

Norges miljø- og
biovitenskapelige
universitet

Masteroppgave 2016 30 stp
Institutt for landskapsplanlegging

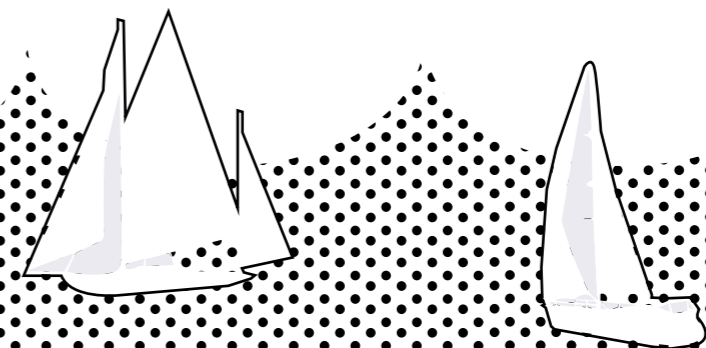
Seaside East - The Urban Software

Prathepa Kirubaharan
Landskapsarkitektur

| SEASIDE EAST |
THE URBAN SOFTWARE

by
Prathepa Kirubaharan

Master in Landscape Architecture
at the
Norwegian University of Life Sciences





LIBRARY PAGE

Title:

Seaside East - The Urban Software

Author:

Prathepa Kirubaharan

Supervisor:

Deni Ruggeri, Associate Professor in the Institute for Landscape Architecture and Spatial Planning at the Norwegian University of Life Sciences

Pages:

000

Font:

Roboto Light, Bold

Images & graphics:

if nothing else is mentioned, the author herself have taken the images or produced the graphics

Keywords:

Horten, Horten city center, coastal city, sustainable development, sustainable city, adaptability



BACKGROUND

This master thesis is written at the institute for landscape planning, at The Norwegian University of Life Sciences. It also marks the end of my 5-year program in Landscape Architecture and the paper makes up 30 ects.

Most of my childhood was spent in the capital of Norway. Therefore, I seem to identify myself with urban cityscapes the most. As the population grows, there will be a need for densification. This will result in creating as little a building imprint on our planet as possible, and will additionally; put pressure on our urban recreational areas. In this process adaptable design becomes important. The theme of urban adaptability was introduced to me by reading competition entries from European, which is a design competition for urban planners.

ACKNOWLEDGEMENTS

In appreciation of academic help, discussions and motivation I would like to thank the following people;



Fig1

Deni Ruggeri
(Main Supervisor)

First manensis at institute of spatial planning at the Norwegian University of Life Sciences



Fig2

Christoffer Evju Olavsson
(Contact at Norconsult AS)

Architect & Urban planner that focuses on early stage planning related to regional and urban development, town center development, retail and transport



Fig3

Marianne Rye Beck
(Contact at Norconsult AS)

Architect working with city development projects with a focus on urban public spaces. She also worked for Norsk Form under By:lab that specializes on the socio

material connections in city development.

I would like to give a special thanks to my friend Rokeis Dalente Convington and cousin, Darshan Kirupamoorthy, for support during this time.

Lastly, I would like to thank my peers for all their help and motivation the last five years. And also my family and friends for support throughout my education.



ABSTRACT

In less than 15 years, 40% of Norway's population will live along the Oslofjord. Population growth often means more urban development, which again puts pressure on our natural resources. Horten in Vestfold is one of the coastal cities along the Oslofjord.

Horten City originated as a result of its location by the sea, and its traditions connected to both shipping and the Norwegian navy base that was located here. The city center established behind the waterfront, where it also lies today.

Seaside East is the site dividing the city center of Horten and the waterfront. The industrial grey areas of the site collectively act as a barrier today. This paper looks at urban adaptable design strategies that can tie the waterfront back to its downtown again. I hope to promote the potential in Horten's Seaside East and the result can be a contribution to the future development of the city center expansion. If a lively city center is a goal, the accessibility to the water should be a priority.

CONTENT

00

Library page	4
Background	5
Acknowledgements	6
Abstract	7
Table of Content	8-9

01

Relevance	13
Introduction to theory: Adaptability	14-15
Social Processes	
Polychromatic and Multifunctional Spaces	17
24-Hour Society	17
Accessibility & Identity	19
Community Participation	19
Natural Processes	
Urban Ecology	21
Development Processes	
Walkable Communities	22-23
Step-by-Step Process	24
Mixed Use	25

02

Site Appraisals	32-33
Premisis	34
General Program	35
Research Question	36
Social Processes	
History	40-43
Demography	44-47
Identity	50-53
Social arenas	54-57
Community participation	61
Summary: Social processes	66
Development Processes	
Daily Average Traffic	70-71
Car Parking	72-73
Pedestrian + Bicyclists	74-75
Landscape	76
Barriers	78-87
Public Transportation	90-92
Building Typologies	98-99
Zoning plan	100-101
Preserved Buildings	106
Summary: Development processes	106
Natural Processes	
Climate Change	110-113
Green structures	114-116
Pollution	118-119
Summary: Natural Processes	120
SWOT-Analysis	122-123

03

Main Tasks	126
Conceptual Approach	128-131
Addressing Barriers	
Strandpromenaden	132
The Ferry Terminal	134-137
Addressing the Circuits	
South-North Circuits	138-139
East-West Circuits	138-139
Elevated Pedestrian zones	140-141
Completed Circuits	142-143
Walkable street types	144-149
Traffic Flow Today/Tomorrow	150-151
Development Hardware	
Blocks	152-153
Block Adaption	154-155
Block types	156-159
Green Hardware	
Green Structures	160-161
The Green Link	162
Courtyards & Green Roofs	163
The Urban Floor	164
Cleansing the Ground	166
Waterfront	168-169
Social Software	
Usergroups	170-171
Overall Plan	172-173
Zoom in #1: Pedestrian Bridge	176-179
Zoom in #2: Shared Space Crossing	180-181
Zoom in #3: Green Link	182-185
Zoom in #4: Housing+Businesses	186-191
Case studies	196-197
Phases	198-199

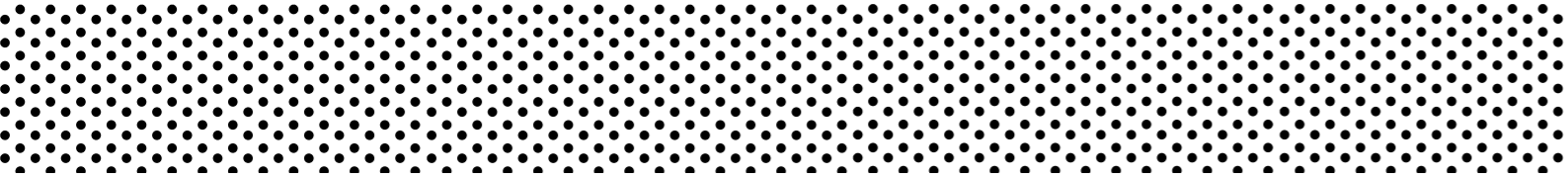
04

Conclusion	200
Photos & Graphics list	201-202
Source list	203-204



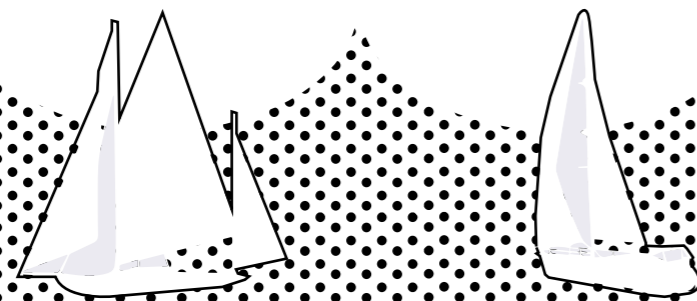
THEORETICAL THEME: ADAPTABILITY

This chapter addresses the theoretical theme as well as explaining the relevance of this for the case site.



40%

of norway's population
is going to live along the
OSLOFJORD by 2030.



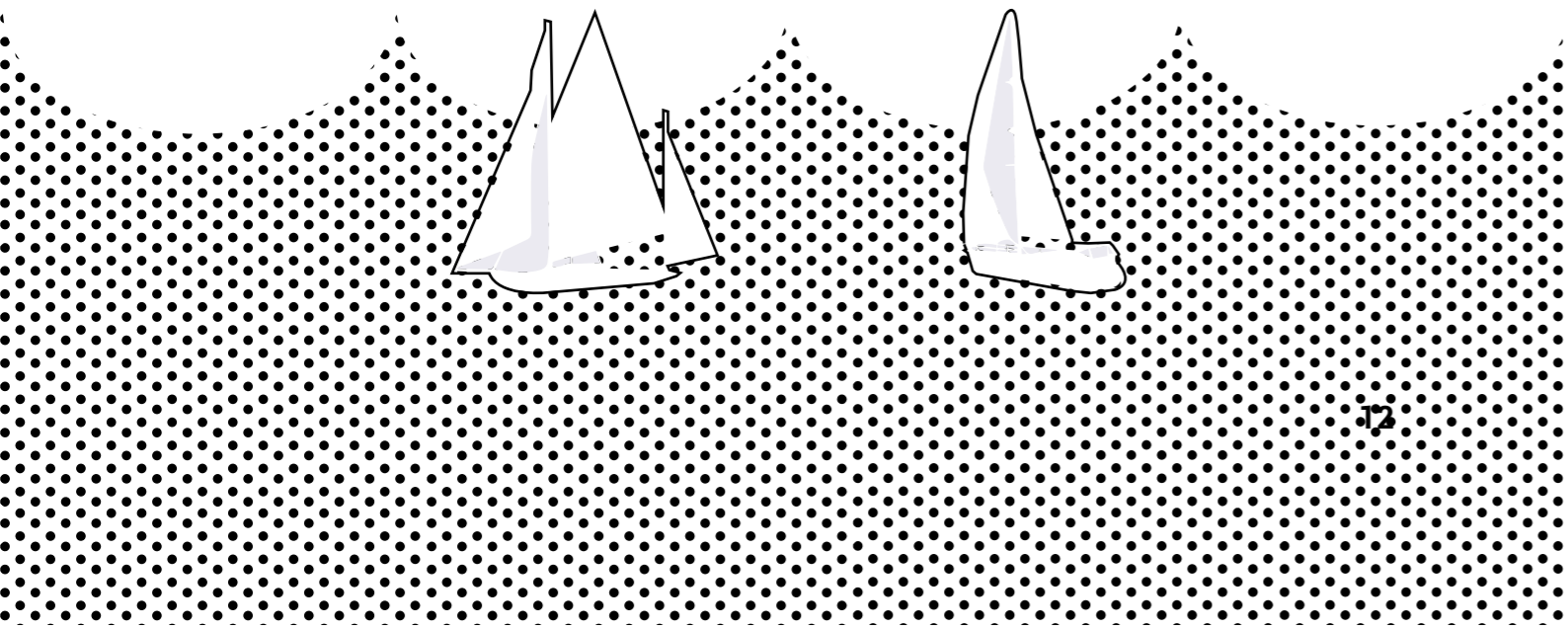
RELEVANCE

Future prognosis shows tendencies where next to 50% of the U.S population will live along coastal cities by 2030 (Lund 2015). Similar prognosis have been done for Norway. The research present that 40% of Norway's population will live along the Oslofjord region. Today 1.6 million people live in cities that border the Oslofjord, Horten city being one of them (Dannevig 2006). The population growth that will happen requires us to design our coastal cities resilient, but also adaptable for the social and built change that will occur. In addition to some of these expected changes, some are unexpected, such as climate change. The consequences such as extreme weather and other changes that can affect our landscape destructive ways, needs to be



Fig5

(The illustration displays 196 coastal cities with a population over 1 million in 2005).



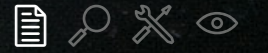


RESILIENCE AND ADAPTABILITY GOES HAND IN HAND

Resilience can be generally defined as the capacity to:

- (1) absorb stressors and maintain proper functionality, even in the face of external stressors imposed upon by a litany of variables, such as: climate change and (Walker 2004)
- (2) adapt, reorganize, and evolve into more desirable configurations that improve the sustainability of the system, leaving it better prepared for future climate change impacts. The concept has since been adapted and reused in a plethora of urban contexts. A resilient city will often contain systems that enable a variety of future scenarios (Walker 2004).

In "Ecological Design", resilience is explained as the design of spaces and environments so that they become adaptable to changes as time passes (Rottle 2010).



INTRODUCTION TO ADAPTABILITY

"A space's quality of being able to adjust to new conditions over time" (own definition)

SPACE

space is a physical construction, where social processes happen. Naturally, urban development has to take the physical and the social processes into consideration. This is a two-way process whereby people shape and take use of their space, simultaneously, the space affects them (Carmona 2010).

CHANGES OVER TIME

The effect of different processes require that our cities be prepared to adapt and incorporate changes. This thesis will look at these 3 time aspects: Natural processes, physical development processes, and lastly social processes (Urnes 2013).



SOCIAL PROCESSES

People and their activities are dynamic. Depending on the time of day or year different spaces are used differently and constitute a rhythm to the space. The rhythms are what form the foundation for social relations (Lefebvre 1973). Placement of different functions as housing, work places and businesses has a considerable influence on how the city is used (Carmona 2010).

SOCIAL PROCESSES

POLYCHROMATIC AND MULTIFUNCTIONAL SPACES

Henri Lefebvre is most known for his theoretical piece about production of the social room. In the book "Rhythmanalysis", he explores analysis rhythms in urban spaces. He calls rhythms that overlap polyrhythms (Lefebvre 1973). Polychromatic spaces are in use at different times during the day and leads to different rhythms being produced. Jane Jacobs illustrated the overlapping functions role, to achieve a variety of rhythms.

Leon Kreitzman says the spatial planners of today need to make buildings and outdoor spaces to be polychromatic (Kreitzman and Foster 2011). This is because today's communities are of the "24-hour society" kind that takes use of more hours of the day than earlier in history. That way, life and activity can happen without zone divisioned areas staying empty all day, or several hours during a day (Carmona 2010). Polychromatic spaces will contribute to a more extensive utilization of time, instead of using new plots for new use.

A space's rhythm can be registered as either mono or polychromatic. There is a distinct connection between function and time use. In monochromatic spaces, buildings and its content are only in use in a given time phase, and will otherwise stay empty.

24-HOURS-SOCIETY

In the industrialization era people started following a "mechanic day rhythm". People had a fixed time where they would be at work and at home. Due to the regularity of gas lighting in factories, the businesses did not depend upon time of the day or the season (Helle 1996). Daily rhythms and yearly rhythms got established. A technological growth in the society led to changes in cities and small town infrastructures: one could now travel by car or train. This made it possible for families to live more spread out. Where people lived and worked were two separate spaces. In bigger parts of the 1900s this became an ideal for spatial planners (Helle 2006). In modernist planning, the city was way more divided into zones. Form and function was defined for people's use of their space. Thus, the city's rhythms were organized. The sociologist, Zerubavel, claims we also replaced those natural rhythms with fixed times of calendars and watches (Urnes 2013).

Social changes lead to a better economy, which consequently leads to a more flexible time use. This also meant that people could make more use of their social arenas to different times of the day (Gehl 2010).

Social life is not just about synchronizing people's pace. It is also about identity, democracy, economics, and awareness of the uniqueness of a place.



SOCIAL PROCESSES

ACCESSIBILITY & IDENTITY

Depended upon our physical environments we get a perception of what a space is and what it communicates. Our environments gives us an image of what is perceived as "ours" and what is "theirs" - how accessible the areas are, who owns them and how does it feel to roam there. (Urnes 2013) A space's edges are crucial in the way we use the city. In the edges different activities can meet and supplement each other. Christoffer Alexander accentuate the edges importance in the book, "A Pattern Language"; "If the edge fails, then the space never becomes lively." (Gehl 2010). For many coastal cities their waterfront is the most visible edge, and accessibility to the water's edge is critical to **social identity**.

COMMUNITY PARTICIPATION

"The myth that the affected population is too shocked and helpless to take responsibility for their own survival is superceded by the reality that on the contrary, many find new strength during an emergency" (Watsan 2005, p1).

Community participation refers to the involvement of people in design and planning. People should be given the opportunity where possible. This is a basic human right and a functional principle of democracy(Watsan 2005).To plan in an adaptable way, as spatial planners we need to know get to know the space as much as possible -the users of a community is the key to this (Watsan 2005). This is not only about shaping form and function. Community participation opens up for a discussion between the planning authorities as well.

NATURAL PROCESSES

Natural processes are the natural changes in a space. Everything in the nature is part of cycle of processes, with diverse time intervals and different scale; from small biotic processes to large natural processes as floods and tsunamis (Urnes 2013). Some of them we can predict, others catch us by surprise. These processes are in constant change and create the fundament for different uses of it to different times.

URBAN ECOLOGY

- NATURAL PROCESSES IN THE CITY

Urban ecology, in the context of city planning, tries to integrate the city as part of the local and global ecosystem (Rottle 2010). Urban ecology consists of adaptable systems to change. In the past, nature and the city was looked upon as two separate entities. Nature was outside the city, with exception of parks and other green lungs. Urban ecology looks at the two as overlapping features where the nature is part of the city, and the city is part of nature (Mcdonnall 2011). Storm water control is a physical strategy of urban ecology. In addition to helping our urban environment to function, nature within the city, serves up a bevy of physiological benefits. (natural features, settings, and processes in urban areas can help to reduce stress associated with urban life.) (Rottle 2010)





THE DEVELOPMENT PROCESS:

Often development processes happens due to changes in social relations. It goes the other way around as well where the **social changes occur due to physical changes.**

WALKABLE COMMUNITIES IN PORTLAND; A RESULT OF DEVELOPMENT CHANGES

Infrastructural changes

In the 70's Portland made alot of distinguished decisions that made it differ from many other American cities. "While most cities had an urban sprawl growth, Portland implemented an urban growth boundary. While most cities where building out parallel parking, Portland instituted a skinny street program. While most cities were building out their roads and highways, Portland invested in their bike lanes and paths for pedestrians. They spent 60 million USD on bike facilities. The money was spent over 30 years, so each year 2 mill was spent."(Speck 2013)

Driving less impacts lifestyles

Changes like these altered the way Portlanders lived their lives. In Portland vehicle miles travelled per day, the amount that each person drives, peaked in 1997 - and has decreased ever since. Today Portlanders drive 20 % less than the rest of the U.S (Speck 2013). The typical Portlander also drives 4 miles less and 11 minutes less per day than before. The economist, Court Wright, did some calculations showing that those 4 miles and 11 minutes adds



Portlanders drive **20%** less than the average american



3,5% of income that could have been used on car expenses are used on other things.

up to fully 3,5 % of all income made in the region (Speck 2013). So if they are not spending that money on driving, what are they spending on then? Speck goes on explaining that Portlanders have the most roof racks and independent owned book stores per capita as examples. These examples are used to paint a bigger picture illustrating that most Portlanders use much time on recreation, compared to inhabitants in other american cities.

Built changes in the city attracting new users

Young educated people have been moving to Portland in droves. Between the two sentences they had a 50 % increase in college educated millenials, which is 5 times more than the US average (Speck 2013). In one hand the city saves money, by it being more bikable and walkable, on the other hand it also is the "cool kind of city". According to Speck the most strategic economic plan for a city is not to do what have been done in the past - by trying to attract corporations, by having a medical or a biotech cluster, but by being a place people would want to live. Of these young educated people, 64% decide where they want to live, and then look for a job (Speck 2013).

Health aspect of the development change

An article from NRK states that 44% of norwegians were overweight in 1980, 30 years later the number is 53% (Bostad 2014). "The health care crisis can be looked upon as a urban design crisis. And in the design of our cities lies the cure", says Speck.

Diet impact weight, and weight impact health.

“Is being more sustainable what gives you a higher quality of life? the same **thing** that makes you more sustainable is what gives you a higher quality of life - which is to live in a **walkable neighbourhood.**”

(Speck 2013)

Speck stresses inactivity as an additional factor saying that is born from our landscapes - Inactivity that comes from a place where we live where there is no such thing called as a useful walk is driving our weight up. In his talk he adresses a study that shows weight gain correlating to two different factors - diet and inactivity. Inactivity was shown to be much more of a correlating cause. We have studies tying weight to inactivity. But now we also have studies tying weight to where we live. There is a big health crisis that stems from environmental induced inactivity. The number of people dying of asma attacs is 3 times as big as in the 90s. The vast pollution coming from our cities is not from industrial pollution, but from car exhaust (Speck 2013).

The U.S is the 3rd country in the world with the most number of road motor vehicles per 1000 inhabitants(Ocia 2014). Portland city illustrates how social changes occur due to infrastructural changes of the mobility network. The city is the "greenest" of the cities in the U.S, making it a role model (Dalal-Clayton 2014). Portland can be a role model for car-based cities in the western world.

*The information presented in this section are highlights from a TED talk held by Urbanist, Jeff Speck about walkability.

STEP-BY-STEP PROCESS

The architect Christopher Alexander states that city planning should consist of a process that is a step-by-step adaptation. By applying small changes at the time, there is room for testing and the response could create improvement potential. This step-by-step approach can be linked to Darwin's evolution theory - an example of a self-regulating and adaptable development form (Carmona 2010). An environment that cannot change creates its own downfall.

In the 1950s adaptable design tried finding one solution mainly for social issues. In the last decades awareness for climate change has become important for urban planners (Urnes 2013). And past experiences have led us to understand that adaptable urban design is a process in itself that needs a flexible armature to respond positive to change.



small changes, huge impacts

This courtyard in Grüneløkka in Oslo was meant to stay empty in 2016, instead it is full of showrooms and pop-up stores.

Fig7

MIXED USE

In monofunctional buildings and its content is in use at a given time period only or empty. There is a connection between function and time. Places of one function are only used at one specific time. Multifunctional spaces are in use at different times at a day. This leads to different rhythms at different times. Jane Jacobs accentuate that overlapping function's role to achieve a variety of rhythms (Carmona, 2010). Mixed use spaces and buildings have a bigger potential to be multifunctional. A place of mixed use can that way adapt easier to changing conditions.

Mixed use implies a diversity of functions in a building or at an outdoor space. But for the space to be working as a livable space diversity in users are crucial(Drummond 2011).



Mixed use skyscraper
in Chicago, IL, U.S

ANALYSIS



ANALYSIS

This chapter includes an introduction to the case site in Horten and analysis & registrations of the area to uncover the challenges that needs to be adapted to.

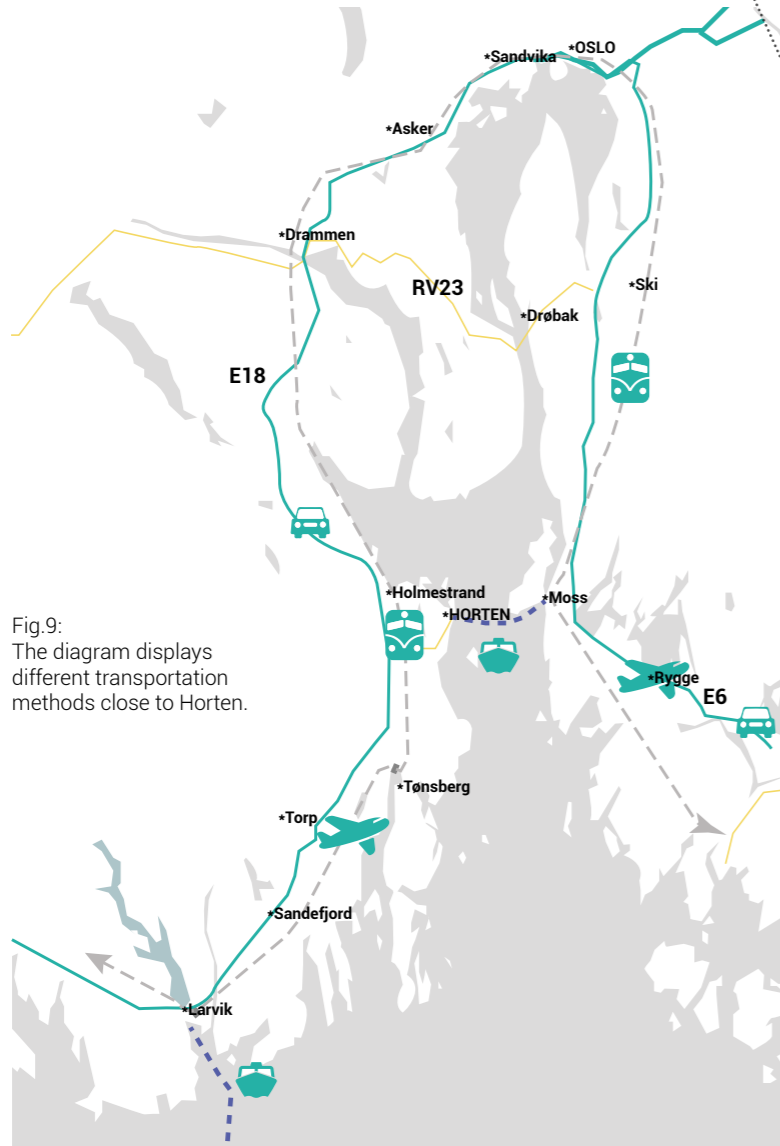
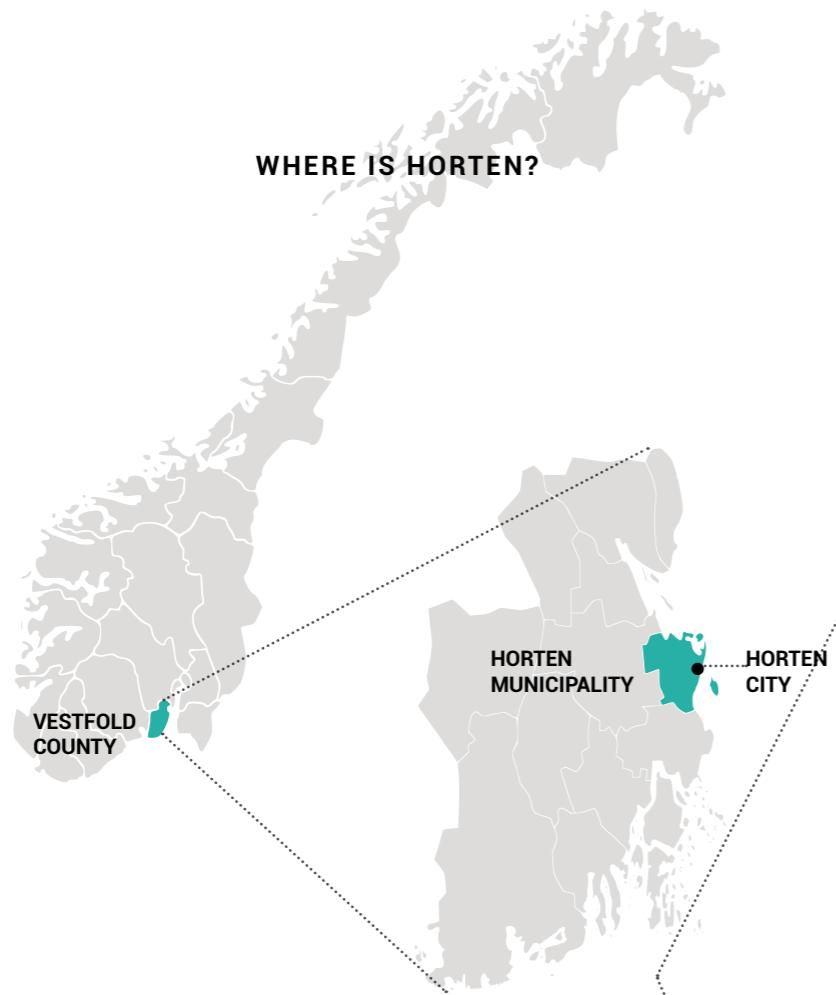


Fig.9:
The diagram displays
different transportation
methods close to Horten.



SITE APPRAISALS

In Fig.9 (B) Shows the existing city center border. The municipality wish to expand the city centre into the area that (C) is marked as. To get a better understanding of the transformation site (C) and the existing city centre (B), it is important to examine the overall structures affecting them in (A).

In this paper the main focus lays (1) on (C)the transformation site and (2) those vital areas intersecting with (B)the city centre and (C)the transformation site. As important it is to show the municipality how vibrant and livable a potential city centre district can look like, it is just as or even more important, to illustrate how and where the new district synergizes with and adapt to the existing city centre.



Fig.9

PREMISSES

BEFORE PLANNING OF AREA BEGINS



NEW TRAIN STATION

The Vestfold train will expand in the future with a double track that will run through in Horten municipality. For now there are no clarification on where the train station will be located, but there has been developed three scenarios (Municipality 2015):

1. Bakketegen - Station by the community college of Vestfold. Ca. 4,3 km away from Horten city centre.

2. Skoppum East - Station close to main road network with possibility for commuter parking. Ca. 6,4 km away from Horten city centre.

3. Skoppum Vest - Station close to main road network with possibility for commuter parking. Ca.



FERRY TERMINAL

Since the chances of a train station being located in Horten are small, the ferry's role as the main public transportation method is important

(Municipality 2015)

This proposal looks at an alternative development where the ferry transport is kept.



CARGO PORT

The plot of the cargo port, owned by Horten port Authorities, is preserved until 2026 (Horten 2015). This paper will look at the possibilities of what can

happen to the downtown if the existing harbour is moved. Since the main focus is to explore the potential of the plot, scenarios for where the cargo port is moved to is not included in this thesis.

GENERAL PROGRAM

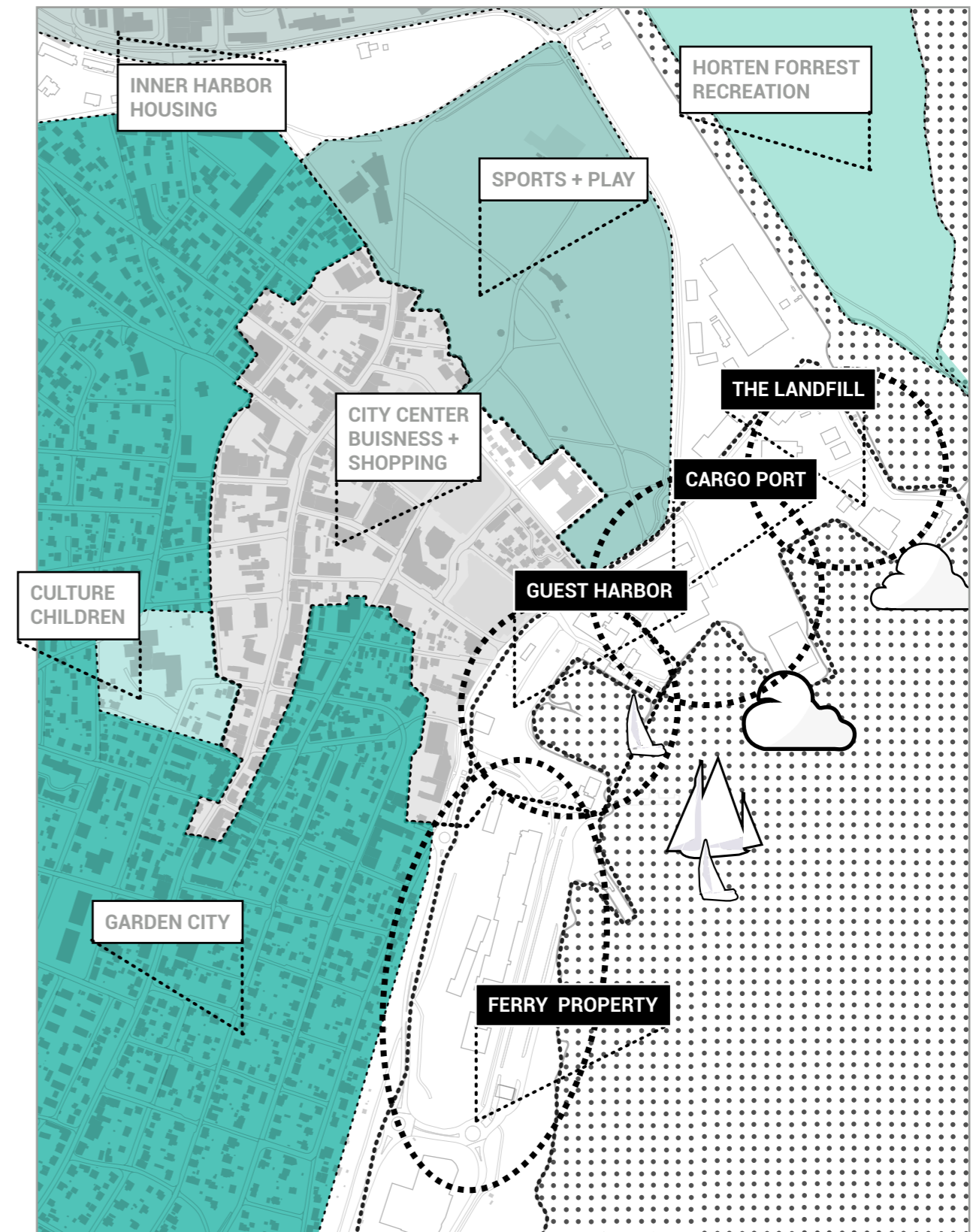


Fig.10 The map illustrates the general program for Horten City today (Brinchmann 2014).

The purpose of this thesis is to explore how a transformation of Seaside East can contribute to create a more coherent connection between the existing city center and the waterside. The thesis presupposes that the cargo port in the area is moved to release areas for housing and business development along the waterside. It also looks at an alternative development of the area that keeps the ferry transportation.

**Research question:
How to develop Horten's
Seaside East to become a
more coherent part of the
existing city center with an
accessible waterfront in an
adaptable way?**



SOCIAL PROCESSES

- 1. History**
- 2. Demography**
- 3. Identity**
- 4. Social arenas**
- 5. Community participation**

HISTORY

MAPS THROUGH TIME



Horten Image6

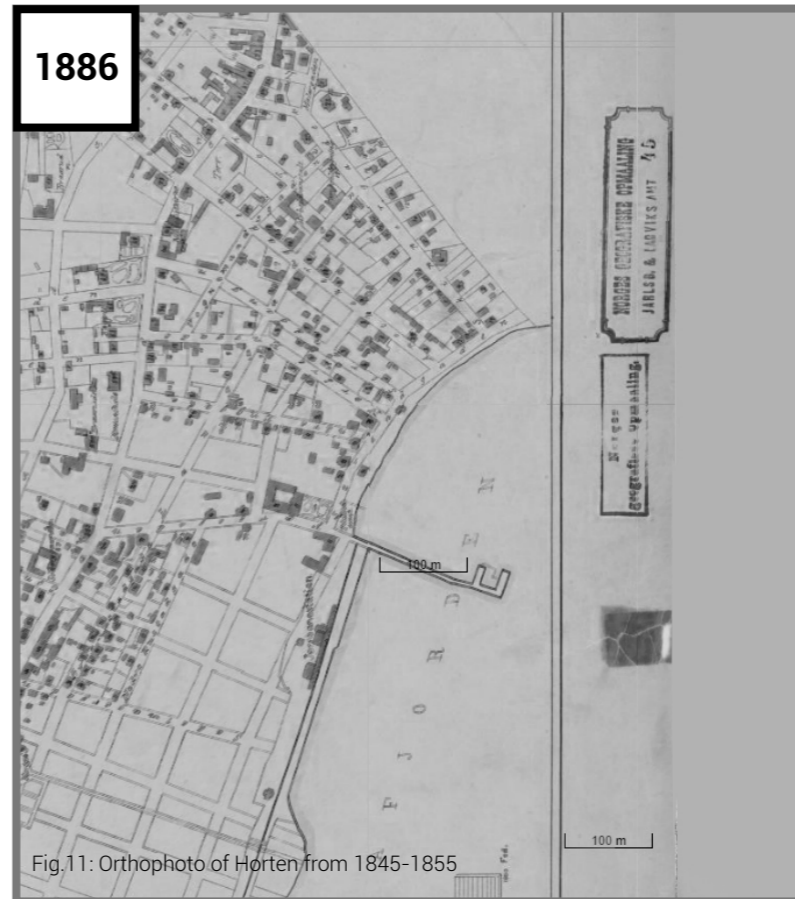


Fig.11: Orthophoto of Horten from 1845-1855

- 1) 1845:**
- Horten is a small vacation place
 - Horten is chosen to be Norway's new navy base.

- 2) 1850:**
- The canal gets built
 - Horten as a city takes shape.

- 3) 1855:**
- The church is built
 - Horten becomes a sea port.
 - The Vestfoldbane get created.

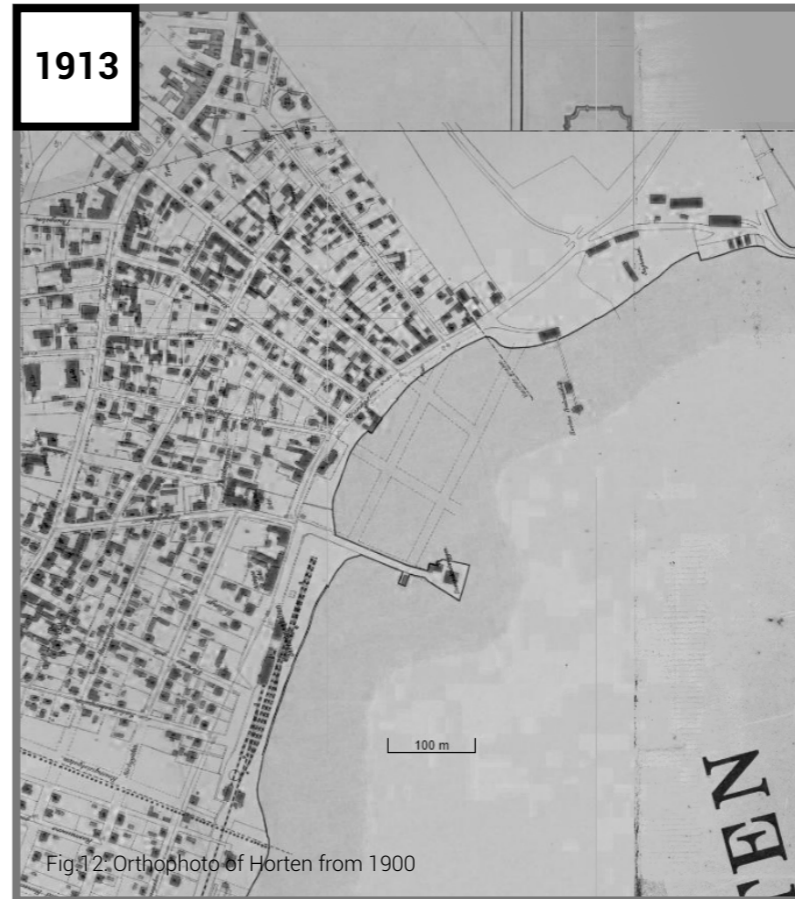


Fig.12: Orthophoto of Horten from 1900

- 4) 1900:**
- Horten get township
 - The city center is in development
 - Cultural attractions, such as theaters and community colleges get built.

*Information source (Moi, 2016)



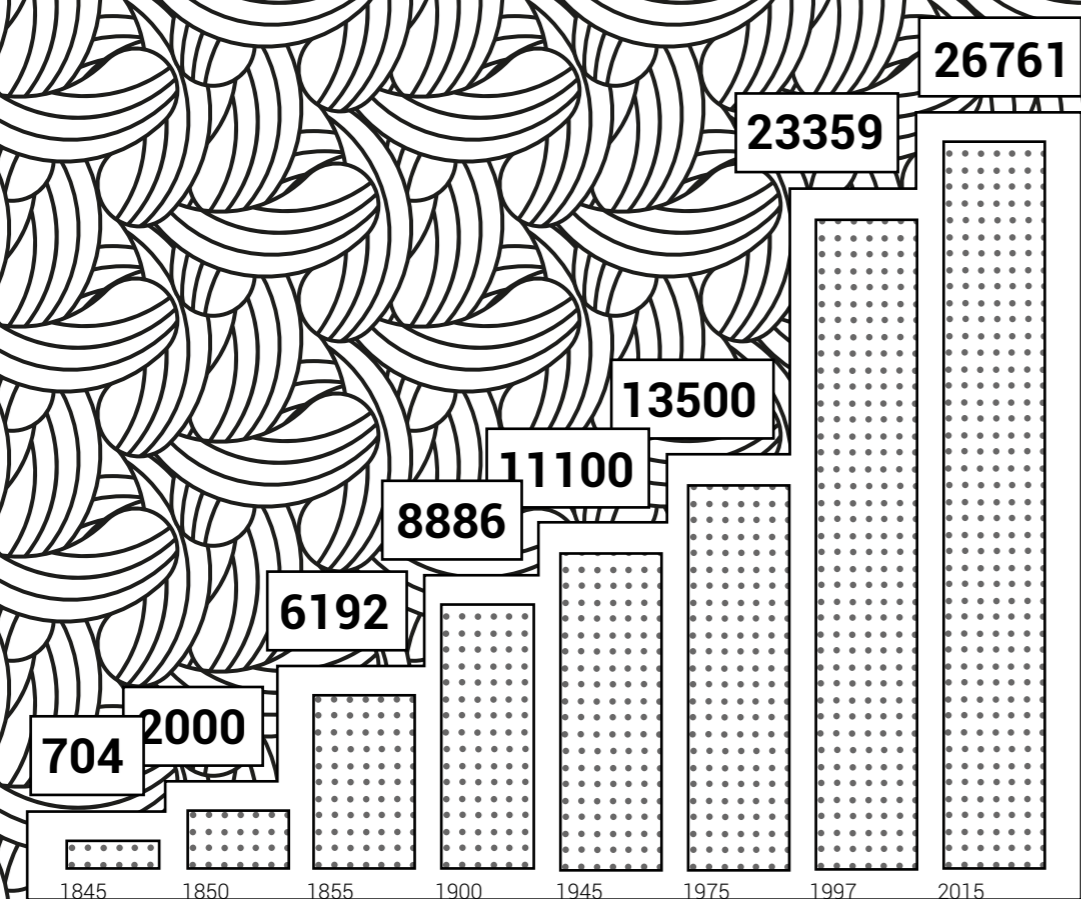
- 5) 1945:**
- Bigger housing projects in downtown
 - The navy base gets moved to Bergen
 - The deep water quay is built.



- 6) 1975:**
- Part of downtown gets redeveloped
 - Horten and Borre municipality merges



Fig.15: This is an orthophoto captured of Horten in 2003, the image of the city today, in 2016, is similar. Future development and expansion of the city center are decided by the municipality to happen along the industrial plots close to the waterside. This property is called Seaside East.



POPULATION GROWTH

Fig.16: Information in the graph collected from (Moi 2016)

POPULATION GROWTH

Horten municipality has had a steady population growth. It is expected for the municipality to grow by 1.1% every year. Today there lives 26751 people in Horten municipality, 70% of these live in Horten city, but only a 14% of these again live in the city center (Municipality 2015).

As stated, 40% of the population in Norway will live along the Oslofjord by 2030 (Lund 2015). The further development of Horten will affect these numbers.

AGE GROUP	NUMBER OF PEOPLE
0-5 years	127
06-12 years	134
13-15 years	60
16-18 years	47
19-30 years	385
30-49 years	596
50-66 years	556
67-79 years	467
80+ years	294
TOTAL	2666

Age distribution in the city center

DEMOGRAPHY:

PUBLIC HEALTH PROFILE

Public health profiles, done by fh.no, states on their website that the public health profile can be used as indicators for questions regarding the inhabitant's health condition and how the situation in the municipality is regarding factors that either reduce or increase the population's health. The stats in this report compares Horten municipality to the country's average on different topics, such as education, health and living conditions (Grøholt 2015).

- Life expectancy for women are lower
- The difference in life expectancy between the people with higher education and the ones without are about the same as the country average.
- The number of people with psychological illnesses or symptoms in the age group 15-29 is higher than the country average.
- The number of people taken into hospital for heart diseases is the same as the average.

Below is a summary of the report. The dotted boxes indicate a higher or the same as the country's average, while another text indicates lower than the country's average.

Population:

In the age group 45 years and older, a lot more people live alone.

Living conditions

- Number of people in high school or taking higher education is not very different from the country average.
- Number of children living in homes of parents with low economic income is higher than the country average.

School

- Drop-out from high school
- Number of 5th graders on mastering level in mathematics are higher than the country average.

Living habits

On a municipal level, there are few stats to find on dieting, physical activity, use of tobacco, alcohol, and drugs. In the public health profile there are some data to find on smoking habits and obesity that can give us some indications on the municipality's living habits. The numbers under the theme health and illnesses can also give us an indicator of this

information.

Health and illnesses

The difference in life expectancy level can tell us something about social health differences in the municipality.

Fig.17:



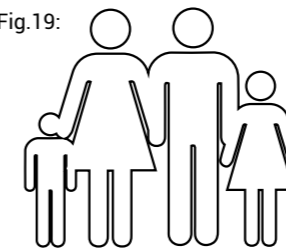
15% of teens deals with **mental problems**.

Fig.18:



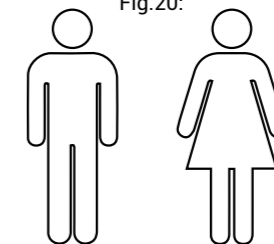
22% of the people living in the city are **overweight**

Fig.19:



Households with parents of **low income** is increasing.

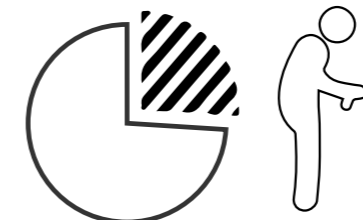
Fig.20:



49% **51%**
77 YRS **81** YRS

The numbers indicate the amount of men and women in the city and the gender's life expectancy

Fig.20:



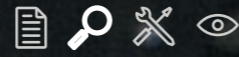
26% LIVE ALONE

More and more people live alone

The information extracted from these infographics are some of the highlighted information in the public health profile done for Horten City.

DID YOU KNOW THAT...

The "Did you know that..."-Sections are meant to contribute information about social life in Horten throughout the paper. Both the information and the layout of the pages contrast from rest of the thesis, giving the reader a break now and then.



HORTEN IS THE COUNTY WITH THE SECOND HIGHEST NUMBER OF DRUG-RELATED INCIDENTS FOR EVERY INHABITANT

(Rønning 2013).



IN HORTEN THERE ARE 22 NARCOTIC INCIDENTS PER 1000 INHABITANT IN A YEAR



HORTEN NAMED THE WEED CAPITAL IN VESTFOLD COLLOQUIALLY

Fig.21:

ROUGH AROUND THE EDGES

According to the to a news article from "Gjengangeren", the police in Horten states the problem is not correlated to the amount of narcotics in this town, but the efforts of the police force.

People say that it first became easy to smuggle drugs into Horten after the danish boat started arriving at the town between the 60s and 70s. After this Horten was known as "Hasjforstaden" by many. The image most people had of the town was often colored by this. "Both the town and the people living in it got a reputation of being scruffy and sketchy looking", Gjengangeren writes.



IDENTITY:

THE GARDEN CITY

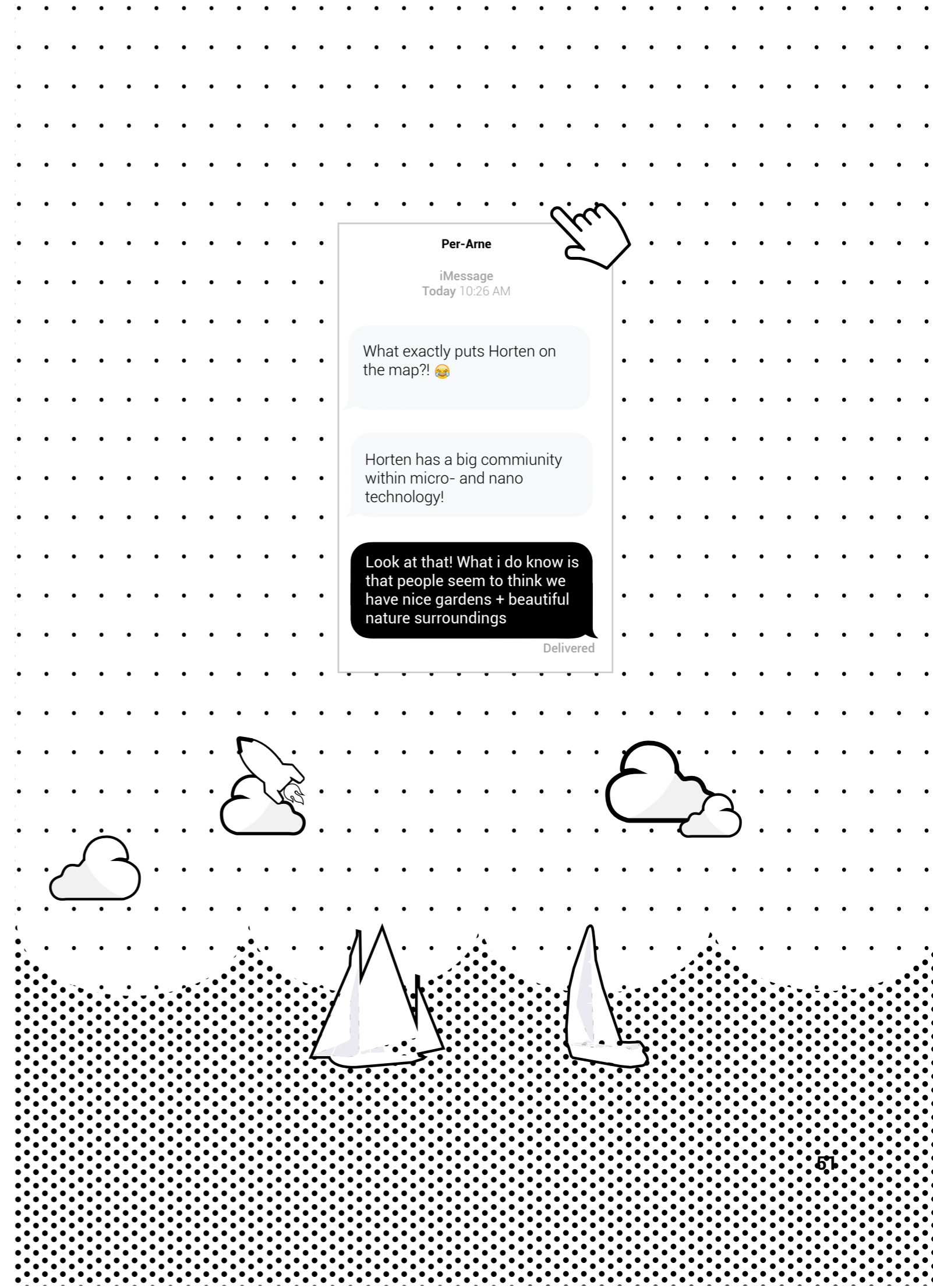
In small towns, there are no developed traffic pivot, a forest of high buildings and dense population, but they have unique geography environment, natural scene, dwelling houses close to the folk customs, large space and fresh air. Small towns are short of the economic superiority but have more local characters.

This is the exact case for Horten. The population appreciates the small town urbanity, meaning the low building heights, etc. The city brands itself as the garden city, as a large portion of the city consists of traditional single houses with bigger green spaces as gardens. When looking at Horten in a holistic way, this contributes to their green structure.

According to SSB, Norwegians tend to live in more non-collective residential types than other countries in Europe (SSB 2013). There is also a known stereotype that most Norwegians would want a big house with a large garden. Therefore, this has been a huge attraction magnet for people wanting this a traditional residential.

NATURE

In addition to the greenness of the garden city that one is met by when entering the city, Horten has other great nature qualities close to the city; such as parks, forest areas, and the ocean. This is an element of the city that most people in Horten find pride in.



IDENTITY:

TECHNOLOGY

Most people do not associate Horten with technology. For outsiders, this almost might come across as a hidden identity of Horten city.

Horten municipality has the country's most concentrated business environments within micro technology and marine electronic. Some of the bigger firms are SensoNor, Kongsberg Maritime, Kongsberg NorSpace, GE Vingmed Sound, Noratron. An initiative to make Horten the national center for microtechnology was an important part of the zoning plans that were enacted in 1999. In 2007 this effort was moved to Bakketeignen, where Campus Vestfold lays. Empowering the college with the micro technology businesses have been important. This community has been pointed out as the Centre of Expertise in micro and nanotechnology (Horten 2015). This states

that the national authorities wish to invest in 12 business clusters across the country. The ambition for Horten municipality is now to become Global Centre of Expertise within 2016. (hentet fra kommuneplanens areal del, s. 25)

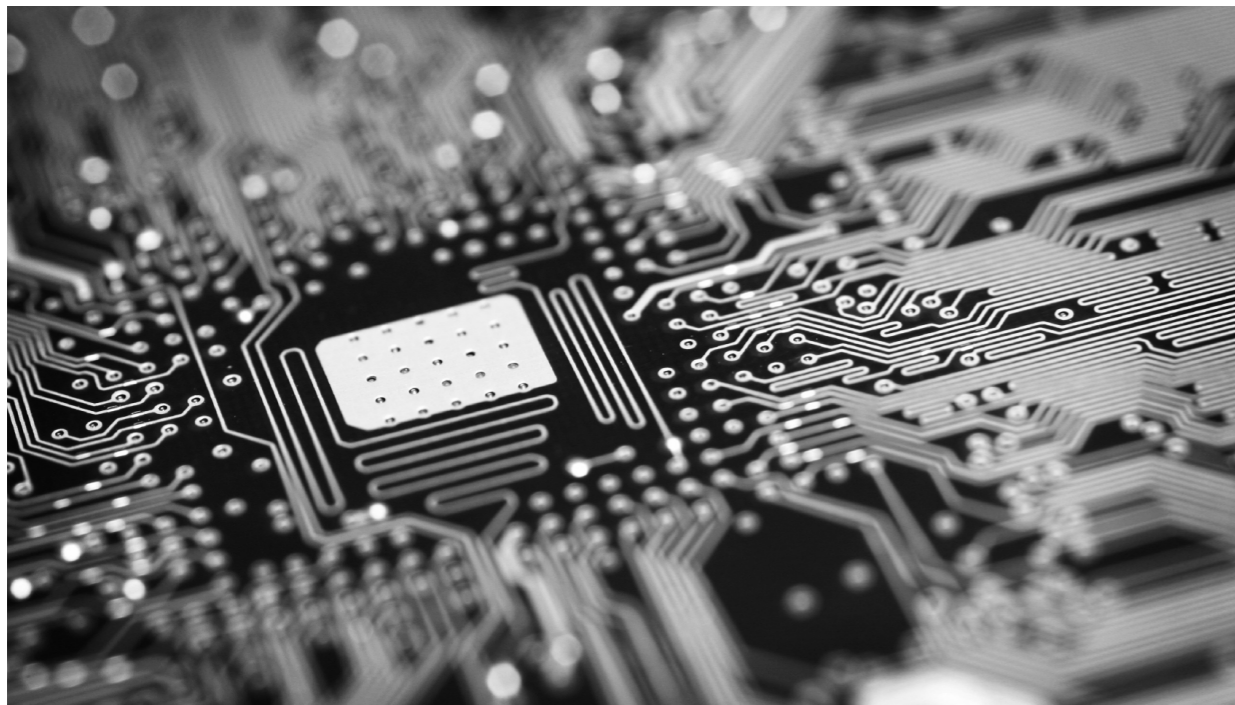


Fig.22: Nanotechnology components

Fig.23: Illustration titled "Young bright minds."



SOCIAL ARENAS

Per-Arne

iMessage
Today 10:26 AM

WOW! Horten got so many big green areas...

...But where are those intimate urban spaces? 🤔

Delivered

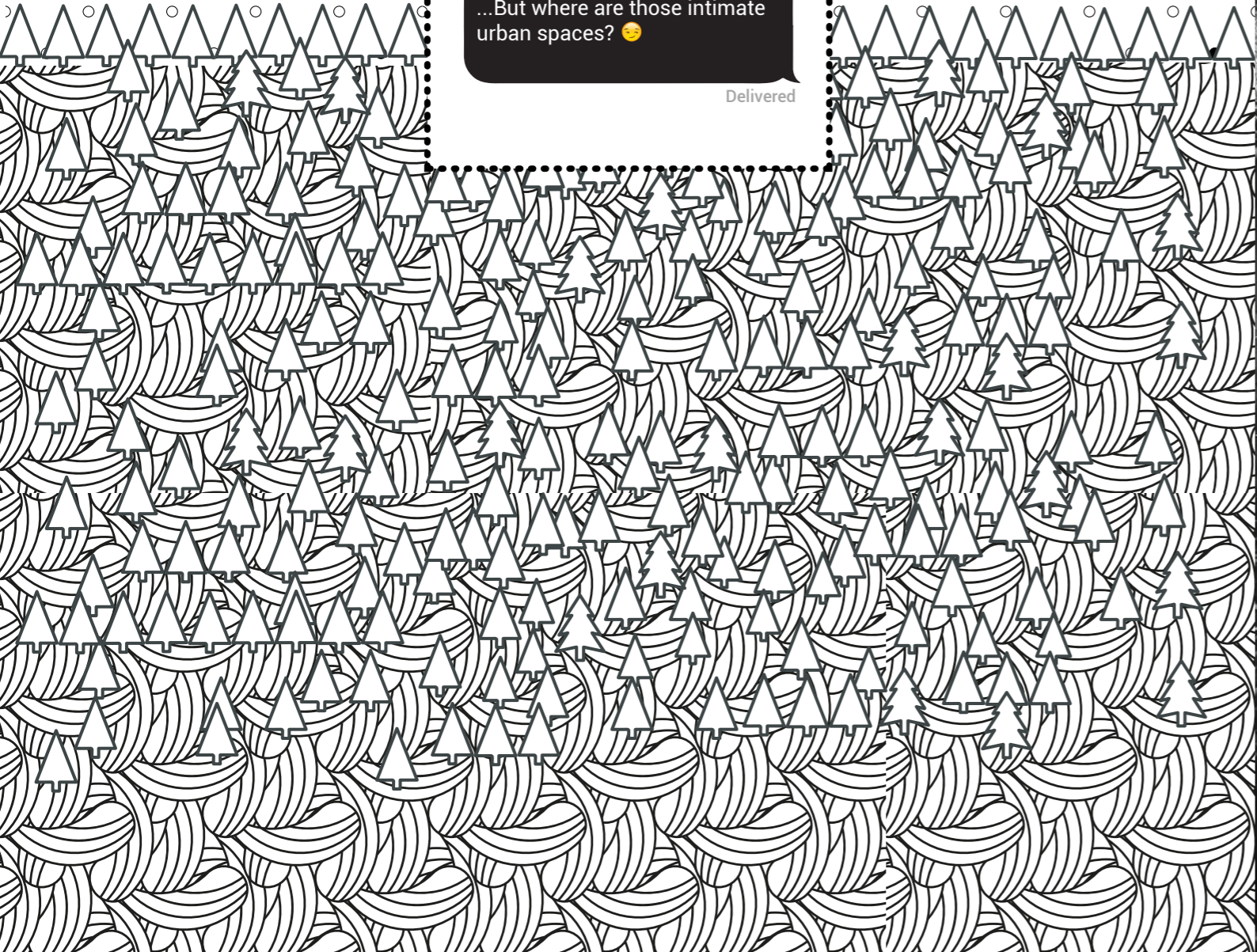


Fig. 24: "The Canal" close to Karljohansvern and the Horten forest.

SOCIAL ARENAS: lack of intimate urban spaces

Horten city center is a compact downtown that often possesses less than 500 meters between most social arenas (illustrated in Fig.28). A social arena is an interactive meeting hub where a population can come together and connect.

Whether it be a green or urban space, it may function as a social arena. In an example, the town square, the ferry terminal, and the guest harbor are all similar in that they are over-sized (Fig.26+25). In the workshops done in the past the inhabitants specified that they wished to have more intimate urban outdoor spaces (Lund 2015).

Youth and social arenas

There is consumption that people think the majority of the population in Horten city center are of the older generation. Stats show that there about the same amount of individuals between the age of 19-30, as people 67+ (Lund 2015). In cities that lack

outdoor social arenas, youth populations tend to be more predisposed to the temptation of drugs or vulgar cultural trends (Sulkunen 2002). These trends have manifested themselves into a current craze, known as car racing, which is both a very popular and very dangerous trend that has become a cultural pastime for the youth of Horten (Ormestad 2006). In contrast, Skateboarding is a popular sport in Horten and has a big community for it. However, it is a weakness for the youth that this attraction point is not located in the city center.

Indoor social arenas

Schools, cinemas, and shopping related arenas (malls) are all examples on indoor social arenas in Horten. The malls are some of the largest social interaction locales within the city center. Approximately 10% of the seating areas in the city center are public, 89% requires you to pay, most of these are to be found in the malls (Fig.27) (Westermak 2014).

Green for days

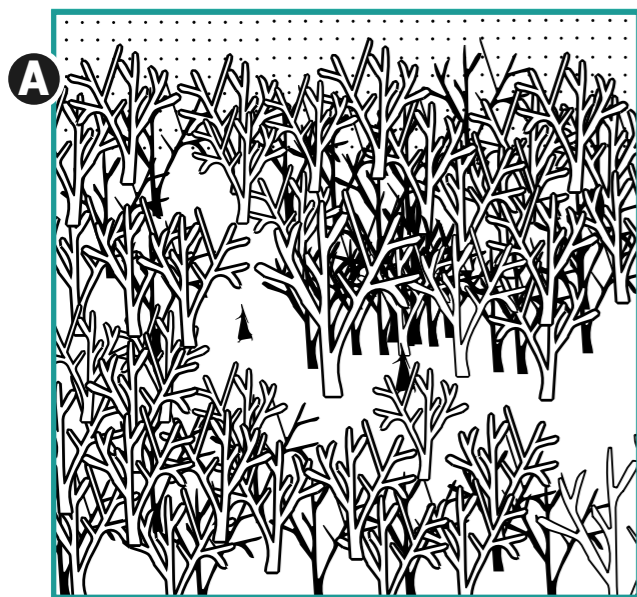


Fig.25:

Inadvertently planned parking spaces

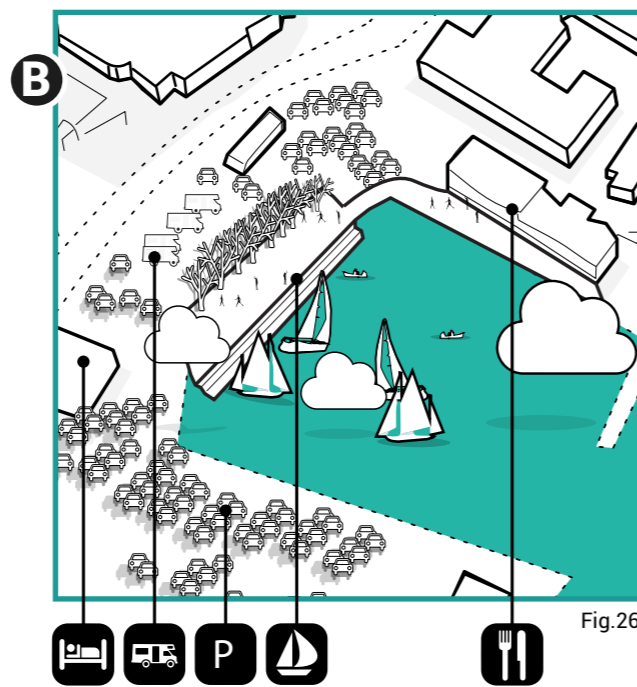
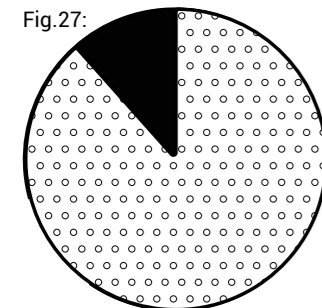


Fig.26:



11% public seating areas in the city center

89% Of the seating areas in the city center requires you to pay

DESTINATIONS POINTS

- 1 The centrum school
- 2 Horten town square
- 3 Horten high school
- 4 Lystlunden park
- 5 Karljohansvern
- 6 Guest harbor
- 7 Ferry terminal
- 8 Sjøsiden mall

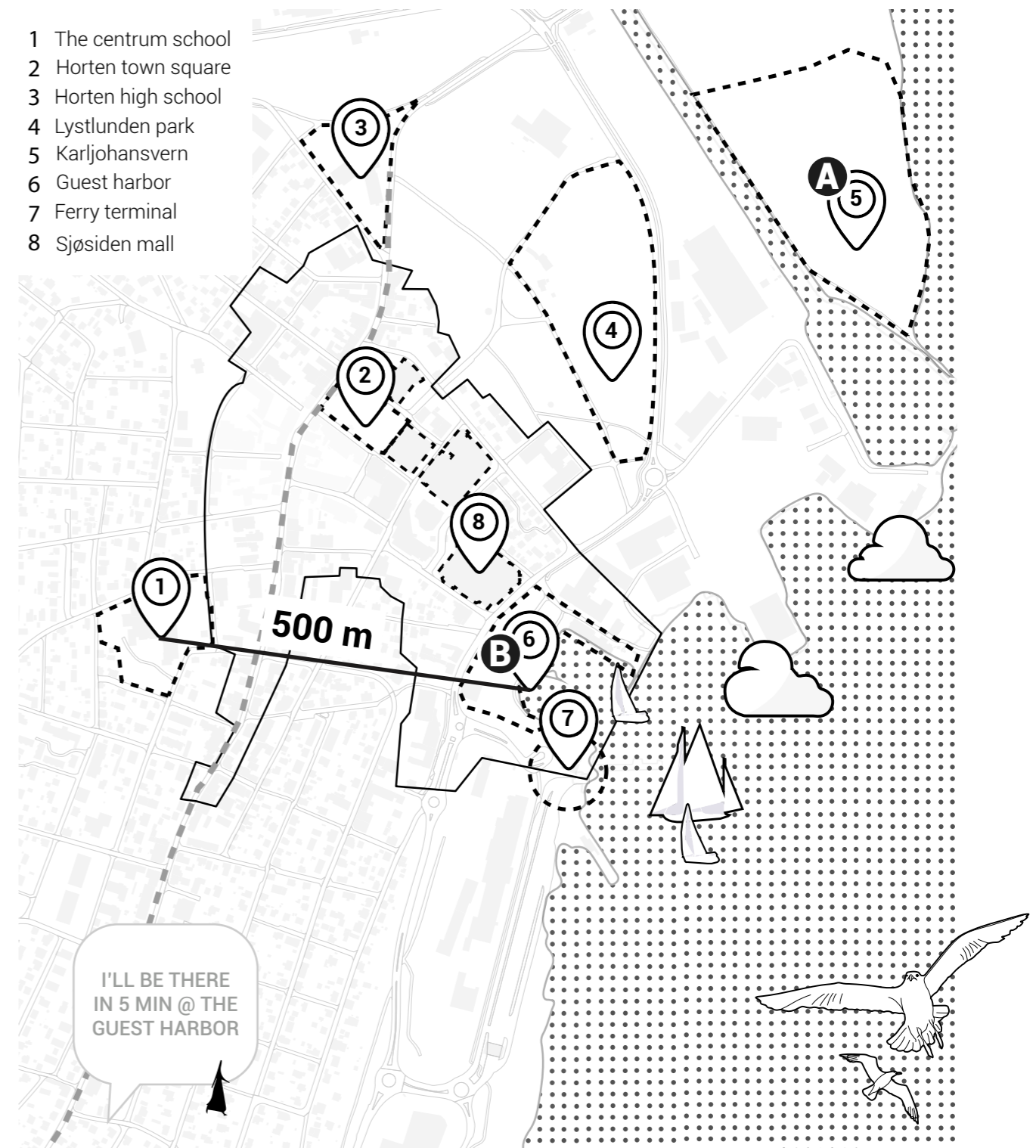
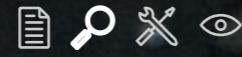


Fig.28:

+ A COMPACT DOWNTOWN

DID YOU KNOW THAT...



**HORTEN HAS THE 3RD
BIGGEST SKATING
COMMUNITY**

(Aasvang 2003)

Fig.31:



**"HANG UP" &
"KANALSESSION" ARE SKATING
EVENTS HAPPENING IN HORTEN**

Fig.29:



Fig.30:

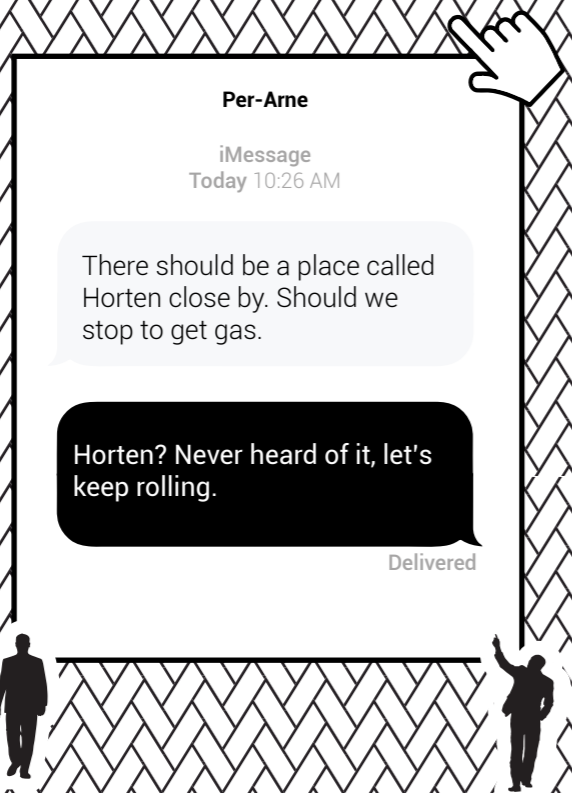


**BROMSJORDET
SKATEPARK ARE
AMONGST
THE MOST POPULAR
ONES IN NORWAY**

SKATING AS A BIG UNDERGROUND CULTURE

Horten has the 3rd biggest skating community in Norway. Festivals such as Hang up and Kanalsession celebrate this culture. Bromsjordet skatepark is a popular skatepark where people all over Norway come together to skate on (Aasvang 2003).

4 COMMUNITY PARTICIPATION



COMMUNITY PARTICIPATION

THE DREAM ABOUT HORTEN
 "The dream about Horten" is the name of a community workshop arranged by the municipality about Horten's strengths and weaknesses. Valuable information about what the inhabitants think of their city was unraveled. Below are some highlights from this workshop study (Municipality 2015).

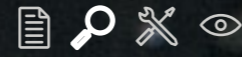
STRENGTHS:

-  **CENTRAL LOCATION - SHORT WAY TO OSLO AND ABROAD**
-  **COLLEGE - CAMPUS VESTFOLD**
-  **A COMPACT CITY WITH SHORT DISTANCES**
-  **40 KM COASTAL TRAIL**
-  **ATTRACTIVE NATURE AND RECREATIONAL AREAS**
-  **VALUABLE CULTURAL TREASURES**

WEAKNESSES:

-  **A CENTRALLY LOCATED BACK ALLEY**
-  **BEACH AREAS BLOCKED BY INDUSTRY LOTS**
-  **LOW SELF-IMAGE - WHERE IS HORTEN ON THE MAP?**
-  **MODERATE GROWTH AND LIMITED INFLOW**
-  **POLITICAL DISAGREEMENTS**

DID YOU KNOW THAT...



THE "EPLESLANG"
INITIATIVE STARTED IN
HORTEN

Fig.32:



EPLESLANGARE AVAILABLE
IN YOUR LOCAL SUPERMARKET

EPLESLANG INTEND
TO INCLUDE
EVERYONE

Fig.34:



IN 2014, 700 GARDEN
OWNERS DONATED THEIR
APPLE GARDENS FOR
HARVEST

Fig.33:



WHAT IS "EPLESLANG"?

"Epleslang" makes apple juice from local gardens. Most people have too many apples than they can harvest or eat. This company believes all apples should come to use. In Norwegian "Epleslang" means to steal apples from gardens. However, this initiative operates with the invitation of kind garden owners.

"Epleslang" have three essential values: They wish to take community responsibility, be eco-friendly and offer a high quality of apple juice. They call themselves a small business that wants to make a huge impact. They create active job opportunities that are meaningful. They create tidy gardens and good conscience. They create local ecological food.

DID YOU KNOW THAT...



HORTEN HAS MANY FESTIVALS. DURING THE HORTEN FESTIVAL IN 1978 BOB MARLEY PERFORMED.

(Rockpedia 2015)



Fig.36:



Fig.36:



Fig.37:

KANALROCK HELPS PUT HORTEN ON THE MAP FOR MUSIC ENTHUSIASTS

MUSIC CULTURE

Horten have for decades been known for their different festivals that celebrate punk and rock'n roll music.

SUMMARY: SOCIAL PROCESSES

Compared to the number of people living in the city of Horten, the population of the city center is a fraction. There is a misconception that the city center of Horten mostly consists of an older generation. Numbers states that the age distribution is balanced.

Horten has some oversized social arenas, but lack the intimate urban spaces.

Most Norwegian small towns pride themselves in their nature and garden cities. Horten has an identity that most outsiders do not know about. In Horten municipality, there are many technology clusters, which the inhabitants of Horten City also identifies themselves with.

Community participation reveals how some of the city's strengths are their weaknesses as well. The water is a part of their identity, yet, it not very accessible from the city center. Community participation also revealed how people of Horten seem to have a low self-esteem about how outsiders perceive their downtown.

DEVELOPMENT PROCESSES

1. Mobility

- Daily Average Traffic
- Car Parking
- Pedestrian + Bicyclists
- Landscape
- Barriers
- Public Transportation

2. Buildings

- Building Typologies
- Preserved Buildings
- Zoning plan

DAILY AVERAGE TRAFFIC:

MAIN ROAD NETWORK IN THE CITY CENTER

The main streets in the city center are Strandpromenaden and Storgata, running through the city from south to north, while Skippergata and Torggata bind the two inside the city center. In a way, both Storgata and Strandpromenaden marks the end and beginning of the existing city center border.

Being connected to E18 and leading the traffic to Bastø Fosen ferry terminal, Riksvei 19 is the most trafficked road in Horten - bringing in a daily average traffic of 9500 (Vegdata 2016) cars (Fig.41). Strandpromenaden is the signed traffic for all the traffic going in the north direction (See Fig.41).

Today, Strandpromenaden is a congested highway featuring four roundabouts in a stretch that does not even constitute 1 km, thereby contributing to the congestion and an unfriendly pedestrian environment. Pedestrians are often forced around the roundabout making the streets a car dominated the place.

Historically Storgata is the most important road. In 1993, the road rebuilt to a "Miljøgate," a street in a dense built area that has its intention to slow down and reduce the car circulation to achieve a more pedestrian friendly atmosphere (Brinchmann 2014).

Changes in the southeast have succeeded in reducing traffic. Storgata went down from 10.000 in DAT in 2007 to 6000 in 2013 (Vegdata 2016), but they led to an increase in traffic on Strandpromenaden. Traffic rose from 5000 to 8000 in DAT (Vegdata 2016) (fig.41).



Fig. 38: Areas for vehicles compared to areas for other traffic groups.



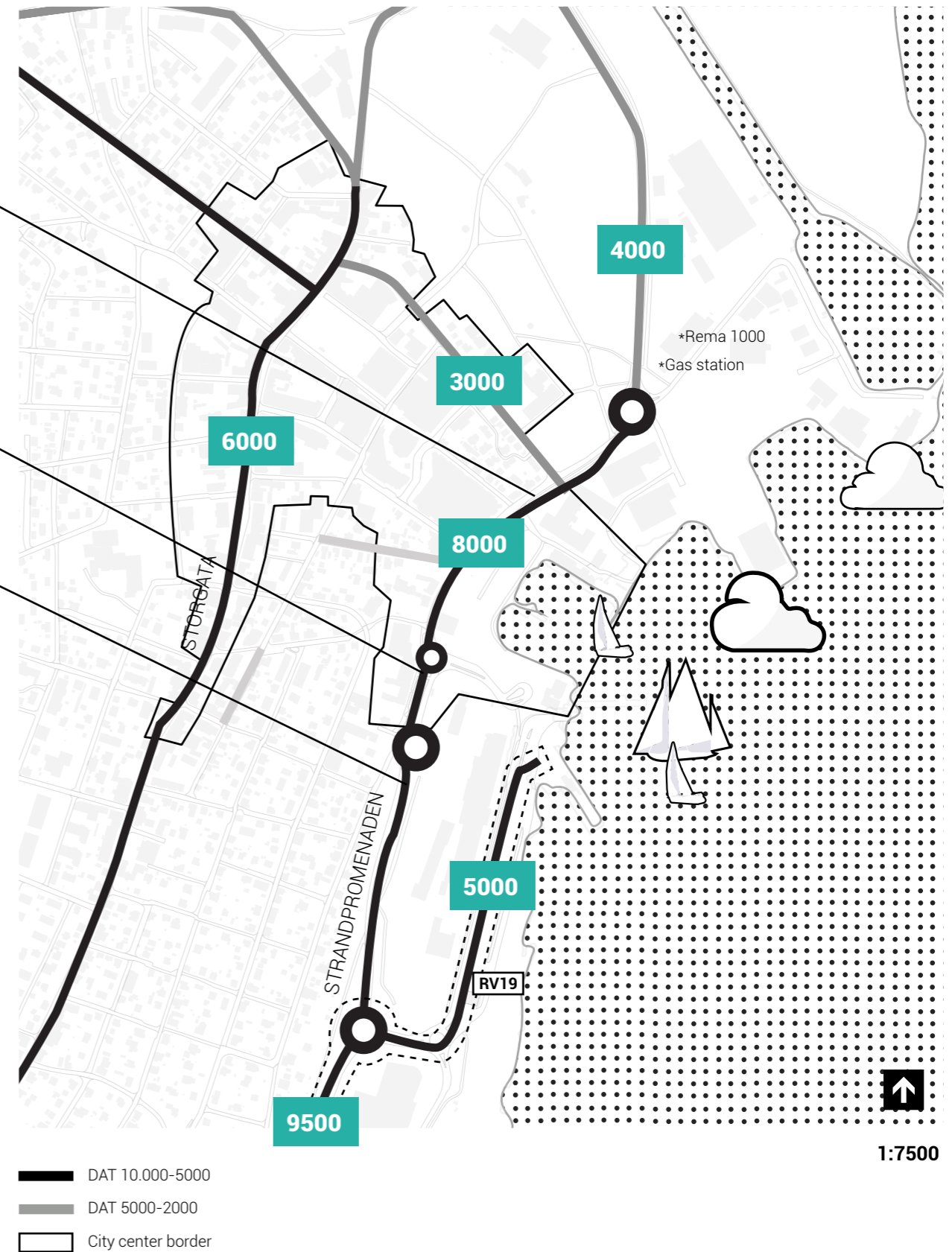
Fig.39: **Pedestrian tolerant:** Example from Strandpromenaden, where pedestrian zone is right next to the vehicle zone. Note, no bikelanes implemented.



Fig.40: **Pedestrian intolerant:** Example of pedestrian zone being disrupted by car space that floats into the area

DAILY AVERAGE TRAFFIC:

Fig.41:



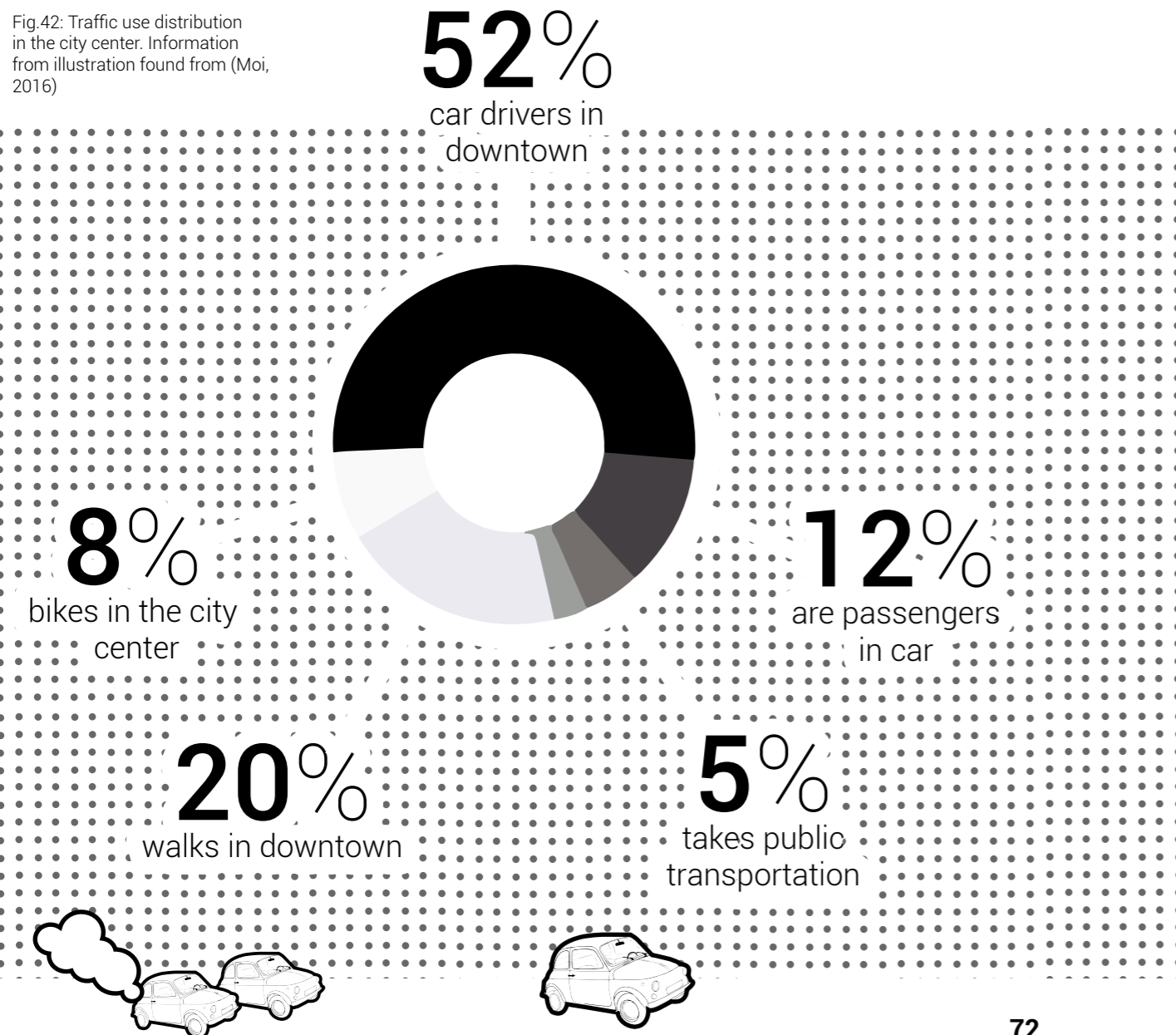
PARKING IN THE CITY CENTER

The parking in the city center is another indicator of a car based city center(See Fig.42). In Horten city center 1388 parking spaces are publically available to be exact(Moi 2016). This makes it easy for Hortenserners to use cars, instead of walking to the mall - at the same time, this weakens the green mobility- a transportation form that allows moving things and people with a minor environment impact"(www.igi-global.com).

the community together. According to livablecities.org the traditional European square " is a place for dialogue and discussion, meetings, and greetings, for shared experiences and forming bonds." The parking in the town square makes it less attractive to pedestrians a bigger parking house can reduce the building imprint of parking spaces in the center of the city.

Today, parking spaces occupy space that could be used for courtyards or outdoor public spaces. 40 % of the town square is occupied by parking today. It does not serve the traditional purpose of bringing

Fig.42: Traffic use distribution in the city center. Information from illustration found from (Moi, 2016)



PARKING IN THE CITY CENTER

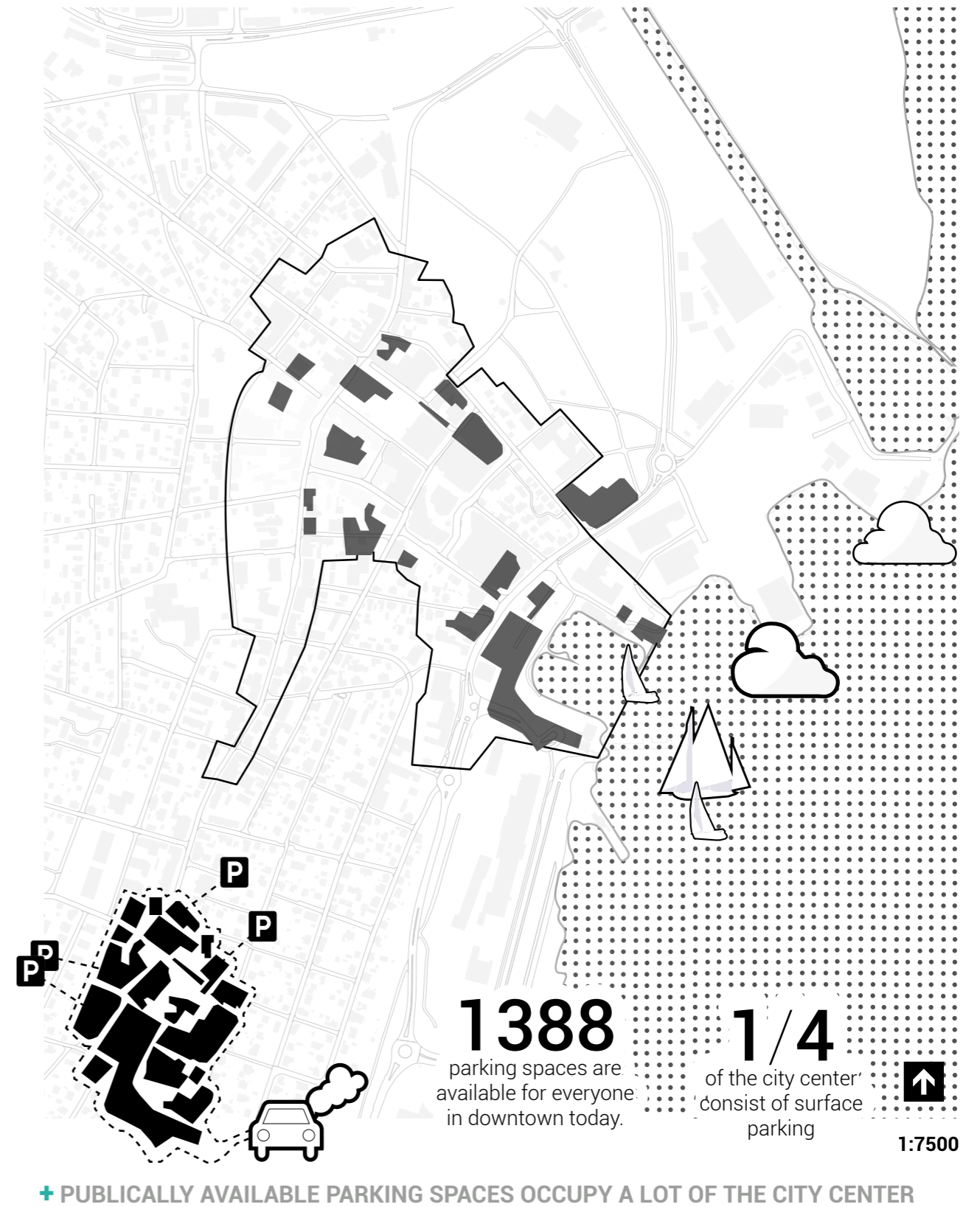


Fig.42: Data for map collected from (Brinchmann 2014)

PEDESTRIANS + CYCLISTS:

Walking in the city center

The existing pedestrian network consists mainly of sidewalks (Brinchmann 2014). Along the main roads, such as Strandpromenaden and Storgata, the pedestrians share the street with cyclists. There are other pedestrian shortcuts within the city center and trails that constitute significant passageways for pedestrians. One of these trails is the coastal path through Horten city center close to the water. This trail does not, however, follow the coast, which is an issue that needs addressing.

a. Apotekergata connects Storgata and Strandpromenaden. Storgata works on the pedestrians premises that almost looks like a "shared space" approach. Apotekergata is a pedestrian friendly street. Safe pedestrian crossings are not present on Strandpromenaden. Some of the attractions for pedestrians on the other side of Strandpromenaden is the ferry terminal, the guest harbor and the small boat harbor to the north (See Fig.44).

b. Strandpromenaden's sidewalks end where jernbaneveien intersects with it. This road is disconnected to streets in the grid of the garden city that is also an important passageway for pedestrians (See Fig.44).

Biking in the city centre

The main routes for cyclists in Horten follows Riksvei 19 and the municipal road network (Fylkesvei 310). In Storgata the cyclist is relegated to use sidewalks or share the space with the cars (Brinchmann 2014). The streets have a speed limit of 30km/h and 40 km/h with speed bumps along it. As the main bike route for cyclists in Horten, Storgata does not have a complete and good biking-friendly infrastructure.

In large parts of Riksvei 19 that border Horten city, there are no bike paths. Statens vegvesen have made plans to introduce amenities for cyclists along this road (Horten 2015). On Strandpromenaden there are no marked areas for bicyclists.

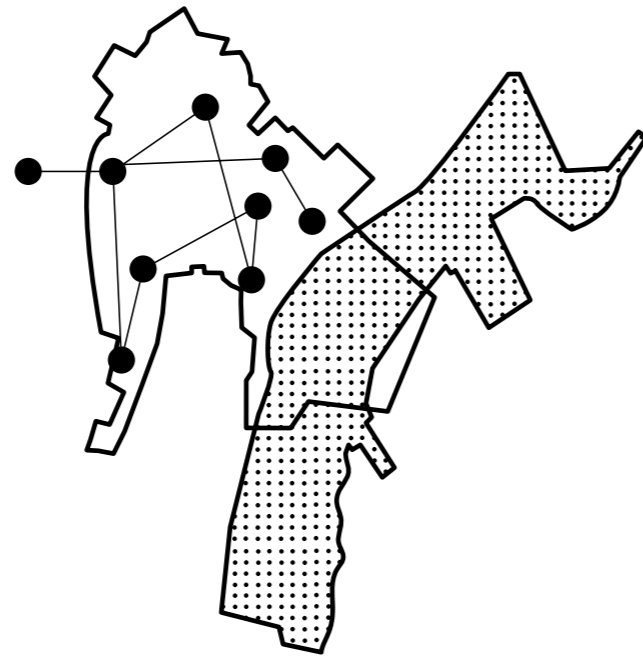


Fig.43: The conceptual drawing of Horten city center describe the following about pedestrians and bicyclists: The lack of good and safe pedestrian and bicyclist pathways on the other side of Strandpromenaden prohibit these traffic users to their accessibility to the waterfront.

PEDESTRIANS + CYCLISTS:

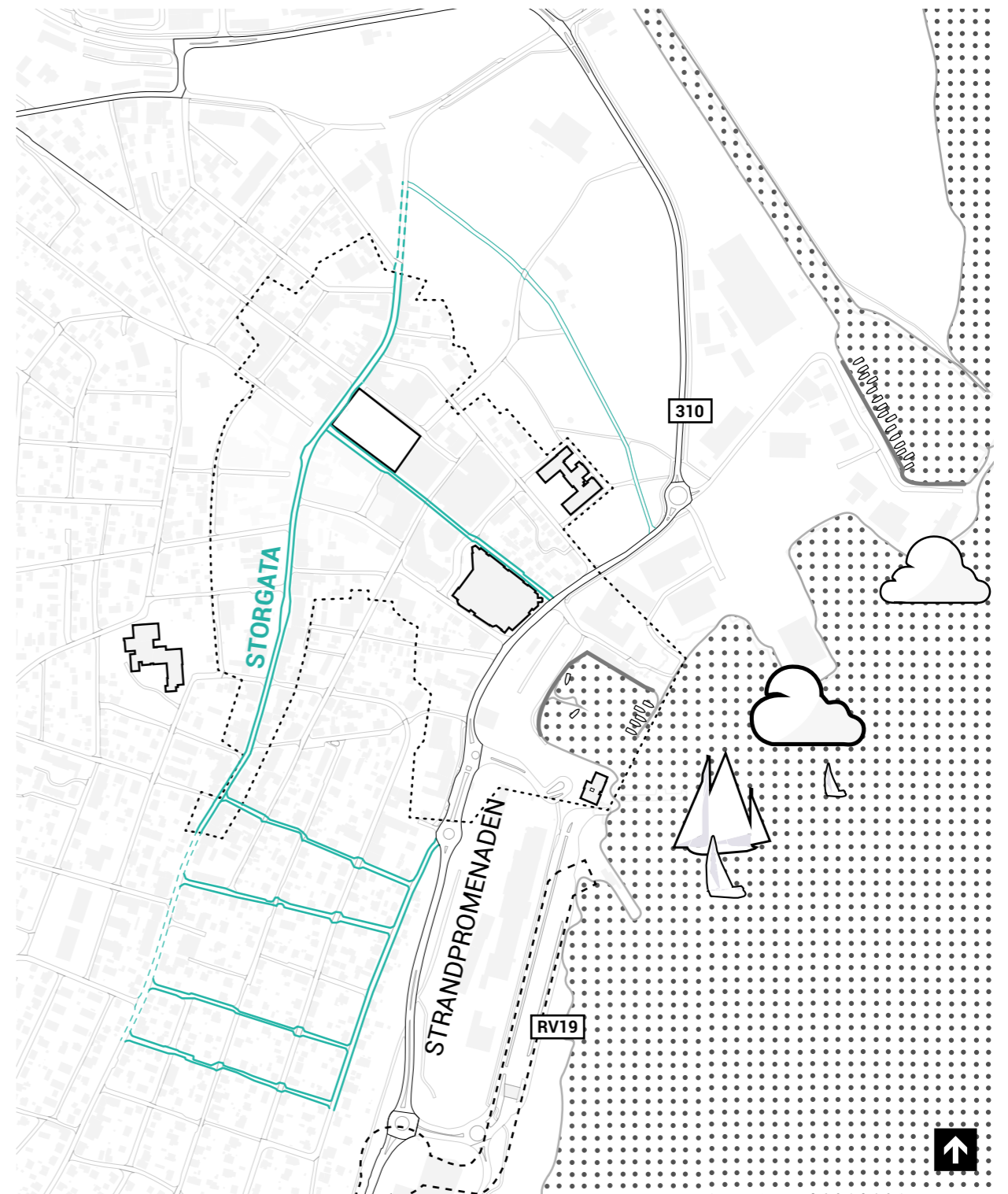


Fig.44:

1:7500

+ IMPORTANT CROSSING B/W APOTEKERGATA AND STRANDPROMENADEN NOT EXPERIENCED AS A SAFE CROSSING FOR PEDESTRIANS

+ CYCLIST-FRIENDLY AMENITIES ALONG STRANDPROMENADEN NEXT TO NON-EXISTING

LANDSCAPE

Landscape that invites to green transportation forms

A green hill silhouette dominates the landscape in Horten city center (Brinchmann 2014). After crossing Strandpromenaden into the industrial areas, the slopes drastically decreases before it touches the water. In general Horten, city center is a quite flat landscape. In theory, flat landscapes make green mobility like walking and biking convenient in Horten.

The garden city lays on a higher grounds, and many of the single houses in this area have excellent views down to the water(See Fig.46).

This section about landscape is included to show the relationship between green mobility forms in Horten and its landscape. A more detailed description of the green qualities in Horten are described in the chapter under "Natural processes."



Fig.45: Green silhouette

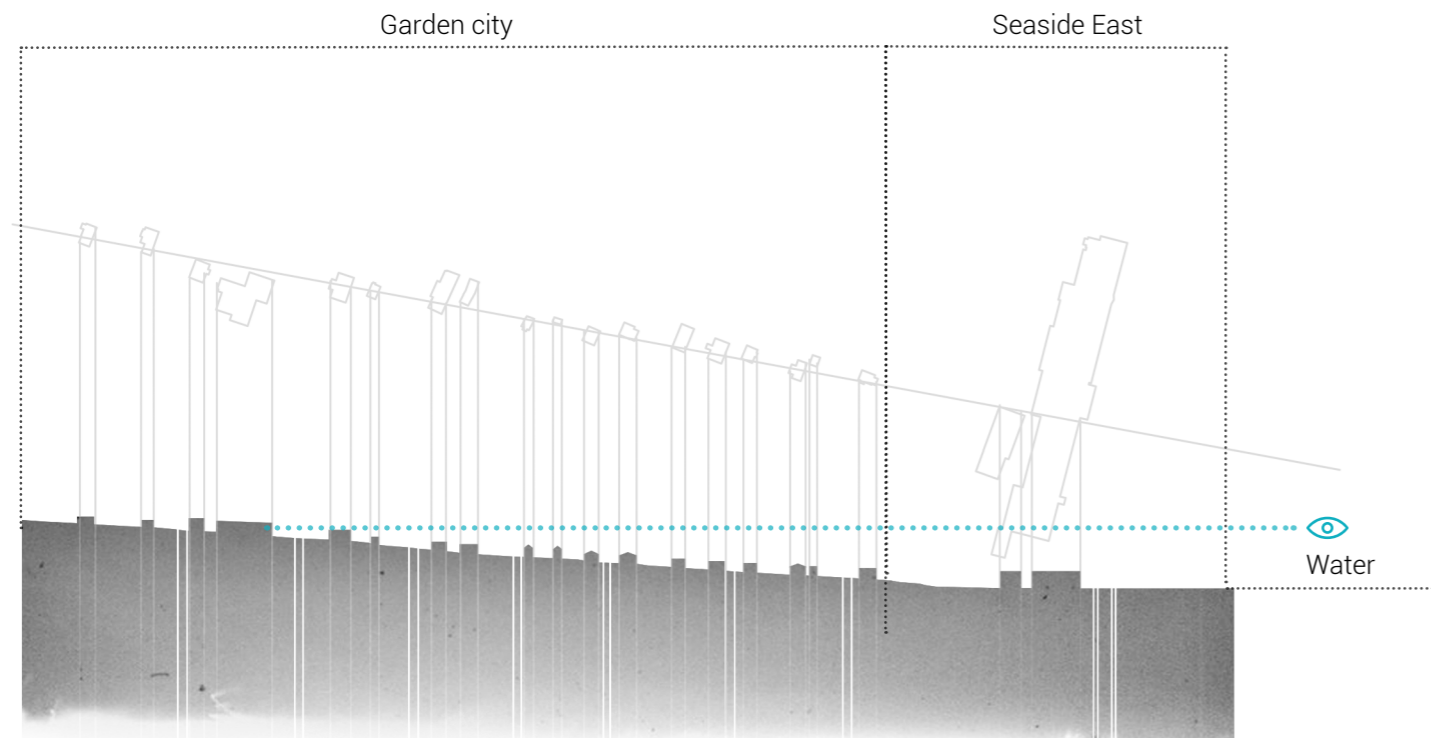


Fig.46: The section is taken from the north side of Seaside East and illustrate the flat landscape.

BARRIERS



Fig.47: One of the few pathways for bicyclists and pedestrians in the ferry terminal area



Fig.48: Car based businesses - not inviting facades



Fig.49: Oversized grey areas by the guest harbor

BARRIERS

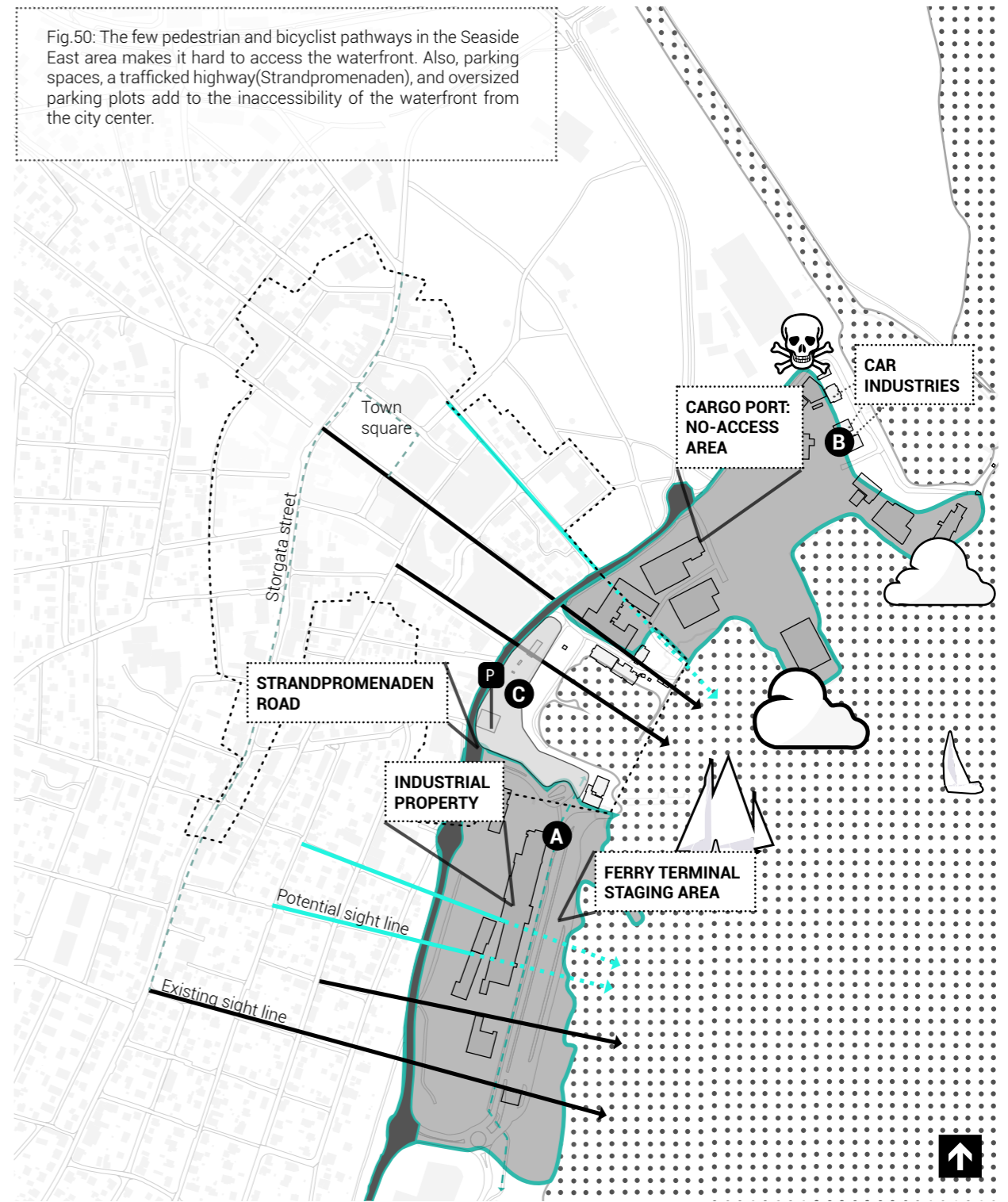


Fig.50: The few pedestrian and bicyclist pathways in the Seaside East area makes it hard to access the waterfront. Also, parking spaces, a trafficked highway(Strandpromenaden), and oversized parking plots add to the inaccessibility of the waterfront from the city center.

- + INDUSTRIAL/MARINE PLOTS WITH NO-ACCESS AREAS
- + BUILDINGS BLOCKING SIGHT LINES TO THE WATER
- + FEW INVITING FACADES
- + SPLOTCHY PARKING SPACES
- + TRAFFICKED HIGHWAY

1:7500



Fig.51:

**PARKING SPACES IN THE
MIDDLE OF THE TOWN SQUARE**



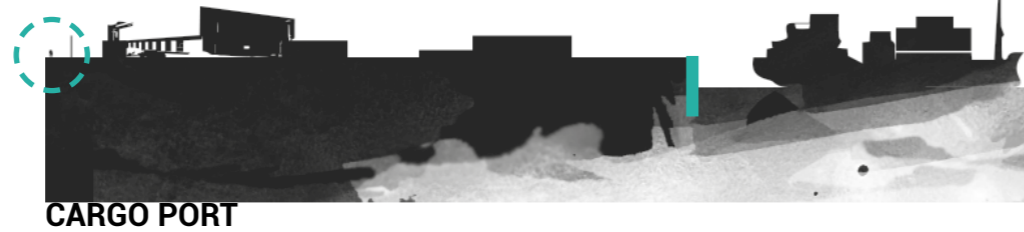
Fig.52:

**INADVERTENT GREY
AREAS FACILITATED
FOR CARS**

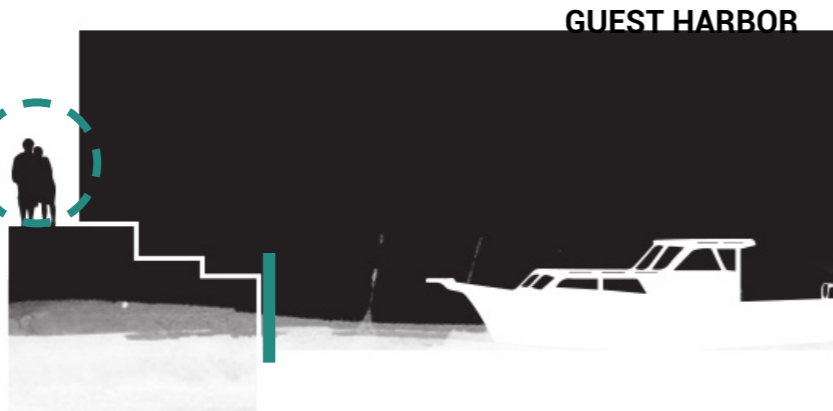
TODAY'S ACCESSIBILITY OF THE WATERFRONT

In addition to the lack of many trails or streets down to the waterfront, the uses and buildings along it prohibits physical contact with the water many places.

38%



20%



42%

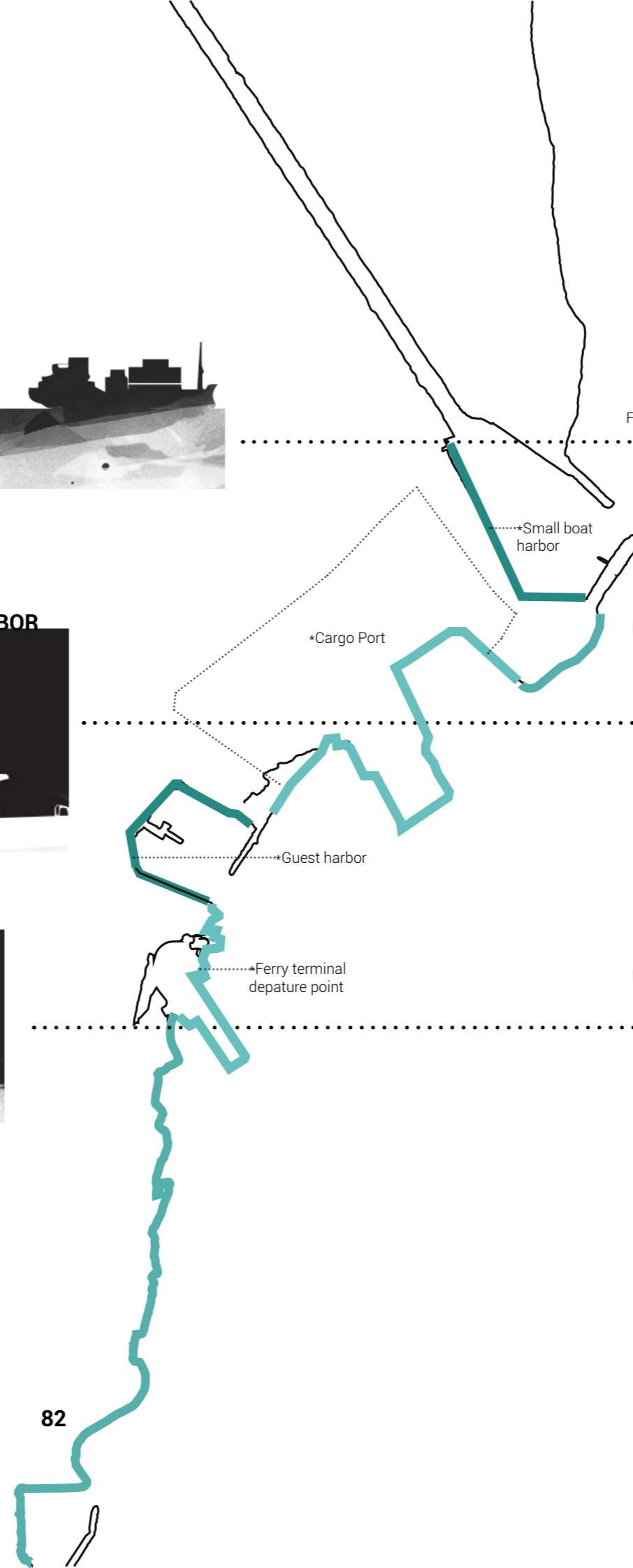
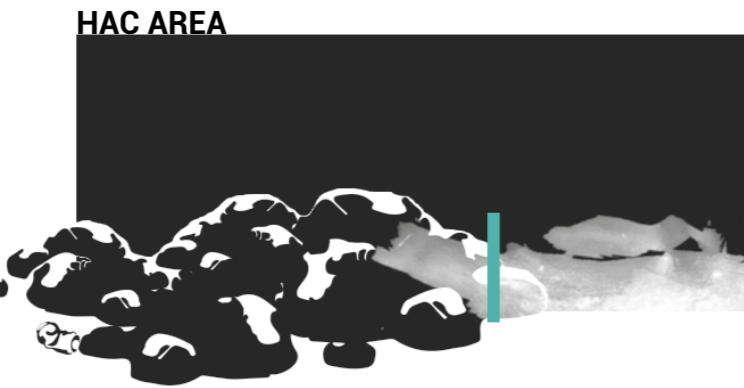


Fig.53: The ferry terminal and the cargo port naturally is a place where pedestrians cannot roam due to safety reasons.



Fig.54: The two boat harbors in the area are the only places where the inhabitants can come in contact with the water. However, the pedestrian experience down to the harbors from the city center is not very pleasant.



Fig.55: The area looks like a leftover area of industrial property. No signs are directing the pedestrians to this plot, nor is it safe to wander along the coastline here because of the size and sharpness of the stones bordering the water.



BARRIERS



Fig.56: Qualities not connected due to barriers

Environments bordering the site: show the relationship between the three different qualities meeting the industrial plots. Garden City vs. Seaside East, City Center vs. Seaside East and Lystlunden park meeting Seaside East.

1:7500

Fig.57: The following pages will display sections. Fig.57 shows where these are taken from.



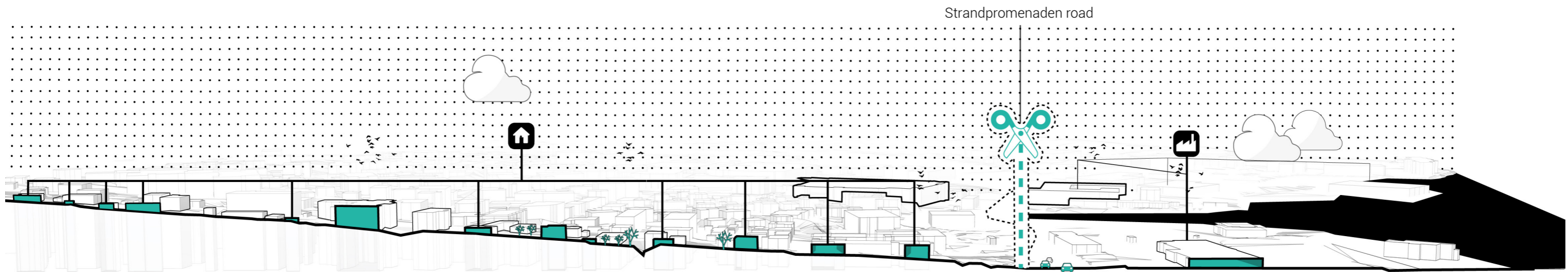
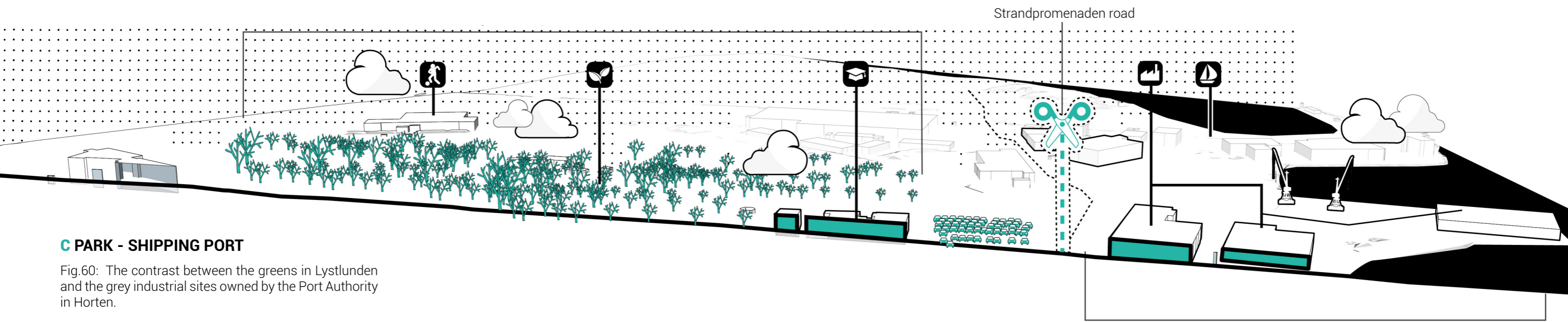
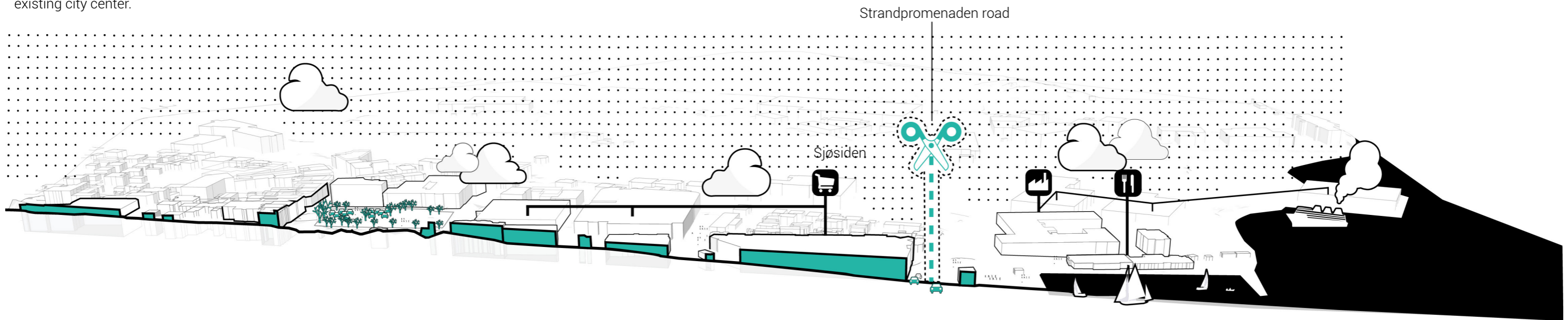


Fig.59: Section 71 displays the contrast of the single houses meeting oversized box architecture on the other side of strandpromenaden road. In all the sections, the character of the city changes on the other side of the road. This marks the end or beginning of the existing city center.



C PARK - SHIPPING PORT

Fig.60: The contrast between the greens in Lystlunden and the grey industrial sites owned by the Port Authority in Horten.

Cargo Port, owned by Horten Port Authorities

POSITIVE QUALITIES SEASIDE EAST

Seaside East may be a barrier because of too many cars, but it also has positive qualities that contribute to the pedestrian experience that should be kept.

The Landfill

The landfill area is a small boat harbor created with the soil removed to build the existing Horten canal. This site has historically been important for the inhabitants, who use it as a bathing area. Today the area, part of NCA's (Norwegian coastal administration) headquarters (Fig.61), has been revitalized into a boat harbor. This quality is hid by the car based businesses that surround it. There are few commercial anchors or commercial attractors, such as supermarkets or a bakeries, in the areas for pedestrians, other than the recreational area of the harbor. In addition to this, the pedestrian zone of the street merges with the space for the vehicles making it unattractive to travel here on foot from the city center (Fig.62).

The Guest harbor

The guest harbor area is located around a camping wagon parking, there is a statement building that stands out. It serves as a landmark for many. (See Fig.66)

The Ferry Plot

Architecture and art differ from the eye of the beholder. Trough private initiative, there are wall art and colorful facades on some of the industrial buildings in the ferry plot area. One of the first sights people traveling with the Bastø ferry meet when they arrive in Horten are these temporary art installations.



Fig.65: More wall art at the Ferry plot.



POSITIVE QUALITIES: SEASIDE EAST

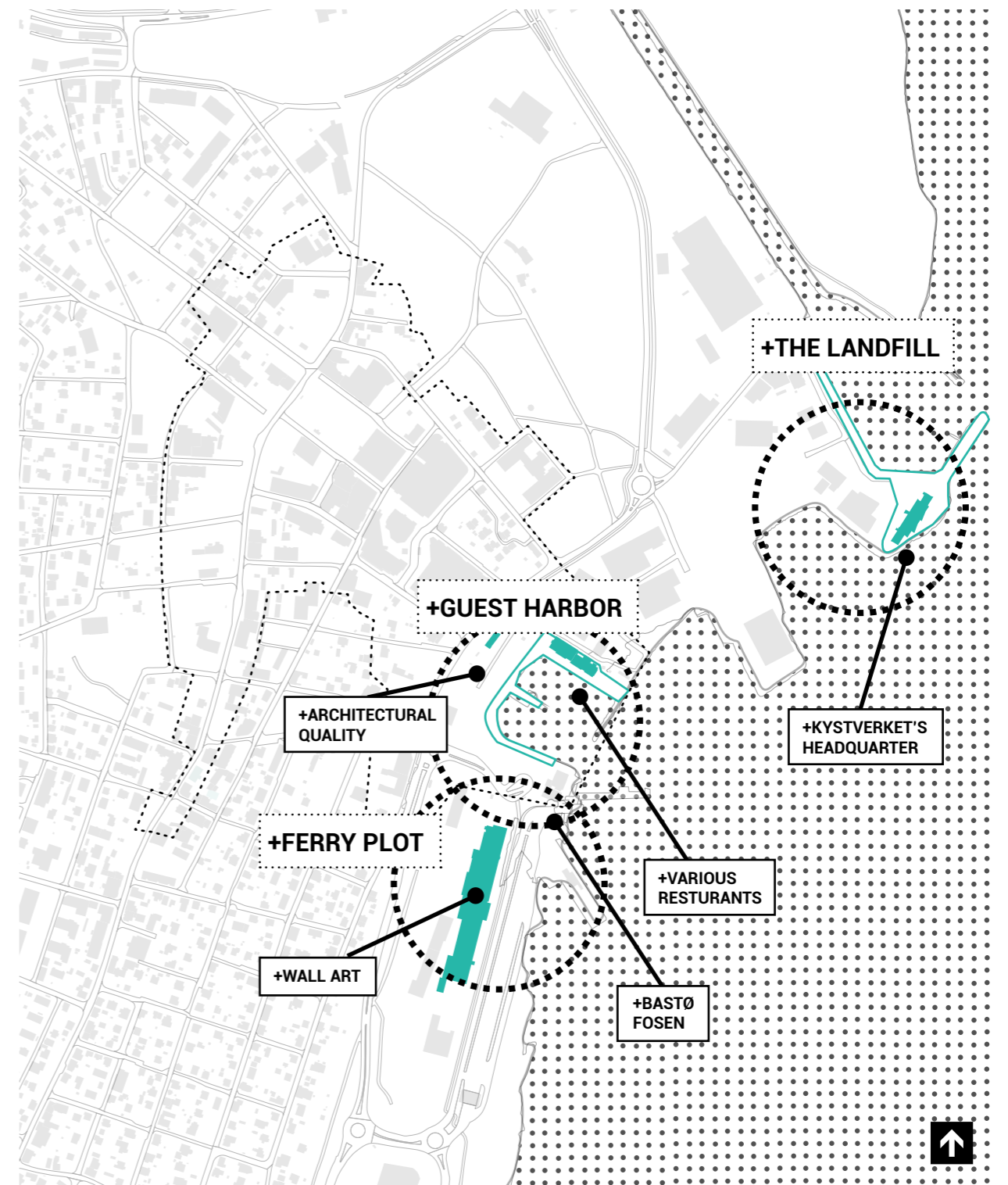


Fig.66:

1:7500

PUBLIC TRANSPORTATION

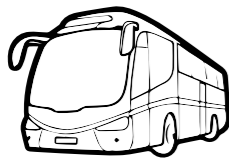


Fig.67:

**BUS COVERAGE
FROM HORTEN**

**HOLMESTRAND: NONE-EXISTING
BAKKETEIGEN: LIMITED**



Fig.68:

**WITH CAR TRANSPORT
FROM HORTEN**

**HOLMESTRAND: 23MIN
BAKKETEIGEN: 10 MIN**

BUS TRANSPORTATION

Of the 12.400 people working in Horten municipality, over 40% commute out the municipality (Lorentzen 2015). The number of individuals that do not live and work within the municipality is large. Within the electronic and IT industries, a majority of people commute into the municipality than elsewhere. The commuting is most likely due to the clusters of micro and nanotechnology businesses and corporations in Horten municipality. Within the municipality, Holmestrand and Bekketeigen have the most of the commuters (Lorentzen 2015). In Bekketeigen, Campus Vestfold is a University that focuses on research within nano and micro technology (Lorentzen 2015).

The distance to Bakketeigen is 10 minutes and 20 minutes to Holmestrand by car(See Fig. 69). However, there are no direct buses to Holmestrand from Horten city center. This increases the dependency on cars for commuters traveling from the city center. In Bakketeigen there is a train station stop. However, the buses going from Horten city center and the train schedules does not correspond.

PUBLIC TRANSPORTATION

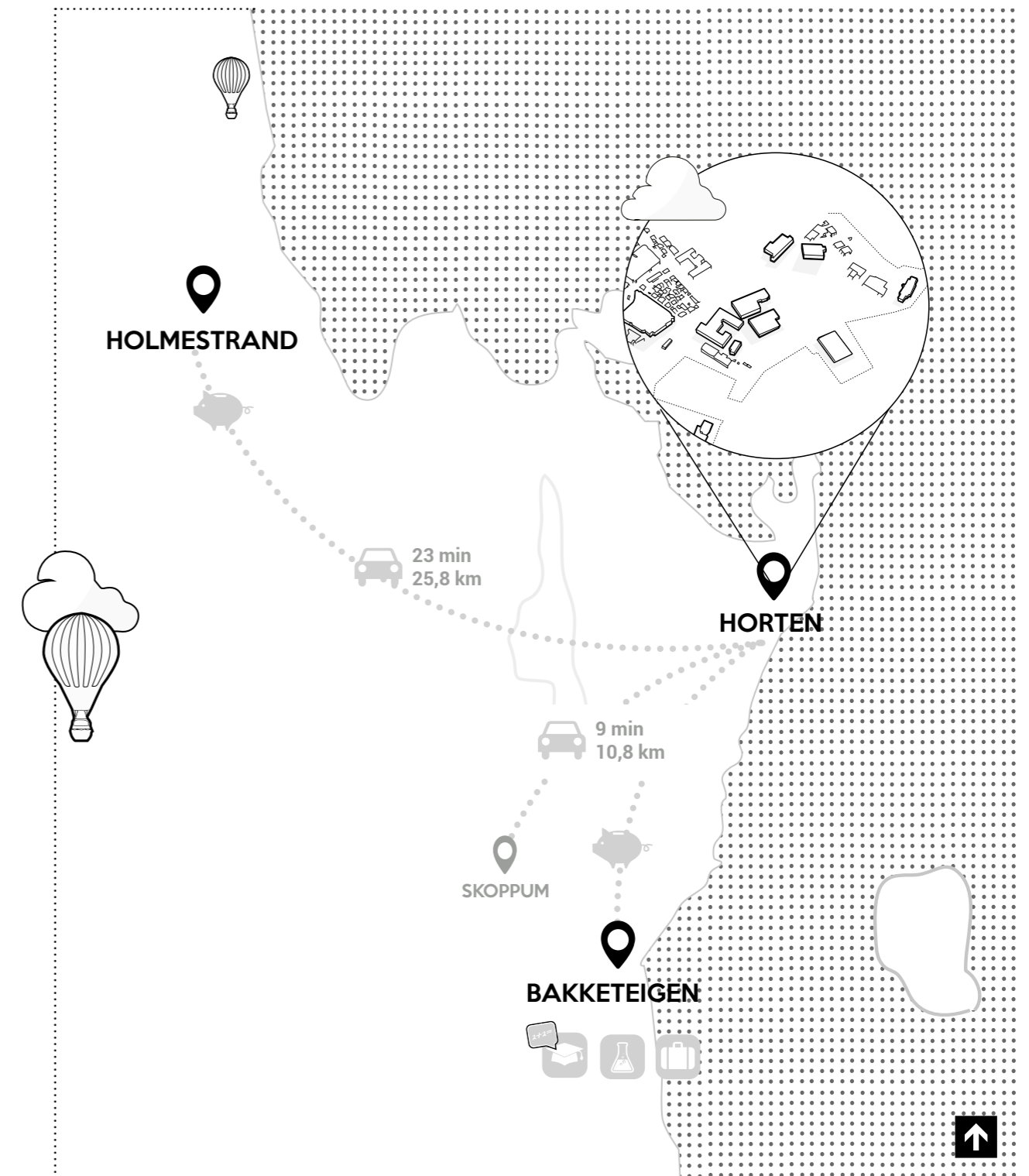


Fig.69:

1:7500

+ VESTFOLD WILL EXPERIENCE MORE INTENSE RAINFALLS OFTEN IN THE FUTURE

PUBLIC TRANSPORTATION

Fig.69: The Ferry plot, photographed in 1970.



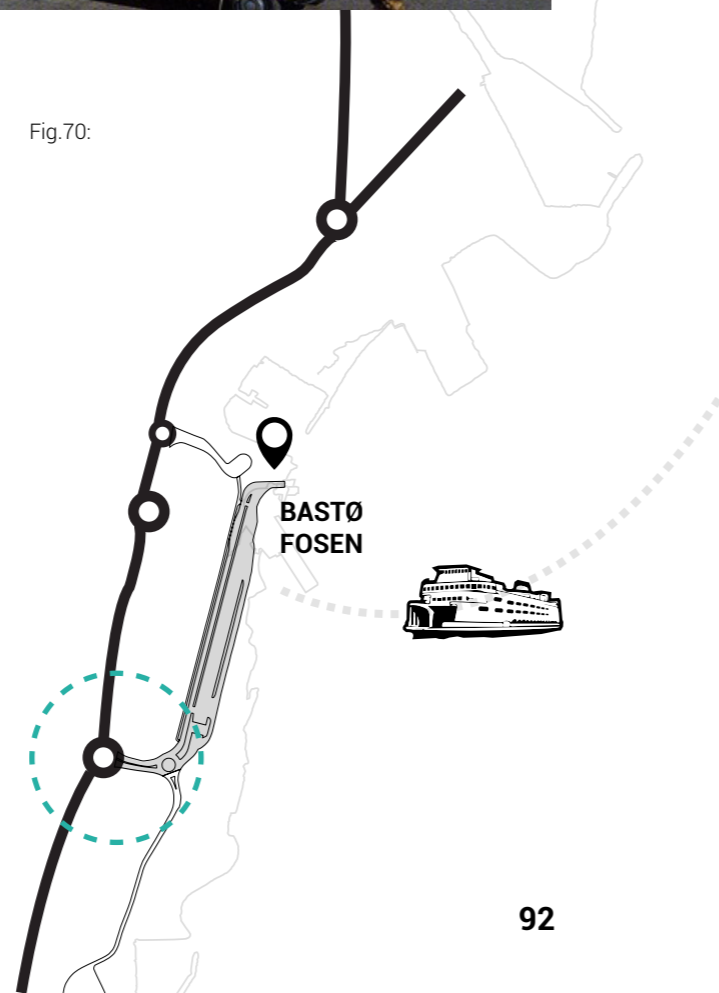
PUBLIC TRANSPORTATION BY SEA

Bastø Fosen is a ferry company providing their travel services between Horten and Moss since 1996. 2,5 million passengers travel each year (www.bastofosen.no). Bastø Fosen has departures per hour and 1 departures at the least (www.bastofosen.no).

Despite making the surrounding areas more congested, it holds an important position in the community of Horten in the context that it is the fastest way for people to travel between Vestfold and Østfold(Fig.70). Since train transport is not an option, the ferry is the next best comfortable green transportation in Horten.

Our vehicles are only getting more and more comfortable, simultaneously, our standard for comfort for public transportation goes up(AAA). This is another reason why green mobility form is more attractive for commuters. According to urbanist, Sissel Engblom(25 years of experience), business people are more likely to value public

Fig.70:



BUILDING TYPOLOGIES

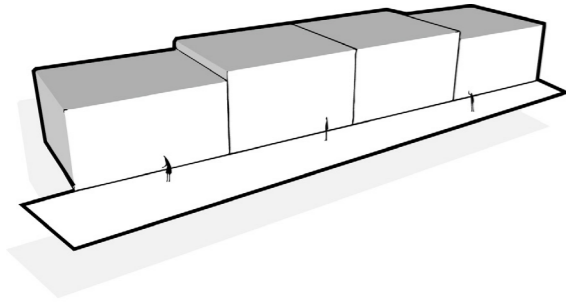


Fig.71: Linear buildings

Linear buildings are in some of Horten's oldest streets (Moi, 2016). Often this kind of architecture has entrances and windows facing the street, contributing to life and activity. An added positive factor is its ability to visually frame in the street. This type of architectural structure holds a value due to its cultural heritage. As the garden city, this building fabric gives the city its character and identity.

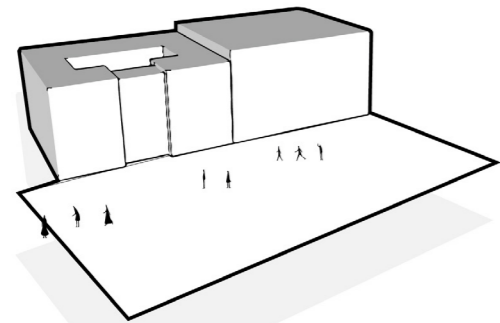


Fig.72: Flat buildings

These buildings often occupy a whole block. Examples can be parking houses or quarter buildings. Horten's Sjøsiden mall is a large flat building mass filling up an entire block. The downside of this type of architecture is that the street often loses its character. Long and empty facades do not invite users to stay. When developing structures like this, it is important to think about adding multiple entrances and facades.

Fig.75: Orthophoto, linear buildings



Fig.76: Linear buildings in Storgata

Fig.77: Orthophoto, flat buildings



Fig.78: Sjøsiden mall, example of a flat building

BUILDING TYPOLOGIES

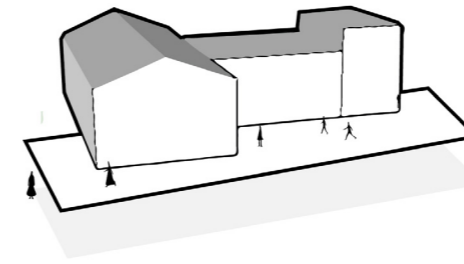


Fig.73: Statement building

This type of architecture differs from the rest of the street structure. Often the architecture works as a landmark. Many of the statement buildings in Horten are industry and school buildings (Moi, 2016). Some may argue that industrial buildings are of little architectural value. In the industrial era, many connected these buildings to fabric work and pollution. These negative associations might still be relevant to some.

Fig.79: Orthophoto, statement building



Fig.80: Statement building at the Guest Harbor

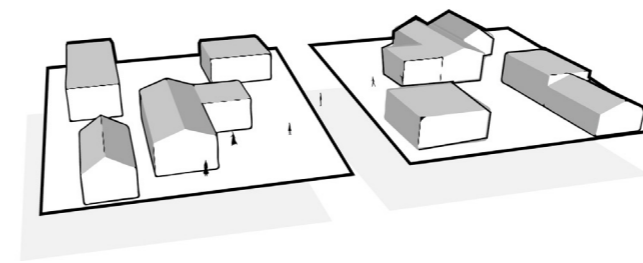


Fig.74: Block structure

In 1867 the street network in Horten started taking the shape of a block structure (Moi, 2016). Orthogonal blocks offer good sightlines and makes it easy to read the streets.

Fig.81: Orthophoto, block structure



Fig.82: Block structure

BUILDING TYPOLOGIES

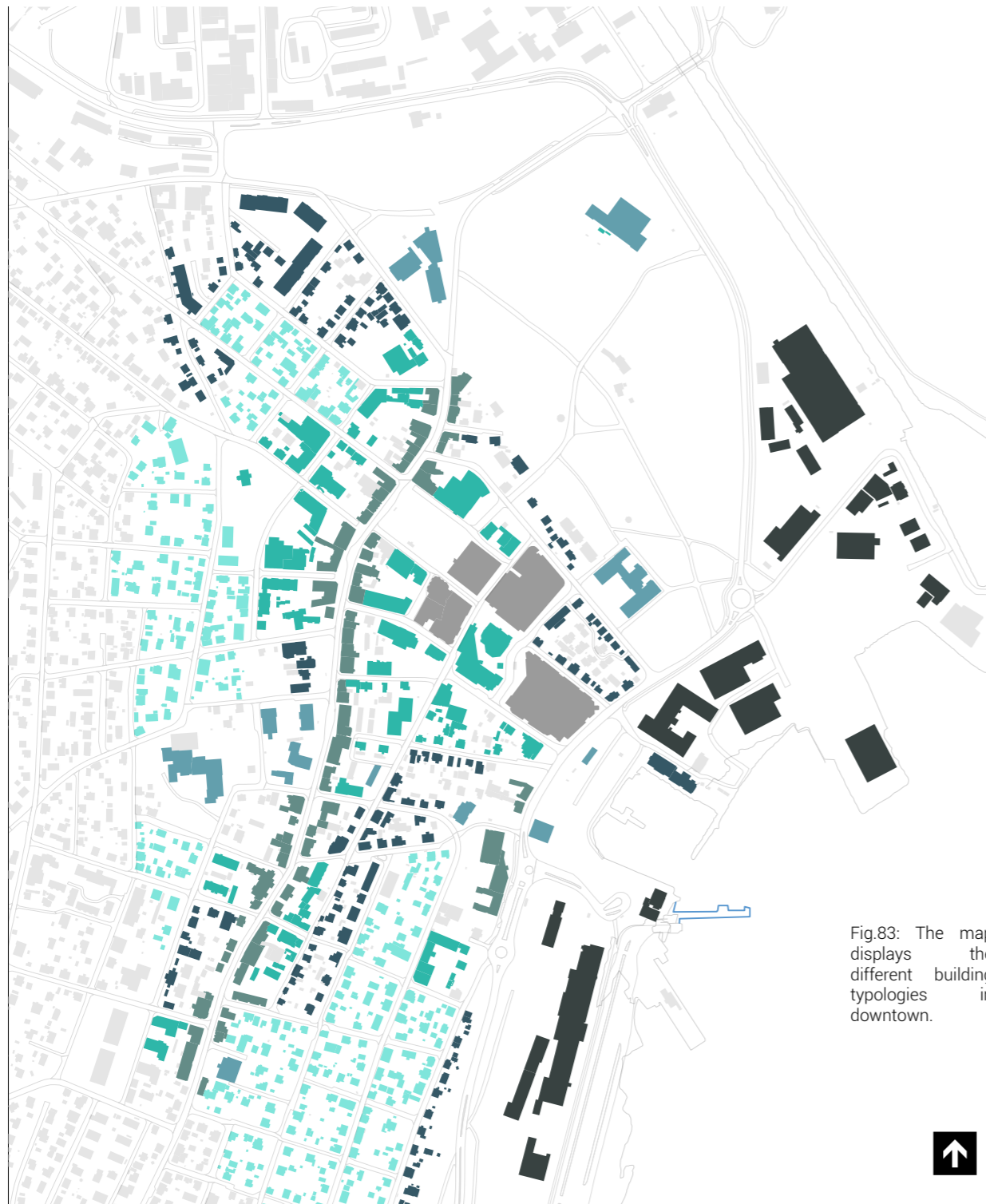


Fig.83: The map displays the different building typologies in downtown.

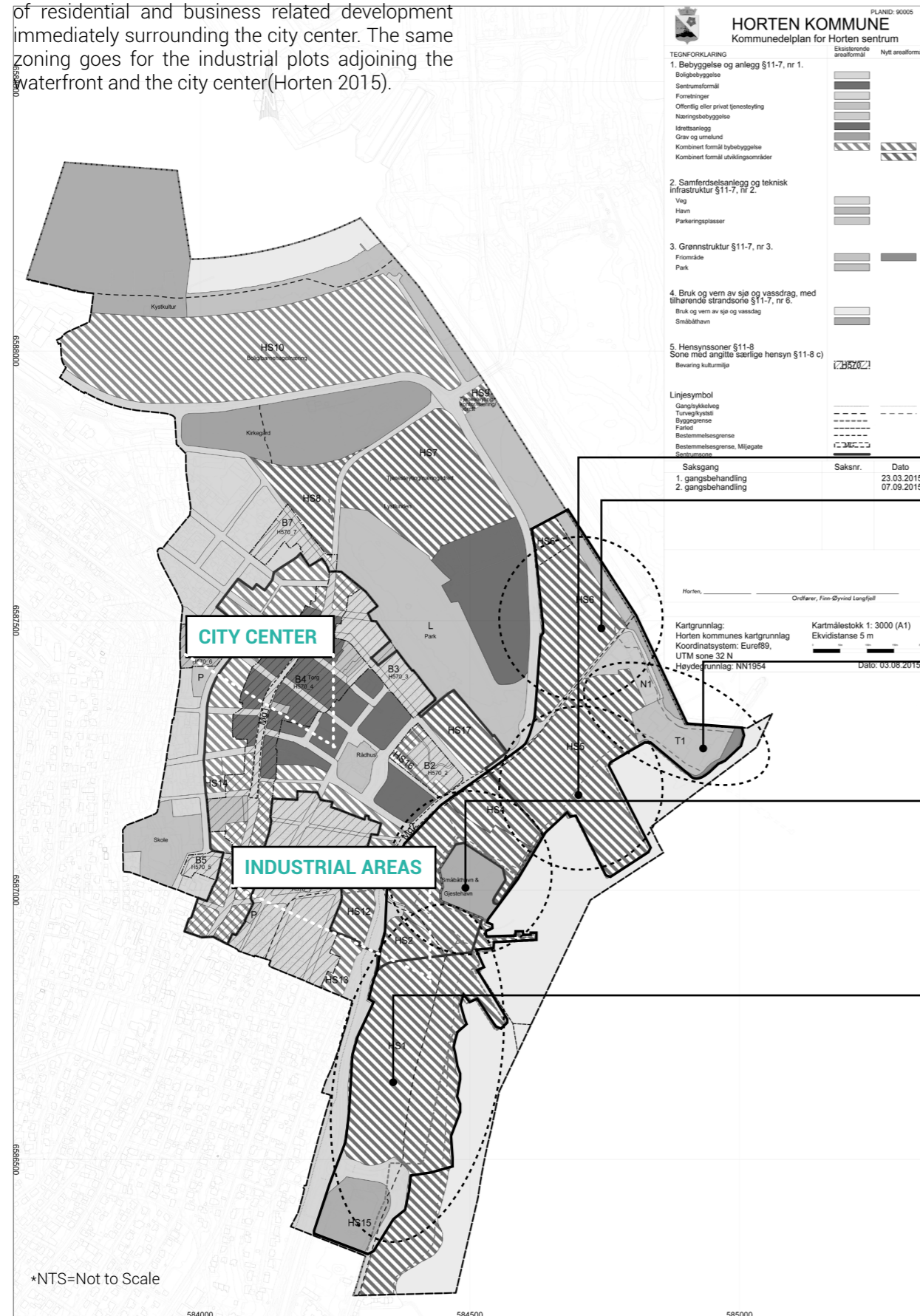


1:7500

- LINEAR BUILDINGS CONNECTED TO BLOCK STRUCTURE
- GRID STRUCTURE BUILDINGS
- INDUSTRY BUILDINGS
- FLAT BUILDINGS

ZONING PLANS

Fig.84: The municipality planned for the mixed use of residential and business related development immediately surrounding the city center. The same zoning goes for the industrial plots adjoining the waterfront and the city center(Horten 2015).



The situation on the industrial plots today

- 1) Industrial property, gas station and a supermarket space(Rema 1000)
- 2) "Fyllinga" is the name of a landfill that makes up a small boat harbor. The waterfront is occupied by car businesses.
- 3) Horten Port Authority owns much of the property. This area is preserved till 2026, making development here not possible until then. Some important actors in the area are "Smith Stål" and "Norsk Stål", which as as economic engines for Horten City.

- 4) The Guest harbor is one of the most popular attractions along the waterfront with the industrial plots. It has a parking area for camping wagons and restaurants surrounding it.
- 5) Most of the property on this site is owned by the ferry company Bastø Fosen. There is also an industrial area in the north and a mall with car businesses in the south.



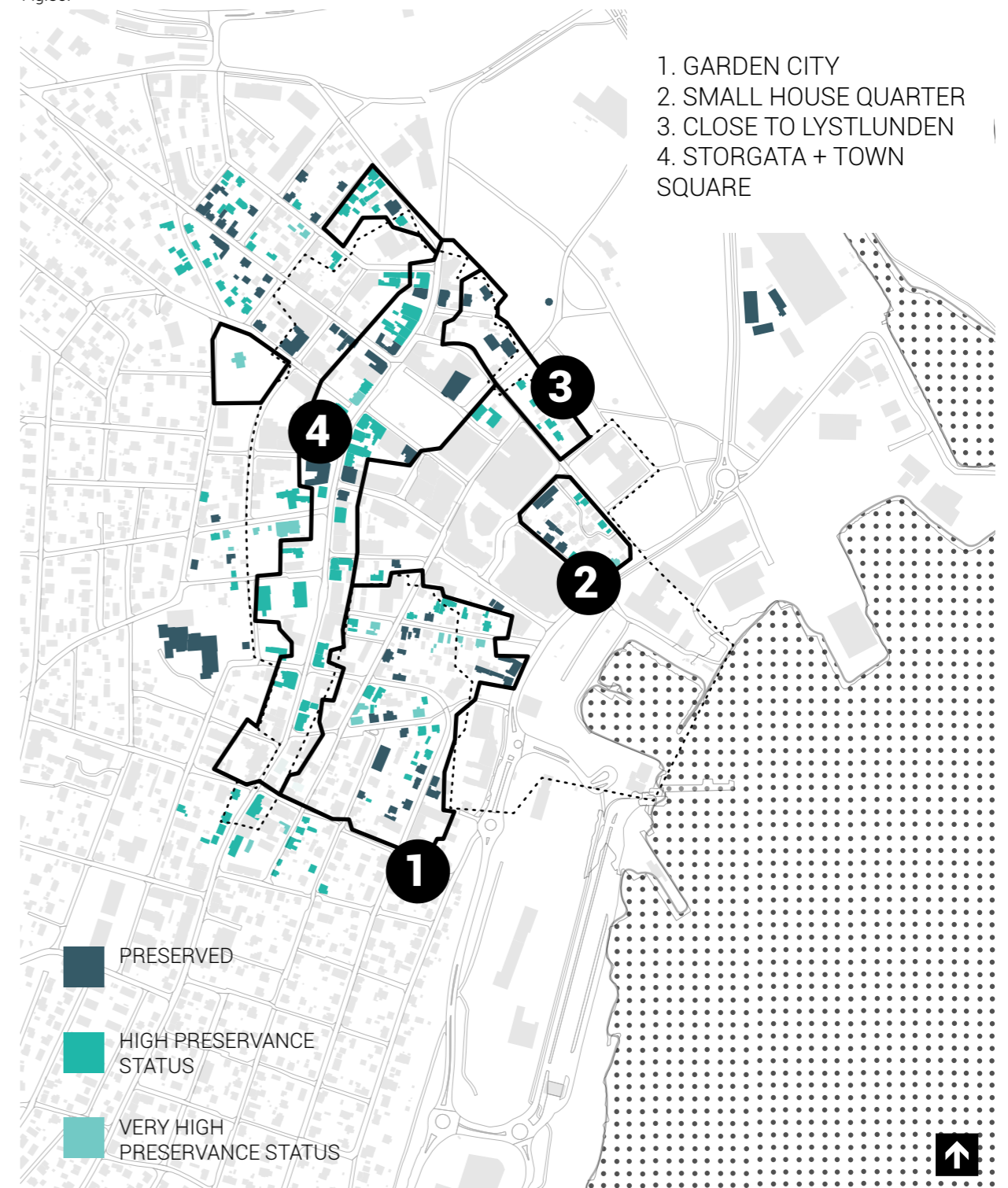
PRESERVED BUILDINGS

The Municipality plans wishes to expand its downtown, but seeks to maintain its identity and character(Westermark 2014). Fig.85 evaluate the different preserved buildings in the city center, ranging from (1) preserved, (2) high perseverance value and (3) Very high preservation value. The existing city center has very beautiful architecture, and much of it is preserved. The garden city is marked as an preserved quality as it is important for the local's image of their town. When adapting and merging the new downtown districts to the existing one must be aware of the structures that already exist.

None of the buildings on the industrial areas are preserved today.

PRESERVED BUILDINGS

Fig.85:



- 1. GARDEN CITY
- 2. SMALL HOUSE QUARTER
- 3. CLOSE TO LYSTLUNDEN
- 4. STORGATA + TOWN SQUARE

+ THE ARCHITECTURE IN THE INDUSTRIAL AREAS ALONG THE WATERFRONT IS NOT PRESERVED

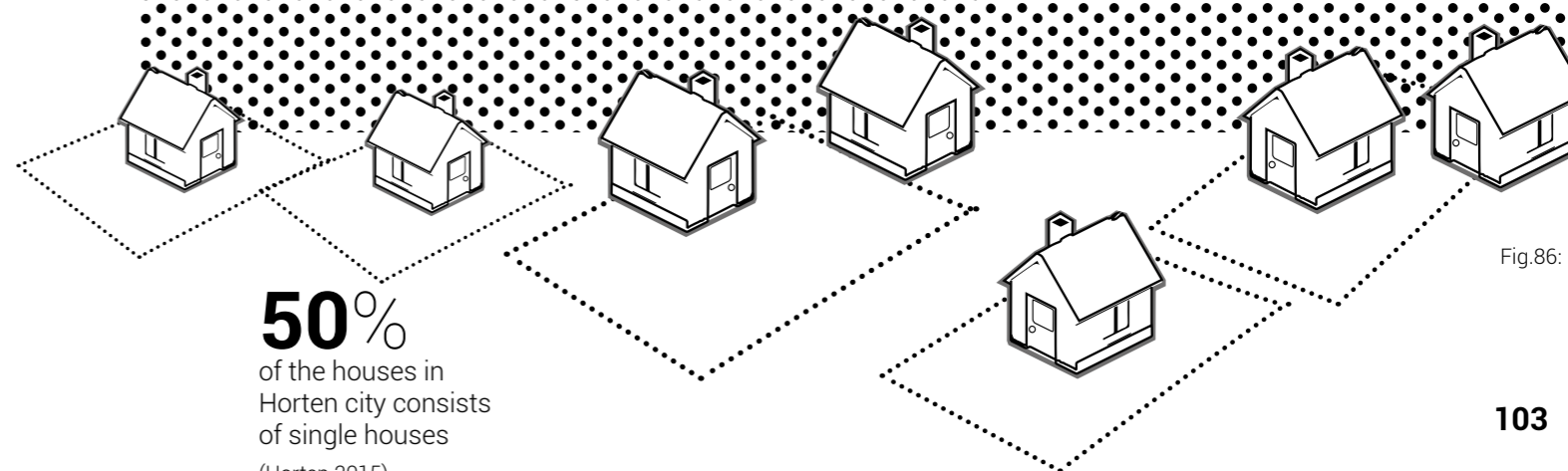
1:7500



86%

**of the inhabitants in
Horten live outside the
city center**

(Horten 2015)



50%
of the houses in
Horten city consists
of single houses
(Horten 2015)

Fig.86:

SUBURBIA RESTRAINING CITY DEVELOPMENT?



ATLANTA

POPULATION 2,5 million

URBAN AREA 4,280 km²

TRANSPORT CARBON EMISSIONS 7,5 Tonnes per person (Public + private transportation)



BARCELONA

POPULATION 2,8 million

URBAN AREA 162 km²

TRANSPORT CARBON EMISSIONS 0,7 Tonnes per person (Public + private transportation)

Fig.87: The density diagram illustrates two very different city planning results. In Atlanta displays an outcome of urban sprawl.

Horten wishes to be one of the most urban attractions the municipality has to offer. In debates about the excessive population growth and about urban density residents comment about streets and buildings being overcrowded or empty. Also, about buildings being too tall or not tall enough. How tall is too tall?

When income or lifestyle are included in the conversation about urban development the relationships between building type, urban form and CO emissions become even more complex. High-rise urbanism exacts a high carbon cost (Schmitt 2014). The Australian carbon consumption

atlas, prepared for the Australian Conservation Foundation by Chris Dey of the University of Sydney and colleagues, provides a striking illustration of this pattern (Dodson 2011). The highest per capita residential environmental consumption occurs in the higher density inner urban areas of Australian cities, according to their work. The 37 tons of total CO consumed per person each year by downtown Sydney residents are more than double the 16 tons produced by residents of Blacktown, a suburban neighborhood (Dodson 2011)..

Findings like these fundamentally confound the "high-density good, low density bad" assumptions



Horten

100 m

in current debates about urban development.

Tall is not the total answer for our future, nor is a low, spread-out, low-density environment (See image above). Society needs a balance between the density and suburban development so we can meet the needs of a growing population and at the same time reduce the effects that housing that population has on the earth's already limited resources.



Fig.89: ADEPT and Mandaworks Design Masterplan for Stockholm's Royal Seaport

SUMMARY: DEVELOPMENT PROCESSES

Horten has a flat landscape and compact downtown. In theory this means that Horten could be a walkable community. However, past municipal plans of the city clearly show that downtown is dominated by car traffic. Today it is easy for anyone to park in the city center. In many streets, the pedestrian zones merge with a parking space. Prioritizing cars made it difficult to reach the waterfront as well.

The number of people commuting to work in both Horten city center and the municipality are larger than one would expect. Horten's public transportation offers needs to be improved. That would be one way to reduce its car dependency.



NATURAL PROCESSES

- 1. Climate**
- 2. Green structures**
- 3. Pollution**

CLIMATE CHANGE:

Sea rise + storm surges

SEA RISE AND ISOSTATIC UPLIFT

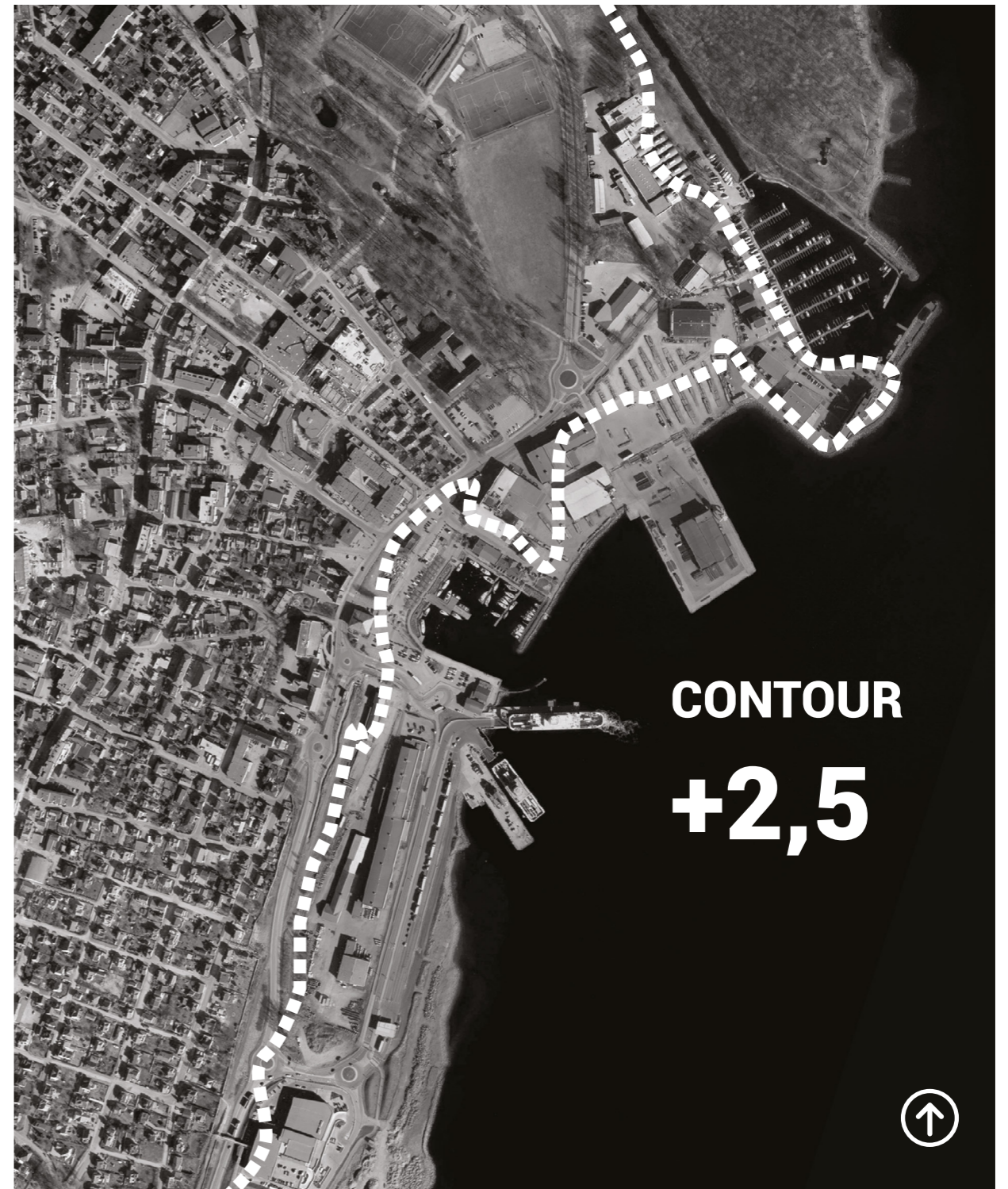
In Vestfold, many cities are situated around coastal areas where sea rise can be an obstacle for the urban planners. Storm surges and big waves that reach land can be of damaging to both buildings and road infrastructure etc. (Klimaservice 2015).

An important risk for Horten municipality is related to storm surges scenarios(ROS-analyse 2015). A one-hundred-year storm surge is a flood event that has a 1% probability of occurring in any given year. Since the area is bordering water, it is appropriate to consider storm surges connected to water level rise (ROS-analyse 2015). A 2009 report estimate that the highest water rise will reach contour +2,5. Parts of Horten downtown lays between contour +1 - +2,5 (ROS-analyse 2015). A possible scenario suggest that most of waterfront area will be flooded(See Fig.90)

TIDE

Tide is a phenomenon that occurs mainly due to forces of attraction between the earth, the moon and the sun. Most places around the world see on average two periods during a day with high tide and low tide. The heights of them can vary(Klimaservice 2015). Below is an example of showing Tide in Horen.

Fredag, 19. august 2016			Lørdag, 20. august 2016		
Høy/lav	Tid	Beregnet tidevann	Høy/lav	Tid	Beregnet tidevann
📈	kl. 05:26	68 cm	📈	kl. 06:02	67 cm
📉	kl. 11:09	43 cm	📉	kl. 11:36	44 cm
📈	kl. 17:39	68 cm	📈	kl. 18:12	68 cm
📉	kl. 23:19	42 cm	📉	kl. 23:51	42 cm



100 YEARS STORM SURGES

Fig.90:

CLIMATE CHANGE:

Rainfalls

CLIMATE CHANGE IN VESTFOLD

The weather, the state of the atmosphere at a particular place and time with regards to heat, cloudiness, dryness, sunshine, wind, rain, etc. Changes in climate can have huge impact on city planning, especially along coastal areas. In the coming years more extreme weather, increased rainfalls, sea rise, avalanche, storm surges and problems related to stormwater are expected to increase. With an increasing population and built development areas of natural infiltration systems decreases (Klimaservice 2015).

Future climate estimates for Vestfold shows that the temperatures will increase with 4, 5 degrees in the year 2100 if the average emissions will continue to rise. The amount of rainfall within the municipality will increase ca. 15 %, and the intervals with rainfalls are to be more intense and recur more regularly (Klimaservice 2015).



Fig.90:

+ VESTFOLD WILL EXPERIENCE MORE INTENSE RAINFALLS OFTEN IN THE FUTURE

GREEN STRUCTURES

The garden city, Karljohansvern, Lystlunden park, and with the downtown create a green framework for the city that almost reaches the water. The industrial site between the city and the water lays in the urban fabric as a green loop.



Fig.91:

THE GARDEN CITY

The gardens in the residential areas add to the holistic green image of Horten city.



Fig.93:

THE CANAL

The Horten canal is 800 meter long between the inner harbour bassin and the Oslofjord. It also divides Karljohansvern to the mainland. It was caved out by hand between 1854-1867 (DNT 2016). Historically it was created as part of the navy base that once was in Horten (Brinchmann 2014). Additionally the canal have made sure of the water circulation of the sea water from inner harbor bassin in north-west and created better water quality.



Fig.92:

BOAT HARBORS

The city center has two boat harbors. The most popular, being the guest harbor close to Sjøsiden Mall. NCA, The Norwegian Coastal Administration, an agency of the Norwegian Ministry of Transport and Communications responsible for services related to maritime safety, maritime infrastructure, transport planning, and emergency response to acute pollution, has established its headquarters here, helping to revitalize the harbor.

LYSTLUNDEN

Lystlunden is a 52 acres park with a sports arena. This is one of the largest recreational green spaces closest to the city center. Historically it was given as a gift from the Navy to the inhabitants of Horten in 1852. Of the 377 trees the ages varies from 80 to 230 years (Dahl 2015).

KARLJOHANSVERN

Karljohansvern was the main navy shipyard in the period 1850-1968 (Forsvarsbygg.no 2014). Today, the Horten forest surrounds the area, making it an attractive closeby green quality people use for recreation.

GREEN STRUCTURES

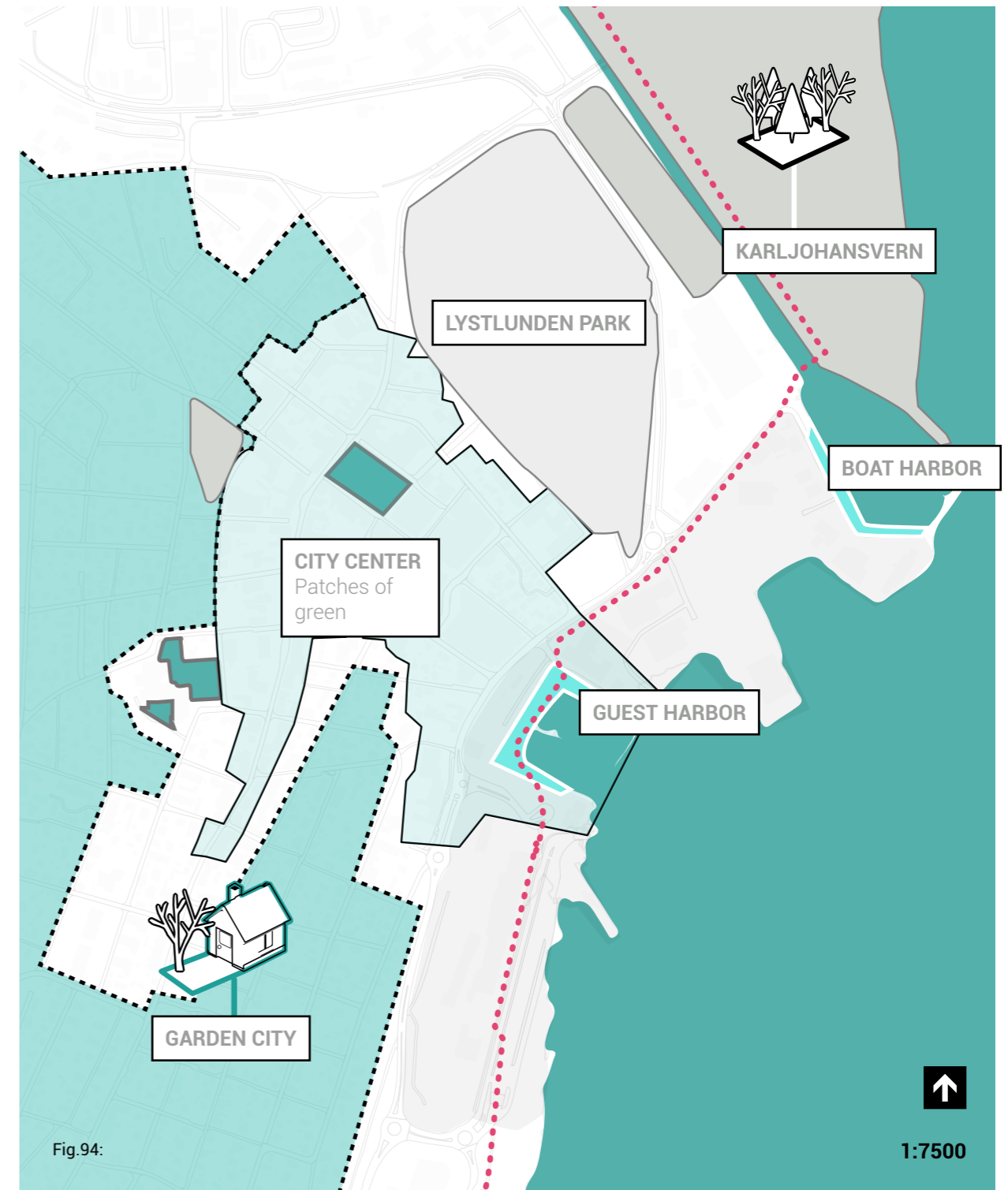


Fig.94:

1:7500

+ THE INDUSTRIAL PLOTS BETWEEN THE CITY AND THE WATER LAY IN THE URBAN FABRIC AS A GREY BARRIER PROHIBITING A SEAMLESS GREEN STRUCTURE.



PATCHES OF GREEN IN THE CITY CORE

Fig.95:

Horten's city center, does not have a coherent green structure. However, there are patches of green in the city adding to the holistic green image of the city.

POLLUTION: GROUND POLLUTION

INDUSTRIAL GROUND POLLUTION

In contrast to other pollution sources, industrial contamination is pollution which can directly be linked to industry, in contrast to other pollution sources. This form of contamination dates back to antiquity, accelerated rapidly in the 1800s (Asachi 2013), with the start of the Industrial Revolution. The Industrial Revolution mechanized the manufacturing processes, allowing for a much greater volume of production, and generating pollution (Asachi 2013). The problem has been compounded by the use of fuels like coal, which is notoriously unclean, and a poor understanding of the causes and consequences of pollution.

There are some forms of industrial pollution. One of the most common is pollution which can impact air quality, and it can enter the soil, causing widespread environmental problems.

Several of the sites in downtown might have soil or ground industrial pollution according to the ROS analysis. Areas close to the ferry terminal have previously been a waste landfill. Oil has polluted the water outside the small boat harbor in the north in the past. The rest of the marine- and industrial lots are likely to have contaminated ground material as well. Before the building process begins, a more thorough report on the ground pollution should be implemented as dangerous emissions might evaporate from the ground while digging up soil in the construction process.

Fig.96:



HIGH POSSIBILITY THAT LARGER AREAS OF THE CITY CENTER HAVE INDUSTRIAL GROUND POLLUTION

SUMMARY:**NATURAL PROCESSES**

Most of the green structures around the city center and within it is coherent, except the seaside East area that consists heavily of grey areas. In a holistic view, seaside East comes across as a green loophole.

A future scenario shows how most of seaside East can be under water. Other results of climate change studies indicate more intense rainfalls in the Vestfold region will increase dramatically.

Government documentation shows that ground pollution may be present in Seaside East. However, there need to be done a more thorough report focusing on pollution before any development occurs along the waterfront on this.

SWOT_ANALYSIS

Fig.97:

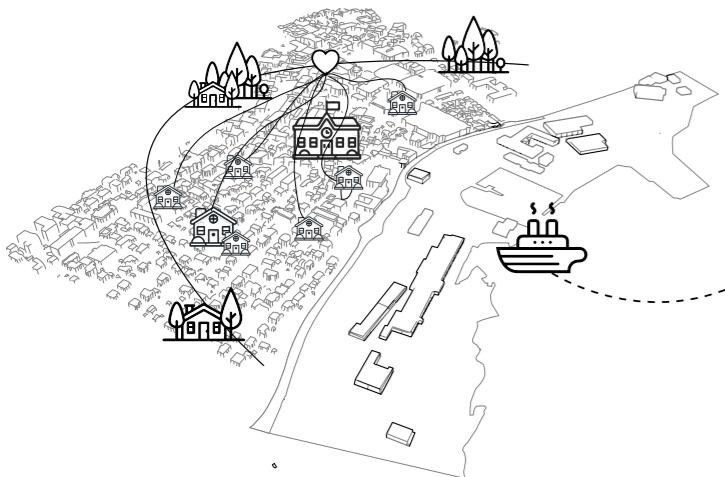


Fig.98:



Fig.99:

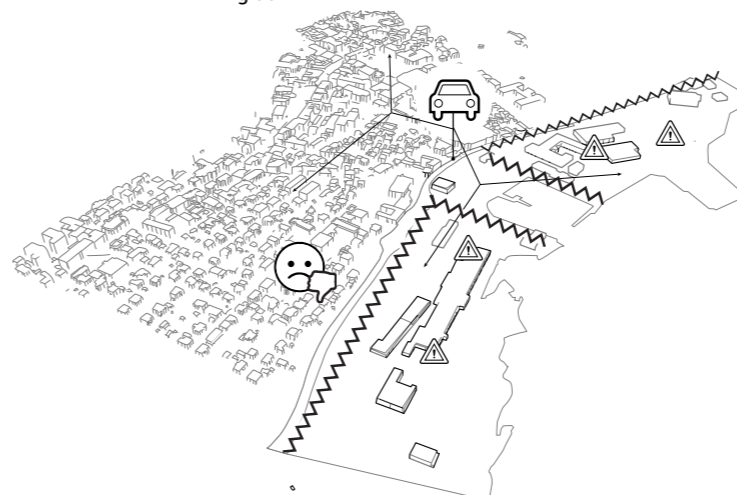
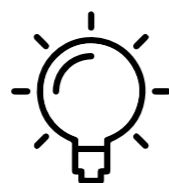


Fig.100:



STRENGTHS

- Attractive nature + recreational areas
- Unsnobby + not significant class differences
- Compact city center
- The ferry connecting Østfold & Vestfold
- Flat landscape making walking + biking easy



OPPURTUNITIES

- More outdoor social arenas
- Waterfront destinations to activate the water side
- Better connections from the city all the way down to the water
- Art on industrial facades of value
- Improvements in public transportation
- Businesses in Bakketeigen & Holmestrand. + Campus Vestfold are attractive work places close to Horten.
- A compact city center, with opportunities for everyone.



WEAKNESSES

- Low self-image
- The large urban spaces in the city center are experienced as deserted.
- Facilitated for cars
- Alot of grey surfaces, need for more green in the industrial plots.
- Barriers between the city and the water
- The entrance point to the city center at Strandpromenaden, from the guest harbor to Sjøsiden mall is not attractive.
- Horten's strengths are not reflected enough in the city center.



TREATHS

- climate change, intensive rainfalls
- polluted ground + air
- Challenge in preserving local identity
- Facilitated for cars

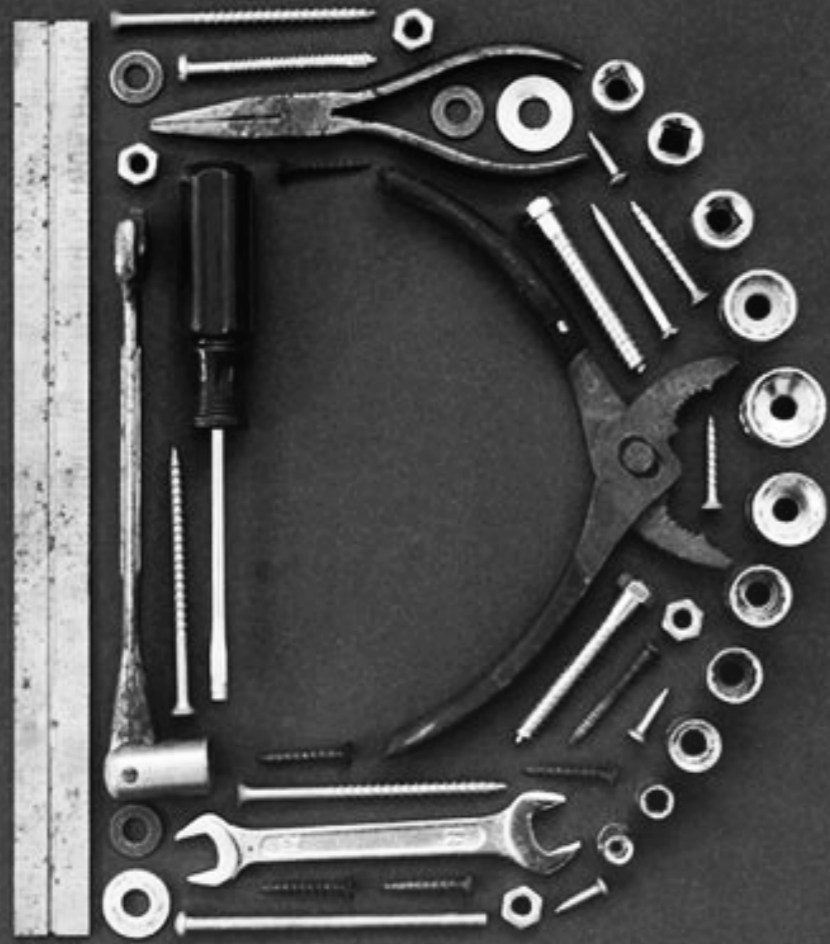
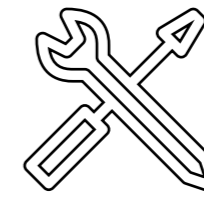


Fig.101:



DESIGN PROPOSAL



MAIN TASKS

In the context of Horten, adaptable design revolves around three main tasks:

- 1. From car facilitated to walkable communities**
- 2. Connecting existing city center to the waterside**
- 3. Climate change**

1. The existing city center is car based; many inadvertently planned parking spaces have the potential to be developed in a myriad of ways to benefit the pedestrians instead of the vehicles. In the expansion of the city center into Seaside East, it is important to adapt new transportation forms for the inhabitants. Walkable communities have proven to have many positive effects on people lives, such as in the aspect of health, economy and ecologically. The mobility structure for Seaside East has to have an another prioritizing of traffic groups than the situation of the existing city center. Clusters of Medical, Engineering or, in Horten's case, a nanotechnology community can help attract people to the city center. However, without it being a place where people are prioritized, the chances of an academic cluster inviting people to stay will not be very powerful.

For Seaside East to be a part of an urban thriving focal point in Horten community it has to be more walkable – it has to be more of a place for people.

2. The second task talks about physical fit. It is prevalent that barriers are dividing the existing city center and the waterside. Today Seaside East as a whole is this barrier, with Strandpromenaden road, oversized grey areas and no-access plots. The community of Horten identifies themselves with the closeness to the water; yet, the physical accessibility to the water is not there. Finding linking points in the existing city center and Seaside East have been another crucial task. The waterside is wished to be

a part of the city center, and needs to be adapted as an integrated component of the city center.

3. Like many coastal cities, Horten too, are facing challenges when developing along the waterside. In Horten, a storm surge will hit in 100 years, and possibly drown the entire plot of Seaside east. This climate threat needs to be kept in mind while developing and expanding the city center.

Research also implies that Vestfold County, in particular, will endure cumbersome and intense rainfalls in the near future. Ways to handle the storm water have to be implemented in the designs.

The idea of the walkable community emphasizes the social processes. A walkable community talks about a change of lifestyle. How do we get to work/school/home? How far are the distances between our everyday facilities experienced as? At the same time, to address these components; naturally, we also deal with the development processes; when restructuring the mobility network to prioritize the different traffic groups or when developing each block. Green structure is another essential part of this equation, as green public areas often enhances the quality of a plot, as it is important for the people living and working here. The different processes that define adaptable design are in an integrated system needs to be considered in context to one another.

CONCEPTUAL APPROACH

SOFTWARE

THE SOCIAL SOFTWARE

HARDWARE

CIRCUITS

NATURAL HARDWARE

DEVELOPMENT HARDWARE

URBAN CHIP

CITY DISTRICTS

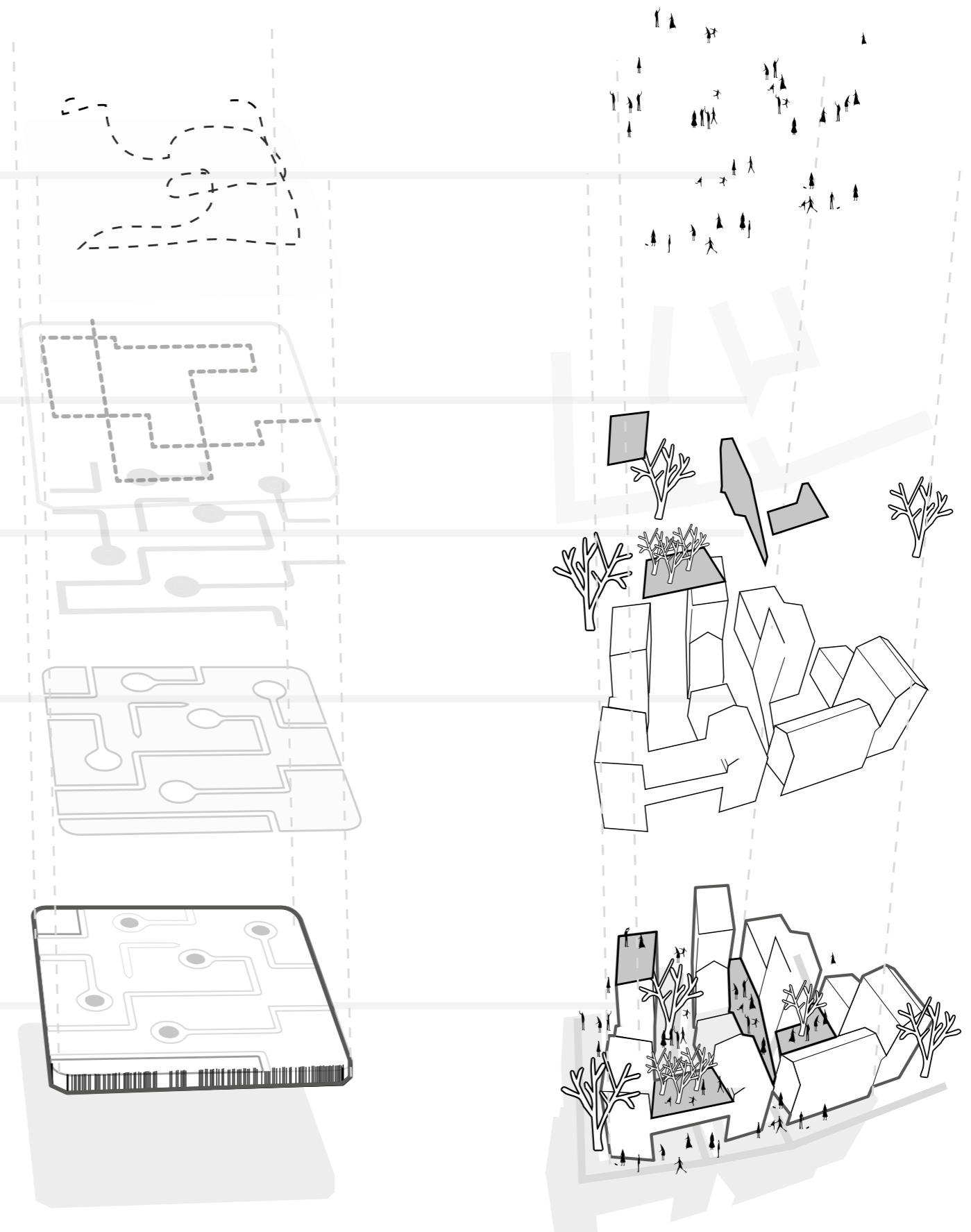


Fig.102:



DECRYPTION:
SOFTWARE - SOCIAL LAYER

HARDWARE
CIRCUITS - TRANSPORT FLOW
NATURAL - GREEN SPACE & INBETWEEN SPACE
DEVELOPMENT - BUILDINGS

CONCEPTUAL APPROACH THE CHIP & THE DEVICE

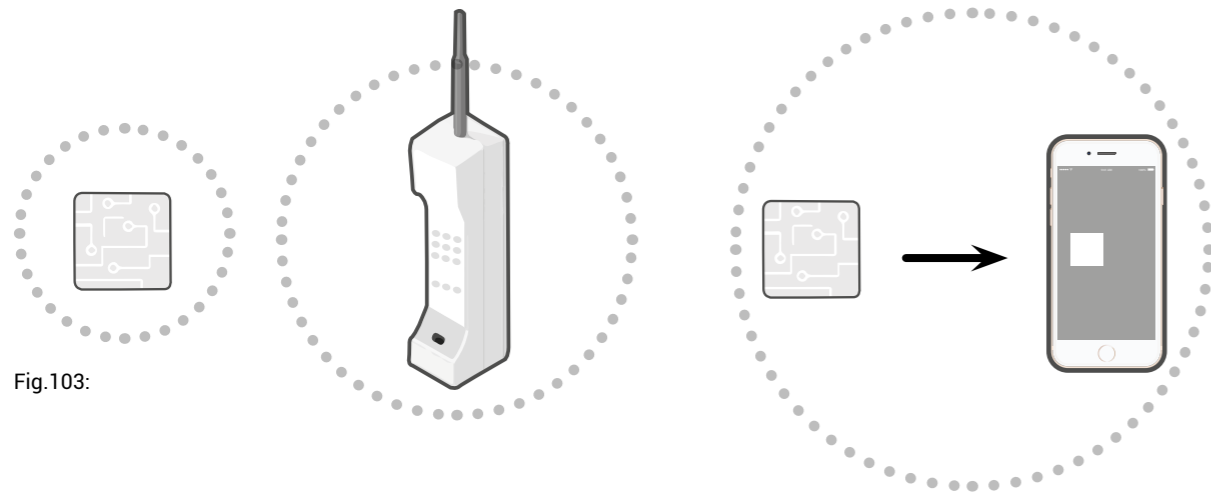


Fig.103:

The analyses indicate that Horten has a flourishing nano and micro-technology community. In example, the microchips made in Horten County are exported throughout the world, and even in space. Their identity is linked to this business: therefore it is used as inspiration to find a conceptual city planning approach.

Fig.102 explains how just like a chip is an intricate and multifaceted element, so is a city, they are both made out of a plethora of layers that come together to create a whole. In a similar way, the hardware of the city is made out of three particular layers: the natural hardware, which constitutes blue and green structures such as parks and bioretention curbs; the development hardware, which constitutes architecture; and; and lastly, the circuits, efficient signaling from one point to another through a well established network, such as a transport network. This layer talks about connectivity.

When these hardware foundations are put into use, a chip will not operate without its software. Thus, it needs to be connected to a device. Within the context of a city, this is the social layer. The question is: what makes a person move from A to

B? The answer inevitably varies. After all, it could be a variety of things: history, culture, art, and identity, just to name a few. Therefore, the people that make up a city are the ones that ultimately control its direction and destination.

In Fig.103, the telephones act as metaphors for Horten City centre. Within the first illustration, the telephone and the microchip are portrayed as two different components, and as two various parts, they are unable to properly function. However, by combining the chip with the phone, they synergize, and can generate new opportunities for calling and texting. Much in the same way, the new urban chip must stay connected to the city center of Horten to yield proper functionality(Fig.104).

CONCEPTUAL APPROACH IN CONTEXT OF HORTEN

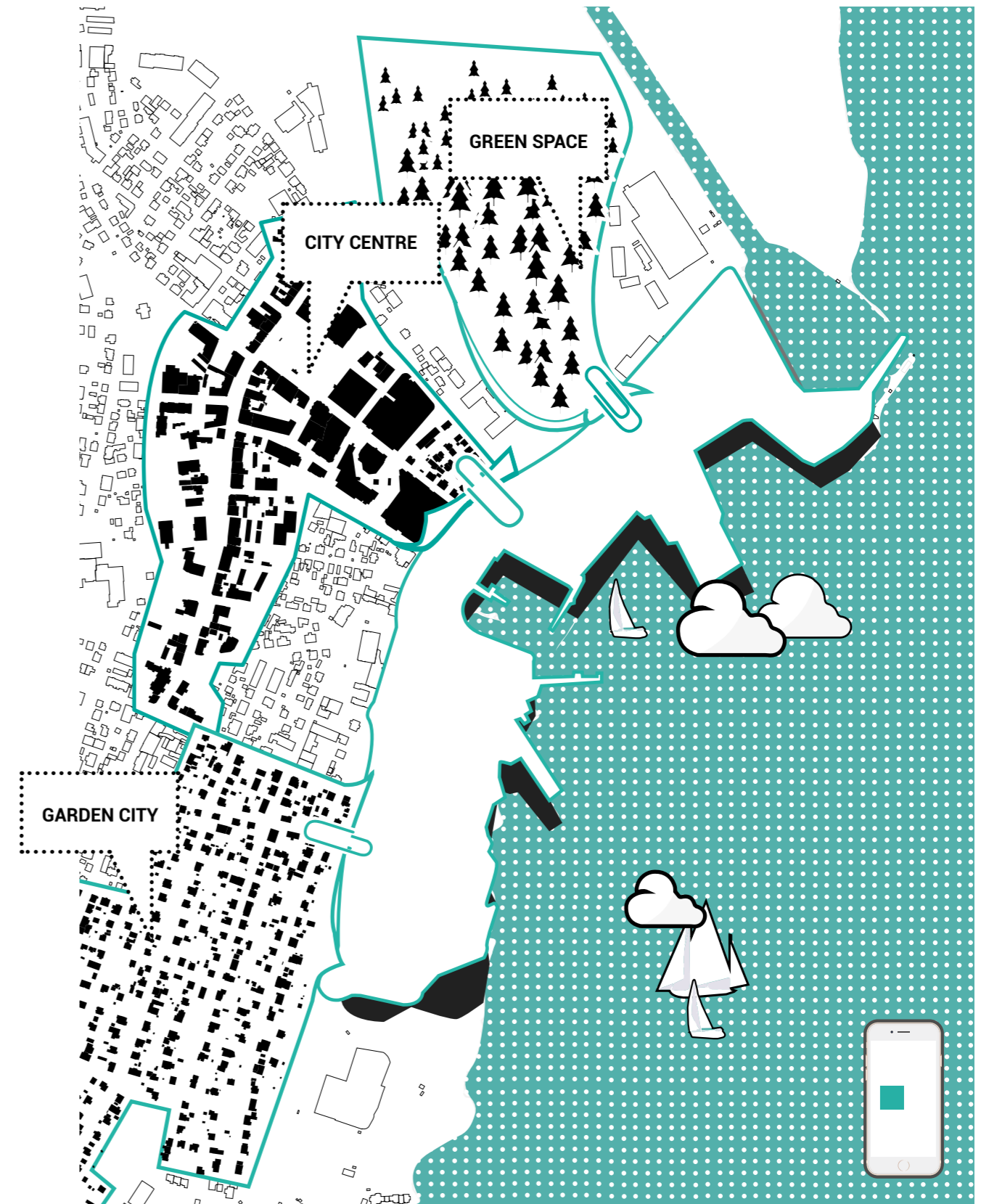
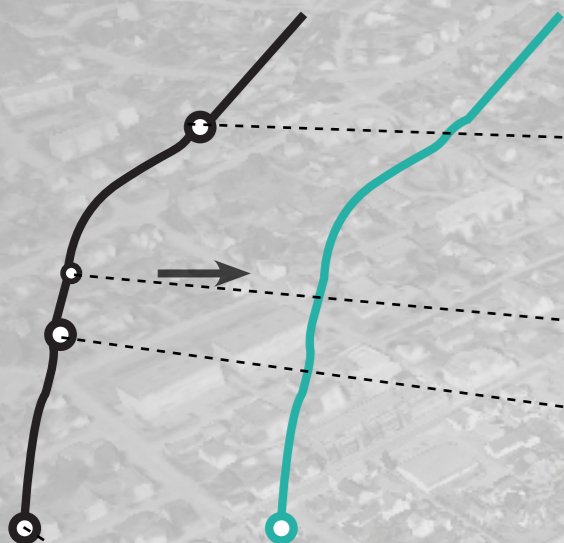


Fig.104:

STEP ONE: ADDRESSING THE BARRIERS

Barriers, Strandpromenaden



One of the biggest barriers between the city, the site, and the water, is Strandpromenaden road as the analysis indicated. Therefore, it is necessary to address this barrier. In a plethora of ways, this road symbolizes the border or even the end of the existing city center. Because once you cross it, you are no longer within the urban environment of Horten city center. Therefore, when considering the expansion of the city center, adapting this highway into a street is a crucial step. Below are three ways to contribute to the de-congesting of Strandpromenaden:

Fig 105:

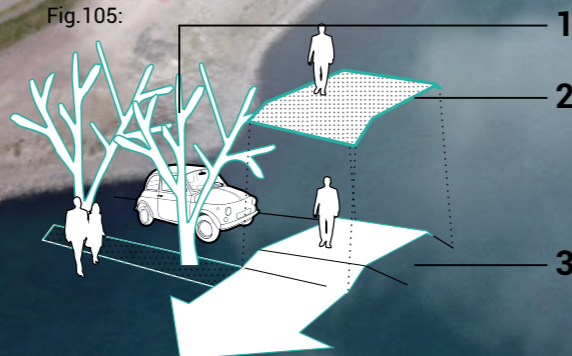
(1) Multiple Crossing Points from the city to the transformation site are critical to the people's sense of safety, in addition to communicating that that this road is not suitable for cars. Also, the East-West connections, making the road more walkable in the north-south direction is a pivotal step as well. That way the pedestrian will possess a myriad of ways to move from A to B.

(2) Raising the ground floors in the horizontal connections to show that pedestrian transport flow is prioritized.

(3) Sections of greenery separating the pedestrians and bicyclists from the car transport is another feasible and efficient approach to converting the highway into a less congested street.



Fig.105:



STEP ONE: ADDRESSING THE BARRIERS

Barriers, ferry terminal

The ferry terminal that acts as a barrier to the development of the area. As long as the ferry continues to be located, in terms of adaptability development will be a challenge. Trying to find proficient solutions to crossing it, remains the biggest problem. Further are two alternatives for the placement of the ferry terminal, along with the positives and negatives of each alternative:



(1) The first alternative is based on the existing condition that the ferry terminal is close to the water.

Positive Effects:

The connections between the current city center and the new transformation area would be expedient for all traffic users. Also, it can be solved practically because car traffic is re-routed to the waterfront pedestrians will be able to walk at their leisure between Strandpromenaden Road and the ferry terminal area.

-This alternative provides a profusion of ways to connections to the west, where the preserved garden city lies.

-A process based solution becomes easier because it protects against the advent of massive infrastructural interventions being necessary.

-This is also a cheaper alternative where the cost of moving the ferry terminal is avoided.

-Separating the local traffic and the ferry traffic will also reduce queuing of cars as they wait to board it. changes.

Negative Effects:

Activating the waterside and making it accessible for pedestrians will become harder since the ferry terminal is a barrier close to the water.

-The development area receives traffic noise from both Strandromenaden in the west and the ferry terminal in the east. To be able to build apartments, a quiet public space area is a necessity.

-In combination with the ferry terminal, as a barrier, the profluence of traffic noise makes this alternative less attractive for housing development.

-The potential for the coast trail to be close to the waterside is excluded.

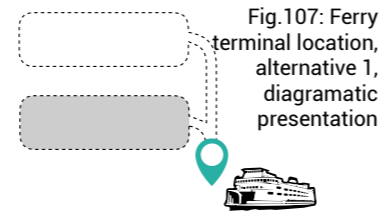


Fig.107: Ferry terminal location, alternative 1, diagrammatic presentation

(2) The third alternative proposes a move of the ferry terminal away from the water and upwards, right under Strandpromenaden and its suburban areas.

Positive Effects:

-Connecting Horten to the water, and thereby, generating city life down to the water. New recreational areas by the water.

-Moving the ferry terminal makes it a more attractive option for developing housing districts within the area.

-Collecting the noise sources in a zone.

Negative Effects:

Negative Effects:

-Costs of moving the ferry terminal

-Creates a massive barrier towards the suburban areas

-If needed, the expansion of the ferry terminal space would be difficult, as both sides contain residential

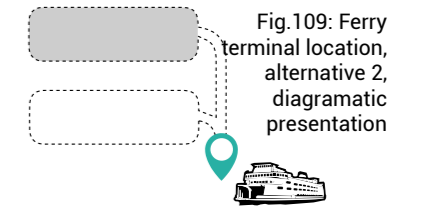


Fig.109: Ferry terminal location, alternative 2, diagrammatic presentation

plots.

-Little contact between the workers at Basto Fosen and the vehicles on the ferry terminal, creates a complicated departure from the ferry.

(1) The site does not have many contours down to the water. Therefore, pushing the ferry terminal downwards is excluded.

(2) The crossing is too dangerous.

(3) In observance of the area, there is a segment of terrain to work with. Thus, a bridge that will function as a public space and crossing point may be a feasible approach. One of the requirements is that there are 4.8 meters between the ground and the highest point of the bridge when its intersecting with the ferry parking area.



Fig.108: Ferry terminal location, alternative 2, orthophoto

FERRY TERMINAL LOCATION TODAY



Fig.110: Ferry terminal location, alternative 2, orthophoto

*One of the main goals of this paper is to make the waterside accessible again for the people of Horten. With that in mind, this is the alternative that the design proposal will base itself on.

STEP TWO: IMPORTANT CIRCUITS AND INTERSECTIONS

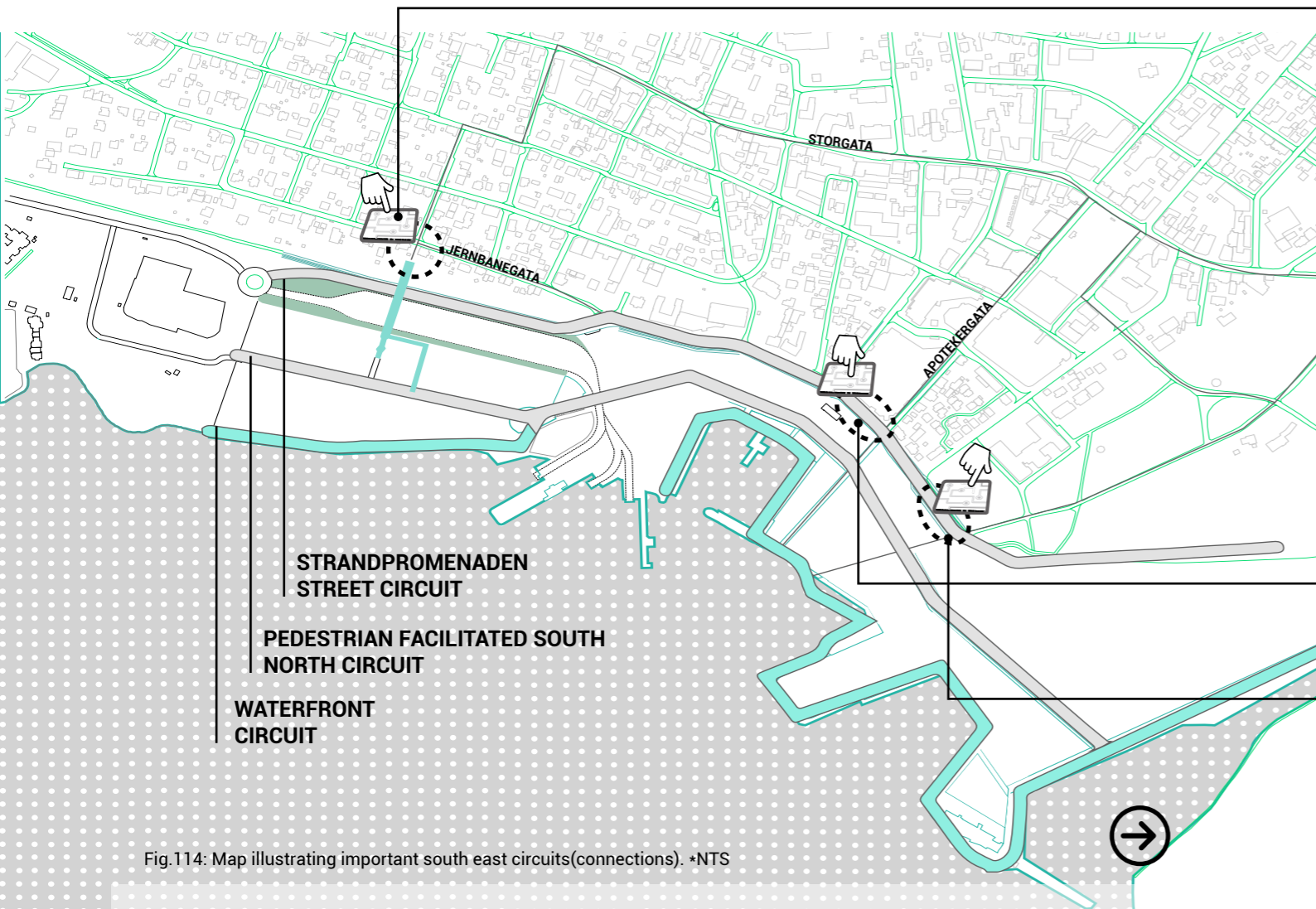


Fig.114: Map illustrating important south east circuits(connections). *NTS

SOUTH-NORTH CIRCUITS

Three different circuits(main street connections) in Seaside East sets the foundation for a potential grid network. A grid based system is flexible in the sense that each block can develop independently, by a different actor and at a different time.

Both the strandpromenaden and the second circuit in this system possesses different qualities than the waterfront circuit, which serves more of a recreational purpose. A goal has been to reactivate and reclaim the waterside, as it is not as accessible today. The other two circuits are to be experienced to be pleasant to walk in for its traffic users, but one of its main priority should be the thoroughfare.

EAST-WEST INTERSECTIONS

The city center should be linked to the existing downtown. The intersections marked on the map above are crucial linking points in connecting the city center to the new development area, seaside East. (1) The people living in the suburban area will just be a short walk away from Storgata and the waterfront's, job opportunities and commercial activities should be linked to the existing downtown, as going to the supermarket. (2) Sjøsiden mall and the other malls create a shopping hub that should be extended over Strandpromenaden, and not be experienced as the end of the city center as it does today. Apotekergata is a pedestrian street that intersects with the town square and storgata. This street also has the potential to connect to the waterfront seamlessly. (3) Lastly, Lystlunden's superior green quality has the potential to be further adapted into Seaside East.

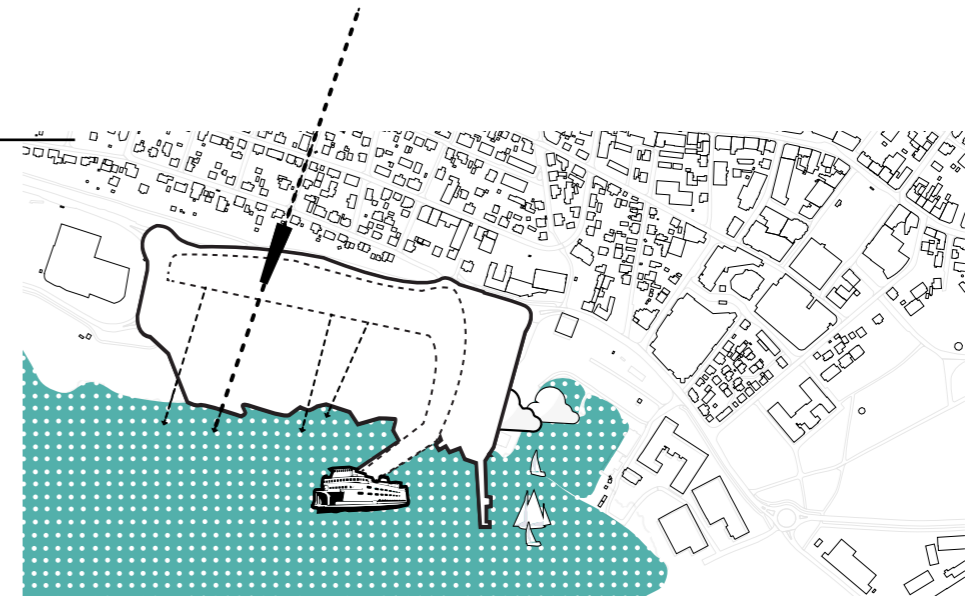


Fig.111: Connection; City center - Ferry plot(Seaside East). **Bridge connection:** The marked area is the only point of the site that has enough terrain to facilitate for a pedestrian bridge.



Fig.112: Connection; City center - Guest harbor(Seaside East). **Continuous urban floor**



Fig.113: Connection; City center/Lystlunden Park - Cargo Port(Seaside East). **Expanded street zone**

STEP TWO: IMPORTANT CIRCUITS AND INTERSECTIONS

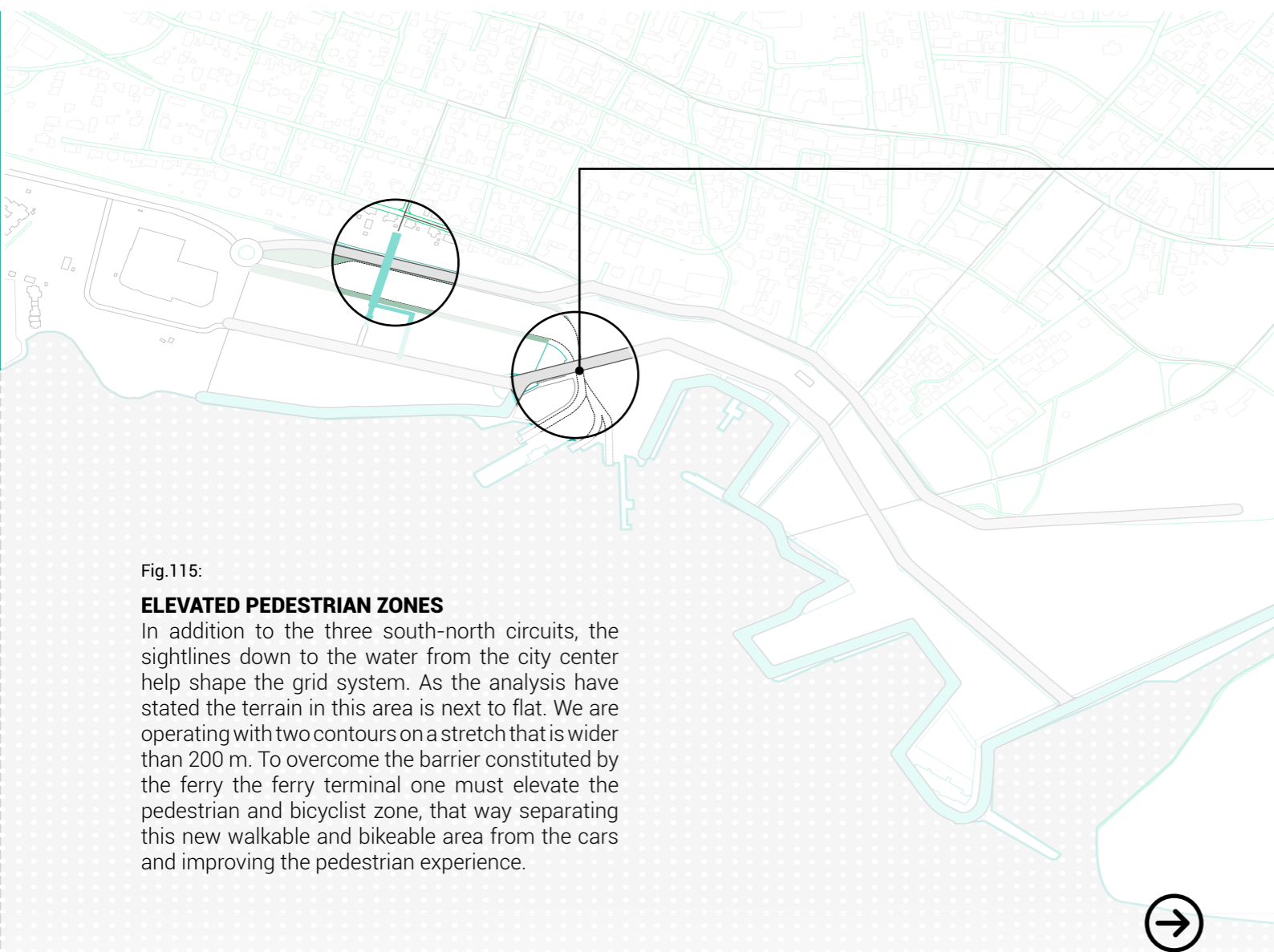


Fig.115:

ELEVATED PEDESTRIAN ZONES

In addition to the three south-north circuits, the sightlines down to the water from the city center help shape the grid system. As the analysis have stated the terrain in this area is next to flat. We are operating with two contours on a stretch that is wider than 200 m. To overcome the barrier constituted by the ferry the ferry terminal one must elevate the pedestrian and bicyclist zone, that way separating this new walkable and bikeable area from the cars and improving the pedestrian experience.

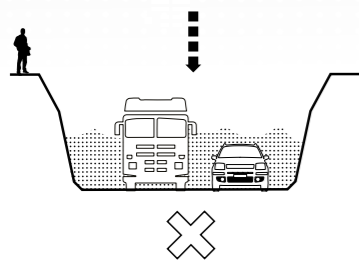


Fig.118: The terrain is too close to contour +1 to develop the ferry terminal downwards.

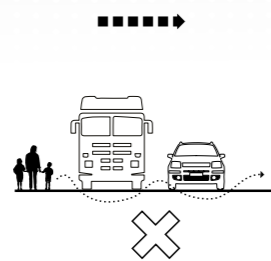


Fig.119: Mixing the traffic groups can reveal some challenges.

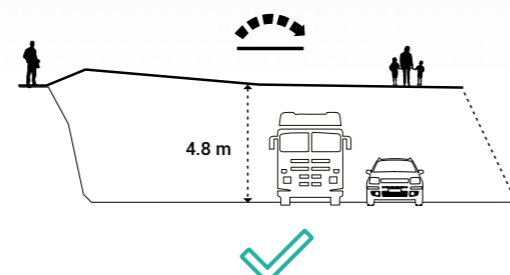


Fig.120: Separating the traffic groups.

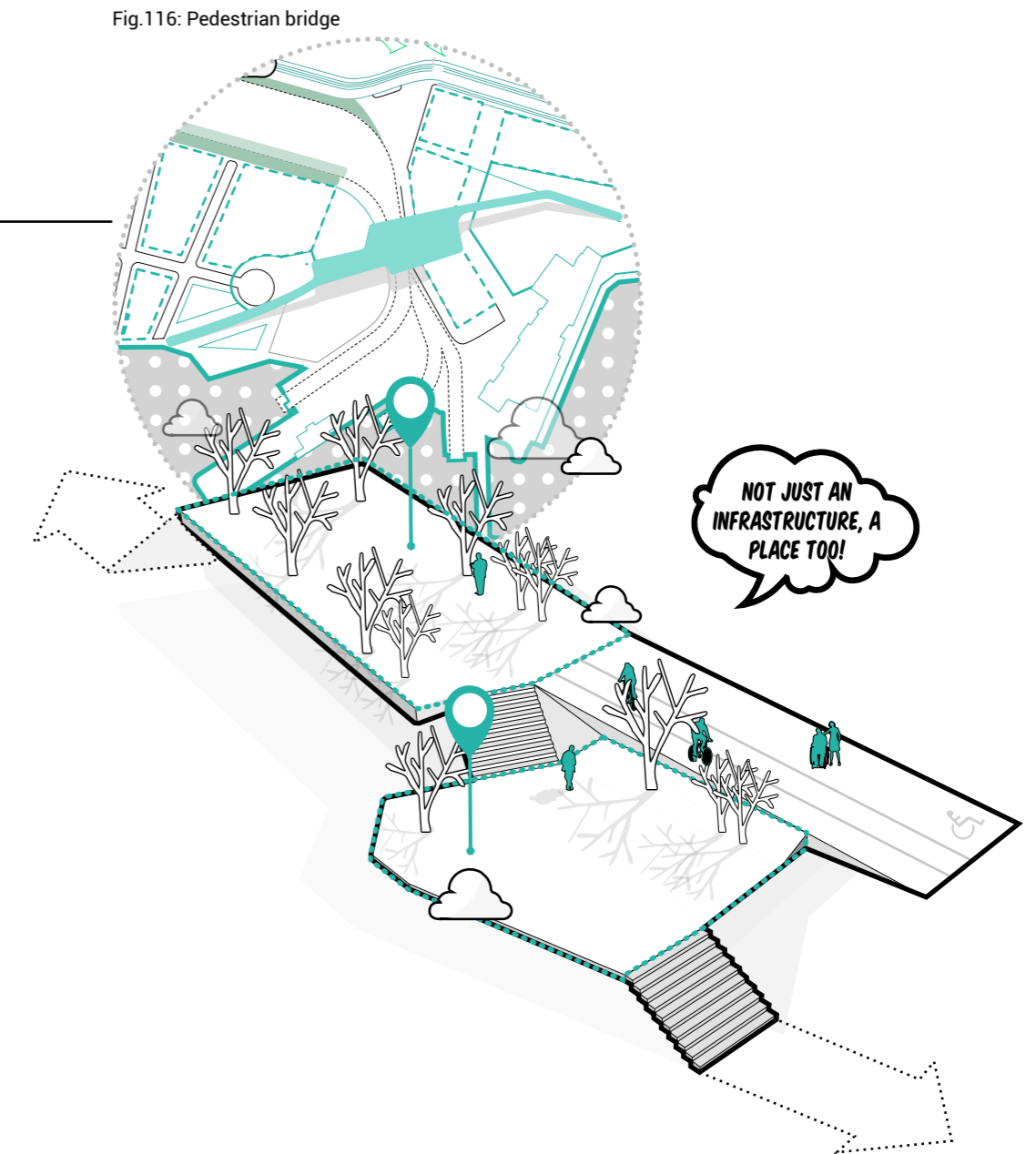


Fig.116: Pedestrian bridge

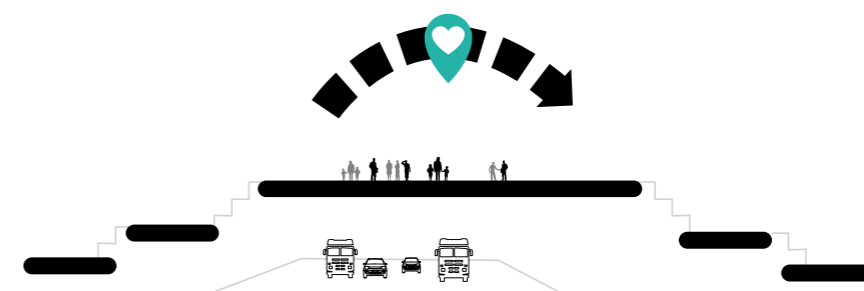
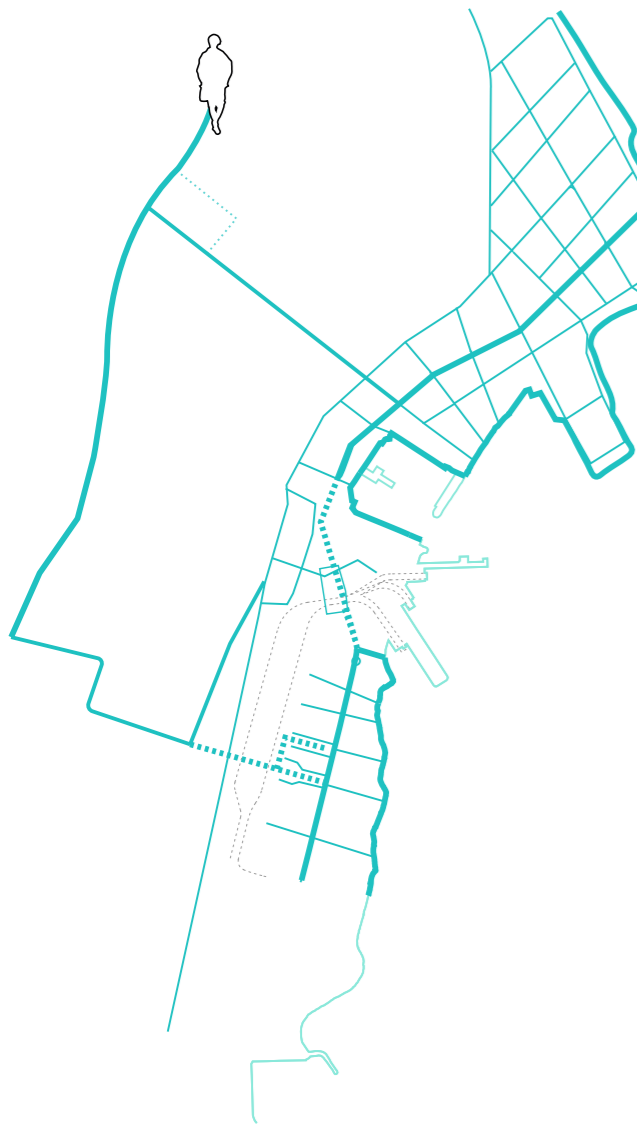


Fig.117: Emphasising each platform

STEP THREE: COMPLETING THE CIRCUITS

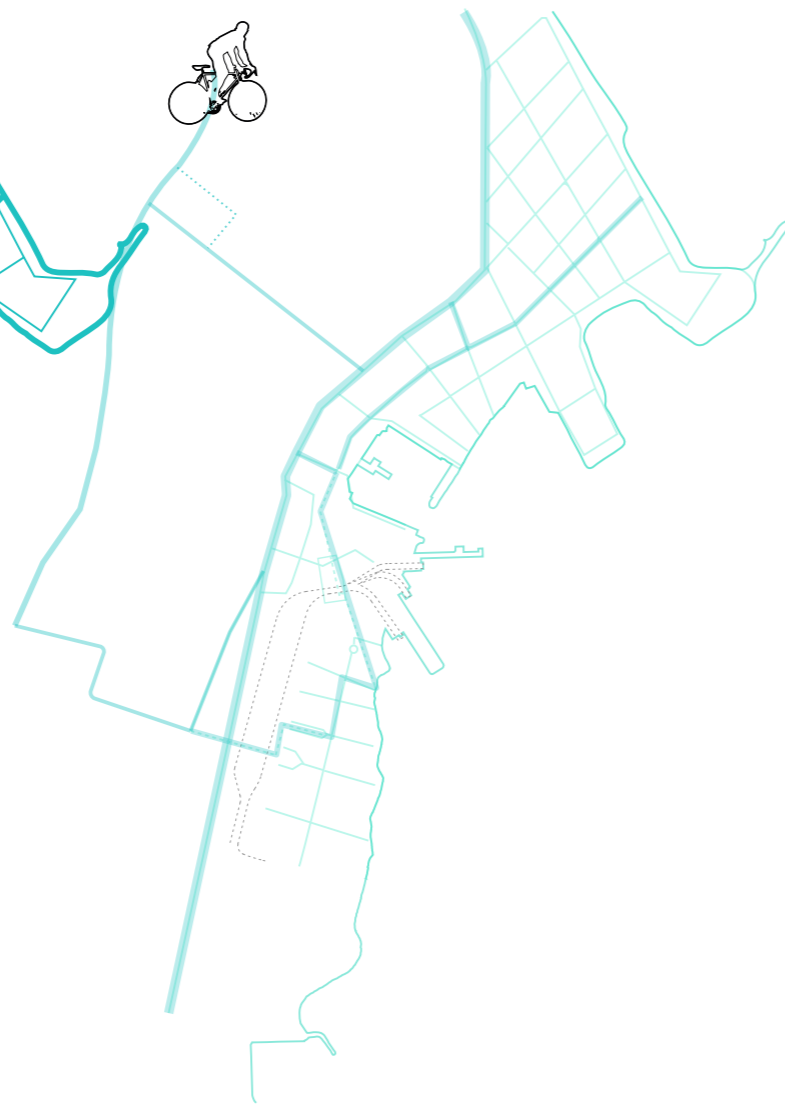
In the city center urban development is facilitated for cars, it is crucial to reverse the trend and make pedestrians a priority again. The positive effects on a more community that lives in walkable communities affects mental and physical health.

Fig.121:



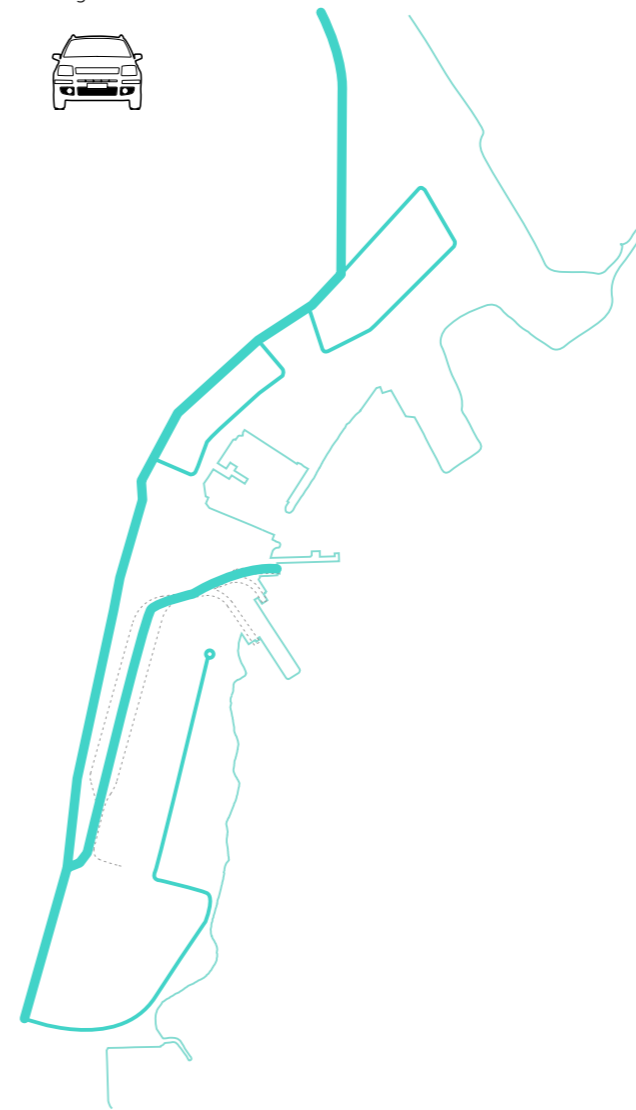
**1. PEDESTRIAN
STREETS**

Fig.122:



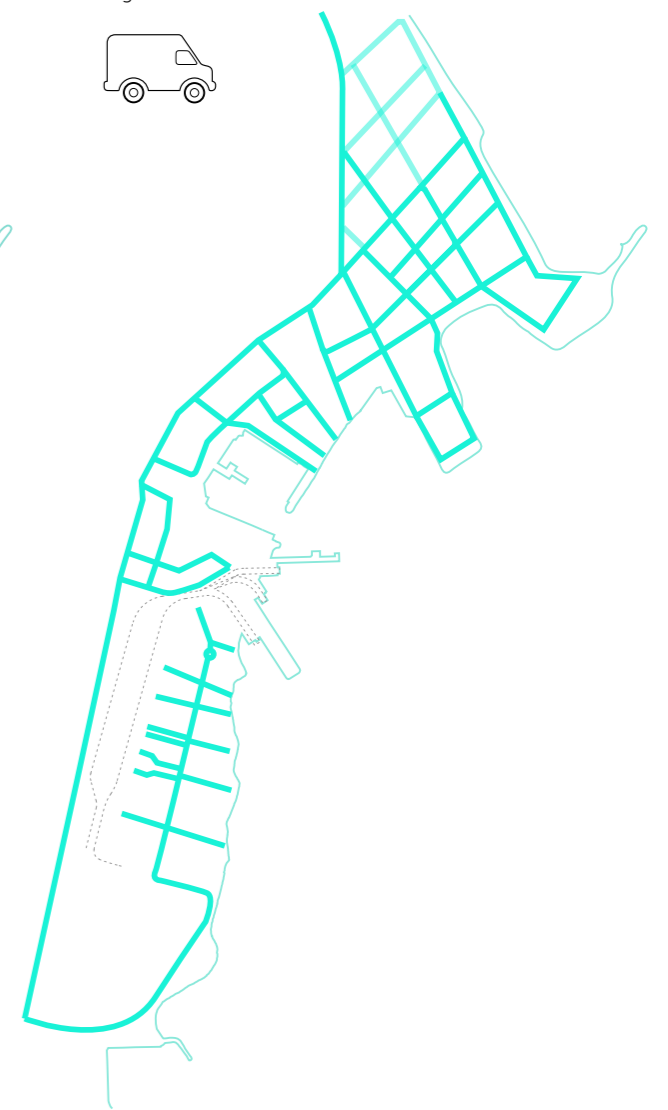
**2. BIKE
TRANSPORT**

Fig.123:



**3. MAIN LOCAL
TRAFFIC**

Fig.124:



**4. SERVICE
TRANSPORT**

Adapting walkable neighborhoods to Horten

Today's downtown is not welcoming to pedestrians. While expanding the city down to the waterfront, it is important not to let the vehicles have a high position in the hierarchy of transportation options. Walkable neighborhoods are how the sustainable future looks like.

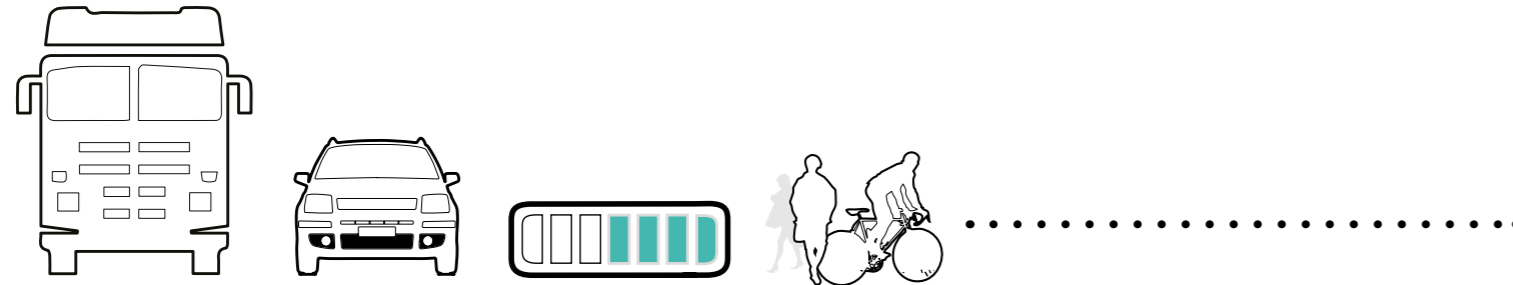


Fig.125: City street

These streets are drivable streets with a high priority for pedestrians. The zone of the streets for the cars will not be wider than 5-6 meter, making the zone narrower. The sidewalk curbstone will be low (5cm for example). Changes should make it less attractive for cars to drive, simultaneously empowering pedestrians to own the street - and the city.



Fig.126: Side streets - bike & cars share street

To prevent side streets to be experienced as "dark alley ways," these zones have been redesigned where cars and bikes share the right of way. By these two traffic groups sharing the street, they also have to acknowledge each other to be able to share the street - that way. Naturally, the speed of the street needs to be low. Recommended speed limits in these streets are 30 km/h or below.



Fig.127: Shared space

Shared space's seeks to minimize the segregation of pedestrians and vehicles, by removing features such as curbs, road surface markings, traffic signs, and traffic lights. By creating a greater sense of uncertainty and making it unclear who has priority, drivers will reduce their speed. This is conducive to a safer environment for both pedestrians and vehicles.

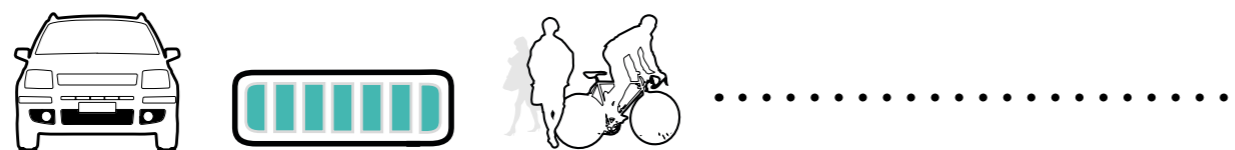


Fig.128: Streets without vehicle traffic

Streets like these are to be found along the waterfront.

*The greener the thermometer is, the more the pedestrian facilitated are the streets

DEVELOPMENT HARDWARE

STEP THREE: COMPLETED CIRCUIT SYSTEM

A completed mobility system where the pedestrian is heavily prioritized in the different street types. It is those travels in a city done by your feet that can create interactions between people, and this is exactly what creates city life in between the buildings.

Sightlines from the city center down to the water's edge has been critical in creating the different paths.

FIG. 129

The Roundabout is here to restrict the cars from further traveling into Seaside East. The vehicles that come into space would have to re-circulate out of it by turning here. There are bollards constructed in the roundabout. That way pedestrians and bicyclist can roam as they please, but not the cars.

Parking spaces in the town square are removed to utilize and explore its full potential.

Strandpromenaden gets connected to Apotekergata with its connection to Storgata

NEW PARKING HOUSE

PEDESTRIAN BRIDGE

NEW BUS POCKET

SHARED SPACE

TOWN SQUARE

APOTEKERGATA

2A.2

2A.1

CITY STREETS

Roundabouts signalize speed and car efficiency. 3 out of 4 roundabouts are removed to signalize slower speed in this street

SIDE STREETS

Traffic coming from the ferry gets separated from the vehicle traffic entering the Seaside East District

Where the ferry terminal meets the waterfront, it transfers over to the pedestrian bridge before it eventually re-connects to the water's edge in the guest harbor area.

BASTØ FØSEN



From this point, Strandpromenaden goes from being a road to a street. If and when the ferry connection in the future gets removed the extension of the street can happen in the north.

STREETS W/O CAR TRAFFIC: THE WATERFRONT

1A

3A



1:4000

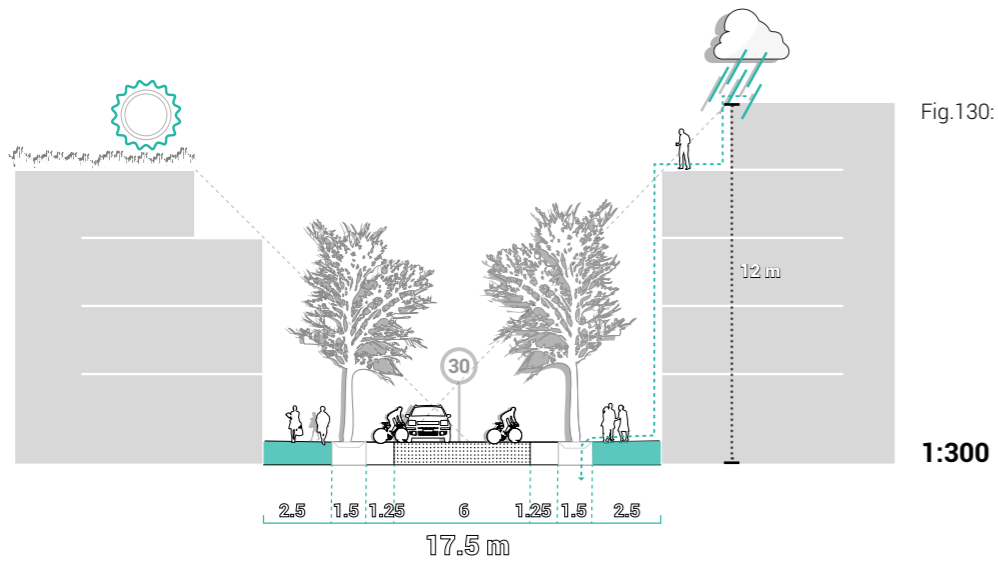


Fig.130:

1:300

1A: City Street

The vegetation zone serve more than an estetic purpose; it is a space to infiltrate and collect storm water. As Vestfold will endure more and intense rainfalls in the future, it is important to keep in mind how the blue infrastructure will merge with the street systems. The bicyclist and cars share the the street. Naturally, users will have to cooperate and this will reduce the speed of traffic.

2A Shared space streets

Shared space are implemented to make the street an adhesive part of the public spaces in Horten Seaside East.

2A.1

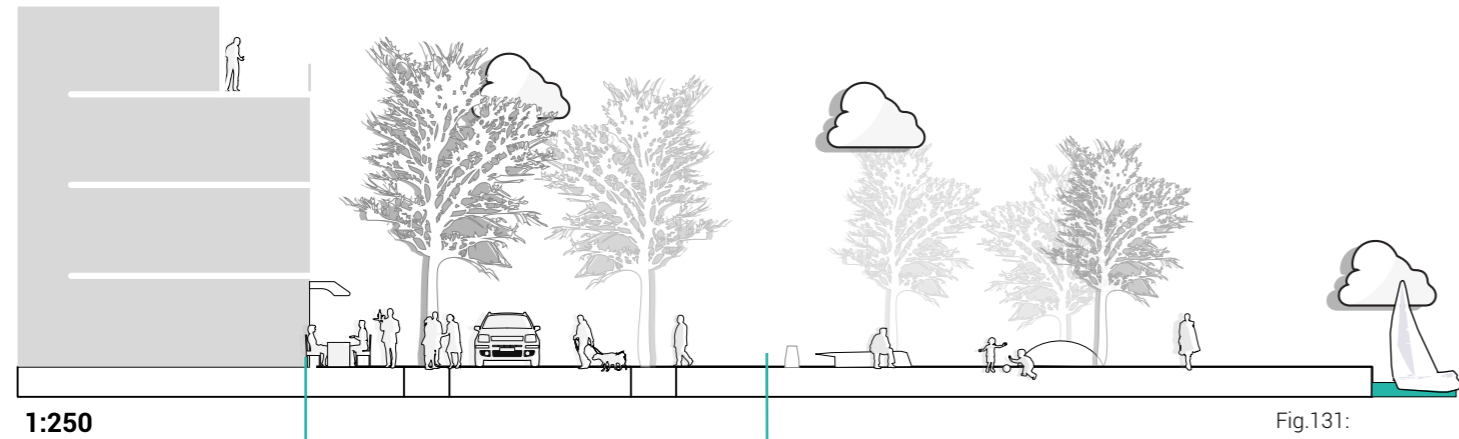


Fig.131:

2A.2

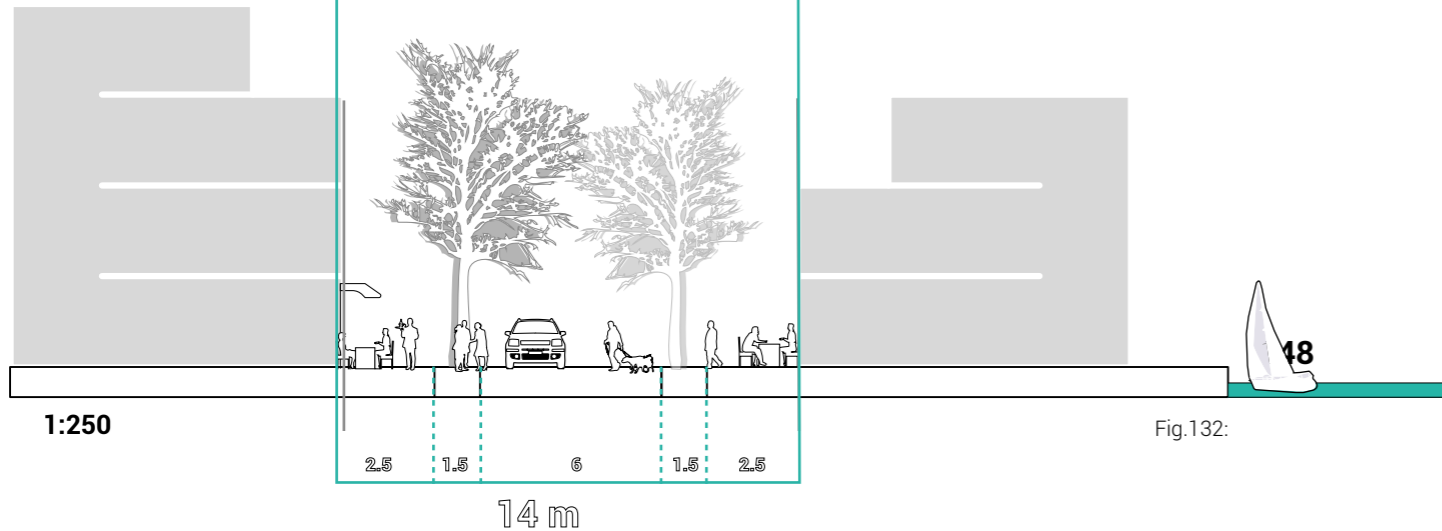


Fig.132:

3A: City Street

Two out of the three places along strandpromenaden where the city connects to Seaside East, the street section is widened to signal for vehicles that there this is no longer a road, but a street. Except for these two intersections, the street section along Strandpromenaden would look like the example in Fig.133:

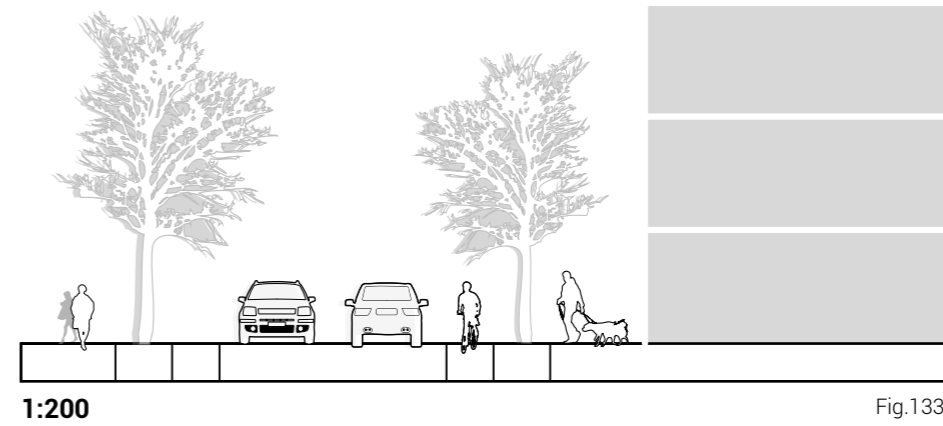


Fig.133:

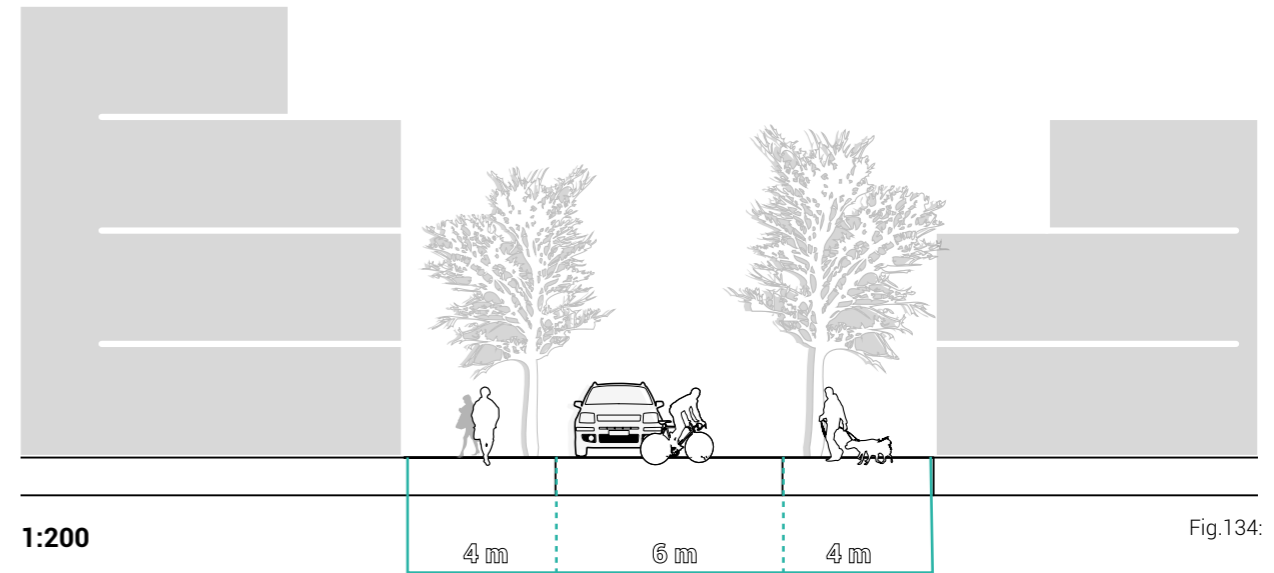


Fig.134:

4A: City Street

These streets have an extended pedestrian zone. Coffee shops and restaurants are invited to put out tables and seating areas here. The cars and the bicyclists share the street here as well. (Fig 134)

TRAFFIC FLOW TODAY

#SEASIDE EAST

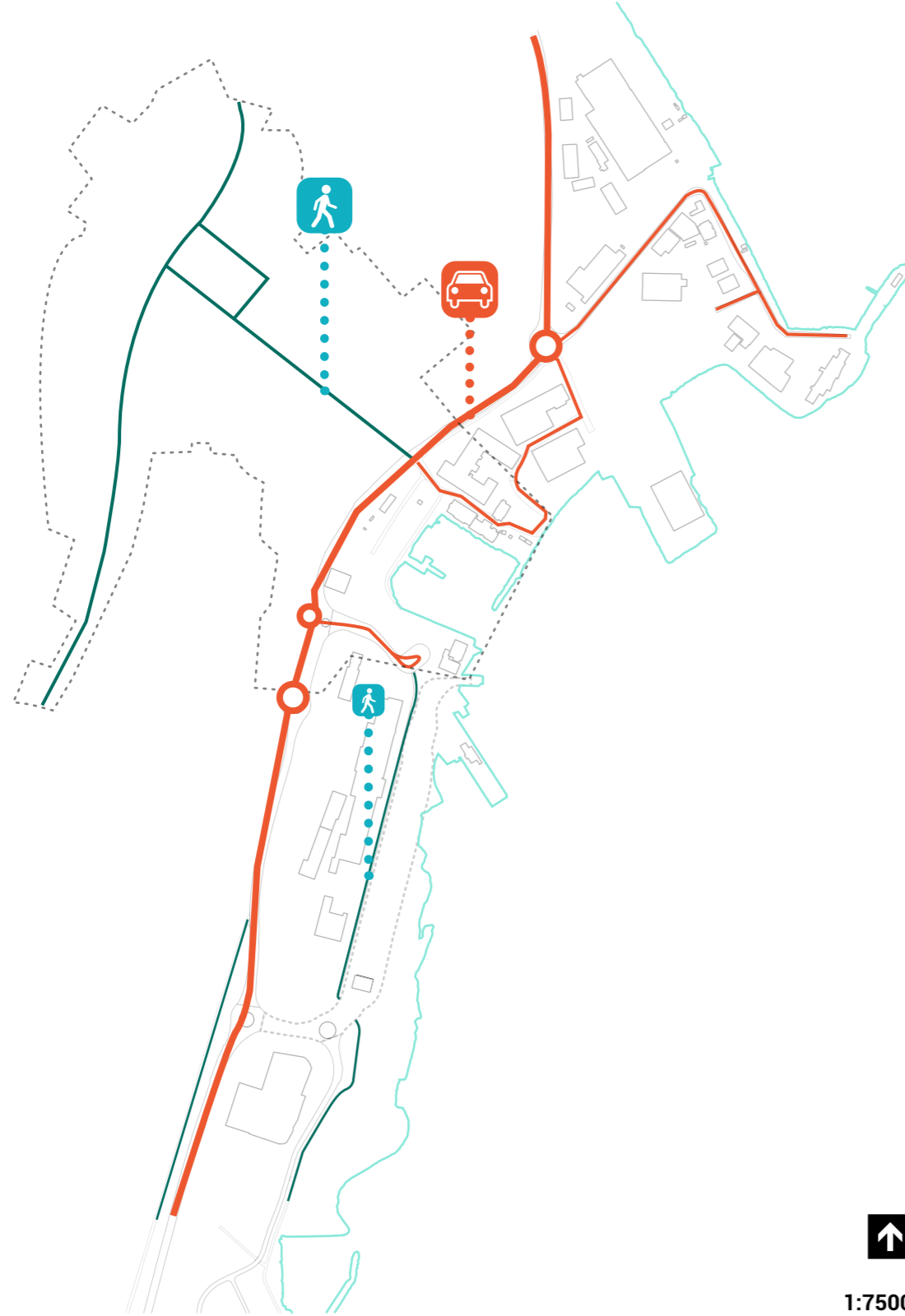


Fig.135:

TRAFFIC FLOW TOMORROW

#SEASIDE EAST

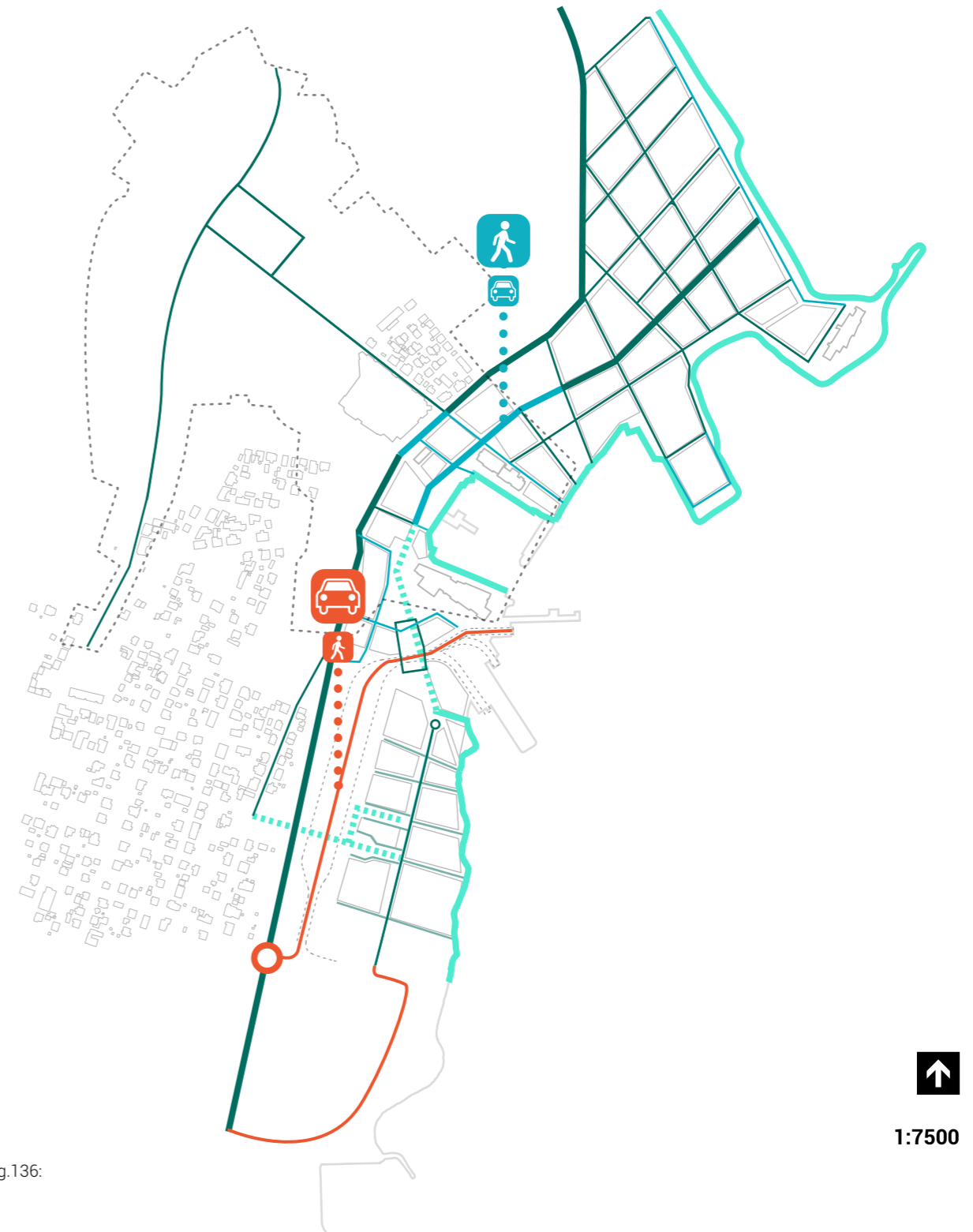


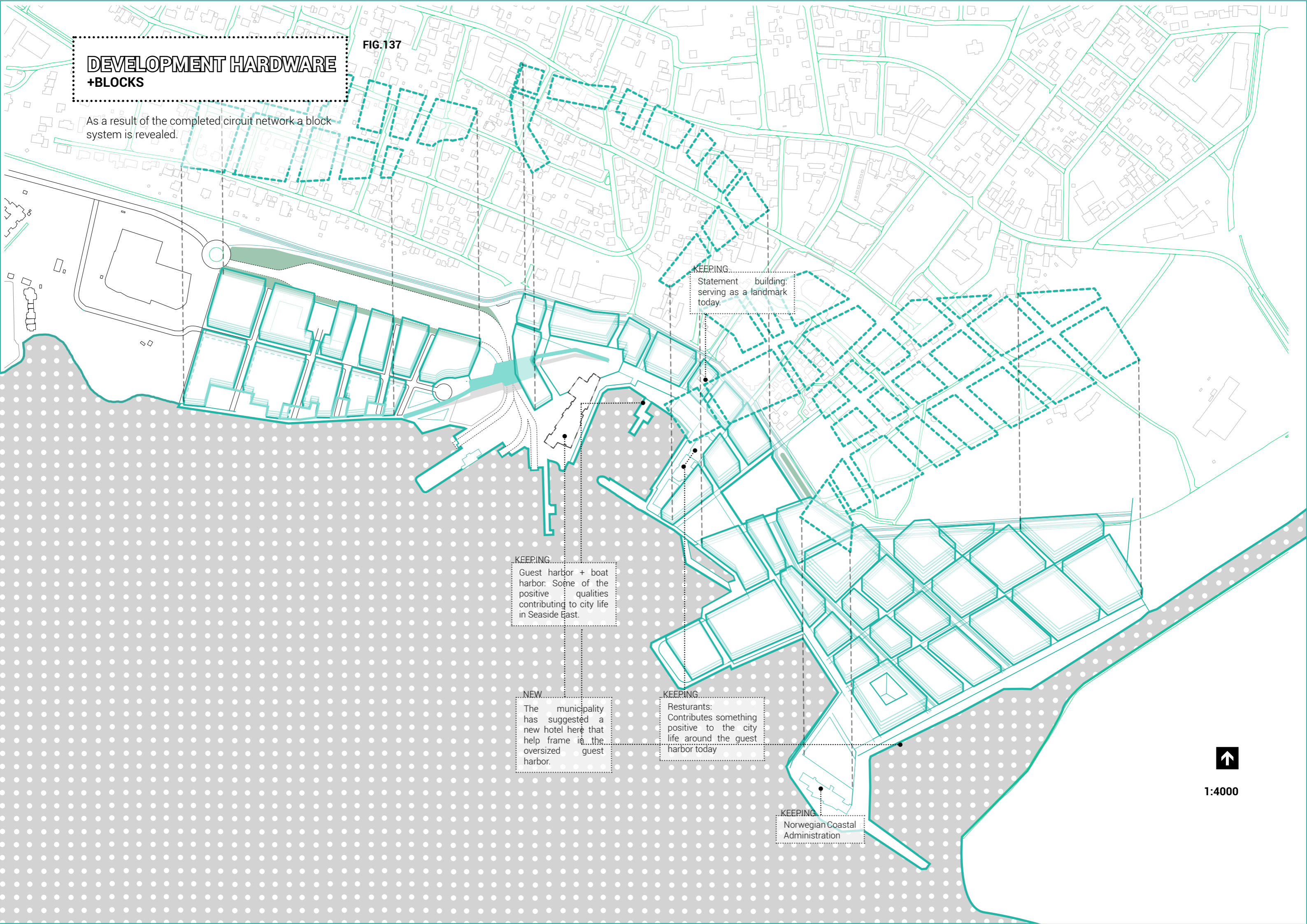
Fig.136:

*The red lines indicate roads where vehicle efficiency is a priority. The blue and green lines put the pedestrian and bicyclist first.

DEVELOPMENT HARDWARE +BLOCKS

FIG.137

As a result of the completed circuit network a block system is revealed.



KEEPING
Statement building:
serving as a landmark
today.

KEEPING
Guest harbor + boat
harbor: Some of the
positive qualities
contributing to city life
in Seaside East.

NEW
The municipality
has suggested a
new hotel here that
help frame in the
oversized guest
harbor.

KEEPING
Restaurants:
Contributes something
positive to the city
life around the guest
harbor today

KEEPING
Norwegian Coastal
Administration



1:4000

BLOCK ADAPTION

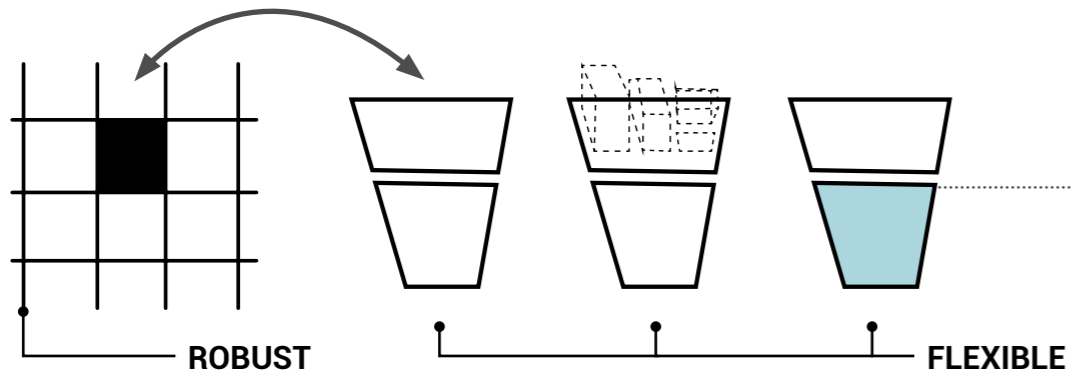


Fig.137:
A grid system is robust, yet flexible since each block can operate differently.

WITHIN THE BLOCK: ARCHITECTURAL FLEXIBILITY

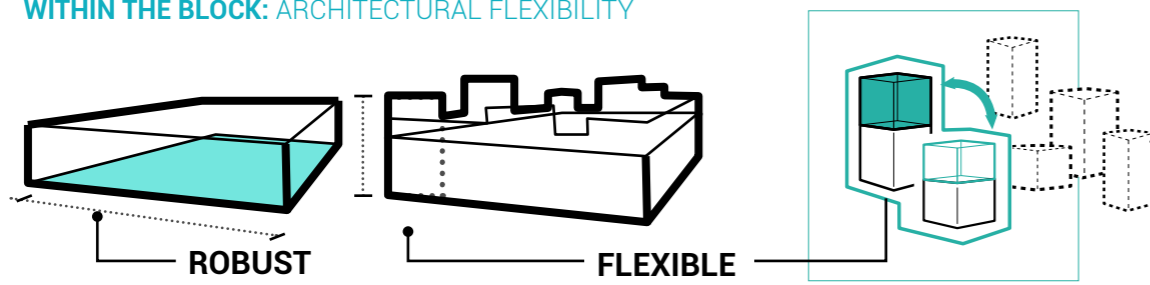


Fig.138:
Within the block different actors, private or public, can buy and develop a piece of the property, creating a variation in the architectural expression.

WITHIN THE BLOCK: RESIDENTIAL TYPE

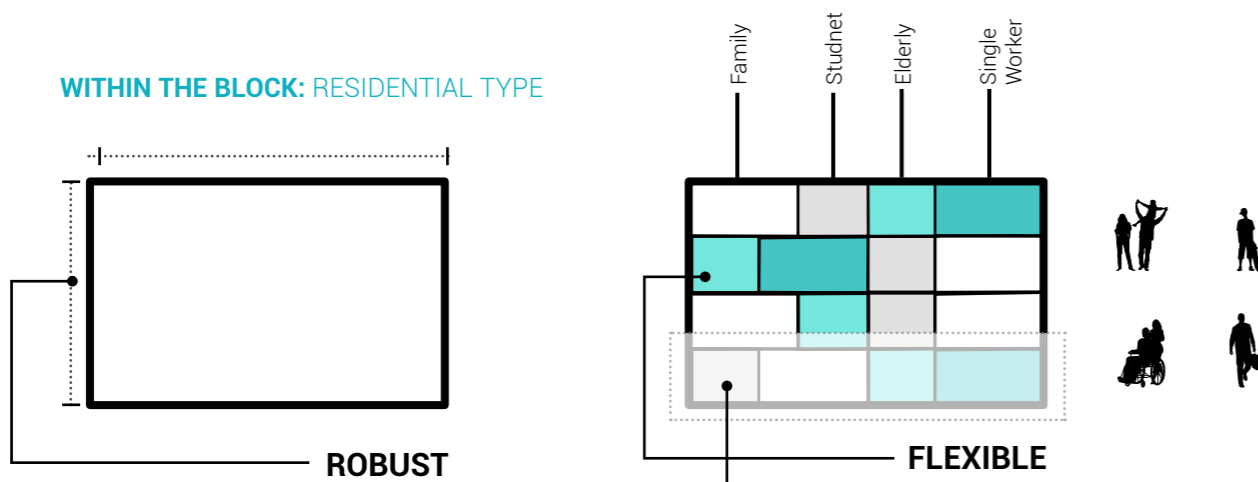
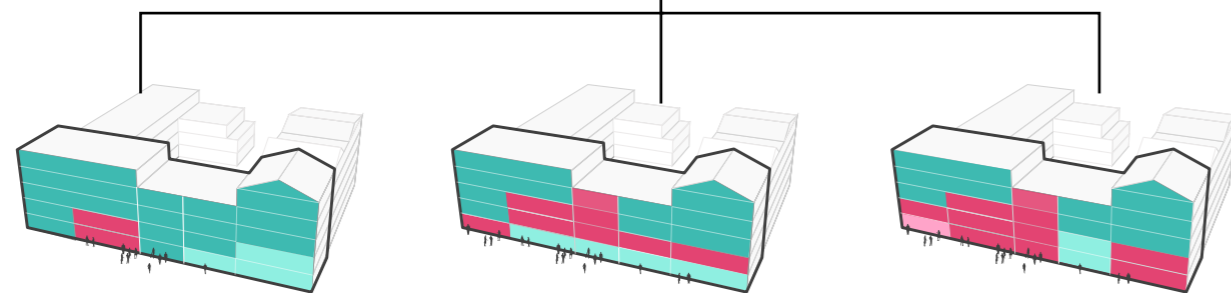


Fig.139:
Within a building, the apartments can vary to facilitate for different user groups with different cultural and economic background.



ACTIVE FACADES: DIFFERENT FIRST FLOOR FACILITIES

Fig.140:
The first floors of a building are extremely important to city life. An office building should be able to have a mix of housing and supermarkets in their first floor.

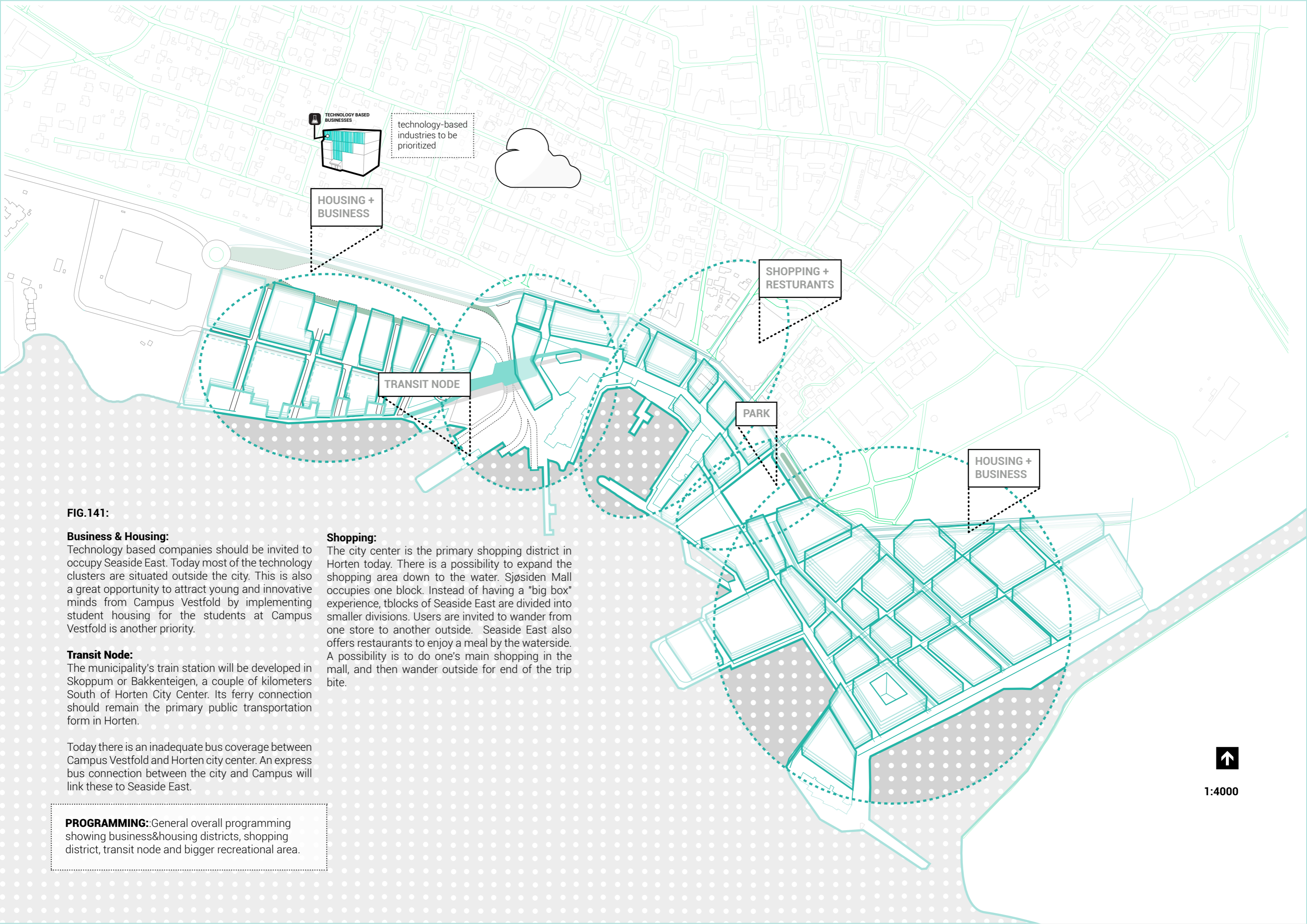


FIG.141:

Business & Housing:

Technology based companies should be invited to occupy Seaside East. Today most of the technology clusters are situated outside the city. This is also a great opportunity to attract young and innovative minds from Campus Vestfold by implementing student housing for the students at Campus Vestfold is another priority.

Transit Node:

The municipality's train station will be developed in Skoppum or Bakkenteigen, a couple of kilometers South of Horten City Center. Its ferry connection should remain the primary public transportation form in Horten.

Today there is an inadequate bus coverage between Campus Vestfold and Horten city center. An express bus connection between the city and Campus will link these to Seaside East.

Shopping:

The city center is the primary shopping district in Horten today. There is a possibility to expand the shopping area down to the water. Sjøsiden Mall occupies one block. Instead of having a "big box" experience, blocks of Seaside East are divided into smaller divisions. Users are invited to wander from one store to another outside. Seaside East also offers restaurants to enjoy a meal by the waterside. A possibility is to do one's main shopping in the mall, and then wander outside for end of the trip bite.

PROGRAMMING: General overall programming showing business&housing districts, shopping district, transit node and bigger recreational area.



1:4000

DEVELOPMENT HARDWARE +BLOCK TYPES

FIG.142

HOUSING+

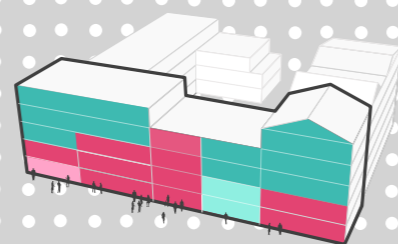
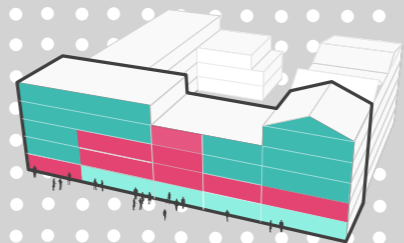
One of the intentions of office+ is to prioritize technology based companies into Seaside East. Today most of the technology clusters are situated outside the city. The clusters make an excellent opportunity to attract the young and innovative minds from Campus Vestfold in the future. Implementing student housing for the students at Campus Vestfold is another priority.

SHOPPING+

Shopping+ is a type of a building or a block that is where most of the first floor will consist of shopping related chains. The upper floors are a mix of housing and businesses.

OFFICE+

Office+ is a building or a block that contains mainly spaces for office use. To avoid black facades, we implement something called Horten+ as well. This facility gives back to the community; it has a social priority; such as a youth club, a dance studio and so on – qualities that contribute to the social life of the community. Additionally, there are housing in the upper stories and supermarkets & restaurants in the first floor.



1:4000

**GREEN HARDWARE
+ GREEN STRUCTURES**

FIG.143

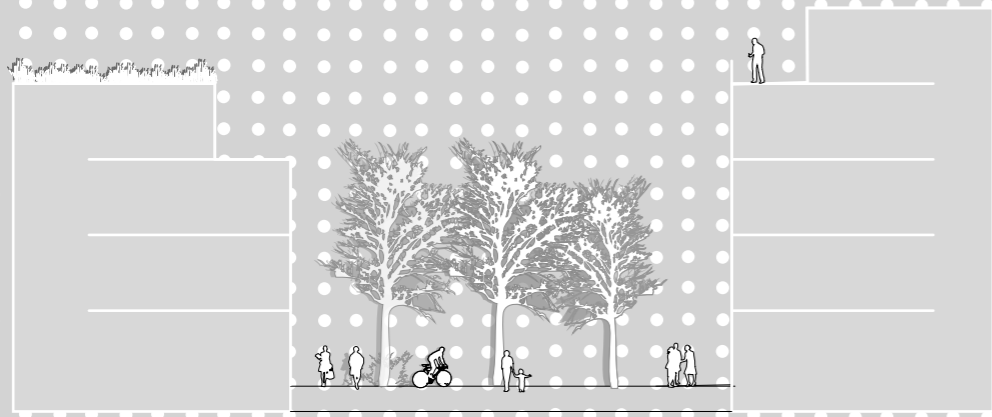
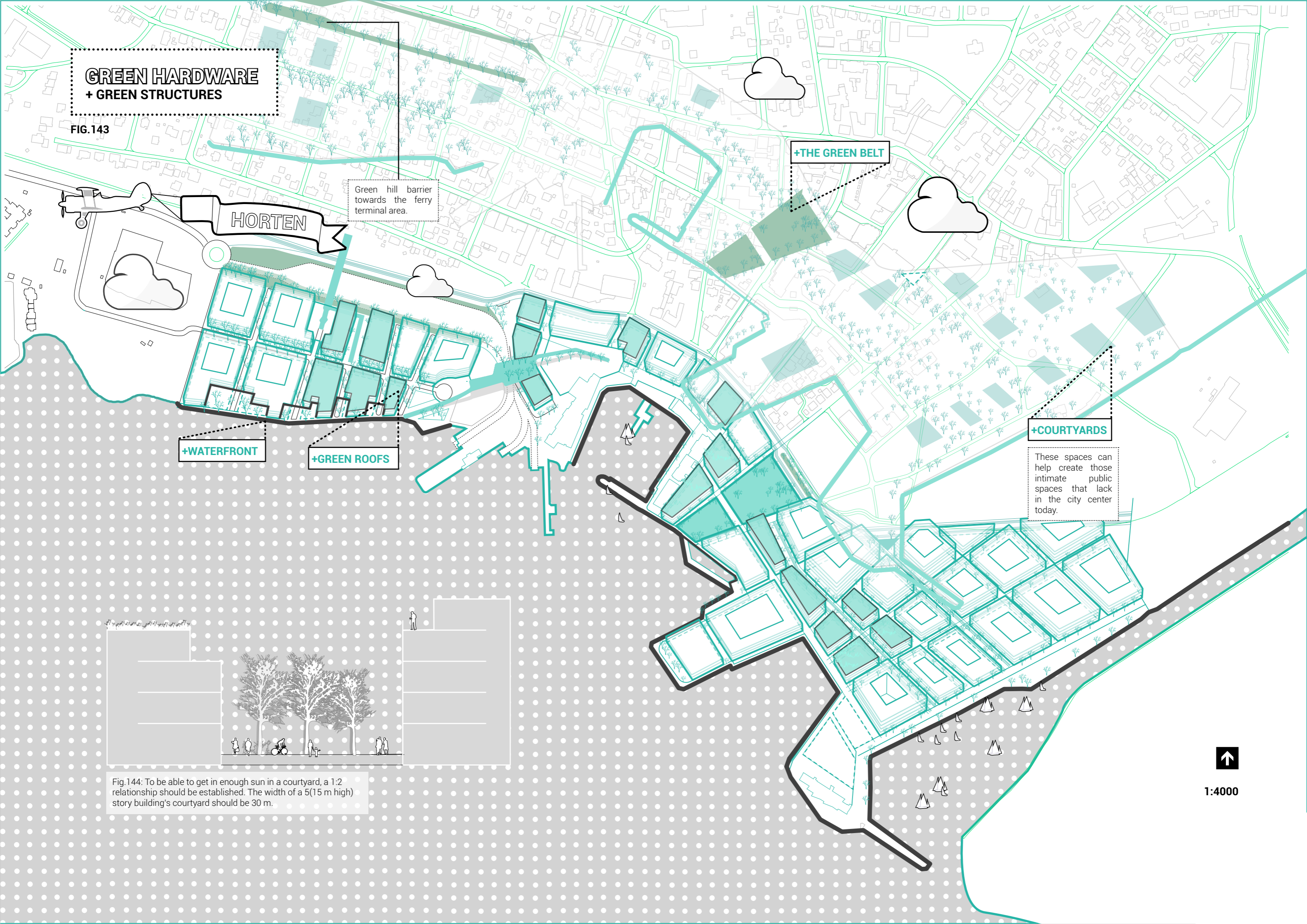


Fig.144: To be able to get in enough sun in a courtyard, a 1:2 relationship should be established. The width of a 5(15 m high) story building's courtyard should be 30 m.

+ THE GREEN BELT

A conceptual approach is to elongate the nature found in Lystlunden all the way down to the waterside. The analysis showed a flat landscape here flat. A possibility is to think of the park as an area for storm water control (Fig.146). It is possible to direct the storm water from the buildings closest to the park into this area. That way the park will not only serve recreational purposes, but also have functional value.

Today, there are few outdoor public spaces that young people can claim in the city center. Integrating a skatepark as an attraction point along the waterfront will serve as a meeting place for the younger generation in Horten. The new waterfront, as well as the urban chips, should showcase the diversity found in Horten.

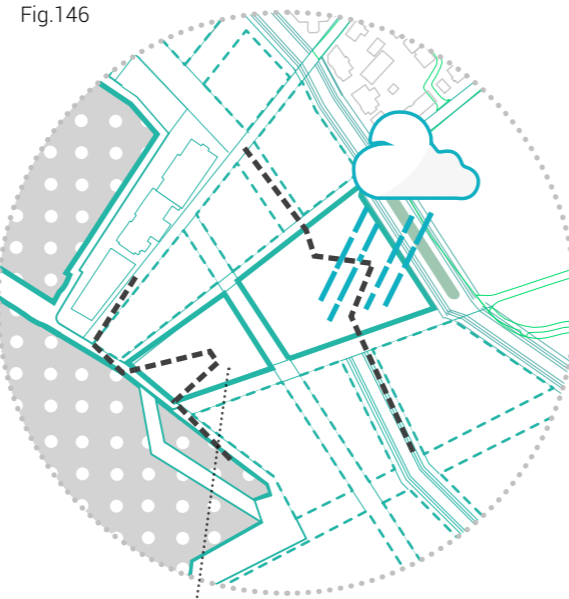


Fig.146



Fig.148

+ COURTYARDS & GREEN ROOFS

The analyses stated that there is a lack of intimate urban outdoor spaces in the city center. Moreover, pedestrian experience is not prioritized and cars are dominating. The new suggested atrium architecture with its courtyards will contribute to this missing quality and the buildings green roofs will become an important piece of the overall green hardware.

Green roofs serve several purposes, such as absorbing rainwater, providing insulation, creating a habitat for wildlife and decreasing the stress by providing a more aesthetically pleasing landscape, and helping to lower urban air temperatures and mitigate the heat island effect. They efficiently utilize the natural functions of plants to filter water and treat the air in urban and suburban landscapes.

Traditionally a suburban household has surface parking, a big fenced in garden. The new proposal for the city center of Horten tries to redefine this traditional suburb image. The new housing complexes try to adapt some of the qualities in the traditional urban fabric. For example, instead of building huge gardens, this proposal proposes shared "gardens" on the roofs and in courtyards. The 3-6 floors buildings can have pitched roofs to resemble the traditional suburban image.

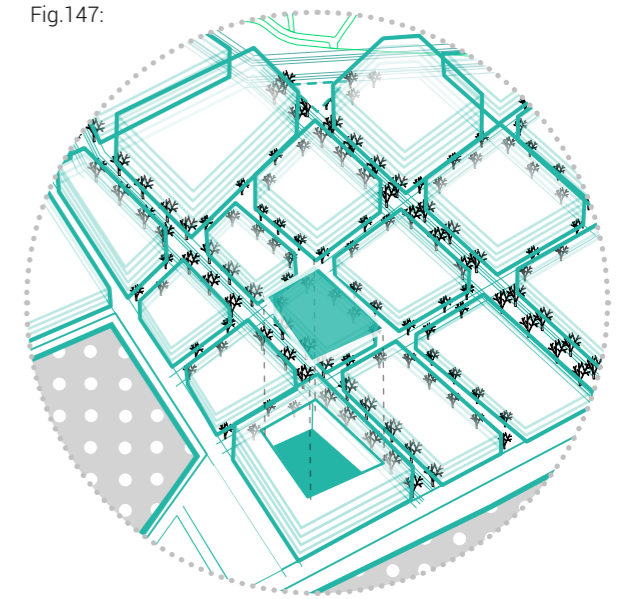


Fig.147:

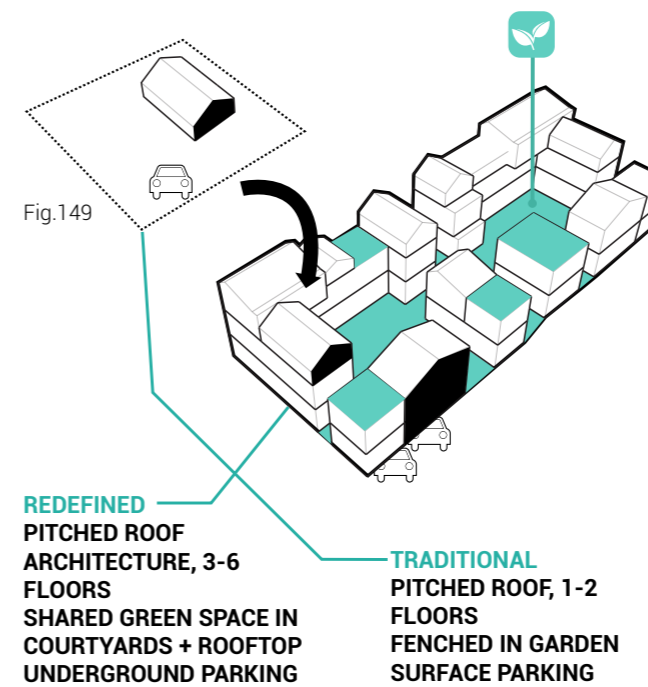


Fig.149

REDEFINED
PITCHED ROOF
ARCHITECTURE, 3-6
FLOORS
SHARED GREEN SPACE IN
COURTYARDS + ROOFTOP
UNDERGROUND PARKING

TRADITIONAL
PITCHED ROOF, 1-2
FLOORS
FENCED IN GARDEN
SURFACE PARKING

+ THE URBAN FLOOR

The analyses showed a future scenario whereby the city center will be largely flooded. As displayed in the analyses the water will stop rising with contour 2,5. In future development phases, the municipality should consider using some fill to raise the landscape to this elevation.

The landfill can put restrictions on the landscape's edge. As building out the waterfront, to achieve physical contact with the water some spaces might be achieved by allowing parts to the site to reach down to contour +1 (See Fig.151-153) One has to keep in mind that these might be temporary installments due to the storm surges.

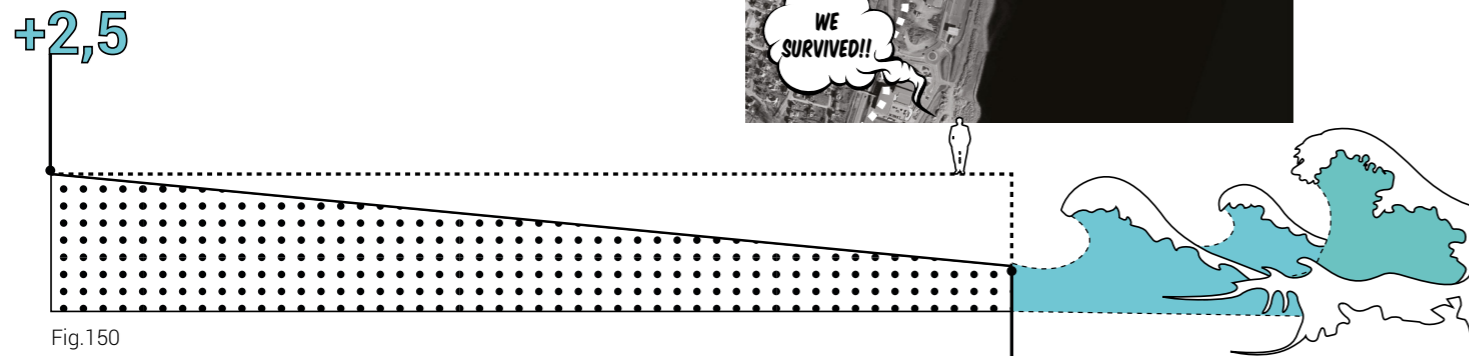


Fig.150

100 year storm surge

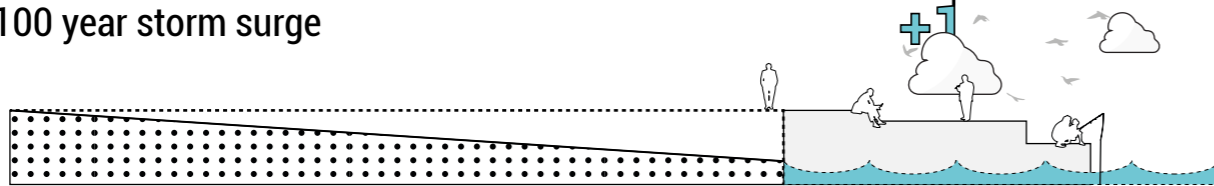


Fig.151: Waterfront that steps down to the water

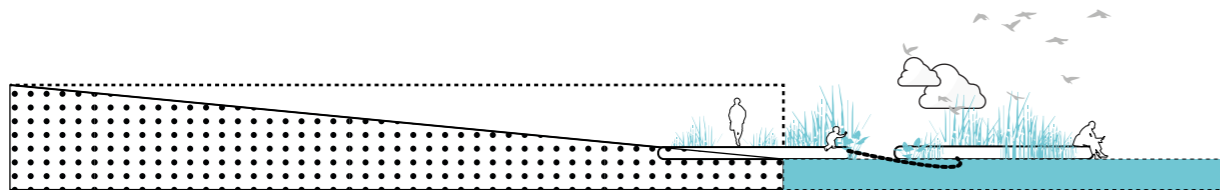


Fig.152: Floating bridges

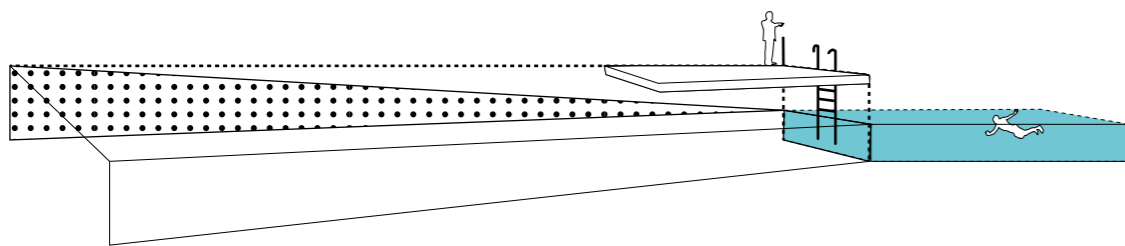
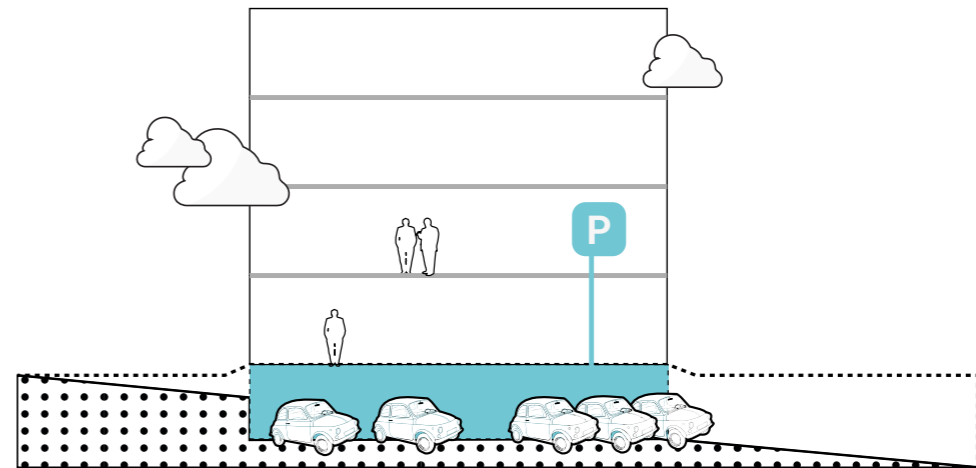


Fig.153: Diving area

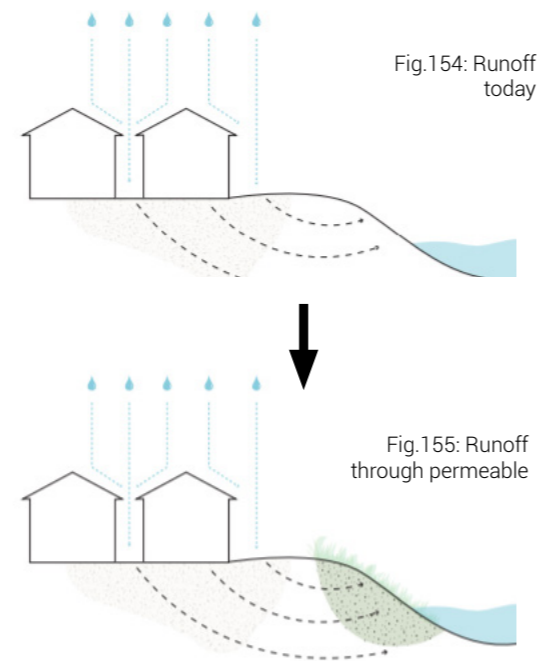


The potential landfill can create opportunities to build parking underground, which will empower the pedestrian's position in the city center.

+ CLEANSING THE GROUND

Both of the areas where new housing and businesses are suggested will develop on industrial plots. Before development, a thorough analysis of the ground masses should be completed. If it is possible to take much of the masses to a chemical lab, that would be the better, but expensive option. In Fornebu, Norway, polluted ground masses are encapsulated into landscape berms. In Seaside East there is a green barrier between the new placement of the ferry terminal and the new housing and business area. If pollution is revealed during the development phases, polluted soil berms could be placed here.

An easier strategy to establish permeable barriers or bio-barriers. The barrier has to lay perpendicularly on the groundwater stream constructed in a trench.



Principles for infiltration of water:

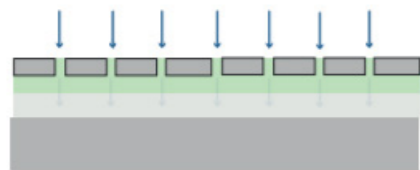


Fig. 156: Permeable paving is a surface with fugues where the ground water can infiltrate through. Commonly used in public spaces and driveways etc.

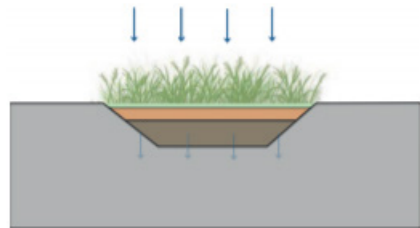


Fig. 157: Rain gardens is a terrain adapted infiltration system with plants. There are often used along roads or in a low point of a terrain. This is a good measure that cleanses the most polluted part of the rainfall.

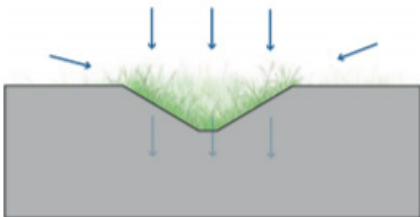
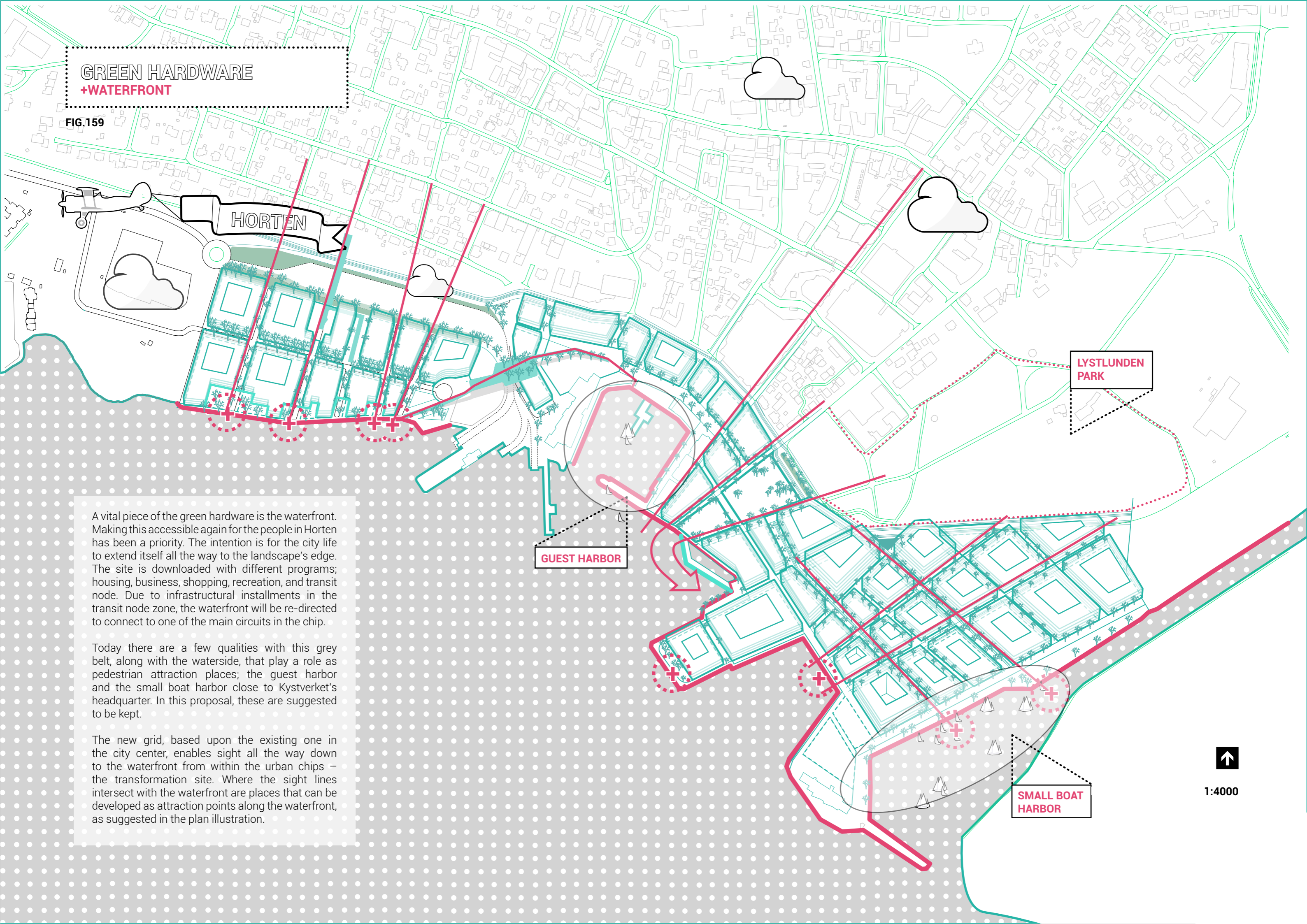


Fig. 158: Lowered terrains with plants are also commonly found along roads.

(Paus 2015)

GREEN HARDWARE
+WATERFRONT

FIG.159



A vital piece of the green hardware is the waterfront. Making this accessible again for the people in Horten has been a priority. The intention is for the city life to extend itself all the way to the landscape's edge. The site is downloaded with different programs; housing, business, shopping, recreation, and transit node. Due to infrastructural installments in the transit node zone, the waterfront will be re-directed to connect to one of the main circuits in the chip.


Today there are a few qualities with this grey belt, along with the waterside, that play a role as pedestrian attraction places; the guest harbor and the small boat harbor close to Kystverket's headquarter. In this proposal, these are suggested to be kept.

The new grid, based upon the existing one in the city center, enables sight all the way down to the waterfront from within the urban chips – the transformation site. Where the sight lines intersect with the waterfront are places that can be developed as attraction points along the waterfront, as suggested in the plan illustration.



1:4000

**SOCIAL SOFTWARE:
+THE PEOPLE**



THE STUDENT:
An attractive group of young educated people study @ Campus Vestfold. Implementing studenhouses in Horten with an express bus to Campus can attract this usergroup.



THE BUSINESS WORKER
Focusing clusters of nanotechnology businesses in Horten will attract people who might both live and work in the city center.

In addition to the ferry, if the bus connections to Holmestrand and Campus Vestfold are bettered you will also have the business worker that commute from Horten or to Horten.



YOUNGSTERS:
Youngsters in public spaces contribute a feeling of safety for other usergroups.



GOLDEN AGE:
Not having the obligation of work or school, the golden age users use the city maybe more than any of the other groups.

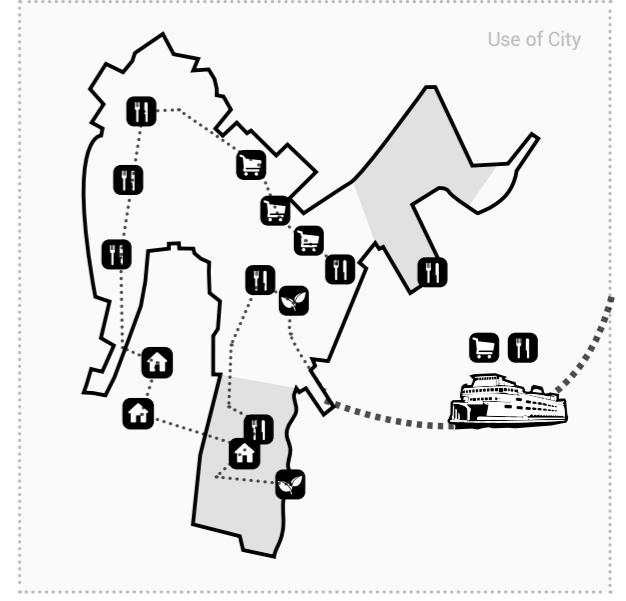
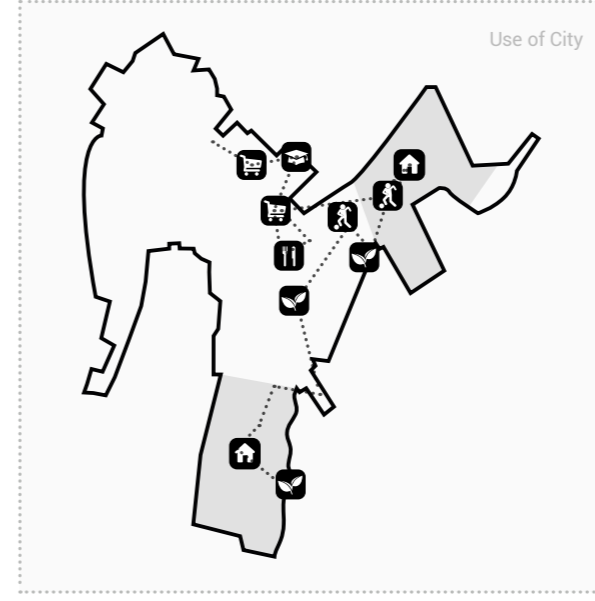
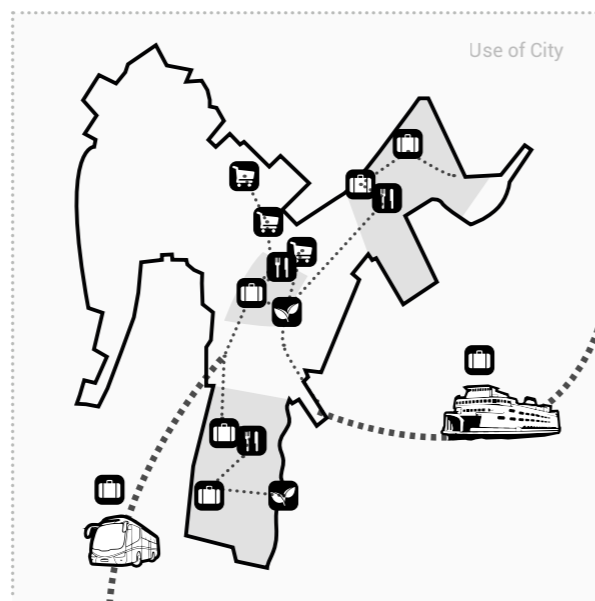
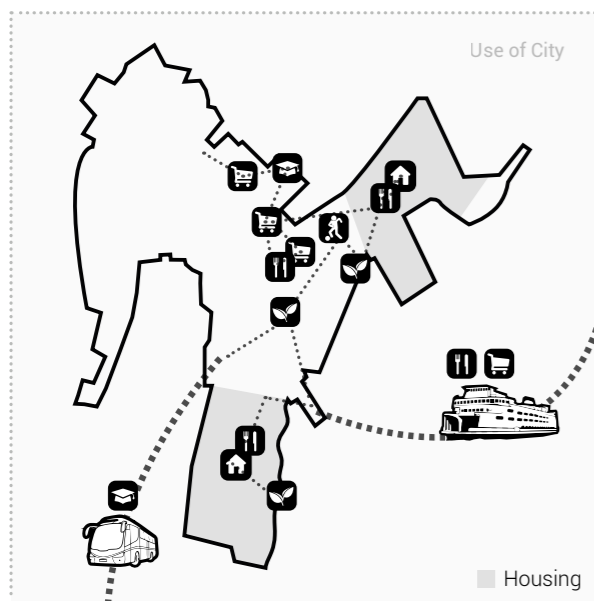
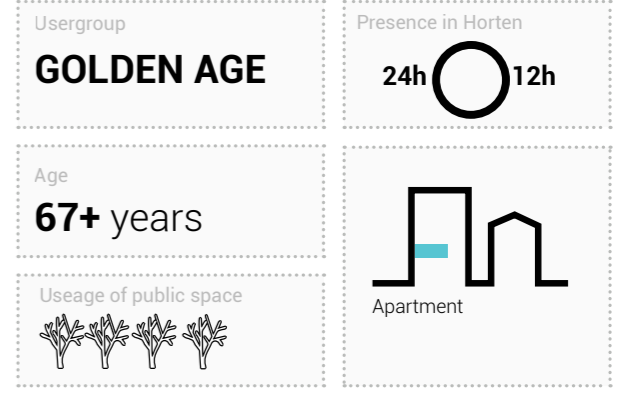
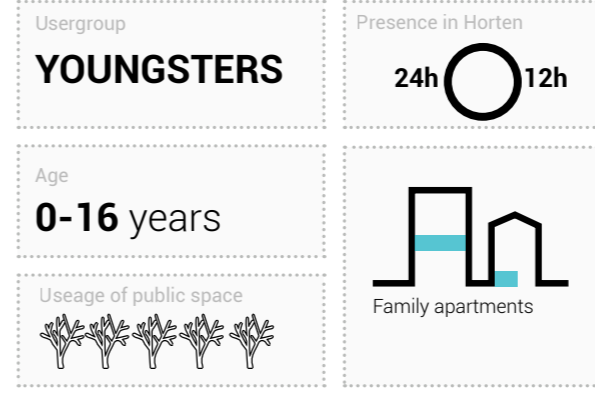
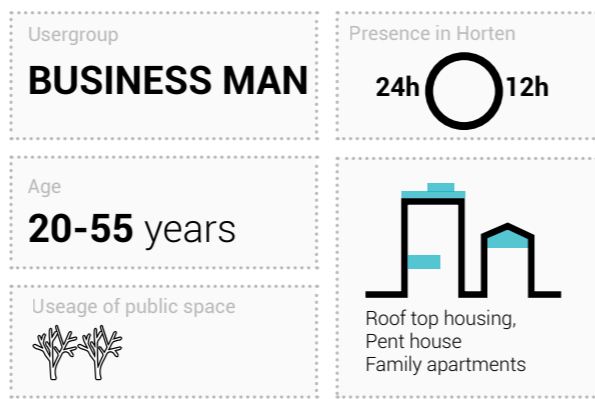
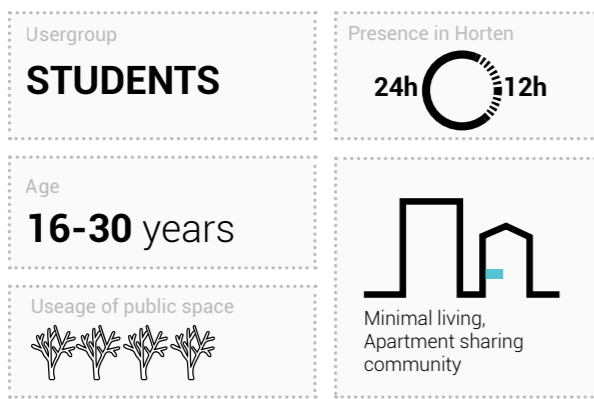


Fig.160

Fig.161

Fig.162

Fig.163

OVERALL PLAN

FIG.163



KARLJOHANS
VERN



1:4000

ZOOM IN #1

PEDESTRIAN BRIDGE

Instead of elevating the ferry traffic, the bicyclists and pedestrians are consequently elevated in a pedestrian bridge over the ferry terminal. The cost of the bridge might seem as a fraction when comparing how much it will contribute to the city life. It is not only an infrastructure, it is meant to serve as a place too.

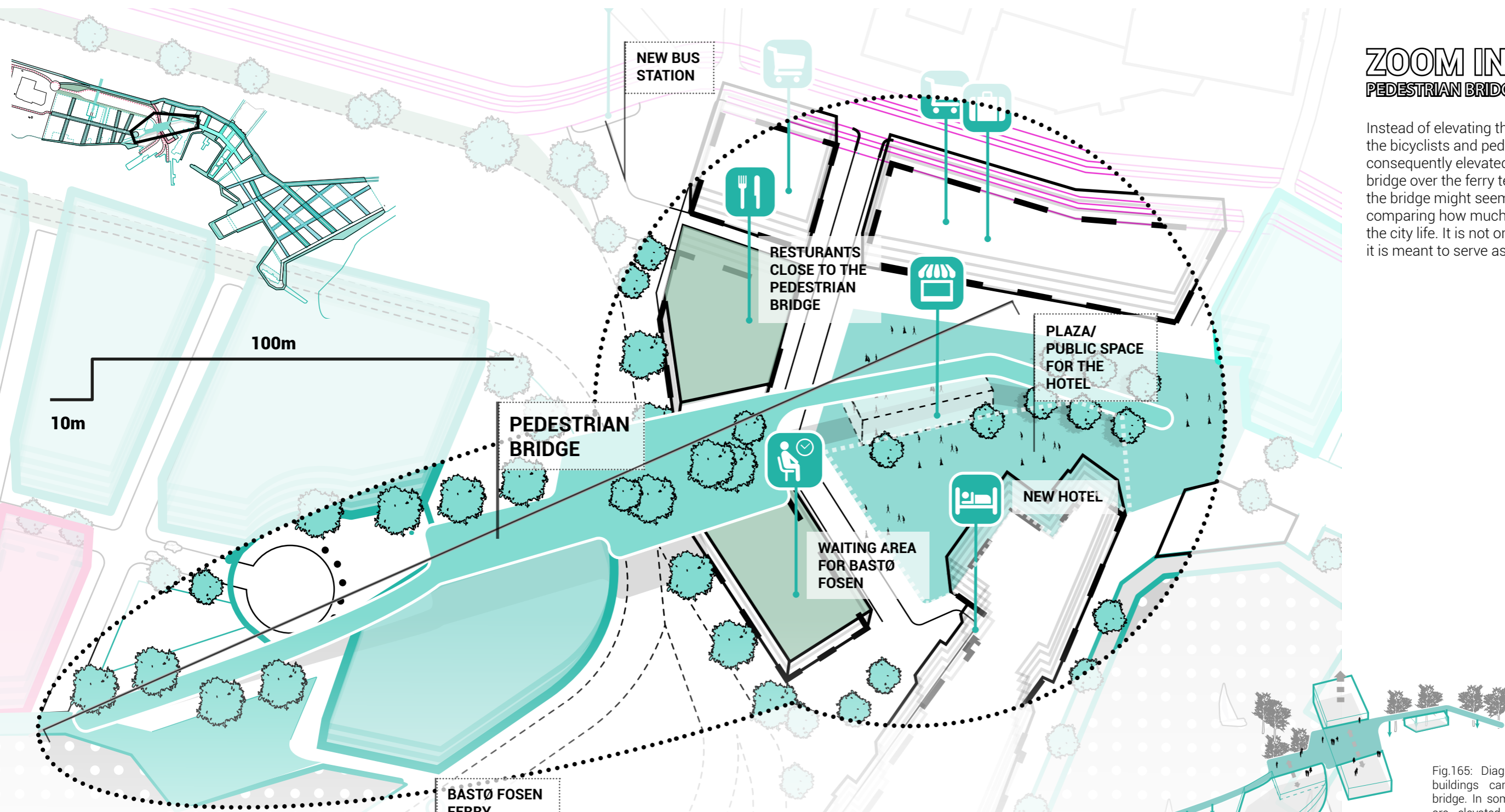


FIG.166

Fig.165: Diagram illustrating how buildings can wrap around the bridge. In some cases the facades are elevated and create a wall, in other cases the roofs of the buildings are to be experienced as an continuation of the pedestrian bridge.



BE IN THE OFFICE IN 10, JUST NEEDED TO GRAB A COFFEE @HORTEN-BRIDGE-COFFEE-SHOP

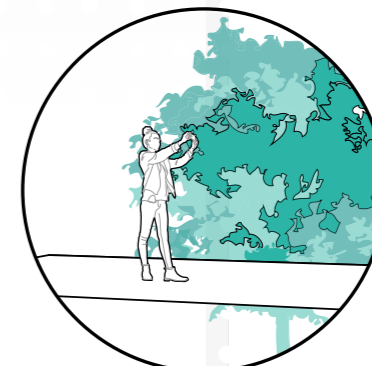
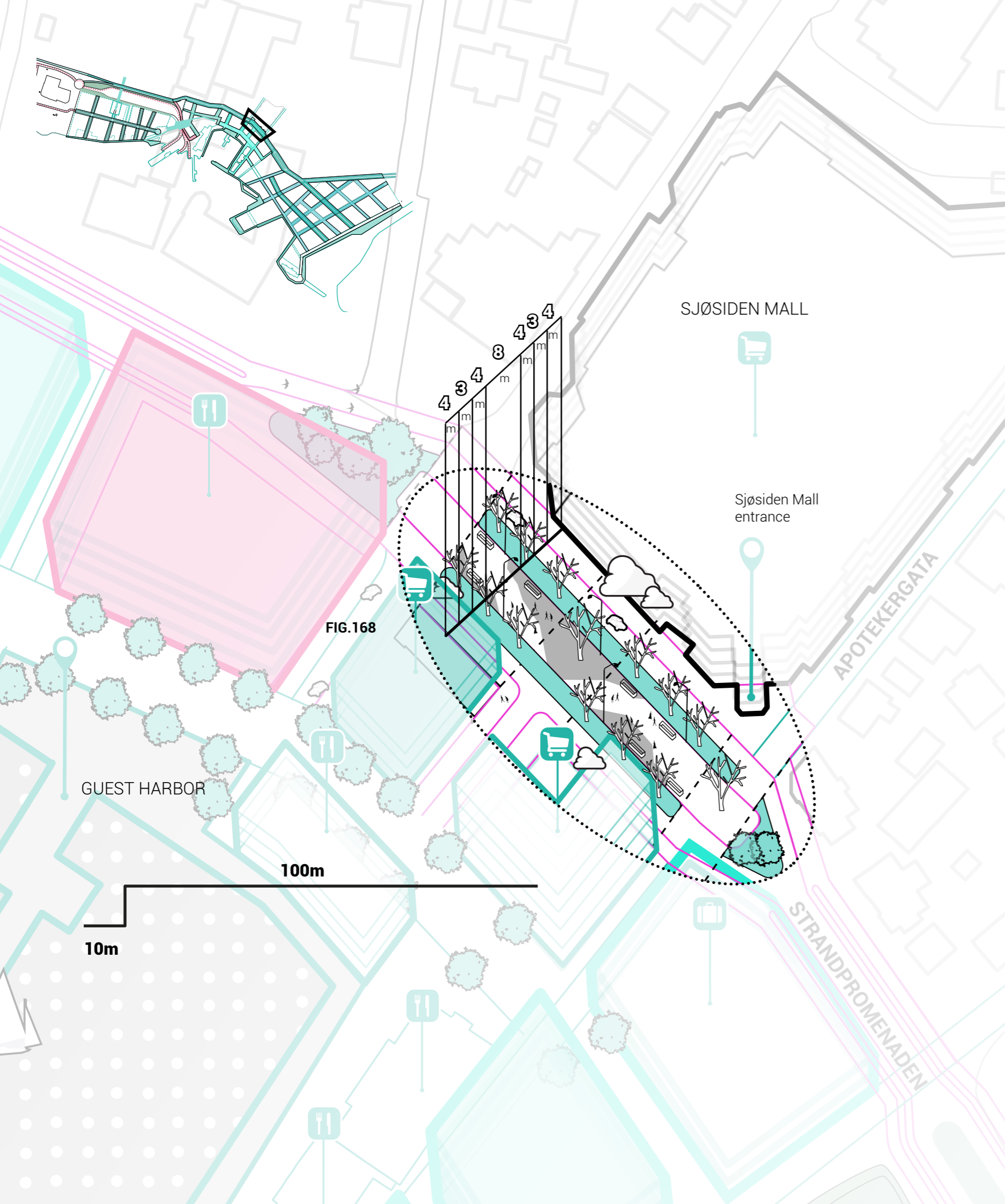


Fig.164: Diving area





Fig.167: Pedestrians watching the ferry travel in from Moss.



ZOOM IN #2 SHARED SPACE CROSSING

The crossing area between Sjøsiden mall and the guest harbor are one of the linking points between the city center and Seaside East. To make the pedestrian experience seem comfortable a shared space solution is proposed.

A reference taken from Indianapolis in the U.S shows how such a crossing can resemble. The street section in this area is widened to signalize a change for the vehicles. The cars are divided into two lanes on the sides of public space in between the lanes.

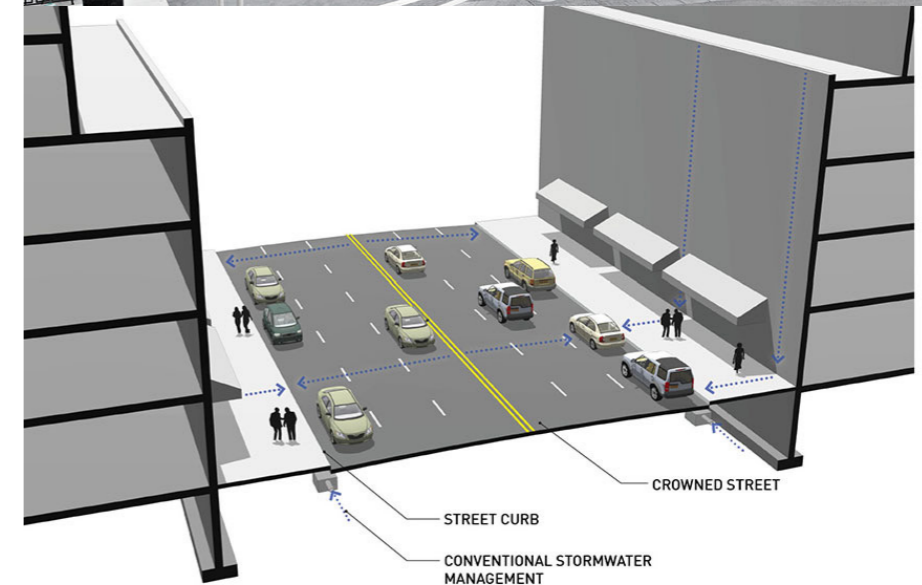
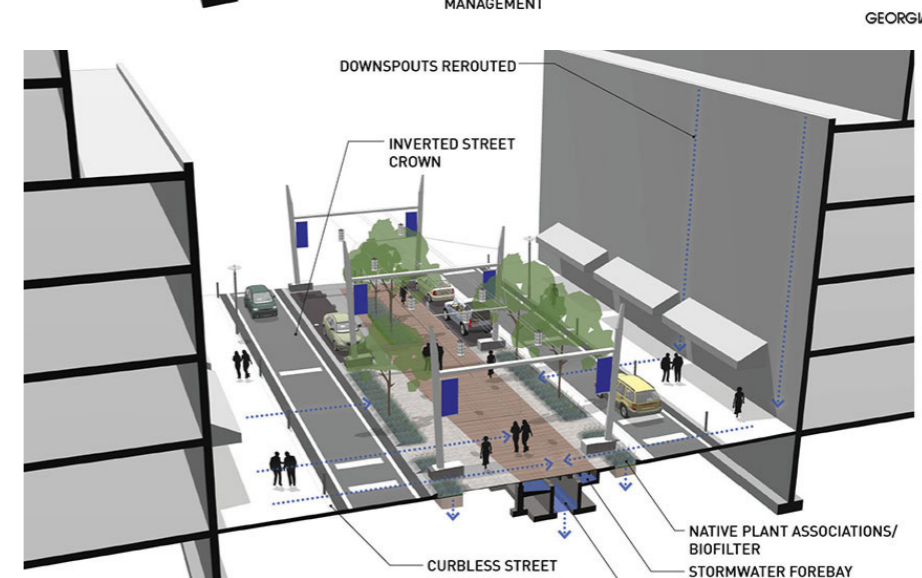


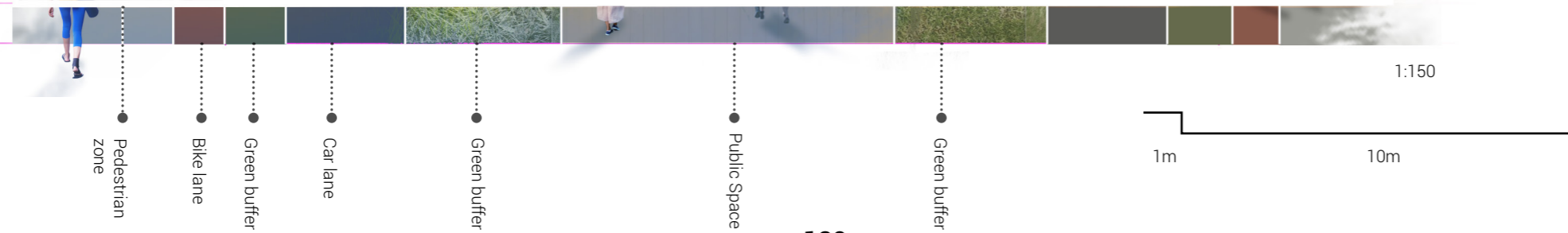
Fig. 169: The illustration displays the street situation before the revitalization in Indianapolis.



GEORGIA STREET PRIOR TO 2011

Fig.170: The illustration displays the street situation after the revitalization.

On the edges of the public space, there are green zones, serving as permeable surfaces to treat storm water.



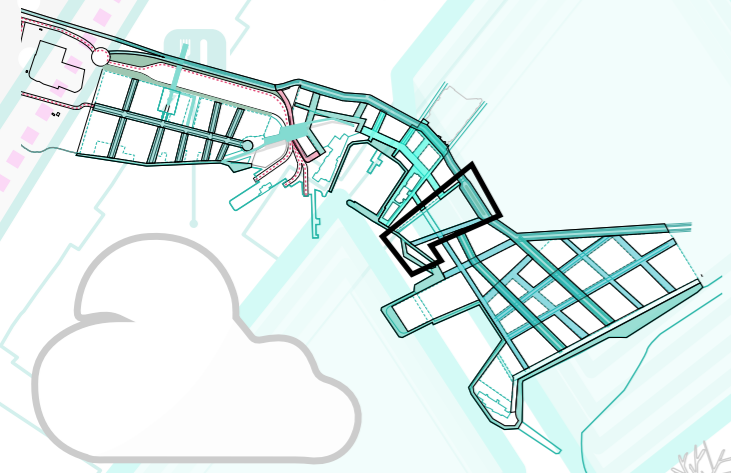


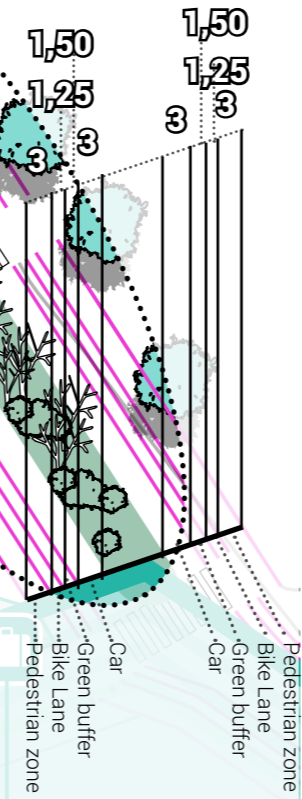
FIG.178

SKATEPARK

COAST TRAIL

WETLAND

FIG.179



ZOOM IN #3 GREEN LINK

The crossing area between Lystlunden Park and Seaside East is another critical connection point. Strandpromenaden's street section is widened to invite vehicles to slow down. It is also to heighten the pedestrian experience.

The green zone in the middle of the street section extend the green qualities in Lystlunden to the water as a park belt.

Since skating is such a popular sport in Horten, a skating park is implemented in the green link. The the hurdles serves as water basins that treat storm water.



Fig. 177
**BUFFALO NIAGARA MEDICAL CAMPUS
STREETScape**
BUFFALO, NY



Fig. 172:
ED BENEDICT SKATEPARK,
PORTLAND, OR, USA



Fig. 173:
55 WATER STREET,
NY, USA

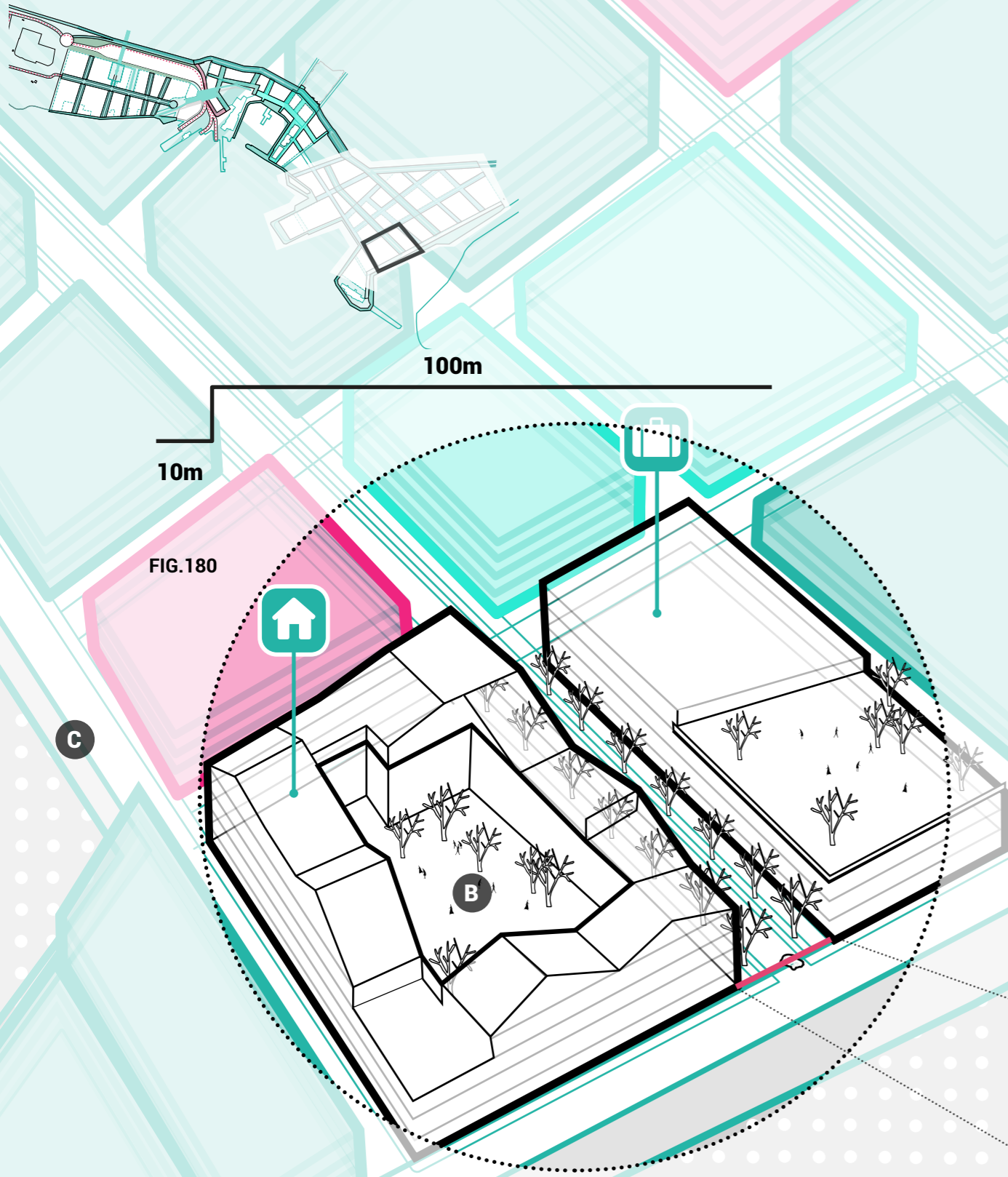


There has not been enough analysis around the landscape and topography of the waterside to show a detailed design. However, the illustration can serve as inspiration.

The continuation of the park belt of Lystlunden leads one to the waterside where green structures from the park are integrated with the blue fabric of a wetland. The waterside contributes to a different nature experience here that is not to be found in the park; physical contact with the water.

If there are some polluted masses in the ground, the wetland is a way to cleanse them.

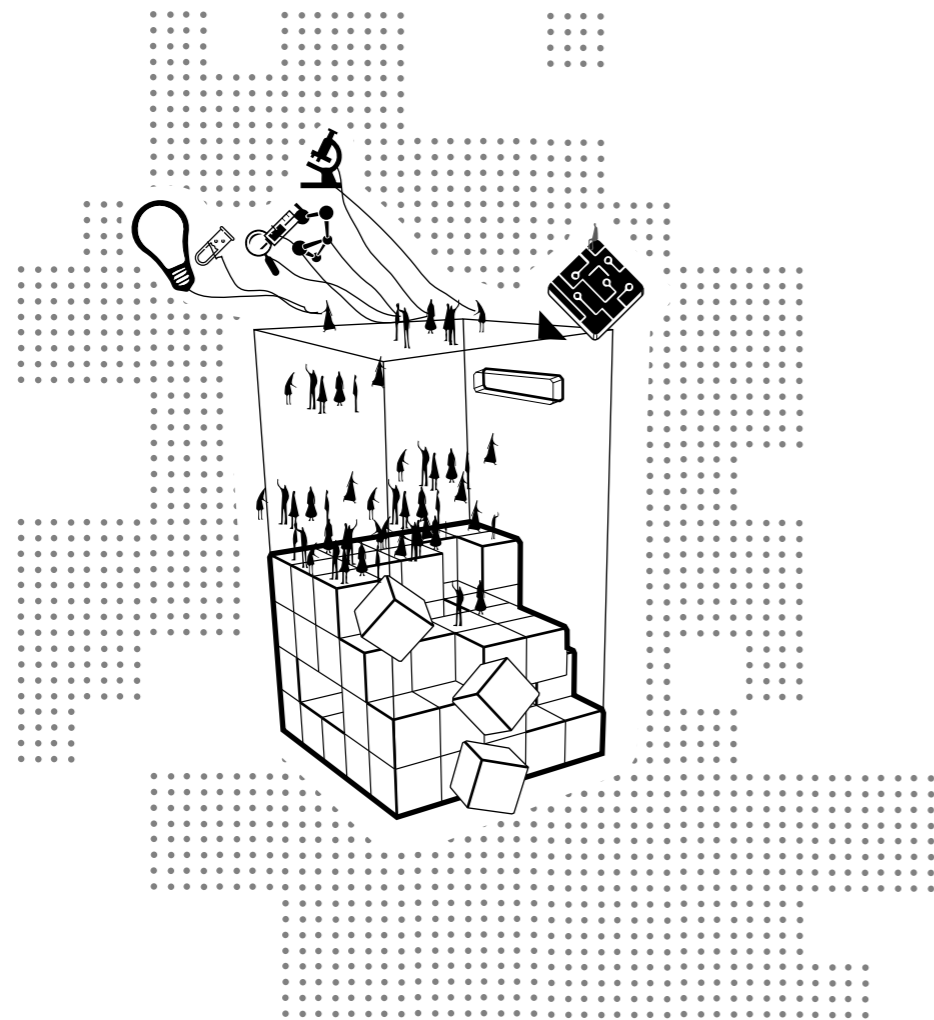
Fig. 174:



ZOOM IN #4 HOUSING + BUSINESS

The intention of this zoom in is to show an example of how a typical street in this area can look like. Most of the student houses will be placed in this districts.





“ The reason why it is important with many people in a downtown, and a variety of facilities and businesses is that then the threshold for being innovative crumbles down”. ”

Fig.181: In the illustration, the boxes represent the threshold for being innovative. The more people of different skills and backgrounds, the less "boxes" are in the city, and thereby it is easier to be innovative together. The chip is a metaphor for a downtown with the different layers that it consists of.

A

INBETWEEN THE BUILDINGS

The illustration displays an example of a street where student housing meets an office building(Fig.182).



Fig. 182



Fig. 183

B

INSIDE A COURTYARD

The illustration displays an example of a courtyard. The architecture within the block varies. Many of them have pitched roofs to resemble the traditional silhouette of a house in the garden city (Fig. 183).



Fig. 184

C **STREET INTERSECTING WITH THE WATERSIDE**
The pedestrian zone of the street is widened as it merges with the waterfront(Fig.184).

CASE STUDIES

KØGE, DENMARK

The plans for the coast of Køge date back to the nineteen thirties. The project is expected to be done in 2030. The project is working on turning the city's face towards the water again to create a better connection to the city by breaking the barrier of the train tracks that is piercing through the city for years.

An interesting focus point is the concept "life before the city", a where attractions and activity is to be created before the building project begins. The intention is to create an social arena for social interaction and strengthening the sense of ownership early in the developing process.

Urban play is an example. It is part of Køge coast's strategy for using temporary cultural interventions as a process for developing the harbour area. In a polluted abandoned lot reclaimed by ruderal vegetation was created and a raised walkway into a contaminated wilderness. Visitors are invited to look but not touch the contaminated soil and to cast grain – stored in a nearby grain silo – into the field to begin the process of remediation(Thallemer 2015).

FREDERICIAC, DENMARK

FredericiaC is an urban development project in the harbor in Fredericia, developed in partnership between Fredericia and Realdania City. The landscape project is created by the Copenhagen design studio SLA. The project transforms a 14-hectare empty former industrial area into a temporary, recreational landscape that is integrated in the strategic, long-term urban development through the method process urbanism.

The landscape project uses nature's processes in the urban development to create natural climate adaptation, great citizen engagement, economic added value and a clear local and identity in the new district even before the first ground is broken. For example the initiative called "Grow your City" is a concept that let the inhabitants produce their own vegetables. FredericiaC opened the temporary area to the city in 2010. The first stages of FredericiaC are now being planned and it is expected that the development can commence in 2014 (Thallemer 2015).

Examples like the ones in Køge and FredericiaC serves as inspiration for similar places, like Horten. The development of Seaside East will have to take a step-by-step approach. The "Grow your city" concept can for example be applied to sites bordering the waterfront during the development process. That way facilitating for social processes to take place: The inhabitants can re-claim parts of their waterfront, even before it is fully built out.



Fig.193: Fredericia C "Grow your city"



Fig.194: Køge, Elevated trail over polluted ground masses



Fig.195

PHASES

2020:

Re-locating the ferry terminal:

Moving the ferry terminal and building the bridges are two bigger infrastructural assignments that might be expensive and protracted. However, the contributions to city life are valuable.

2025:

Expanding the shopping district:

Building out the shared space area in front of Sjøsiden Mall should happen straight away. Simultaneously, one can start identifying the oversized space of the guest harbor

Temporary projects:

After 2026 the Cargo Port plot gets released for development. As temporary installments, containers can be reused as either art installations or as shopping boxes.

Student houses:

The development of business districts and student housing can start, as well as the expansion of Lyst lunden park down to the waterside. The development of the waterfront in this area can happen as well.

2030:

Transit node:

Re-location the ferry terminal is completed. The transit node can develop: New bus pocket ensuring an express route to Campus Vestfold. A new hotel is established to serve the technology industries(business meetings and presentations can be held)

2035:

Waterfront:

Bridges ensure connections from the garden city to the waterfront and from Seaside east to the city center. Development of housing, business offices and public spaces can take place. As well as the waterfront in this district.

2045:

Waterfront destinations:

Different waterfront destinations gets developed.

2080:

Releasing ferry terminal plot for development:

If alternative green mobility options substitute the ferry in Horten, these sites can develop for more housing and business on the existing street grid(See.Fig.192)

Fig.188

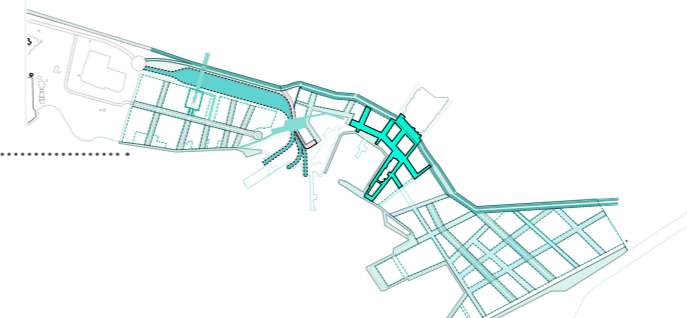


Fig.189

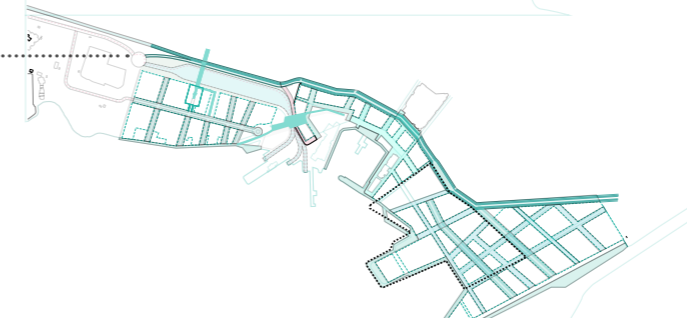


Fig.190

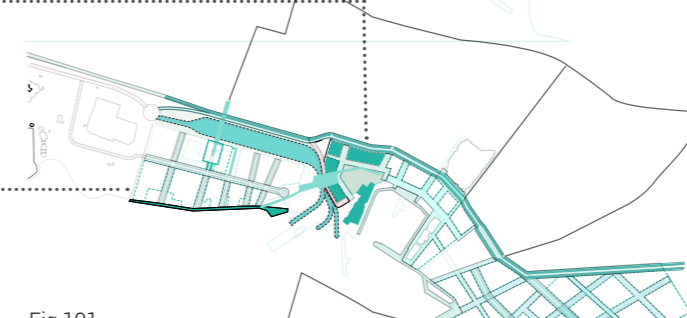


Fig.191



Fig.192

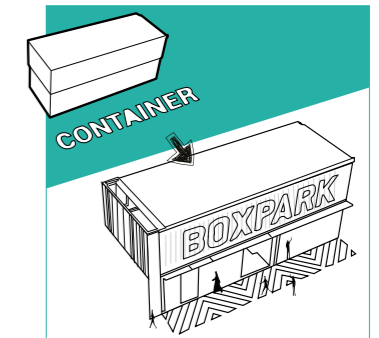
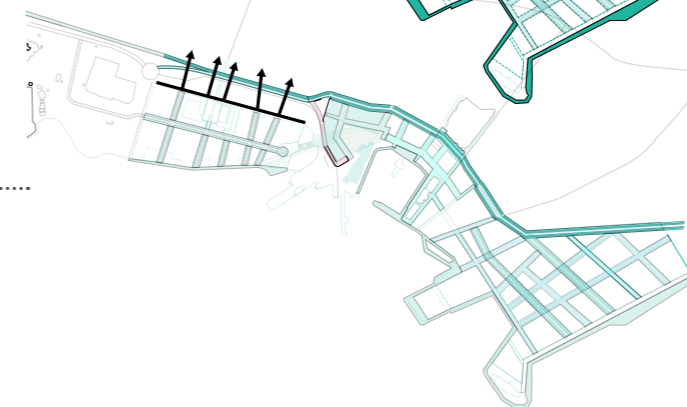


Fig. 186: Waterfront development

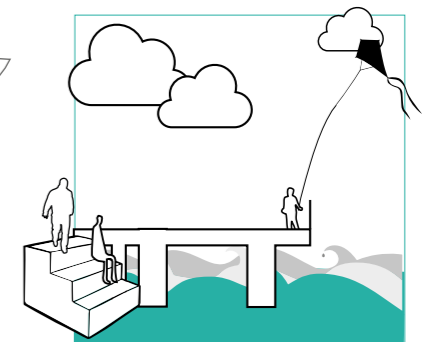


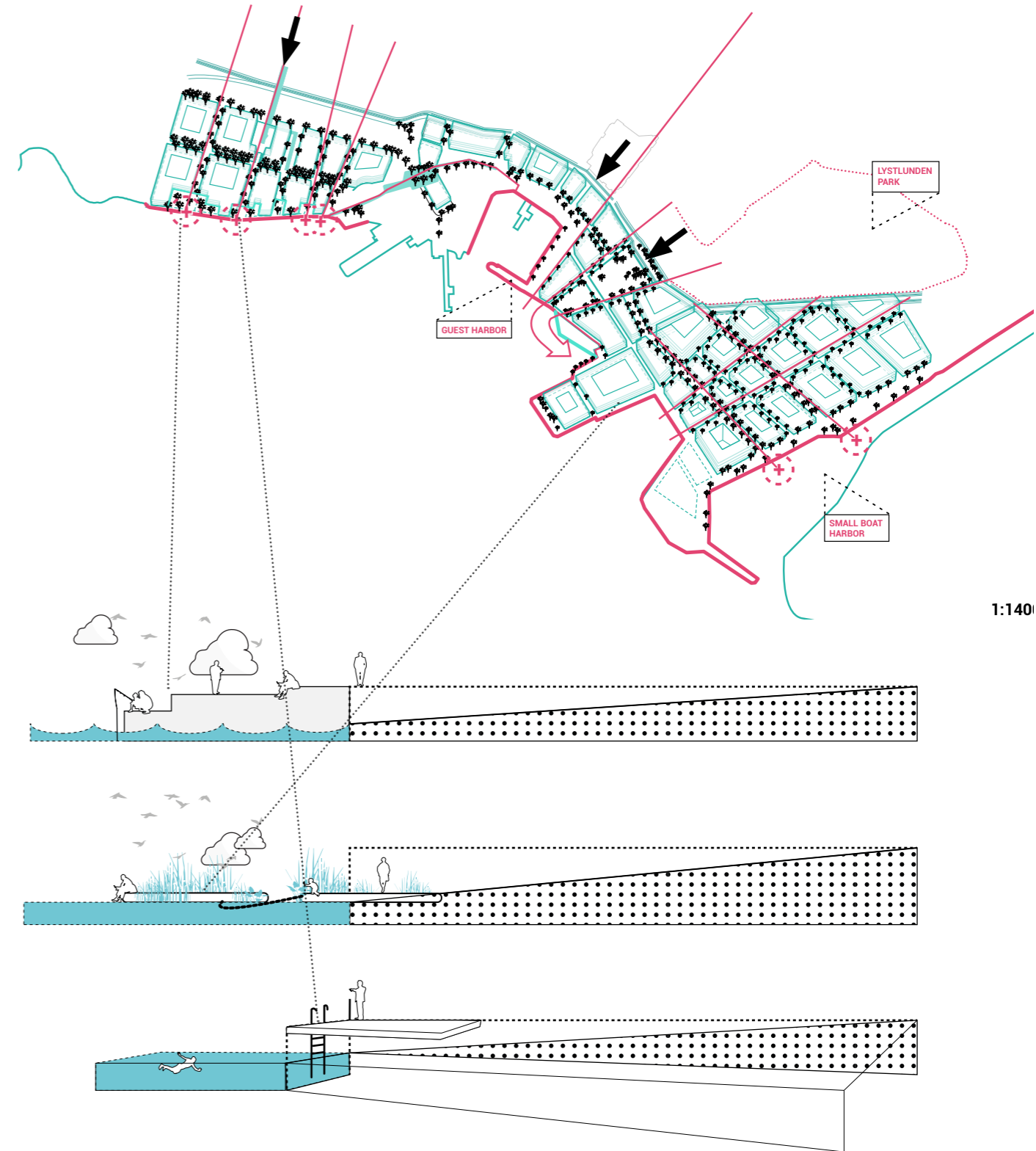
Fig. 187: Waterfront development

CONCLUSION

Research question:
How to develop Horten's Seaside East to become a more coherent part of the existing city center with an accessible waterfront in an adaptable way?

Adaptability will make Seaside East and its waterfront an integral part of the downtown. Much of the inaccessibility and segregation of the city center and the waterside is due to a car based downtown, where spaces for cars or grey areas have reduced areas where pedestrians can roam. Qualities of the existing downtown are adapted into what once served as a barrier between downtown and the water. Strandpromenaden is no longer a road, defining the edge of downtown; it is a **street** connection to the waterfront.

For Horten to be able to be sustainable a change of people's lifestyle - **the urban software** - had to take place. Horten is not only connected to the waterside; the proposal shows a potential Horten with a walkable downtown edge: where there is a mix of facilities and people. Where it is easy to bike and walk, and less easy to drive. Where one can work and live. Where you are connected to the outside world with the ferries and buses. Where green is around every corner, on your roof or in your courtyard.



PHOTOGRAPHY AND OTHER GRAPHICS

If the author's graphics are mentioned without source data, they are addressed here.

Fig.4: Source from: <http://bashooka.com/inspiration/negative-space-design/>

Fig.5: See source list for (Danley 2007)

Fig.6: Photography by Mary Warren

Fig.7: Source from Google street view

Fig.8: <https://www.flickr.com/photos/89230080@N03/>

Fig.9: By Author, data collected from; see (Moi 2016) in source list

Fig.10: By Author, data collected from; see (Brinchmann 2014) in source list

Fig.11-15: www.Finn.no/Kart under "Historiske kart"

Fig.16: By Author, data collected from; see (Moi 2016) in source list

Fig.21: <https://www.rockipedia.no/mediateket/tre-grep-og-sannheten/1980-2/horten/>

Fig.22: <http://www.iran-daily.com/News/132774.html>

Fig.23: Art modified in Photoshop: <http://hammer.dunked.com/>

Fig.24: Photo copyright to Kine-Marita Moi

Fig.29-31: <https://www.instagram.com/explore/tags/horten/>

Fig.32-34: Source from www.epleslang.no

Fig.36-37: <https://www.rockipedia.no/mediateket/tre-grep-og-sannheten/1980-2/horten/>

Fig.38-40: Source from Google street view

Fig.45: By Author, data collected from; see (Brinchmann 2014) in source list

Fig.69: : Old photography of Horten, available at: http://www.destinasjont.no/?page=fotoalbum&cat=natur&subcat=gamle_horten

Fig.71-82: Photo copyright to Kine-Marita Moi

Fig.84: See source list for (Horten 2015)

Fig.85: Reconstructed from <http://usa.streetsblog.org/2014/09/03/wowza-scale-maps-of-barcelona-and-atlanta-show-the-waste-of-sprawl/>

Fig.89: <https://www.dezeen.com/2015/05/18/adept-mandaworks-to-transform-18-hectares-stockholm-royal-seaport-development-ropsten/>

Fig.91-93: Photo copyright to Kine-Marita Moi

Fig.96: <http://kingofwallpapers.com/industry.html>

Fig.154-158: Photo copyright to Charlotte Irjall Danielsen

SOURCES:

Aasvang, A. (2003). "Hang up i Horten."

Asachi, G. (2013) PROGRESS IN ENERGY AND ENVIRONMENTAL SUSTAINABILITY FOR GREEN DEVELOPMENT OF URBAN AND RURAL AREAS

Bostad, R. C. (2014) Half of us are overweight.

Brinchmann, N., Anne. Myrberg, Grethe. Vabo, Marit Olaisen, Even (2014). Sjøfront Øst. Rambøll. Horten Kommune, Rambøll.

Carmona, M., Tiesdell, Steve., Heath, Tim., (2010). Public places urban spaces, The dimensions of urban design, Routledge, Architectural Press.

Cheng, y.-l. L.-j., chen. Wang-chien, lee (2005) A Comfort Measuring System for Public Transportation Systems Using Participatory Phone Sensing.

Dahl, T. (2015). Gjengangeren. <http://www.gjengangeren.no/nyheter/hogger-hvert-tiende-tre-i-lystlunden/s/5-60-20406,gjengangeren.no>.

Dannevig, H. W., Eynden, Jo., (2006). "Tradisjonelle fiskeplasser og méd i Oslofjorden og Skagerrakkysten."

DNT, H. (2016). "Turstier ved kanalen."

Dodson, J. (2011) The carbon devil in the detail on urban density.

Drummond, W., Herndon, Joshua., (2011). "Mixed-Use Development in Theory and Practice: Learning from Atlanta's Mixed Experiences."

Forsvarsbygg.no (2014). "<http://www.forsvarsbygg.no/festningene/Festningene/Karljohansvern/>."

Gehl, J. (2010). Cities for People, Denmark Bogværket.

Grøholt, E. S., Camilla. (2015). Folkehelseprofil, FHI.no.

Helle, K., Eliassen, Finn-Einar., Myhre, Jan. (1996). NORSK BYHISTORIE Urbanisering gjennom 1300 år, Oslo, PAX FORLAG A/S.

Horten (2015). KOMMUNEPLANENS AREALDEL – BESTEMMELSER OG RETNINGSLINJER. H. Municipality, Horten Municipality.

Klimaservice, N. (2015) Klimaprofil, Vestfold.

Kreitzman, L. and R. Foster (2011). The Rhythms Of Life: The Biological Clocks That Control the Daily Lives of Every Living Thing, Profile books.

Lefebvre, H. (1973). Rhythmanalysis: Space, Time and the Everyday Life., Continuum International Publishing Group.

Lorentzen, T. (2015). Slik skal Horten vinne pendlerhertene. Gjengangeren. <http://www.gjengangeren.no/>, Gjengangeren.

Lund, T. R., Hanson, Hilde (2015). Goals & strategies for zoning and city center development in Horten municipality. C. a. Community. Horten municipality's official website, Horten municipality: 60.

McDonnall, M. J. (2011). Urban ecology, Patterns Processes and Applications, Oxford University Press.

Moi, K. (2016). City development in Horten. Braage, norwegian university of life sciences. Masters.

Municipality, H. (2015). Kommuneplanens samfunnsdel, Horten municipality.

Ormestad, S. (2006). Gjengangeren, <http://www.gjengangeren.no/>.

Rockpedia (2015). "Punk musikk i Horten." from <https://www.rockipedia.no/mediateket/tre-grep-og-sannheten/1980-2/horten/>.

ROS-analyse (2015) ROS-analyse.

Rottle, N. Y., K. (2010). Basics Landscape Architecture 02: Ecological Design, La Vergne: Ingram Publisher Services Ltd.

Rønning, H. (2013). Horten på narkotoppen. Gjengangeren. <https://www.nrk.no/vestfold/horten-pa-narkotoppen-1.11411888>, NRK.

Schmitt, A. (2014). Scale Maps of Barcelona and Atlanta Show the Waste of Sprawl. A. Schmitt. streetblog.org, Streetblog.

Speck, J. (2013). The Walkable City. https://www.ted.com/talks/jeff_speck_the_walkable_city, TEDCity2.0.

SSB (2013). "Folke- og boligtellingen, boliger." from <https://www.ssb.no/befolkning/statistikker/fobolig/hvert-10-aar/2013-02-26>.

Urnes, S. S., Hanna. (2013). Adaptable planning in Hamang, norwegian university of life sciences.

Vegdata (2016). Ådt Horten. www.Vegdata.no.

Walker, B., Holling, C. S., Carpenter, S. R. & Kinzing, A. (2004). Resilience, adaptability and transformability in social-ecological systems.

watsan (2005) Community Participation

Westermark, E., , Adal, Birgitte. Hanson, Hilde. (2014). "Bystrategi for Horten sentrum."

Paus, K.H. (2015). Forelesning THT200: Blågrønne løsninger

Ocia (2014) <http://www.oica.net/wp-content/uploads/total-inuse-2013.pdf>

Dalal-Clayton, Barry, and Barry Sadler. Sustainability appraisal: a sourcebook and reference guide to international experience. Routledge, 2014.

Sulkunen, Pekka., (2002) "Between culture and nature. Intoxication in cultural studies of alcohol and drug use" http://blogs.helsinki.fi/psulkune/files/2007/11/2002_Between-Culture-and-Nature.pdf

Thallemer, J., Reinsborg, C., (2015). Adaptability As an Urban Development Process - Nyhavna, Trondheim. Braage, norwegian university of life sciences. Masters.

