APPENDIX 2 - STRATEGY-ANALYSIS

Appendix attached to Master Thesis:
"A New Planning Approach"
in Sustainable Urban Design, LTH, Lund University

Astrid Steen, May 2019

STRATEGY-ANALYSIS

This document analyzes the different layers of Malmö;

- Built environment/Green Areas,
- Topography,
- Areas of High & Low Permeability,
- Infrastructure - Roads & Railway,
- Sea Level Rise (1-3 m), and
- Cloudburst - High Risk Flood Zones.

It is trying to identify how the different city districts of Malmö would be able to handle incoming water and give a proposal as to what type of flood management measures could be used. The flood management measures that are referred to in the document are more thouroughly presented in Appendix 1.

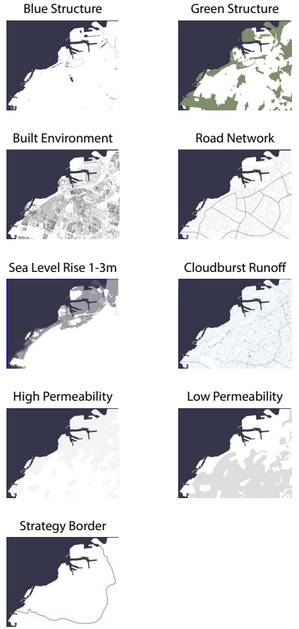
Apart from looking at the flood capacity of the districts this strategic analysis is also trying to acertain the capacity for further development of the areas. Whether or not they are suitable for further green structures/built environment according to the water analysis as well as to the existing city structure.

The appendix starts by showing a map of Malmö containing the layers stated above. It then continues by zooming in to the different city districts within the Inner Ringroad of Malmö and presenting the conclusions drawn as well as a short proposal as to how to proceed with the city development. Some districts are presented as a unity due to their similarities or because of the effect a collected proposal could have.

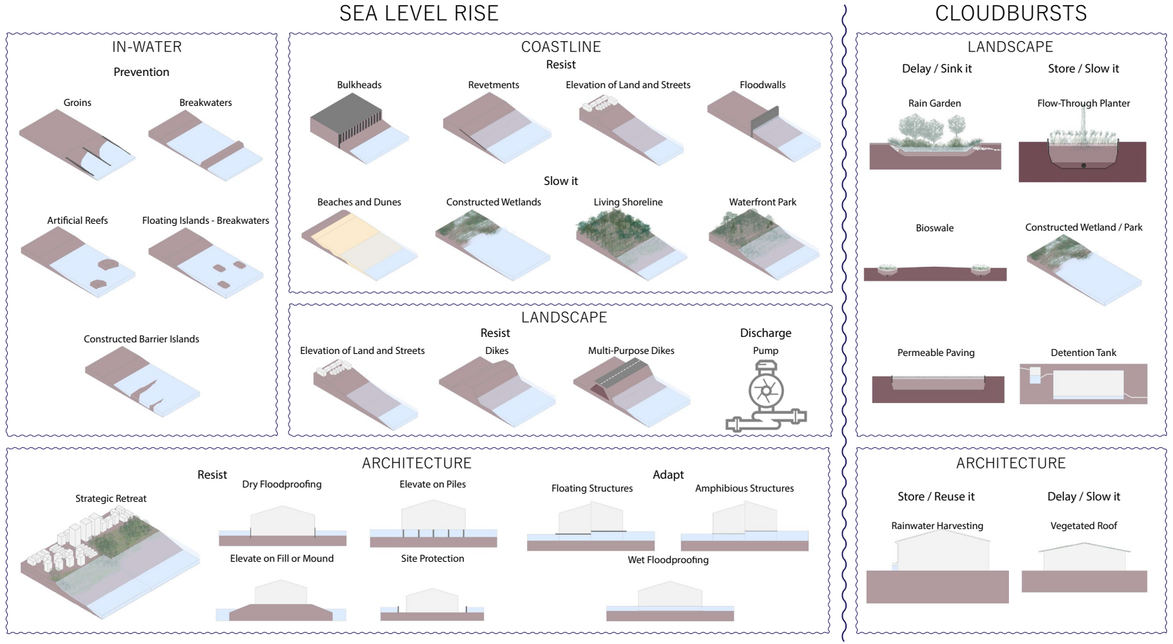
Based on the results from this analysis some general conclusions have been made (which can be found in the main thesis document). Together they make up a proposed strategic plan for how the city should continue to develop in terms of new/expanded green structures, new water management systems, new development and densification areas.

For more in-depth proposals, further studies in the individual areas are recommended.

THE COLLECTIVE MAP



STRATEGY LIBRARY (SUMMARY FROM APPENDIX 1)



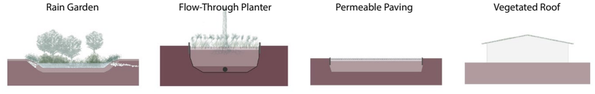
THE CITY DISTRICTS

THE DESIGN SITE OF THE THESIS - AUGUSTENBORG/ALMHÖG

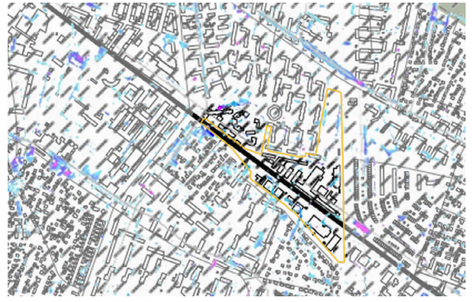
To the right, there is a Zoom-in of the larger map that can be seen on the previous page, as well as two smaller maps showing what the area looks like when different layers are highlighted, making different aspects clearer.

The area is affected by cloudburst floods in a few concentrated areas. Mostly it has a low ability to take up water (low permeability) and on top of that it is dominated by a a sparsely built hardscape. Within the site boundaries there is primarily one area at flood-risk (which is highlighted in pink, in the right hand corner of the “Cloudburst effect” map) which needs to be addressed. Otherwise the general recommendation for this area is to lessen the amount of hardscape, making it possible to deal with stormwater on the site itself, minimizing runoff. Because of the topography this would reduce the pressure made by floods on the surrounding area (which seems to be more affected).

These are some flood management measures that could be suitable in the area;



Zoom-in of the strategy-analysis map



Cloudburst effect

High/Low permeability

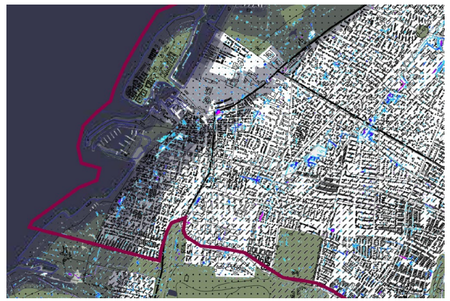
LIMHAMN

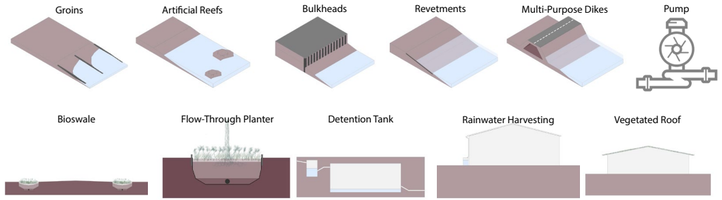
- is heavily affected by sea level rise.
- to prevent the coastline from being “eaten up“ by the sea, *in-water prevention* methods as well as *coastline resist* methods are needed.
- due to the low-lying land, *landscape resist* methods are recommended to keep the sea at bay.

- because of cloudburst effects, the area’s low permeability capacity and lack of larger (public) green structures *landscape discharge* (out to sea or the limestone quarry)*, delay and store* methods are recommended.

- because of the high amount of privately owned property in the area, *architectural store and delay* methods are recommended.

With an allready well-developed city structure no more large development or densification is recommended.

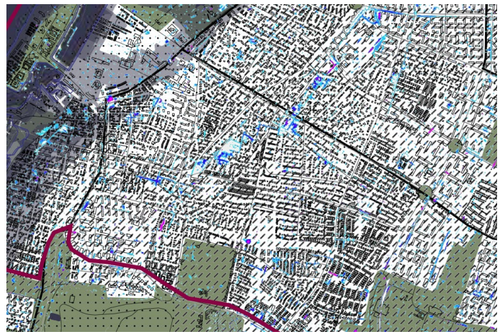




NYA BELLEVUE - ROSENVÅNG - ANNETORP

- due to the cloudburst effect and low permeability *landscape delay and store* methods are recommended.
- especially bioswales are recommended to lead the water south to the limestone quarry or green structures there.

With an allready well-developed city structure no more large development or densification is recommended.

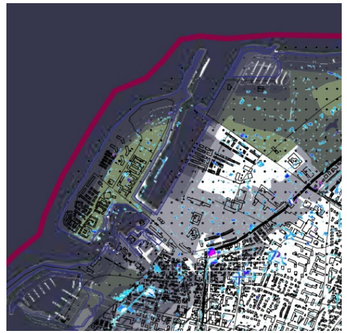


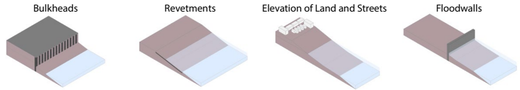
ÖN

- is in need of *coastline resist* methods for protection against sea level rise.

Being a small, limited area at risk, no more large development or densification is recommended.

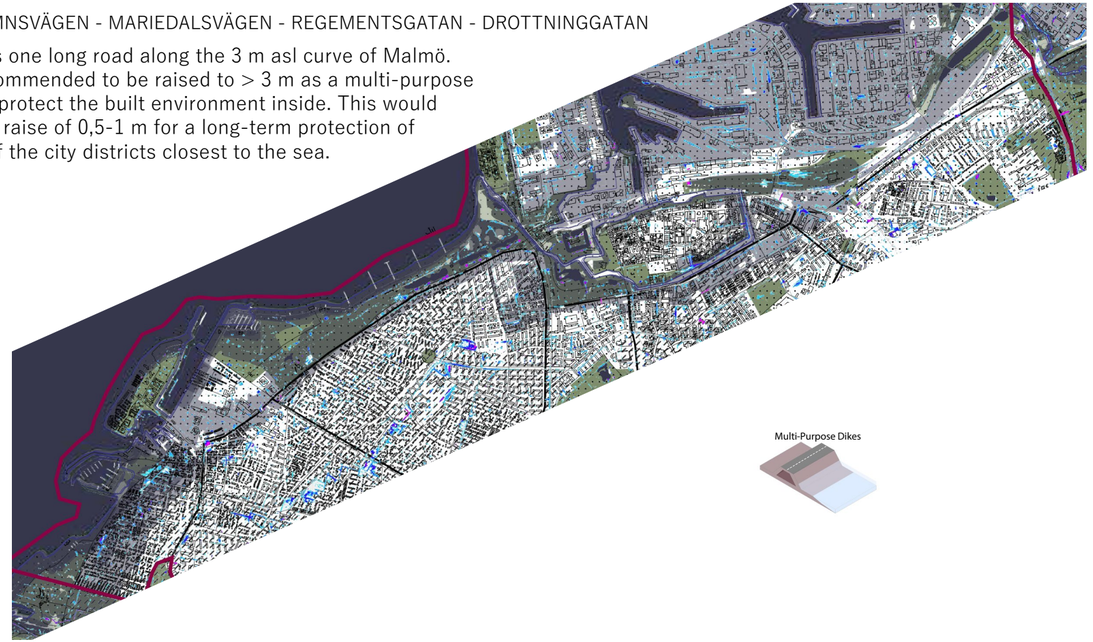
However, the area in between Ön and Limhamn have good potential to house new development projects, if well-protected.





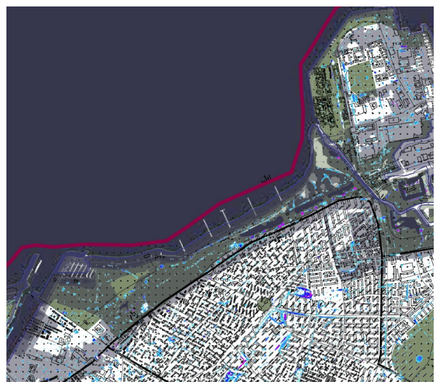
LIMHAMNSVÄGEN - MARIEDALSVÄGEN - REGEMENTSGATAN - DROTTNINGGATAN

- lies as one long road along the 3 m asl curve of Malmö.
- is recommended to be raised to > 3 m as a multi-purpose dike to protect the built environment inside. This would mean a raise of 0,5-1 m for a long-term protection of many of the city districts closest to the sea.



RIBERSBORG

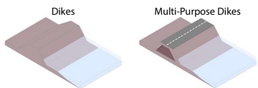
- is heavily affected by sea level rise.
- due to it being a beach meadow, which naturally deals well with water, the recommendation is to keep this as a public green structure but to strengthen it with *coastline resist and slow it* methods so that it is kept intact for many more years to come.



VÄSTRA HAMNEN

- is in need of *landscape resist* methods for protection against sea level rise. By introducing a dike around the east and south coast of the island, the inner structure will be proteced from sea level rise.

With large areas of run down buildings, empty plots etc. both densification projects as well as new development is recommended.



HAMNEN

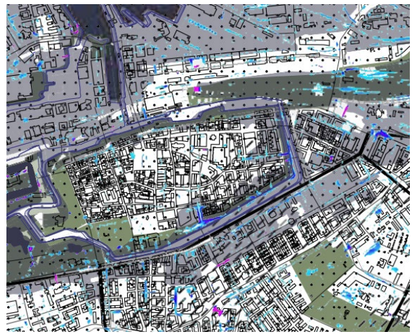
- is heavily affected by sea level rise.

The harbour has great potential for further development, new and densification, because of the vastness of the area and lack of density. To make it possible to create a long-term, sustainable settlement here both *coastline resist* methods and *landscape resist* methods are necessary to protect from mayor floods. Due to its homogeneous nature, more mixed-use functions are also strongly recommended.

CENTRUM (GAMLA STADEN - CAROLIKVARTEREN - KVARTERET S:T GERTRUD)

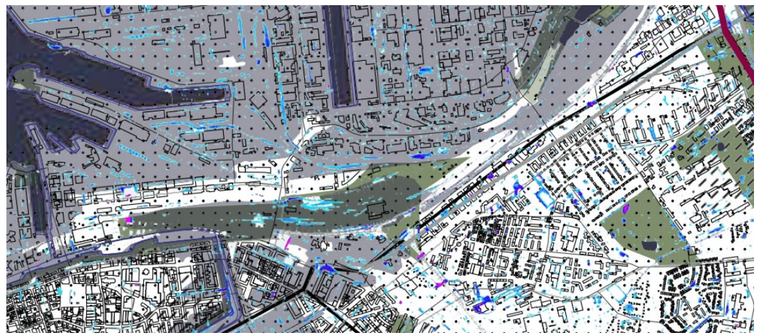
- is most heavily affected by floods from the canals. To protect from this *landscape resist* methods should be built along the canals (these would only need to be under 1 m high to protect against 3 masl. high floods).
- to protect from the floods that are caused by cloudbursts *landscape delay* methods are recommended.

With an allready well-developed city structure no more large development or densification is recommended.



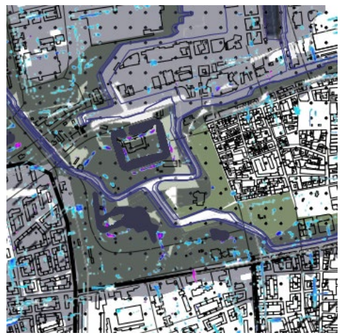
CENTRALEN - ÖSTRA JÄRNVÄGSSPÅREN

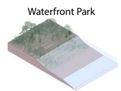
- is affected by a low-point that floods when cloudbursts hit. To decrease the risk of flooding, *landscape delay* methods and as much permeable ground are recommended.



KUNGSPARKEN (MALMÖHUS SLOTT)

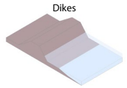
- with good permeability, green structure and runoff posibilities into the canals the area is allready well equipped to deal with floods. There is th posibility to improve this further by turning the park into a wetland area.

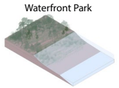




VÄSTKUSTVÄGEN

- the area beyond the road is heavily affected by sea level rise. To prevent this *coastline resist* methods are recommended along the road.
- to further strengthen the area's resilience the area north of Spillepengen's leisure area (green structure) could be transformed with *coastline slow it* methods.



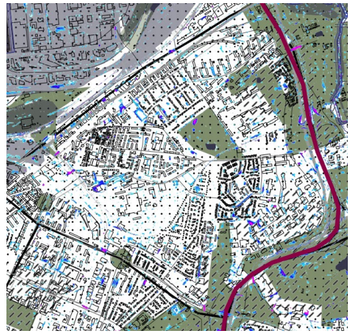


KIRSEBERG - JOHANNESLUST

- not very affected by floods. However, the spots that are would do well with *landscape delay* methods.

The area has good permeability and a non-built areas next to Kirsbergskolan and Lokstallarna. These would be good places for developped green structures that can deal with larger amounts of water, especially since they are more low-lying than their immediate surroundings.

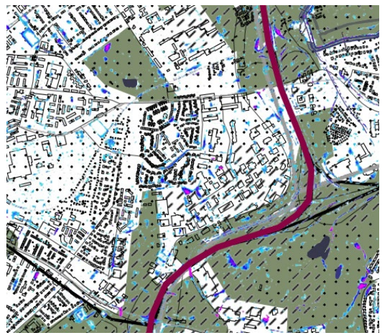
Especially the west part of the area is quite sparsely built and could house further densification projects.



BULLTOFTA

- is a large-scale industrial area with mixed permeability.
- to increase the areas ability to deal with water *landscape delay* methods such as large-scale bioswales are recommended, stretching from Bulltofta interchange to Videdal interchange.

Due to the industrial layout, there are several places in the area that could deal with further densification and/or new development.

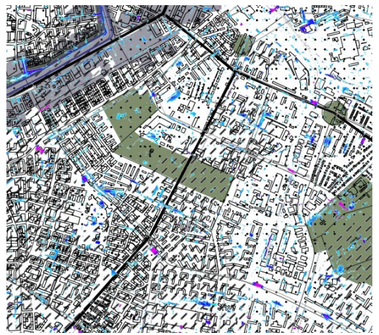


Bioswale

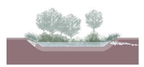
VÄRNHEM - VÄSTRA SORGENFRI

- has mixed permeability. The mayor problem areas are located to low points in the hardscape. The areas of high permeability needs to be better utilized, for example the empty plot of land (300x200m) east of S:t Pauli North Graveyard.
- *landscape delay and store* methods are recommended to increase the rate of permeability or to keep the water away from non-permeable areas.

The areas of industrial character could deal with further densification and/or new development.

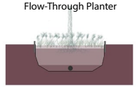


Rain Garden



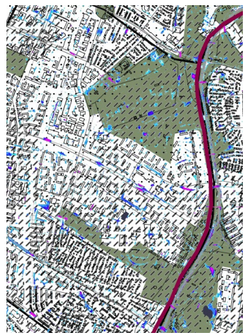
Permeable Paving

Flow-Through Planter

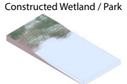


ROSENGÅRD

- is dominated by low permeability, but has two large park areas (Rosengårdsfältet and Cronhielmsparken). These park areas have the potential to store large amounts of water and could be turned into wetlands. Therefore *landscape store and delay* methods are recommended for the area.



Constructed Wetland / Park



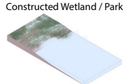
Bioswale

FÅGELBACKEN

- is dominated by high permeability ground. This, combined with Pildammsparken makes for excellent prerequisites for a *wetland park*.

With an allready well-developed city structure no more large development or densification is recommended.

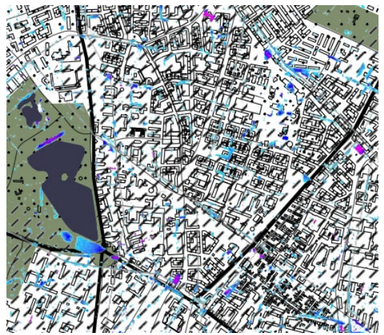
Constructed Wetland / Park



RÅDMANSVÅNGEN - SÖDERVÄRN

- has low permeability, is densily built, has smaller parks.
- main problem areas are situated along the roads and therefore *landscape delay and store* methods are recommended.

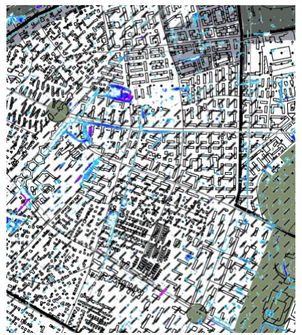
With an allready well-developed city structure no more large development or densification is recommended.

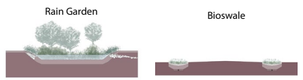


RÖNNEHOLM - MELLANHEDEN - DAMMFRI - LORENSBORG

- has low permeability.
- in the areas dominated by villas, much of the water is dealt with in the private yards. However, the areas with appartment buildings (mostly north west) are in need of *landscape delay* methods.

With an allready well-developed city structure no more large development or densification is recommended.

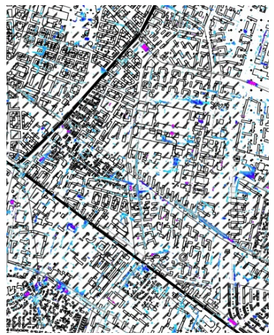




SOFIELUND - ANNELUND

- has low permeability.
- has large appartment building blocks as well as a large industry area. The majority of the flood problems caused by cloudbursts are located along the roads and in the middle of the industrial area. Therefore *landscape delay and store* methods are recommended to increase the overall permeability, deflect some of the runoff water and/or deal with the water on site in areas that are, for example, polluted.

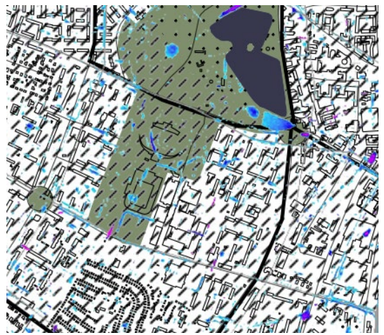
Because of the large-scale structures the industrial area could deal with further densification.

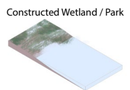


SOLBACKEN

- has low permeability and large green structures that could be used for water storage and slow infiltration. Therefore *landscape delay* methods are recommended.

With an allready well-developed city structure no more large development or densification is recommended.





ÄRTHOLMEN

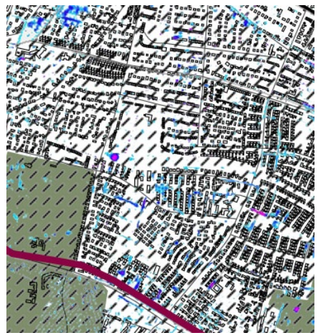
- has low permeability and is dominated by villa blocks.

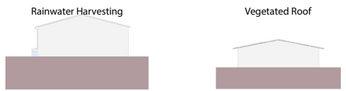
With an allready well-developed city structure no more large development or densification is recommended.

However, *architecture store and delay* methods are recommended to be installed in the private residences.

DJUPADAL

- has low permeability and is dominated by villa blocks. With the two additional parks in the area, the overall ability to deal with water is quite high.
- some streets are more affected by floods. They need a better outflow, for example to the parks.
- better on site water management could be made, therefore, *architecture store and delay* methods are recommended to be installed in the private residences.

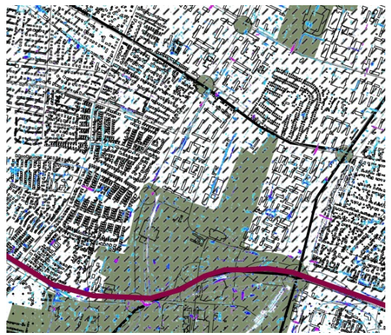


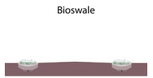


KROKSBÄCK

- has low permeability.
- has mixed building typologies with villa blocks in the west, appartment buildings in the east and large green areas in the central and south areas.
- the main flood issues are caused by cloudbursts along Lorensborgsgatan and Hyllievångsvägen. Therefore, *landscape delay* methods are recommended, where the water is deflected towards the green structures.

To improve the connection between the green and the built structure and also to make better use of the land new development is recommended in the south parts of the area.

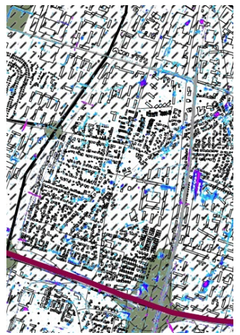




GRÖNDAL - KULLADAL

- is dominated by villa blocks.
- has mixed permeability, but mostly deals with flood problems caused by cloudbursts in areas of low permeability. Therefore, *landscape delay* methods are recommended to deflect the water to areas of high permeability, preferably the green areas. Also *architecture store and delay* methods are recommended to improve the areas ability to deal with water on site.

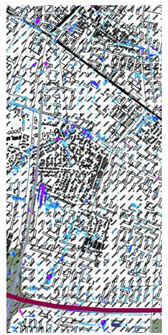
With an allready well-developed city structure no more large development or densification is recommended.

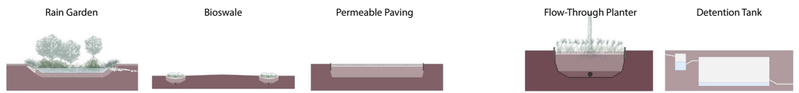


ERIKSFÄLT - VÄSTRA SÖDERKULLA

- is heavily affected by cloudburst floods and has low permeability. As the floods are concentrated along the roads and in a few of the green areas *landscape delay and store* methods are recommended.

With an allready well-developed city structure no more large development or densification is recommended.





ALMHÖG - ÖSTRA SÖDERKULLA

- has mostly low permeability and few spaces with cloudburst induced floods. Therefore point management is recommended with *landscape delay* methods.

Mostly the area allready has a well-developed city structure and no more large development or densification is recommended. However, along the road in the north further densification could be made as it is dominated by large-scale industrial structures.

HINDBY - GULLVIK

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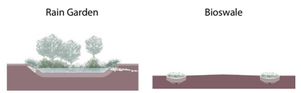

BIBLIOGRAPHY

Background data for maps produced by author provided by SLU. © SLU - Sveriges lantbruksuniversitet. [Swedish University of Agricultural Sciences].