

# IN VITRO

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## ABSTRACT

## INTRODUCTION

**This diploma project has investigated a new methodology of food production, focusing on the growing of in vitro (lab grown) meat and how its production line affects the architectural design of a building in the city.**

The future industry of meat production may no longer breed animals from birth to plate, it could grow the desired product directly. This requires much less land area and allows for facilities located in an urban setting, accommodating short travelled produce.

The work during the semester has consisted of studying the current state of the production line technology today, studying the chosen site and basing the proposed project upon these factors.

The end result has two goals:

1. Design a facility around a production line and showcase it to the public
2. Give the chosen site back to the people of Oslo and reconnect the green areas along Akerselva

## APPROACH

Cultivation of lab grown meat may seem like science fiction, but the cultivation of cell cultures has a long tradition and many similarities to the production lines found in breweries and dairies. A goal of the project has been to design a production facility for cultured meat, a “carney” in the city, by studying these processes and how they in affect the design of a building.

The process of producing meat in a metal tank is foreign to most people, and may seem strange and alienating. It was therefore important to make the facility transparent, giving the public a chance to get close to the production line and understand how it works.

*“We shall escape the absurdity of growing a whole chicken in order to eat the breast or wing, by growing these parts separately under a suitable medium.”*

Winston Churchill, Fifty Years Hence, 1931

## BACKGROUND

Growing meat in a laboratory, as opposed to the traditional breeding of livestock, drastically reduces the need for physical space, production time and nutrition (feed) to achieve the same amount of product. Not to mention that emissions and waste products from this approach to production is close to 4% of conventional methods .

The first lab-grown hamburger was produced in 2013, consisting of 20,000 strands of muscle fiber grown in the course of six weeks, and with a cost of €250,000 EUR.

Today, the same hamburger can be produced in two weeks at a cost of €10 EUR. Researchers in Silicon Valley, who are working on developing a sustainable and affordable procedure for growing in vitro meat, are expecting to launch an affordable product that is interesting to consumers by 2021.

For further elaborations and references, see research and process document.



The worlds first lab grown hamburger, produced by Mark Post in 2013

## SITE

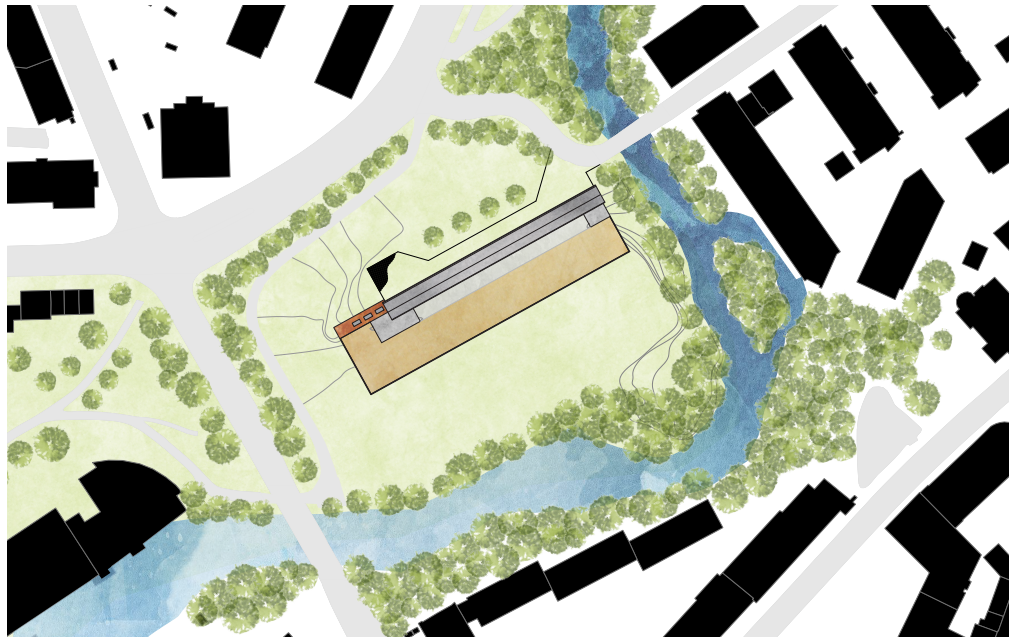
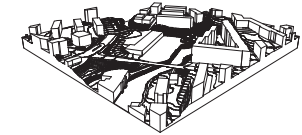
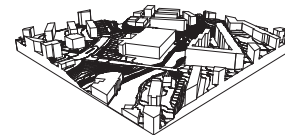
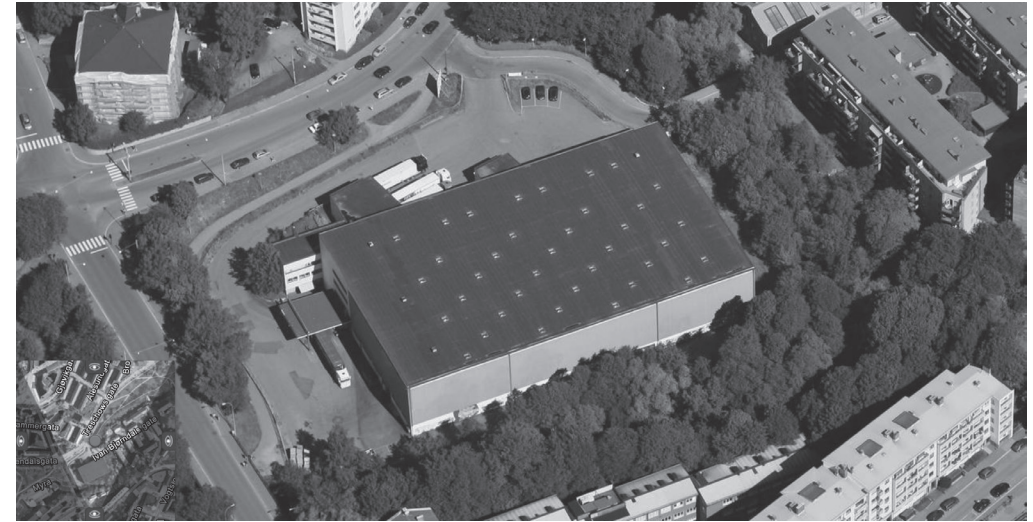
The chosen site is located at Treschows gate 16, Oslo

The existing warehouse building on the site has a footprint of 4620 m<sup>2</sup>, making it's scale three times as large as most of the surrounding buildings.

The site resides in what today has become a residential area, but has a long industrial history, having contained Norway's first paper mill, wood pulp factory, metal workshops and can accommodate the logistical and technical needs of the proposed factory.

The whole site is closed off to the public today, forcing pedestrians to diverge from their natural pathway following Akerselva, moving up to the busy roads, away from nature. A goal of the project has been to open up and give parts of the site back to the public, allowing for access to the river and green areas.

The fencing around the site is completely removed, leaving a public zone on both the north and south side of the site surrounding the building, allowing visitors to get close to and observe the process of production, while reconnecting the green areas along the river at the same time. The green areas are open to anyone and provides access to both the river and the roof level where you can buy samples of produce, prepare a meal yourself or simply enjoy the view.



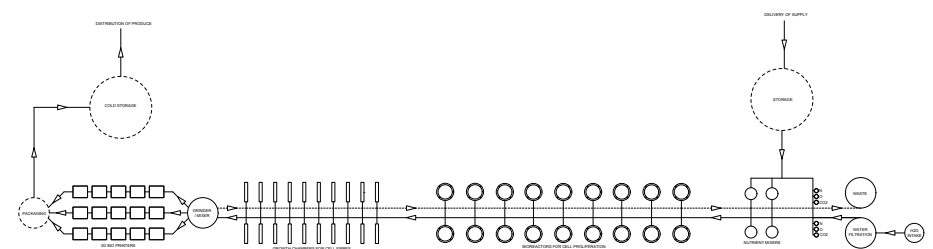
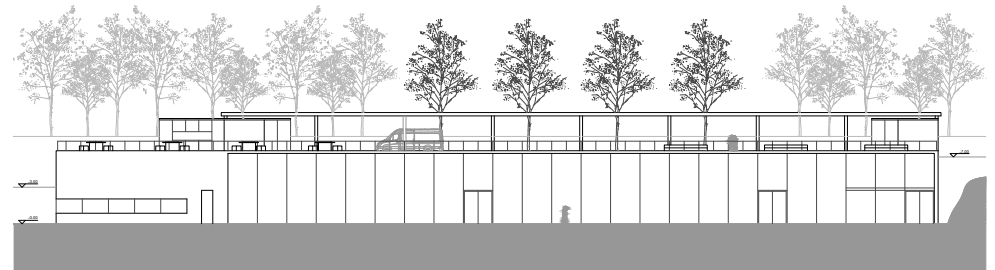
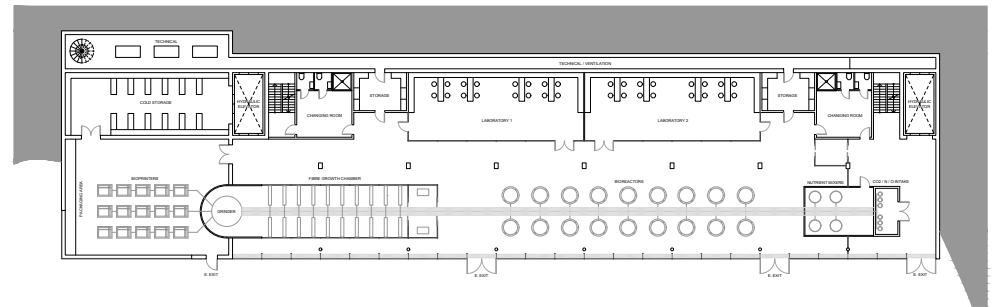
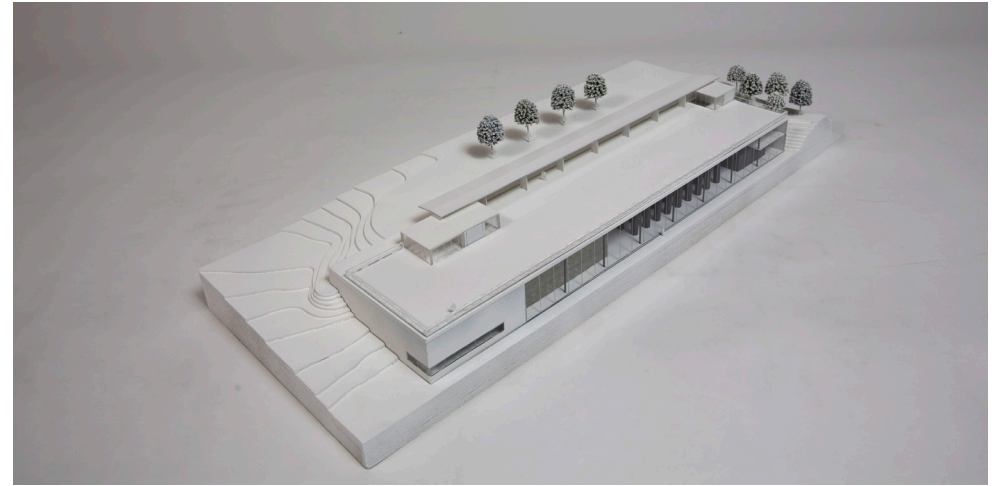
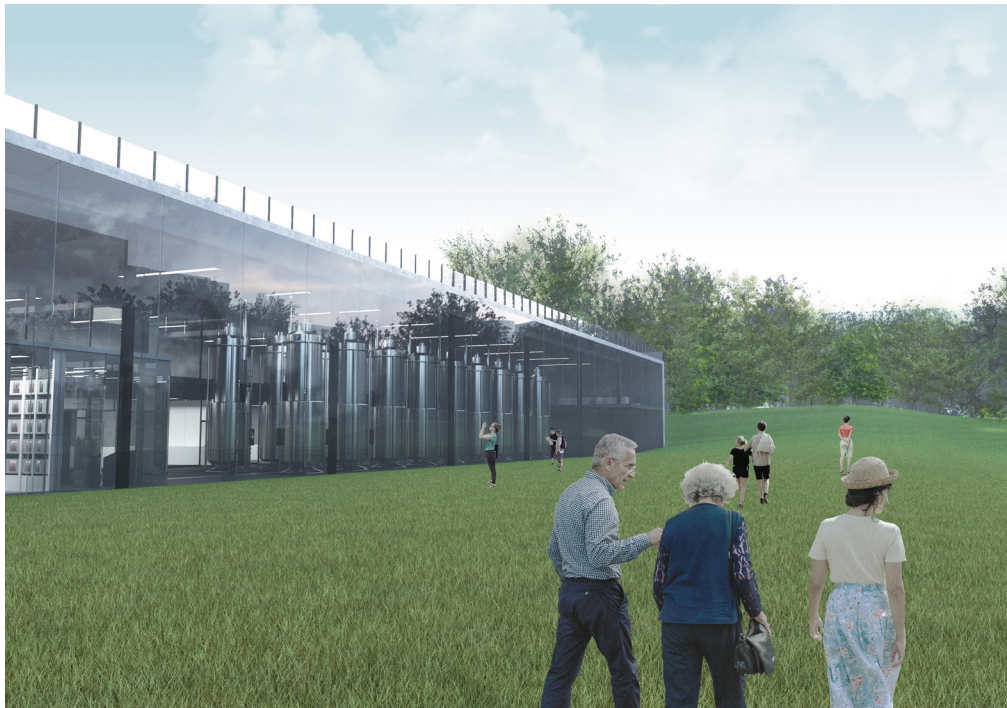
Current situation

Proposed situation

## PROJECT PROPOSAL

The proposed facility has two distinct parts. One clean and closed, housing the production line and research facilities, allowing you to see in, but not enter. This is situated on the ground floor level. The other open and welcoming, allowing the public to either observe from outside or enter the building and understand the process while being guided by staff members, and accomodating supporting functions such as offices, meeting rooms and technical program. This is situated on the first floor level.

It was decided to use the parts of the footprint of the sites existing structure, while reducing both the volumes height and ground floor, eliminating the need for excavating the site while opening most of it for public access. The new building is set into the landscape, which has a height difference of 7 meters from the lower level on the South side towards the river to the roof level on the North side towards Treschows gate. This leaves the west and east facade partly exposed and the south facade open.





## MATERIALS

### GLASS

As a reflection of the starting point of the process housed in the building, where protein cells can grow in glass petri dishes, and the wish to introduce transparency and light in the facility, I decided to construct a glass wall, following the production line from one side. This is also a reflection upon the common slaughterhouse, which is almost always closed and introverted. The glass wall is supported by glass fins, allowing for the supporting columns of the roof to be drawn inside the building, giving the facade a sense of lightness and transparency.

### CONCRETE

The main body of the building is constructed from concrete, both to accommodate the technical needs of the program and to withstand the forces of the landscape surrounding it. The part of the building facing West where the bioprinters are stored has rust pigment mixed into the concrete, giving the facade an earthy tone where it rises out from the ground and marking the area where finished products are produced.

### WOOD

The public area on the roof is covered by a wooden deck, introducing warmth and inviting the public to enter use as they see fit, giving the opportunity of getting an overview of the green area, trees and river below.

### REINFORCED GRASS

The area on the north side of the building is set with reinforced grass, allowing for smaller vehicles to deliver ingredients and pick up products without the need for introducing asphalt and preserving the new green areas around it. The driveway is covered by a long, thin cover, protecting transported goods as well as acting as an entrance portal onto the roof area.

