

# URBANIZE THE SUBURB

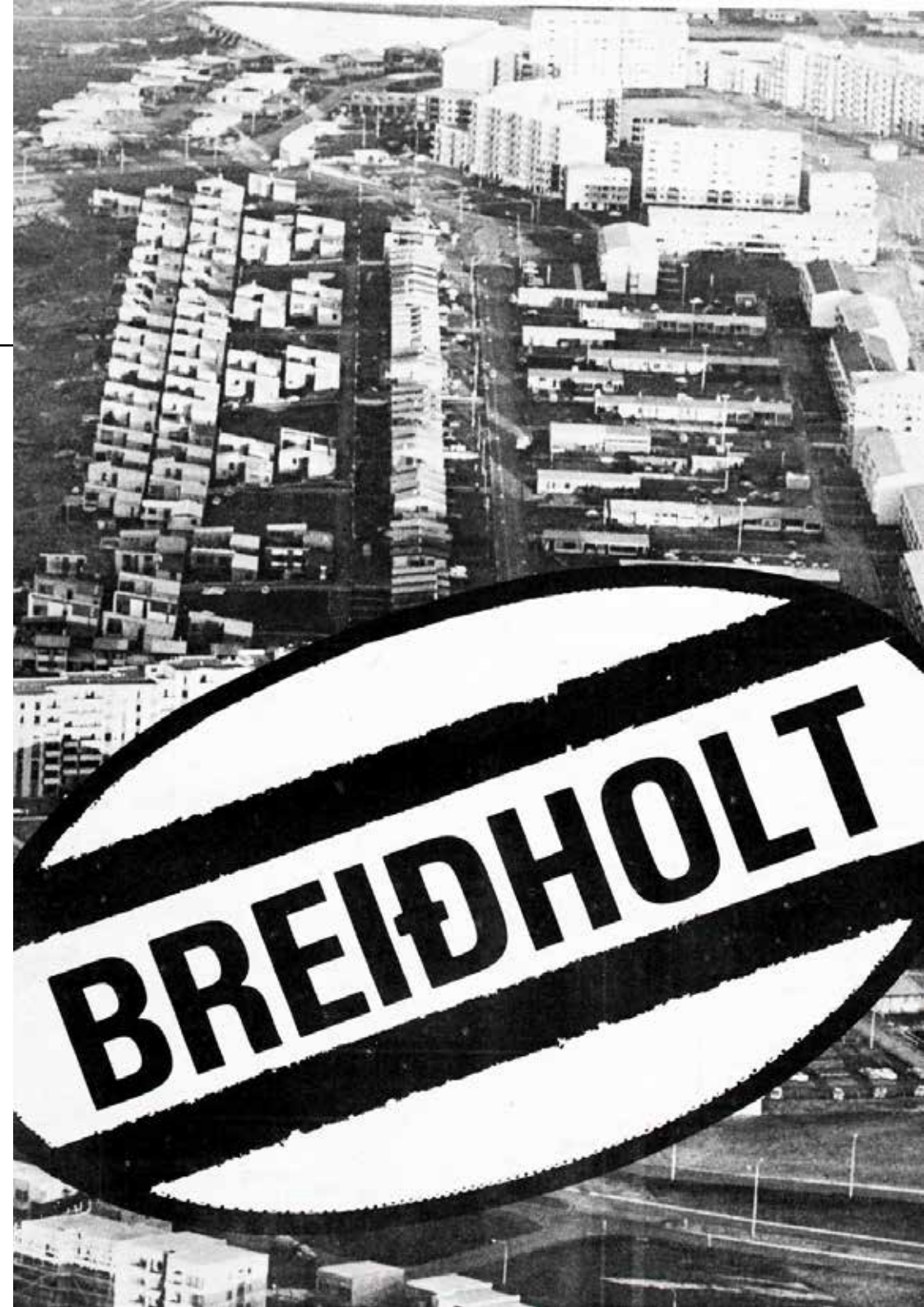
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A Walkable Suburban Center with a new Public  
Transit and a Playful Public Realm

Drífa Árnadóttir, 2017

Degree Project in Sustainable Urban Design

Department of Architecture and Built Environment LTH



# Urbanize the Suburb

A Walkable Suburban Center with a new Public Transit and a Playful Public Realm

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and the SUDes family

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# Statement of Purpose

In urban design one could say that sustainability has four aspects: social, environmental, economical and spatial. Place needs spatial qualities to bring people to the area. People are the essence of every space and they make it into a place that people want to use and care about.

Iceland is an island located in the North Atlantic Ocean where the climate is cold and the weather can be unpredictable. The sun angle is low during winter, which gives minimum daylight. This darkness and strong winds affect the urban life in the capital city Reykjavík and controls how people commute and spend their free time.

One of the main goals in the regional plan (2012-2040) for the capital area is to stop urban sprawl and densify within the existing urban fabric. The plan is to develop strong public transit (the City line) and strengthen centers in the suburbs next to the City line. The densification will be around these transportation centers and the plan is to develop walkable centers with attractive public places that will encourage outdoor activities and contribute to more lively streets.

This thesis deals with redeveloping a suburban center and design for urban life in the suburb together with a new public transit and a playful public realm. The capital area is analyzed in historical context and the future vision presented. The design site is a car-based center in one of the first suburbs in Reykjavík. The new design proposal is an outcome from analysis of the district and the site and the aim is to create a walkable and attractive well-connected suburban center and increase outdoor urban life all year around.

The proposal consists of retrofitting and activating existing buildings and densify around them with housing for residential, offices and commercial use. Introducing a playful public realm for seasonal change and a new public transit. In the design process I followed these research questions and hope that the outcome will bring us closer to the answers.

## **Research questions:**

- How can we design for cold climate in urban design?
- How can we create a better microclimate with spatial qualities?
- In what way can we make the environment more walkable and attractive together with densification?
- How can we offer a new way of living in the suburbs in the future?



1. Breiðholt

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“If the modernists are going to plan our cities together with the motorists, it will be dead cities, not the great lively cities we have had in the past”

Jane Jacobs

# 1\_Introduction to Reykjavík

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1.1\_Location

1.2\_The quality of life in Reykjavík

1.3\_Green and blue

1.4\_The unpredictable weather

1.5\_Reykjavík planning history

1.6\_Urban sprawl and car use

1.7\_Reykjavík districts

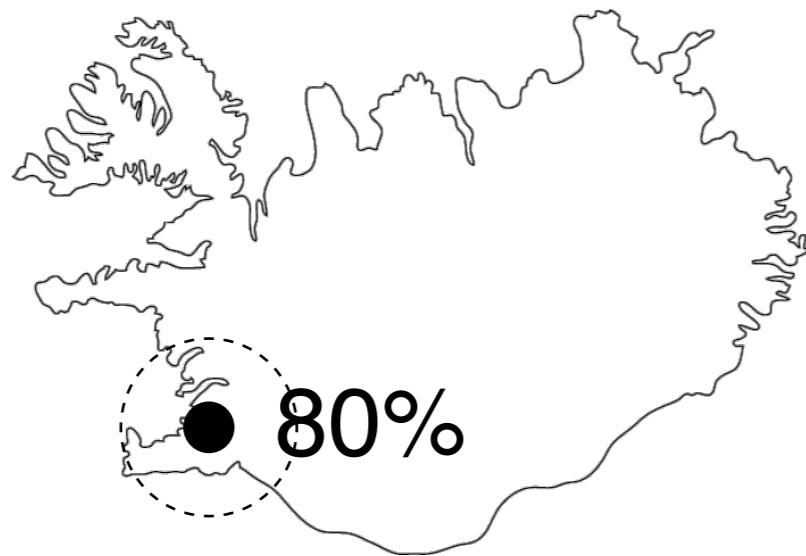
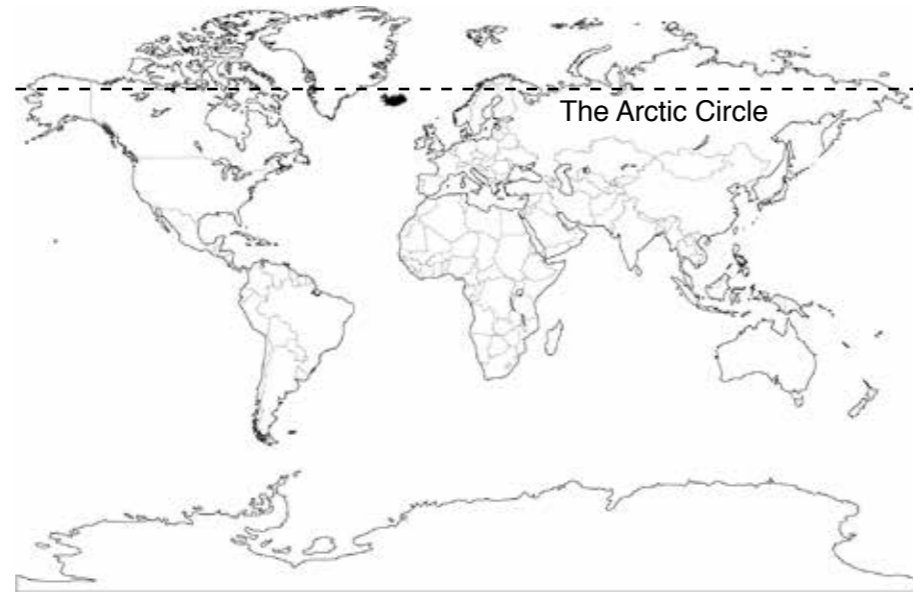
## 1.1 \_Location

Iceland  
102,775 km<sup>2</sup>

Population  
**2016**  
332.529 people

Density  
**3,2 inh/km<sup>2</sup>**

**80 %**  
of the Icelandic population  
lives within an hour drive  
from Reykjavík.



## The Capital area

6 municipalities  
1.062 km<sup>2</sup>

Population  
**2016**  
209.500 people

Density  
**451.5 inh/km<sup>2</sup>**

Estimated growth  
**+ 1.1 %**  
Increase per year  
(2040)



## 1.2\_The Quality of Life in Reykjavík

### Every day life in Reykjavík

Reykjavík is the capital of Iceland and it's the northernmost capital in the world. What defines Reykjavík from other cities is the closeness to the nature and the access to fresh air, unpolluted water and green outdoor areas. Reykjavík is a seaport and most of the towns in Iceland have been developed from the coastline and the harbour because of the sea transports in old days. The ocean and the water are a big part of our culture and have been for many years. It's important for us to be able to access the coastline and almost every town in Iceland has a local outdoor swimming pool heated by geothermal water.

Iceland is rich of renewable energy sources and geothermal energy is used for heating houses and hydroelectric power for electricity. (Orkustofnun, 2010).

Iceland is an island located in the North Atlantic Ocean where the climate is cold and the weather is a big part of our life. The sun angle is low during winter and that gives us minimum daylight. This darkness and strong winds affect the urban life of our capital city Reykjavík and controls how we commute and spend our free time.

Reykjavík is a sprawled city and therefore many people spent a lot of time commuting from home to work every day and it's easy to get stuck in traffic in rush hours. The public transport (buses) in the city area not effective enough and therefore people like to use their private car. It's

in our culture to have our own car and the Icelandic weather does not encourage walking and biking for larger part of the year.

This problem needs to be addressed and the future City Line (public transit) creates new possibilities for densifying the city with more attractive cityscape. That will change how we commute in our every day live and hopefully the residents do not have to rely on the private car in the future. This design proposal is suppose to show how we can change our built environment together with the City line and offer more urban functions in the suburb.



5. Harpa the concert hall.



10. Viðey.



11. Gróttá.



13. Þjóðleikhúsið.



14. Heiðmörk.



6. Vesturbær.



7. Perlan.



8. Hallgrímskirkja.



9. Laugardagslaug.



12. Nauthólsvík beach area.

## 1.3\_Green and blue

### The green scarf and the blue necklace

Reykjavík is a green city and access to different kind of city parks and green and blue areas is good. The blue necklace lies along the coastline and is accessible with continuous walking and bike paths. The green scarf lies around the city with green paths that connect the necklace and the scarf together. One of the biggest outdoor recreational areas in the city is called Elliðaárdalur and is located next to the design site. Elliðaárdalur is 270 HA valley with a large salmon river, forestry, rich birdlife, sports area and geolocal monumental.

During the Ice Age (up to 10,000 years ago) a large glacier covered parts of the city area. After the Ice Age the land rose as the heavy load of the glaciers fell away, and began to look as it is today. The capital city area continued to be shaped by earthquakes and volcanic eruptions, like the one 4,500 years ago in the mountain range Bláfjöll, when the lava came down Elliðaárdalur and reached the sea at the bay of Elliðavogur.

Elliðaárdalur is one of the main connection between the green scarf and the blue necklace and is valuable for the nearest neighbourhoods as for the whole city.



15. Elliðaárdalur.



16. Nauthólsvík, man made beach.



17. Blue and Green map.

#### CITY PARKS:

1. Elliðaárdalur
2. Fossvogsdalur
3. Öskjuhlíð
4. Klambratún
5. Vatnsmýri
6. Laugardalur



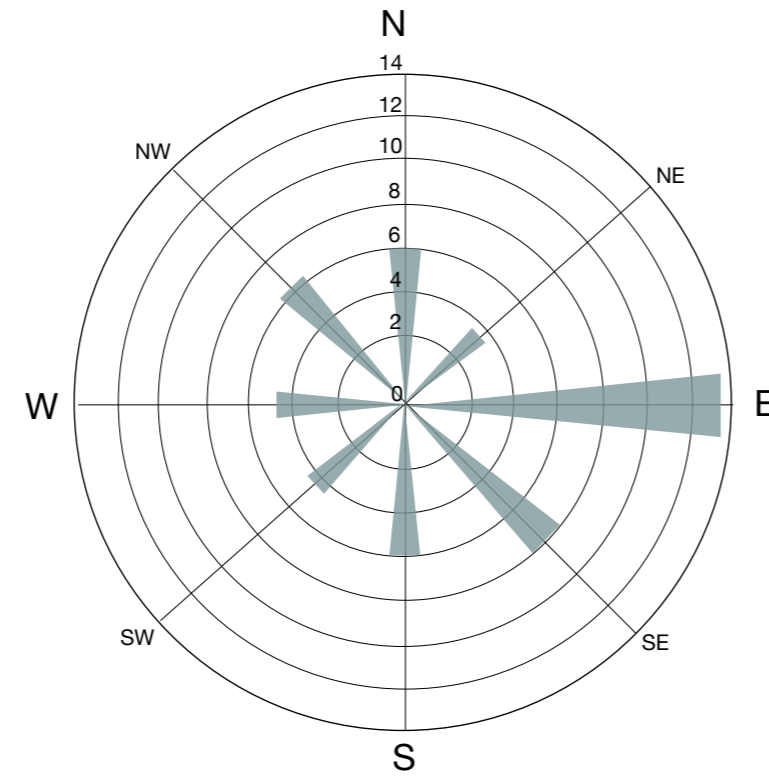
# 1.4\_The Unpredictable Weather



18. The Icelandic coastal weather.

## Climate

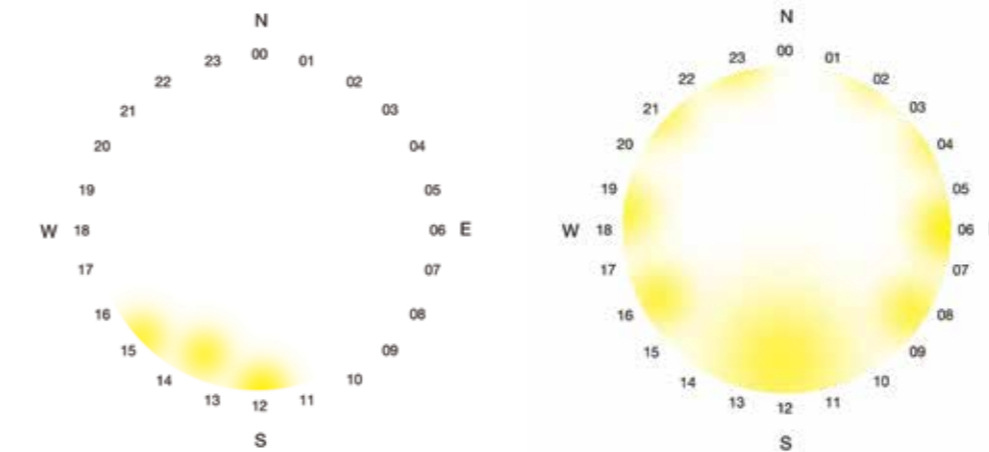
A warming climate has led Reykjavík into the Subpolar Oceanic Climate when considering climate data from 2000-2014. Areas with this type of climate are usually located closer to polar regions and snowfalls tend to be more common than in other oceanic climates. Despite its northern latitude, temperature very rarely drops below  $-15\text{ }^{\circ}\text{C}$  in the winter. This is because the Icelandic coastal weather is moderated by the cold north Atlantic Current itself and extension of the warm Gulf Stream from south. The unpredictable weather in Iceland is strongly affected by these ocean currents and the sea temperature. (Veðurstofa Íslands, 2017)



19. Windrose for the whole year in Iceland (2009-2017).

## Wind and Temperature

In Iceland the winters are long and dark, but not so cold. In 2016 the lowest temperature in Reykjavík was  $-10.3\text{ }^{\circ}\text{C}$  and the average low temperature was  $3.6\text{ }^{\circ}\text{C}$ . The wind is more frequent during winters with strong gales and the main wind direction comes from east. The summers are short and mild. The highest temperature in Reykjavík in 2016 was  $21.3\text{ }^{\circ}\text{C}$  and the average high temperature  $8.9\text{ }^{\circ}\text{C}$ . The main wind direction comes from west during summer. The city receives around 1,300 annual hours of sunshine and overall the summer tends to be the sunniest season. (Veðurstofa Íslands, 2017)



20. Winter solstice 21 December and summer solstice 21 June.

## Solar Chart 2017

### Winter solstice 21 December

Sunrise at 11:22 am, azimuth angle 150 degrees.  
 Sunset at 15:30 pm, azimuth angle 210 degrees.  
 Solar elevation at noon around 0-10 degrees

### Summer solstice 21 June

Sunrise at 2:55 am, azimuth angle 30 degrees.  
 Sunset at 00:04 pm, azimuth angle 330 degrees.  
 Solar elevation at noon around 50 degrees. (Gaisma, 2017)



21. Average precipitation per month for the period 1961-1990.

## Precipitation

The graph shows average amount of days (24h) with precipitation during a month. When precipitation has surpassed 1mm per day (24h) it is defined as a day with precipitation. The mean period is 1961–1990. (Yr, 2017)  
 These numbers show us that the amount of precipitation is rather stable over the year and with climate change and more extreme weather events it's important to take care of the storm water in new developments. The average precipitation for 2016 was 933 mm. (Veðurstofa Ísland, 2017)

## 1.5\_Reykjavík planning history

### From a farming village to a car-based city

The story of Reykjavík began when the Norwegian settler Ingólfur Arnarson decided the location of his settlement by throwing out his high seat pillars into the ocean where he saw the coastline, then settled where the pillars came to shore in 874. Steam from hot springs in the region is said to have inspired Reykjavík's name. But for next thousand years there were no villages or towns in Iceland, only farms. In 1752 sixteen houses called "furnishings" formed a factory village in Reykjavík and the village got municipal rights. In 1800 all the main institutions were moved to Reykjavík and in the end of the 19th century it became the main trading center of Iceland. (Reynarsson, 2014)

In the beginning of the 20th century people started to move from small seaside villages all over Iceland to the capital, looking for jobs. This was largely due to improved technology in agriculture that reduced the need for manpower. From 1903 to 1920 the population growth in Reykjavík went from 7.000 to 17.500. (Reynarsson, 2014)

The first master plan of Reykjavík was made in 1927 with emphasis on squares, street views and public buildings. All the inhabitants lived within a walking distance from the center and farming and agriculture were a big part of the town. The car ownership in the town was within 1000 cars and the plan was made with focus on walkable environment and human dimensions.

After the second world war, in 1965, the next master plan was approved. With more population growth came demand for more houses. The human scale was pushed aside by the car and the focus was on zoning in land use, classification of streets and motorway planning. In next decades the town grew bigger to southeast with suburbs and a once primitive village was rapidly transformed into a city. In 1962 car ownership was 103 cars for 1000 inhabitants and since then private car became more common and in 2008 it had increased to 700 cars for 1000 inhabitants. (Reynarsson, 2014)

Over the last decades the human dimensions in cities all over the world have been overlooked and car traffic has been more in focus. Dominant planning ideologies - modernism in particular - have put a low priority on public space, pedestrianism and the role of city space as a meeting place for urban dwellers. (Gehl, 2010)

In the post-war years much of Reykjavík lost its village feeling and today Reykjavík is a car-based city known for its urban sprawl. The master plan from 1965 had a big impact on how the city was planned and affects our everyday life with long time in commuting; traffic jams in rush hours, non-walkable environment and lack of city life.



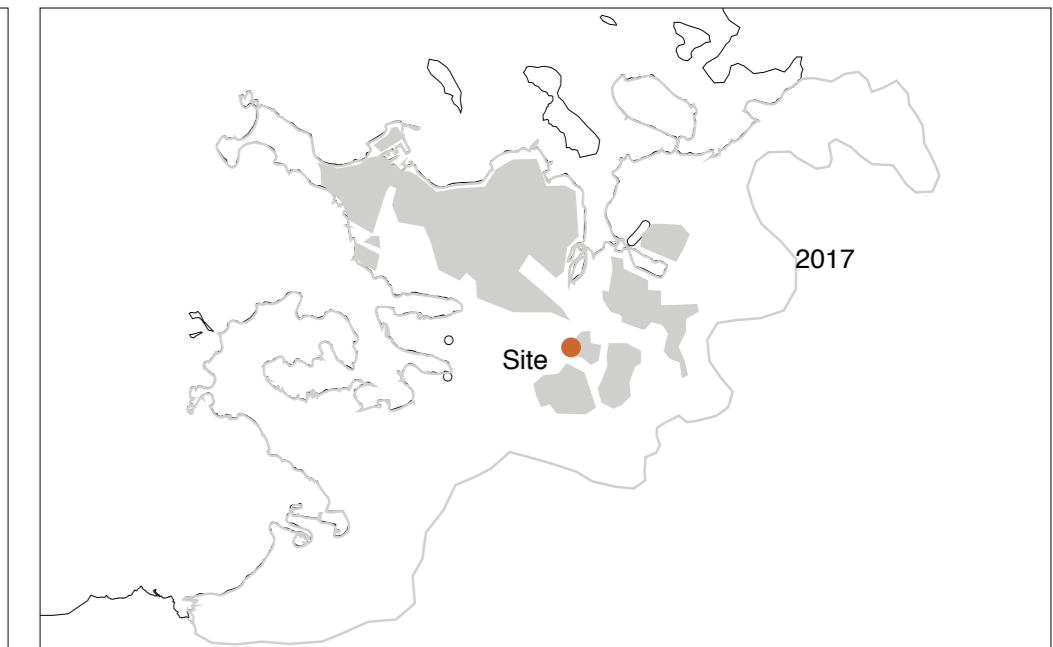
22. The year 1786.



23. The year 1920.



24. The year 1960.



25. The year 1986.

# 1.6\_Urban sprawl and car use

## City scape for cars rather than people

Over the last 25 years the population in the capital area has increased by 70.000 and it's predicted that the yearly population growth will be around 1,1% until 2040. In the past few years the development has been that each inhabitant is taking more and more land space. The average for one hectare in 1985 was 54 inhabitants but in 2012 it had gone down to 35 inhabitants per hectare. This expansion has contributed to urban sprawl with longer distances and increased car traffic. (Samtök sveitarfélaga á höfuðborgarsvæðinu, 2015).

The car ownership is high in the capital area and in 2012 is was 126.000 cars, which gives us 1,5 car for each home. If the increase in car ownership will be in same proportion together as the population growth, the car increase will be around 40 thousand cars until 2040. That equals all the cars in these three municipalities: Kópavogur, Hafnarfjörður and Mosfellsbær. (Samtök sveitarfélaga á höfuðborgarsvæðinu, 2015).

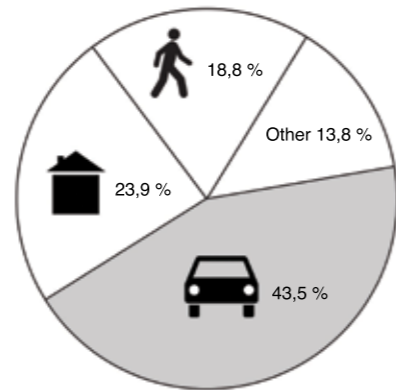
Cars take up a lot of room whether they are driven or parked. And when speed in urban areas is increased from walking speed up to 60 or 100 km/h all spatial dimensions increase dramatically, and image and vision for likely cityscape follows along. (Jan Gehl, "Cities for people") In Reykjavík 48% of the land use goes under car infrastructure which is similar to car cities in North America. The car infrastructure in Reykjavík creates obstacles between neighbourhoods, especially for walking and biking pedestrians. (Aðalskipulag Reykjavíkur 2010-2030, 2017)



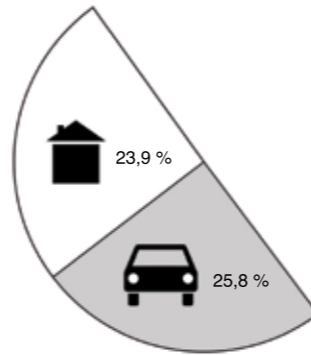
2012 - 126.000 cars  
1 and 1/2 car per home



2040 -166.000 cars  
40.000 increase



**Impermeable surface**  
43,5 % under car infrastructure



**Parkings vs. buildings**  
Parkings take more space then houses



28. The car city scape 1.



29. The car city scape 2.



30 The car city scape 3.



31. The car city scape 4.

## 1.7\_Reykjavík districts

### The main characteristics of the districts

**1. Vesturbær:** One of the oldest districts with a lot of single family houses with nice street views and attractive environment. close connection to the sea which affects topographical names and the history of the area.

**2. Miðborg:** The city center with most of the institutional buildings and rich cultural history. The shopping street Laugarvegur is well known for vibrant city life and is a tourist attraction. The two main universities and center of domestic flight in Iceland are located in the city center.

**3. Hlíðar:** Diverse area with mixed use, mostly small apartments in multi-family houses and a commercial area in the north. Good access to service and green areas but heavy traffic goes through the district.

**4. Laugardalur:** Mainly residential area with single and multi family houses and industrial area on landfills next to the sea. Big green area in the middle with recreational and sport facilities.

**5. Háaleiti - Bústaðir:** Central area defined by traffic streets. Mainly residential but has a big shopping mall, The Kringlan.

**6. Breiðholt:** A suburb with multi family houses and few high concrete blocks, which have become an identity for the area. The neighbourhood has high percentage of social houses and immigrants and is next to the

recreational area Elliðaárdalur. The design site is located in this district.

**7. Árbær:** A suburb east of the recreational area Elliðaárdalur.

**8. Grafarvogur:** Low rise suburb area with high percentage of single family houses and industrial/work areas in the edges. Good connections to the nature and a cemetery in the middle of the area.

**9. Grafarholt:** Similar low rise suburb as Grafarvogur with closeness to the nature.

Today most of the urban functions happen in the western part of Reykjavík, in the city center and the neighbourhoods around, and that area is the biggest tourist attraction. Most of the work places are also located there so there is heavy traffic from the suburbs and the international airport into the city center in rush hours. To spread the tourist flow around the city each neighbourhood has to have its own identity, different attraction, mixed use and more urban functions. Today the suburbs all look to similar when it comes to typologies and character.



“We form the cities - then the cities form us”

Jan Gehl

## 2\_The Capital Region in the Future

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2.1\_Future Trends

2.2\_Efficient Growth

2.3\_Effective transportation

2.4\_Opportunities and benefits

2.5\_Demographic shift

## 2.1\_Future trends

### Future Trends in the Regional Plan 2012-2040

The future trends of the capital area until 2040 are roughly divided into five goals.

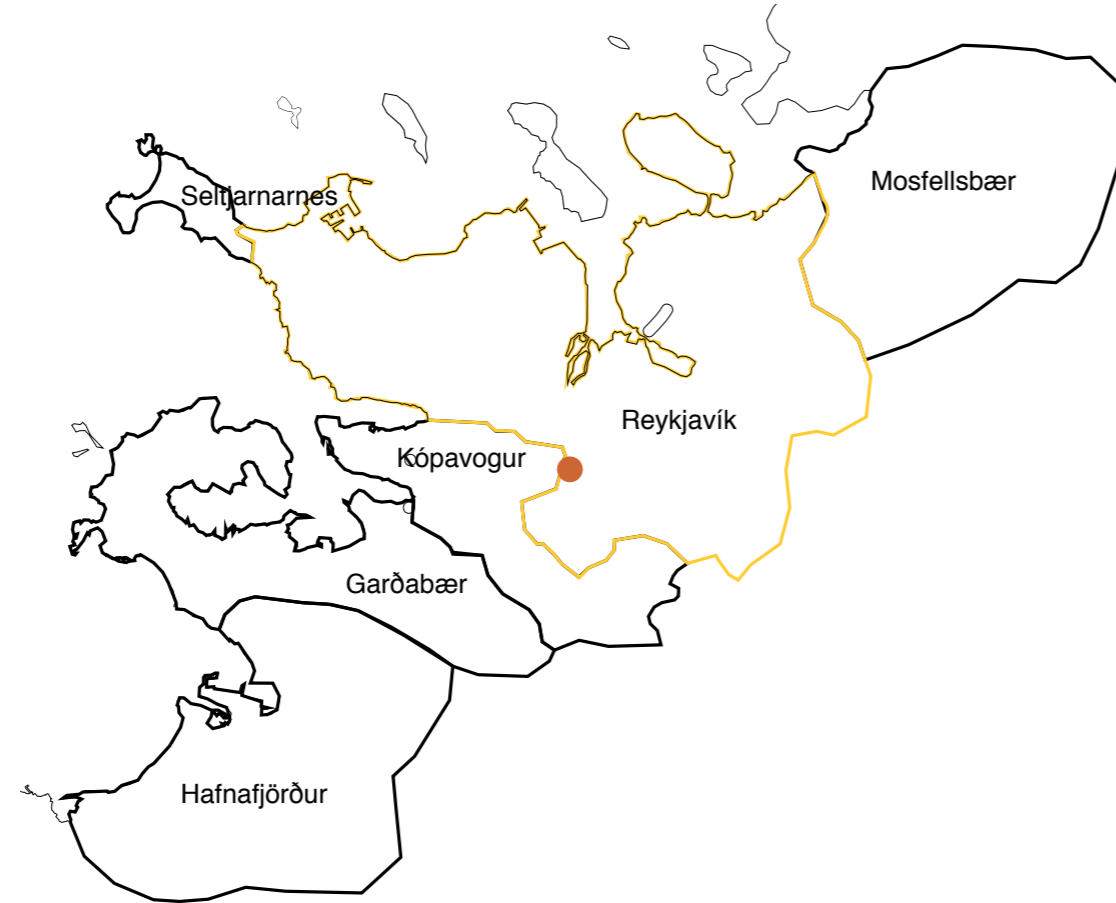
**Efficient growth** refers to densification within the existing urban fabric and to strengthen the center of each neighborhood.

**Effective transportations** refer to transport system that offers more sustainable way of traveling and creates better connections between the municipalities.

**Advance and competitiveness** refers to strengthening the capital area as an international capital by directing investments in infrastructure that increases the diversity of the economy.

**Healthy environment** refers to accessibility to fresh air, untreated drinking water and distances to diverse outdoor areas and natural environment.

Last but not least the **microenvironment** is important and that refers to sustainable neighborhood units with diversity in housing, mixed land use with service close by and good access to public transports. (Samtök sveitarfélaga á höfuðborgarsvæðinu, 2015).



40. The capital area consists of six municipalities.

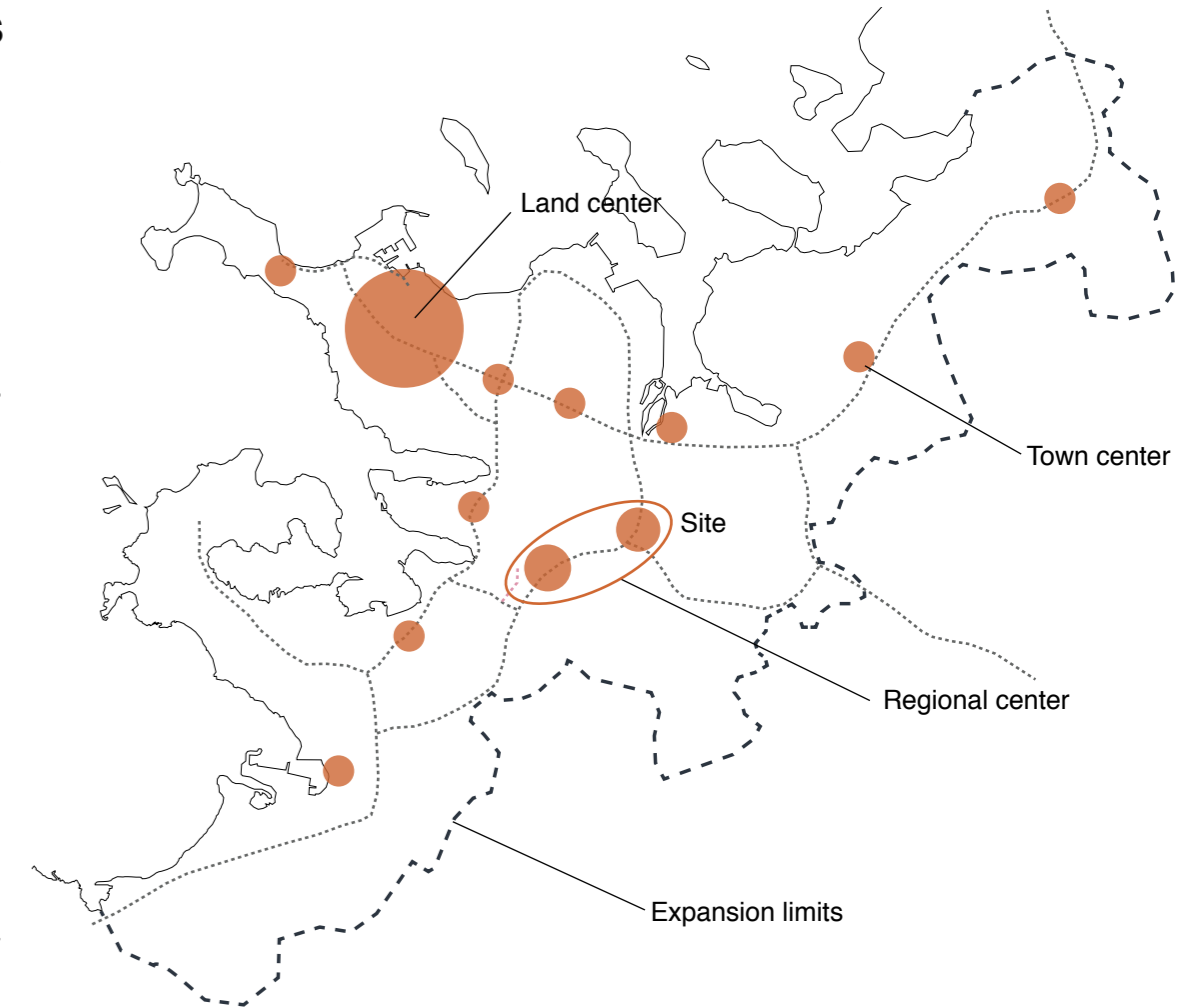
## 2.2\_Efficient growth

### Extension limits and densification centers

Over the last decades the growth of the capital area has led to urban sprawl, which includes longer distances to service, jobs and recreation. The main focus of the Regional plan is to make clear limits between the urban and the rural land and to develop the city within these extension limits.

The densification will be focused on centers and other areas next to transportation nodes and the plan is that the proportion of the residential area goes from 30% to 66% around these nodes. These centers will be densely built with mixed use that will increase the number of jobs and residents, with more sufficient use of existing infrastructure.

The centers will be the key areas for future development and they will have diverse activity and service the surrounding residential areas. They are categorized into land, regional, and town centers. The number and location of these centers has been decided in the regional plan. (Samtök sveitarfélaga á höfuðborgarsvæðinu, 2015).

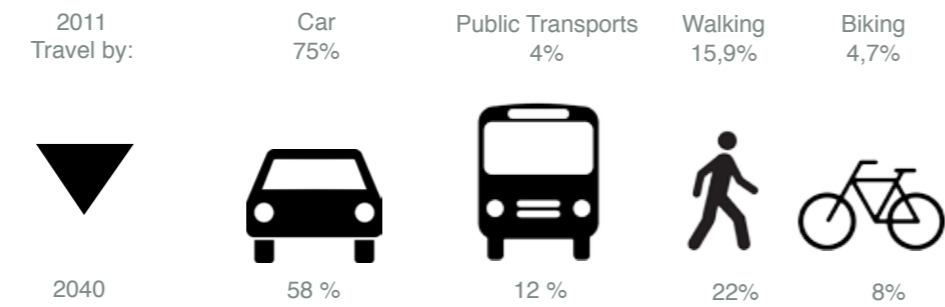


41. Future centers, expansion limits and main roads.

## 2.3\_Effective transportation

### Public transit and development centers

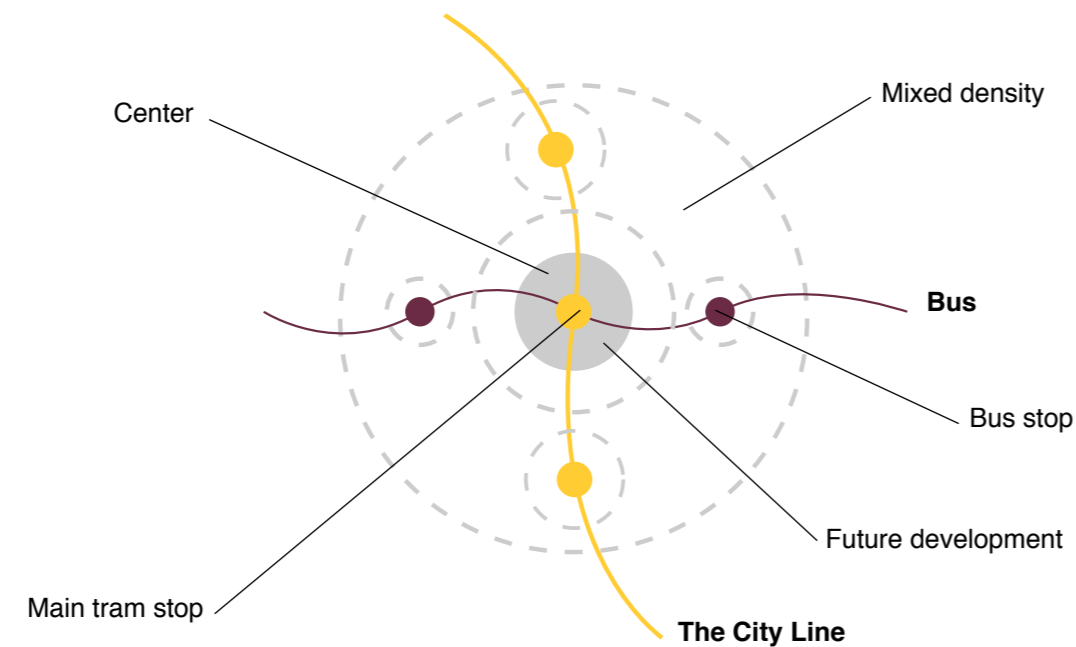
In 2011 the proportion of travels in private cars in the capital area was 75% while it was 4% with public transportations and 20% walking and biking. In the regional plan the goal is to offer more options, means of transportations that are more efficient and environmentally friendly. The goal is to increase the proportion of traveling with public transports to 12% before 2040.



42. Future goals.

The public transportation network is supposed to be twofold. On the one hand is the future City Line, either Bus rapid transit or Light rail transit, which will connect the main centers together. Then there is the existing bus system that will be adjusted to the city-line.

In the development centers people are supposed to be able to walk or bike and use the public transit for longer commutes from the area. The future City Line will connect these centers which will strengthen the municipalities as one capital area. By offering more transportation options the use of the private car will decrease and the release of green house gases as well. (Samtök sveitarfélaga á höfuðborgarsvæðinu, 2015).



43. Development centers.



44. The future City Line - The newest example of the location in the regional plan (2017).

## 2.4\_Opportunities and benefits

### Opportunities and benefits of public transit

Today the inhabited area of Reykjavík is too spread with low density, which makes it almost impossible for sufficient public transit system to function. It's important that the future development of the city and the new public transit system are planned together. That is the main goal of the regional plan. (Samtök sveitarfélaga á höfuðborgarsvæðinu, 2015).

The development centers next to public transit nodes create many possibilities for each neighbourhood. The public transit brings more people to the centers, which creates investment and development opportunities. These areas are perfect for smaller accommodation for individuals and childless people and the public transit makes it easier for them to live car-free lifestyle. The public transit also makes it more feasible to spread the tourist flow in Reykjavík and to create identity and attraction for each neighbourhood.

#### Benefits of public transit:

More sustainable - less land use and green house gas emission per inhabitant than the private car.

Better mobility – better public health.

More opportunities to travel and be a part of the economy for elderly

handicapped, young people and poor.

More possibilities for densification with new and more sustainable accommodations and more investment opportunities.

Tram is more efficient than traditional buses and makes it easier to commute.

Generator for walking which makes the streets livelier.

More opportunities to spread the tourist flow in the city.

More frequent, bus each 7-10 min in rush hours, so people don't have to rely on special time. The public transit has its own lane and does not get stuck in traffic.

High quality transit stop and accessibility for everyone.

## 2.5\_Demographic shift

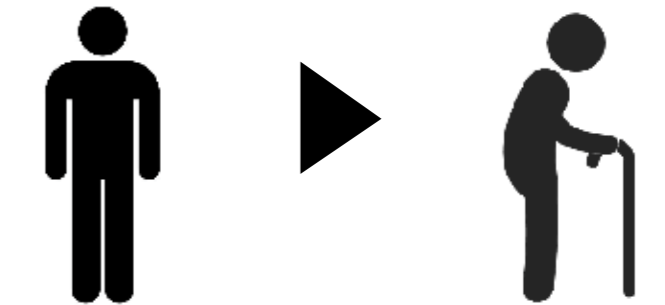
### Change in The Housing Market

The Capital area is located in the southwest of Iceland and today almost 40% of the Icelandic population lives in the capital Reykjavík, around 63% live in the capital area and 80% live within an hour drive from Reykjavík. It's predicted that this part will continue to grow and now Reykjavík will grow as fast as other municipalities in the capital area with the reverse from urban sprawl. (Aðalskipulag Reykjavíkur 2010-2030, 2014)

For last 20 years there has been a change in the age distribution in the capital area. The average age has gone from 31,3 years to 34,2 years. This development will presumably continue in the next decades. The most increase will be in the age of 67 and older, around 38%. Parallel to that the development will be slower in the age of 20-39, around 13% increase.

This development shows us that in the nearest future that there will be more increase in household without kids and the demands in the housing market will change. There will be more need for smaller apartments for individuals and childless families. (Samtök sveitarfélaga á höfuðborgarsvæðinu, 2015).

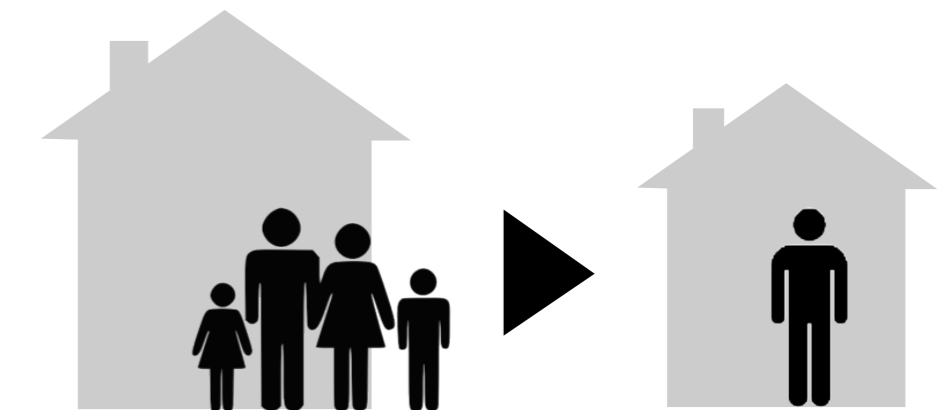
The average apartment in Reykjavík is 100 m<sup>2</sup> and the housing market needs to be more diverse and affordable. Today there is too low supply of new houses compared to the demand and young people do not afford to buy their own apartments and are stuck in their parents home.



20-39 years  
13% increase

67 years +  
38% increase

45. Demographic shift.



46. Change in the housing market.



“Support the zoning changes, the road diets, the infrastructure improvements and retrofits that are coming soon to a neighbourhood near you”

Ellen Dunham Jones

## 3\_ Landing on Site

---

3.1\_ Suburbanisation

3.2 \_ Monofunctional zones

3.3 \_ Mjóddin - the design site

3.4 \_ Urban lifestyle in the suburb

# 3.1\_Suburbanisation

## Reykjavík - City or a Suburb?

The city center of Reykjavík is mostly located on the Seltjarnarnes peninsula and then the suburbs reach far out to the south and east. The city is spread out and most of the urban area consists of low density suburbs with widely spaced houses. The suburbs are also widely spaced from each other with traffic arteries and a lot of empty space in between. This does not contribute to a lively city with attractive cityscape. Jan Ghel describes the different experience of a small city scale, which can often be found in old dense cities, to the bigger scale in newer areas and suburbs very well.

In narrow streets and small spaces, we can see buildings, details and the people around us at a close range. There is much to assimilate, buildings and activities abound and we experience them with great intensity, We perceive the scene as warm, personal and welcoming. This is a sharp contrast to the experience in cities and urban complexes where distances, urban space and buildings are huge, built-up areas are sprawled out, details are lacking and there are no or few people. this type of urban situation is often perceived as impersonal, formal and cold. (Gehl, 2010, 53)

The density in the city center of Reykjavík is rather high but going further to the suburbs the density gets lower with bigger apartments and single family houses. The suburb areas are a big part of the city an one could ask; is Reykjavík a city or a suburb?



47. Skuggahverfi 149 A/HA



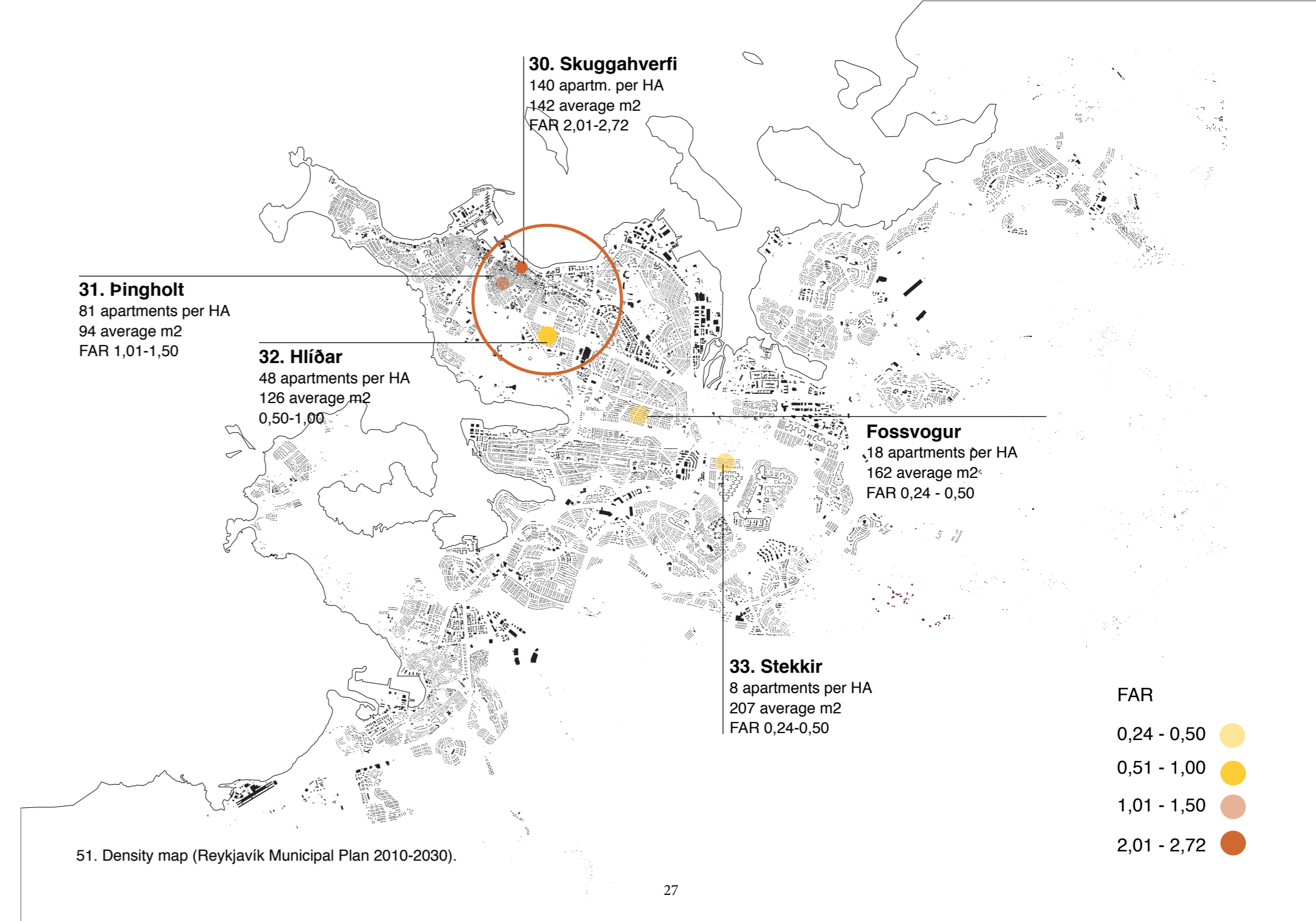
48. Píngholt 81 A/HA



49. Hlíðar 48 A/HA



50. Stekkir 8 A/HA



## 3.2\_Monofunctional zones

### The suburban cityscape

The suburban cityscape is characterized by a car-based sprawl on one hand and zoned, monofunctional areas such as office parks, shopping centers or modernist housing schemes on the other. In fact, the 21st century European city is to a large extent built up of problematic and fragmented urban environment, less than 50 years old but already defunct, socially stigmatized and in need for transformation. (Kraft, 2012)

This description of the suburban cityscape tells a lot about the character of Reykjavik. There are several areas in the capital area that can be called monofunctional zoning areas with offices, light industry, car sales, bigger retailers and fast food joints. They were built in the outskirts but as the city expanded they have become islands within the city. These areas become fragile after work hours because they lack residence and public life and therefore the streets become empty.

The design site is one of these monofunctional zones. It's a suburban center called Mjóddin and I chose this site because of its problems. Suburbs are usually full of big dominant parking lots and single use buildings that encourage car use. The site is defined by motorways which divides the city in different parts and create obstacles for walking and biking. These are global problems that need to be addressed.



52. Monofunctional zones.



53. Skeifan.



54. Kringlan shopping mall.

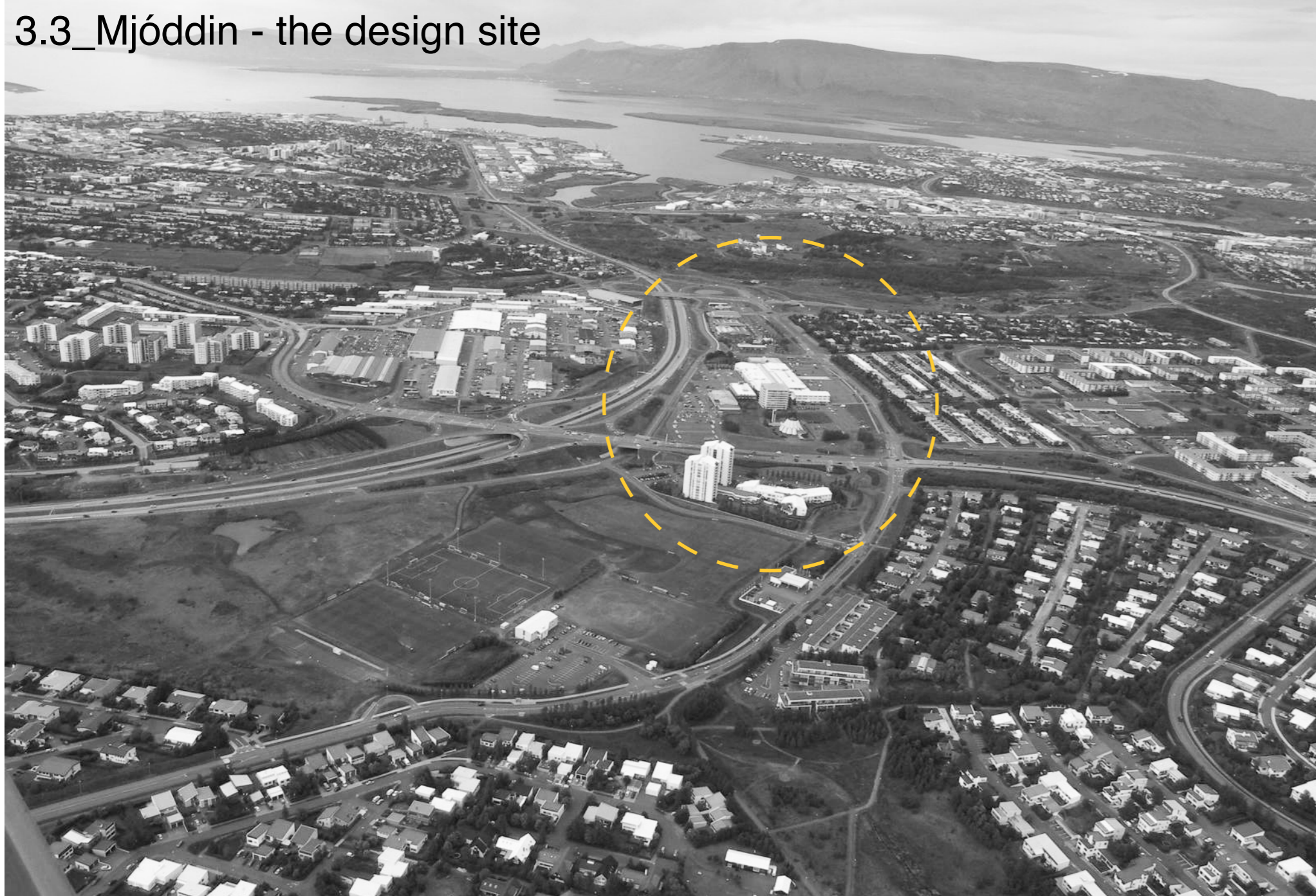


55. Smáralind shopping mall.



56. Mjóddin service center., the design site.

### 3.3\_Mjóddin - the design site



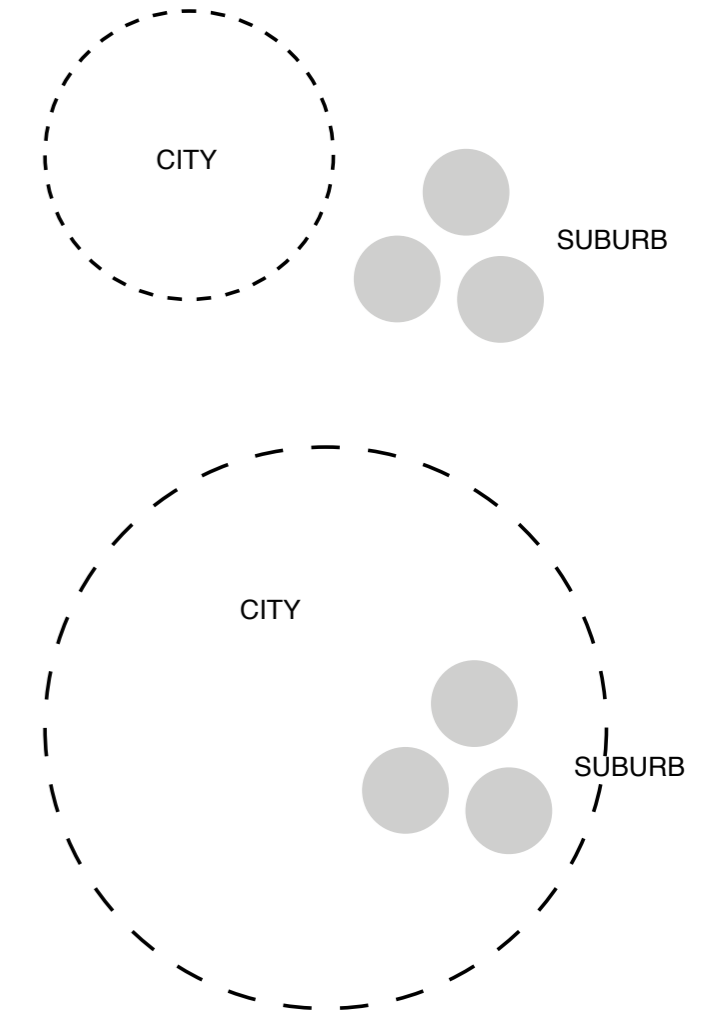
### 3.4\_Urban lifestyle in the suburbs

#### Why urbanize the suburbs?

The suburbs do not encourage sustainable lifestyle. The suburban dwellers have higher carbon footprint than the urban dwellers and they drive more. Detach buildings leak more energy through exterior surface and suburban living also supports sedentary lifestyle with increase in obesity and higher risk for cardiovascular disease and diabetes.

The demographic shift in the society also changes the suburbs. They are not as family driven anymore and there is more demand for urban lifestyle. The retiring baby boomers (group born during post-world war II) want mixed-age and mixed-use communities.

The suburbs were built out on cheap land where it made sense to have big parking lots surrounding single use buildings. Today these parking lots have central location, as the city has grown around them, and the land has become too valuable. The suburbs need to be transformed into more sustainable places and it's better to redirect the growth back into existing communities that need a boost, instead of continuing to tear down trees and green space in the edges. (Jones, 2011)



“Dominant planning ideologies have rejected city space and city life as untimely and unnecessary. Planning has been heavily dedicated to the idea of developing rational and streamlined setting for necessary activities. Increasing car traffic has swept city life of the stage or made travel by foot totally impossible. Trade and service functions have largely been concentrated in large indoor shopping malls“

Jan Gehl, 2010, 26.

## 4\_Mjóddin - site and district analysis

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4.1. Mjóddin

4.2. The site in a bigger city scale

4.3. The site - Analysis

4.4. Breiðholt - One of the first suburb

4.5. Breiðholt - Planning history

4.6. Breiðholt - Architecture and identity

4.7. Breiðholt - Analysis

4.8. Conclusions

# 4.1\_Mjóddin

## A service and a transit center

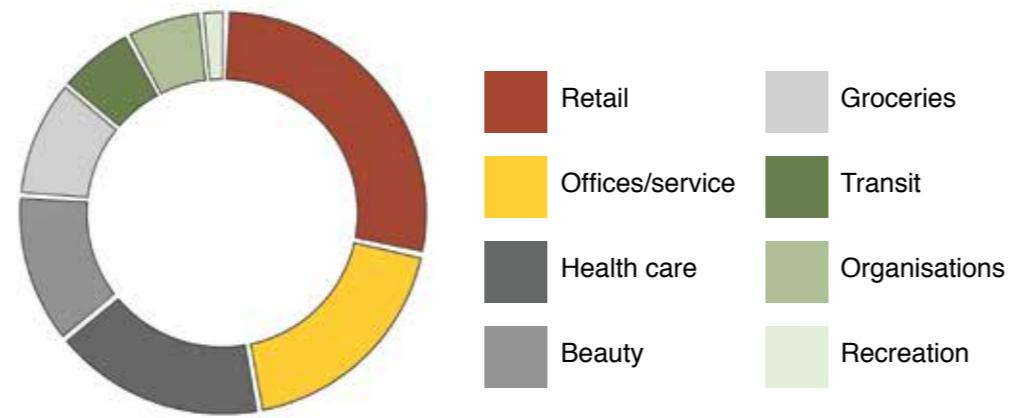
Mjóddin is a typical suburban area built after the second world war with single use buildings surrounded by big parking lots. The name of the area relates to a small service and transportation center. Mjóddin offers main service such as grocery store, health care, pharmacy, bakery, bus station, cinema and other retail stores. North of Mjóddin are two gas stations, a garden center, a car sale and a liquor store. Traffic streets define the area and create an island where the access is better for cars than pedestrians. The outdoor environment is characterized by undefined green areas and is not attractive for walking or spending time outdoors. The area lacks good public places and the architecture needs to be improved.

The area is well connected with public transports and is supposed to become a future center that will be developed together with the City line. In the municipal plan the area is defined as a development area for 100-200 new apartments and mixed use for 2020-2024. (Aðalskipulag Reykjavíkur 2010-2030, 2014)

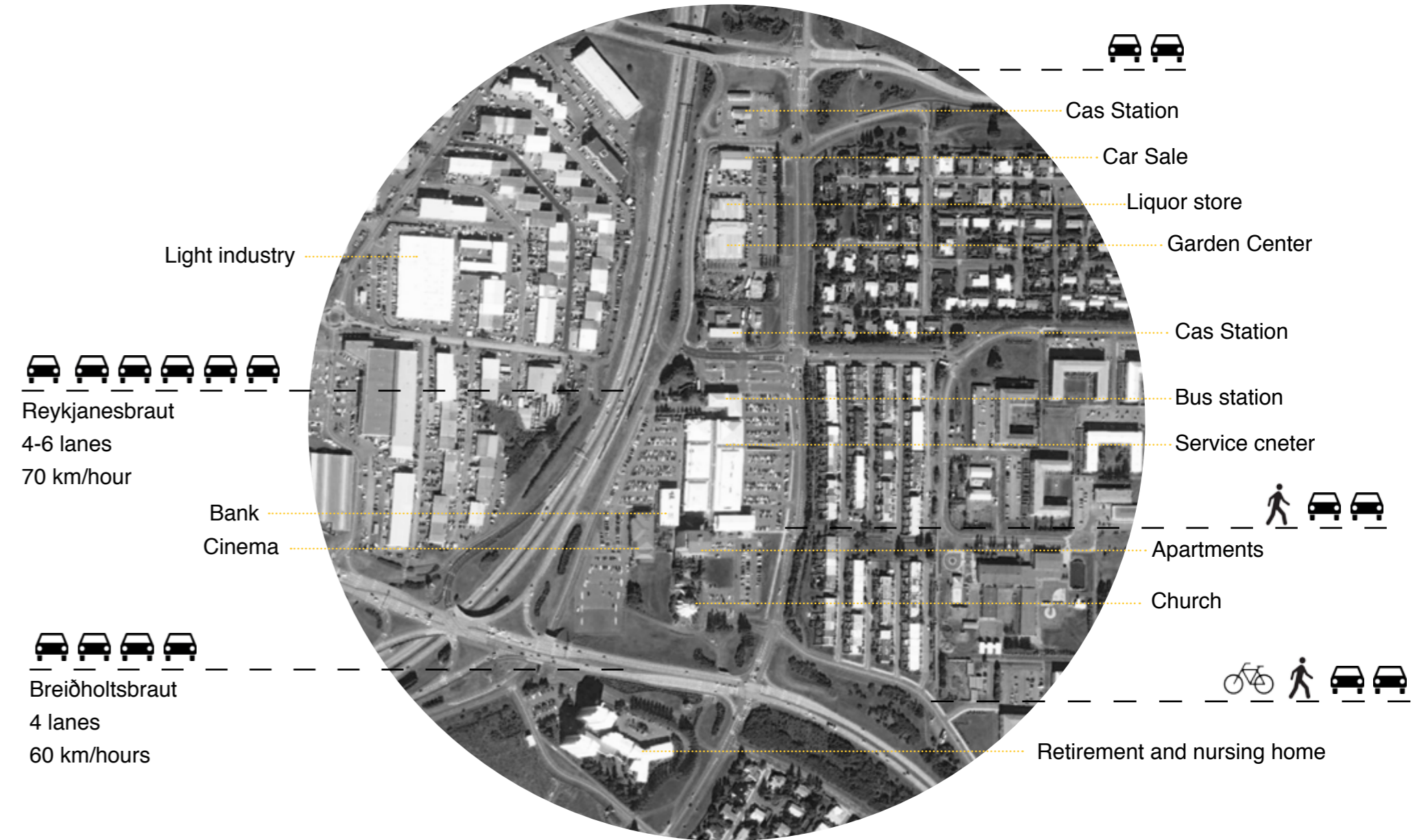
The bus station in Mjóddin is one of the biggest in Reykjavík and all the buses that go to the rural area in Iceland stop there. There are three other main bus stations in Reykjavík but the plan is to strengthen the one that is located in the city center (BSÍ) and in the future that station will be the main transportation center for the city. The bus station in Mjóddin will still remain but there will be less bus traffic. This creates different kind of

opportunities for Mjóddin and with the future City line there will still be a lot of people that pass by in every day life.

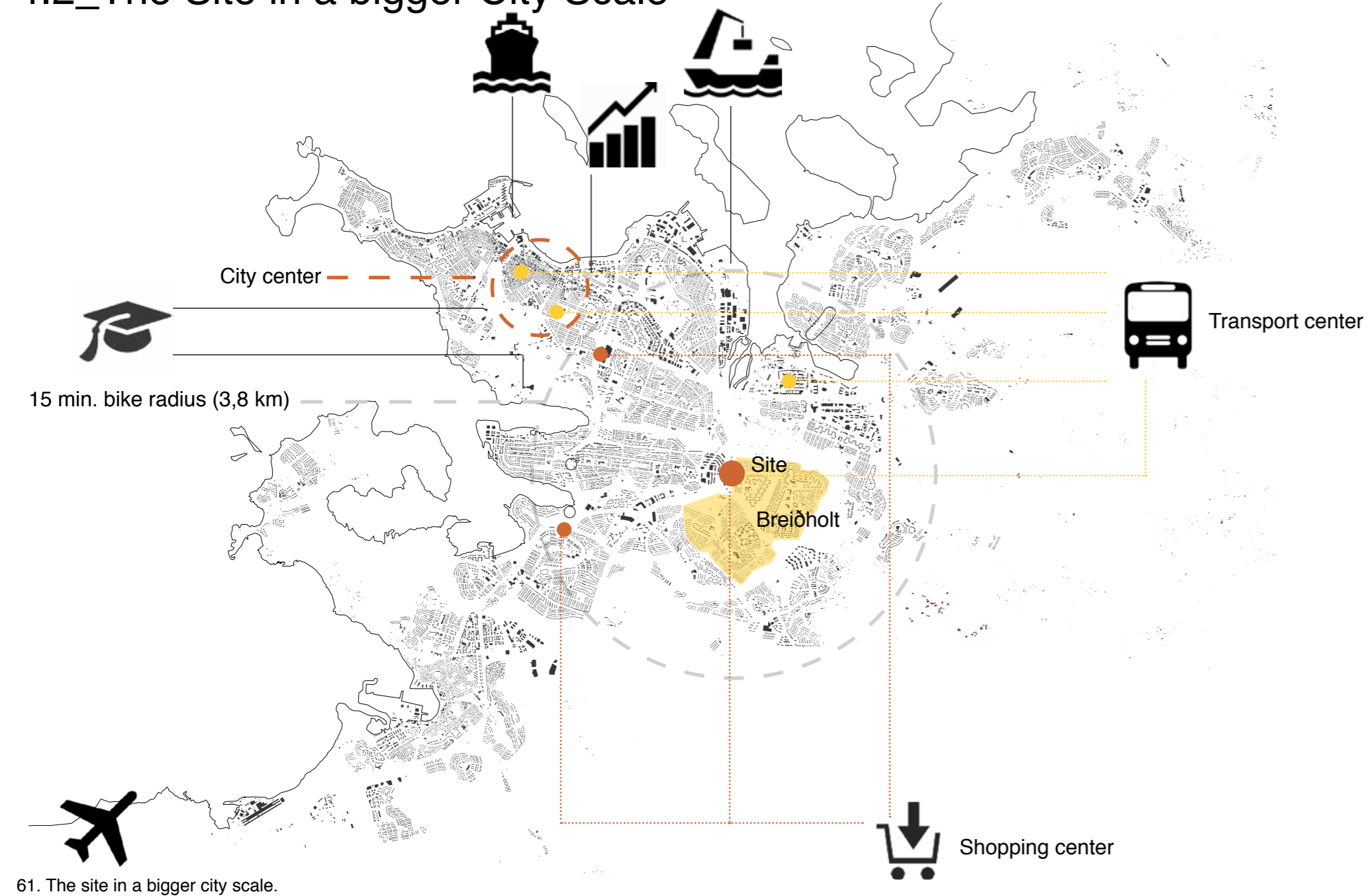
The service/shopping center in Mjóddin is also under pressure from two big shopping malls nearby. The service in Mjóddin today is more for people to pass by, do their grocery shopping and to see the doctor. It's not a place that you want to stay at, meet friends and have a cup of coffee in an attractive environment. But with future changes there is an opportunity to create a third place with more urban activities for people to enjoy. Since the suburbs have become less focused on families there is more need for places like that.



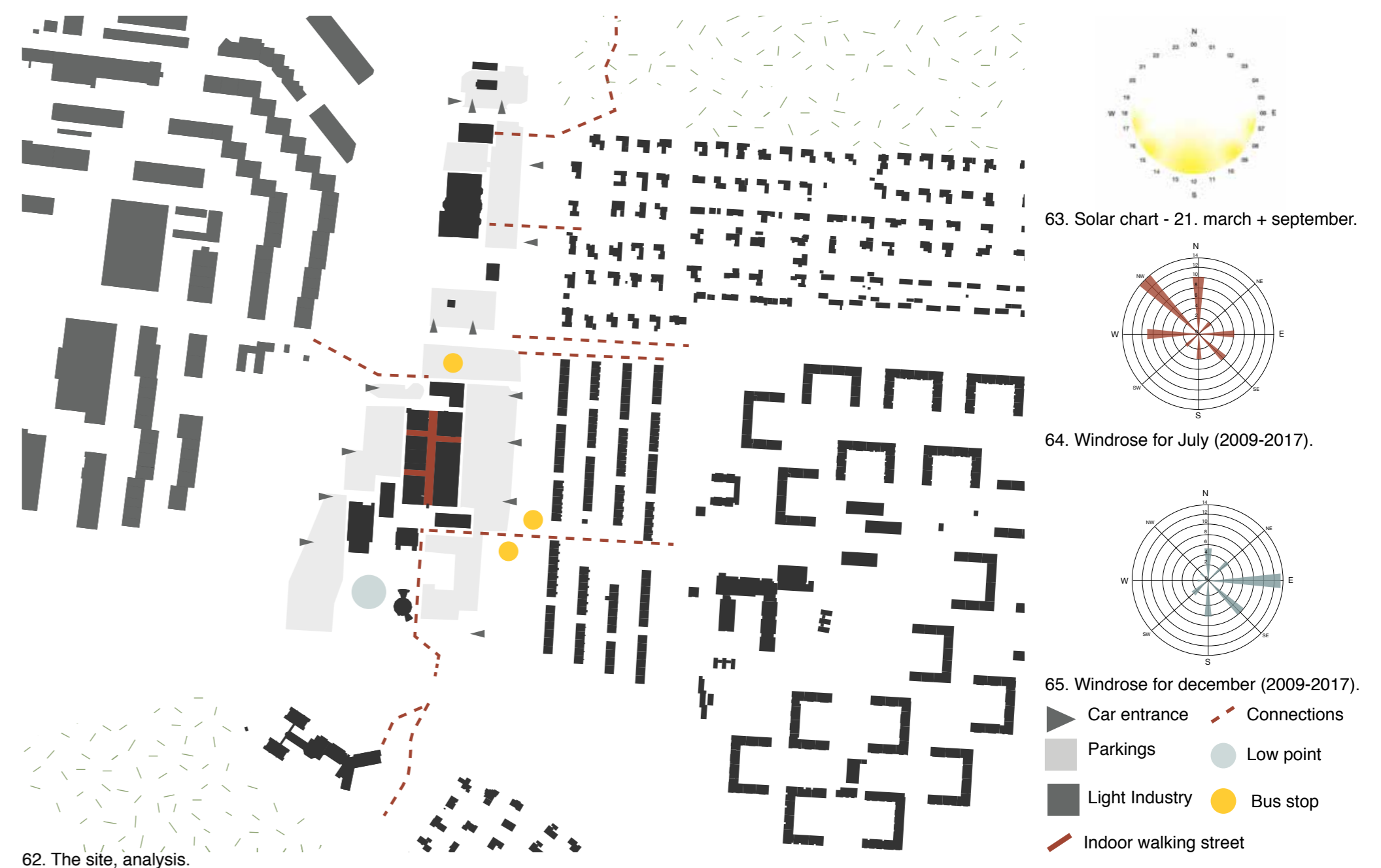
59. Mjóddin - service



## 4.2\_The Site in a bigger City Scale



## 4.3\_The Site - analysis



## Connections - underpasses

With increasing capacity on roads in the 1950s-1970s the traffic became more segregated to prevent accidents to pedestrians. That led pedestrians to go under or over roads by means of pedestrian underpasses and bridges. Pedestrian underpasses have the disadvantage of being dark and people feel insecure if they are unable to see very far ahead. These abandoned underpasses belong to a certain time and philosophy. (Gehl, 2010)

There are three underpasses that connect the site to the surroundings. Two of them are shorter and brighter but the one that goes under the biggest traffic street is too long, narrow and dark (red). These kind of entrances to the site are not attractive and welcoming.



66. Mjóddin - connections.

## Connections - green

A good city for walking must function all year around, day and night. In winter it's important that snow and ice area cleared, pedestrian and bicycle paths first. Lighting is also important once night falls, it gives people sense of security. Sufficient light is needed on pavement, surface and steps so that pedestrians can move safely. (Gehl, 2010)

These connections are more attractive than the underpasses and rather wide. The surface could give more character with different material and there is need for more lighting. During night it might feel unsafe since there are no houses facing the paths.



70. Mjóddin - green connections.



67. Underpass.



68. Underpass.



69. Underpass.



71. Connections.



72. Connections.



73. Connections.



# Walking environment

Street pattern, the design of space, rich details and intense experiences influence the quality of pedestrian routes and pleasure in walking. The city's "edges" also play a role. We have a lot of time to look around as we walk, and the quality of the ground floor facades we pass by at eye level, is very important to the quality of the tour. (Gehl, 2010)

The walking environment in Mjóddin is rather uninviting and does not encourage people to walk for enjoyment or to the bus. The outdoors environment lacks maintenance and cars are dominant wherever you look.



74. Mjóddin - walking environment.

# Public places

Cities must provide good conditions for people to walk, sit, stand, watch, listen and talk. If these basic activities can take place under good conditions, these and related activities will be able to unfold in all possible combinations in the human landscape. Of all the planning tools available, attention to this small scale is the most important. (Gehl, 2010)

The public places around the shopping center are in bad condition and the environment is unattractive. There is an overbuilt walking street in the middle of the service center which is good in the Icelandic climate and has the potential to become more vibrant with chance of functions and the future City line stop in the site.



78. Mjóddin - public places.



75. Sidewalk.



76. Sidewalk.



77. Sidewalk.



79. Mjóddin - indoor walking street.



80. Square.



81. Square.

## Architecture - 60 km/h architecture

Driving in a car at 50 to 100 km/h we miss out on the opportunity to grasp detail and see people. At such high speeds spaces need to be large and all signals have to be simplified so that drivers and passengers can take in the information. The 60 km/h scale has large spaces and wide roads. Buildings are seen at a distance, and only generalities are perceived. Details and multifaceted sensory experiences disappear. Taking a walk in 60 km/h architecture is uninteresting and tiring. (Gehl, 2010)

The architecture in the site lacks all details and aesthetics. It's a 60 km/h architecture that is supposed to be perceived from the road in a car.



82. Mjóddin - architecture.

## Uninteresting shops

There are various types of services located in Mjóddin service center including a health care center, grocery store and a bank. These functions are important for the area, especially for the residents of the elderly home which is close by. Mjóddin is a place to pass by, not a place that you want to stay at, meet friends and have a cup of coffee in an attractive environment. Most of the shops in Mjóddin are out of date and there is a need for something that attracts people to the area. However there are some new interesting functions and could be a start of something different. These functions are for example a fishmonger that sells fresh fish, a second hand shop and a family and multicultural center. There is also a dance school on the second floor that could become more visible.



86. Mjóddin service center.



83. Architecture.



84. Architecture.



85. Architecture.



87. Uninteresting shops.



88. Uninteresting shops.



89. The second hand shop

## 4.4\_Breiðholt - the district

### One of the first suburbs

Mjóddin is a part of a bigger district in Reykjavík called Breiðholt which was planned in the sixties. Breiðholt got its name from a farm that was once on the outskirts of Reykjavík. It is one of the first suburbs in Reykjavík that was connected to the old city center with motorways with open green areas in-between. It is a typical suburb where the residents leave the neighbourhood in work hours which makes it fragile during the day. Breiðholt is Iceland's clearest example of the dominant policy after the second world war which was to quickly construct cheap apartments, targeted generally for the working class.

Today Breiðholt is one of the largest districts in Reykjavík with population around 20.000 and 10% hold foreign citizenship. It is around 500 HA and includes three neighbourhoods: Lower-Breiðholt, Upper-Breiðholt and Seljahverfi. It's furthermore the district that has received the most negative press coverage through the years and is known for being "a ghetto". Since the district was built as a solution for housing problems it has 1.786 social apartments, or 23,4 % of all the apartments. They are mostly located in Upper-Breiðholt and it has been criticized for having too many social housing in the same area. (Kristjánsdóttir, 2002)



90. The swimming pool in Breiðholt.



91. The Cultural Center Gerðuberg.



93. A graffiti which says "the police doesn't care about you!".

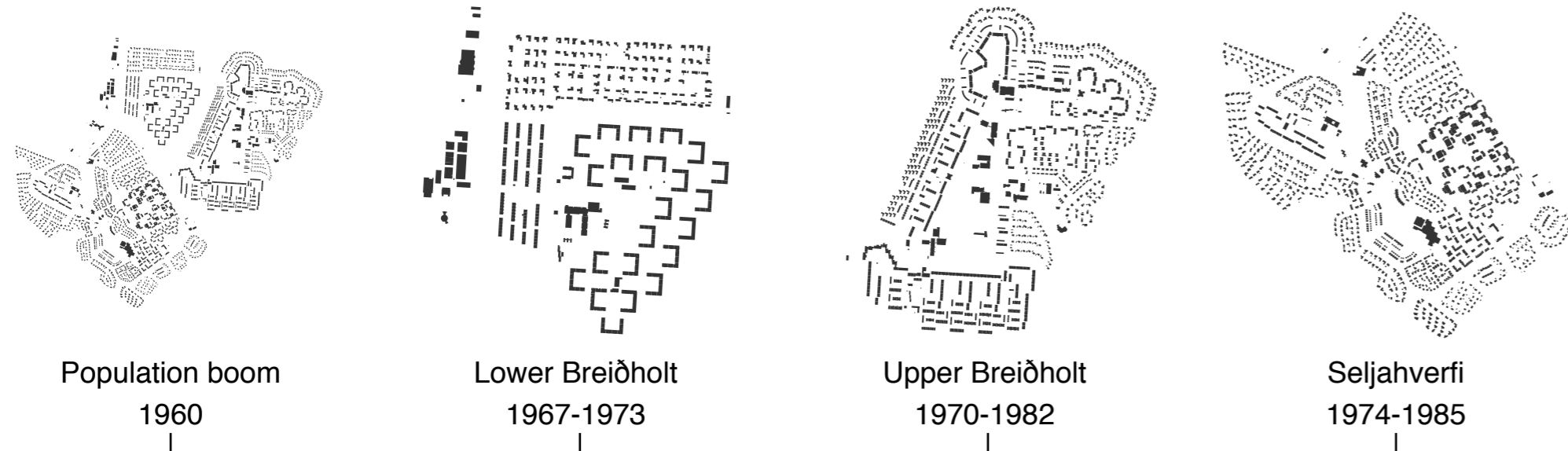


92. An old dance hall in Breiðholt.



94. The skiing area in Breiðholt.

## 4.5\_Breiðholt - Planning History



Breiðholt used to be an outer boundary to the inhabited areas of Reykjavík. Due to population pressure in the 1960s, work began implementing zoning plans for all of Reykjavík. Development plans were published for Breiðholt in 1966 in the hills east of the city. Bad housing had been a big problem, forcing many families to live in the cold, frail barracks that the army had left behind. The idea was to build single-family houses and low-priced apartments buildings mixed together.

The three different housing typologies in this neighbourhood are separated with streets. Row houses in the west, single-family houses in the north and the apartment blocks on the east hill. This was done so all the houses would have a view. The U-shaped block typology was new in Iceland, each block had a garden facing a big open shared area and minimum car-access was supposed to make the walking environment more save. Mjóddin is located next to this neighbourhood.

Upper Breiðholt is much denser than originally planned, with up to 12.000 residents. To get this density, 82% of the houses are multi-family houses. Previous experience from the building of the U-shaped blocks was too expensive so the final outcome was long straight blocks. One block there even got the nickname "Long Nonsense" for being 300 m long with 20 staircases for 7-800 people.

The plan for this part was a neighbourhood with multi-family houses and row houses adapted to the landscape with minimum shading. The houses were built in clusters with a sheltered outdoor area. The identity of the houses was supposed to be mono-pitched roofs. Today the neighbourhood is very diverse with range from small apartments in multi-family houses to the biggest single-family houses in Reykjavík. (Kristjánsdóttir, 2002)



99. Lower Breiðholt, Bakkarnir. Picture taken around 1970.



100. Upper Breiðholt 1976.



101. Part of Lower Breiðholt 1974.



102. Seljahverfi under construction 1976.

## 4.6\_Architecture and Identity

Architecture today can be homogeneous, especially in the western world. Buildings are no longer site specific and have become similar all over the world. The main reason for that is globalization, transportations improvements and open economy. (Stefánsson, 2008) Breiðholt was built in the time of the modernism and the buildings do not relate to Icelandic heritage and could be located anywhere in the world.

The district of Breiðholt was quickly constructed compared to usual construction speed and therefore the quality of the houses was not so high. Rough concrete apartment blocks are dominant in the neighbourhood and the highest are located on the top of the hill and are visual from all over Reykjavík. (Samtök sveitarfélaga á höfuðborgarsvæðinu, 2015).

The environment shapes us and brings out various feelings and thoughts. What affects us are among other color use, material use, diversity, proportion, shape and the form of buildings. (Stefánsson, 2008) Walking around in the neighbourhood or next to the shopping center does not give much restoration or bring out these feelings. It lacks aesthetics and diversity, better proportion between houses and streets and more attractive environment.

The graffiti art on the facades is a part of a the municipalities campaign to create an identity for the area with art in public spaces in Upper-Breiðholt. The artist ERRÓ is well known for his postmodern style and is one of the best contemporary artist in Iceland.



103. Asparfell, Upper Breiðholt. Rough concrete apartment blocks.



104. Seljahverfi, the identity of the houses was supposed to be mono-pitched roofs.



105. Art in public places creates more vivid urban environment in the suburb.



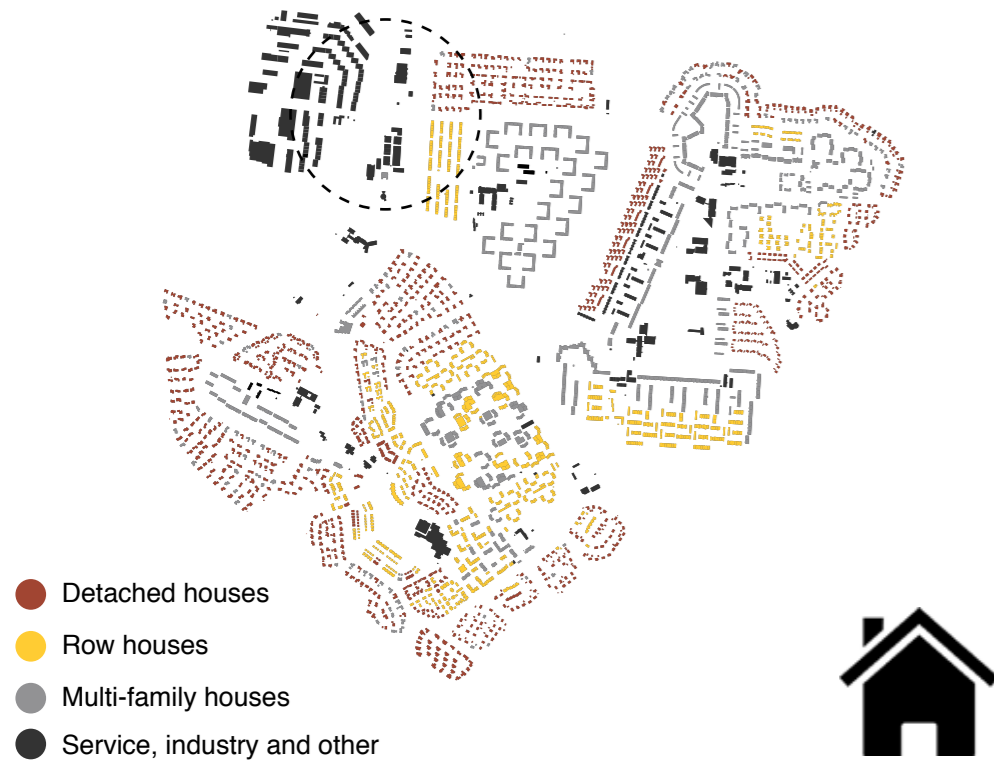
106. Art in public places creates more vivid urban environment in the suburb.



107. Art in public places creates more vivid urban environment in the suburb.

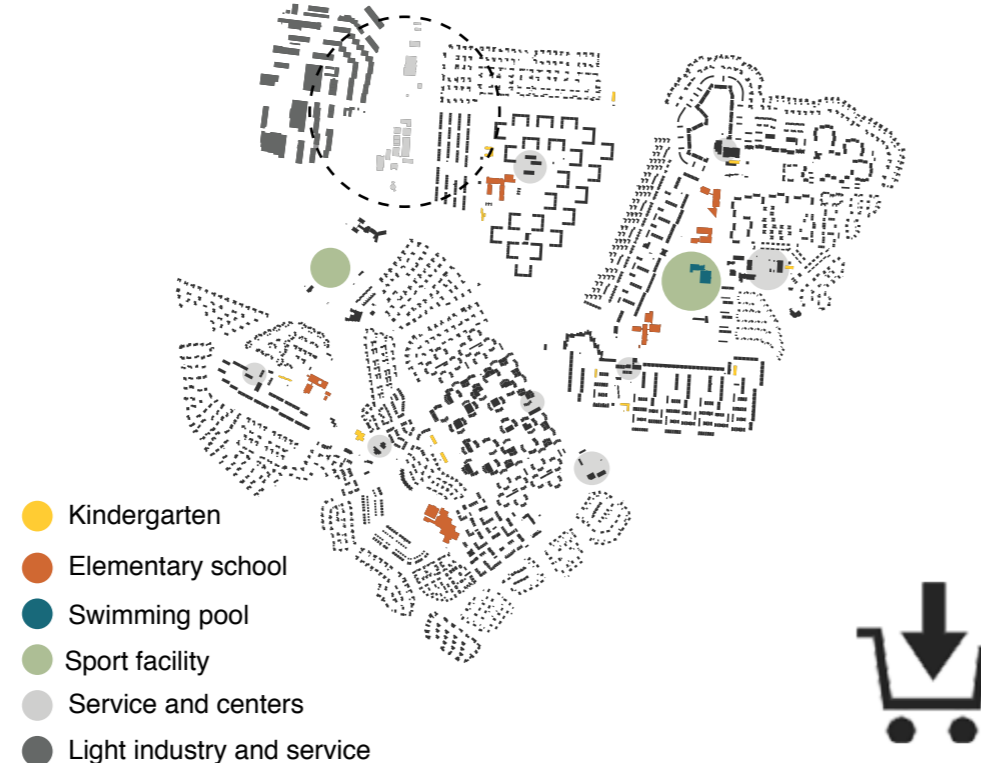
## 4.7\_Breiðholt analysis

### Housing balance



The housing balance in Breiðholt is good and offers small apartments to big detached houses. The neighbourhood has 1.957 detached houses and 5.317 apartments in multi-family house, more than any other neighbourhood in the capital area. Breiðholt was planned so that people of all age groups could get apartments and they would not have to change neighbourhood growing older.

### Service



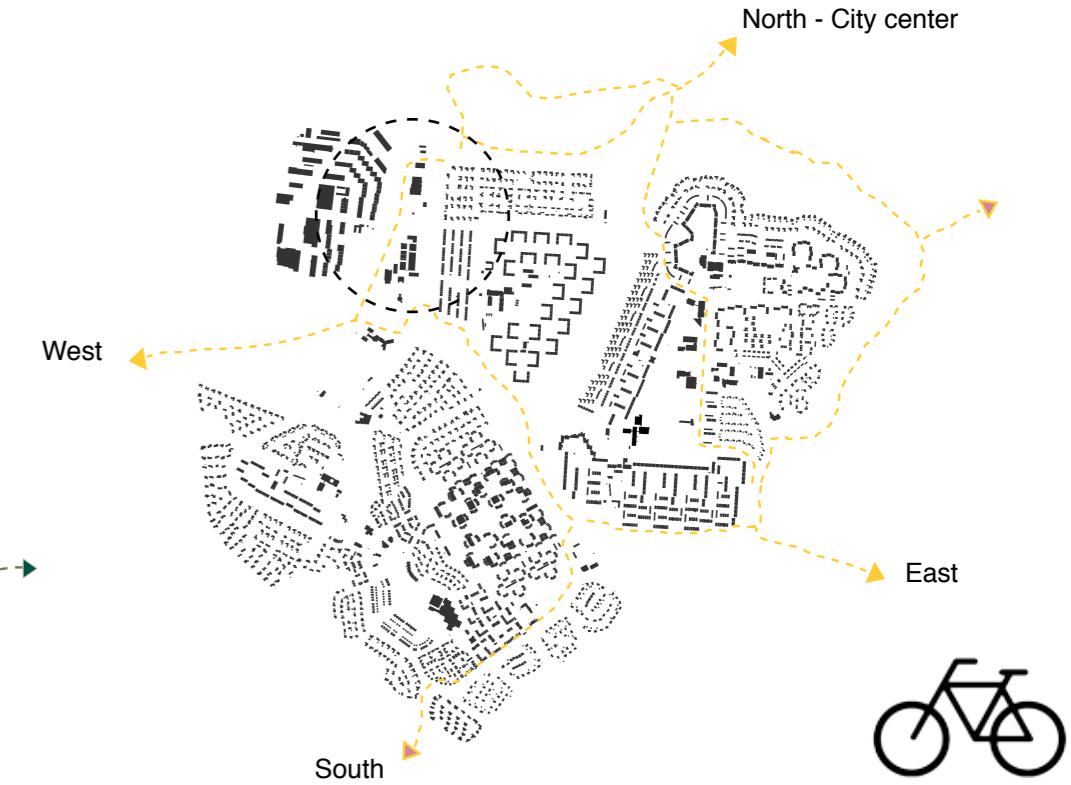
The main service is good in the district and in every neighbourhood are schools, kindergartens, grocery stores and a small center. Mjóddin is the service center for the whole district and has a potential to become an attractive urban center.

### Walking



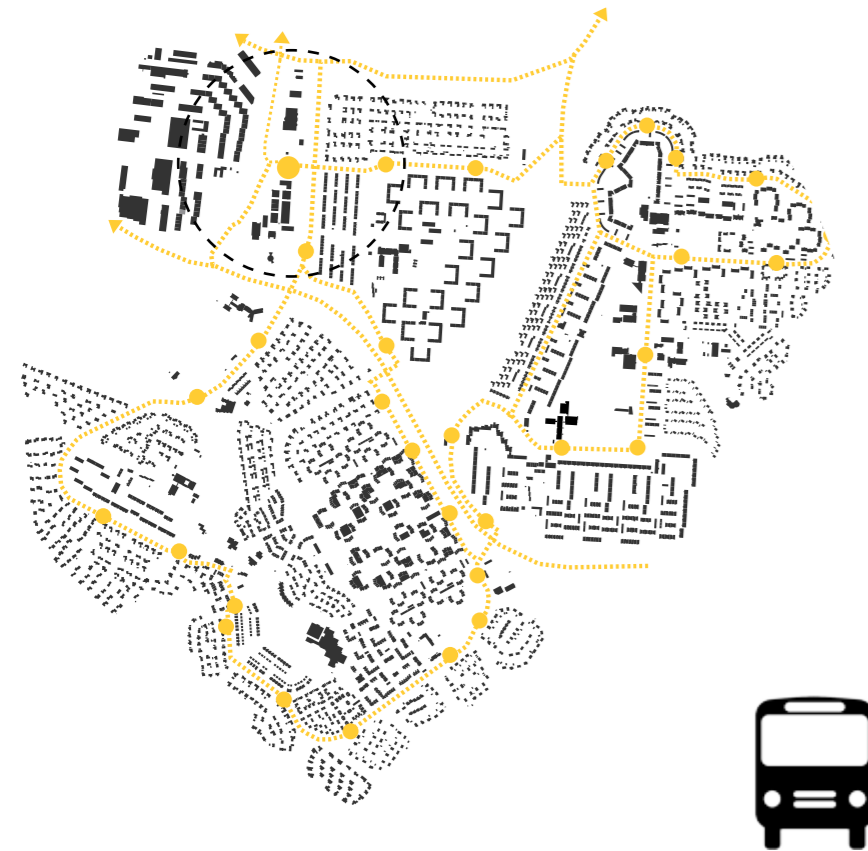
The pedestrian connections are rather good in the whole district, both main and secondary, but the walking environment and public places lack maintenance. Attractive environment and cityscape together with distance can make a difference if people are supposed to walk instead of drive.

### Biking



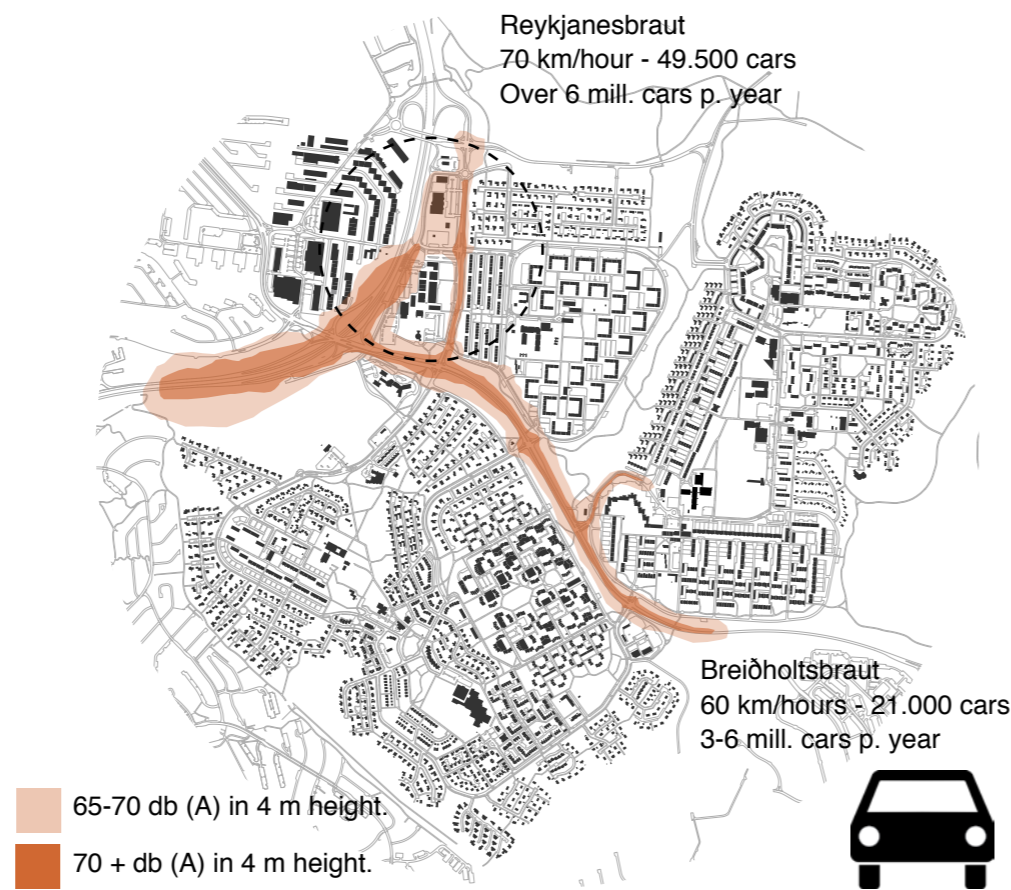
Mjóddin is located next to walking and biking paths that connect to other city parts. Biking is not that encouraging in the district and lacks secondary connections. Biking and walking paths are usually not separated but they should be more divided for better safety and mobility. To encourage biking it's recommended to increase bike parkings and make it a priority to clear the paths when it's snowing.

### Public transport



The overall accessibility to bus stops in the district is good but they are not reliable since they can get stuck in traffic during rush hours. Two buses drive in the district and they drive four times per hour in busy hours (6:36-9:21 and 14:06-18:21) but only two times per hour in-between. They start driving at 06:34 in the morning and drive until 00:47.

### Traffic



Big traffic roads with heavy traffic define the design site. These measurements show the average noise for one day. The average noise pollution from both of the big roads, Reykjanesbraut and Breiðhóltsbraut, is higher than what is allowed in residential areas, which is not over 55-65 db. This has to be taken into account in the future development of the site. (Umhverfisstofnun, 2010)

### District - green



The district is located next to Elliðaárdalur and Fossvogsdalur that are two big recreational areas in Reykjavík. It has skiing area and the district is rather green all over with rich vegetation.

### Site - green



The design site is located next to big traffic roads and the greenery on the site is similar to the greenery that is in-between traffic arteries, big undefined green lawns with little vegetation.

## 4.8\_Conclusions

This is an attempt to start the urbanization of the suburbs.

Breiðholt is one of the biggest districts in Reykjavík with population around 20.000 inhabitants. It's known for being called the "ghetto" because of social problems and negative press coverage. But after further investigations the district has a lot of good qualities and possibilities to become a popular district that is well connected to the rest of the city with the future city line.

The gentrification has already started with the municipalities campaign to change the image of the district and people have become more positive about the district. The rap scene in Iceland is big at the moment and rappers that come from the district are proud of their "ghetto" and have been shooting music videos there. The sport facilities are good in the district and that has a good affect on the society living there.

The district is located next to one of the biggest outdoor recreational area in the city and it's the only district in the city with a skiing area. The district is rather green but the outdoor areas and the public places lack maintainence. The housing balance is good and the overall service as well. The planning of the district brought new ideas to Iceland that still are valuable today, for example; houses built in clusters with sheltered outdoor areas, u-shaped blocks with playground in the middle and minimum car access that makes the walking environment saver.

The design site is supposed to become a future center that will be developed together with the city line. In the municipal plan the area is defined as a development area for 100-200 new apartments and mixed use for 2020-2024. (Aðalskipulag Reykjavíkur 2010-2030, 2014)

The design site today is not something that the residents are proud of and think of as their center with attractive urban life. it's planned for car access and needs to be changed if it's supposed to act as the center of Breiðholt the district. It has the location to become the main entrance to the district and has to mark the identity and the unique position of the district within the city.

The new design proposal is an outcome from analysis of the district and the site and the aim is to create a walkable and attractive well-connected suburban center. The proposal consists of retrofitting existing buildings, playful public realm that is active in different seasons, new public transit and new housing for residential, offices and commercial spaces.

This is an attempt to start the urbanization of the suburbs.



116 .Food store in Breiðholt that was called "Breiðholtskjör".



“Sport is one of the few institutions in society where people can still agree on the rules. No matter where you’re from, what you believe in and wich language you speak, you can walways play fotball together“

Bauman

## 5\_Urbanize the Suburb

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5.1\_District strategy

5.7\_Green infrastructure

5.2\_Site - challanges and goals

5.8\_Seasonal change

5.3\_Site - Strategy

5.9\_Walkable center and public realm

5.4\_Mjóddin - live - work - play

5.10\_Conclusions

5.5\_Design principles

5.6\_Typologies

## 5.1\_Breiðholt - district strategy

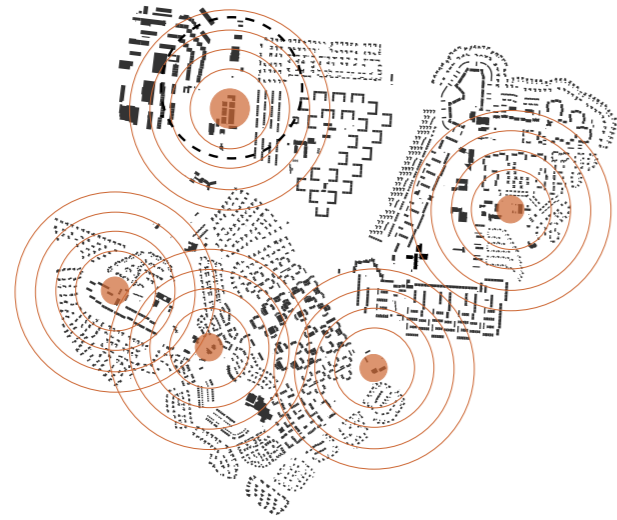
### Embrace the greenery



117

Embrace the green image of the area with green network that connects to the green areas and green roofs, create a new green suburban center for the district.

### Strengthen local service and centers



118

Provide main service in a walking distance (500 m) for each neighbourhood and strengthen the community feeling. The suburban center in Mjóddin offers main service together with more urban activities.

### Activate paths with recreation and play



119

- Sports
- Recreation and play
- Walking and running path
- Urban circle - city streets

Make certain green paths stronger and use recreation and play in public places to encourage people to walk and bike to the City line stop and use the public transit. Create an urban circle with city streets with higher density, slower traffic and more activity and life.

## 5.2\_ Site - challenges and goals

- Unappealing “big box” architecture and outdoor environment



120

+ Urbanize the area and improve architecture

- Car based area with big parking lots and heavy traffic



121

+ Create a walkable center and reduce the traffic impact

- Lack of identity and sense of place.



122

+ Create identity and public realm for everyone

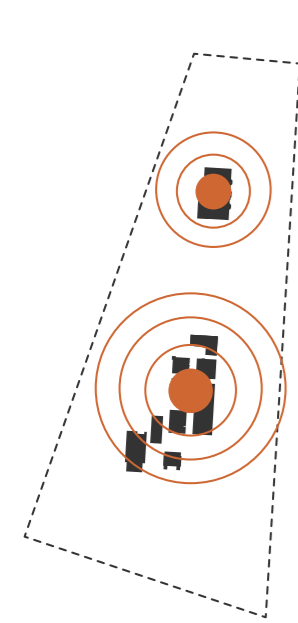
- Cold climate and dark long winters in Iceland



123

+ Increase the outdoor use by designing for seasonal change and cold climate

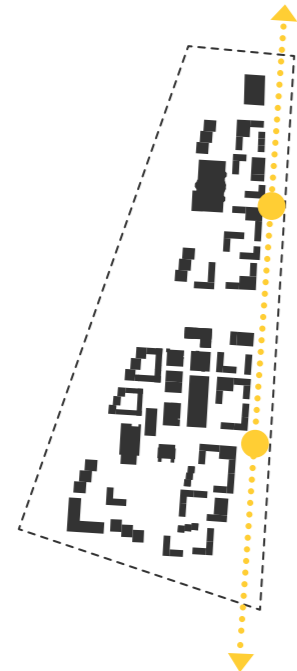
## 5.3\_ Site - strategy



124

Retrofit and activate

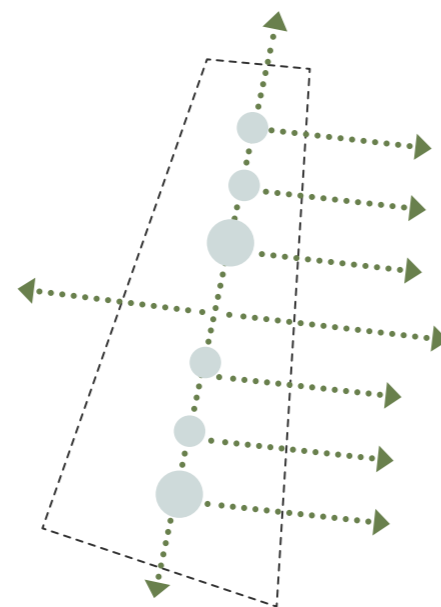
Retrofit and activate existing buildings, improve architecture and create places for people to stay at, not just pass by.



125

Add public transit and urbanize

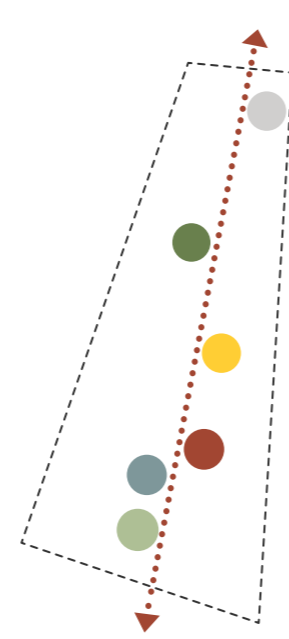
Add public transit to the site and develop a suburban center that blocks the sound pollution from the streets and offers walkable environment and urban functions.



126

Improve connections

Improve connections and add water management along paths and streets to make the environment more functional and attractive and encourage people to use the public transit.



127

Playful public realm

Introduce a playful public realm for multicultural society with diverse public function, strong identity and outdoor functions all year around.

## 5.4\_MJÓDDIN - live - work - play!



128. Mjóddin bird eye view.

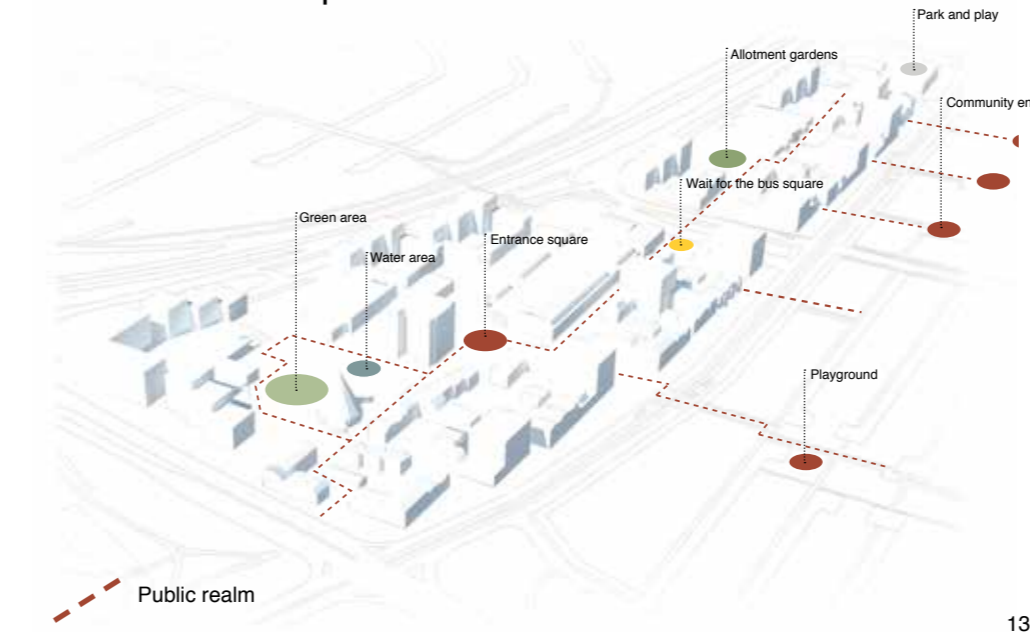
The new Mjóddin goes from being a place to pass by to a place to play and stay. A playful public realm and new urban activities will hopefully bring people to the area in all kind of weathers all year around.

The area is urbanized around two existing buildings, Mjóddin service center and the Garden center, that have been retrofitted and have become generators for the area. They are well connected to the new City line stops and offer activities such as grocery store, café, health care, allotment gardens, skate park, restaurants and other recreation. The new development includes 447 new apartments and 19.000 m2 of new office space. The density is 24 apartments per hectare while the average density in the district is 15 apartments per hectare.

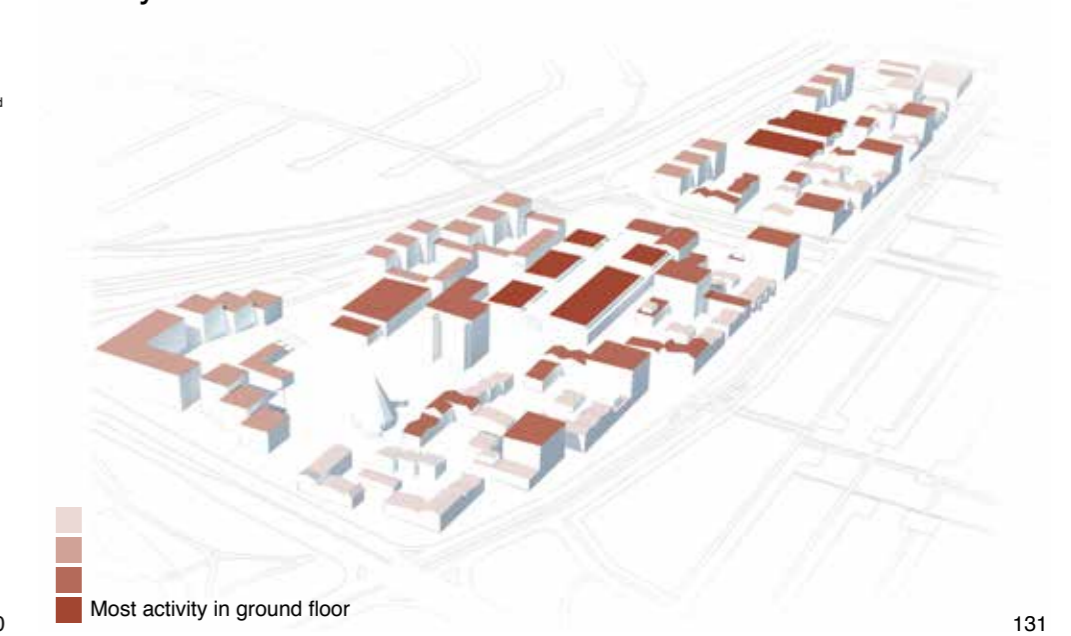
Higher density, better microclimate, diversity in housing typologies and colors, active facades and lively groundfloors that connect to the outdoor areast are all things that improve walkability together with the new public transit, the City line. New and improved old connections are supposed to create better mobility. To improve underpasses there is a new walking bridge over the darkest underpass and higher density next to the other makes them more save with eyes on the street. The new residents have the possibility to choose car free lifestyle and smaller apartments. Functions such as car sharing, city bikes, social green houses and repair café are supposed to encourage more social and sustainable living. The social green houses in every courtyard offer each community to e.g. grow food, share work places, share guesthouse or share activities such as yoga and more. There is also a strong connection to the existing elderly home and functions in the area will activate the old people for e.g. fix things in the repair café, get to know the new culture in the multicultural center and try exotic food in the international food square.



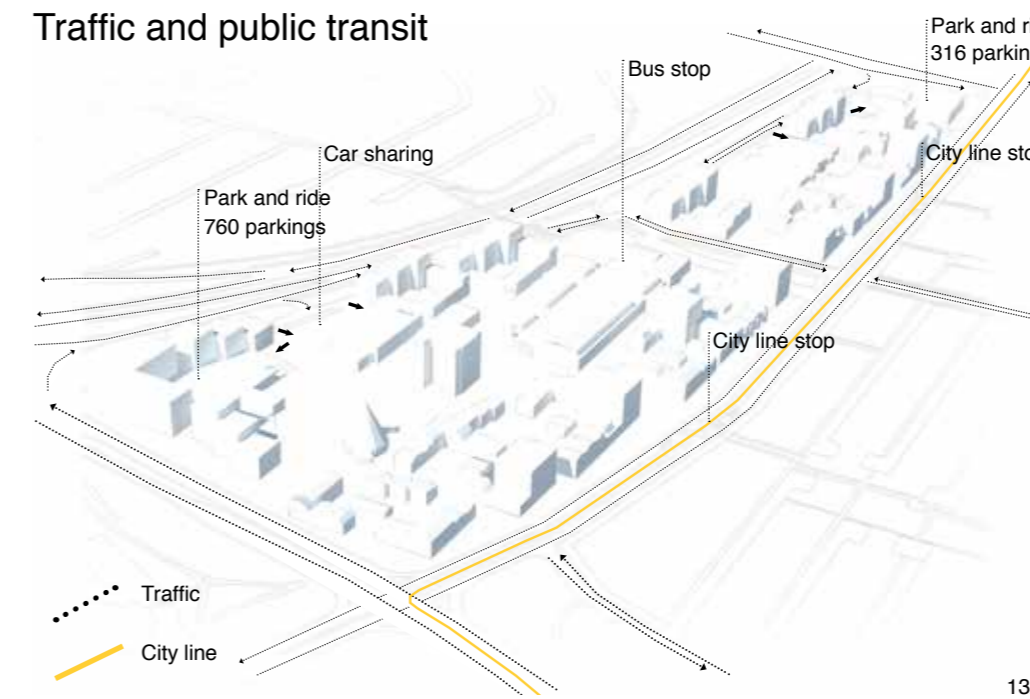
### Public realm and places



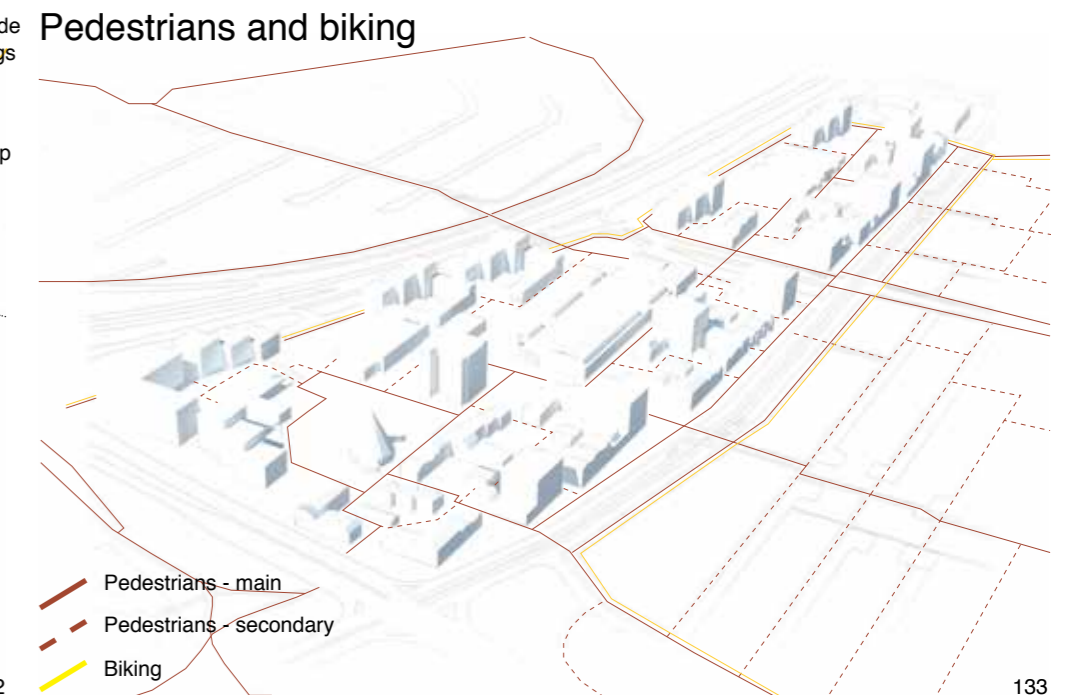
### Activity



### Traffic and public transit



### Pedestrians and biking



# 5.5\_Design principles

## Cold climate



134 Sheltered bike stands    135 Sheltered transit stops    136 Lightning and shelter    137 Waste water to heat sidewalks    138 Community green house

Good biking facilities near houses that protect bikes from rain and snow can increase bike use.

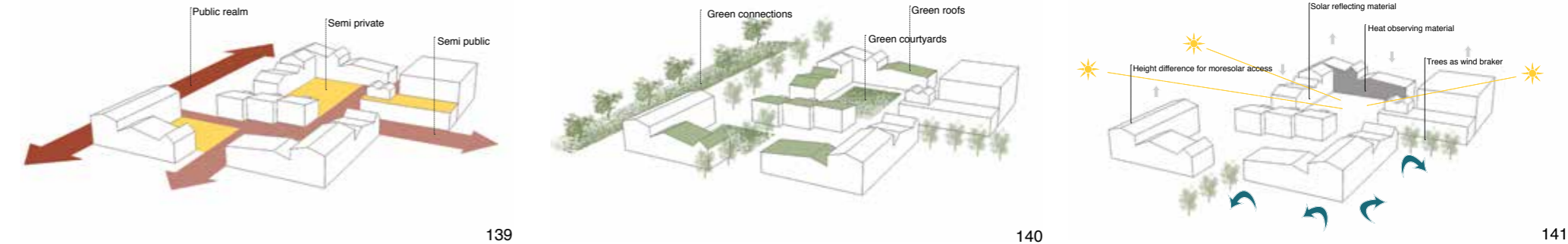
In cold climate people have to be able to wait in shelter from wind, snow and rain for the public transit.

Appropriate lightning and shelter for dark winters and strong wind can make a difference for outdoor use in the urban environment.

In Iceland the houses are heated with geothermal water and the waste water can be reused to heat up sidewalks and melt ice.

Shared community green houses for each courtyard to e.g. grow vegetable, store bikes and for gathering when it's cold and windy outside.

## Courtyards



139 Continuous public realm    140 The green network    141 Microclimate

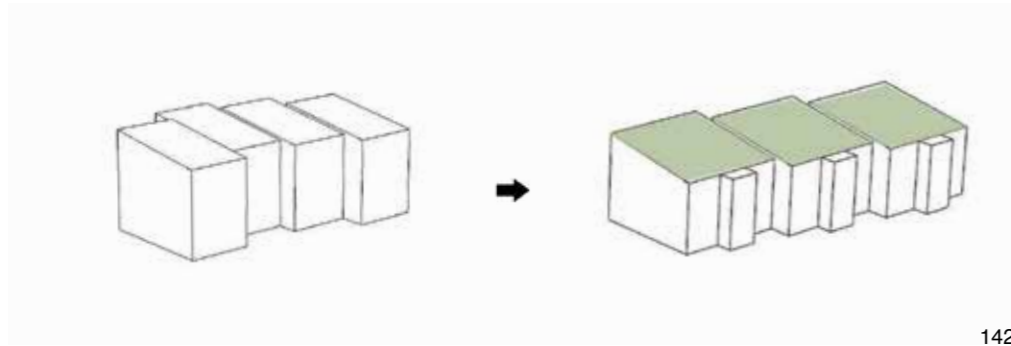
The public realm connects the area together and creates better mobility with interesting connections in-between the houses and diverse semi public/private areas. The public realm is supposed to offer places for everyone with day and evening use all year around.

The network intergrades the nature in to the urban environment and creates a richer biodiversity and ecological balance. The network connects the surrounding green areas together and the green roofs block off the sound pollution, improve air quality, reduce storm water runoff and energy demands and last but not least provide green space and more aesthetics.

In Iceland it's very important to design for better microclimate. With different heights of the houses and pitched roofs the courtyard gets more sun throughout the day. Heat absorbing materials absorb the sun and heat up the nearest environment together with the solar reflecting materials. The trees and the houses act as windbreaker.

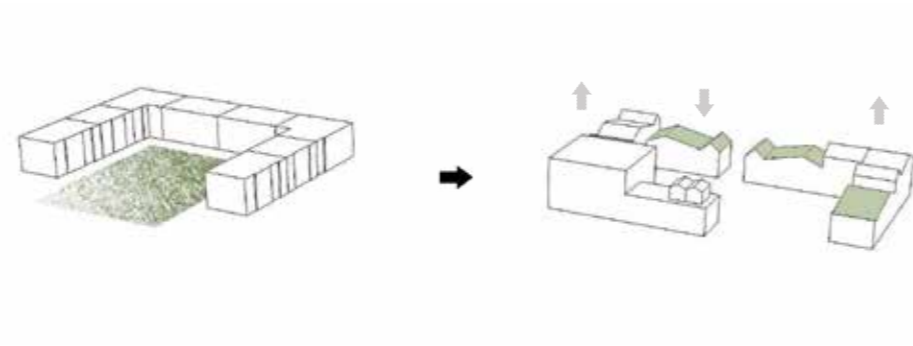
# 5.6 Typologies

## Re-development of typologies from the district



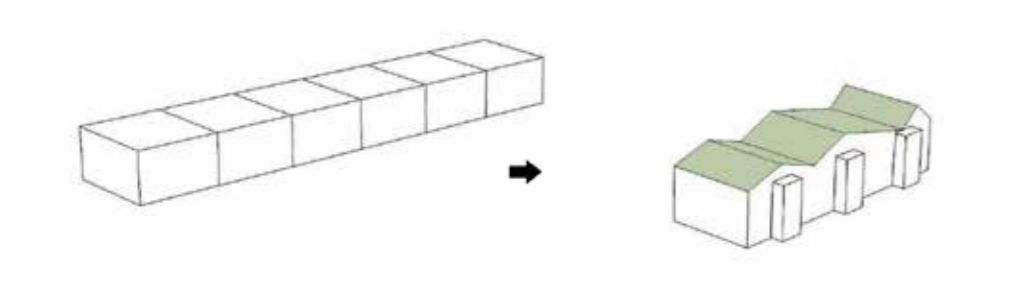
142

Existing multi-family house (3 floors) with mono-pitched roof from Seljahverfi that is an identity for the neighbourhood. The new typology is retrofitted with green roof and offers smaller apartments (6x100m2).



144

Existing U-shaped typology from Lower-Breiðholt with shared green area in the middle. The new typology offers more diversity in roofs, height and creates better connection to the surrounding environment. It has smaller and more flexible apartments, student housing and roof garden with green house for the residence.



143

Existing single-family row house (two floors) from Lower-Breiðholt with flat roofs. The new typology is retrofitted with pitched roof that gives nicer street view and offers smaller apartments (6x100m2).



145

All the typologies mixed together in a half open courtyard with diverse building typologie and shared area in the middle.

## New typologies - size and functions

6 apartments 100 m2  
2 floors

4 apartments 75 m2  
2-3 floors

9 apartments 75 m2  
3 floors

6 apartments 100 m2  
2 floors

Higher blocks  
5-7 - 4x187m2 flexible apartments  
3-5 - 14x50m2 student apartments  
1-3 - 12x80m2

Public function such as library on ground floor to connect to service center

Offices  
Block sound pollution

50m2 - 112 student apartments  
75 m2 - 102 apartments  
80m2 - 96 apartments  
100m2 - 24 on site, 52 around site  
187m2 - 20 flexible apartments

**= 447 new apartments on 18 HA, 24 apartments P/HA**

## 5.7\_Green infrastructure

In recent years people have become more aware of climate change and with extreme weather events it's even more important to take care of storm water in urban areas. Heavy rains happen more frequently in Iceland and last summer 2017 basements on the design site got flooded. That shows the importance of implementing green infrastructure in the new development.

Green infrastructure promotes the natural movement of water, instead of allowing it to wash into streets and down storm drains. Green infrastructure also has the added benefit of beautifying neighborhoods and increasing property values.

On the site the storm water is collected from the neighbourhood above the site in bioswales, channels and pipes. The swales allow storm water to flow and filter through vegetation and gravel. They temporarily store storm water runoff on the top of the soil and filter sediment and pollutant as water infiltrates down through the planter. When the swales become full they are connected with channels and pipes (where it's needed) to transfer the water down to the design site where it finally ends in retention ponds. The channels on the site also collect storm water from the roofs.

Green roofs reduce the volume and the speed of storm water runoff by temporarily storing storm water, provide added insulation and noise reduction compared to conventional roofs, increase biodiversity and habitat and provide green spaces.

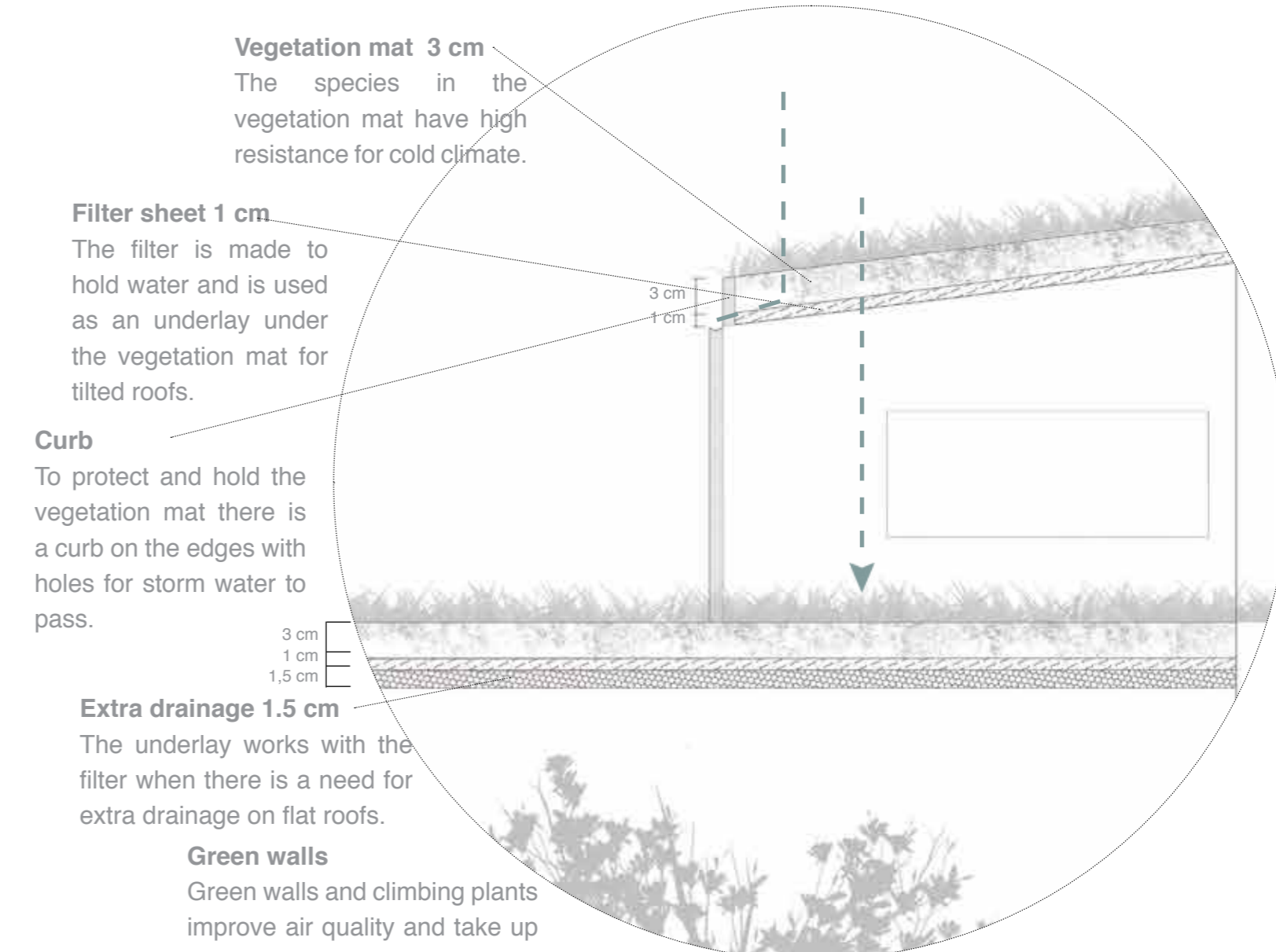
(Pelzer, K. and Tam, L., 2013)



157. Storm water management.

16m/361m = 4% slope

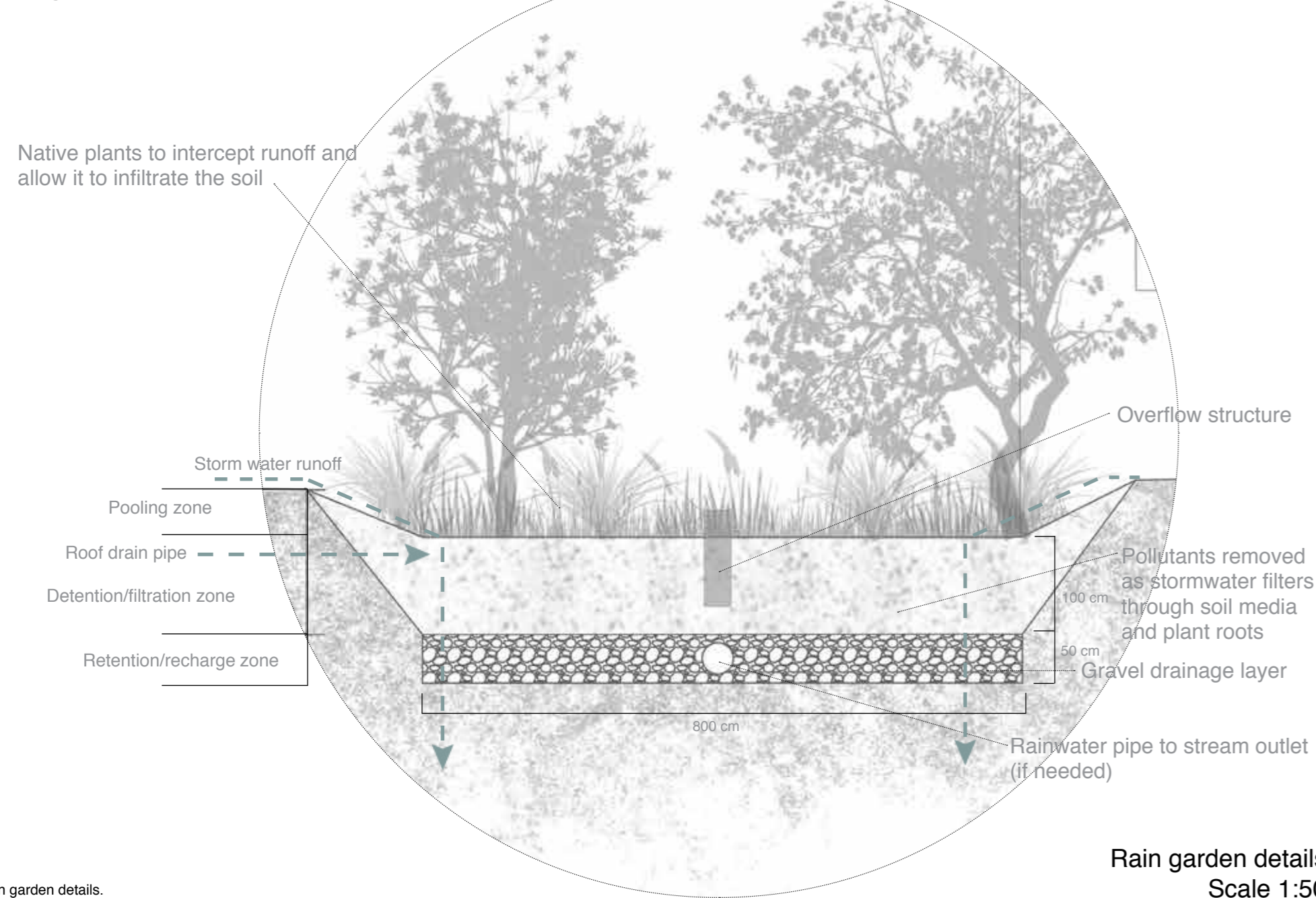
## Green roofs - 50% less runoff water of annual precipitation.



158. Green roof details.

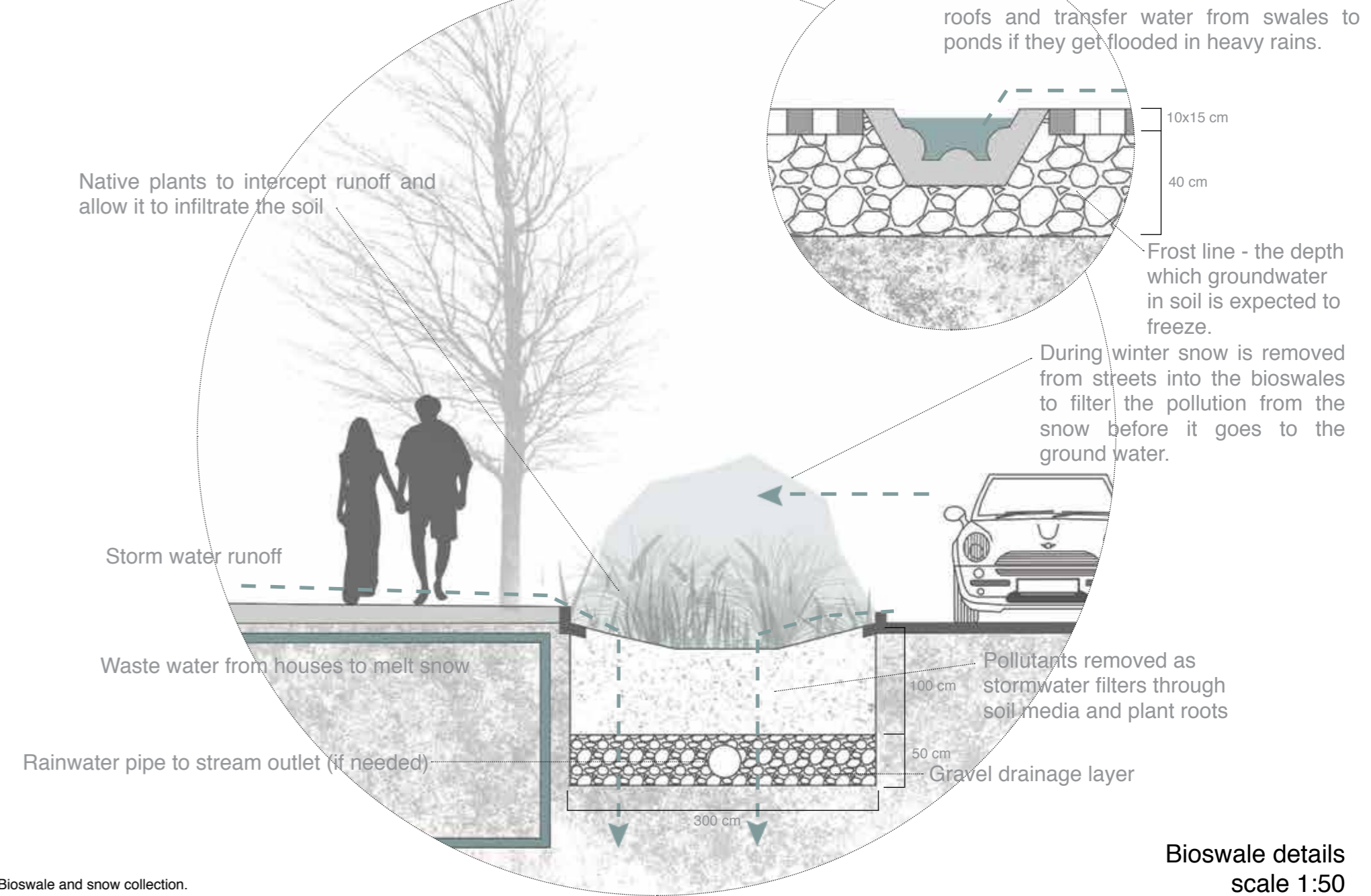
Green roof details  
Scale 1:25

# Rain garden - 30% more infiltration than lawns



Rain garden details  
Scale 1:50

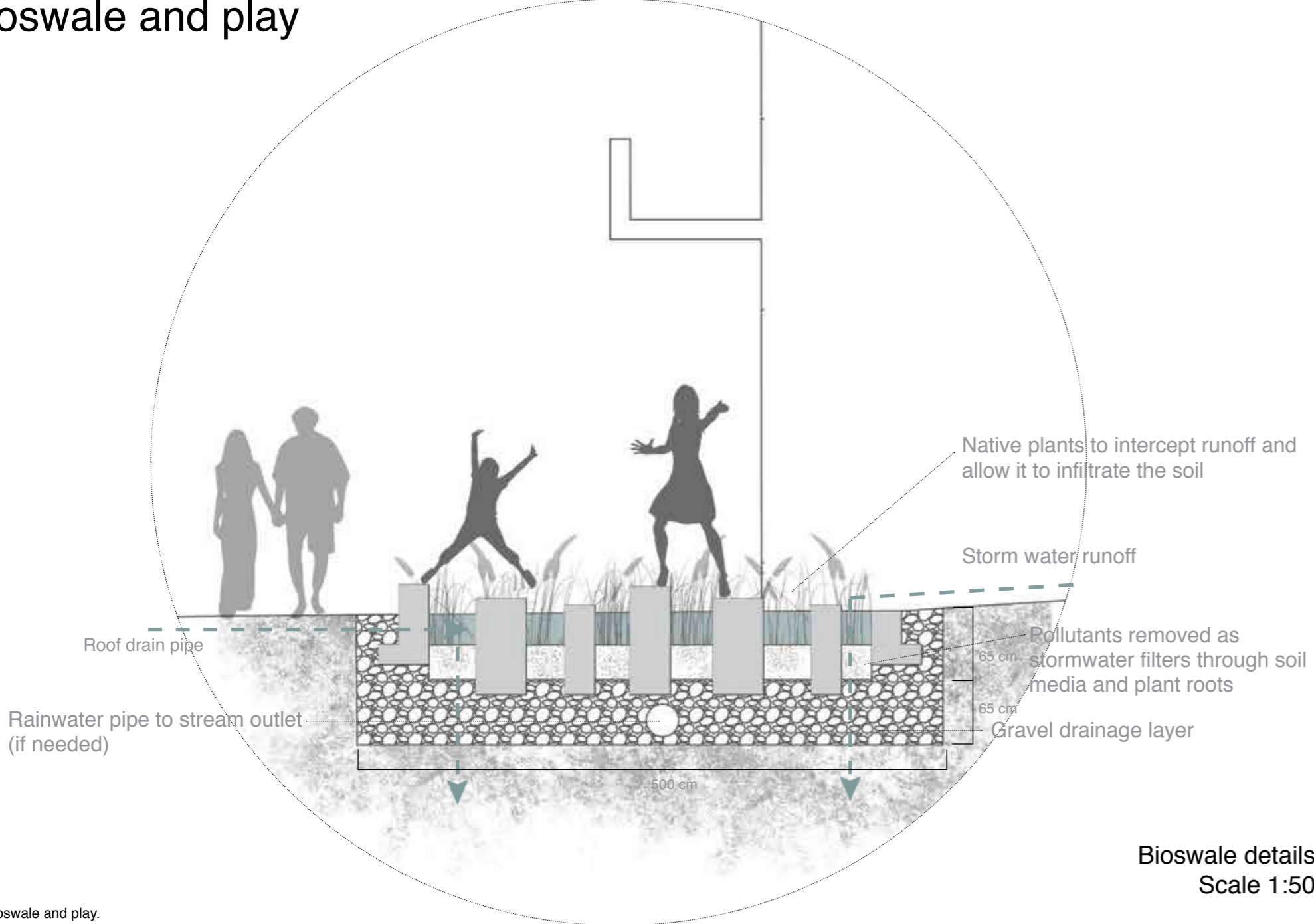
# Bioswale and snow collection



Bioswale details  
scale 1:50



# Bioswale and play

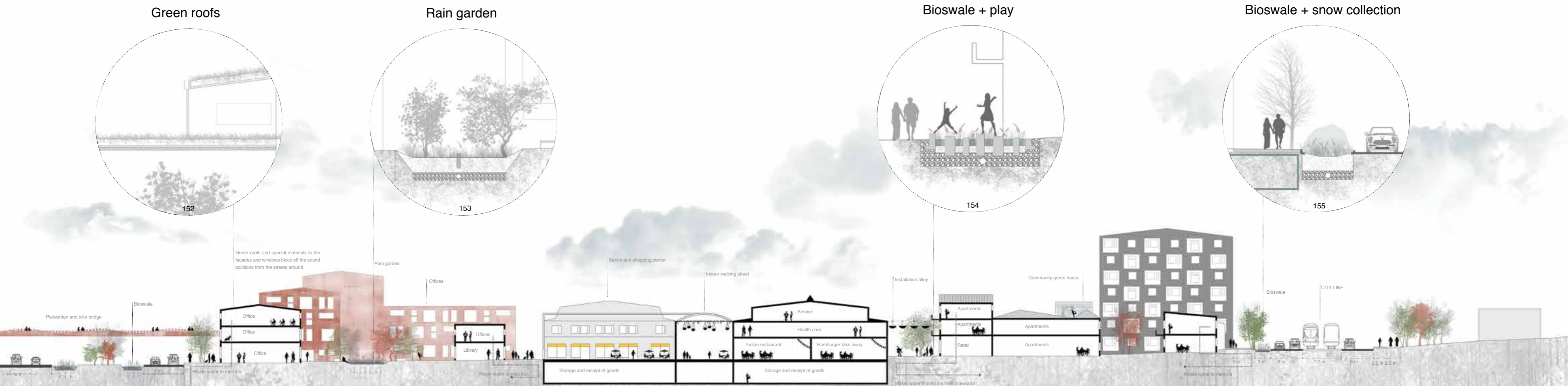


161. Bioswale and play.



165. The big retention pond is connected to a water pipe system and works as a playful gathering point all year around.

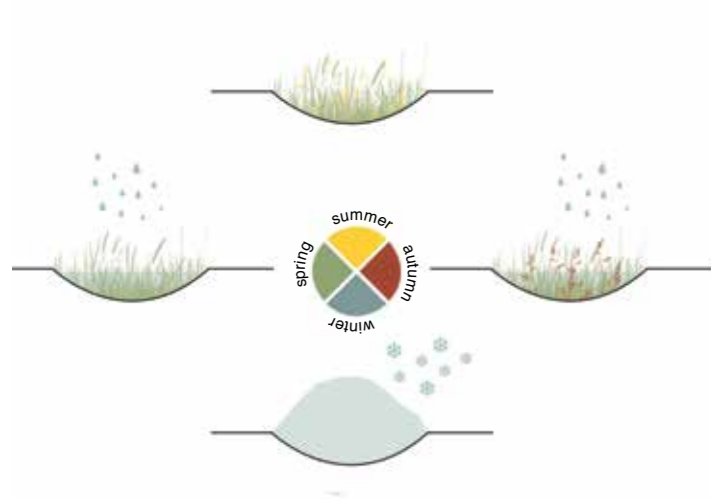
# Green infrastructure in the urban environment



156. Section A-A1 from west to east that shows the green infrastructure, typologies, color and material use, the service center and the city line.

## 5.8\_Seasonal change

Bioswales



162

The bioswales are a part of a storm water management system but they also improve aesthetics and are functional all year around. When it rains they filtrate the pollution from the storm water, slow it down and finally sink it back to the ground water and maintain the natural water cycle. During winters the swales can be used to collect snow from the streets and filtrate the pollution away. Normally when snow is removed from streets with machines they create big piles of snow that collects pollution from the cars, take up a lot of space and can create danger when kids start to play in the piles next to streets.

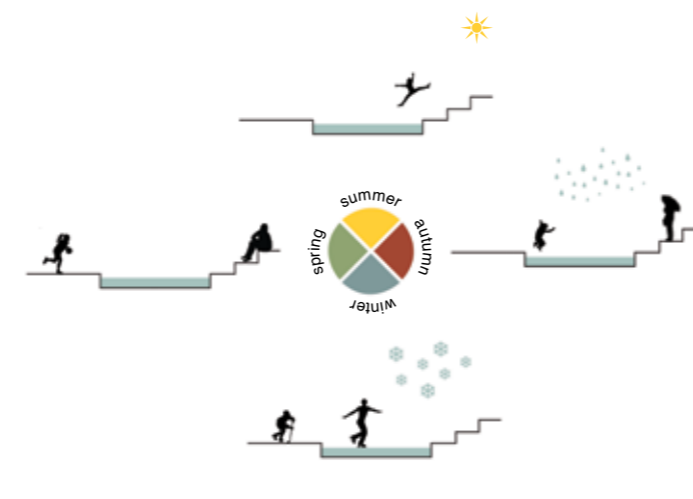
Vegetation



163

The vegetation will be planted after seasonal change so there will always be something green or new for each season. Everything is in blossom during the summer and when the autumn comes the design will allow the autumn colors to give character to each space. During winter evergreen trees give shelter and when the spring finally comes evergreen bushes will be green while the leaf trees are blooming.

Public realm

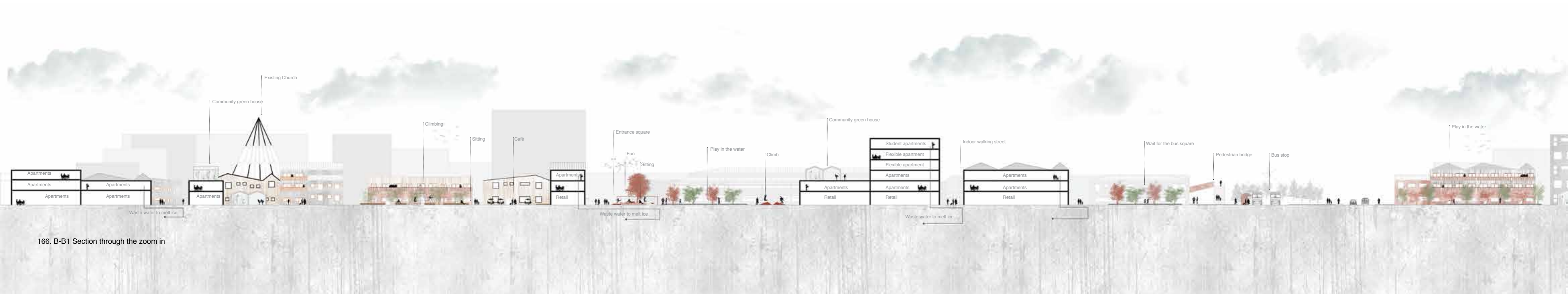


The retention pond that is a part of the storm water management system also works as public place and contributes to the urban life in the area. It's connected to a pipe system so when it's not raining enough it's still full with water. The pond functions all year around in all kinds of weather.

“In this city everything will be done to invite people to walk and bicycle as much as possible in the course of their daily day doings”

Jan Gehl

# 5.9\_Walkable center and playful public realm



166. B-B1 Section through the zoom in



“Good public realm is a necessary precondition for good public transportation that will in the future play a much larger role - you have to get to this tram and from the tram in style in all time of the day”

Jan Gehl



168. The entrance square from the City Line stop to the service center Mjóddin. The playful public realm creates an identity for the area together with the raw colorful material use and the graffiti walls that relate to the urban graffiti in the district.

“Successful city is like a fabulous party, people stay because they are having a great time”

Amanda Burden



169. The indoor walking street in the service center Mjóddin retrofitted with raw material use, playful public realm and new functions such as international food corner and food square, book café, repair café, yoga studio and dance showroom for the dance school.

## 5.10\_Conclusions

The aim of this thesis and design was to create a walkable, attractive well connected suburban center and design for urban life in the suburbs together with a new public transit and solutions for cold climate. That was done by retrofitting and activating existing buildings and densify around them with housing for residential, office and commercial use. Introducing a playful public realm for seasonal change and a new public transit.

The playful public realm is supposed to bring people from different culture with different languages together. Games and sports do not necessarily need people and kids to communicate because they can agree on the rules. New recreational and commercial activities together with higher density bring more urban character to the area and will hopefully attract more people. The new public transit, better connections and more walkable environment make it easier to choose carfree lifestyle in the suburb. The design principles for the cold climate in Iceland are important to increase the use of public transit and the outdoor use of the public places. The green infrastructure together with the public realm and the vegetation use are supposed to contribute to each season. For example the colorful public places will light up the darkness during winter, rainy days are more fun when you can jump in to the pond or follow the water in the channels and everything gets more beautiful when the autumn arrives and the green roofs become colorful together with the vegetation. The diverse and colorful new houses, the raw material use in the public realm and the graffiti art in public places and on the facades will give the area an identity and a unique position in a bigger city scale in Reykjavík.

The new center, Mjóddin - live - work - play, tries to connect a district that is divided by motorways and combines daily activities such as living, working and playing in one place. The development reduces negative effect on the environment by filtering the storm water and maintains the natural water cycle, reuses and retrofits buildings, offers better mobility while it reduces the private car use. It also offers facilities to grow food, share things and build stronger communities.

Redevelopment in the suburbs can be difficult and I agree with Ellen D. Jones that has worked a lot with retrofitting suburbs in USA:

“Consequently, the most effective redevelopments will be those that retrofit the streets, blocks, and lots to provide a compact, connected, walkable mix of uses and housing types. Unfortunately, projects at this scale often evoke criticism as “instant cities” or “faux urbanism.” The challenge for all involved is to provide settings and buildings that transcend their “instant” status and inspire their communities”. (Jones, 2011)

One thing I struggled the most with was that there was no history to preserve and relate to on my site. My solution was to relate to geographical qualities such as use the storm water in the public realm, embrace and connect to the greenery around and use the seasonal change. I also tried to relate to existing features in the district that I think are working well and give an identity to the area. For example by redeveloping typologies, hold on to monopitched roofs and use graffiti on facades in the new center. I think these things will help to prevent criticism of an “instant city”.



## 5.11\_Model



170. Model in 1:250 of the zoom in area that shows the new buildings together with the existing service center.



171. The City line stop and the entrance square to the service center.



172. Roof typologies and social green houses in courtyard and on roof park.



173. Narrow alley that connects to the service center.

## 6\_Bibliography & images

Aðalskipulag Reykjavíkur 2010-2030, (2014). *Reykjavík Municipal Plan 2010-2030* . Reykjavíkurborg, umhverfis og skipulagssvið. Reykjavík: Crymogeia.

Gaisma (2017). Viewed 15. February 2017 on: <http://www.gaisma.com/en/location/reykjavik.html>

Gehl, J. (2010). *Cities for People*. Island Press.

Jacobs, Jane. (1961). *the Death and Life of Great American Cities*. New York: Random House.

Jones, E.D. (2011). *Retrofitting Suburbia*. New Jersey: John Wiley & Sons.

Orkustofnun (2010). *Eðli hitans og sjálfbær nýting hans, álit faghóps um sjálfbæra nýtingu jarðhitans*. Reykjavík: Orkustofnun.

Kraft, P. (2012). *The Image of the European City*. In Jonas Torsvall (editor), *Europanic* (page 31-39). Stockholm: Europan Sweden.

Kristjánsdóttir, Ágústa. (2002). *Skipulagssaga Breiðholtshverfanna*. Morgunblaðið, page 14.

Pelzer, K. and Tam, L. (2013). *8 Shades of green infrastructure*. Viewed 8. September on: <http://www.spur.org/news/2013-08-08/8-shades->

green-infrastructure

Reynarsson, Bjarni. (2014) *Borgir og borgarskipulag - Þróun borga á Versturlöndum Kaupmannahöfn og Reykjavík*. Reykjavík, Skrudda.

Samtök sveitarfélaga á höfuðborgarsvæðinu. (2015). *Höfuðborgarsvæðið 2040: Svæðisskipulags höfuðborgarsvæðisins*. Sótt af [http://www.ssh.is/images/stories/Hofudborgarsvaedid\\_2040/HB2040-2015-07-01-WEB\\_Undirritad.pdf](http://www.ssh.is/images/stories/Hofudborgarsvaedid_2040/HB2040-2015-07-01-WEB_Undirritad.pdf)

Stefánsson, Hjörleifur. (2008). *Andi Reykjavíkur*. Reykjavík: JPV útgáfa

Umhverfisstofnun (2010). Hávaðakort. Viewed March 2017 on: <http://www.ust.is/einstaklingar/umhverfi-og-heilsa/havadi/havadakort>

Veðurstofa Íslands (2017). Viewed 15. February 2017 on: [http://www.vedur.is/Medaltalstoflur-txt/Stod\\_001\\_Reykjavik.ArsMedal](http://www.vedur.is/Medaltalstoflur-txt/Stod_001_Reykjavik.ArsMedal).

VEG TECH AB (2017). *Veg Tech-för grönare städer*. Stockholm.

Windfinder (2017). Viewed 15. February 2017 on: [https://www.windfinder.com/windstatistics/reykjavik\\_airport](https://www.windfinder.com/windstatistics/reykjavik_airport)

Yr (2017).Viewed 15. February 2017 on: [https://www.yr.no/place/Iceland/Capital\\_Region/Reykjavik/statistics.html](https://www.yr.no/place/Iceland/Capital_Region/Reykjavik/statistics.html)

## Images

All pictures are from author except otherwise cited.

Cover photo - Breiðholt  
Breiðholt (1977, 11 December). Morgunblaðið page 23.

1 - Breiðholt  
Breiðholt (1974, 23 May). Morgunblaðið page 24.

2 - Iceland, location in the world.

3 - Iceland

4 - The capital area

5 - Harpan the concert hall  
[https://www.google.com/search?q=heiðmörk&source=lnms&tbn=isch&sa=X&ved=0ahUKEwiiq5WYlRjUAhXCAPoKHx9dAI8Q\\_AUIBigB&biw=1402&bih=739#tbn=isch&q=Harpan+sky+view&imgrc=i-yrSHm89MWS3M](https://www.google.com/search?q=heiðmörk&source=lnms&tbn=isch&sa=X&ved=0ahUKEwiiq5WYlRjUAhXCAPoKHx9dAI8Q_AUIBigB&biw=1402&bih=739#tbn=isch&q=Harpan+sky+view&imgrc=i-yrSHm89MWS3M):

6 - Vesturbær.  
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7 - Perlan  
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8 - Hallgrímskirkja  
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9 - Laugardagslaug  
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10 - Viðey  
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11 - Gróttá  
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12 - Nauthólsvík beach area  
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### 13 - Þjóðleikhúsið

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### 14 - Heiðmörk

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### 15 - Elliðaárdalur

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### 16 - Nauthólsvík, man made beach.

[https://www.google.com/search?q=sjávars%C3%ADðan+reykjav%C3%ADk&source=lnms&tbn=isch&sa=X&ved=0ahUKEwjgpJ-Bgb3UAhVID5oKHdIvBeYQ\\_](https://www.google.com/search?q=sjávars%C3%ADðan+reykjav%C3%ADk&source=lnms&tbn=isch&sa=X&ved=0ahUKEwjgpJ-Bgb3UAhVID5oKHdIvBeYQ_)

### 17 - Blue and Green map

### 18. The Icelandic coastal weather.

### 19. Windrose for the whole year in Iceland.

### 20. Winter solstice 21 December and summer solstice 21 June.

### 21. Average precipitation for the period 1961-1990.

### 22 - The year 1786

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### 25 - The year 1986

### 26 - Car ownership and increase

### 27 - Permiabile surface and parkings in the city

### 28 - The car city scape 1. Satellite photo obtained from Borgarvefsja.is, showing intersections in Reykjavík.

### 29 - The car city scape 2. Satellite photo obtained from Borgarvefsja.is, showing intersections in Reykjavík.

### 30 - The car city scape 3. Satellite photo obtained from Borgarvefsja.is, showing intersections in Reykjavík.

### 31 - The car city scape 4. Satellite photo obtained from Borgarvefsja.is, showing intersections in Reykjavík. 32

### 32. Vesturbær

33. Miðbær  
<http://reykjavik.is/hverfisskipulag/hverfi/skolavorduholt>

34. Hlíðar  
<http://reykjavik.is/hverfisskipulag/hverfi/hlidahverfi>

35. Háaleiti - bústaðir  
<http://reykjavik.is/hverfisskipulag/hverfi/haaleiti-mular>

36. Breiðholt  
<http://reykjavik.is/hverfisskipulag/hverfi/hedra-breidholt>

37. Árbær  
<http://reykjavik.is/hverfisskipulag/hverfi/arpaer>

38. Grafarvogur  
[https://www.google.com/search?q=grafarvogur&source=lnms&tbn=isch&sa=X&ved=0ahUKEwj7gbbc-LjUAhWFFZoKHSb\\_DAIQ\\_AUIBygC&biw=1402&bih=739#imgcr=5EE9WXTY63JHsM](https://www.google.com/search?q=grafarvogur&source=lnms&tbn=isch&sa=X&ved=0ahUKEwj7gbbc-LjUAhWFFZoKHSb_DAIQ_AUIBygC&biw=1402&bih=739#imgcr=5EE9WXTY63JHsM):

39. Grafarholt  
[https://www.google.com/search?q=grafarvogur&source=lnms&tbn=isch&sa=X&ved=0ahUKEwj7gbbc-LjUAhWFFZoKHSb\\_DAIQ\\_AUIBygC&biw=1402&bih=739#tbn=isch&q=Grafarholt&imgcr=A7hDThV1wVOV0M](https://www.google.com/search?q=grafarvogur&source=lnms&tbn=isch&sa=X&ved=0ahUKEwj7gbbc-LjUAhWFFZoKHSb_DAIQ_AUIBygC&biw=1402&bih=739#tbn=isch&q=Grafarholt&imgcr=A7hDThV1wVOV0M):

### 40. The municipalities of the capital area

### 41. Future centers

### 42. Future goals

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### 44. The future city line

### 45. Demographic shift

### 46. Cange in the housing market

47. Skuggahverfi 149 A/HA. Satellite photo obtained from Borgarvefsja.is.

48. Pingholt 81 A/HA. Satellite photo obtained from Borgarvefsja.is.

49. Hlíðar 48 A/HA. Satellite photo obtained from Borgarvefsja.is.

50. Stekkir 8 A/HA. Satellite photo obtained from Borgarvefsja.is.

51. Density map (Reykjavík Municipal Plan 2010-2030)

### 52. Monofunctional zones

53. Skeifan. Satellite photo obtained from Borgarvefsja.is.

54. Kringlan shopping mall. Satellite photo obtained from Borgarvefsja.is.

55. Smáralind shopping mall. Satellite photo obtained from Borgarvefsja.is.

56. Mjóddin service center, the design site. Satellite photo obtained from Borgarvefsja.is.

57. Mjóddin, the design site.  
[https://www.google.com/search?q=Mjóddin&source=lnms&tbn=isch&sa=X&ved=0ahUKEwiQud-p37nVAhWFI1AKHfe3BKgQ\\_AUICigB&biw=1402&bih=759&dpr=2#imgcr=-drayz5ePgMITM](https://www.google.com/search?q=Mjóddin&source=lnms&tbn=isch&sa=X&ved=0ahUKEwiQud-p37nVAhWFI1AKHfe3BKgQ_AUICigB&biw=1402&bih=759&dpr=2#imgcr=-drayz5ePgMITM):

58. Central location.

59. Mjóddin, service.

60. Mjóddin. Satellite photo obtained from Borgarvefsja.is.

61. The site in a bigger city scale.

62. The site, analysis.

63. Solar chart - 21. march + september.

64. Windrose for July (2009-2017).

65. Windrose for december (2009-2017).

66. Mjóddin - connections.

67-69. Underpass

70. Mjóddin - green connections.

71-73. Connections.

74. Mjóddin - walking environment.

75-77. Sidewalks.

78. Mjóddin - public places.

79. Mjóddin - indoor walking street.

80. Square.

81. Square.

82. Mjóddin - architecture.

83-85. Architecture.

86. Mjóddin service center.

87-88. Uninteresting shops.

90. The swimming pool in Breiðholt.

[https://www.google.com/search?q=Breiðholt+sundlaug&source=lnms&tbn=isch&sa=X&ved=0ahUKEwidt9G86p3WAhXBYZoKHRUKCC0Q\\_AUICygC&biw=1439&bih=767&dpr=2#imgrc=l3a4HK5O-td68M](https://www.google.com/search?q=Breiðholt+sundlaug&source=lnms&tbn=isch&sa=X&ved=0ahUKEwidt9G86p3WAhXBYZoKHRUKCC0Q_AUICygC&biw=1439&bih=767&dpr=2#imgrc=l3a4HK5O-td68M):

91. The Cultural Center Gerðuberg.

[https://www.google.com/search?biw=1439&bih=746&tbn=isch&sa=1&q=Breiðholt+Gerðuberg&oq=Breiðholt+Gerðuberg&gs\\_l=psy-ab.3...22189.26509.0.26641.25.10.15.0.0.0.153.985.6j4.10.0...0...1.1.64.psy-ab..0.1.100...0i5i30k1j0i24k1.Z0T20Yt6DI8#imgrc=WA6pCtzwiZWIYM](https://www.google.com/search?biw=1439&bih=746&tbn=isch&sa=1&q=Breiðholt+Gerðuberg&oq=Breiðholt+Gerðuberg&gs_l=psy-ab.3...22189.26509.0.26641.25.10.15.0.0.0.153.985.6j4.10.0...0...1.1.64.psy-ab..0.1.100...0i5i30k1j0i24k1.Z0T20Yt6DI8#imgrc=WA6pCtzwiZWIYM):

92. An old dance hall in Breiðholt.

93. A graffiti which says “the police doesn’t care about you!“.

[https://www.google.com/search?biw=1439&bih=746&tbn=isch&sa=1&q=Breiðholt+graffiti&oq=Breiðholt+graffiti&gs\\_l=psy-ab.3...105671.106442.1.106731.8.8.0.0.0.0.168.807.5j3.8.0...0...1.1.64.psy-ab..0.0.0.Exc8rWdHUVo#imgrc=HKZ1IhL130KIMM](https://www.google.com/search?biw=1439&bih=746&tbn=isch&sa=1&q=Breiðholt+graffiti&oq=Breiðholt+graffiti&gs_l=psy-ab.3...105671.106442.1.106731.8.8.0.0.0.0.168.807.5j3.8.0...0...1.1.64.psy-ab..0.0.0.Exc8rWdHUVo#imgrc=HKZ1IhL130KIMM):

94. The skiing area in Breiðholt.

[https://www.google.com/search?tbn=isch&sa=1&q=Breiðholt+sk%C3%ADðasvæði&oq=Breiðholt+sk%C3%ADðasvæði&gs\\_l=psy-ab.3...184305.185819.0.185989.11.11.0.0.0.0.114.1090.8j3.11.0...0...1.1j4.64.psy-ab..0.0.0.xa2PmU9bLIQ#imgrc=K-NhuqnI0Osyem](https://www.google.com/search?tbn=isch&sa=1&q=Breiðholt+sk%C3%ADðasvæði&oq=Breiðholt+sk%C3%ADðasvæði&gs_l=psy-ab.3...184305.185819.0.185989.11.11.0.0.0.0.114.1090.8j3.11.0...0...1.1j4.64.psy-ab..0.0.0.xa2PmU9bLIQ#imgrc=K-NhuqnI0Osyem):

95-98. Breiðholt planning history.

99. Lower Breiðholt 1970.

Lower Breiðholt (1974, 23 May). Morgunblaðið page 22.

100. Upper Breiðholt 1976.

Jónson. Rafn,. (1976) Viewed March 2017 on:  
[https://leitir.is/primolibweb/action/display.do?tabs=detailsTab&ct=display&fn=search&doc=FOTOWARE34063913b4dd5cced109b7a3674f0bfe&indx=17&reclds=FOTOWARE34063913b4dd5cced109b7a3674f0bfe&recldxs=16&elementId=16&renderMode=poppedOut&displayMode=full&frbrVersion=2&frbg=&&dscnt=0&scp.scps=scope%3A%28ICE01\\_PRIMO%29%2Cscope%3A%28ICE%29%2Cscope%3A%28SKEMMAN%29%2Cprimocentral\\_multiple\\_fe&vl\(1UIStartWith0\)=contains&vl\(164244328UI1\)=all\\_items&vid=ICE&mode=Basic&vl\(2800050UI0\)=any&srt=rank&tab=default\\_tab&dum=true&vl\(freeText0\)=Seljahverfi&dstmp=1505136096426&gathStatIcon=true](https://leitir.is/primolibweb/action/display.do?tabs=detailsTab&ct=display&fn=search&doc=FOTOWARE34063913b4dd5cced109b7a3674f0bfe&indx=17&reclds=FOTOWARE34063913b4dd5cced109b7a3674f0bfe&recldxs=16&elementId=16&renderMode=poppedOut&displayMode=full&frbrVersion=2&frbg=&&dscnt=0&scp.scps=scope%3A%28ICE01_PRIMO%29%2Cscope%3A%28ICE%29%2Cscope%3A%28SKEMMAN%29%2Cprimocentral_multiple_fe&vl(1UIStartWith0)=contains&vl(164244328UI1)=all_items&vid=ICE&mode=Basic&vl(2800050UI0)=any&srt=rank&tab=default_tab&dum=true&vl(freeText0)=Seljahverfi&dstmp=1505136096426&gathStatIcon=true)

101. Part of Lower Breiðholt 1974.

Part of lower Breiðholt (1974, 23 May). Morgunblaðið page 23.

102. Seljahverfi under construction 1976.

Jónson. Rafn,. (1976) Viewed March 2017 on:  
<https://leitir.is/primolibweb/action/display>

103. Asparfell, Upper Breiðholt. Rough concrete apartment blocks.

[https://www.google.com/search?biw=1439&bih=744&tbn=isch&sa=1&q=Breiðholt&oq=Breiðholt&gs\\_l=psy-ab.3...0i4.10604.11644.0.11874.9.8.0.0.0.0.307.939.0j2j1j1.4.0...0...1.1.64.psy-ab..5.4.939.2sdAYtKBvWM#imgrc=JIZ2yC6-CIV1dM](https://www.google.com/search?biw=1439&bih=744&tbn=isch&sa=1&q=Breiðholt&oq=Breiðholt&gs_l=psy-ab.3...0i4.10604.11644.0.11874.9.8.0.0.0.0.307.939.0j2j1j1.4.0...0...1.1.64.psy-ab..5.4.939.2sdAYtKBvWM#imgrc=JIZ2yC6-CIV1dM):

104. Seljahverfi, the identity of the houses was supposed to be mono-pitched roofs.

Bryndis Hulda (2008). Viewed in March on:

<https://www.flickr.com/photos/bryndishulda/2823046424>

105. Vesturhólar, art in public places creates more vivid urban environemnt

in the suburb.

[https://www.google.com/search?biw=1439&bih=744&tbn=isch&sa=1&q=Breiðholt&oq=Breiðholt&gs\\_l=psy-ab.3...0i4.10604.11644.0.11874.9.8.0.0.0.0.307.939.0j2j1j1.4.0...0...1.1.64.psy-ab..5.4.939.2sdAYtKBvWM#imgrc=AeYAcJDpjIkc9M](https://www.google.com/search?biw=1439&bih=744&tbn=isch&sa=1&q=Breiðholt&oq=Breiðholt&gs_l=psy-ab.3...0i4.10604.11644.0.11874.9.8.0.0.0.0.307.939.0j2j1j1.4.0...0...1.1.64.psy-ab..5.4.939.2sdAYtKBvWM#imgrc=AeYAcJDpjIkc9M):

106. Art in public places creates more vivid urban environemnt in the suburb.

[https://www.google.com/search?biw=1439&bih=746&tbn=isch&sa=1&q=Breiðholt+&oq=Breiðholt+&gs\\_l=psy-ab.3...0i5i30k1I3j0i24k1.89587.89587.0.89836.1.1.0.0.0.0.103.103.0j1.1.0...0...1.1.64.psy-ab..0.1.102.GVslcVWdXh8#imgrc=mFaQCiayB5coeM](https://www.google.com/search?biw=1439&bih=746&tbn=isch&sa=1&q=Breiðholt+&oq=Breiðholt+&gs_l=psy-ab.3...0i5i30k1I3j0i24k1.89587.89587.0.89836.1.1.0.0.0.0.103.103.0j1.1.0...0...1.1.64.psy-ab..0.1.102.GVslcVWdXh8#imgrc=mFaQCiayB5coeM):

107. Art in public places creates more vivid urban environemnt in the suburb.

[https://www.google.com/search?biw=1439&bih=767&tbn=isch&sa=1&q=Erró+Breiðholt&oq=Erró+Breiðholt&gs\\_l=psy-ab.3...0.24564.26986.0.27145.15.15.0.0.0.0.211.1953.1j11j2.14.0...0...1.1j4.64.psy-ab..2.13.1867...0i30k1.CVShbdVN0cl#imgrc=pFSWsXHrCQFLDM](https://www.google.com/search?biw=1439&bih=767&tbn=isch&sa=1&q=Erró+Breiðholt&oq=Erró+Breiðholt&gs_l=psy-ab.3...0.24564.26986.0.27145.15.15.0.0.0.0.211.1953.1j11j2.14.0...0...1.1j4.64.psy-ab..2.13.1867...0i30k1.CVShbdVN0cl#imgrc=pFSWsXHrCQFLDM):

108-115. Breiðholt analysis.

116 .Food store in Breiðholt that was called “Breiðholtskjör“.

[https://www.google.com/search?q=Breiðholtskjör&tbn=isch&imgil=QabkaHX4nLtNjM%253A%253B4ngO4xi6iS1gDM%253Bhttps%25253A%25252F%25252Fwww.pinterest.com%25252Fkalleankersen%25252Fold-iceland%25252F&source=iu&pf=m&fir=QabkaHX4nLtNjM%253A%252C4ngO4xi6iS1gDM%252C\\_u sg=\\_\\_wESB41lrorjyX8JAKgVZgSdxmjY%3D&biw=1439&bih=744&ved=0ahUKEwjngfrDnp3WAhVkJJoKHQLZC5gQyjclPA&ei=lo-2WefeL-TA6QSCsq\\_ACQ#imgrc=QabkaHX4nLtNjM](https://www.google.com/search?q=Breiðholtskjör&tbn=isch&imgil=QabkaHX4nLtNjM%253A%253B4ngO4xi6iS1gDM%253Bhttps%25253A%25252F%25252Fwww.pinterest.com%25252Fkalleankersen%25252Fold-iceland%25252F&source=iu&pf=m&fir=QabkaHX4nLtNjM%253A%252C4ngO4xi6iS1gDM%252C_u sg=__wESB41lrorjyX8JAKgVZgSdxmjY%3D&biw=1439&bih=744&ved=0ahUKEwjngfrDnp3WAhVkJJoKHQLZC5gQyjclPA&ei=lo-2WefeL-TA6QSCsq_ACQ#imgrc=QabkaHX4nLtNjM):

117-119. Breiðholt district strategy

120-123. Site challenges and goals

124-127. Site strategy

128. Mjóddin bird eye view

129. Master plan

130-133. Diagrams

134-138. Design principles for cold climate.

139-141. Design principles for courtyards.

142-145. Redevelopment of typologies

146-151. New typologies.

152-155. Green infrastructure

156. Section A-A1 from west to east.

157. Storm water management.

158. Green roof details

159. Rain garden details

160. Bioswale and snow collection

161. Bioswale and play.

162-164. Seasonal change.

165. The big retention pond.

166. B-B1 Section through the zoom in.

167. Zoom in.

168. The entrance square

169. The overbuild walking street in the service center Mjóddin.

170-173. Model

