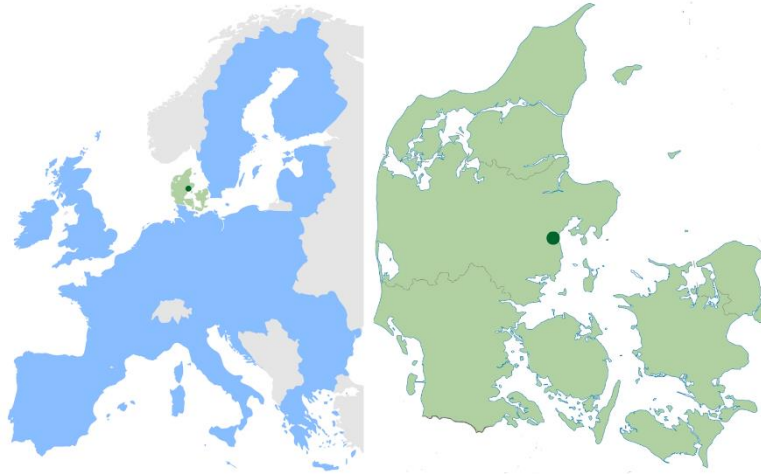


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City of Aarhus

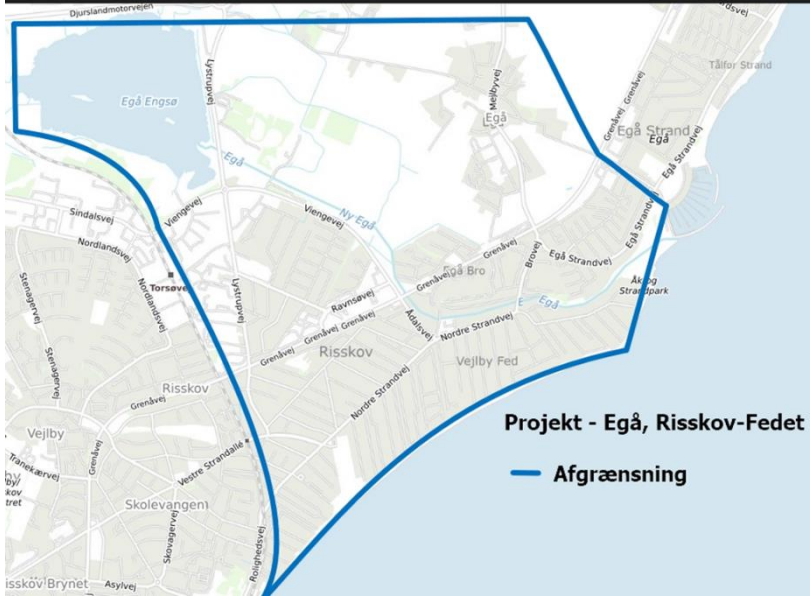


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<p>Context/Situation</p>	<p>Aarhus is Denmark's second-largest city with 350.000 inhabitants and is located on the eastern shore of Jutland facing the Kattegat Sea. Aarhus is built on the low-lying Egå river delta and is due to the present and future climate therefore threatened by flooding.</p> <p>Flood forecasting</p> <p>One of the most threatened areas along the Egå river delta is the northern part of Aarhus. The area is densely populated, low-lying and at risk of flooding under increased precipitation and extreme weather events. Aarhus Municipality has carried out screenings of 1) flood risk from storm surges and rising sea levels, 2) extreme cloudbursts and 3) floods from streams/lakes and the rising groundwater table, respectively (see map below).</p> <p>All forecasts indicate that Aarhus will suffer pluvial flooding events that cause disruption as well as economic and social costs.</p> <div style="display: flex; justify-content: space-around;"> <div> <p>Flood risk from storm surges/rising sea level</p> </div> <div> <p>Flood risk from extreme cloudbursts</p> </div> <div> <p>Flood risk from streams, lakes, rising groundwater</p> </div> </div> <p>Critical infrastructure at risk</p> <p>Aarhus anticipates densification with an additional 75,000 inhabitants by 2030 and some of the most densely populated areas are the ones at the highest risk of flooding. Future flooding scenarios indicate that in addition to houses and</p>
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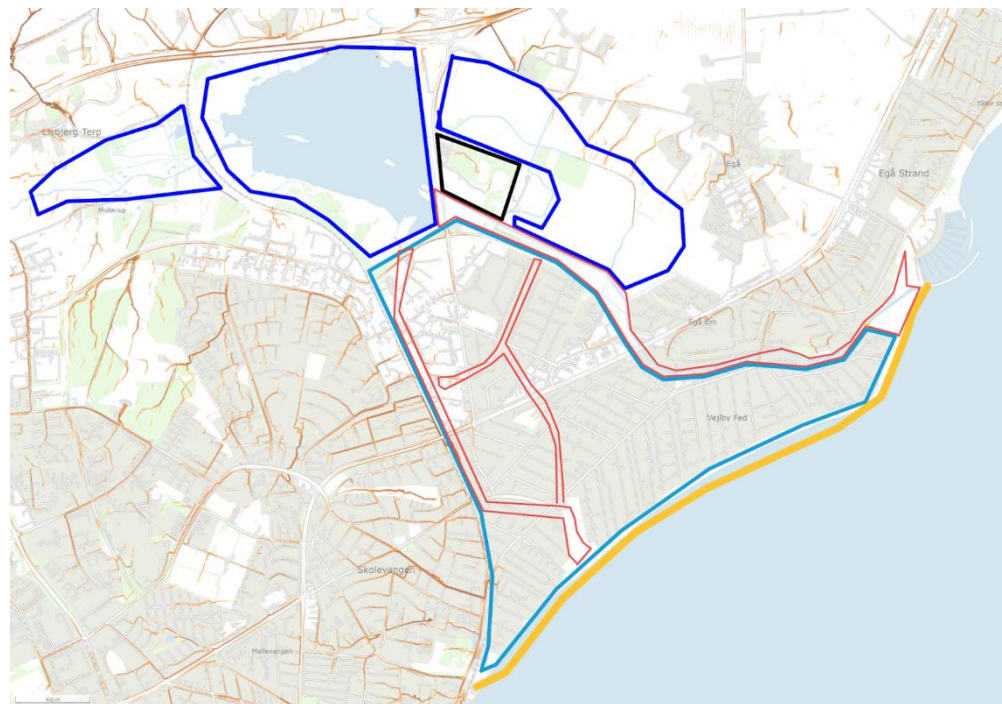
	<p>properties, several critical infrastructure points of the city will be damaged, including main roads, heating lines, recycling stations and at least one vital wastewater plant along the Egå River.</p> <p>Nature-based solutions</p> <p>In the past few years, Aarhus Municipality has together with the water company Aarhus Vand explored how nature-based solutions can address and mitigate some of its CCA challenges and become integrated into long-term city planning. A new project will therefore build on top of previous NBS projects (see list of previous projects below).</p> <p>The need to climate-proof critical infrastructure goes hand in hand with another urgent agenda in the municipality: restoring the environment, and biodiversity and cutting CO2 emissions. Aarhus has decided to double the total nature area in the municipality by 2030 and increase the forested area to 8.000 hectares by 2030 to ensure clean drinking water provision and improve green recreational areas for all citizens.</p> <p>In addition, Aarhus Vand will invest millions over the coming years to reach the full separation of rainwater from wastewater by using NBS to create a flood-resilient city with rainwater on the surface instead of in pipes.¹</p>
<p>Description of demonstration site(s)</p>	<p>Biogeographic region: Nordic, Atlantic and Continental</p> <p>Surface area (Aarhus): 790 ha</p> <p>Aarhus Municipality is conducting a series of pre-studies in the area, while local project partners have identified preliminary ideas of where NBS solutions can be explored in the project.</p> <p>Three demonstration sites</p> <p>Overall, a total of three demo sites are in scope (see map below); Egå, Risskov and Vejlbj Fed.</p>  <p>The screening of the area at Egå, Risskov and Vejlbj Fed shows that future 2-year events will become indistinguishable by 2070 with the latest forecasts. The</p>

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high level of groundwater in the area means that groundwater rises will follow sea level water rises. There is 2.2 million m³ of extraneous wastewater (saltwater and groundwater) leading to the wastewater facility and a discharge permit cannot be granted. Furthermore, the potential for creating a new lake does not harmonise with rising groundwater. The old lock in the Egå River is activated to a large extent, however, prevents fish from passing, and there is also a legal requirement in the watershed plans to remove the blockage. On the other hand, if the lock is used less it will lead to increased saltwater intrusion. There is great potential for synergy between measures to deal with stream flooding and rising seawater. However, measures can also potentially worsen flooding during extreme rain events and rising groundwater levels if they are not addressed simultaneously and with a holistic approach.

Preliminary NBS potentials to be explored



The **blue lines** indicate the potential water retention basins (Egå Engsø & Hede Enge). NBS potentials could be CO₂ biosequestration in soil or planting of trees, restoration of natural areas and biodiversity, water treatment and nutrient recovery.

The **red lines** indicate the Egå stream and other streams. Nature-based solutions could be creating natural dikes or banks and planting these, while at the same time delivering co-benefits in the form of recreational areas and improving well-being in urban areas and thereby supporting sustainable urbanisation.

The **yellow line** indicates where there is a need for coastal protection. NBS-potentials within coastal protection include rethinking the use of dikes e.g. by establishing plants for strengthening the dykes, rock reefs, mangrove/willow or eelgrass.

Cross-cutting opportunities on demo sites:

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	<p>1) Modifying the hydrology by changing ecosystems from fresh in selected areas would open some opportunities, however, is also associated with vast regulatory barriers since some of these are §3 protected areas under the Danish Nature Protection Act.</p> <p>2) Recreative areas (making areas attractive)</p> <p>3) Using space data to monitor development in NBS solutions and how they increase the resilience of infrastructure. More specifically this could be by combining CAMS with IoT already in use and creating a system integration on the municipality open source platform OS2/IoT that operates within the European interoperability framework (soon to be an Act). This data is available to the Aarhus Municipality department for Innovation & Technology.</p>
Programme and call	Horizon Europe: HORIZON-MISS-2023-CLIMA-01-02 : Testing and demonstrating transformative solutions to protect critical infrastructure from climate change, mainstreaming nature-based solutions
Deadline for call	20 September 2023 17:00:00 Brussels time
Lead organisation	Searching for consortium lead partner.
Partners already involved	<p>Aarhus Municipality and Aarhus Vand aim to join an international consortium together with a range of local stakeholders to scale impact across the region and in DK, including the region of Central Denmark, universities and companies. These potential partners or associated partners are described below.</p> <p>Aarhus Vand, the water company of Aarhus participates in several EU projects to explore innovative ways of doing CCA and NBS at once. Aarhus Vand has carried out two major climate adaptation projects with rainwater being handled at the surface – one in Lystrup north of Aarhus and one in Risvangen in the northern end of Aarhus.</p> <p>Central Denmark Region. The regional authority of central Denmark has long experience leading EU projects with its 19 municipalities. The region can draw on its long catalogue of local CCA cases from across the Central Denmark geography, where more than 30 partners participated in the LIFE IP Coast to Coast Climate Challenge project (2017-2022). The project targeted the implementation of CCA plans in municipalities, coordinated CCA analyses and activities, and the improvement of the adaptive capacities of citizens, municipalities, utilities and companies in the water sector. The region is also a partner in the new Horizon RESIST project (see below).</p> <p>VIA University College is one of DK's six university colleges with a research focus on professional practice in areas such as healthcare, teaching, social education, technology, and business. VIA has long experience in EU projects in climate adaptation solutions. VIA participates in the regional LIFE C2CCC project, RESIST and R4C projects, delivering XR visualisations for citizen engagement as well as research within the fields of data measurements of the near-surface groundwater, NBS, and flood-resistant buildings.</p> <p>OK Nygaard A/S (landscaper and climate entrepreneur) and part of Europe's largest landscaping group, <i>idverde</i>. The company has extensive experience in EU projects e.g BARCOVE - Building an Applied Research Facility into Centers of</p>

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	<p>Vocational Excellence and European Platform on Urban Greening, which has provided OK Nyggard with experience in working internationally with nature-based solutions.</p> <p>Aarhus Municipality and the regional authority of Central Denmark are both signatories of the Mission Charter under the EU Mission on Adaptation to Climate Change. Aarhus is furthermore one of the 100 cities under the EU Cities Mission to become climate neutral before 2030. Aarhus Municipality has participated in 9 H2020-projects and is involved in 5 Horizon Europe projects.</p>
Partners we are looking for and their expected role in the project	<p>Other European cities/regions with similar biogeographical conditions.</p> <p>Knowledge partners within climate proofing and NBS are sought.</p>
Legal basis	<p>The project directly relates to the following EU and local strategies:</p> <ul style="list-style-type: none"> • The EU Water Framework Directive • EU strategy on adaptation to climate change (2021) • Aarhus CCA plan and nature plans as outlined in A greener Aarhus, Aarhus with more Blue and Naturkvalitetsplanen 2013 - 2030 • Areas protected under §3 in the Danish Nature Protection Act
Exploitation of previous project results	<p>REGREEN (H2020): In this project, Aarhus aims to promote urban livability, by systematically enhancing and restoring ecosystem services and biodiversity as the basis for Nature-Based Solutions. In this regard, Aarhus aims to improve water quality, water flow management, reforestation, carbon sequestration and urban green spaces for recreation.</p> <p>RECONNECT (H2020): Aarhus participates in the project, which aims to demonstrate the potential of nature-based solutions, such as restoring wetlands, creating green roofs, and improving river management, to increase the resilience of communities and ecosystems to floods and other natural hazards. The project will also develop new methodologies and tools for assessing the effectiveness of nature-based solutions and for engaging local communities in their design and implementation.</p> <p>RESIST (HEU): Central Denmark participates as one out of four large-scale demonstrators in the project. The RESIST project aims to increase the resilience and adaptive capacity of 12 climate-vulnerable regions in the EU through the implementation of four large-scale demonstrations of resilient innovations for CCA. The project engages various stakeholders to co-create and validate innovative solutions and promote sustainable exploitation of results towards the markets.</p>
Contact information	<p>Søren Winther Lundby lsow@aarhus.dk Aarhus Municipality</p>