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5080D – King’s Pond

Flood Risk Statement

Prepared for Alton Town Council

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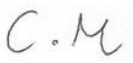
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Project Description

The King's Pond project is a multi-benefit pond restoration and enhancement project commissioned by Alton Town Council. The project aims to transform a sediment-impacted urban pond into a more resilient and ecologically valuable space. The scheme seeks to improve water quality, manage sediment accumulation, control non-native species, enhance biodiversity, and remain a valuable asset and space for the local community. The site is within Water Framework Directive (WFD) waterbody North Wey at Alton (ID: GB106039017800) and is currently rated as a Heavily Modified Waterbody with a 'Moderate' ecological status. Immediately upstream of the site the watercourse is culverted underneath the existing railway track, whilst the downstream River Wey is culverted away from the weir, emerging in open channels flowing through Waterside Court, before being re-culverted beneath Paper Mill Lane, re-surfacing again at The Lamports (SU 72368 39621) as the River Wey. The North Wey at Alton is failing to reach 'Good' ecological status due to physical modifications as a result of urbanisation, flow changes resulting from groundwater abstractions, and point source pollution from intermittent sewage discharges. However, it is acknowledged that the sewage discharges are known to take place downstream of King's Pond.

The project goals are to increase biodiversity, improve water quality, reduce habitat for invasive species of waterfowl, and improve bank stability to reduce sedimentation of the pond. Flood reduction through the design of an improved outlet structure is also a consideration of the project.

This report details the likely flood risk impact of the scheme. A full hydraulic modelling exercise has not been carried out to date, due to the expected increase in channel capacity through the proposed works, and the low existing flood risk extent.

Details of the project can be found within the following supplied documents:

Document Name	Creator
Design Drawings: • 5R-5080D_101_Kings-Pond_Dredging_Overview_V3 • 5R-5080D_102_Kings-Pond_Dredging_CS1_V3 • 5R-5080D_103_Kings-Pond_Dredging_CS2_V3 • 5R-5080D_104_Kings-Pond_Dredging_CS3_V3 • 5R-5080D_105_Kings-Pond_Dredging_CS4_V3 • 5R-5080D_106_Kings-Pond_Dredging_Silt-Trap_V3 • 5R-5080D_107_Kings-Pond_Dredging_Engagement_V3 • 5R-5080D_160_Kings-Pond_Dredging_Planting_Plan_V1 • 5R-5080D_201_Kings-Pond_River_Overview_V3 • 5R-5080D_202_Kings-Pond_River_CS1-3_V3 • 5R-5080D_203_Kings-Pond_River_CS4_V3 • 5R-5080D_204_Kings-Pond_River_Q-Water_V3 • 5R-5080D_205_Kings-Pond_River_Silt-Trap_V3 • 5R-5080D_206_Kings-Pond_River_Engagement_V3 • 5R-5080D_260_Kings-Pond_River_Planting_Plan_V1	Five Rivers Environmental Contracting Ltd
5080D - Designers Risk Assessment	Five Rivers Environmental Contracting Ltd
5080D - Buildability Statement	Five Rivers Environmental Contracting Ltd
5080D - Flood Risk Statement	Five Rivers Environmental Contracting Ltd

Proposed Works Techniques

A full description of the works methodology and proposed machinery for both proposed options at King's Pond can be found in 5080D – Buildability Statement. The proposed works techniques required for each design option are summarised in Table 1.

Table 1. Proposed work by option

Proposed Work	Dredging option – Dredging	River and pond option – River and Pond
Tree works	Yes	Yes
Excavation of bed material	Yes	Yes
Large wood installation	Yes	No
Island creation	Yes	No
Channel excavation	No	Yes
Marginal shelf creation	No	Yes
Backwater	No	Yes
Bank re-profiling	Yes	Yes
Re-use of excavated spoil	Yes	Yes
Willow spiling installation	Yes	Yes
Dead hedge installation	Yes	No
Wet woodland creation/ enhancement	Yes	Yes
In channel silt trap	Yes	Yes
Reed beds	Yes	Yes
Hibernacula	Yes	Yes
Bat box installation	Yes	Yes
Native marginal planting	Yes	Yes
Bench construction and installation	Yes	Yes
Bridge installation	No	Yes
New path creation	No	Yes
New pond culvert inlet and outlet creation	No	Yes

Flood Risk Assessment

1. Flood zones

The flood map (Figure 1) visualises flood zone data provided by the Environment Agency. The map shows flood zone 2 and 3 which refer to areas that have medium to high risk of annual flooding. Flood zone 2 is classified as medium risk and covers areas that has a 0.1%-1% (or 1 in 100 to 1 in 1000) annual probability of flooding. Flood zone 3 is split into 3a and 3b; 3a is high risk, and 3b is the functional floodplain. High risk is anything greater than 1% annual probability of flooding, which can still be as infrequent as 1 in 100 years. The functional floodplain is land that actively stores floodwater. The site flood map is split into three discreet reaches, upstream of King's Pond, King's Pond, and the surrounding parkland and downstream of King's Pond. The upper reach is differentiated by a section of open river channel which is then culverted underneath the railway track before outfalling to King's Pond. The open channel area is surrounded by Copper Lane and Harp Avenue, which are residential streets. The watercourse appears to be lined with established trees and vegetation. Small areas of Flood Zone 2 and 3 are shown in this upper reach affecting properties on Harp Avenue, however the flood zones are mostly confined to the channel extent.

The King's Pond area shows Flood Zone 2 covering parts of the southern island in the pond and a small area of flooding to the pathway on the western bank of the pond. Flood Zone 3 envelopes the extent of the pond and some parts of the path on the western bank.

Downstream of King's Pond, Flood Zone 3 is shown in the Waterside Court area, the watercourse is culverted here, and this outline is assumed to illustrate the effect of the pond overtopping for example due to a blockage at the culvert

or a lack of capacity. Downstream of Paper Mill Lane, the River Wey returns to open channel, and the flood zones are largely contained within the channel extent.



Figure 1. Flood Zones at King's Pond - © Environment Agency copyright and/or database right 2025. All rights reserved

There is a potential opportunity to relieve flood risk to the Waterside Court area through culvert/sluice outlet modifications on King's Pond, to reduce blockage and improve downstream conveyance, reducing backing up and flooding of water. However, this could result in an unacceptable increase in flood risk downstream by passing forward increased flows. Therefore, any culvert/sluice modifications would need to be included within hydraulic modelling, which is recommended to take place at the next stage of the design process.

The water level in the pond is known to fluctuate. According to the information provided in the ecological assessment in 2025, the seasonal variation in level due to changes in through flow is around 100/150mm. However, there are more frequent fluctuations due to blockages at the outlet screen. These can be up to 450mm.

An Environment Agency gauging station (ID 39119 – Wey at King's Pond)[1] is located on a rectangular thin-plate weir at the outfall from the pond. The description of the gauge notes that debris obstructing upstream of the grill can cause minor fluctuations in level. The flow regime is described as baseflow-dominated, with some local urban runoff. The gauge has been operation since 1991, with a mean flow of 0.116m3/s. The Q5 flow, a flow which is exceeded only 5% of the time is 0.339m3/s, and the Q95 exceedance flow is very low at 0.002m3/s. The concrete chamber of the weir contains both a weir and a sluice gate. According to Alton Town Council, water normally flows only through the half of the screen that is in front of the weir. However, it may flow out across the full width of the screen when the water level is high enough to over-top the sluice gate, meaning both the weir and sluice will be in use under especially high flow conditions, providing additional conveyance capacity.

[1] NRFA station mean flow data for 39119 - Wey at King's Pond (Alton)

2. Existing Infrastructure

There are two footbridges within the project area, the first is at the upstream end of site, of where the River Wey emerges from a culvert under the path and (*Figure 2*). The bridge is formed from a path overtop a culvert. No changes are proposed to this upstream culvert structure in order to not affect the flow direction and velocity beneath the path. The culvert is 0.5m high, and the highest water level recorded at the upstream gauging station is 0.44m. There are likely to be road and surface water drainage pipes that feed into the Wey between the Alton gauging station and the inlet to site, however this highest recorded flood level gives some level of assurance when estimating impacts on existing infrastructure.



Figure 2: Image taken from path showing the River Wey entering King's Pond emerging from the culvert under the railway track and path

The downstream outlet sluice structure on the pond is shown in Figure 3. At the time the photograph was taken (5th August 2026), only the weir side of the outfall was flowing, as the water level was not high enough to exit over the top of the sluice. According to Alton Town Council, blockages of this structure are common, resulting in large fluctuations in the water level of the pond. If a blockage coincides with a large rainfall event, the flood risk in the area could be exacerbated. The proposal for the site is to replace the current flat trash screen with an extended screen that will allow for water to enter the sides if the front gets blocked by debris build up, thus ensuring there is a reduced chance of backing up flow.

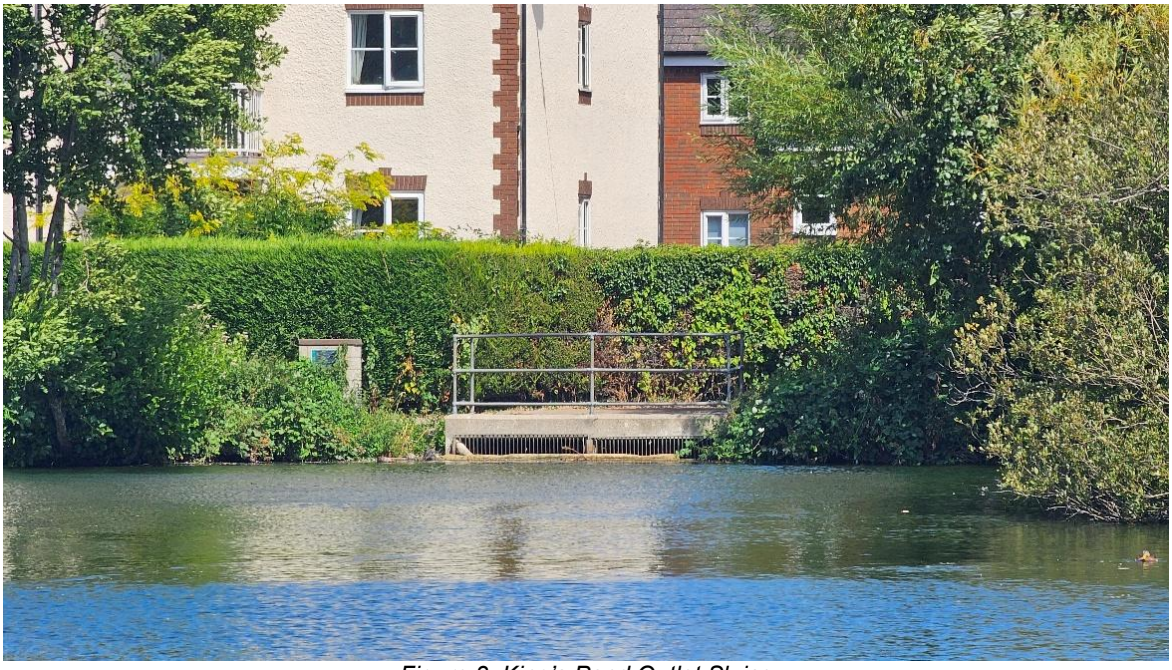


Figure 3. King's Pond Outlet Sluice

The other key infrastructure within and around the site are the paths. The proposals plan to enhance the path network and amenity space within King's Pond, by providing additional access routes through the site and areas of seating e.g. benches.

3. Flow and Function Analysis

Currently the discharge of water from King's Pond is controlled by the height of the weir and sluice, and limited by the roof of the sluice chamber, creating a 0.5m high, 1.5m wide opening over the former, and 0.2m high, 1.5m wide opening over the latter. The weir is the primary outlet from the site, and allows approximately 0.286m3/s maximum flow, while the sluice is more rarely flowing, and allows approximately 0.08m3/s flow, for a total of 0.366m3/s. Top of typical range at Q5 (values exceeded 5% of the year) is 0.339m3/s, however there have been peak flow events recorded above this value, notably in December 2000, and December 2013. The highest flow value in the past 10 years was February 2026 at 0.475m3/s which correlated to the pond water levels being approximately 99.58mAOD, or 0.33m above the weir sill.

Flow values from the upstream gauging station at Alton High Street have also been used to calibrate data and levels as the gauge is approximately 400m upstream of the King's Pond site area, and therefore still a relevant data set to understand flow entering the site. Peak flows from upstream are lower than at King's Pond, likely due to King's Pond also receiving inputs from surface runoff and natural springs, with a Q5 rate of 0.254m3/s. In the lowest flow conditions outside of droughts the flow rate at Alton High Street drops to 0m3/s, which is in character with the ephemeral upper reaches of the Wey beyond Alton.

The design proposal for the dredging option would not see any amendments to the weir or sluice, however the river and pond option would alter how these features function to ensure that the newly reinstated river would flow as often as possible. There are two options, one is to leave the sluice as it

is, only allowing flow to exit once the water level reaches over 99.5mAOD, and to remove the weir and install a top plate that will retain the outfall structure as 1.5m wide and 0.5m high, but low flows will be unimpeded. The other option would be to leave the weir at 99.25mAOD, and to lift the sluice to allow for low flow passage. The level that the sluice is lifted to can be adjusted to suit the desired discharge rate from the King's Pond area, thereby controlling the risk of downstream flooding. The level to which the sluice is set will not allow for flow to exceed current maximum flow out of the site.

Upstream flood risk is mitigated through the proposed wetland area functioning as a backwater that will take flow that is above the level of the outfall "roof" at 99.75mAOD. In December 2013 the water level reached 99.83mAOD, which is the highest level recorded since the gauge began collecting level data in 1991. At this level the wetland would be taking the additional flow through the backwater effect, with a small channel being set up the bank to allow the overflow from the new main Wey.

4. Flood Risk Management

Proposed Works	Potential Flood Risk	Risk Mitigation	RAG
Tree Works	Dislodgement of terrestrial hibernacula created from the leftover woody material. Reduction in floodplain roughness	Any hibernacula created on site will be placed further than 10m from the bank top to reduce risk of washout. Smaller and lighter materials should be pinned down with larger limbs that will be harder to mobilise in flood flows. The addition of coarse material will act as a flood mitigation measure. In the event of an extreme flood scenario where flood flow runs across the land the additional woody material will slow flow. If it was required, the material could be pinned using posts and rope or pegs. This has not been initially proposed due to the desire to make hibernacula as natural as possible. Any removal of trees will initially reduce the roughness of the terrain, but new trees will be planted that will eventually provide greater resilience and support.	
Excavation of bed material	Changing the pond capacity and planform.	Volume calculations to be undertaken following acceptance of design option to confirm the final volume of the pond pre and post construction. Current estimates indicate the dredging option will increase capacity by 4,970m3, and there will be a net neutral change in capacity in the river and pond option, but the storage areas are separated by areas of raised land.	
Island creation	Changing the pond capacity and planform.	Minor reduction in capacity from the fronting brought in for the island, otherwise will offset the removed silt, leading to a net neutral change.	
Channel excavation	Changing the pond / channel capacity and planform.	The new proposed channel will provide low flow and high flow channel conveyance and therefore is not anticipated to pose any flood risk. Dimensions have been created by utilising existing flow values to ensure capacity for high flow conditions as well as peak flow.	
Marginal shelf creation	Changing the pond capacity and planform.	Marginal ledges are to be created using site won spoil. Banks of the ledges should not exceed 1:3 gradients in order to maintain stability and avoid slumping. Ledges are to be topped with biodegradable matting, such as C125BN biodegradable erosion control blankets to prevent erosion. Matting should be pegged into place using 150 mm hardwood pegs in a 0.5 m grid. Plug planting is then to occur after matting. While the ledges alone would result in a reduction in the pond volume, given the excavation/dredging works to create additional capacity in the pond, this impact is not anticipated to make flooding worse.	

Proposed Works	Potential Flood Risk	Risk Mitigation	RAG
Backwater	Changing the pond capacity and planform.	A backwater has been proposed on the downstream left hand bank in river and pond option. The backwater has been designed to provide additional attenuation space within the backwater channel itself and surrounding wetland area for high flows or if the downstream pond outlet is at capacity. The backwater has been designed with banks no steeper than 1:3 to reduce the risk of slumping over time. It is anticipated the backwater and wetland area will be ephemerally wet, but is well connected to the channel to prevent fish entrapment.	
Bank re-profiling	Changing the capacity of the pond.	Alone, bank reprofiling is likely to have a minor impact on the overall pond capacity, and is being undertaken to prevent slumping and future sediment build up in pond to futureproof the capacity. On balance with the excavation works of the pond it is expected to be net neutral.	
Re-use of excavated spoil	Reduction of floodplain storage.	The re-use of excavated spoil around some margins of the pond and on some areas of the banks will result in areas of raised elevation compared to present. These raised areas will be less susceptible to inundation, however, are not generally seen to reducing floodplain storage as they are not within the identified flood zones.	
Willow spiling installation	Structure dislodgement and downstream blockage risk; debris entrapment and flow impediment risk.	Natural deflectors to be secured in place by driving chestnut stakes either side of the structure and secured with rope and fencing staples. The shallow angle and placement of the wood close to the bed should reduce the risk of impeding flow as medium and high flows will be able to pass over the top smoothly. Wire could be used instead of rope if required to achieve the FRAP permit, however natural fibre ropes are preferred to reduce the non-natural material being added to the channel. Yearly checks, or checks following Amber weather warning events, and EA flood warning events, should be undertaken to the site to establish whether any woody structures have become, or are at risk of being dislodged. This will be detailed in the maintenance plan.	
Large wood installation			
Dead hedge installation			
Wet woodland creation/ enhancement	Increased roughness and infiltration.	Enhancing areas of wet woodland will be beneficial to flood risk, allowing for improved bank stability, increased evapotranspiration and infiltration. Additional trees will also increase the roughness of the bank areas, slowing the flow of overland runoff into the pond and channel.	
In channel silt trap	Structure dislodgement and downstream blockage risk; debris entrapment and flow impediment risk.	The proposed silt trap location has been placed more than 20m downstream of the existing culvert to not cause any backwater, and the material is to be sized appropriately to allow for reduced but not blocked flow across, enabling settlement of suspended sediment. The feature will sit similarly to a pool – riffle sequence, with a greater depositional focus. The size and height of the rocks will be based on the incoming flow values relative to the size of the	

Proposed Works	Potential Flood Risk	Risk Mitigation	RAG
		culvert. The existing culvert is approximately 0.5m in height, and the gauging station upstream of the project records a maximum fluctuation of 0.37m in water level, which gives additional clearance for the depositional feature.	
Reed beds	Changing the pond capacity and planform.	The proposed reedbed features would be raised up using site won material, and then secured in place using brash bundles and biodegradable geotextile. This area would be set below the high flow levels of the pond, so that in flood conditions the area can provide additional storage space. The raised brash will slow flow through these areas, reducing downstream flood risk, as well as enhance sediment deposition. This technique mimics saltmarsh restoration techniques, so is suited for fluctuating water levels and retaining sediment.	
Bat box installation	N/A	Not expected to impact flood risk.	
Native marginal planting	N/A	Not expected to impact flood risk.	
Bench construction and installation	N/A	Not expected to impact flood risk.	
Bridge installation	Blockage risk.	The soffit level of the new footbridge is expected to sit above the known maximum water level of the pond to reduce the risk of it causing a blockage or exacerbate flooding. The bridge will be a clear spanning structure, with no footings in the river channel to ensure conveyance is not impeded.	
New path creation	Changing floodplain planform	A new path alongside the true right-hand bank is proposed in river and pond option, to link up to the existing path network to the north and south of the pond. The path will create a flat area on the right-hand bank. Under flood conditions this path is expected to flood, however alternative access will be available using the existing perimeter path network. This new path has been designed to cope with becoming wet under flood conditions.	
New pond culvert inlet and outlet creation	Blockage risk.	The pond inlet and outlet between the new river channel and retained pond area are to be designed at an appropriate level and size to allow water from the channel to flow into the pond and out of the pond back into the channel without becoming blocked. This will retain flow in the new proposed channel at low flow conditions, while ensuring a flood overflow route, and reducing stagnation in the pond.	

5. Recommendations for future assessment

If the preferred option taken forward to detailed design is the river and pond option, then a detailed Flood Risk Assessment including hydraulic modelling using a range of flow scenarios (including an uplift for climate change) should be undertaken in line with Environment Agency requirements. This detailed assessment would ascertain with confidence that the risk of flooding to the area around King's Pond and changes in pass forward flow downstream do not cause an increase in flood risk. It must however be noted that if the modelling does show an increase in flood risk, alterations to the design are likely to be required to mitigate this risk.

The alterations that would be undertaken through design would be in amending levels within storage features and the outfall structure, and would not fundamentally change the overall feel or appearance of either option.