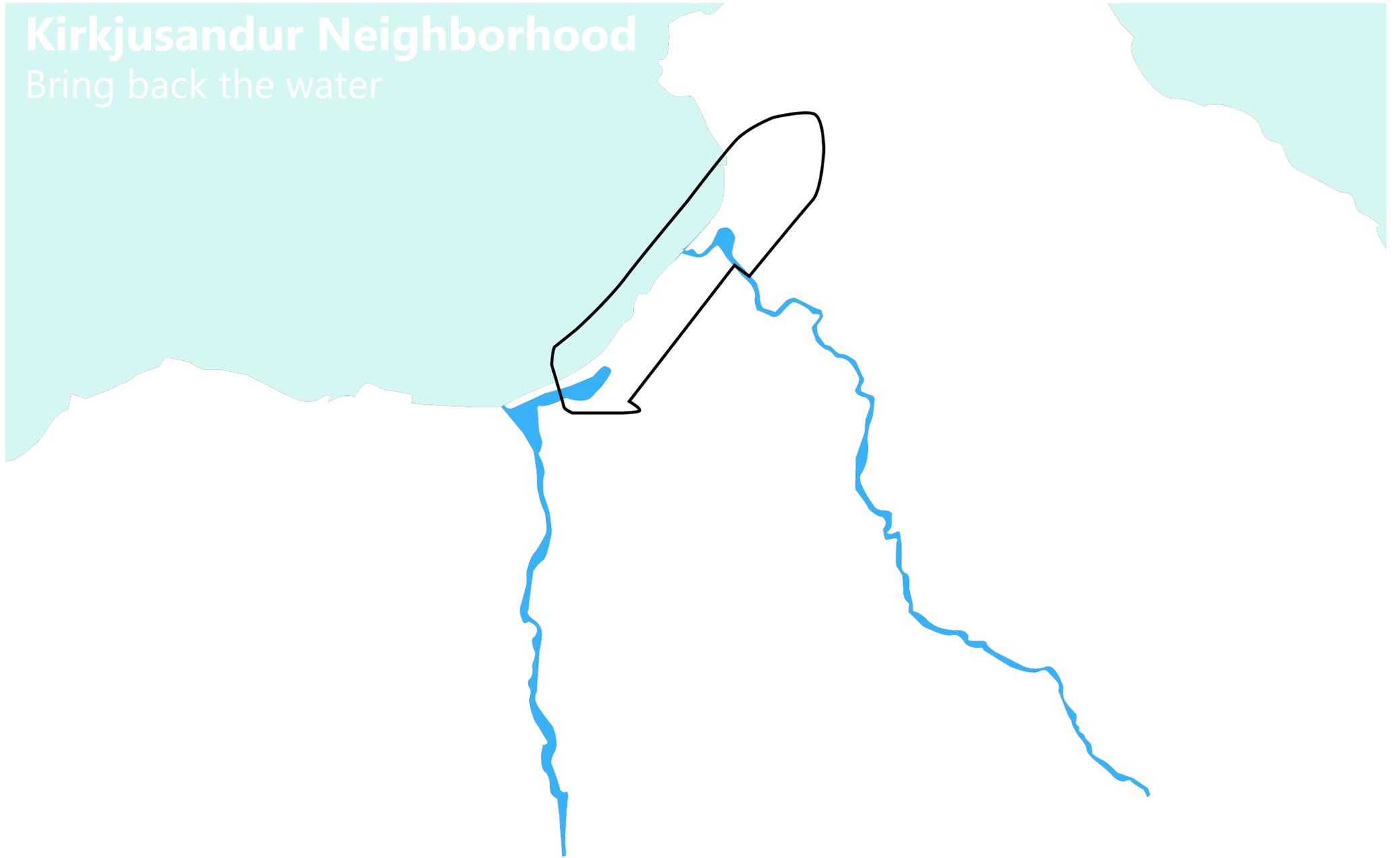


# Kirkjusandur Neighborhood

Bring back the water







Special thanks to my supervisors for their time and input into this project, the Sustainable Urban Design faculty and the jury comments during the project presentation for a Master's Degree in Sustainable Urban Design, Wednesday the 17th of May 2017 at Lund University, School of Architecture.

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Lastly, I would like to thank my partner, Ólafur and my son Emil for their endless patience and moral support during this process.

# Kirkjusandur Neighborhood

## Bring back the water

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## The Aim

Kirkjusandur is a 6 ha site one kilometer east of the city center that sits between an industrial area, residential area and a new business district with the north atlantic ocean across the highway. The site has a history for fish processing and two creeks used to run through the site out to sea, Laugalækur and Fúlutjarnarlækur. Today, the capital is dealing with issues of sprawl, underutilized public transportation, lack of walkable areas outside the historical center, lack of outdoor space away from traffic and wind and lack of free activities. In this thesis, I have investigated how this small site can be densified in a sustainable way and also provide the city with many different, blue and green public spaces, activities for all ages and places to enjoy good weather.

To find a history behind a place in Reykjavik outside the city center is rare. That became my main focus and I wanted to bring back the water that used to be there, 2 creeks that created small ponds on site before going to sea and turn the old coastline that disappeared under landfill into a wet/dry basin. That would bring quality of life for the neighborhood dwellers and city dwellers as well. It could also bring together the new-ish business district and the residential area build between 1940's and 1970's.

### Research questions:

How can we densify without blocking views and casting shadows? How can we recreate water elements?

How can we build a nice microclimate in the windy and cold Reykjavik?

### Problems:

Sprawl, wind, lack of connection to water, lack of meeting places outside city center, lack of updated urban elements and activities for every age-group.

This master thesis addresses urban sprawl, population growth and density in Reykjavik, the capital of Iceland. The inhabitants of the capital area are estimated to increase by 19-26% by 2040.

Reykjavik has a housing shortage, problem with sprawl, movability, walkability and transportation.

The thesis question is how densification can be applied to the site of Kirkjusandur, a left over space just east of the city center and across the street from a big harbour area while considering existing residents and honoring the history of the place

The design site is transformed into a dense mixed use neighbourhood where public space is designed to accommodate activities for all ages. Micro housing is introduced as one of many housing options and artwork, workout stations, urban farming, monthly fleamarkets, water features, warm water to play in and much more are added to add life to this part of the city and help connect the old city center to the first suburb in Reykjavik. A tram-system is introduced on a City scale and also a high speed rail going to the airport.

### Iceland in the North Atlantic Ocean

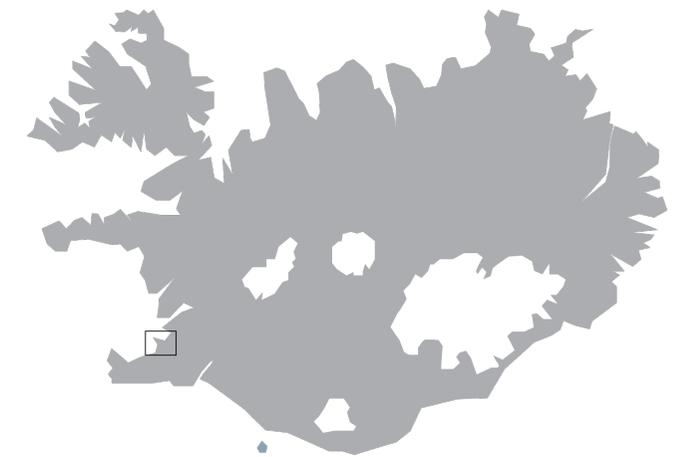


Size: 103.000 km<sup>2</sup>  
64.9631° N, 19.0208° W

### Capital in the southwestern part



8 Regions

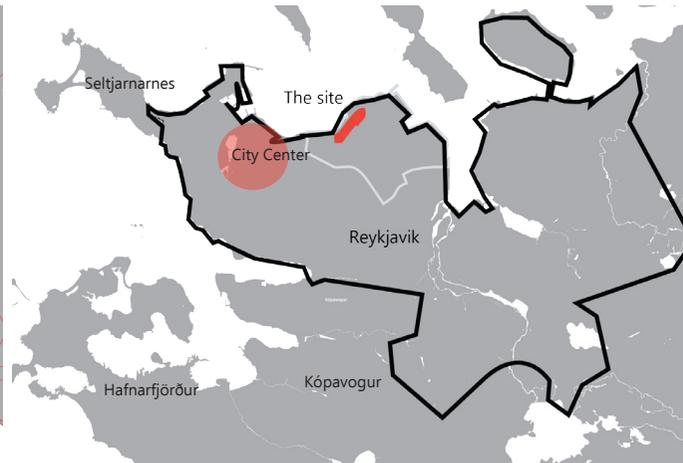


331.000 inhabitants

### The Capital region and built up area

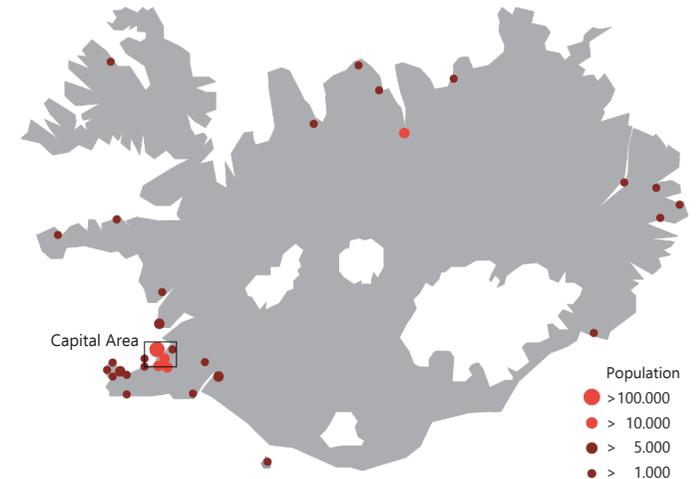


### Reykjavik



217.000 inhabitants  
Estimated population increase 40.000-56.000 people by 2040

### Connection to water



91% live close to the ocean

## Vielwlines out to sea

91% of Icelanders live near the ocean and the fishing industry is still strong. Small fishing villages started forming around the harbour with houses looking out to sea so fish workers and wives could see when the boats would dock.



# Main Industries in Iceland



Hydropower



Image nr. 2



Geothermal power



Image nr. 3



Aluminum smelting



Image nr. 4



Ferrosilicon production



Image nr. 5



Fishing



Image nr. 6



Tourism



Image nr. 7

The Hydropowerplants and Geothermal powerplants are mostly built to serve the heavy industry of aluminum and ferrosilicon production. The aluminum and ferrosilicon industries are export industries, and Iceland has argued that expansion of such energy-intensive industries in the country is beneficial from the perspective of climate change mitigation, because their use of renewable energy and best available technology ensures that emissions are as low as possible from a global perspective.

Environmentalists acknowledge that by using clean energy, the plants in Iceland pollute less than coal-fired smelters in other countries. But they warn that the aluminum companies are extracting heat from the Earth faster than it can be replenished. Although the subterranean heat is virtually inexhaustible from a global perspective, digging too many wells to tap into the hot water and steam, without allowing enough time for nature to renew the supply, can deplete a local site over time.(1)

Energy-intensive industries provides about 15% of the country's export earnings and uses 60% of the electricity produced, which amounts to about 27 % of total energy used.

Industries can buy power at extremely low cost in Iceland, not due to subsidies, but due to the abundance of renewable sources, and because of the fact that Iceland is an isolated energy market, with no opportunity to sell power at a higher price to other countries.

The quite high level of GHG emissions in Iceland is largely due to the use of reductants in the aluminum and ferro-alloy industries, along with the transport sector and the country's large fishing fleet. In 2015, carbon emissions per Icelander were 10.2 tonnes, compared to 5.8 per EU citizen. According to a recent report by the Institute of Economic Studies at the University of Iceland, emissions are set to increase 53-99% by 2030, compared to 1990 levels.(4, 5) That means Iceland will fail to meet the Paris agreement.

Fishing is considered sustainable in Iceland because strict quotas apply. "To keep fish stocks sustainable and protect marine ecosystem, scientists (..) monitor Icelandic waters and provide the data to the government."Although, the quota system means that fishing rights accumulate into fewer hands so the smaller sustainable fishermen with line and hook fishing are dying out.

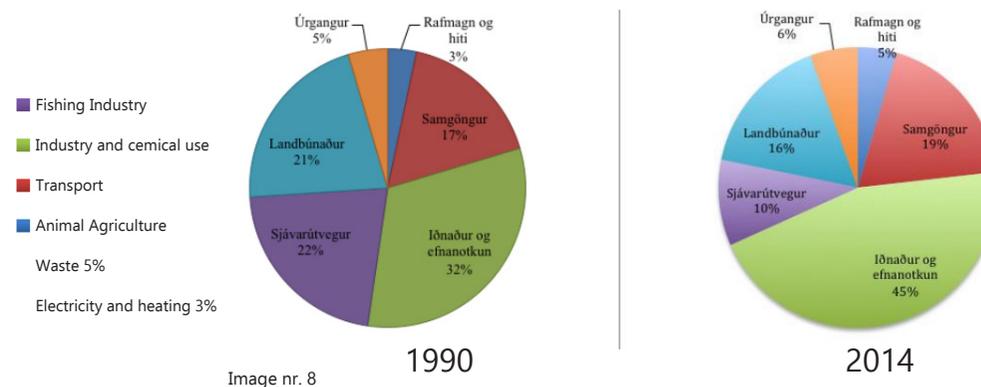
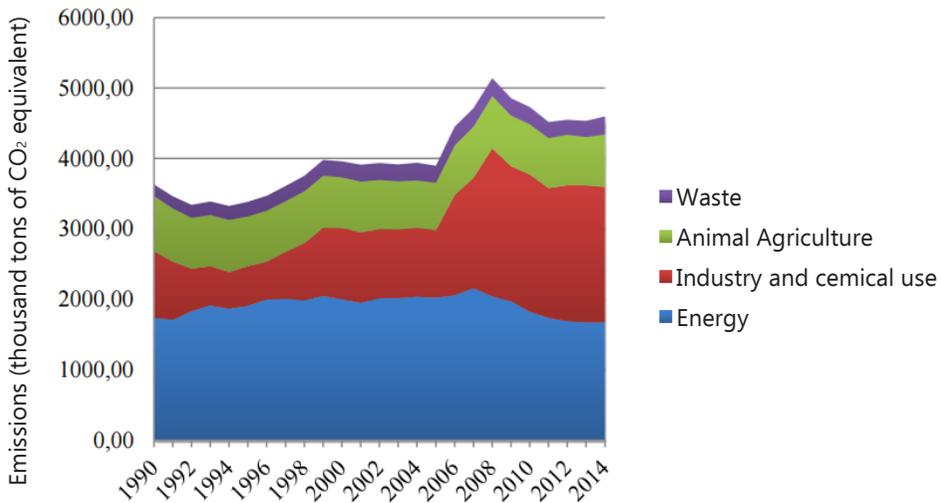


Image nr. 8

## A sustainable future?

Geothermal Energy at Hellisheiði is thought to pollute in Reykjavik and Hveragerði with sulphur (hydrogen sulphide) that results in magnesium and iodine deficiency in humans and livestock.

Geothermal fluids contain high concentrations of heavy metals and other toxic elements, including radon, arsenic, mercury, ammonia and boron, which are damaging to the freshwater systems into which they are released as waste water. Arsenic concentrations of 0.5 to 4.6 ppm are found in waste water released from geothermal power plants; the WHO recommends a maximum 0.01 ppm in drinking water.(2)



GHG emissions by the Paris agreement classification

Image nr. 9

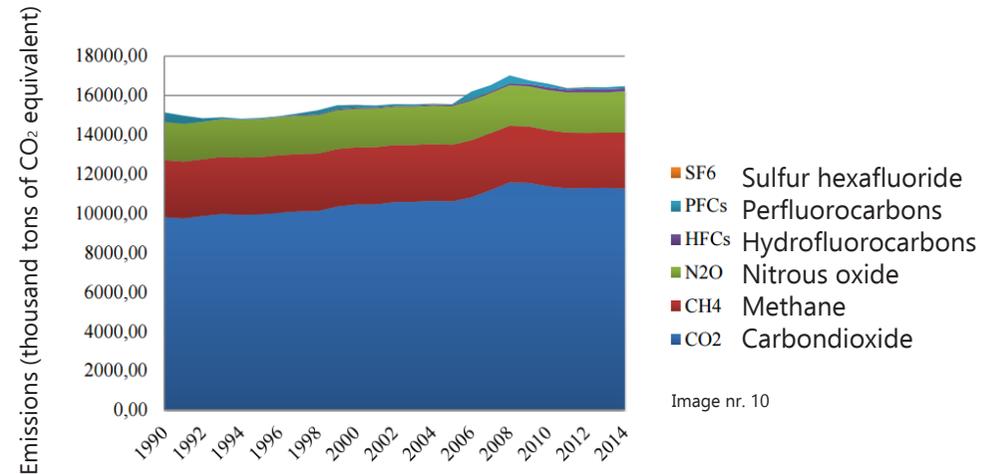


Image nr. 10

Greenhouse gas emissions by type from 1990 to 2014 with land use (LULUCF)

Some types of GHG warm the earth more than CO2. For instance, methane is roughly 30 times more potent as a heat-trapping gas.

The biggest culprit for Methane emissions are animal agriculture. The release of methane gas from ruminant livestock (sheep and cattle) is the largest contributor to GHG emissions. Methane also accounts for over 40% of all emissions in terms of global warming potential. Also, the draining of wetlands to provide land for grazing livestock releases CO2.

Perfluorocarbons (PFC), or Perfluorocompounds: Man-made replacement gases for CFCs but result also as a by-product of aluminium smelting. PFCs also used as a purging agent for semi-conductor manufacture and small amounts are produced during uranium enrichment processes. Global warming potential: 6,000 to 10,000 that of CO2. (3)

## Water in many forms



Geysir



Geysir



Námafjall hverir



Námafjall hverir



Strokkur



Lækur



Dettifoss



Háifoss



Lækur við Hlíð

"Protecting the nature heritage of Icelanders is a priority because nature is a strong part of our national identity and it is a source of unprecedented quality for economic, health and intellectual values. Icelanders also bear responsibility for the protection of the biosphere and the unique nature in various international agreements. Organized conservation, based on scientific assessment of the conservation value and protection of areas and organisms, is therefore an important part of Iceland's environmental policy and the government's work on environmental issues."

-bls 14 [https://www.umhverfisaraduneyti.is/media/PDF\\_skrar/umhverfiogaudlindir2009.pdf](https://www.umhverfisaraduneyti.is/media/PDF_skrar/umhverfiogaudlindir2009.pdf)



Geothermal Pool



Heydalur Geothermal Pool



Árbæjarlaug



Laugardalslaug



The Blue Lagoon Images nr. 11 - 24

## Climate in Iceland

The climate of Iceland is cold oceanic near the southern coastal area and tundra inland in the highlands. The island lies in the path of the North Atlantic Current (originally the Gulf Current), which brings warm ocean currents and makes its climate more temperate than would be expected for its latitude just south of the Arctic Circle. The weather in Iceland can be very variable and unpredictable.

### Winters

The Icelandic winter is relatively mild for its latitude. The southerly lowlands (Capital area) of the island average around 0 °C in winter because of the North Atlantic Current, while the Highlands of Iceland tend to average around -10 °C. The lowest temperatures in the northern part of the island range from around -25 to -30 °C.

### Summers

The average July temperature in the southern part is 10–13 °C. Warm summer days can reach 20–25 °C.[1] The highest temperature recorded was 30.5 °C in 1939. Annual average sunshine hours in Reykjavík are around 1300, which is similar to towns in Scotland and Ireland.

### Winds and storms

The prevailing wind direction is easterly. Westerlies are very infrequent. Generally speaking, wind speeds tend to be higher in the highlands, but topographical features can aggravate winds and cause strong gusts in lowland areas.

(The dynamic climate of Iceland [https://notendur.hi.is/~oi/climate\\_in\\_iceland.htm](https://notendur.hi.is/~oi/climate_in_iceland.htm))

Climate data for Reykjavík, Iceland (1961-1990)													
	January	February	March	April	May	June	July	August	Sept	Oct	Nov	Dec	Year
Average high °C	1,9	2,8	3,2	5,7	9,4	11,7	13,3	13,0	10,1	6,8	3,4	2,2	7,0
Average low °C	-3,0	-2,1	-2,0	0,4	3,6	6,7	8,3	7,9	5,0	2,2	-1,3	-2,8	1,9

Climate data for Akureyri, Iceland (1961-1990)													
	January	February	March	April	May	June	July	August	Sept	Oct	Nov	Dec	Year
Average high °C	0,9	1,7	2,1	5,4	9,5	13,2	14,5	13,9	9,9	5,9	2,6	1,3	6,7
Average low °C	-5,5	-4,7	-4,2	-1,5	2,3	6,0	7,5	7,1	3,5	0,4	-3,5	-5,1	0,2

Source #1: Icelandic Meteorological Office<sup>[2]</sup>



Tjörnir



Tjörnir

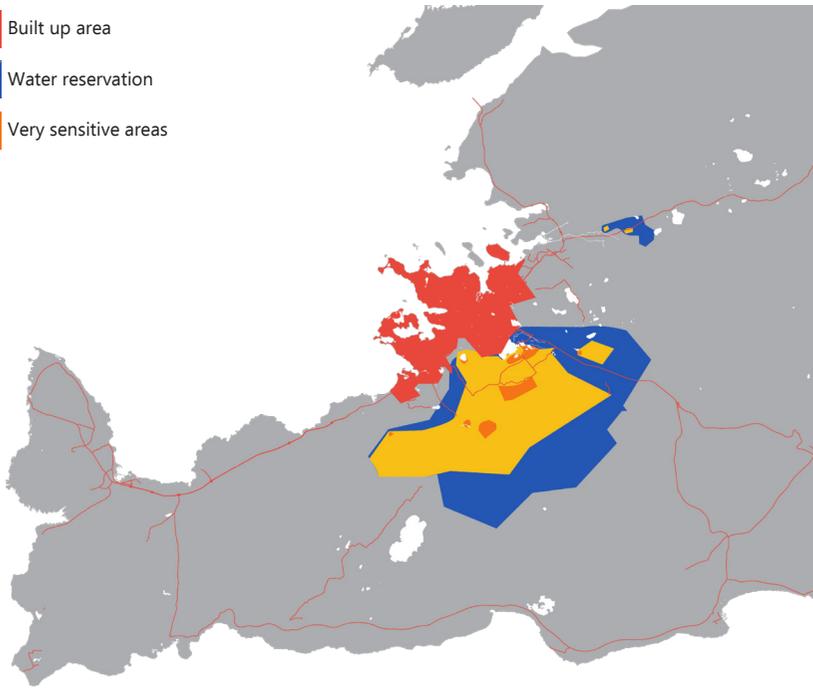


Laugavegur



## Water reservation

- Built up area
- Water reservation
- Very sensitive areas



Reykjavik uses cold water from a freshwater source on the outskirts of the city in Heiðmörk. The water is filtrated through lava fields but the area is covered in lavafields. The flow of fresh-water is 15 m3 per second. The city uses less than 10% of that water eventhough water usage per person is quite high, around 155.000 liters per year.

## Hot water source

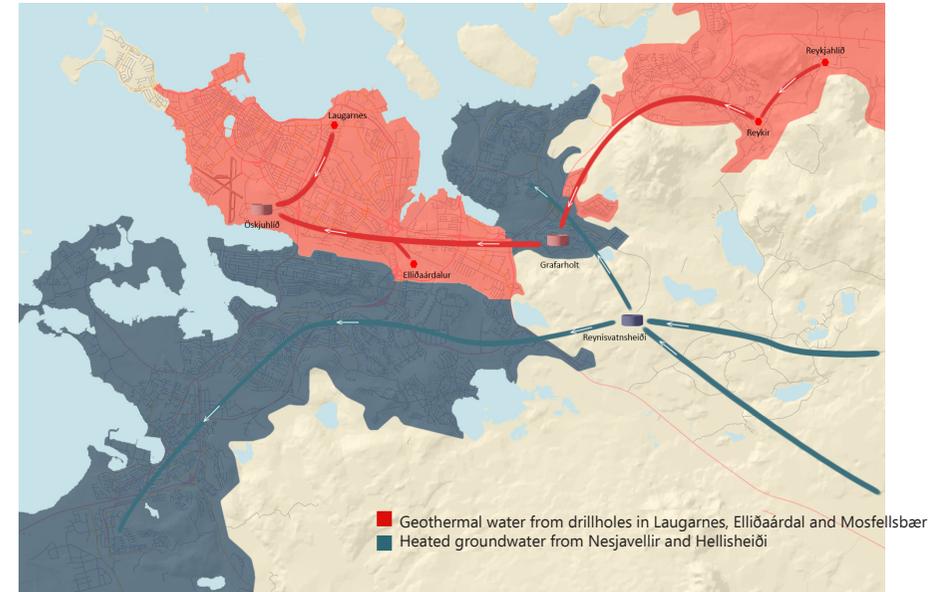


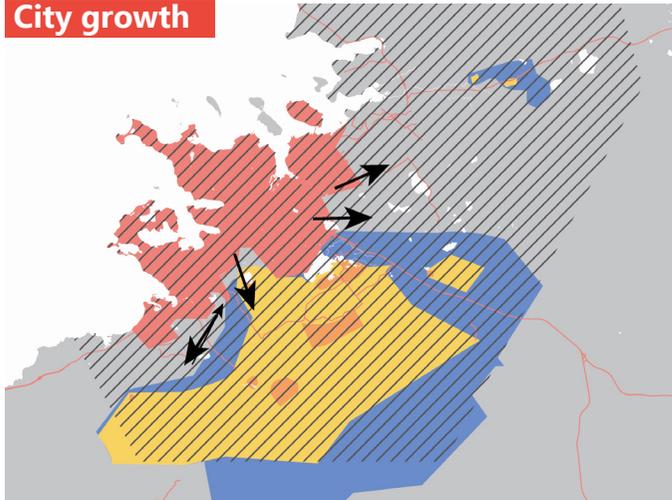
Image nr. 31

## Capital area vs. built up area

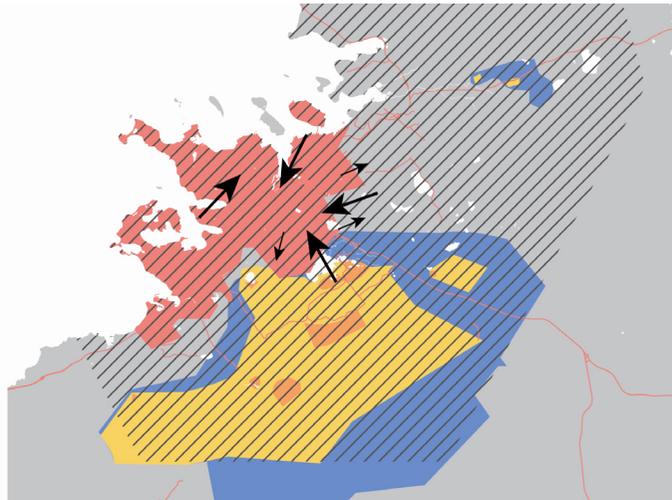
- Built up area
- Capital Area
- International airport



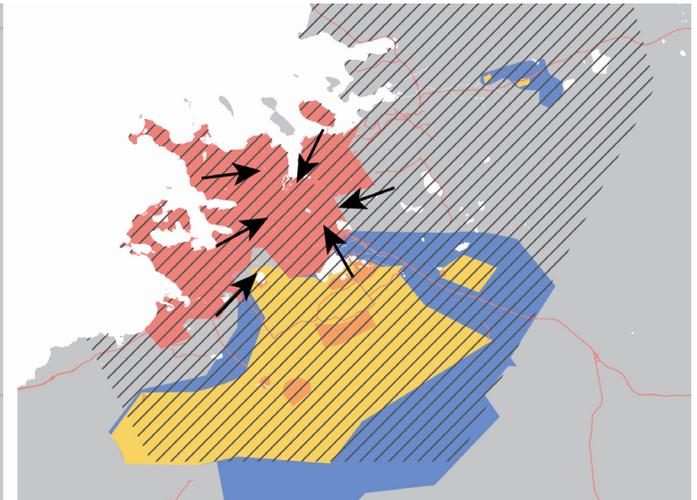
## City growth



The plan after 1927

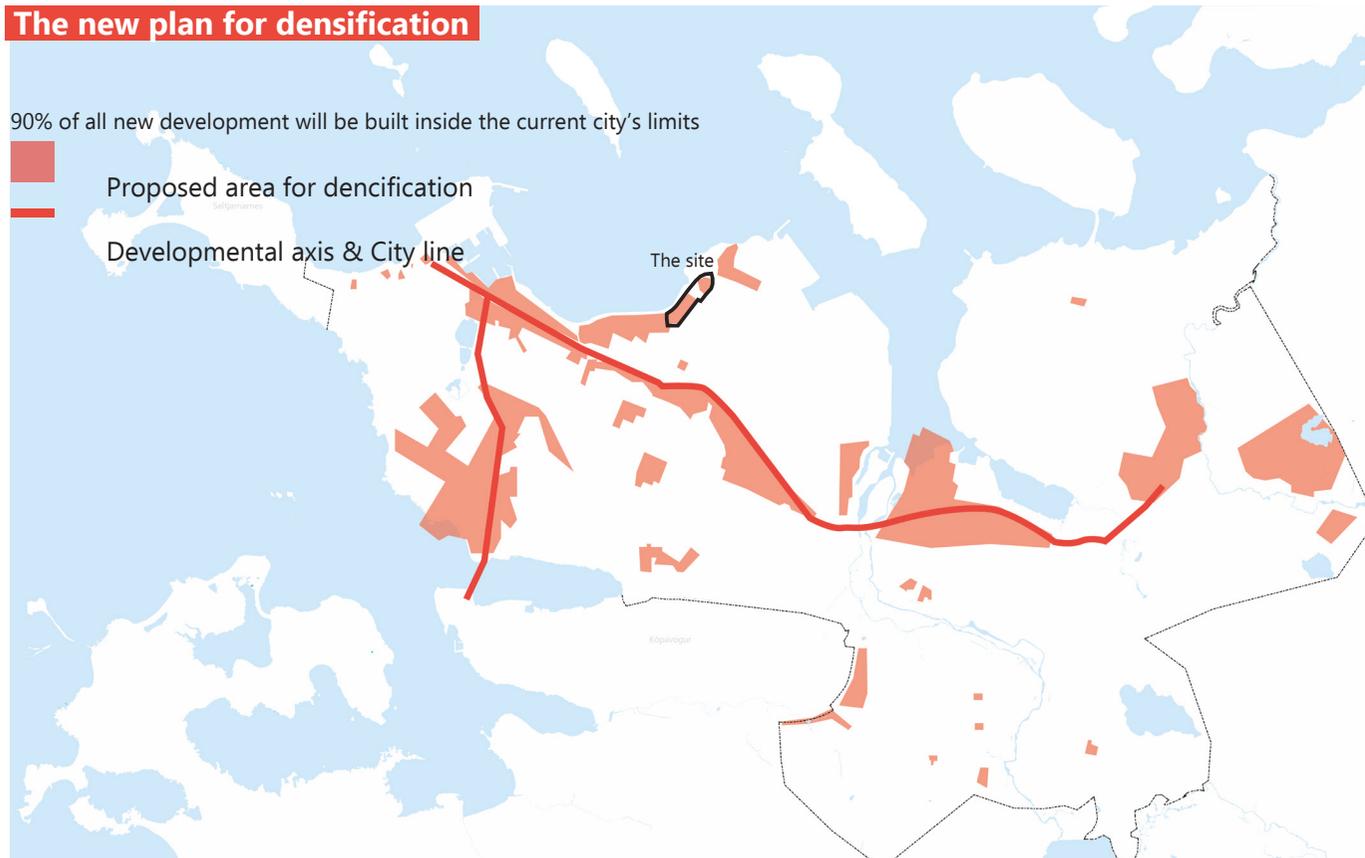


The new plan 2010 - 2030. 90% of development will be inside built area.  
The new government does not support this plan and will likely lower the number.

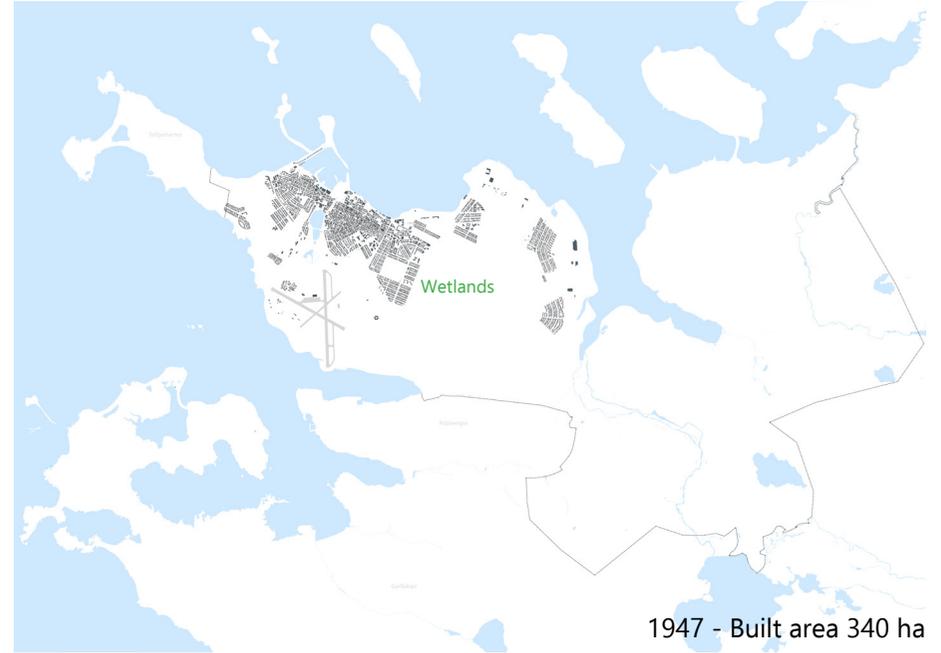


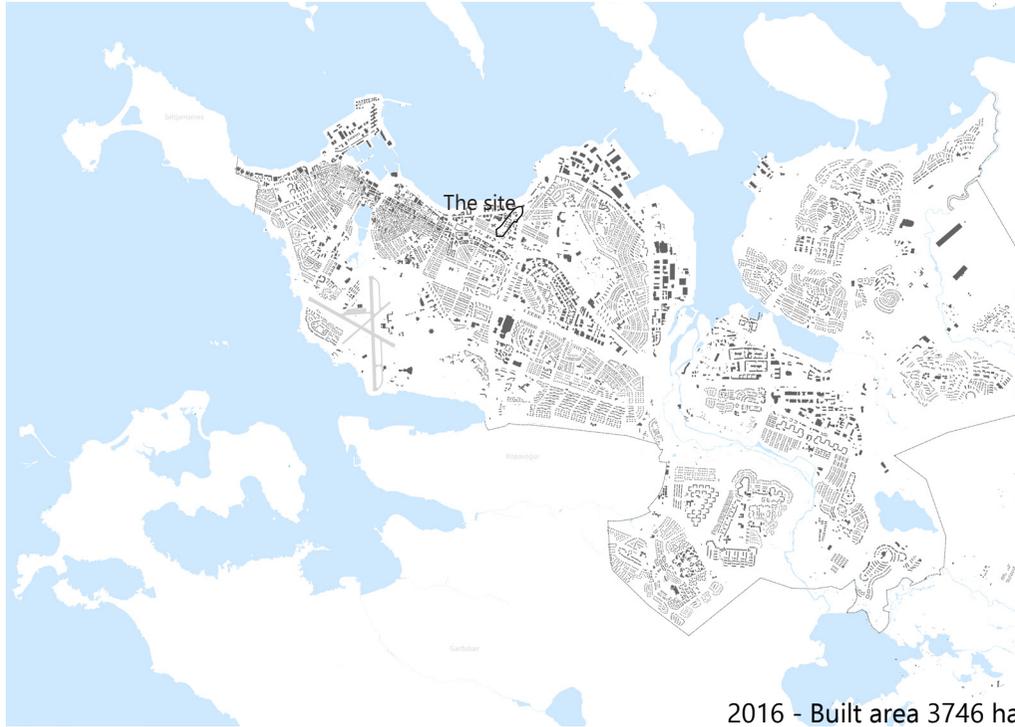
The proposed plan with 100% of development inside built area.

## The new plan for densification



## History of Sprawl in Reykjavik





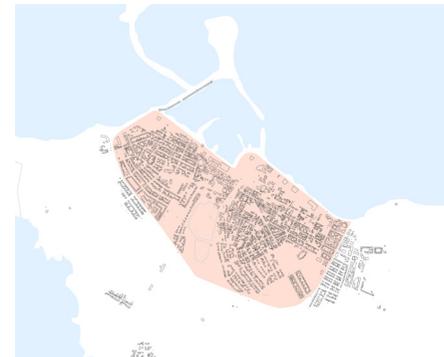
2016 - Built area 3746 ha

Reykjavík the capital of Iceland was established in 1786 and was just a small town with 6700 people in 1890. With more job opportunities that came with new fishing technology, more people moved to Reykjavík from the country side. The inhabitants almost doubled every 10 years in the last century with 210.000 inhabitants in the Capital area and the prediction of 50-75.000 more until 2040.

*"Outside the small historic centre Reykjavík is mostly high-density sprawl: apartment blocks oriented towards motorways or fast streets rather than pedestrian infrastructure or logical public transport paths. Many people in these towers can't even walk to a convenience store."*

*-public transport expert Jarrett Walker*

Until the 1940's Reykjavik was a dense European town. Every citizen lived within a walking distance from the centre. This was according to the 1927 city-plan about building dense inside the Ringroad (Hringbraut - now Hringbraut/Snorrabraut). The great fire in 1915 and poor sanitation standards made the decision to change to the Garden city ideology easy. Many kept large potato or vegetable gardens at the edge of the built up area and kept sheep and cows for domestic use. The garden city movement focused on the man living close to nature, with a view, plenty of sunlight and ventilation, as well as proper sewage and clean water. So the city began to separate its functions and building lowrise to allow for the sun to reach in. And with that the city spread out, avoiding wetlands so the city existed of spotty patches. In the 50's the systematic transportation ideology had its side effects as many old houses in Reykjavik were torn down during this time to make more space for the automobile. The idea was that every family would have a car so they could live in suburbs and drive to work. Then, instead of building around the city center, suburbs were built far away from the city and then later filling up the space in between. The sustainable Environment ideology - 1997  
It will be difficult to give up the comfort of a private car in harsh weather conditions in a city designed for cars.



Images nr. 32 - 35

# Reykjavík highlights



1940 British occupation



Post-war:  
Private cars take over  
Massive car infrastructure  
Suburbs are born

1986 Summit at Höfði  
Ronald Regan and Mikhail  
Gorbachev



Housing bubble 2006  
Economic crisis 2008



Images nr. 36 - 43



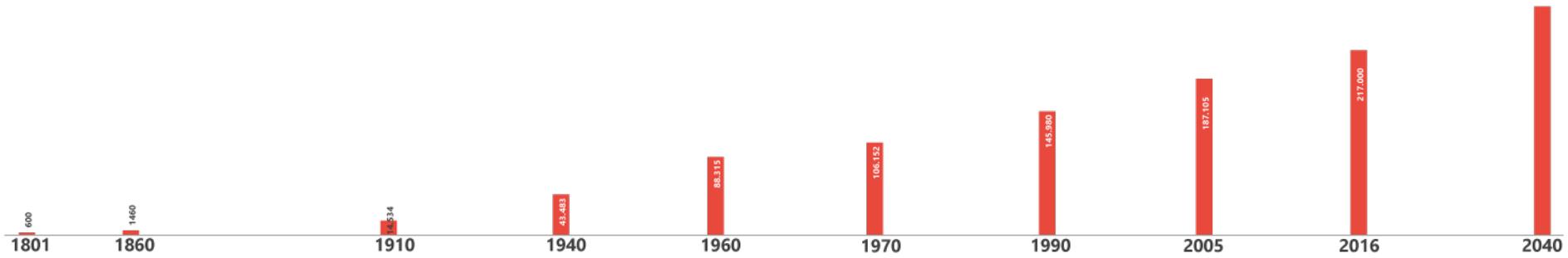
Fishing village

Home rule 1904  
Great depression 1929

Independance 1944

Economic boom  
Mass rural exodus

Sustainable  
development



## Population growth in the Capital

## Places of Interest



- 1. Universities
- 2. Heated beach
- 3. Sports facilities
- 4. Swimming pools
- 5. Parks
- 6. Botanical garden
- 7. Zoo and amusement park
- 8. Pond
- 9. Libraries

## Landmarks

- 1. Harpan Opera House
- 2. Hallgrímskirkja Church
- 3. Perlan restaurant
- 4. Town Hall
- 5. Höfði (Summit meeting between Regan and Mikhail Gorbachev)

Case study map



Image nr. 44

## 1 Framnesvegur 20-26



Burstabær

Images nr. 45 - 47

## 2 Norðurmýri



Images nr. 48 - 49

Dwelling/Ha	Pop/Ha	m <sup>2</sup> /Person	Pop/Dwelling
<b>67</b>	<b>178</b>	<b>32,8</b>	<b>2,67</b>

Dwelling/Ha	Pop/Ha	m <sup>2</sup> /Person	Pop/Dwelling
<b>54,5</b>	<b>99</b>	<b>21,15</b>	<b>1,8</b>

### Pros

Private entrance and garden  
Dense  
Lowrise  
Roofdesign lets sunlight into the garden  
10-15% more retail value on m2

### Cons

None

Ha: 0,18  
Population: 32  
Units: 12  
Pop/Ha Dencity: 178  
Building height: 2,5  
Age: 1922  
m2/pers: 32,8 m2  
pop/unit: 2,67  
Dwelling/ha: 67



### Pros

Dense  
Good microclimate  
Sunlight  
South facing private gardens  
Park, pool and hospital near by  
In the center but not noisy  
Mixed size of dwellings  
Many small dwellings  
Coherent in style, height and materials

### Cons

None

Ha: 12  
Population: 1188  
Dwelling: 655  
Building height: 2-3  
Age: 1938 - 1944



### 3 Skuggahverfi



Images nr. 50 - 51

Dwelling/Ha  
**209**

Pop/Ha  
**695**

m<sup>2</sup>/Person  
**38,9**

Pop/Dwelling  
**3,3**

#### Pros

Very high density  
High return for developers  
Views from dwellings

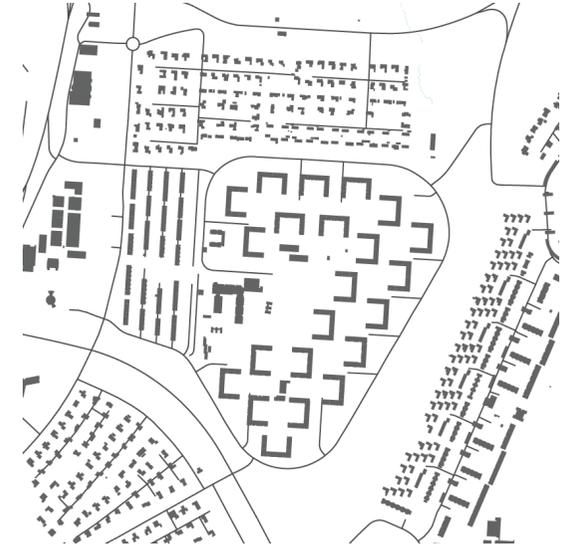
#### Cons

Cast long shadows  
Drag exelerated wind down to stree-  
tlevel  
Obstruct views and viewpoints  
Block sunlight



Ha: 1,46  
Population: 1015  
Dwellings: 305  
Building height: 6-20  
Age: 2006 - 2014

### 4 Bakkar



Images nr. 52 - 54

Dwelling/Ha  
**52,8**

Pop/Ha  
**144**

m<sup>2</sup>/Person  
**32,2**

Pop/Dwelling  
**2,74**

#### Pros

Affordable housing  
Sheltered courtyards  
Many green spaces  
School  
Pedestrian and bikepaths separated  
from car traffic  
Dense lowrises, 2-3 storeys

#### Cons

Monotone architecture  
Many parking lots  
Isolated from the rest of the city

	Rowhouses	U-blocks
Ha:	6,2	25
Population:	284	3614
Units:	120	1320
Pop/Ha Dencity:	45,8	144
Building height:	2	3
Age:	1974	1969
m2/pers:	89,4	32,2
pop/unit:	2,36	2,74
Dwelling/ha	19,3	52,8



## 5 Flyðrugrandi



Images nr. 55 - 56

Dwelling/Ha

**62,5**

Pop/Ha

**107**

m<sup>2</sup>/Person

**49,5**

Pop/Dwelling

**1,7**

### Pros

- High density
- High return for developers
- Views from dwellings
- Affordable housing
- Lowrise 5 floors
- Sheltered garden
- Southfacing garden and balconies
- Stepdesign so every apartment gets plenty of sunlight

### Cons

To much parking space 0,7 ha



Ha 2,3  
Population 246  
Dwellings 144  
building height 5  
Age 1979

## 6 Austurbrún 2-4-6



Images nr. 57 - 59

Dwelling/Ha

**92,1**

Pop/Ha

**99,6**

m<sup>2</sup>/Person

**44**

Pop/Dwelling

**1,08**

### Pros

- High density
- High return for developers
- Views from dwellings
- Affordable housing
- Built on a hill - does not obstruct neighbors view
- Shared top floor - laundromat
- Lottery when flats were first bought

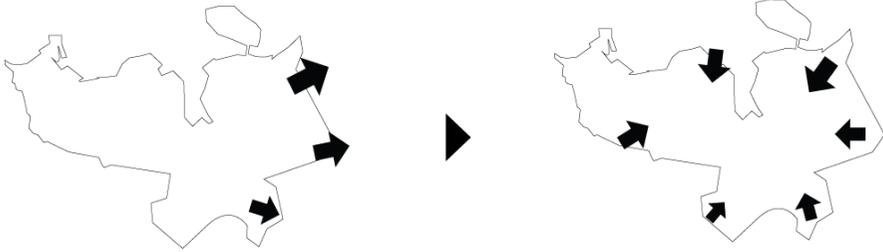
### Cons

Cast long shadows on own lawn  
Drag exelerated wind down to street-level

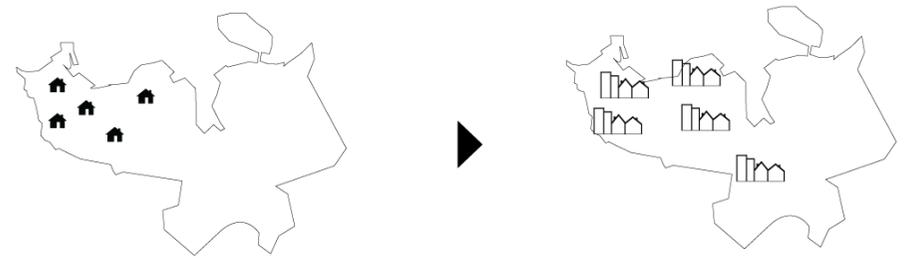
Ha: 2,28  
Population: 227  
Units: 210  
Building height: 13  
Age: 1961



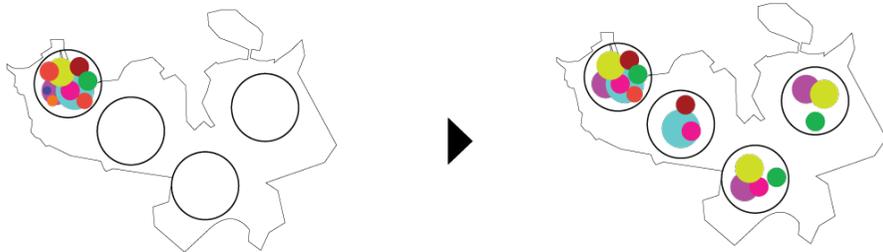
## Design strategies - City scale



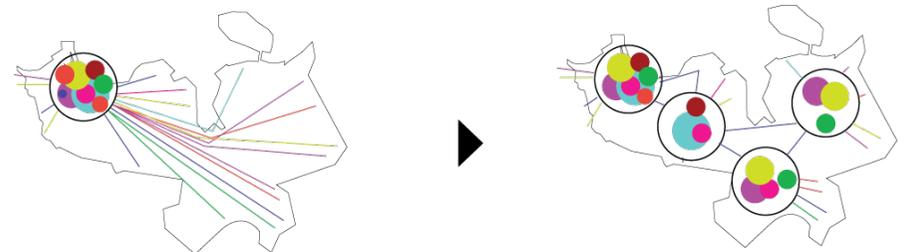
Stop urban sprawl by densifying within the built up area



Build dense, diverse and mixed use neighborhoods

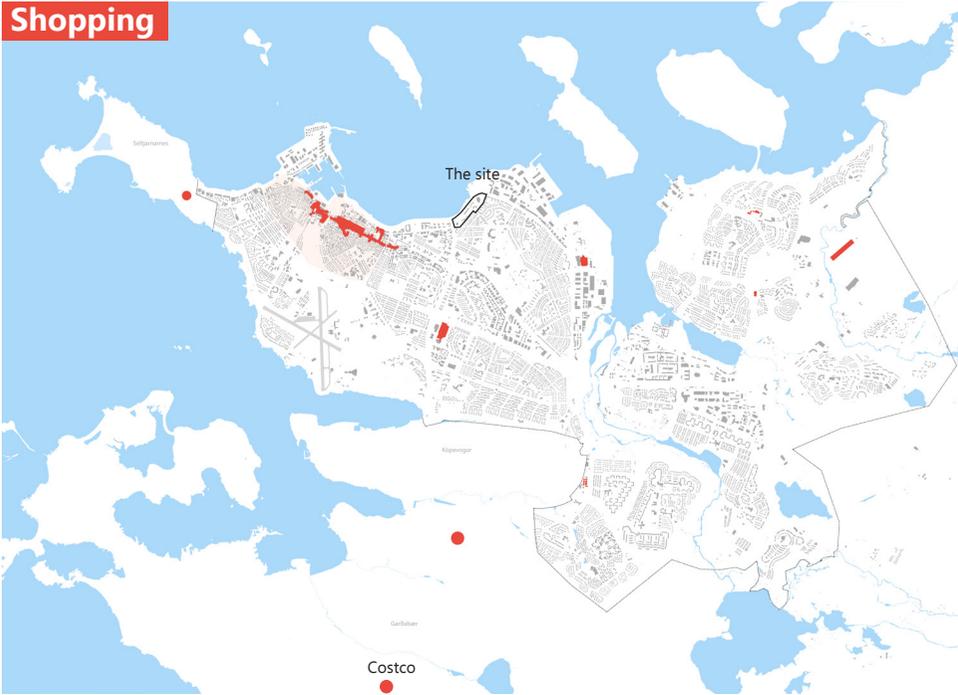


Strengthen neighborhood cores and urbanize the suburbs



Shorten distances from work to home

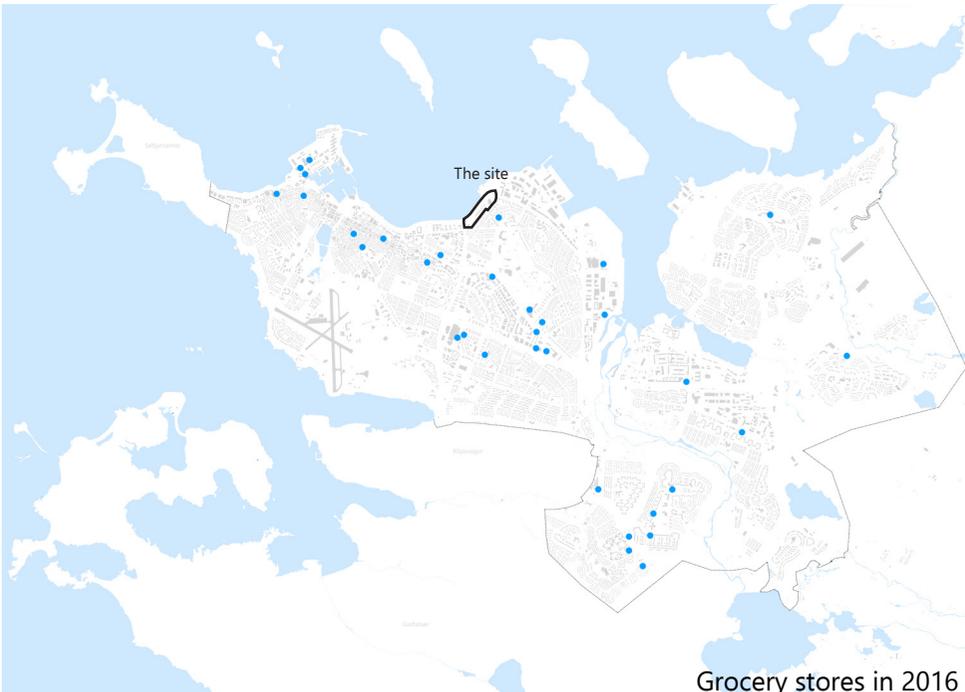
# Shopping



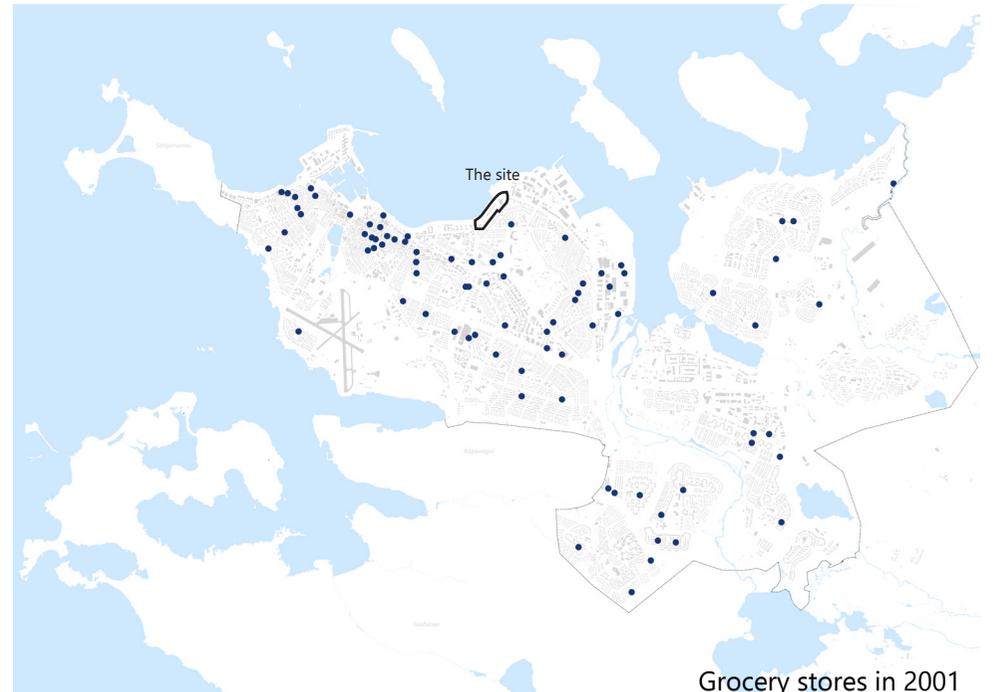
Strengthen neighborhood cores and urbanize the suburbs

Shorten distances from work to home

Dwindling services outside city center. Small grocery stores are going out of business and the main grocery store chain is closing the small stores and opening bigger ones on the outskirts. Large shopping malls with huge parking lots. This development makes the citizens car dependent and lengthens distances that people have to travel daily.



Grocery stores in 2016



Grocery stores in 2001



# The Site

Distance to center



## Parking lot



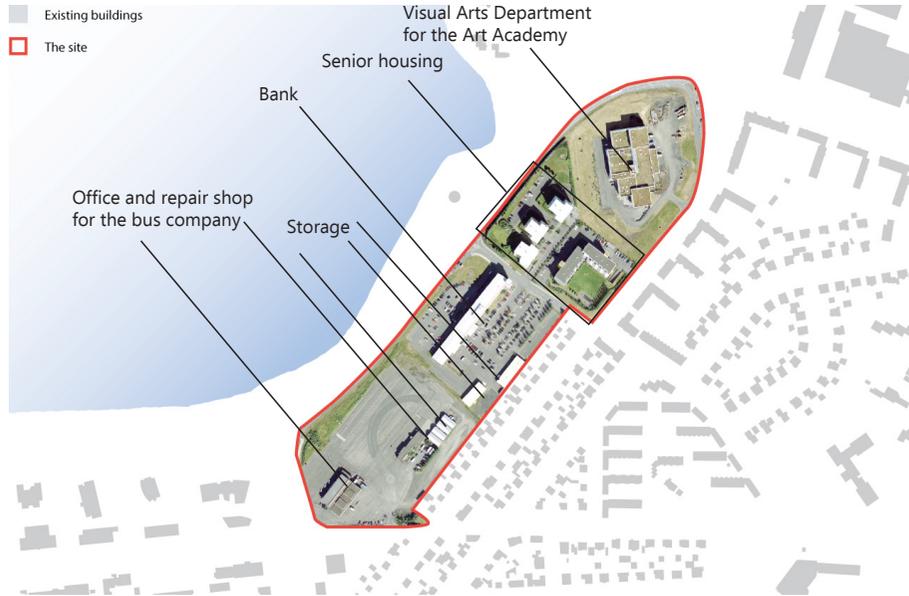
## The site from air



## Panorama of parking lot



# Site Analysis



Current situation



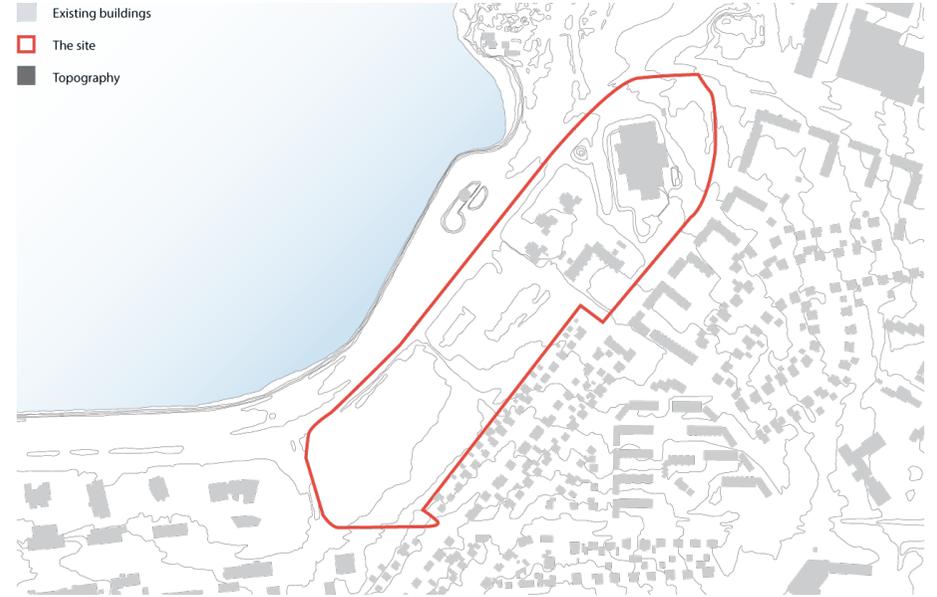
Functions on site



Functions



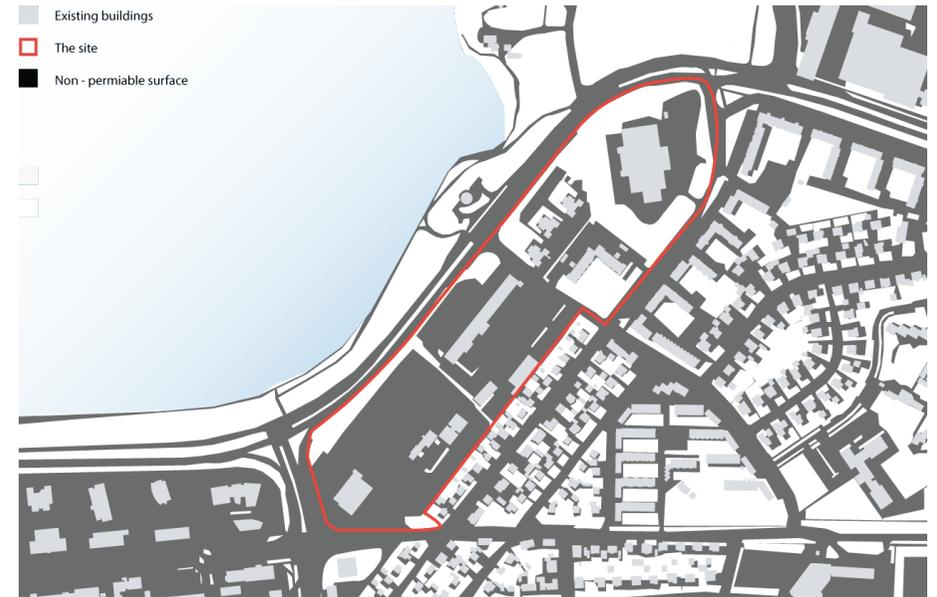
Topography



Topography



Permeable surfaces



Non-permeable surfaces

# Site Analysis



Infrastructure



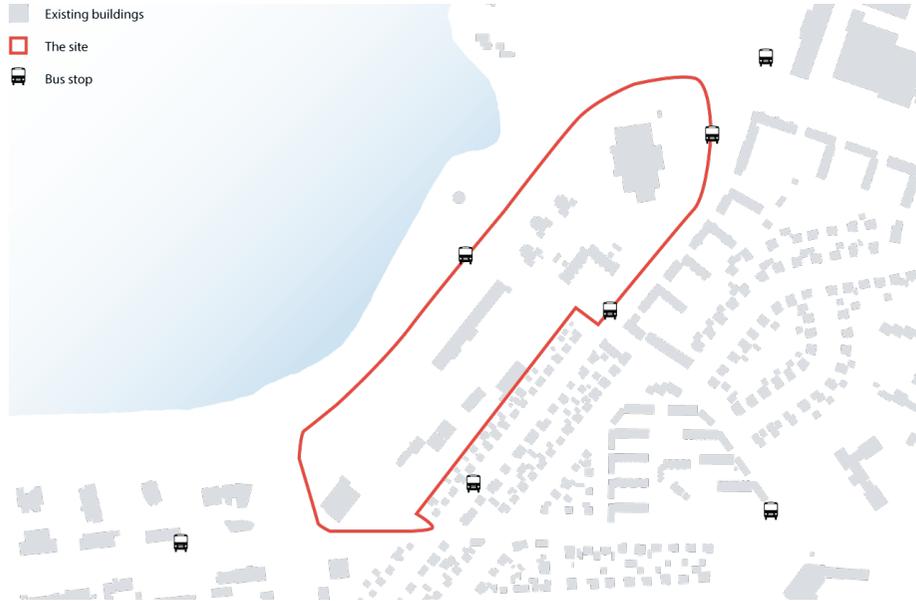
Highway and streets



Car access



Pedestrian connection



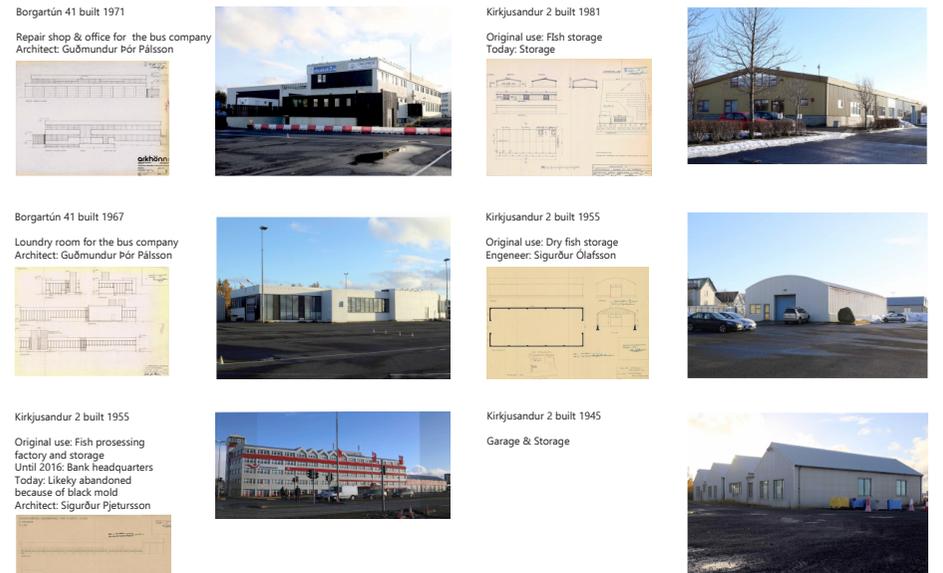
Bus stops



Buildings removed



Pedestrian connection



Images nr. 65 - 75

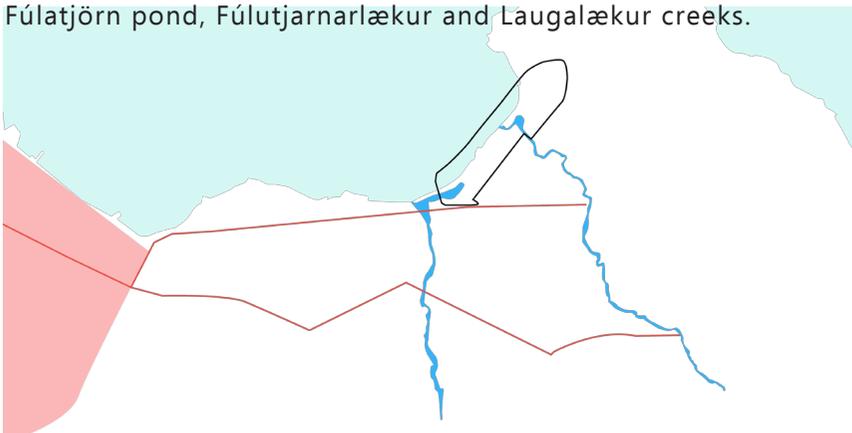
Buildings removed

## Site Analysis - Historical layer

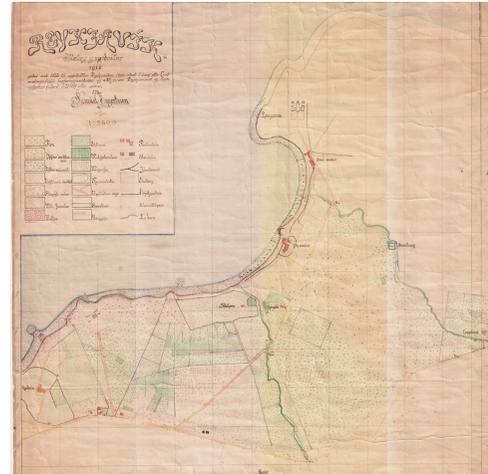
Over 50 years ago, Kirkjusandur had 2 creeks running through it out to sea. The creeks were a nuisance at the time, especially for the women that washed clothes for a living in the hot springs in Laugardalur. It was dirty, difficult and sometimes dangerous to cross the creeks. Today, ponds, creeks and waterfeatures bring us joy, recreation and peace of mind and they make a place. Today they have value and it is important to know the history of the place.



Fúlatjörn pond, Fúlutjarnarlækur and Laugalækur creeks.



The two ponds and creeks were filled up in 1949 (Laugalækur) and 1957. The pink is the center and the red lines are possibly the two routes women walked every day to get to the hot springs to wash clothes and linen at "Þvottalaugarnar". After washing in the boiling water, the laugalækur creek was used to rinse the clothes. It was warm because the hot geothermal water would mix in.



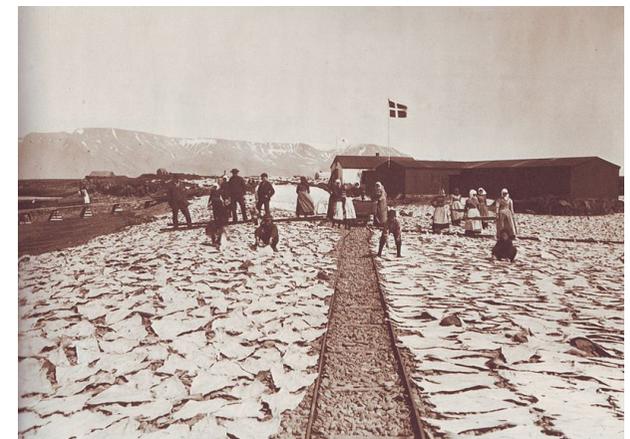
Drying fish at Kirkjusandur

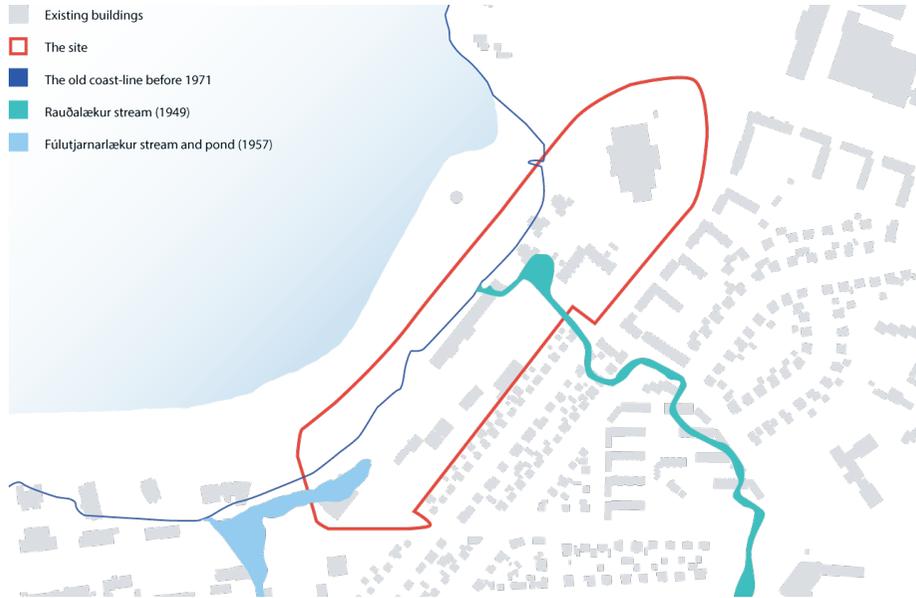


Swimming lessons at Laugalækur pond



Þvottastöðvar





Ponds, creeks & old coastline



Historical relics.  
Houses used for fish processing and drying, traintracks and a pier



Historical preservation



Future public area

# Site Analysis



## Natural processes to treat stormwater

To infiltrate, harvest, reuse, recharge and evaporate water by using soil, topography, vegetation and engineered materials to soften the impact of urban development on water resources and ecosystems in cities

Benefits: Stormwater treatment, flood control, carbon sequestration, habitat creation, recreation value and aesthetics.

**Rain gardens** Water is stored in a depression and will slowly be absorbed into the ground. Are sometimes connected to sewer systems through an overflow structure. Improves water and air quality; aesthetically pleasing; reduces runoff volume

**Permeable paving** Made up of porous surface and an underlying aggregate layer temporarily storing water until it is absorbed into the ground reduces runoff volume and attenuates peak flows; improves water quality by reducing fine-grained sediment, organic matter and trace metals

**Flow through planter** Planters rely on evapotranspiration (water uptake by plants) and short-term storage to manage stormwater. They do not infiltrate runoff into the ground.

**Green roof** reduces the volume and velocity of stormwater runoff from roofs by temporarily storing stormwater. Provides added insulation and noise reduction compared to conventional roofs; increases biodiversity and habitat and provides aesthetic amenities

**Constructed wetland** provides flood attenuation and reduces stormwater peak flows; highly effective at removing stormwater pollutants; provides valuable wetland habitat and community and aesthetic amenities

**Creek Daylighting** Creek daylighting refers to uncovering and restoring natural creeks, streams and rivers that were previously buried in underground pipes or culverts, or otherwise removed from view. Daylighting historic creek channels can decrease demand on treatment facilities and enhance local neighborhoods. Provides flood attenuation and reduces stormwater peak flows; highly effective at removing stormwater pollutants and recharging groundwater; provides valuable habitat and community and aesthetic amenities

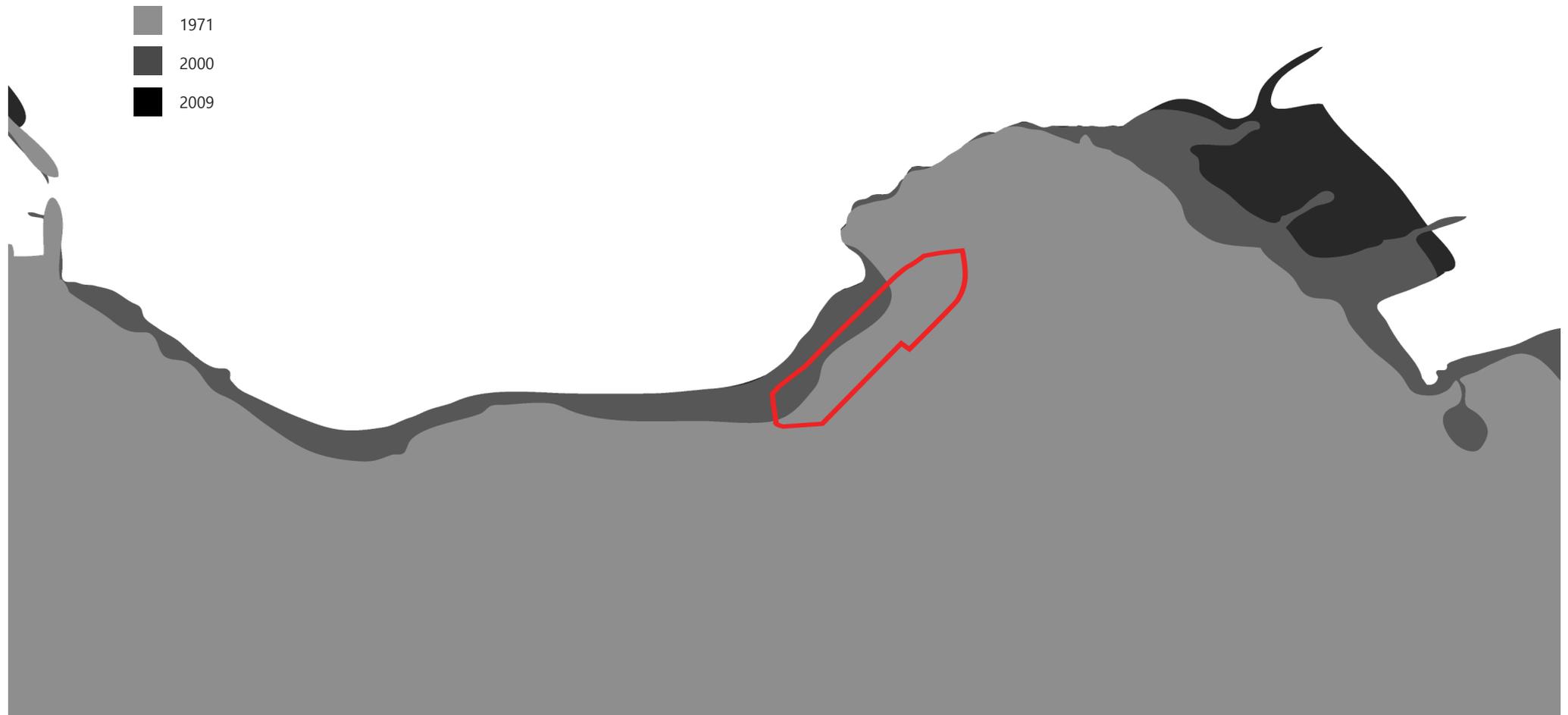
**Swales** are shallow, broad and vegetated channels designed to store and/or convey runoff and remove pollutants. They may be used as conveyance structures to pass the runoff to the next stage of the treatment train and can be designed to promote infiltration where soil and groundwater conditions allow.

## Wet and dry basin

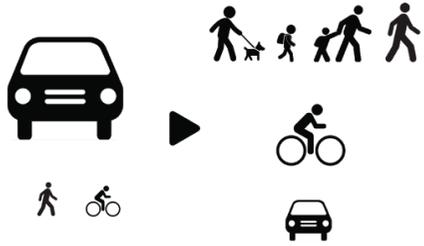
Ponds and wet basins are earthen depressions constructed with a substantial permanent water pool to provide both temporary and long-term storage of stormwater runoff, and they can be used to attenuate peak flows and provide Water Quality treatment through both pollutant removal and slow release. Wet basins can also achieve minimal volume reduction through evapotranspiration. (6)

## Landfil

A big part of the material in landfil comes from the ocean floor in Kollafjörður and taht has been going on for 40 years.



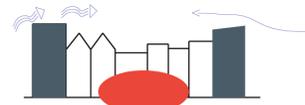
## Goals



Create walkable and pedestrian friendly neighborhoods



3 generations living in the same neighborhood

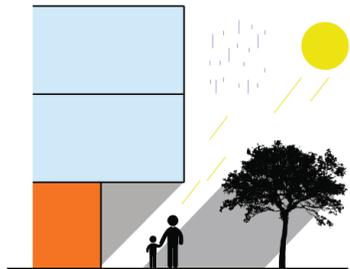


Create public space, densify and mix functions



Design for a more sustainable lifestyle  
Consume less to reduce waste

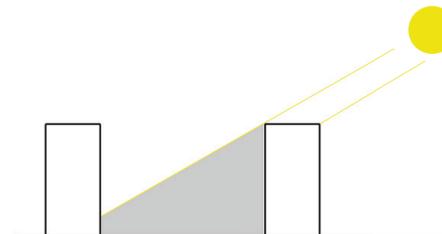
## Design strategies



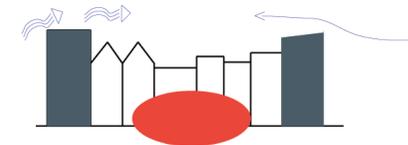
Buildings designed at street level to shelter from the weather



Use vegetation as a wind breaker



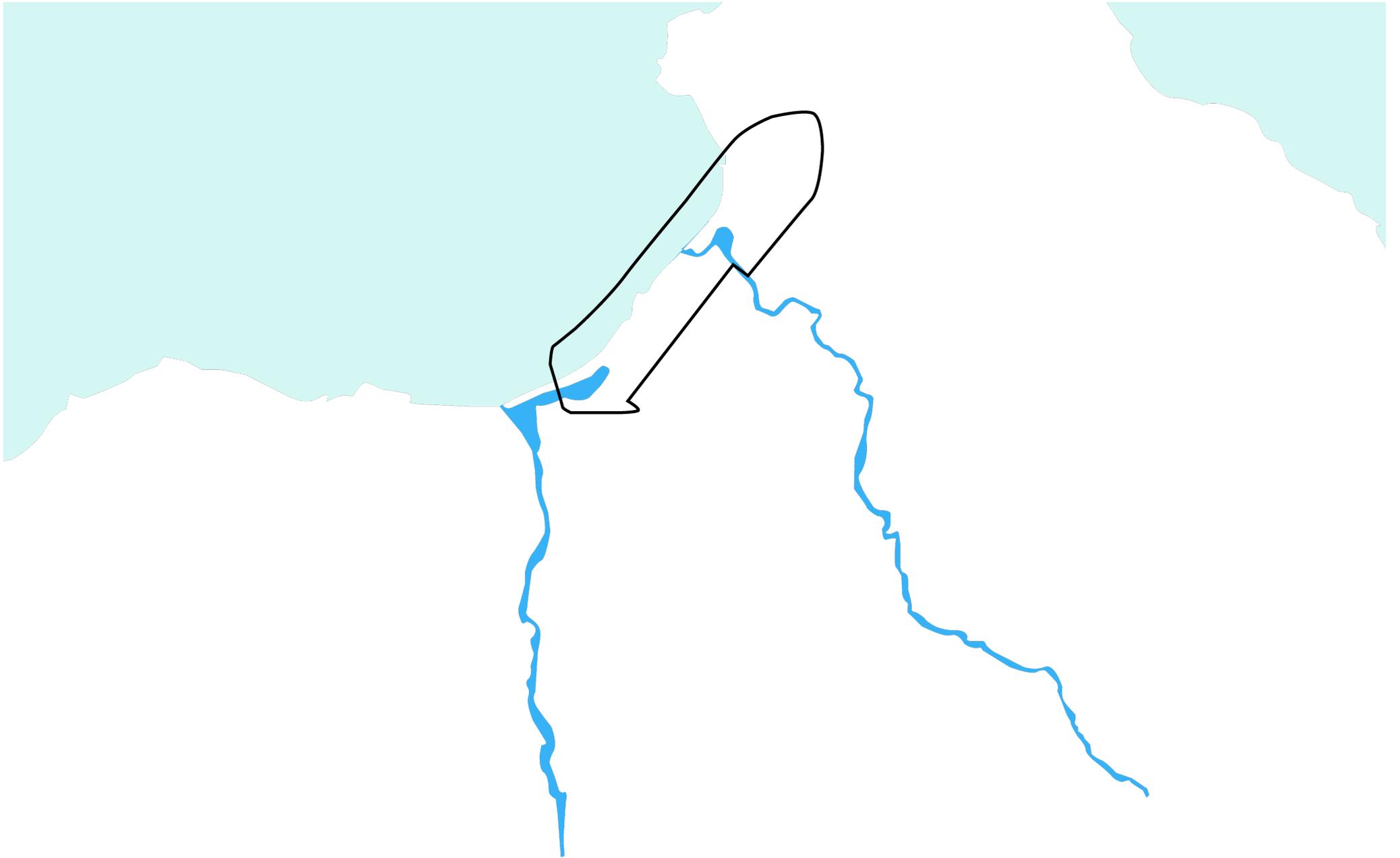
Sun's low angle in Iceland for the most part of the year. Highrises cast long shadows



Use dense housing to shelter outdoor space



# The vision



### **Kirkjusandur neighborhood.**

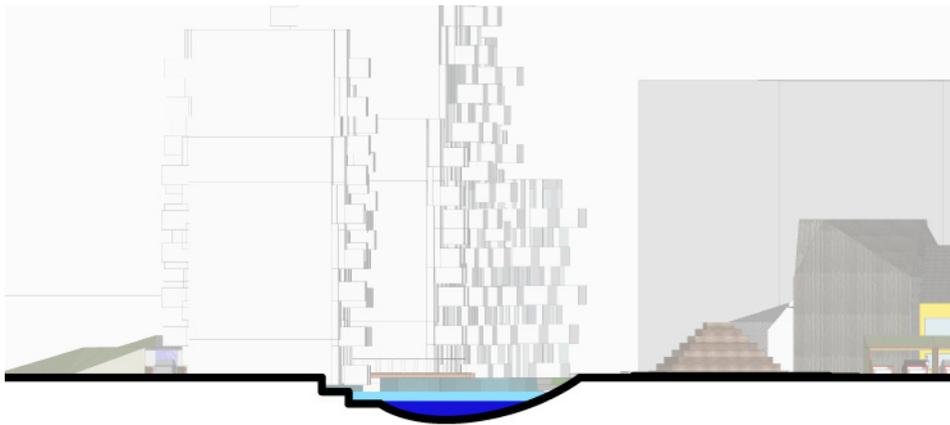
Kirkjusandur is a place that respects the past but is reaching out to the future. It is a place where different types and sizes of families can live together with senior citizens and individuals that want to live in a new way, a minimalistic way, a sustainable and compassionate way where everything is utilized, shared, fixed and eventually recycled. It gives people opportunities to follow their passion, start a business, work of dept, save up money, start a new life etc while living in the affordable micro apartments. It is a place that offers the most important things in life; Shelter, Food and Love. When you have these things you can go for the next important things; Passion and Purpose.

## Implemented water management

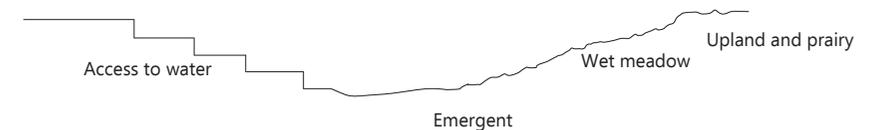
The historic water sources will be dug up and led by creeks, swales, open and closed gutters to the two ponds. From the ponds, the water will run into the retention basin with different levels of water or dry and from there out to sea.

By doing this we bring back water qualities, reconstruct historical features and utilize a clean water source in a positive way instead of leading it into the sewage where it mixes with blackwater and then has to be pumped and cleaned before going into the ocean.

The stormwater that collects in the ponds and basin can be used for example in agriculture. Today the city only uses 10% of its fresh water resources but it will increase in the future so it is beneficial to introduce other ways of recycling stormwater.



Different levels of water in basin, sometimes dry with wetland vegetation



Different vegetation for wet and dry parts of basin



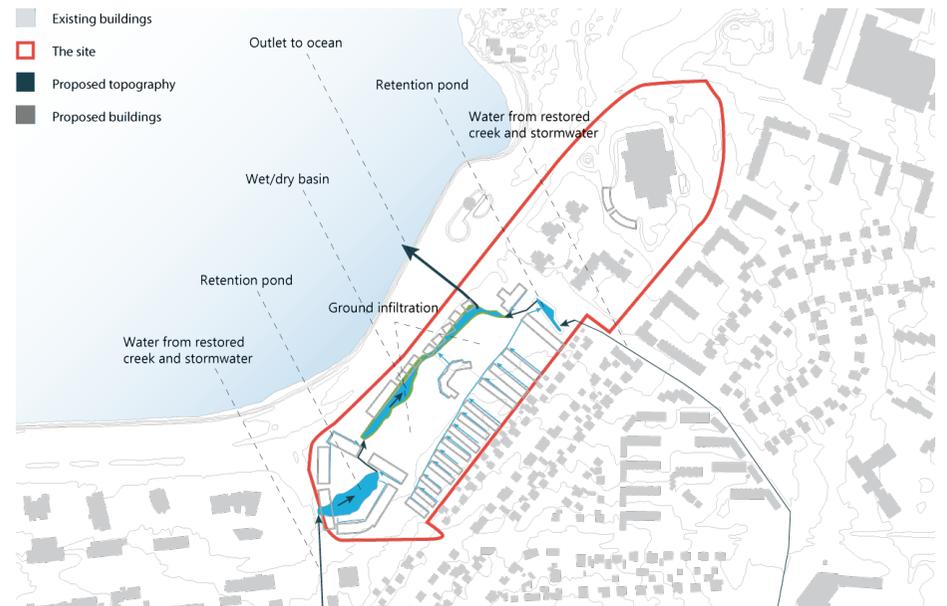
Proposed topography



Water brought back

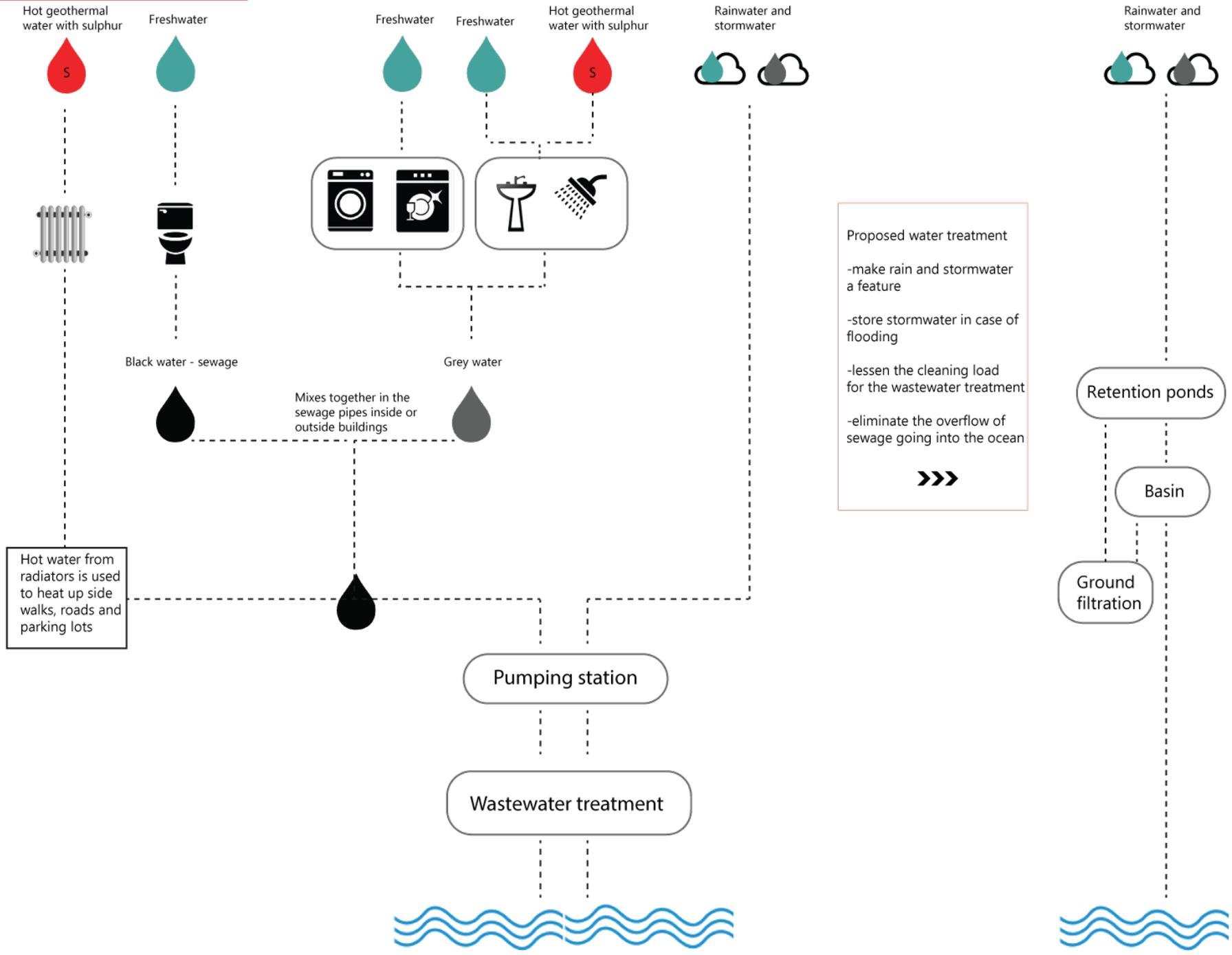


Watersource of creeks dug up. led into ponds, then basin and out to sea



Water Management

# The route of water in the Capital



	White water	completely clean, fresh and potable
	Rainwater	Rainwater run-of of a clean surface like a roof
	Stormwater	Rainwater run-of from roads, parking etc, not clean surfaces
	Greywater	Water that has been through a home once. Can be filtered and reused
	Blackwater	Heavily polluted water by chemical and biological contaminates
	Geothermal water	Hot water pumped from drillholes, contains minereals like sulphur

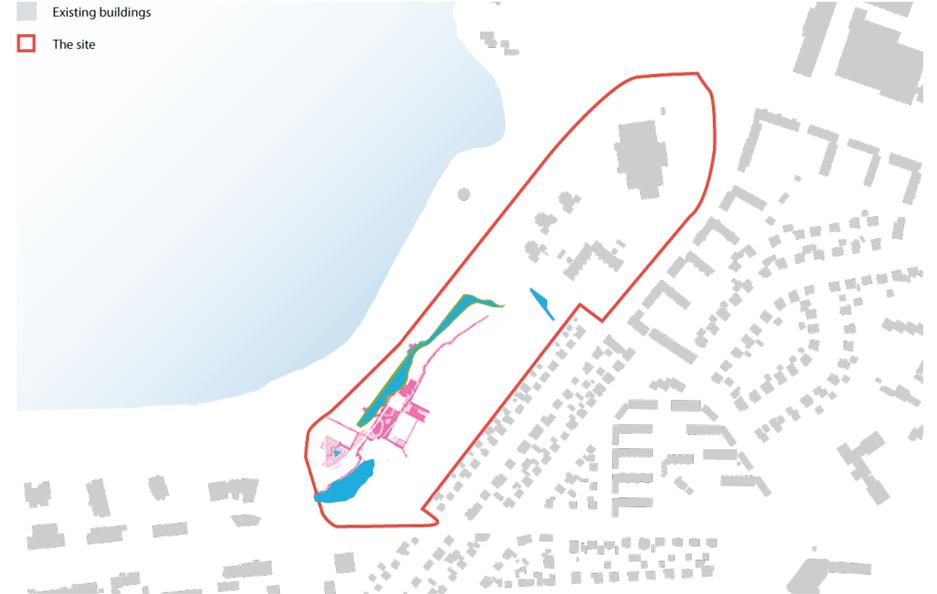
# Proposed Masterplan: Supporting Diagrams

- Existing buildings
- The site
- Proposed public area



Proposed Public Area

- Existing buildings
- The site



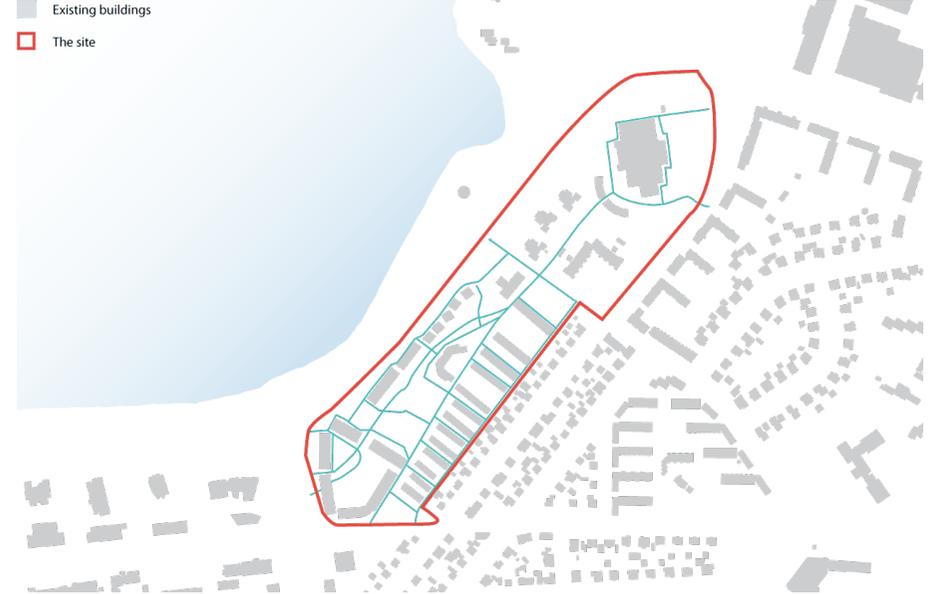
Urban Space and Square

- Existing buildings
- The site



Playgrounds for all ages

- Existing buildings
- The site



Pedestrian movement



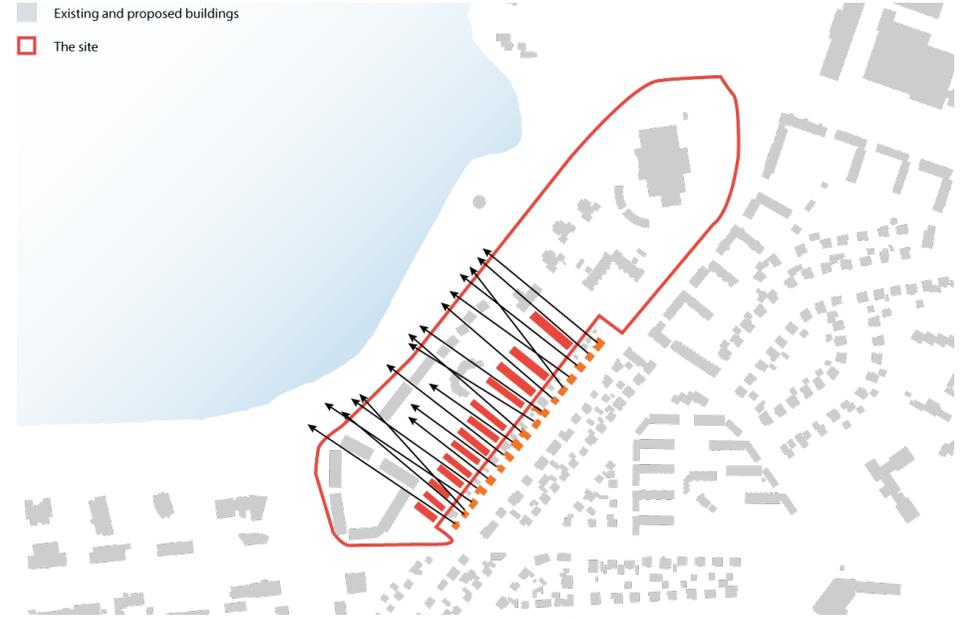
# Proposed Masterplan: Supporting Diagrams

- Existing and proposed buildings
- The site



Existing houses with a great view out to sea

- Existing and proposed buildings
- The site



Build 3 storey high rowhouses

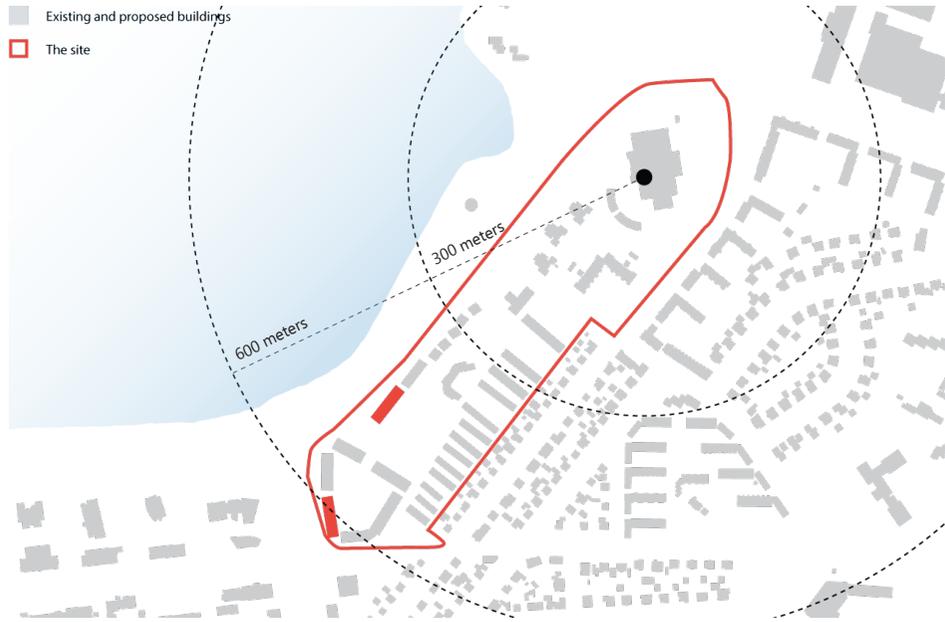
- Existing and proposed buildings
- The site



Build a porpus colonnade of buildings to keep views but also protect from wind and traffic

- Existing and proposed buildings
- The site

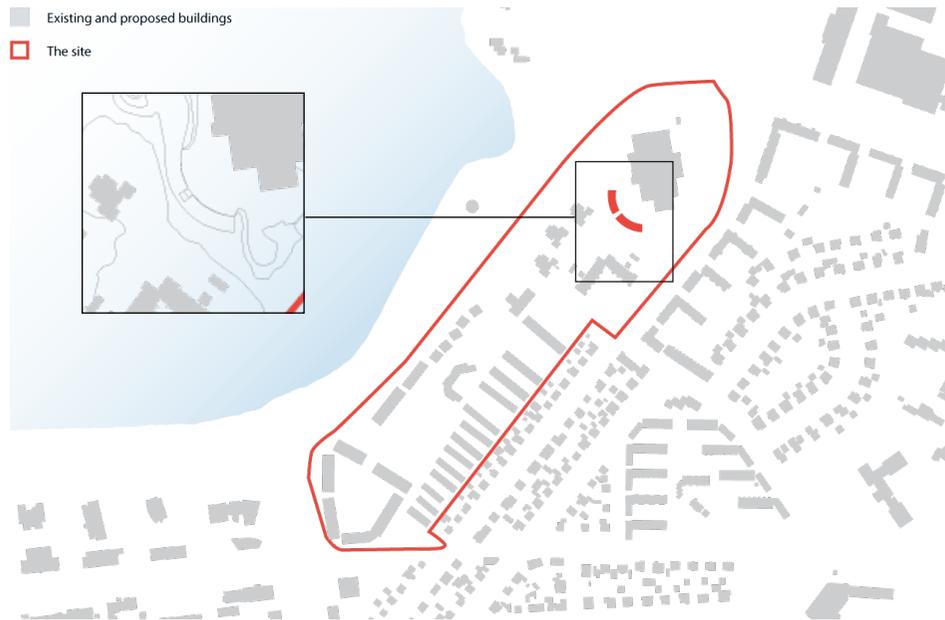




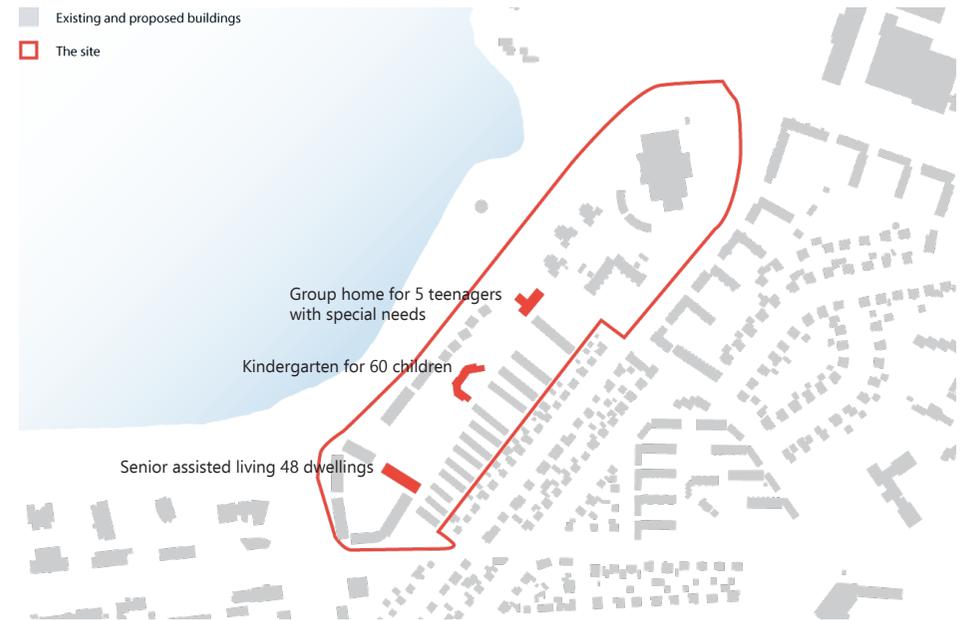
Micro apartments with workspace and cafe on ground floor.  
Distance shown to the art school with a proposed coffee and art gallery



Offices on the corner of the highway



Build into the contour lines



Institutions

# Proposed Masterplan: Supporting Diagrams

- Existing and proposed buildings
- The site



Urban Agriculture

- Existing buildings
- The site



Movement for cars and car access in orange.

- Existing and proposed buildings
- The site

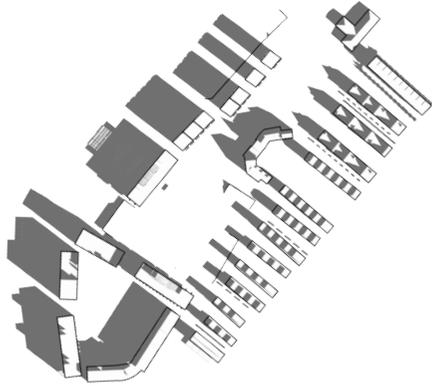


Fast track for bicycles

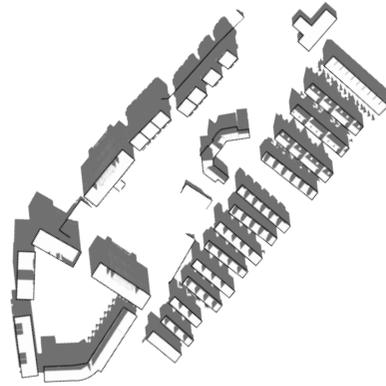


Parking

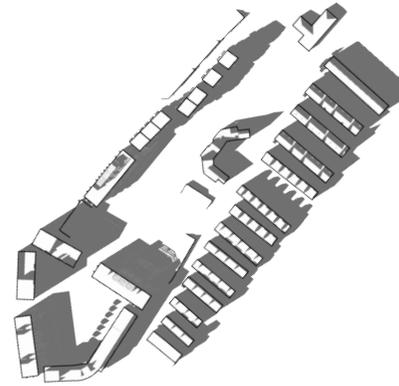
# Shadows



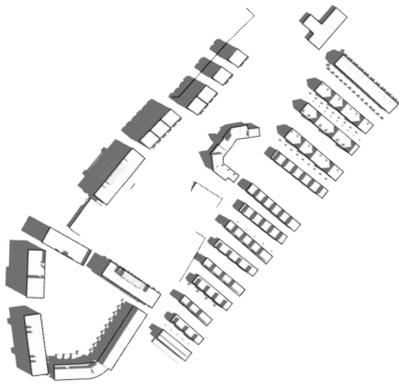
21. march at 9 am



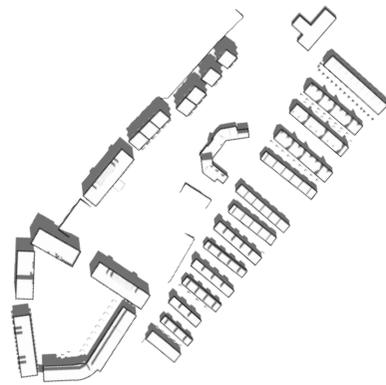
21. march at 12 noon



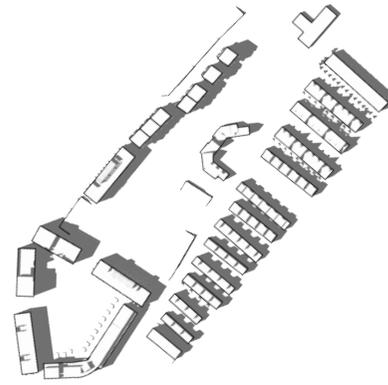
21. march at 4 pm



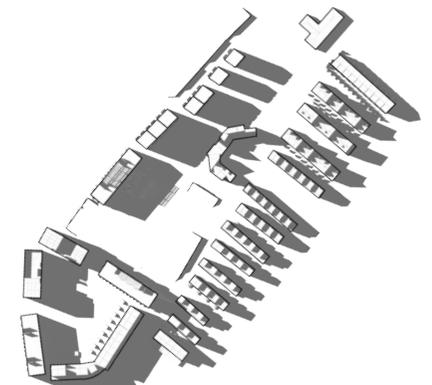
21. june at 9 am



21. june at 12 noon



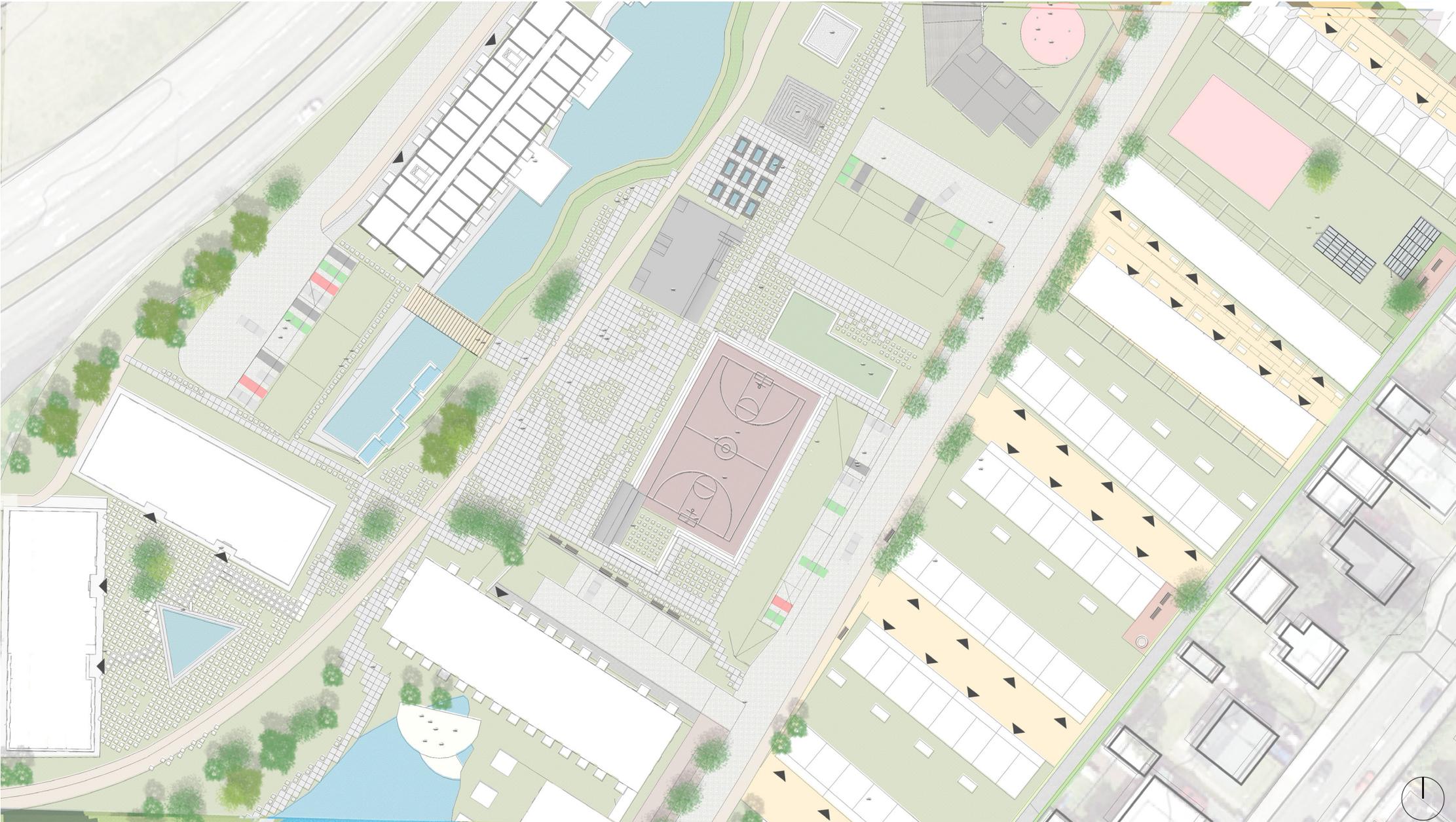
21. june at 4 pm



21. june at 7 pm



Detailed Plan



Looking north west over the square



The new square and sports facilities will create a place for new and existing residents to come together, as well as the rest of the citydwellers.

Looking east down the shared street and over the square



The wet dry basin with a high level of water

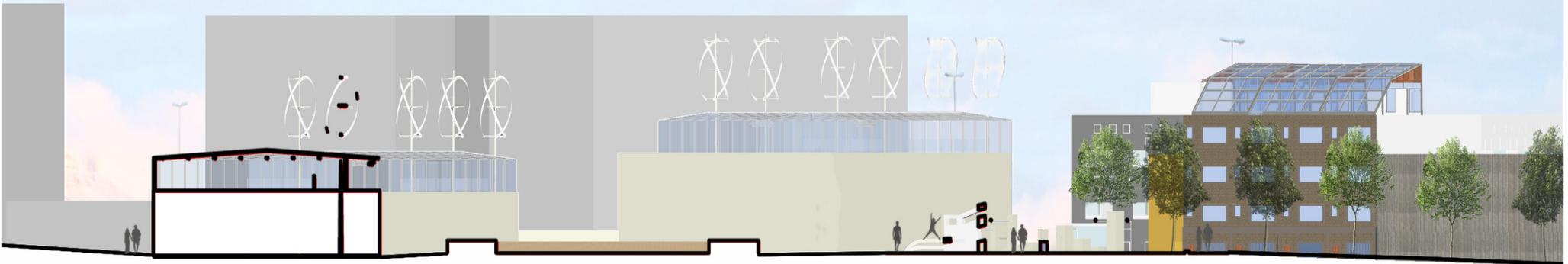


The old coastline is dug up and turned into a wet basin that has a sloping natural side with wetland vegetation on the west side and an artificial feel to the other side since it is artificial land (landfill).

Zoom-in on urban elements in the square



Section A-A



Greenhouses and windturbines added on top of 2 electrical distributors

Bicycle pump track and a parkour park placed in the driveway and the car access is moved on the

The face of the neighborhood. Samples of everything; the pond, microhousing, offices, apartments and rooftop greenhouses.



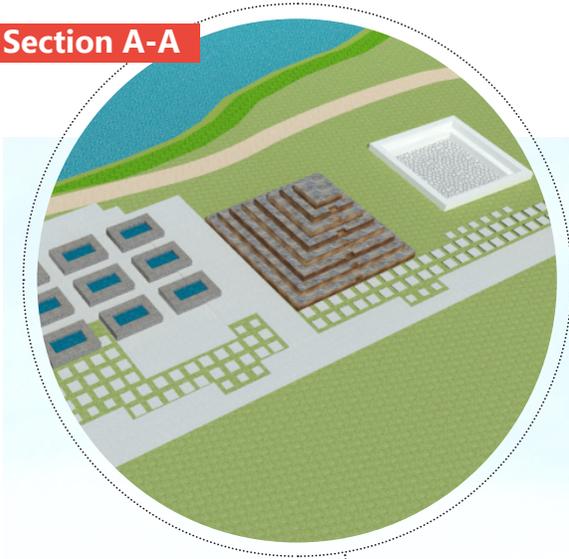
Business on the first floor to connect to the business district

Dence rowhouses

Different styles, sizes and materials offer

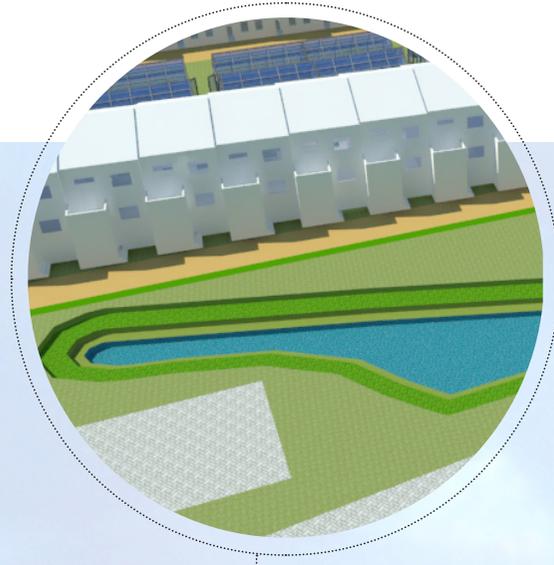
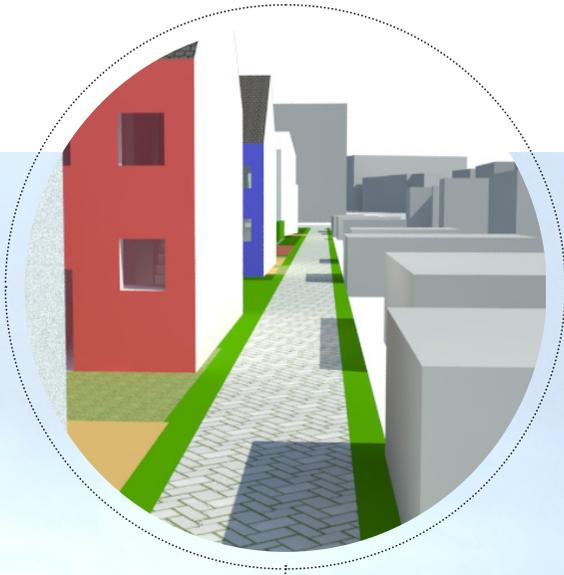
Pedestian connection

Section A-A



Urban elements in the relics footprints. A conversation pit, Poul Gernes Pyramide and small basins with geothermal water, seawater and cold water to wet the toes,

A bigger courtyard opens up towards the kindergarten with a play-area and urban farming.



A pedestrian path runs through the edge between the old and new development creating a shortcut for existing residents

A part of Laugalækur is dug up and then it turns into a canal along the old shoreline

## Section A-A



The art academy only uses the first floor. Open a cafe and an art gallery on the second and third floor. The city uses the space to store office furniture.

Birds eye view



Art school on first floor. Add gallery and Coffice to the second and third floor



View to Esjan mountain



Art gallery on the east side of the building



Coffee - shared workspace and cafe with a view over Esjan mountain



Images nr. 82 - 88

## Consume less, share, repair, buy package free and pompost to reduce waste

Sharing library on the ground floor of the micro apartments for the inhabitants and others that want to consume less can borrow tools, appliances, tableware, sports equipment, tents and more



Repair cafe on the ground floor of the seniors home where dwellers can pass on knowledge to fix and repair things and clothes instead of throwing away and buying new. Transferring skills to the new generations.



Bulk grocery store and a container free store to accommodate and encourage people that want to live a close to zero waste lifestyle.



Compost, where the community comes with their compost and uses the fertilizer for the urban farming in the neighborhood.

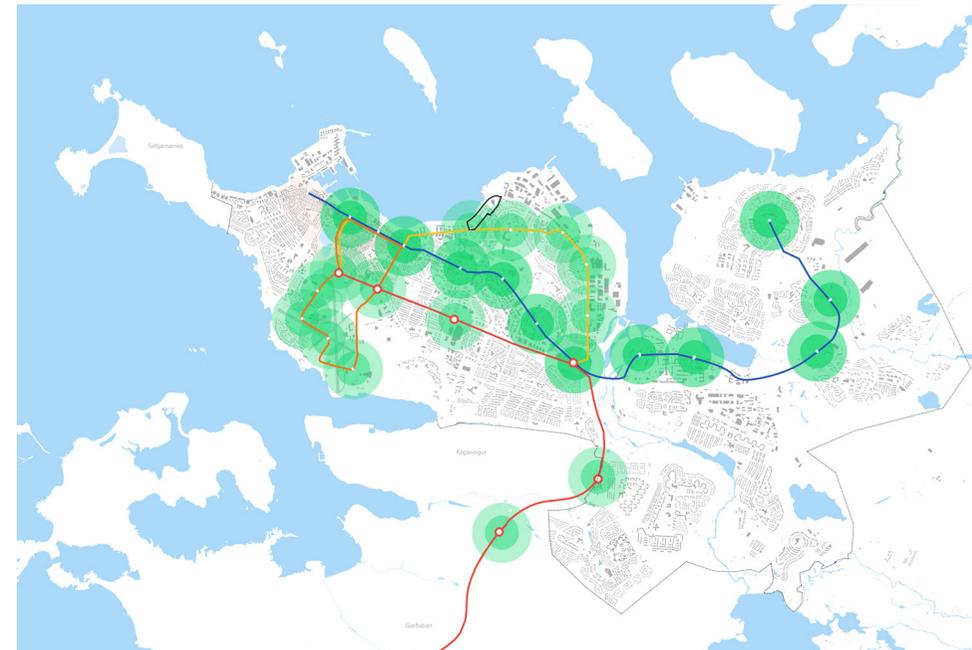
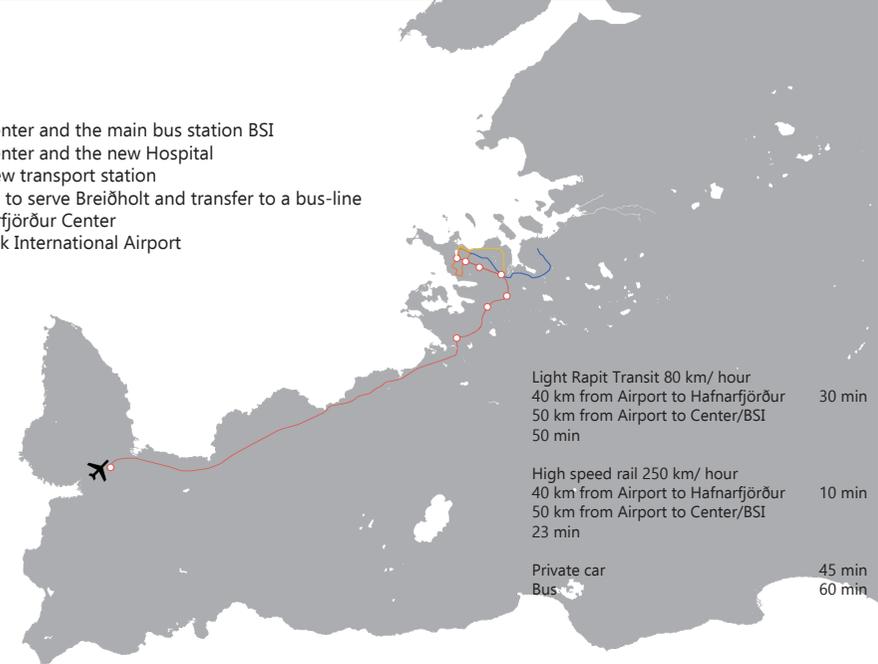


## Proposed city tramline & metro to Keflavík airport



## Rapit transit / High speed rail from airport to city center

- ⊕ City center and the main bus station BSI
- ⊕ City center and the new Hospital
- ⊕ The new transport station
- ⊕ Mjodd to serve Breiðholt and transfer to a bus-line
- ⊕ Hafnarfjörður Center
- ⊕ Keflavik International Airport



Birds eye view



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Physical model

