Figure 1: Ariel view over parts of Skarpnäck (Stockholms Stad, 2024)

RUHR-UNIVERSITÄT BOCHUM

JOINT PROBLEM ANALYSIS IN SKARPNÄCK

Environmental Urban Planning 2024

Table of contents

Introduction to the Study Area

- **In the south of Stockholm** **(Universität Lund, n. d.)**
- **Construction since the 1950s**
- **It has its own district administration and 6 neighbourhoods**
- **46.145 inhabitants, which is estimated to rise to 64.574 by 2040** **(Wanngård & Valeskog 2018: 162)**
- **Grid with buildings varying in scale but with a uniform character** **(Wanngård & Valeskog 2018: 164)**

Figure 2: Skarpnäck District of Stockholm (brown) (Wikimedia w.D) https://upload.wikimedia.org/wikipedia/commons/3/3d/Skarpnäck.png

Urban Redevelopment Plan of Skarpnäck (Wanngård & Valeskog 2018: 162 f.)

- **Development of the Gullmarsplan-Enskede corridor**
- **Development of attractive and high-capacity public transport**
- **Consolidation of the regional ecological functions of the Nacka and Flaten reserve**
- **three new schools and open park areas**
- **needs more meeting places for culture and community groups**

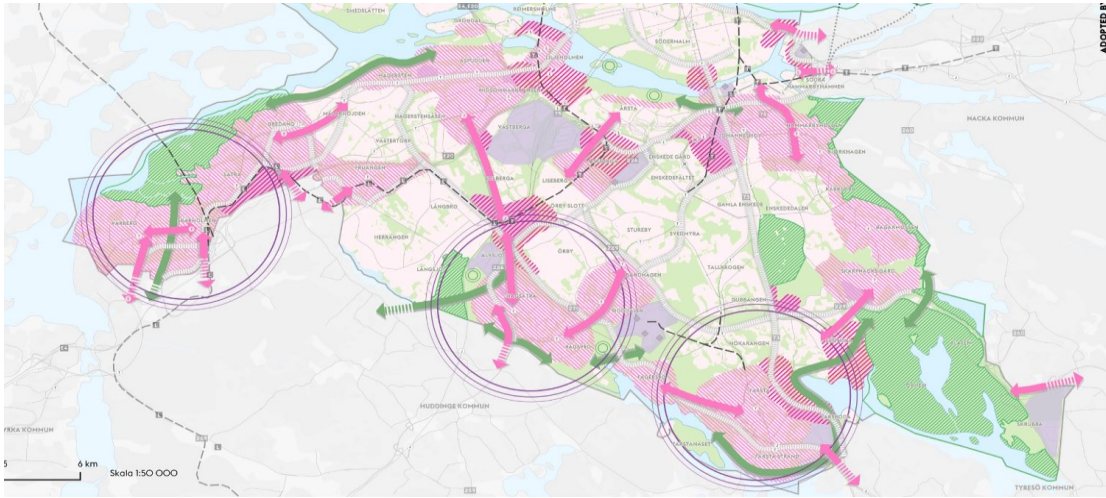
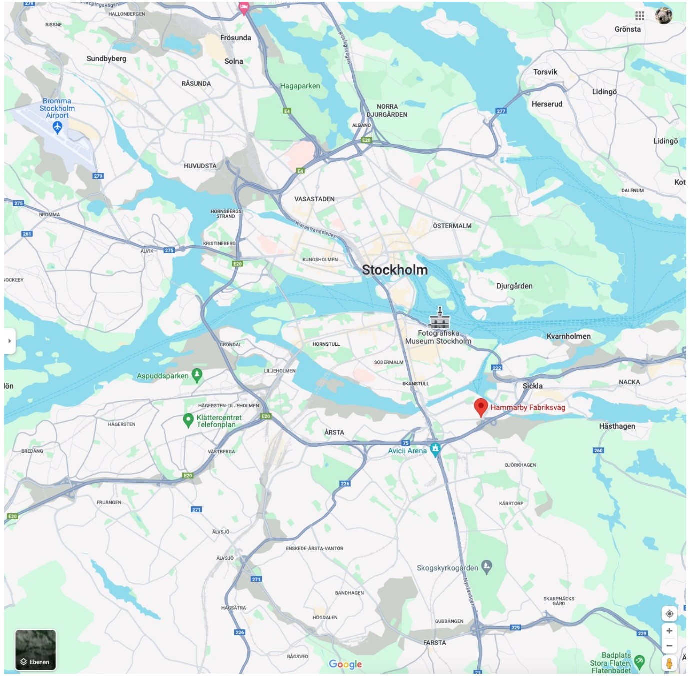


Figure 3: Urban Redevelopment Plan (Stockholm Council 2018)

Example of Hammarby Fabriksväg (Wanngård & Valeskog 2018: 163)

- **Redevelopment of old commercial area planned**
- **Current use for workshops and car dealerships**
- **Main axis with a direct connection to the highway to the eastern outskirts of Stockholm**
- **Redevelopment plan to an urban corridor with parks and open housing**
- **Connecting Crossroads will also improve the connection to Björkhagen**



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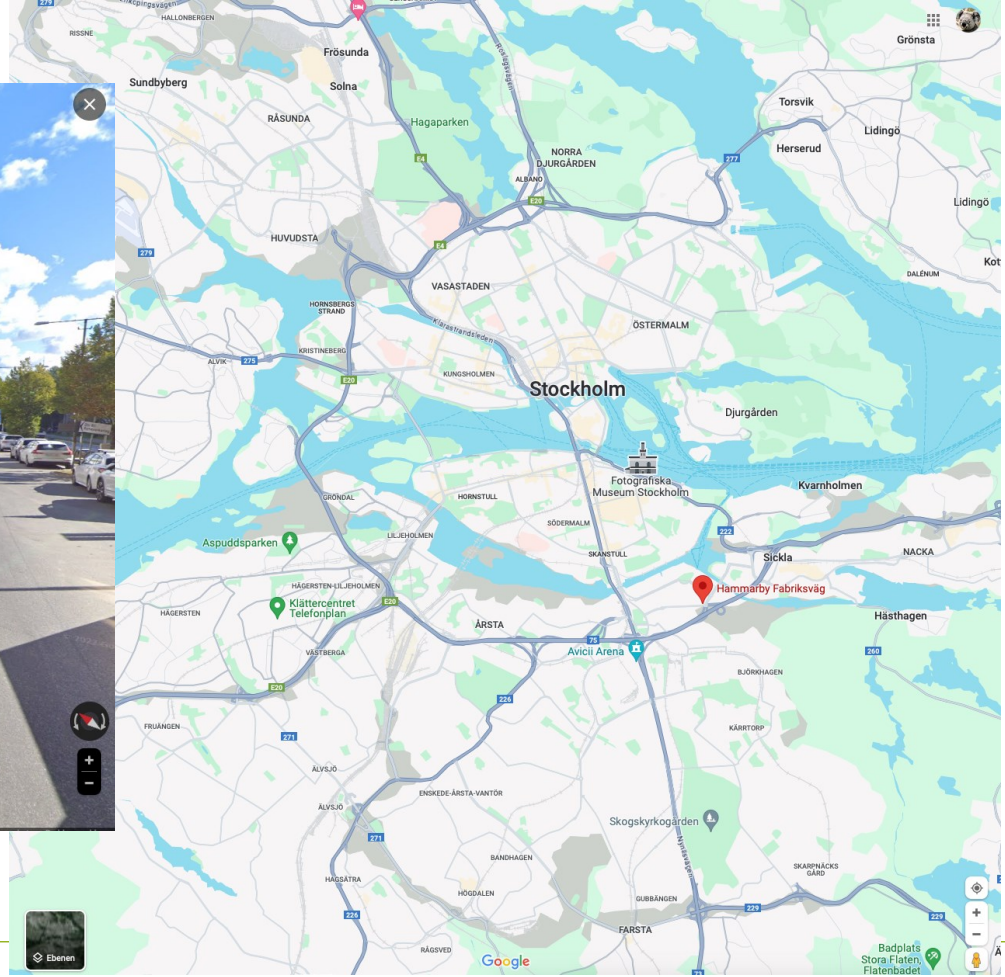

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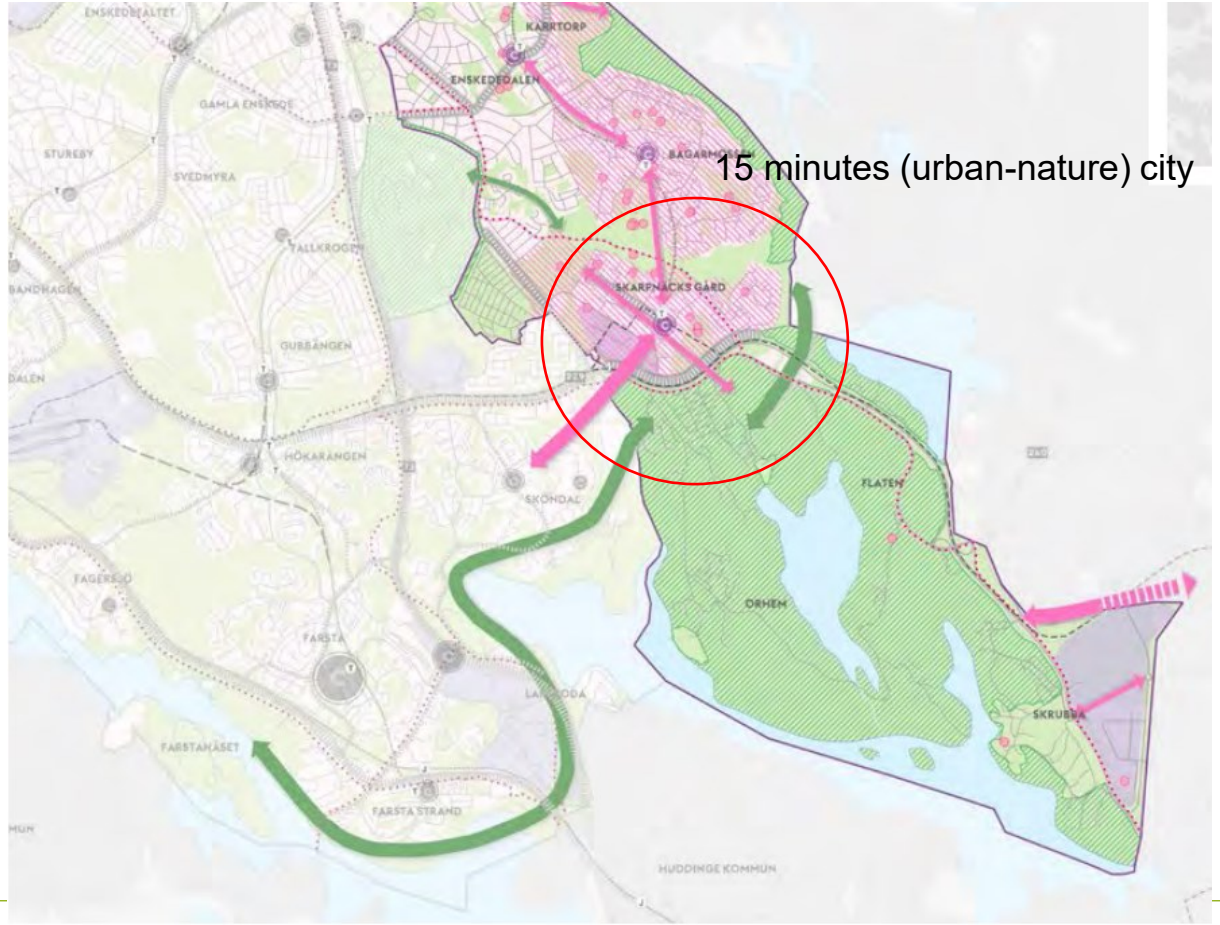
Social cohesion and quality of life (Wanngård & Valeskog 2018).

"The city district needs more meeting places for culture and community groups, as well as space for artistic production and creative industries." - lack of sense of community

"Need of a high-capacity public transport across the southern suburbs and to link together several of the destinations" - mobility in the city

"Skarpnäck has good access to nature and recreation. The ecological and recreational corridor between Flaten nature reserve and the Nacka reserve should be strengthened" - good access to nature, but lack of public engagement


15 minutes (urban-nature) city
KARRTORP
ENSKEDEDALEN
SKARPNÄCKS GÅRD
FLATEN
ÖRHEM
SKÖNDAL
HÖKÄRANGEN
GUBBÄNGEN
FARSTA
FARSTA STRAND
FARSTAHÄSET
HUDDINGE KOMMUN

Social cohesion and quality of life (Wanngård & Valeskog, 2018).

Problem 1: How to build more physical infrastructure (meeting places and public transportation) without jeopardizing the nature reserves around the neighborhood?

Problem 2: Does access to nature by public transportation, including better pavement and cycling, increase public engagement in nature? If yes, what are the interventions (through projects and education) that can increase the awareness of the importance of nature.

Problem 3: When building more physical infrastructure, how do we keep the current architectural traits without using high-demanding construction materials for nature?

Urban Heat Island (Oke et al. 2017 197-200)

- **Phenomena: cities are always warmer than their surrounding**
- **Consequences: increased heat stress, earlier flowering of plants, faster evaporation, increased chemical reactions (smog)**
- **Occurs through the influences on the energy balance of a geographical location (dark surfaces, materials)**
- **Temperature is influenced by weather temperature, city size and wind**

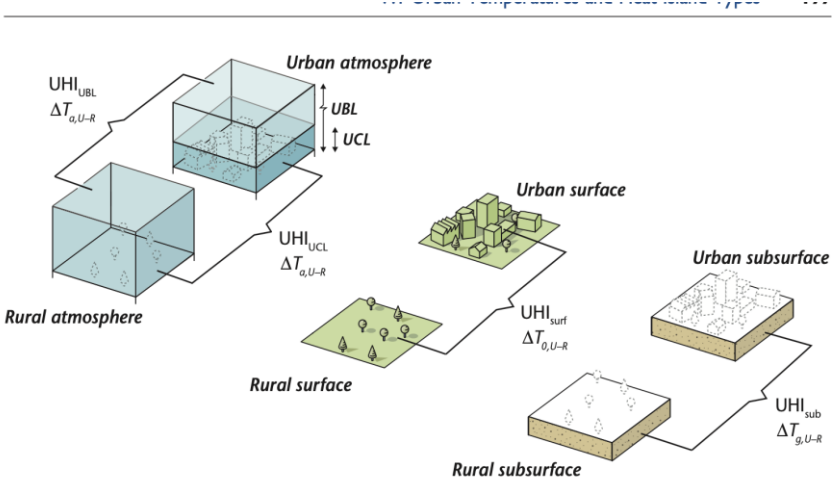


Figure 4: Urban Heat Island Types (Oke et al. 2017: 199)

Types of Urban heat Island

1. **Subsurface Heat island**

❖ **temperature patterns in the ground under the city**

2. **Surface Heat Island**

❖ **temperature differences at the interface of the outdoor atmosphere with the solid materials of the city**

3. **Canopy Layer Heat Island**

❖ **difference between the near-surface air temperature below roof level in the city**

4. **Boundary layer urban heat island**

❖ **the difference between the temperature of the air on top of the urban canopy layer and the atmosphere in the rural area**

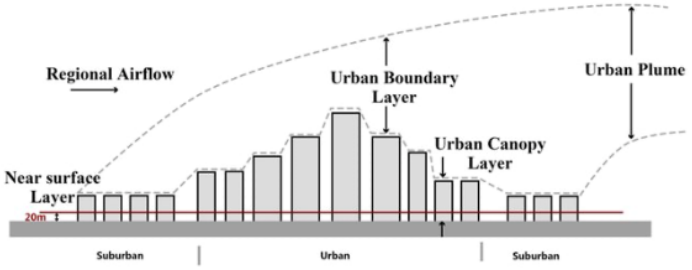
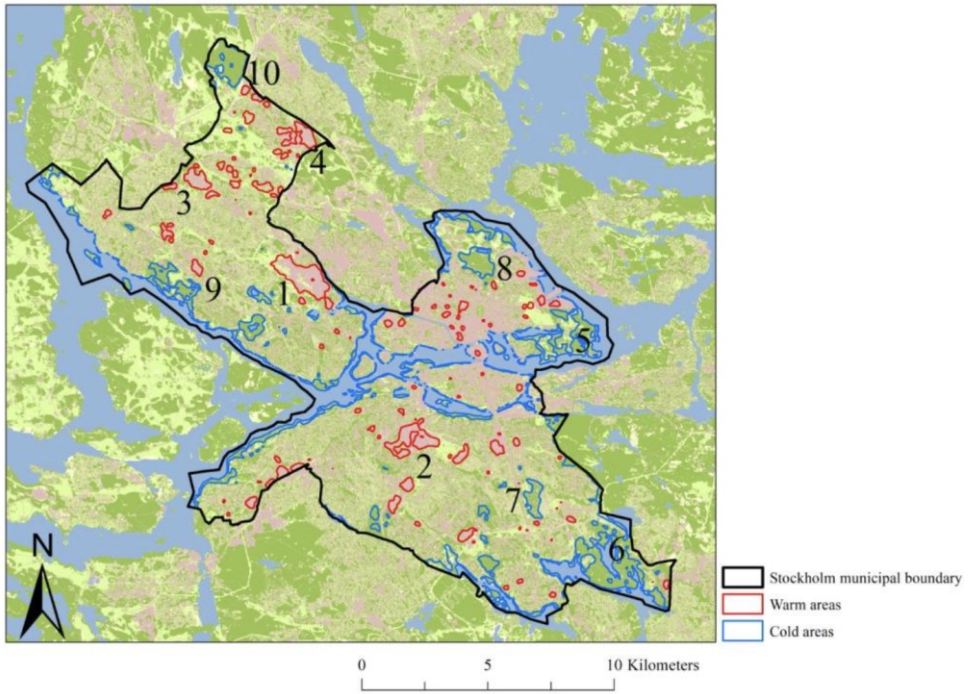


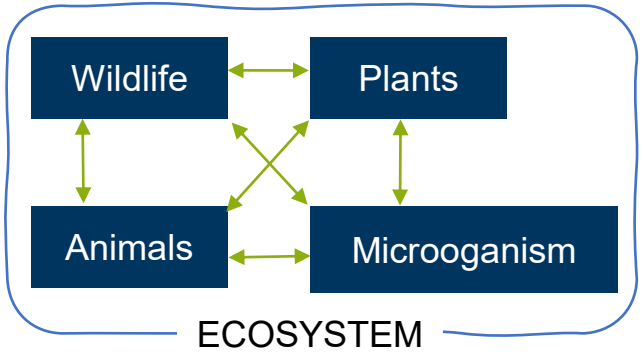
Figure 5: Urban Heat Island Types (Yang et al. (2020)

Urban Heat Island of Stockholm (Igergård 2021: 30)



CH 2: Loss of biodiversity

What is biodiversity?



According to Reyers (2021), own illustration

"The diversity within species, between species and of ecosystems, including plants, animals, bacteria, and fungi. These three levels work together to create life on Earth, in all its complexity."

United Nations 2024

CH 2: Loss of biodiversity

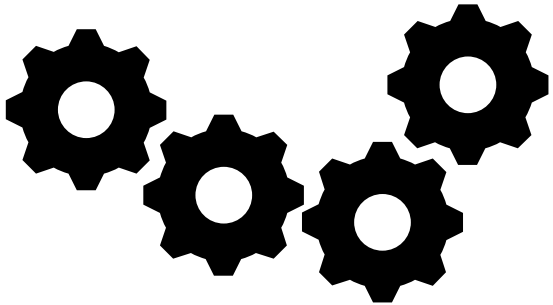
Why do we need biodiversity?

- Providing services: E.g. Sun energy become O_2, Pollination makes food, organism "create" healthy soil by down breaking dead organic matter, …
- Clean air, fresh water, good quality soil and crop pollination

FOR FREE!!!

Why do we lose biodiversity?

- Changes in land use (e.g. deforestation intensive mono-culture, urbanisation)
- Direct exploitation such as hunting and over-fishing
- Climate change
- Pollution
- Invasive alien species



European Parliament (2021a)

SHIJIAZHUANG (2018)

A Value of €15 bil. in the EU

European Parlament (2021b)

CH 2: Loss of biodiversity

Challenges in Skarpnäck

- Preserving inner-city biodiversity with densification
- Creating a link between Nackareservatet and Flattenbadet
- Conservation of biodiversity with more intensive use of the reserves by humans
- Creating and maintaining awareness of the benefits of ecosystems

European Parliament (2021a)

Flooding risks

- **Warmer climate leads to more precipitation due to an increase of evaporation**
- **Increased rainfall leads to higher groundwater levels (hardened areas)**
- **Heavy short rains might not be handled by the sewer systems**
  - **Designed for a 10-year return period**
  - **Can cause material damage or interrupt public functions -> high costs for society**

(Wanngård & Valeskog 2018: 99)

Flooding risks

- **Stockholm is one of the 18 highlighted areas with high flood risks**
  - **Sea level rise (Lake Mälaren)**
  - **Heavy rainfall**

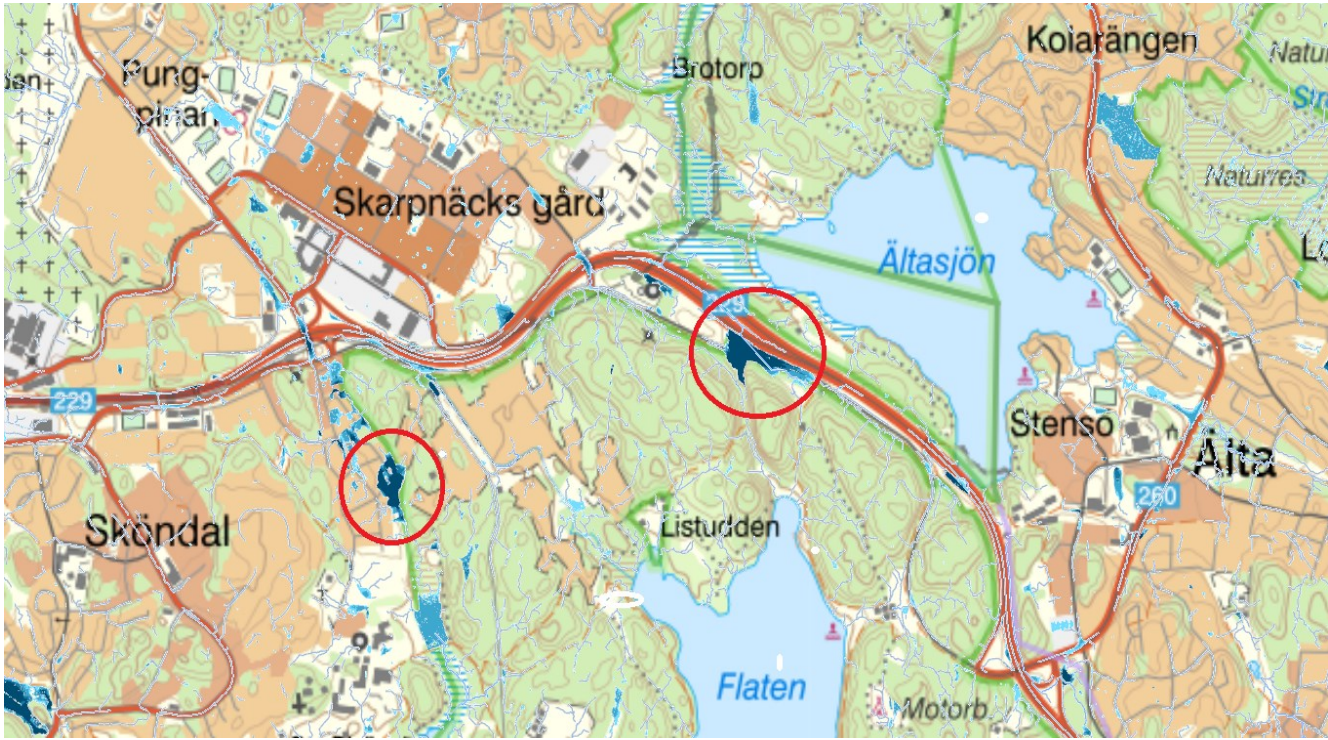
- **Water levels of lake mälaren heavily depend on inflow from surrounding waterscources & water release through sluices**
- **IPCC expects sea levels to rise by 1 metre by 2100 - half a metre for stockholm**

  Higher risk for stockholm due to many waterbodies next to urban areas

(Wanngård & Valeskog 2018: 99)

Flooding risks in skarpnäck district

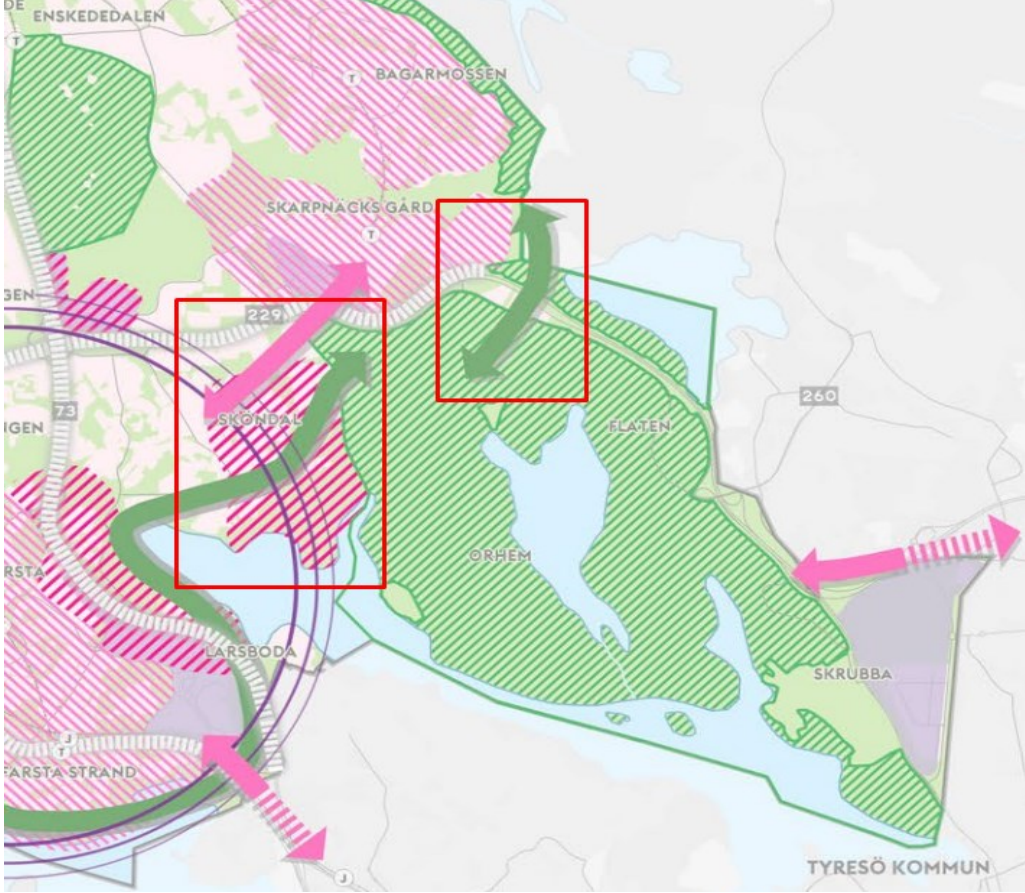
- Noticeable areas with a flooding risk of up to 1m water depth



(Länsstyrelserna Geodata catalogs 2024)

Flooding risks in skarpnäck district

- Ecological corridors connecting the Flaten naturreservat and Bagarmossen/Skarpnäcks Gard
- High potential development area Sköndal



(Wanngård & Valeskog 2018: 99)

Flooding risks in skarpnäck district

- Flooding risks in Bagarmossen and Skarpnäcks gard

(Länsstyrelserna Geodata catalogs 2024)

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