

HYDROGEOLOGICAL CONDITIONS OF INUNDATION OF A HIGH BUILDING IN AN URBANIZED ENVIRONMENT - A CASE STUDY AT NOWOWIEJSKA STREET 20 IN WARSAW

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In the face of intensifying weather extremes, flooding is occurring more and more frequently. One of the specific areas is urbanized terrains, where the foundations of buildings are located very deep and in close proximity, affecting the natural hydrodynamic conditions. The building in question, where two places of seasonal inundating have been documented, has approximate dimensions of 65 m by 20 m (height of about 30 m). To identify hydrogeological conditions and determine at a later stage the concept of protecting the building, reconnaissance drilling was carried out, a monitoring network consisting of 5 piezometers (observations of near-surface and deeper groundwater) was performed, geophysical prospecting was done, and analysis of underground infrastructure.

The building was founded in poorly permeable (northern part) and impermeable (southern part) soils. However, sand bedding and backfilling of the foundation walls were performed before the foundation of the building. Taking into account the good permeability soil at the level of the foundation wall backfill and the level of the groundwater table at the depth at which the backfill was made, it is assumed that rainwater flowing according to the morphology of the terrain towards the building (from northwest to southeast) infiltrates the permeable formations around the building (flowing around the building along the perimeter and under the building), thus feeding the aquifers present in the permeable sediments lenses under the building. The groundwater may also flow into damaged sections of the cable or storm sewer system or damaged/cracked structural elements of the building penetrating under and into the building. This assumption needs to be verified through monitoring that allows long-term observations of the water table level in piezometric boreholes.