Retention pond in Chêne Bougerie, Switzerland

Year of issue

2025

Summary

Located in Chêne-Bougeries (Geneva canton), this 1995 retention pond demonstrates NWRM in a dense urban plot. The small biotope (~300 m²) stores about 450 m³ on-site and contributes ~279 m³ at the 3.1-ha catchment scale, reducing storm runoff and flood risk. Design details include a lined basin (plastic membrane over sand; clay subsoil), a 1.2-m earth embankment with two overflows (primary outlet limiting discharge to ~48 L/s; emergency crest), and a ~150-m open swale collecting parcel runoff. The pond maintains permanent water (~0.5 m; max depth ~1.6 m); the safety overflow reportedly activated only once, and the basin has not dried out. Works were completed in ~2–3 months (1995) for ≈ CHF 60,000. Maintenance is shared by adjacent owners (annual vegetation removal). Reported benefits include habitat for amphibians, fish and odonates and a reduction in mosquito nuisance. Subsequent ecological survey work in Geneva (2015 sampling; 2018 publication) confirms continued use by amphibians at Étang Vieux-Clos. The approach aligns with the canton’s ongoing strategy to manage stormwater “à ciel ouvert”, with new retention/biotope projects under development nearby.

Photo Gallery



Location

46.197778, 6.187778

Project

NWRM

National ID

Switzerland_03

Sector

Hydromorphology

Installation Date

1995

Contact

Anais Hanus, ACTeon

Overview

Location of the project

At the junction of Chemin du Vieux-Clos and Chemin de Vert-Pré, Conches (Chêne-Bougeries); small valley bottom.

Country

Switzerland

NUTS2 Code

Ticino

Sponge measures implemented in the case study

Ponds and scrapes

Objectives

Attenuate storm peaks by ~450 m³ storage (BV retention ~279 m³), cap outflow ~48 L/s, and maintain ≥ 0.5 m permanent water to support aquatic biota; dimensioned for T=10 years events.

Involved partners

Authority type	Authority name	Authority role	Comments
Other	Chêne Bougerie town	Initiation of the measure	—
—	—	Financing	Architects
Private property owners	Solfor SA	Determination of design details of the measure	Architects
Private property owners	Jacquet SA	Implementation	Engineers

Site Information

Climate Zone

Cool temperate moist

Precipitation

942.00 mm

Temperature (°C)

10.10 °C

Runoff

54.00 mm

Runoff coefficient

0.25

Elevation range

422

Slope range

1-2%

Vegetation class

Within the pond: reeds (roseaux), water lilies (nénuphars) and other aquatic macrophytes; along the ~150 m open swale, reed-rich, moisture-loving vegetation.

WFD Ecological status

Moderate

WFD Chemical status

Good

Water quality status

Urban Seymaz: historic channelization & limited space, urban runoff, and recurrent pollution episodes; biological quality historically poor, renaturation ongoing.

Design and Implementation

Project scale

Micro

Project scale specifications

a single on-plot retention biotope within a villa subdivision (~3.2 ha parcel; BV ~30,800 m²)

Project area

3,2 ha

Area subject to Land use change or Management/Practice change (ha)

0.03 ha

Size

300.00

Size unit

m2

Favourable preconditions

A natural 3 ha depression/valley (NW–SE), clay subsoil (quasi-impermeable), and an undersized existing collector favored an on-site retention biotope over costly pipe upgrades.

Financing

Total cost

65126.00 €

Costs operation maintenance

49000.00 €

Financing authorities

Type of funding	Comments
Local funds	—
Private funds	Private owners finance vegetation maintenance

Policy and Governance

Policy description

Privately owned parcels with an internal regulation and shared maintenance; built after rezoning to villa zone (1990s) to mitigate runoff from urbanization. Aligns with canton policy promoting parcel-level stormwater retention and current “à ciel ouvert” strategy.

Land ownership

Private villa-plot owners at Conches. The pond/biotope spans parcels with an internal owners’ regulation; upkeep costs are shared pro-rata.

Policy targets

Increase Water Storage

Improved Biodiversity

Oher Societal Benefits

Part of a wider plan

Yes

Wider plan

Wider plan type	Wider plan focus	Name
National	Water	federal law on water protection, 24 january 1991
Local	Water	Cantonal law on water (L 2 05)

Public consultation

No

Has contractual arrangements

No

Impacts and Monitoring

Impact Assessment Methodology

Performance impact assessment method

Unknown

Performance impact estimation information

null

Socio-economic Impacts

Direct benefits information

The pond reduce runoff in the area and the damages it can generate

Ancillary benefits information

The pond provides a "natural" area which can be used as recreative area for neighboring private owners. It also contributed to reduce mosquitos density.

Biophysical impacts: Hydrology

Information on retained water

Peak-flow attenuation and temporary storage (~450 m³ on-site; ~279 m³ at BV scale), controlled discharge (~48 L/s), and creation of a small hydromorphic biotope; infiltration limited by clay.

Increased water storage

90.00

Increased water storage unit

m3/ha

Information on increased water storage

279m3 can be retained at the watershed scale (3,1ha)

Ecosystem water supply

0

Biophysical impacts: Biodiversity

Improved biodiversity

Yes

Information on improved biodiversity

The pond provide habitat for fauna and flora, including aquatic flora

Biophysical impacts: Water & Soil Quality

Water quality overall improvements

Not relevant for this application

Soil quality overall improvements

Not relevant for this application

Biophysical impacts: Others

Ecosystem impact climate regulation

No information available

Lessons Learned

Key lessons

Example of how to retain water in urban areas.
Its success lead to the easy implementation of new water management projects in the city, for example a new retention pond project was presented to the public in 2025.

Barriers

Barrier type	Barrier role	Comments
Expected maintenance needs	Secondary barrier	Private owners are responsible for maintaining vegetation on their plots

Drivers

Driver type	Driver role	Comments
Other	Main driver	The main driver which led to consider the measure was the new status of the land which became available to be constructed; water management became a major issue.
Other	Main driver	The measure was estimated cheaper than another project (re-build existing infrastructures)
Legal obligations	Main driver	The federal law on water protection requests rain water infiltration in urban areas through retention measures
Organisation committed to it	Secondary driver	Geneva Canton elaboraed recommandations regarding water retention in urban areas

Success factors

Success factor type	Success factor role	Comments
Attitude of relevant stakeholders	Main factor	Since private owners are responsible for maintaining vegetation on their plots, the measure efficiency partly depends on their attitude
Legal obligations	Secondary factor	Legal obligations can lead stakeholders to implemnt measures to retain water in urban areas

Transferability

Highly transferable to low-gradient suburban plots. Key cautions: ensure legal servitudes/owner agreements, safe overflow paths, vector control by predators (avoid stagnant edges), and clear O&M.

Sources

Sources

Chemin du Vieux-clos: étang de rétention et biotope