In between typologies
The future challenges at Refshaleøen
The aim of this thesis is to rethink the transformation of the old industrial area at Refshaleøen. The project unfolds in different scales, from urban investigations to building design, both in terms of program and building typologies. Furthermore, the project desires to rethink the development of the old industrial island, working with both temporary and permanent structures to accommodate the city’s urgent needs and urban life. This meeting fosters unforeseen architectural qualities and spatial experiences that serve both the city and its inhabitants. By tracing back the history and present programs at Refshaleøen, the aim is to design a new building typology for the island’s future. Taking into consideration both market forces and urban life, the desire of this thesis is to design a building typology enabling the district to continue both.

This thesis aims not to propose a new masterplan for the island, but instead use some of the methods of urban planning to analyze and understand the dynamics of the site. This has provided the framework both structurally and strategically, to find the location and the program of the new building design. The argument is that the new building typology program should arrive from the research and investigation of the site to accommodate the needs for the future development of Refshaleøen. The project has been developed through different phases. The first consists of initial studies, case studies of similar areas, interviews with actors at Refshaleøen, and site visits. This lead to a mapping exercise of the site from the initial investigations. These mappings play a crucial part in finding the essential program and specific area for the building design. Alongside the mappings, the site has been explored through physical modeling. This allowed the project to relate strategically to its context.

The next phase of the thesis was to transform the project into a building design that can accommodate the overlapping programs and typologies. This phase consists of concept design development, executed through sketching, drawings, and physical modeling.

Abstract

Motivation

"In the area of contrasts, there is a bit of everything. Great industrial past, uncertain future plans, and a catalog of people who do not just look different. Refshaleøen is in the heart of Copenhagen, but still in the countryside. New but old. Fantastic, but terrible."

Simon Mølgaard and Jacob Mouritsen
Initial Studies

Refshaleøen
Development of the city

In Copenhagen’s Municipal Plan from 2015, a number of areas are designated where future urban development will take place. Most of the major urban development areas show that Copenhagen is still in the process of transforming from an industrial city to a city of knowledge. Old, dilapidated industrial and port areas are being transformed into attractive residential regions to attract resourceful residents and maintain families with children.

Copenhagen is continuously evolving with new large districts that facilitate migration to the city. Old industrial districts have been transformed into new attractive neighborhoods. The discussion is whether these areas have been designed only for the wealthy in society and to benefit the developer, or if the visions of those areas met the realities of the market forces when the district was completed. As architects and developers of the city, we have to look at the reality of our design and learn from it.

What have our projects brought, Sydhavn, Nordhavn, Carlsbergbyen, Ørestad, Islands Brygge, etc., and how do these new areas act in the city?

The different districts have evolved with both positive and negative aspects of urban life. But there is a tendency that the areas are developed to benefit the financial market and lack urban life.

Analog Mapping

Through the project, the map of Copenhagen has been an essential part of understanding the city’s development. Mapping analogous the current infrastructure; metro, bus, and public ferry and locating the old industrial districts that have been transformed. As a result of this, I achieved a greater understanding of the city’s hidden lines. Refshaleøen is located as a terminus to the east. At this moment, the artificial island has low accessibility for the newcomer to the city. Refshaleøen lies between a great historical past and future visions for the city’s development. Simultaneously, the artificial island is located between two of Copenhagen’s, still functional, largest industrial institutions with BIOFOS treatment plant and HOFOR - Amagerbo.

“Market-driven bottom line locational choices promote global social disruption and insecurity”

Michael Sorkin
The development of Refshaleøen

The constant change of size and use is illustrated through a historical timeline of the development at Refshaleøen. The study shows how the island has doubled its footprint over a 100-year period, as well as the future plans of Lynetteholmen. Refshaleøen will then become the link between the inner city and the new district of Copenhagen. This means that Refshaleøen will change its character drastically. It will go from being the endpoint of the city to the east to becoming a more integral part. This will continue that residents from Lynetteholmen will create a daily flow through Refshaleøen, which will strengthen the identity of the artificial island.
Refshaleøens Ejendomsselskab A/S

What the future holds

“We believe that future developments require coherence with society’s needs. We embrace close collaboration with both regional and national politicians so that the progress of Refshaleøen is aligned with societal aspirations. As a consequence, we’re featured in several ongoing development plans for the Copenhagen Region.”

Mapping

The Mapping is a study of the diversity that exists on Refshaleøen. By mapping the different present programs, a greater understanding of the strength of the temporary program has been achieved. The district has been given a strong character through the use of the old industrial buildings, which give the place a history and a story to be told that is unique to the district. In conjunction with creative solutions for urban functions, the district has developed into one of the most attractive places for Copenhageners to take a break from the busy everyday life.

The study also shows how the different programs cluster together on the western side of the artificial island. On the other hand, large open areas are experienced on the eastern side, which provides free space and a respite for visitors. The eastern part is constantly changing, where it goes from being almost deserted to being full of life when major events occupy the large open spaces. This has been crucial in selecting the site for a new building typology, and the design should help activate the areas around.
Analog Mapping
The map is a study of the hidden lines on Refshaleøen. This has been a tool in selecting the site where my building’s design can have the most significant impact on an uncertain future for the district.

Events
The large open areas in the eastern part of Refshaleøen are the area that experiences the most change from day to day. The area still almost abandoned in everyday life, with worn buildings and utterly empty of people. The experience of the open space completely changes character when the area turns into a festival full of life. This happens mostly in the summer months when several events build stages, installations, and temporary bars. In mid-June, the area is filled with happy festival guests who have arrived in experience Copenhell, Copenhagen’s metal music festival. The festival completely transforms the large open area in the eastern part of Refshaleøen with its 20,000 visitors’ life is brought back to the existing industrial buildings and its surroundings. In conjunction, a truly unique experience is experienced. This has been an essential part of this thesis to understand how individual events use the area.

In large cities, it is often experienced that festivals occupy old industrial neighborhoods to give the area a new narrative before they become new urban development projects.

In this project, the argument is that by recognizing the importance of keeping these events in the city, it becomes part of the contemporary narrative and not just a memory.
Site Selection

Through several site visits and various methods of mapping, the project began to narrow down to a specific area of interest for the building proposal. The project could have developed as an extension of the already well-functioning urban functions located on the west side of Refshaleøen. But as the project's ambition is on a larger scale, it became essential to select an area connected to both the historical past of Refshaleøen and the future plan for Copenhagen as a city.

Therefore, the project undertakes the old dry dock. The area is located in between the historic buildings and the future plan for Lynetteholmen. Thus, the building will become a new cultural hub that will bind the two districts more together; at the same time, the building design will be an extension of the open space. By spending over the existing dry dock, the building will help to activate the otherwise abandoned area.
// Present, Refshaleøen

// Physical model 1:2000
Future / uncertainty

However, the future of Refshaleøen is still uncertain. At the earliest in 2023, it will be possible to determine what will happen to the old industrial area when a new local plan is to be announced. The owners of the area have set a goal that the new part of the city must maintain a connection to the old industrial history. The concern lies in the scenario of market forces completely taking over. Will our ideologies and vision be strong enough to hold back, or will Refshaleøen develop as a product of capitalism.

As architects, we should bring the design to the level of capturing the qualities of the old industrial history and channel the energy of the present temporary situation to unfold in a resilient future.

Lynetteholmen - a new island across the harbor

Copenhagen municipality has made plans to extend the city even more by creating a large new artificial island on the edge of Refshaleøen. The island, Lynetteholmen, will mainly consist of housing units for at least 35,000 people. The project includes coastal protection measures to stop surges of stormwater from entering the inner harbor. The new island will have a fundamental impact on the character of Refshaleøen, closing off views out to the sea and would restrict the routes of access into the harbor for large and small vessels. Lynetteholmen is to start construction in 2035.

"The future significance of Refshaleøen depends on whether boring homes are to be built, or whether an attempt is to be made to preserve a history, and whether one has an idea for everything out there. You can easily build new, but you have to think a little about how to do it. Then it can be a huge advantage for Copenhagen to have Refshaleøen, because it is a bit unique that you have a huge area there."

Inger Weine

"Future, Refshaleøen with Lynetteholmen"
The dry dock
The dry dock is used as an active element in the building design to reactivate the abandoned area. With its 250 meters in length and 35 meters in width, the dock gives the possibility that the building design will change character when it is full of water as when it is emptied.
The design explores the industrial remains used in relation to the dock. By reactivating some of the old elements from the past, such as the tracks and the portal crane, the area will regain life. The elements become a crucial part of the building's design instead of simply becoming an installation to remind a lost history.

"Rusty nails and bolts. Round-arched rigging sheds, crane tracks, and halls with ceiling heights of 68 meters. Worn-out steel hawsers, a wrinkled schedule of guard shifts, and a dark wooden shed."

Annette Skov

// The dry dock and its different uses over time
The next challenge in the project was to design a program that can withstand change. The man-made island evolved according to the functional needs of its industrial past. The artificial island has significantly impacted Copenhagen’s development and illustrates how it has gone from being an industrial city to a post-industrial knowledge city.

The good city is a place that is able to go across traditional “mechanistic” divisions, in order to create efficient and sustainable conditions for both people and future development. People must not only have something nice to look at, but must also have something to do, something to live in, and something to build on.

The program began to evolve by studying and discovering the past and the current dynamics experienced on Refshaleøen. Refshaleøen has changed character over the past 100 years and will change again in the future. Therefore, the typology of the new building must be able to withstand change, it is in the spirit of the area. This project proposes a new hub for cultural exchange. The building’s design stands as a permanent structure that will change its character by flexible structures that can change the building’s interior and exterior shape by different uses. The building’s design meets the temporary events experienced at Refshaleøen, and the building will be able to become an important actor of a given event.
Materials
The materials used in the project must reflect the overall vision of the building. Therefore, the project challenges the use of natural building materials. With large timber frames, supported by steel elements, perhaps thoughts will be directed towards wooden ship constructions pulled up on land with the bottom in the air and Copenhagen’s proud shipyard traditions. The large timber structures provide the framework for a flexible building, which forms a new cultural catalyst in Copenhagen. Particular emphasis has been placed on creating an architectural whole that collects, opens up, houses, and distributes the unfolding of various events and activities. The building’s interior and exterior are created with varying spaces that support learning, immersion, and a break from everyday life. Spaces that both can support the great community but at the same time cherish the smaller communities all the way down to small groups and concentrated individual work.

Structure
The project explores the structural techniques of timber and how it will fit the needs of the building. Wood appeals to people and inspires us as humans to interact with the building. Through research and studies of techniques and traditions from other cultures, the project has developed a structural system to give the building a flexible design.
Flexible Structures
Case Studies

To gain a greater understanding of buildings that work with flexibility, I have researched existing buildings. This has been an essential part of the project’s development to understand the necessary elements in creating a truly flexible building. The three selected projects to showcase in this report are projects that each have a unique character that provides the opportunity for flexible space.

Fun Palace by Cedric Price

A laboratory of fun” and “a university of the streets.” Although it was never realized, unlike other visionary projects of the 1960s, it was fully intended to be built. Designed as a flexible framework into which programmable spaces can be plugged, the structure has as its ultimate goal the possibility of change at the behest of its users. Price’s personal vision of the city was inventive and playful and expressed his sense of architecture’s moral obligations toward its users.

Keywords:
- Building program
- Flexible framework
- Service cores

The Shed by Diller Scofidio + Renfro

The Shed can physically transform to support artists’ most ambitious ideas. The Shed’s open infrastructure can be permanently flexible for an unknowable future and responsive to variability in scale, media, technology, and the evolving needs of artists. The McCourt, an iconic space for large-scale performances, installations, and events, is formed when The Shed’s telescoping outer shell is deployed from over the base building and glides along rails onto the adjoining plaza.

Keywords:
- Open infrastructure
- Event space
- Changeable building shape

Centre Pompidou

by Richard Rogers and Renzo Piano

The highly flexible container for art was completed in 1977 in the city center of Paris and has become a cultural landmark. The building is designed so that the internal spaces can be easily rearranged—made possible by placing the building services, corridors, elevators and structural members on its exterior.

Keywords:
- Open floor plans
- Urban space
- Redundancy
- Services on the exterior
Scale and placement exercise

To better understand the large scale that is at stake on Refshaleøen, the site has been investigated using existing building structures. The study illustrates some of the different case studies the thesis project has learned from. The selected project criteria are buildings that work with flexibility, events, temporality, and permanence.
Sketches

The use of pencil sketches has been an essential element in the project's development and has served as a catalyst for testing ideas, both shaping external gestures and internal relationships. The sketches help explore the structural systems, overlaying programs, circulation, urban spaces, and the building's connection to the dry dock, among others.
Design Proposal

The new cultural hub
Physical model 1:500
Activating the dry dock
Main event // Activating the dry dock
Final destination, tourist ferry // Drop off
Mindful exercise // Sauna, winter bathing
The Veins, Infrastructure // Performance space
Timber

Steel

Timber

Timber

Two panes separated by spacers to create an air pocket between the glass panels.

Steel frame with polycarbonate sheets.

Thermopane glass

Flexible wall

Heat, lower and upper horizontal sheaths.
The project started with an uncertain future for Refshaleøen, which asked the question of how we develop our cities. This has given me the opportunity to explore methods by which architects develop urban areas. It has been an exciting and educational process, I have had an openness and curiosity from the start that has characterized the project.

The building proposal has been developed in a wide range of scales as it has been my ambition to create a project that challenges the methods architects use today in their work with future urban areas.

In urban planning, it is often experienced that a place loses its original identity, and the new areas may appear identityless. The thesis explores new methods and an open approach to urban development. It has been essential to look at scales, both in terms of a general dialogue and specific perspectives. Furthermore, it has been many ways been rewarding to include a range of stakeholders that would potentially define the framework and content of the proposed project.

Particular emphasis has been placed on creating an architectural whole that enters into dialogue with both the city, the industrial past of Refshaleøen and its future inhabitants.

The good city is a place that is able to go across traditional 'mechanistic' divisions, in order to create efficient and sustainable conditions for both people and future development. People must not only have something nice to look at, but must also have something to do, something to live on, and something to build on.

The vision has been to create a dynamic and inviting urban cultural hub that promotes innovation and knowledge sharing by bringing leisure, events, crafts, research, and professions close together. Copenhagen’s new hub will form a new living waterfront that activates the area around the dock with daily and varied use.

The project has taught me how influential architecture can be and how it is a powerful tool in the debate about future urban development.

Reflection