Pilot location: Spaanse polder, Rotterdam, NL

Location and Environmental Setting

The Spaanse polder catchment is one of the 42 sewer districts of Rotterdam City, located in the Northwest part of the City (*see Figure 1*). The drainage area of this catchment covers 190 hectares. The sewer system is combined; all the water drained by the system is discharged to the WWTP Dokhaven. The district belongs to a polder area, i.e. below sea level. For this reason, during heavy rainfall, excess storm water needs to be pumped out in the river system (directly to Maas River or to surface water bodies connected to it) or temporally stored.
For that purpose within the system there are 6 different outflow points, which connect the network to the surface water bodies of the area.
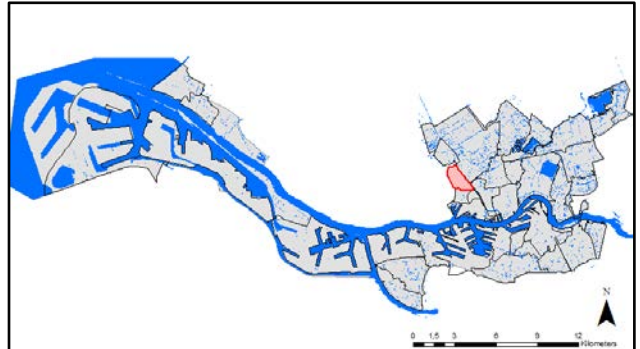

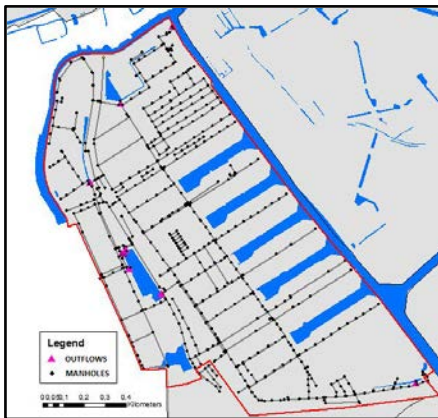*Figure 1: General location of the Spaanse polder catchment*

The catchment is predominantly industrial, there are a few green areas, mainly trees areas surrounding water bodies or linear infrastructures (*see Figure 2 and 3*).

Figure 2: Map of the sewer system of the Spaanse polder catchment

Urban pluvial flood risk problems and management objectives

Past flood problems:
4th July 2005: In Spaanse polder district a severe rainstorm caused 70 cm of water on the streets; sewer system could not absorb the rain due to its extreme intensity. There were in total 170 affected buildings such as basements, households and commercial buildings.

Flooding mechanisms:
The main flooding mechanism in this area is pluvial flooding. Pluvial flooding occurs because of the interaction of several factors:

- The district has a high percentage of imperviousness due to the dense urbanization. In consequence, the hydrologic response to rainfall is very fast and high rainfall peaks translate almost immediately into high runoff peaks.
- There are no storage facilities in which the rainwater can be collected, so surface runoff drains directly into the sewer system, causing flooding when extreme rainfall occurs.
- Under dry weather conditions, water is transported to the waste water treatment plant by means of a pumping system. Under storm conditions, the excess of storm water is pumped out of the system towards the river Maas. However, the pump capacity is limited, and when the water volume exceeds it, water is drained out of the system to surface water bodies. A non-optimal management of the pumping system can exacerbate sewer surcharge.
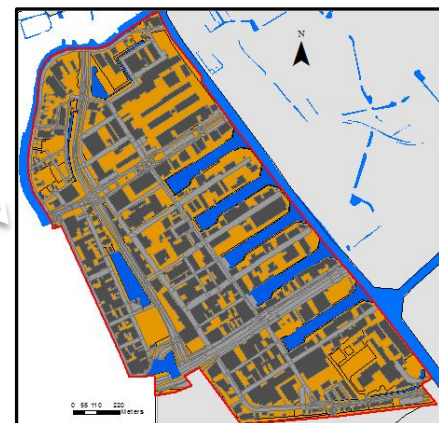

Figure 3: Areas affected by the flood in the past.

Urban pluvial flood risk mitigation options:
Options under consideration for this area, some of which are being explored in the RainGain project, include the following:

- Identify flood prone areas, by modelling the sewer flow in combination with the street flow, taking into account the interaction between the street and the sewer level.
- Find solution to mitigate, reduce or eliminate the risk of flooding, such as: create or optimise storage facilities, better pumping control, new pumping stations that divert water flow towards less vulnerable area.