

3 BASELINE DATA

Flood Risk and Hydrology

Environment Agency Flood Zone Maps

- 3.1 The pond itself is located in Flood Zone 3 based on the GOV.UK Flood Map for Planning, with small areas of flooding also shown immediately downstream within Waterside Court and on Paper Mill Lane. This is shown in Figure 7.

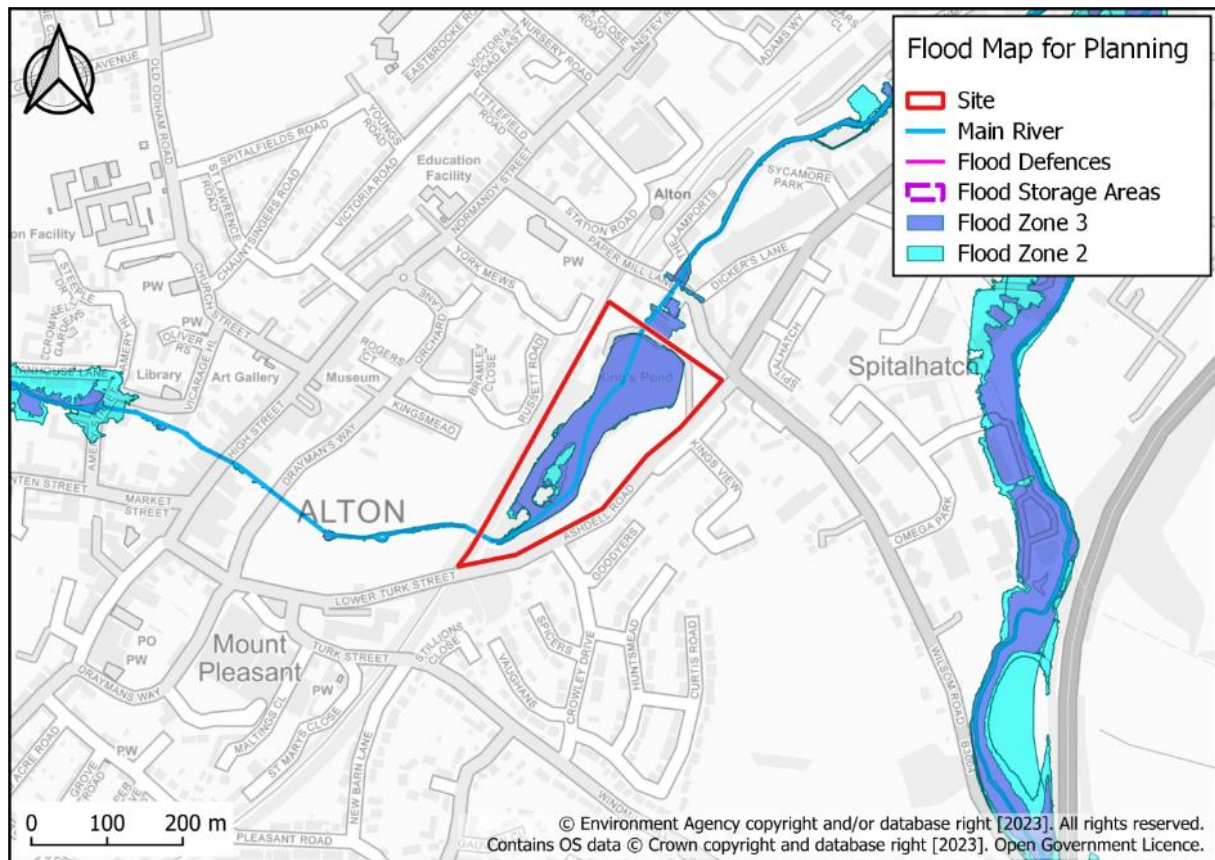


Figure 7 – GOV.UK Flood Map for Planning

- 3.2 According to the flood map, significant flood events could impact upon the residential properties in Waterside Court, and this has the potential to increase in future due to climate change. However, these have been designed to be raised significantly above surrounding ground levels and it is therefore assumed that these were built with due consideration for the local risk of flooding. The property at No. 10 Paper Mill Lane, assumed to be a workshop, is located on an island within the River Wey which is at risk of flooding.
- 3.3 This pond is not shown to have flooded in any of the EA's major recorded flood events, including 6th March 1947, which caused significant flooding of nearby watercourses.
- 3.4 The flood zone map for the pond itself is not of particular concern since there are no vulnerable receptors within the red line boundary. However, any physical changes to the pond including alterations to the sluice / weir or any bed or bank reprofiling, may have resulting impacts on areas downstream. It is critical that a robust assessment of flood risk is part of any further work once preferred options have been chosen and ensure that there is no potential for increases elsewhere at any return period event.

Hydraulic Model

- 3.5 To further the investigation of flood risk, the EA were contacted at the earliest stage in order to request a copy of their hydraulic model of the River Wey in this location. They were able to provide a full, working copy of the model and all associated modelling reports and data.
- 3.6 The site is covered by the "Wey Middle (Tilford to Jacob Well) 2020" model. This is one of a number of hydraulic models which cover the River Wey catchment from the source (close to Alton) to the downstream extent where it reaches the River Thames to the south-west of London.
- 3.7 The hydraulic model is one-dimensional (1D) only, and was constructed in Flood Modeller Pro, a popular and commonly used modelling package. Cross-sections of the watercourse are presented in a standard way, typical of this type of watercourse. Whilst it is more common to produce linked 1D-2D models nowadays, this accuracy of a 1D only model is typically robust for river sections.

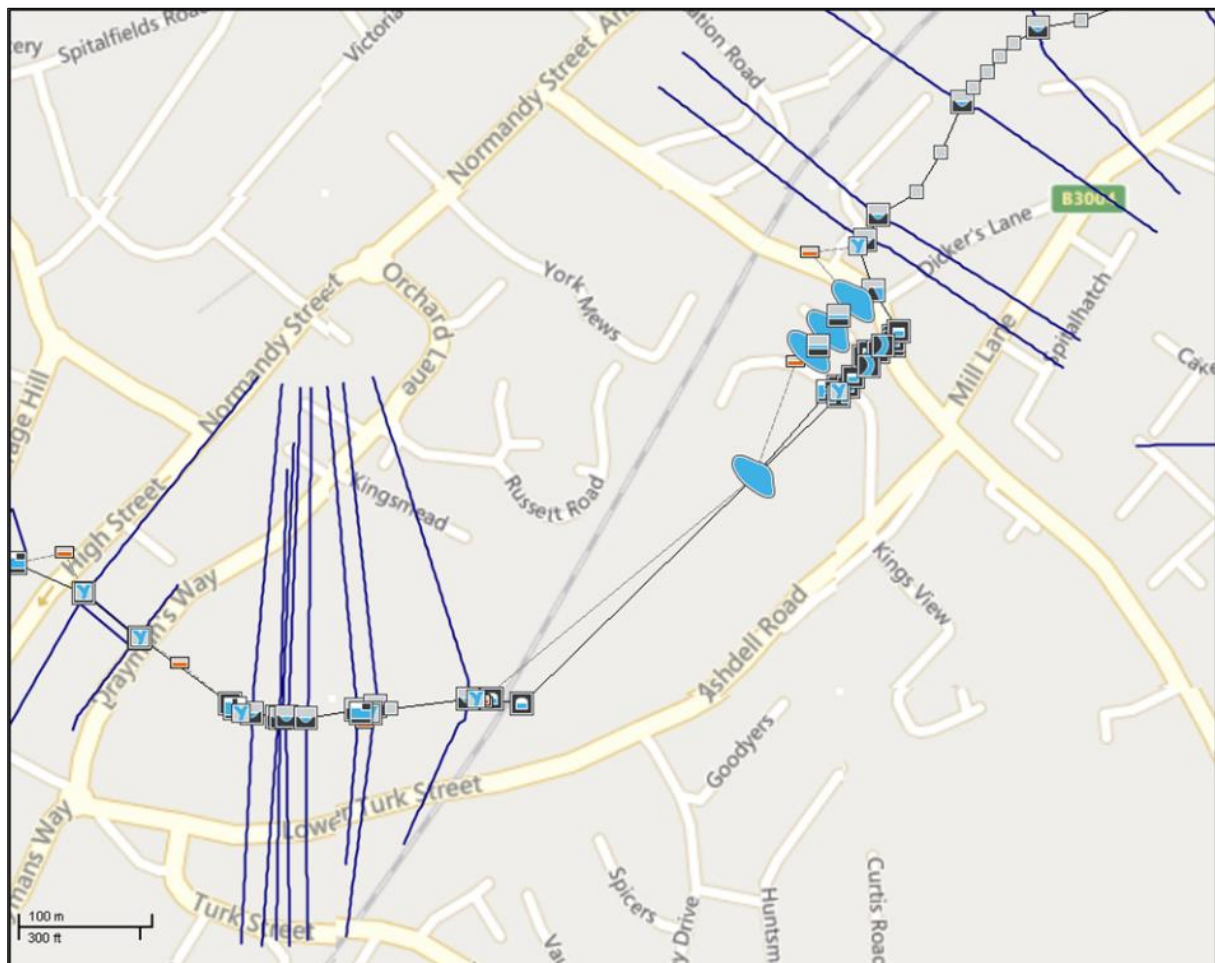


Figure 8 – Schematic of 1D Wey Middle Hydraulic Model

- 3.8 The pond is presented as a reservoir unit. From review of the hydraulic model, it appears that the storage area definition is poorly defined. The model has a wetted plan area of 20,390m² at elevation of 98.53m AOD. Interrogation of the provided survey presents a wetted area of 16,600m² at the same elevation. This indicates that the model is potentially over estimating the wetted area compared to reality.
- 3.9 This is not uncommon since EA models are broad-scale and budget constraints mean that not everywhere can be surveyed in detail. However, since ATC are now in possession of a significantly

more detailed topographic survey, refinements and improvements to the hydraulic model would be possible to better represent reality.

- 3.10 The pond outlet is modelled as two separate offices, with a culverted connection to the River Wey downstream of Paper Mill Lane. In reality, sections of this are in open channel through Waterside Court. The overland flow downstream of the pond is modelled as a series of 1D floodplain sections connecting small reservoir units.
- 3.11 This area of the model would benefit from representation with a linked 1D-2D model to better depict flow paths and areas of flood risk. It is recommended that a local update to the baseline hydraulic model is considered prior to allow proposed options to be tested with greater accuracy.

Surface Water Runoff

- 3.12 The GOV.UK Risk of Surface Water Flooding maps show the likely extent of flooding for a range of events. Surface water flood maps are a good indicator of natural overland flow routes in the local area, as shown in Figure 9.

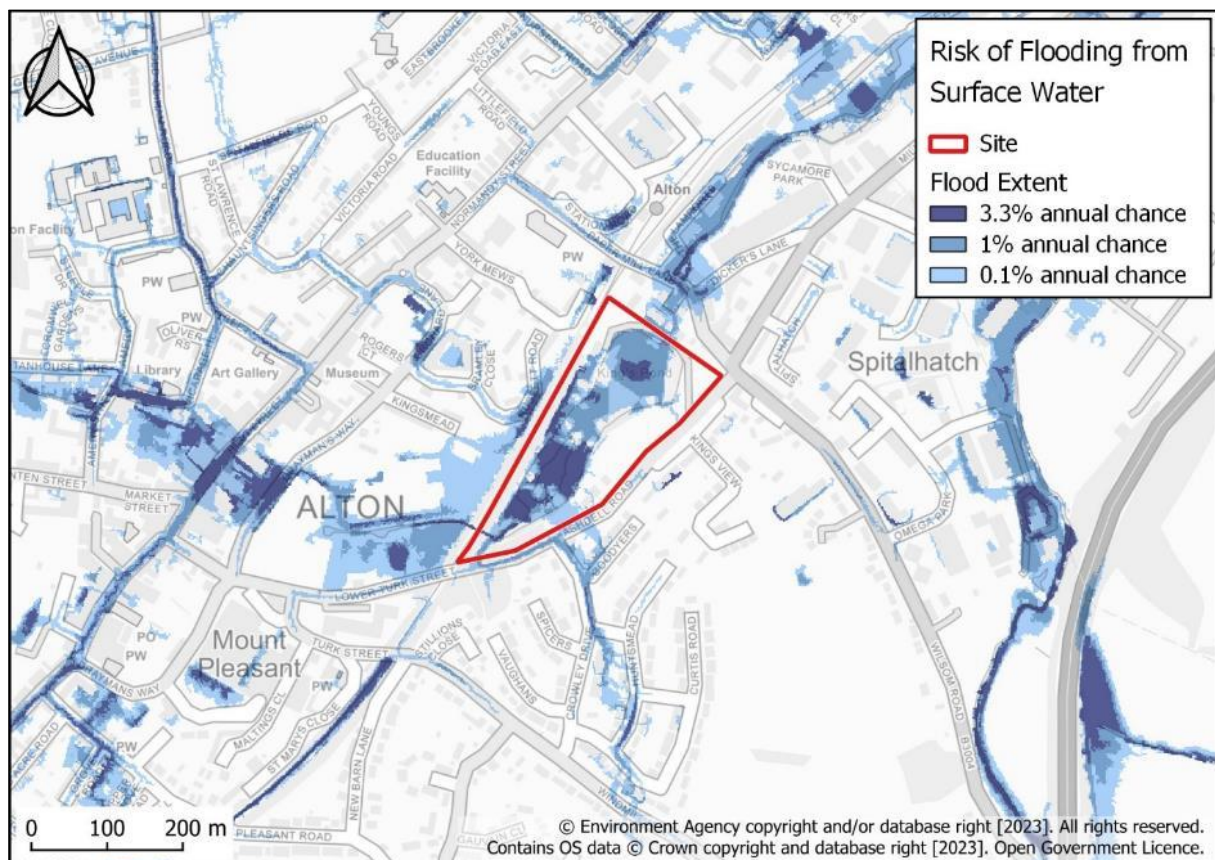


Figure 9 – GOV.UK Risk of Surface Water Flooding Map

- 3.13 Surface water flooding around the pond and immediately downstream is similar to the Flood Zone maps, with increased areas of risk on the western side of the pond. Runoff routes are also clearly shown from the residential area to the south (Crowley Drive) which flows over Ashdell Road and into the pond.
- 3.14 Upstream of the pond areas of surface water flooding are extensive in the local area, typically following the river corridor with areas of ponding on the upstream side of the railway line. Downstream of the pond, more significant flooding is shown around The Lamports, Paper Mill Lane and Dicker's Lane.

- 3.15 The surface water flood mapping appears to show properties at Waterside Court outside of the area of flooding, indicating that these are properly represented within the model. It is likely that this representation is more accurate than the output produced by the fluvial Flood Zone maps.

Catchment Hydrology and Flow Data

- 3.16 The hydrological catchment of the River Wey (North Wey at Alton) is 54.3km², which drains an area to the north and west of Alton, as shown in Figure 10.

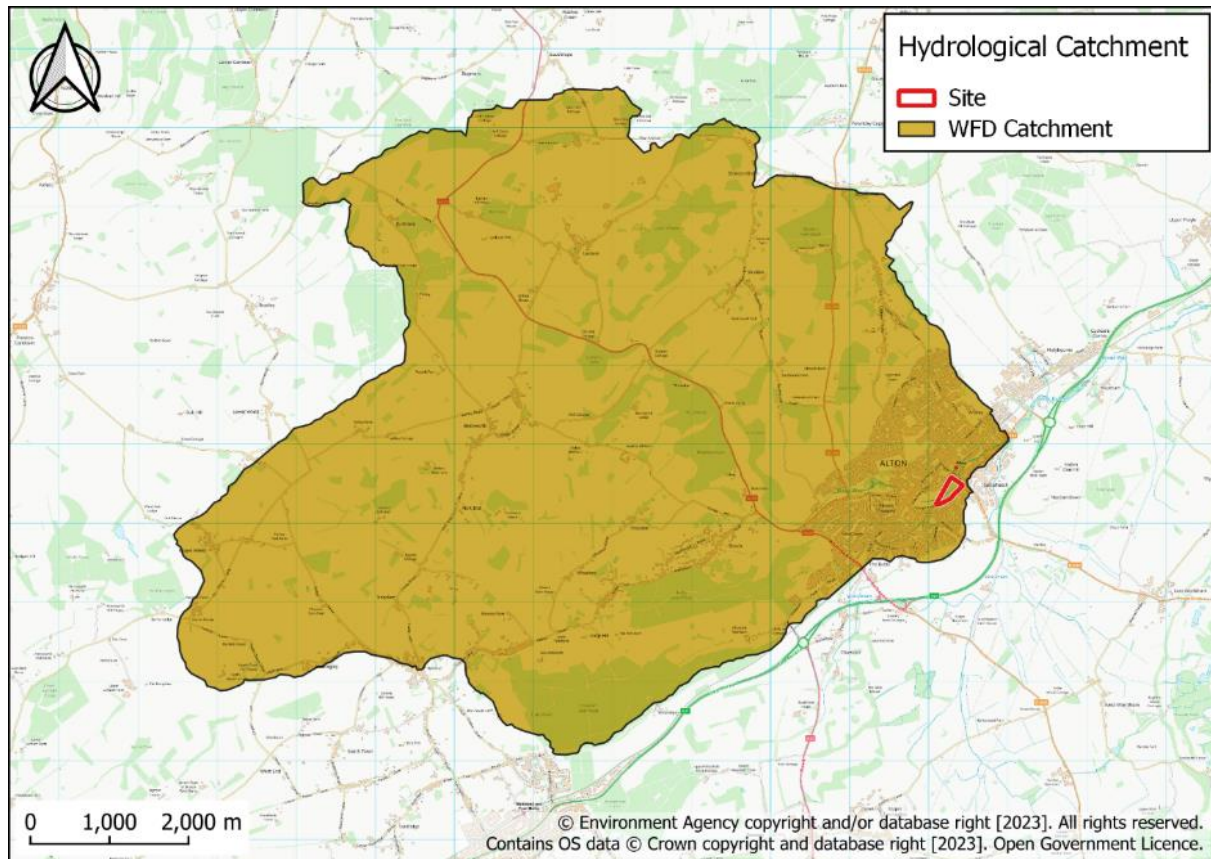


Figure 10 – Hydrological Catchment

- 3.17 A large proportion of this catchment flows directly through the Kings Pond. The weir at the downstream end is an EA Monitoring Station (3012TH) with a reported catchment area of 45.9km² which is 85% of the total catchment area.
- 3.18 Flow data from this gauging station is available via the National River Flow Archive (NFRA) with a record from 1991-2022 which is 99% complete. It is noted that flow data from April to July 1995 is unavailable due to weed grown, and zero flows are recorded during notable drought when pond levels drop significantly enough to prevent flow downstream.
- 3.19 The flow regime within the catchment is described as 'baseflow-dominated' but with some urban runoff. The runoff is influenced by groundwater abstraction and/or recharge.
- 3.20 It is also noted that debris obstructing the upstream grill can cause fluctuations in level. A site visit in November 2022 saw this obstruction (Figure 5), which it is understood that ATC have to clear often as three times per week, increasing to daily during peak leaf fall.
- 3.21 Gauges daily flow data at the downstream end of the Kings Pond reports a mean daily flow (from 1991-2022) of 0.109m³/s, with Q95 of 0.001m³/s ranging up to Q5 of 0.323m³/s.