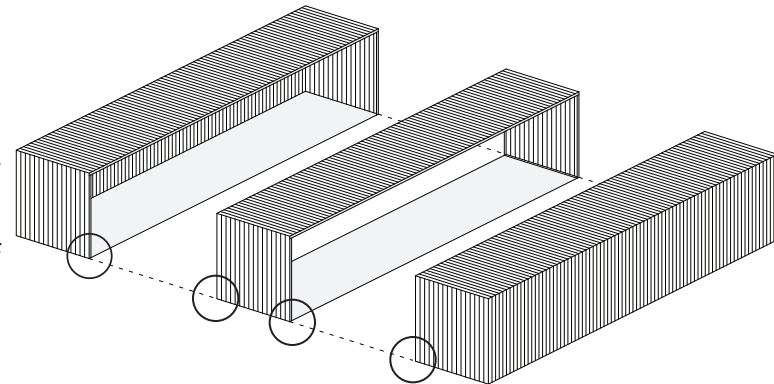
Fig. 7.13

Fig. 7.14

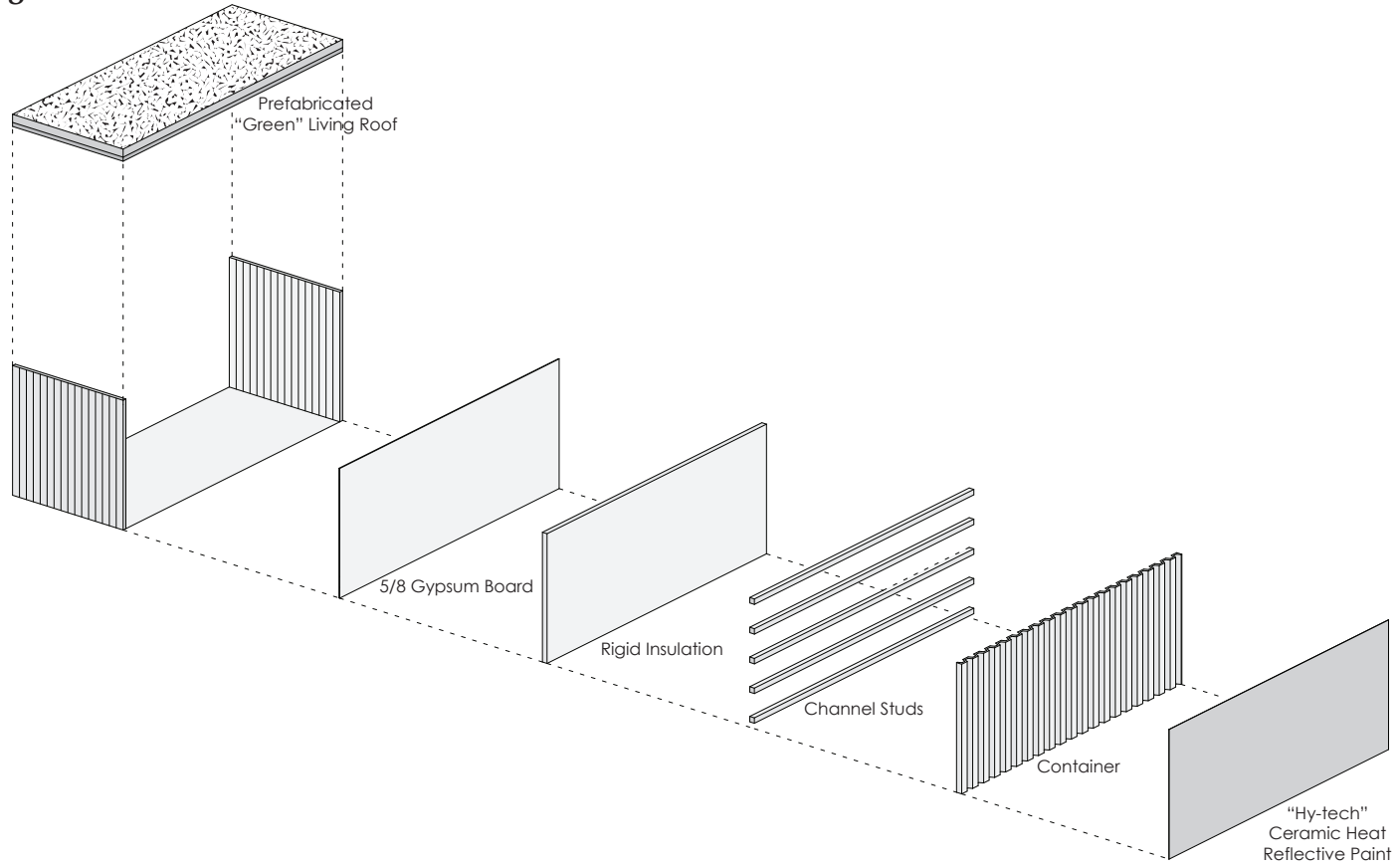
- **Connections of Shipping Containers**

The most popular and economical method of anchoring containers together is welding. Typical the welding occurs along the side rails, corner posts, and/or corner fittings, using a 1/4 plate. The welded plate can be applied to the exterior, but the preferred method is to install enough plate material to cover the entire joined seam from the inside. This later serves as a support shelf for application of roofing cement from the outside gap.

Low cost options for welding containers together usually involves small segments of welded plates at strategic locations like corner fittings followed by the application of sheet steel roofing and roofing cement materials to create a waterproof roof at the joined section.



• Shipping Container Construction



- **Fitting Out The Shipping Container Buildings**

The framing of the interiors of the container used for the numerous buildings within the community complex will use furring strips. The containers already contain their load-bearing qualities and therefore the strength of framing is not an issue. Rigid insulation will be used within these furring strips in order to reduce heat intake from the extreme sun on the exterior.

All containers are manufactured with plywood floors. These are very strong and are designed to support heavy loads. The panels used for this are commonly a 19-ply plywood product. The plywood is further treated in order to prevent infestation and rot. It is an option to cover the floors of the containers with bamboo flooring on top of the existing plywood floor. This will create a finished look within the library modules, high school and university classrooms, and a clean look within the clinic.

Prior to painting the containers, which will be necessary with all containers, surface preparation is needed. “Hy-Tech” ceramic heat reflective paint will be used upon all

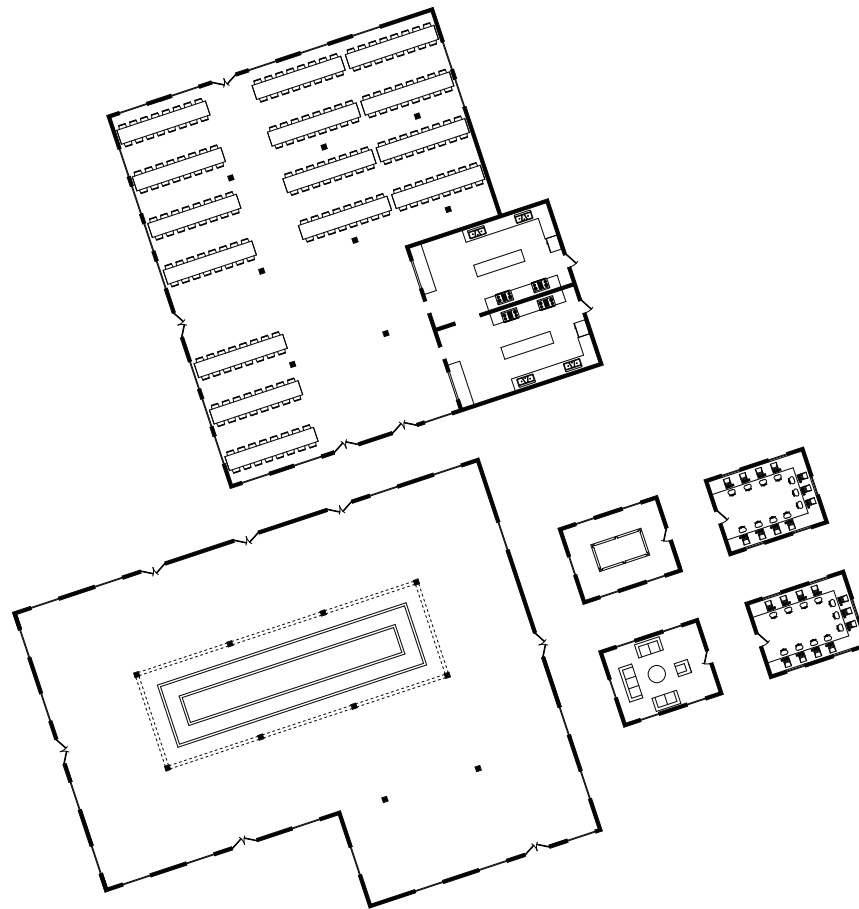
the exterior facades of the containers in order to help greatly with the heat gain within these smaller spaces. The ceramic barrier reflects up to ninety percent of the heat back to its source. This Hy-Tech ceramic insulation paint will allow for many benefits such as: saving money on cooling the buildings, providing long lasting durability, stain and scrub resistant, non-toxic and fire resistant, helps deaden sound within the classrooms, and is environmentally friendly.

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Seven • *Floor Plans: 1' = 10'*

Fig. 7.16

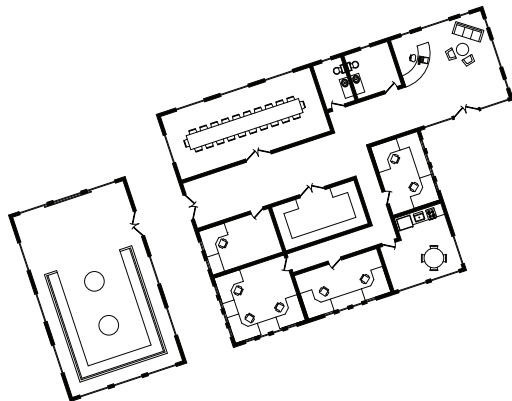
• **Community Center**



Seven • *Floor Plan: 1" = 10'*

- **The Office and Pre-Function Building**

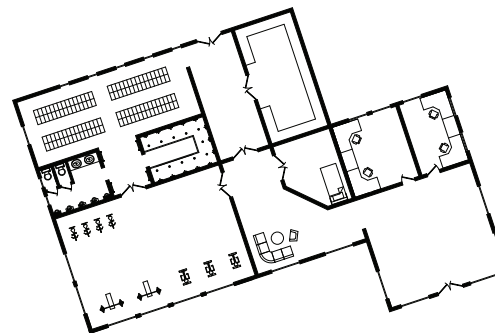
Fig. 7.17



Seven • *Floor Plan: 1" = 10'*

- **'I Love Baseball' Clubhouse**

Fig. 7.18



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Seven • *Floor Plan: 1" = 20'*

• **The Clinic**



Fig. 7.19

Seven • *Floor Plan: 1" = 20'*

• **Housing Module**

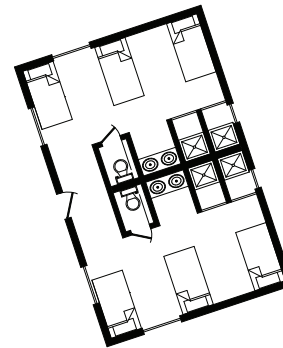


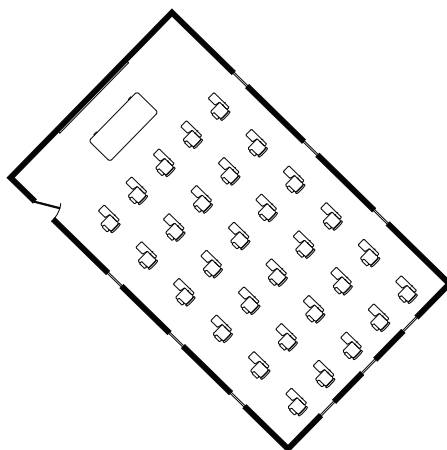
Fig. 7.20



Seven • *Floor Plan: 1' = 20'*

- **University and High School Classroom**

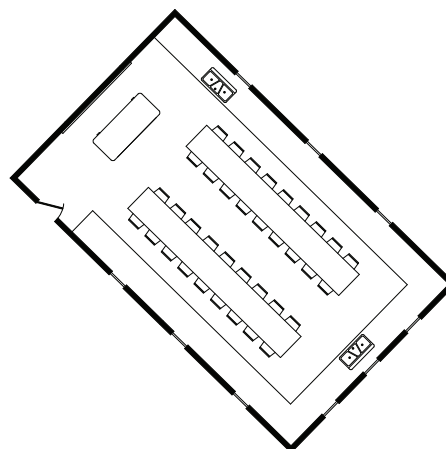
Fig. 7.21



Seven • *Floor Plan: 1' = 20'*

- **High School Science Lab**

Fig. 7.22



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Seven • *Floor Plan: 1" = 20'*

• **The Library**

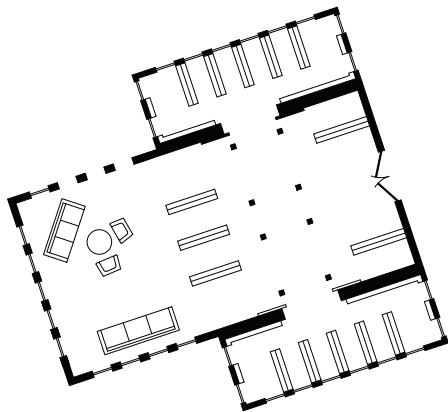


Fig. 7.23

Seven • *Floor Plan: 1" = 20"*

• **The Chapel**

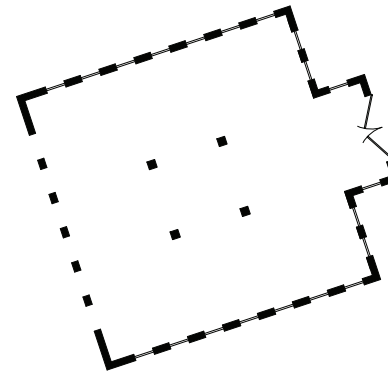


Fig. 7.24



Seven • Floor Plan: 1' = 20'

- Security Building

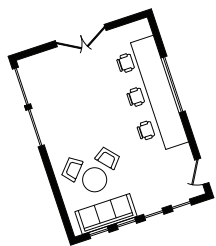


Fig. 7.25

Seven • Floor Plan: 1' = 20'

- Warehouse

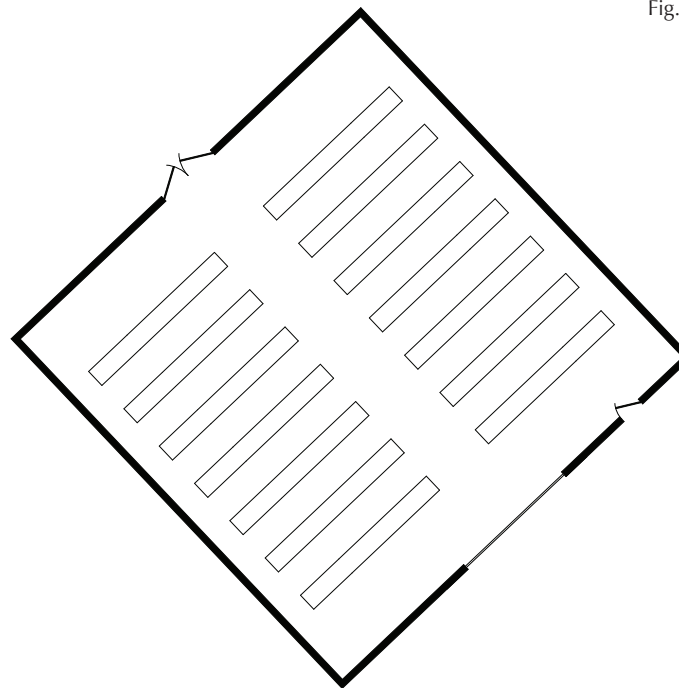


Fig. 7.26



Seven • *The Final Proposal*

• **Construction Phase Plan**

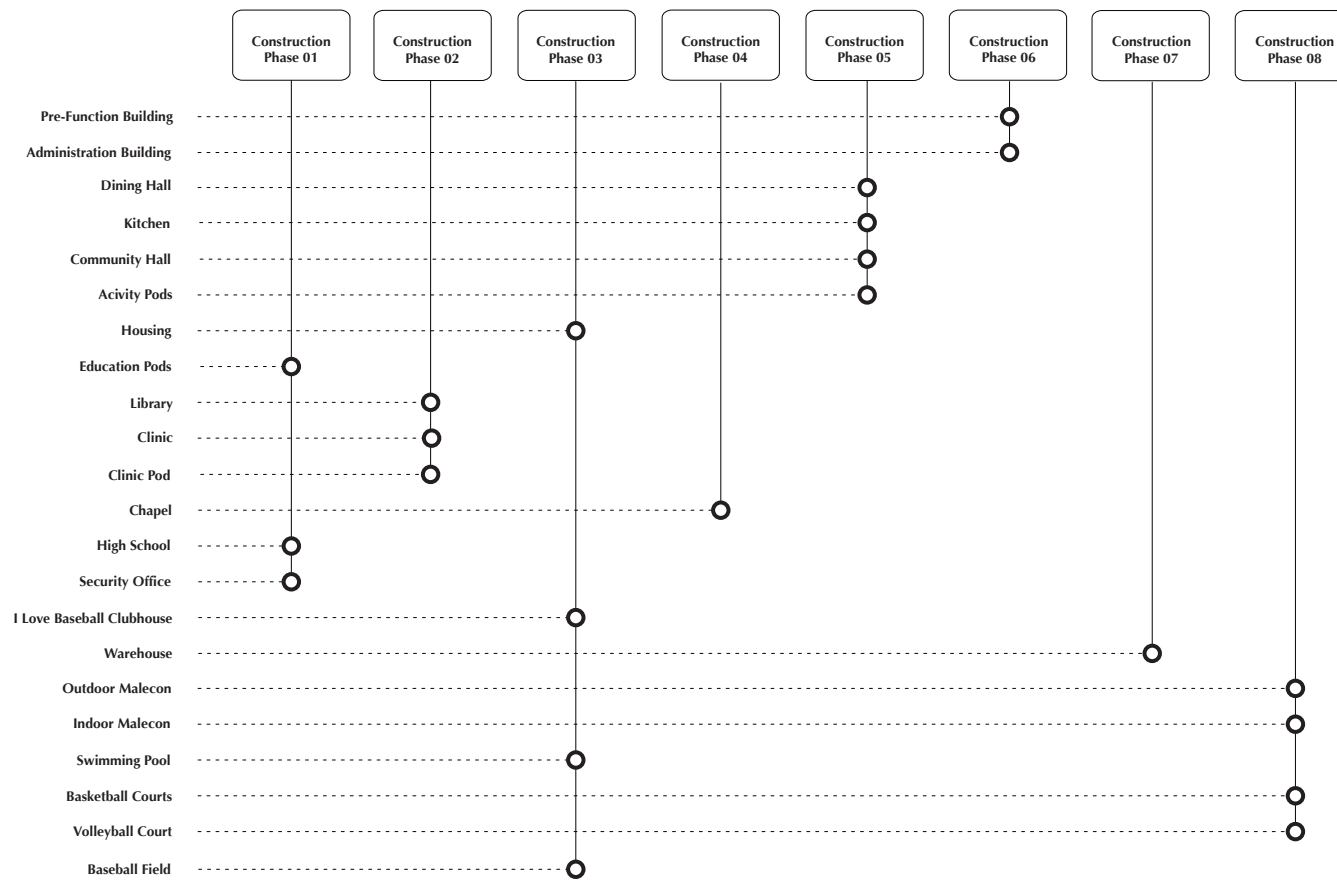
The community complex occupies a large amount of land, as well as a large number of buildings. It has been requested and decided throughout the design of the entire community complex, that it will need to be constructed within phases. Within a meeting with 'Children of the Nations' in Barahona, the decisions were made that determined the order of the construction phases. Other buildings that were not discussed within this meeting were added to the construction phases according to the necessities of 'Children of the Nations' and the people of Barahona at this point and time.

Construction phase one consists of the high school, university classrooms, and the security office. Construction phase two consists of the library, clinic and the shipping container modules for both these permanent structures. Construction phase three consists of the housing, 'I Love Baseball' Clubhouse, the swimming pool and the baseball field. Construction phase four consists of only the chapel. Construction phase five consists of the community center. Within the community center there are numeroud

buildings. These buildings will all be constructed within phase five. These buildings are the dining hall, kitchen, community hall, and the four activity pods. Construction phase six consists of the pre-function building and the office. Construction phase seven consists of the only the warehouse. Construction phase eight is the last phase and will consist of all exterior spaces such as the indoor and outdoor malecons, basketball courts, and the volleyball court.

Fig. 7.27

• **Construction Phase Plan Matrix**



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Seven • *Summary Statement*

Chapter Eight shows the progression of this thesis and the ultimate design of the community complex into the final design. The use of diagrams and matrices within this chapter begin to explain and identify the careful methodology taken in making numerous decisions according to the numerous factors. The exploration of structure through this chapter shows the development of new structural systems that will help the people of Barahona to higher their construction standards and knowledge within this field. As working in any third world country it is important to identify new methods and introduce them in simplistic ways in order to be succesful within the integration of new design and construction methodologies. The evaulation of power and water becomes an important factor within this project and has been explored fully in order to determine how this complex will operate and function. The lack of water and power within Barahona causes problems for larger projects such as this, therefore the consideration of alternatives and sustanable design has been considered. The use of the module has become a fluid language not only through the design of many of the buildings, but throughout the window and rood systems. This ultimatately creates ease when moving

foward into the construction phases with the community. Complexity of certain factors such as these are not needed or wanted within a project such as this and therefore a simple module system has been set up throughout this entire community complex for all buildings to become regulated by. Through the creation of this community complex for the people of Barahona, a pattern language has been created ultimately identifying the complex symbolically aesthetically, emotionally, mentally and physically. These aspects create the opportunity to bring fourth a new-found common ground within the design of the complex.
