

Affoltern am Albis Flood Protection Scheme Switzerland



Client

Construction Department of the
Canton of Zurich,
AWEL Amt für Abfall, Wasser,
Energie und Luft

Project

Design and implementation of an
earthfill dam with bottom outlet and
spillway

Service Provider

Pöyry Energy Ltd. as leading consult-
ant in a joint venture with other
engineering companies

Services

Design and implementation of a flood
control reservoir

- Detailed design
- Tender design
- Final design
- Technical site supervision

Execution Period

2004 – 2007

Project Description

The Jonenbach river in the residential area of Affoltern am Albis was flooded several times in the past, causing damage of some million Swiss Francs, due to its insufficient carrying capacity. The flood control reservoir on the Jonenbach river reduces the maximum outflow on the lower river to 17 m³/s, a discharge which can be passed by the existing river channel without causing any damage. The retention dam on the Jonenbach river is constructed as earthfill dam for technical and aesthetic reasons. The 16.5 m high dam is curved and has upstream and downstream slopes of 1:3. The concrete works - culvert and spillway - are integrated in the earthfill

dam. In the normal case, i.e. in case of low and medium water, the Jonenbach river flows through the culvert unhindered. Only very seldom, in case of heavy rainfall and a discharge of more than 5 m³/s, water does accumulate in the flood control reservoir. The reservoir will only be full every 100 years in average. The retention water level at the level of the overflow edge of the flood control reservoir will then be reached. The reservoir filling is most of the time of short duration, since a full reservoir empties within hours. Vegetation in the retention area is not affected by this. The spillway is an important security item for the dam, and is built for the maximum discharge of 116 m³/s.

The location of the reservoir has been chosen according to the geological and hydro geological characteristics of the site. A good landscape conservation planning ensures a good integration of the dam into the Jonental valley, a construction playground and vegetation adapted to the location. The removal of the existing Jonental road and the revaluation of the Jonenbach river turn the retention area into an attractive recreation area close to nature.

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Affoltern am Albis Flood Protection Scheme

Technical Data

Retention Reservoir

Catchment area	21.0 km ²
Retention reservoir	391,500 m ³
RWL HQ ₁₀₀	513.35 m asl.
RWL HQ ₁₀₀₀	514.35 m asl.
RWL 1.5 x HQ ₁₀₀₀	514.70 m asl.
Q _m (1987 ÷ 2002)	0.33 m ³ /s

Retention Dam

Elevation dam crest	516.35 m asl.
Elevation river bed	496.00 m asl.
Dam height	20.35 m
Crest length	163 m
Dam volume	123,000 m ³

Spillway / Bottom Outlet

Q _{Spillway}	116 m ³ /s
Elevation spillway	313.35 m asl.
Q _{BO} at HQ ₁₀₀	16.7 m ³ /s
Bottom outlet dim.	1.85 x 0.84 m
Plunge pool invert l.	492.75 m asl.
Stilling basin dimensions	10 x 17 m

Flood Hydrology

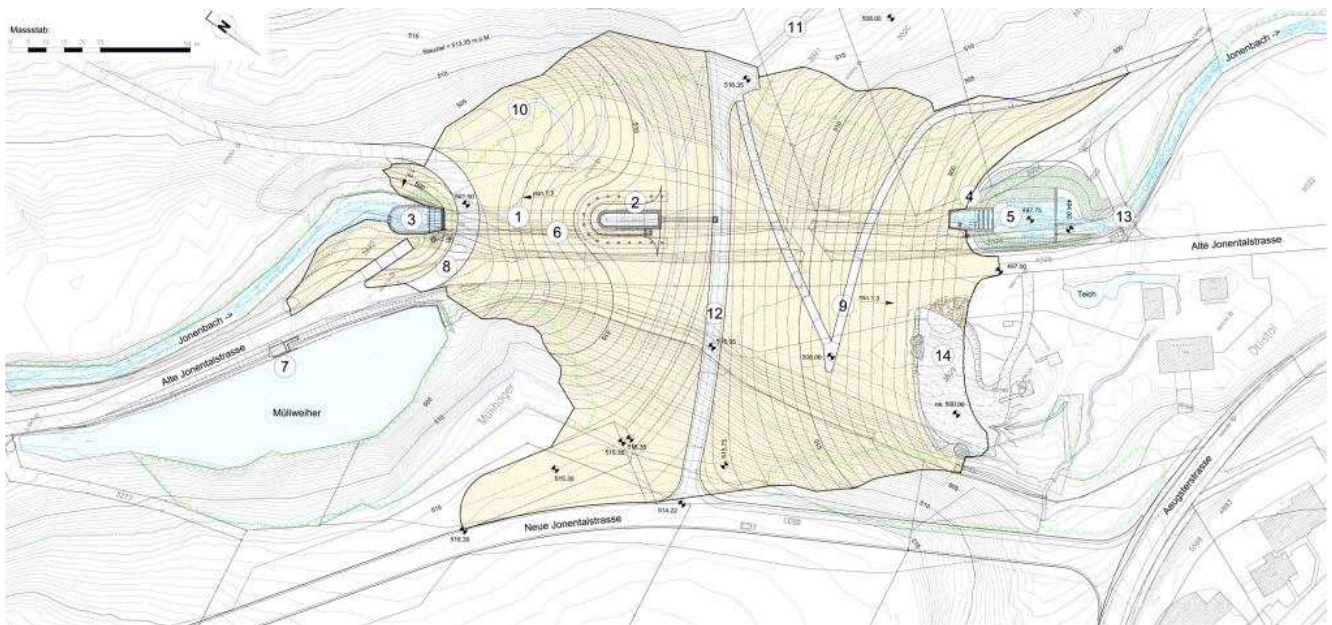
HQ ₁₀₀	34 m ³ /s
HQ ₁₀₀₀	78 m ³ /s
1.5 x HQ ₁₀₀₀	116 m ³ /s

Emergency Spillway

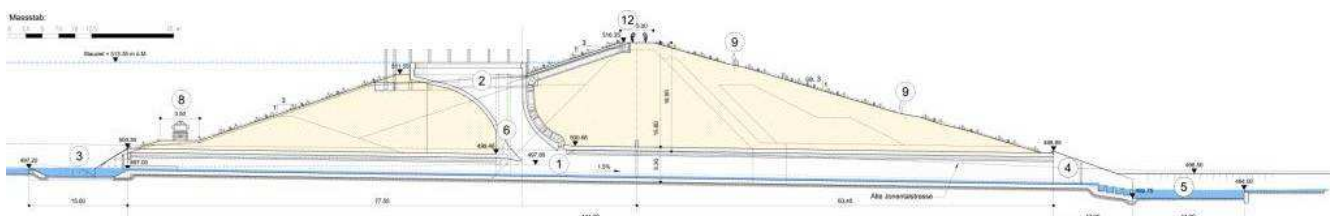
Q _{Spillway}	41 m ³ /s
Elevation spillway	515.35 m asl.

Emergency Outlet

Q _{Em} at retention WL HQ ₁₀₀	7.4 m ³ /s
Gate dimension	0.80 x 0.80 m



Situation of the flood retention dam on the Jonenbach river



Longitudinal section through bottom outlet

- | | | |
|-------------------|---------------------------------|---------------------------|
| 1. Culvert | 6. Emergency Outlet | 11. Connecting path |
| 2. Spillway | 7. Drawoff structure Müliweiher | 12. Dam crest |
| 3. Intake works | 8. Forest path | 13. Bridge |
| 4. Outlet works | 9. Pedestrian path | 14. Children's playground |
| 5. Stilling basin | 10. Hiking trail | |