Gadebridge Park river restoration project
Frequently asked questions

Last updated: 16 June 2022

Answers to frequently asked questions on the following subjects can be found below (click to navigate directly to the related questions and answers):

Chalk streams

1. I understand that the River Gade is a chalk stream, but what is a chalk stream and why are they so important?

Unlike most rivers, chalk streams are fed from chalk aquifers – underground porous rock formations which store water. Chalk streams are directly connected to these aquifers, making their water mineral rich, clean and at a consistent temperature. This unique habitat provides the ideal conditions for a diverse range of plants and animals. Chalk streams are home to some of our most threatened species, such as the Water Vole and Brown Trout.

85% of the world's chalk streams are in England, but only 17% of these currently meet 'Good Ecological Status' under the Water Framework Directive (WFD). The stretch of the River Gade that flows through Gadebridge Park is currently classed as having a 'Poor Ecological Status' under the WFD.

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2. What problems are chalk streams facing?

Chalk streams are a rare and valuable habitat but the problems they face are complicated and expensive to solve:

- Low flows due to unsustainable abstraction, population growth and climate change.
- Poor water quality due to storm overflows, discharges and run-off from farms and roads.
- Degraded habitats due to historical human-made impacts, such as straightening channels and barriers to fish migration.

3. What's being done about it and how can I help?

Like-minded individuals and organisations are working both independently and collectively with the aim of improving chalk streams and the wider water environment. People have come together to form 'Catchment partnerships', to develop a shared vision and plan for their rivers.

For example, the Colne Catchment Action Network (ColneCAN) ties together a number of existing groups, such as the Colne Valley Regional Park and the Chilterns Chalk Stream Project and includes partners such as the Environment Agency, water companies, local authorities, charities, anglers, conservationists and local residents to ensure catchment-wide thinking and local action. They work together to improve the River Gade, the River Ver and many other rivers in the area.

The Gadebridge Park river restoration project is part of Revitalising Chalk Rivers, a wider programme of projects led by the Environment Agency and Affinity Water that aims to protect and restore rare chalk streams like the River Gade. As part of this programme, Affinity Water has completed a project in the upper section of Gadebridge Park to provide new river habitats for wildlife and to improve the river's water quality – you can find out more about this project at www.affinitywater.co.uk/corporate/environment/restoration/river-gade.

What you can do to help:

- Use the water from your tap wisely - using less water means that we can minimise the amount of additional water being taken out of our rivers and aquifers. Visit www.waterwise.org.uk/watersworthsaving/ for ideas on reducing your water use to help our chalk streams.

- Toilets, sinks, washing machines or dishwashers that have been misconnected into surface drains rather than sewers cause significant pollution of our rivers and streams. Find out how to check your property at www.connectright.org.uk/misconnections.

- Report any suspected pollution incidents to our incident hotline on 0800 80 70 60 so we can investigate it. Find out more at www.gov.uk/report-an-environmental-incident.

- Support the local catchment partnership, the Colne Catchment Partnership, by visiting http://colnecan.org.uk/

The River Gade

4. Where does the River Gade start?

The River Gade rises from a spring in the chalk of the Chiltern Hills at Dagnall, Buckinghamshire.

5. The river looks fine – why does it need improving?

Like many chalk streams, the River Gade faces pressure from low flows and historic modifications to its channel that limit the river's habitats and the wildlife it can support. The stretch that flows through Gadebridge Park is currently classified as having a 'Poor Ecological Status' under the Water Framework Directive (WFD).

In Gadebridge Park the River Gade flows down an artificial channel created to supply water to the now demolished Bury Mill. The artificial channel is 'perched', meaning that it sits at a higher level than the valley bottom - the natural course of the river through the park. This means that the river is disconnected from its floodplain. When flooding occurs in the valley bottom, the water remains in the park for long periods of time because it is unable to flow back into the channel.

The artificial channel is much wider and straighter than a natural chalk stream would typically be. This often leads to a build-up of sediment along the bank and associated excessive vegetation growth, which gradually narrows the channel. The river has little resilience to drought conditions due to low volumes, especially in late summer and early autumn.

The Environment Agency's gauging station and weir, located at the bottom of the park, is used to monitor low flows and flood flows on the River Gade. The weir, as well as other remains of historic in-channel structures, act as barriers to fish. These

structures can also cause sediment and vegetation to build up, impacting on river habitats and wildlife.

Low flows

The River Gade often suffers from low flows due to:

- Spring flows (groundwater emerging at the surface) being diverted into an underground tunnel (culvert) rather than feeding the River Gade. The culvert was built to reduce the risk of flooding in Hemel town and discharges into the fishing lake at Kings Langley – about 5km downstream of Gadebridge Park. Spring flow is therefore lost to the River Gade until this point.

- Being disconnected from the groundwater table. For a chalk stream, where over 70% of its flow is from groundwater, this can have a significant impact on its resilience during periods of low flows and to wildlife in the channel.

- Water being taken (abstracted) for public water supply.

Most water we drink in the South East comes from rainwater stored deep beneath our feet in natural chalk 'aquifers'. These also feed our chalk streams. In 2018 Affinity Water reduced net abstraction in the Gade catchment by 2,342,400 m^3/year (that's an average of 6.4 million litres a day). However, demand for water in the South East remains high.

6. Why can you not just leave the park as it is?

There simply is not a 'do nothing' option. Rivers, lakes and coastal waters are vital natural resources. They provide drinking water, habitats for many different types of wildlife, and are an important resource for industry and recreation. A significant proportion of them are environmentally damaged or under threat. Protecting and improving the environment is an important part of achieving sustainable development and is vital for the long term health, well being and prosperity of everyone (read more here).

The River Gade is a chalk stream, which is a globally rare habitat. A chalk stream's unique habitat provides the ideal conditions for a diverse range of plants and animals and are home to some of our most threatened species, such as the Water Vole and Brown Trout. 85% of the world's chalk streams are in England, but only 17% of these currently meet 'Good Ecological Status' under the Water Framework Directive (WFD). The stretch of the River Gade that flows through Gadebridge Park is currently classed as having a 'Poor Ecological Status' under the WFD.

The Hertfordshire State of Nature Report 2020 has identified that nature in Hertfordshire is under threat and declining at significant rates. Climate change will accelerate this trend. In a 'do nothing' scenario, this pattern of decline and extinction will continue to degrade our valuable habitats, such as the River Gade, that are essential for societal well-being. High biodiversity is a proven indicator of a habitat's health and resilience to climate change and is essential to help mitigate impacts. You can read more about the state of Hertfordshire's rivers and wetlands here: https://www.hertswildlifetrust.org.uk/stateofnature

The river improvements as part of the Gadebridge Park river restoration project will contribute to:

- Improving the River Gade towards reaching Good Ecological Status, removing the risk of deterioration and meeting the UK's desire to improve the health of our water environment.

- Meeting the Environment Agency's obligations under the Water Framework Directive (for instance, addressing the risk of deterioration is a statutory requirement), the commitments expressed in the Thames River Basin Management Plan and the Government's Five Year Environment Plan.

- Mitigating the impacts of climate change by establishing sustainable habitats more capable of adapting to future climate scenarios, improving resilience to low flow events and drought conditions when water availability is reduced, and improving floodplain connectivity and drainage when rainfall is high.

These benefits are consistent with the Dacorum draft Local Plan which has references to the importance of protecting chalk streams and mitigating and adapting to climate change.

Project objectives and proposals

7. What does the project aim to do?

The Environment Agency, Dacorum Borough Council and Affinity Water want to:

- Improve the River Gade and the adjacent parkland for wildlife.
- Provide more opportunities, accessible to everyone, for people to get closer to the river and enjoy nature.
- Provide more opportunities to learn about the River Gade, both its historical importance to the landscape and its value as a rare chalk stream.

- Improve the river's resilience – it's ability to cope with and adapt to the pressures of low flows and climate change.
- Improve floodplain connectivity, but reduce the impact of flooding – i.e. flood water can be stored on the floodplain when needed, but doesn't sit on the parkland for long periods of time.
- Improve biodiversity in the River Gade, so that it supports Good Ecological Status under the European Water Framework Directive.
- Reduce the barriers to fish movement and impoundment caused by river structures, including the Environment Agency's gauging station.
- Improve flows in the river, to lessen the build-up of sediment and vegetation and to reduce the need for maintenance.
- Improve the ability to monitor river flows in the River Gade.

8. What are the current proposals?

Our latest proposals include:

- Realigning the part of the River Gade located downstream of the Grade II listed White Bridge back to the valley bottom (through the centre of the park at its lowest point). This will reconnect the river to its floodplain and to the groundwater table below.

- Re-routing spring flows - which are currently diverted through a culvert (underground tunnel) and discharged into a fishing lake at Kings Langley 5km downstream - into the new realigned channel. This will provide additional flow to the river, increasing its resilience to low flows, improve the river's water quality and help to restore natural characteristics of a chalk stream such as a more alkaline PH and a stable temperature all year round.

- Replacing the existing Bury Mill gauging station with a gauging station on the new realigned channel that is passable to fish and has a reduced impact on the river.

- Creating vegetated riparian margins alongside the river channel to provide new habitats for wildlife.

- Providing new footpaths alongside the river, a fully accessible bridge crossing the new realigned channel from the Queensway car park to the Bowls Club and an informal crossing point in the centre of the park - all for people's enjoyment of the river.

- Providing dipping platforms and gravel beach areas for people to get closer to nature.

- Installing information boards within the park to share the River Gade's historical importance to the landscape and help people to understand and value our rare chalk streams.

You can view the proposals on a map of the park at https://consult.environment-agency.gov.uk/hnl/gadebridge-park-information-page

9. What will happen to the old channel?

The existing channel (mill leat) downstream of the White Bridge will be preserved in situ. Material that is excavated from the creation of the new channel will be used to infill the existing channel. By effectively burying the mill leat, this historical feature will remain undisturbed and suffer less erosion and human/animal damage. Its preservation allows for any future archaeological investigations to take place. Before this work is completed, a number of tests will take place to ensure the soil is of a suitable quality. The area will then likely be seeded with grass.

We are working with Hemel Hempstead History and Museum Society to install an information board adjacent to the existing channel to provide historical information about the mill leat.

10. What will happen to the old gauging station?

The brick structure will be removed and the concrete flume (which runs around the corner of the carpark and under the Queensway Bridge) will be filled in. Dacorum Borough Council are likely to remove the Queensway Bridge and tarmac the surface.

11. What will the new gauging station look like?

The equipment used for the new gauging station will be housed beneath the bridge which connects the southern car park to the Bowls Club. The photograph below indicates what the equipment will look like on the base of the new channel.

12. Why is there no river restoration planned for the area north of the White Bridge?

This area was ruled out for restoration during the feasibility and options analysis stage of the project. The valley bottom and its associated groundwater springs are located to the east of this section of the park. Having carried out a heritage assessment for the project, we identified that we are unable to alter the flow beneath the Grade II listed White Bridge, so relocation of the channel is unachievable.

Also, Dacorum Borough Council's main event space is located within the northern section of the park.

13. Can't you just clear out all the overgrown vegetation?

Clearing vegetation and silt from the river is not sustainable – over time it would simply return and require clearance again. Not only would this process increase long-term maintenance costs, it would also cause damage to wildlife habitats. Any benefit from doing so would be very marginal (if any) and short-term.

By restoring the river to a more natural state, we will improve flows and lessen the build-up of sediment and vegetation. We do not expect in-channel maintenance such as desilting to be needed following the project's completion downstream of the White Bridge.

14. Isn't moving the river closer to the children's playground dangerous?

The closest the new river will be to the children's playground is approximately 35 metres. The closest the Splash Park will be to the new river is over 68 metres.

Once the project is complete, flood waters will recede more quickly into the new channel. This means that flooding will have less of an impact on people's enjoyment of the park, including the play areas. Also, floodwaters can be dangerous - standing water quickly becomes a breeding ground for bugs. Public Health England say children should not play in floodwater.

15. Is this all so the council can build more houses?

No. The Environment Agency is leading the project, alongside its partners Dacorum Borough Council and Affinity Water. The project will provide multiple benefits, including improved habitats for wildlife, the protection of water resources for both people and the environment, and allowing local residents and visitors to get closer to the river and enjoy nature.

This project is part of Revitalising Chalk Rivers, a wider programme of environmental projects that the Environment Agency and Affinity Water are working on that aims to protect and restore rare chalk streams like the River Gade.

Costs and funding

16. How much will all this cost and who is paying?

In total, we currently expect the works to cost in the region of £1.2m – including all required investigations, the completion of detailed designs and construction. We will have more detailed costings available for the scheme once the detailed designs have been finalised.

The Environment Agency and Affinity Water are funding the river restoration project, including its construction, and Dacorum Borough Council will be contributing to its recreational and amenity aspects – namely the bridge, footpaths, signage, gravel beaches and dipping platforms.

Project timescales

17. When will it start?

Subject to gaining planning approval and securing all the necessary funding, we expect the restoration works to begin on site in Spring 2023.

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We were originally hoping to begin construction in Spring 2022 but having weighed up all the options, decided to delay until the following year.

In particular, the detailed designs have taken longer than we expected to finalise. This has affected the time available for our technical experts, for instance in biodiversity, to really scrutinise the plans in detail as part of the planning process. By delaying construction, we can use the extra time available to review everybody's comments and ensure that the project delivers the best outcome for the environment, wildlife and people.

Also, Gadebridge Park will be part of the celebrations for the Queen's Platinum Jubilee in June and so it is especially important this year that we do all we can to avoid disruption to any events in the park. This means that we only have a small window of opportunity to complete the works before these events take place. Any unforeseen issues during construction could therefore cause significant problems. Unfortunately, it's not possible to simply carry out the works later in the year. This is due to the need to avoid the school summer holidays, fish spawning and bird nesting seasons and construction during potentially difficult weather conditions over winter.

The optimal time to start construction is still Spring. We will work with Dacorum Borough Council to agree a detailed timetable and will share this information as soon as we can.

18. How long will the works take?

We currently expect the works to take up to four months to complete.

19. Why are you doing the works over spring/summer when the park is at its busiest?

We have considered the timing of the construction phase carefully to balance the needs of the local ecology and the council's events programme and school holidays. For instance, we want the works in the river to be carried out after the fish spawning season in the winter months, but before the schools break up for the summer holidays.

The optimal time for construction is therefore between mid-April and mid-July. We will work with our technical teams and external partners to agree the most suitable programme.

20. Will events in the park go ahead during the construction phase?

Yes – we will work closely with Gadebridge Park's managers at Dacorum Borough Council to ensure we are kept up-to-date of the park's event programme for 2023 in order to minimise disruption.

Access from the Gadebridge Lane car park and the White Bridge will remain open during construction.

Most events in Gadebridge Park use the space north of Gadebridge Lane and this will be available for use at all times. The Splash Park may open later than usual in May 2023 - this is still to be decided.

Wildlife considerations

21. Why was the wetland area removed from the designs?

The proposed wetland area upstream of Gadebridge Lane was removed from our designs because we found it would be too small to function effectively. Also, it was likely to have impacted on the use of the events space in the park.

The existing channel in this location is over-wide and 'active' within the banks. As a result, new low-flow channels are created each summer in between extensive areas of marginal vegetation (much of which is washed away during winter floods). This allows opportunities for the channel to migrate and create another summer course. We plan to remove a small number of concrete weirs in this location to reduce siltation and improve the ecology of the channel and its margins.

Downstream of the White Bridge, we will create vegetated riparian margins along the left bank of the new channel, plus a narrower, more continuous one on the right bank.

Riparian margins provide important habitat for many species. Their mix of semi-aquatic tall herbs, grasses and trees provide a range of services for our wildlife - for example, a source of food for aquatic insects, cover from predation for Water Vole and a migration corridor for Otter. More complex riparian margins will have a varied topography containing temporary ponds that create foraging grounds for wetland bird species such as the Grey Heron.

As well as providing habitat, riparian margins also play a role in filtering sediment and reducing nutrients entering the watercourse, helping to improve water quality. They slow flood flows and help to reduce erosion of banks, providing a natural flood

management solution. They are also critically important in retaining the connectivity of the river environment, both laterally, with its flood plain and longitudinally with upstream and downstream reaches of the river.

Overall, our revised plans will provide more ecological benefit than the previously proposed wetlands within the amenity grassland area.

22. How are you reducing disruption to wildlife in the existing channel during construction?

Works will be carried out to our high ecologically sensitive standards and we will avoid disturbance as much as possible.

Bird Nesting season as stated by Natural England is 1 March to 31 August each year, however we know that this can vary in the South East dependent on the weather. Where tree works are unavoidable during this period we will carry out a bird nesting survey beforehand and appoint an 'Ecological Clerk of Works' to ensure minimal risk to both birds and bats.

Although there may be short-term implications on some species currently found in the existing channel during construction, the new channel will provide an attractive new habitat for many species.

23. What about Water Voles?

Water Voles are a protected species so it is important that we understand whether there is a population living in the River Gade in Gadebridge Park before we begin construction.

Water Vole were spotted in the park for a few weeks back in Autumn 2020 following their recent reintroduction further upstream on the River Gade by the Box Moor Trust. In 2021 our officers also found potential signs of their presence in the park, including possible footprints. As a result of these sightings we arranged for a comprehensive Water Vole survey to be carried out in September 2021 to establish whether Water Voles had migrated into the park. Despite the possible sightings, however, the survey found no current signs of Water Vole.

We arranged for another survey to take place at the end of May 2022. We're excited to say that the survey found a 'probable' sighting of a Water Vole. Although it was a very brief sighting, the mammal's tail suggested it was much more likely to be a Water Vole than a rat. The survey also found feeding remains which provides further evidence to support a positive sighting.

We will carry out a follow-up survey in September 2022 and will work closely with Natural England and the Box Moor Trust to ensure that any Water Voles are safely relocated during construction.

By restoring this stretch of the River Gade and providing suitable habitats, we hope that Water Voles will be spotted here much more regularly in the future!

24. By adding gravel beaches and encouraging children and dogs to enter the river, will this not damage the river and harm wildlife?

We want to protect the river and its wildlife, but we also want to help people get closer to the river and enjoy nature. It is a careful balance. Access to the existing river is uncontrolled and is causing significant localised damage.

Our latest proposals include areas of gravel on the inside of bends in the river. These 'gravel beach' areas will encourage people to enter the river at these locations. The naturally larger sizes of sediment in these features and the faster flow of water should prevent the movement of finer sediments in the water, and therefore reduce the impact of people and dogs accessing the river.

Our plans include the installation of information boards, including one specifically about chalk streams. We hope this will help people to value and protect these important habitats.

25. How will you prevent the spread of non-native invasive species like Orange Balsam and American Crayfish during construction?

Being vigilant is important. We will ensure that regular 'toolbox talks' (involving short presentations and informal discussions) are provided to on-site staff and all visitors concerning non-native invasive species.

The main risk in spreading these species is when vehicles and people leave the park, including the public, carrying propagules (eggs and pieces of vegetation) to other rivers, streams and ponds. During construction, our contractors will therefore adhere to a strict biosecurity plan, including the 'check clean dry' methodology and the use of wheel washes and exclusion zones. Pre-emptive pulling of non-native invasive plant species will take place where necessary.

The new channel will not remain free of non-native invasive species as they will be carried into it by the flow of the River Gade. The continued vigilance of the Parks and

Recreation Team at Dacorum Borough Council will be required to eradicate any new infestations - as they have successfully done to date.

Fish

26. Are fish currently in this stretch of the river? How will the proposals help fish?

In May 2021 we carried out a fish survey on a 100 metre stretch of the River Gade in Gadebridge Park. The results were very disappointing. In total, the survey found 3 3-Spined Stickleback, 15 Bullhead, 2 Minnow and 5 Stone Loach. The cause of the poor results is thought to be a combination of low flows and the site having dried up in 2019, disturbance from dogs and the gauging station acting as a barrier to fish passage.

The good news is that a Brown Trout, a protected species, was found during the survey of the upper section of Gadebridge Park; the stretch already restored as part of the Revitalising Chalk Rivers programme.

By restoring this stretch of the River Gade and providing suitable habitats for fish and other wildlife, we hope that we can significantly improve these results in the future.

The new re-aligned channel has been designed to create a natural chalk stream and includes a variety of features such as riffles, pools and berms. The variety in habitat should support a wide range of species, including fish. Fish have different habitat requirements throughout their life cycles. Providing a diverse channel is vital in order to give fish the best chance possible at each life stage, and to create a habitat that can support a self-sustaining population. For example, marginal planted areas will provide refuge from predators for juvenile trout. Adults will benefit from the deeper pools for cover as well as riffles and clean gravels for spawning.

The proposed new gauging station will also allow movement of fish into Gadebridge Park which was not previously possible.

27. How will you transfer fish to the new channel?

Fish will be moved from the old channel to the new one using a method called electro-fishing. This is a well-known technique that fisheries scientists use to monitor fish populations. We use it many times each year to provide an indication of the ecological quality of our rivers.

Electro-fishing involves walking upstream with equipment that creates a mild electrical current within the water. This causes a response in fish making them swim towards the source of the electrical current where they can be safely caught. A high level of training is required to ensure that fish are not harmed in the process and it will likely take many attempts to provide us with the confidence that all the fish have safely been rehomed into the new channel.

28. Will you restock the new re-aligned channel with fish following project completion?

We don't expect this to be necessary. One of the main aims of the project is to remove the barriers to fish movement, for example by replacing the current gauging station with one which allows fish passage. The relocation of the river Gade to valley bottom and the installation of a new, more sustainable structure will allow wild fish to recolonise the area, with the aim that a self-sustaining population will become established without the need for stocking. We will carry out a fish survey once the work has been completed, and again once the new channel has established, to understand how the fish population has changed following the habitat enhancements.

Archaeological finds

29. What did you find during the archaeological works?

Between 4 and 10 March 2020, we arranged for archaeological trenching to be carried out along the proposed route of the new channel to ensure our planned works would not affect any undiscovered historical structures or artefacts. A number of interesting pieces were found, including a brick culvert, most likely related to the water gardens or mill known to surround the site, a handle shard from a late 18th to early 19th century Creamware jug, a large nail, and a horseshoe!

The size and dating of these finds mean they are of little archaeological value and there were no recommendations for any further archaeological work. A 'heritage watching brief', where an archaeologist monitors the site, may still be required during construction.

Flood risk

30. Won't connecting the river back to its floodplain make flooding worse?

In Gadebridge Park the River Gade flows down an artificial channel created to supply water to the now demolished Bury Mill. The artificial channel is 'perched', meaning that it sits at a higher level than the valley bottom - the natural course of the

river through the park (the channel is half a metre higher than the bottom of the valley). This means that the river is disconnected from its floodplain. When flooding occurs in the valley bottom, the water remains in the park for long periods of time because it is unable to flow back into the channel.

The new channel will be connected to the floodplain and is designed to cope with high flows. Our most recent flood modelling (November 2021) shows that our proposals will reduce flooding in the park.

The figures below show a comparison of the flood outlines pre and post restoration. Currently a portion of the park floods when water spills eastwards from the perched channel. This creates a shallow area of flooding, which frequently ponds because water cannot flow back into the channel. Following restoration, the flood risk within this area of the park will be reduced as the floodplain and river channel will be better connected. Flood water will be able to drain back into the channel as flood water recedes.

Figure 1: Maps showing the existing surface water flooding risk in the park (pooling following heavy rainfall) on the left-hand side and the improved situation on the right-hand side.

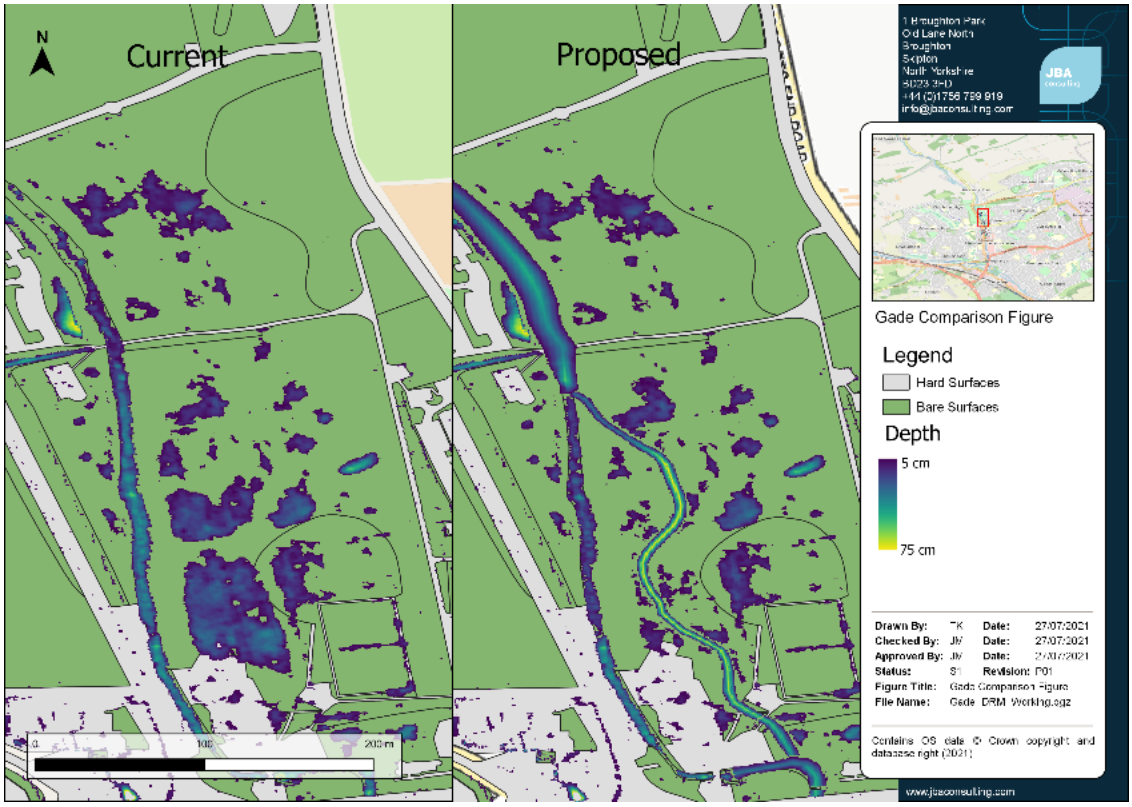
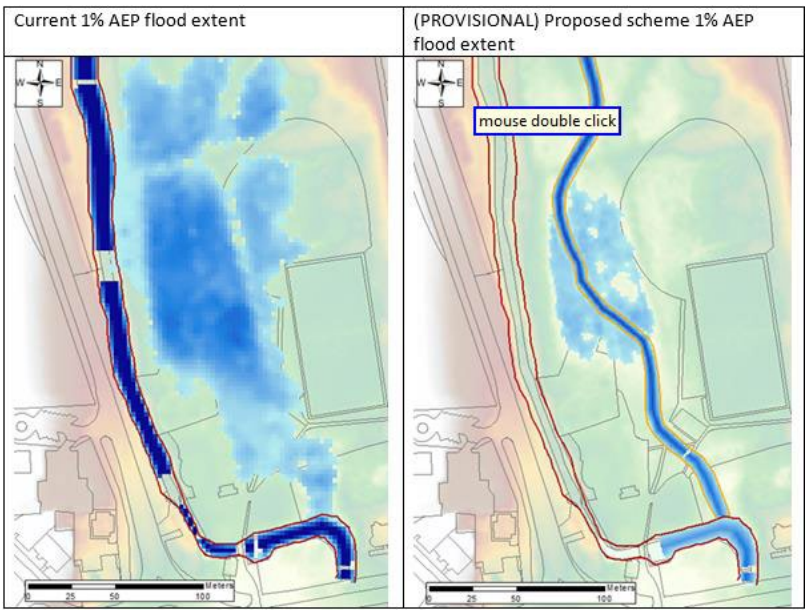


Figure 2: Maps showing the current and post-completion extent of flooding in Gadebridge Park during a flood event which has a 1% chance of happening in any one year.



The flood culvert that was built to stop Hemel town from flooding will remain operational, however the flow of the River Gade into it will be from East to West rather than West to East as it is now.

31. What's wrong with just letting the park flood? Where will the flood water go after the project is completed?

Our most recent flood modelling (November 2021) shows that our proposals will reduce flooding in the park. The works will not increase flooding elsewhere – after heavy rainfall flood water will still divert to the existing flood relief culvert, built to reduce flood risk to Hemel Hempstead back in 1959. Flood water flows through the culvert, bypassing the town, and eventually flows into the fishing lake at Kings Langley, about 5 kilometres downstream of Gadebridge Park. This system will work in the same way, regardless of whether floodwater pools in the park as it does now or flows back into the channel following completion of the restoration works.

Reducing the risk of flooding to the park is just one of the multiple benefits the project provides, however.

The River Gade is a chalk stream; a rare and valuable habitat. Unlike most rivers, chalk streams are fed from chalk aquifers – underground porous rock formations which store water. Chalk streams are directly connected to these aquifers, making their water mineral rich, clean and at a consistent temperature. This unique habitat provides the ideal conditions for a diverse range of plants and animals, including some of our most threatened species, such as the Water Vole and Brown Trout.

85% of the world's chalk streams are in England, but only 17% of these currently meet 'Good Ecological Status' under the Water Framework Directive (WFD). Although the River Gade in Gadebridge Park looks fine, this stretch is currently classified as having a 'Poor Ecological Status' under the WFD.

32. Why is there no restoration planned for the area north of the White Bridge? The river often overtops the banks in this location, causing flooding to the children's playground and other areas.

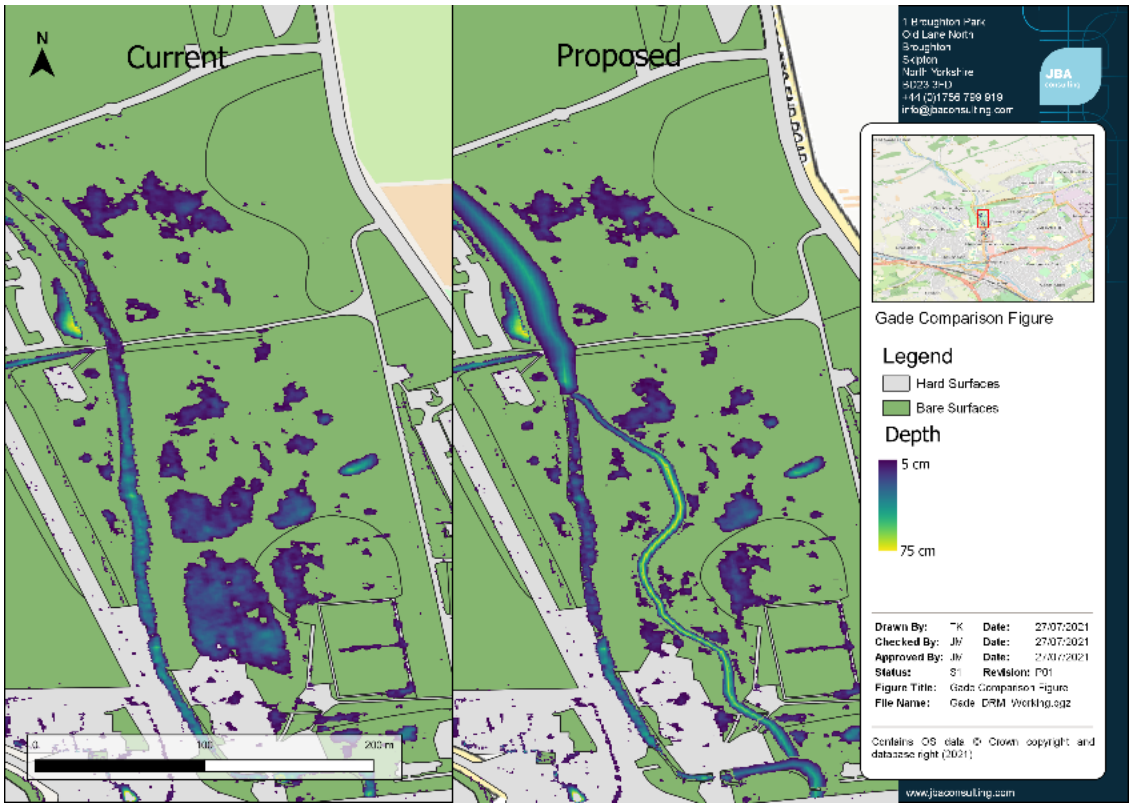
This area was ruled out for restoration during the feasibility and options analysis stage of the project. The valley bottom and its associated groundwater springs are located to the east of this section of the park. If we were to realign the river in this location, it would run through the middle of Dacorum Borough Council's main event space. A heritage assessment also identified that we are unable to alter the flow beneath the Grade II listed White Bridge, making it significantly more challenging to achieve realignment north of the bridge.

We are aware that the river often overtops the banks north of the White Bridge, causing water to pool. During high flows the White Bridge restricts flows heading downstream, which causes water to back up and overtop the banks. The pools in this section of the park are directly linked to the level of the water in the river, and quickly recede once river levels reduce. As we are unable to alter flows beneath the bridge, our original proposals aimed to utilise this 'pooling' by constructing a wetland area in this location. However, this was later removed from our designs because we found it would be too small to function effectively. Also, similarly to the option of a full realignment of the river here, it would have impacted on the use of the council's main events space. While we could investigate other options to alleviate flood risk here, any option would require ongoing maintenance. The associated costs would be difficult to justify given that the overtopping is occurring in the river's natural floodplain and no properties are impacted.

Following completion of the project, while the overtopping currently occurring in the area north of the White Bridge is unlikely to reduce, it will also not be made any worse – water will recede back into the channel as it does now. Despite

improvements downstream to reduce the build-up of vegetation and silt, flow conditions will remain the same upstream due to the impact of the White Bridge. The park south of the White Bridge, however, will benefit from reduced surface water flooding as part of the project, including areas near to the children's adventure playground (see Figure 1 below).

Figure 1: Maps showing the existing surface water flooding risk in the park (pooling following heavy rainfall) on the left-hand side and the improved situation on the right-hand side.



As part of our plans we propose to remove a small number of concrete weirs north of the White Bridge to reduce siltation and improve the ecology of the channel and its margins.

Surface water pollution

33. What's a surface water outfall?

Surface water outfalls are where rain water, for example from roads, enters a river. The water quality from surface water outfalls can be poor as the rain water can carry pollution into the river.

34. What impact will surface water outfalls have on the new river?

A set of manholes located in the centre of the park (visible between the Queensway car park and the path between the Bowls Club and the coffee kiosk) collect the spring flow entering the existing floodplain within the park from the valley sides i.e. the flow that cannot drain naturally.

During construction, this main pipe will be blocked upstream of the car park where it passes underneath the new channel. This will allow the spring water flow from upstream to recharge the river channel and groundwater in this location - this spring water flows 365 days a year and can be seen on the east side of the entrance to the flood culvert from the bridge into the Queensway car park.

The downstream section of this pipe collects surface water flow from the Queensway car park and will be kept open. Surface water flows from Leighton Buzzard Road are currently directed into the River Gade, but this will stop following construction - the new channel will be much further from the road and the flows will be collected in new pipework that will be laid in the base of the old channel (mill leat) before it is filled-in. These pipes, as with the flow from the Queensway car park, will be diverted to the flood culvert (where they all discharge at present).

35. Where will the road water run-off from Leighton Buzzard Road go after the project is complete?

Surface water run-off from Leighton Buzzard Road currently flows directly into the River Gade, carrying pollution into the river. The new channel will be much further from the road and the flows will be collected in new pipework laid in the base of the old channel before it is filled in. These pipes will be diverted to the flood culvert and not into the River Gade.

River flows and groundwater

36. How will river flows be affected? Will the new channel dry out?

The existing channel loses water through its bed due to its perched position to one side of the valley bottom.

We have identified a number of springs that discharge into the bed of the current river channel near the Queensway car park. Although this shows that there is a connection between the existing channel and the groundwater below in this location, the new channel through the valley bottom is likely to intersect more with its groundwater and the deculverted springs from the north east of the park. This should result in an improved, more natural flow. Flows will always be dependent on weather conditions each year, however, and how much rain falls each Winter.

We have carried out modelling to determine the likelihood of water losses once the new channel is complete. The modelling shows that water loss will be no worse than from the current channel, and the river would, to some extent, run dry in a range from 1 in 10 years to 1 in 20 years. The channel will need a period to 'bed in', and for the first 5-6 years following the project's completion, while sediment seals the bed, the river could potentially run dry once a year. A natural feature of chalk streams is that they on occasion run dry, again, depending upon weather conditions and rainfall.

37. What about abstraction by Water Companies? Will this affect flow in the river?

Prior to 2018 Affinity Water abstracted up to 20.5 million litres of water per day from two sites in the area; one upstream of Gadebridge Park and one downstream in the town. The water is not taken directly from the river, but from the groundwater which feeds the river.

Affinity Water agreed to voluntarily decrease their abstraction from 2018, reducing the total water abstracted from both sites by an average of 6.4 million litres per day, down to an average of 14.1 million litres per day. Once the redevelopment of the Civic centre is complete, a permanent change to the conditions of Affinity Water's abstraction licence will further reduce the water abstracted upstream of Gadebridge Park, while allowing for an increase downstream. This won't change the overall reduction in abstraction, but will mean significantly less water will be taken in the more sensitive upper reaches of the river, benefitting flows in the River Gade through Gadebridge Park.

38. What impact will the project have on water levels in the aquifer? If floodwater just flows back into the river then it won't filter down and recharge the aquifer?

Overall the project will not have a negative impact on aquifer recharge. The existing spring water culvert under the park will be intercepted and the flows that are currently lost to the River Gade upstream of Hemel new town will be restored to the river/ groundwater system in Gadebridge Park. This is likely to have a positive impact on water levels within the underlying aquifer, although small.

Trees

39. Why are you cutting down trees as part of your plans?

We have designed the new channel to avoid trees wherever possible, but we will need to remove two (possibly three) trees as part of its construction - one immature Lawson Cypress and one (possibly two) small Weeping Ash. One immature Cherry will be moved. We plan to plant additional trees to replace those that have been removed.

The trees we are removing are of limited ecological value – we will not be removing the dead Metasequoia or the Silver Birches within the Bury gardens.

We also plan to remove a small section of hedge on the left-hand bank of the river, around the Bury, in order to allow the River Gade to flow along the bottom of the valley and then into the culvert under the Queensway.

Footpaths

40. Will the footpaths be accessible?

The footpath on the right bank of the river will be a formal footpath of DDA (Disability Discrimination Act) standard.

41. Will the proposed paths be wide enough to accommodate both pedestrians and cyclists safely?

Our current plans include paths that are 1.2 metres wide, designed to be used by pedestrians and wheelchair users. The recommended width for a footpath for pedestrians, wheelchair users and cyclists is 2 metres. Footpaths including cyclists also require suitable lighting, signage and surface markings. We discussed this option with Dacorum Borough Council and our consultants Jeremy Benn Associates Ltd and agreed that the additional requirements necessary did not align with the project's objective to provide a more naturalised chalk stream environment. We will not therefore be changing the current plans. The current cycle path through the park will be upgraded separately by Dacorum Borough Council.

42. How will the footpath located between the river and Leighton Buzzard Road be accessed?

The footpath located between the new channel and Leighton Buzzard Road will be accessed at three locations – next to the White Bridge via the Gadebridge Lane carpark or underpass, via a bridge opposite the play areas and via the Queensway car park or footpath/bridge connection outside the Bowls Club.

Post-completion monitoring and maintenance

43. Who will maintain the new channel?

Dacorum Borough Council will continue to manage any required maintenance in the park, including the new river channel. This will be carried out in-line with an agreed maintenance plan. Following completion of the project, however, we expect there to be minimal maintenance required.

By restoring the river to a more natural state, we will improve flows and lessen the build-up of sediment and vegetation. We do not expect in-channel maintenance such as desilting to be needed following the project's completion.

The project completed by Affinity Water on the Upper Gadebridge Park reach of the river demonstrates that once the natural shape of the channel has been restored, there is less need for maintenance. The narrower, faster flowing channel has become self-sustaining - the river gravels are visible and silt deposition and plant growth is mostly limited to the margins.

44. How will the new Bowls Club bridge be maintained?

To be confirmed.

45. Is there a group I can join to help look after the park?

Yes, Friends of Gadebridge Park. For more information, contact Rob Cassidy at robert.cassidy@dacorum.gov.uk or phone 01442 228 853.

46. How will you monitor improvements?

We will track improvements made to the river from the restoration project by carrying out several monitoring programmes, including vegetation surveys, water quality monitoring, fisheries surveys and aquatic wildlife surveys.

We continue to carry out channel clearance on the River Gade, north of the White Bridge, to ensure our temporary monitoring weir collects optimal flow data. When the

project is complete, we will compare this data to flows recorded on the new gauging station on the realigned channel to track improvements in river flow.

During the summer months we hope to begin river fly surveys in the River Gade under the Junior River Wardens initiative, a scheme designed to involve and educate local schools on the importance of river health.

Impact on the park's existing services

47. Will utilities be affected?

No. There is a water main from the Queensway car park to the new kiosk and splash park which is at a depth of over 4 metres below the current ground level. Due to its depth, it will not be impacted by the project.

48. Will children's play areas be impacted?

No. The construction of the new channel will not restrict access to the play areas. The closest the river will be to the play area boundary is 35 metres.

Once the project is complete, flood waters will recede more quickly into the new channel. This means that flooding will have less of an impact on people's enjoyment of the park, including the play areas.

49. Will the construction of the new channel permanently remove any car parking spaces?

No - the new channel will not cut across any car parking spaces.

50. Will we still be able to use the car parks during construction? Will any spaces be used up by machinery etc?

You should be able to use the car parks, however we will need to place a construction compound somewhere. We will endeavour to avoid the car parking spaces when siting this, however the location for this has yet to be decided by the construction team. We will provide updated information as soon as we can.

Other

51. I have a question/concern about the restoration works that were completed north of the bridge. Who can I contact?

The restoration project north of the White Bridge is now complete and Dacorum Borough Council is responsible for the area's maintenance.

You can find out further information about the project at http://www.affinitywater.co.uk/corporate/environment/restoration/river-gade. To ask a question about the area now, including its maintenance, please contact Dacorum Borough Council at robert.cassidy@dacorum.gov.uk.

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