unfuse™



Printing Homes for those displaced by borders.

https://**competitions**.uni.xyz



Img 1: An image showing a group of Rohingya refugees migrating from one place to the next. Source

Premise

The biggest democracy in the world, India, is also quickly becoming the epicentre of one of the biggest refugee crises in the world. Assam, a border state in the nation, owing to its geographical location and shared international frontiers has been facing the brunt of this influx since as far back as 1951.

A National Population Register was put into effect after the 1951 Census of India, and a lengthy battle that the natives fought with authorities and migrants over the eroding identity of the state and limited resources due to large scale migration into the state. In the first draft of the ***updated*** NPR released in September 2019, roughly 1.9 Million people have been excluded owing to wrong names, spellings, unavailability of papers, etc. Even as the region remains in political and social turmoil, the government has sanctioned the construction of atleast 11 more detention camps across the state to house people excluded from the register.



Img 2: An image of the UNHCR camp for refugee rehabilitation, representative of the habitation issues with these settlements. Source

Issue

At present, a majority of the people whose name didn't make it into the draft are housed in camps in existing prisons across the state. Furthermore, the total capacity of the detention camps proposed stands at roughly 14000 people, clearly not enough for the number of people detained. Total projected budget for their construction alone (excluding logistic blocks) estimated at 1000 Crore INR ($140 Million).

Various news sources have reported about in-human living conditions inside camps and prisons, apart from overcrowding and a lack of resources. Fear and depression among detainees is extremely common owing to an uncertain future. Even with the detention camps in place, dignified living for the detainees remains an unattained target. Home ownership remains the primary concern of a number of detainees whose lives were thrown into the whirlwind following the NPR. If they aren't deported, their lives shall still remain at a standstill with virtually no work opportunities to rebuild their lives.



Img 3: The community of 3D printed homes by ICON and NewStory ready for occupation in Tabasco, Mexico. Source

Is a Solution in Sight?

Several nations have gauged into low cost, alternate construction methods to house their growing refugee and desolate population. 3D printing has emerged in that sphere as a dominant technology, a potential solution, that can achieve economy of construction in record time, along with the structures being seismically and thermally resilient.

An inspiring practical application of this was seen in Tabasco, Mexico where an entire 50 house neighbourhood was recently 3D printed, with each house costing as less as $4000, and delivered in less than 24 hours. The community houses the poorest families in Tabasco who earned less than $4-5 per day.

India's Assam and Rohingya situation is being termed only the second biggest humanitarian refugee crisis after Syria in the world. Can the nation too employ this progressive technology to house its detainees?



Can **construction technology** help in the quick and dignified rehabilitation of *some* of these displaced people?

Img 4: A representative image of a wide nozzle concrete 3D printer that was used to print and build an entire fantasy village by Andrey Rudenko. Source



Img 5: A conceptual visualisation of a planned 3D printed colony. Courtesy, ICON Build. Source

Brief

The challenge is to design an assembled accommodation, and thereafter a neighbourhood, to absorb the rising and foreboding crisis in Assam using the principles of 3D printing construction.

When employed in construction, 3D printing allows not only a continuous thermal envelope, high thermal mass, and near zero-waste, but also speedy construction, a much broader design palette, next-level resilience, and the possibility of a quantum leap in affordability.

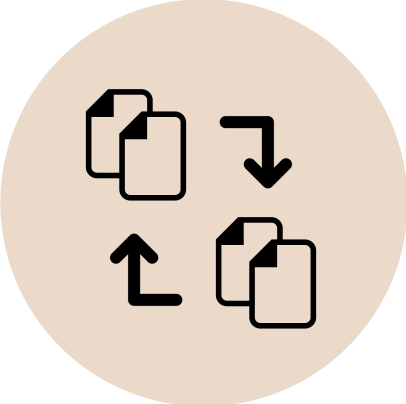
The challenge is to employ the technology to achieve dignifiable residences for the displaced families. Participants must design a **singular modular unit for 3D printing** keeping in mind the design objectives. The same unit must then be used to **design an entire neighborhood** comprising of **150 households** on the given site.

However, as with any other technology, 3D printing also has its set of limitations that would pose the *design guidelines* for this challenge.



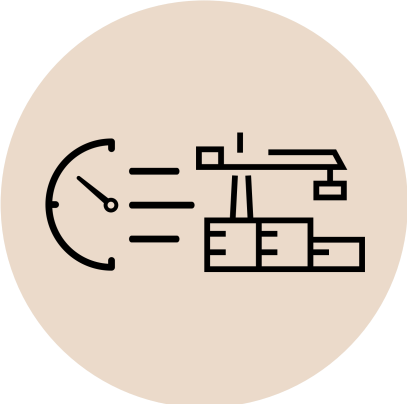
Economy of Construction

The intervention must look to resource and material efficiency to achieve economic construction.



Replicability/Modularity

The design of the unit especially must look to be readily applicable in cases of such crises across the world.



Swift Construction

The intervention must fully utilise the opportunity of speedy construction offered by 3D printing.



Dignity of Living

The design of the unit and neighborhood must look to restore normalcy and dignity for the displaced.

Objectives

The following objectives can be a point of beginning to conceive this design. Participants can assume a rough context from the region's images provided and **a 4 person family** demographic before initiating their design process.

Unit Plan

DESIGN GUIDELINES



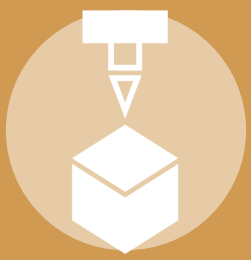
- The residential unit to be 3D Printed has to be **500 sq.ft. in area**, including external and internal wall assemblies.



- Owing to the nature of the printing, the unit's height has to be capped at **11 feet**, roughly **3.3m**. Individual units cannot exceed over a **single storey**.



- Participants need to define the **primary wall assembly** that the unit would be comprised of, both in terms of material and thickness. While the technique of 3D printing can utilise **multiple materials** as well as hybrids of concrete along with binding agents and admixtures, polymers, thermoplastics etc, it needs to be specified.



- Furthermore, the 3D printer nozzle to be employed for these settlements has a **maximum size of 2.5cmX5cm**. This implies that the machine may be able to print only **5cm thick layers** at a given time, and **2.5cm in layer height**. Depending on their design, participants may choose to have a composite wall with cavities or entirely solid comprised of strata.



- The design of the unit must cater to a typical **4 member demographic**.

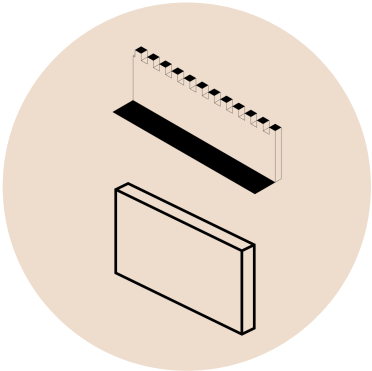


- Unit level water and electricity provision needs to be **conceptually** reflected in unit design.



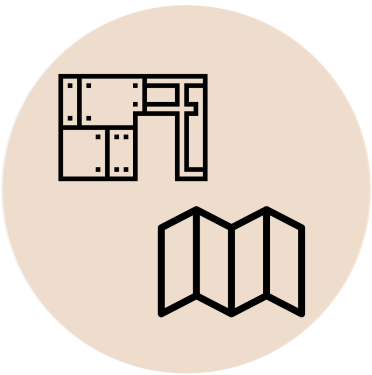
- Participants are completely free to explore, define or assume the **framework and methodology** of how the **3D printing assembly** would be mounted and how it would work (eg: radial, linear, row-wise etc).

Primary Structure
Comprising of walls and the principal elements constituting the outer shell of the unit



55%-60%*

Secondary Structure
Comprising of internal partitions and the roof of the unit



25%-30%*

Tertiary Structure
Comprising of doors, windows and fixtures



10%-15%*

*The given percentages are indicative.

Structural Outline

The above divisions are to be seen as rough guidelines for the **structural constitution** of the house.

Apart from the primary structural constituents, participants have complete control over whether 3D printing is to be employed in the secondary and tertiary components or not. Alternative materials including but not limited to steel, wood, wrought iron, plastic etc may be explored as long as they satisfy design objectives.



Goalpara, Assam, India

Goalpara is an administrative district in Assam, India, located in the state's southwestern region. Situated roughly 150 km west of Guwahati, and to the North of Meghalaya state, it has close proximity to Assam's shared international border with Bangladesh, from where most of the influx of immigrants happens. The region encompasses an extremely fertile belt of land in the floodplains of the Brahmaputra river, and has a semi-hilly terrain. In 2006 the Indian government had named Goalpara one of the country's 250 most backward districts.



Img 6: Set of images to familiarise participants with the context of Matia, Goalpara, Assam, India.

Context

The site for the intervention is located in the town of Matia located within Goalpara. The town lies on the banks of the Brahmaputra river, and has a primary agricultural economy. As with Goalpara, the town too is rich in biodiversity and abundant scenic beauty. The ecological sensitivity of the region and soil type proves to be rich ground for experimentation with 3D Printing technology.

The first and the largest of atleast eleven more detention camps being built right now is in Matia, nearing completion.

Note: It must be borne in mind that even though the intervention is contextualised, participants must look to propose their design with a farsightedness to employ 3D printed homes universally.



Img 1: World in conflict - 18th and 19th Century

Site Plan

Within the 1.6 Ha site, 150 such 3D printed homes/units must be placed to form a fully functional neighbourhood. Provision of greens, circulation and open spaces need to be worked out on the Masterplan Level. Areas for Community Spaces/Facilities, Services, and Admin need to be only earmarked and designated on the master plan simply by way of a boundary. Participants can assume municipal provision of site level services. All units are to be printed/fabricated on site, and part by part prefabrication off site may ***not*** be assumed.

Guidelines

You have to deliver an architectural outcome on the following site, based on the given outlines.

• Recommended number of sheets/presentation images/boards:

5 (Five) of size **[2362px** x **3544px]** or **[400mm x 600mm** in **150 dpi]** in portrait digital format (**JPEG only**).

Minimum 3 (Three) & **No maximum sheet limit.** Each image should be less than **15MB.** (Do not submit PNG format)

Minimum requisite submission are sheets/boards + Cover image containing:

• Site plan (Compulsory)
• Key conceptual sections x 1 (Minimum)
• 3D views x 4
• Cover image / Thumbnail of size 2000px x 1000px or larger in aspect ratio 2:1.
• Answering 6 FAQ's #
• This is the link for new file sizes, here.

#The FAQ's have to be answered as instructed in the FAQ document in the 'additional resources folder'.

Deadlines

Discover the competition schedule and deadlines on the competitions page or on this link - Schedule.

Resources

This competition contains additional resources that contains a set of files useful to complete the competition submission. This folder is made available on your profile dashboard automatically as soon as you register.

This additional resources folder of this competition contains: Submission Format files in PSD | AI | InDD, FAQ Questions, High Res maps, CAD file of the site plan, and reference literature on the process of 3D Printing.

Rules

+ The competitions is open for **students and professionals** from all the disciplines of design.

+ The team limit for this competition is **4 members maximum per team.**

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+ You can register more than one team but they have to be registered separately.

+ Ensure that the final sheets submitted **do not include your name or any other mark of identification**. Your submission is linked to your user account which stands as your identification.

+ This is a design **ideas challenge only.** There is no built commission/realization associated with the problem.

+ In case of publication in yearbook we will reach out separately for selected entries.

Pro-Tips

+ Use exploded views to discuss multi levelled conceptual models better.

+ Mention sheet number on corner of every sheet.

+ Plagiarism of any idea / form / design / image will be disqualified with a notice.

+ All the sheets or images will be viewed on a digital device. **e.g.** Laptop screen or projector. Uploaded sheets or images will not be physically printed for evaluation. The submission hence should be prepared for digital viewing only.

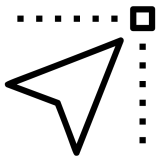
+ Submit JPEG images only. (PNG will not function)



Awards

Grants of up to a total of **14,000$** can be won on this challenge. Learn more about the full conditions on the competition page here.

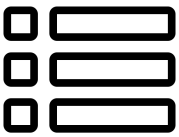
The entries will be judged by an international jury of the competition on the following criterions:



Presentation
The fundamental to a good entry is a good presentation.



Concept/Idea
Quality of thought and intent in pre-design phase.



Spaces/Programme
How the spaces are calculated and ordered.



Design Outcome
The final architectural outcome of the solution.

Judging Criteria

The judging panel can also add other criterions based on their internal discussions - which will be in line with the problem statement. Participants are advised to fulfil above given criterions first in their design.

About

unfuse™

Unfuse serves as a unit for **Uni** in the field of Architecture. It intends to break the fusion of traditional design barriers and methodologies by making it a platform for experimentation and conceptual exchange of ideas in architecture, urbanism, society, culture and ecology. It is a research initiative dedicated to providing opportunities for designers from all domains to explore ideas that go beyond the boundaries of architectural discipline and enrich our built environment; thereby opening up possibilities for promotion of architectural thought at a global level.

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