



Learning Along Borders for Living Across Boundaries

Ganta, Nimba County

Liberia

UNICEF

Bright Apt., Sekou Toure Ave
Mamba Point
Monrovia, Motterrado
Liberia

LAB!!!LAB

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1.0 Program Objectives:

The Learning Along Borders for Living Across Boundaries initiative (LAB4LAB) seeks to use strategic education interventions to help four countries in West Africa (Liberia, Cote d'Ivoire, Guinea, and Sierra Leone) to address the development challenge posed by civil conflict. The program focus is to provide a sustained means for quality basic education that is community oriented and child friendly. All of this will be designed to support new beginnings and an improved quality of life for border communities.

The goal of this initiative is to help these countries strengthen education and other services in their border communities, as a means of easing conflict and stimulating development.

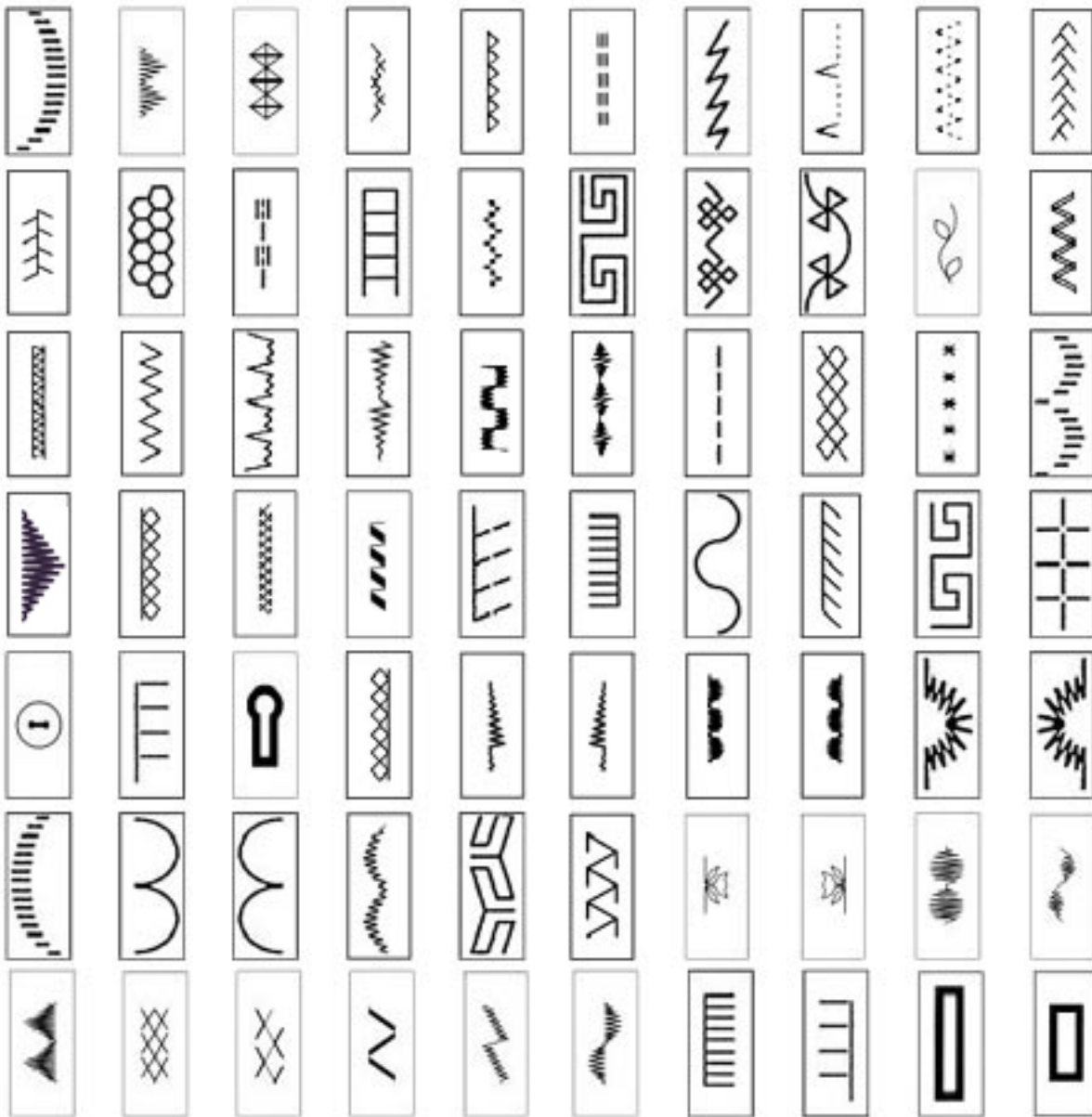
The strategic objectives are:

- 1) To improve the resilience of these border communities, making them more effective buffers against the flow of conflict across national boundaries. In this regard, interventions will build on much of the positive informal links that already exist between these border communities across national boundaries. This will strengthen economic, cultural and social ties and exchanges, as well as promote new patterns of solidarity and interdependence.
- 2) To help stimulate and accelerate the development process in border communities by promoting more innovative development pathways. In this regard interventions are based on two key premises. One is that border communities should not have to wait for development to "trickle down" from capital cities and big towns. Rather they should be part of a more decentralized approach to development that focuses on appropriate local progress as part of overall national development. Second, border communities need not lag behind current trends regarding more sustainable development. In fact, they can be at the forefront of implementing alternative and more sustainable development pathways in terms of patterns of energy production and consumption, conservation of natural resources and protection of the environment.

The design and construction of the schools is intended to demonstrate an immediate signal-to-change while developing a long-term educational and community solution. The proposed interventions will be based on the child-friendly school (CFS) models to promote quality education and will be tailored to fit the specific capabilities and needs of the local and larger community while also offering empowering services currently not available in many of these communities. Empowering services will include basic amenities that often are lacking such as water access, sanitation, energy (e.g. wind/solar power) and connectivity (internet access). Specific objectives are as follows:

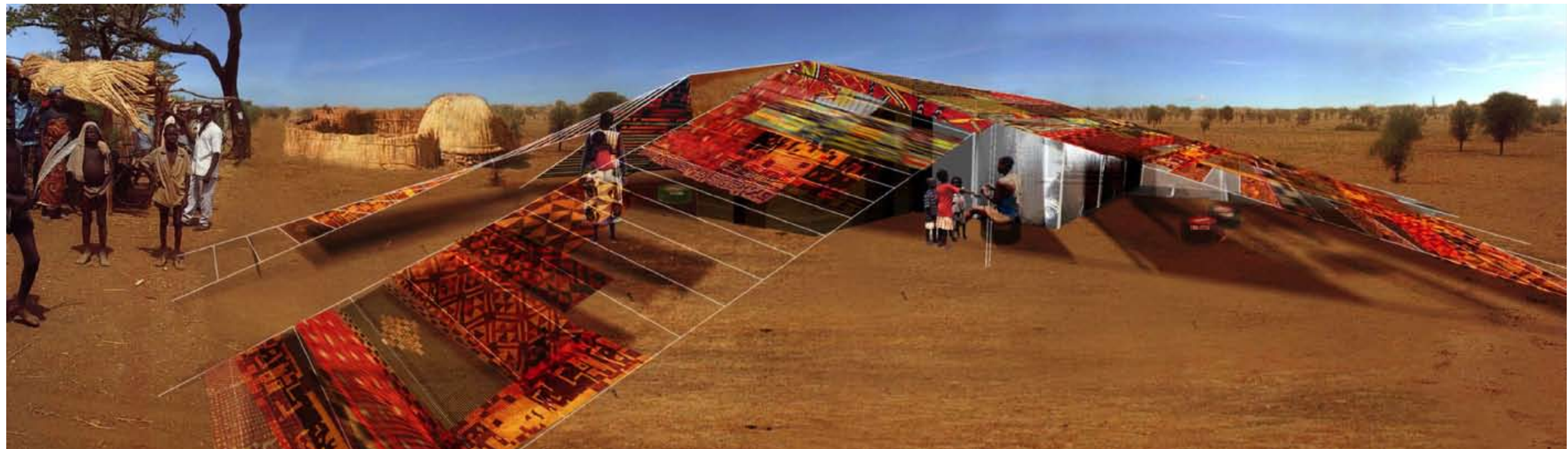
The LAB4LAB facility program will place an emphasis on elements that meet the following objectives:

- 1) Signals change for the community
- 2) Enables the community to be better connected to the wider community, especially the centers of power
- 3) Engages the community members in activities beyond learning
 - To attract students (increased access)
 - To improve attendance rates (persistence)
 - To improve retention and completion rates
 - To improve learning achievement
 - To provide a safe, inclusive and welcoming environment for all children
 - To provide an enabling learning environment (including services for those with disabilities)
 - To build a sense of community within the school (institutional ethos)
 - To involve parents and the community (support and participation)
 - To cultivate a sense of harmony between the school and its community
 - To harmonize children, buildings, school ground and environment



In this way, schools can be a catalyst for innovative localized progress that does not require these remote border communities to wait for development to “trickle down” from capital cities and big towns. Similarly, schools can help to build bridges across national boundaries by promoting greater interdependence of border communities and strengthening the economic and cultural ties that exist across national boundaries.

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2.0 Architecture:

The design of the LAB4LAB school has been a collaborative effort between UNICEF and AFH to provide innovation while incorporating the values of the Child Friendly Schools. A major focus of the design has been on the interaction of students, new opportunities for learning and the inclusion of the community into the campus and the learning process.

Opportunities for learning that go beyond providing four walls, a roof and a chalkboard are integrated into every aspect of the design for the LAB4LAB school in Ganta—from the site plan and layout of the buildings to the placement of doors.

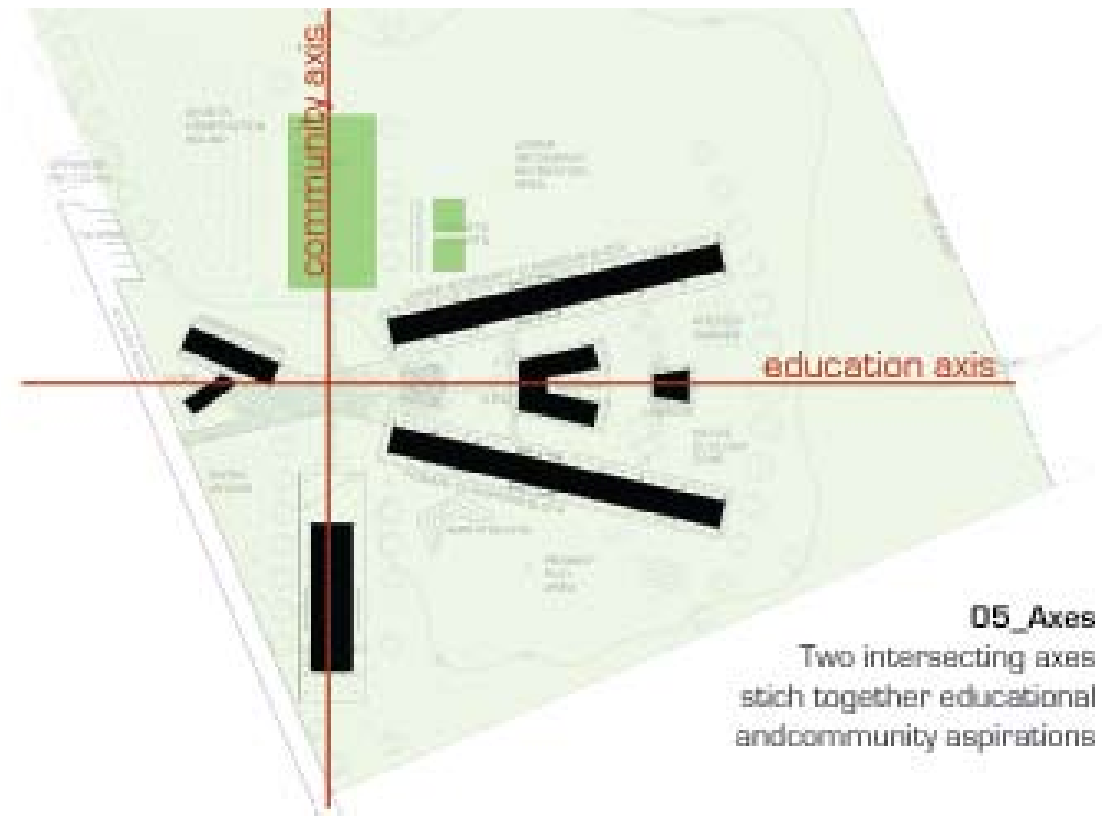
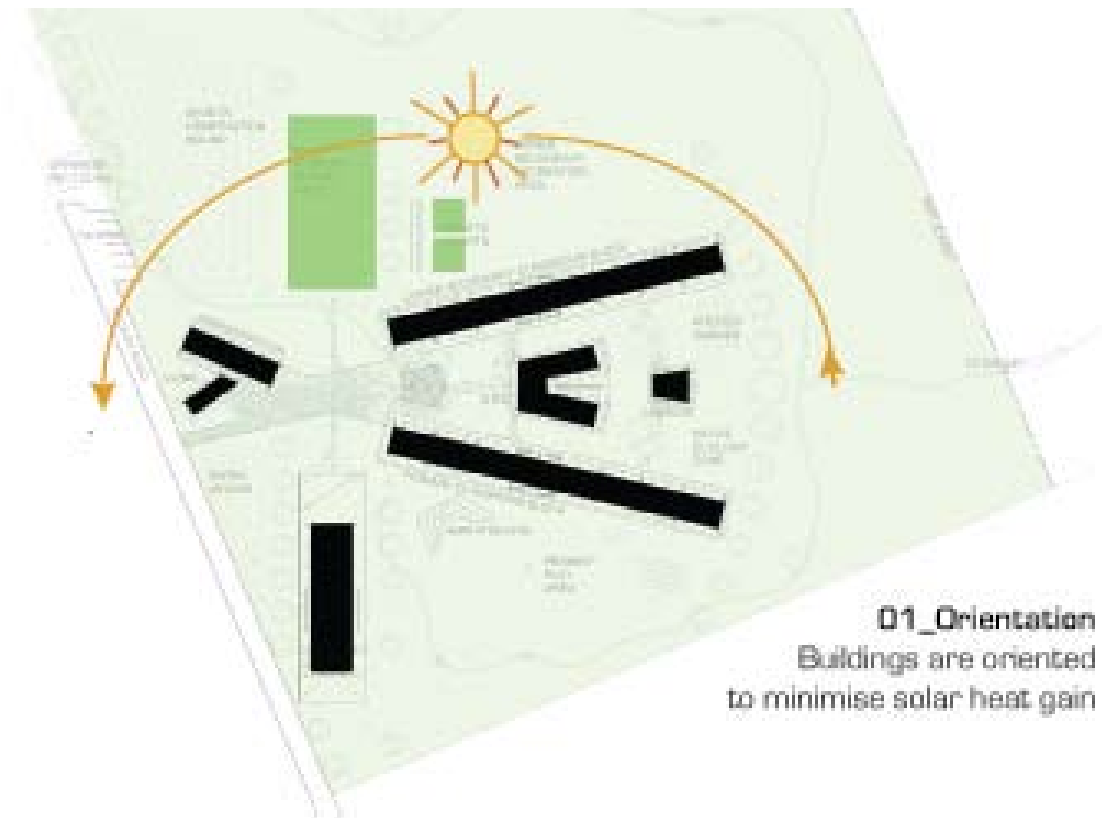
The layout of the buildings on the campus are located along two main axes: The buildings with a primarily educational function are located along the East-West axis, while the facilities along the North-South axis are auxiliary to the school and also provide services for the surrounding community. Where the two axes intersect is the 'heart' - the hub of activity around and through the campus.

The educational axis, moving from West to East includes:

- Administration
- Classroom blocks
- Computer Lab
- Library
- Canteen

The community axis, moving North to South includes:

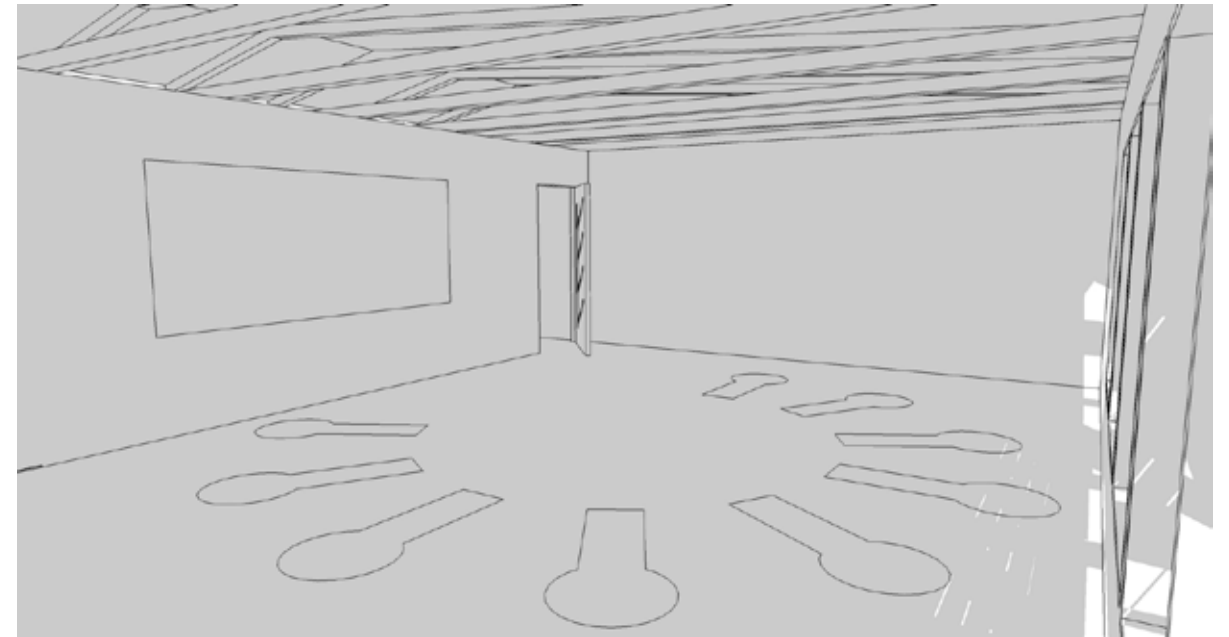
- Sports fields and courts
- Open Play Area
- Clinic
- Resource Center
- Radio Station
- Multi-Purpose Hall/Theater



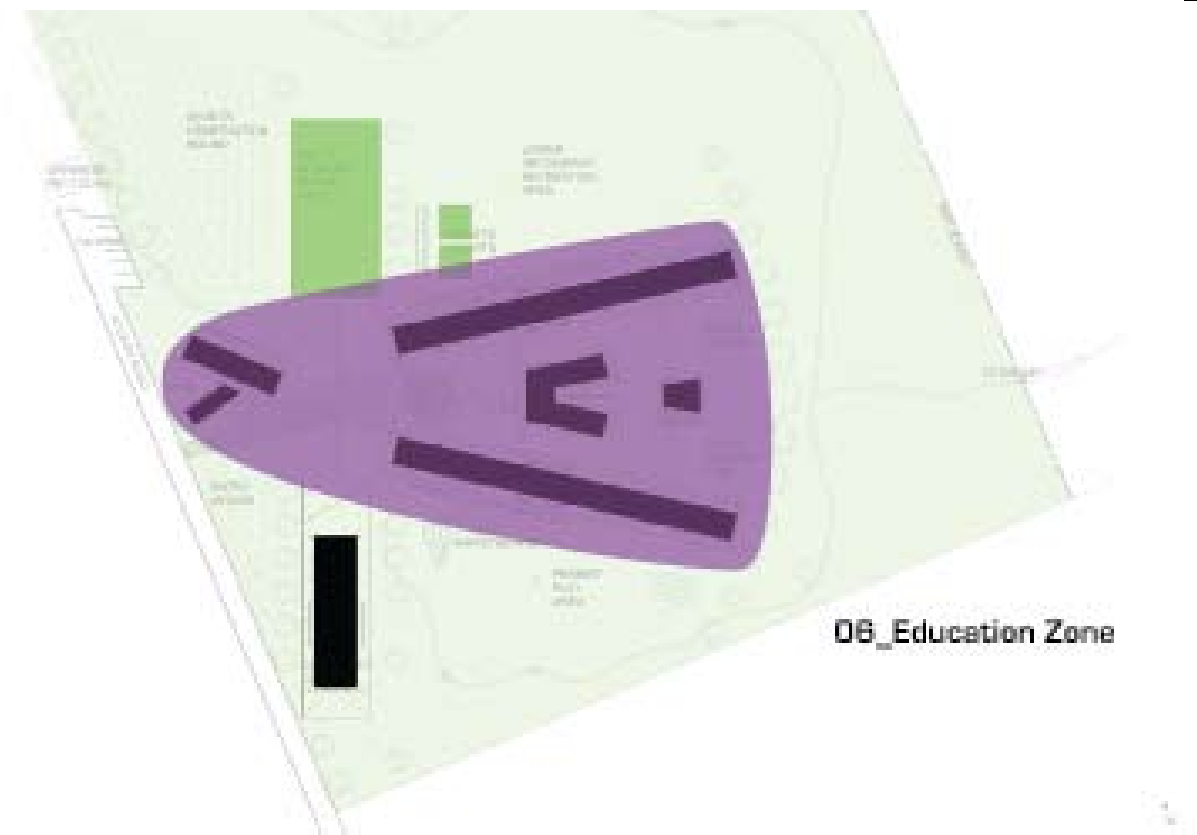
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The buildings have been given considerable thought to provide security, accessibility for all children and innovative learning opportunities.

- The Administration and Clinic buildings along with the Community Center pull away from the school drive and provide a formal entry to the campus. In this area parents and community members will congregate, wait for the clinic or a meeting in the community center.
- As children move past the Community Center they are drawn into the heart of the campus and can then proceed east to the classrooms or to the sports fields and courts.
- The classroom blocks are tapered in towards the heart, which focuses the entry and provides a centralized control point for good passive security.
- The internal courtyard provides space for the Global Resource Center building and the Canteen. This courtyard area provides an external education zone where the teachers can easily supervise students, while remaining close to other classrooms and the administration in case of emergency.
- The interstitial areas connecting the classrooms, the Global Resources Center (library and computer lab) and the Canteen provide an outdoor space which encourages interaction, peer-to-peer learning, learning through play, and protected spaces for eating or studying.
- Access to the sport fields, courts and open play areas can be accessed by passing through or around the classroom block to the south or north.
- The construction of the school will use locally available materials and will incorporate innovative construction techniques, such as a double walled metal roof system which uses the heat generated by the roofing material to help draw and circulate the air and provide increased indoor air quality.

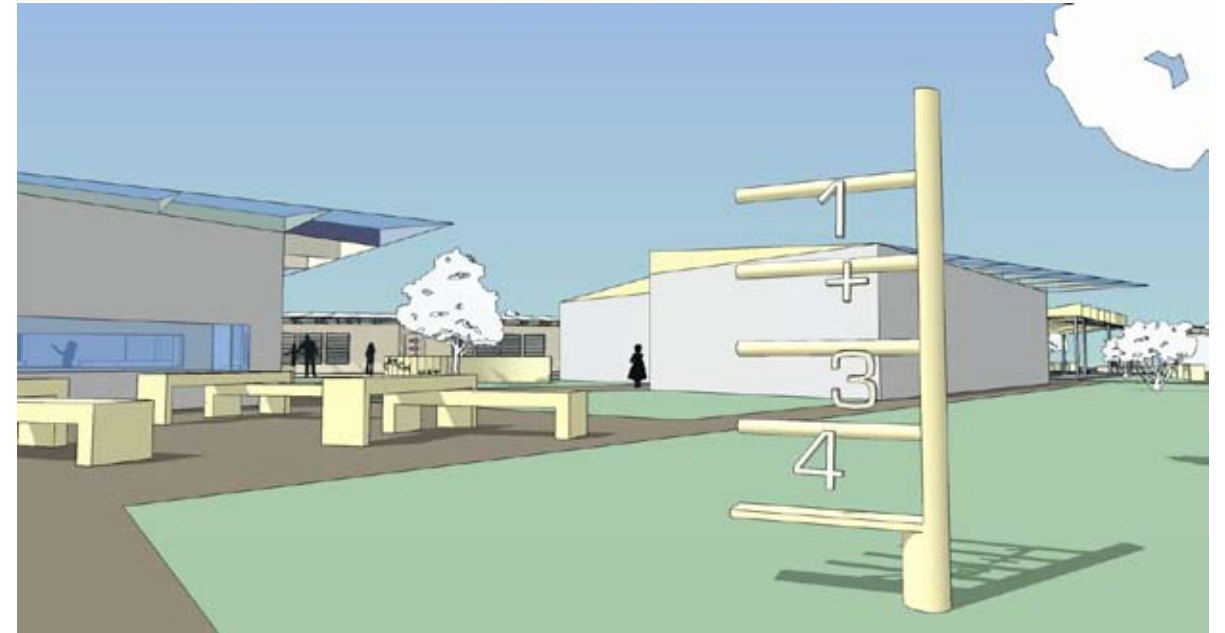


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Every wall, window, or piece of playground equipment is designed as a potential teaching tool.

- A ruler on exterior walls teaches measurement. A window shutter can pivot in a new way or have teaching aids (such as pindoards or chalkboards) built into it that make opening the classroom up for air a teachable experience.
- Students can rearrange and reorder furniture using their their own rules and imagination giving them control over their environment.
- Playground equipment is designed to teach students about leverage or centrifugal forces.
- Maps of Liberia and Ganta inscribed onto the classroom block walls that address the student entry allow students to learn about their country and their neighbors within with which they are familiar.



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2.1 Design Commentary

2.1.1 Architectural Program

The facility will educate primary and junior secondary grades. The population it serves is expected to be approximately 360 children (35-45 per classroom), educating primary and lower secondary grades. The architectural program elements, incorporated in the design are as follows:

Education Functions

- 9 classrooms (6 primary and 3 junior secondary)
- 2 student restrooms for boys (3-4 stalls per room)
- 2 student restrooms for girls (3-4 stalls per room)
- Library
- IT Center and Computer Lab
- Canteen
- Science Laboratory
- Radio Transmission Station
- Solar systems to run designated equipment
- Playground
- Football Field
- Water Well and Tower
- Agriculture garden, Fruit Trees, Reforestation
- Recycling Area

Administration Functions

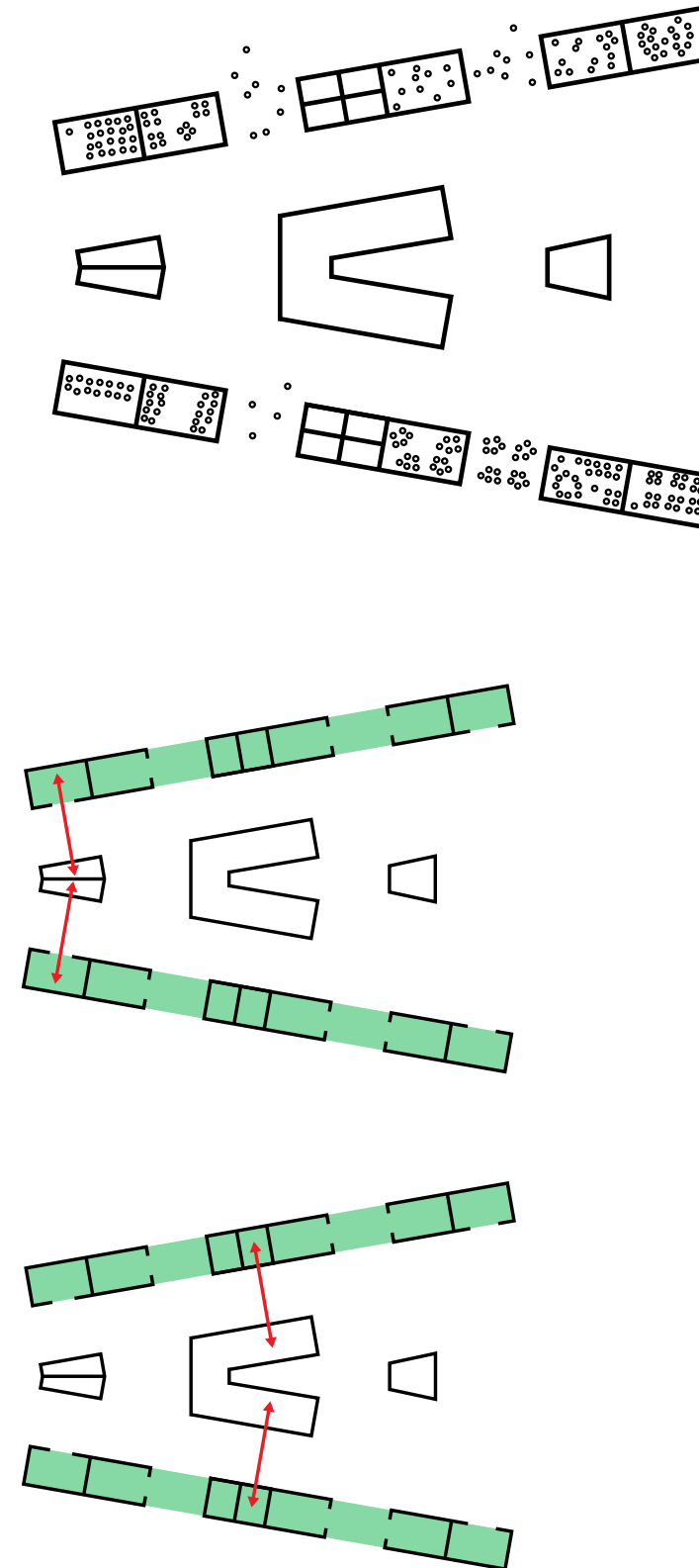
- Health Room and Mobile Clinic Garage
- Principal's Office
- Administration Area (open plan with separate resource room for teachers)
- 1 men's restroom in administration block
- 1 women's restroom in administration block

Community Functions

- Gathering space for community
- Resource/Reading room for community
- Cultural Space for teaching dance/theatre classes and for community performances
- 1 public men's restroom
- 1 public women's restroom

Future Phasing

Throughout the design process, the community and the country office voiced a desire to include additional program elements such as teacher housing and senior secondary classrooms. The site has plentiful space which will allow for the future expansion. In anticipation of this, the classroom blocks are designed to be easily replicable by the community, while the community center uses more complex structural elements. Sites for future teacher housing will be explored based on school needs in future phases.



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2.1.2 Site Context

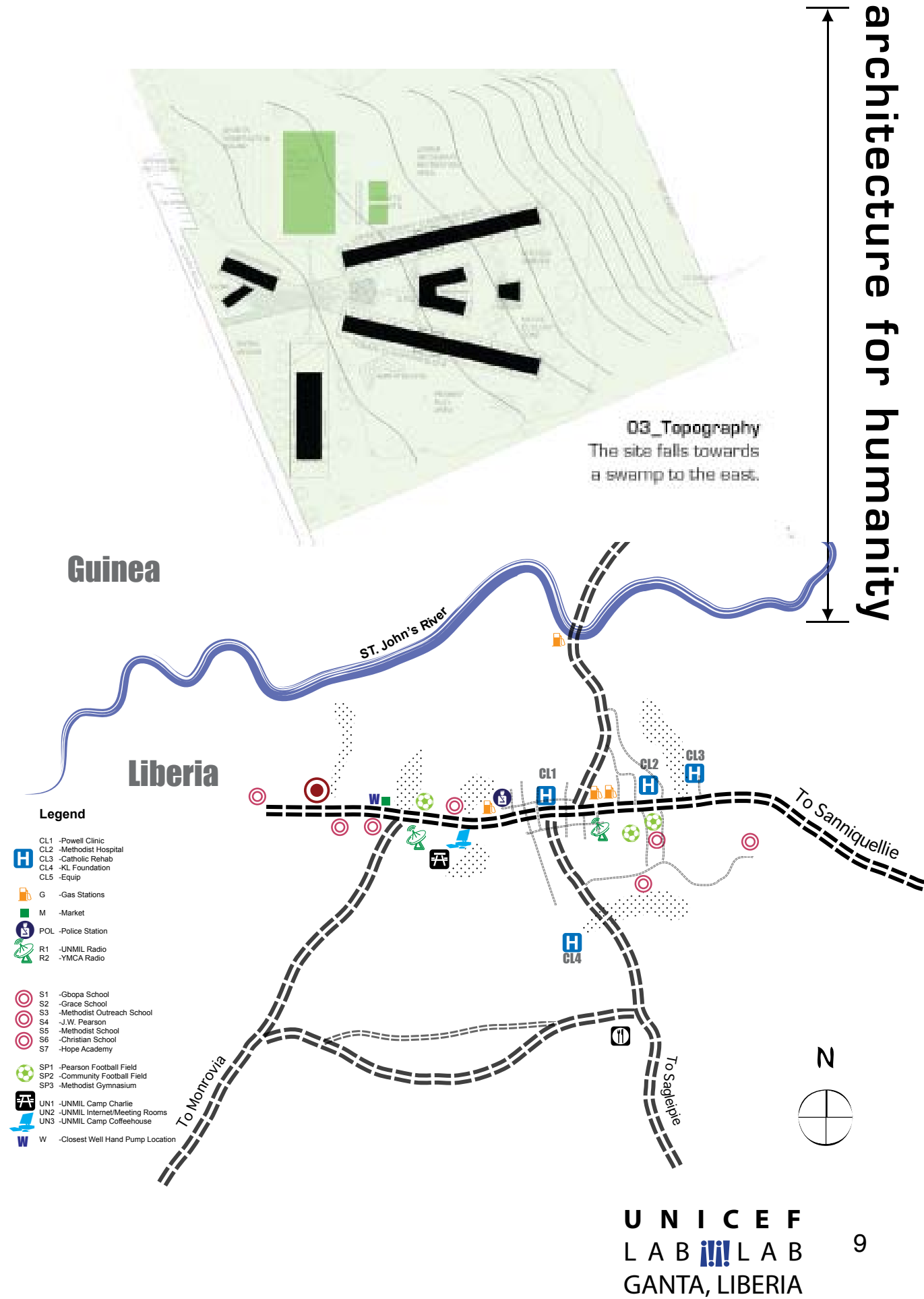
Ganta, a town of approximately 35,000, according to a recent census, is located approximately 2km south of the Saint John River, the border between Guinea and Liberia. Ganta, while far to the northeast of Liberia, is one of main transit hubs in the country. Many of the coastal roads in Liberia are in severe disrepair or non-existent (from the war or flooding) which has forced much of the road travel between Monrovia and the southern half of Liberia through Ganta (or via by helicopter or by sea). The main road between Monrovia and Ganta is in varying levels of disrepair. In some sections the road well paved, while in other sections the pavement is non-existent. The most difficult sections of the road to traverse are those that are partially paved and partially dirt road as the earthen section will wash out and create large potholes, slowing down traffic.

The site is located approximately 5km west of the center of Ganta, between the towns of Gbloyee and Gbuyee. The road to the site is not paved, but has recently been widened, compacted and crowned by UN MIL as part of their assistance in the clearing of the site. The improved quality of the road has already increased the amount of usage of people traveling along the road on a typical day. Most people traveling around Ganta, do so by foot. There are also, motorcycle taxis that are also a regular means of transport for some people. Only the very affluent, NGO’s, the UN or yellow taxis typically use vehicles.

An area of 25-acres was given by the community for the construction of the LAB4LAB school. The site slowly tapers from the top of a hill on the west property boundary until about the middle of the site where the slope falls off down to a swamp. The “swamp” can at times have low water, but is generally an area of saturated ground that catches the runoff from two hills and then flows into the St. Johns River approximately 2km to the north. The existing vegetation on the site consists of low trees and bushes, with very little old growth trees. Most of the vegetation is to the west and top of the hill, while the steeper portions of the site do not have as much growth.

Approximately 8-9 acres at the southwest corner of the site have been cleared by UN-MIL, the other portion portion is covered with low-bush and trees.

A more detailed area survey, which includes discussion of services in the area, is included in this reports Appendix.



2.1.3 Site Plan

The site plan creates gathering spaces and encourages interaction using open spaces to “stitch” together buildings with specific uses and create quiet moments for different types of engagement. The idea of “stitching” refers not to the buildings but to the common space between the buildings that bring people together and encourage interaction. The heart of the campus is where those common spaces meet inside the entrance between the administrative blocks and the other school buildings.

The siting of the administrative block serves as a gateway to the campus.

Students enter the campus by passing a common school bulletin board outside the administrative office and are greeted by play sculpture and covered gathering space which can also be used for open air teaching.

The single narrow entrance prevents entry without first passing the administrative office and allows the campus to be easily monitored.

Visual cues and reference points help students to easily find their way to all parts of the campus. The administrative block offers site lines to all of the structures while ensuring that activities take place within administrator’s views.

The entrance of the campus is designed to signal change both in it’s architecture and in it’s engagement with the street.

The meeting of the administrative block, clinic and community center creates a natural entrance and gathering point.

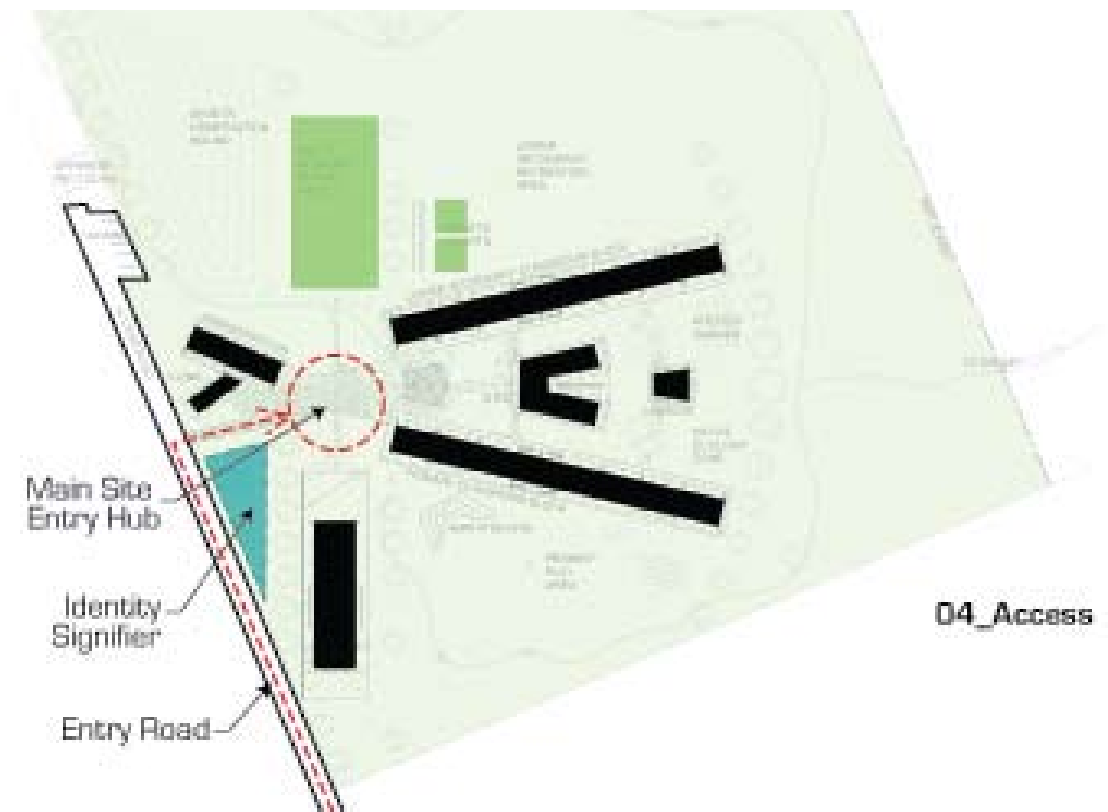
The entrance to the campus is designed to engage the community and invite visitors into the community elements of the school while protecting the students and providing security for classroom areas.

The building structures form a “seam” (building-open space-building). This gives passers by site lines into the heart of the campus rather than “walling” off views of the activities taking place within.

A playground area in the front of the complex gives children a place to play when their parents are using the community center and outside of school hours.

Landscape changes and the interpretive trail provide a visual and intuitive distinction between the community spaces (radio station, theater and resource center) which may be open later hours, from the protected spaces (administration building, classroom buildings, canteen, school library and computer lab).

A perimeter fence and gates provide security for the campus as a whole during non-school hours, while also protecting the gardens from animal pests and pilferage. In addition the perimeter fence will keep many inhabitants from building onto the school site, which is a very common occurrence and will only be worse as people move to be closer to the new school.



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2.2 Landscape

Access to the outdoors is important to health and quality of learning - gardens, learning sculptures and play spaces dot the campus. According to the Child Friendly Schools principles, it is critical to allow easy access to open spaces, so the children can be in close contact with their environment as well as promoting physical activities.

The overall approach in LAB4LAB site in Ganta, is to provide a pathway - what we're referring to as the "Interpretive Trail" - around the entirety of the facility so children of all ages can begin to contextualize the scale and extent of their school and surroundings as well as contemplate and engage with the local ecology and environment in an organized manner.

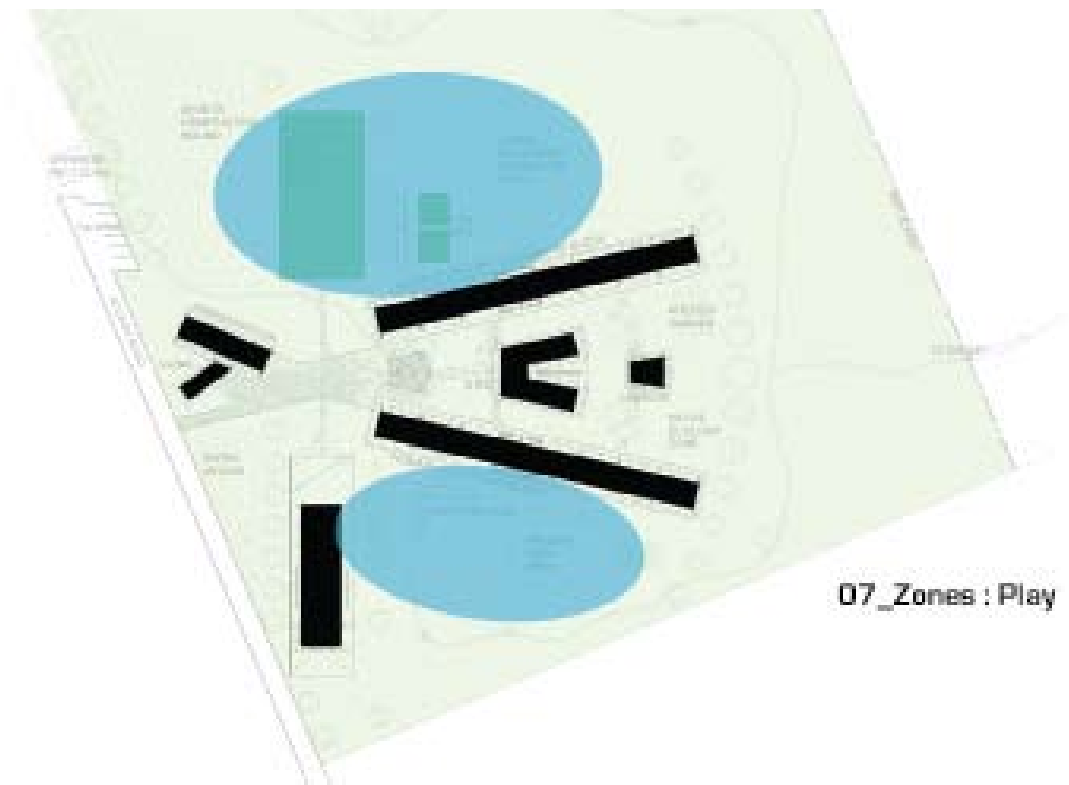
The school grounds will be re-vegetated in a planned manner with native plants and trees by nature itself. It will not take long before the areas that are left to grow will become a habitat for native plants once again. In addition to areas for native regrowth, there will be a small demonstration garden; for teaching the basics of agriculture and cultivated fruit trees. The landscape provides for safe access to the play spaces, a means to engage with the natural environment, while the perimeter security fence will be present, it will not dominate the landscape, with soft landscaping elements providing a 'buffer' to the fence.

2.2.1 Learning Landscapes and Play Spaces

A series of covered outdoor spaces provides opportunities for interaction and outdoor teaching. The largest of these lies at the heart of the campus. Two interior courtyards provide areas for quiet contemplation, conversation and study. The first between the administrative block and the clinic serves the school staff; the second between the library and computer lab serves the students and faculty.

Dotting the campus are a series play spaces and learning sculptures, which are placed alongside frequently used pathways to encourage interaction. Examples include:

- * Energy Generating Merry-Go-Round: A merry-go-round produces energy, teaches learners about kinetic energy, power usage and supply.
- * Giant Magnet Writing Wall: Children can spell words and form sentence from magnetic letters and words teaching the alphabet and basic sentence structure.
- * Tactile Mega Maps: National and Local Maps which are etched in the classroom block walls and provide a daily location reference for the students as they enter the school.
- * Liberian History Trail: Adjacent to the Primary Play Area, the history trail will depict the of the coast of Liberia and include stations which relate formative events in Liberia's past.
- * Number Stand: By arranging numbers and mathematical symbols students can create simple equations.
- * Simple Mechanics: A sculpture that teaches the simple mechanics (lever, pulley, etc.).
- * Living Machine: An on-site water treatment system made of vegetation teaches basic science and the importance of health and sanitation.
- * Life-size Ruler: A giant ruler painted along the outer wall of a classroom wall teaches distance and measuring.
- * Interpretive trail : a trail around the school campus with a number of stations which address natural systems, the building environment, and physical well-being.



Sustainable Ecology

Two garden areas are designated (a kitchen and nature garden) and fruit trees will be planted along the eastern edge of the site. These areas will provide a learning opportunity regarding food production as well as lessons in local vegetation. To further learning in sustainable ecology, a compost area will be provided near the garden areas. A garbage collection area will be provided on the north edge of the site. Although there are no municipal services in Ganta, this will allow a centralized area for non-compostable waste collection and begin to train the school and community in recycling measures and options.

2.2.2 School Commons

Placed at the heart of the campus, the siting gives visual importance to these common spaces and provides easy access to learners at all grade-levels. The interior courtyard provides a quiet covered outdoor space where students can study individually or in groups. Breezeways in the classroom blocks adjacent to the canteen allow students to eat outdoors when the weather permits.

These common facilities are surrounded by “learning sculptures” providing opportunities for interaction and learning in the everyday life of the student.

2.2.3 Sports Field

The sports field is 20m x 40m and is located on the north side of the sight, in alignment with the community center which provides a strong orientation of the community functions along the north-south axis. The north-south orientation also provides the best orientation for day use. In the interstitial space between the field and the road, an earthen mound will provide tiered, theater seating for spectators.

The field can be easily observed from the administration building, and is accessible from the classrooms but does not pose a distraction for children in the midst of lessons or study. The size of the field allows for multiple organized play options for older children and by both genders - including football, kickball, field hockey, and badminton. It is also accessible for use by the community in off-school hours.

2.2.4 Sports Courts

To the east of the sports field there are two sports courts for hard-court activities. These courts will be designed for organized play and will be accessible by both genders, the specific activities could include volleyball or handball. According to the principals of the Child Friendly Schools Chapter 3, an effective measure is to engage the children in layout out of the games area since they understand the needs and requirements. This activity with the children and community can be performed early in the coming phase to enhance the design as well as community involvement and participation.

2.2.5 Playgrounds and Interpretive Trail

The Interpretive Trail meanders around and through areas of the school and provides a variety of different activity zones addressing needs of students at different developmental stages. The trail provides an opportunity to engage or observe engagement with the large group play areas, smaller group areas, and discrete nooks for solitary reflective recreation.

2.2.6 Kitchen Garden

This area is planned to be a demonstration of best practice horticultural technique, skills and experience learned in the garden are easily transported to the home home environment. The day-to-day activities of the garden can also provide a learning opportunity for students, for practical experience in horticulture and agriculture which could include the raising of dairy goats and chickens for eggs.

The learning opportunity can be enhanced by partnering with a specific agriculture program such as “The Growing Connection” that provides relative fool-proof ready-to-grow boxes and learning opportunities by technology uplinks between schools within the program (www.thegrowingconnection.org).

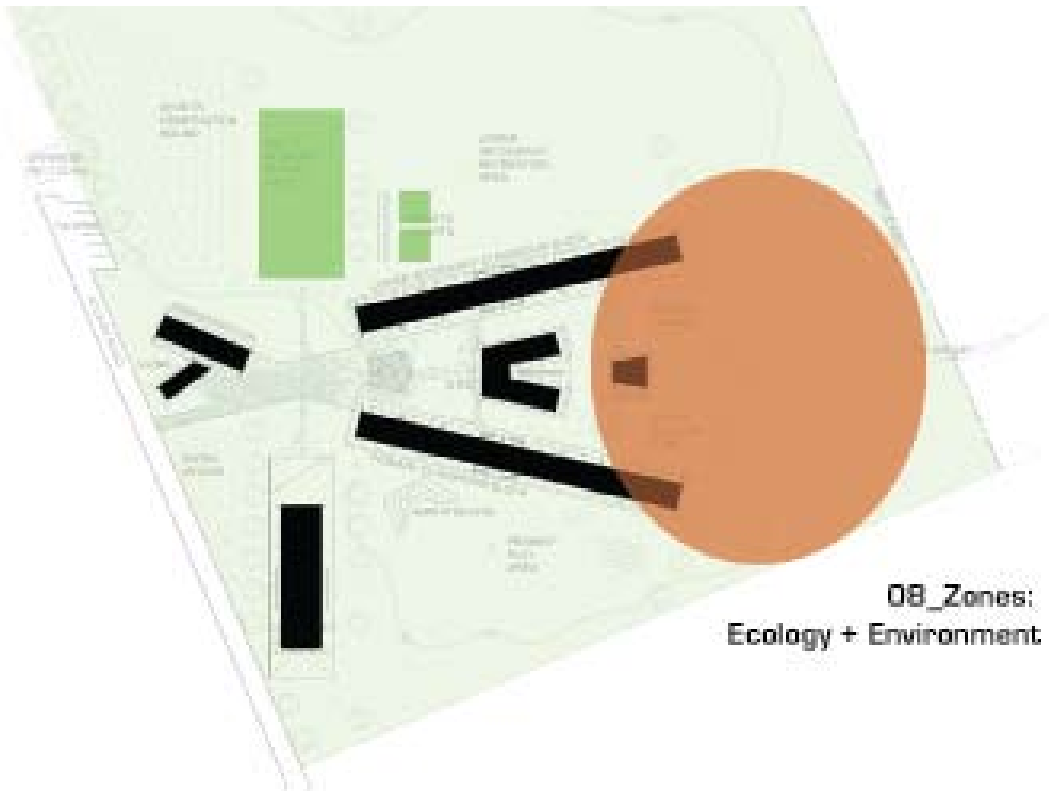


2.2.7 Native/Education Garden
Beyond the vegetables produced for the mid-day meal, a Native Garden will be provided to allow a connection for students to learn the value of native habitat. This will learning opportunity could be enhanced through science class or a partner conservation program and attaches importance to the student's own culture through perennial species of plants as well as indigenous fruit and nut trees. This could also allow for children to educate their families in the use and cultivation of native plants for the sustenance of their families.



Photographer: Shannon McGrath

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2.3 Building Layouts

2.3.1 Typical Classroom Block

Here emphasis is placed on creating a comfortable learning space that supports a wide range of teaching styles such as teaching in the round, or more traditional teacher focused learning.

Classroom Entry

When asked to draw their classroom in a recent study, interestingly a majority of students drew the door to the classroom. Therefore the entrance to each classroom is distinct and serves as a greeting each morning. Each door is painted with a large abstract symbol based on a common stitching pattern that identifies that classroom and makes it unique as well as providing an aesthetic theme to the classroom. Inside each classroom the same pattern is embedded into the flooring using a change of materials to form a semi-circular or circular pattern. The teacher can use the pattern as a guide to move furniture into place or to have learners sit in a circle. The pattern in each classroom would vary and would be based on common stitching patterns.



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Site Lines and Security

The two classroom blocks extend at divergent angles from the central axis through the administrative block, computer lab and canteen. Clear sight lines down each classroom block allow administrators to easily view activity taking place outside the classroom. The classroom blocks are made up of 5 classrooms each and a bathroom facility, one block will be made up of the primary education classrooms, the other block will contain a classroom for the primary-to-secondary transition classroom and a science laboratory. To enhance natural ventilation possibilities along the length of each block there will be a centrally located breezeway.

Ventilation and Daylighting

The facilities in the classroom blocks will be designed to maximize natural ventilation and daylight while minimizing solar gain. This airflow and light will be provided with a “perforated” exterior envelope, achieved by using spaced blocks and operable panels (doors and windows). In order to ensure adequate light and ventilation, 20% of the classroom floor area is window area, no electricity is proposed in these areas.

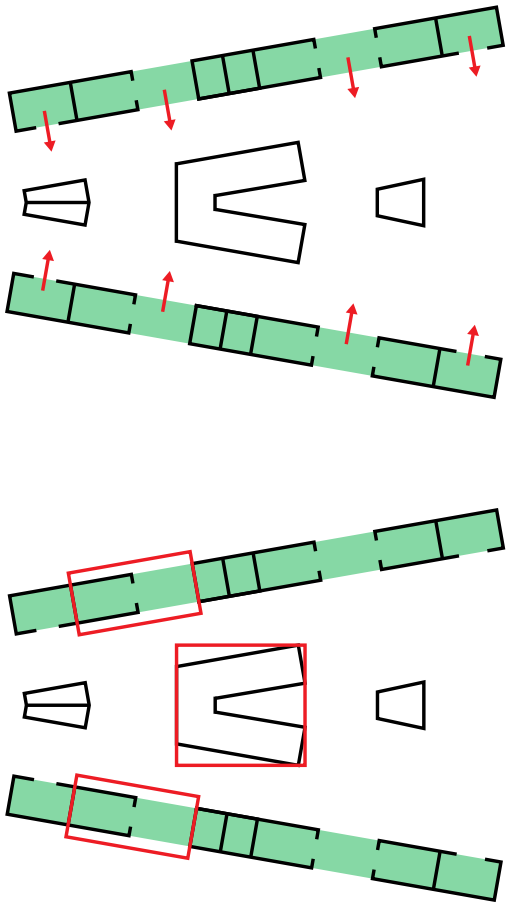
Storage and Learning Aids

The student’s possessions are stored and secured in locking cabinets and bins provided in each classroom. Interior partition walls are constructed of hollow block. Chalkboards will be mounted on both ends of the room to support a variety of learning styles. The structural abutment (adjacent to the doorways) can double as a classroom “bulletin board” allowing teachers to communicate with students and share student work with the rest of the rest of the school.

Breezeways

The classroom blocks each have two breezeway spaces. One breezeway in each block allows access to an art/project space (for the primary students) and a science space (for the lower secondary students). These spaces provide more room, enhanced ventilation and access to a wet area to provide a wash station for the students or equipment and perform messier experiments/activities. The other breezeway provides an opportunity for two classrooms to access a flexible project space or connect two classrooms for flexible or shared learning.

The classroom blocks also have bathroom facilities, which provide adequate facilities for the student population, separate spaces for girls and boys, dimensionally appropriate spaces for the older and younger students, handicap accessibility, adequate privacy and easy-to-use sanitation access.



2.3.2 Global Resource Centre

The Global Resource Centre will provide access to the internet, video presentations and library facilities to engage the students and community with their wider communities. The Global Resource Centre will have electricity (provided by solar panels) for the following:

- * 20 desktop computers, 1 printer and networking equipment
- * lighting - 6 lights running 3 hours in the evening
- * 1 outlet, assuming 12 hours
- * LED projector - could be moved to the multi-purpose room to show the movies

Appropriate security and ventilation are primary issues to be addressed in the design of these areas, which are adjoined, to protect the equipment and provide a pleasant usage environment for the children during school hours and the community and studying students in the evening.

2.3.3 Canteen

The canteen is located between the classroom blocks, directly east of the Global Resources Center and near the kitchen and native gardens. The cooking of the daily meal can provide constant learning opportunities - in sanitation, food preparation and handling. At the edge of each side of the canteen (where the food lines will begin), there will be a hand-washing station which will provide a chance for the teachers and staff to educate the students in proper sanitation. And the open kitchen will allow for observation of food preparation and engagement.

Running water will be provided at the canteen but no power will be provided in this area.

Cooking and baking can be provided by a high-efficiency wood oven or a solar cooker (see information in the appendix).

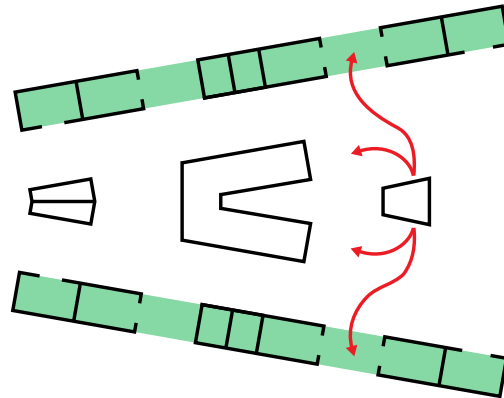
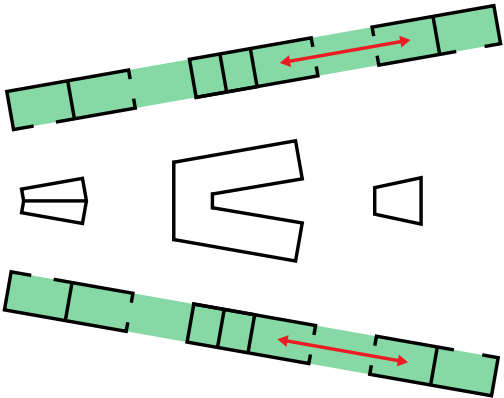
2.3.4 Administration and Health Clinic

This facility provides offices for the principal and a resource area and open-plan office space for the teachers. Teachers restrooms (one for men and one for women) are also provided in this area. The teacher's resource area will include the following equipment:

- * 4 desktop computers and 1 laptop, 1 inkjet printer, and networking gear
- * 1 outlet in the principal's office (for low power applications only)

The health clinic will provide a small private health room to consult on basic health and first aid issues of students, there is also a garage docking-station for a proposed mobile health clinic. The facility can have access to running water for a wash basin and will have a small solar-powered refrigerator for storage of vaccines. The health clinic is in an area of easy access and is located near the sport fields, courts and play grounds in order to quickly treat minor injuries. To assist in proper diagnosis of illness, natural light will be provided through translucent openings or clerestory windows which will also provide privacy and security. The equipment provided in this space will be as follows:

- * small solar fridge (low power)

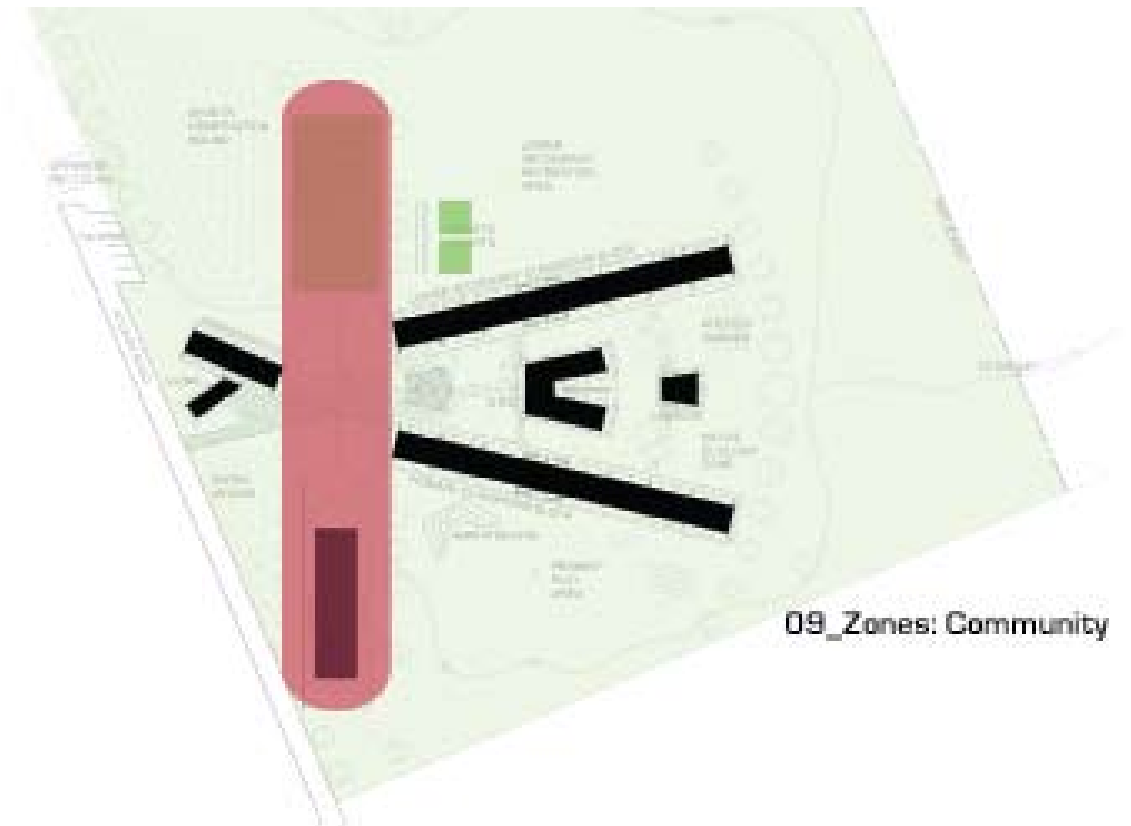


2.3.5 Community Centre

The broader goals of the Learning Along Borders for Living Across Boundary initiative are achieved through the functions of the community common area, which adjoins but is separate from the school campus. Community spaces are deliberately sited adjacent to the street to encourage access. A small radio studio offers communication with the larger community and access to centers of power. A covered theater offers opportunities for larger events, showing films, and hosting performances. A larger multi-use spaces serves as an arts space, dance studio and performance space for the school as well as a community meeting area during school off-hours. A resource center will provide a reading room and small meeting area for the community.

All spaces in the community centre will be lighted and power will be provided in order to run the LED projector (borrowed from the Global Resource Centre) and laptop (borrowed from the principal) to show movies to the community. Specific equipment provided is as follows:

- * outlet to power LED projector and laptop
- * equipment for basic radio station (see appendix)
- * lights for multipurpose area, resource room and radio station



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2.3 Materials
2.3.1 Site/Landscape
Use of durable locally available natural materials have been selected where ever possible.
Landscape materials selection will be developed further during documentation.



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2.3.2 Roof

Generally the roof is corrugated sheet metal on timber trusses. The roof structure is ventilated to provide improved natural ventilation to interior spaces. The ventilated roof cavity has a plywood ceiling lining creating a plenum between the roof and the ceiling where hot air rises and is pulled through by convection.

2.3.3 Walls (External)

Classroom Wall System – infill “perforated” blocks (solid to 3-ft high) on one side and operable window/wall

Option 1 – composite earth block wall with operable openings

Option 2 - cement block wall with perforated blocks, plaster finish and operable openings

2.3.4 Walls (Finish)

* Natural finishes - materials will be chosen for the inherent materiality, durability and ease of maintenance

* Plasters and paint - colors will be used for identity and way-finding in accordance with the concepts put forward in the Child Friendly School manual

2.3.5 Foundation and Floor

* Concrete Block Footings

* Cast-in-Place Concrete Floor

2.3.6 Ceiling

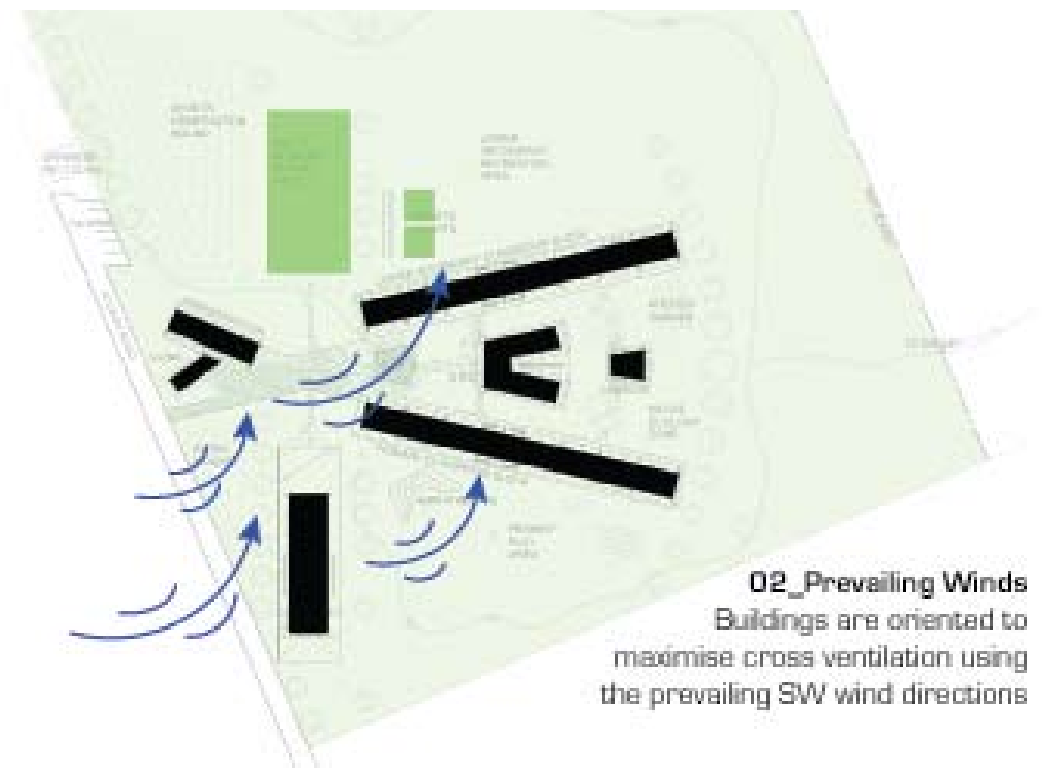
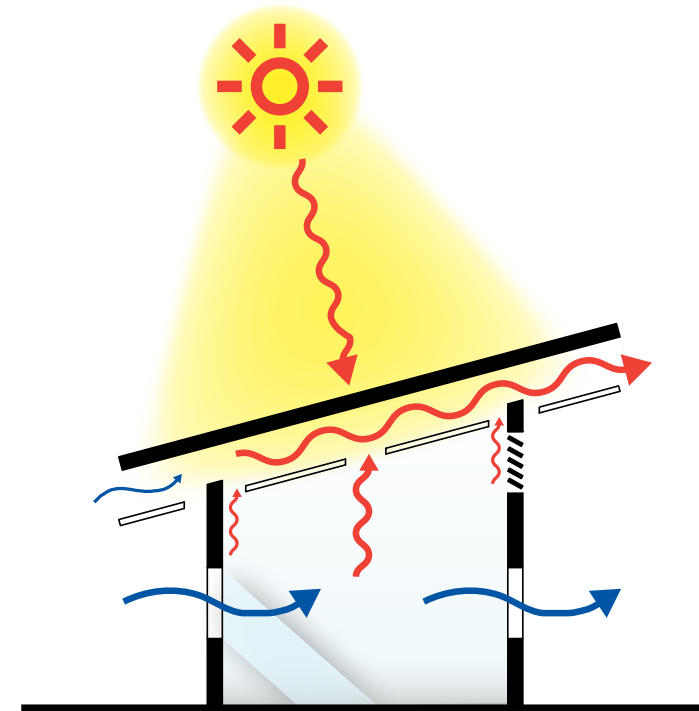
* Dropped wood panel (painted 1/4” plywood ceiling, is most common)

* Exposed ceiling

3.0 Cost Analysis

will be submitted separately

annual expected maintenance costs will be submitted separately



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Legend

Project Notes

NOT FOR CONSTRUCTION

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LAB 4 LAB BORDER SCHOOL

Ganta, Nimba, Liberia

UNICEF

Monrovia, Liberia

General Information / Legends

DESIGN DEVELOPMENT

NOVEMBER 20, 2008

SCALE
SEE NOTED

SHEET TITLE

General Information / Legends

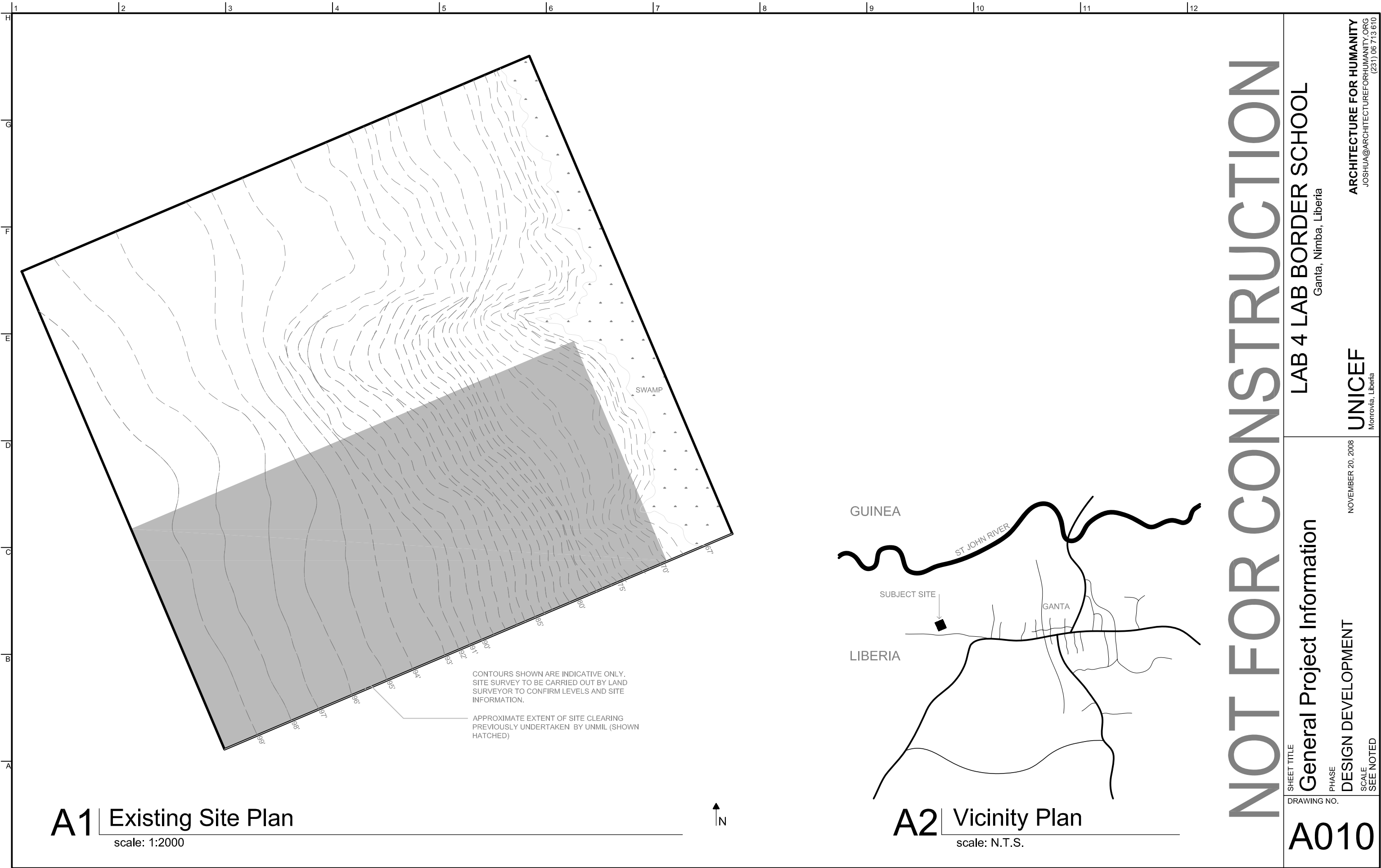
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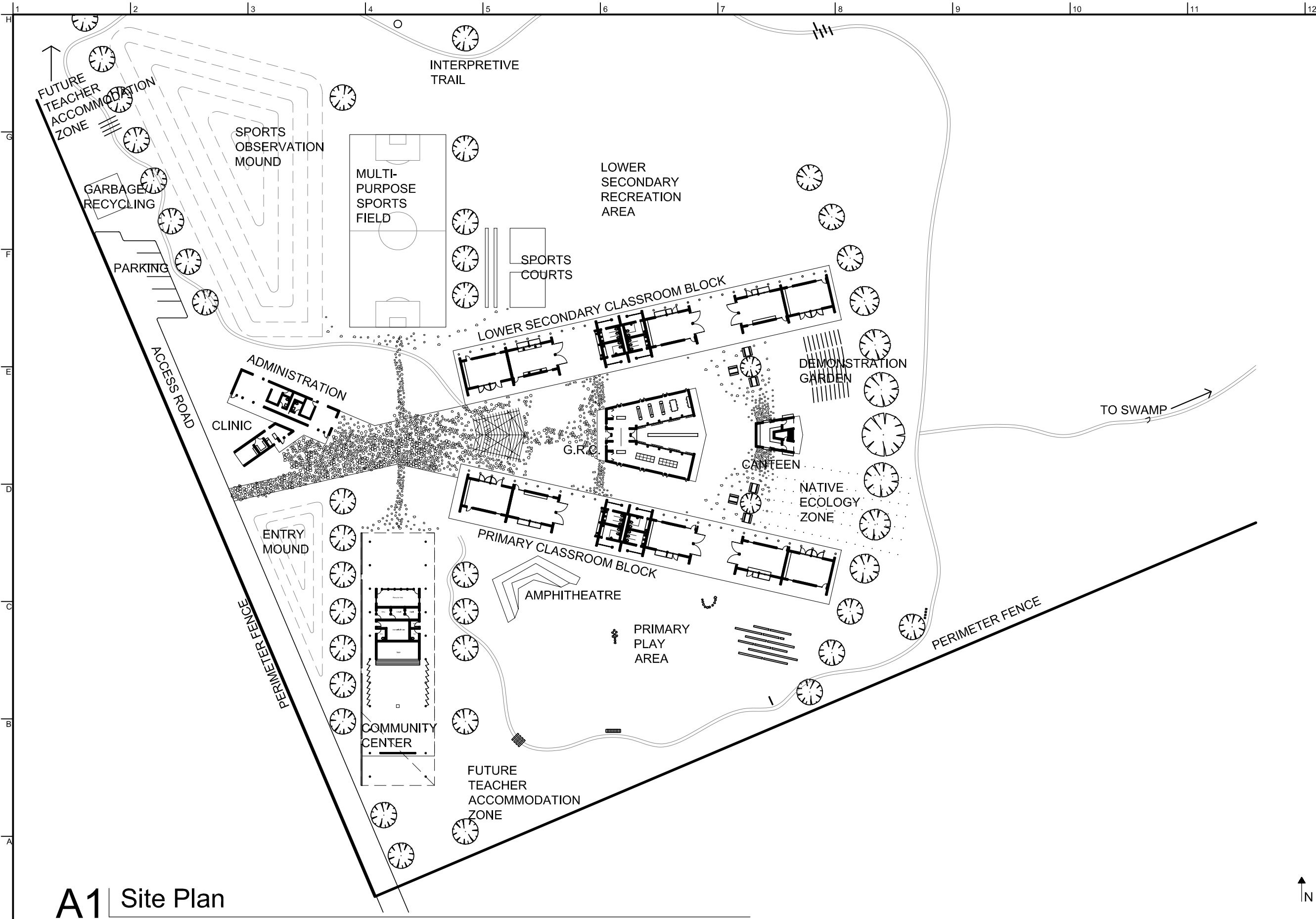
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(231) 06 713 610





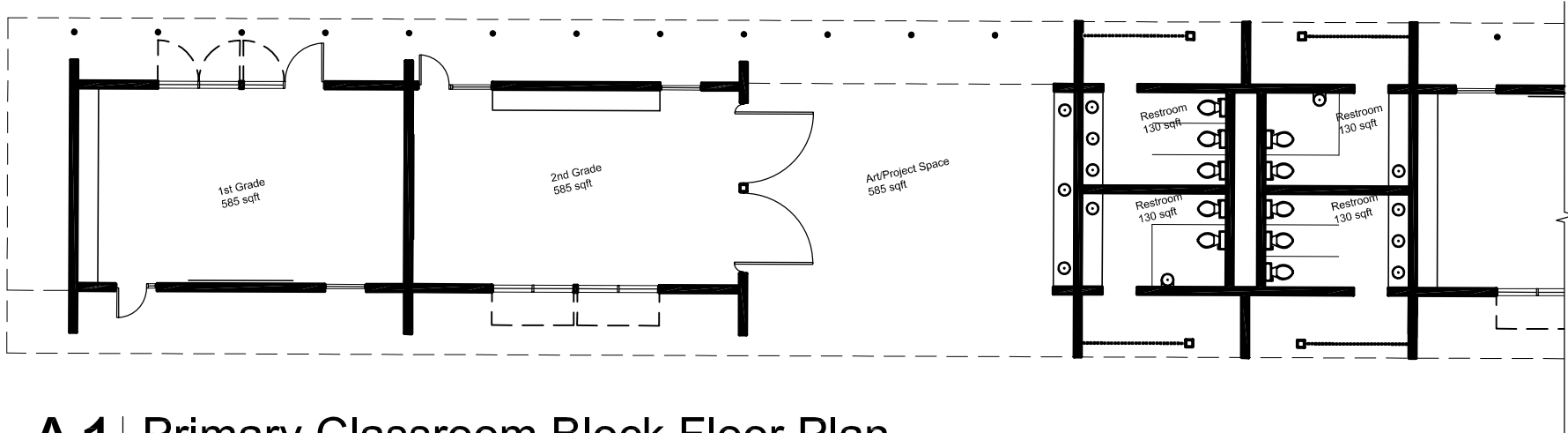
A1 | Site Plan
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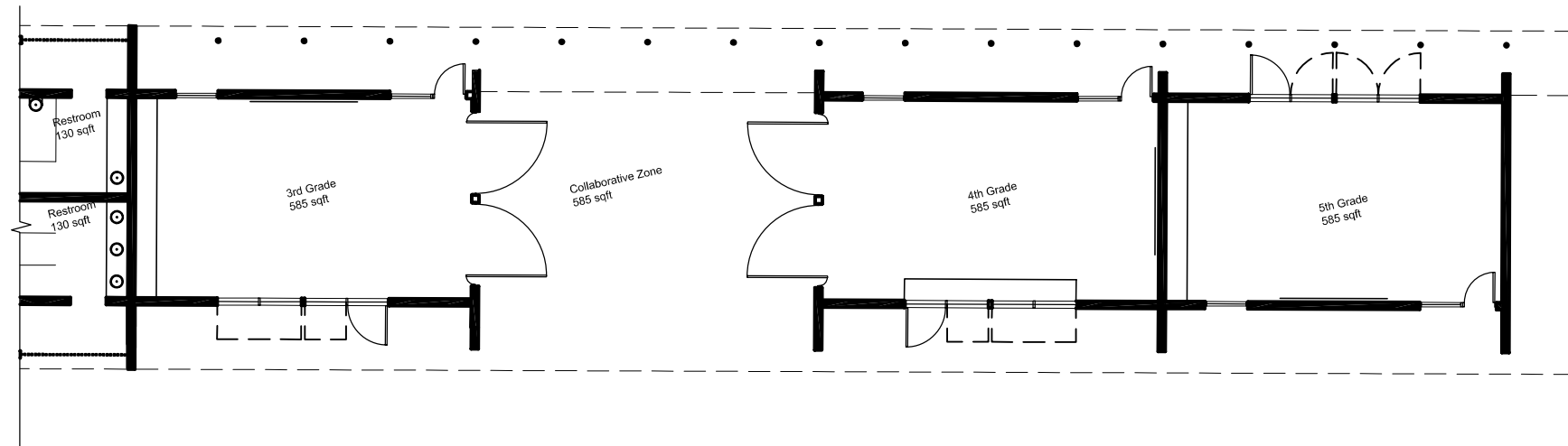
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PHASE	DESIGN DEVELOPMENT
SCALE	SEE NOTED
DRAWING NO.	A020

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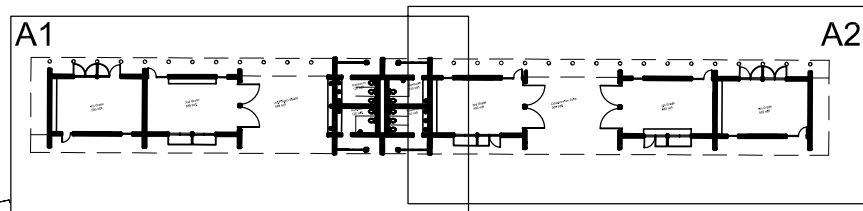
NOVEMBER 20, 2008



A1 Primary Classroom Block Floor Plan
scale: 1/16" = 1'-0"



A2 Primary Classroom Block Floor Plan
scale: 1/16" = 1'-0"



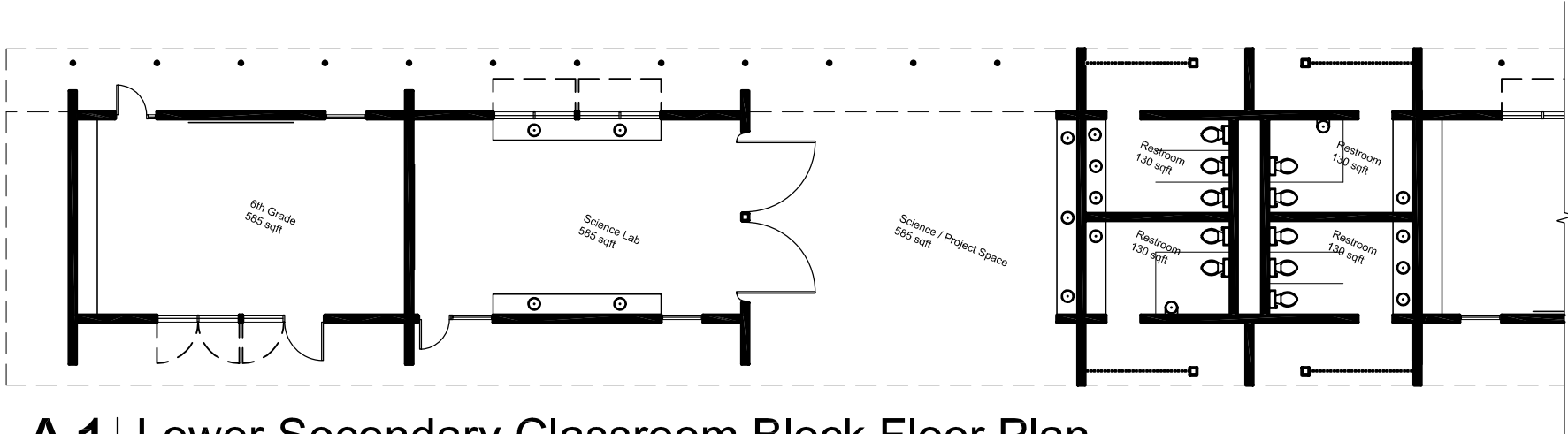
A3 Key Plan
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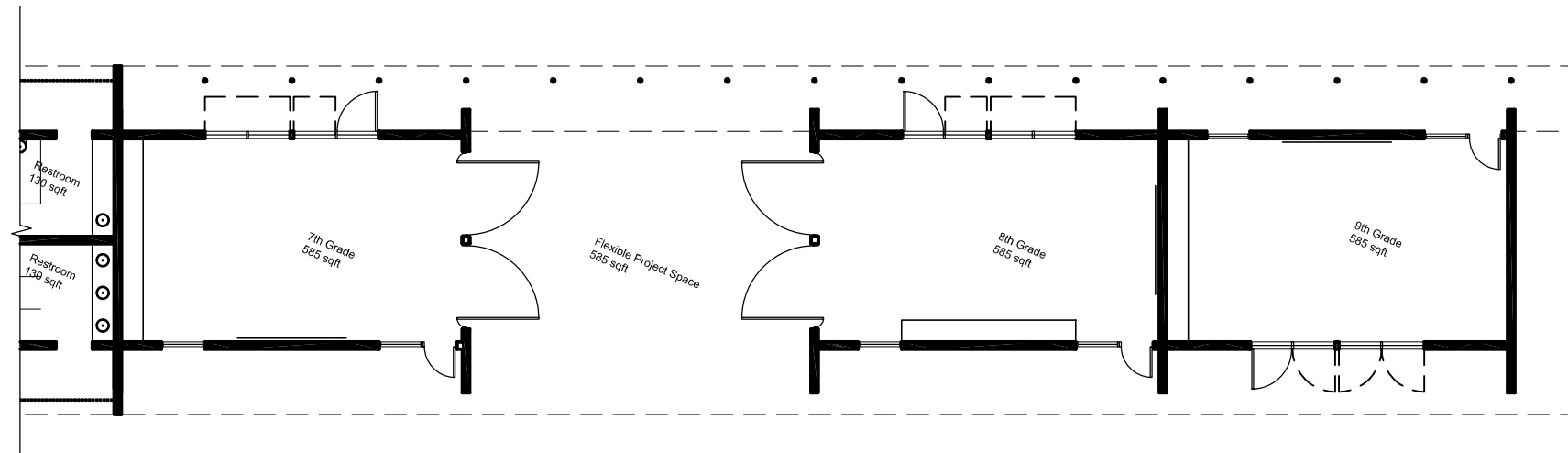


<p>LAB 4 LAB BORDER SCHOOL Ganta, Nimba, Liberia</p> <p>UNICEF Monrovia, Liberia</p>	<p>Classroom Block Floor Plan</p> <p>DESIGN DEVELOPMENT</p> <p>NOVEMBER 20, 2008</p>
<p>ARCHITECTURE FOR HUMANITY JOSHUA@ARCHITECTUREFORHUMANITY.ORG (231) 06 713 610</p>	<p>SHEET TITLE CLASSROOM BLOCK FLOOR PLAN</p> <p>PHASE DESIGN DEVELOPMENT</p> <p>SCALE SEE NOTED</p>

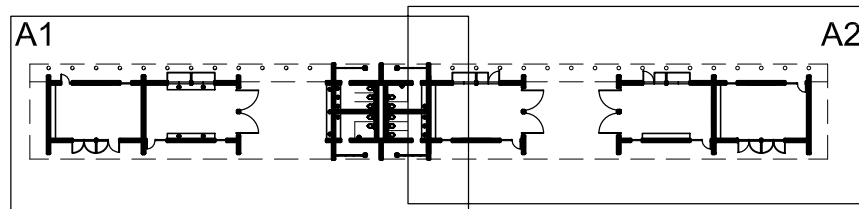
A110



A1 Lower Secondary Classroom Block Floor Plan
scale: 1/16" = 1'-0"



A2 Lower Secondary Classroom Block Floor Plan
scale: 1/16" = 1'-0"



A3 Key Plan
scale: 1/64" = 1'-0"

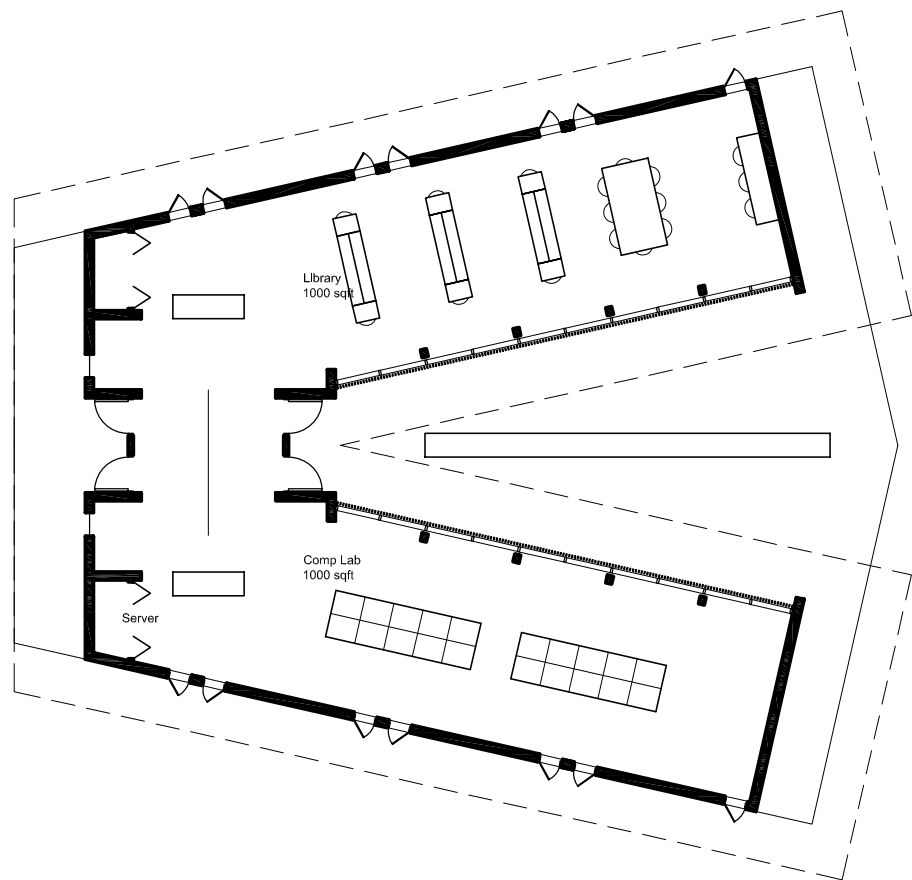
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<p>LAB 4 LAB BORDER SCHOOL Ganta, Nimba, Liberia</p> <p>UNICEF Monrovia, Liberia</p>	<p>Classroom Block Floor Plan</p> <p>DESIGN DEVELOPMENT</p> <p>NOVEMBER 20, 2008</p>
<p>ARCHITECTURE FOR HUMANITY JOSHUA@ARCHITECTUREFORHUMANITY.ORG (231) 06 713 610</p>	<p>A111</p>

A1 Technology Center Floor Plan

scale: 1/16" = 1'-0"



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SHEET TITLE

Technology Center Floor Plan

PHASE

DESIGN DEVELOPMENT

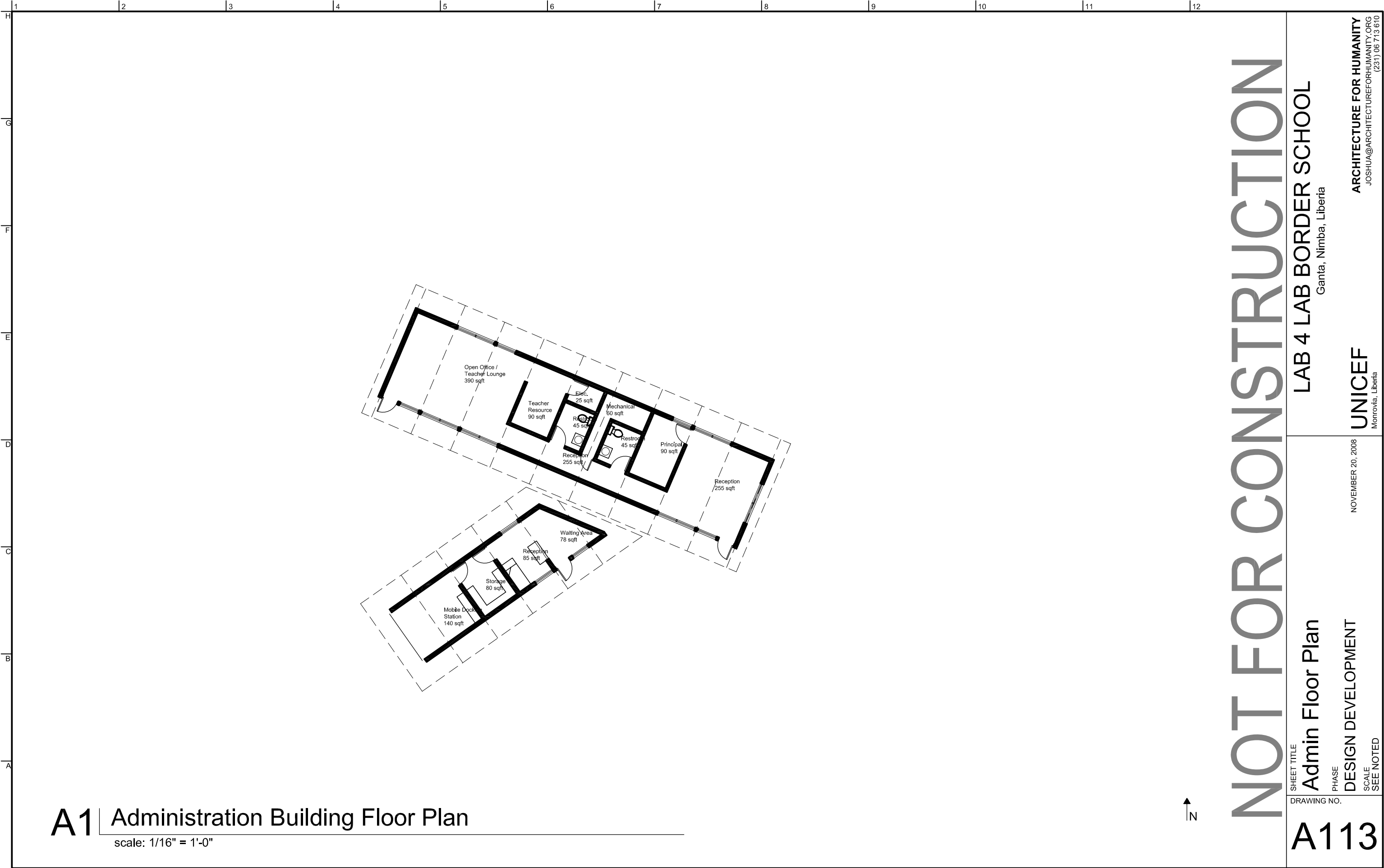
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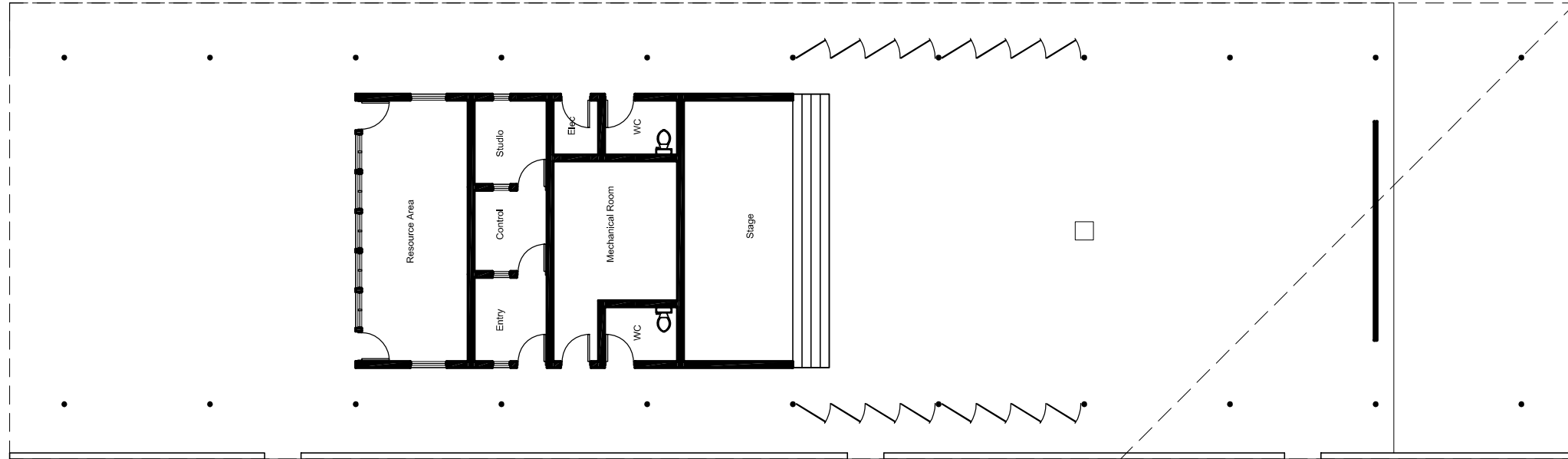
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A1

Community Center Floor Plan

scale: 1/16" = 1'-0"



Z

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SHEET TITLE

Community Center Floor Plan

PHASE

DESIGN DEVELOPMENT

SCALE
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scale: 1/16" = 1'-0"



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Canteen Floor Plan

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(231) 06713610

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scale: $1/16" = 1'-0"$



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Technology Center Roof Plan

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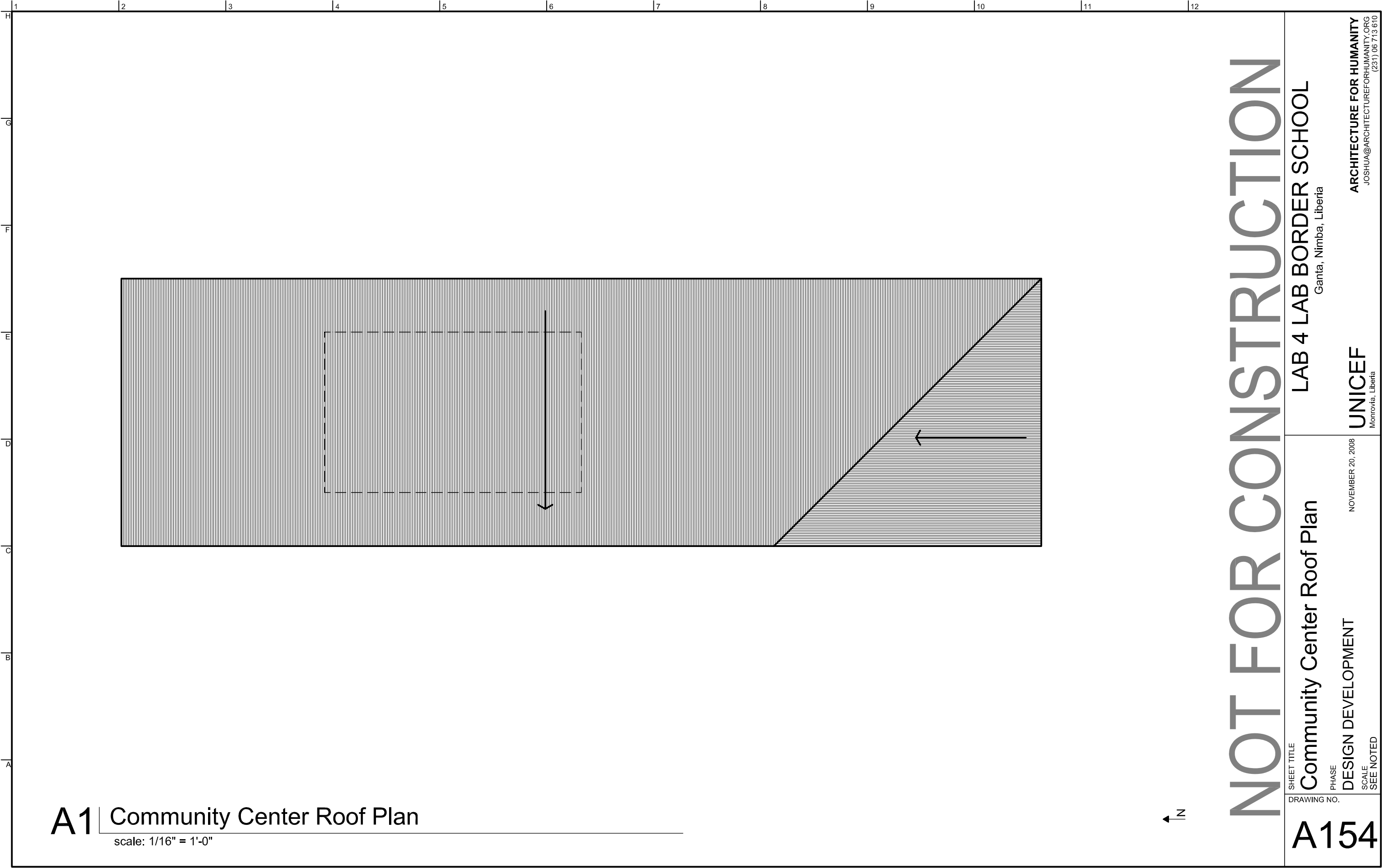
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A1 | Community Center Roof Plan

scale: 1/16" = 1'-0"

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SHEET TITLE

Community Center Roof Plan

PHASE

DESIGN DEVELOPMENT

SCALE

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DRAWING NO.

A154

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scale: $1/16" = 1'-0"$



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A155



A1 | South Elevation Technology Center

scale: 1/16" = 1'-0"



A2 North Elevation Technology Center
scale: 1/16" = 1'-0"



A3 West Elevation Technology Center
scale: 1/16" = 1'-0"

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PHASE

Technology Center Elevations

SHEET TITLE

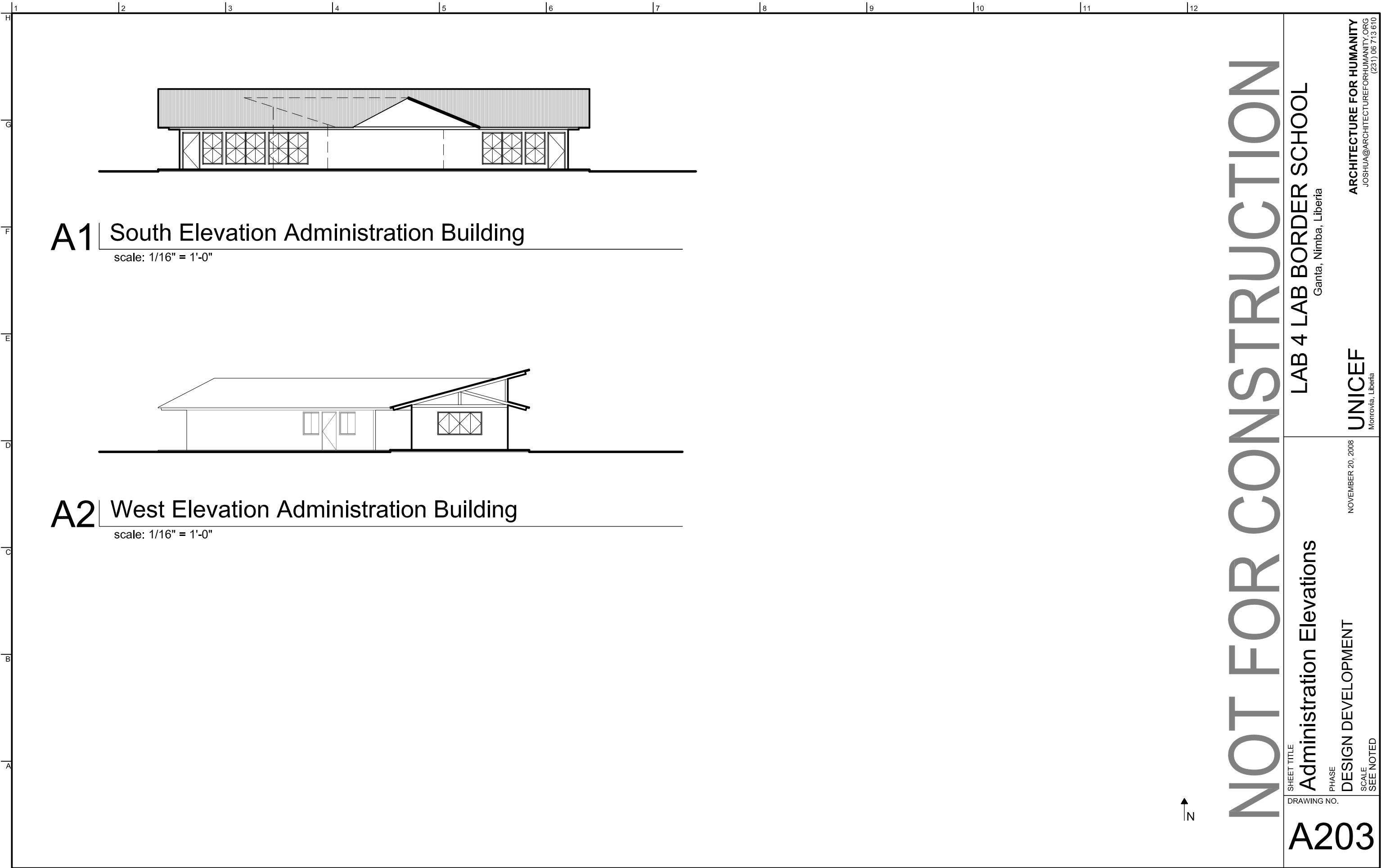
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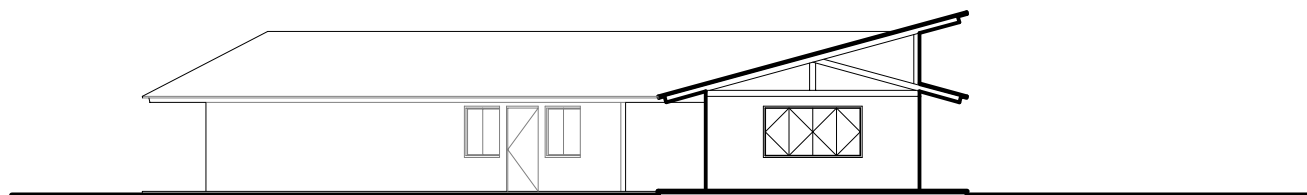
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A202



A1 | South Elevation Administration Building

scale: 1/16" = 1'-0"



A2 | West Elevation Administration Building

scale: $1/16" = 1'-0"$

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N

NOT FOR CONSTRUCTION

SHEET TITLE

Administration Elevations

PHASE

DESIGN DEVELOPMENT

SCALE
SEE NOTED

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LAB 4 LAB BORDER SCHOOL

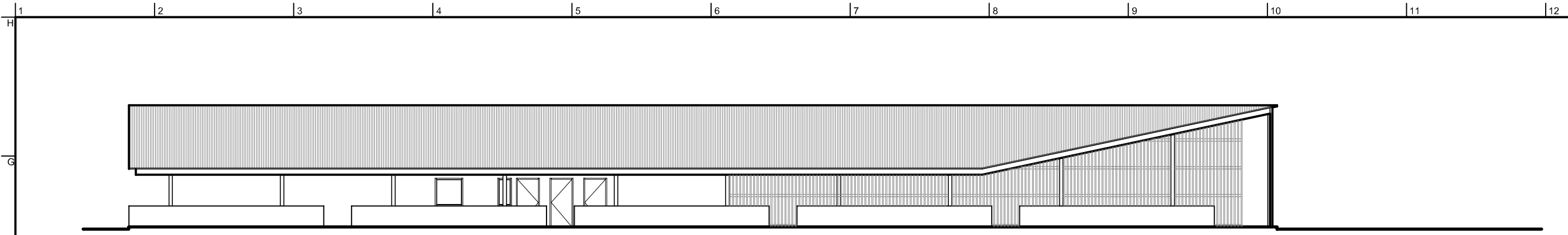
Ganta, Nimba, Liberia

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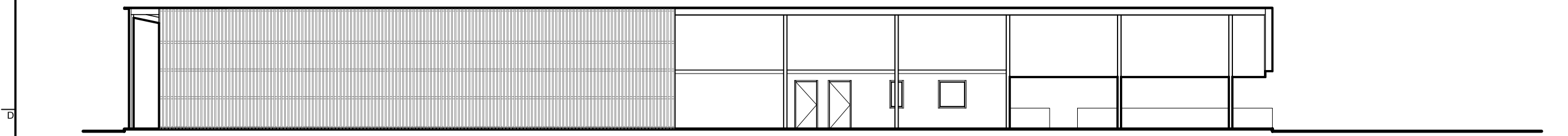
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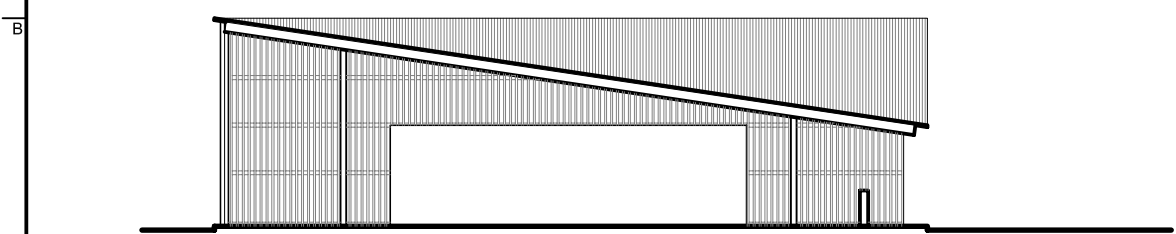
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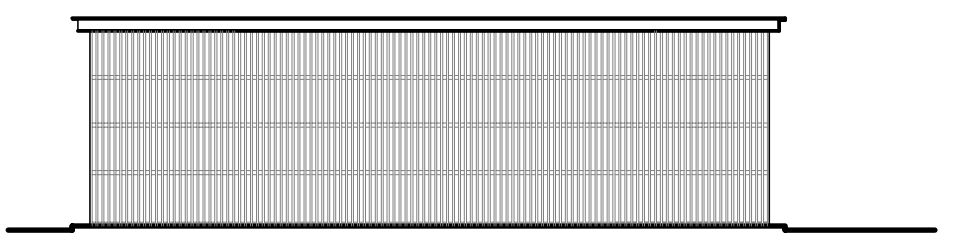
A1 | West Elevation Community Center
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A2 | East Elevation Community Center
scale: 1/16" = 1'-0"



A3 | North Elevation Community Center
scale: 1/16" = 1'-0"

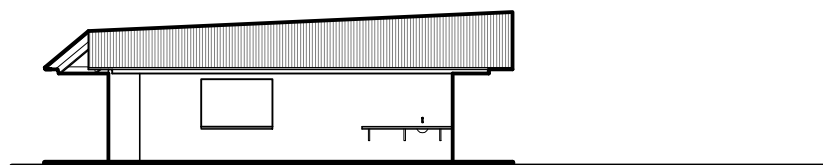


A4 | North Elevation Community Center
scale: 1/16" = 1'-0"

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SHEET TITLE	
Community Center Elevations	
PHASE	
DESIGN DEVELOPMENT	
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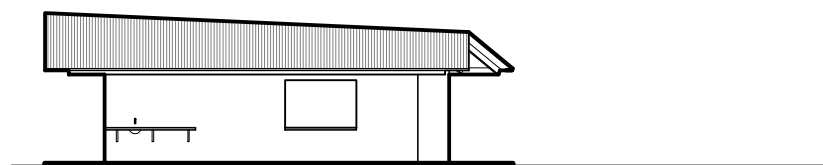
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UNICEF	
Monrovia, Liberia	
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JOSHUA@ARCHITECTUREFORHUMANITY.ORG	
(231) 06 713 610	



A1 | South Elevation Canteen

scale: 1/16" = 1'-0"

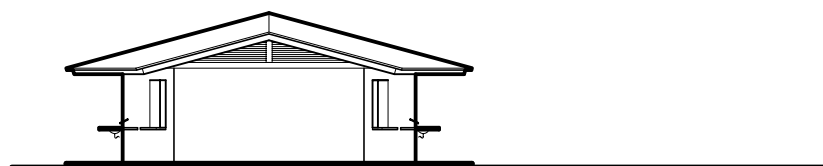
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A2 | North Elevation Canteen

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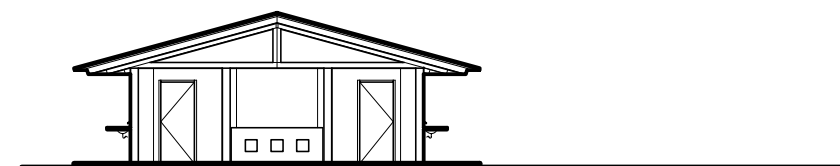
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A3 | East Elevation Canteen

scale: 1/16" = 1'-0"

scale: 1/16" = 1'-0"



A4 | East Elevation Canteen

scale: 1/16" = 1'-0"

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Canteen Elevations

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Ganta, Nimba, Liberia

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(231) 06713610

HUMANITY.ORG
(231) 06 713 610

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A205

APPENDICES

A - Area Survey (prepared by Josh Palmer 10/5/08)

As Ganta is along the border of Guinea, it is a transit hub within the country and the relatively large population have lead many international organizations to locate in and around the area. The UN MIL (Mission In Liberia) has two bases, which security and engineering operations are orchestrated out of. InterPeace, NRC (Norwegian Refugee Council), Equip, IRC and Africare are some of the other NGO's with offices in town.

Clinics

There are several clinics/hospitals in the area. Methodist Hospital (CL2) has the best ability to handle most medical emergencies within at least the surrounding 30-40km. The Methodist Hospital has at its disposal registered doctors, nurses, operating rooms, an eye clinic and an administrative facility with internet connectivity. Most members in the community unfortunately are unable to afford the prices required for the services at the Methodist Hospital (a checkup costs upwards of one month's salary for most individuals), which is why there are several other non-profit clinics in town. In the center of town is a private clinic setup by several community members called the Powell Clinic (CL1). South of town about 1km is the KL Foundation (CL4). The KL Foundation provides health education, testing and treatment at or below costs in order to deliver services to those that are unable to afford other health establishments. The Equip Clinic (CL5) is outside of the town proper and not shown on the map. The Equip Clinic provides help to the community with checkups and personnel, though the main offices are located outside the immediate area. Lastly is the Catholic Rehab (CL3), just east of the Methodist Hospital (CL2). The Catholic Rehab has some medical services, a pharmacy and treatment centers. The Catholic Rehab is foremost concerned with the treatment and testing of TB and leprosy, other medical concerns are referred to the aforementioned clinics.

Market

Downtown Ganta has many stores along the main east/west thoroughfare, including many currency exchange stations, cell phone card huts, several restaurants, general stores and two-three construction supply stores. While there are many general stores in downtown Ganta, typically the products at any one store are located at neighboring establishments. Most stores carry staples such as soap, bottled water, cigarettes, cleaning supplies and small cookies or biscuits.

The three market locations (M) called out on the map are slightly different as they are open markets. In these area there are upwards of twenty small open-air covered tables where people will sell rice, soap, vegetables, school books, clothing or any other commodity that would be traded. It doesn't appear as though anyone owns the stands they use day-to-day, so that those unable to afford a permanent store are still able to bring their goods into town for sale.

Police Station

The police station (POL) is located just east of the UNMIL Charlie Base (UN1). The police are generally not very visible around town except for when they place a roadblock entering town. I believe that this how the police ticket motorcycle drivers without helmets (and probably one of the main revenue methods for the police).

Radio

There are two radio stations in town. The UNMIL Radio (R1), transmits general country information and notices produced by the UN and its subsidiaries. The UNMIL radio regularly plays music, the TRC (Truth and Reconciliation Committee), community meeting notices and educational programs on how to properly clean food and avoid malaria. The YMCA Radio (R2) is more of community radio station. That being said, the YMCA radio has some definite overlap with the UNMIL Radio.

The YMCA Radio plays music that more of the younger people listen to with some interspersed talk shows.

Schools

There are many schools around the town. I have tried to list and locate most of the larger schools that I have come into contact with so far during my work here. Most of the schools in the area are private schools with religious affiliations.

J.W. Pearson (S4) is the government school in town and has by far the most students (and respectively congested classrooms). J.W. Pearson is where the CEO (County Education Officer) directed us for meeting with many of the students, teachers and parents several weeks ago. Prior to the discussion of the new school the officials of the school discussed some items that are of note as we proceed with the design of the new school. The CEO talked with the administration that there has been a lot of trouble with retention of students, overcrowding of classrooms (100-120 students in some rooms), buying of grades from teachers or test answers from other students. I would imagine that these problems are not the sole territory of public schools and are likely occurring in many locations. J.W. Pearson has an elementary, junior high school and high school. The second largest student population would have to be the Methodist School (S5). The Methodist School, similar to Pearson has elementary to high school students. I have not surveyed the classrooms at Methodist and cannot attest to the over/under crowding of the classes. Methodist does have a gymnasium (SP3), which attracts people from around the town for basketball, lecturers and even wedding ceremonies.

There are some other schools also in close proximity to the site which should be mentioned. Down the road, between 100-200m is the Grace Outreach School (S2). Grace teaches out of one open air building with reed mat partition walls to educate around 150 students between 5-12 years old. Coming closer to town, in Gbloyee, is the Methodist Outreach School (S3). The Methodist Outreach has about 50 students from K-6th grade and is affiliated to the larger Methodist School across town. In the other direction, further out in Gbuyee is the Gbopa School (S1). In discussions with teachers, the classrooms at the Gbopa School general have about 70 students per classroom. I have tried to illustrate how crowded many of the schools are in and around Ganta, but this is not even as bad as the schools could be because many children are not even in school. There is a large population of students that do not regularly attend school. Many of these children are unable to afford tuition (every school charges tuition, students must purchase a uniform, shoes, copy books etc.). There are other children I have met or talked with who may be in school, but must work to raise money for the family or to cook for the rest of the family. There would need to be a very focused reconstruction of the school structure and systems to begin to give a quality education to Ganta and the surround towns.

Sports Facilities

Sports facilities could be suggestive of many things. In most instances around Ganta this amounts to an open field with a couple of sticks in the goals of a football field. There are two football fields that actually have real goals and are at or near regulation size. The first is at the campus of J.W. Pearson (SP1). This football field is used by the community at every holiday, intermittently by the students and by the Bangladeshi as it is very near their base. There is also a community football field (SP2) near the Methodist Campus, which is used by men/women teams playing surrounding towns. They generally have games against Sanniquellie/Saclepea on the weekends.

The Methodist Campus also has the only gymnasium in town (SP3). At this facility it is quite common for locales, the Bangladeshi and other to play basketball, have community gatherings and weddings on occasion.

There are several sports facilities around town, but there is also a lack of the equipment, uniforms and organization that would help to realize the full potential of these facilities. Along a similar

note, there are very few, if any, afterschool activities for children to engage in. This could be partly because many students must go home to help cook, or raise money for the family as much as it could be because no one has organized any afterschool programs.

UN
There are two UN MIL bases in Ganta. Camp Charlie (UN1) is the main security detail for the area. They have a barracks, an area for cricket, offices and a mess hall, but all are exclusively for the Bangladeshi personnel stationed there. Across the street and down the road from Camp Charlie is a UN building (UN2) that has internet connectivity and miscellaneous spaces for the community to sign up and use under the supervision of the UN. South of town, along the road to Saclepea, is the second UN MIL base Camp Coffeehouse (UN3). Camp Coffeehouse is the UN MIL base for the engineers who have the responsibility of grading the land and reconstructing the roads as needed throughout the area.

Local Water Supply
There are hand-pumps located around the city with no discernable pattern. The closest pump to the

B - Engineering

Structure: (TBD)
Soil Conditions
Sub-structure
Super-structure

Electrical:
Photovoltaic system

- * solar panels are good for 20-25 years, batteries are good for 5 years. could go wrong if not maintained properly. replacements are \$200 each, install could be \$350-400.
- * dirt needs to be washed off the solar panels - once a month, community will perform
- * inveneo recommends that a maintenance agreement be set-up for computers with their local provider - generally in the first 6 months there is a lot of support needed.

Power, Data, Lights
Global Resource Center

- * 20 computers, 1 printer and networking equipment
- * lighting - 6 lights running 3 hours in the evening
- * 1 outlet, assuming 12 hours
- * LED projector - could be moved to the multi-purpose room to show the movies

(total - \$22,865)

Administrative Block

- * 4 desktop computers and 1 laptop, 1 inkjet printer, and networking gear
- * 1 outlet in the principal's office (for low power applications only)

(total - \$3915)

Radio Equipment
Basic Equipment that gets you "on the air":

- * 5-Watt FM Broadcast Transmitter (\$950 + \$250 shipping)
- * <http://www.fm-transmitter.com/order> Radio Transmittier: ICOM IC-718

- * 1KW - A Real Broadcast FM Antenna (\$350 + \$250 shipping)

<http://fmbroadcastantenna.com/>

- * DSPXmini-FM SE Stereo Generator/Audio Processor (\$1944 + \$250 shipping)

<http://www.audio-processor.com/order>

- * HF Linear amplifier: Homebrew 3CX3000F7 monobander and three Ameritron linears, (AL-1200,AL-1200 and AL-1500)

- * Low Loss, High Quality Coaxial Cable Properly Installed (\$250 + \$50 shipping)

<http://www.tvantenna.com/products/cable/coax.html>

- * An EAS System (???)

http://www.broadcast.harris.com/product_portfolio/product_details.asp?sku=WWWsageendec

Studio Gear:

- * Audio mixing console
- * Microphone(s)
- * CD decks
- * Telephone hibryd
- * Audio editing and production computer
- * Studio monitor speakers
- * Amplifier
- * headphones
- * UHF receiver - preferably one with a signal strength meter

Examples of equipment used in an amateur radio station:

- * Electro-Voice RE27N/D dynamic microphone, 150 ohm balanced output, 45 Hz to 20 kHz response
- * Mackie 1202-VLZ 12 channel mic/line Pro Mixer.
- * Alesis RA500 250 watts per channel power amplifier (10 Hz to 70 kHz)
- * Hammond 1642SE single ended audio transformer, 20 Hz to 20 kHz, 75 watts, 300 ma, 5000 ohms to 4/8/16

ohms

- * Radio Receiver: Drake R8B tuning from 10 kHz to 30,000 kHz for LSB, USB, RTTY, CW, AM and FM
- * Tune-up Equipment:
- * Signal Generator
- * A-B coax switcher

Canteen

Solar Cooker

The VILLAGER SUN OVEN is designed for large-scale feeding situations that require cooking great volumes of food. Even though it is called an oven food can be baked boiled and steamed at cooking temperatures of 500° F / 260° C with no fuel costs. Over 1,200 meals a day can be cooked. For use at night or on rainy days, the VILLAGER is equipped with a propane back-up unit. This oven weighs 980 pounds / 444b kg. It comes mounted on a trailer to enable it to be pushed into the sun during the day and into a secure area when not in use. A number of locations in developing countries use VILLAGER SUN OVENS are used to cook lunches for a school and then to bake bread in the afternoon. The bread is sold to help generate income.

The price is as follows:

\$ 9,500	VILLAGER SUN OVEN without trailer
\$10,000	VILLAGER SUN OVEN with trailer
\$10,500	VILLAGER SUN OVEN with trailer and Sun-Bakery Package

All prices are F.O.B. Elburn, IL USA. The approximate cost to ship a VILLAGER SUN OVEN to the port of Monrovia is \$2,900.

High Efficiency Wood Stove

Hydraulic Services:

MEMORANDUM

Attention: Finley Pitt
Company: Architecture for Humanity
Fax No: Date: 20.11.2008
From: Chris Sullivan Fax No: +61 3 9285 2850
Project: Liberia School Project
Subject: Water Supply and Sanitation Opportunities
Total pages transmitted (including Header): Reference: MM01

MESSAGE

Introduction

We have reviewed your documentation and suggestions and responded with some potential options. Obviously we have limited information on local environmental and social conditions, however, we believe there is some merit in pursuing the following concepts based on the following assumptions:

- No mains electricity supply to the site;
- A limited budget;
- A requirement for simple construction and maintenance; and
- A desirable to use local materials.

We would welcome any questions or feedback from you in regard to the following recommendations.

Water Supply – We would suggest that a rainwater tank be utilised as the primary source of ‘potable’ water for the site. The advantage over roof captured water over other options is that it is of a known quality that is appropriate for consumption. If desired this water can be simply chlorinated by adding a tablet at routine intervals.

We recognise also your concerns about the seasonal rainfall and we would encourage a groundwater bore dug to offer supplementary potable water if required. We would also suggest that this water is used sparingly i.e. not for irrigation etc. as there are endless examples of the over extraction of groundwater. If the water is not utilised in a sustainable manner then there are risks that you may impact your neighbour’s opportunities to access groundwater and that during extended dry periods you may be without the resource. We would also suggest that any overflow from roofs etc. be directed to infiltration pits (rain gardens etc. in an attempt to replenish groundwater supplies for use during dry periods).

Infrastructure options:

1. Rainwater tank – Our initial suggestion would be a concrete stormwater tank connected to the school roof. This could be manufactured on-site using a brick or chicken wire frame and concrete mixed on site.
2. Infiltration system – Overflows from the tank(s) and rooves without tanks can be directed into infiltration pits that can be hand dug and filled with local porous gravel or sand. The systems may also be planted if there are appropriate local species.

Greywater – We notice that you intend to irrigate with your greywater. Given the assumed seasonal nature of irrigation requirements we presume that there may not be a requirement for treated greywater for irrigation throughout the year, which would result in the greywater being disposed off site and. We suggest that there may be greater advantage in utilising the greywater primarily for toilet flushing (flushing toilets and washing / cleaning composting toilets) – thus reducing the demand on the potable water supply. Any additional greywater can then be used for irrigation.

Infrastructure options:

1. Greywater treatment systems – There are a variety of treatment systems available for the

greywater treatment system including sand filters, constructed wetlands and media filters (local gravels, wood chips and coconut husks). All of these systems can be designed to operate without electricity and can be constructed using local materials. The final option will be dependent on local conditions.

Toilets – We support your suggestion of composting toilets. Composting systems have a strong history in the development sector and there are numerous effective dual chamber designs available. The benefits of composting toilets include the reduced water supply demand and the reduced treatment and disposal requirements associated with dry composted waste compared to flushing systems. Dry composting systems also require a careful management process for the safe management of composted waste.

Separated urine can be disposed of in shallow disposal ditches or we recommend that it be collected and re-used as a nutrient source for crops.

Infrastructure options:

1. Composting toilets – As stated previously there are a variety of simple and effective composting toilet designs that can be constructed with locally available material.
2. Conventional toilets – As per normal with flushing demand to be met from treated greywater.
3. Urine separation – Urine separation can be undertaken with split pipes and collection systems including plastic bottles. Careful management is required with the stored urine however it is extremely high in nutrients that are important component of agricultural production.

Toilet wastewater (blackwater treatment and disposal) – The small number of flushing toilets will ensure that there is limited blackwater requiring treatment. This combined with the presumed fluctuations in student and staff numbers lends itself to a small constructed wetland or other low tech treatment system as you suggested. This system can be constructed using local materials (including soils, gravels, plastic bottles, broken glass etc.) and plants. This system would typically also include a septic tank as the primary treatment.

The wastewater would be disposed of in a subsurface drain or irrigation system. We would suggest that this system be heavily vegetated to assist in the uptake of the treated water. We would also suggest that is physically separated by some distance from the rainwater infiltration system, bores and greywater irrigation systems as well as the existing natural wetland / swamp system. We would strongly encourage the isolation of this existing natural system for biodiversity and natural conservation preservation.

Infrastructure options:

1. Blackwater treatment systems – As mentioned previously there are a variety of low tech wastewater treatment systems available include a variety of constructed wetland technologies. All of them can be designed to utilise locally available materials. The specific environmental conditions need to be considered before the final treatment approach is identified.

Water distribution / pumping opportunities –

Both drinking water and treated greywater will need to be pumped to distribution / header tanks on the roofs of the buildings. These small tanks then rely on gravity to supply water to taps, showers and cisterns within the building.

We noticed in your preliminary design information that play equipment was a central component of the schools layout. We believe that there is an opportunity to integrate the pumping system into the children’s play equipment. The benefits of this self regulating system are obvious given that the school will not be connected to the electricity grid.

There is a successful precedent with this type of systems being used in school projects in India by UNICEF where a ‘roundabout’ pump has been used to transport rain water to tanks on rooves, so that children could play while they pumped water. We understand that this pump system has been used in excess of 17 schools in India.

In addition to using the play equipment we would maximise gravity feed and siphon systems where the environment allows it, thus reducing any demand on the solar electricity supply at the site.

Education and Management
Education and management are obviously important considerations for on-site systems. We would strongly encourage that education and monitoring be incorporated into the teaching curriculum in order to assist in the effective long term use of the treatment and supply systems.

Conclusion
As stated in the Introduction this document is intended for initial discussion only. We welcome your response to the suggested concepts and we look forward to incorporating local social and environmental information and input from the design team into developing the most appropriate options for the project.