

# THE MITTERSILL FLOOD PROTECTION SYSTEM

## LARGE-SCALE FLOODWATER RETENTION ON AN ALPINE VALLEY FLOOR A NEW SOLIDARITY APPROACH BETWEEN BENEFICIAIRIES AND LAND OWNERS AFFECTED BY FLOOD CONTROL MEASURES

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MITTERSILL, a small town situated in the western part of the Salzburg province, in the upper reach of the Oberpinzgau valley which is dominated by the Salzach river, has been suffering from floods since records are kept. Disastrous flood events within the last century took place in 1903, 1931, 1966 and 1985, the latter one affecting only the outskirts of the village, “Äußerer Markt”. On 12<sup>th</sup> of July, 2005 so far the last and deciding event flooded the whole town, making it necessary even to evacuate the regional hospital.

### DEVELOPMENT OF A FLOOD PROTECTION SCHEME

The event of 1985 acted as a trigger for the current planning process which cumulated in the actual project described below. Extended surveys of the whole Oberpinzgau valley between Krimml and Högmoos served as a basis for flood flow studies with a special focus on flood wave retention effects caused by large scale flooding of the valley floor.

A wide range of alternatives has been studied in detail, from widening and deepening the river bed to different types of retention basins and improvements of flood plain efficiency. Side effects which also played an important role in the decision process included sediment transport, groundwater interaction and ecological aspects. The results of these investigations showed clearly that any type of flood protection measures for the endangered areas along the Salzach river should not, by any means, accelerate the propagation of the flood wave. The effects of damming up the river and restricting the flood flow to a small and thus hydraulically effective channel would only increase flood hazards in the downstream area.

The flood events of summer of 2002 which harmed vast areas all over Austria were followed by closer looks at hydrological aspects of flood wave form and volume as well as detailed assessments of residual risk factors in flood protection all over the country. Both these issues put even more emphasis on the general idea of the flood protection scheme which had been developed over the past years. Unfortunately, in this case, the 2002 flood event had passed

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Mittersill without major flooding problems, thus not increasing the pressure on local decision makers to advance in the decision process.

The solution for the city of Mittersill which eventually turned out being optimal from the point of integrated flood protection was not accepted by both types of affected local land owners: The farmers did not approve flooding of their best grassland on the valley floor for the good of the city's flood protection, while the city and the house owners in the hazard zones tried to extend the protected area in the upstream direction to gain even more flood free land for building and commercial use.

## **THE CURRENT PROJECT**

Nature itself brought the decisive impact by the rainfalls of the early days of July 2005 which caused a flood event of about 100-year return probability. Onward from this moment the overall acceptance of the flood protection scheme was increasing steadily.

As the densely built-up area of Mittersill occupies the whole valley floor, leaving only a small corridor for the Salzach river on the left shoulder of the valley, there is literally no space for a substantial widening of the river bed. Buildings and infrastructure alongside the river banks as well as the bridges crossing the water do not allow raising the river banks. Thus the only solution is a reduction of peak flows in the upstream area. This will be realized by a dam crossing from the right shoulder of the valley floor all the way to the right river bank, which is located to the far left. The structure which will raise its crest up to 6 m above the lowest point of the valley floor. Controlled flooding begins at a flood flow comparing to a 20-year return period and the maximum retention volume is almost two million cubic meters in the case of an extended flood wave with a 100-year return period.

Detailed investigations had been carried out to prove the stability of the dam under every circumstances including the PMF. Special care was taken in designing the relief system for extreme floods in order not to increase the residual risk. The project had to pass the commission for high dams before applying for the regular construction permit. Total project costs including design, construction and one-time compensation for land use is currently assessed to be in the range of € 10 m.

## **WHAT MAKES THIS PARTICULAR PROJECT STAND OUT FROM OTHERS**

Finding acceptance among the local stakeholders and designing a solution based on solidarity between both types of affected land owners was taking up more efforts outside the range of classical engineering tasks. Specially trained officials of the provincial government guided a mediation process to secure the acceptance of the compensation model developed by the water authority of the Salzburg province in co-operation with the Federal ministry of agriculture, forestry, environment and water management.

The core of the compensation for the land owners consists of a fund installed at the provincial level which will receive its money from three sources: the beneficiaries downstream of the dam, the city itself and the Federal funding for disaster relief. The compensation fund will be administered by the provincial government and will pay full compensation in case of a flood event to the land owners affected by the flooding, thus securing a direct transfer between beneficiaries and those affected by the flood control measures.