

HEALTHY AND RESILIENT HOMES

registration number HHDC65



Site

The Healthy Homes competition defines the site, an old football field situated on the very north tip of the old town of Pernis in Rotterdam. Placed right by the Maas, the largest river flowing through Rotterdam, the site is placed

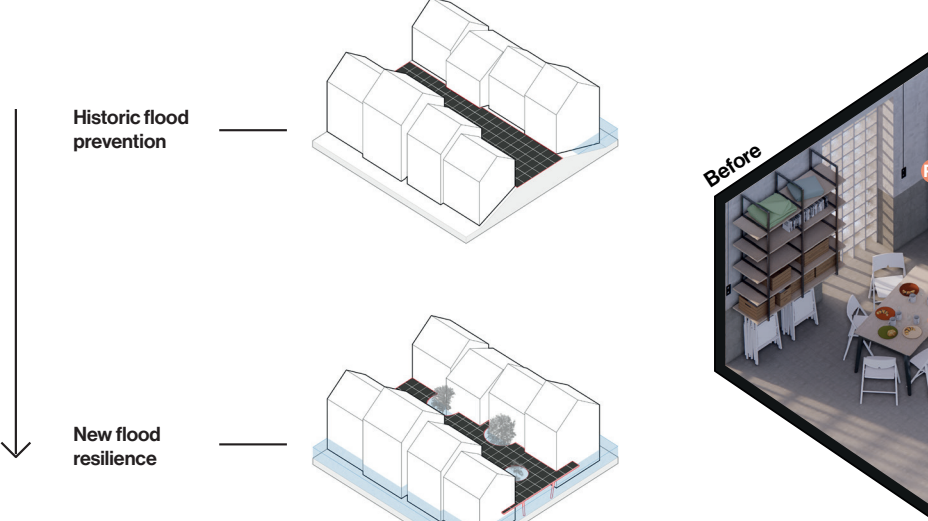
Flooding

With so many people at risk, it's not sustainable to only create new expensive developments that can resist water. The creation and development of technologies and solutions that can be retrofitted in existing buildings and implemented in situations where retention is not an option is crucial to ensure all people the opportunity to adapt to the future. Tomorrow's problems need to be solved today. A new reality where flooding is a part of society is approaching. Today flood events are commonly categorized as disasters, but in some parts of the world it's already part of their life without being categorized as such.

Disaster:

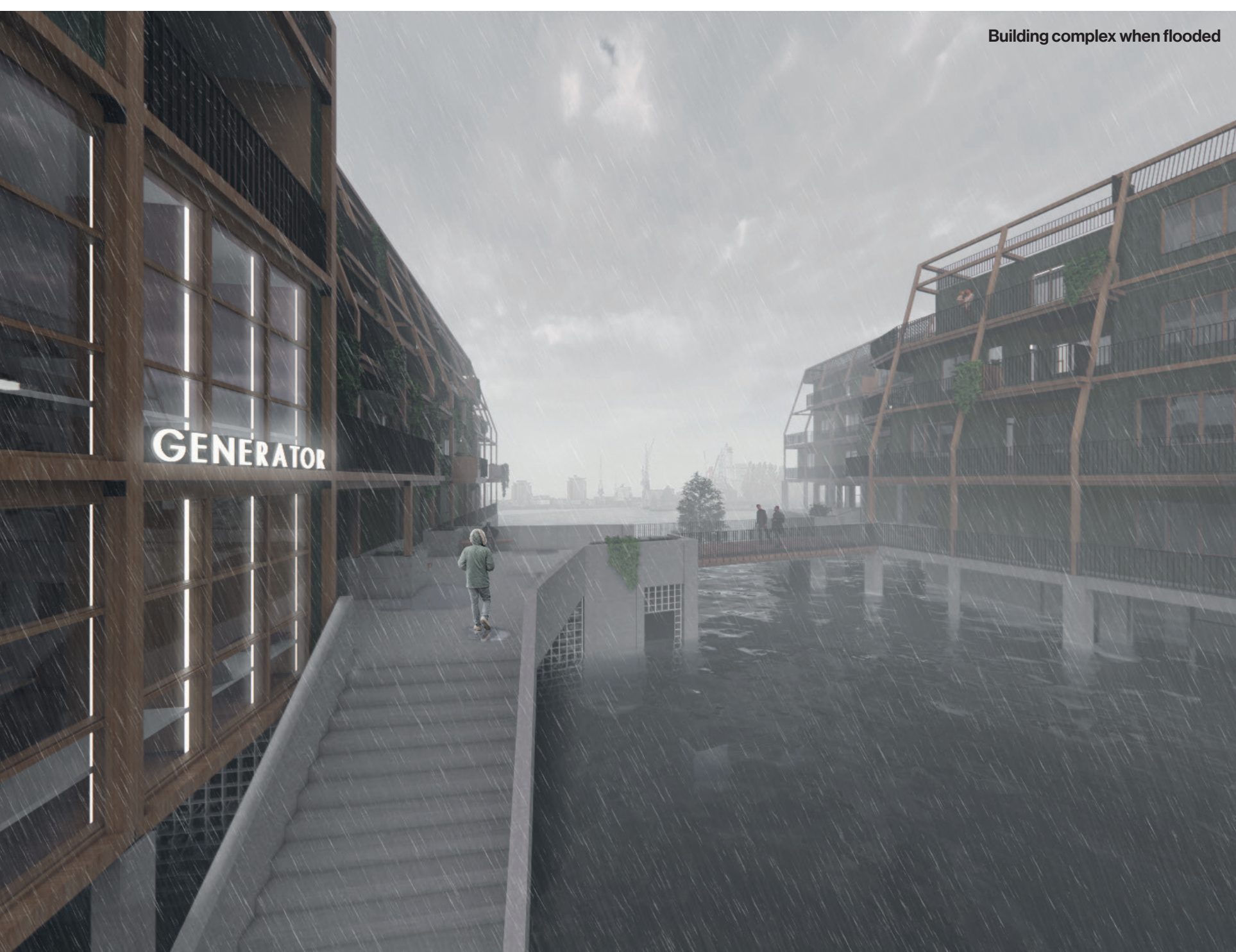
"An event or occurrence of a ruinous or very distressing nature; a calamity, esp. a sudden accident or natural catastrophe that causes great damage or loss of life."
- Oedcom, 2021

If the implemented solution for flooding contradicts the impact, resistance across and facilitates life and activity its effect would no longer be categorized as disastrous.



Visual & atmospheric comfort

As natural ventilation is implemented as a ventilation strategy in the cooling season, the solar chimney is a good supplement to allow for ventilation even in wind still conditions. In addition to the stack effect present in a chimney, the solar chimney takes advantage of solar energy to heat up the air. The solar radiation is absorbed by thermal mass in the back wall of the channel, this in turn heats the air through convection. The thermal buoyancy caused by exposure to the sun further increases the airflow. To investigate the potential of a solar chimney a simple model was modeled in Bim. A 2-meter tall chimney with a glass opening to the south was modeled to investigate the temperature difference between the inside and outside air temperature. This gives an opportunity to guarantee nighttime venting as a great measure against overheating. Assessment of indoor climate is typically measured in categories. Category I being the best and IV being the worst. One of the main focus points has been on developing a healthy home with a good indoor climate, category I have therefore been an aim since the beginning. The documentation has been done by analysis and simulations of a determined apartment. By visualizing and accessing the data, it is to be determined when, where and for how long the modeled apartment fulfills the category I regulations. The category chart and regulation are drawn from DSGEN 45798-1 and DSGEN 17037.



The town

The old town of Pernis has a long varied history, starting as a farming and fishing village affected by the First World War, oversteered and physically enclosed by the thriving economy and expanding industry of Rotterdam. Pernis became a part of the municipality of Rotterdam and a metro station was added, combined with a bicycle tunnel to Rotterdam and good bus routes, the town has excellent conditions for alternative and more sustainable transport



Thermal & acoustic comfort

Assessing the knowledge and information gathered through the analysis and studies regarding the indoor environment, it is clear that many measures can be taken into consideration in terms of ventilation, shading, and user integration. Specifically, the integration of passive strategies regarding natural ventilation, window openings and solar chimney, in the design is necessary to include the user in their own comfort and well-being. Other passive strategies to implement are creating the possibility to utilize the principle of thermal mass through material choice and solar radiation, to utilize the heat, and to examine underground and utilize solar radiation for passive heat gain in the relevant situations, other through permanent shading or utilizing the principle of plants as solar shading to prevent overheating. All passive strategies are dependent on

