



<https://vaxer.stockholm/globalassets/omraden/skarpnack-stadsdelsomrade/skarpnack/skarpnack-180216-2048x1280.jpg?preset=fullbredd-hog-full>

Urban Environmental Planning – Skarpnäck (Stockholm)

Socio-environmental challenges

Ruhr-University Bochum | 07.11.2022

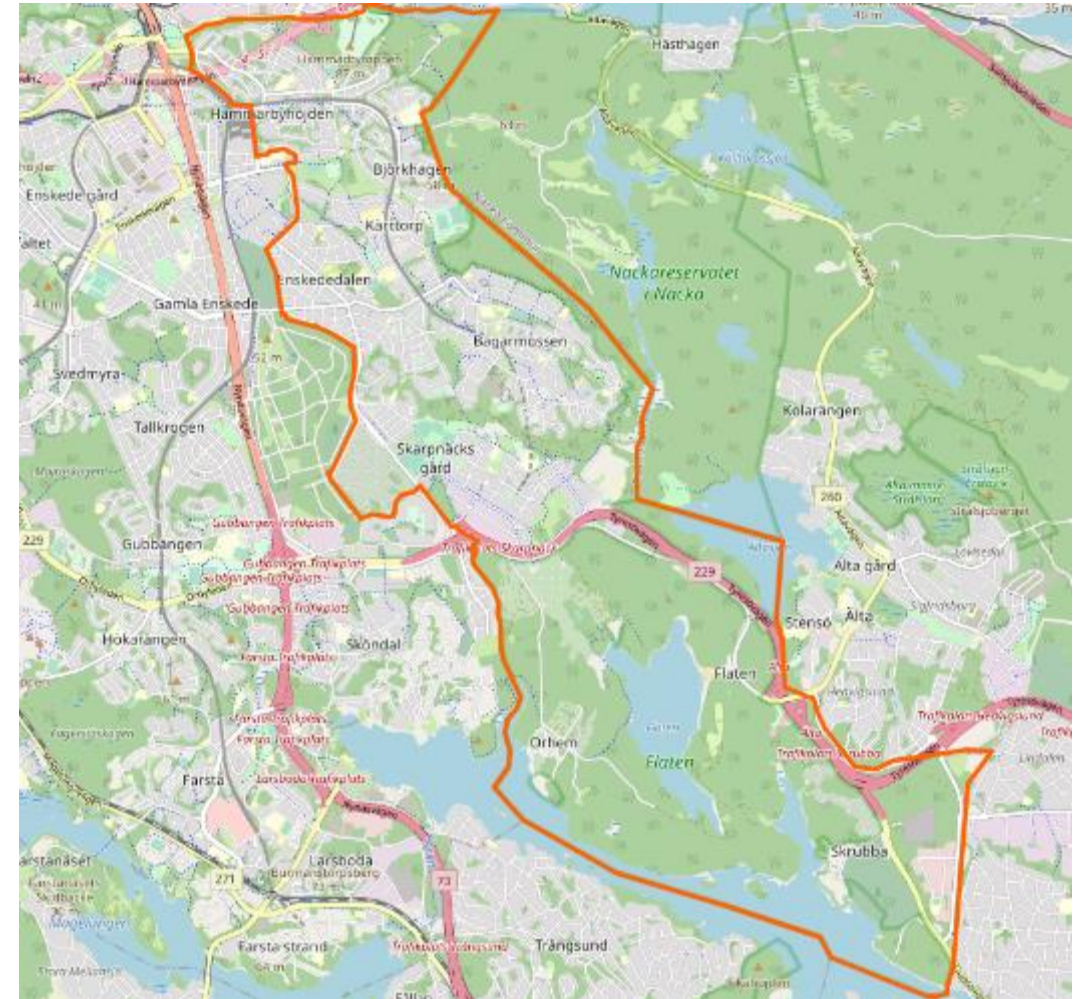
Study Area

Stockholm

- Capital of Sweden
- Good quality of life, safety, democracy, innovation, gender equality, trust
- Administrative, business and financial capital
- Expanding in size and population

Skarpnäck

- Borough in the South of Stockholm
- Nacka and Flaten Nature Reserve
- Main roads: Nynäsvägen and Tyresövägen
- Divided into 9 districts
- Variable urban environments



Open Street Map 2022

Stakeholder Perspectives

Urban Heat
Island



Biodiversity



Flood Risks



Social
Cohesion &
quality of
life



Stakeholder Perspectives

Urban Heat
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Biodiversity



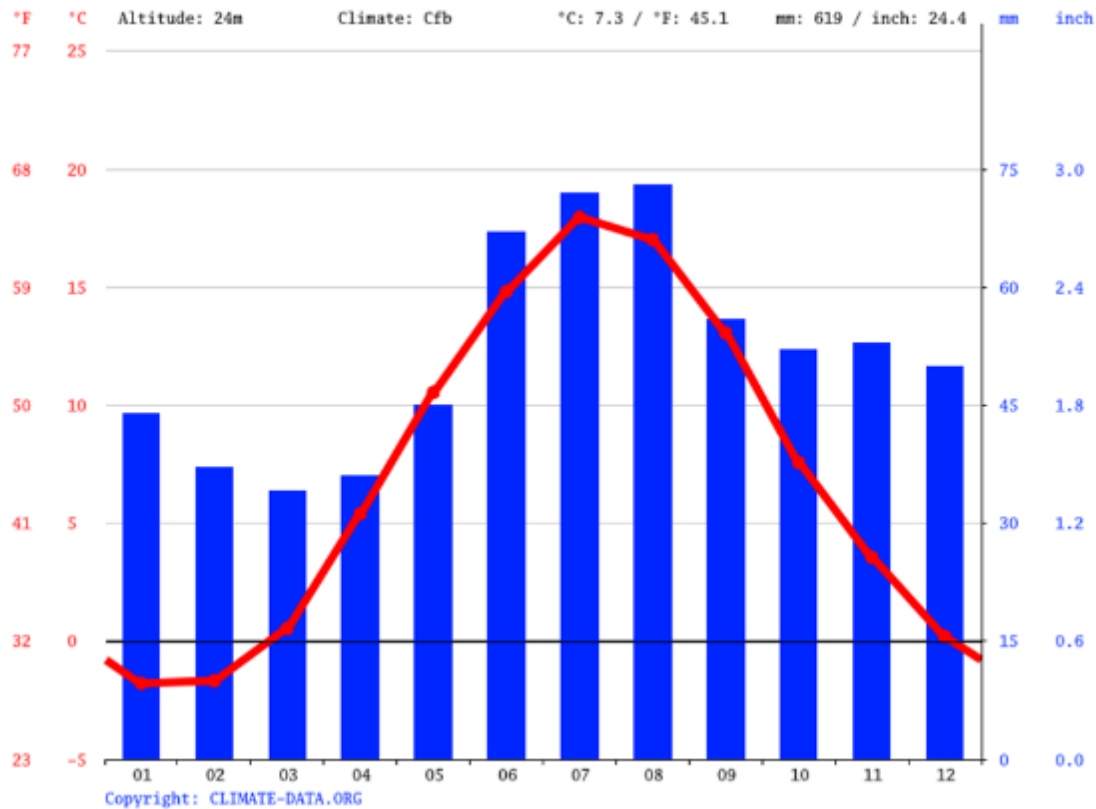
Flood Risks



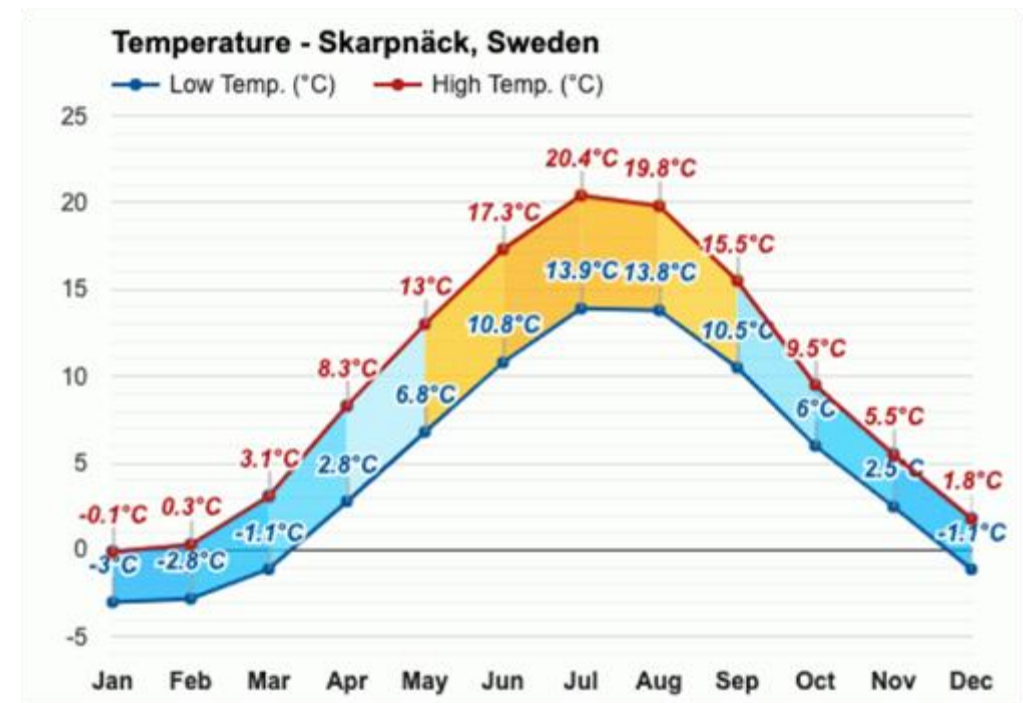
Social
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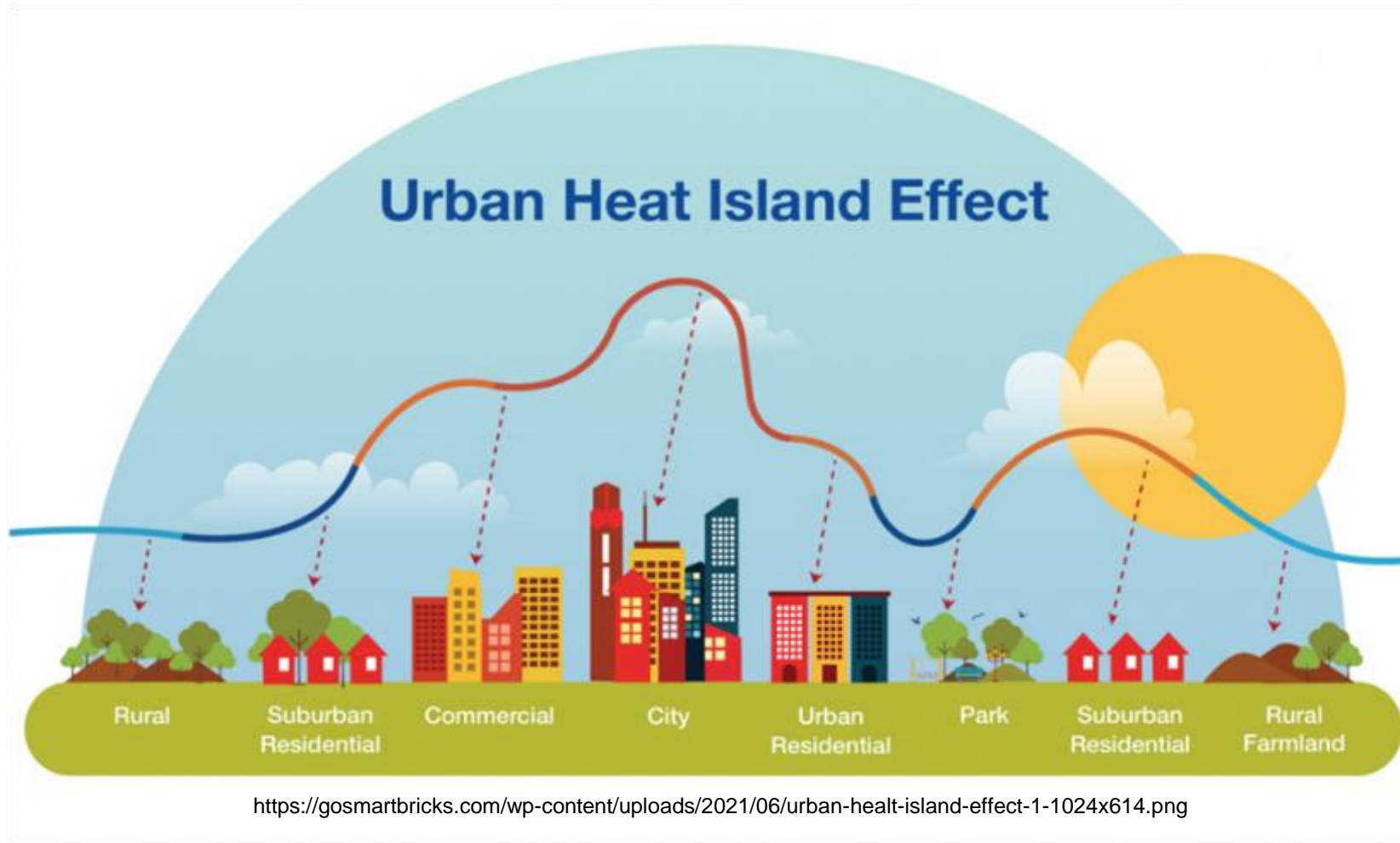
Local climate in Skarpnäck

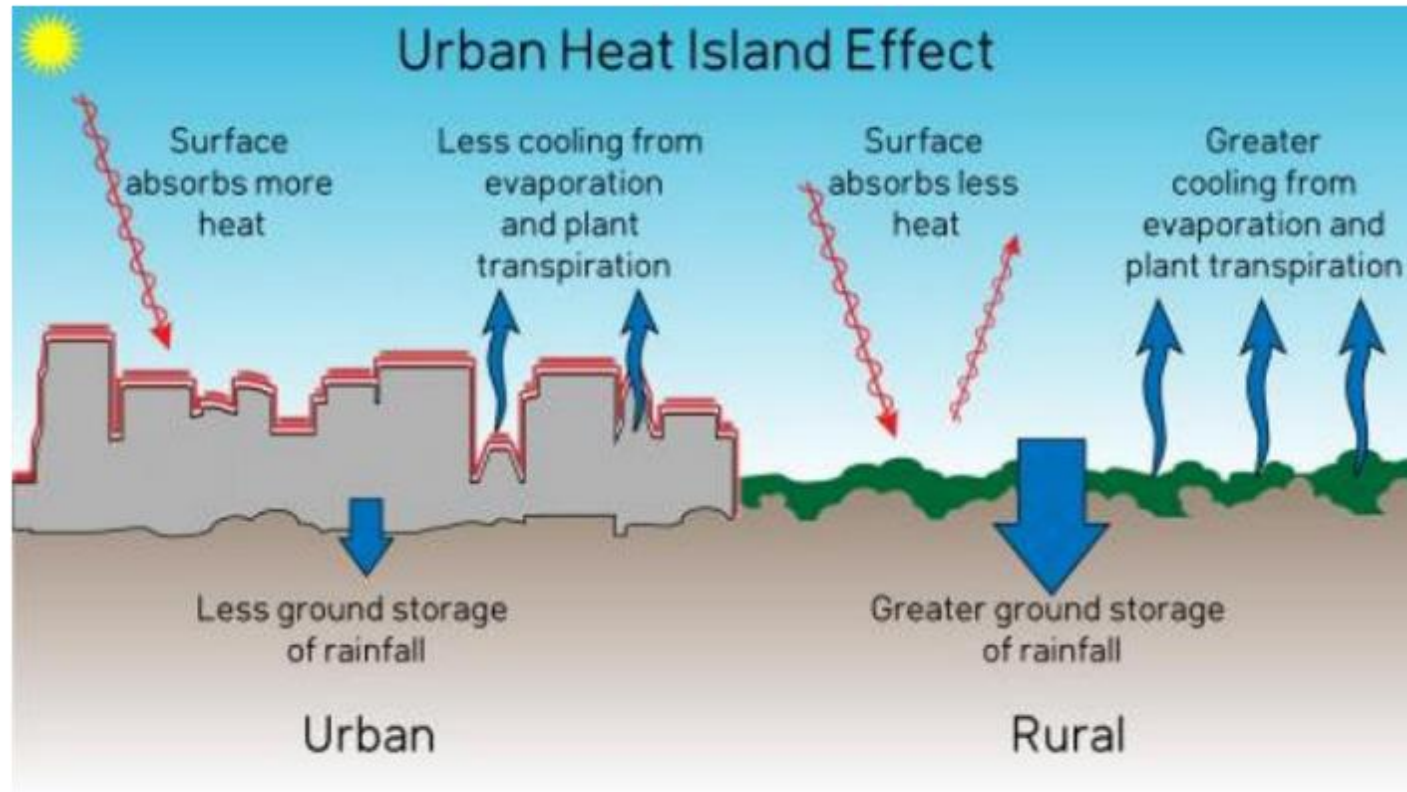


<https://images.climate-data.org/location/196/climate-graph.png>



<https://www.weather-atlas.com/en/sweden/skarpnack-climate>



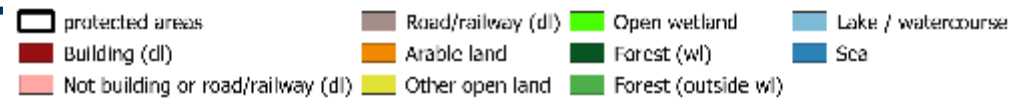


https://wgno.com/wp-content/uploads/sites/2/2020/04/UrbanHeatIsland_med-1.jpg?w=500&h=281&crop=1&resize=1280,720

Land use in Skarpnäck



Geodesign Data Skarpnäck



- Industrial areas with disruptive businesses
 - mostly huge, sealed soil areas
- Barrier effect of the main road Tyresövägen
- Built environment in Skarpnäck is largely based around closed blocks
 - dark surfaces
- Small green spaces in urban area
 - lack of evapotranspiration

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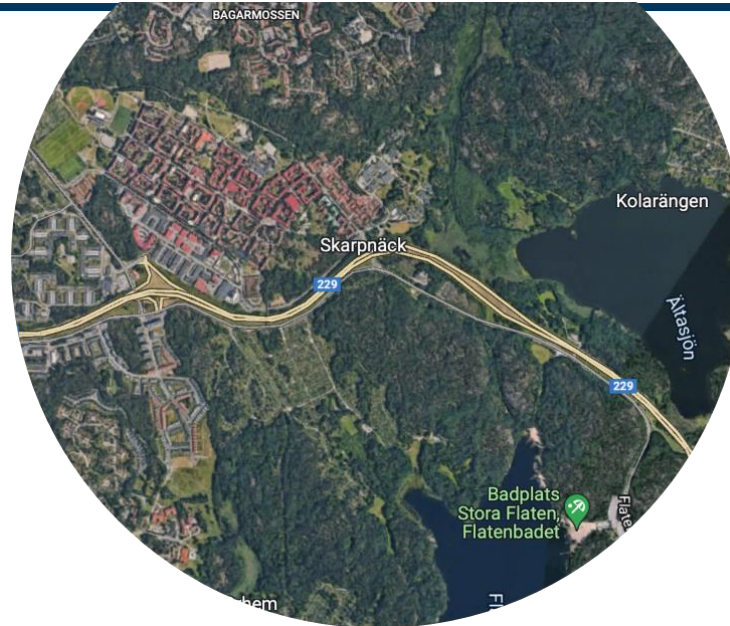


Social
Cohesion &
quality of
life



Our project area

- Borough in the south of Stockholm
- Population: 40.000
- Surrounded by nature reserves, good access to the city centre by public transport / highway
- larger construction projects started in 1920 and continued ever since



New district requirements

- Need for new schools (minimum 3) + expansion of existing schools
- More meeting places for cultural and community groups
- Two sport halls, swimming pool and ice rink
- Strengthening connections between areas
- **Hammarbyhöjden**: major development opportunities, transformation of an urban corridor
- **Bagarmossen**: major local developments, add homes, services, businesses, more public spaces, connect the two areas (Bagarmossen and Skarpnäck)
- Skarpnäck industrial area is to be developed, with more non-disruptive businesses

Planned improvements



Sketch of Bergholmsbacken, with a developed park area towards Skarpnäck

- Destruction of habitats by building projects
- Higher mortality due to increased traffic
- Increased disturbance of surrounding ecosystems
- Increased artificial lights
- And others...

- High environmental consciousness
- Strict environmental laws
- Improved nature protection
- Mitigating the effects of landscape fragmentation

Stakeholder Perspectives

Urban Heat Island



Biodiversity



Flood Risks



Social Cohesion & quality of life



- Flood Risk is one of several societal challenges which Stockholm has to face in the nearly future
- Reasons: climate change, land consumption, sealing of the soil
- Climate adaption of the physical environment becomes increasingly important
- Precipitation and temperature conditions change and more extreme weather events occur

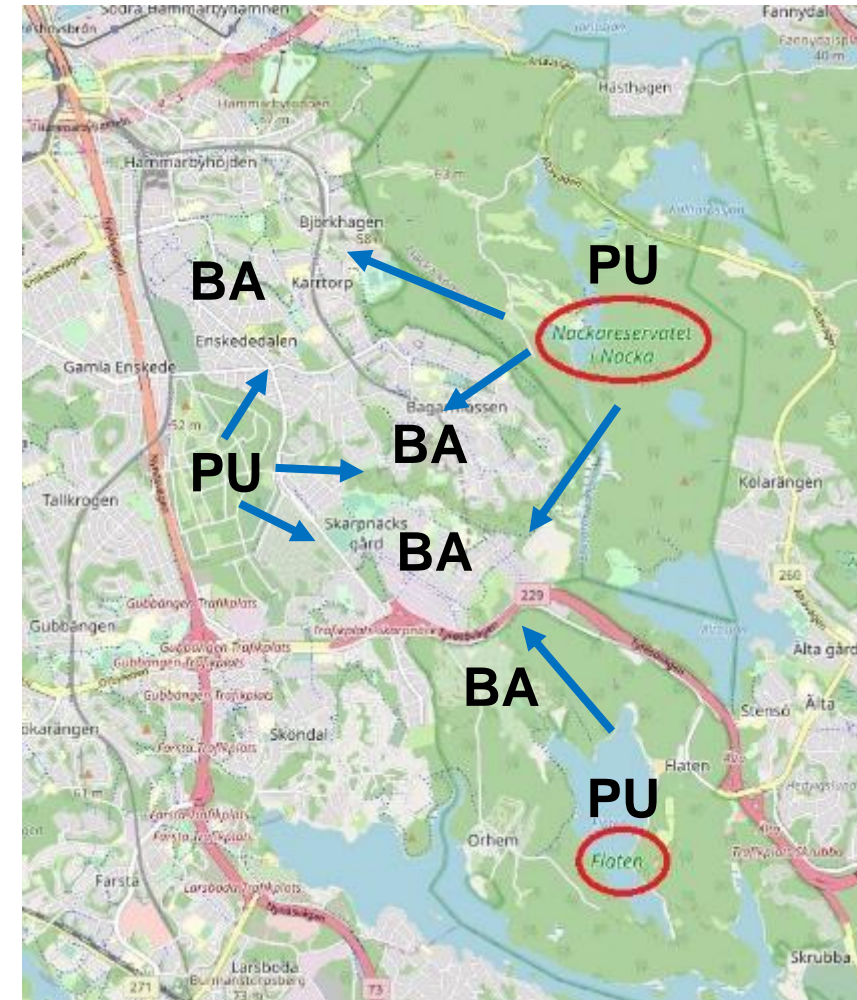
Stockholm = Climate-Smart and Resilient City

Stockholm City Plan 2018

Flood Risk in Skarpnäck

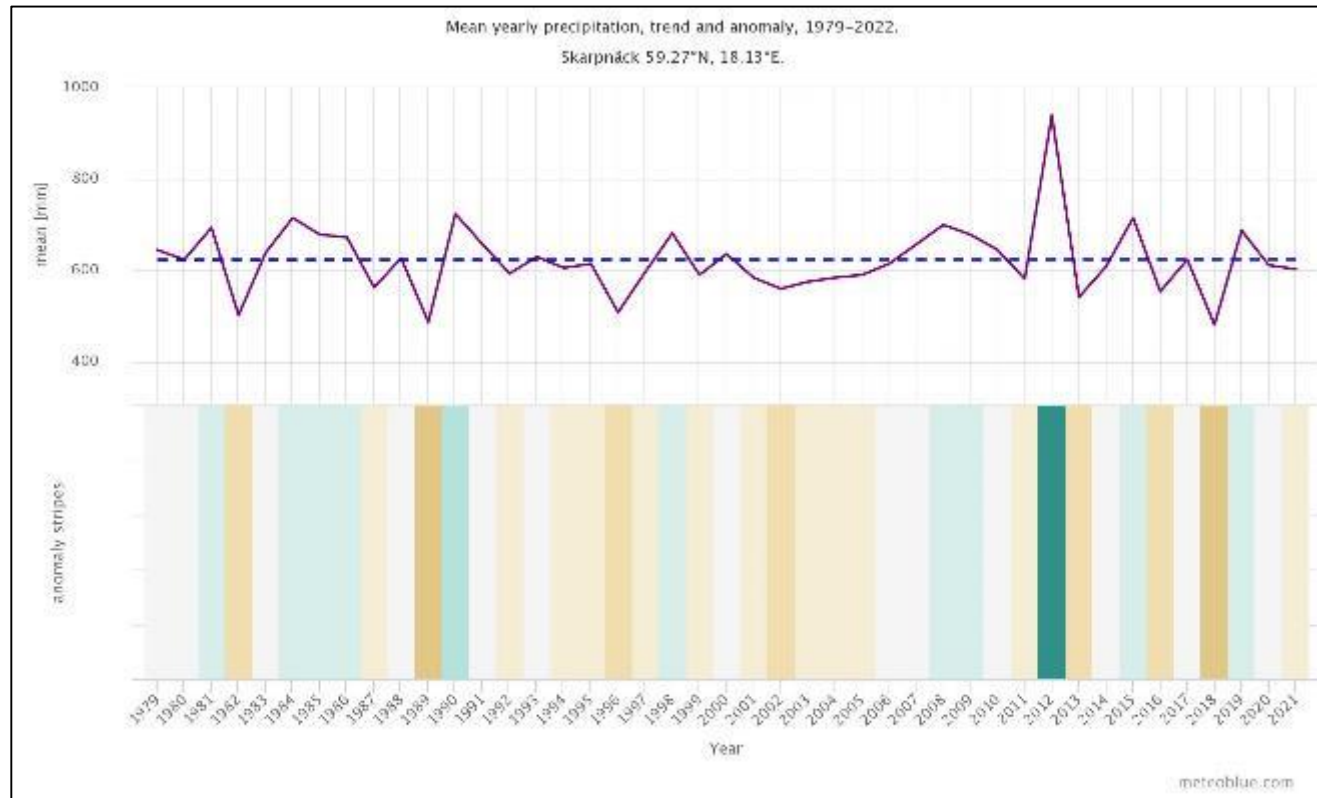
- Skarpnäck has good access to nature and recreation
- Nacka and Flaten as Nature reserve in the east and south-east of Skarpnäck
- These nature reserve are valuable assets to mitigate flood risks
- PU = service providing unity
- BA = service benefiting area

Stockholm City Plan 2018



Flood Risk in Skarpnäck

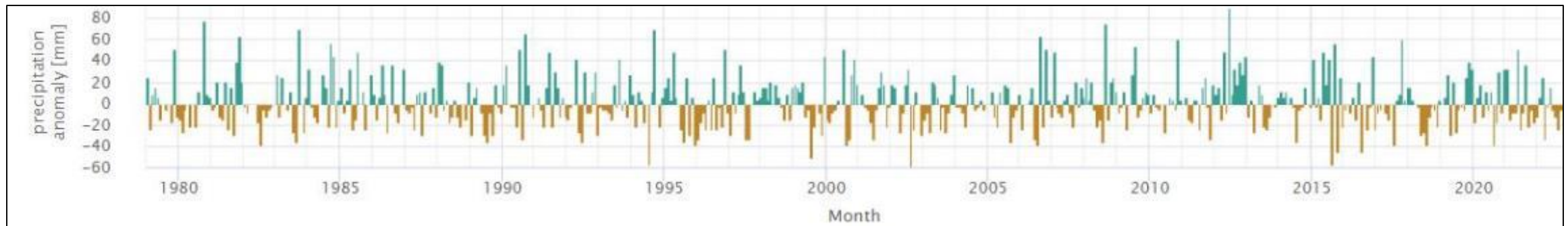
Mean yearly precipitation and trend, 1979 – 2022.



Meteoblue.com

The top graph shows an estimate of mean total precipitation for the larger region of Skarpnäck. The dashed blue line is the linear climate change trend. If the trend line is going up from left to right, the precipitation trend is positive and it is getting wetter in Skarpnäck due to climate change. If it is horizontal, no clear trend is seen and if it is going down conditions are becoming drier in Skarpnäck over time.

Monthly anomalies for precipitation 1979 – 2022.



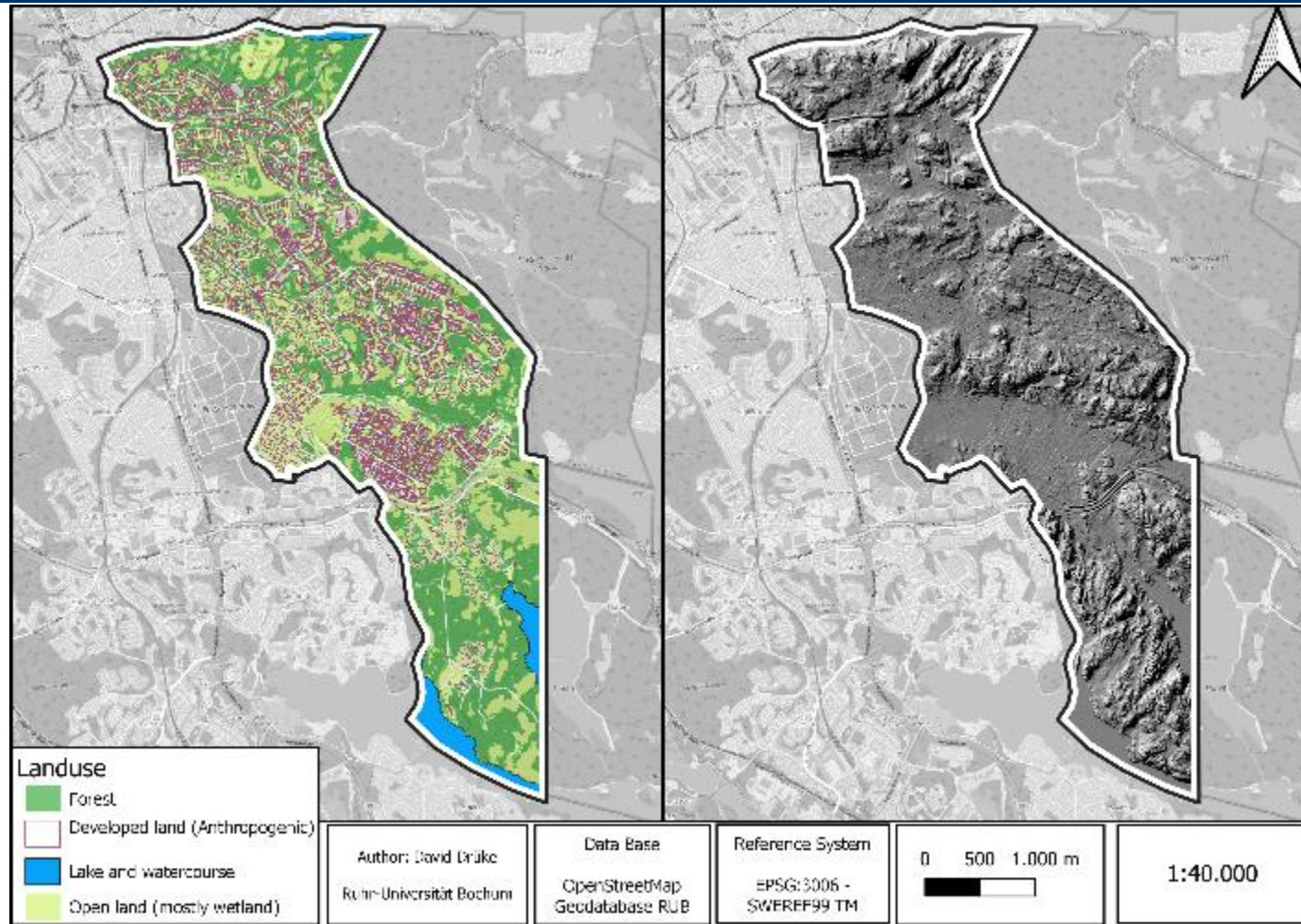
Meteoblue.com

The graph shows the precipitation anomaly for every month since 1979 up to now. The anomaly tells you if a month had more or less precipitation than the 30 year climate mean of 1980-2010. Thus, green months were wetter and brown months were drier than normal.

Flood Risk in Skarpnäck

25% of area is sealed soil by impervious materials = no direct infiltration

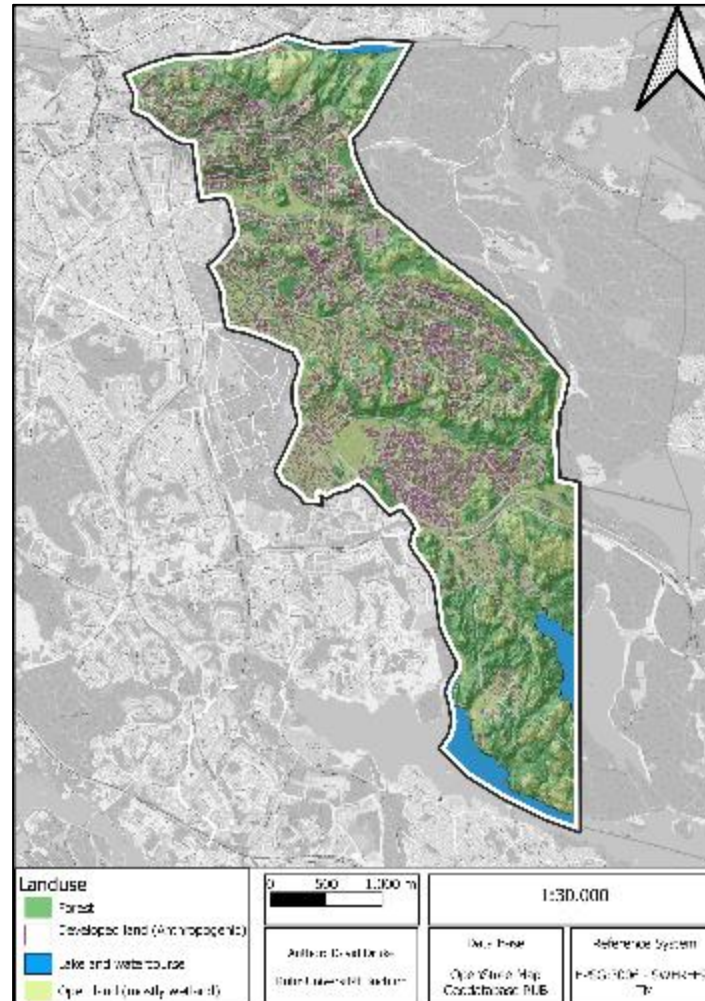
75% of area is unsealed soil = infiltration



Left: Landuse in Skarpnäck

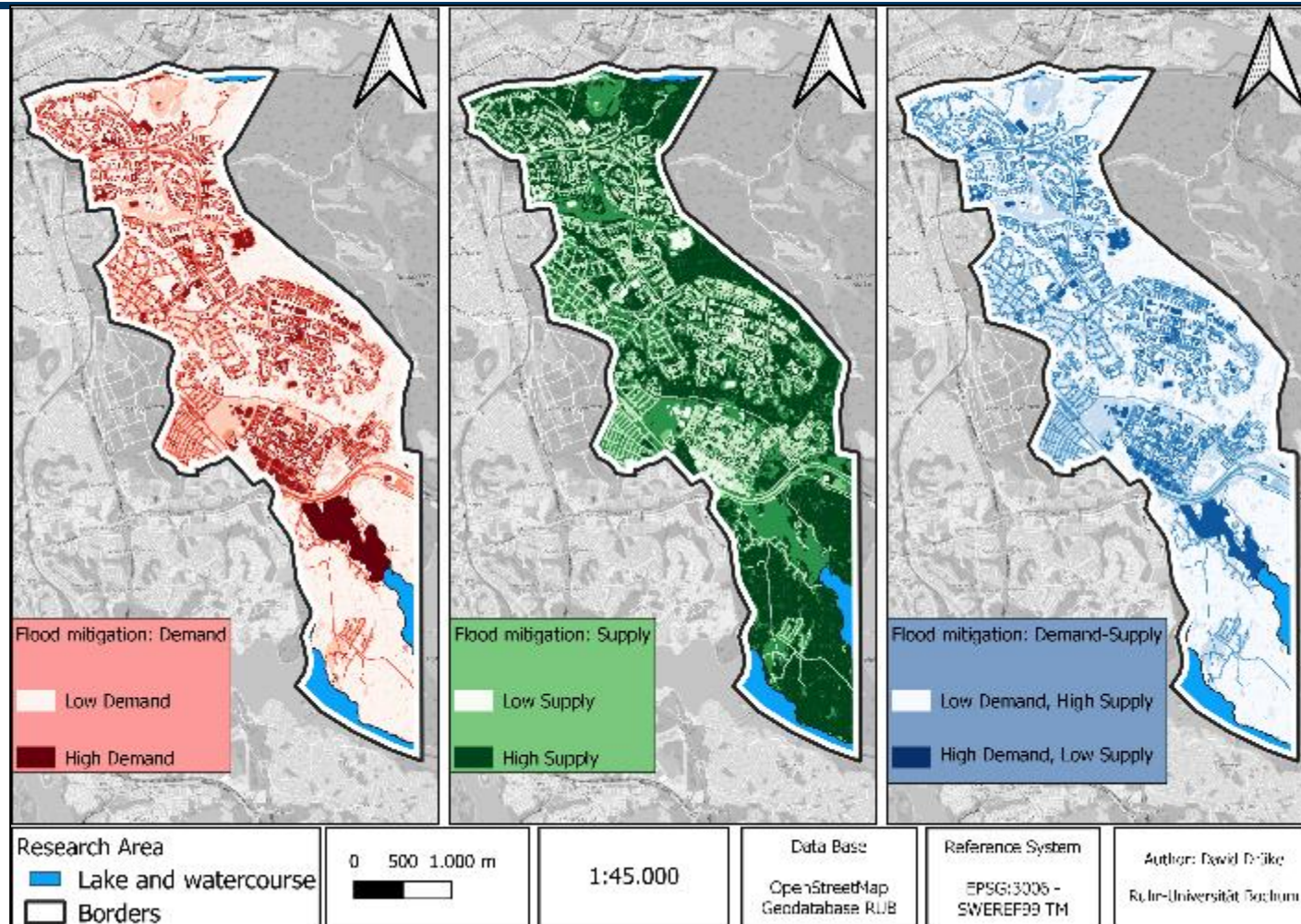
Right: Elevation in Skarpnäck

Flood Risk in Skarpnäck



Combined Map of Landuse and Elevation in Skarpnäck

Flood Risk in Skarpnäck



Different Flood Risk Maps: Left (Flood Risk Demand Map) Centre (Flood Risk Supply Map) Right (Food Risk Services Supply and Demand Map)

- Total Area Size
 - Approx. 1151 ha = 11510000 m²

- Developed Land = 286 ha = 25% with negative effect on flood events

- Population now: 46.145
- Population for 2040 estimated: 64.574
 - Increase of population by 39%

- 286 ha * 1.39 = 397 ha

- Developed Land 2040 = 397 ha = 34% with negative effect on flood events

- Possible Solutions:

- Avoiding/Reducing of impervious surfaces
 - Porous paving, green parking lots, brownfield restoration
 - Contribute to slow down water runoff and enhance water infiltration, reducing peak discharge and offering protection against extreme precipitation events

- Maintaining and managing green areas for flood retention and water storage
 - Vegetated areas reduce peak discharge, increase infiltration and induce the replenishment of groundwater.

Geneletti et al. 2020: 23

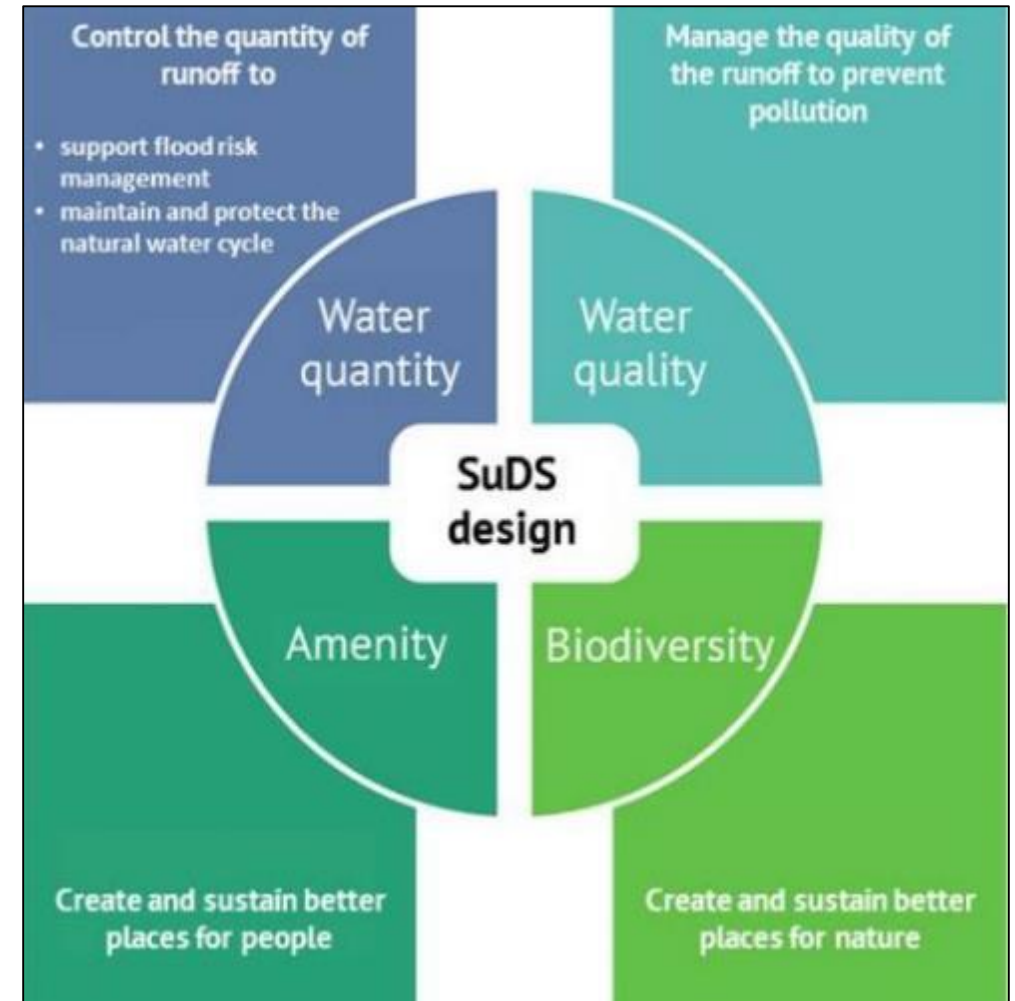
Flood Risk in Skarpnäck / Nature Based Solutions

- Sustainable Urban Drainage Systems (SUDs)
 - Designed to drain water in a more sustainable manner than some conventional techniques.



Examples of SUD's

Susdrain.org



Susdrain.org

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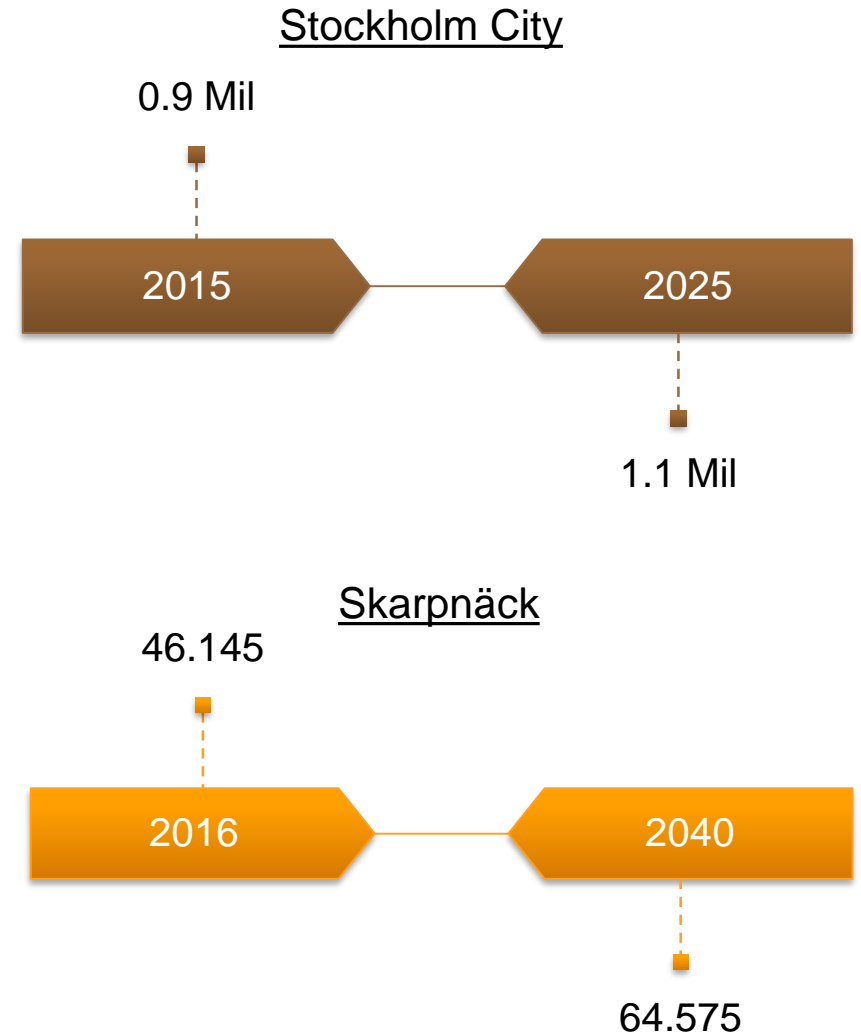


Social
Cohesion &
quality of
life



- Rapid **population growth**
- High birth rate and inwards migration
- Increasing number of **children and young people** (Stockholm City: 2015-2025 + 21%)
- Rising number of **older people** (Stockholm: 2015-2025 + 26%)
- Demands for social cohesion and recreation:
 - **Inclusive spaces** for social encounter
 - **Age-appropriate** recreational spaces
 - **Safe mobility and access** for vulnerable groups

City Planning Administration (2018)



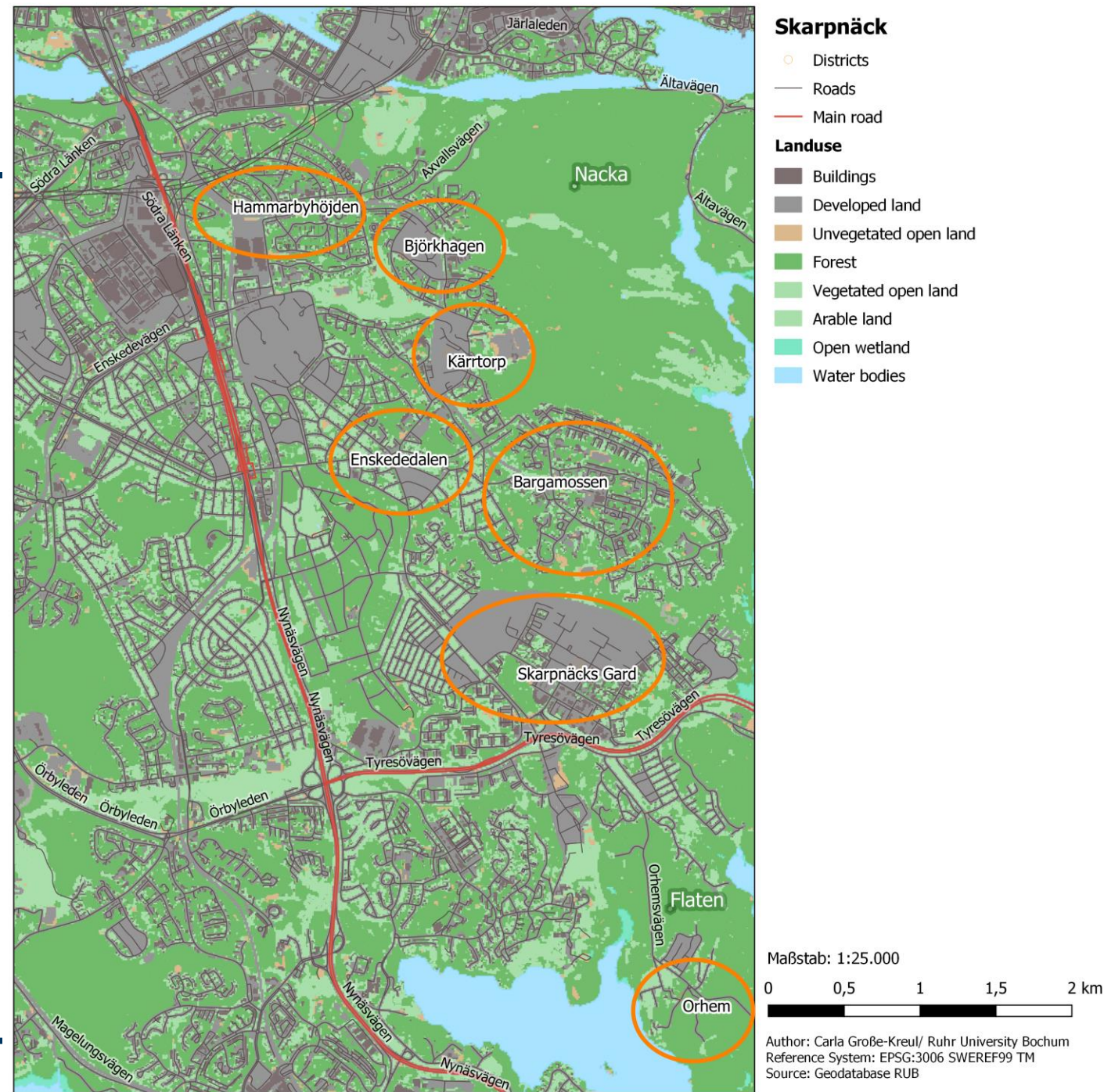
Social Challenges in Skarpnäck



City Planning Administration (2018), p. 47-171

Segregation

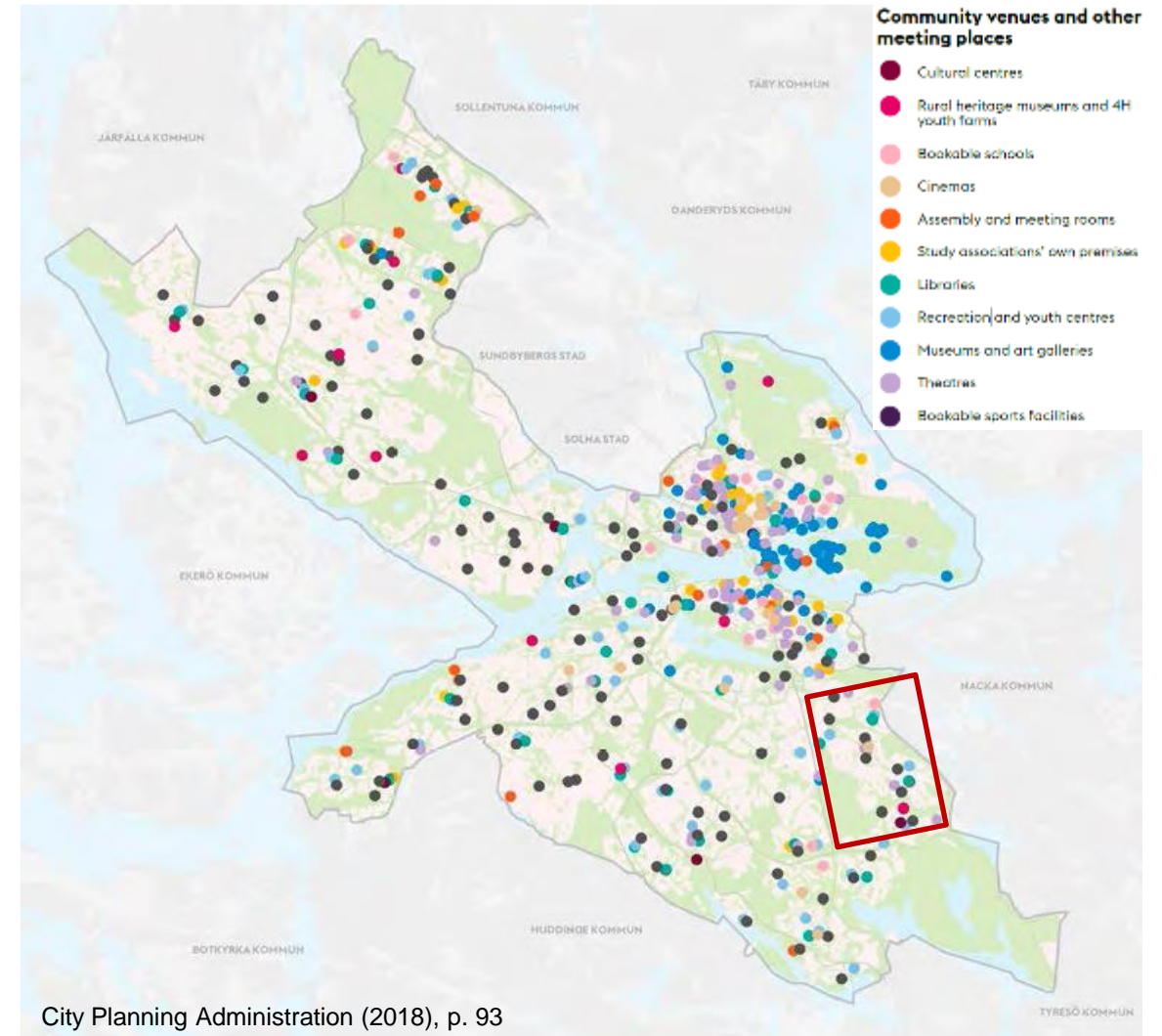
- **Diverse population** which is spatially divided
- **Spatial barriers:**
roads, tracks, water bodies, green spaces
- Isolated neighbourhoods usually have **different socio-economic status and physical condition**
- E.g. „Islands“ of detached houses, apartment blocks, industrial areas
- **Impediment of social encounter** and cohesion



- Elements of social inclusion: **Security and accessibility**
- **Security:**
 - Major perception differences depending on local area and gender
 - Gender: Especially women and girls
 - Local area: Areas with high criminality and social exclusion
- **Accessibility:**
 - Limited access to urban assets: public transport, shopping, public services, culture (age inappropriateness, distance, commercial premises)
 - Vulnerable groups: Children, socio-economic disadvantaged, people with mental/physical disabilities

Community and recreational places

- Majority of cultural institutions in the city centre
- Mostly **sports facilities, youth centres and theatres** in Skarpnäck
- **Lack of spaces** for
 - Cultural encounters
 - Community grounds
 - Artistic production & creative industries
 - Sport facilities
- **Access** to nearby Flaten nature reserve and Nacka reserve
- **Large parks** as Skogskyrkogården



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“Stockholm is to be a city for everyone with dense and cohesive urban environments in which buildings and green spaces work together, enabling good living environments to be created”

(City Planning Administration 2018, p.6)