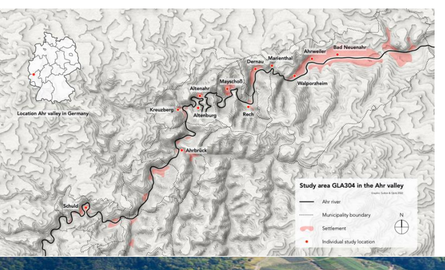
GLA 304- FINAL REVIEW

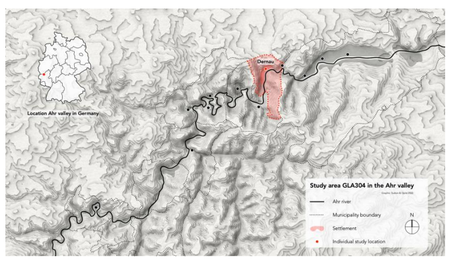
-Noshin Nehal Prova

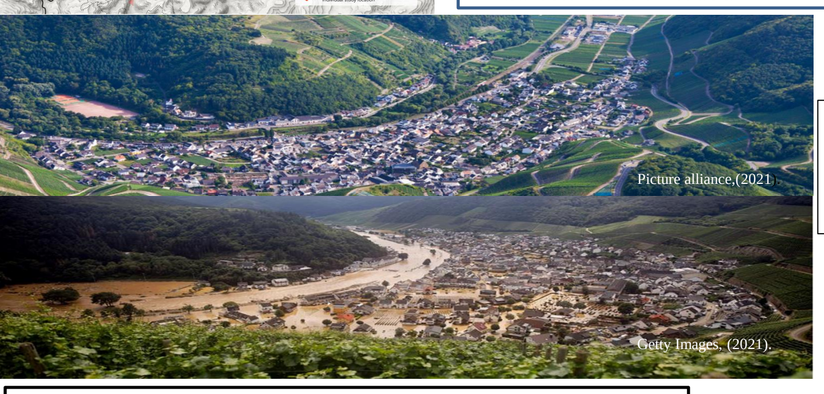
What happened?



Dernau

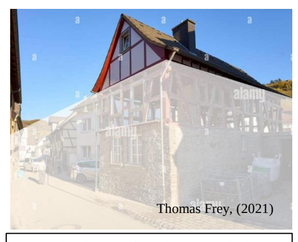
- The village of Dernau is famous for its wines and tourism.
- Eleven people died in Dernau during the flood on 14th & 15th July 2021.
- Around 90 percent of the residents of the town of 1,800 are affected by the floods. 400 of the town's 500 houses are inhabitable.



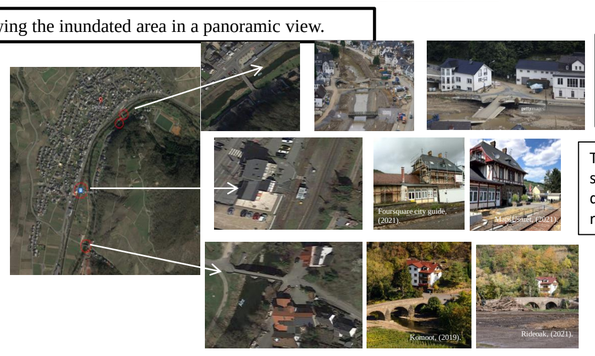


Map: Dernau showing the inundated area by expansion of river bed in flood.

Before and after picture of Dernau, showing the inundated area in a panoramic view.



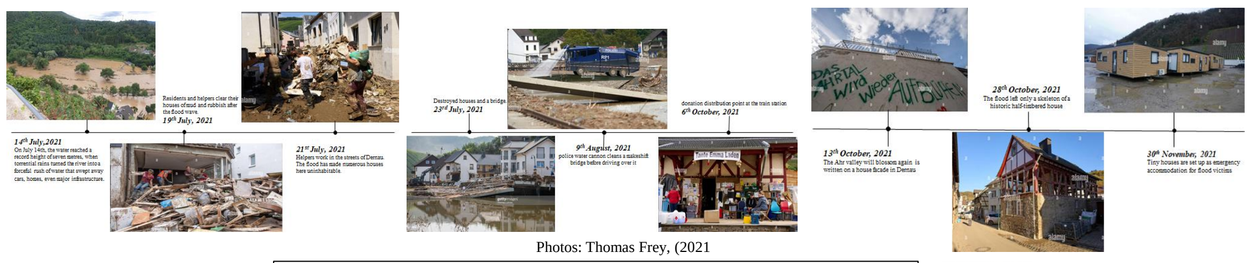
The highest flood recorded in Dernau 7.2 m in perspective to human height shown in a historic timber building.



Dernau Bridge was broke in the main pillar.

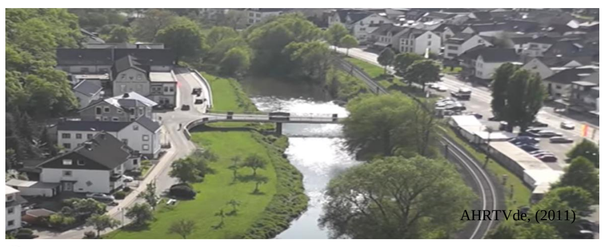
The **Steinbergsbrücke** in Dernau over the Ahr is a stone bridge, built in 1717 , was badly damaged during the Ahr flood in 1804 and was reconstructed probably in 1806.

Dernau Train Station is not severely damaged and open for donation collection.



Photos: Thomas Frey, (2021

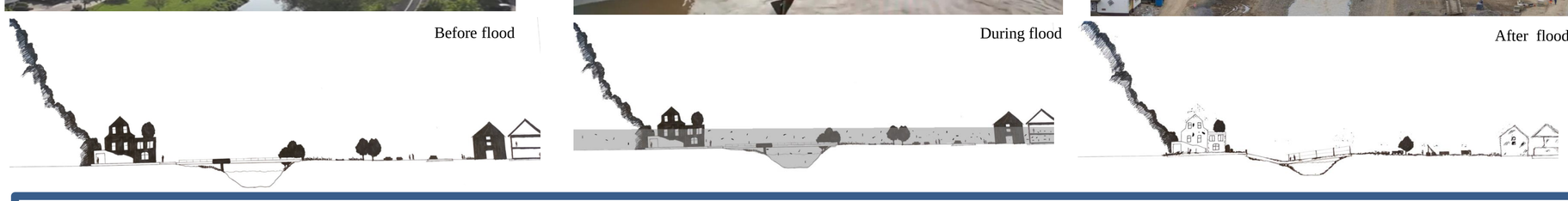
A section line is taken near the bridge, where three consecutive section shows the situation before, during and after flood.



Before flood

During flood

After flood



Photos: Dariajos

What happens?

Dernau relies on mobile homes in the middle of the village. An important goal could thus be achieved for the flood victims, short distances to the building that is to be restored and the connection to the neighborhood structures. This is now possible for 49 residents of Dernau affected by the flood.

Probably the most unusual polling station in the Ahrweiler district is in Dernau. It is in the circus tent. The colorful tent on Gartenstrasse was originally erected by the Johanniter and is still used today as a meeting point for those affected by the flood. There is also childcare there and a station for corona tests has been set up. Today the votes for the district election are collected here.

In the committee for construction, climate, environment and nature of the community of Altenahr the future of the elementary school in Dernau was also discussed in the sub-item in which further action regarding the flood damage to the association's buildings was discussed. The administration determined that reconstruction was possible.

The Dernau day care center suffered massive damage. *Photo: WITE*

The Dernau kindergarten is also demolished

- The kindergarten near the parish church is currently being demolished.
- The day-care center opened in 1979 is to be rebuilt at the same location as

In Dernau the Kölner Hof hotel and restaurant is demolished. The 350-year-old building did not survive the flood. Hotel owner Peter Schnitzler and his family mourn.

Thomas Klein's half-timbered house today. *Photo: WITE*

Dorfschänke and Hofgarten - Restaurant are open again. *Photo: WITE*

This Winery image shows that it was flooded but it is situated outside the official flood line, which shows the flood was much extreme than the official data.

Sebastian sees the town's reconstruction as an opportunity for change.

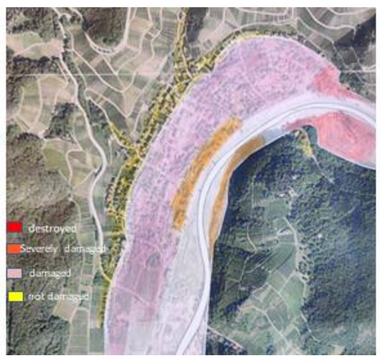
A chance to rebuild differently

- The regulating authority says measures such as installing fuse boxes on the upper floors so that power supply won't be interrupted by a flooded basement will be considered.
- A group of researchers has put forward a proposal for how the region can generate 100% of its energy supply from renewables by 2027 (using wind power and installing solar panels directly onto roofs being repaired)
- Homes in Dernau won't be fitted with fossil oil heating in future. Many oil heating systems leaked in the flood, effectively contaminating houses and upping the overall damage and cost. Instead, build a modern village heating network powered by renewable energy.
- Need for more funding, and fast, otherwise people here will simply get their own fossil fuel heating systems back again.

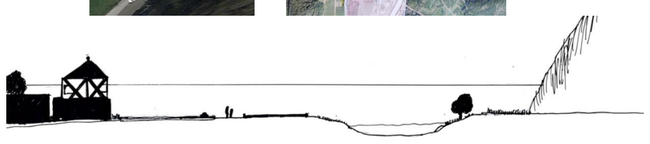
What Should Happen?

Approaches

- Not Rebuilding in destroyed areas
- For severely damaged areas, based on condition, rebuilding differently
- For damaged areas rebuilding differently

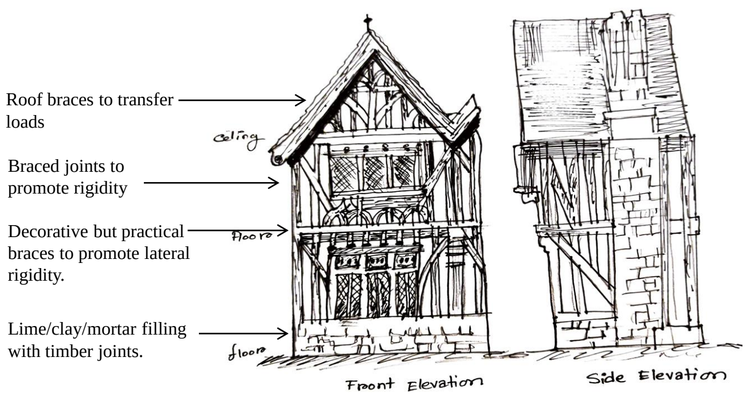


These two consecutive sections show the water level during flood in terms of severely damaged and damaged area.



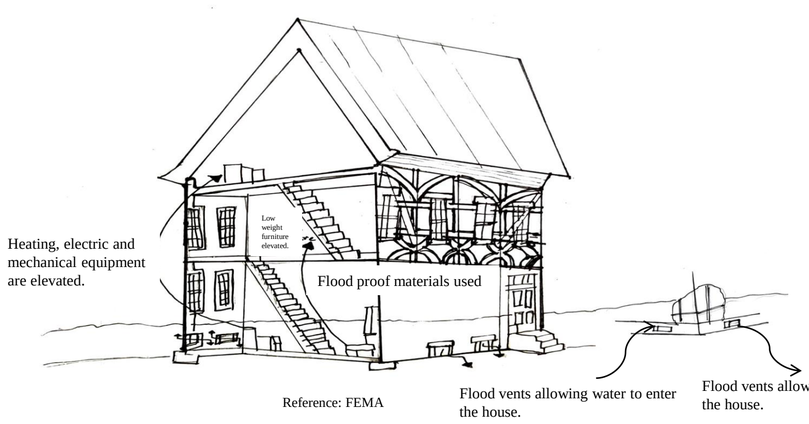
Concept

Main Focus- Historic Half Timbered Houses
Focus Area- Ahr Valley
Design Idea- Flood-proofing Historic Half-Timbered Houses by wet flood-proofing method and interior arrangement changes



Reference: Richard Harris

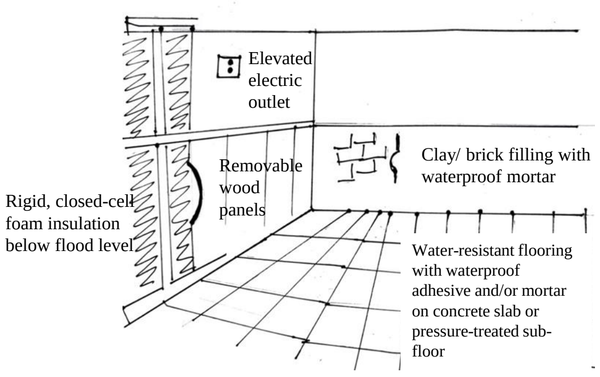
Historic half timbered houses of the Ahr Valley are made of timbered frame structures. This sort of structures have potential sustain flood by developing them into a flood proof structure with wet flood proofing method. As, the filler materials used here are easily replaceable, it's easier to integrate it with flood resistant materials and when the water enters the building, it doesn't interfere with the integrity of the structure. However, It can be easily integrated with installing flood vents, which will allow water to pass through in the events of flood.



Reference: FEMA

Flood vents are installed in the structure which allows the flood water to pass through. The water pressure is reduced by the buoyancy force and thus the structure is protected against heavy force. In this design, we are allowing the first floor to be inundated, so the electric and mechanical systems need to be elevated. Also, the furniture in the first floor need to be light weight and easily relocated. It is very important to use flood proof materials in the interior and exterior of the structure so it can resist the flood water and contamination.

Using Flood Resistant materials for Interior and Exterior of the Structure



Reference: LSUAgCentre

Materials have differing abilities to resist flood damage. Flood-resistance classifications have been developed for flooring, wall and ceiling materials and the adhesives used to install them.

In the case of historic half timbered houses it's suitable to use waterproodf mortar with already existing clay/ lime filling. The timber panels used are easily replaceable after flood. Also foam insulation can be used for better protection.

Flood-proofing historic half timbered houses and maintaining the originality and integrity of them is a challenging task but as it deals with the essence & originality of the Ahr valley it's very beneficial to find solutions to make them survive the catastrophes to come which is inevitable. However, complete protection might not be possible but mitigation is very possible with changing the way of construction and living which should be the aim in the long run. Everything comes with a price, & the price should be paid when it's worth paying.

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