

**iDE CAMBODIA:  
WASH EZ SHELTER HI RES PROTOTYPE  
IN PARTNERSHIP WITH AUSTRALIAN DFAT – JUNE 2015**

## ABOUT THE LAB

inCompass Human-Centered Innovation Lab is a social innovation lab as well as a non-profit HCD (Human-Centered Design) consulting group within iDE. inCompass brings together a multi-disciplinary team of HCD practitioners from the fields of Service Design, Marketing Strategy, Industrial Design, Mechanical Engineering, Business Strategy, and Research Design -- the team has a combined 40+ years of professional experience in applying Human-Centered Design to designing solutions in a range of topic areas around the globe. inCompass provides HCD consultative services to NGO's, grant-makers, social enterprises, corporations, and aid agencies designing for the BoP in the areas of Water, Sanitation, Hygiene, Water Access, Schools, Rural Electrification, Irrigation, Agriculture, and Alternative Energy.

inCompass' lab and team is based in the developing world -- in Cambodia -- to remain close to the BoP user context. inCompass has been engaged in projects in Cambodia, Vietnam, Bangladesh, Nepal, Laos, and Ethiopia to date.

[WWW.INCOMPASS.ORG](http://WWW.INCOMPASS.ORG)

## ABOUT THE COVER

The cover represents the degree markings of a traditional compass. At inCompass we use human-centered insight as our compass towards sustainable innovation. The degree markings seen here are symbols of our approach, methodology and process which diverge and converge along each phase -- guided by deep user understanding, desires and needs.

At inCompass our approach to social innovation always begins with people.

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## THE WASH TEAM

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# EASY SHELTER ORIGINS



## EASY SHELTER

LATRINE CONSTRUCTION



July 2013

Easy Shelter – Latrine Construction

MR. PISEY, iDE WASHS' ENGINEER LED A SMALL PROJECT TO IMPROVE THE EXISTING SHELTER THAT IS ON THE MARKET.

THIS INITIATIVE LED TO A DESIGN THAT SERVED AS THE FOUNDATION FOR THIS PROJECT.

# PROJECT GOALS

Design Improvements\* for the latrine shelter in order to equally catalyze manufacturer-supply and user demand.

\*Design Improvements include:

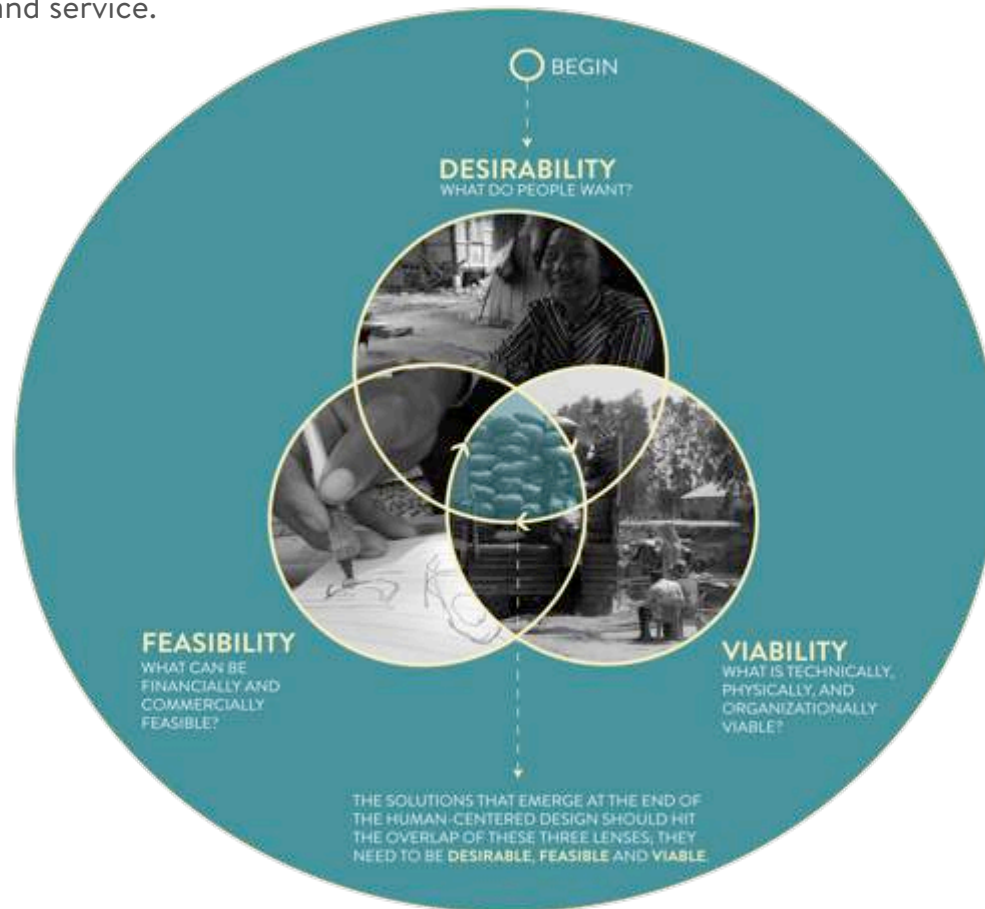
- Product design improvements
- Manufacturing process improvements related to the product design
- To a lesser extent: marketing strategy or service elements that are critical to the product design

# OUR HUMAN CENTERED DESIGN PROCESS

# HUMAN-CENTERED DESIGN

## What is the BIG DEAL about HCD?

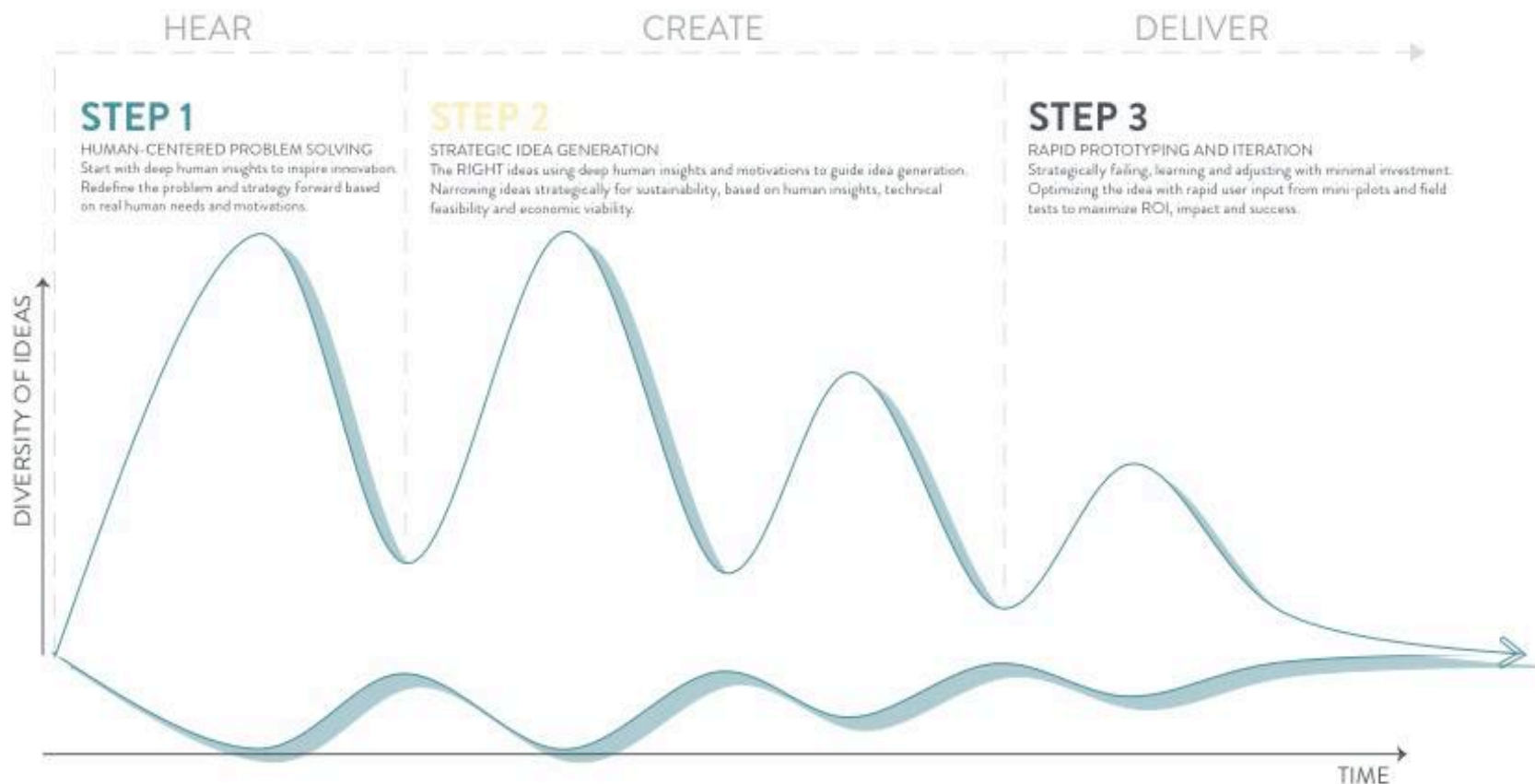
Leading innovation methodology to create solutions that are desirable, viable and feasible. Design solutions for both existing markets and new markets. Design new solutions or re-design existing solutions. Solutions can be products, services, systems, technologies and programs. Solutions are holistic: supply-chain, marketing, product, price and service.



# HUMAN-CENTERED DESIGN

## The HCD Process has 3 Main Stages

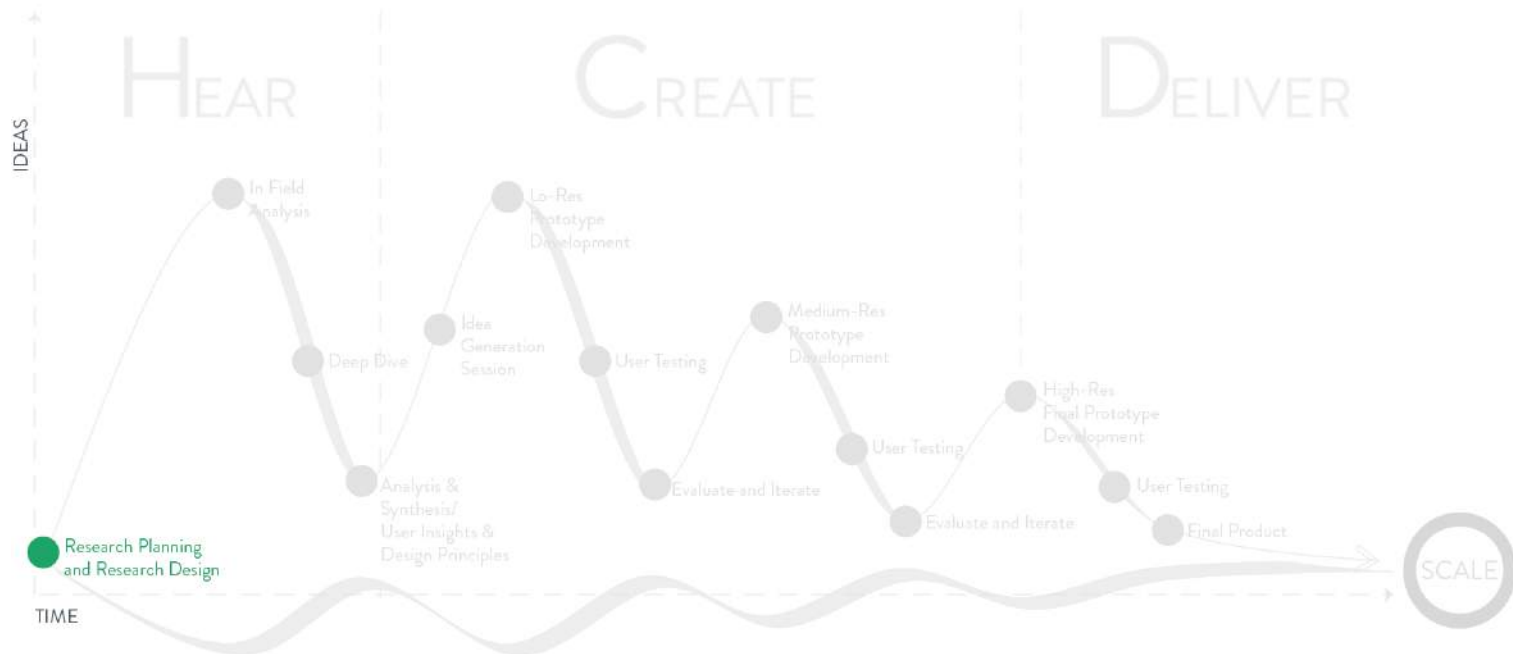
HCD uses a flexible process. We expand as we explore and generate possibilities. We narrow as we evaluate and select among the best ideas.



# HEAR

- Where We Started
- Who We Spoke To
- Who We Met
- Where We Went
- User Insights and Design Principles
- Constraints

# WHERE WE STARTED



# WHO WE SPOKE TO

## EXPERTS:

Ms. Tamara Baker, *Director, iDE Global WASH*

Mr. Ly Saroeun, *SanMark Deputy Program Director – iDE Cambodia*

Mr. Lim Pisey, *SanMark Technical Engineering Manager*

Mr. Pun Soly, *RTLO - Regional Technical and Logistic Officer*

Mr. Michel Dauguet, *WASH Program Director*

## MANUFACTURERS:

Latrine Business Owners who have participated in the Shelter Pilot in Svay Rieng

Masons who have participated in the Shelter Pilot in Svay Rieng

## END-USERS:

Customers who have bought Easy Shelter during last few months

Customers who have bought a brick shelter during the last year

Customers who have bought the Easy Latrine but not a shelter yet

# WHO WE MET

ST: 1

BDC: 1

LBO - EASY SHELTER: 4

LBO - NON-EASY SHELTER: 4

MASONS FROM iDE INSTALLATION TEAM : 2

OTHER MASONS NOT WORKING WITH iDE: 2

END USER - EASY SHELTER: 17

END USER - NON - EASY SHELTER: 4

END USER - WITH EASY LATRINE BUT NO SHELTER YET: 13

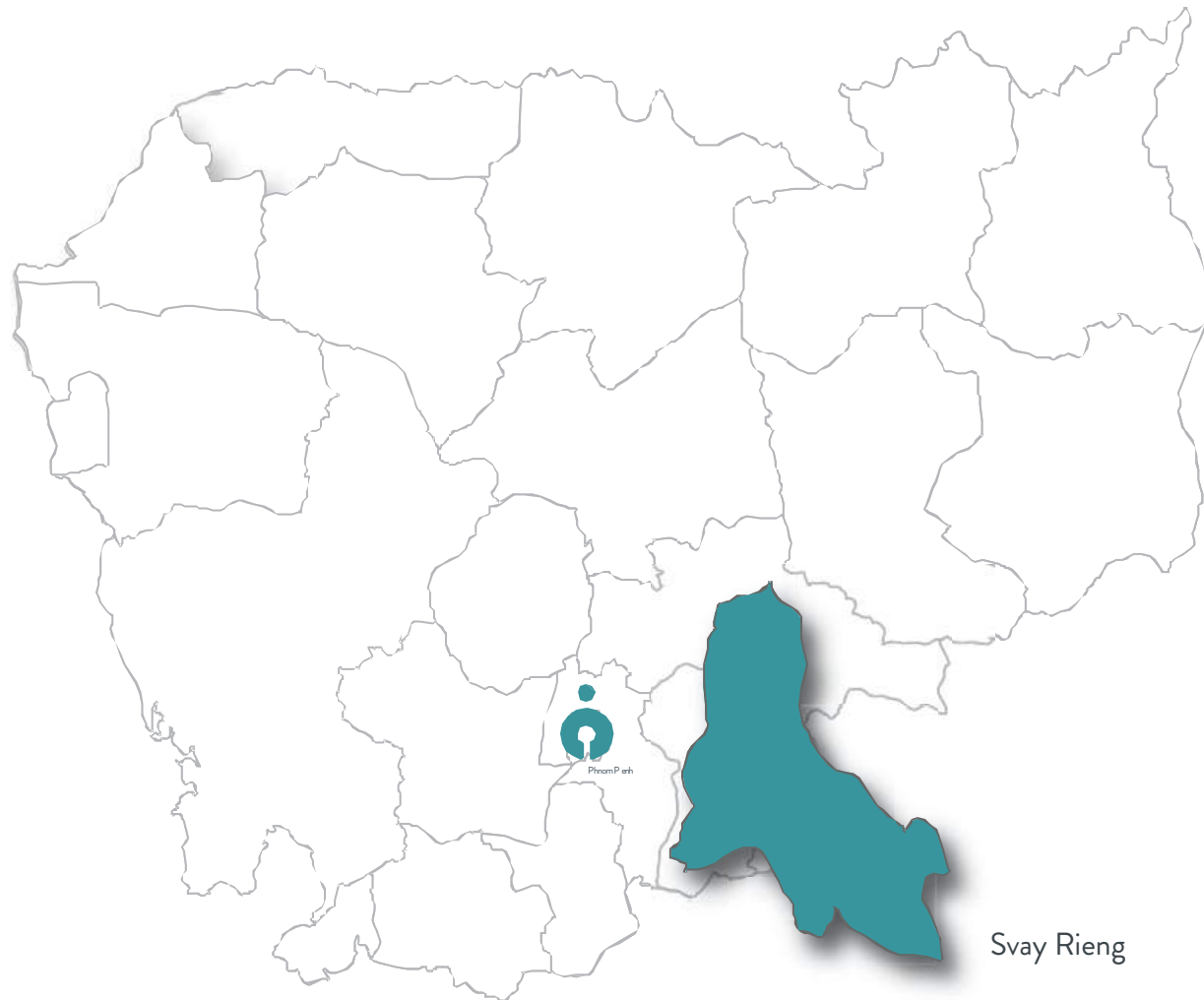
Total: 50

Field Visit 1 - November 24<sup>th</sup>- 28<sup>th</sup> | Field Visit 2 - January 26<sup>th</sup>- 28<sup>th</sup>

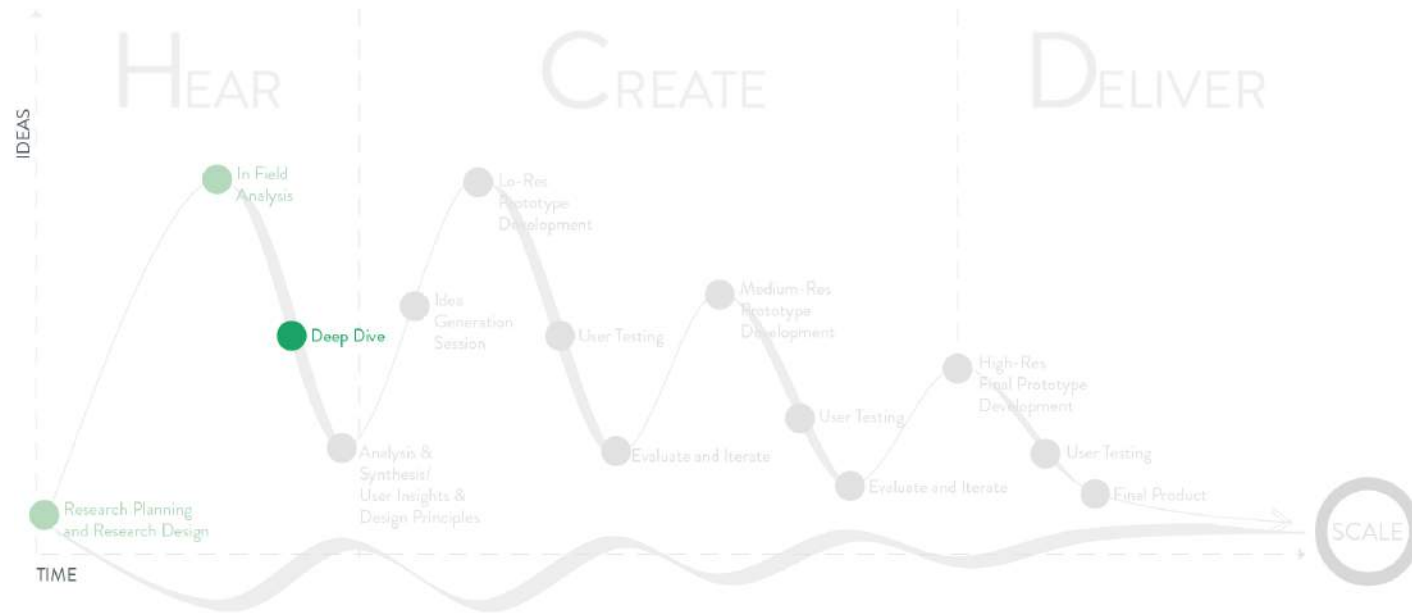
Field Visit 3 - March 23<sup>rd</sup>- 27<sup>th</sup> | Field Visit 4 - June 1 - June 3

# WHERE WE WENT

Easy Shelter 2.0 Test Site



# DEEP DIVE – TO GAIN INSIGHTS



# USER INSIGHTS & DESIGN PRINCIPLES

## A User Insight

A User Insight captures the motivation, needs or mindset of a human user. An insight is the “WHY?” behind the behaviour. It is what users feel and desire but do not say explicitly.

## Design Principles

Design Principles identify the most important user needs, and turn them into a clear direction forward. They become the foundation for a strategy that responds to what users need.



**HOUSEHOLDS BUY THE EASY  
SHELTER EXPECTING MULTI-  
FUNCTIONALITY.**

**USERS TRADE-OFF BETWEEN  
MULTI-PURPOSE + FREQUENT  
BASIN REFILLS vs. SINGLE-  
PURPOSE + LESS BASIN REFILLS.**



HAVING A SHELTER MEANS FREQUENT USE BY MULTIPLE PEOPLE. SIMULTANEOUS USE IS NOT POSSIBLE.

---

PEOPLE DREAM ABOUT EXPANDING TO A TWO-ROOM SHELTER. WHEN THEY BUY A SHELTER, THEY BUY WITH THE POSSIBILITY OF ADDING-ON IN THE FUTURE.

# DESIGN PRINCIPLES

A solution that enables **USERS** to:

1. Access multi-functional use without feeling the need to trade-off with the pain of refilling.
2. Enable a multi-functional experience without interrupted access to water.
3. Have a space that enables both privacy and emotional transformation.
4. Have a space that can be used by multiple people without compromising privacy.
5. Avoid choosing between water that's "conveniently close" and "appropriately clean".
6. Have "clean-looking" water for longer.
7. Buy and act on the possibility of adding-on to the shelter in the future.
8. Not be disappointed by unmet pre-purchase expectations.
9. Get a "beautiful, ready-to-use" shelter that requires no further effort and money.

# DESIGN PRINCIPLES

A solution that enables **LBOs** to:

- 10. Do their measurements more quickly and easily.
- 11. Be freed from personal oversight and construction of the shelter.
- 12. Minimize or avoid the use of skilled production labour.
- 13. Produce the shelters in a “Just-In-Time” manner.
- 14. Build without so many disjointed instructions and components to remember.
- 15. Produce concrete components faster, without additional capital investment.
- 16. Use equipment that can withstand rough-handling.

A solution that enables **Masons** to:

- 17. Get paid for any additional “repair” work required.

# CONSTRAINTS

A few constraints that were taken into account during our exploration:

The overall footprint of the shelter to be kept close to the existing Easy Shelter

The overall price of the shelter to be kept close to the existing Easy Shelter

The size of the components to be regulated as per the needs of transportation

The design of the components to be 'cast-concrete friendly'

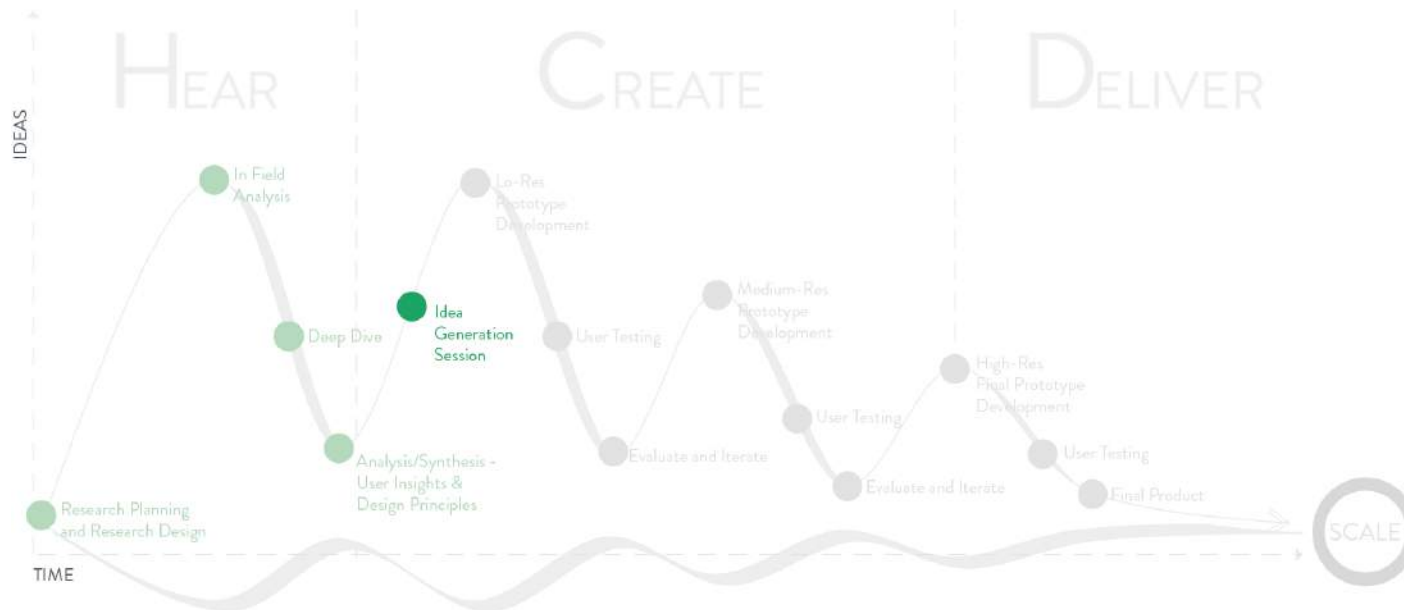
Focus on re-use/multiple use of the Easy Shelter Components

Focus on no development of additional molds

# CREATE

- Idea Generation Session
- Low Resolution Prototype
  - User Testing
  - Methods
- Medium Resolution Prototype
  - User Testing
  - Methods

# IDEA GENERATION SESSION







## IDEA GENERATION SESSION

*Following the design principles, a collaborative session between iDE WASH and inCompass was conducted using two techniques.*

- 1. Brain drawing*
- 2. Brainstorming*



# DIRECTION FOR CONCEPTS

- Inspiration from:*
  - Ideas from idea generation session*
  - Discussions with Lucas and Pisey*
  - Trends research (Toilet and Shelter(s) around the world and other sources)*

*The output of the synthesis of the above information led us to several early concepts.*



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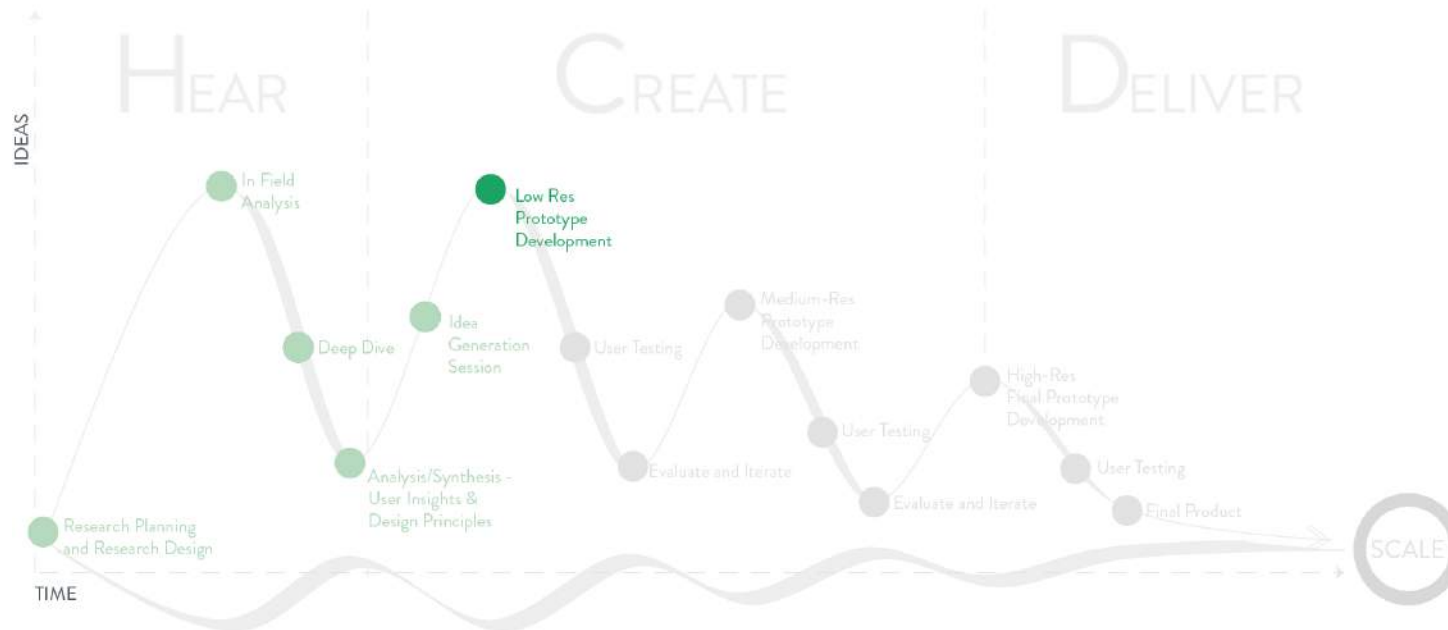
- Ideas from idea generation session*
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*The output of the synthesis of the above information led us to several early concepts.*

## FROM EARLY CONCEPTS TO FINAL CONCEPTS

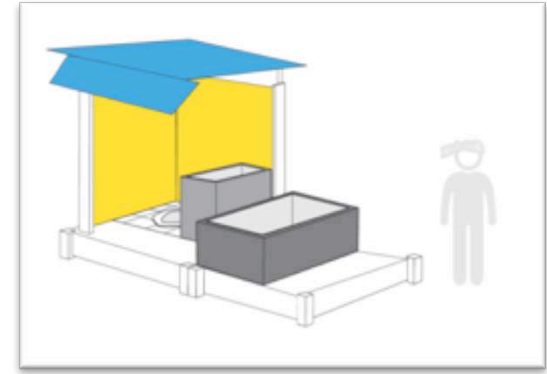
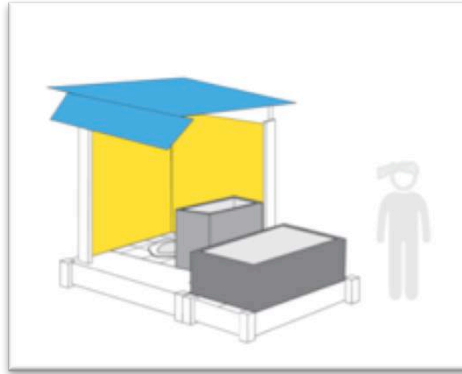
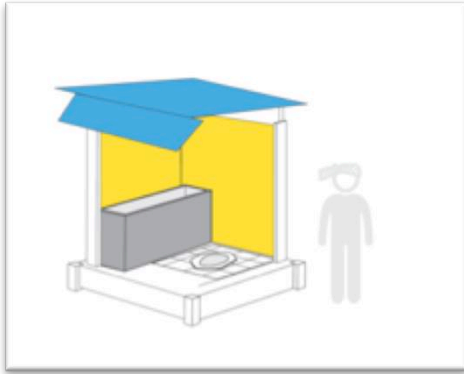
*After analyzing the early concepts through different lenses (Feasibility, Viability and the Design Principles – user needs) we narrowed down to 4 concepts with different options.*

# LOW RESOLUTION PROTOTYPE

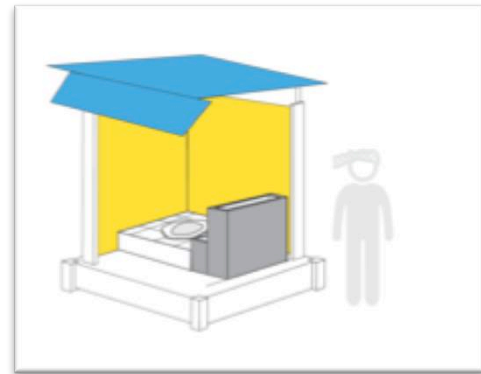
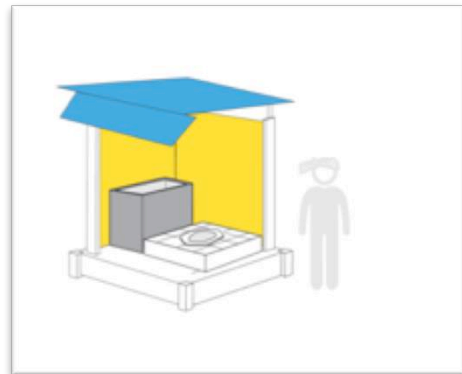
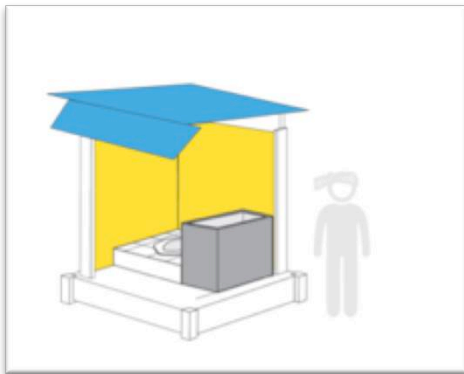


# FINAL CONCEPTS

CONCEPT A : Basin Orientation, Long Inside Basin, Outside Basin, Outside Foundation

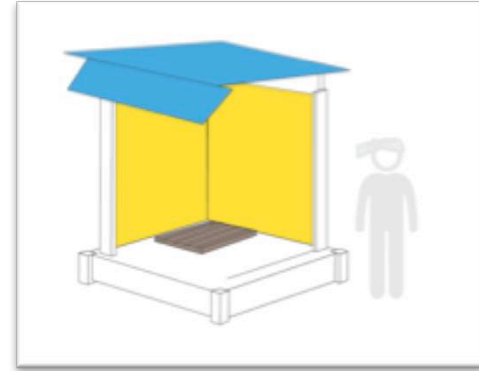
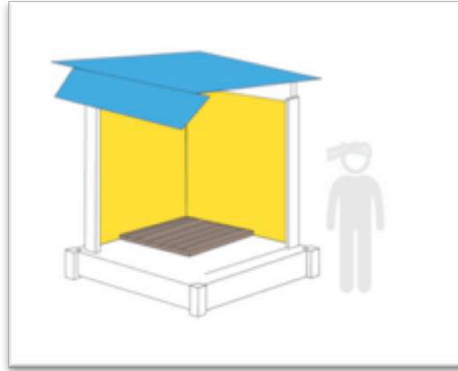
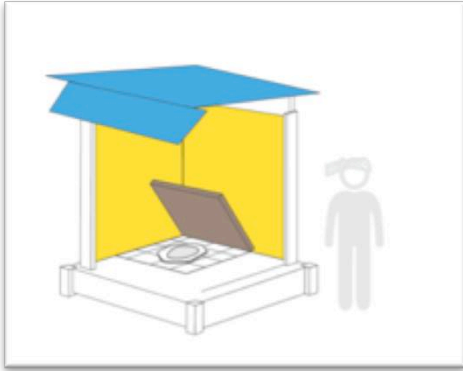


CONCEPT B: Elevated Pan – Slab, Step – Down Basin

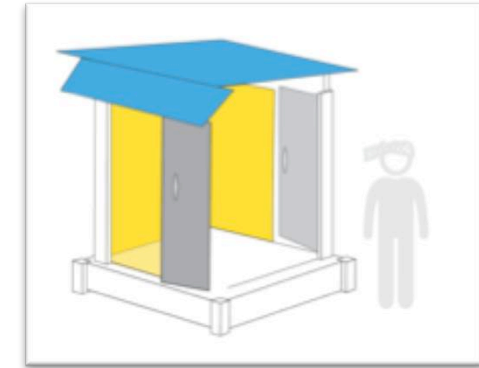
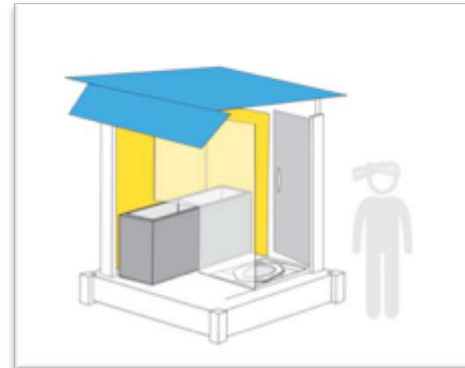
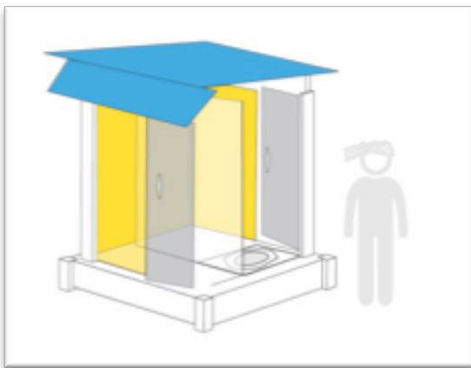


# FINAL CONCEPTS (Contd.)

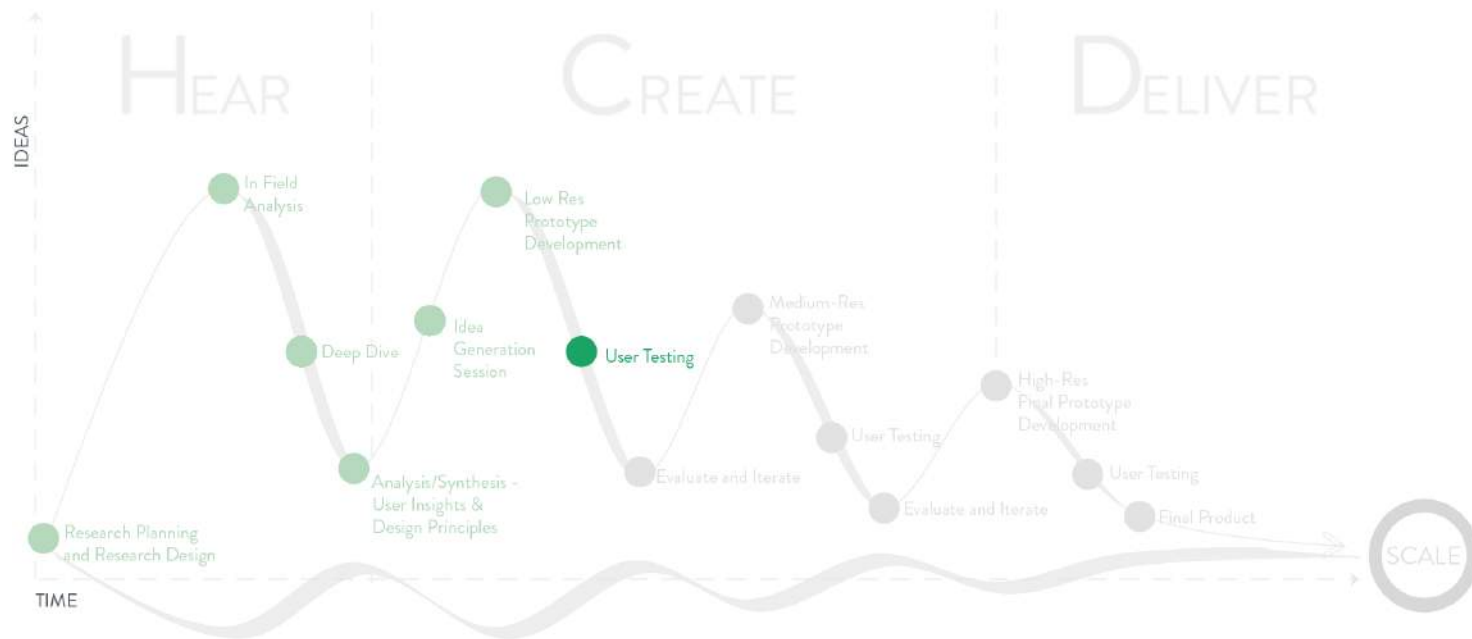
CONCEPT C : Cover for the Pan - Slab, Small size Pan - Slab



CONCEPT D: Long Inside Basin, Partition, Two Doors

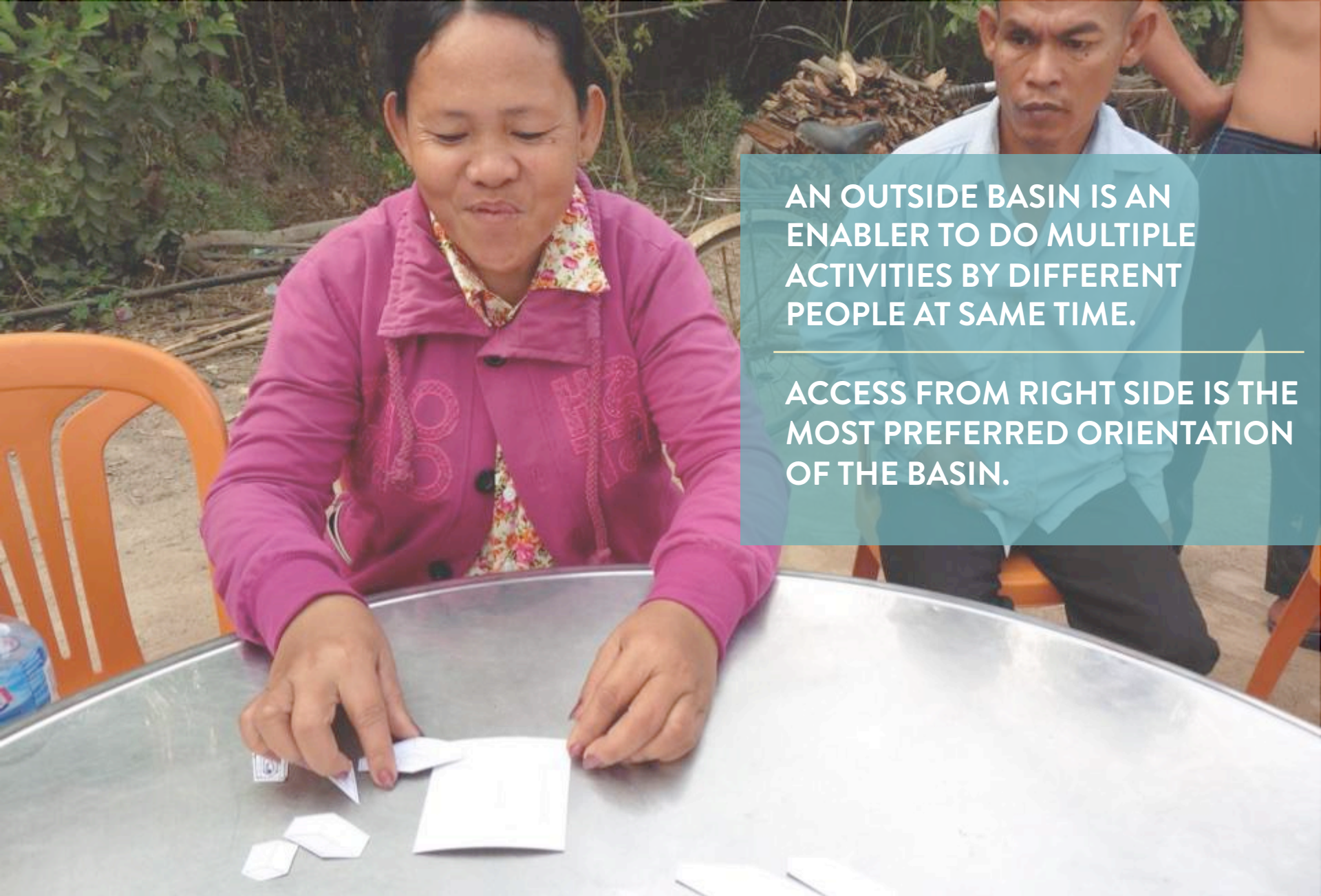


# USER TESTING – LOW RESOLUTION PROTOTYPE



# USER TESTING METHODS & TOOLS

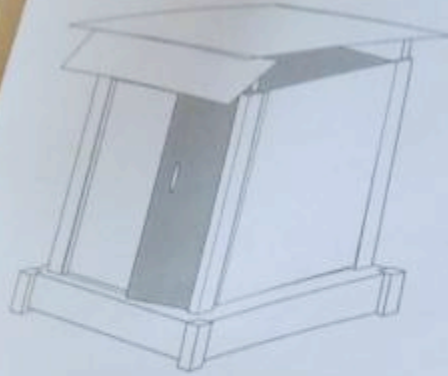
- 1:1 Interviews to test our Low resolution prototypes (4 selected concepts)
- Co-creation design session with our users to design their ideal toilet with stimulus (scenarios and shelter components pieces).
- Think Aloud
- Observations



AN OUTSIDE BASIN IS AN  
ENABLER TO DO MULTIPLE  
ACTIVITIES BY DIFFERENT  
PEOPLE AT SAME TIME.

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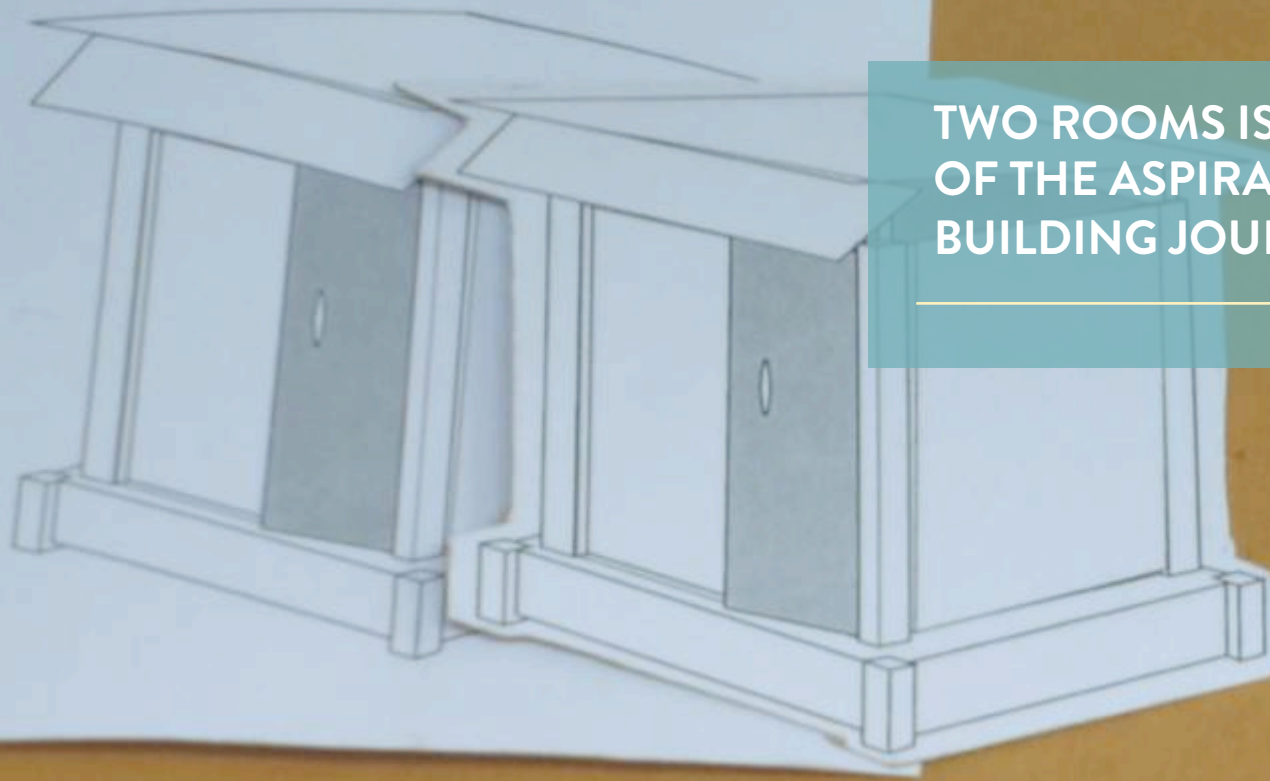
ACCESS FROM RIGHT SIDE IS THE  
MOST PREFERRED ORIENTATION  
OF THE BASIN.



TILES ARE ASSOCIATED WITH CLEAN ACTIVITIES. THEY ARE ALSO A CLEAN SURFACE TO WASH CLOTHES (EVEN OUTSIDE THE SHELTER).

STEP IS A MEANS TO KEEP THE PAN CLEAN AND DRY.







**TWO ROOMS IS THE FINAL STAGE  
OF THE ASPIRATIONAL SHELTER  
BUILDING JOURNEY.**

---

# SUMMARY

## User Testing – Low Resolution Prototype

		
Concept A	Basin on Right, Outside Basin, Outside foundation	Long Inside Basin
Concept B	Raised Pan - Slab	Step Down Basin
Concept C	None	Cover, Small Pan - Slab
Concept D	None	Partition

Other recommendation(s) :

Rainwater gutter & Downpipe

Tiles on both foundation- floor (inside and outside)

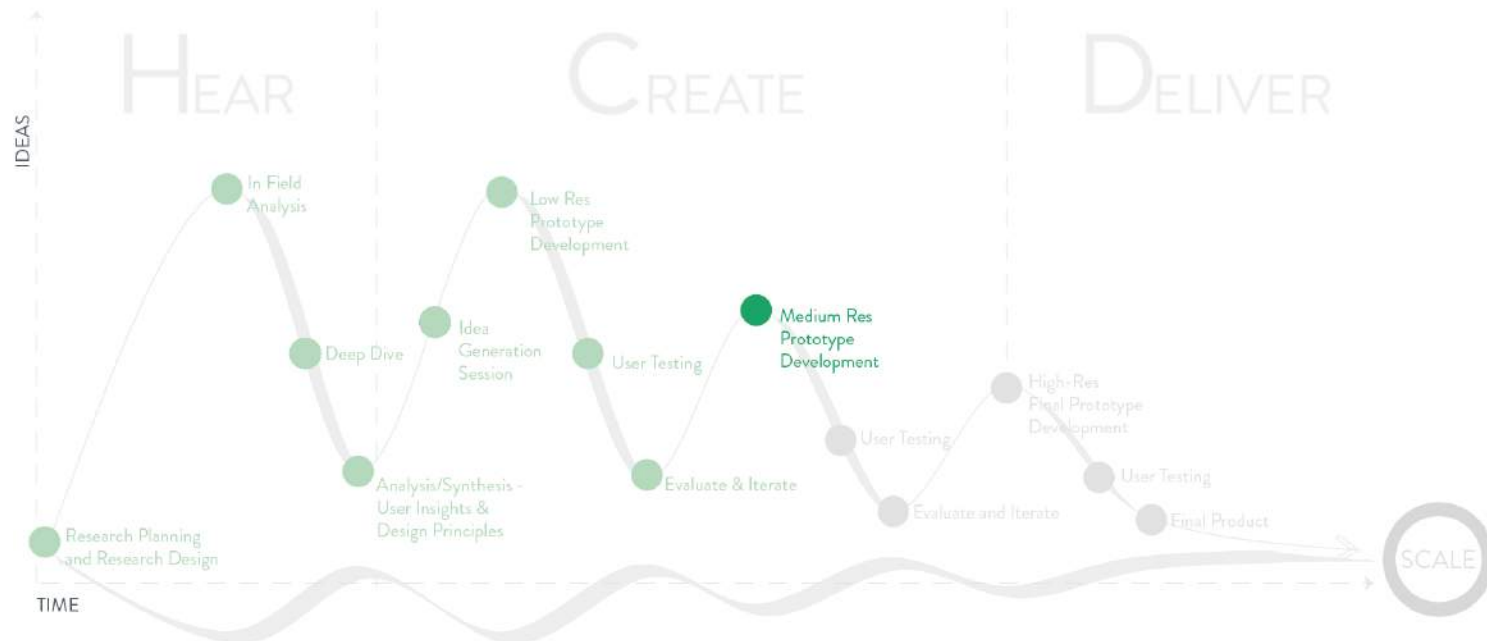
Add – on 2<sup>nd</sup> room

# DIRECTION

## Medium Resolution Prototype



# MEDIUM RESOLUTION PROTOTYPE





## SITE SELECTION: EXISTING WASH SHELTER



## BUILDING THE FOUNDATION, LAYING TILES & FINISHING



OPTION 1: RECTANGULAR BASIN

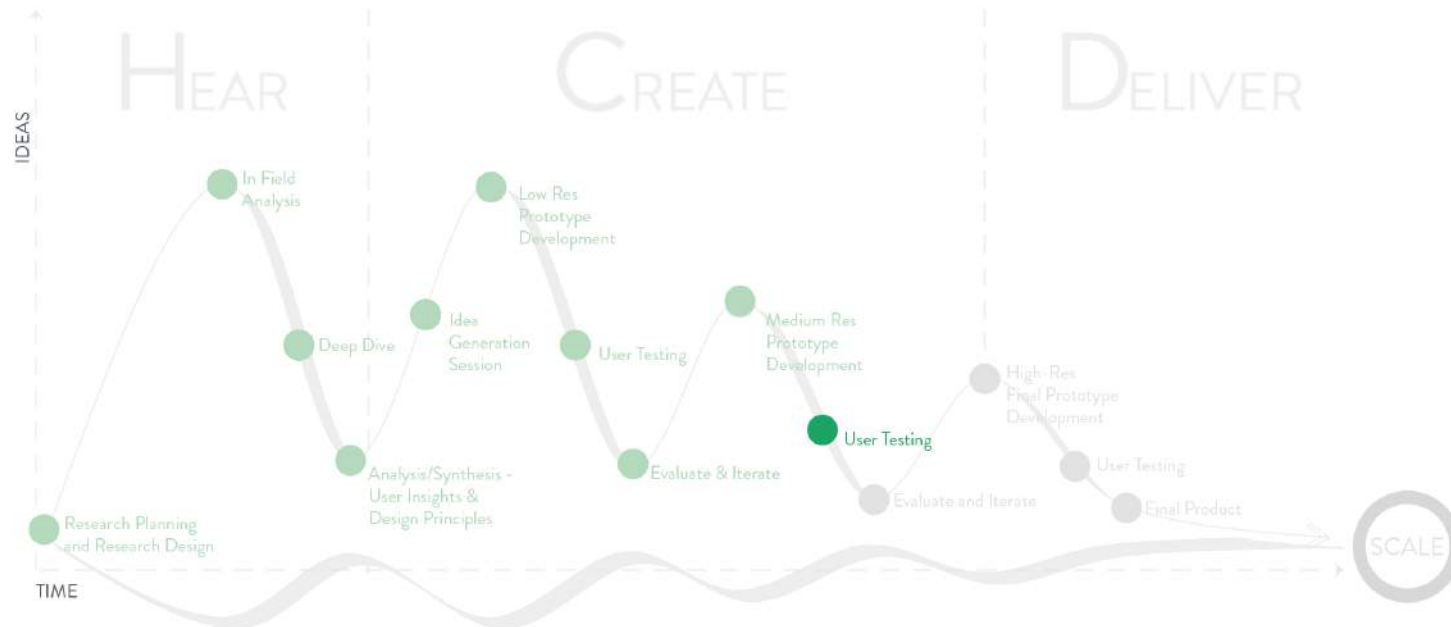


## OPTION 2: CIRCULAR BASIN




## OPTION 3: SEMI-CIRCULAR BASIN

# USER TESTING – MEDIUM RESOLUTION PROTOTYPE



# USER TESTING METHODS & TOOLS

- 1:1 Interviews to test our *Medium* resolution prototype (3 basin configurations)
- Think Aloud
- Observations



**USERS PERCEIVE THE \$350-MARK  
AS 'AFFORDABLE' AND 'NOT  
EXPENSIVE' FOR THE FEATURES.**



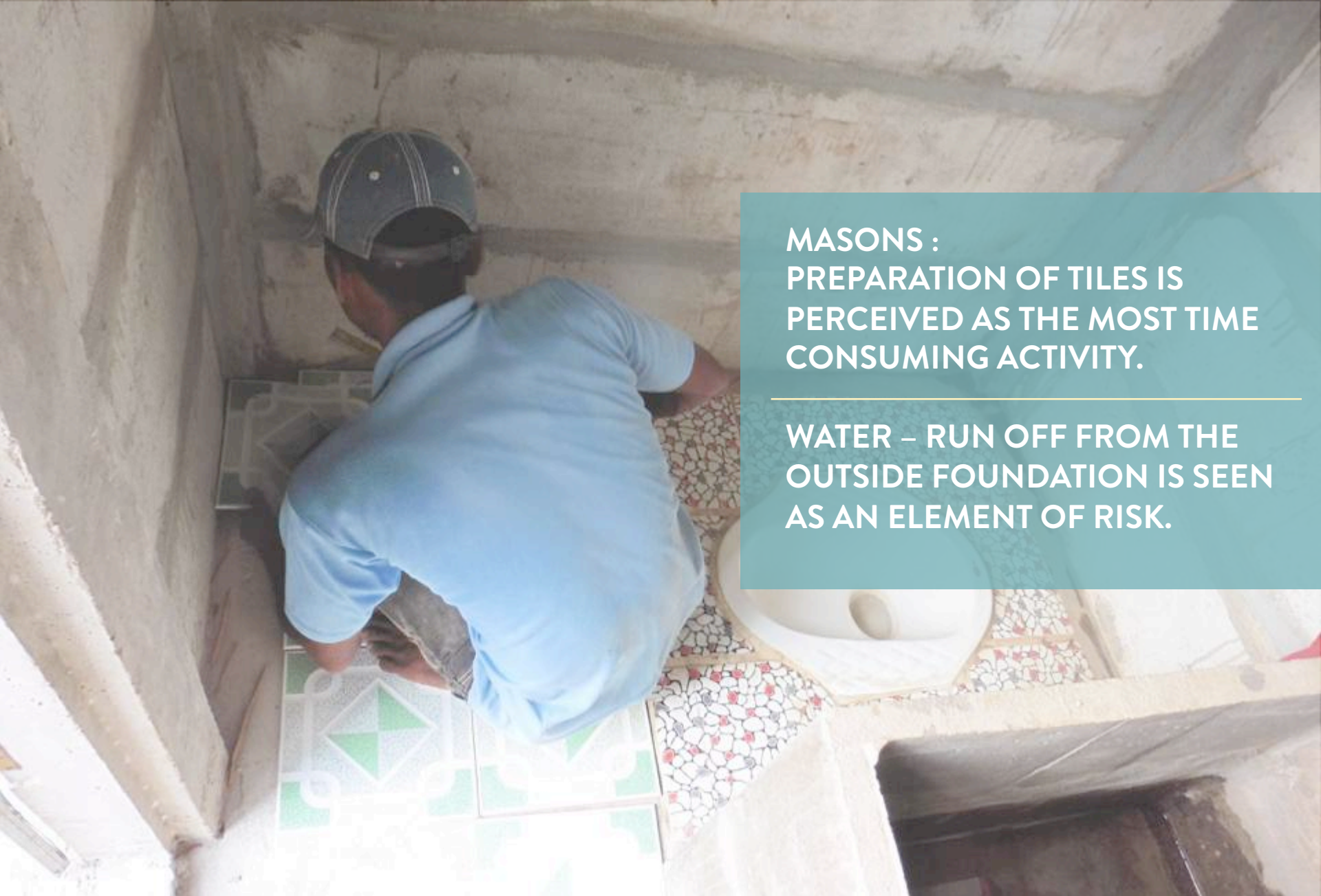
**RECTANGULAR BASIN IS THE MOST PREFERRED SHAPE FOR THE USERS.**

**STORAGE IS THE MOST IMPORTANT FACTOR IN CHOOSING A BASIN.**



**THE OUTSIDE FOUNDATION  
SERVES AS A 'CLEAN AREA' FOR  
WASHING CLOTHES AND  
BATHING SELF AND KIDS.**

**CERTAIN USERS PREFER TO HAVE  
DIFFERENT WATER FOR  
DEFECATION AND BATHING.**





**MASONS :  
PREPARATION OF TILES IS  
PERCEIVED AS THE MOST TIME  
CONSUMING ACTIVITY.**

**WATER – RUN OFF FROM THE  
OUTSIDE FOUNDATION IS SEEN  
AS AN ELEMENT OF RISK.**

# SUMMARY

## User Testing – Medium Resolution Prototype

		
Rectangular Basin	Form, Finish, Placement of basin	Capacity
Circular Basin	Capacity	Form (shape), Placement of basin
Half Circle Basin	Small Size Basin Cover	Form (shape), Capacity

Other Element (s) :

Rainwater gutter & Downpipe - As an Accessory

Tiles on both foundation- floor (inside and outside)

Add – on 2<sup>nd</sup> room

Marketing & Sales Elements

# FUTURE DIRECTION

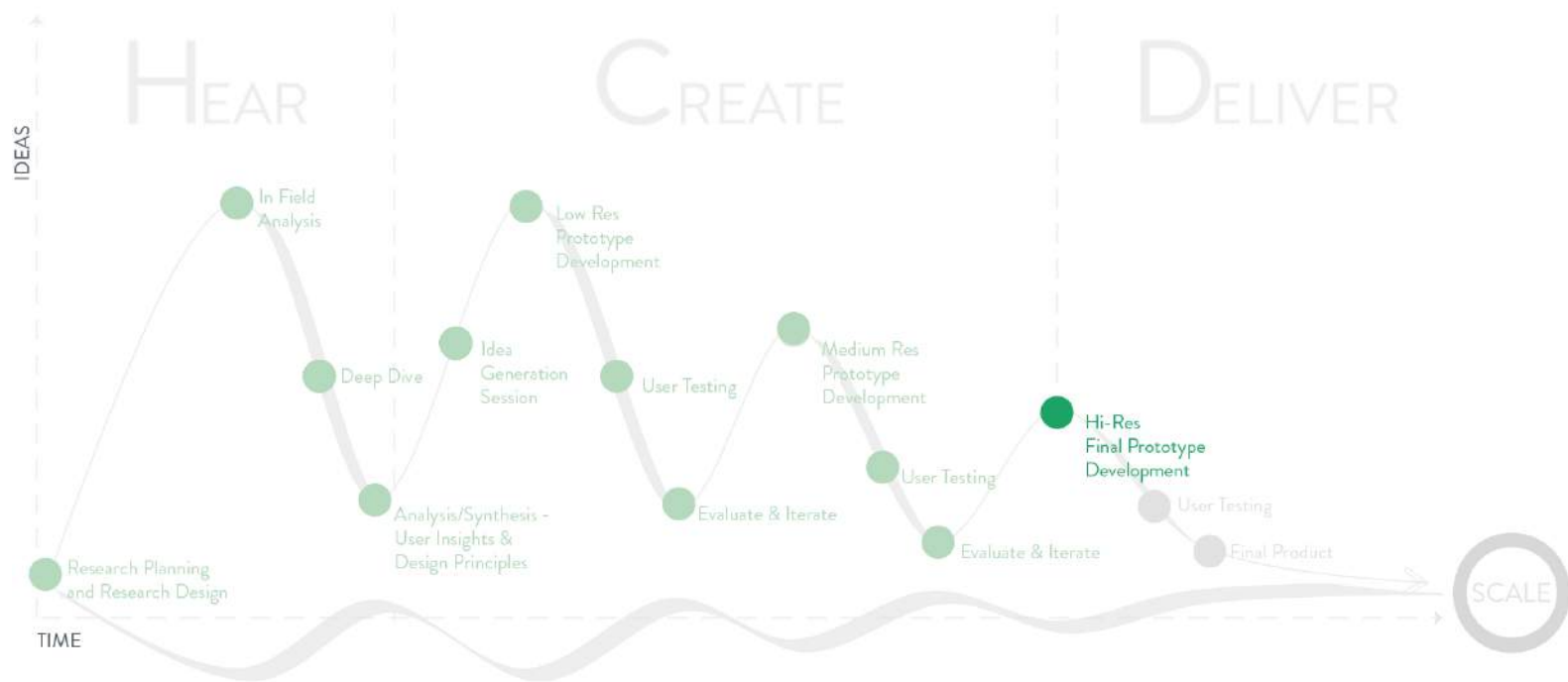
## HI RES PROTOTYPE



## DELIVER

- Space Perception Test
- High Resolution Prototype
  - User Testing
  - Users with Special Needs Testing
  - Methods
- Medium Resolution Prototype
  - User Testing
  - Methods
- The Final Product

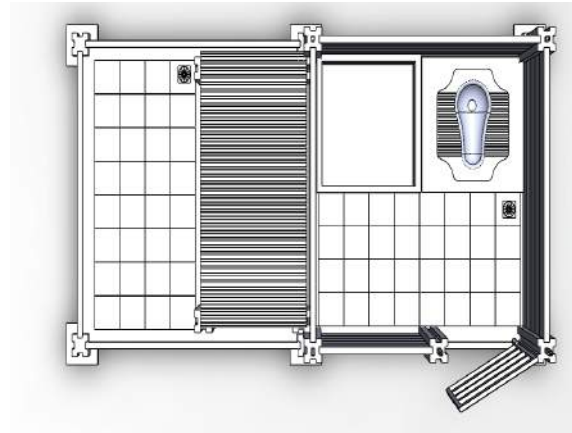
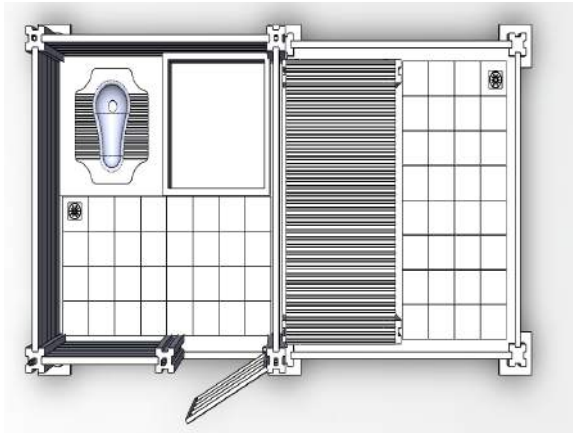
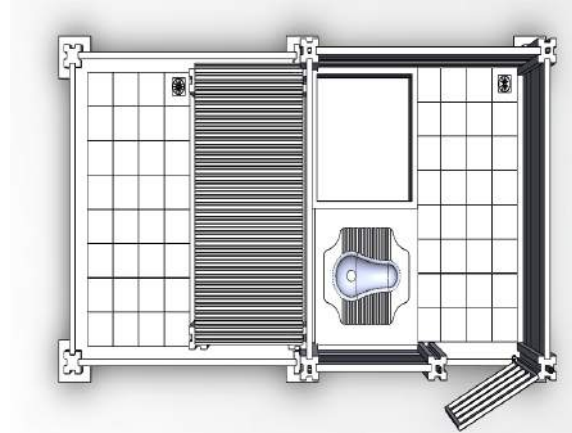
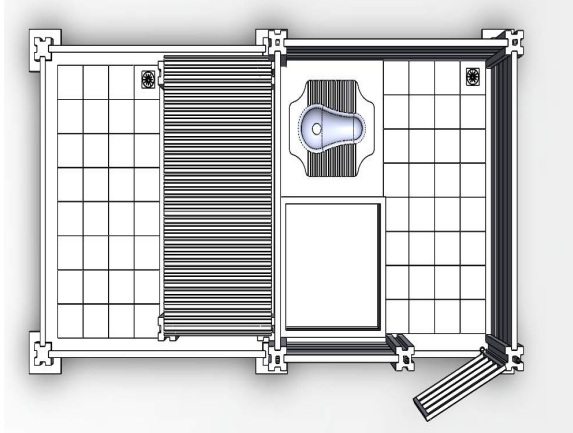
# HI-RES PROTOTYPE



# METHODS & TOOLS

- Quantitative survey using Likert scale to measure:
  - General impression
  - Space perception (big-small)
  - Comfort
  - Privacy
- Those variables were measured after performing 3 tasks: using the underground latrine, having a bath and washing the clothes. They were performed randomly.
- 4 different concepts were tested
- The test was conducted at the inCompass Lab
- 20 end-users came to our prototype and participated in this test

# SPACE PERCEPTION TEST

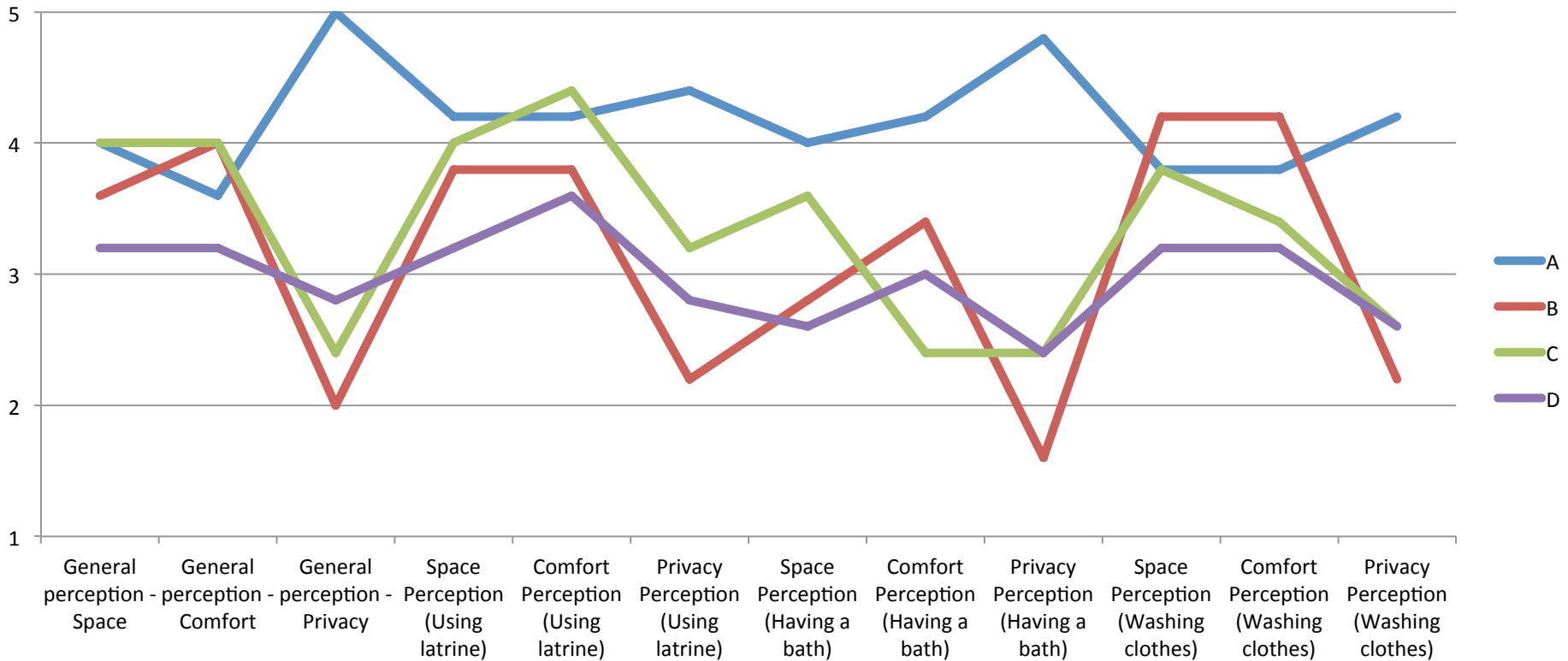




One of our participants from the Shelter Perception Test

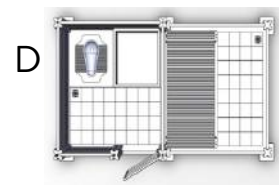
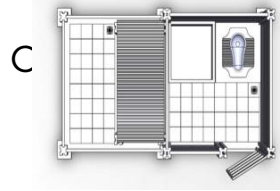
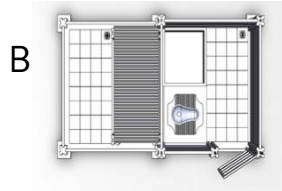
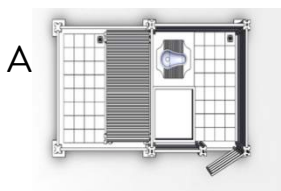
# SPACE PERCEPTION TEST

Four Different Interior Layouts of the Easy Shelter 2.0

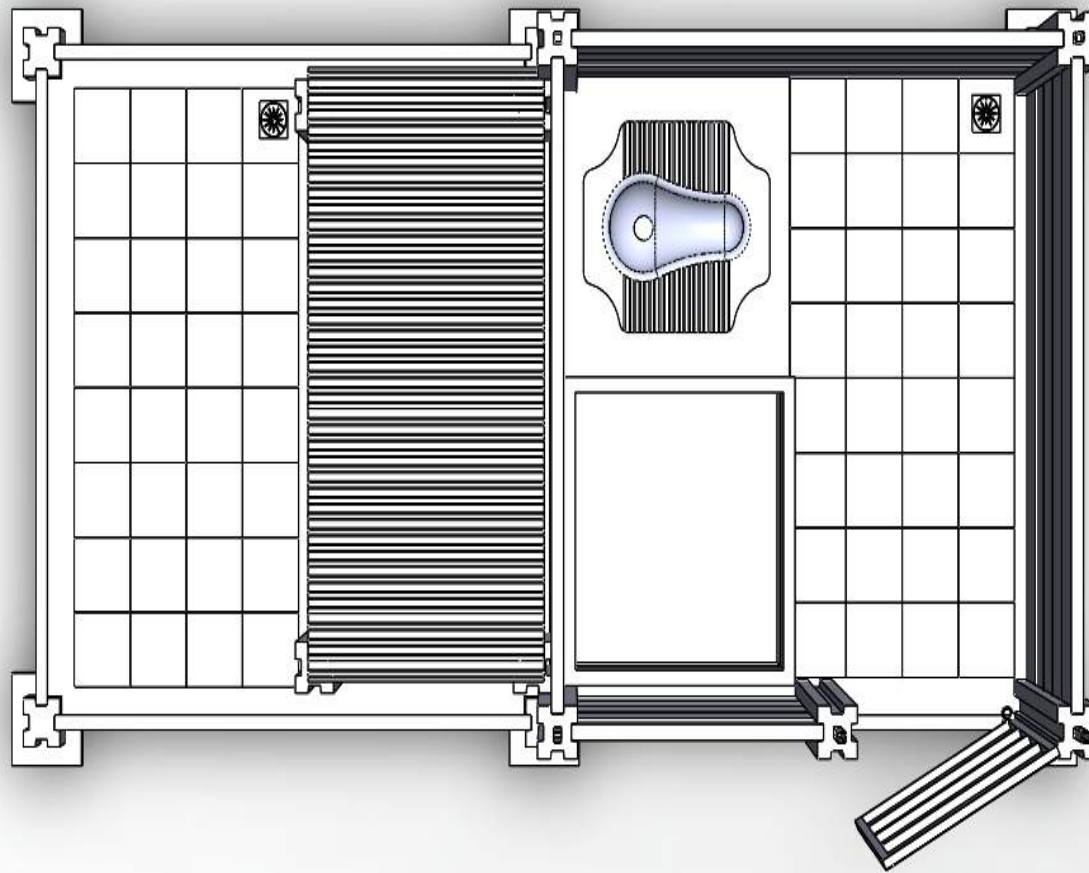


Unit: Mean based on Likert scale from 1 to 5, where 1 is small/short and 5 big/high

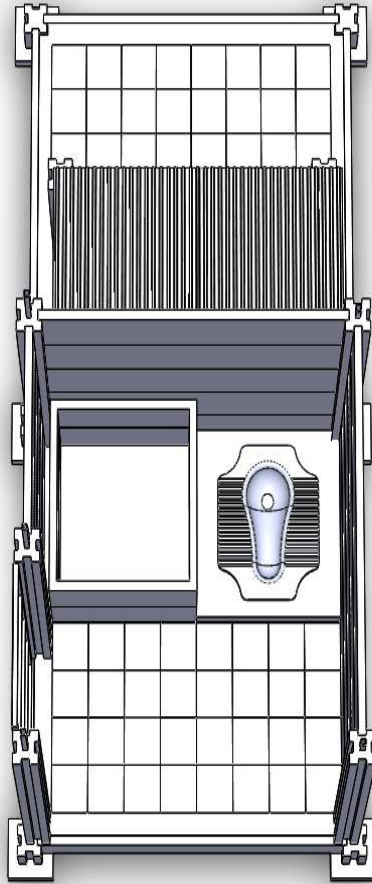
Sample: 20 people



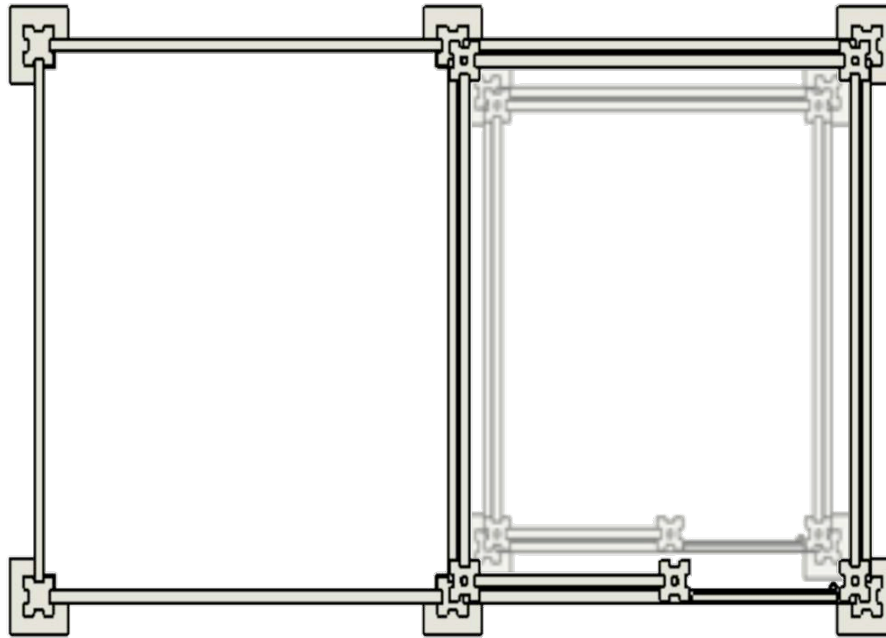
# THE WINNER



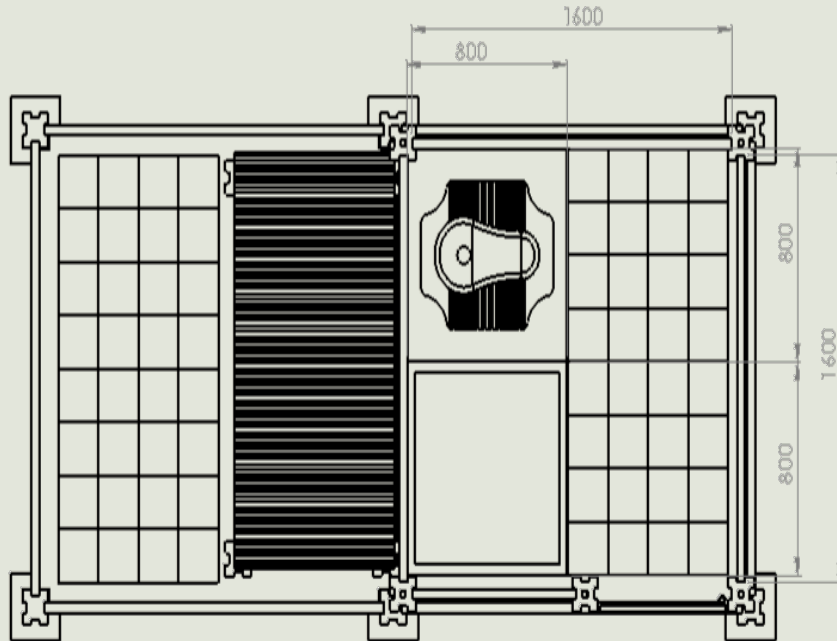
# HI RES PROTOTYPE CONCEPT DEVELOPMENT



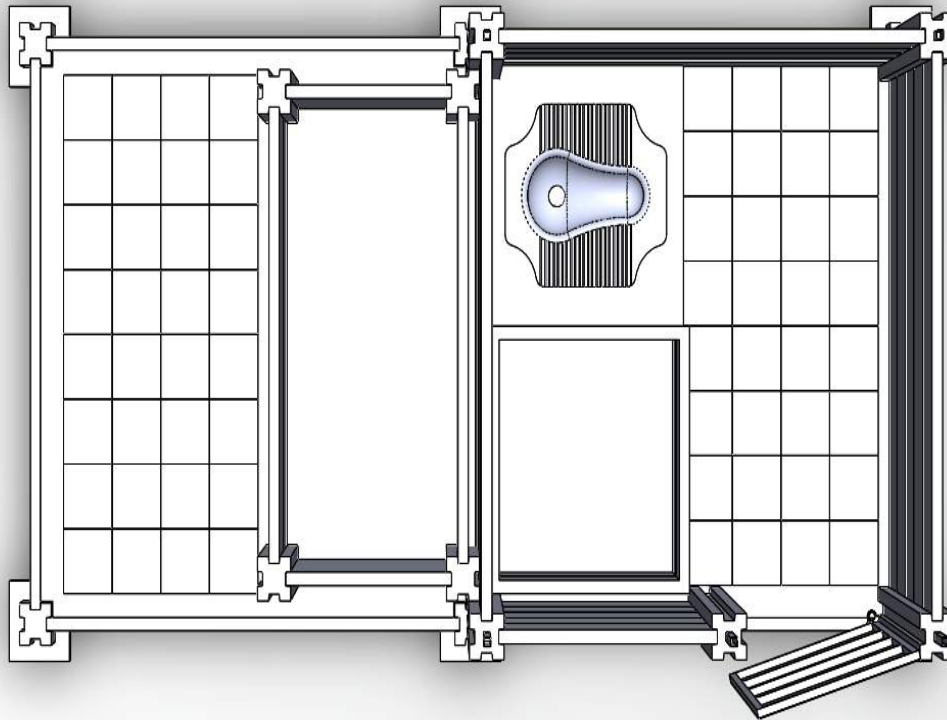
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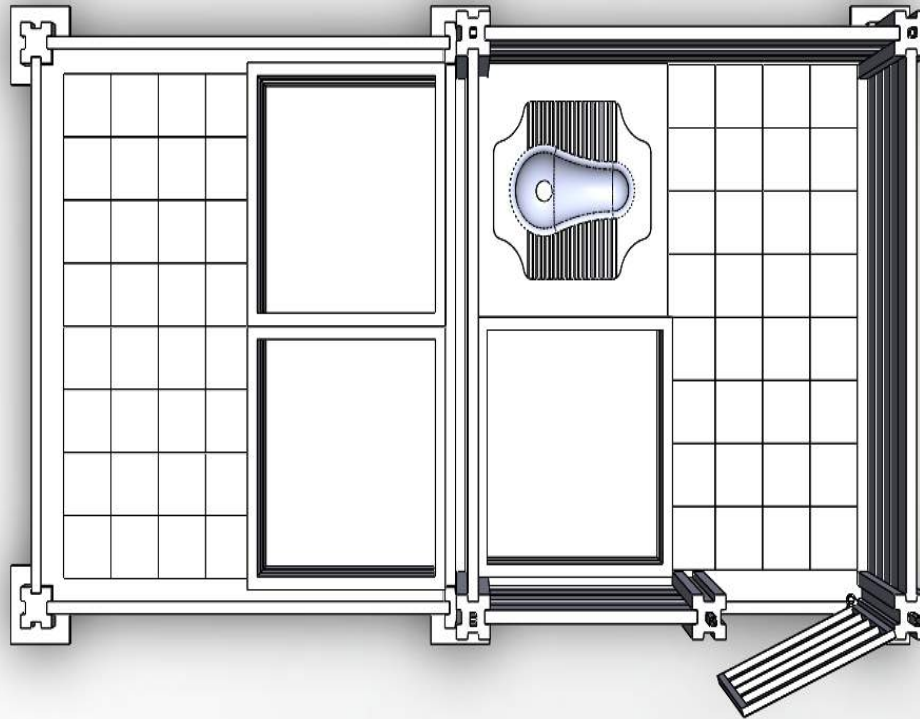
# HI RES PROTOTYPE CONCEPT DEVELOPMENT



## OPTION 1



## OPTION 2



A man wearing a green long-sleeved shirt, black pants, and a light-colored cap is crouched in a dirt trench, using a shovel to dig. A group of children and a woman are gathered around the trench, watching the man work. The children are dressed in casual clothing, and the woman is wearing a pink hat and a pink and white jacket. The background shows a rural landscape with trees, a small hut, and a white car parked nearby. The scene is set in a dry, open field under a clear sky.

## HI RESOLUTION PROTOTYPE FINAL BUILD



## HI RESOLUTION PROTOTYPE FINAL BUILD

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## HI RESOLUTION PROTOTYPE FINAL BUILD

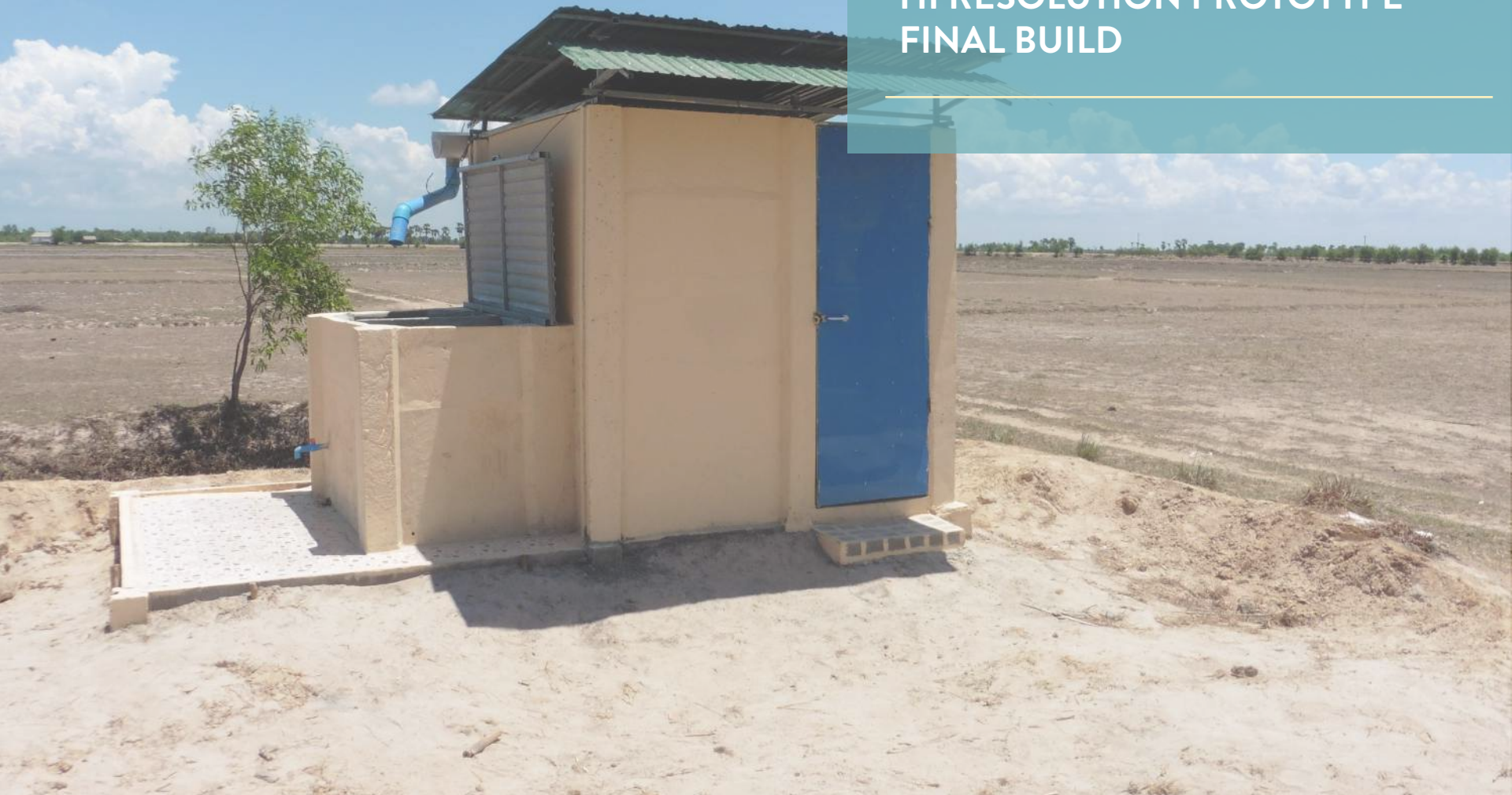
## HI RESOLUTION PROTOTYPE FINAL BUILD



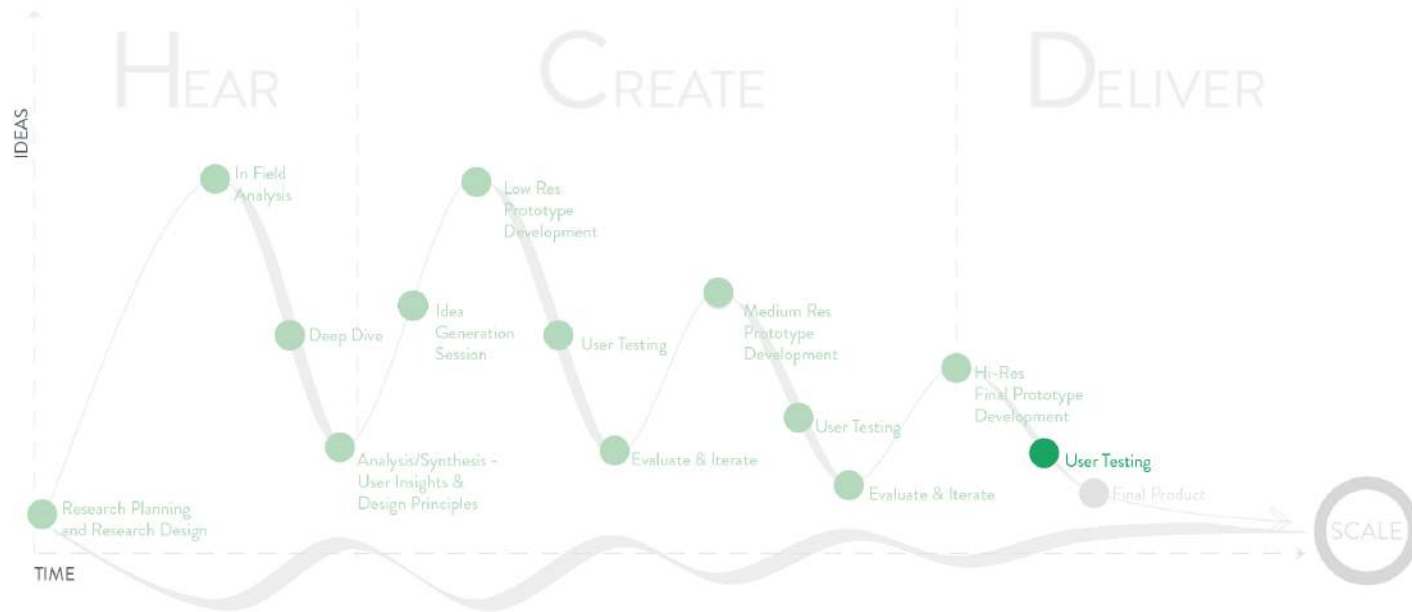
## HI RESOLUTION PROTOTYPE FINAL BUILD



## HI RESOLUTION PROTOTYPE FINAL BUILD




# USER TESTING - HI-RES PROTOTYPE



# USER TESTING METHODS & TOOLS


- 1:1 Interviews to test our Hi resolution prototype
- Task performance
- Observations



THE SPACE INSIDE IS PERCEIVED  
AS 'BIG' FOR ACTIVITIES LIKE  
TAKING A BATH & WASHING  
CLOTHES



THE OUTSIDE BASIN, COVER AND  
RAIN WATER GUTTER WERE THE  
THINGS THAT WERE LIKED THE  
MOST. (OUTSIDE FOUNDATION)

The image shows the interior of a shelter. In the upper left, there is a white ceramic sink set into a wall with green and white geometric tiles. Below the sink is a large, rectangular, dark-colored basin or tub, possibly made of plastic or painted metal, which is partially filled with water. A blue plastic cup is floating in the water. To the left of the basin, a blue and red faucet is visible. The floor is covered with light-colored tiles featuring a pattern of small, dark, irregular shapes. The walls are made of a light-colored, possibly plastered, material.

THE STEP AND THE BIG INSIDE  
BASIN WERE THE THINGS THAT  
WERE LIKED THE MOST. (INSIDE  
THE SHELTER)



USERS DID NOT FIND THE  
PARTITION IN THE OUTSIDE  
BASIN USEFUL.

A photograph of a man and a young child in a rural, outdoor setting. They are looking at several lanterns that are placed on a white, corrugated metal surface, possibly a roof or a table. The lanterns are of various colors and designs, including green, yellow, purple, and orange. The background shows a dirt area, some trees, and a simple building. A semi-transparent blue box with white text is overlaid on the right side of the image.

**WARRANTY IS THE MOST  
IMPORTANT FACTOR IN  
CHOOSING A LANTERN.**

A photograph showing a man and a young child looking at several solar-powered lamps. The lamps are placed on a white, corrugated metal surface, likely a roof or a table. The man is wearing a light-colored, long-sleeved shirt and is looking down at the lamps. The child is looking up at the man. In the background, there are trees and a simple building. A semi-transparent blue box with white text is overlaid on the right side of the image.

THE \$20-\$25 RANGE WAS  
'EXPENSIVE' FOR MOST OF THE  
USERS.

# USERS WITH SPECIAL NEEDS TESTING

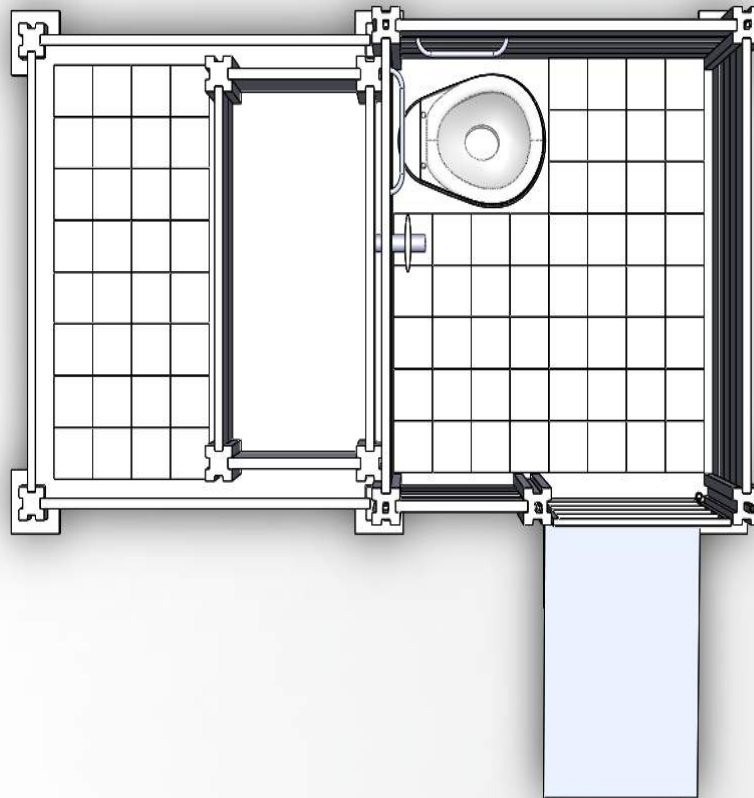


THE WIDTH OF THE DOOR WAS  
FOUND TO BE A BARRIER TO  
ENTER THE TOILET.



A SITTING TYPE PAN WAS  
RECOMMENDED INSTEAD OF  
THE SQUAT PAN.

## EASY SHELTER 2.0 – EASY ACCESS



# LET'S CHECK OUR DESIGN PRINCIPLES

# THE USER

**01. ACCESS MULTI-FUNCTIONAL  
USE WITHOUT FEELING THE  
NEED TO TRADE-OFF WITH THE  
PAIN OF REFILLING.**



✓ 01. ACCESS MULTI-FUNCTIONAL  
USE WITHOUT FEELING THE  
NEED TO TRADE-OFF WITH THE  
PAIN OF REFILLING.





**02. ENABLE A MULTI-  
FUNCTIONAL EXPERIENCE  
WITHOUT INTERRUPTED ACCESS  
TO WATER.**



✓ 02. ENABLE A MULTI-FUNCTIONAL EXPERIENCE WITHOUT INTERRUPTED ACCESS TO WATER.



03. HAVE A SPACE THAT  
ENABLES BOTH PRIVACY AND  
EMOTIONAL TRANSFORMATION.



✓ 03. HAVE A SPACE THAT  
ENABLES BOTH PRIVACY AND  
EMOTIONAL TRANSFORMATION.



04. HAVE A SPACE THAT  
CAN BE USED BY MULTIPLE  
PEOPLE WITHOUT  
COMPROMISING PRIVACY.



✓ 04. HAVE A SPACE THAT  
CAN BE USED BY MULTIPLE  
PEOPLE WITHOUT  
COMPROMISING PRIVACY.



05. AVOID CHOOSING BETWEEN WATER THAT'S "CONVENIENTLY CLOSE" AND "APPROPRIATELY CLEAN".



✓ 05. AVOID CHOOSING BETWEEN WATER THAT'S "CONVENIENTLY CLOSE" AND "APPROPRIATELY CLEAN".



06. HAVE 'CLEAN-LOOKING'  
WATER FOR LONGER.



✓ 06. HAVE 'CLEAN-LOOKING' WATER FOR LONGER.





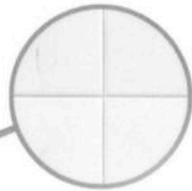
**07. BUY AND ACT ON THE  
POSSIBILITY OF ADDING-ON TO  
THE SHELTER IN THE FUTURE.**



✓ 07. BUY AND ACT ON THE POSSIBILITY OF ADDING-ON TO THE SHELTER IN THE FUTURE.

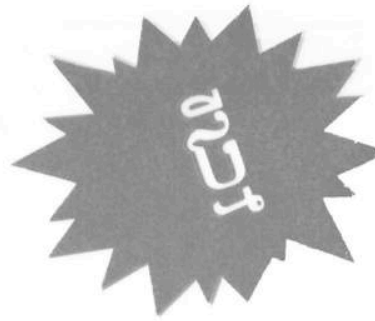
## 08. NOT BE DISAPPOINTED BY UNMET PRE-PURCHASE EXPECTATIONS.

សេវាកម្មកែលម្អផ្ទះដោយឥតគិតថ្លៃ



ថោកជាង

25%



✓ 08. NOT BE DISAPPOINTED BY UNMET PRE-PURCHASE EXPECTATIONS.



ថោកជាង  
**25%**





09. GET A 'BEAUTIFUL, READY-TO-USE SHELTER THAT REQUIRES NO FURTHER EFFORT AND MONEY.

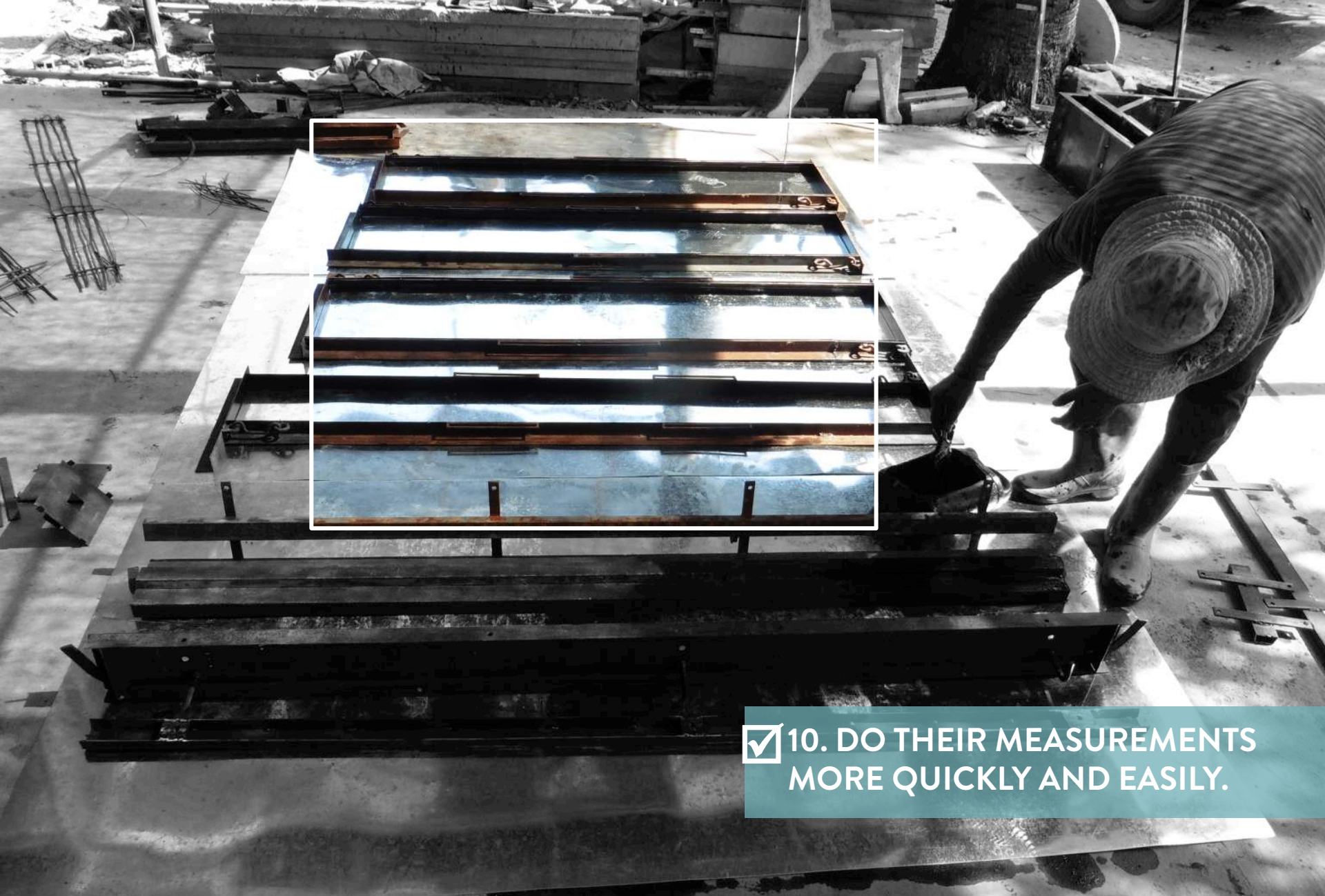


✓ 09. GET A 'BEAUTIFUL, READY-TO-USE SHELTER THAT REQUIRES NO FURTHER EFFORT AND MONEY.

# THE LBO



10. DO THEIR MEASUREMENTS  
MORE QUICKLY AND EASILY.



✓ 10. DO THEIR MEASUREMENTS  
MORE QUICKLY AND EASILY.



**11. BE FREED FROM PERSONAL  
OVERSIGHT AND CONSTRUCTION  
OF THE SHELTER.**



✓ 11. BE FREED FROM PERSONAL  
OVERSIGHT AND CONSTRUCTION  
OF THE SHELTER.



**12. MINIMISE OR AVOID THE USE  
OF SKILLED PRODUCTION  
LABOUR.**



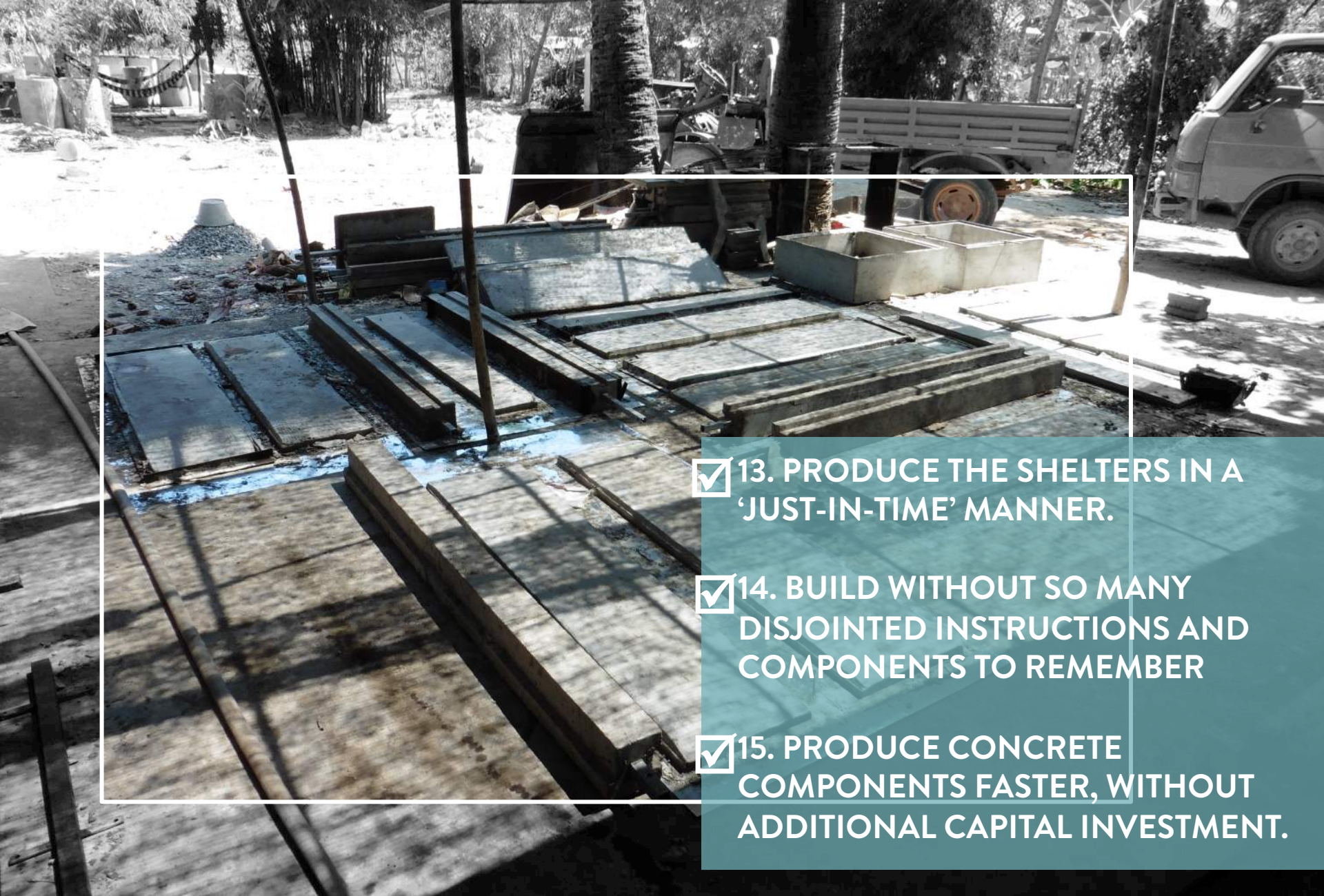
**12. MINIMISE OR AVOID THE USE  
OF SKILLED PRODUCTION  
LABOUR.**



**13. PRODUCE THE SHELTERS IN A  
'JUST-IN-TIME' MANNER.**

**14. BUILD WITHOUT SO MANY  
DISJOINTED INSTRUCTIONS AND  
COMPONENTS TO REMEMBER.**

**15. PRODUCE CONCRETE  
COMPONENTS FASTER, WITHOUT  
ADDITIONAL CAPITAL INVESTMENT.**



- ✓ 13. PRODUCE THE SHELTERS IN A 'JUST-IN-TIME' MANNER.
- ✓ 14. BUILD WITHOUT SO MANY DISJOINTED INSTRUCTIONS AND COMPONENTS TO REMEMBER
- ✓ 15. PRODUCE CONCRETE COMPONENTS FASTER, WITHOUT ADDITIONAL CAPITAL INVESTMENT.



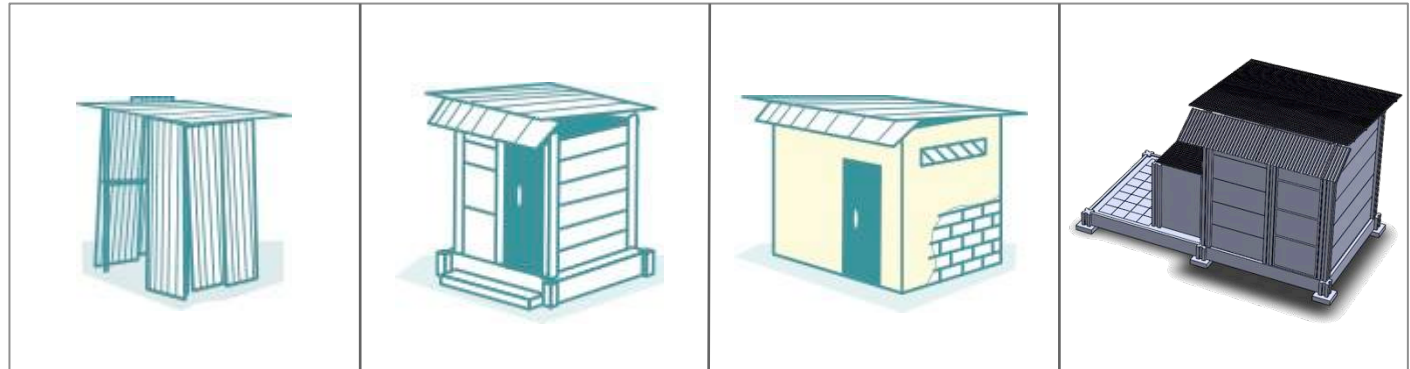
16. USE EQUIPMENT THAT CAN  
WITHSTAND ROUGH-  
HANDLING.



✓ 16. USE EQUIPMENT THAT CAN WITHSTAND ROUGH-HANDLING.

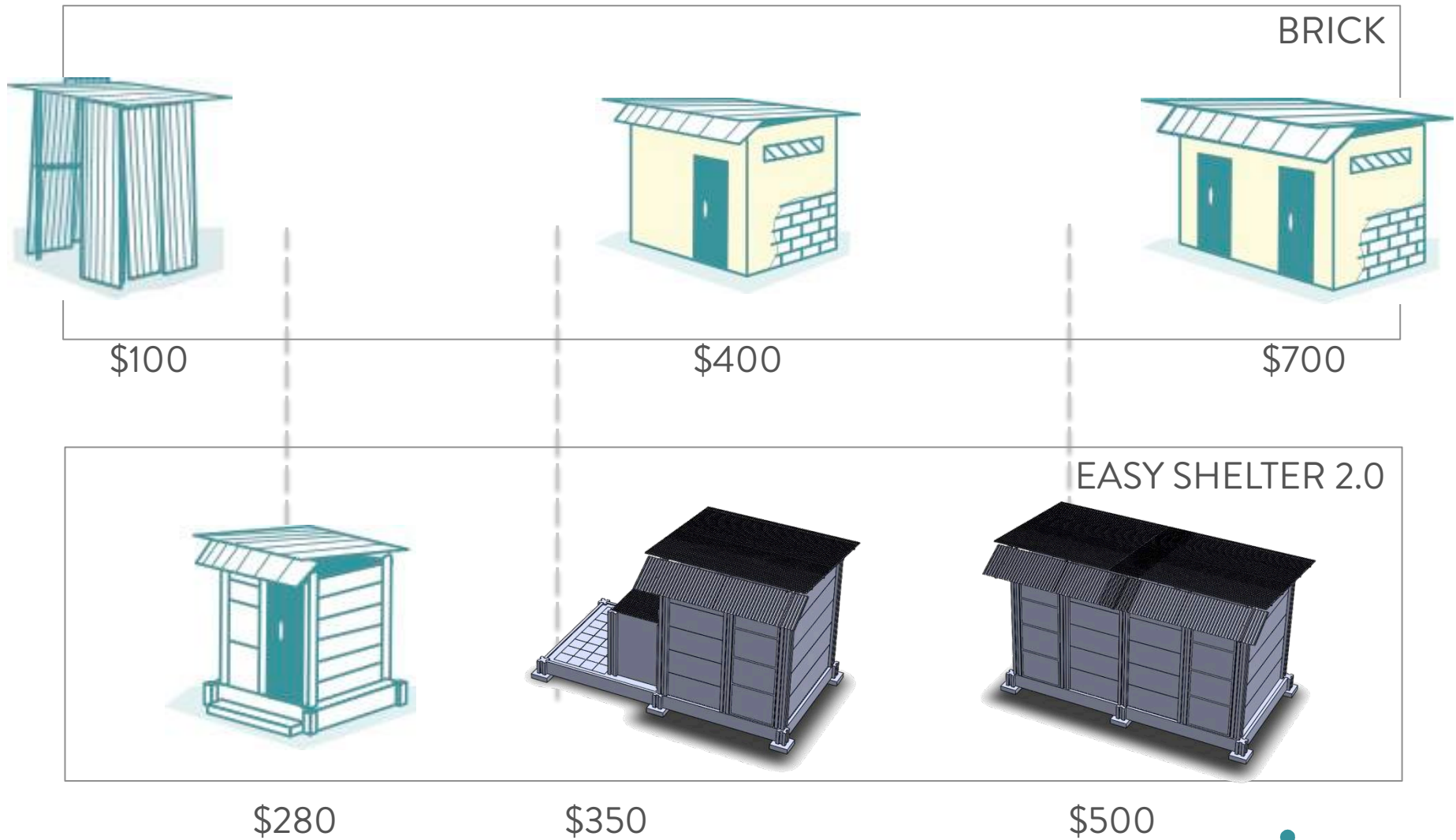
# SHELTER OVERVIEW:

[FUNCTIONALITY OF MAJOR SHELTERS EXISTING IN THE MARKET]

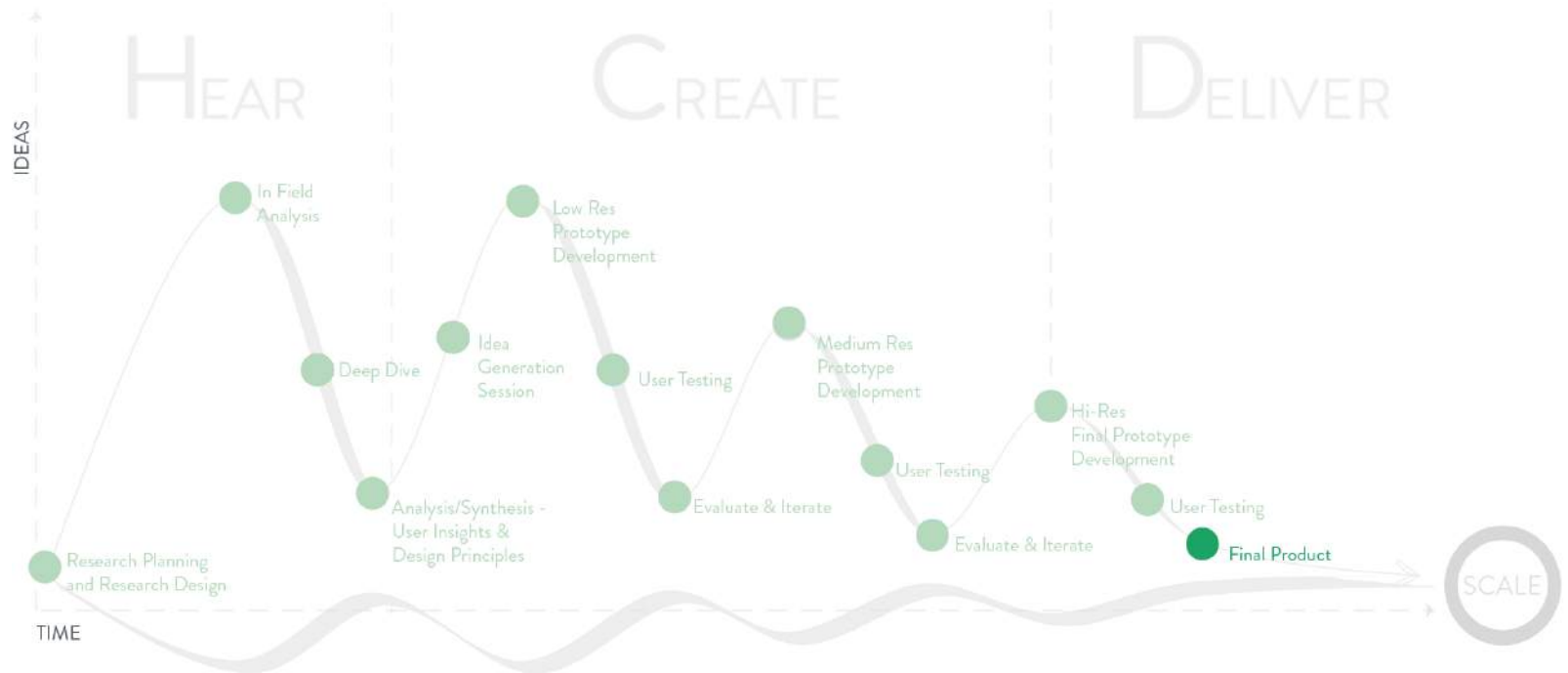


FUNCTIONALITY	Only for defecating	Primarily for defecating	Multi-Functional	Multi-Functional
OCCUPANTS	One	One	One	2+
PRIVACY	Minimal	Only for 1 person	Only for 1 person	Separate bathing/ toilet areas
BASIN	None	1, limited size	Large basin/multiple	Large basin outside and inside
PRIMARY BLOCK	Temporary Materials	Not Expandable	Does not allow simultaneous usage	None
USER PERCEPTION	Temporary	Unfinished and limited functionality	Ready-to-use	Ready-to-use, Good Value for Money

# SHELTER PRICE SPECTRUM



# FINAL PRODUCT



# SUMMARY

Before HCD



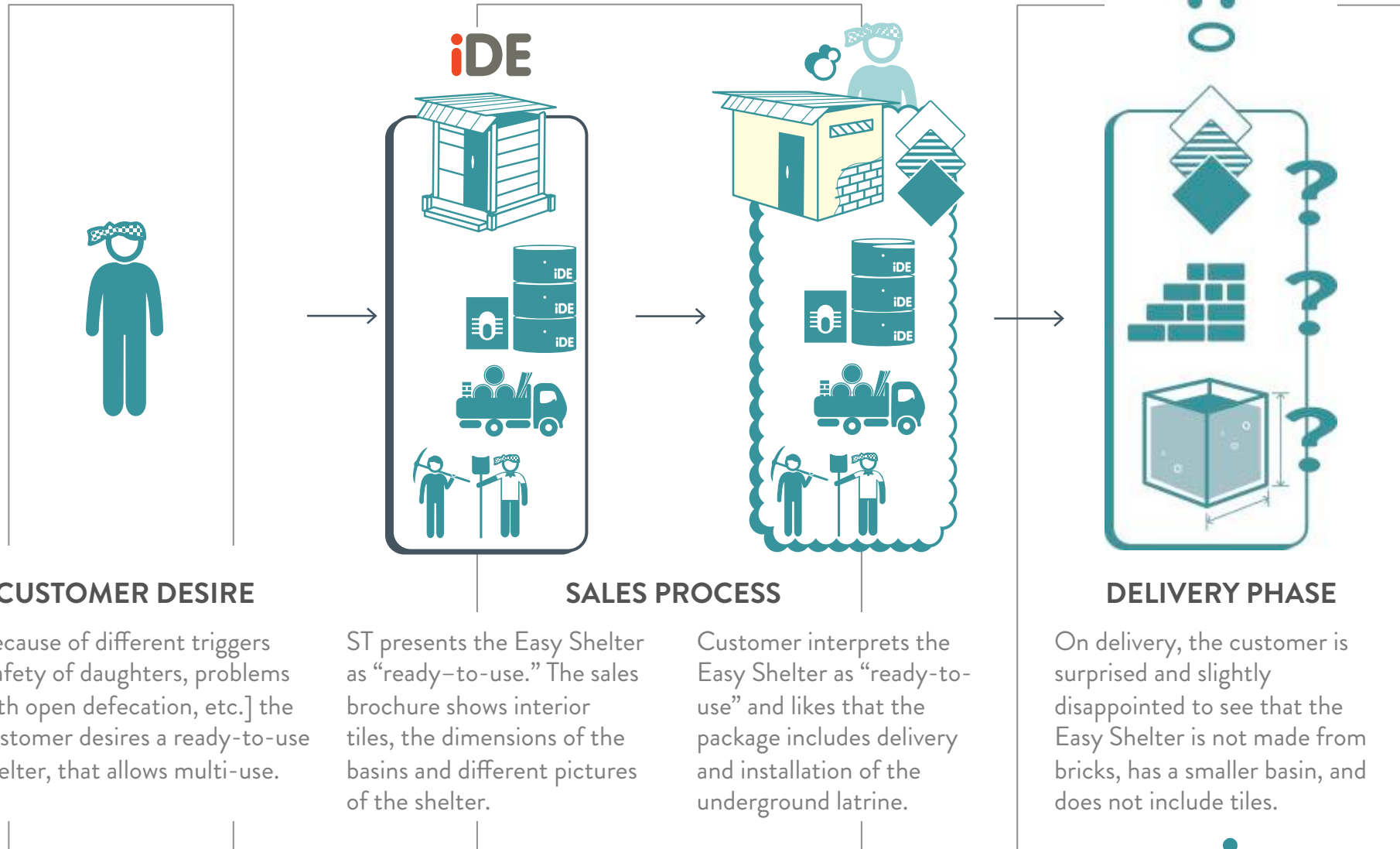
After HCD



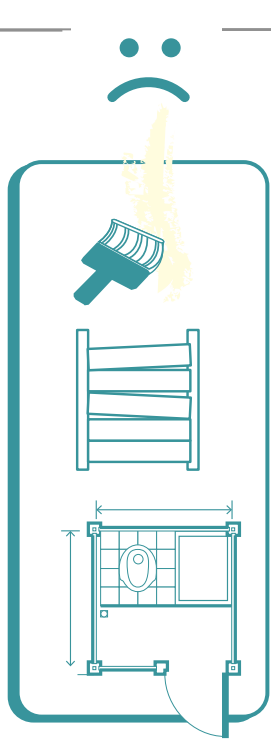
	EASY SHELTER	EASY SHELTER 2.0
DIMENSIONS	1.4m x 1.4m	1.6m x 1.6m each (Two Foundations)
CAPACITIES	Inside Basin – 150L	Inside Basin – 311 L Outside Basin – 973L
ADDITIONS	NA	Step for Pan, Outside Foundation, Outside Basin w Cover
ACCESSORIES	NA	Rainwater Gutter, Light
TIME FOR INSTALLATION	1 Day	1.5 Days
UPGRADEABLE	NO	YES
PRICE	\$280	\$350

# EASY SHELTER 2.0 SALES RECOMMENDATIONS

# CUSTOMER'S DISAPPOINTMENT JOURNEY

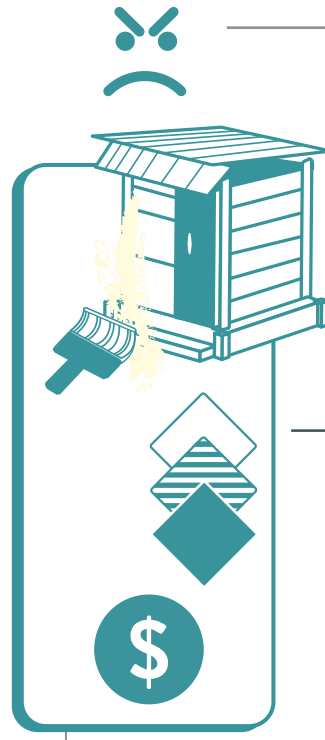


# CUSTOMER'S DISAPPOINTMENT JOURNEY



## INSTALLATION

At installation, customer is very disappointed to find that no tiles are added, the size is smaller than stated, the walls are unpainted, and that the seams are highly visible.



## FIXING PHASE

Once installation finishes, the customer must pay extra for getting the shelter "ready-to-use." The customer requires additional savings, time, effort, and cost to add the tiles and paint originally implied in the sales presentation.



## CANCELLATIONS

The disappointment leads to growing chain-reaction of negative feelings leading to multiple, immediate cancellations throughout the village.



The ST wants to ensure that he/she sells at least one product within the iDE WASH product portfolio. ST's actively push the underground latrine to ensure they get the commission from this product. They do not push the sales of the shelter because it is a much more difficult sell.

#### Recommendations for Easy Shelter 2.0:

1. The shelter target should not be the same as the underground latrine. The new shelter should be sold primarily to:
  - Users who have already purchased the underground latrine.
  - Users with a permanent structure who do not have an underground latrine yet.
2. When trying to sell the underground latrine, the ST often emphasises that the user can buy the underground latrine and build a shelter independently at their leisure. WASH ST's should avoid saying this as it is harmful to future Easy Shelter 2.0 sales.



3. The ST should sell the idea that the Easy Shelter 2.0 is a turn-key sanitation solution. Which includes: the underground latrine, concrete shelter, tiles, paint, delivery and installation. Another key selling point is that the Easy Shelter 2.0 can be used by multiple people at once while guaranteeing privacy.
4. The ST should show the add-on option of additional walls to create a two-room shelter from the Easy Shelter 2.0. Emphasizing the price of only \$150.00 to update. This product add-on should be included in the sales material/ collateral.
5. The Easy Shelter 2.0 should be sold on formal credit or payment plans (6-7 payments of \$50). A pricing and payment option leave-behind should be left with the customer.
6. The Easy Shelter 2.0 sales brochure should include additional photos of new current design including dimensions/proportions and photos of the exact materials (tiles, cement/rock, steel, etc.)



7. The Easy Shelter 2.0 sales brochure should include the product pricing spectrum. It should be explained that the two models of Easy Shelter 2.0, Easy Shelter 2.0 + add-on functional equally and offer the same opportunities as brick shelters but are less expensive.
8. The Easy Shelter 2.0 sales brochure should include a page with six small images (as found in the current brochure) which depicting the **disadvantages** of having an underground latrine paired with a non-permanent shelter:
  - Smell goes to their neighbours.
  - Only one person can use it at a time.
  - Lack of water in a non-permanent shelter for washing themselves after use and before eating.
  - Pain of refilling the bucket constantly.
  - It is not a turn-key solution (no tiles, no paint, etc.) .
  - No light.



9. The Easy Shelter 2.0 sales brochure should include a page with eight small images depicting the **advantages** of purchasing the new Easy Shelter 2.0:
  - It is a turn-key product includes all materials including: underground latrine, concrete walls, tiles, paint, delivery and installation.
  - Two to three members of a household can use the Easy Shelter 2.0 simultaneously.
  - Activities that can be preformed inside the shelter and outside the shelter as washing clothes on the floor, washing the dishes, bathing, bathing children, etc.
  - The large capacity of the outside basin significantly reduces the effort of refilling the inside basin.
  - There is now a large quantity of water within the Easy Shelter 2.0.
  - The new dimensions of the Easy Shelter 2.0.
10. For group sales, the ST should invite participants to a household that has already purchased the Easy Shelter 2.0. The village chief should be there too as an important influencer.

# TECHNICAL SPECIFICATIONS - COST & OTHER CALCULATIONS

# AMOUNT OF RAINWATER COLLECTED

Calculations for the amount of water collected by the Rainwater gutter

Annual average rainfall in Cambodia: 1000mm - 1500mm (39.4in – 59.1in)

Size of the shelter roof: 2000mm x 2000mm (78.74in x 78.74in)  
6.56ft x 6.56ft = 43 sq. ft.

Average rainfall: 49.25in  
43sq. ft. x 0.623(conversion factor) = 26.80 gallons  
26.80 x 49.25 = 1320.38 gallons ~ 4996 liters

Run off percentage – 0.9  
4996 x 0.9 = **4496.4 liters**

-----

Minimum amount of C.S of the pipe – 1cm<sup>2</sup> of gutter C.S / 1 m<sup>2</sup> of roof area  
Roof area – 2 x 2 = 4 sq. m  
Minimum C.S of the gutter pipe – 4 cm<sup>2</sup>

# AMOUNT OF WATER IN THE BASIN

Calculations for the amount of water in the basin

Outside Basin (Option 1):

1000mm x 700mm x 1390mm

**973 liters**

Outside Basin (Option 2):

900mmx720mmx720mm

466 liters

466 liters x 2 = **933 liters**

Inside Basin:

600mm x 720mm x 720mm

**311 liters**

# PRESSURE CALCULATIONS

Pressure Calculations for the Outside basin walls

Considering an outside basin of 1.2m x 0.6m x 0.6m

Force on the wall:

$$F_{\text{wall}} = \frac{1}{2} (\rho) \times g \times w \times h^2$$

$$\frac{1}{2} \times 1000 \text{ kg/m}^3 \times 9.8 \text{ m/s}^2 \times 1.2\text{m} \times 0.6\text{m} \times 0.6\text{m}$$

$$2116.8 \text{ m kg/s}^2$$

**2117N**

-----  
Force on the base:

Mass of water in a basin of 1.2m x 0.6m x 0.6m = Density/Volume

$$1000\text{kg/m}^3 / 0.432\text{m}^3$$

$$432\text{kg}$$

$$F_{\text{base}} = m \times g$$

$$432\text{kg} \times 9.8\text{m/s}^2$$

$$4233.6 \text{ m kg/s}^2$$

**4234N**

# COST CALCULATIONS

## Cost Estimate for the EZ Shelter 2.0

size: 1.6m\*1.6m\*H1.80m

No.	Description	Material	Material Cost	Volumn (m^3)	Unit Measure	Units Req.	Total # Unit req.	Cost/unit (Riel)	Cost (Riel)	Cost (USD)
<b>I. Concrete and Reinforcement bar inputs for Foundation 1</b>									90,948	22.74
	<b>Footing (plinth)</b> size: 0.25m*0.25m*H0.07m	Cement	406	1.28	kg	1	4	521	2,082	0.52
		Sand	22	3.66	kg	1	4	81	322	0.08
		Gravel	78	1.83	kg	1	4	143	571	0.14
		Bar Diameter	-	-	kg	-	-	-	-	-
	<b>Column</b> size: 0.13m*0.13m*H0.22m	Cement	406	0.95	kg	1	4	384	1,535	0.38
		Sand	22	2.70	kg	1	4	59	238	0.06
		Gravel	78	1.35	kg	1	4	105	421	0.11
		Bar Diameter	-	0kg	-	0	0	-	-	-
	<b>Retaining wall</b> size: 1.7m*H0.2m*th0.04m	Cement	406	4.41	kg	1	4	1,790	7,162	1.79
		Sand	22	12.60	kg	1	4	277	1,109	0.28
		Gravel	78	6.30	kg	1	4	491	1,966	0.49
		Bar Diameter	3,000	2.17	kg	1	4	6,510	26,040	6.51
	Prevent collapse of retaining walls by using brick and concrete	Hollow Brick	200	24	Pcs	1	4	4,800	19,200	4.80
	Prevent collapse of retaining walls by using brick and concrete	Cement	406	3.78	kg	1	4	1,535	6,139	1.53
		Sand	22	10.80	kg	1	4	238	950	0.24
		Gravel	78	5.40	kg	1	4	421	1,685	0.42
		Bar Diameter	-	0kg	-	0	0	-	-	-
	Fill the foundation with	Soil or Sand	40,620	0.53m3	-	1	1	21,529	21,529	5.38
<b>II. Concrete and Reinforcement bar inputs for Foundation 2</b>									81,953	20.49
	<b>Footing (plinth)</b> size: 0.25m*0.25m*H0.07m	Cement	406	1.28	kg	1	2	521	1,041	0.26
		Sand	22	3.66	kg	1	2	81	161	0.04
		Gravel	78	1.83	kg	1	2	143	286	0.07
		Bar Diameter	-	-	kg	-	-	-	-	-
	<b>Column</b> size: 0.13m*0.13m*H0.22m	Cement	406	0.95	kg	1	3	384	1,151	0.29
		Sand	22	2.70	kg	1	3	59	178	0.04
		Gravel	78	1.35	kg	1	3	105	316	0.08
		Bar Diameter	-	0kg	-	0	0	-	-	-
	<b>Retaining wall</b> size: 1.7m*H0.2m*th0.04m	Cement	406	4.41	kg	1	3	1,790	5,371	1.34
		Sand	22	12.60	kg	1	3	277	832	0.21
		Gravel	78	6.30	kg	1	3	491	1,474	0.37
		Bar Diameter	3,000	2.07kg	kg	1	4	6,210	24,840	6.21
	Prevent collapse of retaining walls by using brick and concrete	Hollow Brick	200	20	Pcs	1	4	4,000	16,000	4.00
	Prevent collapse of retaining walls by using brick and concrete	Cement	406	3.78	kg	1	4	1,535	6,139	1.53
		Sand	22	10.80	kg	1	4	238	950	0.24
		Gravel	78	5.40	kg	1	4	421	1,685	0.42
		Bar Diameter	-	0kg	-	0	0	-	-	-
	Fill the foundation with	Soil or Sand	40,620	0.53m3	-	1	1	21,529	21,529	5.38
<b>III. Concrete and Reinforcement bar inputs for Shelter Structure</b>									149,871	37.47
	<b>Column</b> size: 0.13m*0.13m*H1.80m	Cement	406	8.62	kg	1	5	3,499	17,495	4.37
		Sand	22	24.62	kg	1	5	542	2,709	0.68
		Gravel	78	12.31	kg	1	5	960	4,802	1.20
		Bar Diameter	3,000	0.389kg	kg	1	5	1,167	5,835	1.46
	<b>Front wall</b> size: 0.82m*H0.36m*th0.04m	Cement	406	3.78	kg	1	5	1,535	7,673	1.92
		Sand	22	10.80	kg	1	5	238	1,188	0.30
		Gravel	78	5.40	kg	1	5	421	2,106	0.53
		Bar Diameter	3,000	0.48m	m	1	5	1,440	7,200	1.80
	<b>Back and 2 sides wall</b> size: 1.6m*H0.36*th0.04m	Cement	406	7.25	kg	1	15	2,941	44,122	11.03
		Sand	22	20.70	kg	1	15	455	6,831	1.71
		Gravel	78	10.35	kg	1	15	807	12,110	3.03
		Bar Diameter	3,000	0.84	kg	1	15	2,520	37,800	9.45

# COST CALCULATIONS

<b>IV. Concrete and Reinforcement bar inputs for Basins</b>										<b>46,758</b>	<b>11.69</b>
<b>Inside Basin</b> size: 0.8m*0.8m*H0.6m	Cement	406	11.34	kg	1	2	4,604	9,208	2.30		
	Sand	22	32.40	kg	1	2	713	1,426	0.36		
	Gravel	78	16.20	kg	1	2	1,264	2,527	0.63		
	Bar Diameter	3,000	0.69	m	1	2	2,073	4,146	1.04		
<b>Outside Basin</b> size: 1.2m*0.65m*H0.9m	Cement	406	36.23	kg	1	1	14,707	14,707	3.68		
	Sand	22	103.50	kg	1	1	2,277	2,277	0.57		
	Gravel	78	51.75	kg	1	1	4,037	4,037	1.01		
	Bar Diameter	3,000	2.81	kg	1	1	8,430	8,430	2.11		
<b>V. Input for Shelter Roof Structure</b>										<b>138,343</b>	<b>34.59</b>
Roof Battens	Cubic steel bar (20mmx20mm)	1,780	N/A	m	2.2	4	3,916	15,664	3.92		
Rafter of the gable of a shelter		1,780	N/A	m	2.2	2	3,916	7,832	1.96		
Batten of the gable roof		1,780	N/A	m	0.6	2	1,068	2,136	0.53		
Common Rafter	Cubic steel bar (25mmx25mm)	3,554	N/A	m	2.2	2	7,819	15,638	3.91		
Steel embedded in the top column (front column)		3,554	N/A	m	0.4	3	1,422	4,265	1.07		
Propping of the gable of a shelter		3,554	N/A	m	0.35	2	1,244	2,488	0.62		
Column Joist Span		3,554	N/A	m	1.85	4	6,575	26,300	6.57		
Steel embedded in the top column (back column)		3,554	N/A	m	0.2	2	711	1,422	0.36		
	Corrugated zinc sheet(0.68m*3m)	12,000	N/A	m	1	4	12,000	48,000	12.00		
	Rivets	50	N/A	m	1	112	50	5,600	1.40		
	Bolts (8mm)	500	N/A	m	1	18	500	9,000	2.25		
<b>VI. Input for Outside Basin Roof Structure</b>										<b>23,351</b>	<b>5.84</b>
	Corrugated zinc sheet(0.68m*2.5m)	12,000		1Pcs	1	1	12,000	12,000	3.00		
	Rivets	50		33Pcs	1	1	1,650	1,650	0.41		
	Cubic steel bar (20mmx20mm)	1,780	5.45	m	1	1	9,701	9,701	2.43		
<b>VII. Input for Finishing work</b>										<b>171,669</b>	<b>42.92</b>
	Door	60,000		1Pcs	1	1	60,000	60,000	15.00		
Tile 20cm*20cm input for Foundation 1	Tile	813	23	Pcs	1	1	18,699	18,699	4.67		
	Cement	406	20.79	kg	1	1	8,441	8,441	2.11		
	Sand	22	89.1	kg	1	1	1,960	1,960	0.49		
Tile 20cm*20cm input for Foundation 2	Tile	813	36		1	1	29,268	29,268	7.32		
	Cement	406	20.79	kg	1	1	8,441	8,441	2.11		
	Sand	22	89.1	kg	1	1	1,960	1,960	0.49		
Floor Drainage input for Foundation 1		2,500		1Pcs	1	1	2,500	2,500	0.63		
Floor Drainage input for Foundation 2		2,500		1Pcs	1	1	2,500	2,500	0.63		
PVC Pipe input for Floor Drainage of Foundation 1		2,000		1m	1	1	2,000	2,000	0.50		
PVC Pipe input for Floor Drainage of Foundation 2		2,000		1m	1	1	2,000	2,000	0.50		
Rain Gutter	Rain Gutter	12,000	2.2	m	1	1	26,400	26,400	6.60		
Connected from rain gutter to the outside basin	PVC Pipe	5,000		1m	1	1.5	5,000	7,500	1.88		
										<b>Total Cost in Riel</b>	<b>702,892</b>
										<b>Total Cost in USD</b>	<b>\$175.72</b>

Labor Fee (Installation)	40\$ (2 laborer x 2 days x \$10)
Labor Fee (Manufacturing)	20\$
Labor Fee (Up/Down Loading)	10\$
Transport	10\$
ST	10\$
<b>Total</b>	<b>90\$</b>

**Total (without margin) 175\$ + 90\$ = 265\$**



TWO MORE EASY SHELTER 2.0 SOLD LAST  
WEEK!  
4997 TO GO..

## THANK YOU!

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