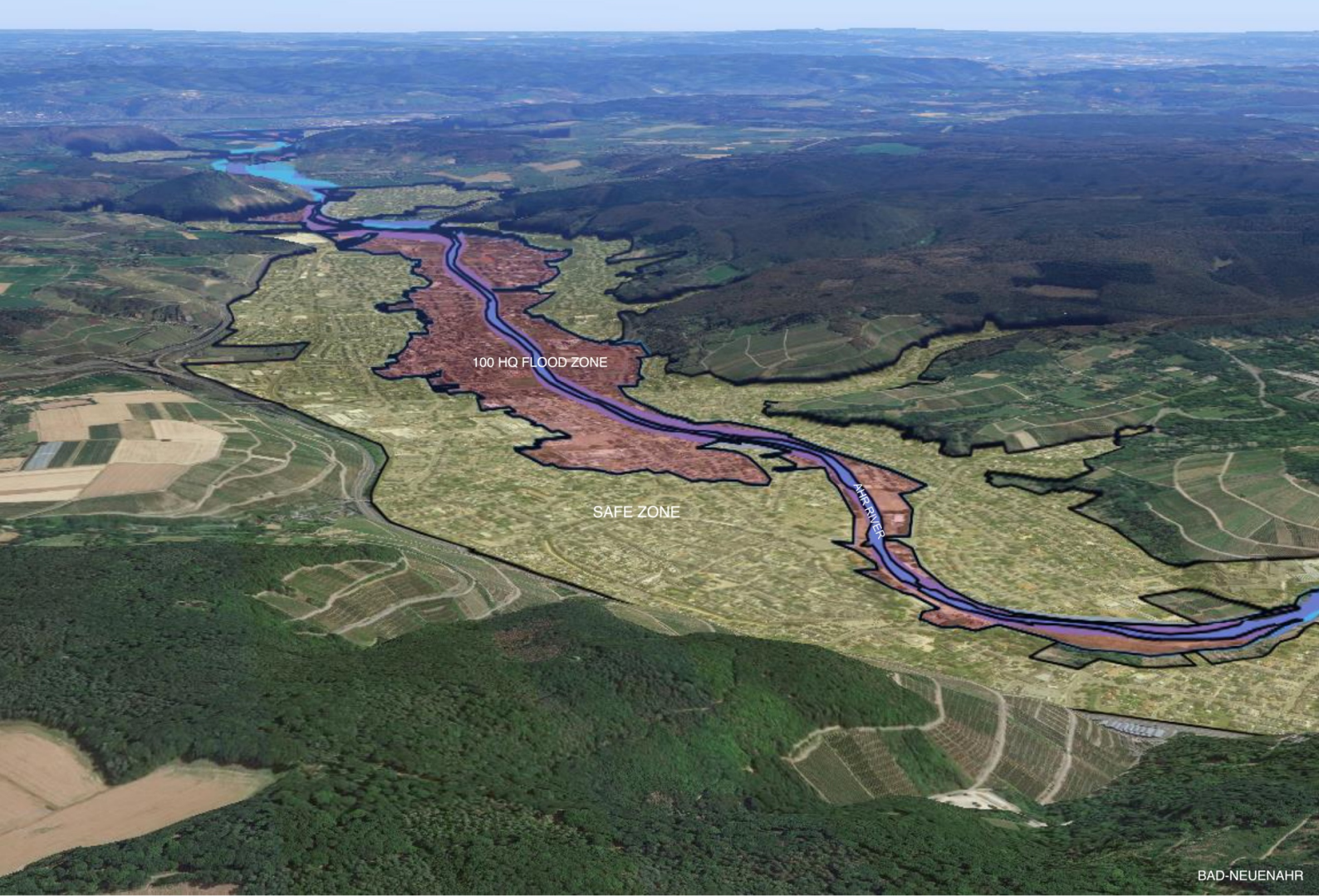
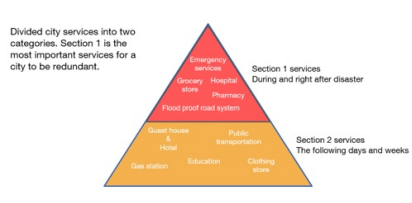




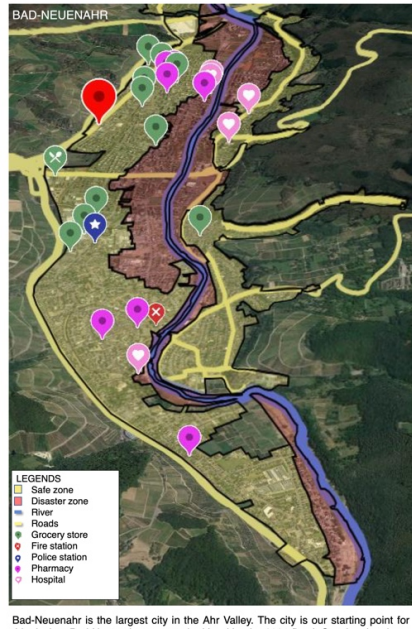
Image: Semming Graff



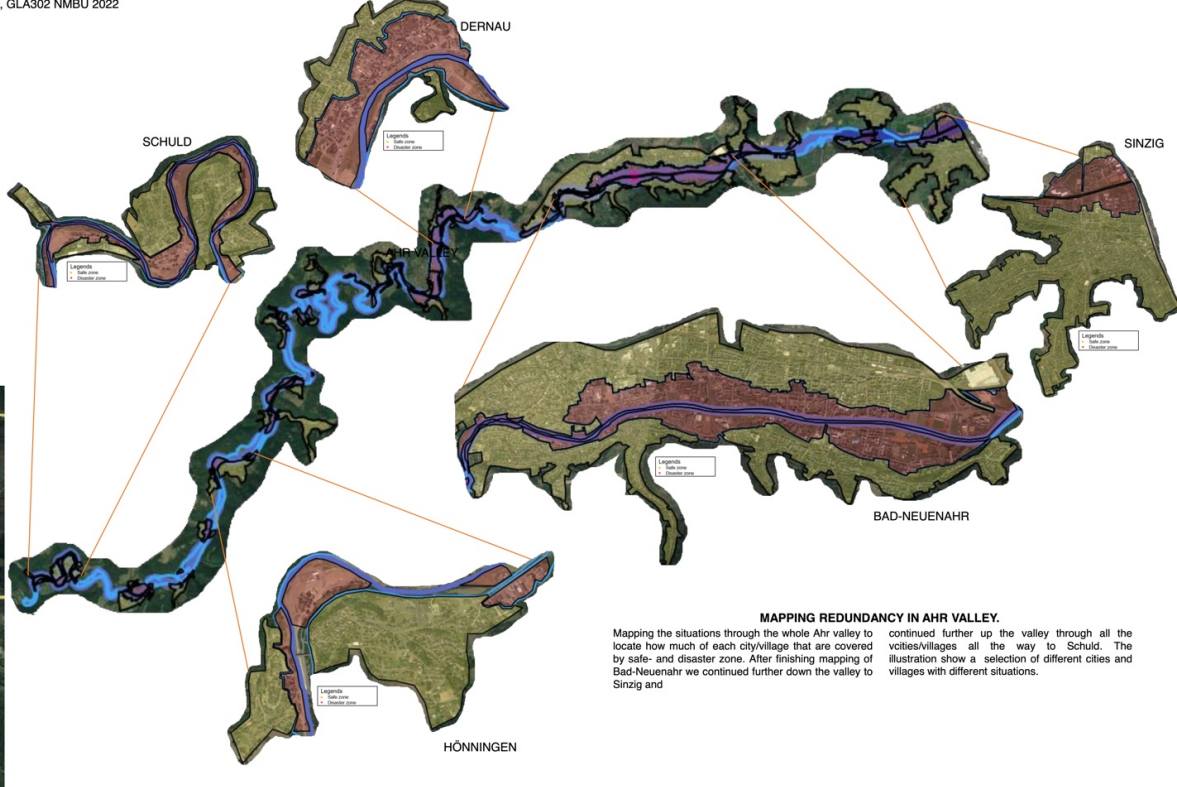
BAD-NEUENAHR



For a city to be redundant, we need to decide what kind of services a city needs on both sides of the river to continue operate during floods. We made this triangle of services and divided it into two sections. The section 1 services are the most important for a city half to be redundant. This services need to be available during and right after the flood. The section 2 services are services that needs to be available the following days and weeks after the flood.



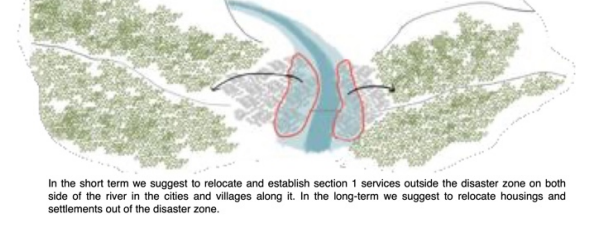
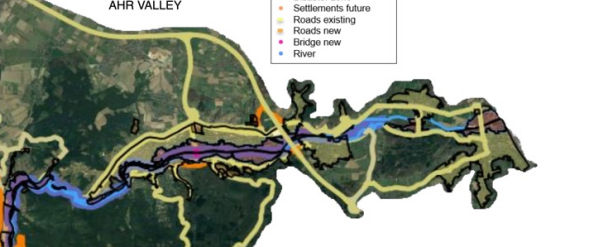
Bad-Neuenahr is the largest city in the Ahr Valley. The city is our starting point for this design. Bad-Neuenahr was situated hard by the 2021 flood. Causing the city to be split in half by the flood. While the north side of the river manage to function as normal as possible, the south side were completely isolated from important services such as grocery stores and fire stations. During the 2021 flood event the south side was isolated from the north side, and they didn't have a single grocery store or fire station to help citizens during the flood.



**INVESTIGATION OF SECTION 1 SERVICES.**  
Skewed distribution of services, compared to North (51) and south (16). This means that 76% of the section 1 services in Bad-Neuenahr are located on the North side. The obvious services that are missing in the south is Grocery Stores and Fire stations. During the 2021 flood event the south side was isolated from the north side, and they didn't have a single grocery store or fire station to help citizens during the flood.

**INVESTIGATION OF SECTION 2 SERVICES.**  
Skewed distribution of services, compared to North (38) and south (11). This means that 80% of the section 2 services in Bad-Neuenahr are located on the North side. Compared to section 1 services, there are no services missing on either side of the river. In this case a larger number of services are located inside the 100 HQ flood zone (45%). Many of these services are educational institutions.

By this long-term idea of city planning of relocating housings and settlements, the development will recede from the riverbed. This will give more space for the river and contribute to opportunities to establish retention areas along the river. By implement the different suggested intervention in a long-term plan of the Ahr Valley, one can achieve a redundant valley. Where cities and villages can continue operating in flooding situations.



In the short term we suggest to relocate and establish section 1 services outside the disaster zone on both side of the river in the cities and villages along it. In the long-term we suggest to relocate housings and settlements out of the disaster zone.

# REDUNDANCY

Our idea revolves around the Principle of Redundancy. Redundancy is often used in military context. Meaning that in case of disasters, there is a plan B.



During the 2021 flood most of the bridges got destroyed splitting the cities and villages in two. Our suggestion for Bad-Neuenahr is to place one larger moveable bridge connecting the city halves. The idea is that most of the time the river are dry and small, therefor a bridge will connect the city halves. During larger floods, the bridge can open, prevents building of a dam, and separates the two city halves that can now operate independent of each other.

The larger moveable bridge will be a greater expense, but we believe one bigger cost is better than several rebuilds of bridges that in the long-term will exceed the expense of the moveable bridge. In some of the villages the question will be if you want to build bridges sustainable to floods, or if you establishing section 1 services on both sides. Contributing so the settlements on both sides of the river is redundant.

