

DIGI FAB LAB

AN INSIGHT INTO THE PROJECT

A project designed to encourage, like-minded designer to help influence the growth of the surrounding ecology around Bromley. Using digital fabrications as a base project, algae and clay from the river bed beneath the mill will be used as a material for 3D printing. The material being biodegradable will have no negative impact on the environment, rather it is aimed for wildlife to grow within the walls. The site is surrounded by pollution, mainly coming from the roads such as the A12 which runs right around the site. Triggering the idea for wildlife to claim back what once was theirs. This is an opportunity for children to learn and understand the aspects of life, especially as our needs for the future is in their hands. Similar to how nature will reclaim areas around Bromley, the public are encouraged to come visit the site.

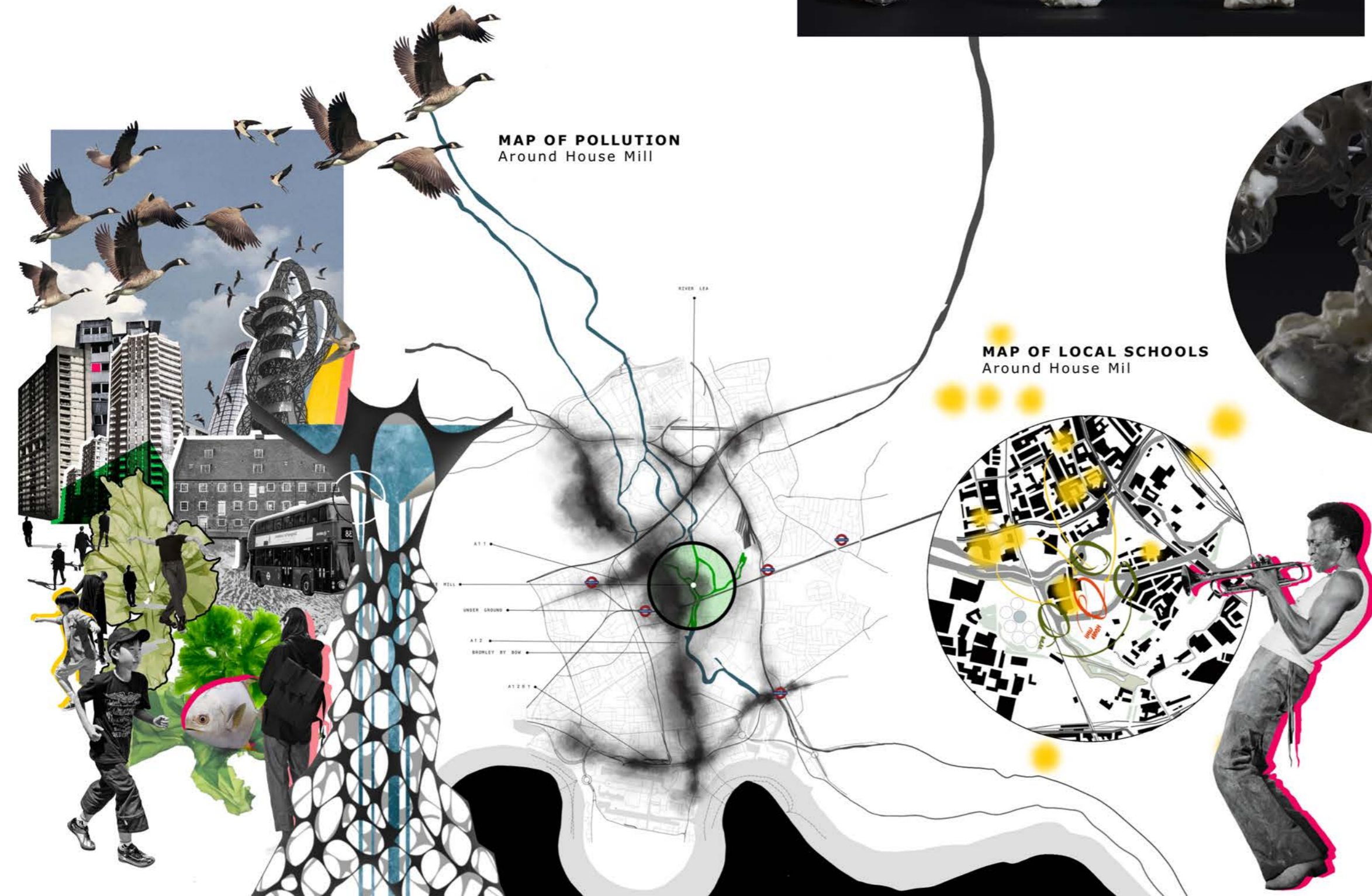
the site includes a research lab dedicated to the production of digital fabrications, algae farms, and a working mill which generates small amounts of electricity. The building uses its own sustainable power hoping that others will follow in their path. The algae farms being accessible to the public to wander round and experience due to the fact that algae takes in CO₂ during photosynthesis and releases fresh air, once again relating back to the pollution around the site. The site will be a place to fresh air and tranquillity in such a busy polluted area, benefiting in physical and mental health.

Megan Leverington



MAP OF POLLUTION
Around House Mill

MAP OF LOCAL SCHOOLS
Around House Mil



MODELING WITH DIGITAL FABRICATION

SUSTAINABLE MATERIAL

The idea of using sustainable materials is becoming more and more frequent in design and architecture. This is because people are becoming more aware of the afterlife of materials. Materials tends to be thrown away in a wasteful demeanour. Creating landfill.

A sustainable materials has three main factors :

1. Where it came from
2. How it was made
3. Where it goes

These factors contribute largely to carbon emissions released into our air and therefore contributing to pollution.

CLAY AND ALGAE MIX BLOCK

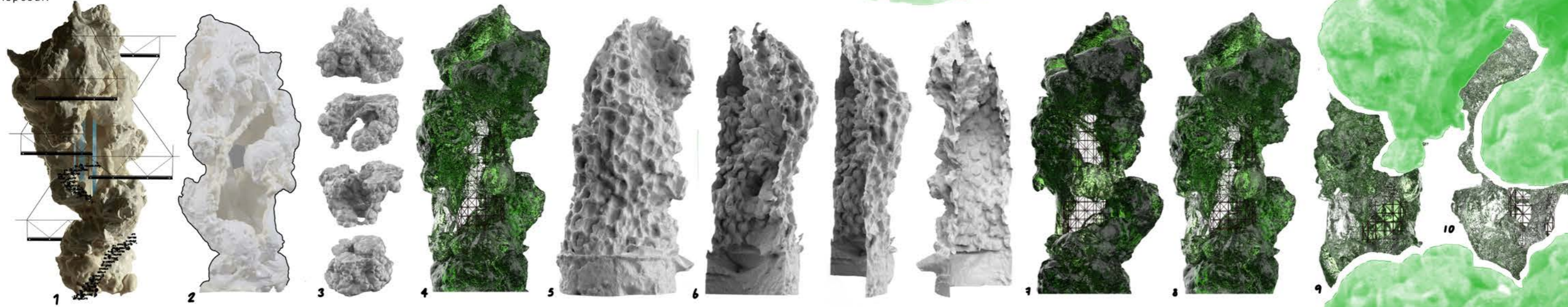
Making materials out of clay and algae reinforces the idea that materials can be made from natural resources. Clay and algae out found on the house mill and can be used for the digital fabrication lab. Research into using these materials for something bigger is likely going to change the course of how we think of design and disposal.

3D SCANNING

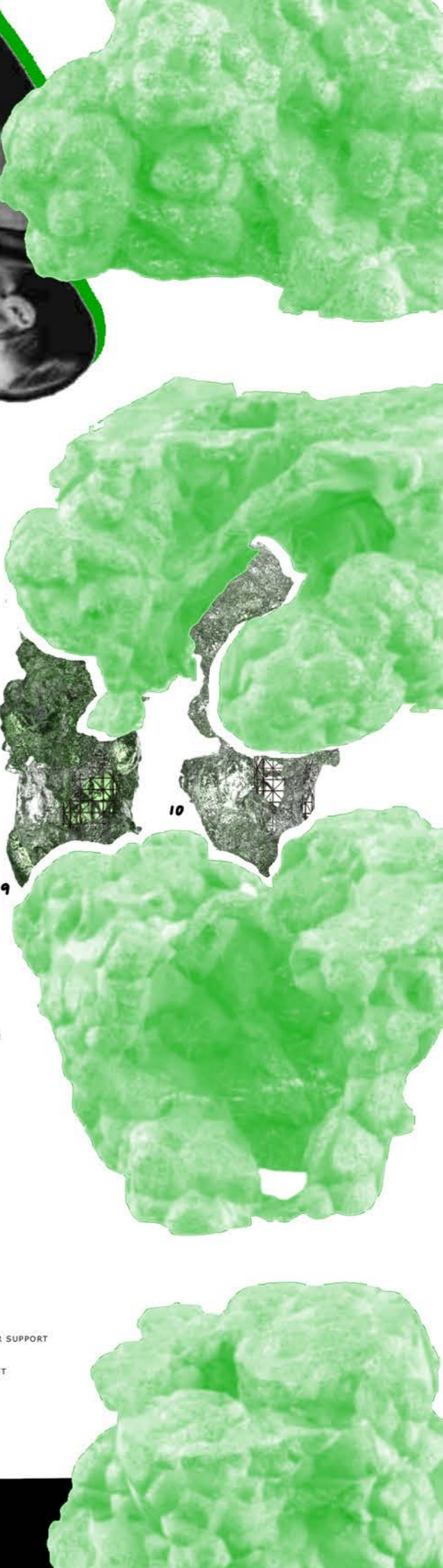
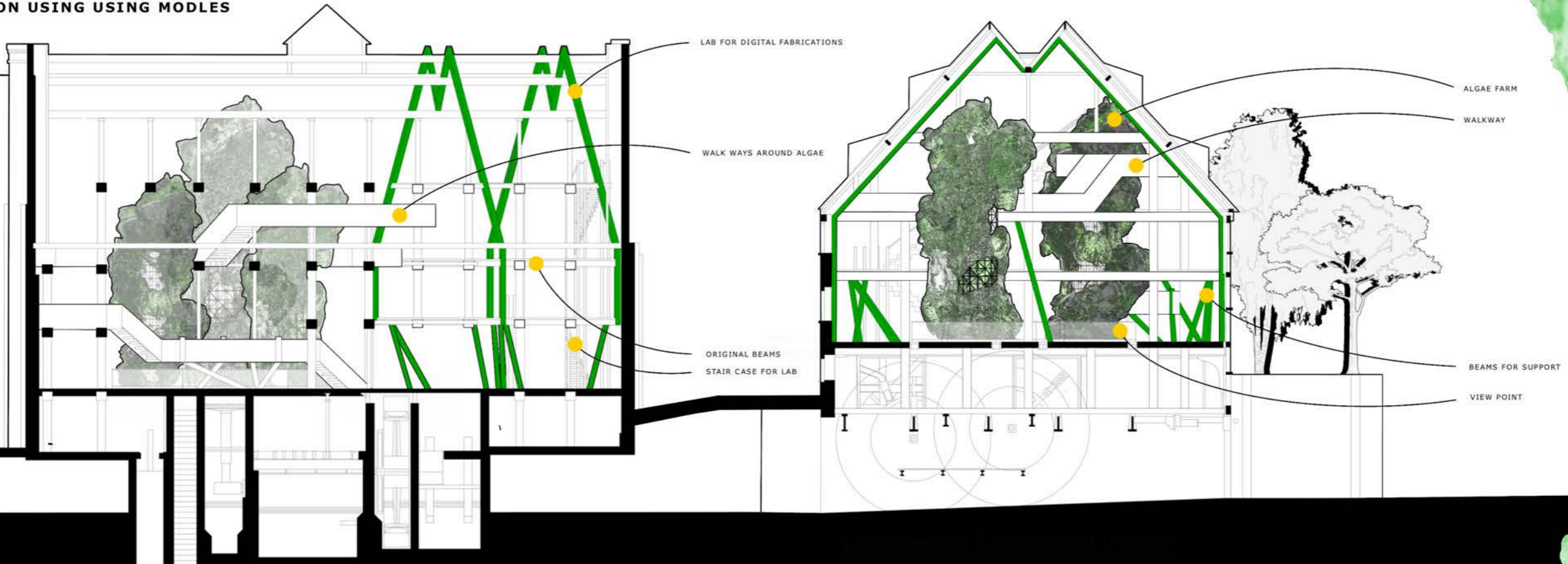
Digital fabrication is based on scanning and printing 3D objects. These can be printed in many different ways but often holds the form of and or organic yet geometric shape. Mimicking this style by 3D scanning my own models created from plaster and foam. These models were taken apart and cut down the middle to create new forms.

Using 3D printing for the vertical algae form is a design decision to inform the public about what is the lab is researching. By phically seeing the models in use encourages people to be more enthusiastic about what is being produced. Schools such as at ETH in Zurich ideally will want to join the team in supporting new sustainable materials.

1. Physical model with drawing collage
2. Model in photoshop
3. 3D scanned model
4. Modelled in program
5. 3D scanned model
6. 3D scanned model cut in half
7. Digital model (4 weeks)
8. Digital model (3 weeks)
9. Digital model (2 weeks)
10. Digital model (1 week)

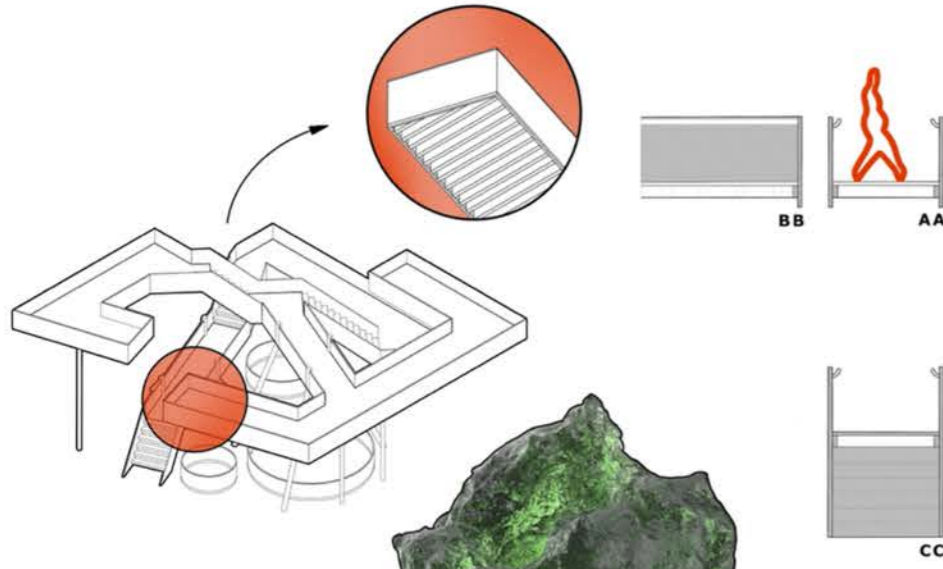


SECOTION USING USING MODLES

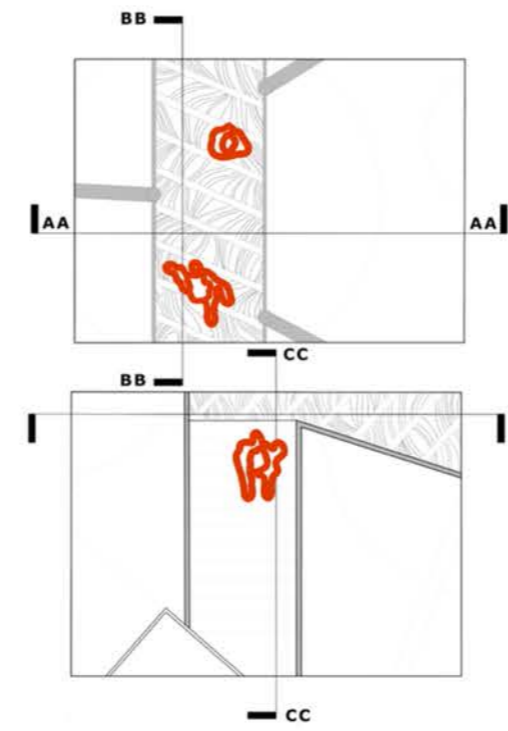


DETAILS OF THE FINAL DESIGN

Intertwining models with drawings makes the project come to life. Visually you can interperate how people will use the site and interact with the algae farms.



FOCUS AREA SCALED 1:20



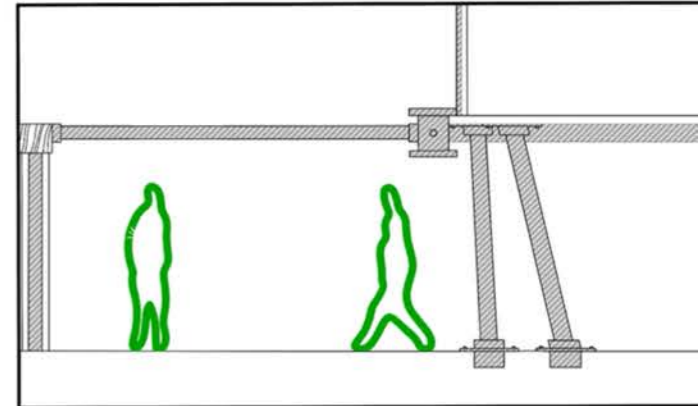
DESIGN LANGUAGE
Using the original struts and floor levels of the house mill, walk ways are placed using a mix of existing and new levels. Already existing floor levels juxtaposed new levels in design language. Aiming to visuall be similar in terms of materials however are different in colour. New being more bold in colour and old being a more classic colour for that time period.

FOCUS AREA SCALED 1:20



DETAIL SECTION OF LAB 1:50

Steel 
Wood 



DETAIL SECTION OF LAB 1:50

RESEARCH LAB FOR DEVELOPMENT OF ALGAE MATERIALS
The lab is situated as a cross section cutting through the building at an angle. The idea being so you can see new development being produced in real life time. Children as well as others who are enthusiastic will be able to view the science behind creation will the goal of being inspired.

The lab design will use the guide of the original floors and beams with added equipment inside. The materiality of old and new bonding together as one. Clearing reprinting each other in colour and texture.

Steel attachments
Specific for the glass to at home to the old structure

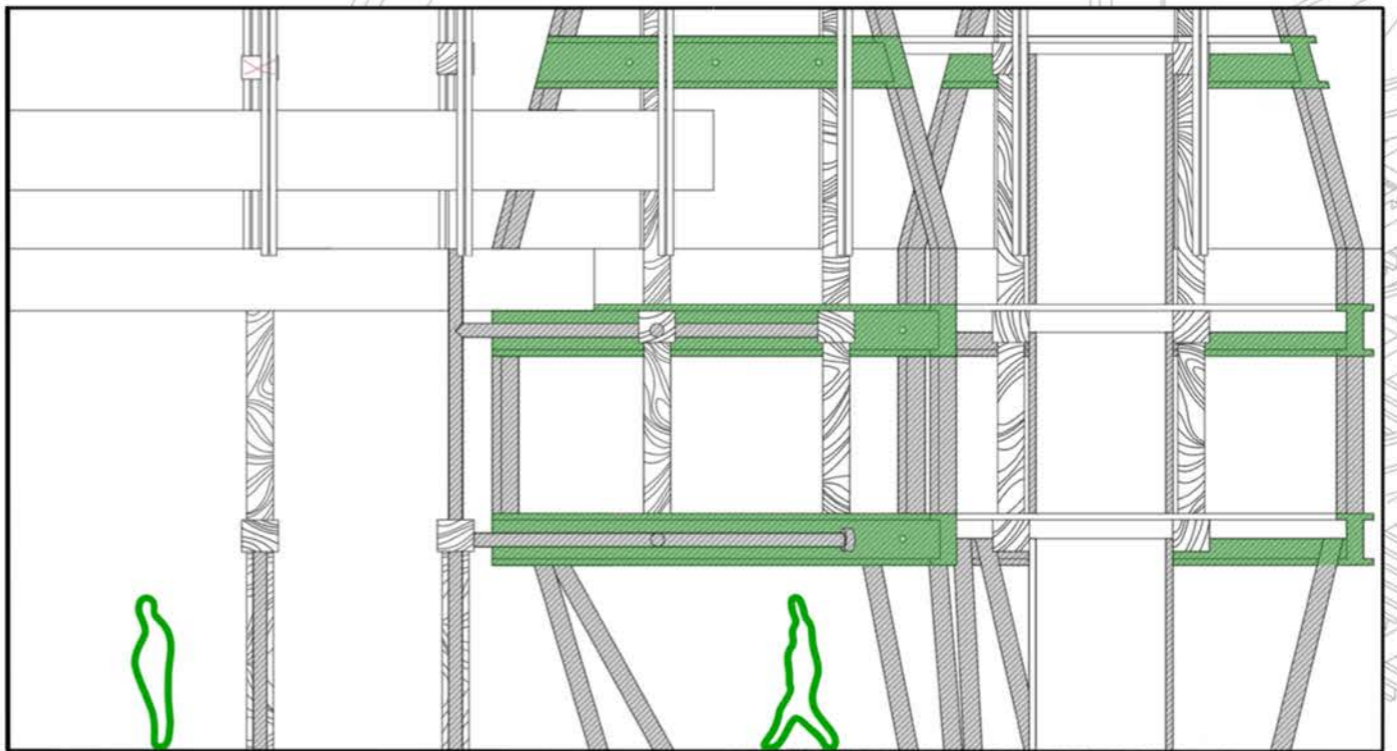
Glass windows

wodden columns
Structure of the old

Steel I beam
Colour green

Lift
Beams
From old building

FOCUS AREA SCALED 1:20

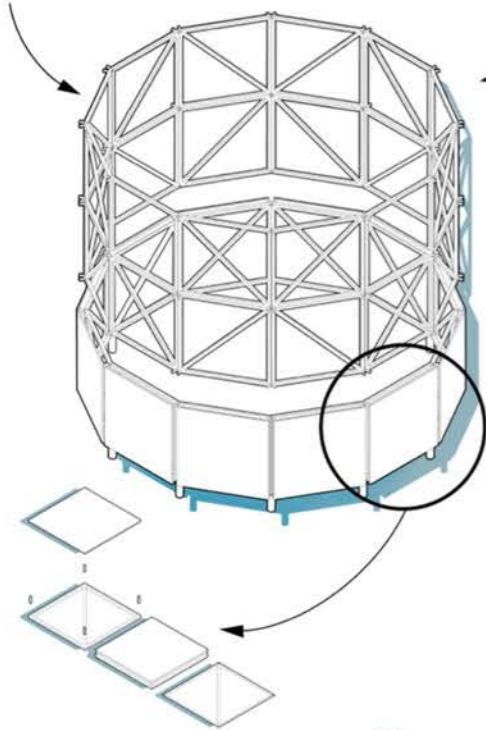


VERTICAL ALGAE FARM
Section showing algae farm in relation to humans
Close up details on the frame jointing

Farming algae allows the development of 3D fabrications using natural materials. On the site there will be three algae farm structures, hoping to bring people together including lab researchers such as ETA school for digital fabrication and local people such as a school and children.

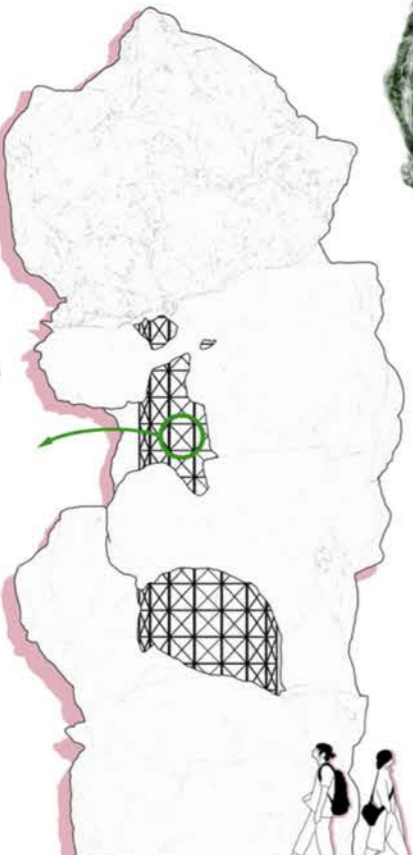
The algae form is a 3D printed structure which clips on at a frame. Algae is poured into each section and left to grow and marinate over time. After roughly two weeks the algae can be harvested and collected for research

Inside structure of the algae farm



JOINTING STRUCTURES
 Depending on the size of the algae farm there are more panels added to create a bigger space, able to use inside

PANEL STRUCTURE
 Each individual structure will have a single pod for algae and water to thrive

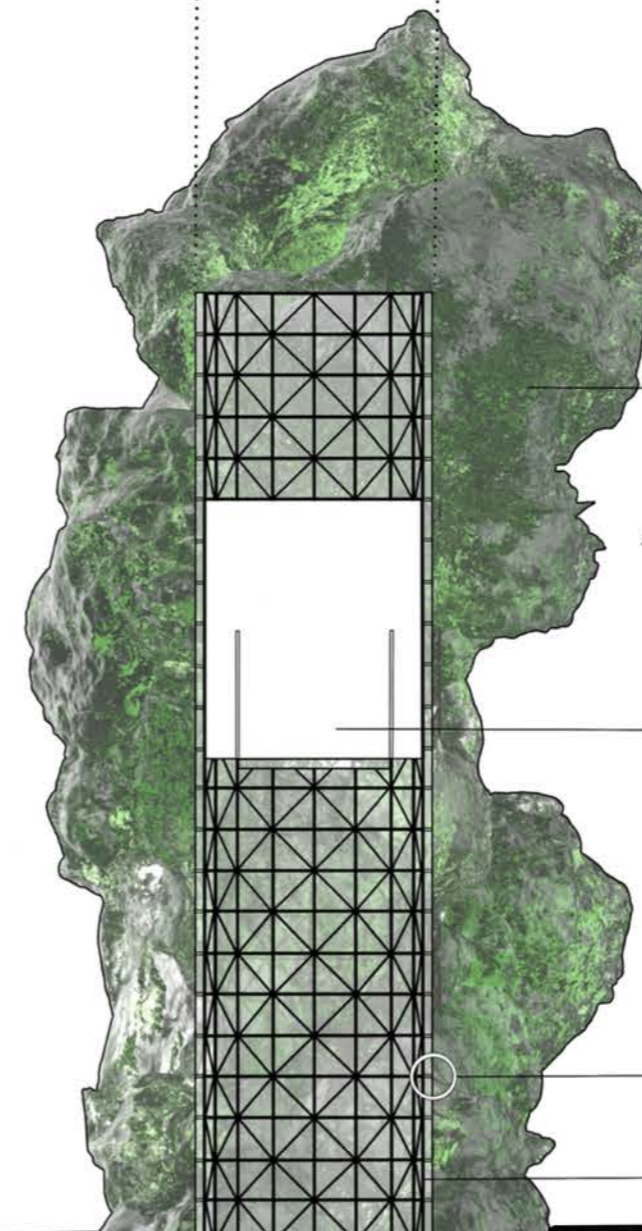
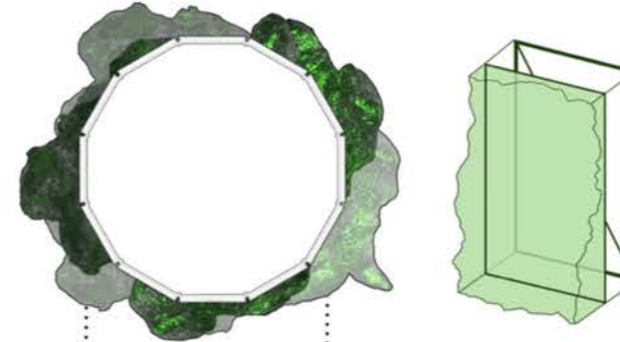


Structural design concept

Focusing on materiality

Structurally the concept of the algae farm is based on the idea of modular design. Taking the pods filled with water and algae and being able to be placed back once emptied. Each pod will have a designated space in which it will be placed such as A1, or B5. Depending on the size of the farm there will be more joining pods added.

The materiality of the algae farm structure is using both new and old materials. The structure on the inside is using already existing materials on the site, specifically the joists from the flooring which has been taken away



Plastic 3D printed design
 Vertical farm which hold the algae

Void for walkway
 The walk way is separated from the structure of the algae farm. Because of the modular design is easy to take away the pods to allow for walkways.

Wood material

Joining of metal nuts and bolts
 Joints for structure and algae pods

Wooden structure using old joists

