

## **Water Neutrality**

**This document is part of a Householder Planning Application for a new swimming pool and building at;**

**Fernbank, Bordon Wood, Milland, GU30 7JZ**

The site lies within the South Downs national Park and within the Sussex North Water Resource Zone.

The requirement for development is maintain 'water neutrality' i.e. the development will impose no greater water usage or load on the water supply.

Please read this document in conjunction with Application drawings/plans.

## **The Proposed Swimming Pool**

The pool including the cover pit has a volume of 66.8 cubic metres of water with a surface area of 45 sq m

The pool will have a cover (motorised slatted roller type) and will be closed when not in use.

## **Water Usage - For Construction**

The pool will be constructed of reinforced concrete which will be off site batched and mixed at a plant outside the Sussex North Water Resource Zone brought to the site via cement mixer lorry therefore there is no water demand on the Sussex North WRZ

The pool building foundations will be off site concrete mixed therefore no water usage within the Sussex North WRZ

The walls will be traditional bricklaying with site mixed mortar and the same for paving around etc. Based on the building size and paving area it is estimated that 1,000 litres of water will be used.

## **Water Usage - Swimming Pool First Fill**

The initial water fill of the pool will be from a water supply outside the Sussex North Water Resource Zone brought to the site via road tanker therefore there is no water demand on the Sussex North WRZ

## **Water Usage - Swimming Pool Evaporation**

There are two scenarios;

- a. cover closed
- b. cover open

a. The cover will be a roller hard slatted cover which covers the whole surface of the pool therefore reducing the evaporation rate to virtually zero. For the purpose of this document this 'cover closed' evaporation rate is 3 litre per day.

b. The pool will be in use 1<sup>st</sup> April through to 30<sup>th</sup> September, which is 183 days / 26 weeks.

Within that period the usage will be weekends and some evenings – assume 5 hours each weekend day and 5 hours of evenings during weekdays – therefore the cover will be open 15 hours per week.

For the purpose of this calculation assume 15 hours = 1 day.

Therefore the cover will be open with full evaporation potential for 26 days within the 'use period'.

Rate of evaporation, based on average water and air temperatures and humidity using existing swimming pool industry data is 5mm depth per day.

45 sq m surface area x 0.004 = 0.225 (22.5 litres)

22.5 litres per day x 26 cover open days = 585 litres.

3 litres per day x 330 cover closed days = 990 litres.

Total annual evaporation losses = 1,575 litres.

Water required to offset evaporation and maintain the water level is therefore 1,575 litres

### **Water Usage - Cleaning and Filtration**

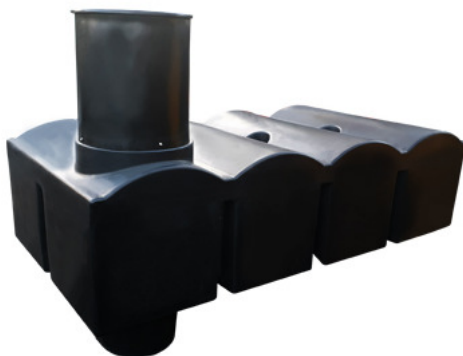
The pool will have 'water intakes and pipework to the plant room where there will be a multi cyclone pre-filter and a normal sand filter.

A domestic pool in normal use will have the filters cleaned every 2 weeks by 'backwashing' which is reversing water flow through them to push out dirt/debris which is then directed away from the pool to 'waste'.

For the size/volume of pool the filter backwash will require 400 to 500 litres of water – for calculation purposes assume 500 litres.

The backwashing will only be carried out when water is being filtered which will be during the 'pool open' period of 26 weeks, assume 14 backwashes which required and also creates 7,000 litres of waste water.

Part of the swimming pool installation will be a 1500 litre backwash settling tank where backwash waste water will be pumped to from the filters and held for 14 days which is sufficient time for any chlorine in the water to evaporate/degrade. Water will then be pumped to either the rainwater harvesting tank if there is capacity or if it is full to soakaway. See plan 22500 – 102 which shows location etc of these tanks.



Below ground 1500 litres backwash settling tank

## **Water Usage - Pool Building**

The changing room has a wc with 6 litres cistern volume. It is assumed this will be in use when the pool is used for 26 weekends, say 3 flushes per weekend day and 1.5 flushes per weekday

2 days x 4 flushes x 6 litres = 48 litres

5 days x 1.5 flushes x 6 litres = 45 litres

WC water consumption = 93 litres per week x 26 weeks = 2,418 litres

The changing room has a hand wash basin – assume 1 minute water flow per wc usage, with a tap flowing 4l/minute

Hand basin consumption 15.5 wc flushes x 4litres/minute = 62 litres basin water consumption per week x 26 weeks = 1,612 litres

The changing room has a shower – assume 10 litres per minute x 3 minute shower = 30 litres per shower. Assume shower is used twice each weekend day.

Shower consumption 30 litres x two showers x 2 days = 120 litres per week x 26 weeks = 3,120 litres.

Pool building water usage total per annum 2,418 + 1,612 + 3,120 = 7,150 litres

## **Water Usage – general use, cleaning etc**

It is assumed that periodically floors will be washed, wc/shower cleaned etc

Assume a tap or hose pipe running at 10 l/minute for 5 minutes per week x 40 weeks = 2,000 litres.

## **Water Usage - Summary / Total**

Construction 1,000 litres – one off water requirement.

Use and Consumption per annum

Pool top up for evaporation 1,575 litres

Pool water filtration/backwashing 7,000 litres

Pool building usage 7,150 litres

General use cleaning etc 2,000 litres

**17,725litres / 17.725 cubic metres.**

## **Offsetting Water Usage**

As demonstrated above the proposed development could impose a demand/load on the Sussex North WRZ of 17,725 cubic metres per annum.

The proposed development includes various measures and methods to mitigate this water usage so that there is ‘water neutrality’.

**Rainwater Harvesting and water use**

The existing house has a roof with an effective rainwater catchment area of 180 square meters.

The proposed pool building has a roof catchment area of 50 sq m

Based on Southern Water data on average long term rainfall for West Sussex there is an average of 71 mm rainfall per month.

The proposal is to collect rainwater and use it in the existing house and new pool building to offset the water usage from the mains supply.

The house and pool building combined useable roof area is 180 sq m x drainage coefficient 0.8 x annual rainfall 851mm = 122.544 cubic metres water per annum, to be collected in a below ground rainwater harvesting tank. Excess water beyond the tanks capacity will drain to soakaway as it currently does. The harvesting tank will be fitted with a pump and basic filtration which will supply;

1No wc in the proposed pool house = 2,418 litres use p/a

3No existing wc's in the existing house;

assume 2.5 flushes per wc (6 litre cistern) per day x 3No wc's x 365 days = 16,425 litres p/a

Total wc water consumption 18,843 litres per annum / 18.843 cubic metres

This volume of water will be supplied by the rainwater harvesting tank

The below ground tank will be of 10,000 litres capacity which will hold sufficient water to fulfil demand and hold sufficient reserves to provide during the dry summer months.



Below ground rainwater harvesting tank 10,000 litre

Month	Long term average	Actual rainfall
January 2023	84.2 mm	110.9 mm
February 2023	79.1 mm	7.2 mm
March 2023	54.7 mm	133.4 mm
April 2023	56.2 mm	91.0 mm
May 2023	52.0 mm	34.8 mm
June 2023	52.8 mm	30.8 mm
July 2023	50.3mm	85.0mm
August 2023	49.5mm	66.2mm
September 2023	56.0mm	62.5mm
October 2023	52.6mm	189.48mm
November 2023	96.1mm	156.74mm
December 2023	89.1mm	131.07mm
January 2024	49.5mm	66.2mm
February 2024	79.8mm	158.67mm

### Swimming pool top up – rainwater

Based on rainwater rainfall rates from Southern Water the annual rainfall of 851mm the swimming pool with surface area of 45 square meters will collect 38 cubic metres of water per annum.

Rainwater added in relatively small quantities to the existing pool water will be subject to filtration and chemical dosing and is thus fit for purpose and can be considered ‘useful’ as a water source.

As can be seen from the section ‘Evaporation’ above the pool requires 1.575 cubic metres per annum is way less than the rainfall the pool collects. Excess water collected will be piped to a soakaway to ground so the area of ground the pool occupies will only use 4.6% of the water that would naturally soak to ground

### Waste Water

Waste from the proposed new wc, basin and shwoer will run to the existing house drainage system

Waste/overflow from the rainwater harvesting and pool filtration wil run to ground soakaway. As stated above any pool waste water runnign to soakaway wil be dechlorinated.

In running water to soakaway the depletion of and impact ongroundwater is reduced to a minimum.

## **Conclusion**

The proposed pool and building will use 17.161 cubic meters of water per annum

Rainwater harvesting and use will reduce the amount of mains supplied piped water by 18.843 cubic metres

The one off construction water usage is either from outside of the Sussex North WRZ or can be accounted for/offset via the rainwater harvesting.

This document therefore demonstrates this proposal achieves water neutrality.

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