

ARCHITECTURE OF EMPOWERMENT

Designing Architecture to offer Autonomy to
Rohingya Refugees in Kutupalong, Bangladesh.

A Design Thesis by Laura Salmela



PERSONAL INVESTMENT

2010. Antigua, Guatemala.



The family of the home



The footprint and structure of the house

PERSONAL INVESTMENT

2017. 100 Fold Summer Studio. Battambang, Cambodia.



Building the pavilion

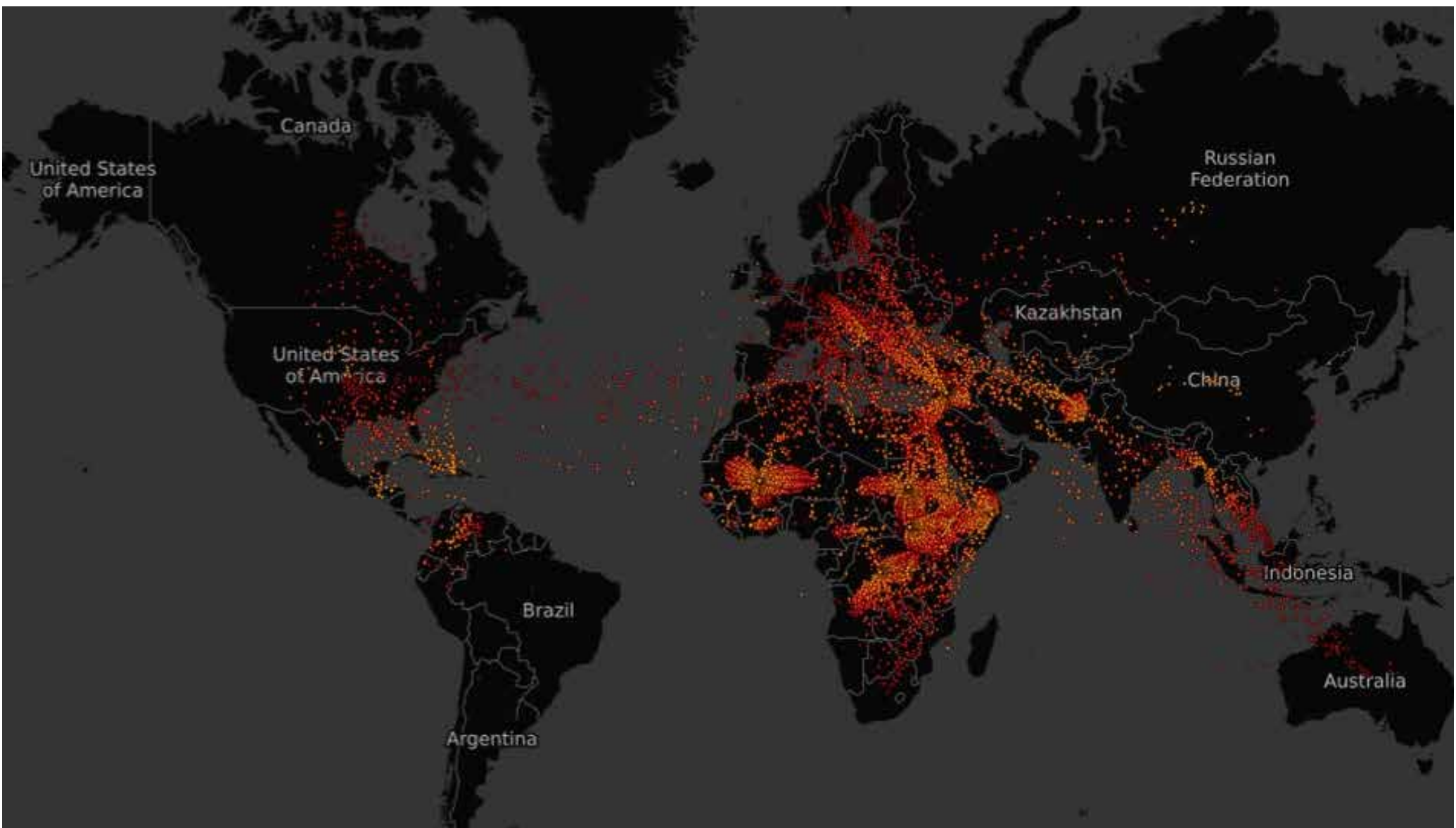


Structure



Finished Pavilion

REFUGEE PHENOMENON



UNHCR. Analyses of Refugee Movements

REFUGE

Alexander Betts & Paul Collier

Proposing a new way to look at refugee policy.

- Investing in Haven Countries
- Giving Ownership to Refugees
- Discard the Idea of the “Humanitarian Camp”
(Systems Structured around Dependence)
 - Food, Shelter, Materials, Water, Jobs, Medical Assistance

DADAAB REFUGEE CAMP, KENYA

Product of the Flawed System.

- Refugee camp in the desolate, dry desert of Kenya.
- Operational since 1992. (27 years)
- Children are born into the camp and have their children in the camp, never stepping outside its borders.



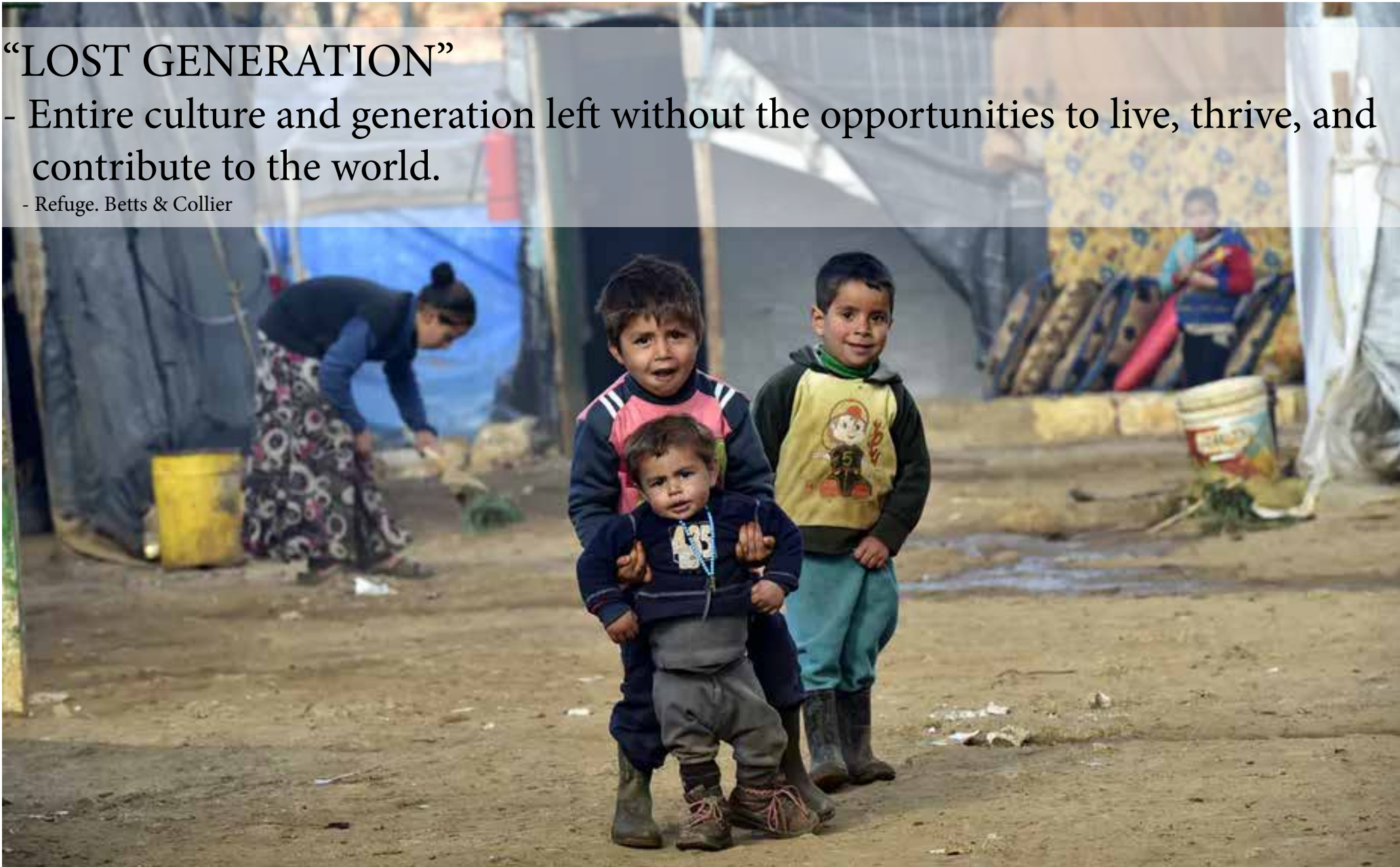
- To refugees, long-term encampment is a
“DENIAL OF RIGHTS AND A WASTE OF HUMANITY”

- US Committee for Refugees and Immigrants. 2004

“LOST GENERATION”

- Entire culture and generation left without the opportunities to live, thrive, and contribute to the world.

- Refuge. Betts & Collier



HUMANITARIANISM VS. DEVELOPMENT



INVESTMENT

- Education
- Skills/Jobs
- Culture
- Government
- Health



PROPOSAL

Proactive instead of Reactive

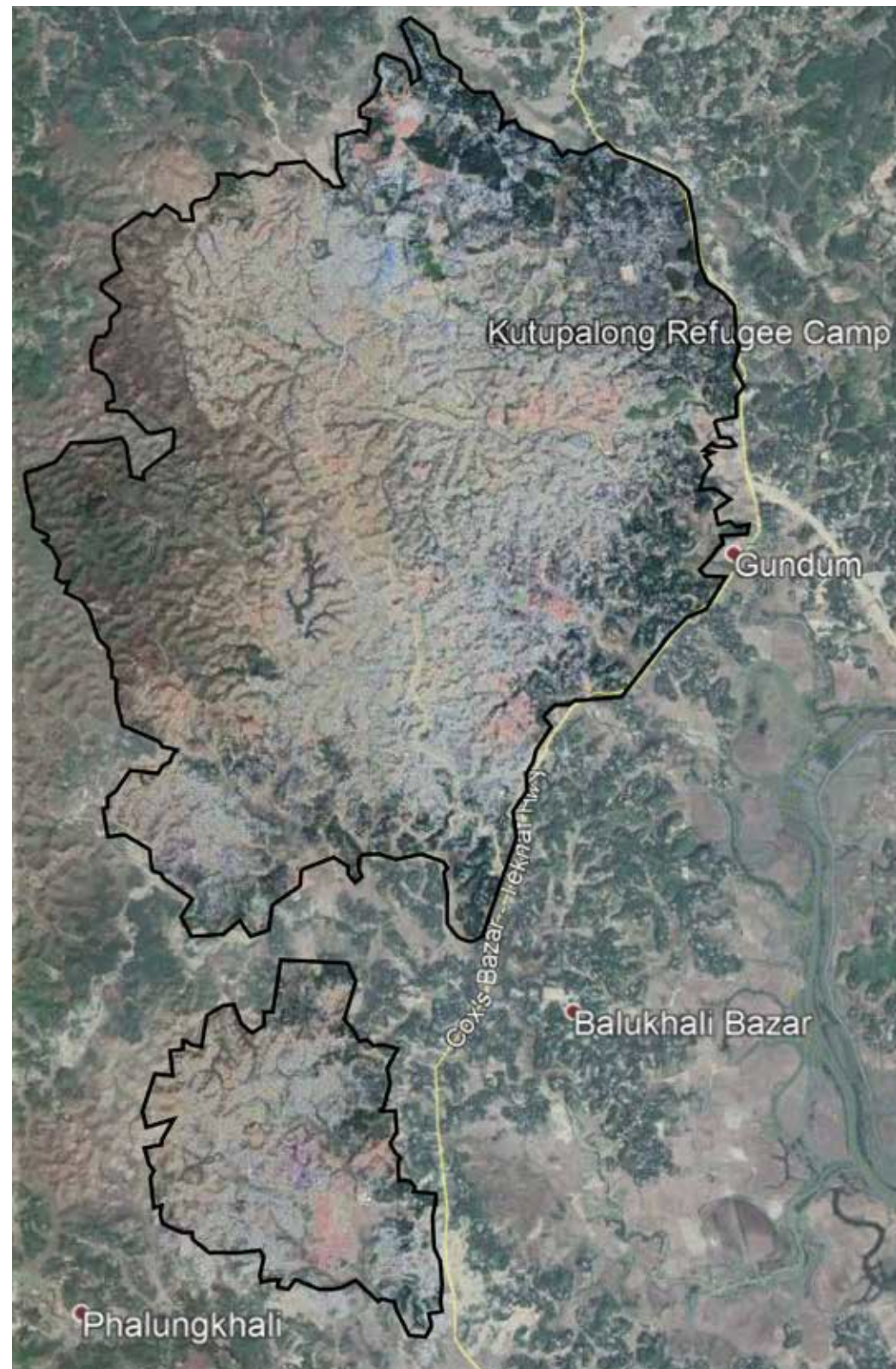
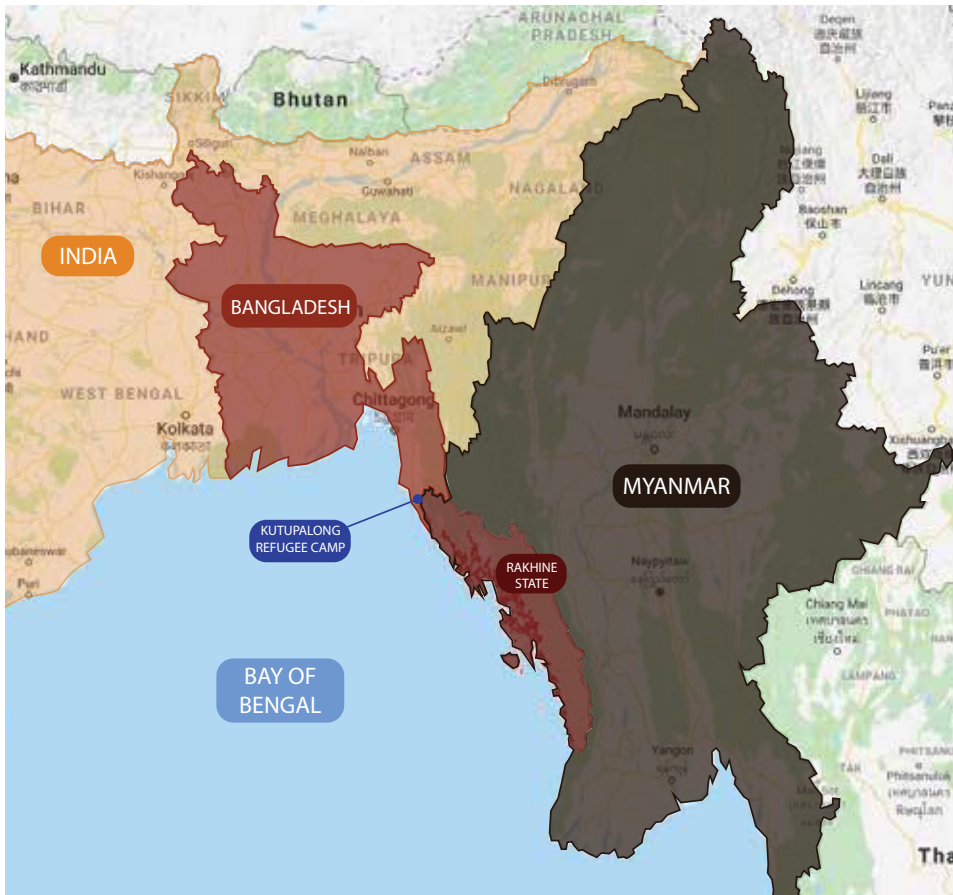
Priorities:

- Haven Country
- Creation of Employment & Access to the Market within the Camp
- Education
- Skill Fostering/Promotion

KUTUPALONG

- POPULATION: 731,600
- AREA: 4.44 Square Miles

Kutupalong is located in the south east corner of Bangladesh. It borders the Rakhine State of Myanmar.

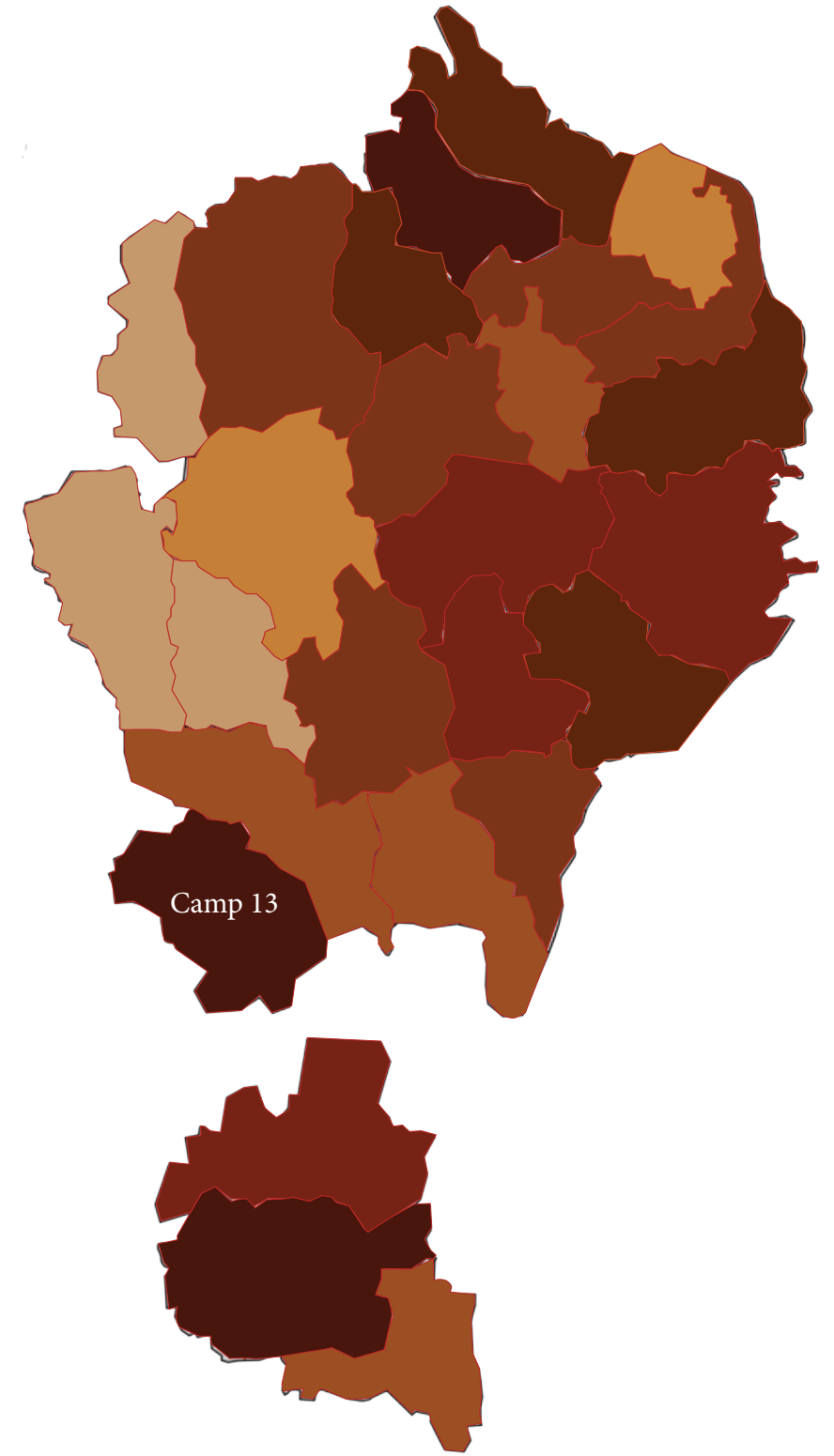




THE ROHINGYA

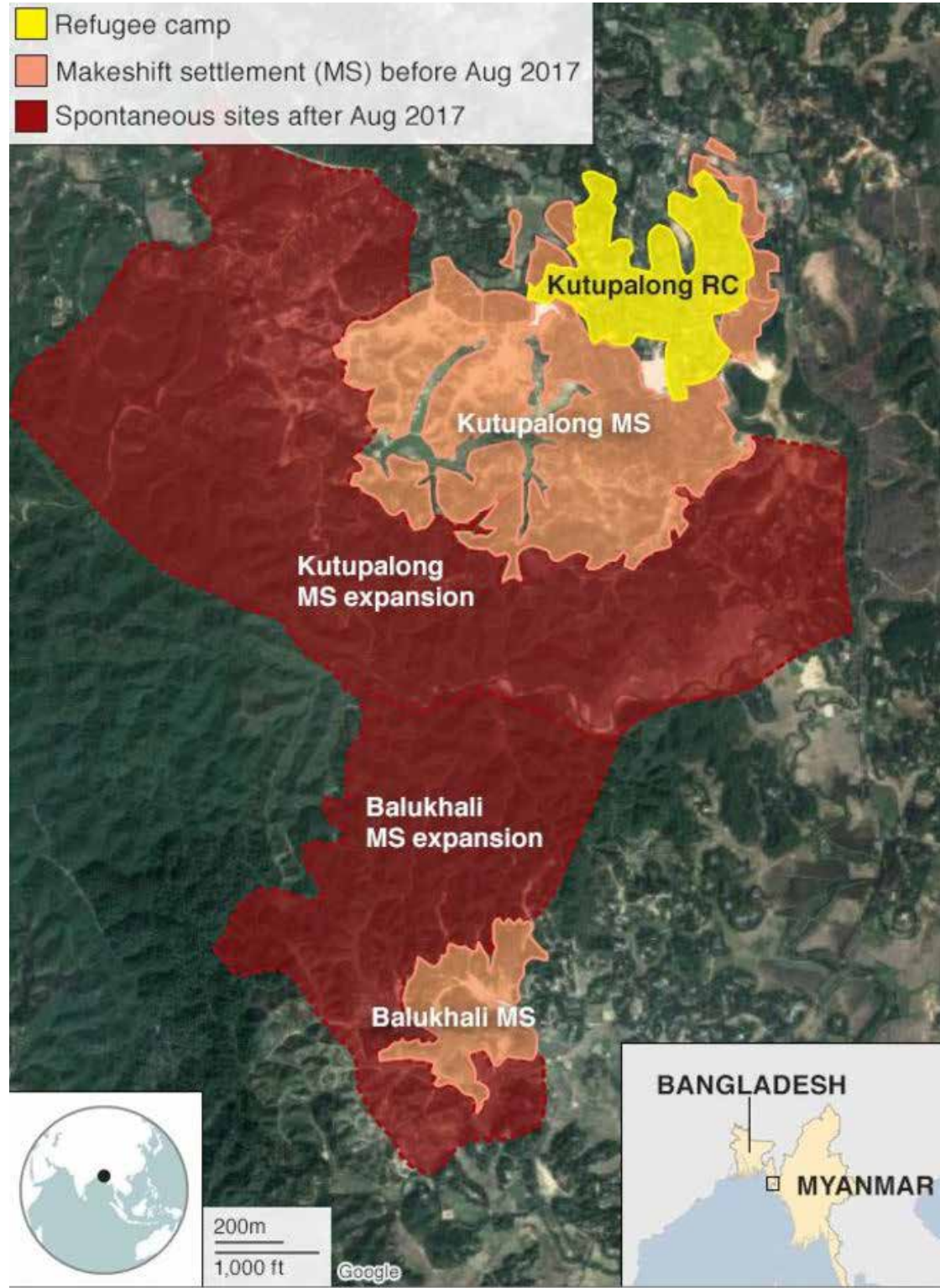


POPULATION AND DENSITY ANALYSES



- Greater than 40,000
- Greater than 35,000
- Greater than 30,000
- Greater than 25,000
- Greater than 20,000
- Between 10,000 & 20,000
- Less than 5,000

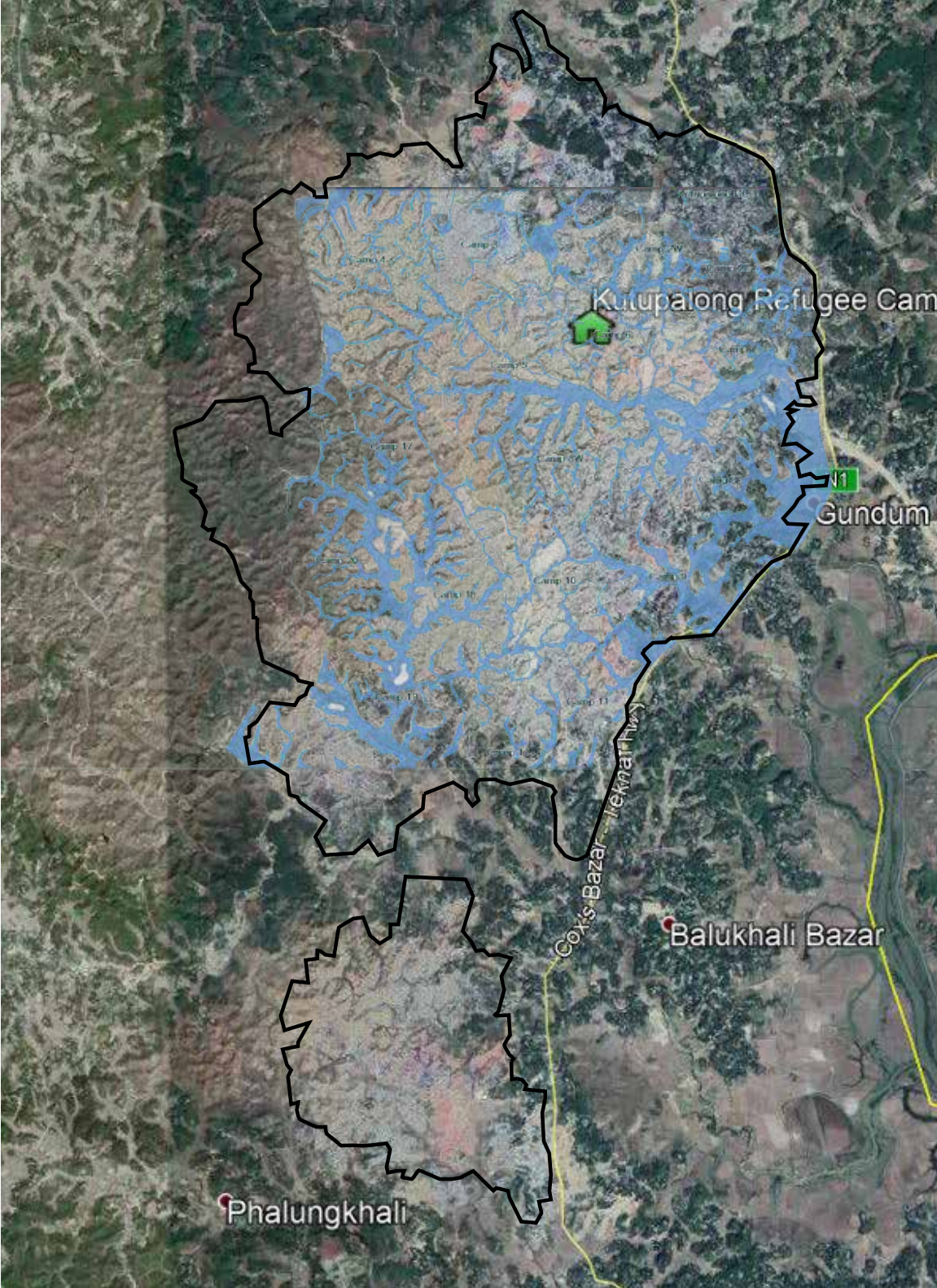
GROWTH OF KUTUPALONG



Source: UNHCR

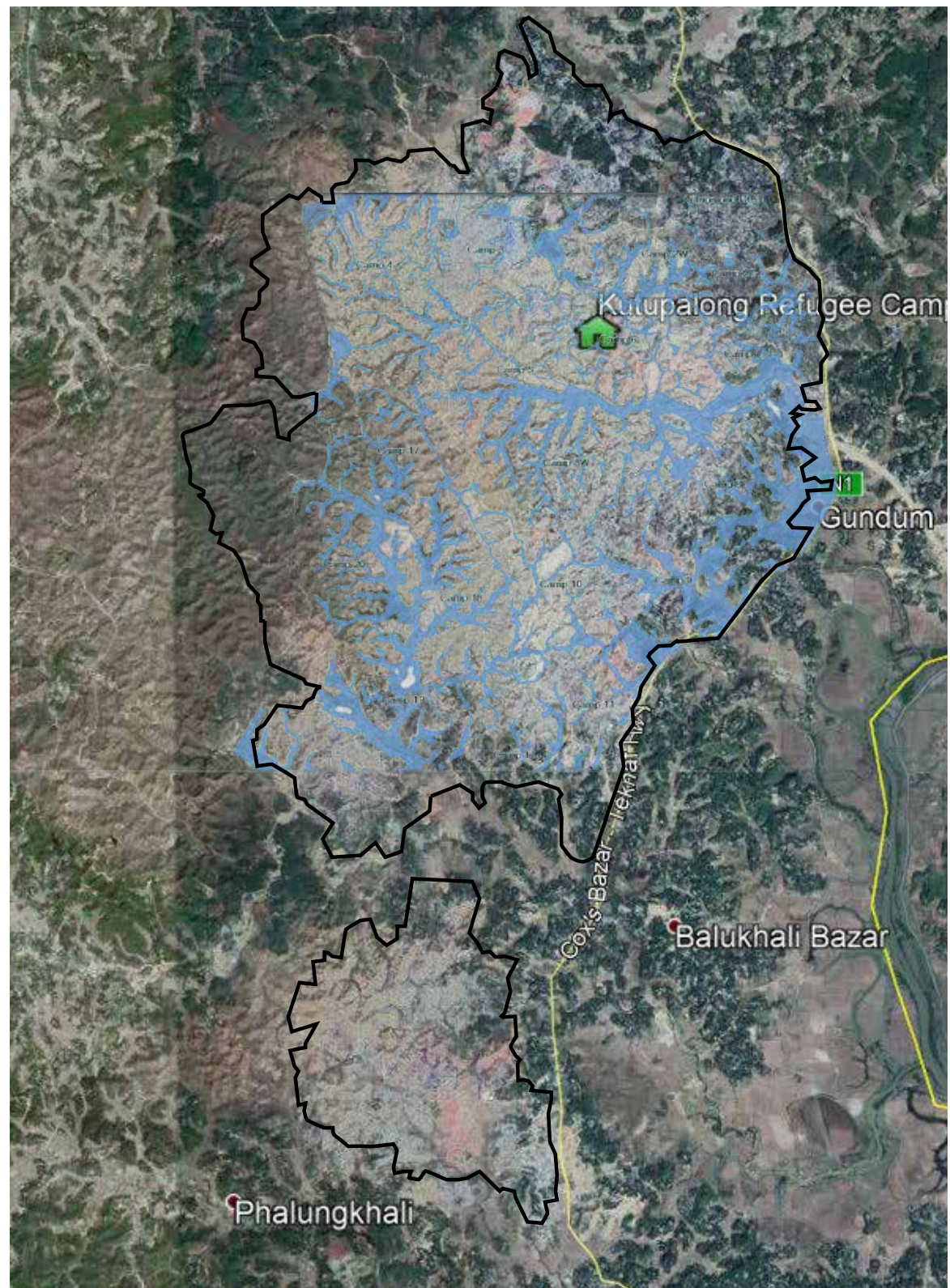
BBC

FLOOD PRONE AREAS



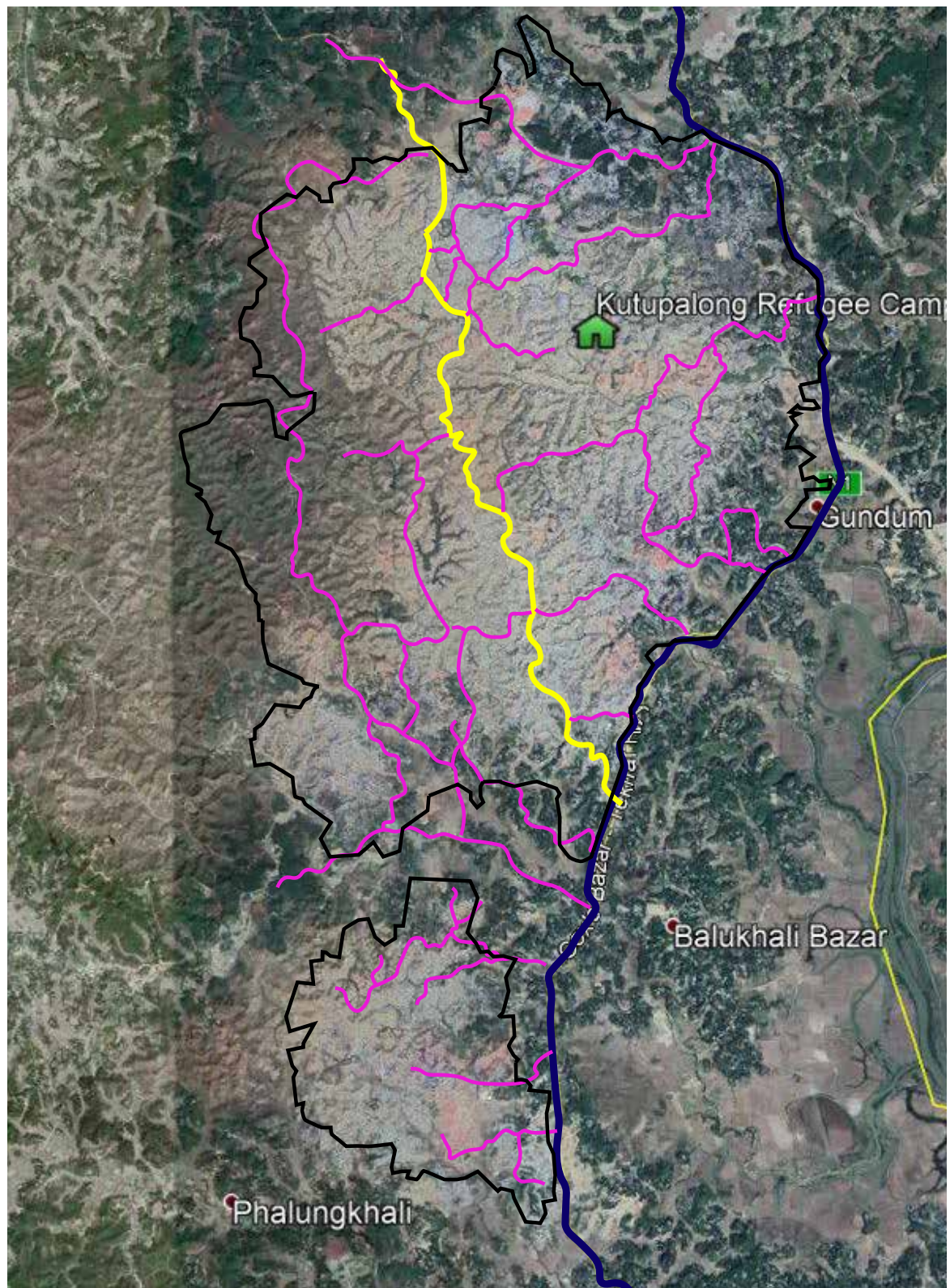
FLOOD PRONE AREAS

Rohingya refugees crossing flooded walkways of Kutupalong



ROADWAYS

- Access Roads
- Army Road
- Existing Highway N1



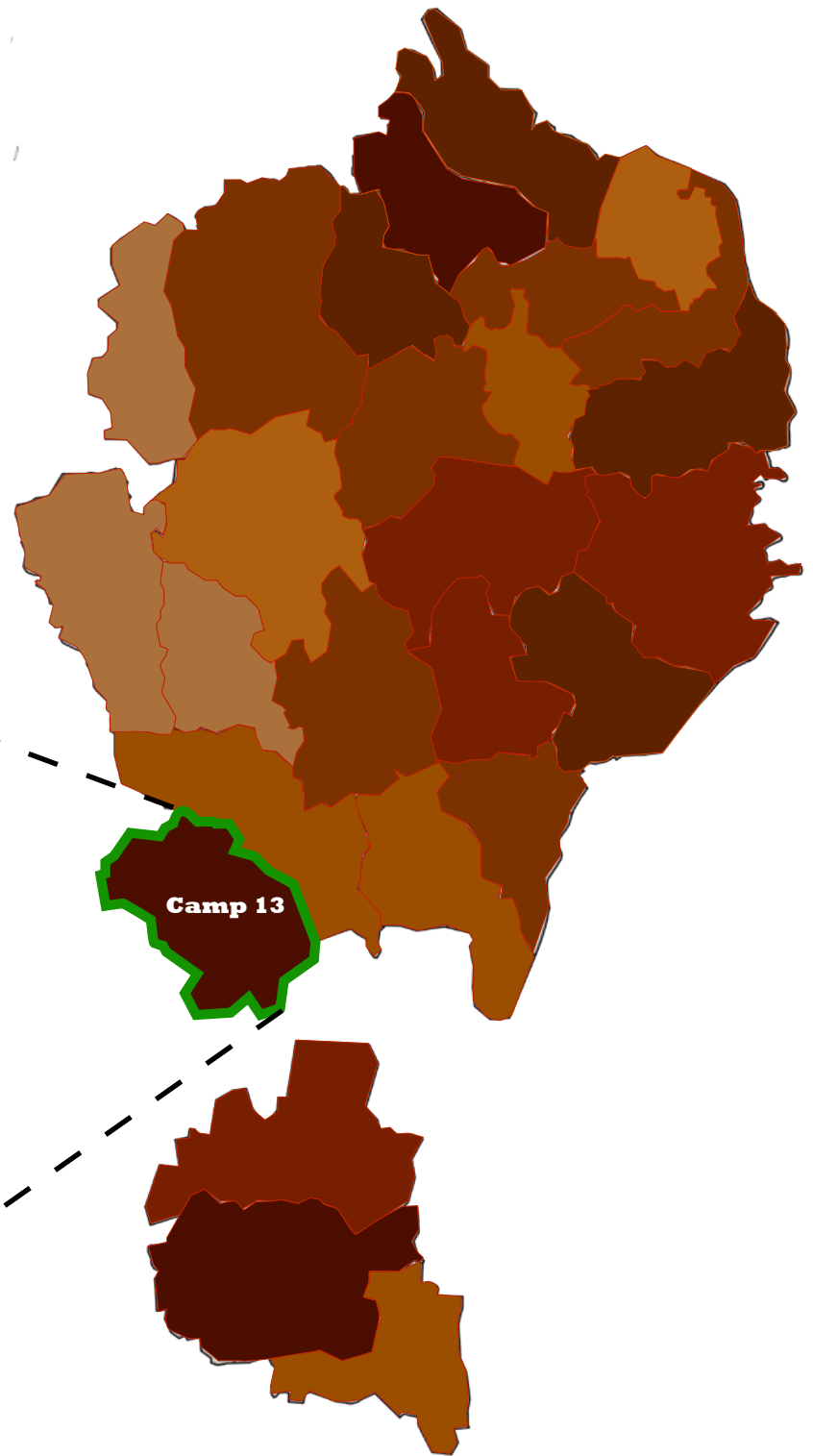
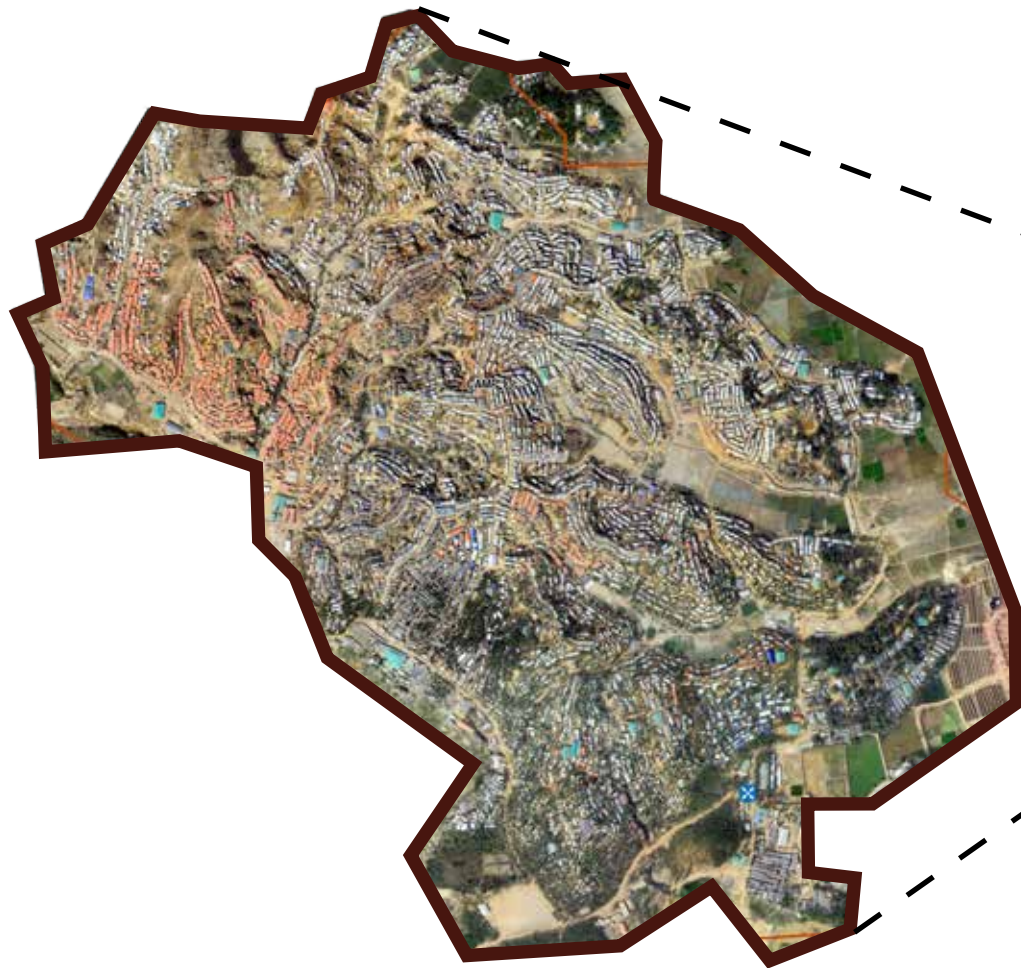


Existing conditions and topography within Kutupalong.



CAMP 13

- POPULATION: 41,735
- TOTAL FAMILIES: 9,790




FLOOD CONDITIONS



 Flood Prone Areas

 Shelters & Buildings at Risk of Landslides

 Site

 Existing Facilities

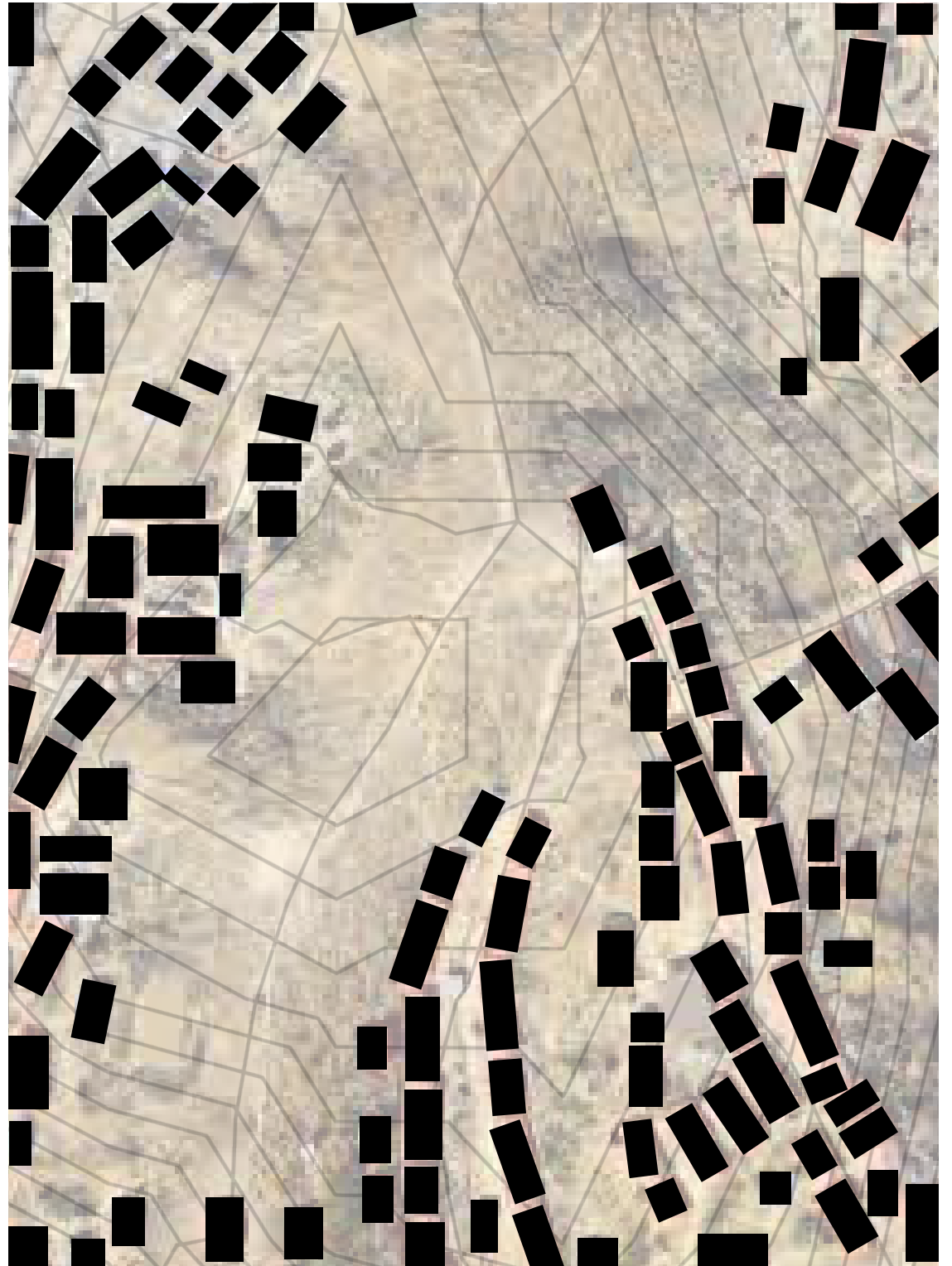
 Existing Hospital Facilities

EXISTING CONDITIONS



- Nodes/Points of Intervention
- Districts/Neighborhoods
- Pathways
- Site
- Existing Facilities
- Existing Hospital Facilities

THE SITE



ENVIRONMENTAL ANALYSES

Manual of Tropical Housing and Building

- Koenigsberger

Appendix 11

TABLE 1

Location	KITUPALONG
Longitude	92.16 N
Latitude	21.21 E
Altitude	

Air temperature: °C

	J	F	M	A	M	J	J	A	S	O	N	D	High AMT	Low AMR
Monthly mean max.	26	28	30.5	32	32	30	29.5	30	30.5	31	29	26.5	32	23
Monthly mean min.	14.5	16.5	20	24	25	25	24.5	24.5	24.5	24	20.5	16	14.5	17.5
Monthly mean range	11.5	11.5	10.5	8	7	5	5	5.5	6	7	8.5	10.5		

Relative humidity: %

	J	F	M	A	M	J	J	A	S	O	N	D
Monthly mean max. a.m.												
Monthly mean min. p.m.												
Average	70	69	70	75	79	81	82	83	82	81	79	78
Humidity group	3	3	3	4	4	4	4	4	4	4	4	4

Humidity group: 1	If average RH: below 30%
2	30-50%
3	50-70%
4	above 70%

Rain and wind (mm)

Rainfall, mm	4.1	17	35	122	287	302	925	667	330	214	109	13	3528	Total
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Wind, prevailing												
Wind, secondary												
	J	F	M	A	M	J	J	A	S	O	N	D

Comfort limits	AMT over 20°C		AMT 15-20°C		AMT below 15°C	
	Day	Night	Day	Night	Day	Night
Humidity group: 1	26-34	17-25	23-32	14-23	21-30	12-21
2	25-31	17-24	22-30	14-22	20-27	12-20
3	23-29	17-23	21-28	14-21	19-26	12-19
4	22-27	17-21	20-25	14-20	18-24	12-18

TABLE 2
Diagnosis: °C

	J	F	M	A	M	J	J	A	S	O	N	D	AMT
Monthly mean max.	26	28	30.5	32	32	30	29.5	30	30.5	31	29	26.5	
Day comfort: upper	29	29	29	27	27	27	27	27	27	27	27	27	
lower	23	23	23	22	22	22	22	22	22	22	22	22	
Monthly mean min.	14.5	16.5	20	24	25	25	24.5	24.5	24.5	24	20.5	16	
Night comfort: upper	23	23	23	21	21	21	21	21	21	21	21	21	
lower	17	17	17	17	17	17	17	17	17	17	17	17	
Thermal stress: day	O	O	H	H	H	H	H	H	H	H	H	O	
night	C	C	O	H	H	H	H	H	H	H	O	C	

Indicators

Humid: H1				X	X	X	X	X	X	X	X	X	3	Totals
H2	X	X											3	
H3				X	X	X	X	X	X				6	
Arid: A1													0	
A2			X										1	
A3													0	

Meaning:	Indicator	Thermal stress		Rainfall	Humidity group	Monthly mean range
		Day	Night			
Air movement essential	H1	H			4	
		H			2, 3	Less than 10°
Air movement desirable	H2	O			4	
Rain protection necessary	H3			Over 200 mm		
Thermal capacity necessary	A1				1, 2, 3	More than 10°
Out-door sleeping desirable	A2		H		1, 2	
		H	O		1, 2	More than 10°
Protection from cold	A3	C				

VERNACULAR ARCHITECTURE



Malaysia



Inle Lake, Myanmar

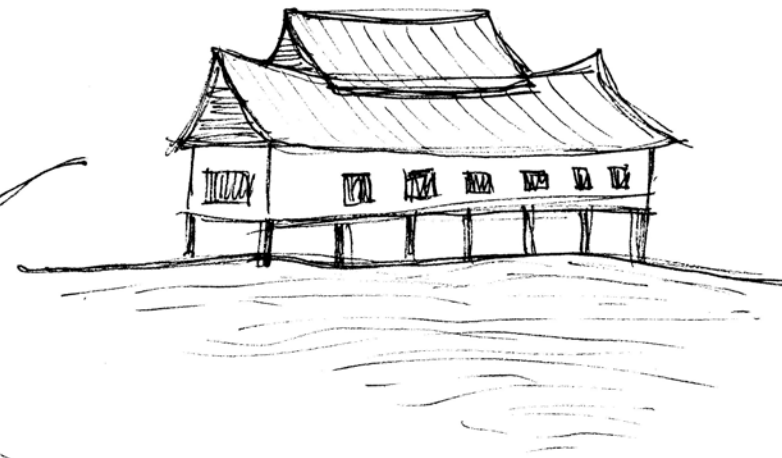
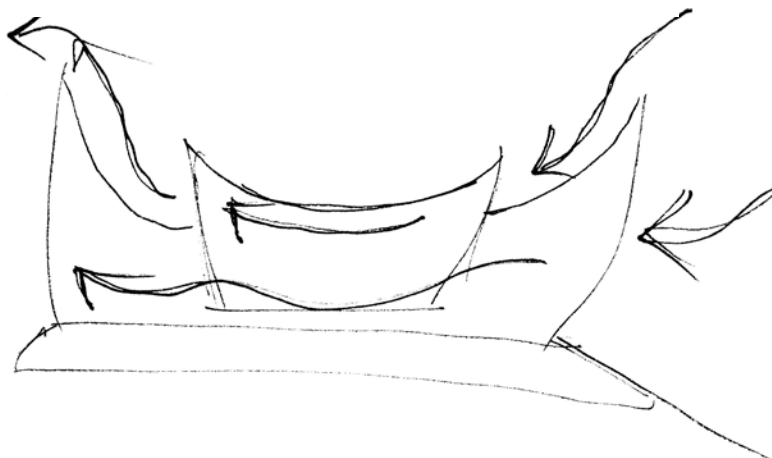
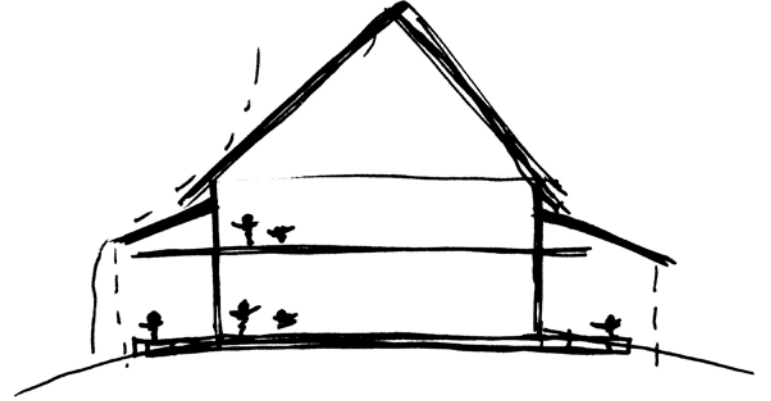
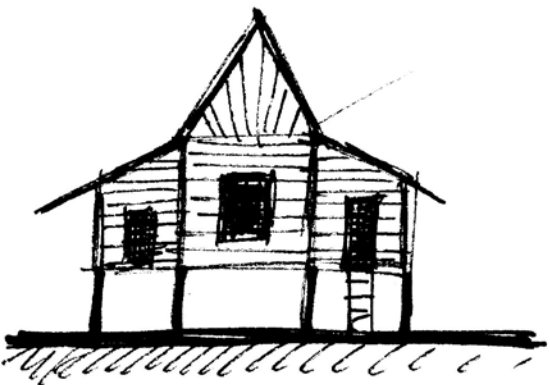
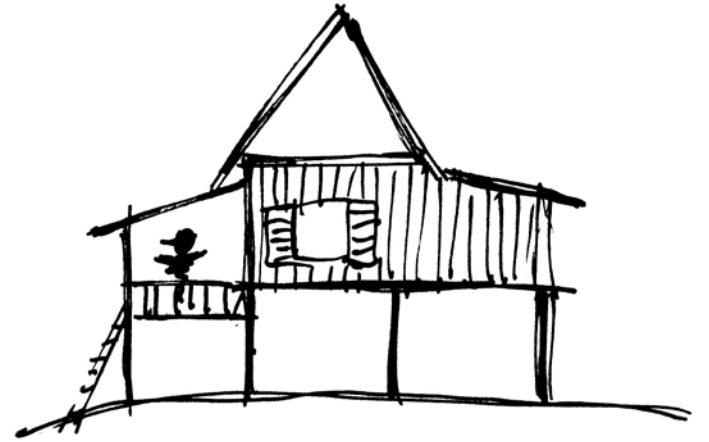
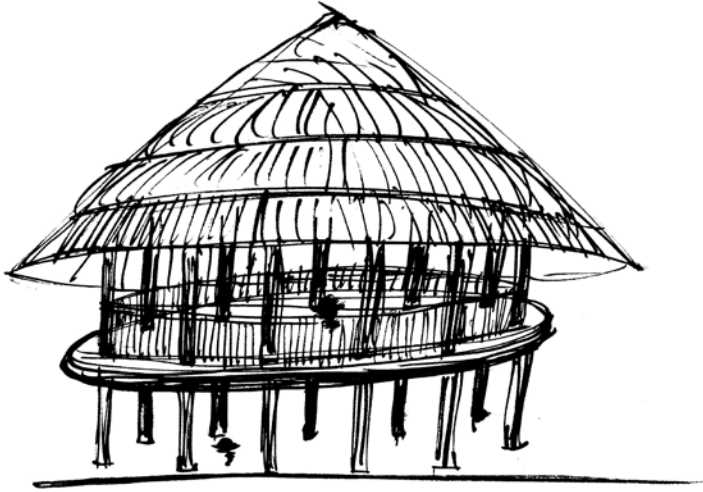


Kerala, India



Indonesia

ANALYSES



MATERIALS. METHODS. CONSTRUCTION.

- Vernacular Construction Methods
- Environmentally Responsive
- Local Materials
- Refugee Built

Bamboo

Bambusa Bambos

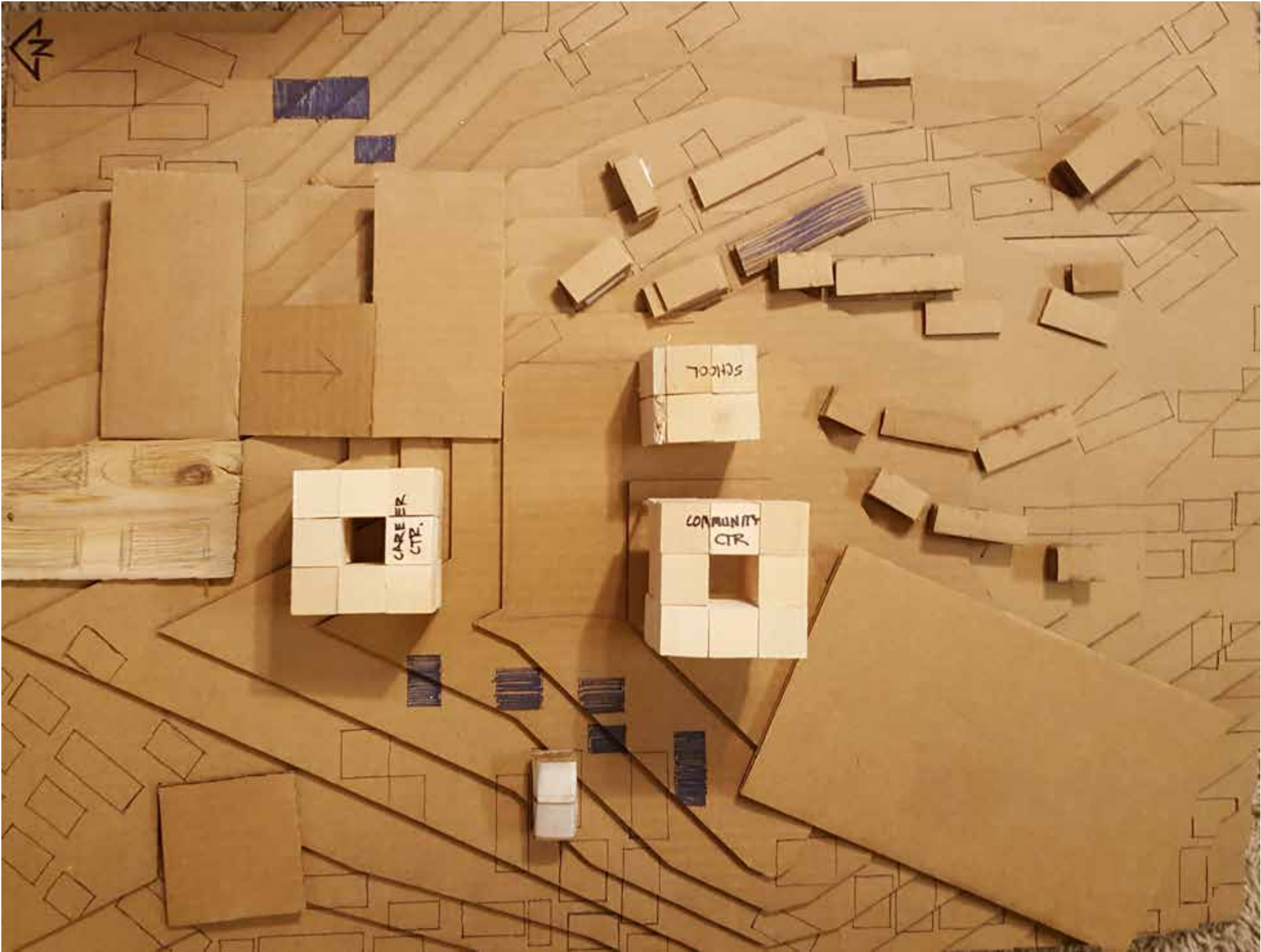
- Native to Bangladesh
- Height: 20-30 m (65-98 ft.)
- Diameter: 10-18 cm (4-7 in.)

Dendrocalamus Giganteus

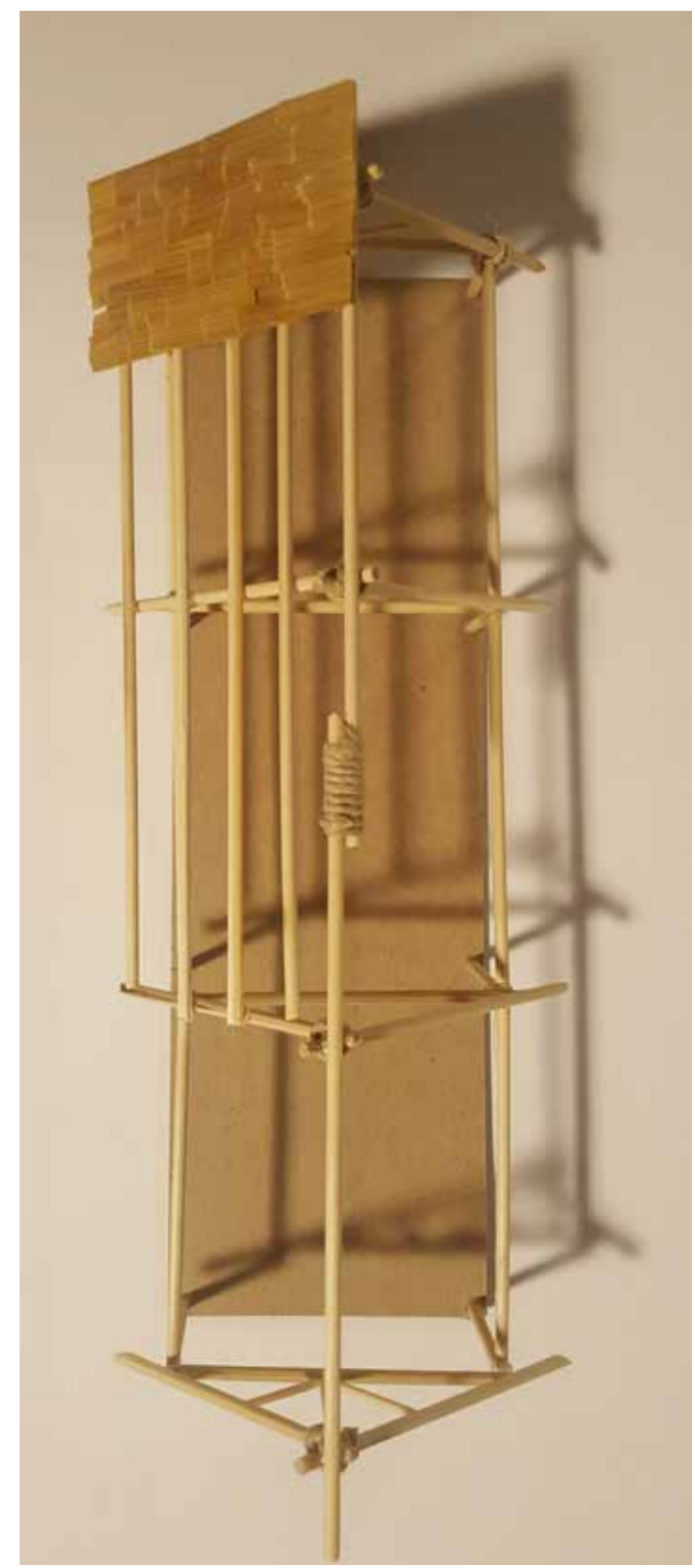
- Introduced in Bangladesh
- Largest species in the world
- Height: 25-35 m (82-115 ft.)
- Diameter: 15-30 cm (6-12 in.)



DESIGN PROCESS



DESIGN PROCESS



DESIGN PROCESS



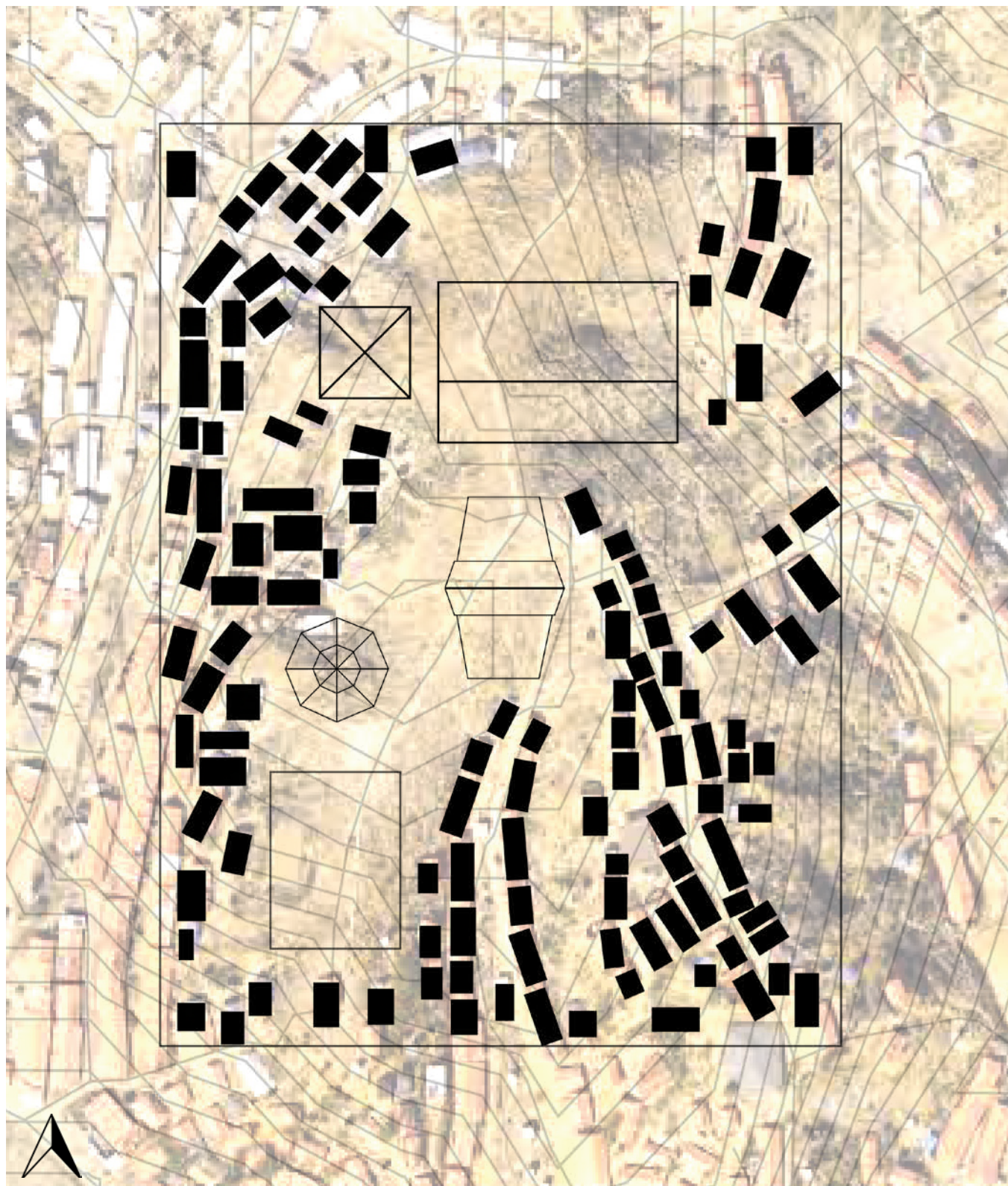
PROPOSAL

- A set of design ideas and proposals which can change and adapt according to the needs and context.
- Various interventions are determined by the Rohingya, who know their homes, needs, and communities best.
- A set of possibilities vs. final answer.

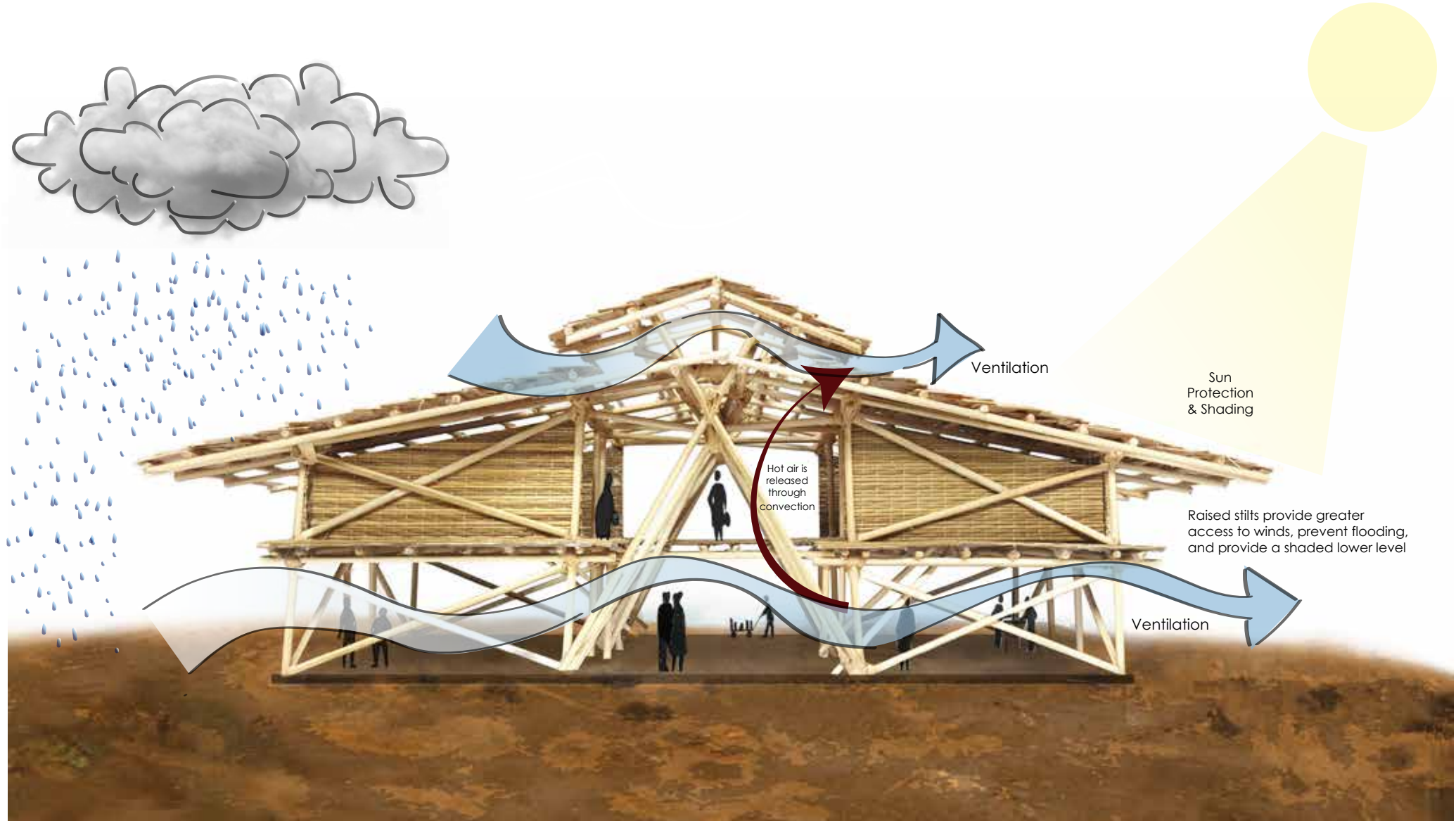
COMMUNITY FOCUSED TYPOLOGIES

- Innovation & Career Center
- Community Center
- School
- Marketplace

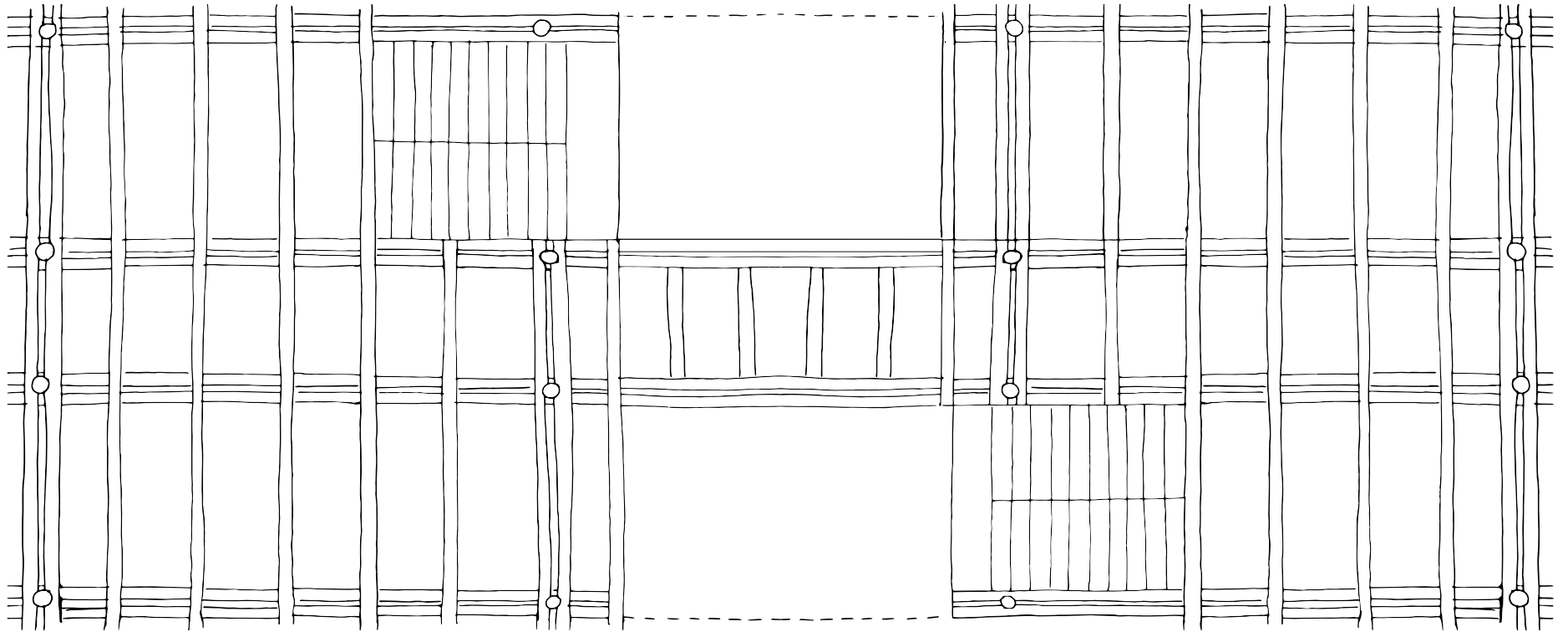
MASTER PLAN



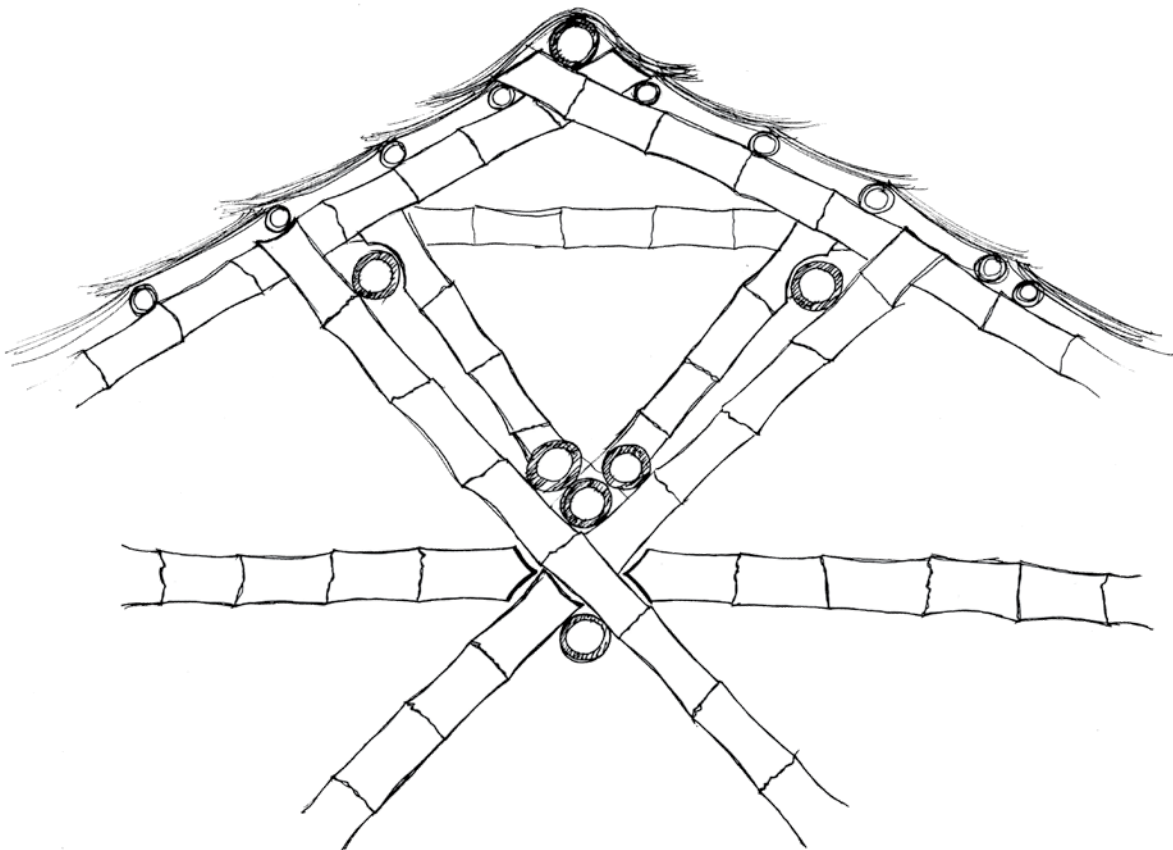
INNOVATION & CAREER CENTER



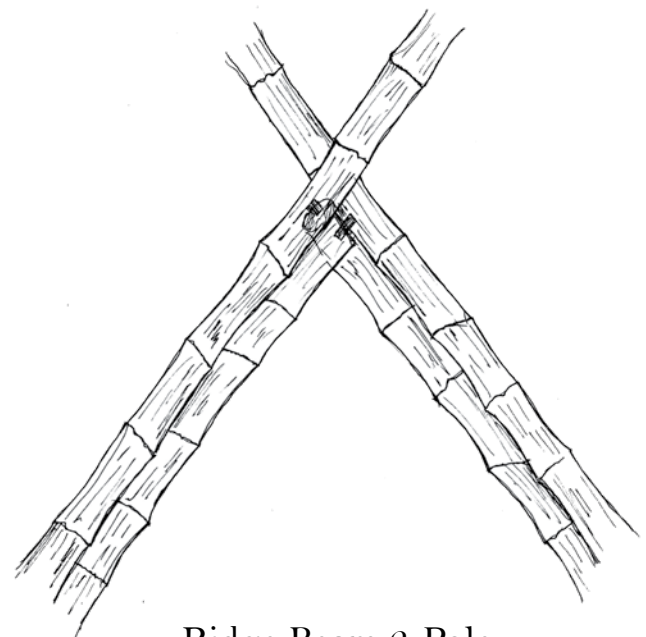
INNOVATION CENTER



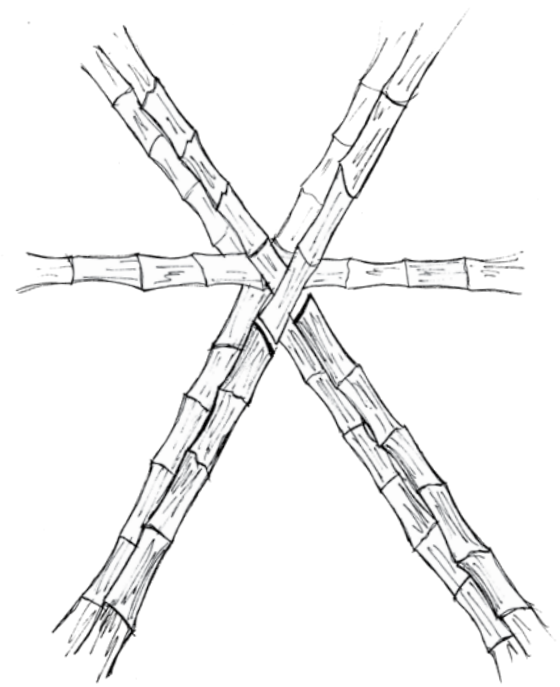
INNOVATION CENTER DETAILS



Ridge Beam Section



Ridge Beam 2-Pole
Connection Detail

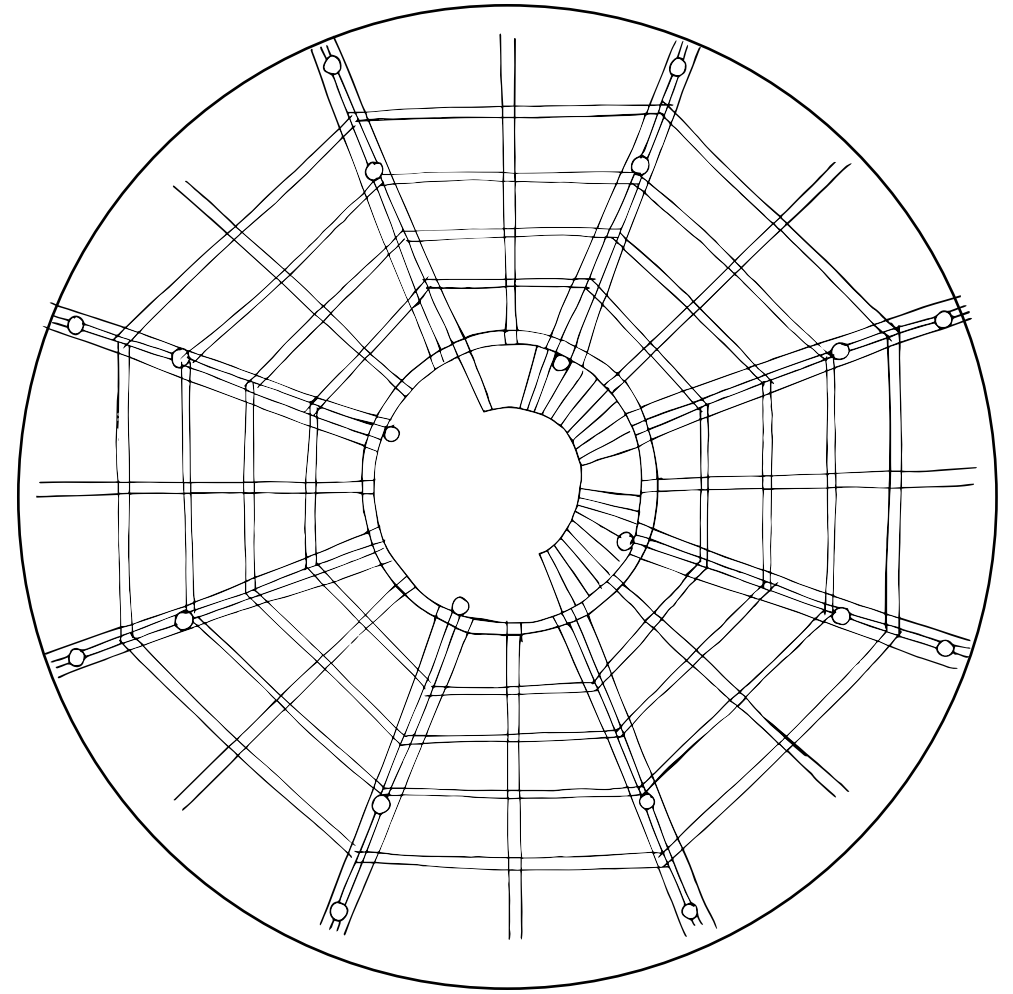
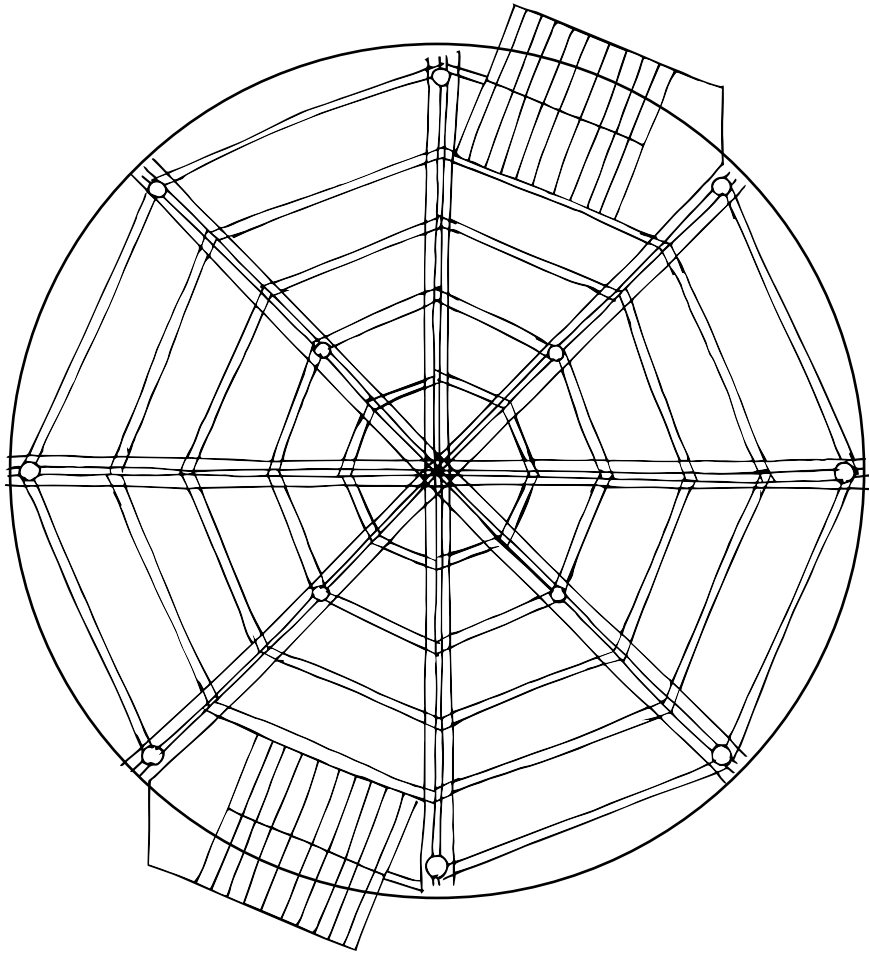


Ridge Beam Connection
Elevation Detail

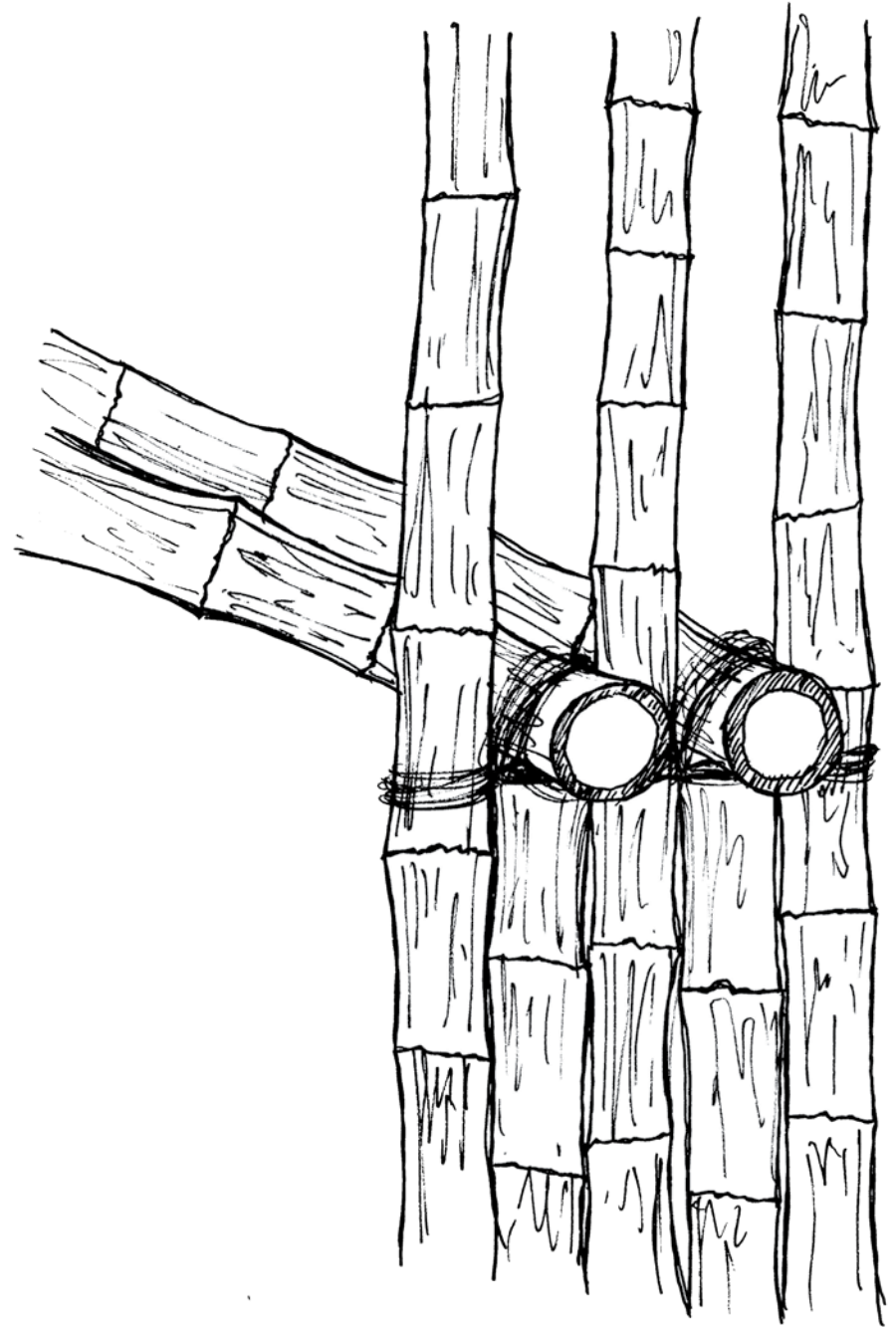
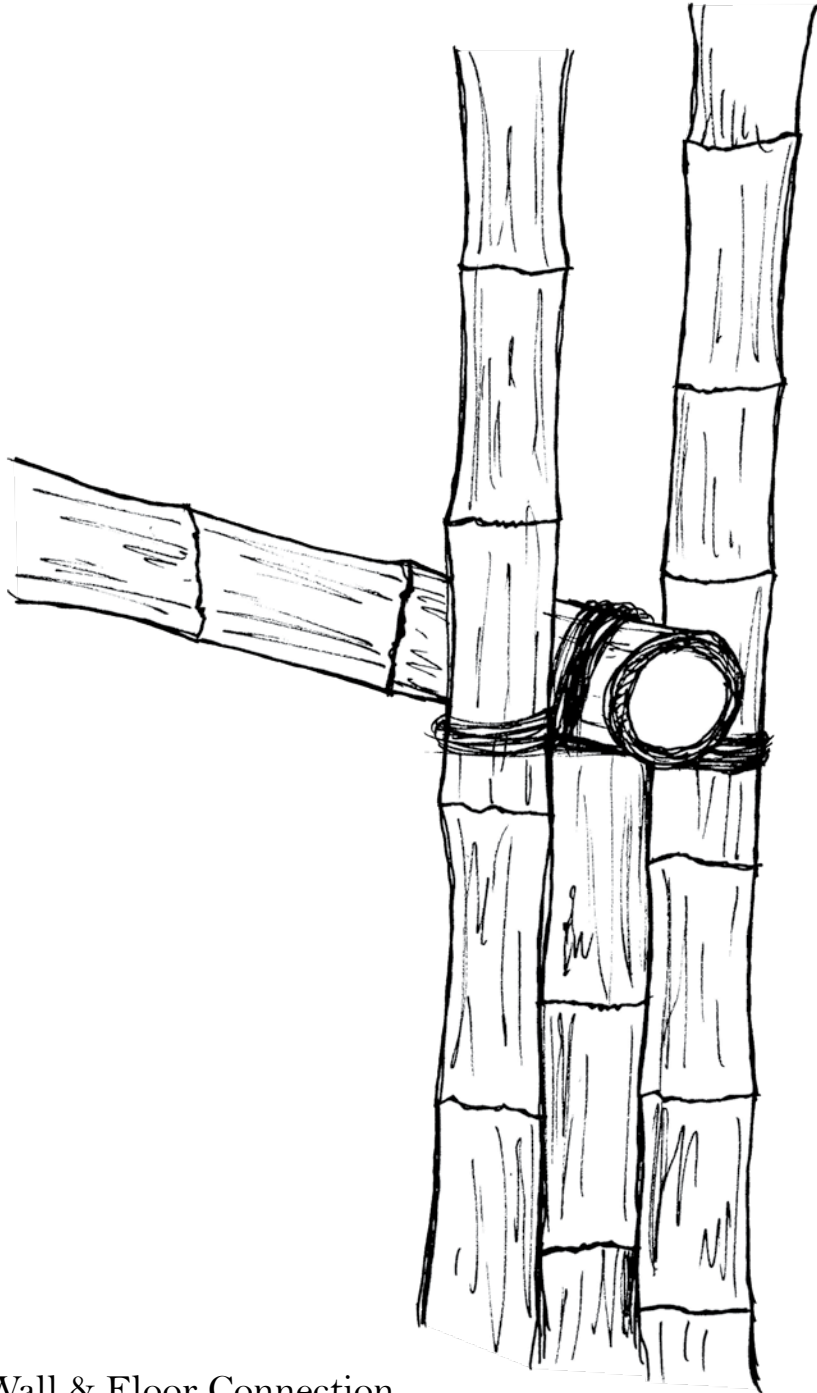
COMMUNITY CENTER



COMMUNITY CENTER



COMMUNITY CENTER DETAILS



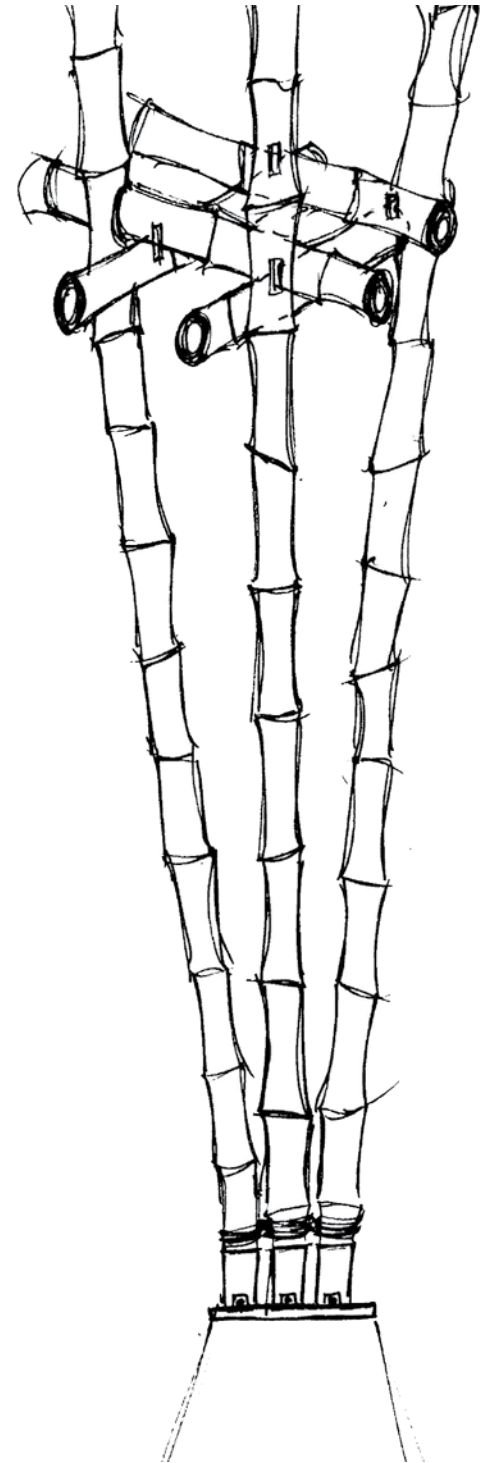
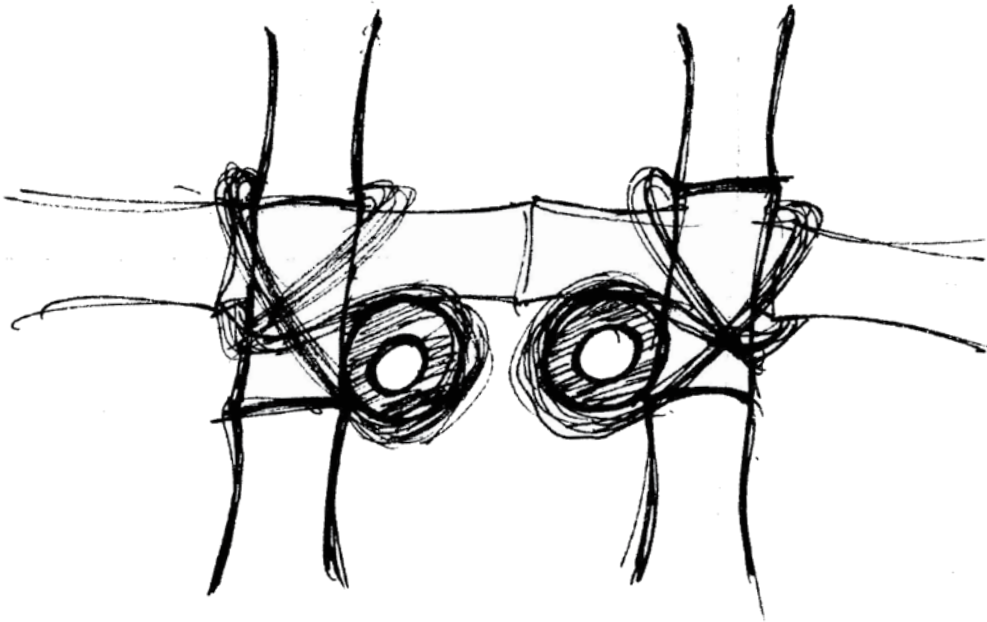
Wall & Floor Connection

SCHOOL



SCHOOL DETAILS

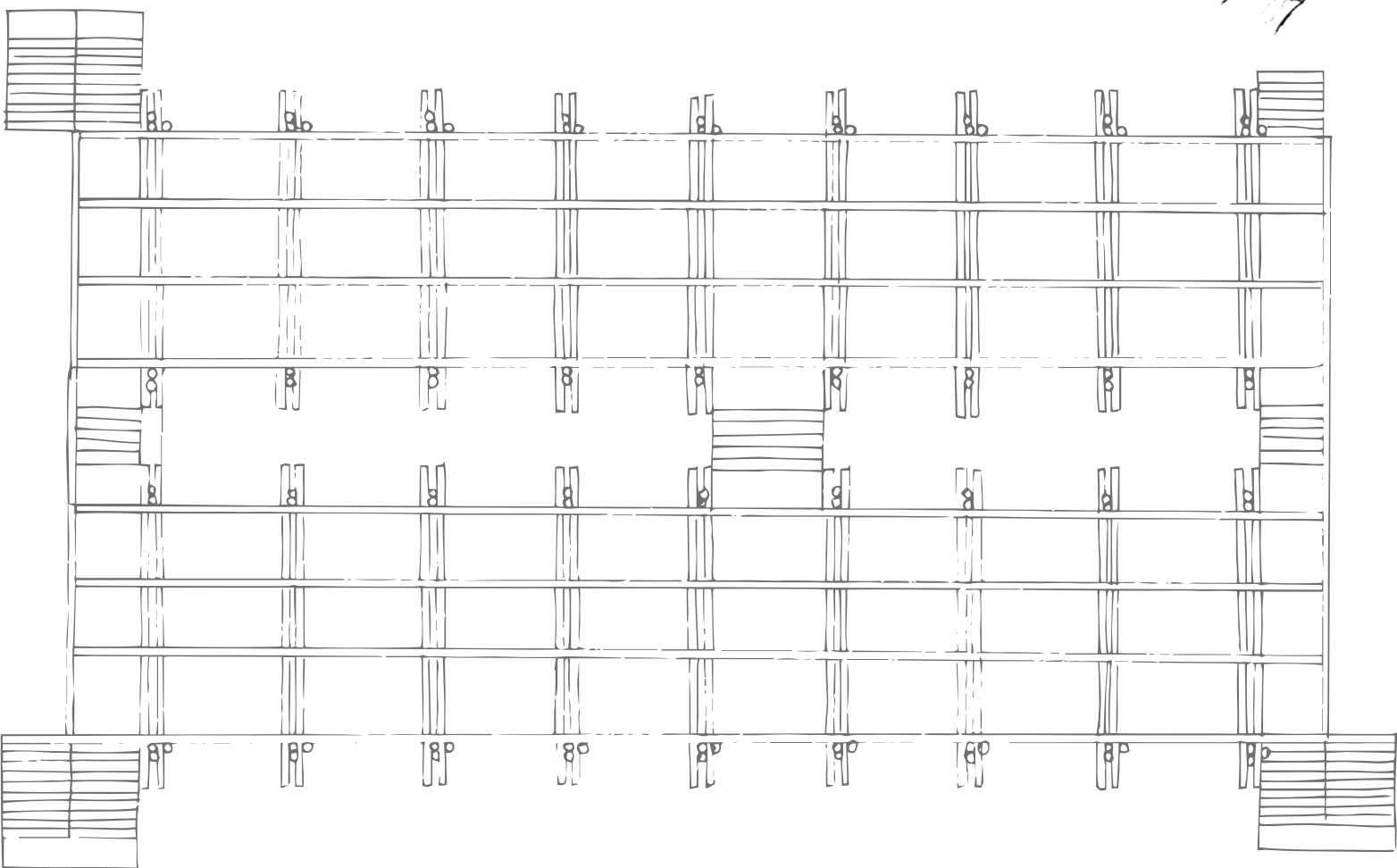
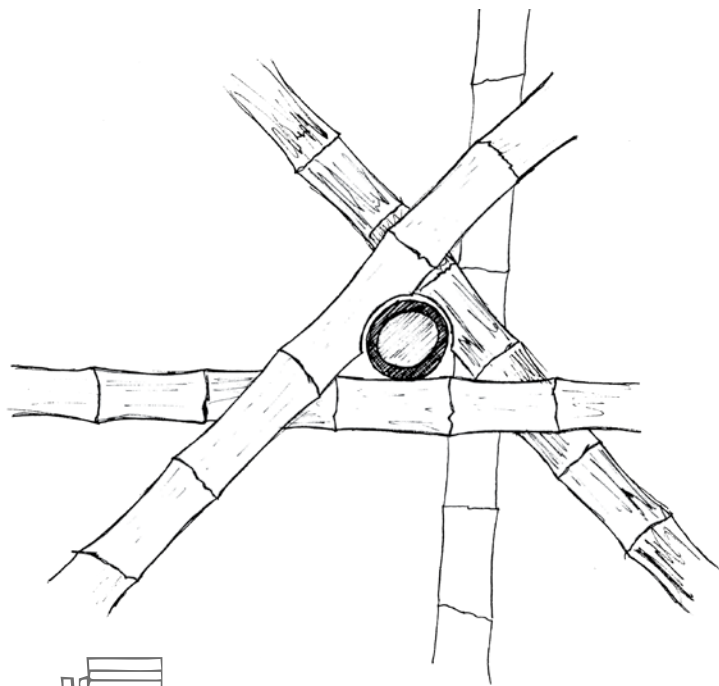
Column Details



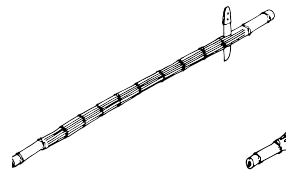
MARKETPLACE



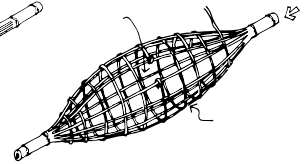
MARKETPLACE



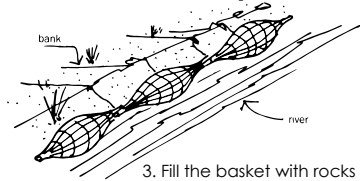
HYDROPONICS



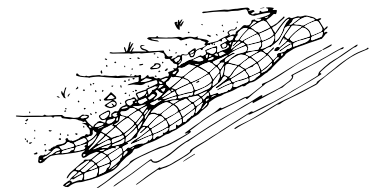
1. Cut bamboo into strips, leaving the ends solid.



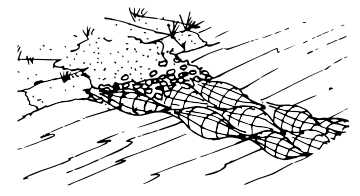
2. Push in the sides and weave strips around to make a basket. Leave one side open.



3. Fill the basket with rocks through the opening and place on the riverbank.



4. Make rows with the baskets and fill with rocks and earth.



5. The bank is retained and this method can also be used for dams.

Lengen, J. (2008) *Improving Riverbank Conditions*. The Barefoot Architect. Bolinas, California. Shelter Publications.

Riverbank Reinforcement

