C.E.L

COOLHAVEN EXHIBITION LABS

COMPLEX GRADUATION STUDIO

Article

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01. ARTICLE

COOLHAVEN EXHIBITION LABS

The catalyst for clean meat in the Netherlands

The research revealed a pressing need for change in today's food production and consumption. The rising global population will demand so much food, that there is not enough land on earth to produce this. The research also showed a possible solution: clean meat. Lab grown meat is more efficient in every way, compared to traditional meat. The problem found is that people are hesitant to try clean meat. It is an unknown technique and very different from the usual consumed food. This is where C.E.L. will come in.

The process of clean meat production is suited for an urban environment. This means it can be brought to the people that need convincing. The research showed that making the process transparent creates knowledge amongst consumers and that will lead to willingness and loyalty for the product. The second way to persuade hesitant consumers is giving choices instead of forcing a choice on them. The concept combines these two aspects by creating a market hall integrated with a food lab: Coolhaven Exhibition Lab.

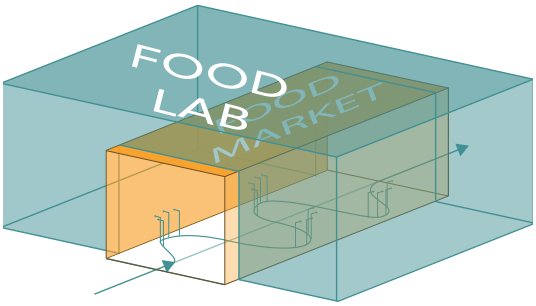


Figure 1: Initial idea if market and lab working together

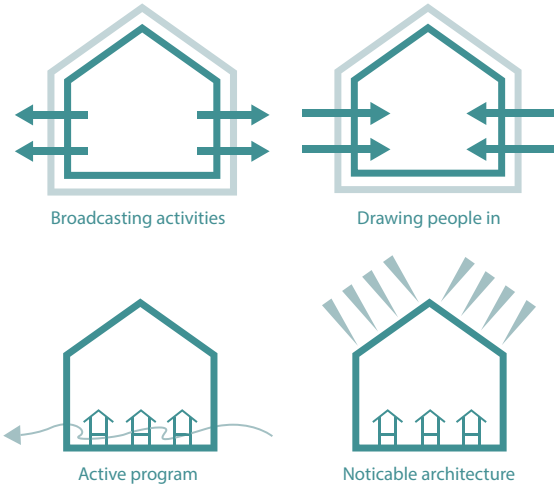


Figure 2: Core design values from design brief

DESIGN BRIEF ANALYSIS

The project statement is clear: a food market combined with a production lab. These two functions are very different and have different needs. There are also general needs. These come from the goal to engage as many people as possible and create a customer base for the clean meat products. The building has to draw people in, broadcast the activities, have a lively program inside and have noticeable architecture. These are the most important aspects from the design brief.

The lab should be flexible, because the food technology is rapidly evolving. It could happen that in five years different machines are needed. Large elevators, space to move around and a flexible floorplan. During production bioreactors are used to grow the meat tissue. These bioreactors increase in size during growing. A clear flow and hierarchy is needed in the lab, so the production process is as efficient as possible. The market is an energetic place with a variety of vendors. This creates an interesting and fun place to explore as visitor. From the references, it became clear that market designs do something to ensure an understandable hall. The spatial design should be understandable for visitors. This also helps to get the message of clean meat across.

PROGRAM CONCEPT

The program studies are made from three different visitor experiences: the celebration, the stroll and the integration.
The celebration aims to make a landmark. Making a building so noticeable that it is recognized by all visitors and acknowledges the scientific triumphs that are achieved inside. The stroll explores the idea of continuing the routing through the building. Visitors are drawn in from the existing routing outside and guiding through the building. The last study is the integration, where the market is punctured by lab spaces. Used for production and also very visible for the

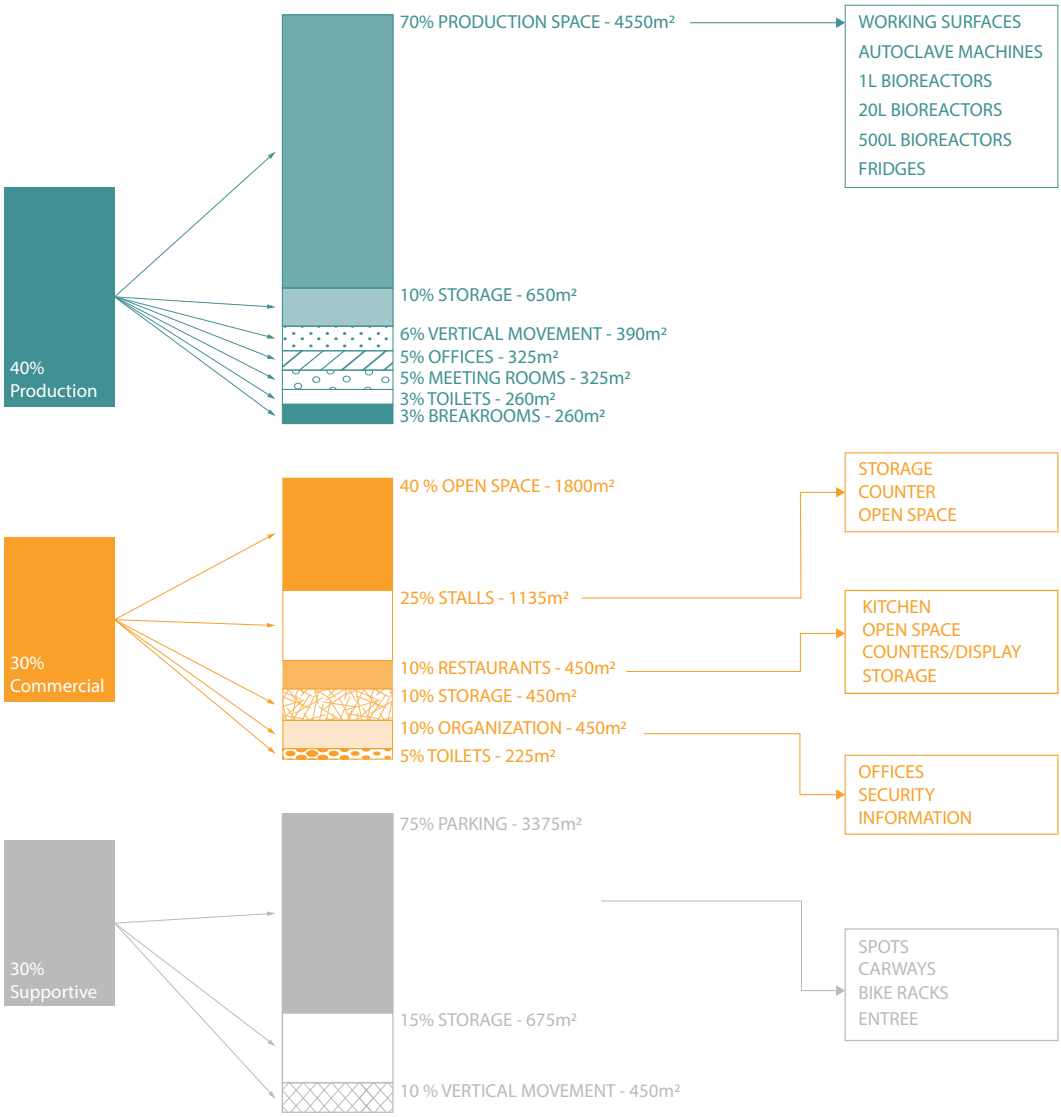


Figure 3: benchmarking program needs for turnover market

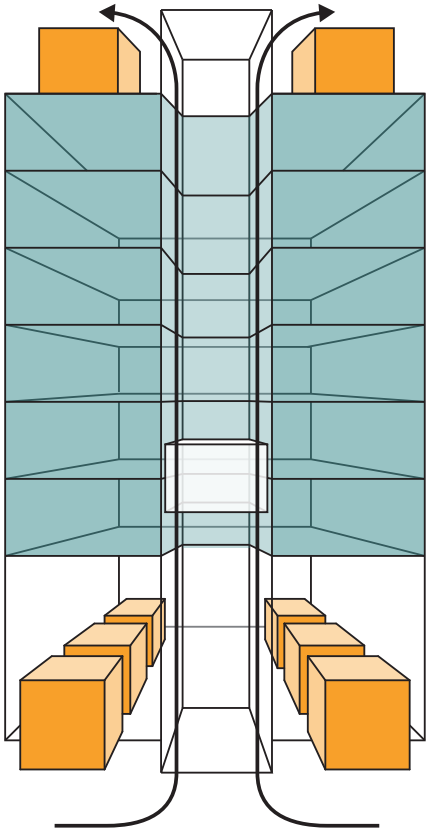


Figure 4: The Celebration

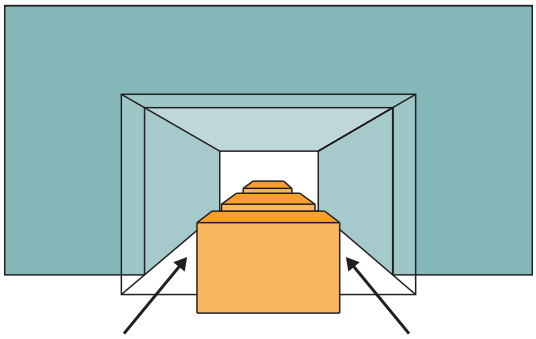


Figure 5: The Stroll

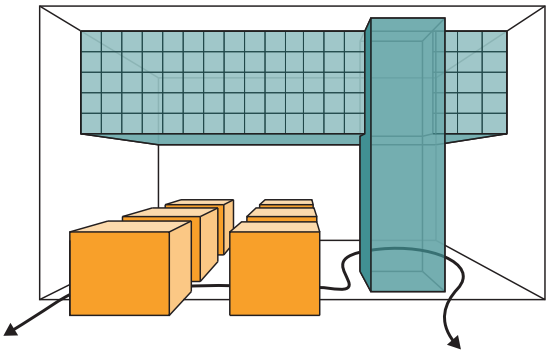


Figure 6: The Stroll

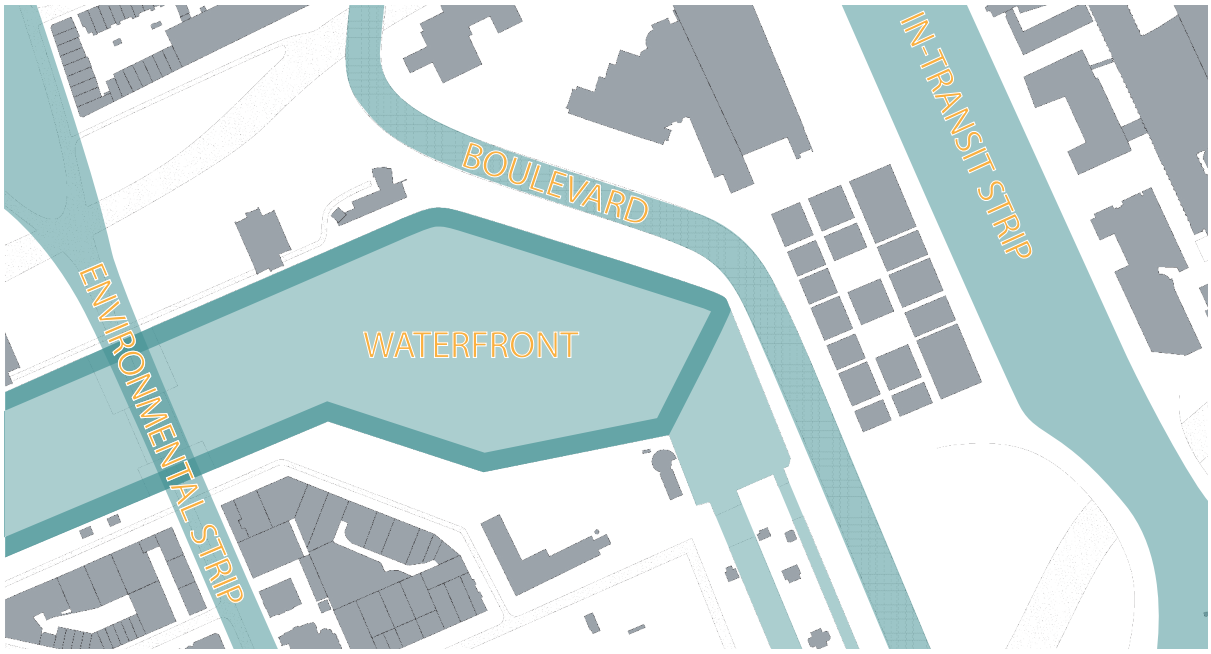


Figure 7: Influences on site

SITE CONCEPT

There are three urban aspects that influence the site directly. The waterfront route, the connection of the environmental and transport strip and the 'Claes de Vrieslaan' boulevard. All three create streams of pedestrians passing through the site. The streams have to be acknowledged and used. By guiding these through and over, the building, we can introduce each individual to clean meat.
The bend in the Coolhaven has the potential to feel like a lake. The strategy of the Western archipelago is to activate the riverfronts and use it for promenades and leisure spots. By making a bridge the North and South side are connected and work together as one. The far East side of the Coolhaven is less suitable for leisure because of the lock and the water pumping station. The placement of the bridge is so that is excludes that part from the lake and connects to the other routes.

Figure 8: transport streams around site

Figure 9: Site stretegy Western archipelago

DESIGN CONCEPT

Figure 10 shows the translation from the site concept to the design concept. The waterfront promenade is continued over the building by lifting it and placing the market volume beneath it. The lab is placed on top of this volume, so the promenade routing is guiding along the façade. The top floor of the tower has a commercial function. This motivates visitors to pass through the lab with the exhibition staircase. Lastly, waterfront elements are placed on both sides of the Coolhaven for leisure activities.

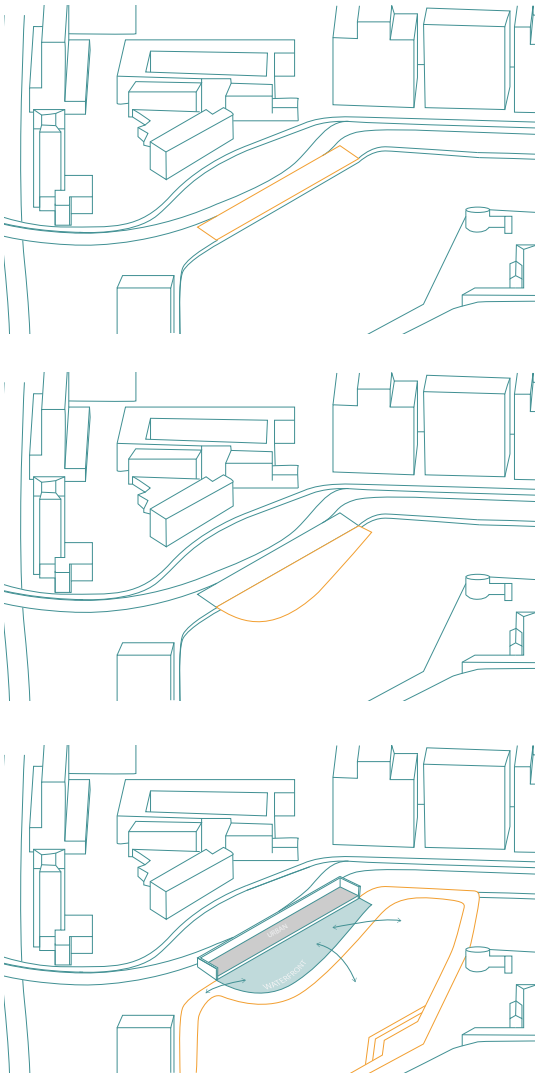
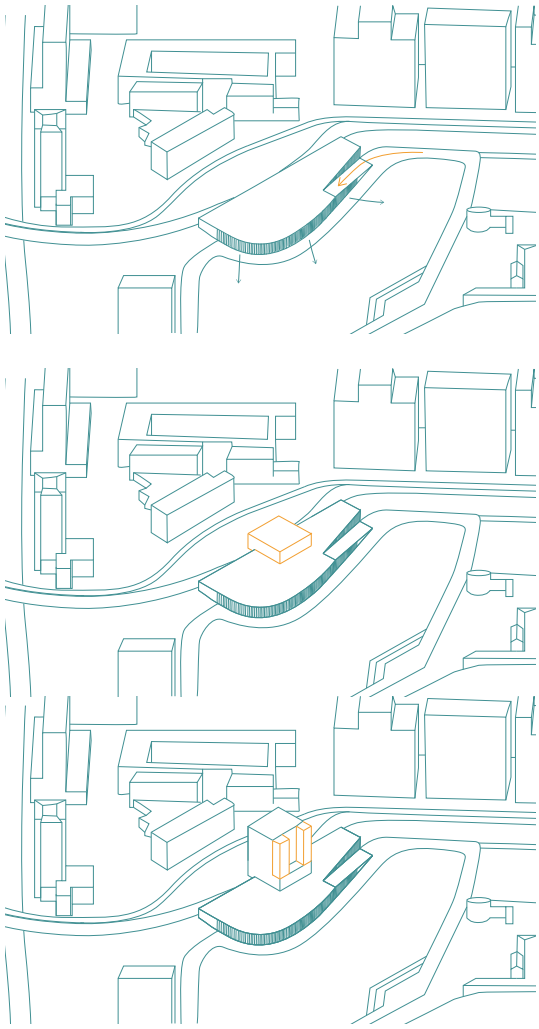


Figure 10: Design concept development

The exact shape of C.E.L. is shown in figure 11, 12 & 13. First the market hall was shaped according to the needs of the urban context. On the North side a straight edge to connect to the buildings on that side and a rounded shape on the South side. Opening up towards the water, creting a soft flow from the promenade to the market and lab. The lab is placed in the middle to provide room to roam around the tower and explore the activities inside. On the Northside the lab creates an overhang. This marks the main entrance in the North façade and a buffer zone between outside and inside.



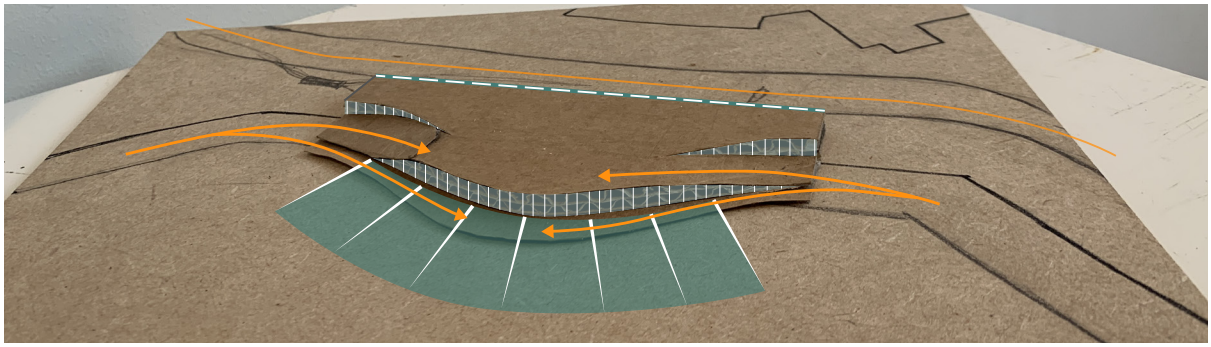


Figure 11: Concept design market hall

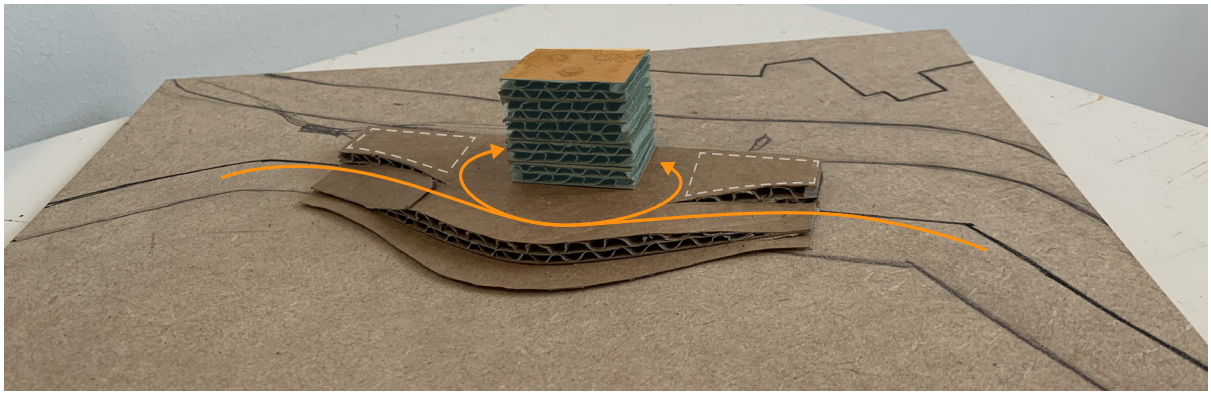


Figure 12: Concept design lab

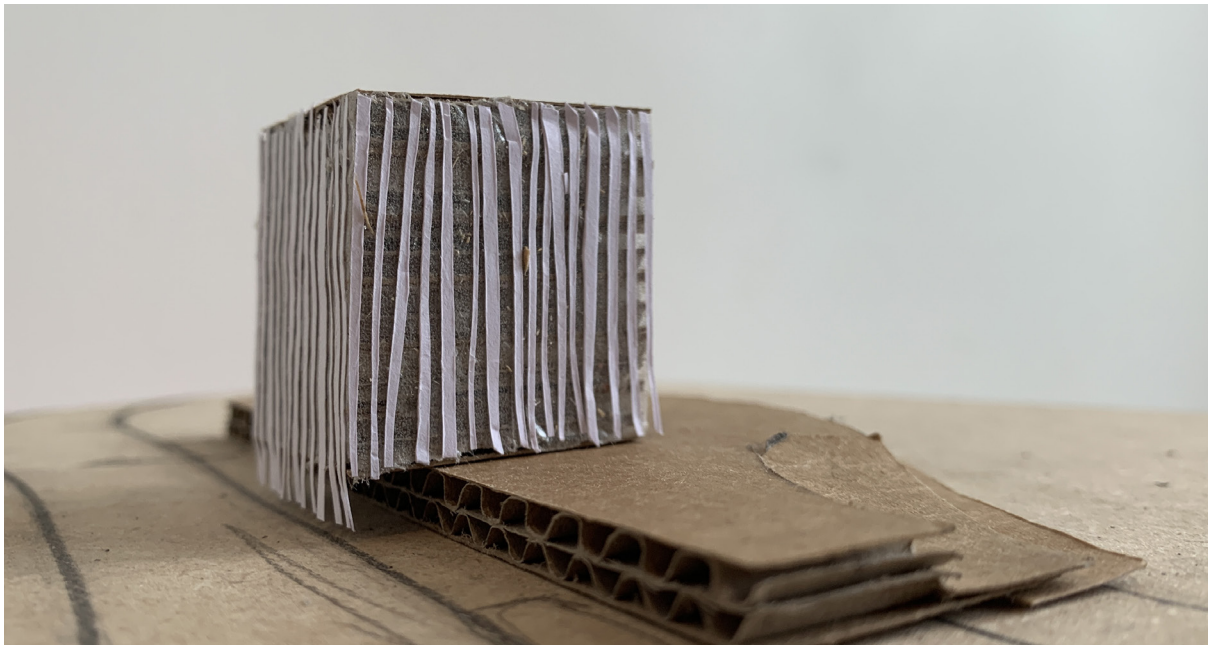


Figure 13: Concept design entrance

DESIGN SPECIFICATIONS

The height differences between the boulevard and the water's edge is 1,5m, because of a slight slope on site. This height difference is used inside the market. By lowering the South part 1.5m, the hall is split in two without using a wall. The high part acts as a stage for the lab and as a viewpoint over the market stalls. This stage is the main entrance of the market hall and the entrance to the labs. The exhibition staircase starts here. After entering the visitors are forced to walk towards either the East of West side of the building to explore the market further. The materialization mirrors the function of the higher and lower part of the market. The high part has a solid materialization. It is the base on which the lab stands and it is the continuation of the urban context on the North side. The lower part has a more natural finish. It opens up towards the water and has more light and view. The wooded floor can continue outside as well. That way the market and the waterfront work together seamlessly. The construction of the hall doesn't chose direction, it is a stiff grid of interlocked CLT beams. The exception is the construction of the lab. The rectangular roof construction is reinforced the bare the extra weight and mirrors the grid of the façade

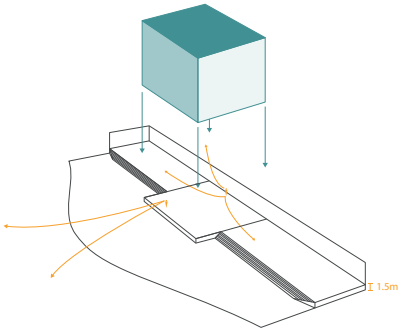


Figure 14: Concept height difference

This is also seen in the ground floor plan in figure 16. The North entrance is flanked with the industrial elevators and the core with the vertical shafts and emergency staircase. After entering the visitor sees the start of the exhibition staircase and the balcony overseeing the hall, combined with the reception desk. The routing into the hall is placed on the sides, with four small staircases enhancing the pathways. The supportive functions are placed on far edges. On the West side the entrance of goods. The goods for the stalls are brought to the market by tram and can be brought in directly or stored in the basement. There is large refrigerated large storage for the clean meat products and smaller pantries for individual vendors. The basement also has extra bathrooms.

Figure 15: Interior view market hall

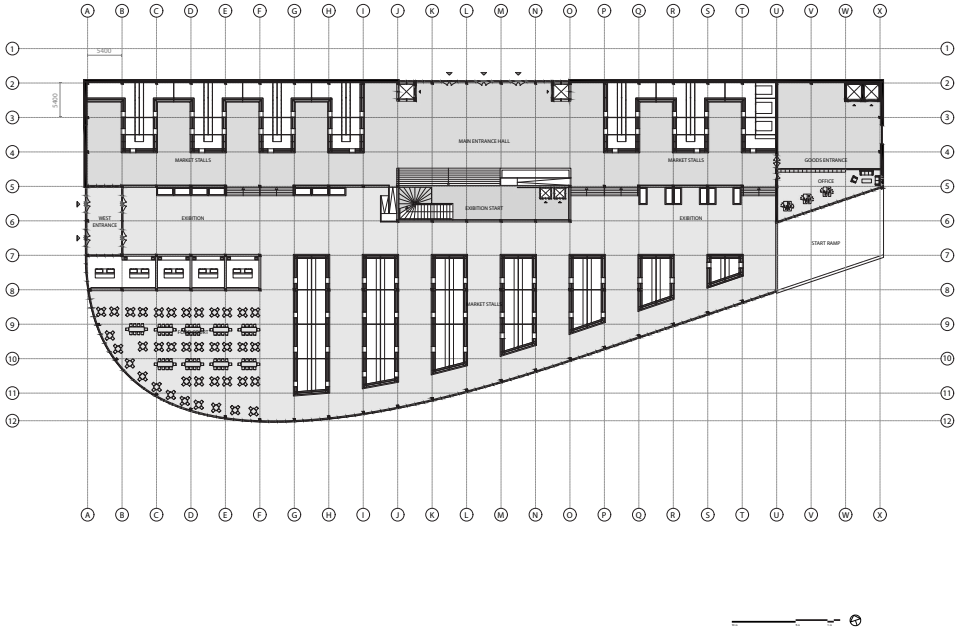


Figure 16: Ground floor

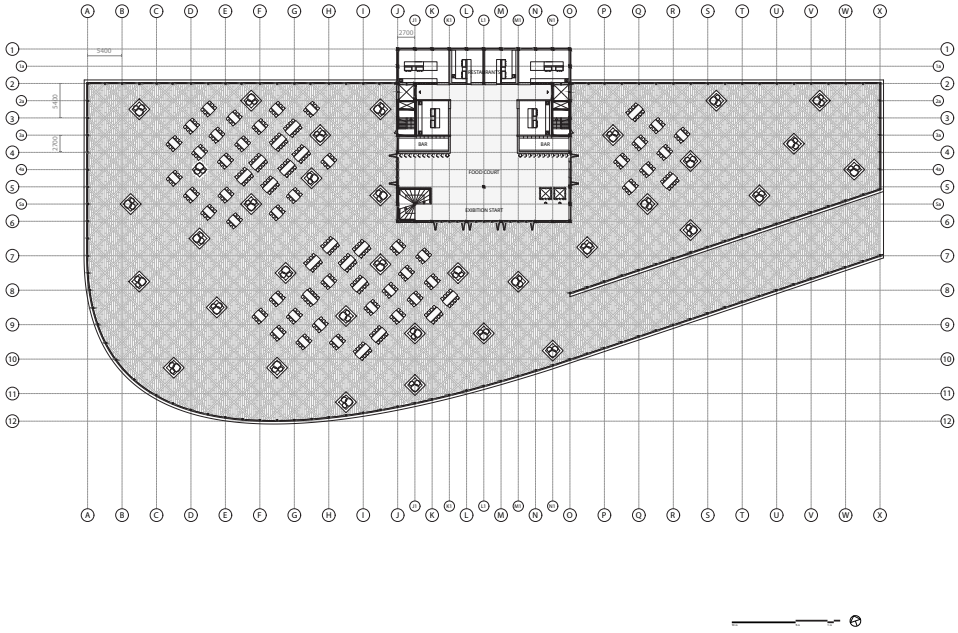


Figure 16: Ground floor

The lab is designed with flexibility in mind, because the food production techniques is rapidly evolving. To provide a structure that can be filled in to deal with the needs of each new technique it has to be flexible. This is achieved by creating an outer shell with a CLT grid. Figure 22 shows a study into the dimensions of this grid. This is filled in with semi-permanent floors and walls. These can be changed on the long-term. The grid also offers the opportunity to play around with floor heights without disrupting the exterior elevations. The most temporary element is the machinery. There has to be enough space to move and change these elements.

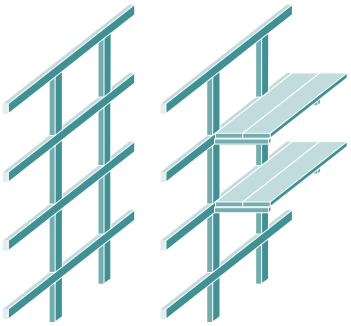


Figure 18: permanent shell & semi-permanent elements

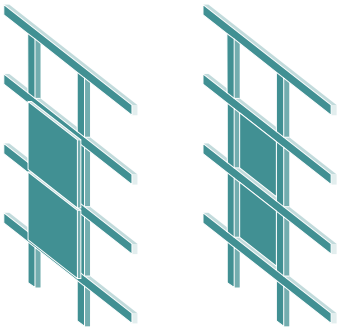


Figure 19: Placement of panels in the grid

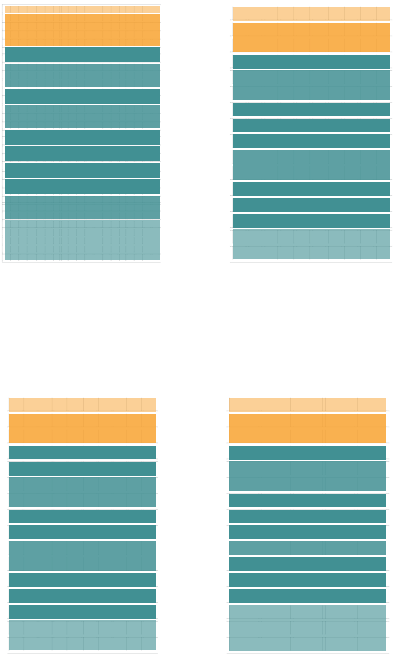


Figure 21: infill of levels study

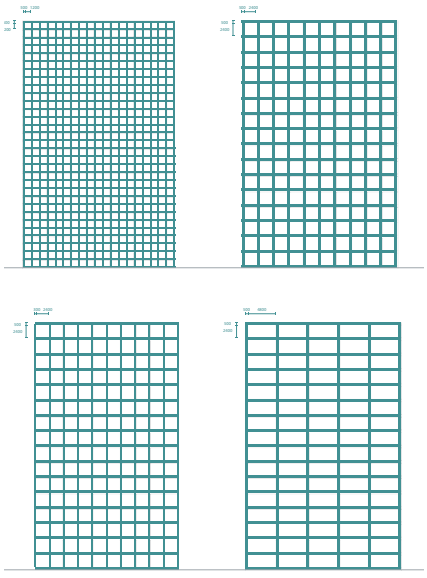


Figure 22: Dimensions of grid study

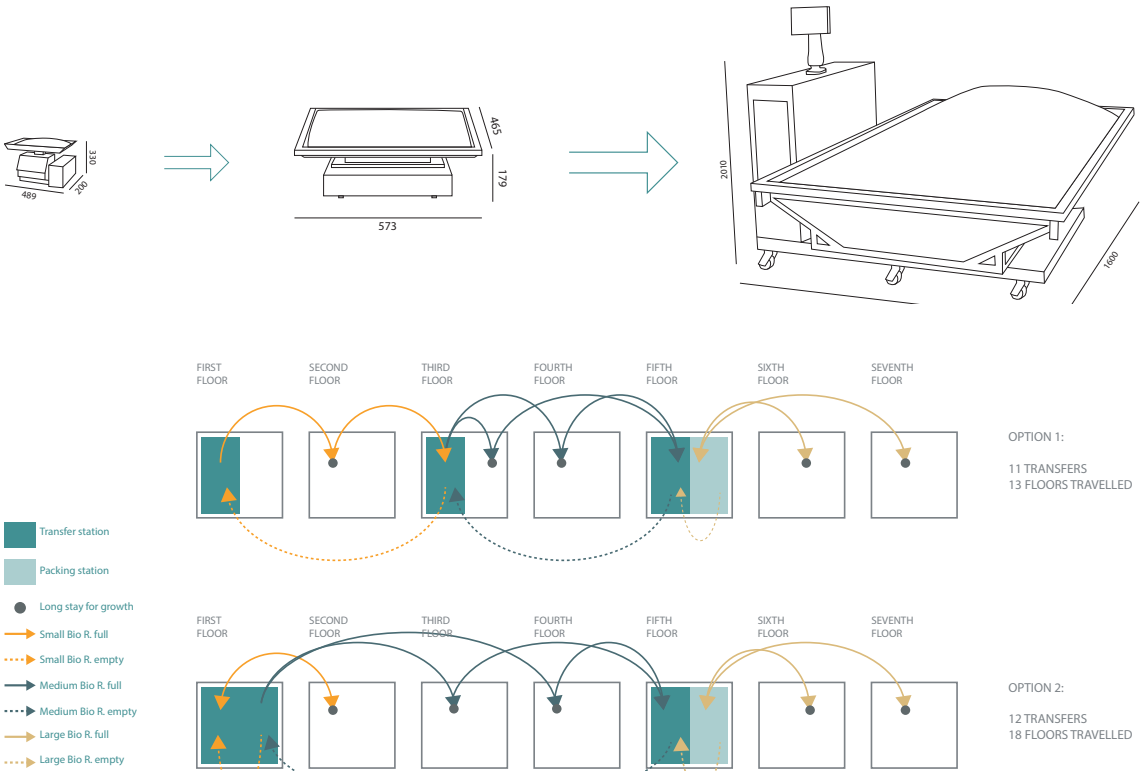


Figure 23: Logistics lab study

Right now, the clean meat production uses bioreactors ranging from 1l to 500l. A clear flow and hierarchy in the building is needed to create an efficient and understandable production process. A logistic study is shown in figure 23, to test the amount of transfers of bioreactors have to be made. The most efficient option is chosen. In that option, there are 3 floors intensively used for bioreactor transfers, packing and starting clean meat. These are also the most interesting to view for the visitors. These floors have a double ceiling height. The section shows the relations between all the lab floors. All lab floors are organized by the scheme in figure 24. With the exhibition staircase on the South side, so passers-by can see the people going up and down, triggering them to go explore too. Behind that is the main function of each floor. This has to be as visible as possible for the visitors. Is can also be seen and explored on the sides, so people walk around the tower. The logistics are aligned with the North façade of the ground floor to not interrupt the main hall too much and also show the vertical movement of goods in the façade. Lastly the supporting spaces in the lest visible part of the building.

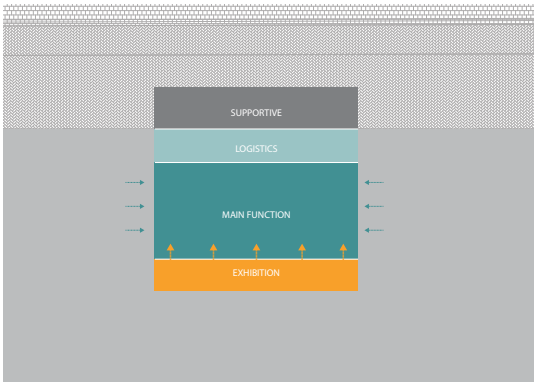


Figure 24: lab plan functions

02. RENDERS

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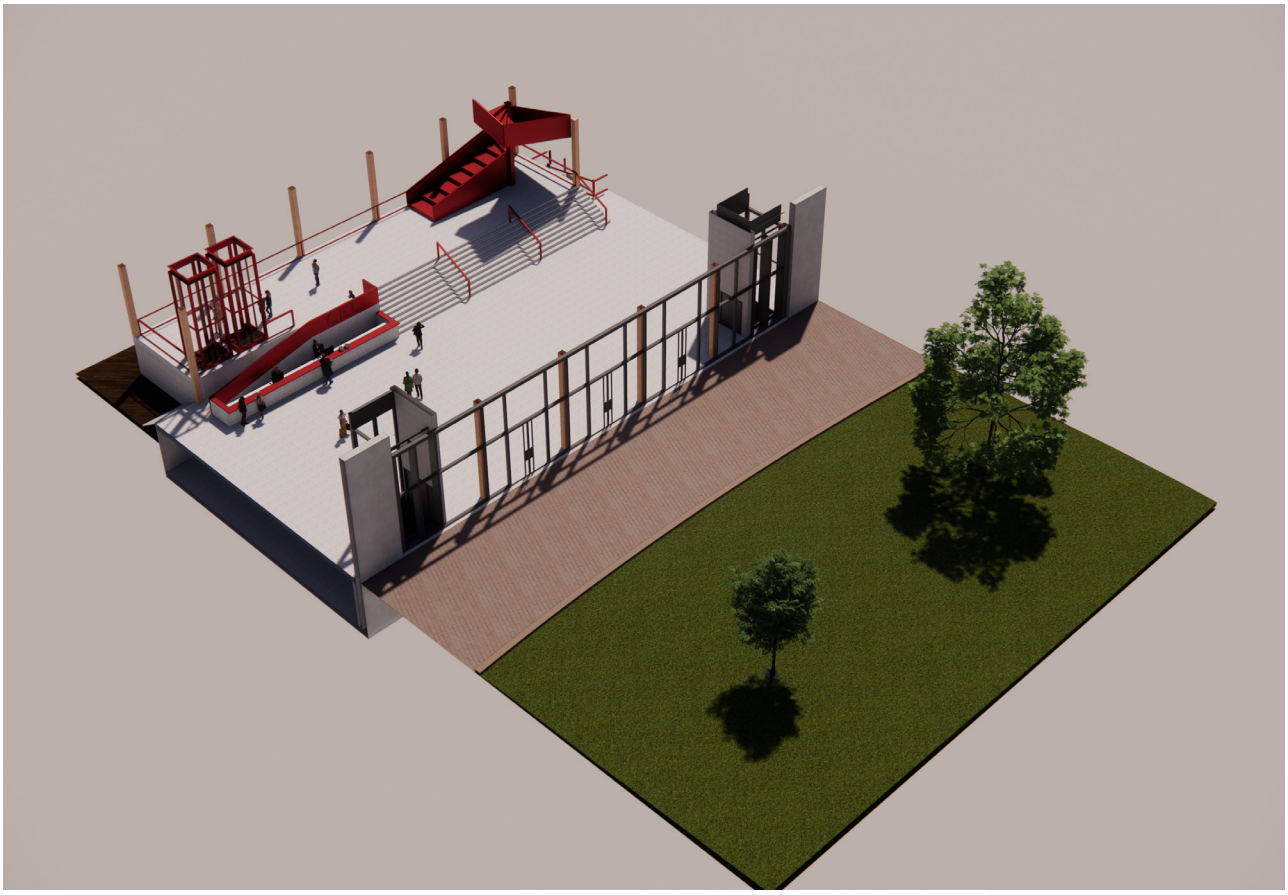

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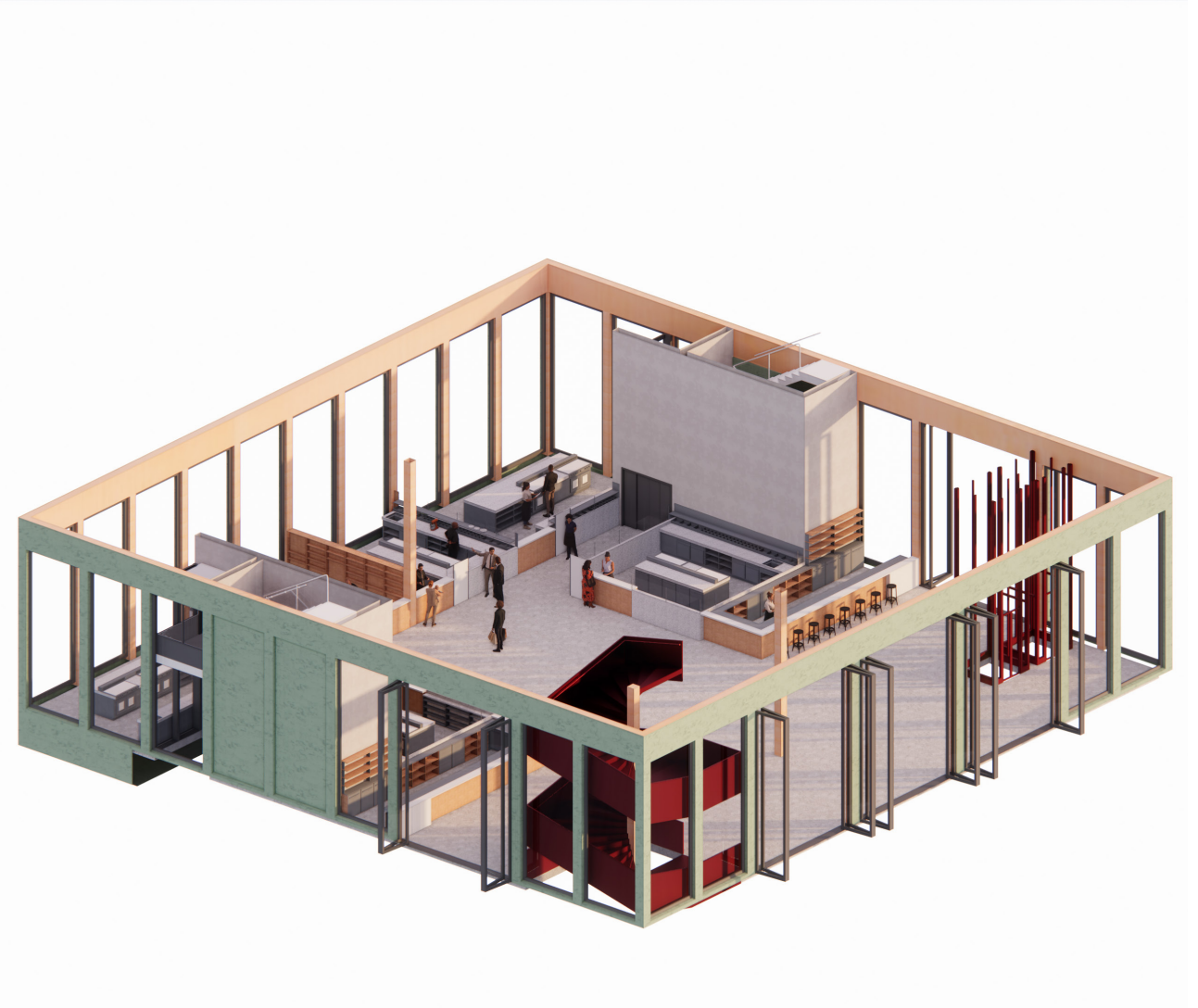
C.E.L



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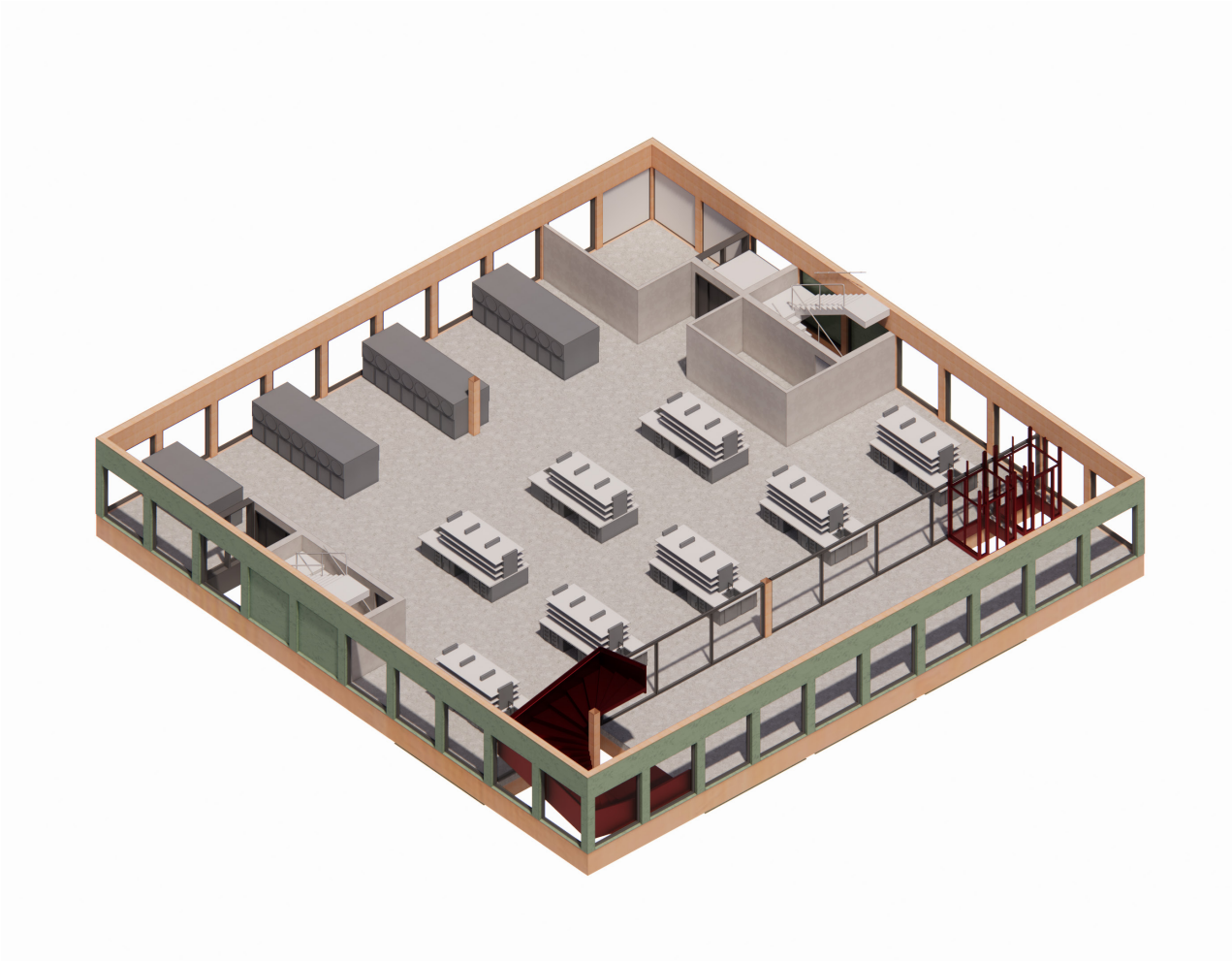

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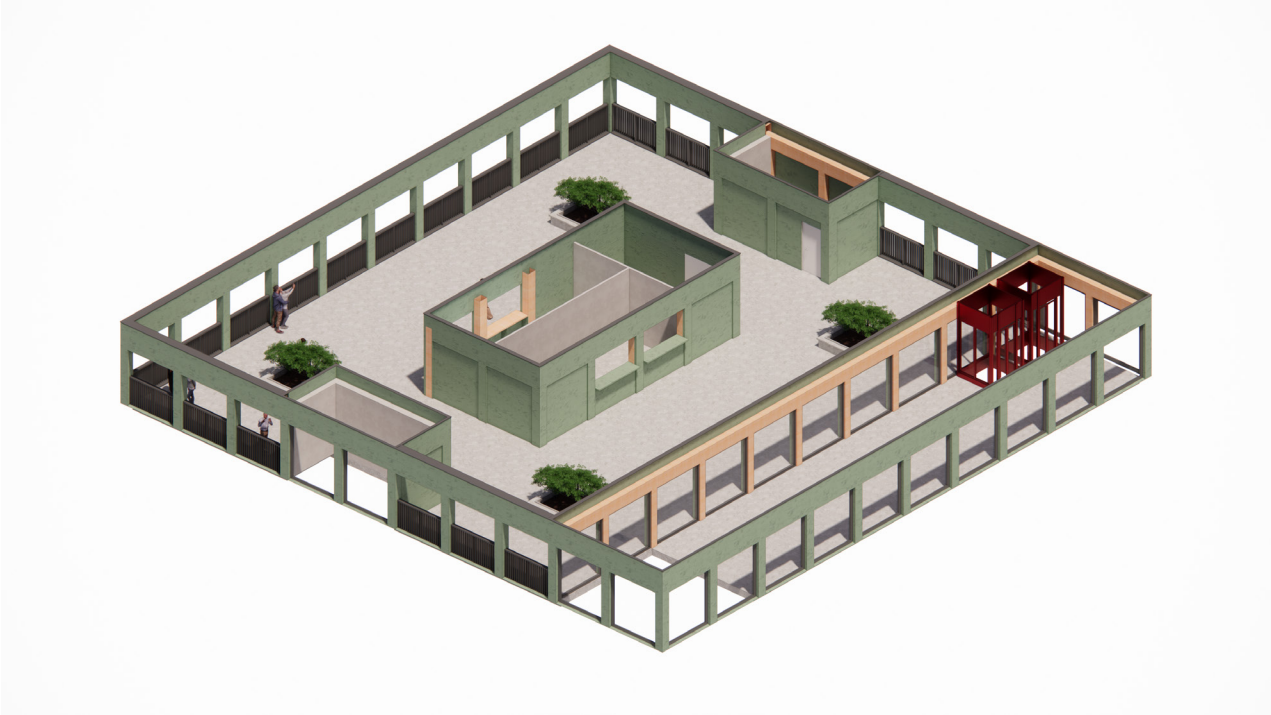

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03. REFLECTION

REFLECTION

It has been a year since the start of this graduation project. During this time, a million small decisions have been made. Resulting in the C.E.L. project. In this paper we will take a step back and look at the bigger picture.

The connection between the research and the project is very visible. The research shows a clear need for drastic change in the global food consumption and production. There is not enough land on earth to produce the amount of food that the population needs in the year 2050. The clean meat technology will offer many advantages over traditional meat. So, this technique could really help in the reduction of carbon emissions, agricultural land and water. The problem is that people are not willing to try these new products. The message of clean meat needs to reach the people. The technique has to be visible and understandable. That way even hesitant people could become new consumers and clean meat can become the mainstream option.
These factors can be found in the building, with multiple routes leading visitors towards the labs and making commercial stands to try the products immediately. A visitor can submerge him or herself completely in the world of clean meat, even in a single visit.

The project started with a fascination of different cuisines spreading over the world and changing in the process. This relates to the Complex studio topic 'migration of ideas'. The research evolved from this culinary fascination to food production and

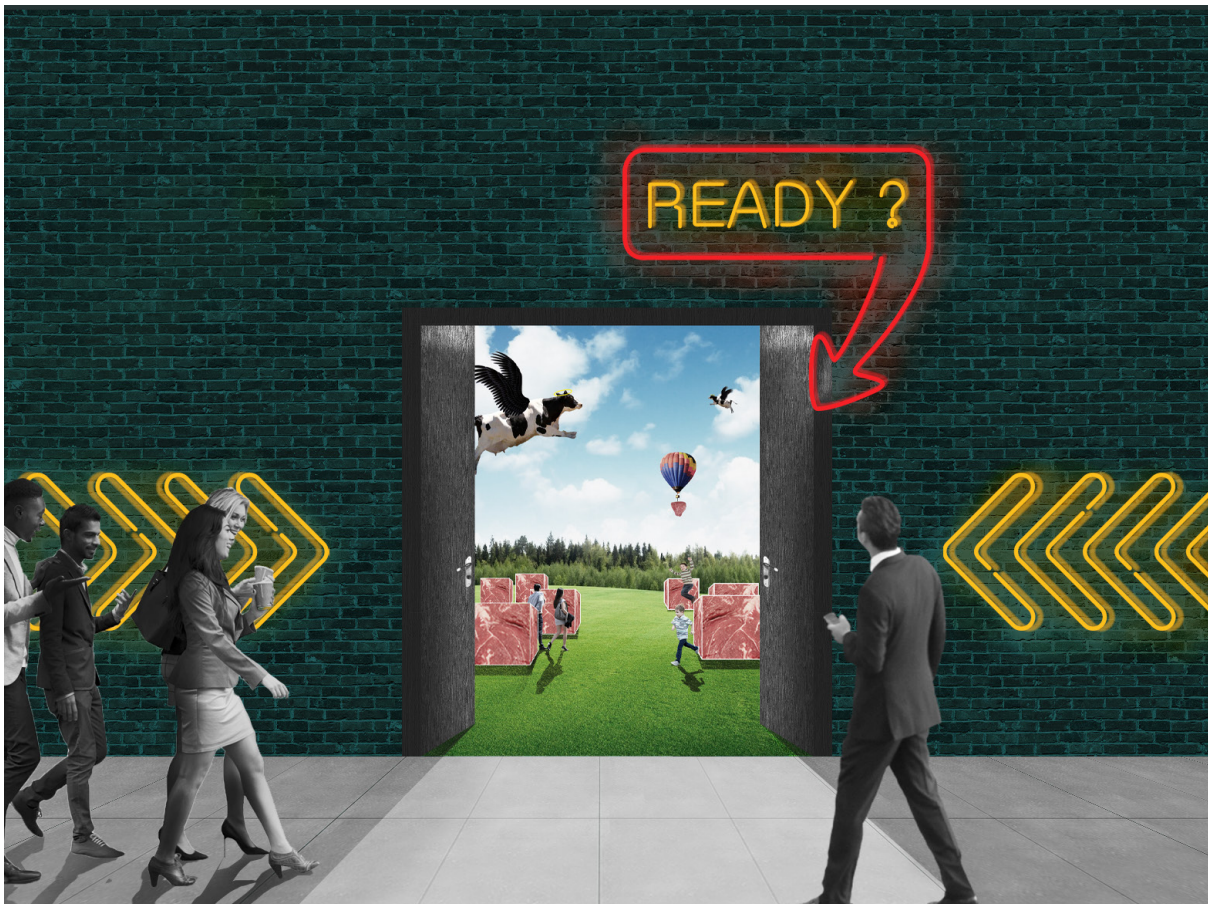
finished with clean meat. Even though this technology has been around for more than 20 years, it is relatively unknown to the public. The goal is to actively spread the ideas of new food technologies.

To get to this result, some different research methods were used. In the beginning of the project the research was quite superficial and passing by several subject, to get a grip on the precise problem statement. For instance, reading books about Japanese culture and watching documentaries about the culture around sushi. Once clean meat was established as the subject, the research became more detailed. The papers about this subject are very technical and speculative because of the current state of development of clean meat.
The design process was a fluctuating process. Looking back it was a reoccurring pattern: First a small problem with a basic solution, then an extra push to think more on the solution, then many ideas and a very over the top solution, then realizing I lost sight of the original problem, then boiling the over the top idea down to match the whole project and the problem. The result is something that looks simple, but has a lot of ideas behind it.

The project has a clear connection with the wider social professional scientific relevance. It really emphasizes the need for a structural change in the human consumption and

production behavior. The world today is under a lot of pressure. Because of the dense population the environmental problems are stacking up. It is necessary to try each idea that might help in the battle. Clean meat can really make a difference if it is used in everyday life. When clean meat has become, this building will still have a function. As it is designed to flexible and adaptable to new uses. When a new product comes along that needs persuade new customers, this building can be used. The principles in the design work on any function inside.
The project also highlights a neglected part of the current research in clean meat. People's perception. There are questionnaires, but no conclusions on how to deal with the hesitant people. This project offer solutions through design in the built environment.

Is clean meat just a Band-Aid or is it the cure for the problem? The core of the problem is that the consumption culture has to change. The amount of food both consumed and wasted is increasing each year. Clean meat will help to lower the environmental impact of meat production. But if the population keeps growing and each individual keeps wanting more and more, the same problem will occur in the future. I predict that the most impactful and permanent solution is a radical change in human behavior, but for now we will try to fix the current problems and clean meat can help greatly with that.



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P4 presentation
C.E.L. Coolhaven Exhibition Labs

Complex Graduation studio
Hotel New York - Migration of ideas

Faculty of Architecture
Technical University Delft

June 2021