

Climate Change Adaptation of Frihamnen: Visualising Retreat, Defend and Attack

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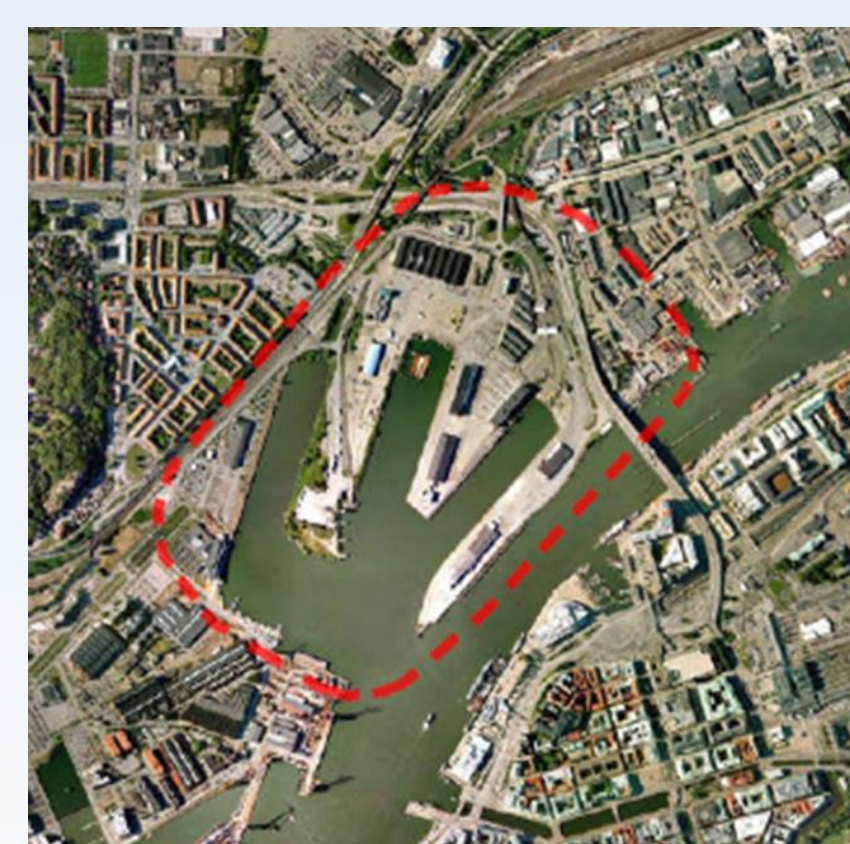
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Introduction

In order to reduce the risks and take advantage of the opportunities linked to climate change, climate change adaptation must *inter alia* be integrated into urban planning and water management (SOU 2007:60).

The expected impacts of global warming, such as flooding in low land areas with damages on infrastructure and buildings, underline that we will have to build for resistance and resilience. Rising sea levels are likely to become an important aspect of water management and are particularly significant for the many European cities that are located near the sea and other water bodies.

This poster demonstrates how climate change adaptation can be integrated into city planning. It illustrates the three different strategies to meet rising sea levels in urban areas. These concepts were originally developed by the Royal Institute of British Architects, Building Futures and Institution of Civil Engineers (RIBA, Building Futures and ICE, 2010) and we demonstrate their applicability in urban planning outside the United Kingdom through a case study of Frihamnen.



The urban district is attractively located by the river in the second largest city in Sweden, Gothenburg, and is about to undergo a transformation from industrial docklands to a modern residential and commercial area.

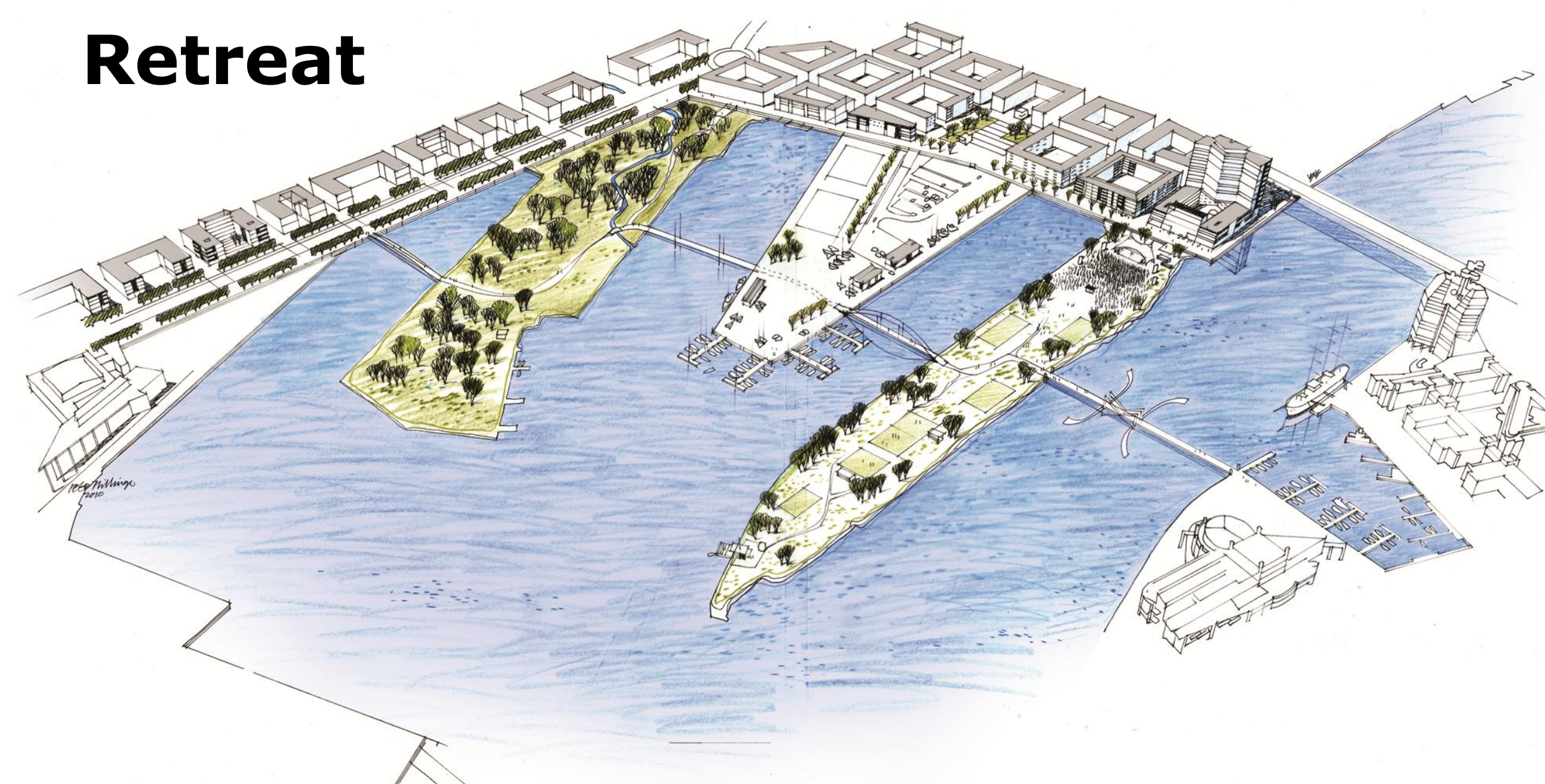
Three strategies for climate change adaptation

The three strategies visualise each strategy in its extreme form, in order to provoke creative thinking on ways to meet the climate change challenge. The three strategies can be summarised as follows (illustrations by SWECO Architects):

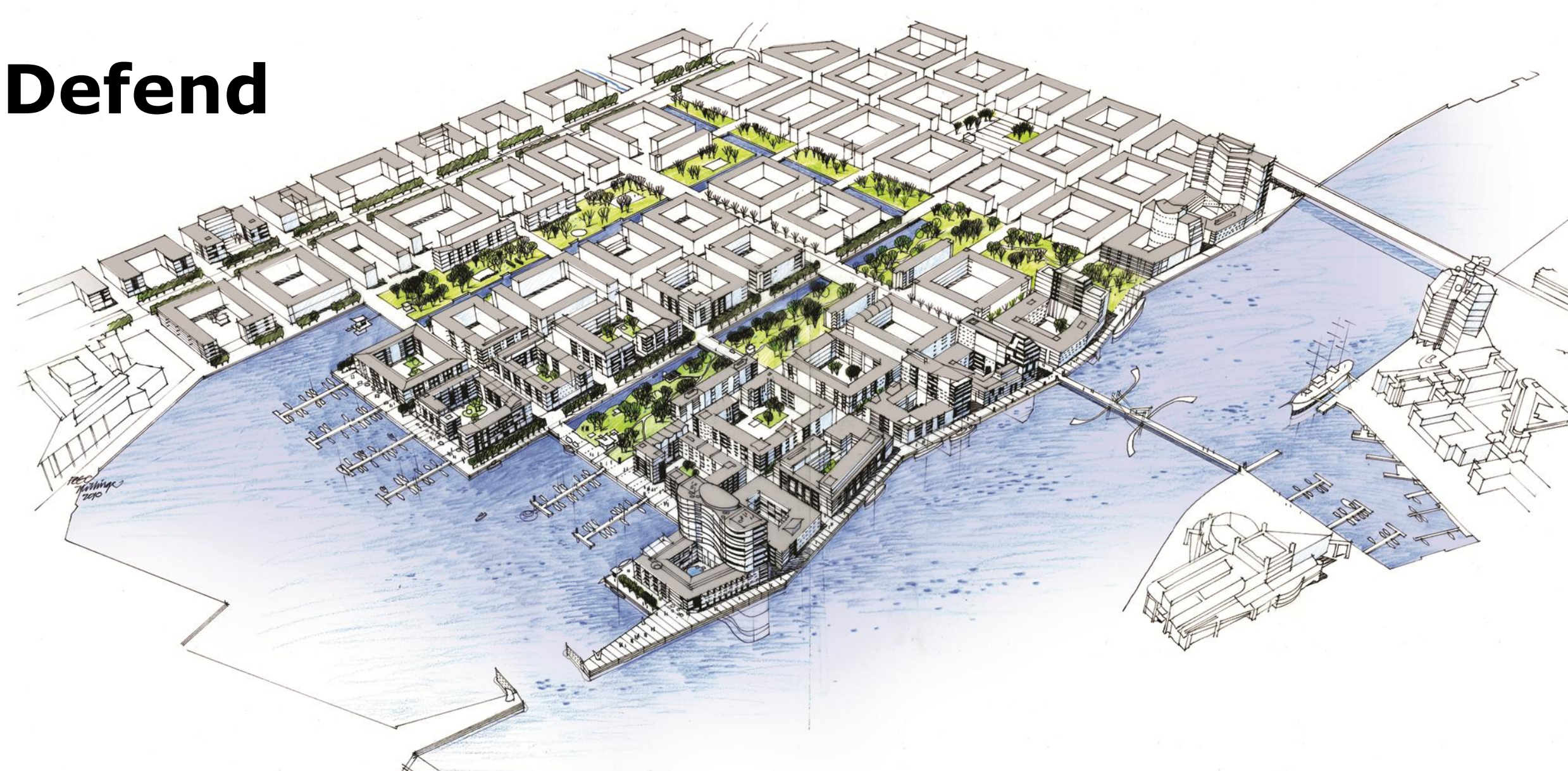
1. Retreat

A retreat strategy means that infrastructure and buildings gradually, i.e. through a long term planned and managed process, are moved to safer ground. The city is in essence gradually reallocated, i.e. it retreats, in order to avoid flooding.

Retreat



Defend



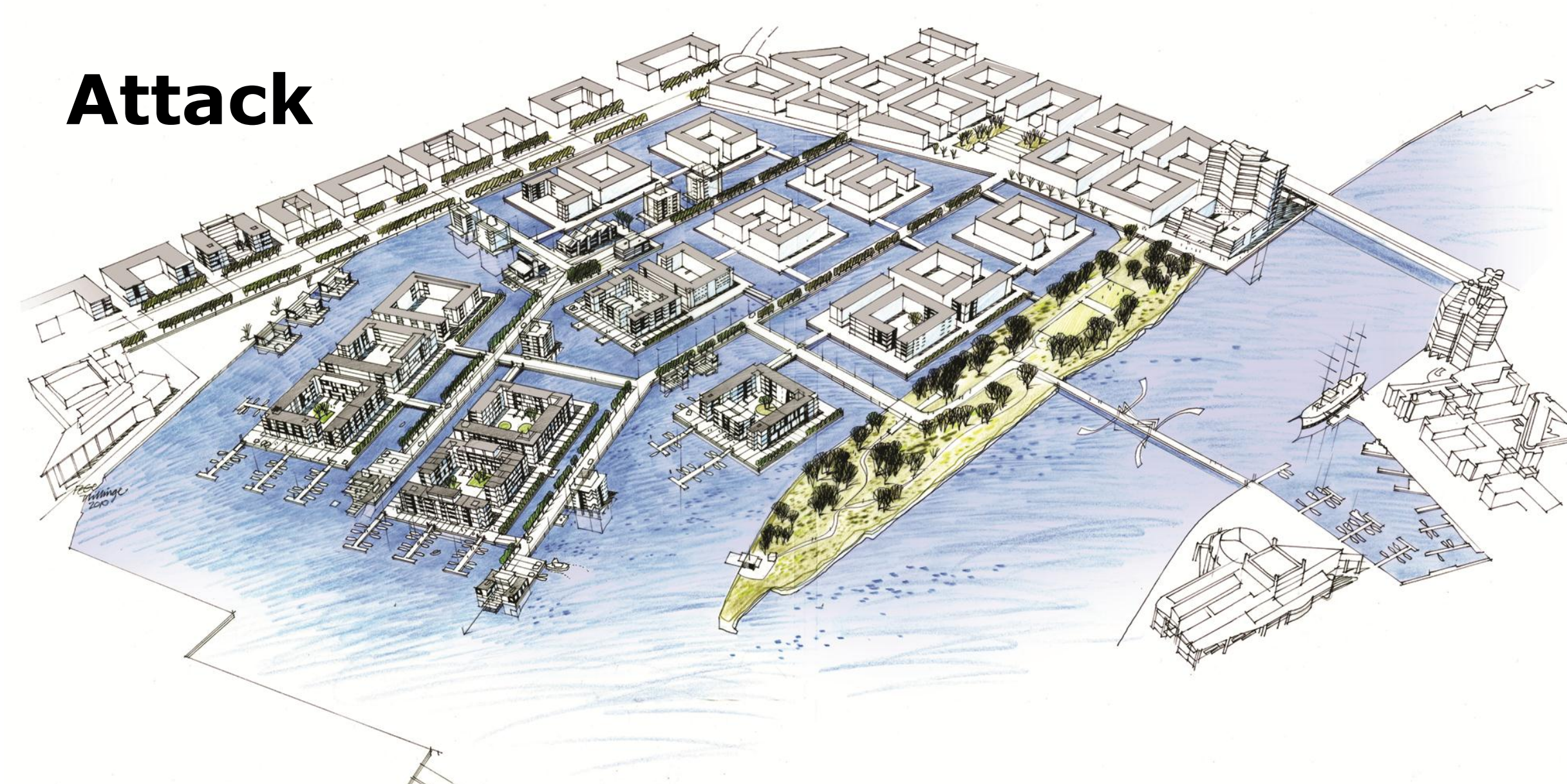
2. Defend

A traditional way to protect an urban district from flooding via flood defenses, e.g. walls or other "hard" measures. A defense strategy saves the city from reallocation and protects existing infrastructure, but can be extremely costly depending on how much protection is needed and the level of risk.

3. Attack

The attack strategy means that the city advances and builds out onto the water. Using modern technology but also traditional construction methods and designs that are adapted to flood risks and are made flexible to handle rising sea levels.

Attack



References

Building Futures, Institution of Civil Engineers (ICE), (2010) Facing up to rising sea-levels: Retreat? Defend? Attack?
Swedish Government Offices (SOU 2007:60), (2007) Sweden Facing Climate Change – Threats and Opportunities.