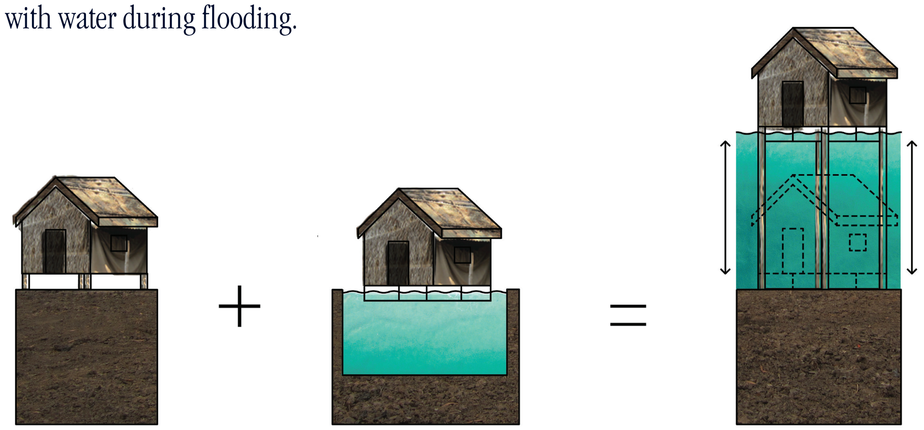
FLOATING HOPE

INNOVATIVE RETROFITS FOR VIETNAM

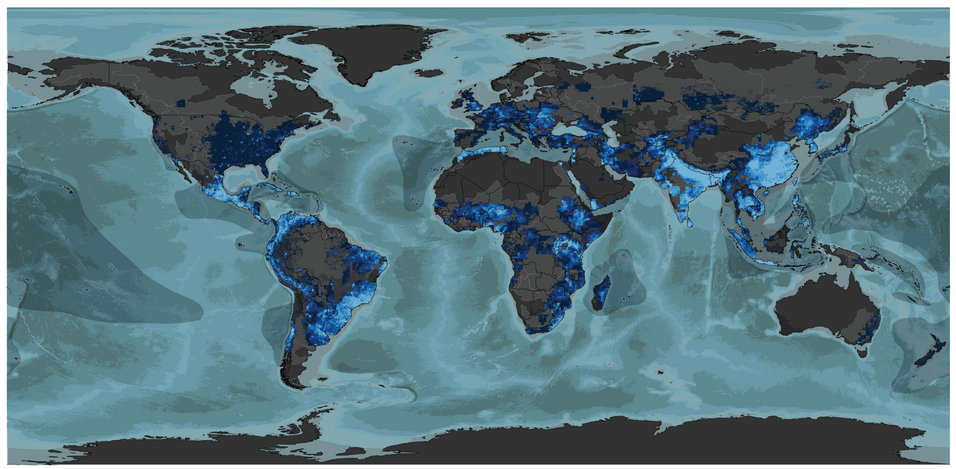
With an increasingly unpredictable climate, densifying urban realm and rapidly growing human population, the threat of flooding is at the forefront of global issues. Cities face worse flooding at greater frequencies, and as the global urban population steadily increases, we risk greater social and economic damage with each flood.

While flooding is a global issue, its impacts vary locally, influenced by site-specific geographical, economical, social and environmental factors. Since each affected zone is its own unique set of circumstances, there is an urgent need for innovative solutions that establish and enhance flood resilience while responding to each site's economy, society and environment.

A buoyant foundation is a particular type of amphibious foundation that is designed to be retrofitted into an existing house, allowing the house to float when floods arrive. The house is provided buoyancy through flotation systems anchored to its substructure and is restrained to only vertical movement by using vertical guideposts do direct its rise and fall with water during flooding.



HOUSES ON LAND + FLOATING HOUSES = BUOYANT FOUNDATION HOUSES



WORLD FLOD MAP SHOWING MOST FLOOD PRONE ZONES

Water is a way of life in Vietnam. The country's geography is criss-crossed with a network of hard infrastucture that is accompanied by parallel lanes of water infrastructure. Residents move by boats as much as they walk, shop at floating markets and have settled with the rise and fall of water as a way of life.

However, severe climate and sparodic flooding due to effects of climate change are slowly making their adaptations inadequate. The widely used static elevations under houses are not enough as flood levels increase year by year. While Vietnam has houses on stilts and houses that float, they do not have houses that can do both. For this reason, we are finding that Buoyant Foundations are welcomed with open arms: it seems to them a natural combination of their existing housing, and a new and wonderful way to live with water.

ADMINISTRATIVE DIVISIONS

WATER & INFRASTRUCTURE

PEOPLE & AGRICULTURE

PEOPLE & FLOODING

LEGEND

Water Bodies

Site

Populated Areas

Roadways

Agriculture

Flood Zones

MAPPING VIETNAM: ADMINISTRATION, WATER & INFRASTRUCTURE, AGRICULTURE AND FLOODING

DANG VAN NANG'S HOUSE

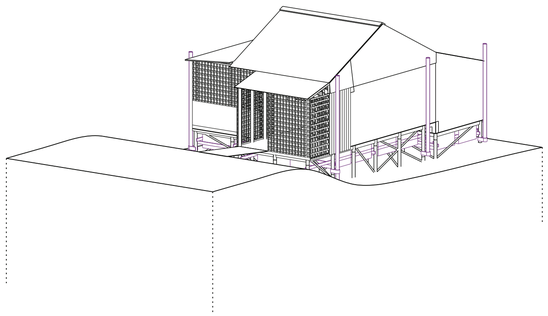
INNOVATIVE RETROFITS FOR VIETNAM

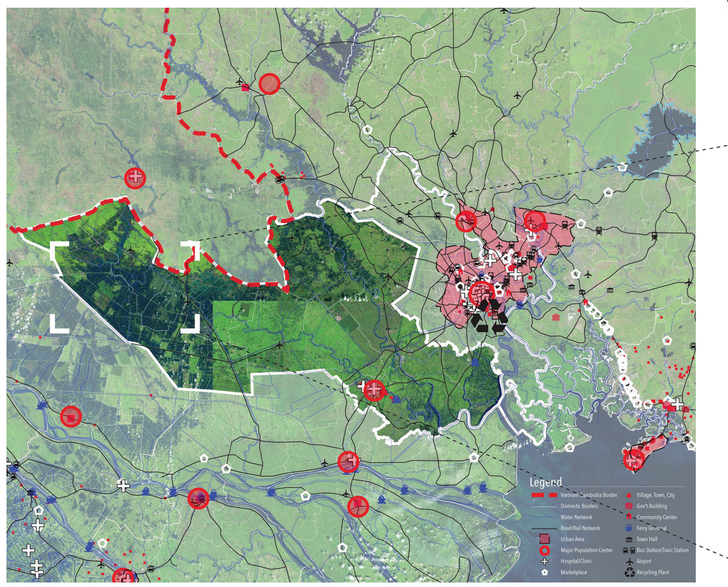
From Vietnam we zoom into Long An Province in the Mekong Delta, sitting at a crucial point between the Vietnam-Cambodia border and the ocean. We further zoom into the study area of the first phase of our project with the Global Resilience Partnership: the Lang Sen Wetlands which spread over three communes: Vinh Dai, Vinh Loi and Vinh Chau. The wetlands are a protected and regulated landscape, marked of as a biodiversity zone. Here, houses are lined along parallel lines of hard and water infrastructure. For many, being safe from floods means being elevated at or above the road line.

Our first chosen house for a retrofit belongs to Dang Van Nang, who moved his house here from another location only to find that it was not elevated high enough to reach the road. Nang can not afford to raise his house, as is the case for many other residents of the area. So every year, Nang lives with floodwater enetering his house. We will begin construction on Nang's house in January 2018 after this year's flood season to provide Nang a safe, dry and innovative house.

NANG'S BACKYARD

NANG'S HOUSE





LONG AN PROVINCE

PHASE 1 STUDY AREA

RETROFITTING STEP-BY-STEP

STEP 1: EXISTING POSTS ARE REINFORCED WITH CROSS FRAMING TO ENSURE THEY STAY IN PLACE DURING FLODING

STEP 2: EXISTING POSTS ARE CUT BELOW THE FLOOR TO ALLOW THEM TO LIFT WITH THE HOUSE DURING FLOODING. POSTS ADJACENT TO VERTICAL GUIDEPOSTS ARE CUT JUST ABOVE GRADE TO ALLOW MORE HEIGHT GAIN DURING FLOODING

STEP 3: POSTS ADJACENT TO VERTICAL GUIDANCE POSTS ARE ANCHORED TO VERTICAL GUIDANCE POSTS USING FOLDED SHEET METAL NAILED INTO POSTS ABOVE CUT LINE

STEP 4: CROSS BRACING IS ATTCHED TO FLOOR JOISTS TO REINFORCE AND CREATE FRAMING TO ATTACH BUOYANCY BLOCKS

STEP 5: BUOYANCY BLOCKS ARE CONSTRUCTED USING CHICKEN WIRE CAGES LINED WITH PLASTIC AND FILLED WITH CAPPED WATER BOTTLES TO PROVIDE FLOATATION

STEP 6: BUOYANCY BLOCKS ARE ATTACHED TO BOTTOM OF ADDED CROSS BRACING

STEP 7: NANG'S HOUSE IS NOW EQUIPPED FOR FLOODING AND WILL BE CAREFULLY MONITORED OVER FLOOD SEASON TO MEASURE SUCCESS OF THE RETROFIT