Secondary School
by Anna Nagasugi

Architecture Thesis Project
Cal Poly San Luis Obispo
Williams 2012/2013

I would like to dedicate this book to my family and friends, who have supported me through my architectural education, especially my parents who have always encouraged me to follow my dreams. Thank you for all of your support; it has been such a blessing.

CONTENTS

Dear Reader,

My name is Anna Nagasugi and I just graduated from Cal Poly San Luis Obispo with my Bachelor of Architecture in June 2013. I have always been passionate about the humanitarian sector of design and for my fifth year thesis project, I decided to pursue that passion. For the fifth and final year of the architecture program at Cal Poly, students are encouraged to investigate different issues of architecture, resulting in each individual having a unique thesis project at the end of the year.

In the fall of 2012, I decided I wanted to work on a real project for my thesis, where I would design something that I could give to someone else that could hopefully benefit others. At this time I contacted Journeyman International, an organization I have been working with for the past couple years. They presented me with a list of potential projects, and from the start, a request for a secondary school in Ghana stood out to me. Within a few weeks, I chose this project and teamed up with a local Ghanaian organization called Disaster Volunteers of Ghana (DIVOG). It was months later that I found out that DIVOG had been requesting this project for a couple years and were so grateful for the opportunity to move forward.

In February, I had the incredible opportunity to visit Ghana, where I was able to see the site of the school, visit construction sites, see some of DIVOG's completed projects, get to know the DIVOG team, and gain a better understanding of the culture. This trip was pivotal to the project and was life-changing.

For the remainder of the year, I continued to work on the design. I am so excited to be a part of this project, and it has shown me the potential of architecture and helped open up my eyes to where my true passion in architecture can be applied. I cannot wait for what is next and to hopefully visit the beautiful country of Ghana again soon.

Thank you for taking your time to look at the project, and I hope you will continue to follow this project as it continues developing.

Sincerely,

Anna Nagasugi

EXECUTIVE SUMMARY

PROJECT TEAMS

Journeyman International
Daniel Wiens - President
(805) 952-5469
9393 Eagle Vista Way
Atascadero, Ca 93422

Disaster Volunteers of Ghana
+233-3620-28514
Post Office Box HP 814
Ho Volta Region, Ghana.

CONTEXT

- the site is located in Akatsi, in southeastern Ghana
- the Akatsi district is 1 of 18 districts in the Volta Region
- population of the Akatsi district = 93,477; 46.9% male, 53.1% female
- the challenges to education in the Akatsi district are not enough support for activities and inset, not enough support from parents and guardians, not enough education infrastructure, far distance to school, unequal resource distribution among rural and urban areas
- the climate is tropical (hot and humid)
- natural hazards include the Harmattan winds (dry, dusty, January to March) and drought
- common building materials include laterite (reddish, clay-like material), straw (roof); sometimes use sand-crete blocks with corrugated iron or asbestos roofing

MAIN CONSIDERATIONS

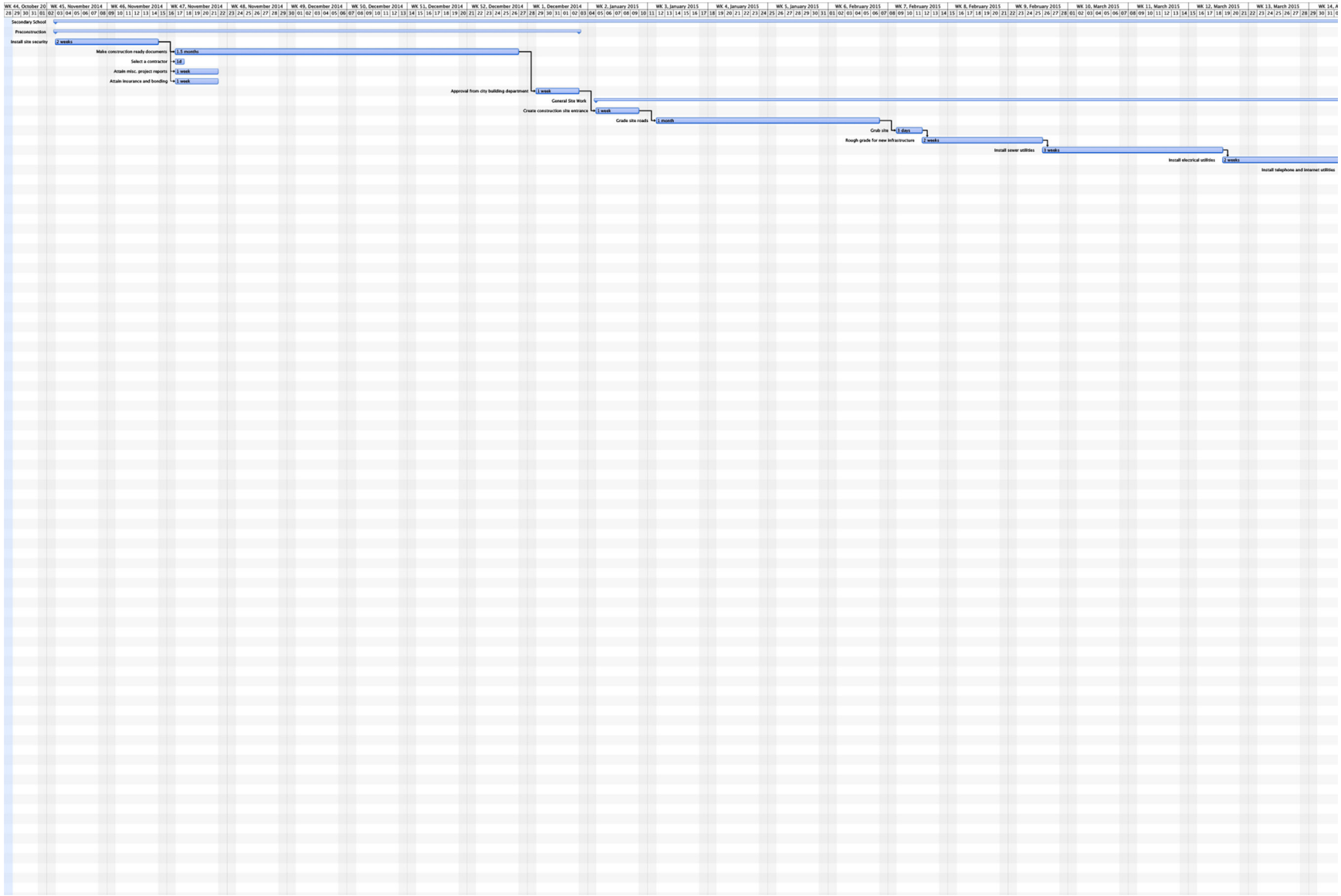
- encouraging gender equality
- addressing the climate
- building in phases
- using local materials

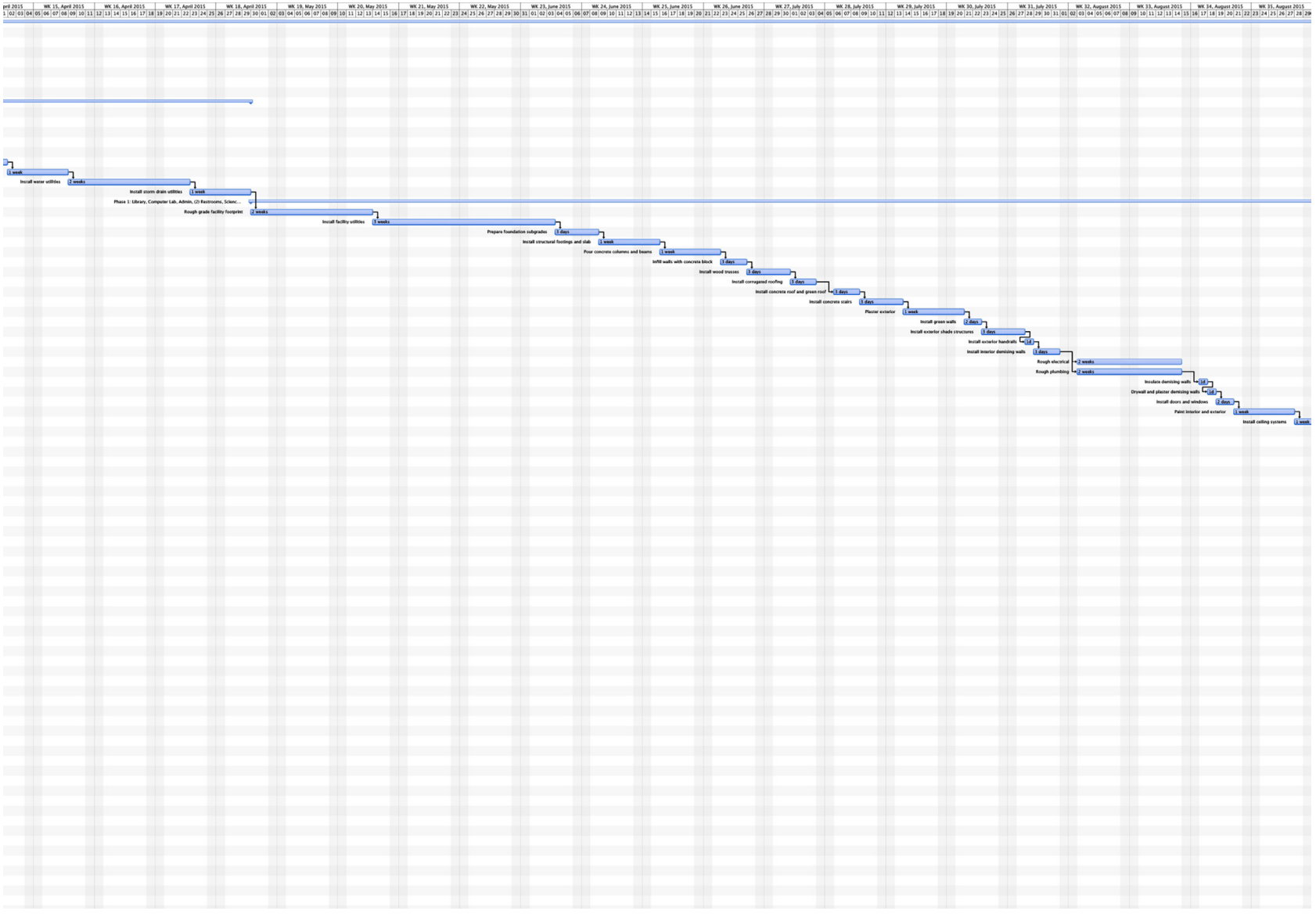
PROJECT OVERVIEW

- the secondary school will be built in phases according to funding
- it will include eight academic departments: science, technical, general arts I, general arts II, vocational home science, visual arts, business, agriculture
- the campus will also have a dining hall, library, administration office, and housing
- the secondary accommodate 200 students from the start and have the potential to grow
- 60% of the students will live on campus

FINAL DESIGN

CONSTRUCTION SCHEDULE

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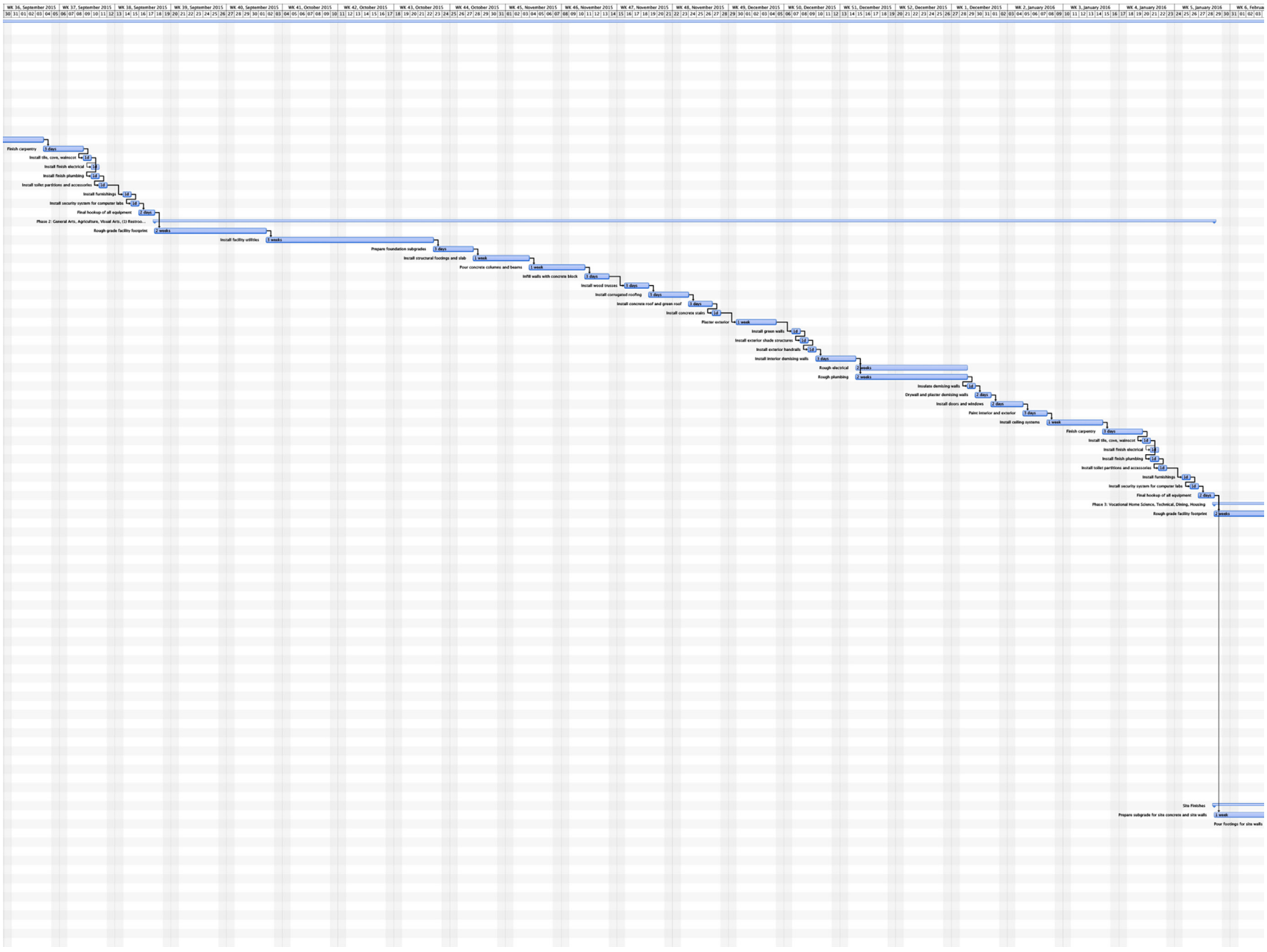
WK 31, July 2015
WK 32, August 2015
WK 33, August 2015
WK 34, August 2015
WK 35, August 2015
1 week
Install water utilities
2 weeks
Install storm drain utilities
1 week
Phase 1: Library, Computer Lab, Admin, (2) Restrooms, Scienc...
Rough grade facility footprint
2 weeks
Install facility utilities
3 weeks
Prepare foundation subgrades
3 days
Install structural footings and slab
1 week
Pour concrete columns and beams
1 week
Infill walls with concrete block
3 days
Install wood trusses
3 days
Install corrugated roofing
3 days
Install concrete roof and green roof
3 days
Install concrete stairs
3 days
Plaster exterior
1 week
Install green walls
2 days
Install exterior shade structures
3 days
Install exterior handrails
1d
Install interior demising walls
3 days
Rough electrical
2 weeks
Rough plumbing
2 weeks
Insulate demising walls
1d
Drywall and plaster demising walls
1d
Install doors and windows
2 days
Paint interior and exterior
1 week
Install ceiling systems
1 week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WK 45, November 2015
WK 46, November 2015
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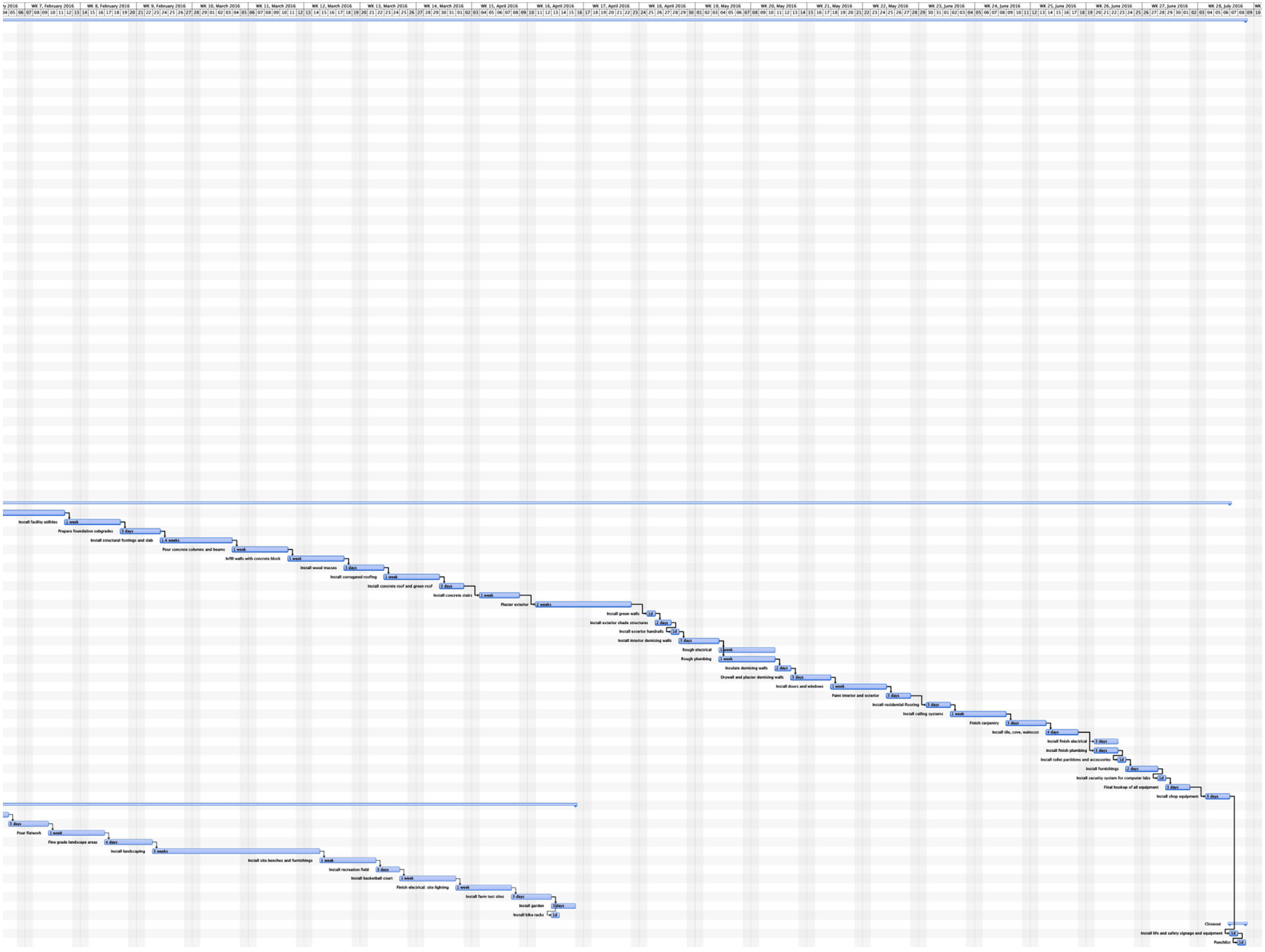
WK 48, November 2015
WK 49, December 2015
WK 50, December 2015
WK 51, December 2015
WK 52, December 2015
WK 1, December 2015
WK 2, January 2016
WK 3, January 2016
WK 4, January 2016
WK 5, January 2016
WK 6, Februa
Finish carpentry
3 days
Install tile, cove, wainscot
1 d
Install finish electrical
1 d
Install finish plumbing
1 d
Install toilet partitions and accessories
1 d
Install furnishings
1 d
Install security system for computer labs
1 d
Final hookup of all equipment
2 days
Phase 2: General Arts, Agriculture, Visual Arts, (1) Restroo...
Rough grade facility footprint
2 weeks
Install facility utilities
1 weeks
Prepare foundation subgrades
2 days
Install structural footings and slab
1 week
Pour concrete columns and beams
1 week
Infill walls with concrete block
3 days
Install wood trusses
3 days
Install corrugated roofing
3 days
Install concrete roof and green roof
3 days
Install concrete stairs
1 d
Plaster exterior
1 week
Install green walls
1 d
Install exterior shade structures
1 d
Install exterior handrails
1 d
Install interior demising walls
3 days
Rough electrical
2 weeks
Rough plumbing
2 weeks
Insulate demising walls
1 d
Drywall and plaster demising walls
2 days
Install doors and windows
2 days
Paint interior and exterior
3 days
Install ceiling systems
1 week
Finish carpentry
3 days
Install tile, cove, wainscot
1 d
Install finish electrical
1 d
Install finish plumbing
1 d
Install toilet partitions and accessories
1 d
Install furnishings
1 d
Install security system for computer labs
1 d
Final hookup of all equipment
2 days
Phase 3: Vocational Home Science, Technical, Dining, Housing
Rough grade facility footprint
2 weeks
Site Finishes
Prepare subgrade for site concrete and site walls
1 week
Pour footings for site walls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WK 23, June 2016
WK 24, June 2016
WK 25, June 2016
WK 26, June 2016
WK 27, June 2016
WK 28, July 2016
Install facility utilities
1 week
Prepare foundation subgrades
3 days
Install structural footings and slab
1.4 weeks
Pour concrete columns and beams
1 week
Infill walls with concrete block
1 week
Install wood trusses
3 days
Install corrugated roofing
1 week
Install concrete roof and green roof
3 days
Install concrete stairs
1 week
Plaster exterior
2 weeks
Install green walls
1 d
Install exterior shade structures
2 days
Install exterior handrails
1 d
Install interior demising walls
3 days
Rough electrical
1 week
Rough plumbing
1 week
Insulate demising walls
2 days
Drywall and plaster demising walls
3 days
Install doors and windows
1 week
Paint interior and exterior
3 days
Install residential flooring
3 days
Install ceiling systems
1 week
Finish carpentry
3 days
Install tile, cove, wainscot
4 days
Install finish electrical
3 days
Install finish plumbing
3 days
Install toilet partitions and accessories
1 d
Install furnishings
2 days
Install security system for computer labs
1 d
Final hookup of all equipment
3 days
Install shop equipment
3 days
Closeout
Install lifs and safety signage and equipment
1 d
Punchlist
1 d
3 days
Pour flatwork
1 week
Fine grade landscape areas
4 days
Install landscaping
3 weeks
Install site benches and furnishings
1 week
Install recreation field
3 days
Install basketball court
1 week
Finish electrical: site lighting
1 week
Install farm test sites
3 days
Install garden
3 days
Install bike racks
1 d

#	Info	Title	Given Planned Work	Flag	# Predecessors	Expected Start	Assigned Resources	% Complete
0		**Secondary School**				**11/3/14**		0%
1		**Preconstruction**				**11/3/14**		0%
2		Install site security	10 days			11/3/14		0%
3		Make construction ready documents	30 days		2	11/17/14		0%
4		Select a contractor	1 day		2	11/17/14		0%
5		Attain misc. project reports	5 days		2	11/17/14		0%
6		Attain insurance and bonding	5 days		2	11/17/14		0%
7		Approval from city building department	5 days		3	12/29/14		0%
8		**General Site Work**				**1/5/15**		0%
9		Create construction site entrance	5 days		7	1/5/15		0%
10		Grade site roads	20 days		9	1/12/15		0%
11		Grub site	3 days		10	2/9/15		0%
12		Rough grade for new infrastructure	10 days		11	2/12/15		0%
13		Install sewer utilities	15 days		12	2/26/15		0%
14		Install electrical utilities	10 days		13	3/19/15		0%
15		Install telephone and internet utilities	5 days		14	4/2/15		0%
16		Install water utilities	10 days		15	4/9/15		0%
17		Install storm drain utilities	5 days		16	4/23/15		0%
18		**Phase 1: Library, Computer Lab, Admin, (2) Restrooms...**				**4/30/15**		0%
19		Rough grade facility footprint	10 days		17	4/30/15		0%
20		Install facility utilities	15 days		19	5/14/15		0%
21		Prepare foundation subgrades	3 days		20	6/4/15		0%
22		Install structural footings and slab	5 days		21	6/9/15		0%
23		Pour concrete columns and beams	5 days		22	6/16/15		0%
24		Infill walls with concrete block	3 days		23	6/23/15		0%
25		Install wood trusses	3 days		24	6/26/15		0%
26		Install corrugated roofing	3 days		25	7/1/15		0%
27		Install concrete roof and green roof	3 days		26	7/6/15		0%
28		Install concrete stairs	3 days		27	7/9/15		0%
29		Plaster exterior	5 days		28	7/14/15		0%
30		Install green walls	2 days		29	7/21/15		0%
31		Install exterior shade structures	3 days		30	7/23/15		0%
32		Install exterior handrails	1 day		31	7/28/15		0%
33		Install interior demising walls	3 days		32	7/29/15		0%
34		Rough electrical	10 days		33	8/3/15		0%
35		Rough plumbing	10 days		33	8/3/15		0%
36		Insulate demising walls	1 day		35	8/17/15		0%
37		Drywall and plaster demising walls	1 day		36	8/18/15		0%
38		Install doors and windows	2 days		37	8/19/15		0%
39		Paint interior and exterior	5 days		38	8/21/15		0%
40		Install ceiling systems	5 days		39	8/28/15		0%
41		Finish carpentry	3 days		40	9/4/15		0%
42		Install tile, cove, wainscot	1 day		41	9/9/15		0%
43		Install finish electrical	1 day		42	9/10/15		0%
44		Install finish plumbing	1 day		42	9/10/15		0%
45		Install toilet partitions and accessories	1 day		44	9/11/15		0%
46		Install furnishings	1 day		45	9/14/15		0%

47	Install security system for computer labs	1 day	46	9/15/15	0%
48	Final hookup of all equipment	2 days	47	9/16/15	0%
49	**Phase 2: General Arts, Agriculture, Visual Arts, (1) Res...**			**9/18/15**	0%
50	Rough grade facility footprint	10 days	48	9/18/15	0%
51	Install facility utilities	15 days	50	10/2/15	0%
52	Prepare foundation subgrades	3 days	51	10/23/15	0%
53	Install structural footings and slab	5 days	52	10/28/15	0%
54	Pour concrete columns and beams	5 days	53	11/4/15	0%
55	Infill walls with concrete block	3 days	54	11/11/15	0%
56	Install wood trusses	3 days	55	11/16/15	0%
57	Install corrugated roofing	3 days	56	11/19/15	0%
58	Install concrete roof and green roof	3 days	57	11/24/15	0%
59	Install concrete stairs	1 day	58	11/27/15	0%
60	Plaster exterior	5 days	59	11/30/15	0%
61	Install green walls	1 day	60	12/7/15	0%
62	Install exterior shade structures	1 day	61	12/8/15	0%
63	Install exterior handrails	1 day	62	12/9/15	0%
64	Install interior demising walls	3 days	63	12/10/15	0%
65	Rough electrical	10 days	64	12/15/15	0%
66	Rough plumbing	10 days	64	12/15/15	0%
67	Insulate demising walls	1 day	66	12/29/15	0%
68	Drywall and plaster demising walls	2 days	67	12/30/15	0%
69	Install doors and windows	2 days	68	1/1/16	0%
70	Paint interior and exterior	3 days	69	1/5/16	0%
71	Install ceiling systems	5 days	70	1/8/16	0%
72	Finish carpentry	3 days	71	1/15/16	0%
73	Install tile, cove, wainscot	1 day	72	1/20/16	0%
74	Install finish electrical	1 day	73	1/21/16	0%
75	Install finish plumbing	1 day	73	1/21/16	0%
76	Install toilet partitions and accessories	1 day	75	1/22/16	0%
77	Install furnishings	1 day	76	1/25/16	0%
78	Install security system for computer labs	1 day	77	1/26/16	0%
79	Final hookup of all equipment	2 days	78	1/27/16	0%
80	**Phase 3: Vocational Home Science, Technical, Dining,...**			**1/29/16**	0%
81	Rough grade facility footprint	10 days	79	1/29/16	0%
82	Install facility utilities	5 days	81	2/12/16	0%
83	Prepare foundation subgrades	3 days	82	2/19/16	0%
84	Install structural footings and slab	7 days	83	2/24/16	0%
85	Pour concrete columns and beams	5 days	84	3/4/16	0%
86	Infill walls with concrete block	5 days	85	3/11/16	0%
87	Install wood trusses	3 days	86	3/18/16	0%
88	Install corrugated roofing	5 days	87	3/23/16	0%
89	Install concrete roof and green roof	3 days	88	3/30/16	0%
90	Install concrete stairs	5 days	89	4/4/16	0%
91	Plaster exterior	10 days	90	4/11/16	0%
92	Install green walls	1 day	91	4/25/16	0%
93	Install exterior shade structures	2 days	92	4/26/16	0%
94	Install exterior handrails	1 day	93	4/28/16	0%

95	Install interior demising walls	3 days	94	4/29/16	0%
96	Rough electrical	5 days	95	5/4/16	0%
97	Rough plumbing	5 days	95	5/4/16	0%
98	Insulate demising walls	2 days	97	5/11/16	0%
99	Drywall and plaster demising walls	3 days	98	5/13/16	0%
100	Install doors and windows	5 days	99	5/18/16	0%
101	Paint interior and exterior	3 days	100	5/25/16	0%
102	Install residential flooring	3 days	101	5/30/16	0%
103	Install ceiling systems	5 days	102	6/2/16	0%
104	Finish carpentry	3 days	103	6/9/16	0%
105	Install tile, cove, wainscot	4 days	104	6/14/16	0%
106	Install finish electrical	3 days	105	6/20/16	0%
107	Install finish plumbing	3 days	105	6/20/16	0%
108	Install toilet partitions and accessories	1 day	107	6/23/16	0%
109	Install furnishings	2 days	108	6/24/16	0%
110	Install security system for computer labs	1 day	109	6/28/16	0%
111	Final hookup of all equipment	3 days	110	6/29/16	0%
112	Install shop equipment	3 days	111	7/4/16	0%
113	**Site Finishes**			**1/29/16**	0%
114	Prepare subgrade for site concrete and site walls	5 days	79	1/29/16	0%
115	Pour footings for site walls	3 days	114	2/5/16	0%
116	Pour flatwork	5 days	115	2/10/16	0%
117	Fine grade landscape areas	4 days	116	2/17/16	0%
118	Install landscaping	15 days	117	2/23/16	0%
119	Install site benches and furnishings	5 days	118	3/15/16	0%
120	Install recreation field	3 days	119	3/22/16	0%
121	Install basketball court	5 days	120	3/25/16	0%
122	Finish electrical: site lighting	5 days	121	4/1/16	0%
123	Install farm test sites	3 days	122	4/8/16	0%
124	Install garden	3 days	123	4/13/16	0%
125	Install bike racks	1 day	123	4/13/16	0%
126	**Closeout**			**7/7/16**	0%
127	Install life and safety signage and equipment	1 day	112	7/7/16	0%
128	Punchlist	1 day	127	7/8/16	0%

CONSTRUCTION ESTIMATE

COST CODE	DESCRIPTION OF WORK	RESOURCE	QUANTITY	UNIT	UNIT PRICE USD	SUBTOTAL USD	TOTAL USD	TOTAL Cedi
DIVISION 1	**GENERAL CONDITIONS**						**$370,000.00**	**$754,356.00**
	General Contractor fee and OH	Allowance	1	LS	$150,000.00	$150,000.00		
	General Conditions	Allowance	1	LS	$150,000.00	$150,000.00		
	General Labor	with trades and GC				$0.00		
	Permit	Allowance	1	LS	$25,000.00	$25,000.00		
	Cost Estimating	with GC	1	FREE		$0.00		
	Equipment Fuel	With GC		included		$0.00		
	Plan Reproduction	With GC		included		$0.00		
	Travel	With GC		excluded		$0.00		
	Subsistance	With GC		excluded		$0.00		
	Design and Architecture Fees	Allowance	1	LS	$15,000.00	$15,000.00		
	Inspection/Testing	Allowance	1	LS	$15,000.00	$15,000.00		
	Clean-Up	with GC				$0.00		
	Final Clean-Up	with GC				$0.00		
	Small Tools	with GC				$0.00		
	Trailor/Storage	with GC				$0.00		
	Temporary Utilities	with GC				$0.00		
	Bonds	Estimate		included		$0.00		
	All Risk Insurance	Allowance	1	LS	$15,000.00	$15,000.00		
	Safety/OSHA Permit	with GC				$0.00		
	Temporary Fencing	with GC				$0.00		
	Project Closeout	with GC				$0.00		
DIVISION 2	**SITE WORK**						**$605,000.00**	**$305,331,400.00**
	Equip Move In/Out	with GC		included		$0.00		
	Traffic Control	with GC		included		$0.00		
	Demolition	Estimate	1	LS	$15,000.00	$15,000.00		
	Surveying	Subcontract	1	LS	$5,000.00	$5,000.00		
	Construction Water (dust control)	with GC		included		$0.00		
	Dewatering (flood control)	with GC		included		$0.00		
	Shoring	with GC				$0.00		
	Rough Grading	Estimate	1	LS	$200,000.00	$200,000.00		
	Fine Grading	Estimate	1	LS	$50,000.00	$50,000.00		
	Excavate road	with grading				$0.00		
	Trench/Backfill	w/utilities				$0.00		
	Soil Treatment	NIC				$0.00		
	Erosion Control (SWPPP)	with GC				$0.00		
	Stormwater Drainage	Estimate	1	LS	$30,000.00	$30,000.00		
	Sewer connection	Septic system	1	LS	$75,000.00	$75,000.00		
	Gas connection	assumed propane				$0.00		
	Water system	with plumbing	1	LS	$50,000.00	$50,000.00		
	Underground Elect connection	Estimate	1	LS	$50,000.00	$50,000.00		
	Rainwater catchment system	Estimate	1	LS	$5,000.00	$5,000.00		
	Asphalt Concrete Paving (road entry)	NIC				$0.00		
	Concrete Paving (road)	NIC				$0.00		
	Site Concrete (pathways, patios, etc.)	Estimate	1	LS	$90,000.00	$90,000.00		

CONSTRUCTION ESTIMATE

COST CODE	DESCRIPTION OF WORK	RESOURCE	QUANTITY	UNIT	UNIT PRICE USD	SUBTOTAL USD	TOTAL USD	TOTAL Cedi
	Athletic Surfaces	with landscaping				$0.00		
	Site Furnishings (benches, tables, etc.)	with owner				$0.00		
	Perimeter fencing	Allowance	1	LS	$20,000.00	$20,000.00		
	Play Equip/Structure	with owner				$0.00		
	Landscape/Irrigation	Estimate	1	LS	$15,000.00	$15,000.00		
DIVISION 3	**CONCRETE**						**$241,000.00**	**$121,627,880.00**
	Sub Base	Estimate	1	LS	$80,000.00	$80,000.00		
	Forms & Accessories	Estimate	1	LS	$20,000.00	$20,000.00		
	Reinforcement (rebar)	Estimate	1	LS	$55,000.00	$55,000.00		
	Cast-In-Place Conc	Estimate	1	LS	$85,000.00	$85,000.00		
	Curing & Sealers	Estimate	1	LS	$1,000.00	$1,000.00		
	Floor Toppings (apoxy over concrete floors)	NIC				$0.00		
	CMU Grout	with masonry				$0.00		
DIVISION 4	**MASONRY**						**$150,000.00**	**$75,702,000.00**
	Concrete masonry units (CMU's)	Estimate	1	LS	$150,000.00	$150,000.00		
DIVISION 5	**METALS**						**$130,000.00**	**$65,608,400.00**
	Structural Steel	NIC				$0.00		
	Metal roof	Allowance	1	LS	$110,000.00	$110,000.00		
	Crane & Hoisting	with GC				$0.00		
	Misc Metal Fab	Allowance	1	LS	$10,000.00	$10,000.00		
	Prefabricated Stairs	NIC				$0.00		
	Handrails & Railings	Estimate	1	LS	$10,000.00	$10,000.00		
DIVISION 6	**CARPENTRY**						**$65,000.00**	**$32,804,200.00**
	Rough Carpentry and bamboo structure	Allowance	1	LS	$50,000.00	$50,000.00		
	Glu Lams/Trusses	NIC				$0.00		
	Finish Carpentry	Estimate	1	LS	$15,000.00	$15,000.00		
	Cabinets	with finish carp.				$0.00		
	Counter Tops	with finish carp.				$0.00		
	Architectural Mill Work	with finish carp.				$0.00		
DIVISION 7	**THERM.&MOIST.PROTECT**						**$32,500.00**	**$16,402,100.00**
	Waterproofing	Estimate	1	LS	$10,000.00	$10,000.00		
	Water Repellent	NIC				$0.00		
	Insulation	for sound	1	LS	$7,500.00	$7,500.00		
	Roofing	with metal roofing				$0.00		
	Roof Accessories	NIC				$0.00		
	Deck Coatings	NIC				$0.00		
	Flashing & Sheet Metal	Estimate	1	LS	$12,500.00	$12,500.00		
	Downspouts/Gutters	with flashing				$0.00		
	Joint Sealants/Caulk	Estimate	1	LS	$2,500.00	$2,500.00		
DIVISION 8	**DOORS & WINDOWS**						**$87,500.00**	**$44,159,500.00**
	Doors/Windows/Frames	Estimate	500	Ea	$175.00	$87,500.00		
	Access Covers/Panels	NIC				$0.00		
DIVISION 9	**FINISHES**						**$85,000.00**	**$42,897,800.00**
	Lath & Plaster (stucco)	Estimate	1	LS	$25,000.00	$25,000.00		
	Drywall (green board, x-board, gypsum)	Estimate	1	LS	$20,000.00	$20,000.00		
	Carpet/ hardwood	NIC				$0.00		
	Wall Coverings	with owner				$0.00		
	Painting	Estimate	1	LS	$40,000.00	$40,000.00		
DIVISION 10	**SPECIALTIES**						**$3,400.00**	**$1,715,912.00**

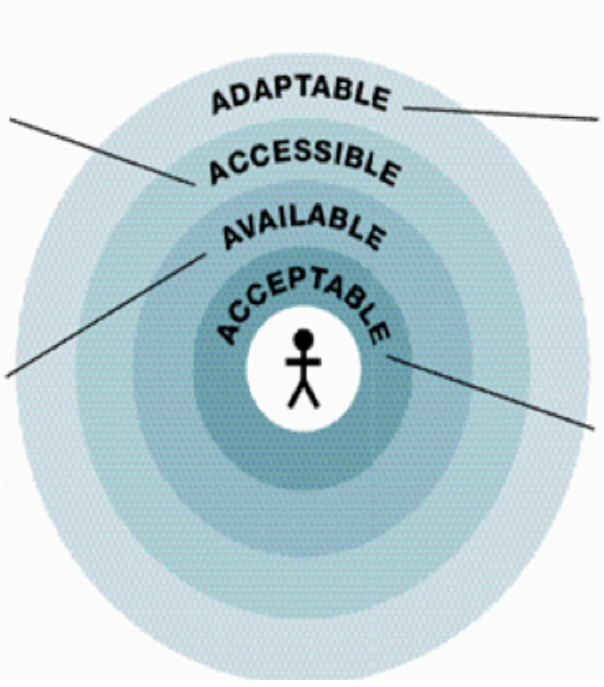
CONSTRUCTION ESTIMATE

COST CODE	DESCRIPTION OF WORK	RESOURCE	QUANTITY	UNIT	UNIT PRICE USD	SUBTOTAL USD	TOTAL USD	TOTAL Cedi
	Bulletin/Tack Boards	with owner				$0.00		
	Toilet partitions	NIC				$0.00		
	Bumper/Corner Guards	with drywall				$0.00		
	Exterior Signage	with owner				$0.00		
	Interior Signage	Estimate	1	LS	$1,000.00	$1,000.00		
	Fire Extinguishers	Estimate	20	EA	$75.00	$1,500.00		
	Fire Extinguisher Cabinets	NIC				$0.00		
	Prefab Awnings	with owner				$0.00		
	Mail Boxes	with owner				$0.00		
	Metal Shelving	with owner				$0.00		
	Wood Shelving	with owner				$0.00		
	Toilet Accessories	Estimate	6	LS	$150.00	$900.00		
DIVISION 11	**EQUIPMENT**						**$0.00**	**$0.00**
	Coax/Antenna/BTS	with owner				$0.00		
	Food/Kitchen Service	with owner				$0.00		
	Appliances	with owner				$0.00		
	Sports Equipment	with owner				$0.00		
	Hood/Vent Systems	with owner				$0.00		
	Office Furnishings	with owner				$0.00		
DIVISION 12	**FURNISHINGS**						**$0.00**	**$0.00**
	Window Louvers	NIC				$0.00		
	Desks and Chairs	with owner				$0.00		
	Tables and Benches	with owner				$0.00		
	Beds	with owner				$0.00		
DIVISION 13	**SPECIAL CONSTRUCTION**						**$0.00**	**$0.00**
	Fire/Security System	with owner				$0.00		
DIVISION 14	**CONVEYING SYSTEMS**						**$0.00**	**$0.00**
	Scaffolding	with trades				$0.00		
DIVISION 15	**MECHANICAL WORK**						**$120,000.00**	**$60,561,600.00**
	Fire Protection sprinklers	NIC				$0.00		
	Plumbing	Estimate	1	LS	$120,000.00	$120,000.00		
	Cable/Coax Cover	NIC				$0.00		
	HVAC (kitchen and select offices)	NIC				$0.00		
	Air Test & Balance	NIC				$0.00		
DIVISION 16	**ELECTRICAL**						**$200,000.00**	**$100,936,000.00**
	Electrical	Estimate	1	LS	$200,000.00	$200,000.00		
	Telecom	with electrical				$0.00		
	Generators	with owner				$0.00		
	Lighting	with electrical				$0.00		
	Data & Communication	with electrical				$0.00		
	Audio/Video/CCTV	with electrical				$0.00		
	Fire Alarm	with electrical				$0.00		
SUBTOTAL						**$2,089,400.00**	**$2,089,400.00**	**$868,501,148.00**
O.H. AND PROFIT								
TOTAL				**74,850.00**	**SF**	**$27.91**	**$2,089,400.00**	**$868,501,148.00**

PROJECT TEAMS

- no child labour
- no gender discrimination
- no disability discrimination
- affirmative action to include the most marginalized school
- within reachable distance

- safe buildings
- school in village
- enough teachers
- free text books and uniforms
- sanitation facilities
- appropriate transport



To the specific needs:

- of the children
- to the local context
- changing needs of society
- contributing to gender equality

- relevant
- pluralistic
- quality education
- quality teaching

DIVOG's diagram on the education system

DIVOG (Disaster Volunteers of Ghana)

Objectives
general:

- improve access to education and improve education quality

specific:

- make learning available for children
- increase school enrollment in the community
- reduce dropout rate, especially for girls
- increase literary rate
- increase awareness in the community on the importance of education for children
- lower gender difference by working on affirmative action with the community
- teach community service and volunteering to future generations
- solve social and economic problems through behavior change/promoting a just society

DIVOG Pillars of Education:

- learning to know
- learning to do
- learning to live together
- learning to be

The guys at DIVOG are some of the most genuine, inspiring people I have ever met. Their passion for helping others is incredible and working with them was a constant encouragement during this project. They are truly making a difference in the Ghanaian community.

While in Ghana, they explained the reasoning behind their name: it is a disaster if any child does not have proper access to education and they are working to repair and prevent these disasters.

I am so grateful to have had this opportunity and hope to go back to Ghana and see the DIVOG team soon.

PROJECT TEAMS

Journeyman International is a 501(c)3 tax exempt corporation started by Cal Poly students after being inspired by their own thesis projects. The goal of Journeyman International is to help other organizations with the design aspects of their projects. Students working with Journeyman have the opportunity to work on real projects that directly help those in need.

I started working with Journeyman during my third year of college. I had the opportunity to be the first intern at the company and I have seen Journeyman grow incredibly over the past few years. At the beginning of my last year of architecture school, I approached Journeyman with the hope of their help with finding a real project. They provided me with an extensive list of projects and I am so grateful for the project I ended up pursuing. The team at Journeyman helped me throughout the past year with communicating with the organization abroad, setting up travel plans, getting funding, and with moving my project forward.

"The Journeyman International vision was launched with the intent of filling the expertise void between international NGO's and the new facilities they construct by tethering university talent to this global urgency of design. While developing a dental clinic in Belize as a senior project, a group of architecture and environmental design students from CalPoly University began recognizing the impact a construction focused non-profit endeavor. can have. Since filling for incorporation in 2009, Journeyman International has designed `facilities all over the world. These projects are catalysts- we are just getting started."

introspection

THESIS

Humanitarian social design has, in many cases, become intrusive, selfish, and impractical, leaving impoverished communities disappointed. With a humble and intentional approach that examines local needs, culture, character, and materials, architects can provide those in unfamiliar regions with practical spaces that encourage a sense of community and develop a sense of identity.

ABSTRACT

GENERAL ANALYSIS: humanitarian design

- strengths and weaknesses
- reception and reaction by others

    resources: journal articles, case studies, interviews, discussions

SPECIFIC ANALYSIS: the secondary school

the context:
- basic site information: topography, vegetation, and climate
- the surroundings

    resources: maps, interviews
- building traditions and possible construction methods

    resources: books on architecture, building techniques; interviews
- Ghana's culture - traditions, customs, holidays, arts, festivals

    resources: case studies; interviews; books and websites on culture, traditions

the users:
- students - types of classes, where the students are from, previous education
- faculty - classes they teach, where they are from, what their jobs require
- community members - what events and activities they will participate in

    resources: books and websites on education, demographics, the Akatsi district; interviews

the typology:
- the secondary school - what is successful and what is not, the needs of a school
- the structure of the education system

    resources: websites and books on the education system; interviews; case studies on schools, buildings in Ghana, sustainable principles

the materials:
- materials available in Ghana
- common building materials

    resources: books and websites on Ghana; interviews; case studies

PROJECT STATEMENT

As I discover more about the elements that will help to shape the project, I am gaining a better understanding of what is required to create a successful humanitarian design. My thesis project is a secondary school located in the Akatsi district of Ghana. It will be both a boarding school and day school that will provide the three years of secondary education. The students are the main focus of the school. Each effort of this project has the goal to provide them with an improved education. The architecture, therefore, is another tool to help to foster a better learning environment. It will work along with the faculty, lectures, textbooks, etc. to strive to achieve this. The design will play a supporting role in the overall idea of school. The building should take an extroverted role by connecting to its surroundings and integrating with nature. It should relate to the space around it and reach out to the street, considering the approach of the students attending the school. Since some students will live on campus and others will live somewhere else, the entry of both categories of students should be taken into account. The program can be split up into the categories of school, home, and community space. There definitely should be a separation of public and private space, so the students and faculty feel like they have their own areas.

The site does not have any built objects surrounding it directly, so then the question is: should the building blend into the surrounding nature or have a strong presence to make people aware of the school? I believe that the design should not directly contrast the natural elements since it is the only built object in the direct vicinity, but that it should connect to the natural and integrate natural characteristics in its vocabulary as well. At the same time, the school should not become hidden in the landscape because the students need to know where it is and develop a sense of place. The design should balance an inviting presence and a relationship with the natural. Also, the site is next to a road, so there will be some traffic going through. There is a small village nearby. Family and kinship is important, so the characteristics of this village and the Akatsi district (where the site is located) will definitely be something to consider when designing.

The secondary school is a tool for learning, a facilitator of knowledge, and a place of freedom. The design should support each of these functions. The main movement will be between different classes, between home and school (both on and off campus), and to and from study spaces, sports areas, and dining areas. The circulation of the faculty and community members should be considered as well. The paths of students and faculty will overlap mostly in the school part of the program. The students will be connected to neighboring towns through their families and the community may be connected to the school as well through community activities and events. The design should communicate whether spaces are public or private so the different users know where to go. For example, the housing should be private, while the library/school may be open to the public.

Buildings in Ghana traditionally use thatch or corrugated metal for roofing and cement blocks for the walls. The goal for this project is to use locally available materials to encourage sustainable design and also to look at innovative ways to use these materials. In many of the case studies that were successful in addressing the community needs, the construction of the building involved locals and helped to teach them new building techniques; I believe this combination of innovation and education is very important in providing a design that makes a positive impact. The building should also incorporate passive design principles to help mitigate the climate to provide a more comfortable environment. Water collection would also be a benefit, since water shortage is a problem in Ghana. On the exterior, the school should read as solid for security purposes, but at the same time it should be welcoming because it is the home of the students. It could combine these two concepts by using the idea of defensible space, which incorporates more visibility to reduce negative activity. The skin should change throughout the building, accommodating for different needs of the spaces. On the exterior, it may be more rigid and secure, while on the interior it may be more flexible and permeable. It is important that the skin addresses the warm, humid climate and helps with cooling the building. The skin should also aid in creating a positive learning environment that is interactive and inclusive.

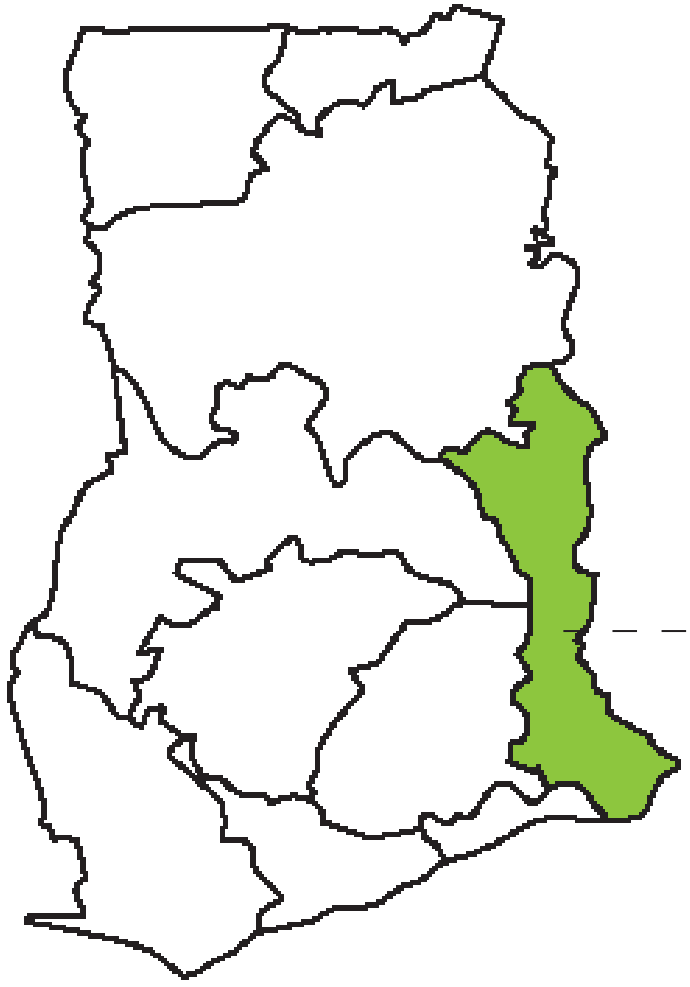
As for phasing, the non-profit organization I am working with in Ghana, DIVOG, is hoping to build a primary and junior high school eventually, so the design may need to accommodate this growth and the introduction of more students of different ages. This will affect the overall organization of the school. It is also important to consider how the program spaces interact with the surroundings and specifically the edges of the site because the future phases could be added on adjacent land.

One important issue to address is gender inequality. More males attend school than females and it is important to integrate the school population more to create diversity and give more opportunities in the future for females. Providing an environment that encourages learning for all is important to closing this gap. Since the population of Ghana is fairly young, it is extremely important to provide this young generation with education because they will make a large impact on the future of the nation because they make up such a large proportion. The school should also offer events that help to build a sense of community within the student body such as extracurricular activities and sports. Events that connect the outside community to the school such as community education events and workshops could help to create a connection within the larger community outside of the school.

This school will bring together people (both students and faculty) from different places since it is a boarding school. A secondary school has the potential to encourage positive friendships and interaction, to inspire people to learn, and to allow them to take an active role in creating more opportunities for their future.

extrospection

CONTEXT



Volta Region,
Ghana

Ghana:

became an independent nation in 1957

climate: tropical

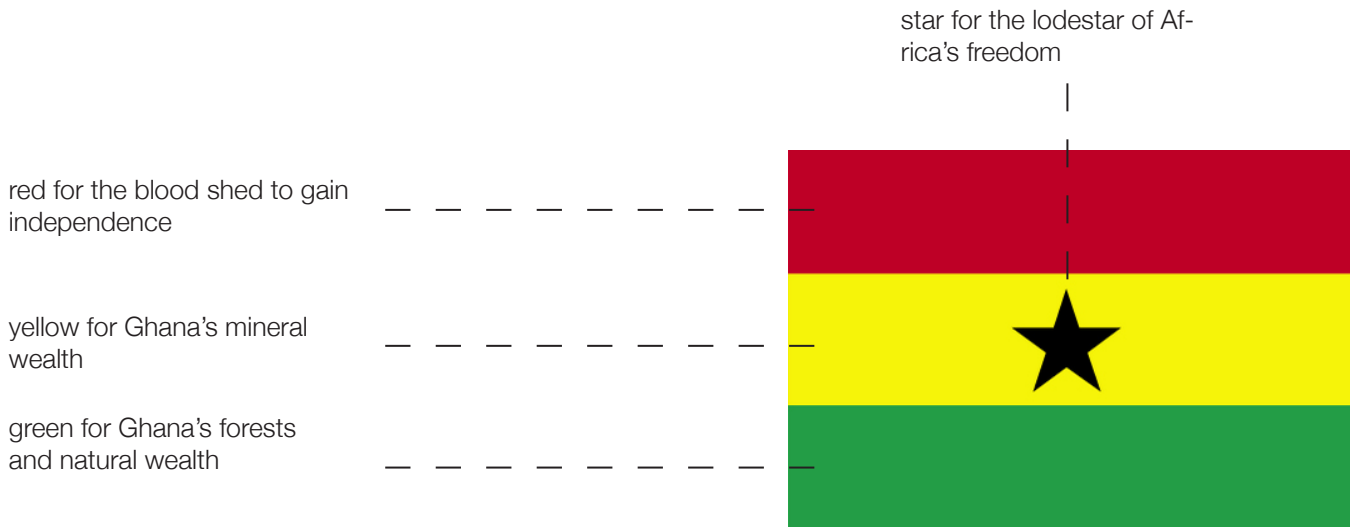
natural resources: gold, timber, industrial diamonds, bauxite, manganese, fish, rubber, hydropower, petroleum, silver, salt, limestone

natural hazards: harmattan winds (dry, dusty, January to March), drought

total population: 24,652,402

agriculture: cocoa, rice, cassava (manioc), peanuts, corn, shea nuts, bananas, timber

industries: mining, lumbering, light manufacturing, aluminum smelting, food processing, cement, small commercial ship building



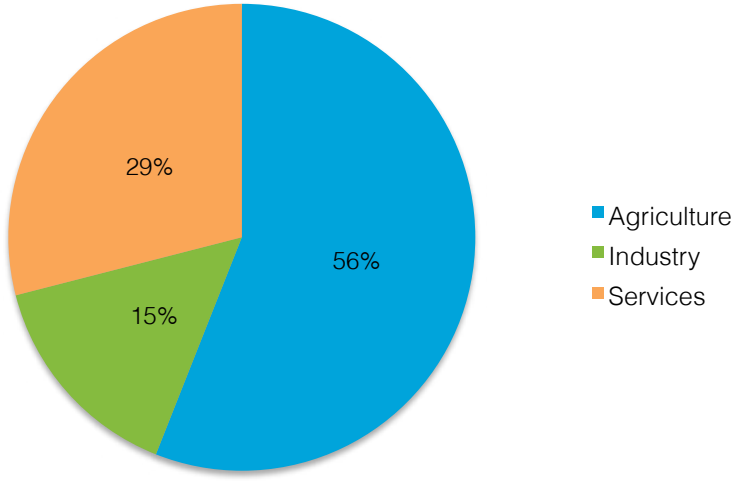
From the research on population data, the labor statistics, population by age, and literacy rates stood out.

The **labor** statistics show where Ghanaians are working. This is significant for the secondary school project because it shows where the students may work in the future, and also gives a better understanding of where their families are working in the present.

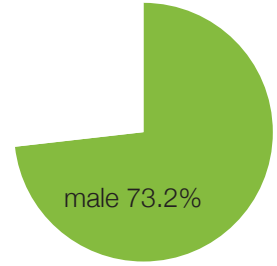
The **population by age** shows that Ghana has a younger population. This demonstrates that there are many people who are in the school age range. Since the population of people who may be attending school is such a large proportion, there is a great potential for this generation to make an impact in their community, making the need for education extremely important. The population data also shows the female population is about equal to the male population. However, in Ghana, more males attend secondary school than females.

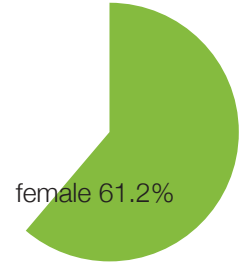
The **literacy rates** show the slight inequality between male and female literacy in Ghana. This suggests that there may be some gender inequality in education opportunities.

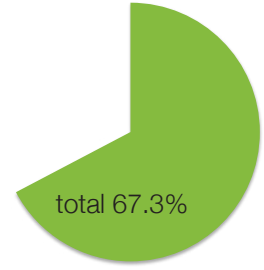
Labor



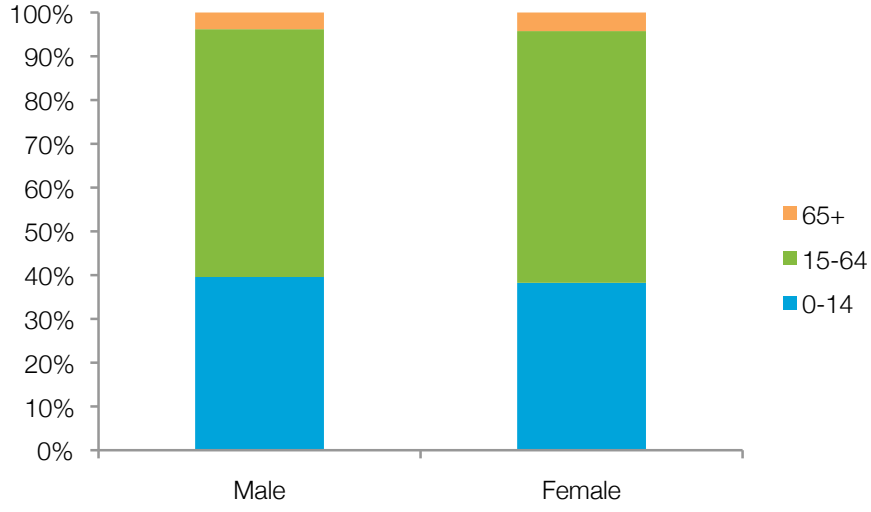
Literacy







Population by age




Volta Region
Akatsi South

The Akatsi District:

1 of 18 districts in the Volta Region

population = 93,477; 46.9% male, 53.1% female

3 main religions: Christianity, Islam, African traditional religion

leading occupation: agriculture (followed by service, then industry)

common building materials: laterite (reddish, clay-like material), straw (roof); sometimes use sand-crete blocks with corrugated iron or asbestos roofing

water need is greater than supply; water is usually inadequate and unhygienic

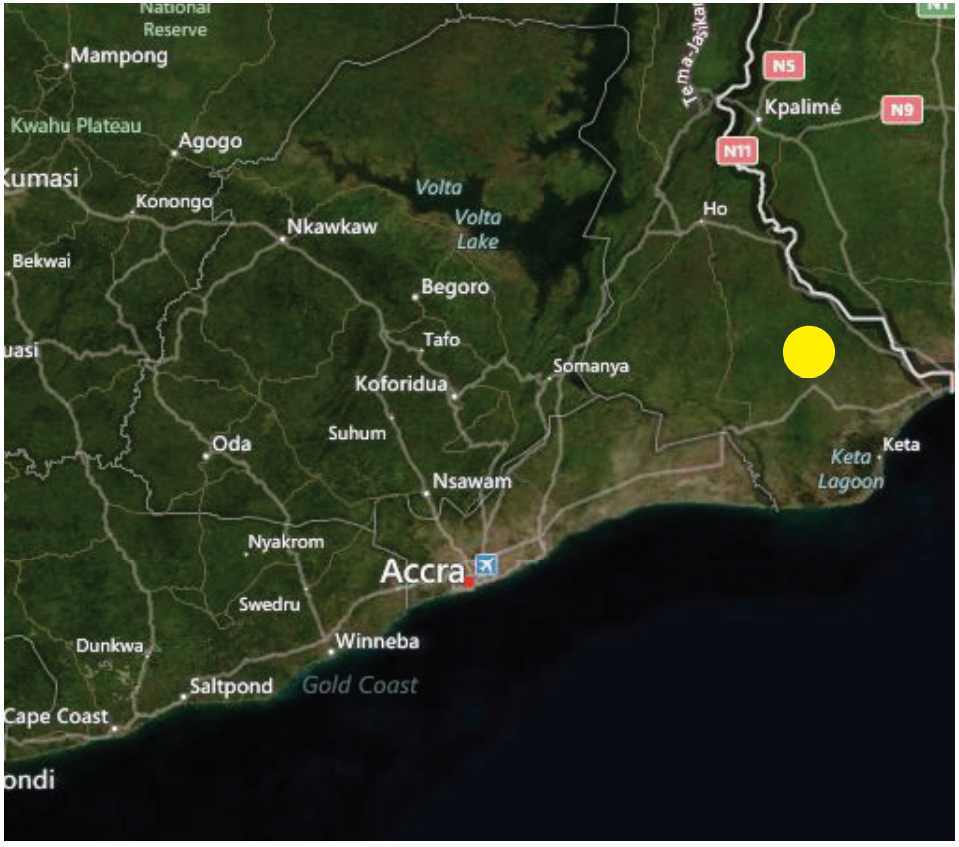
little electricity access

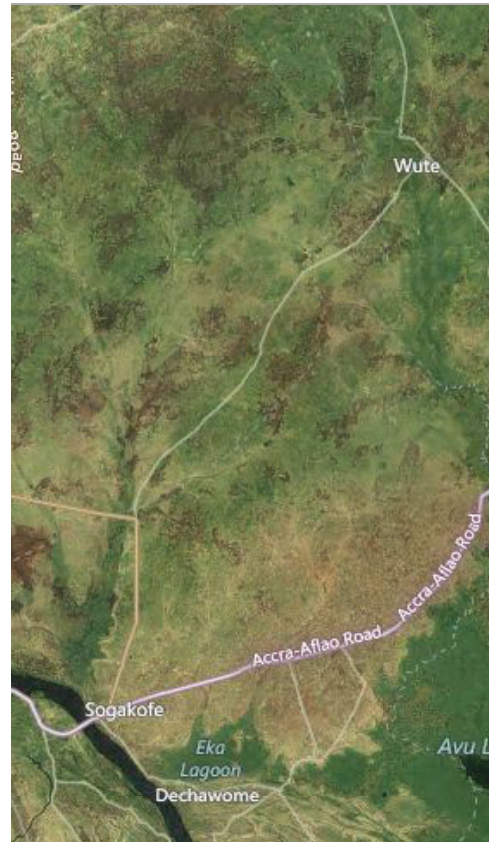
112 primary schools, 53 junior secondary schools, **3 senior secondary schools**, 1 college of education

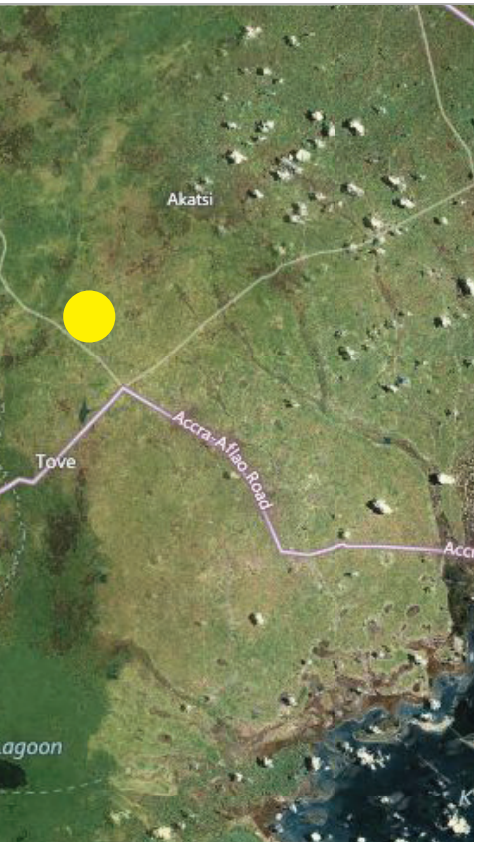
preschool - primary school: 35% have temporary structures, most in poor condition; the government pavilions to address the problem

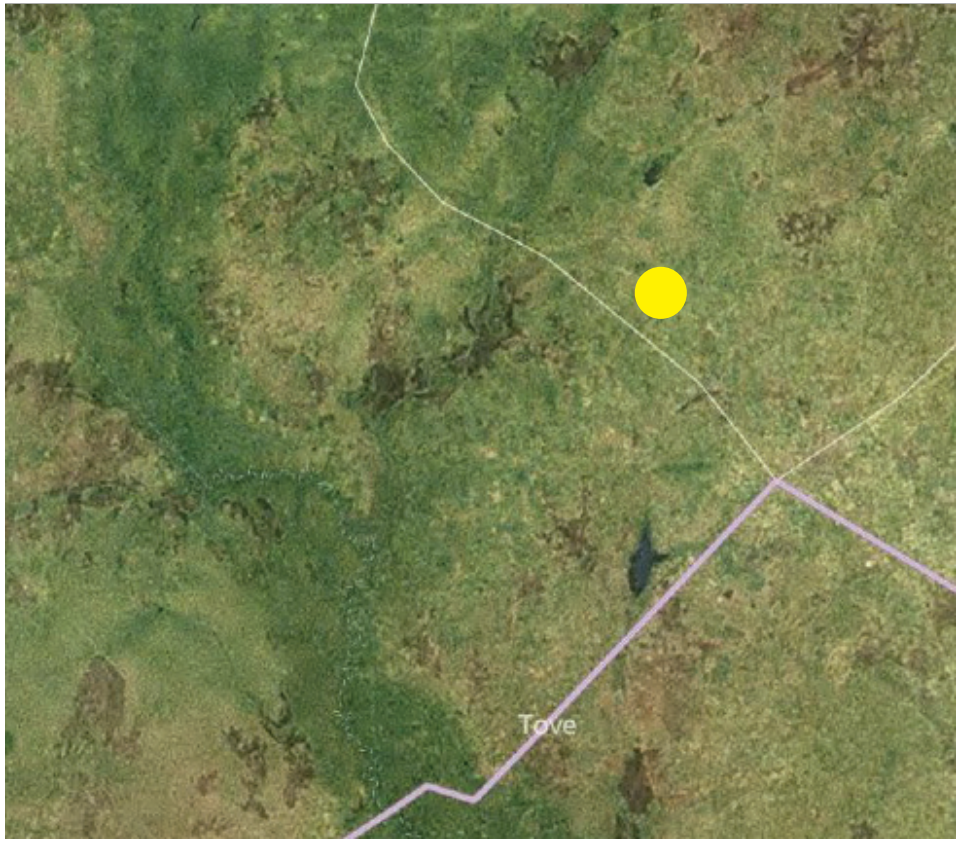
junior secondary level: 80% with standard classroom blocks made with cement and corrugated iron roofing

challenges to education: not enough support for activities and inset, not enough support from parents and guardians, not enough education infrastructure, far distance to school, unequal resource distribution among rural and urban areas

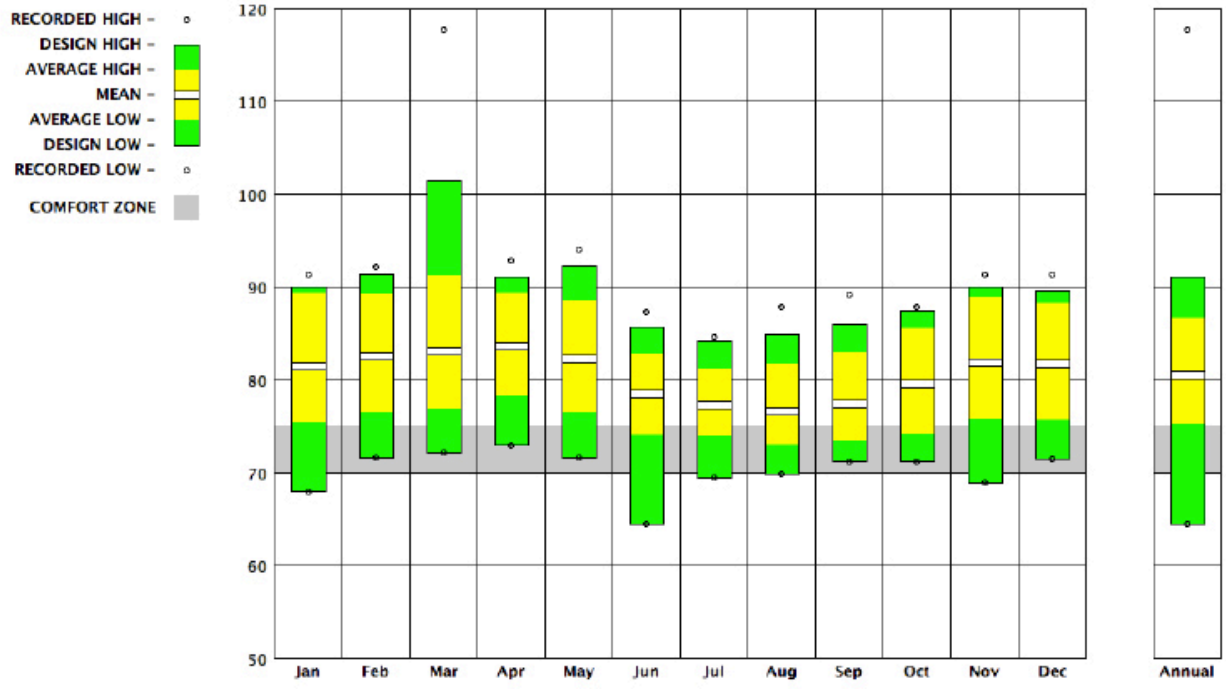

National Reserve
Mampong
Kwahu Plateau
Agogo
Kumasi
Konongo
Nkawkaw
Volta
Volta Lake
Bekwai
Begoro
Tafo
Somanya
Koforidua
Suhum
Oda
Nsawam
Keta
Keta Lagoon
Nyakrom
Accra
Swedru
Dunkwa
Winneba
Saltpond
Gold Coast
Cape Coast
Kpalimé
N5
N9
N11
Ho


Wute
Accra-Aflao Road
Sogakofe
Eka Lagoon
Dechawome


Akatsi
Tove
Accra-Aflao Road
Acc
agoon

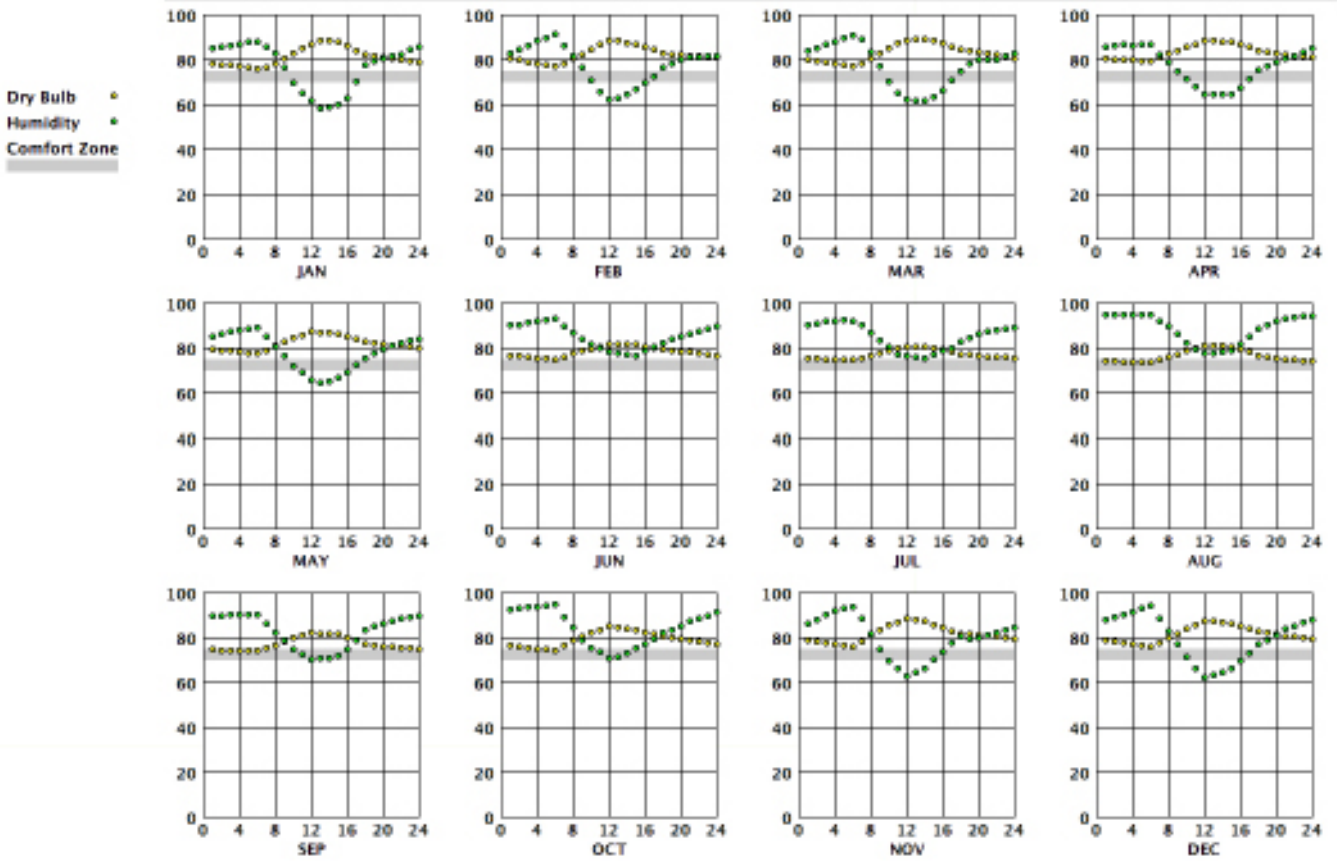

Tove

The temperature is normally above the comfort level, so it will be important for the design to alleviate the users from the hot climate.



dry bulb temperature (Accra, Ghana)

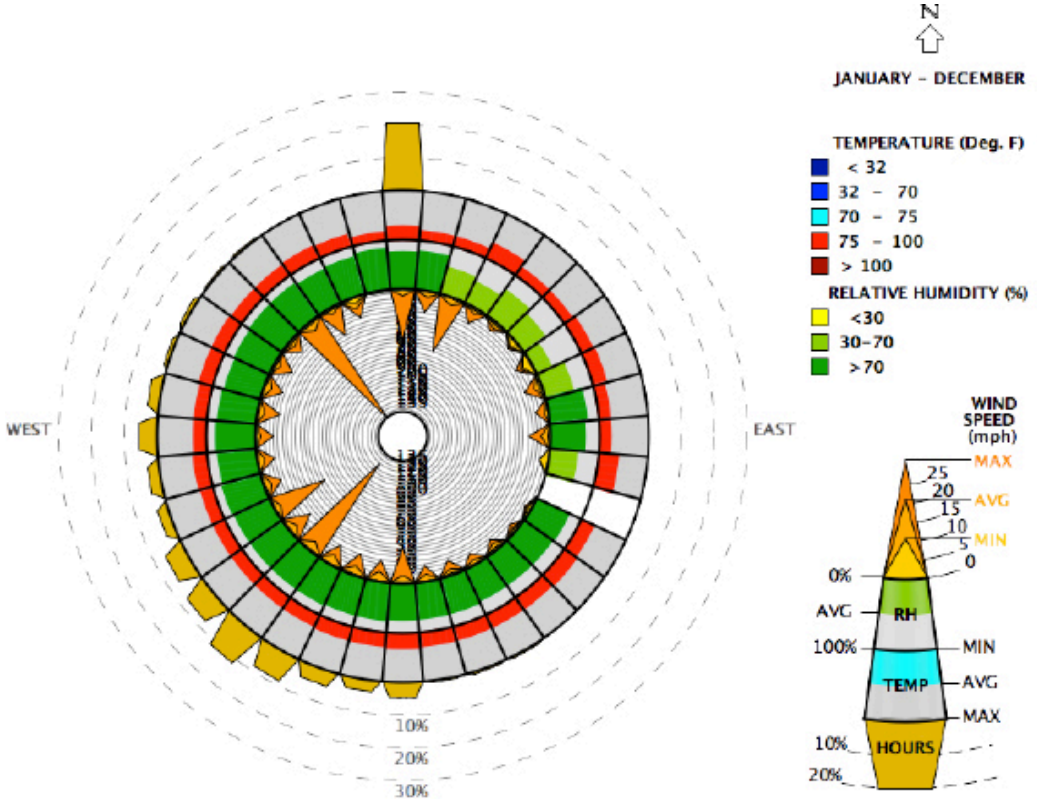
The high humidity should also be addressed by the design. Throughout the year, the humidity moves above and below the comfort zone, so a design that accommodates for these fluctuations would be ideal.



dry bulb temperature and relative humidity (Accra, Ghana)

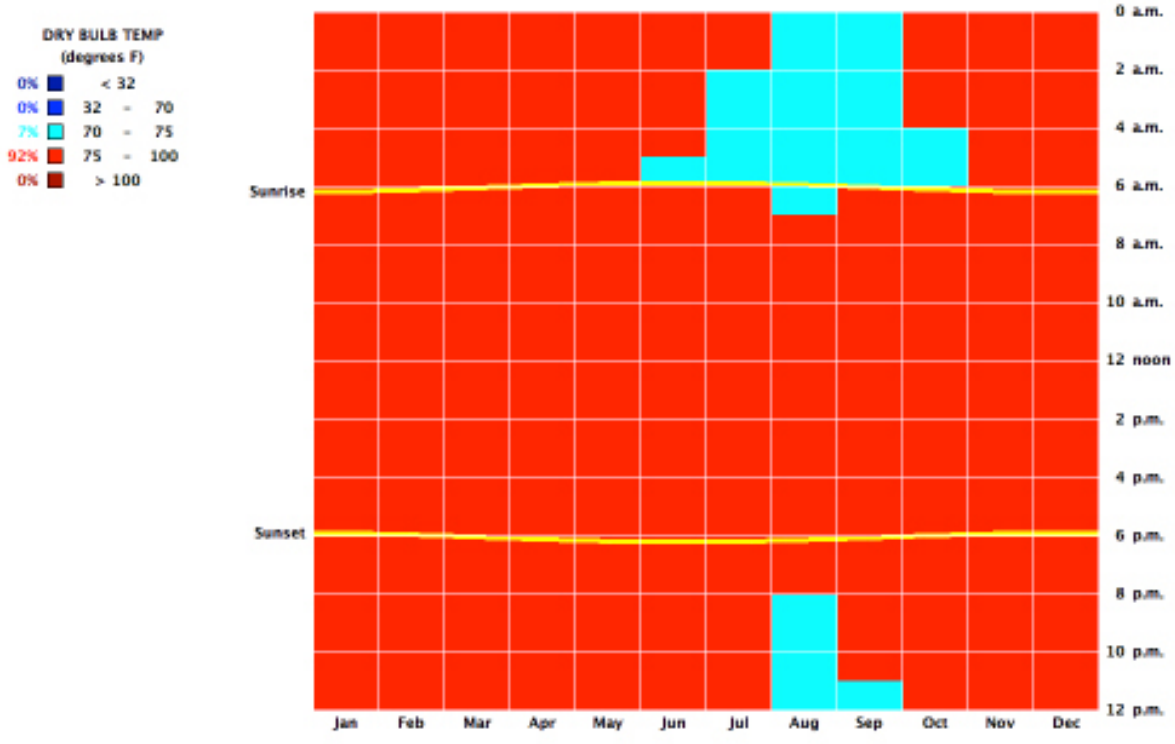
© Climate Consultant 5.2

The wind diagram shows that the majority of the wind is northeast and north. The northeast wind is the dry Harmattan wind that occurs normally from January to March.



wind wheel (Accra, Ghana)

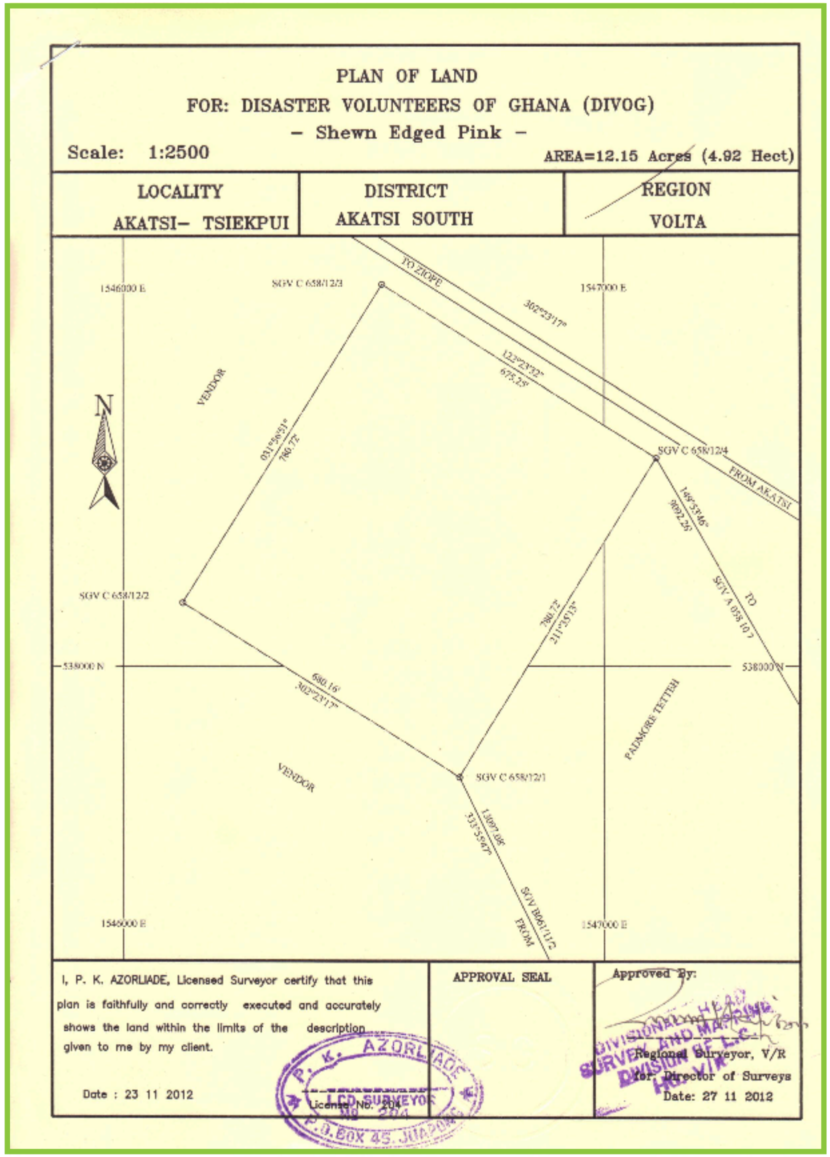
This graph shows that there is overheating throughout the day. Passive cooling techniques will be very important in the design of the school.



two hour temperature (Accra, Ghana)

SITE

photos and site plan provided by DIVOG



PLAN OF LAND

FOR: DISASTER VOLUNTEERS OF GHANA (DIVOG)

– Shewn Edged Pink –

Scale: 1:2500

AREA=12.15 Acres (4.92 Hect)

LOCALITY	DISTRICT	REGION
AKATSI– TSIEKPUI	AKATSI SOUTH	VOLTA

I, P. K. AZORLIADE, Licensed Surveyor certify that this plan is faithfully and correctly executed and accurately shows the land within the limits of the description given to me by my client.

Date : 23 11 2012

License No. 204

P. K. AZORLIADE LCD SURVEYOR No 204 P.O. BOX 45, JUAPONG

APPROVAL SEAL

Approved By:

Regional Surveyor, V/R

for: Director of Surveys

Date: 27 11 2012

In February 2013, I had the amazing opportunity to visit the site of the project in Ghana. The trip was pivotal to this project and helped me to understand so much about the culture that I never could have discovered from reading a book. It greatly reinforced my thesis statement that a designer must fully research and experience a place and its culture in order to create the best design. It emphasized the importance of visiting a site and forming a relationship with the client. I returned home with new inspiration, encouragement, and excitement for the project.

site visit
February 5th, 2013

existing construction methods & materials:

sandcrete block walls with plaster finish
reinforced concrete columns
wood-framed roof system
wood-framed doors and windows
corrugated aluminum roofing
poured concrete foundation

TRANSLUCENT
-glass
-plastic
-nothing

SEMI-TRANSLUCENT/ LIGHTER
-wood
-corrugated metal
-design blocks
-fabric
-shutters

SOLID/HEAVY
-sandcrete blocks with or without plaster covering
-reinforced concrete columns
-rammed earth

material qualities:

exploration of how space can be formed by different materials and how those materials affect the space

at the opening ceremony for a new school in Avata, Ghana

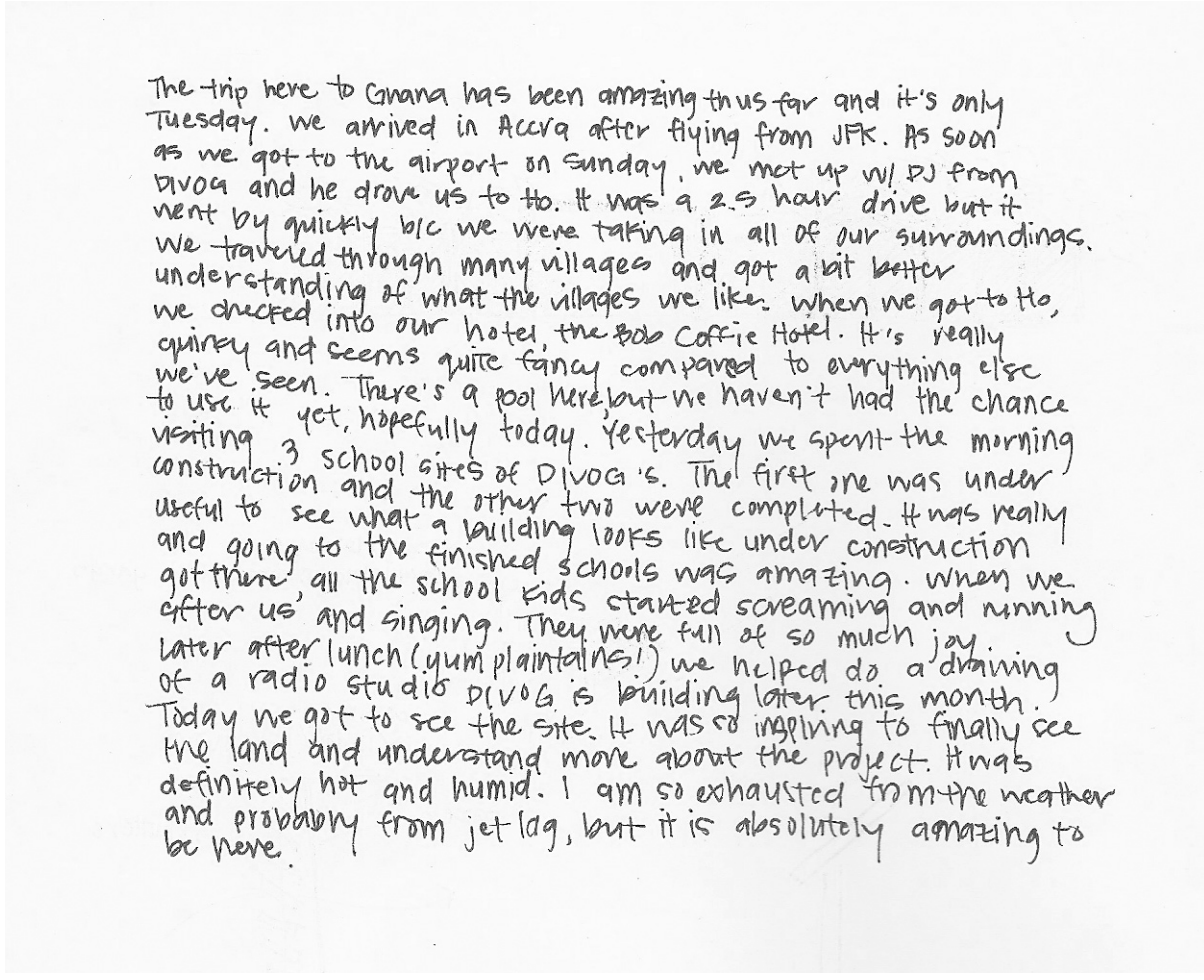

MERCIFUL SPOT









The trip here to Ghana has been amazing thus far and it's only Tuesday. We arrived in Accra after flying from JFK. As soon as we got to the airport on Sunday, we met up w/ DJ from DIVOG and he drove us to Ho. It was a 2.5 hour drive but it went by quickly b/c we were taking in all of our surroundings. We traveled through many villages and got a bit better understanding of what the villages we like. When we got to Ho, we checked into our hotel, the Bob Coffie Hotel. It's really quirky and seems quite fancy compared to everything else we've seen. There's a pool here, but we haven't had the chance to use it yet, hopefully today. Yesterday we spent the morning visiting 3 school sites of DIVOG's. The first one was under construction and the other two were completed. It was really useful to see what a building looks like under construction and going to the finished schools was amazing. When we got there, all the school kids started screaming and running after us and singing. They were full of so much joy. Later after lunch (yum plaintains!) we helped do a drawing of a radio studio DIVOG is building later this month. Today we got to see the site. It was so inspiring to finally see the land and understand more about the project. It was definitely hot and humid. I am so exhausted from the weather and probably from jet lag, but it is absolutely amazing to be here.

notes from the trip

I feel that for the secondary school to be successful, it must follow the building techniques + knowledge of the Ghanians + those building the school. This does not mean that these techniques may not be improved upon or made more innovative or practical. It solely means that the design should build its foundation on the available knowledge. This will help to prevent turning people away from the design bc they don't understand it. It will help to make the design more inclusive + legible and will allow the users to learn and continue to grow in their knowledge of construction.

I have really been trying to understand how to humbly design for the people and I have found one of the most important things is listening to them. It has been amazing to hear the passion and the genuity that each DIVOG team member has about helping people. Richard said there are no excuses not to do something and I think there is so much truth in this. We should not back away or stop bc we are scared, but we need to follow our dreams and have passion in what we do.

CONCEPT

MUSIC and **DANCE** are both extremely important in Ghanaian culture. They form a transactional relationship with one another, building together and supporting the other. Dance in Ghana is very organized and processional, where each facet has a specific role and order. An important part of music in general is polyphony, meaning "the style of simultaneously combining a number of individual parts that harmonize with each other." More specifically for Ghanaian music, each percussion instrument has a different job; some provide the timeline or framework, some support, some respond, and others lead. I hope to incorporate the main structure of Ghanaian music and dance into the secondary school to reference the culture and also to build relationships within the project's design.

PROGRAM

Primary Spaces:

lecture classrooms:
quantitative: 450-500 sf, 25 students
qualitative: good ventilation, natural lighting without glare, free from distraction, flexible to open up to larger spaces and/or to accommodate for many types of classes, organized by elective departments so each department will have different spatial requirements

library:
quantitative: 2500 sf
qualitative: place to study and research, open to the students, faculty, and community, must be quiet, have appropriate lighting for reading, needs to be secure due to the books, could also include the computer lab

laboratory classrooms:
quantitative: 1100 sf
qualitative: needs a high level of security due to lab equipment, needs lab tables and storage areas, good ventilation

housing:
quantitative: 100 sf per room, should accommodate 60% of the students (if starting student population is 200 students, housing should be for 120 students), separated into male and female dorms, separate lounge/study area, head master/mistress and 2 other staff per building, 30% of the faculty will also live on campus, the housing plan should be able to be expanded
qualitative: natural ventilation, community space and personal space

dining hall:
quantitative: 2500 sf
qualitative: main communal space, all meals are served here, should include a kitchen with prep area, should have adequate seating for all students, will probably be a noisier element on the campus

recreation area:
quantitative: soccer field=165-225' x 300-360'
qualitative: should include a sports field and open space, should be flexible for many different activities and should be open to all students, seating should be incorporated

Secondary Spaces:

computer lab:
quantitative: 1200 sf
qualitative: may be part of the library, needs a high level of security, lighting should not create glare because it would be difficult to use the computers, needs access to electricity

shop:
quantitative: 2000 sf
qualitative: for woodwork and metal work, must have enough space to be a safe environment, need appropriate electricity for all tools, work spaces, storage spaces, restroom, sinks

MPR:
quantitative: 1500 sf
qualitative: flexibility, may be used by the students, faculty, and community members, also could function as the dining area or could be converted from classrooms

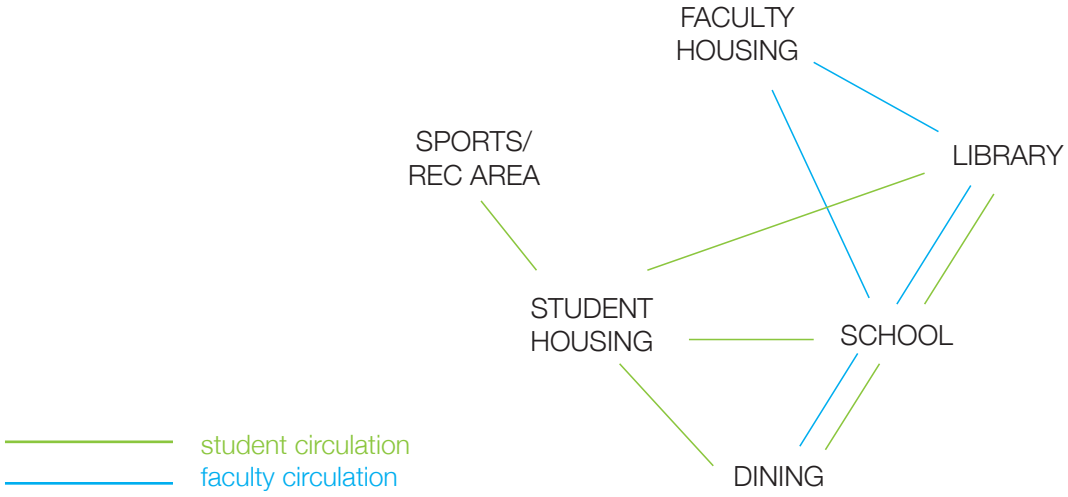
locker rooms:
quantitative: 1100 sf, need male and female locker rooms
qualitative: located near the recreation area and fields, should include showers, lockers, benches, restrooms

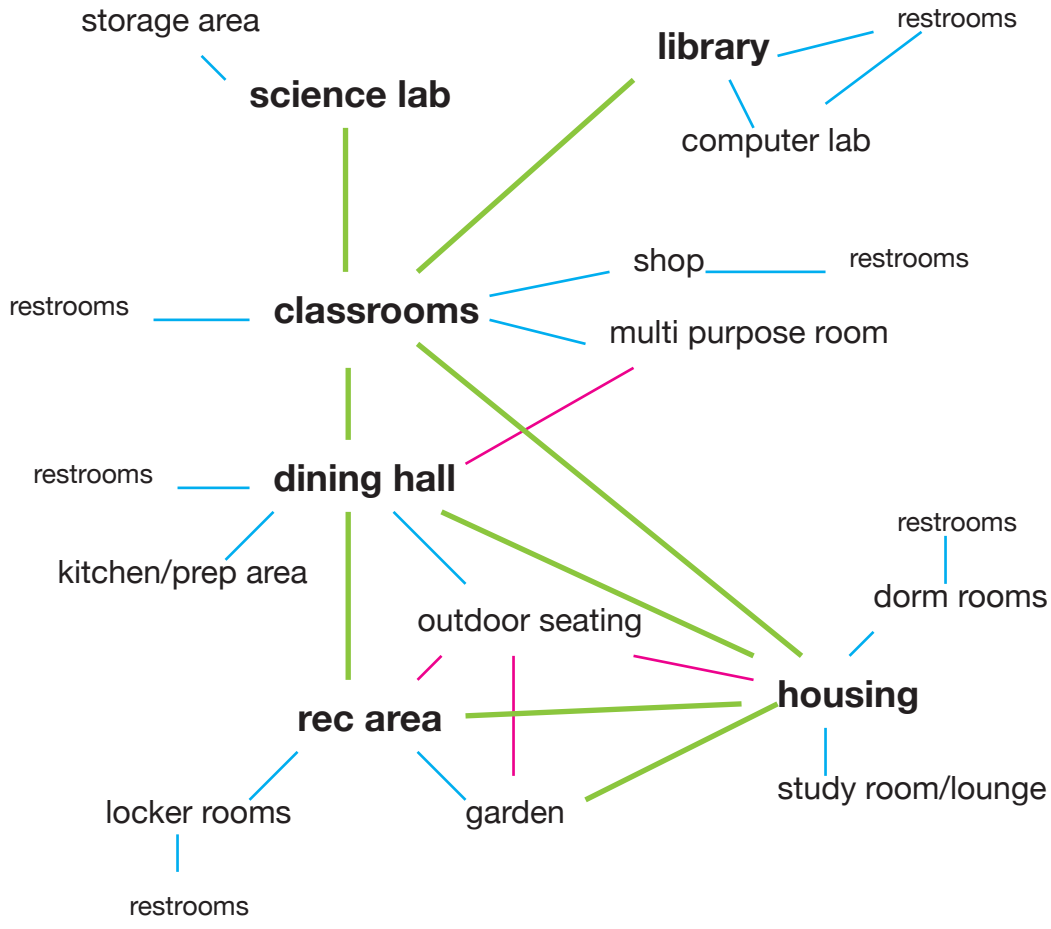
garden:
quantitative: 1000 sf
qualitative: community garden where the students can work together and grow their own food, needs to have adequate soil, may include a composting system and irrigation system

Tertiary Spaces:

restrooms:
quantitative: 200 sf (may vary with restroom location), should be various locations within the school, housing, locker rooms, male and female
qualitative: good ventilation, not in the main circulation pathways

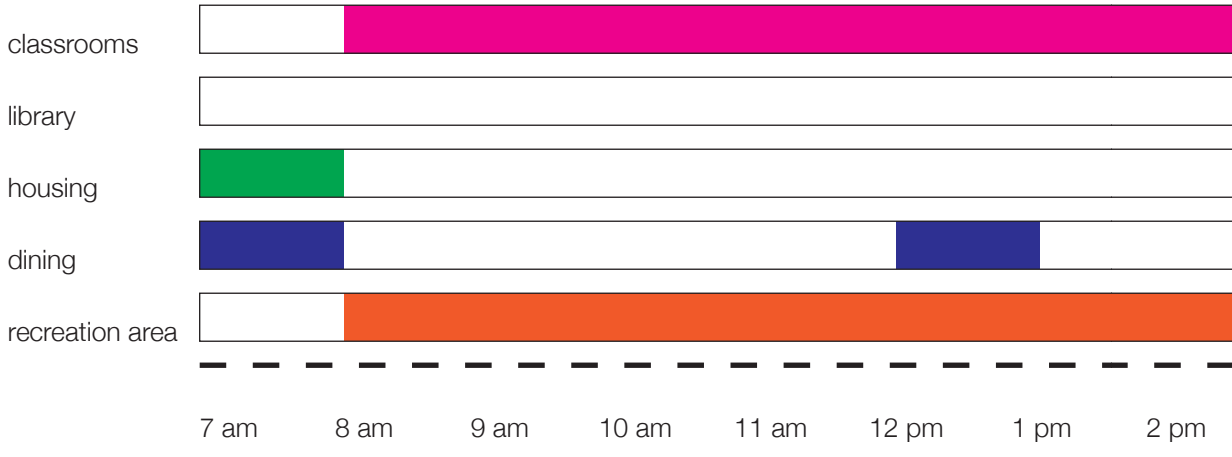

SCHOOL
classrooms
computer lab
science lab
administration office
restrooms
COMMUNITY
sports area/stadium
recreation ara
garden
dining hall/kitchen
multipurpose room
library
HOME
student housing
faculty housing
restrooms
study/community areas
SECONDARY SCHOOL


FACULTY HOUSING
SPORTS/ REC AREA
LIBRARY
STUDENT HOUSING
SCHOOL
DINING
student circulation
faculty circulation

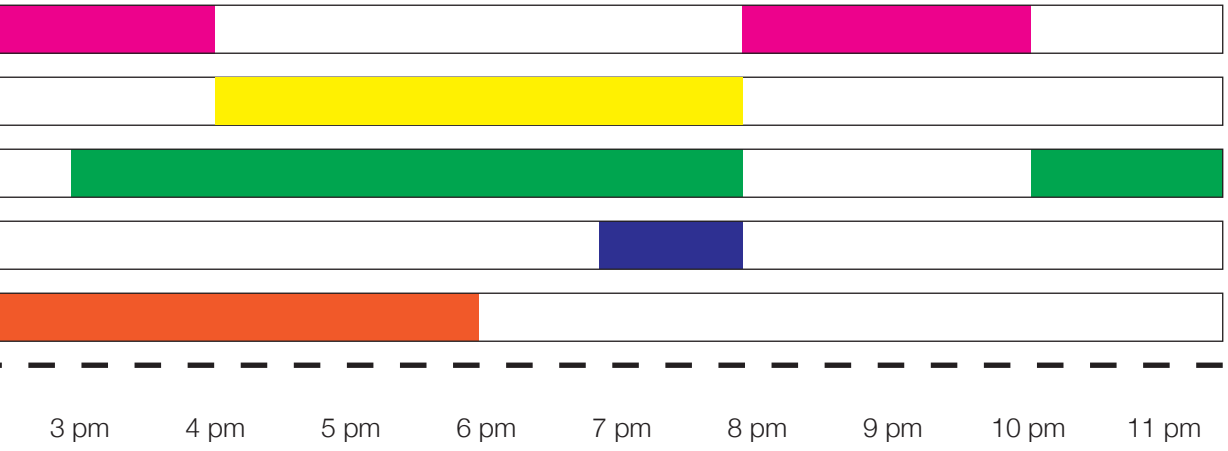


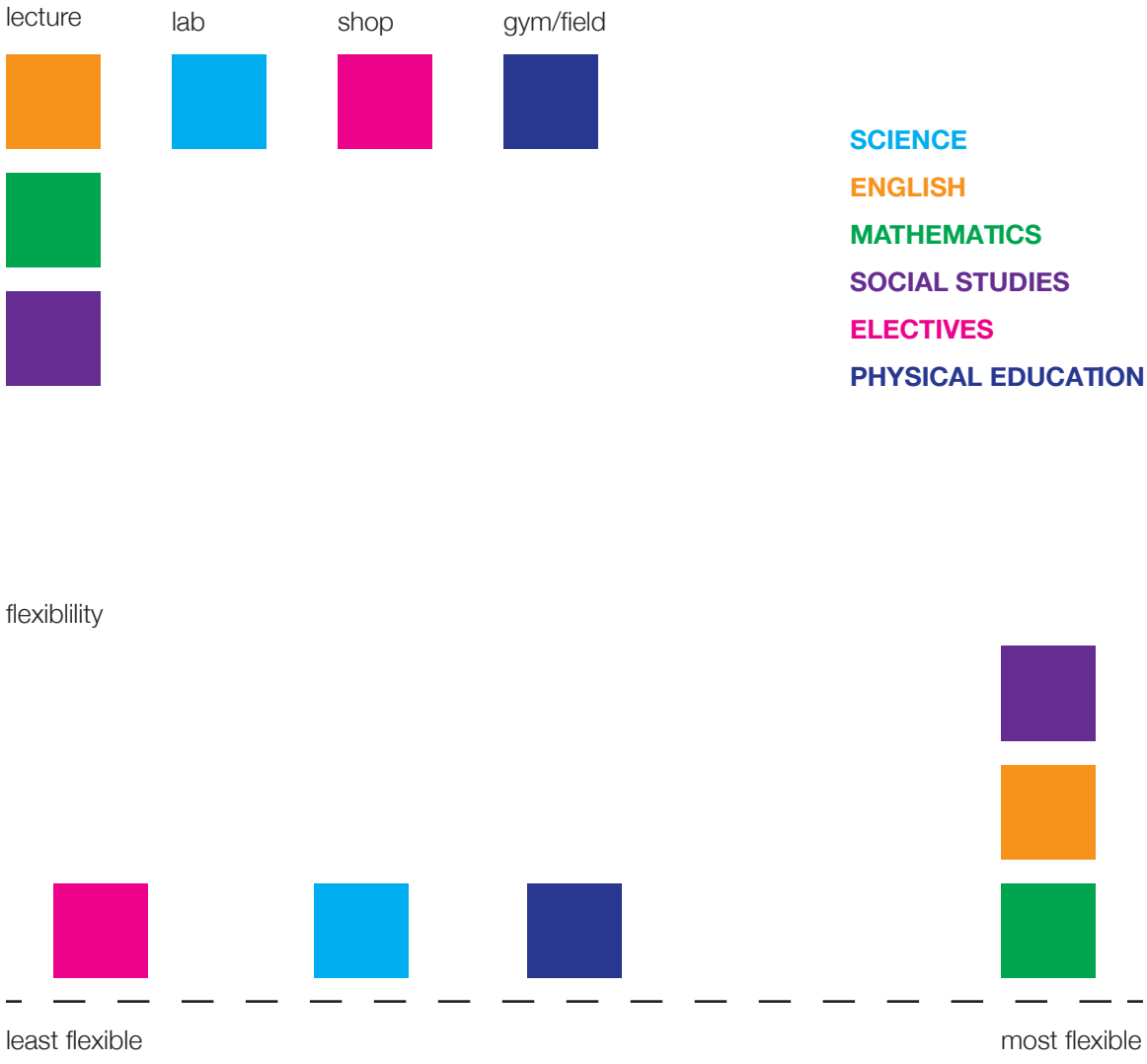
relationships between programs:

primary connections secondary connections connections within a program



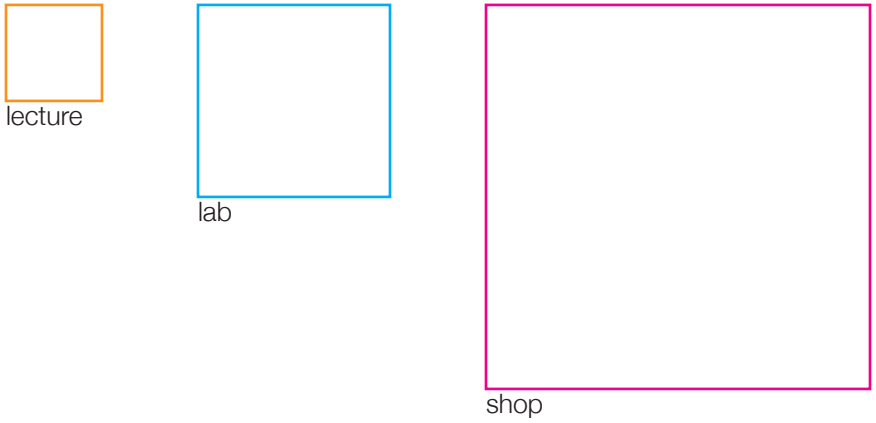
program use schedule


3 pm
4 pm
5 pm
6 pm
7 pm
8 pm
9 pm
10 pm
11 pm

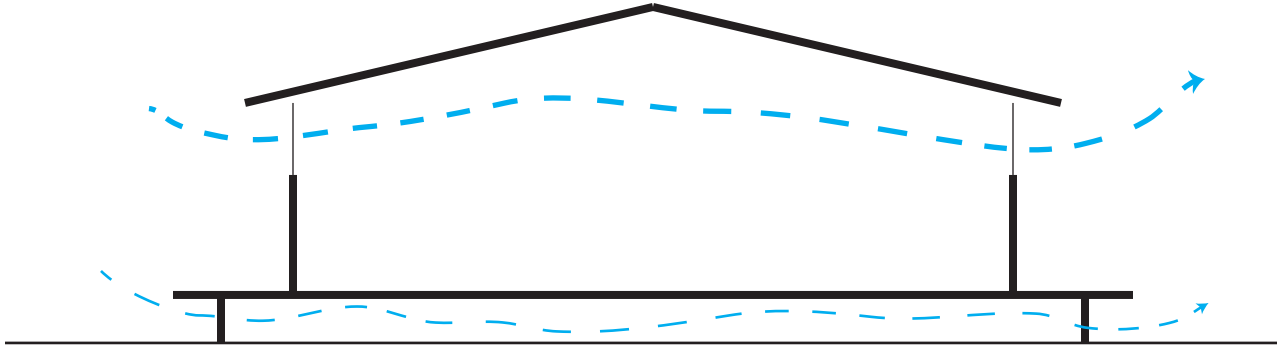

classroom types
lecture
lab
shop
gym/field
SCIENCE
ENGLISH
MATHEMATICS
SOCIAL STUDIES
ELECTIVES
PHYSICAL EDUCATION
flexiblility
least flexible
most flexible

PRIMARY SPACES	SECONDARY SPACES	TERTIARY SPACES
classrooms	shop	restrooms
	multi-purpose room	
library	computer lab	restrooms
science lab	storage area	
housing	study room/lounge	restrooms
dining hall	outdoor seating	restrooms
	kitchen/prep area	
rec area	garden	restrooms
	locker rooms	

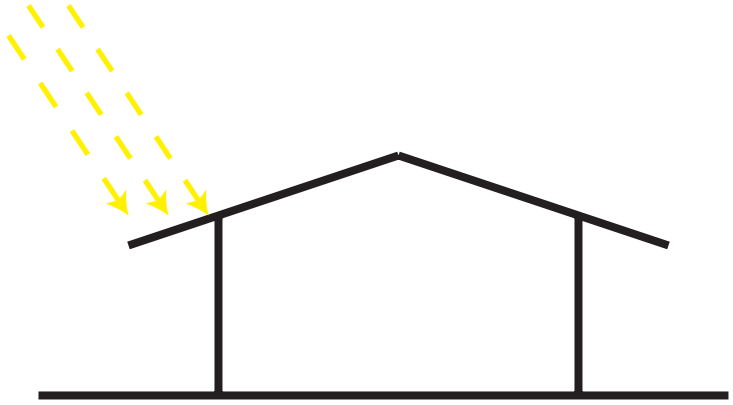
classroom sizes



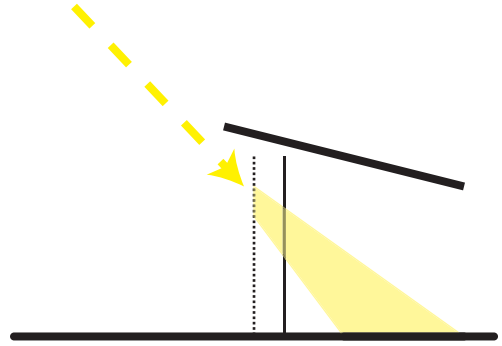
STRATEGIES



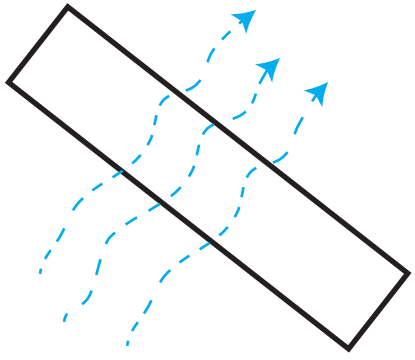
passive cooling techniques

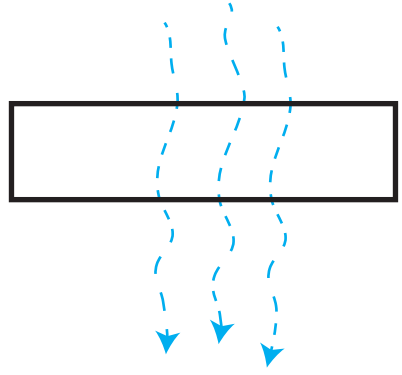


incorporation of overhangs



diffuse light





building orientation for air circulation

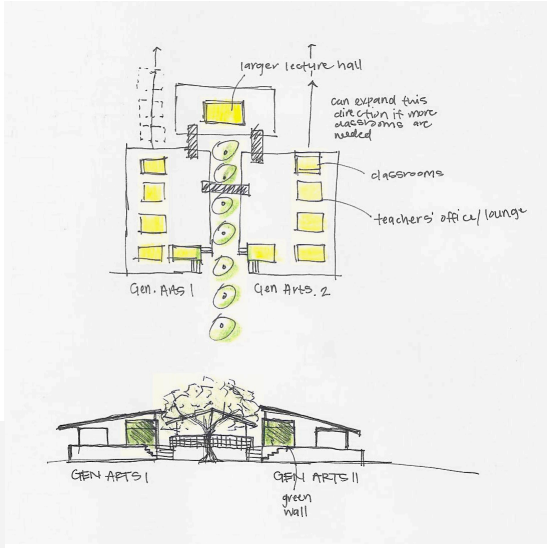
process

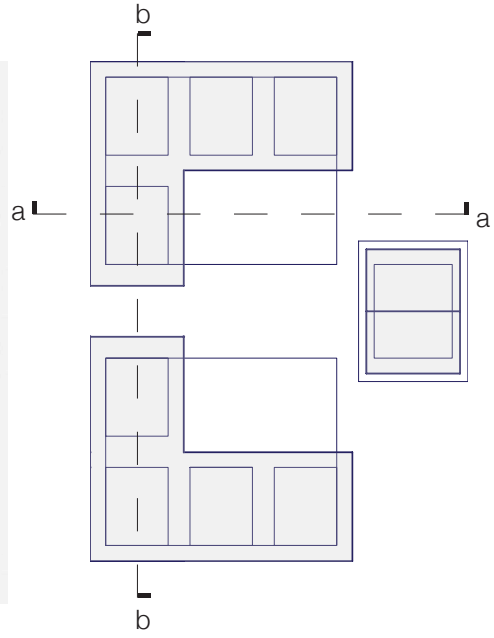
DESIGN BY DEPARTMENT

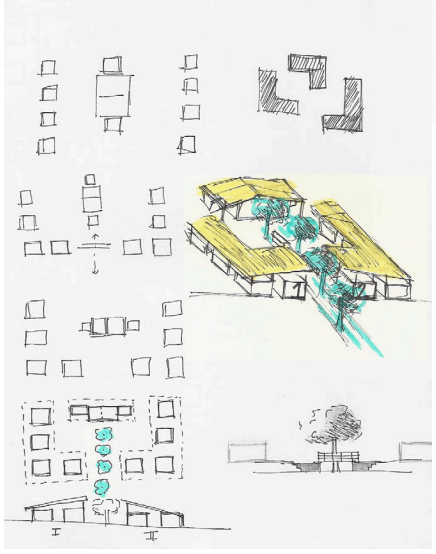
GENERAL ARTS I & II

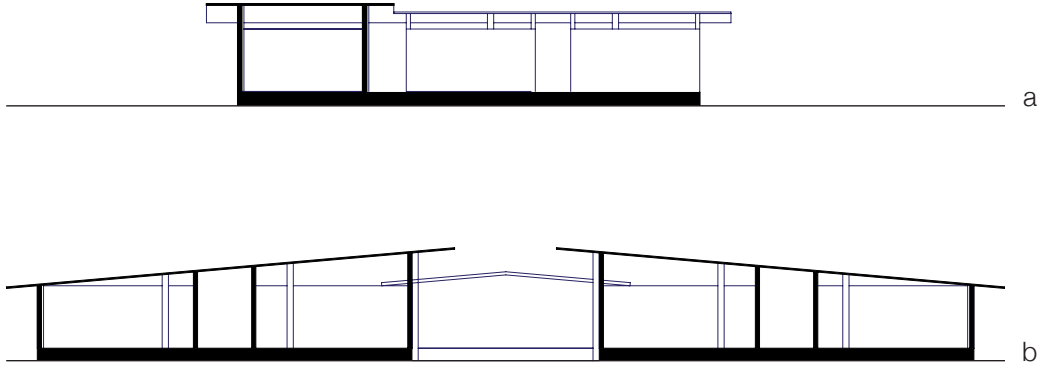
I:
Courses:
French
Geography
Economics
Calculus I/II

II:
Courses:
Literature
Trigonometry
Pre-Calculus
French
HIstory



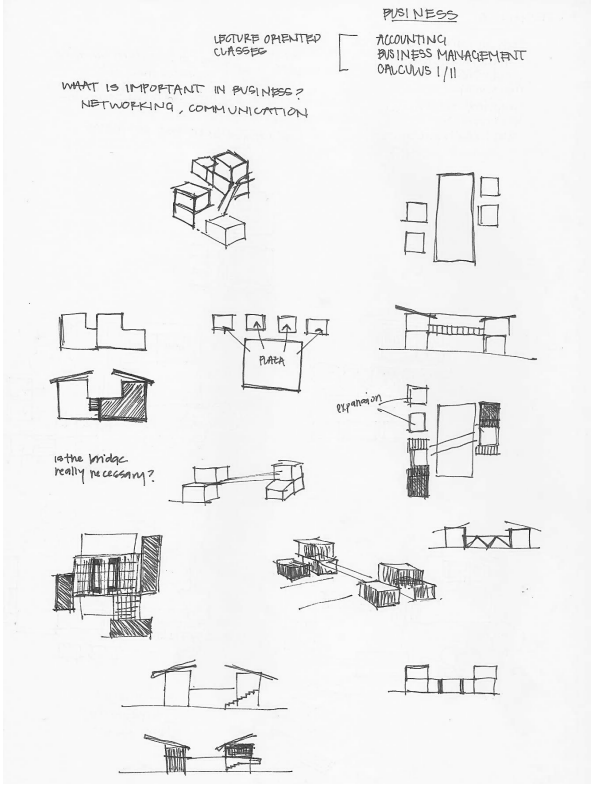


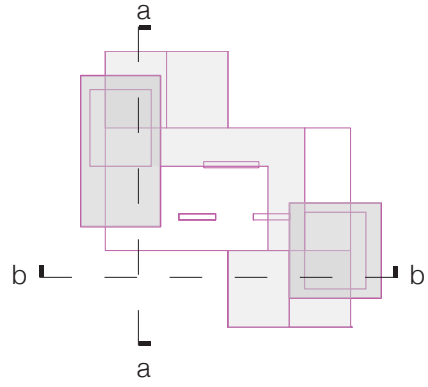


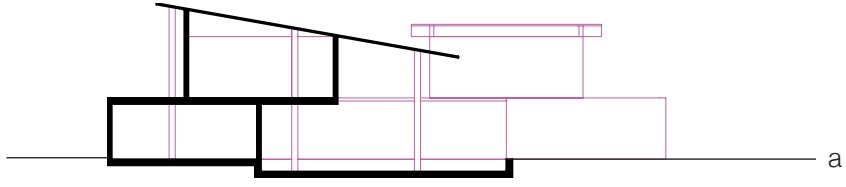


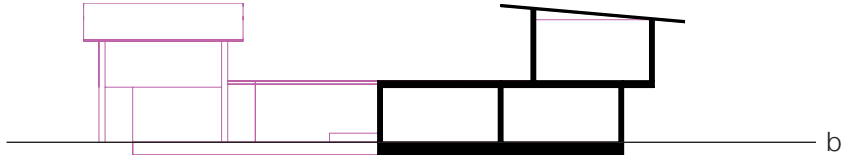
BUSINESS

Courses:
Accounting
Business Management
Calculus I/II



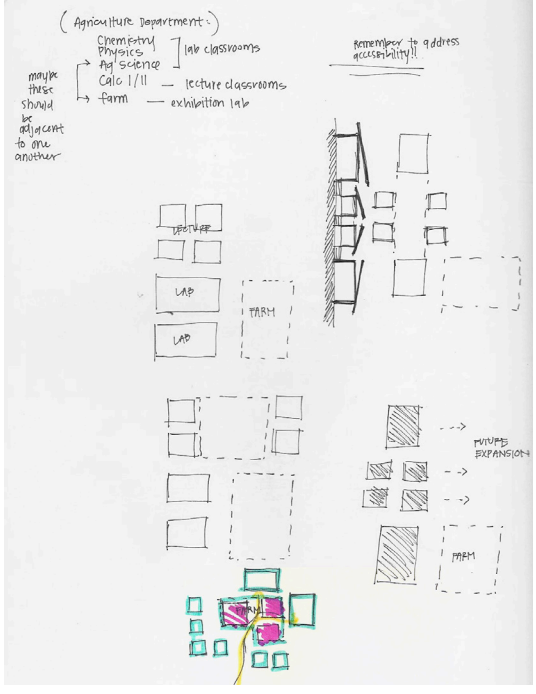


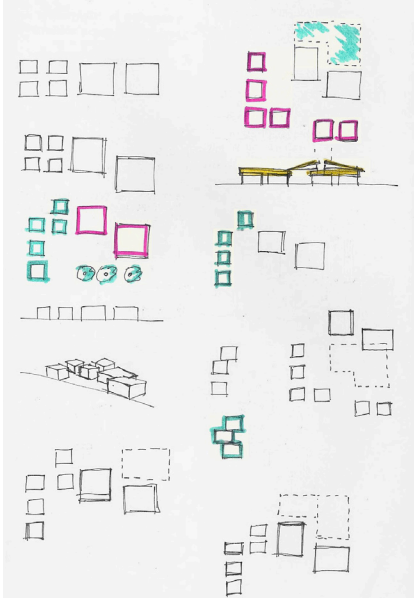


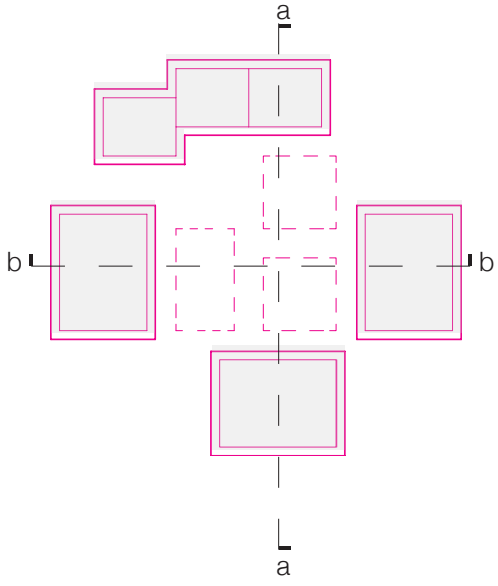


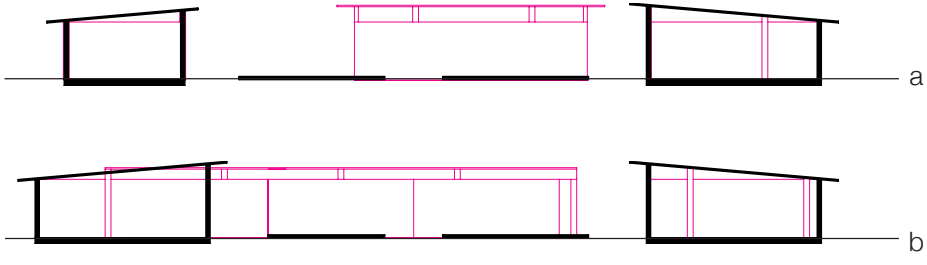
AGRICULTURE

Courses:
Chemistry
Physics
Agriculture Science
Calculus I/II



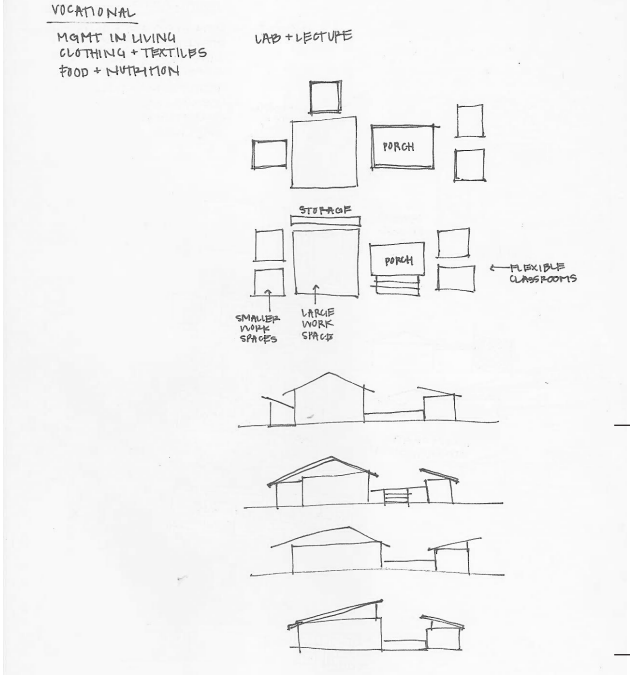


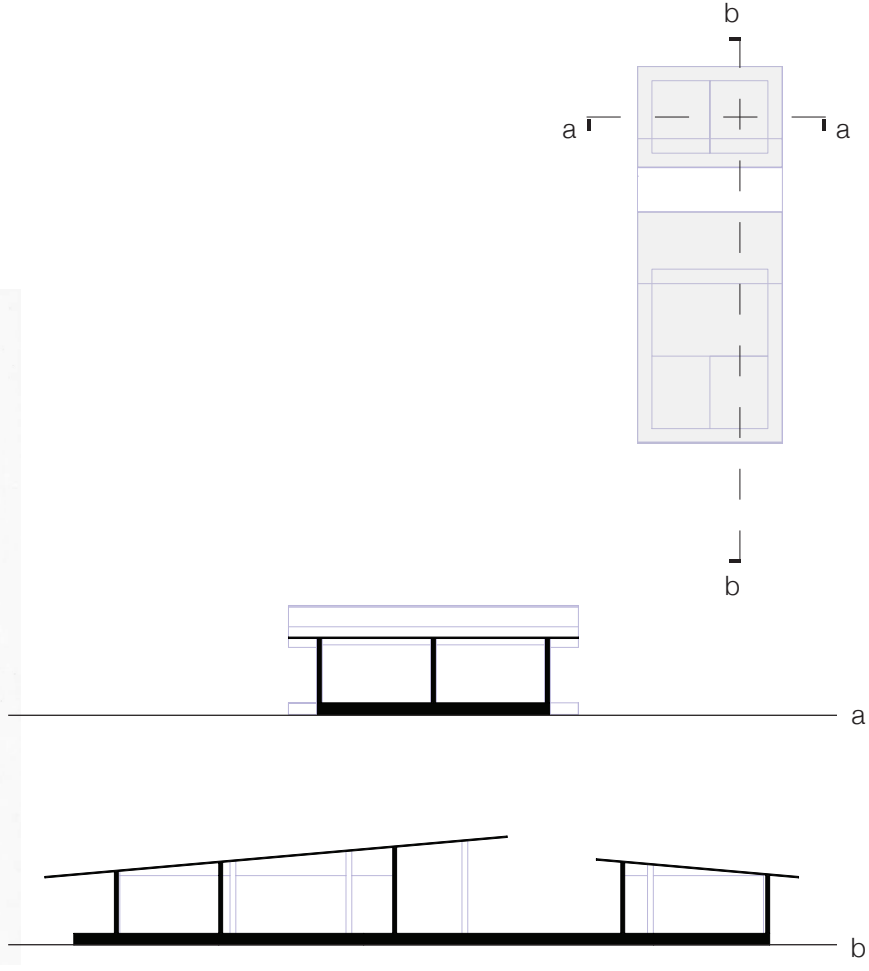




VOCATIONAL HOME SCIENCE

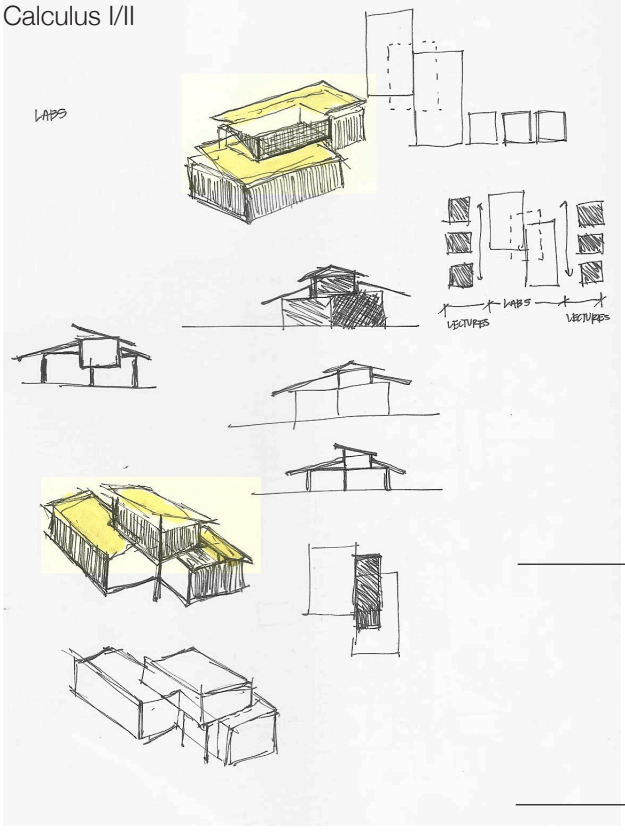
Courses:
Management in Living
Clothing and Textiles
Food and Nutrition

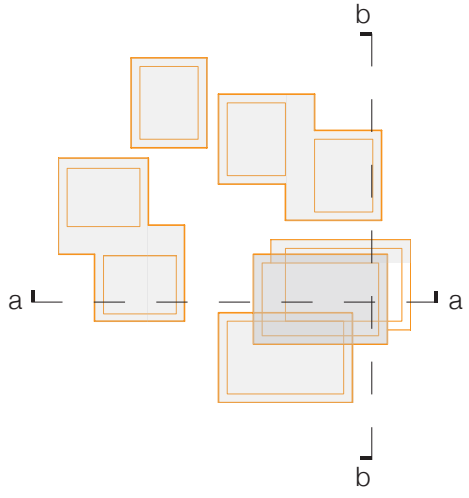


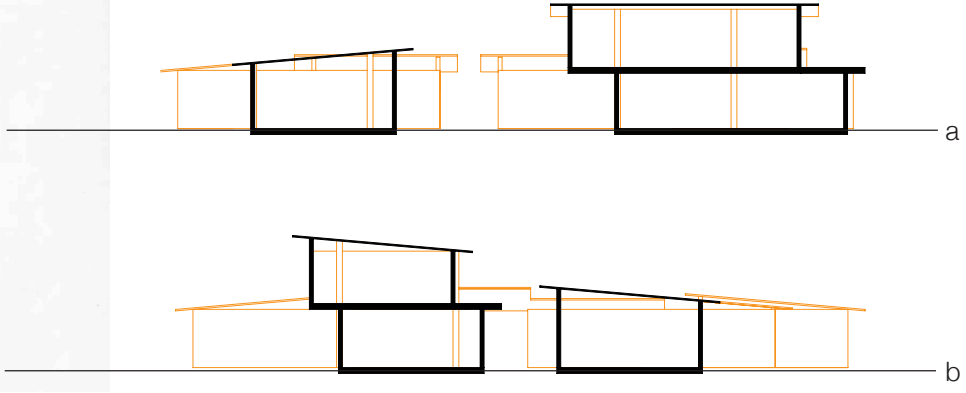


SCIENCE

Courses:
Biology
Chemistry
Physics
Calculus I/II

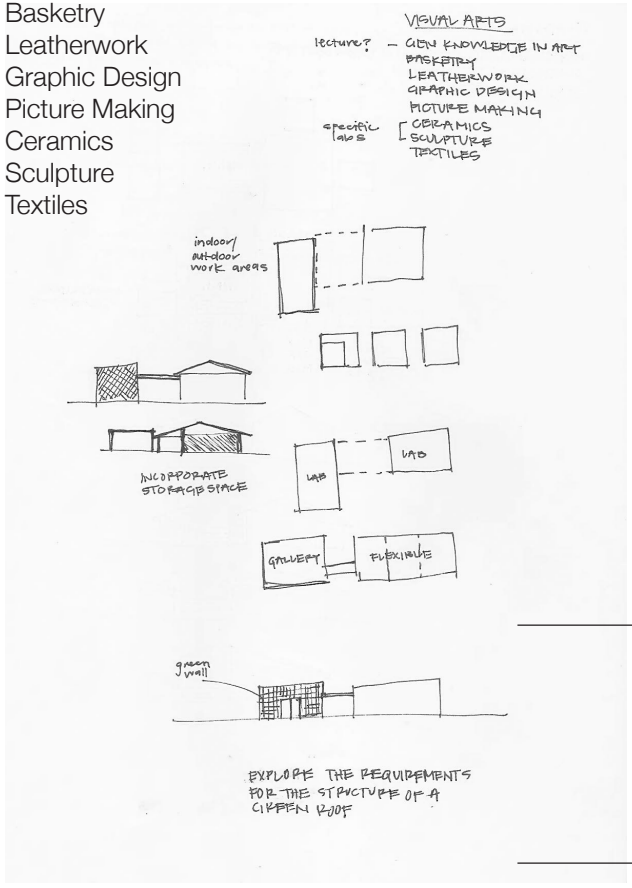


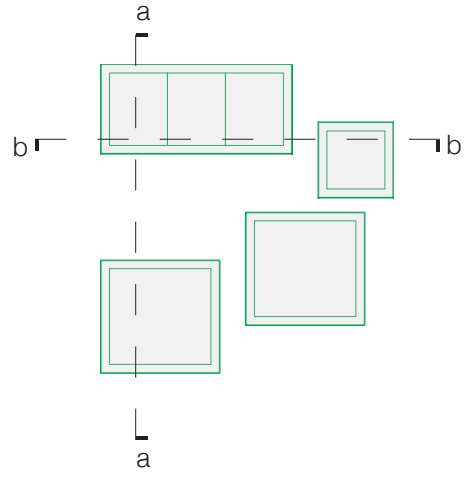


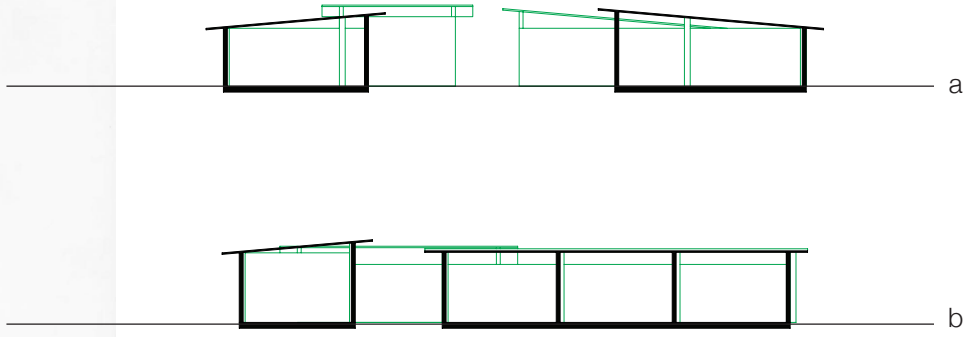


VISUAL ARTS

Courses:
General Knowledge in Art
Basketry
Leatherwork
Graphic Design
Picture Making
Ceramics
Sculpture
Textiles

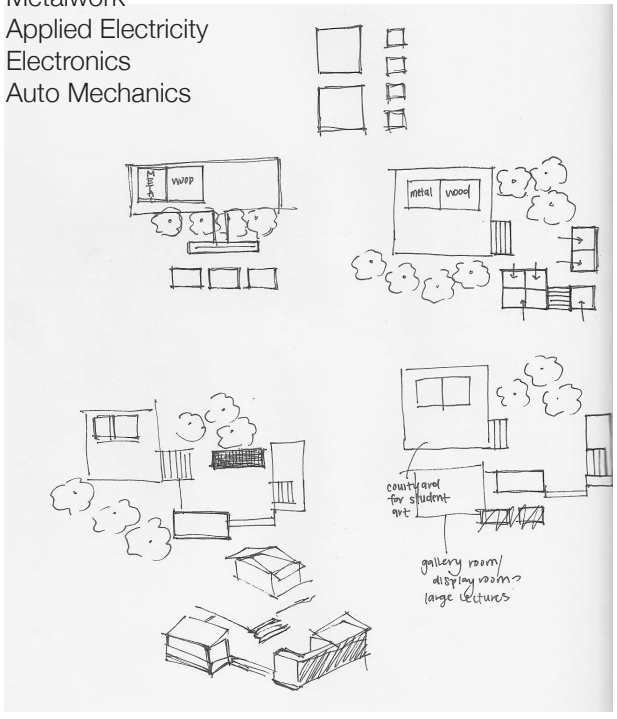


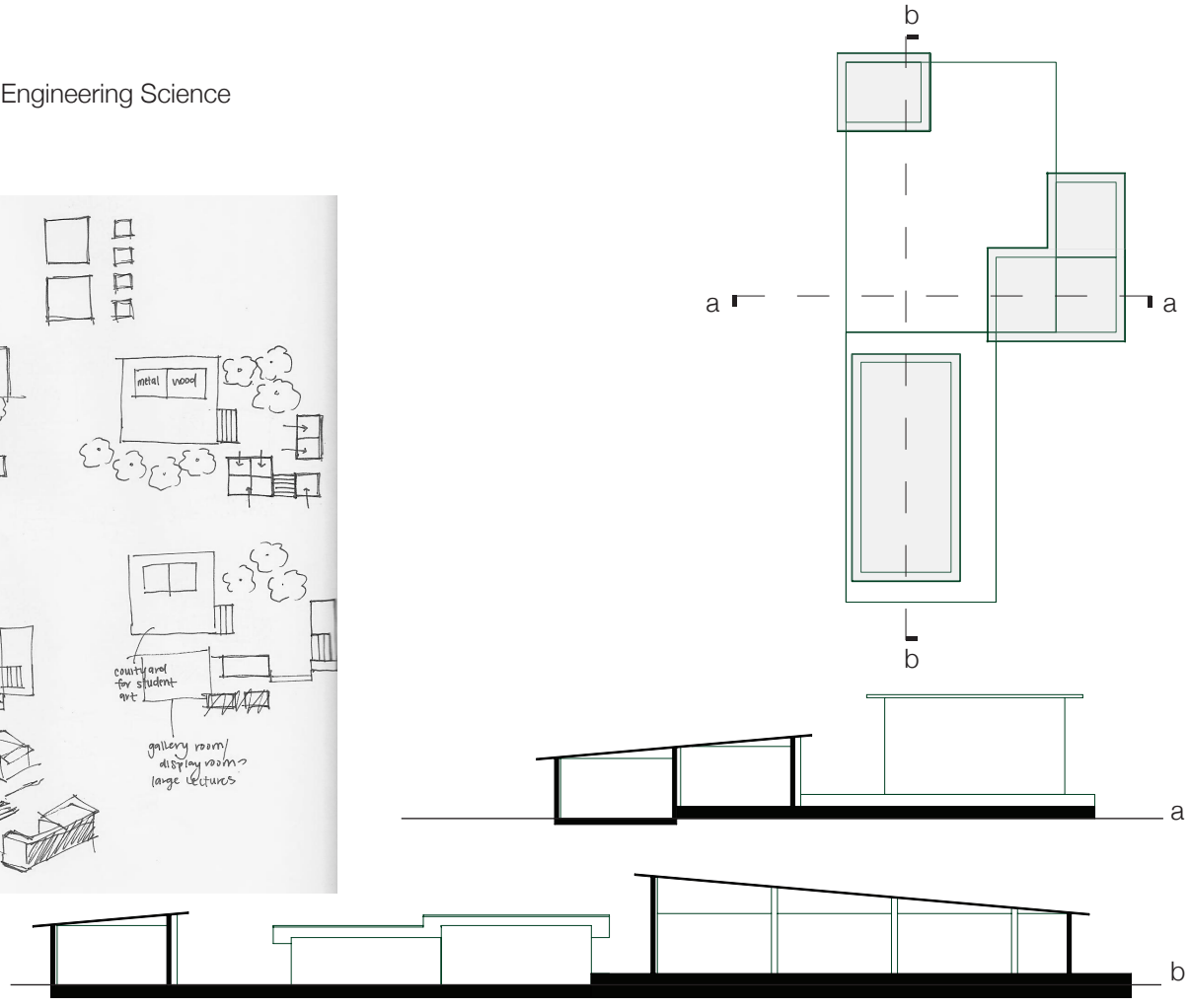




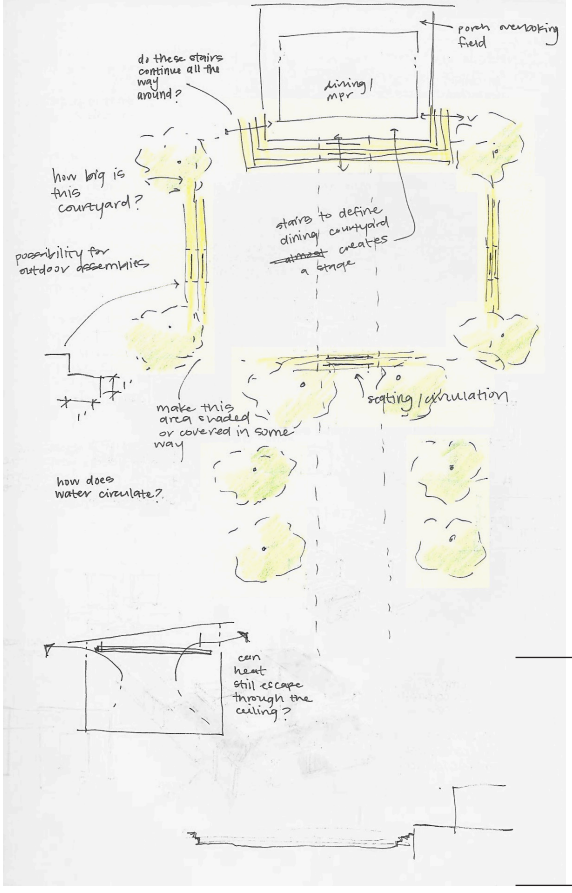
TECHNICAL

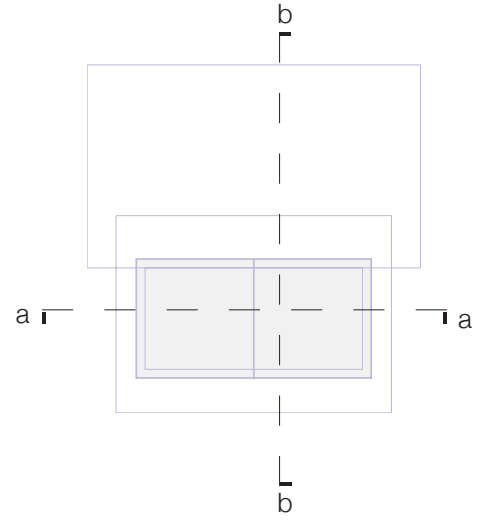
Courses:
Technical Drawing and Engineering Science
Building Construction
Woodwork
Metalwork
Applied Electricity
Electronics
Auto Mechanics

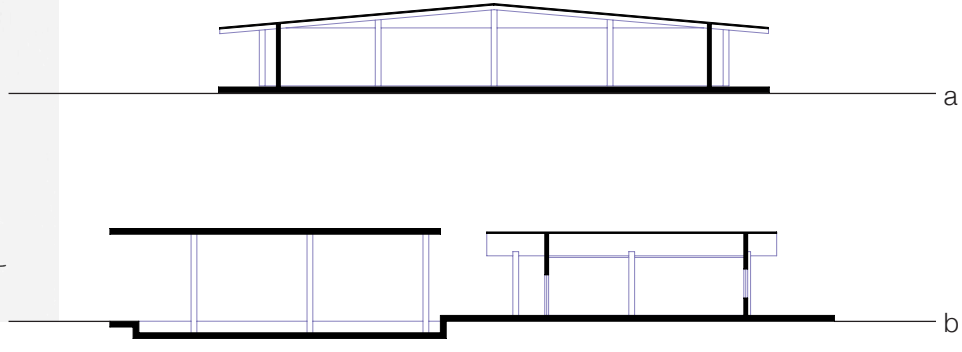




DINING


porch overlooking field
do these stairs continue all the way around?
dining / mpr
how big is this courtyard?
stairs to define dining courtyard creates a space
possibility for outdoor assemblies
make this area shaded or covered in some way
seating / circulation
how does water circulate?
can heat still escape through the ceiling?


b
a
a
b


a
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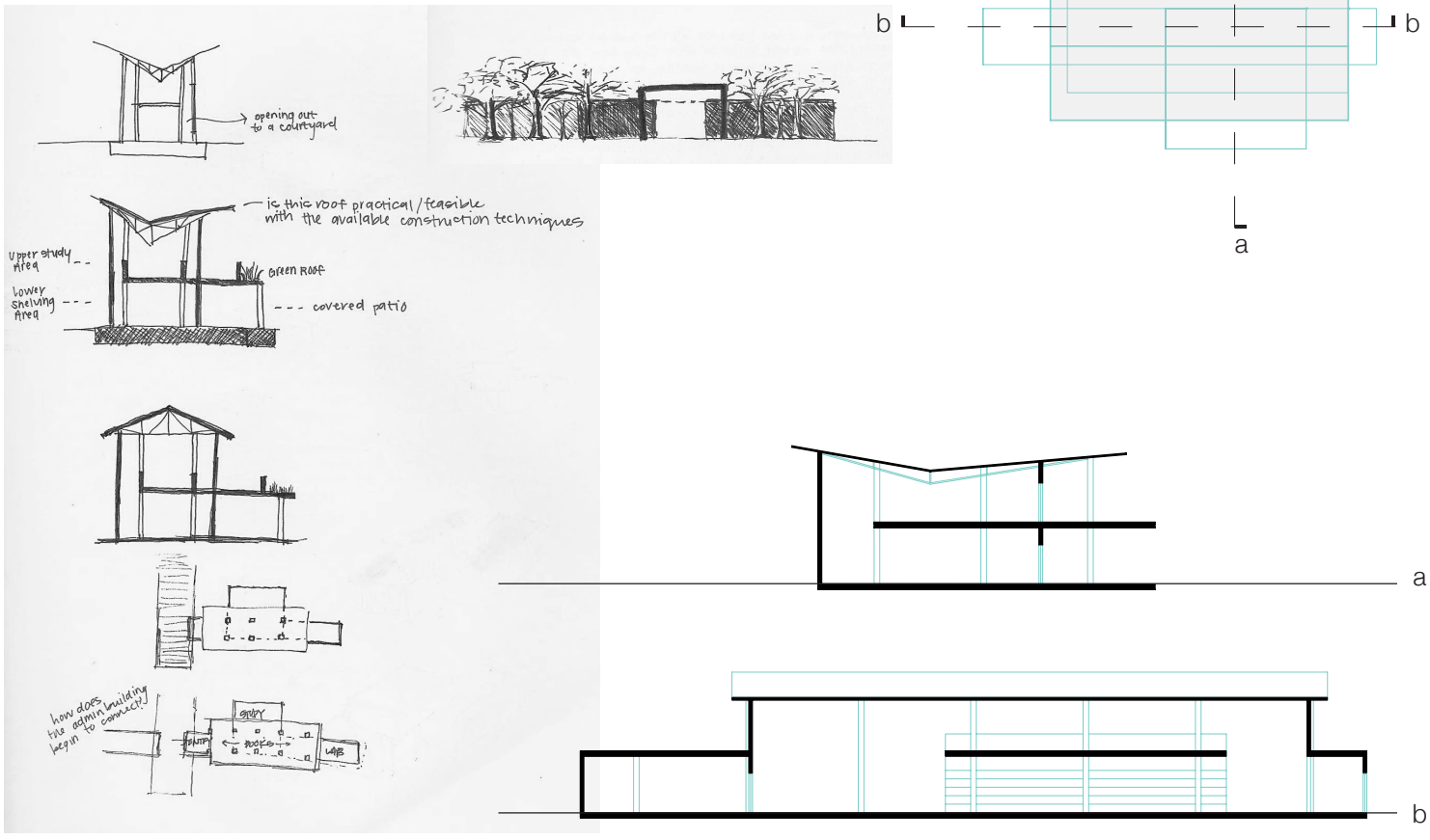
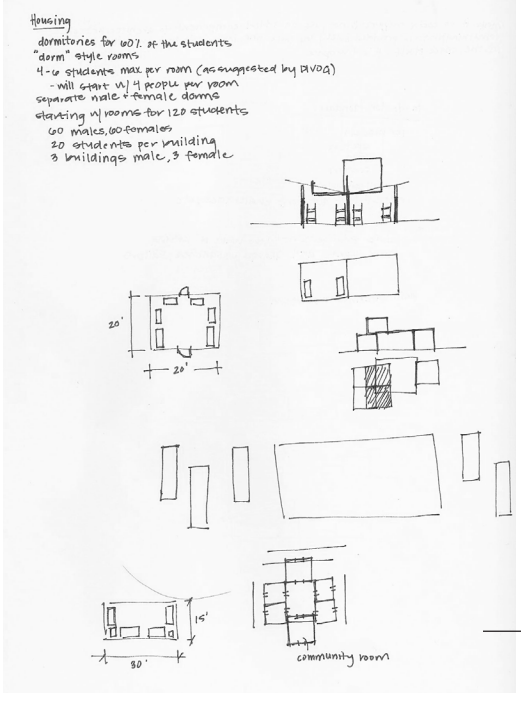
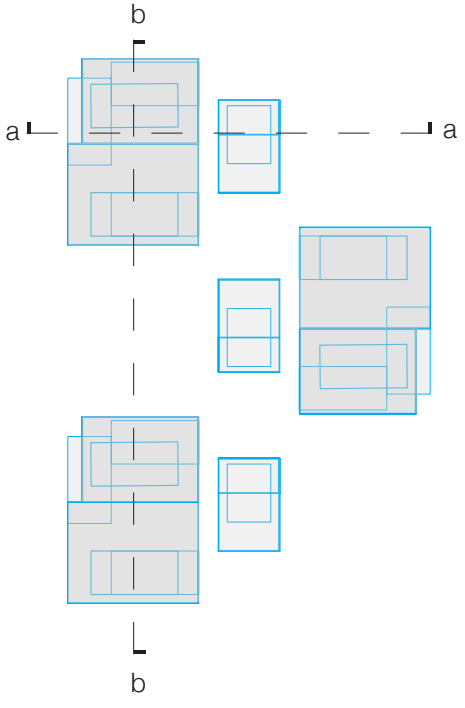
LIBRARY


opening out to a courtyard
b
b
a
a
is this roof practical / feasible with the available construction techniques
Upper study Area
Lower Shelving Area
Green Roof
covered patio
how does this admin building begin to connect?
entry
ramp
books
labs
a
b

HOUSING


Housing
dormitories for 40% of the students
"dorm" style rooms
4-6 students max per room (as suggested by DIVDQ)
- will start w/ 4 people per room
separate male + female dorms
starting w/ rooms for 120 students
60 males, 60 females
20 students per building
3 buildings male, 3 female
20'
20'
15'
80'
community room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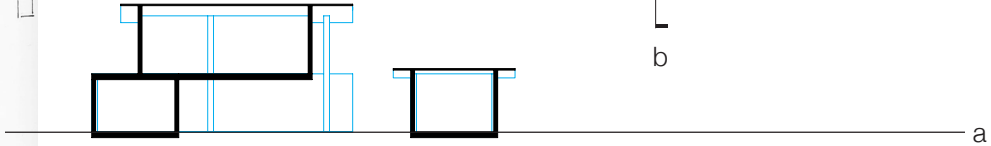
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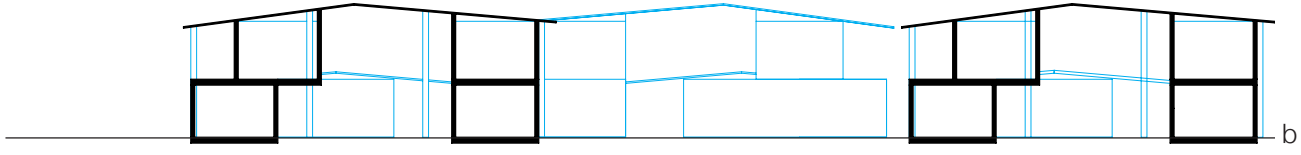
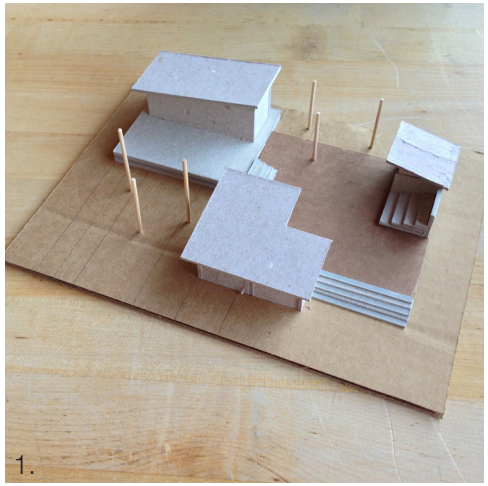

b

exploration through models

1. technical
2. science
3. general arts I & II
4. agriculture
5. vocational home science
6. visual arts
7. business
8. dining
9. library
10. housing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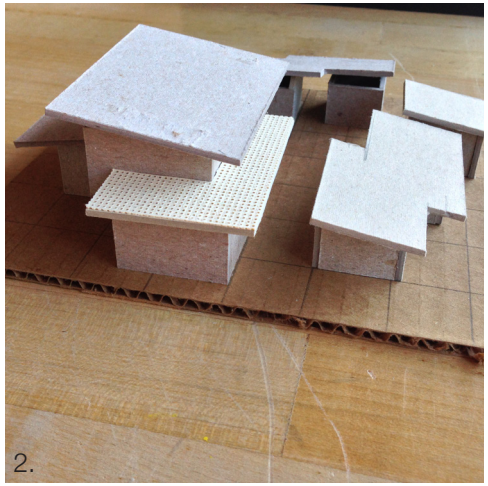
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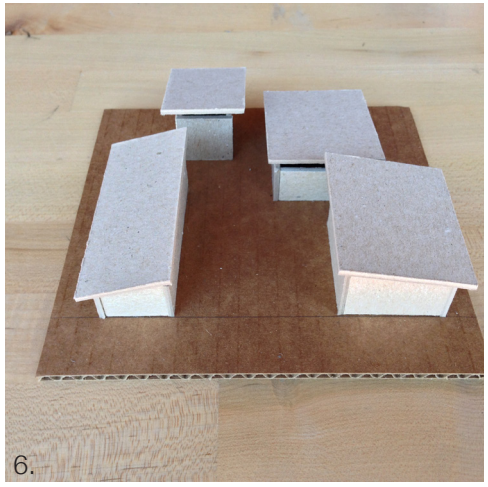
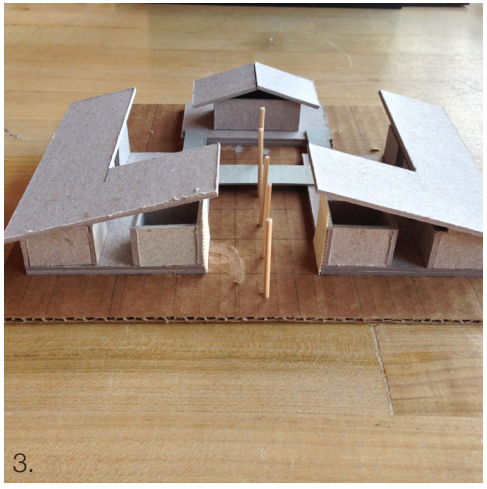

6.


7.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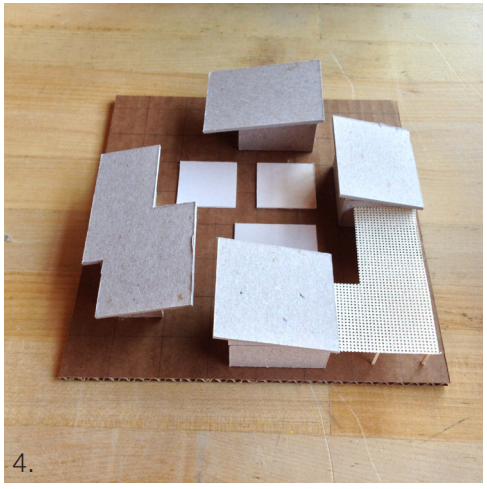
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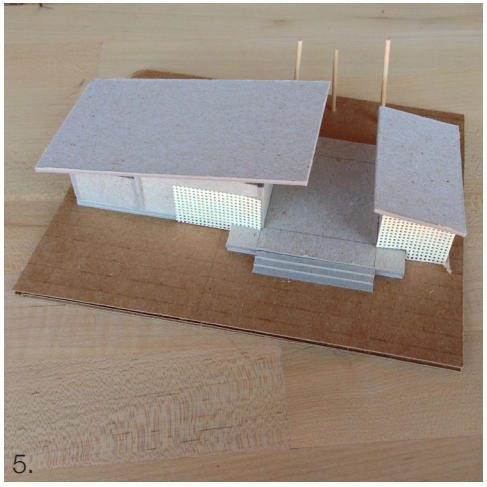
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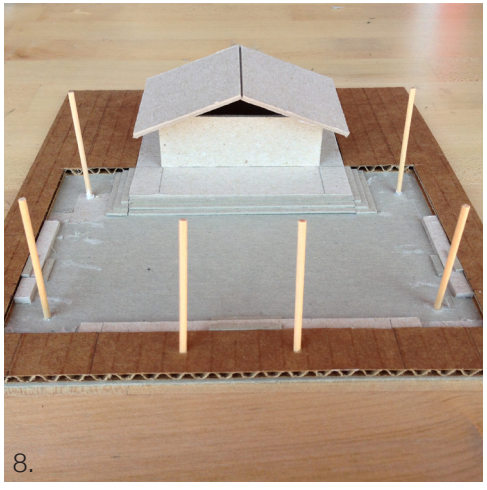
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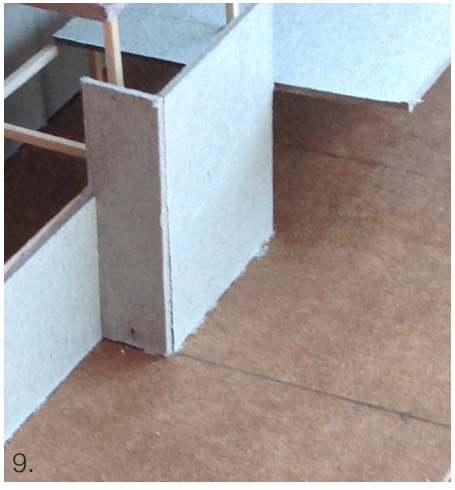
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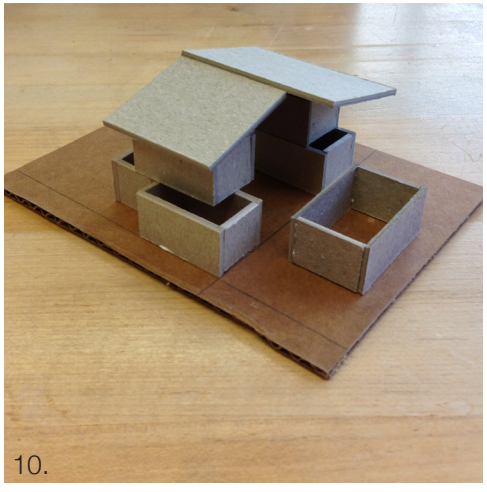
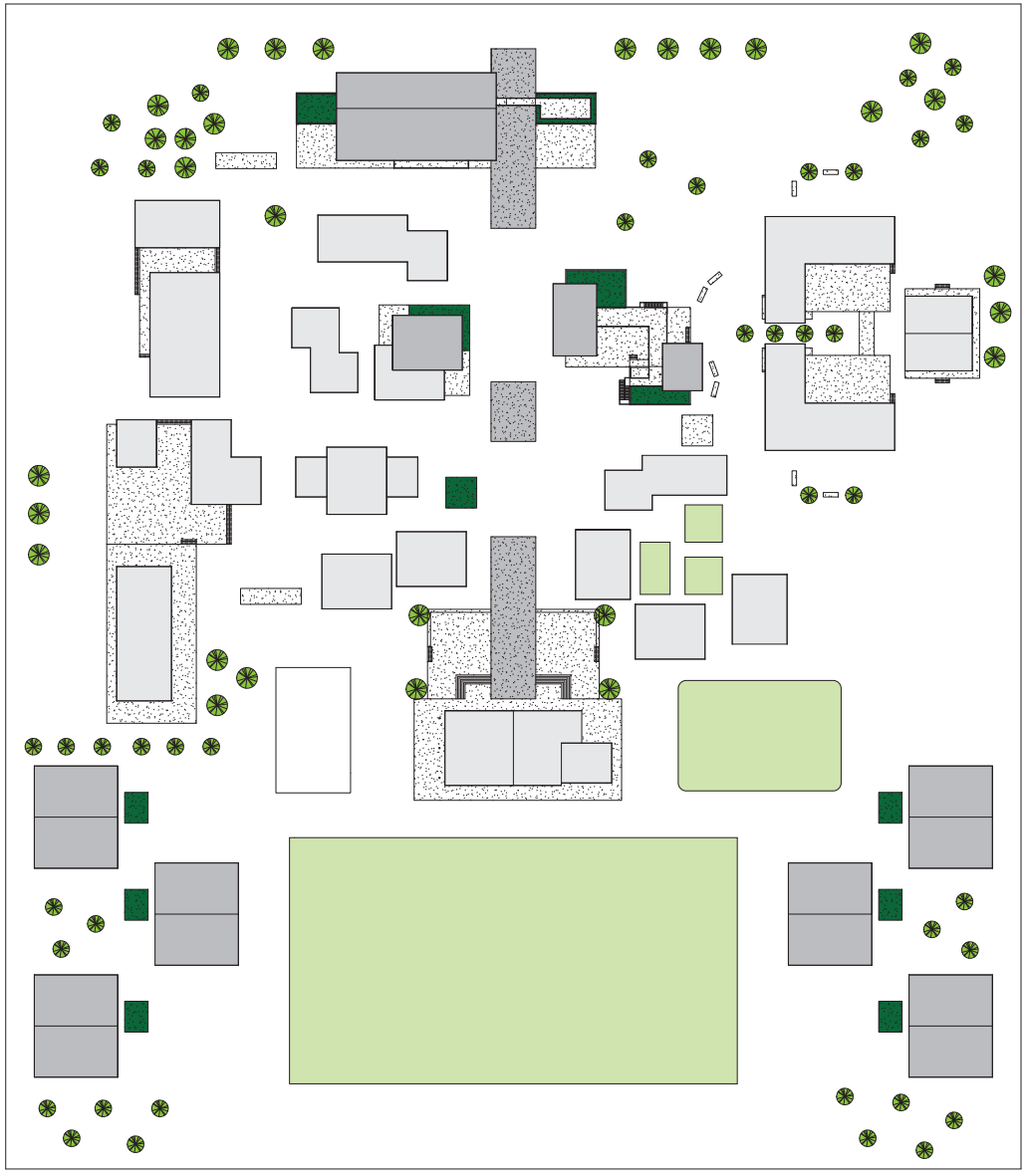

10.


SECOND
SCHOOL: akatsi, ghana

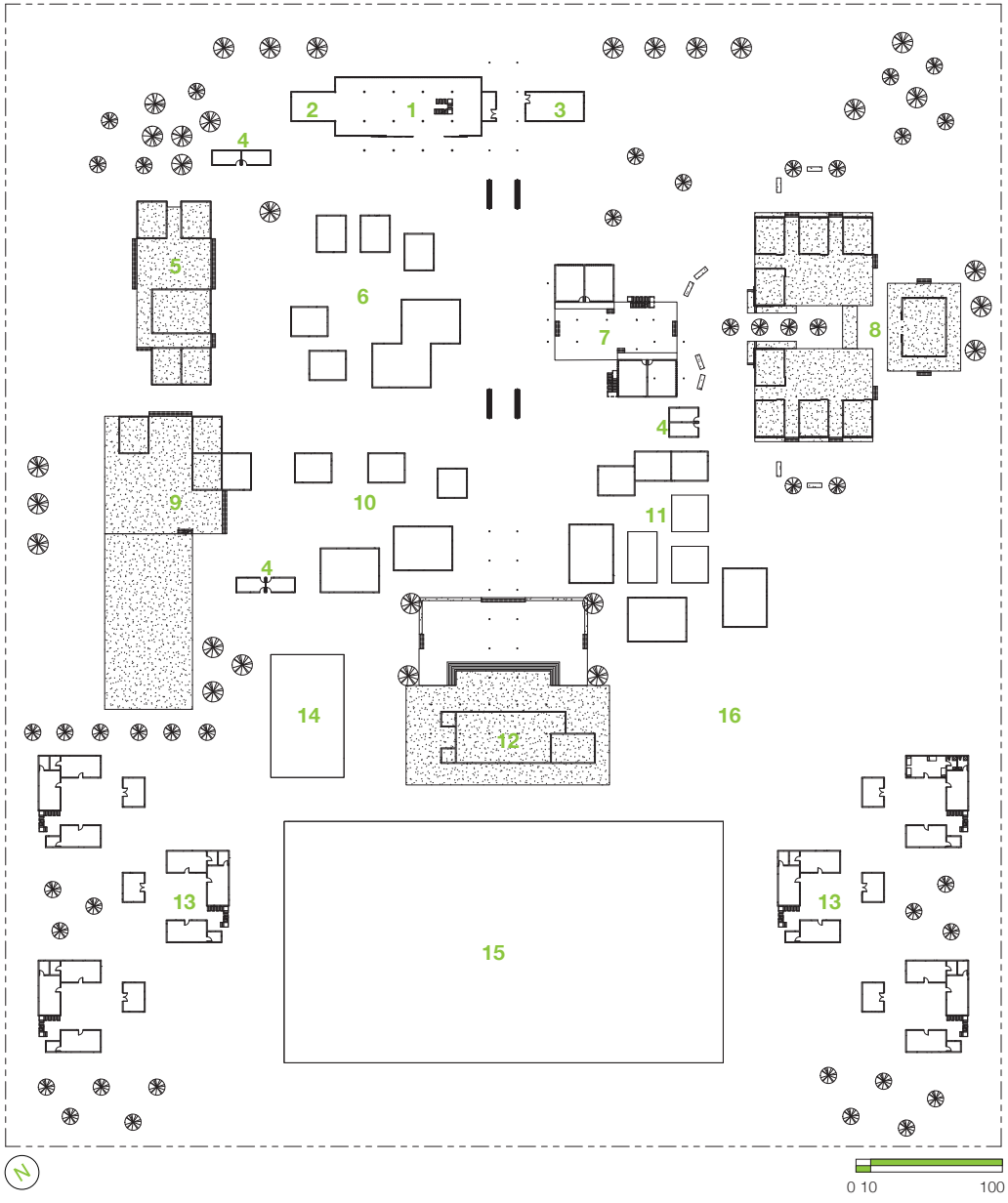
final

PLANS



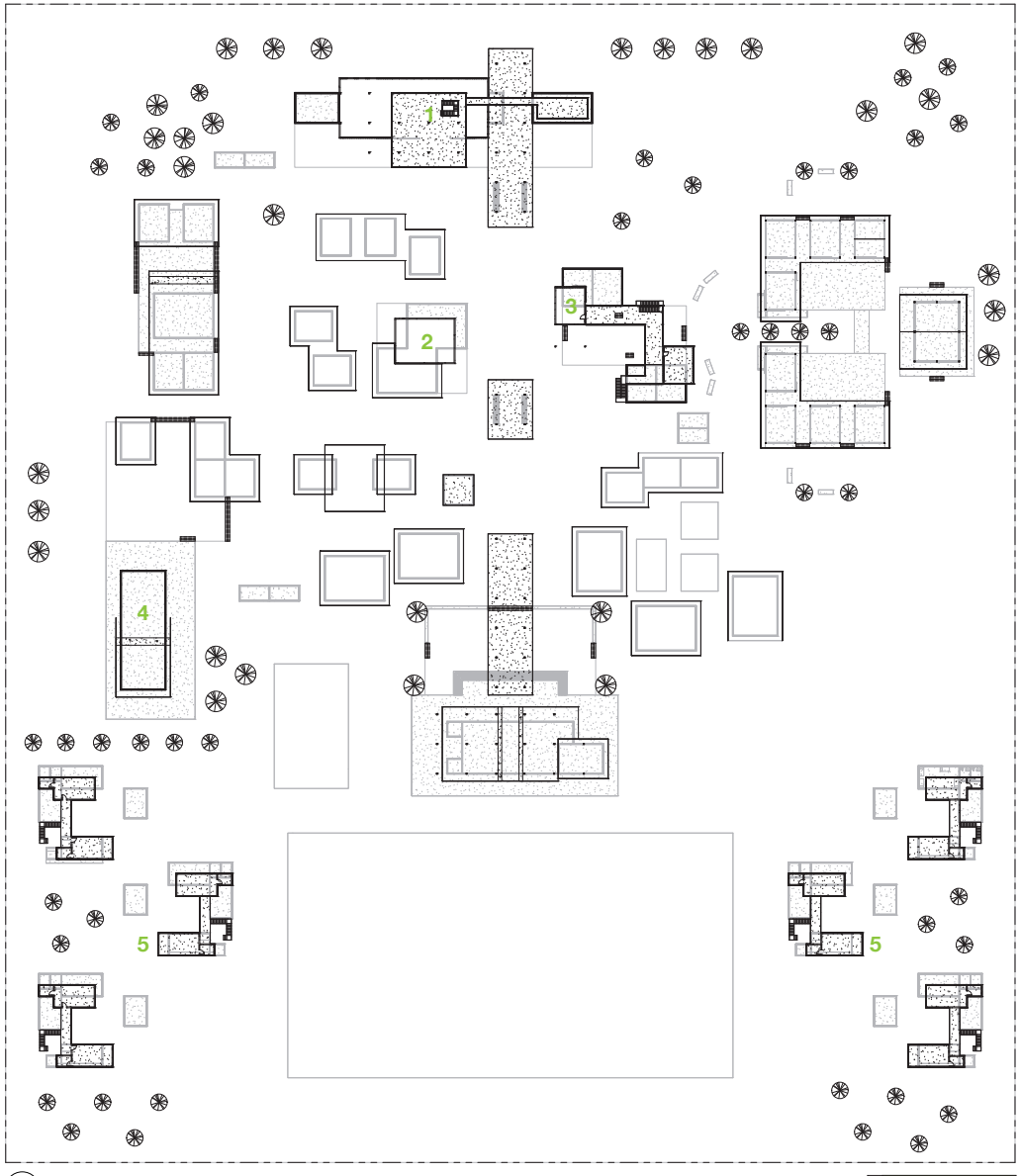
SITE PLAN (highlighting natural elements)

- landscaping
- recreation field, garden, agriculture department farms
- green roofs



FLOOR 0 PLAN

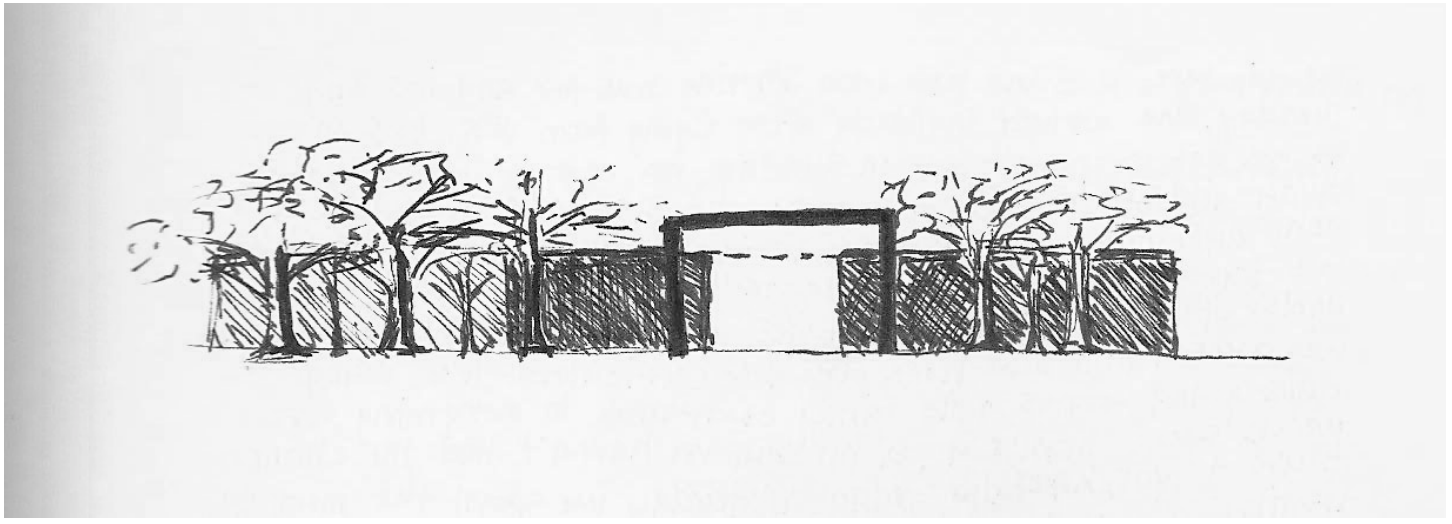
1. library
2. computer lab
3. administration
4. restrooms
5. vocational home science
6. science
7. business
8. general arts I & II
9. technical
10. visual arts
11. agriculture
12. dining
13. housing (dormitories & lounge)
14. basketball court
15. recreation field
16. garden

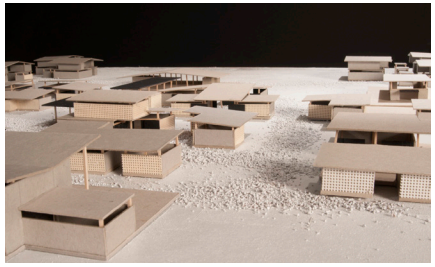


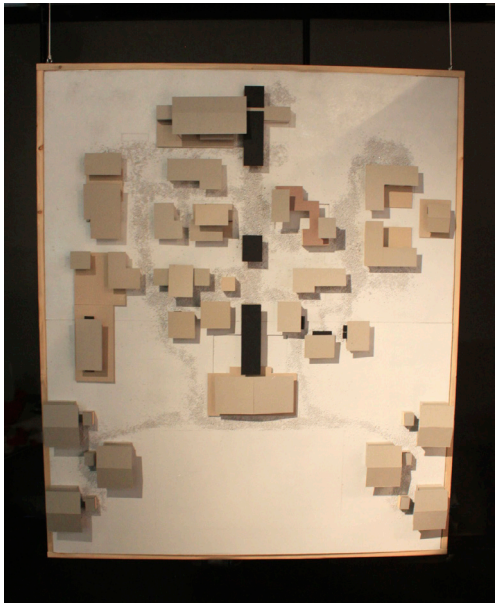
FLOOR 1 PLAN

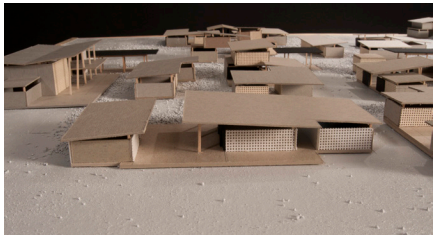
1. library
2. science
3. business
4. technical
5. housing (dormitories)

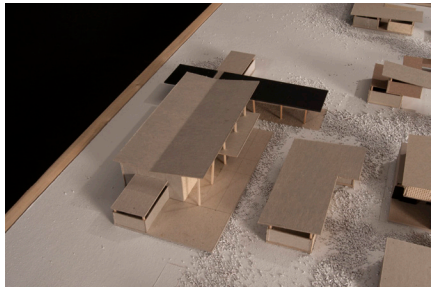
SITE MODEL

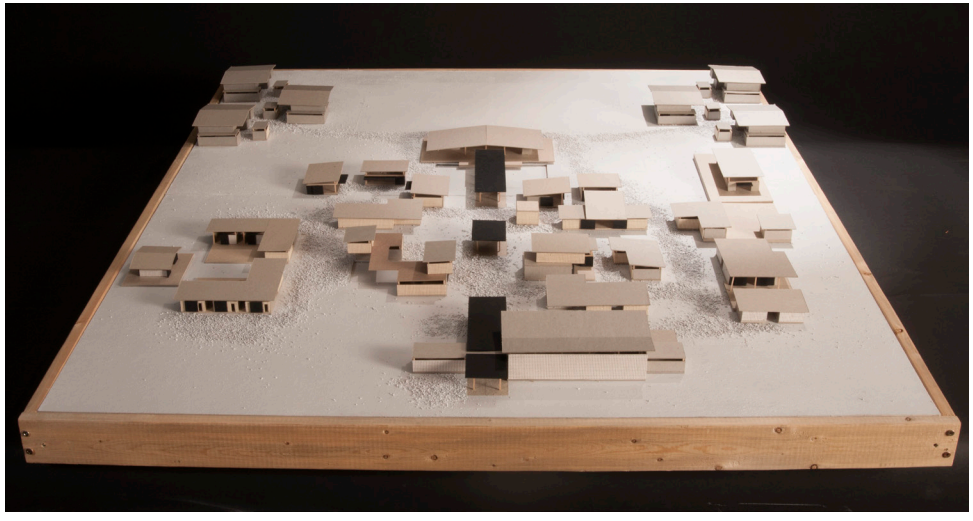


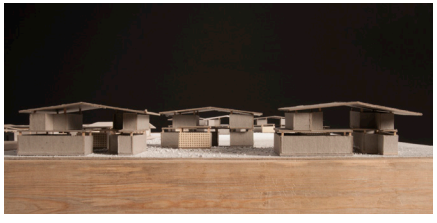




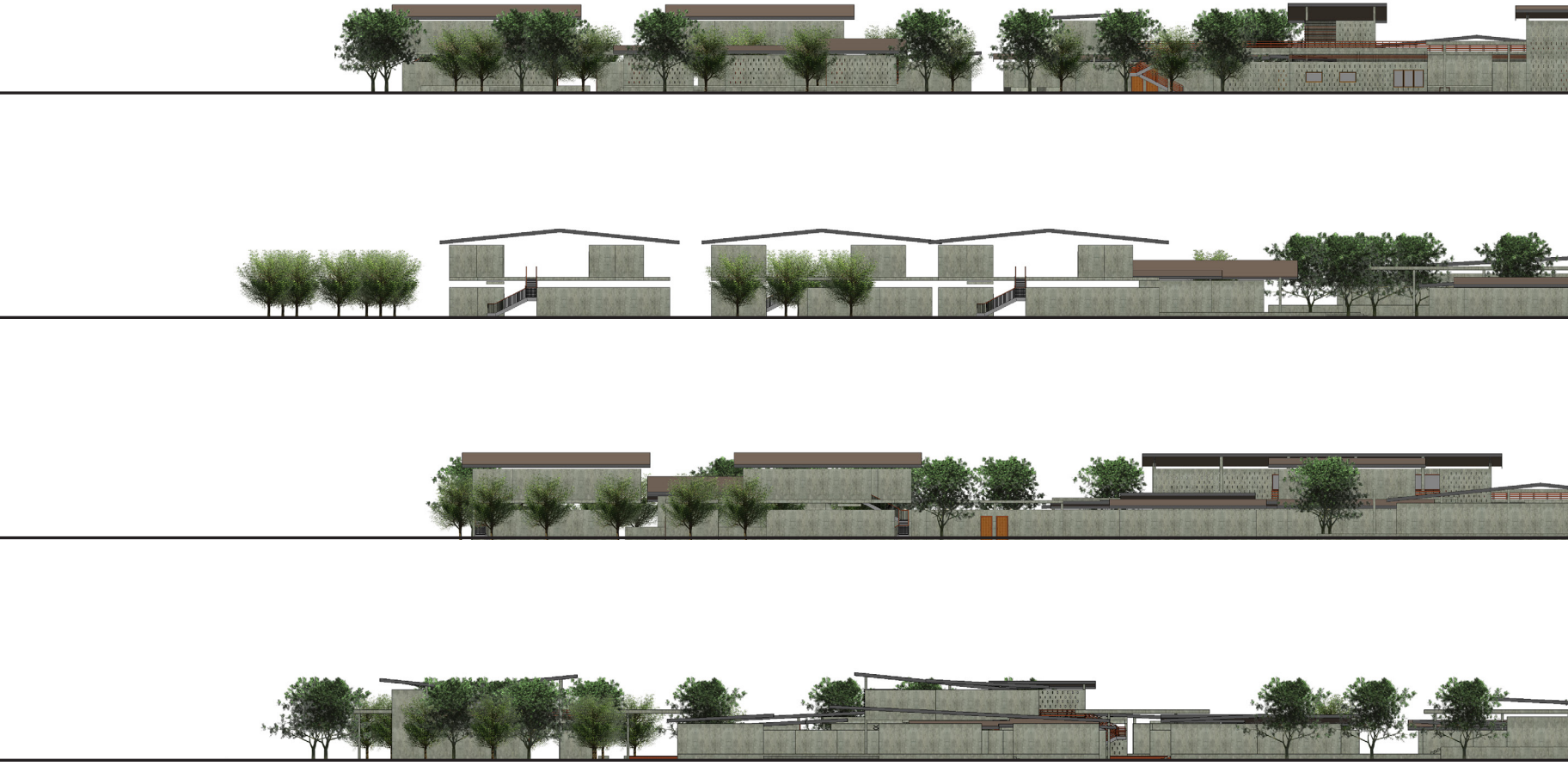








ELEVATIONS



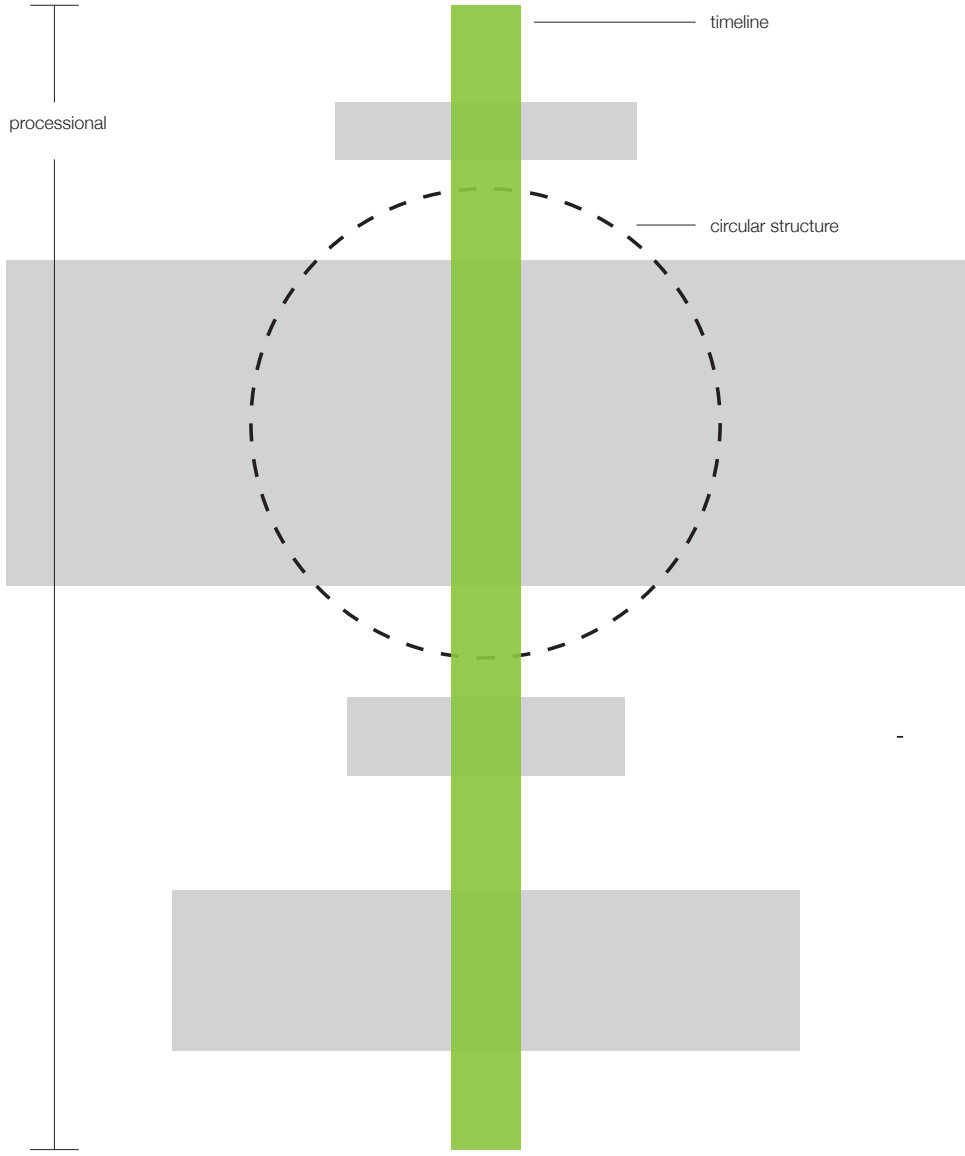
front elevation

right elevation

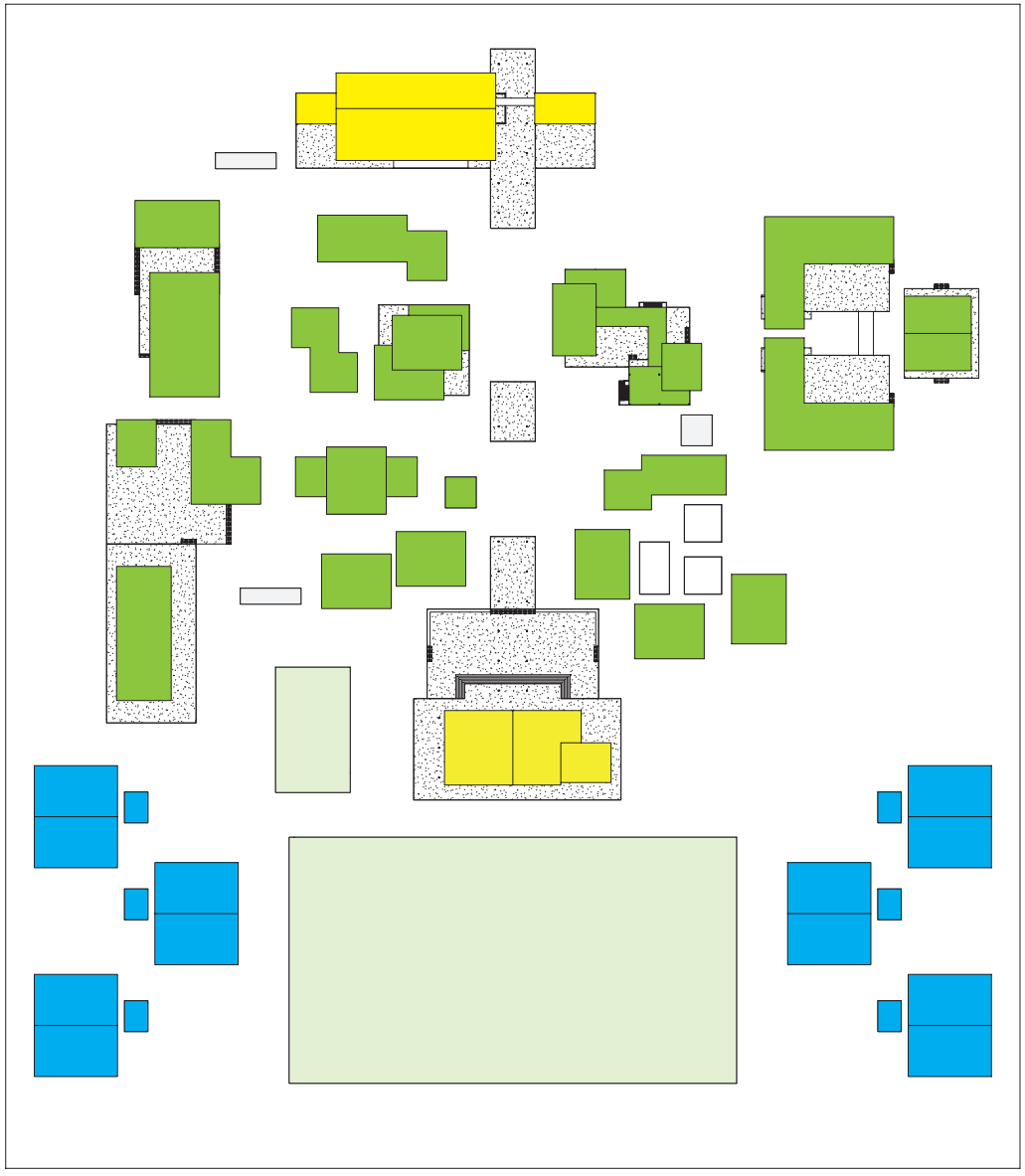
back elevation

left elevation

DIAGRAMS

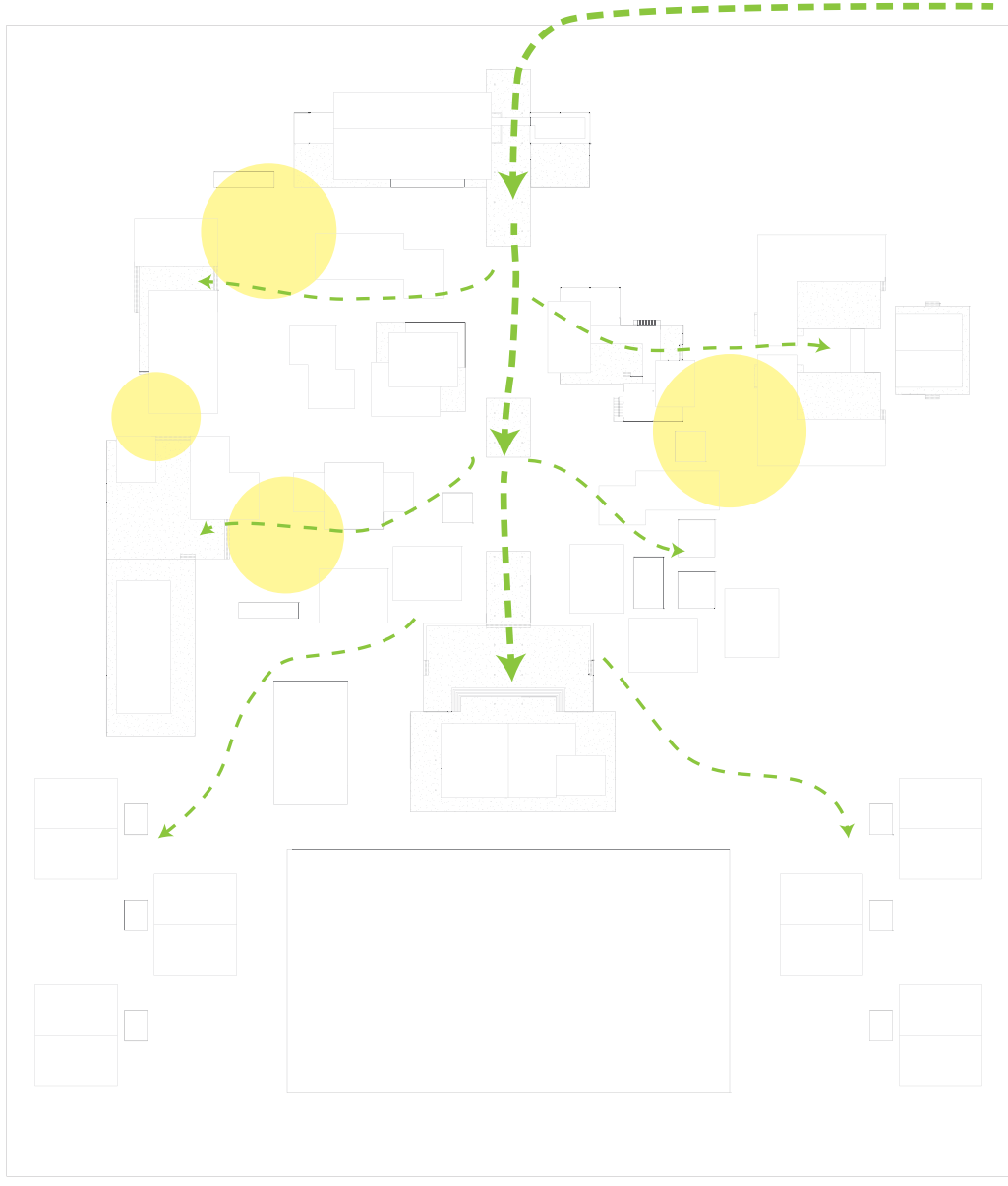


concept diagram



program organization

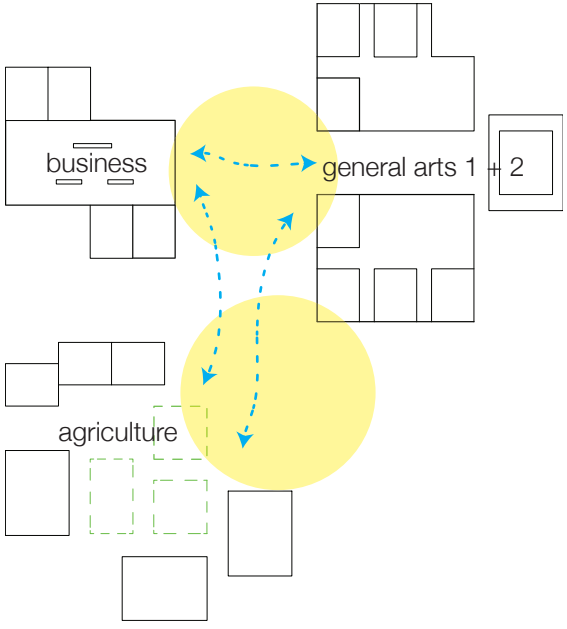
- community
- academics (organized by elective departments)
- housing

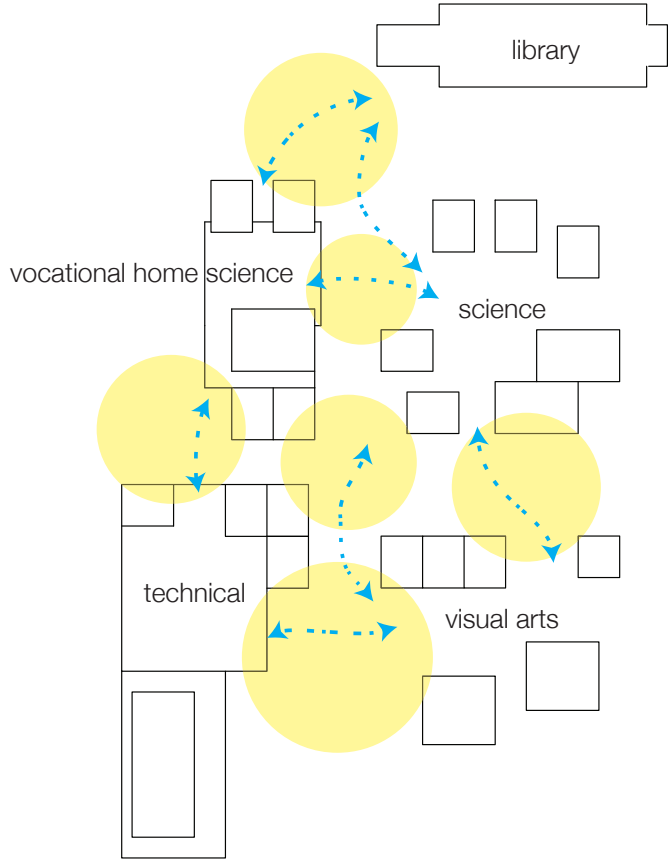


overall site circulation + gathering spaces

community spaces between departments

circulation between departments

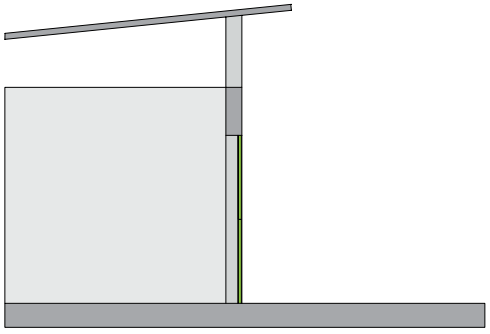


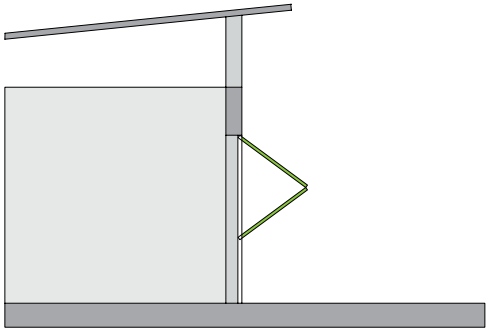


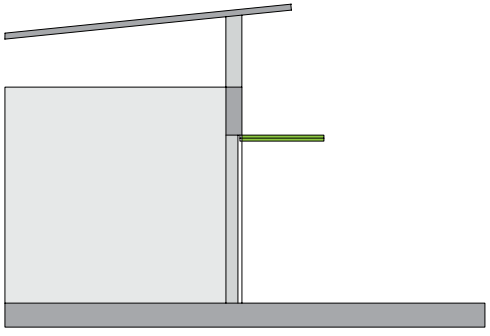
focused circulation + gathering spaces

community spaces between departments

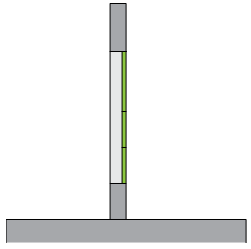
circulation between departments

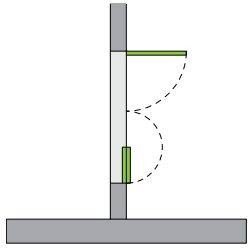


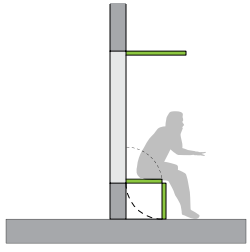




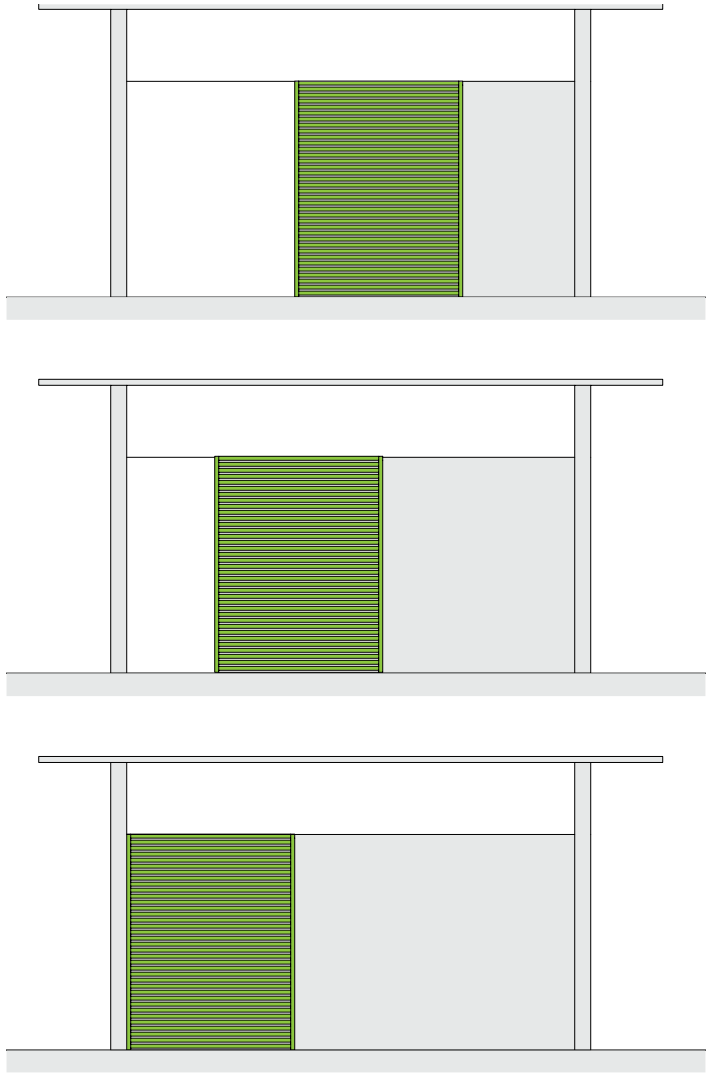
panel system 01: single-fold panel





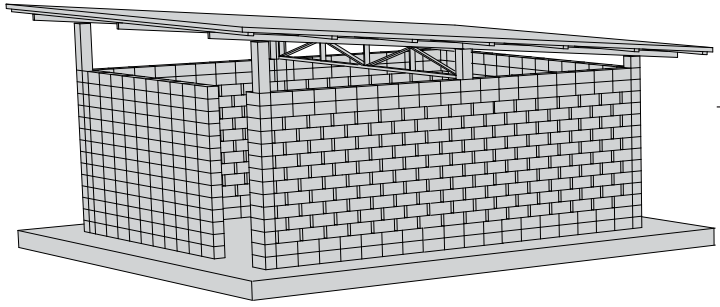


panel system 02: multi-fold panel

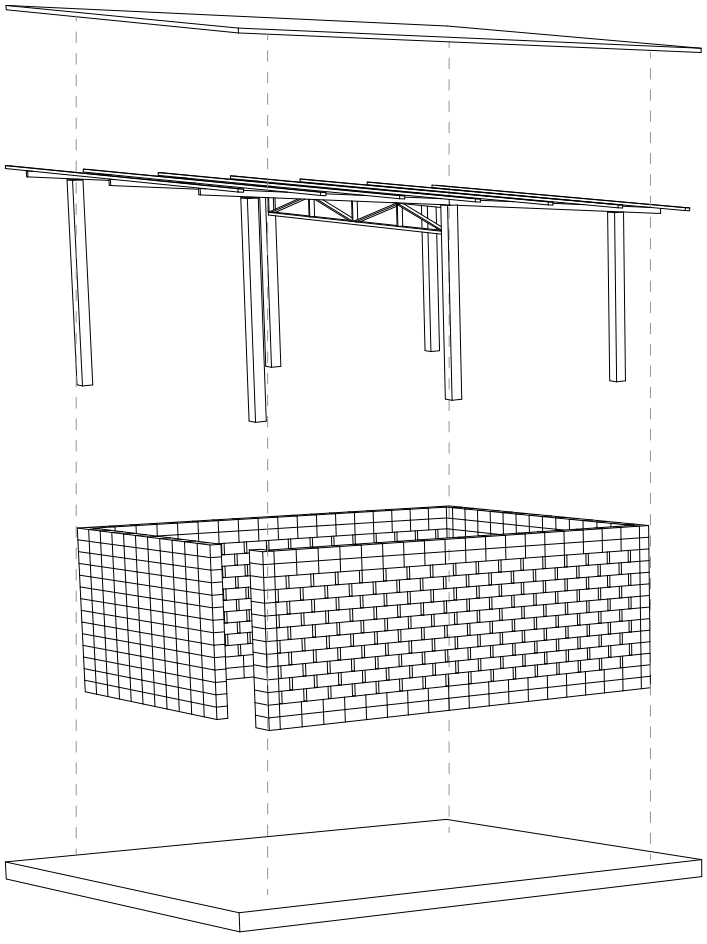


panel system 03: sliding panel

There are 2 main modules used in the design, one for **classrooms** and another for **laboratories**. Modularity is important for this project because it allows the building to be constructed in phases, while still maintaining the overall cohesiveness. It also creates an opportunity for locals to easily construct the project.



classroom module



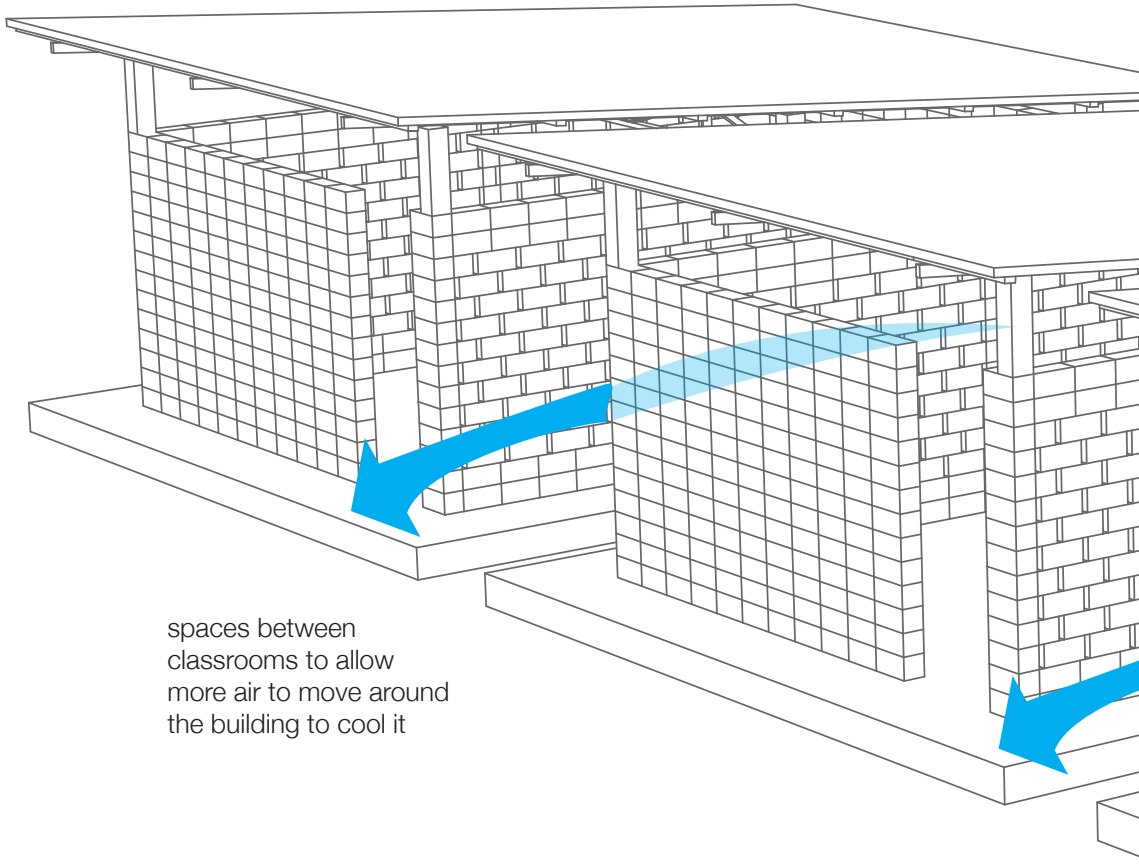
corrugated aluminum roofing panels

wood roof structures with truss to support beams, joists, and corrugated metal

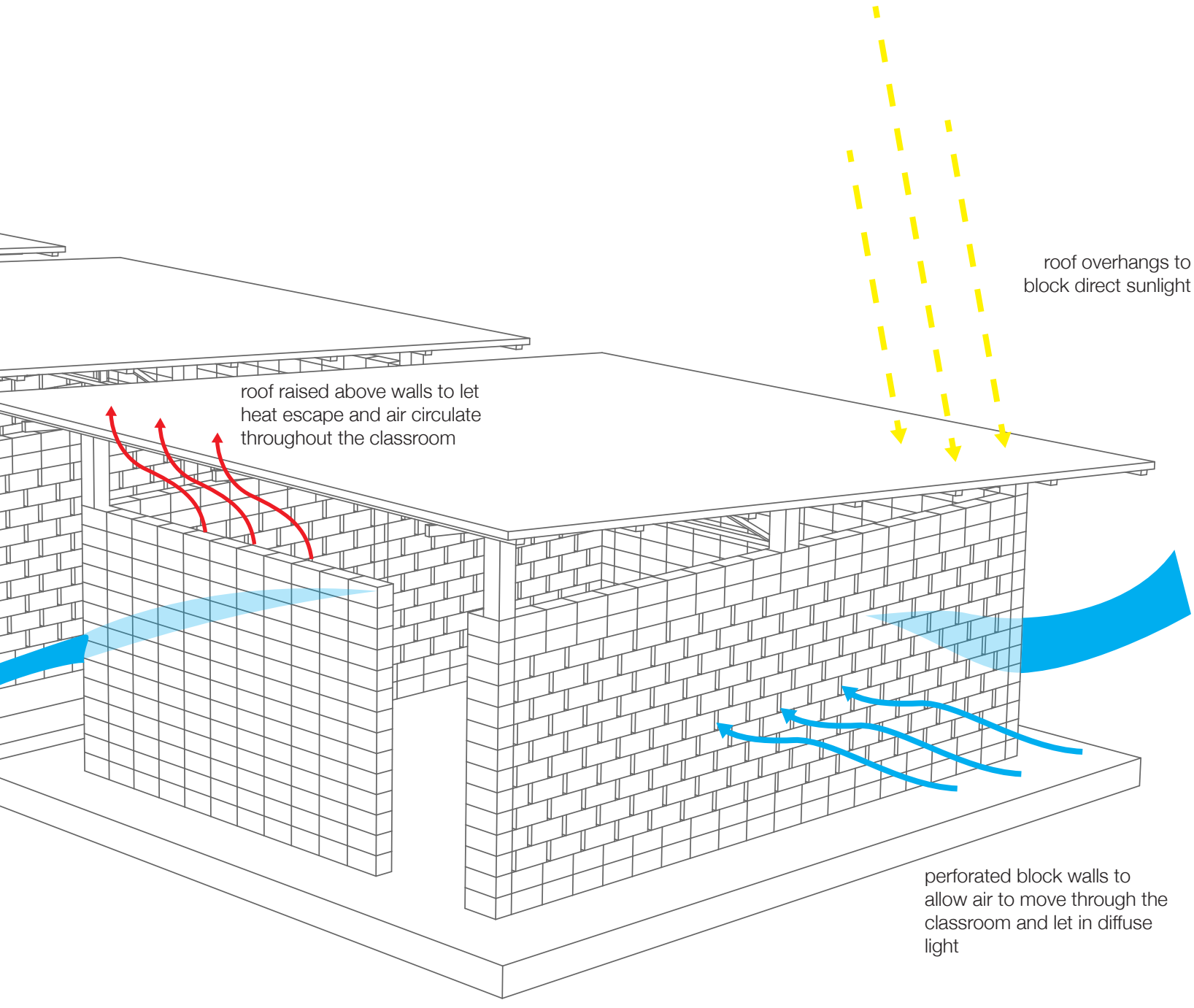
concrete reinforced columns

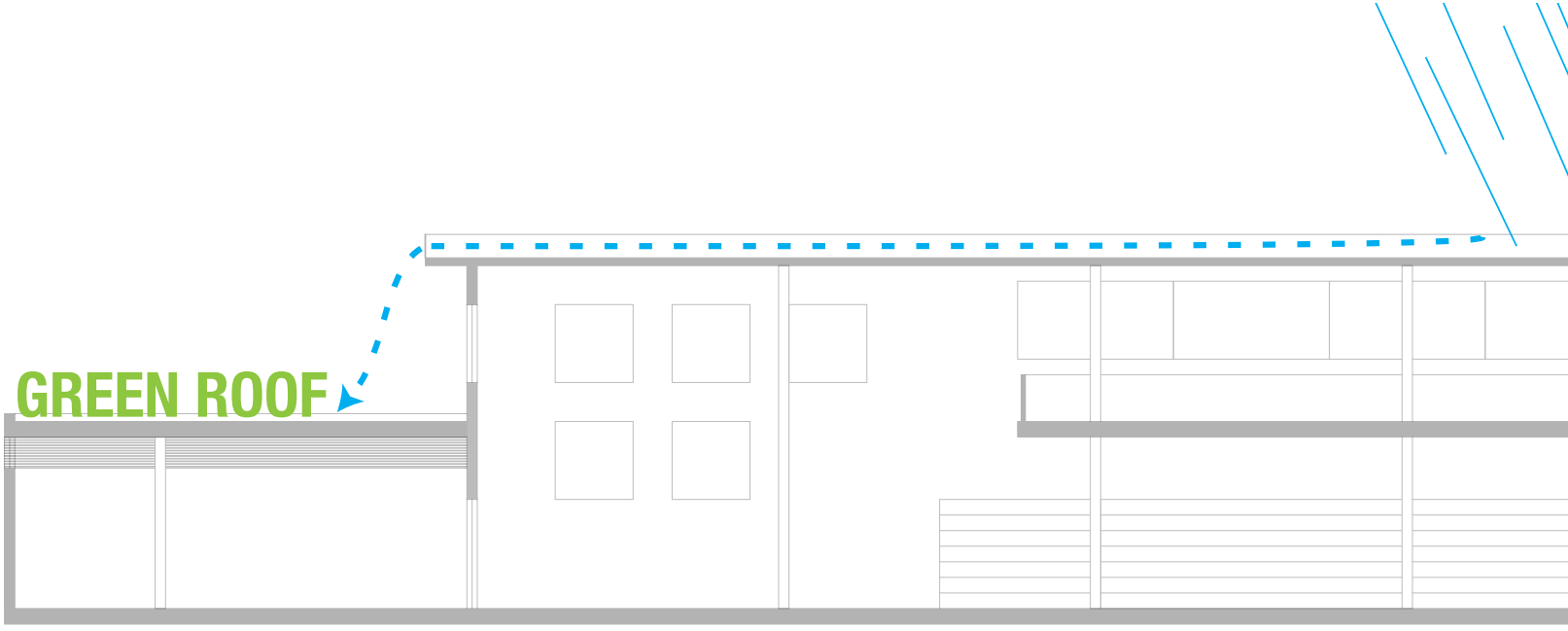
sandcrete block with perforations to allow air circulation and diffuse lighting

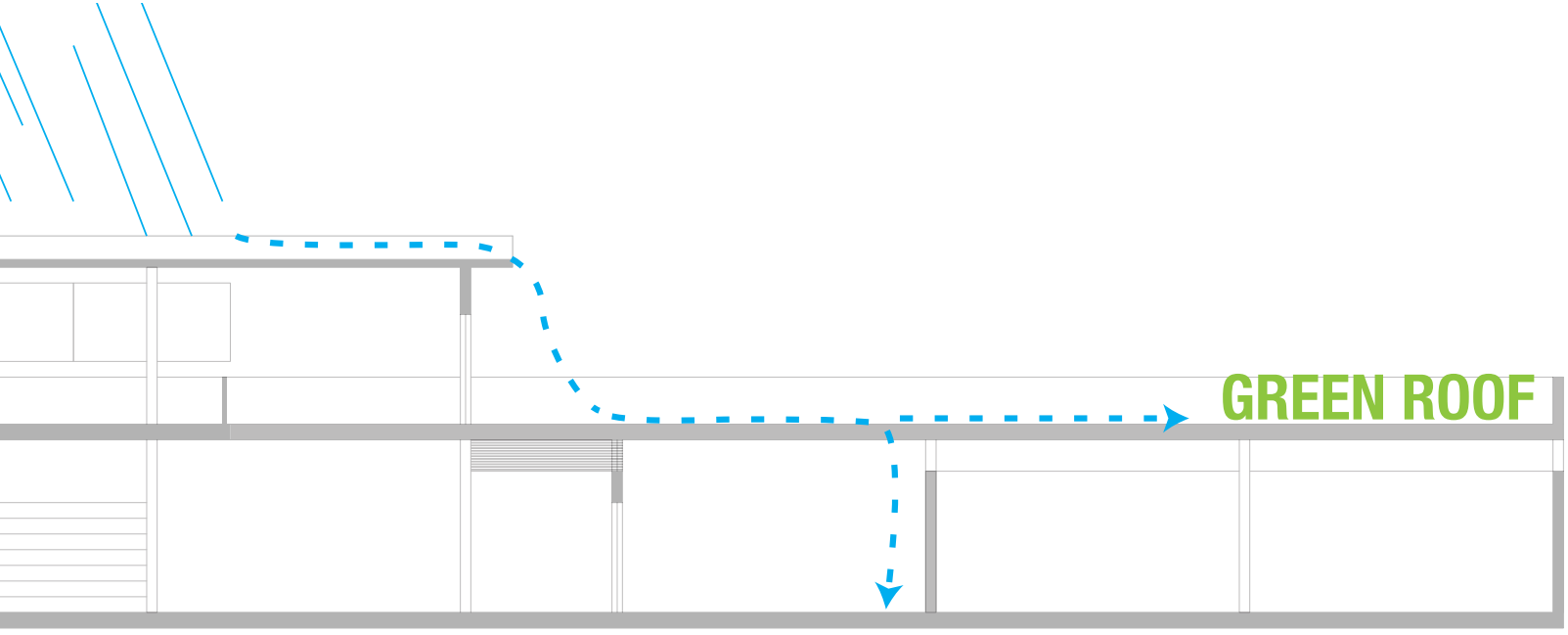
poured concrete foundation



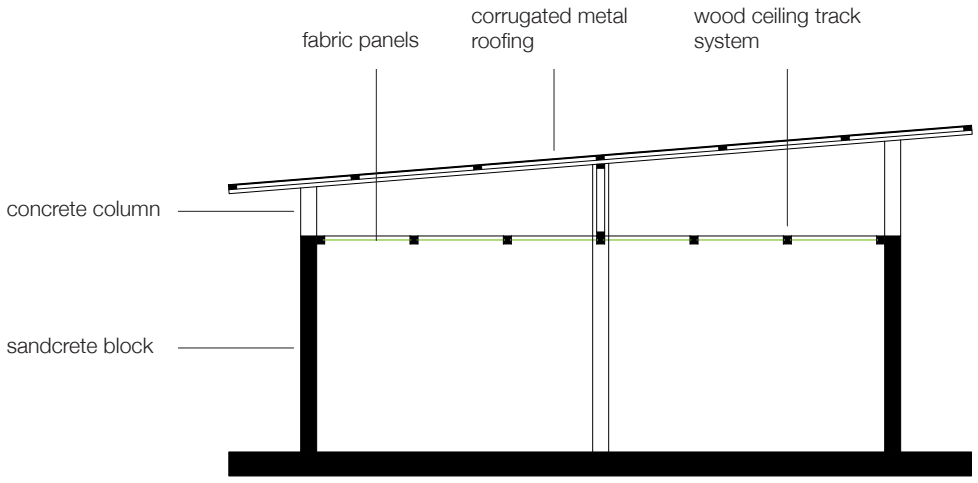
spaces between
classrooms to allow
more air to move around
the building to cool it


roof overhangs to
block direct sunlight
roof raised above walls to let
heat escape and air circulate
throughout the classroom
perforated block walls to
allow air to move through the
classroom and let in diffuse
light

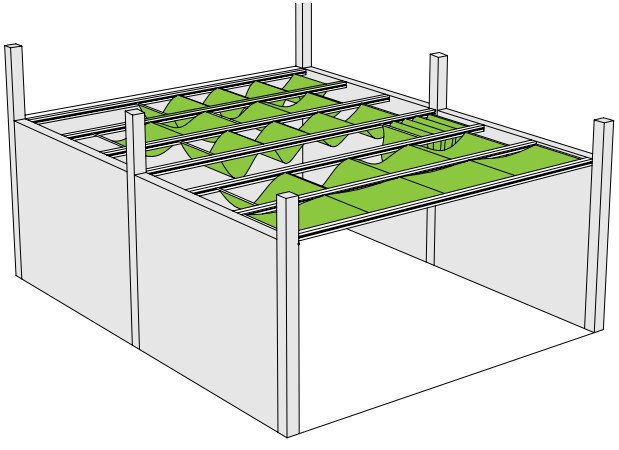

GREEN ROOF



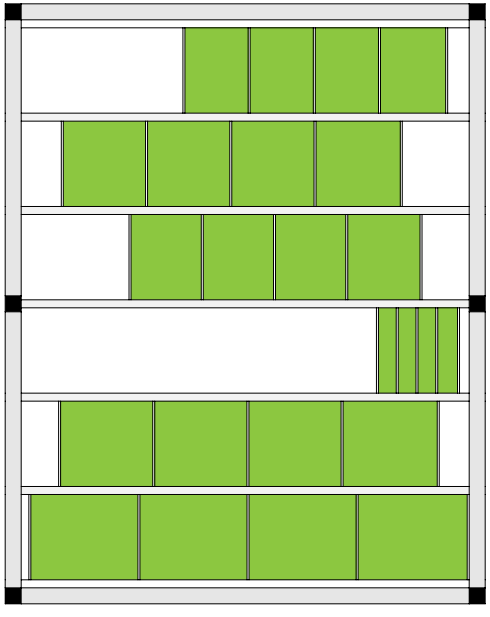
water circulation, demonstrating potential systems for rainwater collection



ceiling detail section 1’-1/4”

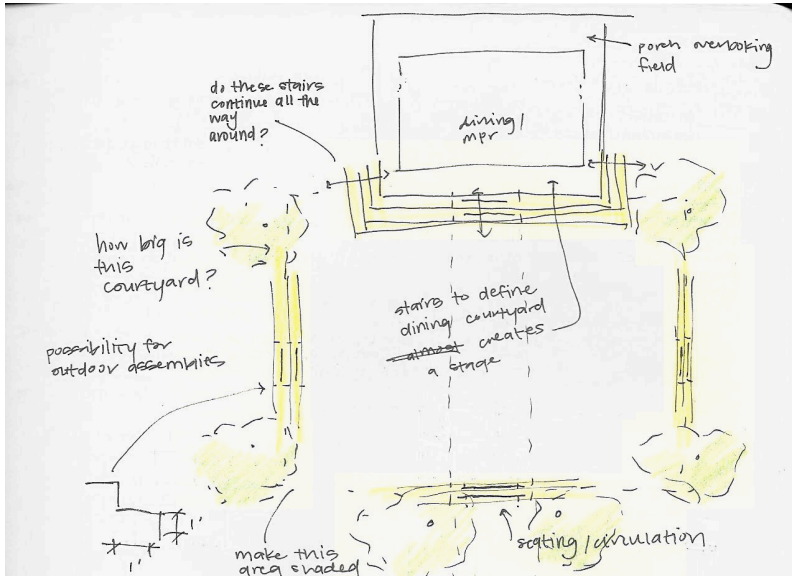


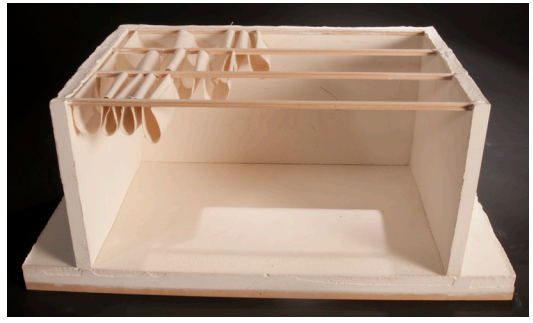
The ceiling system incorporates movable fabric panels to allow for flexibility in addressing different conditions. The ceiling panels can open up for air circulation and also be closed to diffuse the heat and sound of the corrugated metal roofing.



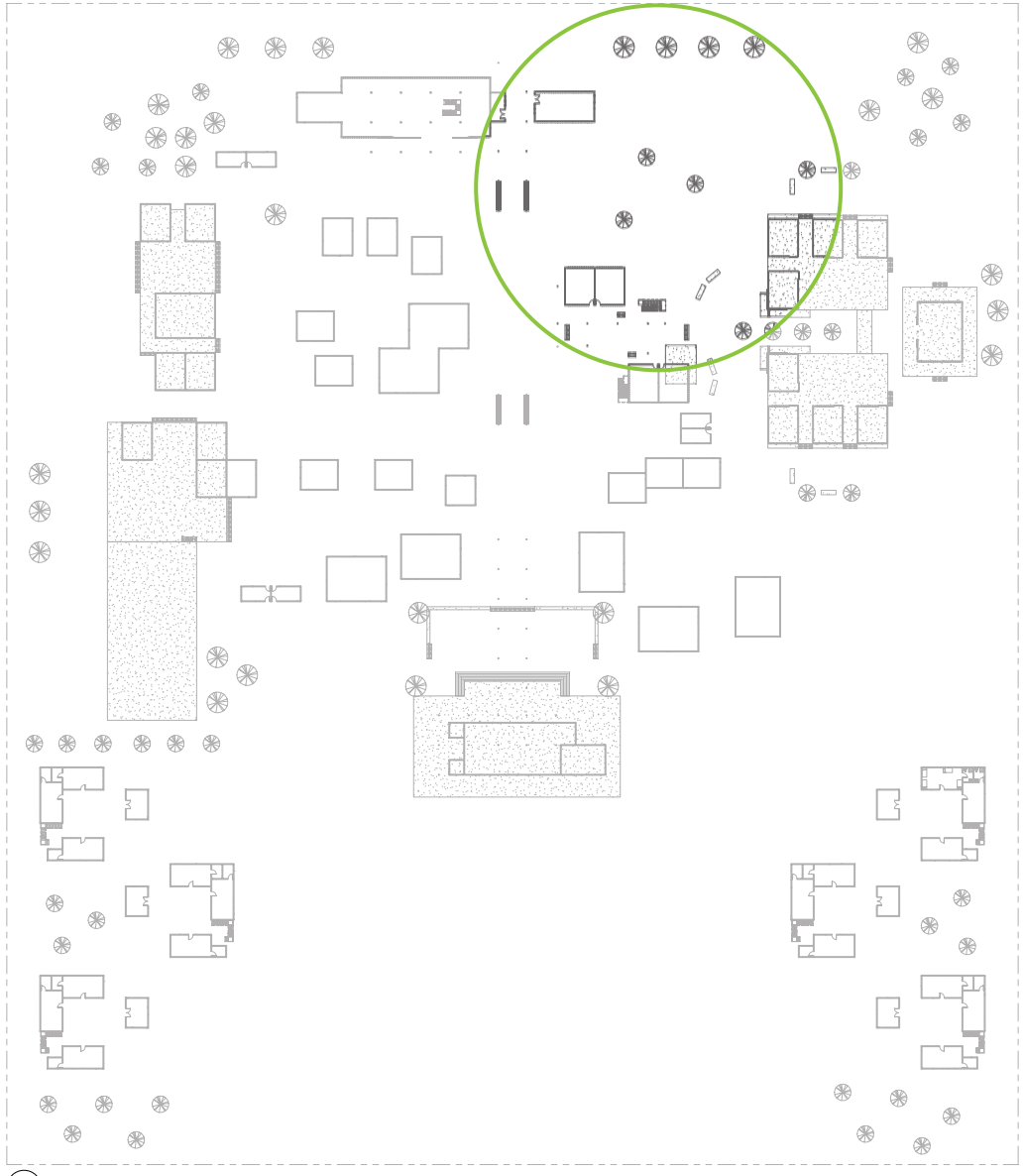
ceiling detail plan 1’-1/4”

DETAIL MODEL



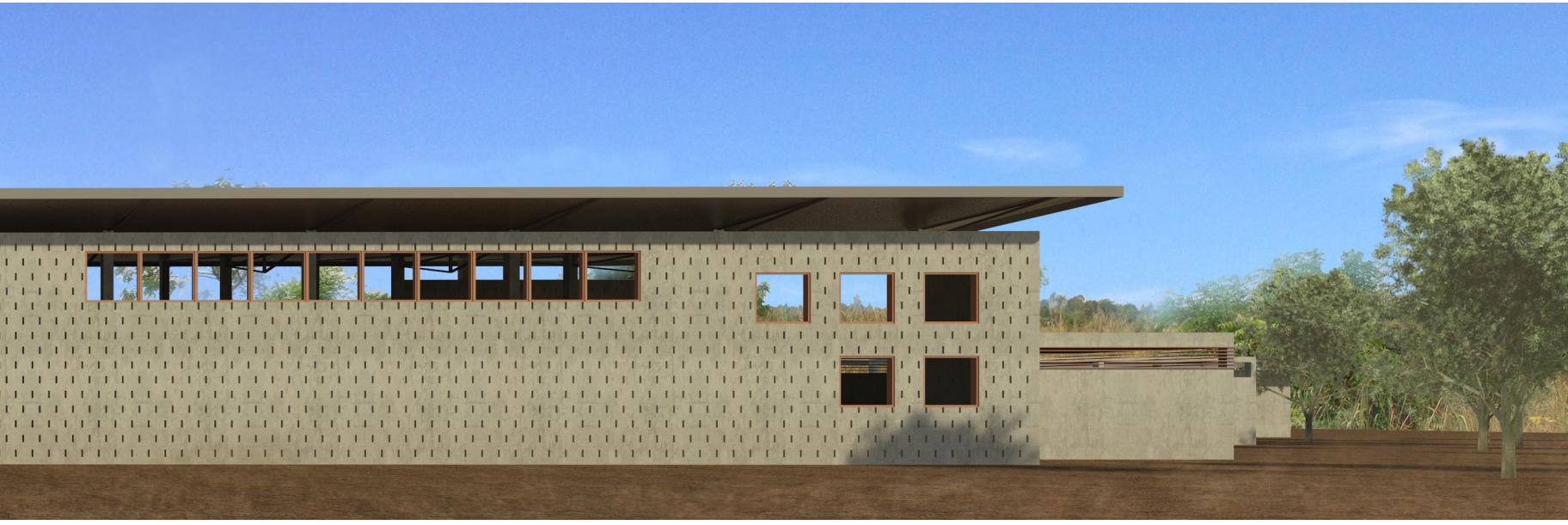


FOCUS

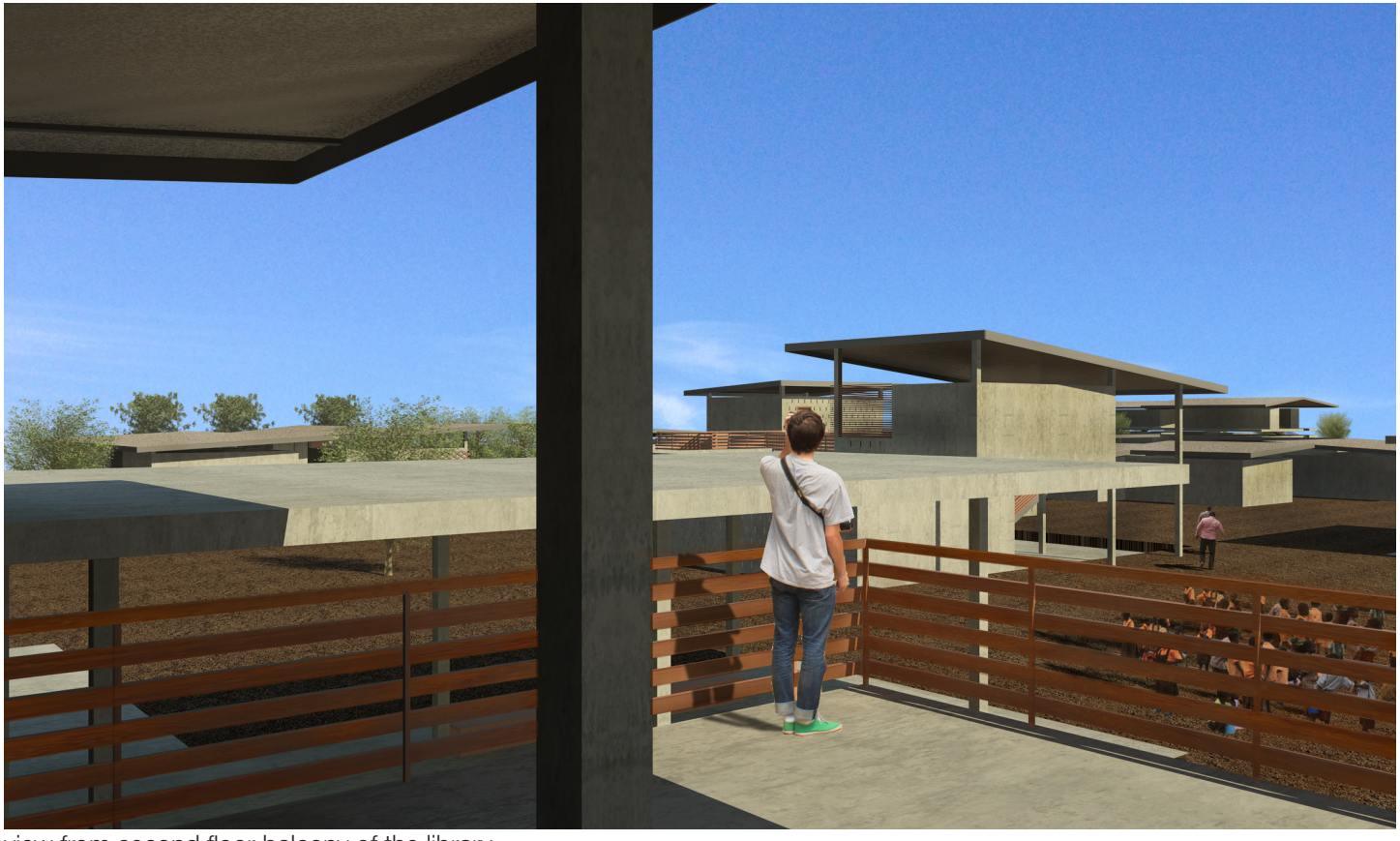


floor 0 plan highlighting region of focus

site plan for region of focus
1’-1/64”



view of entry, library, and administration



view from second floor balcony of the library

view towards the business and general arts departments

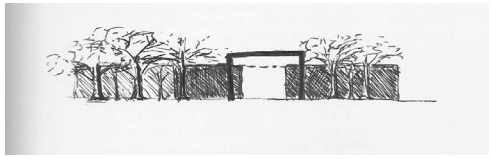
view of outdoor community space between general arts, business, and administration

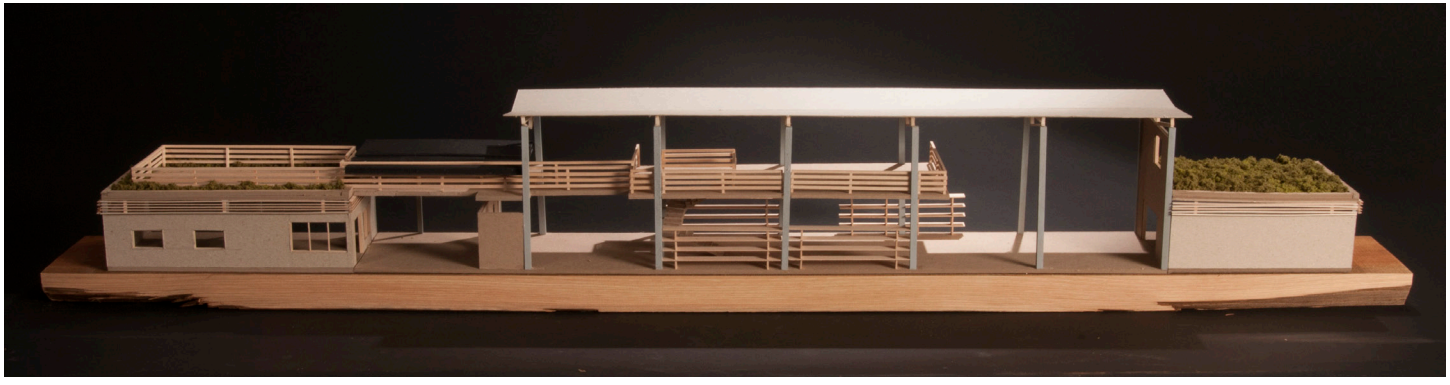
view from business department to general arts department

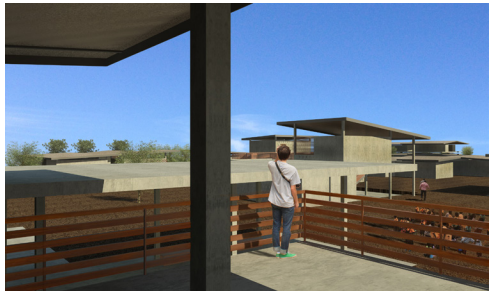
view towards the library from central “timeline” element

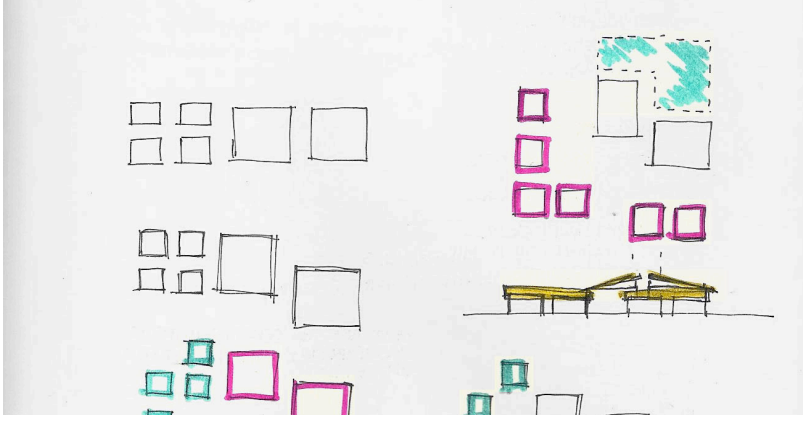
view of the library and administration building

SECTION MODEL









REFLECTION

Looking back on this year, it is hard to believe that the thesis project has already come and gone. Everyone said it would go by faster than you think, but I did not realize how quickly the time would fly by. This year has been one of exploration, challenge, and adventure, and I would not trade it for anything.

When I started this thesis class last fall, I had no idea what my project would be. I had thoughts of working with non-profits and potentially doing a real project, but I did not really have plans further than that. I did know I chose to study architecture because I believe it can be used as a direct tool to help others. This year, I wanted to really explore what that means.

Early in fall quarter, I was looking at a project list of people from all over the world that had requested help with design projects. I went through the list and chose to contact a few organizations. From that point on, everything has worked out for the very best. I partnered with an organization in Ghana called Disaster Volunteers of Ghana (DIVOG) that builds schools, and their request was for a secondary school design. It's strange looking back at how little I knew about the project and how much trust was invested on both sides of the relationship. Within a few months, I had booked a flight to Ghana, was preparing for my visa, and getting immunizations.

In February, I had the amazing opportunity to visit Ghana and to see the project site. This trip solidified the ideas in my thesis statement that it is essential to holistically study a culture before providing a design for them. My ideas for the design completely changed when I was there because I learned things about the Ghanaian education system that I couldn't find in books, such as the fact that the schools are organized by electives and not by core classes as many schools are here in the United States. I left Ghana feeling empowered, inspired, and encouraged. The DIVOG team had so much passion to help others and provide people with education. Anytime I got stuck in design or frustrated with a problem, I thought of the trip and who I was helping; this served as a constant motivation for me and helped me to truly put my heart into this project.

Before the trip, I had no idea how large the program for the school really was, so it was definitely a challenge when I came back home. It helped to constantly switch my perspective from focused areas to the site as whole. I also really appreciated the various reviews we had during this year because they really helped me to step away from the project and see what other people's thoughts were; getting others' opinions was very refreshing.

Overall, I am so happy I chose to work on a real project. I learned a lot about the process of design, such as communicating with a client and learning about another culture. My hope is to continue working on this project, to help with fundraising, and hopefully one day soon go back to Ghana. This has been an amazing year, one that has been pivotal to my architectural education.

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